bryant

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Payne

installation, start-up and service instructions

SINGLE PACKAGE GAS HEATING/ELECTRIC COOLING UNITS

584B
Sizes 018-060
1-1/2 to 5 Tons

Cancels: II 584B-18-1

II 584B-18-2
6/1/92

IMPORTANT — READ BEFORE INSTALLING

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

CONTENTS

SAFETY CONSIDERATIONS

⚠ **WARNING:** Improper installation, adjustment, alteration, service, maintenance or use can cause carbon monoxide poisoning, explosion, fire, electric shock or other occurrences which may injure you or damage your property. Consult a qualified installer, service agency or the gas supplier for information or assistance. The qualified installer or agency must use only factory-authorized kits or accessories when modifying this product.

Recognize safety information. This is the safety-alert symbol (⚠). When you see this symbol on the unit and in instructions or manuals, be alert to the potential for personal injury.

Understand the signal words — DANGER, WARNING and CAUTION. These words are used with the safety-alert symbol. Danger identifies the most serious hazards which will result in severe personal injury or death. Warning indicates a condition that could result in personal injury. Caution is used to identify unsafe practices which would result in minor personal injury or product and property damage.

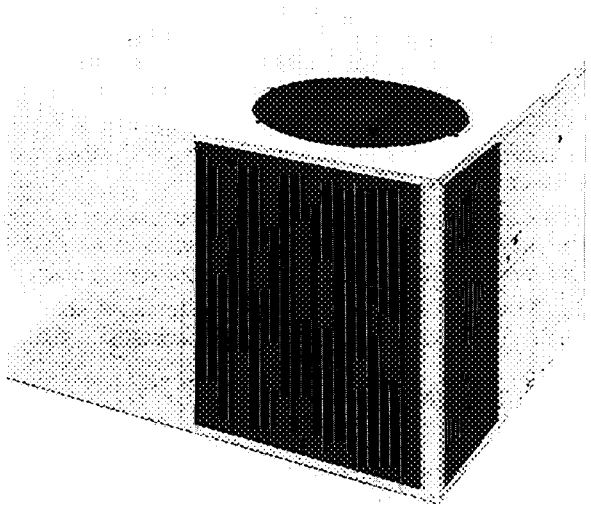


Fig. 1 — Typical 584B Unit (Shown With Accessory Coil Guard)

⚠ **WARNING:** Disconnect gas piping from unit when leak testing at pressure greater than ½ psig. Pressures greater than ½ psig will cause gas valve damage resulting in a hazardous condition. If gas valve is subject to pressure greater than ½ psig, it *must* be replaced before use. When pressure testing field-supplied gas piping at pressures of ½ psig or less, a unit connected to such piping must be isolated by manually closing the gas valve(s).

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

1. The power supply (v, ph and Hz) must correspond to that specified on unit rating plate.
2. The electrical supply provided by the utility must be sufficient to handle load imposed by this unit.
3. Refer to Locate the Unit section on page 2 and Fig. 2-4 for locations of gas inlet, electrical inlets, condensate drain, duct connections and required clearances before setting unit in place.
4. Locate the unit where the vent cap will be a minimum of 4 ft from openable windows or doors.
5. This installation must conform to local building codes and with the National Fuel Gas Code (NFGC), American National Standards Institute (ANSI) Z223.1-1988 (in Canada, CAN/CGA [Canadian Gas Association] B149.1, [2]-M86) or NFPA (National Fire Protection Association) 54-1988 TIA-54-84-1. Refer to Provincial and local plumbing or wastewater codes and other applicable local codes.

6. Approved for outdoor installation on wood flooring or on class A, B or C roof covering materials.

INSTALLATION

The small-cabinet units are shipped in the downflow configuration. To convert to horizontal discharge, refer to Field Duct Connections section on page 11. The large-cabinet units have discharge openings for both downflow and horizontal discharge and are factory shipped with duct opening covers in place. See Fig. 3 for small-cabinet unit sizes and Fig. 4 for large-cabinet unit sizes.

Model 584B meets the California maximum oxides of nitrogen (NO_x) emission regulations.

These units are equipped with an energy-saving, automatic, electric, intermittent spark ignition system that does not have a continuously burning pilot. All units are manufactured with natural gas controls.

These units are designed for a minimum continuous return-air temperature of 67 F (dry bulb).

All units can be connected into existing duct systems *that are sized properly and designed to handle an airflow of 350 to 450 cfm for each 12,000 Btuh of rated cooling capacity.*

NOTE: When installing any accessory item, see the manufacturer's installation instructions packaged with the accessory.

I. LOCATE THE UNIT

A. Clearance

Maintain clearance around and above unit to provide minimum distance from combustible materials, proper airflow and service access. See Fig. 2-4.

⚠ CAUTION: Do not restrict condenser airflow. An air restriction at either the condenser air inlet (the entire surface of the condenser coil) or the fan discharge can be detrimental to compressor life.

The condenser fan discharges through the top of the unit. Ensure that the fan discharge does not recirculate to the condenser coil. Do not locate the unit either in a corner or under a complete overhead obstruction and ensure the following clearances are provided:

On roof overhangs, provide a minimum clearance of 48 in. above the top of the unit for partial overhangs (such as a normal house roof overhang). If there is a horizontal extension on the partial overhang, it must not exceed 48 inches.

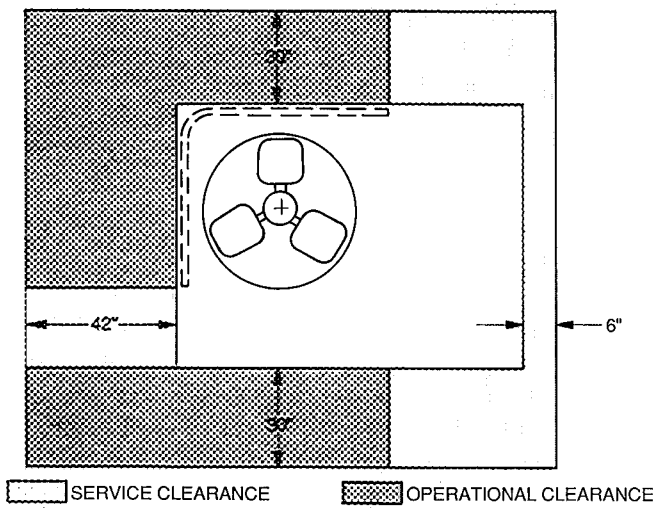


Fig. 2 — Service and Operational Clearances

Provide a minimum clearance of 42 in. for the control box side next to a block wall or any other grounded surface. Provide a minimum clearance of 48 in. between the control box side of the unit and any electrically live parts (for example, another unit). Provide a minimum clearance of 36 in. for the accessory manual outdoor-air damper or economizer (if the unit is equipped with one). The clearance for under the unit is 0 inches.

Minimum clearance to combustibles is 30 in. on all sides except duct side.

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

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

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

Slab-mounted units should be at least 4 in. above the highest expected water, flood and runoff level. Do not use the unit if it has been under water.

Locate mechanical draft system flue assembly at least 48 in. from any opening through which combustion products could enter the building, and at least 30 in. from an adjacent building. When unit is located adjacent to public walkways, flue assembly must be at least 7 ft above grade.

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

Adequate combustion-air space must be provided for proper operation of this equipment. Be sure that installation complies with all local codes.

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

B. Rooftop Installation

⚠ CAUTION: When installing the unit on a rooftop, be sure that the roof will support the additional weight. Refer to Fig. 3 and 4 for total weight and corner weight information. Refer to Fig. 5 and 6 for roof curb dimensions.

For downflow applications, an accessory roof curb must be installed on, and flashed into, the roof before unit installation. Install insulation, cant strips, flashing and gasket material per separate accessory roof curb installation instructions. The placement of the gasket material between the unit and roof curb is critical for a watertight seal. The curb should be level to within ¼ inch. Unit leveling tolerances are shown in Fig. 7.

For horizontal applications, place the unit on a level base that provides proper support. On flat roofs, be sure that the unit is located at least 4 in. above the highest expected water level on the roof to prevent flooding.

C. Ground-Level Installation

Place the unit on a solid, level, concrete pad that is a minimum of 4-in. thick with 2 in. above grade. The pad should extend approximately 2 in. beyond the casing on all 4 sides of the unit. Install a gravel apron in front of condenser air inlets to prevent obstruction of airflow by grass, shrubs, etc. Do not secure the unit to the pad *except* when required by local codes.

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

(Instructions continued on page 9.)

REQ'D CLEARANCES FOR SERVICING INCHES (mm)

Blower Access Panel Side	30 (762.0)
Control Box Access Side	30 (762.0)

REQ'D CLEARANCES TO COMBUSTIBLE MATL. INCHES (mm)

Maximum Extension of Overhang	48 (1219.2)
Unit Top	36 (914.4)
Duct Side of Unit	6 Min. (152.4 Min.)
Side Opposite Ducts	30 (762.0)
Bottom of Unit	0

NOTE: Clearances must be maintained to prevent recirculation of air from outdoor fan discharge.

UNIT	ELECTRICAL CHARACTERISTICS	UNIT WT.		CORNER WT. LB./KG.			
		Lbs.	Kg.	A	B	C	D
584B018040	208/230-1-60	342	155	75/34	102/46	93/42	72/33
584B024040	208/230-1-60	344	156	76/34	102/46	94/43	71/32
584B024060	208/230-1-60	354	161	77/35	106/48	96/44	75/34
584B030040	208/230-1-60, 208/230-3-60	351	159	78/35	104/47	97/44	72/33
584B030060	208/230-1-60, 208/230-3-60	361	164	79/36	108/49	98/44	76/34
584B030080	208/230-1-60, 208/230-3-60	372	169	81/37	112/51	101/46	78/35
584B036060	208/230-1-60, 208/230-3-60, 460-3-60	374	170	82/37	112/51	102/46	78/35
584B036080	208/230-1-60, 208/230-3-60, 460-3-60	386	175	84/38	116/53	105/48	81/37
584B036096	208/230-1-60, 208/230-3-60, 460-3-60	386	175	84/38	116/53	105/48	81/37
584B042060	208/230-1-60, 208/230-3-60, 460-3-60	382	173	83/38	115/52	103/47	81/37
584B042080	208/230-1-60, 208/230-3-60, 460-3-60	394	179	85/39	119/54	106/48	84/38
584B042096	208/230-1-60, 208/230-3-60, 460-3-60	394	179	85/39	119/54	106/48	84/38
584B048080	208/230-1-60, 208/230-3-60, 460-3-60	413	187	90/41	124/56	112/51	87/39
584B048096	208/230-1-60, 208/230-3-60, 460-3-60	413	187	90/41	124/56	112/51	87/39

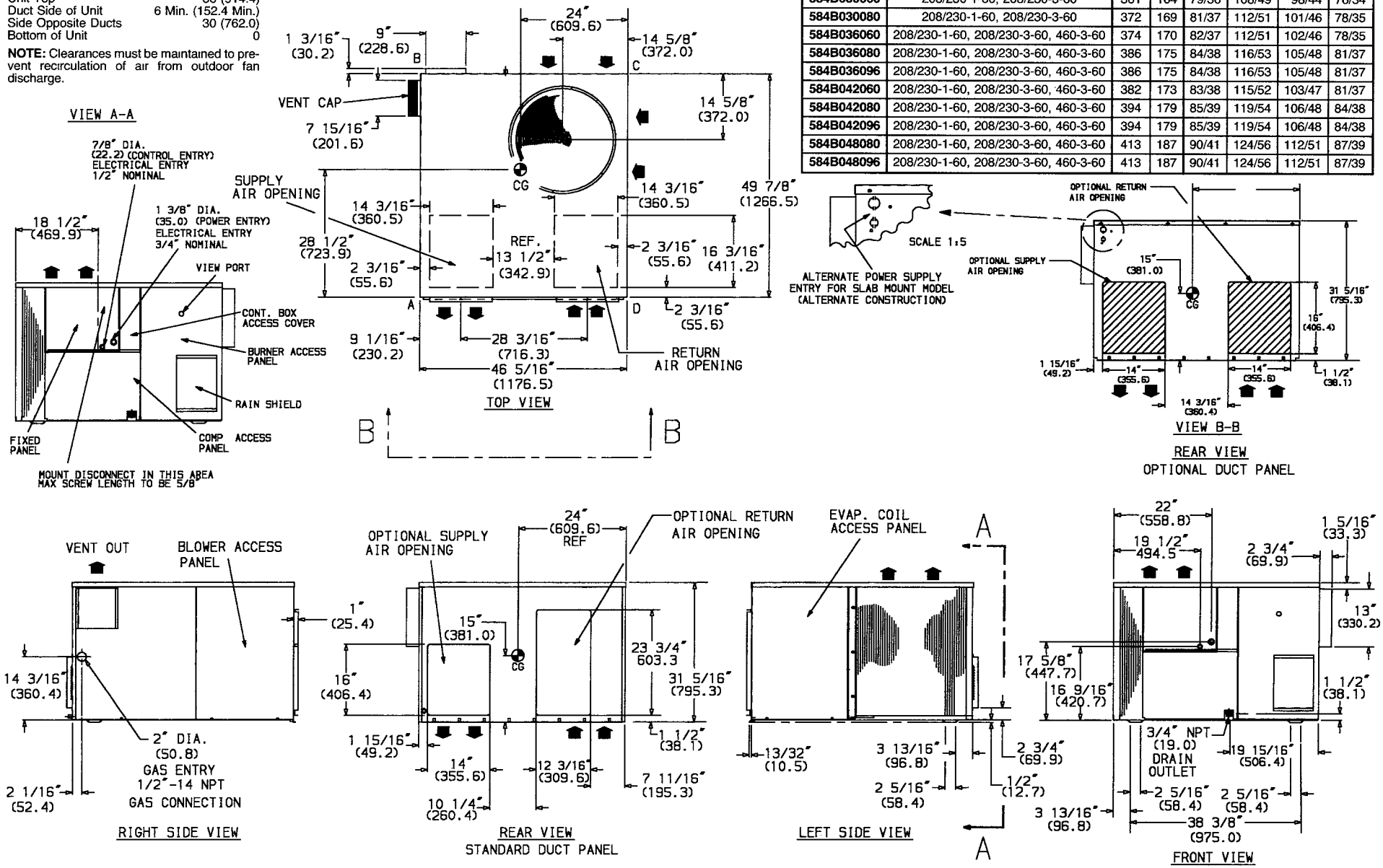


Fig. 3 — 584B Small-Cabinet Unit Dimensions

REQ'D CLEARANCES FOR SERVICING, INCHES (mm)
Blower Access Panel Side . . . 30 (762.0)
Control Box Access Side . . 30 (762.0)

REQ'D CLEARANCES TO COMBUSTIBLE MATL. INCHES (mm)
Maximum Extension of Overhang 48 (1219.2)
Unit Top 36 (914.4)
Duct Side of Unit . . 6 Min. (152.4 Min.)
Side Opposite Ducts . . 30 (762.0)
Bottom of Unit 0

NOTE: Clearances must be maintained to prevent recirculation of air from outdoor fan discharge.

UNIT	ELECTRICAL CHARACTERISTICS	UNIT WT.		CORNER WT. LB./KG.			
		Lbs.	Kg.	A	B	C	D
584B036120	208/230-1-60, 208/230-3-60, 460-3-60	469	213	100/45	136/62	133/60	100/45
584B042120	208/230-1-60, 208/230-3-60, 460-3-60	484	220	103/47	140/64	137/62	103/47
584B048A80	208/230-1-60, 208/230-3-60, 460-3-60	489	222	104/47	142/64	139/63	104/47
584B048100	208/230-1-60, 208/230-3-60, 460-3-60	495	225	105/48	144/65	140/64	106/48
584B048120	208/230-1-60, 208/230-3-60, 460-3-60	501	227	106/48	146/66	142/64	107/49
584B060080	208/230-1-60, 208/230-3-60, 460-3-60	498	226	106/48	144/65	141/64	106/48
584B060100	208/230-1-60, 208/230-3-60, 460-3-60	504	229	106/48	145/66	144/65	107/49
584B060120	208/230-1-60, 208/230-3-60, 460-3-60	510	231	109/49	147/67	145/66	108/49

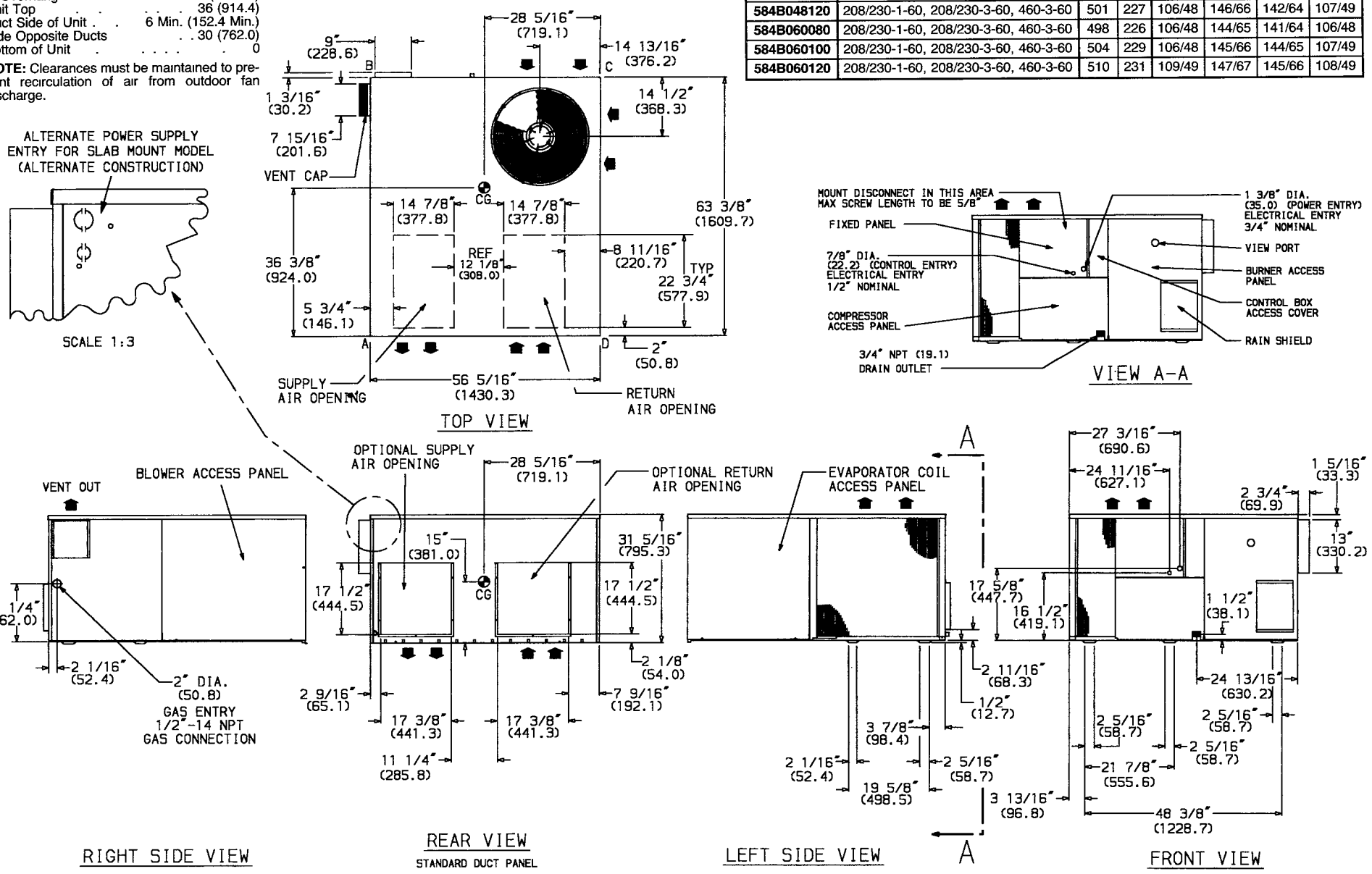


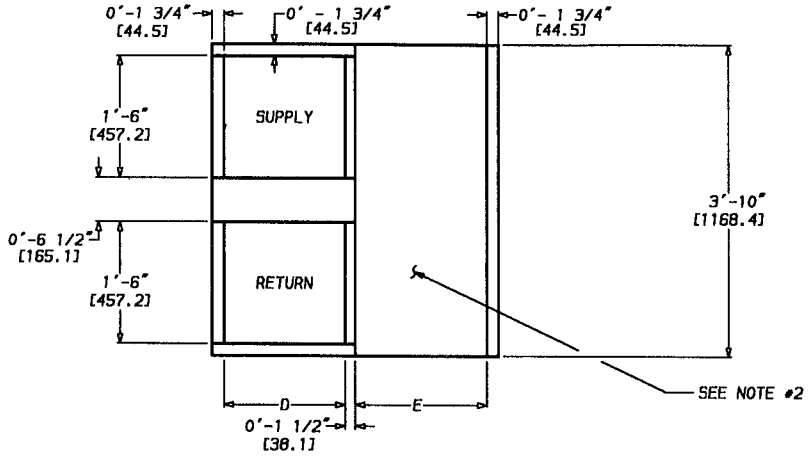
Fig. 4 — 584B Large-Cabinet Unit Dimensions

UNIT SIZE	CURB	CURB P/N	A	B	C	D	E	F	ROOF PITCH
584B018040-584B048096	Flat	389049-701 389049-702 389049-703	3'-6½" [1079.5]	0'- 8" [203 2] 0'-11" [279 4] 1'- 2" [355 6]	—	1'-6" [457.2]	1'-7½" [495.3]	—	—
	Pitched (See Note 1)	389050-701 389050-702 389050-703 389050-704 389050-705 389050-706	3'-6½" [1079.5]	0'- 9¼" [235] 1'-½" [317.5] 1'- 3¾" [400] 1'- 7" [482.6] 1'-10½" [571 5] 2'- 1¾" [654 1]	—	1'-6" [457 2]	1'-7½" [495 3]	—	1: 12 2: 12 3: 12 4: 12 5: 12 6: 12

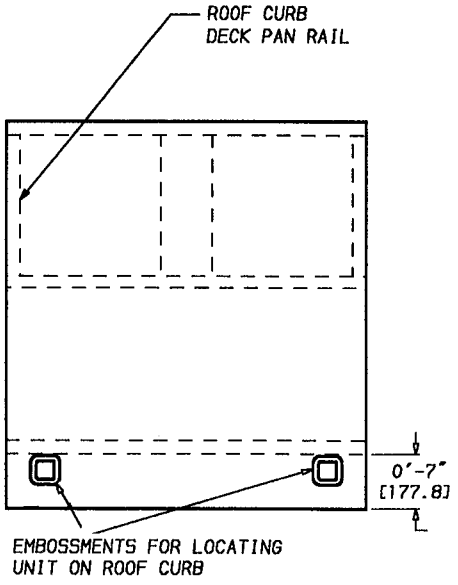
NOTES:

1 Completed specification sheet must accompany pitched curb order. Contact order correspondent or product manager for specification forms.

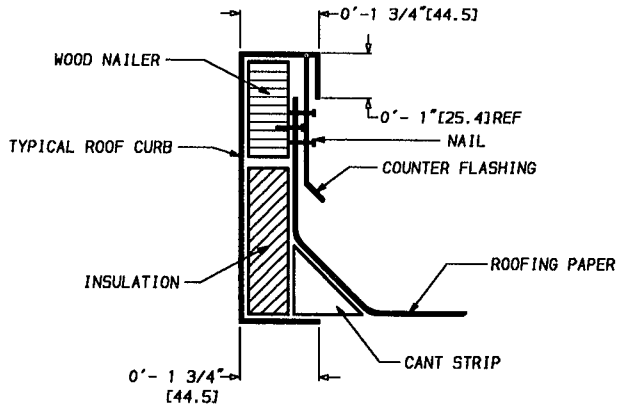
2 This area of the roof curb slopes slightly to the right for drainage purpose



TOP VIEW IS TYPICAL FOR FLAT ROOF CURBS AND PITCHED ROOF CURBS



CABINET UNIT POSITIONED ON ROOF CURB



VIEW IS NOT TO SCALE

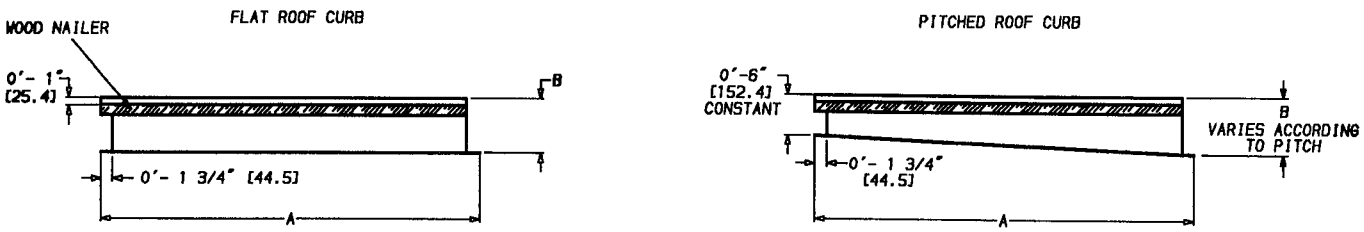
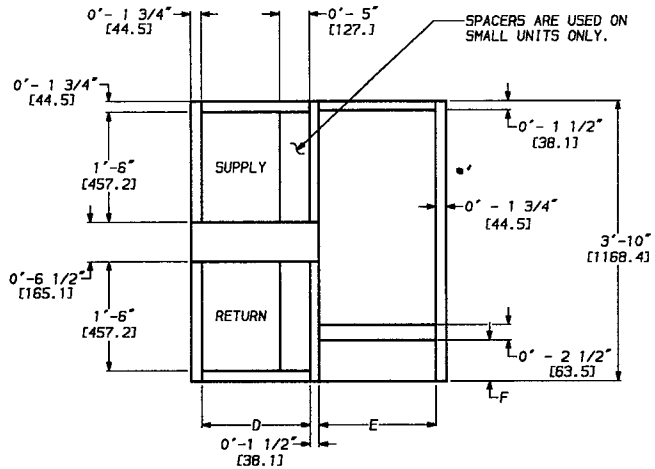


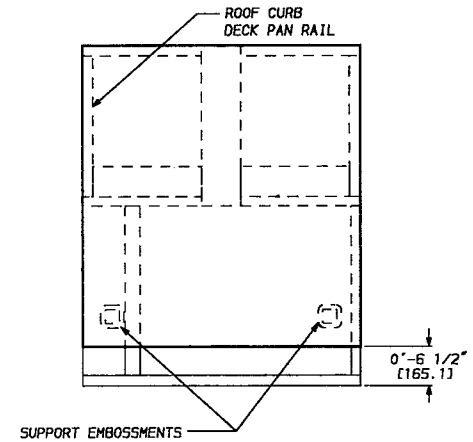
Fig. 5 – Dedicated Small-Cabinet Roof Curb Dimensions

UNIT SIZE	CURB	CURB P/N	A	B	C	D	E	F	ROOF PITCH
584B018040-584B060120	Flat	389059-701	4′-8″ [1422.4]	0′-8″ [203.2]	—	1′-11¼″ [590.5]	2′-3¾″ [704.8]	0′-7″ [177.8]	—
		389059-702		0′-11″ [279.4]	—				
		389059-703		1′- 2″ [355.6]					
	Pitched (See Note 1)	389060-701	4′-8″ [1422.4]	0′-10½″ [266.7]	—	1′-11¼″ [590.5]	2′-3¾″ [704.8]	0′-7″ [177.8]	1:12
		389060-702		1′- 3¼″ [387.4]					2:12
		389060-703		1′- 8″ [508]	—				3:12
		389060-704		2′- ½″ [622.3]	—				4:12
		389060-705		2′- 5¼″ [743]					5:12
		389060-706		2′-10″ [863.6]					6:12

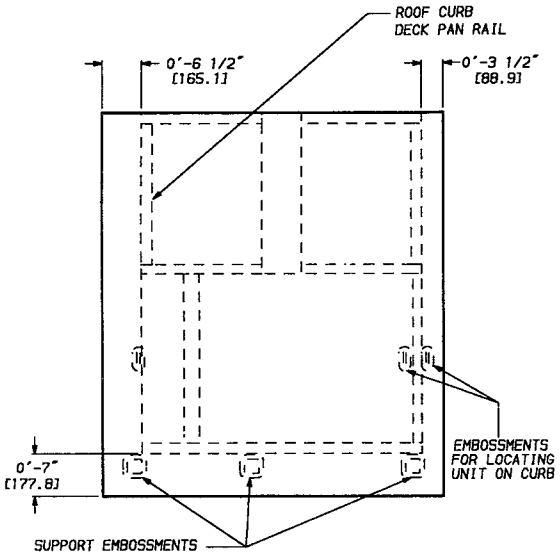
NOTES:
1. Universal roof curb may be used on small- and large-cabinet models.
2. Completed specification sheet must accompany pitched curb order. Contact order correspondent or product manager for specification forms.
3. This area of roof curb with drain holes slopes slightly to the right for drainage purpose.



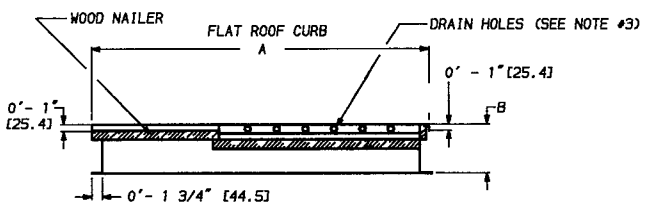
TOP VIEW IS TYPICAL FOR FLAT ROOF CURBS AND PITCHED ROOF CURBS

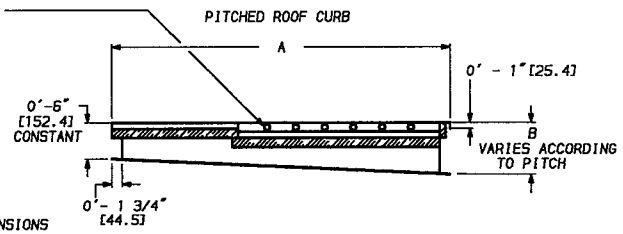


SMALL CABINET UNIT POSITIONED ON UNIVERSAL ROOF CURB.



LARGE CABINET UNIT POSITIONED ON UNIVERSAL ROOF CURB





ROOF CURB DIMENSIONS

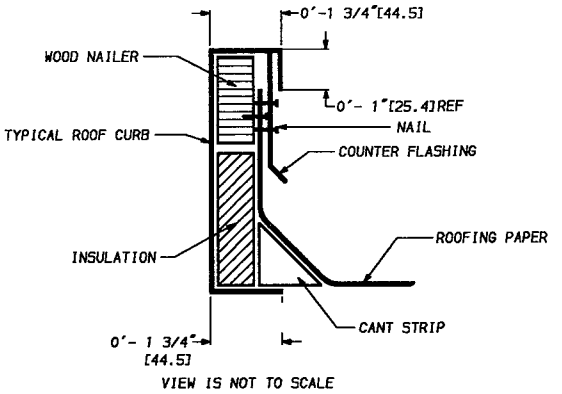


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Fig. 6 — Universal Roof Curb Dimensions

Table 1 — Specifications

UNIT SIZE 584B	018040	024040	024060	030040	030060	030080
NOMINAL CAPACITY (tons)	1½	2	2	2½	2½	2½
OPERATING WEIGHT (lb)	342	344	354	351	361	372
COMPRESSOR	Reciprocating					
Quantity	1					
REFRIGERANT (R-22)						
Charge (lb-oz)	2-13	3-6	3-6	3-3	3-3	3-3
Refrigerant Metering Device	Check-Flo-Rater™ Device					
CONDENSER COIL						
Face Area (sq ft)	6.25	7 29	7 29	8 33	8.33	8.33
Rows	1	1	1	1	1	1
Fins/in.	17	17	17	17	17	17
CONDENSER FAN						
Nominal Airflow (cfm)	2000	2000	2000	2000	2000	2000
Nominal Speed (rpm)	825	825	825	825	825	825
Quantity...Diameter (in.)	1 .22	1. .22	1...22	1 ..22	1...22	1. .22
Motor Hp	1/10	1/10	1/10	1/10	1/10	1/10
EVAPORATOR COIL						
Face Area (sq ft)	3.33	3 89	3 89	3 89	3.89	3.89
Rows	2	2	2	2	2	2
Fins/in.	15	15	15	15	15	15
EVAPORATOR FAN						
Nominal Airflow (cfm)	600	800	800	1000	1000	1000
Nominal Speed (rpm)	1100	1100	1100	1100	1100	1100
Diameter x Width (in.)	10 x 8	10 x 8	10 x 8	10 x 8	10 x 8	10 x 8
Motor Hp (single-phase)	1/4	1/3	1/3	1/3	1/3	1/2
(three-phase)	—	—	—	1/3	1/3	1/2
FURNACE SECTION						
Burner Orifice No. (Qty...drill size) Natural Gas	2 . 44	2 .44	3 44	2 44	3 44	4 44
Burner Orifice No. (Qty...drill size) Propane Gas	2.. 55	2 ..55	3 .55	2 55	3 55	4 55
Pilot Orifice Diameter, Dual Orifice (in.) Natural Gas	0225/ 0240	0225/ 0240	.0225/ 0240	.0225/ 0240	0225/.0240	0225/ 0240
Pilot Orifice Diameter (in.) Propane Gas	.010	010	010	010	010	010
RETURN-AIR FILTERS (sq in.)*						
Disposable	288	288	528	528	528	624
Cleanable	192	192	352	352	352	416

UNIT SIZE 584B	036060	036080	036096	042060	042080	042096
NOMINAL CAPACITY (tons)	3	3	3	3½	3½	3½
OPERATING WEIGHT (lb)	374	386	386	382	394	394
COMPRESSORS	Reciprocating					
Quantity	1					
REFRIGERANT (R-22)						
Charge (lb-oz)	4-0	4-0	4-0	4-11	4-11	4-11
Refrigerant Metering Device	Check-Flo-Rater™ Device					
CONDENSER COIL						
Face Area (sq ft)	8 33	8 33	8 33	6 25	6 25	6 25
Rows	1	1	1	2	2	2
Fins/in.	17	17	17	17	17	17
CONDENSER FAN						
Nominal Airflow (cfm)	2500	2500	2500	2500	2500	2500
Nominal Speed (rpm)	1100	1100	1100	1100	1100	1100
Quantity...Diameter (in.)	1 . 22	1.. 22	1 . 22	1 . 22	1 . 22	1 . 22
Motor Hp	1/4	1/4	1/4	1/4	1/4	1/4
EVAPORATOR COIL						
Face Area (sq ft)	3 89	3 89	3 89	3 89	3 89	3 89
Rows	3	3	3	3	3	3
Fins/in.	15	15	15	15	15	15
EVAPORATOR FAN						
Nominal Airflow (cfm)	1200	1200	1200	1400	1400	1400
Nominal Speed (rpm)	1100	1100	1100	1100	1100	1100
Diameter x Width (in.)	10 x 10	10 x 10	10 x 10	10 x 10	10 x 10	10 x 10
Motor Hp (single-phase)	1/2	1/2	1/2	1/2	1/2	1/2
(three-phase)	1/2	1/2	1/2	1/2	1/2	1/2
FURNACE SECTION						
Burner Orifice No. (Qty...drill size) Natural Gas	3.. 44	4 44	4 42	3 44	4 44	4 42
Burner Orifice No. (Qty...drill size) Propane Gas	3.. 55	4 55	4 54	3 .55	4.. 55	4...54
Pilot Orifice Diameter, Dual Orifice (in.) Natural Gas	0225/ 0240	0225/ 0240	0225/ 0240	0225/ 0240	0225/ 0240	0225/ 0240
Pilot Orifice Diameter (in.) Propane Gas	.010	.010	.010	010	010	010
RETURN-AIR FILTERS (sq in.)*						
Disposable	624	624	720	720	720	720
Cleanable	416	416	480	480	480	480

*Required field-supplied filter areas are based on the larger of the ARI-rated (Air Conditioning & Refrigeration Institute) cooling airflow or the heating airflow at a velocity of 300 ft/min for disposable type or 450 ft/min for high-capacity type Air filter pressure drop must not exceed 0.08 in wg.

Table 1 – Specifications (cont)

UNIT SIZE 584B	036120	042120	048080	048096	048A80
NOMINAL CAPACITY (tons)	3	3½	4	4	4
OPERATING WEIGHT (lb)	469	484	413	413	489
COMPRESSOR	Reciprocating		Scroll		Reciprocating
Quantity			1		
REFRIGERANT (R-22)					
Charge (lb-oz)	4-0	5-5	5-6	5-6	6-10
Refrigerant Metering Device			Check-Flo-Rater™ Device		
CONDENSER COIL					
Face Area (sq ft)	9 38	7 29	8.33	8 33	10.21
Rows	1	2	2	2	2
Fins/in.	17	17	17	17	17
CONDENSER FAN					
Nominal Airflow (cfm)	2500	2500	2500	2500	2500
Nominal Speed (rpm)	1100	1100	1100	1100	1100
Quantity...Diameter (in.)	1.. 22	1 . 22	1...22	1 ..22	1...22
Motor Hp	¼	¼	¼	¼	⅓
EVAPORATOR COIL					
Face Area (sq ft)	3 89	3.89	3.89	3.89	5 44
Rows	3	3	4	4	3
Fins/in.	15	15	15	15	15
EVAPORATOR FAN					
Nominal Airflow (cfm)	1200	1400	1700	1700	1750
Nominal Speed (rpm)	1100	1100	1100	1100	1100
Diameter x Width (in.)	10 x 10	10 x 10	11 x 10	11 x 10	10 x 10
Motor Hp (single-phase)	¾	¾	¾	¾	¾
(three-phase)	¾	¾	¾	¾	¾
FURNACE SECTION					
Burner Orifice No. (Qty...drill size) Natural Gas	6 44	6 44	4 44	4 42	4 ..44
Burner Orifice No. (Qty...drill size) Propane Gas	6 . 55	6 55	4 55	4 54	4 ..55
Pilot Orifice Diameter, Dual Orifice (in.) Natural Gas	.0225/ 0240	.0225/ 0240	.0225/.0240	0225/ 0240	.0225/ 0240
Pilot Orifice Diameter (in.) Propane Gas	.010	.010	.010	010	010
RETURN-AIR FILTERS (sq in.)*					
Disposable	720	720	816	816	816
Cleanable	480	480	544	544	544

UNIT SIZE 584B	048100	048120	060080	060100	060120
NOMINAL CAPACITY (tons)	4	4	5	5	5
OPERATING WEIGHT (lb)	495	501	498	504	510
COMPRESSOR	Reciprocating		Scroll		
Quantity			1		
REFRIGERANT (R-22)					
Charge (lb-oz)	6-10	6-10	7-0	7-0	7-0
Refrigerant Metering Device			Check-Flo-Rater™ Device		
CONDENSER COIL					
Face Area (sq ft)	10.21	10.21	9.38	9 38	9 38
Rows	2	2	2	2	2
Fins/in.	17	17	17	17	17
CONDENSER FAN					
Nominal Airflow (cfm)	2500	2500	3500	3500	3500
Nominal Speed (rpm)	1100	1100	1100	1100	1100
Quantity...Diameter (in.)	1 . 22	1 . 22	1 . 22	1...22	1 . 22
Motor Hp	⅓	⅓	⅓	⅓	⅓
EVAPORATOR					
Face Area (sq ft)	5 44	5 44	5.44	5 44	5 44
Rows	3	3	4	4	4
Fins/in.	15	15	15	15	15
EVAPORATOR FAN					
Nominal Airflow (cfm)	1750	1750	2000	2000	2000
Nominal Speed (rpm)	1100	1100	1100	1100	1100
Diameter x Width (in.)	10 x 10	10 x 10	11 x 10	11 x 10	11 x 10
Motor Hp (single-phase)	¾	¾	1	1	1
(three-phase)	¾	¾	1	1	1
FURNACE SECTION					
Burner Orifice No. (Qty...drill size) Natural Gas	5 ..44	6.. 44	4 44	5.. 44	6 44
Burner Orifice No. (Qty...drill size) Propane Gas	5...55	6 55	4. .55	5 55	6. 55
Pilot Orifice Diameter, Dual Orifice (in.) Natural Gas	0225/.0240	.0225/ 0240	0225/.0240	.0225/ 0240	0225/.0240
Pilot Orifice Diameter (in.) Propane Gas	010	010	010	.010	010
RETURN-AIR FILTERS (sq in.)*					
Disposable	816	816	960	960	960
Cleanable	544	544	640	640	640

*Required field-supplied filter areas are based on the larger of the ARI-rated (Air Conditioning & Refrigeration Institute) cooling airflow or the heating airflow at a velocity of 300 ft/min for disposable type or 450 ft/min for high-capacity type. Air filter pressure drop must not exceed 0.08 in wg

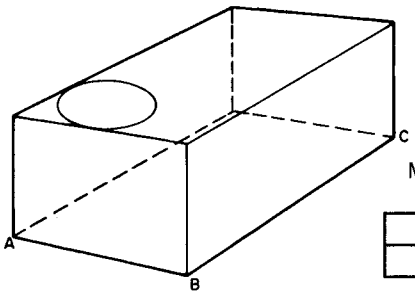
II. UNIT DUCT CONNECTIONS

On down discharge units, secure all ducts to roof curb and building structure. On horizontal units, duct flanges should be attached to horizontal openings and all ductwork should be secured to flanges.

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

A minimum clearance is not required around ductwork. Cabinet return-air static shall not exceed -0.25 in. wg with economizer.

NOTE: Connection may be made to roof curb before unit is set in place.



MAXIMUM ALLOWABLE DIFFERENCE (in.)

A-B	B-C	A-C
1/4	1/4	1/4

Fig. 7 — Unit Leveling Tolerances

III. RIG AND PLACE UNIT

Inspect unit for transportation damage. File any claim with transportation agency. Keep upright and do not drop. Spreader bars are not required if top crating is left on unit. Rollers may be used to move unit across a roof. Level by using unit frame as a reference. See Table 1 and Fig. 8 for additional information. Unit weights and corner weights are shown in Fig. 3 and 4.

⚠ CAUTION: Use spreader bars or crate top when rigging the unit to be lifted. The 584B units must be rigged for lifting as shown in Fig. 8. Use extreme caution to prevent damage when moving the unit. Unit must remain in an upright position during all rigging and moving operations. The unit must be level for proper condensate drainage; therefore, the ground-level pad or accessory roof curb must be level before setting the unit in place. When a field-fabricated support is used, ensure that the support is level and properly supports the unit.

IV. FIELD CONNECTIONS

A. Condensate Disposal

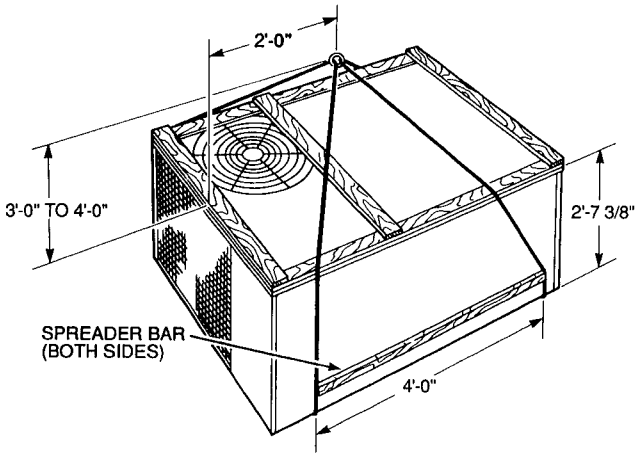
NOTE: Ensure that condensate-water disposal methods comply with local codes, restrictions and practices.

The 584B units dispose of condensate water through a 3/4-in. NPT drain fitting. See Fig. 3 and 4 for location.

Install a 2-in. trap at the drain fitting to ensure proper drainage. See Fig. 9. Prime the trap with water.

If the installation requires draining the condensate water away from the unit, connect a drain tube using a minimum of 7/8-in. OD copper tubing, 3/4-in. galvanized pipe, or 3/4-in. plastic pipe. *Do not undersize the tube.* Pitch the drain tube downward at a slope of at least 1 inch in every 10 ft of horizontal run. Be sure to check the drain tube for leaks.

Condensate water can be drained directly onto the roof in rooftop installations (where permitted) or onto a gravel apron in ground-level installations. When using a gravel apron, make sure it slopes away from the unit.



UNIT 584B	CORNER WEIGHT (LB)			
	A	B	C	D
018040	75	102	93	72
024040	76	102	94	71
024060	77	106	96	75
030040	78	104	97	72
030060	79	108	98	76
030080	81	112	101	78
036060	82	112	102	78
036080	84	116	105	81
036096	84	116	105	81
042060	83	115	103	81
042080	85	119	106	84
042096	85	119	106	84
048080	90	124	112	87
048096	90	124	112	87
036120	100	136	133	100
042120	103	140	137	103
048A80	104	142	139	104
048100	105	144	140	106
048120	106	146	142	107
060080	106	144	141	106
060100	106	145	144	107
060120	109	147	145	108

Fig. 8 — Suggested Rigging

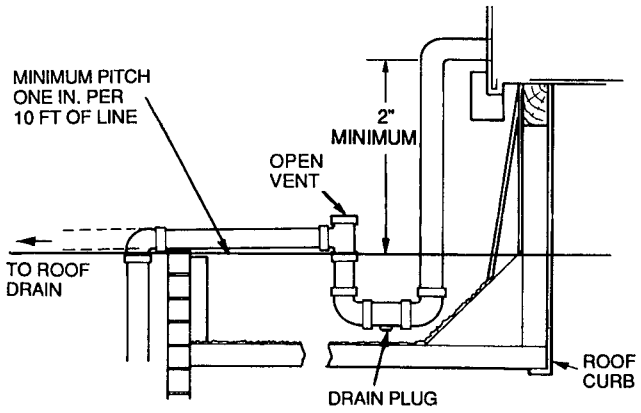


Fig. 9 — External Trap Condensate Drain

B. Install Venting

The vent-cap assembly is shipped in the burner compartment. Remove the access door to locate the assembly.

⚠ CAUTION: The venting system is designed to ensure proper venting. The vent-cap assembly must be installed as indicated in this section of the unit installation instructions.

NOTE: Screw holes in the flue assembly and the unit flue panel are *not* symmetrically located — ensure proper orientation when installing these components.

Refer to Fig. 10 and install the vent cap as follows:

1. Place vent-cap assembly over flue panel.
2. Orient screw holes in vent cap with holes in flue panel.
3. Secure vent cap in place by inserting the single screw on the right side of vent cap.
4. Place the vent-cap guard over the vent cap and orient holes in vent-cap guard with holes in vent cap and flue panel.
5. Secure the entire assembly with the remaining 2 screws on the left side of vent cap and vent-cap guard assembly.

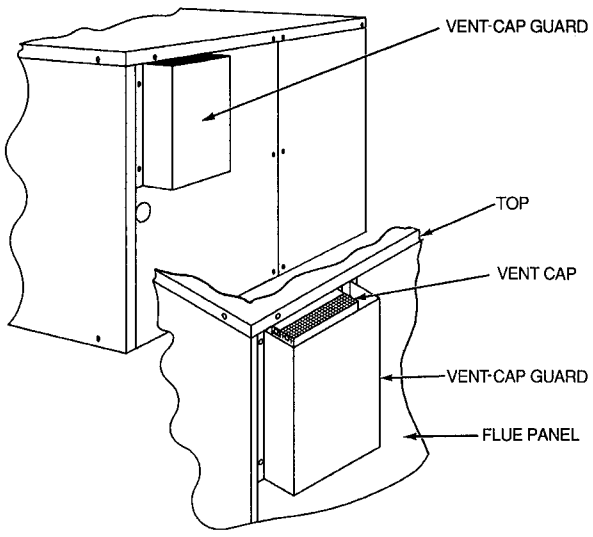


Fig. 10 — Vent Cap Assembly

C. Gas Piping

The gas supply pipe enters the unit through the access hole provided. The gas connection to the unit is made to the ½-in. FPT gas inlet on the gas valve.

Install a separate gas supply line that runs directly from the meter to the heating section. Refer to Table 2 and NFGC for gas pipe sizing. *Do not use cast iron pipe.* Check the local utility for recommendations concerning existing lines. Choose a supply pipe that is large enough to keep the pressure loss as low as practical. *Never use pipe smaller than the ½-in. FPT gas inlet on the unit gas valve.*

For natural gas applications, the gas pressure at unit gas connection must not be less than 5 in. wg or greater than 13 in. wg while the unit is operating. For LP (liquid propane) applications, the gas pressure must not be less than 11 in. wg or greater than 13 in. wg at the unit connection.

When installing the gas supply line, observe local codes pertaining to gas pipe installations. Refer to NFGC ANSI Z223.1-1988 (in Canada, CAN/CGA B149.1, [2]-M86) or NFPA 54-1988 in the absence of local building codes. Adhere to the following pertinent recommendations:

1. Avoid low spots in long runs of pipe. Grade all pipe ¼ inch in every 15 ft to prevent traps. Grade all horizontal runs downward to risers. Use risers to connect to heating section and to meter.
2. Protect all segments of piping system against physical and thermal damage. Support all piping with appropriate straps, hangers, etc. Use a minimum of one hanger every 6 ft. For pipe sizes larger than ½ in., follow recommendations of national codes.
3. Apply joint compound (pipe dope) sparingly and only to male threads of joint when making pipe connections. Use only pipe dope that is resistant to action of liquefied petroleum gases as specified by local and/or national codes. *Never use Teflon tape.*
4. Install sediment trap in riser leading to heating section on natural and LP gas units, per Fig. 11. This drip leg functions as a trap for dirt and condensate.
5. Install an accessible, external, manual main shutoff valve in gas supply pipe within 6 ft of heating section.
6. Install ground-joint union close to heating section between unit manual shutoff and external manual main shutoff valve.
7. Pressure-test all gas piping in accordance with local and national plumbing and gas codes before connecting piping to unit.

NOTE: If gas supply system will be pressure tested *after* the gas supply piping has been connected to the unit gas valve, the following procedures must be observed:

When pressure testing the gas supply piping system at test pressure exceeding 0.5 psig, supply piping must be disconnected from the gas valve.

When pressure testing the gas supply system at test pressure less than or equal to 0.5 psig, the unit heating section must be isolated from the gas piping system by closing the external main manual shutoff valve and slightly opening the ground-joint union.

Table 2 — Maximum Gas Flow Capacity of Pipe in Cubic Feet of Gas Per Hour for Gas Pressures of 0.5 Psig or Less and a Pressure Drop of 0.5 in. wg (Based on a 0.60 Specific Gravity Gas)

NOMINAL IRON PIPE SIZE (in.)	INTERNAL DIAMETER (in.)	LENGTH OF PIPE, FT*													
		10	20	30	40	50	60	70	80	90	100	125	150	175	200
½	.622	175	120	97	82	73	66	61	57	53	50	44	40	—	—
¾	824	360	250	200	170	151	138	125	118	110	103	93	84	77	72
1	1 049	680	465	375	320	285	260	240	220	205	195	175	160	145	135
1¼	1.380	1400	950	770	600	580	530	490	460	430	400	360	325	300	280
1½	1 610	2100	1460	1180	990	900	810	750	690	650	620	550	500	460	430

*This length includes an ordinary number of fittings

NOTES:

1 Typical natural gas heating value is 1000 Btuh per cu ft
For example: A 96,000 Btuh input unit equals 96 cu ft per hour or $\frac{96,000}{1,000}$ = 96 cu ft/hr.

2 Refer to Table C-4, NFPA 54-1984

⚠ CAUTION: Unstable operation may occur when the gas valve and manifold assembly are forced out of position while connecting improperly routed rigid gas piping to the gas valve. Use a backup wrench when making connection to avoid strain on, or distortion of, the gas control piping.

⚠ CAUTION: If a flexible conductor is required or allowed by the authority having jurisdiction, black iron pipe shall be installed at the gas valve and must extend a minimum of 9 in. outside the unit casing.

⚠ WARNING: Never use a match or other open flame when checking for gas leaks. Never purge gas line into combustion chamber. Failure to adhere to this warning could result in an explosion causing personal injury or death.

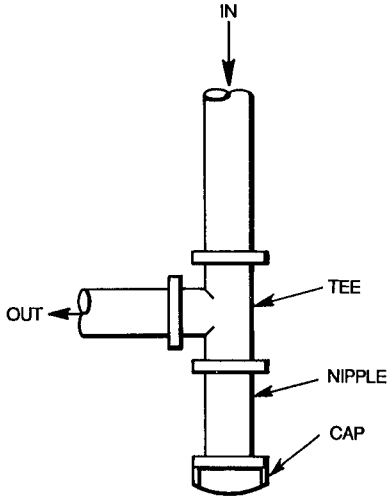


Fig. 11 — Sediment Trap

8. Check for gas leaks at all field-installed and factory-installed gas lines after all piping connections have been completed. Use soap-and-water solution (or method specified by local codes and/or regulations).

Liquid Propane

All LP gas equipment must conform to NFPA safety standards.

The LP gas pressure at the unit must be 10.5 in. wg under full load. Maintaining proper gas pressure depends on:

- Vaporization rate (vaporization rate is determined by the temperature of the LP gas and the level of LP gas in the tank).
- Proper pressure regulation.
- Pressure drop in lines between regulators and between the second-stage regulator and the appliance. Pipe size is determined by the length of the pipe run and the total load of all appliances.

Contact your LP gas supplier or regulator manufacturer for further details regarding tank sizing, recommended regulator settings and pipe sizing.

Special pipe compound must be used when assembling piping for LP gas, as white lead or commercial compounds will be dissolved easily. Use a shellac-based compound suitable for use with LP.

D. Field Duct Connections

NOTE: The design and installation of the duct system must be in accordance with the standards of NFPA for the installation of nonresidence-type air conditioning and ventilating systems, NFPA 90A or residence-type, NFPA 90B, and/or local codes and ordinances.

The 584B units have duct flanges on the supply- and return-air openings on the side (small-cabinet units only) and bottom of the unit. See Fig. 3 and 4 for cabinet sizes.

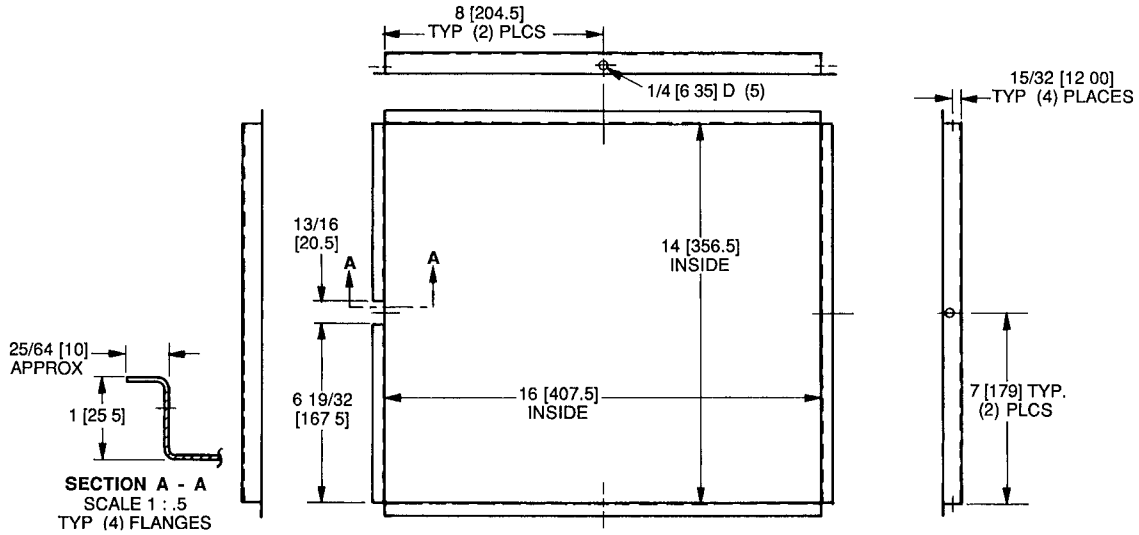
Adhere to the following criteria when selecting, sizing and installing the duct system:

1. The unit is shipped in downflow configuration. Large-cabinet units (Fig. 4) are shipped with all 4 duct openings covered; remove the appropriate panels for intended installation.

   To convert a small-cabinet unit with standard duct panel configuration (see Fig. 3) to horizontal application, remove the panel from the horizontal side discharge opening and cover the return-air opening with an accessory or field-fabricated panel (see Fig. 12). Then remove the panel from the vertical side discharge opening and install on supply-air opening. Note that an accessory return-air duct panel is available as an alternative to field fabrication.

   To convert a small-cabinet unit with optional duct panel configuration (see Fig. 3) to horizontal application, remove side duct covers, save screws and install the covers on bottom duct openings.

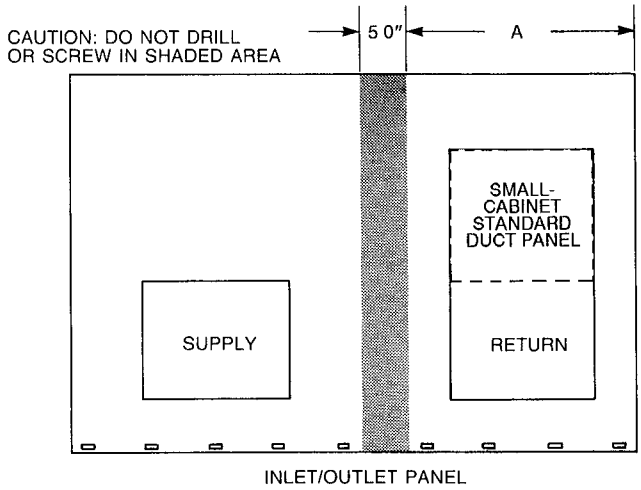
2. Select and size ductwork, supply-air registers and return-air grilles according to ASHRAE (American Society of Heating, Refrigeration, and Air Conditioning Engineers) recommendations.



NOTES:
1. An accessory return-air duct panel is available as an alternative to field fabrication See Table 5 for part number
2. Construct duct cover out of 20-gage sheet metal
3. Dimensions in [ ] are in millimeters

Fig. 12 — Field-Fabricated Duct Cover Dimensions (Small-Cabinet Units Only)

⚠ CAUTION: When drilling the duct system fastening holes into the side of the unit for duct flanges, use extreme care not to puncture the coil or coil tubes. See Fig. 13.



NOTE: Dimensions apply to small-cabinet units in both standard and optional duct panel configuration (see Fig. 3), and to large-cabinet units (see Fig 4)

UNIT 584B	"A" (in.)
Small-Cabinet Units*	20½
Large-Cabinet Units*	25½

*Refer to Fig. 3 and 4 for small- and large-cabinet model sizes.

Fig. 13 — Location of Coil Area Not to be Drilled

3. Use flexible transition between rigid ductwork and unit to prevent transmission of vibration. The transition may be screwed or bolted to duct flanges. Use suitable gaskets to ensure weathertight and airtight seal.
4. When horizontal return is used, install external, field-supplied air filter(s) in return-air ductwork where it is easily accessible for service. Recommended filter sizes are shown in Table 1.
5. Size all ductwork for maximum required airflow (either heating or cooling) for unit being installed. Avoid abrupt duct size increases or decreases.
6. Adequately insulate and weatherproof all ductwork located outdoors. Insulate ducts passing through unconditioned space, and use vapor barrier in accordance with 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. Secure all ducts to building structure.
7. Flash, weatherproof and vibration-isolate all openings in building structure in accordance with local codes and good building practices.

E. Electrical Connections

⚠ WARNING: The unit cabinet must have an uninterrupted, unbroken, electrical ground to minimize the possibility of personal injury if an electrical fault should occur. This ground may consist of electrical wire connected to the unit ground lug in the control compartment, or conduit approved for electrical ground when installed in accordance with NEC (National Electrical Code), ANSI/NFPA 70-1990 (in Canada, Canadian Electrical Code CSA C22.1) and local electrical codes. *Do not use gas piping as an electrical ground.* Failure to adhere to this warning could result in personal injury.

⚠ CAUTION: Failure to follow these precautions could result in damage to the unit being installed:

Field Power Supply

1. Make all electrical connections in accordance with NEC ANSI/NFPA 70-1990 and local electrical codes governing such wiring. In Canada, all electrical connections must be in accordance with CSA Standard C22.1 Canadian Electrical Code Part 1 and applicable local codes. Refer to unit wiring diagram. See Table 3 for electrical data.
2. Use only *copper or copper-clad* conductor for connections between field-supplied electrical disconnect switch and unit. DO NOT USE ALUMINUM WIRE.

Table 3 — Electrical Data

UNIT SIZE 584B	NOMINAL V-PH-HZ	UNIT 584B	VOLTAGE RANGE		COMPR		CONDENSER-FAN MOTOR	EVAPORATOR-FAN MOTOR	AWG MIN WIRE SIZE*	POWER SUPPLY		MAXIMUM WIRE LENGTH — FT (60 C Wire)
			Min	Max	RLA	LRA	FLA	FLA		MCA	MOCP†	
018	208/230-1-60	018040	187	253	10.4	49.0	0.8	1.8	12	15 6	25	100
024	208/230-1-60	024040 024060	187	253	12 4	61.0	0 8	2.5	12	18.8	30	80
030	208/230-1-60	030040 030060 030080	187	253	16 0	82 0	0 8	2.5 2.5 3.0	10	23.3 23 3 23 8	35	100
	208/230-3-60	030040 030060 030080	187	253	10.4	65 5	0.8	2.5 2.5 3.0	12	16.3 16 3 16 8	25	75
036	208/230-1-60	036060 036080 036096 036120	187	253	18 0	96 0	1 5	3 0 3 0 3 0 4 2	10	27 0 27 0 27 0 28 2	45	85 85 85 80
	208/230-3-60	036060 036080 036096 036120	187	253	11 4	75.0	1 5	3 0 3.0 3 0 4.2	12	18 8 18.8 18.8 20.0	30	65 65 65 60
	460-3-60	036060 036080 036096 036120	414	506	4 8	40.0	1 2 1 2 1 2 0.8	1.5 1.5 1.5 2.3	14	8 7 8.7 8.7 9 1	10	100
042	208/230-1-60	042060 042080 042096 042120	187	253	20.4 20.4 20 4 21.5	102 0	1 5	3.0 3 0 3.0 4.2	10 10 10 8	30.0 30 0 30 0 32.6	50	80 80 80 100
	208/230-3-60	042060 042080 042096 042120	187	253	14 0	91 0	1 5	3.0 3.0 3.0 4.2	10	22.0 22 0 22 0 23.2	35	90 90 90 85
	460-3-60	042060 042080 042096 042120	414	506	6 4	42.0	1 2 1 2 1 2 0 8	1 5 1 5 1 5 2.3	14	10 7 10 7 10 7 11.1	15	100
048 (Small Cabinet)	208/230-1-60	048080 048096	187	253	26 4	129.0	1 5	4 9 4.9	8	39 4 39 4	60	90
	208/230-3-60	048080 048096	187	253	15 0	99 0	1 5	4 9 4 9	10	25 2 25.2	40	80
	460-3-60	048080 048096	414	506	8.6	49.5	0 8	2 3 2.3	14	13 9 13 9	20	100
048 (Large Cabinet)	208/230-1-60	048A80 048100 048120	187	253	24.6	110 0	2.1	4.2 4 2 4 2	8	37 1 37.1 37.1	60	100
	208/230-3-60	048A80 048100 048120	187	253	13 4	92 0	2.1	4.2 4.2 4 2	10	23.1 23 1 23.1	35	100
	460-3-60	048A80 048100 048120	414	506	6 7	46.0	1 1	2.3 2.3 2.3	14	11 8 11 8 11.8	15	100
060	208/230-1-60	060080 060100 060120	187	253	32 1	169.0	2 1	6.4 6.4 6.4	6	48 6 48 6 48.6	80	100
	208/230-3-60	060080 060100 060120	187	253	19 3	123 0	2 1	6 4 6 4 6 4	8	32.6 32 6 32 6	50	100
	460-3-60	060080 060100 060120	414	506	10 0	62 0	1 1	3 2 3 2 3 2	12	16 8 16 8 16 8	25	100

LEGEND

AWG — American Wire Gage
CGA — Canadian Gas Association
FLA — Full Load Amps
HACR — Heating, Air Conditioning and Refrigeration
LRA — Locked Rotor Amps
MCA — Minimum Circuit Amps
MOCP — Maximum Overcurrent Protection
NEC — National Electrical Code
RLA — Rated Load Amps

*Minimum wire size is based on 60 C copper wire. If other than 60 C wire is used, determine size from NEC Voltage drop of wire must be less than 2% of rated voltage
†Fuse or HACR breaker

NOTES:

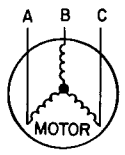
1 In compliance with NEC requirements for multimotor and combination load equipment (refer to NEC Articles 430 and 440), the overcurrent protective device for the unit shall be fuse or HACR breaker The CGA units may be fuse or circuit breaker.

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 % 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 % voltage imbalance

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

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

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

3. Voltage to compressor terminals during operation must be within voltage range indicated on unit nameplate (also see Table 3). On 3-phase units, ensure that phases are balanced within 2%. Consult local power company for correction of improper voltage and/or phase balance.

High-Voltage Connections

The unit must have a separate electrical service with a field-supplied, waterproof, 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. Table 3 shows recommended wire sizes based on rating plate data.

The field-supplied disconnect may be mounted on the unit over the high-voltage inlet hole. See Fig. 3 and 4.

Proceed as follows to complete the high-voltage connections to the unit:

1. Connect ground lead to chassis ground connection when using separate ground wire.
2. Run high-voltage leads into unit control box and connect to contactor on single-phase units and to power leads on 3-phase units. See unit wiring label, and Fig. 14.

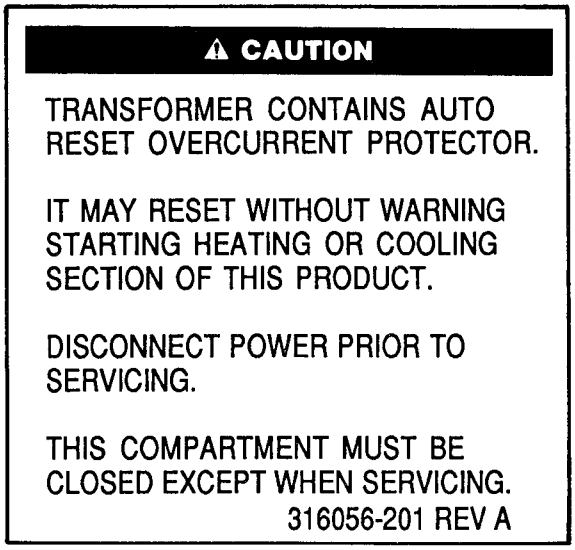


Fig. 14 — Transformer Label

Special Procedures for 208-V Operation

⚠ WARNING: Make sure that the gas supply *then* the power supply to the unit is switched OFF before making any wiring changes. Electrical shock can cause personal injury or death.

For operation on 208 v:

1. Disconnect the orange transformer-primary lead from the contactor. See the unit wiring label.
2. Remove the tape and cover from the terminal on the end of the red transformer-primary lead. Save the cover.
3. Connect the red lead to the contactor terminal from which the orange lead was disconnected.
4. Using the cover removed from the red lead, insulate the loose terminal on the orange lead. Wrap the cover with electrical tape so that the metal terminal cannot be seen.

Indoor blower-motor speeds may need to be changed for 208-v operation. See Indoor Airflow and Airflow Adjustments section on page 20 and unit wiring label. **Do not change speed setting for 460-v rated units.**

Control Voltage Connections

Install a factory-approved thermostat. See Table 4.

Locate the room thermostat on an inside wall in the space to be conditioned, where it will not be subjected to either a cooling or heating source or direct exposure to sunlight. Mount the thermostat 4 to 5 ft above the floor.

Use no. 18 AWG color-coded, insulated (35 C minimum) wires to make the control voltage connections between the thermostat and the unit. If the thermostat is located more than 100 ft from the unit (as measured along the control voltage wires), use no. 16 AWG color-coded, insulated (35 C minimum) wires.

A grommeted, control-voltage inlet hole is located in the panel adjacent to the control access panel. See Fig. 3 and 4. To make connections:

1. Run the low-voltage leads from the thermostat, through the inlet hole and to the control voltage leads through a hole in the bottom of the unit control box.
2. Connect the thermostat leads to the unit leads as shown in Fig. 15.

Table 4 — Recommended Thermostats

TYPE	THERMOSTAT AND SUBBASE PART NO.
Manual Changeover Thermostat and Subbase	HH07PC184
Autochangeover Thermostat and Subbase	HH07PC185

Heat Anticipator Setting

The room thermostat heat anticipator must be adjusted properly to ensure proper heating performance. Set the heat anticipator, using an ammeter to determine the exact required setting.

NOTE: For thermostat selection purposes, use 0.6 amp for the approximate required setting.

Failure to make a proper heat anticipator adjustment will 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.

Transformer Circuit Breaker

The unit transformer contains an automatic reset overcurrent protector for control circuit protection. If this device trips, it may reset without warning, starting the heating or cooling section of this product. Use caution when servicing: if overcurrent protector continues to trip, there is a problem in the low-voltage electrical circuit, such as an electrical short, ground, or transformer overload. Disconnect power, correct the condition, and check for normal unit operation.

F. Accessory Installation

At this time, any required accessories should be installed on the unit. Refer to Table 5 for available accessories. Control wiring information is provided in the unit wiring book.

PRE-START-UP

Proceed as follows to inspect and prepare the unit for initial startup:

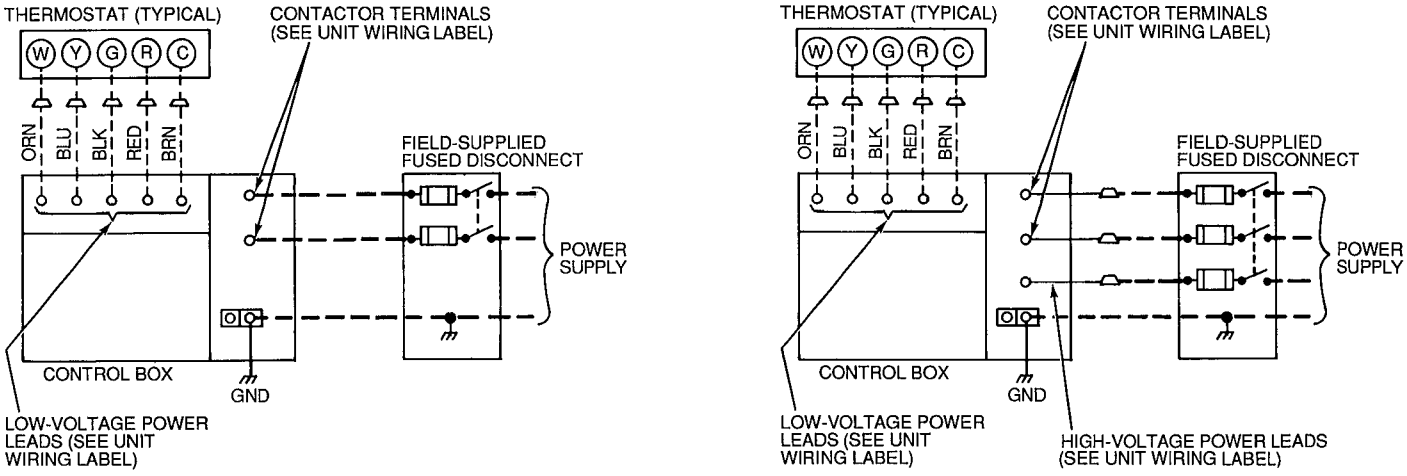
⚠ **WARNING:** Failure to observe the following warnings could result in serious personal injury:

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

1. Remove all access panels.
2. Read and follow instructions on all WARNING, CAUTION, and INFORMATION labels attached to, or shipped with, unit.
3. Make the following inspections:
   a. Inspect for shipping and handling damages such as broken lines, loose parts, disconnected wires, etc.
   b. Inspect for oil at all refrigerant tubing connections and on unit base. Detecting oil generally indicates a refrigerant leak. Leak-test all refrigerant tubing connections using electronic leak detector, halide torch or liquid-soap solution. If refrigerant leak is detected, see Repairing Refrigerant Leaks section on page 26.
   c. Inspect all field- and factory-wiring connections. Be sure that connections are completed and tight.
   d. Inspect coil fins. If damaged during shipping and handling, carefully straighten fins with a fin comb.
4. Verify the following conditions:

⚠ **DANGER:** Do not purge gas supply into the combustion chamber. Do not use a match or other open flame to check for gas leaks. Failure to adhere to this warning could result in an explosion causing personal injury or death.

   a. Make sure that gas supply has been purged, and that all gas piping has been checked for leaks.
   b. Make sure that condenser-fan blade is positioned correctly in fan orifice. *Blades should clear fan motor and fan orifice ring.*
   c. Make sure that air filter(s) is in place.
   d. Make sure that condensate drain pan and trap are filled with water to ensure proper drainage.
   e. Make sure that all tools and miscellaneous loose parts have been removed.



SINGLE-PHASE UNITS

3-PHASE UNITS

LEGEND

GND — Ground	Splice Connection
---- Field Control-Voltage Wiring	Unmarked Connection
---- Field High-Voltage Wiring	
——— Factory Wiring	

*"C" terminal connection, if applicable

Fig. 15 — High- and Control-Voltage Connections

5. Compressors are internally spring mounted. Do not loosen or remove compressor holddown bolts.
6. Each unit system has 2 Schrader-type ports, one on the suction line and one on the compressor discharge line. Be sure that caps on the ports are tight.

Unit is now ready for initial start-up.

START-UP

I. HEATING SECTION START-UP AND ADJUSTMENTS

⚠ CAUTION: Complete the required procedures given in the Pre-Start-Up section, page 15, before starting unit.

Do not jumper any safety devices when operating the unit.

Ensure that burner orifices are aligned properly. Unstable operation may occur when the burner orifices in the manifold are misaligned.

Follow the lighting instructions on the heating section operation label (located inside the burner access door) to start the heating section. However, when lighting the unit for the first time, perform the following additional steps: If the gas supply pipe was not purged before connecting the unit, it will be full of air. It is recommended that the ground joint union be loosened and the supply line be allowed to purge until the odor of gas is detected. Never purge gas lines into a combustion chamber. Immediately upon detection of gas odor, retighten the union. Allow 5 minutes to elapse, then light unit in accordance with Checking Heating Control Operation section below.

A. Checking Heating Control Operation

Start and check the unit for proper heating control operation as follows: (See furnace lighting instructions located inside burner access panel.)

1. Place the room thermostat SYSTEM switch in the HEAT position and the FAN switch in the AUTO. position.
2. Set the heating temperature control of the thermostat above room temperature.
3. Observe that after built-in time delays, the pilot automatically lights, the burners light and the blower motor starts. Observe that the burners and pilot go out, and that after a built-in delay the blower motor stops when the heating control setting of the thermostat is satisfied.

B. Gas Input

Check gas input and manifold pressure after unit start-up. (See Table 6.) If adjustment is required, proceed as follows:

⚠ CAUTION: These units are designed to consume the rated gas inputs using the fixed orifices at specified manifold pressures as shown in Table 6. DO NOT REDRILL THE ORIFICES UNDER ANY CIRCUMSTANCES.

The rated gas inputs shown in Table 6 are for altitudes from sea level up to 2000 ft above sea level. These inputs are based on natural gas with a heating value of 1050 Btu/ft^3 at 0.65 specific gravity, or LP gas with a heating value of 2500 Btu/ft^3 at 1.5 specific gravity. For elevations above 2000 ft, reduce input 4% for each 1000 ft above sea level. When the gas supply being used has a different heating value or specific gravity, refer to national and local codes, or contact your distributor to determine the required orifice size.

C. Adjusting Gas Input

The gas input to the unit is determined by measuring the gas flow at the meter or by measuring the manifold pressure. Measuring the gas flow at the meter is recommended for natural gas units. The manifold pressure must be measured to determine the input of LP gas units.

Measuring Gas Flow at Meter Method — Natural Gas Units

Minor adjustment can be made by changing the manifold pressure. The manifold pressure must be maintained between 3.2 and 3.8 in. wg. If larger adjustments are required, change main burner orifices following the recommendations of national and local codes.

NOTE: All other appliances that use the same meter must be turned off when gas flow is measured at the meter.

Proceed as follows:

a. Turn off gas supply to unit.
b. Remove pipe plug on outlet of gas valve, then connect manometer at this point. Turn on gas to unit.
c. Record number of seconds for gas meter test dial to make one revolution.
d. Divide number of seconds in Step c into 3600 (number of seconds in one hour).
e. Multiply result of Step d by the number of cubic ft shown for one revolution of test dial to obtain cubic ft of gas flow per hour.
f. Multiply result of Step e by Btu heating value of gas to obtain total measured input in Btuh. (Consult the local gas supplier if the heating value of gas is not known.)

Example: Assume that the size of test dial is one cubic ft, one revolution takes 30 seconds and the heating value of the gas is 1050 Btu/ft^3. Proceed as follows:

a. 30 seconds to complete one revolution.
b. 3600 ÷ 30 = 120.
c. 120 x 1 = 120 ft^3 of gas flow/hr.
d. 120 x 1050 = 126,000 Btuh input.

If the desired gas input is 120,000 Btuh, only a minor change in the manifold pressure is required.

Observe manifold pressure and proceed as follows to adjust gas input:

a. Remove cover screw over regulator adjustment screw on gas valve.
b. Turn regulator adjustment screw clockwise to increase gas input, or turn regulator adjustment screw counterclockwise to decrease input. Manifold pressure must be between 3.2 and 3.8 in. wg.

⚠ WARNING: Unsafe operation of the unit may result if manifold pressure is outside this range. Personal injury or unit damage may result.

c. Replace cover screw cap on gas valve.
d. Turn off gas supply to unit. Remove manometer from pressure tap. Replace pipe plug on gas valve. Turn on gas to unit. Check for leaks.

Measuring Manifold Pressure— LP Gas Units

The main burner orifices on an LP gas unit are sized for the unit rated input when the manifold pressure is 10.5 in. wg.

Proceed as follows to adjust gas input on an LP gas unit:

a. Turn off gas to unit.
b. Remove pipe plug on outlet of gas valve, then connect manometer at this point.
c. Turn on gas to unit.

Table 5 — Accessory List

ACCESSORY		PART NUMBER									
		Small-Cabinet Units 584B						Large-Cabinet Units 584B			
		018040	024040 024060	030040 030060 030080	036060 036080 036096	042060 042080 042096	048080 048096	036120	042120	048A80 048100 048120	060080 060100 060120
Dedicated Small-Cabinet Flat Roof Curb	8 in.	389049-701						—			
	11 in.	389049-702						—			
	14 in.	389049-703						—			
Universal Flat Roof Curb	8 in.	389059-701									
	11 in.	389059-702									
	14 in.	389059-703									
Universal Pitched Roof Curb	1:12	389060-701									
	2:12	389060-702									
	3:12	389060-703									
	4:12	389060-704									
	5:12	389060-705									
	6:12	389060-706									
Dedicated Small-Cabinet Pitched Roof Curb	1:12	389050-701						—			
	2:12	389050-702						—			
	3:12	389050-703						—			
	4:12	389050-704						—			
	5:12	389050-705						—			
	6:12	389050-706						—			
Square-to-Round Transition (Curbs), Downflow	14 in.	312149-201		—				—			
	16 in.	—		312149-202				312149-203			
	18 in.	—									312149-204
Square-to-Round Transition, Horizontal	14 in.	389048-701						—			
	16 in.	389048-702						389043-703			
	18 in.	—						389048-704			
Square-to-Round Transition (16 in.) Truss, Downflow		312149-205									
Duct Cover, Return Air		389045-701						—			
Modulating Economizer, Downflow		312116-201						312116-202			
Two-Position Economizer, Downflow		315236-201						315236-202			
Modulating Economizer With Filter Rack, Downflow		312116-203						312116-204			
Two-Position Economizer With Filter Rack, Downflow		315236-203						315236-204			
Modulating Economizer, Horizontal		389043-701						312121-202			
Two-Position Economizer, Horizontal		389042-701						315233-202			
Manual Outdoor-Air Damper, Downflow		312118-201									
Barometric Relief Damper, Horizontal		312124-201						312124-202			
Filter Rack, Downflow		312120-201						312120-202			
Filter Rack, Horizontal		389040-201						312123-202			
Flexible Duct Kit	14 in.	312119-201		—				—			
	16 in.	312119-202						312119-203			—
	18 in.	—						312119-204			
Flexible Duct Kit (14 in.) for 16-in. Truss Centers		312119-205									
Concentric Diffuser Box	14 in.	309410-204		—			—	—			
	16 in.	309410-201						309410-202			—
	18 in.	—						309410-203			
Crankcase Heater (230-1-60)		389037-701					—	389037-701			—
Low-Pressure Switch Kit		301619-702									
High-Pressure Switch Kit		301619-701									
Comprotec® Kit		389046-701					—	389046-701			—
Low-Ambient Kit (Weatherprobe™ II Device)		389034-201									
Hard Start Kit		389036-701				389036-702	—	389036-701	389036-702	389036-703	—
Coil Guard		389038-701	389038-702	389038-703		389038-701	389038-703	389038-704	389038-705	389038-706	389038-704
SEER Improvement Relay		389047-701									

d. Remove cover screw over the regulator adjustment screw on gas valve.

e. Adjust regulator adjustment screw for a manifold pressure reading of 10.5 in. wg. Turn adjusting screw clockwise to increase manifold pressure, or turn screw counterclockwise to decrease manifold pressure.

f. Replace cover screw.

g. Turn off gas to unit. Remove manometer from pressure tap. Replace pipe plug on gas valve, then turn on gas to unit. Check for leaks.

D. Check Burner Flame

Observe the unit heating operation, and watch the burner flames through the observation port to see if they are light blue and soft in appearance, and that the flames are approximately the same in appearance for each burner. See Fig. 16.

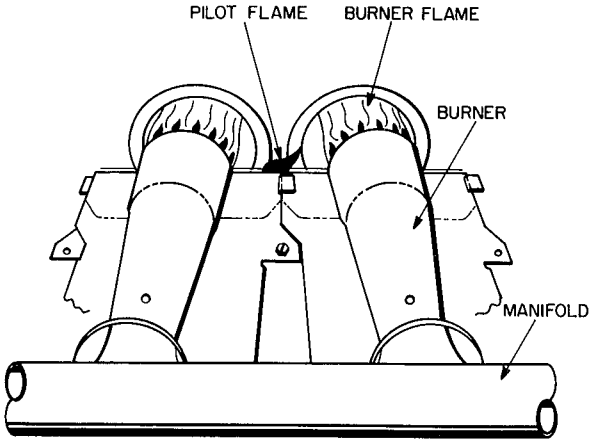


Fig. 16 – Monoport Burners

E. Airflow and Temperature Rise

The heating section of each unit size is designed and approved for heating operation within the temperature rise range stamped on the unit rating plate.

Table 7 shows the approved temperature rise range for each unit and the air delivery cfm at various temperature rises. The heating operation airflow must produce a temperature rise that falls within the approved range.

Refer to Indoor Airflow and Airflow Adjustments section on page 20, to adjust heating airflow when required.

F. Safety Check of Limit Control

The control shuts off the gas supply and energizes the circulating-air blower motor if the furnace overheats.

The recommended method of checking this limit control is to gradually block off the return air after the furnace has been operating for a period of at least 5 minutes. As soon as the limit control functions, the return-air opening should be unblocked to permit normal air circulation. By using this method to check the limit control, it can be established that the limit is functioning properly and the furnace will "fail-safe" if there is a restricted circulating-air supply or motor failure. If the limit control does not function during this test, the cause must be determined and corrected.

G. Heating Sequence of Operation

NOTE: With the FAN switch in the ON position, 24 v is supplied to the indoor-fan relay (IFR) through the G terminal on the thermostat. This voltage energizes the coil of the relay, closing the normally open set of contacts which provide power to the indoor-fan motor (IFM) continuously. Moving the FAN switch back to the AUTO. position, providing there is not a call for heating or cooling, deenergizes IFR, opening contacts on the relay deenergizing IFM. The FAN switch in AUTO. position cycles fan with either a call for heating or cooling.

On a call for heat, 24 v is supplied to the induced-draft relay (IDR) and to the time delay relay (TDR) through the W terminal of the thermostat. The 24 v energizes the TDR and after a delay of ± 30 seconds, the normally-open set of contacts closes, energizing the IFM. The 24 v also energizes IDR, closing the normally-open set of contacts and starting the induced-draft motor (IDM).

As the IDM comes to speed, it creates a negative pressure in the collector box of the burner compartment. The pressure switch senses this negative pressure, which closes the normally-open set of contacts when a negative pressure of approximately .29 in. wg is reached. This switch closure allows the

Table 6 – Rated Gas Inputs at Indicated Manifold Pressures

UNIT 584B	NUMBER OF ORIFICES	GAS SUPPLY PRESSURE (in. wg)				MANIFOLD PRESSURE (in. wg)		NATURAL GAS		PROPANE*	
		Natural		Propane				Orifice Drill Size	Heating Input (Btuh)†	Orifice Drill Size	Heating Input (Btuh)†
		Min	Max	Min	Max	Natural	Propane				
018040, 024040, 030040	2	5.0	13 6	11.0	13.6	3 5	10 5	44	40,000	55	40,000
024060, 030060, 036060, 042060	3	5.0	13 6	11.0	13.6	3.5	10 5	44	60,000	55	60,000
030080, 036080, 042080, 048080, 048A80, 060080	4	5 0	13 6	11.0	13 6	3.5	10 5	44	80,000	55	80,000
036096, 042096, 048096	4	5 0	13.6	11.0	13 6	3.5	10 5	42	96,000	54	96,000
048100, 060100	5	5.0	13.6	11.0	13.6	3.5	10.5	44	100,000	55	100,000
036120, 042120, 048120, 060120	6	5 0	13 6	11 0	13 6	3.5	10 5	44	120,000	55	120,000

*When a 584B unit is converted to propane, the unit must be modified. See accessory natural-to-propane conversion kit instructions.

†Based on altitudes from sea level up to 2000 ft above sea level For altitudes above 2000 ft, reduce input rating 4% for each 1000 ft above sea level. In Canada, from 2000 ft above sea level to 4,500 ft above sea level, derate the unit 10%.

24 v to pass through the safety chain rollout switch (RS), auxiliary limit switch (ALS), limit switch (LS), and pressure switch (PS), energizing the TH terminal of the ignition control (ICP). Immediately the pilot valve of the main gas valve is energized and gas is allowed to flow to the pilot; simultaneously, the ignition circuit of the ICP is energized, creating a spark and igniting the pilot.

If the pilot fails to ignite after a period of 90 seconds, both the pilot valve and spark will cease for a period of 5½ minutes. When the 5½ minutes have elapsed, the pilot valve and spark will energize for another try for ignition. If the pilot again fails to light, the ICP will continue going into a retry mode until the pilot ignites or power is removed from the TH terminal. If the pilot does ignite, the flame is sensed through the flame rectification circuit through the FP terminal of the ICP. (A minimum of 1 μa is needed for the sensing circuit, but a normal current of 5 to 7 μa dc should be attained for continued reliable operation.) The main valve opens and allows gas to flow to the main burners, where it is ignited by the pilot.

When the call for heat has been satisfied, the ICP, TDR, and IDR are deenergized, immediately deenergizing the gas valve and IDM. The IFM continues to run for ± 90 seconds.

NOTE: The indoor-fan time-delay relay (TDR) on and off time delays vary depending on manufacturing tolerance and ambient temperature.

H. Limit Switches

Normally-closed LS completes the control circuit through the thermostat R circuit. Should the leaving-air temperature rise above the maximum allowable temperature, the LS opens and the R control circuit "breaks." Any interruption in the "R" control circuit instantly closes the gas valve and stops gas flow to the burners and pilot. The IFM motor continues to run until LS resets.

When the air temperature at the LS drops to the low-temperature setting of the LS, the switch closes and completes the R control circuit. The electric-spark ignition system cycles and the unit returns to normal heating operation.

I. Auxiliary Limit Switch – Blower

Blower auxiliary limit switch (ALS) is a temperature-actuated automatic reset switch and is connected in series with the LS. The function of the switch is to prevent abnormal blower-compartment temperatures. The switch is mounted on the blower housing. When the temperature at the auxiliary switch reaches the maximum allowable temperature, the R control circuit "breaks", closing the gas valve and stopping gas flow to the burners and pilot. The switch will reset automatically when the blower-compartment temperature returns to normal. The IFM continues to run until ALS resets.

J. Rollout Switch

The RS is a temperature-actuated non-resettable switch connected in series with LS and ALS. The function of the switch is to close the main gas valve in the event of flame rollout. The switch is located above the main burners. When the temperature at the auxiliary switch reaches the maximum allowable temperature, the R control circuit trips, closing the gas valve and stopping gas flow to the burners and pilot. The IFM and IDM continue to run. If the switch opens, shut down unit by first turning the gas off, then the power; call for service.

II. COOLING SECTION START-UP AND ADJUSTMENTS

⚠ CAUTION: Complete the required procedures given in Pre-Start-Up section, page 15, before starting the unit.

Do not jumper any safety devices when operating the unit.

Do not operate the compressor when the outdoor temperature is below 40 F for 024-060 units or 45 F for 018 units (unless accessory low-temperature kit is installed).

Do not rapid-cycle the compressor. A 5-minute time delay is provided to prevent compressor damage.

A. Checking Cooling Control Operation

Start and check the unit for proper cooling control operation as follows:

1. Place room thermostat SYSTEM switch in OFF position. Observe that blower motor starts when FAN switch is placed in ON position and shuts down when FAN switch is placed in AUTO. position.
2. Place SYSTEM switch in COOL position and FAN switch in AUTO. position. Set cooling control below room temperature. Observe that compressor, condenser fan and evaporator blower motors start. Observe that cooling cycle shuts down when control setting is satisfied.
3. When using an autochangeover room thermostat, place both SYSTEM and FAN switches in AUTO. positions. Observe that unit operates in Heating mode when temperature control is set to "call for heating" (above room temperature) and operates in Cooling mode when temperature control is set to "call for cooling" (below room temperature).

IMPORTANT: Scroll compressors are direction oriented. Three-phase units must be checked to ensure proper compressor 3-phase power lead orientation. If not corrected within 5 minutes, the internal protector will shut off the compressor. The 3-phase power leads to the unit must be reversed to correct rotation. When turning backwards, scroll compressors emit elevated noise levels, and the difference between compressor suction and discharge pressures may be dramatically lower than normal.

B. Checking and Adjusting Refrigerant Charge

The refrigerant system is fully charged with R-22 refrigerant and is tested and factory sealed.

NOTE: Adjustment of the refrigerant charge is not required unless the unit is suspected of not having the proper R-22 charge. For all applications, the correct R-22 charge for the best performance is the charge that results in a suction gas superheat of 10 F at the compressor inlet when the unit is operating at the ARI (Air-Conditioning & Refrigeration Institute) rating conditions of 95 F dry-bulb outdoor ambient temperature and 80 F dry-bulb/67 F wet-bulb indoor ambient temperature. See Refrigerant Charge section on page 28 for procedure to check and adjust R-22 charge.

C. Unit Controls

Compressor

All compressors have the following internal-protection controls:

1. *High-Pressure Relief Valve* – This valve opens when the pressure differential between the low and high side becomes excessive.

2. *Compressor Overload* — This overload interrupts power to the compressor when either the current or internal temperature become excessive, and automatically resets when the internal temperature drops to a safe level.

This overload may require up to 60 minutes (or longer) to reset. If the internal overload is suspected of being open, disconnect the electrical power to the unit and check the circuit through the overload with an ohmmeter or continuity tester.

Accessory Low-Pressure Switch (LPS) Kit

When the refrigerant low-side pressure drops below 27 psig, the LPS opens 24-v power to the compressor contactor and stops the compressor. When the pressure reaches 60 psig, the switch rests and the compressor is allowed to come back on.

Accessory High-Pressure Switch (HPS) Kit

When the refrigerant high-side pressure reaches 428 psig, the HPS opens 24-v power to the compressor contactor and stops the compressor. When the pressure drops to 320 psig, the switch resets and the compressor is allowed to restart.

D. Cooling Sequence of Operation

NOTE: With the FAN switch in the ON position, 24 v is supplied to the IFR through the G terminal on the thermostat. This voltage energizes the coil of the relay closing the normally-open set of contacts which provide power to the IFM continuously. Moving the FAN switch back to the AUTO. position, providing there is not a call for heating or cooling, deenergizes IFR, opening contacts on the relay deenergizing IFM. The FAN switch in AUTO. position cycles fan with either a call for heating or cooling.

On a call for cooling, 24 v is supplied to the compressor contactor (C) and IFR simultaneously through the Y and G terminals of the thermostat, respectively. On units with a scroll compressor, there is a built-in 5-minute (± 45 seconds) compressor time delay between compressor starts. Energizing the contactor closes the normally-open set of contacts supplying power to both the compressor and outdoor-fan motor (OFM). Energizing the IFR closes the normally open set of contacts providing power to the IFM. On the loss of the call for cooling, 24 v is removed from both the Y and G terminals of the thermostat (providing the FAN switch is in the AUTO. position), deenergizing both the contactor and IFR and opening both the contacts supplying power to compressor, OFM and IFM.

III. INDOOR AIRFLOW AND AIRFLOW ADJUSTMENTS

⚠ **CAUTION:** For cooling operation, the recommended airflow is 350 to 450 cfm for each 12,000 Btuh of rated cooling capacity. For heating operation, the airflow must produce a temperature rise that falls within the range stamped on the unit rating plate.

⚠ **WARNING:** Shut off gas supply, *then* disconnect electrical power to the unit before changing blower speed. Electrical shock can cause personal injury or death.

⚠ **CAUTION:** Do not change the blower-motor lead connections on 460-v units from the factory setting. Damage to unit may result.

Blower motors are factory set on low speed. For 208-v operation on 208/230-v rated units, depending on unit performance, motor speed can also be adjusted by changing the tap.

Table 7 shows the temperature rise at various airflow rates. Tables 8A, 8B, 9A, and 9B show both heating and cooling airflows at various external static pressures. Refer to these tables to determine the airflow for the system being installed.

NOTE: Be sure that all supply- and return-air grilles are open, free from obstructions, and adjusted properly.

The heating and/or cooling airflow of 208/230-v blower motors can be changed by changing the lead connections of the blower motor. The motor leads are color-coded as follows:

red = low speed
blue = medium speed (size 060 units only)
black = high speed

NOTE: Motor is factory wired for low speed.

To change the heating and cooling speed, connect the black lead at blower-motor connector to speed tap desired. (See unit wiring label.)

Table 7 — Air Delivery (Cfm) at Indicated Temperature Rise and Rated Heating Input

UNIT 584B	HEATING INPUT (Btuh)	TEMPERATURE RISE (°F)												
		20	25	30	35	40	45	50	55	60	65	70	75	80
018040, 024040, 030040	40,000	—	—	987	846	740	658	592	538	493	—	—	—	—
024060, 030060, 036060	60,000	—	—	—	—	—	987	888	808	740	683	634	592	—
042060	60,000	—	—	1481	1269	1111	987	888	808	740	—	—	—	—
030080, 036080, 042080	80,000	—	—	—	—	—	1316	1185	1077	987	911	846	790	—
036096, 042096	96,000	—	—	—	—	1777	1580	1422	1292	1185	1096	1015	—	—
048080, 048A80	80,000	—	2370	1975	1693	1481	1316	1185	1077	—	—	—	—	—
060080	80,000	2962	2370	1975	1693	1481	1316	1185	—	—	—	—	—	—
048096	96,000	—	—	—	—	1777	1580	1422	1292	1185	1096	1015	—	—
048100	100,000	—	—	—	2116	1851	1646	1481	1346	1234	1139	—	—	—
060100	100,000	—	—	2469	2116	1851	1646	1481	1346	1234	—	—	—	—
036120, 042120, 048120	120,000	—	—	—	—	—	—	1777	1616	1481	1367	1269	1185	1111
060120	120,000	—	—	—	2539	2222	1975	1777	1616	1481	1367	—	—	—

NOTE: Dashed areas of the table do not fall in the approved temperature rise range of the unit

Table 8A — Dry-Coil Air Delivery*
Unit 584B Air Delivery (Cfm) at Indicated External Static Pressure and Voltage — Horizontal Discharge at 208 V

584B	MOTOR SPEED	AIR DELIVERY	EXTERNAL STATIC PRESSURE (in. wg)										
			0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
018040	Low	Watts	200	190	181	170	155	137	125	†	†	†	†
		Cfm	910	855	800	735	635	505	300	†	†	†	†
	High	Watts	320	295	275	255	235	210	200	†	†	†	†
		Cfm	1275	1200	1100	990	830	640	425	†	†	†	†
024040, 024060	Low	Watts	451	427	407	383	365	348	328	309	288	275	258
		Cfm	1185	1129	1088	1026	979	922	857	796	734	670	606
	High	Watts	511	483	464	440	420	402	383	366	347	328	313
		Cfm	1370	1291	1221	1142	1063	1003	920	840	759	679	600
030040, 030060	Low	Watts	519	507	492	477	455	431	416	397	378	358	336
		Cfm	1184	1163	1150	1134	1105	1064	1038	1001	963	924	882
	High	Watts	620	602	581	559	532	493	492	470	448	426	403
		Cfm	1443	1414	1376	1329	1279	1197	1157	1090	1020	950	875
030080, 036060, 036080, 036096, 042060, 042080, 042096	Low	Watts	560	544	527	505	482	461	436	411	384	356	330
		Cfm	1515	1452	1389	1308	1227	1105	1019	906	787	659	523
	High	Watts	670	650	631	602	573	542	506	469	431	395	353
		Cfm	1765	1705	1621	1521	1383	1254	1098	931	760	579	392
048080, 048096	Low	Watts	873	847	814	785	758	734	692	660	626	595	560
		Cfm	1717	1690	1645	1597	1550	1496	1432	1368	1301	1233	1162
	High	Watts	1075	1030	995	960	930	900	872	843	817	790	762
		Cfm	2119	2062	1995	1913	1863	1793	1752	1642	1569	1491	1415
036120, 042120	Low	Watts	740	700	660	615	580	540	496	454	412	366	323
		Cfm	1913	1820	1736	1645	1544	1428	1308	1182	1049	906	755
	High	Watts	790	760	720	690	650	610	572	531	482	445	400
		Cfm	2032	1942	1844	1759	1636	1514	1391	1260	1114	962	800
048A80, 048100, 048120	Low	Watts	770	730	690	650	610	575	531	489	445	402	356
		Cfm	1945	1880	1796	1708	1611	1508	1384	1252	1111	961	801
	High	Watts	850	810	770	730	690	655	611	572	532	493	455
		Cfm	2138	2045	1943	1846	1738	1624	1494	1372	1244	1114	980
060080, 060100, 060120	Low	Watts	1005	935	915	890	855	835	810	775	740	700	665
		Cfm	1910	1885	1860	1830	1785	1750	1710	1655	1590	1520	1445
	Medium	Watts	1215	1170	1120	1080	1040	1015	970	920	875	835	790
		Cfm	2395	2345	2295	2235	2175	2105	2035	1960	1875	1790	1690
	High	Watts	1305	1285	1240	1210	1175	1135	1095	1055	1010	965	900
		Cfm	2575	2550	2485	2435	2365	2290	2215	2125	2025	1925	1810

* Air delivery values are without air filter and are for dry coil See Table 10 for wet coil pressure drop. Deduct field-supplied air filter pressure drop and wet coil pressure drop to obtain external static pressure available for ducting.
†Unit air delivery is outside of operating range.

NOTES:
1 Do not operate the unit at a cooling airflow that is less than 350 cfm for each 12,000 Btuh of rated cooling capacity. Evaporator-coil icing may occur at airflows below this point. Water blow-off may occur at airflows above 450 cfm per 12,000 Btuh of rated cooling capacity.
2. The 460-v units are high speed only for both cooling and heating Do not change blower speed settings

Table 8B — Dry-Coil Air Delivery*
Unit 584B Air Delivery (Cfm) at Indicated External Static Pressure and Voltage — Horizontal Discharge at 230 V or 460 V

584B	MOTOR SPEED	AIR DELIVERY	EXTERNAL STATIC PRESSURE (in. wg)										
			0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
018040	Low	Watts	245	230	212	190	177	152	135	†	†	†	†
		Cfm	1090	1010	925	830	725	570	360	†	†	†	†
	High	Watts	385	345	315	290	278	262	242	†	†	†	†
		Cfm	1350	1250	1140	1025	885	680	490	†	†	†	†
024040, 024060	Low	Watts	501	477	457	433	415	398	375	356	336	313	298
		Cfm	1256	1195	1148	1081	1031	971	907	844	781	717	652
	High	Watts	561	533	514	490	470	452	428	408	389	371	353
		Cfm	1442	1359	1285	1202	1119	1056	950	865	777	690	600
030040, 030060	Low	Watts	569	557	542	527	505	481	445	413	373	338	295
		Cfm	1248	1226	1211	1194	1164	1120	1066	1004	934	858	776
	High	Watts	670	652	631	609	582	543	525	493	461	430	397
		Cfm	1519	1489	1449	1399	1347	1261	1222	1154	1057	1010	935
030080, 036060, 036080, 036096, 042060, 042080, 042096	Low	Watts	610	593	575	524	500	494	467	436	406	375	344
		Cfm	1597	1530	1464	1378	1293	1164	1043	921	794	665	531
	High	Watts	720	701	680	653	625	594	564	532	500	467	434
		Cfm	1857	1795	1708	1603	1457	1321	1161	990	809	610	426
048080, 048096	Low	Watts	987	945	911	877	850	809	774	740	708	676	650
		Cfm	1979	1922	1859	1802	1734	1667	1594	1522	1450	1376	1303
	High	Watts	1121	1087	1046	1017	981	952	925	900	877	854	831
		Cfm	2135	2066	1998	1931	1858	1795	1717	1646	1570	1494	1420
036120, 042120	Low	Watts	755	725	680	650	610	575	545	515	490	463	438
		Cfm	1976	1909	1806	1714	1603	1495	1380	1255	1128	996	855
	High	Watts	850	820	780	750	715	675	640	602	563	527	490
		Cfm	2086	1983	1883	1782	1665	1545	1430	1310	1185	1063	940
048A80, 048100, 048120	Low	Watts	810	765	730	695	655	610	563	512	458	402	343
		Cfm	2061	1970	1892	1813	1704	1580	1444	1240	1113	928	723
	High	Watts	890	855	820	780	750	715	675	639	600	563	526
		Cfm	2178	2081	1941	1869	1769	1650	1530	1408	1280	1153	1021
060080, 060100, 060120	Low	Watts	1150	1080	1040	1005	970	915	870	835	805	765	720
		Cfm	2260	2205	2150	2095	2035	1970	1900	1830	1755	1670	1575
	Medium	Watts	1290	1235	1180	1150	1110	1065	1030	995	960	915	850
		Cfm	2655	2550	2480	2410	2340	2265	2185	2105	2025	1930	1795
	High	Watts	1385	1325	1300	1265	1245	1210	1165	1110	1075	1035	980
		Cfm	2735	2665	2595	2490	2410	2335	2255	2165	2070	1960	1800

* Air delivery values are without air filter and are for dry coil See Table 10 for wet coil pressure drop. Deduct field-supplied air filter pressure drop and wet coil pressure drop to obtain external static pressure available for ducting
†Unit air delivery is outside of operating range.

NOTES:
1. Do not operate the unit at a cooling airflow that is less than 350 cfm for each 12,000 Btuh of rated cooling capacity. Evaporator-coil icing may occur at airflows below this point. Water blow-off may occur at airflows above 450 cfm per 12,000 Btuh of rated cooling capacity.
2. The 460-v units are high speed only for both cooling and heating. Do not change blower speed settings.

Table 9A – Dry-Coil Air Delivery*
Unit 584B Air Delivery (Cfm) at Indicated External Static Pressure and Voltage – Vertical Discharge at 208 V

584B	MOTOR SPEED	AIR DELIVERY	EXTERNAL STATIC PRESSURE (in. wg)										
			0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
018040	Low	Watts	195	180	172	163	145	127	120	†	†	†	†
		Cfm	875	825	760	675	565	425	240	†	†	†	†
	High	Watts	310	285	265	242	224	205	195	†	†	†	†
		Cfm	1240	1145	1045	910	730	520	290	†	†	†	†
024040, 024060	Low	Watts	451	417	397	373	355	338	320	307	292	277	263
		Cfm	1138	1102	1045	996	942	889	835	770	708	645	580
	High	Watts	491	463	454	420	400	382	351	330	306	282	263
		Cfm	1308	1234	1162	1084	1020	951	879	809	740	670	602
030040, 030060	Low	Watts	509	497	482	467	445	421	377	351	316	282	250
		Cfm	1155	1138	1120	1104	1073	1031	977	942	893	842	790
	High	Watts	600	582	561	539	512	473	430	381	333	285	243
		Cfm	1411	1362	1326	1249	1195	1133	1078	1012	950	887	820
030080, 036060, 036080, 036096, 042060, 042080, 042096	Low	Watts	522	504	485	463	440	422	398	379	357	335	314
		Cfm	1494	1430	1358	1273	1174	1058	941	820	691	561	429
	High	Watts	651	631	610	575	540	517	493	466	442	417	395
		Cfm	1683	1615	1536	1440	1274	1153	997	826	644	460	270
048080, 048096	Low	Watts	833	792	765	725	700	650	615	576	537	509	481
		Cfm	1653	1611	1569	1518	1473	1373	1297	1212	1125	1035	939
	High	Watts	945	915	890	865	805	770	712	652	590	527	466
		Cfm	1895	1839	1803	1740	1629	1532	1400	1264	1119	963	801
036120, 042120	Low	Watts	680	645	610	580	545	510	469	429	392	350	312
		Cfm	1797	1709	1620	1547	1448	1315	1210	1089	963	833	703
	High	Watts	750	715	680	650	615	585	551	519	492	457	428
		Cfm	1885	1779	1704	1608	1507	1404	1291	1179	1063	945	816
048A80, 048100, 048120	Low	Watts	710	680	650	600	570	520	478	428	388	343	302
		Cfm	1833	1768	1700	1599	1505	1390	1275	1154	1031	903	772
	High	Watts	785	750	720	685	650	610	588	543	506	471	436
		Cfm	1957	1873	1786	1699	1598	1495	1393	1292	1189	1084	977
060080, 060100, 060120	Low	Watts	940	910	885	865	830	800	770	740	705	665	635
		Cfm	1885	1860	1830	1790	1745	1695	1645	1583	1520	1455	1390
	Medium	Watts	1170	1125	1095	1045	1015	970	920	870	830	785	735
		Cfm	2350	2300	2245	2180	2110	2035	1955	1870	1775	1675	1560
	High	Watts	1270	1255	1220	1185	1145	1110	1070	1030	980	930	865
		Cfm	2545	2505	2450	2390	2320	2240	2155	2070	1965	1860	1735

*Air delivery values are for without air filter and are for dry coil See Table 10 for wet coil pressure drop. Deduct field-supplied air filter pressure drop and wet coil pressure drop to obtain external static pressure available for ducting.
†Unit air delivery is outside of operating range

NOTES:
1. Do not operate the unit at a cooling airflow that is less than 350 cfm for each 12,000 Btuh of rated cooling capacity. Evaporator-coil icing may occur at airflows below this point. Water blow-off may occur at airflows above 450 cfm per 12,000 Btuh of rated cooling capacity
2 The 460-v units are high speed only for both cooling and heating. Do not change blower speed settings

Table 9B – Dry-Coil Air Delivery*
Unit 584B Air Delivery (Cfm) at Indicated External Static Pressure and Voltage – Vertical Discharge at 230 V or 460 V

584B	MOTOR SPEED	AIR DELIVERY	EXTERNAL STATIC PRESSURE (in. wg)										
			0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
018040	Low	Watts	238	220	204	185	167	142	128	†	†	†	†
		Cfm	1045	965	875	780	650	470	250	†	†	†	†
	High	Watts	355	327	304	285	267	253	225	†	†	†	†
		Cfm	1280	1190	1080	955	785	555	300	†	†	†	†
024040, 024060	Low	Watts	491	467	447	423	405	388	371	354	336	323	307
		Cfm	1196	1161	1101	1050	993	932	873	806	740	672	601
	High	Watts	541	513	494	470	450	432	417	401	386	370	354
		Cfm	1379	1301	1225	1143	1075	1002	940	879	806	741	678
030040, 030060	Low	Watts	559	547	532	517	495	471	436	400	360	319	275
		Cfm	1218	1200	1182	1165	1132	1088	1035	976	909	836	761
	High	Watts	650	632	611	589	562	523	520	498	474	451	429
		Cfm	1493	1457	1412	1358	1274	1218	1125	1032	938	838	732
030080, 036060, 036080, 036096, 042060, 042080, 042096	Low	Watts	600	573	555	523	491	470	431	398	369	339	313
		Cfm	1574	1507	1431	1341	1237	1115	959	841	700	550	395
	High	Watts	695	680	658	624	590	563	525	484	446	407	367
		Cfm	1763	1700	1619	1492	1343	1215	1032	844	649	443	235
048080, 048096	Low	Watts	880	850	810	790	745	710	670	630	591	551	511
		Cfm	1805	1748	1692	1650	1582	1475	1396	1301	1198	1093	985
	High	Watts	1005	965	935	900	865	820	886	747	710	674	635
		Cfm	1971	1899	1830	1762	1673	1568	1476	1371	1260	1146	1025
036120, 042120	Low	Watts	705	670	640	595	570	535	494	460	425	390	356
		Cfm	1855	1707	1684	1574	1498	1361	1224	1087	941	789	632
	High	Watts	795	765	735	700	670	640	608	575	543	510	479
		Cfm	1906	1821	1722	1623	1533	1410	1293	1173	1050	925	798
048A80, 048100, 048120	Low	Watts	740	705	665	635	600	560	525	488	452	418	381
		Cfm	1918	1849	1752	1670	1561	1442	1321	1194	1062	930	790
	High	Watts	835	805	770	735	705	670	633	597	562	525	490
		Cfm	1997	1907	1817	1713	1618	1506	1388	1273	1160	1040	920
060080, 060100, 060120	Low	Watts	1080	1040	1005	970	915	870	840	800	765	720	665
		Cfm	2205	2150	2095	2035	1970	1900	1825	1750	1665	1570	1500
	Medium	Watts	1240	1180	1160	1120	1075	1030	1000	960	915	865	790
		Cfm	2555	2480	2425	2355	2275	2195	2110	2025	1930	1825	1675
	High	Watts	1325	1300	1275	1250	1225	1180	1130	1085	1050	1000	940
		Cfm	2665	2595	2520	2440	2360	2280	2195	2100	2000	1860	1695

*Air delivery values are for without air filter and are for dry coil. See Table 10 for wet coil pressure drop. Deduct field-supplied air filter pressure drop and wet coil pressure drop to obtain external static pressure available for ducting

†Unit air delivery is outside of operating range.

NOTES:

1. Do not operate the unit at a cooling airflow that is less than 350 cfm for each 12,000 Btuh of rated cooling capacity. Evaporator-coil icing may occur at airflows below this point. Water blow-off may occur at airflows above 450 cfm per 12,000 Btuh of rated cooling capacity.
2. The 460-v units are high speed only for both cooling and heating. Do not change blower speed settings

Table 10 — Wet Coil Pressure Drop

584B UNIT SIZE	AIRFLOW (cfm)	PRESSURE DROP (in. wg)
018	500	033
	600	038
	700	.044
024, 030	800	.035
	900	.042
	1000	.050
	1200	.064
036, 042	1000	.038
	1200	.050
	1400	.064
	1600	.080
048	1400	.050
	1600	.060
	1800	.072
060	1700	.100
	1900	.120
	2100	.140
	2300	.160

CARE AND MAINTENANCE

To ensure continuing high performance, and to minimize the possibility of premature equipment failure, periodic maintenance must be performed on this equipment. This combination heating/cooling unit should be inspected at least once each year by a qualified service person.

NOTE TO EQUIPMENT OWNER: Consult your local dealer about the availability of a maintenance contract.

⚠ **WARNING:** The ability to properly perform maintenance on this equipment requires certain expertise, mechanical skills, tools, and equipment. If you do not possess these, do not attempt to perform any maintenance on this equipment other than those procedures recommended in the User's Manual. FAILURE TO HEED THIS WARNING COULD RESULT IN SERIOUS PERSONAL INJURY AND POSSIBLE DAMAGE TO THIS EQUIPMENT.

The minimum maintenance requirements for this equipment are as follows:

1. Inspect air filter(s) each month. Clean or replace when necessary.
2. Inspect indoor coil, drain pan and condensate drain each cooling season for cleanliness. Clean when necessary.
3. Inspect blower motor and wheel for cleanliness, and check lubrication each heating and cooling season. Clean and lubricate (if required) when necessary.
4. Check electrical connections for tightness and controls for proper operation each heating and cooling season. Service when necessary.
5. Check and inspect heating section before each heating season. Clean and adjust when necessary.
6. Check and clean vent screen, if needed.

⚠ **WARNING:** Failure to follow these warnings could result in serious personal injury:

1. Turn off gas supply, *then* turn off electrical power to the unit before performing any maintenance or service on the unit.
2. Use extreme caution when removing panels and parts. As with any mechanical equipment, personal injury can result from sharp edges, etc.
3. Never place anything combustible either on, or in contact with, the unit.
4. Should overheating occur, or the gas supply fail to shut off, shut off the external main manual gas valve to the unit, *then* shut off the electrical supply.

I. AIR FILTER

⚠ **CAUTION:** Never operate the unit without a suitable air filter in the return-air duct system. Always replace the filter with the same dimensional size and type as originally installed. See Table 1 for recommended filter sizes.

Inspect air filter(s) at least once each month and replace (disposable-type) or clean (cleanable-type) at least twice during each heating and cooling season or whenever the filter(s) becomes clogged with dust and lint.

II. EVAPORATOR BLOWER AND MOTOR

NOTE: Motors without oilers are permanently lubricated. Do not attempt to lubricate these motors.

For longer life, operating economy and continued efficiency, clean accumulated dirt and grease from the blower wheel and motor annually.

Lubricate the motor every 5 years if the motor is used intermittently (thermostat FAN switch in AUTO. position), or every 2 years if the motor is used continuously (thermostat FAN switch in ON position).

⚠ **WARNING:** Turn off the gas supply, *then* disconnect and tag electrical power to the unit before cleaning and lubricating the blower motor and wheel. Failure to adhere to this warning could cause personal injury or death.

Clean and lubricate the blower motor and wheel as follows:

1. Remove and disassemble blower assembly as follows:
   a. Remove blower access door.
   b. Disconnect blower-motor leads from their termination points at motor. Disconnect yellow lead from control box at capacitor. Disconnect auxiliary limit switch leads at switch.
   c. Remove blower assembly from unit. Be careful not to tear insulation in blower compartment.
   d. Ensure proper reassembly by marking blower wheel and motor in relation to blower housing before disassembly.
   e. Loosen setscrew(s) that secures wheel to motor shaft. Then remove screws that secure motor mount brackets to housing and slide motor and motor mount out of housing.

2. Lubricate motor as follows:
   a. Thoroughly clean all accumulations of dirt or grease from motor housing.
   b. Remove dust caps or plugs from oil ports located at each end of motor.
   c. Use a good grade of SAE 20 nondetergent motor oil and put one teaspoon (5 cc, 3/16 ounce or 16 to 25 drops) in each oil port.
   d. Allow time for oil to be absorbed by each bearing, then wipe excess oil from motor housing.
   e. Replace dust caps or plugs in oil ports.
3. Remove and clean blower wheel as follows:
   a. Ensure proper reassembly by marking wheel orientation and cutoff plate location.
   b. Remove screws holding cutoff plate, and remove plate from housing.
   c. Lift wheel from housing. When handling and/or cleaning blower wheel, be sure not to disturb balance weights (clips) on blower-wheel vanes.
   d. Remove caked-on dirt from wheel and housing with a brush. Remove lint and/or dirt accumulations from wheel and housing with vacuum cleaner, using soft brush attachment. Remove grease and oil with mild solvent.
   e. Reassemble wheel and cutoff plate into housing.
   f. Reassemble motor into housing. Be sure setscrews are tightened on motor shaft flats and not on round part of shaft.

SERVICE

⚠ **WARNING:** When servicing unit, shut off the gas supply, *then* shut off all electrical power to unit to avoid shock hazard or injury from rotating parts.

I. CLEANING

Inspect unit interior at the beginning of each heating and cooling season or as operating conditions require. To inspect and clean, the unit top must be removed.

A. Unit Top Removal

⚠ **CAUTION:** Condenser fan and motor are fastened to the unit top. When removing the top, use extreme care to not pull the fan motor leads loose.

NOTE: When performing maintenance or service procedures that require removal of the unit top, be sure to perform *all* of the routine maintenance procedures that require top removal, including: inspection of the heat exchanger area, coil inspection and cleaning, and condensate drain pan inspection and cleaning.

Only qualified service personnel should perform maintenance and service procedures that require unit top removal. Refer to the following top removal procedures:

1. Turn off gas supply, *then* turn off electric power to unit.
2. Remove all screws that secure unit top, including screws around 4 sides and those on top that screw into internal divider panels. Save all screws.
3. Tape all side panels at each seam near unit top. Use tape strips that are at least 5-in. long to prevent sides from falling when top is removed.
4. Lift top from unit carefully. Set top on edge and ensure that top is supported by unit side that is opposite duct (or plenum) side. *Use extreme care to prevent damage to the fan blades, motor and insulation.*
5. Carefully replace and secure unit top to unit, using screws removed in Step 2, when maintenance and/or service procedures are concluded. (Be sure to use original screws that have rubber washers to seal out water when securing top to internal divider panels.)

B. Repairing Refrigerant Leaks

Proceed as follows to repair a refrigerant leak and to charge the unit.

1. Locate leak and ensure that refrigerant system pressure has been relieved and reclaimed from both high- and low-pressure ports.
2. Repair leak following accepted practices.

NOTE: Install a filter drier whenever the system has been opened for repair.

3. Charge system to 150 psi with nitrogen and, using soap-and-water solution or nitrogen detector, check for leaks.
4. Evacuate and reclaim refrigerant system if additional leaks are not found.
5. Charge unit with R-22 refrigerant, using a volumetric-charging cylinder or accurate scale. *Refer to unit rating plate for required charge.* Be sure to add extra refrigerant to compensate for internal volume of filter drier.

NOTE: See Checking and Adjusting Refrigerant Charge section on page 19.

C. Condenser Coil, Evaporator Coil and Condensate Drain Pan

Inspect the condenser coil, evaporator coil and condensate drain pan at least once each year. Proper inspection and cleaning requires the removal of the unit top. See Unit Top Removal section above.

The coils are easily cleaned when dry; therefore, inspect and clean the coils either before or after each cooling season. Remove all obstructions (including weeds and shrubs) that interfere with the airflow through the condenser coil. Straighten bent fins with a fin comb. If coated with dirt or lint, clean the coils with a vacuum cleaner, using the soft brush attachment. Be careful not to bend the fins. If coated with oil or grease, clean the coils with a mild detergent-and-water solution. Rinse coils with clear water, using a garden hose. Be careful not to splash water on motors, insulation, wiring or air filter(s). For best results, spray condenser coil fins from inside to outside the unit. On units with an outer and inner condenser coil, be sure to clean between the coils. Be sure to flush all dirt and debris from the unit base.

Inspect the drain pan and condensate drain line when inspecting the coils. Clean the drain pan and condensate drain by removing all foreign matter from the pan. Flush the pan and drain tube with clear water. Do not splash water on the insulation, motor, wiring or air filter(s). If the drain tube is restricted, clear it with a "plumber's snake" or similar probe device.

D. Condenser Fan

⚠ **CAUTION:** Keep the condenser fan free from all obstructions to ensure proper cooling operation. Never place articles on top of the unit. Damage to unit may result.

Remove control and compressor access panels. Inspect the fan blades for cracks or bends each year. *Ensure that blades clear the motor by no more than 1/4 inch.* If the blade assembly has slipped down the motor shaft, adjust the fan position on the motor shaft by loosening the setscrew, then moving the blade

assembly up. Be sure that the setscrew is on the flat of the motor shaft before tightening.

E. Pilot

Inspect the pilot and clean (when necessary) at the beginning of each heating season. Remove the accumulation of soot and carbon from the pilot. The pilot flame must be high enough for proper impingement on the flame sensor. Pilot flame also must come in contact with the pilot hood (target) for proper operation. If the pilot flame appears too hard (lifting and blowing) or too soft (unstable), check inlet gas pressure for proper value. See Table 6. The spark electrode must be located so the spark travels through a combustible mixture of gas. If necessary, readjust the electrode as shown in Fig. 17; be certain to maintain the ⅛-in. spark gap.

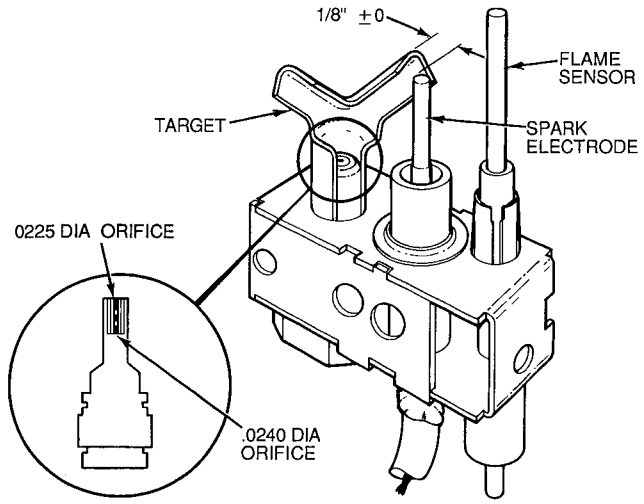


Fig. 17 — Position of Electrode to Pilot

F. Electrical Controls and Wiring

Inspect and check the electrical controls and wiring annually. *Be sure to turn off the gas supply and then the electrical power to the unit.*

Remove the control, blower and compressor compartment access panels to locate all the electrical controls and wiring. Check all electrical connections for tightness. Tighten all screw connections. If any smoky or burned connections are noticed, disassemble the connection and clean all the parts. Then restrip the wire end, and reassemble the connection properly and securely.

After inspecting the electrical controls and wiring, replace all the panels. Start the unit, and observe at least one complete heating cycle and one complete cooling cycle to ensure proper operation. If discrepancies are observed in either or both operating cycles, or if a suspected malfunction has occurred, check each electrical component with the proper electrical instrumentation. Refer to the unit wiring label when making these checkouts. Also see typical wiring diagrams on pages 32-34.

NOTE: Refer to the heating and/or cooling sequence of operation in this publication as an aid in determining proper control operation.

G. Gas Input

The gas input does not require checking unless improper heating performance is suspected. If a problem exists, refer to Adjusting Gas Input section on page 16.

H. Evaporator Airflow

The heating and/or cooling airflow does not require checking unless improper performance is suspected. *If a problem exists, be sure that all supply- and return-air grilles are open and free from obstructions, and that the air filter is clean.* When necessary, refer to Indoor Airflow and Airflow Adjustments section on page 20 to check the system airflow.

I. Metering Devices

Refrigerant metering devices are fixed orifices and are located in the inlet header to the evaporator coil.

J. Liquid Line Strainer

The liquid line strainer (to protect metering device) is made of wire mesh and is located in the liquid line on inlet side of the metering device.

K. Heating Section

Ensure dependable and efficient heating operation by inspecting the heating section before each heating season, and cleaning when necessary.

Proceed as follows to inspect and clean heating section:

1. Turn off gas and power to unit.
2. Remove burner access door.
3. Disconnect 2 wires from inducer motor.
4. Remove complete inducer assembly from unit.
5. Remove screws that secure collector box to heat exchanger, exposing flue openings.
6. Remove flue choke.
7. Clean cells using field-supplied small wire brush, steel spring cable, reversible electric drill and vacuum cleaner.
   a. Assemble wire brush and steel spring cable.
      - Use 4 ft of ¼-in. diameter high-grade steel spring cable (commonly known as drain cleanout or Roto-Rooter cable).
      - Use ¼-in. diameter wire brush (commonly known as 25-caliber rifle cleaning brush).

NOTE: The items called for above can be purchased at a local hardware store.

   (1.) Insert twisted wire end of brush into end of spring cable, and crimp tight with crimping tool or strike with ball-peen hammer. *Tightness is very important.*
   (2.) Remove metal sleeve from wire brush to allow proper brush action.

   b. Clean each heat exchanger cell.
   (1.) Attach variable-speed reversible drill to end of spring cable (end opposite brush).
   (2.) Insert brush end of cable into upper opening of cell and slowly rotate with drill. *Do not* force cable. Gradually insert at least 3 ft of cable into 2 upper passes of cell.
   (3.) Work cable in and out of cell 3 or 4 times to obtain sufficient cleaning. *Do not* pull cable with great force. Reverse drill and gradually work cable out.
   (4.) Remove burner assembly.
   (5.) Insert brush end of cable in lower opening of cell, and proceed to clean in same manner.
   (6.) Repeat above procedures until each cell in unit has been cleaned.
   (7.) Using vacuum cleaner, remove residue from each cell.
   (8.) Using vacuum cleaner with soft brush attachment, clean burner assembly.
   (9.) Reinstall burner assembly.

8. After cleaning, check sealant and gaskets to ensure that they have not been damaged. If new sealants or gaskets are needed, contact your distributor.

9. Reinstall flue choke. Be sure all screws are in and tight.
10. Clean and replace flue collector assembly, making sure all screws are secure.
11. Replace inducer assembly.
12. Reconnect 2 wires to inducer motor.
13. Replace burner access door.
14. Turn on power and gas.
15. Set thermostat and check unit for proper operation.

II. REFRIGERANT CHARGE

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

A superheat charging label is attached to the outside of the compressor access door. The label includes a "Field Superheat Charging Table" and a "Required Suction-Tube Temperature (F)" chart.

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

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

Proceed as follows:

1. Remove caps from low- and high-pressure service fittings.
2. Using hoses with valve core depressors, attach low- and high-pressure gage hoses to low- and high-pressure service fittings, respectively.
3. Start unit in cooling mode and let unit run until system pressures stabilize.
4. Measure and record the following:
   a. Outdoor ambient-air temperature (F dry-bulb).
   b. Evaporator inlet-air temperature (F wet-bulb).
   c. Suction-tube temperature (F) at low-side service fitting.
   d. Suction (low-side) pressure (psig).
5. Using "Field Superheat Charging Table," compare outdoor-air temperature (F dry-bulb) with evaporator inlet-air temperature (F wet-bulb) to determine desired system operating superheat temperature. See Tables 11A - 11I.
6. Next, using "Required Suction-Tube Temperature (F)" table, compare desired superheat temperature with suction (low-side) operating pressure (psig) to determine proper suction-tube temperature. See Table 12.
7. Compare actual suction-tube temperature with proper suction-tube temperature. Using a tolerance of ± 3° F, add refrigerant if actual temperature is more than 3° F higher than proper suction-tube temperature; remove and reclaim refrigerant if actual temperature is more than 3° F lower than required suction-tube temperature.

NOTE: If the problem causing the inaccurate readings is a refrigerant leak, refer to Repairing Refrigerant Leaks section on page 26.

III. REPLACEMENT PARTS

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

Table 11A — Superheat Charging Table, 584B018
(Superheat Entering Suction Service Port)

Temp (F) Air Ent Cond		Evap Air — Cfm 600 Evap Air — Ewb (F)											
		54	56	58	60	62	64	66	68	70	72	74	76
65	SPH	20.0	21 0	22 0	23 0	24.6	26.2	27.4	28.6	28.8	29.0	29 0	29.0
70	SPH	19.5	19 5	19 5	19 5	21.1	22.7	23.8	25.0	26.7	28.5	28 5	28 5
75	SPH	18.9	18.9	18.9	18.9	20.5	22.1	23.3	24 5	25.6	26.8	27.3	27.9
80	SPH	15 4	16.3	17.3	18.3	20.0	21.6	22 7	23 9	25.1	26.2	26.3	26.3
85	SPH	14.8	14 8	14 8	14.8	16.4	18.0	20.7	23.4	24.0	24.5	25 1	25 7
90	SPH	14.3	14 3	14.3	14.3	15 9	*17.5	19 5	21.5	22.8	24.0	24.2	24.4
95	SPH	13 7	12.7	11.7	10.7	13.8	16.9	18.9	21.0	22.2	23 5	23.7	23 9
100	SPH	13 1	12.1	11.1	10.1	13.3	16.4	18.4	20.4	21.7	22.9	23.1	23.3
105	SPH	12.6	11.6	10.6	9.60	12 7	15.8	17 8	19 9	20.4	21.0	21.4	21.9
110	SPH	*	*	*	*	11.2	13.8	15.8	17.8	19.1	20.5	20.9	21.3
115	SPH	*	*	*	*	*	11.7	13 7	15 8	17.8	19.9	20 3	20 8

LEGEND
Ewb — Entering Wet Bulb
SPH — Superheat at Compressor (F)

*Do not attempt to charge system under these conditions — refrigerant slugging may occur.

Table 11B — Superheat Charging Table, 584B024 (Superheat Entering Suction Service Port)

Temp (F) Air Ent Cond		Evap Air — Cfm 800 Evap Air — Ewb (F)											
		54	56	58	60	62	64	66	68	70	72	74	76
65	SPH	7.35	10.0	12.6	15 3	18.8	22.3	23 6	25.0	26.1	27.2	28.3	29 4
70	SPH	6 81	9.45	12.1	14.7	16.7	18.7	21 6	24.5	25.6	26.7	27.1	27.4
75	SPH	6.25	8.90	11.5	14.2	16.2	18.2	19.5	20.9	23.5	26.1	25.8	25.5
80	SPH	7.21	8 35	9.49	10 6	12.6	14.6	17.5	20 3	21.5	22.6	23 7	24.7
85	SPH	6.65	7.80	8.94	10.1	12.1	14.1	16.9	19.8	20.9	22.0	22 4	22 8
90	SPH	6.10	7 25	8.40	9.54	10.0	10.5	13.4	16 3	18.9	21.5	22.6	23.8
95	SPH	5 55	6.70	7.84	8.99	9.48	9.97	12 8	15.7	17.8	19.9	20.9	21 9
100	SPH	6.50	6.15	5.79	5 44	7.43	9 42	12.3	15.1	17 2	19.3	19.6	19.9
105	SPH	5.95	5.60	5.24	4.89	6.88	8 87	11.7	14.6	16.7	18.8	19.9	20.9
110	SPH	*	*	*	*	5.58	6.82	10 4	14.0	16.1	18.2	19.4	20.5
115	SPH	*	*	*	*	*	*	9.14	13.5	15.6	17.7	18.8	20.0

LEGEND
Ewb — Entering Wet Bulb
SPH — Superheat at Compressor (F)

*Do not attempt to charge system under these conditions — refrigerant slugging may occur

Table 11C — Superheat Charging Table, 584B030 (Superheat Entering Suction Service Port)

Temp (F) Air Ent Cond		Evap Air — Cfm 1000 Evap Air — Ewb (F)											
		54	56	58	60	62	64	66	68	70	72	74	76
65	SPH	15.3	15.3	15.3	15.3	19.3	23.3	24.8	26.3	27 4	28 6	28.9	29.2
70	SPH	11 8	11.8	11.8	11.8	15.8	19.8	21.3	22.8	24.6	26.5	27.1	27.7
75	SPH	6.70	8 20	9.70	11.2	13 7	16 2	19.2	22.2	23.4	24 5	25.3	26 2
80	SPH	7.65	7.65	7.65	7.65	10 2	12 7	17.2	21.7	22 1	22.5	23.6	24.6
85	SPH	*	*	*	*	8.12	12.1	15.1	18 1	20.1	22.2	23.2	24.2
90	SPH	*	*	*	*	*	8.59	13 1	17 6	18.8	20 1	21.4	22 7
95	SPH	*	*	*	*	*	8.04	11 0	14.0	16 1	18.1	20.1	22.1
100	SPH	*	*	*	*	*	7.49	10 5	13 5	16.3	19.1	19.8	20.6
105	SPH	*	*	*	*	*	*	8.42	12.9	15.0	17.1	18 0	19 0
110	SPH	*	*	*	*	*	*	7.16	10.9	13 7	16 5	17 8	19 0
115	SPH	*	*	*	*	*	*	5.90	8.81	12.4	16.0	17.5	19.0

LEGEND
Ewb — Entering Wet Bulb
SPH — Superheat at Compressor (F)

*Do not attempt to charge system under these conditions — refrigerant slugging may occur

Table 11D — Superheat Charging Table, 584B036 (Superheat Entering Suction Service Port)

Temp (F) Air Ent Cond		Evap Air — Cfm 1200 Evap Air — Ewb (F)											
		54	56	58	60	62	64	66	68	70	72	74	76
65	SPH	16.6	16.6	16 6	16 6	18.6	20 7	21.5	22 2	22 9	23 5	23.5	23.4
70	SPH	13.0	13.0	13.0	13 0	15 1	17 1	18.7	20.3	21 6	23.0	22.9	22.9
75	SPH	12 5	12.5	12.5	12.5	13.0	13.6	15.9	18 3	18 9	19.4	20 4	21.4
80	SPH	8.95	8 95	8.95	8.95	11 0	13 0	14 7	16.4	17.6	18.8	19.8	20.8
85	SPH	8 40	8.40	8.40	8.40	8 94	9 48	11 9	14.4	16.4	18.3	18.7	19 2
90	SPH	7.85	7 85	7.85	7.85	8.39	8.93	10.7	12.5	15 1	17.7	18.2	18.6
95	SPH	*	*	6.30	7.30	6 34	5 38	7 94	10 5	12 4	14 2	16 1	18.1
100	SPH	*	*	*	*	*	*	6.69	8.56	11 1	13.6	14 9	16.2
105	SPH	*	*	*	*	*	*	*	9.60	11 3	13.1	14.4	15 7
110	SPH	*	*	*	*	*	*	*	6.15	9.34	12 5	13.6	14 6
115	SPH	*	*	*	*	*	*	*	*	7.34	12.0	12.7	13.5

LEGEND
Ewb — Entering Wet Bulb
SPH — Superheat at Compressor (F)

*Do not attempt to charge system under these conditions — refrigerant slugging may occur.

Table 11E — Superheat Charging Table, 584B042060,080,096 (Superheat Entering Suction Service Port)

Temp (F) Air Ent Cond		Evap Air — Cfm 1447 Evap Air — Ewb (F)											
		54	56	58	60	62	64	66	68	70	72	74	76
65	SPH	14.4	14.4	14 4	14 4	18.5	22.6	23 0	23 4	24.6	25.8	25.5	25.2
70	SPH	10.9	10 9	10.9	10 9	15.0	19.1	21.0	22.8	23.4	23.9	24.3	24 7
75	SPH	10.3	10.3	10 3	10.3	12.9	15.5	18.9	22 3	22.2	22 0	23.1	24.1
80	SPH	6 75	6.75	6.75	6.75	9.35	12 0	15.4	18.8	20.0	21.3	21.9	22.4
85	SPH	6.20	6 20	6.20	6.20	7.30	8 41	13 3	18.2	18.8	19.4	20 6	21 8
90	SPH	5.65	5.65	5 65	5.65	6 75	7.86	12.8	17.7	17.6	17.5	19.4	21.3
95	SPH	*	*	*	*	*	7.31	10.7	14.1	14.9	15.6	18.2	20.7
100	SPH	*	*	*	*	*	6.76	10.2	13 5	15.1	16 7	18.4	20.2
105	SPH	*	*	*	*	*	*	8.10	13.0	13 9	14.8	17.2	19.6
110	SPH	*	*	*	*	*	*	7.78	12.4	13.4	14.4	16.4	18.4
115	SPH	*	*	*	*	*	*	7.45	11 9	12 9	13.9	15 5	17 1

LEGEND
Ewb — Entering Wet Bulb
SPH — Superheat at Compressor (F)

*Do not attempt to charge system under these conditions — refrigerant slugging may occur

Table 11F — Superheat Charging Table, 584B042120 (Superheat Entering Suction Service Port)

Temp (F) Air Ent Cond		Evap Air — Cfm 1400 Evap Air — Ewb (F)											
		54	56	58	60	62	64	66	68	70	72	74	76
65	SPH	11.1	11.1	11.1	11.1	15 6	20 1	22 0	23.6	24.9	26.1	26 1	26 1
70	SPH	8.30	8 30	8 30	8.30	12.4	16 5	19.0	21.1	22 8	24 6	24.7	24 8
75	SPH	5.50	5.50	5.50	5.50	9 25	13 0	15 9	18.5	20.8	23.0	23 3	23 5
80	SPH	*	*	*	*	6.07	9.45	12.9	16.0	18.8	21.5	21 9	22 2
85	SPH	*	*	*	*	*	5 90	9.85	13.5	16.7	20.0	20.5	20.9
90	SPH	*	*	*	*	*	5.00	8 50	12.1	15.3	18 5	19 0	19.6
95	SPH	*	*	*	*	*	*	7 15	10.8	13.9	16.9	17.6	18.3
100	SPH	*	*	*	*	*	*	6.23	10.0	13.1	16 2	17 2	18.1
105	SPH	*	*	*	*	*	*	5.32	9.30	12.3	15.4	16.7	18.0
110	SPH	*	*	*	*	*	*	5.00	8 57	11.6	14.6	16.2	17.8
115	SPH	*	*	*	*	*	*	*	7.84	10.8	13 8	15.7	17 7

LEGEND
Ewb — Entering Wet Bulb
SPH — Superheat at Compressor (F)

*Do not attempt to charge system under these conditions — refrigerant slugging may occur

Table 11G — Superheat Charging Table, 584B048080,096 (Superheat Entering Suction Service Port)

Temp (F) (Air Ent Cond		Evap Air — Cfm 1700 Evap Air — Ewb (F)											
		54	56	58	60	62	64	66	68	70	72	74	76
65	SPH	15.0	15.0	15.0	15 0	18.0	21.0	24.0	25.8	26.4	27.0	26.2	25.3
70	SPH	12.9	12.9	12.9	12.9	15.2	17.4	20.5	22.6	23 8	25.0	24.6	24 3
75	SPH	10.9	10 9	10.9	10 9	12.4	13.9	16.9	19.3	21 1	22 9	23.1	23 4
80	SPH	8.85	8.85	8.85	8.85	9.60	10.3	14.4	17.3	19.1	20 8	21.6	22.4
85	SPH	6.80	6.80	6.80	6.80	6.80	6.80	11.8	15.2	17.0	18.8	20 1	21.4
90	SPH	5 00	5 00	5 00	5.00	5.00	5 00	9.81	13.5	15.9	18.3	19.3	20.4
95	SPH	*	*	*	*	*	*	7.81	11.7	14.7	17 7	18.6	19.5
100	SPH	*	*	*	*	*	*	5.76	9.66	12.7	15.6	17 1	18.5
105	SPH	*	*	*	*	*	*	*	7.61	10.6	13.6	15.6	17 5
110	SPH	*	*	*	*	*	*	*	8.42	11 5	14.7	15.6	16.5
115	SPH	*	*	*	*	*	*	*	9.23	12 5	15.7	15 6	15.6

LEGEND
Ewb — Entering Wet Bulb
SPH — Superheat at Compressor (F)

*Do not attempt to charge system under these conditions — refrigerant slugging may occur

Table 11H — Superheat Charging Table, 584B048A80,100,120 (Superheat Entering Suction Service Port)

Temp (F) Air Ent Cond		Evap Air — Cfm 1750 Evap Air — Ewb (F)											
		54	56	58	60	62	64	66	68	70	72	74	76
65	SPH	10 0	10.0	10.0	10 0	14.5	19.0	22.0	25.0	26 0	27.0	26.7	26 3
70	SPH	7.95	7.95	7.95	7 95	11 7	15.4	18.4	21 5	23.2	25.0	25.0	25.1
75	SPH	5.90	5.90	5.90	5.90	8.90	11.9	14 9	17.9	20.4	22.9	23.4	23 9
80	SPH	*	*	*	*	6.85	9.85	12.8	15.9	18.3	20.8	21.7	22.6
85	SPH	*	*	*	*	*	7 80	10 8	13 8	16.3	18.8	20 1	21.4
90	SPH	*	*	*	*	*	*	8 00	11.8	14.3	16.8	18.5	20.2
95	SPH	*	*	*	*	*	*	5.20	9.70	12.2	14.7	16 8	19.0
100	SPH	*	*	*	*	*	*	*	7.65	10.9	14 1	15 9	17 7
105	SPH	*	*	*	*	*	*	*	5 60	9.60	13.6	15 1	16.5
110	SPH	*	*	*	*	*	*	*	*	8.67	13.0	14.9	16.8
115	SPH	*	*	*	*	*	*	*	*	7 75	12 5	14.8	17 1

LEGEND
Ewb — Entering Wet Bulb
SPH — Superheat at Compressor (F)

*Do not attempt to charge system under these conditions — refrigerant slugging may occur

Table 11I — Superheat Charging Table, 584B060 (Superheat Entering Suction Service Port)

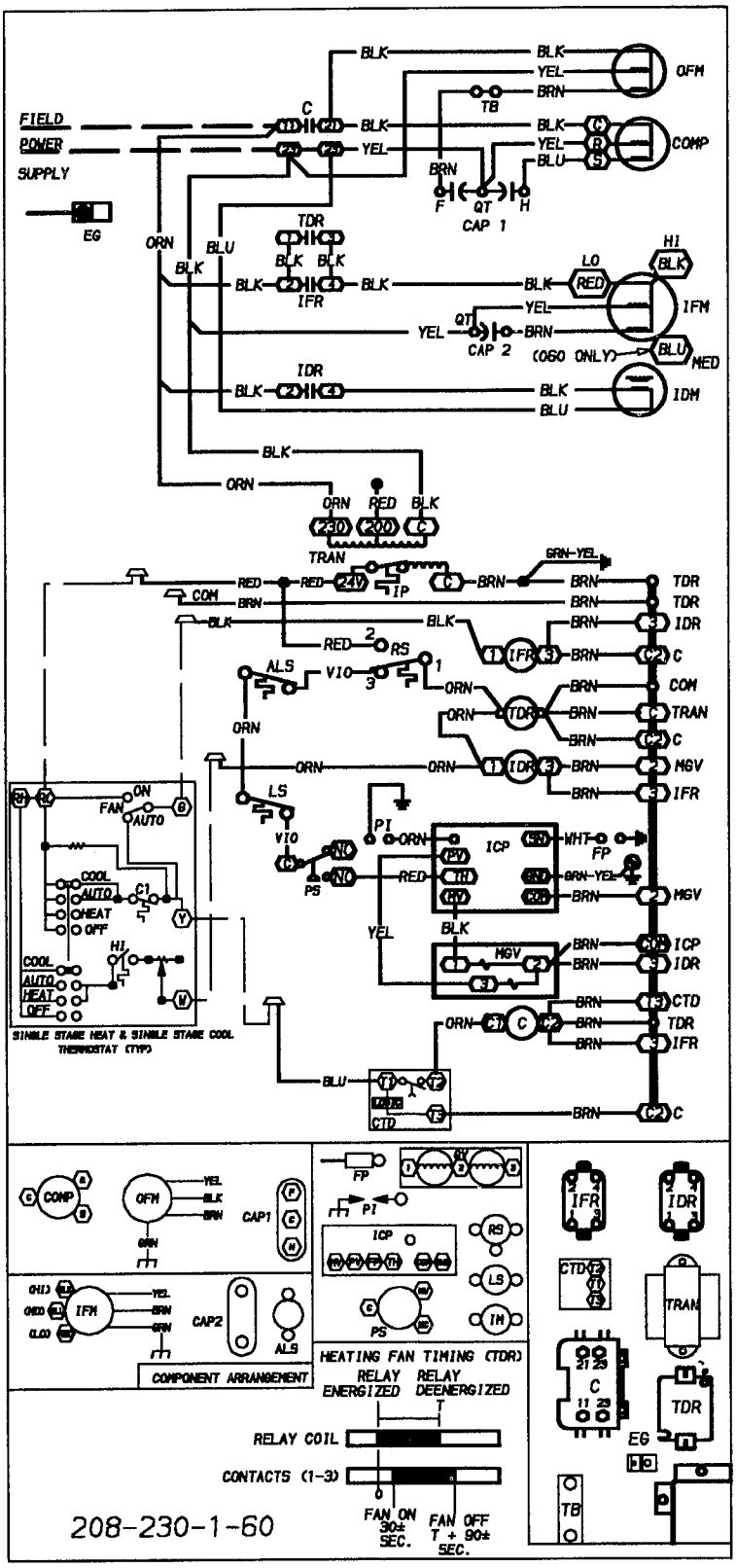
Temp (F) Air Ent Cond		Evap Air — Cfm 2000 Evap Air — Ewb (F)											
		54	56	58	60	62	64	66	68	70	72	74	76
65	SPH	21 0	20.5	20 0	19.5	22.2	24.9	26.0	27.0	27.5	28.0	27.5	27.0
70	SPH	17.4	17 0	16.5	16 0	18 7	21.4	23.2	25 0	25.4	25 9	25.9	25.9
75	SPH	13.9	13.4	12.9	12.4	15 1	17.8	20 4	22.9	23 4	23 9	24 3	24 7
80	SPH	10.3	9.86	9.36	8.87	11.6	14.3	17 6	20 8	22.1	23.3	23.5	23.6
85	SPH	6.80	6.31	5.81	5.32	8.02	10.7	14.8	18.8	20.8	22.8	22.6	22.5
90	SPH	*	*	*	*	*	7.18	12 0	16.8	18 7	20 7	21.0	21 3
95	SPH	*	*	*	*	*	*	9 16	14 7	16.7	18.7	19 4	20 2
100	SPH	*	*	*	*	*	*	7.11	12.6	14.6	16.6	17.8	19.0
105	SPH	*	*	*	*	*	*	5.06	10 6	12 6	14.6	16.2	17.9
110	SPH	*	*	*	*	*	*	*	8.55	11.3	14.0	16.1	18.3
115	SPH	*	*	*	*	*	*	*	6 50	9.98	13 5	16 1	18.6

LEGEND
Ewb — Entering Wet Bulb
SPH — Superheat at Compressor (F)

*Do not attempt to charge system under these conditions — refrigerant slugging may occur.

Table 12 — Required Suction-Tube Temperature (F) (Entering Suction Service Port)

SUPERHEAT TEMP (F)	SUCTION PRESSURE AT SERVICE PORT (Psig)								
	61.5	64.2	67.1	70.0	73.0	76.0	79.2	82.4	85.7
0	35	37	39	41	43	45	47	49	51
2	37	39	41	43	45	47	49	51	53
4	39	41	43	45	47	49	51	53	55
6	41	43	45	47	49	51	53	55	57
8	43	45	47	49	51	53	55	57	59
10	45	47	49	51	53	55	57	59	61
12	47	49	51	53	55	57	59	61	63
14	49	51	53	55	57	59	61	63	65
16	51	53	55	57	59	61	63	65	67
18	53	55	57	59	61	63	65	67	69
20	55	57	59	61	63	65	67	69	71
22	57	59	61	63	65	67	69	71	73
24	59	61	63	65	67	69	71	73	75
26	61	63	65	67	69	71	73	75	77
28	63	65	67	69	71	73	75	77	79
30	65	67	69	71	73	75	77	79	81
32	67	69	71	73	75	77	79	81	83
34	69	71	73	75	77	79	81	83	85
36	71	73	75	77	79	81	83	85	87
38	73	75	77	79	81	83	85	87	89
40	75	77	79	81	83	85	87	89	91



LEGEND

ALS	—	Auxiliary Limit Switch (SPST) (Blower)
C	—	Contactor
CAP 1,2	—	Capacitors
COM	—	Common
COMP	—	Compressor
CTD	—	Compressor Time Delay
EG	—	Equipment Ground
FP	—	Pilot (Flame Sensing)
ICP	—	Ignitor Control
IDR	—	Induced-Draft Relay (SPST)
IDM	—	Induced-Draft Motor
IFM	—	Indoor Fan Motor
IFR	—	Indoor Fan Relay (SPST)
IM	—	Inducer Motor
IP	—	Internal Protector (Auto Reset)
LS	—	Limit Switch (SPST)
MGV	—	Main Gas Valve
OFM	—	Outdoor Fan Motor
PI	—	Pilot Ignitor
PS	—	Pressure Switch (SPDT)
PV	—	Pilot Valve
QT	—	Quad Terminal
RS	—	Rollout Switch (SPDT), Non-Resettable
TB	—	Terminal Block
TDR	—	Time-Delay Relay(SPST)
TRAN	—	Transformer

Field High Voltage Wiring

Factory High Voltage Wiring

Factory Low Voltage Wiring

Field Low Voltage Wiring

Marked Connection

Unmarked Connection

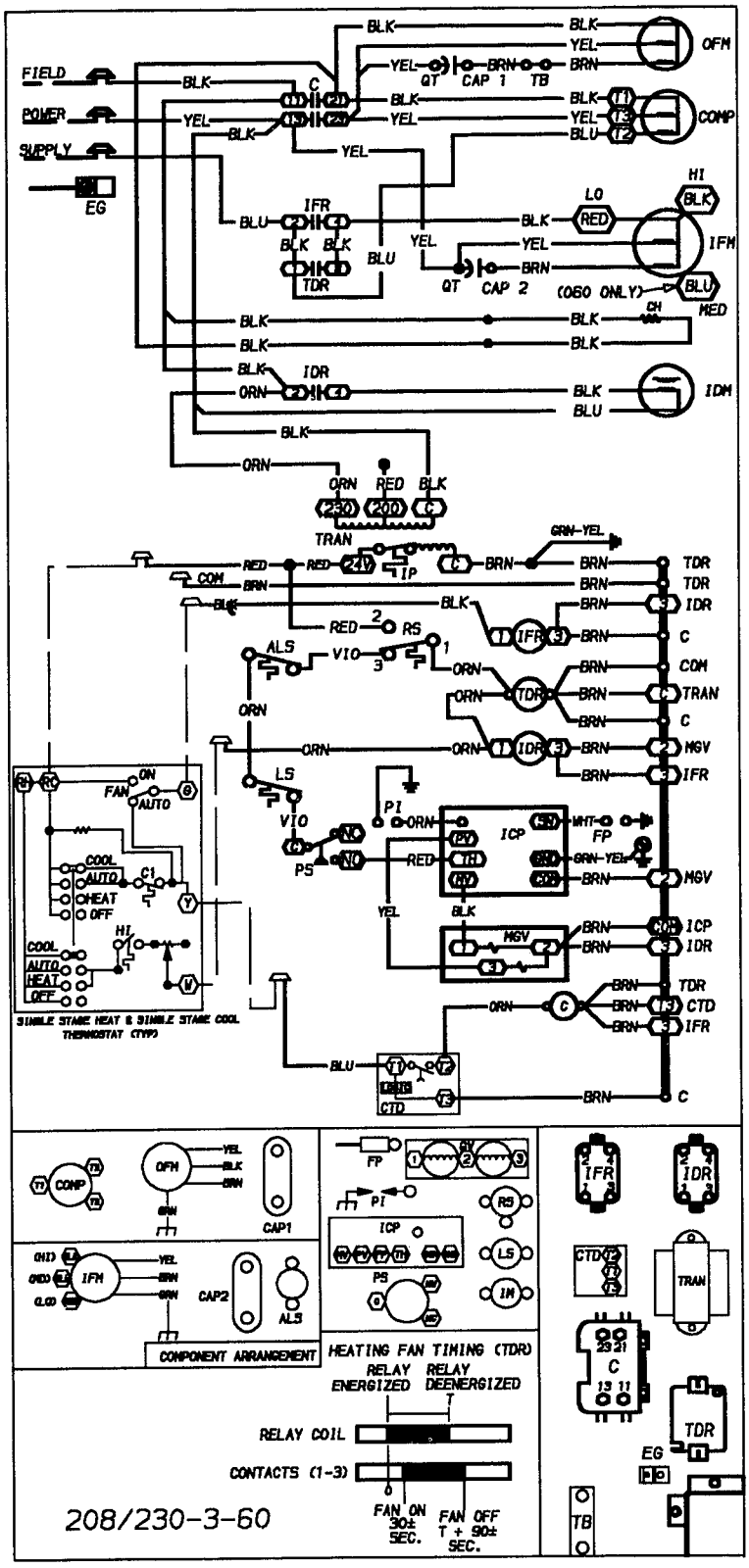
Internally Connected or Wirenut

Field Splice

NOTES:

1. 230-v operation as shown. For 208-v operation reverse RED and ORN leads of transformer.
2. Transformer has internal automatic reset overload.
3. If any of the original wire as supplied must be replaced, use minimum 105 C wiring material.
4. Use copper wire only for field power supply leads.
5. Compressor and fan motors provided with inherent thermal protection.

Fig. 18 — Typical 208/230-1-60 Wiring Diagram



LEGEND

ALS	—	Auxiliary Limit Switch (SPST) (Blower)
C	—	Contactor
CAP 1,2	—	Capacitors
CH	—	Crankcase Heater
COM	—	Common
COMP	—	Compressor
CTD	—	Compressor Time Delay
EG	—	Equipment Ground
FP	—	Pilot (Flame Sensing)
ICP	—	Ignitor Control
IDR	—	Induced-Draft Relay (SPST)
IDM	—	Induced-Draft Motor
IFM	—	Indoor Fan Motor
IFR	—	Indoor Fan Relay (SPST)
IM	—	Inducer Motor
IP	—	Internal Protector (Auto Reset)
LS	—	Limit Switch (SPST)
MGV	—	Main Gas Valve
OFM	—	Outdoor Fan Motor
PI	—	Pilot Ignitor
PS	—	Pressure Switch (SPDT)
PV	—	Pilot Valve
QT	—	Quad Terminal
RS	—	Rollout Switch (SPDT), Non-Resettable
TB	—	Terminal Block
TDR	—	Time-Delay Relay(SPST)
TRAN	—	Transformer

Field High Voltage Wiring

Factory High Voltage Wiring

Factory Low Voltage Wiring

Field Low Voltage Wiring

Marked Connection

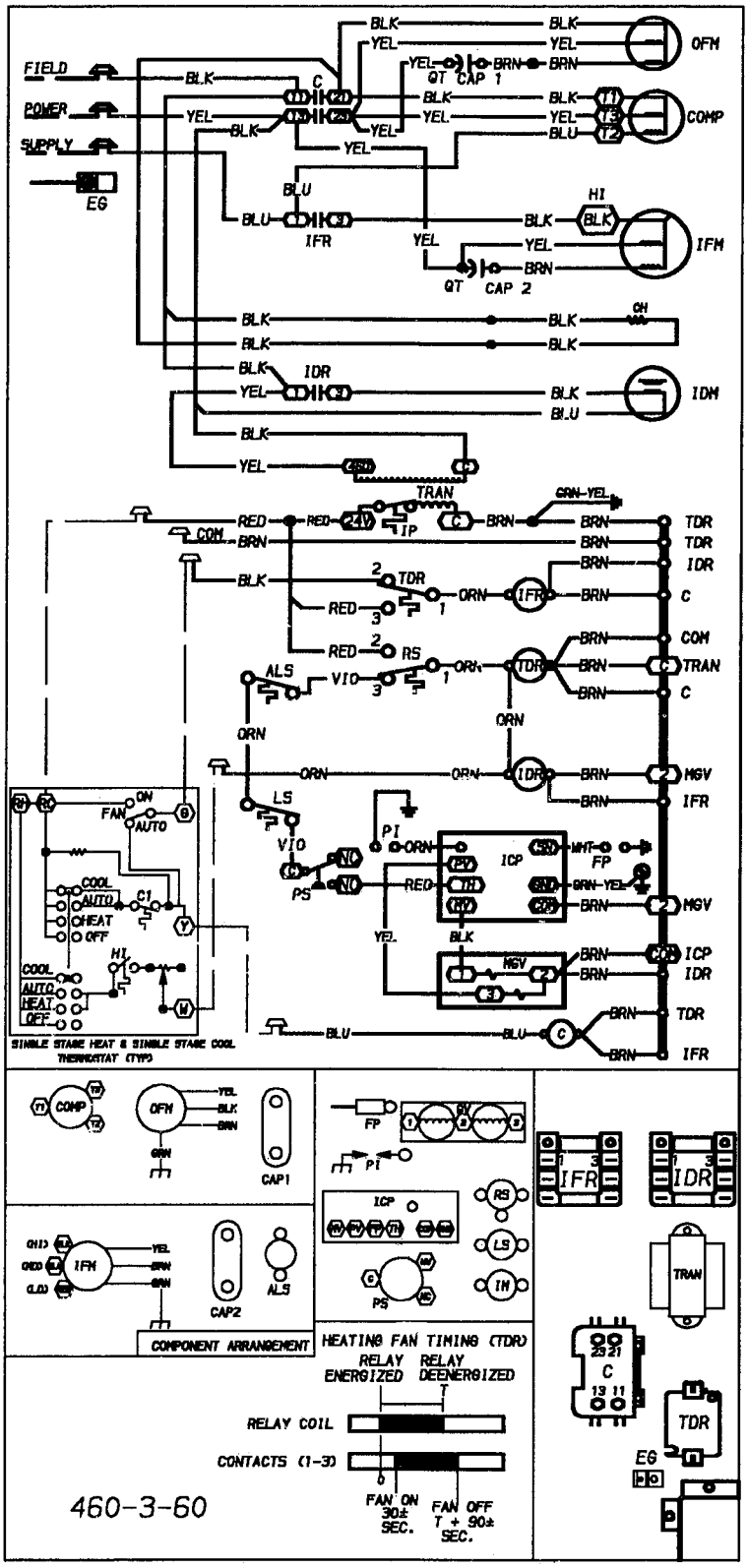
Unmarked Connection

Internally Connected or Wirenut

Field Splice

NOTES:
1. 230-v operation as shown. For 208-v operation reverse RED and ORN leads of transformer.
2. Transformer has internal automatic reset overload.
3. If any of the original wire as supplied must be replaced, use minimum 105 C wiring material
4. Use copper wire only for field power supply leads.
5 Compressor and fan motors provided with inherent thermal protection.

Fig. 19 — Typical 208/230-3-60 Wiring Diagram



LEGEND

ALS	—	Auxiliary Limit Switch (SPST) (Blower)
C	—	Contactor
CAP 1,2	—	Capacitors
CH	—	Crankcase Heater
COM	—	Common
COMP	—	Compressor
EG	—	Equipment Ground
FP	—	Pilot (Flame Sensing)
ICP	—	Ignitor Control
IDR	—	Induced-Draft Relay (SPST)
IDM	—	Induced-Draft Motor
IFM	—	Indoor Fan Motor
IFR	—	Indoor Fan Relay (SPST)
IM	—	Inducer Motor
IP	—	Internal Protector (Auto Reset)
LS	—	Limit Switch (SPST)
MGV	—	Main Gas Valve
OFM	—	Outdoor Fan Motor
QT	—	Quad Terminal
PI	—	Pilot Ignitor
PS	—	Pressure Switch (SPDT)
PV	—	Pilot Valve
RS	—	Rollout Switch (SPDT), Non-Resettable
TB	—	Terminal Block
TDR	—	Time-Delay Relay (SPDT)
TRAN	—	Transformer

Field High Voltage Wiring

Factory High Voltage Wiring

Factory Low Voltage Wiring

Field Low Voltage Wiring

Marked Connection

Unmarked Connection

Internally Connected or Wirenut

Field Splice

NOTES:

1 230-v operation as shown. For 208-v operation reverse RED and ORN leads of transformer.
2. Transformer has internal automatic reset overload.
3 If any of the original wire as supplied must be replaced, use minimum 105 C wiring material.
4. Use copper wire only for field power supply leads.
5 Compressor and fan motors provided with inherent thermal protection

Fig. 20 — Typical 460-3-60 Wiring Diagram

TROUBLESHOOTING

Cooling Troubleshooting

SYMPTOM	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.
	Units with scroll compressor (size 048 small-cabinet and 060 units only) have a 5-minute time delay (do not bypass this compressor time delay)	Wait for 5 minutes until time-delay relay is energized.
Compressor will not start but condenser fan runs	Faulty wiring or loose connections in compressor circuit	Check wiring and repair or replace
	Compressor motor burned out, seized or internal overload open	Determine cause Replace compressor
	Defective run/start capacitor, overload, start relay	Determine cause and replace
	One leg of 3-phase power dead	Replace fuse or reset circuit breaker Determine cause
Three-phase scroll compressor (size 048 small-cabinet and 060 units only) makes excessive noise, and there may be low pressure differential	Scroll compressor is rotating in the wrong direction	Correct the direction of rotation by reversing the 3-phase power leads to the unit.
Compressor cycles (other than normally satisfying thermostat)	Refrigerant overcharge or undercharge	Reclaim refrigerant, evacuate system and recharge to nameplate.
	Defective compressor	Replace and determine cause.
	Insufficient line voltage	Determine cause and correct.
	Blocked condenser	Determine cause and correct
	Defective run/start capacitor, overload or start relay	Determine cause and replace.
	Defective thermostat	Replace thermostat
	Faulty condenser fan motor or capacitor	Replace.
	Restriction in refrigerant system	Locate restriction and remove.
Compressor operates continuously	Dirty air filter	Replace filter.
	Unit undersized for load	Decrease load or increase unit size
	Thermostat set too low	Reset thermostat.
	Low refrigerant charge	Locate leak, repair and recharge
	Leaking valves in compressor	Replace compressor.
	Air in system	Reclaim 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	Reclaim excess refrigerant
	Air in system	Reclaim refrigerant, evacuate system and recharge.
	Condenser air restricted or air short-cycling	Determine cause and correct
Head pressure too low	Low refrigerant charge	Check for leaks, repair and recharge.
	Compressor valves leaking	Replace compressor.
	Restriction in liquid tube	Remove restriction.
Excessive suction pressure	High heat load	Check for source and eliminate
	Compressor valves leaking	Replace compressor.
	Refrigerant overcharged	Reclaim excess refrigerant
Suction pressure too low	Dirty air filter	Replace filter.
	Low refrigerant charge	Check for leaks, repair and recharge.
	Metering device or low side restricted	Remove source of restriction.
	Insufficient evaporator airflow	Increase air quantity. Check filter — replace if necessary.
	Temperature too low in conditioned area	Reset thermostat.
	Outdoor ambient below 40 F (024-060 units) or 45 F (018 units)	Install low-ambient kit.
	Field-installed filter drier restricted	Replace.

START-UP CHECKLIST

(Remove and Store in Job File)

I. PRELIMINARY INFORMATION

MODEL NO.: _____ SERIAL NO.: _____

DATE: _____ TECHNICIAN: _____

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

☐ VERIFY THAT ALL PACKING MATERIALS HAVE BEEN REMOVED FROM UNIT

☐ REMOVE ALL SHIPPING HOLDDOWN BOLTS AND BRACKETS PER INSTALLATION INSTRUCTIONS

☐ VERIFY THAT CONDENSATE CONNECTION IS INSTALLED PER INSTALLATION INSTRUCTIONS

☐ CHECK ALL ELECTRICAL CONNECTIONS AND TERMINALS FOR TIGHTNESS

☐ CHECK GAS PIPING FOR LEAKS

☐ CHECK THAT INDOOR-AIR FILTER IS CLEAN AND IN PLACE

☐ VERIFY THAT UNIT INSTALLATION IS LEVEL

☐ CHECK FAN WHEEL AND PROPELLER FOR LOCATION IN HOUSING/ORIFICE AND SETSCREW TIGHTNESS

CUT ALONG DOTTED LINE

III. START-UP

ELECTRICAL

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

COMPRESSOR AMPS L1 _____ L2 _____ L3 _____ INDOOR FAN AMPS _____

TEMPERATURES

OUTDOOR-AIR TEMPERATURE _____ DB

RETURN-AIR TEMPERATURE _____ DB _____ WB

COOLING SUPPLY AIR _____

GAS HEAT SUPPLY AIR _____

PRESSURES

GAS INLET PRESSURE _____ IN. WG

GAS MANIFOLD PRESSURE _____ IN. WG

REFRIGERANT SUCTION _____ PSIG

REFRIGERANT DISCHARGE _____ PSIG

☐ VERIFY THAT 3-PHASE SCROLL COMPRESSOR (SIZE 048 SMALL CABINET AND 060 UNITS ONLY) IS ROTATING IN CORRECT DIRECTION

☐ VERIFY REFRIGERANT CHARGE USING CHARGING CHARTS ON PAGES 28-31

Heating Troubleshooting

SYMPTOM	CAUSE	REMEDY
No heat	LED is flashing	Look for problems external to the ignitor module.
	LED is glowing continuously	Replace IGN control.
	LED is off	Check for power to TH terminal of control.
Pilot will not light	No spark at electrode	Check air gap between electrode tip and pilot target Gap should be as shown in Fig. 17. Readjust as necessary
		Clean moisture or dirt accumulation on electrode ceramic with cloth.
		Cracked ceramic — replace pilot electrode assembly.
		Check for loose or broken wiring at and between electronic control head and electrode. Replace wire or tighten connection as necessary
		Check fuses or circuit breaker to ensure voltage to unit
		Check for 24 v between TH and COM. If you read 24 v and above steps have been completed, replace electronic ignition control
	Spark shorting out to main burner	Realign electrode tip away from main burner but maintain spark gap to pilot burner. See Fig 17
	No gas at pilot burner	Clean pilot orifice
		Check inlet pressure to gas valve. Recommended operating pressure 7-in. wg natural gas, 11-in wg LP gas; 0.5 psig (13.6-in. wg) max. pressure. Check for 24 v between terminals PV and COM If you read 24 v and above steps have been completed, replace gas valve
Burners will not ignite	Water in gas line	Drain — install water trap
	No power to furnace	Check power supply, fuses, wiring or circuit breaker.
	No 24-v power supply to control circuit	Check transformer — replace if necessary
	Miswired or loose connections	Check all wiring and wirenut connections.
	Dirty pilot — yellow flame	Clean pilot orifice.
	Pilot burning improperly — sharp blue flame	Replace pilot.
	Burned-out heat anticipator in thermostat	Replace thermostat.
	No gas at main burners	1 Check for 24 v between terminals MV and COM on control head. If you read 24 v, replace gas valve portion of control head/gas valve assembly. 2. If 24 v is not present, check flame sensor for cracked ceramic insulator or shorted sensor cable
	Broken thermostat wire	Run continuity check to locate break.
Inadequate heating	Dirty air filter	Clean or replace filter as necessary.
	Gas input to furnace 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 or replace filter — or remove any restriction
	Blower speed too low	Check temperature rise.
		Use faster speed tap.
	Limit switch cycles main burners	Dirty air filters — clean or replace
		Registers closed, restricted ductwork — open or remove restriction.
		Check temperature rise
		Check heat anticipator setting on thermostat — readjust.
Poor flame characteristics (sooting flame or floating flame)	Incomplete combustion or lack of combustion air	Check all screws around flue outlets and burner compartment — tighten
		Cracked heat exchanger — replace
		Overfired furnace — reduce input, or change orifices.
		Check vent for restriction — clean as required.
		Check orifice for burner alignment

LED — Light-Emitting Diode