installation, start-up and service instructions

SINGLE PACKAGE ROOFTOP ELECTRIC COOLING/GAS HEATING UNITS

581A
Sizes 155-240

Cancels: II 581A-155-2

II 581A-155-3
6/15/99

CONTENTS

SAFETY CONSIDERATIONS

Installation and servicing of air-conditioning equipment can be hazardous due to system pressure and electrical components. Only trained and qualified service personnel should install, repair, or service air-conditioning equipment.

Untrained personnel can perform the basic maintenance functions of cleaning coils and filters and replacing filters. All other operations should be performed by trained service personnel. When working on air-conditioning equipment, observe precautions in the literature, tags and labels attached to the unit, and other safety precautions that may apply.

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

⚠ **WARNING:** Before performing service or maintenance operations on unit, turn off mail power switch to unit. electrical shock could cause personal injury.

⚠ **WARNING:**

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

What to do if you smell gas:

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

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

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

INSTALLATION

I. STEP 1 — PROVIDE UNIT SUPPORT

A. Roof Curb

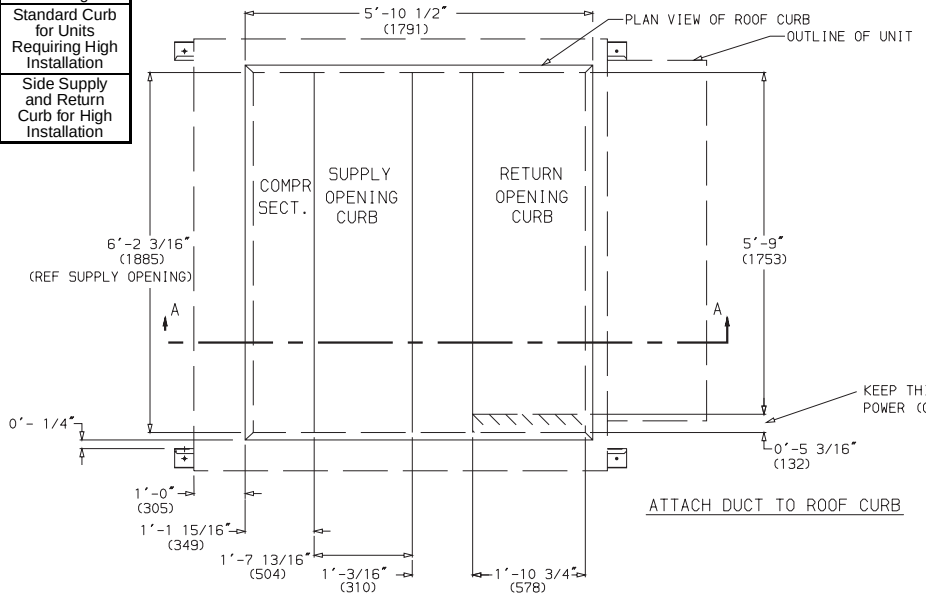
Assemble or install accessory roof curb or horizontal supply roof curb in accordance with instructions shipped with this accessory. See Fig. 1 and 2. Install insulation, cant strips, roofing, and counter flashing as shown. Ductwork can be installed to roof curb or horizontal supply roof curb before unit is set in place.

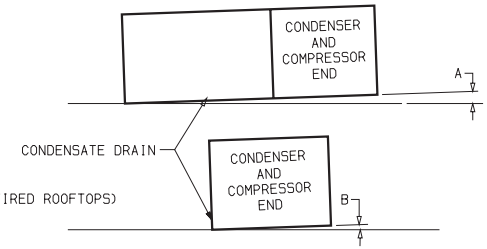
(Instructions continued on page 3.)

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

NOTES:
1. Roof curb accessory is shipped disassembled.
2. Insulated panels: 1 in. thick neoprene coated $1^1/_2$ lb density.
3. Dimensions in ( ) are in millimeters.
4. ⇨ Direction of airflow.
5. Roof curb: 16 ga. (VA03-56) stl.

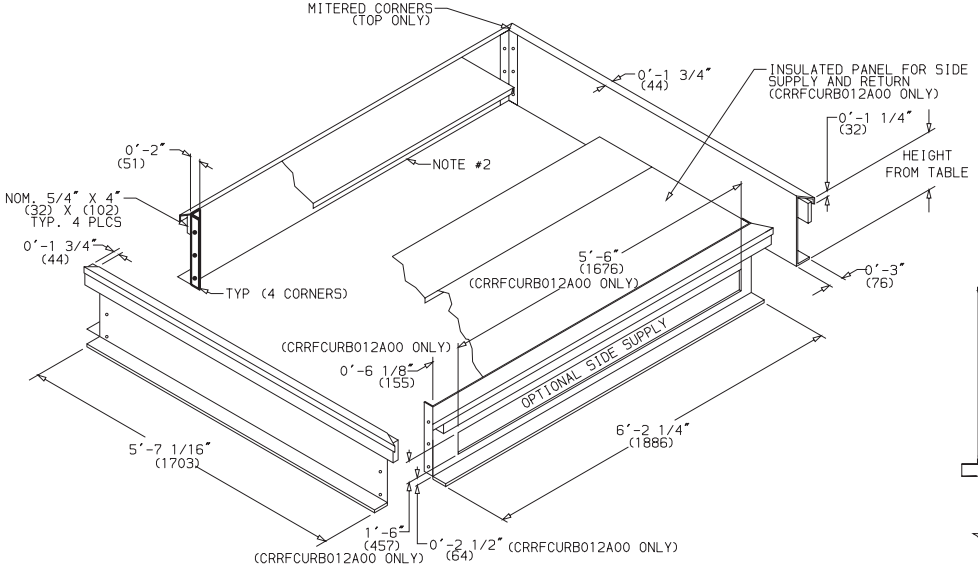
NOTE: To prevent the hazard of stagnant water build-up in the drain pan of the indoor section, unit can only be pitched as shown.

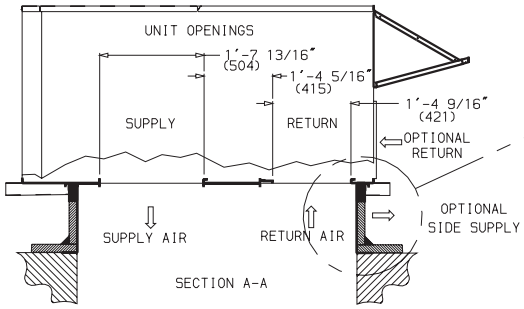




Dimensions (degrees and inches)

UNIT	A		B	
	DEG.	IN.	DEG.	IN.
ALL	.28	.45	.28	.43





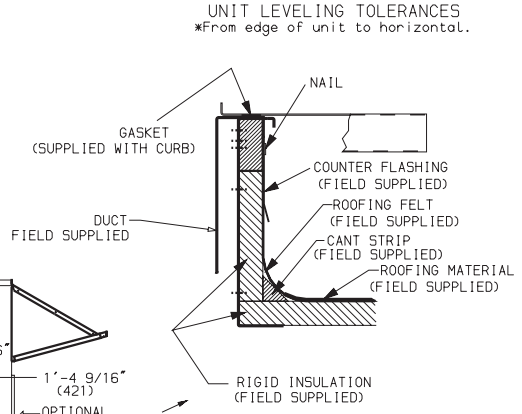
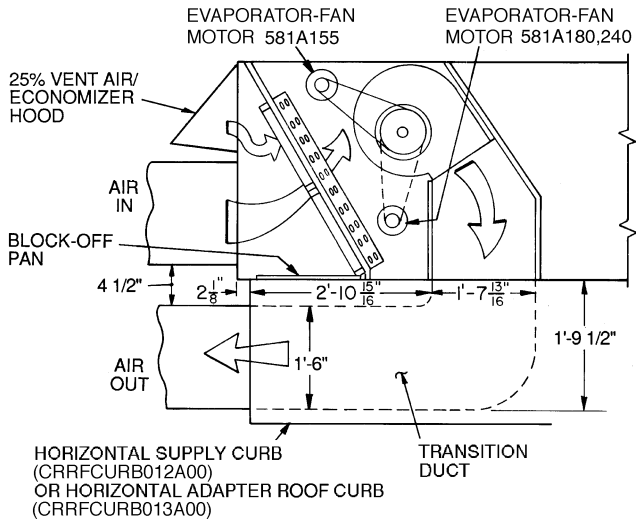


Fig. 1 — Roof Curb Details



NOTE: For preassembled horizontal adapter roof curb part no. (CRRFCURB013A00), the accessory kit includes a factory-designed, high-static, regain transition duct. For horizontal curb part no. CRRFCURB012A00, a field-supplied transition duct is required.

Fig. 2 — Horizontal Adapter Roof Curbs and Roof Curbs

IMPORTANT: Curb or adapter roof curb must be level. This is necessary to permit unit drain to function properly. Unit leveling tolerance is $\pm 1/16$ in. per linear ft in any direction. Refer to Accessory Roof Curb or Horizontal Supply Roof Curb Installation Instructions for additional information as required.

When accessory roof curb or horizontal supply roof curb is used, unit may be installed on class A, B, or C roof covering material.

IMPORTANT: The gasketing of the unit to the roof curb or adapter roof curb is critical for a watertight seal. Install gasket with the roof curb or adapter as shown in Fig. 1. Improperly applied gasket can also result in air leaks and poor unit performance.

B. Alternate Unit Support

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

II. STEP 2 — RIG AND PLACE UNIT

Inspect unit for transportation damage. File any claim with transportation agency.

Do not drop unit; keep upright. Spreader bars are not required if top crating is left on unit. Use spreader bars over unit to prevent sling or cable damage. Rollers may be used to move unit across a roof. Level by using unit frame as a reference; leveling tolerance is $\pm 1/16$ in. per linear ft in any direction. See Fig. 3 for additional information. Unit operating weight is shown in Table 1.

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

A. Positioning

Maintain clearance, per Fig. 4 and 5, around and above unit to provide minimum distance from combustible materials, proper airflow, and service access.

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

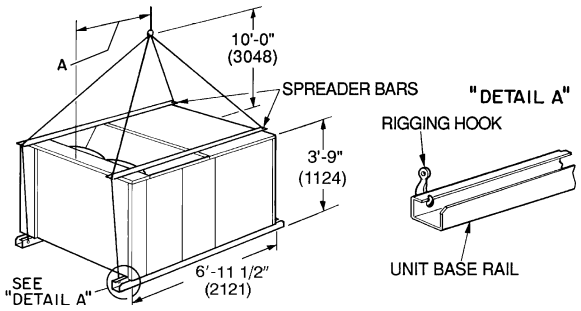
Although unit is weatherproof, guard against water from higher level runoff and overhangs.

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

B. Roof Mount

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

Instructions continued on page 8.



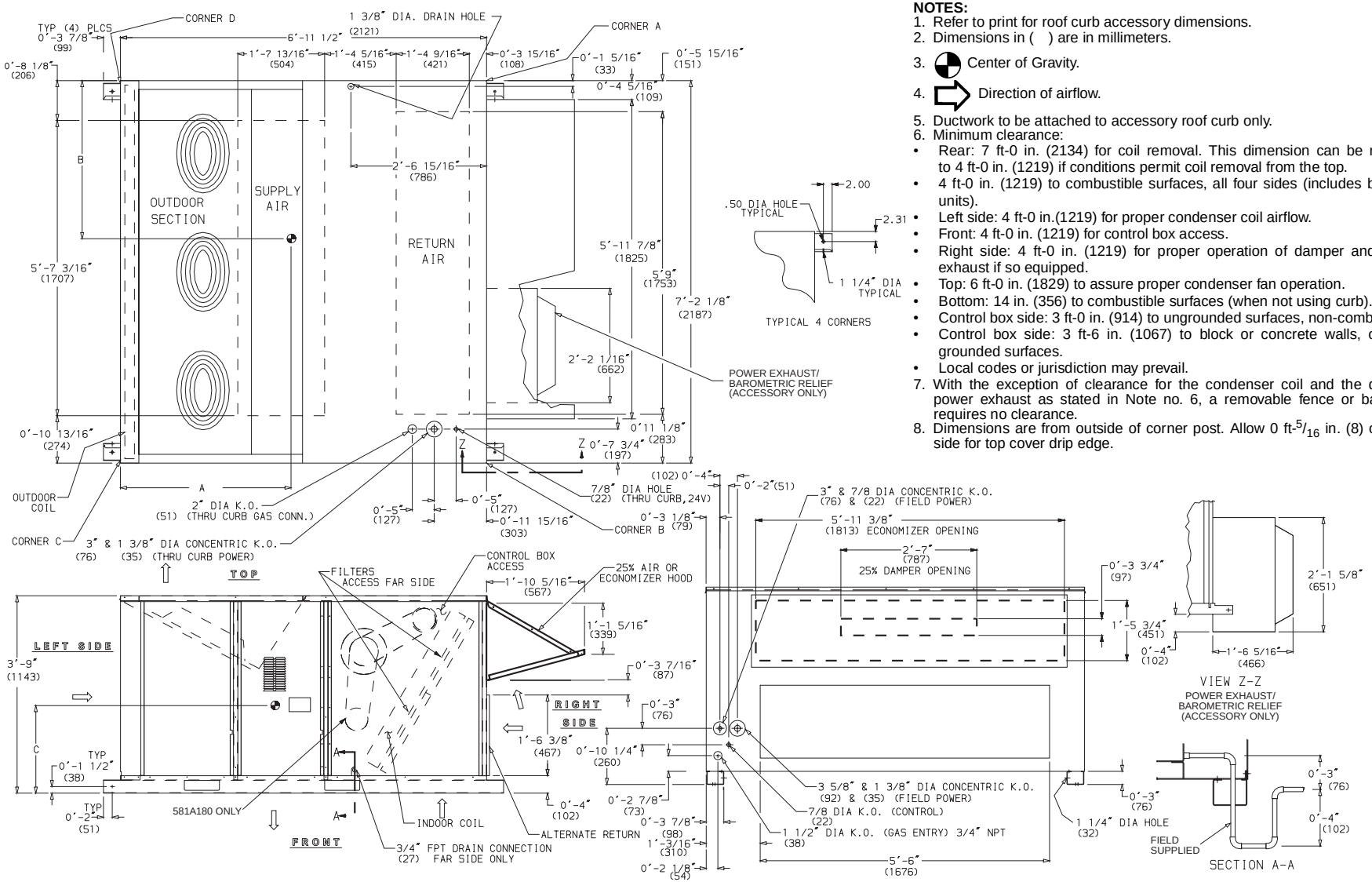
NOTES:
1. Dimensions in ( ) are in millimeters.
2. Refer to Fig. 4 and 5 for unit operating weights.
3. Remove boards at ends of unit and runners prior to rigging.
4. Rig by inserting hooks into unit base rails as shown. Use corner post from packaging to protect coil from damage. Use bumper boards for spreader bars on all units.
5. Weights do not include optional economizer. Add 110 lb (50 kg) for economizer weight.
6. Weights given are for aluminum evaporator and condenser coil plate fins.
7. Add 75 lb (34 kg) for crating on 581A155 and 180 units. Add 135 lb (61 kg) for crating on 581A240 units.
8. Add 150 lb (68 kg) for copper condenser coil. Add 280 lb (127 kg) for copper condenser and evaporator coils.

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

UNIT 581A	MAXIMUM SHIPPING WEIGHT		DIMENSIONS			
			A		B	
	lb	kg	ft-in.	mm	ft-in.	mm
155	1725	782	6-11 1/2	2121	4-0	1219
180	1800	816	6-11 1/2	2121	3-2	964
240	1900	862	6-11 1/2	2121	3-4	1016

Fig. 3 — Rigging Details

UNIT 581A	STD UNIT WEIGHT		ECONO-MIZER WEIGHT		CORNER A		CORNER B		CORNER C		CORNER D		DIM A		DIM B		DIM C	
	Lb	Kg	Lb	Kg	Lb	Kg	Lb	Kg	Lb	Kg	Lb	Kg	ft-in.	mm	ft-in.	mm	ft-in.	mm
155	1725	782	110	50	427	194	390	177	438	199	470	213	3-3	991	3-5	1051	1-10	559
180	1800	816	110	50	417	189	399	181	481	218	503	228	3-2	961	3-6	1070	1-10	559



NOTES:

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

Fig. 4 — Base Unit Dimensions; 581A155 and 180

UNIT	STD. UNIT WEIGHT	ECONOMIZER WEIGHT
581A240	1900 lbs (862 kg)	110 lbs (50 kg)

NOTES:
1. Refer to print for roof curb accessory dimensions.
2. Dimensions in ( ) are in millimeters.
3. Center of Gravity.
4. Direction of airflow.
5. Ductwork to be attached to accessory roof curb only.
6. Minimum clearance:
   - Rear: 7 ft-0 in. (2134) for coil removal. This dimension can be reduced to 4 ft-0 in. (1219) if conditions permit coil removal from the top.
   - 4 ft-0 in. (1219) to combustible surfaces, all four sides (includes between units).
   - Left side: 4 ft-0 in.(1219) for proper condenser coil airflow.
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   - Local codes or jurisdiction may prevail.
7. With the exception of clearance for the condenser coil and the damper/power exhaust as stated in Note no. 6, a removable fence or barricade requires no clearance.
8. Dimensions are from outside of corner post. Allow 0 ft-$^{5}/_{16}$ in. (8) on each side for top cover drip edge.

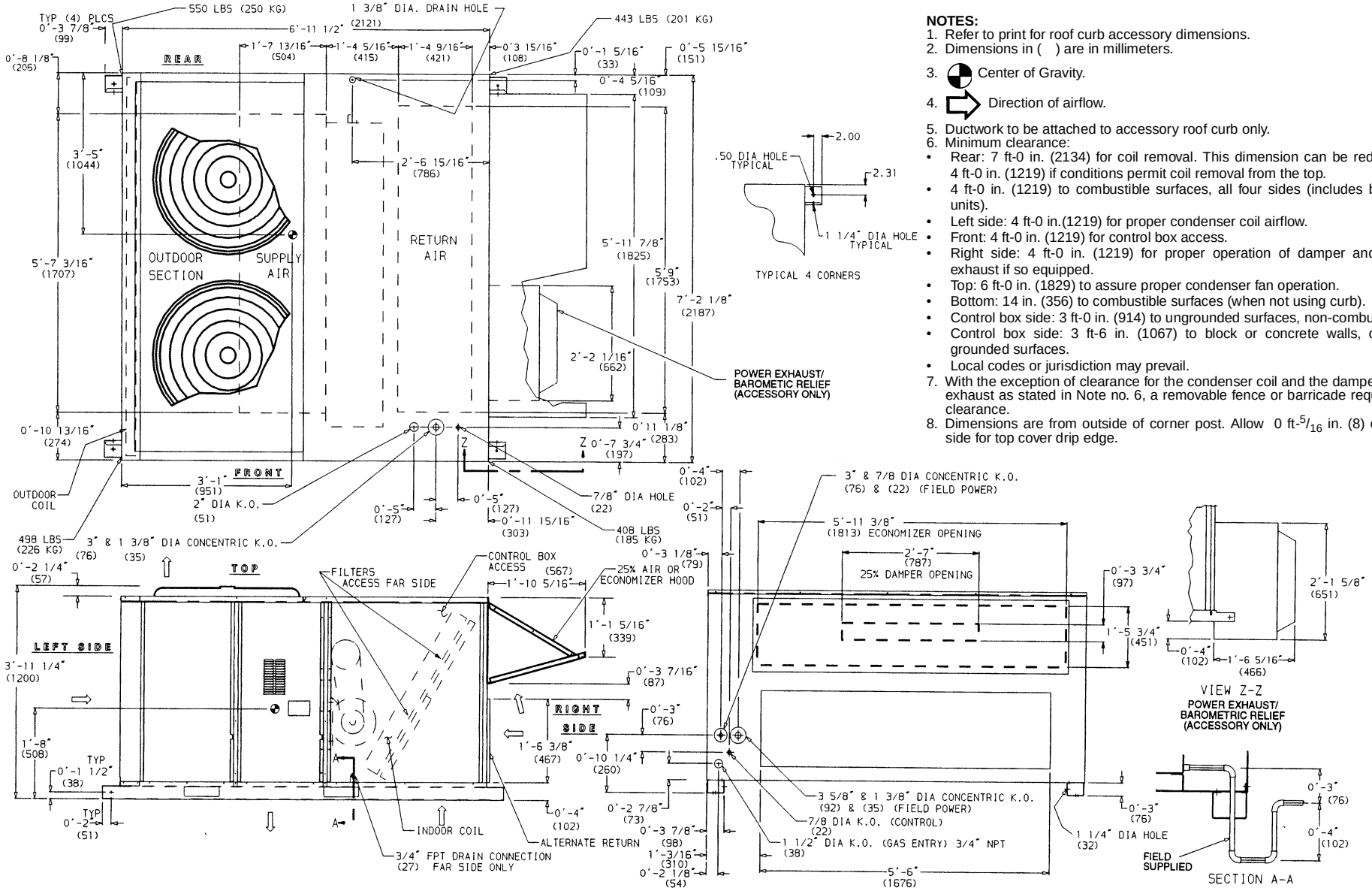


Fig. 5 — Base Unit Dimensions; 581A240

Table 1 — Physical Data

UNIT 581A		155	180	240
NOMINAL CAPACITY (tons)		12	15	20
OPERATING WEIGHT (lb)				
Unit				
Al/Al*		1725	1800	1900
Al/Cu*		1875	1950	2050
Cu/Cu*		2005	2080	2180
Economizer		110	110	110
Roof Curb†		200	200	200
COMPRESSOR				
Quantity		2	2	2
Number of Refrigerant Circuits		2	2	2
Crankcase Heater Watts		70	70	70
Oil (oz) (Ckt 1, Ckt 2)		60,66	85,60	110,110
REFRIGERANT TYPE		R-22		
Expansion Device		TXV		
Operating Charge (lb oz)				
Circuit 1**		20.7	19.5	18.5
Circuit 2		11.9	13.45	13.3
CONDENSER COIL		Cross-Hatched 3/8-in. Copper Tubes, Aluminum Lanced, Aluminum Pre-Coated, or Copper Plate Fins		
Rows...Fins/in.		4...15	4...15	4...15
Total Face Area (sq ft)		21.7	21.7	21.7
CONDENSER FAN		Propeller Type		
Nominal Cfm		10,500	10,500	14,200
Quantity...Diameter (in.)		3...22	3...22	2...30
Motor Hp...Rpm		1/2...1050	1/2...1050	1...1075
Watts Input (Total)		1100	1100	3400
EVAPORATOR COIL		Cross-Hatched 3/8-in. Copper Tubes, Aluminum Lanced or Copper Plate Fins, Face Split		
Rows...Fins/in.		4...15	4...15	4...15
Total Face Area (sq ft)		17.5	17.5	17.5
EVAPORATOR FAN		Centrifugal Type		
Quantity...Size (in.)		2...10 X 10	2...12 x 12	2...12 x 12
Type Drive		Belt	Belt	Belt
Nominal Cfm		5200	6000	8000
Std Motor Hp		2.9	5	7.5
Opt Motor Hp		3.7		
Motor Nominal Rpm		1725	1745	1745
Std Maximum Continuous Bhp		3.13	6.13	9.47 (208 v) | 10.33 (230 and 460 v)
Opt Maximum Continuous Bhp		4.38		
Motor Frame Size		56H	184T	213T
Fan Rpm Range	Low-Medium Static	834-1064	873-1021	1002-1151
	High Static	1161-1426	1025-1200	1193-1369
Motor Bearing Type		Ball	Ball	Ball
Maximum Allowable Rpm		1550	1550	1550
Motor Pulley Pitch Dia.	Low-Medium Static	3.1/4.1	4.9/5.9	5.4/6.6
	High Static	3.7/4.7	4.9/5.9	5.4/6.6
Nominal Motor Shaft Diameter (in.)		7/8	1 1/8	1 3/8
Fan Pulley Pitch Diameter (in.)	Low-Medium Static	6.0	9.4	9.4
	High Static	5.2	8.0	7.9
Nominal Fan Shaft Diameter (in.)		1 3/16	1 7/16	1 7/16
Belt, Quantity...Type... Length (in.)	Low-Medium Static	1...BX...42	1...BX...50	1...BX...54
	High Static	1...BX...42	1...BX...48	1...BX...50
Pulley Center Line Distance (in.)		13.5-15.5	13.3-14.8	14.6-15.4
Speed Change per Full Turn of Movable Pulley Flange (Rpm)	Low-Medium Static	58	37	37
	High Static	67	44	44
Movable Pulley Maximum Full Turns From Closed Position		4††	4††	4††
Factory Speed		3.5	3.5	3.5
Factory Speed Setting (Rpm)	Low-Medium Static	978	965	1095
	High Static	1327	1134	1303
FURNACE SECTION				
Rollout Switch Cutout Temp (F) ll		190	190	190
Burner Orifice Diameter (in...drill size)				
Natural Gas		0.1285...30/ 0.136...29	0.1285...30/ 0.136...29	0.1285...30/ 0.136...29
Thermostat Heat Anticipator Setting				
Stage 1 (amps)		0.98 | 0.8	0.98 | 0.8	0.98 | 0.8
Stage 2 (amps)		0.44 | 0.44	0.44 | 0.44	0.44 | 0.44
Gas Input (Btuh) Stage 1		172,000/230,000	206,000/275,000	206,000/275,000
Stage 2		225,000/300,000	270,000/360,000	270,000/360,000
Efficiency (Steady State) (%)		81	81	81
Temperature Rise Range		15-45/30-60	15-45/20-50	15-45/20-50
Manifold Pressure (in. wg)				
Natural Gas		3.3	3.3	3.3
Gas Valve Quantity		1	1	1
Gas Valve Pressure Range (in. wg)		5.5-13.5	5.5-13.5	5.5-13.5
(psig)		.235-.487	.235-.487	.235-.487
Field Gas Connection Size (in.-FPT)		3/4	3/4	3/4
HIGH-PRESSURE SWITCH (psig)				
Cutout		426		
Reset (Auto.)		320		
LOW-PRESSURE SWITCH (psig)				
Cutout		27		
Reset (Auto.)		44		
FREEZE PROTECTION THERMOSTAT (F)				
Opens		30 ± 5		
Closes		45 ± 5		
OUTDOOR-AIR INLET SCREENS		Cleanable		
Quantity...Size (in.)		2...20 x 25 x 1 1...20 x 20 x 1		
RETURN-AIR FILTERS		Throwaway		
Quantity...Size (in.)		4...20 x 20 x 2 4...16 x 20 x 2		

LEGEND

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

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

III. STEP 3 — FIELD FABRICATE DUCTWORK

On vertical units, secure all ducts to roof curb and building structure. *Do not connect ductwork to unit.* Use flexible duct connectors between unit and ducts as required. Adequately insulate and weatherproof all ductwork located outdoors, joints, and roof openings with counter flashing and mastic in accordance with applicable codes. Insulate ducts passing through unconditioned space, and use vapor barrier in accordance with the latest issue of SMACNA (Sheet Metal and Air Conditioning Contractors National Association) and ACCA (Air Conditioning Contractors of America) minimum installation standards for heating and air conditioning systems.

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

A minimum clearance to combustibles of 1 in. for the first 24 in. of ductwork is required for all units with electric heat. Cabinet return-air static shall not exceed –0.35 in. wg with economizer or –0.45 in. wg without economizer.

IV. STEP 4 — MAKE UNIT DUCT CONNECTIONS

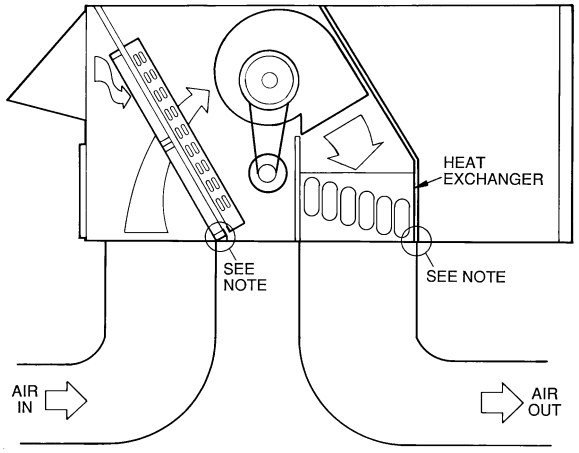
Unit is shipped for thru-the-bottom duct connections. Ductwork openings are shown in Fig. 1, 4, and 5. Duct connections are shown in Fig. 6. Field-fabricated concentric ductwork may be connected as shown in Fig. 7 and 8. Attach all ductwork to roof curb and roof curb basepans. Refer to installation instructions shipped with accessory roof curb for more information.

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

V. STEP 5 — INSTALL FLUE HOOD AND WIND BAFFLE

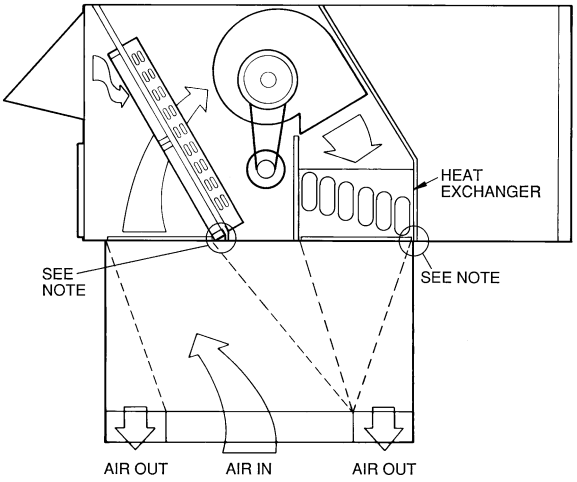
Flue hood, screen, and wind baffle are shipped secured under main control box. To install, secure flue hood and screen to access panel with screws provided. See Fig. 9. The wind baffle is then installed over the flue hood.

NOTE: When properly installed, flue hood will line up with combustion fan housing. See Fig. 10.



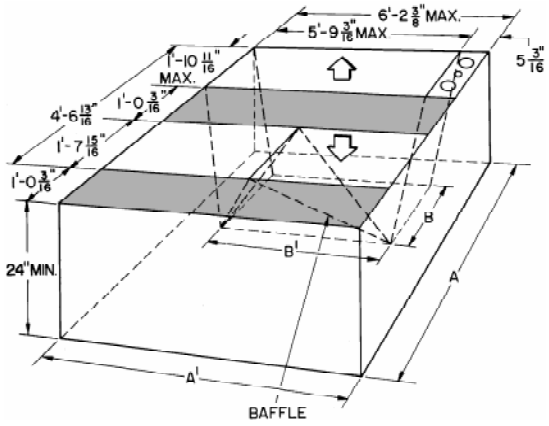
NOTE: Do not drill in this area; damage to basepan may result in water leak.

Fig. 6 — Air Distribution — Thru-the-Bottom (581A180, 240 Unit Shown)



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

Fig. 7 — Concentric Duct Air Distribution (581A180, 240 Unit Shown)



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

Shaded areas indicate block-off pans.

Fig. 8 — Concentric Duct Details

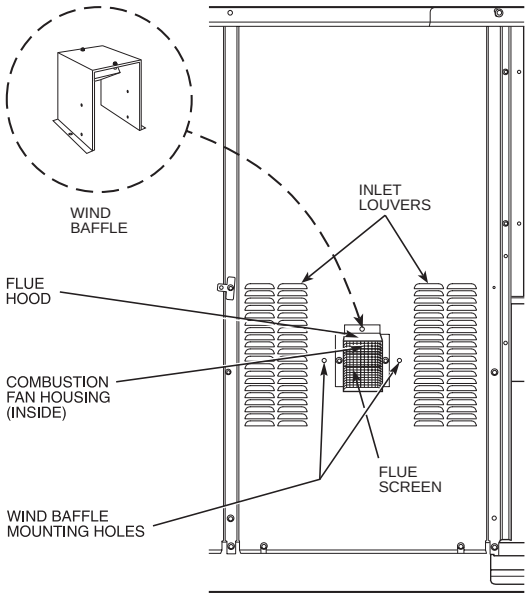


Fig. 9 — Flue Hood Location

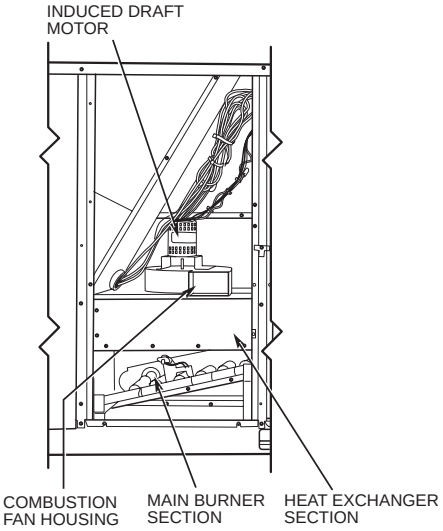


Fig. 10 — Combustion Fan Housing Location

VI. STEP 6 — TRAP CONDENSATE DRAIN

See Fig. 4, 5, and 11 fore drain location. Plug is provided in drain hole and must be removed when unit is operating. One $^{3}/_{4}$ in. half coupling is provided inside unit evaporator section for condensate drain connection. An $8^{1}/_{2}$ in. x $^{3}/_{4}$ in. diameter nipple and a 2 in. x $^{3}/_{4}$ in. diameter pipe nipple are coupled to standard $^{3}/_{4}$ in. diameter elbow to provide a straight path down through holes in unit base rails (see Fig. 11 and 12). A trap at least 4 inches deep must be used.

VII. STEP 7 — INSTALL GAS PIPING

The gas supply pipe enters the unit through the $1^{1}/_{2}$ in. diameter knockout provided. The gas connection to the unit is made to the $^{3}/_{4}$ in. FPT gas inlet on the gas manifold. Unit is equipped for use with natural gas. Installation must conform with local building codes or, in the absence of local codes, with the National Fuel Gas code, ANSI Z223.1.

Install field-supplied manual gas shutoff valve with a $^{1}/_{8}$ in. NPT pressure tap for test gage connection at unit. Field gas piping must include sediment trap and union. See Fig. 13. Install sediment trap in riser leading to heating section. This drip leg functions as a trap for dirt and condensate. Install trap where condensate cannot freeze. Install this sediment trap by connecting a piping tee to riser leading to heating section, so that straight-through section of tee is vertical. Then, connect capped nipple into lower end of tee. Extend capped nipple below level of gas controls.

⚠WARNING: Do not pressure test gas supply while connected to unit. Always disconnect union before servicing.

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

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

VIII. STEP 8 — MAKE ELECTRICAL CONNECTIONS

A. Field Power Supply

Unit is factory wired for voltage shown on unit nameplate.

When installing units, provide a disconnect per NEC (National Electrical Code) requirements of adequate size (Table 2).

All field wiring must comply with NEC and local requirements. Insulate low-voltage wires for highest voltage contained within conduit when low-voltage control wires are run in the same conduit as high-voltage wires.

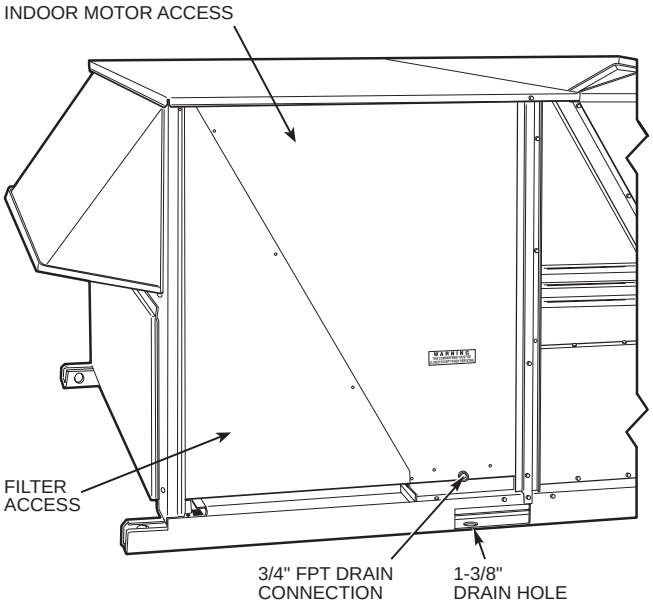


Fig. 11 — Condensate Drain Details (581A155 Shown)

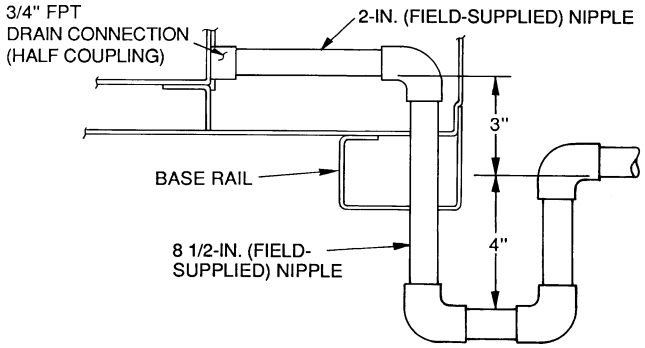


Fig. 12 — Condensate Drain Piping Details

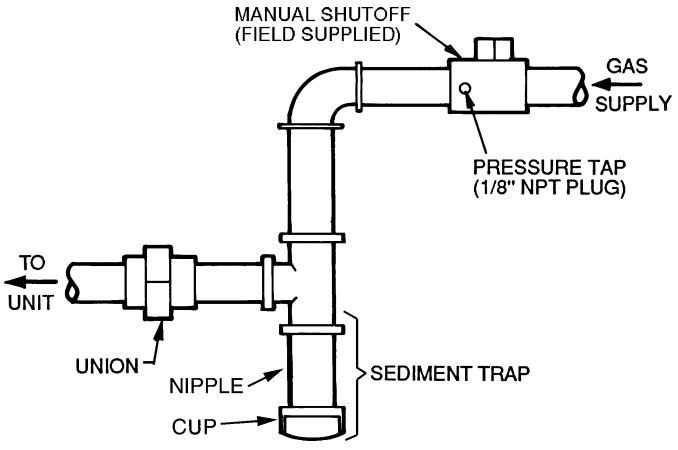


Fig. 13 — Field Gas Piping

Route power and ground lines through control box end panel or unit basepan (see Fig. 4 and 5) to connections as shown on unit wiring diagram and Fig. 14.

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

⚠**WARNING:** The unit must be electrically grounded in accordance with local codes and NEC ANSI/NFPA 70 (National Fire Protection Association).

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

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

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

IMPORTANT: BE CERTAIN UNUSED WIRES ARE CAPPED. Failure to do so may damage the transformers.

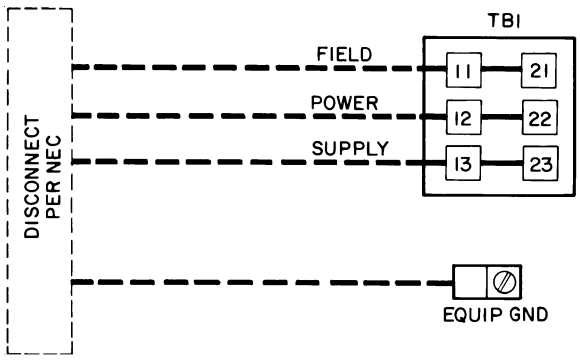
Operating voltage to compressor must be within voltage range indicated on unit nameplate. On 3-phase units, voltages between phases must be balanced within 2%.

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

B. Field Control Wiring

The unit must have a separate electrical service with a field-supplied, waterproof, fused disconnect switch mounted at, or within sight from, the unit. Refer to the unit rating plate for maximum fuse/circuit breaker size and minimum circuit amps (ampacity) for wire sizing. Be sure disconnect switch does not obstruct unit rating plate.

The field-supplied disconnect switchbox may be mounted on the unit over the high-voltage inlet hole in the control corner panel.



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

LEGEND

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

Fig. 14 — Field Power Wiring Connections

Connect ground lead to chassis ground connection when using separate ground wire. The unit has a terminal block for field power connections. Install conduit connectors in side panel power supply knockout openings indicated in Fig. 4 and 5. Route power lines through connector to unit control box.

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

Route thermostat cable or equivalent single leads of colored wire from subbase terminals through conduit in unit to low-voltage connections as shown on unit label wiring diagram and in Fig. 15.

NOTE: For wire runs up to 50 ft, use no. 18 AWG (American Wire Gage) insulated wire (35 C minimum). For 50 to 75 ft, use no. 16 AWG insulated wire (35 C minimum). For over 75 ft, use no. 14 AWG insulated wire (35 C Minimum).

All wire larger than no. 18 AWG cannot be directly connected at the thermostat and will require a junction box and splice at the thermostat.

Set heat anticipator settings as follows:

VOLTAGE	W1	W2
208/230	0.98	0.44
460	0.80	0.44

The room thermostat heat anticipator must be properly adjusted to ensure proper heating performance. Set the heat anticipator to settings based on the table above, by using an ammeter to determine the exact setting for stages 1 and 2. Failure to make a proper heat anticipator adjustment may result in improper operation, discomfort to the occupants of the conditioned space, and inefficient energy utilization; however, the required setting may be changed slightly to provide a greater degree of comfort for a particular installation.

Refer to Accessory Remote Control Panel instructions if required.

STEP 9 — MAKE OUTDOOR-AIR INLET ADJUSTMENTS

A. Manual Outdoor-Air Damper

All units (except those equipped with a factory-installed economizer) have a manual outdoor-air damper to provide ventilation air.

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

B. Optional Economizer

Economizer Motor Control Module (See Fig. 17-19)

The economizer control location is shown Fig. 17. For maximum benefit of outdoor air, set economizer motor control module to the "D" setting (Fig. 18). The economizer motor control module is located on the economizer motor. See Fig. 19.

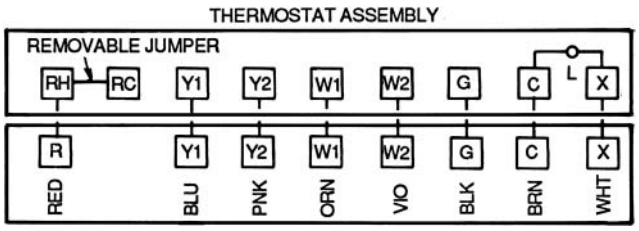


Fig. 15 — Field Control Thermostat Wiring

Table 2 — Electrical Data

UNIT 581A	NOMINAL VOLTAGE (3 Ph, 60 Hz)	VOLTAGE RANGE		COMPRESSOR				OFM			IFM		POWER EXHAUST		COMBUSTION FAN MOTOR	POWER SUPPLY	
				No. 1		No. 2											
		Min	Max	RLA	LRA	RLA	LRA	Qty	Hp	FLA (ea)	Hp	FLA	FLA	LRA	FLA	MCA	MOCP*
015 (Standard IFM)	208/230	187	253	20.7	156	19.3	123	3	0.5	1.7	2.9	8.8/ 8.4	— 4.6	— 18.8	0.57 0.57	59/59 64/63	70/70 80/80
	460	414	508	10	70	10	62	3	0.5	0.8	2.9	4.2	— 2.3	— 6.0	0.30 0.30	29 31	35 40
015 (Optional IFM)	208/230	187	253	20.7	156	19.3	123	3	0.5	1.7	3.7	11.0/ 10.5	— 4.6	— 18.8	0.57 0.57	61/61 66/65	80/80 80/80
	460	414	508	10	70	10	62	3	0.5	0.8	3.7	4.8	— 2.3	— 6.0	0.30 0.30	30 32	35 40
017	208/230	187	253	32.1	195	20.7	156	3	0.5	1.7	5.0	15.8/ 15.8	— 4.6	— 18.8	0.57 0.57	82/82 86/86	110/110 110/110
	460	414	508	16.4	95	10	70	3	0.5	0.8	5.0	7.9	— 2.3	— 6.0	0.30 0.30	41 43	50 50
025	208/230	187	253	42	239	33.6	225	2	1	6.6	7.5	25.0/ 25.0	— 4.6	— 18.8	0.57 0.57	124/124 129/129	150/150 150/150
	460	414	508	19.2	125	17.3	114	2	1	3.3	7.5	13.0	— 2.3	— 6.0	0.30 0.30	61 63	80 80

LEGEND

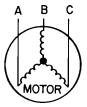
FLA — Full Load Amps
HACR — Heating, Air Conditioning and Refrigeration
IFM — Indoor (Evaporator) Fan Motor
LRA — Locked Rotor Amps
MCA — Minimum Circuit Amps
MOCP — Maximum Overcurrent Protection
NEC — National Electrical Code
OFM — Outdoor (Condenser) Fan Motor
RLA — Rated Load Amps

*Fuse or HACR circuit breaker.

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 voltage imbalance.

$$\% \text{ Voltage Imbalance} = 100 \times \frac{\text{max voltage deviation from average voltage}}{\text{average voltage}}$$

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 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.

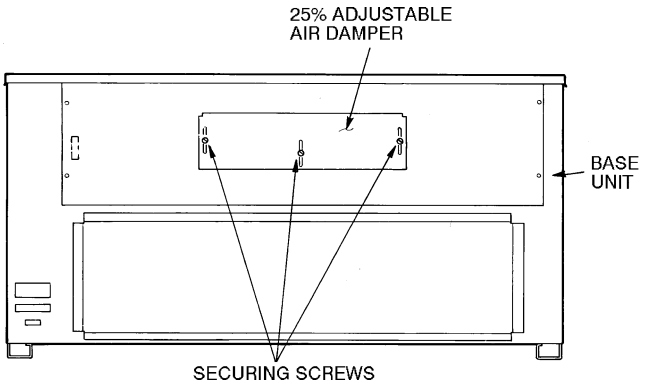


Fig. 16 — 25% Outdoor-Air Section Details

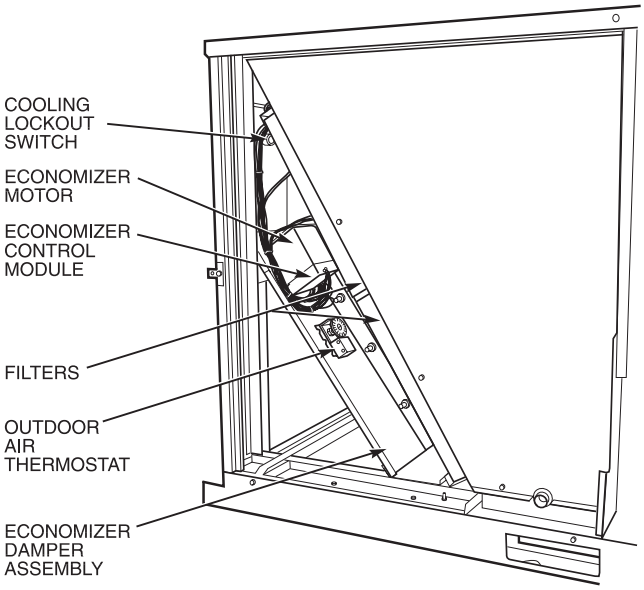
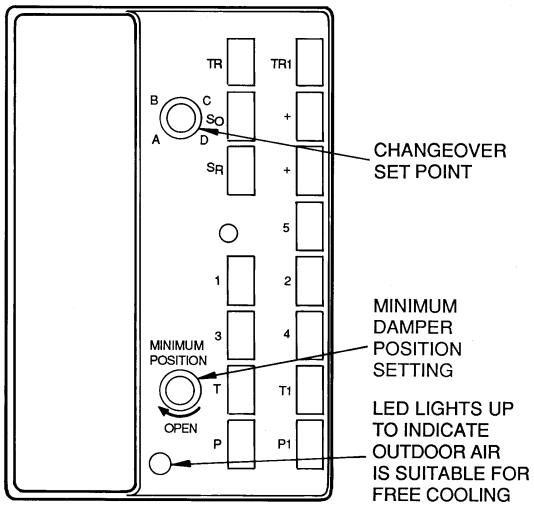


Fig. 17 — Economizer Damper Assembly-End View



LEGEND

LED — Light-Emitting Diode

Fig. 18 — Economizer Motor Control Module (Part Number W7459A)

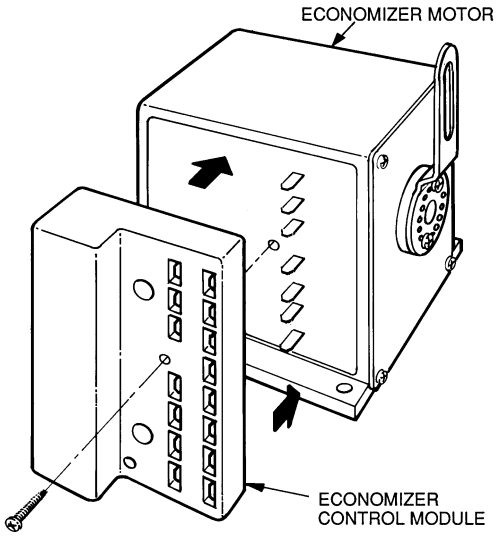


Fig. 19 — Economizer Motor Control Module Location

Damper Vent Position Setting

1. Set fan switch at ON position (continuous fan operation) and close night switch if used.
2. Set system selector switch at OFF position.
3. Turn damper adjustment knob located on control module clockwise slowly until dampers assume desired vent position. *Do not manually operate economizer motor, since damage to motor will result.*

X. STEP 10 — INSTALL OUTDOOR-AIR HOOD

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

NOTE: The hood top panel, upper and lower filter retainers, hood drain pan, baffle (sizes 180 and 240), and filter support bracket are secured opposite the condenser end of the unit. The screens, hood side panels, remaining section of filter support bracket, seal strip, and other hardware are in a package located inside the return-air filter access panel (Fig. 20).

1. Attach seal strip to upper filter retainer. See Fig. 21.
2. Assemble hood top panel, side panels, upper filter retainer, and drain pan (see Fig. 22).

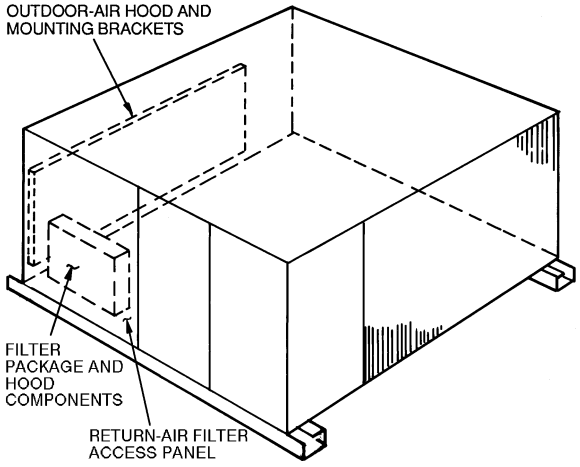


Fig. 20 — Outdoor-Air Hood Component Location

3. Secure lower filter retainer and long section of filter support bracket to unit. See Fig. 22. Leave screws loose on 180 and 240 units.
4. Slide baffle (sizes 180 and 240) behind lower filter retainer and tighten screws.
5. Loosen sheet metal screws for top panel of base unit-located above outdoor-air inlet opening, and remove screws for hood side panels located on the sides of the outdoor-air inlet opening.
6. Match notches in hood top panel with unit top panel screws. Insert hood flange between top panel flange and unit. Tighten screws.
7. Hold hood side panel flanges flat against unit, and install screws removed in Step 5.

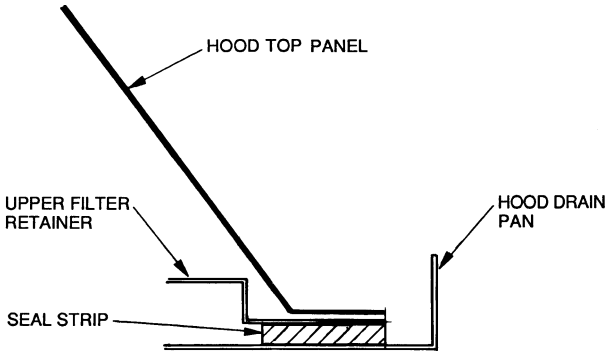
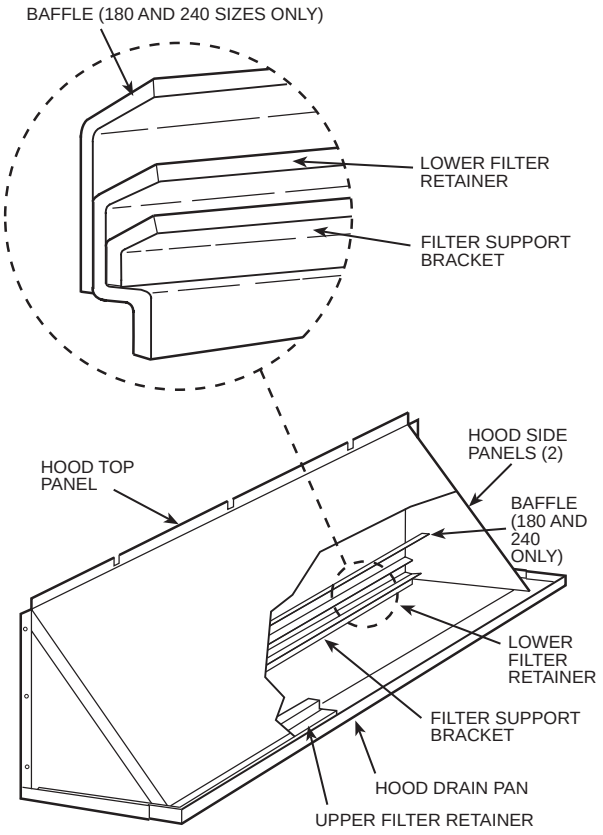


Fig. 21 — Seal Strip Location



NOTE: The outdoor air hood comes with a baffle which is used on sizes 180 and 240 only. Discard baffle for size 155 units.

Fig. 22 — Outdoor-Air Hood Details

8. Insert outdoor-air inlet screens and spacer in channel created by lower filter retainer and filter support bracket.
9. Attach remaining short section of filter support bracket.

A. Enthalpy Control Installation

NOTE: The accessory outdoor-air enthalpy sensor must be installed BEFORE the economizer hoods are installed on the unit or hoods will have to be removed.

1. Remove and discard the factory-installed jumper assembly containing the 800-ohm resistor on the economizer control module (between terminals S_R and +). See Fig. 18.
2. Remove black wire assembly containing the 620-ohm resistor from between economizer control module terminal S_O and the outdoor-air thermostat (OAT). Place this wire assembly (containing the 620-ohm resistor) between economizer control module terminals S_R and +, replacing the jumper removed in Step 1. See Fig. 18.
3. Disconnect the blue wire from the OAT.
4. Remove OAT from the outside of the economizer. See Fig. 17.
5. Mount the enthalpy sensor (Fig. 23) to the economizer on the outside of the unit (in the same location from which the OAT was removed) using the 2 screws provided. See Fig. 17.
6. Reconnect the blue wire removed in Step 3 to the enthalpy sensor terminal +.
7. Cut the violet wire provided to desired length and terminate with quick-connect terminal provided. Route the violet wire from the enthalpy sensor terminal S, through the snap bushing, and to the economizer control module terminal S_O. See Fig. 18.
8. Set changeover set point to the desired location. See Fig. 24.

NOTE: For maximum benefit of outdoor air, set the enthalpy control to the "A" setting. At this setting, when the relative humidity is 50% and the outdoor air is below 74 F, the relay contacts on the sensor will be closed.

9. Reinstall economizer hoods if removed.

IMPORTANT: Be sure all seal strips and RTV sealant are intact. A watertight seal to inside of unit must be maintained.

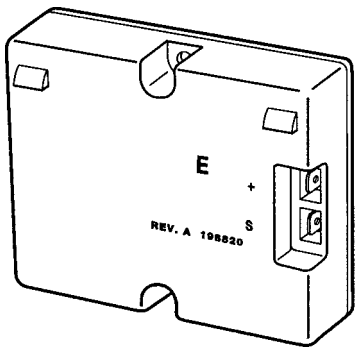
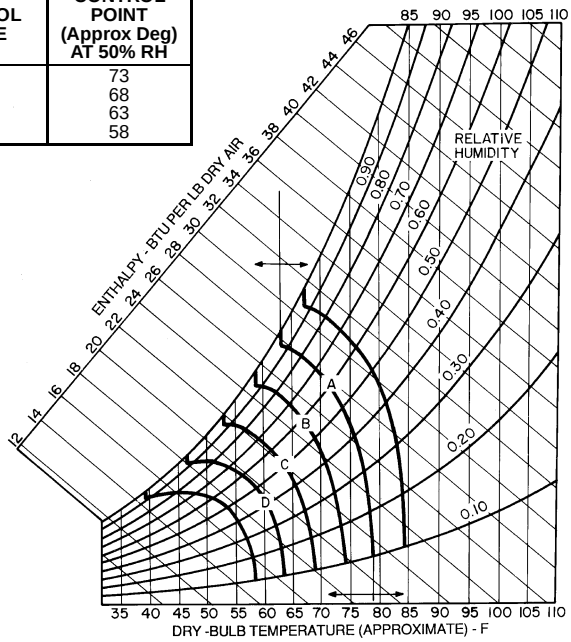


Fig. 23 — Outdoor-Air and Return-Air Enthalpy Sensor

CONTROL CURVE	CONTROL POINT (Approx Deg) AT 50% RH
A	73
B	68
C	63
D	58



RH — Relative Humidity

Fig. 24 — Psychrometric Chart for Solid-State Enthalpy Control

B. Differential Enthalpy Control

NOTE: The accessory outdoor-air enthalpy sensor must be installed BEFORE the economizer hoods are installed on the unit or hoods will have to be removed.

1. Remove and discard the factory-installed jumper assembly containing the 800-ohm resistor on the economizer control module (between terminals S_R and +). See Fig. 18.
2. Disconnect black wire from economizer control module terminal S_O and blue wire from the OAT (outdoor-air thermostat).
3. Remove OAT and black wire assembly containing the 620-ohm resistor from the outside of the economizer (see Fig. 17).
4. Mount the outdoor-air enthalpy sensor (first sensor) to the economizer on the outside of the unit (in the same location from which the OAT was removed) using the 2 screws provided. See Fig. 17.
5. Reconnect the blue wire removed in Step 2 to the enthalpy sensor terminal +.
6. Cut the violet wire provided to desired length and terminate with quick-connect terminal provided. Route the violet wire from the enthalpy sensor terminal S, through the snap bushing, and to the economizer control module terminal S_O.
7. Mount the second enthalpy sensor in the return-air duct (return-air sensor).
8. Route the blue wire (provided) from terminal + on the return-air enthalpy sensor to the economizer control module terminal +.
9. Route the violet wire (provided) from terminal S on the return-air enthalpy sensor to the economizer control module terminal S_R.
10. Turn changeover set point dial clockwise past the "D" setting, or the control will not operate on a differential. See Fig. 18.
11. Reinstall economizer hood if removed.

IMPORTANT: Be sure all seal strips and RTV sealant are intact. A watertight seal to inside of unit must be maintained.

XI. STEP 11 — INSTALL ALL ACCESSORIES

After all the factory-installed options have been adjusted, install all field-installed accessories. Refer to the accessory installation instructions included with each accessory.

A. Motormaster® I Control Installation (581A155 and 180 Only)

Install Field-Fabricated Wind Baffles

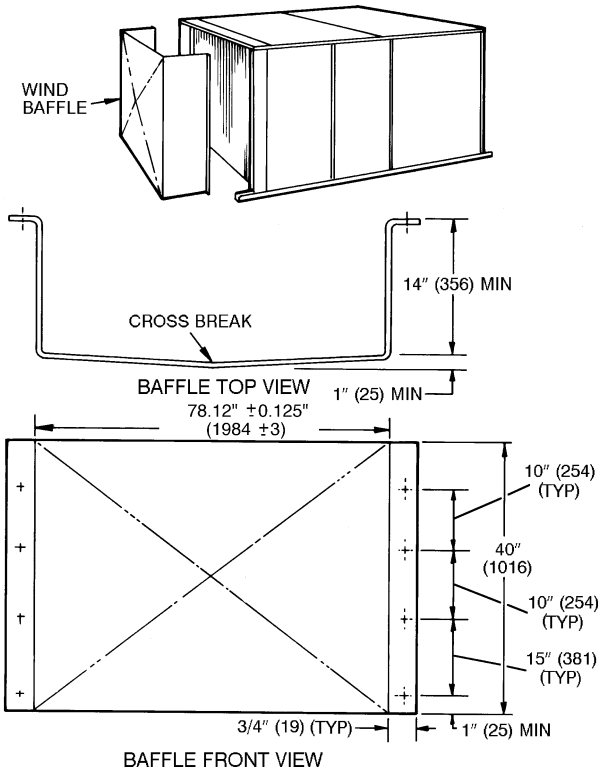
Wind baffles must be field-fabricated for all units to ensure proper cooling cycle operation at low ambient temperatures. See Fig. 25 for baffle details. Use 20-gage, galvanized sheet metal, or similar corrosion-resistant metal for baffles. Use field-supplied screws to attach baffles to unit. Screws should be $^1/_4$-in. diameter and $^5/_8$-in. long. Drill required screw holes for mounting baffles.

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

Install Motormaster I Controls

Only one Motormaster I control is required per unit. The Motormaster I control must be used in conjunction with the Accessory 0° F Low Ambient Kit (purchased separately). The Motormaster I device controls outdoor fan no. 1 while outdoor fans no. 2 and 3 are sequenced off by the Accessory 0° F Low Ambient Kit.

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



NOTE: Dimensions in ( ) are in mm.

Fig. 25 — Wind Baffle Details

Sensor Assembly — Install the sensor assembly in the location shown in Fig. 26.

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

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

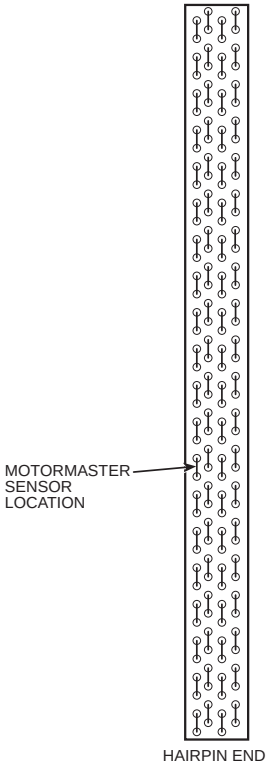
Motormaster® I Control — Recommended mounting location is on the inside of the panel to the left of the control box. The control should be mounted on the inside of the panel, vertically, with leads protruding from bottom of extrusion.

B. Motormaster III Control Installation (581A240)

Install Field-Fabricated Wind Baffles

Wind baffles must be field-fabricated for all units to ensure proper cooling cycle operation at low ambient temperatures. See Fig. 25 for baffle details. Use 20-gage, galvanized sheet metal, or similar corrosion-resistant metal for baffles. Use field-supplied screws to attach baffles to unit. Screws should be $^1/_4$-in. diameter and $^5/_8$-in. long. Drill required screw holes for mounting baffles.

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



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

Fig. 26 — Motormaster I and Motormaster III Sensor Locations

Replace Outdoor Motor

Replace outdoor-fan motor no. 1 with motor included in accessory kit. Existing motor is not Motormaster III compatible.

Install Motormaster III Controls

Only one Motormaster III control is required per unit.

Sensor — Install the sensor for thermistor input control in the location shown in Fig. 26. Connect sensor leads to the purple and grey control signal leads on the Motormaster III control.

Signal Selection Switch — Remove the cover of the Motormaster III control. Set the switch to accept the thermistor sensor input signal. Set the frequency to match the unit power supply (60 Hz).

Motormaster III Control — Recommended mounting location is beneath the control box, mounted to the partition that separates the control box section from the indoor section.

NOTE: If unit power is supplied through the roof curb and basepan of the unit, mount the Motormaster III control on the corner post adjacent to the conduit running from the basepan to the bottom of the control box.

START-UP

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

I. UNIT PREPARATION

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

II. SERVICE VALVES

Ensure that the liquid line service valve is open. Damage to the compressor could result if it is left closed.

III. COMPRESSOR MOUNTING

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

IV. REFRIGERANT SERVICE PORTS

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

V. COMPRESSOR ROTATION

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

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

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

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

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

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

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

VI. INTERNAL WIRING

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

VII. CRANKCASE HEATER(S)

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

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

VIII. EVAPORATOR FAN

Fan belt and variable pulleys are factory-installed. Remove tape from the fan pulley. See Tables 3-10 for Fan Performance Data. Be sure that fans rotate in the proper direction. See Table 11 for air quantity limits. See Table 12 for Evaporator Fan Motor Specifications. See Table 13 for static pressure information for accessories and options. See Table 14 for fan rpm at various motor pulley settings. To alter fan performance, see Evaporator Fan Performance Adjustment section on page 26.

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

IX. CONDENSER FANS AND MOTORS

Condenser fans and motors are factory set. Refer to Condenser-Fan Adjustment section (page 27) as required. Be sure that fans rotate in the proper direction.

X. RETURN-AIR FILTERS

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

XI. OUTDOOR-AIR INLET SCREENS

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

XII. ACCESSORY ECONOMIZER ADJUSTMENT

Remove filter access panel. Check that outdoor-air damper is closed and return-air damper is open.

Economizer operation and adjustment are described in Base Unit Operation section on page 24, and in Economizer Adjustment section on page 28.

Table 3 — Fan Performance — 581A155225 (Low Heat Units with Standard Indoor Fan Motor)

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)														
	0.2			0.4			0.6			0.8			1.0		
	Rpm	Watts	Bhp	Rpm	Watts	Bhp	Rpm	Watts	Bhp	Rpm	Watts	Bhp	Rpm	Watts	Bhp
3750	753	915	1.05	838	1066	1.23	945	1278	1.47	1044	1500	1.73	1138	1731	1.99
4000	755	991	1.14	865	1198	1.38	968	1414	1.63	1063	1639	1.89	1154	1873	2.15
4250	788	1129	1.30	894	1341	1.54	992	1562	1.80	1084	1791	2.06	1172	2029	2.33
4500	822	1280	1.47	923	1497	1.72	1017	1722	1.98	1106	1956	2.25	1191	2196	2.53
4750	857	1443	1.66	953	1666	1.92	1044	1896	2.18	1130	2133	2.45	1212	2377	2.73
5000	891	1620	1.86	984	1847	2.12	1071	2082	2.39	1154	2323	2.67	1234	2572	2.96
5250	927	1810	2.08	1015	2043	2.35	1099	2282	2.62	1180	2528	2.91	—	—	—
5500	962	2014	2.32	1047	2252	2.59	1129	2496	2.87	—	—	—	—	—	—
5750	998	2233	2.57	1080	2476	2.85	—	—	—	—	—	—	—	—	—
6000	1035	2466	2.84	—	—	—	—	—	—	—	—	—	—	—	—

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)														
	1.2			1.4			1.6			1.8			2.0		
	Rpm	Watts	Bhp	Rpm	Watts	Bhp	Rpm	Watts	Bhp	Rpm	Watts	Bhp	Rpm	Watts	Bhp
3750	1226	1971	2.27	1311	2218	2.55	1391	2474	2.85	—	—	—	—	—	—
4000	1240	2116	2.43	1322	2366	2.72	1401	2623	3.02	—	—	—	—	—	—
4250	1255	2274	2.61	1335	2526	2.91	—	—	—	—	—	—	—	—	—
4500	1272	2444	2.81	1350	2700	3.10	—	—	—	—	—	—	—	—	—
4750	1291	2628	3.02	—	—	—	—	—	—	—	—	—	—	—	—
5000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
5250	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
5500	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
5750	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
6000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

LEGEND

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

*Standard low-medium static drive range is 834 to 1064 rpm. Alternate high-static drive range is 1161 to 1426. Other rpms require a field-supplied drive.

NOTES:

1. Maximum continuous bhp for the standard motor is 3.13. The maximum continuous watts is 2700. Do not adjust motor rpm such that motor maximum bhp and/or watts is exceeded at the maximum operating cfm.
2. Static pressure losses (i.e., economizer) must be added to external static pressure before entering Fan Performance table.
3. Interpolation is permissible. Do not extrapolate.
4. Fan performance is based on wet coils, clean filters, and casing losses. See Table 13 for accessory/FIOP static pressure information.
5. Extensive motor and drive testing on these units ensures that the full bhp and watts range of the motor can be utilized with confidence. Using your fan motors up to the watts or bhp rating shown will not result in nuisance tripping or premature motor failure. Unit warranty will not be affected.
6. Use of a field-supplied motor may affect wiring size. Contact your Bryant representative for details.

Table 4 — Fan Performance — 581A155225 (Low Heat Units with Optional Indoor Fan Motor)

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)														
	0.2			0.4			0.6			0.8			1.0		
	Rpm	Watts	Bhp	Rpm	Watts	Bhp	Rpm	Watts	Bhp	Rpm	Watts	Bhp	Rpm	Watts	Bhp
3750	753	942	1.08	838	1091	1.25	945	1298	1.49	1044	1513	1.74	1138	1737	2.00
4000	755	1020	1.17	865	1223	1.41	968	1433	1.65	1063	1652	1.90	1154	1878	2.16
4250	788	1159	1.33	894	1366	1.57	992	1581	1.82	1084	1803	2.07	1172	2032	2.34
4500	822	1311	1.51	923	1522	1.75	1017	1740	2.00	1106	1966	2.26	1191	2197	2.53
4750	857	1474	1.70	953	1690	1.94	1044	1912	2.20	1130	2141	2.46	1212	2376	2.73
5000	891	1650	1.90	984	1871	2.15	1071	2097	2.41	1154	2329	2.68	1234	2567	2.95
5250	927	1840	2.12	1015	2065	2.37	1099	2295	2.64	1180	2530	2.91	1257	2771	3.19
5500	962	2042	2.35	1047	2272	2.61	1129	2506	2.88	1207	2745	3.16	1281	2989	3.44
5750	998	2259	2.60	1080	2492	2.87	1159	2730	3.14	1234	2973	3.42	1307	3221	3.70
6000	1035	2489	2.86	1114	2727	3.14	1189	2969	3.41	1262	3215	3.70	1333	3466	3.99

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)														
	1.2			1.4			1.6			1.8			2.0		
	Rpm	Watts	Bhp	Rpm	Watts	Bhp	Rpm	Watts	Bhp	Rpm	Watts	Bhp	Rpm	Watts	Bhp
3750	1226	1968	2.26	1311	2206	2.54	1391	2451	2.82	1468	2702	3.11	1543	2959	3.40
4000	1240	2111	2.43	1322	2351	2.70	1401	2598	2.99	1476	2850	3.28	1549	3108	3.57
4250	1255	2267	2.61	1335	2509	2.89	1412	2757	3.17	1486	3011	3.46	—	—	—
4500	1272	2436	2.80	1350	2680	3.08	1425	2929	3.37	1497	3185	3.66	—	—	—
4750	1291	2616	3.01	1366	2863	3.29	1440	3115	3.58	1510	3372	3.88	—	—	—
5000	1310	2810	3.23	1384	3059	3.52	1456	3314	3.81	1525	3573	4.11	—	—	—
5250	1332	3018	3.47	1403	3269	3.76	1473	3526	4.05	—	—	—	—	—	—
5500	1354	3238	3.72	1424	3492	4.02	1491	3751	4.31	—	—	—	—	—	—
5750	1377	3473	3.99	1445	3730	4.29	—	—	—	—	—	—	—	—	—
6000	1401	3722	4.28	—	—	—	—	—	—	—	—	—	—	—	—

LEGEND

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

*Standard low-medium static drive range is 834 to 1064 rpm. Alternate high-static drive range is 1161 to 1426. Other rpms require a field-supplied drive.

NOTES:

1. Maximum continuous bhp for the optional motor is 4.38. The maximum continuous watts is 3775. Do not adjust motor rpm such that motor maximum bhp and/or watts is exceeded at the maximum operating cfm.
2. Static pressure losses (i.e., economizer) must be added to external static pressure before entering Fan Performance table.
3. Interpolation is permissible. Do not extrapolate.
4. Fan performance is based on wet coils, clean filters, and casing losses. See Table 13 for accessory/FIOP static pressure information.
5. Extensive motor and drive testing on these units ensures that the full bhp and watts range of the motor can be utilized with confidence. Using your fan motors up to the watts or bhp rating shown will not result in nuisance tripping or premature motor failure. Unit warranty will not be affected.
6. Use of a field-supplied motor may affect wiring size. Contact your Bryant representative for details.

Table 5 — Fan Performance — 581A180270 (Low Heat Units)

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

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

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

LEGEND

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

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

NOTES:

1. Maximum continuous bhp for the standard motor is 6.13. The maximum continuous watts is 5180. Do not adjust motor rpm such that motor maximum bhp and/or watts is exceeded at the maximum operating cfm.
2. Static pressure losses (i.e., economizer) must be added to external static pressure before entering Fan Performance table.
3. Interpolation is permissible. Do not extrapolate.
4. Fan performance is based on wet coils, clean filters, and casing losses. See Table 13 for accessory/FIOP static pressure information.
5. Extensive motor and drive testing on these units ensures that the full bhp and watts range of the motor can be utilized with confidence. Using your fan motors up to the watts or bhp rating shown will not result in nuisance tripping or premature motor failure. Unit warranty will not be affected.
6. Use of a field-supplied motor may affect wiring size. Contact your Bryant representative for details.

Table 6 — Fan Performance — 581A240270 (Low Heat Units)

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)														
	0.2			0.4			0.6			0.8			1.0		
	Rpm	Watts	Bhp	Rpm	Watts	Bhp	Rpm	Watts	Bhp	Rpm	Watts	Bhp	Rpm	Watts	Bhp
6,000	824	2607	3.09	894	2844	3.37	961	3085	3.66	1023	3330	3.95	1083	3578	4.24
6,500	881	3030	3.59	947	3266	3.88	1009	3507	4.16	1069	3751	4.45	1126	3998	4.74
7,000	939	3488	4.14	1001	3725	4.42	1060	3965	4.70	1116	4208	4.99	1170	4454	5.28
7,500	998	3982	4.72	1055	4218	5.00	1111	4458	5.29	1165	4701	5.58	1217	4946	5.87
8,000	1056	4512	5.35	1111	4748	5.63	1164	4988	5.92	1215	5230	6.20	1264	5474	6.49
8,500	1116	5077	6.02	1167	5314	6.30	1218	5553	6.59	1266	5795	6.87	1314	6039	7.16
9,000	1175	5678	6.74	1224	5915	7.02	1272	6154	7.30	1319	6395	7.59	1364	6639	7.88
9,500	1235	6315	7.49	1282	6552	7.77	1327	6791	8.06	1372	7033	8.34	1415	7276	8.63
10,000	1295	6988	8.29	1340	7225	8.57	1383	7465	8.86	1426	7706	9.14	1468	7949	9.43

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)														
	1.2			1.4			1.6			1.8			2.0		
	Rpm	Watts	Bhp	Rpm	Watts	Bhp	Rpm	Watts	Bhp	Rpm	Watts	Bhp	Rpm	Watts	Bhp
6,000	1141	3829	4.54	1196	4082	4.84	1249	4337	5.15	1301	4596	5.45	1351	4856	5.76
6,500	1181	4247	5.04	1234	4499	5.34	1285	4753	5.64	1334	5009	5.94	1383	5267	6.25
7,000	1223	4702	5.58	1274	4953	5.88	1323	5205	6.18	1371	5460	6.48	1417	5716	6.78
7,500	1267	5194	6.16	1316	5443	6.46	1363	5694	6.76	1409	5947	7.06	1454	6202	7.36
8,000	1313	5721	6.79	1359	5970	7.08	1405	6220	7.38	1449	6472	7.68	1493	6726	7.98
8,500	1360	6285	7.46	1405	6533	7.75	1449	6783	8.05	1491	7034	8.34	1533	7286	8.64
9,000	1408	6885	8.17	1451	7132	8.46	1494	7381	8.76	1535	7631	9.05	—	—	—
9,500	1458	7521	8.92	1499	7768	9.22	1540	8016	9.51	—	—	—	—	—	—
10,000	1508	8193	9.72	1549	8440	10.01	—	—	—	—	—	—	—	—	—

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)														
	2.2			2.4			2.6			2.8			3.0		
	Rpm	Watts	Bhp	Rpm	Watts	Bhp	Rpm	Watts	Bhp	Rpm	Watts	Bhp	Rpm	Watts	Bhp
6,000	1399	5118	6.07	1446	5381	6.38	1492	5647	6.70	1537	5914	7.02	—	—	—
6,500	1429	5527	6.56	1475	5789	6.87	1520	6052	7.18	—	—	—	—	—	—
7,000	1462	5974	7.09	1507	6234	7.40	1550	6495	7.71	—	—	—	—	—	—
7,500	1498	6459	7.66	1540	6717	7.97	—	—	—	—	—	—	—	—	—
8,000	1535	6981	8.28	—	—	—	—	—	—	—	—	—	—	—	—
8,500	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
9,000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
9,500	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
10,000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

LEGEND

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

*Standard low-medium static drive range is 1002 to 1151 rpm. Alternate high-static drive range is 1193 to 1369. Other rpms require a field-supplied drive.

NOTES:

1. Maximum continuous bhp for the standard motor is 9.47 (for 208-v units) and 10.33 (for 230 and 460-v units). The maximum continuous watts is 7915 (for 208-v units) and 8640 (for 230 and 460-v units). Do not adjust motor rpm such that motor maximum bhp and/or watts is exceeded at the maximum operating cfm.
2. Static pressure losses (i.e., economizer) must be added to external static pressure before entering Fan Performance table.
3. Interpolation is permissible. Do not extrapolate.
4. Fan performance is based on wet coils, clean filters, and casing losses. See Table 13 for accessory/FIOP static pressure information.
5. Extensive motor and drive testing on these units ensures that the full bhp and watts range of the motor can be utilized with confidence. Using your fan motors up to the watts or bhp rating shown will not result in nuisance tripping or premature motor failure. Unit warranty will not be affected.
6. Use of a field-supplied motor may affect wiring size. Contact your Bryant representative for details.

Table 7 — Fan Performance — 581A155300 (High Heat Units with Standard Indoor Fan Motor

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)														
	0.2			0.4			0.6			0.8			1.0		
	Rpm	Watts	Bhp	Rpm	Watts	Bhp	Rpm	Watts	Bhp	Rpm	Watts	Bhp	Rpm	Watts	Bhp
3750	753	915	1.05	844	1077	1.24	949	1287	1.48	1047	1507	1.73	1139	1735	2.00
4000	764	1006	1.16	872	1211	1.39	972	1425	1.64	1067	1648	1.90	1156	1880	2.16
4250	798	1147	1.32	901	1357	1.56	997	1576	1.81	1089	1803	2.07	1175	2038	2.34
4500	832	1301	1.50	931	1516	1.74	1024	1739	2.00	1112	1970	2.27	1195	2209	2.54
4750	868	1467	1.69	962	1688	1.94	1051	1916	2.20	1136	2151	2.47	1217	2393	2.75
5000	903	1648	1.89	994	1873	2.15	1079	2106	2.42	1161	2345	2.70	1240	2590	2.98
5250	939	1842	2.12	1026	2073	2.38	1109	2309	2.66	1188	2553	2.9	—	—	—
5500	976	2050	2.36	1059	2286	2.63	1139	2528	2.91	—	—	—	—	—	—
5750	1012	2273	2.61	1093	2514	2.89	—	—	—	—	—	—	—	—	—
6000	1049	2511	2.89	—	—	—	—	—	—	—	—	—	—	—	—

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)														
	1.2			1.4			1.6			1.8			2.0		
	Rpm	Watts	Bhp	Rpm	Watts	Bhp	Rpm	Watts	Bhp	Rpm	Watts	Bhp	Rpm	Watts	Bhp
3750	1227	1973	2.27	1310	2218	2.55	1390	2471	2.84	—	—	—	—	—	—
4000	1241	2120	2.44	1323	2368	2.72	1400	2623	3.02	—	—	—	—	—	—
4250	1258	2281	2.62	1337	2531	2.91	—	—	—	—	—	—	—	—	—
4500	1275	2454	2.82	—	—	—	—	—	—	—	—	—	—	—	—
4750	1295	2642	3.04	—	—	—	—	—	—	—	—	—	—	—	—
5000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
5250	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
5500	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
5750	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
6000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

LEGEND

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

*Standard low-medium static drive range is 834 to 1064 rpm. Alternate high-static drive range is 1161 to 1426. Other rpms require a field-supplied drive.

NOTES:

1. Maximum continuous bhp for the standard motor is 3.13. The maximum continuous watts is 2700. Do not adjust motor rpm such that motor maximum bhp and/or watts is exceeded at the maximum operating cfm.
2. Static pressure losses (i.e., economizer) must be added to external static pressure before entering Fan Performance table.
3. Interpolation is permissible. Do not extrapolate.
4. Fan performance is based on wet coils, clean filters, and casing losses. See Table 13 for accessory/FIOP static pressure information.
5. Extensive motor and drive testing on these units ensures that the full bhp and watts range of the motor can be utilized with confidence. Using your fan motors up to the watts or bhp rating shown will not result in nuisance tripping or premature motor failure. Unit warranty will not be affected.
6. Use of a field-supplied motor may affect wiring size. Contact your Bryant representative for details.

Table 8 — Fan Performance — 581A155300 (High Heat Units with Optional Indoor Fan Motor)

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)														
	0.2			0.4			0.6			0.8			1.0		
	Rpm	Watts	Bhp	Rpm	Watts	Bhp	Rpm	Watts	Bhp	Rpm	Watts	Bhp	Rpm	Watts	Bhp
3750	753	942	1.08	844	1101	1.27	949	1306	1.50	1047	1520	1.75	1139	1741	2.00
4000	764	1035	1.19	872	1236	1.42	972	1444	1.66	1067	1661	1.91	1156	1885	2.17
4250	798	1177	1.35	901	1382	1.59	997	1594	1.83	1089	1814	2.09	1175	2041	2.35
4500	832	1331	1.53	931	1540	1.77	1024	1757	2.02	1112	1980	2.28	1195	2209	2.54
4750	868	1498	1.72	962	1711	1.97	1051	1932	2.22	1136	2158	2.48	1217	2390	2.75
5000	903	1677	1.93	994	1896	2.18	1079	2120	2.44	1161	2350	2.70	1240	2585	2.97
5250	939	1871	2.15	1026	2093	2.41	1109	2321	2.67	1188	2554	2.94	1264	2793	3.21
5500	976	2077	2.39	1059	2304	2.65	1139	2536	2.92	1215	2773	3.19	1289	3015	3.47
5750	1012	2298	2.64	1093	2529	2.91	1170	2765	3.18	1244	3005	3.46	1315	3250	3.74
6000	1049	2533	2.91	1127	2768	3.18	1201	3008	3.46	1273	3252	3.74	1342	3500	4.03

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)														
	1.2			1.4			1.6			1.8			2.0		
	Rpm	Watts	Bhp	Rpm	Watts	Bhp	Rpm	Watts	Bhp	Rpm	Watts	Bhp	Rpm	Watts	Bhp
3750	1227	1970	2.27	1310	2206	2.54	1390	2448	2.82	1467	2696	3.10	1541	2951	3.39
4000	1241	2116	2.43	1323	2353	2.71	1400	2597	2.99	1475	2847	3.27	1548	3102	3.57
4250	1258	2274	2.62	1337	2513	2.89	1413	2759	3.17	1486	3010	3.46	—	—	—
4500	1275	2445	2.81	1352	2687	3.09	1426	2934	3.37	1498	3187	3.67	—	—	—
4750	1295	2629	3.02	1369	2873	3.30	1442	3122	3.59	1511	3377	3.88	—	—	—
5000	1315	2826	3.25	1388	3073	3.53	1458	3324	3.82	1527	3581	4.12	—	—	—
5250	1337	3037	3.49	1408	3286	3.78	1477	3540	4.07	—	—	—	—	—	—
5500	1360	3262	3.75	1429	3513	4.04	1496	3769	4.34	—	—	—	—	—	—
5750	1384	3500	4.03	1452	3755	4.32	—	—	—	—	—	—	—	—	—
6000	1410	3753	4.32	—	—	—	—	—	—	—	—	—	—	—	—

LEGEND

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

*Standard low-medium static drive range is 834 to 1064 rpm. Alternate high-static drive range is 1161 to 1426. Other rpms require a field-supplied drive.

NOTES:

1. Maximum continuous bhp for the optional motor is 4.38. The maximum continuous watts is 3775. Do not adjust motor rpm such that motor maximum bhp and/or watts is exceeded at the maximum operating cfm.
2. Static pressure losses (i.e., economizer) must be added to external static pressure before entering Fan Performance table.
3. Interpolation is permissible. Do not extrapolate.
4. Fan performance is based on wet coils, clean filters, and casing losses. See Table 13 for accessory/FIOP static pressure information.
5. Extensive motor and drive testing on these units ensures that the full bhp and watts range of the motor can be utilized with confidence. Using your fan motors up to the watts or bhp rating shown will not result in nuisance tripping or premature motor failure. Unit warranty will not be affected.
6. Use of a field-supplied motor may affect wiring size. Contact your Bryant representative for details.

Table 9 — Fan Performance — 581A180360 (High Heat Units)

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)														
	0.2			04			0.6			0.8			1.0		
	Rpm	Watts	Bhp	Rpm	Watts	Bhp	Rpm	Watts	Bhp	Rpm	Watts	Bhp	Rpm	Watts	Bhp
4500	753	1307	1.53	786	1404	1.65	861	1644	1.93	932	1893	2.22	997	2150	2.52
4800	747	1384	1.62	818	1603	1.88	890	1852	2.17	958	2108	2.47	1022	2373	2.78
5100	775	1571	1.84	850	1822	2.14	920	2079	2.44	986	2344	2.75	1048	2616	3.07
5700	849	2054	2.41	918	2323	2.73	982	2598	3.05	1044	2879	3.38	1102	3166	3.71
6000	886	2329	2.73	952	2607	3.06	1015	2891	3.39	1074	3180	3.73	1130	3474	4.08
6300	924	2628	3.08	987	2915	3.42	1047	3207	3.76	1105	3504	4.11	1160	3807	4.46
6600	962	2951	3.46	1023	3246	3.81	1081	3547	4.16	1136	3853	4.52	1190	4163	4.88
6900	1000	3298	3.87	1059	3603	4.23	1115	3912	4.59	1168	4225	4.96	1220	4543	5.33
7200	1038	3672	4.31	1095	3986	4.67	1149	4303	5.05	1201	4625	5.42	1251	4950	5.81
7500	1077	4072	4.78	1131	4394	5.15	1184	4720	5.54	1234	5050	5.92	—	—	—

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

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

LEGEND

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

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

NOTES:

1. Maximum continuous bhp for the standard motor is 6.13. The maximum continuous watts is 5180. Do not adjust motor rpm such that motor maximum bhp and/or watts is exceeded at the maximum operating cfm.
2. Static pressure losses (i.e., economizer) must be added to external static pressure before entering Fan Performance table.
3. Interpolation is permissible. Do not extrapolate.
4. Fan performance is based on wet coils, clean filters, and casing losses. See Table 13 for accessory/FIOP static pressure information.
5. Extensive motor and drive testing on these units ensures that the full bhp and watts range of the motor can be utilized with confidence. Using your fan motors up to the watts or bhp rating shown will not result in nuisance tripping or premature motor failure. Unit warranty will not be affected.
6. Use of a field-supplied motor may affect wiring size. Contact your Bryant representative for details.

Table 10 — Fan Performance — 581A240360 (High Heat Units)

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)														
	0.2			0.4			0.6			0.8			1.0		
	Rpm	Watts	Bhp	Rpm	Watts	Bhp	Rpm	Watts	Bhp	Rpm	Watts	Bhp	Rpm	Watts	Bhp
6,000	868	2752	3.26	934	2987	3.54	997	3227	3.83	1058	3470	4.12	1115	3716	4.41
6,500	929	3201	3.80	991	3436	4.08	1051	3675	4.36	1108	3917	4.65	1162	4163	4.94
7,000	991	3687	4.37	1049	3923	4.65	1105	4161	4.94	1159	4403	5.22	1211	4647	5.51
7,500	1054	4211	5.00	1109	4447	5.28	1161	4686	5.56	1213	4926	5.84	1262	5170	6.13
8,000	1117	4773	5.66	1168	5009	5.94	1218	5247	6.22	1267	5488	6.51	1314	5731	6.80
8,500	1180	5373	6.37	1229	5609	6.65	1277	5847	6.94	1323	6088	7.22	1368	6331	7.51
9,000	1244	6011	7.13	1290	6247	7.41	1335	6485	7.69	1380	6726	7.98	1423	6968	8.27
9,500	1308	6687	7.93	1352	6924	8.21	1395	7162	8.50	1437	7402	8.78	1479	7644	9.07
10,000	1372	7401	8.78	1414	7638	9.06	1455	7876	9.34	1496	8117	9.63	1535	8358	9.92

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)														
	1.2			1.4			1.6			1.8			2.0		
	Rpm	Watts	Bhp	Rpm	Watts	Bhp	Rpm	Watts	Bhp	Rpm	Watts	Bhp	Rpm	Watts	Bhp
6,000	1171	3965	4.70	1224	4216	5.00	1276	4469	5.30	1326	4726	5.61	1374	4983	5.91
6,500	1215	4410	5.23	1266	4659	5.53	1316	4911	5.83	1364	5165	6.13	1411	5421	6.43
7,000	1262	4894	5.81	1311	5142	6.10	1358	5392	6.40	1404	5645	6.70	1449	5899	7.00
7,500	1310	5415	6.42	1357	5663	6.72	1403	5912	7.01	1447	6164	7.31	1490	6416	7.61
8,000	1360	5976	7.09	1405	6222	7.38	1449	6471	7.68	1492	6721	7.97	1533	6973	8.27
8,500	1412	6575	7.80	1455	6821	8.09	1497	7068	8.39	1538	7318	8.68	—	—	—
9,000	1465	7212	8.56	1506	7457	8.85	1547	7705	9.14	—	—	—	—	—	—
9,500	1519	7888	9.36	—	—	—	—	—	—	—	—	—	—	—	—
10,000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)														
	2.2			2.4			2.6			2.8			3.0		
	Rpm	Watts	Bhp	Rpm	Watts	Bhp	Rpm	Watts	Bhp	Rpm	Watts	Bhp	Rpm	Watts	Bhp
6,000	1422	5243	6.22	1468	5505	6.53	1513	5768	6.84	—	—	—	—	—	—
6,500	1456	5679	6.74	1501	5938	7.04	1544	6199	7.35	—	—	—	—	—	—
7,000	1493	6155	7.30	1536	6412	7.61	—	—	—	—	—	—	—	—	—
7,500	1533	6670	7.91	—	—	—	—	—	—	—	—	—	—	—	—
8,000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
8,500	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
9,000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
9,500	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
10,000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

LEGEND

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

*Standard low-medium static drive range is 1002 to 1151 rpm. Alternate high-static drive range is 1193 to 1369. Other rpms require a field-supplied drive.

NOTES:

1. Maximum continuous bhp for the standard motor is 9.47 (for 208-v units) and 10.33 (for 230 and 460-v units). The maximum continuous watts is 7915 (for 208 and 575-v units) and 8640 (for 230 and 460-v units). Do not adjust motor rpm such that motor maximum bhp and/or watts is exceeded at the maximum operating cfm.
2. Static pressure losses (i.e., economizer) must be added to external static pressure before entering Fan Performance table.
3. Interpolation is permissible. Do not extrapolate.4
4. Fan performance is based on wet coils, clean filters, and casing losses. See Table 13 for accessory/FIOP static pressure information.
5. Extensive motor and drive testing on these units ensures that the full bhp and watts range of the motor can be utilized with confidence. Using your fan motors up to the watts or bhp rating shown will not result in nuisance tripping or premature motor failure. Unit warranty will not be affected.
6. Use of a field-supplied motor may affect wiring size. Contact your Bryant representative for details.

Table 11 — Air Quantity Limits

UNIT 581A	MINIMUM CFM	MAXIMUM CFM
155	3600	6,000
180	4500	7,500
240	6000	10,000

Table 12 — Evaporator Fan Motor Specifications

UNIT 581A	NOMINAL Hp	VOLTAGE	MAX WATTS	EFF.	MAX BHP	MAX BkW	MAX AMPS
155 (Standard Motor)	2.9	208	2700	85.8%	3.13	2.34	9.46
	2.9	230	2700	85.8%	3.13	2.34	8.6
	2.9	460	2700	85.8%	3.13	2.34	4.3
155 (Optional Motor)	3.7	208	3775	85.8%	4.38	3.27	10.5
	3.7	230	3775	85.8%	4.38	3.27	10.5
	3.7	460	3775	85.8%	4.38	3.27	4.8
180	5	208	5180	87.5%	6.13	4.57	15.8
	5	230	5180	87.5%	6.13	4.57	15.8
	5	460	5180	87.5%	6.13	4.57	7.9
240	7.5	208	7915	88.5%	9.47	7.06	22
	7.5	230	8640	88.5%	10.33	7.71	22
	7.5	460	8640	88.5%	10.33	7.71	13

BHP — Brake Horsepower

Table 13 — Accessory/FIOP Economizer Static Pressure (in. wg)

UNIT 581A	UNIT VOLTAGE	CFM	ECONOMIZER PRESSURE DROP
155, 180	All	3,750	.03
		4,000	.03
		5,000	.05
		6,000	.07
		7,500	.10
240	All	6,000	.07
		7,200	.09
		9,000	.11
		10,000	.12

LEGEND

bhp — Brake Horsepower
FIOP — Factory-Installed Option

NOTES:

1. The factory-assembled horizontal adapter substantially improves fan performance. See Fig. 27.
2. The static pressure must be added to external static pressure. The sum and the evaporator entering-air cfm should then be used in conjunction with the Fan Performance table to determine blower rpm, bhp, and watts.

Table 14 — Fan RPM at Motor Pulley Setting*

581A	0	$^1/_2$	1	$1^1/_2$	2	$2^1/_2$	3	$3^1/_2$	4	$4^1/_2$	5	$5^1/_2$	6
155†	††	††	††	††	1064	1035	1006	978	949	920	891	863	834
155**	††	††	††	††	1426	1393	1360	1327	1294	1261	1227	1194	1161
180†	††	††	††	††	1021	1002	984	965	947	928	910	891	873
180**	††	††	††	††	1200	1178	1156	1134	1112	1091	1069	1047	1025
240†	††	††	††	††	1151	1132	1114	1095	1077	1058	1040	1021	1002
240**	††	††	††	††	1369	1347	1325	1303	1281	1259	1237	1215	1193

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

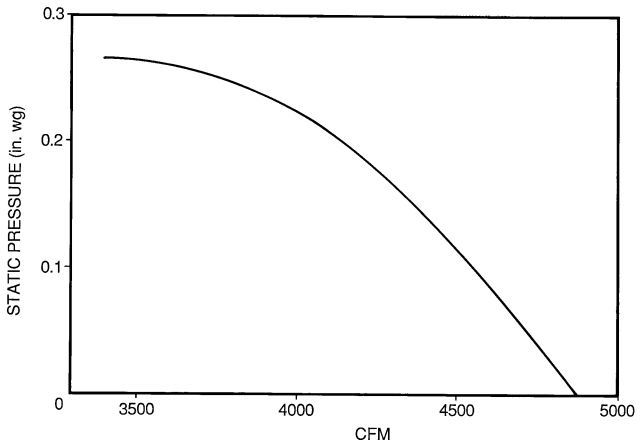


Fig. 27 — Fan Performance Using Accessory Power Exhaust

XIII. GAS HEAT

Verify gas pressures before turning on heat as follows:

1. Turn off manual gas stop.
2. Connect pressure gage to supply gas pressure tap (see Fig. 13).
3. Connect pressure gage to manifold pressure tap on gas valve.
4. Turn on manual gas stop and set thermostat to HEAT position. After the unit has run for several minutes, verify that incoming pressure is 5.5 in. wg or greater, and that the manifold pressure is 3.3 in. wg. If manifold pressure must be adjusted, refer to Gas Valve Adjustment section on page 29.
5. After unit has been in operation for 5 minutes, check temperature rise across the heat exchangers. See unit informative plate for correct rise limits of the heat supplied. Air quantities may need to be adjusted to bring the actual rise to within the allowable limits.

XIV. BASE UNIT OPERATION

A. Cooling, Units Without Economizer

When thermostat calls for cooling, terminals G and Y1 are energized. The indoor (evaporator) fan contactor (IFC) and-compressor contactor no. 1 (C1) are energized and evaporator-fan motor (IFM), compressor no. 1 and condenser fan start. The condenser-fan motors run continuously while unit is cooling. If the thermostat calls for a second stage of cooling by energizing Y2, compressor contactor no. 2 (C2) is energized and compressor no. 2 starts.

B. Heating, Units Without Economizer

NOTE: The 581A155-240 units have 2 stages of heat.

When the thermostat calls for heating, power is sent to W on the IGC (integrated gas unit controller) board. An LED (light-emitting diode) on the IGC board will be on during normal operation. A check is made to ensure that the rollout switch and limit switch are closed and the induced-draft motor is running. The induced-draft motor is then energized, and when speed is proven with the hall effect sensor on the motor, the ignition activation period begins. The burners will ignite within 5 seconds.

If the burners do not light, there is a 22-second delay before another 5-second attempt. If the burners still do not light, this sequence is repeated for 15 minutes. After the 15 minutes have elapsed, if the burners still have not lighted, heating is locked out. To reset the control, break 24-v power to the thermostat.

When ignition occurs the IGC board will continue to monitor the condition of the rollout and limit switches, the hall effect sensor, as well as the flame sensor. If the unit is controlled through a room thermostat set for fan auto.,45 seconds after ignition occurs, the indoor-fan motor will be energized (and the outdoor-air dampers will open to their minimum position). If for some reason the overtemperature limit opens prior to the start of the indoor fan blower, on the next attempt, the 45-second delay will be shortened to 5 seconds less than the time from initiation of heat to when the limit tripped. Gas will not be interrupted to the burners and heating will continue. Once modified, the fan on delay will not change back to 45 seconds unless power is reset to the control.

When additional heat is required, W2 closes and initiates power to the second stage of the main gas valve. When the thermostat is satisfied, W1 and W2 open and the gas valve closes, interrupting the flow of gas to the main burners. If the call for W1 lasted less than 1 minute, the heating cycle will not terminate until 1 minute after W1 became active. If the unit is controlled through a room thermostat set for fan auto., the indoor-fan motor will continue to operate for an additional 45 seconds then stop (and the outdoor-air dampers will close). If the overtemperature limit opens after the indoor motor is stopped within 10 minutes of W1 becoming inactive, on the next cycle the time will be extended by 15 seconds. The maximum delay is 3 minutes. Once modified, the fan off delay will not change back to 45 seconds unless power is reset to the control.

A LED indicator is provided on the IGC to monitor operation. The IGC is located by removing the side panel and viewing the IGC through the view port located in the control box access panel. See Fig. 28. During normal operation, the LED is continuously on. See Table 15 for error codes.

Table 15 — IGC LED Indications

ERROR CODE	LED INDICATION
Normal Operation	On
HardwareFailure	Off
Fan On/Off Delay Modified	1 Flash
Limit Switch Fault	2 Flashes
Flame Sense Fault	3 Flashes
Five Consecutive Limit Switch Faults	4 Flashes
Ignition Lockout Fault	5 Flashes
Inducer Switch Fault	6 Flashes
Rollout Switch Fault	7 Flashes
Internal Control Fault	8 Flashes

LEGEND

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

NOTES:
1. There is a 3-second pause between error code displays.
2. If more than one error code exists, all applicable error codes will be displayed in numerical sequence.
3. Error codes on the IGC will be lost if power to the unit is interrupted.

C. Cooling, Units With Economizer

Upon a call for cooling, when outdoor ambient is above the changeover control setting, the economizer damper moves to VENT position. The compressors and evaporator and condenser fans energize and operate as per Cooling, Units Without Economizer section on this page.

Upon a first call for cooling, when outdoor ambient is below the changeover control setting, the evaporator fan starts and the economizer is fully open. The compressors remain off.

Upon a second-stage call for cooling, compressor no. 1 is energized and mechanical cooling is integrated with economizer cooling. If the outdoor-air temperature drops below 50 F, a cooling lockout switch prevents the compressors from running.

When supply-air temperature drops below a fixed set point, the economizer damper modulates to maintain the temperature at the fixed set point.

D. Freeze Protection Thermostats

A freeze protection thermostat is located on the top and bottom of the evaporator coil. It detects frost build-up and locks out the compressors, allowing the coil to clear. Once frost has melted, the compressors can be reenergized by resetting the compressor lockout.

E. Heating, Units With Economizer

Outdoor-air damper stays at VENT position while evaporator fan is operating. Refer to Heating, Units without Economizer section on page 24 for heating sequence of operation.

SERVICE

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

I. CLEANING

Inspect unit interior at beginning of each heating and cooling season and as operating conditions require. Remove unit top panel and/or side panels for access to unit interior.

A. Evaporator Coil

Clean as required with commercial coil cleaner. Wash both sides of coil and flush with clean water.

B. Condenser Coil

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

C. Condensate Drain

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

D. Filters

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

E. Outdoor-Air Inlet Screens

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

F. Main Burner

At the beginning of each heating season, inspect for deterioration or blockage due to corrosion or other causes. Observe the main burner flames. Refer to Main Burners section on page 29.

G. Flue Gas Passageways

The flue collector box and heat exchanger cells may be inspected by removing heat exchanger access panel (Fig. 4 and 5), flue box cover, and main burner assembly (Fig. 28). Refer to Main Burners section on page 29 for burner removal sequence. If cleaning is required, remove heat exchanger baffles and clean tubes with a wire brush.

Use caution with ceramic heat exchanger baffles. When installing retaining clip, be sure the center leg of the clip extends inward toward baffle. See Fig. 29.

H. Combustion-Air Blower

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

To inspect blower wheel, remove heat exchanger access panel. Shine a flashlight into opening to inspect wheel. If cleaning is required, remove motor and wheel assembly by removing screws holding motor mounting plate to top of combustion fan housing (Fig. 28). The motor and wheel assembly will slide up and out of the fan housing. Remove the blower wheel from the motor shaft and clean with a detergent or solvent. Replace motor and wheel assembly.

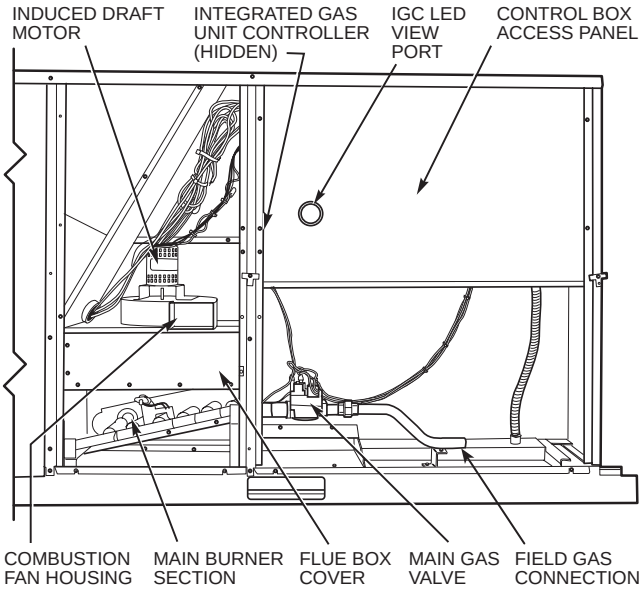
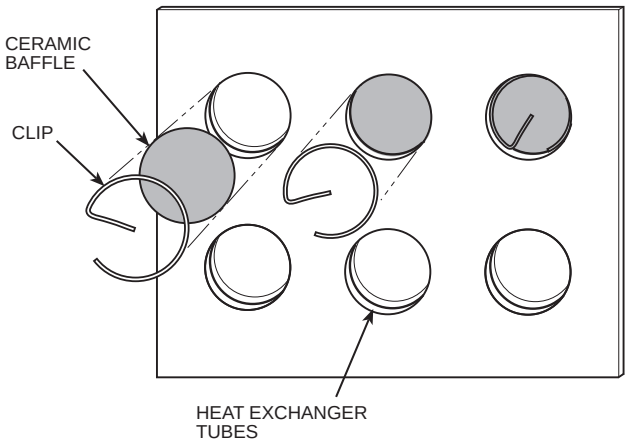


Fig. 28 — Typical Gas Heating Section



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

Fig. 29 — Removing Heat Exchanger Ceramic Baffles and Clips

II. LUBRICATION

A. Compressors

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

B. Fan Shaft Bearings

For size 155 units, bearings are permanently lubricated. No field lubrication is required. For size 180 and 240 units, lubricate bearings at least every 6 months with suitable bearing grease. Extended grease line is provided for far side fan bearing (opposite drive side). Typical lubricants are given below:

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

*Preferred lubricant because it contains rust and oxidation inhibitors.

C. Condenser and Evaporator-Fan Motor Bearings

The condenser- and evaporator-fan motors have permanently sealed bearings, so no field lubrication is necessary.

III. EVAPORATOR FAN PERFORMANCE ADJUSTMENT (Fig. 30-32)

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

To change fan speeds:

1. Shut off unit power supply.
2. *Size 155 only:*

   Loosen belt by loosening carriage nuts holding motor mount assembly to fan scroll side plates (A and B).

   Size 180, 240 only:

   Loosen nuts on the 2 carriage bolts in the mounting base. Install jacking bolt and plateunder motor base (bolt and plate are shipped in installer's packet). Using bolt and plate, raise motor to top of slide and remove belt. Secure motor in this position by tightening the nuts on the carriage bolts.
3. Loosen movable-pulley flange setscrew (see Fig. 30).
4. Screw movable flange toward fixed flange to increase speed and away from fixed flange to decrease speed. Increasing fan speed increases load on motor. Do not exceed maximum speed specified in Table 1.

   See Table 11 for air quantity limits.
5. Set movable flange at nearest keyway of pulley hub and tighten setscrew. (See Table 1 for speed change for each full turn of pulley flange.)
6. Replace and tighten belts (see Belt Tension Adjustment section on page 27).

To align fan and motor pulleys:

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

IV. EVAPORATOR FAN SERVICE AND REPLACEMENT

A. 581A155 Units (See Fig. 31)

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

1. Remove filter and supply-air section panels.
2. Remove unit top panel.
3. Loosen carriage nuts A and B holding motor mount assembly to fan scroll side plates.
4. Loosen screw C.
5. Rotate motor mount assembly (with motor attached) as far as possible away from evaporator coil.
6. Remove belt.
7. Rotate motor mount assembly back past original position toward evaporator coil.
8. Remove motor mounting nuts D and E (both sides).
9. Lift motor up through top of unit.
10. Reverse above procedure to reinstall motor.
11. Check and adjust belt tension as necessary.

B. 581A180 and 240 Units (See Fig. 32)

The 581A180 and 240 units use a fan motor mounting system that features a slide-out motor mounting plate. To replace or service the motor, slide out the bracket.

1. Remove the evaporator-fan access panel and the heating control access panel.
2. Remove the center post (located between the evaporator fan and heating control access panels) and all screws securing it.
3. Loosen nuts on the 2 carriage bolts in the motor mounting base.
4. Using jacking bolt under motor base, raise motor to top of slide and remove belt. Secure motor in this position by tightening the nuts on the carriage bolts.
5. Remove the belt drive.

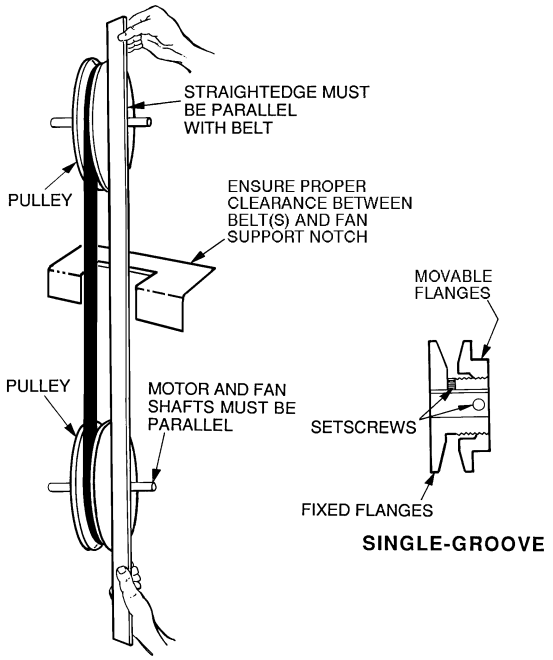


Fig. 30 — Evaporator-Fan Alignment and Adjustment

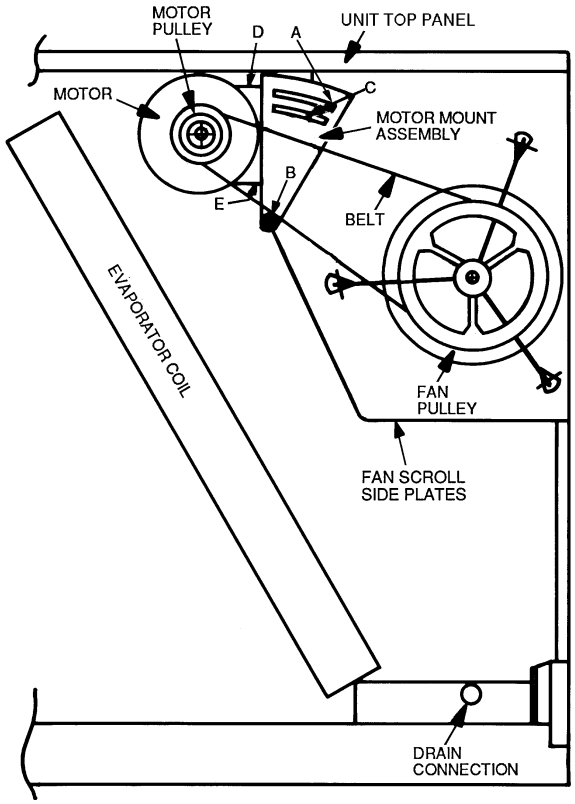
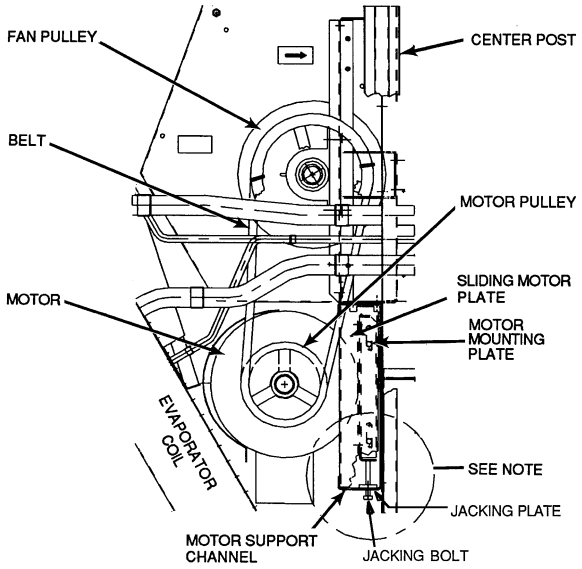


Fig. 31 — 581A155 Evaporator-Fan Motor Adjustment



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

Fig. 32 — 581A180 and 240 Evaporator-Fan Motor Section

6. Remove jacking bolt and tapped jacking bolt plate.
7. Remove the 2 screws that secure the motor mounting plate to the motor support channel.
8. Remove the 3 screws from the end of the motor support channel that interfere with the motor slide path.
9. Slide out the motor and motor mounting plate.
10. Disconnect wiring connections and remove the 4 mounting bolts.
11. Remove the motor.
12. To install the new motor, reverse Steps 1-11.

V. BELT TENSION ADJUSTMENT

To adjust belt tension:

1. Loosen fan motor bolts.
2. *Size 155 Units*:

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

   Size 180 and 240 Units:

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

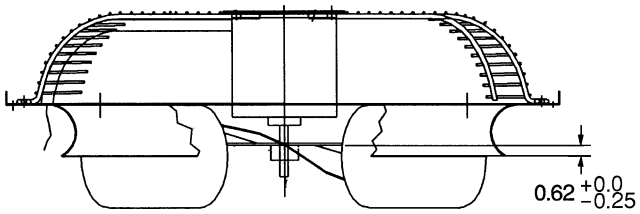
VI. CONDENSER-FAN ADJUSTMENT

A. 581A155 and 180 Units (Fig. 33)

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

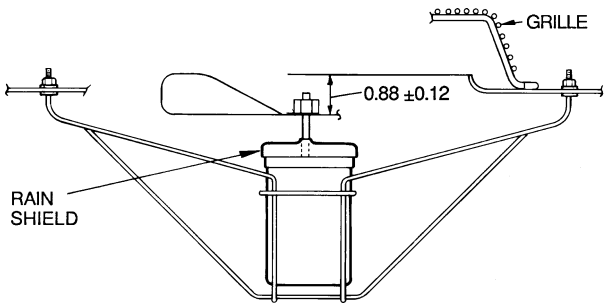
B. 581A240 Units (Fig. 34)

1. Shut off unit power supply.
2. Remove fan top-grille assembly and loosen fan hub screws.
3. Adjust fan height on unit, using a straightedge placed across the fan orifice.



NOTE: Dimension is in inches.

Fig. 33 — Condenser Fan Adjustment, 581A155 and 180



NOTE: Dimension is in inches.

Fig. 34 — Condenser Fan Adjustment, 581A240

4. Tighten setscrews and replace rubber hubcap to prevent hub from rusting to motor shaft.
5. Fill hub recess with permagum if rubber hubcap is missing.

VII. ECONOMIZER ADJUSTMENT

See Tables 16 and 17 for checkout and outdoor air temperature simulation. Make certain the outdoor-air damper is fully closed and the return-air damper is fully open before completing the following steps:

1. Turn on power to the unit.
2. Turn the thermostat fan switch to the ON position. The damper will go to the vent position.
3. Adjust the vent position with the minimum damper-position adjustment on the economizer motor control module. See Fig. 18.
4. Set the system selector switch to COOL position and set the cooling temperature selector to its lowest setting.

   NOTE: The Cooling mode may also be simulated by removing the thermostat wires from terminals Y1 and Y2 and installing a jumper between terminals R and Y1. Refer to unit label diagram for terminal locations.

Table 16 — Economizer Checkout Procedures

TEST PROCEDURE	RESULTS
A. Disconnect power at TR and TR1. Disconnect jumper between P and P1. See Fig. 18. B. Jumper TR to 1. C. Jumper T1 to T. D. Disconnect outdoor-air thermostat connections from S_O and +. Factory-installed 800 ohm resistor should remain connected to S_R and +. E. Reconnect power to terminals TR and TR1.	1. LED (light-emitting diode) should be off. 2. Motor is in closed position.

TEST PROCEDURE	RESULTS
Disconnect factory-installed resistor from terminals S_R and +.	1. LED should be on. 2. Motor drives toward open.

Table 17 — High and Low Outdoor-Air Simulation

TEST PROCEDURE	RESULTS
A. Reconnect factory-installed 800 ohm resistor between terminals SR and +. B. Connect 1200 ohm checkout resistor between terminals SO and +. C. Turn set point potentiometer to position A.	Low outdoor-air test results: 1. LED (light-emitting diode)should be on. 2. Motor drives toward open.
D. Turn set point potentiometer to position D. E. Disconnect 1200 ohm checkout resistor.	High outdoor-air test results: 1. LED should be off. 2. Motor drives toward closed.

5. Set the outdoor-air thermostat (OAT), located in the economizer section of the unit (see Fig. 17) to 75 F.
6. If the outdoor temperature is below 75 F, the economizer will control the mixed air with the mixed-air sensor. If the outdoor air is above 75 F, place a jumper around the contacts of the OAT.
7. Jumper terminal T to terminal T1 on the module (see Fig. 18). The economizer will go to the full open position. The outdoor-air damper will go to the full open position, and the return-air damper will go to the full closed position.
8. Adjust mechanical linkage, if necessary, for correct positioning. If may be necessary to remove the filters to adjust the linkage.
9. Remove the jumper from around the contacts of the OAT if installed in Step 6. Remove the jumper from terminals T and T1 installed in Step 7.
10. If the Cooling mode was simulated to operate the unit in Step 4, remove the jumper and reconnect the thermostat wires to terminals Y1 and Y2.

VIII. POWER FAILURE

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

IX. REFRIGERANT CHARGE

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

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

A. No Charge

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

B. Low Charge Cooling

Using appropriate cooling charging chart (see Fig. 35), add or remove refrigerant until conditions of the chart are met. Note that charging chart is different from those normally used. An accurate pressure gage and temperature-sensing device is required. Charging is accomplished by ensuring the proper amount of liquid sub-cooling. Measure liquid line pressure at the liquid line service valve using pressure gage. Connect temperature sensing device to the liquid line near the liquid line service valve and insulate it so that outdoor ambient temperature does not affect reading.

C. To Use the Cooling Charging Chart

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

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

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

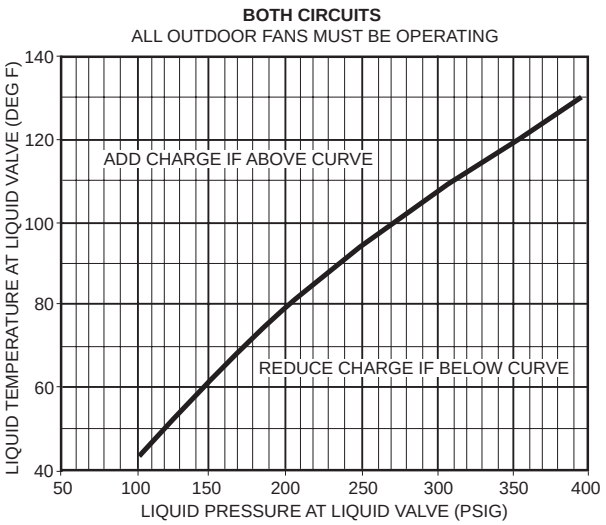


Fig. 35 — Cooling Charging Chart

X. GAS VALVE ADJUSTMENT

A. Natural Gas

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

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

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

To adjust regulator:

1. Set thermostat at setting for no call for heat.
2. Turn main gas valve to OFF position.
3. Remove $^1/_8$-in. pipe plug from manifold or gas valve pressure tap connection. Install a suitable pressure-measuring device.
4. Set main gas valve to ON position.
5. Set thermostat at setting to call for heat.
6. Remove screw cap covering regulator adjustment screw (See Fig. 36).
7. Turn adjustment screw clockwise to increase pressure or counterclockwise to decrease pressure.
8. Once desired pressure is established, set thermostat setting for no call for heat, turn off main gas valve, remove pressure-measuring device, and replace $^1/_8$-in. pipe plug and screw cap.

XI. MAIN BURNERS

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

A. Main Burner Removal

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

B. Cleaning and Adjustment

1. Remove burner rack from unit as described in Main Burner Removal section above.
2. Inspect burners, and if dirty, remove burners from rack.
3. Using a soft brush, clean burners and crossover port as required.
4. Adjust spark gap. See Fig. 37.
5. Reinstall burners on rack.
6. Reinstall burner rack as described above.

XII. FILTER DRIER

Replace whenever refrigerant system is exposed to atmosphere.

XIII. PROTECTIVE DEVICES

A. Compressor Protection

Overcurrent

Each compressor has internal line break motor protection.

Overtemperature

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

Crankcase Heater

The 581A units are equipped with a 70-watt crankcase heater to prevent absorption of liquid refrigerant by oil in the crankcase when the compressor is idle. The crankcase heater is energized whenever there is main power to the unit and the compressor is not energized.

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

Compressor Lockout

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

B. Evaporator Fan Motor Protection

On size 155 units, an internal protector with auto-reset is included in the indoor fan motor as a protection against overcurrent.

On size 180 and 240 units, a manual reset, calibrated trip, magnetic circuit breaker protects against overcurrent. Do not bypass connections or increase the size of the breaker to correct trouble. Determine the cause and correct it before resetting the breaker.

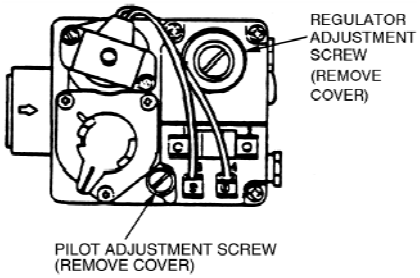


Fig. 36 — Gas Valve

C. Condenser-Fan Motor Protection

Each condenser-fan motor is internally protected against overtemperature.

D. High- and Low-Pressure Switches

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

E. Freeze Protection Thermostat (FPT)

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

XIV. RELIEF DEVICES

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

XV. CONTROL CIRCUIT, 24-V

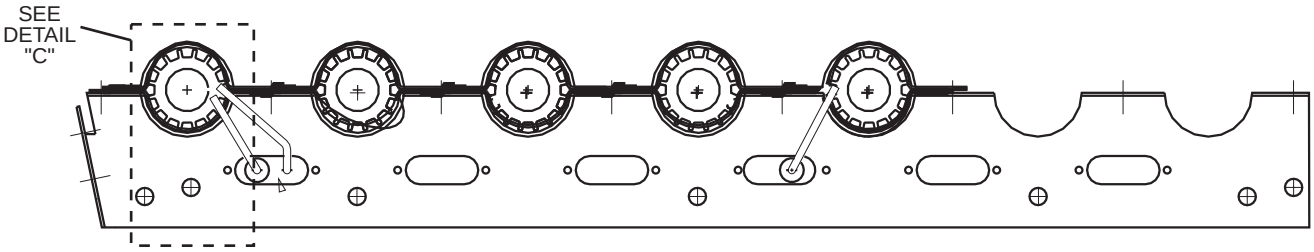
This control circuit is protected against overcurrent by a 3.2 amp circuit breaker. Breaker can be reset. If it trips, determine cause of trouble before resetting

XVI. REPLACEMENT PARTS

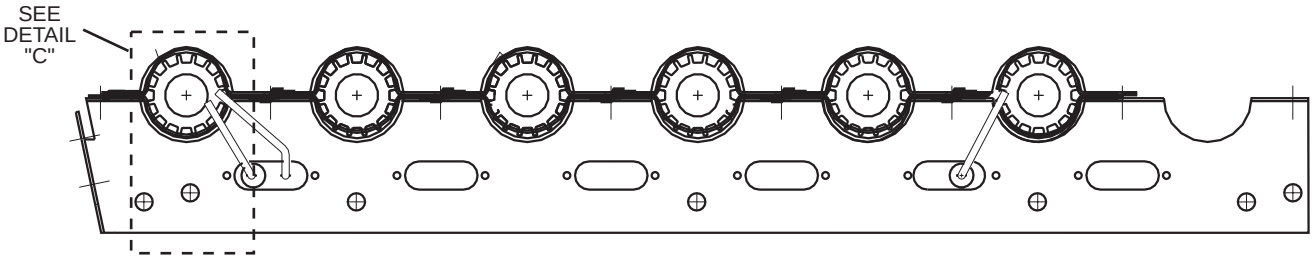
A complete list of replacement parts may be obtained from any Carrier distributor upon request.

XVII. DIAGNOSTIC LEDS

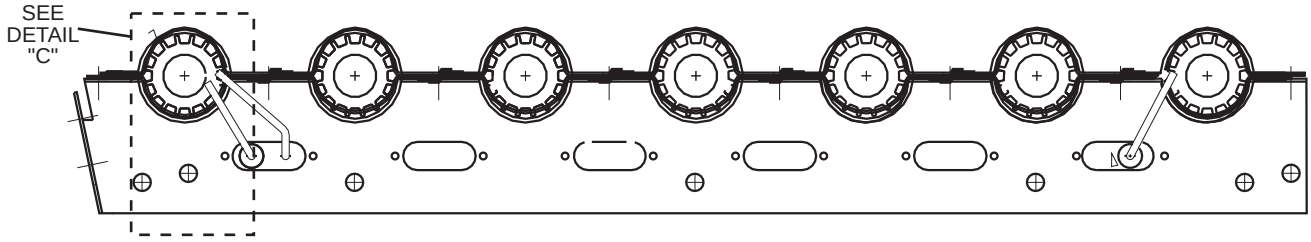
The IGC control board has a LED for diagnostic purposes. The IGC error codes are shown in Table 15.



581A155225



581A180270, 581A240270, AND 581A155300



581A180360 AND 581A240360

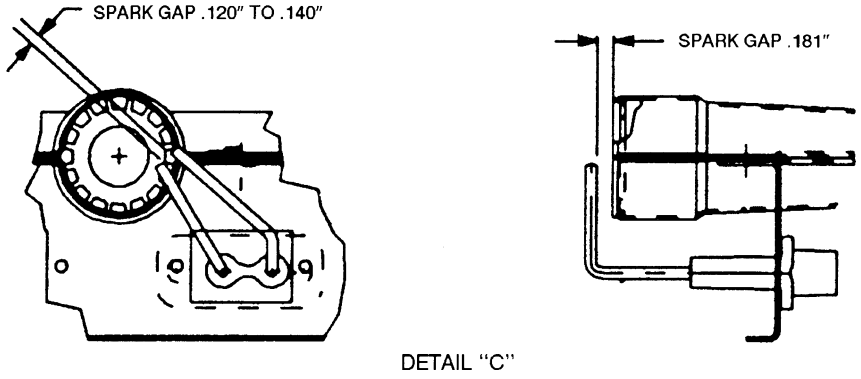


Fig. 37 — Spark Gap Adjustment

LEGEND

Fig. 38 — Typical Wiring Schematic and Fig. 39 — Typical Component Arrangement

AHA	—	Adjustable Heat Anticipator
BKR W/AT	—	Breaks with Amp Turns
BR	—	Burner Relay
C	—	Contactor, Compressor
CAP	—	Capacitor
CB	—	Circuit Breaker
CC	—	Cooling Compensator
CH	—	Crankcase Heater
CLO	—	Compressor Lockout
CLS	—	Compressor Lockout Switch
COMP	—	Compressor Motor
CR	—	Control Relay
CT	—	Current Transformer
DM	—	Damper Motor
DU	—	Dummy Terminal
EQUIP	—	Equipment
FPT	—	Freeze Protection Thermostat
FU	—	Fuse
GND	—	Ground
GVR	—	Gas Valve Relay
HPS	—	High-Pressure Switch
HS	—	Hall Effect Sensor
HV	—	High Voltage
IDM	—	Induced-Draft Motor
IFC	—	Indoor (Evaporator) Fan Contactor
IFCB	—	Indoor (Evaporator) Fan Circuit Breaker
IFM	—	Indoor (Evaporator) Fan Motor
IGC	—	Integrated Gas Unit Controller
L	—	Light
LED	—	Light-Emitting Diode
LOR	—	Lockout Relay
LPS	—	Low-Pressure Switch
LS	—	Limit Switch
MAT	—	Mixed-Air Thermostat
MGV	—	Main Gas Valve
NEC	—	National Electrical Code
OAT	—	Outdoor-Air Thermostat
OFC	—	Outdoor (Condenser) Fan Contactor
OFM	—	Outdoor (Condenser) Fan Motor
PL	—	Plug Assembly
QT	—	Quadruple Terminal
R	—	Relay
RS	—	Rollout Switch
SN	—	Sensor
SW	—	Switch
TB	—	Terminal Block
TRAN	—	Transformer

Terminal (Marked)

Terminal (Unmarked)

Terminal Block

Splice

Splice (Marked)

Splice (Field Supplied)

Factory Wiring

Field Control Wiring

Field Power Wiring

Accessory or Optional Wiring

To Indicate Common Potential Only, Not To Represent Wiring

NOTES:
1. Compressor and fan motors thermally protected; 3-phase motors protected against primary single-phasing conditions.
2. If any of the original wire furnished must be replaced, it must be replaced with type 90 C wire or its equivalent.
3. Jumpers are omitted when unit is equipped with economizer.
4. IFCB must trip amps is equal to or less than 140% full load amps.
5. On 208/230-v unit, TRAN1 is factory wired to ORN lead for 230-v power supply. If unit is to run on 208-v power supply, TRAN1 must be rewired. Disconnect the BLK wire on TRAN1 and connect wire to 208-v RED wire. Insulate 230-v ORN wire.
6. The CLO locks out the compressor to prevent short cycling on compressor overload and safety devices. Before replacing CLO, check these devices.
7. Number(s) indicates the line location of used contacts. A bracket over (2) numbers signifies a single-pole, double-throw contact. An underlined number signifies a normally closed contact. A plain (no line) number signifies a normally open contact.

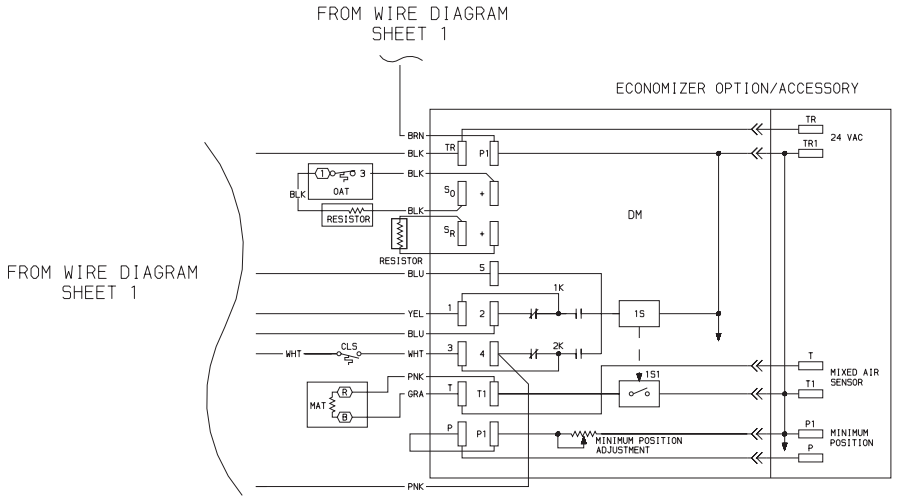


Fig. 38 — Typical Wiring Schematic (581A180, 208/230 V Shown)

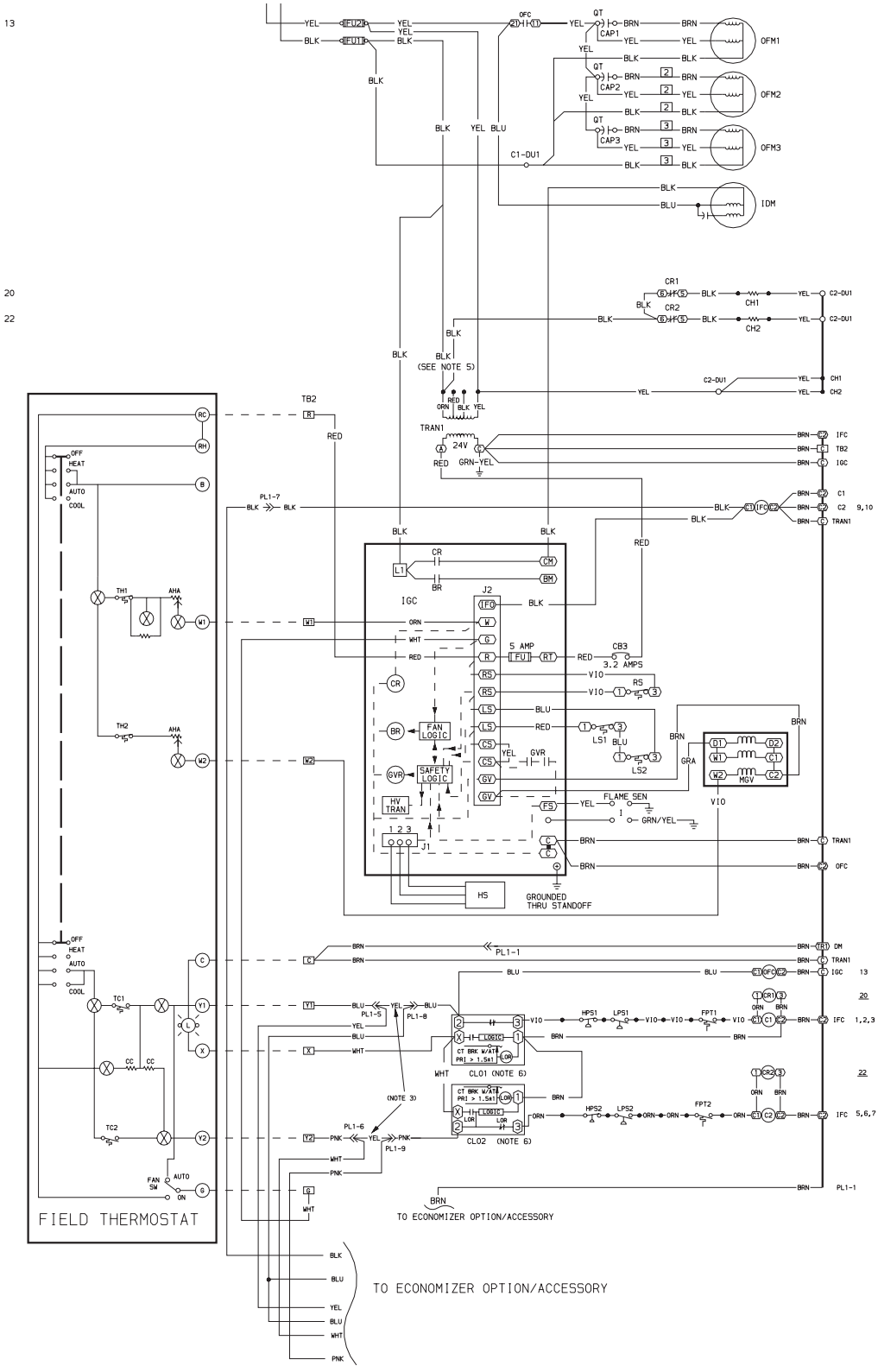


Fig. 38 — Typical Wiring Schematic (581A180, 208/230 V Unit Shown) (cont)

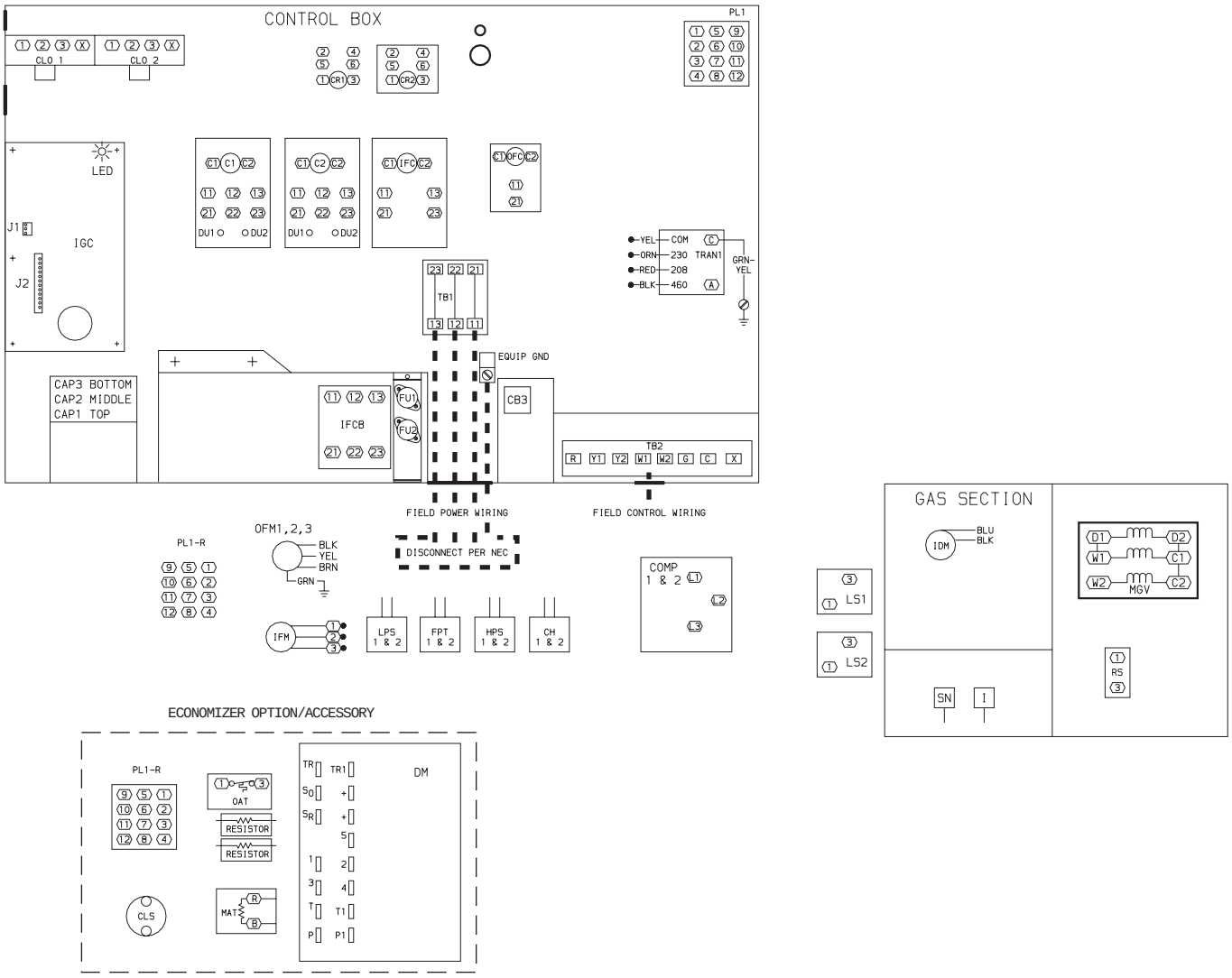


Fig. 39 — Typical Component Arrangement (581A180 Shown)

TROUBLESHOOTING

Refer to Tables 18 and 19 for troubleshooting details.

Table 18 — Cooling Service Analysis

PROBLEM	CAUSE	REMEDY
Compressor and condenser fan will not start.	Power failure.	Call power company.
	Fuse blown or circuit breaker tripped.	Replace fuse or reset circuit breaker.
	Defective thermostat, contactor, transformer, or control relay.	Replace component.
	Insufficient line voltage.	Determine cause and correct.
	Incorrect or faulty wiring.	Check wiring diagram and rewire correctly.
	Thermostat setting too high.	Lower thermostat setting below room temperature.
Compressor will not start but condenser fan runs.	Faulty wiring or loose connections in compressor circuit.	Check wiring and repair or replace.
	Compressor motor burned out, seized, or internal overload open.	Determine cause. Replace compressor.
	Defective overload.	Determine cause and replace.
	Compressor locked out.	Determine cause for safety trip and reset lockout.
	One leg of 3-phase power dead.	Replace fuse or reset circuit breaker. Determine cause.
Compressor cycles (other than normally satisfying thermostat).	Refrigerant overcharge or undercharge.	Recover refrigerant, evacuate system, and recharge to nameplate.
	Defective compressor.	Replace and determine cause.
	Insufficient line voltage.	Determine cause and correct.
	Blocked condenser.	Determine cause and correct.
	Defective overload.	Determine cause and replace.
	Defective thermostat.	Replace thermostat.
	Faulty condenser-fan motor.	Replace.
	Restriction in refrigerant system.	Locate restriction and remove.
Compressor operates continuously.	Dirty air filter.	Replace filter.
	Unit undersized for load.	Decrease load or increase unit size.
	Thermostat set too low.	Reset thermostat.
	Low refrigerant charge.	Locate leak, repair, and recharge.
	Air in system.	Recover refrigerant, evacuate system, and recharge.
	Condenser coil dirty or restricted.	Clean coil or remove restriction.
Excessive head pressure.	Dirty air filter.	Replace filter.
	Dirty condenser coil.	Clean coil.
	Refrigerant overcharged.	Recover excess refrigerant.
	Faulty TXV.	1. Check TXV bulb mounting and secure tightly to suction line. 2. Replace TXV if stuck open or closed.
	Air in system.	Recover refrigerant, evacuate system, and recharge.
	Condenser air restricted or air short-cycling.	Determine cause and correct.
Head pressure too low.	Low refrigerant charge.	Check for leaks, repair, and recharge.
	Restriction in liquid tube.	Remove restriction.
Excessive suction pressure.	High heat load.	Check for source and eliminate.
	Faulty TXV.	1. Check TXV bulb mounting and secure tightly to suction line. 2. Replace TXV if stuck open or closed.
	Refrigerant overcharged.	Recover excess refrigerant.
Suction pressure too low.	Dirty air filter.	Replace filter.
	Low refrigerant charge.	Check for leaks, repair, and recharge.
	Metering device or low side restricted.	Remove source of restriction.
	Faulty TXV.	1. Check TXV bulb mounting and secure tightly to suction line. 2. Replace TXV if stuck open or closed.
	Insufficient evaporator airflow.	Increase air quantity. Check filter and replace if necessary.
	Temperature too low in conditioned area.	Reset thermostat.
	Field-installed filter drier restricted.	Replace.
Compressor no. 2 will not run.	Unit in economizer mode.	Proper operation; no remedy necessary.

LEGEND

TXV — Thermostatic Expansion Valve

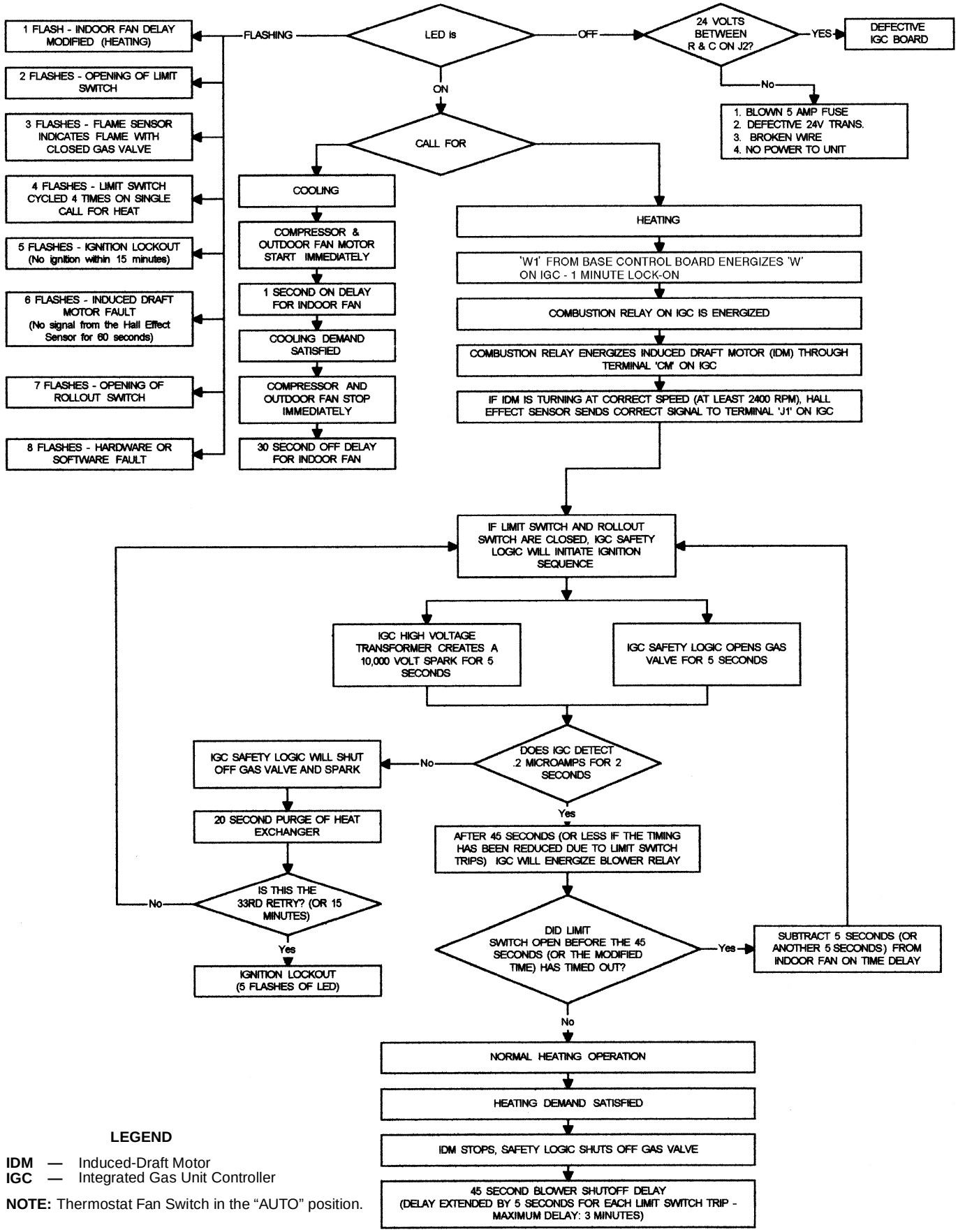
Table 19 — Heating Service Analysis

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

LEGEND

GR — Ground

Refer to Fig. 40 for IGC troubleshooting information.



LEGEND

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

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

Fig. 40 — IGC Control (Heating and Cooling)

PACKAGED SERVICE TRAINING

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

- Unit Familiarization
- Installation Overview
- Maintenance
- Operating Sequence

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

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START-UP CHECKLIST

MODEL NO.: _____ SERIAL NO.: _____

DATE: _____ TECHNICIAN: _____

I. PRE-START-UP

- ☐ VERIFY THAT ALL PACKING MATERIALS HAVE BEEN REMOVED FROM UNIT
- ☐ VERIFY INSTALLATION OF INDOOR FAN MOTOR ADJUSTMENT BOLT (155) OR ADJUSTMENT BOLT AND PLATE (180, 240 ONLY)
- ☐ OPEN LIQUID LINE SERVICE VALVE
- ☐ VERIFY INSTALLATION OF ECONOMIZER HOOD
- ☐ VERIFY INSTALLATION OF EXHAUST HOOD
- ☐ VERIFY THAT CONDENSATE CONNECTION IS INSTALLED PER INSTRUCTIONS
- ☐ VERIFY THAT ALL ELECTRICAL CONNECTIONS AND TERMINALS ARE TIGHT
- ☐ VERIFY GAS PRESSURE TO UNIT GAS VALVE IS WITHIN SPECIFIED RANGE
- ☐ CHECK GAS PIPING FOR LEAKS
- ☐ CHECK THAT INDOOR-AIR FILTER IS CLEAN AND IN PLACE
- ☐ CHECK THAT OUTDOOR AIR INLET SCREEN IS IN PLACE
- ☐ VERIFY THAT UNIT IS LEVEL
- ☐ CHECK FAN WHEEL AND PROPELLER FOR LOCATION IN HOUSING/ORIFICE, AND VERIFY SETSCREWIS TIGHT
- ☐ VERIFY THAT FAN SHEAVES ARE ALIGNED AND BELTS ARE PROPERLY TENSIONED
- ☐ VERIFY THAT SCROLL COMPRESSOR IS ROTATING IN THE CORRECT DIRECTION
- ☐ VERIFY THAT CRANKCASE HEATER HAS BEEN ENERGIZED 24 HOURS BEFORE START-UP

II. START-UP

ELECTRICAL

SUPPLY VOLTAGE L1-L2 _____ L2-L3 _____ L3-L1 _____

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

— COMPRESSOR NO. 2 L1 _____ L2 _____ L3 _____

SUPPLY FAN AMPS _____ EXHAUST FAN AMPS _____

TEMPERATURES

OUTDOOR-AIR TEMPERATURE _____ F DB (Dry Bulb)

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

COOLING SUPPLY AIR _____ F

GAS HEAT SUPPLY AIR _____ F

PRESSURES

GAS INLET PRESSURE _____ IN. WG

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

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

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

- ☐ VERIFY REFRIGERANT CHARGE USING CHARGING CHART ON PAGE 29.

GENERAL

- ☐ ECONOMIZER MINIMUM VENT AND CHANGEOVER SETTINGS TO JOB REQUIREMENTS

CUT ALONG DOTTED LINE

CUT ALONG DOTTED LINE