Carrier®
HEATING & COOLING

38EH/QH Multiplex System

Installation and Start-Up Instructions

NOTE: Use these instructions in conjunction with separate instructions packaged with outdoor section to be installed (38EH condensing unit or 38QH heat pump). Valuable information is provided in both publications.

GENERAL (See Fig. 1, 2.)

The Multiplex air conditioning system requires 4 major components:

1. An outdoor unit, either a 38EH condensing unit, or a 38QH heat pump.
2. Two or three wall-mounted indoor fan coil units (40QX) for distributing cool or warm air indoors. (Three units maximum)
3. A Multiplex control box which connects outdoor coil with indoor fan coils and contains all necessary controls plus piping and electrical connections.
4. A standard room thermostat for *each* indoor fan coil unit.

SAFETY CONSIDERATIONS

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

Untrained personnel can perform basic maintenance, such as cleaning indoor coils and cleaning and replacing filters. All other operations should be performed by trained service personnel. When working on air conditioning equipment, observe precautions in literature and on tags and labels on 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) for special installation requirements.

⚠ WARNING

Before installing or servicing system, always turn off main power to system. More than one disconnect switch may be needed. Electrical shock can cause personal injury.

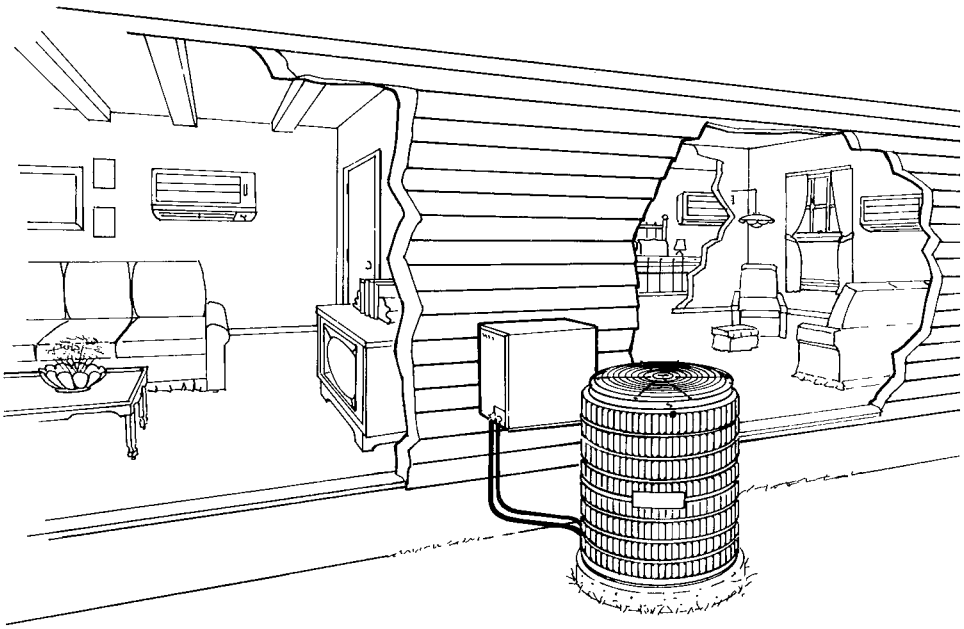


Fig. 1 — The Multiplex System — Three Indoor Fan Coils Installed; One, Two or Three Indoor Fan Coils Operating

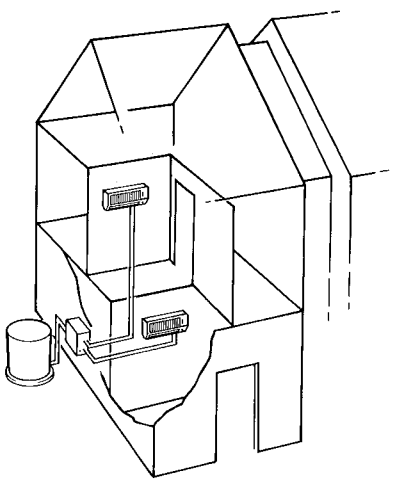


Fig. 2 — Two Indoor Fan Coils Installed; One or Two Indoor Fan Coils Operating

PREPARING FOR INSTALLATION

Step 1 — Check Equipment and Jobsite — Position outdoor unit on a solid, level mounting pad. It is recommended that unit be attached to pad using tiedown bolts. Installer may wish to wait until final installation steps before fastening tiedown bolts. Unit fastens to pad with use of holes provided in unit mounting feet (QH) or base (EH). Refer to separate outdoor unit installation instructions packaged with unit for outdoor section dimensional and physical data and diagrams.

NOTE: Be sure to locate outdoor unit so that connection fittings are lined up to where Multiplex control box is to be located. Keep in mind that Multiplex control box must be conveniently located for connection to indoor fan coils.

When installing system components, allow sufficient space around all units for airflow clearance, wiring, refrigerant piping and servicing. Maintain a minimum of 4 ft clearance from obstructions above outdoor section and 18 in. on 3 sides of unit (12 in. on remaining side). For indoor fan coil clearances see Table 1 clearances.

Position outdoor section so water or ice from roof or eaves cannot fall directly on unit.

Step 2 — Select Locations for Indoor Fan Coils — Be sure you have decided which rooms are to receive indoor fan coils (since piping and electrical wiring hole must be made in walls). Select walls which are: strong enough to support weight of units, not exposed to sunlight for long periods, accessible to convenient drainage of condensate away from patios, walls, etc., and free of blockage of air circulation around indoor fan coils.

1. Be sure indoor fan coils are easily accessible to refrigerant piping and electrical power line.

   IMPORTANT: *Maximum* refrigerant line distance from Multiplex box to any indoor fan coil should not exceed 5 feet. *Maximum* elevation differential between Multiplex control box and any indoor fan coil should not exceed 18 feet

2. Be sure indoor fan coil condensate tubing is accessible to proper drain.
3. Allow ample clearance for air filter to be removed by pulling straight downward.
4. Avoid obstacles near inlet and discharge grilles that block flow of air.
5. Be sure structural wall studs are sturdy enough to support mounting bracket and indoor fan coil.
6. Decide whether to run refrigerant tubing and electrical wiring inside walls, ceiling, floors, etc., or to outside of building. Under all circumstances, AccuRater™ must remain accessible for service.

Step 3 — Select Location for Multiplex Control Box — Control box contains connections for refrigerant tubing and for electrical wiring. Box may be located outdoors adjacent to outdoor section, or indoors in basement, closet, garage or other suitable area. Box should be positioned so that it can be conveniently inspected and serviced if necessary. Keep box out of reach of small children.

IMPORTANT: *Maximum* distance between control box and outdoor section must not exceed 10 feet. Refer to Table 1 for service clearance requirements.

Step 4 — Make Piping Hole in Wall (if needed)

1. Remove template from indoor fan coil carton. Tack or tape template to wall in location desired for indoor fan coil. NOTE: There are 2 sizes of indoor fan coils. Be sure to place correct sizes in rooms desired.
2. Cut a 2-1/2 in. diameter piping hole in wall as indicated on template. Hole may be cut only through interior wall for downward routing of tubing inside wall, or cut through to outside for routing tubing outdoors to control box.
3. If installer prefers piping hole in location off to side of indoor fan coil, mark off and make hole where it does not interfere with tubing joints.
4. After installing tubing, close off hole neatly, to protect tubing from hole edges and to seal against air leakage.
5. Piping hole must be made at downward angle to outside to ensure proper condensate drainage.

INSTALLATION (See Table 1.)

Step 1 — Install Mounting Bracket

1. Remove metal mounting bracket screwed to back of indoor fan coil unit.
2. Locate studs in wall. Fasten mounting bracket *level* (use carpenter's level) on wall using 6 one-in. mounting screws. See paper pattern for locations of screw holes. First begin holes in walls and studs for screws. Insert field-supplied screw anchors if studs are not used. See Fig. 3.
3. If mounting bracket on concrete wall using stud bolts, make stud bolt holes in locations shown on pattern.

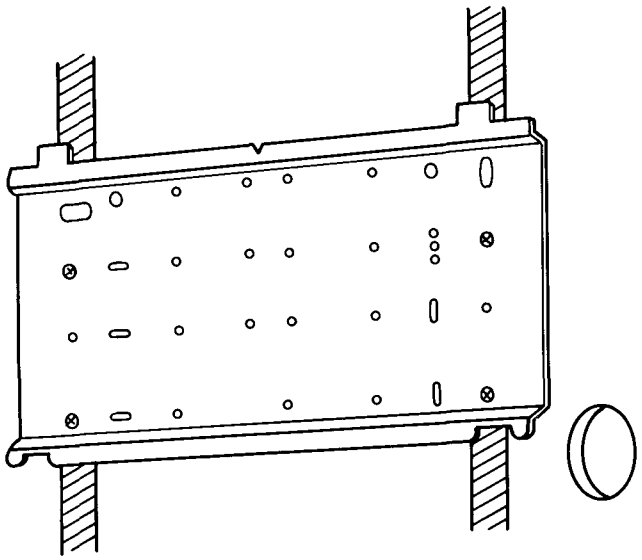


Fig. 3 — Mounting on Wall Studs

Step 2 — Install Electrical Wiring

1. Provide independent supply circuit for use of Multiplex control box, with independent fuse or circuit breaker. Provide disconnects as required by local or national code.

   NOTE: Be sure electrical supply has an identical voltage to that stated on indoor fan coil nameplate (see Table 2).

2. Provide branch circuit to be connected from Multiplex control box to terminal block in each indoor fan coil. It is recommended that a disconnect be provided at each remote indoor fan coil. Thermostat control wiring is wired to Multiplex control box.

Table 1 — Physical Data and Dimensions

INDOOR FAN COIL MODEL 40QX		006	008	013
OPERATING WEIGHT (lb)		35 2		57.2
REFRIGERANT		R-22		
DIMENSIONS (in.)				
Width	A	31 1		36 2
Height	B	14 6		15 0
Depth	C	6 6		10 0
COIL				
Tube Diameter (in.)		⅜		⅜
Rows		2		3
Refrigerant Circuits		1		2
Face Area (sq ft)		1 7		2 2
CONNECTIONS (in.) (OD)		Flare		
Size		⅜		½

MULTIPLEX CONTROL BOX 38QH900300		
OPERATING WEIGHT (lb)		48
DIMENSIONS (in.)		
Width	A	19 0
Height	B	19 7
Depth	C	12 1

Table 2 — Indoor Fan Coil Electrical Data

V-PH-HZ	MOTOR FLA MODEL 40QX		
	006	008	013
208-230/1/60	15	18	28

⚠ CAUTION

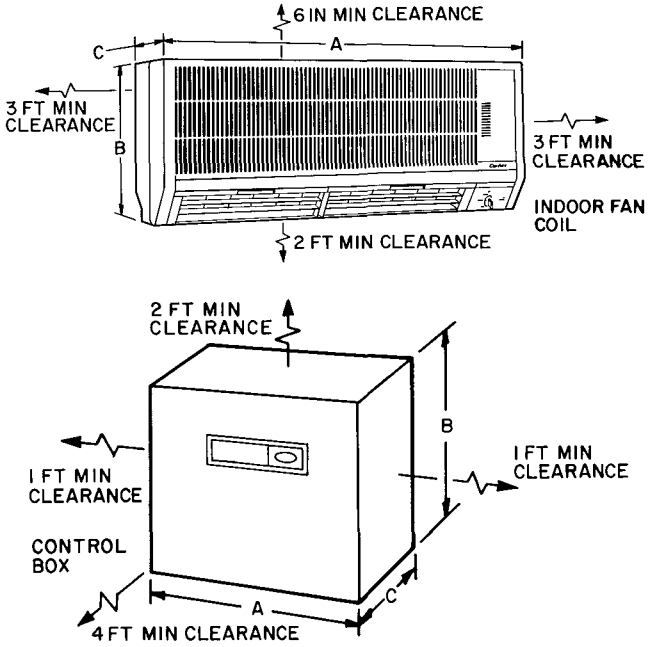
All wiring must be done in accordance with local codes and National Electrical Code (NEC).

3. Use a right-angle connector to properly orient branch circuit wiring entering indoor fan coil.
4. Remove front panel of indoor fan coil by removing screws along bottom of air discharge grille and pulling straight toward you. Save screws for reassembly. See Fig. 4.
5. Run branch circuit wiring (previously installed) into indoor fan coil through opening provided in back of indoor fan coil control box. Connect wiring to proper terminals in indoor fan coil control box.
6. Connect wiring according to wiring label provided on indoor fan coil control box cover.
7. Insert wiring into terminals. Tighten screws firmly.
8. Secure wiring neatly and safely.
9. Install thermostat according to instructions packaged with thermostat. Route thermostat wiring through wall to Multiplex control box and connect to proper terminals.
10. Replace indoor fan coil front panel.

Step 3 — Shape Indoor Piping and Drain Hose — (See Fig. 5.)

NOTE: Piping can be led out at back to left or right, whichever is preferred.

1. Shape indoor fan coil stub pipes carefully with minimum curvature radius of 4 inches.
2. At final installation, include enough pitch to ensure condensate drainage.
3. If insulated drain hose (27-1/2 in.) extended from indoor fan coil is not long enough, use 1/2-in. field-supplied extension hose. Insert insulated drain hose deep into extension hose to ensure a tight fit.



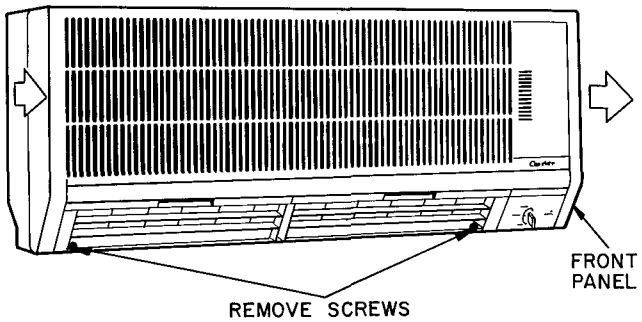


Fig. 4 — Removing Front Panel

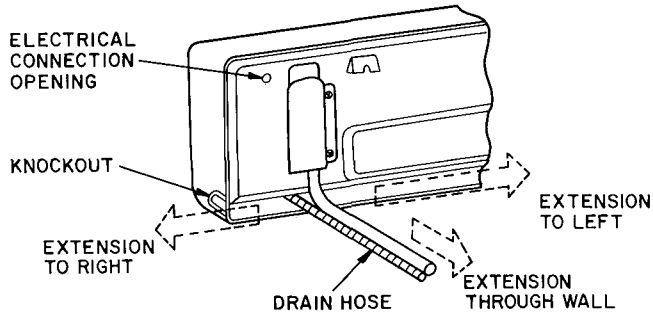


Fig. 5 — Extending Drain Hose

4. Where extension drain hose is routed inside room, be sure to wrap that section with field-supplied closed-cell foam insulation to avoid sweating and dripping.
5. There are 2 drain ports in drain pan. Use whichever is preferred, left or right. The insulated drain hose is factory installed to right-hand drain port. To switch to left connection, remove unit front panel. Follow procedure below:
   a. Loosen hose clamp. Disconnect insulated drain hose from right drain port of drain pan.
   b. Remove rubber plug from left drain port. Connect insulated drain hose onto left drain port. Reinstall hose clamp firmly.
   c. Replace removed plug in right drain port Be sure plug is securely installed.

Step 4 — Install Indoor Fan Coil

1. Electrical wiring, refrigerant piping and drain hose should be oriented as indoor fan coil is hung.

⚠ CAUTION

Be sure hooks on mounting bracket are engaged firmly with indoor fan coil.

2. Make sure indoor unit is in position and level, with no leaning backward, forward, left or right.
3. Be sure drain hose has no slack to form a trap. Trap in field-fabricated drain line is *not recommended.*
4. Pour water into drain pan. Check to see if water drains properly.

Step 5 — Connect Refrigerant Piping

1. Use only refrigeration grade copper tubing. All tubing and insulation is field supplied.
2. Insulate all refrigerant lines to prevent sweating. Use any acceptable heat resistant closed cell foam insulation.
3. To avoid kinking, measure and bend refrigerant tubing carefully, with a minimum bend radius of 4 inches. See Table 3 for proper tubing.

Table 3 — Tubing

TUBING	O.D. (in.)	MATERIAL
LIQUID-SIDE	3/8	Refrigeration grade copper tubing
VAPOR-SIDE	1/2	

4. Use tubing cutter to cut refrigerant tubing to size.
5. Place flare nut on tubing. Flare tubing end.
6. Assemble and install AccuRater™. See Fig. 6. AccuRater body is marked with an arrow that indicates the free flow direction. AccuRater piston must be installed with teflon seal facing the opposite direction of the arrow.

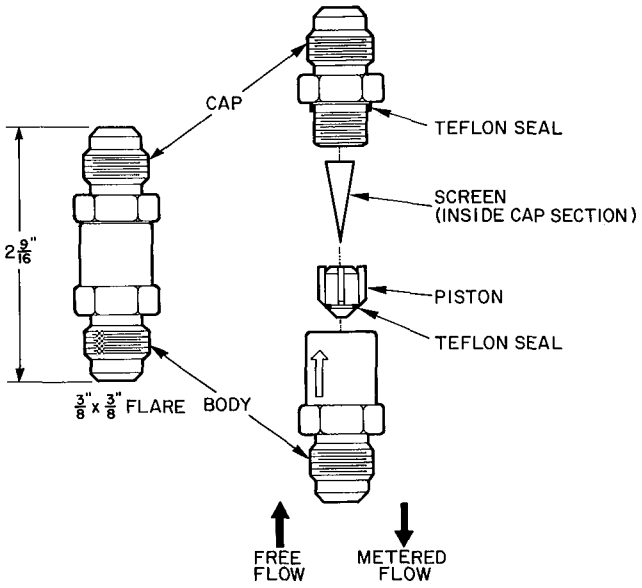


Fig. 6 — AccuRater Assembly

Heating AccuRaters are installed in liquid line at the Multiplex control box with arrows pointing away from box. Cooling AccuRaters are installed in liquid line at each indoor fan coil with arrows pointing away from coil.

7. Line up tubing. Secure flare nuts using backup wrench.
8. Secure tubing neatly and safely.

⚠ CAUTION

DO NOT BURY MORE THAN 3 FT OF REFRIGERANT TUBING IN GROUND. If any section of tubing is buried, there must be a 6-in. vertical rise to valve connections on outdoor unit. If more than recommended length is buried, refrigerant may migrate to cooler buried section during extended periods of unit shutdown. This causes refrigerant slugging and possibly compressor damage at start-up.

Step 6 — Wire Outdoor Unit — Refer to separate outdoor unit installation instructions packaged with unit, and system wiring diagram, Fig. 8.

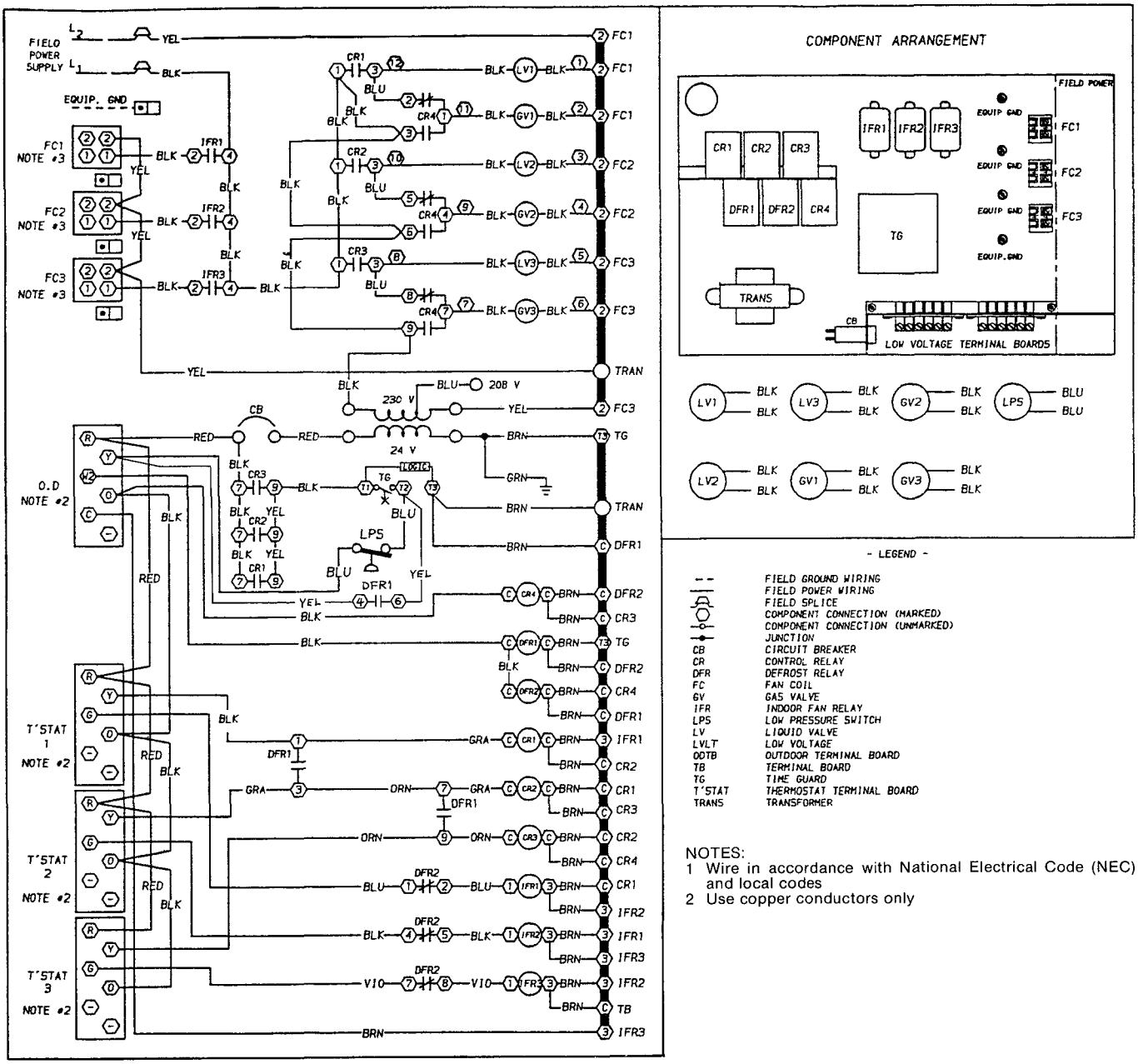
⚠ CAUTION

Improper wiring results in damage to electrical parts and possible personal injury. Be sure to check and double-check wiring *before* turning on electrical power to system.

1. Be sure to install unit so that piping connections line up so that they connect easily to Multiplex control box, which connects to indoor fan coils.
2. Connect control wiring from outdoor unit terminal board to proper Multiplex control box terminals.

Step 7 — Install Multiplex Control Box

1. Mount control box outdoors adjacent to outdoor section, or indoors in basement, closet, garage or other suitable area.
2. Use 4 field-supplied bolts (1/4 in. minimum diameter) suitable for intended mounting surface.
3. Be sure box is mounted where cover can be removed easily for internal inspection. Box should be at a height convenient for maintenance.
4. IMPORTANT: *Maximum* refrigerant line distance from Multiplex box to any indoor fan coil should not exceed 35 feet. *Maximum* elevation differential between Multiplex control box and any indoor fan coil should not exceed 18 feet.
5. There are 6 tubing connection stubs on right side of box, for 3 refrigerant liquid lines and 3 refrigerant vapor lines to indoor fan coils.
6. Connect the liquid and vapor line from each indoor fan coil to proper tubing stubs in Multiplex control box.
7. On left side of Multiplex control box are 2 tubing stubs, one for liquid line and one for vapor line to outdoor section. Connect liquid and vapor lines from outdoor section to proper tubing stubs in Multiplex control box. Condensate drain connection is also located on left side. If Multiplex control box is mounted indoors, be sure to connect drain connection to a suitable drain. It is recommended that a filter drier be installed in liquid line between outdoor unit and Multiplex box. Use biflow drier for heat pump application.
8. Make field power supply connection to Multiplex control box. Make branch circuit connection from indoor fan coils to Multiplex control box. Make control wiring connection from outdoor unit to Multi-



NOTES:
1 Wire in accordance with National Electrical Code (NEC) and local codes
2 Use copper conductors only

Fig. 7 — Multiplex Control Box Wiring Schematic

plex control box. Make thermostat wiring connections from separate room thermostats to Multiplex control box.

9. See Fig. 7 and 8 wiring diagrams and Table 4, in addition to wiring diagrams provided on separate components.

Table 4 — Multiplex Control Box Electrical Data

V-PH-HZ	OPER VOLTS		MINIMUM CIRCUIT AMPS	MAXIMUM OVERCURRENT PROTECTIVE DEVICE AMPS
	Max	Min		
208-230/1/60	254	187	15	15

Provide disconnects as required by local and national electrical codes. All wiring must be done in accordance with all codes.

Step 8 — Purge or Evacuate System

1. To properly purge or evacuate system:
   a. Disconnect all power to outdoor unit. Leave service valves closed.
   b. Energize Multiplex box.
   c. Set all room thermostats to call for cooling. This will energize all solenoid valves and ensure entire system is purged or evacuated.
2. Evacuate or purge air from lines with refrigerant bottle. Do not use system charge. Use safety glasses and gloves when handling refrigerant.
3. Check all connections for gas leaks.
4. Bleed excess refrigerant from system prior to opening service valves.

Step 9 — Charge System

1. Refrigerant charge amount for each system size is specified on Multiplex control box rating plate. Refrigerant charge amount specified on outdoor unit rating plate is contained in outdoor unit. Additional charge is required to bring total system charge up to that specified on Multiplex control rating plate.
2. Use standard weigh-in method for charging total system.

START-UP

1. Energize crankcase heater a minimum of 24 hours before starting outdoor unit. To energize heater only, set thermostat at OFF position and close electrical disconnect to outdoor unit.
2. Turn on main disconnect switch(es) to indoor fan coils and outdoor unit.
3. Set fan switch as desired (ON or AUTO.).
4. Set thermostat dial at desired temperature.
5. Set selector switch at HEAT or COOL. Operate unit for 15 minutes.
6. Check all indoor fan coil fan speeds for proper operation.

Motors and controls are designed to operate satisfactorily in voltage range shown in Table 2. If necessary to use manifold gages for servicing, refer to Carrier Standard Service Techniques Manual, Chapter 1, Refrigerants, page 1-5, Fig. 8, for bypass method of returning charge to system. Removal of liquid line charging hose without following these precautions may result in loss of charge.

LEGEND

C	— Contactor
CAP.	— Capacitor
CH	— Crankcase Heater
COMP	— Compressor
CR	— Control Relay
CSLR	— Current Sensing Lockout Relay
DB	— Defrost Board
DFT	— Defrost Thermostat
DR (DFR)	— Defrost Relay
FC	— Fan Coil
FM	— Fan Motor
GV	— Gas Valve
HPS	— High-Pressure Switch
IFR	— Indoor Fan Relay
LPS	— Low-Pressure Switch
LV	— Liquid Valve
OF	— Outdoor Fan
OL	— Overload
PL	— Plug
QT	— Quad Terminal
RVS	— Reversing Valve Solenoid
SC	— Start Capacitor
SR	— Start Relay
SW	— Switch
TB	— Terminal Board
TG	— Time Guard
TL	— Timing Logic
TRAN	— Transformer

Field Power Wiring

Field Ground Wiring

Field Control Wiring

Component Connection (Marked)

Component Connection (Unmarked)

Field Splice

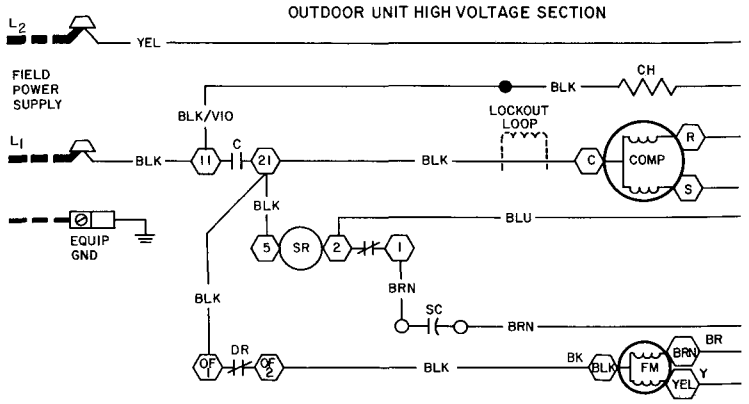
Junction

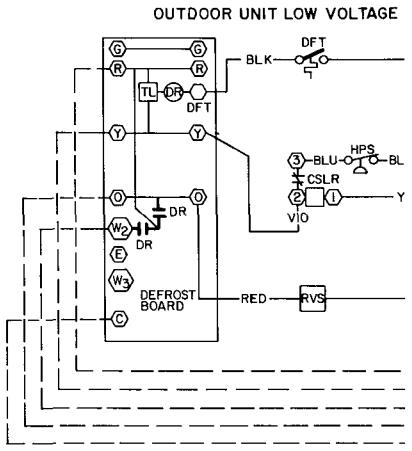
Junction (Thermostat to Subbase)

NOTES:
1 Wire in accordance with N E C (National Electrical Code) and local codes
2 Use copper conductors only
3 N E C Class 2 circuit. Connect low voltage from O D unit to O D terminal board in control box Connect room thermostats to proper terminal board for indoor fan coil to be controlled All connections to be R to R, C to C, etc
4 Compressor and fan motor furnished with inherent thermal protection.
5 Use thermostat Part No. HH07AT171 with subbase Part No HH93AZ173 (shown) or HH93AZ175

MODELS

OUTDOOR SECTION	MULTIPLEX CONTROL BOX	INDOOR FAN COILS
38EH018300DL **38EH030300DL** **38QH018300MX** **38QH030300MX**	38QH900300	40QX006300 40QX008300 40QX013300





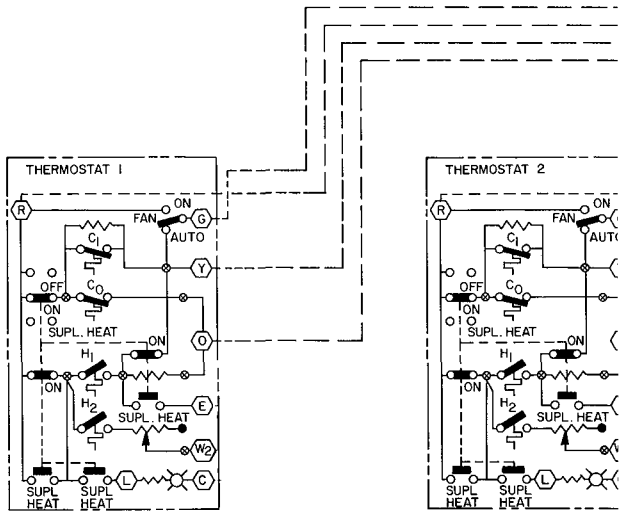
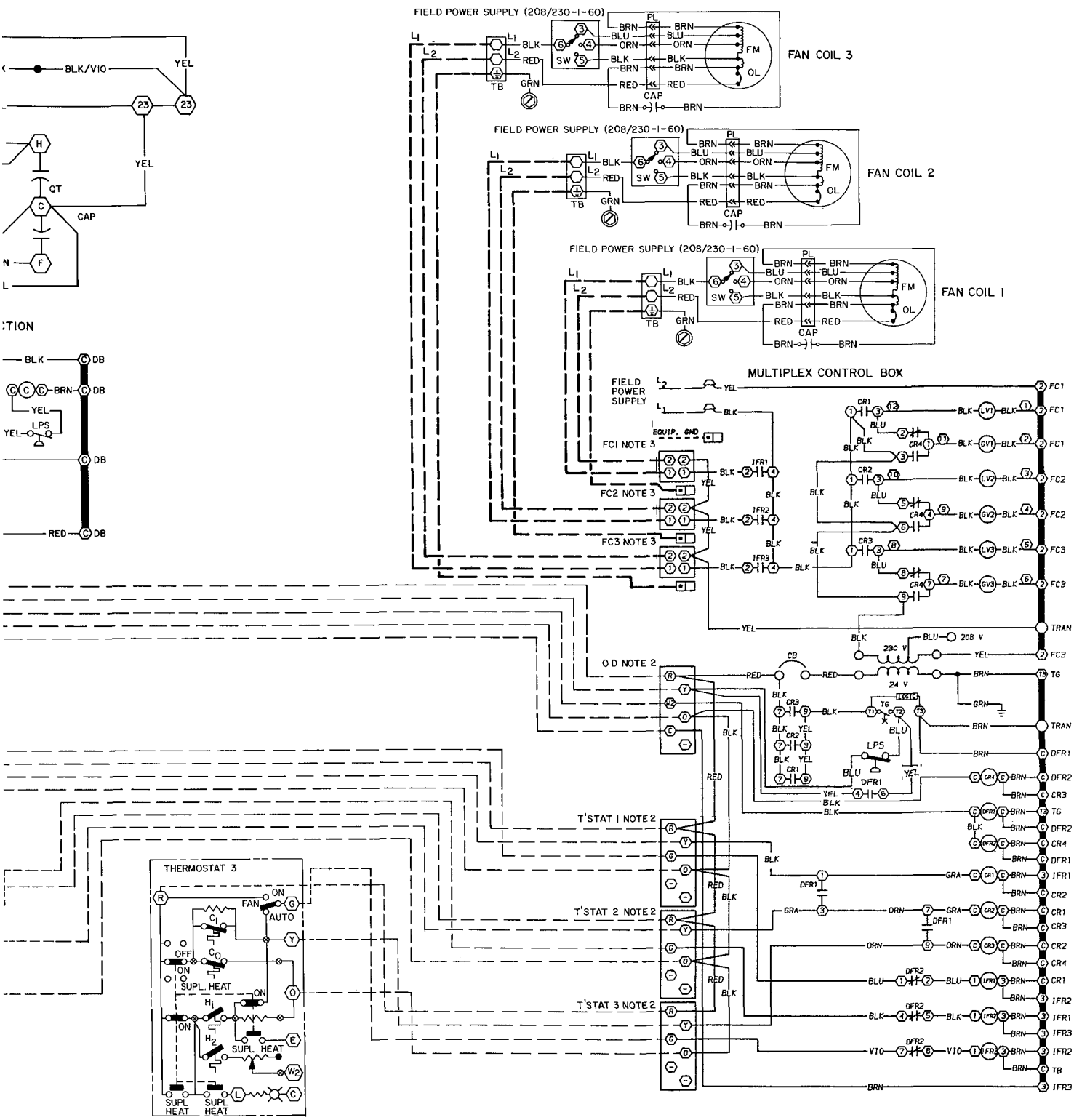


Fig. 8 — System Wiring Di



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