



# Installation, Start-Up and Service Instructions

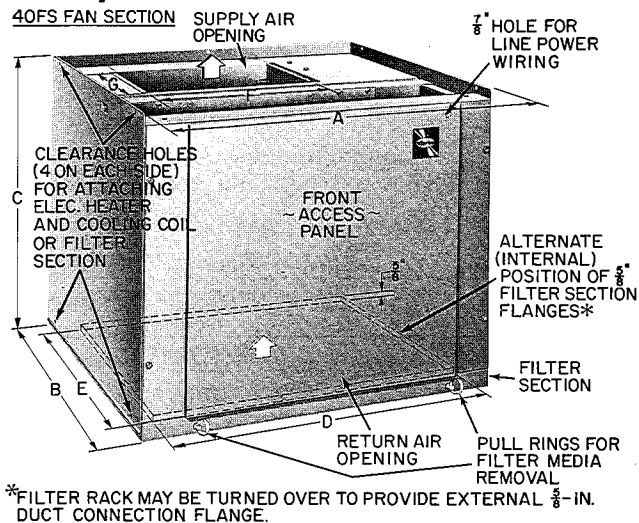
# 40FS

Carrier Corporation • Syracuse, N.Y. 13221

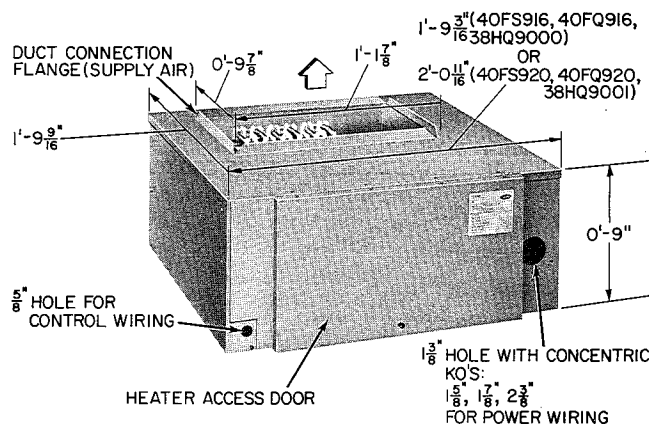
## Fan Sections and Accessory Electric Heaters

### CONTENTS

	Page
<b>SAFETY CONSIDERATIONS</b> .....	2
<b>MODULAR SYSTEM INTRODUCTION</b> .....	2,3
<b>INSTALLATION</b> .....	3-9
Step 1 — Inspect Equipment .....	3
Step 2 — Determine Position of Unit by Airflow Direction .....	3
Step 3 — Assemble Required Unit .....	3-7
Step 4 — Connect Ductwork to Unit Supply and Return Air Openings .....	7,8
Step 5 — Insulate Ductwork .....	8
Step 6 — Install Accessory Cooling Control Kit (cooling-only applications) ...	9
Step 7 — Install Accessory Humidity Control Kit (28TQ applications only) .....	9
<b>ELECTRICAL DATA AND WIRING</b> .....	9-16
Step 8 — Install Branch Circuit Disconnect Switch(es) per NEC .....	9
Step 9 — Route Line Power Leads into Unit .....	9
Step 10 — Connect Ground Leads .....	9,10
Step 11 — Set Fan Motor Speed(s) .....	10
Step 12 — Connect Control Power Wiring (24-v) .....	10
<b>START-UP</b> .....	16
<b>FAN SECTION SERVICE</b> .....	17
<b>ELECTRIC HEATER SERVICE</b> .....	17



\*FILTER RACK MAY BE TURNED OVER TO PROVIDE EXTERNAL 5/8-IN. DUCT CONNECTION FLANGE.



→ Table 1 — Physical Data and Dimensions (Fig. 1)

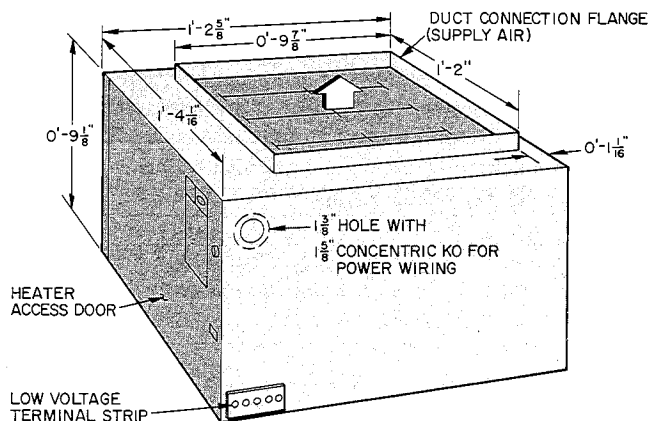
MODEL 40FS	075	120	160	200	220
OPERATING WT (lb)	60			65	72
FAN	Centrifugal — Direct Drive				
Rpm, 60 Hz	625-800 (2-speed)	975 (1-speed)	800-1100 (3-speed)		
Air Discharge	Upflow- Horizontal	Upflow	Upflow-Downflow- Horizontal		
Nominal Cfm	750	1150	1250	1750	2000
PSC Motor — Hp	1/10	1/8	1/2	3/4	1
DIMENSIONS (ft.-in.)					
Length	2-0 1/16		1-9 3/16		2-0 1/16
Width	B		1-10 1/16		
Height	C		1- 7 5/16		
DUCT INLET (ft.-in.)					
D	1-11 1/16		1-7 7/16		1-11 1/16
E			1-7		
DUCT OUTLET (ft.-in.)					
F			1-1 1/8		
G			0-9 7/8		
FILTER (1-in. thick)*					
No.			1		
Size (in.)	21x24 1/4		21x20 3/4		21x24 1/4

PSC — Permanent Split Capacitor

\*40FS units factory equipped with permanent filter and reversible rack with 5/8-in. duct connection flange.

### ELECTRIC HEATERS

(All 38HQ, 40FS, FQ Models except 40FS916320 CD thru JR, 40FS916500EH, GM and HV)



### ELECTRIC HEATERS

(40FS916320 CD thru JR, 40FS916500 EH, GM and HV)

Certified dimension drawings are available on request.

Fig. 1 — Dimensions and Connections

## SAFETY CONSIDERATIONS

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

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

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

**WARNING:** Before performing service or maintenance operations on unit, turn off main power switch to unit. Turn off accessory heater power switch if applicable. Electrical shock could cause personal injury.

## MODULAR SYSTEM INTRODUCTION

Field assemble the required 28 Series direct-expansion (encased) coil and/or 40FS,40FQ,38HQ accessory electric heater to 40FS fan section. Combine fan section and coil for a split system fan coil; fan section and accessory electric heater for an electric furnace; fan section, coil and electric heater for a heating and cooling unit. (See Table 2 for total height dimension of assembled units.)

**Table 2 — Height Dimensions of Assembled Units**

MODULAR UNIT ASSEMBLIES						TOTAL HEIGHT*‡ (ft.-in.)		
Cooling and Heating Unit						Airflow		
Cooling Unit				Heating Unit		Upflow (or Horizontal)†	Downflow	
Coil				Fan Section	Elec Heater			
28HQ036020	28VQ036020	—	—	—	40FS160	40FS,FQ916 38HQ9000**	3-11 <sup>3</sup> / <sub>16</sub>	4- 0 <sup>7</sup> / <sub>16</sub>
28HQ042030 28HQ048020	28VQ042030 28VQ048030	28TQ042	—	—	40FS160	40FS,FQ916 38HQ9000**	4- 6 <sup>7</sup> / <sub>16</sub>	4- 7 <sup>1</sup> / <sub>8</sub>
28HQ042020 28HQ048020	28VQ042020 28VQ048020	—	28QX036 28QX042	—	40FS200	40FS916,920 40FQ920 38HQ9001*	4- 3 <sup>5</sup> / <sub>16</sub> 5- 0 <sup>3</sup> / <sub>8</sub> ††	4- 3 <sup>5</sup> / <sub>16</sub> 5- 0 <sup>3</sup> / <sub>8</sub> ††
28HQ060020	28VQ060020	28TQ060	—	—	40FS200,220	40FS916,920 40FQ920 38HQ9001**	4- 7 <sup>7</sup> / <sub>16</sub>	4- 8 <sup>1</sup> / <sub>16</sub>
28HQ036020	28VQ036020	—	—	—	40FS160	—	3- 3 <sup>3</sup> / <sub>16</sub>	3- 4 <sup>3</sup> / <sub>16</sub>
28HQ042030 28HQ048020	28VQ042030 28VQ048030	—	—	—	40FS160	—	3-10 <sup>1</sup> / <sub>4</sub>	3-10 <sup>3</sup> / <sub>8</sub>
28HQ042020 28HQ048020	28VQ042020 28VQ048020	—	—	—	40FS200	—	3- 7 <sup>1</sup> / <sub>8</sub>	3- 7 <sup>3</sup> / <sub>4</sub>
28HQ060020	28VQ060020	—	—	—	40FS200,220	—	3-11 <sup>3</sup> / <sub>16</sub>	3-11 <sup>3</sup> / <sub>16</sub>
—	—	—	—	—	40FS160	40FS,FQ916 38HQ9000**	2-4 <sup>3</sup> / <sub>16</sub>	—
—	—	—	—	—	40FS200,220	40FS916,920 40FQ920 38HQ9001**		—
→	—	—	—	28VH002/004	40FS075/120	40FS920EH	4- 7 <sup>1</sup> / <sub>8</sub>	—
→	—	—	—	28VH002/004	40FS075/120	—	3-11 <sup>3</sup> / <sub>16</sub>	—

\*Total height may vary slightly depending on electric heater model used.  
†Length dimension of assemblies in the horizontal position are same as height dimension of units assembled for upflow airflow.  
‡All height dimensions include 40FS filter section.

\*\*For use with 38HQ227 and 234 only.  
††Total height for 28QX coil with fan section and electric heater.  
NOTE: 020,030 denotes dimensional variation within 28HQ/VQ models. Refer to 28HQ/VQ literature for exact dimensions.

**Table 3 — Installation and Usage Data (See Modular System Introduction, Page 3)**

FAN SECTION	COIL (Draw-Thru Airflow)				ELECTRIC HEATER* (Blow-Thru Airflow)			UNIT ASSEMBLY POSITION		
	Upflow	Upflow, Downflow	Horizontal	Upflow, Downflow, Horizontal	Upflow, Downflow, Horizontal	KW		Heating Unit	Cooling Unit	Heating and Cooling Unit
						208 V	240 V			
40FS075	28VH002	—	28VH002†	—	40FS920300EH	7.5	10.0	Fig. 2, 3	Fig. 4	Fig. 5
→ 40FS120	28VH004	Upflow	—	—	40FS920300EH	7.5	10.0	Fig. 2, 3	Fig. 4	Fig. 5
40FS160	—	28VQ036, 28VQ042	28HQ036, 28HQ042	28TQ042	40FS916300	6 - 18.8	8-25	Fig. 2, 3	Fig. 4	Fig. 5
					40FS916320	3.75-15	5-20			
					40FS916500	7.5-22.5	10-30			
					40FQ916	6-18.8	8-25			
					38HQ9000**	6-15	8-20			
40FS200, 40FS220‡	28QX036, 28QX042	28VQ042, 28VQ048, 28VQ060	28HQ042, 28HQ048, 28HQ060, 28QX036, 28QX042	28TQ048, 28TQ060	40FS920300	7.5-22.5	10-30	Fig. 2, 3	Fig. 4	Fig. 5
					40FS916320	3.75-15	5-20			
					40FS916500	7.5-22.5	10-30			
					40FQ920	7.5-22.5	10-30			
					38HQ9001**	7.5-18.8	10-25			

\*Electric heater for use with 208/230 V, 40FS units only. Refer to Electrical Data and Wiring, Table 4, for fan section/electric heater usage and complete electric heater model numbers.

†Horizontal application not recommended for Weathermaster IV system.  
‡Model 40FS220 not for use with 28QX coil.  
\*\*For use with 38HQ227 and 234 only.

Models 28VQ, HQ coils and 40FS heaters are for use in cooling-only and/or cooling and electric heating systems. The 28VQ and HQ coils are also for use in heat pump systems with 38HQ or 40FQ electric heaters. Model 28TQ coil is for installation in 38TQ 2-speed heat pump systems. The 28QX coil is for solar-assisted heat pump systems. The 28VH coil application is with Model 40FS075 only.

Fan section, coil and electric heater are tested and approved for installation in unconditioned space per ARI Standard (80 F db, 75 F wb indoor temperature; 80 F db outdoor temperature). Insulate supply and return air ductwork in unconditioned space. If conditions exceed the ARI Standard, additional insulation with vapor barrier may be required for the unit.

**Fan Sections 40FS** can be positioned to discharge air upward (upflow), horizontally, or downward (downflow), except for sizes 075, 120 which cannot be used in downflow applications, and are suitable for "Attic-Type" installations.

**The 28 Series Coils** are approved as draw-thru (airflow) units *only* with the 40FS fan section. Install coils in draw-thru position; heater in blow-thru position. Therefore, coil must be attached to air inlet end of fan section. As indicated in Table 3, permissible coil airflow position(s) in system are: 28TQ — upflow, downflow or horizontal; 28VQ — upflow or downflow; 28HQ — horizontal; 28QX — upflow or horizontal; 28VH002 — horizontal or upflow with 40FS075 only, upflow with 40FS120 only.

Assembly of coils to 40FS fan section, electric heater and filter section is described in this booklet. For further coil information, see 28 Series installation data.

**COIL CONDENSATE DRAINAGE** (for any unit assembly installed above an occupied or usable space) — In addition to normal condensate drain line connection, install an auxiliary condensate pan under entire unit assembly. Route drain line to any drain that is visible to occupant. In 28VH coil applications, only the drain pan needed should be used. See 28VH Installation Instructions.

*Under prolonged high humidity conditions, eliminator plates may be required on downflow applications. Horizontal coil installation may also require special condensate removal methods. See Coil Installation Data.*

**Accessory Electric Heater** is used with 40FS, 208/230-volt fan section. See Electrical Data and Wiring table for fan section/electric heater usage. Use electric heater as a blow-thru unit *only* by attaching heater to air discharge end of 40FS fan section in any of the 3 positions. Electric heater has both heating and cooling controls including a 40-va or 60-va control circuit transformer, indoor fan relay and low-voltage terminal strip.

**MODELS 40FS916320 AND 40FS916500EH, GM AND HV** — These heaters are approved for downflow usage but require the use of adapters (downflow support angles) to support fan section weight. See Installation, Heating Unit Assembly.

**Filter Section** is shipped taped to air inlet end of fan section. Filter section includes a reversible filter rack with 5/8-in. duct connection flanges. On

most unit assemblies the filter section can be attached to unit with flanges exposed or turned over so flanges are inside unit. The permanent one-in. filter media pulls out (Fig. 1) for easy removal and cleaning.

**Cooling Control Kit** is an accessory for 40FS, 208/230-volt fan sections used in cooling-only installations. The kit contains a 40-va transformer, fan deck filler panels, indoor fan relay and low-voltage terminal strip. See Fig. 11, and cooling control kit installation on page 9. Because accessory electric heaters come equipped with cooling controls listed above (plus required heating controls), a cooling control kit is not required when electric heater is used. An accessory humidity control kit is required for use in 28TQ 2-speed installations. See Step 7 and Fig. 12.

## INSTALLATION

**Step 1 — Inspect Equipment** — File claim with shipping company if shipment is damaged or incomplete.

**Step 2 — Determine Position of Unit by Air-flow Direction** — See Table 3 and Fig. 2, 3, 4 and 5. Ensure access panels on all units face front before and after unit assembly.

**Step 3 — Assemble Required Unit** — Follow assembly procedure below for required unit. On downflow unit assemblies, loosen or remove fan motor mounting bolts and rotate fan motor so oiling holes are a minimum of 45° above horizontal center line of motor.

Fasteners for assembling units are shipped in a bag inside of fan section or inside electric heater enclosure. Use the no. 10 serrated hex head sheet metal screws (or equivalent) provided, where indicated in unit assembly instructions below, to ensure proper electrical ground continuity.

**CAUTION:** All coils must be applied draw-thru and heaters blow-thru when combining components.

### HEATING UNIT ASSEMBLY (Fig. 2)

Electric Heater Models except 40FS916320, 40FS916500EH, GM and HV, and 40FS916500LW and PA when used with fan sections 40FS075, 40FS120, 40FS200 and 40FS220 — Position fan section for upflow air direction. (Accessory flange deck 40FS900391 or 40FS900401 required.) Set electric heater on air discharge end of fan section. Attach heater to fan section with 5 no. 8-32 self-threading screws provided. Clearance holes for screws are provided on each side (2) and back (1) of fan section and engagement holes on heater.

Electric Heater Models 40FS916320, 40FS916330 and 40FS916500EH, GM and HV — Position fan section for upflow air direction. Mount heater on fan section supply air duct connection flanges, and attach with 4 sheet metal screws. Four clearance holes for screws, provided on heater cabinet, can be used as template for drilling engagement holes in duct flanges as required. See Fig. 3. Assembly may be aided by first removing top flange deck from fan section (2 screws hold flange deck in place). Assembled heater and flange deck can then be resecured to fan section. Reposition plug buttons

and rubber grommet positions in top flange deck to accommodate heater fan leads. Install door air seal strip on fan deck along front edge of heater.

Electric Heater Models 40FS916500LW, and PA used with Fan Sections 40FS200 and 40FS220 — Position fan section for upflow air direction. Assemble flange deck according to instructions shipped with accessory. Mount heater on fan section supply air duct connection flanges; attach with 3 no. 8-32 self-threading screws and bracket provided as shown in Fig. 3.

On all heating unit assemblies, attach filter section to air inlet (return) end of fan section. The filter section can be mounted with its 5/8-in. duct connection flanges inside or outside of fan section. Filter section is held in place with 4 screws and speed nuts provided. See Fig. 6. Clearance holes for screws are provided on each side of filter section. Speed nuts provide engagement holes on each side of fan section.

To position heating unit for horizontal airflow, simply place assembled unit on either left or right side with access panels at front. Position Model 40FS075 horizontally only with the motor above the scroll as shown in Fig. 4.

For a downflow heating unit, turn assembled unit over so fan discharges downward thru electric heater. Remove fan section access panel. Turn access panel so Carrier nameplate is in upright position and replace panel on fan section.

**CAUTION:** The electric heater models 40FS916500EH, GM, HV and 40FS916320 are approved for downflow but will not support fan section weight. When assembled unit is used in downflow position, install accessory downflow support angles 40FS900241 to support fan weight as described in Downflow Support Angles below.

### Downflow Support Angles

1. Position fan-heater combination for upflow arrangement (Fig. 3). Remove screws (4) securing fan cover; remove and set aside cover.
2. Remove tie angle. Save screws "A" (2).
3. Install accessory fan deck filler panels as described in instructions shipped with accessory. Assembly is similar to filler panels on accessory cooling control kit. See Step 6 and Fig. 11.
4. Position support angles on fan section as shown in Fig. 11. Reinstall screws "A" securing support angles and flange deck to fan wrapper.
5. Using screws "B" supplied, attach each angle to corresponding fan side flange. Holes in side flanges are clearance holes.
6. Using remaining hole in each angle as a guide drill a .128 in. diameter hole in front flange of flange deck. Install screws "C" (supplied) in these holes to attach angles to front flange.

NOTE: All 3 screws are required in each angle for proper unit stability.

7. Using the 4 screws removed in step 1, reattach fan cover so that Carrier nameplate is upside down. Fan-heater assembly is now ready to be

inverted so that when installed in final location, nameplate will be right-side up.

The electric heater is equipped with heating controls as described in Modular System Introduction. See Electrical Data and Wiring for wiring details.

**COOLING UNIT ASSEMBLY** — Be sure 28 Series coil is assembled in recommended airflow position:

DRAW-THRU AIRFLOW		
Upflow	Downflow	Horizontal
28TQ,28VQ, 28QX,28VH	28TQ,28VQ	28HQ,28QX, 28TQ,28VH

Coil casing on most models has sheet metal screw engagement holes for assembly to fan section. When engagement holes are not provided, carefully drill holes where required.

Upflow and Horizontal Cooling Unit — Position fan section for upflow air direction and coil in upright position as shown in Fig. 4, page 6. Set fan section on top of cooling coil casing. Attach fan section to coil casing with 5 no. 10 hex head sheet metal screws provided. Clearance holes for screws are provided on each side (2) and back (1) of fan section and engagement holes in sides and back of coil casing. (Drill engagement holes as required).

Before attaching filter section to air inlet (return) end of coil casing, remove return air duct flange from coil casing. Be sure to install secondary condensate tray with lip over edge of condensate pan (28HQ only). The filter section can be mounted with its 5/8-in. duct connection flanges inside or outside of coil casing. Filter section is held in place with 4 screws and speed nuts provided (Fig. 6). Engagement holes for screws are provided by speed nuts on each side of coil casing. Drill engagement holes in each side of coil casing as required.

Use cooling unit as assembled above for horizontal airflow. To position unit for horizontal airflow, place unit on its right side by turning it clockwise 90°.

Downflow Cooling Unit — Install as accessory downflow base under fan section to provide a "firebreak" in accordance with UL requirements. This base, which is a heater enclosure with no heating components in it, is shown in Fig. 4. Install base in the same manner as the heater as described previously in Heating Unit Assembly. Also see Fig. 2. The bases are used as follows:

FAN SECTION	USES BASE
40FS160300	40FS900220
40FS200300	40FS900230
40FS220300	40FS900230

Turn fan section (only) over so fan discharges downward. Remove return air duct flange from coil casing. Place coil, in an upright position, on air inlet end (top) of fan section. Attach coil casing to fan section with 4 no. 10 hex head sheet metal screws provided. Clearance holes for screws are provided in each side of fan section and engagement holes on sides of coil casing. (Drill engagement holes as required).

Set filter section on top of coil section with filter flanges overlapping coil flanges. Drill 1/8-in. holes thru coil and filter flanges, and fasten together with sheet metal screws provided. Do not drill into filter support rack. See Fig. 6.

Remove fan section access panel. Turn access panel so Carrier nameplate is in upright position and replace panel on fan section.

An accessory cooling control kit is required for 208-230-volt upflow, horizontal or downflow cooling units described above. See cooling control kit installation. An accessory humidity control package is required for use with the 28TQ coil in 2-speed applications. See 28TQ installation data.

**HEATING AND COOLING UNIT ASSEMBLY** — Attach electric heater to fan section as described under Heating Unit Assembly. However, before attaching filter section, proceed as follows:

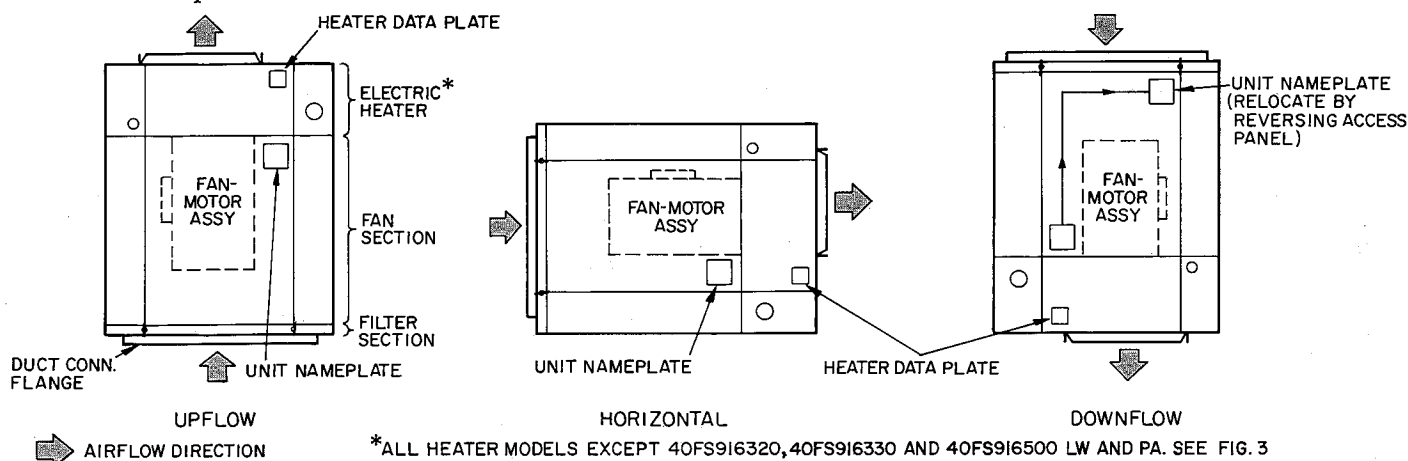
**Upflow and Horizontal Heating/Cooling Units** — Position heating unit assembly (Fig. 2, 3) for upflow air direction and coil in upright position as shown in Fig. 5 and 7. Set heating unit assembly on top of cooling coil casing. Attach heating unit assembly to coil casing with 5 no. 10 hex head sheet metal screws provided. Clearance holes for screws

are provided on each side (2) and back (1) of fan section, and engagement holes in side and back of coil casing. (Drill engagement holes as required).

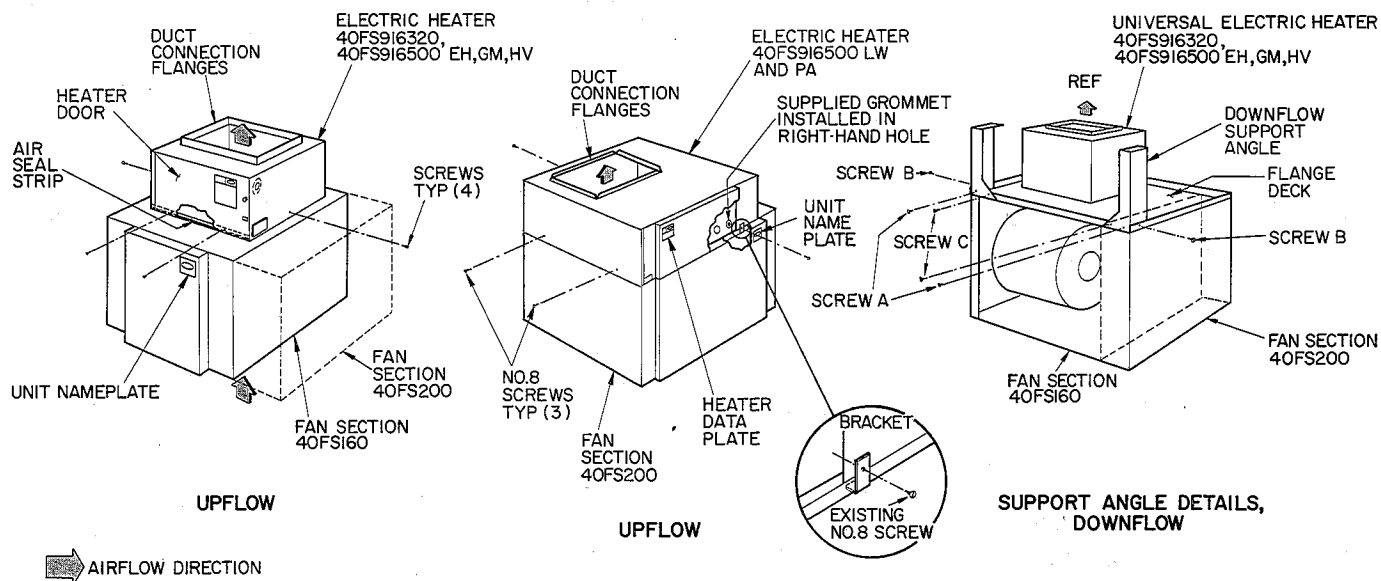
Before attaching filter section to air inlet (return) end of coil casing: remove return air duct flange from coil casing. Be sure to install secondary condensate tray with lip over edge of condensate pan (28HQ only). The filter section can be mounted with its 5/8-in. duct connection flanges inside or outside of coil casing. Filter section is held in place with 4 screws and speed nuts provided (Fig. 6). Engagement holes for screws are provided by speed nuts on each side of coil casing. Drill engagement holes in each side of coil casing as required.

Use cooling and heating unit as assembled above for horizontal airflow. To position unit for horizontal airflow, place unit on its right side by turning it clockwise 90°.

**Downflow, Heating/Cooling Unit** — When 40FS916320, or 40FS916500EH, GM, or HV heaters are used in this assembly, install accessory downflow support angles 40FS900241 to support fan section/coil weight as described on page 3. Turn fan section/electric heater assembly (Fig. 2, 3) over so fan discharges downward thru electric heater. Remove return air duct flange from coil casing.



**Fig. 2 — Heating Unit Assembly**



**Fig. 3 — Heating Unit Assembly Details**

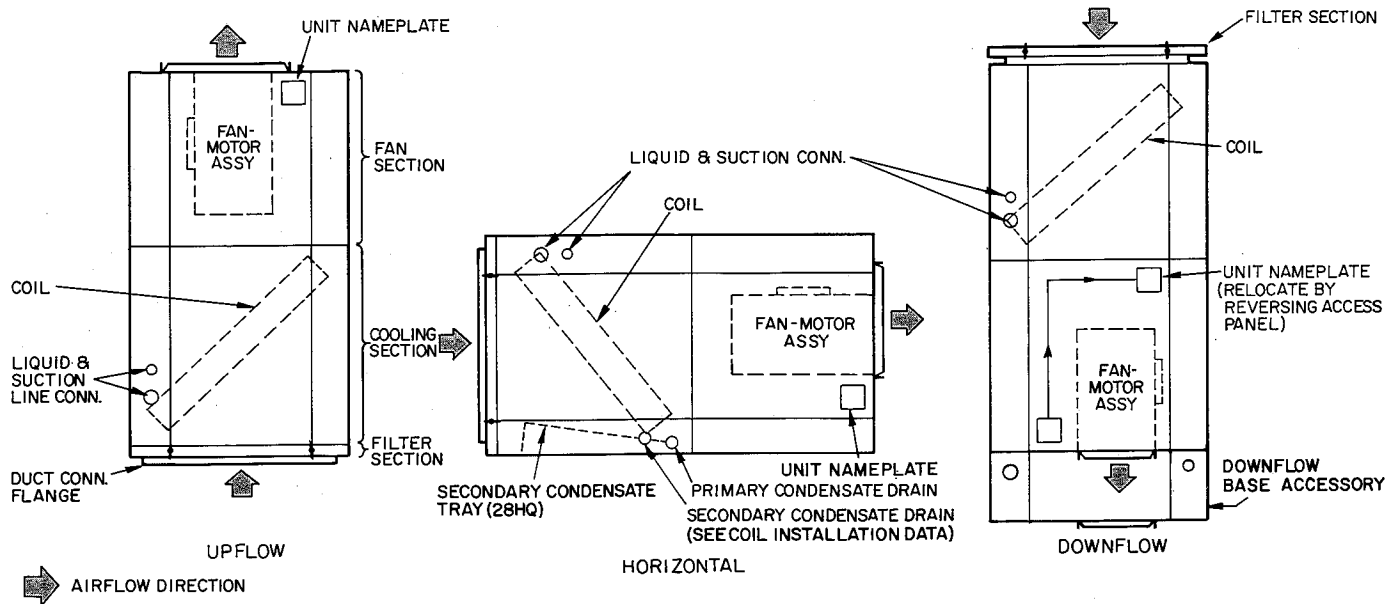
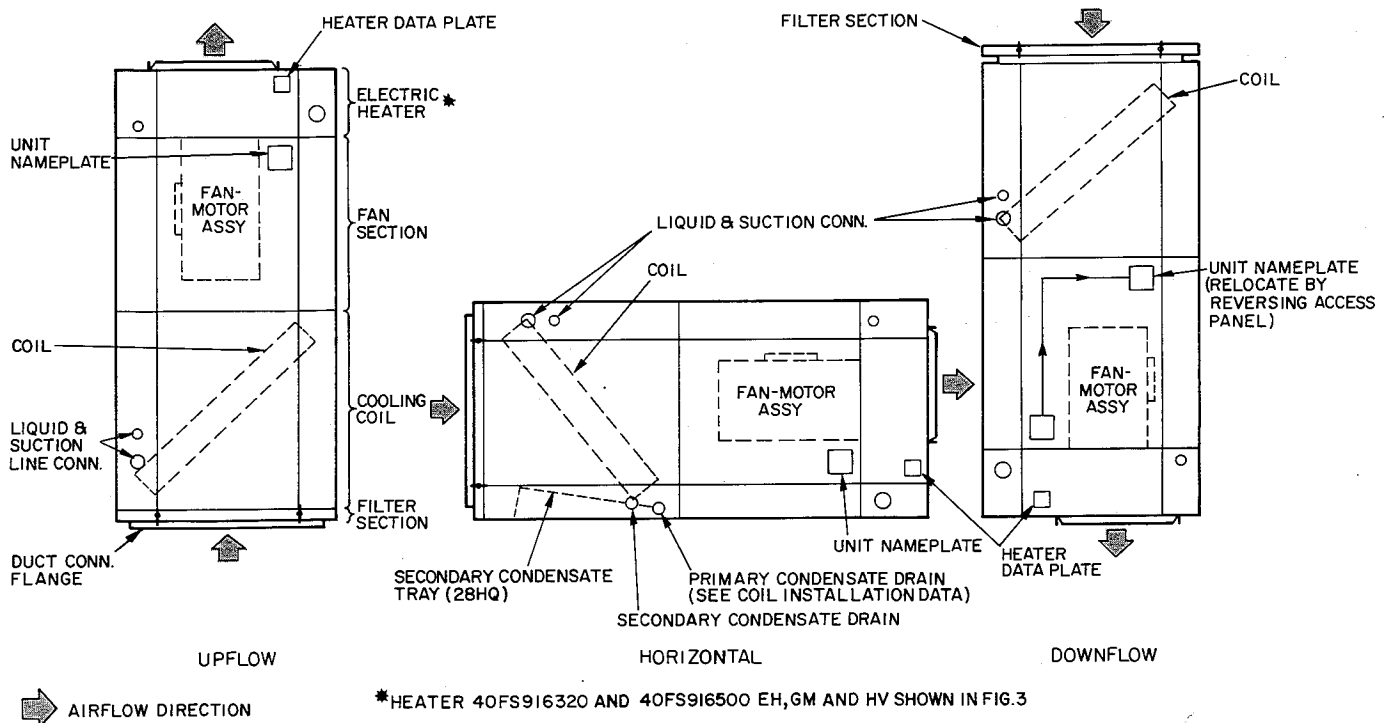


Fig. 4 — Cooling Unit Assembly



\*HEATER 40FS916320 AND 40FS916500 EH,GM AND HV SHOWN IN FIG.3

Fig. 5 — Heating and Cooling Unit Assembly

Place coil, in an upright position, on air inlet end (top) of fan section. Attach coil casing to fan section with no. 10 hex head sheet metal screws provided. Clearance holes for screws are provided on each side of fan section and engagement holes on sides of coil casing. (Drill engagement holes as required).

Set filter section on top of coil section with filter flanges overlapping coil flanges. Drill 1/8-in. holes thru coil and filter flanges and fasten together with sheet metal screws provided. Do not drill into filter support rack. See Fig. 6 and 8.

Remove fan section access panel. Turn access panel so Carrier nameplate is in upright position and replace panel on fan section.

The electric heater is equipped with heating controls and cooling system controls as described in Modular System Introduction. See Electrical Data and Wiring, page 9, for wiring details.

**Ductwork** — Air Ducts should be installed in accordance with the Standards of the National Fire Protection Association, NFPA numbers 90A and 90B in compliance with paragraph 46.1-E of the UL Standard 1096.

All 40FS units with accessory electric heaters are suitable for installation with 0-in. clearance from heater cabinet, discharge plenum and ductwork to combustible materials with the following exceptions: When using 40FS920300PA (30 kw),

all 38HQ and 40FQ models, 40FS916320 (11 to 20 kw) with 40FS200 fan section, and all 40FS916500 models, maintain a 1-in. clearance between discharge plenum and ductwork to combustible materials for a distance of 36-in. from unit. (0-in. clearance to heater cabinet still permissible.) Use a heater spacer plate, Carrier Model No. 40FS900310 to maintain 1-in. clearance.

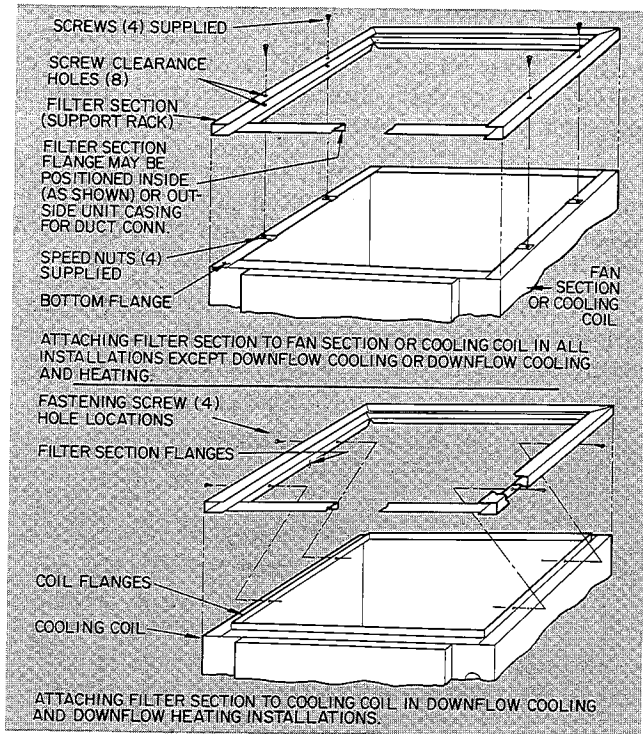


Fig. 6 — Attaching Filter Section

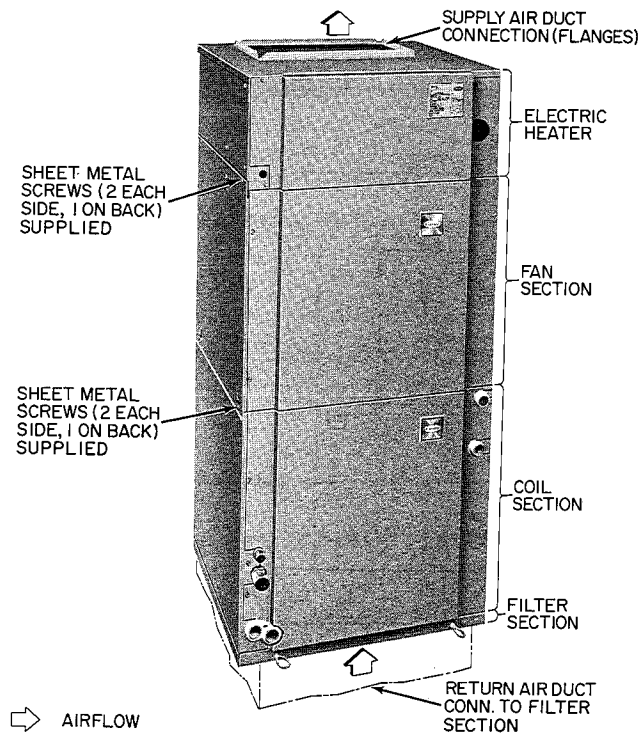


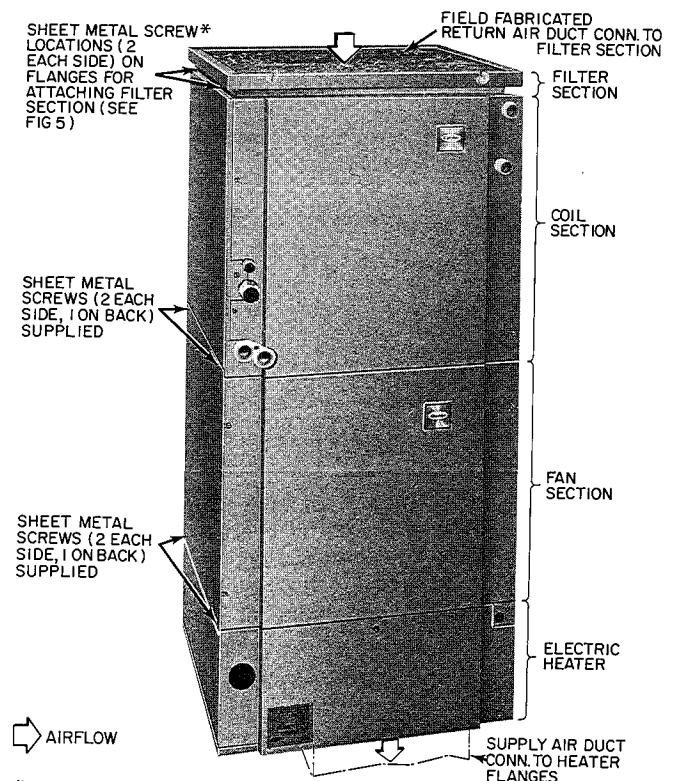
Fig. 7 — Upflow Heating and Cooling Unit Assembly

To maintain ductwork clearance on upflow installations when heater top is within 3 in. of combustible material, set heater spacer plate over heater discharge air opening. Attach ductwork to heater flanges, Fig. 9. To maintain ductwork clearance on downflow installations thru a floor: cut a 16-in. x 12-in. hole thru the floor. Set the spacer plate into the hole. Place unit into the installed spacer plate and connect discharge plenum to flanges provided on heater.

**Step 4 — Connect Ductwork to Unit Supply and Return Air Openings** — Duct connection flanges are provided on fan section when used with accessory flange deck, cooling coil, electric heater and filter section, Fig. 1 thru 8. Two instances may occur when duct connection flanges are not available for use: when cooling unit or cooling and heating unit is assembled for downflow cooling or downflow cooling and heating with filter section in place (Fig. 8), when filter section is installed on fan section or cooling coil with its duct connection flanges in alternate position inside of coil or fan casing. Field-fabricated duct connections are then required.

**CAUTION:** Do not screw ductwork directly to filter section. Screws will prevent removal of filter.

If necessary, refer to Carrier System Design Manual, Part 2, for system air duct design. It is recommended that flexible connectors be used between ductwork and unit to prevent transmission of vibration. (See Ductwork Acoustical



\*DRILL THRU FILTER SECTION FLANGES AND COOLING COIL FLANGES TO ATTACH FILTER SECTION. DO NOT SCREW DUCTWORK TO FILTER SECTION.

Fig. 8 — Downflow Heating and Cooling Unit Assembly

Treatment.) When electric heater is installed, use heat resistant material for flexible connector between ductwork and unit air discharge connection. Ductwork passing thru unconditioned space must be insulated and covered with vapor barrier. External ductwork must be insulated and weatherproofed.

**UPFLOW RETURN AIR CONNECTION THRU THE FLOOR** — Size floor opening large enough to accept flanges on filter section. Make duct flush with floor. Set unit on floor over opening with filter section flanges inserted thru floor into duct. Use fireproof resilient gasket 1/8 to 1/4-in. thick between duct, unit and floor. For downflow supply air connection thru the floor, proceed as above, except size floor opening large enough to accept flanges on unit air discharge connection. (See combustible material specifications.)

If a side inlet return air connection is required, use an accessory return air plenum.

**ACCESSORY RETURN AIR PLENUM** is available in 2 sizes for use in upflow installations where side return air inlet is required. A 21-in. wide model, 40FS900-141, is for use with 40FS160 assemblies, and a 24-1/2 in. wide model, 40FS900-191, is for use with 40FS200,220 assemblies and 40FS075 assemblies.

Set 40FS heating and/or cooling assembly in place on top of plenum. Cut opening in either side or back of plenum and make return air ductwork connection. Return air plenums and typical installation are shown in Fig. 10.

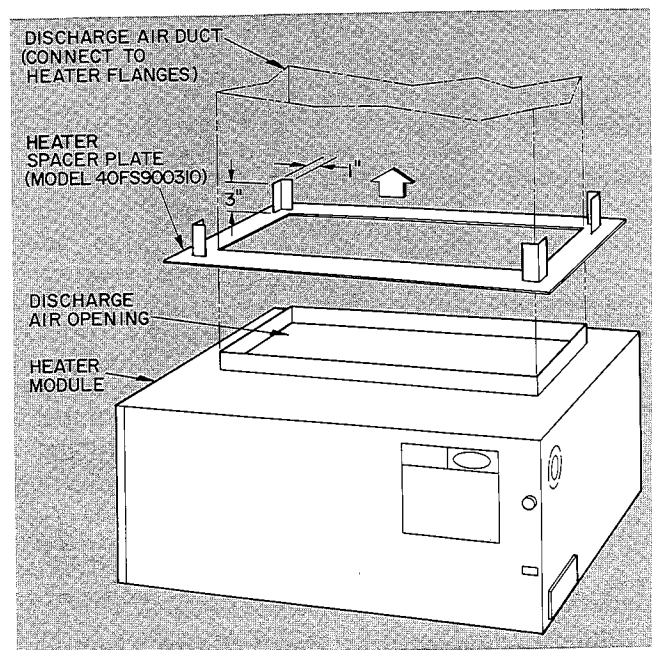
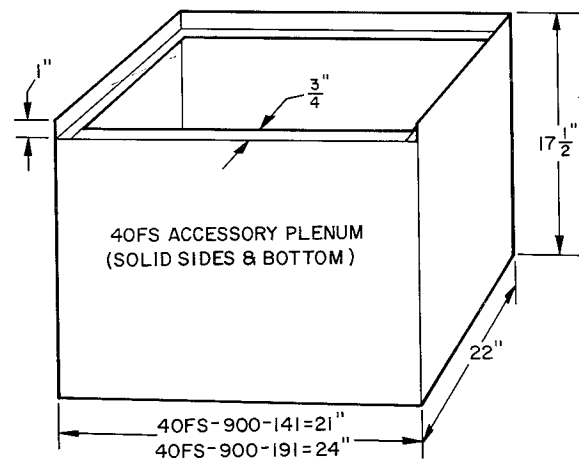
**Step 5 — Insulate Ductwork (Thermal and Acoustical)** — Insulate all ductwork passing thru unconditioned spaces such as hot attics and crawl spaces. Heat gain due to ductwork transmission can result in insufficient air supply temperatures at

duct outlets. Metal duct systems that do not have one 90° elbow and 10 ft of main duct to first branch takeoff require internal acoustical insulation lining per the following specifications:

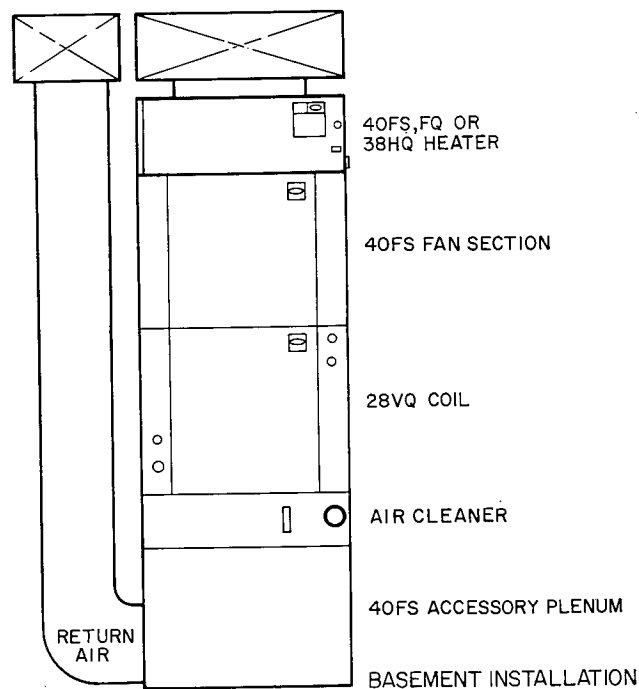
Line the inside of plenum, branch runs and main duct with acoustical insulation in accordance with the latest edition of SMACNA (Sheet Metal and Air Conditioning Contractors National Association) application standard for duct liner. Duct liners should be UL classified batts and blankets with a fire hazard classification marking of FHC-25/50 or less. Ensure main duct lining is extended 6 to 8 ft down the duct from plenum.

As an alternate to above, fibrous glass ductwork may be used if constructed and installed in accordance with the latest edition of SMACNA construction standard on fibrous glass duct.

Both acoustical lining and fibrous ductwork shall comply with National Fire Protection Association as tested by UL Standard 181 for Class I air ducts.



**Fig. 9 — Heater Spacer Plate**



**Fig. 10 — Accessory Return Air Plenum**

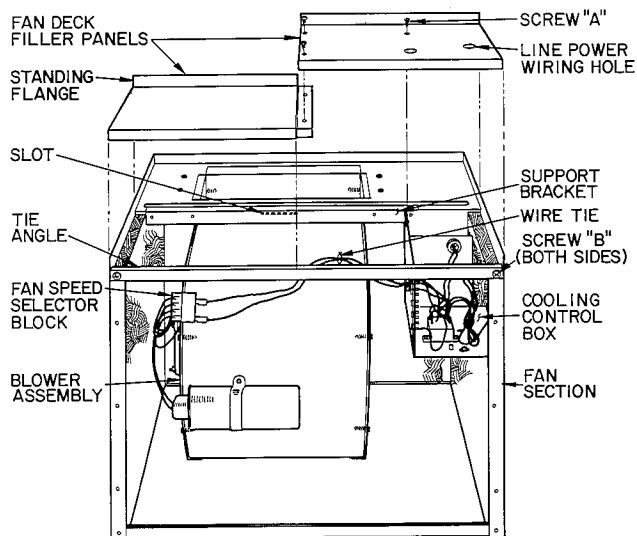


**Step 6 — Install Accessory Cooling Control Kit** on 208/230-volt cooling only applications. As indicated on page 3, kit is not required on units equipped with electric heater. Remove fan section access panel; unpack and install control kit as shown in Fig. 11 as follows:

1. Assemble left-hand and right-hand filler panels using screws provided. Holes in filler panels are provided to accommodate fan section width.
2. Cut supplied foam seal strip to fit filler panel standing flange. Apply seal strip to back of flange.
3. Secure cooling control box to right-hand filler panel using screws "A" provided.
4. Remove screws "B" securing tie angle to fan section. Remove tie angle; save screws.
5. Install filler panel/control box assembly on fan section as shown. Secure, reusing screws "B" plus screws provided (4 for top of panels to fan deck; 2 for filler-to-side panels).
6. Route relay wires from control box thru wire tie on fan assembly to fan speed selector block.

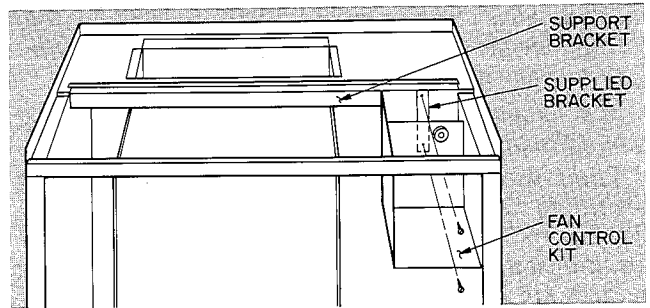
**WARNING:** Wires from heater must pass thru wire tie to prevent wires from rubbing on sharp edges.

7. To install control box cover (not shown), secure to hole in right-hand filler panel using screw provided.
8. Secure ductwork to fan section flanges (3) and filler panel standing flange. Review ductwork information discussed previously.
9. Install fan section access panel.



**Fig. 11 — Fan Section 40FS; Interior Details**

**Step 7 — Install Accessory Humidity Control Kit** (for 230-v, 28TQ application). See Fig. 12. Attach supplied bracket to rear of control box using hole closest to strain relief. Place control box in upper right-hand corner of 40FS fan section. Secure control box by fastening bracket supplied to support bracket of fan section.



**Fig. 12 — Humidity Control Kit Installation (28TQ Applications Only)**

## ELECTRICAL DATA AND WIRING

Field wiring must comply with local and national fire, safety and electrical codes. Voltage to unit must be within  $\pm 10\%$  of voltage indicated on nameplate (voltage range at which the units will operate satisfactorily for limited periods of time). Contact local power company for correction of improper line voltage.

Operation of unit on improper line voltage constitutes abuse and is not covered by Carrier Warranty.

See Tables 4 and 5 for recommended wire and fuse sizes.

**Step 8 — Install a Branch Circuit Disconnect Switch(es) per NEC.** One disconnect switch is required on all unit assemblies except those which include 40FS916320 (11- to 20-kw) electric heaters. Standard assemblies using these heaters require 2 disconnect switches for 2 line power circuits. If one line power circuit, using one disconnect, is required, attach an accessory line power connection conversion lug set (Lug Adapter Kit — Part No. 40FS900271) to fuse terminals in electric heater. Installation may be aided by first attaching adapter lugs to wire then positioning lugs to fuse block. See Fig. 13C.

Locate disconnect(s) within sight from and readily accessible from the unit, per section 440-14 of National Electrical Code (NEC).

**Step 9 — Route Line Power Leads Into Unit —** Extend leads from disconnect per NEC thru hole provided (Fig. 1) into cooling control kit or accessory electric heater. (Cooling control kit not required when heater is used.)

**Step 10 — Connect Ground Lead(s) to the Ground Screw in Cooling Control Kit or Grounding Lug in Electric Heater Control Section** for safety. Connect power wiring, Fig. 13. Splice power leads to pigtails in cooling control kit or connect leads to fuse terminals or terminal board on electric heater.

When using control kit, splice a power lead to black transformer pigtail on 230-volt units or red transformer pigtail on 208-volt units. Cap unused transformer pigtail.

When using an electric heater on 230-volts, connect the red transformer pigtail to heater line voltage terminal. When using heater on 208-volts,

connect blue transformer pigtail to heater line voltage terminal. See heater label wiring diagram. Cap unused transformer pigtail.

For splice connections or capping pigtails, use wire nuts provided. Tape each connection.

Three-speed fan motor on all units (except Model 40FS075) may be connected for high, medium or low fan speeds as described below. Refer to Table 7 for minimum allowable fan speeds when electric heaters are used.

**Step 11 — Set Fan Motor Speed(s)** — High, medium or low fan speed leads are provided on motor for choice of fan speeds. Motor leads are factory connected to fan speed selector block located on fan housing (Fig. 11 and 13). Selector block terminal 1 is high fan speed, terminal 2 is medium fan speed and terminal 3 is low fan speed. Model 40FS075 utilizes terminals 1 and 2 only.

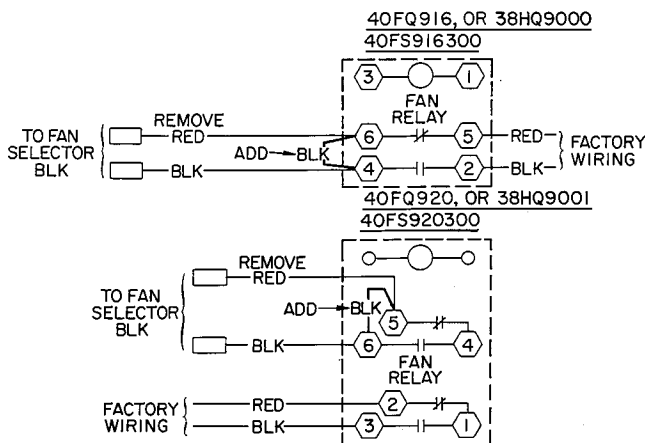
Line power leads are supplied with cooling control kit and electric heater for connection to fan speed selector block as directed in Fig. 13.

Route yellow and black power leads which extend thru hole in back of cooling control kit to selector block. Route yellow and black or yellow, black and red power leads from electric heater thru power openings (Fig. 15) in bottom of heater casing and fan section deck to selector block.

One fan speed may be selected for cooling only unit assembly, heating only or cooling and heating unit assembly when 40FS916320 or 40FS916500 heater is used.

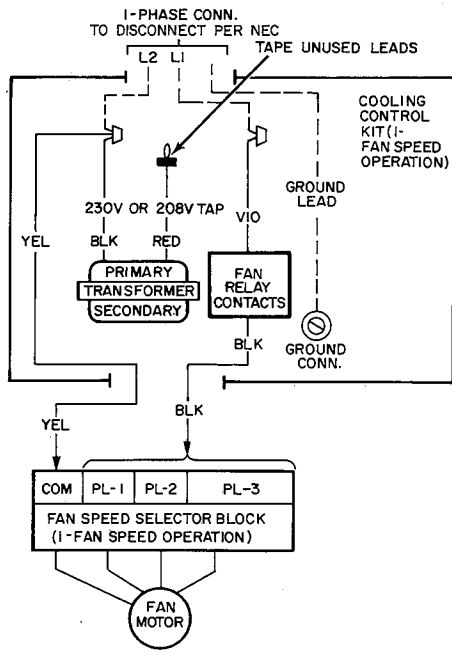
Two fan speeds may be selected for remaining combined cooling and heating assemblies; a heating speed and a cooling speed. (See Table 7 for Minimum Fan Speeds on heating application.) For single fan speed operation on these heating only or

heating and cooling assemblies, remove red lead from heater fan relay terminal 5 or 6. Connect a black jumper (supplied) between fan relay terminal 6 and fan relay terminal 4 (40FS, FQ916, or 38HQ9000 heaters) or terminal 5 (40FS, FQ920, or 38HQ9001 heaters). Connect black heater lead to fan speed selector block for speed required. See unit label diagram for details.

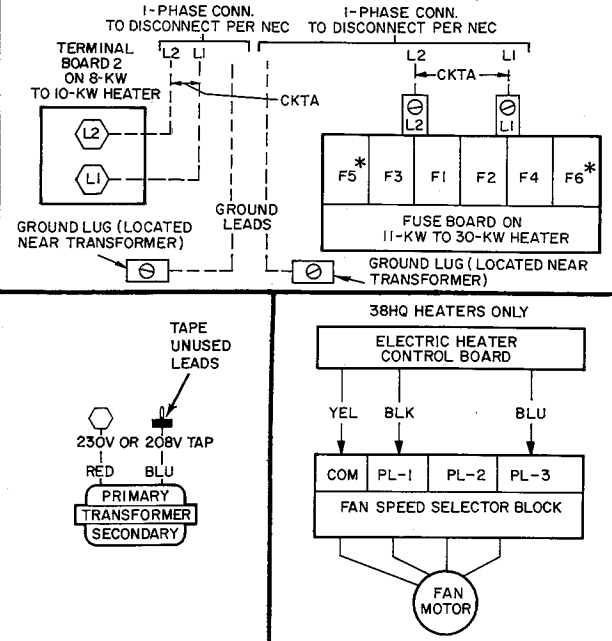


**Step 12 — Connect Control Power Wiring (24-volt)** with Cooling Control Kit or Electric Heater — Use 40- or 60-va transformer supplied as part of cooling control kit or electric heater controls as 24-volt supply for system. A one-transformer control wiring hookup is recommended for ease of installation. When outdoor unit transformer is used together with control kit (or heater) transformer, a phasing problem may result. If both transformers are used, also use a thermostat with isolating contacts to prevent interconnection of class 2 (24-v) outputs.

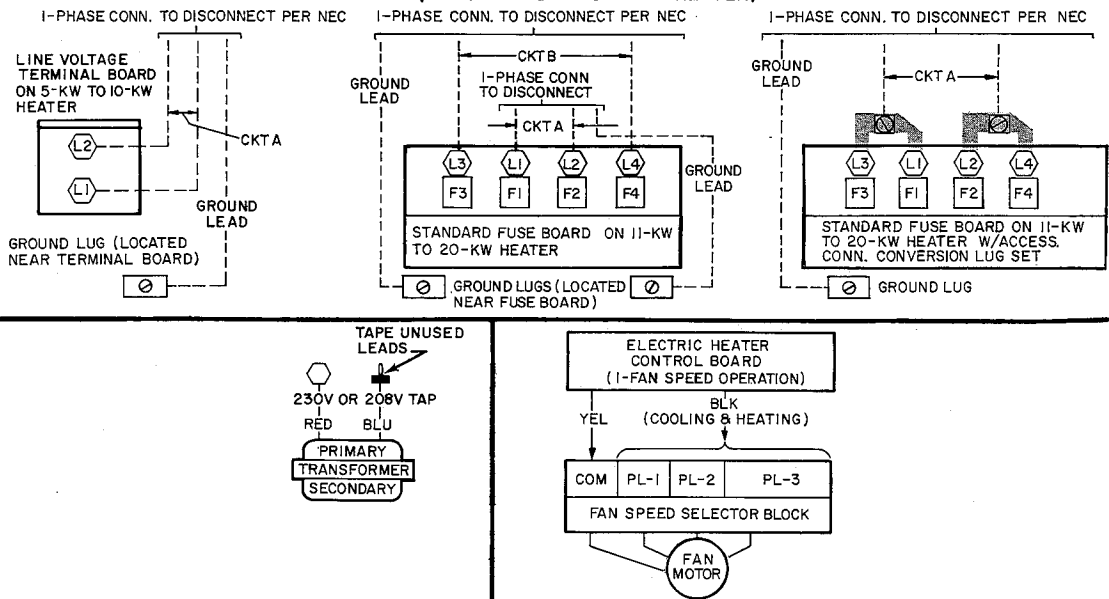
**A. COOLING ONLY UNITS**



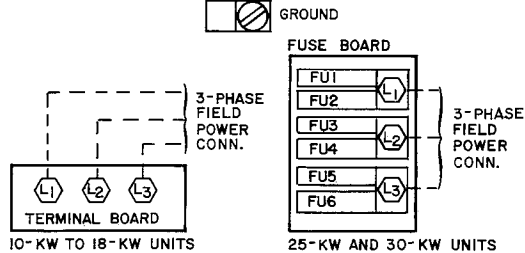
**B. HEATING ONLY OR HEATING AND COOLING UNITS (WITH ALL HEATER MODELS EXCEPT 40FS916320, 40FS916500 AND CIRCUIT BREAKER VERSIONS OF ALL 40FQ)**



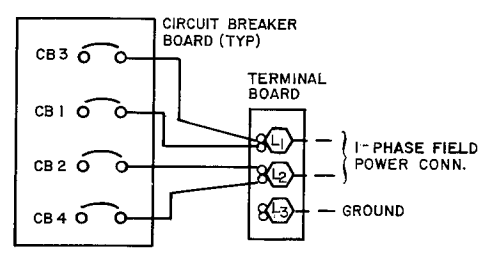
**C. HEATING ONLY OR HEATING AND COOLING UNITS (WITH MODEL 40FS916320 HEATER)**



**D. HEATING ONLY OR HEATING AND COOLING UNITS (WITH MODEL 40FS916500 HEATERS)**



**E. HEATING ONLY OR HEATING AND COOLING UNITS (UNITS 40FQ WITH CIRCUIT BREAKERS)**



SELECTOR BLOCK TERMINATIONS	
COM - COMMON	PL-2 - MED
PL-1 - HIGH	PL-3 - LOW†

- Line Voltage Connection
- Splice Connection
- Field Wiring
- Factory Wiring
- Accessory connection conversion lug set. See text for power wiring.

- \*Fuses 5 and 6 only on heater models over 20 kw.  
†PL-3 not used on Model 40FS075.
- NOTES:
1. Branch circuit wiring data as shown in Table 4.
  2. Tape or cap all unused wire leads.
  3. For 1 fan speed operation, see text for power wiring.

**Fig. 13 — Line Power Connections**

**Table 4 — Heater Electrical Data and Usage**

FAN SECTION	ELECTRIC RESISTANCE HEATER (208/240 V)																
	Heater Model	Kw		No. Ckts	Branch Circuit												
		240 V	208 V		Htr Amps		Min Wire Size (AWG)		Max Ft Wire		Min Gnd Wire Size		Fuse/CB Amps				
					240 V	208 V	240 V	208 V	240 V	208 V	240 V	208 V	240 V	208 V			
40FS075 → 40FS120	40FS920300 (1-Ph)	EH	10.0	7.5	1	A	39.6	34.4	4	6	80	50	10	10	60**	60**	
		DL	8.0	6.0	1	A	33.3	28.9	6	8	60	40	10	10	50**	40**	
40FS160	40FS916300 (1-Ph)	DX	9.0	6.8	1	A	37.5	32.5	6	6	55	55	10	10	60**	45**	
		EH	10.0	7.5	1	A	41.6	36.1	4	6	80	50	10	10	60**	50**	
		ET	11.0	8.3	1	A	45.8	39.7	4	6	75	45	8	10	70	60	
		FE	12.0	9.0	1	A	50.0	43.4	4	4	70	65	8	10	70	60	
		FQ	13.0	9.8	1	A	54.2	47.0	2	4	100	65	8	8	80	70	
		GB	14.0	10.5	1	A	58.3	50.5	2	4	75	60	8	8	80	70	
		GM	15.0	11.3	1	A	62.5	54.2	2	2	85	70	8	8	90	80	
		JR	20.0	15.0	1	A	83.3	72.2	2†	2	65	65	6	8	110	100	
		LW	25.0	18.8	1	A	104.2	90.3	0†	1†	80	65	6	6	150	125	
		40FQ916 (1-Ph)	010	8.0	6.0	1	A	33.3	28.9	6†	6†	60	60	10	10	50**	40**
	060*								6†	8†	60	40					
	020		10.0	7.5	1	A	41.6	36.1	4†	6†	80	50	10	10	60**	50**	
	070*								6†	6†	50	50					
	030		15.0	11.3	1	A	62.5	54.2	2†	2†	85	70	8	8	90	80	
	080*								4†	4†	55	55					
	040		20.0	15.0	1	A	83.3	72.2	1†	2†	85	65	6	8	110	100	
	090*								2†	2†	65	65					
	050		25.0	18.8	1	A	104.2	90.3	00†	0†	100	85	6	6	150	125	
	100*								0†	1†	80	65					
	38HQ9000 (1-Ph)	61	8.0	6.0	1	A	33.3	28.9	6†	6†	60	60	10	10	50**	40**	
									6†	8†	60	40					
		71	10.0	7.5	1	A	41.6	36.1	4†	6†	80	50	10	10	60**	50**	
									6†	6†	50	50					
	81	15.0	11.3	1	A	62.5	54.2	2†	2†	85	70	8	8	90	80		
								4†	4†	55	55						
	91	20.0	15.0	1	A	83.3	72.2	1†	2†	85	65	6	8	110	100		
								2†	2†	65	65						
	40FS200 or 40FS220	40FS920300 (1-Ph)	EH	10.0	7.5	1	A	39.6	34.4	4	6	80	50	10	10	60**	60**
			ET	11.0	8.3	1	A	43.6	37.8	4	6	75	45	8	10	70	60
			FE	12.0	9.0	1	A	47.6	39.4	4	4	65	70	8	10	70	70
			FQ	13.0	9.8	1	A	51.6	44.8	2	4	100	60	8	8	80	70
			GB	14.0	10.5	1	A	55.5	48.0	2	4	90	55	8	8	80	70
GM			15.0	11.3	1	A	59.5	51.6	2	2	85	85	8	8	90	80	
JR			20.0	15.0	1	A	79.3	68.8	1†	2	85	70	6	8	110	100	
LW			25.0	18.8	1	A	99.2	86.0	0†	1†	85	70	6	6	150	125	
PA		30.0	22.5	1	A	119.0	103.2	00†	0†	90	70	6	6	175	150		
40FQ920 (1-Ph)		060	10.0	7.5	1	A	39.6	34.4	4†	6†	80	50	10	10	60**	60**	
		120*							6†	6†	50	50					
		070	15.0	11.3	1	A	59.5	51.6	2†	2†	90	90	8	8	90	80	
		130*							4†	4†	55	55					
		080	20.0	15.0	1	A	79.3	68.8	1†	1†	85	85	6	8	110	100	
	140*							2†	2†	70	70						
	090	25.0	18.8	1	A	99.2	86.0	00†	0†	105	85	6	6	150	125		
	150*							0†	1†	85	70						
100	30.0	22.5	1	A	119.0	103.2	000†	00†	110	90	6	6	175	150			
160*							00†	0†	90	70							
38HQ9001 (1-Ph)	01	10.0	7.5	1	A	39.6	34.4	4†	6†	80	50	10	10	60**	60**		
								6†	6†	50	50						
	11	15.0	11.3	1	A	59.5	51.6	2†	2†	90	90	8	8	90	80		
								4†	4†	55	55						
21	20.0	15.0	1	A	79.3	68.8	1†	1†	85	85	6	8	110	100			
							2†	2†	70	70							
31	25.0	18.8	1	A	99.2	86.0	00†	0†	105	85	6	6	150	125			
							0†	1†	85	70							

**Table 4 — Heater Electrical Data and Usage (cont)**

FAN SECTION	ELECTRIC RESISTANCE HEATER (208/240 V)															
	Heater Model	Kw		No. Ckts	Branch Circuit											
					Htr Amps		Min Wire Size (AWG)		Max Ft Wire		Min Gnd Wire Size		Fuse/CB Amps			
		240 V	208 V		240 V	208 V	240 V	208 V	240 V	208 V	240 V	208 V	240 V	208 V		
40FS160, 40FS200 or 40FS220	40FS916320 (1-Ph)	CD	5.0	3.75	1	A	20.8	18.0	8	10	60	45	10	10	35	30
		CP	6.0	4.5	1	A	25.0	21.6	8	8	50	60	10	10	40	35
		DA	7.0	5.25	1	A	29.2	25.2	6	8	70	50	10	10	45	40
		DF	7.5	5.63	1	A	31.3	27.0	6	8	65	50	10	10	45	40
		DL	8.0	6.0	1	A	33.3	28.9	6	6	65	70	10	10	50	45
		DX	9.0	6.75	1	A	37.5	32.5	6	6	55	65	10	10	60	50
		EH	10.0	7.5	1	A	41.6	36.1	4	6	80	60	10	10	60	60
		ET††	11.0	8.25	1	A	45.8	39.7	4	6	75	55	8	10	70	60
					2	A	25.0	21.6	8	8	50	60	10	10	40	35
		FE††	12.0	9.0	1	A	50.0	43.4	4	4	70	80	8	10	70	60
					2	A	29.2	25.2	6	8	70	50	10	10	45	40
		FQ††	13.0	9.75	1	A	54.2	47.0	2	4	100	70	8	8	80	70
					2	A	33.3	28.9	6	6	60	70	10	10	50	45
		GB††	14.0	10.5	1	A	58.3	50.5	2	4	100	70	8	8	80	70
					2	A	37.5	32.5	6	6	55	65	10	10	60	50
		GM††	15.0	11.25	1	A	62.5	54.2	2	2	90	100	8	8	90	80
					2	A	41.6	36.1	4	6	80	60	10	10	60	60
		GY††	16.0	12.0	1	A	66.7	57.7	2	2	80	90	8	8	90	80
					2	A	33.3	28.9	6	6	60	70	10	10	50	45
		HJ††	17.0	12.75	1	A	70.8	61.3	2	2	80	90	8	8	100	90
					2	A	35.4	30.6	6	6	60	65	10	10	50	45
		HV††	18.0	13.5	1	A	75.0	64.9	1	2	90	85	8	8	100	90
					2	A	37.5	32.5	6	6	55	65	10	10	60	50
		JF††	19.0	14.25	1	A	79.2	68.5	2†	2	70	80	6	8	110	100
					2	A	39.6	34.3	6	6	55	60	10	10	60	50
		JR††	20.0	15.0	1	A	83.3	72.2	2†	1	65	95	6	8	110	100
					2	A	41.6	36.1	4	6	80	60	10	10	60	60
		40FS916500 (3-Ph)		EH	10.0	7.5	1		24.0	20.8	8†	8†	70	60	10	10
GM	15.0			11.3	1		36.0	31.3	6†	8†	65	40	10	10	60	45
HV	18.0			13.5	1		43.3	37.5	6†	6†	55	55	10	10	60	60
LW	25.0			18.8	1		60.2	52.2	4	4	65	65	8	8	90	80
PA	30.0			22.5	1		72.2	62.5	2	4	90	55	8	8	100	90

Two-stage electric heaters. Remaining heaters are single-stage. See Fig. 15.

CB — Circuit Breaker

\*Circuit breaker models. All remaining models over 10 kw are internally fused.

†Copper wire sizes based on 75C; all other copper wire sizes based on 60C. Use copper wire only.

‡Copper wire rated at 75C and no larger than 00 size must be used.

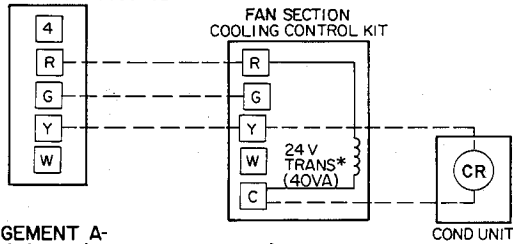
\*\*Use fuses only on 40FS916300 DL, DX, EH, 40FQ916010,020, 40FQ920060 and 40FS920300 EH units.

††Standard heater models that require 2 line power circuits. Add accessory conversion lug set for single power circuit operation.

**NOTES:**

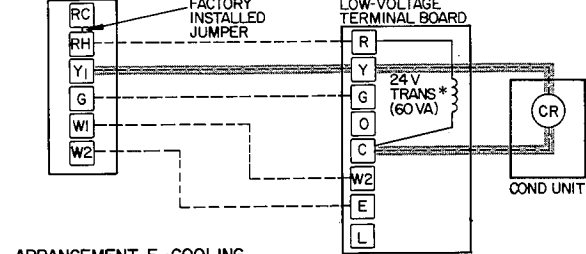
1. Heater models 40FQ916, 40FQ920 and 40FS916320 equipped with 60-volt control circuit transformer. Remaining heater models have 40-volt transformer.
2. Field-selected wire sizes must not create a voltage drop between power source and unit in excess of 2% of unit rated voltage.

THERMOSTAT HH01AD040 OR 042 WITH HH93AZ040 OR 042 SUBBASE



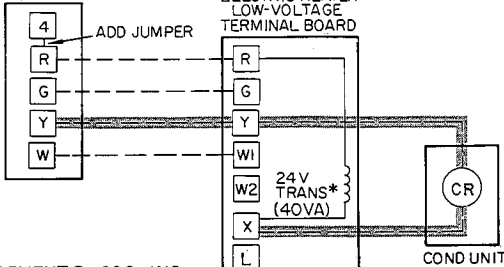
ARRANGEMENT A - COOLING ONLY. (SEE NOTE 1 BELOW)

THERMOSTAT HH07AT070 WITH HH93AZ080 SUBBASE



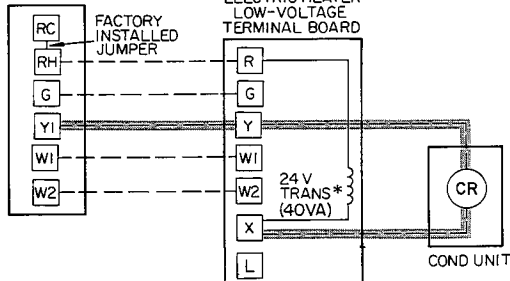
ARRANGEMENT E - COOLING AND 2-STAGE HEATING - 11KW TO 20 KW, 40FS916320 HEATERS. (SEE NOTE 1 BELOW)

THERMOSTAT HH01AD040 OR 042 WITH HH93AZ040 OR 042 SUBBASE



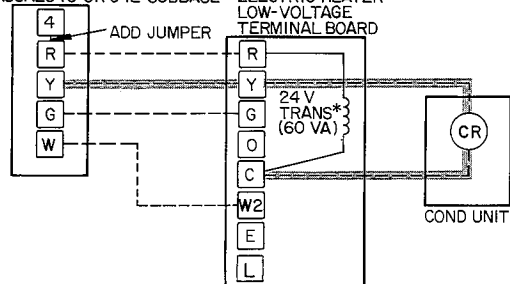
ARRANGEMENT B - COOLING AND 1-STAGE HEATING WITH, 8-KW TO 15-KW, 40FS916300 OR 40FS920300 HEATER. (SEE NOTE 1 BELOW)

THERMOSTAT HH07AT070 SUBBASE HH93AZ080



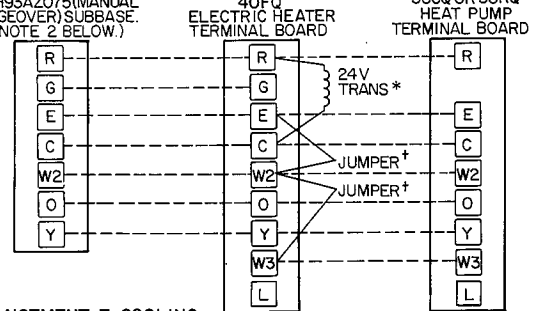
ARRANGEMENT C - COOLING AND 2-STAGE HEATING WITH, 20-KW TO 30-KW, 40FS916300 OR 40FS920300 HEATER. (SEE NOTE 1 BELOW)

THERMOSTAT HH01AD040 OR 042 WITH HH93AZ040 OR 042 SUBBASE



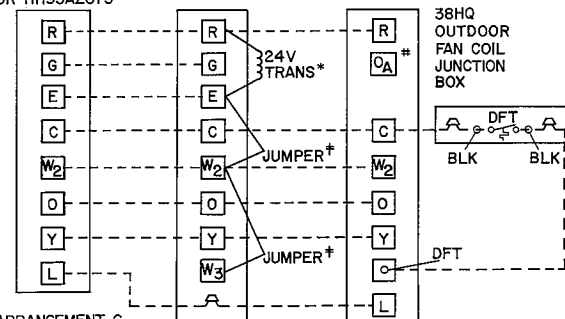
ARRANGEMENT D - COOLING AND 1-STAGE HEATING - 5 KW TO 10 KW, 40FS916320 HEATERS. (SEE NOTE 1 BELOW)

THERMOSTAT HH07AT071 WITH HH93AZ073 (AUTO. CHANGEOVER) OR HH93AZ075 (MANUAL CHANGEOVER) SUBBASE. (SEE NOTE 2 BELOW.)



ARRANGEMENT F - COOLING AND 2-STAGE HEATING - 38CQ HEAT PUMP AND 40FQ HEATER (ALL); SUPPLEMENTAL HEAT, NO OUTDOOR THERMOSTATS. (SEE NOTE 1 BELOW) REFER TO 38CQ OR 38RQ HEAT PUMP INSTALLATION INSTRUCTIONS IF OUTDOOR THERMOSTATS ARE USED.

THERMOSTAT SUBBASE HH93AZ073 OR HH93AZ075



ARRANGEMENT G - COOLING AND TWO-STAGE HEATING (38HQ WITH 40AQ OR 40FS/28HQ,VQ EQUIPPED WITH ELECTRIC HEATER, SUPPLEMENTAL HEAT, NO OUTDOOR THERMOSTATS) REFER TO 38HQ HEAT PUMP INSTALLATION INSTRUCTIONS IF OUTDOOR THERMOSTATS ARE USED.

†Remove jumpers from 40FQ heater terminal board to wire with outdoor thermostat(s).

‡Remove factory-installed jumpers (connection B) when installing outdoor thermostats (ODT).

NOTES:

- For simplicity, arrangement identifications below diagrams do not call out fan section/coil model numbers. See Modular System Introduction and Tables 2, 3 and 4 for fan section/coil/heater models and usage.
- Thermostat/subbase package numbers: 38CQ900081 for HH07AT071/HH93AZ073 (auto. changeover); 38CQ900111 for HH07AT071/HH93AZ075 (manual changeover).
- See Carrier price pages for other approved thermostats.

Eliminate shaded wiring connections for heating only applications.

- CR — Control Relay
- ODT — Outdoor Thermostat
- SHR — Supplemental Heat Relay
- — — Factory Wiring
- - - - Field Wiring

\*A 40-va transformer is located in cooling control kit and 40FS916300,920300 electric heaters. All 40FS916320,330,500 and 40FQ916,920 electric heaters have a 60-va transformer that is internally fused. All 38HQ heaters have a 75-va transformer that is internally fused. Do not short secondary terminals.

Fig. 14 — Control Wiring Connections

→ Table 5 — Fan Section Electrical Data

FAN SECTION					
Model 40FS	Volts (1-ph)	FLA	Branch Circuit		
			Wire Size* (AWG)	Max Ft Wire	Fuse Amps
075	208/230	0.9	14	399	15
120		1.5	14	240	15
160		3.5	14	103	15
200		4.5	14	80	15
220		6.9	14	52	15

FLA — Full Load Amps

\*Copper wire sizes based on 60C. Use copper wire only.

NOTES: 1. See Table 4 for units equipped with electric heaters.

2. When 40FS unit is equipped with electric heater, fan motor line power is supplied from electric heater line power circuit.

Table 6 — Thermostat Anticipator Settings

HEATER MODEL		KW				ANTICIPATOR SETTING			
		1st Stage		2nd Stage		1st Stage		2nd Stage	
		240 V	208 V	240 V	208 V	240 V	208 V	240 V	208 V
40FS916300	DL	8.0	6.0	—	—	.16	.14	—	—
	DX	9.0	6.8	—	—	.16	.14	—	—
	EH	10.0	7.5	—	—	.16	.14	—	—
	ET	11.0	8.3	—	—	.16	.14	—	—
	FE	12.0	9.0	—	—	.16	.14	—	—
	FQ	13.0	9.8	—	—	.16	.14	—	—
	GB	14.0	10.5	—	—	.16	.14	—	—
	GM	15.0	11.3	—	—	.16	.14	—	—
	JR	10.0	7.5	10.0	7.5	.16	.14	.16	.14
	LW	15.0	11.3	10.0	7.5	.16	.14	.16	.14
40FQ916	010 060	8.0	6.0	—	—	.16	.16	—	—
	020 070	10.0	7.5	—	—	.16	.16	—	—
	030 080	10.0	7.5	5.0	3.75	.16	.16	.16	.16
	040* 090*	10.0	7.5	10.0	7.5	.16*	.16*	.16*	.16*
	050* 100*	15.0	11.3	10.0	7.5	.16*	.16*	.16*	.16*
38HQ9000	61	8.0	6.0	—	—	.16	.16	—	—
	71	10.0	7.5	—	—	.16	.16	—	—
	81	10.0	7.5	5.0	3.75	.16	.16	.16	.16
	91	10.0	7.5	10.0	7.5	.16*	.16*	.16*	.16*
40FS920300	EH	10.0	7.5	—	—	.16	.14	—	—
	ET	11.0	8.3	—	—	.16	.14	—	—
	FE	12.0	9.0	—	—	.16	.14	—	—
	FQ	13.0	9.8	—	—	.16	.14	—	—
	GB	14.0	10.5	—	—	.16	.14	—	—
	GM	15.0	11.3	—	—	.16	.14	—	—
	JR	10.0	7.5	10.0	7.5	.16	.14	.16	.14
	LW	15.0	11.3	10.0	7.5	.16	.14	.16	.14
40FQ920	060 120	10.0	7.5	—	—	.16	.16	—	—
	070 130	10.0	7.5	5.0	3.75	.16	.16	.16	.16
	080 140	10.0	7.5	10.0	7.5	.16	.16	.16	.16
	090* 150*	15.0	11.3	10.0	7.5	.16*	.16*	.16*	.16*
	100* 160*	20.0	15.0	10.0	7.5	.32*	.32*	.16*	.16*
	01	10.0	7.5	—	—	.16	.16	—	—
38HQ9001	11	10.0	7.5	5.0	3.75	.16	.16	.16	.16
	21	10.0	7.5	10.0	7.5	.16	.16	.16	.16
	31	15.0	11.3	10.0	7.5	.16	.16	.16*	.16*

**Table 6 — Thermostat Anticipator Settings (cont)**

HEATER MODEL		KW				ANTICIPATOR SETTING			
		1st Stage		2nd Stage		1st Stage		2nd Stage	
		240 V	208 V	240 V	208 V	240 V	208 V	240 V	208 V
40FS916320	CD	5.0	3.75	—	—	.25	.25	—	—
	CP	6.0	4.5	—	—	.25	.25	—	—
	DA	7.0	5.25	—	—	.25	.25	—	—
	DF	7.5	5.63	—	—	.25	.25	—	—
	DL	8.0	6.0	—	—	.25	.25	—	—
	DX	9.0	6.75	—	—	.25	.25	—	—
	EH	10.0	7.5	—	—	.25	.25	—	—
	ET*	6.0	4.5	5.0	3.75	.25*	.25*	.25*	.25*
	FE*	7.0	5.25	5.0	3.75	.25*	.25*	.25*	.25*
	FQ*	8.0	6.0	5.0	3.75	.25*	.25*	.25*	.25*
	GB*	9.0	6.75	5.0	3.75	.25*	.25*	.25*	.25*
	GM*	10.0	7.5	5.0	3.75	.25*	.25*	.25*	.25*
	GY*	8.0	6.0	8.0	6.0	.25*	.25*	.25*	.25*
	HJ*	8.5	6.38	8.5	6.38	.25*	.25*	.25*	.25*
HV*	9.0	6.75	9.0	3.75	.25*	.25*	.25*	.25*	
JF*	9.5	7.13	9.5	7.13	.25*	.25*	.25*	.25*	
JR*	10.0	7.5	10.0	7.5	.25*	.25*	.25*	.25*	
40FS916500	EH	10.0	7.5	—	—	.23	.23	—	—
	GM	15.0	11.3	—	—	.23	.23	—	—
	HV	18.0	13.5	—	—	.23	.23	—	—
	LW	12.5	9.4	12.5	9.4	.23	.23	.23	.23
	PA	15.0	11.25	15.0	11.25	.23	.23	.23	.23

\*Heaters that may be wired for 1- or 2-stage operation. When wired for 1-stage operation, add first and second stage anticipator settings.

**Table 7 — Minimum Fan Speeds\***

FAN SECTION	HEATER			MIN FAN SPEED	MIN CFM
	Model	Kw			
		240 V	208 V		
→ 40FS075 40FS120	40FS920300	10.0	7.5	Low	650
40FS160	40FS916300	8 to 15	6.0 to 11.3	Low	1200
		20 and 25	15 and 18.8	Medium	1350
	40FS916320	5 to 10	3.75 to 7.5	Low	950
		11 to 20	8.75 to 15.0	Medium	950
	40FS916500	10 to 18	7.5 to 13.5	Medium	1000
		25 and 30	18.8 and 22.5	High	1400
	40FQ916 or 38HQ90000	8 and 10	6 and 7.5	Low	1130
		15 to 25	11.3 to 18.8	Low	1130

FAN SECTION	HEATER			MIN FAN SPEED	MIN CFM
	Model	Kw			
		240 V	208 V		
40FS200 or 40FS220	40FS920300	10 to 20	7.5 to 15	Low	1600
		25 and 30	18.8 and 22.5	Medium	1800
	40FS916320	5 to 10	3.75 to 7.5	Low	1200
		11 to 20	8.25 to 15.0	Medium	1200
	40FS916500	10 to 18	7.5 to 13.5	Medium	1000
		25 and 30	18.8 and 22.5	High	1400
	40FQ920 or 38HQ90001 (w/40FS200)	10 to 30	7.5 to 22.5	Medium	1550†
	40FQ920 (w/40FS220)	10 to 30	7.5 to 22.5	Low	1550

†Minimum cfm is 1960 (High Speed) when 40FS200/40FQ920 is used with 38RQ054.

\*Minimum fan speed and cfm for safe electric heater operation.

**START-UP**

Adjust room thermostat as follows:

1. When electric heater is used, set thermostat anticipator settings according to Table 6. These settings may be changed slightly to provide a greater degree of comfort for a particular installation.
2. Set thermostat selector switch at OFF.
3. Set thermostat fan switch at AUTO. or FAN.

4. Turn on main disconnect switch(es) to unit.
5. Set thermostat dial to the desired temperature (above or below room temperature).
6. Set selector switch at HEAT or COOL.
7. If necessary, adjust the system airflow (cfm) by changing fan motor speed. See Electrical Data and Wiring for fan speed adjustment. Refer to Table 7 for minimum allowable fan speed when electric heaters are used.



## FAN SECTION SERVICE

Disconnect power to all circuits before servicing unit.

Remove unit front access panels for cleaning, lubrication or parts replacement (Fig. 15).

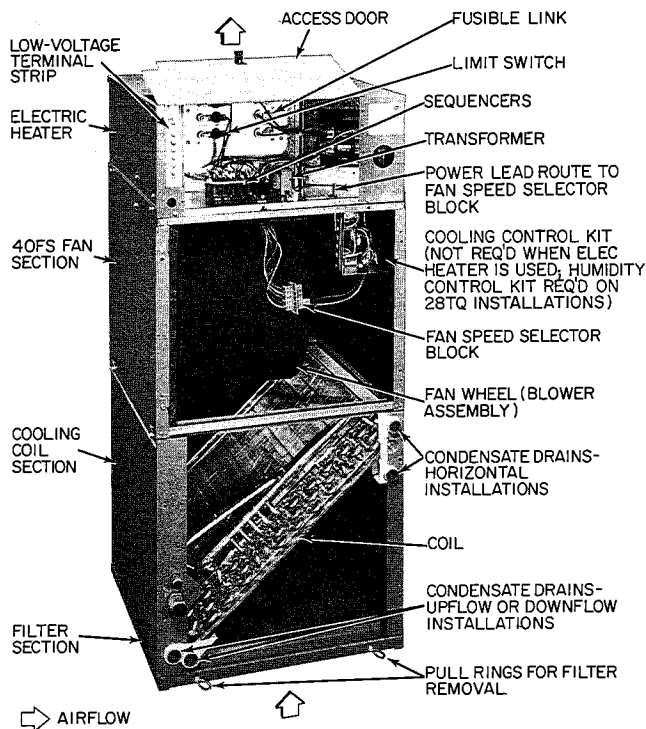


Fig. 15 — Upflow Heating and Cooling Unit Interior Details (Typical)

### Fan Motors

**LUBRICATION** — Where oil holes are provided, remove oil plugs and add 8 drops of SAE 20 nondetergent oil at start of every cooling season. Replace oil plugs. When motor is removed, reinstall so that oil holes are at least 45 degrees above horizontal. Motors without oil holes are factory lubricated for life of motor.

### BLOWER ASSEMBLY REMOVAL (Fig. 11)

**CAUTION:** Blower assembly is heavy and may fall free when disengaged from its mounting. Support the assembly to avoid injury or damage.

1. Shut off unit power.
2. Remove fan section access panel.
3. Disconnect motor wires at fan speed selector block.
4. Where applicable, disconnect wires from cooling control box and remove control box.
5. Remove tie angle screws and tie angle (these screws secure front corners of filler panels to fan section side panels as shown in Fig. 11). Remove screws to allow filler panels to be raised slightly.
6. Grasp blower assembly firmly — left hand on motor, right hand on scroll right side inlet.
7. Pull blower assembly forward. Rotate assembly so that rear drops slightly, allowing assembly to pass thru front of unit.
8. Reassembly is the reverse of the above procedure. Note that when reassembling, rear flange of blower outlet sits on top of fan deck, tab on forward edge of outlet engages slot in front of fan deck.

**Cleaning** — Remove caked-on dirt from fan wheel and housing with brush; remove grease with mild solvent. When replacing blower assembly, ensure fan wheel is centered in housing.

**Return Air Filter** — Pull rings (Fig. 1) are provided for removing 1-in. permanent filters. Inspect filter frequently. Clean filter with a vacuum cleaner or wash with mild soap and water solution.

A steel rod acting as a media support is imbedded in the filter. Replace filter so that support prevents media from being drawn into fan during operation.

## ELECTRIC HEATER SERVICE

See Fig. 15 for component location. All service can be completed with heater in place. Ensure all power is shut off before servicing.

**Limit Switch** malfunction prevents heating element from coming on or causes fusible link to blow. Replace switch if malfunction occurs.

**Sequencer** malfunction will cause heater not to come on or never to shut off — replace sequencer.

**Transformer** — (40- or 60-va) supplies 24-volt power for control circuit. Replace transformer if faulty.

**Fan Relay** malfunction will cause unit fan not to run or run continuously — replace relay.

For replacement items use Carrier Specified Parts.

Manufacturer reserves the right to discontinue, or change at any time, specifications or designs without notice and without incurring obligations.

Book	1	4
Tab	3c	2c

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