Number One Air Conditioning Maker

Carrier

Division of Carrier Corporation

Carrier Parkway • Syracuse N Y 13221

Installation, Start-Up and Service Instructions

50PQ

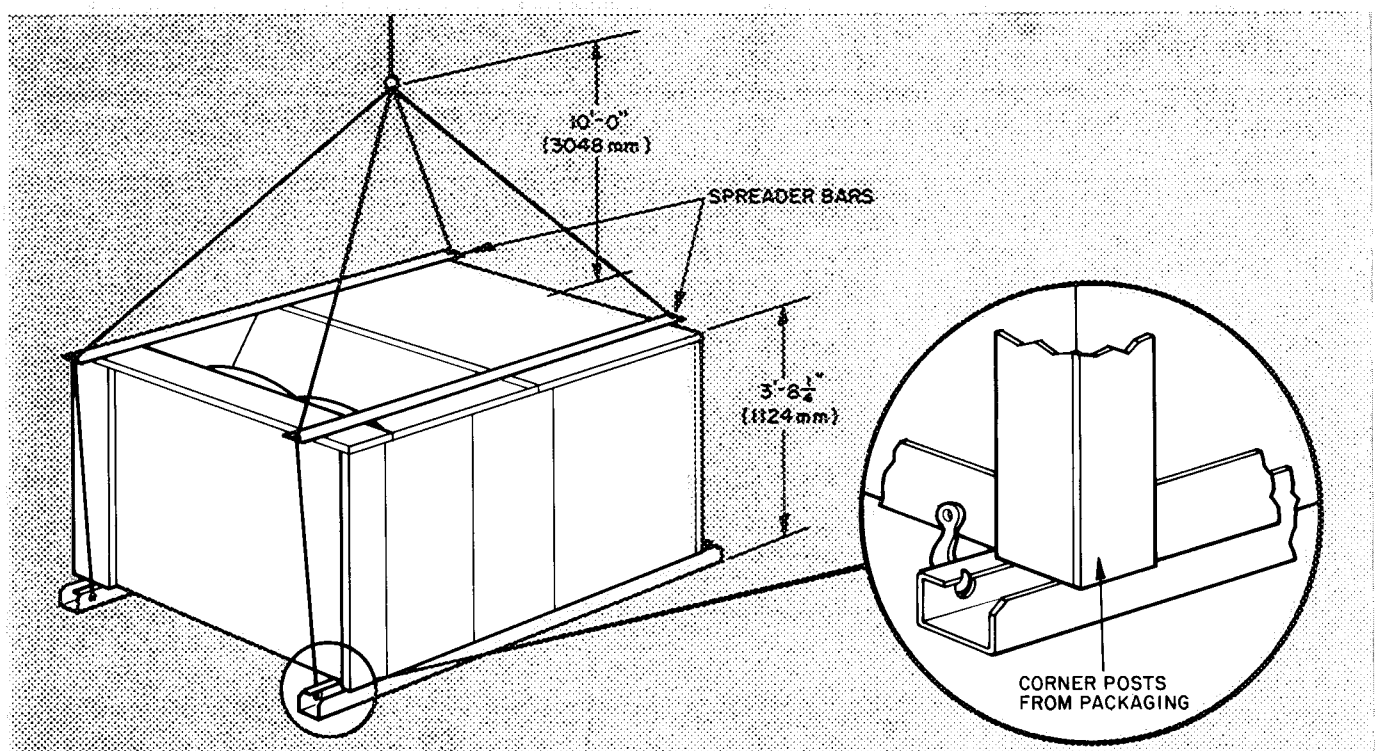
3-12 Ton

Single-Package Heat Pumps

INSTALLATION

Rigging and Unit Placement — Inspect unit for transportation damage. File any claim with transportation agency. Do not drop unit. Keep unit upright. Use spreader bars over unit to prevent sling or cable damage. Rollers may be used to move unit across a roof. Level unit by using unit frame as a reference; unit leveling tolerance is ±1/16 in. per linear ft in any direction. See Fig. 1 for additional information. Unit weight is shown in Table 1.

Four lifting holes are provided in ends of unit base rails as shown in Fig. 1. Refer to rigging instructions on unit. Refer to Accessory Roof Curb Installation Instructions for additional information as required. Locate unit so that defrost drainage holes in outdoor section of base pan are not covered by the roof curb.



UNIT MODEL	WEIGHT		WEIGHT WITH ECONOMIZER	
	LB	Kg	LB	Kg
50PQ012	1460	663	1610	731
50PQ016	1750	795	1900	863

NOTE: Rig by inserting hooks into unit base rails as shown. Maintain a distance of 120 in. (3048mm) from top of unit to eyehook. Use corner post from packaging to protect coil of unit from damage by rigging cable. Use bumper boards for spreader bars.

CAUTION!

All panels must be in place when rigging.

Fig. 1 — Rigging Details

Table 1 — Physical Data

UNIT SIZE 50PQ		012	016
OPERATING WT (lb)			
Unit		1460	1750
With Economizer		1610	1900
Roof Curb		200	200
COMPRESSOR		Hermetic — 2 Cylinders	Semi-Hermetic — 4 Cylinders
No. ...Type		2 P64	2 06D818
Oil (oz)		76 ea	112 ea
REFRIGERANT (Capillary Control)		R-22	R-22
Charge (lb) Sys 1*, Sys 2		9 1, 9 1	16 8, 16 8
OUTDOOR COIL		Copper Tube, Aluminum Plate Fins/in	
Rows		2	3
Fins/in		14	14
Total Face Area (sq ft)		18 9	22 2
OUTDOOR AIR FAN		Propeller Type, Direct Drive	
Nominal Cfm		8000	12,000
No. ...Diam (in.)		2 22	2. 26
Motor Hp (1075 Rpm)		1/2	1
INDOOR COIL		Copper Tube, 14 Aluminum Plate Fins/in	
Total Face Area (sq ft)		16 5	18 3
Rows		2	3
INDOOR BLOWER		Centrifugal, Adjustable Belt Drive	
Size (in)		10x10	10x10
Nominal Cfm		4000	6000
Rpm Range	Std	690- 978	916-1186
	Opt	878-1191	1158-1428
Max Allowable Rpm		1550	1550
Fan Pulley Pitch Diam (in.)	Std	6 0	6 4
	Opt	5 5	6 4
Belt, No. ..Type. .Length (in)		1 V 51	1 V 56
Speed Change per Full Turn	Std	58	54
of Moveable Pulley Flange (Rpm)	Opt	63	54
Moveable Pulley Max Full Turns from Closed Position			
Factory Setting — Full Turns Open		5	5
Factory Speed Setting (Rpm)	Std	690	916
	Opt	878	1158
Motor Hp	Std	1	3
	Opt	1-1/2	3
HEAT ANTICIPATOR SETTING		4	5
DEFROST THERMOSTAT CONTACTS (F)			
Open		65	
Close		28	
HIGH PRESSURE SWITCH			
Cutout (psig)		428	
Reset (psig)		395	
LOW PRESSURE SWITCH (Liquid Line)			
Cutout (psig)		5	
Reset (psig)		20	
FREEZESTAT CONTACTS (F)			
Open		5	
Close		45	
AIR INLET SCREENS		2 20x25x1	
Economizer, No. ..Size (in.)		1 20x20x1	
INDOOR AIR FILTERS	Type	10% efficient — 2-in Disposable Fiber Glass	
No. . .Size (in.)		2 20x20x2 2 16x25x2 3. .16x20x2	4 20x20x2 4 16x20x2

*System 1 consists of upper portion of outdoor coil and lower portion of indoor coil

Roof Curb — Assemble and install accessory roof curb in accordance with instructions shipped with this accessory. Refer to Fig. 2. Accessory roof curb and information required to field fabricate a roof curb of 2 in. x 12 in. planks is shown in Fig. 2. Install insulation, cant strips, roofing and flashing as shown. Ductwork can be installed to roof curb before unit is set in place. Curb should be level. Unit leveling tolerance is ±1/16 in. per linear ft in any direction. This is necessary to permit unit drain to function properly.

Roof Mount — Check building codes for weight distribution requirements. Unit weight is shown in Table 1.

Alternate Unit Support Methods — Where the curb cannot be used, support unit with sleepers using unit curb support area. If sleepers cannot be used, support long sides of unit a minimum of 3 equally spaced 4-in. x 4-in. pads on each side.

Positioning — Position unit to prevent snowdrifts from blocking outdoor coil. Provide clearance around and above unit for airflow, safety and service access.

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

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

Outdoor Air Intake — The unit can be equipped with an outdoor air damper (economizer) which mixes outdoor air with return air.

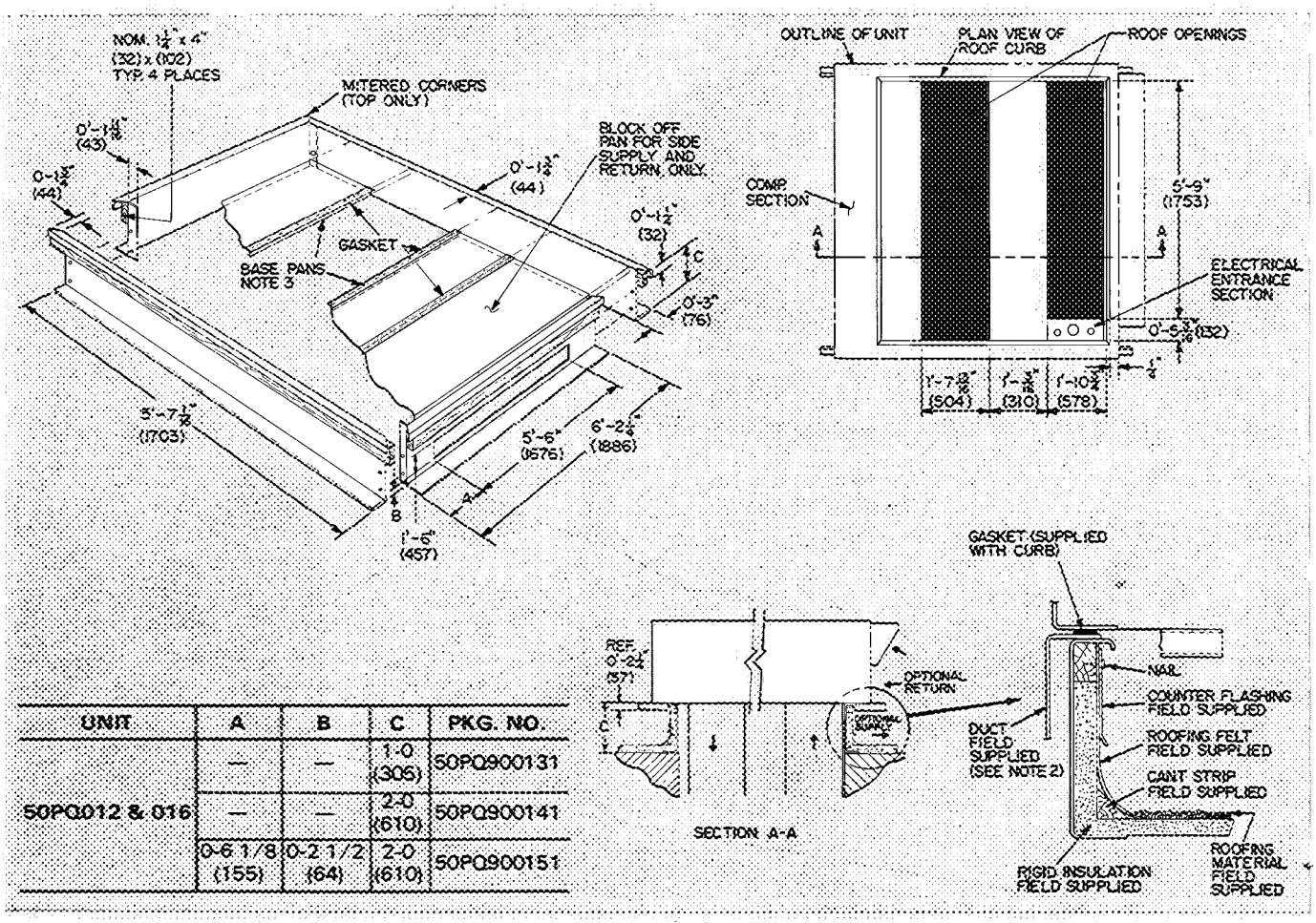
Field-Fabricated Ductwork — Secure all ducts to building structure. Use flexible duct connectors between unit and ducts as required. Insulate and weatherproof all external ductwork, joints and roof openings with flashing and mastic in accordance with applicable codes.

Ducts passing thru an unconditioned space must be insulated and covered with a vapor barrier.

A minimum clearance is not required for any air duct installation.

Outlet grilles must not lie directly below unit discharge.

Unit Duct Connections — Unit is shipped for thru-the-bottom duct connections. Ductwork openings are shown in Fig. 2 and 3. Duct connections are shown in Fig. 4. Field-fabricated concentric



UNIT	A	B	C	PKG. NO.
50PQ012 & 016	—	—	1-0 (305)	50PQ900131
	—	—	2-0 (610)	50PQ900141
	0-6 1/8 (155)	0-2 1/2 (64)	2-0 (610)	50PQ900151

NOTES:
1 Dimensions in parenthesis ( ) are millimeters.
2 Attach all ductwork to roof curb
3 Place gasket on edge of base pans before installing unit

Fig. 2 — Roof Curb Details — 50PQ012,016

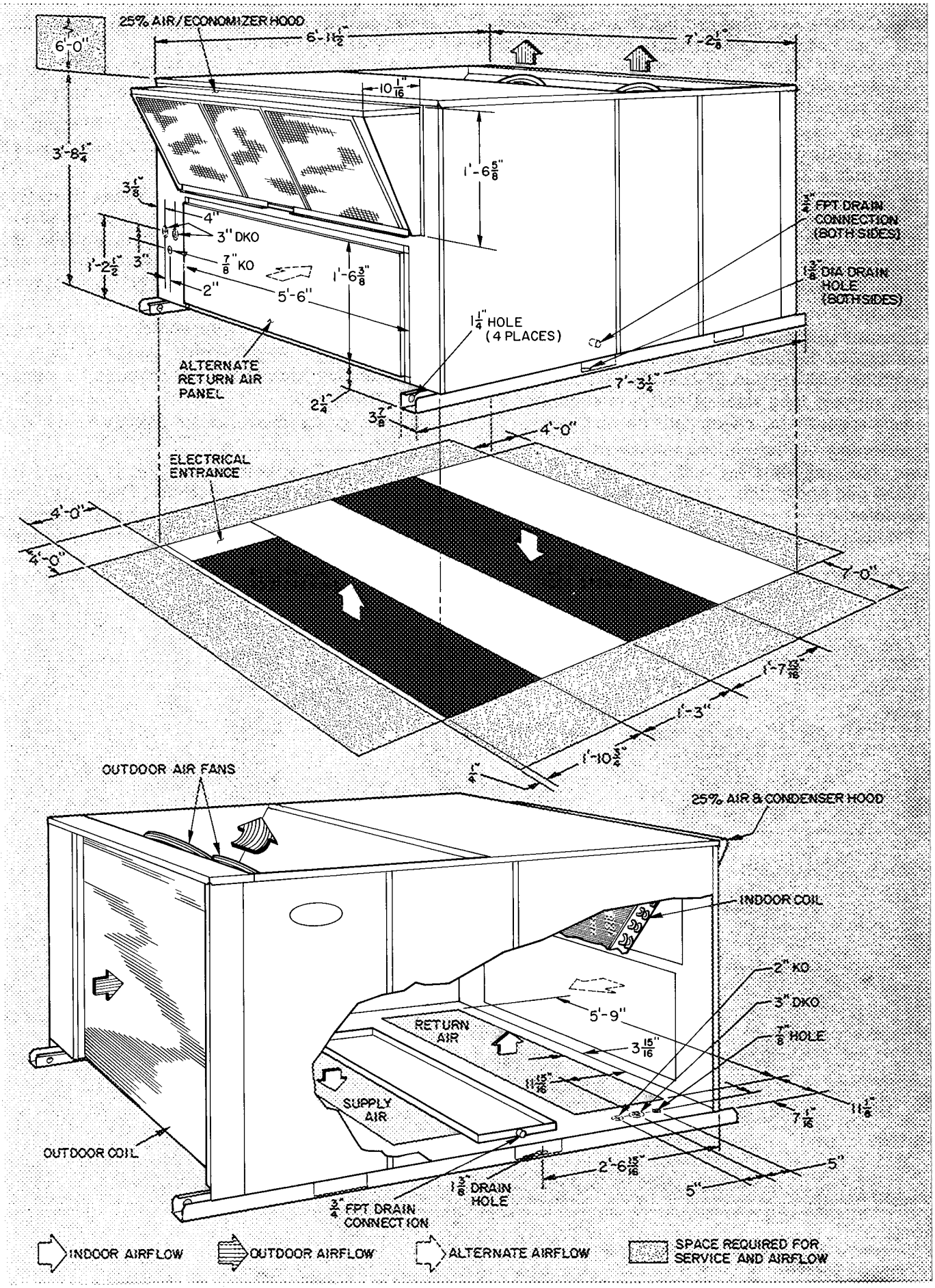


Fig. 3 — Physical Data and Dimensions

ductwork may be connected to unit as shown in Fig. 5. Attach all ductwork to roof curb and roof curb base pans.

Concentric duct details are shown in Fig. 6. Also, refer to installation instructions shipped with accessory roof curb.

Economizer Section — Remove filter access panel. Check that outdoor air damper is closed and return air damper is open.

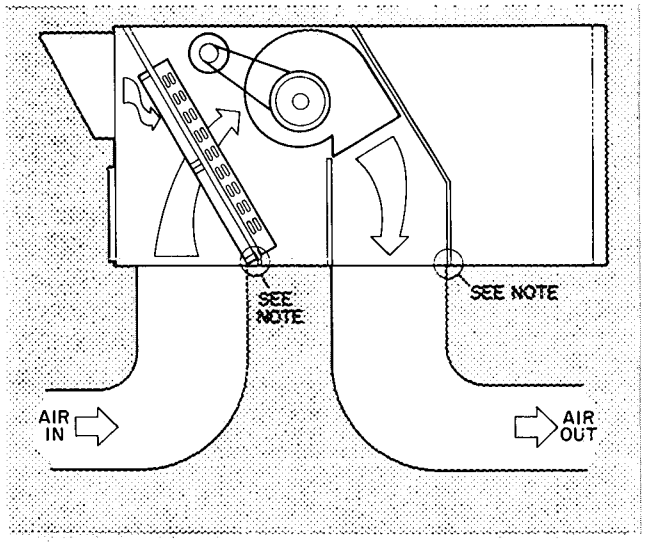
Economizer operation and adjustment is described in Start-Up, Economizer Operation; and Service, Economizer Adjustment, respectively.

Outside Air Damper (25% ventilation air) — Outside air damper can be adjusted to permit up to 25% outdoor air entry into return air compartment.

Outdoor Air Hood Installation (Fig. 3) — The outdoor air hood is common to 25% air ventilation and economizer. The economizer and all electrical connections are factory installed and adjusted. The hood assembly, outdoor air inlet screen(s) and required hardware are shipped in a carton located on outdoor fan section and must be field installed.

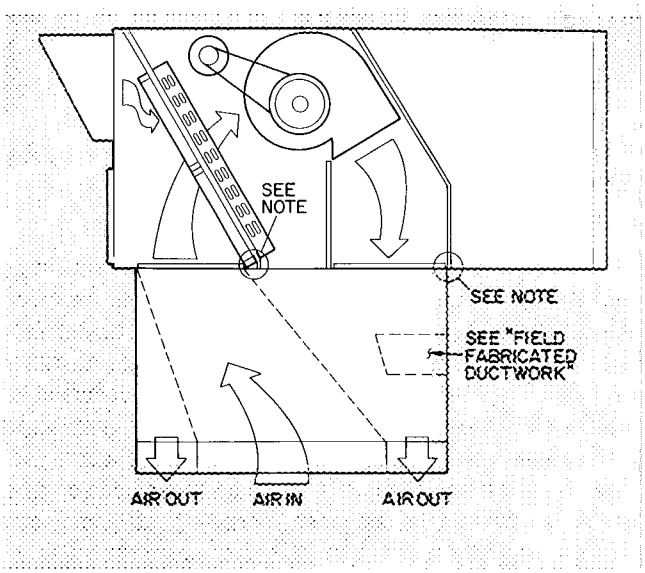
Using screws in carton install hood as follows:

1. Assemble hood top cover, side panels and bottom track angle (Fig. 7).
2. Loosen base unit top cover sheet metal screws above outdoor air inlet opening.
3. Matching notches in hood top cover to unit top cover screws, insert hood flange beween unit top cover flange and unit. Tighten screws.
4. Secure hood sides and bottom track angle to unit. The screw on unit that matches bottom track angle center hole must be removed prior to assembly. Re-use screw to secure bottom track angle to unit.
5. Insert outdoor air filters and spacer in hood filter tracks. NOTE: Hood may also be installed by individually attaching hood parts to base unit following sequence above.
6. Attach filter retainers to bottom track angle.



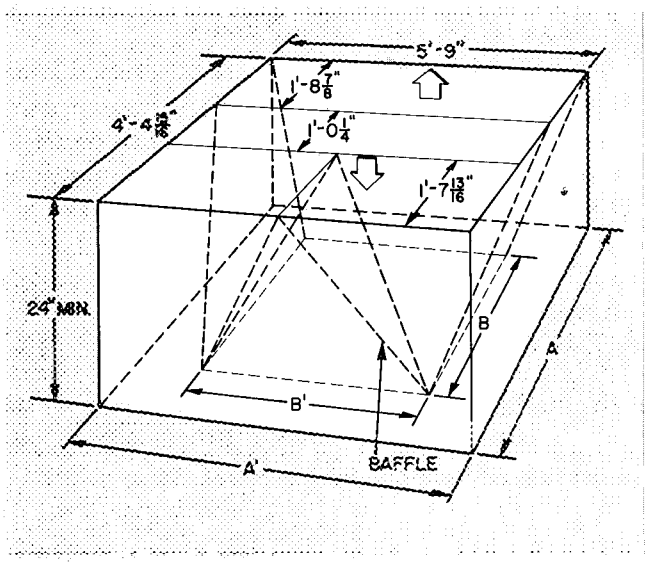
NOTE: Do not drill in this area, damage to base pan may result in water leak

Fig. 4 — Air Distribution — Thru-the-Bottom



NOTE: Do not drill in this area as damage to base pan may result in water leak

Fig. 5 — Concentric Duct Air Distribution



NOTE: Dimension A, A1 and B, B1 are obtained from field-supplied ceiling diffuser

Fig. 6 — Concentric Duct Details

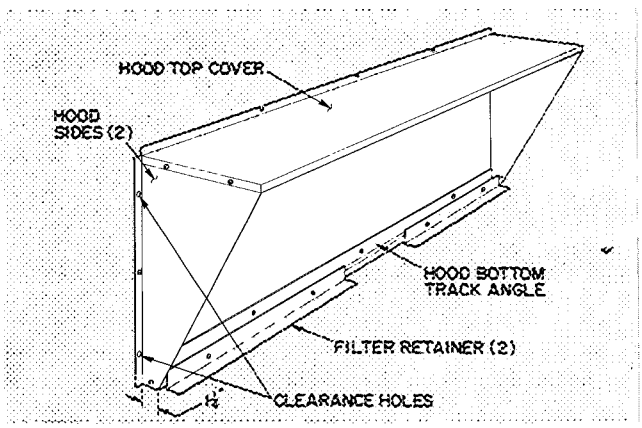


Fig. 7 — Outdoor Air Hood Details

Indoor Blower — Blower belts and pulleys are factory installed. Belts are secured to pulleys with tape. Remove tape and, if required, adjust as described in Service, Indoor Blower Adjustment.

Outdoor Air Fans and Motors are factory set. Refer to Service, Outdoor Air Fan Adjustment as required.

Condensate Drain — See Fig. 3 and 8 for drain locations. Two 3/4-in. half couplings are provided inside the unit evaporator section for the condensate drain connection(s). An 8-1/2 x 3/4-in. diameter and 2-in. x 3/4-in. diameter pipe nipple coupled to standard 3/4-in. diameter elbows provide a straight path down thru holes in the unit base rails (see Fig. 9). A trap of at least 4 in. deep must be used and must be protected against freeze-up. If only one drain connection is trapped, other connection must be plugged.

Field Power Supply — Unit is factory wired for voltage shown on nameplate. Units are provided with terminal block.

When installing units, provide a fused disconnect of adequate size. See Table 2 and 3.

All field wiring must comply with National Electrical Code and local requirements.

Route power lines thru control box end panel — or unit basepan — (Fig. 3) to terminal connections as shown on unit wiring diagram and Fig. 10.

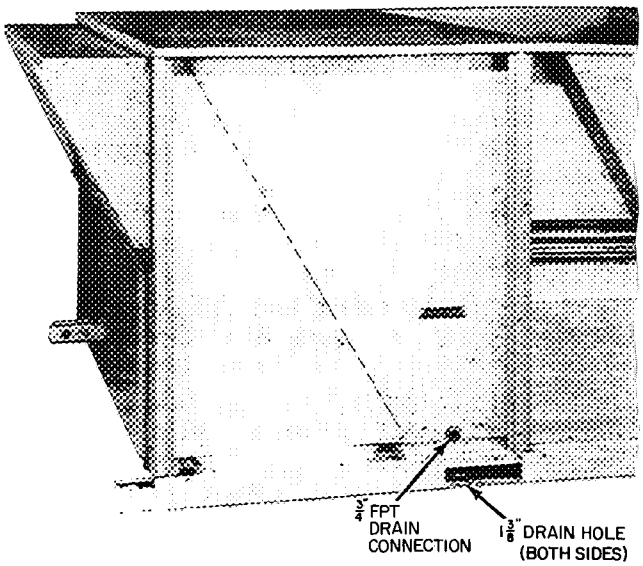


Fig. 8 — Condensate Drain Details

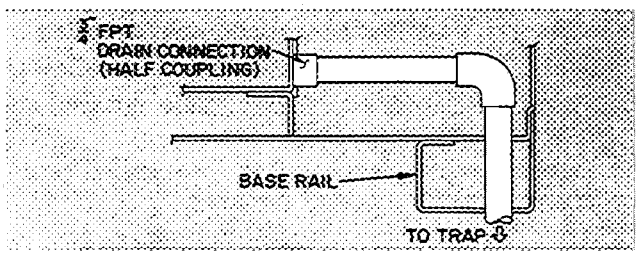


Fig. 9 — Condensate Drain Piping Details

Table 2 — Electrical Data — 50PQ012

VOLTS-PH-HZ	VOLTAGE RANGE		COMPR NO. 1 & 2		OUTDOOR FAN MOTORS		INDOOR FAN MOTOR		FACTORY INSTALLED HEATERS	POWER SUPPLY	
	Min	Max	RLA	LRA	Qty	FLA	Hp	FLA	FLA	Min Ckt Amp	Max Fuse Amps
200-3-60	180	220	24	113	2	4.6	1	3.5	—	70	80
							1-1/2	5.5	—	70	80
							1	3.5	39	120	125
							1	3.5	72	165	150
							1	3.5	117	215	200
							1	3.5	156	270	225
							1-1/2	5.5	39	120	125
							1-1/2	5.5	72	165	150
							1-1/2	5.5	117	230	200
							1-1/2	5.5	156	270	225
230-3-60	207	253	19.9	98	2	3.8	1	3.2	—	65	70
							1-1/2	4.8	—	65	70
							1	3.2	45	110	110
							1	3.2	82	230	150
							1	3.2	135	285	200
							1-1/2	4.8	45	110	110
							1-1/2	4.8	82	230	150
							1-1/2	4.8	135	285	200
460-3-60	414	508	10.4	49	2	2.1	1	1.6	—	30	35
							1-1/2	2.4	—	40	35
							1	1.6	21	50	60
							1	1.6	39	70	70
							1	1.6	66	100	100
							1-1/2	2.4	21	55	60
							1-1/2	2.4	39	70	70
							1-1/2	2.4	66	100	100
575-3-60	518	632	8.3	41	2	1.8	1	1.4	—	25	25
							1-1/2	2.4	—	25	25

FLA — Full Load Amps **LRA** — Locked Rotor Amps **RLA** — Rated Load Amps

Table 3 — Electrical Data — 50PQ016

VOLTS-PH-HZ	VOLTAGE RANGE		COMPR NO. 1 & 2		OUTDOOR FAN MOTORS		INDOOR FAN MOTOR		FACTORY INSTALLED HEATERS	POWER SUPPLY	
	Min	Max	RLA	LRA	Qty	FLA	Hp	FLA	FLA	Min Ckt Amp	Max Fuse Amps
208/230-3-60	187	253	30 8	137	2	6.6	3	11 0	—	95	110
									72/ 82	185/200	175/200
									117/135	240/270	225/250
									156/180	290/325	250/300
460-3-60	414	508	13 5	62	2	3 3	3	4 7	—	50	50
									—	50	50
									39	95	90
									66	130	110
									96	175	150
									39	95	90
									66	130	110
									96	175	150
575-3-60	518	632	10 8	50	2	2 6	3	3 8	—	40	40
									—	40	40

FLA — Full Load Amps
LRA — Locked Rotor Amps
RLA — Rated Load Amps
⬚ — Unit may be used on 208- or 230-volt supply Shaded values apply when used on 230-volt supply

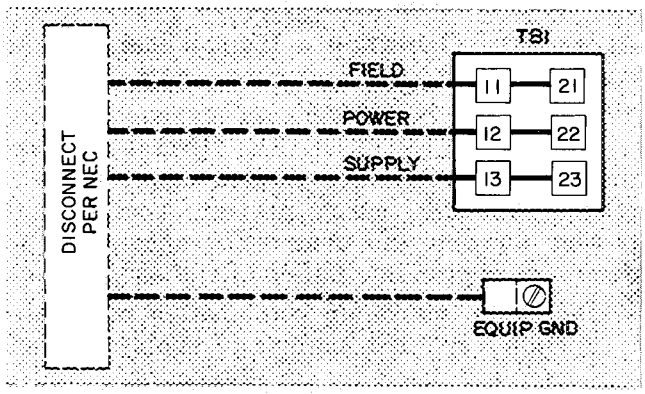


Fig. 10 — Field Power Wiring Connections

Operating voltage to compressor must be within voltage range indicated on unit nameplate. On 3-phase units, voltages between phases must be balanced with 2% and the current must be balanced within 10%. Contact local power company for correction of improper voltage or phase imbalance. Unit failure as a result of operation on improper line voltage or excessive phase imbalance constitutes abuse and may cause damage to electrical components. Such operation would invalidate applicable Carrier warranty.

Field Control Wiring — Install a Carrier-approved accessory thermostat assembly according to installation instructions included with accessory. Locate thermostat assembly on a solid wall in the conditioned space to sense average temperature.

Route thermostat cable or equivalent single leads of no. 18 AWG colored wire from subbase terminals thru connector on unit to low-voltage connections as shown on unit label wiring diagram and in Fig. 11. Use no. 16 AWG wire for lengths exceeding 50 feet. Set heat anticipator settings as indicated in Table 1. Settings may be changed slightly to provide a greater degree of comfort for a particular installation.

Refer to accessory remote control panel instructions as required.

Return Air Filters — Check that correct air return filters are installed in filter tracks. See Table 1. Do not operate unit without return air filters.

Outdoor Air Inlet Screens — Outdoor air inlet screen(s) must be in place before operating unit.

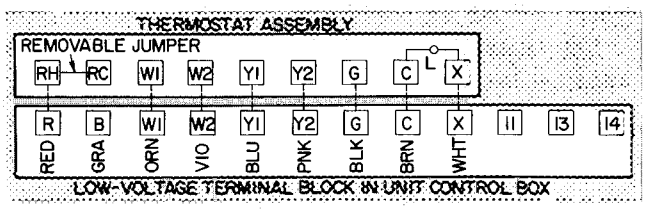


Fig. 11 — Field Control Thermostat Wiring

START-UP

Unit Preparation — Make sure that unit has been installed in accordance with installation instructions and applicable codes.

Compressor Mounting — On 50PQ012 units, compressors are internally spring mounted. Do not loosen or remove compressor hold-down bolts. On 50PQ016 units, loosen compressor hold-down bolts until sidewise movement of the washer under each hold-down bolt head can be obtained. Do not loosen completely as bolts are self-locking and will maintain adjustment.

Internal Wiring — Check all electrical connections in unit control boxes. . .tighten as required.

Refrigerant Service Valves — Each 50PQ012 unit system has 2 Schraeder type service ports, 1 on suction line and 1 on compressor discharge line. Be sure that caps on the ports are tight. The 50PQ016 has 1 service valve on suction line, 1 on discharge line and 1 on liquid line.

Crankcase Heater(s) are energized as long as there is power to the unit.

Cooling — To start unit, turn on main power supply. Set system selector switch at COOL and fan switch at AUTO. Set thermostat below room temperature. Number 1 compressor starts on closure of no. 1 contactor on all units.

Additional rise in room temperature closes cooling contact no. 2 in thermostat, energizing no. 2 contactor. Second compressor (no. 2) starts.

Check cooling effects at a setting above room temperature. Check unit charge. Refer to Refrigeration Charge in Service Section.

Reset thermostat at a temperature above room temperature. Compressor will shut off.

TO SHUT OFF UNIT — Set system selector switch at OFF position or reset thermostat above room temperature. Units with Signal-LOC™ protection device shut down on any safety trip and thermostat light comes on. Determine reason for safety trip. Restart 012 compressor by turning thermostat selector switch OFF then ON. Restart 016 compressor by resetting circuit breaker at unit.

Heating — To start unit, turn on main power supply. Refer to Crankcase Heaters.

Set thermostat at HEAT, fan at AUTO. and above room temperature.

First stage of the heating thermostat energizes compressor no. 1; second stage energizes compressor no. 2. Electric heater elements cannot be energized until defrost switch closes (approximately 40 F). When this occurs, first stage of the thermostat energizes compressor no. 1 and no. 2; second stage energizes electric heater elements.

TO SHUT OFF UNIT — Set system selector switch at OFF or set heating selector level below room temperature.

Safety Relief — A fusible plug in the accumulator provides pressure relief under abnormal temperature and pressure conditions.

Defrost Cycle — As frost builds up on outdoor coil, defrost thermostat closes and unit operates in a defrost cycle (controlled by the defrost timer and thermostat). During this cycle, outdoor air fans shut off as the unit operates on cooling cycle for a maximum of 10 minutes. During defrost, bottom of outdoor coil defrosts first to ensure proper drainage. Optional electric heaters are energized to maintain a warm air supply to conditioned spaces.

Ventilating (Continuous Fan) — Set fan and system selector switches at ON and OFF, respectively. Indoor air fans operate continuously to provide constant air circulation.

Automatic Changeover — The unit automatically switches from heating mode to cooling mode when system selector switch is set at AUTO. and temperature of the conditioned space rises to cooling selector lever setting. When temperature of the conditioned space falls to the heating selector lever setting, unit automatically changes from cooling mode to heating mode. The thermostat is interlocked so that cooling and heating systems do not operate at the same time.

Economizer Operation — If unit is equipped with modulating outdoor air control (economizer), it should operate as follows:

ENTHALPY CONTROL SETTING — Set enthalpy control (Fig. 12) to desired temperature and relative humidity which provides cooling with outside air only (no compressor operation). To determine appropriate setting of enthalpy control:

1. Determine maximum combination of relative humidity and temperature of supply air considered acceptable for the installation.
2. In Fig. 13, locate percent humidity on the left-hand scale and dry-bulb temperature on the

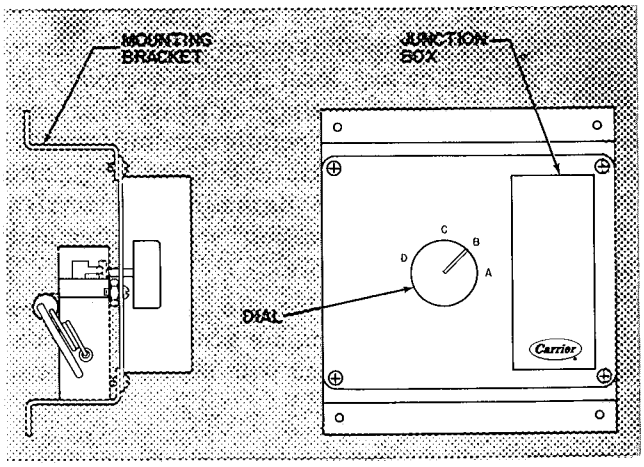


Fig. 12 — Enthalpy Control Assembly

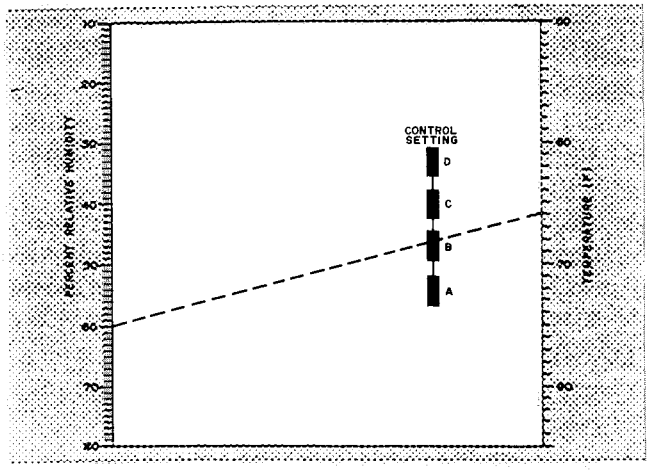


Fig. 13 — Nomograph for Determining Enthalpy Control Setting

right-hand scale. Example in Fig. 13 uses 60% RH and 66 F.

3. Draw a straight line connecting the 2 points.
4. Adjust the enthalpy control dial to the setting indicated on control setting scale in Fig. 13. The control setting for example conditions is the B range.

MIXED AIR THERMOSTAT SETTING — Set mixed air thermostat in return air compartment to desired temperature of air delivered to the conditioned space (not less than 35 F or condensation in unit will result).

When stage 1 is satisfied, outdoor fans, indoor blowers and compressors shut off. Outdoor air damper closes.

If fan switch is at ON, and stage 1 is satisfied, outdoor air fans and compressors shut off, indoor blowers continue to operate and outdoor air damper stays in ventilation position.

INTERMEDIATE SEASON (Economizer Control) — Operation is similar to cooling season except when stage 1 of cooling thermostat closes, outdoor air fans and compressor remain off if outdoor enthalpy is below enthalpy control setting. Only indoor blowers are operative. As temperature of the mixed air (outdoor air mixed with return air) rises above or drops below mixed air thermostat setting, outdoor air damper modulates to maintain mixed air setting.

With the fan switch at AUTO. and the room thermostat satisfied, indoor blowers shut off and outdoor air damper closes. If fan switch is at ON and room thermostat satisfied, damper goes to ventilation position.

HEATING SEASON — Outdoor air damper always stays in ventilation position while indoor blowers are operating. The damper closes and the indoor blowers shut off when the room thermostat is satisfied.

SERVICE

Cleaning — Inspect unit interior at beginning of each heating and cooling season or as operating conditions require. Remove unit top panel and/or side panels for access to unit interior.

INDOOR COIL — Clean with a stiff brush, vacuum cleaner or compressed air.

OUTDOOR COIL — Clean outdoor coil annually or as required by location or outdoor air conditions. Inspect coil monthly — clean as required.

CONDENSATE DRAINS — Check and clean each year at start of cooling season. In winter, keep drains and traps dry or protect against freeze-up.

FILTERS — Clean or replace at start of each heating and cooling season, or more often if operating conditions require it. Refer to Table 1 for type and size.

OUTDOOR AIR INLET SCREENS — Clean screens with steam or hot water and a mild detergent. Do not use throwaway filters in place of screens.

Lubrication

COMPRESSORS — Each compressor is charged with correct amount of oil at the factory.

FAN SHAFT BEARINGS — No lubrication required. Bearings are permanently lubricated.

FAN MOTOR BEARINGS — No lubrication of outdoor fan or indoor blower motors are required for first 5 years of operation. Annually thereafter, clean and repack bearings with a suitable bearing grease.

Indoor Blower Adjustment — Blower motor pulleys are factory set for speed shown in Table 1. To change blower speed:

1. Shut off unit power supply.
2. Loosen belt by loosening blower motor mounting plate nuts.
3. Loosen movable pulley flange setscrew (see Fig. 14).
4. Screw movable flange toward fixed flange to increase speed and away from fixed flange to decrease speed. Increasing blower speed increases load on motor. Do not exceed maximum speed specified in Table 1.
5. Set movable flange at nearest keyway of pulley hub and tighten setscrew. (See Table 1 for speed change for each full turn of pulley flange.)

To align blower and motor pulleys, loosen blower pulley setscrews and slide blower pulley along blower shaft. Make angular alignment by loosening motor from mounting plate.

To Adjust Belt Tension — Loosen blower motor pivot bolts. Move motor mounting plate up or down for proper belt tension (1/2-in. deflection with one finger) and tighten pivot bolts. Adjust lock bolt and nut on mounting plate to secure in fixed position.

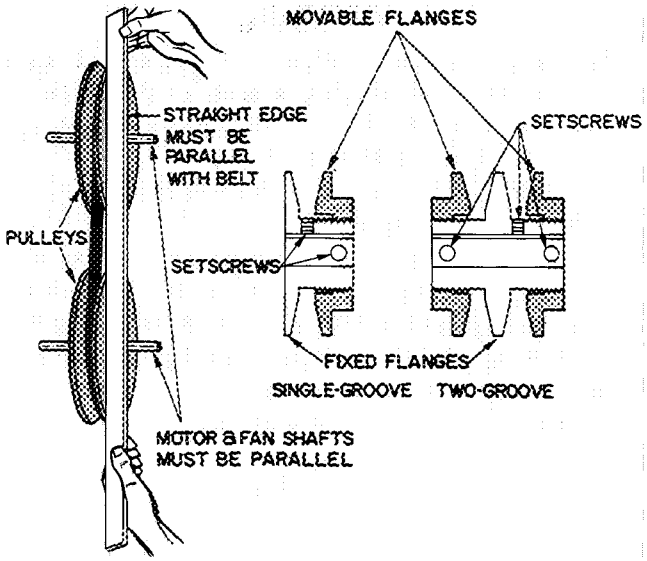


Fig. 14 — Indoor Blower Pulley Alignment and Adjustment

Outdoor Air Fan Adjustment (Fig. 15) — Shut off unit power supply. Remove fan top grille assembly and loosen fan hub screws. Adjust fan height on units using a straight edge placed across the fan orifice. Tighten setscrews and replace rubber hubcap to prevent hub from rusting to motor shaft. Fill hub recess with permagum if rubber hubcap is missing.

Economizer Adjustment

1. Set enthalpy control at its highest setting. If outdoor temperature is above 70 F, perform the following: install jumper between enthalpy control terminals 1 and 2 (red and yellow wires). Remove control relay (CR) from unit economizer control panel.
2. Set system selector switch at COOL and set cooling selector lever at lowest setting. (Cooling mode may be simulated by removing thermostat wires from terminals Y1 and Y2 [if used] and installing jumper between Y1 and R.)

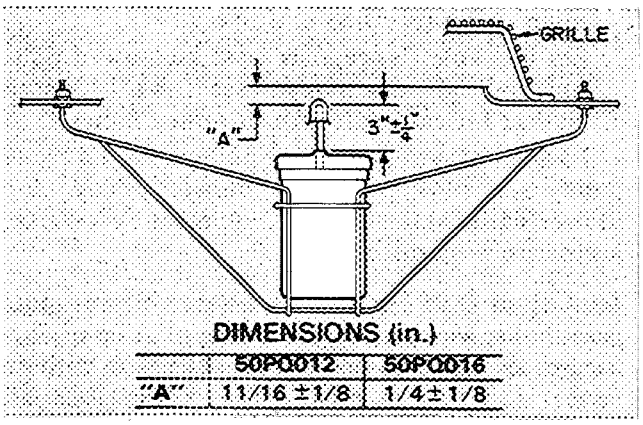


Fig. 15 — Outdoor Air Fan Adjustment

3. Set mixed air thermostat (MAT.) at lowest setting. Outdoor air damper goes to fully open position (indoor air damper closes).
4. Set mixed air thermostat at highest setting. Outdoor air damper goes to fully closed position (indoor air damper opens).
5. Adjust mechanical linkage for correct positioning if necessary. If cooling was simulated in 2, remove jumper and reconnect thermostat wire(s).

DAMPER VENT POSITION SETTING

1. Set fan switch at ON (continuous fan operation) and close night switch if used.
2. Set system selector switch at OFF.
3. Remove cap from vent adjustment screw on damper motor terminal box cover.
4. Turn adjustment screw slowly until dampers assume desired vent position. *Do not manually operate damper motor. Damage to motor will result.*

POWER FAILURE — Dampers do not have a spring return. In event of power failure, dampers remain in position until power is restored. *Do not manually operate damper motor.*

Refrigerant Charge — Amount of refrigerant charge is listed on unit nameplate (also refer to Table 1). Refer to Carrier Standard Service Techniques Manual, Chapter 1, Refrigerants.

Unit panels must be in place when unit is operating during charging procedure.

NO CHARGE — Use standard evacuating techniques. After evacuating system, weigh in the specified amount of refrigerant. (Refer to Table 1.)

LOW CHARGE COOLING — Using appropriate cooling charging chart, Fig. 16 or 17, add refrigerant until conditions of the chart are met. Note that charging charts are different from ones normally used. Charts are based on charging units to correct superheat for various operating conditions. An accurate pressure gage and temperature sensing device are required. Connect pressure gage to service port on the suction line. Mount temperature sensing device on suction line and insulate it so that outdoor ambient temperature does not affect reading. Indoor air cfm must be within normal operating range of unit.

TO USE COOLING CHARGING CHART — Take outdoor ambient temperature and read the suction pressure gage. Refer to chart to determine correct suction temperature. If suction temperature is high, add refrigerant. If suction temperature is low, carefully blow some of the charge. Recheck suction pressure as charge is adjusted.

Example: Fig. 16 — 50-PQ012

Outdoor Temperature ..... 85 F
Suction Pressure ..... 68 psig
Suction Temperature should be ..... 58 F

(Suction Temperature may vary ±5 F.)

If Chargemaster® charging device is used, temperature and pressure readings must be accomplished using appropriate charging chart.

LOW CHARGE, HEATING — If outdoor ambient temperature is above 35 F, operate unit on cooling and refer to LOW CHARGE, COOLING. If outdoor ambient is below 35 F, evacuate system and weigh in specified amount of refrigerant. (Refer to Table 1.)

To check *system operation* during heating cycle, use correct Heating Cycle Operation Check Chart (Fig. 18 or 19). These charts indicate whether a correct relationship exists between system operating pressures and indoor and outdoor entering air temperatures. If pressure and temperature lines do not intersect on chart, the system refrigerant charge may not be correct or other system abnormalities may exist. *Do not use Heating Cycle Charts to adjust refrigerant charge.*

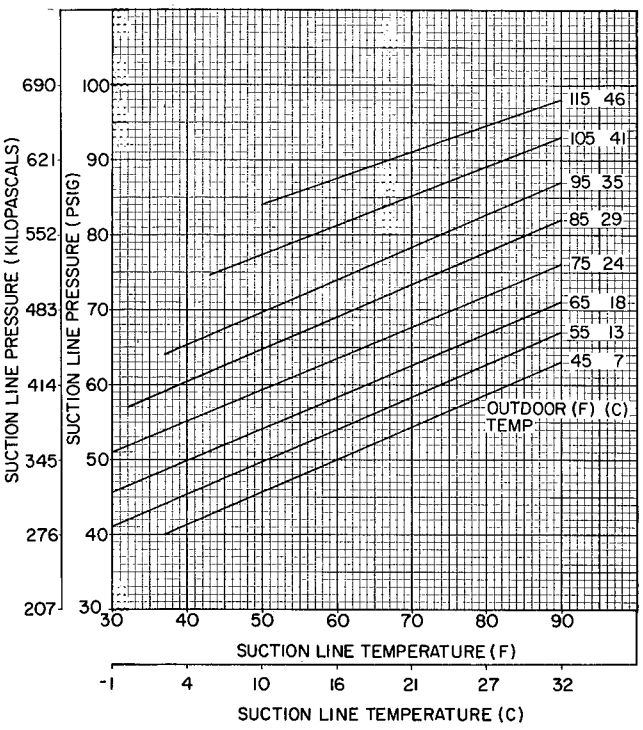


Fig. 16 — Cooling Charging Chart — 50PQ012

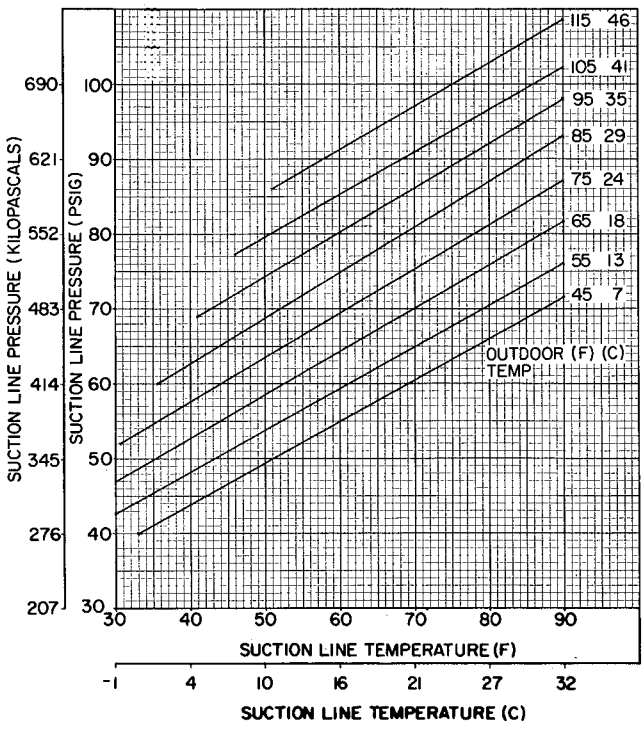


Fig. 17 — Cooling Charging Chart — 50PQ016

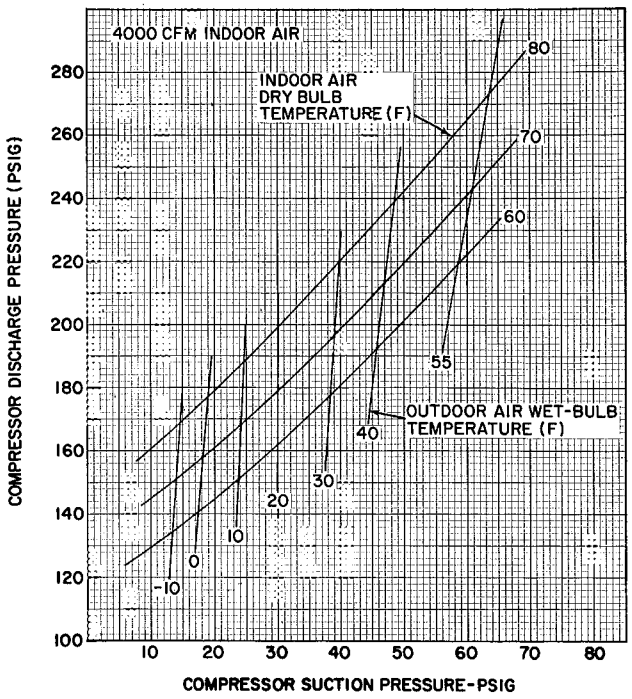


Fig. 18 — Heating Cycle Operation Check Chart — 50PQ012

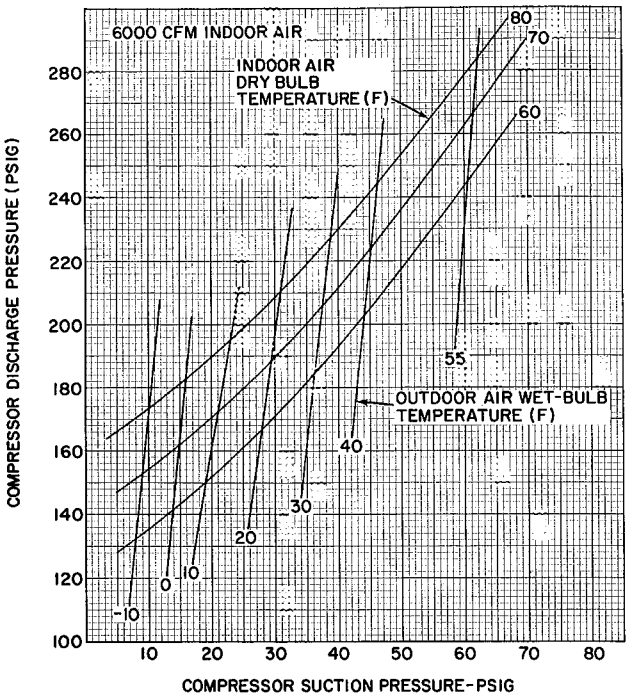
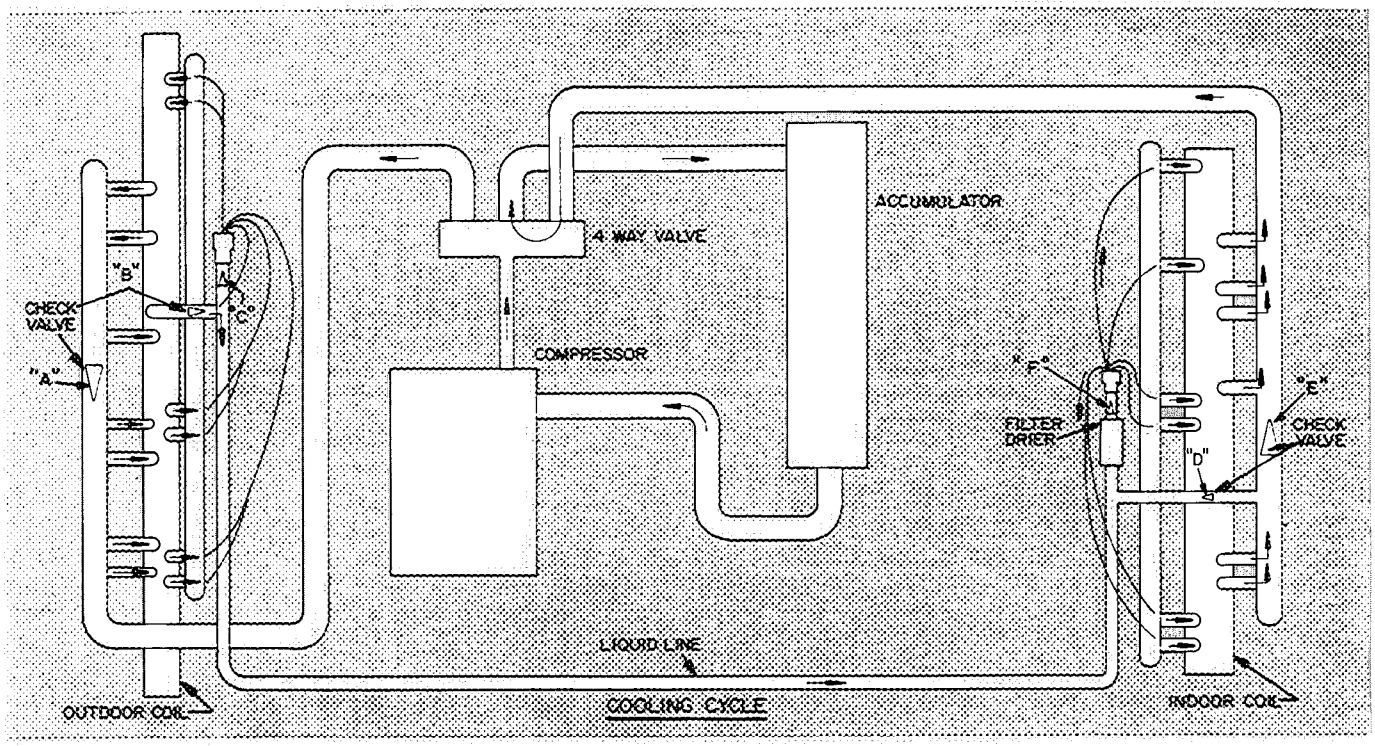


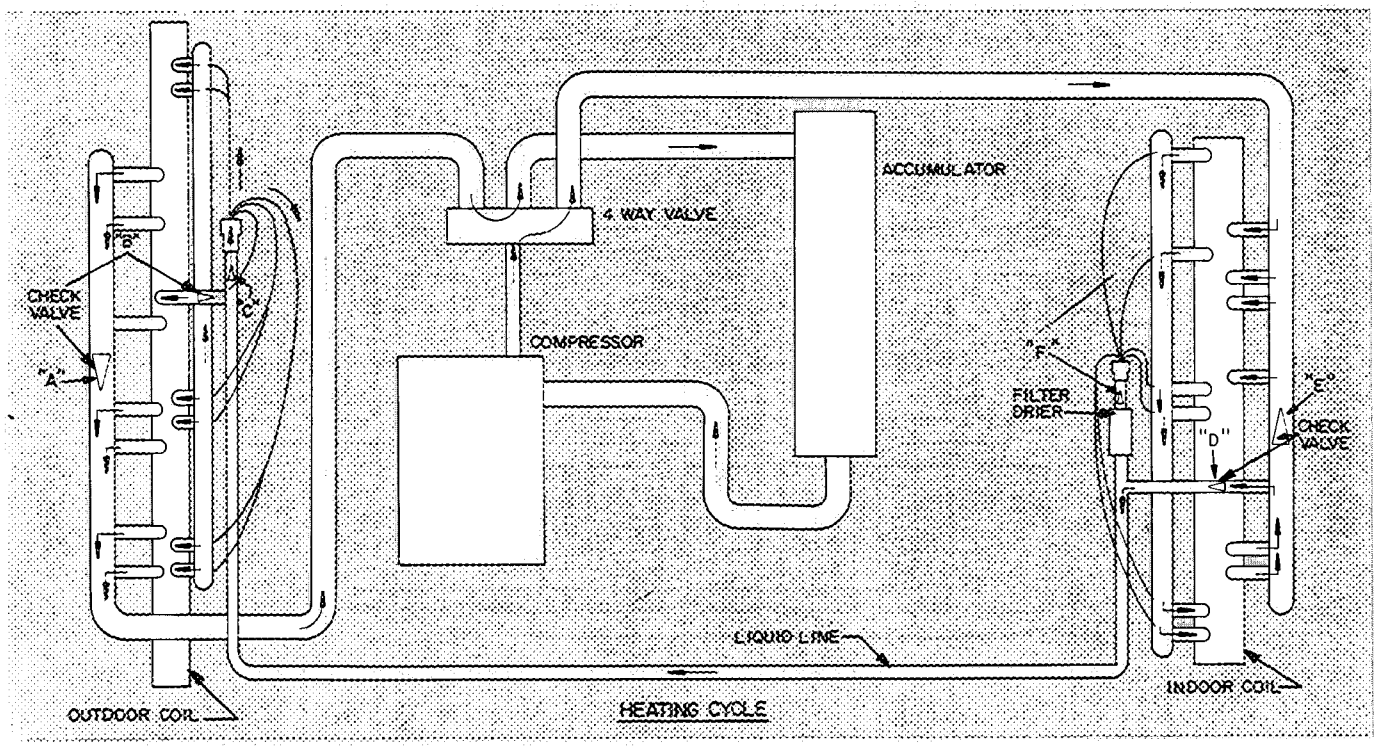
Fig. 19 — Heating Cycle Operation Check Chart — 50PQ016

Table 4 — Check Valve Functions — 50PQ012,016

CHECK VALVE IDENTIFICATION	LOCATION	COOLING CYCLE	HEATING CYCLE	COOLING CYCLE CHECK VALVE STUCK		HEATING CYCLE CHECK VALVE STUCK	
				Open	Closed	Open	Closed
A	Outdoor Coil Header	Closed	Open	Lose Circuiting in Outdoor Coil Acts like Low Charge.	Normal	Normal	Top 3 Circuits Restricted
B	Outdoor Coil Liquid Line Leaving Coil	Open	Closed	Normal	Restricted Liquid Line	Flooding Outdoor Coil & Compressor	Normal
C*	Outdoor Coil Liquid Line Feeding Capillaries	Closed	Open	Lose Slight Amount of Capacity	Normal	Normal	Restricted Outdoor Capillaries
D	Indoor Coil Liquid Line Leaving Coil	Closed	Open	Bypasses Coil & Floods Compressor	Normal	Normal	Restricted Liquid Line
E	Indoor Coil Header	Open	Closed	Normal	Bottom Circuits of Indoor Coil Inactive	Lose Indoor Coil Circuiting. Symptom of Low Charge	Normal
F	Indoor coil liquid line feeding capillaries	Open	Closed	Normal	Restricted Indoor capillaries	Lose small amount of capacity	Normal



1 Hot gas from compressor flows thru the 4-way valve and is directed to the outdoor coil header At the header it is condensed and subcooled thru converging circuits (4-2-1) Refrigerant leaves the outdoor coil by way of the check valve to the liquid line
2 The refrigerant then flows thru the filter-drier and feeds the indoor coil by way of capillary tubes on each circuit
3 Each circuit evaporates the refrigerant and the circuits are combined in the indoor coil header with some of the circuits flowing thru the check valve
4 The refrigerant then flows thru the 4-way valve accumulator and back to the compressor

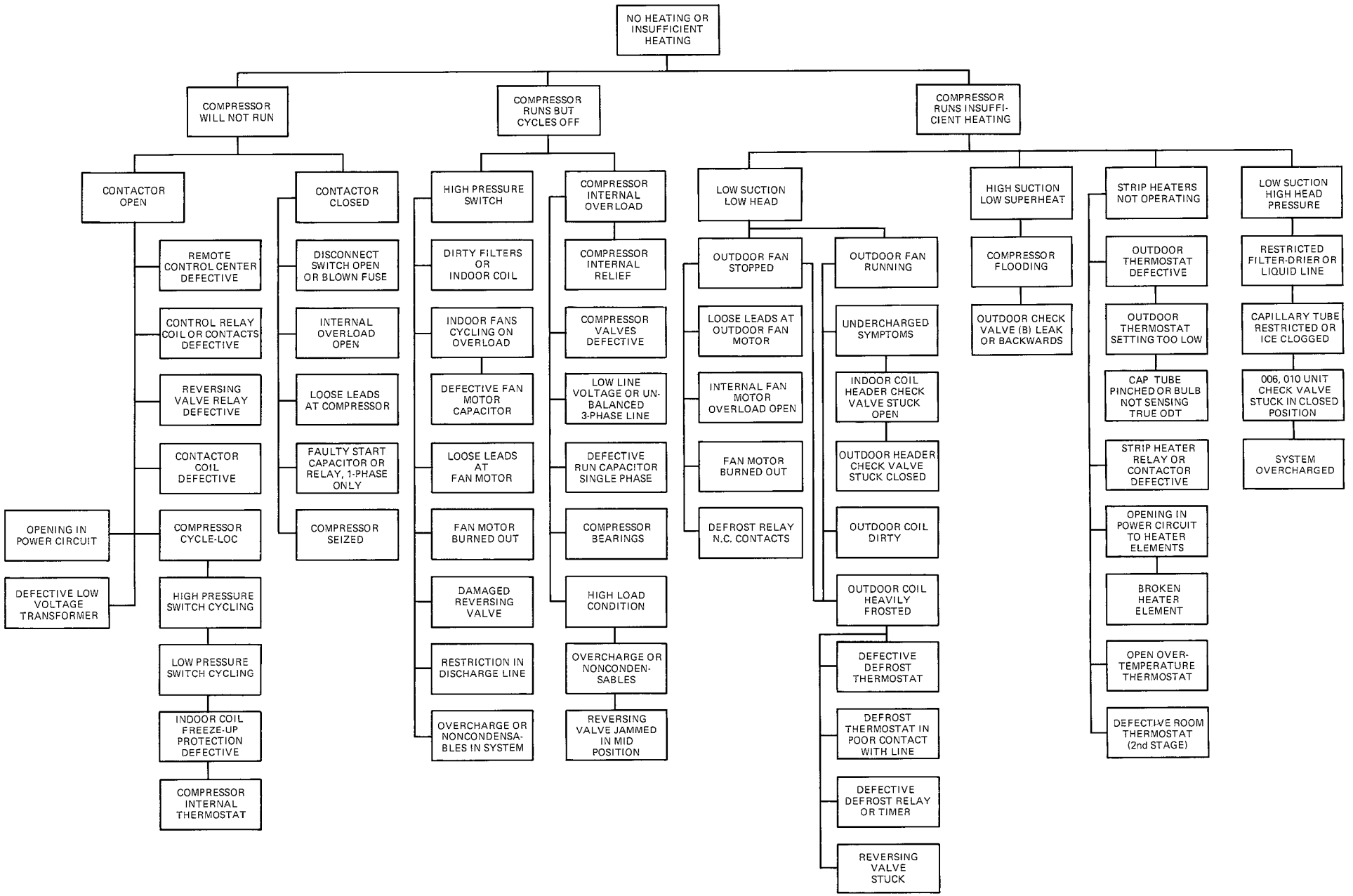


1 Hot gas from compressor flows thru the 4-way valve and is directed to the indoor coil header At the header it is condensed and directed thru subcooling circuits and out the indoor coil check valve to the liquid line
2 The refrigerant then feeds the outdoor coil by way of a strainer and then thru capillary tubes on each circuit
3. Each circuit evaporates the refrigerant and the circuits are combined in the outdoor header with some of the circuits flowing thru the check valve
4 The refrigerant then flows thru the 4-way valve, accumulator and back to the compressor

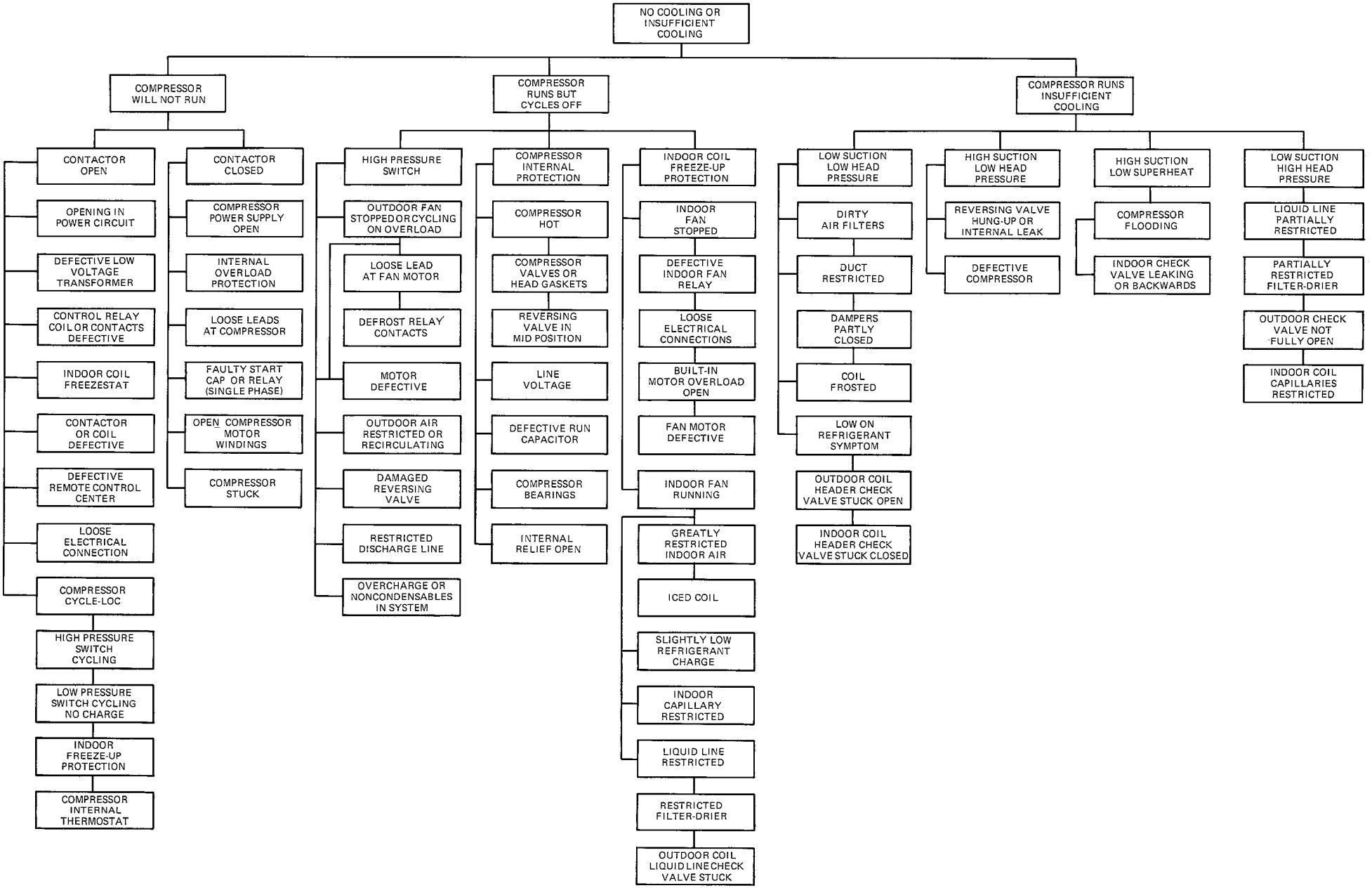
NOTE: Circuitry shown is for single system; 50PQ units with 2 individual and independent refrigeration systems operate in an identical manner

Fig. 20 — Typical Heat Pump Operation

TROUBLESHOOTING CHART, HEATING CYCLE — 50PQ012,016



TROUBLESHOOTING CHART, COOLING CYCLE — 50PQ012,016



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	5a	5a

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