

## Installation, Start-Up and Service Instructions

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

#### ▲ WARNING

Before installing or servicing system, always turn off main power to system. There may be more than one disconnect switch. Turn off accessory heater power if applicable. Electrical shock can cause personal injury.

### INSTALLATION

#### Step 1 — Complete Pre-Installation Checks

**UNCRATE UNIT** — Remove unit packaging except for the top skid assembly and wood bumpers, which should be left in place until after unit is rigged into place.

**INSPECT SHIPMENT** — File claim with shipping company if shipment is damaged or incomplete.

#### CONSIDER SYSTEM REQUIREMENTS

- Consult local building codes and National Electrical Code (NEC) for special installation requirements.
- Allow sufficient space for airflow clearance, wiring, refrigerant piping, and servicing unit. See Fig. 1.
- Locate unit so that condenser airflow is unrestricted on all sides and above. Refer to Fig. 1.
- Unit may be mounted on a level pad directly on base channels or mounted on raised pads at support points. See Table 2 for weight distribution based on recommended support points.

**NOTE:** If vibration isolators are required for a particular installation, use data in Table 2 to make proper selection.

Table 1 — Physical Data

UNIT 38AF	007	008
<b>OPER WEIGHT (lb)</b>	300	400
<b>REFRIGERANT*</b>	22	22
<b>COMPRESSOR</b>		
Oil (pts)	4 6	8 0
Crankcase Heater Watts	40	40
<b>CONDENSER AIR FAN</b>	Propeller; Direct Drive	
Number...Rpm	1 1075	1 1075
Diameter (in.)	22	22
Motor Hp (NEMA)	½	½
Nominal Cf <sub>m</sub> Total	3500	4300
<b>CONDENSER COIL</b>		
Face Area (sq ft)	10 8	17 7
Storage Capacity (lb)†	16 8	18 0
<b>CONNECTIONS (Sweat)</b>	1½	
Suction (in.)	½	
Liquid (in.)	½	
<b>CONTROLS</b>		
<b>Pressurestat Settings</b>		
High	Cutout	426 ± 7 psig
	Cut-in	320 ± 20 psig
Low	Cutout	27 ± 4 psig
	Cut-in	67 ± 7 psig
<b>FUSIBLE PLUG</b>	200 F	

\*Unit is factory supplied with holding charge only.

†Storage capacity of condenser coil with coil 80% full of liquid R-22 at 124 F

#### Step 2 — Rig and Mount the Unit

#### ▲ CAUTION

Be sure unit panels are securely in place prior to rigging.

**RIGGING** — These units are designed for overhead rigging only. Traverse base channels are provided with 1-1/2 in. rigging holes that are located 1-3/4 in. from each end. Rig with top skid packaging assembly and wood bumper strips in place to prevent unit damage by rigging cable. As further protection for coil faces, plywood sheets may be placed against sides of unit, behind cables. Run cables to a central suspension point so that angle from the horizontal is not less than 45 degrees. Raise and set unit down carefully.

If it is necessary to roll unit into position, mount unit on longitudinal rails, using a minimum of 3 rollers. *Apply force to rails, not unit.* If unit is to be skidded into position, place it on a large pad and drag it by the pad. *Do not apply any force to unit.*

Raise from above to lift unit from rails or pad when unit is in final position.

## Step 3 — Complete Refrigerant Piping Connections

→ The evaporator coils on all indoor sections are equipped with a single-circuit coil requiring only one liquid and one suction connection to match 38AF condensing unit connections. Suction connection is 1-1/8-in. sweat with plastic cap; liquid connection is 1/2-in. sweat with plastic cap. Follow standard piping practices.

### REFRIGERANT PIPING SIZES

COND UNIT	EQUIVALENT LENGTH OF PIPING — FT							
	0-25		26-50		51-75		76-100	
	Line Size (in. OD)							
	L	S	L	S	L	S	L	S
38AFP007	1/2	1 1/8	1/2	1 1/8	1/2	1 1/8	1/2	1 1/8
38AFC008	1/2	1 1/8	1/2	1 1/8	5/8	1 1/8	5/8	1 1/8

L — Liquid Line    S — Suction Line

#### NOTES:

- 1 Pipe sizes are based on a 2° loss for liquid and suction lines
- 2 Pipe sizes are based on an equivalent length equal to the maximum length of interconnecting piping plus 50 percent for fittings
- 3 Charge units with R-22 in accordance with unit installation instructions

**SIZE REFRIGERANT LINES** — Consider length of piping required between condensing unit and evaporator, amount of liquid lift, and compressor oil return. See Table 3 and also refer to Part 3 of Carrier System Design Manual for design details and line sizing. Refer to evaporator installation instructions for additional information.

**USE FILTER DRIER AND MOISTURE INDICATOR** — The filter drier is factory supplied. Moisture indicator (sight glass) is a field-installed option and should be installed just after liquid line shutoff valve. *Do not use a receiver;* there is none provided with unit and one should not be used.

**MAKE PIPING CONNECTIONS** — Remove block-off in corner post and unsweat caps from liquid and suction lines.

**NOTE.** Unit is shipped with R-22 holding charge. System pressure must be relieved before unsweating caps

Pass nitrogen or other inert gas through piping while brazing to prevent formation of copper oxide.

Install field-supplied thermostatic expansion valve(s) to evaporator section. If 2 thermostatic expansion valves are installed for 2-step cooling, install field-supplied liquid line solenoid valve ahead of the second expansion valve.

**PROVIDE SAFETY RELIEF** — A fusible plug is located in unit liquid line. Do not cap this plug. If local code requires additional safety devices, install as directed.

## Step 4 — Complete Electrical Connections

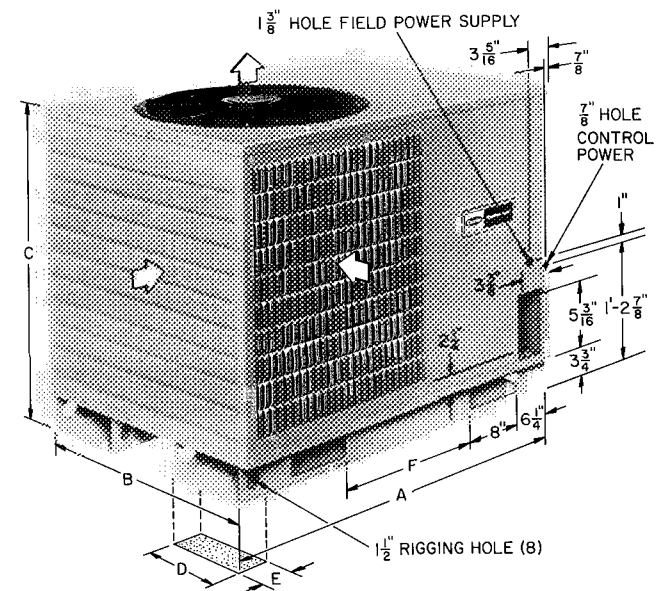
**POWER WIRING** — Unit is factory wired for voltage

shown on nameplate. Provide adequate fused disconnect switch within sight of unit, readily accessible, but out of reach of children. Provision for locking switch open (off) is advisable to prevent power from being turned on while unit is being serviced. Disconnect switch, fuses, and field wiring must comply with National Electrical Code and local code requirements.

Route power wires through opening in unit side panel and connect in unit control box as shown on unit label diagram and Fig. 2. Unit must be grounded.

Affix crankcase heater warning sticker to unit disconnect switch.

**CONTROL CIRCUIT WIRING** — Control voltage is 24 volts. See Fig. 3 and unit label diagram for field-supplied wiring details. Route control wires through opening in unit side panel to connection in unit control box.



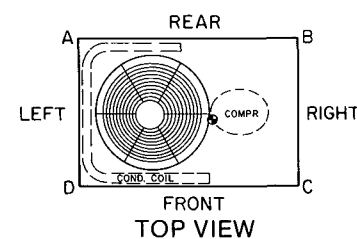
	UNIT 38AF	007	008
Length	A	2-9	4- 0%
Width	B	2-9	2- 8%
Height	C	2-8	2-11%
Base Rail Width	D	0-10 1/2	0-10 1/2
Minimum Support	E	0-4	0- 4
Lift opening separation	F	1- 0 1/4	1-10

**NOTE:** Units may be installed with any one side, except compressor access side, within one ft of wall or other airflow obstruction as long as remaining sides have at least 3 ft clearance. Compressor side access is always 3 feet. Units may be located side by side with a minimum of 3 ft between units. Allow at least a 5-ft clearance above the unit.

Fig. 1 — Dimensions (ft.-in.)

Table 2 — Weight Distribution

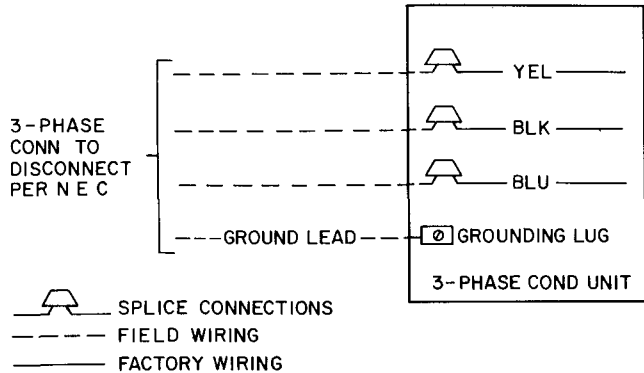
UNIT 38AF	WEIGHT (lb)				
	Oper Wt	Support Point			
		A	B	C	D
007	300	54	78	100	68
008	410	75	116	133	86



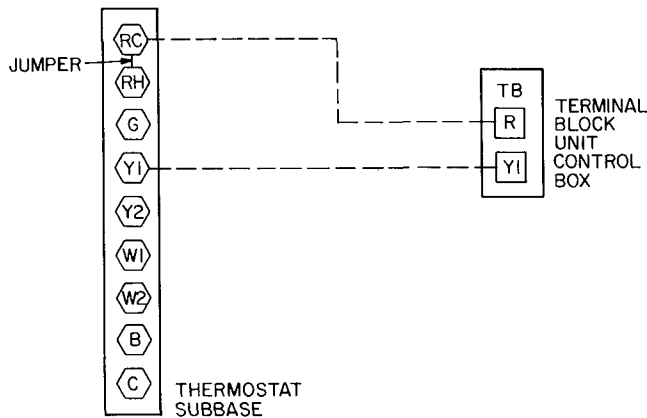
**Table 3 — Liquid Line Data**

UNIT 38AF	MAX ALLOWABLE LIQUID LIFT (ft)	LIQUID LINE	
		Max Allowable Pressure Drop (psi)	Max Allowable Temp Loss (F)
007	70	7	2
008	70	7	2

NOTE: Values shown are for units operating at 45F saturated suction and 95F entering air.



**Fig. 2 — Line Power Connections**



**Fig. 3 — Remote Thermostat Wiring**

## START-UP

### Preliminary Checks

1. Check that all internal wiring connections are tight and that all barriers, covers and panels are in place.
2. Field electrical power source must agree with unit nameplate rating.
3. All service valves must be open.
4. Crankcase heaters must be firmly seated into compressor crankcase.

**Leak Test** entire refrigerant system by pressure method described in Carrier Standard Service Techniques Manual, Chapter 1, Section 1-6. Use R-22 at approximately 25 psig backed up with an inert gas to a total pressure not to exceed 245 psig.

**Table 4 — Electrical Data (3-Ph/60-Hz)**

38AF	UNIT					FAN		COM-PRESSOR	
	Volts		ICF	MCA	MOCP (Fuse)	FLA†	RLA	LRA	
	Nameplate	Supplied* Min Max							
007	208-230	187 253	140	36 3	60	2.9	26 7	137	
	460	414 528	71	16 6	25	1 5	12 1	69	
	575	518 666	58	14.9	20	2.9‡	9.6	55	
008	208-230	187 253	186	44 4	60	2 9	32 5	183	
	460	414 528	93	20 9	25	1 5	15 2	91	
	575	518 666	76	18 8	25	2.9‡	12.4	73	

**FLA** — Full Load Amps  
**ICF** — Maximum Instantaneous Current Flow  
**LRA** — Locked Rotor Amps  
**MCA** — Minimum Circuit Amps per NEC Section 430-24  
**MOCP** — Maximum Overcurrent Protection  
**RLA** — Rated Load Amps (compressor)

\*Units are suitable for use on electrical systems where voltage supplied to the unit terminals is not below or above the listed limits  
 †Fan motor is single phase  
 ‡230 volts

*Before starting unit, crankcase heaters must be on for 24 hours to be sure all refrigerant is out of the oil. To energize crankcase heaters, proceed as follows: set space thermostat above ambient so there will be no demand for cooling. Close field disconnect. The crankcase heaters are now energized.*

**Evacuate and Dehydrate** entire refrigerant system by either of the methods described in Carrier Standard Service Techniques Manual, Chapter 1, Section 1-7.

**Charge System** — Refer to Carrier Standard Service Techniques Manual, Chapter 1, Section 1-8. Using liquid charging method and charging by weight procedure, charge to a clear sight glass. After proper charge has been determined, indicate this amount on unit's aluminum informative plate section entitled "Refrig./System R-22."

**To Start Unit** — Assuring that crankcase heater has been on for 24 hours and field disconnect is closed, set room thermostat below ambient. Unit compressor will start after a 15-second delay.

## SERVICE

**Crankcase Heater** prevents refrigerant migration and compressor oil dilution during shutdown when compressor is not operating. If crankcase heater is de-energized for more than 6 hours, both compressor service valves must be closed.

**Condenser Fan** is supported by a reinforced wire guard to which the fan motor is bolted.

Figure 4 shows proper mounted fan position.

### Lubrication

**FAN MOTORS** have permanently sealed, lubricated bearings. *Do not oil.*

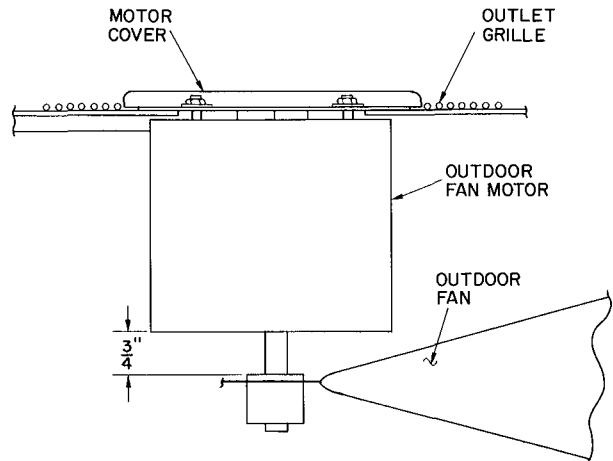
**COMPRESSOR** also has its own oil supply.

**CONDENSER FAN ADJUSTMENT** (Fig. 4) — Shut off unit main power supply. Remove condenser fan assembly (grille, motor, motor cover and fan) and loosen fan hub setscrews. Adjust fan height as shown in Fig. 4. Tighten setscrews and replace fan assembly.

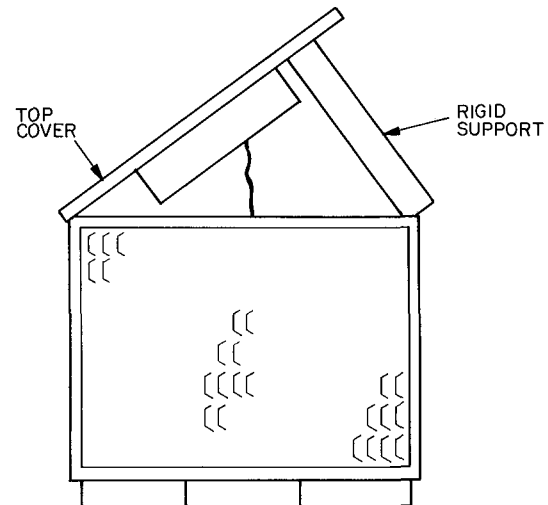
**Cleaning Coils** — Coils can be cleaned with a vacuum cleaner, washed out with water, blown out with compressed air, or brushed (*do not use wire brush*). Fan motors are drip proof but not waterproof.

Clean coil annually or as required by location or outdoor air conditions. Inspect coil monthly, and clean as required. Fins are not continuous through coil sections. Dirt and debris may pass through first section, become trapped between the row of fins and restrict condenser airflow. Use a flashlight to determine if dirt or debris has collected between coil sections. Clean coil as follows:

1. Turn off unit power.
2. Disconnect fan motor leads. Note position of leads for reconnection.
3. Remove screws holding top cover in place. Do not remove fan motor or orifice.
4. Remove top cover assembly from unit (see Fig. 5). Be especially careful not to damage coil fins.
5. Using a water hose, or other suitable equipment, flush down between the sections of coil to remove dirt and debris.
6. Clean the remaining surfaces in the normal manner.
7. Reposition outer coil sections. Reinstall top cover assembly. Make certain fan motor leads are in compressor compartment before replacing screws. Care must be taken to prevent damage to coil fins.
8. Reconnect fan motor leads.
9. Replace all screws.



**Fig. 4 — Condenser Fan Adjustment**



NOTE: Top cover must come off

**Fig. 5 — Pivot and Support Top Cover**

## TROUBLESHOOTING GUIDE

### COMPRESSOR DOES NOT RUN

#### Contactors Open

Power off — *restore power.*

Fuses blown — *replace with correct fuses after finding cause and correcting.*

Transformer dead — *replace transformer if primary windings are receiving power.*

Thermostat circuit open — *check thermostat setting.*

Circuit breaker tripped — *check for excessive compressor current draw (140% FLA maximum allowable).*

Low-pressure switch open — *check for refrigerant undercharge or obstruction of indoor airflow.*

High-pressure switch open — *check for refrigerant overcharge or obstruction of outdoor airflow.*

Connections loose — *tighten all connections.*

Compressor stuck — *see compressor service literature.*

Compressor motor thermostat open — *check for excessive motor temperature.*

#### Contactors Closed

Compressor leads loose — *check connections.*

Motor windings open — *see compressor service literature.*

Single phasing — *replace blown fuse.*

### COMPRESSOR CYCLES ON HIGH-PRESSURE SWITCH

#### Condenser Fan On

High-pressure switch faulty — *replace switch.*

Airflow restricted — *remove obstruction.*

Air recirculating — *clear airflow area.*

Noncondensables in system — *purge and recharge as required.*

Refrigerant overcharge — *purge as required.*

Line voltage incorrect — *consult power company.*

Refrigerant system restrictions — *check or replace filter drier, expansion valve, etc.*

#### Condenser Fan Off

Fan slips on shaft — *tighten fan hub setscrews.*

Motor not running — *check power and capacitor.*

Motor bearings stuck — *replace bearings.*

Motor overload open — *check overload rating. Check for fan blade obstruction.*

Motor burned out — *replace motor.*

### COMPRESSOR CYCLES ON LOW-PRESSURE SWITCH

#### Evaporator Air Fan Running

Filter drier plugged — *replace filter drier.*

Expansion valve power head defective — *replace power head.*

Low refrigerant charge — *add charge. Check low-pressure switch setting.*

#### Airflow Restricted

Evaporator coil iced up — *check refrigerant charge.*

Evaporator coil dirty — *clean coil fins.*

Indoor air filter dirty — *clean or replace filters.*

Indoor air dampers closed — *check damper operation and position.*

#### Evaporator Air Fan Stopped

Electrical connections loose — *tighten all connections.*

Fan relay defective — *replace relay.*

Motor overload open — *power supply.*

Motor defective — *replace motor.*

Fan belt broken or slipping — *replace or tighten belt.*

### COMPRESSOR RUNS BUT COOLING INSUFFICIENT

#### Suction Pressure Low

Refrigerant charge low — *add refrigerant.*

Head pressure low — *check refrigerant charge. Check condenser air fan thermostat settings.*

Indoor air filters dirty — *clean or replace filters.*

Expansion valve power head defective — *replace power head.*

Evaporator coil partially iced — *check low-pressure setting.*

Evaporator airflow restricted — *remove obstruction.*

#### Suction Pressure High

Compressor valves defective — *see compressor service literature.*

Heat load excessive — *check for open doors or windows.*



# 38AF Air-Cooled Condensing Units

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

Book 1 4  
Tab 3a 2a

PC 111

Catalog No 563-852

Printed in U S A

Form 38AF-1SI

Pg 6

989

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Replaces: New

For replacement items use Carrier Specified Parts.