installation, start-up and service instructions

SINGLE PACKAGE ROOFTOP GAS HEATING/ELECTRIC COOLING UNITS

580F
Dura*Pac* Series
Sizes 036-073
3 to 6 Tons

Cancels: II 580F-36-3

II 580F-36-4
1/15/04

IMPORTANT — READ BEFORE INSTALLING

1. Read and become familiar with these installation instructions before installing this unit (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 apply.

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

⚠ **WARNING:** 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.

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

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

INSTALLATION

Unit is shipped in the vertical duct 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, not to the unit. The accessory thru-the-bottom power and gas connection package must be installed before the unit is set on the roof curb.* If field-installed (thru-the-roof curb) gas connections are desired, use factory-supplied $^3/_4$-in. pipe coupling and gas plate assembly to mount the thru-the-roof curb connection to the roof curb. Gas connections and power connections to the unit must be field installed after the unit is installed on the roof curb.

If electric and control wiring is to be routed through the basepan, attach the accessory thru-the-bottom service connections to the basepan in accordance with the accessory installation instructions.

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 result in air 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.

UNIT	STD. UNIT WEIGHT		ECONOMI$ER+ WEIGHT		VERT. ECON+ W/P.E. WEIGHT		(A) CORNER WEIGHT		(B) CORNER WEIGHT		(C) CORNER WEIGHT		(D) CORNER WEIGHT		"A" PANEL LENGTH
	LB	KG	LB	KG	LB	KG	LB	KG	LB	KG	LB	KG	LB	KG	
580F036	460	209	50	22.7	90	40.9	140	63.5	105	47.6	159	72.1	56	25.4	1'-10 3/8" [568.0]
580F048	470	213	↓	↓	↓	↓	142	64.4	106	48.1	162	73.5	60	27.2	1'-10 3/8" [568.0]
580F060	490	222	↓	↓	↓	↓	150	68.0	115	52.2	160	72.6	65	29.5	1'-0 3/8" [315.0]
580F072	565	256	↓	↓	↓	↓	165	74.8	136	61.7	200	90.7	64	29.0	1'-0 3/8" [315.0]

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, 36 IN.,18 IN. 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 USED 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 BASERAIL.
8. THE VERTICAL CENTER OF GRAVITY IS 1'-6" [457] UP FROM THE BOTTOM OF THE BASE RAIL.

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.

	CONNECTION SIZES
A	1 3/8" DIA. [35] FIELD POWER SUPPLY HOLE
B	2" DIA. [51] POWER SUPPLY KNOCK-OUT
C	2 1/2" DIA. [64] POWER SUPPLY KNOCK-OUT
D	7/8" DIA. [22] FIELD CONTROL WIRING HOLE
E	3/4"-14 NPT CONDENSATE DRAIN
F	1/2"-14 NPT GAS CONNECTION

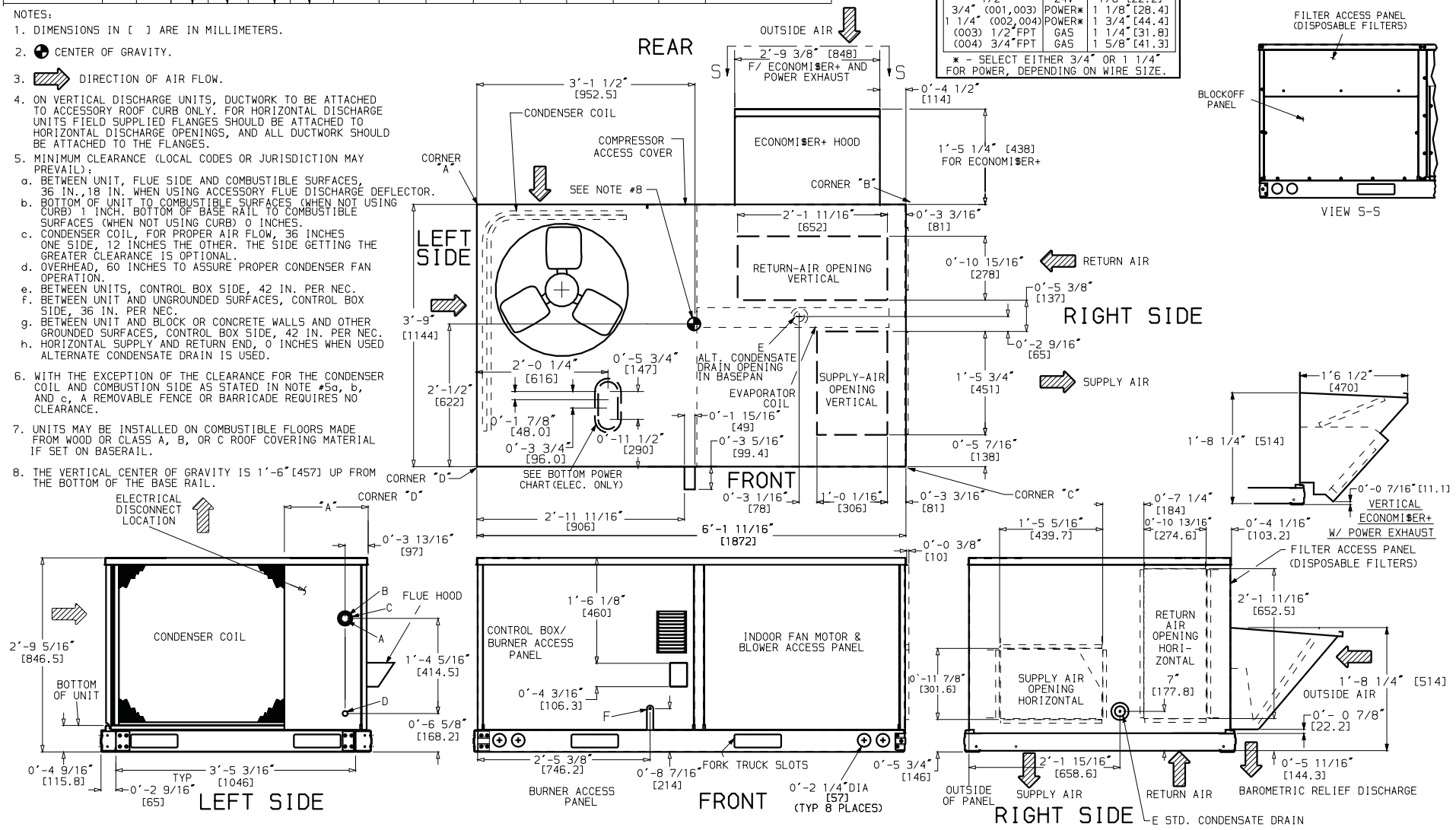


Fig. 1A — Base Unit Dimensions — 580F036-072

UNIT	STD. UNIT WEIGHT		ECONOMI$ER+ WEIGHT		VERT. ECON+ W/P.E. WEIGHT		(A) CORNER WEIGHT		(B) CORNER WEIGHT		(C) CORNER WEIGHT		(D) CORNER WEIGHT		"J"	
	LB	KG	LB	KG	LB	KG	LB	KG	LB	KG	LB	KG	LB	KG	FT -IN.	MM
580F073	615	279	50	22.7	90	40.9	147	66.7	142	64.4	160	72.6	166	75.3	2'-9 5/16"	846.5

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.

	CONNECTION SIZES
A	1 3/8" DIA. [35] FIELD POWER SUPPLY HOLE
B	2" DIA. [51] 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 CONNECTION
G	2 1/2" DIA. [64] POWER SUPPLY KNOCK-OUT

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, 36 IN.,18 IN. WHEN USING ACCESSORY FLUE DISCHARGE DEFLTR.
   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'-6" [457] UP FROM FROM THE BOTTOM OF THE BASE RAIL.

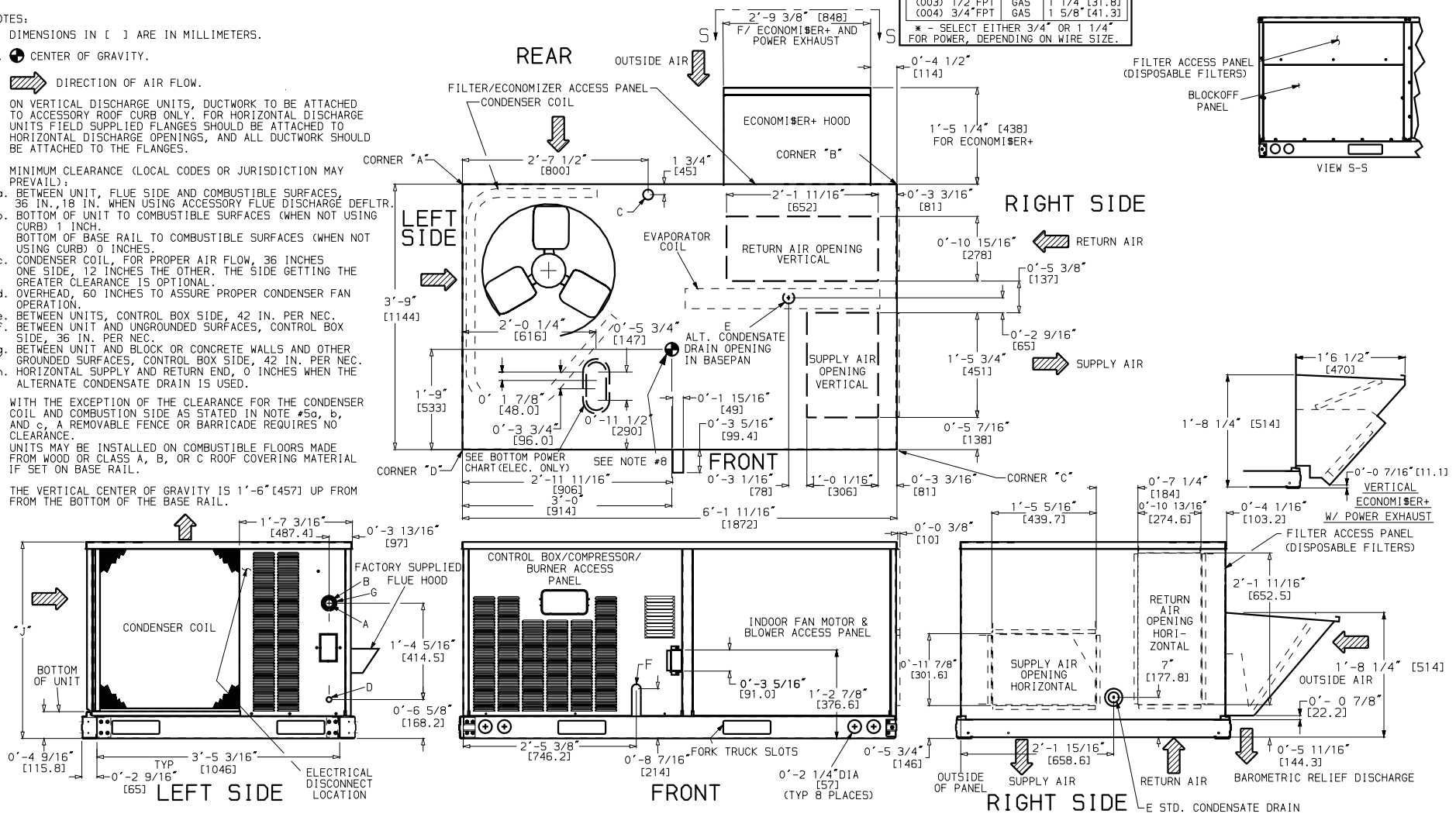


Fig. 1B — Base Unit Dimensions — 580F073

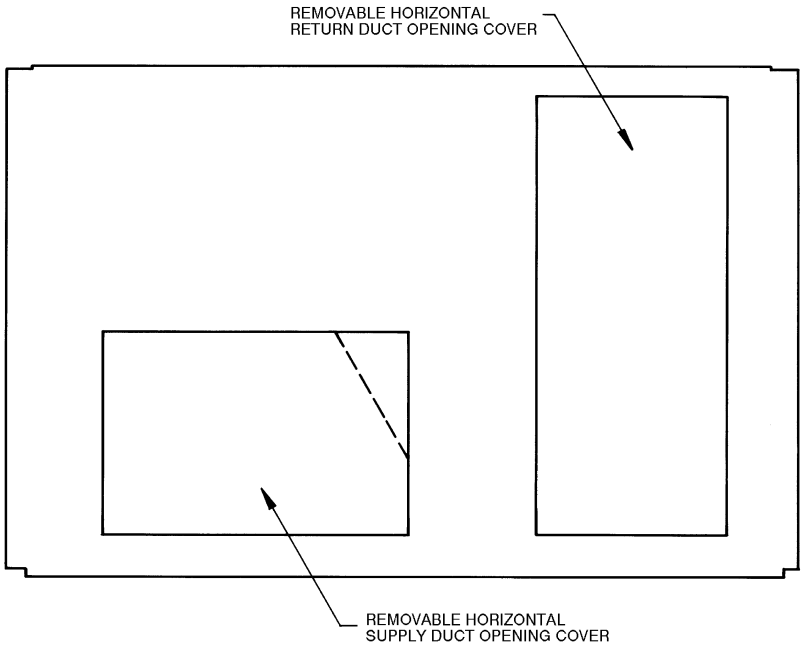


Fig. 2 — Horizontal Conversion Panels

B. Slab Mount (Horizontal Units Only)

Provide a level concrete slab that extends a minimum of 6 in. beyond unit cabinet. Install a 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.

C. Alternate Unit Support

A non-combustible sleeper rail can be used in the unit curb support area. If sleeper rails cannot be used, support the long sides of the unit with a minimum of 3 equally spaced 4-in. x 4-in. pads on each side.

II. STEP 2 — FIELD FABRICATE DUCTWORK

Secure all ducts to roof curb and building structure on vertical ducted units. *Do not connect ductwork to unit.* For horizontal applications, field-supplied flanges should be attached to horizontal duct openings and all ductwork should be 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 –.20 in. wg with economizer or –.45 in. wg without economizer.

These units are designed for a minimum continuous heating 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. The center drain plug looks like a star connection, however it can be removed with a $^1/_2$-in. socket drive. 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 at least 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.

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 Table 1 and Fig. 6 for additional information.

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

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

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. A properly positioned unit will have the following clearances between unit and roof curb: $^1/_4$-in. clearance between roof curb and base rails on each side and duct end of unit; $^1/_4$-in. clearance between roof curb and condenser coil end of unit. (See Fig. 3, section C-C.)

ROOF CURB ACCESSORY	A	UNIT SIZE
CRRFCURB001A01	1′-2″ [356]	580F 036-073
CRRFCURB002A01	2′-0″ [610]	

CONNECTOR PKG. ACCY.	B	C	D ALT DRAIN HOLE	GAS	POWER	CONTROL	ACCESSORY POWER
CRBTMPWR001A01	1′-9 11/16″ [551]	1′-4″ [406]	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]		

NOTES:
1. Roof curb accessory is shipped disassembled.
2. Insulated panels.
3. Dimensions in [ ] are in millimeters.
4. Roof curb, galvanized 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 type gas. Packages CRBTMPWR003A01 and 4A01 are for thru-the-bottom type gas connections.

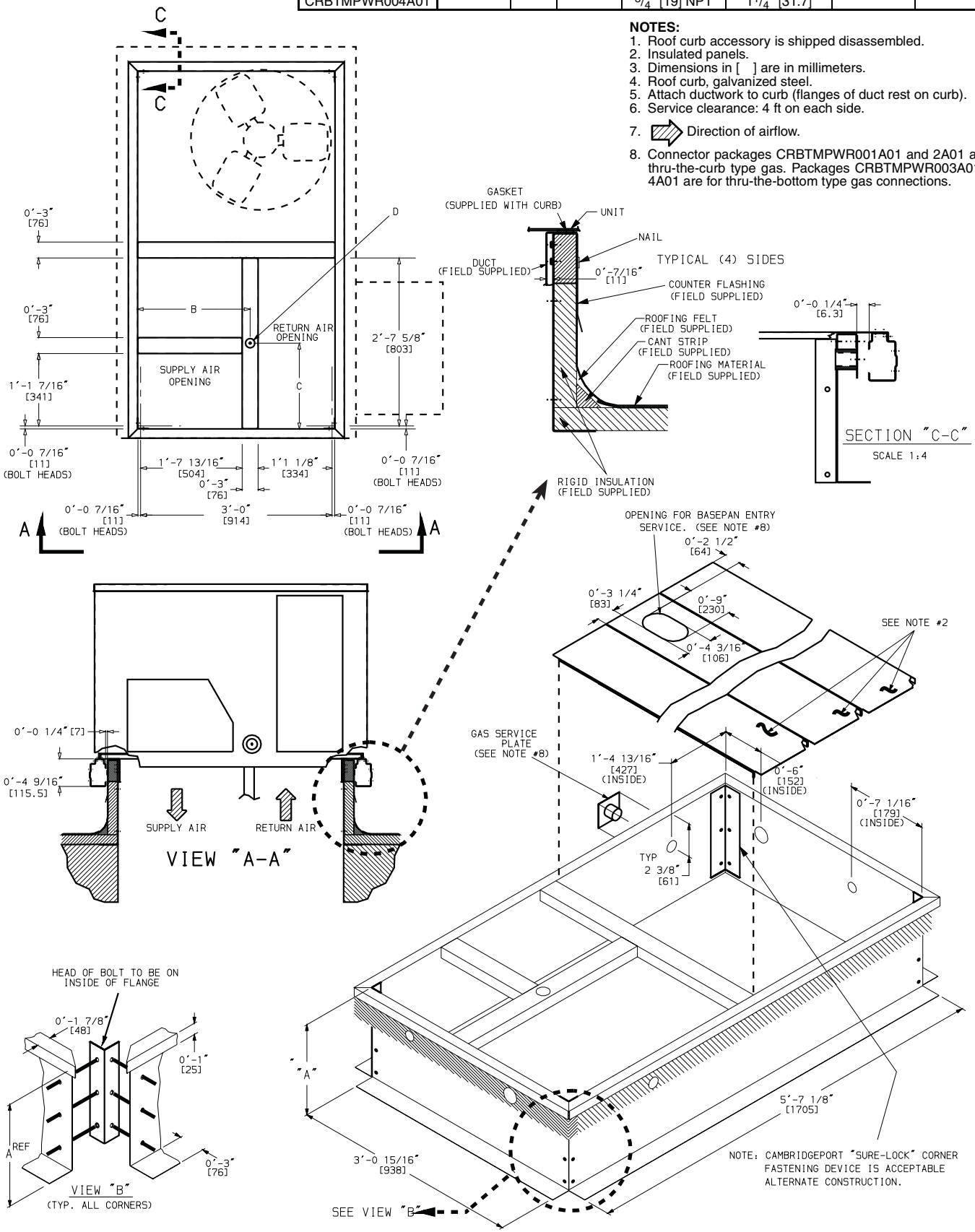
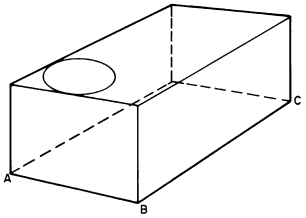


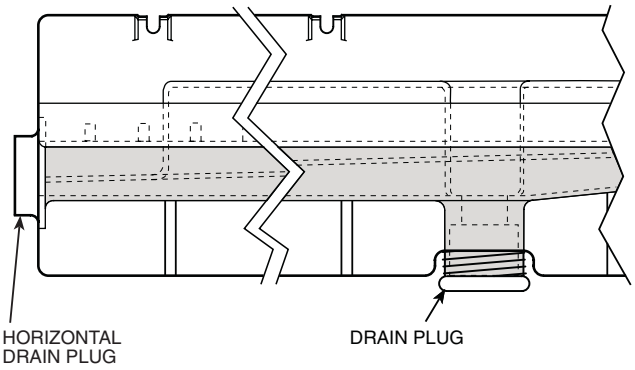
Fig. 3 — Roof Curb



MAXIMUM ALLOWABLE DIFFERENCE (in.)

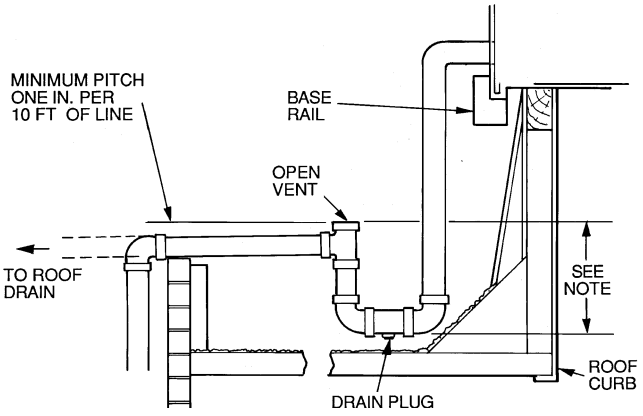
A-B	B-C	A-C
0.5	1.0	1.0

Fig. 4 — Unit Leveling Tolerances



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

Fig. 5A — Condensate Drain Pan



NOTE: Trap should be deep enough to offset maximum unit static difference. A 4-in. trap is recommended.

Fig. 5B — External Trap Condensate Drain

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 such 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.

Flue vent discharge must have a minimum horizontal clearance of 4 ft from electric and gas meters, gas regulators, and gas relief equipment.

Minimum distance between unit and other electrically live parts is 48 inches.

Flue gas can deteriorate building materials. Orient unit such 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), and ANSI (American National Standards Institute) Z223.1, and NFPA (National Fire Protection Association) 54 TIA-54-84-1. In Canada, installation must be in accordance with the CAN1-B149 installation codes for gas burning appliances.

After unit is in position, remove rigging skids and shipping materials.

V. STEP 5 — INSTALL FLUE HOOD

Flue hood is shipped screwed to the basepan beside 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

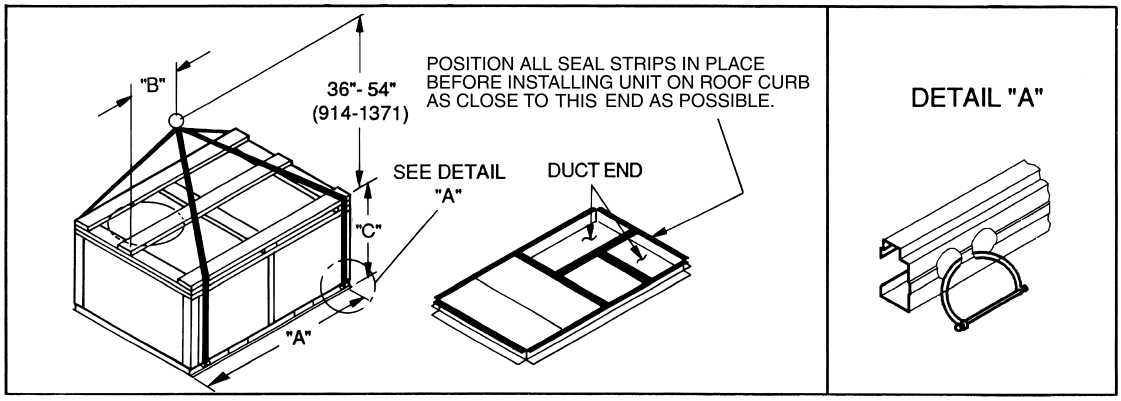
Unit is equipped for use with type of gas shown on nameplate. Refer to local building codes, or in the absence of local codes, to ANSI Z223.1 entitled National Fuel Gas Code. In Canada, installation must be in accordance with the CAN1.B149.1 and CAN1.B149.2 installation codes for gas burning appliances.

For natural gas applications, gas pressure at unit gas connection must not be less than 4 in. wg or greater than 13.0 in. wg while unit is operating. On 580F048,060,072 high heat units, the gas pressure at unit gas connection must not be less than 5 in. wg or greater than 13 in. wg while the unit is operating. For propane applications, the gas pressure must not be less than 5 in. wg or greater than 13 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. 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. Therefore, an 18-ft long gas pipe would have a minimum of 2 support beams, a 48-ft long pipe would have a minimum of 6 support beams.

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

⚠ **CAUTION:** When connecting the gas line to the unit gas valve, the installer MUST use a backup wrench to prevent valve damage.



NOTES:
1. Dimensions in ( ) are 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. Unit weights do not include economizer. See Table 1 for economizer weights.

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

UNIT 580F	MAX WEIGHT		"A"		"B"		"C"	
	Lb	Kg	in.	mm	in.	mm	in.	mm
036	510	231	73.69	1872	37.50	953	33.35	845
048	520	236						
060	540	245						
072	615	279						
073	665	302						

Fig. 6 — Rigging Details

Table 1 — Physical Data

UNIT SIZE 580F		036	048	060	072	073
NOMINAL CAPACITY (tons)		3	4	5	6	6
OPERATING WEIGHT (lb)						
Unit						
Al/Al*		460	470	490	565	615
Al/Cu*		465	476	497	576	—
Cu/Cu*		468	482	505	587	—
Economizer						
EconoMi$er+		50	50	50	50	50
Roof Curb†		115	115	115	115	115
COMPRESSOR			Reciprocating		Scroll	
Quantity		1	1	1	1	1
No. Cylinders (per Circuit)		2	2	2	2	2
Oil (oz)		50	50	50	54	60
REFRIGERANT TYPE		R-22				
Expansion Device		Fixed Orifice Metering Device				
Operating Charge (lb-oz)						
Circuit 1		4-4	6-6	6-14	9-0	11-0
Circuit 2		—	—	—	—	—
CONDENSER COIL		Enhanced Copper Tubes, Aluminum Lanced Fins				
Rows...Fins/in.		1...17	2...17	2...17	2...17	2...17
Total Face Area (sq ft)		8.36	8.36	10.42	10.42	16.5
CONDENSER FAN		Propeller Type				
Nominal Cfm		3500	4000	4000	4000	4100
Quantity...Diameter (in.)		1...22.0	1...22.0	1...22.0	1...22.0	1...22.0
Motor Hp...Rpm		1/4...1100	1/4...1100	1/4...1100	1/4...1100	1/4...1100
Watts Input (Total)		325	325	325	325	320
EVAPORATOR COIL		Enhanced Copper Tubes, Aluminum Double-Wavy Fins				
Rows...Fins/in.		2...15	2...15	3...15	4...15	4...15
Total Face Area (sq ft)		4.17	5.5	5.5	5.5	5.5
EVAPORATOR FAN		Centrifugal Type				
Quantity...Size (in.)	Std	1...10 x 10	1...10 x 10	1...11 x 10	1...10 x 10	1...10 x 10
	Alt	1...10 x 10	1...10 x 10	1...10 x 10	—	—
	High-Static	1...10 x 10	1...10 x 10	1...11 x 10	1...10 x 10	1...10 x 10
Type Drive	Std	Direct	Direct	Direct	Belt	Belt
	Alt	Belt	Belt	Belt	—	—
	High-Static	Belt	Belt	Belt	Belt	Belt
Nominal Cfm		1200	1600	2000	2100	2100
Maximum Continuous Bhp	Std	.34	.75	1.20	2.40	2.40
	Alt	1.20	1.20	1.30/2.40**	—	—
	High-Static	2.40	2.40	2.90	2.90	2.90
Motor Frame Size	Std	48	48	48	56	56
	Alt	48	48	56	—	—
	High-Static	56	56	56	56	56
Nominal Rpm High/Low (Direct Drive)	Std	860/800	1075/970	1075/970	—	—
	Alt	—	—	—	—	—
	High-Static	—	—	—	—	—
Fan Rpm Range	Std	—	—	—	1070-1460	1070-1460
	Alt	685-1045	770-1175	8778-1192	—	—
	High-Static	1075-1455	1075-1455	1300-1685	1300-1685	1300-1685
Motor Bearing Type		Ball	Ball	Ball	Ball	Ball
Maximum Allowable Rpm		2100	2100	2100	2100	2100
Motor Pulley Pitch Diameter Min/Max (in.)	Std	—	—	—	2.8/3.8	2.8/3.8
	Alt	1.9/2.9	1.9/2.9	2.4/3.4	—	—
	High-Static	2.8/3.8	2.8/3.8	3.4/4.4	3.4/4.4	3.4/4.4
Nominal Motor Shaft Diameter (in.)	Std	1/2	1/2	1/2	5/8	5/8
	Alt	1/2	1/2	5/8	—	—
	High-Static	5/8	5/8	5/8	5/8	7/8
Fan Pulley Pitch Diameter (in.)	Std	—	—	—	4.5	4.5
	Alt	4.5	4.0	4.5	—	—
	High-Static	4.5	4.5	4.5	4.5	4.5
Belt, Quantity...Type...Length (in.)	Std	—	—	—	1...A...40	1...A...40
	Alt	1...A...34	1...A...34	1...A...39	—	—
	High-Static	1...A...39	1...A...39	1...A...40	1...A...40	1...A...40
Pulley Center Line Distance (in.)	Std	—	—	—	14.7-15.5	14.7-15.5
	Alt	10.0-12.4	10.0-12.4	14.7-15.5	—	—
	High-Static	10.0-12.4	10.0-12.4	14.7-15.5	14.7-15.5	14.7-15.5
Speed Change per Full Turn of Movable Pulley Flange (rpm)	Std	—	—	—	80	80
	Alt	48	70	80	—	—
	High-Static	65	65	60	60	60
Movable Pulley Maximum Full Turns From Closed Position	Std	—	—	—	5	5
	Alt	5	5	6	—	—
	High-Static	6	6	5	5	5
Factory Setting	Std	—	—	—	3	3
	Alt	3	3	3	—	—
	High-Static	3 1/2	3 1/2	3 1/2	3 1/2	3 1/2
Factory Speed Setting (rpm)	Std	—	—	—	1226	1226
	Alt	829	932	1035	—	—
	High-Static	1233	1233	1416	1416	1416
Fan Shaft Diameter at Pulley (in.)		5/8	5/8	5/8	5/8	5/8

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.
**Single phase/three-phase.
††Rollout switch lockout is manually reset by interrupting power to unit or resetting thermostat.
‖California rated three-phase high heat models.
***Three phase standard high-heat models have heating input values as shown. Single phase standard high heat models have one-stage heating with heating input values as follows:
580FJV036115 — 115,000 Btuh
580FJV048150 — 150,000 Btuh
580FJV060150 — 150,000 Btuh
†††California SCAQMD compliant Low NO_x models have combustion products that are controlled to 40 nanograms per joule or less.

Table 1 — Physical Data (cont)

UNIT SIZE 580F			036	048	060	072 AND 073
FURNACE SECTION						
Rollout Switch Cutout Temp (F)††			195	195	195	195
Burner Orifice Diameter (in. ...drill size)						
Natural Gas	Std	074	.113...33	.113...33	.113...33	.113...33
		114/115	.113...33	.113...33	.113...33	.113...33
		149/150	—	.129...30	.129...30	.129...30
		060N	.102...38	.102...38	.102...38	—
		090N	.102...38	.102...38	.102...38	—
		120N	—	.116...32	.116...32	—
Liquid Propane	Alt	074	.089...43	.089...43	.089...43	.089...43
		114/115	.089...43	.089...43	.089...43	.089...43
		149/150	—	.104...37	.104...37	.104...37
		060N	.082...45	.082...45	.082...45	—
		090N	.082...45	.082...45	.082...45	—
		120N	—	.094...42	.094...42	—
Thermostat Heat Anticipator Setting (amps)						
208/230 v and 575	Stage 1		.14	.14	.14	.14
	Stage 2		.14	.14	.14	.14
460 v	Stage 1		.14	.14	.14	.14
	Stage 2		.14	.14	.14	.14
Gas Input (Btuh)	CA High Output 3-Phase Units	114‖	115,000	—	—	—
		149‖	—	150,000	150,000	—
	Standard Units (Stage 2/ Stage 1)	074	74,000/—	74,000/—	74,000/—	74,000/—
		115***	115,000/82,000	115,000/—	115,000/—	115,000/—
		150***	—	150,000/120,000	150,000/120,000	150,000/120,000
	Low NOx Units	060N†††	60,000	60,000	60,000	—
		090N†††	90,000	90,000	90,000	—
		120N†††	—	120,000	120,000	—
Efficiency (Steady State) (%)			80	80	80	80
Temperature Rise Range		074	25-55	25-55	25-55	25-55
		114/115	55-85	35-65	35-65	35-65
		149/150	—	50-80	50-80	50-80
		060N	20-50	20-50	20-50	—
		090N	30-60	30-60	30-60	—
		120N	—	40-70	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.)			1/2	1/2	1/2	1/2
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 with option selected.			
RETURN-AIR FILTERS			Throwaway			
Quantity...Size (in.)			2...16 x 25 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.
**Single phase/three-phase.

††Rollout switch lockout is manually reset by interrupting power to unit or resetting thermostat.
‖California rated three-phase high heat models.
***Three phase standard high-heat models have heating input values as shown. Single phase standard high heat models have one-stage heating with heating input values as follows:
580FJV036115 — 115,000 Btuh
580FJV048150 — 150,000 Btuh
580FJV060150 — 150,000 Btuh
†††California SCAQMD compliant Low NO_x models have combustion products that are controlled to 40 nanograms per joule or less.

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, 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 with the $^1/_4$-in. female space connector from the 230-volt connection and moving to the 208-volt $^1/_4$-in. male terminal on the primary side of the transformer.

Refer to unit label diagram for additional information. Pigtails are provided for field wire connections. Use factory-supplied splices or UL (Underwriters' Laboratories) approved copper/aluminum connector.

When installing units, provide a disconnect per the NEC.

All field wiring must comply with NEC and local requirements.

Install field wiring as follows:

1. Install conduit through side panel openings. Install conduit between disconnect and control box.
2. Install power lines to terminal connections as shown in Fig. 9.

Voltage to compressor terminals during operation must be within voltage range indicated on unit nameplate (see Tables 2A and 2B). On 3-phase units, voltages between phases must be balanced within 2% and the current within 10%. Use the formula shown in the legend for Tables 2A and 2B, Note 2 to determine the percent 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.

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. Connect thermostat wires to terminal board.

Route thermostat cable or equivalent single leads of colored wire from subbase terminals through connector on unit to low-voltage connections (shown in Fig. 10).

NOTE: For wire runs up 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.

Pass the control wires through the hole provided in the corner post; then 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 clearance between high-voltage and low-voltage wiring.

C. Heat Anticipator Settings

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

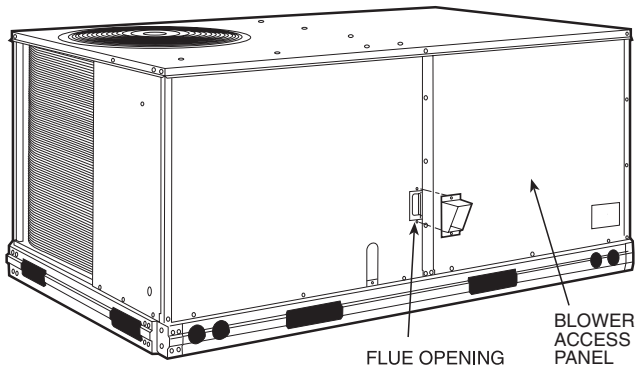
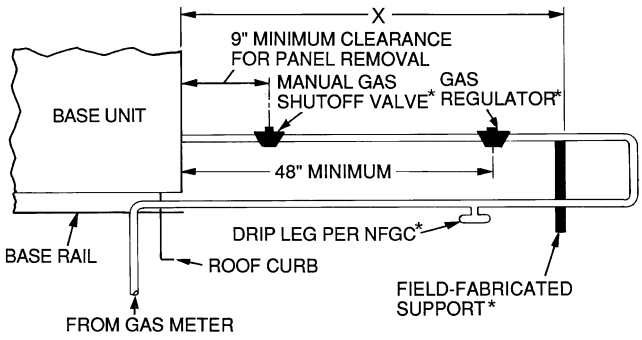


Fig. 7 — Flue Hood Details



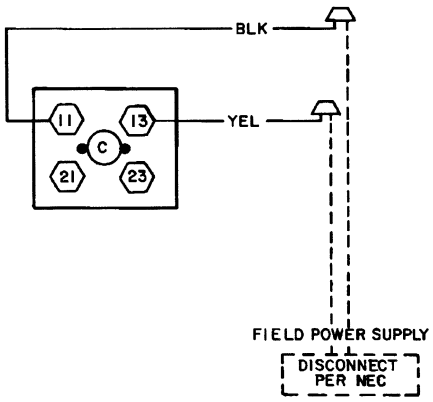
LEGEND

NFGC — National Fuel Gas Code
*Field supplied.
NOTE: Follow all local codes.

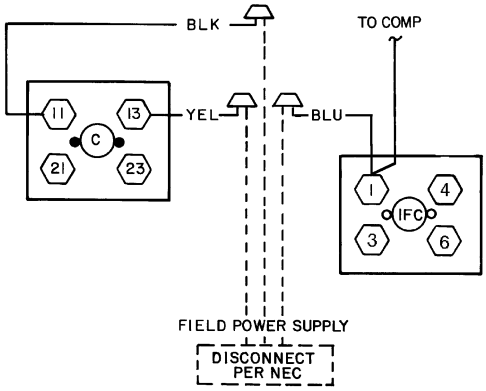
SPACING OF SUPPORTS

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

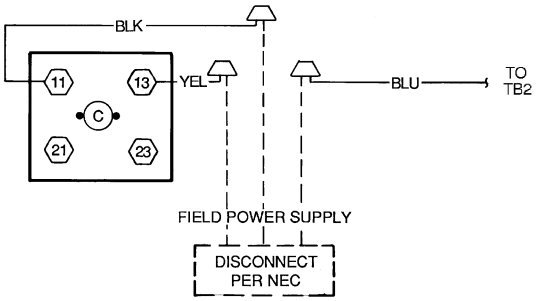
Fig. 8 — Gas Piping Guide (With Accessory Thru-the-Curb Service Connections)



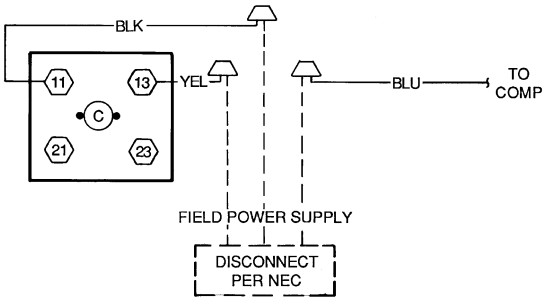
208/230-1-60



208/230-3-60
460-3-60
(SIZES 072 AND 073)



575-3-60
(SIZES 072 AND 073)

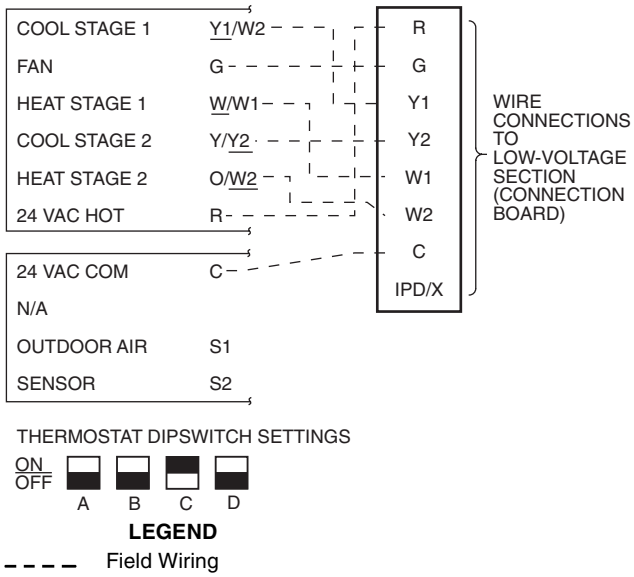


208/230-3-60
575-3-60, 460-3-60
(SIZES 036-060)

LEGEND

C — Contactor
COMP — Compressor
IFC — Indoor-Fan Contactor
NEC — National Electrical Code
TB — Terminal Block

Fig. 9 — Power Wiring Connections



LEGEND

– – – – Field Wiring

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

Fig. 10 — Low-Voltage Connections

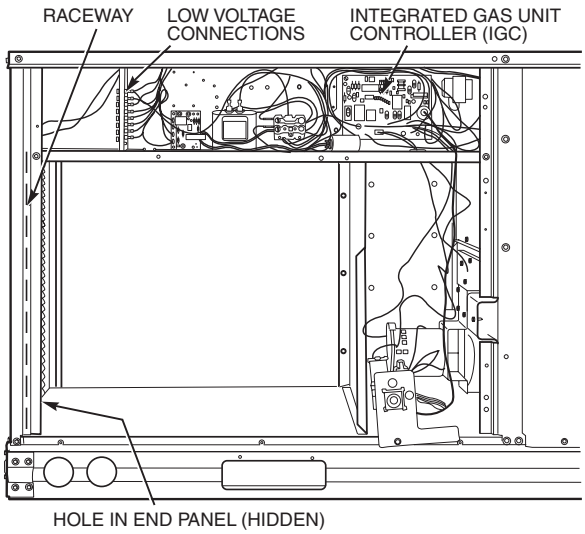


Fig. 11 — Field Control Wiring Raceway

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	RLA	LRA	Hp	FLA	FLA		MCA	MOCP†	FLA	LRA
036 (3 Tons)	208/230-1-60	Std	187	254	16.2	96.0	1/4	1.4	3.5	.6	25.2/25.2	30/30	24/24	106/106
		Alt							4.9		26.6/26.6	35/35	26/26	111/111
	208/230-3-60	Std	187	254	10.2	75.0	1/4	1.4	3.5	.6	17.7/17.7	25/25	17/17	85/ 85
		Alt							4.9		19.1/19.1	25/25	19/19	90/ 90
		High							5.2		19.4/19.4	25/25	19/19	109/109
	460-3-60	Std	414	508	4.4	40.0	1/4	0.8	1.3	.3	7.6	15	7	44
		Alt							2.1		8.4	15	8	48
		High							2.6		8.9	15	9	57
	575-3-60	Std	518	632	3.7	31.0	1/4	0.8	1.3	.3	5.5	15	6	35
		Alt							2.1		6.0	15	7	37
		High							2.6		6.3	15	7	56
048 (4 Tons)	208/230-1-60	Std	187	254	23.3	118.0	1/4	1.4	3.5	.6	34.0/34.0	40/40	32/32	129/129
		Alt							4.9		35.4/35.4	45/45	34/34	133/133
	208/230-3-60	Std	187	254	15.4	90.0	1/4	1.4	3.5	.6	24.2/24.2	30/30	23/23	101/101
		Alt							4.9		25.6/25.6	30/30	25/25	105/105
		High							5.2		25.9/25.9	30/30	25/25	124/124
	460-3-60	Std	414	508	8.3	45.0	1/4	0.8	1.8	.3	13.0	20	13	51
		Alt							2.1		13.3	20	13	53
		High							2.6		13.8	20	13	62
	575-3-60	Std	518	632	6.4	36.0	1/4	0.8	1.8	.3	9.2	15	10	41
		Alt							2.1		9.3	15	10	42
		High							2.6		9.7	15	10	49
060 (5 Tons)	208/230-1-60	Std	187	254	28.8	147.0	1/4	1.4	5.9	.6	43.3/43.3	60/60	42/42	161/161
		Alt							6.6		44.0/44.0	60/60	42/42	184/184
	208/230-3-60	Std	187	254	16.0	114.0	1/4	1.4	5.9	.6	27.3/27.3	35/35	27/27	128/128
		Alt							5.2		26.6/26.6	35/35	26/26	148/148
		High							7.5		28.9/28.9	35/35	29/29	174/174
	460-3-60	Std	414	508	7.4	64.0	1/4	0.8	3.1	.3	13.2	20	13	71
		Alt							2.6		13.5	20	13	81
		High							3.4		13.5	20	13	93
	575-3-60	Std	518	632	6.2	52.0	1/4	0.8	3.1	.3	9.7	15	11	58
		Alt							2.6		9.9	15	11	65
		High							3.4		9.9	15	11	76
072 (6 Tons)	208/230-3-60	Std	187	254	20.6	146.0	1/4	1.4	5.2	.6	32.4/32.4	40/40	31/31	180/180
		High							7.5		34.7/34.7	40/40	34/34	205/205
	460-3-60	Std	414	508	9.5	73.0	1/4	0.9	2.6	.3	15.4	20	15	90
		High							3.4		16.2	20	16	103
	575-3-60	Std	518	632	7.6	58.4	1/4	0.6	2.6	.3	11.4	15	12	75
		High							3.4		11.9	15	13	86
073 (6 Tons)	208/230-3-60	Std	187	254	20.6	146.0	1/4	1.4	5.2	.6	32.4/32.4	40/40	31/31	180/180
		High							7.5		34.7/34.7	40/40	34/34	205/205
	460-3-60	Std	414	508	9.5	73.0	1/4	0.9	2.6	.3	15.4	20	15	90
		High							3.4		16.2	20	16	103
	575-3-60	Std	518	632	7.6	58.4	1/4	0.6	2.6	.3	11.4	15	12	79
		High							3.4		11.9	15	13	86

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

*Used to determine minimum disconnect per NEC.
†Fuse or HACR circuit breaker.

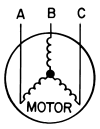
NOTES:

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.

3. For units with power exhaust: If a single power source is to be used, size wire to include power exhaust MCA and MOCP. Check MCA and MOCP when power exhaust is powered through the unit (must be in accordance with NEC and/or local codes). 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 580F060 unit with MCA = 28.9 and MOCP = 35, with CRPWREXH030A00 power exhaust.

   MCA New = 28.9 amps + 1.6 amps = 30.5 amps

   If the new MCA does not exceed the published MOCP, then MOCP would not change. The MOCP in this example is 35 amps, the MCA New is below 35, 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.

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

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	RLA	LRA	Hp	FLA	FLA		MCA	MOCP†	FLA	LRA
036 (3 Tons)	208/230-1-60	Std	187	254	16.2	96.0	1/4	1.4	3.5	.6	31.2/31.2	35/35	30/30	111/111
		Alt							4.9		32.6/32.6	40/40	31/31	116/116
	208/230-3-60	Std	187	254	10.2	75.0	1/4	1.4	3.5	.6	22.5/22.5	25/25	23/23	90/ 90
		Alt							4.9		23.9/23.9	30/30	25/25	95/ 95
		High							5.2		24.2/24.2	30/30	25/25	114/114
	460-3-60	Std	414	508	4.4	40.0	1/4	0.8	1.3	.3	9.8	15	10	47
		Alt							2.1		10.6	15	11	50
		High							2.6		11.1	15	11	59
	575-3-60	Std	518	632	3.7	31.0	1/4	0.8	1.3	.3	7.2	15	8	36
		Alt							2.1		7.7	15	9	39
		High							2.6		8.0	15	9	58
048 (4 Tons)	208/230-1-60	Std	187	254	23.3	118.0	1/4	1.4	3.5	.6	40.0/40.0	45/45	38/38	134/134
		Alt							4.9		41.4/41.4	50/50	40/40	138/138
	208/230-3-60	Std	187	254	15.4	90.0	1/4	1.4	3.5	.6	29.0/29.0	35/35	29/29	106/106
		Alt							4.9		30.4/30.4	35/35	30/30	110/110
		High							5.2		30.7/30.7	35/35	31/31	129/129
	460-3-60	Std	414	508	8.3	45.0	1/4	0.8	1.8	.3	15.2	20	15	53
		Alt							2.1		15.5	20	15	55
		High							2.6		16.0	20	16	64
	575-3-60	Std	518	632	6.4	36.0	1/4	0.8	1.8	.3	10.9	15	12	42
		Alt							2.1		11.1	15	12	44
		High							2.6		11.4	15	12	51
060 (5 Tons)	208/230-1-60	Std	187	254	28.8	147.0	1/4	1.4	5.9	.6	49.3/49.3	60/60	47/47	166/166
		Alt							6.6		50.0/50.0	60/60	48/48	188/188
	208/230-3-60	Std	187	254	16.0	114.0	1/4	1.4	5.9	.6	32.1/32.1	40/40	32/32	133/133
		Alt							5.2		31.4/31.4	40/40	32/32	153/153
		High							7.5		33.7/33.7	40/40	34/34	179/179
	460-3-60	Std	414	508	7.4	64.0	1/4	0.8	3.1	.3	15.3	20	15	74
		Alt							2.6		15.6	20	15	83
		High							3.4		15.6	20	16	96
	575-3-60	Std	518	632	6.2	52.0	1/4	0.8	3.1	.3	11.5	15	13	60
		Alt							2.6		11.7	15	12	67
		High							3.4		11.7	15	13	77
072 (6 Tons)	208/230-3-60	Std	187	254	20.6	146.0	1/4	1.4	5.2	.6	37.2/37.2	45/45	37/37	184/184
		High							7.5		39.5/39.5	45/45	39/39	210/210
	460-3-60	Std	414	508	9.5	73.0	1/4	0.6	2.6	.3	17.6	20	17	92
		High							3.4		18.4	25	18	105
	575-3-60	Std	518	632	7.6	58.4	1/4	0.6	2.6	.3	13.1	20	14	77
		High							3.4		13.7	20	15	90
073 (6 Tons)	208/230-3-60	Std	187	254	20.6	146.0	1/4	1.4	5.2	.6	37.2/37.2	45/45	37/37	184/184
		High							7.5		39.5/39.5	45/45	39/39	210/210
	460-3-60	Std	414	508	9.5	73.0	1/4	0.6	2.6	.3	17.6	20	17	92
		High							3.4		18.4	25	18	105
	575-3-60	Std	518	632	7.6	58.4	1/4	0.6	2.6	.3	13.1	20	14	77
		High							3.4		13.7	20	15	90

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

*Used to determine minimum disconnect per NEC.
†Fuse or HACR circuit breaker.

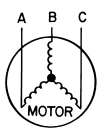
NOTES:

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.

3. For units with power exhaust: If a single power source is to be used, size wire to include power exhaust MCA and MOCP. Check MCA and MOCP when power exhaust is powered through the unit (must be in accordance with NEC and/or local codes). 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 580F060 unit with MCA = 28.9 and MOCP = 35, with CRPWREXH030A00 power exhaust.

   MCA New = 28.9 amps + 1.6 amps = 30.5 amps

   If the new MCA does not exceed the published MOCP, then MOCP would not change. The MOCP in this example is 35 amps, the MCA New is below 35, 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.

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

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 and save outdoor air opening panel and screws. See Fig. 12.
3. Separate hood and screen from basepan by removing the 4 screws securing them. Save all screws.
4. Replace evaporator coil access panel.
5. Place hood on front of outdoor air opening panel. See Fig. 13 for hood details. Secure top of hood with the 4 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. Adjust minimum position setting of the damper blade by 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 screen. Secure screen to hood using the screws. See Fig. 14.

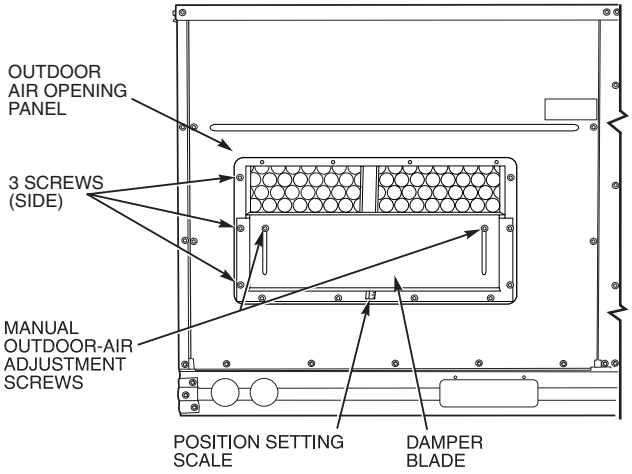


Fig. 12 — Damper Panel with Manual Outdoor-Air Damper Installed

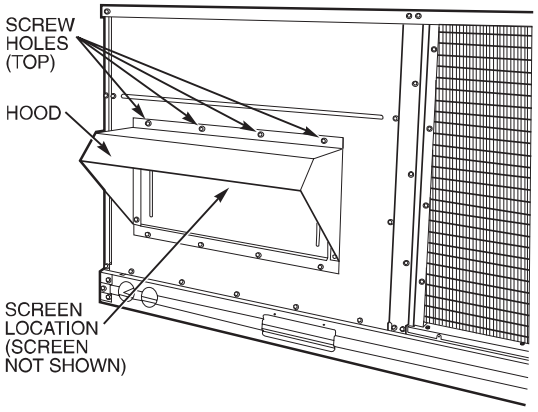


Fig. 14 — Outdoor-Air Damper with Hood Attached

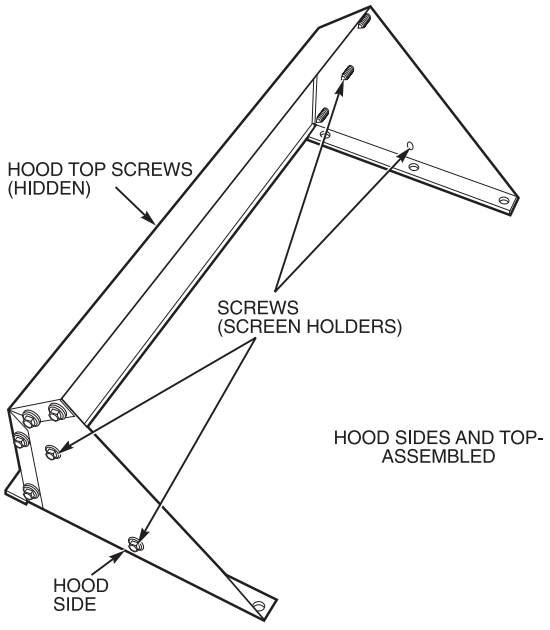


Fig. 13 — Outdoor-Air Hood Details

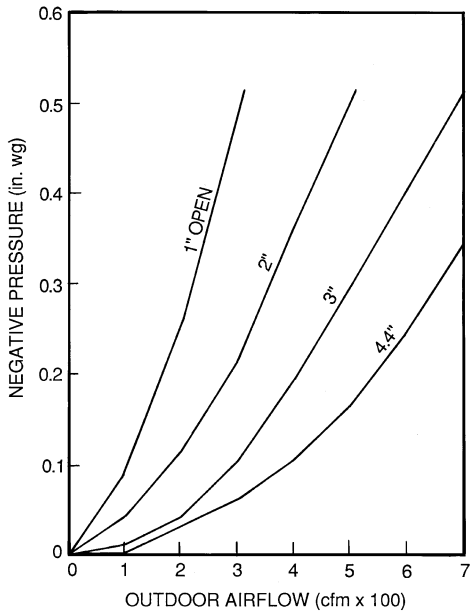


Fig. 15 — Outdoor-Air Damper Position Setting

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.

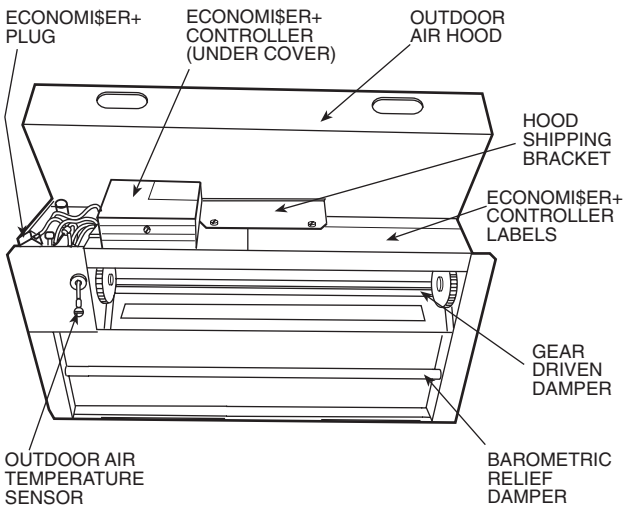


Fig. 16 — EconoMi$er+ Component Locations

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.

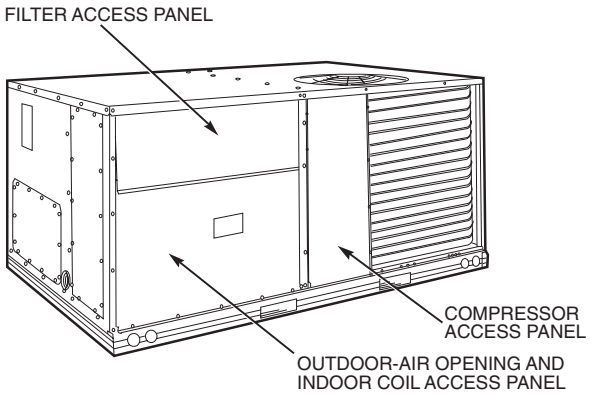


Fig. 17 — Typical Access Panel Locations

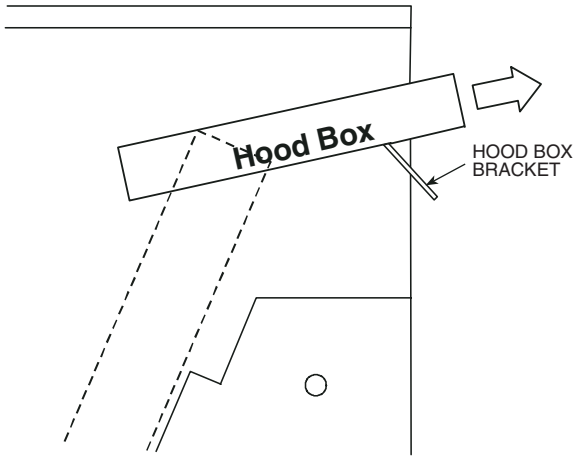


Fig. 18 — Hood Box Removal

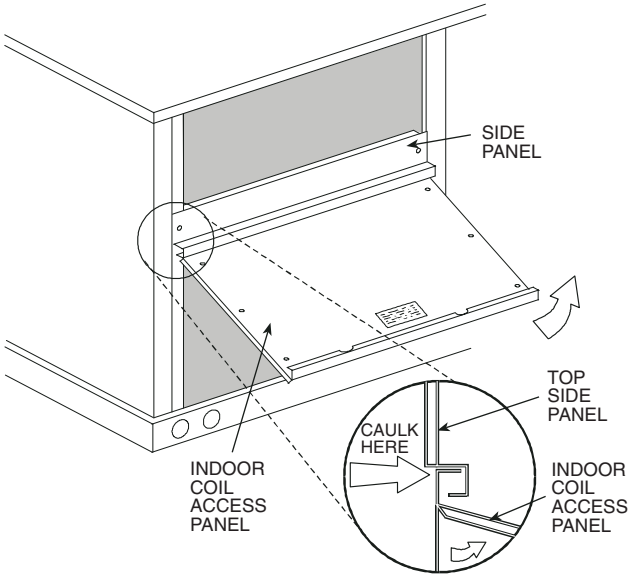


Fig. 19 — Indoor Coil Access Panel Relocation

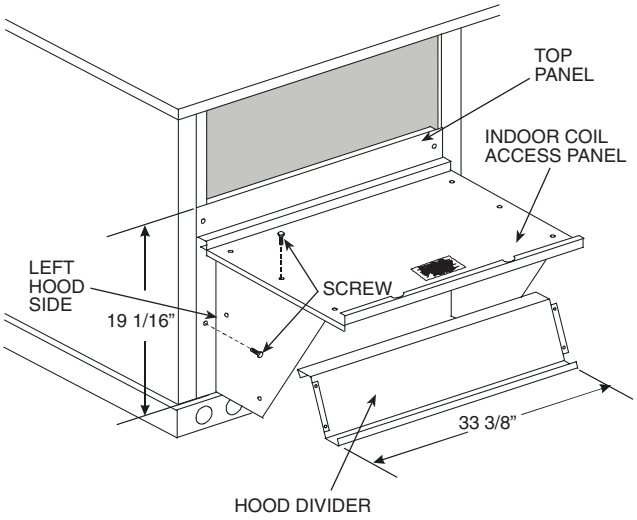


Fig. 20 — Outdoor-Air Hood Construction

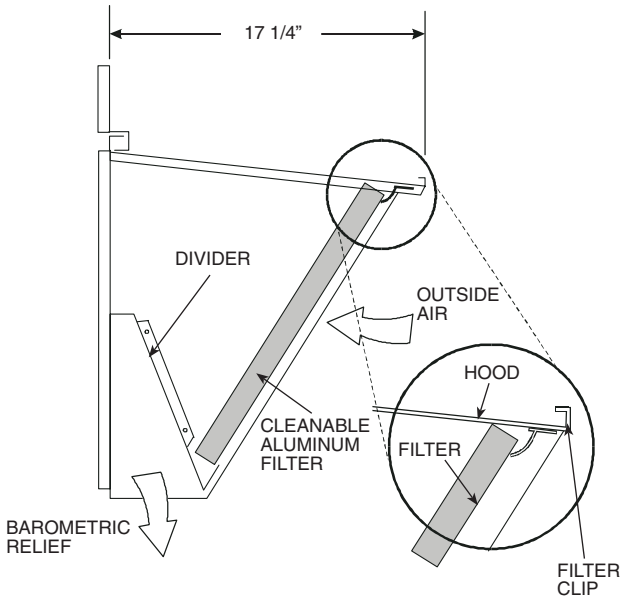
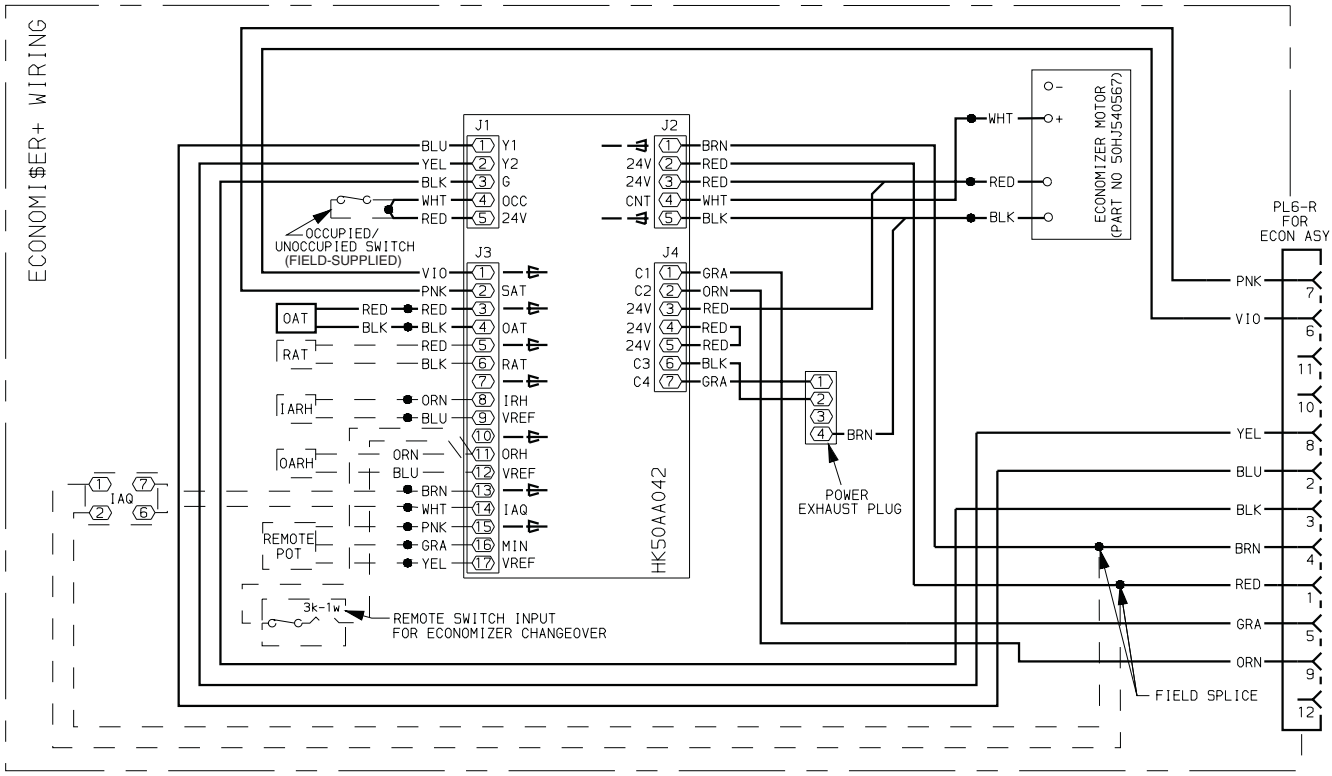


Fig. 21 — Filter Installation



LEGEND

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

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

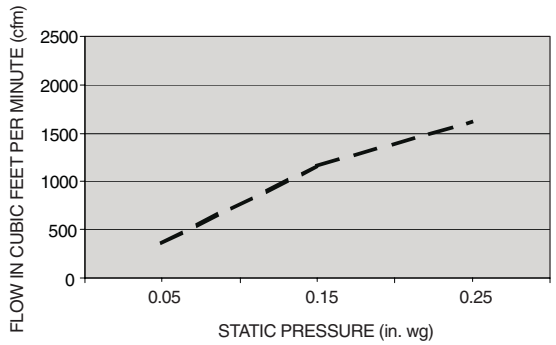


Fig. 23 — Barometric Flow Capacity

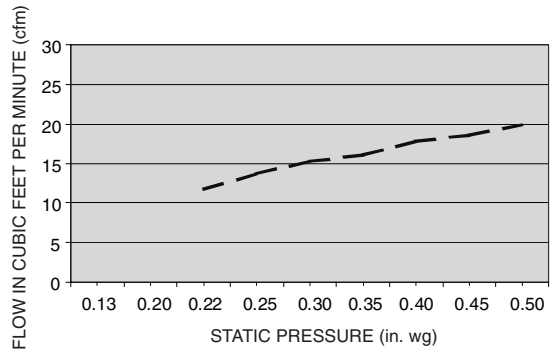


Fig. 24 — Outdoor-Air Damper Leakage

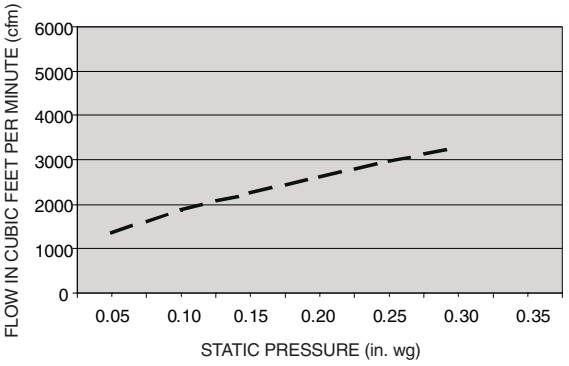


Fig. 25 — Return-Air Pressure Drop

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 outside 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 outside 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 42.

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 outside 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
3-6 Ton Power Exhaust 208-230 v 1 Ph	CRPWREXH030A00
3-6 Ton Power Exhaust 460 v 3 Ph	CRPWREXH021A00
Return Air Temperature Sensor with Harness	CRTEMPSN001A00
Outdoor Air Humidity Sensor with Harness	CRHUMDSN001B00
Indoor Air Humidity Sensor with 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° to 158 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° to 158 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.

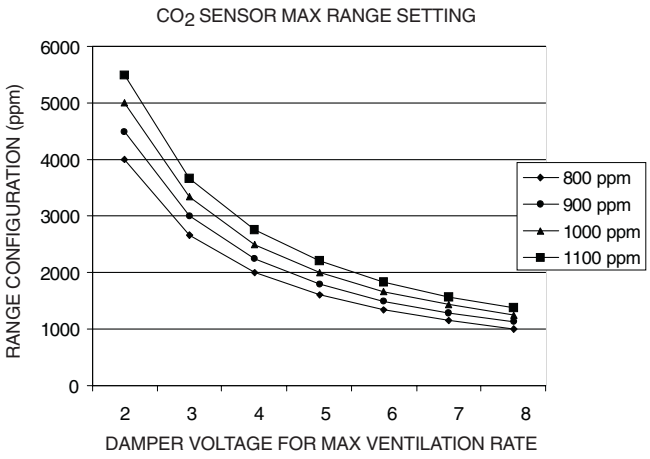
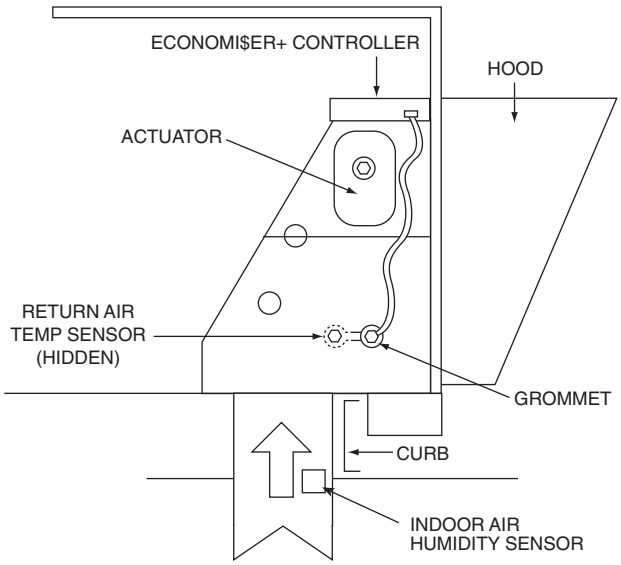


Fig. 26 — Indoor Air Quality Voltage Setting



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

Fig. 27 — Return Air Temperature Sensor

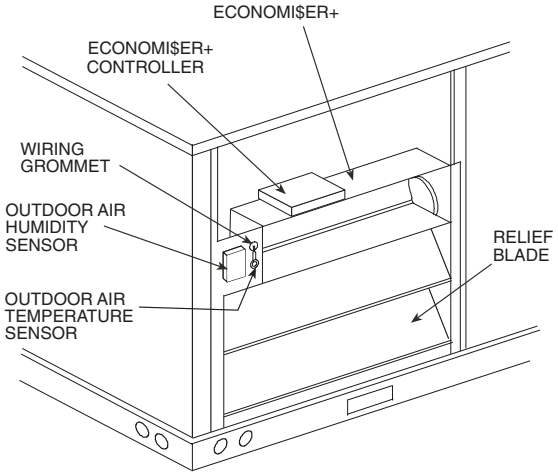


Fig. 28 — Outdoor-Air Humidity Sensor

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

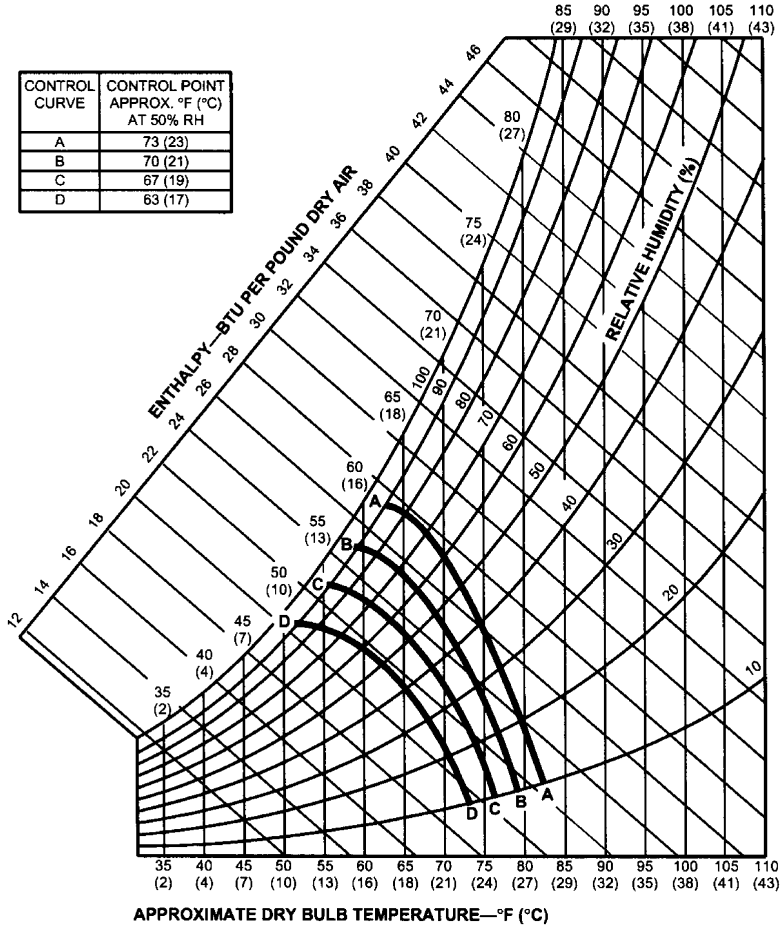
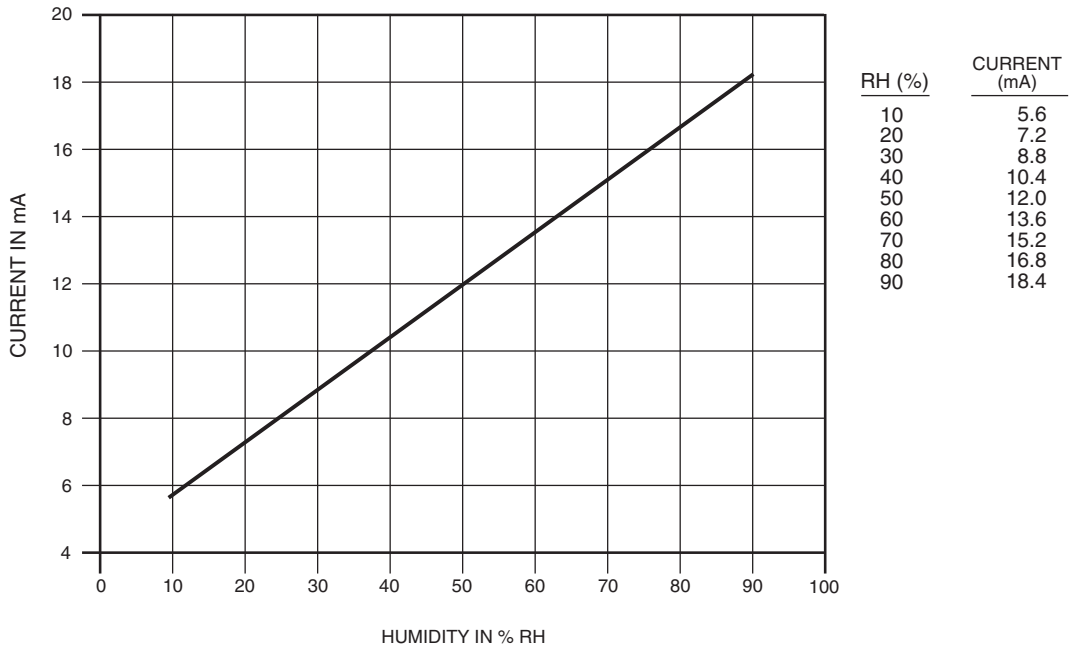


Fig. 29 — Enthalpy Changeover Settings



RH — Relative Humidity

Fig. 30 — Humidity Sensor Current 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.

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.

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.

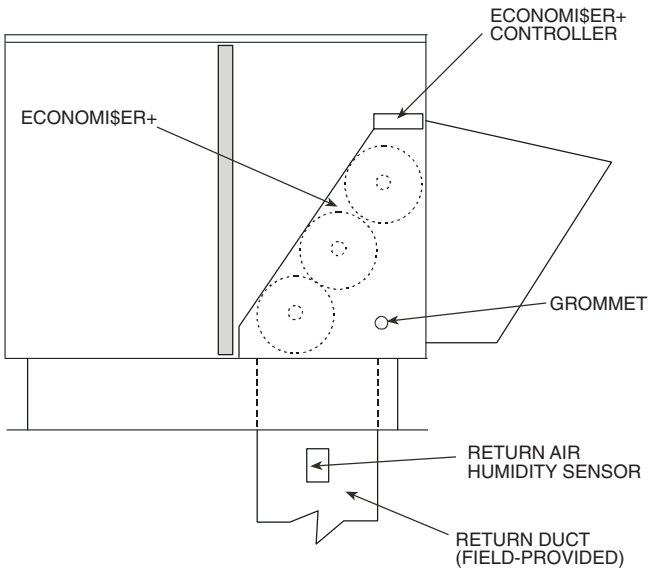


Fig. 31 — Return Air Humidity Sensor

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.

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 2 times. 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.

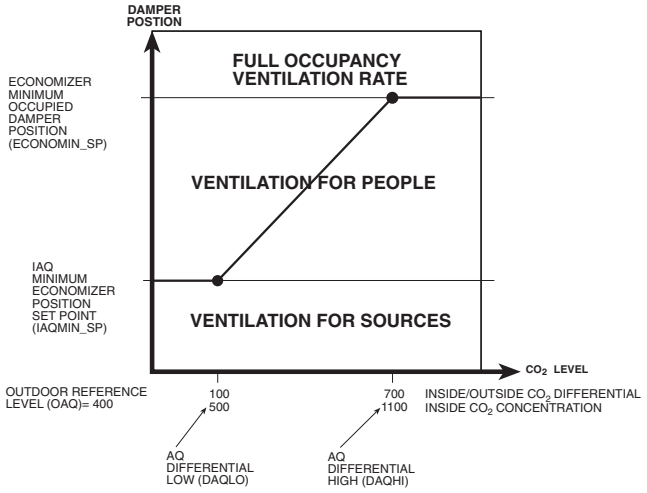


Fig. 32 — Demand Ventilation Control

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 rpm to meet jobsite conditions. Table 8 shows fan rpm at motor pulley settings. Table 9 shows motor performance. Refer to Tables 10-33 to determine fan speed settings.

A. Direct-Drive Motors

The evaporator-fan motor factory speed setting is shown on label diagram affixed to base unit. If other than factory setting is desired, refer to label diagram for motor reconnection. See Fig. 33 for direct drive motor location.

B. Belt-Drive Motors

Fan motor pulleys are factory set for speed shown in Table 1. See Fig. 34 for belt drive motor location.

NOTE: Before adjusting fan speed, make sure the new fan speed will provide an air temperature rise range as shown in Table 1.

To change fan speed:

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

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.

To adjust belt tension:

1. Loosen fan motor mounting nuts.
2. Slide motor mounting plate away from fan scroll for proper belt tension ($^1/_2$-in. deflection with 8 to 10 lb of force).
3. Tighten motor mounting nuts.
4. Adjust bolt and tighten nut to secure motor in fixed position.

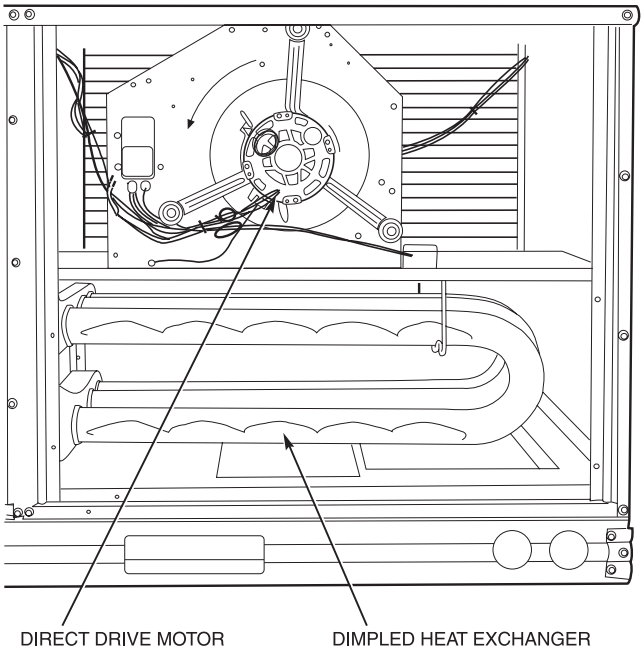


Fig. 33 — Direct-Drive Motor Mounting

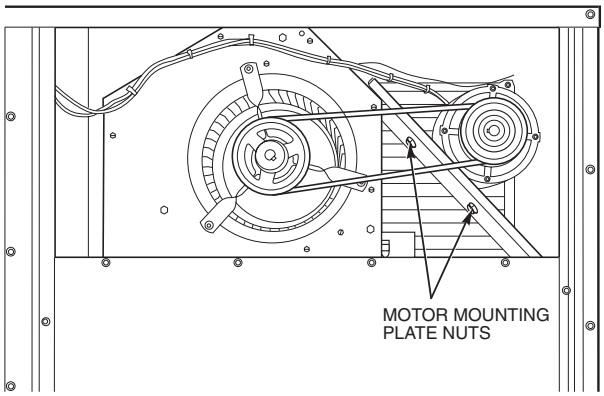


Fig. 34 — Belt Drive Motor Mounting

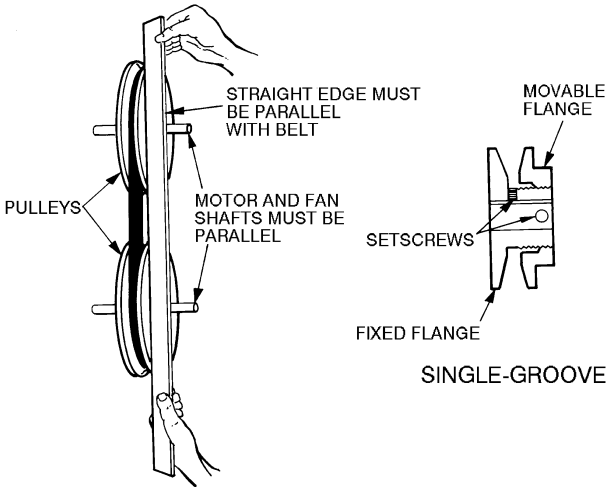


Fig. 35 — Evaporator-Fan Pulley Adjustment

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
036†	1045	1009	973	937	901	865	829	793	757	721	685	—	—
036**	1455	1423	1392	1360	1328	1297	1265	1233	1202	1170	1138	1107	1075
048†	1175	1135	1094	1054	1013	973	932	892	851	811	770	—	—
048**	1455	1423	1392	1360	1328	1297	1265	1233	1202	1170	1138	1107	1075
060†	1192	1166	1140	1114	1087	1061	1035	1009	983	957	930	904	878
060**	1685	1647	1608	1570	1531	1493	1454	1416	1377	1339	1300	—	—
072, 073††	1460	1421	1382	1343	1304	1265	1226	1187	1148	1109	1070	—	—
072, 073**	1685	1647	1608	1570	1531	1493	1454	1416	1377	1339	1300	—	—

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

Table 9 — Motor Data

UNIT 580F	EVAPORATOR-FAN MOTOR	UNIT VOLTAGE	MAXIMUM ACCEPTABLE CONTINUOUS BHP*	MAXIMUM ACCEPTABLE OPERATING WATTS	MAXIMUM AMP DRAW
036	Standard	208/230	0.34	440	2.8
		460			1.3
		575			1.3
	Alternate	208/230	1.20	1000	4.9
		460			2.1
		575			2.1
	High Static	208/230	2.40	2120	6.0
		460			3.0
		575			3.0
048	Standard	208/230	0.75	850	3.5
		460			1.8
		575			1.8
	Alternate	208/230	1.20	1000	4.9
		460			2.1
		575			2.1
	High Static	208/230	2.40	2120	6.0
		460			3.0
		575			3.0
060	Standard	208/230	1.20	1340	5.9
		460			3.2
		575			3.2
	Alternate	208/230	1.30/2.40†	2120	10.1/6.7†
		460			3.0
		575			3.0
	High Static	208/230	2.90	2562	8.6
		460			3.9
		575			3.9
072, 073	Standard	208/230	2.40	2120	6.7
		460			3.0
		575			3.0
	High Static	208/230	2.90	2562	8.6
		460			3.9
		575			3.9

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.
†Single phase/three-phase.

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 single-phase units.

Table 10 — Fan Performance 580F036 — Vertical Discharge Units, Standard Motor

Airflow (Cfm)	STANDARD MOTOR (DIRECT DRIVE)											
	Low Speed						High Speed					
	208 V			230, 460, 575 V			208 V			230, 460, 575 V		
	ESP	Bhp	Watts	ESP	Bhp	Watts	ESP	Bhp	Watts	ESP	Bhp	Watts
900	0.49	0.21	253	0.50	0.23	277	0.51	0.26	307	0.55	0.31	363
1000	0.42	0.23	270	0.43	0.25	292	0.43	0.27	321	0.51	0.32	374
1100	0.37	0.24	287	0.38	0.26	307	0.39	0.28	335	0.46	0.33	385
1200	0.33	0.26	304	0.33	0.27	323	0.34	0.29	349	0.40	0.34	397
1300	0.27	0.27	321	0.28	0.29	338	0.28	0.31	364	0.34	0.34	408
1400	0.20	0.29	338	0.23	0.30	354	0.25	0.32	378	—	—	—
1500	0.16	0.30	355	0.18	0.31	369	0.20	0.33	392	—	—	—

LEGEND
Bhp — Brake Horsepower Input to Fan
ESP — External Static Pressure (in. wg)

See page 36 for general fan performance notes.

Table 11 — Fan Performance 580F036 — 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
900	**643**	**0.15**	**152**	768	0.22	222	870	0.30	296	958	0.37	373	1037	0.46	454
1000	**683**	**0.19**	**191**	804	0.27	268	904	0.35	348	991	0.43	430	**1069**	**0.52**	**517**
1100	725	0.24	237	842	0.32	321	939	0.41	407	1025	0.50	496	**1102**	**0.59**	**588**
1200	767	0.29	291	880	0.38	382	976	0.48	474	**1060**	**0.57**	**570**	**1136**	**0.67**	**668**
1300	811	0.35	352	920	0.45	451	1013	0.55	550	**1095**	**0.66**	**652**	**1170**	**0.76**	**756**
1400	855	0.43	423	960	0.53	529	**1051**	**0.64**	**636**	**1132**	**0.75**	**744**	**1205**	**0.86**	**855**
1500	900	0.51	504	1002	0.62	617	**1090**	**0.74**	**731**	**1169**	**0.85**	**846**	**1242**	**0.97**	**963**

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
900	**1110**	**0.54**	**538**	**1177**	**0.63**	**627**	**1239**	**0.72**	**718**	**1298**	**0.82**	**813**	**1355**	**0.92**	**911**
1000	**1141**	**0.61**	**607**	**1207**	**0.70**	**700**	**1269**	**0.80**	**796**	**1328**	**0.90**	**895**	**1384**	**1.00**	**998**
1100	**1173**	**0.69**	**683**	**1238**	**0.79**	**781**	**1300**	**0.89**	**883**	**1358**	**0.99**	**987**	**1414**	**1.10**	**1094**
1200	**1205**	**0.77**	**768**	**1270**	**0.88**	**872**	**1332**	**0.98**	**979**	**1389**	**1.09**	**1088**	—	—	—
1300	**1239**	**0.87**	**863**	**1303**	**0.98**	**972**	**1364**	**1.09**	**1084**	—	—	—	—	—	—
1400	**1273**	**0.97**	**967**	**1337**	**1.09**	**1082**	—	—	—	—	—	—	—	—	—
1500	**1309**	**1.09**	**1082**	—	—	—	—	—	—	—	—	—	—	—	—

LEGEND

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

*Motor drive range: 685 to 1045 rpm. All other rpms require a field-supplied drive.

NOTES:
1. **Boldface** indicates field-supplied drive is required.
2. Maximum continuous bhp is 1.20.
3. See page 36 for general fan performance notes.

Table 12 — Fan Performance 580F036 — 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
900	**643**	**0.15**	**152**	**768**	**0.22**	**222**	**870**	**0.30**	**296**	**958**	**0.37**	**373**	**1037**	**0.46**	**454**
1000	**683**	**0.19**	**191**	**804**	**0.27**	**268**	**904**	**0.35**	**348**	**991**	**0.43**	**430**	**1069**	**0.52**	**517**
1100	**725**	**0.24**	**237**	**842**	**0.32**	**321**	**939**	**0.41**	**407**	**1025**	**0.50**	**496**	1102	0.59	588
1200	**767**	**0.29**	**291**	**880**	**0.38**	**382**	**976**	**0.48**	**474**	**1060**	**0.57**	**570**	1136	0.67	668
1300	**811**	**0.35**	**352**	**920**	**0.45**	**451**	**1013**	**0.55**	**550**	1095	0.66	652	1170	0.76	756
1400	**855**	**0.43**	**423**	**960**	**0.53**	**529**	**1051**	**0.64**	**636**	1132	0.75	744	1205	0.86	855
1500	**900**	**0.51**	**504**	**1002**	**0.62**	**617**	1090	0.74	731	1169	0.85	846	1242	0.97	963

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
900	1110	0.54	538	1177	0.63	627	1239	0.72	718	1298	0.82	813	1355	0.92	911
1000	1141	0.61	607	1207	0.70	700	1269	0.80	796	1328	0.90	895	1384	1.00	998
1100	1173	0.69	683	1238	0.79	781	1300	0.89	883	1358	0.99	987	1414	1.10	1094
1200	1205	0.77	768	1270	0.88	872	1332	0.98	979	1389	1.09	1088	1444	1.21	1200
1300	1239	0.87	863	1303	0.98	972	1364	1.09	1084	1421	1.21	1199	**1475**	**1.32**	**1316**
1400	1273	0.97	967	1337	1.09	1082	1397	1.21	1200	1453	1.33	1320	**1507**	**1.45**	**1443**
1500	1309	1.09	1082	1371	1.21	1204	1430	1.33	1327	**1486**	**1.46**	**1453**	**1540**	**1.59**	**1581**

LEGEND

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

*Motor drive range: 1075 to 1455 rpm. All other rpms require a field-supplied drive.

NOTES:
1. **Boldface** indicates field-supplied drive is required.
2. Maximum continuous bhp is 2.40.
3. Seee page 36 for general fan performance notes.

Table 13 — Fan Performance 580F048 — Vertical Discharge Units, Standard Motor

Airflow (Cfm)	STANDARD MOTOR (DIRECT DRIVE)											
	Low Speed						High Speed					
	208 V			230, 460, 575 V			208 V			230, 460, 575 V		
	ESP	Bhp	Watts	ESP	Bhp	Watts	ESP	Bhp	Watts	ESP	Bhp	Watts
1200	0.68	0.41	458	0.74	0.45	506	0.74	0.51	572	0.85	0.56	632
1300	0.61	0.42	471	0.67	0.46	521	0.66	0.52	589	0.78	0.58	651
1400	0.53	0.45	503	0.59	0.49	556	0.59	0.54	616	0.70	0.60	681
1500	0.45	0.47	536	0.51	0.52	593	0.52	0.56	631	0.63	0.62	698
1600	0.36	0.49	557	0.42	0.54	616	0.45	0.58	654	0.56	0.64	723
1700	0.26	0.52	584	0.32	0.57	646	0.37	0.60	678	0.48	0.66	750
1800	0.15	0.54	610	0.22	0.60	674	0.30	0.62	698	0.41	0.68	772
1900	0.04	0.56	629	0.11	0.62	696	0.23	0.64	720	0.34	0.70	796
2000	—	—	—	—	—	—	0.16	0.66	744	0.26	0.73	823

LEGEND

Bhp — Brake Horsepower Input to Fan
ESP — External Static Pressure (in. wg)

See page 36 for general fan performance notes.

Table 14 — Fan Performance 580F048 — 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
1200	**666**	**0.26**	**257**	778	0.37	367	871	0.47	471	952	0.57	572	1025	0.67	670
1300	**701**	**0.31**	**306**	810	0.43	426	901	0.54	540	981	0.65	651	1053	0.76	760
1400	**737**	**0.36**	**361**	842	0.49	491	931	0.62	616	1010	0.74	738	1081	0.86	856
1500	773	0.42	422	875	0.57	564	963	0.70	699	1040	0.84	831	1110	0.96	960
1600	810	0.49	491	909	0.65	643	994	0.79	790	1070	0.94	932	1140	1.08	1070
1700	847	0.57	567	943	0.73	730	1027	0.89	888	1101	1.05	1040	1170	1.20	1189
1800	885	0.66	652	978	0.83	826	1060	1.00	994	1133	1.16	1157	—	—	—
1900	923	0.75	745	1014	0.94	930	1093	1.11	1109	—	—	—	—	—	—
2000	962	0.85	847	1049	1.05	1043	—	—	—	—	—	—	—	—	—

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
1200	1093	0.77	767	1155	0.87	861	**1213**	**0.96**	**955**	**1268**	**1.05**	**1047**	**1321**	**1.14**	**1137**
1300	1119	0.87	866	**1181**	**0.98**	**970**	**1239**	**1.08**	**1073**	**1294**	**1.18**	**1175**	—	—	—
1400	1147	0.98	972	**1208**	**1.09**	**1086**	—	—	—	—	—	—	—	—	—
1500	1175	1.09	1086	—	—	—	—	—	—	—	—	—	—	—	—
1600	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
1700	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
1800	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
1900	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

LEGEND

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

*Motor drive range: 770 to 1175 rpm. All other rpms require a field-supplied drive.

NOTES:
1. **Boldface** indicates field-supplied drive is required.
2. Maximum continuous bhp is 1.20.
3. See page 36 for general fan performance notes.

Table 15 — Fan Performance 580F048 — 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
1200	**666**	**0.26**	**257**	**778**	**0.37**	**367**	**871**	**0.47**	**471**	**952**	**0.57**	**572**	**1025**	**0.67**	**670**
1300	**701**	**0.31**	**306**	**810**	**0.43**	**426**	**901**	**0.54**	**540**	**981**	**0.65**	**651**	**1053**	**0.76**	**760**
1400	**737**	**0.36**	**361**	**842**	**0.49**	**491**	**931**	**0.62**	**616**	**1010**	**0.74**	**738**	1081	0.86	856
1500	**773**	**0.42**	**422**	**875**	**0.57**	**564**	**963**	**0.70**	**699**	**1040**	**0.84**	**831**	1110	0.96	960
1600	**810**	**0.49**	**491**	**909**	**0.65**	**643**	**994**	**0.79**	**790**	**1070**	**0.94**	**932**	1140	1.08	1070
1700	**847**	**0.57**	**567**	**943**	**0.73**	**730**	**1027**	**0.89**	**888**	1101	1.05	1040	1170	1.20	1189
1800	**885**	**0.66**	**652**	**978**	**0.83**	**826**	**1060**	**1.00**	**994**	1133	1.16	1157	1200	1.32	1316
1900	**923**	**0.75**	**745**	**1014**	**0.94**	**930**	1093	1.11	1109	1165	1.29	1283	1231	1.46	1453
2000	**962**	**0.85**	**847**	**1049**	**1.05**	**1043**	1127	1.24	1233	1198	1.42	1417	1263	1.61	1598

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
1200	1093	0.77	767	1155	0.87	861	1213	0.96	955	1268	1.05	1047	1321	1.14	1137
1300	1119	0.87	866	1181	0.98	970	1239	1.08	1073	1294	1.18	1175	1346	1.28	1275
1400	1147	0.98	972	1208	1.09	1086	1265	1.21	1199	1320	1.32	1310	1371	1.43	1419
1500	1175	1.09	1086	1235	1.22	1209	1292	1.34	1332	1346	1.46	1452	1397	1.58	1572
1600	1204	1.21	1207	1263	1.35	1340	1320	1.48	1472	1373	1.61	1603	1424	1.74	1732
1700	1233	1.34	1336	1292	1.49	1480	1348	1.63	1622	1401	1.77	1762	1451	1.91	1901
1800	1262	1.48	1473	1321	1.64	1627	1376	1.79	1779	1428	1.94	1930	**1479**	**2.09**	**2078**
1900	1293	1.63	1620	1350	1.79	1784	1405	1.96	1946	**1457**	**2.12**	**2106**	**1506**	**2.28**	**2265**
2000	1323	1.79	1776	1380	1.96	1950	1434	2.13	2123	**1486**	**2.31**	**2293**	—	—	—

LEGEND

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

*Motor drive range: 1075 to 1455 rpm. All other rpms require a field-supplied drive.

NOTES:
1. **Boldface** indicates field-supplied drive is required.
2. Maximum continuous bhp is 2.40.
3. See page 36 for general fan performance notes.

Table 16 — Fan Performance 580F060 — Vertical Discharge Units, Standard Motor

STANDARD MOTOR (DIRECT DRIVE)																		
Airflow (Cfm)	Low Speed						Medium Speed						High Speed					
	208 V			230,460,575 V			208 V			230,460,575 V			208 V			230,460,575 V		
	ESP	Bhp	Watts	ESP	Bhp	Watts	ESP	Bhp	Watts	ESP	Bhp	Watts	ESP	Bhp	Watts	ESP	Bhp	Watts
1500	0.69	0.67	750	1.01	0.71	791	1.00	0.70	782	1.20	0.76	845	1.22	0.79	875	1.28	0.85	949
1600	0.49	0.70	780	0.85	0.74	824	0.85	0.74	821	1.06	0.79	883	1.09	0.82	913	1.17	0.89	988
1700	0.29	0.73	810	0.70	0.77	857	0.70	0.77	861	0.93	0.83	921	0.97	0.85	950	1.06	0.92	1027
1800	0.09	0.75	839	0.54	0.80	891	0.55	0.81	900	0.80	0.86	959	0.84	0.89	988	0.95	0.96	1066
1900	—	—	—	0.39	0.83	924	0.40	0.84	940	0.67	0.90	997	0.72	0.92	1025	0.84	0.99	1105
2000	—	—	—	0.23	0.86	957	0.25	0.88	979	0.54	0.93	1035	0.59	0.95	1063	0.73	1.03	1144
2100	—	—	—	0.08	0.89	990	0.10	0.91	1018	0.41	0.96	1073	0.46	0.99	1101	0.62	1.06	1183
2200	—	—	—	—	—	—	—	—	—	0.28	1.00	1111	0.34	1.02	1138	0.51	1.10	1222
2300	—	—	—	—	—	—	—	—	—	0.15	1.03	1149	0.21	1.06	1176	0.40	1.13	1261
2400	—	—	—	—	—	—	—	—	—	0.02	1.07	1187	0.09	1.09	1213	0.29	1.17	1300
2500	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.18	1.20	1340

LEGEND

Bhp — Brake Horsepower Input to Fan
ESP — External Static Pressure (in. wg)

See page 36 for general fan performance notes.

Table 17 — Fan Performance 580F060 — Single-Phase, Vertical Discharge Unit, 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
1500	**802**	**0.42**	**370**	912	0.55	489	1006	0.70	624	1088	0.87	773	1163	1.05	935
1600	**840**	**0.49**	**432**	947	0.63	557	1038	0.78	696	1119	0.95	848	**1193**	**1.14**	**1013**
1700	878	0.57	502	982	0.71	632	1071	0.87	776	1151	1.05	932	**1224**	**1.24**	**1100**
1800	917	0.65	581	1017	0.81	716	1105	0.97	864	1183	1.15	1024	—	—	—
1900	956	0.75	668	1053	0.91	808	1139	1.08	961	**1216**	**1.27**	**1126**	—	—	—
2000	995	0.86	764	1090	1.02	910	1173	1.20	1067	—	—	—	—	—	—
2100	1035	0.98	869	1127	1.15	1021	—	—	—	—	—	—	—	—	—
2200	1075	1.11	984	1164	1.29	1141	—	—	—	—	—	—	—	—	—
2300	1115	1.25	1110	—	—	—	—	—	—	—	—	—	—	—	—
2400	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2500	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

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
1500	**1232**	**1.25**	**1109**	—	—	—	—	—	—	—	—	—	—	—	—
1600	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
1700	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
1800	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
1900	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2100	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2200	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2300	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2400	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2500	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

LEGEND

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

*Motor drive range: 878 to 1192 rpm. All other rpms require a field-supplied drive.

NOTES:
1. **Boldface** indicates field-supplied drive is required.
2. Maximum continuous bhp is 1.30.
3. See page 36 for general fan performance notes.

Table 18 — Fan Performance 580F060 — Three-Phase, 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
1500	**802**	**0.42**	**370**	912	0.55	489	1006	0.70	624	1088	0.87	773	1163	1.05	935
1600	**840**	**0.49**	**432**	947	0.63	557	1038	0.78	696	1119	0.95	848	**1193**	**1.14**	**1013**
1700	878	0.57	502	982	0.71	632	1071	0.87	776	1151	1.05	932	**1224**	**1.24**	**1100**
1800	917	0.65	581	1017	0.81	716	1105	0.97	864	1183	1.15	1024	**1255**	**1.35**	**1197**
1900	956	0.75	668	1053	0.91	808	1139	1.08	961	**1216**	**1.27**	**1126**	**1287**	**1.47**	**1302**
2000	995	0.86	764	1090	1.02	910	1173	1.20	1067	**1249**	**1.39**	**1236**	**1319**	**1.59**	**1416**
2100	1035	0.98	869	1127	1.15	1021	1209	1.33	1183	**1283**	**1.53**	**1357**	**1351**	**1.74**	**1541**
2200	1075	1.11	984	1164	1.29	1141	1244	1.47	1309	**1317**	**1.68**	**1488**	**1385**	**1.89**	**1676**
2300	1115	1.25	1110	1202	1.43	**1273**	**1280**	**1.63**	**1446**	**1352**	**1.83**	**1629**	**1418**	**2.05**	**1822**
2400	1155	1.40	**1246**	**1240**	**1.59**	**1415**	**1316**	**1.79**	**1594**	**1387**	**2.01**	**1782**	**1452**	**2.23**	**1980**
2500	1196	1.57	**1394**	**1278**	**1.77**	**1569**	**1353**	**1.97**	**1753**	**1422**	**2.19**	**1946**	—	—	—

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
1500	**1232**	**1.25**	**1109**	**1297**	**1.46**	**1295**	**1357**	**1.68**	**1492**	**1415**	**1.91**	**1700**	**1469**	**2.16**	**1917**
1600	**1262**	**1.34**	**1190**	**1325**	**1.55**	**1379**	**1385**	**1.78**	**1579**	**1442**	**2.01**	**1788**	**1496**	**2.26**	**2009**
1700	**1291**	**1.44**	**1281**	**1354**	**1.66**	**1472**	**1414**	**1.89**	**1674**	**1470**	**2.12**	**1887**	**1524**	**2.37**	**2109**
1800	**1322**	**1.55**	**1380**	**1384**	**1.77**	**1575**	**1443**	**2.00**	**1779**	**1499**	**2.25**	**1994**	—	—	—
1900	**1352**	**1.68**	**1489**	**1414**	**1.90**	**1687**	**1472**	**2.13**	**1894**	**1528**	**2.38**	**2112**	—	—	—
2000	**1384**	**1.81**	**1607**	**1445**	**2.04**	**1808**	**1502**	**2.27**	**2019**	—	—	—	—	—	—
2100	**1415**	**1.95**	**1736**	**1476**	**2.18**	**1940**	—	—	—	—	—	—	—	—	—
2200	**1448**	**2.11**	**1875**	**1507**	**2.35**	**2083**	—	—	—	—	—	—	—	—	—
2300	**1480**	**2.28**	**2025**	—	—	—	—	—	—	—	—	—	—	—	—
2400	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2500	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

LEGEND

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

*Motor drive range: 878 to 1192 rpm. All other rpms require a field-supplied drive.

NOTES:
1. **Boldface** indicates field-supplied drive is required.
2. Maximum continuous bhp is 2.40.
3. See page 36 for general fan performance notes.

Table 19 — Fan Performance 580F060 — 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
1500	**802**	**0.42**	**370**	**912**	**0.55**	**489**	**1006**	**0.70**	**624**	**1088**	**0.87**	**773**	**1163**	**1.05**	**935**
1600	**840**	**0.49**	**432**	**947**	**0.63**	**557**	**1038**	**0.78**	**696**	**1119**	**0.95**	**848**	**1193**	**1.14**	**1013**
1700	**878**	**0.57**	**502**	**982**	**0.71**	**632**	**1071**	**0.87**	**776**	**1151**	**1.05**	**932**	**1224**	**1.24**	**1100**
1800	**917**	**0.65**	**581**	**1017**	**0.81**	**716**	**1105**	**0.97**	**864**	**1183**	**1.15**	**1024**	**1255**	**1.35**	**1197**
1900	**956**	**0.75**	**668**	**1053**	**0.91**	**808**	**1139**	**1.08**	**961**	**1216**	**1.27**	**1126**	**1287**	**1.47**	**1302**
2000	**995**	**0.86**	**764**	**1090**	**1.02**	**910**	**1173**	**1.20**	**1067**	**1249**	**1.39**	**1236**	1319	1.59	1416
2100	**1035**	**0.98**	**869**	**1127**	**1.15**	**1021**	**1209**	**1.33**	**1183**	**1283**	**1.53**	**1357**	1351	1.74	1541
2200	**1075**	**1.11**	**984**	**1164**	**1.29**	**1141**	**1244**	**1.47**	**1309**	1317	1.68	1488	1385	1.89	1676
2300	**1115**	**1.25**	**1110**	**1202**	**1.43**	**1273**	**1280**	**1.63**	**1446**	1352	1.83	1629	1418	2.05	1822
2400	**1155**	**1.40**	**1246**	**1240**	**1.59**	**1415**	1316	1.79	1594	1387	2.01	1782	1452	2.23	1980
2500	**1196**	**1.57**	**1394**	**1278**	**1.77**	**1569**	1353	1.97	1753	1422	2.19	1946	1486	2.42	2149

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
1500	**1232**	**1.25**	**1109**	**1297**	**1.46**	**1295**	1357	1.68	1492	1415	1.91	1700	1469	2.16	1917
1600	**1262**	**1.34**	**1190**	1325	1.55	1379	1385	1.78	1579	1442	2.01	1788	1496	2.26	2009
1700	**1291**	**1.44**	**1281**	1354	1.66	1472	1414	1.89	1674	1470	2.12	1887	1524	2.37	2109
1800	1322	1.55	1380	1384	1.77	1575	1443	2.00	1779	1499	2.25	1994	1552	2.50	2219
1900	1352	1.68	1489	1414	1.90	1687	1472	2.13	1894	1528	2.38	2112	1580	2.63	2339
2000	1384	1.81	1607	1445	2.04	1808	1502	2.27	2019	1557	2.52	2240	1609	2.78	2470
2100	1415	1.95	1736	1476	2.18	1940	1533	2.43	2155	1587	2.68	2378	—	—	—
2200	1448	2.11	1875	1507	2.35	2083	1563	2.59	2301	1617	2.85	2528	—	—	—
2300	1480	2.28	2025	1539	2.52	2237	1595	2.77	2459	—	—	—	—	—	—
2400	1513	2.46	2187	1571	2.71	2403	—	—	—	—	—	—	—	—	—
2500	1547	2.66	2360	—	—	—	—	—	—	—	—	—	—	—	—

LEGEND

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

*Motor drive range: 1300 to 1685 rpm. All other rpms require a field-supplied drive.

NOTES:
1. **Boldface** indicates field-supplied drive is required.
2. Maximum continuous bhp is 2.90.
3. See page 36 for general fan performance notes.

Table 20 — Fan Performance 580F072,073 — 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
1800	**967**	**0.65**	**579**	1077	0.81	718	1172	0.96	856	1257	1.12	993	1334	1.27	1130
1900	**1007**	**0.75**	**663**	1115	0.91	811	1208	1.08	957	1291	1.24	1101	1368	1.40	1246
2000	**1048**	**0.85**	**757**	1153	1.03	913	1244	1.20	1066	1326	1.37	1219	1401	1.54	1371
2100	1090	0.97	859	1191	1.15	1023	1281	1.33	1185	1361	1.51	1345	1435	1.69	1505
2200	1131	1.09	970	1230	1.29	1143	1318	1.48	1313	1397	1.67	1481	**1470**	**1.86**	**1649**
2300	1173	1.23	1091	1269	1.43	1273	1355	1.63	1451	1433	1.83	1627	**1505**	**2.03**	**1803**
2400	1215	1.38	1223	1309	1.59	1413	1393	1.80	1600	**1470**	**2.01**	**1784**	**1540**	**2.21**	**1967**
2500	1258	1.54	1365	1349	1.76	1564	1431	1.98	1759	**1506**	**2.20**	**1951**	—	—	—
2600	1300	1.71	1518	1389	1.94	1726	**1470**	**2.17**	**1929**	**1544**	**2.40**	**2130**	—	—	—
2700	1343	1.90	1683	1430	2.14	1899	**1509**	**2.38**	**2111**	—	—	—	—	—	—
2800	1386	2.09	1860	**1471**	**2.35**	**2085**	—	—	—	—	—	—	—	—	—
2900	1429	2.31	2050	—	—	—	—	—	—	—	—	—	—	—	—
3000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

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
1800	1406	1.43	1268	**1473**	**1.58**	**1407**	**1535**	**1.74**	**1548**	**1595**	**1.90**	**1690**	**1652**	**2.06**	**1833**
1900	1438	1.57	1391	**1504**	**1.73**	**1537**	**1567**	**1.90**	**1685**	**1626**	**2.06**	**1833**	**1682**	**2.23**	**1983**
2000	**1471**	**1.72**	**1523**	**1536**	**1.89**	**1677**	**1598**	**2.06**	**1831**	**1657**	**2.24**	**1986**	—	—	—
2100	**1504**	**1.87**	**1665**	**1569**	**2.06**	**1825**	**1630**	**2.24**	**1986**	—	—	—	—	—	—
2200	**1538**	**2.04**	**1816**	**1602**	**2.23**	**1984**	—	—	—	—	—	—	—	—	—
2300	**1572**	**2.23**	**1978**	—	—	—	—	—	—	—	—	—	—	—	—
2400	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2500	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2600	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2700	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2800	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2900	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
3000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

LEGEND

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

*Motor drive range: 1070 to 1460 rpm. All other rpms require a field-supplied drive.

NOTES:
1. **Boldface** indicates field-supplied drive is required.
2. Maximum continuous bhp is 2.40.
3. See page 36 for general fan performance notes.

Table 21 — Fan Performance 580F072,073 — 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
1800	**967**	**0.65**	**579**	**1077**	**0.81**	**718**	**1172**	**0.96**	**856**	**1257**	**1.12**	**993**	1334	1.27	1130
1900	**1007**	**0.75**	**663**	**1115**	**0.91**	**811**	**1208**	**1.08**	**957**	**1291**	**1.24**	**1101**	1368	1.40	1246
2000	**1048**	**0.85**	**757**	**1153**	**1.03**	**913**	**1244**	**1.20**	**1066**	1326	1.37	1219	1401	1.54	1371
2100	**1090**	**0.97**	**859**	**1191**	**1.15**	**1023**	**1281**	**1.33**	**1185**	1361	1.51	1345	1435	1.69	1505
2200	**1131**	**1.09**	**970**	**1230**	**1.29**	**1143**	1318	1.48	1313	1397	1.67	1481	1470	1.86	1649
2300	**1173**	**1.23**	**1091**	**1269**	**1.43**	**1273**	1355	1.63	1451	1433	1.83	1627	1505	2.03	1803
2400	**1215**	**1.38**	**1223**	1309	1.59	1413	1393	1.80	1600	1470	2.01	1784	1540	2.21	1967
2500	**1258**	**1.54**	**1365**	1349	1.76	1564	1431	1.98	1759	1506	2.20	1951	1576	2.41	2142
2600	1300	1.71	1518	1389	1.94	1726	1470	2.17	1929	1544	2.40	2130	1613	2.62	2329
2700	1343	1.90	1683	1430	2.14	1899	1509	2.38	2111	1581	2.61	2320	1649	2.85	2527
2800	1386	2.09	1860	1471	2.35	2085	1548	2.60	2305	1619	2.84	2522	—	—	—
2900	1429	2.31	2050	1512	2.57	2283	1588	2.83	2512	—	—	—	—	—	—
3000	1473	2.54	2252	1553	2.81	2494	—	—	—	—	—	—	—	—	—

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
1800	1406	1.43	1268	1473	1.58	1407	1535	1.74	1548	1595	1.90	1690	1652	2.06	1833
1900	1438	1.57	1391	1504	1.73	1537	1567	1.90	1685	1626	2.06	1833	1682	2.23	1983
2000	1471	1.72	1523	1536	1.89	1677	1598	2.06	1831	1657	2.24	1986	**1713**	**2.41**	**2142**
2100	1504	1.87	1665	1569	2.06	1825	1630	2.24	1986	**1688**	**2.42**	**2149**	**1744**	**2.60**	**2312**
2200	1538	2.04	1816	1602	2.23	1984	1663	2.42	2152	**1720**	**2.61**	**2321**	**1775**	**2.81**	**2491**
2300	1572	2.23	1978	1635	2.42	2153	**1695**	**2.62**	**2328**	**1753**	**2.82**	**2504**	—	—	—
2400	1607	2.42	2150	1669	2.63	2332	**1729**	**2.83**	**2515**	—	—	—	—	—	—
2500	1642	2.63	2333	**1704**	**2.84**	**2523**	—	—	—	—	—	—	—	—	—
2600	1677	2.85	2527	—	—	—	—	—	—	—	—	—	—	—	—
2700	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2800	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2900	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
3000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

LEGEND

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

*Motor drive range: 1300 to 1685 rpm. All other rpms require a field-supplied drive.

NOTES:
1. **Boldface** indicates field-supplied drive is required.
2. Maximum continuous bhp is 2.90.
3. See page 36 for general fan performance notes.

Table 22 — Fan Performance 580F036 — Horizontal Discharge Units, Standard Motor

STANDARD MOTOR (DIRECT DRIVE)												
Airflow (Cfm)	Low Speed						High Speed					
	208 V			230, 460, 575 V			208 V			230, 460, 575 V		
	ESP	Bhp	Watts	ESP	Bhp	Watts	ESP	Bhp	Watts	ESP	Bhp	Watts
900	0.54	0.21	253	0.57	0.23	277	0.55	0.26	307	0.60	0.31	363
1000	0.49	0.23	270	0.51	0.25	292	0.52	0.27	321	0.53	0.32	374
1100	0.43	0.24	287	0.45	0.26	307	0.46	0.28	335	0.49	0.33	385
1200	0.39	0.26	304	0.40	0.27	323	0.38	0.29	349	0.43	0.34	397
1300	0.33	0.27	321	0.35	0.29	338	0.35	0.31	364	0.36	0.34	408
1400	0.26	0.29	338	0.28	0.30	354	0.29	0.32	378	—	—	—
1500	0.21	0.30	355	0.23	0.31	369	0.24	0.33	392	—	—	—

LEGEND

Bhp — Brake Horsepower Input to Fan
ESP — External Static Pressure (in. wg)

See page 36 for general fan performance notes.

Table 23 — Fan Performance 580F036 — 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
900	**607**	**0.14**	**142**	745	0.22	221	856	0.31	304	952	0.39	393	1037	0.49	485
1000	**640**	**0.18**	**174**	775	0.26	261	884	0.35	351	978	0.45	446	**1062**	**0.55**	**545**
1100	**674**	**0.21**	**212**	805	0.31	307	912	0.41	404	1005	0.51	506	**1089**	**0.61**	**611**
1200	708	0.26	256	836	0.36	359	941	0.47	464	1033	0.57	572	**1116**	**0.69**	**683**
1300	743	0.31	307	868	0.42	417	971	0.53	530	**1062**	**0.65**	**645**	**1143**	**0.77**	**764**
1400	780	0.37	364	900	0.49	483	1002	0.61	603	**1091**	**0.73**	**726**	**1172**	**0.86**	**851**
1500	816	0.43	428	934	0.56	556	1033	0.69	685	**1121**	**0.82**	**815**	**1201**	**0.95**	**947**

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
900	**1114**	**0.59**	**582**	**1186**	**0.69**	**684**	**1253**	**0.79**	**789**	**1316**	**0.90**	**898**	**1375**	**1.02**	**1010**
1000	**1139**	**0.65**	**648**	**1210**	**0.76**	**754**	**1277**	**0.87**	**865**	**1340**	**0.98**	**979**	**1399**	**1.10**	**1097**
1100	**1165**	**0.72**	**720**	**1236**	**0.84**	**832**	**1302**	**0.95**	**948**	**1364**	**1.07**	**1068**	**1423**	**1.20**	**1191**
1200	**1191**	**0.80**	**799**	**1261**	**0.92**	**917**	**1327**	**1.04**	**1039**	**1389**	**1.17**	**1165**	—	—	—
1300	**1218**	**0.89**	**885**	**1288**	**1.02**	**1010**	**1353**	**1.14**	**1138**	—	—	—	—	—	—
1400	**1246**	**0.99**	**980**	**1315**	**1.12**	**1111**	—	—	—	—	—	—	—	—	—
1500	**1274**	**1.09**	**1083**	—	—	—	—	—	—	—	—	—	—	—	—

LEGEND

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

*Motor drive range: 685 to 1045 rpm. All other rpms require a field-supplied drive.

NOTES:
1. **Boldface** indicates field-supplied drive is required.
2. Maximum continuous bhp is 1.20.
3. See page 36 for general fan performance notes.

Table 24 — Fan Performance 580F036 — 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
900	**607**	**0.14**	**142**	**745**	**0.22**	**221**	**856**	**0.31**	**304**	**952**	**0.39**	**393**	**1037**	**0.49**	**485**
1000	**640**	**0.18**	**174**	**775**	**0.26**	**261**	**884**	**0.35**	**351**	**978**	**0.45**	**446**	**1062**	**0.55**	**545**
1100	**674**	**0.21**	**212**	**805**	**0.31**	**307**	**912**	**0.41**	**404**	**1005**	**0.51**	**506**	1089	0.61	611
1200	**708**	**0.26**	**256**	**836**	**0.36**	**359**	**941**	**0.47**	**464**	**1033**	**0.57**	**572**	1116	0.69	683
1300	**743**	**0.31**	**307**	**868**	**0.42**	**417**	**971**	**0.53**	**530**	**1062**	**0.65**	**645**	1143	0.77	764
1400	**780**	**0.37**	**364**	**900**	**0.49**	**483**	**1002**	**0.61**	**603**	1091	0.73	726	1172	0.86	851
1500	**816**	**0.43**	**428**	**934**	**0.56**	**556**	**1033**	**0.69**	**685**	1121	0.82	815	1201	0.95	947

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
900	1114	0.59	582	1186	0.69	684	1253	0.79	789	1316	0.90	898	1375	1.02	1010
1000	1139	0.65	648	1210	0.76	754	1277	0.87	865	1340	0.98	979	1399	1.10	1097
1100	1165	0.72	720	1236	0.84	832	1302	0.95	948	1364	1.07	1068	1423	1.20	1191
1200	1191	0.80	799	1261	0.92	917	1327	1.04	1039	1389	1.17	1165	1448	1.30	1293
1300	1218	0.89	885	1288	1.02	1010	1353	1.14	1138	1414	1.28	1270	**1473**	**1.41**	**1404**
1400	1246	0.99	980	1315	1.12	1111	1379	1.25	1246	1440	1.39	1383	**1499**	**1.53**	**1523**
1500	1274	1.09	1083	1342	1.23	1221	1406	1.37	1362	**1467**	**1.51**	**1505**	**1525**	**1.66**	**1652**

LEGEND

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

*Motor drive range: 1075 to 1455 rpm. All other rpms require a field-supplied drive.

NOTES:
1. **Boldface** indicates field-supplied drive is required.
2. Maximum continuous bhp is 2.40.
3. See page 36 for general fan performance notes.

Table 25 — Fan Performance 580F048 — Horizontal Discharge Units, Standard Motor

STANDARD MOTOR (DIRECT DRIVE)												
Airflow (Cfm)	Low Speed						High Speed					
	208 V			230, 460, 575 V			208 V			230, 460, 575 V		
	ESP	Bhp	Watts	ESP	Bhp	Watts	ESP	Bhp	Watts	ESP	Bhp	Watts
1200	0.75	0.41	458	0.81	0.45	506	0.87	0.51	572	0.92	0.56	632
1300	0.68	0.42	471	0.74	0.46	521	0.79	0.52	589	0.85	0.58	651
1400	0.60	0.45	503	0.66	0.49	556	0.71	0.54	616	0.77	0.60	681
1500	0.51	0.47	536	0.58	0.52	593	0.64	0.56	631	0.70	0.62	698
1600	0.42	0.49	557	0.49	0.54	616	0.56	0.58	654	0.63	0.64	723
1700	0.32	0.52	584	0.39	0.57	646	0.48	0.60	678	0.55	0.66	750
1800	0.21	0.54	610	0.29	0.60	674	0.41	0.62	698	0.48	0.68	772
1900	0.09	0.56	629	0.18	0.62	696	0.33	0.64	720	0.41	0.70	796
2000	—	—	—	0.06	0.65	731	0.26	0.66	744	0.33	0.73	823

LEGEND

Bhp — Brake Horsepower Input to Fan
ESP — External Static Pressure (in. wg)

See page 36 for general fan performance notes.

Table 26 — Fan Performance 580F048 — 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
1200	**643**	**0.23**	**234**	**762**	**0.34**	**343**	859	0.46	458	944	0.58	579	1020	0.71	705
1300	**675**	**0.28**	**277**	790	0.40	394	886	0.52	517	969	0.65	644	1044	0.78	777
1400	**707**	**0.33**	**326**	819	0.45	452	913	0.58	581	996	0.72	716	1070	0.86	855
1500	**740**	**0.38**	**382**	849	0.52	515	941	0.66	653	1023	0.80	795	1096	0.95	941
1600	773	0.45	444	879	0.59	586	970	0.73	731	1050	0.88	880	1123	1.04	1034
1700	807	0.52	513	910	0.67	663	999	0.82	817	1078	0.98	973	1150	1.14	1134
1800	841	0.59	589	942	0.75	749	1029	0.91	910	1106	1.08	1074	—	—	—
1900	875	0.68	674	974	0.85	842	1059	1.02	1012	1135	1.19	1184	—	—	—
2000	910	0.77	767	1006	0.95	944	1090	1.13	1122	—	—	—	—	—	—

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
1200	1089	0.84	837	1153	0.98	974	**1213**	**1.12**	**1115**	—	—	—	—	—	—
1300	1113	0.92	915	**1177**	**1.06**	**1058**	—	—	—	—	—	—	—	—	—
1400	1138	1.01	1000	**1201**	**1.15**	**1149**	—	—	—	—	—	—	—	—	—
1500	1163	1.10	1092	—	—	—	—	—	—	—	—	—	—	—	—
1600	**1189**	**1.20**	**1191**	—	—	—	—	—	—	—	—	—	—	—	—
1700	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
1800	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
1900	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

LEGEND

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

*Motor drive range: 770 to 1175 rpm. All other rpms require a field-supplied drive.

NOTES:

1. **Boldface** indicates field-supplied drive is required.
2. Maximum continuous bhp is 1.20.
3. See page 36 for general fan performance notes.

Table 27 — Fan Performance 580F048 — 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
1200	**643**	**0.23**	**234**	**762**	**0.34**	**343**	**859**	**0.46**	**458**	**944**	**0.58**	**579**	**1020**	**0.71**	**705**
1300	**675**	**0.28**	**277**	**790**	**0.40**	**394**	**886**	**0.52**	**517**	**969**	**0.65**	**644**	**1044**	**0.78**	**777**
1400	**707**	**0.33**	**326**	**819**	**0.45**	**452**	**913**	**0.58**	**581**	**996**	**0.72**	**716**	**1070**	**0.86**	**855**
1500	**740**	**0.38**	**382**	**849**	**0.52**	**515**	**941**	**0.66**	**653**	**1023**	**0.80**	**795**	1096	0.95	941
1600	**773**	**0.45**	**444**	**879**	**0.59**	**586**	**970**	**0.73**	**731**	**1050**	**0.88**	**880**	1123	1.04	1034
1700	**807**	**0.52**	**513**	**910**	**0.67**	**663**	**999**	**0.82**	**817**	1078	0.98	973	1150	1.14	1134
1800	**841**	**0.59**	**589**	**942**	**0.75**	**749**	**1029**	**0.91**	**910**	1106	1.08	1074	1177	1.25	1242
1900	**875**	**0.68**	**674**	**974**	**0.85**	**842**	**1059**	**1.02**	**1012**	1135	1.19	1184	1205	1.37	1360
2000	**910**	**0.77**	**767**	**1006**	**0.95**	**944**	1090	1.13	1122	1165	1.31	1302	1234	1.49	1485

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
1200	1089	0.84	837	1153	0.98	974	1213	1.12	1115	1270	1.27	1262	1324	1.42	1413
1300	1113	0.92	915	1177	1.06	1058	1237	1.21	1205	1293	1.36	1358	1347	1.52	1514
1400	1138	1.01	1000	1201	1.15	1149	1261	1.31	1303	1317	1.47	1461	1370	1.63	1623
1500	1163	1.10	1092	1226	1.25	1247	1285	1.41	1407	1341	1.58	1571	1394	1.75	1740
1600	1189	1.20	1191	1252	1.36	1353	1310	1.53	1520	1365	1.70	1690	1418	1.87	1865
1700	1216	1.31	1299	1277	1.48	1468	1335	1.65	1640	1390	1.83	1817	1442	2.01	1998
1800	1242	1.42	1414	1303	1.60	1590	1361	1.78	1770	1415	1.96	1953	**1467**	**2.15**	**2140**
1900	1270	1.55	1538	1330	1.73	1721	1387	1.92	1908	1441	2.11	2098	**1493**	**2.30**	**2292**
2000	1297	1.68	1672	1357	1.87	1862	1414	2.07	2055	**1467**	**2.26**	**2252**	—	—	—

LEGEND

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

*Motor drive range: 1075 to 1455 rpm. All other rpms require a field-supplied drive.

NOTES:
1. **Boldface** indicates field-supplied drive is required.
2. Maximum continuous bhp is 2.40.
3. See page 36 for general fan performance notes.

Table 28 — Fan Performance 580F060 — Horizontal Discharge Units, Standard Motor

Airflow (Cfm)	STANDARD MOTOR (DIRECT DRIVE)																	
	Low Speed						Medium Speed						High Speed					
	208V			230, 460, 575 V			208 V			230, 460, 575 V			208 V			230, 460, 575 V		
	ESP	Bhp	Watts	ESP	Bhp	Watts	ESP	Bhp	Watts	ESP	Bhp	Watts	ESP	Bhp	Watts	ESP	Bhp	Watts
1500	0.74	0.67	750	1.06	0.71	791	1.07	0.70	782	1.27	0.76	845	1.26	0.79	875	1.33	0.85	949
1600	0.54	0.70	780	0.90	0.74	824	0.92	0.74	821	1.13	0.79	883	1.14	0.82	913	1.22	0.89	988
1700	0.34	0.73	810	0.75	0.77	857	0.77	0.77	861	1.00	0.83	921	1.01	0.85	950	1.11	0.92	1027
1800	0.14	0.75	839	0.59	0.80	891	0.62	0.81	900	0.87	0.86	959	0.89	0.88	988	1.00	0.96	1066
1900	—	—	—	0.44	0.83	924	0.47	0.84	940	0.74	0.90	997	0.77	0.92	1025	0.89	0.99	1105
2000	—	—	—	0.28	0.86	957	0.32	0.88	979	0.61	0.93	1035	0.64	0.95	1063	0.78	1.03	1144
2100	—	—	—	0.13	0.89	990	0.17	0.91	1018	0.48	0.96	1073	0.51	0.99	1101	0.67	1.06	1183
2200	—	—	—	—	—	—	0.02	0.95	1058	0.35	1.00	1111	0.39	1.02	1138	0.56	1.10	1222
2300	—	—	—	—	—	—	—	—	—	0.22	1.03	1149	0.26	1.06	1176	0.45	1.13	1261
2400	—	—	—	—	—	—	—	—	—	0.09	1.07	1187	0.14	1.09	1213	0.34	1.17	1300
2500	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.23	1.20	1340

LEGEND

Bhp — Brake Horsepower Input to Fan
ESP — External Static Pressure (in. wg)

See page 36 for general fan performance notes.

Table 29 — Fan Performance 580F060 — Single-Phase, 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
1500	**790**	**0.40**	**353**	896	0.53	470	990	0.67	599	1074	0.83	738	1151	1.00	886
1600	**828**	**0.46**	**413**	930	0.60	535	1021	0.75	669	1103	0.91	812	1179	1.09	965
1700	**866**	**0.54**	**479**	964	0.68	607	1053	0.84	746	1133	1.01	894	**1207**	**1.18**	**1051**
1800	905	0.62	553	1000	0.77	687	1085	0.94	831	1164	1.11	984	**1236**	**1.29**	**1146**
1900	944	0.71	635	1036	0.87	775	1119	1.04	924	**1195**	**1.22**	**1082**	—	—	—
2000	984	0.82	725	1072	0.98	871	1153	1.15	1025	—	—	—	—	—	—
2100	1024	0.93	824	1109	1.10	976	1188	1.28	1136	—	—	—	—	—	—
2200	1064	1.05	932	1147	1.23	1090	—	—	—	—	—	—	—	—	—
2300	1105	1.18	1050	—	—	—	—	—	—	—	—	—	—	—	—
2400	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2500	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

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
1500	**1223**	**1.18**	**1045**	—	—	—	—	—	—	—	—	—	—	—	—
1600	**1249**	**1.27**	**1127**	—	—	—	—	—	—	—	—	—	—	—	—
1700	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
1800	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
1900	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2100	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2200	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2300	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2400	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2500	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

LEGEND

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

*Motor drive range: 875 to 1192 rpm. All other rpms require a field-supplied drive.

NOTES:
1. **Boldface** indicates field-supplied drive is required.
2. Maximum continuous bhp is 1.30.
3. See page 36 for general fan performance notes.

Table 30 — Fan Performance 580F060 — Three-Phase, 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
1500	**790**	**0.40**	**353**	896	0.53	470	990	0.67	599	1074	0.83	738	1151	1.00	886
1600	**828**	**0.46**	**413**	930	0.60	535	1021	0.75	669	1103	0.91	812	1179	1.09	965
1700	**866**	**0.54**	**479**	964	0.68	607	1053	0.84	746	1133	1.01	894	**1207**	**1.18**	**1051**
1800	905	0.62	553	1000	0.77	687	1085	0.94	831	1164	1.11	984	**1236**	**1.29**	**1146**
1900	944	0.71	635	1036	0.87	775	1119	1.04	924	**1195**	**1.22**	**1082**	**1266**	**1.41**	**1248**
2000	984	0.82	725	1072	0.98	871	1153	1.15	1025	**1227**	**1.34**	**1189**	**1297**	**1.53**	**1360**
2100	1024	0.93	824	1109	1.10	976	1188	1.28	1136	**1260**	**1.47**	**1305**	**1328**	**1.67**	**1481**
2200	1064	1.05	932	1147	1.23	1090	**1223**	**1.41**	**1256**	**1294**	**1.61**	**1430**	**1360**	**1.81**	**1612**
2300	1105	1.18	1050	1185	1.37	1215	**1259**	**1.56**	**1386**	**1328**	**1.76**	**1566**	**1393**	**1.97**	**1752**
2400	1146	1.33	1179	**1223**	**1.52**	**1349**	**1295**	**1.72**	**1527**	**1362**	**1.93**	**1711**	**1426**	**2.14**	**1903**
2500	1187	1.48	1317	**1262**	**1.68**	**1494**	**1332**	**1.89**	**1677**	**1398**	**2.10**	**1868**	**1460**	**2.33**	**2065**

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
1500	**1223**	**1.18**	**1045**	**1291**	**1.36**	**1212**	**1355**	**1.56**	**1388**	**1415**	**1.77**	**1573**	**1473**	**1.99**	**1765**
1600	**1249**	**1.27**	**1127**	**1316**	**1.46**	**1298**	**1379**	**1.66**	**1478**	**1439**	**1.87**	**1665**	**1496**	**2.09**	**1860**
1700	**1277**	**1.37**	**1217**	**1342**	**1.57**	**1392**	**1404**	**1.77**	**1575**	**1463**	**1.99**	**1766**	**1520**	**2.21**	**1965**
1800	**1305**	**1.48**	**1316**	**1369**	**1.68**	**1495**	**1430**	**1.89**	**1681**	**1489**	**2.11**	**1876**	**1545**	**2.34**	**2078**
1900	**1333**	**1.60**	**1423**	**1397**	**1.81**	**1606**	**1457**	**2.02**	**1797**	**1514**	**2.25**	**1995**	—	—	—
2000	**1363**	**1.73**	**1540**	**1425**	**1.94**	**1727**	**1484**	**2.16**	**1922**	**1541**	**2.39**	**2124**	—	—	—
2100	**1393**	**1.87**	**1665**	**1454**	**2.09**	**1857**	**1512**	**2.31**	**2056**	—	—	—	—	—	—
2200	**1424**	**2.03**	**1801**	**1484**	**2.25**	**1997**	—	—	—	—	—	—	—	—	—
2300	**1455**	**2.19**	**1946**	—	—	—	—	—	—	—	—	—	—	—	—
2400	**1487**	**2.37**	**2103**	—	—	—	—	—	—	—	—	—	—	—	—
2500	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

LEGEND

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

*Motor drive range: 878 to 1192 rpm. All other rpms require a field-supplied drive.

NOTES:
1. **Boldface** indicates field-supplied drive is required.
2. Maximum continuous bhp is 2.40.
3. See page 36 for general fan performance notes.

Table 31 — Fan Performance 580F060 — 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
1500	**790**	**0.40**	**353**	**896**	**0.53**	**470**	**990**	**0.67**	**599**	**1074**	**0.83**	**738**	**1151**	**1.00**	**886**
1600	**828**	**0.46**	**413**	**930**	**0.60**	**535**	**1021**	**0.75**	**669**	**1103**	**0.91**	**812**	**1179**	**1.09**	**965**
1700	**866**	**0.54**	**479**	**964**	**0.68**	**607**	**1053**	**0.84**	**746**	**1133**	**1.01**	**894**	**1207**	**1.18**	**1051**
1800	**905**	**0.62**	**553**	**1000**	**0.77**	**687**	**1085**	**0.94**	**831**	**1164**	**1.11**	**984**	**1236**	**1.29**	**1146**
1900	**944**	**0.71**	**635**	**1036**	**0.87**	**775**	**1119**	**1.04**	**924**	**1195**	**1.22**	**1082**	**1266**	**1.41**	**1248**
2000	**984**	**0.82**	**725**	**1072**	**0.98**	**871**	**1153**	**1.15**	**1025**	**1227**	**1.34**	**1189**	**1297**	**1.53**	**1360**
2100	**1024**	**0.93**	**824**	**1109**	**1.10**	**976**	**1188**	**1.28**	**1136**	**1260**	**1.47**	**1305**	1328	1.67	1481
2200	**1064**	**1.05**	**932**	**1147**	**1.23**	**1090**	**1223**	**1.41**	**1256**	**1294**	**1.61**	**1430**	1360	1.81	1612
2300	**1105**	**1.18**	**1050**	**1185**	**1.37**	**1215**	**1259**	**1.56**	**1386**	1328	1.76	1566	1393	1.97	1752
2400	**1146**	**1.33**	**1179**	**1223**	**1.52**	**1349**	**1295**	**1.72**	**1527**	1362	1.93	1711	1426	2.14	1903
2500	**1187**	**1.48**	**1317**	**1262**	**1.68**	**1494**	1332	1.89	1677	1398	2.10	1868	1460	2.33	2065

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
1500	**1223**	**1.18**	**1045**	**1291**	**1.36**	**1212**	1355	1.56	1388	1415	1.77	1573	1473	1.99	1765
1600	**1249**	**1.27**	**1127**	1316	1.46	1298	1379	1.66	1478	1439	1.87	1665	1496	2.09	1860
1700	**1277**	**1.37**	**1217**	1342	1.57	1392	1404	1.77	1575	1463	1.99	1766	1520	2.21	1965
1800	1305	1.48	1316	1369	1.68	1495	1430	1.89	1681	1489	2.11	1876	1545	2.34	2078
1900	1333	1.60	1423	1397	1.81	1606	1457	2.02	1797	1514	2.25	1995	1570	2.48	2200
2000	1363	1.73	1540	1425	1.94	1727	1484	2.16	1922	1541	2.39	2124	1596	2.63	2333
2100	1393	1.87	1665	1454	2.09	1857	1512	2.31	2056	1568	2.55	2262	1622	2.79	2475
2200	1424	2.03	1801	1484	2.25	1997	1541	2.48	2200	1596	2.71	2411	—	—	—
2300	1455	2.19	1946	1514	2.42	2147	1571	2.65	2355	1625	2.89	2570	—	—	—
2400	1487	2.37	2103	1545	2.60	2308	1601	2.84	2521	—	—	—	—	—	—
2500	1520	2.56	2269	1577	2.79	2480	—	—	—	—	—	—	—	—	—

LEGEND

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

*Motor drive range: 1300 to 1685 rpm. All other rpms require a field-supplied drive.

NOTES:
1. **Boldface** indicates field-supplied drive is required.
2. Maximum continuous bhp is 2.90.
3. See page 36 for general fan performance notes.

Table 32 — Fan Performance 580F072,073 — 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
1800	**919**	**0.63**	**561**	**1010**	**0.75**	**663**	1095	0.87	771	1174	1.00	886	1250	1.14	1008
1900	**960**	**0.73**	**648**	**1047**	**0.85**	**754**	1129	0.98	867	1206	1.11	986	1279	1.25	1111
2000	**1001**	**0.84**	**744**	1085	0.96	855	1163	1.09	972	1238	1.23	1095	1309	1.38	1224
2100	**1043**	**0.96**	**850**	1123	1.09	965	1199	1.22	1086	1271	1.37	1213	1340	1.52	1346
2200	1085	1.09	966	1162	1.22	1086	1235	1.36	1211	1305	1.51	1342	1372	1.67	1479
2300	1127	1.23	1092	1201	1.37	1217	1272	1.52	1347	1340	1.67	1482	1405	1.83	1623
2400	1169	1.38	1229	1241	1.53	1359	1310	1.68	1493	1375	1.84	1633	1439	2.00	1778
2500	1212	1.55	1378	1281	1.70	1513	1348	1.86	1652	1412	2.02	1796	**1473**	**2.19**	**1945**
2600	1255	1.73	1539	1322	1.89	1678	1386	2.05	1822	1448	2.22	1970	**1508**	**2.39**	**2124**
2700	1298	1.93	1713	1363	2.09	1857	1425	2.26	2005	—	—	—	—	—	—
2800	1341	2.14	1899	1404	2.31	2048	—	—	—	—	—	—	—	—	—
2900	1384	2.36	2099	—	—	—	—	—	—	—	—	—	—	—	—
3000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

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
1800	1321	1.28	1137	1390	1.43	1273	1455	1.59	1415	**1518**	**1.76**	**1563**	**1579**	**1.93**	**1718**
1900	1348	1.40	1243	1415	1.56	1381	**1479**	**1.72**	**1526**	**1541**	**1.89**	**1677**	**1601**	**2.06**	**1834**
2000	1377	1.53	1359	1442	1.69	1500	**1505**	**1.86**	**1648**	**1565**	**2.03**	**1801**	**1624**	**2.21**	**1961**
2100	1406	1.67	1485	**1470**	**1.83**	**1629**	**1531**	**2.00**	**1780**	**1591**	**2.18**	**1936**	**1648**	**2.36**	**2098**
2200	1437	1.83	1621	**1499**	**1.99**	**1769**	**1559**	**2.16**	**1923**	**1617**	**2.34**	**2082**	—	—	—
2300	**1468**	**1.99**	**1769**	**1529**	**2.16**	**1920**	**1587**	**2.34**	**2077**	—	—	—	—	—	—
2400	**1500**	**2.17**	**1928**	**1559**	**2.35**	**2083**	—	—	—	—	—	—	—	—	—
2500	**1533**	**2.36**	**2098**	—	—	—	—	—	—	—	—	—	—	—	—
2600	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2700	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2800	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2900	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
3000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

LEGEND

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

*Motor drive range: 1070 to 1460 rpm. All other rpms require a field-supplied drive.

NOTES:
1. **Boldface** indicates field-supplied drive is required.
2. Maximum continuous bhp is 2.40.
3. See page 36 for general fan performance notes.

Table 33 — Fan Performance 580F072,073 — 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
1800	**919**	**0.63**	**561**	**1010**	**0.75**	**663**	**1095**	**0.87**	**771**	**1174**	**1.00**	**886**	**1250**	**1.14**	**1008**
1900	**960**	**0.73**	**648**	**1047**	**0.85**	**754**	**1129**	**0.98**	**867**	**1206**	**1.11**	**986**	**1279**	**1.25**	**1111**
2000	**1001**	**0.84**	**744**	**1085**	**0.96**	**855**	**1163**	**1.09**	**972**	**1238**	**1.23**	**1095**	1309	1.38	1224
2100	**1043**	**0.96**	**850**	**1123**	**1.09**	**965**	**1199**	**1.22**	**1086**	**1271**	**1.37**	**1213**	1340	1.52	1346
2200	**1085**	**1.09**	**966**	**1162**	**1.22**	**1086**	**1235**	**1.36**	**1211**	1305	1.51	1342	1372	1.67	1479
2300	**1127**	**1.23**	**1092**	**1201**	**1.37**	**1217**	**1272**	**1.52**	**1347**	1340	1.67	1482	1405	1.83	1623
2400	**1169**	**1.38**	**1229**	**1241**	**1.53**	**1359**	1310	1.68	1493	1375	1.84	1633	1439	2.00	1778
2500	**1212**	**1.55**	**1378**	**1281**	**1.70**	**1513**	1348	1.86	1652	1412	2.02	1796	1473	2.19	1945
2600	**1255**	**1.73**	**1539**	1322	1.89	1678	1386	2.05	1822	1448	2.22	1970	1508	2.39	2124
2700	**1298**	**1.93**	**1713**	1363	2.09	1857	1425	2.26	2005	1485	2.43	2158	1544	2.61	2315
2800	1341	2.14	1899	1404	2.31	2048	1464	2.48	2201	1523	2.66	2358	1580	2.84	2520
2900	1384	2.36	2099	1445	2.54	2253	1504	2.71	2410	1561	2.90	2572	—	—	—
3000	1428	2.60	2313	1487	2.78	2471	—	—	—	—	—	—	—	—	—

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
1800	1321	1.28	1137	1390	1.43	1273	1455	1.59	1415	1518	1.76	1563	1579	1.93	1718
1900	1348	1.40	1243	1415	1.56	1381	1479	1.72	1526	1541	1.89	1677	1601	2.06	1834
2000	1377	1.53	1359	1442	1.69	1500	1505	1.86	1648	1565	2.03	1801	1624	2.21	1961
2100	1406	1.67	1485	1470	1.83	1629	1531	2.00	1780	1591	2.18	1936	1648	2.36	2098
2200	1437	1.83	1621	1499	1.99	1769	1559	2.16	1923	1617	2.34	2082	1673	2.53	2246
2300	1468	1.99	1769	1529	2.16	1920	1587	2.34	2077	1644	2.52	2239	**1699**	**2.71**	**2406**
2400	1500	2.17	1928	1559	2.35	2083	1616	2.53	2243	1672	2.71	2408	**1726**	**2.90**	**2579**
2500	1533	2.36	2098	1591	2.54	2257	1647	2.73	2421	—	—	—	—	—	—
2600	1566	2.57	2281	1623	2.75	2444	—	—	—	—	—	—	—	—	—
2700	1600	2.79	2477	—	—	—	—	—	—	—	—	—	—	—	—
2800	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2900	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
3000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

LEGEND

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

*Motor drive range: 1300 to 1685 rpm. All other rpms require a field-supplied drive.

NOTES:

1. **Boldface** indicates field-supplied drive is required.
2. Maximum continuous bhp is 2.90.
3. See below for general fan performance notes.

GENERAL FAN PERFORMANCE NOTES

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 Table 9 — Motor Data 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.

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 the servicing refrigerant system.
2. Do not operate the compressor or provide any electric power to the unit unless the compressor terminal cover is in place and secured.
3. Do not remove the compressor terminal cover until all electrical sources are disconnected.
4. Relieve all pressure from the system before touching or disturbing anything inside the compressor terminal box if refrigerant leak is suspected around the compressor terminals.
5. Never attempt to repair a soldered connection while the refrigerant system is under pressure.
6. Do not use torch to remove any component. The system contains oil and refrigerant under pressure. To remove a component, wear protective goggles and proceed as follows:
   a. Shut off gas and then electrical power to the unit. Install lockout tag.
   b. Relieve all pressure from the system using both high-pressure and low-pressure ports.
   c. Cut the component connection tubing with a tubing cutter, and remove the component from the unit.
   d. Carefully unsweat the 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, the 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 an electronic leak detector, halide torch, or liquid-soap solution.
   c. Inspect all field- and factory-wiring connections. Be sure that connections are completed and tight.
   d. Inspect coil fins. If damaged during shipping and handling, carefully straighten the fins with a fin comb.
4. Verify the following conditions:
   a. Make sure that condenser fan blade is correctly positioned in the fan orifice. See Condenser-Fan Adjustment section on page 48 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 Start-Up Checklist on back page is filled out and completed.

II. RETURN-AIR FILTERS

Make sure correct filters are installed in filter tracks. See Table 1. Do not operate unit without return-air filters.

III. COMPRESSOR MOUNTING

Compressors are internally spring mounted. Do not loosen or remove compressor holddown bolts.

IV INTERNAL WIRING

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

V. 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.

VI. REFRIGERANT SERVICE PORTS

To service refrigerant service ports, remove compressor access panel. Each unit system has 4 Schrader-type service gage ports: one on the suction line, one on the liquid line, and two on the compressor discharge line. Be sure that caps on the ports are tight. One of the Schrader-type valves on the compressor discharge line is located under the low-pressure switch.

The Schrader valve on the compressor discharge line that is located under the high pressure switch does not contain a Schrader core in the valve.

VII. 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 cannot be accessed for service in the field. Ensure the plastic caps are in place and tight or the possibility of refrigerant leakage could occur.

VIII. 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 tag disconnect.
3. Reverse any two of the unit power leads.
4. Reapply power to the unit.

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 makes an elevated level of noise and does not provide cooling.

IX. COOLING

Set space thermostat to OFF position. 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, outdoor fan and evaporator motor start on closure of contactor.

Check unit charge. Refer to Service, Refrigerant Charge section, page 48.

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

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.

X. 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 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 34A and 34B for the correct orifice to use at high altitudes.

XI. HEATING

1. Purge gas supply line of air by opening union ahead of gas valve. If gas odor is detected, tighten union and wait 5 minutes before proceeding.
2. Turn on electrical supply and 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.
5. After a call for heating, the main burners should light within 5 seconds. If the burner does not light, then there is a 22-second delay before another 5-second try. If the burner still does not light, the time delay is repeated. If the burner does 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 thermostat temperature is satisfied.
8. Adjust airflow to obtain a temperature rise within the range specified on the unit nameplate.

NOTE: The default value for the evaporator-fan motor ON/OFF delay is 45 seconds. The Integrated Gas Unit 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 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. 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.

To Shut Off Unit

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

Table 34A — Altitude Compensation* — Standard Units

ELEVATION (ft)	74,000 AND 115,000 BTUH NOMINAL INPUT		150,000 BTUH NOMINAL INPUT	
	Natural Gas Orifice Size†	Liquid Propane Orifice Size†	Natural Gas Orifice Size†	Liquid Propane Orifice Size†
0-2,000	33	43	30	37
2,000	36	44	31	39
3,000	36	45	31	40
4,000	37	45	32	41
5,000	38	46	32	42
6,000	40	47	34	43
7,000	41	48	35	43
8,000	42	49	36	44
9,000	43	50	37	45
10,000	44	50	39	46
11,000	45	51	41	47
12,000	46	52	42	48
13,000	47	52	43	49
14,000	48	53	44	50

*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.
†Orifices available through your Bryant distributor.

Table 34B — Altitude Compensation* — Low NOx Units

ELEVATION (ft)	60,000 AND 90,000 BTUH NOMINAL INPUT		120,000 BTUH NOMINAL INPUT	
	Natural Gas Orifice Size†	Liquid Propane Orifice Size†	Natural Gas Orifice Size	Liquid Propane Orifice Size†
0-2,000	38	45	32	42
2,000	40	47	33	43
3,000	41	48	35	43
4,000	42	49	36	44
5,000	43	49	37	45
6,000	43	50	38	45
7,000	44	50	39	46
8,000	45	51	41	47
9,000	46	52	42	48
10,000	47	52	43	49
11,000	48	53	44	50
12,000	49	53	44	51
13,000	50	54	46	52
14,000	51	54	47	52

*As the height above sea level increases, there is less oxygen per cubic foot of air. Therefore, the input rate should be reduced at higher altitudes.
†Orifices are available through your local Bryant distributor.

XII. SAFETY RELIEF

A soft solder joint at the suction service Schrader port provides pressure relief under abnormal temperature and pressure conditions (i.e., fire in building).

XIII. 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.

XIV. 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 35 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 36, 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 37) and I/O channel status (Table 38). 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 37) and then the I/O channels (Table 38) 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.

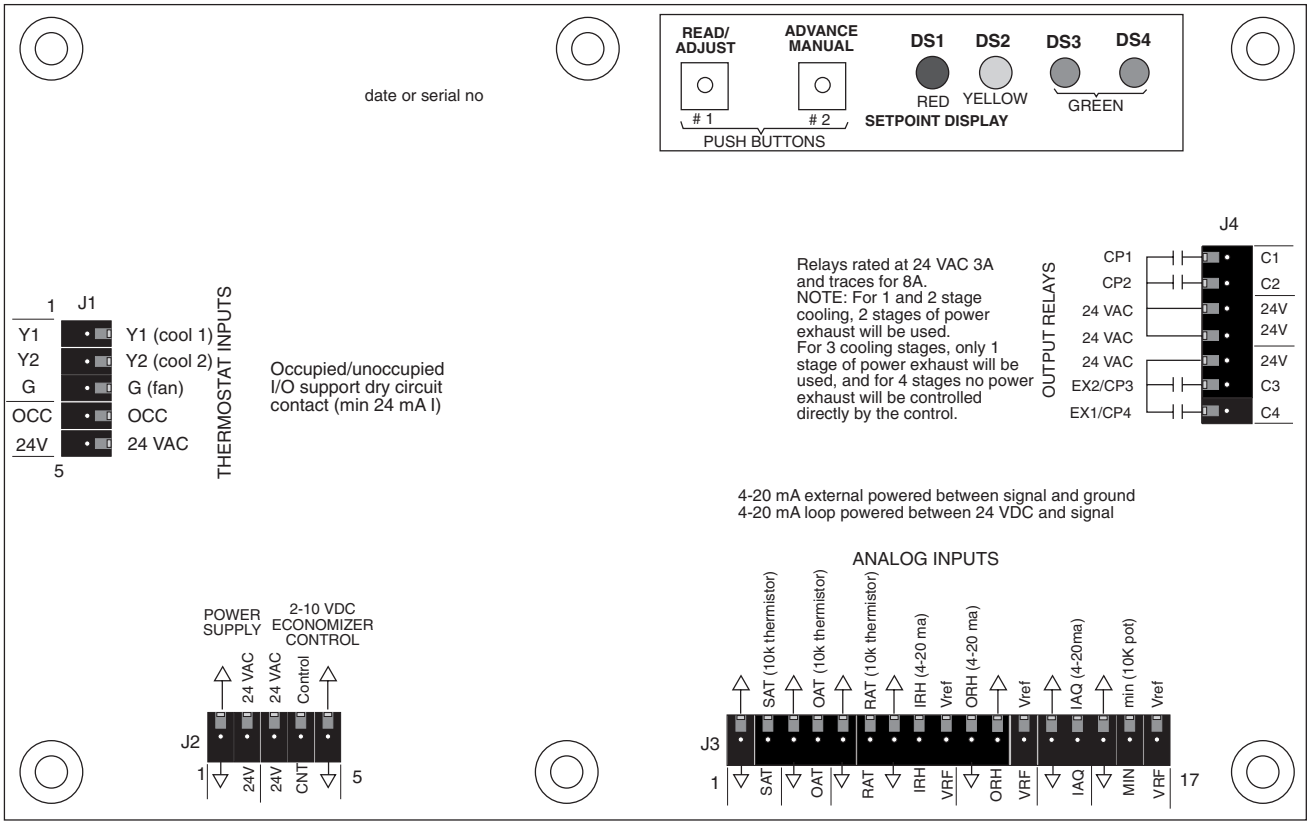


Fig. 36 — EconoMi$er+ Controller Board

Table 35 — 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 no power exhaust stages are directly controlled.

Table 36 — 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 37 — 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 38 — 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 38. 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 37 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 37) 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 38.

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 38. 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.

One 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.

XV. 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 37.

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 37 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 37 (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 outside air damper to the ventilation position. If the outside 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 37. 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 37. 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 2 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$er+ will be enabled based on the outside-air temperature. The EconoMi$er+ is shipped with an outside air temperature sensor. The outside 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 outside-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).

XVI. 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 changed 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 DAQHIGH 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 18.

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 Economi$er+

When the room temperature calls for heat through terminal W1, the indoor (evaporator) fan contactor (IFC) and heater contactor no. 1 (HC1) are energized. On units equipped for 2 stages of heat, when additional heat is needed, W2 is energized and the high-fire solenoid on the main gas valve (MGV) is energized. 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 install lockout tag to avoid shock hazard or injury from rotating parts.

I. CLEANING

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

A. Evaporator Coil

1. Turn unit power off and install lockout tag. Remove evaporator coil access panel.
2. If economizer or two-position damper is installed, remove economizer by disconnecting Molex plug and removing mounting screws.
3. Slide filters out of 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. Flush condensate pan after completion.
5. Reinstall economizer and filters.
6. Reconnect wiring.
7. 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 (Size 036)</u>

Wash coil with commercial coil cleaner. It is not necessary to remove top panel.

<u>2-Row Coils (Sizes 048-073)</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 compressor plate and compressor access panel.
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. 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.

E. Outdoor-Air Inlet Screen

Clean screen with steam or hot water and a mild detergent. Do not use disposable filters in place of screen.

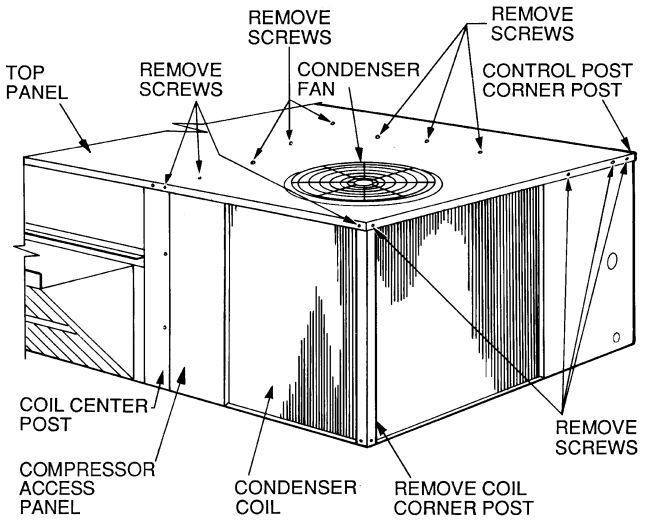


Fig. 37 — Cleaning Condenser Coil

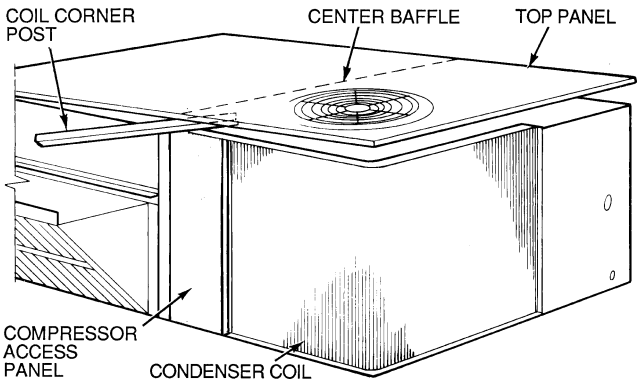


Fig. 38 — Propping Up Top Panel

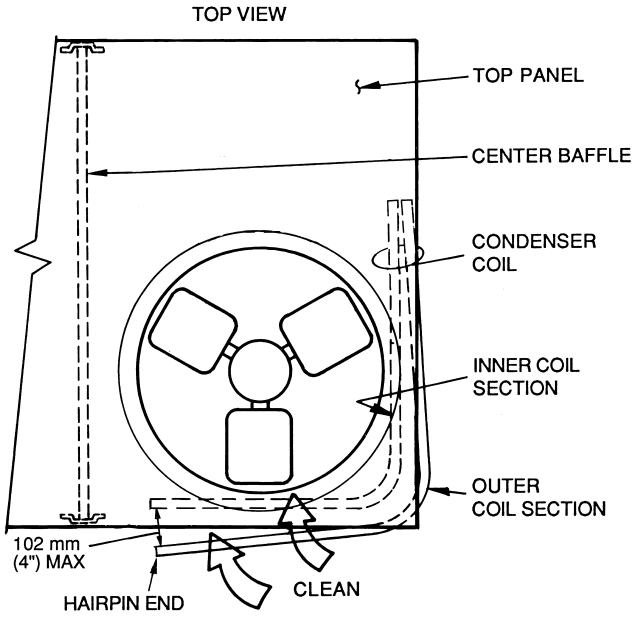


Fig. 39 — Separating Coil Sections

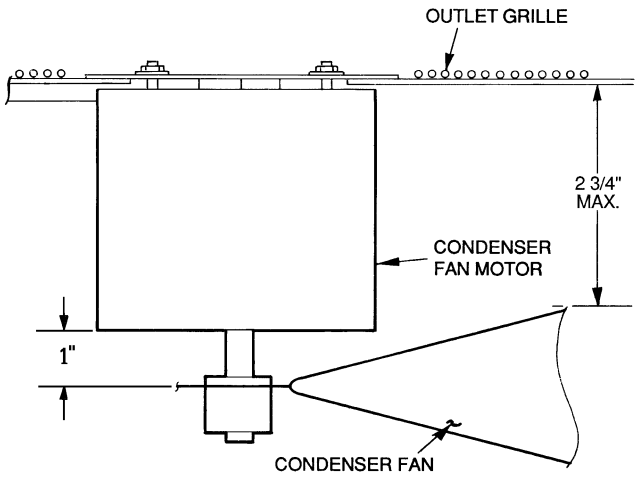


Fig. 40 — Condenser-Fan Adjustment

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 or evaporator fan motors is required.

III. 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 24 for adjustment and alignment procedures.

Check belt tension at least once each heating or cooling season or as conditions require. Adjust as required.

IV. MANUAL OUTDOOR-AIR DAMPER

If outdoor-air damper blade adjustment is required, see Manual Outdoor-Air Damper section on page 14.

V. ECONOMI$ER+ ADJUSTMENT

Refer to Optional EconoMi$er+ section on page 15.

VI. CONDENSER-FAN ADJUSTMENT (Fig. 40)

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

VII. REFRIGERANT CHARGE

Amount of refrigerant charge is listed on unit nameplate (also refer to Table 1). Compressor must run a minimum of 10 minutes before adjusting or checking charge.

Unit panels must be in place when unit is operating during charging procedure.

A. No Charge

Use standard evacuating techniques. After evacuating system, to 500 microns, weigh in the specified amount of refrigerant. (Refer to Table 1.)

B. Low-Charge Cooling

Using Cooling Charging Charts, Fig. 41-44, vary refrigerant until the conditions of the appropriate chart are met. Note the charging charts are different from type normally used. Charts are based on charging the units to the correct superheat for the various operating conditions. Accurate pressure gage and temperature sensing device are required. Do not use pocket type thermometers for measuring surface temperatures as they are not designed for this type of measurement. Connect the pressure gage to the service port on the suction line. Mount the temperature sensing device on the suction line and insulate it so that outdoor ambient temperature does not affect the reading. Indoor-air cfm must be within the normal operating range of the unit.

C. To Use Cooling Charging Chart

Take the outdoor ambient temperature and read the suction pressure gage. Refer to 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. 43)

Outdoor Temperature . . . . . 85 F
Suction Pressure . . . . . 80 psig
Suction Temperature should be . . . . . 76 F
(Suction Temperature may vary 5 F.)

VIII. 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 on page 49.
2. Remove the flue cover to inspect the heat exchanger.
3. Clean all surfaces as required using a wire brush.

IX. COMBUSTION-AIR BLOWER

Clean periodically to assure proper airflow and heating efficiency. Inspect blower wheel every fall and periodically during heating season. For the first heating season, inspect blower wheel bimonthly to determine proper cleaning frequency.

To access burner section, slide the sliding burner partition out of the unit.

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 7 screws that attach induced-draft motor housing to vestibule plate (Fig. 45).
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 the motor 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.

X. LIMIT SWITCH

Remove blower access panel (Fig. 7). Limit switch is located on the fan deck.

XI. 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). The IGC contains a self-diagnostic LED (light-emitting diode). A single LED on the IGC provides a visual display of operational or sequential problems when the power supply is uninterrupted. When a break in power occurs, the IGC will be reset (resulting in a loss of fault history) and the indoor (evaporator) fan ON/OFF times will be reset. The LED error code can be observed through the viewport. During servicing refer to the label on the control box cover or Table 39 for an explanation of LED error code descriptions.

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

Table 39 — 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	Internal Software Processor Fault

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 41-43 for additional information.

XII. MAIN BURNERS

To access burners, remove burner access panel and slide out burner partition. At the beginning of each heating season, inspect for deterioration or blockage due to corrosion or other causes. Observe the main burner flames and adjust, if necessary.

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

A. Removal and Replacement of Gas Train (Fig. 45-47)

1. Shut off manual gas valve.
2. Shut off power to unit and tag disconnect.
3. Slide out burner partition.
4. Disconnect gas piping at unit gas valve.
5. Remove wires connected to gas valve. Mark each wire.
6. Remove ignitor wires and sensor wires at the Integrated Gas Unit Controller (IGC) (see Fig. 11).
7. Remove the 2 screws that attach the burner rack to the vestibule plate (Fig. 45).
8. Slide the burner tray out of the unit (Fig. 46).
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. 47.
5. Reinstall burners on rack.
6. Reinstall burner rack as described in Removal and Replacement of Gas Train section, above.

XIII. HIGH-PRESSURE SWITCH

Located on the compressor hot gas line is a high-pressure switch containing a Schrader core depressor. This switch opens at 428 psig and closes at 320 psig. No adjustment is necessary. Refer to Table 1.

XIV. LOSS OF CHARGE SWITCH

Located on the condenser 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 Table 1.

XV. 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 Table 1.

XVI. REPLACEMENT PARTS

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

3 TON UNIT CHARGING CHART

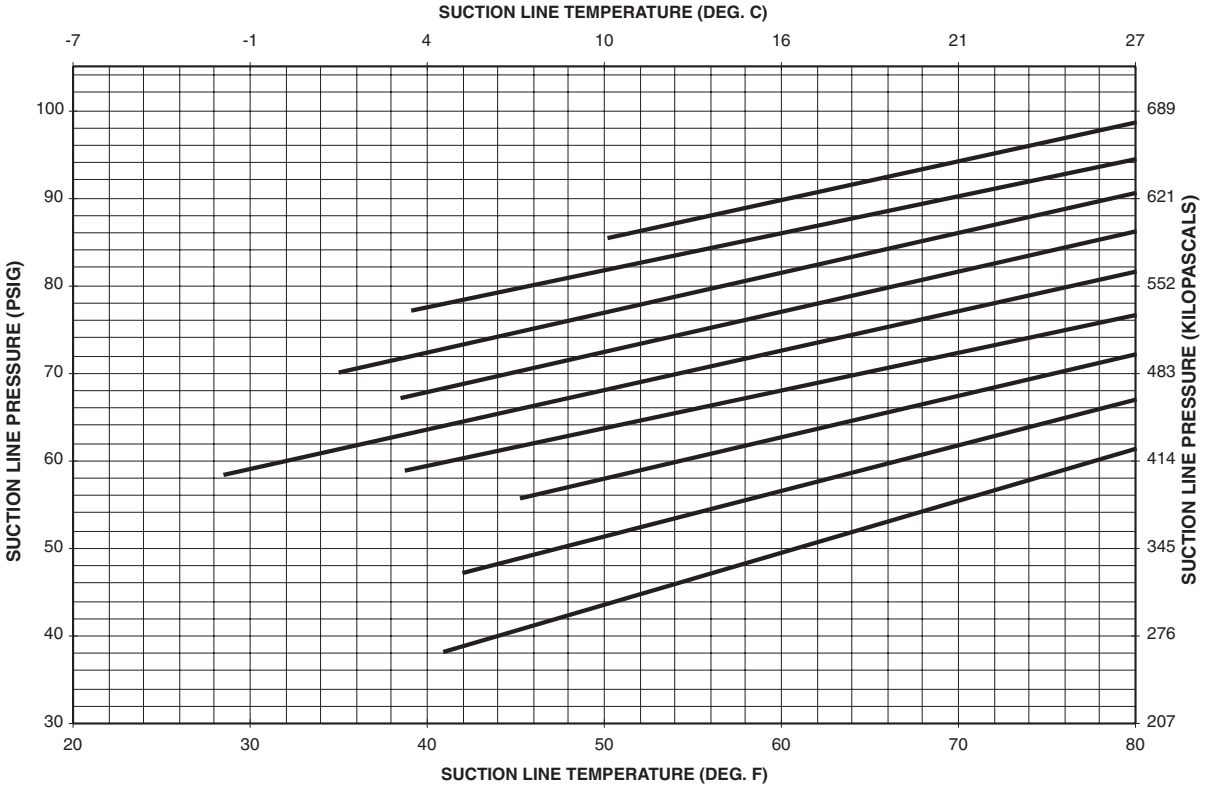


Fig. 41 — Cooling Charging Chart, 580F036

4 TON UNIT CHARGING CHART

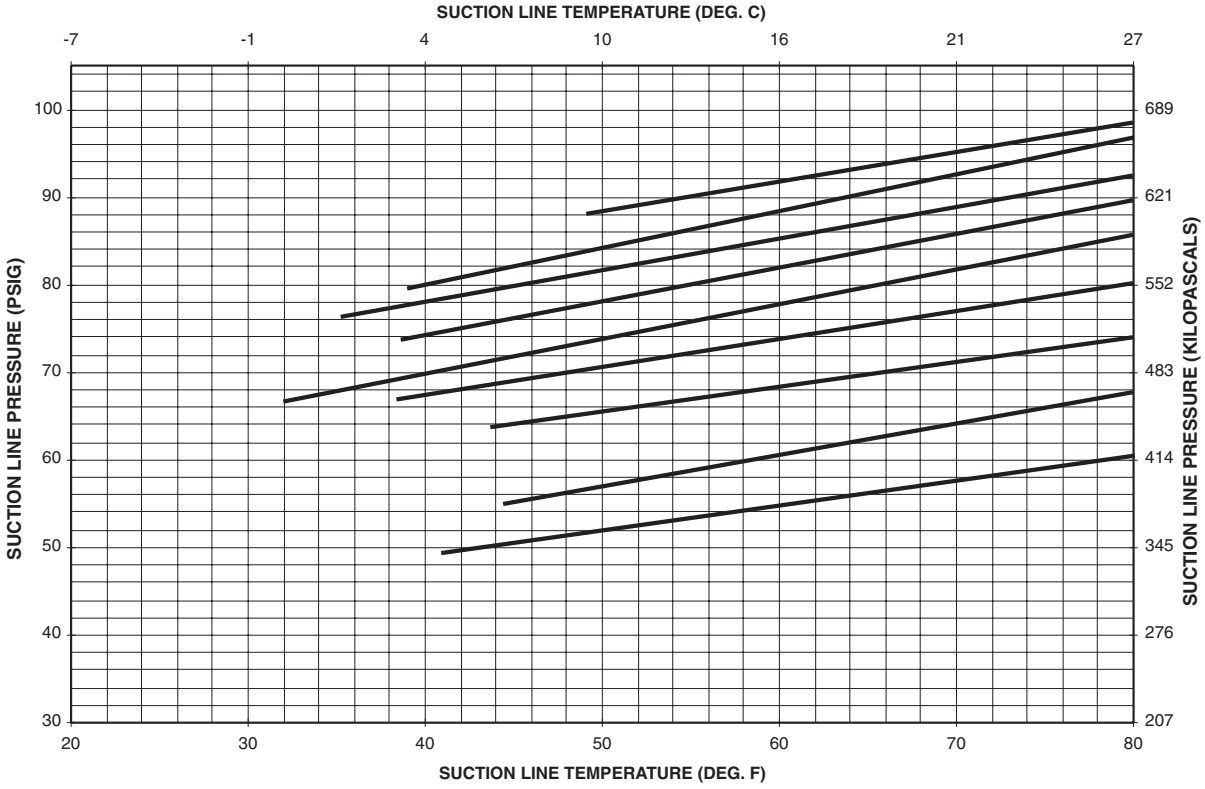


Fig. 42 — Cooling Charging Chart, 580F048

5 TON UNIT CHARGING CHART

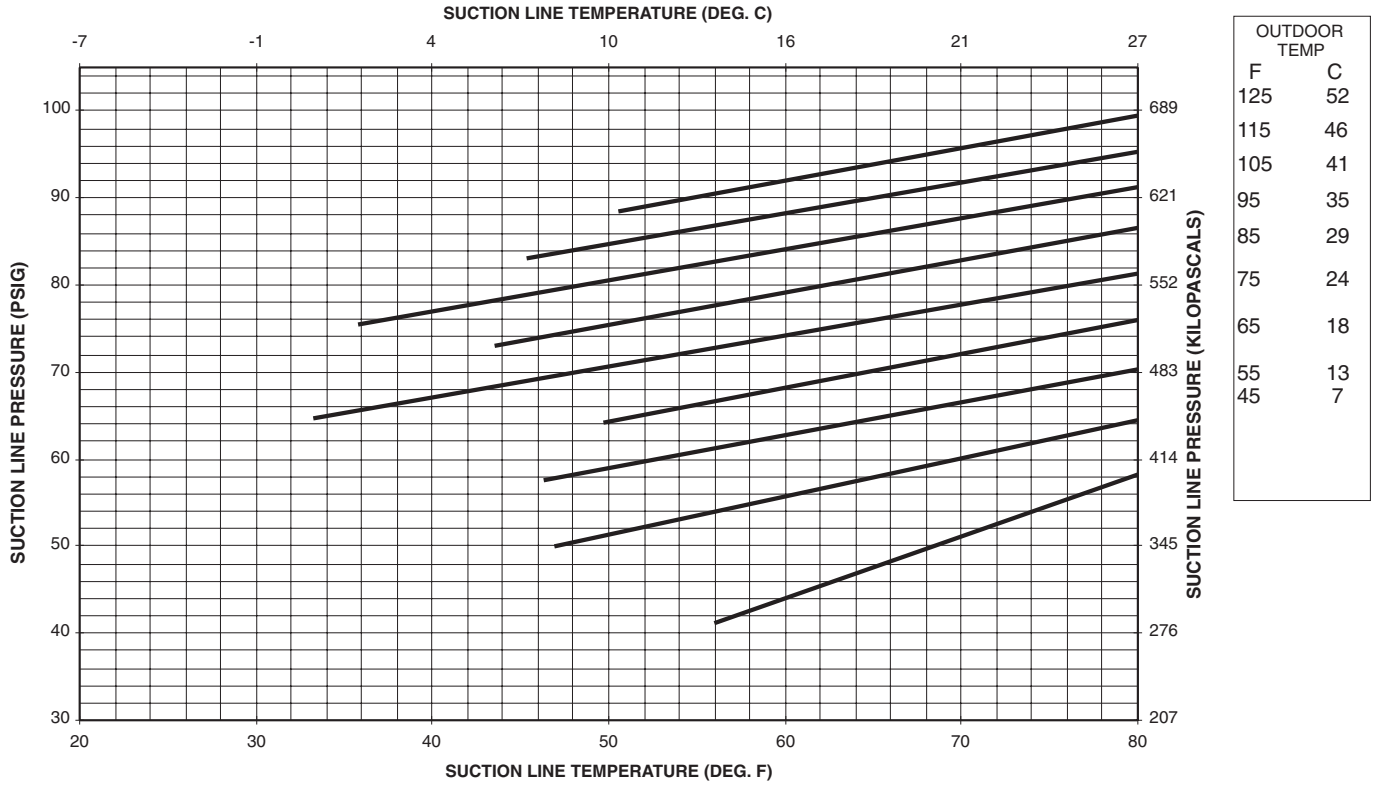


Fig. 43 — Cooling Charging Chart, 580F060

6 TON UNIT (60 Hz) CHARGING CHART

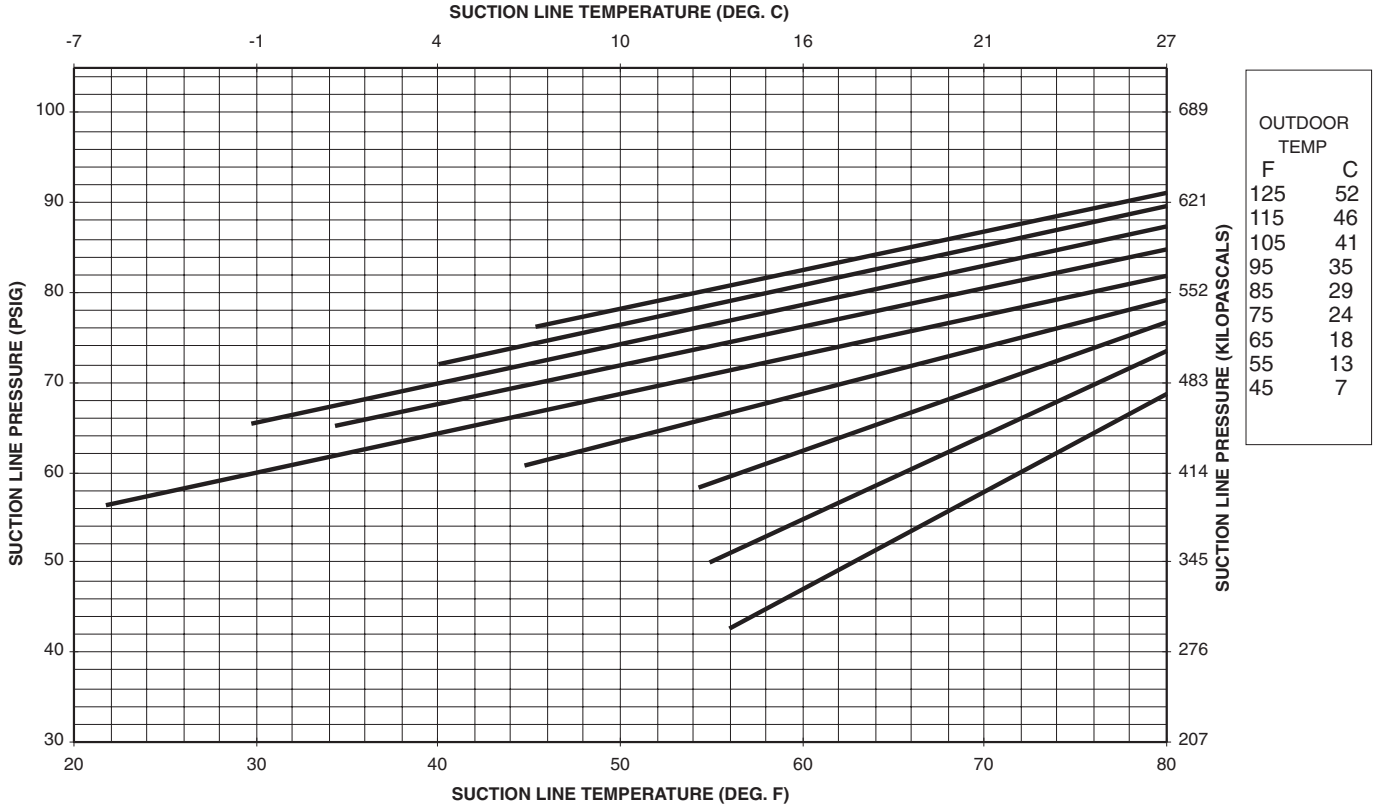


Fig. 44 — Cooling Charging Chart, 580F072, 073

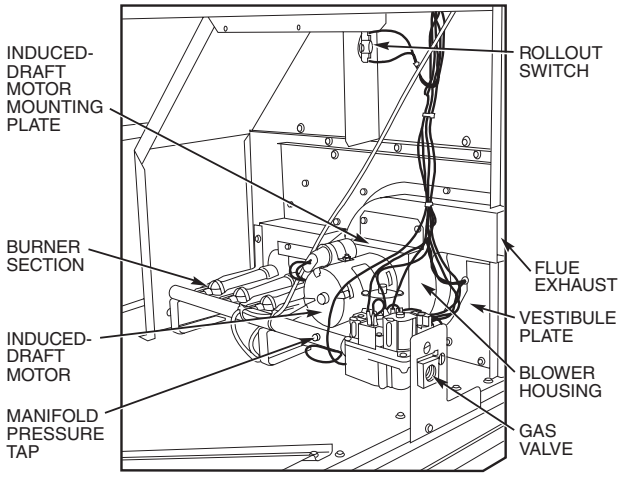


Fig. 45 — Burner Section Details

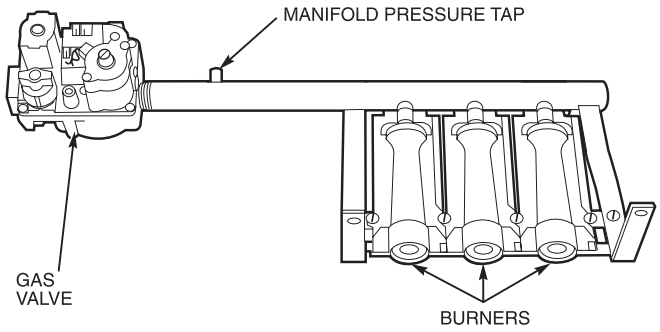
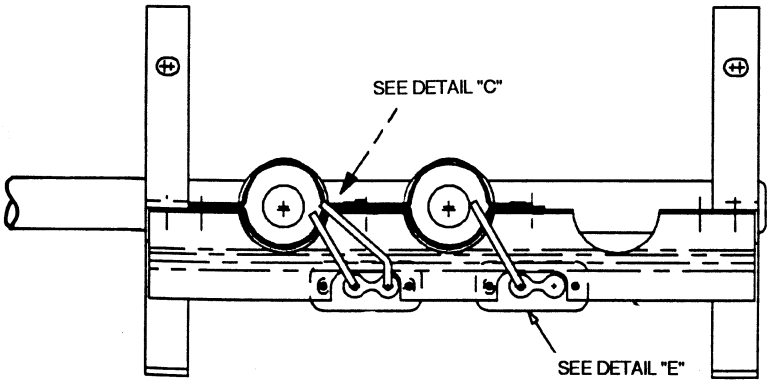
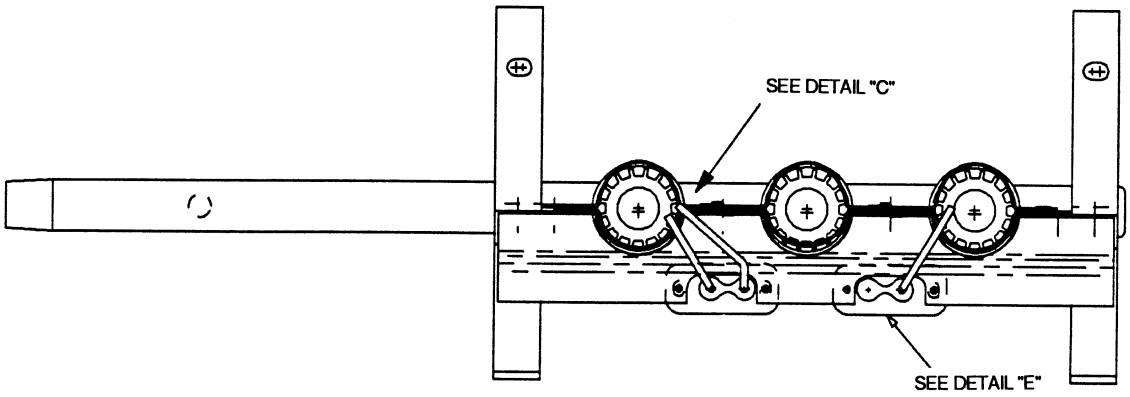


Fig. 46 — Burner Tray Details



LOW HEAT
580F036-073 — 74,000 BTUH INPUT
580F036-060 (Low NO_x) — 60,000 BTUH INPUT



MEDIUM AND HIGH HEAT
580F036-073 — 115,000 BTUH INPUT
580F048-073 — 150,000 BTUH INPUT
580F036-060 (Low NO_x) — 90,000 BTUH INPUT
580F048-060 (Low NO_x) — 120,000 BTUH INPUT

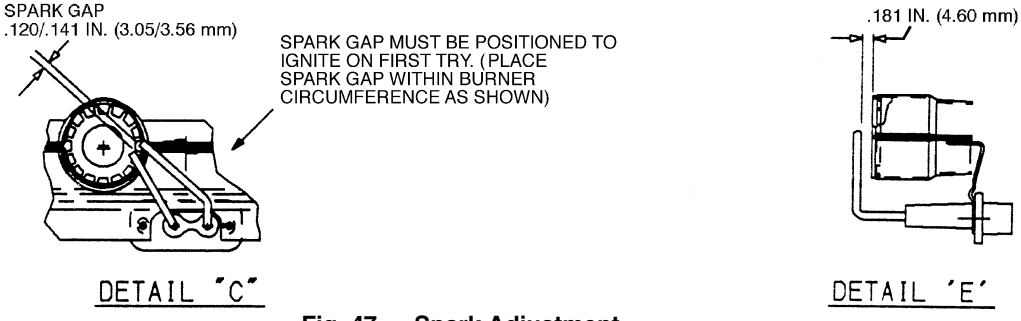


Fig. 47 — Spark Adjustment

TROUBLESHOOTING

I. ECONOMI$ER+ TROUBLESHOOTING

The EconoMi$er+ control has built-in diagnostics. The control can detect and display 10 different diagnostic codes as shown in Table 40. The user can also use the integrated display to check the status of all the inputs and outputs and run the manual control mode to check the operation of the EconoMi$er+ and compressors.

Table 40 — 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 41-43.

Table 41 — LED Error Code Service Analysis

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 lockout 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.
Internal Software Fault. (LED 9 flashes)	Internal Software Processor fault.	Fault code will automatically reset after one hour. Can be immediately reset by resetting unit power supply.

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 Table 42 — Heating Service Analysis for additional troubleshooting analysis.

LEGEND

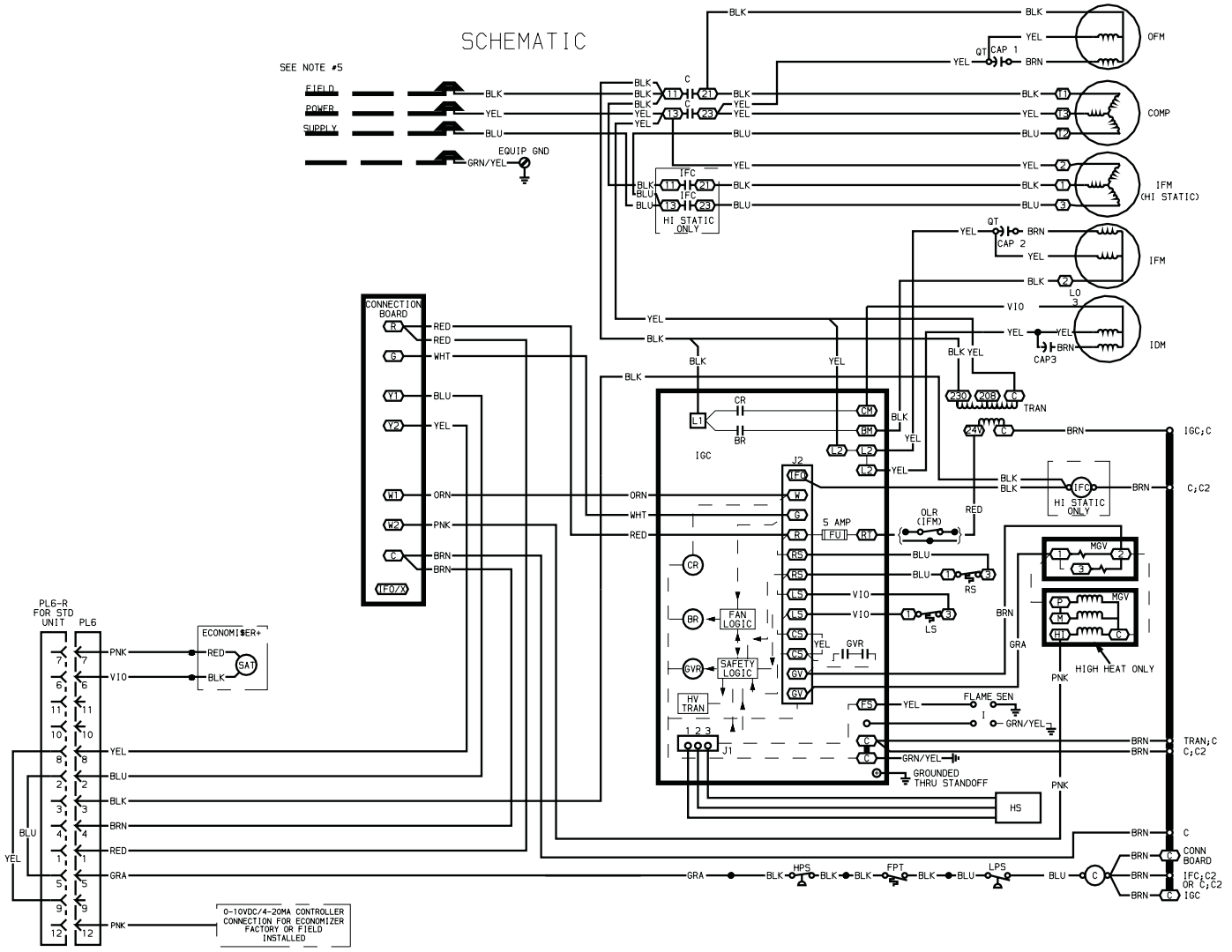
IGC — Integrated Gas Unit Controller
LED — Light-Emitting Diode

Table 42 — Heating Service Analysis

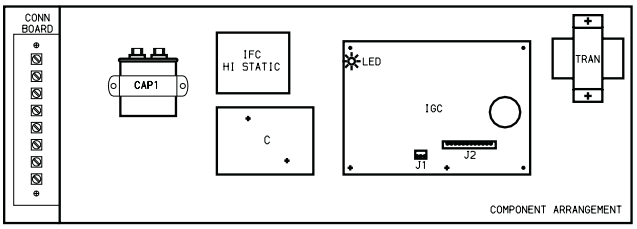
PROBLEM	CAUSE	REMEDY
Burners Will Not Ignite.	Misaligned spark electrodes.	Check flame ignition and sensor electrode positioning. Adjust as needed.
	No gas at main burners.	Check gas line for air, purge as necessary. After purging gas line of air, allow gas to dissipate for at least 5 minutes before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

Table 43 — Cooling Service Analysis

PROBLEM	CAUSE	REMEDY
Compressor and Condenser Fan Will Not Start.	Power failure.	Call power company.
	Fuse blown or circuit breaker tripped.	Replace fuse or reset circuit breaker.
	Defective thermostat, contactor, transformer, or control relay.	Replace component.
	Insufficient line voltage.	Determine cause and correct.
	Incorrect or faulty wiring.	Check wiring diagram and rewire correctly.
	Thermostat setting too high.	Lower thermostat setting below room temperature.
Compressor Will Not Start But Condenser Fan Runs.	Faulty wiring or loose connections in compressor circuit.	Check wiring and repair or replace.
	Compressor motor burned out, seized, or internal overload open.	Determine cause. Replace compressor.
	Defective run/start capacitor, overload, start relay.	Determine cause and replace.
	One leg of three-phase power dead.	Replace fuse or reset circuit breaker. Determine cause.
Compressor Cycles (Other Than Normally Satisfying Thermostat).	Refrigerant overcharge or undercharge.	Recover refrigerant, evacuate system, and recharge to nameplate.
	Defective compressor.	Replace and determine cause.
	Insufficient line voltage.	Determine cause and correct.
	Blocked condenser.	Determine cause and correct.
	Defective 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 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.	Recover 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 head 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.
	Outdoor ambient below 25 F.	Install low-ambient kit.
Evaporator Fan Will Not Shut Off.	Time off delay not finished.	Wait for 30-second off delay.
Compressor Makes Excessive Noise (580F072 and 073 Scroll Only).	Compressor rotating in wrong direction.	Reverse the 3-phase power leads as described in the Start-Up section on page 37.



NOTES:
1. If any of the original wire furnished must be replaced, it must be replaced with type 90 C wire or its equivalent.
2. Three phase motors are protected under primary single phasing conditions.
4. Use copper conductors only.
6. TRAN is wired for 230 v unit. If unit is to be run with 208 v power supply, disconnect BLK wire from 230 v tap (ORN) and connect to 208 v tap (RED). Insulate end of 230 v tap.



LEGEND

C	—	Contactor, Compressor
CAP	—	Capacitor
COMP	—	Compressor Motor
EQUIP	—	Equipment
FPT	—	Freeze Up Protection Thermostat
FU	—	Fuse
GND	—	Ground
GVR	—	Gas Valve Relay
HPS	—	High-Pressure Switch
HS	—	Hall-Effect Sensor
I	—	Ignitor
IDM	—	Induced-Draft Motor
IFC	—	Indoor Fan Contactor
IFM	—	Indoor (Evaporator) Fan Motor
IGC	—	Integrated Gas Unit Controller
LPS	—	Low-Pressure Switch
LS	—	Limit Switch
MGV	—	Main Gas Valve
OFM	—	Outdoor (Condenser) Fan Motor
OLR	—	Overload Relay
P	—	Plug
PL	—	Plug Assembly
QT	—	Quadruple Terminal
RS	—	Rollout Switch
SAT	—	Supply Air Temperature Sensor
TRAN	—	Transformer

Field Splice
Marked Wire (X)
Terminal (Marked) (X)
Terminal (Unmarked)
Terminal Block (X)

Splice
Splice (Marked)
Factory Wiring
Field Control Wiring
Field Power Wiring
Accessory or Optional Wiring
To indicate common potential only; not to represent wiring.

Fig. 48 — Typical Unit Wiring Diagram

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

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 Use in Job File)

I. PRELIMINARY INFORMATION:

MODEL NO.: _____ SERIAL NO.:_____

DATE: _____ TECHNICIAN: _____

BUILDING LOCATION: _____

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

- ☐ VERIFY THAT ALL PACKING MATERIALS HAVE BEEN REMOVED FROM UNIT
- ☐ VERIFY THAT CONDENSATE CONNECTION IS INSTALLED PER INSTALLATION INSTRUCTIONS
- ☐ VERIFY THAT FLUE HOOD IS INSTALLED
- ☐ CHECK ALL ELECTRICAL CONNECTIONS AND TERMINALS FOR TIGHTNESS
- ☐ CHECK TO ENSURE NO WIRES ARE TOUCHING REFRIGERANT TUBING OR SHARP EDGES
- ☐ CHECK GAS PIPING FOR LEAKS
- ☐ CHECK THAT RETURN-AIR FILTER IS CLEAN AND IN PLACE
- ☐ VERIFY THAT UNIT INSTALLATION IS LEVEL
- ☐ CHECK FAN WHEEL AND PROPELLER FOR LOCATION IN HOUSING/ORIFICE AND SETSCREW TIGHTNESS
- ☐ VERIFY PULLEY ALIGNMENT AND BELT TENSION ARE CORRECT

III. START-UP:

ELECTRICAL

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

TEMPERATURES

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

PRESSURES

GAS INLET PRESSURE	_____	IN. WG		
GAS MANIFOLD PRESSURE	_____	IN. WG (LOW FIRE)	_____	IN. WG (HI FIRE)
REFRIGERANT SUCTION	_____	PSIG	_____	TEMP ° F
REFRIGERANT DISCHARGE	_____	PSIG	_____	TEMP ° F

- ☐ VERIFY REFRIGERANT CHARGE USING CHARGING TABLES
- ☐ VERIFY THAT 3-PHASE SCROLL COMPRESSOR IS ROTATING IN CORRECT DIRECTION (580F072 AND 073 ONLY)

CUT ALONG DOTTED LINE

CUT ALONG DOTTED LINE