Installation, Start-Up and Maintenance 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.

⚠ WARNING

Open all remote disconnects before servicing this equipment. Failure to do so could result in personal injury from electric shock.

⚠ DANGER

Separate power sources (main and control power circuits) are used for these units. Be sure both main and control power circuits are disconnected before servicing. Failure to do so could result in personal injury from electric shock.

→ **⚠ WARNING**

DO NOT USE TORCH to remove any component. System contains oil and refrigerant under pressure.

To remove a component, wear protective gloves and goggles and proceed as follows:

a. Shut off electrical power to unit.
b. Recover refrigerant to relieve all pressure from system using both high-pressure and low pressure ports.
c. Traces of vapor should be displaced with nitrogen and the work area should be well ventilated. Refrigerant in contact with an open flame produces toxic gases.
d. Cut component connection tubing with tubing cutter and remove component from unit. Use a pan to catch any oil that may come out of the lines and as a gage for how much oil to add to the system.
e. Carefully unsweat remaining tubing stubs when necessary. Oil can ignite when exposed to torch flame.

Failure to follow these procedures may result in personal injury or death.

→ **⚠ CAUTION**

DO NOT re-use compressor oil or any oil that has been exposed to the atmosphere. Dispose of oil per local codes and regulations. DO NOT leave refrigerant system open to air any longer than the actual time required to service the equipment. Seal circuits being serviced and charge with dry nitrogen to prevent oil contamination when timely repairs cannot be completed. Failure to follow these procedures may result in damage to equipment.

INSTALLATION

Step 1 — Inspect Shipment — Inspect unit for damage upon arrival. If damage is found, immediately file a claim with the shipping company. Verify proper unit delivery by checking unit nameplate data and the model number nomenclature shown in Fig. 1. See Tables 1-6 for unit physical data.

Step 2 — 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. It is recommended to use shackles in the lifting holes (see rigging label on the unit and Fig. 2 and 3 for rigging weights and center of gravity). All panels must be in place when rigging.

IMPORTANT: To maintain unit stability while lifting, use 4 cables, chains or straps of equal length. Attach one end of each cable to shackle attachment point and the other end of each cable 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.

⚠ CAUTION

All panels must be in place when rigging. Failure to comply could result in equipment damage.

⚠ CAUTION

For unit sizes 018 to 060 when handling with a forklift, handle only through fork pocket holes. Failure to follow this caution could result in equipment damage or personal injury.

⚠ CAUTION

For unit sizes 065 to 130, do not forklift the unit unless unit is attached to a skid designed for forklifting. Failure to follow this caution could result in equipment damage or personal injury.

09DP M 035 6 4 – 0 0 0 0 0

09DP – Split System Condenser

Refrigeration Circuit Options*
M – Multiple Refrigeration Circuit
S – Single Refrigeration Circuit

Unit Size

018	**050**	**095**
020	**060**	**115**
030	**065**	**130**
035	**075**	
040	**085**	

Power Supply
1 – 575-3-60
2 – 380-3-60
5 – 208/230-3-60
6 – 460-3-60
9 – 380/415-3-50

Condenser Coil/Low Sound Options
4 – MCHX, No Sound Treatment
5 – E-coat, MCHX, No Sound Treatment
C – MCHX, Low Sound Fan(s)
D – E-coat MCHX, Low Sound Fan(s)

Revision Level
– – Current Revision Level

Packaging/Security Options
0 – Std Packaging
4 – Security Grilles/Hail Guards Only
8 – Bottom Skid Only
D – Bottom Skid, Security Grilles/Hail Guards
J – Bottom Skid, Top Crate, Bag
N – Bottom Skid, Top Crate, Bag, Security Grilles/Hail Guards

Not Used

Electrical Options
0 – Single Point Power, Terminal Block
1 – Single Point Power, Non-Fused Disconnect

Ambient/SCCR Options
0 – Std Ambient, Std Interrupt
3 – Std Ambient, High Interrupt
6 – Low Ambient, Std Interrupt
9 – Low Ambient, High Interrupt

Not Used

LEGEND
MCHX — Microchannel Heat Exchanger

*09DPS units available in sizes 018-030. 09DPM units available in sizes 035-130.

Quality Assurance
Certified to ISO 9001:2000

Fig. 1 — Model Number Nomenclature

Table 1 — Physical Data, 09DP018-040 Units — English

09DP UNIT SIZE	09DPS018	09DPS020	09DPS030	09DPM035		09DPM040	
CAPACITY, 60 Hz (tons)*	20.7	33.1	37.7	43.3		55.0	
CAPACITY, 50 Hz (tons)*	17.2	27.6	31.4	36.1		45.8	
CIRCUIT	Single Circuit	Single Circuit	Single Circuit	Dual Circuit	Single Circuit	Dual Circuit	Single Circuit
OPERATING WEIGHTS (lb)							
Standard	638	719	869	1126		1204	
With Low Sound Option	656	755	905	1162		1258	
APPROXIMATE TOTAL REFRIGERANT CHARGE R-410A (lb)	9.6	12.0	12.0	24.0		24.0	
APPROXIMATE TOTAL REFRIGERANT CHARGE R-134a (lb)	11.1	13.9	13.9	27.7		27.7	
NITROGEN SHIPPING CHARGE	5 psig						
CONDENSER FANS							
Standard	Propeller Type - Direct Drive						
Quantity	1	2	2	2	2	3	3
Motor Hp (per fan)	1	1	1	1	1	1	1
RPM	1140 (60 Hz), 950 (50 Hz)						
Diameter (in.)	30						
Airflow (cfm) (60 Hz)†	11,300	18,500	20,900	22,700		32,000	
Airflow (cfm) (50 Hz)†	9420	15,420	17,420	18,920		26,670	
Total Watts (60 Hz)†	1600	3200	3200	3100		4800	
Total Watts (50 Hz)†	1333	2667	2667	2583		4000	
Low Noise	Plastic Type - Direct Drive						
Quantity	1	2	2	2	2	3	3
Motor Hp (per fan)	1	1	1	1	1	1	1
RPM	850 (60 Hz), 700 (50 Hz)						
Diameter (in.)	30						
Airflow (cfm) (60 Hz)†	10,450	17,500	19,400	21,000		29,600	
Airflow (cfm) (50 Hz)†	8710	14,580	16,170	17,500		24,670	
Total Watts (60 Hz)†	1300	2600	2600	2500		3900	
Total Watts (50 Hz)†	1083	2167	2167	2083		3250	
MCHX COIL							
No. Coils per Circuit (Ckt A/Ckt B)		1		1	2	1	2
Circuit % (Ckt A/Ckt B)		100		50/50	100	50/50	100
Total Coils		1		2	2	2	2
sq ft	27.1	27.1	33.9	54.2	54.2	54.2	54.2
PIPING							
Pressure Relief	Fusible Plug on liquid lines of both circuits - 210 F						
Hot Gas Connection Line Size (in.)	$1\frac{3}{8}$	$1\frac{3}{8}$	$1\frac{3}{8}$	$1\frac{3}{8} + 1\frac{3}{8}$	$1\frac{5}{8}$	$1\frac{3}{8} + 1\frac{3}{8}$	$1\frac{5}{8}$
Liquid Connection Line Size (in.)	$\frac{5}{8}$	$\frac{5}{8}$	$\frac{5}{8}$	$\frac{5}{8} + \frac{5}{8}$	$\frac{7}{8}$	$\frac{5}{8} + \frac{5}{8}$	$\frac{7}{8}$
CHASSIS DIMENSIONS (ft-in.)							
Length	7-5	7-5	7-5	7-9	7-9	7-9	7-9
Width	3-5	3-5	3-5	7-5	7-5	7-5	7-5
Height							
Standard	5-1	5-1	6-2	5-1	5-1	5-1	5-1
Low Sound	5-7	5-7	6-7	5-7	5-7	5-7	5-7

LEGEND

MCHX — Microchannel Heat Exchanger

*Nominal heat rejection based on optimum refrigerant charge of R-410A with 15 F subcooling at 30 F temperature difference.
†Condenser fan airflow and power are for units operating at full load and 95 F ambient.

Table 2 — Physical Data, 09DP050-075 Units — English

09DP UNIT SIZE	09DPM050		09DPM060		09DPM065		09DPM075	
CAPACITY, 60 Hz (tons)*	66.4		75.3		85.8		107.6	
CAPACITY, 50 Hz (tons)*	55.3		62.7		71.5		89.7	
CIRCUIT	Dual Circuit	Single Circuit	Dual Circuit	Single Circuit	Dual Circuit	Single Circuit	Dual Circuit	Single Circuit
OPERATING WEIGHTS (lb)								
Standard	1282		1524		1622		1846	
With Low Sound Option	1354		1596		1694		1936	
APPROXIMATE TOTAL REFRIGERANT CHARGE R-410A (lb)	24.0		24.0		35.2		44.0	
APPROXIMATE TOTAL REFRIGERANT CHARGE R-134a (lb)	27.7		27.7		40.7		50.8	
NITROGEN SHIPPING CHARGE	5 psig							
CONDENSER FANS								
Standard	Propeller Type - Direct Drive							
Quantity	4	4	4	4	4	4	5	5
Motor Hp (per fan)	1	1	1	1	1	1	1	1
RPM	1140 (60 Hz), 950 (50 Hz)							
Diameter (in.)	30							
Airflow (cfm) (60 Hz)†	39,250		41,800		45,000		56,250	
Airflow (cfm) (50 Hz)†	32,710		34,830		37,500		46,870	
Total Watts (60 Hz)†	6500		6400		6400		8000	
Total Watts (50 Hz)†	5417		5333		5333		6667	
Low Noise	Plastic Type - Direct Drive							
Quantity	4	4	4	4	4	4	5	5
Motor Hp (per fan)	1	1	1	1	1	1	1	1
RPM	850 (60 Hz), 700 (50 Hz)							
Diameter (in.)	30							
Airflow (cfm) (60 Hz)†	36,300		38,800		41,600		52,000	
Airflow (cfm) (50 Hz)†	30,250		32,330		34,670		43,330	
Total Watts (60 Hz)†	5300		5200		5200		6500	
Total Watts (50 Hz)†	4417		4333		4333		5417	
MCHX COIL								
No. Coils per Circuit (Ckt A/Ckt B)	1	2	1	2	2	4	3/2	5
Circuit % (Ckt A/Ckt B)	50/50	100	50/50	100	50/50	100	60/40	100
Total Coils	2	2	2	2	4	4	5	5
sq ft	54.2	54.2	67.8	67.8	99.8	99.8	124.7	124.7
PIPING								
Pressure Relief	Fusible Plug on liquid lines of both circuits - 210 F							
Hot Gas Connection Line Size (in.)	$1\frac{3}{8} + 1\frac{3}{8}$	$1\frac{5}{8}$	$1\frac{3}{8} + 1\frac{3}{8}$	$1\frac{5}{8}$	$1\frac{3}{8} + 1\frac{3}{8}$	$1\frac{5}{8}$	$1\frac{5}{8} + 1\frac{3}{8}$	$2\frac{1}{8}$
Liquid Connection Line Size (in.)	$\frac{5}{8} + \frac{5}{8}$	$\frac{7}{8}$	$\frac{5}{8} + \frac{5}{8}$	$\frac{7}{8}$	$\frac{7}{8} + \frac{7}{8}$	$1\frac{1}{8}$	$\frac{7}{8} + \frac{7}{8}$	$1\frac{1}{8}$
CHASSIS DIMENSIONS (ft-in.)								
Length	7-9	7-9	7-9	7-9	9-3	9-3	12-8	12-8
Width	7-5	7-5	7-5	7-5	7-5	7-5	7-5	7-5
Height								
Standard	5-1	5-1	6-2	6-2	6-1	6-1	6-1	6-1
Low Sound	5-7	5-7	6-7	6-7	6-7	6-7	6-7	6-7

LEGEND

MCHX — Microchannel Heat Exchanger

*Nominal heat rejection based on optimum refrigerant charge of R-410A with 15 F subcooling at 30 F temperature difference.

†Condenser fan airflow and power are for units operating at full load and 95 F ambient.

Table 3 — Physical Data, 09DP085-130 Units — English

09DP UNIT SIZE	09DPM085		09DPM095		09DPM115		09DPM130	
CAPACITY, 60 Hz (tons)*	115.6		129.4		149.4		172.0	
CAPACITY, 50 Hz (tons)*	96.3		107.8		124.5		143.3	
CIRCUIT	Dual Circuit	Single Circuit	Dual Circuit	Single Circuit	Dual Circuit	Single Circuit	Dual Circuit	Single Circuit
OPERATING WEIGHTS (lb)								
Standard	1933		1933		2447		2533	
With Low Sound Option	2041		2041		2573		2677	
APPROXIMATE TOTAL REFRIGERANT CHARGE R-410A (lb)	52.8		52.8		61.6		70.4	
APPROXIMATE TOTAL REFRIGERANT CHARGE R-134a (lb)	61.0		61.0		71.1		81.3	
NITROGEN SHIPPING CHARGE	5 psig							
CONDENSER FANS								
Standard	Propeller Type - Direct Drive							
Quantity	6	6	6	6	7	7	8	8
Motor Hp (per fan)	1	1	1	1	1	1	1	1
RPM	1140 (60 Hz), 950 (50 Hz)							
Diameter (in.)	30							
Airflow (cfm) (60 Hz)†	67,500		67,500		78,750		90,000	
Airflow (cfm) (50 Hz)†	56,250		56,250		65,620		75,000	
Total Watts (60 Hz)†	9600		9600		11200		12800	
Total Watts (50 Hz)†	8000		8000		9333		10667	
Low Noise	Plastic Type - Direct Drive							
Quantity	6	6	6	6	7	7	8	8
Motor Hp (per fan)	1	1	1	1	1	1	1	1
RPM	850 (60 Hz), 700 (50 Hz)							
Diameter (in.)	30							
Airflow (cfm) (60 Hz)†	62,400		62,400		72,800		83,200	
Airflow (cfm) (50 Hz)†	52,000		52,000		60,670		69,330	
Total Watts (60 Hz)†	7800		7800		9100		10400	
Total Watts (50 Hz)†	6500		6500		7583		8667	
MCHX COIL								
No. Coils per Circuit (Ckt A/Ckt B)	3/2	5	3/3	6	4/3	7	5/3	8
Circuit % (Ckt A/Ckt B)	60/40	100	50/50	100	57/43	100	63/37	100
Total Coils	5	5	6	6	7	7	8	8
sq ft	124.7	124.7	149.6	149.6	174.6	174.6	199.5	199.5
PIPING								
Pressure Relief	Fusible Plug on liquid lines of both circuits - 210 F							
Hot Gas Connection Line Size (in.)	$1^5/_8 + 1^3/_8$	$2^1/_8$	$1^5/_8 + 1^5/_8$	$2^1/_8$	$1^5/_8 + 1^5/_8$	$2^1/_8$	$1^5/_8 + 1^5/_8$	$2^1/_8$
Liquid Connection Line Size (in.)	$^7/_8 + ^7/_8$	$1^1/_8$	$^7/_8 + ^7/_8$	$1^1/_8$	$^7/_8 + ^7/_8$	$1^1/_8$	$1^1/_8 + ^7/_8$	$1^3/_8$
CHASSIS DIMENSIONS (ft-in.)								
Length	12-8	12-8	12-8	12-8	16-0	16-0	16-0	16-0
Width	7-5	7-5	7-5	7-5	7-5	7-5	7-5	7-5
Height								
Standard	6-1	6-1	6-1	6-1	6-1	6-1	6-1	6-1
Low Sound	6-7	6-7	6-7	6-7	6-7	6-7	6-7	6-7

LEGEND

MCHX — Microchannel Heat Exchanger

*Nominal heat rejection based on optimum refrigerant charge of R-410A with 15 F subcooling at 30 F temperature difference.

†Condenser fan airflow and power are for units operating at full load and 95 F ambient.

Table 4 — Physical Data, 09DP018-040 Units — SI

09DP UNIT SIZE	09DPS018	09DPS020	09DPS030	09DPM035		09DPM040	
CAPACITY, 60 Hz (kW)*	72.8	116.4	132.6	152.3		193.4	
CAPACITY, 50 Hz (kW)*	60.7	97.0	110.5	126.9		161.2	
CIRCUIT	Single Circuit	Single Circuit	Single Circuit	Dual Circuit	Single Circuit	Dual Circuit	Single Circuit
OPERATING WEIGHTS (kg)							
Standard	289	326	394	511		546	
With Low Sound Option	298	342	411	527		571	
APPROXIMATE TOTAL REFRIGERANT CHARGE R-410A (kg)	4.4	5.4	5.4	10.9		10.9	
APPROXIMATE TOTAL REFRIGERANT CHARGE R-134a (kg)	5.0	6.3	6.3	12.6		12.6	
NITROGEN SHIPPING CHARGE	0.35 bar						
CONDENSER FANS							
Standard	Propeller Type - Direct Drive						
Quantity	1	2	2	2	2	3	3
Motor kW (per fan)	0.75	0.75	0.75	0.75	0.75	0.75	0.75
r/s	19 (60 Hz), 16 (50 Hz)						
Diameter (mm)	762						
Airflow (l/sec) (60 Hz)†	5333	8731	9864	10 713		15 102	
Airflow (l/sec) (50 Hz)†	4444	7276	8220	8928		12 585	
Total Watts (60 Hz)†	1600	3200	3200	3100		4800	
Total Watts (50 Hz)†	1333	2667	2667	2583		4000	
Low Noise	Plastic Type - Direct Drive						
Quantity	1	2	2	2	2	3	3
Motor kW (per fan)	0.75	0.75	0.75	0.75	0.75	0.75	0.75
r/s	14 (60 Hz), 12 (50 Hz)						
Diameter (mm)	762						
Airflow (l/sec) (60 Hz)†	4932	8260	9156	9911		13 971	
Airflow (l/sec) (50 Hz)†	4110	6883	7630	8259		11 643	
Total Watts (60 Hz)†	1300	2600	2600	2500		3900	
Total Watts (50 Hz)†	1083	2167	2167	2083		3250	
MCHX COIL							
No. Coils per Circuit (Ckt A/Ckt B)		1		1	2	1	2
Circuit % (Ckt A/Ckt B)		100		50/50	100	50/50	100
Total Coils		1		2	2	2	2
sq m	2.5	2.5	3.1	5.0	5.0	5.0	5.0
PIPING							
Pressure Relief	Fusible Plug on liquid lines of both circuits - 99 C						
Hot Gas Connection Line Size (in.)	$1\frac{3}{8}$	$1\frac{3}{8}$	$1\frac{3}{8}$	$1\frac{3}{8} + 1\frac{3}{8}$	$1\frac{5}{8}$	$1\frac{3}{8} + 1\frac{3}{8}$	$1\frac{5}{8}$
Liquid Connection Line Size (in.)	$\frac{5}{8}$	$\frac{5}{8}$	$\frac{5}{8}$	$\frac{5}{8} + \frac{5}{8}$	$\frac{7}{8}$	$\frac{5}{8} + \frac{5}{8}$	$\frac{7}{8}$
CHASSIS DIMENSIONS (mm)							
Length	2242	2242	2242	2340	2340	2340	2340
Width	1025	1025	1025	2242	2242	2242	2242
Height							
Standard	1550	1550	1857	1550	1550	1550	1550
Low Sound	1690	1690	1997	1690	1690	1690	1690

LEGEND

MCHX — Microchannel Heat Exchanger

*Nominal heat rejection based on optimum refrigerant charge of R-410A with 8.3 C subcooling at 16.7 C temperature difference.
†Condenser fan airflow and power are for units operating at full load and 35 C ambient.

Table 5 — Physical Data, 09DP050-075 Units — SI

09DP UNIT SIZE	09DPM050		09DPM060		09DPM065		09DPM075	
CAPACITY, 60 Hz (kW)*	233.5		264.8		301.8		378.5	
CAPACITY, 50 Hz (kW)*	194.6		220.7		251.5		315.4	
CIRCUIT	Dual Circuit	Single Circuit	Dual Circuit	Single Circuit	Dual Circuit	Single Circuit	Dual Circuit	Single Circuit
OPERATING WEIGHTS (kg)								
Standard	582		691		736		837	
With Low Sound Option	614		724		768		878	
APPROXIMATE TOTAL REFRIGERANT CHARGE R-410A (kg)	10.9		10.9		16.0		20.0	
APPROXIMATE TOTAL REFRIGERANT CHARGE R-134a (kg)	12.6		12.6		18.4		23.1	
NITROGEN SHIPPING CHARGE	0.35 bar							
CONDENSER FANS								
Standard	Propeller Type - Direct Drive							
Quantity	4	4	4	4	4	4	5	5
Motor kW (per fan)	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75
r/s	1140 (60 Hz), 950 (50 Hz)							
Diameter (mm)	30							
Airflow (l/sec) (60 Hz)†	18 524		19 727		21 238		26 547	
Airflow (l/sec) (50 Hz)†	15 437		16 439		17 698		22 123	
Total Watts (60 Hz)†	6500		6400		6200		8000	
Total Watts (50 Hz)†	5417		5333		5167		6667	
Low Noise	Plastic Type - Direct Drive							
Quantity	4	4	4	4	4	4	5	5
Motor kW (per fan)	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75
r/s	14 (60 Hz), 12 (50 Hz)							
Diameter (mm)	762							
Airflow (l/sec) (60 Hz)†	17 132		18 314		19 633		24 541	
Airflow (l/sec) (50 Hz)†	14 277		15 262		16 361		20 451	
Total Watts (60 Hz)†	5300		5200		5200		6500	
Total Watts (50 Hz)†	4417		4333		4333		5417	
MCHX COIL								
No. Coils per Circuit (Ckt A/Ckt B)	1	2	1	2	2	4	3/2	5
Circuit % (Ckt A/Ckt B)	50/50	100	50/50	100	50/50	100	60/40	100
Total Coils	2	2	2	2	4	4	5	5
sq m	5.0	5.0	6.3	6.3	9.3	9.3	11.6	11.6
PIPING								
Pressure Relief	Fusible Plug on liquid lines of both circuits - 99 C							
Hot Gas Connection Line Size (in.)	$1^3/_8 + 1^3/_8$	$1^5/_8$	$1^3/_8 + 1^3/_8$	$1^5/_8$	$1^3/_8 + 1^3/_8$	$1^5/_8$	$1^5/_8 + 1^3/_8$	$2^1/_8$
Liquid Connection Line Size (in.)	$^5/_8 + ^5/_8$	$^7/_8$	$^5/_8 + ^5/_8$	$^7/_8$	$^7/_8 + ^7/_8$	$1^1/_8$	$^7/_8 + ^7/_8$	$1^1/_8$
CHASSIS DIMENSIONS (mm)								
Length	2340	2340	2340	2340	2816	2816	3838	3838
Width	2242	2242	2242	2242	2242	2242	2242	2242
Height								
Standard	1550	1550	1857	1857	1855	1855	1855	1855
Low Sound	1690	1690	1997	1997	1994	1994	1994	1994

LEGEND

MCHX — Microchannel Heat Exchanger

*Nominal heat rejection based on optimum refrigerant charge of R-410A with 8.3 C subcooling at 16.7 C temperature difference.
†Condenser fan airflow and power are for units operating at full load and 35 C ambient.

Table 6 — Physical Data, 09DP085-130 Units — SI

09DP UNIT SIZE	09DPM085		09DPM095		09DPM115		09DPM130	
CAPACITY, 60 Hz (kW)*	406.6		455.1		525.5		605.0	
CAPACITY, 50 Hz (kW)*	338.8		379.2		437.9		504.2	
CIRCUIT	Dual Circuit	Single Circuit	Dual Circuit	Single Circuit	Dual Circuit	Single Circuit	Dual Circuit	Single Circuit
OPERATING WEIGHTS (kg)								
Standard	877		877		1110		1149	
With Low Sound Option	926		926		1167		1214	
APPROXIMATE TOTAL REFRIGERANT CHARGE R-410A (kg)	23.9		23.9		27.9		31.9	
APPROXIMATE TOTAL REFRIGERANT CHARGE R-134a (kg)	27.7		27.7		32.3		36.9	
NITROGEN SHIPPING CHARGE	0.35 bar							
CONDENSER FANS								
Standard	Propeller Type - Direct Drive							
Quantity	6	6	6	6	7	7	8	8
Motor kW (per fan)	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75
r/s	1140 (60 Hz), 950 (50 Hz)							
Diameter (mm)	30							
Airflow (l/sec) (60 Hz)†	31 856		31 856		37 166		42 475	
Airflow (l/sec) (50 Hz)†	26 547		26 547		30 972		35 396	
Total Watts (60 Hz)†	9600		9600		11 200		12 800	
Total Watts (50 Hz)†	8000		8000		9333		10 667	
Low Noise	Plastic Type - Direct Drive							
Quantity	6	6	6	6	7	7	8	8
Motor kW (per fan)	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75
r/s	14 (60 Hz), 12 (50 Hz)							
Diameter (mm)	762							
Airflow (l/sec) (60 Hz)†	29 450		29 450		34 358		39 266	
Airflow (l/sec) (50 Hz)†	24 541		24 541		28 632		32 722	
Total Watts (60 Hz)†	7800		7800		9100		10 400	
Total Watts (50 Hz)†	6500		6500		7583		8667	
MCHX COIL								
No. Coils per Circuit (Ckt A/Ckt B)	3/2	5	3/3	6	4/3	7	5/3	8
Circuit % (Ckt A/Ckt B)	60/40	100	50/50	100	57/43	100	63/37	100
Total Coils	5	5	6	6	7	7	8	8
sq m	11.6	11.6	13.9	13.9	16.2	16.2	18.5	18.5
PIPING								
Pressure Relief	Fusible Plug on liquid lines of both circuits - 99 C							
Hot Gas Connection Line Size (in.)	$1\frac{5}{8} + 1\frac{3}{8}$	$2\frac{1}{8}$	$1\frac{5}{8} + 1\frac{5}{8}$	$2\frac{1}{8}$	$1\frac{5}{8} + 1\frac{5}{8}$	$2\frac{1}{8}$	$1\frac{5}{8} + 1\frac{5}{8}$	$2\frac{1}{8}$
Liquid Connection Line Size (in.)	$\frac{7}{8} + \frac{7}{8}$	$1\frac{1}{8}$	$\frac{7}{8} + \frac{7}{8}$	$1\frac{1}{8}$	$\frac{7}{8} + \frac{7}{8}$	$1\frac{1}{8}$	$1\frac{1}{8} + \frac{7}{8}$	$1\frac{3}{8}$
CHASSIS DIMENSIONS (mm)								
Length	3838	3838	3838	3838	4860	4860	4860	4860
Width	2242	2242	2242	2242	2242	2242	2242	2242
Height								
Standard	1855	1855	1855	1855	1855	1855	1855	1855
Low Sound	1994	1994	1994	1994	1994	1994	1994	1994

LEGEND

MCHX — Microchannel Heat Exchanger

*Nominal heat rejection based on optimum refrigerant charge of R-410A with 8.3 C subcooling at 16.7 C temperature difference.

†Condenser fan airflow and power are for units operating at full load and 35 C ambient.

DOMESTIC UNITS — Standard 09DP 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 UNITS — When considering location of the unit, be sure to consult National Electrical Code (NEC, U.S.A.) and local code requirements. Allow sufficient space for airflow, wiring, piping, and service. The placement area must be level and strong enough to support the operating weight of the unit. (See Fig. 2.) When unit is in proper location, use of mounting holes in base rails is recommended for securing unit to supporting structure. Fasteners for mounting unit are field supplied. See Fig. 4.

Refer to Fig. 5-9 for airflow clearances. Recommended minimum clearances are 6 ft (1829 mm) for unrestricted airflow and service on sides of unit, 4 ft (1219 mm) on ends, and unrestricted clear air space above the unit. Provide ample space to connect refrigerant lines to indoor unit. For multiple units, allow 10 ft (3048 mm) separation between airflow surfaces. If walls surround the unit, wall height should not exceed the top of the unit fan discharge. Installation in a pit is not recommended.

IMPORTANT: Be sure to mount unit level to ensure proper oil return to compressors.

Refer to Fig. 10 for outdoor fan and compressor layout.

Refer to Fig. 11 and 12 for unit piping installation.

09DP Unit (lb)

09DP UNIT SIZE	TOTAL WEIGHT	OPERATIONAL CORNER WEIGHT					
		A	B	C	D	E	F
018	638	153	149	166	171	—	—
020	719	173	169	186	191	—	—
030	869	208	203	226	231	—	—
035	1126	290	289	273	274	—	—
040	1204	319	317	283	285	—	—
050	1282	331	329	310	312	—	—
060	1524	392	390	370	372	—	—
065	1622	413	409	398	403	—	—
075	1846	471	465	452	457	—	—
085	1933	493	487	474	479	—	—
095	1933	493	487	474	479	—	—
115	2447	418	414	397	402	405	410
130	2533	429	424	416	420	420	425

09DP Unit (kg)

09DP UNIT SIZE	TOTAL WEIGHT	OPERATIONAL CORNER WEIGHT					
		A	B	C	D	E	F
018	289	69	67	75	77	—	—
020	326	79	77	84	87	—	—
030	394	94	92	103	105	—	—
035	511	132	131	124	124	—	—
040	546	145	144	128	129	—	—
050	582	150	149	141	141	—	—
060	691	178	177	168	169	—	—
065	736	187	185	181	183	—	—
075	837	214	211	205	207	—	—
085	877	224	221	215	217	—	—
095	877	224	221	215	217	—	—
115	1110	285	282	270	273	250	248
130	1149	292	289	283	286	262	258

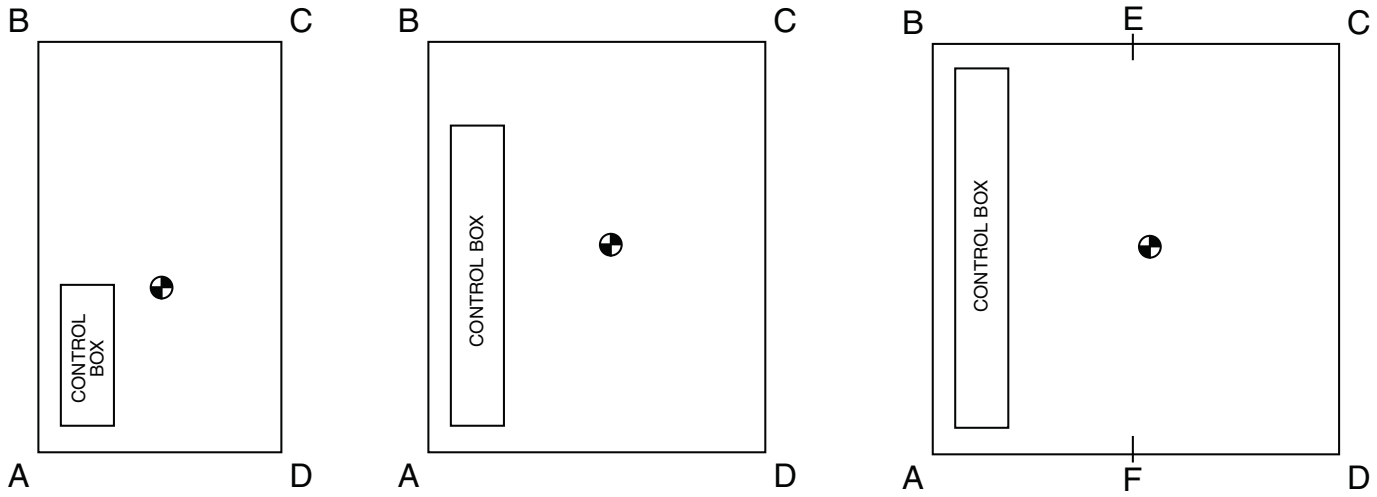
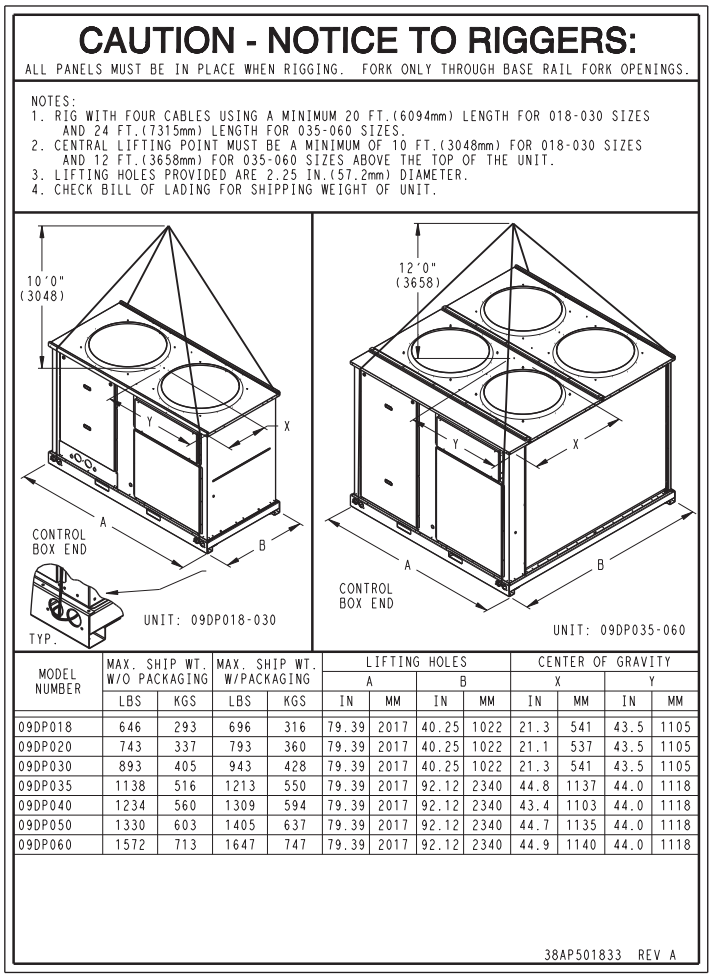
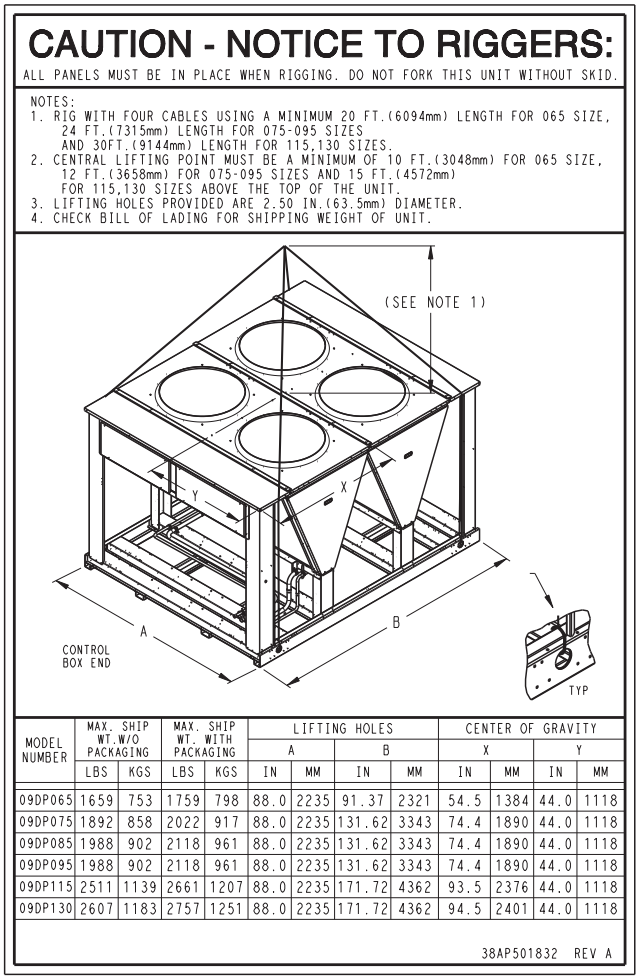


Fig. 2 — Corner Weights



MODEL NUMBER	MAX. SHIP WT. W/O PACKAGING		MAX. SHIP WT. W/PACKAGING		LIFTING HOLES				CENTER OF GRAVITY			
					A		B		X		Y	
	LBS	KGS	LBS	KGS	IN	MM	IN	MM	IN	MM	IN	MM
09DP018	646	293	696	316	79.39	2017	40.25	1022	21.3	541	43.5	1105
09DP020	743	337	793	360	79.39	2017	40.25	1022	21.1	537	43.5	1105
09DP030	893	405	943	428	79.39	2017	40.25	1022	21.3	541	43.5	1105
09DP035	1138	516	1213	550	79.39	2017	92.12	2340	44.8	1137	44.0	1118
09DP040	1234	560	1309	594	79.39	2017	92.12	2340	43.4	1103	44.0	1118
09DP050	1330	603	1405	637	79.39	2017	92.12	2340	44.7	1135	44.0	1118
09DP060	1572	713	1647	747	79.39	2017	92.12	2340	44.9	1140	44.0	1118

SIZES 018 TO 060



MODEL NUMBER	MAX. SHIP WT.W/O PACKAGING		MAX. SHIP WT. WITH PACKAGING		LIFTING HOLES				CENTER OF GRAVITY			
					A		B		X		Y	
	LBS	KGS	LBS	KGS	IN	MM	IN	MM	IN	MM	IN	MM
09DP065	1659	753	1759	798	88.0	2235	91.37	2321	54.5	1384	44.0	1118
09DP075	1892	858	2022	917	88.0	2235	131.62	3343	74.4	1890	44.0	1118
09DP085	1988	902	2118	961	88.0	2235	131.62	3343	74.4	1890	44.0	1118
09DP095	1988	902	2118	961	88.0	2235	131.62	3343	74.4	1890	44.0	1118
09DP115	2511	1139	2661	1207	88.0	2235	171.72	4362	93.5	2376	44.0	1118
09DP130	2607	1183	2757	1251	88.0	2235	171.72	4362	94.5	2401	44.0	1118

SIZES 065 TO 130

Fig. 3 — Rigging Labels

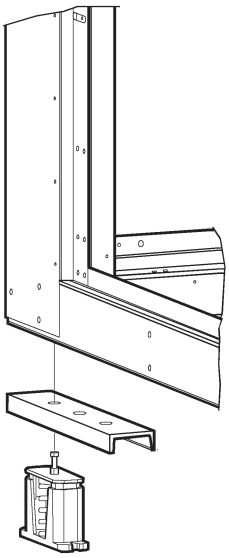
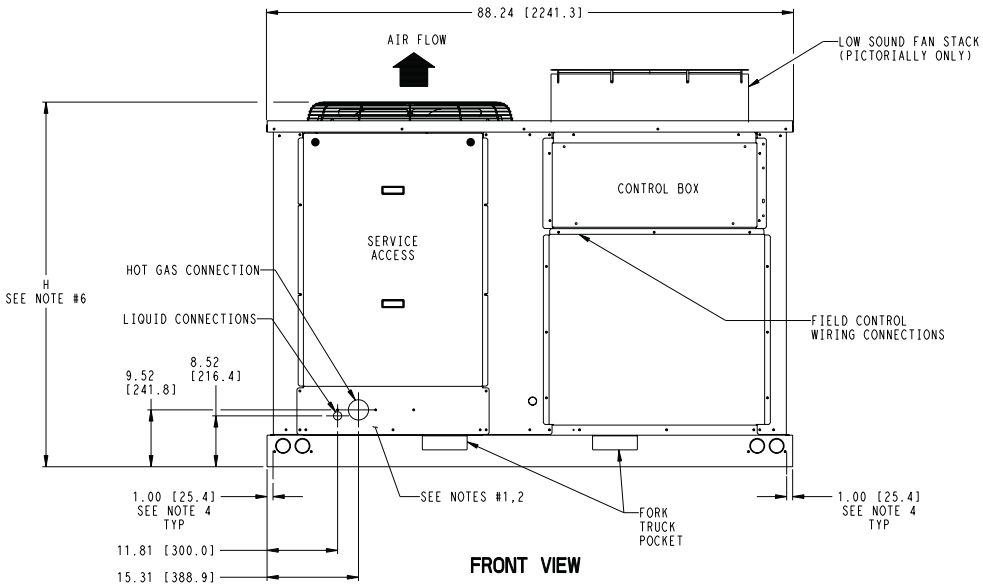
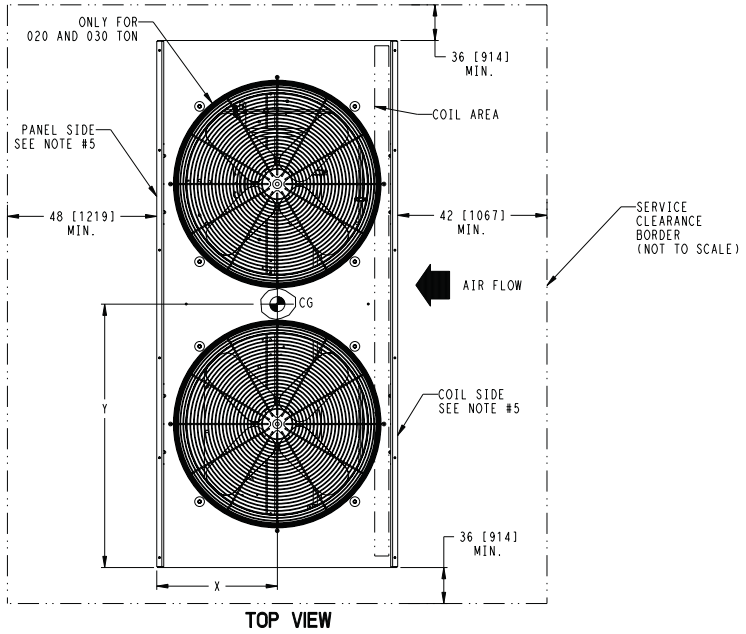


Fig. 4 — Perimeter Support Channel

	UNIT	STD. UNIT WT.		CENTER OF GRAVITY		UNIT HEIGHT	POWER ENTRY	PIPING CONNECTIONS	
		LBS.	KG.	X	Y	H	P	HOT GAS	LIQUID
STANDARD	09DPS018	628	285	21.3 [541]	43.5 [1105]	61.0 [1549]	24.9 [632]	1-3/8 [35]	5/8 [16]
	09DPS020	707	321	21.1 [536]					
	09DPS030	857	389	21.3 [541]	43.6 [1107]	73.1 [1857]	36.9 [937]		
LOW SOUND	09DPS018	646	293	21.3 [541]	43.5 [1105]	66.5 [1689]	24.9 [632]		
	09DPS020	743	337	21.1 [536]					
	09DPS030	893	405	21.3 [541]	43.6 [1107]	78.6 [1996]	36.9 [937]		

NOTES:
1. BE SURE TO USE A WET RAG AND REMOVE ALL VALVE CORES BEFORE BRAZING FIELD PIPING.
2. DO NOT CAP OR OTHERWISE OBSTRUCT THE LIQUID LINE TEMPERATURE RELIEF.
3. Ø7/8 [22.4] PILOT HOLE PROVIDED FOR LOCATING FIELD POWER WIRING. ACTUAL HOLE REQUIRED DEPENDS ON FIELD WIRE SIZING.
4. Ø0.437 [11.10] HOLE USED FOR MOUNTING UNIT.
5. UNIT MUST HAVE CLEARANCES AS FOLLOWS:
   TOP - DO NOT RESTRICT.
   COIL END - 42 [1067] FROM SOLID SURFACE.
   PANEL SIDE - 48 [1219] PER NEC.
6. SEE TABLE COLUMN H; DIMENSION FOR STANDARD AND LOW SOUND WITH STACK FAN OPTION.
7. CARRIER DOES NOT RECOMMEND INSTALLATION IN A PIT.
8. UNIT CAN BE HANDLED USING THE FORK TRUCK LIFT POCKETS.
9. THE LIQUID AND HOTGAS PIPING CONNECTIONS END APPROXIMATELY 9 INCHES INSIDE THE UNIT.
10. WEIGHT DOES NOT INCLUDE UNIT REFRIGERANT CHARGE.
11. **DIMENSIONS ARE IN INCHES.** DIMENSIONS IN [ ] ARE IN MILLIMETERS





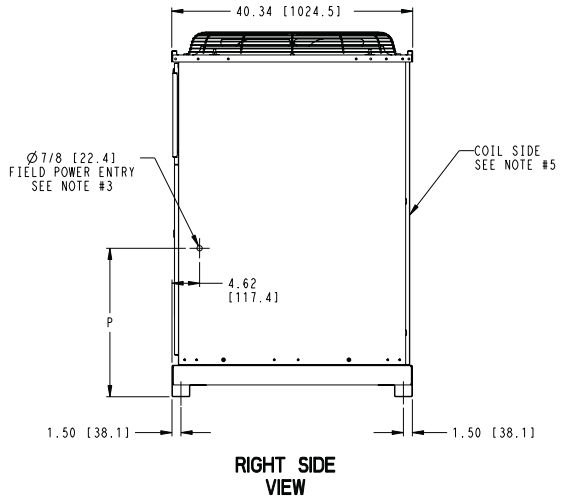
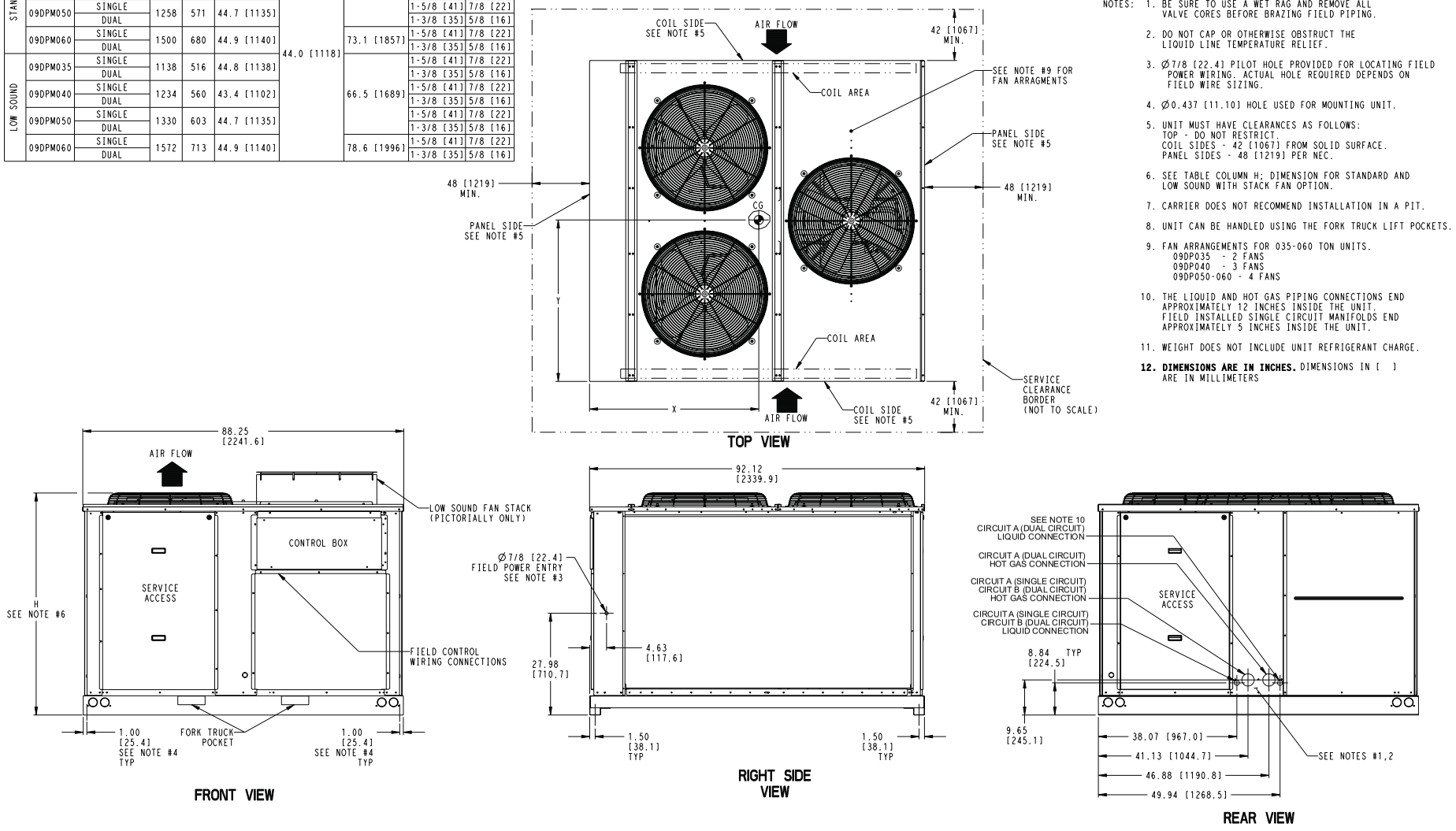


Fig. 5 — Unit Dimensions — 09DPS018-030 Units

	UNIT	CONFIGURATION	STD.UNIT WT		CENTER OF GRAVITY		UNIT HEIGHT	PIPING CONNECTIONS	
			LBS.	KG.	X	Y	H	HOT GAS	LIQUID
STANDARD	09DPM035	SINGLE	1102	500	44.8 [1138]	44.0 [1118]	61.0 [1549]	1-5/8 [41]	7/8 [22]
		DUAL						1-3/8 [35]	5/8 [16]
	09DPM040	SINGLE	1180	535	43.4 [1102]			1-5/8 [41]	7/8 [22]
		DUAL						1-3/8 [35]	5/8 [16]
	09DPM050	SINGLE	1258	571	44.7 [1135]			1-5/8 [41]	7/8 [22]
		DUAL						1-3/8 [35]	5/8 [16]
	09DPM060	SINGLE	1500	680	44.9 [1140]		73.1 [1857]	1-5/8 [41]	7/8 [22]
		DUAL						1-3/8 [35]	5/8 [16]
LOW SOUND	09DPM035	SINGLE	1138	516	44.8 [1138]		66.5 [1689]	1-5/8 [41]	7/8 [22]
		DUAL						1-3/8 [35]	5/8 [16]
	09DPM040	SINGLE	1234	560	43.4 [1102]			1-5/8 [41]	7/8 [22]
		DUAL						1-3/8 [35]	5/8 [16]
	09DPM050	SINGLE	1330	603	44.7 [1135]			1-5/8 [41]	7/8 [22]
		DUAL						1-3/8 [35]	5/8 [16]
	09DPM060	SINGLE	1572	713	44.9 [1140]		78.6 [1996]	1-5/8 [41]	7/8 [22]
		DUAL						1-3/8 [35]	5/8 [16]



NOTES:
1. BE SURE TO USE A WET RAG AND REMOVE ALL VALVE CORES BEFORE BRAZING FIELD PIPING.
2. DO NOT CAP OR OTHERWISE OBSTRUCT THE LIQUID LINE TEMPERATURE RELIEF.
3. Ø7/8 [22.4] PILOT HOLE PROVIDED FOR LOCATING FIELD POWER WIRING. ACTUAL HOLE REQUIRED DEPENDS ON FIELD WIRE SIZING.
4. Ø0.437 [11.10] HOLE USED FOR MOUNTING UNIT.
5. UNIT MUST HAVE CLEARANCES AS FOLLOWS:
   TOP - DO NOT RESTRICT.
   COIL SIDES - 42 [1067] FROM SOLID SURFACE.
   PANEL SIDES - 48 [1219] PER NEC.
6. SEE TABLE COLUMN H; DIMENSION FOR STANDARD AND LOW SOUND WITH STACK FAN OPTION.
7. CARRIER DOES NOT RECOMMEND INSTALLATION IN A PIT.
8. UNIT CAN BE HANDLED USING THE FORK TRUCK LIFT POCKETS.
9. FAN ARRANGEMENTS FOR 035-060 TON UNITS.
   09DP035 - 2 FANS
   09DP040 - 3 FANS
   09DP050-060 - 4 FANS
10. THE LIQUID AND HOT GAS PIPING CONNECTIONS END APPROXIMATELY 12 INCHES INSIDE THE UNIT. FIELD INSTALLED SINGLE CIRCUIT MANIFOLDS END APPROXIMATELY 5 INCHES INSIDE THE UNIT.
11. WEIGHT DOES NOT INCLUDE UNIT REFRIGERANT CHARGE.
12. **DIMENSIONS ARE IN INCHES.** DIMENSIONS IN [ ] ARE IN MILLIMETERS

Fig. 6 — Unit Dimensions — 09DPM035-060 Units

	UNIT	CONFIGURATION	STD. UNIT WT.		CENTER OF GRAVITY		UNIT HEIGHT	PIPING CONNECTIONS				PIPING LOCATION
								HOT GAS		LIQUID		
			LBS.	KG.	X	Y	H	CIRCUIT A	CIRCUIT B	CIRCUIT A	CIRCUIT B	R
STANDARD	09DPM065	SINGLE	1587	720	54.5 [1384]	44.0 [1118]	73.0 [1854]	1-5/8 [41]	-	1-1/8 [29]	-	0.83 [21.0]
		DUAL						1-3/8 [35]	1-3/8 [35]	7/8 [22]	7/8 [22]	9.00 [228.6]
LOW SOUND		SINGLE	1659	753			78.5 [1994]	1-5/8 [41]	-	1-1/8 [29]	-	0.83 [21.0]
		DUAL						1-3/8 [35]	1-3/8 [35]	7/8 [22]	7/8 [22]	9.00 [228.6]

NOTES:
1. BE SURE TO USE A WET RAG AND REMOVE ALL VALVE CORES BEFORE BRAZING FIELD PIPING.
2. DO NOT CAP OR OTHERWISE OBSTRUCT THE LIQUID LINE TEMPERATURE RELIEF.
3. Ø7/8 [22.4] PILOT HOLE PROVIDED FOR LOCATING FIELD POWER WIRING. ACTUAL HOLE REQUIRED DEPENDS ON FIELD WIRE SIZING.
4. Ø0.437 [11.10] HOLE USED FOR MOUNTING UNIT.
5. UNIT MUST HAVE CLEARANCES AS FOLLOWS: TOP - DO NOT RESTRICT. COIL, PANEL, AND REAR SIDE'S - 42 [1067] FROM SOLID SURFACE.
6. SEE TABLE COLUMN H; DIMENSION FOR STANDARD AND LOW SOUND WITH STACK FAN OPTION.
7. CARRIER DOES NOT RECOMMEND INSTALLATION IN A PIT.
8. UNIT CAN BE HANDLED USING CRANE, REFER TO SERVICE INSTALLATION INSTRUCTION.
9. WEIGHT DOES NOT INCLUDE UNIT REFRIGERANT CHARGE.
10. **DIMENSIONS ARE IN INCHES.** DIMENSIONS IN [ ] ARE IN MILLIMETERS

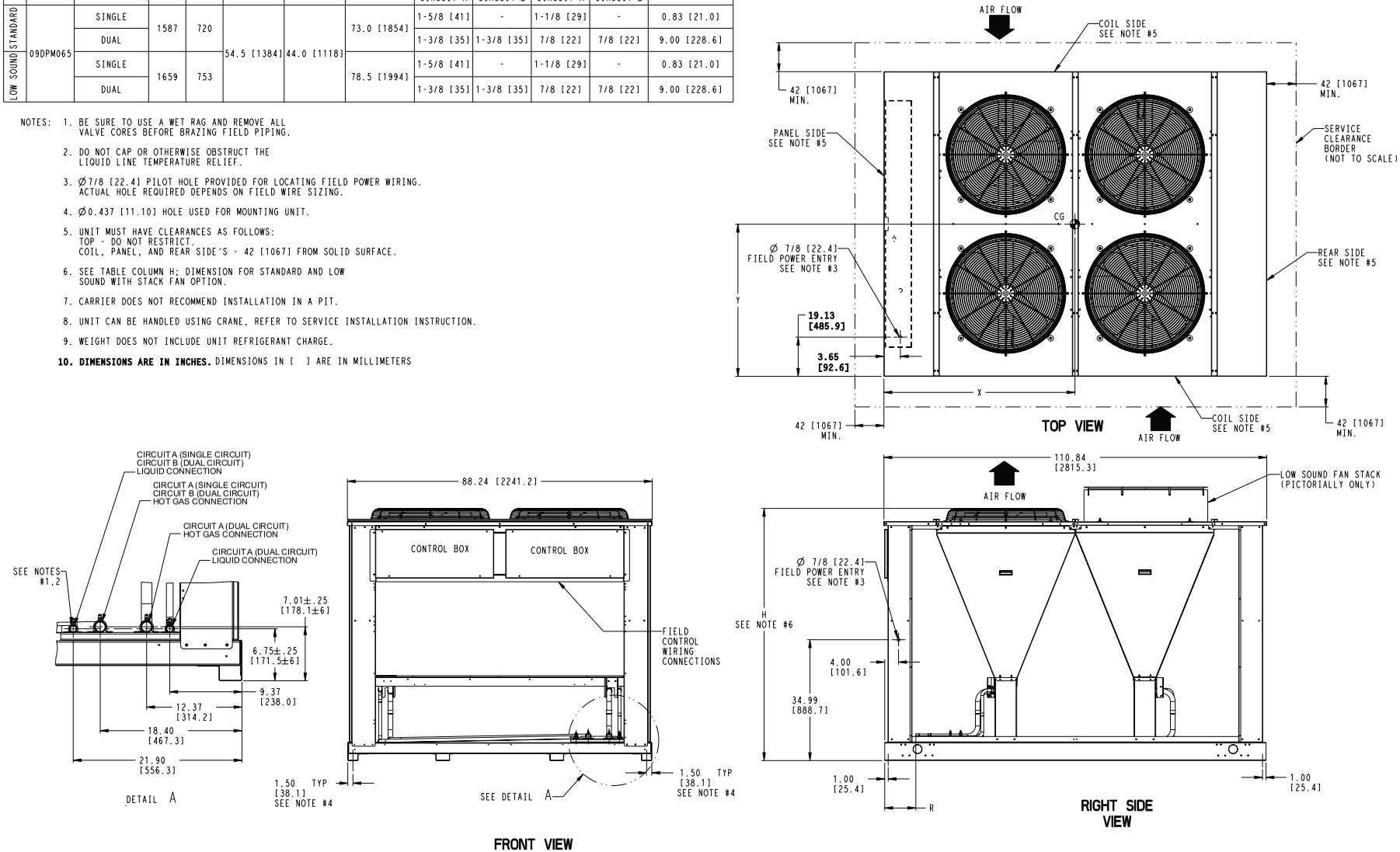


Fig. 7 — Unit Dimensions — 09DPM065 Units

	UNIT	CONFIGURATION	STD.UNIT WT.		CENTER OF GRAVITY		UNIT HEIGHT	PIPING CONNECTIONS				PIPING LOCATIONS
								HOT GAS		LIQUID		
			LBS.	KG.	X	Y	H	CIRCUIT A	CIRCUIT B	CIRCUIT A	CIRCUIT B	R
STANDARD	09DPM075	SINGLE	1802	817	74.4 [1890]	44.0 [1118]	73.0 [1854]	2-1/8 [54]	-	1-1/8 [29]	-	0.83 [21.0]
		DUAL						1-5/8 [41]	1-3/8 [35]	7/8 [22]	7/8 [22]	9.00 [228.6]
	09DPM085	SINGLE	1880	853				2-1/8 [54]	-	1-1/8 [29]	-	0.83 [21.0]
		DUAL						1-5/8 [41]	1-3/8 [35]	7/8 [22]	7/8 [22]	9.00 [228.6]
	09DPM095	SINGLE						2-1/8 [54]	-	1-1/8 [29]	-	0.95 [24.0]
		DUAL						1-5/8 [41]	1-5/8 [41]	7/8 [22]	7/8 [22]	9.00 [228.6]
LOW SOUND	09DPM075	SINGLE	1892	858			78.5 [1994]	2-1/8 [54]	-	1-1/8 [29]	-	0.83 [21.0]
		DUAL						1-5/8 [41]	1-3/8 [35]	7/8 [22]	7/8 [22]	9.00 [228.6]
	09DPM085	SINGLE	1988	902				2-1/8 [54]	-	1-1/8 [29]	-	0.83 [21.0]
		DUAL						1-5/8 [41]	1-3/8 [35]	7/8 [22]	7/8 [22]	9.00 [228.6]
	09DPM095	SINGLE						2-1/8 [54]	-	1-1/8 [29]	-	0.95 [24.0]
		DUAL						1-5/8 [41]	1-5/8 [41]	7/8 [22]	7/8 [22]	9.00 [228.6]

NOTES:
1. BE SURE TO USE A WET RAG AND REMOVE ALL VALVE CORES BEFORE BRAZING FIELD PIPING.
2. DO NOT CAP OR OTHERWISE OBSTRUCT THE LIQUID LINE TEMPERATURE RELIEF.
3. Ø7/8 [22.4] PILOT HOLE PROVIDED FOR LOCATING FIELD POWER WIRING. ACTUAL HOLE REQUIRED DEPENDS ON FIELD WIRE SIZING.
4. Ø0.437 [11.10] HOLE USED FOR MOUNTING UNIT.
5. UNIT MUST HAVE CLEARANCES AS FOLLOWS: TOP - DO NOT RESTRICT. COIL, PANEL, AND REAR SIDE'S - 42 [1067] FROM SOLID SURFACE.
6. SEE TABLE COLUMN H; DIMENSION FOR STANDARD AND LOW SOUND WITH STACK FAN OPTION.
7. CARRIER DOES NOT RECOMMEND INSTALLATION IN A PIT.
8. UNIT CAN BE HANDLED USING CRANE, REFER TO SERVICE INSTALLATION INSTRUCTION.
9. WEIGHT DOES NOT INCLUDE UNIT REFRIGERANT CHARGE.
10. **DIMENSIONS ARE IN INCHES.** DIMENSIONS IN [ ] ARE IN MILLIMETERS

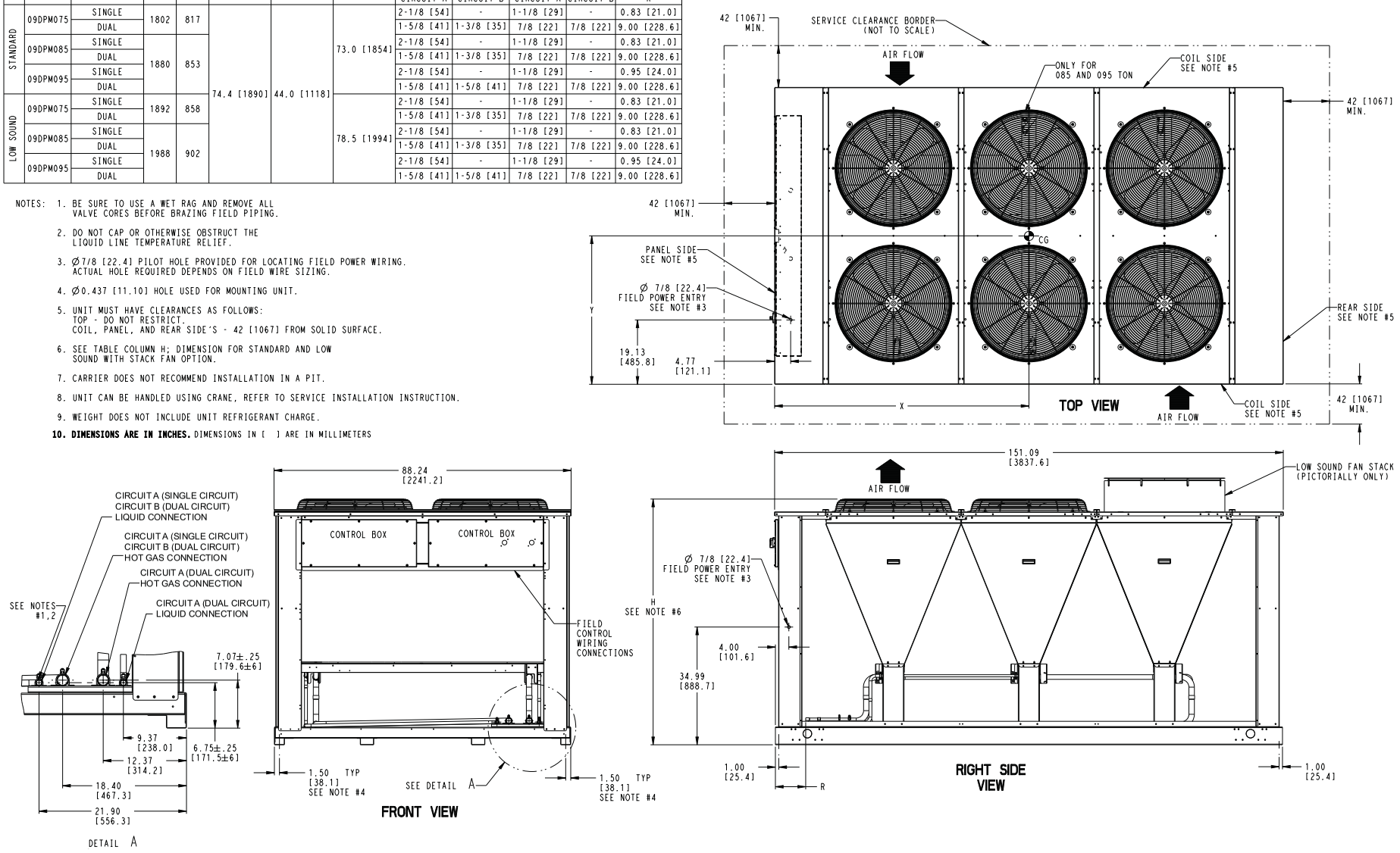
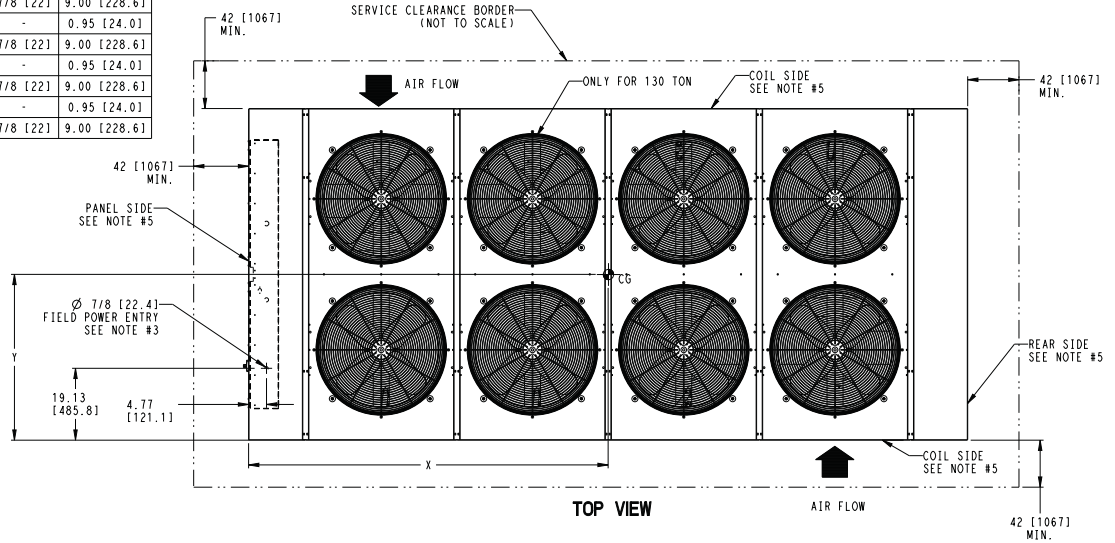
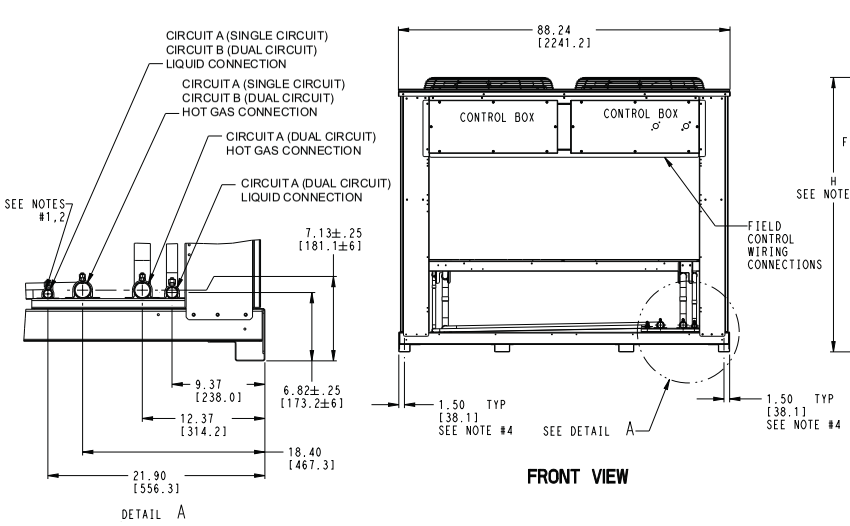


Fig. 8 — Unit Dimensions — 09DPM075-095 Units

	UNIT	CONFIGURATION	STD.UNIT WT.		CENTER OF GRAVITY		UNIT HEIGHT	PIPING CONNECTIONS				PIPING LOCATION
								HOT GAS		LIQUID		
			LBS.	KG.	X	Y	H	CIRCUIT A	CIRCUIT B	CIRCUIT A	CIRCUIT B	R
STANDARD	09DPM115	SINGLE	2385	1082	93.5 [2375]	44.0 [1118]	73.0 [1854]	2-1/8 [54]	-	1-1/8 [29]	-	0.95 [24.0]
		DUAL						1-5/8 [41]	1-5/8 [41]	7/8 [22]	7/8 [22]	9.00 [228.6]
	09DPM130	SINGLE	2463	1117	94.5 [2400]			2-1/8 [54]	-	1-3/8 [35]	-	0.95 [24.0]
		DUAL						1-5/8 [41]	1-5/8 [41]	1-1/8 [29]	7/8 [22]	9.00 [228.6]
LOW SOUND	09DPM115	SINGLE	2511	1139	93.5 [2375]		78.5 [1994]	2-1/8 [54]	-	1-1/8 [29]	-	0.95 [24.0]
		DUAL						1-5/8 [41]	1-5/8 [41]	7/8 [22]	7/8 [22]	9.00 [228.6]
	09DPM130	SINGLE	2607	1183	94.5 [2400]			2-1/8 [54]	-	1-3/8 [35]	-	0.95 [24.0]
		DUAL						1-5/8 [41]	1-5/8 [41]	1-1/8 [29]	7/8 [22]	9.00 [228.6]

NOTES:
1. BE SURE TO USE A WET RAG AND REMOVE ALL VALVE CORES BEFORE BRAZING FIELD PIPING.
2. DO NOT CAP OR OTHERWISE OBSTRUCT THE LIQUID LINE TEMPERATURE RELIEF.
3. Ø7/8 [22.4] PILOT HOLE PROVIDED FOR LOCATING FIELD POWER WIRING. ACTUAL HOLE REQUIRED DEPENDS ON FIELD WIRE SIZING.
4. Ø0.437 [11.10] HOLE USED FOR MOUNTING UNIT.
5. UNIT MUST HAVE CLEARANCES AS FOLLOWS: TOP - DO NOT RESTRICT. COIL, PANEL, AND REAR SIDE'S - 42 [1067] FROM SOLID SURFACE.
6. SEE TABLE COLUMN H; DIMENSION FOR STANDARD AND LOW SOUND WITH STACK FAN OPTION.
7. CARRIER DOES NOT RECOMMEND INSTALLATION IN A PIT.
8. UNIT CAN BE HANDLED USING CRANE, REFER TO SERVICE INSTALLATION INSTRUCTION.
9. WEIGHT DOES NOT INCLUDE UNIT REFRIGERANT CHARGE.
10. **DIMENSIONS ARE IN INCHES.** DIMENSIONS IN [ ] ARE IN MILLIMETERS





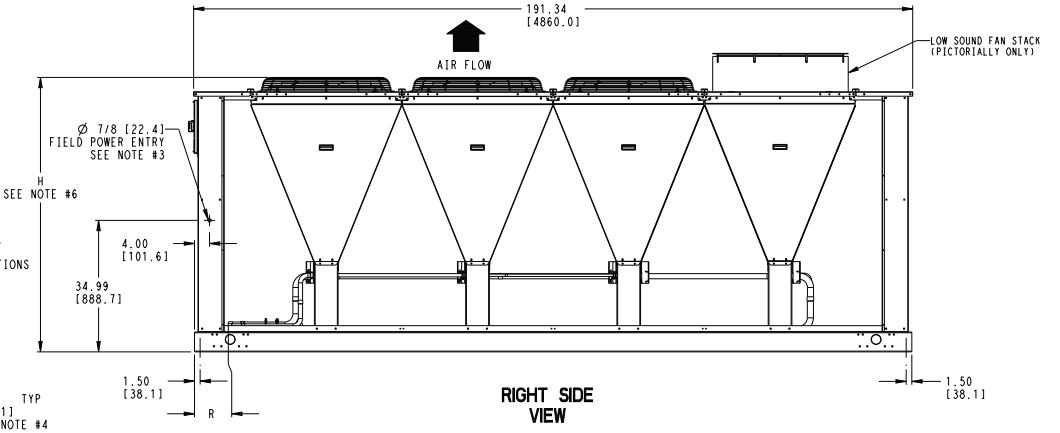
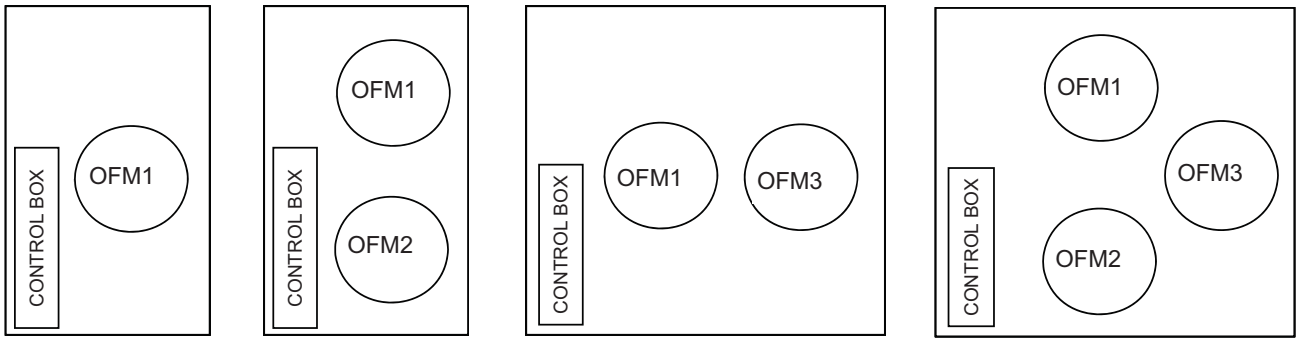


Fig. 9 — Unit Dimensions — 09DPM115,130 Units

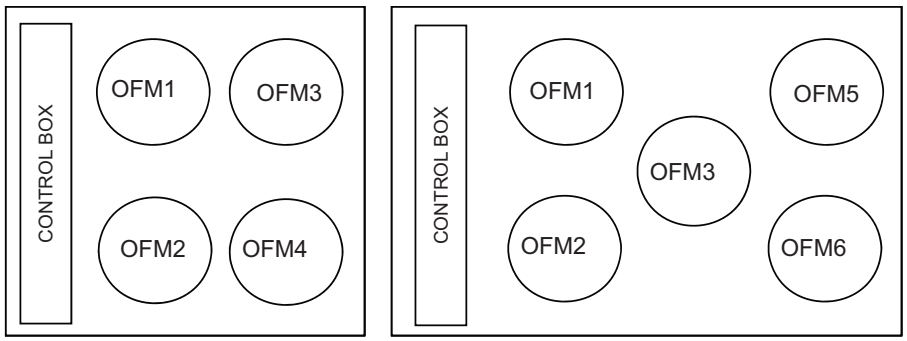


Top View
Size 018

Top View
Sizes 020-030

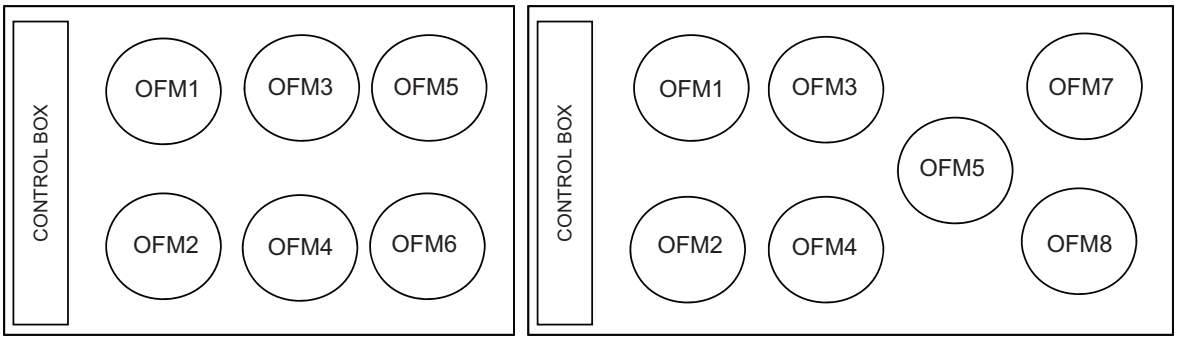
Top View
Size 035

Top View
Size 040



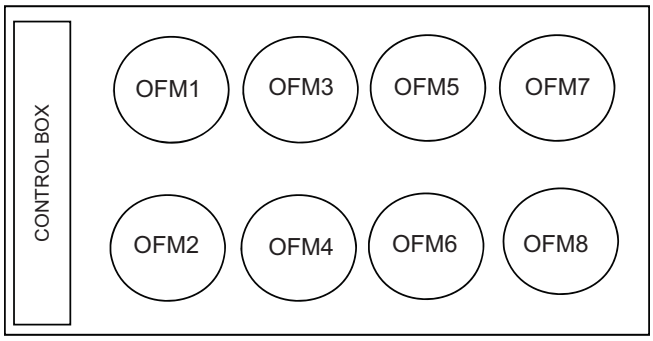
Top View
Sizes 050-065

Top View
Size 075



Top View
Sizes 085-095

Top View
Size 115



Top View
Size 130

LEGEND
OFM — Outdoor Fan

Fig. 10 — Outdoor Fan Layout

NOTES:
1. Chiller and condenser must be installed *levelly* to maintain proper compressor oil return.
2. Wiring and piping shown are general points-of-connection guides only and are not intended for a specific installation. Wiring and piping shown are for a quick overview of system and are not in accordance with recognized standards.
3. All wiring must comply with applicable local and national codes.
4. All piping must follow standard piping techniques. Refer to Carrier System Design Manual part 3, Carrier E20-II software Refrigerant Piping program, or appropriate ASHRAE (American Society of Heating, Refrigerating, and Air Conditioning Engineers) handbook for details on proper piping sizes and design.
5. See Tables 1-6 for approximate refrigerant charge.
6. Double discharge riser may be required; check unit minimum capacity.
7. Trap should be installed on hot gas lines to prevent condenser oil and refrigerant vapor migration from accumulating in the compressor during off cycle.
8. Pitch all horizontal lines downward in the direction of refrigerant flow.
9. For piping lengths greater than 100 ft (30 m), provide discharge line check valve.
10. For pressure relief requirements, see latest revision of ASHRAE Standard 15, Safety Code for Mechanical Refrigeration.
11. All 09DP units have factory-installed contactors.

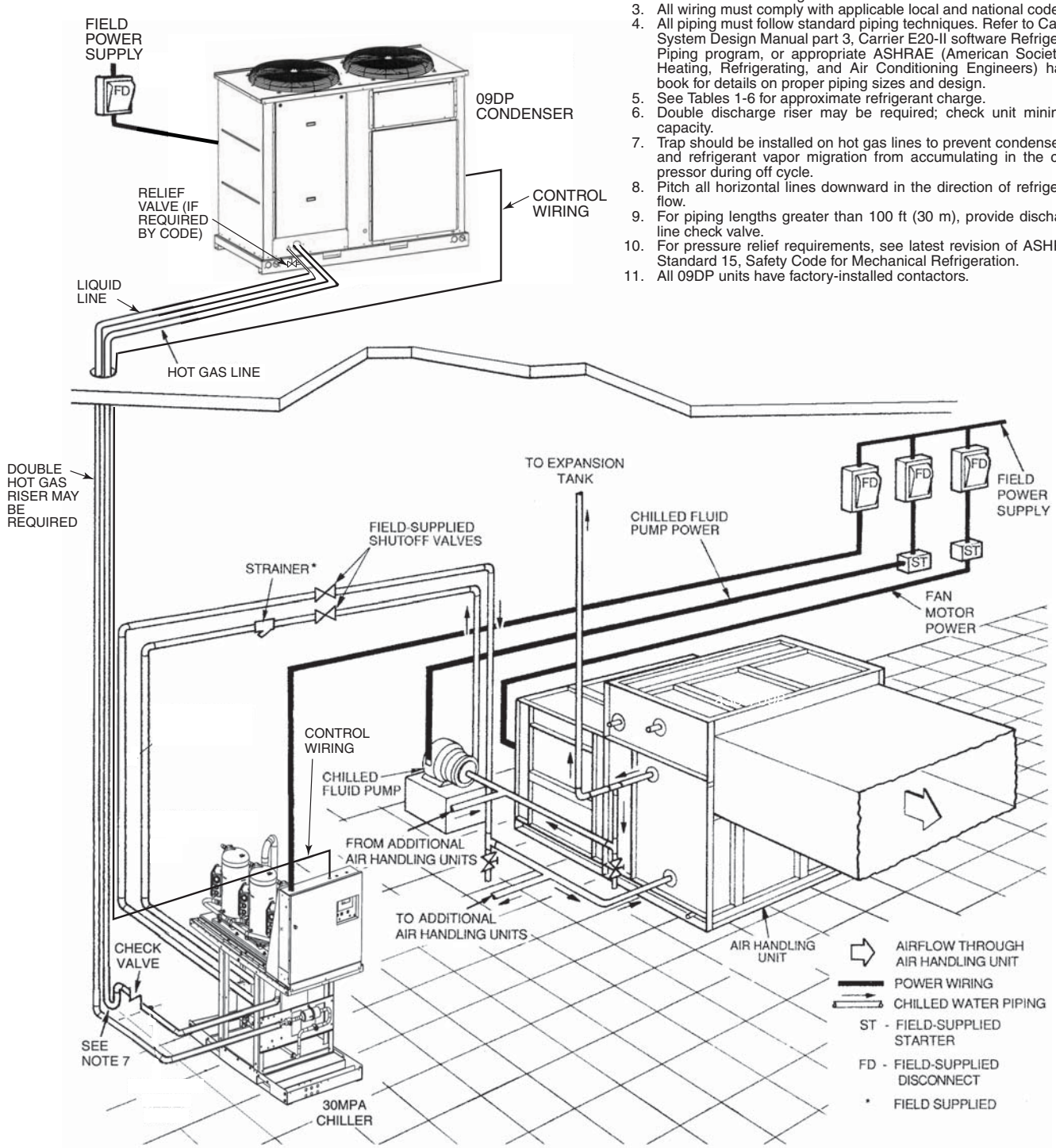
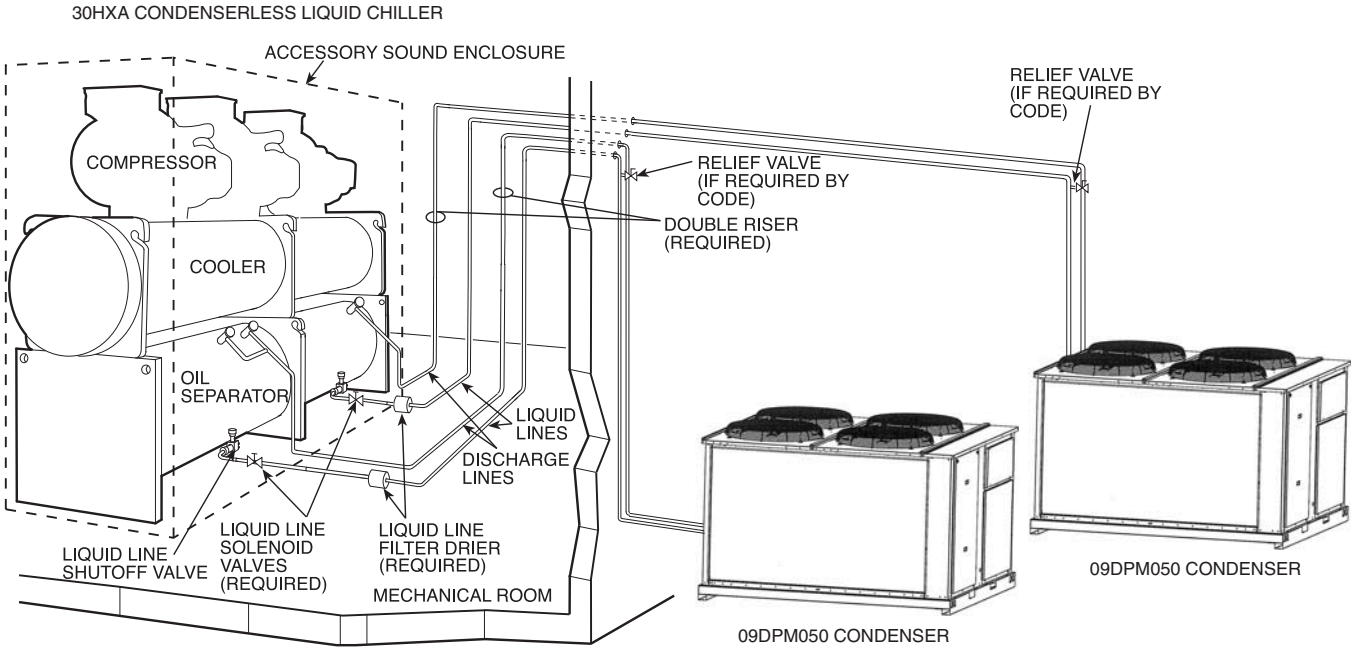


Fig. 11 — Typical 30MPA Refrigerant Piping to 09DP Remote Condenser (30MPA030 and 09DPS030 Units Shown)



NOTES:
1. Chiller and condenser must be installed *levelly* to maintain proper compressor oil return.
2. Wiring and piping shown are general points-of-connection guides only and are not intended for a specific installation. Wiring and piping shown are for a quick overview of system and are not in accordance with recognized standards.
3. All wiring must comply with applicable local and national codes.
4. All piping must follow standard piping techniques. Refer to Carrier System Design Manual part 3, Carrier E20-II software Refrigerant Piping program, or appropriate ASHRAE (American Society of Heating, Refrigerating, and Air Conditioning Engineers) handbook for details on proper piping sizes and design.
5. See Tables 1-6 for approximate refrigerant charge.
6. Double discharge riser may be required; check unit minimum capacity.
7. Trap should be installed on hot gas lines to prevent condenser oil and refrigerant vapor migration from accumulating in the compressor during off cycle.
8. Pitch all horizontal lines downward in the direction of refrigerant flow.
9. For pressure relief requirements, see latest revision of ASHRAE Standard 15, Safety Code for Mechanical Refrigeration.
10. All 09DP units have factory-installed contactors.

Fig. 12 — Typical 30HXA Condenserless Liquid Chiller Refrigerant Piping to 09DP Remote Condensers (30HXA076 and 09DPM050 Units Shown)

Step 3 — Complete Refrigerant Piping

⚠ CAUTION

Do NOT bury refrigerant piping underground. Failure to comply could result in equipment damage.

⚠ CAUTION

The 09DP unit is shipped with a nitrogen holding charge. Use caution when relieving unit pressure to avoid possible equipment damage or personal injury.

GENERAL — All field leak and pressure testing should be in accordance with local code requirements. If a local code does not exist, use ASHRAE (American Society of Heating, Refrigerating, and Air Conditioning Engineers) Standard 15, Safety Code for Mechanical Refrigeration.

For leak testing procedures, refer to the Carrier "Refrigerant Service Techniques" book, Form SM-1A.

Perform phos-copper brazing on all field-made connections while protecting adjacent joints from heat.

Install or replace filter driers.

If the chiller is above the condensing unit, the maximum allowable vertical separation between the condensing unit and the evaporator. See Liquid Lift section on page 21.

Relieve the pressure caused by the nitrogen holding charge. Connect liquid line and discharge line to field piping. Refer to Fig. 5-9 for circuit orientation. Hot gas and liquid connections are located on the same end of the uit and are sealed with tube plugs.

IMPORTANT: Unit is compatible with various refrigerants. Ensure fan cycle pressure switches and Motormaster® option are installed correctly per unit refrigeration configuration.

Units are shipped standard with fan cycle pressure switches for use with R-410A refrigerant. Carrier 30HXA units are shipped with fan cycles pressure switches for use with R-134a condensing units.

Fan cycle pressure switches are to be installed on the discharge lines. Do not remove Schraeder valves from fittings. See Fig. 13-15 for unit piping. See Fig. 16 for switch details.

A tubing package for converting dual circuit units into single circuit units is shipped with all 09DP035-130 units. The kit is field installed. See Fig. 17.

IMPORTANT: Protect the liquid and suction service valves from the heat of brazing. Schrader valve cores must be removed from the liquid and suction service valves before brazing in field connection piping to avoid damage. Reinsert cores after brazing is completed.

The refrigerant system must not be opened and exposed to atmosphere for longer than 15 minutes. Connection and pumpdown should be made as soon as possible to avoid acids forming in the compressor POE (polyolester) oils, which could damage the compressors.

Leak test the entire system by using soap bubbles and nitrogen and an electronic leak detector.

Purge nitrogen from system after completion of leak-checking procedure. Repair leak if one is found. When finished, evacuate and dehydrate system using the following method.

EVACUATION AND DEHYDRATION — Because the 30MPA and 30HXA systems use polyolester oil, which can absorb moisture, it is important to minimize the amount of time that the system interior is left exposed to the atmosphere. Minimizing the exposure time of the oil to the atmosphere will minimize the amount of moisture that needs to be removed during evacuation.

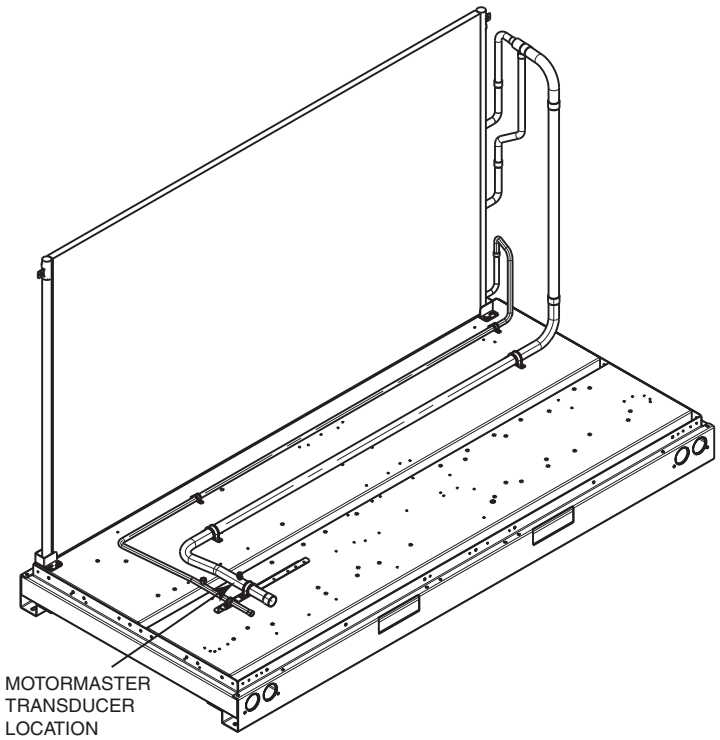


Fig. 13 — Unit Piping — Sizes 018-030

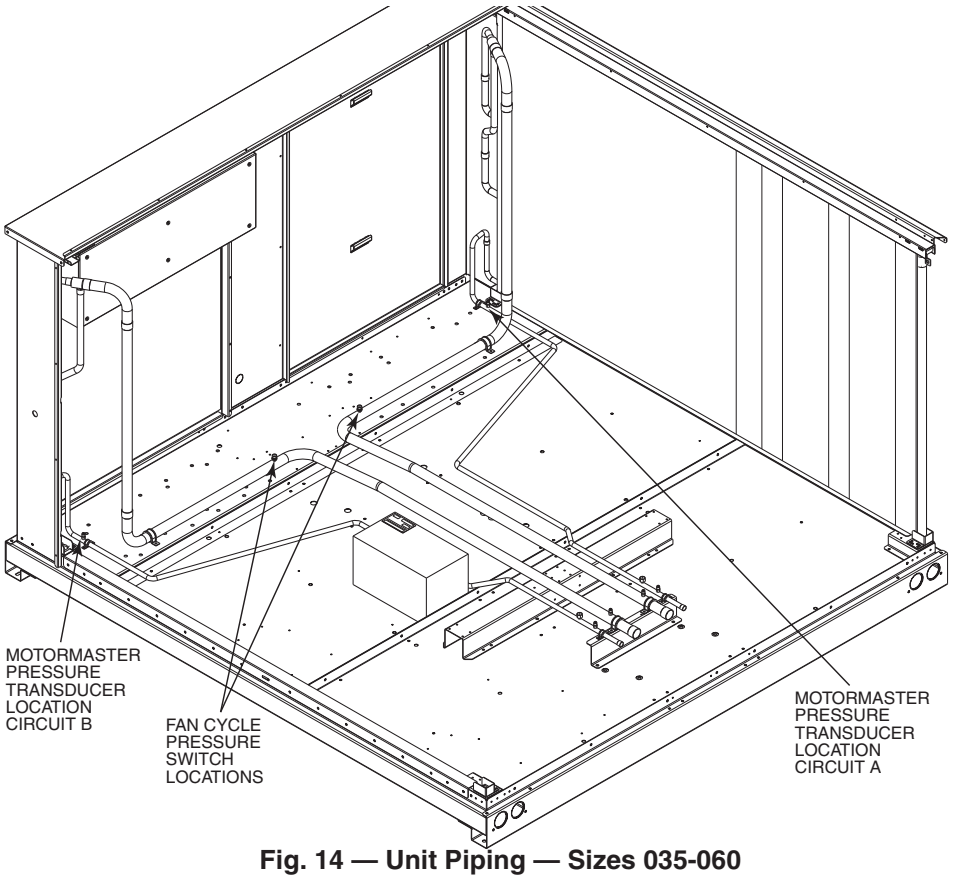


Fig. 14 — Unit Piping — Sizes 035-060

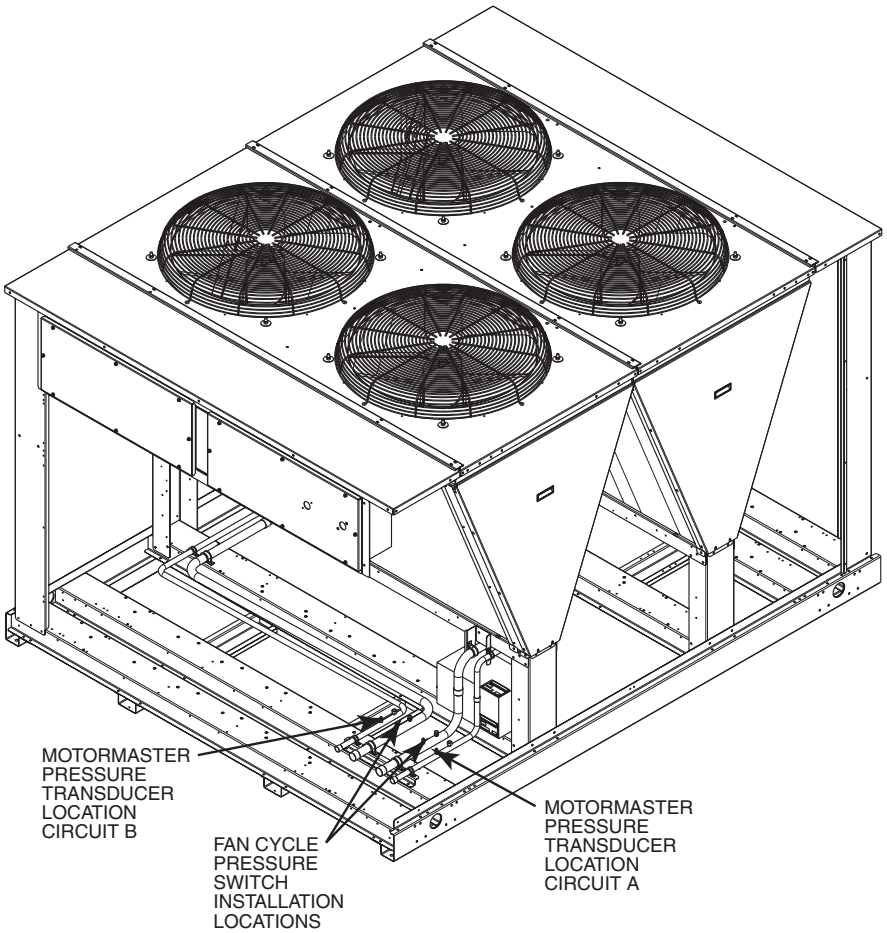
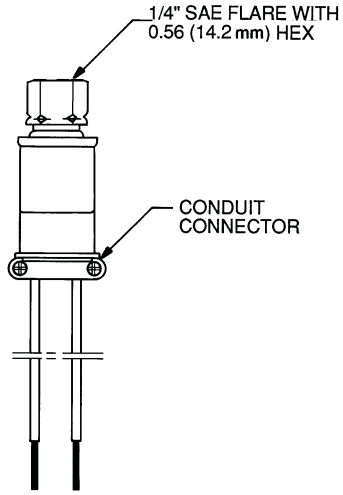


Fig. 15 — Unit Piping — Sizes 065-130



LEGEND

SAE — Society of Automotive Engineers

Fig. 16 — Fan Cycle Pressure Switch

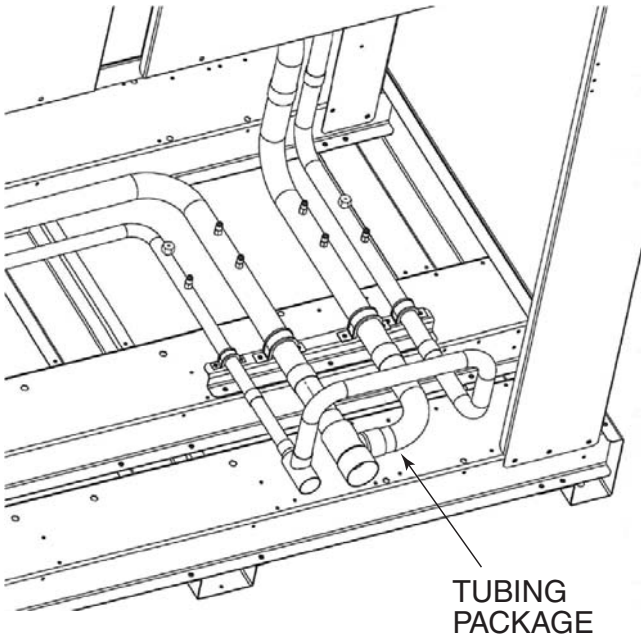


Fig. 17 — Tubing Package Installed in Unit

Once all of the piping connections are complete, leak test the unit and then pull a deep dehydration vacuum. Connect the vacuum pump to the low side and high side of the system. For best results, it is recommended that a vacuum of at least 500 microns (0.5 mm Hg) be obtained. Afterwards, to ensure that no moisture is present in the system, perform a standing vacuum-rise test.

With the unit in deep vacuum (500 microns or less), isolate the vacuum pump from the system. Observe the rate-of-rise of the vacuum in the system. If the vacuum rises by more than 50 microns in a 30-minute time period, then continue the dehydration process. Maintain a vacuum on the system until the standing vacuum requirement is met. This will ensure a dry system.

By following these evacuation and dehydration procedures, the amount of moisture present in the system will be minimized. It is required that liquid line filter driers be installed between the condenser(s) and the expansion devices to capture any foreign debris and provide additional moisture removal capacity. Be sure to consider the pressure drop of the filter drier when determining piping requirements.

REFRIGERANT LINE SIZING — Sizing depends on length of lines between various sections of the refrigerant system. See Tables 2-6 for pipe connection details. Consider the amount of liquid lift and drop in the system as well as proper compressor oil return. See Liquid Lift section for more information. Consult Carrier System Design Manual, Part 3, or Carrier E20-II Refrigerant Piping Computer Program for proper piping sizes and design.

PRESSURE RELIEF — The ASHRAE Standard 15, Safety Code for Mechanical Refrigeration states: "Every refrigerating system shall be protected by a pressure relief device or some other means designed to safely relieve pressure due to fire or other abnormal conditions." The 09DP units are provided with a 210 F temperature fusible plug on the liquid line of each circuit. This may or may not meet local code requirements.

REFRIGERANT RECEIVER — A refrigerant receiver is *not* furnished with 09DP units and is *not* recommended for normal applications as its use will be detrimental to the desired effects of subcooling. However, if a particular application requires a receiver to increase refrigerant holding capacity of the condenser, a receiver can be used. Recommended receiver and valve installation and piping are shown in Fig. 18. When a receiver is to be used year-round, it should be installed indoors.

Procedure for Using the Refrigerant Receiver (Fig. 18)

1. *During normal operation* — Valve A is open and valves B and C are closed. Receiver is isolated from the system.
2. *For servicing* — Valves A and C are closed and valve B is open. Run unit until all the refrigerant is in the receiver and then close valve B. Unit is now ready for servicing.
3. *To resume operation* — Leave valve A closed and open valves B and C. Run unit until the stored refrigerant is drawn into the system. To completely remove the refrigerant from the receiver, throttle valve B while noting condition of refrigerant in the liquid line sight glass; also, watch the suction pressure. A sudden surge of bubbles in the sight glass and a rapid decrease in suction pressure indicate that all the refrigerant has been withdrawn from the receiver. Immediately close valves B and C and then open valve A. The unit should now be ready for normal operation, with the receiver isolated from the system. *The system should be charged to a clear sight glass when under normal operation.*

LIQUID LIFT — Amount of liquid lift available before refrigerant flashing occurs depends on amount of liquid sub-cooling in the system.

All 09DP condensers have positive subcooling when applied with optimum charge. With subcooling, it is possible to overcome an appreciable pressure drop and/or static head (due to elevation of the liquid metering device above the condenser).

When 09DP condensers are applied with minimum charge, they do not provide positive subcooling. If subcooling is required, it must be obtained by external means such as a liquid suction interchanger.

The average amount of liquid lift available is shown in Tables 7 and 8 for refrigerants R-410A and R-134a. It is recommended that the evaporator be at the same level as the condenser, or lower.

⚠ WARNING

Do not apply pumpdown cycle with MCHX (microchannel heat exchanger) condensers. Damage to unit or personal injury may occur.

Table 7 — Available Liquid Lift (ft)* — English

UNIT	REFRIGERANT			
	R-410A		R-134a	
	Temperature Difference (F)†			
	20	30	20	30
09DPS018	75	75	60	45
09DPS020			50	35
09DPS030			45	30
09DPM035			55	40
09DPM040			50	35
09DPM050			50	35
09DPM060			45	30
09DPM065			55	40
09DPM075			50	35
09DPM085			50	35
09DPM095			50	35
09DPM115			50	35
09DPM130			50	35

*Allows 7 psi drop for liquid line accessories with maximum charge.
†Saturated Condensing Temperature (entering) – Entering Air Temperature (dry bulb) °F.

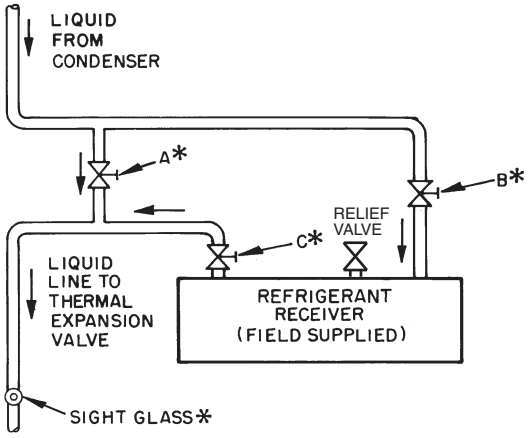
NOTES:
1. Data based on 15 F subcooling.
2. Subcooling = Saturated condensing temperature of refrigerant – Actual temperature of refrigerant leaving the coil.

Table 8 — Available Liquid Lift (m)* — SI

UNIT	REFRIGERANT			
	R-410A		R-134a	
	Temperature Difference (C)†			
	11.1	16.6	11.1	16.6
09DPS018	23	23	18	14
09DPS020			15	11
09DPS030			14	9
09DPM035			17	12
09DPM040			15	11
09DPM050			15	11
09DPM060			14	9
09DPM065			17	12
09DPM075			15	11
09DPM085			15	11
09DPM095			15	11
09DPM115			15	11
09DPM130			15	11

*Allows 48 kPa drop for liquid line accessories with maximum charge.
†Saturated Condensing Temperature (entering) – Entering Air Temperature (dry bulb) °C.

NOTES:
1. Data based on 8.3° C subcooling.
2. Subcooling = Saturated condensing temperature of refrigerant – Actual temperature of refrigerant leaving the coil.



*Field-supplied service valves.

A — Bypass valve
B — Receiver inlet valve
C — Receiver outlet valve

Fig. 18 — Piping for Field-Supplied Receiver

Step 4 — Make Electrical Connections

⚠ WARNING

Before performing service or maintenance operations on unit, turn off main power switch to unit. Electrical shock could cause personal injury.

IMPORTANT: When starting up this equipment for operation, be sure to check tightness of all electrical terminal connections, clamps, screws, etc., as they may have become loose during shipment. It is also advisable to re-tighten all electrical connections after equipment has been in operation and components have reacted to operating temperature.

IMPORTANT: Operating unit on improper supply voltage or with excessive phase imbalance constitutes abuse and may adversely affect Carrier warranty.

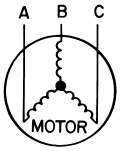
⚠ CAUTION

Proper rotation of condenser fan(s) MUST be verified. Failure to comply could result in possible equipment damage.

GENERAL — Verify nameplate electrical requirements match available power supply. Voltage at condenser must be within the minimum and maximum shown in Tables 9 and 10. Phases must be balanced within 2%. Contact local power company for line voltage corrections. Never operate a motor where a phase imbalance in supply voltage is greater than 2%. Use the following formula to determine the percentage of voltage imbalance:

$$\%\ \text{Voltage Imbalance} = 100 \times \frac{\text{max voltage deviation from average voltage}}{\text{Average voltage}}$$

Example: Supply voltage is 240-3-60.



AB = 243 volts
BC = 236 volts
AC = 238 volts

$$\text{Average Voltage} = \frac{243 + 236 + 238}{3}$$

$$= \frac{717}{3}$$

$$= 239$$

Determine maximum deviation from average voltage:

(AB) 243 – 239 = 4 volts
(BC) 239 – 236 = 3 volts
(AC) 239 – 238 = 1 volt

Maximum deviation is then 4 volts. To determine the percentage of voltage imbalance:

$$\%\ \text{Voltage Imbalance} = 100 \times \frac{4}{239}$$

$$= 1.7\%$$

This amount of phase imbalance is satisfactory since it is below the maximum allowable of 2%.

IMPORTANT: If supply voltage phase imbalance is more than 2%, contact your local electric utility company immediately.

Condenser operation on improper line voltage or excessive phase imbalance may be considered abuse and any resulting damage may not be covered by Carrier warranty.

All wiring must be in accordance with local or NEC regulations.

POWER WIRING — All field power wiring must comply with applicable local and national codes. Install field-supplied branch circuit fused disconnect per NEC of a type that can be locked OFF or OPEN. Disconnect must be within sight and readily accessible from the unit in compliance with NEC Article 440-14.

General Wiring Notes:

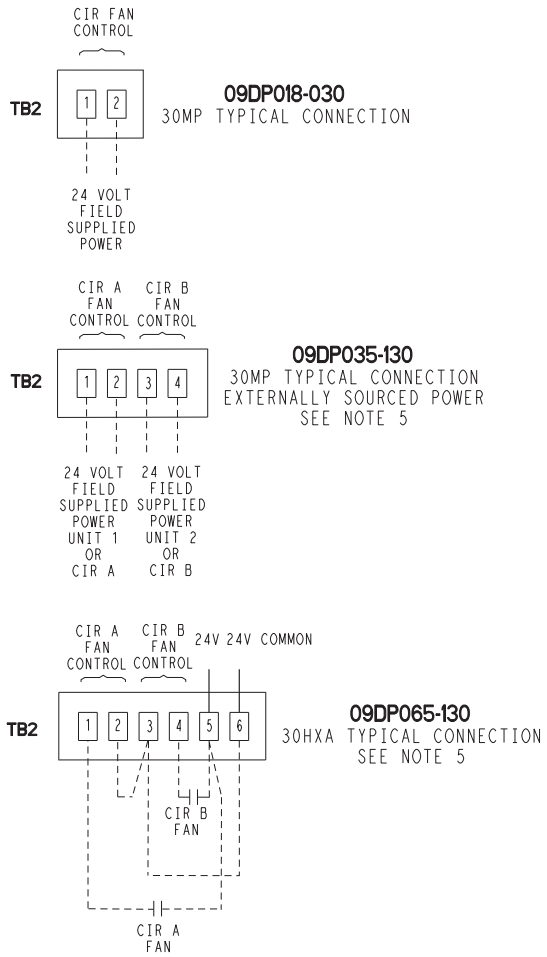
1. A terminal strip is provided for field-wired control devices.
2. Power entry is at one end only.
3. All field power enters the unit through a hole located in the corner post of the unit or the bottom of the control box shelf. Refer to Fig. 19 for field power wiring details. Refer to Fig. 5-9 for exact location of field power entry. See Table 11 for incoming power wiring options.
4. Terminals for field power supply are suitable only for copper conductors. Insulation must be rated 75 C minimum.
5. Units with high short circuit ratings require that only RK1, RK5, or J type fuses be used.

NOTES:

1. FACTORY WIRING IS IN ACCORDANCE WITH UL 1995 STANDARDS. FIELD MODIFICATIONS OR ADDITIONS MUST BE IN COMPLIANCE WITH ALL APPLICABLE CODES.
2. ALL UNITS OR MODULES HAVE SINGLE POINT PRIMARY POWER CONNECTION. MAIN POWER MUST BE SUPPLIED FROM A FIELD OR FACTORY SUPPLIED DISCONNECT.
3. WIRING FOR MAIN FIELD SUPPLY MUST BE RATED 75C. USE COPPER CONDUCTORS ONLY.
   a. INCOMING WIRE SIZE RANGE FOR TERMINAL BLOCK IS 14 AWG (AMERICAN WIRE GAGE) TO 2 AWG.
   b. INCOMING WIRE SIZE FOR NON-FUSED DISCONNECT WITH MCA UP TO 38 AMPS IS 14 TO 6 AWG; FOR MCA GREATER THAN 38 AMPS IS 8 TO 1 AWG.
4. REFER TO CERTIFIED DIMENSIONAL DRAWINGS FOR EXACT LOCATIONS OF THE MAIN POWER AND CONTROL POWER ENTRANCE LOCATIONS.
5. JUMPER TERMINALS 2 AND 3 TOGETHER AND TERMINALS 1 AND 4 TOGETHER FOR SINGLE UNIT OPERATION.
6. ALL UNITS RATED FOR HIGH SHORT CIRCUIT INTERRUPT CAPABILITY MUST BE PROTECTED USING FUSES.

LEGEND:

- FIELD POWER WIRING
- FIELD CONTROL WIRING
- FACTORY INSTALLED WIRING



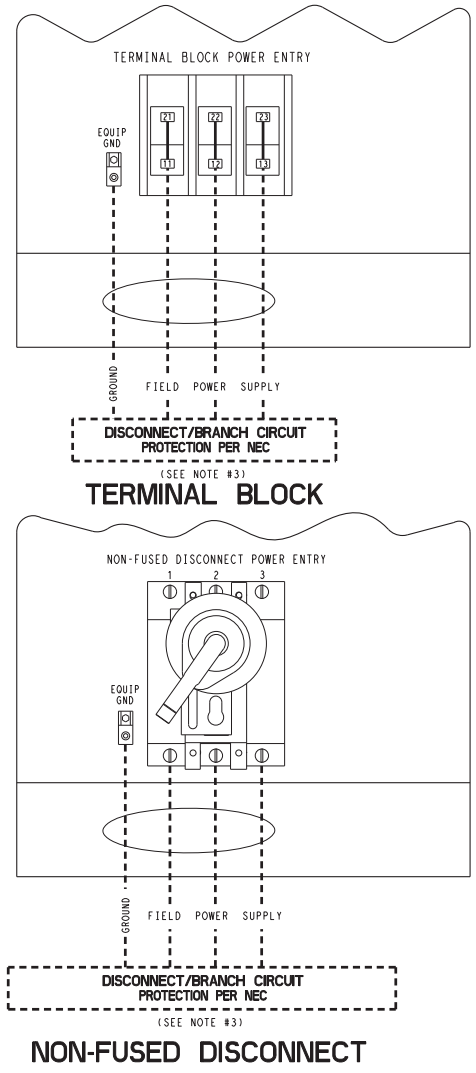


Fig. 19 — Unit Field Power Wiring

Table 9 — 09DP Electrical Data — Standard Fan

09DP UNIT SIZE	V-Ph-Hz	SUPPLY VOLTAGE		CONDENSER FAN		MCA	MOCP
		Min	Max	TOTAL QTY	FLA		
018	208/230-3-60	187	254	1	6.6	8.3	15
	380-3-60	342	418		3.9	4.9	15
	460-3-60	414	506		3.3	4.1	15
	575-3-60	518	632		2.6	3.3	15
	380/415-3-50	342	440		3.3	4.1	15
020	208/230-3-60	187	254	2	6.6	14.9	20
	380-3-60	342	418		3.9	8.8	15
	460-3-60	414	506		3.3	7.4	15
	575-3-60	518	632		2.6	5.9	15
	380/415-3-50	342	440		3.3	7.4	15
030	208/230-3-60	187	254	2	6.6	14.9	20
	380-3-60	342	418		3.9	8.8	15
	460-3-60	414	506		3.3	7.4	15
	575-3-60	518	632		2.6	5.9	15
	380/415-3-50	342	440		3.3	7.4	15
035	208/230-3-60	187	254	2	6.6	14.9	20
	380-3-60	342	418		3.9	8.8	15
	460-3-60	414	506		3.3	7.4	15
	575-3-60	518	632		2.6	5.9	15
	380/415-3-50	342	440		3.3	7.4	15
040	208/230-3-60	187	254	3	6.6	21.5	25
	380-3-60	342	418		3.9	12.7	15
	460-3-60	414	506		3.3	10.7	15
	575-3-60	518	632		2.6	8.5	15
	380/415-3-50	342	440		3.3	10.7	15
050	208/230-3-60	187	254	4	6.6	28.1	30
	380-3-60	342	418		3.9	16.6	20
	460-3-60	414	506		3.3	14.0	15
	575-3-60	518	632		2.6	11.1	15
	380/415-3-50	342	440		3.3	14.0	15
060	208/230-3-60	187	254	4	6.6	28.1	30
	380-3-60	342	418		3.9	16.6	20
	460-3-60	414	506		3.3	14.0	15
	575-3-60	518	632		2.6	11.1	15
	380/415-3-50	342	440		3.3	14.0	15

LEGEND

AWG — American Wire Gage
FIOP — Factory-Installed Option
FLA — Full Load Amps
MCA — Minimum Circuit Amps, complies with NEC, Article 430-24
MOCP — Maximum Overcurrent Protection (Amps)
NEC — National Electrical Code

1. Units are suitable for use on electrical systems where voltage supplied to the unit terminals is not below or above the listed minimum and maximum limits. Maximum allowable phase imbalance is voltage 2% and amps 10%.
2. All units or modules have single point primary power connection. Main power must be supplied from a field-supplied disconnect.
3. All terminal block units should be capable of handling 14 AWG to 2 AWG.
4. Disconnect units with MOCP of greater than 40 require 8 AWG to 1 AWG.
5. Disconnect units with MOCP less than 40 require 14 AWG to 6 AWG.
6. For all high short circuit capable FIOP units, fuses must be used for overload protection.

Table 9 — 09DP Electrical Data — Standard Fan (cont)

09DP UNIT SIZE	V-Ph-Hz	SUPPLY VOLTAGE		CONDENSER FAN		MCA	MOCP
		Min	Max	TOTAL QTY	FLA		
065	208/230-3-60	187	254	4	6.6	28.1	30
	380-3-60	342	418		3.9	16.6	20
	460-3-60	414	506		3.3	14.0	15
	575-3-60	518	632		2.6	11.1	15
	380/415-3-50	342	440		3.3	14.0	15
075	208/230-3-60	187	254	5	6.6	34.7	40
	380-3-60	342	418		3.9	20.5	25
	460-3-60	414	506		3.3	17.3	20
	575-3-60	518	632		2.6	13.7	15
	380/415-3-50	342	440		3.3	17.3	20
085	208/230-3-60	187	254	6	6.6	41.3	45
	380-3-60	342	418		3.9	24.4	25
	460-3-60	414	506		3.3	20.6	25
	575-3-60	518	632		2.6	16.3	15
	380/415-3-50	342	440		3.3	20.6	25
095	208/230-3-60	187	254	6	6.6	41.3	45
	380-3-60	342	418		3.9	24.4	25
	460-3-60	414	506		3.3	20.6	25
	575-3-60	518	632		2.6	16.3	15
	380/415-3-50	342	440		3.3	20.6	25
115	208/230-3-60	187	254	7	6.6	47.9	50
	380-3-60	342	418		3.9	28.3	30
	460-3-60	414	506		3.3	23.9	25
	575-3-60	518	632		2.6	18.9	20
	380/415-3-50	342	440		3.3	23.9	25
130	208/230-3-60	187	254	8	6.6	54.5	60
	380-3-60	342	418		3.9	32.2	35
	460-3-60	414	506		3.3	27.2	30
	575-3-60	518	632		2.6	21.5	25
	380/415-3-50	342	440		3.3	27.2	30

LEGEND

AWG — American Wire Gage
FIOP — Factory-Installed Option
FLA — Full Load Amps
MCA — Minimum Circuit Amps, complies with NEC, Article 430-24
MOCP — Maximum Overcurrent Protection (Amps)
NEC — National Electrical Code

1. Units are suitable for use on electrical systems where voltage supplied to the unit terminals is not below or above the listed minimum and maximum limits. Maximum allowable phase imbalance is voltage 2% and amps 10%.
2. All units or modules have single point primary power connection. Main power must be supplied from a field-supplied disconnect.
3. All terminal block units should be capable of handling 14 AWG to 2 AWG.
4. Disconnect units with MOCP of greater than 40 require 8 AWG to 1 AWG.
5. Disconnect units with MOCP less than 40 require 14 AWG to 6 AWG.
6. For all high short circuit capable FIOP units, fuses must be used for overload protection.

Table 10 — 09DP Electrical Data — Low Sound Fan

09DP UNIT SIZE	V-Ph-Hz	SUPPLY VOLTAGE		CONDENSER FAN		MCA	MOCP
		Min	Max	TOTAL QTY	FLA		
018	208/230-3-60	187	254	1	6.0	7.5	15
	380-3-60	342	418		3.9	4.9	15
	460-3-60	414	506		2.9	3.6	15
	575-3-60	518	632		2.4	3.0	15
	380/415-3-50	342	440		2.9	3.6	15
020	208/230-3-60	187	254	2	6.0	13.5	15
	380-3-60	342	418		3.9	8.8	15
	460-3-60	414	506		2.9	6.5	15
	575-3-60	518	632		2.4	5.4	15
	380/415-3-50	342	440		2.9	6.5	15
030	208/230-3-60	187	254	2	6.0	13.5	15
	380-3-60	342	418		3.9	8.8	15
	460-3-60	414	506		2.9	6.5	15
	575-3-60	518	632		2.4	5.4	15
	380/415-3-50	342	440		2.9	6.5	15
035	208/230-3-60	187	254	2	6.0	13.5	15
	380-3-60	342	418		3.9	8.8	15
	460-3-60	414	506		2.9	6.5	15
	575-3-60	518	632		2.4	5.4	15
	380/415-3-50	342	440		2.9	6.5	15
040	208/230-3-60	187	254	3	6.0	19.5	25
	380-3-60	342	418		3.9	12.7	15
	460-3-60	414	506		2.9	9.4	15
	575-3-60	518	632		2.4	7.8	15
	380/415-3-50	342	440		2.9	9.4	15
050	208/230-3-60	187	254	4	6.0	25.5	30
	380-3-60	342	418		3.9	16.6	20
	460-3-60	414	506		2.9	12.3	15
	575-3-60	518	632		2.4	10.2	15
	380/415-3-50	342	440		2.9	12.3	15
060	208/230-3-60	187	254	4	6.0	25.5	30
	380-3-60	342	418		3.9	16.6	20
	460-3-60	414	506		2.9	12.3	15
	575-3-60	518	632		2.4	10.2	15
	380/415-3-50	342	440		2.9	12.3	15

LEGEND

AWG — American Wire Gage
FIOP — Factory-Installed Option
FLA — Full Load Amps
MCA — Minimum Circuit Amps, complies with NEC, Article 430-24
MOCP — Maximum Overcurrent Protection (Amps)
NEC — National Electrical Code

1. Units are suitable for use on electrical systems where voltage supplied to the unit terminals is not below or above the listed minimum and maximum limits. Maximum allowable phase imbalance is voltage 2% and amps 10%.
2. All units or modules have single point primary power connection. Main power must be supplied from a field-supplied disconnect.
3. All terminal block units should be capable of handling 14 AWG to 2 AWG.
4. Disconnect units with MOCP of greater than 40 require 8 AWG to 1 AWG.
5. Disconnect units with MOCP less than 40 require 14 AWG to 6 AWG.
6. For all high short circuit capable FIOP units, fuses must be used for overload protection.

Table 10 — 09DP Electrical Data — Low Sound Fan (cont)

09DP UNIT SIZE	V-Ph-Hz	SUPPLY VOLTAGE		CONDENSER FAN		MCA	MOCP
		Min	Max	TOTAL QTY	FLA		
065	208/230-3-60	187	254	4	6.0	25.5	30
	380-3-60	342	418		3.9	16.6	20
	460-3-60	414	506		2.9	12.3	15
	575-3-60	518	632		2.4	10.2	15
	380/415-3-50	342	440		2.9	12.3	15
075	208/230-3-60	187	254	5	6.0	31.5	35
	380-3-60	342	418		3.9	20.5	25
	460-3-60	414	506		2.9	15.2	20
	575-3-60	518	632		2.4	12.6	15
	380/415-3-50	342	440		2.9	15.2	20
085	208/230-3-60	187	254	6	6.0	37.5	40
	380-3-60	342	418		3.9	24.4	25
	460-3-60	414	506		2.9	18.1	20
	575-3-60	518	632		2.4	15.0	15
	380/415-3-50	342	440		2.9	18.1	20
095	208/230-3-60	187	254	6	6.0	37.5	40
	380-3-60	342	418		3.9	24.4	25
	460-3-60	414	506		2.9	18.1	20
	575-3-60	518	632		2.4	15.0	15
	380/415-3-50	342	440		2.9	18.1	20
115	208/230-3-60	187	254	7	6.0	43.5	45
	380-3-60	342	418		3.9	28.3	30
	460-3-60	414	506		2.9	21.0	25
	575-3-60	518	632		2.4	17.4	20
	380/415-3-50	342	440		2.9	21.0	25
130	208/230-3-60	187	254	8	6.0	49.5	50
	380-3-60	342	418		3.9	32.2	35
	460-3-60	414	506		2.9	23.9	25
	575-3-60	518	632		2.4	19.8	20
	380/415-3-50	342	440		2.9	23.9	25

LEGEND

AWG — American Wire Gage
FIOP — Factory-Installed Option
FLA — Full Load Amps
MCA — Minimum Circuit Amps, complies with NEC, Article 430-24
MOCP — Maximum Overcurrent Protection (Amps)
NEC — National Electrical Code

1. Units are suitable for use on electrical systems where voltage supplied to the unit terminals is not below or above the listed minimum and maximum limits. Maximum allowable phase imbalance is voltage 2% and amps 10%.
2. All units or modules have single point primary power connection. Main power must be supplied from a field-supplied disconnect.
3. All terminal block units should be capable of handling 14 AWG to 2 AWG.
4. Disconnect units with MOCP of greater than 40 require 8 AWG to 1 AWG.
5. Disconnect units with MOCP less than 40 require 14 AWG to 6 AWG.
6. For all high short circuit capable FIOP units, fuses must be used for overload protection.

Table 11 — Unit Incoming Power Options

MOCP VALUE	UNIT INCOMING POWER OPTION						
	Standard Terminal Block Option		High SCCR Terminal Block Option			Standard and High SCCR Disconnect Option	
	Max Wire Size	Min Wire Size	Max Wire Size	Min Wire Size	High SCCR Fuse Type	Max Wire Size	Min Wire Size
100 A or less	2/0 AWG	14 AWG	2/0 AWG	6 AWG	J, RK1, or RK5	1/0 AWG	14 AWG
Greater than 100 A and Less than or Equal to 200 A	2/0 AWG	14 AWG	2/0 AWG	6 AWG	J or RK1	350 kcmil	6 AWG
Greater than 200	600 kcmil	2 AWG	600 kcmil	3/0 AWG	J or RK1	500 kcmil (1) 500 kcmil (2)	3/0 AWG

LEGEND

AWG — American Wire Gage
kcmil — Thousand Circular Mills
MOCP — Maximum Overcurrent Protection
SCCR — Short Circuit Current Rating

NOTES:

1. Terminal block high SCCR option units must use approved fuses to meet high SCCR rating.
2. High SCCR disconnect option units can use either approved fuse or circuit breaker for incoming power protection.
3. Time delay fuse type required.

CONTROL CIRCUIT WIRING

09DP018-030 Units — The units require a 24-volt externally supplied power to energize the control circuit connected to TB2 terminal 1 and 2 shown in Fig. 20.

09DP035-0130 Units — Size 035 to 130 units are designed to operate with a 24-v field-supplied control power or can be powered by internal control transformer using contact closures to energize each control circuit. The 035-130 size units are designed to operate with either single, dual circuit or multiple unit applications.

When 24-v control power is supplied from external source (30MP application), this application requires the 24-v externally supplied power to energize the control relays for each circuit. Unit 1/Cir A should be connected to TB2 terminal 1 and 2. Unit 2/Cir B should be connected to TB2 terminal 3 and 4. See Fig. 21.

FIELD CONTROL WIRING — With 24-v internally supplied power applications (30HX applications), the application requires field-supplied control relay(s) to energize contacts to energize the 09DP control relays for each circuit.

1. Install field-supplied jumpers between terminals 2, 3 and 6 of TB2. See Fig. 22.
2. Connect field-supplied wiring and relay for Unit 1/Circuit A. Contacts should be connected between TB2 terminal 1 and 5.
3. For single unit applications a jumper should be installed between TB2 terminals 1 and 4. See Fig. 23.
4. Connect field-supplied wiring and relay for Unit 2/Circuit B. Contacts should be connected between TB2 terminals 4 and 5.

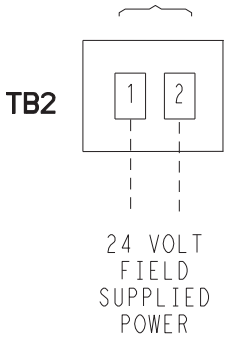


Fig. 20 — 09DP018-030 Control Circuit Wiring

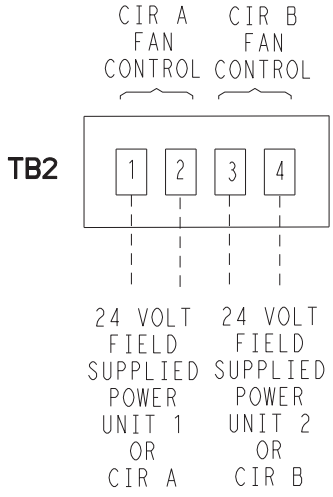


Fig. 21 — 09DP035-130 with 30MP Control Circuit Wiring

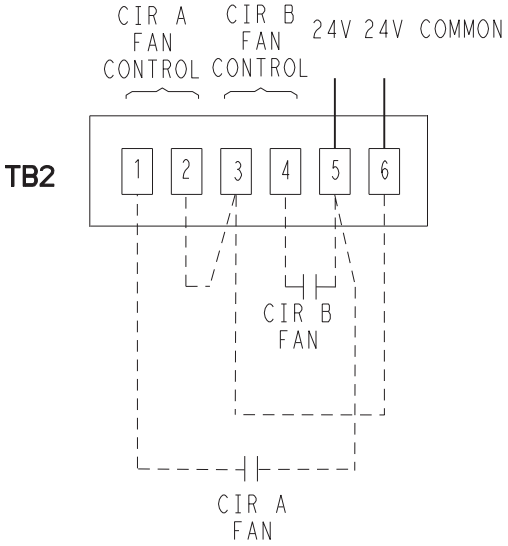


Fig. 22 — 09DP035-130 with 30HX Control Circuit Wiring

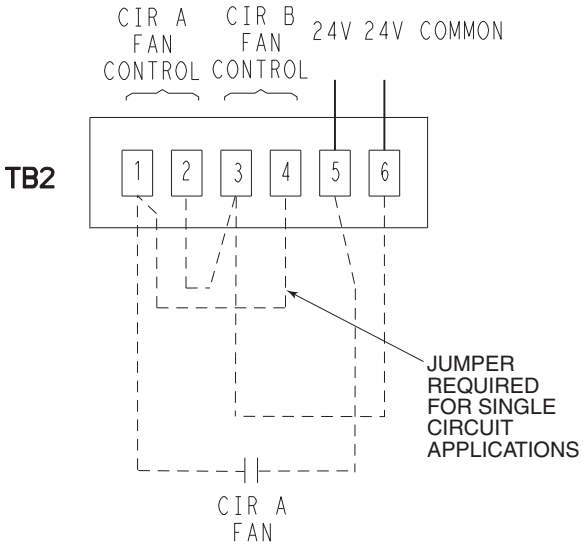


Fig. 23 — Single Circuit 09DP035-130 with 30HX Control Circuit Wiring

Fan Cycling Pressure Switches (FCPS) — Unit sizes 040-060 and 075-130 require fan cycling pressure switches to be installed and wired into the control circuit. See Fig. 14 and 15 for mounting location of FCPS.

⚠ CAUTION

Since the 09DP units are compatible with multiple refrigerants, the correct FCPS must be installed for proper operation of unit. Damage to unit could result.

For sizes 040-060:

1. The FCPS wires should be routed through bushing located in bottom of control box as shown in Fig. 24.
2. The FCPS1 and FCPS2 switches are wired in parallel into the control circuit as shown in Fig. 25. The VIO and PNK wires are wired together when shipped from the factory. The connectors should be removed and the FCPS wired in using wire nuts.

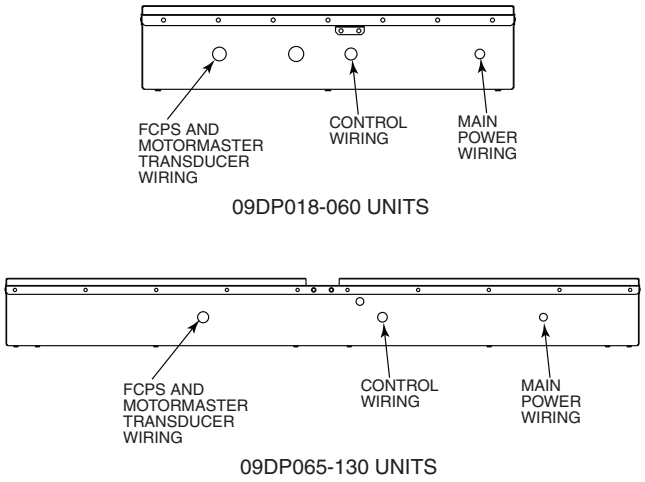


Fig. 24 — Control Box Entry Points

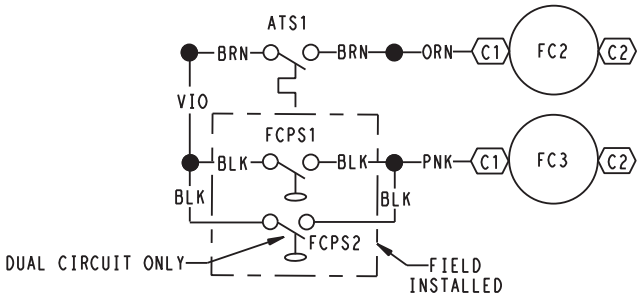


Fig. 25 — Fan Cycle Pressure Switch Wiring 09DP040-060 Units

For sizes 075-095:

1. The FCPS wires should be routed through bushing located in bottom of control box as shown in Fig. 24.
2. Remove the factory-supplied red jumper wire between terminals 3 and 4 of TB3.
3. The FCPS1 and FCPS2 switches are wired in Parallel into the control circuit as shown in Fig. 26. The VIO and ORN wires are wired together when shipped from the factory. The connectors should be removed and one end of the FCPS wired together with the RED and ORN wire using wire nuts and the other end connected to TB3 terminal 4.

For sizes 115-130:

1. The FCPS wires should be routed through bushing located in bottom of control box as shown in Fig. 24.
2. Remove the red jumper wire between terminals 3 and 4 of TB3 that is supplied from the factory. This is installed for test purposes only.
3. Disconnect the VIO and ORN FCPS1 and FCPS2 wires that are connected together when shipped from the factory.
4. Connect FCPS1 between to the violet wire labeled FCPS1 and TB3 terminal 4 per Fig. 27.
5. Connect FCPS2 between to the orange wire labeled FCPS2 and pink wire labeled FC4 coil per Fig. 27.

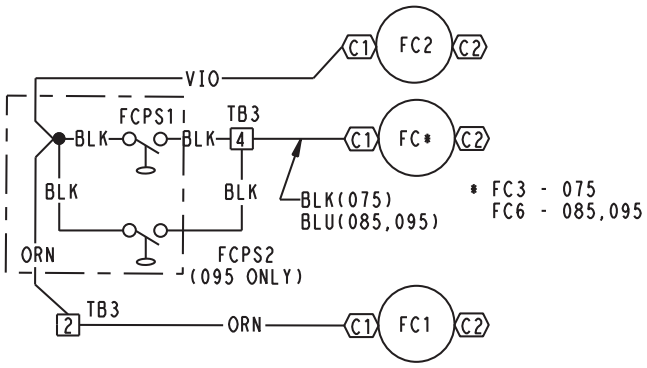


Fig. 26 — Fan Cycle Pressure Switch Wiring 09DP075-095 Units

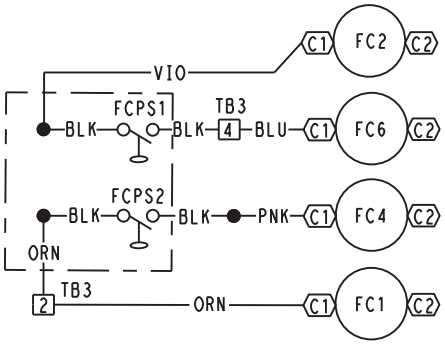


Fig. 27 — Fan Cycle Pressure Switch Wiring 09DP115,130 Units

Step 5 — Check Condenser Fans — Each fan is supported by a formed wire mount bolted to a fan deck and covered with a wire guard.

METAL FANS — The exposed end of fan motor shaft is protected from weather by grease and a rubber boot. If fan motor must be removed for service or replacement, be sure to re-grease fan shaft and reinstall fan guard. For proper performance, fan web should be 0.32 in. (8 mm) below top of orifice on the fan deck to top of the fan hub. (See Fig. 28.) Tighten set screws to 15 ± 1 ft-lb (20 ± 1.3 N-m). Figure 28 shows the proper position of mounted fan.

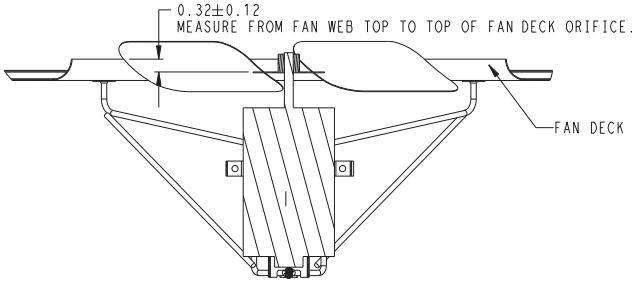


Fig. 28 — Mounted Fan Position

IMPORTANT: Check for proper fan rotation (clockwise when viewed from above). If necessary, switch any 2 power leads to reverse fan rotation.

LOW SOUND FAN — A shroud and a wire guard provide protection from the rotating fan. The exposed end of the fan motor shaft is protected from weather by grease. If fan motor must be removed for service or replacement, be sure to re-grease fan shaft and reinstall fan guard. The fan motor has a step in the motor shaft. For proper performance, fan should be

positioned such that it is securely seated on this step. Tighten the bolt to 15 ± 1 ft-lb (20 ± 1.3 N·m).

IMPORTANT: Check for proper fan rotation (counterclockwise when viewed from above). If necessary, switch any 2 power leads to reverse fan rotation.

Step 6 — Configure Optional Motormaster® V Controller — The optional or accessory Motormaster V controller uses a 0 to 5 vdc signal from a pressure transducer to control the speed of the fans controlled by the Motormaster control. The Motormaster V control is applied in 3 different applications on the 09DP product and must be configured for the proper refrigerant application.

SINGLE CIRCUIT APPLICATIONS (09DPS018-030) — One Motormaster control is used to control the speed of the motor attached to the Motormaster V control based on the signal from the liquid line transducer.

DUAL CIRCUIT APPLICATIONS (09DPM065-130) — There is one Motormaster control for each circuit and the speed output of each Motormaster control is controlled independently by the liquid line transducer reading for each circuit.

SINGLE CIRCUIT APPLICATIONS (09DPM065-130) — There are two Motormaster drives in the unit; one is the lead Motormaster control and the other is the follower Motormaster control. The units are shipped from the factory for independent Motormaster control. This application requires modification to the unit wiring during initial installation. This application MM-A controls the speed of both MM-A and MM-B based on the pressure transducer connected to MM-A.

Perform the following wiring modifications:

1. Remove the wiring to the Circuit B pressure transducer connected to terminals 2, 5 and 6 on the terminal board of the controller per Fig. 29.
2. The units are shipped with a package required for modifying the unit for single circuit application. The package is located in the bottom of the control box below the Motormaster controllers.
3. Install the wire between MM-A terminal 2 and MM-B terminal 2.
4. Install the wire with the resistor between MM-A terminal 30 and MM-B terminal 25.

MOTORMASTER V REFRIGERANT CONFIGURATION — The units are shipped from the factory for application with R-410A refrigerant. When applying on R-134a systems, a jumper must be installed between terminal 2 and 12 of MM-A and MM-B.

Once the controller is wired properly it is configured for the application and no other adjustments are required. If the drive does not function properly, the information in this book and in Tables 12 and 13 can be used to troubleshoot.

⚠ CAUTION

If input power has not been applied to the drive for a period of time exceeding three years (due to storage, etc.), the electrolytic DC bus capacitors within the drive can change internally, resulting in excessive leakage current. This can result in premature failure of the capacitors if the drive is operated after such a long period of inactivity or storage. In order to reform the capacitors and prepare the drive for operation after a long period of inactivity, apply input power to the drive for 8 hours prior to actually operating the motor. Before attempting to operate the drive, motor, and driven equipment, be sure all procedures pertaining to installation and wiring have been properly followed. Failure to comply could result in equipment damage.

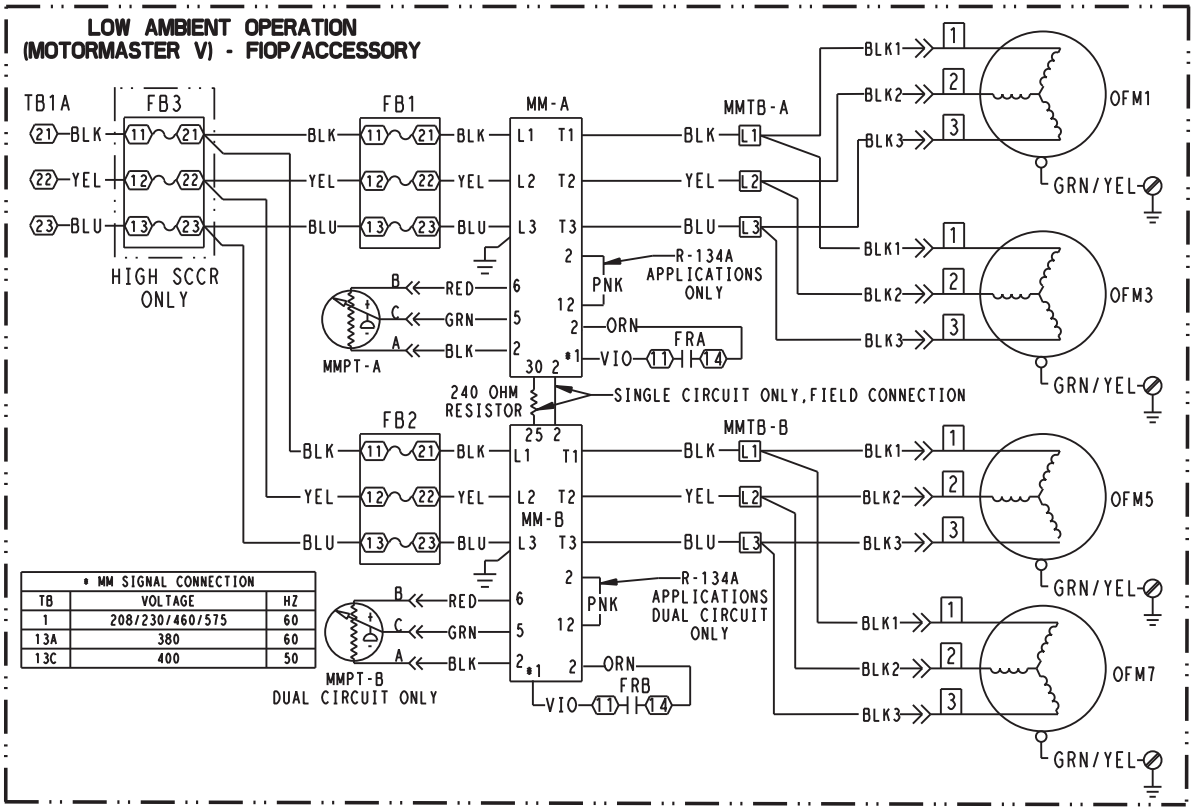


Fig. 29 — Motormaster V Wiring (09DP115,130 Units Shown)

Table 12 — Fault Codes

FAULT CODE	DESCRIPTION	SOLUTION
AF	High Temperature Fault: Ambient temperature is too high; Cooling fan has failed (if equipped).	Check cooling fan operation
CF	Control Fault: A blank EPM, or an EPM with corrupted data has been installed.	Perform a factory reset using Parameter 48 — PROGRAM SELECTION.
cF	Incompatibility Fault: An EPM with an incompatible parameter version has been installed.	Either remove the EPM or perform a factory reset (Parameter 48) to change the parameter version of the EPM to match the parameter version of the drive.
CL	CURRENT LIMIT: The output current has exceeded the CURRENT LIMIT setting (Parameter 25) and the drive is reducing the output frequency to reduce the output current. If the drive remains in CURRENT LIMIT too long, it can trip into a CURRENT OVERLOAD fault (PF).	Check for loose electrical connections. Check for faulty condenser fan motor. Check Parameter P25 from Table 13 is set correctly.
GF	Data Fault: User data and OEM defaults in the EPM are corrupted.	Restore factory defaults P48, see section above. If that does not work, replace EPM.
HF	High DC Bus Voltage Fault: Line voltage is too high; Deceleration rate is too fast; Overhauling load.	Check line voltage — set P01 appropriately
JF	Serial Fault: The watchdog timer has timed out, indicating that the serial link has been lost.	Check serial connection (computer) Check settings for PXX. Check settings in communication software to match PXX.
LF	Low DC Bus Voltage Fault: Line voltage is too low.	Check line voltage — set P01 appropriately
OF	Output Transistor Fault: Phase to phase or phase to ground short circuit on the output; Failed output transistor; Boost settings are too high; Acceleration rate is too fast.	Reduce boost or increase acceleration values. If unsuccessful, replace drive. Check for incorrect wiring T1, T2, T3.
PF	Current Overload Fault: VFD is undersized for the application; Mechanical problem with the driven equipment.	Check line voltage — set P01 appropriately Check for dirty coils Check for motor bearing failure
SF	Single-phase Fault: Single-phase input power has been applied to a three-phase drive.	Check input power phasing
F1	EPM Fault: The EPM is missing or damaged.	
F2-F9, Fo	Internal Faults: The control board has sensed a problem	Consult factory
Drive display = 60.0 even though it is cold outside and it should be running slower	Feedback signal is above set point	Check for proper set point Check liquid line pressure
Drive display = '---' even though drive should be running	Start jumper is missing	Replace start jumper. See section above
Drive display = 8.0 even though fan should be running faster	Feedback signal is below set point and fan is at minimum speed	Check for proper set point Check liquid line pressure
VFD flashes 57 and LCS	Feedback or speed signal lost. Drive will operate at 57 Hz until reset or loss of start command. Resetting requires cycling start command (or power).	In stand alone mode: Check transducer wiring and feedback voltage. Feedback voltage displayed on P-69. Pin 6 should be 5 v output. Pin 5 (feedback) should be somewhere between 0 and 5 v.

LEGEND

EPM — Electronic Programming Module

DRIVE PROGRAMMING

⚠ CAUTION

It is strongly recommended that the user NOT change any programming without consulting Carrier service personnel. Unit damage may occur from improper programming.

To enter password and change program values:

1. Press **Mode.**
2. Upper right decimal point blinks.
3. Display reads "00". To enter the PROGRAM mode to access the parameters, press the **Mode** button. This will activate the PASSWORD prompt (if the password has not been disabled). The display will read "00" and the upper right-hand decimal point will be blinking. (See Fig. 30.)
4. Use the ▲ and ▼ buttons to scroll to the password value (the factory default password is "111") and press the **Mode** button. Once the correct password value is entered, the display will read "P01", which indicates that the PROGRAM mode has been accessed at the beginning of the parameter menu (P01 is the first parameter).

NOTE: If the display flashes "Er", the password was incorrect, and the process to enter the password must be repeated.

5. Press **Mode** to display present parameter number. Upper right decimal point blinks.

   Use the ▲ and ▼ buttons to scroll to the desired parameter number.

Once the desired parameter number is found, press the **Mode** button to display the present parameter setting. The upper right-hand decimal point will begin blinking, indicating that the present parameter setting is being displayed, and that it can be changed by using the up and down buttons. Use ▲ and ▼ to change setting. Press **Mode** to store new setting.

Pressing the **Mode** will store the new setting and also exit the PROGRAM mode. To change another parameter, press the **Mode** key again to re-enter the PROGRAM mode (the parameter menu will be accessed at the parameter that was last viewed or changed before exiting). If the **Mode** key is pressed within two minutes of exiting the PROGRAM mode, the password is not required to access the parameters. After two minutes, the password must be entered in order to access the parameters again.

To change password: first enter the current password then change parameter P44 to the desired password.

To disable automatic control mode and enter manual speed control mode:

1. Change P05 to '01- keypad'.
2. Push UP and DOWN arrow key to set manual speed.
3. Set P05 to '04 - 4-20mA control' to restore 4 to 20 mA control.

Fault Codes — The drive is programmed to automatically restart after a fault and will attempt to restart three times after a fault (the drive will not restart after CF, cF, GF, F1, F2-F9, or Fo faults). If all three restart attempts are unsuccessful, the drive will trip into FAULT LOCKOUT (LC), which requires a manual reset.

MANUAL RESET — If the fault condition has been removed, cycle power to the Motormaster to reset the drive.

TROUBLESHOOTING — Troubleshooting the Motormaster V control requires a combination of observing system operation and VFD (variable frequency drive) information. Refer to Fig. 29 for the low ambient wiring diagram. The drive provides 2 kinds of troubleshooting modes: a status matrix using the 3-digit display (P57, P58) and real time monitoring of key inputs and outputs. The collective group is displayed through parameters 50 to 71 and all values are read-only. The key read-only outputs are:

- P50: FAULT HISTORY - This displays the last 8 faults.
- P51 : SOFTWARE VERSION - This displays the Software version number.
- P52: DC BUS VOLTAGE - This displays the DC bus voltage in percent of nominal. It is usually rated input voltage x 1.4.
- P53: MOTOR VOLTAGE - This displays the motor voltage in percent of rated output voltage.
- P54: LOAD - This displays the motor load in percent of the drive's rated output current rating.
- P55: VDC INPUT - This displays the VDC input in percent of maximum input. A display of 100 will indicate full scale, which is 5 v.
- P56: 4-20 mA INPUT - This displays the 4 to 20 mA input in percent of maximum input. A value of 20% = 4 mA and a value of 100% = 20 mA.

Refer to Tables 12 and 13 for more troubleshooting information.

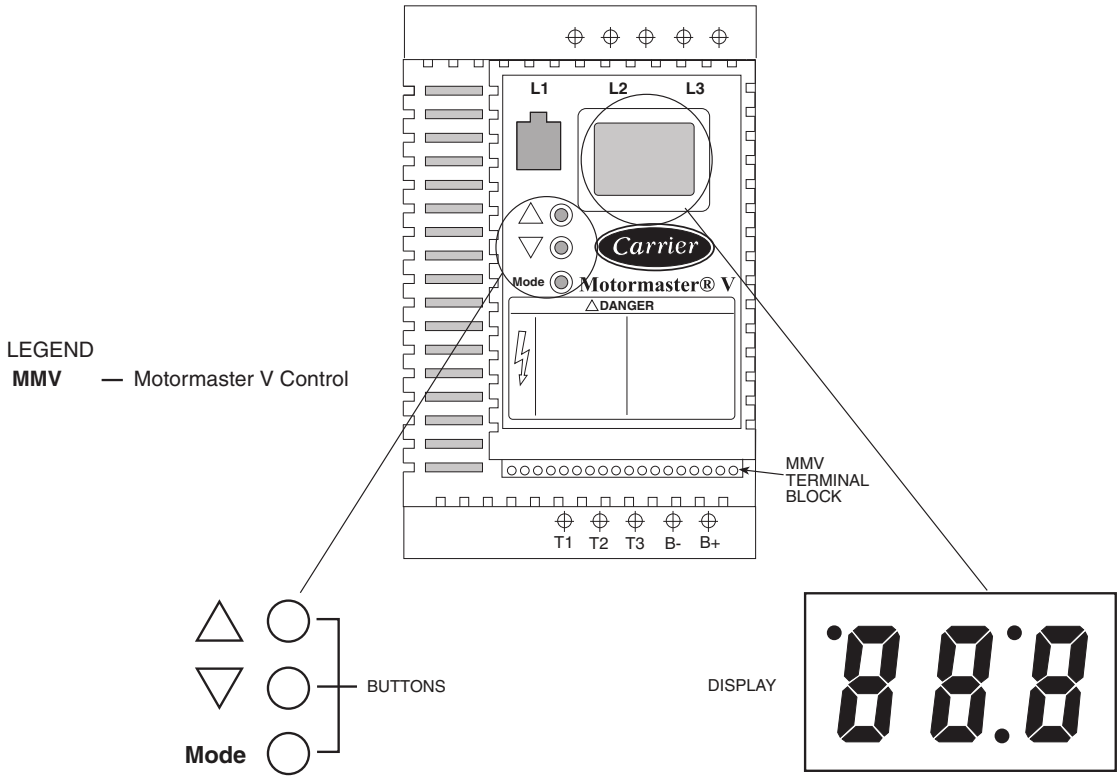


Fig. 30 — Motormaster® V Mode Buttons and Mode Display

Table 13 — Motormaster® V Program Parameters for Operating Modes

CODE	DESCRIPTION	MODE 1	MODE 2	MODE 3	MODE 4	MODE 5	MODE 6	MODE 7	MODE 8	MODE 9	MODE 10	MODE 11	MODE 12
P01	Line Voltage: 01 = low line, 02 = high line	01	02	01	02	01	02	01	02	01	02	01	02
P02	Carrier Freq: 01 = 4 kHz, 02 = 6 kHz, 03=8 kHz	01	01	01	01	01	01	01	01	01	01	01	01
P03	Startup mode: flying restart	06	06	06	06	06	06	06	06	06	06	06	06
P04	Stop mode: coast to stop	01	01	01	01	01	01	01	01	01	01	01	01
P05	Standard Speed source: 01= keypad, 04=4-20mA (NO PI), 05= R410A, 06=R134a	05	05	05	05	04	04	04	04	06	06	06	06
P06	TB-14 output: 01 = none	01	01	01	01	01	01	01	01	01	01	01	01
P08	TB-30 output: 01 = none	01	01	01	01	01	01	01	01	01	01	01	01
P09	TB-31 Output: 01 = none	01	01	01	01	01	01	01	01	01	01	01	01
P10	TB-13A function sel: 01 = none	01	01	01	01	01	01	01	01	01	01	01	01
P11	TB-13B function sel: 01 = none	01	01	01	01	01	01	01	01	01	01	01	01
P12	TB-13C function sel: 01 = none	01	01	01	01	01	01	01	01	01	01	01	01
P13	TB-15 output: 01 = none	01	01	01	01	01	01	01	01	01	01	01	01
P14	Control: 01 = Terminal strip	01	01	01	01	01	01	01	01	01	01	01	01
P15	Serial link: 02 = enabled 9600,8,N,2 with timer	02	02	02	02	02	02	02	02	02	02	02	02
P16	Units editing: 02 = whole units	02	02	02	02	02	02	02	02	02	02	02	02
P17	Rotation: 01 = forward only, 03 = reverse only	01	01	01	01	01	01	01	01	01	01	01	01
P19	Acceleration time: 10 sec	10	10	10	10	10	10	10	10	10	10	10	10
P20	Deceleration time: 10 sec	10	10	10	10	10	10	10	10	10	10	10	10
P21	DC brake time: 0	0	0	0	0	0	0	0	0	0	0	0	0
P22	DC BRAKE VOLTAGE 0%	0	0	0	0	0	0	0	0	0	0	0	0
P23	Min freq = 8 Hz ~ 100 – 160 rpm	8	8	8	8	8	8	8	8	8	8	8	8
P24	Max freq	60	60	50	50	60	60	50	50	60	60	50	50
P25	Current limit: (%)	125	110	125	110	125	110	125	110	125	110	125	110
P26	Motor overload: 100	100	100	100	100	100	100	100	100	100	100	100	100
P27	Base freq: 60 or 50 Hz	60	60	50	50	60	60	50	50	60	60	50	50
P28	Fixed boost: 0.5% at low frequencies	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
P29	Accel boost: 0%	0	0	0	0	0	0	0	0	0	0	0	0
P30	Slip compensation: 0%	0	0	0	0	0	0	0	0	0	0	0	0
P31	Preset spd #1: speed if loss of control signal	57	57	47	47	57	57	47	47	57	57	47	47
P32	Preset spd #2: 0	0	0	0	0	0	0	0	0	0	0	0	0
P33	Preset spd #3: 0	0	0	0	0	0	0	0	0	0	0	0	0
P34	Preset spd 4 default — R410A setpoint. TB12-2 open	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0
P35	Preset spd 5 default — R134a setpoint. TB12-2 closed	12.6	12.6	12.6	12.6	12.6	12.6	12.6	12.6	12.6	12.6	12.6	12.6
P36	Preset spd 6 default	0	0	0	0	0	0	0	0	0	0	0	0
P37	Preset spd 7 default	0	0	0	0	0	0	0	0	0	0	0	0
P38	Skip bandwidth	0	0	0	0	0	0	0	0	0	0	0	0
P39	Speed scaling	0	0	0	0	0	0	0	0	0	0	0	0
P40	Frequency scaling 50 or 60 Hz	60	60	50	50	60	60	50	50	60	60	50	50
P41	Load scaling: default (not used so NA)	200	200	200	200	200	200	200	200	200	200	200	200
P42	Accel/decel #2: default (not used so NA)	60	60	60	60	60	60	60	60	60	60	60	60
P43	Serial address	1	1	1	1	1	1	1	1	1	1	1	1
P44	Password:111	111	111	111	111	111	111	111	111	111	111	111	111
P45	Speed at min signal: 8 Hz; used when PID mode is disabled and 4-20mA input is at 4 mA	8	8	8	8	8	8	8	8	8	8	8	8
P46	Speed at max feedback: 60 or 50 Hz. Used when PID disabled and 4-20mA input is at 20 mA	60	60	50	50	60	60	50	50	60	60	50	50
P47	Clear history? 01 = maintain. (set to 02 to clear)	01	01	01	01	01	01	01	01	01	01	01	01
P48	Program selection: Program 1 – 12	01	02	03	04	05	06	07	08	09	10	11	12
P61	PI Mode: 05= reverse, 0-5V, 01 = no PID	05	05	05	05	01	01	01	01	05	05	05	05
P62	Min feedback = 0 (0V *10)	0	0	0	0	0	0	0	0	0	0	0	0
P63	Max feedback = 50 (5V * 10)	50	50	50	50	50	50	50	50	50	50	50	50
P64	Proportional gain = 4%	4	4	4	4	4	4	4	4	4	4	4	4
P65	Integral gain = .2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
P66	PI acell/decel (setpoint change filter) = 5	5	5	5	5	5	5	5	5	5	5	5	5
P67	Min alarm	0	0	0	0	0	0	0	0	0	0	0	0
P68	Max alarm	0	0	0	0	0	0	0	0	0	0	0	0

LEGEND

NA — Not Applicable
PID — Proportional Integral Derivative
TB — Terminal Block

Step 7 — Install Accessories

LOW-AMBIENT OPERATION — If operating temperatures below those found in Tables 14 and 15 are expected, Motormaster® V fan motor control is recommended.

MISCELLANEOUS ACCESSORIES — Energy management module, Navigator™ display, remote enhanced display, Touch Pilot™ display, BACnet* translator control, LON (local operating network) translator control, and long line accessory kit are available for special applications.

*Sponsored by ASHRAE (American Society of Heating, Refrigerating and Air Conditioning Engineers).

Table 14 — Minimum Outdoor-Air Operating Temperature — English

UNIT 09DP	TD	MINIMUM AMBIENT (F) WITHOUT MOTORMASTER CONTROL			
		100% Capacity	75% Capacity	50% Capacity	25% Capacity
018	30	58	62	62	64
	25	63	66	65	66
	20	67	70	68	68
020	30	44	51	54	59
	25	51	58	58	62
	20	58	63	64	66
030	30	27	38	45	54
	25	37	47	51	58
	20	47	55	58	63
035	30	41	48	50	58
	25	47	53	55	60
	20	53	59	60	63
040	30	32	41	45	55
	25	39	47	50	57
	20	46	53	56	61
050	30	20	35	45	52
	25	25	42	50	56
	20	31	50	56	60
060	30	20	30	45	50
	25	25	37	50	54
	20	31	47	56	58
065	30	19	32	41	51
	25	30	42	47	56
	20	42	51	55	62
075	30	24	36	43	53
	25	35	45	50	57
	20	45	54	57	63
085	30	16	29	39	50
	25	28	40	46	55
	20	39	49	54	61
095	30	15	26	37	49
	25	25	38	44	54
	20	37	48	53	61
115	30	15	24	35	48
	25	22	36	43	54
	20	35	46	52	60
130	30	15	25	36	49
	25	23	36	43	54
	20	36	47	52	60

LEGEND

TD — Temperature Difference (F)

NOTES:
1. Based on 80 F condensing temperature at 100% and 75% capacity and a 75 F condensing temperature at 50% and 25% capacity.
2. Unit sizes 035 to 130 are based on dual circuit operation. Dual circuit low ambient option should be based on circuit with lowest TD.
3. Operation below minimum ambient temperatures listed will require Motormaster® control.

Table 15 — Minimum Outdoor-Air Operating Temperature — SI

UNIT 09DP	TD	MINIMUM AMBIENT (C) WITHOUT MOTORMASTER CONTROL			
		100% Capacity	75% Capacity	50% Capacity	25% Capacity
018	16.6	14.2	16.7	16.6	17.6
	13.9	16.9	19.1	18.2	18.7
	11.1	19.7	21.3	20.1	20.1
020	16.6	6.4	10.6	12.3	15.1
	13.9	10.5	14.2	14.7	16.8
	11.1	14.5	17.4	17.5	18.8
030	16.6	-2.8	3.3	7.2	12.2
	13.9	2.8	8.3	10.6	14.4
	11.1	8.3	12.8	14.4	17.2
035	16.6	5.0	8.9	10.2	14.2
	13.9	8.2	11.8	12.7	15.5
	11.1	11.6	14.8	15.4	17.1
040	16.6	0.1	4.9	7.2	12.5
	13.9	3.8	8.4	10.2	14.1
	11.1	7.9	11.9	13.4	16.0
050	16.6	-6.7	1.7	7.2	11.1
	13.9	-3.9	5.6	10.0	13.3
	11.1	-0.6	10.0	13.3	15.6
060	16.6	-6.7	-1.1	7.2	10.0
	13.9	-3.9	2.8	10.0	12.2
	11.1	-0.6	8.3	13.3	14.4
065	16.6	-7.3	-0.2	4.7	10.8
	13.9	-1.0	5.5	8.5	13.3
	11.1	5.3	10.5	12.9	16.5
075	16.6	-4.4	2.1	6.3	11.7
	13.9	1.4	7.3	9.8	14.0
	11.1	7.3	12.0	13.9	17.0
085	16.6	-9.0	-1.6	3.8	10.2
	13.9	-2.4	4.4	7.7	12.9
	11.1	4.2	9.6	12.4	16.2
095	16.6	-9.4	-3.1	2.7	9.6
	13.9	-4.0	3.2	6.9	12.4
	11.1	2.9	8.7	11.7	15.9
115	16.6	-9.4	-4.3	1.9	9.1
	13.9	-5.3	2.2	6.2	12.0
	11.1	1.9	7.9	11.2	15.6
130	16.6	-9.4	-3.9	2.1	9.3
	13.9	-5.0	2.5	6.4	12.1
	11.1	2.2	8.1	11.4	15.7

LEGEND

TD — Temperature Difference (C)

NOTES:

1. Based on 26.7 C condensing temperature at 100% and 75% capacity and a 23.9 C condensing temperature at 50% and 25% capacity.
2. Unit sizes 035 to 130 are based on dual circuit operation. Dual circuit low ambient option should be based on circuit with lowest TD.
3. Operation below minimum ambient temperatures listed will require Motormaster® control.

START-UP

System Evacuation and Dehydration — Refer to GTAC II (General Training Air Conditioning), Module 4, "Dehydration for Proper Evacuation and Dehydration Techniques."

Preliminary Charge — Refer to GTAC II, Module 5, Charging, Recovery, Recycling, and Reclamation for charging procedures. Using the liquid charging method and charging by weight procedure, charge each circuit with the amount of refrigerant (R-410A or R-134a depending on unit configuration) listed in Table 16.

Adjust Refrigerant Charge

⚠CAUTION

Never charge liquid into the low pressure side of system. Do not overcharge. During charging or removal of refrigeration, be sure indoor fan system is operating. Failure to comply could result in personal injury or equipment damage.

⚠CAUTION

Charging procedures for MCHX (microchannel heat exchanger) units require very accurate measurement techniques. Charge should be added in small increments. Using cooling charging charts provided, add or remove refrigerant until conditions of the chart are met. As conditions get close to the point on the chart, add or remove charge in 1/4 lb (100 gram) increments until complete. Ensure that all fans are on and all compressors are running when using charging charts. Failure to comply may result in equipment damage.

Table 16 — Preliminary Refrigerant Charge, lb (kg)

UNIT SIZE	R-410A		R-134a	
	Circuit A	Circuit B	Circuit A	Circuit B
09DPS018	9.6	—	11.1	—
09DPS020	12.0	—	13.9	—
09DPS030	12.0	—	13.9	—
09DPM035	12.0	12.0	13.9	13.9
09DPM040	12.0	12.0	13.9	13.9
09DPM050	12.0	12.0	13.9	13.9
09DPM060	12.0	12.0	13.9	13.9
09DPM065	17.6	17.6	20.3	20.3
09DPM075	26.4	17.6	30.5	20.3
09DPM085	31.7	21.1	36.6	24.4
09DPM095	26.4	26.4	30.5	30.5
09DPM115	35.2	26.4	40.6	30.5
09DPM130	44.0	26.4	50.8	30.5

NOTES:
1. Preliminary charge does not take into account interconnecting piping between indoor and outdoor units.
2. For liquid line piping longer than 25 ft (7.6 m) with R-410A refrigerant, use the following information:
   1/2 in. (12.7 mm) liquid line — 0.6 lb per 10 linear ft (0.27 kg per 3 m)
   5/8 in. (15.9 mm) liquid line — 1.0 lb per 10 linear ft (0.45 kg per 3 m)
   7/8 in. (22.2 mm) liquid line — 2.0 lb per 10 linear ft (0.91 kg per 3 m)
   1 1/8 in. (28.6 mm) liquid line — 3.5 lb per 10 linear ft (1.59 kg per 3 m)
3. For liquid line piping longer than 25 ft (7.6 m) with R-134a refrigerant, use the following information:
   1/2 in. (12.7 mm) liquid line — 0.7 lb per 10 linear ft (0.32 kg per 3 m)
   5/8 in. (15.9 mm) liquid line — 1.2 lb per 10 linear ft (0.53 kg per 3 m)
   7/8 in. (22.2 mm) liquid line — 2.4 lb per 10 linear ft (1.06 kg per 3 m)
   1 1/8 in. (28.6 mm) liquid line — 4.1 lb per 10 linear ft (1.80 kg per 3 m)

Due to the compact design of microchannel heat exchangers, refrigerant charge is reduced significantly. As a result, charging procedures for MCHX units require very accurate measurement techniques. Charge should be added in small increments. Add or remove refrigerant until conditions are met. As conditions get close to the desired point, add or remove charge in 1/4 lb (100 gram) increments until complete. Ensure that all fans are on and all compressors are running when charging. If charging at low outdoor ambient, the condenser coil can be partially blocked in order to increase head pressure.

With all fans operating and all compressors on the circuit being serviced operating at full capacity, adjust the refrigerant charge to obtain desired subcooling. Charge vapor into compressor low-side service port. Measure pressure at the liquid line port, making sure a Schrader depressor is used. Also, measure liquid line temperature as close to the liquid service port as possible.

If the sight glass is cloudy, check refrigerant charge again. Ensure all fans and compressors on the circuit being serviced are operating. Also ensure maximum allowable liquid lift has not been exceeded. If the sight glass is cloudy, a restriction could exist in the liquid line. Check for a plugged filter drier or partially open solenoid valve. Replace or repair, as needed.

Head Pressure Control — The head pressure control reduces condensing capacity under low ambient temperature conditions.

FAN CYCLING — The 09DP units are shipped from the factory equipped to work down to ambient temperatures listed in Tables 14 and 15. This is accomplished by cycling condenser fans based on ambient temperature switch (ATS) and fan cycling pressure switches. The ATS opens at approximately 60 F and closes at approximately 65 F. The ATS is located below the control box behind the front access panel on the 020-060 and at the bottom of the control box on the 065-130 unit sizes.

The 040-060 and 075-130 size units need fan cycling pressure switches (FCPS) installed. The units are shipped from the factory with switches for use with R-410A. The switches are set to open at 289 psig (1993 kPa) and close at 445 psig (3068 kPa). The 30HXA units which are designed for use with R-134a are shipped from the factory with FCPS to be used with the 09DP units. The R-134a switch open point is 97 psig (669 kPa) and close point is 185 psig (1275 kPa).

Fan contactor and fan motor operation is shown in Tables 17 and 18.

LIQUID LINE PRESSURE SET POINT ADJUSTMENT — Adjusting the set point may be necessary to avoid interaction with other head pressure control devices. If adjustment is necessary, use the set point parameter found in P34 for R-410A or P35 for R-134a. A lower value will result in a lower liquid line set point. As an example for R-410A, decreasing the P34 from 24 to 23 will decrease the liquid line pressure by approximately 15 psig (103 kPa). As an example for R-134a, decreasing the P35 from 12.6 to 11.6 will decrease the liquid line pressure by approximately 15 psig (103 kPa). It is recommended to adjust P34 for R-410A units by 1 and P35 for R-134a units by 0.5 increments.

Table 17 — Fan Control without Motormaster® V Control

09DP UNIT SIZE	CR1		CR2		ATS		FCPSA		FCPSB	
	FC	FM	FC	FM	FC	FM	FC	FM	FC	FM
018	FC1	OFM1	—	—	—	—	—	—	—	—
020-030	FC1	OFM1	—	—	FC2	OFM2	—	—	—	—
035	FC1	OFM3	FC1	OFM3	FC2	OFM1	—	—	—	—
040	FC1	OFM3	FC1	OFM3	FC2	OFM1	FC3	OFM2	FC3	OFM2
050,060	FC1	OFM3	FC1	OFM3	FC2	OFM1	FC3	OFM4, OFM2	FC3	OFM4, OFM2
065	FC2	OFM1	FC1	OFM5	FC6/FC5	OFM2/OFM4	—	—	—	—
075	FC2	OFM1	FC1	OFM5	FC6/FC5	OFM2/OFM6	FC3	OFM3	—	—
085	FC2	OFM1	FC1	OFM5	FC3/FC5	OFM2/OFM3	FC6	OFM4	FC6	OFM4
095	FC2	OFM1	FC1	OFM5	FC3/FC5	OFM2/OFM6	FC6	OFM4	FC6	OFM4
115	FC2	OFM1	FC1	OFM5	FC5/FC3	OFM4/OFM8	FC6	OFM2, OFM3	FC4	OFM7
130	FC2	OFM1	FC1	OFM5	FC5/FC3	OFM4/OFM8	FC6	OFM2, OFM3, OFM6	FC4	OFM7

LEGEND

ATS — Ambient Temperature Switch
CR — Control Relay
FC — Fan Contactor
FCPS — Fan Cycling Pressure Switch
FM — Fan Motor
OFM — Outdoor Fan Motor

Table 18 — Fan Control with Motormaster V Control

09DP UNIT SIZE	CR1		CR2		ATS		FCPSA		FCPSB	
	RC	MMA	RC	MMB	FC	FM	FC	FM	FC	FM
018	FRA	OFM1	—	—	—	—	—	—	—	—
020-030	FRA	OFM1	—	—	FC2	OFM2	—	—	—	—
035	FRA	OFM3	FRA	—	FC2	OFM1	—	—	—	—
040	FRA	OFM3	FRA	—	FC2	OFM1	FC3	OFM2	FC3	OFM2
050,060	FRA	OFM3	FRA	—	FC2	OFM1	FC3	OFM4, OFM2	FC3	OFM4, OFM2
065	FRA	OFM1	MMB	OFM5	FC6/FC5	OFM2/OFM4	—	—	—	—
075	FRA	OFM1, OFM3	MMB	OFM5	FC6/FC5	OFM2/OFM6	—	—	—	—
085	FRA	OFM1, OFM3	MMB	OFM5	FC3/FC5	OFM2/OFM3	FC6	OFM4	FC6	OFM4
095	FRA	OFM1, OFM3	MMB	OFM5	FC3/FC5	OFM2/OFM6	FC6	OFM4	FC6	OFM4
115	FRA	OFM1, OFM3	MMB	OFM5, OFM7	FC5/FC3	OFM4/OFM8	FC6	OFM2	FC4	—
130	FRA	OFM1, OFM3	MMB	OFM5, OFM7	FC5/FC3	OFM4/OFM8	FC6	OFM2, OFM6	FC4	—

LEGEND

ATS — Ambient Temperature Switch
CR — Control Relay
FC — Fan Contactor
FCPS — Fan Cycling Pressure Switch
FM — Fan Motor
FR — Fan Relay
MM — Motormaster
OFM — Outdoor Fan Motor
RC — Relay Control

MAINTENANCE

Recommended Maintenance Schedule — The following are only recommended guidelines. Jobsite conditions may dictate that maintenance schedule is performed more often than recommended.

Every month:

- Check condenser coils for debris, clean as necessary.

Every 3 months:

- Check all refrigerant joints and valves for refrigerant leaks, repair as necessary.
- Check condenser coils for debris.
- Check all condenser fans for proper operation.

Every 12 months:

- Check all electrical connections, tighten as necessary.
- Inspect all contactors and relays, replace as necessary.
- Check condition of condenser fan blades and ensure they are securely fastened to the motor shaft.

Microchannel Heat Exchanger (MCHX) Condenser Coil Maintenance and Cleaning Recommendations

⚠ CAUTION

Do not apply any chemical cleaners to MCHX condenser coils. These cleaners can accelerate corrosion and damage the coil.

Routine cleaning of coil surfaces is essential to maintain proper operation of the unit. Elimination of contamination and removal of harmful residues will greatly increase the life of the coil and extend the life of the unit. The following steps should be taken to clean MCHX condenser coils:

1. Remove any foreign objects or debris attached to the coreface or trapped within the mounting frame and brackets.
2. Put on personal protective equipment including safety-glasses and/or face shield, waterproof clothing and gloves. It is recommended to use full coverage clothing.
3. Start high pressure water sprayer and purge any soap or industrial cleaners from sprayer before cleaning condenser coils. Only clean, potable water is authorized for cleaning condenser coils.
4. Clean condenser face by spraying the core steady and uniformly from top to bottom while directing the spray straight toward the core. Do not exceed 900 psig or 30 degree angle. The nozzle must be at least 12 in. from the core face. Reduce pressure and use caution to prevent damage to air centers.

⚠ CAUTION

Excessive water pressure will fracture the braze between air centers and refrigerant tubes.

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