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installation, operation, and maintenance instructions

PACKAGED GAS HEATING/ ELECTRIC COOLING UNITS

585B

Sizes 018050 thru 060150

Cancels: 39585DP26-A

39585DP26-B
7/15/79

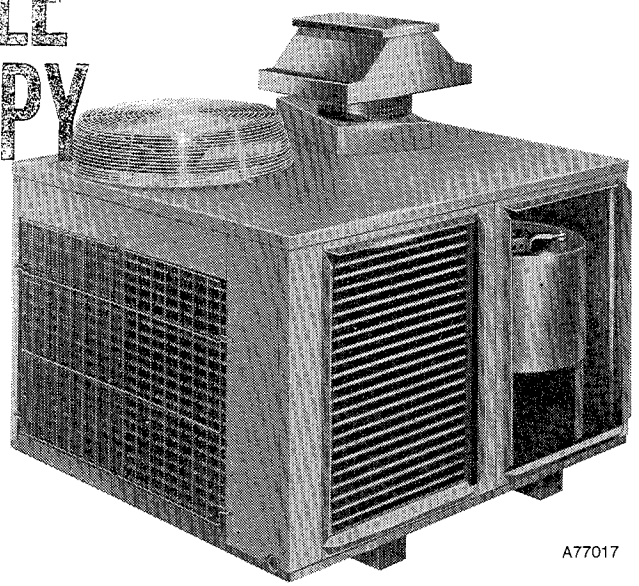


Figure 1—Sizes 024075, 030075, & 036075 With Optional Condenser Coil Grille Installed

Model 585B Gas/Electric Units are fully self-contained, single-packaged combination heating/cooling horizontal-discharge units.

These packaged units are equipped with an energy-saving RELITE-type electric spark ignition pilot that saves gas by operating only when the room thermostat "calls for heating." Natural gas controls are standard. For propane operation, conversion kit P/N 301625-703 must be field-installed.

Model 585B units have two A.G.A.-certified heating input ratings. See Table I.

These units are designed for outdoor installation either on a rooftop or at ground level on a slab. The cooling section is factory-charged and sealed, minimizing installation time. Installation is easy—connect gas supply, air ducts, condensate drain, high- and low-voltage wiring, and install the air filter.

NOTE: An optional condenser coil grille is available for field installation. See Figure 1.

A full line of rooftop system accessories are available for field installation. These accessories include plenums with factory-supplied high-capacity filter and outside air intake hood, unitized curbs, economizers (both downflow and horizontal), barometric relief dampers, concentric diffuser box assemblies, flexible duct packages, and high-capacity filter racks with filters. When installing these accessories, see Installation Instructions packaged with them.

Important—Read Before Installing

1. Check all local or other applicable codes for information concerning proximity to property lines, height above roof, obstructions, etc.
2. Make certain power supply available (volts, hertz, and phase) corresponds to that specified on unit rating plate.
3. Check electrical supply provided by utility to be sure that service capacity is sufficient to handle load imposed by this unit.
4. Locate the unit where the vent cap is a minimum of 4 feet from openable windows or doors.
5. The installation must conform with local building codes or, in the absence of local codes, with the National Fuel Gas Code ANSI Z223.1.

GENERAL

The condensing section has been designed and tested in accordance with ARI 210. The appliance design is certified by American Gas Association for use with natural or propane gases with appropriate controls and orifices.

Installation of the unit consists of the following:

I. MOVING AND SETTING UNIT IN PLACE

CAUTION: Be sure to protect the top and sides of the unit when rigging the unit to be lifted. See Figure 4.

Extreme caution should be used to prevent damage when moving the unit. The unit should remain in an upright position during all rigging and moving operations. To facilitate lifting and moving, place the unit in an adequate rope or cable sling.

A. Rooftop Installation

Place the unit on a level base. See Figures 8 and 9 for typical installations. On flat roofs, be sure that the unit is at least 4 inches above the roof to prevent flooding. Consult local codes for installation requirements. Be sure the roof will support the additional weight. See Figure 2 for weight information.

NOTE: See the Installation Instructions packaged with the accessory plenum and unitized curb when these system accessories are being installed.

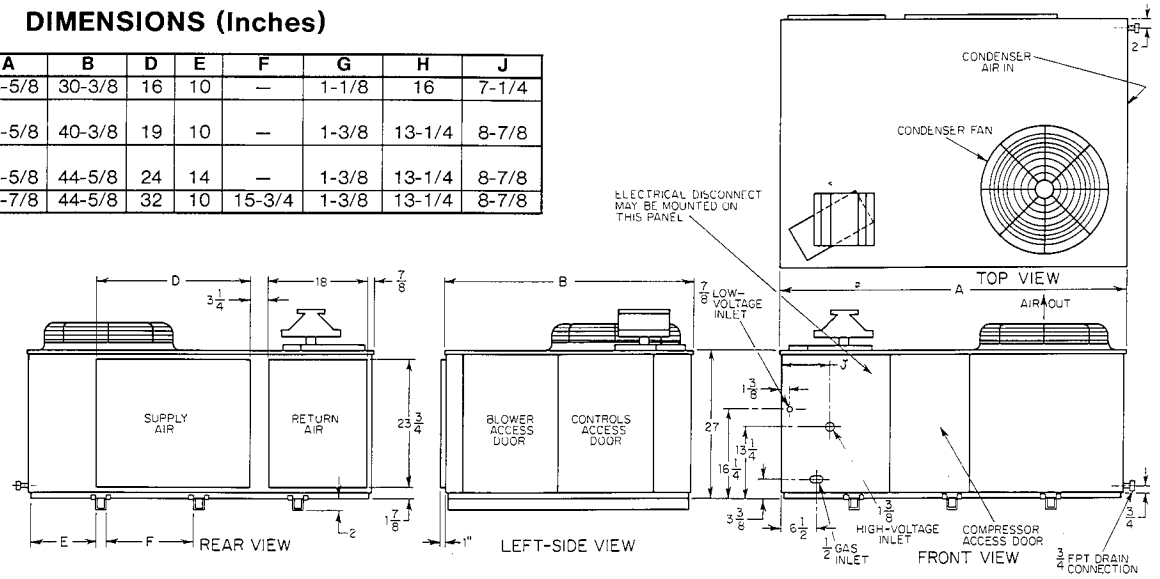
B. Ground Level Installation

CAUTION: Unit must be mounted level for proper condensate drainage.

Place the unit on a level concrete slab that is a minimum of

DIMENSIONS (Inches)

Size	A	B	D	E	F	G	H	J
018050 & 024050	44-5/8	30-3/8	16	10	—	1-1/8	16	7-1/4
024075, 030075, & 036075	44-5/8	40-3/8	19	10	—	1-3/8	13-1/4	8-7/8
036125, 042100, & 048125	58-5/8	44-5/8	24	14	—	1-3/8	13-1/4	8-7/8
060125 & 060150	66-7/8	44-5/8	32	10	15-3/4	1-3/8	13-1/4	8-7/8



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WEIGHT DISTRIBUTION

Size	Shipping Wt (lbs)	Operating Wt (lbs)	Corner Wt (lbs)			
			A	B	C	D
018050	325	300	77	75	73	75
024050	330	305	86	83	66	70
024075	425	395	115	110	83	87
030075	430	400	116	111	84	89
036075	440	405	117	112	85	91
036125	510	465	132	126	101	106
042100	520	475	136	129	103	107
048125	535	490	150	143	96	101
060125	600	550	142	136	132	140
060150	615	565	144	138	137	146

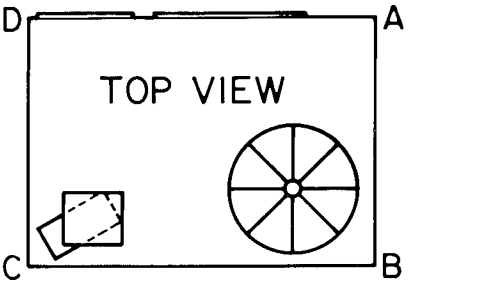

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Figure 2—Model 585B Dimensional Drawing, Shipping Weights, Operating Weights, & Weight Distribution

TABLE I—585B RATINGS & RECOMMENDED FILTER SIZES

SIZE	018050	024050	024075	030075	036075	036125	042100	048125	060125	060150
Rated Cooling Capacity (Btuh)*	18,500	23,000	24,000	29,000	37,000	35,500	42,000	47,000	59,000	59,000
Rated Cooling Airflow (Ft^3/Min)*	690	850	900	1000	1200	1300	1550	1600	2200	2200
Rated Maximum External Static Pressure										
Single-Phase Units (In. wc)	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Three-Phase Units (In. wc)	—	—	—	—	0.65	0.65	0.65	0.65	0.65	0.65
ARI Sound Rating Number†	19	20	19	19	20	20	20	20	21	21
Rated Minimum Heating Input (Btuh)‡	40,000	40,000	60,000	60,000	60,000	100,000	80,000	100,000	100,000	120,000
Bonnet Capacity (Btuh)	30,000	30,000	45,000	45,000	45,000	75,000	60,000	75,000	75,000	90,000
Rated Maximum Heating Input (Btuh)‡	50,000	50,000	75,000	75,000	75,000	125,000	100,000	125,000	125,000	150,000
Bonnet Capacity (Btuh)	37,500	37,500	56,250	56,250	56,250	93,750	75,000	93,750	93,750	112,500
Recommended Field-Supplied Filter Size										
Standard-Type (Sq In.)	288	384	384/433**	480	576	576/722**	672	768	960	960
Cleanable- or High-Capacity-Type (Sq In.)	187	250	250/281**	312	374	374/469**	437	499	624	624

*Rated in accordance with ARI Standard 210-75.

†Rated in accordance with ARI Standard 270-75.

‡All units have two A.G.A.-certified heating input ratings and are manufactured with burner orifices that permit heating operation at the minimum rating. Units may **not** be derated below this minimum rating. Optional field-installed burner orifices are required to provide the optional maximum heating input rating. See Table V.

**When size 024075 or 036125 is installed to operate at the minimum rated heating input, the recommended filter area is the smaller square inch figure shown for each type of filter. The larger square inch figures shown are recommended when these units have been field-converted to operate at the maximum rated heating input. All other recommended filter sizes shown in the table are determined by the cooling airflow requirements only and are not affected by the heating operation input rating.

4 inches thick and extends 6 inches beyond the casing on all 4 sides. The slab should be a minimum of 3 inches above finished grade and constructed so that water runoff will not accumulate around unit. Be sure to locate the unit where water can not drain directly on the unit.

C. Clearances

The minimum clearance is 6 inches from the duct side, 24 inches from the condenser coil side, and 30 inches from the remaining two sides of the unit to allow for adequate service space. Minimum clearance from the top of the vent is 24 inches.

CAUTION: The 24-inch side clearance stipulation assures unrestricted airflow to the condenser fan inlet. Any restriction at the inlet grille can be detrimental to compressor life.

The condenser fan discharge is through the top of the unit. When installing the unit on the ground, do not locate in a corner or under a complete roof cover such as a carport. Minimum clearance under a normal house roof construction is

TABLE II—585B ELECTRICAL DATA (Sizes 018050 Thru 036125)

SIZE	018050	024050	024075	030075	036075			036125	
SERIES	A	A	A	A† or B†	A			A	
Unit Volts—Phase (60 Hz)	208/230—1	208-230—1	208-230—1	208-230—1	230—1	208-230—3	460—3	230—1	208/230—3
Operating Voltage Range	187—253	197—253	197—253	197—253	207—253	197—253	414—506	207—253	187—253
Total Unit Amps	14.2	17.2	17.6	22.6	25.6	21.6	10.4	23.8	21.36
Total Power Consumption (Watts)	2600	3200	3200	4150	5300	5300	5300	4750	4750
Max Branch Circuit Fuse Size (Amps)	25	30	30	40	50	30	20	45	30
Unit Ampacity for Wire Sizing	16.7	20.0	21.0	27.0	30.6	24.3	12.2	28.0	22.2
Min Wire Size (AWG) (60°C/75°C)*	12/12	12/12	10/10	10/10	8/8	10/10	14/14	10/10	10/10
Max Wire Length (Ft) (60°C/75°C)*	90/90	75/75	115/115	90/90	140/140	115/115	220/220	95/95	130/130

TABLE III—585B ELECTRICAL DATA (Sizes 042100 & 048125)

SIZE	042100				048125			
SERIES	A†	B†	A		A			
Unit Volts—Phase (60 Hz)	230—1	230—1	208—3	230—3	230—1	208—3	230—3	460—3
Operating Voltage Range	207—253	207—253	187—229	207—253	207—253	187—229	207—253	414—506
Total Unit Amps	27.92	30.92	24.6	21.7	31.8	26.56	23.7	12.4
Total Power Consumption (Watts)	5800	5800	5800	5800	6700	6700	6700	6700
Max Branch Circuit Fuse Size (Amps)	50	60	40	35	60	45	40	20
Unit Ampacity for Wire Sizing	33.0	37.0	28.3	25.0	38.7	30.8	27.5	14.4
Min Wire Size (AWG) (60°C/75°C)*	8/8	8/8	10/10	10/10	8/8	8/8	10/10	14/14
Max Wire Length (Ft) (60°C/75°C)*	125/125	115/115	105/105	125/125	105/105	150/150	115/115	185/185

TABLE IV—585B ELECTRICAL DATA (Sizes 060125 & 060150)

SIZE	060125				060150		
SERIES	A				A		
Unit Volts—Phase (60 Hz)	230—1	208—3	230—3	460—3	230—1	208—3	230—3
Operating Voltage Range	207—253	187—229	207—253	414—506	207—253	187—229	207—253
Total Unit Amps	41.5	29.8	27.0	14.2	41.5	29.8	27.0
Total Power Consumption (Watts)	8100	8100	8100	8100	8100	8100	8100
Max Branch Circuit Fuse Size (Amps)	80	50	50	25	80	50	50
Unit Ampacity for Wire Sizing	50.0	35.0	32.0	17.0	50.0	35.0	32.0
Min Wire Size (AWG) (60°C/75°C)*	6/6	8/8	8/8	12/12	6/6	8/8	8/8
Max Wire Length (Ft) (60°C/75°C)*	130/130	130/130	160/160	250/250	130/130	130/130	160/160

*Use copper wire only. Wire size is based on 60°C or 75°C copper conductor at 86°F (30°C) ambient temperature and ampacity shown in table. If other than 60°C or 75°C copper conductor is used, if ambient temperature is above 86°F, or if voltage drop of wire exceeds 2% of unit rated voltage, determine wire size from ampacity shown and the National Electrical Code. Wire lengths shown are measured one way along the wire path between unit and service panel for minimum voltage drop.

†Series designation may be A or B as determined by the compressor used at time of manufacture.

24 inches. Select a location where rain, ice, and snow will not fall from an overhang and damage the unit top or fan blade, or flood the unit.

There is no minimum clearance requirement for the bottom of the unit; therefore, combustible materials can be used for supports.

D. Base Rails

The base rails are easily removed for a lower profile installation or a better fit to angle iron frames used in some rooftop installations. To remove the base rails, simply remove the screws on either end of the rails.

NOTE: The base rails must not be removed when installing the accessory unitized curb and plenum.

E. Condensate Drain

The unit is designed to dispose of condensate water through a 3/4-inch FPT connection on the drain pan. See Figure 2 for location. It is recommended that a trap be installed in the condensate drain line to avoid improper drainage. See Figure 5. The trap should be as close to the coil as possible. Make sure that the top of the trap is at least 2 inches lower than the drain pan connection to prevent the drainpan from overflowing.

Prime the trap with water and check the condensate line for leaks.

If the installation requires draining the condensate away from the roof or the building, connect a minimum of 7/8-inch OD copper tubing, 3/4-inch galvanized pipe, or 7/8-inch plastic pipe, and pitch downward at a slope of at least 1 inch in every 10 feet of horizontal run.

CAUTION: Do not undersize condensate drain connection.

Consult local codes for additional restrictions and/or precautions.

II. VENTING

NOTE: The vent cap assembly is shipped in the blower compartment with sizes 018050 and 024050. Remove the blower access door to locate the assembly. This assembly is shipped in the control compartment with all other sizes. Remove the control access door to locate the assembly. See Figure 2 for the location of these access doors.

CAUTION: The venting system has been designed to ensure proper venting. The vent cap assembly must be installed only as indicated in this section of the unit Installation Instructions.

NOTE: Screw holes in the vent stack extension and the vent cap are *not* symmetrically located to ensure proper orientation when installing these components.

Refer to Figure 6 and install the vent cap assembly as follows:

1. Place gasket and vent stack extension through hole in combustion air duct and orient screw holes in base of vent stack extension with holes in unit top.
2. Secure gasket and vent stack extention to unit top with screws provided.
3. Place vent cap onto vent stack extension and orient screw holes in vent cap with holes in extension.
4. Secure vent cap in place with screws provided.
5. Form flat wire screen provided into circular shape around protruding lip of combustion air duct.
6. Bend wire ends through holes of screen mesh to secure screen in place.

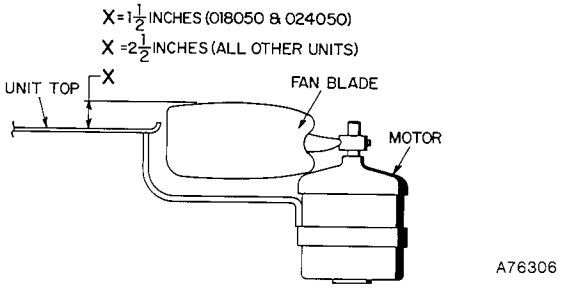

Figure 3—Condenser Fan Setting

III. GAS PIPING

A separate gas supply line should be installed to run directly from meter to heating section. Check the local utility for recommendations concerning existing lines. Choose a supply pipe large enough to keep pressure loss as low as practical. Never use pipe smaller than gas connection to heating section. Observe local codes for all gas pipe installations. Refer to the national codes indicated on the first page of the instructions in the absence of local building codes. The following are pertinent recommendations:

1. Avoid low spots in long runs of pipe. It is best to grade all pipe 1/4 inch in every 15 feet to prevent traps. All horizontal runs should grade downward to risers. Risers should be used to connect to heating section and to meter.
2. Install drip leg in riser leading to heating section. Drip leg will function as trap for dirt and condensate. Install drip legs where condensate will not freeze.
3. Install external manual shut-off valve in gas supply pipe near heating section.

CAUTION: Unstable operation may occur, particularly under high wind conditions, when the gas valve and manifold assembly are forced out of position while connecting improperly routed rigid gas piping to the gas valve.

A backup wrench should be used when making piping connections to avoid strain on, or distortion of, the gas control piping.

4. Where local codes permit, we recommend using flexible gas pipe to make connection between rigid gas piping and unit gas valve to ensure proper alignment between manifold orifices and burners. Gas supply pipe enters unit through access hole provided. See Figure 2 for location. Gas connection to unit is made to 1/2-inch FPT gas inlet on gas valve. See Figure 7.
5. Install ground joint union close to heating section between gas valve and manual shut-off valve.
6. Support all piping with appropriate hangers, etc. Use minimum of one hanger in every 6 feet. For pipe size other than 1/2 inch, follow recommendations of the national codes.
7. Use joint compound (pipe dope) that is resistant to action of liquefied petroleum gases.

NOTE: Teflon tape is not recommended.

WARNING: Never use a match or other open flame when checking for gas leaks.

8. After all connections are made, use soap-and-water solution to check for leaks (or method specified by local utility regulations) at all field installed and factory installed gas lines.

IV. DUCT CONNECTIONS

Flanges are provided on the unit supply- and return-air openings for duct connections. See Figure 2 for connection sizes and locations. See Figures 8, 9, and 10 for illustrations of typical installations.

NOTE: *When installing the accessory plenum or horizontal economizer, use the accessory Installation Instructions in con-*

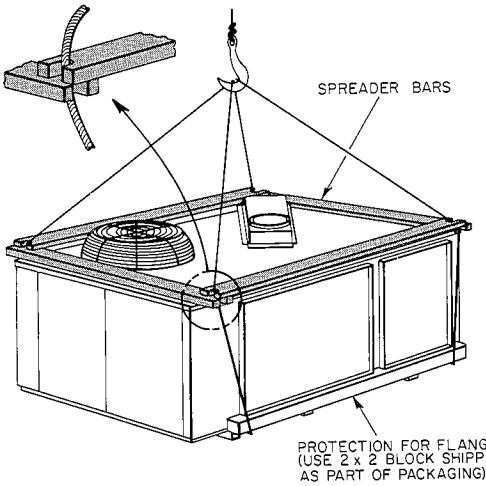

Figure 4—Suggested Rigging

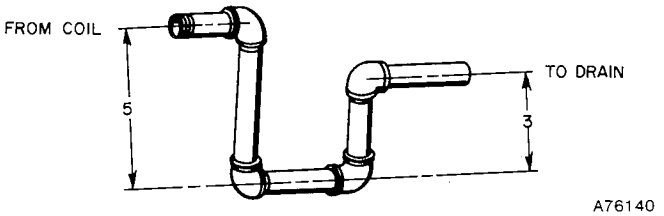

Figure 5—Condensate Trap

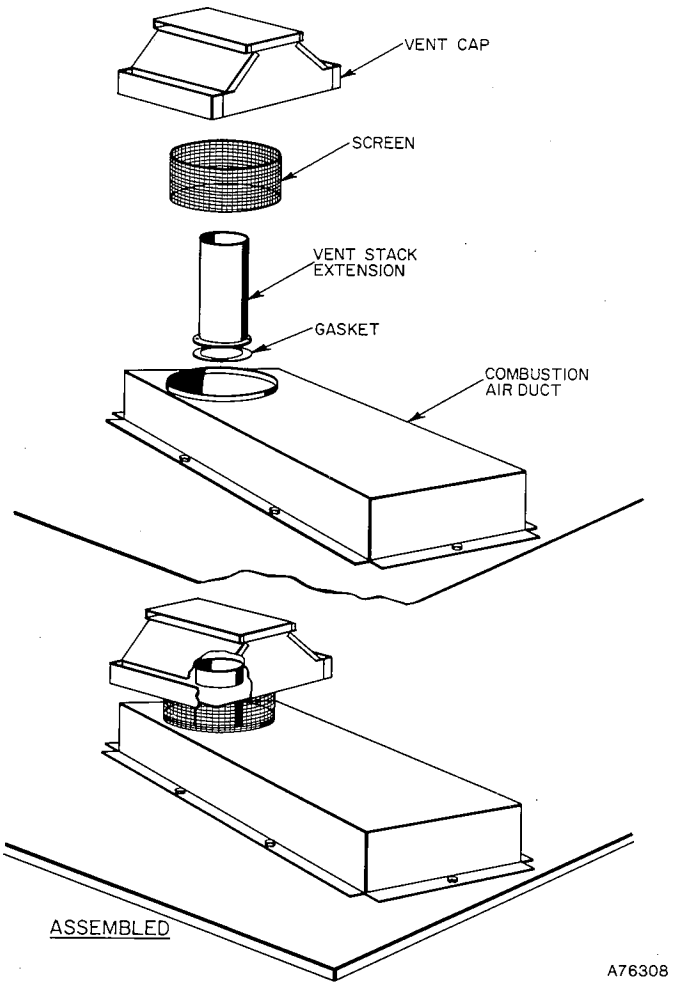

Figure 6—Vent Cap Assembly

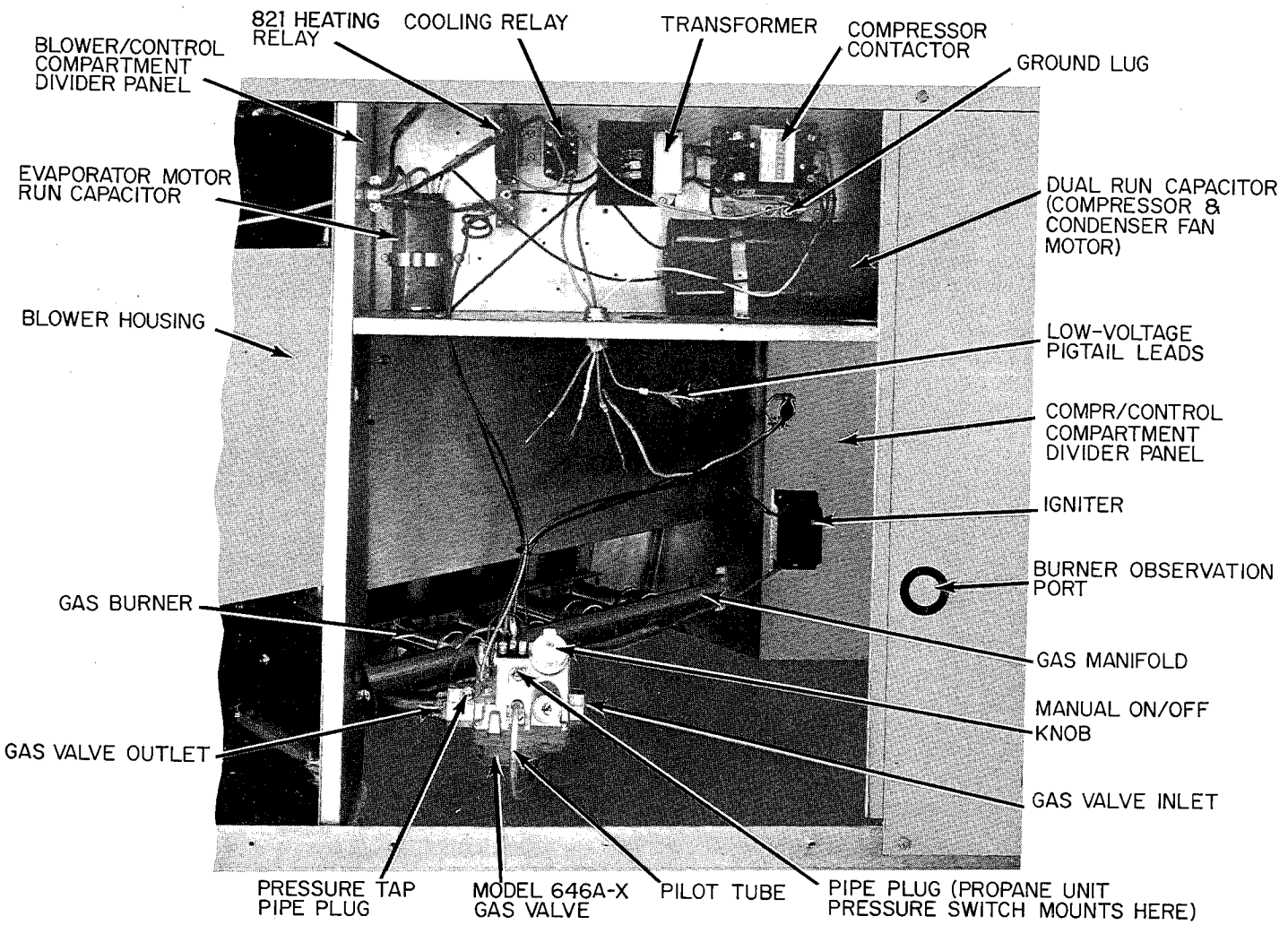

Figure 7—Partial Left-Side View with Control Access Door Removed

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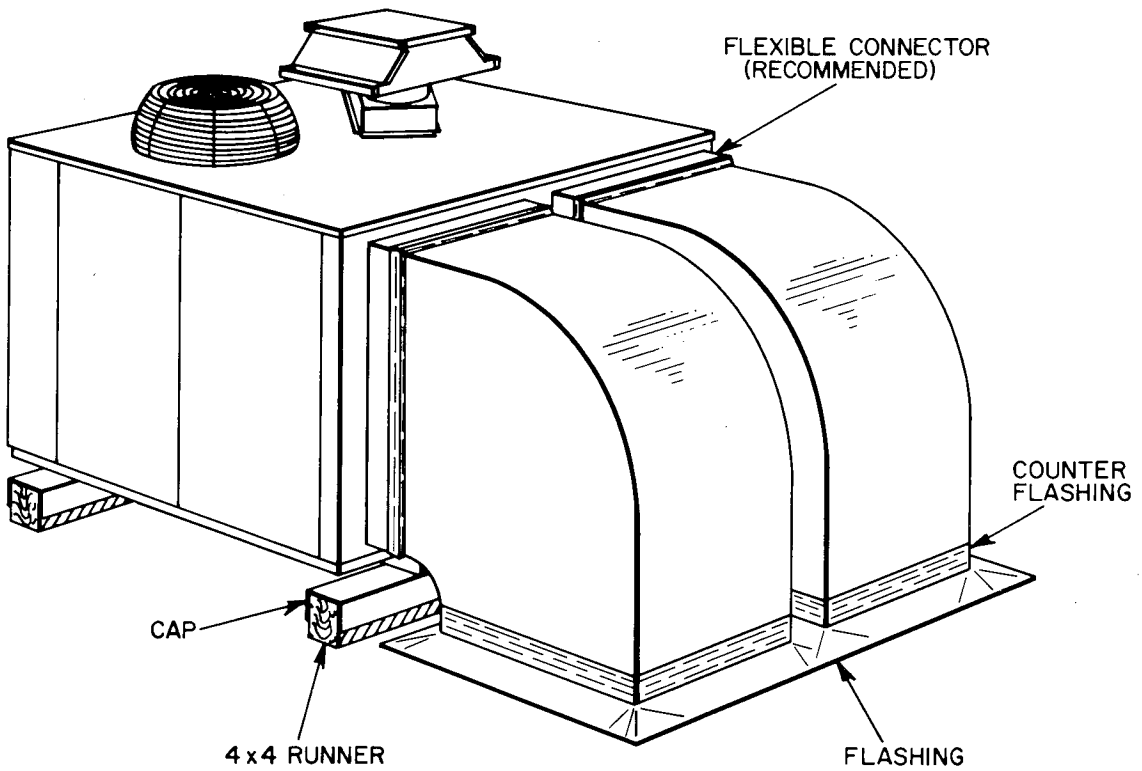

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Figure 8—Typical Rooftop Installation on Flat Roof

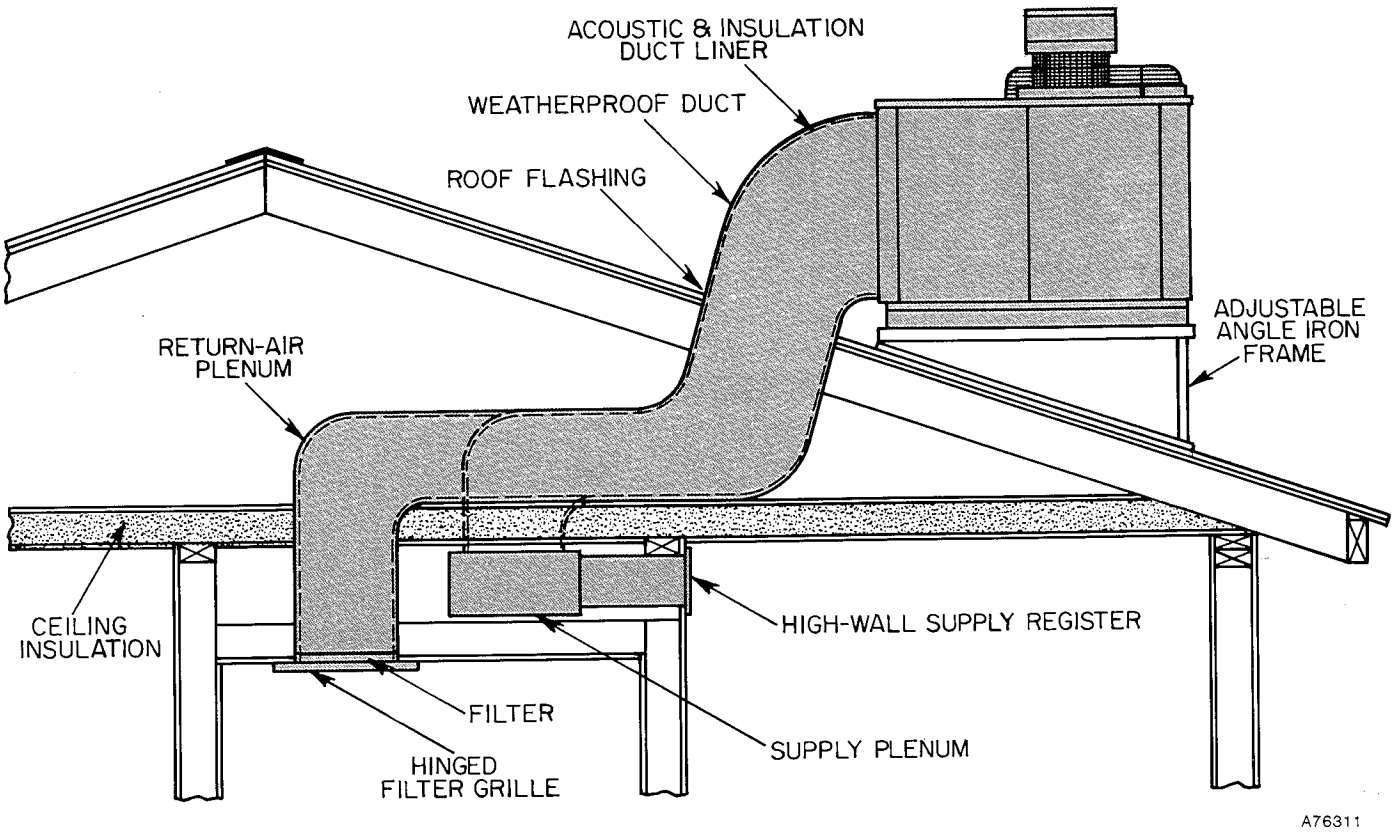


Figure 9—Typical Rooftop Installation on Pitched Roof

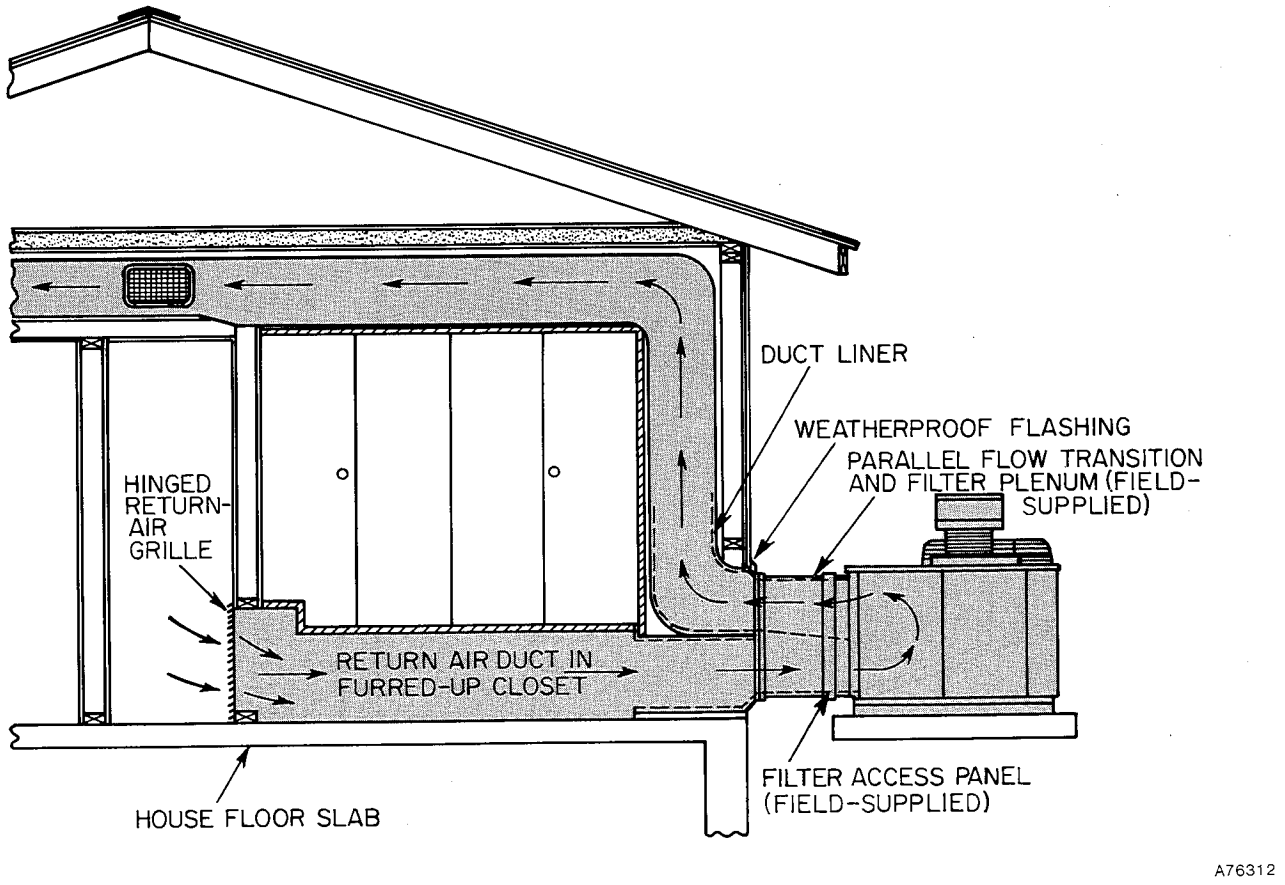


Figure 10—Typical Ground Level Installation Through Single Closet

junction with all applicable criteria presented in this section of the unit Installation Instructions.

NOTE: The minimum installation requirements of the duct system must be in accordance with the standards of the National Fire Protection Association for installation of air conditioning and ventilating systems of other than residence-type, NFPA No. 90; or residence-type, warm-air heating and air conditioning systems, NFPA No. 90B; and/or local codes and ordinances.

The following criteria must be followed when selecting, sizing, and installing ductwork:

1. Ductwork, registers, and return-air grilles should be selected and sized according to ASHRAE recommendations and as presented in BDP training materials.

CAUTION: When drilling duct flange fastening holes in the unit side, use care to avoid puncturing the evaporator coil.

2. Ductwork can be screwed or bolted to unit duct flanges. Use suitable gaskets to insure airtight seal.
3. External field-supplied air filter must be installed in return-air ductwork. Recommended sizes for filters are shown in Table I. Install filters where they are easily accessible for service.

NOTE: Accessory plenums and horizontal economizers have factory-supplied, high-capacity filters.

4. Avoid abrupt duct size increases and reductions.
5. Provide supply and return ductwork with an approved vibration eliminator.
6. Adequately insulate and weatherproof all ductwork located outdoors. Ducts passing thru unconditioned space must be insulated and covered with vapor barrier in accordance with latest issue of SMACNA and NESCA minimum installation standards for heating and air conditioning systems.
7. Secure all ducts to building structure.
8. All openings in building structure must be properly flashed, weatherproofed, and vibration-isolated in accordance with local codes and good building practices.

V. ELECTRICAL CONNECTIONS

WARNING: The unit cabinet must have an uninterrupted or unbroken electrical ground. This can consist of electrical wire connected to the ground lug in the control box or conduit approved for electrical ground, when installed in accordance with existing electrical codes.

CAUTION: Copper conductor is the only type of wire that is to be connected between the electrical disconnect and the unit. Do not use aluminum wire.

Operation of the unit on improper line voltage, or with excessive phase imbalance, constitutes abuse and is not covered by warranty.

All electrical connections must be made in accordance with the National Electrical Code and local electrical codes governing such wiring.

The unit must be electrically grounded in accordance with the National Electrical Code, ANSI CI-1975, when an external electrical source is utilized.

A separate electrical line with a fused disconnect switch mounted at, or within sight of, the unit should be used for this installation. Refer to the unit rating plate for maximum fuse size. See Table II, III, or IV for recommended wire sizes and lengths.

WARNING: Label P/N A-74191B, which is shipped loose in bag of parts, must be affixed to the electrical disconnect box. This label states: "Do not disconnect the electrical power to this appliance without first turning off the gas supply."

NOTE: Fused disconnect may be mounted directly on control corner panel. To mount disconnect on this panel, align disconnect box knockout with unit high-voltage inlet hole and secure box to panel. Route wiring from disconnect through aligned knockout and unit inlet.

CAUTION: Ensure that the drill does not damage any components when drilling through the panel.

NOTE: If aluminum conductor is used *from the electrical service to the disconnect switch* where local codes permit the use of aluminum wire, the connections must be made in accordance with the National Electrical Code. In preparing the wire, just before installing the connector, all aluminum wire must be "brush-scratched" and then coated with a corrosion inhibiter, such as Pentrox A. When it is suspected that the connection will be exposed to moisture, it is very important to cover the entire connection completely to prevent an electrochemical action that will cause the connection to fail very quickly. Reducing the effective size of the wire, such as cutting off strands so that the wire will fit a connector, is very poor practice. Properly sized connectors should be used.

CAUTION: If aluminum conductors are to be used, the wire gauge selected must have current capacity not less than the copper wire specified and must not create a voltage drop between the service panel and the unit in excess of 2% of the unit rated voltage.

A. High-Voltage Connections

Proceed as follows to complete high-voltage connections:

1. Run high-voltage leads from fused disconnect through high-voltage inlet hole provided in control corner panel. See Figure 2 for location of panel and hole.
2. Run high-voltage leads into unit control box and connect leads to contactor. See unit wiring label and Figure 11.

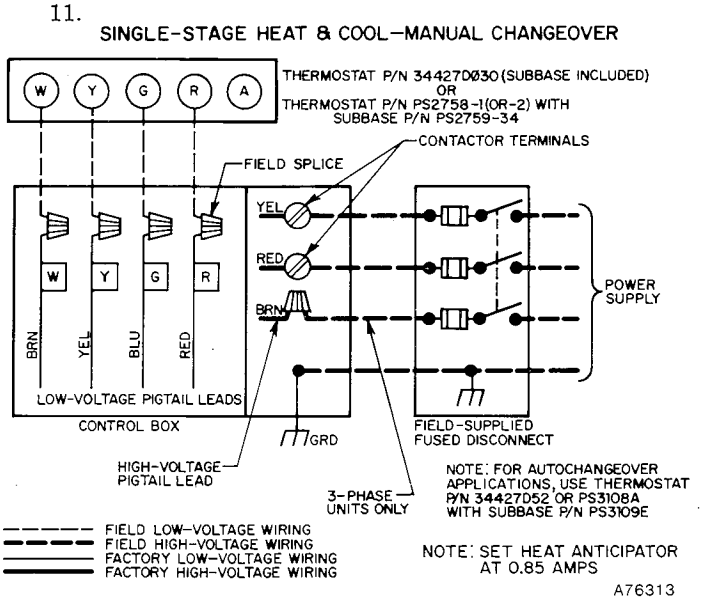


Figure 11—High- & Low-Voltage Connections

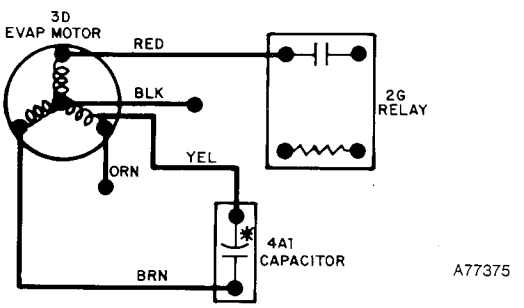


Figure 12—Evaporator Motor Connections for 208-V Operation of Sizes 018050 & 024050

NOTE: On 3-phase units, the third power lead is connected to the brown high-voltage pigtail lead. See unit wiring label and Figure 11.

B. Special Procedures for 208-V Operation

WARNING: Make sure the power supply to the unit is switched OFF before making any wiring changes.

When size 018050 thru 036125 dual-voltage units are to be operated at 208 volts, unplug the orange lead running to the primary side of the unit transformer and plug it onto the 208-V red transformer tap. See the unit wiring label.

When sizes 018050 or 024050 are to be operated at 208 volts, additional wiring changes must be made in the unit control box as follows:

1. Unplug orange motor lead connected to evaporator motor run capacitor (4A1). See unit wiring label. Tape end of orange lead.
2. Plug unused yellow motor lead onto vacated run capacitor terminal. Figure 12 shows corrected wiring.

B. Low-Voltage Connections

CAUTION: When room thermostat leads are run in the same conduit with high-voltage leads, they must be insulated for the highest voltage contained within the conduit.

A room thermostat with isolated contacts must be used to prevent interconnection of class 2 outputs. (The following recommended thermostats meet this criteria.)

Recommended room thermostats are P/N 34427DØ30 (subbase included) or P/N PS2758-1 (or -2) with subbase P/N PS2759-34 for manual system changeover. For automatic system changeover, use thermostat P/N 34427D52 or P/N PS3108A with subbase P/N PS3109E.

Mount the room thermostat on an inside wall of the space to be conditioned. The thermostat should be positioned approximately 4 or 5 feet above the floor, and located where it will not be subjected directly to either a cooling or heating source, or direct exposure to sunlight.

If low-voltage leads from the thermostat are run separately, enter the unit through grommeted hole provided in the control corner panel. See Figure 2 for hole location.

Connect the low-voltage thermostat leads to the flagged pigtail leads that run through a hole in the bottom of the unit control box. See Figures 7 and 11.

NOTE: Connect thermostat to unit using No. 18 AWG "color-coded" insulated wires. If thermostat is located more than 100 feet from unit as measured along the low-voltage wires, use No. 16 AWG wire.

C. Heat Anticipator Setting

The room thermostat heat anticipator must be properly adjusted to insure proper heating performance. *Set the heat anticipator to 0.85 amps.*

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 can be changed *slightly* to provide a greater degree of comfort for a particular installation.

VI. PREPARING UNIT FOR STARTUP

Proceed as follows to prepare the unit for startup:

1. Remove all service access panels and check for shipping damages, such as broken lines, loose parts, disconnected wires, etc.
2. Read and follow instructions on all WARNING, CAUTION, AND INFORMATION labels and tags attached to unit; such as motor rotation labels, blower rotation labels, and vent instruction tag.
3. Make certain gas supply has been purged and all gas piping checked.

WARNING: Do not purge into the combustion chamber. Do not use a match or other open flame to check for leakage.

4. Check to be sure all wiring connections, including factory connections, have been completed and are tight.
5. Inspect all supply ducts and grilles to be sure they are adjusted properly.
6. Check to be sure air filters are in place.

VII. HEATING STARTUP AND ADJUSTMENTS

CAUTION: Complete the steps in Section VI before starting unit.

Do not jumper any safety devices when operating unit.

Burner orifice alignment must be insured. Unstable operation may occur when the manifold's burner orifices are not aligned correctly. To insure correct burner orifice alignment, check the orifice angle with a machinist's or carpenter's square, a machinist's protractor, or other suitable device. The orifice angle should be from horizontal to 3 degrees down as measured from the unit base.

Follow the instructions on the unit rating plate for starting the heating section.

A. Gas Input

The unit rating plate indicates two A.G.A.-certified gas inputs. The burners are equipped with natural gas orifices that deliver the minimum rated input. Optional field-installed burner orifices are required to provide the optional maximum heating input rating. See Table V.

When the unit is being installed for operation at the optional maximum heating input rating, proceed as follows to install the field-supplied maximum heating input burner orifices:

1. Remove burner shield and burners.
2. Remove factory-supplied burner orifices from manifold and replace with field-supplied maximum heating input burner orifices.
3. Replace burners and burner shield.
4. Mark appropriate changes on unit rating plate in boxes provided.

For propane gas operation, propane conversion kit P/N 301625-703 must be field-installed. This kit contains six burner orifices for the minimum input rating and six for the maximum input rating. Six orifices are sufficient for the largest heating unit. For smaller heating sizes, all orifices will not be required. See Table V.

CAUTION: The units are designed to give the correct input using the fixed orifices and manifold pressures shown in Table V. Do not redrill the orifices under any circumstances.

NOTE: The minimum and maximum rated inputs shown in Table V are for altitudes from sea level up to 7000 feet above sea level at the minimum input or 2000 feet above sea level at the maximum input. These inputs are based on a heating value for natural gas of 1050 Btu/ft^3 at 0.65 specific gravity and propane gas with a heating value of 2500 Btu/ft^3. For elevations above 7000 feet at the minimum rated input or 2000 feet at the maximum rated input, reduce the ratings 4% for each 1000 feet above sea level. For other gas heating values or specific gravities, refer to BDP training and application materials, national and local codes, or contact your BDP Distributor or Branch to determine the required orifice size.

B. Adjusting Gas Input (Natural Gas Furnace)

Natural gas input can be determined and adjusted using one of the following two recommended methods.

1. Measuring Gas Flow at Meter

All other gas appliances must be turned off when measuring gas flow at meter to check the input. Proceed as follows:

TABLE V—RATED GAS INPUTS (Btuh) FOR VARIOUS MAIN BURNER ORIFICES AT INDICATED MANIFOLD PRESSURES*

585B Size	Number of Orifices	Manifold Pressure (in. wc)		Natural Gas		Propane Gas	
		Nat	Prop.	Orifice P/N	Heating Input (Btuh)†	Orifice P/N**	Heating Input (Btuh)†
018050 & 024050	2	3.5	10.5	55365-45‡	40,000	55365-55	40,000
				55365-42	50,000	55365-53	50,000
024075, 030075, & 036075	3	3.5	10.5	55365-45‡	60,000	55365-55	60,000
				55365-42	75,000	55365-53	75,000
042100	4	3.5	10.5	55365-44‡	80,000	55365-55	80,000
				55365-41	100,000	55365-53	100,000
036125, 048125, & 060125	5	3.5	10.5	55365-44‡	90,000	55365-55	90,000
				55365-41	125,000	55365-53	125,000
060150	6	3.5	10.5	55365-44‡	120,000	55365-55	120,000
				55365-41	150,000	55365-53	150,000

*Data in this table is based on altitudes from sea level up to 7000 feet above sea level at the minimum rated input, or 2000 feet above sea level at the maximum rated input. For higher altitudes, follow the recommendations of national and local codes.

†Gas inputs for natural gas are based on a heating value of 1050 Btu/Ft^3 with a specific gravity of 0.65 at the factory-set manifold pressure of 3.5 inches wc. Gas inputs for propane gas is based on a heating value of 2500 Btu/Ft^3 with a specific gravity of 1.5 at a manifold pressure of 10.5 inches wc.

‡These natural gas burner orifices are the factory-supplied orifices. All other natural gas orifices shown are optional field-supplied orifices.

**Propane burner orifice P/N's shown are furnished in conversion kit P/N 301625-703.

a. Determine number of seconds for gas meter test dial to make one revolution.
b. Divide 3600 by number of seconds in step a.
c. Multiply result of step b by the number of cubic feet shown for one revolution of test dial. This gives cubic feet of gas flow per hour.
d. Multiply result from step c by Btu heating value of gas. Consult local utility for heating value of gas.

This is the total measured input in Btuh. Compare this value with input shown in Table V.

Example: Suppose the size of test dial is 1 cubic foot; it takes 30 seconds to complete one revolution; heating value of gas 1050 Btu/ft^3. Proceed as follows:

a. 30 seconds to complete one revolution.
b. 3600 divided by 30 equals 120.
c. 120 times 1 equals 120 cubic feet of gas flow per hour.
d. 120 times 1050 equals 126,000-Btuh input.

If the desired input was 125,000 Btuh, only minor changes would have to be made at the pressure regulator adjustment screw on the gas valve to bring the unit to the desired input.

If the measured input does not agree with the value desired, the manifold pressure may be adjusted with the REG ADJ screw on the gas valve as follows:

To increase input: Turn screw clockwise.

To decrease input: Turn screw counterclockwise.

2. Measuring Manifold Pressure

A water manometer is required to measure the manifold pressure. *If a spring manometer is used, make sure the manometer is calibrated.*

When the heating value of the natural gas being used for a particular installation is significantly more or less than 1050 Btu/ft^3, or slight manifold pressure changes are necessary for other reasons, the manifold pressure may be adjusted at the REG ADJ screw on the gas valve.

CAUTION: Do not adjust the manifold pressure more than 0.3 inches wc above or below the 3.5 inches wc factory setting. If larger adjustments are required, change the burner orifices following the recommendations of national and local codes.

Proceed as follows to measure manifold pressure and to adjust gas input:

a. Turn off gas to unit.
b. Remove pipe plug on gas valve outlet identified as PRESS TAP, and connect manometer at this point.
c. Turn on gas to unit and start heating section.
d. With all burners fired, adjust manifold pressure with REG ADJ screw on gas valve to obtain desired gas input.

NOTE: *To increase input,* increase manifold pressure by turning screw clockwise. *To decrease input,* decrease manifold pressure by turning screw counterclockwise.

e. Turn off gas to unit. Remove manometer from gas valve and replace pipe plug.

C. Adjusting Gas Input (Propane Gas Furnace)

The field-installed propane conversion kit contains a propane gas regulator spring that replaces the natural gas regulator spring in the unit combination gas valve/pressure regulator. The converted pressure regulator is then adjusted to provide the desired gas input. Follow the procedures in the conversion kit Installation Instructions to adjust the propane gas input.

D. Adjusting Burner Air Shutters

To adjust the primary air to each burner, partially close the air shutter until there is a slight yellow tip on the top of the flame, then open the air shutter until the yellow tip just disappears. This should be done after the burners have been operating at full input for 5 or 10 minutes (approximately). Secure shutters with locking screws after adjusting primary air to each burner.

E. Blower Fan Relay (Heating)

The heating relay (See Figure 7) is located in the control box and is adjustable to permit lengthening or shortening the "off" cycle. The "on" cycle is automatically adjusted as the "off" cycle is changed.

The fan control adjusting lever is factory-set at the center position and should give optimum performance in most installations. However, on unusual installations, or where the line voltage is considerably above or below the rated output, it may be necessary to increase or decrease the length of time the blower remains on. For longer blower operation, move the adjusting lever toward the right-hand position. In this position, the control makes contact sooner and takes the maximum time to break contact. For shorter blower operation, move the lever to the left-hand position.

TABLE VI—AIR DELIVERY (Ft³/Min) AT INDICATED TEMPERATURE RISE AND RATED HEATING INPUT

585B Size	Heating Input (Btuh)	Temperature Rise (°F)																
		35	37.5	40	42.5	45	47.5	50	52.5	55	57.5	60	62.5	65	67.5	70	72.5	75
018050 & 024050	40,000*	804	751	704	662	626	593	563	536	512	490	469	450	433	417	402	388	375
	50,000	1032	963	903	850	802	760	722	688	657	628	602	578	556	535	516	498	481
024075, 030075, & 036075(1Ø)	60,000*	1206	1126	1056	993	938	889	844	804	768	734	704	676	650	626	603	582	563
	75,000	1548	1444	1354	1275	1204	1140	1083	1032	985	942	903	867	833	802	774	747	722
036075(3Ø)	60,000*	1206	1126	1056	993	938	889	844	804	768	734	704	676	650	626	603	582	563
	75,000	1548	1444	1354	1275	1204	1140	1083	1032	985	942	903	867	833	802	774	747	722
042100	80,000*	1608	1501	1407	1325	1251	1185	1126	1072	1024	979	938	901	866	834	804	777	751
	100,000	2063	1926	1806	1699	1605	1520	1444	1376	1313	1256	1204	1156	1111	1070	1032	996	963
036125, 048125, & 060125	100,000*	2011	1877	1759	1656	1564	1481	1407	1340	1279	1224	1173	1126	1083	1043	1005	971	938
	125,000	2579	2407	2257	2124	2006	1901	1806	1720	1641	1570	1505	1444	1389	1337	1290	1245	1204
060150	120,000*	2413	2252	2111	1987	1877	1778	1689	1608	1535	1469	1407	1351	1299	1251	1206	1165	1126
	150,000	3095	2889	2708	2549	2407	2281	2167	2063	1970	1884	1806	1733	1667	1605	1548	1494	1444

*Rated heating input as manufactured with factory-installed burner orifices. Higher inputs shown for each size are the maximum rated inputs using field-installed burner orifices.

NOTE: Shaded portions of the table are beyond the rated temperature rise range.

F. Airflow and Temperature Rise

The heating section is designed for operation within a temperature rise range of 35 to 70°F for units rated up to 75,000 Btuh input (except size 036075, 3-phase units), and within a range of 45 to 75°F for units with inputs rated at 80,000 Btuh or higher.

Temperature rise is the difference of the air temperature in the return duct and the air temperature in the discharge duct at the unit.

Table VI shows the air delivery at various temperature rises for both A.G.A.-certified input ratings for each size unit.

For heating operation, it is recommended that the airflow produces a temperature rise that falls within the range stamped on the unit rating plate.

Refer to Section VIII, part B, of these instructions to determine and adjust both the heating and cooling airflow.

G. Sequence of Operation (Heating)

The following sequence of operation pertains to model 585B, 208- or 230-V, 3-phase units; size 036075, 036125, 042100, or 048125; however, the sequence of operation of all other units is very similar. Refer to the line-to-line wiring diagram in Figure 13.

NOTE: Although the actual unit wiring may vary slightly from that shown in Figure 13, the sequence of operation will not be affected.

With the room thermostat SYSTEM switch in HEAT position and FAN switch in AUTO position, the sequence of operation is as follows:

Model 585B is equipped with the intermittent RELITE-type pilot that does not have a standing flame, gas flow to the pilot gas valve portion of the main gas valve 5F when the pilot gas cock is open. The unit is now in a "standby" condition, ready for a "call for heat" from the room thermostat.

When the room thermostat "calls for heat," control lead R is connected to control lead W through the room thermostat. The 821 time-delay blower relay 2G becomes energized through lead W. After a short delay, during which time the following burner ignition sequence of operation is completed, the blower relay contacts 2G close and the circuit to the blower motor 3D2 is completed. This circuit energizes the blower motor 3D2, starting the blower.

The circuit between R and W through the room thermostat simultaneously energizes the pilot gas valve portion of the main gas valve 5F and the pilot igniter 6F. The energized pilot gas valve portion of the main gas valve 5F permits gas flow to the pilot 6H.

NOTE: The pilot gas valve portion of the main gas valve 5F is a solenoid consisting of a "pick" and a "hold" coil. Both coils must be energized to open the valve, but only the "hold" coil must be energized to *keep* the pilot gas valve open.

The energized pilot igniter 6F sends a high-voltage charge to the pilot electrode 6H, producing a spark that ignites the pilot flame. The pilot flame sensing monometal switch proves the presence of the pilot flame. Approximately 40 to 60 seconds after the pilot flame is established, pilot 6H switches its contacts, energizes the main gas valve 5F, deenergizes the pilot igniter 6F, and deenergizes the "pick" coil of the pilot solenoid. The main gas valve 5F is heat motor operated; therefore, after approximately 10 seconds, the main gas valve 5F opens permitting gas flow to the burners where the gas is ignited by the pilot 6H.

When the room thermostat "call for heat" is satisfied, the circuit between R and W through the room thermostat breaks and gas flow through the main gas valve 5F is stopped. The gas flow to pilot is also stopped and the pilot flame goes out.

The 821 time-delay blower relay 2G is deenergized. There will be a delay before the heating relay contacts 2G open. When these contacts do open, the blower motor 3D2 is deenergized.

The unit has now returned to a "standby" condition, waiting for the next "call for heat" from the room thermostat.

H. Limit and Pressure Switch Operation

The furnace limit switch 7H (Figure 13) functions to shut off the gas valve and main burner operation if the furnace leaving air temperature exceeds 175°F.

The pressure switch 7P (Figure 13) is only required when the unit has been converted for propane gas operation. This switch is part of the field-installed propane conversion kit. See the conversion kit Installation Instructions for operation of the pressure switch.

The normally closed furnace limit switch 7H completes the control circuit through the W pigtail lead to the gas valve 5F. See Figure 13. Should the leaving air temperature rise to 175°F, the switch opens and the W control circuit is broken. Any interruption in the control circuit through the W pigtail lead to the gas valve instantly closes the gas valve and stops gas flow to the burners and pilot.

The control circuit through the gas valve to the blower relay 2G is still closed and the blower motor 3D2 will continue to run.

When the leaving air temperature drops to the limit switch low-temperature setting, the switch closes, completing the W control circuit. The electric-spark ignition system cycles and the unit returns to normal heating operation.

VIII. COOLING STARTUP AND ADJUSTMENTS

CAUTION: Complete the steps in Section VI before starting unit.

Do not jumper any safety devices when operating unit.

TABLE VII—AIR DELIVERY (Ft³/Min) AT INDICATED EXTERNAL STATIC PRESSURE & VOLTAGE WITHOUT FILTER*

585B Size	Volts—Phase (60 Hz)	Application Motor Speed Setting†	External Static Pressure—Inches wc															
			0.1		0.2		0.3		0.4		0.5		0.6		0.7		0.8	
			208V	230V or 460V	208V	230V or 460V	208V	230V or 460V	208V	230V or 460V	208V	230V or 460V	208V	230V or 460V	208V	230V or 460V	208V	230V or 460V
018050	208—&	Heating-L	—	725	765	705	730	685	695	650	645	620	—	—	—	—	—	—
	230—1	Cooling-L	—	715	745	695	715	670	670	640	615	590	—	—	—	—	—	—
024050	208—&	Heating-L	—	725	765	705	730	685	695	650	645	620	580	—	—	—	—	—
	203—1	Cooling-H	—	900	930	865	885	825	840	775	780	720	710	—	—	—	—	—
024075	208—&	Heating-M	955	1030	925	1000	890	960	855	920	810	875	—	820	—	—	—	—
	230—1	Cooling-L	830	910	805	885	775	855	740	820	700	780	—	730	—	—	—	—
030075	208—&	Heating-M	—	—	925	1000	890	960	855	920	810	875	765	820	—	—	—	—
	230—1	Cooling-H	—	—	1165	1200	1100	1140	1045	1080	975	1010	905	930	—	—	—	—
036075	230—1	Heating-L	—	1185	—	1150	—	1125	—	1085	—	1035	—	975	—	—	—	—
		Cooling-H	—	1495	—	1430	—	1360	—	1280	—	1205	—	1125	—	—	—	—
	208—,	Heating-L	—	—	1370	1410	1350	1390	1320	1360	1260	1300	1195	1230	1110	1145	1020	1050
	230—, or	Cooling-L‡	—	—	1360	1400	1335	1375	1285	1325	1220	1260	1145	1180	—	1080	—	—
	460—3	Cooling-H	—	—	—	—	—	—	—	—	1465	1510	1355	1395	1230	1265	1085	1120
036125	230—1	Heating-H	—	1640	—	1605	—	1545	—	1485	—	1425	—	1345	—	—	—	—
		Cooling-L	—	1395	—	1355	—	1320	—	1275	—	1215	—	1125	—	—	—	—
	208—&	Heating-L‡	—	—	1580	1630	1545	1595	1505	1550	1460	1505	1405	1450	1320	1360	1195	1230
	230—3	Heating-M	—	—	1930	1990	1860	1920	1795	1850	1715	1770	1620	1670	1515	1560	1375	1420
		Cooling-L	—	—	—	—	—	—	—	—	1435	1480	1370	1410	1260	1300	1115	1150
042100	230—1	Heating-L	—	1415	—	1375	—	1340	—	1295	—	1245	—	1175	—	—	—	—
		Cooling-H	—	1620	—	1575	—	1515	—	1455	—	1385	—	1300	—	—	—	—
	208— or	Heating-L	—	—	1600	1630	1565	1595	1520	1550	1475	1505	1420	1450	1335	1360	1205	1230
	230—3	Cooling-L‡	—	—	1580	1610	1540	1570	1500	1530	1450	1480	1380	1410	1275	1300	—	—
		Cooling-M	—	—	—	—	—	—	—	—	1685	1720	1590	1620	1470	1500	1315	1340
048125	230—1	Heating-L	—	1460	—	1425	—	1390	—	1350	—	1305	—	—	—	—	—	—
		Cooling-H	—	1760	—	1700	—	1640	—	1575	—	1490	—	—	—	—	—	—
	208—,	Heating-L‡	—	—	1600	1630	1565	1595	1520	1550	1475	1505	1420	1450	1335	1360	1205	1230
	230—, or	Heating-M	—	—	1950	1990	1880	1920	1815	1850	1735	1770	1635	1670	1530	1560	1390	1420
	460—3	Cooling-M‡	—	—	1920	1960	1850	1885	1775	1810	1685	1720	1590	1620	1470	1500	—	—
		Cooling-H	—	—	—	—	—	—	1940	—	1835	1870	1725	1760	1615	1650	1490	1520
060125	230—1	Heating-L	—	1750	—	1715	—	1675	—	1630	—	1590	—	1520	—	—	—	—
		Cooling-H	—	2175	—	2110	—	2035	—	1950	—	1850	—	1735	—	—	—	—
	208—,	Heating-L	—	—	1665	1700	1610	1645	1560	1590	1490	1520	1400	1430	1315	1340	1215	1240
	230—, or	Cooling-M‡	—	—	2100	2145	2025	2065	1930	1970	1835	1870	1725	1760	—	—	—	—
	460—3	Cooling-H	—	—	—	—	2425	2475	2330	2380	2225	2270	2090	2135	1955	1995	1820	1855
060150	230—1	Heating-M	—	2050	—	1995	—	1940	—	1870	—	1795	—	1690	—	—	—	—
		Cooling-H	—	2175	—	2110	—	2035	—	1950	—	1850	—	1735	—	—	—	—
	208— or	Heating-L‡	—	—	1665	1700	1610	1645	1560	1590	1490	1520	1400	1430	1315	1340	1215	1240
	230—3	Heating-M	—	—	2155	2200	2075	2115	1990	2030	1895	1935	1795	1830	1680	1715	1570	1600
		Cooling-M‡	—	—	2100	2145	2025	2065	1930	1970	1835	1870	1725	1760	—	—	—	—
		Cooling-H	—	—	—	—	2425	2475	2330	2380	2225	2270	2090	2135	1995	1995	1820	1855

NOTE: For air delivery data applicable to size 036075 thru 060150 single-phase units with a field-installed, high-static blower, refer to the air delivery data for the equivalent size 3-phase unit.

NOTE: 460-V units operate on the same motor speed for both heating and cooling, and are factory-set on the indicated cooling speed.

*Deduct field-supplied filter pressure drop to obtain available static pressure for ducting.

†Heating airflow values are with dry coil. Cooling airflow values are with wet coil.

‡These motor speed settings require a field wiring change. All other settings indicated are the factory setting.

—Indicates portions of the table that are beyond the recommended operating range or that are not applicable.

WARNING/DANGER: Failure to follow these instructions could result in serious personal injury:

1. Follow recognized safety practices and wear protective goggles.
2. Do not operate compressor or provide any electric power to this unit unless compressor terminal cover is in place and secured.
3. Do not remove terminal cover until all electrical sources have been disconnected.
4. If refrigerant leak is suspected around compressor terminals, relieve all pressure from system before touching or disturbing anything inside terminal box.

System contains oil and refrigerant under pressure. Do not use torch to remove any component. Wear your protective goggles. To remove a component:

1. Shut off electrical power to unit.
2. Relieve all pressure from system.
3. Cut connecting piping with tubing cutter.
4. Remove component from unit.
5. When necessary, unsweat remaining piping stubs carefully. Oil may ignite when exposed to torch flame.

A. Checking Components

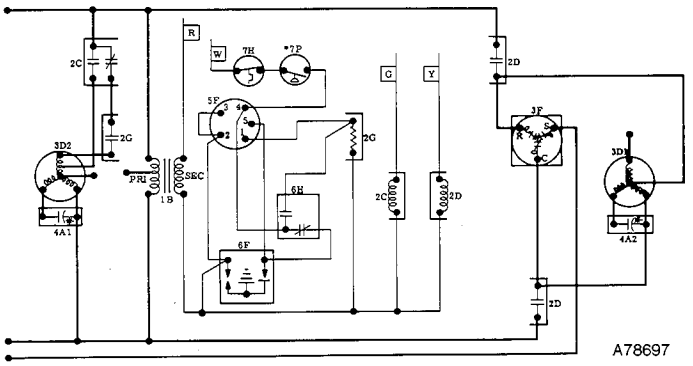
Perform the following steps before starting the unit.

1. Check for correct position of condenser fan blade in unit top panel. See Figure 3.
2. Leak-test all refrigerant circuit connections to make certain that none has been damaged in shipment.
3. Check entire system for leaks at all connections, including evaporator coil located in blower compartment. (Use electronic leak detector, halide torch, or liquid-soap solution.)

NOTE: The cooling section is fully charged with refrigerant, tested, and factory-sealed. **There should be no need to check refrigerant charge if no leaks were found.** In rare instances, when the refrigerant charge has been lost because of a leak caused by shipping damage or a refrigerant leak has been found, proceed as follows:

WARNING: Never attempt to repair any soldered connection while system is under pressure. Severe bodily injury may result.

a. Locate and repair leak.



LEGEND

1B-Transformer
2C-Cool Relay (SPDT)
2D-Contactor (N. O.)
2G-Heat Relay (821) (N. O.)
3D1-Condenser Motor
3D2-Evap Blower Motor
3F-Compressor
4A1 & 4A2-Run Capacitors
5F-Gas Valve
6F-Pilot Igniter
6H-Safety Pilot (Flame Sensing)
7H-Limit Switch (SPST)
*7P-Pressure Switch (N. O.)

*Pressure switch 7P required on propane units only.

Figure 13—Typical Line-to-Line Wiring Diagram

b. Leak-test unit.
c. Evacuate system.

CAUTION: Charge unit with exact amount of refrigerant as shown on unit rating plate.

d. Charge unit with proper type and amount of refrigerant listed on unit rating plate. It is recommended that a volumetric charging cylinder or an accurate scale be used.

4. Check to be sure all tools and loose parts have been removed.
5. Check to be sure all panels and covers are in place. Following this initial inspection, unit may be started.

B. Evaporator Airflow & Airflow Adjustments

Model 585B units are equipped with a direct-drive blower motor. Motor speeds have been factory-set for both heating and cooling to deliver the proper airflow under normal static pressures.

For cooling operation, the recommended evaporator airflow is 350 to 450 ft^3/min per 12,000 Btuh of cooling. For heating operation, it is recommended that the airflow produce a temperature rise that falls within the range stamped on the unit rating plate.

1. Determining Evaporator Airflow

Table VI shows air delivery at various temperature rises and Table VII shows air delivery at various static pressures. Refer to these tables to determine the airflow.

NOTE: Optional field-installed high-static blower packages are available for sizes 036075 through 060150, single-phase units. For air delivery applicable to these units, refer to the air delivery data in Table VII for the equivalent size 3-phase unit. (Three-phase units have factory-installed high-static blowers.)

2. Airflow Adjustments

WARNING: Disconnect all electrical power to the unit before adjusting airflows.

Motor speed settings can be changed by changing motor lead connections. The motor leads are color-coded as follows:

black = high speed
blue = medium speed
red = low speed

Sizes 018050, 024050, 036075, 036125, 042100, and 048125 single-phase units; and the 208/230-V, 3-phase version of size 036075 have a 2-speed motor and *do not have the blue lead for medium speed.*

All 460-V units operate on the same speed for both heating and cooling. Size 036075 460-V units have a 2-speed motor. Size 048125 and 060125 460-V units have a 3-speed motor.

For all 208- and 230-V units, the motor lead connected to the heating relay 2G determines the heating speed, and the motor lead connected to the cooling relay 2C determines the cooling speed. See the unit wiring label. To change the heating and/or cooling speed, connect the appropriate color-coded motor lead to the appropriate relay. Be sure to tape unused motor lead(s).

When the same speed is desired for both heating and cooling for 208- and 230-V units, connect the appropriate color-coded motor lead to either relay and connect a field-supplied jumper between the two relays.

For all 460-V units, the single motor lead connection to the blower relay 2A determines the single motor speed for both heating and cooling. See unit wiring label. To change the single motor speed, connect the appropriate color-coded motor lead to the blower relay 2A. Be sure to tape unused motor lead(s).

C. Checking Unit Operation

Perform the following steps to make certain the unit is operating properly:

1. Place thermostat SYSTEM switch in COOL position; place FAN switch in AUTO position; set thermostat setting below room temperature. Observe that compressor, condenser fan motor, and blower motor are all running. Observe that all motors stop when thermostat is satisfied.

CAUTION: Do not rapid-cycle compressor. Allow 5 minutes between cycles. Rapid-cycling can cause compressor damage.

2. Move thermostat fan switch to ON position. Observe that blower fan runs continuously with thermostat set above or below conditioned space temperature.

D. Sequence of Operation (Cooling)

The following sequence of operation pertains to Model 585B, 208- or 230-V, 3-phase units; sizes 036075, 036125, 042100, or 048125; however, the sequence of operation of all units is very similar. Refer to the line-to-line wiring diagram in Figure 13.

NOTE: Although the actual unit wiring may vary slightly from that shown in Figure 13, the sequence of operation will not be affected.

With the room thermostat SYSTEM switch in COOL and FAN switch in AUTO, the sequence of operation is as follows:

When there is demand for cooling by the room thermostat, terminal R "makes" to terminals Y and G through the thermostat. This circuit connects the compressor contactor coil 2D and cooling blower relay coil 2C across the 24-volt secondary of the transformer 1B to energize the compressor contactor and blower relay. The contacts of the energized blower relay 2C close, completing the circuit through the single-phase blower motor 3D2, starting the motor instantly. The contacts of the energized compressor contactor

TABLE VIII—HEATING SERVICE ANALYSIS CHART

SYMPTOM	CAUSE	REMEDY
Pilot will not light.	No spark at electrode	Check air gap between electrode tip and pilot burner. Gap should be 1/8-in. ± 1/16 in. Readjust as necessary.
		Check moisture or dirt accumulation on electrode ceramic—clean ceramic with cloth.
		Cracked ceramic—replace pilot electrode assembly.
		Check for loose or broken wiring at and between control and electrode—replace wire as necessary.
		Check fuses or circuit breaker to insure voltage to unit.
		Check 24-volt input to igniter control. If you find 24 volts and the above remedies have been explored, replace igniter.
	Spark shorting out to main burner	Realign electrode tip away from main burner but maintain spark gap to pilot burner.
	No gas at pilot burner	Check to see if pilot valve is opening. Check for loose or broken wiring connections. If no deficiency is found, 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-volt 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 properly—sharp blue flame	Replace pilot.
	Burned out heat anticipator in thermostat	Replace thermostat.
	No gas at main burners	Check to see if main gas valve is opening. Look for loose or broken wiring connections. If no deficiency is found, replace valve assembly.
	Broken thermostat wire	Run continuity check to locate break.
Inadequate heating	Dirty air filter	Replace filter.
	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	Use faster speed tap—or install optional blower.
	Limit switch cycles main burners	OFF setting of fan control set too high—reset.
		Dirty air filters—clean or replace.
		Registers closed, restricted ductwork—open or remove restriction.
		Check heat anticipator setting on thermostat—readjust.
Poor flame characteristics	Incomplete combustion results in: Aldehyde odors, (CO), sooting flame—floating flame	Air shutters on burners closed—adjust to soft blue flame.
		Check all screws around flue outlets and burner compartment—tighten.
		LACK OF COMBUSTION AIR.
		Cracked heat exchanger—replace.
		Overfired furnace—reduce input, or change orifices.
		Check vent for restriction—clean as required.
		Check orifice to burner alignment.

2D close and complete the circuit through the compressor motor 3F and condenser fan motor 3D1, causing both motors to start instantly.

All motors will continue to run and the cooling cycle will remain "on" until the room thermostat is satisfied. When the conditioned space temperature drops to the thermostat setting, the electrical connection from terminal R to terminals Y and G is opened in the thermostat. This open circuit deenergizes the compressor contactor coil 2D and the cooling blower relay coil 2C. The blower, condenser, and compressor motors will stop. The cooling will remain "off" until there is another demand for cooling by the thermostat.

IX. CARE AND MAINTENANCE

WARNING: Never place anything combustible on or in contact with the unit.

Disconnect all electrical power to unit before performing any maintenance or service on unit.

To ensure continuing high performance, and to minimize possible equipment failure, it is essential that periodic maintenance be performed on this equipment. Consult your local Dealer as to the proper frequency of maintenance and the availability of a maintenance contract.

WARNING: As with any mechanical equipment, personal injury can result from sharp metal edges, etc.; therefore, be careful when removing parts.

Because of possible damage to the equipment or personal injury, maintenance should be performed by qualified persons only.

The ability to properly perform maintenance on this equipment requires certain mechanical skills and tools. If you do not possess these, contact your Dealer for maintenance.

The minimum maintenance that should be performed on this equipment is as follows:

1. Check air filter each month. Clean or replace as required.
2. Check cooling coil, drain pan, and condensate drain each cooling season for cleanliness. Clean as necessary.
3. Check blower motor and wheel for cleanliness and lubrication each heating and cooling season. Clean and lubricate as necessary.
4. Check electrical connections for tightness and controls for proper operation each heating and cooling season. Service as necessary.

A. Air Filter

CAUTION: Do not operate the unit for any period of time without having a suitable filter in place in the return-air duct system. Always replace filter with same size and type.

Filters are not provided as an integral part of the unit. A filter must be used with the unit and must be inspected frequently. When the filter becomes clogged with dust and lint, it should be replaced (disposable-type) or cleaned (cleanable-type). The filter should be inspected at least once each month, and replaced or cleaned at least twice during the year (more often, if necessary).

TABLE IX—COOLING SERVICE ANALYSIS CHART

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.
Compressor will not start but condenser fan runs.	Faulty wiring or loose connections in compressor circuit	Check wiring and repair or replace.
	Compressor motor burned out, seized, or internal overload open	Determine cause. Replace compressor.
	Defective run/start capacitor, overload, start relay	Determine cause and replace.
	One leg of three-phase power dead	Replace fuse or reset circuit breaker. Determine cause.
Compressor cycles (other than normally satisfying thermostat)	Refrigerant overcharge or undercharge	Blow 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, start relay, or reset 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	Blow 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	Purge excess refrigerant.
	Air in system	Blow 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	Purge 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 65°F	Install low-ambient kit.
	Filter-drier restricted	Replace.

B. Lubrication

Fan and blower motors are prelubricated for 2 years of heavy duty or 5 years of normal duty. When lubrication is necessary, send motor to an authorized motor repair shop.

C. Evaporator and Condenser Coils

CAUTION: Be sure all electrical power to the unit is turned OFF before cleaning coils.

The coils are easily cleaned when they are dry; therefore, they should be checked and cleaned **before** each cooling season. The coils should be inspected periodically during the cooling season.

If the coils are coated with dirt or lint, they should be vacuumed with a vacuum cleaner's soft brush attachment. **Be careful not to bend the fins.** If the coils are coated with oil or grease, they may be cleaned with a mild detergent and water solution. Rinse coils with clear water. Be careful not to splash water on motors, insulation, wiring, or filters.

D. Condensate Drain

The drain pan and condensate drain should be checked at the same time the cooling coils are checked. Clean the drain pan and condensate drain by removing any foreign matter from the pan. Flush pan and drain tube with clear water. If the drain tube is restricted, it can generally be cleared with high-pressure water. If this does not work, try a "plumber's snake" or similar probe device.

E. Evaporator Blower

The blower should be inspected at least once each year. Remove caked-on dirt from the blower wheel and housing with brush; remove grease with mild solvent. Make sure blower is centered in the blower housing.

F. Condenser Fan

The condenser fan should be kept free of all obstructions to

WARNING: Do not poke sticks, screwdrivers, or any other object into revolving fan blades—severe bodily injury may result.

The required fan position is shown in Figure 3. Adjust fan position by loosening setscrews and moving fan up or down.

G. Electrical Controls and Wiring

With power disconnected to unit, check all electrical connections for tightness. Tighten all screws on connections. If any smoky or burned connections are noticed, disassemble the connection, clean all parts, strip wire, and reassemble properly and securely. Electrical controls are difficult to check without proper instrumentation; therefore, reconnect electrical power to unit and observe unit through one complete operating cycle. If there are any discrepancies in the operating cycle, contact your Dealer and request service.

H. Refrigerant Circuit

The refrigerant circuit is difficult to check for leaks without proper equipment. Therefore, if low-cooling performance is suspected, contact your local Dealer for service.

I. Cleaning the Heating Section

Soot, lint, or dirt on the heating section components visible in Figure 7 should be cleaned off before each heating season. To insure dependable and efficient heating operation, the heat exchanger should be checked by a qualified maintenance person before each heating season, and cleaned when necessary. This checkout should not be attempted by anyone not having the required expertise and equipment to do the job properly. Checking and/or cleaning the heat exchanger involves removing the unit top, disconnecting various motor leads, and when completed, reinstalling the top properly to maintain a proper seal. Contact your local Dealer for the required periodic maintenance.