Carrier
HEATING & COOLING

38AH044-084
Air-Cooled Condensing Units
50/60 Hz

Installation, Start-Up and Service Instructions

CONTENTS

SAFETY CONSIDERATIONS

Installing, starting up, and servicing this equipment can be hazardous due to system pressures, electrical components, and equipment location (roofs, elevated structures, etc.)

Only trained, qualified installers and service mechanics should install, start up, and service this equipment.

Untrained personnel can perform basic maintenance functions, such as cleaning coils. All other operations should be performed by trained service personnel.

When working on the equipment, observe precautions in the literature, and on tags, stickers, and labels attached to the equipment and any other safety precautions that may apply.

- Follow all safety codes.
- Wear safety glasses and work gloves.
- Use care in handling, rigging, and setting bulky equipment.

ELECTRIC SHOCK HAZARD.

Open all remote disconnects before servicing this equipment.

INSTALLATION

Step 1 — Rig and Place Unit — All units are designed for overhead rigging, and *it is important that this method be used.* Lifting holes are provided in the frame base rails which are marked for rigging (see rigging label on the unit and on Tables 1A or B and 2A or B for rigging weights and center of gravity). It is recommended that field-supplied pipes, of sufficient length to extend at least 12-in. (305 mm) beyond the frame, be passed through the holes.

To maintain unit stability while lifting, use 4 cables, chains, or straps of equal length. Attach one end of each cable to one pipe end and the other cable end to the overhead rigging point.

Use spreader bars or frame to keep the cables, chains, and straps clear of the unit sides. Leave standard coil protection packaging in place during rigging to provide protection to coils. Remove and discard all coil protection after rigging cables are detached.

DOMESTIC UNITS — Standard unit packaging consists of coil protection only. *Skids are not provided* If overhead rigging is not available at the jobsite, place the unit on a skid or pad before dragging or rolling. When rolling, use a minimum of 3 rollers. When dragging, pull the pad or skid. *Do not apply force to the unit.* When in final position, raise from above to lift unit off the pad or skid.

EXPORT UNITS — All export units are mounted on skids with vertical coil protection. Leave the unit on the skid until it is in final position. *While on the skid, the unit can be rolled or skidded. Apply force to the skid, not to the unit.* Use a minimum of 3 rollers when rolling. When in final position, raise from above to remove the skid.

PLACING UNIT — Refer to Fig. 1 and 2 for airflow clearances It is recommended that at least 6 ft (1829 mm) for unrestricted airflow and service on sides of unit, 5 ft (1524 mm) on ends, and unrestricted, clear air space above the unit be available. Provide ample space to connect liquid and suction lines to indoor unit. For multiple units, allow 8 ft (2440 mm) separation between units for airflow and service

⚠ CAUTION

Do not forklift these units unless the unit is attached to a skid designed for forklifting.

The placement area must be level and strong enough to support the operating weight of the unit (see Table 3). When unit is in proper location, use of mounting holes in base rails is recommended for securing unit to supporting structure. For mounting unit on vibration isolators, a perimeter support channel between the unit and the isolators is recommended. Fasteners for mounting unit are field supplied. Be sure to mount unit level to ensure proper oil return to compressors.

Table 1A — Rigging Center of Gravity — 50/60 Hz (in.)

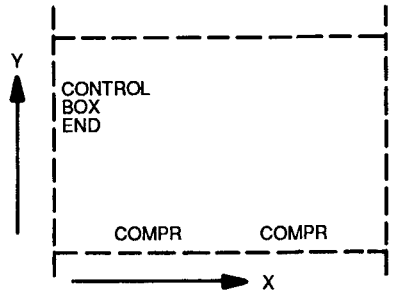
UNIT 38AH	044	054	064	074	084
Dimension X	48.50	48.20	49 60	56.80	57.00
Dimension Y	38.75	38.50	38.13	39 10	39.00
Dimension X-C	48.60	48.40	49 63	56 10	56 00
Dimension Y-C	39 10	39.00	38.86	39 60	39.70

C — Copper Fin Coils

Table 1B — Rigging Center of Gravity — 50/60 Hz (mm)

UNIT 38AH	044	054	064	074	084
Dimension X	1232	1224	1260	1443	1448
Dimension Y	984	978	968	993	991
Dimension X-C	1234	1229	1261	1425	1422
Dimension Y-C	993	991	986	1006	1008

C — Copper Fin Coils



TOP VIEW, TYPICAL

Table 2A — Operational Corner Weights with Refrigerant Charge (Approximate) — Lb

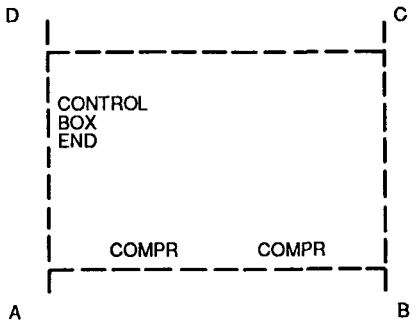
UNIT 38AH	TOTAL WEIGHT	OPERATIONAL CORNER WEIGHT			
		A	B	C	D
044	3259	939	893	695	732
044C	3547	1013	967	765	802
054	3309	964	905	697	742
054C	3597	1034	978	771	814
064	3565	1018	1011	765	771
064C	3998	1125	1117	874	879
074	3812	1146	986	777	903
074C	4229	1272	1059	862	1035
084	4057	1220	1049	827	961
084C	4735	1425	1186	965	1159

C — Copper Fin Coils

Table 2B — Operational Corner Weights with Refrigerant Charge (Approximate) — Kg

UNIT 38AH	TOTAL WEIGHT	OPERATIONAL CORNER WEIGHT			
		A	B	C	D
044	1480	426	405	316	332
044C	1609	460	438	347	364
054	1501	437	411	316	337
054C	1632	469	444	350	369
064	1617	462	459	347	350
064C	1813	510	508	397	399
074	1729	520	447	352	410
074C	1918	577	481	391	470
084	1840	553	476	375	436
084C	2148	646	538	438	526

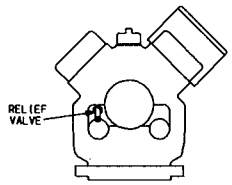
C — Copper Fin Coils



TOP VIEW, TYPICAL

UNIT	DIMENSION Y	DIMENSION X
38AH-044---	3'-2¾" [984mm]	4'-½" [1232mm]
38AH-044--C	3'-3⅛" [993mm]	4'-⁹⁄₁₆" [1234mm]
38AH-054---	3'-2½" [978mm]	4'-³⁄₁₆" [1224mm]
38AH-054--C	3'-3" [991mm]	4'-⅜" [1229mm]
38AH-064---	3'-2⅛" [968mm]	4'-1⅝" [1260mm]
38AH-064--C	3'-2⅞" [986mm]	4'-1⅝" [1260mm]

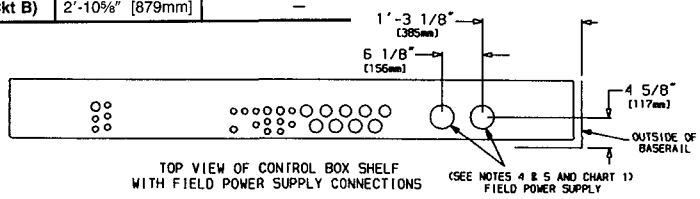
	DUAL CKT	SINGLE CKT
SUCTION CONNECTION(S)	2⅛" Dia [54 mm]	2⅝" Dia [67 mm]
LIQUID CONNECTION(S)	⅞" Dia [22 mm]	1⅛" Dia [29 mm]
SUCTION C	2'-1¹⁄₁₆" [627mm]	1'-10⁵⁄₁₆" [567mm]
LIQUID D	1'-10¹⁄₁₆" [561mm]	1'-10⁵⁄₁₆" [567mm]
SUCTION (Ckt A)	1'-7¹³⁄₁₆" [503mm]	2'-⅝" [626mm]
SUCTION (Ckt B)	2'-⅝" [626mm]	—
LIQUID (Ckt A)	2'-5¾" [756mm]	2'-10⅝" [879mm]
LIQUID (Ckt B)	2'-10⅝" [879mm]	—



RELIEF VALVES LOCATED ON THE COMPRESSORS ARE EQUIPPED WITH A 3/8" SAE FLARE FOR FIELD CONNECTION

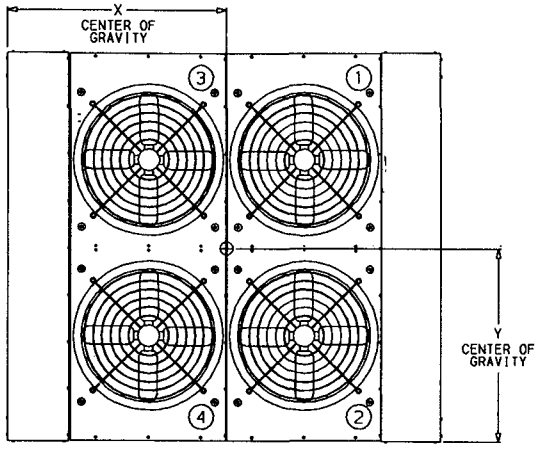
SCALE 1:8

CONTROL BOX END

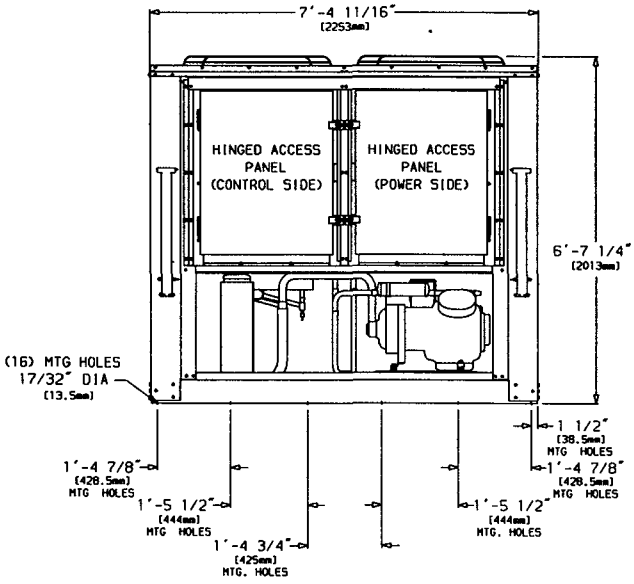


TOP VIEW OF CONTROL BOX SHELF WITH FIELD POWER SUPPLY CONNECTIONS

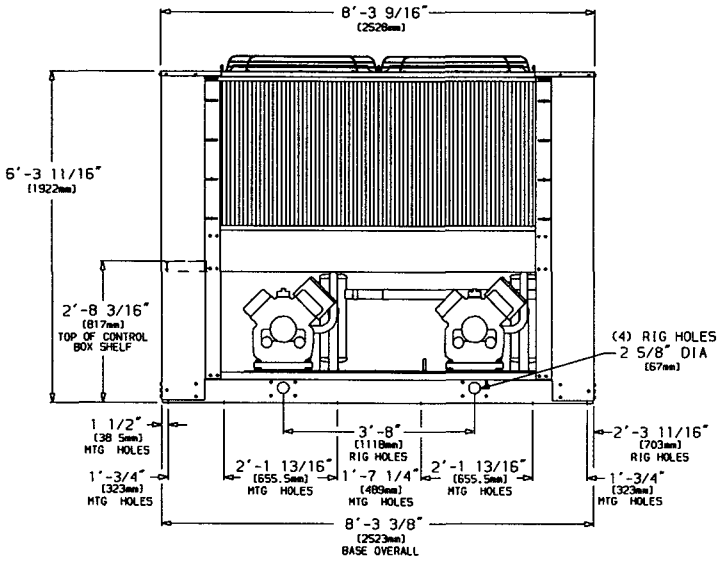
SCALE 1:10



TOP VIEW



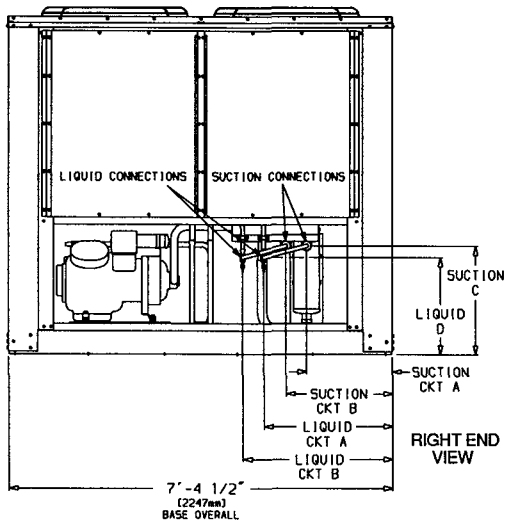
LEFT END VIEW



SIDE VIEW

Chart 1, Field Power Supply Connections

UNIT	VOLTAGE	Hz	DIAMETER	QTY.
044	230	50	3⅝" [92 mm]	1
044, 054	208/230	60	3⅝" [92 mm]	1
064	208/230	60	2½" [63 mm]	2
044, 054, 064	460,575,380	60	2½" [63 mm]	1
044, 054	346, 380/415	50	2½" [63 mm]	1
064	346, 380/415	50	3⅝" [92 mm]	1



RIGHT END VIEW

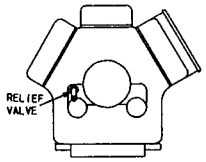
NOTES:
1 The approximate operating weight of the unit is:
- 38AH-044--- → 3259 lb [1478 kg]
- 38AH-044--C → 3547 lb [1609 kg]
- 38AH0-54--- → 3309 lb [1501 kg]
- 38AH-054--C → 3597 lb [1632 kg]
- 38AH-064--- → 3565 lb [1617 kg]
- 38AH-064--C → 3998 lb [1813 kg]

2 Unit must have clearances for airflow as follows:
Top — Do not restrict in any way
Ends — 5 ft [1524 mm]
Sides — 6 ft [1829 mm]
3 Mounting holes may be used to mount unit to concrete pad They are not recommended for mounting unit to spring isolators If spring isolators are used, a perimeter support channel between the unit and the isolators is recommended
4 Two 2" diameter holes are recommended for parallel conductors on 044 (230-v) and on 044 and 054 (208/230-v) units
5 One 3⅝" diameter hole is recommended for single-entry power on 064 (208/230-v) units

Fig. 1 — Dimensions — 38AH044, 054, 064

UNIT	DIMENSION Y	DIMENSION X
38AH-074---	3'-3⅛" [993 mm]	4'-8¹³⁄₁₆" [1443mm]
38AH-074--C	3'-3⅝" [1006mm]	4'-8⅛" [1425mm]
38AH-084---	3'-3" [991 mm]	4'-9" [1448mm]
38AH-084--C	3'-3¹¹⁄₁₆" [1008mm]	4'-8" [1422mm]

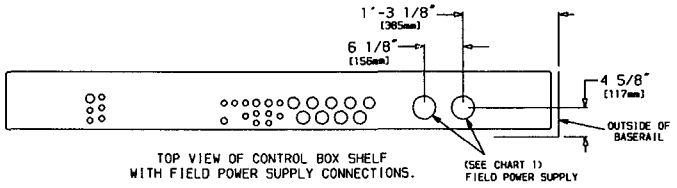
	DUAL CKT	SINGLE CKT
SUCTION CONNECTION(S)	2⅛" Dia [54 mm]	2⅝" Dia [67 mm]
LIQUID CONNECTION(S)	⅞" Dia [22 mm]	1⅛" Dia [29 mm]
SUCTION C	2'-11⅛" [627mm]	1'-10⁵⁄₁₆" [567mm]
LIQUID D	1'-10¹⁄₁₆" [561mm]	1'-10⁵⁄₁₆" [567mm]
SUCTION (Ckt A)	1'-7¹³⁄₁₆" [503mm]	2'-⅝" [626mm]
SUCTION (Ckt B)	2'-⅝" [626mm]	—
LIQUID (Ckt A)	2'-5¾" [756mm]	2'-10⅝" [879mm]
LIQUID (Ckt B)	2'-10⅝" [879mm]	—



RELIEF VALVES LOCATED ON THE COMPRESSORS ARE EQUIPPED WITH A 3/8" SAE FLARE FOR FIELD CONNECTION

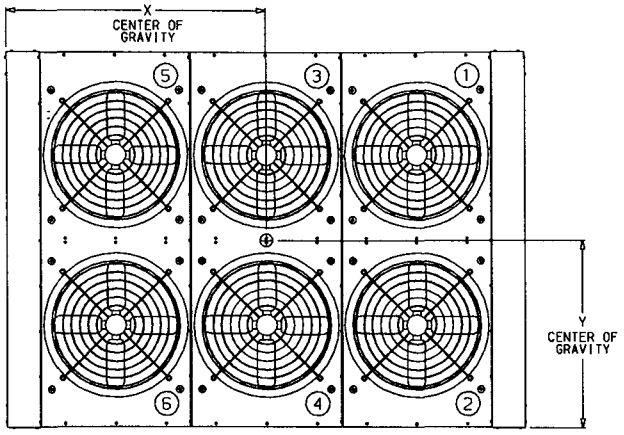
SCALE 1:8

CONTROL BOX END

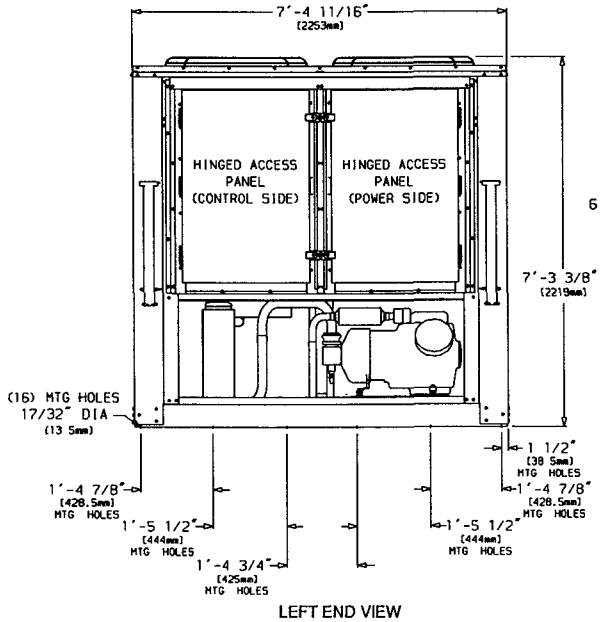


TOP VIEW OF CONTROL BOX SHELF WITH FIELD POWER SUPPLY CONNECTIONS.

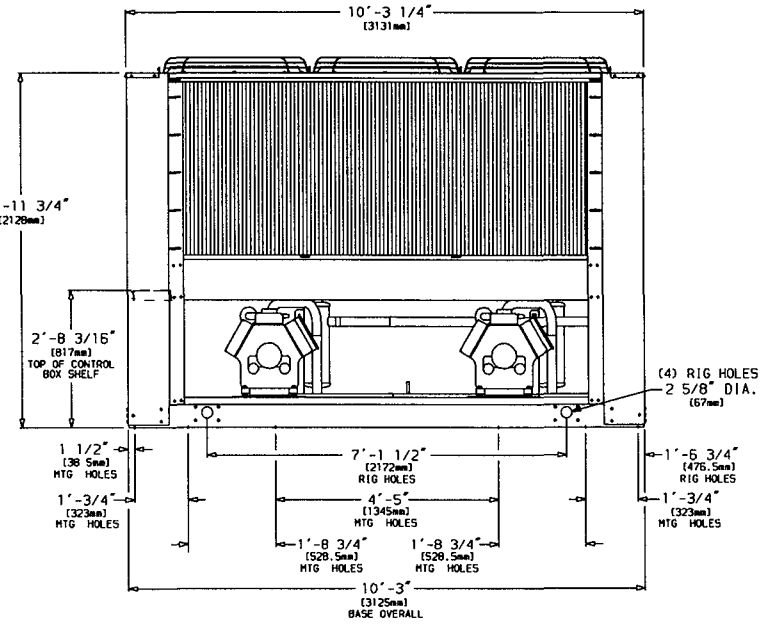
SCALE 1:10



TOP VIEW



LEFT END VIEW

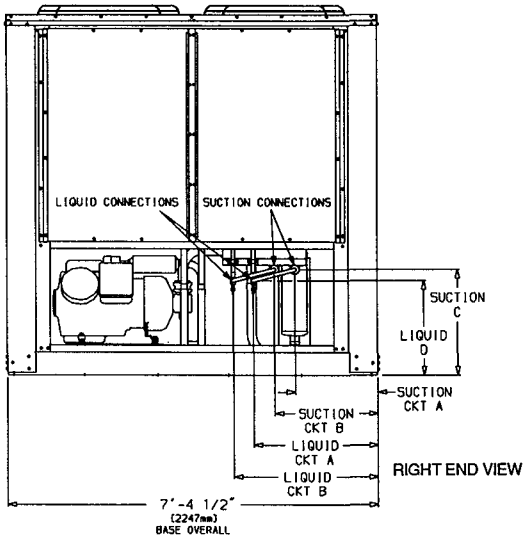


SIDE VIEW

Chart 1, Field Power Supply Connections

UNIT	VOLTAGE	Hz	DIAMETER	QTY
074	208/230	60	2½" [63 5 mm]	2
084	208/230	60	3⅝" [92 mm]	2
074	460	60	2½" [63 5 mm]	1
084	460	60	3⅝" [92 mm]	1
074, 084	575	60	2½" [63 5 mm]	1
074, 084	380	60	3⅝" [92 mm]	1
074, 084	346, 380/415	50	3⅝" [92 mm]	1

NOTES:
1 The approximate operating weight of the unit is:
38AH-074--- ⟶ 3812 lb (1729 kg)
38AH-074--C ⟶ 4229 lb (1918 kg)
38AH-084--- ⟶ 4057 lb (1840 kg)
38AH-084--C ⟶ 4730 lb (2148 kg)
2 Unit must have clearances for airflow as follows:
Top — Do not restrict in any way.
Ends — 5 ft [1524 mm]
Sides — 6 ft [1829 mm]
3 Mounting holes may be used to mount unit to concrete pad. They are not recommended for mounting unit to spring isolators. If spring isolators are used, a perimeter support channel between the unit and the isolators is recommended



RIGHT END VIEW

Fig. 2 — Dimensions — 38AH074, 084

Table 3A — Physical Data — 50/60 Hz (English)

38AH		044		054		064		074		084	
OPERATING WEIGHT WITH REFRIGERANT* (lb)	Cu-Al	3259		3309		3565		3812		4057	
	Cu-Cu	3547		3597		3998		4229		4735	
SHIP WEIGHT* WITH COIL PROTECTION ONLY (lb)	Cu-Al	3250		3290		3530		3780		4000	
	Cu-Cu	3538		3578		3963		4197		4678	
TYPICAL OPERATING REFRIGERANT CHARGE* (lb) R-22		62		72		88		104		130	
COMPRESSOR 06E† Type...Rpm		Reciprocating Semi-Hermetic...1750 @ 60 Hz; 1458 @ 50 Hz									
(Qty Cylinder) Ckt**	Std	(4) A1	(4) B1	(4) A1	(6) B1	(6) A1	(6) B1	(6) A1	(6) B1	(6) A1	(6) B1
Model No.	Std	250	250	250	265	265	275	275	299	299	299
(Qty Cylinder) Ckt**	Opt	(4) A1	(4) A2	(6) A1	(4) A2	(6) A1	(6) A2	(6) A1	(6) A2	(6) A1	(6) A2
Model No.	Opt	250	250	265	250	275	265	299	275	299	299
Oil Charge (pt)	Std	17	17	17	21	21	21	21	19	19	19
	Opt	17	17	21	17	21	21	19	21	19	19
Capacity Control Steps		4									
CONDENSER FANS (4 Blade) — 60 Hz											
Qty...Dia (in.)		4. 30						6 ..30			
Airflow (cfm)		35,000						52,000		51,000	
Speed (rpm)		1140						1140			
Total Power (kW)		6.2						9 3			
CONDENSER FANS (6 Blade) — 50 Hz											
Qty...Dia (in.)		4. 30						6...30			
Airflow (cfm)		35,000						52,000		51,000	
Speed (rpm)		950						950			
Total Power (kW)		6.2						9.3			
CONDENSER COIL — Rows		2		2		3		2		3	
Fins per...in.		17		17		17		19		17	
Face Area (ft^2)		80.5		80.5		80 5		116.7		116.7	
Storage Capacity* (lb per circuit) at 120 F		35		35		55		55		80	
CONNECTIONS											
Suction, ODF (in.)††		2⅛									
Liquid, ODF (in.)††		⅞									
Hot Gas Bypass, ODF (in.)		⅝									

LEGEND

Cu-Al — Copper tubes with aluminum fins
Cu-Cu — Copper tubes with copper fins
ODF — Outside Diameter, Female
Opt — Optional Single-Circuit Units
Std — Standard Dual-Circuit Units

*Approximate
†06E250 compressors have 4 cylinders; all others have 6
**Circuit A1 compressor is lead on standard and optional single-circuit units.
††For single-circuit units, suction ODF is 2⅝ in and liquid ODF is 1⅛ inches. **Single circuits have a factory-installed manifold; no field modification is required.**

NOTE Certified dimensional drawings available on request.

Table 3B — Physical Data — 50/60 Hz (SI)

38AH		044		054		064		074		084	
OPERATING WEIGHT WITH REFRIGERANT* (kg)	Cu-Al	1478		1501		1617		1729		1840	
	Cu-Cu	1609		1632		1813		1918		2148	
SHIP WEIGHT* WITH COIL PROTECTION ONLY (kg)	Cu-Al	1474		1492		1601		1715		1814	
	Cu-Cu	1605		1623		1798		1904		2122	
TYPICAL OPERATING REFRIGERANT CHARGE* (kg) R-22		28.1		32 7		39 9		47.2		58.9	
COMPRESSOR 06E† Type...r/s		Reciprocating Semi-Hermetic 29.2 @ 60 Hz; 24.3 @ 50 Hz									
(Qty Cylinder) Ckt**	Std	(4) A1	(4) B1	(4) A1	(6) B1	(6) A1	(6) B1	(6) A1	(6) B1	(6) A1	(6) B1
Model No.	Std	250	250	250	265	265	275	275	299	299	299
(Qty) Cylinder) Ckt**	Opt	(4) A1	(4) A2	(6) A1	(4) A2	(6) A1	(6) A2	(6) A1	(6) A2	(6) A1	(6) A2
Model No.	Opt	250	250	265	250	275	265	299	275	299	299
Oil Charge (L)	Std	8.0	8.0	8.0	9 9	9 9	9.9	9.9	9 0	9.0	9.0
	Opt	8.0	8.0	9 9	8.0	9.9	9 9	9.0	9.9	9.0	9.0
Capacity Control Steps		4									
CONDENSER FANS (6 Blade) — 50 Hz											
Qty...Dia (mm)		4...762						6...762			
Airflow (L/s)		16 500						24 500		24 100	
Speed (r/s)		15.8						15.8			
Total Power (kW)		6 2						9 3			
CONDENSER FANS (4 Blade) — 60 Hz											
Qty...Dia (mm)		4 .762						6...762			
Airflow (L/s)		16 500						24 500		24 100	
Speed (r/s)		19 0						19 0			
Total Power (kW)		6.2						9.3			
CONDENSER COIL — Rows		2		2		3		2		3	
Fins per...(m)		669		669		669		782		669	
Face Area (m^2)		7.48		7 48		7.48		10 84		10.84	
Storage Capacity* (kg per circuit) at 48.9 C		16		16		25		25		36	
CONNECTIONS											
Suction, ODF (in.)††		2⅛									
Liquid, ODF (in.)††		⅞									
Hot Gas Bypass, ODF (in.)		⅝									

LEGEND

Cu-Al — Copper tubes with aluminum fins
Cu-Cu — Copper tubes with copper fins
ODF — Outside Diameter, Female
Opt — Optional Single-Circuit Units
Std — Standard Dual-Circuit Units

*Approximate
†06E250 compressors have 4 cylinders; all others have 6.
**Circuit A1 compressor is lead on standard and optional single-circuit units.
††For single-circuit units, suction ODF is 2⅝ in. and liquid ODF is 1⅛ inches. **Single circuits have a factory-installed manifold; no field modification is required.**

NOTE: Certified dimensional drawings available on request

Step 2 — Check Compressor Mounting —

All compressors are mounted on pans and are held down by 4 bolts during shipment. After unit is installed, loosen each of these bolts until the snubber washer can be moved with finger pressure. See Fig. 3.

Step 3 — Make Refrigeration Piping Connections

⚠ CAUTION

The field-supplied liquid line solenoid valve *must* be installed at the evaporator to avoid possible compressor damage during unit operation. (See Fig. 4-6.)

The units have large suction lines to minimize friction losses. The units also have the ability to operate at low capacity. Because of these capabilities, use special care with suction piping and suction risers to ensure proper compressor oil return under all operating conditions. Maximum allowable vertical separation between the condensing unit and the evaporator is shown in Table 4. Size suction lines in accordance with Tables 5A or B through 8A or B.

To achieve good mixing of the refrigerant leaving the evaporator suction header for proper sensing by the TXV (thermostatic expansion valve) bulb:

1. Install a minimum of two 90-degree elbows upstream of the TXV bulb location. (See Fig. 7 or 8.)
2. Locate the TXV bulb on a vertical riser, where possible. If a horizontal location is necessary, secure the bulb at approximately the 4 o'clock position.
3. Size the suction line from the evaporator to the common suction line to achieve high refrigerant velocity. See Tables 5A or B through 8A or B.

If an oil return connection at the bottom of the suction header is supplied with an evaporator, tee-in this connection ahead of first mixing elbow. See Fig. 7 (for standard dual-circuit units) and Fig. 8 (for optional single-circuit units). When the compressor is below the evaporator, the riser at the evaporator should extend to the top of the evaporator section. After the riser is installed, the suction line can elbow down immediately.

Install a field-supplied filter drier and sight glasses in each refrigerant system. Select the filter drier for maximum unit capacity and minimum pressure drop. Figure 5 (for standard dual-circuit units) and Fig. 6 (for optional single-circuit units) show required location of solenoid valves and recommended locations for the filter driers and sight glasses. Complete the refrigerant piping from the evaporator to the condenser before opening the liquid and suction lines at the condenser.

Relieve into a refrigerant recovery system the pressure caused by the holding charge. Uncap the suction line and cut the run-around tube at the liquid line as close to the loop elbow as possible. This will leave approximately 2 in. of straight tube for liquid line connection.

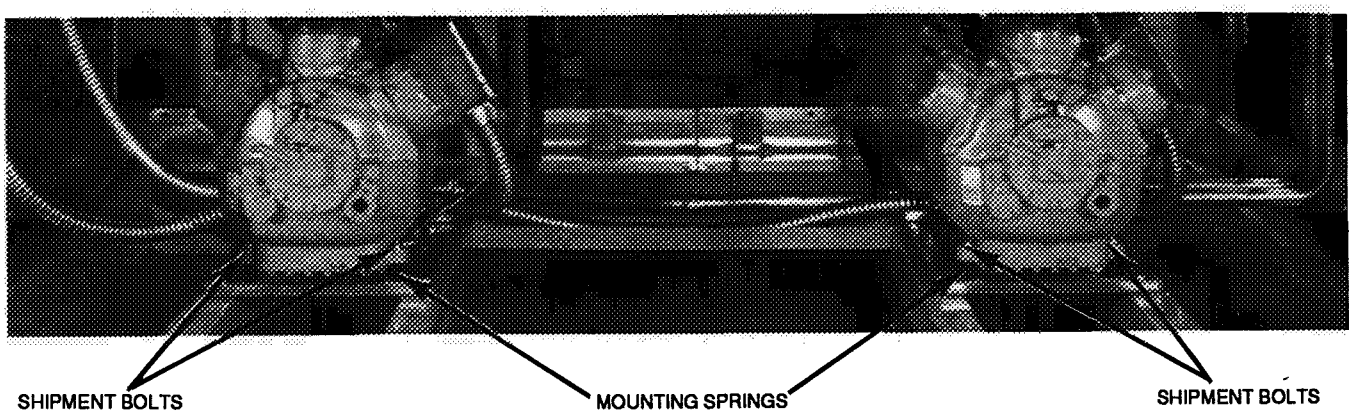


Fig. 3 – Outer View, Compressor Mounting

IMPORTANT: Protect the liquid valves from the heat of brazing.

Leak test the entire system by using soap bubbles and nitrogen or R-22 with an electronic leak detector.

Purge nitrogen or reclaim R-22 from system after completion of leak-checking procedure. Repair leak if one is found. When finished, evacuate and dehydrate system using the methods described in GTAC II (General Training Air Conditioning), Module 4, System Dehydration.

Table 4 – Liquid Lift

UNIT 38AH	MAXIMUM LIQUID LIFT			
	60 Hz		50 Hz	
	Ft	M	Ft	M
044	69	21.0	57.5	17.5
054	75	23	75	23
064	75	23	65	19.8
074	45	13.7	37.5	11 4
084	75	23	75	23

LEGEND AND NOTES FOR TABLES 5A AND B THROUGH 8A AND B

Double risers are required if condensing unit is elevated above evaporator. See Table 6A or B for standard unit or Table 8A or B for Optional Single-Circuit Unit.

L — Liquid Line
S — Suction Line
Pipe A — Suction Riser Without Trap
Pipe B — Suction Riser With Trap
Pipe C — Suction Line to Condensing Unit

*Use risers in Table 6B, 50-75 ft (15 2-22 9 m) column.
†No double suction riser required.
**Double suction riser required on single-circuit unit
††Double suction riser required if field-installed unloader is installed on standard unit compressor A1

NOTES:
1 Pipe sizes are based on the total linear length, shown for each column, plus a 50% allowance for fittings
2 Suction line sizing is based on 2 0 F (1 1 C) pressure drop at nominal rating conditions. Liquid line sizing is based on 2 F (1.1 C) pressure drop. Higher design pressure drop criteria may allow selection of smaller pipe sizes but at a penalty of decreased system capacity and efficiency
3. Suction line sizing is based on using the same diameter tube from the evaporator riser outlet to the condensing unit
4. Suction line riser selections are based on using maximum possible unloaders
5 Refer to Carrier System Design Manual or to E20-II design programs for further information on selecting pipe sizes for split systems
6. All pipe sizes are OD inches; the following lists equivalent millimeters:

in.	mm
5/8	15.9
7/8	22.2
1 1/8	28 6
1 3/8	34 9
1 5/8	41 3
2 1/8	54 0
2 5/8	66.7
3 1/8	79.4
3 5/8	92 1

7 See Fig. 4 for Double Suction Riser construction

Table 5A — Refrigerant Piping Requirements — 60 Hz

UNIT 38AH		TOTAL LINEAR LENGTH OF INTERCONNECTING PIPE — FT (M)											
		15-25 (4.6-7.6)		25-50 (7.6-15.2)		50-75 (15.2-22.9)		75-100 (22.9-30.5)		100-150 (30.5-45.7)		150-200 (45.7-61.0)	
		L	S	L	S	L	S	L	S	L	S	L	S
044	Ckt A	5/8	1 5/8	7/8	1 5/8	7/8	2 1/8	7/8	2 1/8	7/8	2 1/8	7/8	2 1/8
	Ckt B	5/8	1 5/8	7/8	1 5/8	7/8	2 1/8	7/8	2 1/8	7/8	2 1/8	7/8	2 1/8
054	Ckt A	5/8	1 5/8	7/8	1 5/8	7/8	2 1/8	7/8	2 1/8	7/8	2 1/8	7/8	2 1/8
	Ckt B	7/8	1 5/8	7/8	[illegible]	7/8	[illegible]	1 1/8	[illegible]	1 1/8	[illegible]	1 1/8	[illegible]
064	Ckt A	7/8	1 5/8	7/8	[illegible]	7/8	[illegible]	7/8	[illegible]	1 1/8	[illegible]	1 1/8	[illegible]
	Ckt B	7/8	2 1/8	7/8	2 1/8	7/8	2 1/8	1 1/8	2 1/8	1 1/8	[illegible]	1 1/8	[illegible]
074	Ckt A	7/8	2 1/8	7/8	2 1/8	1 1/8	2 1/8	1 1/8	2 1/8	1 1/8	[illegible]	1 1/8	[illegible]
	Ckt B	7/8	2 1/8	1 1/8	2 1/8	1 1/8	2 1/8	1 1/8	[illegible]	1 3/8	[illegible]	1 3/8	[illegible]
084	Ckt A	7/8	2 1/8	1 1/8	2 1/8	1 1/8	2 1/8	1 1/8	[illegible]	1 3/8	[illegible]	1 3/8	[illegible]
	Ckt B	7/8	2 1/8	1 1/8	2 1/8	1 1/8	2 1/8	1 1/8	[illegible]	1 3/8	[illegible]	1 3/8	[illegible]

Table 5B — Refrigerant Piping Requirements — 50 Hz

UNIT 38AH		TOTAL LINEAR LENGTH OF INTERCONNECTING PIPE — FT (M)											
		15-25 (4.6-7.6)		25-50 (7.6-15.2)		50-75 (15.2-22.9)		75-100 (22.9-30.5)		100-150 (30.5-45.7)		150-200 (45.7-61.0)	
		L	S	L	S	L	S	L	S	L	S	L	S
044	Ckt A	5/8	1 3/8	7/8	1 5/8	7/8	1 5/8	7/8	2 1/8	7/8	2 1/8	7/8	2 1/8
	Ckt B	5/8	1 3/8	7/8	1 5/8	7/8	1 5/8	7/8	2 1/8	7/8	2 1/8	7/8	2 1/8
054	Ckt A	5/8	1 3/8	7/8	1 5/8	7/8	[illegible]	7/8	[illegible]	7/8	[illegible]	7/8	[illegible]
	Ckt B	7/8	1 5/8	7/8	1 5/8	7/8	[illegible]	7/8	[illegible]	1 1/8	[illegible]	1 1/8	[illegible]
064	Ckt A	7/8	1 5/8	7/8	[illegible]	7/8	[illegible]	7/8	[illegible]	1 1/8	[illegible]	1 1/8	[illegible]
	Ckt B	7/8	1 5/8	7/8	[illegible]	7/8	[illegible]	7/8	[illegible]	1 1/8	[illegible]	1 1/8	[illegible]
074	Ckt A	7/8	1 5/8	7/8	2 1/8	7/8	2 1/8	7/8	[illegible]	1 1/8	[illegible]	1 1/8	[illegible]
	Ckt B	7/8	2 1/8	7/8	2 1/8	1 1/8	2 1/8	1 1/8	[illegible]	1 1/8	[illegible]	1 1/8	[illegible]
084	Ckt A	7/8	2 1/8	7/8	2 1/8	1 1/8	2 1/8	1 1/8	[illegible]	1 1/8	[illegible]	1 1/8	[illegible]
	Ckt B	7/8	2 1/8	7/8	2 1/8	1 1/8	2 1/8	1 1/8	[illegible]	1 1/8	[illegible]	1 1/8	[illegible]

Table 6A — Refrigerant Piping Requirements for Double Suction Riser — 60 Hz

UNIT 38AH		TOTAL LINEAR LENGTH OF INTERCONNECTING PIPE — FT (M)											
		50-75 (15.2-22.9)			75-100 (22.9-30.5)			100-150 (30.5-45.7)			150-200 (45.7-61.0)		
		A	B	C	A	B	C	A	B	C	A	B	C
044	Ckt A	†	†	†	†	†	†	†	†	†	†	†	†
	Ckt B	†	†	†	†	†	†	†	†	†	†	†	†
054	Ckt A	†	†	†	†	†	†	†	†	†	†	†	†
	Ckt B	1 3/8	1 5/8	2 1/8	1 3/8	1 5/8	2 1/8	1 3/8	1 5/8	2 1/8	1 5/8	2 1/8	2 5/8
064	Ckt A	1 3/8	1 5/8	2 1/8	1 3/8	1 5/8	2 1/8	1 3/8	1 5/8	2 1/8	1 5/8	2 1/8	2 5/8
	Ckt B	†	†	†	†	†	†	1 5/8	2 1/8	2 5/8	1 5/8	2 1/8	2 5/8
074	Ckt A	†	†	†	†	†	†	1 5/8	2 1/8	2 5/8	1 5/8	2 1/8	2 5/8
	Ckt B	†	†	†	1 5/8	2 1/8	2 5/8	1 5/8	2 1/8	2 5/8	1 5/8	2 1/8	2 5/8
084	Ckt A	†	†	†	1 5/8	2 1/8	2 5/8	1 5/8	2 1/8	2 5/8	1 5/8	2 1/8	2 5/8
	Ckt B	†	†	†	1 5/8	2 1/8	2 5/8	1 5/8	2 1/8	2 5/8	1 5/8	2 1/8	2 5/8

Table 6B — Refrigerant Piping Requirements for Double Suction Riser — 50 Hz

UNIT 38AH		TOTAL LINEAR LENGTH OF INTERCONNECTING PIPE — FT (M)											
		50-75 (15.2-22.9)			75-100 (22.9-30.5)			100-150 (30.5-45.7)			150-200 (45.7-61.0)		
		A	B	C	A	B	C	A	B	C	A	B	C
044	Ckt A	†	†	†	†	†	†	†	†	†	†	†	†
	Ckt B	†	†	†	†	†	†	†	†	†	†	†	†
054	Ckt A	†	†	†	†	†	†	†	†	†	†	†	†
	Ckt B	1 3/8	1 5/8	2 1/8	1 3/8	1 5/8	2 1/8	1 5/8	1 5/8	2 1/8	1 5/8	2 1/8	2 5/8
064	Ckt A	1 3/8	1 5/8	2 1/8	1 3/8	1 5/8	2 1/8	1 5/8	1 5/8	2 1/8	1 5/8	2 1/8	2 5/8
	Ckt B	1 3/8	1 5/8	2 1/8	1 3/8	1 5/8	2 1/8	1 5/8	2 1/8	2 5/8	1 5/8	2 1/8	2 5/8
074	Ckt A	†	†	†	†	†	†	1 5/8	2 1/8	2 5/8	1 5/8	2 1/8	2 5/8
	Ckt B	†	†	†	1 5/8	2 1/8	2 5/8	1 5/8	2 1/8	2 5/8	1 5/8	2 1/8	2 5/8
084	Ckt A	†	†	†	1 5/8	2 1/8	2 5/8	1 5/8	2 1/8	2 5/8	1 5/8	2 1/8	2 5/8
	Ckt B	†	†	†	1 5/8	2 1/8	2 5/8	1 5/8	2 1/8	2 5/8	1 5/8	2 1/8	2 5/8

Table 7A — Refrigerant Piping Requirements for Optional Single-Circuit Unit — 60 Hz

UNIT 38AH	TOTAL LINEAR LENGTH OF INTERCONNECTING PIPE — FT (M)											
	15-20 (4.6-6.1)		20-50 (6.1-15.2)		50-75 (15.2-22.9)		75-100 (22.9-30.5)		100-150 (30.5-45.7)		150-200 (45.7-61.0)	
	L	S	L	S	L	S	L	S	L	S	L	S
044	7/8	2 1/8	7/8	2 1/8	1 1/8		1 1/8		1 3/8		1 3/8	
054	7/8	2 1/8	1 1/8		1 1/8		1 1/8		1 3/8		1 3/8	
064	1 1/8	2 1/8	1 1/8		1 1/8		1 3/8		1 3/8		1 3/8	
074	1 1/8	2 1/8	1 1/8		1 3/8		1 3/8		1 3/8		1 5/8	
084	1 1/8		1 1/8		1 3/8		1 3/8		1 5/8		1 5/8	

Table 7B — Refrigerant Piping Requirements for Optional Single-Circuit Unit — 50 Hz

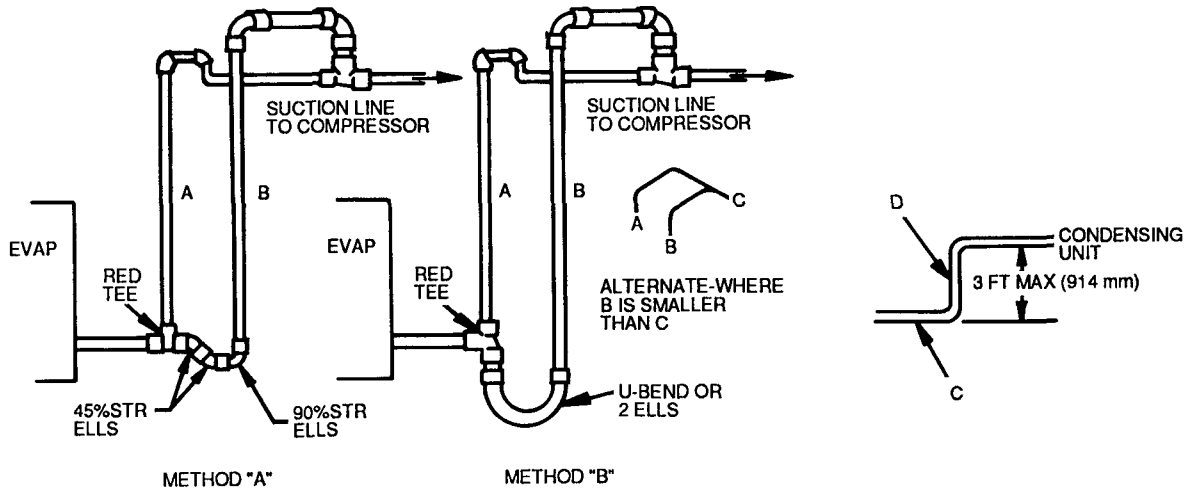
UNIT 38AH	TOTAL LINEAR LENGTH OF INTERCONNECTING PIPE — FT (M)											
	15-20 (4.6-6.1)		20-50 (6.1-15.2)		50-75 (15.2-22.9)		75-100 (22.9-30.5)		100-150 (30.5-45.7)		150-200 (45.7-61.0)	
	L	S	L	S	L	S	L	S	L	S	L	S
044	7/8	2 1/8	7/8	2 1/8	1 1/8	2 1/8	1 1/8		1 1/8		1 3/8	
054	7/8		1 1/8		1 1/8		1 1/8		1 1/8		1 3/8	
064	7/8		1 1/8		1 1/8		1 1/8		1 3/8		1 3/8	
074	7/8	2 1/8	1 1/8		1 1/8		1 3/8		1 3/8		1 3/8	
084	1 1/8		1 1/8		1 3/8		1 3/8		1 3/8		1 5/8	

Table 8A — Refrigerant Piping Requirements for Double Suction Riser for Optional Single-Circuit Unit — 60 Hz

UNIT 38AH	TOTAL LINEAR LENGTH OF INTERCONNECTING PIPE — FT (M)														
	20-50 (6.1-15.2)			50-75 (15.2-22.9)			75-100 (22.9-30.5)			100-150 (30.5-45.7)			150-200 (45.7-61.0)		
	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C
044	†	†	†	1 5/8	2 1/8	2 5/8	1 5/8	2 1/8	2 5/8	1 5/8	2 1/8	2 5/8	1 5/8	2 5/8	3 1/8
054	1 5/8	2 1/8	2 5/8	1 5/8	2 1/8	2 5/8	1 5/8	2 1/8	2 5/8	1 5/8	2 5/8	3 1/8	1 5/8	2 5/8	3 1/8
064	1 5/8	2 1/8	2 5/8	1 5/8	2 1/8	2 5/8	1 5/8	2 5/8	3 1/8	1 5/8	2 5/8	3 1/8	1 5/8	2 5/8	3 1/8
074	1 5/8	2 1/8	2 5/8	1 5/8	2 5/8	3 1/8	1 5/8	2 5/8	3 1/8	1 5/8	2 5/8	3 1/8	2 1/8	3 1/8	3 5/8
084	1 5/8	2 1/8	2 5/8	1 5/8	2 5/8	3 1/8	1 5/8	2 5/8	3 1/8	2 1/8	3 1/8	3 5/8	2 1/8	3 1/8	3 5/8

Table 8B — Refrigerant Piping Requirements for Double Suction Riser for Optional Single-Circuit Unit — 50 Hz

UNIT 38AH	TOTAL LINEAR LENGTH OF INTERCONNECTING PIPE — FT (M)																	
	15-20 (4.6-6.1)			20-50 (6.1-15.2)			50-75 (15.2-22.9)			75-100 (22.9-30.5)			100-150 (30.5-45.7)			150-200 (45.7-61.0)		
	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C
044	†	†	†	†	†	†	†	†	†	1 5/8	2 1/8	2 5/8	1 5/8	2 5/8	2 5/8	1 5/8	2 5/8	2 5/8
054	1 3/8	1 5/8	2 1/8	1 3/8	1 5/8	2 1/8	1 5/8	2 1/8	2 5/8	1 5/8	2 1/8	2 5/8	1 5/8	2 1/8	2 5/8	1 5/8	2 5/8	3 1/8
064	1 5/8	1 5/8	2 1/8	1 5/8	2 1/8	2 5/8	1 5/8	2 1/8	2 5/8	1 5/8	2 1/8	2 5/8	1 5/8	2 5/8	3 1/8	1 5/8	2 5/8	3 1/8
074	1 5/8	1 5/8	2 1/8	1 5/8	2 1/8	2 5/8	1 5/8	2 1/8	2 5/8	1 5/8	2 5/8	3 1/8	1 5/8	2 5/8	3 1/8	1 5/8	3 1/8	3 5/8
084	1 5/8	1 5/8	2 1/8	1 5/8	2 1/8	2 5/8	1 5/8	2 5/8	3 1/8	1 5/8	2 5/8	3 1/8	1 5/8	2 5/8	3 1/8	1 5/8	3 1/8	3 5/8



LEGEND

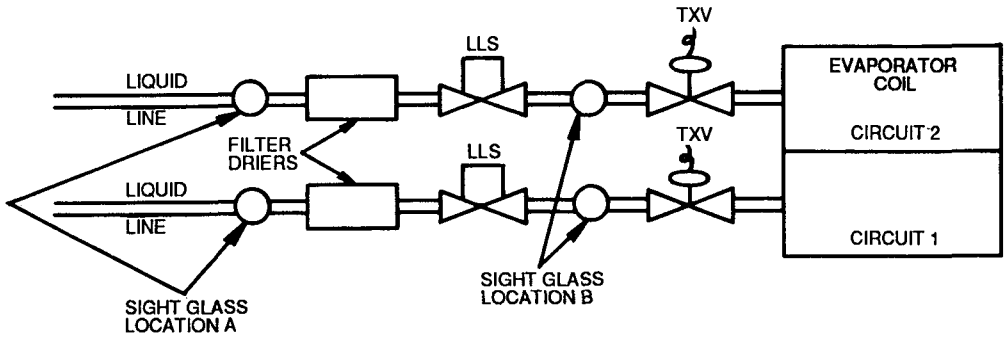
A — Pipe A, Suction Riser, Lower Trap
B — Pipe B, Suction Riser with Trap
C — Suction Line to Condensing Unit
D — Pipe D, Suction Riser Short Lift
RED — Reducer
STR — Street

NOTES:
1. Short riser, pipe D, is used when routing suction line to condensing unit connection. See table at right
2. See Tables 6A and B, and 8A and B for values of A, B, and C.

UNIT 38AH	PIPE D DIAMETER		
	Dual Circuit*		Single Circuit*
	A	B	
044	1⅝	1⅝	2⅛
054	1⅝	1⅝	2⅛
064	1⅝	2⅛	2⅛
074	2⅛	2⅛	2⅛
084	2⅛	2⅛	2⅝

*Maximum length of riser is 3 ft (914 mm)

Fig. 4 — Double Suction Riser Construction



LEGEND

LLS — Liquid Line Solenoid
TXV — Thermostatic Expansion Valve

Fig. 5 — Required Location of Solenoid Valves and Recommended Filter Drier(s) and Sight Glass Locations for Standard Dual-Circuit Unit

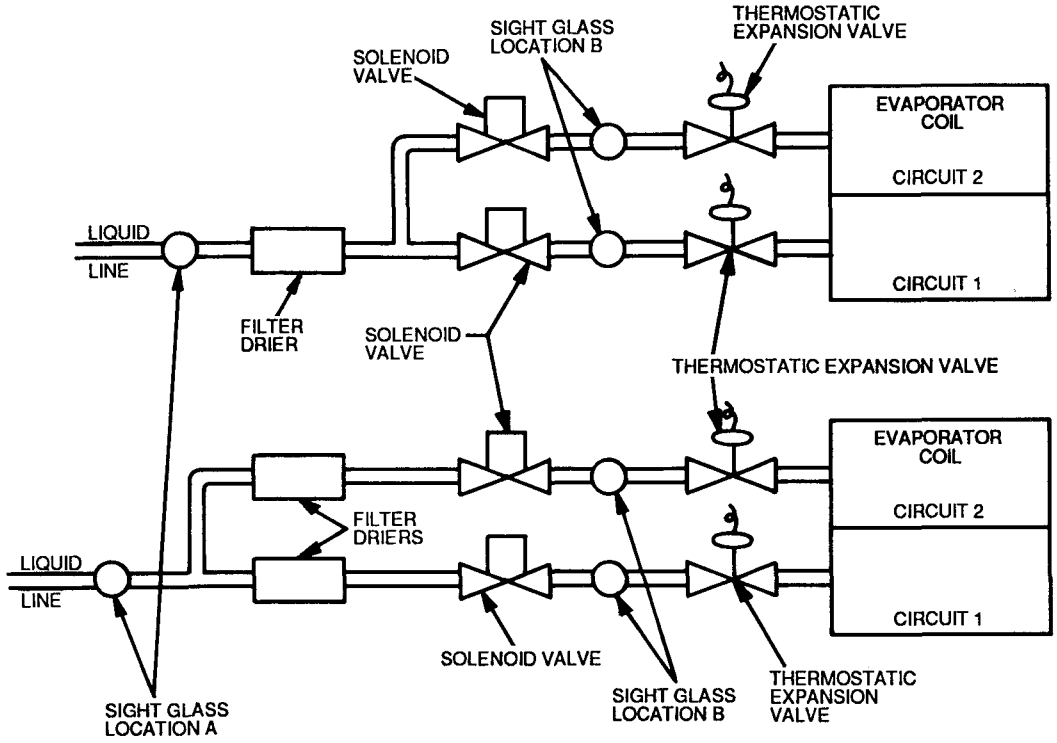
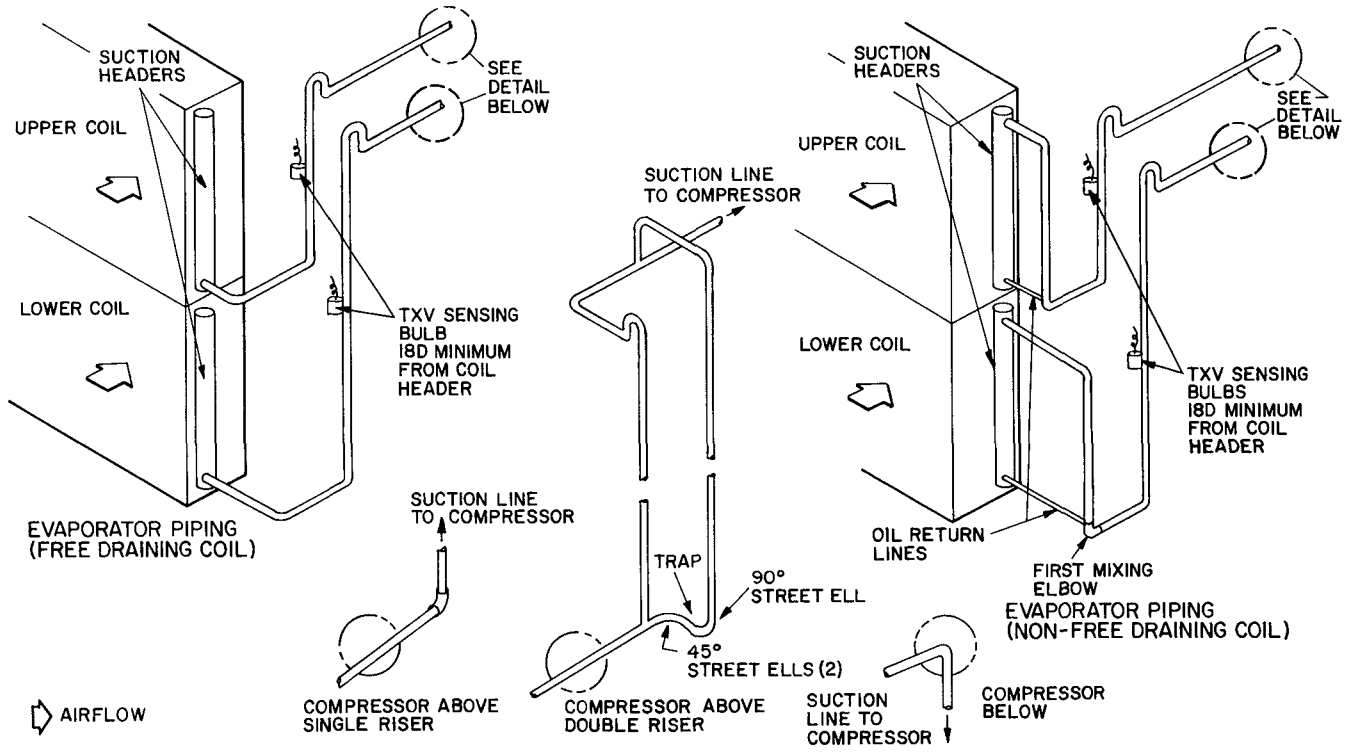


Fig. 6 — Required Location of Solenoid Valves and Recommended Filter Drier(s) and Sight Glass Locations for Optional Single-Circuit Unit

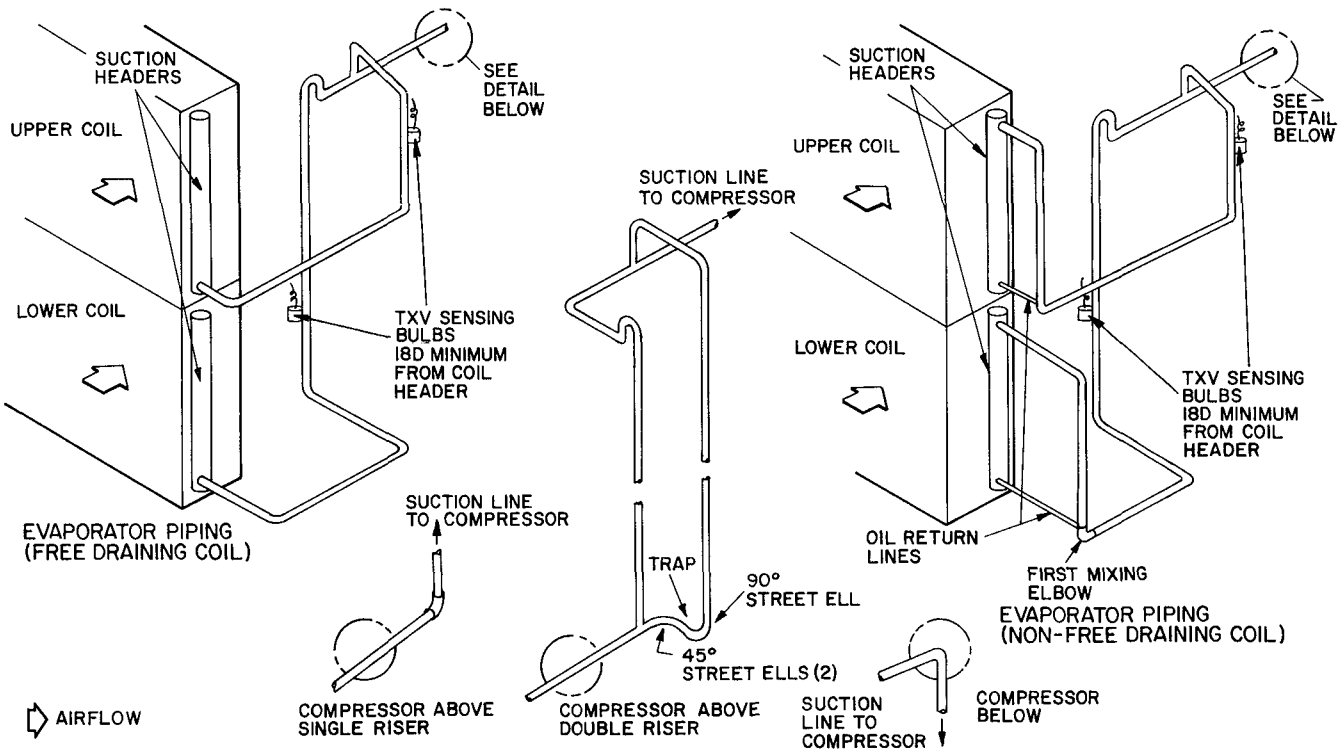


LEGEND

TXV — Thermostatic Expansion Valve

NOTES:
1 Lower split first on, last off
2 D as used in 8D etc., indicates the pipe diameter size as a measure of length

Fig. 7 — Typical Piping Connections for Face Split Coils for Standard Dual-Circuit Unit



LEGEND

TXV — Thermostatic Expansion Valve

NOTES:
1. Lower split first on, last off
2. D as used in 8D etc , indicates the pipe diameter size as a measure of length.

Fig. 8 — Typical Piping Connections for Face Split Coils for Optional Single-Circuit Units

Step 4 — Make Electrical Connections

POWER SUPPLY — Electrical characteristics of available power supply must agree with unit nameplate rating. Supply voltage must be within the limits shown in Tables 9A and 9B.

> IMPORTANT: Operation of unit on improper supply voltage or with excessive phase imbalance constitutes abuse and can affect any Carrier warranty.

FIELD POWER CONNECTIONS — All power wiring must comply with applicable local and national codes. Install field-supplied, branch circuit, safety disconnect(s) of a type that can be locked off/open. Disconnects must be located within sight of, and readily accessible from, the unit in compliance with NEC (National Electrical Code) Article 440-14.

All field power enters the unit through a hole in the control box shelf. Refer to Fig 9-11 for field wiring details.

MAIN POWER — All units have single-point power connection to simplify field-power wiring (all power enters at one end). Units may use copper, copper-clad aluminum, or aluminum conductors at all voltages.

Power must be supplied as shown in Table 10.

Table 9A — Electrical Data — 50/60 Hz (Standard Unit)

STANDARD UNIT									COMPRESSOR*			
38AH	Model	Compressor A1/B1 Model No.	Nameplate V-Ph-Hz	Supply Voltage†		MCA	MOCP	ICF	RLA		LRA	
				Min	Max				A1	B1	A1	B1
044	500	06E4250/250	208/230-3-60	187	254	174 6	225	434 7	67.9	67 9	345	345
	600		460-3-60	414	508	100.0	100	218.6	34 6	34 6	173	173
	100		575-3-60	518	632	100.0	100	162 4	28.8	28 8	120	120
	200		380-3-60	342	418	100.0	125	241.2	34.6	34 6	191	191
	800 (PW)		230-3-50	198	254	174.6	225	296.7	67.9	67.9	207	207
	900		380/415-3-50	342	440	100 0	100	219 6	34.6	34.6	173	173
	300 (PW)		346-3-50	325	367	100.0	125	165 9	33.3	33.3	115	115
054	500	06E4250/265	208/230-3-60	187	254	201 8	250	535 7	67.9	89.7	345	446
	600		460-3-60	414	508	100.1	125	268.6	34.6	43.6	173	223
	100		575-3-60	518	632	100.0	125	206.4	28.8	36.5	120	164
	200		380-3-60	342	418	107.1	150	297.2	34.6	45.5	191	247
	900		380/415-3-50	342	440	101.1	125	269 6	34.6	43.6	173	223
	300 (PW)		346-3-50	325	367	107.0	150	198.9	33.3	44 9	115	148
064	500	06E8265/275	208/230-3-60	187	254	244.5	350	617 5	89 7	106 4	446	506
	600		460-3-60	414	508	113.1	150	307.6	43.6	46 8	223	253
	100		575-3-60	518	632	100 6	125	226.1	36.5	40.4	164	176
	200		380-3-60	342	418	126.9	175	341.1	45.5	52 6	247	280
	900		380/415-3-50	342	440	114 1	150	335.6	43 6	46.8	223	280
	300 (PW)		346-3-50	325	367	129.8	175	230.5	44.9	53.8	148	168
074	500	06E8275/299	208/230-3-60	187	254	323.3	450	829 0	106.4	147.4	506	690
	600		460-3-60	414	508	139.6	200	408 2	46.8	65 4	253	345
	100		575-3-60	518	632	125.4	175	336.8	40.4	57 1	176	276
	200		380-3-60	342	418	174.5	250	458.0	52 6	78 8	280	382
	900		380/415-3-50	342	440	140.6	200	403.8	46 8	65.4	280	345
	300 (PW)		346-3-50	325	367	170.8	250	300.4	53.8	79.5	168	229
084	500	06E8299/299	208/230-3-60	187	254	364.3	500	870 0	147.4	147.4	690	690
	600		460-3-60	414	508	163 6	225	426.8	65.4	65.4	345	345
	100		575-3-60	518	632	148 9	200	353.5	57.1	57 1	276	276
	200		380-3-60	342	418	200.7	250	484.2	78 8	78 8	382	382
	900		380/415-3-50	342	440	165 2	225	428.4	65.4	65.4	345	345
	300 (PW)		346-3-50	325	367	205 3	250	334.9	79.5	79.5	229	229

LEGEND

FLA — Full Load Amps
ICF — Maximum Instantaneous Current Flow During Starting (The point in the starting sequence where the sum of the LRA for the starting compressors, plus the total RLA for all running compressors, plus the FLA for all running fan motors is maximum.)
kcmil — Thousand Circular Mils
LRA — Locked Rotor Amps
Max — Maximum
MCA — Minimum Circuit Amps (used for sizing; complies with National Electrical Code [NEC], section 430-24).
Min — Minimum
MOCP — Maximum Overcurrent Protection (used for sizing disconnect; complies with NEC Article 440, Section 22)
RLA — Rated Load Amps
PW — Part Wind Only

*All compressors are across-the-line start only except 38AH044: 230 v, 3 phase, 50 Hz; and all 346 v, 3 phase, 50 Hz.
†Units are suitable for use on electrical systems where voltage supplied to unit terminals is within listed minimum to maximum limits

NOTES:
1. All fans are protected by a single circuit breaker.
2. Maximum allowable phase imbalance: voltage - 2%; amps - 10%.
3 Maximum incoming wire size for terminal block is 500 kcmil.

Table 9B — Electrical Data — 50/60 Hz (Optional Single-Circuit Unit)

OPTIONAL SINGLE-CIRCUIT UNIT									COMPRESSOR*			
38AH	Model	Compressor A1/A2 Model No.	Nameplate V-Ph-Hz	Supply Voltage		MCA	MOCP	ICF	RLA		LRA	
				Min	Max				A1	A2	A1	A2
044	500 600 100 200 800 (PW) 900 300 (PW)	06E4250/250	208/230-3-60 460-3-60 575-3-60 380-3-60 230-3-50 380/415-3-50 346-3-50	187 414 518 342 198 342 325	254 508 632 418 254 440 367	174 6 100 0 100.0 100 0 174.6 100.0 100.0	225 100 100 125 225 100 125	434 7 218.6 162 4 241 2 296.7 219 6 165.9	67 9 34 6 28.8 34.6 67.9 34.6 33.3	67.9 34.6 28.8 34.6 67.9 34.6 33.3	345 173 120 191 207 173 115	345 173 120 191 207 173 115
054	500 600 100 200 900 300 (PW)	06E4265/250	208/230-3-60 460-3-60 575-3-60 380-3-60 380/415-3-50 346-3-50	187 414 518 342 342 325	254 508 632 418 440 367	201.8 100.1 100.0 107.1 101.1 107.0	250 125 125 150 125 150	535.7 268.6 206.4 297.2 269.6 198.9	89.7 43 6 36 5 45.5 43.6 44.9	67.9 34.6 28.8 34.6 34 6 33 3	446 223 164 247 223 148	345 173 120 191 173 115
064	500 600 100 200 900 300 (PW)	06E8275/265	208/230-3-60 460-3-60 575-3-60 380-3-60 380/415-3-50 346-3-50	187 414 518 342 342 325	254 508 632 418 440 367	244 5 113.1 100.6 126.9 114 1 129 8	350 150 125 175 150 175	617.5 307.6 226.1 341 1 335 6 230.5	106.4 46.8 40.4 52 6 46.8 53.8	89.7 43.6 36 5 45.5 43.6 44.9	506 253 176 280 280 168	446 223 164 247 223 148
074	500 600 100 200 900 300 (PW)	06E8299/275	208/230-3-60 460-3-60 575-3-60 380-3-60 380/415-3-50 346-3-50	187 414 518 342 342 325	254 508 632 418 440 367	323.3 139.6 125.4 174 5 140 6 170.8	450 200 175 250 200 250	829 0 408.2 336.8 458 0 403.8 300 4	147 4 65.4 57.1 78 8 65 4 79.5	106.4 46.8 40 4 52.6 46.8 53 8	690 345 276 382 345 229	506 253 176 280 280 168
084	500 600 100 200 900 300 (PW)	06E8299/299	208/230-3-60 460-3-60 575-3-60 380-3-60 380/415-3-50 346-3-50	187 414 518 342 342 325	254 508 632 418 440 367	364.3 163 6 148.9 200 7 165.2 205 3	500 225 200 250 225 250	870 0 426 8 353.5 484 2 428 4 334.9	147 4 65 4 57 1 78 8 65.4 79 5	147.4 65.4 57.1 78 8 65 4 79.5	690 345 276 382 345 229	690 345 276 382 345 229

Fan Motors

UNIT 38AH	CONDENSER FAN				
	Nameplate V-Ph-Hz	Qty	Hp	Total kW	(No.) FLA Each
044	208/230-3-60 460-3-60 575-3-60 380-3-60 230-3-50 380/415-3-50 346-3-50	4	1	6 2	(1,2) 5.5 (3,4) 5 4 (1,2) 2 8 (3,4) 2.7 (1-4) 3 4 (1-4) 3.9 (1,2) 5 5 (3,4) 5.4 (1-4) 3.0 (1-4) 4 4
054	208/230-3-60 460-3-60 575-3-60 380-3-60 380/415-3-50 346-3-50	4	1	6 2	(1,2) 5.5 (3,4) 5 4 (1,2) 2 8 (3,4) 2.7 (1-4) 3.4 (1-4) 3.9 (1-4) 3 0 (1-4) 4.4
064	208/230-3-60 460-3-60 575-3-60 380-3-60 380/415-3-50 346-3-50	4	1	6.2	(1,2) 5.5 (3,4) 5.4 (1,2) 2 8 (3,4) 2 7 (1-4) 3.4 (1-4) 3 9 (1-4) 3.0 (1-4) 4.4
074	208/230-3-60 460-3-60 575-3-60 380-3-60 380/415-3-50 346-3-50	6	1	9 3	(1,2) 5.5 (3-6) 5.4 (1,2) 2.8 (3-6) 2.7 (1-6) 3.4 (1-6) 3 9 (1-6) 3.0 (1-6) 4.4
084	208/230-3-60 460-3-60 575-3-60 380-3-60 380/415-3-50 346-3-50	6	1	9.3	(1,2) 5.5 (3-6) 5 4 (1,2) 2.8 (3-6) 2.7 (1-6) 3.4 (1-6) 3 9 (1-6) 3.0 (1-6) 4.4

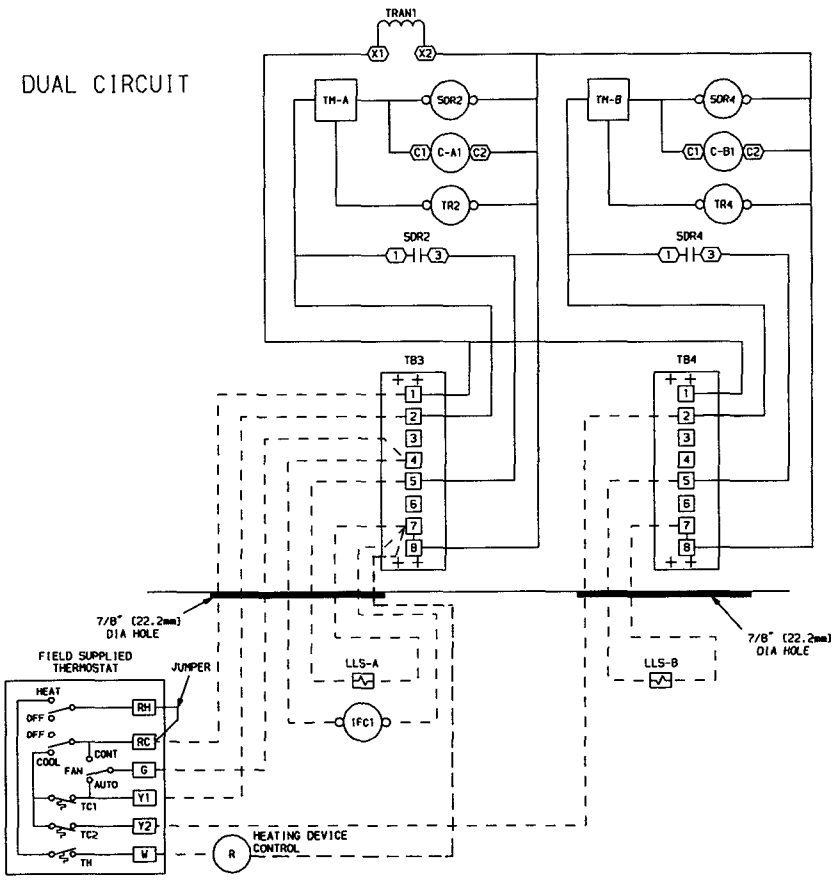
UNIT 38AH 044-084	CONTROL CIRCUIT INFORMATION — 50/60 Hz				
	Unit Power	Control Power†			Amps
	V-Ph-Hz	V-Ph-Hz	Min	Max	
-500	208/230-3-60	115-1-60	103	127	4.1
-600	460-3-60	115-1-60	103	127	4 1
-100	575-3-60	115-1-60	103	127	4 1
-200	380-3-60	230-1-60	207	253	2 0
-800	230-3-50	230-1-50	207	253	2 0
-900	380/415-3-50	230-1-50	207	253	2 0
-300	346-3-50	200-1-50	180	220	2.4

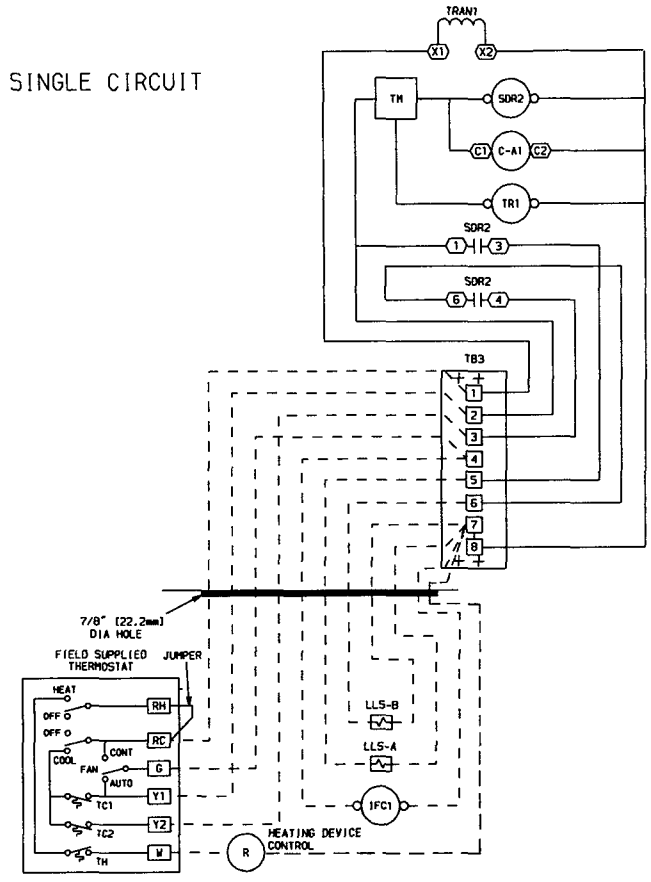
LEGEND

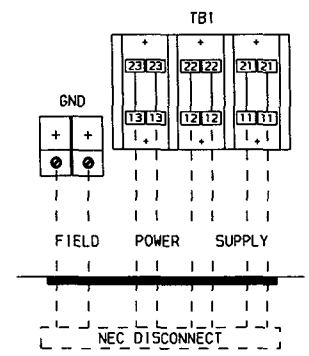
FLA — Full Load Amps
ICF — Maximum Instantaneous Current Flow During Starting. (The point in the starting sequence where the sum of the LRA for the starting compressors, plus the total RLA for all running compressors, plus the FLA for all running fan motors is maximum.)
kcmil — Thousand Circular Mils
LRA — Locked Rotor Amps
Max — Maximum
MCA — Minimum Circuit Amps (used for sizing; complies with National Electrical Code [NEC], section 430-24).
Min — Minimum
MOCP — Maximum Overcurrent Protection (used for sizing disconnect; complies with NEC Article 440, Section 22).
RLA — Rated Load Amps
PW — Part Wind Only

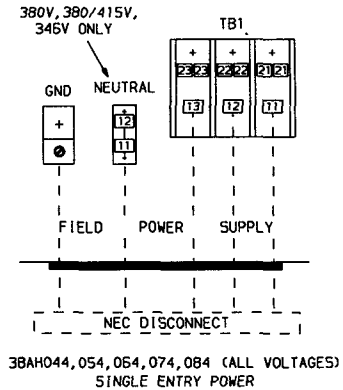
*All compressors are across-the-line start only except 38AH044 230 v, 3 phase, 50 Hz; and all 346 v, 3 phase, 50 Hz.
†Units are suitable for use on electrical systems where voltage supplied to unit terminals is within listed minimum to maximum limits.

NOTES:
1. All fans are protected by a single circuit breaker.
2 Maximum allowable phase imbalance: voltage - 2%; amps - 10%.
3 Maximum incoming wire size for terminal block is 500 kcmil.







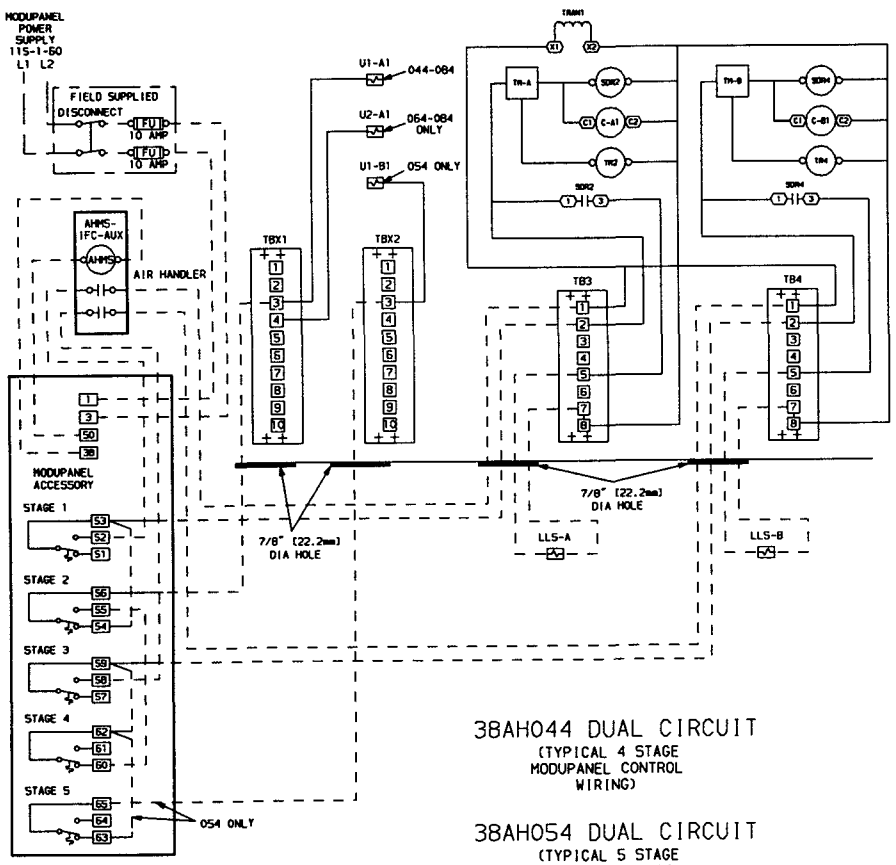


NOTES:
1. Factory wiring is in accordance with National Electrical Code (NEC); field modifications or additions must be in compliance with all applicable codes.
2. Wiring for field power supply must be rated 75 C minimum. Use copper, copper-clad aluminum, or aluminum conductors. Maximum incoming wire size for each terminal block is 500 kcmil.
3. Terminal blocks TB3, TB4 are for external field control connections. Control connections are to be class 1 wiring.
4. Two 2" diameter holes are recommended for parallel conductors on 044 (230-v) and on 044 and 054 (208/230-v) units.
5. One 3⅝" diameter hole is recommended for single entry power on 064 (208/230-v) units.
6. Field-supplied components (IFC, LLS-A, and LLS-B) must have a maximum sealed coil rating of 30 va each (.25 amp at 120 vac, .13 amp at 230 vac). Thermostats must have a minimum pilot duty rating of 300 va (2.5 amps at 120 vac, 1.3 amps at 230 vac). The fan switch must have a pilot duty rating of 30 va (0.25 amp at 120 vac, 0.13 amp at 230 vac).
7. Replacement of factory wires must be with type 105 C wire or its equivalent.
8. Field-supplied liquid line solenoid valves installed at the evaporator are required on all units.
9. Units have 175 va of power available for field-installed accessories.

LEGEND

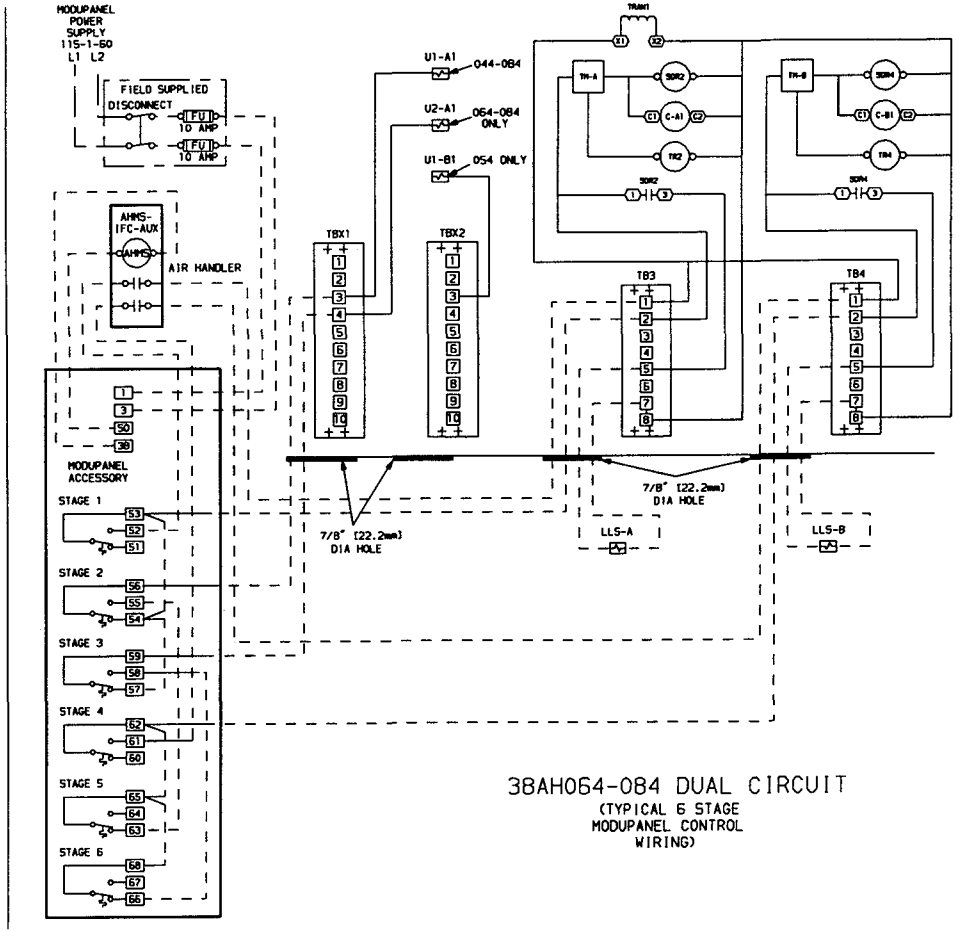
C	—	Compressor Contactor
GND	—	Equipment Ground
IFC	—	Indoor Fan Control
LLS	—	Liquid Line Solenoid
R	—	Heating Relay (Field Supplied 24-V *Sealed Coil, 10 VA Maximum Rating*)
SDR	—	Solenoid Drop Relay
TB	—	Terminal Block
TC	—	Thermostat, Cooling
TH	—	Thermostat, Heating
TM	—	Timer Motor
TR	—	Timer Relay
———		Factory Wiring
- - - -		Field Wiring

Fig. 9 — Field Wiring, One 2-Stage Thermostat

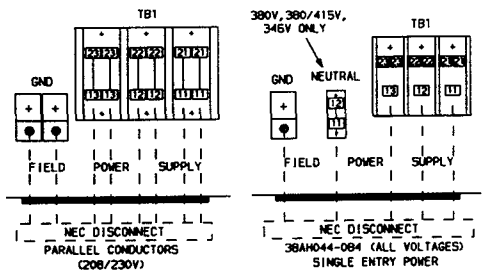


38AH044 DUAL CIRCUIT
(TYPICAL 4 STAGE MODUPANEL CONTROL WIRING)

38AH054 DUAL CIRCUIT
(TYPICAL 5 STAGE MODUPANEL CONTROL WIRING)



38AH064-084 DUAL CIRCUIT
(TYPICAL 6 STAGE MODUPANEL CONTROL WIRING)

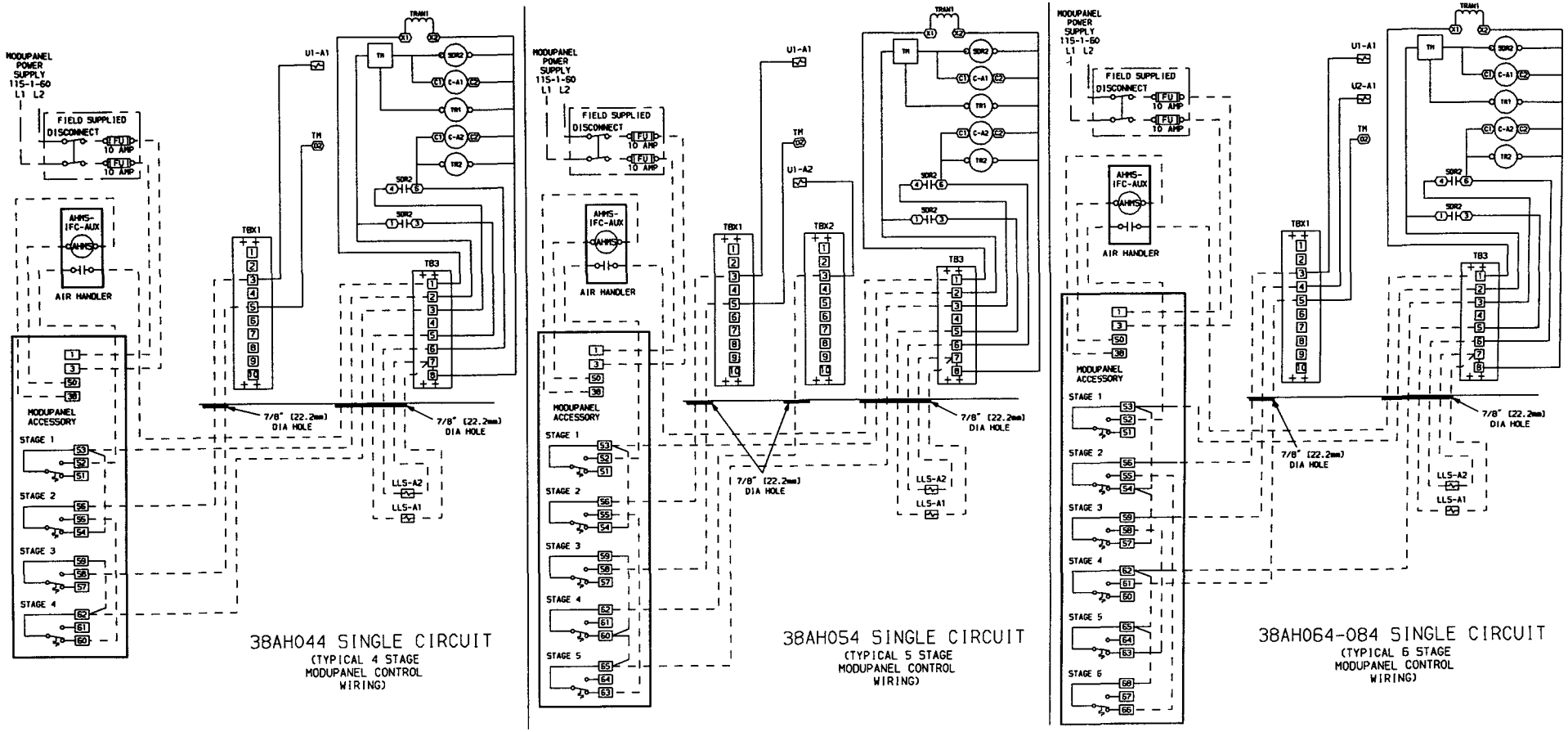


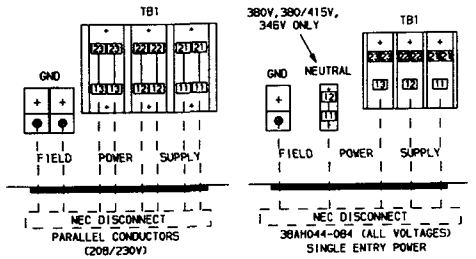
NOTES:
1. Factory wiring is in accordance with National Electrical Code (NEC); field modifications or additions must be in compliance with all applicable codes.
2. Wiring for field power supply must be rated 75 C minimum. Use copper, copper-clad aluminum, or aluminum conductors. Maximum incoming wire size for each terminal block is 500 kcmil.
3. Terminal blocks TB3 and TB4 are for external field control connections. Control connections are to be class 1 wiring.
4. Two 2" diameter holes are recommended for parallel conductors on 044 (230-v) and on 044 and 054 (208/230-v) units.
5. Field-supplied components (IFC, LLS-A, and LLS-B) must have a maximum sealed coil rating of 30 va each (.25 amp at 120 vac, .13 amp at 230 vac). AHMS IFC-AUX must have a minimum pilot duty rating of 200 va (1.7 amps at 120 vac, 0.9 amps at 230 vac) each.
6. Replacement of factory wires must be with type 105 C wire or its equivalent.
7. Field-supplied liquid line solenoid valves installed at the evaporator are required on all units.
8. Units have 175 va of power available for field-installed accessories.

LEGEND

AHMS	—	Air Handler Motor Starter
AUX	—	Auxiliary
C	—	Compressor Contactor
FU	—	Fuse
GND	—	Equipment Ground
IFC	—	Indoor Fan Control
LLS	—	Liquid Line Solenoid
SDR	—	Solenoid Drop Relay
TB	—	Terminal Block
TM	—	Timer Motor
TR	—	Timer Relay
U	—	Unloader Solenoid
———		Factory Wiring
- - - -		Field Wiring

Fig. 10 — Field Wiring, Single Modupanel™, 38AH044-084 Dual-Circuit Units





NOTES:
1. Factory wiring is in accordance with National Electrical Code (NEC); field modifications or additions must be in compliance with all applicable codes.
2. Wiring for field power supply must be rated 75 C minimum. Use copper, copper-clad aluminum, or aluminum conductors. Maximum incoming wire size for each terminal block is 500 kcmil.
3. Terminal blocks TB3, TBX1, and TBX2 are for external field control connections. Control connections are to be class 1 wiring.
4. Two 2-in. diameter holes are recommended for parallel conductors on 044 (230-v) and on 044 and 054 (208/230 v) units.
5. Field-supplied components (IFC, LLS-A1, and LLS-A2) must have a maximum sealed coil rating of 30 va each (.25 amp at 120 vac, .13 amp at 230 vac). AHMS IFC-AUX must have a minimum pilot duty rating of 400 va (3.4 amps at 120 vac, 1.8 amps at 230 vac) each.
6. Replacement of factory wires must be with type 105 C wire or its equivalent.
7. Field-supplied liquid line solenoid valves installed at the evaporator are required on all units.
8. Units have 175 va of power available for field-installed accessories.

LEGEND

AHMS	—	Air Handler Motor Starter
AUX	—	Auxiliary
C	—	Compressor Contactor
FU	—	Fuse
GND	—	Equipment Ground
IFC	—	Indoor Fan Control
LLS	—	Liquid Line Solenoid
SDR	—	Solenoid Drop Relay
TB	—	Terminal Block
TM	—	Timer Motor
TR	—	Timer Relay
U	—	Unloader Solenoid
———	—	Factory Wiring
- - - -	—	Field Wiring

Fig. 11 — Field Wiring, Single Modupanel™, 38AH044-084 Single-Circuit Units

Table 10 — Main Power Connection and Control Circuit Wiring

MAIN POWER CONNECTION				CONTROL CIRCUIT	
Electrical Characteristics	Qty Terminal Blocks	Qty Parallel Conductors*	Max Wire Size (kcmil)	Control Power (V)	Safety Circuit (V)
208/230-3-60	1	6	500	115†	24
460-3-60 575-3-60	1	3	500	115†	24
230-3-50	1	6	500	230	24
380-3-60 380/415-3-50	1	3	500	230	24
346-3-50	1	3	500	200	24

LEGEND

kcmil — Thousand Circular Mils

*Conductors are from the safety disconnect.
†Control power is accomplished with a step-down transformer where primary voltage is field voltage.

Step 5 — Install Accessories

LOW-AMBIENT OPERATION — If operating temperatures below 50 F (10 C) are expected, refer to separate installation instructions for low-ambient operation, Motormaster® III control.

MISCELLANEOUS ACCESSORIES — For applications requiring special accessories, the following packages are available: condenser coil hail guard package, gage panel, unloader package, unloader conversion kits, sound reduction package, condenser coil protective grilles, compressor security grilles, Modupanel™ control, and thermostat transformer relay package.

PRE-START-UP

IMPORTANT: Before beginning Pre-Start-Up or Start-Up, review Start-Up Checklist at the back of this publication. The Checklist assures proper start-up of a unit and provides a record of unit condition, application requirements, system information, and operation at initial start-up.

Do not attempt to start the air-conditioning system until following checks have been completed.

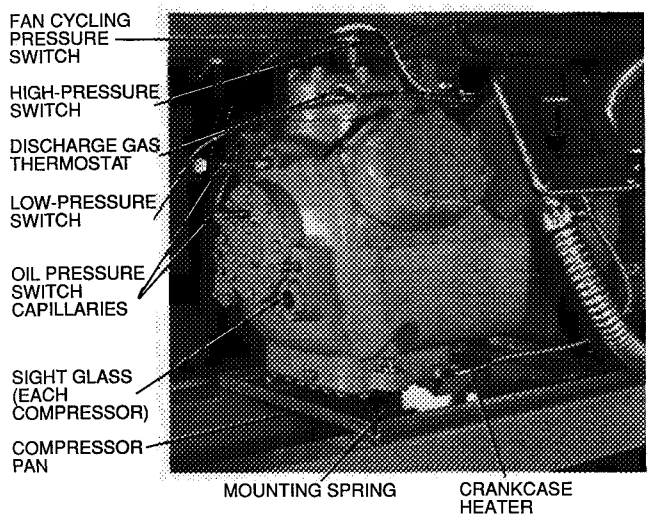
System Check

1. Check all system components, including the air-handling equipment. Consult manufacturer's instructions. If the unit has field-installed accessories, be sure all are properly installed and wired correctly. Refer to unit wiring diagrams.
2. Backseat (open) compressor suction and discharge shut-off valves. Close valves one turn to allow refrigerant pressure to reach the test gages.
3. Open liquid line service valves.
4. Check tightness of all electrical connections.
5. Oil should be visible in the compressor sight glasses. See Fig. 12. An acceptable oil level in the compressor is from ⅛ to ⅓ of sight glass. Adjust the oil level as required. No oil should be removed unless the crankcase heater has been energized for at least 24 hours. See Start-Up section on page 19, Preliminary Oil Charge, for Carrier-approved oils.
6. Electrical power source must agree with unit nameplate.

⚠ CAUTION

Crankcase heaters on all units are wired into the control circuit, so they are always operable as long as the main power supply disconnect is on (closed), even if any safety device is open. Compressor heaters must be on for 24 hours prior to the start-up of any compressor.

7. *Crankcase heaters must be firmly locked into compressors, and must be on for 24 hours prior to start-up.*
8. Fan motors are 3 phase. Check rotation of fans during first start-up check. Fan rotation is clockwise as viewed from top of unit. If fan is not turning clockwise, reverse 2 of the power wires.
9. Check compressor suspension. Snubber washers (for noise suppression) can be moved with finger pressure.
10. On 38AH074,084 single-circuit units, ensure that the packaging block located between the oil equalization tube and the compressor cross-brace has been removed.



NOTE: Six-cylinder model shown.

Fig. 12 — 06E Compressor Compartment

START-UP

Compressor crankcase heaters must be on for 24 hours before start-up. To energize the crankcase heaters, set the space thermostat above the ambient so there will be no demand for cooling. Close the field disconnect and turn on the fan circuit breakers. Leave the compressor circuit breakers off/open. The crankcase heaters are now energized.

Preliminary Checks

1. Ensure that compressor service valves are backseated.
2. Verify that each compressor floats freely on its mounting springs.
3. Check that electric power supply agrees with unit nameplate data.
4. Verify that compressor crankcase heaters are securely in place.
5. Check that compressor crankcase heaters have been on at least 24 hours.
6. Note that compressor oil level is visible in the sight glass.
7. Recheck for leaks using same procedure as previously outlined in Step 3 — Make Refrigerant Piping Connections, page 6.
8. If any leaks are detected, evacuate and dehydrate as previously outlined in Step 3 — Make Refrigerant Piping Connections, page 6.

Preliminary Oil Charge — Each compressor is factory charged with oil (see Table 3). When oil is checked at start-up, it may be necessary to add or remove oil to bring it to the proper level. One recommended oil level adjustment method is as follows:

ADD OIL — Close suction shutoff valve and pump down crankcase to 2 psig (14 kPa). (Low-pressure cutout must be jumped.) Wait a few minutes and repeat until pressure remains steady at 2 psig (14 kPa). Remove oil fill plug above the bull's-eye, add oil through plug hole, and replace plug. Run compressor for 20 minutes and check oil level.

IMPORTANT: *For single refrigerant circuit units, both compressors must be running* to adjust the oil level. Two oil level equalizer lines between compressors distribute the oil to each compressor.

NOTE: Use only Carrier approved compressor oil. Approved sources are: Petroleum Specialties Inc. (Cryol 150A), Texaco, Inc. (Capella WF-32-150), and Witco Chemical Co. (Suniso 3GS). Do not reuse oil that has been drained out, or oil that has been exposed to atmosphere.

REMOVE OIL — Pump down compressor to 2 psig (14 kPag). Loosen the ¼-in. (6.4 mm) pipe plug at the compressor base and allow the oil to seep out past the threads of the plug.

NOTE: The crankcase will be slightly pressurized. Do not remove the plug, or the entire oil charge will be lost.

Small amounts of oil can be removed through the oil pump discharge connection while the compressor is running.

Preliminary Charge — Refer to GTAC II, Module 5, Charging, Recovery, Recycling, and Reclamation of charging procedures. Using the liquid charging method and charging by weight procedure, charge each circuit with the amount of R-22 listed in Table 3A or B.

Start Unit — The field disconnect is closed, the fan circuit breaker is closed, and the space thermostats are set above ambient so that there is no demand for cooling. Only the crankcase heaters will be energized.

Next close the compressor circuit breakers and then reset space thermostat TC1 below ambient so that a call for stage one cooling is ensured. *Lead refrigeration circuit thermostat TC1 must be set to call for cooling at a lower temperature than lag refrigeration circuit thermostat TC2.* Now set TC2 for cooling.

NOTE: Do not use circuit breakers to start and stop the compressor except in an emergency.

Start-up of the lead compressor will be delayed from 12 seconds to 5½ minutes from the time the call for cooling is initiated. After the lead compressor starts, close refrigeration circuit thermostat TC2 to start the lag compressor. The minimum time lag before the start of the next compressor is 40 seconds after the lead compressor (A1) starts.

⚠ CAUTION

Never charge liquid into the low-pressure side of system. Do not overcharge. During charging or removal of refrigerant, be sure indoor fan system is operating.

Adjust Refrigerant Charge — *With all fans operating,* adjust the refrigerant charge in accordance with the unit charging charts located on the inside of the control box doors and in Fig. 13-22. Charge vapor into compressor low-side service port located above oil pump crankshaft housing. Measure pressure at the liquid line service valve, making sure a Schrader depressor is used if required. Also, measure liquid line temperature as close to the liquid service valve as possible. Add charge until the pressure and temperature conditions of the charging chart curve are met. If liquid pressure and temperature point fall above curve, add charge. If liquid pressure and temperature point fall below curve, reduce the charge until the conditions match the curve.

If the sight glass at location A (Fig. 5 and 6) is cloudy, check refrigerant charge again. *Ensure all fans are operating.* Also ensure maximum allowable liquid lift has not been exceeded.

If the sight glass at location A is clear and the sight glass at location B is cloudy, a restriction exists in the line between the 2 sight glasses. Check for a plugged filter drier or partially open solenoid valve. Replace or repair, as needed.

Check Compressor Oil Level — After adjusting the refrigerant charge, allow each circuit to run fully loaded for 20 minutes. Running oil level should be ⅛ to ⅓ up on the sight glass. Stop the compressors at the field power supply disconnect and check the crankcase oil level. Add oil only if necessary to bring the oil into view in the sight glass. If oil is added, run the circuit for an additional 10 minutes, then stop and check oil level. If the level remains low, check the piping system for proper design for oil return; also, check the system for leaks.

If the initial check shows too much oil (too high in the sight glass) remove oil to proper level. See Preliminary Oil Charge for proper procedure for adding and removing oil.

When the above checks are complete, repeat the procedure with the unit operating at minimum load conditions. For this minimum load check, the A1 circuit compressor is unloaded. No minimum load check is required on the B1 circuit of the standard unit.

IMPORTANT: For single-circuit unit minimum load check, run compressor A1 unloaded. *Compressor A2 must not be running.*

Unload the compressor(s) by turning the control set point adjustment nut counterclockwise until the adjustment nut stops. The unloader is now at 0 psig (0 kPag) set point. If electric actuated unloaders are installed, energize the solenoid to unload the compressor.

Return unloader to original setting after checks are complete.

Final Checks — Ensure all safety controls are operating, control panel covers are on, and the service panels are in place.

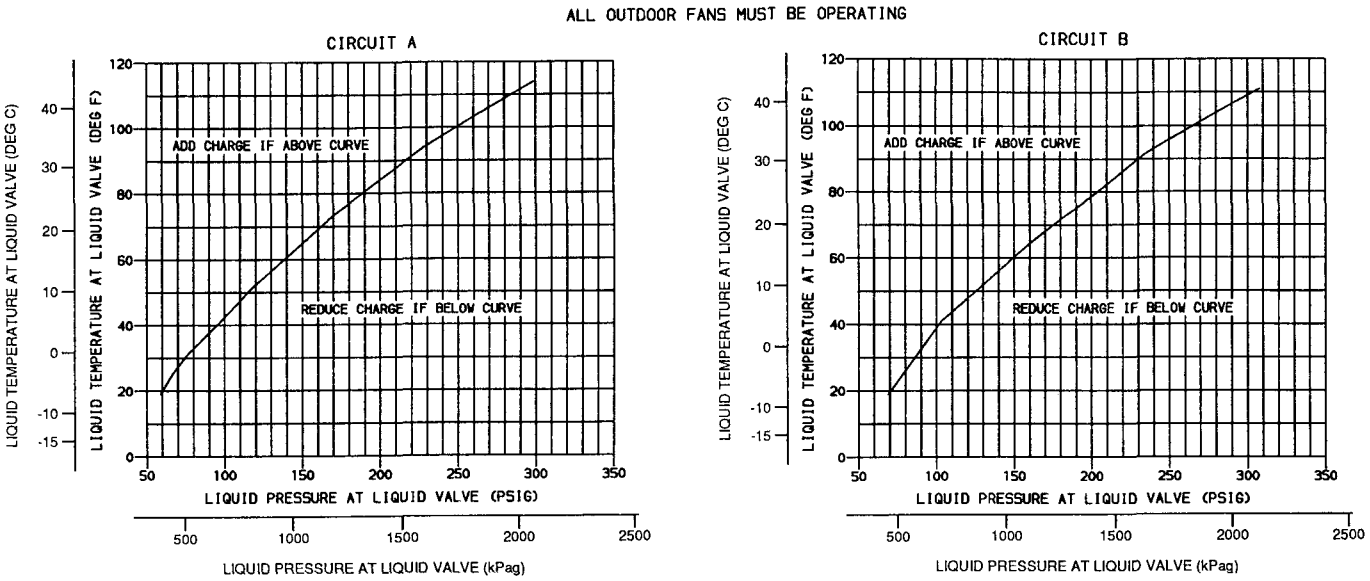


Fig. 13 – Charging Chart – Unit 38AH044; 50/60 Hz

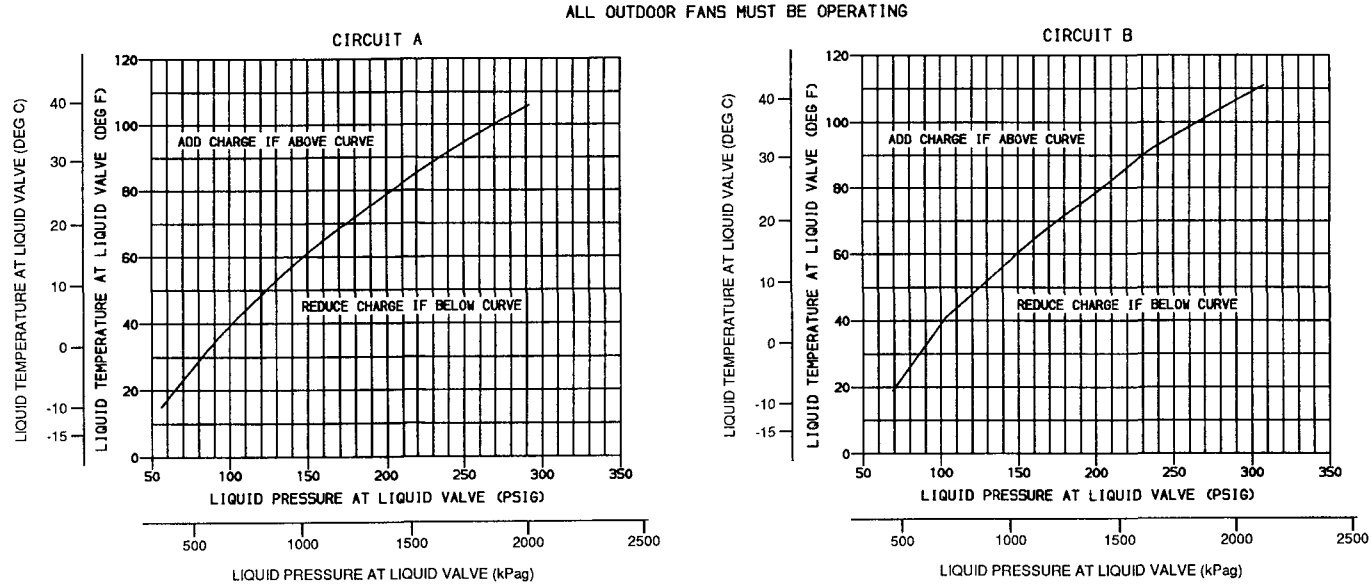


Fig. 14 – Charging Chart – Unit 38AH054; 50/60 Hz

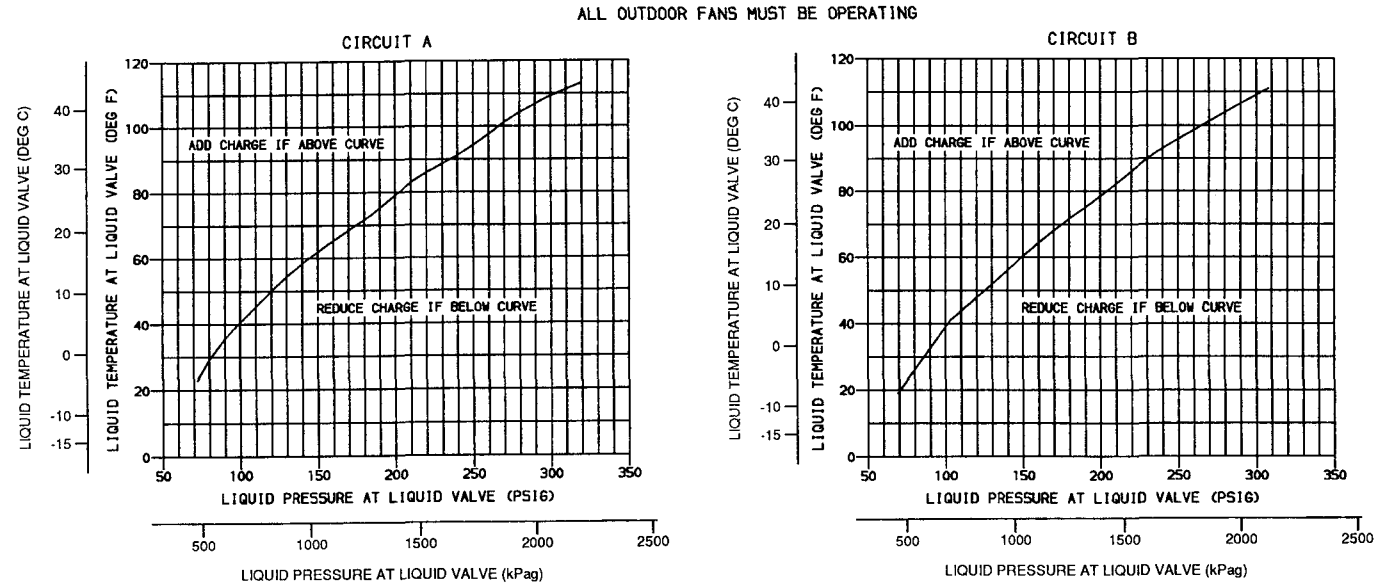


Fig. 15 – Charging Chart – Unit 38AH064; 50/60 Hz

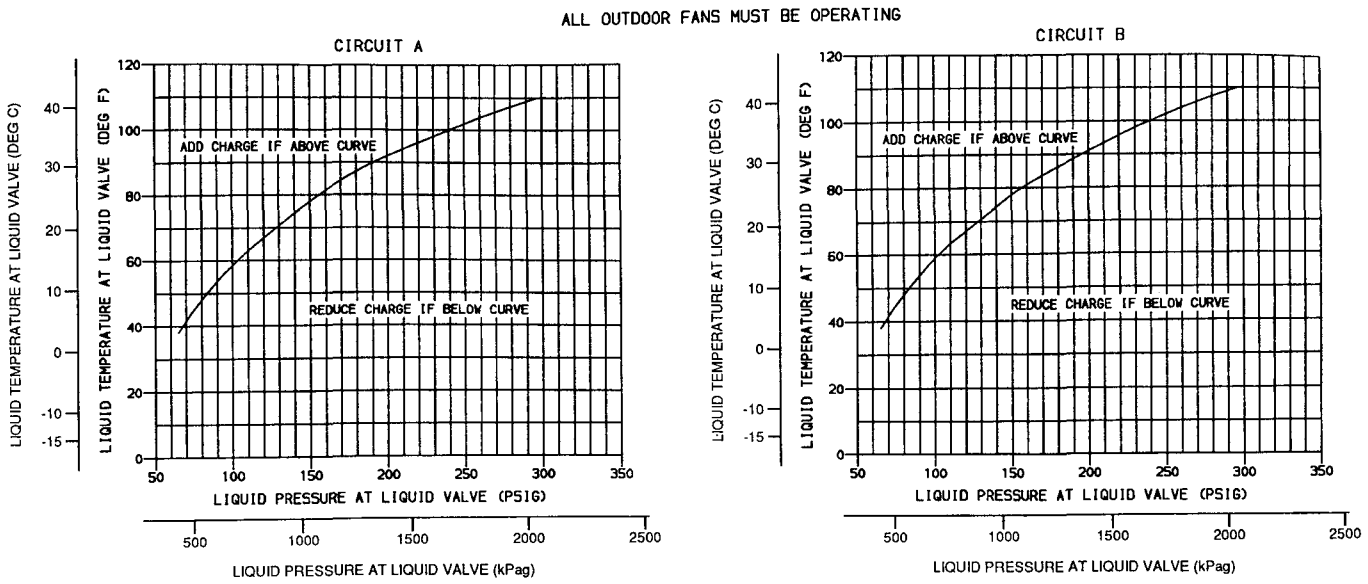


Fig. 16 — Charging Chart — Unit 38AH074; 50/60 Hz

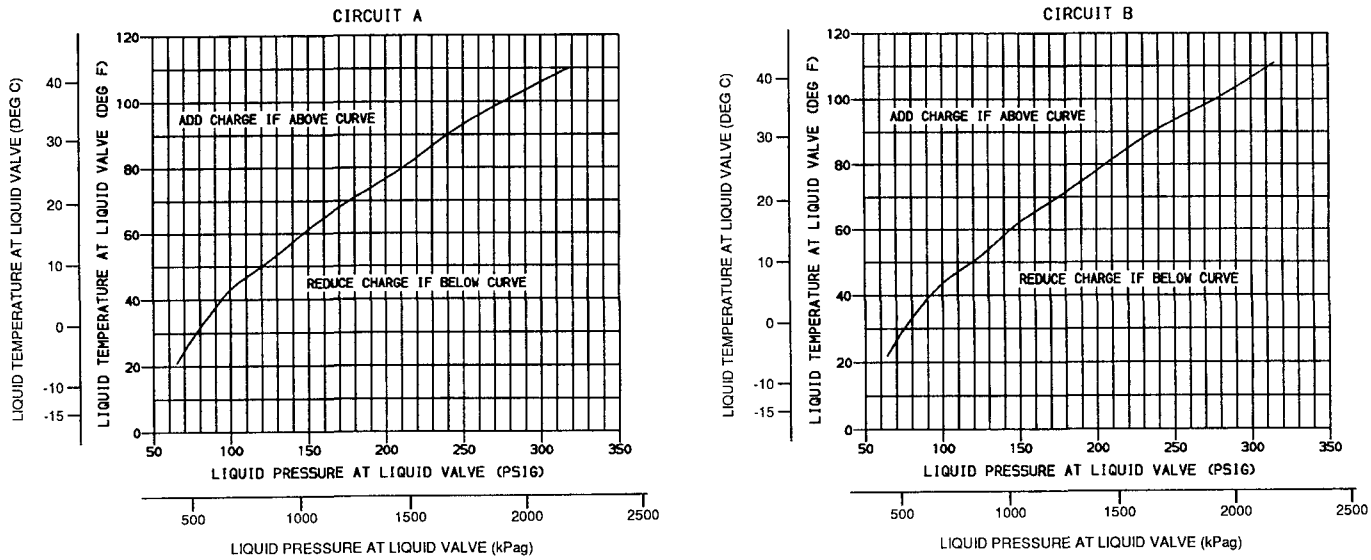


Fig. 17 — Charging Chart — Unit 38AH084; 50/60 Hz

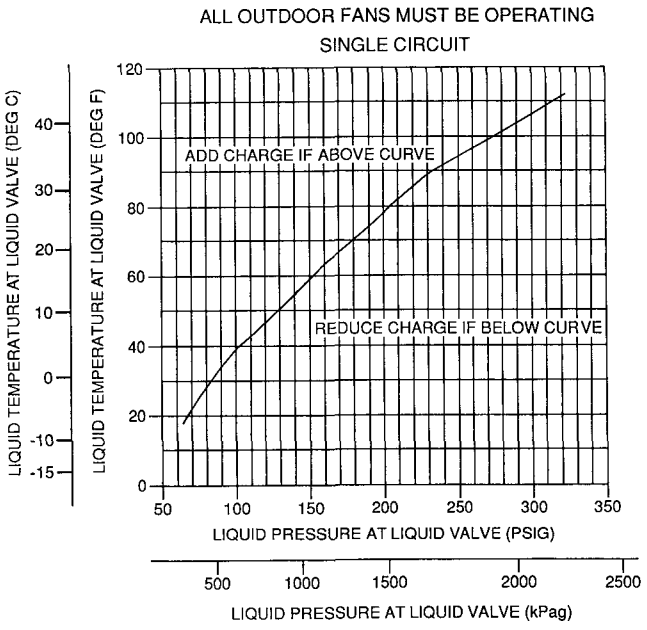


Fig. 18 — Charging Chart — Unit 38AH044; 50/60 Hz

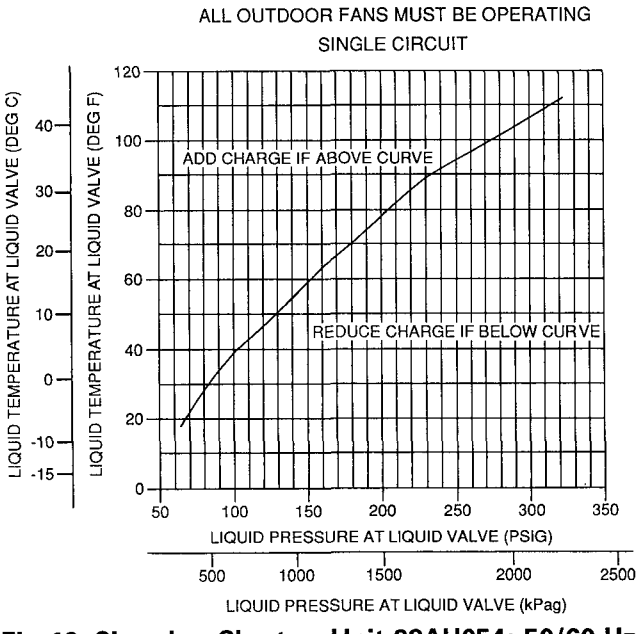


Fig. 19 Charging Chart — Unit 38AH054; 50/60 Hz

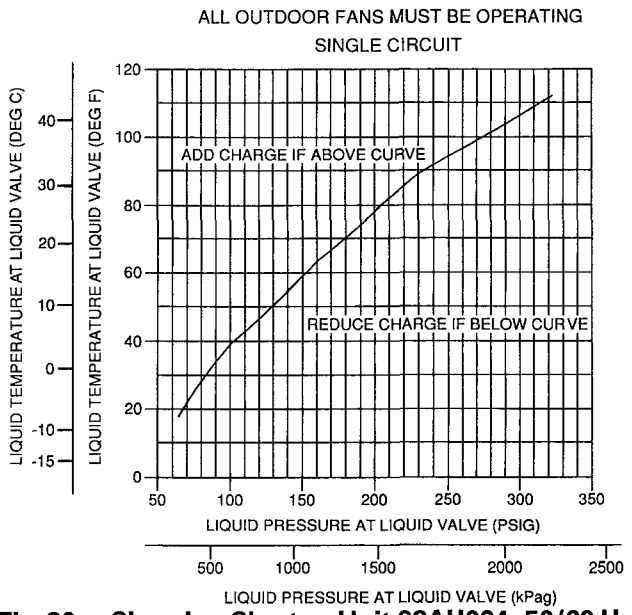


Fig. 20 – Charging Chart – Unit 38AH064; 50/60 Hz

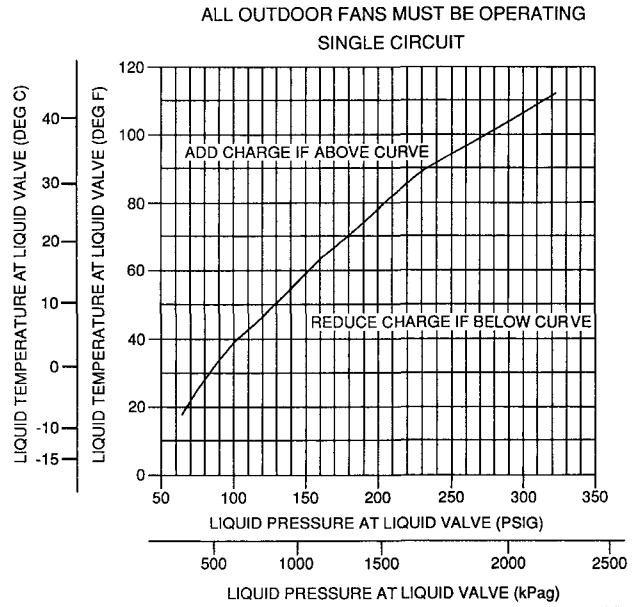


Fig. 21 – Charging Chart – Unit 38AH074; 50/60 Hz

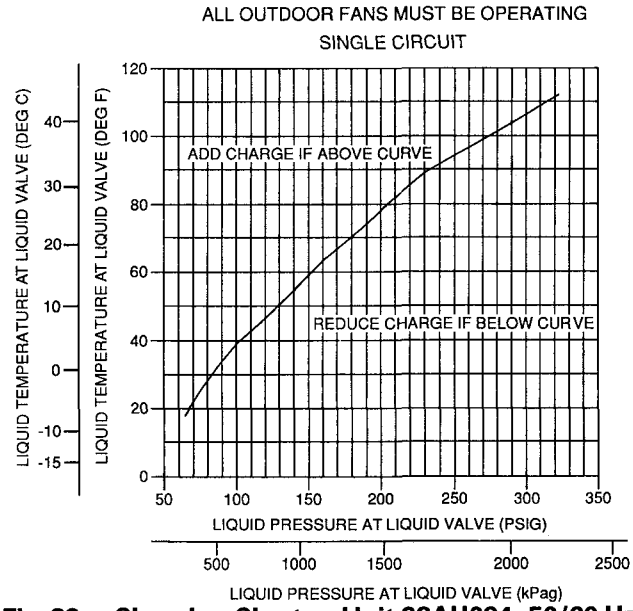


Fig. 22 – Charging Chart – Unit 38AH084; 50/60 Hz

SERVICE

	ELECTRIC SHOCK HAZARD Turn off all power to unit before servicing. The ON-OFF switch on control panel does *not* shut off control power; *use field* disconnect.

Coil Cleaning – Clean the coils with a vacuum cleaner, compressed air, water, or a non-wire bristle brush.

Refrigerant Circuit

LEAK TESTING — Units are shipped with a holding charge of R-22 (see Table 3A or B) and should be under sufficient pressure to conduct a leak test. If there is no pressure in the system, introduce enough nitrogen to search for the leak. Repair the leak using good refrigeration practices. After leaks are repaired, system must be evacuated and dehydrated using methods described in GTAC II (General Training Air Conditioning), Module 4, System Dehydration.

REFRIGERANT CHARGE (Refer to Table 3A or B) — At the liquid line connection point on each circuit is a factory-installed liquid line service valve. On each valve is a ¼-in. Schrader connection for charging liquid refrigerant.

Charging with Unit Off and Evacuated— Close liquid line service valve before charging. Weigh in charge shown in Table 3A or B. Open liquid line service valve; start unit and allow it to run several minutes fully loaded. Check for a clear sight glass. Be sure clear condition is liquid and not vapor. Complete charging the unit in accordance with the Start-Up, Adjust Refrigerant Charge section on page 19.

Charging with Unit Running— If charge is to be added while unit is operating, it will be necessary to have all condenser fans and compressors operating. It may be necessary to block condenser coils at low ambient temperatures to raise condensing pressure to approximately 280 psig (1931 kPag) to turn all condenser fans on. Do not totally block a coil to do this. Partially block all coils in uniform pattern. Charge vapor into compressor low-side service port located above oil pump crankshaft housing. Charge each circuit until sight glass shows clear liquid.

Troubleshooting – Refer to Troubleshooting chart located at back of book.

Oil Pressure Safety Switch (OPS) – An oil pressure safety switch for each of the independent refrigerant circuits will shut off the compressor in that circuit if oil pressure is not established at start-up or maintained during operation. If the OPS stops the unit, determine and correct the cause before restarting the unit. *Failure to do so constitutes equipment abuse and could affect the warranty.*

Compressor Motor Protection

CIRCUIT BREAKER — A manual reset, calibrated trip circuit breaker for each compressor protects against overcurrent. *Do not bypass connections or increase size of circuit breaker for any reason. If trouble occurs, determine the cause and correct it before resetting the breaker.*

DISCHARGE GAS THERMOSTAT — A sensor in the cylinder head of each compressor (Fig. 12) shuts down the compressor if excessively high discharge gas temperature is sensed. If the discharge gas thermostat shuts the unit down, it may be reset by the thermostat or power disconnect switch.

CRANKCASE HEATER (See Fig. 12) — Each compressor has an electric crankcase heater located in the bottom cover. The heater is held in place by a clip and bracket and must be tightly connected since exposure to the air causes the heater to burn out. Each heater is wired into the com-

pressor control circuit through a relay which energizes only when the compressor is off. The heater keeps the oil at a temperature that prevents excessive absorption of refrigerant during shutdown periods.

Energize the crankcase heaters when the unit is not running except during prolonged shutdown or servicing. *Energize the heaters at least 24 hours before restarting the unit after prolonged shutdown.*

TIME GUARD® FUNCTION — This function prevents compressors from short cycling.

Fan Motor Protection — Fan motors are protected by a single circuit breaker for all motors.

Head Pressure Control — Head pressure control reduces condenser capacity under low-ambient conditions. This is achieved by fan cycling control (standard, all units) and Motormaster® III accessory (field installed).

FAN CYCLING — All condensing units have standard provision for fully automatic intermediate season head pressure control through fan cycling (see Table 11). On all dual-circuit units, fans no. 3 and 4 are cycled by pressure control. Fans no. 5 and 6 on units 38AH074 and 084 are also cycled by pressure control. For all optional single-circuit units, fans no. 3 and 4 are controlled by the fan cycling pressure switch. Sizes 074 and 084 also include fan cycling temperature switch to control fans no. 5 and 6. The temperature switch is closed and fans operate when ambient temperature is above 70 F (21 C). The pressure sensor is located on the compressor cylinder head (see Fig. 12).

Winter Start Control — A 2½-minute low-pressure switch (LPS) bypass function in the timer prevents nuisance LPS trips during start-up in low-ambient conditions.

Pressure Relief — High-side pressure relief is provided by a fusible plug in the liquid line at the service valve. For low-side pressure relief, a fusible plug is inserted in the side of the accumulator (see Fig. 23). A pressure relief valve installed on the compressor will relieve at 450 psig (3102 kPag) (see Fig. 1 and 2).

High-Pressure Switch — This switch has fixed, nonadjustable settings. Figure 12 shows connection on a cylinder head. See Tables 12A and B for pressure switch settings.

NOTE: High-pressure switch must be removed from cylinder head before removing compressor from the unit.

TO CHECK — Slowly close the discharge shutoff valve until the compressor shuts down. This should be at approximately 426 psig (2938 kPag). Now slowly open the valve. When the pressure drops to approximately 320 psig (2207 kPag), the pressure switch will reset. To reenergize the control circuit, manually switch the fan circuit breaker off and then on. The compressor will start again under Time Guard controls.

Low-Pressure Switch — The low-pressure switch (LPS) has fixed nonadjustable settings. It is located at the pump end of the compressor above the bearing head.

TO CHECK — Slowly close the suction cut-off valve and allow the compressor to shut down. This should occur at approximately 27 psig (186 kPag). Now slowly open the valve. The compressor will restart under Time Guard control when the pressure builds to approximately 67 psig (462 kPag).

Capacity Control — Capacity control is achieved by a suction pressure actuated cylinder unloader on lead compressor A1. As the cooling load decreases, the suction pressure drops. At a defined suction pressure, (see Tables 13A or B, and 14A or B) the compressor cylinder bank on compressor A1 unloads. Lag compressor B1 will run unless the call for cooling is satisfied by TC2.

SINGLE CIRCUIT UNITS ONLY — Lag compressor A2 is controlled by fixed setting capacity control pressure switches (see Tables 13-15). If suction pressure continues to drop after compressor A1 unloads, compressor A2 will stop when the CCPSs (capacity control pressure switches) open.

As load increases, the compressors will start at the pressure switch cut-in points and reload at the unloader load pressure.

Control Set Point (cylinder load point) is adjustable from 0 to 85 psig (0 to 586 kPag). To adjust the set point, turn the control set point adjustment nut clockwise to bottom stop. (See Fig. 24.) In this position, load-up set point is 85 psig (586 kPag). Turn adjustment counterclockwise to desired control set point. Every full turn clockwise decreases the load-up set point by 7.5 psig (52 kPag).

Pressure Differential (difference between cylinder load and unload points) is adjustable from 6 to 22 psig (41 to 152 kPag). To adjust, turn pressure differential adjustment screw counterclockwise to back stop position. The differential pressure is now adjusted to 6 psig (41 kPag). Turn the adjustment screw clockwise to adjust the differential pressure. Every full clockwise turn increases the differential by 1.5 psig (10 kPag).

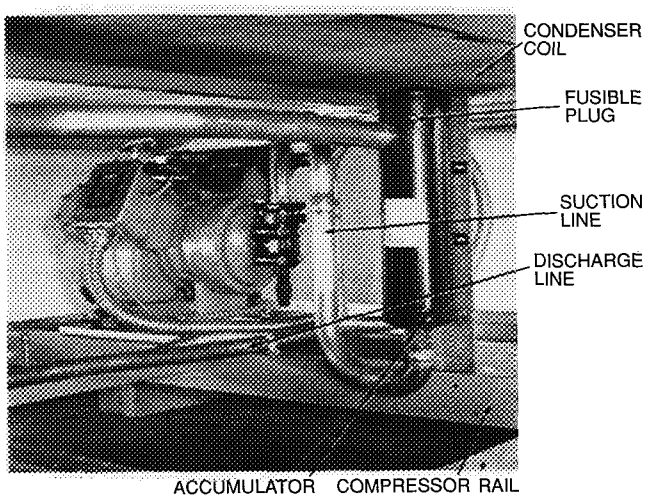


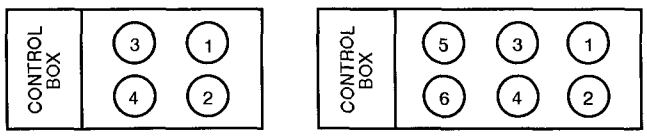
Fig. 23 — Accumulator and Fusible Plug

Table 11 — Fan Cycling Control — Psig (kPag)

Control by Pressure* Switch Opens	±7 (48)
Switch Closes	126 (869)
	264 (1820)

*On all units, fans no 3 and 4; also on unit 38AH074, 084, fans no. 5 and 6

NOTE: Fans no. 1 and 2 are noncycling.



Timer Functions — (See Timer Cycle, Fig. 25.) Each compressor is operated by an independent timer motor which allows for the independent operation of each refrigeration circuit.

NOTE: Optional single-circuit units have one timer motor which controls lead compressor. Lag compressor is controlled by CCPS (capacity control pressure switch).

SWITCH A — The timer motor is energized through contacts A-A1 or A-A2. This establishes the Time Guard® function which prevents compressor short cycling. Start of compressor is delayed approximately 5.5 minutes after shutdown. Compressor B1 start-up is delayed 60 seconds after the TC2 call-for-cooling by a time-delay relay. This prevents both compressors from starting at the same time.

SWITCH B — The compressor is initially energized through contacts B-B1.

SWITCH D — Contacts D-D1 provide a 2.5-minute bypass of the low-pressure switch at start-up for winter-start control. On single-circuit units, contacts D-D2 control start-up of compressor A2.

SWITCH E — Contacts E-E1 provide a 40-second bypass of the oil pressure switch at start-up. If oil pressure does not build to the required minimum pressure in 40 seconds, the compressor shuts down and the control circuit locks out.

Control Circuit Reset — The control circuit locks out if the unit shuts down because of low oil pressure, high discharge gas temperature (DGT), or excessive high-side pressure To reset the control circuit, open and close the fan circuit breaker (FCB). This will reset the timer motor, and the unit will restart under Time Guard control. At start-up, if the low-pressure switch is not made after 2½ minutes, the unit shuts down. When the pressure comes up enough for the LPS to cut in, the control circuit is energized automatically and start-up proceeds under Time Guard control.

Table 12A — Pressure Switch Settings (Psig)

SWITCH	CUTOUT	CUT-IN
High	426 ± 20	320 ± 20
Low	27 ± 4	67 ± 7

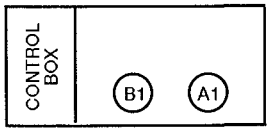
Table 12B — Pressure Switch Settings (kPag)

SWITCH	CUTOUT	CUT-IN
High	2938 ± 48	2207 ± 138
Low	186 ± 28	462 ± 48

Table 13A — Capacity Control for Standard Dual-Circuit Unit — Psig (kPag)

COMPRESSOR A1*	
CONTROL — Cylinder Unloader†	
Suction Pressure Activated	
Unload	56 (386)
Load	76 (524)

*Location of unloader.
†One unloader on each unit is standard

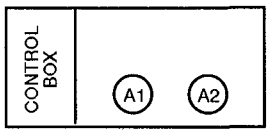


COMPRESSORS

Table 13B — Capacity Control for Optional Single-Circuit Unit — Psig (kPag)

COMPRESSOR A1*	—
CONTROL — Cylinder Unloader†	
Suction Pressure Activated	
Unload	56 (386)
Load	76 (524)

*Location of unloader
†One unloader on each unit is standard



COMPRESSORS

Table 14A — One 2-Stage Thermostat Capacity Control for Standard Dual-Circuit Unit

UNIT 38AH	STEP	COMPR A1* 06E-		COMPR B1 06E-		LOADED CYL-QTY	CAP. %
044	1	250	ON†	250	—	2	25
	2		ON		—	4	50
	3		ON†		ON	6	75
	4		ON		ON	8	100
054	1	250	ON†	265	—	2	21
	2		ON		—	4	42
	3		ON†		ON	8	79
	4		ON		ON	10	100
064	1	265	ON†	275	—	4	32
	2		ON		—	6	48
	3		ON†		ON	10	84
	4		ON		ON	12	100
074	1	275	ON†	299	—	4	29
	2		ON		—	6	43
	3		ON†		ON	10	86
	4		ON		ON	12	100
084	1	299	ON†	299	—	4	33
	2		ON		—	6	50
	3		ON†		ON	10	83
	4		ON		ON	12	100

*A1 is lead compressor.
†One cylinder bank is unloaded.

Table 14B — One 2-Stage Thermostat Capacity Control for Optional Single-Circuit Unit

UNIT 38AH	CAPACITY STEP	COMPR A1* 06E-		COMPR A2 06E-		NO. OF LOADED CYL	CAP. %
044	1	250	ON†	250	OFF	2	25
	2		ON		OFF	4	50
	3		ON†		ON	6	75
	4		ON		ON	8	100
054	1	265	ON†	250	OFF	4	38
	2		ON		OFF	6	58
	3		ON†		ON	8	79
	4		ON		ON	10	100
064	1	275	ON†	265	OFF	4	35
	2		ON		OFF	6	52
	3		ON†		ON	10	83
	4		ON		ON	12	100
074	1	299	ON†	275	OFF	4	38
	2		ON		OFF	6	57
	3		ON†		ON	10	86
	4		ON		ON	12	100
084	1	299	ON†	299	OFF	4	33
	2		ON		OFF	6	50
	3		ON†		ON	10	83
	4		ON		ON	12	100

*A1 is lead compressor.
†One cylinder bank is unloaded.

Table 15 — Capacity Control Pressure Switches for Optional Single-Circuit Unit — Psig (kPag)

	CUT-IN	CUTOUT
CCPS 1	83 (572)	77 (531)
CCPS 2	80 (551)	53 (365)

CCPS — Capacity Control Pressure Switch

CONTROL

Sequence of Operation — On call for cooling, first-stage cooling thermostat TC1 closes. First step of condenser fans and timer motor (TM) is energized. (See Fig. 25, Wiring Diagrams [Fig. 9-11 pages 15-17], and Control Label diagram located inside unit control box door.) After approximately 7 seconds, timer contacts E-E1 close. Approximately 12 seconds after TC1 closes, normally open timer contacts B-B1 close for 1 second. This energizes timer relay no. 1, TR2 (for optional single-circuit units, TR1), closing the TR2 (or TR1) normally-open contacts around B-B1. This maintains a circuit when B-B1 contacts open after one second. At the same time, solenoid drop relays SDR1 and SDR2 are energized. SDR1 normally-closed contacts open, shutting off the crankcase heater. SDR2 normally-open contacts close, energizing liquid line solenoid LLS-A, allowing refrigerant flow through the evaporator. Also at the same time, compressor contactor C-A1 is energized, starting the first-stage compressor. (On units equipped with part-wind start, contactor C-A1 energizes the first step of motor windings; second step of windings is energized after a 1-second delay by contactor C-A1A.)

Contacts E-E1 remain closed for approximately 40 seconds to bypass the oil pressure switch (OPS). If oil pressure is insufficient after contacts E-E1 open, the compressor will stop and the control circuit will lock out (through timer relay TR2 contacts at timer contacts A-A2).

At start-up, timer motor contacts D-D1 are closed, bypassing low-pressure relay contacts LPR-A for 2½ minutes. This provides a winter start-up feature.

After 2½ minutes, contacts D-D1 open. If system pressure is insufficient to close the low-pressure switch (LPS-A1), then low-pressure switch relay LPR-A (for optional single-circuit units, LPR) contacts will be open, the compressor will shut down, and the Time Guard® control delay will be initiated.

FOR DUAL-CIRCUIT UNITS — If circuit A is insufficient for the cooling requirements, second-stage thermostat TC2 will close to bring the second circuit (circuit B) on line for cooling. This circuit follows the same sequence of operation as circuit A except that a 40-second time delay relay (TDR) delays compressor start-up for 40 seconds after the call for cooling.

FOR OPTIONAL SINGLE-CIRCUIT UNITS —If compressor A1 is insufficient for the cooling requirements, the second-stage thermostat will close and liquid line solenoid valve LLS-A2 will open. Compressor A2 will start only after timer contacts D-D2 are closed and suction pressure is sufficient to close capacity control pressure switches CCPS1 and CCPS2.

When the fan switch is set for automatic operation (AUTO.), the indoor-fan contactor (IFC) is cycled with the lead compressor. If the fan switch is set for continuous operation (CONT), the IFC is energized as long as the unit power is on.

Restart After Stoppage by Safety Control — The high-pressure switch, compressor discharge gas thermostats, and the oil pressure switch must be reset manually by breaking the control power supply at any of the following points: control circuit fuse, fan motor circuit breaker, or the thermostat. Restart will follow the Time Guard control delay.

Stoppage by low-pressure switch will result in Time Guard control delay, then unit will attempt normal restart.

The compressor motor overcurrent protectors are manual-reset circuit breakers. Reset of control circuit may also be necessary.

Independent Refrigerant Circuit Controls — Circuits A1 and B1 are controlled by independent circuitry. It is therefore possible to maintain partial cooling capability even if one compressor is inoperable.

NOTE: Single-circuit units do not have independent control circuitry.

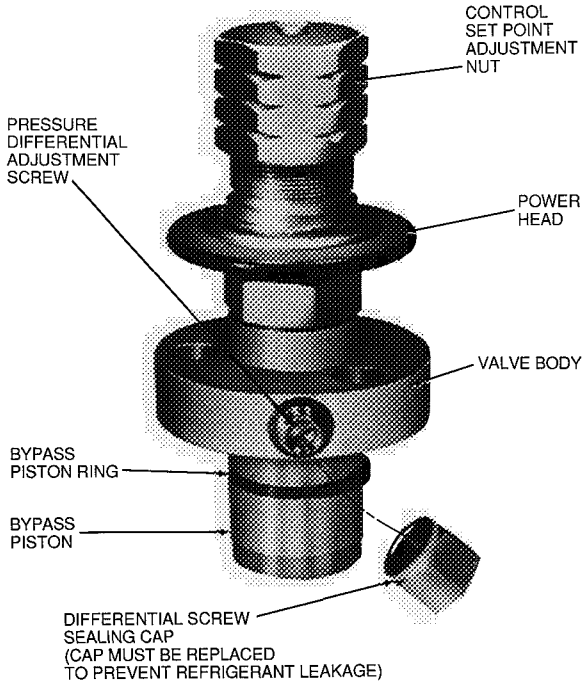
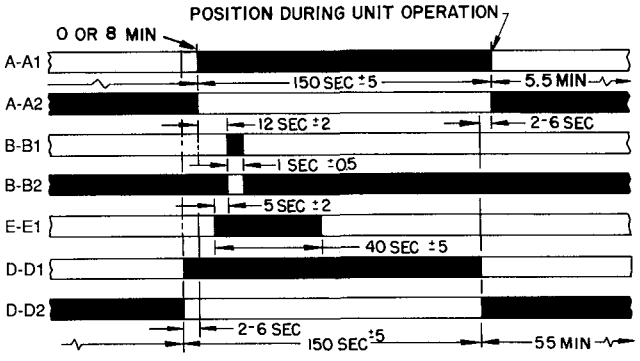


Fig. 24 — Capacity Control Valve



NOTE: Black denotes closed contacts

Fig. 25 — Timer Cycle

Unit Control Box — (See Fig. 26.) Viewed facing compressors, the control box is at left end of the unit. All incoming power enters through the control box. The control box contains power components and electronic controls. Outer panels are hinged and latched for easy opening. Remove screws to remove inner panels. Outer panels can be held open for service and inspection by using door retainer on each panel. Remove bottom pin from door retainer assembly, swing retainer out horizontally, and engage pin in one of the retainer ears and the hinge assembly.

Condenser Fans — Each fan is supported by a formed wire mount bolted to fan deck and covered with a wire guard. The exposed end of fan motor shaft is protected from weather by grease. If fan motor must be removed for service or replacement, be sure to regrease fan shaft, and reinstall fan guard. For proper performance, fan should be 7/8 in. (22 mm) below top of venturi on the fan deck to top of the fan hub for 60-Hz units, and 1/2 in. (13 mm) for 50-Hz units. (See Fig. 27.) Tighten set screws to 15 ± 1 ft-lbs (20 ± 1.3 N-m). Figure 27 shows proper position of mounted fan.

IMPORTANT: Check for proper fan rotation (clockwise viewed from above). If necessary to reverse, switch leads.

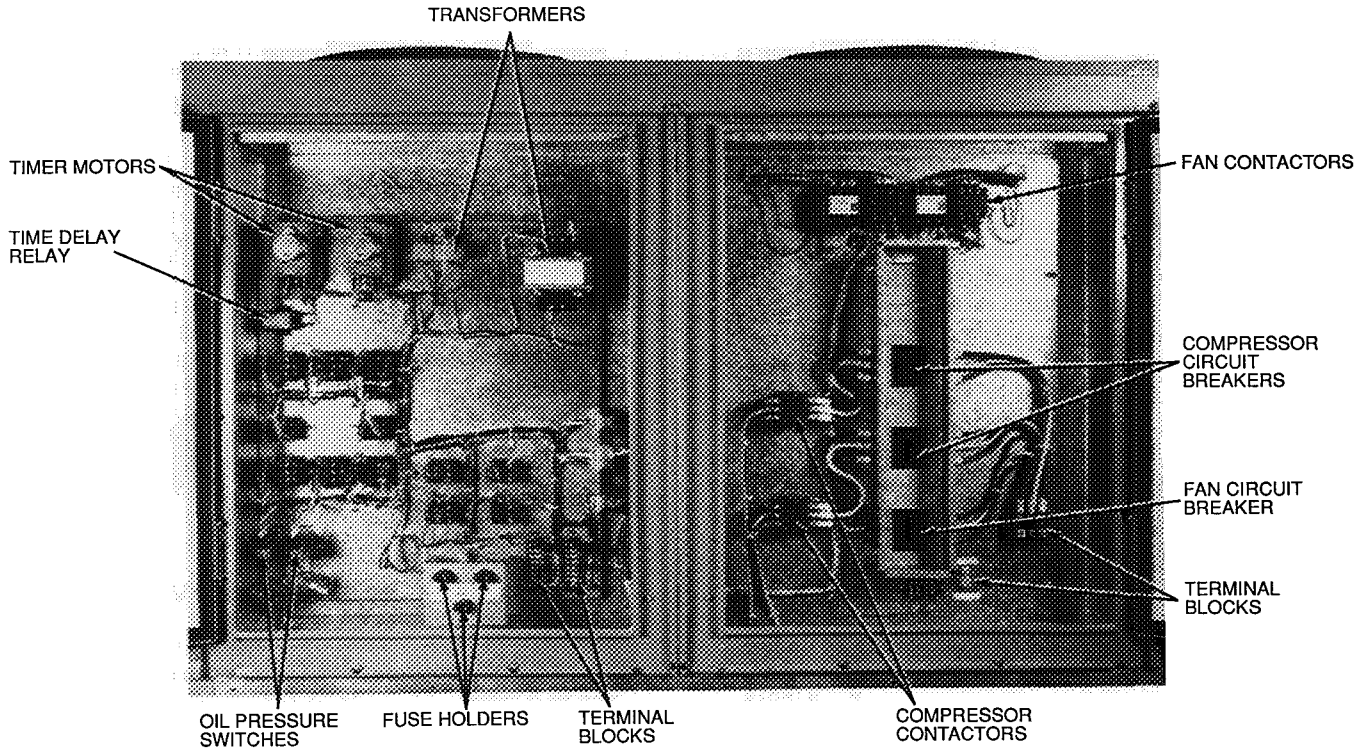
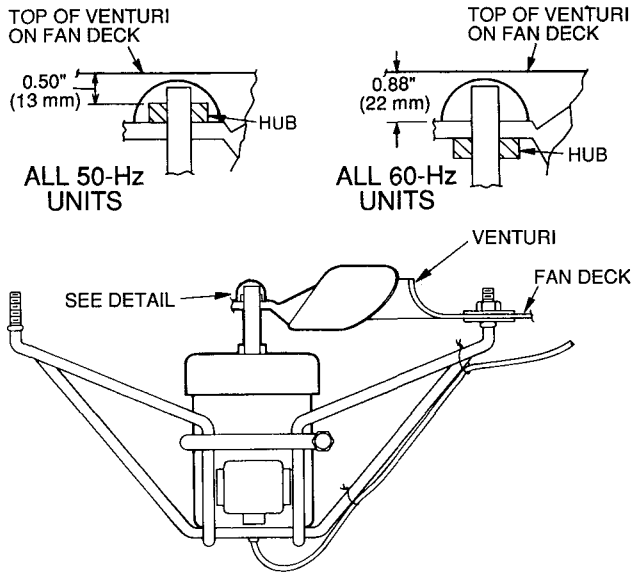


Fig. 26 — Unit Control Box



NOTE: Fan rotation is clockwise when viewed from top of unit.

Fig. 27 — Condenser Fan Adjustment

Compressor Required Modification for Single-Circuit Option, When Compressor A1 is Out — To maintain unit operation, compressor no.1 must be operable. If it is not operable, the following *temporary* modifications must be made to keep the unit running:

1. Change the oil pressure switch connections from compressor A1 to compressor A2.
2. Connect compressor A2 into the Time Guard® circuit as compressor A1 was originally.
3. Open compressor A1 circuit breaker.

NOTE: Make sure the crankcase heaters are energized when compressors are off.

Compressor Removal — Access to the pump end of the compressor is from the compressor side of the unit. Access to the motor end of the compressor is from the inside of the unit. All compressors can be removed from the compressor side of the unit.

> IMPORTANT: All compressor mounting hardware and support brackets removed during servicing must be reinstalled prior to start-up.

1. Disconnect power to unit; lockout power to compressor.
2. Close suction and discharge service valves.
3. Relieve refrigerant pressure into a refrigerant recovery system.
4. Remove:
   a. Fan-cycling pressure switch (FCPS)
   b. High-pressure switch
   c. Low-pressure switch
   d. Oil-pressure switch
   e. Discharge gas temperature switch.
5. Disconnect power wires at terminal box and disconnect conduit.
6. Disconnect wires from crankcase heater.
7. Disconnect service valves from compressor.

   NOTE: On single-circuit units, disconnect both oil equalizer lines located on the motor barrel and on the oil pump sump.
8. Remove 4 large screws securing compressor mounting pan to unit base rail.
9. Slide compressor (on mounting pan) to outside of unit frame; support and/or lower to ground.
10. Unbolt compressor from mounting pan and remove.

Compressor Replacement — Perform the following:

1. Reverse procedure in Compressor Removal section up to Step 4.
2. Reinstall service valves and safety switches, and tighten to torques as listed:

Torque	Compressor(s)
20-25 ft-lbs (27- 34 N-m)	06E-250
80-90 ft-lbs (109-122 N-m)	06E-265,275,299
Tighten suction valves to —	
80- 90 ft-lbs (109-122 N-m)	06E-250
90-120 ft-lbs (122-163 N-m)	06E-265,275,299
Tighten the following fittings to —	
60 ft-lbs (81 N-m)	Discharge Gas Thermostat
120 in.-lbs (13.5 N-m)	High-Pressure Switch, Fan-Cycling Pressure Switch
120 in.-lbs (13.5 N-m)	Low-Pressure Switch

3. Leak-check and evacuate system.
4. Recharge system per pre-start-up and start-up sequences. Recheck oil levels.
5. Energize crankcase heater for 24 hours prior to restart of system.

OIL CHARGE — (Refer to Tables 3A and B.) All units are factory charged with oil. Acceptable oil level for each compressor is from ⅛ to ⅓ of sight glass (see Fig. 12).

When additional oil or a complete charge is required, use only Carrier-approved compressor oil.

Approved oils are:

Petroleum Specialties, Inc. — Cryol 150A (factory oil charge)
Texaco, Inc. — Capella WF-32-150
Witco Chemical Co. — Suniso 3GS

COMPRESSOR	OIL REQUIRED	
	Pts	L
06E-250	14	6.6
06E-265	19	9.0
06E-275	19	9.0
06E-299	19	9.0

Do not reuse drained oil, and do not use any oil that has been exposed to atmosphere.

Adjust oil level in accordance with Start-Up, Preliminary Oil Charge section on page 19.

TROUBLESHOOTING

PROBLEM	SOLUTION
COMPRESSOR DOES NOT RUN	
Contactor Open	
1. Power off.	1. Restore power.
2. Fuses blown in field power circuit.	2 After finding cause and correcting, replace with correct size fuse
3. No control power.	3 Check secondary fuse(s); replace with correct type and size Replace transformer if primary windings receiving power.
4. Thermostat circuit open.	4 Check thermostat setting.
5. Multi-function timer not operating.	5. Check timer for proper operation; replace if defective.
6. Compressor circuit breaker tripped.	6. Check for excessive compressor current draw. Reset breaker; replace if defective
7. Safety device lock-out circuit active.	7 Reset lock-out circuit at thermostat or circuit breaker.
8. Low-pressure switch open.	8. Check for refrigerant undercharge, obstruction of indoor airflow, or whether compressor suction shutoff valve is fully open. Make sure liquid line solenoid valve(s) is open.
9. High-pressure switch open.	9 Check for refrigerant overcharge, obstruction of outdoor airflow, air in system or whether compressor discharge valve is fully open. Be sure outdoor fans are operating correctly
10. Discharge gas temperature switch open.	10 Check for open condition. Allow for reset. Replace if defective
11. Loose electrical connections.	11. Tighten all connections
12. Compressor stuck.	12 See 06E compressor service literature.
Contactor Closed	
1. Compressor leads loose.	1. Check connections.
2. Motor windings open.	2 See 06E compressor service literature
3. Single phasing.	3. Check for blown fuse Check for loose connection at compressor terminal
COMPRESSOR STOPS ON HIGH-PRESSURE SWITCH	
Outdoor Fan On	
1. High-pressure switch faulty.	1. Replace switch.
2. Airflow restricted.	2. Remove obstruction.
3. Air recirculating.	3 Clear airflow area
4. Noncondensables in system.	4. Purge and recharge as required.
5. Refrigerant overcharge.	5. Purge as required.
6. Line voltage incorrect.	6. Consult power company
7. Refrigerant system restrictions.	7 Check or replace filter drier, expansion valve, etc. Check that compressor discharge valve is fully open.
Outdoor Fan Off	
1. Fan slips on shaft.	1 Tighten fan hub setscrews.
2. Motor not running.	2. Check power and capacitor.
3. Motor bearings stuck.	3 Replace bearings
4. Motor overload open.	4. Check overload rating Check for fan blade obstruction.
5. Motor burned out.	5. Replace motor.
COMPRESSOR CYCLES ON LOW-PRESSURE SWITCH	
Indoor-Air Fan Running	
1. Filter drier plugged.	1 Replace filter drier.
2. Expansion valve power head defective.	2. Replace power head.
3. Low refrigerant charge.	3 Add charge. Check low-pressure switch setting.
Airflow Restricted	
1. Coil iced up.	1. Check refrigerant charge
2. Coil dirty.	2 Clean coil fins
3. Air filters dirty.	3 Clean or replace filters.
4. Dampers closed.	4. Check damper operation and position
Indoor-Air Fan Stopped	
1. Electrical connections loose.	1 Tighten all connections.
2. Fan relay defective.	2. Replace relay
3. Motor overload open.	3 Power supply.
4. Motor defective.	4. Replace motor
5. Fan belt broken or slipping.	5 Replace or tighten belt.

TROUBLESHOOTING (cont)

PROBLEM	SOLUTION
COMPRESSOR STOPS ON OIL PRESSURE SWITCH	
1. Oil level too low or too high.	1 Check oil level requirements; adjust oil level until sight glass is filled ⅛ to ⅓ when running.
2. Compressor is short cycling.	2 Check for a) Thermostat location and operation b) Safety device lockout circuit operation. c) End-of-cycle control and timer operation. d) Low-pressure switch and relay operation.
3. Crankcase heater off.	3. Check relay operation, replace crankcase heater(s), if defective
4. Low refrigerant charge.	4 Adjust charge as required.
5. Refrigerant floodback.	5. Adjust TXV superheat
6. Evaporator coil is blocked or iced.	6 Check and correct as required
7. Evaporator fan not operating.	7. Check and correct as required.
8. Distributor and/or TXV too large.	8 Check sizing at design conditions; change if incorrect for current application.
9. Suction riser too large.	9 Check line sizing at minimum design condition; change piping if incorrect
10. Defective oil pressure switch.	10 Check switch for proper operation, check capillary lines for plugged lines
11. Plugged oil pump inlet screen.	11. Clean oil pump screen
12. Faulty oil pump drive segment.	12. Replace drive segment
13. Worn oil pump.	13. Replace bearing head assembly
14. Worn compressor bearings.	14. Replace compressor; see 06E service instructions
COMPRESSOR RUNNING BUT COOLING INSUFFICIENT	
Suction Pressure Low	
1. Refrigerant charge low.	1 Add refrigerant.
2. Head pressure low.	2 Check refrigerant charge. Check outdoor-air fan thermostat settings.
3. Air filters dirty.	3. Clean or replace filters.
4. Expansion valve power head defective.	4 Replace power head.
5. Indoor coil partially iced.	5. Check low-pressure setting.
6. Indoor airflow restricted.	6 Remove obstruction
Suction Pressure High	
1. Unloaders not functioning.	1. Check unloader adjustments. Check unloader setting
2. Compressor valve defective.	2. See 06D compressor service literature.
3. Heat load excessive.	3 Check for open doors or windows in vicinity of fan coil.
UNIT OPERATES TOO LONG OR CONTINUOUSLY	
1. Low refrigerant charge.	1. Add refrigerant
2. Control contacts fused.	2. Replace control
3. Air in system.	3 Purge and evacuate system.
4. Partially plugged expansion valve or filter drier.	4. Clean or replace.
SYSTEM IS NOISY	
1. Piping vibration.	1 Support piping as required.
2. Compressor noisy.	2. Check valve plates for valve noise. Replace compressor if bearings are worn.
COMPRESSOR LOSES OIL	
1. Leak in system.	1. Repair leak.
2. Crankcase heaters not energized during shutdown.	2 Check wiring and relays Check heater and replace if defective
3. Improper interconnecting piping design.	3. Check piping for oil return. Replace if necessary.
FROSTED SUCTION LINE	
1. Expansion valve admitting excess refrigerant.	1 Adjust expansion valve.
HOT LIQUID LINE	
1. Shortage of refrigerant due to leak.	1 Repair leak and recharge.
2. Expansion valve opens too wide.	2. Adjust expansion valve
FROSTED LIQUID LINE	
1. Restricted filter drier.	1. Remove restriction or replace
COMPRESSOR WILL NOT UNLOAD	
1. Defective unloader.	1. Replace unloader
2. Defective capacity control solenoid valve (if used).	2. Replace valve.
3. Miswired capacity control liquid line solenoid (if used).	3. Rewire correctly
4. Weak, broken, or wrong valve body spring.	4. Replace spring.
COMPRESSOR WILL NOT LOAD	
1. Miswired capacity control liquid line solenoid (if used).	1 Rewire correctly
2. Defective capacity control solenoid valve (if used).	2. Replace valve.
3. Plugged strainer (high side).	3 Clean or replace strainer.
4. Stuck or damaged unloader piston or piston ring(s).	4. Clean or replace the necessary parts.

START-UP CHECKLIST

A. Preliminary Information

OUTDOOR: MODEL NO. _____ SERIAL NO. _____

INDOOR. AIR HANDLER MANUFACTURER _____

MODEL NO. _____ SERIAL NO. _____

ADDITIONAL ACCESSORIES _____

B. Pre-Start-Up

OUTDOOR UNIT

IS THERE ANY SHIPPING DAMAGE? _____ (Y/N) _____

IF SO, WHERE: _____

_____

WILL THIS DAMAGE PREVENT UNIT START-UP? (Y/N) _____

CHECK POWER SUPPLY. DOES IT AGREE WITH UNIT? (Y/N) _____

HAS THE GROUND WIRE BEEN CONNECTED? (Y/N) _____

HAS THE CIRCUIT PROTECTION BEEN SIZED AND INSTALLED PROPERLY? (Y/N) _____

ARE THE POWER WIRES TO THE UNIT SIZED AND INSTALLED PROPERLY? (Y/N) _____

HAVE COMPRESSOR HOLDDOWN BOLTS BEEN LOOSENED? (Y/N) _____

CONTROLS

ARE THERMOSTAT(S) AND INDOOR FAN CONTROL WIRING CONNECTIONS MADE AND CHECKED? (Y/N) _____

ARE ALL WIRING TERMINALS (including main power supply) TIGHT? (Y/N) _____

HAVE CRANKCASE HEATERS BEEN ENERGIZED FOR 24 HOURS? (Y/N) _____

INDOOR UNIT

HAS WATER BEEN PLACED IN DRAIN PAN TO CONFIRM PROPER DRAINAGE? (Y/N) _____

ARE PROPER AIR FILTERS IN PLACE? (Y/N) _____

HAVE FAN AND MOTOR PULLEYS BEEN CHECKED FOR PROPER ALIGNMENT? (Y/N) _____

DO THE FAN BELTS HAVE PROPER TENSION? (Y/N) _____

PIPING

ARE LIQUID LINE SOLENOID VALVES LOCATED AT THE EVAPORATOR COILS AS REQUIRED? (Y/N) _____

HAVE LEAK CHECKS BEEN MADE AT COMPRESSORS, CONDENSERS, EVAPORATORS, TXVs (Thermostatic Expansion Valves) SOLENOID VALVES, FILTER DRIERS, AND FUSIBLE PLUGS WITH A LEAK DETECTOR? (Y/N) _____

LOCATE, REPAIR, AND REPORT ANY LEAKS. _____

HAVE ALL COMPRESSOR SERVICE VALVES BEEN FULLY OPENED (BACKSEATED)? (Y/N) _____

ARE THE COMPRESSOR OIL SIGHT GLASSES SHOWING ABOUT ½ FULL? (Y/N) _____

CHECK VOLTAGE IMBALANCE

LINE-TO-LINE VOLTS: AB _____ V AC _____ V BC_____ V

(AB + AC + BC)/3 = AVERAGE VOLTAGE = _____ V

MAXIMUM DEVIATION FROM AVERAGE VOLTAGE = _____ V

VOLTAGE IMBALANCE = 100 X (MAX DEVIATION)/(AVERAGE VOLTAGE) = _____ %

IF OVER 2% VOLTAGE IMBALANCE, DO NOT ATTEMPT TO START SYSTEM!
CALL LOCAL POWER COMPANY FOR ASSISTANCE.

CUT ALONG PERFORATED LINE

C. Start-Up

CHECK EVAPORATOR FAN SPEED AND RECORD. _____

CHECK CONDENSER FAN SPEED AND RECORD. _____

AFTER AT LEAST 10 MINUTES RUNNING TIME, RECORD THE FOLLOWING MEASUREMENTS:

	COMP A1	COMP B1
OIL PRESSURE	_____	_____
SUCTION PRESSURE	_____	_____
SUCTION LINE TEMP	_____	_____
DISCHARGE PRESSURE	_____	_____
DISCHARGE LINE TEMP	_____	_____
ENTERING CONDENSER AIR TEMP	_____	_____
LEAVING CONDENSER AIR TEMP	_____	_____
EVAP ENTERING AIR DB TEMP	_____	_____
EVAP ENTERING AIR WB TEMP	_____	_____
EVAP LEAVING AIR DB TEMP	_____	_____
EVAP LEAVING AIR WB TEMP	_____	_____
COMPRESSOR AMPS (L1/L2/L3)	_____ / _____ / _____	_____ / _____ / _____

CHECK THE COMPRESSOR OIL LEVEL SIGHT GLASSES; ARE THE SIGHT GLASSES SHOWING OIL LEVEL AT ⅛ TO ⅓ FULL? (Y/N) _____

NOTES:

CUT ALONG PERFORATED LINE