



## Air-Cooled Condensing Units

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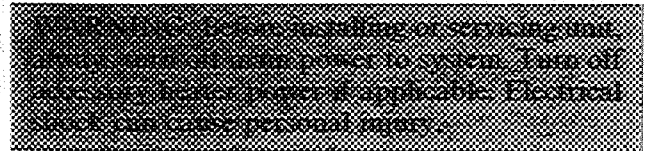
### SAFETY CONSIDERATIONS

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

Untrained personnel can perform basic maintenance, such as 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 literature and on tags and labels attached to unit.

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

Read these installation instructions thoroughly.



### INSTALLATION

#### Step 1 — Check Equipment and Jobsite

**UNPACK UNIT** — Move to final location. Remove carton taking care not to damage service valves or grilles.

**INSPECT EQUIPMENT** — File claim with shipper if damaged or incomplete. Check factory-supplied (field-installed) liquid line solenoid valve for shipping damage.

**COMPLETE SYSTEM REQUIREMENTS** before installing.

Consult local building codes and National Electrical Code (NEC) for special installation requirements.

When installing, allow sufficient space for airflow clearance, wiring, refrigerant piping and service. Maintain a minimum of 4 ft clearance from obstructions above and 18 in. on sides of unit. Maintain a distance of 24 in. between condensing units. Position so water from roof or eaves does not flow directly on unit.

Install on a solid, level mounting pad. For safety and security, attach unit to pad using tiedown bolts. Use holes provided in unit base. See Fig. 1.

Carrier Cooling System Capacity Optimization — AccuRater™ (bypass type) refrigerant control, with field-replaceable piston (see Fig. 2), is supplied on evaporator. Use Optimization Chart, Table 2, to find AccuRater piston size required for condenser/evaporator system being installed.

**Table 1 — Physical Data (Refer to Fig. 1)**

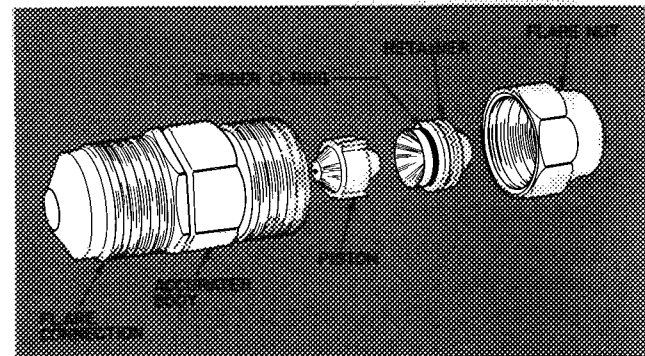
MODEL 38ED	018	024	030	036	042	048	060
OPER WT (lb)	167	190	190	223	248	248	278
DIMENSIONS (ft-in.)							
Diameter A	2-5 <sup>7</sup> / <sub>32</sub>			2-8 <sup>3</sup> / <sub>32</sub>		3-2 <sup>63</sup> / <sub>64</sub>	
Unit Height B	2-2 <sup>15</sup> / <sub>16</sub>	2-8 <sup>3</sup> / <sub>32</sub>	3-1 <sup>3</sup> / <sub>4</sub>	2-8 <sup>7</sup> / <sub>16</sub>		3-2 <sup>5</sup> / <sub>64</sub>	
CONNECTIONS (in.)							
Suction (ODF)*				3/8			
Liquid (ODF)*				3/8			
REFRIG LINES (in.)							
Suction (ODF)	3/4					1 1/8*	
Liquid (ODF)				3/8			

\*For a 1 1/8-in suction line on 38ED036,042,048,060, a 3/4-in x 1 1/8-in suction valve connection adapter is available as an accessory. See Table 3

**Table 2 — Optimization Chart  
(Outdoor air design temperature, db-F,  
100 F and below)**

MODEL 38ED	ACCURATER™ PISTON NO							
	Evap Size (Coil or Fan Coil)							
	018	024	030	036	042	048	060	28AR062
018	50	—	52	TXV	—	—	—	—
024	—	63	—	65	TXV	—	—	—
030	—	—	67	—	70	TXV	—	—
036	—	—	—	70	—	73	TXV	—
042	—	—	—	—	78	—	80	TXV
048	—	—	—	—	—	84	—	86
060	—	—	—	—	—	—	90	—

Factory-supplied piston Obtain replacement pistons thru local Carrier distributor

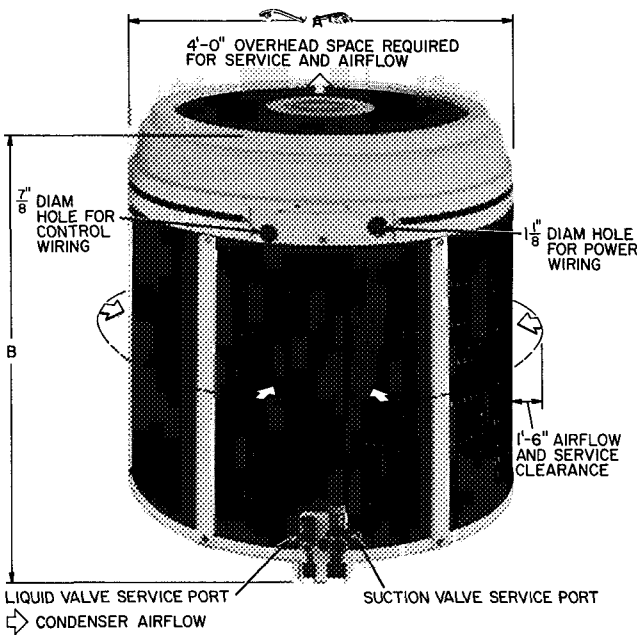


**Fig. 2 — AccuRater (Bypass Type)  
Components**

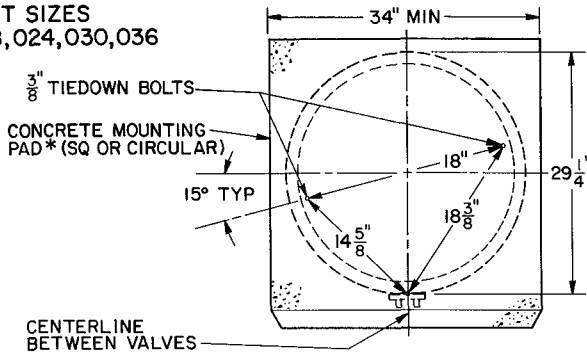
**Condensing Units Connected to Carrier-Approved Evaporators** — Condensing Units contain correct system refrigerant charge for operation with evaporator of the same size when connected by 25 ft or less of field-supplied or Carrier accessory tubing. Check refrigerant charge for maximum efficiency (see Refrigerant Charging, page 6).

**Step 2 — Make Piping Connections** — Condensing units may be connected to evaporator sections using Carrier accessory tubing package (Table 3) or field-supplied tubing of refrigerant grade, correct size and condition (Table 1). For tubing requirements beyond 50 ft, obtain information from local Carrier distributor.

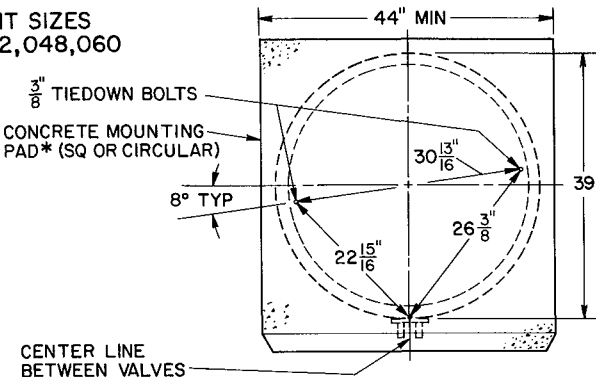
**CAUTION** If undersized, damaged, or elliptically-shaped tubing is used when making compatible fitting, leaks may result.



**UNIT SIZES  
018, 024, 030, 036**



**UNIT SIZES  
042, 048, 060**



\*CONCRETE PAD SHOULD WEIGH 1 1/2 TO 2 TIMES WEIGHT OF UNIT

Certified dimension drawings are available upon request

**Fig. 1 — Dimensions, Connections and  
Mounting Pad (Refer to Table 1)**

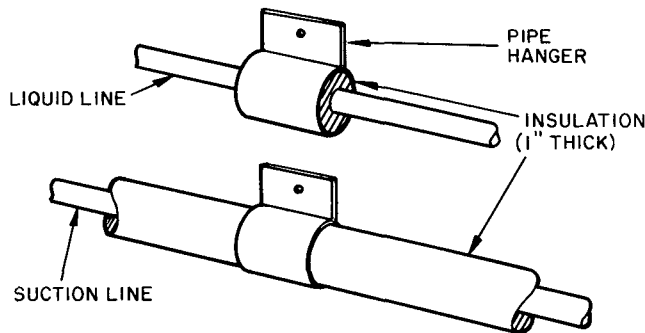
When evaporator is more than 2 sizes larger than condensing unit (i.e. 38ED018/28HQ036), remove AccuRater™ and use a bleed-type thermal expansion valve (TXV) for refrigerant control. Size TXV to nominal capacity of condensing unit.

Replace piston, only if required (Table 2), before connecting refrigerant lines. Piston replacement instructions are included in evaporator installation book. After system installation is complete, use Charging Chart to check and/or adjust refrigerant charge.

When 1-1/8 in. tubing is used (38ED036,042, 048,060) braze it to the accessory 1-1/8 x 3/4-in. suction connection adapter (Carrier Part No. →28AU900061) or to correctly sized field-supplied adapter, then make Compatible Fitting connections.

**CAUTION: DO NOT BURY MORE THAN 1 FT. OF REFRIGERANT LINES IN GROUND.** If any section of line is buried there must be 6-in. vertical rise to the valve connections on the outdoor unit. If more than the recommended length is buried, refrigerant may migrate to the cooler buried section during extended periods of non shutdown, causing refrigerant slugging and possibly compressor damage at start-up.

Isolate interconnecting tubing from framing and ductwork or where tubing runs thru stud spaces, enclosed ceilings or pipe chases. Use isolation type hanger (Fig. 3) since rigid fastening transmits pulsations to structure creating objectionable sound.



**Fig. 3 — Refrigerant Line Hangers**

Use 1-1/8 in. suction line on 38ED036,042,048 and 060 systems. A capacity reduction results if Carrier accessory tubing is used on these systems. (Example: When a 25-ft accessory tubing package is used on a 38ED048 system, the smaller suction line results in a 3% capacity reduction.)

Length of interconnecting tubing may necessitate refrigerant charge adjustment. Follow special requirements described in Start-Up, Refrigerant Charging, page 6. Do not use less than 10 ft of interconnecting tubing. On Carrier accessory tubing packages, do not cut 5/16-in. or 1/4-in. liquid line or 7/8-in. suction line. These tubing packages have swaged ends that, if cut, will not fit into refrigerant line fittings. Bend or coil excess tubing to fit.

Do not use damaged, undersized or contaminated tubing. Always evacuate or purge evaporator coil and tubing system. When purging, use field-supplied refrigerant, not unit holding charge refrigerant.

When making tubing connections, be sure to provide clearance at unit for electrical connections.

**REPLACE ACCURATER™ REFRIGERANT CONTROL PISTON** in indoor coil, if required, before connecting refrigerant lines. See Carrier Cooling System Capacity Optimization, page 1.

**CONNECT REFRIGERANT LINES** to fittings on condensing unit suction and liquid service valves (Fig. 1). Unit Compatible Fittings permit mechanical (quick connect) or sweat connections.

**Models 38ED036,042,048,060** — When using 1-1/8 in. field-supplied suction line, use field-supplied 3/4-in. by 1-1/8 in. suction valve connection adapter (28AU900061). Sweat connect refrigerant suction line to 1-1/8 in. end of adapter. Be sure to provide a heat sink at the service valve to prevent damage during sweating operation. Connect 3/4-in. end of adapter to unit suction line Compatible Fitting. Connect liquid refrigerant line to unit. When a 7/8-in. field-supplied suction line is used, provide a field-supplied 3/4-in. to 7/8-in. suction line adapter. (Not necessary if 38LS accessory tubing is used.)

**Mechanical Connection** — (Mate one set of connections at a time.)

1. Loosen nut on Compatible Fitting one turn. Do not remove.
2. Remove plug and be sure O-ring is in the groove inside the Compatible Fitting.
3. Cut tubing to correct length, deburr and size as necessary.
4. Insert tube into Compatible Fitting until it bottoms. Tighten nut until it bottoms on back coupling flange. Keep tube bottomed in Compatible Fitting while tightening nut.

**Sweat Connection** — (Use refrigerant grade tubing.)

1. Remove locking nut, rubber O-ring and Schrader core and cap from valve service port.
2. Cut tubing to correct length, deburr and size as necessary.
3. Insert tube in Compatible Fitting until it bottoms.

**NOTE:** Wrap top and bottom of service valves in wet cloth to prevent damage by heat.

Solder with low-temperature (430 F) silver alloy solder.

4. Replace Schrader core and cap.
5. Evacuate or purge system using field-supplied refrigerant.

### **Step 3 — Install Solenoid on Indoor Coil Liquid Line Fitting**

— Before making liquid line connections, install factory-supplied solenoid on indoor coil liquid line fitting. It is not necessary to flare the system liquid line if an accessory flare-to-Compatible Fitting coupler is used (refer to indoor coil installation instructions, Accessory Flare to Compatible Coupler).

**CAUTION:** If a field-supplied 60-volt control power source is needed, when adding solenoid wiring must comply with local and National Electrical Code (NEC) requirements.

See Fig. 4 and install as follows:

1. Remove coil liquid line cap and discard.
2. Attach field-supplied flare fittings to solenoid valve straight 3/8-in. stubs.

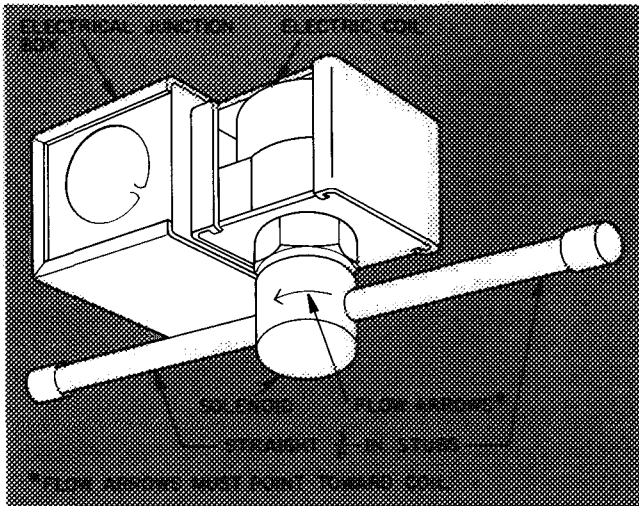


Fig. 4 — Solenoid Installation

3. Connect solenoid to tube assembly, making sure solenoid flow arrows point towards indoor coil. Mount solenoid in any position *except* valve body at top and electric coil at bottom (see Fig. 4).
4. Tighten flare nuts.
5. Wire coil into system control circuit as shown in Fig. 5.

**Step 4 — Make Electrical Connections** — Be sure field wiring complies with local and national fire, safety and electrical codes, and that voltage to unit is within permissible limits of voltages indicated on nameplate. Contact local power company for correction of improper line voltage.

**CATION** Operation of unit on improper line voltage constitutes abuse and could affect Carrier Warranty. See Table 4. Do not apply unit in areas where voltage may fluctuate above or below permissible limits.

Table 3 — Accessories

PART NO.	DESCRIPTION						MODEL 38ED
HH01AD040	Low-Voltage Control — Honeywell Deluxe Thermostat						All
HH93AZ040	Thermostat Subbase						
HH51AR001	Comfort Control Center (Use with HH01AD040)						
HH07AT170	Low-Voltage Control — Honeywell Thermostat						
HH07AT174	Low-Voltage Control — Honeywell Thermostat						
HH93AZ176	Thermostat Subbase (with Automatic Changeover)						
HH01AD042	Low-Voltage Control — Honeywell Thermostat						
HH93AZ042	Thermostat Subbase						
38VH90000106	Thermocharger™ Replacement Unit Module (Six 38VH900001)						
38GS900102	Indoor Fan Relay (Six HN61KJ210)						
HT01AW230	Low-Voltage Transformer (60 va) — Available thru Carrier Service Parts						
09WQ036,060	Refrigerant-to-water heat exchanger for chilled water systems						
→ 38RQ90008106	Liquid Line Filter Drier (Six KH45LD077)						
28AU90006112	Twelve 3/4 x 1 1/8-in suction connection adapters						
TUBING*							
TUBING PACKAGES	Length (ft)	Liquid		Suction†			MODEL 38ED
		OD (in.)	Tube End OD (in.)	OD (in.)	Tube End OD (in.)		
					Evap	Cond	
38LS934151	15	3/8	3/8	3/4	3/4	3/4	018,024,030
38LS934201	20	3/8	3/8	3/4	3/4	3/4	
38LS934251	25	3/8	3/8	3/4	3/4	3/4	
38LS934301	30	3/8	3/8	3/4	3/4	3/4	
38LS934351	35	3/8	3/8	3/4	3/4	3/4	
38LS934401	40	3/8	3/8	3/4	3/4	3/4	
38LS934501	50	3/8	3/8	3/4	3/4	3/4	
38LS978151	15	3/8	3/8	7/8	3/4	3/4	036,042,048,060 (See Note 2)
38LS978201	20	3/8	3/8	7/8	3/4	3/4	
38LS978251	25	3/8	3/8	7/8	3/4	3/4	
38LS978301	30	3/8	3/8	7/8	3/4	3/4	
38LS978351	35	3/8	3/8	7/8	3/4	3/4	
38LS978401	40	3/8	3/8	7/8	3/4	3/4	
38LS978501	50	3/8	3/8	7/8	3/4	3/4	

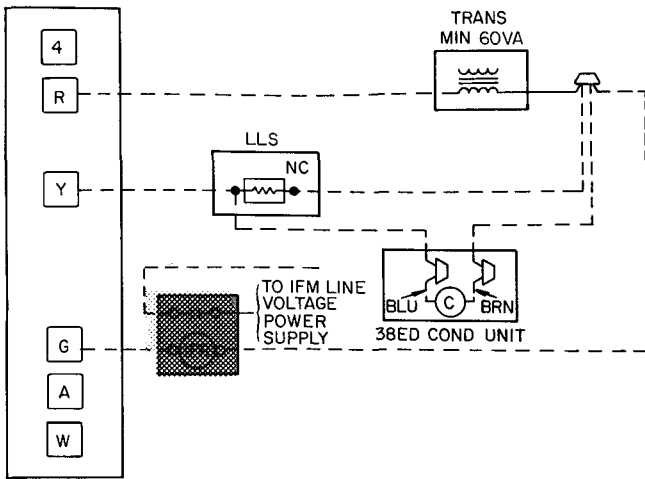
\*For maximum capacities, use suction line sizes recommended in Table 1. Use of accessory tubing packages smaller than recommended may result in slight capacity loss (see Note 2)

†Suction line is insulated and has a 90 degree bend at one end

**NOTES**

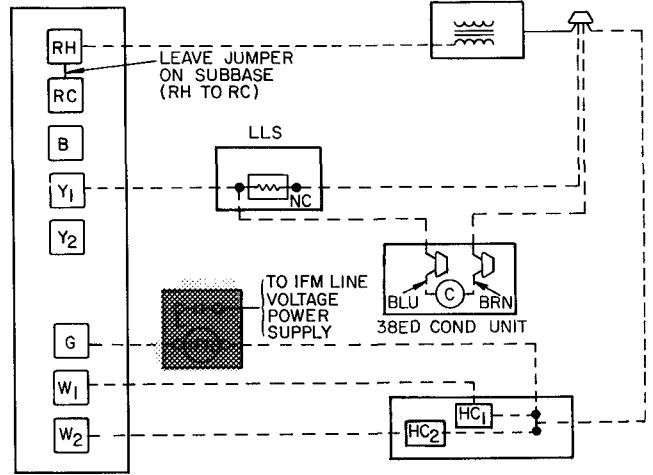
1. Do not cut 3/8-in OD liquid line to a length shorter than 10 feet. Do not cut 7/8-in OD suction lines.
2. Field-supplied 1 1/8-in suction line is recommended on 38ED 036,042,048 and 060. If accessory tubing package is used, a capacity reduction can result.

THERMOSTAT SUBBASE  
HH93AZ042 OR  
HH93AZ040



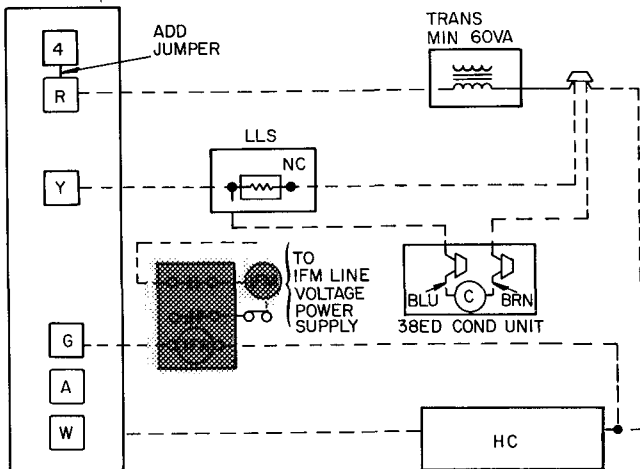
ARRANGEMENT A — COOLING ONLY

THERMOSTAT SUBBASE  
HH93AZ042 OR  
HH93AZ040



ARRANGEMENT C — ONE TRANSFORMER,  
COOLING AND TWO-STAGE HEATING

THERMOSTAT SUBBASE  
HH93AZ042 OR  
HH93AZ040



ARRANGEMENT B — ONE TRANSFORMER;  
COOLING AND ONE-STAGE HEATING

NOTE: Refer to unit label wiring diagram for wire colors

IFR, IFM and LLS are located indoors on heating-cooling applications. If accessory IFR is required for cooling-only applications, locate IFR in fan coil

- C — Contactor
- HC — Heating Control
- IFM — Indoor Fan Motor
- IFR — Indoor Fan Relay
- LLS — Liquid Line Solenoid Valve
- NC — Normally Closed
- Trans — Transformer

Fig. 5 — 24-Volt Control Circuit Connections

Table 4 — Electrical Data (60 Hz)

MODEL 38ED	V/PH	OPER VOLTS*		COMPR		FAN FLA	BRANCH CIRCUIT				
		Max	Min	LRA	RLA		Min Wire Size† (AWG)	Max Ft Wire†	Min Ground Wire Size‡	Max Fuse or HACR Type Ckt Bkr Amps**	MCA
018	208-230/1	254	197	43.0	7.8	1.1	14	32	14	15	10.9
024				54.0	11.5		12	37	12	25	15.5
030				65.0	13.7		12	31	12	30	18.2
036				78.8	13.5		12	31	12	30	18.0
042				95.0	19.7		10	34	10	45	26.3
048				116.0	23.7		8	44	10	50	31.3
060	230/1	254	207	130.0	27.8	1.7	8	38	10	60	36.5

AWG — American Wire Gauge  
FLA — Full Load Amps  
HACR — Heating, Air Conditioning and Refrigeration  
LRA — Locked Rotor Amps  
MCA — Minimum Circuit Amps  
RLA — Rated Load Amps

\*Permissible limits of the voltage range at which the unit will operate satisfactorily

†Copper wire sizes based on 60°C. Use copper wire only. Use ← latest NEC requirements

‡Required when using nonmetallic conduit.

\*\*Maximum dual element size

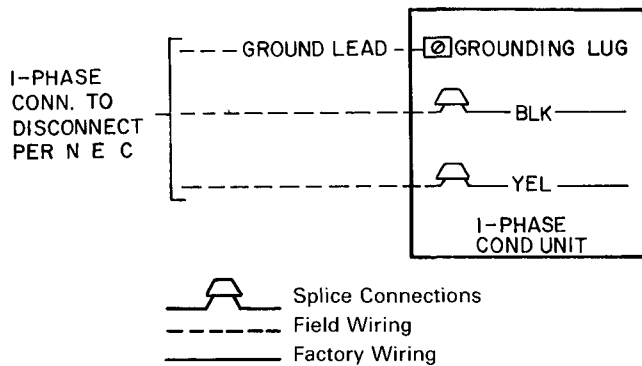
NOTE: Control circuit is 24 v on all units and requires external power source

See Table 4 for recommended wire and fuse sizes. When making electric connections, provide clearance at unit for refrigerant piping connections.

**INSTALL BRANCH CIRCUIT DISCONNECT PER NEC** of adequate size to handle unit starting current. Locate disconnect within sight from and readily accessible from the unit, per section 440-14 of National Electrical Code (NEC).

**ROUTE LINE POWER LEADS** — Extend leads from disconnect thru power wiring hole provided (see Fig. 1) and into unit splice area. Remove top cover to gain access to unit wiring.

**CONNECT GROUND LEAD AND POWER WIRING** — Connect ground lead to a ground lug in control box for safety. Then connect power wiring. See Fig. 6. Splice line power leads to yellow and black pigtails. Use wire nuts and tape at each connection. Connect unit wiring to copper power wiring. *Do not* connect to aluminum or copper-clad aluminum wiring.



**Fig. 6 — Line Power Connections**

**CONNECT CONTROL POWER WIRING** — Route 24-v control wires thru control wiring hole and connect to pigtails supplied with unit (Fig. 1). Splice control leads to black and blue pigtails on all units. See Fig. 5.

*Use a furnace or fan coil transformer as 24-v (60-v minimum) supply for systems as shown in Fig. 5 or use accessory transformer shown in Table 3.*

### START-UP

1. Backseat (open) liquid and suction line service valves.
2. Set thermostat selector switch at OFF.
3. Set room thermostat at desired temperature. Be sure this temperature is below indoor ambient temperature.
4. Energize electrical disconnects for entire system.
5. Set room thermostat at COOL and fan switch at FAN or AUTO, as desired. Operate unit for 15 minutes. Check system refrigerant charge. See Refrigerant Charging, this page.

Motors and controls are designed to operate satisfactorily in the voltage range shown in Table 4. If necessary to use manifold gages for servicing, refer to Carrier Standard Service Techniques Manual, Chapter 1, Refrigerants, page 1-5, Fig. 8, for bypass method of returning charge to system. Removal of liquid line charging hose without following these precautions could result in some loss of charge.

**IMPORTANT:** Liquid line solenoid valve must be energized during evacuation and purging for effective evacuation.

### Refrigerant Charging

**CAUTION:** To prevent personal injury, wear safety glasses and gloves when handling refrigerant.  
Do not overcharge system. An overcharge can cause compressor flooding.

Condensing units contain correct operating charge for complete system when connected to Carrier-approved evaporators of same capacity as condensing unit with 25 ft or less of Carrier accessory tubing or field-supplied tubing of recommended size. For every 10 ft of liquid line of recommended size over 25 ft, add refrigerant charge as follows: .4 lb for 3/8-in. line; .28 lb for 5/16-in. line. On all other systems, adjust charge for correct operation as applicable.

Service port connections are provided on liquid and suction line service valves for evacuation and charging. See Fig. 1.

**TO CHECK OR REPLACE REFRIGERANT CHARGE** use method recommended in Table 5. Details of charging methods are listed below.

Before recharging system, thoroughly evacuate system and then weigh in refrigerant charge specified in Table 6. Check or adjust charge as required. Refer to Carrier Standard Service Techniques Manual, Chapter 1, Refrigerants, for additional system evacuation and dehydration instructions.

**WEIGHT METHOD** — Refer to Table 6 or unit nameplate for correct system refrigerant charge. Remove any refrigerant remaining in system before recharging.

When system is not evacuated, subtract the following amount from total charge:

- 38ED018 thru 036 — .10 lb (1.6 oz)
- 38ED042 thru 060 — .20 lb (3.2 oz)

The Dial-a-charge charging cylinder is an accurate device used to recharge system by weight. These cylinders are available at refrigeration supply firms.

**CHARGING CHART METHOD** — Use Charging Chart, Fig. 7, and the following procedure:

1. Operate unit a minimum of 10 minutes before checking charge.

**Table 5 — Refrigerant Charging Methods**

**CAUTION:** Do not add refrigerant beyond amount indicated by Chargemaster or charging chart. This could damage the system performance or reliability.

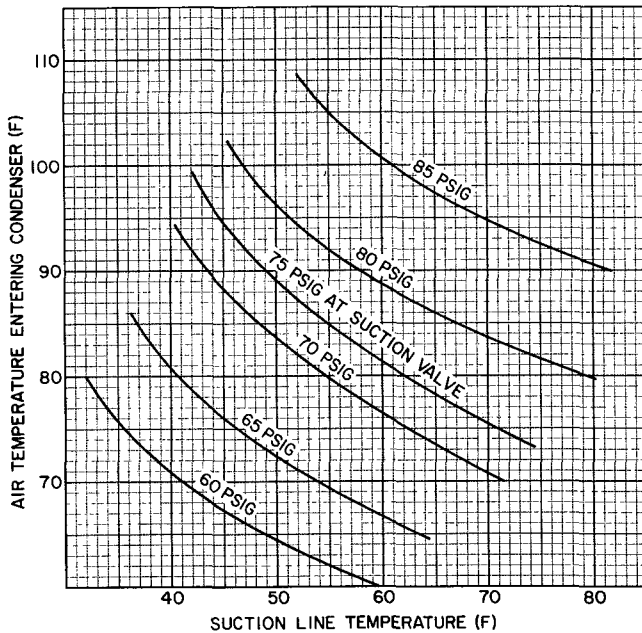
MODEL 38ED	METHODS OF CHECKING OR ADJUSTING CHARGE System Refrigerant Control		METHODS FOR COMPLETE RECHARGING System Refrigerant Control	
	Non TXV	TXV	Non TXV	TXV
ALL	Chargemaster® or Charging Chart	Sight Glass*	Weight Method plus Chargemaster or Charging Chart	Weight Method plus Sight Glass*

\*Sight glass field supplied and installed in liquid refrigerant line

**Table 6 — Service Data**

MODEL 38ED	R-22 CHARGE* (lb)	CONDENSER FAN RPM
018	6.5	830
024	7.4	
030	7.6	
036	11.0	
042	9.0	840
048	8.4	
060	10.2	

\*Factory refrigerant charge is adequate when evaporator and condensing unit are the same size and are connected with 25 ft or less of field-supplied tubing of recommended size or Carrier accessory tubing



**Fig. 7 — 38ED Charging Chart (AccuRater™ System)**

2. Measure suction pressure by attaching a gage to suction valve service port.
3. Measure suction line temperature by attaching a service thermometer to unit suction line near suction valve. (Insulate thermometer for accurate readings.)
4. Measure outdoor (condenser inlet) air dry-bulb temperature with a second thermometer.

5. Refer to Charging Chart (Fig. 7). Find air temperature entering condenser and project horizontally to curve showing suction pressures (psig at suction valve).
6. From this intersection, project vertically downward to suction line temperature.
7. If unit has a higher suction line temperature than charted temperature, add refrigerant until charted temperature is reached.
8. If unit has a lower suction line temperature than charted temperature, bleed refrigerant until charted temperature is reached.
9. If air temperature entering condenser or pressure at suction valve changes, charge to new suction line temperature indicated on chart.

**CHARGEMASTER® METHOD** — Operate unit for 10 minutes before using Chargemaster (Carrier Part No. 38GC680004).

1. Tape Chargemaster feeler bulb to suction line close to condensing unit. Insulate bulb. Ensure suction line is clean for good contact with bulb. (Uninsulated bulb or dirty suction line will seriously affect accuracy of temperature readings.)
2. Connect refrigerant drum to Chargemaster inlet port keeping drum in position for vapor charging.
3. Connect Chargemaster outlet port to unit suction valve service port.
4. Crack valves on refrigerant drum and Chargemaster to purge lines from drum to suction valve. After purging lines, close valve on Chargemaster only.
5. Measure outdoor air dry-bulb temperature.
6. Crack unit suction valve and read *evaporator temperature at red needle position on Chargemaster temperature gage and suction line temperature at black needle position.*

**CAUTION:** Do not read evaporator temperature while Chargemaster valve is open.

7. Enter Chargemaster Charging Chart, Table 7, at outdoor air temperature (step 5) and evaporator temperature (step 6). Find the suction line temperature required for correct system charge. If



actual suction line temperature (step 6) is higher than table value, the system is undercharged. If suction line temperature is lower than table value, system is overcharged.

EXAMPLE: At outdoor air temperature of 85 F and evaporator temperature of 44 F, the system will be correctly charged at 60 ± 2 F suction line temperature. See Table 7.

**Table 7 — 38ED Chargemaster Charging Chart (AccuRater™ System)**

OUTDOOR TEMP (F)	SATURATED EVAPORATOR TEMPERATURE (F)											
	34	36	38	40	42	44	46	48	50	52	54	56
	Suction Line Temperature (F)											
60	60											
65	49	58	65									
70	41	48	58	68	75							
75	35	41	48	58	68							
80	32	36	42	50	59							
85						80						
90				40	47	53	61	69	78			
95					42	48	53	59	67	79		
100						43	47	52	58	68	88	
105								44	53	60	75	104
110									49	54	65	80
115										50	62	69

Example

8. Add charge by slowly opening Chargemaster valve. If necessary, reduce charge by bleeding at liquid line service valve. Check outdoor air and evaporator temperature during procedure. If they change, refer back to Chargemaster Charging Chart.

Correct use of Chargemaster ensures that an optimum refrigerant charge will be in system when conditions and system components are normal. However, the Chargemaster does not solve or fix system abnormalities. It indicates correct charge for condi-

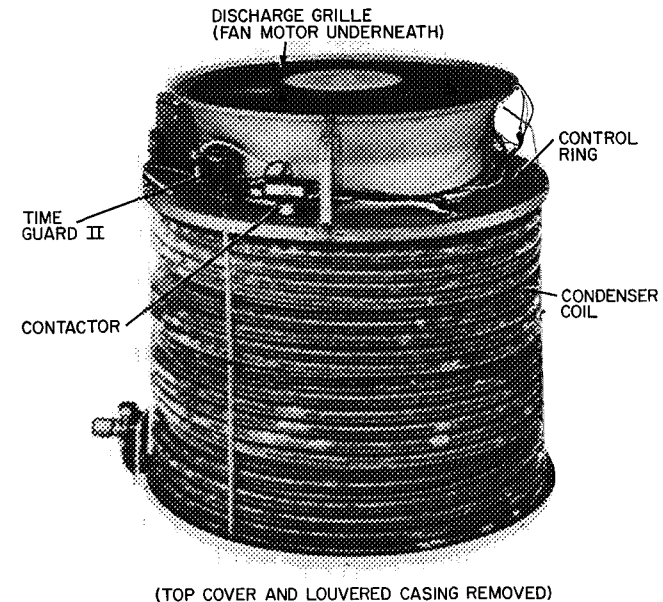
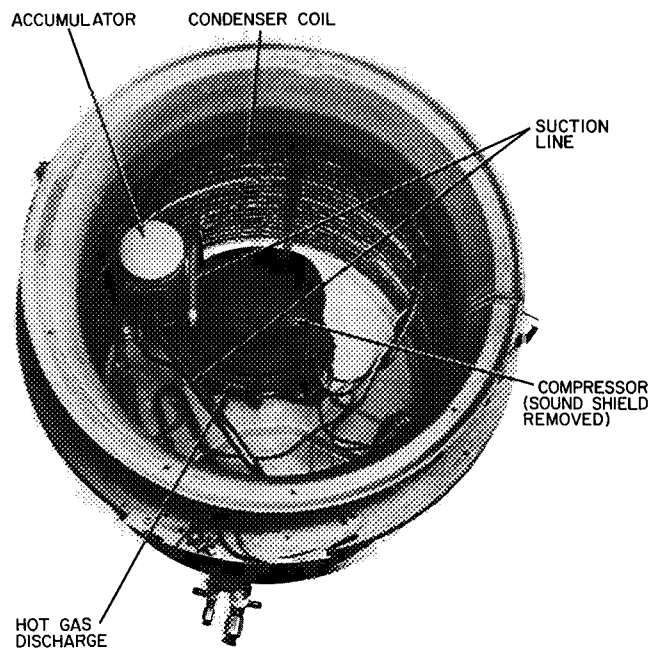
tion of the system. It will not make corrections for dirty filters, slow fans, excessively long or short suction lines or other abnormal conditions. This charging device ensures that a correct relationship exists between outdoor temperature, evaporator temperature, and suction line temperature on a specific system.

**SIGHT GLASS METHOD** — (Field-supplied sight glass installed in liquid line.) A satisfactory operating charge can be obtained on *thermal expansion valve systems only* by charging to a clear sight glass. For optimum charge, increase high-side pressure to 380 ± 10 psig by blocking condenser fan discharge or air entering condenser. Charge to a clear sight glass while holding constant high-side pressure. For peak efficiency, adjust charge to yield a liquid refrigerant temperature at the evaporator that is approximately the same as outdoor dry-bulb temperature.

### SERVICE

**CAUTION:** Unit has high-pressure piping which may also be hot to touch, energized electrical components and a rotating fan. Before servicing or checking unit, be sure all system power is off and tubing is cool.

**Compressor Removal** — See Table 8 for compressor information and Fig. 8 for component location. Shut off power to unit. Remove refrigerant from unit using refrigerant removal methods described in Carrier Standard Service Techniques Manual, Chapter 1, Refrigerants. Be sure system pressure is 0 psig before attempting compressor removal.



**Fig. 8 — 38ED Component Locations**



**Table 8 — Compressor Data**

MODEL 38ED	PRODUCTION COMPRESSOR*	OIL CHARGE (oz)†	
		Initial	Recharge
018	AB5515H	32	30
024	CRC-1	55	51
030	CRE-1	55	51
036	AV5532H	54	50
042	AV5538E	54	50
048	AV5546E	54	50
060	PC6016BD	76	64

\*Refer to Carrier Service Parts Catalog for replacement model numbers

†Where piping exceeds 50 ft, contact your local Carrier distributor

**CAUTION:** Aluminum tubing is used in and with this unit. Do not overheat or place excessive strain on tubing or damage may result.

1. Remove top cover by loosening screws around unit and screws in connector plate. Lift cover straight up.
2. Disconnect high- and low-voltage field wiring and fan motor leads from capacitor and contactor.
3. Remove screws holding discharge grille in place. Lift grille from unit.
4. Disconnect compressor leads (crankcase heater, low-pressure switch, if so equipped) from electrical components and pull them thru the wire access opening into the coil section. Lift fan orifice/control ring after pinching and pressing down on 3 plastic pins of tube supports.
5. Remove louvered casing by taking out 16 screws securing it to the cabinet and sliding it away from the coil.
6. Using a midget tubing cutter, cut liquid and discharge lines on the coil and suction line at a convenient place for easy reassembly with copper slip couplings.

**CAUTION:** Excessive movement of copper lines at compressor may cause a break where lines connect to condenser coil.

7. After plugging connections, remove condenser coil by pinching plastic pins of tube supports that extend into basepan and lift vertically. Set coil on a clean, flat surface.
8. Remove compressor holddown bolts and slide out compressor. Remove crankcase heater, if so equipped.

**WARNING:** For brazing and unbrazing, have fire extinguisher and/or quenching cloth available in case oil vapor ignites.

9. Carefully unbrazed suction and discharge line piping stubs from compressor after noting position of stubs to assist when reinstalling.

10. Install new compressor, placing crankcase heater around compressor, if so equipped. Be sure compressor holddown bolts are in place.
11. Replace coil; braze suction and discharge lines to compressor piping stubs (at points where cut, step 6); rewire compressor and leak test.
12. Replace fan orifice/control ring; connect compressor wires after feeding them thru control ring; replace fan/grille assembly and rewire; connect high- and low-voltage power wiring; and replace louvered casing.
13. Replace top cover by running screws into orifice loosely and tighten when cover is in place.
14. Evacuate and recharge system.

**Filter Drier** — Install field-supplied filter drier (Table 3) in system liquid line when refrigerant system is opened for service as described under Compressor Removal. Position drier in liquid line at convenient location.

**Pumpdown Procedure** — The system may be pumped down in order to make repairs on low side without losing complete refrigerant charge.

**IMPORTANT:** Liquid line solenoid valve must be energized during evacuation and purging for effective evacuation.

1. Attach pressure gage to suction service valve gage port.
2. Frontseat liquid line valve.
3. Start unit. Run until suction pressure reaches 5 psig (see Caution).
4. Shut unit off. Frontseat suction valve.
5. Vent remaining pressure to atmosphere.

**CAUTION:** The condenser will hold only factory-supplied amount of refrigerant. Excess refrigerant may cause unit to shut off on high-pressure switch cutout, if unit is so equipped, during pumpdown (indicated by a high discharge pressure or a sudden rise of suction pressure) before suction pressure reaches 5 psig. If this occurs, shut unit off immediately and frontseat suction valve. Transfer remaining refrigerant into a suitable container.

### Unit Controls and Safety Devices

**HIGH-PRESSURE RELIEF VALVE** is located in compressor. Relief valve opens if system operating pressure differential between suction and discharge → pressure reaches 450 ± 50 psi on all models.

**LOW-PRESSURE SWITCH** (018 model only) is located on unit suction line. Low-pressure switch settings are: cutout, 31 ± 4 psig; cut-in, 60 (+15, -0) psig.

**COMPRESSOR INTERNAL TEMPERATURE AND/OR CURRENT SENSITIVE OVERLOADS** reset automatically when motor internal temperatures drop to a safe level (overload may require up to 30 minutes to reset). When internal overload is suspected of being open, check by using an ohmmeter or continuity tester. If necessary, refer to Carrier Standard Service Techniques Manual, Chapter 2, Electrical, for complete instructions.

**INHERENT FAN MOTOR PROTECTION** protects motor from abnormal current and temperature. **SOLID-STATE TIME GUARD II CIRCUIT**, protects unit compressor by preventing short cycling. Time Guard II circuit provides a  $5 \pm 2$ -minute delay before restarting compressor after shutdown for any reason. On normal start-up, the 5-minute delay occurs before thermostat closes. After thermostat closes, the Time Guard II circuit then provides a 3-second delay to prevent contactor chattering.

**CRANKCASE HEATER** keeps the crankcase warm during the off cycle and prevents dilution of oil with refrigerant. This assures good lubrication and prevents loss of oil from crankcase during start-up.

**CRANKCASE HEATER RELAY** deactivates heater when compressor is operating for maximum energy efficiency.

### Compatible Fitting Repair

**MECHANICAL CONNECTION** — Frontseat unit service valves. Relieve refrigerant pressure from tubing. Back off locknut from Compatible Fitting onto tube. Cut fitting between threads and O-ring as shown in Fig. 9. Remove tubing section remaining in threaded portion of fitting. Discard locknut.

Clean, flux and insert new tube end into remaining portion of Compatible Fitting. *Wrap valve base in wet rag.* Heat and apply low-temperature (430 F) solder.

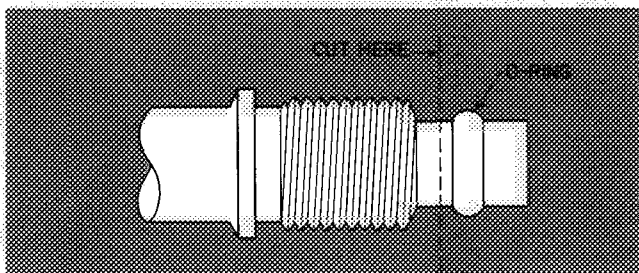


Fig. 9 — Repair of Mechanical Connection

**SWEAT CONNECTION** — Frontseat unit service valve. Relieve refrigerant pressure from tubing. Clean and flux area around leak. Repair using low-temperature (430 F) solder.

Evacuate or purge evaporator coil and tubing system. Add refrigerant charge. See Refrigerant Charging instructions described previously.

**Outdoor Fan Adjustment** — Required fan position is shown in Fig. 10. Adjust fan by loosening setscrew(s) and moving fan blade up or down.

### Outdoor Fan Motor Removal

1. *Shut off power to unit.* Failure to do so may result in electric shock or injury from rotating fan blade.
2. Remove top cover by loosening screws and lifting straight up.
3. Disconnect fan motor leads from control leads. See Fig. 8.
4. Remove Carrier medallion by turning 4 Tinnerman fasteners 1/4 turn each.
5. Remove screws holding fan motor/discharge grille in place and lift assembly from unit.
6. Remove 4 nuts holding fan motor to discharge grille. Remove motor and leads.
7. Reassembly is reverse of above procedure. Make sure fan is positioned correctly as in Fig. 10.

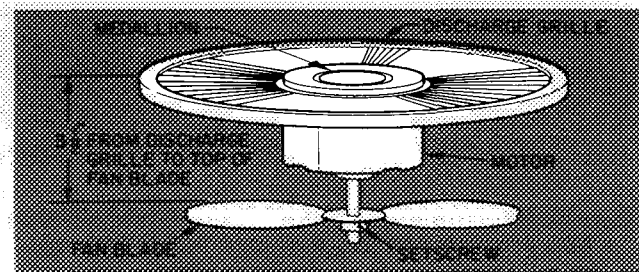


Fig. 10 — Outdoor Fan Position

## MAINTENANCE

**CAUTION:** Before performing recommended maintenance, be sure unit main power is turned off. Failure to do so may result in electric shock or injury from rotating fan blade.

### Lubrication

**COMPRESSOR** contains factory oil charge. Replace oil when lost. See Table 8 for oil recharge and refer to Carrier Standard Service Techniques Manual, Chapter 1, page 1-21, for oil recharging procedure. Use Carrier PP33-2, Texaco WF-32 or Suniso 3GS oil.

**FAN MOTOR BEARINGS** — Oiling holes are provided at each end of condenser fan motor. Remove fan motor and lubricate motor with 32 drops (16 drops per hole) of SAE10 nondetergent oil at intervals described below.

- a. Annually, when environment is very dirty, ambient temperature is higher than 105 F and average unit operating time exceeds 15 hours a day.
- b. Every 3 years when environment is reasonably clean, ambient temperature is less than 105 F and unit operating time averages 8 to 15 hours a day.

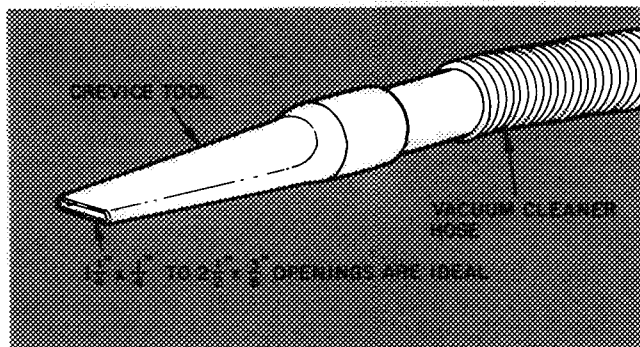
- c. Every 5 years when environment is clean, ambient temperature is less than 105 F and unit operating time averages less than 8 hours a day.

**Coil Repair** — A flare-union coupling repair kit is available, with instructions, from Carrier Service Parts.

**Coil Cleaning** to be done at the beginning of each cooling season or more often if required.

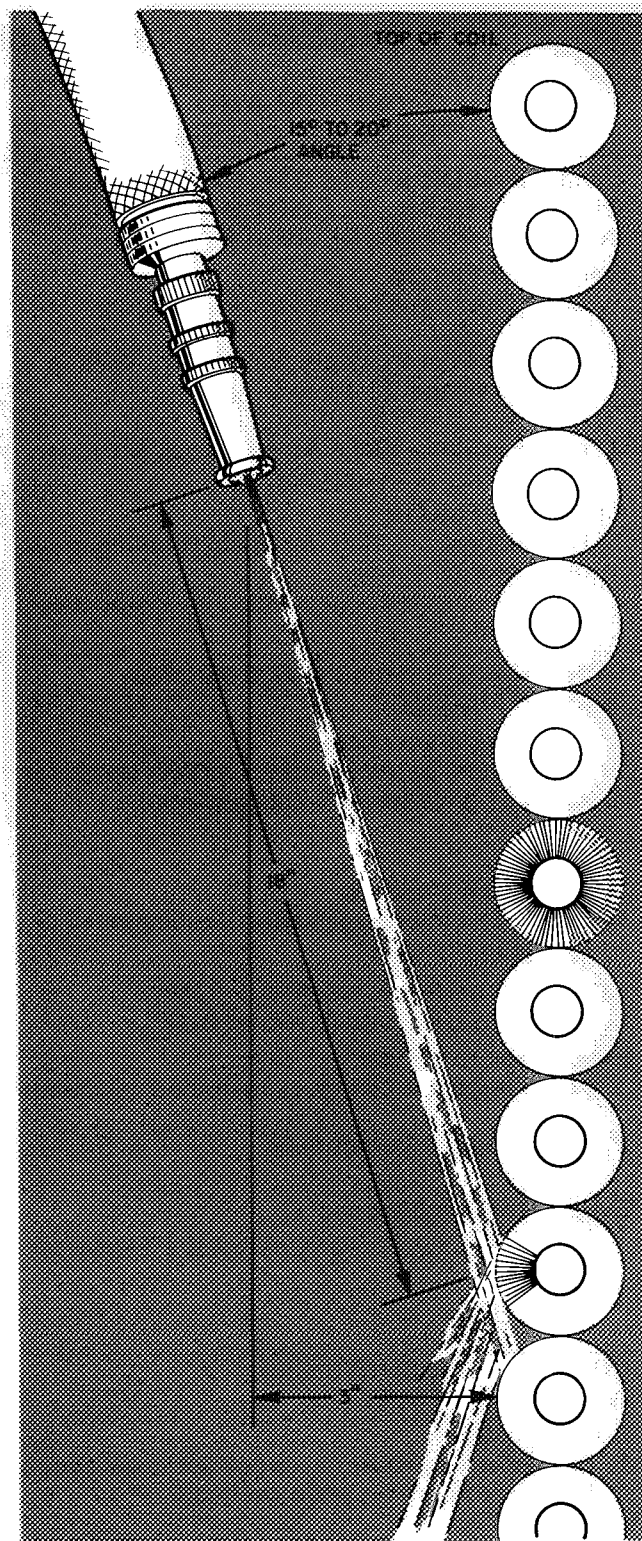
**CAUTION:** Fin damage can result in higher operating costs or compressor damage. Do not use flame, high-pressure water, steam or volatile or corrosive cleaners on fins and tubing. Follow these instructions carefully. Contact your dealer if you encounter problems.

1. Shut off power to unit.
2. Remove louvered casing by taking out 16 screws securing it to the cabinet and sliding it away from the coil.
3. Clean coil using vacuum cleaner and its crevice tool (see Fig. 11). Work crevice tool *vertically* making sure tool only touches dirt on fins. To prevent fin damage, do not “scrub” fins with tool or move tool horizontally.
4. If oil deposits are present, spray coil with ordinary household detergent. Wait 10 minutes then proceed to step 5.
5. Using garden hose, spray coil vertically downward with a constant stream of water at moderate pressure (see Fig. 12). Keep nozzle at a



**Fig. 11 — Crevice Cleaning Tool**

15 to 20 degree angle, about 3 in. from coil face and 18 in. from tube. Spray so debris is washed out of coil.



**Fig. 12 — Positioning Hose to Spray Coil**

6. Reinstall louvered casing being careful not to damage coil.
7. Restore power to unit.

## TROUBLESHOOTING GUIDE

SYMPTOM AND PROBABLE CAUSE	PROBABLE REMEDY
<p><b>COMPRESSOR SHUTS OFF, FAN OVERLOAD OR HIGH-PRESSURE SWITCH CUT OUT, OR INTERNAL PRESSURE RELIEF OPENS</b></p> <p><b>Condenser Fan On</b></p> <ol style="list-style-type: none"> <li>1 Condenser air restricted or recirculating</li> <li>2 Refrigerant overcharge; noncondensables in system, system restricted.</li> <li>3 Improper line voltage, loose electrical connections, faulty run capacitor</li> </ol> <p><b>Condenser Fan Off</b></p> <ol style="list-style-type: none"> <li>1 Fan slipping on shaft, fan motor bearing stuck, fan motor defective.</li> <li>2 Loose electrical connections Fan motor overload open.</li> </ol>	<ol style="list-style-type: none"> <li>1 Condenser coil blocked See Maintenance, Coil Cleaning Check airflow clearance (Fig 1)</li> <li>2 Review Refrigerant Charging procedures, purge system, replace filter drier, check refrigerant control</li> <li>3. Review Installation, Step 4; replace capacitor.</li> </ol> <ol style="list-style-type: none"> <li>1 Tighten fan hub setscrews, see Condenser Fan Motor Removal.</li> <li>2. Check unit wiring. Check motor bearings. Replace motor</li> </ol>
<p><b>COMPRESSOR RUNS BUT COOLING IS INSUFFICIENT</b></p> <ol style="list-style-type: none"> <li>1. Low refrigerant charge.</li> <li>2. Dirty filters, partially restrict airflow (evaporator coil may have partial frost condition).</li> </ol> <p><b>High Suction Pressure</b></p> <ol style="list-style-type: none"> <li>1 Defective compressor valves (accompanied by low head pressure).</li> </ol>	<ol style="list-style-type: none"> <li>1. Check Refrigerant Charging procedures</li> <li>2 Check evaporator air system for dirty filters, obstruction in ductwork, improper damper settings Refer to coil, fan coil or furnace instructions as applicable</li> </ol> <ol style="list-style-type: none"> <li>1 Perform Compressor Replacement procedure Recheck system charge</li> </ol>
<p><b>COMPRESSOR SHUTS OFF FROM LOW-PRESSURE SWITCH CUTOUT</b></p> <p><b>Evaporator Fan Runs</b></p> <ol style="list-style-type: none"> <li>1 Low refrigerant charge or restricted evaporator air</li> <li>2 Restricted refrigerant flow.</li> </ol> <p><b>Evaporator Fan Stopped</b></p> <ol style="list-style-type: none"> <li>1 Evaporator fan motor defective or inoperative</li> </ol>	<ol style="list-style-type: none"> <li>1 See Compressor Runs But Cooling Is Insufficient above regarding filters, ductwork, etc</li> <li>2 Check refrigerant flow device, be sure correct AccuRater™ or TXV is used</li> </ol> <ol style="list-style-type: none"> <li>1. Check furnace or fan instructions regarding defective fan relay, belt adjustment, condition of motor bearings and overloads, check and tighten electrical connections, check power supply</li> </ol>
<p><b>COMPRESSOR SHUTS OFF, WILL NOT RESTART</b></p> <p><b>Contactors Open</b></p> <ol style="list-style-type: none"> <li>1 Burned out transformer, open thermostat circuit, faulty control relay, open overload</li> </ol> <p><b>Contactors Closed or Closes Then Opens</b></p> <ol style="list-style-type: none"> <li>1 Compressor power is out, compressor motor is burned out or internal overloads are open Time Guard II circuit faulty</li> </ol>	<ol style="list-style-type: none"> <li>1. Check control circuit components and wiring. Refer to unit label diagram, check all conditions. Refer to Standard Service Techniques Manual, Chapter 2, Electrical.</li> </ol> <ol style="list-style-type: none"> <li>1 Check main power supply wiring Refer to Electrical Data table and label diagram. Substitute Time Guard II with a replacement to verify its operation Refer to Standard Service Techniques Manual, Chapter 2, Electrical</li> </ol>

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.

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