



38HDS024,048 Outdoor Condensing Unit



Installation, Start-Up and Service Instructions

CONTENTS

	Page
GENERAL	1-3
System Description	1
Planning the System	3
SAFETY CONSIDERATIONS	3
INSTALLATION	3-10
Step 1 — Complete Pre-Installation Checks	3
• UNPACK OUTDOOR UNIT	
• INSPECT SHIPMENT	
• CONSIDER SYSTEM REQUIREMENTS	
Step 2 — Install Outdoor Unit	3
• MOUNTING ON GROUND	
• MOUNTING ON ROOF	
• SURROUNDING FENCES AND WALLS	
• RIGGING	
Step 3 — Install Fan Coil Units	5
Step 4 — Complete Refrigerant Piping Connections	8
• MAKE PIPING SWEAT CONNECTIONS	
• PROVIDE SAFETY RELIEF	
• LEAK TEST, EVACUATE, AND DEHYDRATE SYSTEM	
Step 5 — Make Electrical Connections	9
• OUTDOOR CONDENSING UNIT	
• INSTALL BRANCH CIRCUIT DISCONNECT PER NEC	
• ROUTE LINE POWER LEADS	
• CONNECT GROUND LEAD AND POWER WIRING	
• INDOOR UNIT	
• CONNECT CONTROL CIRCUIT WIRING	
• CONNECT THERMISTOR WIRING	
• RECONFIGURE FOR ONE FAN COIL UNIT PER COMPRESSOR CIRCUIT IF NECESSARY	
START-UP	10-16
Preliminary Checks	10
Leak Test	14
Evacuate and Dehydrate	14
Charge System	14
Unit Operation	14
• FAN COIL UNITS	
• 38HDS OUTDOOR CONDENSING UNIT	
• 38HDS MICROPROCESSOR CONTROL OF OUTDOOR FAN	
• STATUS INDICATOR LIGHTS	
• UNIT MALFUNCTION	
SERVICE	16-18
Outdoor Fan	16
Scroll Compressors	16
• TIME-DELAY DEVICE OVERRIDE	
• SYSTEM STATUS LEDs AND FAULT CODES	
High-Pressure Relief Valve	16
Internal Current and Temperature Sensitive Overload	16
High-Pressure Switch	16
Low-Pressure Switch	17
Service Valves	17
Refrigerant Charging	17
• SUBCOOLING CHARGING METHOD	
Compressor Lockout Switch (CLO)	17
Outdoor-Coil Temperature Thermistor (OCT TH)	17
Low-Ambient Control Thermistor (LAT)	18
Pressure Transducer	18
MAINTENANCE	18
Lubrication	18
• FAN-MOTOR BEARINGS	
• COMPRESSOR	
Cleaning Coils	18
TROUBLESHOOTING	19,20
Checking Cooling Control Operation	19
START-UP CHECKLIST	CL-1-CL-4

GENERAL

IMPORTANT: Before installing a multi-split system, carefully read the following information:

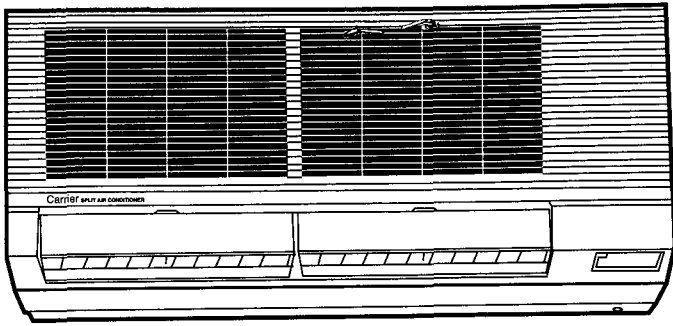
- The TXV (thermostatic expansion valve) is located in the outdoor unit, NOT the indoor fan coil units.
- The 38HDS outdoor unit has a factory-installed low-ambient control.
- BOTH refrigerant lines between the indoor and outdoor units MUST BE insulated, because the TXV is in the outdoor unit.
- If the installation includes a 40QAB ceiling-suspended fan coil unit, REMOVE the Accurater® device.
- DO NOT install a filter drier in the line set to the fan coil units. A filter drier has already been factory-installed on the outdoor unit.
- DO NOT run thermistor wires and control wires in the same jacket.
- The 38HDS unit has been pre-charged at the factory with sufficient refrigerant for the entire system (assuming 50 ft of tubing and the use of one of the system combinations listed in Planning the System section on page 3).

System Description — The 38HDS multi-split air conditioning system requires 3 major components (see Fig. 1):

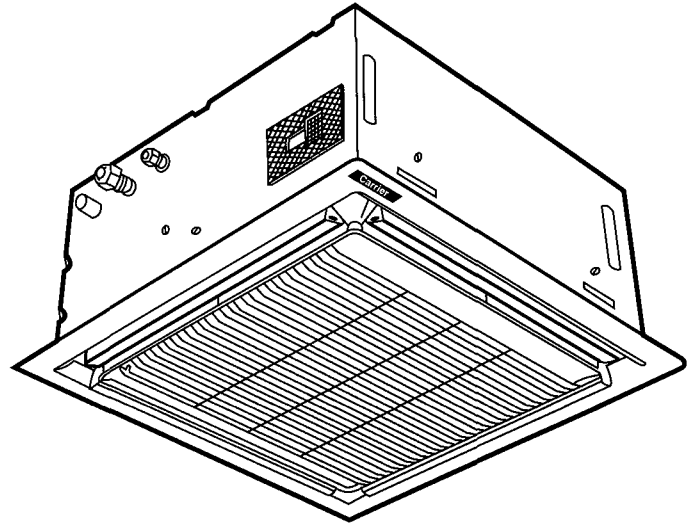
- A 38HDS outdoor condensing unit
- Either 2, 3, or 4 duct-free split fan coil units for distribution of air to a maximum of 4 independent zones (see Planning the System section on page 3)
- A wired or wireless infrared remote controller to control each fan coil unit independently (one remote controller is necessary for each fan coil unit)

NOTE: The wireless infrared remote controller is not available for 40QKB in-ceiling cassette fan coil units.

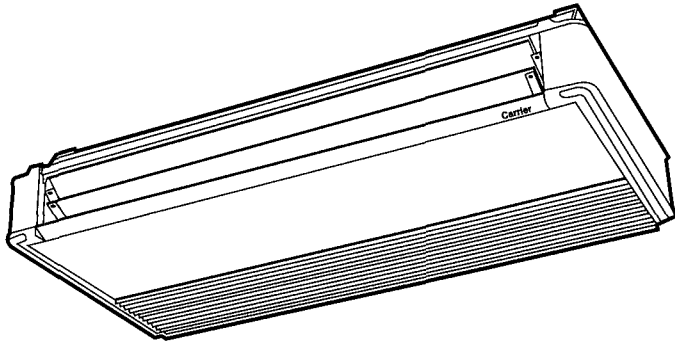
IMPORTANT: The 38HDS outdoor units may only be used with the indoor fan coil unit sizes listed in Planning the System section on page 3. **DO NOT** try to substitute or add more fan coils to these systems.



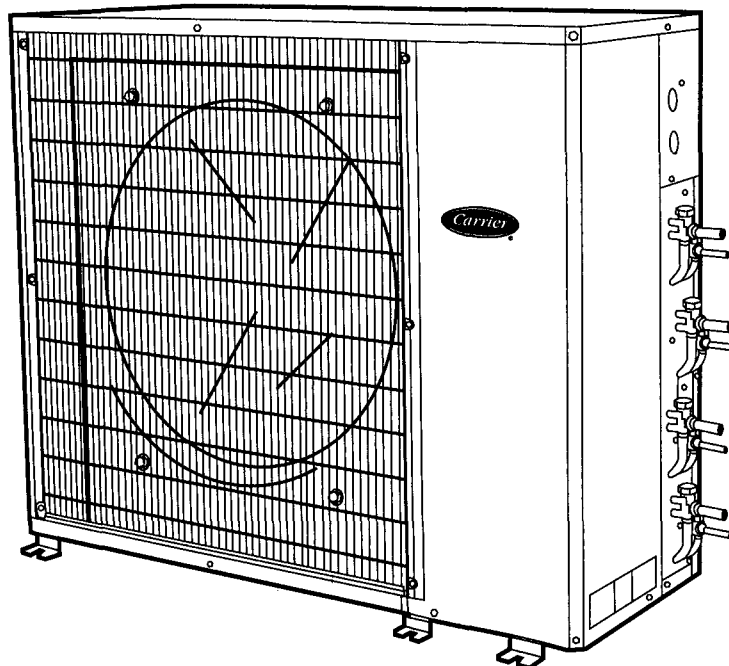
40QYB HIGH-WALL FAN COIL UNIT



40QKB IN-CEILING CASSETTE FAN COIL UNIT



40QAB CEILING-SUSPENDED FAN COIL UNIT



38HDS OUTDOOR CONDENSING UNIT (048 Unit Shown)

Fig. 1 — Multi-Split System Components

Planning the System — This is a complex system with up to 4 separate tubing systems and 8 different control cable sets. Plan the installation carefully as instructed below. Read these installation instructions (outdoor condensing unit) and the installation instructions included with the fan coil units carefully and completely **PRIOR** to system installation.

1. Maximum line length is 50 ft equivalent (any single line run), and maximum elevation differential is 30 ft (from highest to lowest system component).
2. Verify that Carrier components received form a legitimate multi-split system as follows:
 - a. Systems using one 38HDS024 outdoor condensing unit may use any combination (for a total of 2) of Carrier nominal 1½ ton fan coil units.
 - b. Systems using one 38HDS048 outdoor condensing unit may use any of the following combinations:
 - any combination (for a total of 2) of Carrier nominal 2 ton fan coil units (1 fan coil unit per circuit).
 - any one Carrier nominal 2-ton fan coil unit on one circuit, and any combination of 2 Carrier nominal 1½ ton fan coil units (for a system total of 3) on the other circuit.
 - any combination (for a total of 4) of Carrier nominal 1½ ton fan coil units (2 fan coil units per circuit).
3. Identify and record each fan coil section as it will be connected to the 38HDS outdoor unit on the Multi-Split Installation Planning Worksheet included as part of the Start-Up Checklist on page CL-1.
4. Check all system components to ensure that all required materials are on hand before starting installation of this system.
5. Re-read Step 3 — Install Fan Coil Units section on page 5 before installing indoor fan coil units.

SAFETY CONSIDERATIONS

Installing and servicing air-conditioning equipment can be hazardous due to system pressure and electrical components. Only trained and qualified service personal should install or service air-conditioning equipment.

Untrained personnel can perform basic maintenance, such as cleaning and replacing filters. All other operations should be performed by trained service personnel. When working on air-conditioning equipment, observe safety precautions in literature, and tags and labels attached to unit.

Follow all safety codes. Wear safety glasses and work gloves. Use quenching cloth for brazing operations. Have fire extinguisher available. Read these instructions *thoroughly*. Consult local building codes and National Electrical Code (NEC) Standard ANSI/NFPA 70 (American National Standards Institute/National Fire Protection Association) for special installation requirements.

⚠ WARNING

Before installing or servicing system, always turn off main power to system. There may be more than one disconnect switch, since each fan coil unit will normally have its own disconnect. Turn off accessory heater power if applicable. Electrical shock can cause personal injury.

INSTALLATION

Step 1 — Complete Pre-Installation Checks

UNPACK OUTDOOR UNIT (see Fig. 1) — Move 38HDS unit to final location. Remove carton from unit, being careful not to damage service valves and grilles.

INSPECT SHIPMENT — File claim with shipping company if shipment is damaged or incomplete. Check unit nameplate to be sure unit matches job requirements.

CONSIDER SYSTEM REQUIREMENTS — Consult local building codes and NEC for special installation requirements.

Allow sufficient space for airflow, wiring, refrigerant piping, and servicing unit. See Fig. 2 and 3.

Locate unit so that condenser coil airflow is unrestricted on both sides. Refer to Fig. 2 and 3.

Unit may be mounted on a level pad directly on base legs or mounted on raised pads at support points. See Fig. 2 and 4 for center of gravity.

Step 2 — Install Outdoor Unit

MOUNTING ON GROUND — Mount unit on a solid, level concrete pad. Position unit so water or ice from roof does not fall directly onto unit. If conditions or local codes require unit be fastened to pad, 6 field-supplied tiedown bolts should be used and fastened through slots provided in unit mounting feet. See Fig. 2.

MOUNTING ON ROOF — Mount unit on a level platform or frame at least 6 in. (154 mm) above roof surface. Isolate unit and tubing from structure.

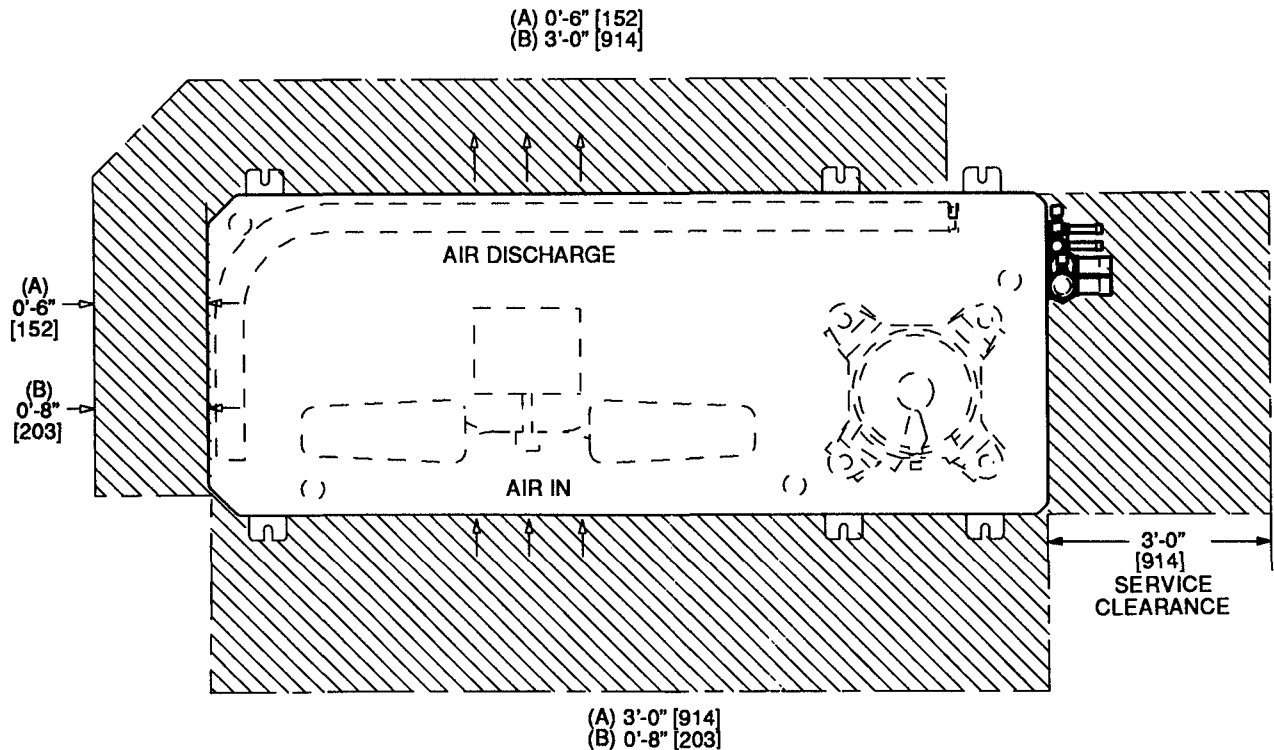
SURROUNDING FENCES AND WALLS — Select and install surrounding fences and walls to allow for free entry of ambient air. Avoid pits and solid walls as unit surroundings, because recirculation of warm discharge air can occur.

RIGGING

⚠ CAUTION

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

Keep unit upright. Lift unit using sling. Use cardboard or padding under sling, and use spreader bars to prevent sling damage to unit. See Fig. 4. See Fig. 2 for center of gravity reference. Install unit so that coil does not face into prevailing winds. If this is not possible and constant winds above 25 mph are expected, field fabricate and install wind baffles. In areas where outdoor ambient will be less than 40 F during cooling, wind baffles are also required. Contact your local Carrier representative for drawings and assembly details.



NOTE Dimensions in [] are in mm.

- (A) Minimum operating clearance required when this side faces a wall
(B) Minimum operating clearance required when this side faces away from a wall.

Fig. 3 — Operating and Service Clearance

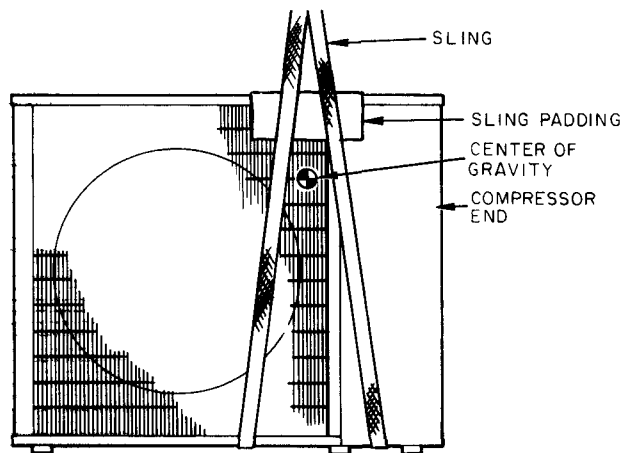


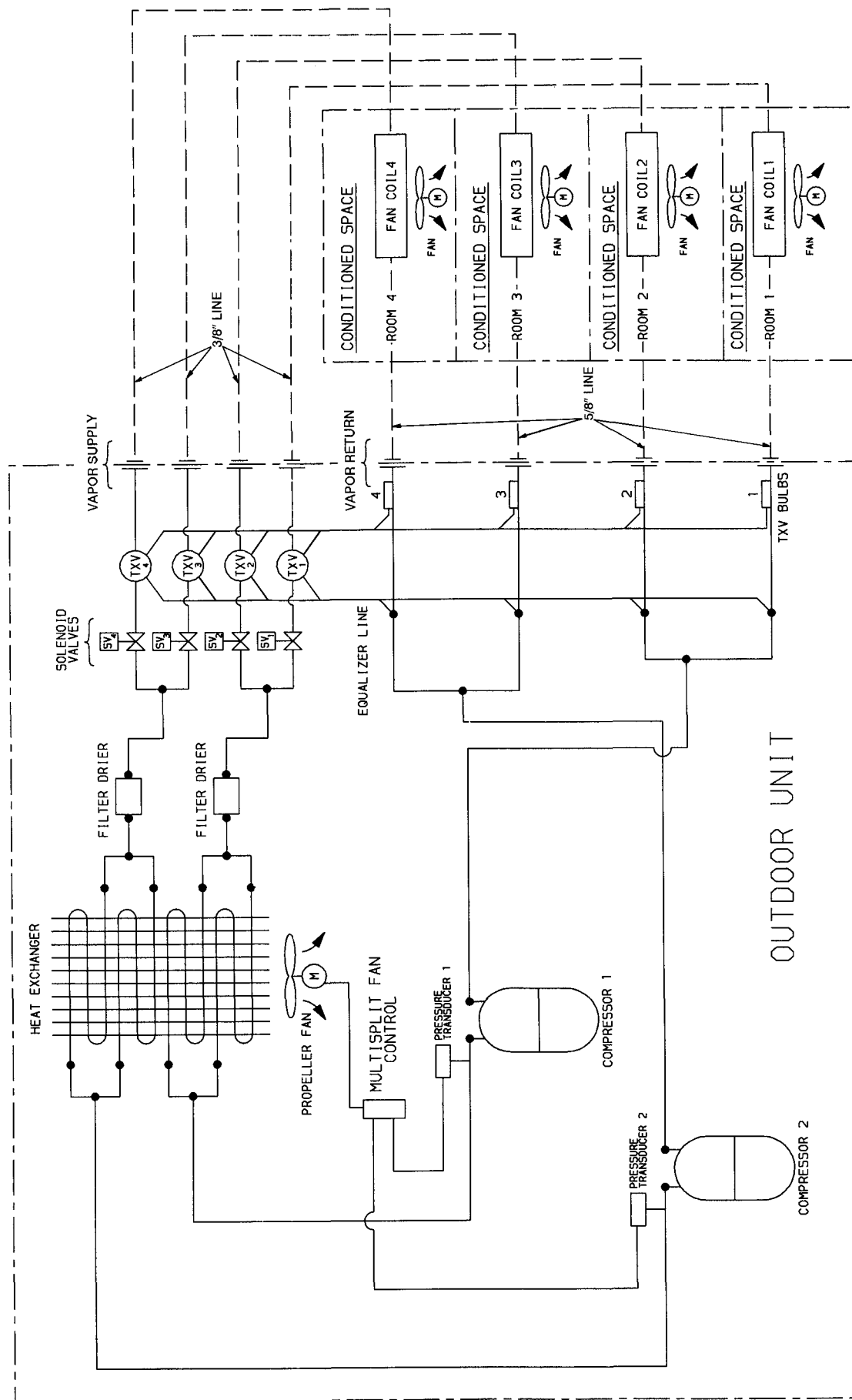
Fig. 4 — Lifting Unit With Sling

Step 3 — Install Fan Coil Units — Refer to Installation, Start-Up and Service Instructions provided with the fan coil units.

NOTE: If this system is mixing 2 or more types of fan coil units, be sure to follow instructions provided with each type of fan coil unit closely.

Mount fan coil units in locations which will be easily accessible when routing refrigerant tubing (see Fig. 5 and 6) and electrical wiring between the fan coil units and outdoor unit. Fan coil unit locations must also provide adequate drainage capabilities. If desired, condensate pumps may be used with any type of fan coil unit.

IMPORTANT: DO NOT install filter driers or AccuRater® refrigerant metering device body or pistons into this system. TXVs are located in the outdoor condensing unit to control refrigerant flow.

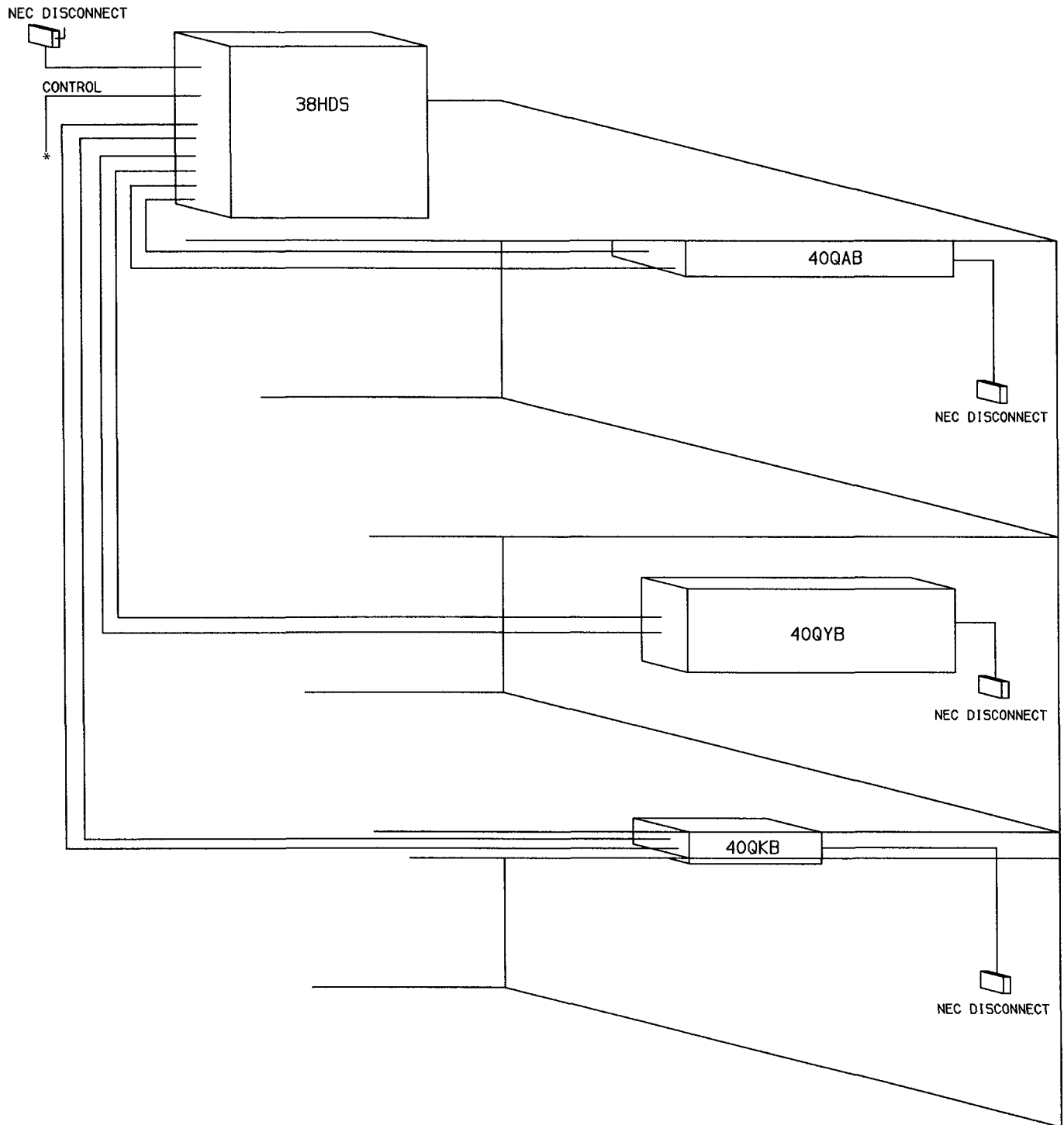


LEGEND

- M** — Motor
- TXV** — Thermostatic Expansion Valve
- Field-Supplied Tubing

NOTE: Insulate ALL lines between outdoor condensing unit and indoor fan coil units.

Fig. 5 — Refrigerant Tubing Schematic (38HDS048 Shown)



NEC — National Electrical Code

*See Fig 9 for control connection details

Fig. 6 — Typical Piped System

Step 4 — Complete Refrigerant Piping

NOTE: Complete all refrigerant tubing connections at the fan coil units first. Then route the tubing sets back to the outdoor unit. Mark each tubing set carefully to identify its respective fan coil unit.

Outdoor units may be connected to indoor units using field-supplied tubing of refrigerant grade and condition. See Table 1 for correct line sizes. Do not use less than 10 ft (3 m) of interconnecting tubing.

NOTE: It is not necessary to make any changes to line sizes or any refrigerant system modifications when using recommended refrigerant line lengths.

When installing tubing both the vapor return line and the vapor supply (smaller) line must be insulated between outdoor unit and indoor unit to avoid condensation on the lines. Use closed-cell foam insulation and tape all seams and joints.

⚠ CAUTION

DO NOT BURY MORE THAN 36 IN. (922 mm) OF REFRIGERANT TUBING IN THE GROUND. If any section of tubing is buried, there must be a 6-in. (154 mm) vertical rise to the valve connections on the outdoor unit. If more than the recommended length is buried, refrigerant may migrate to cooler, buried section during extended periods of system shutdown. This causes refrigerant slugging and could possibly damage compressor at start-up.

DO NOT USE MORE THAN 50 FT of equivalent interconnecting tubing or more than 30 ft of vertical lift (see Fig. 7) between the lowest system component and the highest system component.

When more than 50 ft of interconnecting tubing or more than 30 ft of vertical lift is necessary, contact your local distributor.

If either refrigerant tubing or indoor coil is exposed to atmospheric conditions for longer than 5 minutes, it must be evacuated to 1000 microns to eliminate contamination and moisture in the system.

Run refrigerant tubes as directly as possible, avoiding unnecessary turns and bends. Suspend refrigerant tubes so they do not damage insulation on vapor return tube and do not transmit vibration to structure. Also, when passing refrigerant tubes through wall, seal opening so that vibration is not transmitted to structure. Leave some slack in refrigerant tubes between structure and outdoor unit to absorb vibration. See Fig. 5 for indoor to outdoor unit tubing connections, and refer to separate indoor fan coil unit installation instructions for additional information.

NOTE: If only 2 fan coil units are used on 38HDS048 systems, be sure that one is used with each compressor refrigerant circuit. If 2 or 3 fan coils are used, cap any unused refrigerant lines at the service valves.

⚠ WARNING

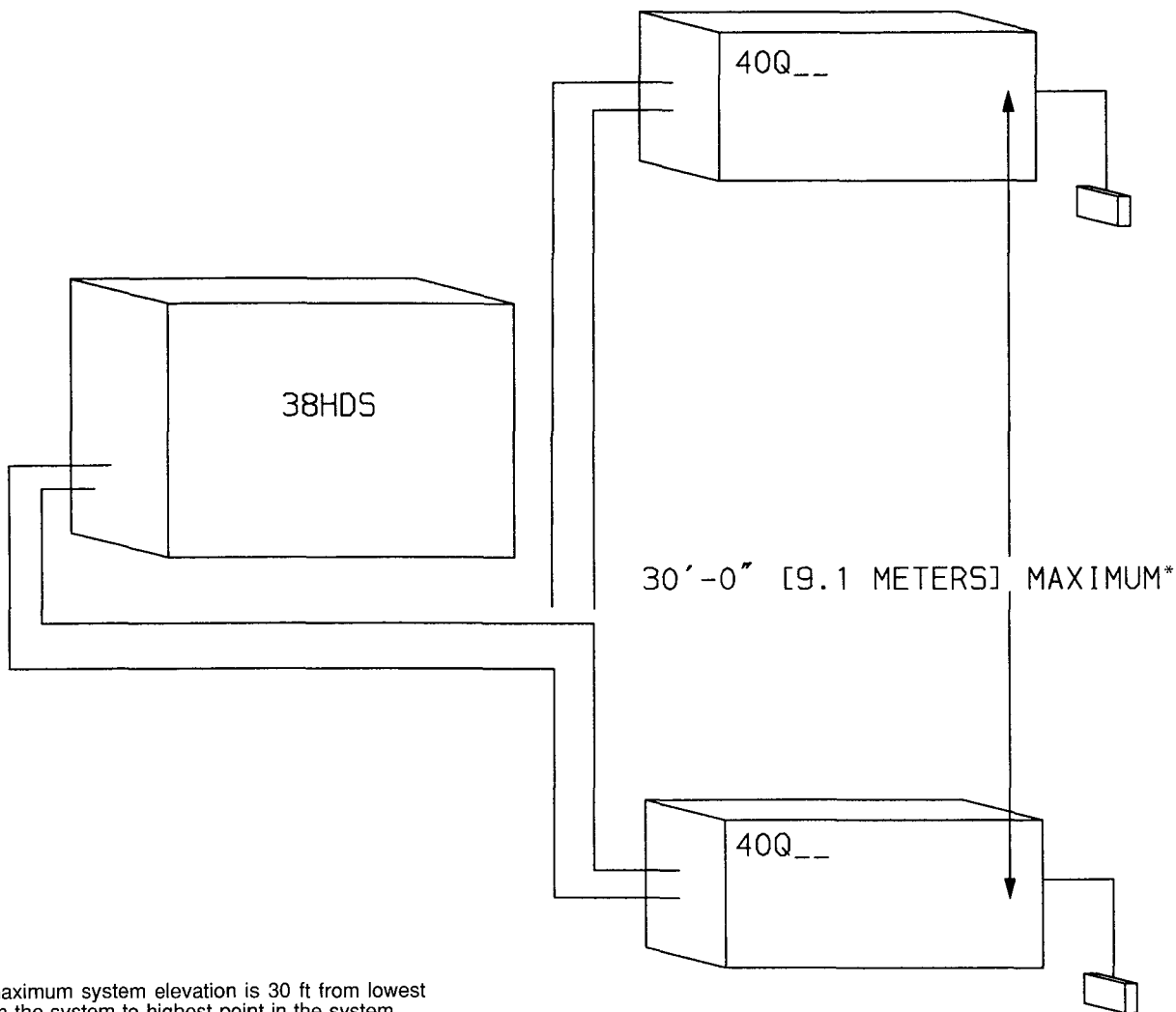
DO NOT INSTALL A FIELD-SUPPLIED FILTER DRIER in this system. Filter drier is factory installed inside the outdoor unit. Installing a filter drier in the liquid line between the indoor and outdoor units will cause a high-pressure drop, and will result in abnormal system operation.

Table 1 — Physical Data

Unit 38HD	024	048
Nominal Capacity (Btuh)	24,000	48,000
Operating Weight (lb)	159	292
Refrigerant Quantity (lb)	R-22	
Circuit A	5.0	5.5
Circuit B	—	5.5
Compressor Type	Hermetic Scroll	
Model	Copeland ZR23K1-PFV	Copeland ZR23K1-PFV
Oil (oz) — Initial...Recharge	28...24	28 .24
Crankcase Heater Watts	19	27
Outdoor Fan	Propeller Type, Direct-Drive, Horizontal	
Rpm	850	850
Diameter (in.)...No. of Blades	18 3	24. 3
Fan Pitch (Deg)	27	24
Motor Hp	1/8	1/4
Nominal Airflow (cfm)	1720	3900
Outdoor Coil	Copper Tube, Aluminum-Plate Fin	
Face Area (sq ft)...No. of Rows	6.1 2	12.3...2
Fins./in.	15	15
Line Sizes*		
Vapor Return Quantity...OD (in.)	2 5/8	4 5/8
Vapor Supply Quantity...OD (in.)	2...3/8	4...3/8
Valve Connection — ODF (in.)		
Vapor Return Quantity...ODF (in.)	2. 5/8	4...5/8
Vapor Supply Quantity...ODF (in.)	2 3/8	4 . 3/8
Controls		
High-Pressure Switch Cutout (psig)	426 ± 7	
High-Pressure Switch Cut-in (psig)	320 ± 20	
Low-Pressure Switch Cutout (psig)	7 ± 3	
Low-Pressure Switch Cut-in (psig)	22 ± 5	
Discharge Temperature Switch Cutout† (F)	280	
Fusible Plug	210 F	

*Line sizes are for runs up to 25 ft

†Switch will reset automatically when temperature drops below 280 F



*The maximum system elevation is 30 ft from lowest point in the system to highest point in the system

Fig. 7 — Maximum Elevation Differential

MAKE PIPING SWEAT CONNECTIONS — Check tubing set identification against Multi-Split Installation Planning Worksheet on page CL-1 to ensure correct selection of service valve set on outdoor unit.

Remove plastic caps from liquid and suction service valves. Use refrigerant grade tubing. Service valves are closed from the factory and are ready for brazing. Pass nitrogen or other inert gas through piping while brazing to prevent formation of copper oxide.

After wrapping the service valve with a wet cloth, the tubing set can be brazed to the service valve using either silver bearing or non-silver bearing brazing material. Consult local code requirements. Refrigerant tubing and indoor coil are now ready for leak testing.

NOTE: Unit is shipped from the factory with a full system charge of R-22 (exact amount is indicated on unit nameplate).

⚠ CAUTION

To avoid damage while brazing, service valves should be wrapped with a heat-sinking material such as a wet cloth.

⚠ CAUTION

When brazing tubing sets to the service valves, a brazing shield **MUST** be used to prevent damage to the painted unit surface.

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

LEAK TEST, EVACUATE, AND DEHYDRATE SYSTEM — Refer to Leak Test and Evacuate and Dehydrate sections on page 14 for details.

Step 5 — Make Electrical Connections

⚠ WARNING

Unit cabinet must have an uninterrupted, unbroken electrical ground to minimize the possibility of personal injury if an electrical fault should occur. This ground may consist of electrical wire connected to unit ground lug in control compartment, or conduit approved for electrical ground when installed in accordance with NEC, ANSI/NFPA 70, and local electrical codes. Failure to follow this warning could result in the installer being liable for personal injury of others.

⚠ CAUTION

Unit failure as a result of operation on improper line voltage or excessive phase imbalance constitutes abuse and may cause damage to electrical components. Do not install units in system where voltage may fluctuate above or below permissible limits. Such operation would invalidate any applicable Carrier warranty.

OUTDOOR CONDENSING UNIT — Be sure field wiring complies with local and national fire, safety, and electrical codes, and that voltage to the system is within limits shown in Table 2. Contact local power company for correction of improper line voltage.

See Table 2 for recommended fuse sizes. When making electrical connections, provide clearance at unit for refrigerant piping connections.

INSTALL BRANCH CIRCUIT DISCONNECT PER NEC — Install a disconnect of adequate size to handle unit starting current. Locate disconnect within sight from and readily accessible from unit per Section 440-14 of NEC.

ROUTE LINE POWER LEADS — Extend leads from disconnect through power wiring hole provided and into unit splice area. Remove outdoor unit control box cover to gain access to unit wiring.

NOTE: Power leads from disconnect into outdoor unit must be **COPPER WIRE ONLY**.

CONNECT GROUND LEAD AND POWER WIRING — Connect ground lead to equipment ground connection in outdoor unit control box. Then connect power wiring to TB1 (terminal block no. 1). See Fig. 8. Splice the line power leads to yellow and black leads provided.

INDOOR UNIT — Refer to installation instructions included with the fan coil units for fan coil unit installation and power supply piping.

CONNECT CONTROL CIRCUIT WIRING

⚠ WARNING

To avoid personal injury, be sure system main power switch is turned off before proceeding.

1. Refer to Multi-Split Installation Planning Worksheet completed prior to the start of this installation and verify the markings on each set of control wiring cable sets.
2. Route 24-v control wiring through wiring hole on the outdoor unit. See Fig. 9 for typical connections for each type of fan coil. See Fig. 10 and 11 for 38HDS component arrangement and unit wiring details. See Fig. 12 for 38HDS terminal block detail.
3. Connect wiring to screw connections labeled FC1, FC2, FC3, and FC4 on terminal board for each corresponding fan coil unit. See Fig. 9-12.
4. Route the other end of the control wiring back to the fan coil unit and connect to the fan coil terminal board according to the wiring schematic for the fan coil unit. See fan coil unit installation instructions for wiring schematic.

CONNECT THERMISTOR WIRING

1. Refer to fan coil unit installation instructions for location of thermistor harness assemblies (not used on 40QKB units). The installation instructions are shipped with each fan coil unit. Connect the outdoor unit thermistor harness plugs at the matching fan coil unit terminal blocks.

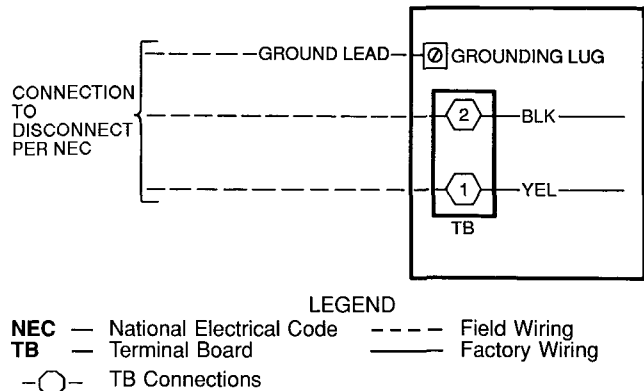


Fig. 8 — Line Power Connections

2. Label each thermistor harness per the previously completed Multi-Split Installation Planning Worksheet.
3. Route the thermistor harness assemblies from the fan coil units to the outdoor condensing unit.

IMPORTANT: DO NOT RUN THE THERMISTOR CABLES IN THE SAME CONDUIT AS THE CONTROL CIRCUIT POWER WIRING.

4. Route harnesses into 38HDS unit junction box.
5. Connect each thermistor plug to its matching plug in the outdoor condensing unit.

RECONFIGURE FOR ONE FAN COIL UNIT PER COMPRESSOR CIRCUIT IF NECESSARY — The control also provides the option of using either 1 or 2 fan coil units per compressor (depending on the position of the jumpers on J3 and J4 on the control board). See Fig. 12. The control is preset to 2 fan coil units per compressor at the factory. If only one fan coil per compressor is to be used, position a jumper between pins 1 and 2 on J3 and J4 (one jumper for each set of pins). Jumper J3 is associated with the compressor on the 38HDS024 units and compressor number 1 on 38HDS048 units (bottom compressor). Jumper J4 is associated with compressor number 2 on the 38HDS048 units.

START-UP

Preliminary Checks — Complete Start-Up Checklist on page CL-1 and the following checks prior to starting up unit.

1. Check condensate drainage system. To do this, add a small amount of water into each fan coil unit condensate pan, and ensure that each pan drains freely. Inspect drain pans and lines, and inspect as required.
2. Make sure that all wiring connections are correct and tight.
3. Check all barriers, covers, and panels to ensure they are in place.
4. Identify which fan coil unit valve sets have been connected.

IMPORTANT: DO NOT open valves which do not have fan coil units connected to them.

5. Unit is shipped with the valve stems frontseated and caps factory installed. Remove caps from all valves to which fan coil units have been connected. Replace caps and tighten until finger tight.

START-UP CHECKLIST

A. Multi-Split Installation Planning Worksheet

38HDS024 OUTDOOR CONDENSING UNIT

	CIRCUIT NO.	CIRCUIT IDENTIFICATION	FAN COIL MODEL	INSTALLER'S IDENTIFICATION (Room or Occupied Space Location)
○ } ○ }	2	_____	_____	_____
○ } ○ }	1	_____	_____	_____

38HDS048 OUTDOOR CONDENSING UNIT

	CIRCUIT NO.	CIRCUIT IDENTIFICATION	FAN COIL MODEL	INSTALLER'S IDENTIFICATION (Room or Occupied Space Location)
○ } ○ }	4	_____	_____	_____
○ } ○ }	3	_____	_____	_____
○ } ○ }	2	_____	_____	_____
○ } ○ }	1	_____	_____	_____

NOTE: Circuits 1 and 2 are controlled by compressor no. 1, and circuits 3 and 4 are controlled by compressor no. 2

B. Pre-Start-Up

OUTDOOR UNIT

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

IF SO, WHERE? _____

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

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

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

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

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

ARE ALL TERMINALS TIGHT? (Y/N) _____

Piping

ARE REFRIGERANT LINES CONNECTED TO SERVICE VALVE SETS AS INDICATED IN MULTI-SPLIT INSTALLATION PLANNING WORKSHEET? (Y/N) _____

ARE CONTROL POWER LINES CONNECTED TO CONTROL POWER TERMINAL BLOCK AS INDICATED IN MULTI-SPLIT INSTALLATION PLANNING WORKSHEET? (Y/N) _____

ARE THERMISTOR CABLES CONNECTED TO CORRECT THERMISTOR PLUGS AS INDICATED IN MULTI-SPLIT INSTALLATION PLANNING WORKSHEET? (Y/N) _____

ARE THERMISTOR CABLES SEATED? (Y/N) _____

ARE TERMINALS SNUG IN THE HOUSINGS? (Y/N) _____

ARE SERVICE VALVES OPENED AND BACKSEATED? (Y/N) _____

ARE STEM VALVES INSTALLED AND SNUG? (Y/N) _____

HAVE ALL REFRIGERANT CONNECTIONS AND PIPING JOINTS BEEN CHECKED FOR LEAKS? (Y/N) _____

INDOOR FAN COIL UNIT

Piping

CHECK TO BE SURE ACCURATER® DEVICE IS NOT INSTALLED IN FAN COIL UNIT. _____

CHECK TO BE SURE FILTER DRIER IS NOT INSTALLED IN VAPOR SUPPLY LINE AT INDOOR UNIT. _____

IS VAPOR SUPPLY LINE INSULATED OVER ENTIRE LENGTH TO OUTDOOR UNIT? (Y/N) _____

ARE REFRIGERANT LINES CONNECTED TO SAME SERVICE VALVES AS THE MATCHING CONTROL WIRES? (Y/N) _____

HAVE REFRIGERANT CONNECTIONS BEEN CHECKED FOR LEAKS? (Y/N) _____

IS CONDENSATE LINE CONNECTED? (Y/N) _____

DOES CONDENSATE LINE DRAIN FREELY? (Y/N) _____

IF ACCESSORY CONDENSATE PUMP IS INSTALLED, IS MAXIMUM LIFT OF PUMP LESS THAN 20 INCHES? (Y/N)

IF ACCESSORY CONDENSATE PUMP IS INSTALLED, DOES PUMP START AND RUN ACCORDING TO CONTROLS SPECIFICATION? (Y/N) _____

Controls

ARE CONTROL POWER WIRES LABELLED ACCORDING TO INDIVIDUAL FAN COIL UNIT? (Y/N) _____

ARE THERMISTOR CABLES LABELLED BY INDIVIDUAL FAN COIL UNIT? (Y/N) _____

ARE CONTROL POWER LINES AND THERMISTOR CABLES ROUTED SEPARATELY (NOT IN SAME CONDUIT AND NOT IN SAME MULTI-CONDUCTOR CABLE)? (Y/N) _____

ARE CONTROL WIRES AND THERMISTOR CABLES CONNECTED TO THE SAME CIRCUIT AS ASSOCIATED REFRIGERANT LINES? (Y/N) _____

Units with Wired Remote Controller

CHECK CONNECTIONS OF CABLE LEADS AT SUBBASE. THEY SHOULD BE AS FOLLOWS:

TERMINAL	COLOR
1	Red
2	Black
3	Brown
4	Orange
5	White

CHECK ROUTING OF LEADS WITHIN SUBBASE; ARE THERE PINCHED OR CUT LEADS? (Y/N) _____

CHECK MOUNTING OF SUBBASE TO WALL; IS IT TIGHT (DO NOT APPLY EXCESSIVE FORCE TO MOUNTING SCREW)? (Y/N) _____

B. Pre-Start-Up (cont)

Units with Wireless Remote Controller

CHECK MOUNTING OF INTERFACE BOARD; ARE STANDOFFS USED (TO MAINTAIN FIXED SEPARATION ABOVE SHEET METAL CHASSIS)? (Y/N) _____

CHECK CONNECTION OF POWER SUPPLY PLUG (2-CIRCUIT MOLEX PLUG) ON INTERFACE BOARD; IS THE BLUE LEAD CONNECTED TO PIN 1? (Y/N) _____

ARE FRESH BATTERIES INSTALLED PROPERLY IN THE FAN COIL UNIT REMOTE CONTROLLER (PER DIAGRAM IN CONTROLLER)? (Y/N) _____

DOES THE REMOTE CONTROLLER BACKLIGHT ILLUMINATE WHEN THE BUTTON ON THE BACK OF THE REMOTE CONTROLLER IS PRESSED? (Y/N) _____

Fan System

DOES THE FAN ROTATE FREELY? (Y/N) _____

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

Power Supply

DOES THE POWER SUPPLY MATCH THE FAN COIL UNIT DATAPLATE? (Y/N) _____

IS GROUND WIRE CONNECTED? (Y/N) _____

C. Start-Up

CHECK INDOOR FAN OPERATION

40QAB,QYB Fan Coil Units

SELECT FAN MODE, THEN INITIATE TEST SEQUENCE. DOES EACH FAN COIL UNIT START AT LOW SPEED, THEN SHIFT TO MEDIUM SPEED, AND THEN SHIFT TO HIGH SPEED? (Y/N) _____

40QKB Fan Coil Units

POSITION SELECTOR SWITCH AT SUBBASE IN EACH FAN SPEED SETTING IN SEQUENCE. DOES EACH FAN COIL UNIT CHANGE SPEEDS PER SWITCH SETTING? (Y/N) _____

START SYSTEM OPERATION AT ONE FAN COIL UNIT

SELECT COOLING MODE AND ADJUST SET POINT TO BE BELOW CURRENT ROOM TEMPERATURE. OBSERVE OPERATION OF OUTDOOR CONDENSING UNIT:

DOES COMPRESSOR START (AFTER INITIAL TIME DELAY) AND RUN? (Y/N) _____

DOES OUTDOOR FAN RUN OR CYCLE ACCORDING TO SPACE REQUIREMENTS? (Y/N) _____

DESELECT COOLING MODE AT INDOOR FAN COIL UNIT. REPEAT FOR REMAINING FAN COIL UNIT(S), AND RECORD ALL INFORMATION BELOW:

START SYSTEM OPERATION AT BOTH FAN COIL UNITS ON A SINGLE COMPRESSOR CIRCUIT (FOR 40QAB,QYB FAN COIL UNITS, SELECT COOL MODE AND INITIATE TEST CYCLE)

AFTER AT LEAST 15 MINUTES RUNNING TIME, RECORD THE MEASUREMENTS BELOW. FOR SYSTEMS USING 38HDS048 UNITS, REPEAT THIS PROCEDURE FOR THE SECOND COMPRESSOR CIRCUIT.

	SYSTEM A		SYSTEM B
COMPRESSOR AMPS (L1/L2)	_____		_____
OIL PRESSURE	_____		_____
SUCTION PRESSURE	_____		_____
SUCTION LINE TEMP	_____		_____
DISCHARGE PRESSURE	_____		_____
DISCHARGE LINE TEMP	_____		_____
ENTERING OUTDOOR-AIR TEMP	_____		_____
LEAVING OUTDOOR-AIR TEMP	_____		_____
	FAN COIL NO. 1	FAN COIL NO. 2	FAN COIL NO. 1
	_____	_____	_____
INDOOR ENTERING-AIR DB (dry bulb) TEMP	_____	_____	_____
INDOOR ENTERING-AIR WB (wet bulb) TEMP	_____	_____	_____
INDOOR LEAVING-AIR DB TEMP	_____	_____	_____
INDOOR LEAVING-AIR WB TEMP	_____	_____	_____
VAPOR SUPPLY LINE TEMPERATURE	_____	_____	_____
(AT VAPOR SUPPLY LINE SOLENOID VALVE COIL)	_____	_____	_____

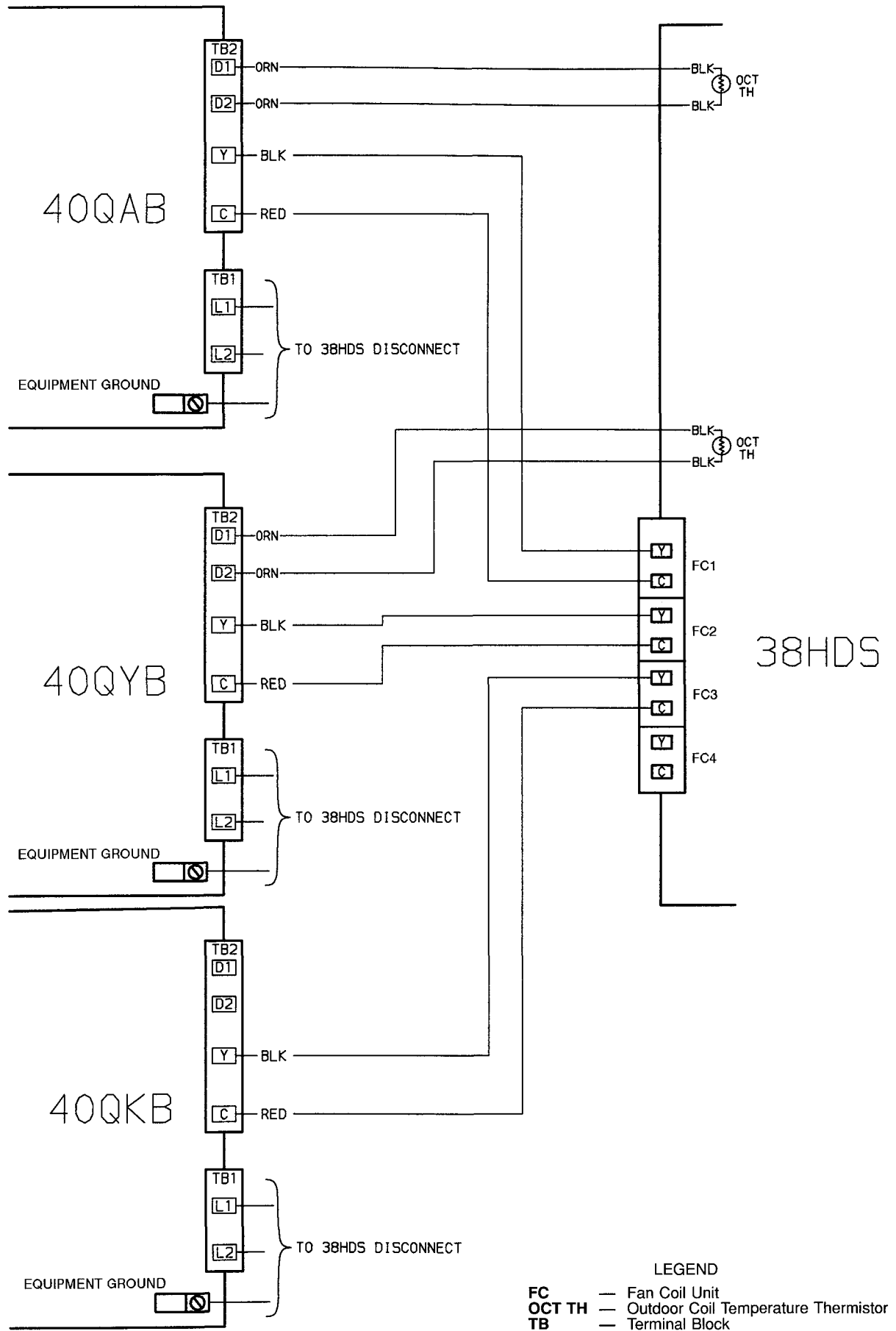
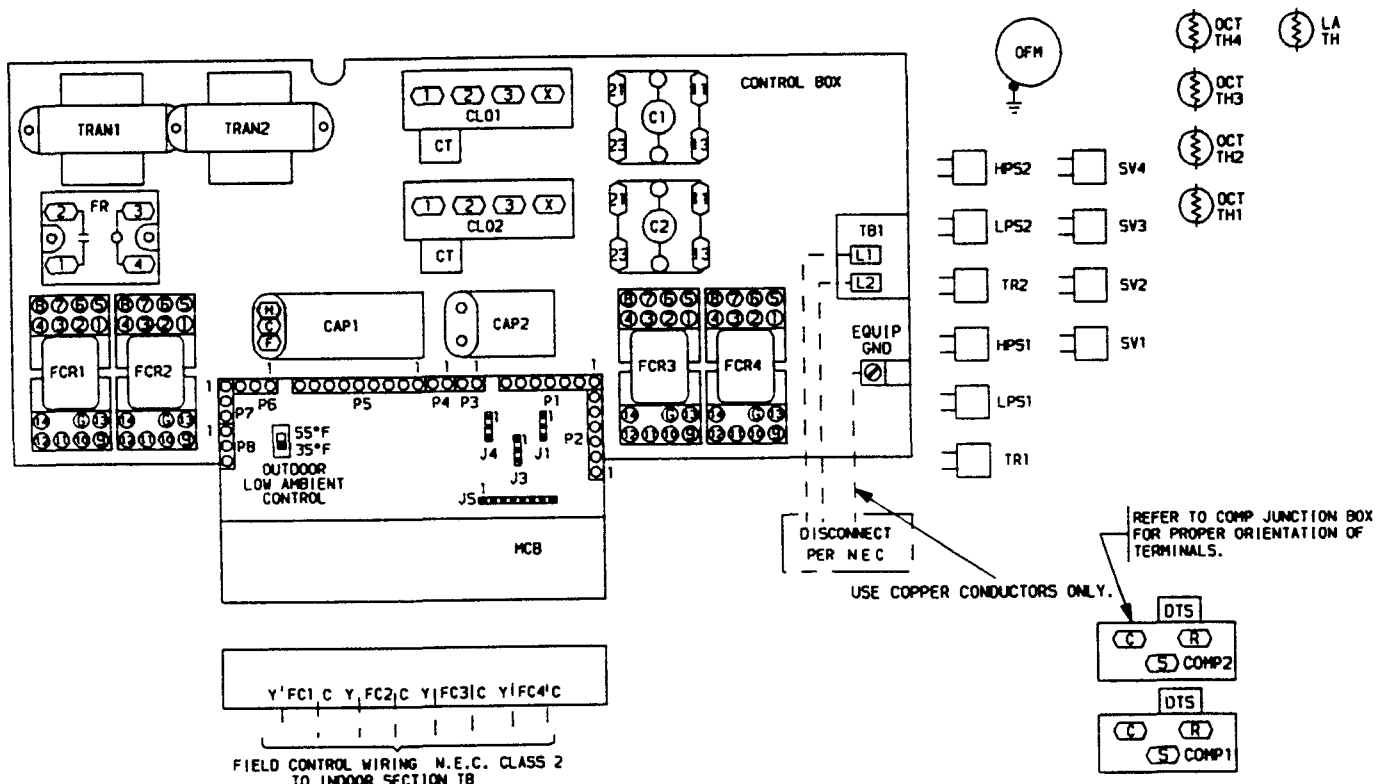
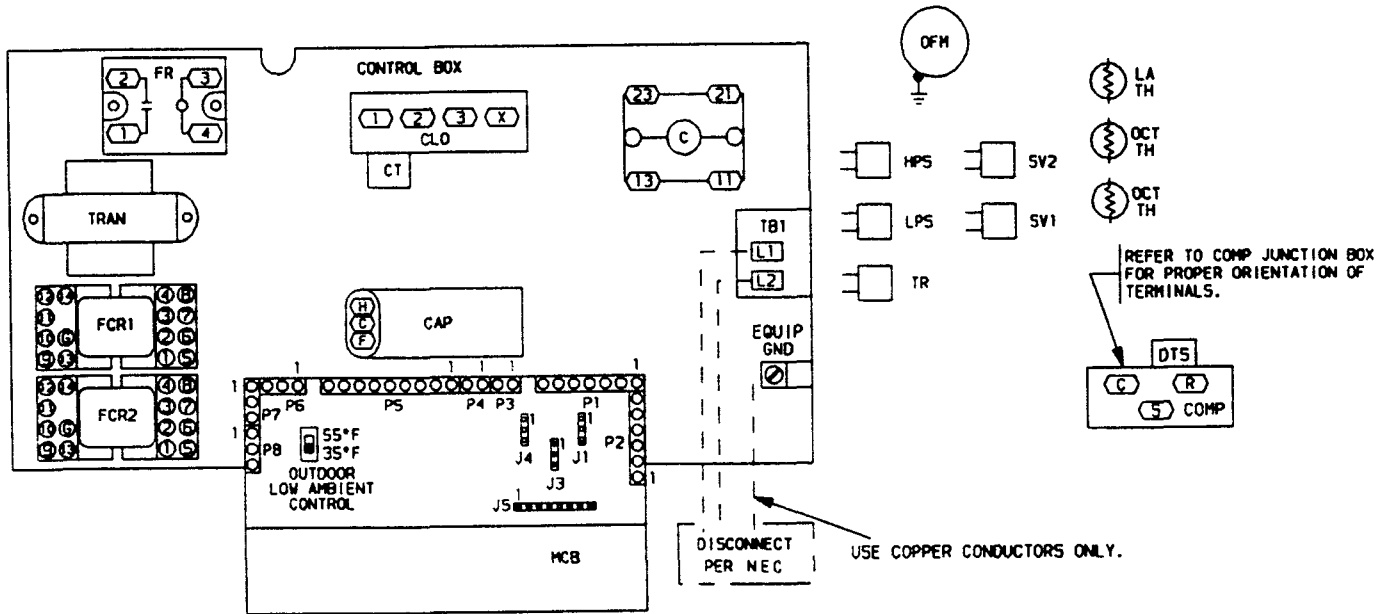


Fig. 9 — Control Line Connections (Typical Connections for Each Type of Fan Coil Illustrated)



LEGEND FOR FIG. 10 AND 11

C — Contactor, Compressor
CAP — Capacitor
CLO — Compressor Lock Out
COMP — Compressor Motor
CT — Current Transformer
DTS — Discharge Temperature Switch
EQUIP — Equipment
FC — Fan Coil Unit
FCR — Fan Coil Relay
FR — Fan Relay

GND — Ground
HPS — High-Pressure Switch
LPS — Low-Pressure Switch
LA — Low Ambient
MCB — Multi-Split Control Board
NEC — National Electrical Code
OCT — Outdoor Coil Temperature
OFM — Outdoor-Fan Motor
SV — Solenoid Valve
TB — Terminal Block
TH — Thermistor

TR — Transducer
TRAN — Transformer
Terminal (PCB, Field)
Terminal (PCB, Factory)
Terminal (Marked)
Terminal (Unmarked)

x — Terminal Block
● — Splice
— — Factory Wiring
- - - Field Control Wiring
- - - Field Power Wiring
- - - Option or Accessory Wire
= = = PCB Run

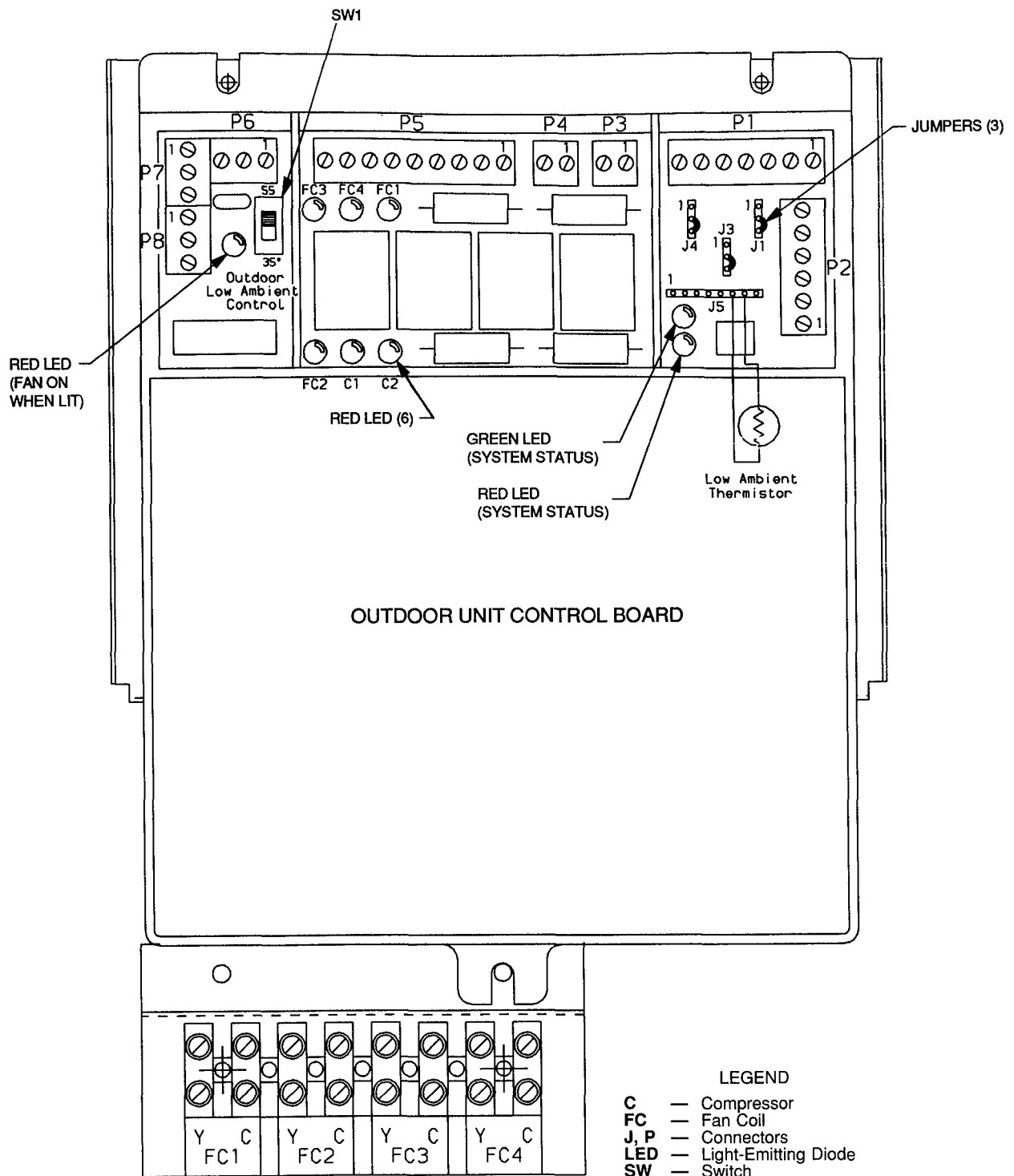


Fig. 12 — Outdoor Unit Microprocessor Control Board

Table 2 — Electrical Data

UNIT SIZE 38HDS	V-PH-HZ	OPERATIONAL VOLTAGE*		COMPRESSOR			FAN	POWER SUPPLY	
		Min	Max	Quantity	RLA	LRA	FLA	MCA	Max Fuse or HACR-Type Circuit Breaker Amps
024	208/230-1-60	187	254	1	12.9	62.5	0.70	16.8	25
048				2			1.45	30.5	40

LEGEND

FLA — Full Load Amps
HACR — Heating, Air Conditioning, Refrigeration
LRA — Locked Rotor Amps
MCA — Minimum Circuit Amps per NEC Section 430-24
NEC — National Electrical Code
RLA — Rated Load Amps (Compressor)

*Permissible limits of the voltage range at which unit will operate satisfactorily.

NOTES

1 The 38HDS units contain a 24-v transformer; additional transformers are not required

- 2 All motors and compressors contain internal overload protection.
- 3 In compliance with NEC requirements for multimotor and combination load equipment (refer to NEC Articles 430 and 440), the overcurrent protective device for the unit shall be fuse or HACR breaker.
4. Motor RLA values are established in accordance with UL (Underwriters' Laboratories) Standard 465.



6. Fully backseat (open) the vapor supply and vapor return tube service valves.
7. Turn on main disconnect switch(es) to indoor fan coil units and outdoor condensing unit.
8. Using the remote controller for each indoor fan coil unit, turn on each fan coil unit and operate each unit in each mode (i.e., electric heat [if provided], and fan cooling) for 15 minutes to test for proper operation.
9. Test for proper refrigerant charge in each circuit using the subcooling method.

Leak Test — Field piping and all tubing connections must be leak tested by the pressure method described in the Carrier General Training for Air Conditioning Manual (GTAC2), Module 5. Use R-22 at approximately 25 psig backed up with an inert gas to reach a total system pressure not to exceed 245 psig.

Evacuate and Dehydrate — Field piping and fan coil must be evacuated and dehydrated by either of the methods described in GTAC2, Module 5.

⚠ WARNING

Service valves must be fully backseated to close service port. There is no Schrader valve at the service port, and failure to backseat the valve could result in loss of system charge or personal injury.

Charge System — Release charge into system by opening (backseating) vapor supply and vapor return line service valves. Open ONLY those service valve sets which have fan coil unit sections connected to them. DO NOT open valves where no field tubing has been connected.

Unit Operation

NOTE: AUTO. fan mode is used as the unit operation example for ALL fan coil units in this section. Contact your local Carrier dealer for operation information in other fan modes.

FAN COIL UNITS — Each fan coil unit has a self-contained control system that determines the set point for fan coil operation, fan mode operation, and heating mode operation (if provided). The fan coil units are equipped with either a wired or wireless remote controller set (wireless remote controller is not available for 40QKB fan coil units). Set points and fan modes may be determined separately for each fan coil unit.

Each fan coil unit may call for cooling operation independently. On a call for cooling operation by a single fan coil unit, a 24-v signal is sent to the 38HDS outdoor unit and energizes a control relay. The indoor blower starts according to the normal fan coil unit sequence of operation. The control relay (in the outdoor unit) initiates operation of a cooling cycle for the respective indoor unit refrigerant circuit; including opening a liquid line solenoid valve in the outdoor unit.

As the set point at each fan coil is satisfied, its individual 24-v signal to the 38HDS unit stops, and the respective solenoid valve for each fan coil unit closes. The indoor fan cycles off. The 40QAB and 40QYB fan coil units then begin room sampling operation after a 3-minute off period (during sampling, the fan motor runs at low speed for 1 minute to sample the demand in the space; then cycles off until the next sampling period if no demand is found).

38HDS OUTDOOR CONDENSING UNIT — The outdoor unit is equipped with a control that will monitor the indoor fan coil unit cooling request. The control will turn on solenoid valves for the appropriate indoor fan coil unit system. The control will also combine the cooling requests to control up to 2 compressors.

The control provides a 2-minute compressor time-delay device which disables the compressor for 2 minutes. The time delay device timers will be initialized when the unit is powered up (for the first 2 minutes).

The head pressure for the 2 compressors will be monitored to control the outdoor fan output. The control reads an outdoor temperature thermistor to determine if the head pressure should be used to control the fan output. There are 3 jumpers and one slide switch used to determine if the head pressure should be used to control the fan output. See 38HDS MICROPROCESSOR CONTROL OF OUTDOOR FAN section on next page for more details.

The 38HDS unit control also includes an integral head pressure control function. This function will maintain a minimum head pressure by cycling the outdoor fan motor in response to inputs from the thermistor (for outdoor ambient temperature) and the transducers (for system discharge pressures in each compressor circuit).

Operation — The 38HDS unit receives a 24-v control signal from each fan coil unit as each fan coil unit initiates a demand for cooling. The 24-v signal energizes a control relay in the 38HDS unit (one relay per fan coil unit). The refrigerant flow to each fan coil unit is controlled through a solenoid valve (one valve per fan coil unit). The solenoid valve(s) will not open until compressor operation is initiated by the controller.

The microprocessor control in the 38HDS unit includes a 2-minute, anti-short cycle, time-delay function. This function provides a minimum off delay between compressor run stages (2 minutes each from the end of the last on period to the beginning of the next on period). If more than 2 minutes have passed since the end of the last on period, the compressor will be ready to restart with initiation of demand from any fan coil unit on its circuit.

Increased Demand for Cooling

NOTE: There are 2 separate compressor circuits in the 38HDS048 units (circuit A and circuit B). Each circuit operates independently, and will operate as follows (as will the single-circuit 024 units) upon receiving the first 24-v cooling demand signal from a fan coil unit:

1. After the 2-minute time-delay function is satisfied, the appropriate compressor starts.
2. The solenoid valve connected to the fan coil sending the demand signal is energized (at the 38HDS units).
3. The outdoor fan starts, and its operation is controlled by the microprocessor as described in 38HDS Microprocessor Control of Outdoor Fan section below.

When a second fan coil unit signals a demand for cooling, its associated solenoid valve is energized immediately, allowing refrigerant to flow to both fan coil units simultaneously.

Decreased Demand for Cooling — When a fan coil unit's demand for cooling ends, the 24-v signal to the 38HDS unit stops, and the appropriate solenoid valve closes. If the other fan coil unit on this circuit still has a demand, the appropriate compressor will continue to run as long as necessary for the second fan coil unit.

When the second fan coil unit's demand for cooling ends, its solenoid valve closes, and the appropriate compressor stops. The compressor will not start for at least 2 minutes after the end of this cycle due to the time-delay function.

On size 024 units, when the compressor stops, the outdoor fan also stops. On size 048 units, outdoor fan operation may continue under control of the 38HDS microprocessor if the other refrigerant circuit is still operating. The outdoor fan will only stop when both compressors are off. Refer to 38HDS Microprocessor Control of Outdoor Fan section below for more details.

38HDS MICROPROCESSOR CONTROL OF OUTDOOR FAN — The microprocessor control has a built-in head pressure control system that will cycle the outdoor-fan motor to maintain a selected discharge pressure. The microprocessor senses outdoor ambient temperature using a thermistor and refrigerant pressure using a pressure transducer mounted on the compressor circuit discharge line. The 38HDS024 units have one transducer, and the 048 units have two.

The factory set points for the head pressure control operation are 55 F for outdoor ambient temperature and 250 psig for discharge pressure. The current set points can be determined as follows (see Fig. 12): If pin numbers 2 and 3 on J1 are jumpered, the setting is 250 psig (factory setting); if pin numbers 1 and 2 are jumpered, the setting is 200 psig. When switch SW1 is set at the top setting, ambient set point is 55 F. When the switch is set to the bottom setting, ambient set point is 35 F.

When the outdoor ambient temperature is above the outdoor ambient set point and both fan coils on a compressor circuit are calling for cooling operation, the outdoor fan will run at full speed whenever compressor operation is permitted. When only one fan coil is calling for cooling, fan cycling is permitted at all ambients. Fan motor will be cycled on and off to maintain set point discharge pressure.

When the outdoor ambient temperature is below the specified set point, the fan motor will be cycled on and off to maintain a compressor discharge pressure at the specified pressure set point. On 38HDS048 units with 2 compressors running, the compressor with the lower head pressure will control the fan operation. If only one compressor is running, that compressor will control the fan operation.

If the discharge pressure on either circuit exceeds 370 psig, the outdoor fan motor will run continuously, and the fan cycling function will be bypassed until the discharge pressure decreases to 365 psig.

STATUS INDICATOR LIGHTS (see Table 3 and Fig. 12) — The 38HDS control board is equipped with LED indicators to aid in evaluating the status of the control system, including:

- time delay function status
- fan coil unit demand status
- head pressure control status
- current unit malfunctions

UNIT MALFUNCTION — Each compressor circuit is equipped with a high-pressure switch (HPS), a low-pressure switch (LPS), and a discharge temperature switch (DTS). These safety devices are located in a Cycle-LOC™ device circuit that prevents compressor operation if any of these safety devices is activated. The lockout can be reset by turning the main power to the 38HDS unit off, then on again.

Compressor overcurrent protection is achieved by an internal linebreak overload, which will automatically reset when the motor temperature cools to a satisfactory level. Manual reset of Cycle-LOC circuit may also be required.

Pressure transducers and the outdoor ambient thermistor are monitored by the 38HDS controller. If a pressure transducer is found to be out of range, the LEDs will flash a code for this fault, but the control will continue to cycle the outdoor fan according to input from the other transducer. If only one transducer is active and is determined to be out of range, the head pressure control will be bypassed and the fan will run continuously. If the thermistor is found to be out of range, the control will allow fan cycling per transducer input, and the LEDs will flash a code for this failure. See Table 3 for diagnostic codes.

Table 3 — System Status Red and Green LEDs and Fault Codes

GREEN LED		RED LED		UNIT STATUS
Number of Flashes On	Number of Flashes Off	Number of Flashes On	Number of Flashes Off	
1	1	—	Always	System Ready
1	1	1	1	Low Head Pressure, Circuit 1
1	1	2	2	High Head Pressure, Circuit 1
1	1	3	3	Low Head Pressure, Circuit 2
2	2	1	1	High Head Pressure, Circuit 2
2	2	2	2	Low Outdoor Ambient Temperature, Outdoor Thermistor
2	2	3	3	High Outdoor Ambient Temperature, Outdoor Thermistor
3	3	1	1	Hardware Error
3	3	2	2	Time Guard® Device Active, Circuit 1
3	3	3	3	Time Guard Device Active, Circuit 2

LED — Light-Emitting Diode

SERVICE

⚠ WARNING

Before performing recommended maintenance, be sure unit main power switch is turned off, and be sure all disconnects for indoor fan coil units are open. These systems typically have one disconnect per fan coil unit. Failure to turn off unit main power and open all disconnects may result in electrical shock or injury from rotating fan blade.

Outdoor Fan — A reinforced wire mount holds the outdoor fan assembly in position. See Fig. 13 for proper mounting positions.

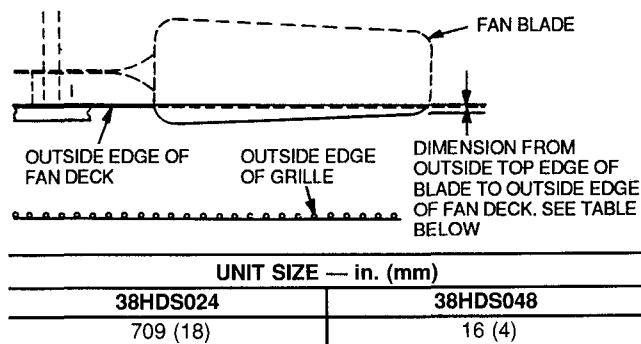


Fig. 13 — Condenser-Fan Mounting Positions

Scroll Compressors — The 38HDS condensing units use scroll compressors. The 38HDS024 unit has one compressor, and the 38HDS048 unit has 2 compressors which are stacked vertically (using a sheet metal stand to support the top compressor). In the event of a compressor failure, remove and replace the compressor(s) as follows:

1. Attach refrigerant hose to suction service valve of the circuit related to the defective compressor.
2. Recover refrigerant using accepted techniques.
3. Remove discharge and suction piping from compressor by unsweating. Pass either nitrogen or another inert gas through the compressor.
4. Remove compressor mounting bolts. Use a swivel socket to remove the bolt in the rear.
5. Carefully pull compressor stand and piping away from the compressor to remove the compressor.
6. Reverse Steps 1-5 to install the new compressor.

TIME-DELAY DEVICE OVERRIDE — The time delay device can be overridden for easier unit servicing by temporarily shorting the time delay device override connector (P9) located in the control box. The short MUST be removed before the time delay device timer can be cleared.

SYSTEM STATUS LEDs AND FAULT CODES — In normal operating mode, the green LED located on the outdoor unit microprocessor board will flash on and off at a rate of once per second. Whenever a fan coil unit, compressor, or outdoor fan is energized, a red LED designated for each fan coil unit will be illuminated. If there is an error condition, a code will be displayed using the green and red system status LEDs. The green LED will blink its code first, followed by the red LED. The LEDs will flash at a rate of once every 2 seconds, with a 2-second pause between the last red LED flash and the first green LED flash of the next code. See Table 3.

High-Pressure Relief Valve — Valve is located in compressor. Relief valve opens at a pressure differential of approximately 450 ± 50 psig between suction (low side) and discharge (high side) to allow pressure equalization.

Internal Current and Temperature Sensitive Overload — Control resets automatically when internal compressor motor temperature drops to a safe level (overloads may require up to 45 minutes to reset). When an internal overload is suspected of being open, check by using an ohmmeter or continuity tester. If necessary, refer to GTAC2, Module 9, for complete information.

High-Pressure Switch — This switch, located on discharge line, protects against high discharge pressures caused by such events as overcharge, condenser-fan motor failure, system restriction, etc. It opens on pressure rise at about 426 psig. If system pressures go above this setting during abnormal conditions, the switch opens.

⚠ WARNING

DO NOT attempt to simulate these system abnormalities — high pressures pose a serious safety hazard.

High-pressure switch is checked with an ohmmeter. If system pressure is below approximately 320 psig switch shows continuity. The high-pressure switch will reset automatically after CLO (compressor lockout switch) has been reset and time-delay device has completed its timing cycle.

Low-Pressure Switch — This switch, mounted on the suction line, has fixed, non-adjustable settings. To check pressure switch, attach pressure gage to suction service valve gage port. Slowly close liquid shutoff valve and allow compressor to pump down. Do not allow compressor to pump down below 2 psig. Compressor should shut down when suction pressure drops to about 7 psig, and should restart when pressure builds up to about 22 psig after CLO has been reset and time-delay device has completed its timing cycle.

Service Valves — The service valves in the outdoor unit are frontseated at the factory. This means the refrigerant charge is isolated from the line-set connection ports. To prevent damage to the valve, use a wet cloth or other accepted heat sink material on the valve before brazing.

The service valves must be backseated (turned counter-clockwise until seated) before the service port caps are removed and the hoses of gage manifold connected. In this position, refrigerant has access from and through outdoor and indoor unit. The service valve cannot be field repaired; only a complete valve or valve stem seal and service port caps are available for replacement.

NOTE: Do not open service valves which are not connected to a tubing set. Be sure any inactive circuits are capped off.

Refrigerant Charging

⚠ WARNING

To prevent personal injury, wear safety glasses and gloves when handling refrigerant. Do not overcharge system — this can cause compressor flooding.

⚠ WARNING

Service valves must be fully backseated to close service port. There is no Schrader valve at the service port, and failure to backseat the valve could result in loss of system charge or personal injury.

NOTE: Do not vent or depressurize unit refrigerant to atmosphere. Remove and recover refrigerant following accepted practices (see GTAC2, Module 5).

The 38HDS units are factory charged with a full operating charge. Check the system for proper charge level using the subcooling method.

If a refrigerant system must be opened for major service work, first recover refrigerant in system as described in GTAC2, Module 5. Evacuate and dehydrate the system when ready to recharge; then weigh in the proper refrigerant quantity (as marked on the unit data plate for each circuit.)

SUBCOOLING CHARGING METHOD

1. Operate the unit a minimum of 15 minutes before checking the charge.
2. Measure discharge pressure by attaching an accurate gage to the discharge service port. DO NOT use the external service valves for this pressure reading.
3. Measure the vapor supply line temperature by attaching an accurate thermistor-type or electronic thermometer to the vapor supply line near the outdoor coil. See Fig. 14.
4. Refer to Table 4 to find the required subcooling temperature for the unit. Find the point at which the required subcooling temperature intersects the measured internal discharge service port pressure in Table 5.

5. To obtain the required subcooling temperature at a specific discharge pressure, add refrigerant if vapor supply line temperature is higher than indicated, or remove refrigerant if temperature is lower than indicated. Allow a tolerance of $\pm 3\%$.

Table 4 — Required Unit Subcooling

UNIT 38HDS	SUBCOOLING AT TXV INLET (F) WITH ALL FANS OPERATING
024	19
048	16

TXV — Thermostatic Expansion Valve

Table 5 — Required Liquid Line Temperatures

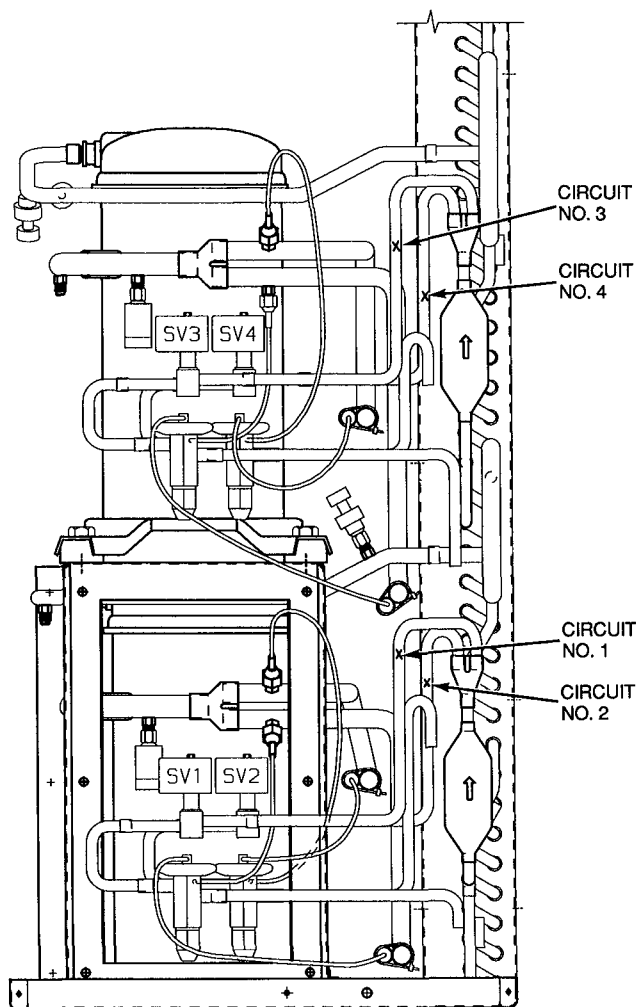
PRESSURE (Psig) AT SERVICE FITTING	REQUIRED SUBCOOLING TEMPERATURE (F)					
	0	5	10	15	20	25
134	76	71	66	61	56	51
141	79	74	69	64	59	54
148	82	77	72	67	62	57
156	85	80	75	70	65	60
163	88	83	78	73	68	63
171	91	86	81	76	71	66
179	94	89	84	79	74	69
187	97	92	87	82	77	72
196	100	95	90	85	80	75
205	103	98	93	88	83	78
214	106	101	96	91	86	81
223	109	104	99	94	89	84
233	112	107	102	97	92	87
243	115	110	105	100	95	90
253	118	113	108	103	98	93
264	121	116	111	106	101	96
274	124	119	114	109	104	99
285	127	122	117	112	107	102
297	130	125	120	115	110	105
309	133	128	123	118	113	108
321	136	131	126	121	116	111
331	139	134	129	124	119	114
346	142	137	132	127	122	117
359	145	140	135	130	125	120

Compressor Lockout Switch (CLO) — Units are provided with compressor lockout protective device. If the compressor shuts down due to any safety device, a current loop monitoring the compressor current senses no current flow. The unit will lock out until the control power is interrupted to reset the lockout. Determine reason for safety trip. To restart, turn the 38HDS main disconnect to OFF, then to ON position.

Outdoor-Coil Temperature Thermistor (OCT TH)

— Thermistor is for use only with duct-free split systems employing a microprocessor control (40QA and 40QY fan coil units only) as part of the system diagnostics. Refer to separate installation instructions for the 40QA and QY indoor units. The thermistor is mounted in a well attached to the condenser coil. See Table 6 for thermistor characteristics.

NOTE: The 40QK in-ceiling fan coil units use 24-v electro-mechanical controls for system diagnostics. Refer to 40QK installation instructions for more details.



LEGEND
SV — Service Valve
X — Measurement Location

Fig. 14 — Vapor Supply Line Measurement Locations (38HDS048 Unit Shown)

Table 6 — Thermistor Characteristics

TEMP (F)	RESISTANCE (OHM)		
	MIN	NOMINAL	MAX
20	36,230	37,100	37,980
30	28,330	28,930	29,540
32	26,870	27,430	27,990
40	22,320	22,740	23,160
50	17,710	17,990	18,280
60	14,230	14,420	14,620
70	11,490	11,630	11,760
77	9,900	10,000	10,100
80	9,340	9,440	9,540
90	7,610	7,700	7,800
100	6,230	6,320	6,410
110	5,130	5,220	5,310
120	4,250	4,340	4,420
130	3,550	3,620	3,690
140	2,960	3,030	3,100
150	2,500	2,560	2,620
160	2,120	2,170	2,230
170	1,810	1,850	1,900
180	1,540	1,580	1,630
190	1,320	1,360	1,400
200	1,140	1,170	1,210
210	980	1,020	1,050
212	954	986	1,019
220	853	882	912
230	742	769	796

NOTES:

- 1 A high quality digital volt-ohmmeter is required to check thermistor resistance.
- 2 Measure temperature at thermistor location with an accurate thermocouple-type temperature measuring instrument
- 3 If a more accurate check is required, thermistor must be removed and checked at a known temperature (freezing point or boiling point of water)

Low-Ambient Control Thermistor (LAT) — The low-ambient control thermistor is located on the outdoor fan support bracket. See Unit Operation section on page 14 and Fig. 12 for more information about the controls.

Pressure Transducer — The pressure transducer activates the low-ambient control when discharge pressure drops to either 250 psig or 200 psig based on the setting of control jumper J1. See Unit Operation section on page 14 for more information about the controls.

If transducer has to be removed for any reason, first disconnect the snap lock plug. The transducer can now be unscrewed and removed without loss of refrigerant since there is a Schrader-type core valve in the transducer port. When reinserting the transducer, reverse this procedure. Be careful not to overtighten the transducer.

MAINTENANCE

⚠ WARNING

Before performing recommended maintenance, be sure unit main power switch is turned off. Failure to do so may result in electric shock or injury from rotating fan blade.

Lubrication

FAN-MOTOR BEARINGS — Oiling holes are provided at each end of condenser-fan motor. Remove fan motor and lubricate motor with 32 drops (16 drops per hole) of SAE-10 (Society of Automotive Engineers) nondetergent oil at the following intervals:

- Annually when environment is very dirty, ambient temperature is higher than 105 F (40 C), and average unit operating time exceeds 15 hours a day, or
- Every 3 years when environment is reasonably clean, ambient temperature is less than 105 F (40 C), and unit operating time averages 8 to 15 hours a day, or
- Every 5 years when environment is clean, ambient temperature is less than 105 F (40 C), and unit operating time averages less than 8 hours a day.

COMPRESSOR — Compressor contains factory oil charge; replace oil when lost. See Table 1 for oil recharge and refer to Carrier "Refrigerant Service Techniques" training book for oil recharging procedure.

NOTE: Use only Cryol 150A oil in these units.

Cleaning Coils — Coil should be washed out with water or blown out with compressed air. Note that the blow-thru design causes dirt and debris to build up on the inside of the coils.

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

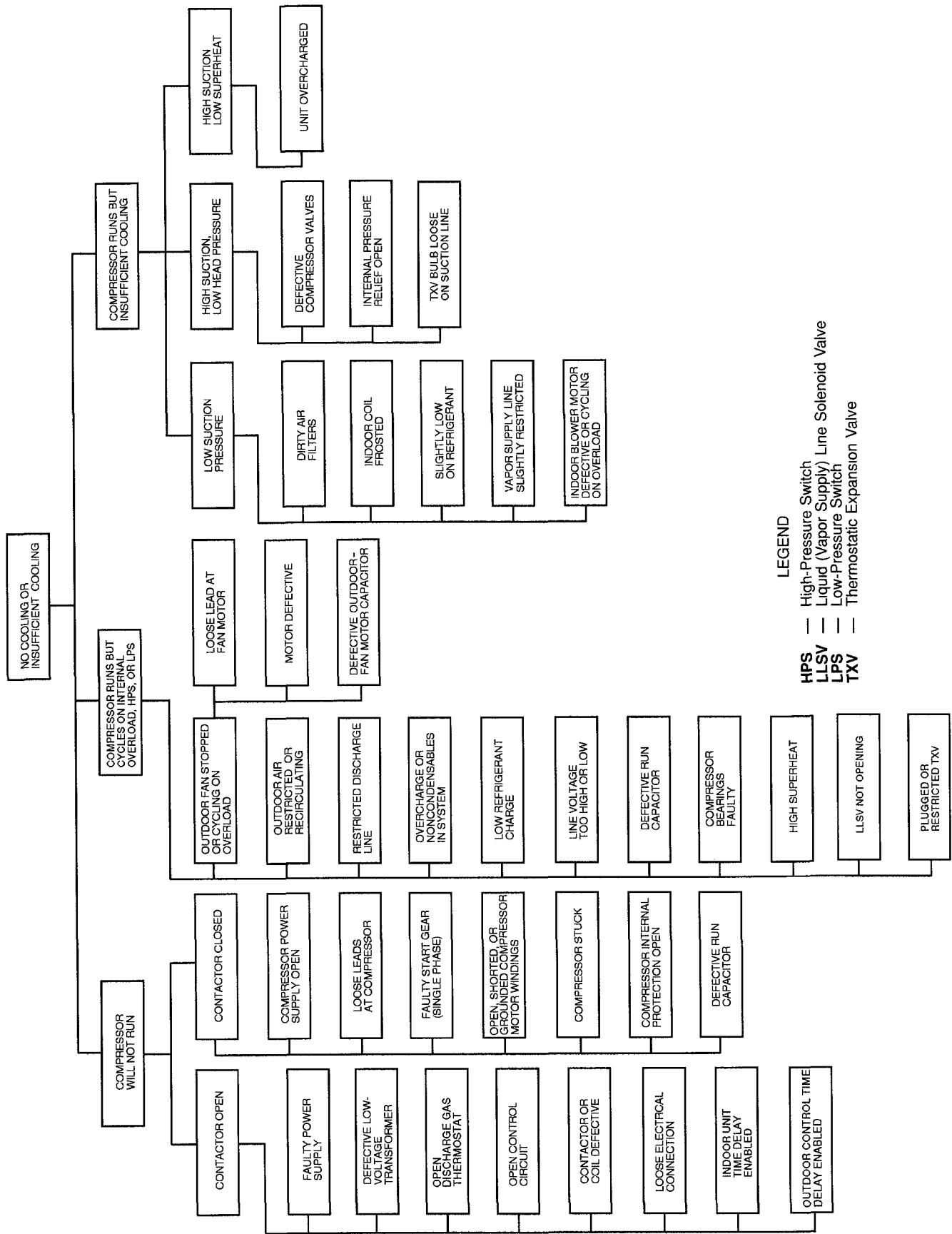
1. Turn off unit power.
2. Using a garden hose or other suitable equipment, flush coil from the outside to remove dirt. Be sure to flush all dirt and debris from drain holes in base of unit. Fan motors are waterproof.

TROUBLESHOOTING

Checking Cooling Control Operation — Check the system for proper control operation as follows (refer to Troubleshooting Chart on page 20 for more details):

1. Check status LED at the 38HDS control board. A green LED will flash on and off at one-second intervals when the unit is ready to run. If a time delay function is active (3 green LED flashes followed by 2 or 3 red LED flashes), wait 2 minutes for time delay to clear.
2. At a fan coil unit remote controller, select AUTO fan mode, COOL system mode, and adjust set point down until thermometer segment is fully displayed. Notice the snowflake display on the handset (system mode is COOL) and the compressor run display (demand signal is being sent to the outdoor unit). Note that the indoor fan starts at low speed.
3. At the outdoor unit, check that the LED signal lamp for the indoor fan coil unit is illuminated, that the compressor and the outdoor-fan motor start and run, that the solenoid valve for the indoor fan coil is energized, and that refrigerant is flowing to the correct indoor unit.
4. Observe that cooling operation shuts down when control setting at the fan coil unit is satisfied (compressor stops, outdoor fan stops, solenoid valve closes, and LED for fan coil demand is off).
5. Observe operation of indoor fan during the off period. The fan will be off for 3 minutes, then turn on for 1 minute at low speed (for occupied space air temperature sampling).

TROUBLESHOOTING CHART — COOLING CYCLE



LEGEND
HPS — High-Pressure Switch
LLSV — Liquid (Vapor Supply) Line Solenoid Valve
LPS — Low-Pressure Switch
TXV — Thermostatic Expansion Valve