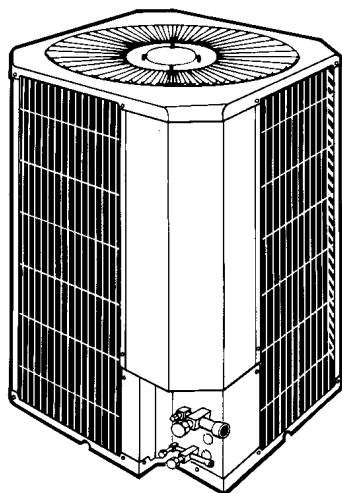


MODELS H*DB012 THRU H*DB060 (Canadian Models Included)

035-10870



GENERAL

This instruction covers the installation of the following outdoor units:

H1DB012(A,S)06
 H1DB018(A,S)06
 H1DB024(A,S)06
 H1DB030(A,S)06
 H1DB036(A,S)06
 H1DB042(A,S)06
 H1DB048(A,S)06
 H1DB060(A,S)06

The outdoor units are designed to be connected to a matching evaporator with quick or sweat connect lines. Quick connect units are factory charged with refrigerant for most sold matching evaporator and factory charged line sets are available in various lengths. Sweat connect units are factory charged with refrigerant for most sold matching evaporator plus 15 feet of field supplied lines.

Matching evaporators contain an orifice liquid feed sized for the most common usage. The orifice size and/or refrigerant charge may need to be changed for some indoor-outdoor unit combinations, elevation differences or total line lengths.

INSPECTION

As soon as a unit is received, it should be inspected for possible damage during transit. If damage is evident, the extent of the damage should be noted on the carrier's freight bill. A separate request for inspection by the carrier's agent should be made in writing. See Form 50.15-NM for more information.

REFERENCE

Use this instruction in conjunction with the instruction for the appropriate indoor unit, air moving system and accessories.

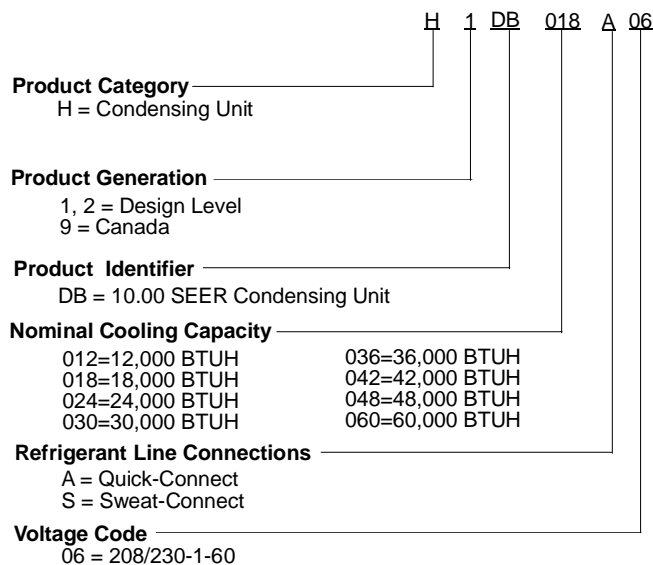
Installer should pay particular attention to the words:NOTE, CAUTION and WARNING.

NOTES are intended to clarify or make the installation easier. CAUTIONS identifies procedure which, if not followed carefully,

could result in personal injury, property damage or product damage.

WARNINGS are given to alert the installer that severe personal injury, death or equipment damage may result if installation procedures are not handled properly.

NOMENCLATURE



LIMITATIONS

The unit should be installed in accordance with all national and local safety codes.

Limitations for the indoor unit, coil and appropriate accessories must also be observed.

The outdoor unit must not be installed with any ductwork in the air stream. The outdoor fan is the propeller type and is not designed to operate against any additional external static pressure.

CAUTION: Use a field supplied crankcase heater on 1 - 2.5 ton units when line set is over 50 ft.

The unit should not be operated at temperatures below 45°F.

LOCATION

Before starting the installation, select and check the suitability of the location for both the indoor and outdoor unit. Observe all limitations and clearance requirements.

The outdoor unit must have sufficient clearance for air entrance to the condenser coil, for air discharge and for service access. See Figure 1.

If the unit is to be installed on a hot sun exposed roof or a black-topped ground area, the unit should be raised sufficiently above the roof or ground to avoid taking the accumulated layer of hot air into the outdoor unit.

Provide an adequate structural support.

The unit may be installed at ground level on a solid base that will not shift or settle, causing strain on the refrigerant lines and possible leaks. Maintain the clearances shown below and install the unit in a level position. Isolate the base from the structure to avoid noise or vibration transmission.

When installing units on a roof, the structure must be capable of supporting the total weight of the unit, including a pad, lintels, rails, etc., which should be used to minimize the transmission of sound or vibration into the conditioned space.

Isolate the unit from rain gutters to avoid any possible wash out of the foundation.

Normal operating sound levels may be objectionable if the unit is placed directly under windows of certain rooms (bedrooms, study, etc.).

TABLE 1 - PHYSICAL AND ELECTRICAL DATA

MODELS H1DB...		012	018	024	030	036	042	048	060
UNIT SUPPLY VOLTAGE		208/230-1-60							
NORMAL VOLTAGE RANGE ¹		187 to 252							
MIN. CIRCUIT AMPACITY		10.8	13.0	16.0	17.7	23.2	27.2	30.3	37.2
MAX. OVERCURRENT DEVICE AMPS ²		15	20	25	25	35	40	45	50
COMPRESSOR AMPS	RATED LOAD	8.0	9.7	12.1	13.5	17.3	20.5	23.0	28.5
	LOCKED ROTOR	35.0	54.0	57.0	68.0	94.0	120	105	169
CRANKCASE HEATER		NO	NO	NO	NO	YES	YES	YES	NO
FAN MOTOR AMPS	RATED LOAD	0.8	0.8	0.8	0.8	1.6	1.6	1.6	1.6
	LOCKED ROTOR	1.7	1.7	1.7	1.7	3.8	3.8	3.8	3.5
MIN. FIELD WIRE SIZE AWG 60°C COPPER CONDUCTORS		14	12	12	10	10	10	10	6
MAX. WIRE LENGTH FEET BASED ON 3% VOLTAGE DROP	208V	90	115	95	140	105	135	125	115
	230V	100	130	105	155	120	150	140	130
FAN DIAMETER INCHES		18	18	18	18	18	18	18	24
FAN MOTOR	RATED HP	1/8	1/8	1/8	1/8	1/4	1/4	1/4	1/4
	NOMINAL RPM	1075	1075	1075	1075	1075	1075	1075	850
	NOMINAL CFM	1950	1950	1950	1950	2350	2200	2150	3000
COIL	FACE AREA SQ. FT.	9.4	9.4	11.3	11.3	11.3	14.1	17.0	20.0
	ROWS DEEP	1	1	1	1	1	1	1	1
	FIN / INCH	16	16	18	20	20	18	20	18
LIQUID LINE OD		3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8
VAPOR LINE OD		5/8	5/8	5/8	3/4	3/4	7/8	7/8	7/8
OPERATING WEIGHT LBS.		120	124	134	135	140	155	175	210

¹ Utilization range "A" in accordance with ARI standard 110.

² Dual element fuses or HACR circuit breaker.

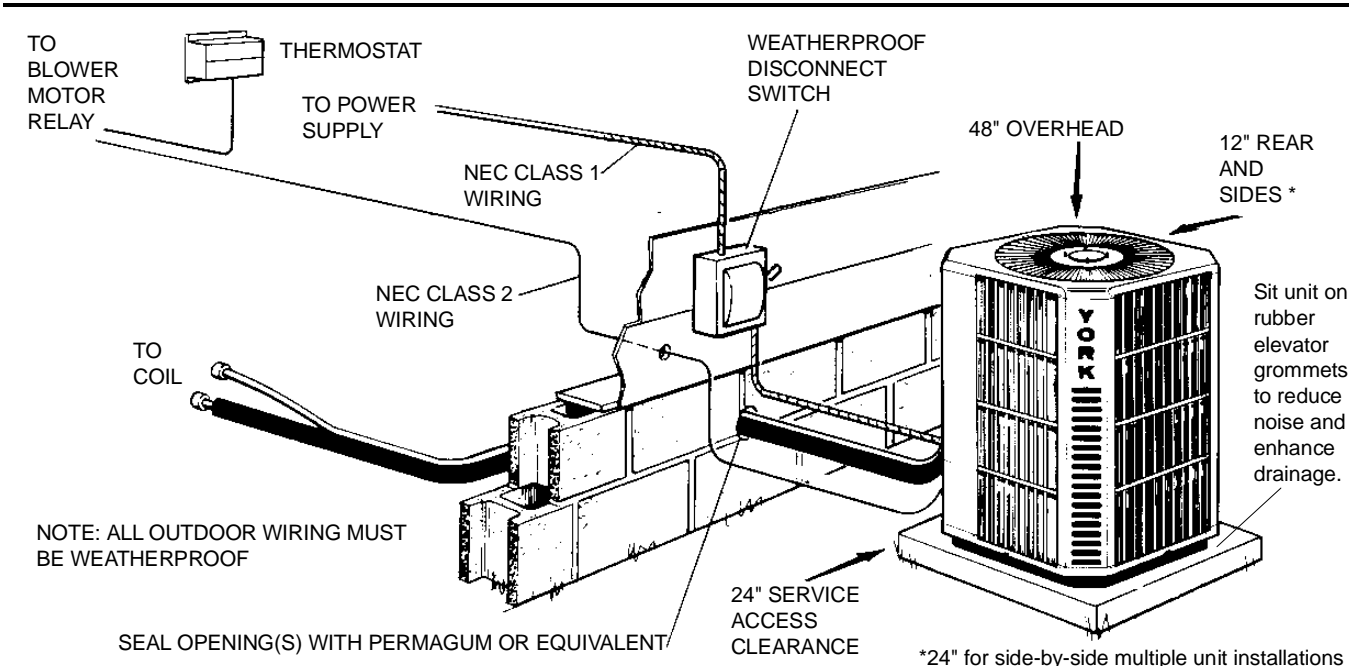


FIGURE 1- TYPICAL INSTALLATION

INSTALLATION PROCEDURES

The following sequence of installation steps is suggested.

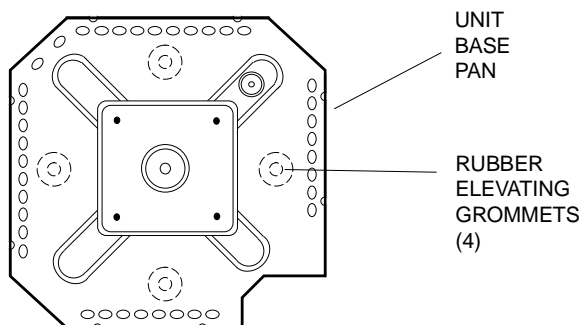
1. Inspect unit and set in place.
2. Check orifice size and replace with correct size if necessary.
3. Route / install the vapor and liquid lines.
4. Connect line and leak test. Evacuate if necessary.
5. Charge system.
6. Make electrical power connections.
7. Make electrical control connections.
8. Instruct owner and operate unit.

UNIT PLACEMENT

1. Provide a base in the pre-determined location.
2. Remove the shipping carton and inspect for possible damage.

CAUTION: Some units may have a shipping strap. It must be removed before the unit is started up.

3. Position the unit on the base provided.
4. To reduce noise and to enhance drainage, sit unit on (4) rubber elevating grommets provided in bulk packed accessory kit model number 1SG0601. Grommets should be positioned as shown in Figure 2.
5. Make a hole(s) in the structure wall large enough to accommodate the insulated vapor line, the liquid line and the wiring.



Note: Do Not block drainage holes with grommets.

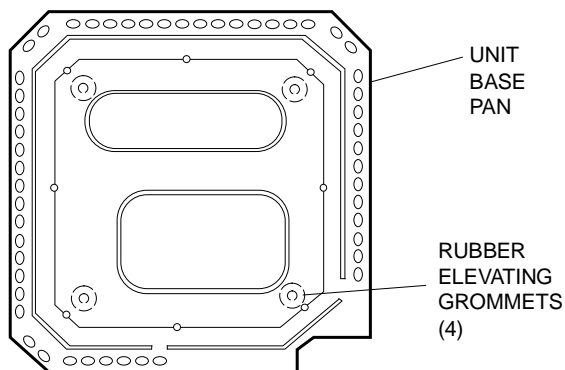


FIGURE 2- POSITIONING GROMMETS

ORIFICE SELECTION

NOTE: The proper orifice must be installed in the evaporator coil liquid connection prior to the connection of the refrigerant lines.

WARNING: Coil (whether sweat or quick connect) is under 15 PSIG pressure. Use safety glasses and gloves when handling refrigerants to prevent personal injury.

Each quick connect coil will have an orifice installed in the fitting between the liquid line connection and distributor. The orifice is identified on a label next to the liquid connection as shown.

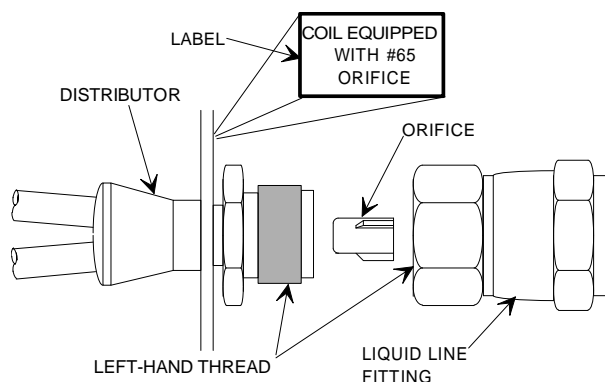


FIGURE 3 - ORIFICE LABEL

Sweat coils are shipped with a standard orifice in a plastic bag attached to the liquid line connection.

The orifice that is shipped with the coil is based on the "most sold" combination, but it may have to be changed depending on the capacity and efficiency of the outdoor unit, elevation differences, and/or long total line lengths. An additional orifice(s) is shipped with most outdoor units in the literature packet for the most commonly required replacement combinations. Other sizes must be ordered from the Parts Department if required.

Table 2 shows the orifice and charge adjustment for approved system combinations (indoor coil/outdoor unit). See Application Data for other piping and orifice considerations for long line length and elevation differences.

If the orifice sizes match, nothing further is required and the refrigerant lines may be connected per the outdoor unit instruction. However, if another orifice should be used, see the coil instruction for details to change the orifice in the coil.

LINE INSTALLATION

Quick-connect systems must use pre-charged refrigerant line sets (quick-connect couplings) designated for the respective unit size and available from CES. Pre-charged lines with excess tubing should be coiled horizontally in an inconspicuous location to avoid oil trapping.

Stub kits are available to field fabricate quick-connect line sets or to connect mix-matched units and coils.

Sweat-connect systems and systems with stub kits must use field supplied, clean, dehydrated refrigerant-grade copper tubing.

Unit should be installed only with the specified line sizes for approved system combinations (indoor coil/outdoor unit) and total line lengths up to 15 feet. See Application Data for long line lengths and elevation differences.

Using a larger than specified line size could result in oil return problems. Using too small a line will result in loss of capacity and other problems caused by insufficient refrigerant flow.

Slope horizontal vapor lines at least 1" every 20 feet toward the outdoor unit to facilitate proper oil return.

The lines should be installed so that they will not obstruct service access to the coil, air handling system or filter.

Install the lines with as few bends as possible. Care must be taken not to damage the couplings or kink the tubing.

Care must also be used to isolate the refrigerant lines to minimize noise transmission from the equipment to the structure.

Tape and suspend the refrigerant lines as shown. DO NOT allow metal-to-metal contact. See Figure 4.

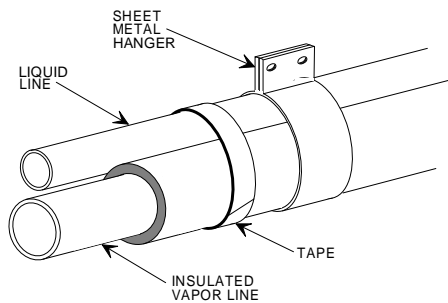


FIGURE 4 - TUBING HANGER

Use PVC piping as a conduit for all underground installations as shown in Figure 5. Buried lines should be kept as short as possible to minimize the build up of liquid refrigerant in the vapor line during long periods of shutdown.

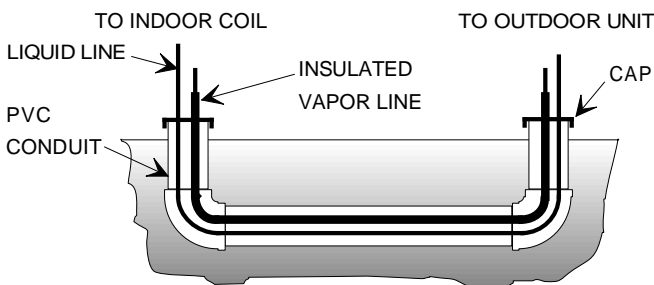


FIGURE 5 - UNDERGROUND INSTALLATION

Pack fiber glass insulation and a sealing material such as permagum around refrigerant lines where they penetrate a wall to reduce vibration and to retain some flexibility.

Do not install a filter drier since one is factory installed in every outdoor unit.

Insulate all vapor lines with a minimum 1/2" foam rubber. Liquid lines that will be exposed to direct sunlight and/or high temperatures must also be insulated.

NOTE: Some units do not have crankcase heaters (See Table 1). A crankcase heater must be added to these units when the refrigerant line piping exceeds 50 feet.

See Form 690.01-AD1V for additional piping recommendations.

QUICK CONNECT SYSTEM CONNECTIONS

Indoor coils and outdoor units are to be connected with pre-charged interconnecting tubing specified for the split systems. The units and the lines are equipped with sealed one-time quick-connect couplings which, when screwed together, will have their seals broken, allowing for free passage of refrigerant. One end of the tubing contains a female fitting for connecting to the outdoor unit. The other end has a male fitting with a 90° bend on the vapor line for connecting to the indoor coil.

The outdoor end of the lines have capped service (Schrader) ports. Install the coupling in a position that will permit a Schrader tool to be attached to the service port.

Prepare and connect fittings as follows:

1. Begin at either the indoor coil or the outdoor unit. Remove only one dust cap at a time to avoid damage and to prevent dirt from getting into the other. If necessary, carefully wipe seals and threaded surfaces with a clean cloth.
2. Lubricate the male half diaphragm and the "O" ring with several drops of refrigerant oil. Thread the halves together by hand to insure proper mating of the threads. Use proper size wrenches (on both the body hex and on the union nut) and tighten until bodies "bottom" or a definite resistance is felt.
3. Using a marker or ink pen, mark a line lengthwise from the union nut to the unit panel. Then tighten an additional 1/4 turn (90° from the mark on the panel to the mark on the union nut).
4. Repeat this procedure with the other three in the system, removing the dust cap just prior to making the connection.
5. Leak test all refrigerant piping connections including the service port flare caps to be sure they are leak tight. DO NOT OVERTIGHTEN (between 40 and 60 inch - lbs. maximum).
6. Do not remove the flare caps from the service ports except when necessary for servicing the system.

CAUTION: Do not connect manifold gauges unless trouble is suspected. Approximately 3/4 ounce of refrigerant will be lost each time a standard manifold gauge is connected.

7. The quick connect outdoor unit contains enough refrigerant charge for a matched evaporator. Refer to the Table 2 for the amount of additional charge required for some mismatched evaporators. If additional charge is required, see recommended charging methods.

SWEAT CONNECT SYSTEM CONNECTIONS

The outdoor units have re-usable service valves on both the liquid and vapor connections. The total system refrigerant charge is retained within the outdoor unit during shipping and installation. The re-usable service valves are provided to evacuate and charge per this instruction.

Serious service problems can be avoided by taking adequate precautions to assure an internally clean and dry system.

Always use refrigerant-grade copper tubing that is internally clean and dry for refrigerant lines. Use clean hard drawn copper tubing where no appreciable amount of bending around obstruction is necessary. If soft copper must be used, care must be taken to avoid sharp bends which may cause a restriction. The vapor line must be insulated with a minimum of 1/2 inch insulation (Arm-A-Flex or equivalent).

CAUTION: Dry nitrogen should always be supplied through the tubing while it is being brazed, because the temperature required is high enough to cause oxidation of the copper unless an inert atmosphere is provided. The flow of dry nitrogen should continue until the joint has cooled. Always use a pressure regulator and safety valve to insure that only low pressure dry nitrogen is introduced into the tubing. Only a small flow is necessary to displace air and prevent oxidation.

All outdoor unit and evaporator coil connections are copper-to-copper and should be brazed with a phosphorous-copper alloy material such as Silfos-5 or equivalent. DO NOT use soft solder.

BASE VALVE CONNECTION PRECAUTIONS

Precautions should be taken to prevent heat damage to the fitting by wrapping a wet rag around it as shown in Figure 6. Also, protect all painted surfaces and insulation during brazing. After brazing - cool joint with wet rag.

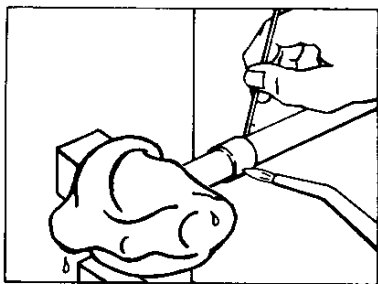


FIGURE 6 - HEAT PROTECTION

WARNING: This is not a backseating valve. The service access port has a valve core. Opening or closing valve does not close service access port.

Valve can be opened by removing the plunger cap and fully inserting a hex wrench into the stem and backing out counter-clockwise until valve stem just touches retaining ring. See Figure 7.

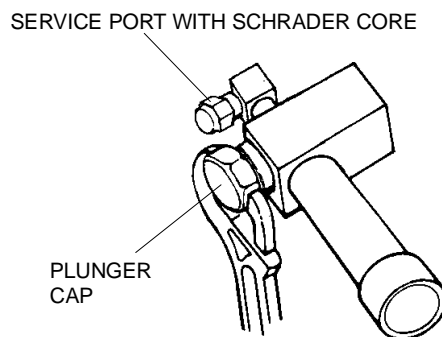


FIGURE 7 - PLUNGER CAP

CAUTION: If visual verification of the valve stem reaching the retaining ring is impossible, stop backing out the valve stem when the slightest increase in resistance is felt. Because of the small size and therefore the reduced resistance, back out the liquid valve 5 turns maximum to prevent going past the retaining ring.

WARNING: If the valve stem is backed out past the retaining ring, the O'ring can be damaged causing leakage or system pressure could force the valve stem out of the valve body possibly causing personal injury. In the event the retaining ring is missing, do not attempt to open the valve.

Replace plunger cap finger tight, then tighten an additional 1/12 turn (1/2 hex flat). Cap must be replaced to prevent leaks.

LINE INSTALLATION PROCEDURE

Install the refrigerant lines using the following procedure:

1. Remove the cap and Schrader core from both the liquid and vapor fitting service ports at the outdoor unit. Connect low pressure nitrogen to the liquid line service port.
2. Braze the liquid line to the liquid fitting at the outdoor unit. Be sure to wrap the fitting body with a wet rag. Allow the nitrogen to continue flowing.
3. Carefully remove the rubber plugs from the evaporator liquid and vapor connections. Use caution, since the evaporator is pressurized.
4. Braze the liquid line to the evaporator liquid connection. The nitrogen should now be flowing through the evaporator coil.
5. Remove the grommet from the vapor connection at the coil. Braze the vapor line to the evaporator vapor connection. After the connection has cooled, replace the grommet.
6. Protect the vapor fitting with a wet rag and braze the vapor line connection. The nitrogen flow should be exiting the system from the vapor service port connection. After this connection has cooled, remove the nitrogen source from the liquid fitting service port and replace Schrader cores.
7. Evacuate the vapor line, evaporator and the liquid line, to 1000 microns or less.

CAUTION: Do not use the system refrigerant in the outdoor unit to purge or leak test.

TABLE 2 - ORIFICE SIZES & CHARGE ADD STANDARD COILS

OUTDOOR UNITS		H1DB	H1DB	H1DB	H1DB	H1DB	H1DB	H1DB	H1DB
		012	018	024	030	036	042	048	060
UNIT ORIFICE(S) ²		49, 51	53, 55	59, 63	63, 65	73	81,78.73	87,84	90
FACTORY R-22	SWEAT	3 - 7	3 - 14	4 - 3	4 - 6	4 - 8	5 - 9	6 - 4	7 - 10
CHARGE, LBS. OZ.	QUICK	2 - 14	3 - 5	3 - 10	3 - 12	3 - 14	4 - 15	5 - 10	7 - 0
INDOOR COIL	COIL ORIFICE ¹	SYSTEM ORIFICE + ADDITIONAL CHARGE, OZ.							
G3HC / G1FC018	55	51 + 0	53 + 0	-	-	-	-	-	-
G3HC / G1FC024	61	-	53 + 10	59 + 11	-	-	-	-	-
G3HC / G1FC030	69	-	-	63 + 14	63 + 8	-	-	-	-
G3HC / G1FC036	81	-	-	-	63 + 9	73 + 23	-	-	-
G3HC / G1FC042	78	-	-	-	-	73 + 19	81 + 9	-	-
G3HC / G1FC048	90	-	-	-	-	-	81 + 21	87 + 13	-
G3HC / G1FC060	96	-	-	-	-	-	-	(84) + 29	90 + 5
G3US018	55	49 + 7	55 + 1	-	-	-	-	-	-
G3UA024	59	-	53 + 2	59 + 5	-	-	-	-	-
G3UA030	65	-	-	59 + 14	63 + 1	-	-	-	-
G3UA036	69	-	55 + 18	63 + 17	65 + 7	73 + 6	-	-	-
G3UA037	69	-	-	63 + 17	65 + 7	73 + 6	-	-	-
G3UA048	87	-	-	-	-	73 + 23	78 + 7	87 + 11	-
G3UA060	96	-	-	-	-	-	73 + 33	(84) + 29	90 + 9
G3UA061	96	-	-	-	-	-	73 + 33	(90) + 29	87 + 19
M3CF032	59	49 + 7	55 + 2	59 + 5	63 + 0	-	-	-	-
M3CF044	69	-	-	-	65 + 5	73 + 0	78 + 0	-	-
M3CF052	84	-	-	-	-	-	81 + 9	87 + 0	-
G3CN030	65	49 + 15	55 + 11	63 + 10	63 + 8	-	-	-	-
G3CN042	73	-	-	-	-	73 + 19	81 + 9	-	-
G3CN060	87	-	-	-	-	-	-	84 + 25	90 + 5
M3HD024	59	49 + 8	53 + 7	59 + 6	-	-	-	-	-
M3HD036	69	-	-	63 + 10	63 + 6	69 + 3	-	-	-
M3HD048	84	-	-	-	-	73 + 7	78 + 2	87 + 11	-
M3HD060	96	-	-	-	-	-	-	87 + 14	90 + 1
M3UF024	53	49 + 4	53 + 6	59 + 0	-	-	-	-	-
M3UF032	59	-	55 + 7	59 + 13	63 + 0	-	-	-	-
M3UF044	69	-	-	63 + 13	63 + 5	73 + 0	78 + 0	-	-
M3UF052	84	-	-	-	-	73 + 12	81 + 9	87 + 0	-
M3UF064	90	-	-	-	-	-	-	-	90 + 0
F1SA / F1SF018	53	(47) + 0	53 + 0	-	-	-	-	-	-
F1SA / F1SF024	61	-	53 + 3	59 + 5	-	-	-	-	-
F1SA / F1SF030	67	-	-	63 + 6	63 + 0	-	-	-	-
F1SA / F1SF036	81	-	-	-	65 + 4	73 + 1	-	-	-

¹These orifices are factory-mounted in the flow control device of each indoor coil.

²These orifices are packed in the instruction/warranty packet of each outdoor unit.

NOTE: Orifices () must be ordered from the Parts Department.

8. Leak test all refrigerant piping connections including the service port flare caps to be sure they are leak tight. DO NOT OVERTIGHTEN (between 40 and 60 inch - lbs. maximum).
9. Do not remove the flare caps from the service ports except when necessary for servicing the system.
10. Release refrigerant charge into the system. Open both the liquid and vapor fittings by removing the plunger cap and with an allen wrench back out counter-clockwise until valve stem just touches retaining ring. See Base Valve Connection Precautions.
11. The sweat connect outdoor unit contains enough refrigerant charge for a most sold matched evaporator and 15 feet of tubing. Refer to the Table 2 for the amount of additional charge required for some mix-matched evaporators. Additional charge for lines longer than 15 feet is shown in Table 3. If additional charge is required, see recommended charging methods.

CAUTION: Do not connect manifold gauges unless trouble is suspected. Approximately 3/4 ounce of refrigerant will be lost each time a standard manifold gauge is connected.

EVACUATION

It will be necessary to evacuate the system if the unit has developed a leak during shipment or was, for any other reason, opened to the atmosphere. If a leak is suspected, leak test to locate the leak. Repair the leak and test again.

WARNING: Never attempt to repair any brazed connections while the system is under pressure. Personal injury could result.

Evacuate the system down to at least 1,000 microns.

To verify if the system has no leaks, simply close the valve to the vacuum pump suction to isolate the pump and hold the system under vacuum. Watch the micron gauge for a few minutes. If the micron gauge indicates a steady and continuous rise, it's an indication of a leak.

If the gauge shows a rise, then levels off after a few minutes and remains fairly constant, it's an indication the system is leak free, but still contains moisture and may require further evacuation if the reading is above 1000 microns.

SYSTEM CHARGE

The factory charge in the outdoor unit is listed in Table 2 and includes enough charge for the unit and a most sold matched evaporator. Some indoor coil matches may require some additional charge.

Sweat connect units also include sufficient charge for 15 feet of lines. Pre-charged line lengths are factory charged with the correct amount of refrigerant required. Table 3 lists the refrigerant line charges.

TABLE 3 - REFRIGERANT LINE CHARGES

UNIT SIZE	LIQUID LINE OD	VAPOR LINE OD	R22 CHARGE OZ / FT
012 TO 024	3/8	5/8	0.66
030 TO 036	3/8	3/4	0.68
042 TO 060	3/8	7/8	0.70

The "TOTAL SYSTEM CHARGE" must be permanently stamped on the unit data plate.

Total system charge is determined as follows:

1. Determine the outdoor unit charge from Table 2.
2. Determine indoor coil adjustment from Table 2.
3. Calculate the line charge using Table 3 factors.
 - a) Calculate total length of pre-charged lines for quick connect units.
 - b) Calculate over 15 feet of sweat lines for sweat connect units.

NOTE: The charge for pre-charged lines should be included in the system charge shown on the data plate but need not be added to the system. If sweat connect lines are used, the line charge over 15 feet should be included on the data plate and must be added to the system.

4. Total system charge = item 1 + item 2 + item 3.
5. Permanently stamp the unit data plate with the total amount of refrigerant in the system.

Use one of the following charging methods whenever additional refrigerant is required for the system charge.

CAUTION: Refrigerant charging should only be carried out by a qualified air conditioning contractor.

Measurement Method

If a calibrated charging cylinder or accurate weighing device is available, add refrigerant accordingly.

CAUTION: Compressor damage will occur if system is improperly charged. On new system installations charge system per R-22 Charge Information label and follow guidelines in this instruction.

Check flare caps on service ports to be sure they are leak tight. DO NOT OVERTIGHTEN (between 40 and 60 inch - lbs. maximum).

Superheat Charging Method

NOTE: Use this method only during system maintenance and repair.

1. Operate system until temperatures and pressures stabilize (minimum of 10 minutes).
2. Measure and record indoor wet bulb (WB) temperature using a sling psychrometer and the outdoor dry bulb (DB) temperature using a thermometer.
3. Measure and record the suction pressure at the suction service valve port.
4. Using Table 4, note the superheat value corresponding to the intersection of the indoor wet bulb and the outdoor dry bulb.
5. With the superheat value obtained in step 4 and the suction pressure value from step 3, find the intersection of the values in Table 5. This is the required suction tube temperature at the suction service valve.
6. To bring the tube temperature in line with the required value from Table 5, add refrigerant to the service port to cause the tube temperature to fall and reclaim refrigerant to cause the temperature to rise.

TABLE 4 - Superheat Value

INDOOR WB °F*	OUTDOOR DB°F												
	55	60	65	70	75	80	85	90	95	100	105	110	115
50	9	7											
52	12	10	6										
54	14	12	10	7									
56	17	15	14	10	6								
58	20	18	16	13	9	5							
60	23	21	19	16	12	8	6						
62	26	24	22	19	16	12	8	5					
64	29	27	24	21	18	15	11	9	6				
66	32	31	30	24	23	18	15	11	9	6			
68	35	33	30	27	24	21	19	16	14	12	9	6	
70		35	33	30	28	25	22	20	18	15	13	11	8
72			35	33	30	28	26	24	20	20	17	15	14
74					34	31	30	27	25	23	22	20	18
76						35	33	31	29	27	26	25	23

*Evaporator Entering Air °F

TABLE 5 - Temperature and Pressure

SUCTION PRESSURE PSIG (Service Port)	SUCTION SERVICE VALVE SUPERHEAT																	
	0**	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34
61.5	35	37	39	41	43	45	47	49	51	53	55	57	59	61	63	65	67	69
64.2	37	39	41	43	45	47	49	51	53	55	57	59	61	63	65	67	69	71
67.1	39	41	43	45	47	49	51	53	55	57	59	61	63	65	67	69	71	73
70.0	41	43	45	47	49	51	53	55	57	59	61	63	65	67	69	71	73	75
73.0	43	45	47	49	51	53	55	57	59	61	63	63	67	69	71	73	75	77
76.0	45	47	49	51	53	55	57	59	61	63	65	67	69	71	73	75	77	79
79.2	47	49	51	53	55	57	59	61	63	65	67	69	71	73	75	77	79	81
82.4	49	51	53	55	57	59	61	63	65	67	69	71	73	75	77	79	81	83

** Saturation Temperature

TABLE 6 - R-22 Saturation Properties

TEMP. °F	PRESSURE PSIG	TEMP. °F	PRESSURE PSIG	TEMP. °F	PRESSURE PSIG	TEMP. °F	PRESSURE PSIG	TEMP. °F	PRESSURE PSIG
45	76.02	60	101.62	75	132.22	90	168.40	105	210.75
46	77.58	61	103.49	76	134.45	91	171.02	106	213.81
47	79.17	62	105.39	77	136.71	92	173.67	107	216.90
48	80.77	63	107.32	78	138.99	93	176.35	108	220.02
49	82.39	64	109.26	79	141.30	94	179.06	109	223.17
50	84.03	65	111.23	80	143.63	95	181.80	110	226.35
51	85.69	66	113.22	81	145.99	96	184.56	111	229.56
52	87.38	67	115.24	82	148.37	97	187.36	112	232.80
53	89.08	68	117.28	83	150.78	98	190.18	113	236.08
54	90.81	69	119.34	84	153.22	99	193.03	114	239.38
55	92.56	70	121.43	85	155.68	100	195.91	115	242.72
56	94.32	71	123.54	86	158.17	101	198.82	116	246.10
57	96.11	72	125.67	87	160.69	102	201.76	117	249.50
58	97.93	73	127.83	88	163.23	103	204.72	118	252.94
59	99.76	74	130.01	89	165.80	104	207.72	119	256.41

Check flare caps on Schrader fittings to be sure they are tight. **DO NOT OVERTIGHTEN** (40-60 inch-lbs. maximum).

ELECTRICAL CONNECTIONS

1. Check the electrical supply to be sure that it meets the values specified on the unit nameplate and wiring label.
2. Route low voltage wiring into bottom of control box as shown in Figure 8. Make low voltage wiring connections inside the junction box.
3. The complete connection diagram and schematic wiring label is located on the inside surface of the unit electrical box cover.
4. All field wiring to be in accordance with national electrical codes (NEC) and/or local-city codes.

NOTE: Power wiring, disconnect switch, and overcurrent protection to be supplied by installer. See *Physical and Electric Data Table* for proper sizes. Use **COPPER CONDUCTORS ONLY**.

WARNING: Unit must be grounded with a separate ground conductor wire.

5. Install the proper size weatherproof disconnect switch outdoors and within sight of the unit.
6. Run power wiring from the disconnect switch to the unit.
7. Install the proper size time-delay fuses or circuit breaker, and make the power supply connections.

NOTE: A Start Assist Kit is available and recommended for long line set applications or in areas of known low voltage problems. A hard start kit must be used if a solenoid valve accessory or non-bleed type expansion device is installed.

8. Energize the crankcase heater, if applicable, to save time by preheating the compressor oil while the remaining installation is completed. See "CRANKCASE HEAT" data below.

9. Mount the thermostat about 5 ft. above the floor, where it will be exposed to normal room air circulation. Do not place it on an outside wall or where it is exposed to the radiant effect from exposed glass or appliances, drafts from outside doors or supply air grilles.

10. Route the 24-volt control wiring (NEC Class 2) from the outdoor unit to the indoor unit and thermostat.

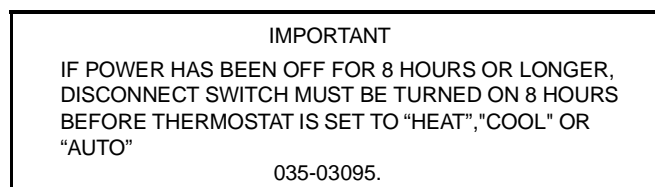
NOTE: To eliminate erratic operation, seal the hole in the wall at the thermostat with permagum or equivalent to prevent air drafts affecting the anticipators in the thermostat.

CRANKCASE HEAT

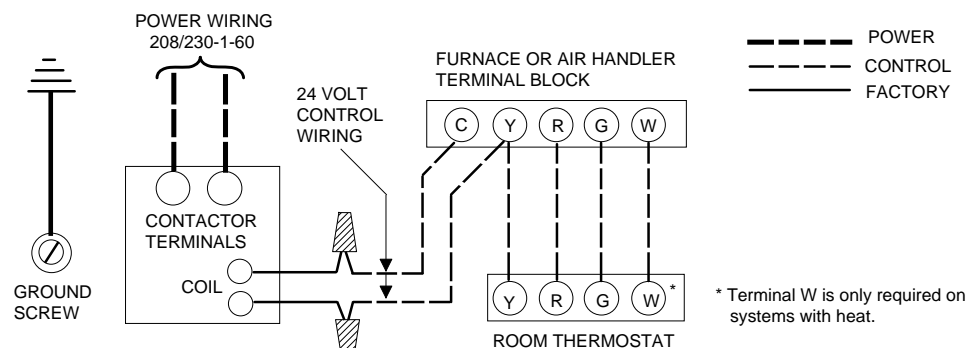
The crankcase heater, when furnished, is energized whenever the compressor is not running. Check for proper operation by feeling for heat on the compressor where the heater is installed. The heater should be energized for at least 8 hours before the thermostat is set to operate the compressor.

CAUTION: An attempt to start the compressor without at least 8 hours of crankcase heat will damage the compressor.

A warning label with an adhesive back is supplied in the unit installation instruction packet. This label should be attached to the field supplied disconnect switch where it will be easily seen. See below:



ALL FIELD WIRING TO BE IN ACCORDANCE WITH NATIONAL ELECTRICAL CODE (NEC) AND/OR LOCAL CODES



ALL OUTDOOR WIRING MUST BE WEATHERPROOF. USE COPPER CONDUCTORS ONLY.

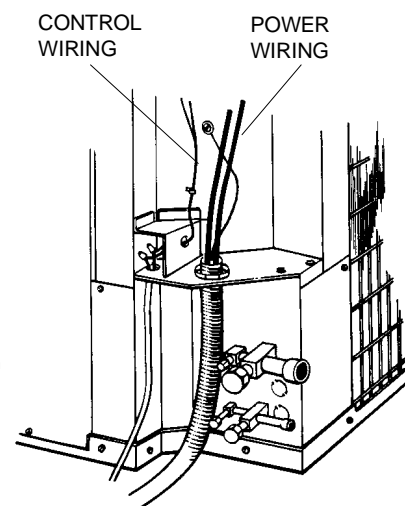


FIGURE 8 - TYPICAL FIELD WIRING

INSTRUCTING THE OWNER

Assist owner with processing warranty cards. Review Owners Guide and provide a copy for the owner guidance on proper operation and maintenance. Instruct the owner or the operator how to start, stop and adjust temperature setting.

When applicable, instruct the owner that the compressor is equipped with a crankcase heater to prevent the migration of refrigerant to the compressor during the "OFF" cycle. The heater is energized only when the unit is not running. If the main switch is disconnected for long periods of shut down, do not attempt to start the unit 8 hours after the switch has been connected. This will allow sufficient time for all liquid refrigerant to be driven out of the compressor.

The installer should also instruct the owner on proper operation and maintenance of all other system components.

INDICATIONS OF PROPER OPERATION

Cooling operation is the same as any conventional air conditioning unit.

The following checks may be made to determine if the system is operating properly:

1. The outdoor fan should be running, with warm air being discharged from the top of the unit.
2. The indoor blower (furnace or air handler) will be operating, discharging cool air from the ducts.
3. The vapor line at the outdoor unit will feel cool to the touch.
4. The liquid line at the outdoor unit will feel warm to the touch.

If unit is not operating properly, check the following items before calling a serviceman:

1. *Indoor section for dirty filter.*

2. *Outdoor section for leaf or debris blockage.*

Eliminate problem, turn off the thermostat for 10 seconds and attempt start. Wait 5 minutes. If system does not start, call serviceman.

MAINTENANCE

1. Dirt should not be allowed to accumulate on the outdoor coils or other parts in the air circuit. Clean as often as necessary to keep the unit clean. Use a brush, vacuum cleaner attachment, or other suitable means.
2. The outdoor fan motor is permanently lubricated and does not require periodic oiling.
3. If the coil needs to be cleaned, it should be washed with Calgon Coil Clean (mix one part Coil Clean to seven parts water). Allow solution to remain on coil for 30 minutes before rinsing with clean water. Solution should not be permitted to come in contact with painted surfaces.
4. Refer to the furnace or air handler instructions for filter and blower motor maintenance.
5. The evaporator coil drain pan should be inspected and cleaned regularly to prevent odors and assure proper drainage.

CAUTION: IT IS UNLAWFUL TO KNOWINGLY VENT, RELEASE OR DISCHARGE REFRIGERANT INTO THE OPEN AIR DURING REPAIR, SERVICE, MAINTENANCE OR THE FINAL DISPOSAL OF THIS UNIT.

WHEN THE SYSTEM IS FUNCTIONING PROPERLY AND THE OWNER HAS BEEN FULLY INSTRUCTED, SECURE THE OWNER'S APPROVAL.



Heating and Air Conditioning

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