installation, start-up and service instructions

SINGLE PACKAGE ROOFTOP GAS HEATING/ELECTRIC COOLING UNITS

580F
Dura*Pac* Series
Sizes 090-151
$7^1/_2$ to $12^1/_2$ Tons

Cancels: II 580F-90-2

II 580F-90-3
2/1/04

IMPORTANT — READ BEFORE INSTALLING

1. Read and become familiar with these installation instructions before installing this unit. (See Fig. 1A and 1B.)
2. Be sure the installation conforms to all applicable local and national codes.
3. These instructions contain important information for the proper maintenance and repair of this equipment. Retain these instructions for future use.

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 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.

⚠ **CAUTION:** Ensure voltage listed on unit data plate agrees with electrical supply provided for the unit.

⚠ **WARNING:** Disconnect gas piping from unit when leak testing at pressure greater than $^1/_2$ psig. Pressures greater than $^1/_2$ psig will cause gas valve damage resulting in hazardous condition. If gas valve is ever subjected to pressure greater than $^1/_2$ psig, it *must* be replaced before use. When pressure testing field-supplied gas piping at pressures of $^1/_2$ psig or less, a unit connected to such piping must be isolated by manually closing the gas valve(s).

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

INSTALLATION

Unit is shipped in the vertical discharge configuration. To convert to horizontal configuration, remove screws from side duct opening covers and remove covers. Using the same screws, install covers on vertical duct openings with the insulation side down. Seals around duct openings must be tight. See Fig. 2.

Confirm before installation of unit that voltage, amperage and circuit protection requirements listed on unit data plate agree with power supply provided.

I. STEP 1 — PROVIDE UNIT SUPPORT

A. Roof Curb

Assemble and install accessory roof curb in accordance with instructions shipped with curb. See Fig. 3. Install insulation, cant strips, roofing felt, and counter flashing as shown. *Ductwork must be attached to curb.* If gas or electrical connections are to be routed through the curb, attach the accessory thru-the-curb service connection plate to the roof curb in accordance with the accessory installation instructions. Connections must be installed before unit is set on roof curb.

IMPORTANT: The gasketing of the unit to the roof curb is critical for a watertight seal. Install gasket supplied with the roof curb as shown in Fig. 3. Improperly applied gasket can also result in air or water leaks and poor unit performance.

Curb should be level. Unit leveling tolerances are shown in Fig. 4. This is necessary for unit drain to function properly. Refer to Accessory Roof Curb Installation Instructions for additional information as required.

If gas or electrical connections are to be routed through the bottom of the unit, attach accessory thru-the-bottom service connections to the basepan in accordance with the accessory installation instructions.

UNIT	STD. UNIT WEIGHT		ECONOMI$ER+ WEIGHT		VERT. ECON+ W/ P.E. WEIGHT		CORNER WEIGHT (A)		CORNER WEIGHT (B)		CORNER WEIGHT (C)		CORNER WEIGHT (D)		"H"		"J"		"K"		"L"	
	LB	KG	LB	KG	LB	KG	LB	KG	LB	KG	LB	KG	LB	KG	FT - IN.	MM	FT - IN.	MM	FT - IN.	MM	FT - IN.	MM
580F090	870	395	75	34.1	145	65.9	189	86	161	73	239	109	280	127	1'-2 7/8"	632	3'-5 5/16"	1050	2'-9 11/16"	856	2'-2 7/16"	672
580F102	880	399	↓	↓	↓	↓	191	87	163	74	242	110	284	129	3'-3 7/8"	1013	3'-5 5/16"	1050	2'-9 11/16"	856	2'-2 7/16"	672
580F120	1035	469	↓	↓	↓	↓	225	102	192	87	285	129	333	151	2'-5 7/8"	759	4'-1 5/16"	1253	3'-0 3/8"	924	2'-10 7/16"	875
580F150	1050	476	↓	↓	↓	↓	228	103	195	88	289	131	338	153	1'-2 7/8"	378	4'-1 5/16"	1253	3'-0 3/8"	924	2'-10 7/16"	875

NOTES:

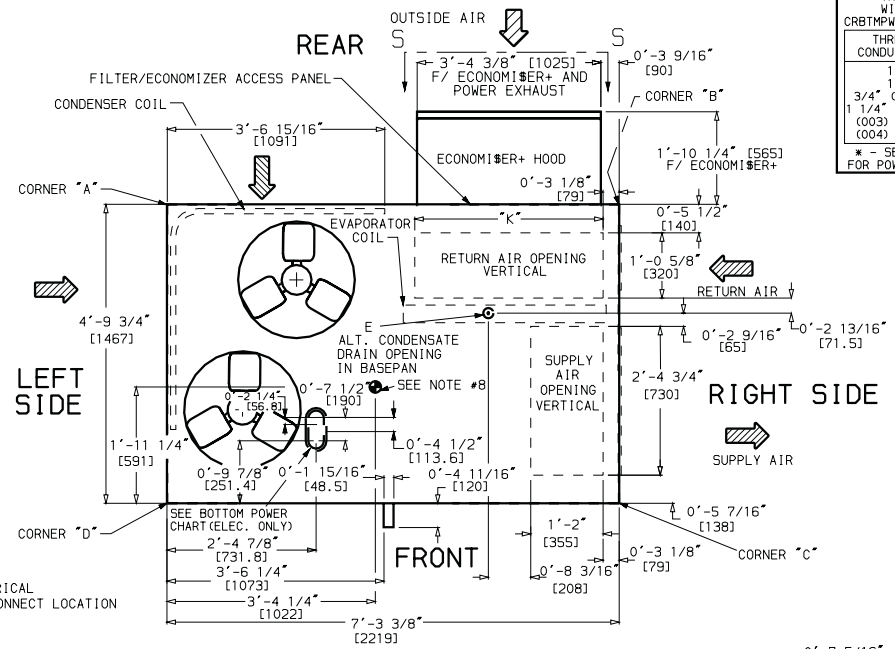
1. DIMENSIONS IN [ ] ARE IN MILLIMETERS.
2. ⊕ CENTER OF GRAVITY.
3. ⇒ DIRECTION OF AIR FLOW.
4. ON VERTICAL DISCHARGE UNITS, DUCTWORK TO BE ATTACHED TO ACCESSORY ROOF CURB ONLY. FOR HORIZONTAL DISCHARGE UNITS FIELD SUPPLIED FLANGES SHOULD BE ATTACHED TO HORIZONTAL DISCHARGE OPENINGS, AND ALL DUCTWORK SHOULD BE ATTACHED TO THE FLANGES.
5. MINIMUM CLEARANCE (LOCAL CODES OR JURISDICTION MAY PREVAIL):
   a. BETWEEN UNIT, FLUE SIDE AND COMBUSTIBLE SURFACES, 48 INCHES. 18 INCHES WHEN USING ACCESSORY FLUE DISCHARGE DEFLECTOR.
   b. BOTTOM OF UNIT TO COMBUSTIBLE SURFACES (WHEN NOT USING CURB) 1 INCH.
      BOTTOM OF BASE RAIL TO COMBUSTIBLE SURFACES (WHEN NOT USING CURB) 0 INCHES.
   c. CONDENSER COIL, FOR PROPER AIR FLOW, 36 INCHES ONE SIDE, 12 INCHES THE OTHER. THE SIDE GETTING THE GREATER CLEARANCE IS OPTIONAL.
   d. OVERHEAD, 60 INCHES TO ASSURE PROPER CONDENSER FAN OPERATION.
   e. BETWEEN UNITS, CONTROL BOX SIDE, 42 IN. PER NEC.
   f. BETWEEN UNIT AND UNGROUNDED SURFACES, CONTROL BOX SIDE, 36 IN. PER NEC.
   g. BETWEEN UNIT AND BLOCK OR CONCRETE WALLS AND OTHER GROUNDED SURFACES, CONTROL BOX SIDE, 42 IN. PER NEC.
   h. HORIZONTAL SUPPLY AND RETURN END, 0 INCHES WHEN THE ALTERNATE CONDENSATE DRAIN IS USED.
6. WITH THE EXCEPTION OF THE CLEARANCE FOR THE CONDENSER COIL AND COMBUSTION SIDE AS STATED IN NOTE #5a, b, AND c, A REMOVABLE FENCE OR BARRICADE REQUIRES NO CLEARANCE.
7. UNITS MAY BE INSTALLED ON COMBUSTIBLE FLOORS MADE FROM WOOD OR CLASS A, B, OR C ROOF COVERING MATERIAL IF SET ON BASE RAIL.
8. THE VERTICAL CENTER OF GRAVITY IS 1'-7" [483] FOR 090 AND 102, 1'-11" [584] FOR 120 AND 150 UP FROM THE BOTTOM OF THE BASE RAIL.

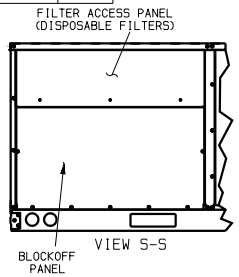
	CONNECTION SIZES
A	1 3/8" DIA. [35] FIELD POWER SUPPLY HOLE
B	2 1/2"DIA [64] POWER SUPPLY KNOCK-OUT
C	1 3/4"DIA [44] CHARGING PORT HOLE
D	7/8" DIA. [22] FIELD CONTROL WIRING HOLE
E	3/4"-14 NPT CONDENSATE DRAIN
F	1/2"-14 NPT GAS CONN. - 580F090 & 102 - 125 HEAT 3/4"-14 NPT GAS CONN. - 580F090 TO 120 - 180 HEAT, 580F090 TO 150 - 224 HEAT, 580F120 & 150 - 250 HEAT
G	2" DIA [51] POWER SUPPLY KNOCK-OUT

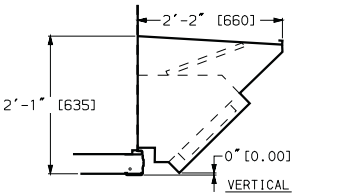
BOTTOM POWER CHART:
THESE HOLES REQ'D FOR USE WITH ACCESSORY PACKAGES - CRBTMPWR001A01, 2A01, 3A01, OR 4A01

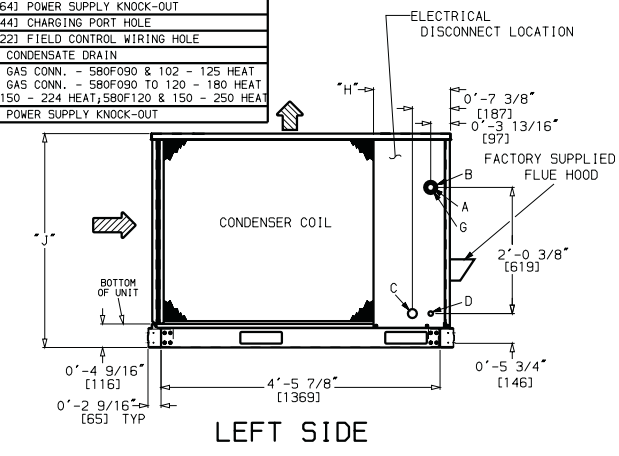
THREADED CONDUIT SIZE	WIRE USE	REQ'D HOLE SIZES (MAX.)
1/2"	ACC.	7/8" [22.2]
1/2"	24V	7/8" [22.2]
3/4" (001,003)	POWER*	1 1/8" [28.4]
1 1/4" (002,004)	POWER*	1 3/4" [44.4]
(003) 1/2" FPT	GAS	1 1/4" [31.8]
(004) 3/4" FPT	GAS	1 5/8" [41.3]

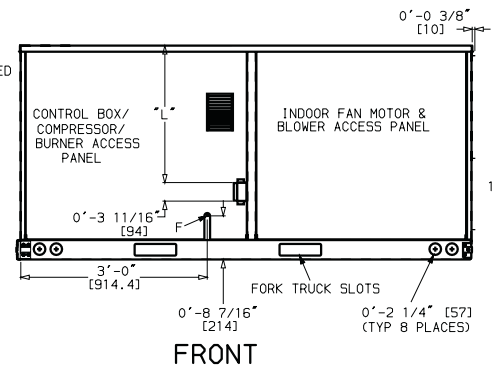
* - SELECT EITHER 3/4" OR 1 1/4" FOR POWER, DEPENDING ON WIRE SIZE.











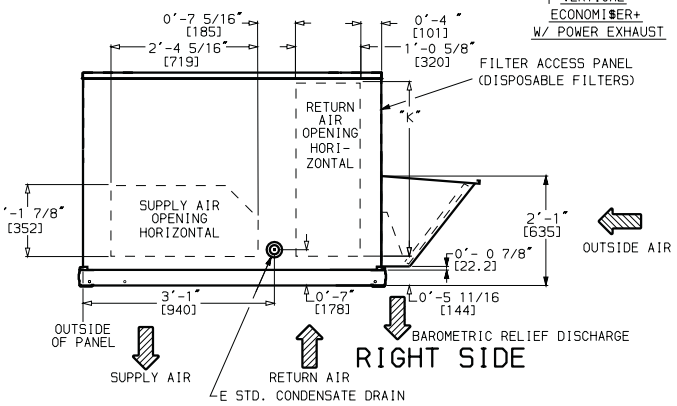


Fig. 1A — Base Unit Dimensions — 580F090,102,120,150

UNIT	STD. UNIT WEIGHT		ECONOMI$ER+ WEIGHT		VERT. ECON+ W/ P.E. WEIGHT		CORNER WEIGHT (A)		CORNER WEIGHT (B)		CORNER WEIGHT (C)		CORNER WEIGHT (D)		"H"		"J"		"K"		"L"	
	LB	KG	LB	KG	LB	KG	LB	KG	LB	KG	LB	KG	LB	KG	FT -IN.	MM	FT -IN.	MM	FT -IN.	MM	FT -IN.	MM
580F091	870	395	75	34.1	145	65.9	189	86	161	73	239	109	280	127	1'-2 7/8"	378	3'-5 5/16"	1050	2'-9 11/16"	856	2'-2 7/16"	672
580F103	880	399	↓	↓	↓	↓	191	87	163	74	242	110	284	129	3'-3 7/8"	1013	3'-5 5/16"	1050	2'-9 11/16"	856	2'-2 7/16"	672
580F121	1035	469	↓	↓	↓	↓	225	102	192	87	285	129	333	151	2'-5 7/8"	759	4'-1 5/16"	1253	3'-0 3/8"	924	2'-10 7/16"	875
580F151	1050	476	↓	↓	↓	↓	228	103	195	88	289	131	338	153	1'-2 7/8"	378	4'-1 5/16"	1253	3'-0 3/8"	924	2'-10 7/16"	875

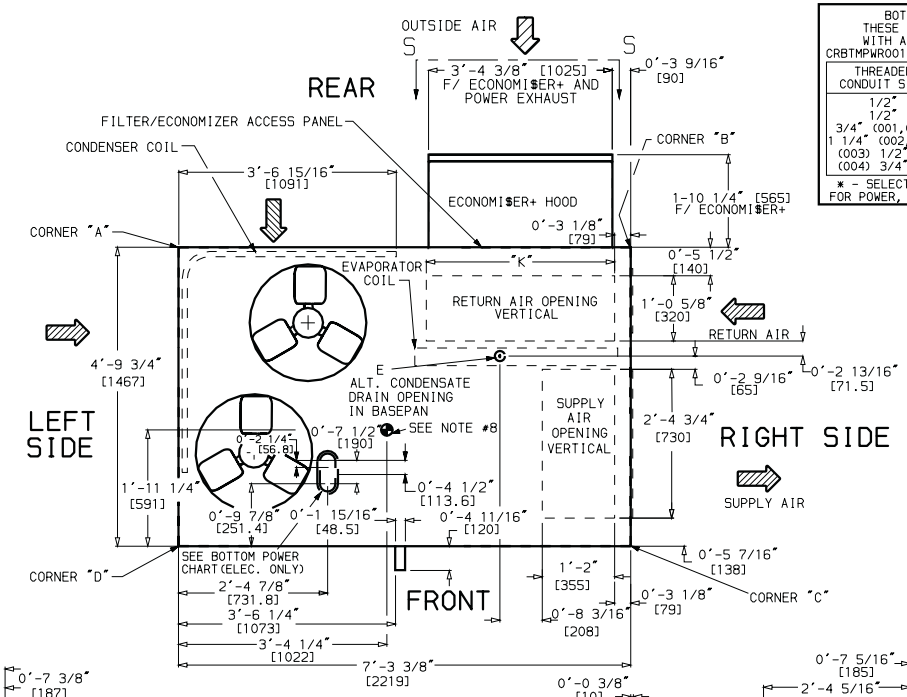
NOTES:
1. DIMENSIONS IN [ ] ARE IN MILLIMETERS.
2. ⊕ CENTER OF GRAVITY.
3. ⇒ DIRECTION OF AIR FLOW.
4. ON VERTICAL DISCHARGE UNITS, DUCTWORK TO BE ATTACHED TO ACCESSORY ROOF CURB ONLY. FOR HORIZONTAL DISCHARGE UNITS FIELD SUPPLIED FLANGES SHOULD BE ATTACHED TO HORIZONTAL DISCHARGE OPENINGS, AND ALL DUCTWORK SHOULD BE ATTACHED TO THE FLANGES.
5. MINIMUM CLEARANCE (LOCAL CODES OR JURISDICTION MAY PREVAIL):
   a. BETWEEN UNIT, FLUE SIDE AND COMBUSTIBLE SURFACES, 48 INCHES. 18" WHEN USING ACCESSSORY FLUE DISCHARGE DEFLECTOR.
   b. BOTTOM OF UNIT TO COMBUSTIBLE SURFACES (WHEN NOT USING CURB) 1 INCH.
      BOTTOM OF BASE RAIL TO COMBUSTIBLE SURFACES (WHEN NOT USING CURB) 0 INCHES 18 INCHES WHEN USING ACCESSORY FLUE DISCHARGE DEFLECTOR.
   c. CONDENSER COIL. FOR PROPER AIR FLOW, 36 INCHES ONE SIDE, 12 INCHES THE OTHER. THE SIDE GETTING THE GREATER CLEARANCE IS OPTIONAL.
   d. OVERHEAD, 60 INCHES TO ASSURE PROPER CONDENSER FAN OPERATION.
   e. BETWEEN UNITS, CONTROL BOX SIDE, 42 IN. PER NEC.
   f. BETWEEN UNIT AND UNGROUNDED SURFACES, CONTROL BOX SIDE, 36 IN. PER NEC.
   g. BETWEEN UNIT AND BLOCK OR CONCRETE WALLS AND OTHER GROUNDED SURFACES, CONTROL BOX SIDE, 42 IN. PER NEC.
   h. HORIZONTAL SUPPLY AND RETURN END, 0 INCHES WHEN THE ALTERNATE CONDENSATE DRAIN IS USED.
6. WITH THE EXCEPTION OF THE CLEARANCE FOR THE CONDENSER COIL AND COMBUSTION SIDE AS STATED IN NOTE #5a, b, AND c, A REMOVABLE FENCE OR BARRICADE REQUIRES NO CLEARANCE.
7. UNITS MAY BE INSTALLED ON COMBUSTIBLE FLOORS MADE FROM WOOD OR CLASS A, B, OR C ROOF COVERING MATERIAL IF SET ON BASE RAIL.
8. THE VERTICAL CENTER OF GRAVITY IS 1'-7" [483] FOR 091 AND 103, 1'-11 [584] FOR 121 AND 151 UP FROM THE BOTTOM OF THE BASE RAIL.

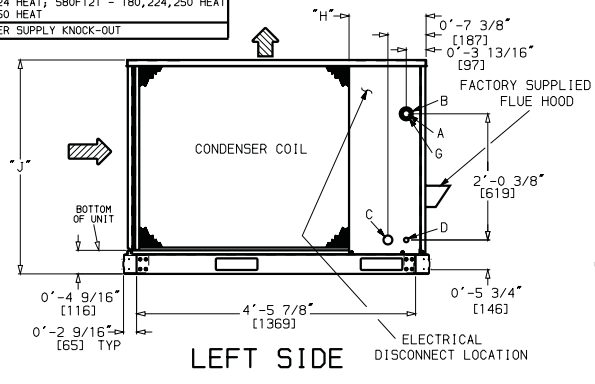
	CONNECTION SIZES
A	1 3/8" DIA. [35] FIELD POWER SUPPLY HOLE
B	2 1/2" DIA [64] POWER SUPPLY KNOCK-OUT
C	1 3/4" DIA [44] CHARGING PORT HOLE
D	7/8" DIA. [22] FIELD CONTROL WIRING HOLE
E	3/4"-14 NPT CONDENSATE DRAIN
F	1/2"-14 NPT GAS CONN. 580F091 - 125 HEAT 3/4"-14 NPT GAS CONN. 580F091 - 180,224 HEAT, 580F121 - 180,224,250 HEAT 580F151 - 224,250 HEAT
G	2" DIA [51] POWER SUPPLY KNOCK-OUT

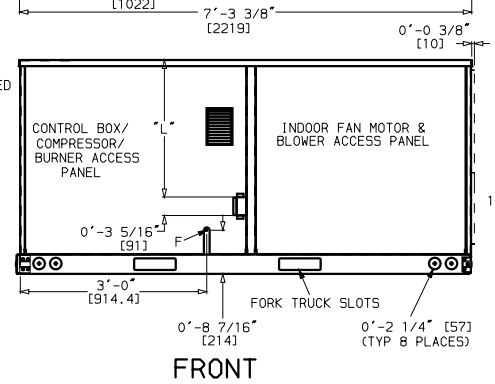
BOTTOM POWER CHART:
THESE HOLES REQ'D FOR USE WITH ACCESSORY PACKAGES - CRBTMPWR001A01, 2A01, 3A01, OR 4A01

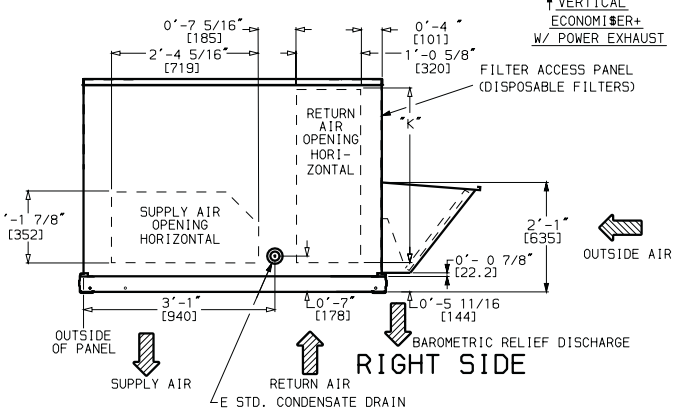
THREADED CONDUIT SIZE	WIRE USE	REQ'D HOLE SIZES (MAX.)
1/2"	ACC.	7/8" [22.2]
1/2"	24V	7/8" [22.2]
3/4" (001,003)	POWER*	1 1/8" [28.4]
1 1/4" (002,004)	POWER*	1 3/4" [44.4]
(003) 1/2"FPT	GAS	1 1/4" [31.8]
(004) 3/4"FPT	GAS	1 5/8" [41.3]

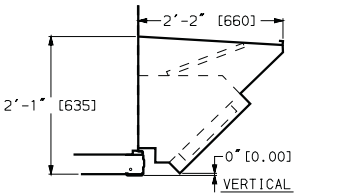
* - SELECT EITHER 3/4" OR 1 1/4" FOR POWER, DEPENDING ON WIRE SIZE.











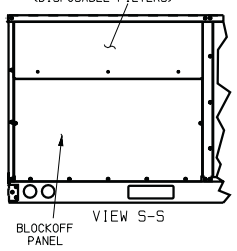


Fig. 1B — Base Unit Dimensions — 580F091,103,121,151

B. Alternate Unit Support

When the curb or adapter cannot be used, support unit with sleepers using unit curb or adapter support area. If sleepers cannot be used, support long sides of unit with a minimum of three 4-in. x 4-in. pads, two at the corners and one at the unit's center of gravity. If more than 3 pads are used, equally space them along the side.

C. Slab Mount (Horizontal Units Only)

Provide a level concrete slab that extends a minimum of 6 in. beyond unit cabinet. Install a 6-in. gravel apron in front of condenser coil air inlet to prevent grass and foliage from obstructing airflow.

NOTE: Horizontal units may be installed on a roof curb if required.

II. STEP 2 — FIELD FABRICATE DUCTWORK

Secure all ducts to roof curb and building structure on vertical units. *Do not connect ductwork to unit.* For horizontal applications, field-supplied flanges should be attached to horizontal discharge openings and all ductwork secured to the flanges. 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.

If a plenum return is used on a vertical unit, the return should be ducted through the roof deck to comply with applicable fire codes.

A minimum clearance is not required around ductwork. Cabinet return-air static shall not exceed –.30 in. wg with EconoMi$er+ or .45 in. wg without economizer.

These units are designed for a minimum heating operation continuous return-air temperature of 50 F (dry bulb), or an intermittent operation down to 45 F (dry bulb), such as when used with a night set-back thermostat.

To operate at lower return air temperatures, a field-supplied outdoor-air temperature control must be used to initiate both stages of heat when the temperature is below 45 F. Indoor comfort may be compromised when these lower air temperatures are used with insufficient heating temperature rise.

III. STEP 3 — INSTALL EXTERNAL TRAP FOR CONDENSATE DRAIN

The unit's $^3/_4$-in. condensate drain connections are located on the bottom and side of the unit. Unit discharge connections do not determine the use of drain connections; either drain connection can be used with vertical or horizontal applications.

When using the standard side drain connection, make sure the plug (Red) in the alternate bottom connection is tight before installing the unit.

To use the bottom drain connection for a roof curb installation, relocate the factory-installed plug (Red) from the bottom connection to the side connection. See Fig. 5A. The piping for the condensate drain and external trap can be completed after the unit is in place.

All units must have an external trap for condensate drainage. Install a trap a minimum of 4-in. deep and protect against freeze-up. If drain line is installed downstream from the external trap, pitch the line away from the unit at 1 in. per 10 ft of run. Do not use a pipe size smaller than the unit connection ($^3/_4$ in.). See Fig. 5B.

The center drain plug looks like a star connection, however it can be removed with a $^1/_2$ in. socket drive extension.

IV. STEP 4 — RIG AND PLACE UNIT

Inspect unit for transportation damage. File any claim with transportation agency. Keep unit upright and do not drop. Spreader bars are not required if top crating is left on unit. Rollers may be used to move unit across a roof. Level by using unit frame as a reference. See Tables 1A and 1B and Fig. 6 for additional information. Operating weight is shown in Table 1 and Fig. 6.

Lifting holes are provided in base rails as shown in Fig. 1 and 6. Refer to rigging instructions on unit.

⚠ **CAUTION:** All panels must be in place when rigging and lifting.

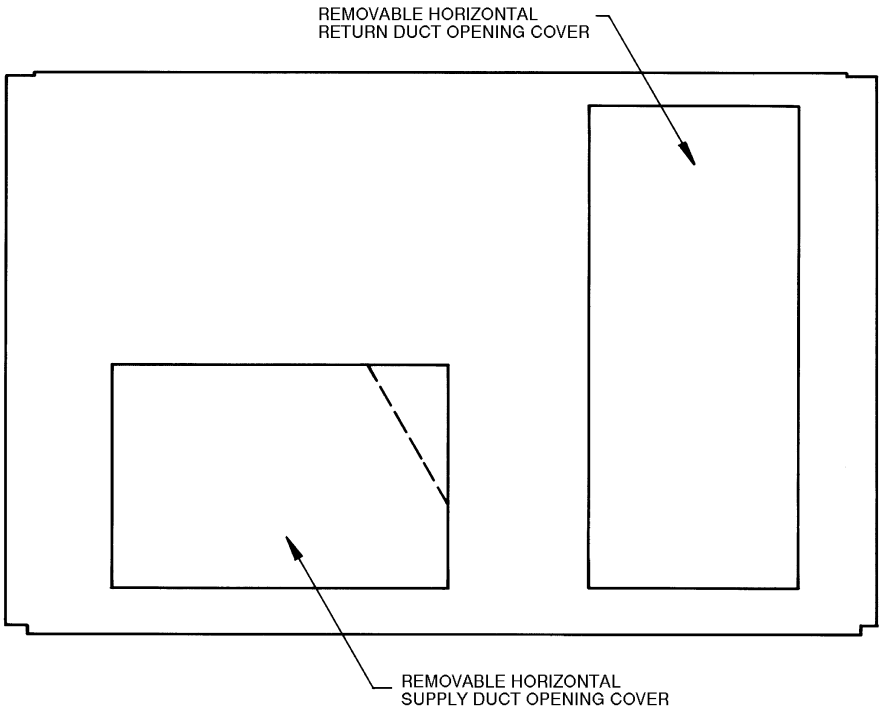


Fig. 2 — Horizontal Conversion Panels

CONNECTOR PKG. ACCY.	B	C	D ALT DRAIN HOLE	GAS	POWER	CONTROL	ACCESSORY POWER
CRBTMPWR001A01	2′-8 7/16″ [827]	1′-10 15/16″ [583]	1 3/4″ [44.5]	3/4″ [19] NPT	3/4″ [19] NPT	1/2″ [12.7] NPT	1/2″ [12.7] NPT
CRBTMPWR002A01					1 1/4″ [31.7]		
CRBTMPWR003A01				1/2″ [12.7] NPT	3/4″ [19] NPT		
CRBTMPWR004A01				3/4″ [19] NPT	1 1/4″ [31.7]		

ROOF CURB ACCESSORY	"A"	UNIT SIZE
CRRFCURB003A01	1′-2″ [356]	580F 090-151
CRRFCURB004A01	2′-0″ [610]	

NOTES:
1. Roof curb accessory is shipped disassembled.
2. Insulated panels: 1-in. thick polyurethane foam, 1 3/4 lb density.
3. Dimensions in [ ] are in millimeters.
4. Roof curb: 16-gage steel.
5. Attach ductwork to curb (flanges of duct rest on curb).
6. Service clearance 4 ft on each side.
7. Direction of airflow.
8. Connector packages CRBTMPWR001A01 and 2A01 are for thru-the-curb gas type. Packages CRBTMPWR003A01 and 4A01 are for thru-the-bottom type gas connections.

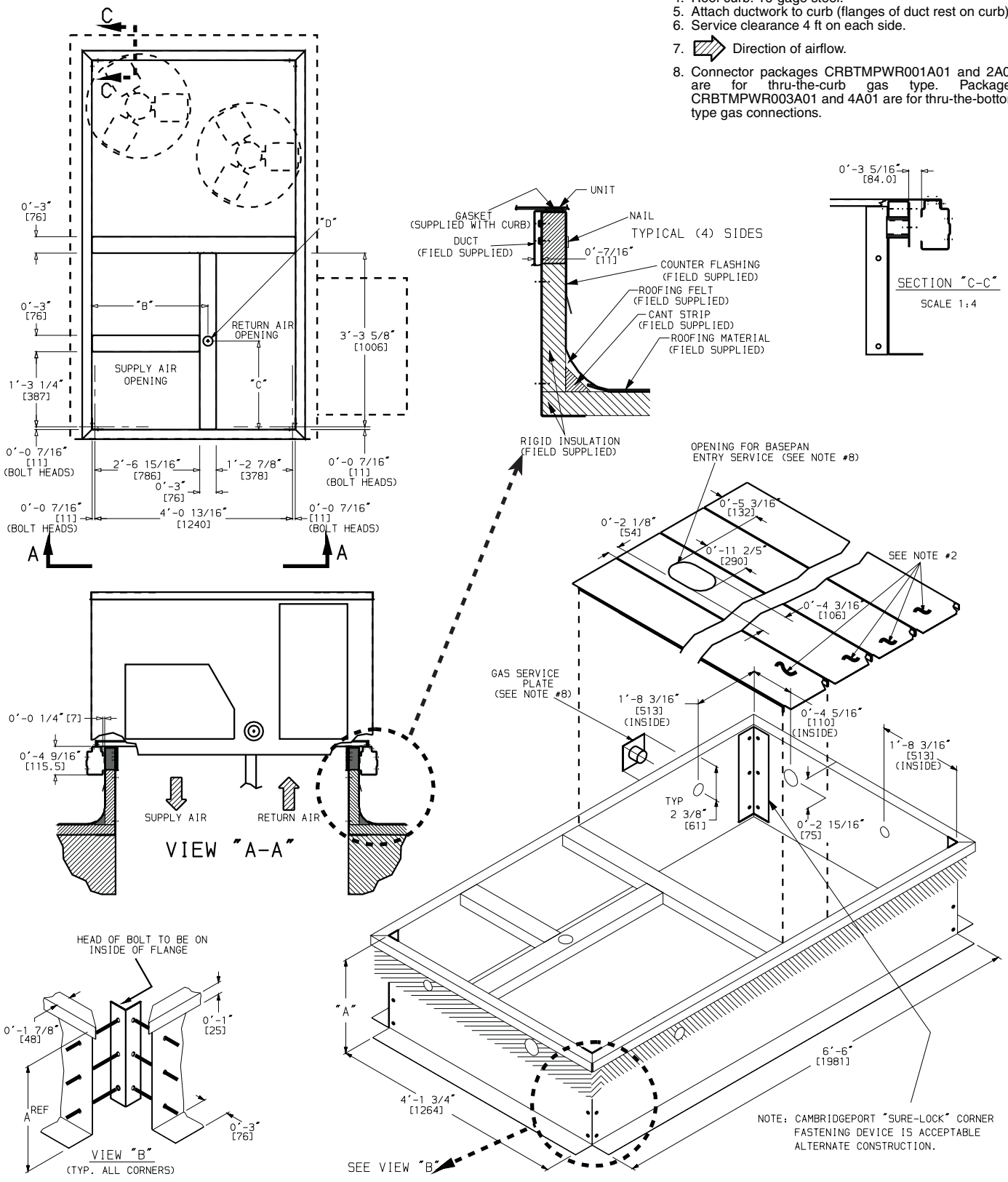
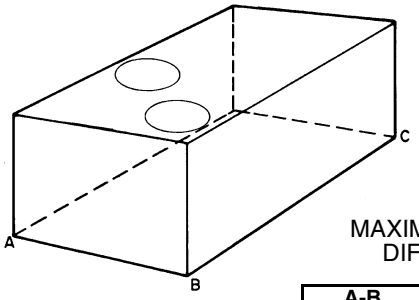


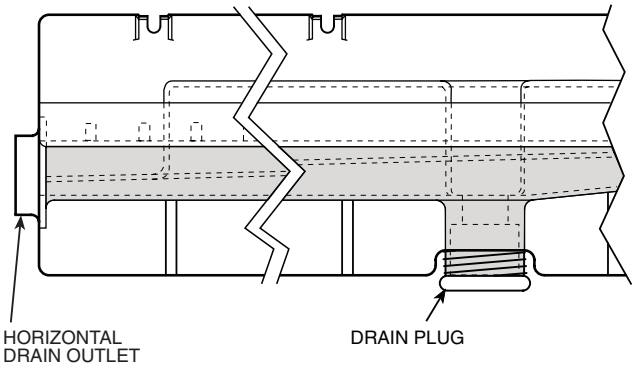
Fig. 3 — Roof Curb Details



MAXIMUM ALLOWABLE DIFFERENCE (in.)

A-B	B-C	A-C
0.5	1.0	1.0

Fig. 4 — Unit Leveling Tolerances



NOTE: Drain plug is shown in factory-installed position.

Fig. 5A — Condensate Drain Pan (Side View)

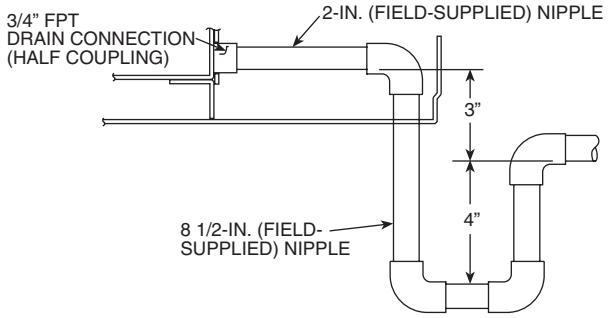


Fig. 5B — Condensate Drain Piping Details

A. Positioning

Maintain clearance around and above unit to provide minimum distance from combustible materials, proper airflow, and service access. See Fig. 1A and 1B Notes.

Do not install unit in an indoor location. Do not locate unit air inlets near exhaust vents or other sources of contaminated air.

Be sure that unit is installed so that snow will not block the combustion intake or flue outlet.

Unit may be installed directly on wood flooring or on Class A, B, or C roof-covering material when roof curb is used.

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

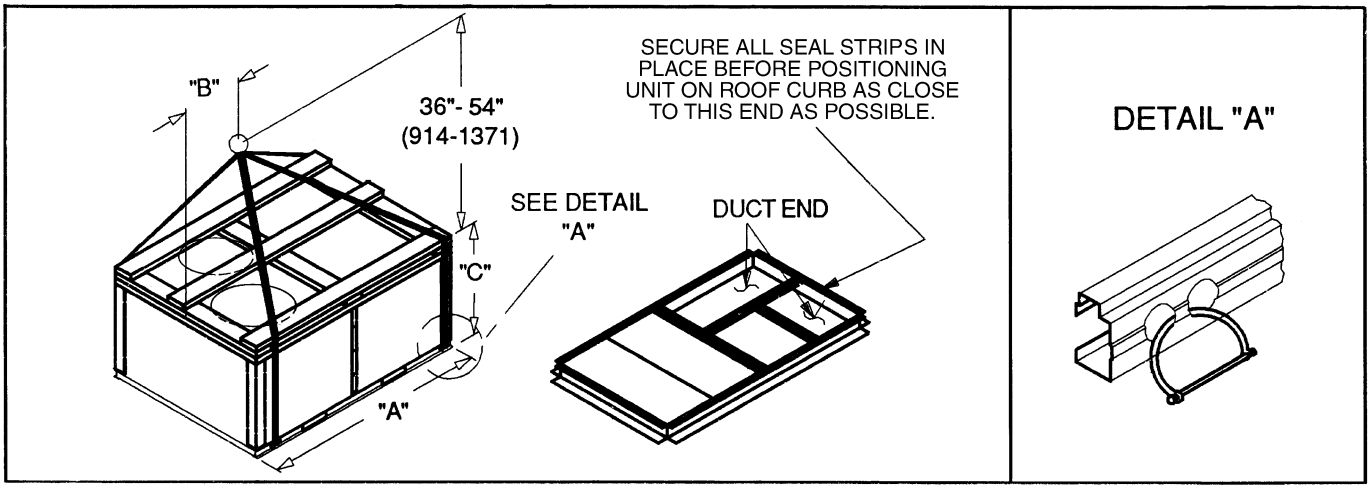
Position unit on roof curb so that the following clearances are maintained: $^1/_4$-in. clearance between roof curb and base rails on each side and duct end of unit; $3^5/_{16}$-in. clearance between roof curb and condenser section end. (See Fig. 3, section C-C.)

Locate mechanical draft system flue assembly at least 48 in. from an adjacent building or combustible material. When unit is located adjacent to public walkways, flue assembly must be at least 7 ft above grade.

Flue vent discharge must have a minimum horizontal clearance of 48 in. from electric and gas meters, gas regulators, and gas relief equipment.

Flue gas can deteriorate building materials. Orient unit so that flue gas will not affect building materials.

Adequate combustion-air space must be provided for proper operation of this equipment. Be sure that installation complies with all local codes and Section 5.3, Air for Combustion and Ventilation, NFGC (National Fuel Gas Code), ANSI (American National Standards Institute) Z223.1-latest year and addendum Z223.1A-latest year. In Canada, installation must be in accordance with the CAN1. B149.1 and CAN1.B149.2 installation codes for gas burning appliances.



NOTES:

1. Dimension in ( ) is in millimeters.
2. Hook rigging shackles through holes in base rail as shown in detail "A." Holes in base rails are centered around the unit center of gravity. Use wooden top skid when rigging to prevent rigging straps from damaging unit.
3. Weights include base unit without economizer. See Table 1 for economizer weights.

⚠ **CAUTION:** All panels must be in place when rigging.

UNIT	OPERATING WEIGHT		DIMENSIONS					
			"A"		"B"		"C"	
	lb	kg	in.	mm	in.	mm	in.	mm
580F090,091	870	395	87.38	2219	40.25	1022	41.31	1050
580F102,103	880	399	87.38	2219	40.25	1022	41.31	1050
580F120,121	1035	469	87.38	2219	40.25	1022	49.31	1253
580F150,151	1050	476	87.38	2219	40.25	1022	49.31	1253

Fig. 6 — Rigging Details

Table 1A — Physical Data (580F090, 102, 120, 150 Units)

UNIT SIZE 580F		090	102	120	150
NOMINAL CAPACITY (tons)		7 1/2	8 1/2	10	12 1/2
OPERATING WEIGHT (lb)					
Unit					
Al/Al*		870	880	1035	1050
Al/Cu*		881	896	1057	1077
Cu/Cu*		893	907	1080	1100
Economizer					
EconoMi$er+		75	75	75	75
Roof Curb†		143	143	143	143
COMPRESSOR		Reciprocating	Reciprocating	Reciprocating	Scroll
Quantity		2	2	2	2
No. Cylinders (per Circuit)		2	2	2	—
Oil (oz)		42 ea	65 ea	54 ea	54 ea
REFRIGERANT TYPE		R-22			
Expansion Device		Fixed Orifice Metering Device			
Operating Charge (lb-oz)					
Circuit 1		4-13	6-14	7- 3	8-10
Circuit 2		4-14	9- 2	7-13	8- 6
CONDENSER COIL		Enhanced Copper Tubes, Aluminum Lanced Fins			
Rows...Fins/in.		1...17	2...17	2...17	2...17
Total Face Area (sq ft)		20.50	18.00	20.47	25.00
CONDENSER FAN		Propeller Type			
Nominal Cfm		6400	6400	7000	7000
Quantity...Diameter (in.)		2...22	2...22	2...22	2...22
Motor Hp...Rpm		1/4...1100	1/4...1100	1/4...1100	1/4...1100
Watts Input (Total)		600	600	600	600
EVAPORATOR COIL		Enhanced Copper Tubes, Aluminum Double-Wavy Fins, Face Split			
Rows...Fins/in.		3...15	3...15	3...15	4...15
Total Face Area (sq ft)		8.0	8.0	10.0	11.1
EVAPORATOR FAN		Centrifugal Type			
Quantity...Size (in.)	Std	1...15 x 15	1...15 x 15	1...15 x 15	1...15 x 15
	Alt	1...15 x 15	—	1...15 x 15	1...15 x 15
	High-Static	1...15 x 15	1...15 x 15	1...15 x 15	—
Type Drive	Std	Belt	Belt	Belt	Belt
	Alt	Belt	—	Belt	Belt
	High-Static	Belt	Belt	Belt	—
Nominal Cfm		3000	3100	4000	5000
Maximum Continuous Bhp	Std	2.40	2.40	2.40	3.70
	Alt	2.40	—	2.90	5.25
	High-Static	3.70	3.70	5.25	—
Motor Frame Size	Std	56	56	56	56
	Alt	56	—	56	56
	High-Static	56	56	56	—
Fan Rpm Range	Std	590-840	685-935	685-935	860-1080
	Alt	685-935	—	835-1085	830-1130
	High-Static	860-1080	860-1080	830-1130	—
Motor Bearing Type		Ball	Ball	Ball	Ball
Maximum Allowable Rpm		2100	2100	2100	2100
Motor Pulley Pitch Diameter Min/Max (in.)	Std	2.4/3.4	2.8/3.8	2.8/3.8	4.0/5.0
	Alt	2.8/3.8	—	3.4/4.4	3.1/4.1
	High-Static	4.0/5.0	4.0/5.0	2.8/3.8	—
Nominal Motor Shaft Diameter (in.)	Std	5/8	5/8	5/8	7/8
	Alt	1/2	—	7/8	7/8
	High-Static	7/8	7/8	7/8	—
Fan Pulley Pitch Diameter (in.)	Std	7.0	7.0	7.0	8.0
	Alt	7.0	—	7.0	5.9
	High-Static	8.0	8.0	5.8	—
Belt, Quantity...Type...Length (in.)	Std	1...A...49	1...A...49	1...A...49	1...A...52
	Alt	1...A...49	—	1...A...49	1...BX...46
	High-Static	1...A...55	1...A...55	1...BX...46	—
Pulley Center Line Distance (in.)	Std	16.75-19.25	16.75-19.25	15.85-17.50	15.85-17.50
	Alt	16.75-19.25	—	15.85-17.50	15.85-17.50
	High-Static	16.75-19.25	16.75-19.25	15.85-17.50	—
Speed Change per Full Turn of Movable Pulley Flange (rpm)	Std	50	50	50	44
	Alt	50	—	50	50
	High-Static	60	60	60	—
Movable Pulley Maximum Full Turns From Closed Position	Std	5	5	5	5
	Alt	5	—	5	6
	High-Static	5	5	6	—
Factory Setting	Std	5	5	5	5
	Alt	5	—	5	5
	High-Static	5	5	5	—
Factory Speed Setting (rpm)	Std	590	685	685	860
	Alt	685	—	835	887
	High-Static	860	860	887	—
Fan Shaft Diameter at Pulley (in.)		1	1	1	1

LEGEND

Al — Aluminum
Bhp — Brake Horsepower
Cu — Copper

*Evaporator coil fin material/condenser coil fin material. Contact your local representative for details about coated fins.

†Weight of 14-in. roof curb.
**Rollout switch lockout is manually reset by interrupting power to unit or resetting thermostat.

NOTE: High-static motor not available on size 150 and 151 units.

Table 1A — Physical Data (580F090, 102, 120, 150 Units) (cont)

UNIT SIZE 580F			090	102	120	150
FURNACE SECTION						
Rollout Switch Cutout Temp (F)**			195	195	195	195
Burner Orifice Diameter (in. ...drill size)						
Natural Gas	Std	LOW	.120...31	.120...31	.120...31	.120...31
		MED	.120...31	.120...31	.120...31	.129...30
		HIGH	.120...31	.120...31	.129...30	—
Liquid Propane	Alt	LOW	.096...41	.096...41	.096...41	.096...41
		MED	.096...41	.096...41	.096...41	.102...38
		HIGH	.096...41	.096...41	.102...38	—
Thermostat Heat Anticipator Setting (amps)						
208/230 v and 575 Stage 1			.14	.14	.14	.14
208/230 v and 575 Stage 2			.20	.20	.20	.20
460 v Stage 1			.14	.14	.14	.14
460 v Stage 2			.20	.20	.20	.20
Gas Input (Btuh) Stage 1		LOW	125,000	125,000	120,000	180,000
		MED	120,000	120,000	180,000	200,000
		HIGH	180,000	180,000	200,000	—
Stage 2		LOW	—	—	180,000	220,000
		MED	180,000	180,000	220,000	250,000
		HIGH	220,000	220,000	250,000	—
Efficiency (Steady State) (%)			80	80	80	80
Temperature Rise Range		LOW	20-50	20-50	35-65	35-65
		MED	35-65	35-65	35-65	40-70
		HIGH	45-75	45-75	40-70	—
Manifold Pressure (in. wg)						
Natural Gas	Std		3.5	3.5	3.5	3.5
Liquid Propane	Alt		3.5	3.5	3.5	3.5
Gas Valve Quantity			1	1	1	1
Gas Valve Pressure Range						
Psig			0.180-0.487	0.180-0.487	0.180-0.487	0.180-0.487
in. wg			5.0-13.5	5.0-13.5	5.0-13.5	5.0-13.5
Field Gas Connection Size (in.)		LOW	1/2	1/2	3/4	3/4
		MED	3/4	3/4	3/4	3/4
		HIGH	3/4	3/4	3/4	—
HIGH-PRESSURE SWITCH (psig)						
Standard Compressor			450 ± 50			500 ± 50
Internal Relief (Differential)						
Cutout			428			428
Reset (Auto.)			320			320
LOSS-OF-CHARGE (LOW-PRESSURE) SWITCH (psig)						
Cutout			7 ± 3			
Reset (Auto.)			22 ± 7			
FREEZE PROTECTION THERMOSTAT (F)						
Opens			30 ± 5			
Closes			45 ± 5			
OUTDOOR-AIR INLET SCREENS			Cleanable. Screen size and quantity varies by option selected.			
RETURN-AIR FILTERS			Throwaway			
Quantity...Size (in.)			4...16 x 20 x 2	4...16 x 20 x 2	4...20 x 20 x 2	4...20 x 20 x 2

LEGEND

Al — Aluminum
Bhp — Brake Horsepower
Cu — Copper

*Evaporator coil fin material/condenser coil fin material. Contact your local representative for details about coated fins.

†Weight of 14-in. roof curb.
**Rollout switch lockout is manually reset by interrupting power to unit or resetting thermostat.

NOTE: High-static motor not available on size 150 and 151 units.

Table 1B — Physical Data (580F091, 103, 121, 151 [ASHRAE 90.1-1999 Compliant Units])

UNIT SIZE 580F		091	103	121	151
NOMINAL CAPACITY (tons)		7 1/2	8 1/2	10	12 1/2
OPERATING WEIGHT (lb)					
Unit					
Al/Al*		870	880	1035	1050
Al/Cu*		881	896	1057	1077
Cu/Cu*		893	907	1080	1100
Economizer					
EconoMi$er+		75	75	75	75
Roof Curb†		143	143	143	143
COMPRESSOR		Reciprocating	Scroll	Scroll	Scroll
Quantity		2	2	2	2
No. Cylinders (per Circuit)		2	2	2	2
Oil (oz) (each compressor)		42	53	50	60
REFRIGERANT TYPE		R-22			
Expansion Device		Fixed Orifice Metering Device			
Operating Charge (lb-oz)					
Circuit 1		7-10	7-14	8-10	9-8
Circuit 2		8-2	8-5	8-8	9-5
CONDENSER COIL		Enhanced Copper Tubes, Aluminum Lanced Fins			
Rows...Fins/in.		2...17	2...17	2...17	2...17
Total Face Area (sq ft)		20.50	20.50	25.00	25.00
CONDENSER FAN		Propeller Type			
Nominal Cfm		6500	6500	7000	7000
Quantity...Diameter (in.)		2...22	2...22	2...22	2...22
Motor Hp...Rpm		1/4...1100	1/4...1100	1/4...1100	1/4...1100
Watts Input (Total)		650	650	650	650
EVAPORATOR COIL		Enhanced Copper Tubes, Aluminum Double-Wavy Fins, Face Split			
Rows...Fins/in.		3...15	3...15	3...15	4...15
Total Face Area (sq ft)		8.9	8.9	10.0	11.1
EVAPORATOR FAN		Centrifugal Type			
Quantity...Size (in.)	Std	1...15 x 15	1...15 x 15	1...15 x 15	1...15 x 15
	Alt	1...15 x 15	—	1...15 x 15	1...15 x 15
	High-Static	1...15 x 15	1...15 x 15	1...15 x 15	—
Type Drive	Std	Belt	Belt	Belt	Belt
	Alt	Belt	—	Belt	Belt
	High-Static	Belt	Belt	Belt	—
Nominal Cfm		2900	3000	3200	5000
Maximum Continuous Bhp	Std	2.40	2.40	2.40	3.70
	Alt	2.40	—	2.90	5.25
	High-Static	3.70	3.70	5.25	—
Motor Frame Size	Std	56	56	56	56
	Alt	56	—	56	56
	High-Static	56	56	56	—
Fan Rpm Range	Std	590-840	685-935	685-935	860-1080
	Alt	685-935	—	835-1085	830-1130
	High-Static	860-1080	860-1080	830-1130	—
Motor Bearing Type		Ball	Ball	Ball	Ball
Maximum Allowable Rpm		2100	2100	2100	2100
Motor Pulley Pitch Diameter Min/Max (in.)	Std	2.4/3.4	2.8/3.8	2.8/3.8	4.0/5.0
	Alt	2.8/3.8	—	3.4/4.4	3.1/4.1
	High-Static	4.0/5.0	4.0/5.0	2.8/3.8	—
Nominal Motor Shaft Diameter (in.)	Std	5/8	5/8	5/8	7/8
	Alt	5/8	—	7/8	7/8
	High-Static	7/8	7/8	7/8	—
Fan Pulley Pitch Diameter (in.)	Std	7.0	7.0	7.0	8.0
	Alt	7.0	—	7.0	5.9
	High-Static	8.0	8.0	5.8	—
Belt, Quantity...Type...Length (in.)	Std	1...A...49	1...A...49	1...A...49	1...A...52
	Alt	1...A...49	—	1...A...49	1...BX...46
	High-Static	1...A...55	1...A...55	1...BX...46	—
Pulley Center Line Distance (in.)	Std	16.75-19.25	16.75-19.25	15.85-17.50	15.85-17.50
	Alt	16.75-19.25	—	15.85-17.50	15.85-17.50
	High-Static	16.75-19.25	16.75-19.25	15.85-17.50	—
Speed Change per Full Turn of Movable Pulley Flange (rpm)	Std	50	50	50	44
	Alt	50	—	50	50
	High-Static	60	60	60	—
Movable Pulley Maximum Full Turns From Closed Position	Std	5	5	5	5
	Alt	5	—	5	6
	High-Static	5	5	6	—
Factory Setting	Std	5	5	5	5
	Alt	5	—	5	5
	High-Static	5	5	5	—
Factory Speed Setting (rpm)	Std	590	685	685	860
	Alt	685	—	835	887
	High-Static	860	860	887	—
Fan Shaft Diameter at Pulley (in.)		1	1	1	1

LEGEND

Al — Aluminum
Bhp — Brake Horsepower
Cu — Copper

*Evaporator coil fin material/condenser coil fin material. Contact your local representative for details about coated fins.

†Weight of 14-in. roof curb.
**Rollout switch lockout is manually reset by interrupting power to unit or resetting thermostat.

NOTE: High-static motor not available on size 150 and 151 units.

Table 1B — Physical Data (580F091, 103, 121, 151 [ASHRAE 90.1-1999 Compliant Units]) (cont)

UNIT SIZE 580F			091	103	121	151
FURNACE SECTION						
Rollout Switch Cutout Temp (F)**			195	195	195	195
Burner Orifice Diameter (in. ...drill size)						
Natural Gas	Std	LOW	.120...31	.120...31	.120...31	.120...31
		MED	.120...31	.120...31	.120...31	.129...30
		HIGH	.120...31	.120...31	.129...30	—
Liquid Propane	Alt	LOW	.096...41	.096...41	.096...41	.096...41
		MED	.096...41	.096...41	.096...41	.102...38
		HIGH	.096...41	.096...41	.102...38	—
Thermostat Heat Anticipator Setting (amps)						
208/230 v and 575 Stage 1			.14	.14	.14	.14
Stage 2			.20	.20	.20	.20
460 v Stage 1			.14	.14	.14	.14
Stage 2			.20	.20	.20	.20
Gas Input (Btuh) Stage 1		LOW	125,000	125,000	120,000	180,000
		MED	120,000	120,000	180,000	200,000
		HIGH	180,000	180,000	200,000	—
Stage 2		LOW	—	—	180,000	220,000
		MED	180,000	180,000	220,000	250,000
		HIGH	220,000	220,000	250,000	—
Efficiency (Steady State) (%)			80	80	80	80
Temperature Rise Range		LOW	20-50	20-50	35-65	35-65
		MED	35-65	35-65	35-65	40-70
		HIGH	45-75	45-75	40-70	—
Manifold Pressure (in. wg)						
Natural Gas	Std		3.5	3.5	3.5	3.5
Liquid Propane	Alt		3.5	3.5	3.5	3.5
Gas Valve Quantity			1	1	1	1
Gas Valve Pressure Range						
Psig			0.180-0.487	0.180-0.487	0.180-0.487	0.180-0.487
in. wg			5.0-13.5	5.0-13.5	5.0-13.5	5.0-13.5
Field Gas Connection Size (in.)		LOW	1/2	1/2	3/4	3/4
		MED	3/4	3/4	3/4	3/4
		HIGH	3/4	3/4	3/4	—
HIGH-PRESSURE SWITCH (psig)						
Standard Compressor			450 ± 50			500 ± 50
Internal Relief (Differential)						
Cutout			428			428
Reset (Auto.)			320			320
LOW-PRESSURE SWITCH (psig)						
Cutout			7 ± 3			
Reset (Auto.)			22 ± 7			
FREEZE PROTECTION THERMOSTAT (F)						
Opens			30 ± 5			
Closes			45 ± 5			
OUTDOOR-AIR INLET SCREENS			Cleanable. Screen size and quantity varies by option selected.			
RETURN-AIR FILTERS			Throwaway			
Quantity...Size (in.)			4...16 x 20 x 2	4...16 x 20 x 2	4...20 x 20 x 2	4...20 x 20 x 2

LEGEND

Al — Aluminum
Bhp — Brake Horsepower
Cu — Copper

*Evaporator coil fin material/condenser coil fin material. Contact your local representative for details about coated fins.

†Weight of 14-in. roof curb.
**Rollout switch lockout is manually reset by interrupting power to unit or resetting thermostat.

NOTE: High-static motor not available on size 150 and 151 units.

V. STEP 5 — INSTALL FLUE HOOD

Flue hood is shipped screwed to the burner compartment access panel. Remove from shipping location and, using screws provided, install flue hood and screen in location shown in Fig. 7.

VI. STEP 6 — INSTALL GAS PIPING

Unit is equipped for use with type of gas shown on nameplate. Refer to local building codes, or in the absence of local codes, to ANSI Z223.1-latest year and addendum Z223.1A-latest year entitled National Fuel Gas Code. In Canada, installation must be in accordance with the CAN1.B149.1 and CAN1.B149.2 installation codes for gas burning appliances when installing gas piping.

For natural gas applications, gas pressure at unit gas connection must not be less than 4.0 in. wg (5.0 in. wg in high heat units) or greater than 13.0 in. wg while unit is operating. For liquid propane applications, the pressure must not be less than 5.0 in. wg or greater than 13.0 in. wg at the unit connection.

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

⚠ **CAUTION:** When installing gas piping to gas valve inlet, use properly sized back-up wrench on inlet flange flats to prevent valve damage.

Support gas piping as shown in the table in Fig. 8. For example, a $^3/_4$-in. gas pipe must have one field-fabricated support beam every 8 ft.

See Fig. 8 for typical pipe guide and locations of external manual gas shutoff valve.

NOTE: If field-installed thru-the-bottom connections are used, refer to the accessory installation instructions for power wiring and gas connections. Refer to Fig. 1A and 1B for drilling holes in basepan.

VII. STEP 7 — MAKE ELECTRICAL CONNECTIONS

⚠ **WARNING:** Unit cabinet must have an uninterrupted, unbroken electrical ground to minimize the possibility of personal injury if an electrical fault should occur. This ground may consist of electrical wire connected to unit ground lug in control compartment, or conduit approved for electrical ground when installed in accordance with NEC (National Electrical Code), ANSI/NFPA (National Fire Protection Association), latest edition, and local electrical codes. *Do not use gas piping as an electrical ground.* Failure to follow this warning could result in the installer being liable for personal injury of others.

A. Field Power Supply

All units except 208/230-v units are factory wired for the voltage shown on the nameplate. If the 208/230-v unit is to be connected to a 208-v power supply, the transformer *must* be rewired by moving the black wire from the 230-v $^1/_4$-in. male spade terminal on the transformer and connecting it to the 208-v $^1/_4$-in. male spade terminal from the transformer.

Refer to unit label diagram for additional information. Pigtails are provided for field service.

When installing units, provide a disconnect per NEC. Use copper conductors only when splice connectors are used.

All field wiring must comply with NEC and local requirements. In Canada, electrical connections must be in accordance with CSA (Canadian Standards Association) C22.1 Canadian Electrical Code Part One.

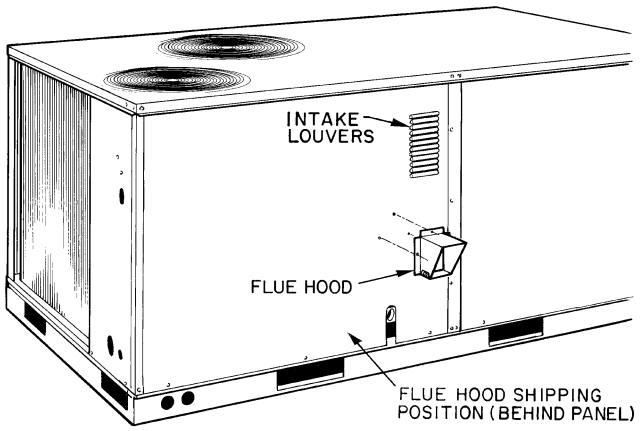
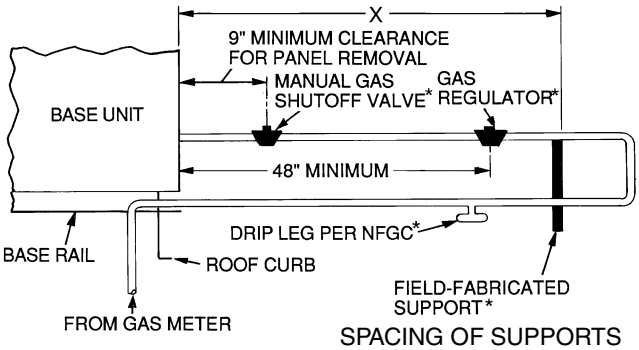


Fig. 7 — Flue Hood Details



LEGEND

NFGC — National Fuel Gas Code

*Field supplied.

NOTE: Follow all local codes.

SPACING OF SUPPORTS

STEEL PIPE NOMINAL DIAMETER (in.)	X DISTANCE (feet)
$^1/_2$	6
$^3/_4$ or 1	8
$1^1/_4$ or larger	10

Fig. 8 — Gas Piping Guide (With Accessory Thru-the-Curb Service Connections)

Install conduit through side panel openings indicated in Fig. 1A and 1B. Route power lines through connector to terminal connections as shown in Fig. 9.

On 3-phase units, voltages between phases must be balanced within 2% and the current within 10%. Use the formula shown in Tables 2A and 2B, Note 2 to determine the percentage of voltage imbalance. Operation on improper line voltage or excessive phase imbalance constitutes abuse and may cause damage to electrical components. Such operation would invalidate any applicable Bryant warranty.

NOTE: If field-installed thru-the-bottom connections are used, refer to the accessory installation instructions for power wiring and gas connections. Refer to Fig. 1A and 1B for drilling holes in basepan.

B. Field Control Wiring

Install a Bryant-approved accessory thermostat assembly according to installation instructions included with the accessory. Locate thermostat assembly on a solid wall in the conditioned space to sense average temperature in accordance with thermostat installation instructions.

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 to the thermostat and will require a junction box and splice at the thermostat.

Route thermostat cable or equivalent single leads of colored wire from thermostat subbase terminals to low-voltage connections on unit (shown in Fig. 10) as described in Steps 1-4 below.

If unit is mounted on roof curb and accessory thru-the-curb service plate connection is used, route wire through connection plate.

Pass control wires through the hole provided on unit (see connection D in Connection Sizes table in Fig. 1A and 1 B).

Feed wires through the raceway built into the corner post to the 24-v barrier located on the left side of the control box. See Fig. 11. The raceway provides the UL-required (Underwriters' Laboratories) clearance between high- and low-voltage wiring.

Connect thermostat wires to screw terminals on low-voltage connection board.

C. Heat Anticipator Settings

Set heat anticipator settings at .14 amp for the first stage and .20 amp for second-stage heating.

Table 2A — Electrical Data (Without Convenience Outlet)

UNIT 580F	NOMINAL VOLTAGE	IFM TYPE	VOLTAGE RANGE		COMPR (ea)			OFM (ea)			IFM	COMBUSTION FAN MOTOR FLA	POWER SUPPLY*		DISCONNECT SIZE†	
			Min	Max	Qty	RLA	LRA	Qty	Hp	FLA	FLA		MCA	MOCP**	FLA	LRA
090 (7 1/2 Tons)	208/230-3-60	Std	187	254	2	14.0	91.0	2	1/4	1.4	5.8	.6	40.1/40.1	45/45	42/42	229/229
		Alt									5.8		40.1/40.1	45/45	42/42	229/229
		High									10.6		44.9/44.9	50/50	48/48	273/273
	460-3-60	Std	414	508	2	6.4	42.0	2	1/4	0.7	2.6	.3	18.4	20	19	108
		Alt									2.6		18.4	20	19	108
		High									4.8		20.6	25	22	130
	575-3-60	Std	518	632	2	5.2	39.0	2	1/4	0.7	2.6	.3	14.9	20	16	97
		Alt									2.6		14.9	20	16	97
		High									4.8		16.7	20	18	114
091 (7 1/2 Tons)	208/230-3-60	Std	187	254	2	14.0	91.0	2	1/4	1.4	5.8	.6	40.1/40.1	45/45	42/42	229/229
		Alt									5.8		40.1/40.1	45/45	42/42	229/229
		High									10.6		44.9/44.9	50/50	48/48	273/273
	460-3-60	Std	414	508	2	6.4	42.0	2	1/4	0.7	2.6	.3	18.4	20	19	108
		Alt									2.6		18.4	20	19	108
		High									4.8		20.6	25	22	130
	575-3-60	Std	518	632	2	5.2	39.0	2	1/4	0.7	2.6	.3	14.9	20	16	97
		Alt									2.6		14.9	20	16	97
		High									4.8		16.7	20	18	114
102 (8 1/2 Tons)	208/230-3-60	Std	187	254	2	16.0	137.0	2	1/4	1.4	5.8	.6	44.6/44.6	50/50	47/47	321/321
		High									10.6		49.4/49.4	60/60	52/52	365/365
	460-3-60	Std	414	508	2	8.3	69.0	2	1/4	0.7	2.6	.3	22.7	25	24	162
		High									4.8		24.9	30	26	184
	575-3-60	Std	518	632	2	6.4	58.0	2	1/4	0.7	2.6	.3	17.6	20	18	135
		High									4.8		19.4	25	20	152
103 (8 1/2 Tons)	208/230-3-60	Std	187	254	2	17.3***	120.0***	2	1/4	1.4	5.8	.6	44.3/44.3	50/50	46/46	272/272
		High									10.6		49.1/49.1	60/60	52/52	316/316
	460-3-60	Std	414	508	2	7.9***	70.0***	2	1/4	0.7	2.6	.3	21.0	25	22	149
		High									4.8		23.2	30	24	171
	575-3-60	Std	518	632	2	5.5***	50.0***	2	1/4	0.7	2.6	.3	16.7	20	17	109
		High									4.8		18.5	25	19	126
120 (10 Tons)	208/230-3-60	Std	187	254	2	15.8	130.0	2	1/4	1.4	5.8	.6	44.2/44.2	50/50	46/46	307/307
		Alt									7.5		45.9/45.9	50/50	48/48	326/326
		High									15.0		53.4/53.4	60/60	57/57	374/374
	460-3-60	Std	414	508	2	7.9	64.0	2	1/4	0.7	2.6	.3	21.8	25	23	152
		Alt									3.4		22.6	25	24	191
		High									7.4		26.6	30	28	185
	575-3-60	Std	518	632	2	6.6	52.0	2	1/4	0.7	2.6	.3	18.1	25	19	123
		Alt									3.4		18.7	25	20	155
		High									7.4		21.9	30	23	150
121 (10 Tons)	208/230-3-60	Std	187	254	2	16.0	125.0	2	1/4	1.4	5.8	.6	44.6/44.6	50/50	47/47	297/297
		Alt									7.5		46.3/46.3	60/60	49/49	316/316
		High									15.0		53.4/53.4	60/60	57/57	374/374
	460-3-60	Std	414	508	2	8.0	62.5	2	1/4	0.7	2.6	.3	22.0	25	24	188
		Alt									3.4		22.8	25	24	191
		High									7.4		26.8	30	29	182
	575-3-60	Std	518	632	2	6.3	50.0	2	1/4	0.7	2.6	.3	17.4	20	18	119
		Alt									3.4		18.0	20	19	151
		High									7.4		21.2	25	23	146
150 (12 1/2 Tons)	208/230-3-60	Std	187	254	2	23.0	146.0	2	1/4	1.4	10.6	.6	65.2/65.2	80/80††	68/68	383/383
		Alt									15.0		69.6/69.6	80/80††	73/73	406/406
	460-3-60	Std	414	508	2	10.4	73.0	2	1/4	0.7	4.8	.3	29.6	40	31	192
		Alt									7.4		32.2	45	34	203
	575-3-60	Std	518	632	2	8.3	58.4	2	1/4	0.7	4.8	.3	23.6	30	25	154
		Alt									7.4		25.7	30	27	162
151 (12 1/2 Tons)	208/230-3-60	Std	187	254	2	19.0	156.0	2	1/4	1.4	10.6	.6	56.2/56.2	70/70††	59/59	359/359
		Alt									15.0		60.6/60.6	70/70††	64/64	378/378
	460-3-60	Std	414	508	2	9.0	75.0	2	1/4	0.7	4.8	.3	26.5	30	28	174
		Alt									7.4		29.1	35	31	213
	575-3-60	Std	518	632	2	7.4	54.0	2	1/4	0.7	4.8	.3	21.6	25	23	127
		Alt									7.4		23.7	30	25	159

LEGEND AND NOTES FOR TABLES 2A AND 2B

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

*The values listed in this table do not include power exhaust. See table below for power exhaust requirements.
†Used to determine minimum disconnect per NEC.
**Fuse or HACR circuit breaker.
††Fuse only.
***Compressor no. 1 data indicated in table.
208/230-3-60: Compressor no. 2 RLA is 14.1 amps and LRA is 105 amps.
460-3-60: Compressor no. 2 RLA is 7.1 amps and LRA is 55 amps.
575-3-60: Compressor no. 2 RLA is 6.4 amps and LRA is 40 amps.

POWER EXHAUST ELECTRICAL DATA

POWER EXHAUST PART NO.	MCA (230 v)	MCA (460 v)	MCA (575 v)	MOCP (for separate power source)
CRPWREXH021A00	N/A	0.9	N/A	15
CRPWREXH022A00	3.3	N/A	1.32	15
CRPWREXH023A00	N/A	1.8	N/A	15
CRPWREXH024A00	1.6	N/A	0.64	15
CRPWREXH025A00	N/A	0.9	N/A	15
CRPWREXH026A00	3.3	N/A	1.32	15
CRPWREXH027A00	N/A	1.8	N/A	15
CRPWREXH028A00	1.7	N/A	0.68	15
CRPWREXH029A00	N/A	1.0	N/A	15
CRPWREXH030A00	1.6	N/A	0.64	15

N/A — Not available

NOTE: If a single power source is to be used, size wire to include power exhaust MCA and MOCP. Must be in accordance with NEC or local codes.

Check MCA and MOCP when power exhaust is powered through the unit. Determine the new MCA including the power exhaust using the following formula:

MCA New = MCA unit only + MCA of Power Exhaust

For example, using a 580FPV090 unit with MCA = 40.1 and MOCP = 45, with CRPWREXH030A00 power exhaust.

MCA New = 40.1 amps + 1.6 amps = 41.7 amps

If the new MCA does not exceed the published MOCP, then MOCP would not change. The MOCP in this example is 45 amps and the MCA New is below 45; therefore the MOCP is acceptable. If "MCA New" is larger than the published MOCP, raise the MOCP to the next larger size. For separate power, the MOCP for the power exhaust will be 15 amps per NEC.

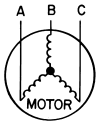
NOTES:

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.

Table 2B — Electrical Data (With Convenience Outlet)

UNIT 580F	NOMINAL VOLTAGE	IFM TYPE	VOLTAGE RANGE		COMPR (ea)			OFM (ea)			IFM	COMBUSTION FAN MOTOR FLA	POWER SUPPLY*		DISCONNECT SIZE†	
			Min	Max	Qty	RLA	LRA	Qty	Hp	FLA	FLA		MCA	MOCP**	FLA	LRA
090 (7 1/2 Tons)	208/230-3-60	Std	187	254	2	14.0	91.0	2	1/4	1.4	5.8	.6	46.1/46.1	50/50	48/48	233/233
		Alt									5.8		46.1/46.1	50/50	48/48	233/233
		High									10.6		50.9/50.9	60/60	53/53	273/273
	460-3-60	Std	414	508	2	6.4	42.0	2	1/4	0.7	2.6	.3	24.1	25	22	110
		Alt									2.6		24.1	25	22	110
		High									4.8		23.3	30	24	132
	575-3-60	Std	518	632	2	5.2	39.0	2	1/4	0.7	2.6	.3	20.9	25	18	99
		Alt									2.6		20.9	25	18	99
		High									4.8		19.4	25	20	117
091 (7 1/2 Tons)	208/230-3-60	Std	187	254	2	14.0	91.0	2	1/4	1.4	5.8	.6	44.9/44.9	50/50	48/48	234/234
		Alt									5.8		44.9/44.9	50/50	48/48	234/234
		High									10.6		49.7/49.7	60/60	53/53	277/277
	460-3-60	Std	414	508	2	6.4	42.0	2	1/4	0.7	2.6	.3	20.6	25	22	110
		Alt									2.6		20.6	25	22	110
		High									4.8		22.8	30	24	132
	575-3-60	Std	518	632	2	5.2	39.0	2	1/4	0.7	2.6	.3	16.6	20	18	99
		Alt									2.6		16.6	20	18	99
		High									4.8		18.4	20	20	116
102 (8 1/2 Tons)	208/230-3-60	Std	187	254	2	16.0	137.0	2	1/4	1.4	5.8	.6	50.6/50.6	60/60	52/52	325/325
		High									10.6		55.4/55.4	60/60	58/58	369/369
	460-3-60	Std	414	508	2	8.3	69.0	2	1/4	0.7	2.6	.3	25.4	30	26	164
		High									4.8		27.6	35	29	138
	575-3-60	Std	518	632	2	6.4	58.0	2	1/4	0.7	2.6	.3	20.3	25	20	137
		High									4.8		22.1	30	22	155
103 (8 1/2 Tons)	208/230-3-60	Std	187	254	2	17.3***	120.0***	2	1/4	1.4	5.8	.6	49.1/49.1	60/60	52/52	277/277
		High									10.6		53.9/53.9	60/60	57/57	320/320
	460-3-60	Std	414	508	2	7.9***	70.0***	2	1/4	0.7	2.6	.3	23.2	30	24	151
		High									4.8		25.4	30	27	173
	575-3-60	Std	518	632	2	5.5***	50.0***	2	1/4	0.7	2.6	.3	18.4	25	19	111
		High									4.8		20.2	25	21	128
120 (10 Tons)	208/230-3-60	Std	187	254	2	15.8	130.0	2	1/4	1.4	5.8	.6	50.2/50.2	60/60	52/52	311/311
		Alt									7.5		51.9/51.9	60/60	54/54	330/330
		High									15.0		59.4/59.4	70/70††	62/62	378/378
	460-3-60	Std	414	508	2	7.9	64.0	2	1/4	0.7	2.6	.3	27.8	30	25	154
		Alt									3.4		25.3	30	26	193
		High									7.4		29.3	35	31	187
	575-3-60	Std	518	632	2	6.6	52.0	2	1/4	0.7	2.6	.3	24.1	25	21	109
		Alt									3.4		24.7	25	22	141
		High									7.4		24.6	30	25	136
121 (10 Tons)	208/230-3-60	Std	187	254	2	16.0	125.0	2	1/4	1.4	5.8	.6	49.4/49.4	60/60	52/52	302/302
		Alt									7.5		51.9/51.9	60/60	54/54	321/321
		High									15.0		58.6/58.6	70/70††	63/63	369/369
	460-3-60	Std	414	508	2	8.0	62.5	2	1/4	0.7	2.6	.3	24.2	30	26	151
		Alt									3.4		25.0	30	26	190
		High									7.4		29.0	35	31	184
	575-3-60	Std	518	632	2	6.3	50.0	2	1/4	0.7	2.6	.3	19.1	25	20	121
		Alt									3.4		19.7	25	21	152
		High									7.4		22.9	25	25	148
150 (12 1/2 Tons)	208/230-3-60	Std	187	254	2	23.0	146.0	2	1/4	1.4	10.6	.6	71.2/71.2	80/80††	74/74	387/387
		Alt									15.0		75.6/75.6	80/80††	79/79	410/410
	460-3-60	Std	414	508	2	10.4	73.0	2	1/4	0.7	4.8	.3	35.6	40	34	194
		Alt									7.4		34.9	40	37	205
	575-3-60	Std	518	632	2	8.3	58.4	2	1/4	0.7	4.8	.3	29.6	35	27	156
		Alt									7.4		31.7	35	29	165
151 (12 1/2 Tons)	208/230-3-60	Std	187	254	2	19.0	156.0	2	1/4	1.4	10.6	.6	61.0/61.0	70/70††	65/65	364/364
		Alt									15.0		65.4/65.4	80/80††	70/70	383/383
	460-3-60	Std	414	508	2	9.0	75.0	2	1/4	0.7	4.8	.3	28.7	35	30	176
		Alt									7.4		31.3	35	33	215
	575-3-60	Std	518	632	2	8.3	58.4	2	1/4	0.7	4.8	.3	23.3	30	25	129
		Alt									7.4		25.4	30	27	160

See Legend and Notes on page 14.

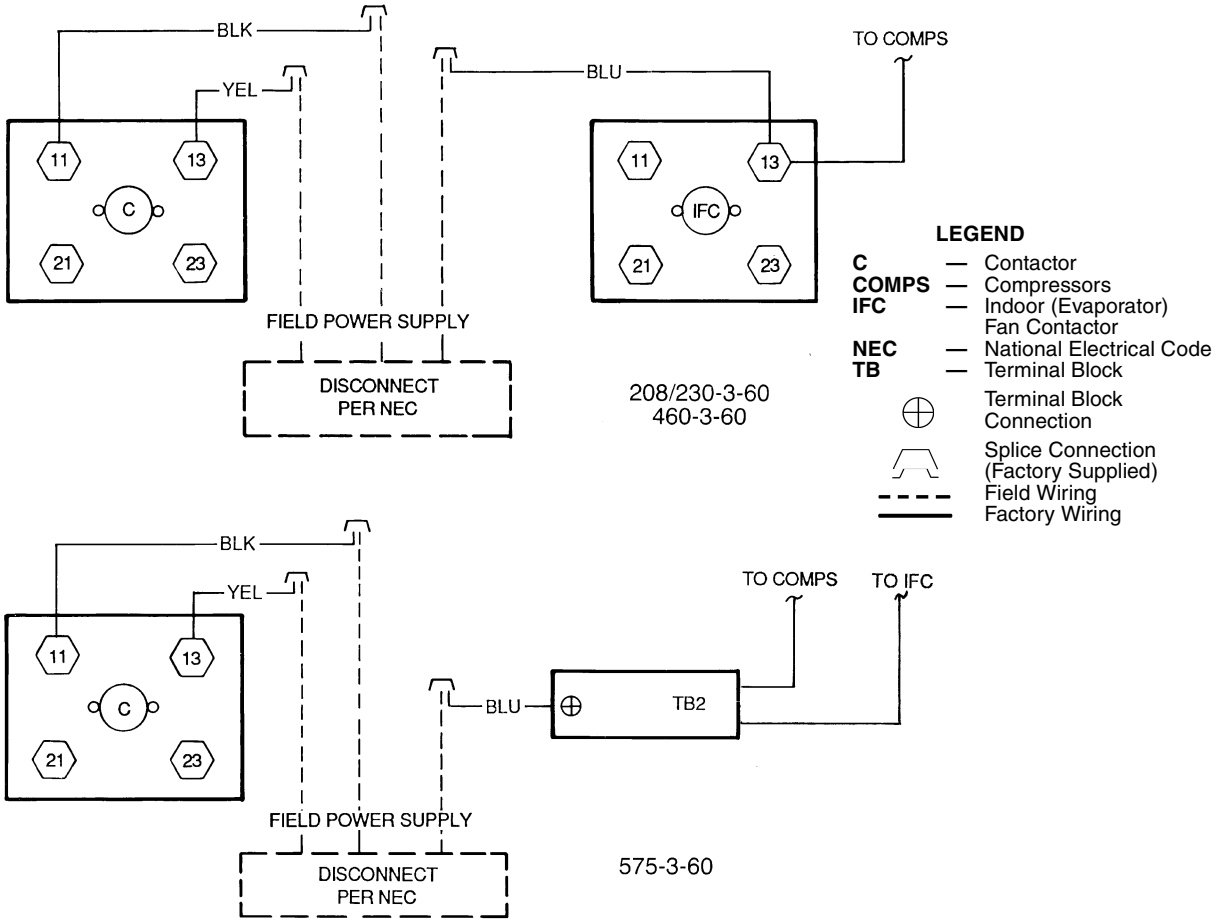
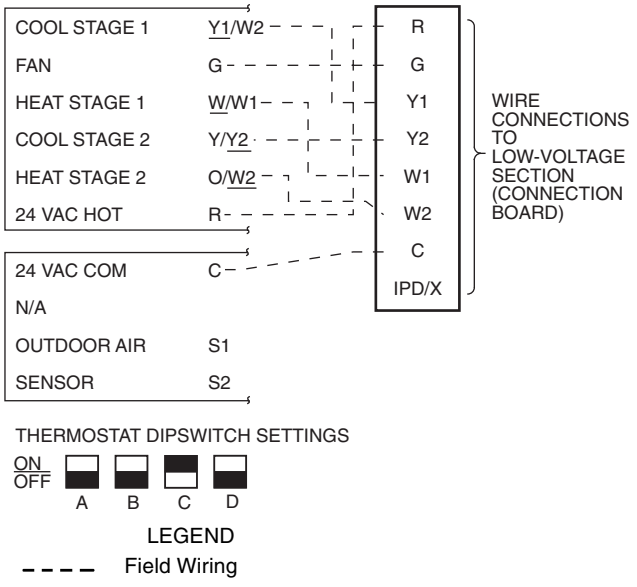


Fig. 9 — Power Wiring Connections



NOTE: Underlined letter indicates active thermostat output when configured for A/C operation.

Fig. 10 — Low-Voltage Connections

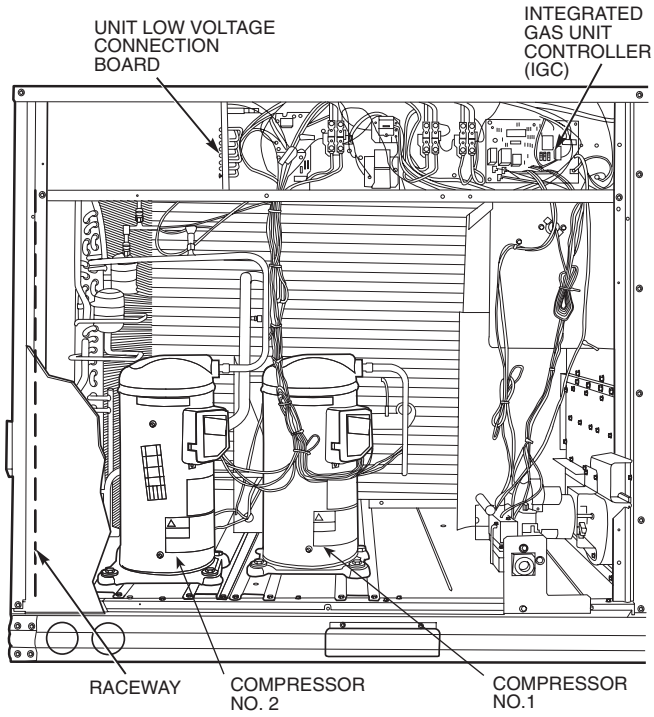


Fig. 11 — Field Control Wiring Raceway and Compressor Location

VIII. STEP 8 — ADJUST FACTORY-INSTALLED OPTIONS

A. Manual Outdoor-Air Damper

The outdoor-air hood and screen are attached to the basepan at the bottom of the unit for shipping.

Assembly:

1. Determine quantity of ventilation required for building. Record amount for use in Step 8.
2. Remove filter access panel by raising panel and swinging panel outward. Panel is now disengaged from track and can be removed. No tools are required to remove the filter access panel. Remove outdoor-air opening panel. Save panels and screws. See Fig. 12.
3. Separate hood and screen from basepan by removing the screws and brackets securing them. Save all screws and discard brackets.
4. Replace outdoor air opening panel with screws saved from Step 2.
5. Place hood on front of outdoor-air opening panel. See Fig. 13 for hood details. Secure top of hood with the 6 screws removed in Step 3. See Fig. 14.
6. Remove and save 6 screws (3 on each side) from sides of the manual outdoor-air damper.
7. Align screw holes on hood with screw holes on side of manual outdoor-air damper. See Fig. 13 and 14. Secure hood with 6 screws from Step 6.
8. Adjusting the manual outdoor-air adjustment screws on the front of the damper blade. See Fig. 12. Slide blade vertically until it is in the appropriate position determined by Fig. 15. Tighten screws.
9. Remove and save screws currently on sides of hood. Insert screens. Secure screens to hood using the screws. See Fig. 14.
10. Replace filter access panel. Ensure filter access panel slides along the tracks and is securely engaged.

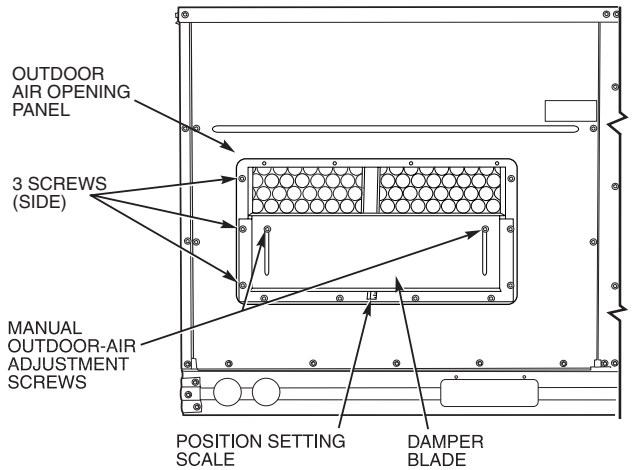


Fig. 12 — Damper Panel with Manual Outdoor-Air Damper Installed

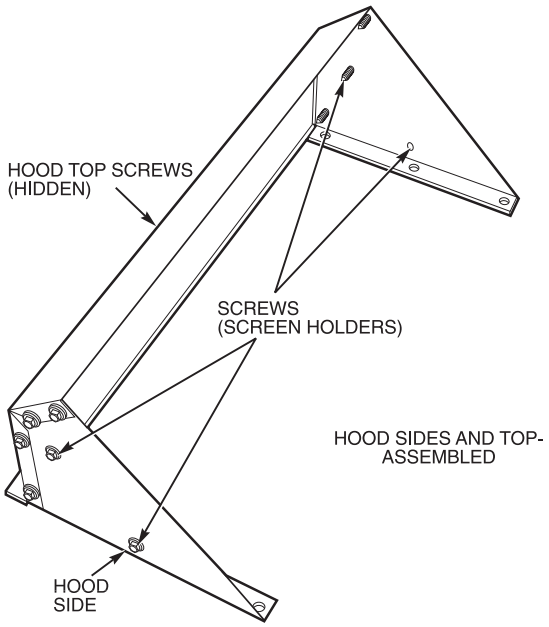


Fig. 13 — Outdoor-Air Hood Details

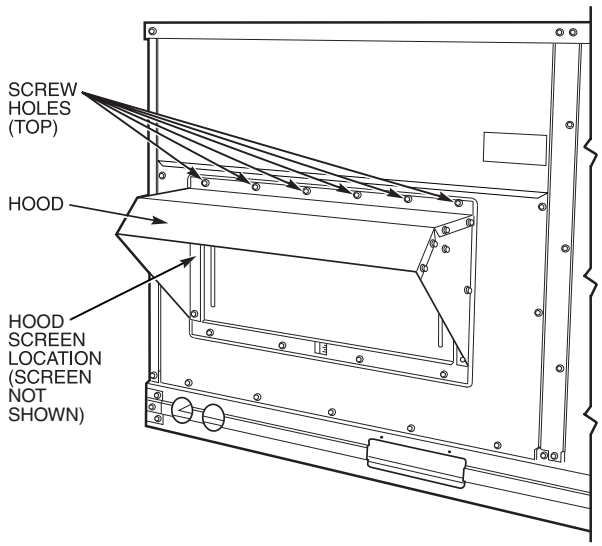


Fig. 14 — Optional Manual Outdoor-Air Damper with Hood Attached

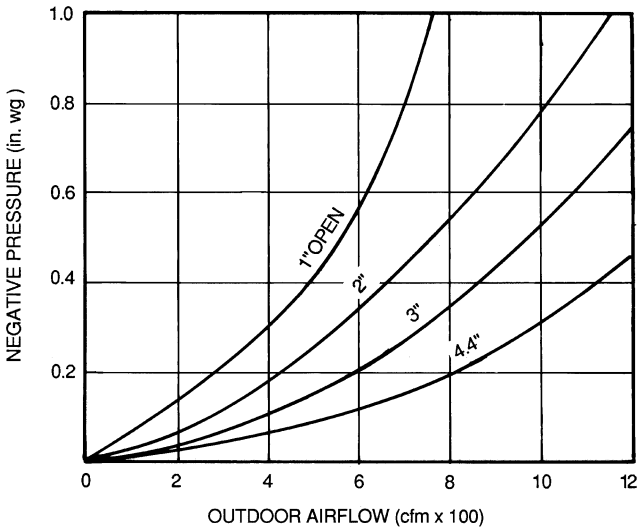


Fig. 15 — Outdoor-Air Damper Position Setting

B. Optional EconoMi$er+

See Fig. 16 for EconoMi$er+ component locations.

NOTE: These instructions are for the factory-installed optional EconoMi$er+ only. Refer to the accessory EconoMi$er+ installation instructions when field installing an EconoMi$er+ accessory.

1. To remove the existing unit filter access panel, raise the panel and swing the bottom outward. The panel is now disengaged from the track and can be removed. See Fig. 17.
2. The box with the EconoMi$er+ hood components is shipped in the compartment behind the EconoMi$er+. The EconoMi$er+ does not have to be removed to retrieve the hood box. Remove the screw holding the hood box bracket to the top of the EconoMi$er+. Slide the hood box out of the unit. See Fig. 18.

IMPORTANT: If a power exhaust accessory will be installed on the unit, the hood shipped with the unit will not be used and must be discarded. Save the aluminum filter for use in the power exhaust.

3. The indoor coil access panel will be used as the top of the hood. Remove the screws along the bottom of the indoor coil access panel. See Fig. 19.
4. Swing out the indoor coil access panel and insert the hood sides under the panel (hood top). Use the screws provided to attach the hood sides to the hood top. Use the screws provided to attach the hood sides to the unit. See Fig. 20.
5. Remove the shipping tape holding the EconoMi$er+ barometric relief damper in place.
6. Insert the hood divider between the hood sides. See Fig. 20. Secure hood divider with 2 screws on each hood side. The hood divider is also used as the bottom filter rack for the aluminum filter.
7. Open the filter clips which are located underneath the hood top. Insert the aluminum filter into the bottom filter rack (hood divider). Push the filter into position past the open filter clips. Close the filter clips to lock the filter into place. See Fig. 21.
8. Caulk the ends of the joint between the unit top panel and the hood top. See Fig. 19.
9. Replace the filter access panel.
10. Install all EconoMi$er+ accessories. EconoMi$er+ wiring is shown in Fig. 22.

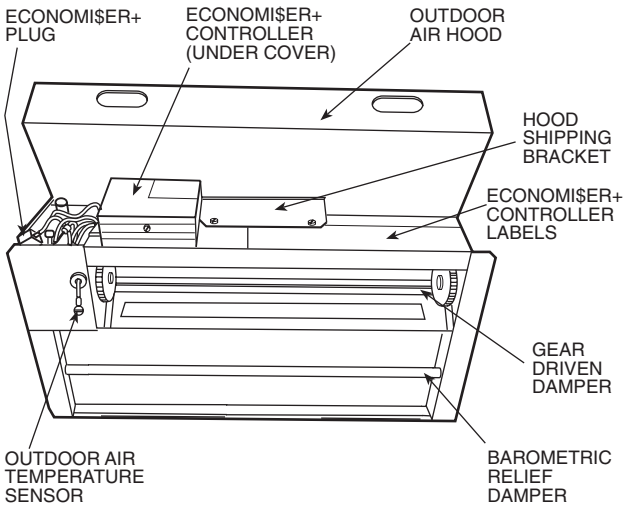


Fig. 16 — EconoMi$er+ Component Locations

Barometric flow capacity is shown in Fig. 23. Outdoor air leakage is shown in Fig. 24. Return air pressure drop is shown in Fig. 25.

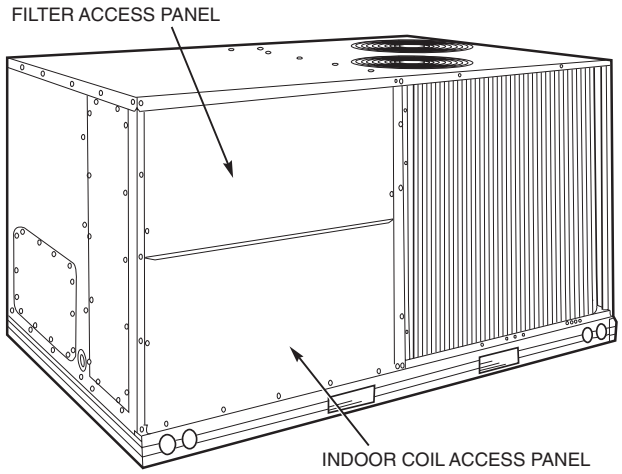


Fig. 17 — Typical Access Panel Locations

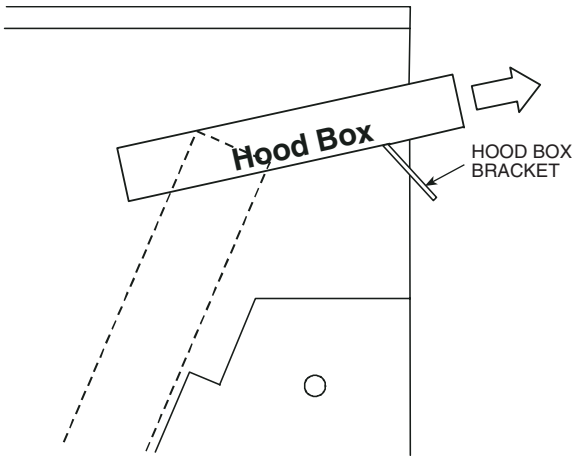


Fig. 18 — Hood Box Removal

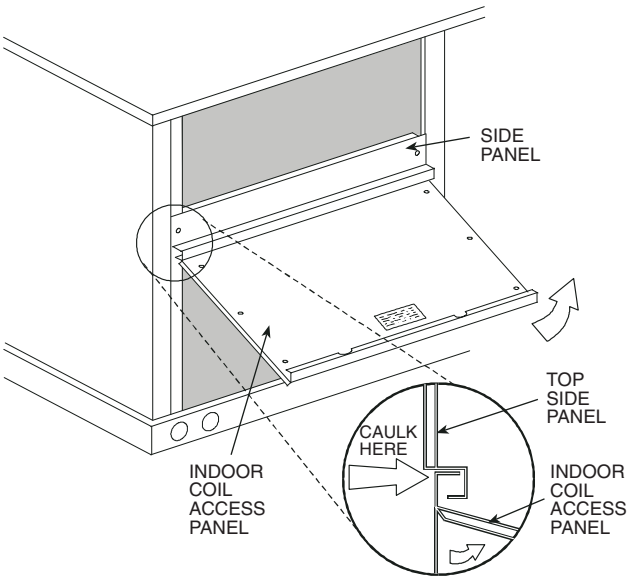


Fig. 19 — Indoor Coil Access Panel Relocation

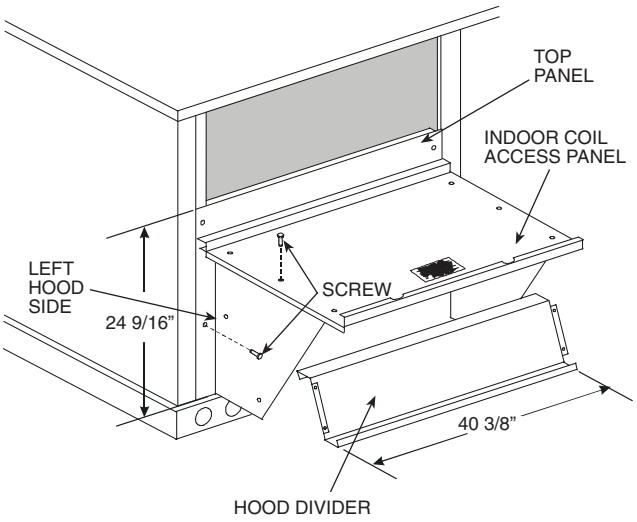


Fig. 20 — Outdoor-Air Hood Construction

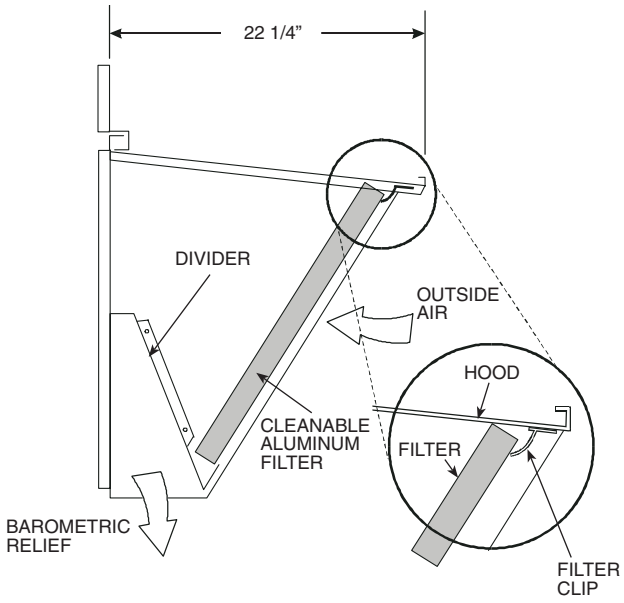
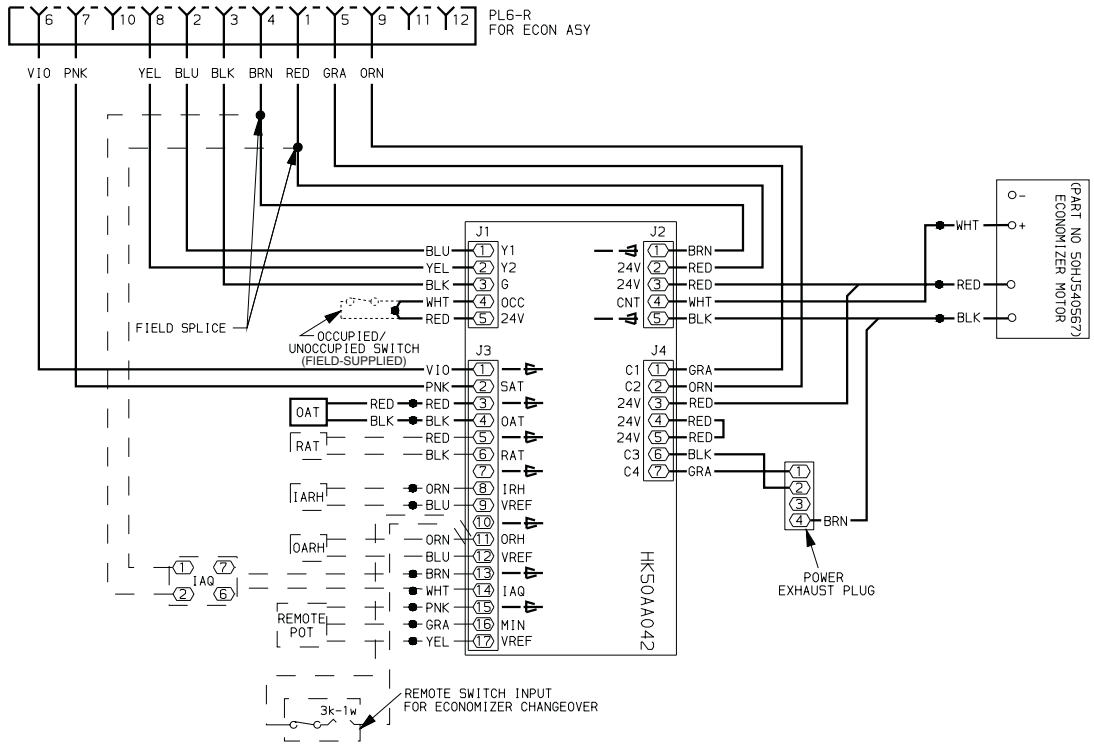


Fig. 21 — Filter Installation



LEGEND

ECON	— Economizer	**OAT**	— Outdoor-Air Temperature
IAQ	— Indoor-Air Quality (4 to 20 mA)	**ORH**	— Outdoor-Air Relative Humidity (Sensor)
IARH	— Indoor-Air Relative Humidity (Signal)	**POT**	— Potentiometer
IRH	— Indoor-Air Relative Humidity (Sensor)	**RAT**	— Return-Air Temperature
OARH	— Outdoor-Air Relative Humidity (Signal)	**SAT**	— Supply-Air Temperature

NOTES:
1. Terminals 13-17 are wired to 5-pin plug assembly (P/N CRE+PLUG001A00).
2. Pin numbers are not printed on the controller. They are provided in this book as a reference.

Fig. 22 — EconoMi$er+ Wiring

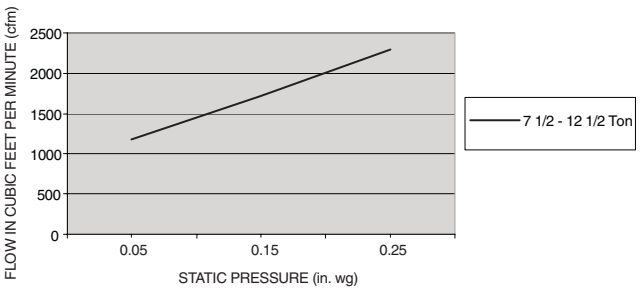


Fig. 23 — Barometric Flow Capacity

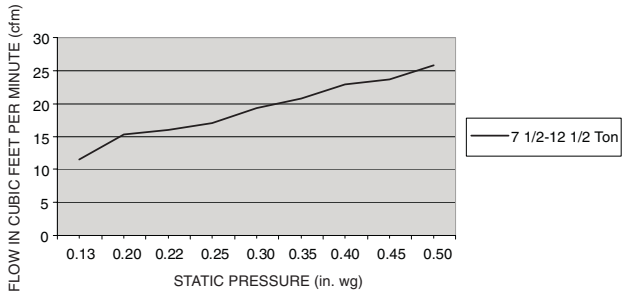


Fig. 24 — Outdoor-Air Damper Leakage

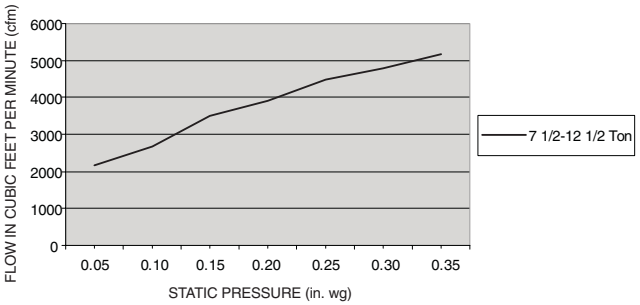


Fig. 25 — Return-Air Pressure Drop

C. EconoMi$er+ Control Mode

Determine the EconoMi$er+ control mode before installing sensors and accessories. Different sensors are required for different control modes, and a number of accessories are available. Refer to Tables 3 and 4.

Outdoor Dry Bulb Changeover

The standard control mode for the EconoMi$er+ is Outdoor Dry Bulb Changeover. The outdoor air and supply air temperature sensors are also included as standard. EconoMi$er+ control is based on the outdoor temperature relative to a set point in the software. If the outdoor-air temperature is above the set point then the EconoMi$er should be in minimum position. If the outdoor-air temperature is below the set point, the position should be controlled to maintain the leaving air temperature set point. The set point range is 45 to 70 F.

Differential Dry Bulb Changeover

The control supports differential dry bulb changeover control. This requires an accessory return air temperature sensor CRTEMPSN001A00 installed in the return airstream. Refer to the Start-up section for details on how to configure and enable the control mode. The user can check the operation of the sensor using the Read function.

Outdoor Air Enthalpy Changeover

The control supports outdoor air enthalpy changeover control. This mode requires a factory-supplied outdoor air temperature sensor (OAT) and an accessory outdoor air humidity sensor (ORH) (part no. CRHUMDSN001B00). Refer to the Start-Up section for details on how to configure and enable the control mode. The user can check the operation of the sensors using the Read function.

Differential Enthalpy Changeover

The control supports differential enthalpy changeover control. This requires the factory-supplied outdoor air temperature sensor, an accessory outdoor air humidity sensor, an accessory return air temperature sensor, and an accessory indoor air humidity sensor. Refer to the Start-Up section for details on how to configure and enable the control mode. The user can check the operation of the sensors using the Read function.

D. Damper Movement

When the EconoMi$er+ board receives initial power, it will take the damper up to $2^1/_2$ minutes before it begins to position itself. After the initial positioning, subsequent changes to damper position will take up to 30 seconds to initiate. Damper movement from full open to full closed (or vice versa) takes $2^1/_2$ minutes.

If the damper is in the process of changing positions (for example it is trying to open to 100%) and the fan signal is turned off, the damper will continue to its 100% open position before closing.

NOTE: Occupied minimum position can not be set lower than +1% higher than the value of IAQ minimum economizer position. Refer to the setup examples on page 56.

E. EconoMi$er+ Controller Wiring

The EconoMi$er+ is supplied from the factory with a supply air temperature sensor and an outside air temperature sensor. This allows for operation of the EconoMi$er+ with outdoor air dry bulb changeover control. Additional accessories can be added to allow for different types of change over control and operation of the EconoMi$er+ and unit.

F. Thermostats

The EconoMi$er+ control works with conventional thermostats that have a Y1 (cool stage 1), Y2 (cool stage 2), W1 (heat stage 1), W2 (heat stage 2), and G (fan). The EconoMi$er+ control does not support sensor thermostats like the T56 and T57. Connections are made at the thermostat terminal connection board located in the main control box.

Table 3 — EconoMi$er+ Sensor Usage

APPLICATION	STANDARD OUTDOOR AIR TEMPERATURE SENSOR	ACCESSORY RETURN AIR TEMPERATURE SENSOR	ACCESSORY OUTDOOR AIR HUMIDITY SENSOR	ACCESSORY INDOOR RETURN AIR HUMIDITY SENSOR
Standard Unit	Included — HH79NZ039	—	—	—
Differential Dry Bulb	Included — HH79NZ039	Required — CRTEMPSN001A00	—	—
Outdoor Air Enthalpy	Included — HH79NZ039	—	Required — CRHUMDSN001B00	—
Differential Enthalpy	Included — HH79NZ039	Required — CRTEMPSN001A00	Required — CRHUMDSN001B00	Required — CRHUMDSN001B00

NOTES:
1. CO_2 Sensors (Optional, 5-Pin sensor wiring plug CRE+PLUG001A00 required for installation.).
   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 set point.
   CRCBDIOX002A00 — Return air CO_2 sensor.
2. All units include the following Standard Sensors:
   Outdoor-Air Sensor — set point adjustable from 45 F to 70 F, factory set at 65 F.
   Supply-Air Sensor — set point adjustable from 40 F to 65 F. Factory set at 55 F.
   All temperature adjustments are made at the EconoMi$er+ controller.

Table 4 — EconoMi$er+ Field-Installed Accessories

DESCRIPTION	PART NUMBER
$7^1/_2$-$12^1/_2$ Ton Power Exhaust 208-230 v 1 Ph	CRPWREXH022A00
$7^1/_2$-$12^1/_2$ Ton Power Exhaust 460 v 3 Ph	CRPWREXH023A00
Return Air Temperature Sensor with Harness	CRTEMPSN001A00
Outdoor Air Humidity Sensor with Harness	CRHUMDSN001B00
Indoor Air Humidity Sensor w/Harness	CRHUMDSN001B00
Return Air CO_2 Sensor	CRCBDIOX002A00*
CO_2 Room Sensor	33ZCSENCO2*
Aspirator Box for Duct Mount CO_2 Sensor	33ZCASPCO2
Space Temperature and CO_2 Room Sensor with Override	33ZCT55CO2*
Space Temperature and CO_2 Room Sensor with Override and Set Point	33ZCT56CO2*
5-Pin Sensor Wiring Plug	CRE+PLUG001A00*

*5-pin sensor wiring plug accessory (P/N CRE+PLUG001A00) is required to install IAQ sensor.

G. Outdoor Air Temperature (OAT) Sensor (Provided)

The outdoor air temperature sensor is a 10K thermistor used to measure the outdoor-air temperature. The sensor controls EconoMi$er+ changeover and compressor lockout. The sensor is factory-installed on the EconoMi$er+ in the outdoor airstream. The operating range of temperature measurement is 0° to158 F. See Tables 5 and 6 for thermistor resistance and resolution 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.

The user can read the value of the sensor using the Read mode, described in the Start-Up section.

H. Supply Air Temperature (SAT) Sensor (Provided)

The supply air temperature sensor is a 10K thermistor located at the inlet to the indoor fan. This sensor must be field installed. The operating range of temperature measurement is 0° to158 F. See Tables 5 and 6 for thermistor resistance and resolution 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.

The user can read the value of the sensor using the Read mode, described in the EconoMi$er+ Controller section.

I. Indoor Air Quality (IAQ) Sensor

Any indoor air quality or CO_2 sensor that provides a 4 to 20 mA output can be used as the IAQ sensor. The controller will modulate the outdoor-air damper to provide ventilation based on the sensor output and the IAQ setting of the controller. The CO_2 sensor will modulate the outdoor-air damper from the minimum position (IAQ minimum damper position set point) to the maximum position (occupied minimum damper position). When there is no CO_2 call, the damper will go to the unoccupied minimum position. When there is a CO_2 call, the damper will be between the IAQ minimum economizer set point position and the occupied minimum damper position.

Mount the sensor according to manufacturer specifications. In order to wire this sensor, an accessory 5-pin plug (part number CRE+PLUG001A00) is required. See Fig. 22.

The IAQ sensor is wired to the ground and IAQ wires in the harness. The accessory 5-pin wiring plug is connected to pins 13-17 of J3 on the EconoMi$er+ controller. Push the plug down onto the pins of the EconoMi$er+ controller to install. Pins 13 and 14 are used for the IAQ sensor. Pins 15-17 are used for the field-installed remote potentiometer. Connect the IAQ sensor to the BRN and WHT wires of the accessory 5-pin plug.

NOTE: Pin numbers are not shown on the controller. They are provided only as reference for the installer. On the EconoMi$er+ board, they numbered 1-17 from left to right, but only the 1 and the 17 are printed on the board.

Sensor wiring should be extended with wire and wire nuts and routed to the IAQ sensor location. Adjust the IAQ setting at the controller to correspond to the IAQ voltage output of the sensor at the user-determined set point. See Fig. 26. Power the sensor with a field-supplied transformer.

J. Return Air Temperature (RAT) Sensor

The EconoMi$er+ controller will accept input from the accessory 10K return air temperature sensor (CRTEMPSN001A00) in addition to the outdoor air temperature sensor shipped with the EconoMi$er+. By using both sensors, the outdoor air and the return air temperatures are compared (differential dry bulb) for optimal energy savings. See Tables 5 and 6 for thermistor resistance and resolution 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.

The user can read the value of the sensor using the Read mode, described in the EconoMi$er+ Controller section.

Mount the return air temperature sensor on the EconoMi$er+, through pre-punched holes. See Fig. 27.

The return air temperature (RAT) sensor is provided with a 2-wire, 42-in. long wiring harness with a 2-pin connector. The plug is installed on pins 5 and 6 on J3 of the EconoMi$er+ controller. The pins are labeled with a ground symbol and RAT on the EconoMi$er+ controller. See Fig. 22. The red wire of the harness is connected to pin 5 (ground). The black wire of the harness is connected to pin 6 (RAT). The wiring harness should be routed from the EconoMi$er+ controller to the sensor. The controller compares the temperatures of the two airstreams, chooses the best one, and modulates the EconoMi$er+ actuator accordingly.

This 10K thermistor is used to measure the return air temperature vs. resistance curve, per Table 5. The range of temperature measurement is between 0° and 158 F. See Table 6 for resolution.

K. Outdoor Air Humidity Sensor

The EconoMi$er+ controller accepts input from the accessory outdoor air humidity sensor in addition to the outdoor air temperature sensor shipped with the EconoMi$er+. By using both sensors, the total enthalpy of the outside air is calculated.

Mount the outdoor-air humidity sensor in to the EconoMi$er+, through the pre-punched holes. See Fig. 28. The outdoor-air humidity sensor is provided with a 2-wire, 42-in. wiring harness with a 2-pin connector. The plug is installed on pins 11 and 12 on J3 of the EconoMi$er+ controller. The pins are labeled ORH and VREF on the EconoMi$er+ controller. See Fig. 22. The orange wire of the harness is connected to pin 11 (ORH). The blue wire of the harness is connected to pin 12 (VREF). The wiring harness should be routed from the EconoMi$er+ controller to the sensor location.

The outdoor enthalpy changeover curve is set at the EconoMi$er+ controller. The factory default is curve “A.” See Fig. 29. See Fig. 30 for Sensor Curve vs. Humidity.

L. Indoor Air Humidity Sensor

For differential enthalpy sensing, the EconoMi$er+ controller uses the standard outdoor air temperature sensor, the outdoor air humidity sensor, and the optional indoor air humidity sensor, an optional return air temperature sensor (RAT). The indoor-air humidity sensor is provided with a 2-wire, 42-in. wiring harness with a 2-pin connector. The plug is installed on pins 8 and 9 on J3 of the EconoMi$er+ controller. The pins are labeled IRH and VREF on the EconoMi$er+ controller. See Fig. 22. The orange wire of the harness is connected to pin 8 (IRH). The blue wire of the harness is connected to pin 9 (VREF). The wiring harness should be extended with wires and wire nuts and routed from the EconoMi$er+ controller to the sensor location. The EconoMi$er+ controller compares the outdoor air enthalpy to the return air enthalpy to determine EconoMi$er+ 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, the EconoMi$er+ controller opens the damper to bring in outdoor air for free cooling.

Mount the return-air humidity sensor in the return-air duct. See Fig. 31.

The outdoor enthalpy changeover curve is set with at the EconoMi$er+ controller. The selectable curves are A, B, C, and D. The factory default is curve “A.” See Fig. 29. See Fig. 30 for Sensor Curve vs. Humidity.

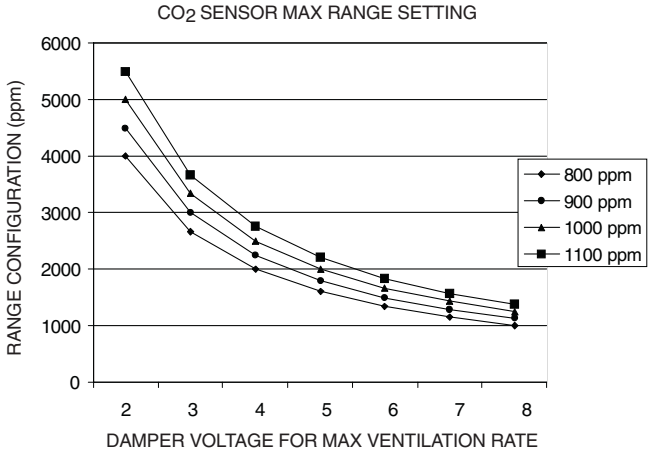
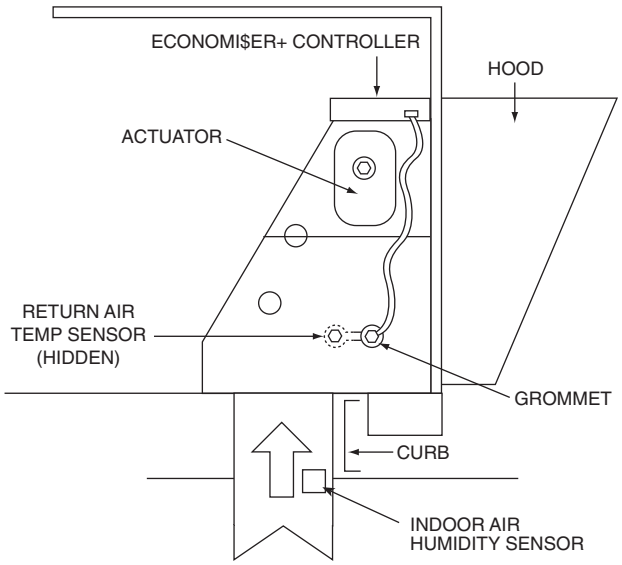


Fig. 26 — Indoor Air Quality Voltage Setting



VERTICAL ECONOMI$ER+
(3 TO 12 1/2 TON UNITS)
(SIDE VIEW)

Fig. 27 — Return Air Temperature Sensor

Table 5 — Outdoor Air, Return Air, and Supply Air Temperature Sensors (CRTEMPSN001A00 or HH79NZ039) — 10K Thermistor Curve

TEMPERATURE		RESISTANCE	TEMPERATURE		RESISTANCE	TEMPERATURE		RESISTANCE
C	F	ohms	C	F	ohms	C	F	ohms
120	248.0	390.0	66	150.8	2,011.0	12	53.6	18,090.0
119	246.2	401.2	65	149.0	2,083.0	11	51.8	18,972.0
118	244.4	412.8	64	147.2	2,157.0	10	50.0	19,903.0
117	242.6	424.8	63	145.4	2,235.0	9	48.2	20,883.0
116	240.8	437.2	62	143.6	2,315.0	8	46.4	21,918.0
115	239.0	450.0	61	141.8	2,400.0	7	44.6	23,013.0
114	237.2	462.5	60	140.0	2,488.0	6	42.8	24,117.0
113	235.4	475.5	59	138.2	2,579.0	5	41.0	25,396.0
112	233.6	488.9	58	136.4	2,675.0	4	39.2	26,686.0
111	231.8	502.7	57	134.6	2,774.0	3	37.4	28,052.0
110	230.0	517.0	56	132.8	2,878.0	2	35.6	29,498.0
109	228.2	531.0	55	131.0	2,986.0	1	33.8	31,030.0
108	226.4	545.6	54	129.2	3,099.0	0	32.0	32,654.0
107	224.6	560.5	53	127.4	3,217.0	–1	30.2	34,367.0
106	222.8	576.0	52	125.6	3,340.0	–2	28.4	36,182.0
105	221.0	592.0	51	123.8	3,469.0	–3	26.6	38,109.0
104	219.2	608.5	50	122.0	3,603.0	–4	24.8	40,153.0
103	217.4	625.5	49	120.2	3,743.0	–5	23.0	42,324.0
102	215.6	643.0	48	118.4	3,889.0	–6	21.2	44,617.0
101	213.8	661.2	47	116.6	4,042.0	–7	19.4	47,052.0
100	212.0	680.0	46	114.8	4,203.0	–8	17.6	49,640.0
99	210.2	700.0	45	113.0	4,370.0	–9	15.8	52,392.0
98	208.4	720.6	44	111.2	4,544.0	–10	14.0	55,319.0
97	206.6	742.0	43	109.4	4,727.0	–11	12.2	58,415.0
96	204.8	764.1	42	107.6	4,918.0	–12	10.4	61,711.0
95	203.0	787.0	41	105.8	5,117.0	–13	8.6	65,219.0
94	201.2	810.8	40	104.0	5,327.0	–14	6.8	68,957.0
93	199.4	835.5	39	102.2	5,546.0	–15	5.0	72,940.0
92	197.6	861.0	38	100.4	5,774.0	–16	3.2	77,162.0
91	195.8	888.5	37	98.6	6,014.0	–17	1.4	81,662.0
90	194.0	915.0	36	96.8	6,266.0	–18	–0.4	86,463.0
89	192.2	944.0	35	95.0	6,530.0	–19	–2.2	91,588.0
88	190.4	974.0	34	93.2	6,806.0	–20	–4.0	97,060.0
87	188.6	1005.0	33	91.4	7,096.0	–21	–5.8	102,868.0
86	186.8	1037.0	32	89.6	7,401.0	–22	–7.6	109,075.0
85	185.0	1070.0	31	87.8	7,720.0	–23	–9.4	115,710.0
84	183.2	1104.0	30	86.0	8,056.0	–24	–11.2	122,807.0
83	181.4	1140.0	29	84.2	8,407.0	–25	–13.0	130,402.0
82	179.6	1177.0	28	82.4	8,776.0	–26	–14.8	138,482.0
81	177.8	1215.0	27	80.6	9,164.0	–27	–16.6	147,134.0
80	176.0	1255.0	26	78.8	9,571.0	–28	–18.4	156,404.0
79	174.2	1297.0	25	77.0	10,000.0	–29	–20.2	166,342.0
78	172.4	1340.0	24	75.2	10,449.0	–30	–22.0	177,000.0
77	170.6	1385.0	23	73.4	10,921.0	–31	–23.8	188,340.0
76	168.8	1431.0	22	71.6	11,418.0	–32	–25.6	200,510.0
75	167.0	1480.0	21	69.8	11,942.0	–33	–27.4	213,570.0
74	165.2	1530.0	20	68.0	12,493.0	–34	–29.2	227,610.0
73	163.4	1582.0	19	66.2	13,071.0	–35	–31.0	242,700.0
72	161.6	1637.0	18	64.4	13,681.0	–36	–32.8	258,730.0
71	159.8	1693.0	17	62.6	14,323.0	–37	–34.6	275,970.0
70	158.0	1752.0	16	60.8	15,000.0	–38	–36.4	294,520.0
69	156.2	1813.0	15	59.0	15,714.0	–39	–38.2	314,490.0
68	154.4	1876.0	14	57.2	16,464.0	–40	–40.0	336,000.0
67	152.6	1943.0	13	55.4	17,255.0			

Table 6 — Outdoor Air, Return Air, and Supply Air Temperature Sensors (CRTEMPSN001A00 or HH79NZ039) — Thermistor Resolution

RANGE		RESOLUTION
Low	High	
F	F	F
–41	–18	4.0
–17	14	2.0
15	28	1.0
29	47	0.8
48	86	0.7
87	108	0.8
109	126	1.0
127	171	2.0
127	195	4.0

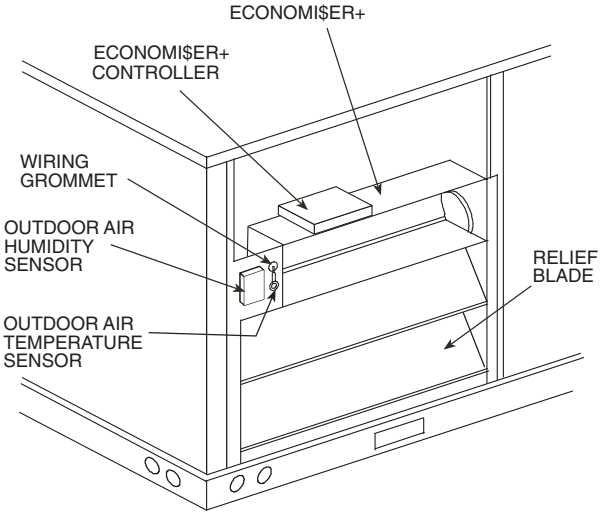


Fig. 28 — Outdoor-Air Humidity Sensor

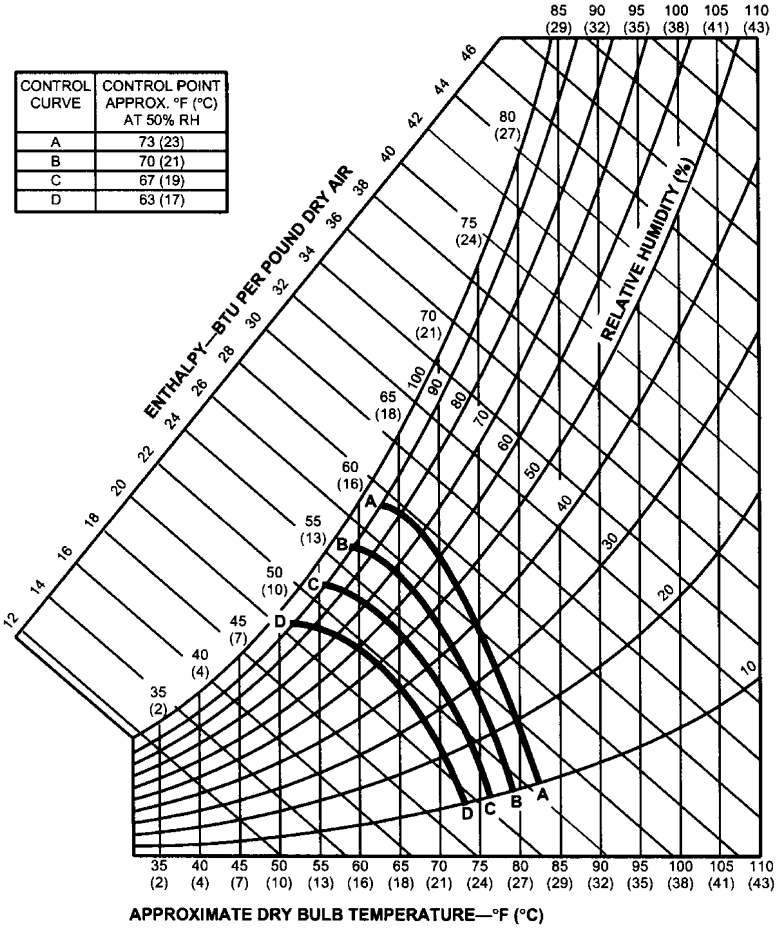
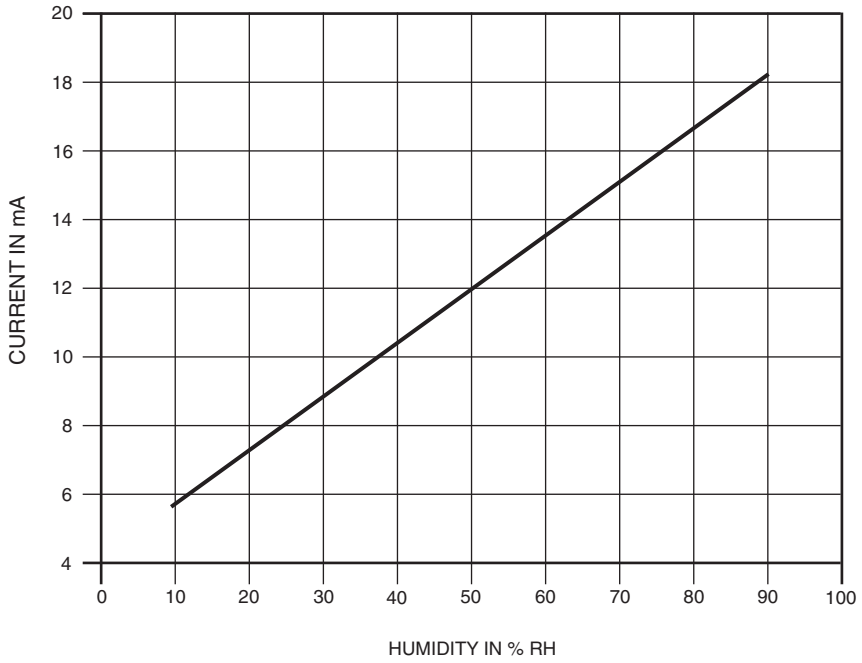


Fig. 29 — Enthalpy Changeover Settings



RH (%)	CURRENT (mA)
10	5.6
20	7.2
30	8.8
40	10.4
50	12.0
60	13.6
70	15.2
80	16.8
90	18.4

RH — Relative Humidity

Fig. 30 — Humidity Sensor Current vs. Humidity

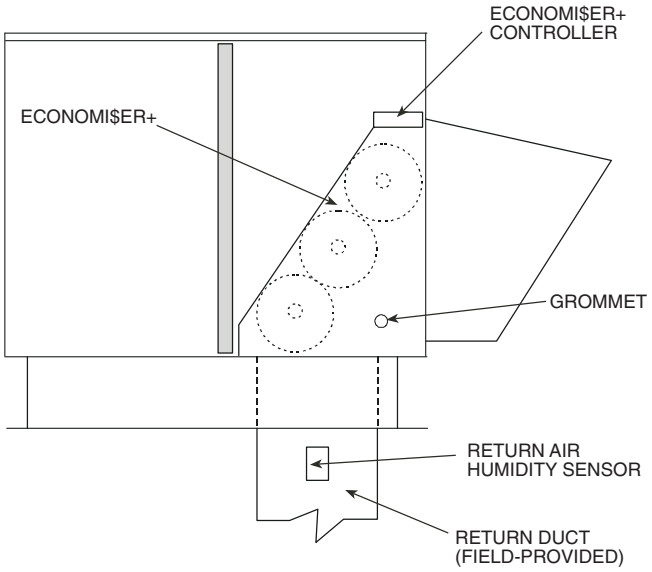


Fig. 31 — Return Air Humidity Sensor

M. Occupied/Unoccupied Switch

The EconoMi$er+ supports the use of a field-supplied occupied/unoccupied switch. When the switch is closed it provides a 24-vac signal to the unit for occupied mode and when open, there is no signal to indicate unoccupied mode. The control can be configured to allow different minimum economizer damper positions and to control how mechanical cooling will and will not be used in the occupied mode.

NOTE: The remote potentiometer (see below) will override the occupied minimum position if the potentiometer setting is greater than the occupied minimum position.

For 3 to $12^1/_2$ ton units, a wire from J1-OCC (pin 4) and a wire from J1-24V (pin 5) are wire-nutted together to jumper the terminals.

An occupied/unoccupied switch can be field-installed in place of the jumper to allow the user to force the control into occupied or unoccupied mode of operation for EconoMi$er+ damper position. The occupied/unoccupied switch is required if the user wants to use unoccupied free cooling or different EconoMi$er+ damper vent positions in the unoccupied mode.

N. Power Exhaust

Refer to the Accessory Power Exhaust installation instructions for information on installing the power exhaust accessory.

O. Remote EconoMi$er+ Enable Control

When the control is used with energy management systems that enable and disable the EconoMi$er+, the user can install a field-supplied enable/disable switch. The switch must be wired in series with a 3K ohm, 1 watt or greater resistor. The switch is wired to terminals ORH (pin 11) and VREF (pin 12) on J3. Refer to the Start-Up section for details on how to configure the control.

P. Remote Potentiometer Occupied Minimum Position

The occupied minimum position set point remote potentiometer (field-supplied) is used when requiring additional temporary ventilation. The remote potentiometer (10K ohm - closed damper, 100K ohm - open damper) will only control the occupied minimum position.

The accessory 5-in wiring plug, CRE+PLUG001A00 is required to connect the potentiometer.

The plug is installed on pins 15, 16 and 17 on J3 of the EconoMi$er+ controller. The pins are labeled with the ground symbol, MIN and VREF on the EconoMi$er+ controller. See Fig. 22. The pink wire from the harness is connected to pin 15 (ground symbol). The gray wire from the harness is connected to pin 16 (MIN). The yellow wire from the harness is connected to pin 16 (VREF). The wiring harness should be extended with wires and wire nuts and routed from the EconoMi$er+ controller to the remote potentiometer location.

NOTE: Pins 13 (ground symbol) and 14 (IAQ), which are wired to the accessory 5-pin plug, are not used for the remote potentiometer installation. They are used for an accessory IAQ sensor (if required).

The unoccupied minimum position can only be set at the controller. The occupied minimum position set point configured at the EconoMi$er+ controller should be set to 0 when using a remote potentiometer. The occupied minimum position will also be used as part of the IAQ routing; it will be the maximum position the damper moves to when there is an IAQ call.

If the remote potentiometer (occupied) position is greater than the EconoMi$er+ controller unoccupied minimum position, then the remote potentiometer setting will be used. The remote potentiometer is field supplied and must be a 3-wire, linear potentiometer with a resistance between 10K ohm and 100K ohm (such as the Honeywell S963B1128).

Q. Demand Ventilation Control

Demand ventilation control uses an IAQ sensor (CRE+PLUG001A00 required) to control the amount of outside air admitted into the system. Normally, the minimum position of the EconoMi$er+ damper is established based on the demand occupancy of the space. The IAQ sensor will be used to modulate the EconoMi$er+ minimum damper position below the normal minimum position based on full occupancy. The lower limit is called the base ventilation rate. See Fig. 32.

If there is no IAQ signal the damper will be in the unoccupied minimum position (configuration item number 3). If there is an IAQ signal the damper will be in the occupied minimum position (configuration item number 15), unless the remote potentiometer is used to override it.

For the demand ventilation control logic, the user configures the lower and upper actuator position to establish the base ventilation rate (IAQMIN_SP) and the design ventilation rate (ECONOMIN_SP) for full occupancy. When the EconoMi$er+ damper is being modulated for demand ventilation control, the damper position will be between IAQMIN_SP and ECONOMIN_SP. The upper IAQ differential set point is DAQHI. The lower IAQ differential set point is DAQLO.

The differential set points represent the differential CO_2 level (in ppm) above the outdoor reference IAQ levels. Normally, the outdoor reference IAQ levels are around 400 ppm, but the value should be configured based on the reference levels taken at the job site.

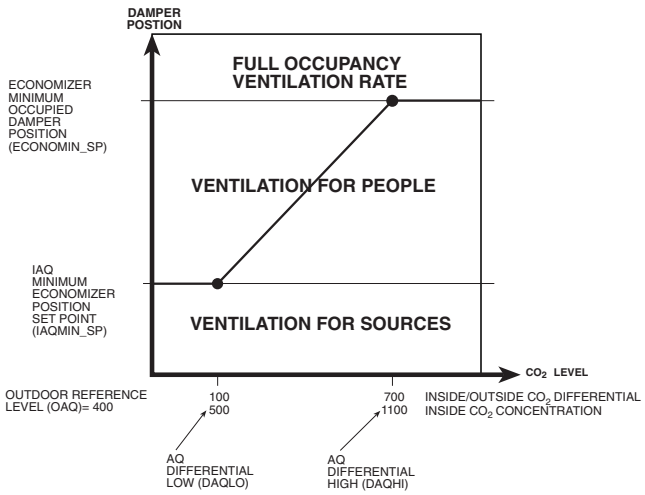


Fig. 32 — Demand Ventilation Control

The following equation is used to determine EconoMi$er+ damper position (ECONOMIN_POS):

$$IAQMIN\_SP + = \frac{(ECONOMIN\_SP - IAQMIN\_SP) * (IAQ - OAQ - DAQLO)}{(DAQHI - DAQLO)}$$

R. 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 7.

1. Press Clear and Mode buttons. Hold at least 5 seconds until the sensor enters the Edit mode.
2. Press Mode 2 times. The STDSET Menu will appear.
3. Use the Up/Down button to select the preset number. See Table 7.
4. Press Enter to lock in the selection.

Press Mode to exit and resume normal operation. The custom settings of the CO_2 sensor can be changed any time 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.

S. Dehumidification of Fresh Air with Demand Control Ventilation (DCV)

Information from ASHRAE (American Society of Heating, Refrigeration and Air Conditioning Engineers) indicates that the largest humidity load on any zone is the fresh air introduced. For some applications, a device such as a 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.

This makes the control of the dehumidification device simple when using the enthalpy or differential enthalpy sensor. The enthalpy sensor or differential enthalpy sensor is installed on the equipment to determine economizer operation. The high enthalpy signal from the temperature and humidity sensors or differential temperature and humidity sensors can be used to turn on the outdoor air moisture removal device any time fresh air is required for the space.

The energy recovery device should be sized for maximum latent and sensible conditioning at maximum ventilation on a design day.

A calculation for leaving-air temperature on a low ambient, low ventilation day should also be done to determine the supply-air temperature of the return and pre-conditioned outside air. The design should produce air temperature somewhat near room conditions to prevent reheat of the air mixture. The energy recovery device should be interlocked with the heat to turn off the device when in the heat mode.

Table 7 — 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 with Standard Building Control System	Proportional	Any	4-20 mA	0-2000	1000	50
2		Proportional	Any	7-20 mA	0-2000	1000	50
3		Exponential	Any	4-20 mA	0-2000	1100	50
4	Economizer	Proportional	15	4-20 mA	0-1100	1100	50
5		Proportional	20	4-20 mA	0- 900	900	50
6		Exponential	15	4-20 mA	0-1100	1100	50
7		Exponential	20	4-20 mA	0- 900	900	50
8	Health & Safety	Proportional	—	4-20 mA	0-9999	5000	500
9	Parking/Air Intakes/ Loading Docks	Proportional	—	4-20 mA	0-2000	700	50

LEGEND

ppm — Parts Per Million

*Available sensor part numbers are listed in Table 4.

IX. STEP 9 — ADJUST EVAPORATOR-FAN SPEED

Adjust evaporator-fan speed to meet jobsite requirement.

Table 8 shows fan rpm at motor pulley settings and Table 9 shows motor efficiencies. Table 10 shows motor performance. Refer to Fan Performance Tables 11-30 to determine fan speed settings. Fan motor pulleys are factory set for speed shown in Tables 1A and 1B.

To change fan speed:

1. Shut off unit power supply and install lockout tag.
2. Loosen belt by loosening fan motor mounting plate nuts (see Fig. 33 and 34).
3. Loosen movable pulley flange setscrew (see Fig. 35).
4. Screw movable flange toward fixed flange to increase fan speed and away from fixed flange to decrease fan speed. Increasing fan speed increases load on motor. Do not exceed maximum speed specified in Tables 1A and 1B.
5. Set movable flange at nearest flat of pulley hub and tighten setscrew (see Tables 1A and 1B for speed change for each full turn of pulley flange).

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.

To adjust belt tension (see Fig. 33 and 34):

1. Loosen fan motor mounting plate nuts.
2. *Units 090-103* — Slide motor mounting plate away from fan scroll for proper belt tension ($^1/_2$-in. deflection with 5 to 10 lb of force) and tighten mounting nuts (see Fig. 33).

   Units 120-151 — Slide motor mounting plate downward to tighten belt tension. ($^1/_2$-in. deflection with 5 to 10 lb of force.) Secure motor mounting plate nuts. See Fig. 34.
3. Adjust bolt and nut on mounting plate to secure motor in fixed position.

Realign 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.

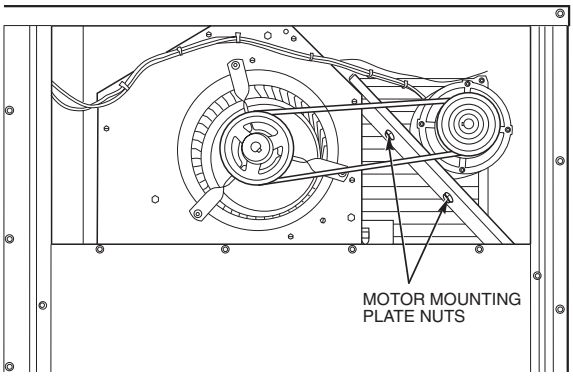


Fig. 33 — Typical Belt-Drive Motor Mounting for Sizes 090-103

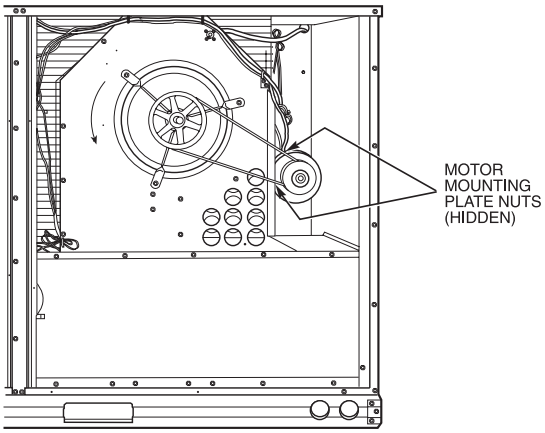


Fig. 34 — Typical Belt-Drive Motor Mounting for Sizes 120-151

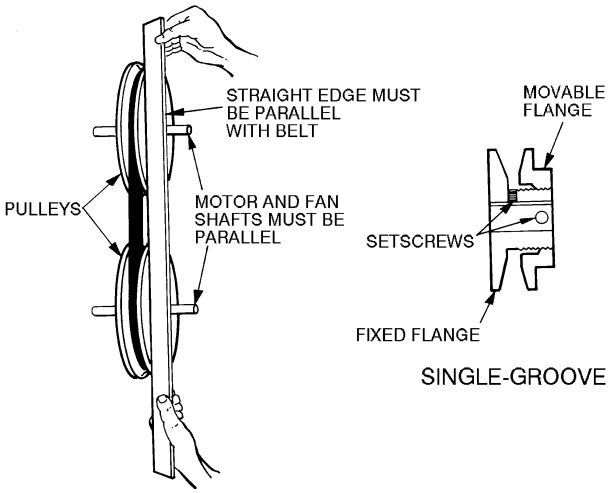


Fig. 35 — Evaporator-Fan Pulley Adjustment

Table 8 — Fan Rpm at Motor Pulley Settings*

UNIT 580F	MOTOR PULLEY 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
090,091†	840	815	790	765	740	715	690	665	635	615	590	—	—
090,091**	935	910	885	860	835	810	785	760	735	710	685	—	—
090,091††	1080	1025	1007	988	970	952	933	915	897	878	860	—	—
102,103†	935	910	885	860	835	810	785	760	735	710	685	—	—
102,103††	1080	1025	1007	988	970	952	933	915	897	878	860	—	—
120,121†	935	910	885	860	835	810	785	760	735	710	685	—	—
120,121**	1085	1060	1035	1010	985	960	935	910	885	860	835	—	—
120,121††	1130	1112	1087	1062	1037	1012	987	962	937	912	887	862	830
150,151†	1080	1060	1035	1015	990	970	950	925	905	880	860	—	—
150,151**	1130	1112	1087	1062	1037	1012	987	962	937	912	887	862	830

*Approximate fan rpm shown.
†Indicates standard motor and drive package.
**Indicates alternate motor and drive package.
††Indicates high-static motor and drive package.

Table 9 — Evaporator-Fan Motor Efficiency

UNIT 580F	MOTOR EFFICIENCY (%)
090-121	80
150,151	87

NOTE: All indoor-fan motors 5 hp and larger meet the minimum efficiency requirements as established by the Energy Policy Act of 1992 (EPACT) effective October 24, 1997.

Table 10 — Evaporator-Fan Motor Performance

UNIT 580F	EVAPORATOR-FAN MOTOR	UNIT VOLTAGE	MAXIMUM ACCEPTABLE CONTINUOUS BHP*	MAXIMUM ACCEPTABLE OPERATING WATTS	MAXIMUM AMP DRAW
090,091	Standard, Alternate	208/230	2.40	2120	6.7
		460			3.0
		575			3.0
	High Static	208/230	3.70	3313	12.2
		460			5.5
		575			5.5
102,103	Standard	208/230	2.40	2120	6.7
		460			3.0
		575			3.0
	High Static	208/230	3.70	3313	12.2
		460			5.5
		575			5.5
120,121	Standard	208/230	2.40	2120	6.7
		460			3.0
		575			3.0
	Alternate	208/230	2.90	2615	8.6
		460			3.9
		575			3.9
	High Static	208/230	5.25	4400	17.3
		460			8.5
		575			8.5
150,151	Standard	208/230	3.70	3313	12.2
		460			5.5
		575			5.5
	Alternate	208/230	5.25	4400	17.3
		460			8.5
		575			8.5

LEGEND

BHP — Brake Horsepower

*Extensive motor and electrical testing on these units ensures that the full horsepower range of the motors can be utilized with confidence. Using your fan motors up to the horsepower ratings shown in this table will not result in nuisance tripping or premature motor failure. Unit warranty will not be affected.

NOTES:

1. All indoor-fan motors 5 hp and larger meet the minimum efficiency requirements as established by the Energy Policy Act of 1992 (EPACT) effective October 24, 1997.
2. High-static motor not available on size 150 and 151 units.

GENERAL NOTES FOR FAN PERFORMANCE DATA TABLES

1. Values include losses for filters, unit casing, and wet coils.
2. Extensive motor and electrical testing on these units ensures that the full range of the motor can be utilized with confidence. Using your fan motors up to the wattage ratings shown will not result in nuisance tripping or premature motor failure. Unit warranty will not be affected. See Evaporator-Fan Motor Performance data in Tables 10 for additional information.
3. Use of a field-supplied motor may affect wire sizing. Contact your Bryant representative for details.
4. Interpolation is permissible. Do not extrapolate.

Table 11 — Fan Performance 580F090,091 — Vertical Discharge Units; Standard Motor (Belt Drive)*

AIRFLOW (Cfm)	EXTERNAL STATIC PRESSURE (in. wg)														
	0.2			0.4			0.6			0.8			1.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
2250	**513**	**0.54**	**505**	595	0.76	713	665	1.01	940	728	1.27	1187	786	1.56	1453
2300	**521**	**0.57**	**531**	601	0.79	741	671	1.04	972	734	1.31	1222	791	1.60	1489
2400	**535**	**0.63**	**584**	615	0.86	802	684	1.11	1038	745	1.39	1293	802	1.68	1566
2500	**551**	**0.69**	**642**	628	0.93	866	696	1.19	1109	757	1.47	1369	813	1.77	1647
2550	**558**	**0.72**	**673**	635	0.97	900	702	1.23	1146	763	1.51	1409	818	1.81	1689
2600	**566**	**0.76**	**705**	642	1.00	935	709	1.27	1183	769	1.55	1450	824	1.86	1732
2700	**582**	**0.83**	**771**	656	1.08	1008	721	1.35	1263	781	1.65	1535	835	1.95	1823
2800	597	0.90	842	670	1.16	1086	734	1.44	1347	793	1.74	1625	**847**	**2.06**	**1917**
2900	613	0.98	918	684	1.25	1169	748	1.54	1436	805	1.84	1720	**859**	**2.16**	**2019**
3000	629	1.07	999	699	1.35	1256	761	1.64	1530	818	1.95	1820	**871**	**2.28**	**2125**
3100	645	1.16	1085	713	1.45	1349	775	1.75	1630	831	2.06	1925	**883**	**2.40**	**2235**
3200	662	1.26	1176	728	1.55	1448	788	1.86	1734	**844**	**2.18**	**2036**	—	—	—
3300	678	1.36	1272	743	1.66	1551	802	1.98	1845	**857**	**2.31**	**2152**	—	—	—
3400	694	1.47	1374	758	1.78	1660	816	2.10	1961	—	—	—	—	—	—
3500	711	1.59	1482	773	1.90	1775	831	2.23	2082	—	—	—	—	—	—
3600	727	1.71	1596	789	2.03	1896	**845**	**2.37**	**2210**	—	—	—	—	—	—
3700	744	1.84	1716	804	2.17	2023	—	—	—	—	—	—	—	—	—
3750	752	1.91	1778	812	2.24	2089	—	—	—	—	—	—	—	—	—

AIRFLOW (Cfm)	EXTERNAL STATIC PRESSURE (in. wg)														
	1.2			1.4			1.6			1.8			2.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
2250	839	1.86	1735	**889**	**2.18**	**2032**	—	—	—	—	—	—	—	—	—
2300	**844**	**1.90**	**1773**	**893**	**2.22**	**2073**	—	—	—	—	—	—	—	—	—
2400	**854**	**1.99**	**1855**	**903**	**2.32**	**2159**	—	—	—	—	—	—	—	—	—
2500	**865**	**2.08**	**1940**	—	—	—	—	—	—	—	—	—	—	—	—
2550	**870**	**2.13**	**1985**	—	—	—	—	—	—	—	—	—	—	—	—
2600	**875**	**2.18**	**2031**	—	—	—	—	—	—	—	—	—	—	—	—
2700	**886**	**2.28**	**2126**	—	—	—	—	—	—	—	—	—	—	—	—
2800	**897**	**2.39**	**2227**	—	—	—	—	—	—	—	—	—	—	—	—
2900	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
3000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
3100	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
3200	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
3300	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
3400	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
3500	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
3600	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
3700	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
3750	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

LEGEND

Bhp — Brake Horsepower Input to Fan
Watts — Input Watts to Motor

*Motor drive range: 590 to 840 rpm. All other rpms require field-supplied drive.

NOTES:

1. **Boldface** indicates field-supplied drive is required.
2. Maximum continuous bhp is 2.40.
3. See page 29 for General Fan Performance Notes.

Table 12 — Fan Performance 580F090,091 — Vertical Discharge Units; Alternate Motor (Belt Drive)*

AIRFLOW (Cfm)	EXTERNAL STATIC PRESSURE (in. wg)														
	0.2			0.4			0.6			0.8			1.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
2250	**513**	**0.54**	**505**	**595**	**0.76**	**713**	**665**	**1.01**	**940**	728	1.27	1187	786	1.56	1453
2300	**521**	**0.57**	**531**	**601**	**0.79**	**741**	**671**	**1.04**	**972**	734	1.31	1222	791	1.60	1489
2400	**535**	**0.63**	**584**	**615**	**0.86**	**802**	**684**	**1.11**	**1038**	745	1.39	1293	802	1.68	1566
2500	**551**	**0.69**	**642**	**628**	**0.93**	**866**	696	1.19	1109	757	1.47	1369	813	1.77	1647
2550	**558**	**0.72**	**673**	**635**	**0.97**	**900**	702	1.23	1146	763	1.51	1409	818	1.81	1689
2600	**566**	**0.76**	**705**	**642**	**1.00**	**935**	709	1.27	1183	769	1.55	1450	824	1.86	1732
2700	**582**	**0.83**	**771**	**656**	**1.08**	**1008**	721	1.35	1263	781	1.65	1535	835	1.95	1823
2800	**597**	**0.90**	**842**	**670**	**1.16**	**1086**	734	1.44	1347	793	1.74	1625	847	2.06	1917
2900	**613**	**0.98**	**918**	**684**	**1.25**	**1169**	748	1.54	1436	805	1.84	1720	859	2.16	2019
3000	**629**	**1.07**	**999**	699	1.35	1256	761	1.64	1530	818	1.95	1820	871	2.28	2125
3100	**645**	**1.16**	**1085**	713	1.45	1349	775	1.75	1630	831	2.06	1925	883	2.40	2235
3200	**662**	**1.26**	**1176**	728	1.55	1448	788	1.86	1734	844	2.18	2036	—	—	—
3300	**678**	**1.36**	**1272**	743	1.66	1551	802	1.98	1845	857	2.31	2152	—	—	—
3400	694	1.47	1374	758	1.78	1660	816	2.10	1961	—	—	—	—	—	—
3500	711	1.59	1482	773	1.90	1775	831	2.23	2082	—	—	—	—	—	—
3600	727	1.71	1596	789	2.03	1896	845	2.37	2210	—	—	—	—	—	—
3700	744	1.84	1716	804	2.17	2023	—	—	—	—	—	—	—	—	—
3750	752	1.91	1778	812	2.24	2089	—	—	—	—	—	—	—	—	—

AIRFLOW (Cfm)	EXTERNAL STATIC PRESSURE (in. wg)														
	1.2			1.4			1.6			1.8			2.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
2250	839	1.86	1735	889	2.18	2032	—	—	—	—	—	—	—	—	—
2300	844	1.90	1773	893	2.22	2073	—	—	—	—	—	—	—	—	—
2400	854	1.99	1855	903	2.32	2159	—	—	—	—	—	—	—	—	—
2500	865	2.08	1940	—	—	—	—	—	—	—	—	—	—	—	—
2550	870	2.13	1985	—	—	—	—	—	—	—	—	—	—	—	—
2600	875	2.18	2031	—	—	—	—	—	—	—	—	—	—	—	—
2700	886	2.28	2126	—	—	—	—	—	—	—	—	—	—	—	—
2800	897	2.39	2227	—	—	—	—	—	—	—	—	—	—	—	—
2900	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
3000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
3100	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
3200	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
3300	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
3400	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
3500	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
3600	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
3700	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
3750	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

LEGEND

Bhp — Brake Horsepower Input to Fan
Watts — Input Watts to Motor

*Motor drive range: 685 to 935 rpm. All other rpms require field-supplied drive.

NOTES:

1. **Boldface** indicates field-supplied drive is required.
2. Maximum continuous bhp is 2.40.
3. See page 29 for General Fan Performance Notes.

Table 13 — Fan Performance 580F090,091 — Vertical Discharge Units; High-Static Motor (Belt Drive)*

AIRFLOW (Cfm)	EXTERNAL STATIC PRESSURE (in. wg)														
	0.2			0.4			0.6			0.8			1.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
2250	**513**	**0.54**	**505**	**595**	**0.76**	**713**	**665**	**1.01**	**940**	**728**	**1.27**	**1187**	**786**	**1.56**	**1453**
2300	**521**	**0.57**	**531**	**601**	**0.79**	**741**	**671**	**1.04**	**972**	**734**	**1.31**	**1222**	**791**	**1.60**	**1489**
2400	**535**	**0.63**	**584**	**615**	**0.86**	**802**	**684**	**1.11**	**1038**	**745**	**1.39**	**1293**	**802**	**1.68**	**1566**
2500	**551**	**0.69**	**642**	**628**	**0.93**	**866**	**696**	**1.19**	**1109**	**757**	**1.47**	**1369**	**813**	**1.77**	**1647**
2550	**558**	**0.72**	**673**	**635**	**0.97**	**900**	**702**	**1.23**	**1146**	**763**	**1.51**	**1409**	**818**	**1.81**	**1689**
2600	**566**	**0.76**	**705**	**642**	**1.00**	**935**	**709**	**1.27**	**1183**	**769**	**1.55**	**1450**	**824**	**1.86**	**1732**
2700	**582**	**0.83**	**771**	**656**	**1.08**	**1008**	**721**	**1.35**	**1263**	**781**	**1.65**	**1535**	**835**	**1.95**	**1823**
2800	**597**	**0.90**	**842**	**670**	**1.16**	**1086**	**734**	**1.44**	**1347**	**793**	**1.74**	**1625**	**847**	**2.06**	**1917**
2900	**613**	**0.98**	**918**	**684**	**1.25**	**1169**	**748**	**1.54**	**1436**	**805**	**1.84**	**1720**	**859**	**2.16**	**2019**
3000	**629**	**1.07**	**999**	**699**	**1.35**	**1256**	**761**	**1.64**	**1530**	**818**	**1.95**	**1820**	871	2.28	2125
3100	**645**	**1.16**	**1085**	**713**	**1.45**	**1349**	**775**	**1.75**	**1630**	**831**	**2.06**	**1925**	883	2.40	2235
3200	**662**	**1.26**	**1176**	**728**	**1.55**	**1448**	**788**	**1.86**	**1734**	**844**	**2.18**	**2036**	895	2.52	2352
3300	**678**	**1.36**	**1272**	**743**	**1.66**	**1551**	**802**	**1.98**	**1845**	**857**	**2.31**	**2152**	908	2.65	2475
3400	**694**	**1.47**	**1374**	**758**	**1.78**	**1660**	**816**	**2.10**	**1961**	870	2.44	2275	920	2.79	2603
3500	**711**	**1.59**	**1482**	**773**	**1.90**	**1775**	**831**	**2.23**	**2082**	884	2.58	2402	933	2.93	2737
3600	**727**	**1.71**	**1596**	**789**	**2.03**	**1896**	**845**	**2.37**	**2210**	897	2.72	2537	946	3.09	2877
3700	**744**	**1.84**	**1716**	**804**	**2.17**	**2023**	860	2.51	2343	911	2.87	2677	959	3.24	3023
3750	**752**	**1.91**	**1778**	**812**	**2.24**	**2089**	867	2.59	2413	918	2.95	2750	966	3.32	3100

AIRFLOW (Cfm)	EXTERNAL STATIC PRESSURE (in. wg)														
	1.2			1.4			1.6			1.8			2.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
2250	**839**	**1.86**	**1735**	889	2.18	2032	935	2.52	2345	980	2.87	2673	1022	3.23	3015
2300	**844**	**1.90**	**1773**	893	2.22	2073	940	2.56	2389	984	2.91	2718	1027	3.28	3062
2400	**854**	**1.99**	**1855**	903	2.32	2159	950	2.66	2478	993	3.02	2812	1035	3.39	3159
2500	865	2.08	1940	913	2.41	2249	959	2.76	2573	1003	3.12	2911	1044	3.50	3261
2550	870	2.13	1985	918	2.46	2296	964	2.81	2622	1008	3.18	2962	1049	3.55	3315
2600	875	2.18	2031	923	2.51	2344	969	2.87	2673	1012	3.23	3014	1054	3.61	3370
2700	886	2.28	2126	934	2.62	2445	979	2.98	2777	1022	3.35	3123	—	—	—
2800	897	2.39	2227	944	2.73	2550	989	3.10	2888	1032	3.47	3238	—	—	—
2900	908	2.50	2333	955	2.85	2661	1000	3.22	3003	1042	3.60	3358	—	—	—
3000	920	2.62	2443	966	2.98	2777	1010	3.35	3123	—	—	—	—	—	—
3100	931	2.75	2560	977	3.11	2899	1021	3.49	3250	—	—	—	—	—	—
3200	943	2.88	2682	989	3.25	3026	1032	3.63	3383	—	—	—	—	—	—
3300	955	3.01	2810	1000	3.39	3159	—	—	—	—	—	—	—	—	—
3400	967	3.16	2945	1012	3.54	3299	—	—	—	—	—	—	—	—	—
3500	980	3.31	3084	1024	3.69	3445	—	—	—	—	—	—	—	—	—
3600	992	3.46	3230	—	—	—	—	—	—	—	—	—	—	—	—
3700	1005	3.63	3383	—	—	—	—	—	—	—	—	—	—	—	—
3750	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

LEGEND

Bhp — Brake Horsepower Input to Fan
Watts — Input Watts to Motor

*Motor drive range: 860 to 1080 rpm. All other rpms require field-supplied drive.

NOTES:

1. **Boldface** indicates field-supplied drive is required.
2. Maximum continuous bhp is 3.70.
3. See page 29 for General Fan Performance Notes.

Table 14 — Fan Performance 580F102,103 — Vertical Discharge Units; Standard Motor (Belt Drive)*

AIRFLOW (Cfm)	EXTERNAL STATIC PRESSURE (in. wg)														
	0.2			0.4			0.6			0.8			1.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
2550	**558**	**0.72**	**673**	**635**	**0.97**	**900**	702	1.23	1146	763	1.51	1409	818	1.81	1689
2600	**566**	**0.76**	**705**	**642**	**1.00**	**935**	709	1.27	1183	769	1.55	1450	824	1.86	1732
2700	**582**	**0.83**	**771**	**656**	**1.08**	**1008**	721	1.35	1263	781	1.65	1535	835	1.95	1823
2800	**597**	**0.90**	**842**	**670**	**1.16**	**1086**	734	1.44	1347	793	1.74	1625	847	2.06	1917
2900	**613**	**0.98**	**918**	**684**	**1.25**	**1169**	748	1.54	1436	805	1.84	1720	859	2.16	2019
3000	**629**	**1.07**	**999**	699	1.35	1256	761	1.64	1530	818	1.95	1820	871	2.28	2125
3100	**645**	**1.16**	**1085**	713	1.45	1349	775	1.75	1630	831	2.06	1925	883	2.40	2235
3200	**662**	**1.26**	**1176**	728	1.55	1448	788	1.86	1734	844	2.18	2036	—	—	—
3300	**678**	**1.36**	**1272**	743	1.66	1551	802	1.98	1845	857	2.31	2152	—	—	—
3400	694	1.47	1374	758	1.78	1660	816	2.10	1961	—	—	—	—	—	—
3500	711	1.59	1482	773	1.90	1775	831	2.23	2082	—	—	—	—	—	—
3600	727	1.71	1596	789	2.03	1896	845	2.37	2210	—	—	—	—	—	—
3700	744	1.84	1716	804	2.17	2023	—	—	—	—	—	—	—	—	—
3750	752	1.91	1778	812	2.24	2089	—	—	—	—	—	—	—	—	—
3800	761	1.98	1842	820	2.31	2156	—	—	—	—	—	—	—	—	—
3900	777	2.12	1974	—	—	—	—	—	—	—	—	—	—	—	—
4000	794	2.27	2113	—	—	—	—	—	—	—	—	—	—	—	—
4100	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
4200	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
4250	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

AIRFLOW (Cfm)	EXTERNAL STATIC PRESSURE (in. wg)														
	1.2			1.4			1.6			1.8			2.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
2550	870	2.13	1985	—	—	—	—	—	—	—	—	—	—	—	—
2600	875	2.18	2031	—	—	—	—	—	—	—	—	—	—	—	—
2700	886	2.28	2126	—	—	—	—	—	—	—	—	—	—	—	—
2800	897	2.39	2227	—	—	—	—	—	—	—	—	—	—	—	—
2900	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
3000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
3100	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
3200	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
3300	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
3400	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
3500	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
3600	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
3700	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
3750	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
3800	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
3900	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
4000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
4100	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
4200	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
4250	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

LEGEND

Bhp — Brake Horsepower Input to Fan
Watts — Input Watts to Motor

*Motor drive range: 685 to 935 rpm. All other rpms require field-supplied drive.

NOTES:

1. **Boldface** indicates field-supplied drive is required.
2. Maximum continuous bhp is 2.40.
3. See page 29 for General Fan Performance Notes.

Table 15 — Fan Performance 580F102,103 — Vertical Discharge Units; High-Static Motor (Belt Drive)*

AIRFLOW (Cfm)	EXTERNAL STATIC PRESSURE (in. wg)														
	0.2			0.4			0.6			0.8			1.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
2550	**558**	**0.72**	**673**	**635**	**0.97**	**900**	**702**	**1.23**	**1146**	**763**	**1.51**	**1409**	**818**	**1.81**	**1689**
2600	**566**	**0.76**	**705**	**642**	**1.00**	**935**	**709**	**1.27**	**1183**	**769**	**1.55**	**1450**	**824**	**1.86**	**1732**
2700	**582**	**0.83**	**771**	**656**	**1.08**	**1008**	**721**	**1.35**	**1263**	**781**	**1.65**	**1535**	**835**	**1.95**	**1823**
2800	**597**	**0.90**	**842**	**670**	**1.16**	**1086**	**734**	**1.44**	**1347**	**793**	**1.74**	**1625**	**847**	**2.06**	**1917**
2900	**613**	**0.98**	**918**	**684**	**1.25**	**1169**	**748**	**1.54**	**1436**	**805**	**1.84**	**1720**	**859**	**2.16**	**2019**
3000	**629**	**1.07**	**999**	**699**	**1.35**	**1256**	**761**	**1.64**	**1530**	**818**	**1.95**	**1820**	871	2.28	2125
3100	**645**	**1.16**	**1085**	**713**	**1.45**	**1349**	**775**	**1.75**	**1630**	**831**	**2.06**	**1925**	883	2.40	2235
3200	**662**	**1.26**	**1176**	**728**	**1.55**	**1448**	**788**	**1.86**	**1734**	**844**	**2.18**	**2036**	895	2.52	2352
3300	**678**	**1.36**	**1272**	**743**	**1.66**	**1551**	**802**	**1.98**	**1845**	**857**	**2.31**	**2152**	908	2.65	2475
3400	**694**	**1.47**	**1374**	**758**	**1.78**	**1660**	**816**	**2.10**	**1961**	870	2.44	2275	920	2.79	2603
3500	**711**	**1.59**	**1482**	**773**	**1.90**	**1775**	**831**	**2.23**	**2082**	884	2.58	2402	933	2.93	2737
3600	**727**	**1.71**	**1596**	**789**	**2.03**	**1896**	**845**	**2.37**	**2210**	897	2.72	2537	946	3.09	2877
3700	**744**	**1.84**	**1716**	**804**	**2.17**	**2023**	860	2.51	2343	911	2.87	2677	959	3.24	3023
3750	**752**	**1.91**	**1778**	**812**	**2.24**	**2089**	867	2.59	2413	918	2.95	2750	966	3.32	3100
3800	**761**	**1.98**	**1842**	**820**	**2.31**	**2156**	874	2.66	2484	925	3.03	2824	973	3.41	3177
3900	**777**	**2.12**	**1974**	**835**	**2.46**	**2296**	889	2.82	2630	939	3.19	2977	986	3.58	3336
4000	**794**	**2.27**	**2113**	**851**	**2.62**	**2442**	904	2.99	2784	953	3.36	3137	—	—	—
4100	**811**	**2.42**	**2259**	867	2.78	2595	919	3.16	2944	968	3.54	3304	—	—	—
4200	**828**	**2.59**	**2412**	883	2.95	2755	934	3.34	3110	—	—	—	—	—	—
4250	**837**	**2.67**	**2490**	891	3.04	2838	942	3.43	3197	—	—	—	—	—	—

AIRFLOW (Cfm)	EXTERNAL STATIC PRESSURE (in. wg)														
	1.2			1.4			1.6			1.8			2.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
2550	870	2.13	1985	918	2.46	2296	964	2.81	2622	1008	3.18	2962	1049	3.55	3315
2600	875	2.18	2031	923	2.51	2344	969	2.87	2673	1012	3.23	3014	1054	3.61	3370
2700	886	2.28	2126	934	2.62	2445	979	2.98	2777	1022	3.35	3123	—	—	—
2800	897	2.39	2227	944	2.73	2550	989	3.10	2888	1032	3.47	3238	—	—	—
2900	908	2.50	2333	955	2.85	2661	1000	3.22	3003	1042	3.60	3358	—	—	—
3000	920	2.62	2443	966	2.98	2777	1010	3.35	3123	—	—	—	—	—	—
3100	931	2.75	2560	977	3.11	2899	1021	3.49	3250	—	—	—	—	—	—
3200	943	2.88	2682	989	3.25	3026	1032	3.63	3383	—	—	—	—	—	—
3300	955	3.01	2810	1000	3.39	3159	—	—	—	—	—	—	—	—	—
3400	967	3.16	2945	1012	3.54	3299	—	—	—	—	—	—	—	—	—
3500	980	3.31	3084	1024	3.69	3445	—	—	—	—	—	—	—	—	—
3600	992	3.46	3230	—	—	—	—	—	—	—	—	—	—	—	—
3700	1005	3.63	3383	—	—	—	—	—	—	—	—	—	—	—	—
3750	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
3800	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
3900	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
4000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
4100	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
4200	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
4250	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

LEGEND

Bhp — Brake Horsepower Input to Fan
Watts — Input Watts to Motor

*Motor drive range: 860 to 1080 rpm. All other rpms require field-supplied drive.

NOTES:

1. **Boldface** indicates field-supplied drive is required.
2. Maximum continuous bhp is 3.70.
3. See page 29 for General Fan Performance Notes.

Table 16 — Fan Performance 580F120,121 — Vertical Discharge Units; Standard Motor (Belt Drive)*

AIRFLOW (Cfm)	EXTERNAL STATIC PRESSURE (in. wg)														
	0.2			0.4			0.6			0.8			1.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
3000	726	0.75	656	793	0.94	822	853	1.14	997	910	1.35	1181	**962**	**1.56**	**1373**
3100	746	0.81	713	811	1.01	883	870	1.21	1062	926	1.42	1250	**978**	**1.65**	**1447**
3200	766	0.88	773	829	1.08	947	887	1.29	1131	**942**	**1.51**	**1323**	**993**	**1.74**	**1524**
3300	786	0.95	836	847	1.16	1016	905	1.37	1204	**958**	**1.60**	**1400**	**1008**	**1.83**	**1604**
3400	806	1.03	904	866	1.24	1088	922	1.46	1280	**975**	**1.69**	**1481**	**1024**	**1.92**	**1689**
3500	826	1.11	975	885	1.33	1163	**940**	**1.55**	**1360**	**991**	**1.78**	**1565**	**1040**	**2.03**	**1778**
3600	846	1.20	1050	904	1.42	1243	**958**	**1.65**	**1444**	**1008**	**1.88**	**1654**	**1056**	**2.13**	**1870**
3700	866	1.29	1129	923	1.51	1327	**975**	**1.75**	**1532**	**1025**	**1.99**	**1746**	**1073**	**2.24**	**1967**
3800	886	1.38	1212	**942**	**1.61**	**1415**	**994**	**1.85**	**1625**	**1043**	**2.10**	**1843**	**1089**	**2.36**	**2068**
3900	907	1.48	1299	**961**	**1.72**	**1507**	**1012**	**1.96**	**1722**	**1060**	**2.21**	**1944**	—	—	—
4000	927	1.58	1391	**980**	**1.83**	**1603**	**1030**	**2.08**	**1823**	**1078**	**2.33**	**2049**	—	—	—
4100	**948**	**1.69**	**1487**	**1000**	**1.94**	**1704**	**1049**	**2.20**	**1928**	—	—	—	—	—	—
4200	**968**	**1.81**	**1588**	**1019**	**2.06**	**1809**	**1067**	**2.32**	**2038**	—	—	—	—	—	—
4300	**989**	**1.93**	**1694**	**1039**	**2.19**	**1920**	—	—	—	—	—	—	—	—	—
4400	**1009**	**2.06**	**1804**	**1058**	**2.32**	**2034**	—	—	—	—	—	—	—	—	—
4500	**1030**	**2.19**	**1919**	—	—	—	—	—	—	—	—	—	—	—	—
4600	**1051**	**2.32**	**2039**	—	—	—	—	—	—	—	—	—	—	—	—
4700	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
4800	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
4900	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
5000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

AIRFLOW (Cfm)	EXTERNAL STATIC PRESSURE (in. wg)														
	1.2			1.4			1.6			1.8			2.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
3000	**1012**	**1.79**	**1574**	**1060**	**2.03**	**1781**	**1105**	**2.28**	**1997**	—	—	—	—	—	—
3100	**1027**	**1.88**	**1651**	**1073**	**2.12**	**1863**	**1118**	**2.37**	**2081**	—	—	—	—	—	—
3200	**1041**	**1.97**	**1732**	**1088**	**2.22**	**1947**	—	—	—	—	—	—	—	—	—
3300	**1056**	**2.07**	**1817**	**1102**	**2.32**	**2036**	—	—	—	—	—	—	—	—	—
3400	**1071**	**2.17**	**1905**	—	—	—	—	—	—	—	—	—	—	—	—
3500	**1087**	**2.28**	**1998**	—	—	—	—	—	—	—	—	—	—	—	—
3600	**1102**	**2.39**	**2094**	—	—	—	—	—	—	—	—	—	—	—	—
3700	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
3800	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
3900	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
4000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
4100	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
4200	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
4300	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
4400	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
4500	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
4600	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
4700	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
4800	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
4900	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
5000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

LEGEND

Bhp — Brake Horsepower Input to Fan
Watts — Input Watts to Motor

*Motor drive range: 685 to 935 rpm. All other rpms require field-supplied drive.

NOTES:

1. **Boldface** indicates field-supplied drive is required.
2. Maximum continuous bhp is 2.40.
3. See page 29 for General Fan Performance Notes.

Table 17 — Fan Performance 580120,121 — Vertical Discharge Units; Alternate Motor (Belt Drive)*

AIRFLOW (Cfm)	EXTERNAL STATIC PRESSURE (in. wg)														
	0.2			0.4			0.6			0.8			1.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
3000	**726**	**0.75**	**656**	**793**	**0.94**	**822**	853	1.14	997	910	1.35	1181	962	1.56	1373
3100	**746**	**0.81**	**713**	**811**	**1.01**	**883**	870	1.21	1062	926	1.42	1250	978	1.65	1447
3200	**766**	**0.88**	**773**	**829**	**1.08**	**947**	887	1.29	1131	942	1.51	1323	993	1.74	1524
3300	**786**	**0.95**	**836**	847	1.16	1016	905	1.37	1204	958	1.60	1400	1008	1.83	1604
3400	**806**	**1.03**	**904**	866	1.24	1088	922	1.46	1280	975	1.69	1481	1024	1.92	1689
3500	**826**	**1.11**	**975**	885	1.33	1163	940	1.55	1360	991	1.78	1565	1040	2.03	1778
3600	846	1.20	1050	904	1.42	1243	958	1.65	1444	1008	1.88	1654	1056	2.13	1870
3700	866	1.29	1129	923	1.51	1327	975	1.75	1532	1025	1.99	1746	1073	2.24	1967
3800	886	1.38	1212	942	1.61	1415	994	1.85	1625	1043	2.10	1843	**1089**	**2.36**	**2068**
3900	907	1.48	1299	961	1.72	1507	1012	1.96	1722	1060	2.21	1944	**1106**	**2.48**	**2173**
4000	927	1.58	1391	980	1.83	1603	1030	2.08	1823	1078	2.33	2049	**1123**	**2.60**	**2283**
4100	948	1.69	1487	1000	1.94	1704	1049	2.20	1928	**1095**	**2.46**	**2159**	**1140**	**2.73**	**2397**
4200	968	1.81	1588	1019	2.06	1809	1067	2.32	2038	**1113**	**2.59**	**2274**	**1157**	**2.87**	**2516**
4300	989	1.93	1694	1039	2.19	1920	**1086**	**2.45**	**2153**	**1131**	**2.73**	**2393**	—	—	—
4400	1009	2.06	1804	1058	2.32	2034	**1105**	**2.59**	**2272**	**1149**	**2.87**	**2517**	—	—	—
4500	1030	2.19	1919	1078	2.45	2154	**1124**	**2.73**	**2397**	—	—	—	—	—	—
4600	1051	2.32	2039	**1098**	**2.60**	**2279**	**1143**	**2.88**	**2527**	—	—	—	—	—	—
4700	1071	2.47	2165	**1118**	**2.75**	**2409**	—	—	—	—	—	—	—	—	—
4800	**1092**	**2.62**	**2295**	**1138**	**2.90**	**2545**	—	—	—	—	—	—	—	—	—
4900	**1113**	**2.77**	**2431**	—	—	—	—	—	—	—	—	—	—	—	—
5000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

AIRFLOW (Cfm)	EXTERNAL STATIC PRESSURE (in. wg)														
	1.2			1.4			1.6			1.8			2.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
3000	1012	1.79	1574	1060	2.03	1781	**1105**	**2.28**	**1997**	**1148**	**2.53**	**2219**	**1190**	**2.79**	**2449**
3100	1027	1.88	1651	1073	2.12	1863	**1118**	**2.37**	**2081**	**1161**	**2.63**	**2308**	**1202**	**2.89**	**2540**
3200	1041	1.97	1732	**1088**	**2.22**	**1947**	**1132**	**2.47**	**2170**	**1174**	**2.73**	**2400**	—	—	—
3300	1056	2.07	1817	**1102**	**2.32**	**2036**	**1146**	**2.58**	**2262**	**1188**	**2.84**	**2496**	—	—	—
3400	1071	2.17	1905	**1116**	**2.43**	**2128**	**1160**	**2.69**	**2359**	—	—	—	—	—	—
3500	**1087**	**2.28**	**1998**	**1131**	**2.53**	**2225**	**1174**	**2.80**	**2459**	—	—	—	—	—	—
3600	**1102**	**2.39**	**2094**	**1146**	**2.65**	**2326**	—	—	—	—	—	—	—	—	—
3700	**1118**	**2.50**	**2195**	**1162**	**2.77**	**2430**	—	—	—	—	—	—	—	—	—
3800	**1134**	**2.62**	**2300**	**1177**	**2.89**	**2539**	—	—	—	—	—	—	—	—	—
3900	**1150**	**2.75**	**2410**	—	—	—	—	—	—	—	—	—	—	—	—
4000	**1167**	**2.88**	**2524**	—	—	—	—	—	—	—	—	—	—	—	—
4100	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
4200	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
4300	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
4400	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
4500	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
4600	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
4700	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
4800	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
4900	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
5000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

LEGEND

Bhp — Brake Horsepower Input to Fan
Watts — Input Watts to Motor

*Motor drive range: 835 to 1085 rpm. All other rpms require field-supplied drive.

NOTES:

1. **Boldface** indicates field-supplied drive is required.
2. Maximum continuous bhp is 2.90.
3. See page 29 for General Fan Performance Notes.

Table 18 — Fan Performance 580F120,121 — Vertical Discharge Units; High-Static Motor (Belt Drive)*

AIRFLOW (Cfm)	EXTERNAL STATIC PRESSURE (in. wg)														
	0.2			0.4			0.6			0.8			1.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
3000	**726**	**0.75**	**656**	**793**	**0.94**	**822**	853	1.14	997	910	1.35	1181	962	1.56	1373
3100	**746**	**0.81**	**713**	**811**	**1.01**	**883**	870	1.21	1062	926	1.42	1250	978	1.65	1447
3200	**766**	**0.88**	**773**	**829**	**1.08**	**947**	887	1.29	1131	942	1.51	1323	993	1.74	1524
3300	**786**	**0.95**	**836**	847	1.16	1016	905	1.37	1204	958	1.60	1400	1008	1.83	1604
3400	**806**	**1.03**	**904**	866	1.24	1088	922	1.46	1280	975	1.69	1481	1024	1.92	1689
3500	**826**	**1.11**	**975**	885	1.33	1163	940	1.55	1360	991	1.78	1565	1040	2.03	1778
3600	846	1.20	1050	904	1.42	1243	958	1.65	1444	1008	1.88	1654	1056	2.13	1870
3700	866	1.29	1129	923	1.51	1327	975	1.75	1532	1025	1.99	1746	1073	2.24	1967
3800	886	1.38	1212	942	1.61	1415	994	1.85	1625	1043	2.10	1843	1089	2.36	2068
3900	907	1.48	1299	961	1.72	1507	1012	1.96	1722	1060	2.21	1944	1106	2.48	2173
4000	927	1.58	1391	980	1.83	1603	1030	2.08	1823	1078	2.33	2049	1123	2.60	2283
4100	948	1.69	1487	1000	1.94	1704	1049	2.20	1928	1095	2.46	2159	**1140**	**2.73**	**2397**
4200	968	1.81	1588	1019	2.06	1809	1067	2.32	2038	1113	2.59	2274	**1157**	**2.87**	**2516**
4300	989	1.93	1694	1039	2.19	1920	1086	2.45	2153	**1131**	**2.73**	**2393**	**1175**	**3.01**	**2640**
4400	1009	2.06	1804	1058	2.32	2034	1105	2.59	2272	**1149**	**2.87**	**2517**	**1192**	**3.15**	**2768**
4500	1030	2.19	1919	1078	2.45	2154	1124	2.73	2397	**1168**	**3.01**	**2646**	**1210**	**3.31**	**2901**
4600	1051	2.32	2039	1098	2.60	2279	**1143**	**2.88**	**2527**	**1186**	**3.17**	**2780**	**1228**	**3.46**	**3040**
4700	1071	2.47	2165	1118	2.75	2409	**1162**	**3.03**	**2661**	**1205**	**3.33**	**2919**	**1245**	**3.63**	**3184**
4800	1092	2.62	2295	**1138**	**2.90**	**2545**	**1181**	**3.19**	**2801**	**1223**	**3.49**	**3064**	**1264**	**3.80**	**3333**
4900	1113	2.77	2431	**1158**	**3.06**	**2685**	**1201**	**3.36**	**2947**	**1242**	**3.66**	**3214**	**1282**	**3.97**	**3487**
5000	**1134**	**2.93**	**2572**	**1178**	**3.23**	**2832**	**1220**	**3.53**	**3097**	**1261**	**3.84**	**3369**	**1300**	**4.16**	**3647**

AIRFLOW (Cfm)	EXTERNAL STATIC PRESSURE (in. wg)														
	1.2			1.4			1.6			1.8			2.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
3000	1012	1.79	1574	1060	2.03	1781	1105	2.28	1997	**1148**	**2.53**	**2219**	**1190**	**2.79**	**2449**
3100	1027	1.88	1651	1073	2.12	1863	1118	2.37	2081	**1161**	**2.63**	**2308**	**1202**	**2.89**	**2540**
3200	1041	1.97	1732	1088	2.22	1947	**1132**	**2.47**	**2170**	**1174**	**2.73**	**2400**	**1215**	**3.00**	**2636**
3300	1056	2.07	1817	1102	2.32	2036	**1146**	**2.58**	**2262**	**1188**	**2.84**	**2496**	**1228**	**3.12**	**2735**
3400	1071	2.17	1905	1116	2.43	2128	**1160**	**2.69**	**2359**	**1201**	**2.96**	**2595**	**1241**	**3.23**	**2839**
3500	1087	2.28	1998	**1131**	**2.53**	**2225**	**1174**	**2.80**	**2459**	**1215**	**3.08**	**2699**	**1255**	**3.36**	**2946**
3600	1102	2.39	2094	**1146**	**2.65**	**2326**	**1188**	**2.92**	**2563**	**1229**	**3.20**	**2808**	**1268**	**3.48**	**3058**
3700	1118	2.50	2195	**1162**	**2.77**	**2430**	**1203**	**3.04**	**2672**	**1243**	**3.33**	**2920**	**1282**	**3.62**	**3174**
3800	**1134**	**2.62**	**2300**	**1177**	**2.89**	**2539**	**1218**	**3.17**	**2785**	**1258**	**3.46**	**3036**	**1296**	**3.75**	**3295**
3900	**1150**	**2.75**	**2410**	**1193**	**3.02**	**2653**	**1233**	**3.31**	**2902**	**1273**	**3.60**	**3158**	**1311**	**3.90**	**3420**
4000	**1167**	**2.88**	**2524**	**1208**	**3.16**	**2770**	**1249**	**3.45**	**3024**	**1287**	**3.74**	**3284**	**1325**	**4.04**	**3549**
4100	**1183**	**3.01**	**2642**	**1224**	**3.30**	**2893**	**1264**	**3.59**	**3151**	**1302**	**3.89**	**3414**	**1340**	**4.20**	**3683**
4200	**1200**	**3.15**	**2765**	**1240**	**3.44**	**3020**	**1280**	**3.74**	**3282**	**1318**	**4.04**	**3549**	**1355**	**4.36**	**3823**
4300	**1216**	**3.30**	**2893**	**1257**	**3.59**	**3152**	**1295**	**3.89**	**3418**	**1333**	**4.20**	**3690**	**1370**	**4.52**	**3967**
4400	**1233**	**3.45**	**3025**	**1273**	**3.75**	**3289**	**1311**	**4.05**	**3559**	**1349**	**4.37**	**3834**	**1385**	**4.69**	**4116**
4500	**1250**	**3.60**	**3163**	**1290**	**3.91**	**3431**	**1328**	**4.22**	**3705**	**1364**	**4.54**	**3985**	—	—	—
4600	**1268**	**3.77**	**3306**	**1306**	**4.08**	**3578**	**1344**	**4.39**	**3856**	**1380**	**4.72**	**4140**	—	—	—
4700	**1285**	**3.94**	**3454**	**1323**	**4.25**	**3730**	**1360**	**4.57**	**4013**	**1396**	**4.90**	**4300**	—	—	—
4800	**1303**	**4.11**	**3608**	**1340**	**4.43**	**3888**	**1377**	**4.76**	**4175**	—	—	—	—	—	—
4900	**1320**	**4.29**	**3766**	**1357**	**4.62**	**4051**	**1394**	**4.95**	**4342**	—	—	—	—	—	—
5000	**1338**	**4.48**	**3930**	**1375**	**4.81**	**4219**	—	—	—	—	—	—	—	—	—

LEGEND

Bhp — Brake Horsepower Input to Fan
Watts — Input Watts to Motor

*Motor drive range: 830 to 1130 rpm. All other rpms require field-supplied drive.

NOTES:

1. **Boldface** indicates field-supplied drive is required.
2. Maximum continuous bhp is 5.25.
3. See page 29 for General Fan Performance Notes.

Table 19 — Fan Performance 580F150,151 — Vertical Discharge Units; Standard Motor (Belt Drive)*

AIRFLOW (Cfm)	EXTERNAL STATIC PRESSURE (in. wg)														
	0.2			0.4			0.6			0.8			1.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
3700	**728**	**1.36**	**1266**	**789**	**1.58**	**1473**	**848**	**1.81**	**1686**	904	2.04	1906	957	2.29	2132
3800	**744**	**1.46**	**1361**	**804**	**1.69**	**1572**	861	1.92	1790	916	2.16	2015	969	2.41	2246
3900	**760**	**1.57**	**1460**	**819**	**1.80**	**1676**	875	2.04	1899	929	2.28	2128	981	2.53	2364
4000	**777**	**1.68**	**1563**	**834**	**1.91**	**1785**	889	2.16	2012	942	2.41	2247	993	2.67	2487
4100	**793**	**1.79**	**1672**	**850**	**2.04**	**1899**	904	2.29	2132	956	2.54	2371	1006	2.80	2615
4200	**810**	**1.92**	**1786**	865	2.16	2018	918	2.42	2255	969	2.68	2499	1018	2.95	2748
4300	**826**	**2.04**	**1906**	880	2.30	2142	932	2.56	2385	983	2.82	2633	1031	3.10	2888
4400	**843**	**2.18**	**2031**	896	2.44	2272	947	2.70	2520	996	2.97	2773	1044	3.25	3032
4500	860	2.32	2161	912	2.58	2408	962	2.85	2660	1010	3.13	2918	1057	3.41	3182
4600	876	2.46	2297	927	2.73	2549	977	3.01	2807	1024	3.29	3070	1070	3.58	3338
4700	893	2.62	2439	943	2.89	2696	992	3.17	2958	1038	3.46	3226	—	—	—
4800	910	2.77	2587	959	3.06	2849	1007	3.34	3116	1053	3.63	3390	—	—	—
4900	927	2.94	2741	975	3.23	3008	1022	3.52	3280	—	—	—	—	—	—
5000	944	3.11	2901	991	3.40	3173	1037	3.70	3451	—	—	—	—	—	—
5100	961	3.29	3068	1007	3.59	3345	—	—	—	—	—	—	—	—	—
5200	978	3.48	3241	—	—	—	—	—	—	—	—	—	—	—	—
5300	995	3.67	3420	—	—	—	—	—	—	—	—	—	—	—	—
5400	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
5500	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
5600	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
5700	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
5800	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
5900	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
6000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
6100	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
6200	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
6300	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

AIRFLOW (Cfm)	EXTERNAL STATIC PRESSURE (in. wg)														
	1.2			1.4			1.6			1.8			2.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
3700	1008	2.54	2364	1058	2.79	2602	**1106**	**3.05**	**2846**	**1152**	**3.32**	**3094**	**1198**	**3.59**	**3348**
3800	1019	2.66	2482	1068	2.92	2725	**1116**	**3.19**	**2972**	**1162**	**3.46**	**3226**	—	—	—
3900	1031	2.79	2605	1079	3.06	2852	**1126**	**3.33**	**3104**	**1171**	**3.61**	**3362**	—	—	—
4000	1042	2.93	2733	**1090**	**3.20**	**2984**	**1136**	**3.48**	**3241**	—	—	—	—	—	—
4100	1054	3.07	2866	**1101**	**3.35**	**3122**	**1146**	**3.63**	**3383**	—	—	—	—	—	—
4200	1066	3.22	3004	**1112**	**3.50**	**3264**	—	—	—	—	—	—	—	—	—
4300	1078	3.38	3148	**1123**	**3.66**	**3413**	—	—	—	—	—	—	—	—	—
4400	**1090**	**3.54**	**3297**	—	—	—	—	—	—	—	—	—	—	—	—
4500	**1103**	**3.70**	**3451**	—	—	—	—	—	—	—	—	—	—	—	—
4600	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
4700	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
4800	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
4900	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
5000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
5100	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
5200	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
5300	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
5400	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
5500	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
5600	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
5700	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
5800	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
5900	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
6000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
6100	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
6200	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
6300	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

LEGEND

Bhp — Brake Horsepower Input to Fan
Watts — Input Watts to Motor

*Motor drive range: 860 to 1080 rpm. All other rpms require field-supplied drive.

NOTES:

1. **Boldface** indicates field-supplied drive is required.
2. Maximum continuous bhp is 3.70.
3. See page 29 for General Fan Performance Notes.

Table 20 — Fan Performance 580F150,151 — Vertical Discharge Units; Alternate Motor (Belt Drive)*

AIRFLOW (Cfm)	EXTERNAL STATIC PRESSURE (in. wg)														
	0.2			0.4			0.6			0.8			1.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
3700	**728**	**1.36**	**1266**	**789**	**1.58**	**1473**	848	1.81	1686	904	2.04	1906	957	2.29	2132
3800	**744**	**1.46**	**1361**	**804**	**1.69**	**1572**	861	1.92	1790	916	2.16	2015	969	2.41	2246
3900	**760**	**1.57**	**1460**	**819**	**1.80**	**1676**	875	2.04	1899	929	2.28	2128	981	2.53	2364
4000	**777**	**1.68**	**1563**	834	1.91	1785	889	2.16	2012	942	2.41	2247	993	2.67	2487
4100	**793**	**1.79**	**1672**	850	2.04	1899	904	2.29	2132	956	2.54	2371	1006	2.80	2615
4200	**810**	**1.92**	**1786**	865	2.16	2018	918	2.42	2255	969	2.68	2499	1018	2.95	2748
4300	**826**	**2.04**	**1906**	880	2.30	2142	932	2.56	2385	983	2.82	2633	1031	3.10	2888
4400	843	2.18	2031	896	2.44	2272	947	2.70	2520	996	2.97	2773	1044	3.25	3032
4500	860	2.32	2161	912	2.58	2408	962	2.85	2660	1010	3.13	2918	1057	3.41	3182
4600	876	2.46	2297	927	2.73	2549	977	3.01	2807	1024	3.29	3070	1070	3.58	3338
4700	893	2.62	2439	943	2.89	2696	992	3.17	2958	1038	3.46	3226	1084	3.75	3500
4800	910	2.77	2587	959	3.06	2849	1007	3.34	3116	1053	3.63	3390	1098	3.93	3668
4900	927	2.94	2741	975	3.23	3008	1022	3.52	3280	1067	3.82	3558	1111	4.12	3841
5000	944	3.11	2901	991	3.40	3173	1037	3.70	3451	1082	4.00	3733	1125	4.31	4021
5100	961	3.29	3068	1007	3.59	3345	1053	3.89	3627	1096	4.20	3915	**1139**	**4.51**	**4208**
5200	978	3.48	3241	1024	3.78	3523	1068	4.09	3811	1111	4.40	4103	**1153**	**4.72**	**4400**
5300	995	3.67	3420	1040	3.98	3707	1084	4.29	4000	1126	4.61	4298	**1168**	**4.93**	**4600**
5400	1012	3.87	3606	1056	4.18	3899	1099	4.50	4196	**1141**	**4.82**	**4499**	**1182**	**5.15**	**4806**
5500	1029	4.07	3799	1073	4.39	4097	1115	4.72	4400	**1156**	**5.05**	**4707**	—	—	—
5600	1046	4.29	3999	1089	4.61	4302	**1131**	**4.94**	**4610**	—	—	—	—	—	—
5700	1063	4.51	4207	1105	4.84	4515	**1146**	**5.18**	**4827**	—	—	—	—	—	—
5800	1080	4.74	4420	1122	5.08	4734	—	—	—	—	—	—	—	—	—
5900	1098	4.98	4642	—	—	—	—	—	—	—	—	—	—	—	—
6000	1115	5.22	4872	—	—	—	—	—	—	—	—	—	—	—	—
6100	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
6200	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
6300	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

AIRFLOW (Cfm)	EXTERNAL STATIC PRESSURE (in. wg)														
	1.2			1.4			1.6			1.8			2.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
3700	1008	2.54	2364	1058	2.79	2602	1106	3.05	2846	**1152**	**3.32**	**3094**	**1198**	**3.59**	**3348**
3800	1019	2.66	2482	1068	2.92	2725	1116	3.19	2972	**1162**	**3.46**	**3226**	**1206**	**3.74**	**3484**
3900	1031	2.79	2605	1079	3.06	2852	1126	3.33	3104	**1171**	**3.61**	**3362**	**1215**	**3.89**	**3624**
4000	1042	2.93	2733	1090	3.20	2984	**1136**	**3.48**	**3241**	**1180**	**3.76**	**3503**	**1224**	**4.04**	**3770**
4100	1054	3.07	2866	1101	3.35	3122	**1146**	**3.63**	**3383**	**1190**	**3.91**	**3649**	**1233**	**4.20**	**3921**
4200	1066	3.22	3004	1112	3.50	3264	**1157**	**3.79**	**3530**	**1200**	**4.08**	**3801**	**1243**	**4.37**	**4077**
4300	1078	3.38	3148	1123	3.66	3413	**1167**	**3.95**	**3683**	**1210**	**4.24**	**3958**	**1252**	**4.54**	**4238**
4400	1090	3.54	3297	**1135**	**3.82**	**3566**	**1179**	**4.12**	**3841**	**1221**	**4.42**	**4121**	**1262**	**4.72**	**4405**
4500	1103	3.70	3451	**1147**	**4.00**	**3726**	**1190**	**4.29**	**4005**	**1232**	**4.60**	**4289**	**1273**	**4.91**	**4578**
4600	1115	3.87	3612	**1159**	**4.17**	**3891**	**1201**	**4.48**	**4175**	**1243**	**4.79**	**4464**	**1283**	**5.10**	**4757**
4700	1128	4.05	3778	**1171**	**4.36**	**4062**	**1213**	**4.67**	**4350**	**1254**	**4.98**	**4644**	—	—	—
4800	**1141**	**4.24**	**3951**	**1183**	**4.55**	**4239**	**1225**	**4.86**	**4532**	**1265**	**5.18**	**4830**	—	—	—
4900	**1154**	**4.43**	**4130**	**1196**	**4.74**	**4422**	**1237**	**5.06**	**4720**	—	—	—	—	—	—
5000	**1167**	**4.63**	**4314**	**1209**	**4.95**	**4611**	—	—	—	—	—	—	—	—	—
5100	**1181**	**4.83**	**4505**	**1221**	**5.16**	**4808**	—	—	—	—	—	—	—	—	—
5200	**1194**	**5.04**	**4703**	—	—	—	—	—	—	—	—	—	—	—	—
5300	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
5400	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
5500	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
5600	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
5700	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
5800	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
5900	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
6000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
6100	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
6200	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
6300	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

LEGEND

Bhp — Brake Horsepower Input to Fan
Watts — Input Watts to Motor

*Motor drive range: 830 to 1130 rpm. All other rpms require field-supplied drive.

NOTES:

1. **Boldface** indicates field-supplied drive is required.
2. Maximum continuous bhp is 5.25.
3. See page 29 for General Fan Performance Notes.

Table 21 — Fan Performance 580F090,091 — Horizontal Discharge Units; Standard Motor (Belt Drive)*

AIRFLOW (Cfm)	EXTERNAL STATIC PRESSURE (in. wg)														
	0.2			0.4			0.6			0.8			1.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
2250	**505**	**0.52**	**484**	**586**	**0.73**	**681**	657	0.97	901	722	1.22	1142	782	1.50	1403
2300	**513**	**0.55**	**509**	592	0.76	708	663	1.00	931	727	1.26	1174	787	1.54	1437
2400	**527**	**0.60**	**561**	605	0.82	766	674	1.07	993	738	1.33	1241	796	1.62	1508
2500	**543**	**0.66**	**617**	618	0.89	828	686	1.14	1060	748	1.41	1312	806	1.70	1583
2550	**550**	**0.69**	**647**	625	0.92	860	692	1.17	1095	754	1.45	1349	811	1.74	1623
2600	**558**	**0.73**	**677**	632	0.96	894	698	1.21	1131	759	1.49	1388	816	1.78	1664
2700	**574**	**0.80**	**742**	645	1.03	964	710	1.29	1207	770	1.58	1469	826	1.88	1749
2800	**589**	**0.87**	**811**	659	1.11	1039	723	1.38	1287	782	1.67	1554	837	1.97	1839
2900	605	0.95	885	673	1.20	1119	736	1.47	1372	794	1.76	1644	**848**	**2.07**	**1933**
3000	621	1.03	963	688	1.29	1204	749	1.57	1463	806	1.87	1740	**859**	**2.18**	**2033**
3100	637	1.12	1046	702	1.39	1293	762	1.67	1558	818	1.97	1840	**871**	**2.29**	**2139**
3200	654	1.22	1135	717	1.49	1388	776	1.78	1658	831	2.09	1946	—	—	—
3300	670	1.32	1228	732	1.60	1488	789	1.89	1764	**843**	**2.21**	**2057**	—	—	—
3400	686	1.42	1328	747	1.71	1593	803	2.01	1876	**856**	**2.33**	**2174**	—	—	—
3500	703	1.54	1433	762	1.83	1705	817	2.14	1993	—	—	—	—	—	—
3600	720	1.66	1543	777	1.95	1822	832	2.27	2116	—	—	—	—	—	—
3700	736	1.78	1660	793	2.09	1944	—	—	—	—	—	—	—	—	—
3750	745	1.85	1721	801	2.15	2008	—	—	—	—	—	—	—	—	—

AIRFLOW (Cfm)	EXTERNAL STATIC PRESSURE (in. wg)														
	1.2			1.4			1.6			1.8			2.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
2250	838	1.81	1683	**891**	**2.12**	**1981**	—	—	—	—	—	—	—	—	—
2300	**842**	**1.84**	**1719**	**895**	**2.17**	**2019**	—	—	—	—	—	—	—	—	—
2400	**851**	**1.92**	**1793**	**903**	**2.25**	**2097**	—	—	—	—	—	—	—	—	—
2500	**860**	**2.01**	**1873**	**911**	**2.34**	**2180**	—	—	—	—	—	—	—	—	—
2550	**865**	**2.05**	**1914**	**916**	**2.38**	**2223**	—	—	—	—	—	—	—	—	—
2600	**869**	**2.10**	**1957**	—	—	—	—	—	—	—	—	—	—	—	—
2700	**879**	**2.19**	**2046**	—	—	—	—	—	—	—	—	—	—	—	—
2800	**889**	**2.29**	**2140**	—	—	—	—	—	—	—	—	—	—	—	—
2900	**899**	**2.40**	**2239**	—	—	—	—	—	—	—	—	—	—	—	—
3000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
3100	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
3200	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
3300	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
3400	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
3500	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
3600	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
3700	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
3750	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

LEGEND

Bhp — Brake Horsepower Input to Fan
Watts — Input Watts to Motor

*Motor drive range: 590 to 840 rpm. All other rpms require field-supplied drive.

NOTES:

1. **Boldface** indicates field-supplied drive is required.
2. Maximum continuous bhp is 2.40.
3. See page 29 for General Fan Performance Notes.

Table 22 — Fan Performance 580F090,091 — Horizontal Discharge Units; Alternate Motor (Belt Drive)*

AIRFLOW (Cfm)	EXTERNAL STATIC PRESSURE (in. wg)														
	0.2			0.4			0.6			0.8			1.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
2250	**505**	**0.52**	**484**	**586**	**0.73**	**681**	**657**	**0.97**	**901**	722	1.22	1142	782	1.50	1403
2300	**513**	**0.55**	**509**	**592**	**0.76**	**708**	**663**	**1.00**	**931**	727	1.26	1174	787	1.54	1437
2400	**527**	**0.60**	**561**	**605**	**0.82**	**766**	**674**	**1.07**	**993**	738	1.33	1241	796	1.62	1508
2500	**543**	**0.66**	**617**	**618**	**0.89**	**828**	686	1.14	1060	748	1.41	1312	806	1.70	1583
2550	**550**	**0.69**	**647**	**625**	**0.92**	**860**	692	1.17	1095	754	1.45	1349	811	1.74	1623
2600	**558**	**0.73**	**677**	**632**	**0.96**	**894**	698	1.21	1131	759	1.49	1388	816	1.78	1664
2700	**574**	**0.80**	**742**	**645**	**1.03**	**964**	710	1.29	1207	770	1.58	1469	826	1.88	1749
2800	**589**	**0.87**	**811**	**659**	**1.11**	**1039**	723	1.38	1287	782	1.67	1554	837	1.97	1839
2900	**605**	**0.95**	**885**	**673**	**1.20**	**1119**	736	1.47	1372	794	1.76	1644	848	2.07	1933
3000	**621**	**1.03**	**963**	688	1.29	1204	749	1.57	1463	806	1.87	1740	859	2.18	2033
3100	**637**	**1.12**	**1046**	702	1.39	1293	762	1.67	1558	818	1.97	1840	871	2.29	2139
3200	**654**	**1.22**	**1135**	717	1.49	1388	776	1.78	1658	831	2.09	1946	—	—	—
3300	**670**	**1.32**	**1228**	732	1.60	1488	789	1.89	1764	843	2.21	2057	—	—	—
3400	686	1.42	1328	747	1.71	1593	803	2.01	1876	856	2.33	2174	—	—	—
3500	703	1.54	1433	762	1.83	1705	817	2.14	1993	—	—	—	—	—	—
3600	720	1.66	1543	777	1.95	1822	832	2.27	2116	—	—	—	—	—	—
3700	736	1.78	1660	793	2.09	1944	—	—	—	—	—	—	—	—	—
3750	745	1.85	1721	801	2.15	2008	—	—	—	—	—	—	—	—	—

AIRFLOW (Cfm)	EXTERNAL STATIC PRESSURE (in. wg)														
	1.2			1.4			1.6			1.8			2.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
2250	838	1.81	1683	891	2.12	1981	—	—	—	—	—	—	—	—	—
2300	842	1.84	1719	895	2.17	2019	—	—	—	—	—	—	—	—	—
2400	851	1.92	1793	903	2.25	2097	—	—	—	—	—	—	—	—	—
2500	860	2.01	1873	911	2.34	2180	—	—	—	—	—	—	—	—	—
2550	865	2.05	1914	916	2.38	2223	—	—	—	—	—	—	—	—	—
2600	869	2.10	1957	—	—	—	—	—	—	—	—	—	—	—	—
2700	879	2.19	2046	—	—	—	—	—	—	—	—	—	—	—	—
2800	889	2.29	2140	—	—	—	—	—	—	—	—	—	—	—	—
2900	899	2.40	2239	—	—	—	—	—	—	—	—	—	—	—	—
3000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
3100	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
3200	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
3300	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
3400	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
3500	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
3600	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
3700	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
3750	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

LEGEND

Bhp — Brake Horsepower Input to Fan
Watts — Input Watts to Motor

*Motor drive range: 685 to 935 rpm. All other rpms require field-supplied drive.

NOTES:

1. **Boldface** indicates field-supplied drive is required.
2. Maximum continuous bhp is 2.40.
3. See page 29 for General Fan Performance Notes.

Table 23 — Fan Performance 580F090,091 — Horizontal Discharge Units; High-Static Motor (Belt Drive)*

AIRFLOW (Cfm)	EXTERNAL STATIC PRESSURE (in. wg)														
	0.2			0.4			0.6			0.8			1.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
2250	**505**	**0.52**	**484**	**586**	**0.73**	**681**	**657**	**0.97**	**901**	**722**	**1.22**	**1142**	**782**	**1.50**	**1403**
2300	**513**	**0.55**	**509**	**592**	**0.76**	**708**	**663**	**1.00**	**931**	**727**	**1.26**	**1174**	**787**	**1.54**	**1437**
2400	**527**	**0.60**	**561**	**605**	**0.82**	**766**	**674**	**1.07**	**993**	**738**	**1.33**	**1241**	**796**	**1.62**	**1508**
2500	**543**	**0.66**	**617**	**618**	**0.89**	**828**	**686**	**1.14**	**1060**	**748**	**1.41**	**1312**	**806**	**1.70**	**1583**
2550	**550**	**0.69**	**647**	**625**	**0.92**	**860**	**692**	**1.17**	**1095**	**754**	**1.45**	**1349**	**811**	**1.74**	**1623**
2600	**558**	**0.73**	**677**	**632**	**0.96**	**894**	**698**	**1.21**	**1131**	**759**	**1.49**	**1388**	**816**	**1.78**	**1664**
2700	**574**	**0.80**	**742**	**645**	**1.03**	**964**	**710**	**1.29**	**1207**	**770**	**1.58**	**1469**	**826**	**1.88**	**1749**
2800	**589**	**0.87**	**811**	**659**	**1.11**	**1039**	**723**	**1.38**	**1287**	**782**	**1.67**	**1554**	**837**	**1.97**	**1839**
2900	**605**	**0.95**	**885**	**673**	**1.20**	**1119**	**736**	**1.47**	**1372**	**794**	**1.76**	**1644**	**848**	**2.07**	**1933**
3000	**621**	**1.03**	**963**	**688**	**1.29**	**1204**	**749**	**1.57**	**1463**	**806**	**1.87**	**1740**	**859**	**2.18**	**2033**
3100	**637**	**1.12**	**1046**	**702**	**1.39**	**1293**	**762**	**1.67**	**1558**	**818**	**1.97**	**1840**	871	2.29	2139
3200	**654**	**1.22**	**1135**	**717**	**1.49**	**1388**	**776**	**1.78**	**1658**	**831**	**2.09**	**1946**	882	2.41	2249
3300	**670**	**1.32**	**1228**	**732**	**1.60**	**1488**	**789**	**1.89**	**1764**	**843**	**2.21**	**2057**	894	2.54	2365
3400	**686**	**1.42**	**1328**	**747**	**1.71**	**1593**	**803**	**2.01**	**1876**	**856**	**2.33**	**2174**	907	2.67	2488
3500	**703**	**1.54**	**1433**	**762**	**1.83**	**1705**	**817**	**2.14**	**1993**	870	2.46	2297	919	2.81	2616
3600	**720**	**1.66**	**1543**	**777**	**1.95**	**1822**	**832**	**2.27**	**2116**	883	2.60	2425	932	2.95	2750
3700	**736**	**1.78**	**1660**	**793**	**2.09**	**1944**	**846**	**2.41**	**2245**	896	2.75	2560	944	3.10	2889
3750	**745**	**1.85**	**1721**	**801**	**2.15**	**2008**	**853**	**2.48**	**2312**	903	2.82	2630	951	3.18	2962

AIRFLOW (Cfm)	EXTERNAL STATIC PRESSURE (in. wg)														
	1.2			1.4			1.6			1.8			2.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
2250	**838**	**1.81**	**1683**	891	2.12	1981	941	2.46	2297	988	2.82	2629	1033	3.19	2976
2300	**842**	**1.84**	**1719**	895	2.17	2019	944	2.51	2336	992	2.86	2669	1037	3.24	3018
2400	**851**	**1.92**	**1793**	903	2.25	2097	952	2.59	2416	999	2.95	2752	1043	3.33	3104
2500	860	2.01	1873	911	2.34	2180	960	2.68	2502	1006	3.05	2842	1051	3.43	3196
2550	865	2.05	1914	916	2.38	2223	964	2.73	2547	1010	3.10	2888	1054	3.48	3243
2600	869	2.10	1957	920	2.43	2267	968	2.78	2593	1014	3.15	2935	1058	3.53	3292
2700	879	2.19	2046	929	2.53	2360	976	2.88	2689	1022	3.25	3035	1066	3.64	3395
2800	889	2.29	2140	938	2.64	2458	985	2.99	2791	1030	3.37	3140	—	—	—
2900	899	2.40	2239	948	2.75	2561	994	3.11	2898	1039	3.49	3250	—	—	—
3000	910	2.51	2343	958	2.86	2670	1004	3.23	3011	1048	3.61	3366	—	—	—
3100	921	2.63	2453	968	2.98	2783	1013	3.35	3128	—	—	—	—	—	—
3200	932	2.75	2569	978	3.11	2903	1023	3.49	3252	—	—	—	—	—	—
3300	943	2.88	2690	989	3.25	3029	1033	3.63	3382	—	—	—	—	—	—
3400	954	3.02	2816	1000	3.39	3159	—	—	—	—	—	—	—	—	—
3500	966	3.16	2950	1011	3.54	3297	—	—	—	—	—	—	—	—	—
3600	978	3.31	3088	1022	3.69	3442	—	—	—	—	—	—	—	—	—
3700	990	3.47	3233	—	—	—	—	—	—	—	—	—	—	—	—
3750	996	3.55	3308	—	—	—	—	—	—	—	—	—	—	—	—

LEGEND

Bhp — Brake Horsepower Input to Fan
Watts — Input Watts to Motor

*Motor drive range: 860 to 1080 rpm. All other rpms require field-supplied drive.

NOTES:

1. **Boldface** indicates field-supplied drive is required.
2. Maximum continuous bhp is 3.70.
3. See page 29 for General Fan Performance Notes.

Table 24 — Fan Performance 580F102,103 — Horizontal Discharge Units; Standard Motor (Belt Drive)*

AIRFLOW (Cfm)	EXTERNAL STATIC PRESSURE (in. wg)														
	0.2			0.4			0.6			0.8			1.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
2550	**550**	**0.69**	**647**	**625**	**0.92**	**860**	692	1.17	1095	754	1.45	1349	811	1.74	1623
2600	**558**	**0.73**	**677**	**632**	**0.96**	**894**	698	1.21	1131	759	1.49	1388	816	1.78	1664
2700	**574**	**0.80**	**742**	**645**	**1.03**	**964**	710	1.29	1207	770	1.58	1469	826	1.88	1749
2800	**589**	**0.87**	**811**	**659**	**1.11**	**1039**	723	1.38	1287	782	1.67	1554	837	1.97	1839
2900	**605**	**0.95**	**885**	**673**	**1.20**	**1119**	736	1.47	1372	794	1.76	1644	848	2.07	1933
3000	**621**	**1.03**	**963**	688	1.29	1204	749	1.57	1463	806	1.87	1740	859	2.18	2033
3100	**637**	**1.12**	**1046**	702	1.39	1293	762	1.67	1558	818	1.97	1840	871	2.29	2139
3200	**654**	**1.22**	**1135**	717	1.49	1388	776	1.78	1658	831	2.09	1946	—	—	—
3300	**670**	**1.32**	**1228**	732	1.60	1488	789	1.89	1764	843	2.21	2057	—	—	—
3400	686	1.42	1328	747	1.71	1593	803	2.01	1876	856	2.33	2174	—	—	—
3500	703	1.54	1433	762	1.83	1705	817	2.14	1993	—	—	—	—	—	—
3600	720	1.66	1543	777	1.95	1822	832	2.27	2116	—	—	—	—	—	—
3700	736	1.78	1660	793	2.09	1944	—	—	—	—	—	—	—	—	—
3750	745	1.85	1721	801	2.15	2008	—	—	—	—	—	—	—	—	—
3800	753	1.91	1783	808	2.22	2074	—	—	—	—	—	—	—	—	—
3900	770	2.05	1912	824	2.37	2209	—	—	—	—	—	—	—	—	—
4000	787	2.20	2047	—	—	—	—	—	—	—	—	—	—	—	—
4100	804	2.35	2189	—	—	—	—	—	—	—	—	—	—	—	—
4200	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
4250	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

AIRFLOW (Cfm)	EXTERNAL STATIC PRESSURE (in. wg)														
	1.2			1.4			1.6			1.8			2.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
2550	865	2.05	1914	916	2.38	2223	—	—	—	—	—	—	—	—	—
2600	869	2.10	1957	—	—	—	—	—	—	—	—	—	—	—	—
2700	879	2.19	2046	—	—	—	—	—	—	—	—	—	—	—	—
2800	889	2.29	2140	—	—	—	—	—	—	—	—	—	—	—	—
2900	899	2.40	2239	—	—	—	—	—	—	—	—	—	—	—	—
3000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
3100	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
3200	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
3300	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
3400	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
3500	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
3600	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
3700	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
3750	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
3800	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
3900	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
4000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
4100	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
4200	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
4250	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

LEGEND

Bhp — Brake Horsepower Input to Fan
Watts — Input Watts to Motor

*Motor drive range: 685 to 935 rpm. All other rpms require field-supplied drive.

NOTES:

1. **Boldface** indicates field-supplied drive is required.
2. Maximum continuous bhp is 2.40.
3. See page 29 for General Fan Performance Notes.

Table 25 — Fan Performance 580F102,103 — Horizontal Discharge Units; High-Static Motor (Belt Drive)*

AIRFLOW (Cfm)	EXTERNAL STATIC PRESSURE (in. wg)														
	0.2			0.4			0.6			0.8			1.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
2550	**550**	**0.69**	**647**	**625**	**0.92**	**860**	**692**	**1.17**	**1095**	**754**	**1.45**	**1349**	**811**	**1.74**	**1623**
2600	**558**	**0.73**	**677**	**632**	**0.96**	**894**	**698**	**1.21**	**1131**	**759**	**1.49**	**1388**	**816**	**1.78**	**1664**
2700	**574**	**0.80**	**742**	**645**	**1.03**	**964**	**710**	**1.29**	**1207**	**770**	**1.58**	**1469**	**826**	**1.88**	**1749**
2800	**589**	**0.87**	**811**	**659**	**1.11**	**1039**	**723**	**1.38**	**1287**	**782**	**1.67**	**1554**	**837**	**1.97**	**1839**
2900	**605**	**0.95**	**885**	**673**	**1.20**	**1119**	**736**	**1.47**	**1372**	**794**	**1.76**	**1644**	**848**	**2.07**	**1933**
3000	**621**	**1.03**	**963**	**688**	**1.29**	**1204**	**749**	**1.57**	**1463**	**806**	**1.87**	**1740**	**859**	**2.18**	**2033**
3100	**637**	**1.12**	**1046**	**702**	**1.39**	**1293**	**762**	**1.67**	**1558**	**818**	**1.97**	**1840**	871	2.29	2139
3200	**654**	**1.22**	**1135**	**717**	**1.49**	**1388**	**776**	**1.78**	**1658**	**831**	**2.09**	**1946**	882	2.41	2249
3300	**670**	**1.32**	**1228**	**732**	**1.60**	**1488**	**789**	**1.89**	**1764**	**843**	**2.21**	**2057**	894	2.54	2365
3400	**686**	**1.42**	**1328**	**747**	**1.71**	**1593**	**803**	**2.01**	**1876**	**856**	**2.33**	**2174**	907	2.67	2488
3500	**703**	**1.54**	**1433**	**762**	**1.83**	**1705**	**817**	**2.14**	**1993**	870	2.46	2297	919	2.81	2616
3600	**720**	**1.66**	**1543**	**777**	**1.95**	**1822**	**832**	**2.27**	**2116**	883	2.60	2425	932	2.95	2750
3700	**736**	**1.78**	**1660**	**793**	**2.09**	**1944**	**846**	**2.41**	**2245**	896	2.75	2560	944	3.10	2889
3750	**745**	**1.85**	**1721**	**801**	**2.15**	**2008**	**853**	**2.48**	**2312**	903	2.82	2630	951	3.18	2962
3800	**753**	**1.91**	**1783**	**808**	**2.22**	**2074**	861	2.55	2380	910	2.90	2701	957	3.26	3036
3900	**770**	**2.05**	**1912**	**824**	**2.37**	**2209**	875	2.70	2522	924	3.05	2848	970	3.42	3189
4000	**787**	**2.20**	**2047**	**840**	**2.52**	**2351**	890	2.86	2669	938	3.22	3002	984	3.59	3348
4100	**804**	**2.35**	**2189**	**856**	**2.68**	**2499**	905	3.03	2824	952	3.39	3162	—	—	—
4200	**821**	**2.51**	**2338**	872	2.85	2655	920	3.20	2986	967	3.57	3331	—	—	—
4250	**829**	**2.59**	**2415**	880	2.93	2735	928	3.29	3069	974	3.66	3417	—	—	—

AIRFLOW (Cfm)	EXTERNAL STATIC PRESSURE (in. wg)														
	1.2			1.4			1.6			1.8			2.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
2550	865	2.05	1914	916	2.38	2223	964	2.73	2547	1010	3.10	2888	1054	3.48	3243
2600	869	2.10	1957	920	2.43	2267	968	2.78	2593	1014	3.15	2935	1058	3.53	3292
2700	879	2.19	2046	929	2.53	2360	976	2.88	2689	1022	3.25	3035	1066	3.64	3395
2800	889	2.29	2140	938	2.64	2458	985	2.99	2791	1030	3.37	3140	—	—	—
2900	899	2.40	2239	948	2.75	2561	994	3.11	2898	1039	3.49	3250	—	—	—
3000	910	2.51	2343	958	2.86	2670	1004	3.23	3011	1048	3.61	3366	—	—	—
3100	921	2.63	2453	968	2.98	2783	1013	3.35	3128	—	—	—	—	—	—
3200	932	2.75	2569	978	3.11	2903	1023	3.49	3252	—	—	—	—	—	—
3300	943	2.88	2690	989	3.25	3029	1033	3.63	3382	—	—	—	—	—	—
3400	954	3.02	2816	1000	3.39	3159	—	—	—	—	—	—	—	—	—
3500	966	3.16	2950	1011	3.54	3297	—	—	—	—	—	—	—	—	—
3600	978	3.31	3088	1022	3.69	3442	—	—	—	—	—	—	—	—	—
3700	990	3.47	3233	—	—	—	—	—	—	—	—	—	—	—	—
3750	996	3.55	3308	—	—	—	—	—	—	—	—	—	—	—	—
3800	1002	3.63	3385	—	—	—	—	—	—	—	—	—	—	—	—
3900	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
4000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
4100	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
4200	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
4250	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

LEGEND

Bhp — Brake Horsepower Input to Fan
Watts — Input Watts to Motor

*Motor drive range: 860 to 1080 rpm. All other rpms require field-supplied drive.

NOTES:

1. **Boldface** indicates field-supplied drive is required.
2. Maximum continuous bhp is 3.70.
3. See page 29 for General Fan Performance Notes.

Table 26 — Fan Performance 580F120,121 — Horizontal Discharge Units; Standard Motor (Belt Drive)*

AIRFLOW (Cfm)	EXTERNAL STATIC PRESSURE (in. wg)														
	0.2			0.4			0.6			0.8			1.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
3000	**555**	**0.72**	**630**	**629**	**0.87**	**765**	696	1.03	904	757	1.19	1048	814	1.36	1198
3100	**568**	**0.78**	**686**	**641**	**0.94**	**825**	706	1.10	968	766	1.27	1115	823	1.45	1269
3200	**582**	**0.85**	**745**	**652**	**1.01**	**888**	717	1.18	1035	776	1.35	1186	832	1.53	1343
3300	**595**	**0.92**	**808**	**664**	**1.09**	**955**	728	1.26	1106	786	1.44	1261	841	1.62	1421
3400	**609**	**1.00**	**874**	**677**	**1.17**	**1026**	739	1.35	1181	797	1.53	1340	851	1.71	1503
3500	**623**	**1.08**	**945**	689	1.25	1100	750	1.43	1259	807	1.62	1422	860	1.81	1589
3600	**636**	**1.16**	**1019**	702	1.34	1179	762	1.53	1341	817	1.72	1508	870	1.91	1679
3700	**650**	**1.25**	**1097**	714	1.44	1261	773	1.63	1428	828	1.82	1598	880	2.02	1772
3800	**664**	**1.34**	**1179**	727	1.54	1347	785	1.73	1518	839	1.93	1693	890	2.13	1870
3900	**678**	**1.44**	**1266**	740	1.64	1438	797	1.84	1613	850	2.04	1791	901	2.25	1973
4000	693	1.55	1356	753	1.75	1533	809	1.95	1712	861	2.16	1894	911	2.37	2080
4100	707	1.65	1451	766	1.86	1632	821	2.07	1816	873	2.28	2002	—	—	—
4200	721	1.77	1551	779	1.98	1736	833	2.19	1924	—	—	—	—	—	—
4300	735	1.89	1656	792	2.10	1845	846	2.32	2037	—	—	—	—	—	—
4400	750	2.01	1764	806	2.23	1958	—	—	—	—	—	—	—	—	—
4500	764	2.14	1879	819	2.37	2077	—	—	—	—	—	—	—	—	—
4600	779	2.28	1998	—	—	—	—	—	—	—	—	—	—	—	—
4700	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
4800	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
4900	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
5000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

AIRFLOW (Cfm)	EXTERNAL STATIC PRESSURE (in. wg)														
	1.2			1.4			1.6			1.8			2.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
3000	867	1.54	1353	918	1.72	1513	**966**	**1.91**	**1680**	**1012**	**2.11**	**1852**	**1056**	**2.31**	**2029**
3100	876	1.63	1427	926	1.81	1590	**973**	**2.00**	**1760**	**1019**	**2.20**	**1934**	—	—	—
3200	884	1.71	1504	934	1.90	1671	**981**	**2.10**	**1843**	**1026**	**2.30**	**2020**	—	—	—
3300	893	1.81	1586	**942**	**2.00**	**1755**	**988**	**2.20**	**1931**	**1033**	**2.40**	**2111**	—	—	—
3400	902	1.90	1671	**950**	**2.10**	**1844**	**996**	**2.30**	**2022**	—	—	—	—	—	—
3500	911	2.01	1760	**959**	**2.21**	**1937**	—	—	—	—	—	—	—	—	—
3600	920	2.11	1854	**967**	**2.32**	**2033**	—	—	—	—	—	—	—	—	—
3700	929	2.22	1951	—	—	—	—	—	—	—	—	—	—	—	—
3800	**939**	**2.34**	**2053**	—	—	—	—	—	—	—	—	—	—	—	—
3900	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
4000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
4100	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
4200	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
4300	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
4400	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
4500	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
4600	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
4700	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
4800	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
4900	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
5000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

LEGEND

Bhp — Brake Horsepower Input to Fan
Watts — Input Watts to Motor

*Motor drive range: 685 to 935 rpm. All other rpms require field-supplied drive.

NOTES:

1. **Boldface** indicates field-supplied drive is required.
2. Maximum continuous bhp is 2.40.
3. See page 29 for General Fan Performance Notes.

Table 27 — Fan Performance 580F120,121 — Horizontal Discharge Units; Alternate Motor (Belt Drive)*

AIRFLOW (Cfm)	EXTERNAL STATIC PRESSURE (in. wg)														
	0.2			0.4			0.6			0.8			1.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
3000	**555**	**0.72**	**630**	**629**	**0.87**	**765**	**696**	**1.03**	**904**	**757**	**1.19**	**1048**	**814**	**1.36**	**1198**
3100	**568**	**0.78**	**686**	**641**	**0.94**	**825**	**706**	**1.10**	**968**	**766**	**1.27**	**1115**	**823**	**1.45**	**1269**
3200	**582**	**0.85**	**745**	**652**	**1.01**	**888**	**717**	**1.18**	**1035**	**776**	**1.35**	**1186**	**832**	**1.53**	**1343**
3300	**595**	**0.92**	**808**	**664**	**1.09**	**955**	**728**	**1.26**	**1106**	**786**	**1.44**	**1261**	841	1.62	1421
3400	**609**	**1.00**	**874**	**677**	**1.17**	**1026**	**739**	**1.35**	**1181**	**797**	**1.53**	**1340**	851	1.71	1503
3500	**623**	**1.08**	**945**	**689**	**1.25**	**1100**	**750**	**1.43**	**1259**	**807**	**1.62**	**1422**	860	1.81	1589
3600	**636**	**1.16**	**1019**	**702**	**1.34**	**1179**	**762**	**1.53**	**1341**	**817**	**1.72**	**1508**	870	1.91	1679
3700	**650**	**1.25**	**1097**	**714**	**1.44**	**1261**	**773**	**1.63**	**1428**	**828**	**1.82**	**1598**	880	2.02	1772
3800	**664**	**1.34**	**1179**	**727**	**1.54**	**1347**	**785**	**1.73**	**1518**	839	1.93	1693	890	2.13	1870
3900	**678**	**1.44**	**1266**	**740**	**1.64**	**1438**	**797**	**1.84**	**1613**	850	2.04	1791	901	2.25	1973
4000	**693**	**1.55**	**1356**	**753**	**1.75**	**1533**	**809**	**1.95**	**1712**	861	2.16	1894	911	2.37	2080
4100	**707**	**1.65**	**1451**	**766**	**1.86**	**1632**	**821**	**2.07**	**1816**	873	2.28	2002	922	2.50	2191
4200	**721**	**1.77**	**1551**	**779**	**1.98**	**1736**	**833**	**2.19**	**1924**	884	2.41	2114	933	2.63	2307
4300	**735**	**1.89**	**1656**	**792**	**2.10**	**1845**	846	2.32	2037	896	2.54	2231	944	2.77	2428
4400	**750**	**2.01**	**1764**	**806**	**2.23**	**1958**	858	2.45	2154	908	2.68	2352	—	—	—
4500	**764**	**2.14**	**1879**	**819**	**2.37**	**2077**	871	2.59	2276	920	2.82	2479	—	—	—
4600	**779**	**2.28**	**1998**	**833**	**2.51**	**2200**	883	2.74	2404	—	—	—	—	—	—
4700	**793**	**2.42**	**2121**	846	2.65	2328	896	2.89	2537	—	—	—	—	—	—
4800	**808**	**2.56**	**2251**	860	2.81	2462	—	—	—	—	—	—	—	—	—
4900	**822**	**2.72**	**2385**	—	—	—	—	—	—	—	—	—	—	—	—
5000	837	2.88	2525	—	—	—	—	—	—	—	—	—	—	—	—

AIRFLOW (Cfm)	EXTERNAL STATIC PRESSURE (in. wg)														
	1.2			1.4			1.6			1.8			2.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
3000	867	1.54	1353	918	1.72	1513	966	1.91	1680	1012	2.11	1852	1056	2.31	2029
3100	876	1.63	1427	926	1.81	1590	973	2.00	1760	1019	2.20	1934	1062	2.41	2114
3200	884	1.71	1504	934	1.90	1671	981	2.10	1843	1026	2.30	2020	1069	2.51	2203
3300	893	1.81	1586	942	2.00	1755	988	2.20	1931	1033	2.40	2111	1076	2.62	2295
3400	902	1.90	1671	950	2.10	1844	996	2.30	2022	1041	2.51	2205	1083	2.73	2393
3500	911	2.01	1760	959	2.21	1937	1004	2.41	2118	1048	2.62	2303	**1091**	**2.84**	**2494**
3600	920	2.11	1854	967	2.32	2033	1013	2.53	2217	1056	2.74	2406	—	—	—
3700	929	2.22	1951	976	2.43	2134	1021	2.65	2322	1064	2.86	2513	—	—	—
3800	939	2.34	2053	985	2.55	2239	1030	2.77	2430	—	—	—	—	—	—
3900	949	2.46	2159	995	2.68	2349	1039	2.90	2543	—	—	—	—	—	—
4000	959	2.59	2269	1004	2.81	2462	—	—	—	—	—	—	—	—	—
4100	969	2.72	2384	—	—	—	—	—	—	—	—	—	—	—	—
4200	979	2.85	2504	—	—	—	—	—	—	—	—	—	—	—	—
4300	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
4400	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
4500	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
4600	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
4700	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
4800	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
4900	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
5000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

LEGEND

Bhp — Brake Horsepower Input to Fan
Watts — Input Watts to Motor

*Motor drive range: 835 to 1085 rpm. All other rpms require field-supplied drive.

NOTES:

1. **Boldface** indicates field-supplied drive is required.
2. Maximum continuous bhp is 2.90.
3. See page 29 for General Fan Performance Notes.

Table 28 — Fan Performance 580F120,121 — Horizontal Discharge Units; High-Static Motor (Belt Drive)*

AIRFLOW (Cfm)	EXTERNAL STATIC PRESSURE (in. wg)														
	0.2			0.4			0.6			0.8			1.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
3000	**555**	**0.72**	**630**	**629**	**0.87**	**765**	**696**	**1.03**	**904**	**757**	**1.19**	**1048**	**814**	**1.36**	**1198**
3100	**568**	**0.78**	**686**	**641**	**0.94**	**825**	**706**	**1.10**	**968**	**766**	**1.27**	**1115**	**823**	**1.45**	**1269**
3200	**582**	**0.85**	**745**	**652**	**1.01**	**888**	**717**	**1.18**	**1035**	**776**	**1.35**	**1186**	832	1.53	1343
3300	**595**	**0.92**	**808**	**664**	**1.09**	**955**	**728**	**1.26**	**1106**	**786**	**1.44**	**1261**	841	1.62	1421
3400	**609**	**1.00**	**874**	**677**	**1.17**	**1026**	**739**	**1.35**	**1181**	**797**	**1.53**	**1340**	851	1.71	1503
3500	**623**	**1.08**	**945**	**689**	**1.25**	**1100**	**750**	**1.43**	**1259**	**807**	**1.62**	**1422**	860	1.81	1589
3600	**636**	**1.16**	**1019**	**702**	**1.34**	**1179**	**762**	**1.53**	**1341**	**817**	**1.72**	**1508**	870	1.91	1679
3700	**650**	**1.25**	**1097**	**714**	**1.44**	**1261**	**773**	**1.63**	**1428**	**828**	**1.82**	**1598**	880	2.02	1772
3800	**664**	**1.34**	**1179**	**727**	**1.54**	**1347**	**785**	**1.73**	**1518**	839	1.93	1693	890	2.13	1870
3900	**678**	**1.44**	**1266**	**740**	**1.64**	**1438**	**797**	**1.84**	**1613**	850	2.04	1791	901	2.25	1973
4000	**693**	**1.55**	**1356**	**753**	**1.75**	**1533**	**809**	**1.95**	**1712**	861	2.16	1894	911	2.37	2080
4100	**707**	**1.65**	**1451**	**766**	**1.86**	**1632**	**821**	**2.07**	**1816**	873	2.28	2002	922	2.50	2191
4200	**721**	**1.77**	**1551**	**779**	**1.98**	**1736**	833	2.19	1924	884	2.41	2114	933	2.63	2307
4300	**735**	**1.89**	**1656**	**792**	**2.10**	**1845**	846	2.32	2037	896	2.54	2231	944	2.77	2428
4400	**750**	**2.01**	**1764**	**806**	**2.23**	**1958**	858	2.45	2154	908	2.68	2352	955	2.91	2553
4500	**764**	**2.14**	**1879**	**819**	**2.37**	**2077**	871	2.59	2276	920	2.82	2479	966	3.06	2684
4600	**779**	**2.28**	**1998**	833	2.51	2200	883	2.74	2404	932	2.97	2611	978	3.21	2820
4700	**793**	**2.42**	**2121**	846	2.65	2328	896	2.89	2537	944	3.13	2747	989	3.37	2960
4800	**808**	**2.56**	**2251**	860	2.81	2462	909	3.05	2674	956	3.29	2889	1001	3.54	3106
4900	**822**	**2.72**	**2385**	873	2.96	2601	922	3.21	2818	968	3.46	3037	1013	3.71	3258
5000	837	2.88	2525	887	3.13	2745	935	3.38	2966	981	3.63	3189	1024	3.89	3414

AIRFLOW (Cfm)	EXTERNAL STATIC PRESSURE (in. wg)														
	1.2			1.4			1.6			1.8			2.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
3000	867	1.54	1353	918	1.72	1513	966	1.91	1680	1012	2.11	1852	1056	2.31	2029
3100	876	1.63	1427	926	1.81	1590	973	2.00	1760	1019	2.20	1934	1062	2.41	2114
3200	884	1.71	1504	934	1.90	1671	981	2.10	1843	1026	2.30	2020	1069	2.51	2203
3300	893	1.81	1586	942	2.00	1755	988	2.20	1931	1033	2.40	2111	1076	2.62	2295
3400	902	1.90	1671	950	2.10	1844	996	2.30	2022	1041	2.51	2205	1083	2.73	2393
3500	911	2.01	1760	959	2.21	1937	1004	2.41	2118	1048	2.62	2303	1091	2.84	2494
3600	920	2.11	1854	967	2.32	2033	1013	2.53	2217	1056	2.74	2406	1098	2.96	2600
3700	929	2.22	1951	976	2.43	2134	1021	2.65	2322	1064	2.86	2513	1106	3.09	2710
3800	939	2.34	2053	985	2.55	2239	1030	2.77	2430	1073	2.99	2625	1114	3.22	2824
3900	949	2.46	2159	995	2.68	2349	1039	2.90	2543	1081	3.12	2741	1122	3.35	2943
4000	959	2.59	2269	1004	2.81	2462	1048	3.03	2660	1090	3.26	2861	1130	3.49	3067
4100	969	2.72	2384	1014	2.94	2581	1057	3.17	2782	1098	3.40	2987	**1139**	**3.64**	**3195**
4200	979	2.85	2504	1024	3.08	2705	1066	3.31	2909	1107	3.55	3117	**1147**	**3.79**	**3329**
4300	990	3.00	2629	1034	3.23	2833	1076	3.46	3040	1117	3.71	3252	**1156**	**3.95**	**3467**
4400	1000	3.14	2758	1044	3.38	2966	1085	3.62	3177	1126	3.87	3392	**1165**	**4.11**	**3611**
4500	1011	3.30	2892	1054	3.54	3104	1095	3.78	3319	**1135**	**4.03**	**3537**	**1174**	**4.28**	**3759**
4600	1022	3.45	3032	1064	3.70	3247	1105	3.95	3466	**1145**	**4.20**	**3688**	**1183**	**4.46**	**3913**
4700	1033	3.62	3176	1075	3.87	3395	1115	4.12	3618	**1155**	**4.38**	**3843**	**1193**	**4.64**	**4072**
4800	1044	3.79	3326	1085	4.04	3549	1126	4.30	3775	**1164**	**4.56**	**4004**	**1202**	**4.83**	**4237**
4900	1055	3.97	3482	1096	4.22	3708	**1136**	**4.49**	**3938**	**1174**	**4.75**	**4171**	**1212**	**5.02**	**4406**
5000	1066	4.15	3642	1107	4.41	3873	**1146**	**4.68**	**4106**	**1184**	**4.95**	**4342**	**1221**	**5.22**	**4582**

LEGEND

Bhp — Brake Horsepower Input to Fan
Watts — Input Watts to Motor

*Motor drive range: 830 to 1130 rpm. All other rpms require field-supplied drive.

NOTES:

1. **Boldface** indicates field-supplied drive is required.
2. Maximum continuous bhp is 5.25.
3. See page 29 for General Fan Performance Notes.

Table 29 — Fan Performance 580F150,151 — Horizontal Discharge Units; Standard Motor (Belt Drive)*

AIRFLOW (Cfm)	EXTERNAL STATIC PRESSURE (in. wg)														
	0.2			0.4			0.6			0.8			1.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
3700	**676**	**1.19**	**1106**	**747**	**1.42**	**1328**	**811**	**1.66**	**1552**	871	1.91	1779	927	2.15	2008
3800	**690**	**1.27**	**1185**	**760**	**1.52**	**1414**	**823**	**1.76**	**1644**	882	2.01	1876	938	2.26	2111
3900	**705**	**1.36**	**1269**	**773**	**1.61**	**1503**	**835**	**1.86**	**1739**	894	2.12	1977	948	2.38	2217
4000	**719**	**1.45**	**1357**	**786**	**1.71**	**1597**	**848**	**1.97**	**1838**	905	2.23	2082	959	2.50	2328
4100	**734**	**1.55**	**1449**	**799**	**1.82**	**1695**	860	2.08	1942	917	2.35	2192	970	2.62	2443
4200	**748**	**1.66**	**1545**	**813**	**1.93**	**1797**	872	2.20	2050	928	2.47	2305	981	2.75	2562
4300	**763**	**1.76**	**1646**	**826**	**2.04**	**1903**	885	2.32	2162	940	2.60	2423	992	2.88	2686
4400	**778**	**1.88**	**1751**	**840**	**2.16**	**2014**	898	2.44	2279	952	2.73	2546	1004	3.02	2814
4500	**792**	**1.99**	**1860**	**853**	**2.28**	**2130**	910	2.57	2401	964	2.87	2673	1015	3.16	2947
4600	**807**	**2.12**	**1975**	867	2.41	2250	923	2.71	2527	976	3.01	2805	1027	3.31	3085
4700	**822**	**2.25**	**2094**	881	2.55	2375	936	2.85	2658	989	3.15	2942	1038	3.46	3227
4800	**837**	**2.38**	**2218**	895	2.69	2505	949	3.00	2794	1001	3.31	3083	1050	3.62	3375
4900	**852**	**2.52**	**2347**	909	2.83	2640	963	3.15	2935	1014	3.46	3230	—	—	—
5000	867	2.66	2482	923	2.98	2781	976	3.30	3081	1026	3.63	3383	—	—	—
5100	882	2.81	2622	937	3.14	2926	989	3.47	3232	—	—	—	—	—	—
5200	897	2.97	2766	951	3.30	3077	1003	3.63	3389	—	—	—	—	—	—
5300	912	3.13	2917	966	3.47	3233	—	—	—	—	—	—	—	—	—
5400	927	3.30	3073	980	3.64	3395	—	—	—	—	—	—	—	—	—
5500	943	3.47	3234	—	—	—	—	—	—	—	—	—	—	—	—
5600	958	3.65	3402	—	—	—	—	—	—	—	—	—	—	—	—
5700	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
5800	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
5900	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
6000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
6100	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
6200	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
6300	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

AIRFLOW (Cfm)	EXTERNAL STATIC PRESSURE (in. wg)														
	1.2			1.4			1.6			1.8			2.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
3700	981	2.40	2240	1031	2.65	2473	1079	2.91	2709	**1125**	**3.16**	**2948**	**1169**	**3.42**	**3189**
3800	990	2.52	2348	1040	2.77	2587	**1088**	**3.03**	**2828**	**1133**	**3.30**	**3073**	**1177**	**3.56**	**3319**
3900	1000	2.64	2459	1050	2.90	2705	**1097**	**3.17**	**2951**	**1142**	**3.43**	**3201**	**1186**	**3.70**	**3452**
4000	1011	2.76	2576	1059	3.03	2826	**1106**	**3.30**	**3079**	**1151**	**3.58**	**3334**	—	—	—
4100	1021	2.89	2697	1069	3.17	2953	**1116**	**3.44**	**3210**	—	—	—	—	—	—
4200	1031	3.03	2822	1079	3.31	3083	**1125**	**3.59**	**3347**	—	—	—	—	—	—
4300	1042	3.16	2951	**1089**	**3.45**	**3218**	—	—	—	—	—	—	—	—	—
4400	1053	3.31	3085	**1100**	**3.60**	**3357**	—	—	—	—	—	—	—	—	—
4500	1064	3.46	3224	—	—	—	—	—	—	—	—	—	—	—	—
4600	1075	3.61	3367	—	—	—	—	—	—	—	—	—	—	—	—
4700	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
4800	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
4900	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
5000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
5100	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
5200	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
5300	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
5400	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
5500	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
5600	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
5700	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
5800	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
5900	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
6000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
6100	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
6200	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
6300	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

LEGEND

Bhp — Brake Horsepower Input to Fan
Watts — Input Watts to Motor

*Motor drive range: 860 to 1080 rpm. All other rpms require field-supplied drive.

NOTES:

1. **Boldface** indicates field-supplied drive is required.
2. Maximum continuous bhp is 3.70.
3. See page 29 for General Fan Performance Notes.

Table 30 — Fan Performance 580F150,151 — Horizontal Discharge Units; Alternate Motor (Belt Drive)*

AIRFLOW (Cfm)	EXTERNAL STATIC PRESSURE (in. wg)														
	0.2			0.4			0.6			0.8			1.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
3700	**676**	**1.19**	**1106**	**747**	**1.42**	**1328**	**811**	**1.66**	**1552**	871	1.91	1779	927	2.15	2008
3800	**690**	**1.27**	**1185**	**760**	**1.52**	**1414**	**823**	**1.76**	**1644**	882	2.01	1876	938	2.26	2111
3900	**705**	**1.36**	**1269**	**773**	**1.61**	**1503**	835	1.86	1739	894	2.12	1977	948	2.38	2217
4000	**719**	**1.45**	**1357**	**786**	**1.71**	**1597**	848	1.97	1838	905	2.23	2082	959	2.50	2328
4100	**734**	**1.55**	**1449**	**799**	**1.82**	**1695**	860	2.08	1942	917	2.35	2192	970	2.62	2443
4200	**748**	**1.66**	**1545**	**813**	**1.93**	**1797**	872	2.20	2050	928	2.47	2305	981	2.75	2562
4300	**763**	**1.76**	**1646**	**826**	**2.04**	**1903**	885	2.32	2162	940	2.60	2423	992	2.88	2686
4400	**778**	**1.88**	**1751**	840	2.16	2014	898	2.44	2279	952	2.73	2546	1004	3.02	2814
4500	**792**	**1.99**	**1860**	853	2.28	2130	910	2.57	2401	964	2.87	2673	1015	3.16	2947
4600	**807**	**2.12**	**1975**	867	2.41	2250	923	2.71	2527	976	3.01	2805	1027	3.31	3085
4700	**822**	**2.25**	**2094**	881	2.55	2375	936	2.85	2658	989	3.15	2942	1038	3.46	3227
4800	837	2.38	2218	895	2.69	2505	949	3.00	2794	1001	3.31	3083	1050	3.62	3375
4900	852	2.52	2347	909	2.83	2640	963	3.15	2935	1014	3.46	3230	1062	3.78	3528
5000	867	2.66	2482	923	2.98	2781	976	3.30	3081	1026	3.63	3383	1074	3.95	3685
5100	882	2.81	2622	937	3.14	2926	989	3.47	3232	1039	3.80	3540	1086	4.13	3849
5200	897	2.97	2766	951	3.30	3077	1003	3.63	3389	1052	3.97	3702	1099	4.31	4017
5300	912	3.13	2917	966	3.47	3233	1016	3.81	3551	1065	4.15	3870	1111	4.49	4191
5400	927	3.30	3073	980	3.64	3395	1030	3.99	3719	1078	4.34	4044	1123	4.69	4370
5500	943	3.47	3234	994	3.82	3563	1044	4.17	3892	1091	4.53	4223	**1136**	**4.88**	**4555**
5600	958	3.65	3402	1009	4.01	3736	1057	4.37	4071	1104	4.73	4408	**1149**	**5.09**	**4746**
5700	973	3.83	3575	1023	4.20	3915	1071	4.56	4256	1117	4.93	4599	—	—	—
5800	988	4.03	3754	1038	4.40	4100	1085	4.77	4447	1130	5.14	4796	—	—	—
5900	1004	4.22	3939	1052	4.60	4292	1099	4.98	4645	—	—	—	—	—	—
6000	1019	4.43	4131	1067	4.81	4489	1113	5.20	4848	—	—	—	—	—	—
6100	1034	4.64	4329	1082	5.03	4693	—	—	—	—	—	—	—	—	—
6200	1050	4.86	4533	—	—	—	—	—	—	—	—	—	—	—	—
6300	1065	5.09	4744	—	—	—	—	—	—	—	—	—	—	—	—

AIRFLOW (Cfm)	EXTERNAL STATIC PRESSURE (in. wg)														
	1.2			1.4			1.6			1.8			2.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
3700	981	2.40	2240	1031	2.65	2473	1079	2.91	2709	1125	3.16	2948	**1169**	**3.42**	**3189**
3800	990	2.52	2348	1040	2.77	2587	1088	3.03	2828	**1133**	**3.30**	**3073**	**1177**	**3.56**	**3319**
3900	1000	2.64	2459	1050	2.90	2705	1097	3.17	2951	**1142**	**3.43**	**3201**	**1186**	**3.70**	**3452**
4000	1011	2.76	2576	1059	3.03	2826	1106	3.30	3079	**1151**	**3.58**	**3334**	**1194**	**3.85**	**3591**
4100	1021	2.89	2697	1069	3.17	2953	1116	3.44	3210	**1160**	**3.72**	**3471**	**1203**	**4.00**	**3733**
4200	1031	3.03	2822	1079	3.31	3083	1125	3.59	3347	**1169**	**3.87**	**3612**	**1212**	**4.16**	**3880**
4300	1042	3.16	2951	1089	3.45	3218	**1135**	**3.74**	**3487**	**1179**	**4.03**	**3758**	**1221**	**4.32**	**4031**
4400	1053	3.31	3085	1100	3.60	3357	**1145**	**3.90**	**3632**	**1188**	**4.19**	**3909**	**1230**	**4.49**	**4187**
4500	1064	3.46	3224	1110	3.76	3502	**1155**	**4.06**	**3782**	**1198**	**4.36**	**4064**	**1239**	**4.66**	**4348**
4600	1075	3.61	3367	1121	3.91	3650	**1165**	**4.22**	**3937**	**1208**	**4.53**	**4224**	**1249**	**4.84**	**4514**
4700	1086	3.77	3515	**1131**	**4.08**	**3805**	**1175**	**4.39**	**4096**	**1217**	**4.71**	**4389**	**1258**	**5.02**	**4684**
4800	1097	3.93	3668	**1142**	**4.25**	**3963**	**1186**	**4.57**	**4260**	**1228**	**4.89**	**4559**	**1268**	**5.21**	**4860**
4900	1109	4.10	3826	**1153**	**4.43**	**4128**	**1196**	**4.75**	**4430**	**1238**	**5.08**	**4734**	—	—	—
5000	1120	4.28	3990	**1164**	**4.61**	**4296**	**1207**	**4.94**	**4604**	—	—	—	—	—	—
5100	**1132**	**4.46**	**4159**	**1175**	**4.79**	**4471**	**1218**	**5.13**	**4784**	—	—	—	—	—	—
5200	**1144**	**4.65**	**4333**	**1187**	**4.99**	**4651**	—	—	—	—	—	—	—	—	—
5300	**1155**	**4.84**	**4512**	**1198**	**5.19**	**4836**	—	—	—	—	—	—	—	—	—
5400	**1167**	**5.04**	**4697**	—	—	—	—	—	—	—	—	—	—	—	—
5500	**1179**	**5.24**	**4889**	—	—	—	—	—	—	—	—	—	—	—	—
5600	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
5700	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
5800	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
5900	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
6000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
6100	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
6200	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
6300	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

LEGEND

Bhp — Brake Horsepower Input to Fan
Watts — Input Watts to Motor

*Motor drive range: 830 to 1130 rpm. All other rpms require field-supplied drive.

NOTES:

1. **Boldface** indicates field-supplied drive is required.
2. Maximum continuous bhp is 5.25.
3. See page 29 for General Fan Performance Notes.

PRE-START-UP

⚠ **WARNING:** Failure to observe the following warnings could result in serious personal injury.

1. Follow recognized safety practices and wear protective goggles when checking or servicing refrigerant system.
2. Do not operate compressor or provide any electric power to unit unless compressor terminal cover is in place and secured.
3. Do not remove compressor terminal cover until all electrical sources are disconnected.
4. Relieve all pressure from system before touching or disturbing anything inside terminal box if refrigerant leak is suspected around compressor terminals.
5. Never attempt to repair soldered connection while refrigerant system is under pressure.
6. Do not use torch to remove any component. System contains oil and refrigerant under pressure. To remove a component, wear protective goggles and proceed as follows:
   a. Shut off electrical power and then gas to unit.
   b. Reclaim refrigerant to relieve all pressure from system using both high- and low-pressure ports.
   c. Cut component connection tubing with tubing cutter and remove component from unit.
   d. Carefully unsweat remaining tubing stubs when necessary. Oil can ignite when exposed to torch flame.

Proceed as follows to inspect and prepare the unit for initial start-up:

1. Remove all access panels.
2. Read and follow instructions on all WARNING, CAUTION, and INFORMATION labels attached to, or shipped with, unit.
3. Make the following inspections:
   a. Inspect for shipping and handling damages such as broken lines, loose parts, or disconnected wires, etc.
   b. Inspect for oil at all refrigerant tubing connections and on unit base. Detecting oil generally indicates a refrigerant leak. Leak-test all refrigerant tubing connections using electronic leak detector, halide torch, or liquid-soap solution.
   c. Inspect all field-wiring and factory-wiring connections. Be sure that connections are completed and tight. Be sure that wires are not in contact with refrigerant tubing or sharp edges.
   d. Inspect coil fins. If damaged during shipping and handling, carefully straighten fins with a fin comb.
4. Verify the following conditions:
   a. Make sure that condenser-fan blade are correctly positioned in fan orifice. See Condenser-Fan Adjustment section on page 62 for more details.
   b. Make sure that air filter(s) is in place.
   c. Make sure that condensate drain trap is filled with water to ensure proper drainage.
   d. Make sure that all tools and miscellaneous loose parts have been removed.

START-UP

I. UNIT PREPARATION

Make sure that unit has been installed in accordance with these installation instructions and applicable codes. Make sure that Start-Up Checklist, located on back page of this booklet, has been completed and filled out.

II. RETURN-AIR FILTERS

Make sure correct filters are installed in filter tracks (see Tables 1A and 1B). Do not operate unit without return-air filters.

III. OUTDOOR-AIR INLET SCREENS

Outdoor-air inlet screens must be in place before operating unit.

IV. COMPRESSOR MOUNTING

Compressors are internally spring mounted. Do not loosen or remove compressor holddown bolts. On 580F150 and 151 units, remove the tiedown bands that hold the compressors together.

V. INTERNAL WIRING

Check all electrical connections in unit control boxes. Tighten as required. Ensure wiring does not come into direct contact with refrigerant tubing.

VI. GAS PIPING

Check gas piping for leaks.

⚠ **WARNING:** Disconnect gas piping from unit when leak testing at pressure greater than $^1/_2$ psig. Pressures greater than $^1/_2$ psig will cause gas valve damage resulting in hazardous condition. If gas valve is subjected to pressure greater than $^1/_2$ psig, it *must* be replaced before use. When pressure testing field-supplied gas piping at pressures of $^1/_2$ psig or less, a unit connected to such piping must be isolated by manually closing the gas valve.

VII. REFRIGERANT SERVICE PORTS

To service refrigerant service ports, remove compressor access panel. Each unit system has 3 Schrader-type service gage ports: one on the suction line, one on the liquid line, and one on the compressor discharge line. Be sure that caps on the ports are tight. The Schrader-type valve on the discharge line is located under the low-pressure switch. Another valve is located on the discharge line underneath the high-pressure switch. It is screwed on a Schrader fitting but there is no Schrader core.

VIII. HIGH FLOW VALVES

Located on the compressor hot gas and suction tubes are High Flow Valves. Large black plastic caps distinguish these valves with O-rings located inside the caps. These valves can not be accessed for service in the field. Ensure the plastic caps are in place and tight or the possibility of refrigerant leakage could occur.

IX. COMPRESSOR ROTATION

On 3-phase units with scroll compressors, it is important to be certain compressor is rotating in the proper direction. To determine whether or not compressor is 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 and install lockout tag.
3. Reverse any two of the unit power leads.
4. Reapply power to unit. Reenergize compressor.

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

NOTE: When the compressor is rotating in the wrong direction, the unit will make an elevated level of noise and will not provide cooling.

X. COOLING

To start unit, turn on main power supply. Set system selector switch at COOL position and fan switch at AUTO. position. Adjust thermostat to a setting below room temperature. Compressor, indoor and outdoor fans start on closure of contactors.

Check unit charge. Refer to Checking and Adjusting Refrigerant Charge section, page 62. Unit must operate a minimum of 10 minutes before adjusting charge.

Reset thermostat at a position above room temperature. Compressor and outdoor fans will shut off. Evaporator fan will shut off after 30-second delay.

A. To Shut Off Unit

Set system selector switch at OFF position. Resetting thermostat at a position above room temperature shuts unit off temporarily until space temperature exceeds thermostat setting.

XI. MAIN BURNERS

Main burners are factory set and should require no adjustment.

TO CHECK ignition of main burners and heating controls, move thermostat set point above room temperature and verify that the burners light and evaporator fan is energized. After ensuring that the unit continues to heat the building, lower the thermostat setting below the room temperature and verify that the burners and evaporator fan turn off (fan will turn off only if fan selector switch is in the AUTO. position). Refer to Table 31 for the correct orifice to use at high altitudes.

NOTE: Upon a call for heat, the main burners will remain on for a minimum of 60 seconds.

A. Adjust Gas Input

The gas input to the unit is determined by measuring the gas flow at the meter or by measuring the manifold pressure. Manifold pressure should be 3.5 in. wg. in high-fire operation.

NOTE: Unit uses a 2-stage gas valve. There is no need to adjust the "Low Fire" manifold pressure.

Measure Gas Flow (Natural Gas Units)

Minor adjustment to the gas flow can be made by changing the manifold pressure. The manifold pressure must be 3.5 in. wg. Normal manifold pressure is 3.5 in. wg in high fire (W1 and W2 inputs to gas valve).

Proceed as follows:

1. Turn off gas supply to unit.
2. Remove pipe plug on manifold then connect manometer at this point. Turn on gas to unit. Ensure gas valve is in high fire operation.

Observe manifold pressure in high fire (W1 and W2 energized) and proceed as follows to adjust gas input:

1. Remove cover screw over regulator adjustment screw on gas valve. Ensure gas valve is operating in high fire mode.
2. Turn regulator adjustment screw clockwise to increase gas input, or turn regulator adjustment screw counterclockwise to decrease input. High fire manifold pressure must be 3.5 in. wg.

⚠ **WARNING:** Unsafe operation of the unit may result if manifold pressure is outside 3.4 to 3.6 in. wg range. Personal injury or unit damage may result.

3. Replace cover screw cap on gas valve.
4. Turn off gas supply to unit. Remove manometer from pressure tap and replace pipe plug on gas valve. Turn on gas to unit and check for leaks.

Table 31 — Altitude Compensation*

ELEVATION (Ft)	125,000, 180,000, AND 220,000 BTUH NOMINAL INPUT		250,000 BTUH NOMINAL INPUT	
	Natural Gas Orifice Size†	Liquid Propane Orifice Size†	Natural Gas Orifice Size†	Liquid Propane Orifice Size†
0-2,000	31	41	30	38
2,000	32	42	30	39
3,000	32	42	31	40
4,000	32	42	32	41
5,000	33	43	33	42
6,000	34	43	34	43
7,000	35	44	35	43
8,000	36	44	36	44
9,000	37	45	37	44
10,000	38	46	38	45
11,000	39	47	39	45
12,000	40	47	40	46
13,000	41	48	41	47
14,000	42	48	42	47

*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.
†Orifice available through your local distributor.

XII. HEATING

1. Purge gas supply line of air by opening union ahead of gas valve. When gas odor is detected, tighten union and wait 5 minutes before proceeding.
2. Turn on electrical supply and open manual gas valve.
3. Set system switch selector at HEAT position and fan switch at AUTO. or ON position. Set heating temperature lever above room temperature.
4. The induced-draft motor will start, purging heat exchangers.
5. After a call for heating, the main burners should light within 5 seconds. If the burners do not light, then there is a 22-second delay before another 5-second ignition try. If the burners still do not light, the time delay is repeated. If the burners do not light within 15 minutes, there is a lockout. To reset the control, break the 24 v power to W1.
6. The evaporator-fan motor will turn on 45 seconds after the burners are ignited.
7. The evaporator-fan motor will turn off 45 seconds after the thermostat temperature is satisfied.
8. Adjust airflow to obtain a temperature rise within the range specified on the unit nameplate and in Tables 1A and 1B.

XIII. INTEGRATED GAS CONTROLLER (IGC) OPERATION

NOTE: The default value for the evaporator-fan motor ON and OFF delay is 45 seconds. The Integrated Gas Controller (IGC) modifies this value when abnormal limit switch cycles occur. Based upon unit operating conditions, the ON delay can be reduced to 0 seconds and the OFF delay can be extended to 180 seconds.

When one flash of the LED (light-emitting diode) is observed, the evaporator-fan ON/OFF delay has been modified. If the limit switch trips at the start of the heating cycle during the evaporator ON delay, the time period of the ON delay for the next cycle will be 5 seconds less than the time at which the switch tripped. (Example: If the limit switch trips at 30 seconds, the evaporator-fan ON delay for the next cycle will occur at 25 seconds.) To prevent short-cycling, a 5-second reduction will only occur if a minimum of 10 minutes has elapsed since the last call for heating.

The evaporator-fan OFF delay can also be modified. Once the call for heating has ended, there is a 10-minute period during which the modification can occur. If the limit switch trips during this period, the evaporator-fan OFF delay will increase by 15 seconds on the next cycle. A maximum of 9 trips can occur, extending the evaporator-fan OFF delay to 180 seconds. To restore the original default value, reset the power to the unit.

A. To Shut Off Unit

Set system selector switch at OFF position. Resetting heating selector lever below room temperature will shut unit off temporarily until space temperature falls below thermostat setting.

XIV. SAFETY RELIEF

A soft-solder joint at the suction line Schrader port provides pressure relief under abnormal temperature and pressure conditions.

XV. VENTILATION (Continuous Fan)

Set fan and system selector switches at ON and OFF positions, respectively. Evaporator fan operates continuously to provide constant air circulation. When the evaporator-fan selector switch is turned to the OFF position, there is a 30-second delay before the fan turns off.

XVI. ECONOMI$ER+ CONTROLLER

The EconoMi$er+ controller is mounted to the top of the EconoMi$er+ damper and is accessible by removing the filter access door of the unit.

The EconoMi$er+ controller is protected by a sheet metal enclosure mounted over the controller. Remove the single screw on the front of the enclosure and lift off the top for access to the controller. The primary purpose of the controller is to provide control of the EconoMi$er+ dampers and the cooling compression stages. The status of the indoor fan is monitored through the G input but is not directly controlled by the controller. The heating function is completely independent of the controller.

IMPORTANT: The controller can only be used with conventional thermostats with Y1, Y2 and G input to the controller; it can **NOT** be used with electronic thermostats with a proportional room temperature input, or with Variable Air Volume systems.

There are 4 LEDs on the controller, which are used to read values and display status and configuration information. There are 2 buttons (READ/ADJUST and ADVANCE/MANUAL), which change modes and configure the controller. See Fig. 36.

The EconoMi$er+ microprocessor based control system provides the following control functions:

- EconoMi$er+ damper control for free cooling
- Minimum position control for ventilation
- Demand Ventilation Control using a CO_2 sensor
- Compressor Cooling Stage Control
- Occupied/Unoccupied Control
- Diagnostics Display and History
- Manual test control

See Table 32 for Inputs and Outputs.

A. Integrated Display

The control board includes an integrated display, which is used for the following functions:

- Configuration and setup
- Set point and control adjustment
- Error status and alarm monitoring
- Manual control
- Reading sensor values

There are 5 modes of display operation:

- Startup Mode
- Run Mode
- Read Mode
- Setup Mode
- Manual Mode

External devices are not required to operate and configure the control.

B. Startup Mode

During the first 3 seconds after power is applied to the control, the four LEDs flash as shown in Table 33, indicating that the control is being initialized. The buttons are not operational during Startup mode.

C. Run Mode

Run mode indicates status of controller and unit. The mode can be changed to the Read, Setup, or Manual modes by pushing various buttons.

While the control is in Run mode, the DS1 heartbeat indicator LED (red) will flash to indicate the controller is operating properly. The DS2 Econo indicator LED (yellow) will flash whenever economizer is being used for free cooling. The DS3 first stage cooling indicator LED (green) will be on steady indicate demand for stage 1 cooling. The DS4 second stage cooling indicator LED (green) will be on steady to indicate demand for stage 2 cooling.

If the controller is in a different mode, the controller will return to Run mode after 10 minutes of user inactivity or if the READ/ADJUST (#1) and ADVANCE/MANUAL (#2) buttons are held for at least 3 seconds until all LEDs flash.

D. Read Mode

Read mode is used to check set points (Table 34) and I/O channel status (Table 35). Enter the Read mode by pushing and releasing the READ/ADJUST (#1) button. A user can only enter Read mode from the Run mode (to get to Run mode, press both the #1 and #2 buttons for at least 3 seconds until all LEDs flash). In Read mode, LEDs are not lit until the READ/ADJUST button (#1) is pushed.

NOTE: If the user pushes and holds the READ/ADJUST button (#1) for more than 3 seconds, then the control will go into the Setup mode, indicated by the yellow LED (on steady).

While in Read mode, push button #1 then the DS1 LED (Red) flashes to indicate setup point number as defined in the setup table. The two green LEDs will then show the value of the display item. The DS3 LED will first display the

tens digit and the DS4 LED will then display the ones digit. For example to display 54, the DS3 LED will flash 1 group of 5 at a high flash rate to indicate 50, and then follow with 4 flashes (DS4) at 1-second intervals to complete the display of the number 54.

NOTE: Do not try to count the "5 Fast Flashes" individually, but instead count how many groups of 5 flashes were displayed. In this case, 1 group of 5 flashes, plus the 4 flashes at 1 second results in the value of 54.

To read the display again, push the READ/ADJUST (#1) button and the sequence will repeat as many times as needed.

To advance to the next setup point, push the ADVANCE/MANUAL (#2) button. The controller will cycle through all the setup channels (Table 34) and then the I/O channels (Table 35) and then back to the first setup channel.

NOTE: The user can only advance forward, not reset to #1 or go backwards. Cycling the EconoMi$er+ power will reset the item number (but not the item value) to item #1.

In the Read mode for setup variables, the LEDs will not turn on steady; the LEDs will always flash. Steady-on indicators are reserved for the configuration modes. No data is modified in the Read mode. The controller will always remain at the last read number even if reset back to normal operation.

NOTE: To enter another mode, the user first must exit the Read mode.

If no button is pushed in 10 minutes, Read mode will automatically be exited. Also, if the READ/ADJUST (#1) and ADVANCE/MANUAL (#2) buttons are pushed and held for more than 3 seconds, then Read mode will be exited to Run mode. While in the Read mode, the controller will continue to operate with normal unit control.

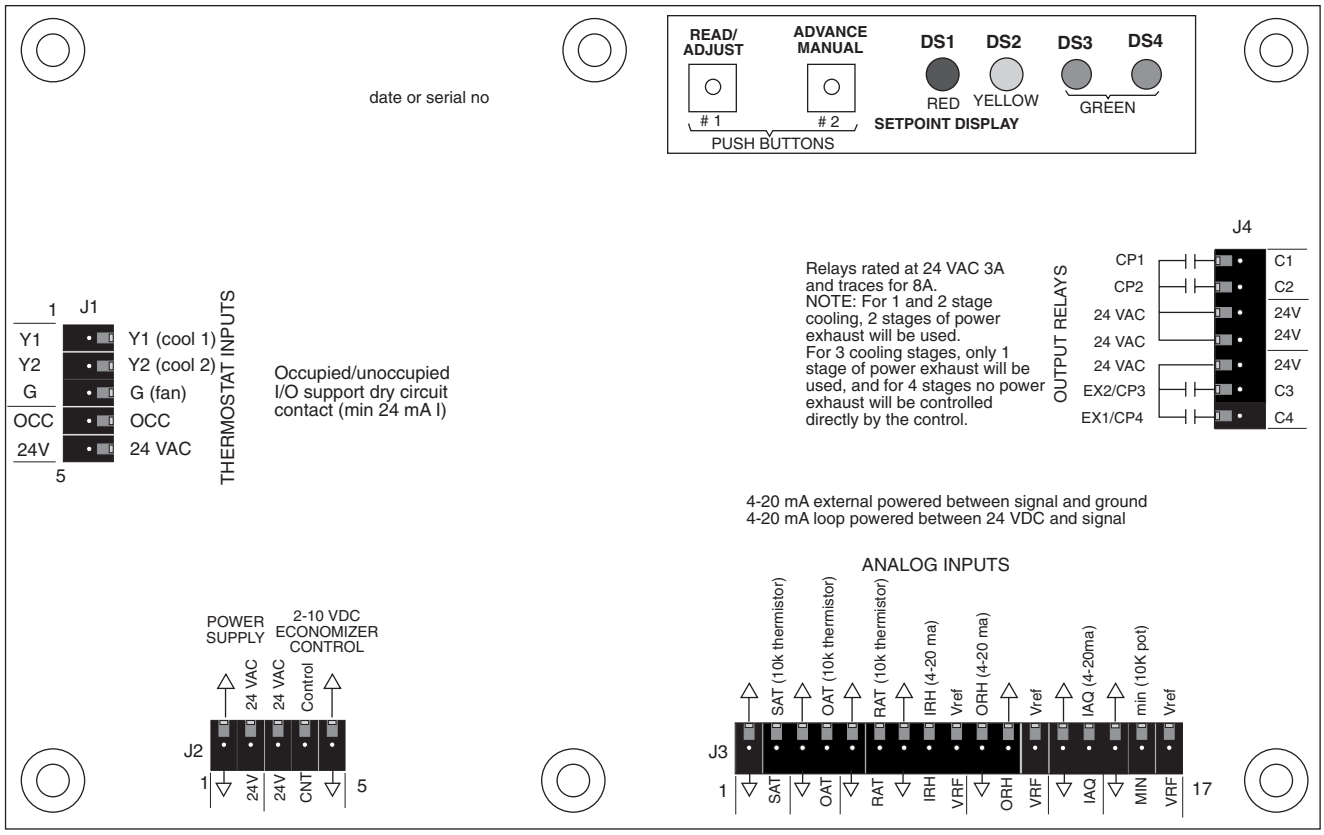


Fig. 36 — EconoMi$er+ Controller Board

Table 32 — EconoMi$er+ Inputs and Outputs

INPUT	NAME	TYPE	USE	INPUT/OUTPUT RANGE	CONVERSION RANGE	CONVERSION RESOLUTION	CONNECTION	PIN NO.
THERMOSTAT INPUTS								
Y1 (Cool/Low Cool)	Y1	Switch	Standard	18-30 vac 50/60 Hz w/min 24 mA Load	NA	On/Off	J1	1
Y2 (Cool 2/High Cool)	Y2	Switch	Option	18-30 vac 50/60 Hz w/min 24 mA Load	NA	On/Off	J1	2
G (fan)	G	Switch	Standard	18-30 vac 50/60 Hz w/min 24 mA Load	NA	On/Off	J1	3
Occupied/Unoccupied	OCC	Switch	Option	18-30 vac 50/60 Hz w/min 24 mA Load	NA	On/Off	J1	4,5
POWER								
Power	24V	Input	Standard	18-30 VAC 50/60 Hz	NA	NA	J2	1,2
ECONOMIZER MOTOR								
Control	CNT	2-10 vdc	Standard	2-10 vdc	0-100%	1%	J2	3,4,5
ANALOG INPUTS								
Supply Air Temperature	SAT	10 K Thermistor	Standard	1816 to 86407 Ohms	30 to 125 F	0.8 F	J3	1,2
Outside Air Temperature	OAT	10 K Thermistor	Standard	1816 to 86407 Ohms	30 to 125 F	0.8 F	J3	3,4
Return Air Temperature	RAT	10 K Thermistor	Option	1816 to 86407 Ohms	30 to 125 F	0.8 F	J3	5,6
Indoor Humidity	IRH	4-20 mA, Loop Powered	Option	4-20 mA, 24 vdc	0-100%	.08 mA	J3	7,8,9
Outdoor Humidity	ORH	4-20 mA, Loop Powered	Option	4-20 mA, 24 vdc	0-100%	.08 mA	J3	10,11,12
Indoor CO_2	IAQ	4-20 mA, Ext Sourced	Option	4-20 mA, 24 vdc	0-200 PPM/10	10 PPM	J3	13,14
Remote Minimum Position Pot	MIN	10K	Option	10K to 100K Ohms	0 to 100%	1%	J3	15,16,17
RELAY OUTPUTS								
Cooling Stage 1	CP1	Relay	Standard	24 vac, 2.5 Amps at 24 vac	NA	On/Off	J4	1,3,4
Cooling Stage 2	CP2	Relay	Option	24 vac, 2.5 Amps at 24 vac	NA	On/Off	J4	2,3,4
Power Exhaust 2/ Cooling Stage 3*	CP3/ EX2	Relay	Option	24 vac, 2.5 Amps at 24 vac	NA	On/Off	J4	5,6
Power Exhaust 1/ Cooling Stage 4†	CP4/ EX1	Relay	Option	24 vac, 2.5 Amps at 24 vac	NA	On/Off	J4	5,7
DISPLAY								
Setpoint Switch 1	SP1	Digital	Standard	Open/Closed	Logic	Open/Closed	On Board	NA
Setpoint Switch 2	SP2	Digital	Standard	Open/Closed	Logic	Open/Closed	On Board	NA
LED 1	DS1	LED Output	Standard	Red	Logic	On/Off	On Board	NA
LED 2	DS2	LED Output	Standard	Yellow	Logic	On/Off	On Board	NA
LED 3	DS3	LED Output	Standard	Green	Logic	On/Off	On Board	NA
LED 4	DS4	LED Output	Standard	Green	Logic	On/Off	On Board	NA

*If there are 3 stages then there can only be 1 stage of power exhaust.
†If there are 4 stages then there will not be power exhaust stages that will be directly controlled.

Table 33 — Start-Up Mode Sequence

TIME	LED 1/DS1 (RED)	LED 2/DS2 (YELLOW)	LED 3/DS3 (GREEN)	LED 4/DS4 (GREEN)
0-1.0 SEC	OFF	OFF	OFF	OFF
1-1.5 SEC	FLASH ½ SEC	OFF	OFF	OFF
1.5-2.0 SEC	OFF	FLASH ½ SEC	OFF	OFF
2.0-2.5 SEC	OFF	OFF	FLASH ½ SEC	OFF
2.5-3.0 SEC	OFF	OFF	OFF	FLASH ½ SEC

LED — Light-Emitting Diode

Table 34 — Configuration Variables (Read and Setup Modes)

NO.	SETUP POINTS (viewable and adjustable)	UNITS	MINIMUM VALUE	MAXIMUM VALUE	FACTORY SETTING	INC	COMMENTS
1	Supply Air Temperature Setpoint	F	40 F	65 F	55 F	1 F	Leaving Air Temperature Control Point
2	Occupied Minimum Economizer Position	%	Item 15 +1%	100%	15%	1%	Min Econo Position (occupied mode)
3	Unoccupied Minimum Economizer Position	%	1%	100%	5%	1%	Min Econo Position (unoccupied mode)
4	Economizer Maximum Position	%	1%	100%	100%	1%	Maximum Econo Position
5	Economizer Type	—	1	3	2	1	1 = Vent Only, 2 = Proportional, 3 = 3 Position
6	Economizer Changeover Type	—	1	5	2	1	1 = Switch, 2 = Outdoor Dry Bulb, 3 = Diff Dry Bulb, 4 = Outdoor Enthalpy, 5 = Diff Enthalpy
7	Economizer Changeover Setpoint (mode 2)	F	45 F	70 F	65 F	1 F	For Outdoor Changeover
8	Economizer Changeover Setpoint (mode 3)	—	1	4	1	1	Outdoor Enthalpy Changeover Setpoint 1 = A, 2 = B, 3 = C, 4 = D
9	No. of compressors	—	1	4	2	1	1, 2, 3, or 4
10	Compressor Sequencing	—	1	4	1	1	1 = DC-Sensible, 2 = DC-Latent, 3 = LAT-Sensible, 4 = LAT-Latent
11	Power Exhaust Stage 1 Activation	%	1%	Item 12 -5%	25%	1%	Economizer Position
12	Power Exhaust Stage 2 Activation	%	Item 11 +1%	100%	50%	1%	Economizer Position (> stage 1)
13	Unoccupied Configuration	—	1	3	3	1	1 = No Unoccupied Cooling, 2 = Unoccupied Free Cooling, 3 = Unoccupied Free & Mech Cooling
14	Compressor Lockout Temperature	—	1 F	65 F	45 F	1 F	Compressor Operation
15	IAQ Min Economizer Position Setpoint	%	1%	Item 2 +1%	5%	1%	Min IAQ Position for VOC Emissions
16	IAQ Enable	—	1	2	1	1	1 = Disabled, 2 = Enabled
17	Outdoor IAQ Reference	PPM/10	1 PPM/10	100 PPM/10	40 PPM/10	1 PPM/10	Outdoor Reference IAQ Level
18	IAQ Lower Limit Control Point Differential	PPM/10	1 PPM/10	Item 19 -1 PPM/10	60 PPM/10	1 PPM/10	Differential Lower Limit Indoor IAQ Level
19	IAQ Upper Limit Control Point Differential	PPM/10	Item 18 +1 PPM/10	200 PPM/10	140 PPM/10	1 PPM/10	Differential Upper Limit Indoor IAQ Level
20	1st Most Recent Error/Reset	—	1	8	—	—	Used in Setup Mode to Reset Alarms
21	2nd Most Recent Error (read only)	—	1	8	—	—	Not Displayed in Setup Mode
22	3rd Most Recent Error (read only)	—	1	8	—	—	Not Displayed in Setup Mode
23	4th Most Recent Error (read only)	—	1	8	—	—	Not Displayed in Setup Mode
24	5th Most Recent Error (read only)	—	1	8	—	—	Not Displayed in Setup Mode

LEGEND

DC — Direct Control
IAQ — Indoor Air Quality
LAT — Leaving Air Temperature Compensated Control
VOC — Volatile Organic Compounds

NOTE: The accessibility of these channels will be as follows:
READ MODE — All channels will be accessible.
SETUP MODE — Only channels 1-20 will be accessible and 20 will be used to reset alarms.

Table 35 — Input/Output Channels

NO.	I/O POINTS	UNITS	MINIMUM VALUE	MAXIMUM VALUE	INC	COMMENTS
1	C1 Output	—	Off	On	—	Compressor 1
2	C2 Output	—	Off	On	—	Compressor 2
3	C3 Output	—	Off	On	—	Compressor 3/Power Exhaust 2
4	C4 Output	—	Off	On	—	Compressor 4/Power Exhaust 1
5	Economizer Damper Output	%	1 F	100 F	1%	Damper Commanded Position
6	Supply Air Temperature	F	1 F	150 F	1 F	Supply Air Temperature
7	Outdoor Air Temperature	F	1 F	150 F	1 F	Outdoor Air Temperature
8	Return Air Temperature	F	1 F	150 F	1 F	Return Air Temperature
9	Indoor Relative Humidity	%	1%	100%	1%	Return Air Relative Humidity
10	Outdoor Relative Humidity	%	1%	100%	1%	Outdoor Air Relative Humidity
11	Indoor Air Quality	PPM	1 PPM/10	200 PPM/10	10 PPM	Indoor Air Quality (/10)
12	Remote Minimum Position	%	1%	100%	1%	Remote Minimum Pot Position
13	Y1 Status	—	Open	Close	—	Thermostat Y1 Status
14	Y2 Status	—	Open	Close	—	Thermostat Y2 Status
15	G Status	—	Open	Close	—	Indoor Fan Status
16	Occ Status	—	Open	Close	—	Remote Occupied Status

NOTE: The accessibility of these channels will be as follows:
READ MODE — All channels will be accessible for reading.
ADJUST MODE — Only channels 1-5 will be accessible.
MANUAL MODE — Only channels 1-5 will be accessible.

After advancing through all the configuration variables in the Read mode, the controller will then advance through the status of the I/O channels. As in the Read mode, there will be no LEDs on. Push the READ/ADJUST (#1) button and the yellow LED will flash the "I/O Point" number and the green LEDs will flash the "I/O Values" in the same manner described in the Read mode section. See Table 35. At the first I/O point (Compressor 1 Output), the DS2 LED (Yellow) will flash with the number of the I/O channel and the DS1 LED (red) will stop flashing. This will be followed by the I/O channel status. To read the value again, push the READ/ADJUST (#1) button.

To advance to the next channel, push the ADVANCE/ MANUAL (#2) button. If the number of the channel or the status value is greater than 4 the controller will count out the increments of 5 at a high flash rate followed by the remaining digits. The channel number will be counted out through the DS2 LED (yellow). The status value will be counted out through the DS3 and DS4 LEDs (green).

If the status value is an analog value then the numeric value will be displayed by using the DS3 Green LED to display the tens digit and the DS4 will be used to display the ones digit.

If the channel is a digital output (relay), the DS3 LED (flashing green) will indicate ON status and the DS4 LED (flashing green) will indicate OFF status. If the output is the economizer control signal then the DS3 LED will be used to indicate the motor is being driven open, and the DS4 LED will be used to indicate it is being closed. If the motor is not being commanded in either direction then both the DS3 and DS4 LEDs will be on. The controller will first go through the output relays, then the economizer motor, and will then follow with the values currently being read for the analog input channels as defined in the configuration table. All values are maintained in memory even during a power loss. To exit Setup mode, push and hold the READ/ADJUST (#1) and ADVANCE/MANUAL (#2) buttons for more than 3 seconds. Setup mode will automatically be exited after 10 minutes of no activity.

E. Setup Mode

The Setup mode is used to change set points and configuration values.

Enter the Setup mode by pushing and holding the READ/ ADJUST (#1) button 1 for at least 3 seconds until all LEDs flash once. Then, the yellow LED will come on steady. A user can only enter the Setup mode from the Run mode (to get to Run mode, press buttons both buttons #1 and #2 for at least 3 seconds).

In Setup mode, all configurations can be modified even while the unit is running, but the user will not be able to adjust the I/O channels. Only channels 1 through 20 on Table 34 will be accessible in the Setup mode. Channel 20 will be used to reset any alarms that may have occurred. As an option, alarms can also be reset by cycling power to the controller.

NOTE: During the Setup mode, all routines including safety routines will continue to run and control the unit.

While in this mode, the DS1 LED (red) will flash to indicate the number of the configuration item. The DS2 LED (yellow) will be on continuously to indicate that the unit is in configuration mode. Use the ADVANCE/MANUAL button to sequence through the setup channels. If the value of the channel is less than 5 it will count out the value of the channel on the DS1 LED at 1-second intervals. If the channel value is 5 or greater, the DS1 LED will first count out the groups of 5 and then following with the remaining digit.

Verify what Setup Point is being read by pushing the READ/ ADJUST button (#1). First the Red LED will flash the set point number, then the Green LEDs will flash the value. Then, the green DS3 and DS4 LEDs will each come on steady for about 2 seconds. While DS3 is on steady, its new value can be entered by pushing READ/ADJUST (#1), and entering the value for the ten's digit. When the DS4 comes on steady, enter the value for the one's digit. After the green LEDs are off, push the READ/ADJUST button (#1) again to verify that the correct value has been entered. If the configuration is a discrete On/off setting, push the READ/ADJUST button (#1) to toggle LED 3 or 4 on or off.

Setup Example 1: Change "Occupied Minimum Position" (configuration item 2) to 53%.

1. Read the General Notes about reading and entering values found on the label on the top of the EconoMi$er+.
2. Push and hold button #1 (READ/ADJUST) for at least 3 seconds until all LEDs flash. The yellow LED will go on steady.
3. Read the current configuration point by pushing button #1. The red LED flashes the configuration point number and the green LEDs flash the current setting for that setup point number.
4. On the label (on top of the EconoMi$er+), read Step 2 and Note 1 for Setup mode operation.
5. Use button #2 (ADVANCE/MANUAL) to advance to configuration point number 2, Occupied Min.

NOTE: ***Before*** performing Step 6, be ready to push button #1; there is a limited time window that can easily be missed when the DS3 green LED comes on, and again when the DS4 green LED comes on.

6. Verify the configuration point by pushing button #1. The red LED should flash twice to indicate point 2, and then the green LEDs will flash the current setting.
7. Next, the green DS3 LED will turn on steady for 2 seconds. During this time, push button #1 five times.
8. The DS3 LED will turn off and the green DS4 LED will go on steady for 2 seconds. During this time, push button #1 three times.
9. The 5 button #1 pushes, followed by the 3 button #1 pushes is the sequence that sets the occupied minimum position to 53%.
10. Wait until the green LEDs turn off then verify the setting by pushing button #1 to read the value. There should be 5 fast blinks of DS3 and 3 slow blinks of DS4.

Setup Example 2: Change the Occupied Minimum Position (item 2) to 2% (lowest value).

1. Read the General Notes about reading and entering values found on the label on the top of the EconoMi$er+.
2. Push and hold button #1 (READ/ADJUST) for at least 3 seconds until all LEDs flash. The yellow LED will go on steady.
3. Read the current configuration point by pushing button #1. The red LED flashes the configuration point number and the green LEDs flash the current setting for that setup point number.
4. On the label (on top of the EconoMi$er+), read Step 2 and Note 1 for Setup mode operation.

5. Use button #2 (ADVANCE/MANUAL) to advance to configuration point number 2, Occupied Min.
6. Verify the configuration point by pushing button #1. The red LED should flash twice to indicate point 2, and then the green LEDs will flash the current setting.

NOTE: Since the occupied minimum position MUST be 1 greater than the IAQ minimum position (item 15), the IAQ minimum position must be changed first. (IAQ min has a default value of 5%, which is higher than the 2% value in this example.)

7. Use button #2 (ADVANCE/MANUAL) to get to configuration point 15 (IAQ Minimum Position).

NOTE: ***Before*** performing Step 8, be ready to push button #1; there is a limited time window that can easily be missed when the DS3 green LED comes on, and again when the DS4 green LED comes on.

8. Verify the configuration point by pushing button #1. The red LED should flash 15 times to indicate point 15, then the green LEDs will flash the current setting.
9. Next, the green DS3 LED will turn on steady for 2 seconds. During this time, do NOT do anything so that the position defaults to 0.
10. The DS3 LED will turn off and the green DS4 LED will go on steady for 2 seconds. During this time, push button #1 once to set the point to 1%.
11. Wait until the green LEDs turn off then verify the setting by pushing button #1 to read the value. DS3 should not blink, and DS4 should blink once.
12. Now configure the Occupied Minimum Position to 2%. Use button #2 (ADVANCE/MANUAL) to get to configuration point 2.

NOTE: ***Before*** performing Step 13, be ready to push button #1; there is a limited time window that can easily be missed when the DS3 green LED comes on, and again when the DS4 green LED comes on.

13. Verify the configuration point by pushing button #1. The red LED should flash twice to indicate point 2, then the green LEDs will flash the current setting.
14. Next, the green DS3 LED will turn on steady for 2 seconds. During this time, do NOT do anything so that the position goes to 0.
15. The DS3 LED will turn off and the green DS4 LED will go on steady for 2 seconds. During this time, push button #1 twice to set the point to 2%.
16. Wait until the green LEDs turn off then verify the setting by pushing button #1 to read the value. DS3 should not blink, and DS4 should blink twice.

NOTE: Configuration items 2, 15, 11, 12, 18 and 19 (in Table 34) are dependent upon other items. Before attempting to change one of these items, be sure to check the value of the item it depends upon (as described in Example 2 above).

IMPORTANT: During SETUP MODE, changes are allowed when the DS3 LED and DS4 LED are lit for 2 seconds (as described in Example 1 and 2 above). During this time, if button #1 is pushed to change one position and not the other, the value for that one position will change and the other will *default to zero* (unless a dependency prevents the zero). However, if button #1 is *not pushed at all* during the 2 seconds that the green LEDs are lit, the configuration item will not change.

F. Manual Mode

Manual mode is used to control the status of I/O channels for use in troubleshooting. See Table 35.

Enter the Manual mode by holding down the ADVANCE/MANUAL (#2) button for at least 3 seconds until all LEDs flash and then the red LED comes on steady.

NOTE: A user can only enter the Manual mode from the Run mode, which is entered by pushing buttons #1 and #2 for at least 3 seconds.

All EconoMi$er+ control outputs are turned off. “I/O Inputs” 1-5 can be adjusted even if the unit is in operation.

In manual mode, the yellow DS2 LED flashes once to indicate the I/O channel. See Table 35. If the value is less than 5, the yellow DS2 LED will count out the value using 1-second flashes. If the value is greater than 4, the yellow DS2 LED will count out groups of 5 at a high flash rate and then follow with the additional value at a flash rate of once per second. For example a flash of 1 indicates Compressor Relay Output 1.

Push READ/ADJUST button (#1) to read the value. The yellow LED will flash the I/O Channel number being viewed.

Once the channel number is displayed it will then turn on the appropriate green LED (DS3 or DS4) to indicate the status of the output. For relay outputs if the DS3 LED is on, then the output is on. If DS4 is on, then the output is off. The green DS3 and DS4 LEDs will remain on for about 2 seconds and if during this time the READ/ADJUST (#1) button is pushed, then the output will toggle to the alternate state. To change again, push the READ/ADJUST button and repeat the test or change the status of the output. As an example, for channel 5 (EconoMi$er+ control damper motor) use the READ/ADJUST button to toggle the motor from open to close in %.

At any time, the ADVANCE/MANUAL (#2) button can be used to advance to the next SET I/O. To exit the mode, push and hold the READ/ADJUST and ADVANCE/MANUAL buttons (#1 and #2) for more than 3 seconds.

NOTE: After exiting the Manual mode, the controller will re-initialize and start with all outputs off.

G. Error Mode

The error mode is used to indicate that an error has occurred The error is indicated by LED #1 red and #2 yellow are on steady.

Enter the RUN mode by pushing the READ/ADJUST and ADVANCE/MANUAL buttons (#1 and #2) for at least 3 seconds until all LEDs flash. Next, push and release button #1 to enter the Read mode. Then push button #2 to advance to item 20 (“first most recent error”). Determine the error by reading the value in items 20 to 24 and referring to the Troubleshooting section.

Once the error has been fixed, press buttons #1 and 2 for at least 3 seconds to exit Read mode. All LEDs will flash.

Enter Setup mode by pressing the READ/ADJUST button (#1) for at least 3 seconds. All LEDs will flash. Push the ADVANCE/MANUAL button (#2) to advance to item 20. Push READ/ADJUST to read item 20.

To reset the error code while the green DS4 LED is on, press the READ/ADJUST button (#1) once. In addition to resetting the error mode, this will erase all error codes. Cycling the power will also erase the error code.

XVII. ECONOMI$ER+ CONFIGURATION

For most applications, the factory setting will be used to control the EconoMi$er+. However, there are 19 different variables that can be used to configure the control for wide range of applications. The factory settings and variables are shown in Table 34.

IMPORTANT: There is no way to reset/restore the factory default configurations; use caution when making changes to any set point or operational variable.

The EconoMi$er+ control accepts an occupied/unoccupied switch input. This input is used to control the occupied and unoccupied minimum ventilation damper position as shown in Table 34 items 2 (ECONOMIN_SP) and 3 (U_ECONOMIN_SP). These values represent the minimum damper position. In addition, the controls allows for different modes of compressor operation in the unoccupied mode. Using item 13 in Table 34 (OCC_MODE), the user can select one of the following unoccupied modes:

- No unoccupied cooling
- Unoccupied free cooling (EconoMi$er+)
- Unoccupied free cooling and mechanical cooling

The EconoMi$er+ will control the cooling operation of the unit based on the demand from the thermostat outputs Y1 and Y2. The EconoMi$er+ will monitor the fan output G, but will not control the fan directly. Note that G must be energized for any cooling to take place. Gas or electric heating will be controlled directly from the thermostat.

When a demand for cooling occurs, the control will check to see if it is in the occupied or unoccupied mode. Depending on the configuration, the control will move the outdoor air damper to the ventilation position. If the outdoor air conditions are acceptable, then the control will use the EconoMi$er+ for free cooling. If the supply-air temperature does not meet the configurable set point, then the control will turn on additional stages of mechanical cooling. Several compressor sequences can be used depending on the application requirements; these will be covered in the mechanical compressor staging section.

A. Compressor Configuration And Control

The EconoMi$er+ control can support from 1 to 4 compressor stages. For the 3 to $12^1/_2$ ton units, there will only be 1 or 2 stages of compressor cooling, so the control is factory configured for 2 stages. There is no difference between 1 and 2 stages. The control also provides the option to configure for high sensible or high latent loads, but for units with only two compressors this option does not apply.

Compressors are configured using item 10 (STAGE_TYPE) in Table 34. The control also has the capability of controlling directly to Y1 and Y2 inputs. The control can be configured to control to the leaving-air temperature using Y1 and Y2 as a low cool and high cool demand based on the supply air set point and the rate of change of supply-air temperature. For low cool the leaving air temperature set point will be SAT_SP +2° F. For high cool the leaving air temperature set point will be the supply-air temperature set point (SAT_SP).

To use this option, configure the compressor sequencing variable (STAGE_TYPE) to a value of 3. Configure the supply air temperature set point (SAT_SP) to the desired leaving air temperature.

NOTE: The supply air temperature set point is also the temperature used for EconoMi$er+ control.

The logic will control the operation of the compressors depending on the configuration selected. If free cooling can be used, then the compressors will be integrated with the EconoMi$er+ to provide the lowest cost cooling control. The logic includes time guards on the compressors to provide a minimum of 3 minutes on and 3 minutes off time. The control will also prevent two compressors from starting at the same time. The logic uses the EconoMi$er+ to prevent rapid cycling of the compressors and low air temperatures.

B. Ventilation Air And Free Cooling

In order for the EconoMi$er+ to control ventilation air and free cooling, several items must be configured.

EconoMi$er+ Type

First, select the EconoMi$er+ control type that will be used. This is the EconoMi$er+ Type function (ECONO_TYPE) defined by item 5 in Table 34. The choices are:

1. Vent only — This is used to have just ventilation control. The EconoMi$er+ will not provide free cooling, but the occupied and unoccupied minimum positions can be used.
2. Proportional — In this configuration, full proportional EconoMi$er+ control will be used. When EconoMi$er+ free cooling cannot be used, the dampers will be set to the appropriate occupied and unoccupied minimum positions.
3. Three-Position — This mode of EconoMi$er+ is used to provide a minimum ventilation EconoMi$er+ position and a fixed free cooling or high ventilation position. The high ventilation position is controlled by the optional Remote EconoMi$er+ Enable Switch Input connected to terminals 11 and 12 on T3.

Supply Air Temperature Set Point

Once the type of EconoMi$er+ control has been selected, the user will need to set the Supply Air Temperature set point (SAT_SP). The SAT_SP has a range of 40 to 65 F.

NOTE: This will be the set point when both Y1 and Y2 are closed. When just Y1 is closed, the set point will be ° F higher.

Minimum Damper Position

Set the occupied minimum damper position (ECONOMIN_SP) and unoccupied minimum position (U_ECONOMIN_SP). These should be set to provide the ventilation requirements at full occupancy as defined by the building specifications. When demand ventilation is used, the control will close the dampers below this position based on measured CO_2 levels in the space to provide additional operation savings.

The control will also allow for the use of a remote minimum position potentiometer. This will only adjust the Occupied Minimum position. If used, the software set point ECONOMIN_SP should be set to 0 as the control will use the largest set point.

The damper position is not linear with the amount of outside air, so the user will need to set the position of the EconoMi$er+ accordingly. It is best to use the following equation and measured data to set the position:

$$OA = \frac{SAT - RAT}{OAT - RAT} * 100$$

OA = % outdoor air

SAT = supply air temperature

RAT = return air temperature

OAT = outdoor air temperature

The SAT and OAT values can be read from the control and, if the unit is equipped with an RAT sensor, then all three values can be read. For the calculation to work properly, there should be at least a 10° F difference between the OAT and RAT temperatures.

Maximum Damper Position

Set the maximum EconoMi$er+ position. Normally this is set at 100%. If using 3-position control or there is a reason not to use 100% outside air, this can be set using the EconoMi$er+ Maximum Position (MAX_POS_SP).

Compressor Lockout Temperature

Set the Compressor Lockout Temperature. The Compressor Lockout Temperature (CMP_LOCK) is used to prevent compressor from running at low ambient conditions when an EconoMi$er+ can easily satisfy the load.

EconoMi$er+ Changeover Control

Determine the type of EconoMi$er+ changeover control which will be used to enable and disable free cooling. This is done using the EconoMi$er+ Changeover Type.

1. Switch — This changeover setting is used when a remote signal from an energy management system will enable and disable the EconoMi$er+. This is done through a remote EconoMi$er+ enable switch.
2. Outdoor Dry Bulb — For this changeover setting, the EconoMi$er+ will be enabled based on the outdoor-air temperature. The EconoMi$er+ is shipped with an outdoor air temperature sensor. The outdoor air temperature set point can be configured by the user. The EconoMi$er+ will be disabled when the outdoor-air temperature rises above the set point. The configuration variable is the EconoMi$er+ Changeover set point (OAT_SP).
3. Differential Dry Bulb — For this changeover setting, the EconoMi$er+ will be enabled whenever the outside-air temperature is lower than the return-air temperature. No configuration of set points is required other than to select the differential dry bulb function.
4. Outdoor Enthalpy — For this changeover setting, the control will enable the EconoMi$er+ based on the outdoor-air enthalpy curves as shown in Fig. 29. Using the EconoMi$er+ Changeover set point (ENTHALPY_SP), select curves A, B, C or D. The control will then use the EconoMi$er+ at conditions below the curve. The control uses the OAT and optional humidity sensor to calculate the enthalpy and also has the A, B, C, and D curves stored in memory.
5. Differential Enthalpy — For this changeover setting, the EconoMi$er+ will be enabled based on the comparison of the enthalpy of the return air and outside air. If the outside air enthalpy is lower than the return air, then the EconoMi$er+ will be enabled. To use this option, an accessory outside air humidity sensor, a return air dry bulb sensor and a return air humidity sensor must be ordered and installed. No configuration of set points is required other than to select the function.

C. Demand Ventilation Configuration

The EconoMi$er+ control has demand ventilation control capability when using an IAQ sensor. The indoor air quality (IAQ) is measured using a CO_2 sensor. The IAQ sensor can be field-installed in the return duct or the occupied space.

The EconoMi$er+ control algorithm modulates the position of the EconoMi$er+ damper between two user configurations depending upon the relationship between the IAQ and the Outdoor Air Quality (OAQ). The lower of these two positions is referred to as the Minimum IAQ Minimum EconoMi$er+ Position (IAQMIN_SP). The higher position is referred to as the Occupied EconoMi$er+ Minimum Position (ECONOMIN_SP). The IAQMIN_SP should be set to an EconoMi$er+ position that brings in enough fresh air to remove contaminants and CO_2 generated by sources other than people. The ECONOMIN_SP should be set to an EconoMi$er+ position that brings in enough fresh air to remove contaminants and CO_2 generated by all sources including people at the design value for maximum occupancy.

A reference differential CO_2 level above the outside CO_2 level is used as the starting point for IAQ control and another reference differential level for maximum ventilation at design occupancy is used for the end of IAQ control. Between these points the control will modulate the dampers open from the IAQMIN_SP and the ECONOMIN_SP setpoints. The damper position will never go above ECONOMIN_SP or below IAQMIN_SP.

The control does not measure the outdoor IAQ reference level as these levels are relatively constant. The installer should take a measurement at start-up of the unit and enter this value into the control using the Outdoor Air IAQ reference level configuration.

The control is configured for air quality sensors which provide 4 mA at 0 ppm and 20 mA at 2000 ppm. If a sensor has a different range, these bounds must be reconfigured.

To configure the control for an IAQ sensor perform the following steps:

1. Determine the Occupied EconoMi$er+ Minimum position (ECONOMIN_SP) and enter it into the control.
2. Determine the IAQ minimum EconoMi$er+ position (IAQMIN_SP) and enter it into the control.
3. Enable IAQ control using IAQ Enable (IAQ_FLG).
4. Determine the Outdoor Air IAQ Reference (OAQ) and enter it into the control.

NOTE: The value entered into the control will be the CO_2 ppm level divided by 10. For example, 400 ppm would be entered as 40.

5. Determine the lower control point differential level (DAQLO) and enter it into the control. This is a differential level so if the desired level to start IAQ control is 500 ppm and the OAQ reference level is 400 then a value of 100 would be used.

NOTE: The value entered into the control will be the CO_2 ppm level divided by 10. For example 100 ppm would be entered as 10.

6. Determine the upper control point differential level (DAQHI) and enter it into the control. This is a differential level so if the desired level to start IAQ control is 1100 ppm and the OAQ reference level is 400 then a value of 700 would be used.

NOTE: The value entered into the control will be the CO_2 ppm level divided by 10. For example 700 ppm would be entered as 70.

D. Power Exhaust Configuration

The EconoMi$er+ can control up to 2 stages of power exhaust. Power exhaust activation is done through configurable damper position set points. The first stage of power is controlled by relay C4 on the EconoMi$er+ board. The activation point for the first stage is set using the Power Exhaust Stage 1 Activation set point (PE_SP1). The second stage of power exhaust must be set at a value greater than the first stage. It is configured using the Power Exhaust Stage 2 Activation set point (PE_SP2).

XVIII. OPERATING SEQUENCE

A. Cooling, Units Without EconoMi$er+

When thermostat calls for cooling, terminals G and Y1 and the compressor contactor (C) are energized. The indoor (evaporator) fan motor (IFM), compressor, and outdoor (condenser) fan motor (OFM) start. The OFM runs continuously while the unit is in cooling. When the thermostat is satisfied, C is deenergized and the compressor and OFM shut off. After a 30-second delay, the (IFM) shuts off. If the thermostat fan selector switch is in the ON position, the evaporator motor will run continuously.

B. Heating, Units Without EconoMi$er+

When the thermostat calls for heating, terminal W1 is energized. The induced-draft motor is energized and the burner ignition sequence begins. The indoor (evaporator) fan motor (IFM) is energized 45 seconds after a flame is ignited. 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.

C. Cooling, Units With EconoMi$er+

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

When the EconoMi$er+ control is the occupied mode and a call for cooling exists (Y1 on the thermostat), the control will first check for indoor fan operation. If the fan is not on, then cooling will not be activated. If the fan is on, then the control will open the EconoMi$er+ damper to the minimum position.

On the initial power to the EconoMi$er+ board, it will take the damper up to $2^1/_2$ minutes before it begins to position itself. With subsequent fan signal (G) to the board, the change in damper position will take up to 30 seconds to initiate. Damper movement from full closed to full open (or vice versa) will take $2^1/_2$ minutes.

If the damper is in the process of a change (for example going to 100% open) and the signal (G) is turned off, the damper will continue to open to 100% before it closes (due to no fan signal [G]).

If free cooling can be used as determined from the appropriate changeover command (switch, dry bulb, enthalpy curve, differential dry bulb, or differential enthalpy), then the control will modulate the dampers open to main the supply air temperature set point plus 2° F.

If there is a further demand for cooling (cooling second stage — Y2 is energized), then the control set point for the leaving air will be set at the supply air set point to increase the cooling capacity. If this cannot satisfy the load then the control will bring on compressor stages as needed to maintain the supply air temperature set point. The EconoMi$er+ damper will be locked open at 100% or the maximum damper position set point.

To ensure that there is oil return, the compressors will operate for at least 3 minutes. If, during this period, the leaving temperature drops below the set point by 5° F, then the EconoMi$er+ dampers will be closed to 60% until the compressor is turned off to avoid cold leaving air temperatures.

If the conditions are not suitable for free cooling then the EconoMi$er+ dampers will be closed to the minimum ventilation position.

Compressor stages will be used to cool the air. If the control is configured for direct control by Y1 and Y2, then the stages will sequence based on the demand of Y1 and Y2. If the control is configured for leaving air temperature control, then Y1 will maintain the leaving air temperature at the supply air set point plus 2° F. If Y1 and Y2 are closed, then the leaving air will be controlled to the supply air set point. If Y2 is closed and Y1 is open, then control will shut down and indicate an error due to a thermostat failure or improper wiring of the thermostat.

If the unit is in the unoccupied mode, then the control of the temperature will depend on the unoccupied free cooling configuration: no unoccupied cooling, unoccupied free cooling with any mechanical cooling, or unoccupied free and mechanical cooling. If free cooling is enabled, then the control will check if free cooling can be used. The EconoMi$er+ will then control to the leaving air temperature set point plus 2° F for a Y1 command, or the leaving air temperature set point for a Y1 and Y2 command. If mechanical cooling is allowed to be used, then the control will then bring on additional stages of mechanical cooling if free cooling cannot satisfy the load.

If the EconoMi$er+ control:

- is in the occupied mode
- is configured to use demand ventilation
- cannot use free cooling
- has return air or space CO_2 levels below the DAQLO limit,

then the EconoMi$er+ damper position will be set to the IAQMIN_SP set point. If the CO_2 level rises above the DAQLO limit, then the dampers will modulate open in a linear relationship until the return air or space CO_2 levels are at or above the DAQHI limit. The damper position will be at the ECONOMIN_SP set point.

When the EconoMi$er+ is being used for free cooling and the position exceeds the power exhaust set point, then the control will turn on the appropriate power exhaust fans. Refer to Fig. 23 for barometric relief capacity, Fig. 24 for outdoor air leakage, and Fig. 25 for pressure drop.

Unoccupied and Occupied Minimum Position Control

There is an unoccupied minimum damper position and an occupied minimum damper position on the EconoMi$er+ controller. When the HVAC fan is off the outdoor air damper will always be closed. When the fan is on and in the unoccupied mode, the outdoor air damper will be at the unoccupied minimum position. When the fan is on (G call) and in the occupied mode, the outdoor air damper will be at the occupied minimum position.

A jumper wire is factory-installed to force the unit into occupied configuration whenever G or Y1 are closed. Without the jumper wire, the unit will always be in unoccupied mode.

The 2 minimum position settings are also used in the IAQ sequence of operation. See Indoor Air Quality Sensor on page 21.

NOTE: The minimum position signal takes priority over the maximum position signal. If the maximum damper position is set below the minimum damper position, the EconoMi$er+ controller will maintain the actuator at minimum position.

Adjust the unoccupied minimum position 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 (6 C) temperature difference between the outdoor and return air temperatures.

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

Calculate the appropriate supply-air temperature using the following formula: (TO x OA) + (TR x RA) = TM

TO = Outdoor-Air Temperature

OA = Percent of Outdoor Air

TR = Return-Air Temperature

RA = Percent of Return Air

TM = Supply-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 0.10) + (75 x 0.90) = 73.5 F

Carefully adjust the unoccupied minimum position until the measured supply-air temperature matches the calculated value. Then, carefully adjust the occupied minimum position set point on the controller until the desired position is reached.

D. Heating, Units With Economizer+

When the thermostat calls for heating, terminal W1 is energized. The induced-draft motor is energized and the burner ignition sequence begins. The indoor (evaporator) fan motor (IFM) is energized 45 seconds after a flame is ignited. 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. The economizer damper moves to the minimum position. When the thermostat is satisfied, the damper moves to the fully closed position.

SERVICE

⚠ **CAUTION:** When servicing unit, shut off all electrical power to unit and tag disconnect to avoid shock hazard or injury from rotating parts.

I. CLEANING

Inspect unit interior at the beginning of each heating and cooling season or more frequently as operating conditions require.

A. Evaporator Coil

Clean coil as required. Inspect coil at beginning of heating and cooling seasons.

1. Turn unit power off and install lockout tag. Remove evaporator coil access panel.
2. If economizer is installed, remove economizer by disconnecting Molex plug and removing economizer mounting screws. Refer to Accessory Economizer Installation Instructions or Optional EconoMi$er+ section on page 18 for more details.
3. Remove filters from unit.
4. Clean coil using a commercial coil cleaner or dishwasher detergent in a pressurized spray canister. Wash both sides of coil and flush with clean water. For best results, back-flush toward return-air section to remove foreign material. Caution should be taken as to not overflow the evaporator drain condensate pan.
5. Flush condensate pan after completion.
6. Reinstall economizer and filters.
7. Reconnect wiring.
8. Replace access panels.

B. Condenser Coil

Inspect coil monthly. Clean condenser coil annually, and as required by location and outdoor-air conditions.

<u>One-Row Coils</u>

Wash coil with commercial cleaner. Clean outer surfaces with a stiff brush in the normal manner. It is not necessary to remove top panel.

<u>2-Row Coils</u>

Clean coil as follows:

1. Turn off unit power and install lockout tag.
2. Remove top panel screws on condenser end of unit.
3. Remove condenser coil corner post. See Fig. 37. To hold top panel open, place coil corner post between top panel and center post. See Fig. 38.
4. Remove screws securing coil to center post.
5. Remove fastener holding coil sections together at return end of condenser coil. Carefully separate the outer coil section 3 to 4 in. from the inner coil section. See Fig. 39.
6. Use a water hose or other suitable equipment to flush down between the 2 coil sections to remove dirt and debris. Clean the outer surfaces with a stiff brush in the normal manner.
7. Secure inner and outer coil rows together with a field-supplied fastener.
8. Reposition the outer coil section and remove the coil corner post from between the top panel and center post.
9. Reinstall the coil corner post and replace all screws.

C. Condensate Drain

Check and clean each year at start of cooling season. In winter, keep drain dry or protect against freeze-up.

D. Filters

Clean or replace at start of each heating and cooling season, or more often if operating conditions require it. Replacement filters must be same dimensions as original filters.

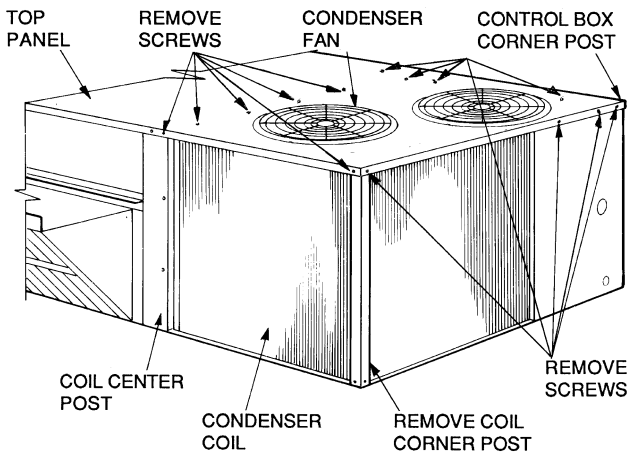


Fig. 37 — Cleaning Condenser Coil

II. LUBRICATION

A. Compressors

Each compressor is charged with the correct amount of oil at the factory.

B. Fan-Motor Bearings

Fan-motor bearings are of the permanently lubricated type. No further lubrication is required. No lubrication of condenser-fan or evaporator-fan motors is required.

III. CONDENSER FAN ADJUSTMENT (Fig. 40)

1. Shut off unit power supply and tag disconnect.
2. Remove condenser-fan assembly (grille, motor, motor cover, and fan) and loosen fan hub setscrews.
3. Adjust fan height as shown in Fig. 40.
4. Tighten setscrews and replace condenser-fan assembly.

IV. BLOWER BELT ADJUSTMENT

Inspect blower belt for wear, proper belt tension, and pulley alignment as conditions require or at the beginning of each heating and air conditioning season. Refer to Step 9 — Adjust Evaporator Fan Speed on page 27 for adjustment and alignment procedures.

V. MANUAL OUTDOOR-AIR DAMPER

If outdoor-air damper blade is required, see Manual Outdoor-Air Damper section on page 17.

VI. ECONOMIZER ADJUSTMENT

Refer to Optional EconoMi$er+ section on page 18.

VII. CONDENSER COIL GRILLE

Condenser coil grille is shipped factory-installed. No adjustments are required.

VIII. HIGH-PRESSURE SWITCH

Located on the compressor's hot gas line is a high-pressure switch. This switch opens at 428 psig and closes at 320 psig. No adjustment is necessary. Refer to Tables 1A and 1B.

NOTE: There is no Schrader core in the valve below the high-pressure switch.

IX. LOSS-OF-CHARGE SWITCH

Located on the condenser's liquid line is a low-pressure switch which functions as a loss-of-charge switch. This switch contains a Schrader core depressor. This switch opens at 7 psig and closes at 22 psig. No adjustment is necessary. Refer to Tables 1A and 1B.

X. FREEZESTAT

Located on the "hair pin" end of the evaporator coil is a bimetal temperature sensing switch. This switch protects the evaporator coil from freeze-up due to lack of airflow. The switch opens at 30 F and closes at 45 F. No adjustment is necessary. Refer to Tables 1A and 1B.

XI. CHECKING AND ADJUSTING REFRIGERANT CHARGE

The refrigerant system is fully charged with R-22 refrigerant, tested, and factory-sealed. Unit must operate in Cooling mode a minimum of 10 minutes before checking charge.

NOTE: Adjustment of the refrigerant charge is not required unless the unit is suspected of not having the proper R-22 charge.

A superheat charging chart is attached to the outside of the service access panel. The chart includes the required suction line temperature at given suction line pressures and outdoor ambient temperatures.

An accurate superheat, thermocouple-type or thermistor-type thermometer, and a gage manifold are required when using the superheat charging method for evaluating the unit charge. *Do not use mercury or small dial-type thermometers because they are not adequate for this type of measurement.*

⚠ **CAUTION:** When evaluating the refrigerant charge, an indicated adjustment to the specified factory charge must always be very minimal. If a substantial adjustment is indicated, an abnormal condition exists somewhere in the cooling system, such as insufficient airflow across either coil or both coils.

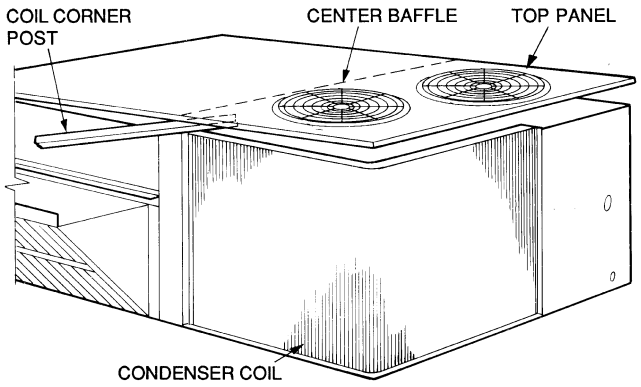


Fig. 38 — Propping Up Top Panel

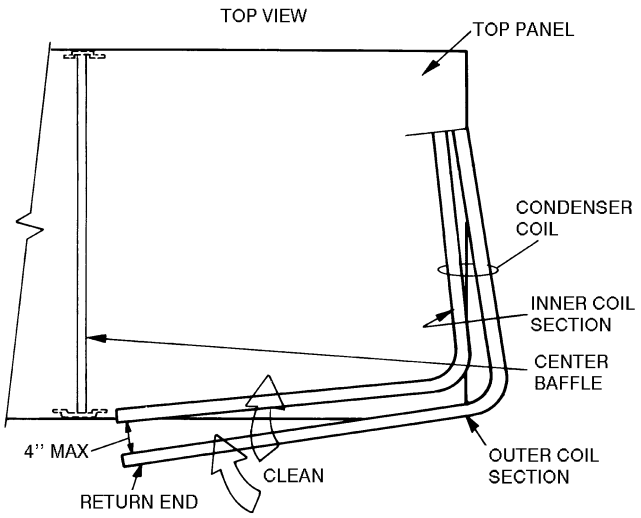
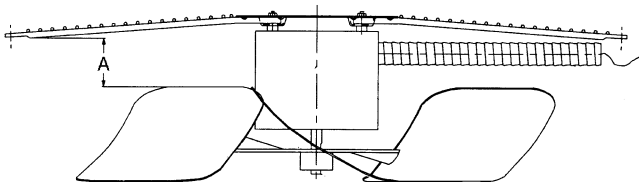


Fig. 39 — Separating Coil Sections



580F UNIT VOLTAGE	FAN HEIGHT "A" (in.)
208/230 V	2.75
460 V and 575 V	3.50

Fig. 40 — Condenser-Fan Adjustment

Proceed as follows:

1. Remove caps from low-pressure and high-pressure Schrader valve fittings.
2. Using hoses with valve core depressors, attach low- and high-pressure gage hoses to low-pressure and high-pressure service fittings, respectively.
3. Start unit in Cooling mode and let unit run until system pressure stabilize.
4. Measure and record the following:
   a. Outdoor ambient-air temperature (F db).
   b. Evaporator inlet-air temperature (F wb).
   c. Suction-tube temperature (F) at low-side service fitting.
   d. Suction (low-side) pressure (psig).
5. Using "Cooling Charging Charts" compare outdoor-air temperature (F db) with the suction line pressure (psig) to determine desired system operating suction line temperature. See Fig. 41-48.
6. Compare measured suction-tube temperature with desired suction-tube temperature. Using a tolerance of ± 3° F, add refrigerant if measured temperature is more than 3° F higher than proper suction-tube temperature, or remove refrigerant if actual temperature is more than 3° F lower than required suction-tube temperature.

A. To Use Cooling Charging Chart

This method is to be used in Cooling mode only. Take the outdoor ambient temperature and read the suction pressure gage. Refer to appropriate chart to determine what suction temperature should be. If suction temperature is high, add refrigerant. If suction temperature is low, carefully recover some of the charge. Recheck the suction pressure as charge is adjusted. Example (Fig. 44, Circuit 2):

Outdoor Temperature . . . . . 85 F
Suction Pressure . . . . . 74 psig
Suction Temperature should be . . . . . 56 F

(Suction temperature may vary ± 3 F.)

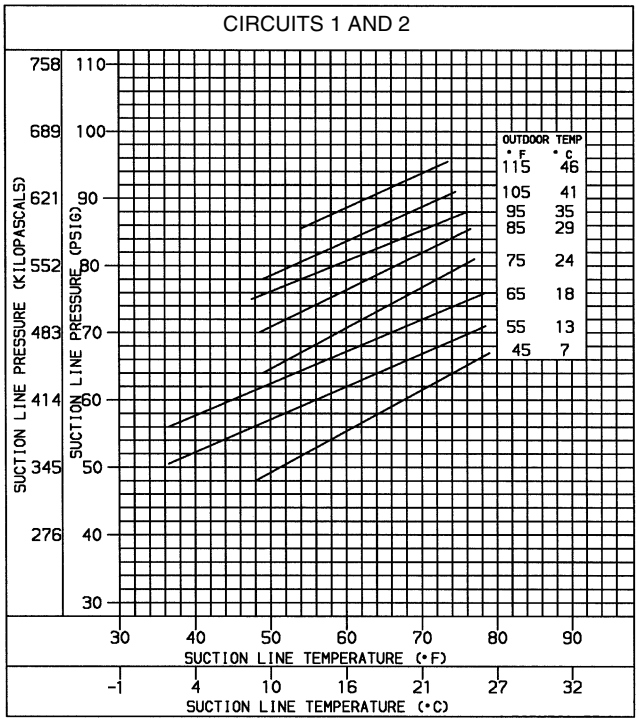


Fig. 41 — Cooling Charging Chart; 580F090

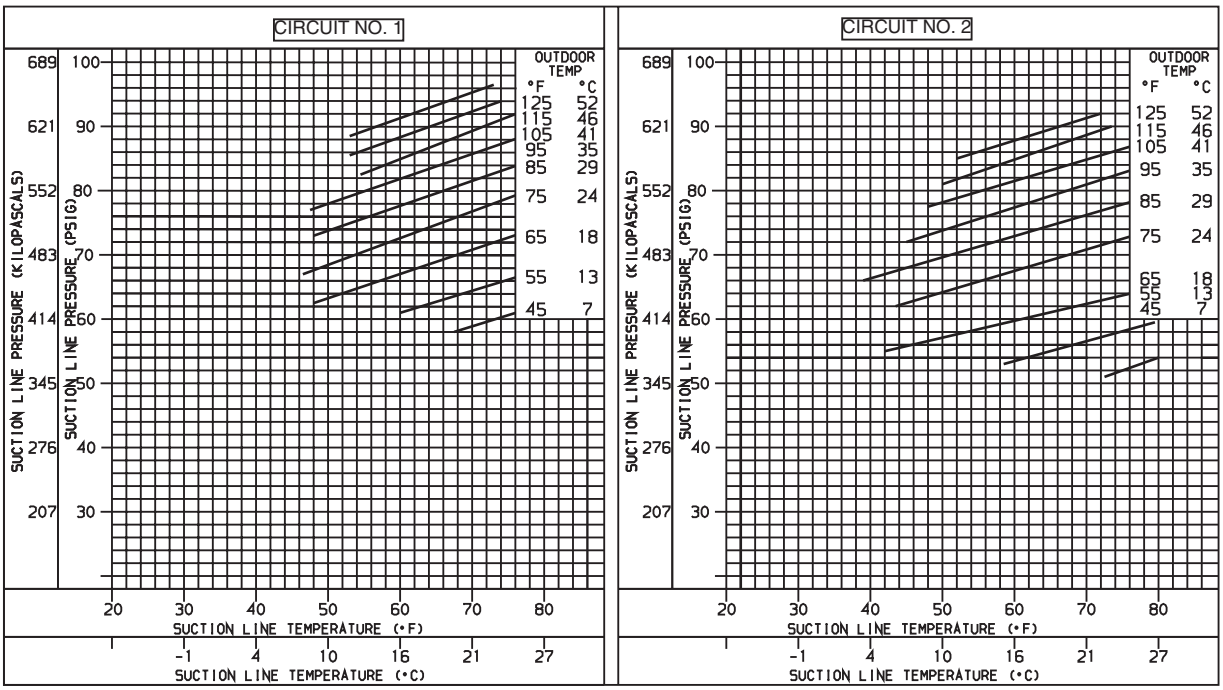


Fig. 42 — Cooling Charging Chart; 580F102

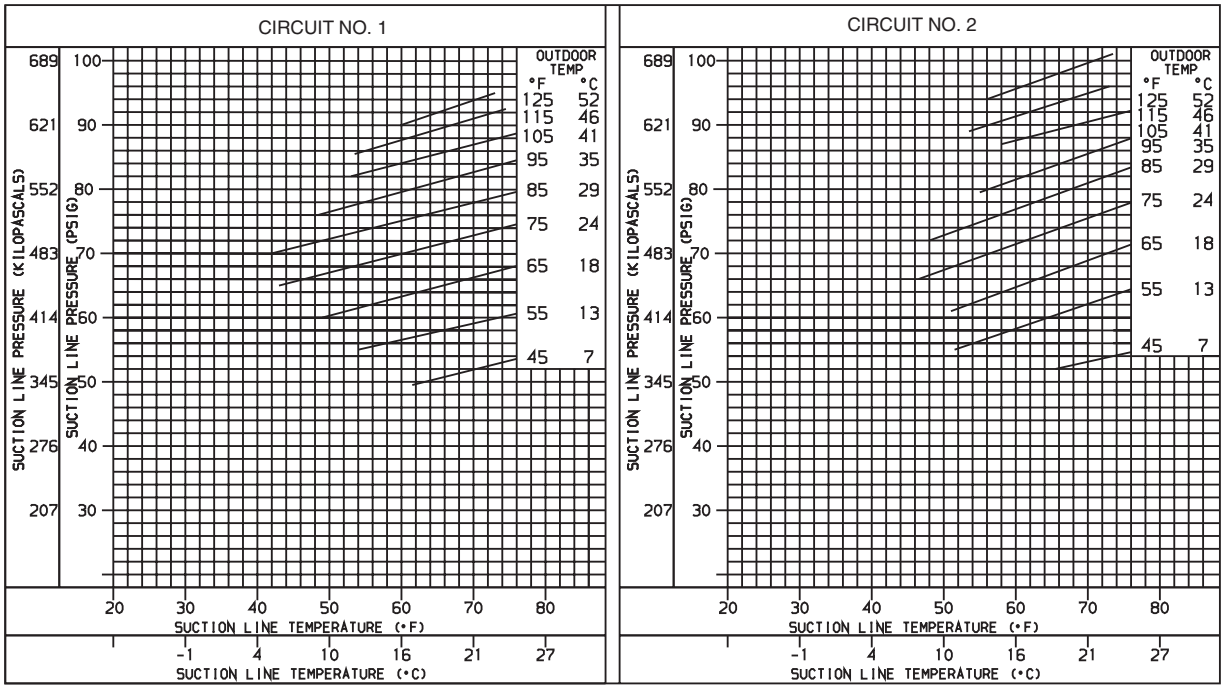


Fig. 43 — Cooling Charging Chart; 580F120

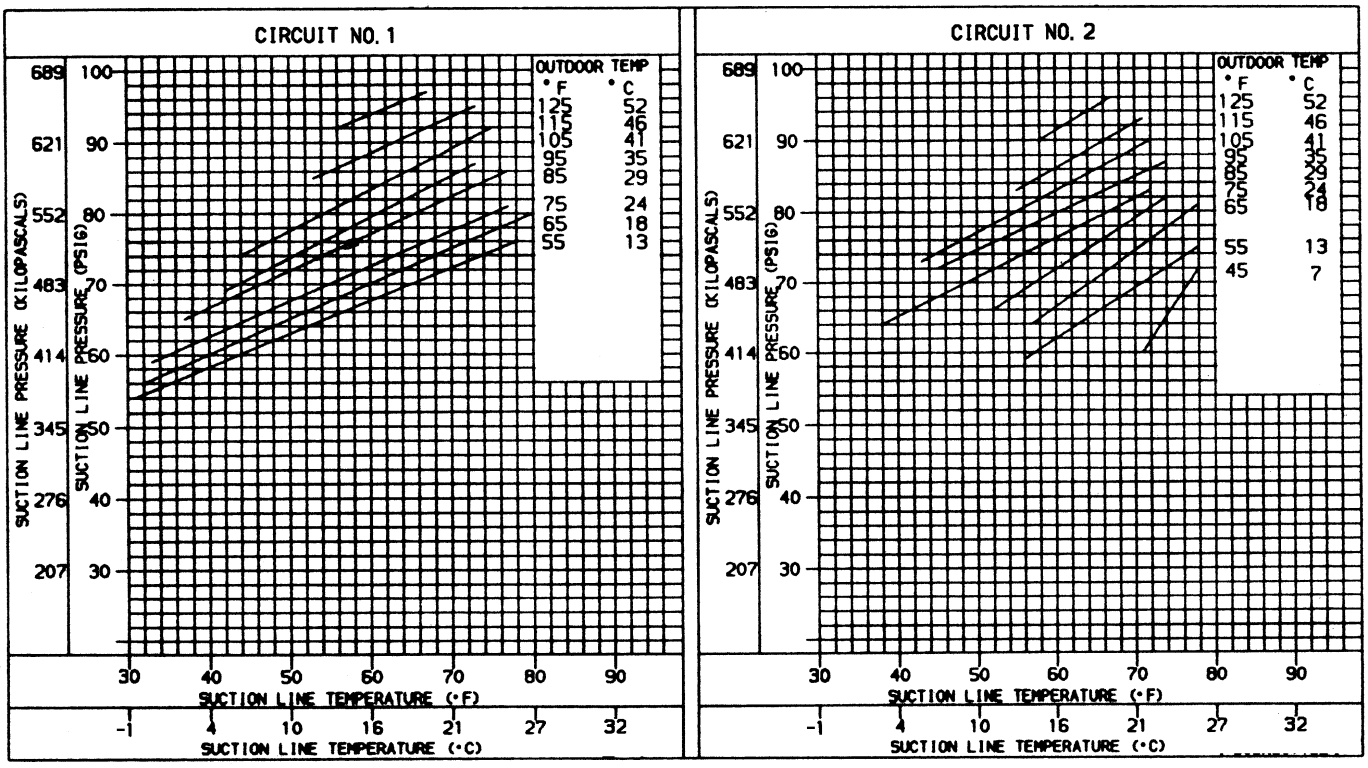


Fig. 44 — Cooling Charging Chart; 580F150

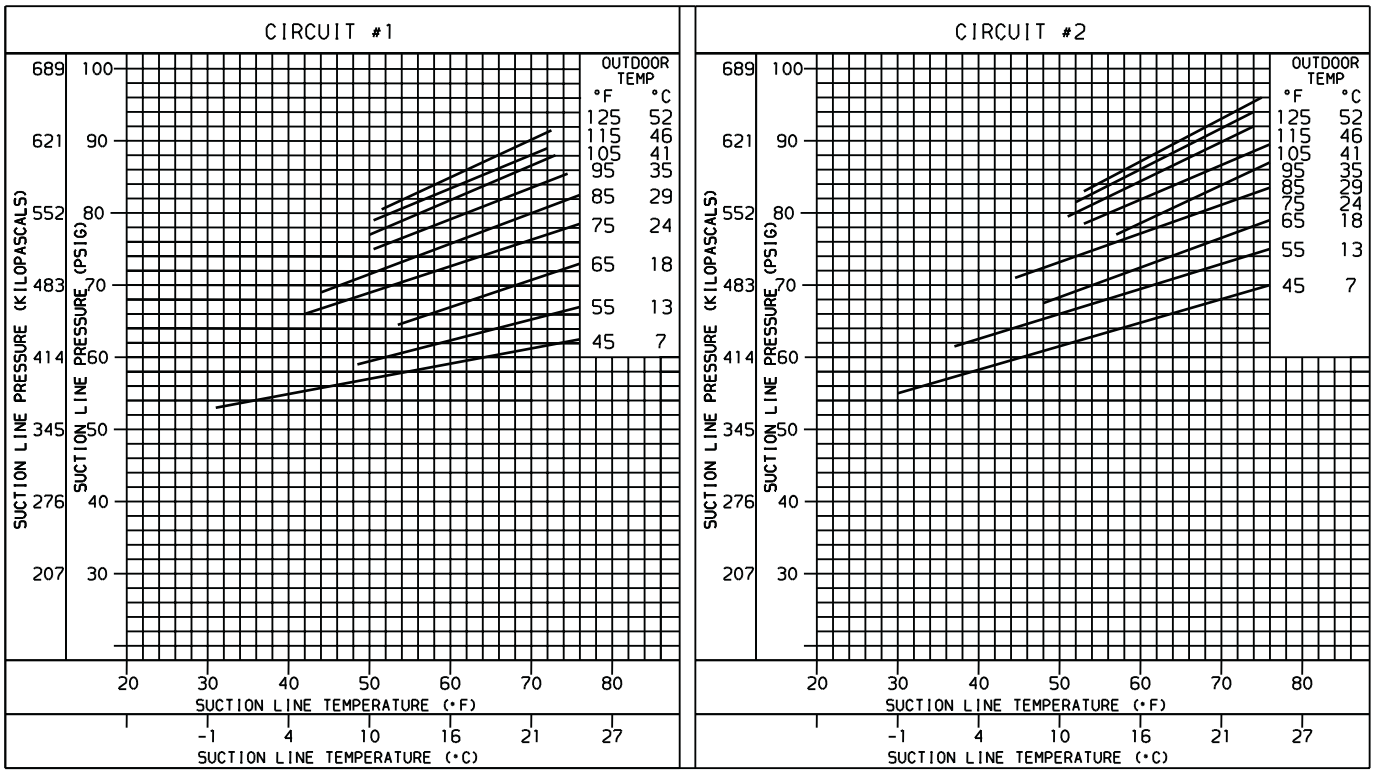


Fig. 45 — Cooling Charging Chart; 580F091

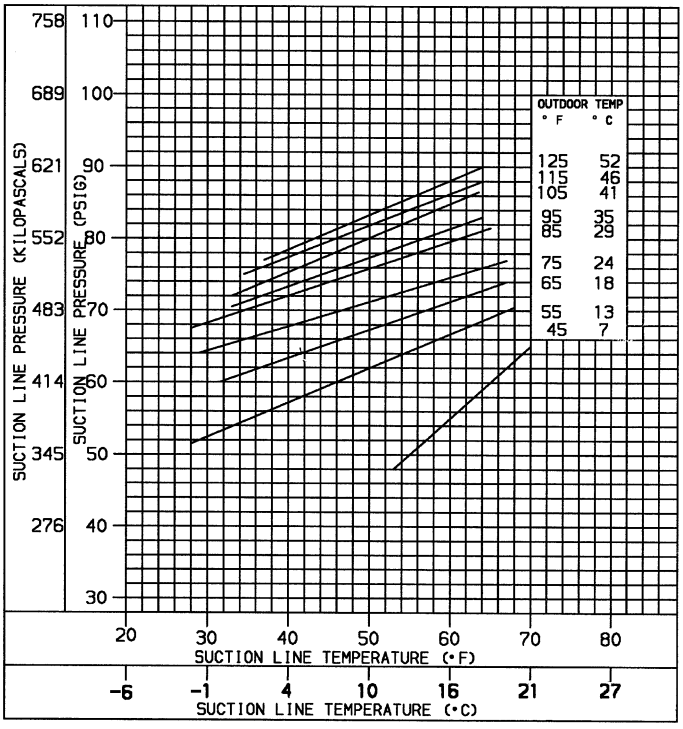


Fig. 46 — Cooling Charging Chart; 580F103 (Circuits 1 and 2)

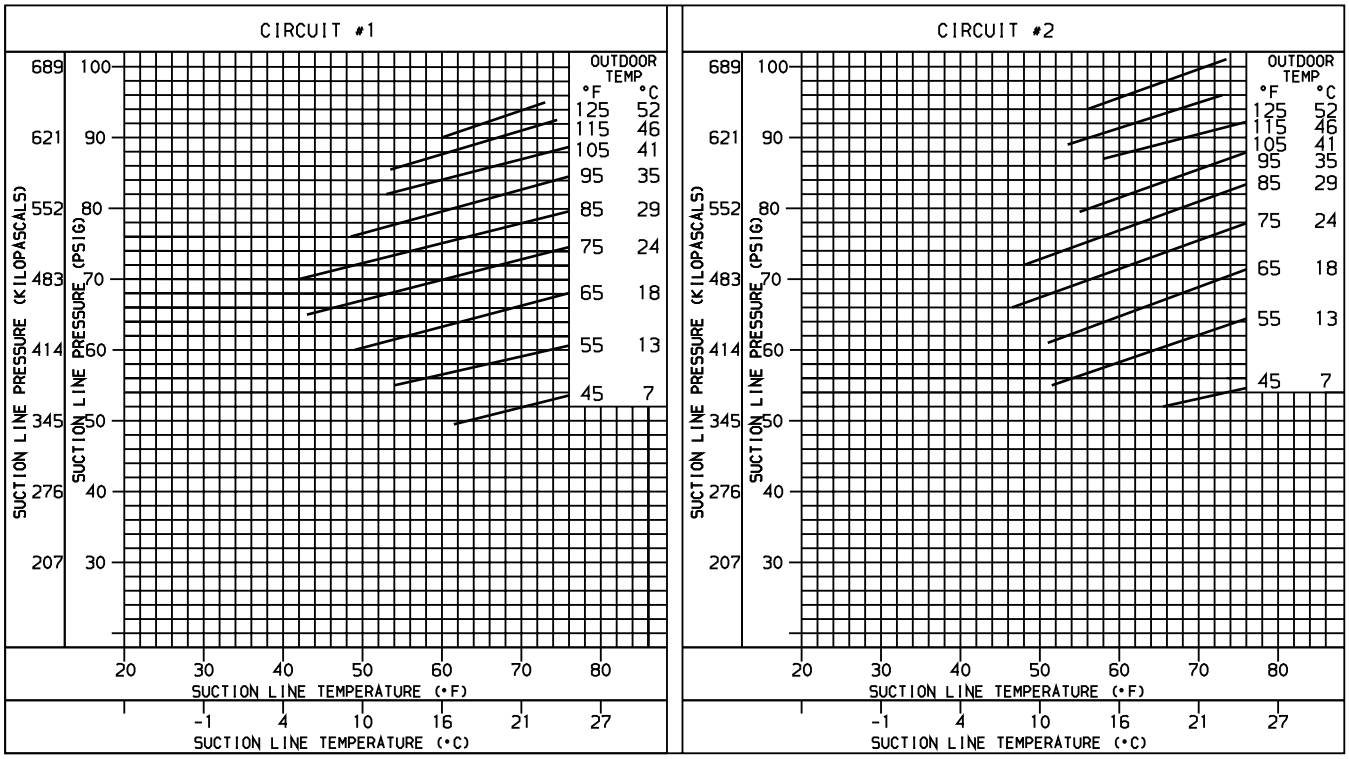


Fig. 47 — Cooling Charging Chart; 580F121

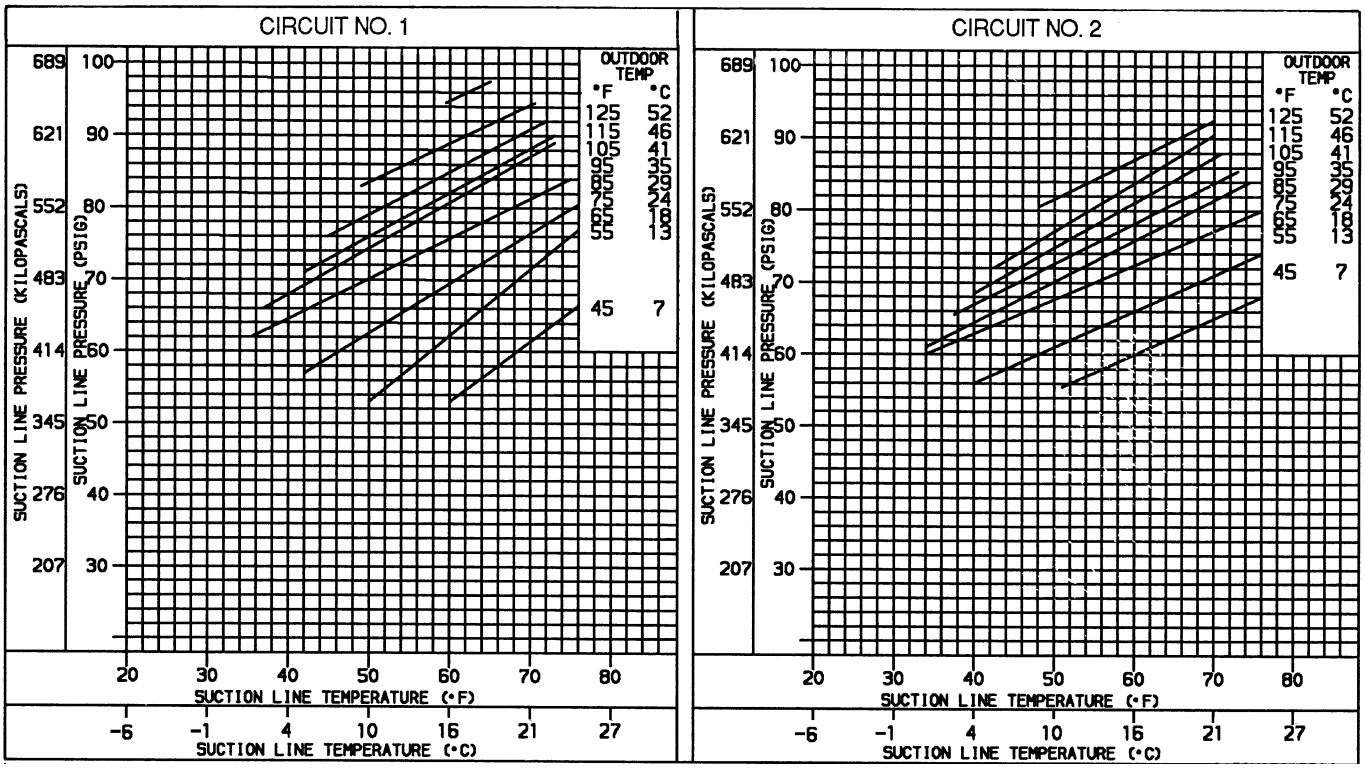


Fig. 48 — Cooling Charging Chart; 580F151

XII. FLUE GAS PASSAGEWAYS

To inspect the flue collector box and upper areas of the heat exchanger:

1. Remove the combustion blower wheel and motor assembly according to directions in Combustion-Air Blower section below.
2. Remove the flue cover to inspect the heat exchanger.
3. Clean all surfaces as required using a wire brush.

XIII. COMBUSTION-AIR BLOWER

Clean seasonally 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 bimonthly to determine proper cleaning frequency.

To inspect blower wheel, shine a flashlight into draft hood opening. If cleaning is required, remove motor and wheel as follows:

1. Slide burner access panel out.
2. Remove the 6 screws that attach induced-draft motor housing to vestibule plate (Fig. 49).
3. The blower wheel can be cleaned at this point. If additional cleaning is required, continue with Steps 4 and 5.
4. To remove blower from the motor shaft, remove 2 setscrews.
5. To remove motor, remove the 4 screws that hold blower housing to mounting plate. Remove the motor cooling fan by removing one setscrew. Then remove nuts that hold motor to mounting plate.
6. To reinstall, reverse the procedure outlined above.

XIV. LIMIT SWITCH

Remove blower access panel (Fig. 1A and 1B). Limit switch is located on the fan deck. Verify operation of limit by temporarily blocking return air until limit trips.

XV. BURNER IGNITION

Unit is equipped with a direct spark ignition 100% lockout system. Integrated Gas Unit Controller (IGC) is located in the control box (Fig. 11). Module contains a self-diagnostic LED. A single LED on the IGC provides a visual display of operational or sequential problems when the power supply is interrupted. When a break in power occurs, the module will be reset (resulting in a loss of fault history) and the indoor (evaporator) fan ON/OFF times will be reset. For additional information, refer to the Start-Up, Heating section on page 51. The LED error code can be observed through the viewport. See Fig. 11. During servicing refer to the label on the control box cover or Table 36 for an explanation of LED error code descriptions.

If lockout occurs, unit may be adjusted by interrupting power supply to unit for at least 5 seconds.

XVI. MAIN BURNERS

At the beginning of each heating season, inspect for deterioration, blockage due to corrosion or other causes. Observe the main burner flames and replace burners if necessary.

⚠ **CAUTION:** When working on gas train, do not hit or plug orifice spuds.

A. Removal and Replacement of Gas Train (Fig. 49 and 50)

1. Shut off manual gas valve.
2. Shut off power to unit and install lockout tag.
3. Slide out burner section side panel (not shown).
4. Disconnect gas piping at unit gas valve using backup wrench on the flats of the valve body where the gas pipe enters the gas valve. See Fig. 49.
5. Remove wires connected to gas valve. Mark each wire.

Table 36 — LED Error Code Description*

LED INDICATION	ERROR CODE DESCRIPTION
ON	Normal Operation
OFF	Hardware Failure
1 Flash†	Evaporator Fan On/Off Delay Modified
2 Flashes	Limit Switch Fault
3 Flashes	Flame Sense Fault
4 Flashes	4 Consecutive Limit Switch Faults
5 Flashes	Ignition Lockout Fault
6 Flashes	Induced-Draft Motor Fault
7 Flashes	Rollout Switch Fault
8 Flashes	Internal Control Fault
9 Flashes	Software Lockout

LEGEND

LED — Light-Emitting Diode

*A 3-second pause exists between LED error code flashes. If more than one error code exists, all applicable codes will be displayed in numerical sequence.

†Indicates a code that is not an error. The unit will continue to operate when this code is displayed.

IMPORTANT: Refer to Troubleshooting Tables 38-40 for additional information.

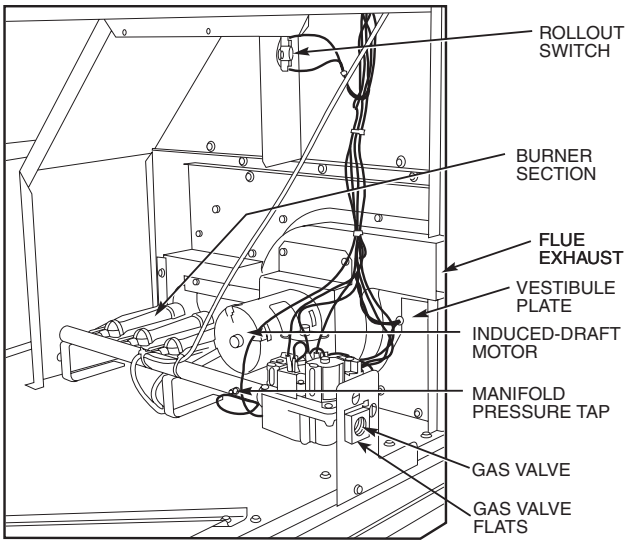


Fig. 49 — Burner Section Details

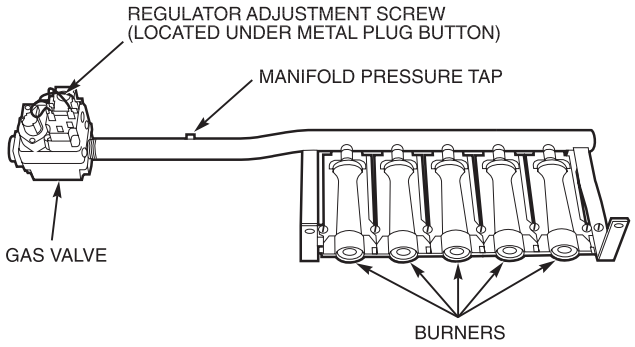


Fig. 50 — Burner Tray Details

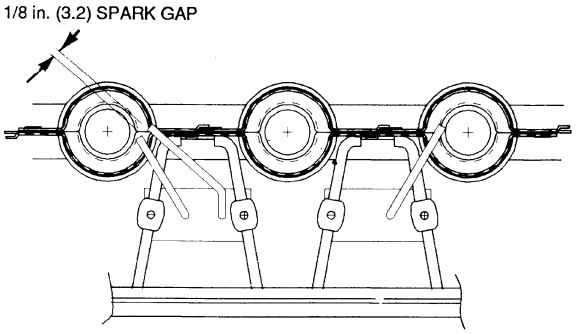
6. Remove wires from ignitor and sensor wires at the Integrated Gas Unit Controller (IGC).
7. Remove the 2 screws that attach the burner rack to the vestibule plate.
8. Slide the burner tray out of the unit (Fig. 50).
9. To reinstall, reverse the procedure outlined above.

B. Cleaning and Adjustment

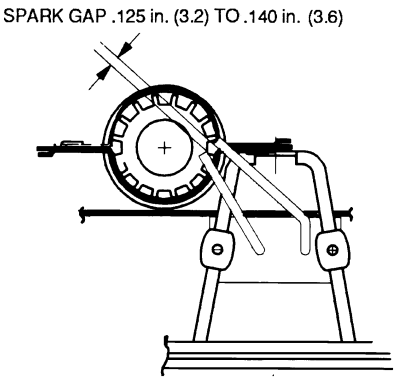
1. Remove burner rack from unit as described in Removal and Replacement of Gas Train section, above.
2. Inspect burners; if dirty, remove burners from rack.
3. Using a soft brush, clean burners and cross-over port as required.
4. Adjust spark gap. See Fig. 51.
5. Reinstall burners on rack.
6. Reinstall burner rack as described in Removal and Replacement of Gas Train section, this page.

XVII. REPLACEMENT PARTS

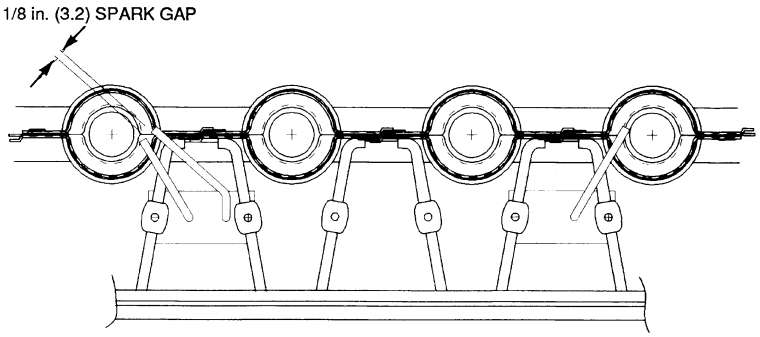
A complete list of replacement parts may be obtained from any Bryant distributor upon request.



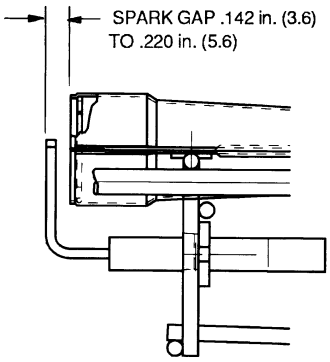
580F090,091,102,103
125,000 BTUH INPUT

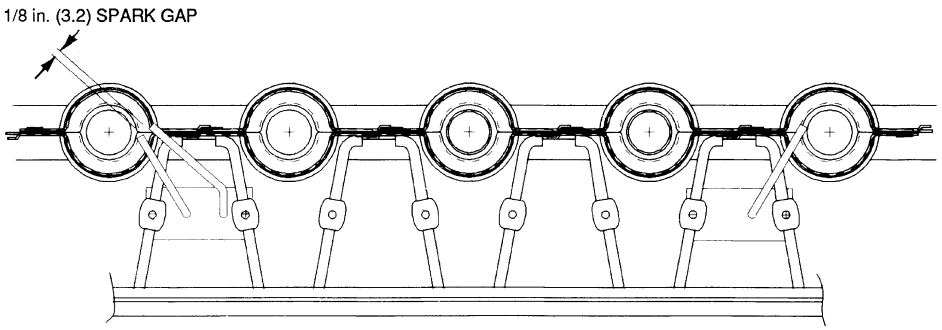


NOTE: Dimensions in ( ) are millimeters.



580F090,091,102,103,120,121
180,000 BTUH INPUT





580F090,091,102,103,120,121,150,151
220,000 BTUH INPUT AND 580F120,121,150,151
250,000 BTUH INPUT

Fig. 51 — Spark Gap Adjustment

TROUBLESHOOTING

I. ECONOMI$ER+ TROUBLESHOOTING

The EconoMi$er+ control has built-in diagnostics. The control can detect and display 10 different diagnostic codes as shown in Table 37. The user can also use the integrated display to check the status of all the inputs and outputs and run the manual control mode to check the operation of the EconoMi$er+ and compressors.

Table 37 — EconoMi$er+ Error Codes

NO.	DESCRIPTION	CRITERIA
1	SAT Sensor Failure	Temperature <–40 F or Greater Than 250 F
2	RAT Sensor Failure	Temperature <–40 F or Greater Than 250 F
3	OAT Sensor Failure	Temperature <–40 F or Greater Than 250 F
4	ORH Sensor Failure	Read Less Than 2 mA or Greater Than 22 mA
5	IRH Sensor Failure	Read Less Than 2 mA or Greater Than 22 mA
6	IAQ Sensor Failure	Read Less Than 2 mA or Greater Than 22 mA
7	Y2 On Y1 Off	Wiring Error
8	Micro Fails E2 Tests	Hardware/Software Check
*	Micro Fails RAM Test	Hardware/Software Check
†	Micro Fails ROM Tests	Hardware/Software Check

LEGEND

IAQ — Indoor Air Quality
IRH — Indoor Relative Humidity
OAT — Outdoor Air Temperature
ORH — Outdoor Relative Humidity
RAT — Return Air Temperature
SAT — Supply Air Temperature

*If there is a RAM failure DS1+DS3/DS2+DS4 will alternately flash.
†If there is a ROM failure DS1+DS2/DS3+DS4 will alternately flash.

A. Error Code 1 — SAT Sensor Failure

Error Criteria

An SAT Sensor Failure error will occur if the sensor is shorted or faulty. If the measured temperature reads below –40 F or above 250 F an error will occur.

Required Action

If an error occurs, then the control will default to Mode 2 compressor stage control where Y1 and Y2 have direct control of the compressors. Use of free cooling is disabled and the EconoMi$er+ will be set to the minimum damper position for either the occupied or unoccupied mode of operation. Replace sensor if faulty.

Reset Method

The error will automatically reset after the value has returned to a normal level. The alarm has to be cleared from the display in the Setup mode or a power reset.

B. Error Code 2 — RAT Sensor Failure

Error Criteria

The RAT Sensor failure error is only applicable the unit has been configured for EconoMi$er+ changeover methods 3 (differential dry bulb) or 5 (differential humidity). For other modes it should be ignored. If the sensor is shorted or faulty, then the measured temperature will be below –40 F or above 250 F and the error will occur.

Required Action

If this error occurs, then change the default EconoMi$er+ changeover control to method 2 (dry bulb changeover control) or replace sensor.

Reset Method

This error will automatically reset after the value has returned to a normal level. The alarm will have to be cleared from the display in the Setup mode.

C. Error Code 3 — OAT Sensor Failure

Error Criteria

An OAT Sensor Failure error occurs if the sensor is shorted or faulty, then the measured temperature will be below –40 F or above 250 F.

Required Action

— If this error occurs disable the economizer and set the economizer to the minimum economizer position.

Reset Method

This error should automatically reset after the value has returned to a normal level. The alarm will have to be cleared from the display in the Setup mode or by a power reset.

D. Error Code 4 — ORH (Outdoor Relative Humidity) Sensor Failure

Error Criteria

If the unit is configured for economizer changeover type 3 or 4, and the input signal is less than 2 mA or greater than 22 mA, then the sensor is faulty and an error will occur.

Required Action

If this error occurs, switch the EconoMi$er+ to dry bulb changeover control.

Reset Method

This error should automatically reset after the value has returned to a normal level. The alarm will have to be cleared from the display in the Setup mode or by a power reset.

E. Error Code 5 — IRH (Indoor Relative Humidity) Sensor Failure

Error Criteria

This error occurs if the unit is configured for EconoMi$er+ changeover type 5 and the input signal is less than 2 mA or greater than 22 mA (faulty sensor).

Required Action

If this error occurs, switch the EconoMi$er+ to differential dry bulb changeover control.

Reset Method

This error should automatically reset after the value has returned to a normal level. The alarm will have to be cleared from the display in the Setup mode or by a power reset.

F. Error Code 6 — IAQ Sensor Failure

Error Criteria

This error occurs if the unit is configured for IAQ demand ventilation control and the input signal is less than 2 mA or greater than 22 mA (faulty sensor).

Required Action

If this error occurs, disable the IAQ control routine and default to the standard EconoMi$er+ minimum position.

Reset Method

This error should automatically reset after the value has returned to a normal level. The alarm will have to be cleared from the display in the Setup mode or by a power reset.

G. Error Code 7 — Y2 On with Y1 Off

Error Criteria

This error occurs if Y2 is turned on and Y1 is off. This indicates that there is a wiring error at the thermostat connections. This alarm should be ignored for the first 20 seconds of operation so that it does not conflict with the special production test mode.

Required Action

Shut the unit off and check wiring.

Reset Method

This error must be manually reset and requires a power reset.

H. Error Code 8 — E2 Test Failure

Error Criteria

This error occurs if internal hardware detects an E2 failure.

Required Action

Shut the unit off.

Reset Method

This error must be manually reset and requires a power reset.

I. Error Mode

When an error occurs, the red and yellow LEDs both come on steady. To determine the error, follow these steps:

1. Enter the Run mode by pushing buttons #1 and #2 for at least 3 seconds until all LEDs flash.
2. Press and release the #1 button to enter the Read mode.
3. Push the ADVANCE/MANUAL (#2) button to advance to item number 20, "1st Most Recent Error." Determine the error(s) by reading the values in items 20-24 and referring to the error codes described above.
4. Fix the error(s).
5. Press buttons 1 and 2 to exit read mode. Enter Setup mode by pressing button #1 for at least 3 seconds until all the LEDs flash.
6. Push button #2 to advance to item number 20.
7. To reset the error code while the green DS4 LEDS is ON, press the READ/ADJUST (#1) button once. This resets the error mode and erases all repaired error codes.

NOTE: Cycling power to the board will also erase the repaired error codes.

J. RAM Test Failure

Error Criteria

If internal hardware detects a RAM failure, this alarm will be displayed by alternately flashing DS1+DS3 and DS2+DS4.

Required Action

Shut the unit off.

Reset Method

This error must be manually reset and requires a power reset.

K. ROM Test Failure

Error Criteria

If internal hardware detects a ROM failure, the alarm is displayed by alternately flashing DS1+DS2 and DS3+DS4.

Required Action

Shut the unit off.

Reset Method

This error must be manually reset and requires a power reset.

L. Unit Always In Unoccupied Mode

A jumper wire is factory-installed to force the unit into occupied configuration whenever G or Y1 are closed. Without the jumper wire, the unit will always be in unoccupied mode. Check the wire. An occupied/unoccupied switch may be installed in place of the jumper. Check the wiring and setting of the switch.

II. UNIT TROUBLESHOOTING

Refer to Tables 38-40 and Fig. 52.

Table 38 — LED Troubleshooting — Error Code

SYMPTOM	CAUSE	REMEDY
Hardware Failure. (LED OFF)	Loss of power to control module (IGC).	Check 5 amp fuse on IGC, power to unit, 24-v circuit breaker, and transformer. Units without a 24-v circuit breaker have an internal overload in the 24-v transformer. If the overload trips, allow 10 minutes for automatic reset.
Fan ON/OFF Delay Modified (LED/FLASH)	High limit switch opens during heat exchanger warm-up period before fan-on delay expires. Limit switch opens within three minutes after blower-off delay timing in Heating mode.	Ensure unit is fired on rate and temperature rise is correct. Ensure unit's external static pressure is within application guidelines.
Limit Switch Fault. (LED 2 flashes)	High temperature limit switch is open.	Check the operation of the indoor (evaporator) fan motor. Ensure that the supply-air temperature rise is in accordance with the range on the unit nameplate.
Flame Sense Fault. (LED 3 flashes)	The IGC sensed flame that should not be present.	Reset unit. If problem persists, replace control board.
4 Consecutive Limit Switch Faults. (LED 4 flashes)	Inadequate airflow to unit.	Check operation of indoor (evaporator) fan motor and that supply-air temperature rise agrees with range on unit nameplate information.
Ignition Lockout. (LED 5 flashes)	Unit unsuccessfully attempted ignition for 15 minutes.	Check ignitor and flame sensor electrode spacing, gaps, etc. Ensure that flame sense and ignition wires are properly terminated. Verify that unit is obtaining proper amount of gas.
Induced-Draft Motor Fault. (LED 6 flashes)	IGC does not sense that induced-draft motor is operating.	Check for proper voltage. If motor is operating, check the speed sensor plug/IGC Terminal J2 connection. Proper connection: PIN 1— White, PIN 2 — Red, PIN 3 — Black.
Rollout Switch Fault. (LED 7 flashes)	Rollout switch has opened.	Rollout switch will automatically reset, but IGC will continue to lock out unit. Check gas valve operation. Ensure that induced-draft blower wheel is properly secured to motor shaft. Reset unit at unit disconnect.
Internal Control Fault. (LED 8 flashes)	Microprocessor has sensed an error in the software or hardware.	If error code is not cleared by resetting unit power, replace the IGC.
Temporary Software Lockout (LED 9 flashes)	Electrical interference is impeding the IGC software	Reset 24-v to control board or turn the thermostat off and on. Fault will automatically reset itself in one hour.

⚠ **CAUTION:** If the IGC must be replaced, be sure to ground yourself to dissipate any electrical charge that may be present before handling new control board. The IGC is sensitive to static electricity and may be damaged if the necessary precautions are not taken.

IMPORTANT: Refer to Heating troubleshooting chart for additional troubleshooting analysis.

LEGEND

IGC — Integrated Gas Unit Controller
LED — Light-Emitting Diode

Table 39 — Cooling Service Troubleshooting

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 run/start capacitor, overload, or start relay.	Determine cause and replace.
	One leg of 3-phase power dead.	Replace fuse or reset circuit breaker. Determine cause.
Compressor cCycles (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 run/start capacitor, overload, or start relay.	Determine cause and replace.
	Defective thermostat.	Replace thermostat.
	Faulty condenser-fan motor or capacitor.	Replace.
	Restriction in refrigerant system.	Locate restriction and remove.
Compressor Makes Excessive Noise (580F103,121,150, and 151 Scroll Only).	Compressor rotating in wrong direction.	Reverse the 3-phase power leads as described on page 50.
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.
	Leaking valves in compressor.	Replace compressor.
	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.	Remove excess refrigerant.
	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.
	Compressor valves leaking.	Replace compressor.
	Restriction in liquid tube.	Remove restriction.
Excessive Suction Pressure.	High heat load.	Check for source and eliminate.
	Compressor valves leaking.	Replace compressor.
	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.
	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.
Compressor No. 2 Will Not Run.	Unit in economizer mode.	Proper operation; no remedy necessary.

Table 40 — Heating Service Troubleshooting

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.
	Miswired or loose connections.	Check all wiring and wirenut 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.	Use high speed tap, increase fan speed, or install optional blower, as suitable for individual units.
	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:	Check all screws around flue outlets and burner compartment. Tighten as necessary.
	Aldehyde odors, CO, sooting flame, or floating flame.	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.

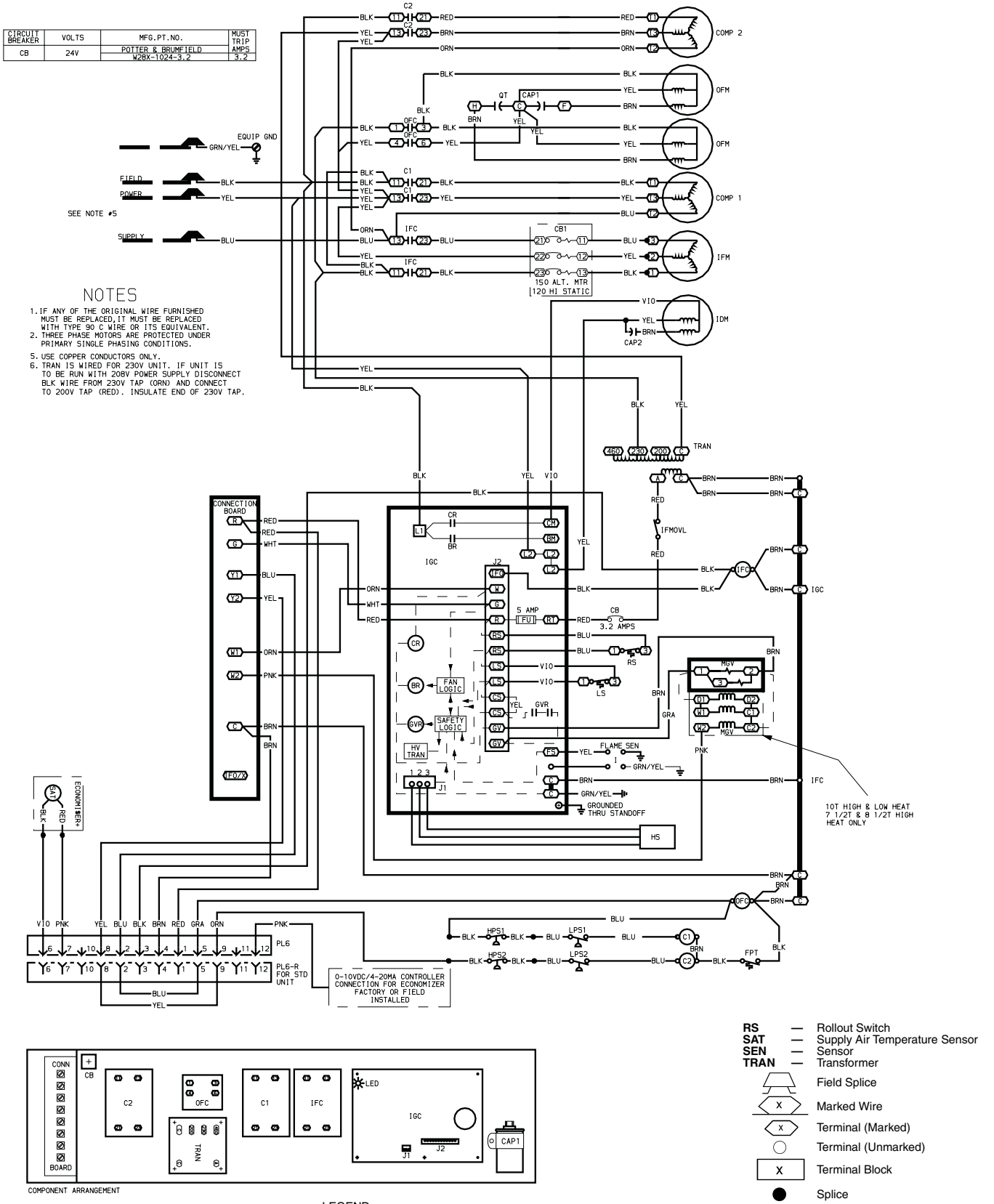


Fig. 52 — Typical Unit Wiring Schematic (208/230-3-60 Unit Shown)

MODE OF OPERATION		PUSHBUTTONS		LED INDICATORS			
		Button 1	Button 2	DS1 (Red)	DS2 (Yellow)	DS3 (Green)	DS4 (Green)
STARTUP MODE	Action			flash →	flash →	flash →	flash

Note 1 Indicators flash in sequence at .5 sec intervals

RUN MODE							
	Names			HB	ECONO	Y1	Y2
	Actions			flash	flash	steady	steady

Note 1 Heartbeat Indicator flashes to indicate proper operation of the control
Note 2 Econo indicator flashes to indicate free cooling being used
Note 3 Y1 and Y2 are on steady when a call thermostat Y1 and Y2 are closed
Note 4 ERROR - HB and Econo are on steady to indicate the presence of an error

READ MODE							
	Names	READ	ADV	SET NO	I/O NO	TEN'S OR ON	ONES OR OFF
	Actions	Push	Push	flash, no	flash no	flash no	flash no

Note 1 Push and release the READ button to enter Read Mode. The SET NO Indicator flashes once to indicate the setup point is selected for viewing
Note 2 Push and release ADV button repeatedly to advance to the desired setup point or I/O point
Each time the ADV button is pushed, the SET NO flashes the point number until the desired I/O point is reached and then the I/O NO flashes the I/O point no.
Note 3 After the SET NO indicator identifies the desired point no, push and release the READ button to display the value in the TEN's and ONE's indicator (i.e., 5 flashes for a value of 5) or a steady TEN's indicator for an on and a steady ONE's for off.
To aid in counting, values of 5 are flashed in groups of 5 (i.e., 15 = 3 groups of fast 5 flashes) and then follow by balance in slow flashes (i.e., 7 = 5 quick flashes + 2 slow flashes)
Note 4 Setpoint values are displayed first followed by I/O values and then back to Setpoint values
Red Set No LED displays Setup item numbers, and Yellow I/O LED displays I/O item no
Note 5 Routine exits after 10 min of no activity or push and hold button 1 and 2 for 3 seconds to exit

MODE OF OPERATION		PUSHBUTTONS		LED INDICATORS			
		Button 1	Button 2	DS1 (Red)	DS2 (Yellow)	DS3 (Green)	DS4 (Green)

SETUP MODE							
	Names	ADJUST	ADV	SET NO	SETUP	TEN'S OR ON	ONES OR OFF
	Actions	Hold/Push	Push	flash, no	steady	flash no	flash no

Note 1 Push and hold the ADJUST button until the SETUP indicator turns on.
Note 2 Push and release ADV button repeatedly to advance to the desired setup point.
Each time the ADV button is pushed, the SET NO flashes the point number and then displays the current setting
Note 3 Once the current value has been displayed the TENS indicator will turn on steady and while it on use the ADJUST button to enter the value. (i.e., push the button 4 times to enter 4)
Then wait for the ONES indicator to turn on and enter the ONES setting
Wait for indicator to turn off and then push read/adjust to check the setting
Note 4 Routine exits after 10 min of no activity or push and hold button 1 and 2 for 3 seconds to exit

MANUAL							
	Names	ADJUST	MAN	MAN	I/O NO	TEN'S OR ON	ONES OR OFF
	Actions	Push	Hold/Push	steady	flash no	flash no	flash no

Note 1 Push and hold the MAN button until the MAN indicator turns on.
Note 2 Push and release MAN button repeatedly to advance to the desired I/O point.
Each time the MAN button is pushed, the I/O NO flashes the I/O point number.
Note 3 After the desired I/O No is reached push and release the ADJUST to toggle the output on and off or open and closed
Note 4 Routine exits after 10 min of no activity or push and hold button 1 and 2 for 3 seconds to exit

I/O POINTS

NO	I/O Points	UNITS
1	C1 Output	-
2	C2 Output	-
3	C3 Output	-
4	C4 Output	-
5	Economizer Damper Output	%
6	Supply Air temperature	F
7	Outside Air temperature	F
8	Return Air Temperature	F
9	Indoor Relative Humidity	%
10	Outdoor Relative Humidity	%
11	Indoor Air Quality	PPM
12	Remote Minimum Position	%
13	Y1 Status (next version)	-
14	Y2 Status (next version)	-
15	G Status (next version)	-
16	Occ Status (next version)	-

ALARM CODES

NO	DESCRIPTION
1	SAT sensor invalid
2	RAT Sensor Invalid (only with changeover type 3&5)
3	OAT Sensor Invalid
4	ORH Sensor invalid (only with changeover type 3&4)
5	IRH Sensor invalid (only with changeover type 5)
6	IAQ Sensor Invalid (only if IAQ=1)
7	Y2 on Y1 off
8	Micro Fails E2 test
note 1	Micro Fails RAM test
note 2	Micro Fails ROM test

Note 1 DS1+DS3/DS2+D4 will alternately flash
Note 2 DS1+DS2/DS3+D4 will alternately flash

CONFIGURATION VARIABLES (READ AND SETUP MODE)

NO	SETUP POINTS (viewable and adjustable)	MINIMUM VALUE	MAXIMUM VALUE	FACTORY SETTING	COMMENTS
1	Supply Air Temperature Setpoint	40 F	65 F	55 F	Supply air temperature control setpoint
2	Occupied minimum economizer position	Item 15+1	100 %	15 %	Min economizer position (occupied mode)
3	Unoccupied minimum economizer position	1 %	100 %	5 %	Min economizer position (unoccupied mode)
4	Economizer Maximum Position	1 %	100 %	100 %	Maximum econo position
5	Economizer Type	1	3	2	1 = vent only, 2 = proportional, 3 = 3 position
6	Economizer Changeover Type	1	5	2	1 = Switch, 2= Outdoor drybulb, 3=diff drybulb, 4= outdoor enthalpy, 5= diff enthalpy
7	Economizer Changeover Setpoint (mode 2)	45 F	70 F	65 F	For outdoor changeover dry bulb temperature
8	Economizer Changeover Setpoint (mode 3)	1	4	1	Outdoor Enthalpy changeover setpoint 1=A, 2=B, 3=C, 4=D
9	No of compressors	1	4	2	1, 2, 3, or 4
10	Compressor Sequencing	1	4	1	1=DC-Sensible, 2=DC-Latent, 3= LAT- Sensible, 4=LAT-Latent
11	Power Exhaust Stage 1 Activation	1 %	Item 12 - 5%	25 %	Economizer position for exhaust stage 1
12	Power Exhaust Stage 2 Activation	Item 11+1%	100 %	50 %	Economizer position for exhaust stage 2
13	Unoccupied configuration	1	3	3	1=no unoccupied cooling, 2= unoccupied free cooling, 3= unoccupied free & mech cooling
14	Compressor Lockout temperature	1 F	65 F	45 F	Low ambient compressor limit
15	IAQ min economizer position setpoint	1 %	Item 2 + 1%	5 %	Min IAQ position for demand ventilation
16	IAQ Enable	1	2	1	1= Disabled, 2= Enabled
17	Outdoor IAQ Reference	1 PPM/10	100 PPM/10	40 PPM/10	Outdoor reference IAQ level
18	IAQ lower limit control point differential	1 PPM/10	Item 19 - 1 PPM/10	60 PPM/10	Differential lower limit Indoor IAQ level
19	IAQ upper limit control point differential	Item 18 + 1 PPM/10	200 PPM/10	140 PPM/10	Differential upper limit indoor IAQ level
20	1st Most Recent Error /reset	1	8	--	Used in setup mode to reset alarms
21	2nd Most Recent Error (read only)	1	8	--	not displayed in Setup mode
22	3rd Most Recent Error (read only)	1	8	--	not displayed in Setup mode
23	4th Most Recent Error (read only)	1	8	--	not displayed in Setup mode
24	5th Most Recent Error (read only)	1	8		not displayed in Setup mode

APPENDIX B — JOB SPECIFIC ECONOMI$ER+ CONFIGURAITON SETTINGS

Enter the job specific settings in the "Job Setting" column below.

CONFIGURATION VARIABLES (READ AND SETUP MODE)

NO	SETUP POINTS (viewable and adjustable)	MINIMUM VALUE	MAXIMUM VALUE	FACTORY SETTING	JOB SETTING	COMMENTS
1	Supply Air Temperature Setpoint	40 F	65 F	55 F		Supply air temperature control setpoint
2	Occupied minimum economizer position	Item 15+1	100 %	15 %		Min economizer position (occupied mode)
3	Unoccupied minimum economizer position	1 %	100 %	5 %		Min economizer position (unoccupied mode)
4	Economizer Maximum Position	1 %	100 %	100 %		Maximum econo position
5	Economizer Type	1	3	2		1 = vent only, 2 = proportional, 3 = 3 position
6	Economizer Changeover Type	1	5	2		1 = Switch, 2= Outdoor drybulb, 3=diff drybulb, 4= outdoor enthalpy, 5= diff enthalpy
7	Economizer Changeover Setpoint (mode 2)	45 F	70 F	65 F		For outdoor changeover dry bulb temperature
8	Economizer Changeover Setpoint (mode 3)	1	4	1		Outdoor Enthalpy changeover setpoint 1=A, 2=B, 3=C, 4=D
9	No of compressors	1	4	2		1, 2, 3, or 4
10	Compressor Sequencing	1	4	1		1=DC-Sensible, 2=DC-Latent, 3= LAT- Sensible, 4=LAT-Latent
11	Power Exhaust Stage 1 Activation	1 %	Item 12 - 5%	25 %		Economizer position for exhaust stage 1
12	Power Exhaust Stage 2 Activation	Item 11+1%	100 %	50 %		Economizer position for exhaust stage 2
13	Unoccupied configuration	1	3	3		1=no unoccupied cooling, 2= unoccupied free cooling, 3= unoccupied free & mech cooling
14	Compressor Lockout temperature	1 F	65 F	45 F		Low ambient compressor limit
15	IAQ min economizer position setpoint	1 %	Item 2 + 1%	5 %		Min IAQ position for demand ventilation
16	IAQ Enable	1	2	1		1= Disabled, 2= Enabled
17	Outdoor IAQ Reference	1 PPM/10	100 PPM/10	40 PPM/10		Outdoor reference IAQ level
18	IAQ lower limit control point differential	1 PPM/10	Item 19 - 1 PPM/10	60 PPM/10		Differential lower limit Indoor IAQ level
19	IAQ upper limit control point differential	Item 18 + 1 PPM/10	200 PPM/10	140 PPM/10		Differential upper limit indoor IAQ level
20	1st Most Recent Error /reset	1	8	--		Used in setup mode to reset alarms
21	2nd Most Recent Error (read only)	1	8	--		not displayed in Setup mode
22	3rd Most Recent Error (read only)	1	8	--		not displayed in Setup mode
23	4th Most Recent Error (read only)	1	8	--		not displayed in Setup mode
24	5th Most Recent Error (read only)	1	8			not displayed in Setup mode

INDEX

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

- Unit Familiarization
- Maintenance
- Installation Overview
- 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.

Classroom Service Training which includes "hands-on" experience with the products in our labs can mean increased confidence that really pays dividends in faster troubleshooting and fewer call-backs. Course descriptions and schedules are in our catalog.

CALL FOR FREE CATALOG 1-800-644-5544

[ ] Packaged Service Training [ ] Classroom Service Training

START-UP CHECKLIST
(Remove and Store in Job File)

I. PRELIMINARY INFORMATION

MODEL NO. _____ SERIAL NO. _____

DATE: _____ TECHNICIAN: _____

UNIT NO.: _____ JOB LOCTION:_____

JOB NAME:_____

II. PRE-START-UP (insert checkmark in box as each item is completed)

- ☐ VERIFY THAT ALL PACKING MATERIALS HAVE BEEN REMOVED FROM UNIT
- ☐ REMOVE SHIPPING TIE DOWN BANDS ON COMPRESSOR (SIZE 150 AND 151 ONLY) PER INSTALLATION INSTRUCTIONS
- ☐ VERIFY THAT CONDENSATE CONNECTION IS INSTALLED PER INSTALLATION INSTRUCTIONS
- ☐ CHECK ALL ELECTRICAL CONNECTIONS AND TERMINALS FOR TIGHTNESS
- ☐ CHECK GAS PIPING FOR LEAKS
- ☐ CHECK THAT RETURN-AIR FILTERS ARE CLEAN AND IN PLACE
- ☐ VERIFY THAT UNIT INSTALLATION IS LEVEL
- ☐ CHECK FAN WHEELS AND PROPELLERS FOR LOCATION IN HOUSING/ORIFICE AND SETSCREW TIGHTNESS
- ☐ ENSURE BELT TENSION IS CORRECT AND BLOWER PULLEYS ARE PROPERLY ALIGNED.

III. START-UP

ELECTRICAL

SUPPLY VOLTAGE	L1-L2	_____	L2-L3	_____	L3-L1	_____
COMPRESSOR AMPS	L1	_____	L2	_____	L3	_____
COMPRESSOR AMPS	L1	_____	L2	_____	L3	_____
INDOOR-FAN AMPS	L1	_____	L2	_____	L3	_____

TEMPERATURES AND PRESSURES

OUTDOOR-AIR TEMPERATURE	_____	DB		
RETURN-AIR TEMPERATURE	_____	DB	_____	WB
COOLING SUPPLY AIR	_____	DB	_____	WB
GAS HEAT SUPPLY AIR	_____	DB		

GAS INLET PRESSURE	_____	IN. WG		
GAS MANIFOLD PRESSURE	_____	IN. WG (HI FIRE)	_____	IN. WG (LO FIRE)
REFRIGERANT SUCTION PRESSURE	_____	PSIG — CIRCUIT NO. 1	_____	PSIG — CIRCUIT NO. 2
REFRIGERANT TEMP. (SUCTION) PRESSURE	_____	CIRCUIT NO. 1	_____	CIRCUIT NO. 2
REFRIGERANT DISCHARGE	_____	PSIG — CIRCUIT NO. 1	_____	PSIG — CIRCUIT NO. 2
DISCHARGE TEMPERATURE	_____	°F/C — CIRCUIT NO. 1	_____	°F/C — CIRCUIT NO. 2

- ☐ VERIFY REFRIGERANT CHARGE USING CHARGING TABLES
- ☐ VERIFY THAT 3-PHASE SCROLL COMPRESSOR ROTATING IN CORRECT DIRECTION (580F103,121,150,151 ONLY)

CUT ALONG DOTTED LINE

CUT ALONG DOTTED LINE