

Installation, Start-Up and Service Instructions

CONTENTS

	Page
GENERAL	1
SAFETY CONSIDERATIONS	1
INSTALLATION	1-7
Step 1 — Complete Pre-Installation Checks	1
• UNPACK UNIT	
• INSPECT SHIPMENT	
• CONSIDER SYSTEM REQUIREMENTS	
Step 2 — Rig and Mount Unit	3
• MOUNTING ON GROUND	
• MOUNTING ON ROOF	
• RIGGING	
Step 3 — Complete Refrigerant Piping Connections	3
• CHECK ACCURATER® CONTROL	
• INSTALL FILTER DRIER AND MOISTURE INDICATOR	
• MAKE PIPING SWEAT CONNECTIONS	
• PROVIDE SAFETY RELIEF	
Step 4 — Make Electrical Connections	4
• POWER WIRING	
• CONTROL CIRCUIT WIRING	
• CONNECTIONS TO DUCT-FREE FAN COIL UNIT	
Step 5 — Accessory Installation	7
START-UP	7-9
SERVICE	9-12
MAINTENANCE	13
TROUBLESHOOTING	14

GENERAL

The 38HD007 unit utilizes the 38HD060C cabinet and has a nominal capacity of 72,000 Btuh (21.1 kW). Because the 38HD007 has the largest capacity of any of the units in this Installation Instruction, it will be listed after the 38HDC060C in all figures, references, and tables.

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 and replacing filters. All other operations should be performed by trained service personnel. When working on air conditioning equipment, observe safety precautions in literature, 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; U.S.A. Standard ANSI/NFPA 70 [American National Standards Institute/National Fire Protection Association]) for special installation requirements.

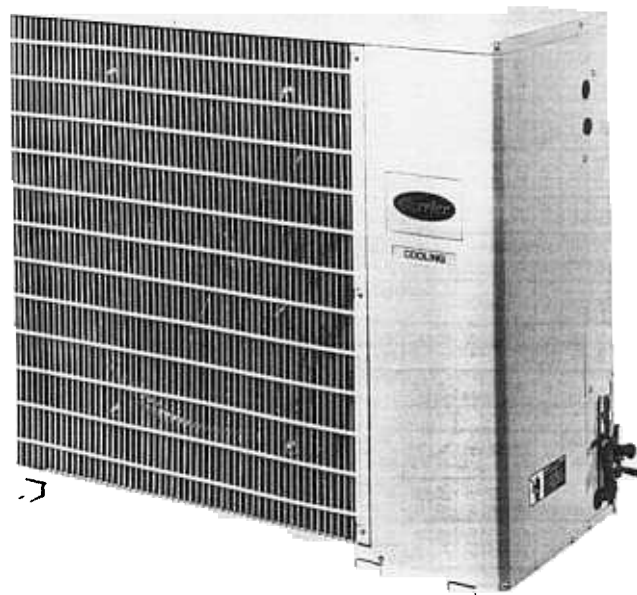


Fig. 1 — Model 38HD018C-060C and 38HD007

⚠ WARNING

Before installing or servicing system, always turn off main power to system. There may be more than one disconnect switch. Turn off accessory heater power if applicable. Electrical shock can cause personal injury.

INSTALLATION

Step 1 — Complete Pre-Installation Checks

UNPACK UNIT (see Fig. 1) — Move 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.

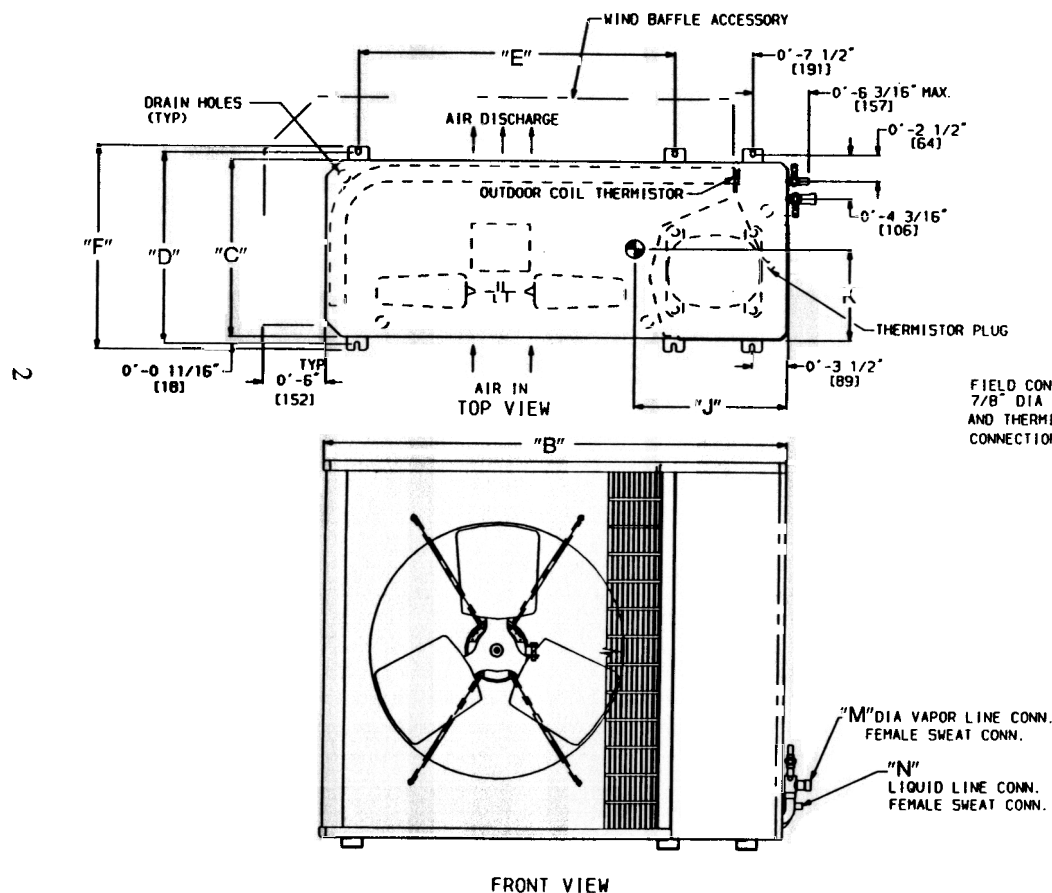
Allow sufficient space for airflow clearance, wiring, refrigerant piping, and servicing unit. See Fig. 2.

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

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

Manufacturer reserves the right to discontinue, or change at any time, specifications or designs without notice and without incurring obligations.

UNIT	A		B		C		D		E		F		G		H		J		K		L		M		N		R		S		OPERATING WEIGHT	
	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	Lb	Kg
38HD018C	25 1/8	638	36 1/8	938	14 1/8	370	16	406	23 7/8	595	17 3/8	437	17 1/2	445	20 1/8	511	13	330	6 3/8	168	11 1/4	286	3/8	16	3/8	10	4 1/8	110	6 1/8	176	148	67.1
38HD024C	25 1/8	638	36 1/8	938	14 1/8	370	16	406	23 7/8	595	17 3/8	437	17 1/2	445	20 1/8	511	13	330	6 3/8	172	11 3/8	295	3/8	16	3/8	10	4 1/8	110	6 1/8	176	160	72.6
38HD030C	25 1/8	638	36 1/8	938	14 1/8	370	16	406	23 7/8	595	17 3/8	437	17 1/2	445	20 1/8	511	13	330	6 3/8	172	11 3/8	295	3/8	19	3/8	10	4 1/8	110	6 1/8	176	171	77.6
38HD036C 1Ø	25 1/8	638	36 1/8	938	14 1/8	370	16	406	23 7/8	595	17 3/8	437	17 1/2	445	20 1/8	511	13	330	6 3/8	172	11 3/8	295	3/8	19	3/8	10	4 1/8	110	6 1/8	176	171	77.6
38HD036C 3Ø	37 3/8	945	44 1/8	1132	17 1/8	433	18 1/8	468	30 1/2	775	19 3/8	499	29 3/8	753	32 1/8	818	13 3/8	352	8 1/4	210	16	406	3/8	19	3/8	10	4 1/8	110	6 1/8	176	240	108.9
38HD048C	37 3/8	945	44 1/8	1132	17 1/8	433	18 1/8	468	30 1/2	775	19 3/8	499	29 3/8	753	32 1/8	818	13 3/8	348	8 1/8	206	15 1/8	403	3/8	22	3/8	10	4 1/8	110	6 1/8	176	244	110.7
38HD060C	37 3/8	945	44 1/8	1132	17 1/8	433	18 1/8	468	30 1/2	775	19 3/8	499	29 3/8	753	32 1/8	818	14 1/2	368	8 1/8	206	15 1/8	403	3/8	22	3/8	10	4 1/8	110	6 1/8	176	244	110.7
38HD007	37 3/8	945	44 1/8	1132	17 1/8	433	18 1/8	468	30 1/2	775	19 3/8	499	29 3/8	753	32 1/8	818	16 1/4	413	8	203	15 3/8	395	1 1/8	29	1/2	13	7 1/8	179	8	203	285	129.3



UNIT SIZE	MINIMUM MOUNTING PAD DIMENSIONS					
	SUPPORT FEET		SNOW STAND		ICE STAND	
	in.	(mm)	in.	(mm)	in.	(mm)
018-030, and 036 1Ø	23 x 42	584 x 1067	26 x 42	660 x 1067	26 x 42	660 x 1067
036C (3Ø), 048, 060 and 007	24 x 50	610 x 1270	28 x 50	711 x 1270	26 x 50	660 x 1270

NOTES:

- Required clearances: with coil facing wall; allow 6 in. minimum clearance on coil side and coil end, and 3 ft minimum clearance on compressor end and fan side. With fan facing wall; allow 8 in. minimum clearance on fan side and coil end, and 3 ft minimum on compressor end and coil side. With multi-unit application: arrange units so discharge of one does not enter inlet of another.
- Dimensions in () are in millimeters.
- Center of gravity
- Thermistors used with 40QY and 40QA fan coils only.

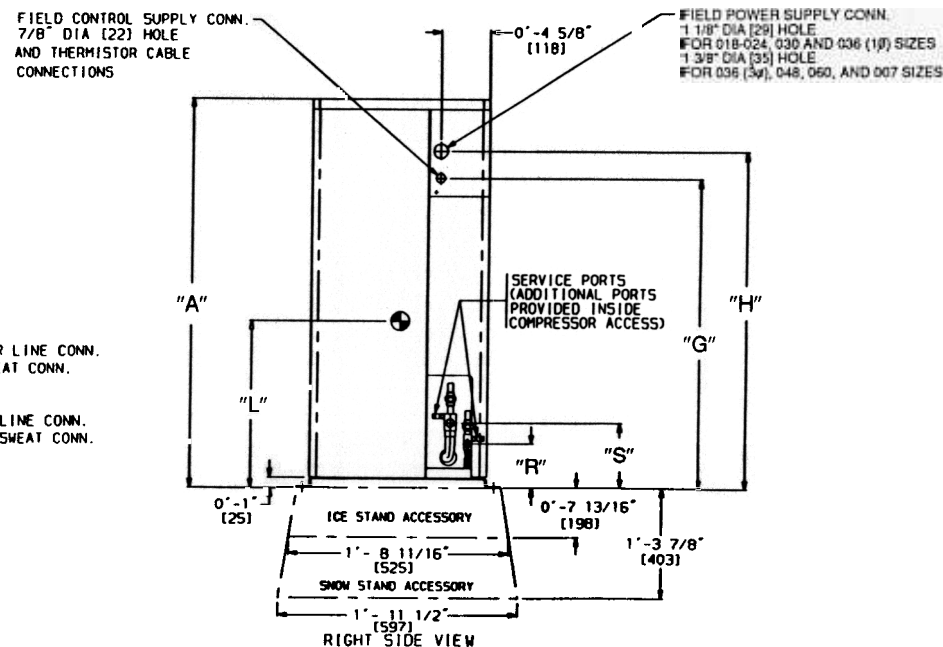


Fig. 2 — 38HD018C-060C and 38HD007 Dimensional Drawing

Step 2 – Rig and Mount 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. Accessory stacking kits (part no. KSAST0101STK and KSAST0201STK) can be used when units are to be stacked. See installation instructions provided with accessory kit. 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.

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.

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 spreader bars to prevent sling damage to unit. See Fig. 3. 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, use accessory wind baffle (part no. KSAWB0101AAA or KSAWB0201AAA). See installation instructions provided with accessory kit.

NOTE: Accessory wind baffles should be used on all units with accessory low-ambient control.

Accessory snow stand may be used to raise unit when operation will be required during the winter. Use accessory part no. KHASH0401SML or KHASH0501LRG. Units may also be wall mounted using the accessory wall-mounting kit. Use part no. KSAWM0101AAA or KSAWM0201AAA. See installation instructions provided with accessory kits.

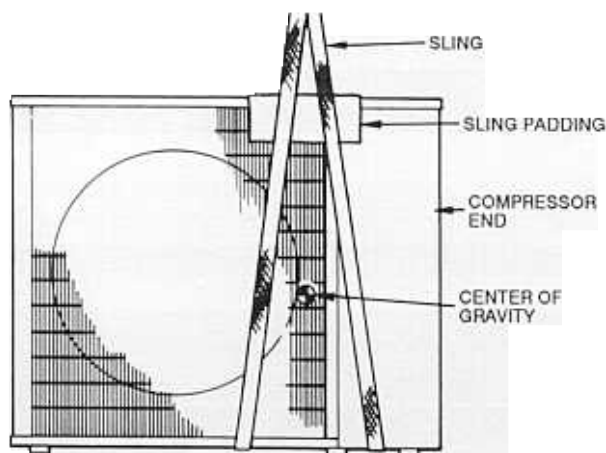


Fig. 3 – Lifting Unit With Sling

Step 3 – Complete Refrigerant Piping Connections

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

⚠ CAUTION

DO NOT BURY MORE THAN 36 IN. (922 mm) OF REFRIGERANT PIPE IN THE GROUND. If any section of pipe 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.

When more than 50 ft (15.2 m) of interconnecting tubing and more than 30 ft (9.1 m) of vertical lift is used, refer to Part 3 of Carrier System Design Manual for design details, or contact your local Distributor. For long-line applications, interconnecting lines over 100 ft must be installed with a liquid line solenoid. A liquid line solenoid may also be installed on some units to improve part-load efficiency. Refer to ARI (Air Conditioning & Refrigeration Institute) Directory.

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.

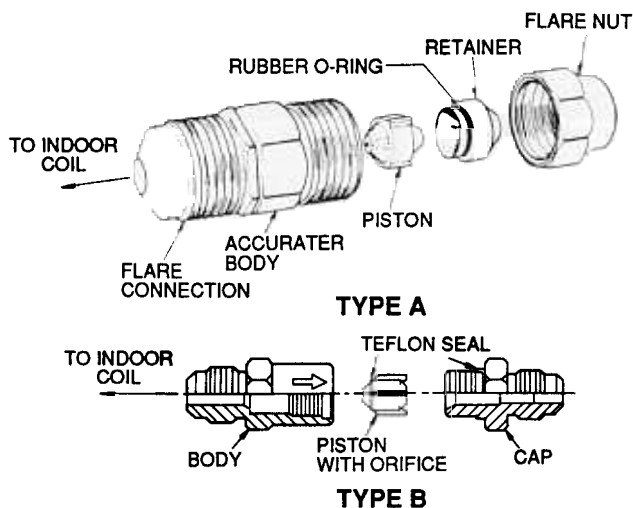
Run refrigerant tubes as directly as possible, avoiding unnecessary turns and bends. Suspend refrigerant tubes so they do not damage insulation on vapor tube and do not transmit vibration to structure. Also, when passing refrigerant tubes through wall, seal opening so that vibration is not transmitted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

CHECK ACCURATER® CONTROL — The correct AccuRater (bypass type) refrigerant control is required for cooling system capacity optimization. An AccuRater device with field-replaceable piston should be supplied with the indoor unit. Refer to the AccuRater metering device table in separate indoor unit installation instructions to determine the correct AccuRater piston size required for the condenser/evaporator system being installed.

Note that one of 2 types of AccuRater devices can be found on the indoor unit. See Fig. 4. *Do not* interchange components between AccuRater types.

Matching of outdoor unit with indoor unit may require field replacement of piston. Replace piston, *if required*, before connecting refrigerant lines. Piston replacement instructions are included in the indoor unit installation instructions. After system installation is complete, see Refrigerant Charging section on page 10 to check and/or adjust refrigerant charge.

The 38HD018C-060C units may also be installed with units using a thermostatic expansion valve (TXV). The 38HD007 units should only be used on systems with a TXV. If a TXV is used, be sure to remove the piston from the indoor coil. See installation instructions shipped with the TXV for proper positioning and adjustment.



NOTE: Arrow on AccuRater® body points in free-flow direction, away from the indoor coil.

Fig. 4 — AccuRater® (Bypass Type) Metering Device Components

INSTALL FILTER DRIER AND MOISTURE INDICATOR — The filter drier is factory supplied and field installed. Moisture indicator (sight glass) is a field-supplied option and should be installed just after liquid line shutoff valve. *Do not use a receiver* (a receiver is not provided with unit and one should not be used).

MAKE PIPING SWEAT CONNECTIONS — 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. 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 with R-22 factory holding charge indicated on nameplate.

Pass nitrogen or other inert gas through piping while brazing to prevent formation of copper oxide.

⚠ 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.

Step 4 — 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 (U.S.A. Standards), 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. Such operation would invalidate any applicable Carrier warranty.

POWER WIRING — Unit is factory wired for voltage shown on nameplate. Provide adequate, fused disconnect switch within sight from unit, readily accessible, but out of reach of children. Provision for locking the switch open (off) is advisable to prevent power from being turned on while unit is being serviced. Disconnect switch, fuses, and field wiring must comply with NEC and local code requirements. Use copper wire only between disconnect switch and unit. Use minimum 60 C wire for field power connection.

Route power wires through opening in unit side panel and connect in unit control box as shown on unit label diagram and Fig. 5 and 6. Unit must be grounded.

CONTROL CIRCUIT WIRING — Control voltage is 24 v (40 va minimum). See Fig. 5 and unit label diagram for field-supplied wiring details. Route control wire through opening in unit side panel to connection in unit control box.

NOTE: For wire runs up to 50 ft (15 m), use no. 18 AWG (American Wire Gage) insulated wire (35 C minimum). For 50 to 75 ft (15 to 23 m), use no. 16 AWG insulated wire (35 C minimum). For over 75 ft (23 m), use 14 AWG insulated wire (35 C minimum). See Table 2 for conversion to European wire sizes.

NOTE: Operation of unit on improper line voltage constitutes abuse and could affect Carrier warranty. See Table 3. *Do not* install unit in system where voltage may fluctuate above or below permissible limits.

See Table 3 for recommended fuse sizes. When making electrical connections, provide clearance at unit for refrigerant piping connections.

Use indoor unit transformer as 24-v (40-v minimum) supply for system as shown in Fig. 5 or use accessory transformer.

⚠ WARNING

Before performing service or maintenance, be sure indoor unit main power switch is turned OFF and indoor blower has stopped. Failure to do so may result in electrical shock or injury from rotating fan blades.

Table 1A – Physical Data (English)

Unit 38HD	018C-3	024C-3	030C-3	036C-3	036C-5,6	048C-3,5,6	060C-3,5,6	007
	18,000	24,000	30,000	36,000	36,000	48,000	60,000	
	148	160	171	171	240	244	244	
Refrigerant	R-22							
Compressor Type	Reciprocating Scroll Hermetic Reciprocating							
	Tecumseh AW5519G	Tecumseh AW5524G	Copeland ZR28KI-PFV	Copeland ZR34KI-PFV	Copeland CRH3-0275	Tecumseh AV5549G	Copeland CRP5-0450	Tecumseh SF5572E
Oil (oz) — Initial/Recharge	32/30	32/30	28/24	34/30	55/51	54/50	70/66	
Crankcase Heater Watts	19	19	—	—	40	27	40	
	Propeller Type, Direct-Drive, Horizontal							
	850	850	850	850	850	850	850	850
	18-3	18-3	18-3	18-3	24-3	24-3	24-3	
	25	27	27	31	24	24	24	
	1/8	1/8	1/8	1/8	1/4	1/4	1/4	1/4
	1720	1720	1720	1720	3900	3900	3900	3900
	Copper Tube, Aluminum-Plate Fin							
	6.1/1.5*	6.1/2	6.1/3	6.1/3	12.3/2	12.3/2	12.3/3	12.3/3
	15	15	15	15	15	15	15	
	5/8	5/8	3/4	3/4	3/4	1 1/8	1 1/8	1 1/8
	3/8	3/8	3/8	3/8	3/8	3/8	3/8	
	5/8	5/8	3/4	3/4	3/4	7/8	7/8	1 1/8
	3/8	3/8	3/8	3/8	3/8	3/8	3/8	
	426 ± 7 320 ± 20							
Fusible Plug								

*The second row of the coil is one half of the height of the first row.

†Line sizes are for runs up to 25 ft.

Table 1B – Physical Data (SI Units)

Unit 38HD	018C-3	024C-3	030C-3	036C-3	036C-5,6	048C-3,5,6	060C-3,5,6	007
Nominal Capacity (kW)	5.3	7.0	8.8	10.5	10.5	14.1	17.6	21.1
Operating Weight (kg)	67.1	72.6	77.6	77.6	108.9	110.7	110.7	129.3
Refrigerant	R-22							
Compressor Type	Reciprocating Scroll Hermetic Reciprocating							
Model	Tecumseh AW5519G	Tecumseh AW5524G	Copeland ZR28KI-PFV	Copeland ZR34KI-PFV	Copeland CRH3-0275	Tecumseh AV5549G	Copeland CRP5-0450	Tecumseh SF5572E
Oil (l) — Initial/Recharge	.95/.89	.95/.89	.83/.71	1.00/.89	1.63/1.51	1.60/1.48	2.07/2.01	2.22/2.16
Crankcase Heater Watts	19	19	—	—	40	27	40	
	Propeller Type, Direct-Drive, Horizontal							
	457-3	457-3	457-3	457-3	610-3	610-3	610-3	610-3
	25	27	27	31	24	24	24	24
	.13	.09	.09	.09	.19	.19	.19	.26
	812	812	812	812	1840	1840	1840	1840
	Copper Tube, Aluminum-Plate Fin							
	.57/1.5*	.57/2	.57/3	.57/3	1.14/2	1.14/2	1.14/2	1.14/3
	.6	.6	.6	.6	.6	.6	.6	
	5/8	5/8	3/4	3/4	3/4	1 1/8	1 1/8	1 1/8
	3/8	3/8	3/8	3/8	3/8	3/8	3/8	
	5/8	5/8	3/4	3/4	3/4	7/8	7/8	1 1/8
	3/8	3/8	3/8	3/8	3/8	3/8	3/8	
	2937 ± 48 2206 ± 138							
Fusible Plug (C)	aa							

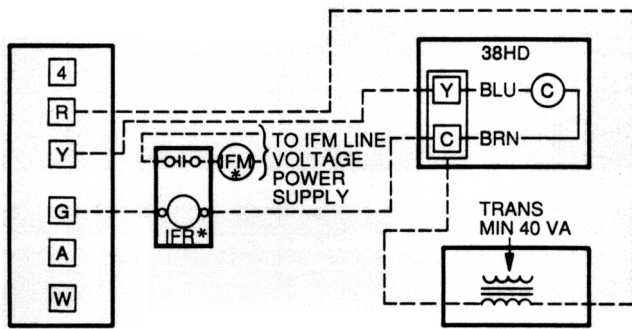
*The second row of the coil is one-half the height of the first row.

†Line sizes are for runs up to 7.6 m.

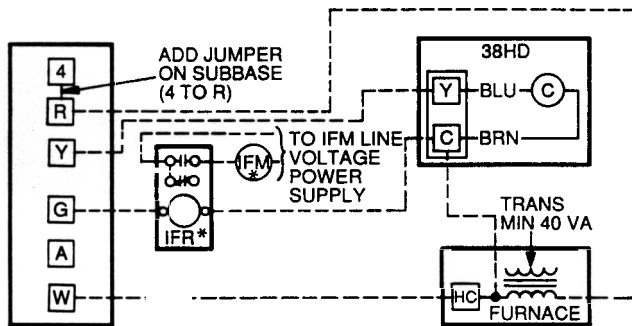
**See reference table below for equivalent mm dimensions.

Reference Table

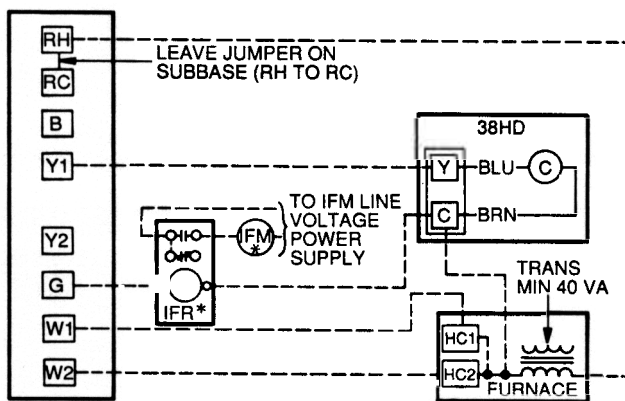
in.	mm
5/8	9.5
1/2	12.7
3/8	15.9
3/4	19.0
7/8	22.2
1 1/8	28.6



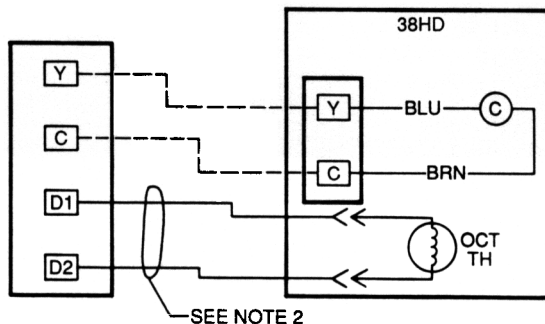
ARRANGEMENT A-(COOLING ONLY)



ARRANGEMENT B-ONE TRANSFORMER
(COOLING AND ONE-STAGE HEATING)



ARRANGEMENT C-ONE TRANSFORMER
(COOLING AND TWO-STAGE HEATING)



ARRANGEMENT 40QA† AND 40QY†

*The IFR and IFM are located in indoor unit on heating-cooling applications. If accessory IFR is required for cooling-only applications, locate (IFR) in fan coil.

†The transformer is provided in the fan coil unit.

C	—	Contact (12-va)
HC	—	Heating Control
HPS	—	High-Pressure Switch
IFM	—	Indoor-Fan Motor
IFR	—	Indoor-Fan Relay
LPS	—	Low-Pressure Switch
OCT TH	—	Outdoor Coil Temperature Thermistor
TRANS	—	Transformer
---	---	Field Wiring
---	---	Factory Wiring

NOTES:

1. Refer to unit wiring label for wire colors: C to G and C to Y connections.
2. Thermistor wiring cable 35 ft long is provided with indoor unit. This cable may be extended.

Fig. 5 — Typical Control Circuit Connections

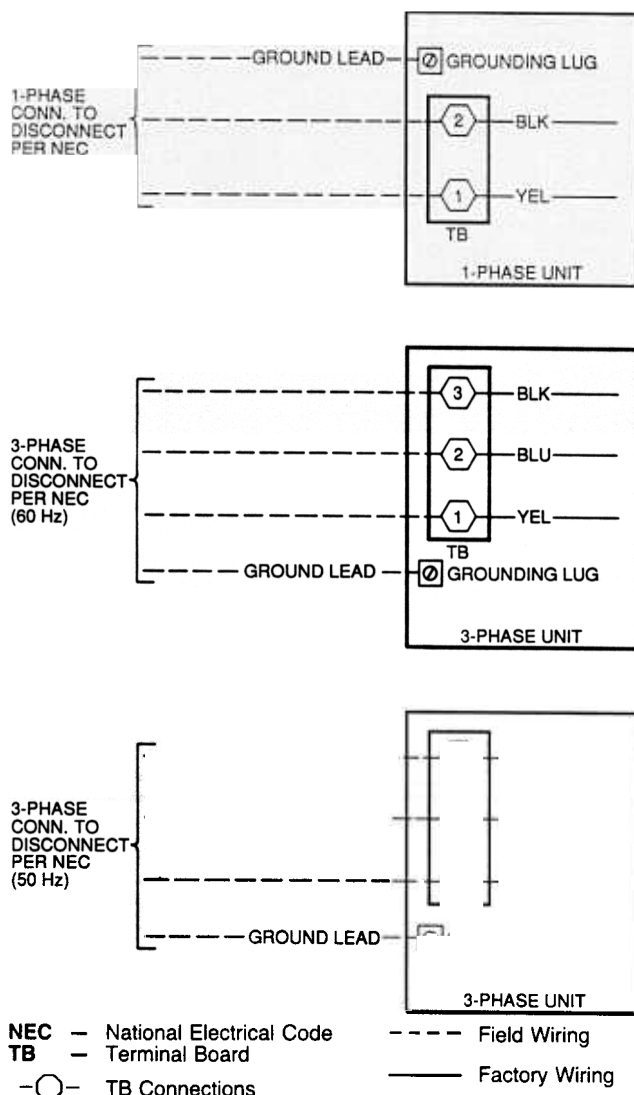


Fig. 6 — Line Power Connections

Table 2 — American/European Wire Conversions

AMERICAN		EUROPEAN
Industry Standard Size	American Conversion (mm ²)	Industry Standard Size (mm ²)
18 AWG	0.82	1.0
16 AWG	1.30	1.5
14 AWG	2.08	2.5
12 AWG	3.30	4.0
10 AWG	5.25	6.0
8 AWG	6.36	10.0
6 AWG	13.29	16.0
4 AWG	21.14	25.0
3 AWG	26.65	—
2 AWG	33.61	35.0
1 AWG	42.39	50.0
1/0 AWG	53.49	—
2/0 AWG	67.42	70.0
3/0 AWG	85.00	95.0
4/0 AWG	107.19	120.0
250 kcmil	126.64	150.0
300 kcmil	151.97	—
350 kcmil	177.90	185.0
400 kcmil	202.63	240.0
500 kcmil	253.29	300.0
600 kcmil	303.95	—

LEGEND

AWG — American Wire Gage
kcmil — Thousand Circular Mills

CONNECTIONS TO DUCT-FREE FAN COIL UNITS — The 38HD-C units are designed for easy match-up to 40QAB and 40QYB duct-free fan coils. These units provide 24-v power for the outdoor unit from the fan coil. Connect the Y and C terminals of the indoor unit to the Y and C terminals of the outdoor unit with 20-gage (minimum) thermostat wire. The unit also has a thermistor located on the outdoor coil. A thermistor connection cable is provided with the indoor unit. This cable **MUST** be attached to the thermistor plug of the outdoor unit. If the thermistor is not attached, the fan coil will not work and the error E2 will be displayed on the display panel. See fan coil installation instructions for more details.

Step 5 — Accessory Installation — Install all unit accessories per accessory installation instructions prior to start-up.

Do not use accessory Time Guard® II device with 40QA and 40QY indoor units. When ambient temperature will fall below 55 F (13 C), accessory low-ambient controller (part no. 38HD900001) is required. When accessory low-ambient kit is used, unit should also be equipped with accessory winter start kit and wind baffles.

START-UP

Preliminary Checks

1. Check that all internal wiring connections are tight and that all barriers, covers, and panels are in place.
2. Field electrical power source must agree with unit name-plate rating.
3. All service valves must be open.
4. Crankcase heater must be tight on compressor crankcase (if equipped).

Leak Test — Field piping and fan coil must be leak tested by pressure method described in Carrier Standard Service Techniques Manual, Chapter 1, Section 1-6. Use R-22 at approximately 25 psig (172 kPa) backed up with an inert gas to a total pressure not to exceed 245 psig (1690 kPa).

Before starting unit, crankcase heater must be on for 12 hours to be sure all refrigerant is out of the oil.

To energize crankcase heater, set space thermostat above ambient temperature so there will be no demand for cooling. Close field disconnect. The crankcase heater is now energized.

Evacuate and Dehydrate — Field piping and fan coil must be evacuated and dehydrated by either of the methods described in Carrier Standard Service Techniques Manual, Chapter 1, Section 1-7.

⚠ 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.

Table 3 – Electrical Data

UNIT SIZE 38HD	V-PH-HZ	OPERATIONAL VOLTAGE*		COMPRESSOR		POWER SUPPLY		
		Min	Max	RLA	LRA	Fan FLA	MCA	Max Fuse† or HACR-Type Ckt Bkr Amps
018C	208/230-1-60	187	254	8.9	49.0	.70	11.8	20
024C				10.9	61.0	.70	14.3	25
030C				13.5	76.0	.70	17.6	30
036C				17.9	90.5	.70	23.1	40
048C				22.4	110.0	1.45	29.5	50
060C				27.6	135.0	1.45	35.9	60
036C	208/230-3-60	187	254	11.2	66.0	1.45	15.5	25
048C				14.7	92.0	1.45	19.8	30
060C				17.6	105.0	1.45	23.5	40
007				21.1	142.0	1.45	27.9	45
036C	460-3-60	414	508	5.2	35.0	.80	7.3	15
048C				7.0	46.0	.80	9.6	15
060C				9.4	55.0	.80	12.6	20
007				10.6	72.0	.80	14.0	20
007	575-3-60	518	632	8.5	58.0	.65	11.2	15
007	230-3-50	198	254	20.6	142.0	2.0	27.7	45
007	400-3-50	342	440	10.5	72.0	1.0	14.1	20

LEGEND

CSA — Canadian Standards Association
 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.

†Time-delay fuse.

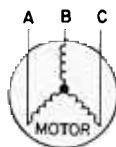
NOTES:

- Control circuit is 24 v on all units and requires an external power source.
- All motors and compressors contain internal overload protection.
- In compliance with NEC (U.S.A. Standard) requirements for multi-motor and combination load equipment (refer to NEC Articles 430 and 440), the overcurrent protective device for the unit shall be fuse or HACR breaker.
- Motor RLA values are established in accordance with UL (Underwriters' Laboratories) Standard 465 (U.S.A. Standard).
- Unbalanced 3-Phase Supply Voltage**
Never operate a motor where a phase imbalance in supply voltage is greater than 2%. Use the following formula to determine the percent voltage imbalance.

% Voltage Imbalance

$$= 100 \times \frac{\text{max voltage deviation from average voltage}}{\text{average voltage}}$$

Example: Supply voltage is 460-3-60.



$$AB = 452 \text{ v}$$

$$BC = 464 \text{ v}$$

$$AC = 455 \text{ v}$$

$$\text{Average Voltage} = \frac{452 + 464 + 455}{3}$$

$$= \frac{1371}{3}$$

$$= 457$$

Determine maximum deviation from average voltage.

$$(AB) 457 - 452 = 5 \text{ v}$$

$$(BC) 464 - 457 = 7 \text{ v}$$

$$(AC) 457 - 455 = 2 \text{ v}$$

Maximum deviation is 7 v.

Determine percent voltage imbalance.

$$\% \text{ Voltage Imbalance} = 100 \times \frac{7}{457}$$

$$= 1.53\%$$

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

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



Charge System — Release holding charge into system by opening (backseating) liquid and suction line service valves. Add charge amount as required for the total system. Refer to separate indoor unit installation instructions for the required total system charge when connected to indoor unit.

To Start Unit

NOTE: When using in conjunction with 40QA or 40QY fan coils, refer to start-up instructions included with fan coil for correct start-up procedures.

Be sure that crankcase heater has been on for 12 hours and that field disconnect is closed. Set room thermostat below ambient temperature. Operate unit for 15 minutes, then check system refrigerant charge. See Refrigerant Charging section on page 10.

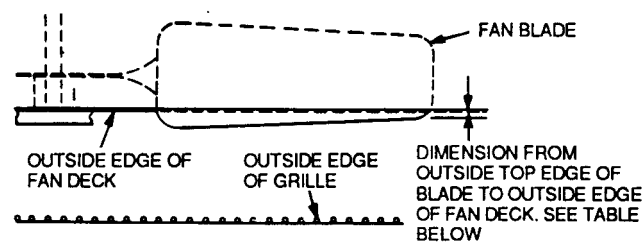
Unit compressor starts after a 5-minute delay if equipped with accessory Time Guard® II device (part no. KSACY0101AAA).

SERVICE

⚠ WARNING

Before performing recommended maintenance, be sure unit main power switch is turned off. Failure to do so 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. 7 for proper mounting positions.



UNIT SIZE — in. (mm)		
38HD018C	38HD024C,030C,036C (1/2)	38HD036C (3/4),048C,060C and 007
.433 (11)	.709 (18)	.16 (4)

Fig. 7 — Condenser-Fan Mounting Positions

High-Pressure Relief Valve — Valve is located in compressor. Relief valve opens at a pressure differential of approximately 450 ± 50 psig (3100 ± 345 kPa) 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 Carrier Standard System Techniques Manual, Chapter 2, for complete information.

Pumpdown Procedure — The system may be pumped down in order to make repairs on low side without losing complete refrigerant charge.

1. Attach pressure gage to suction service valve gage port.
2. Frontseat the liquid line valve.

⚠ CAUTION

The 38HD018C-060C and 007 unit coils hold only the factory-designated amount of refrigerant. Additional refrigerant may cause units to relieve pressure through compressor internal pressure relief valve (indicated by a sudden rise of suction pressure) before suction pressure reaches 5 psig (34 kPa). If this occurs, shut off unit immediately, then, frontseat the suction valve and remove and reclaim excess refrigerant following accepted practices.

3. Start unit and run until suction pressure reaches 5 psig (34 kPa).
4. Shut unit off and frontseat suction valve.
5. Depressurize low side of unit and reclaim refrigerant following accepted practices.

Filter Drier — Whenever the moisture liquid indicator shows presence of moisture, replace the filter drier. Refer to Carrier Standard Service Techniques Manual, Chapter 1, Refrigerants, for details on servicing filter driers.

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 (2940 kPa). 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 320 psig (2210 kPa) switch shows continuity.

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 (14 kPa). Compressor should shut down when suction pressure drops to cutout pressure in Tables 1A and 1B, and should restart when pressure builds up to cut-in pressure shown after CLO (compressor lockout switch) has been reset and accessory Time Guard® II device has completed its timing cycle.

Crankcase Heater — Heater prevents refrigerant migration and compressor oil dilution during shutdown when compressor is not operating. If crankcase heater is deenergized for more than 6 hours, both compressor service valves must be closed.

Crankcase heaters come in 2 basic types: wraparound (bellyband) type that is wrapped externally around compressor shell, and insertion type that is inserted into compressor oil well in shell of compressor.

Crankcase heater is powered by *high-voltage* power of unit. It is connected across the line side of the contactor and operates continually. Use extreme caution when troubleshooting this device with unit power on.

To troubleshoot:

1. Apply voltmeter across crankcase heater leads to see if heater voltage is on. *Do not touch heater*. Carefully feel area around crankcase heater; if warm, crankcase heater is probably functioning.
2. With power off and heater leads disconnected, check across leads with ohmmeter. Do not look for a specific resistance reading. Check for resistance or an open circuit, and change heater if an open circuit is detected.

Service Valves — The service valves in the outdoor unit come from the factory frontseated. 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 can be 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, therefore, only a complete valve or valve stem seal and service port caps are available for replacement.

AccuRater® (Bypass Type) Device — See Fig. 4 for bypass-type AccuRater device components. The piston has a refrigerant metering hole through it. The retainer forms a stop for the piston in the refrigerant bypass mode and a sealing surface for liquid line flare connection. To check, clean, or replace piston:

1. Shut off power to unit.
2. Pump down unit using Pumpdown Procedure section on page 9.
3. Remove liquid line flare connection from AccuRater device.
4. Pull retainer out of body, being careful not to scratch flare sealing surface. If retainer does not pull out easily, carefully use locking pliers to remove retainer.
5. Slide piston out by inserting a small soft wire, with small kinks, through metering hole. Ensure metering hole, sealing surface around piston cones, and fluted portion of piston are not damaged.
6. Clean piston refrigerant metering hole.
7. Replace retainer O-ring before reassembling AccuRater device (Carrier O-ring part no. 99CC501052).

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 reclaim refrigerant following accepted practices.

SUPERHEAT METHOD (COOLING, NON-TXV) — To check and adjust charge during cooling season, use Tables 4A-5B and the following procedure:

1. Operate unit a minimum of 15 minutes before checking charge.
2. Measure suction pressure by attaching a gage to suction valve service port.
3. Measure suction line temperature by attaching a service thermometer to unit suction line near suction valve. Insulate thermometer for accurate readings.
4. Measure outdoor coil inlet-air dry bulb temperature with a second thermometer.
5. Measure indoor coil inlet-air wet bulb temperature with a sling psychrometer.
6. Refer to Tables 4A and 4B. Find air temperature entering outdoor coil and wet-bulb temperature entering indoor coil. At this intersection, note the superheat temperature.
7. Refer to Tables 5A and 5B. Find superheat temperature and suction pressure and note suction line temperature.
8. If unit has higher suction line temperature than charted temperature, add refrigerant until charted temperature is reached.
9. If unit has lower suction line temperature than charted temperature, remove and reclaim refrigerant until charted temperature is reached.
10. If air temperature entering outdoor coil or pressure at suction valve changes, charge to new suction line temperature indicated on chart.
11. This procedure is independent of indoor-air quantity.

**Table 4A — Superheat Charging Table — English
(Superheat Entering Suction Service Valve)**

OUTDOOR TEMP (F)	INDOOR COIL ENTERING AIR (F) WB															
	50	52	54	56	58	60	62	64	66	68	70	72	74	76		
55	9	12	14	17	20	23	26	29	32	35	37	40	42	45		
60	7	10	12	15	18	21	24	27	30	33	35	38	40	43		
65	*	6	10	13	16	19	21	24	27	30	33	36	38	41		
	*	*	7	10	13	16	19	21	24	27	30	33	36	39		
	*	*	*	6	9	12	15	18	21	24	28	31	34	37		
	*	*	*	*	5	8	12	15	18	21	25	28	31	35		
	*	*	*	*	*	*	8	11	15	19	22	26	30	33		
	*	*	*	*	*	*	5	9	13	16	20	24	27	31		
95	*	*	*	*	*	*	*	6	10	14	18	22	25	29		
100	*	*	*	*	*	*	*	*	8	12	15	20	23	27		
105	*	*	*	*	*	*	*	*	5	9	13	17	22	26		
	*	*	*	*	*	*	*	*	*	6	11	15	20	25		
	*	*	*	*	*	*	*	*	*	*	8	14	18	23		

LEGEND

WB — Wet Bulb

*Do not attempt to charge system under these conditions or refrigerant slugging may occur.

**Table 4B — Superheat Charging Table — SI
(Superheat Entering Suction Service Valve)**

OUTDOOR TEMP (C)	INDOOR COIL ENTERING AIR (C) WB														
	10	11	12	13	14	16	17	18	19	20	21	22	23	24	
13	5	7	8	9	11	13	14	16	18	19	21	22	23	25	
16	4	6	7	8	10	12	13	15	17	18	19	21	22	24	
18	*	3	6	7	9	11	12	13	15	17	18	20	21	23	
	*	*	4	6	7	9	11	12	13	15	17	18	20	22	
	*	*	*	3	5	7	8	10	12	13	16	17	19	21	
	*	*	*	*	3	4	7	8	10	12	14	16	17	19	
	*	*	*	*	*	*	4	6	8	11	12	14	17	18	
	*	*	*	*	*	*	3	5	7	9	11	13	15	17	
	*	*	*	*	*	*	*	3	6	8	10	12	14	16	
	*	*	*	*	*	*	*	*	4	7	8	11	13	15	
	*	*	*	*	*	*	*	*	3	5	7	9	12	14	
	*	*	*	*	*	*	*	*	*	3	6	8	11	14	
	*	*	*	*	*	*	*	*	*	*	4	8	10	13	

LEGEND

WB — Wet Bulb

*Do not attempt to charge system under these conditions or refrigerant slugging may occur.

**Table 5A — Required Suction-Tube Temperature (F)
— English
(Entering Suction Service Valve)**

SUPERHEAT TEMP (F)	SUCTION PRESSURE AT SERVICE PORT (psig)								
	61.5	64.2	67.1	70.0	73.0	76.0	79.2	82.4	85.7
0	35	37	39	41	43	45	47	49	51
2	37	39	41	43	45	47	49	51	53
4	39	41	43	45	47	49	51	53	55
6	41	43	45	47	49	51	53	55	57
8	43	45	47	49	51	53	55	57	59
10	45	47	49	51	53	55	57	59	61
12	47	49	51	53	55	57	59	61	63
14	49	51	53	55	57	59	61	63	65
16	51	53	55	57	59	61	63	65	67
18	53	55	57	59	61	63	65	67	69
20	55	57	59	61	63	65	67	69	71
22	57	59	61	63	65	67	69	71	73
24	59	61	63	65	67	69	71	73	75
26	61	63	65	67	69	71	73	75	77
28	63	65	67	69	71	73	75	77	79
30	65	67	69	71	73	75	77	79	81
32	67	69	71	73	75	77	79	81	83
34	69	71	73	75	77	79	81	83	85
36	71	73	75	77	79	81	83	85	87
38	73	75	77	79	81	83	85	87	89
40	75	77	79	81	83	85	87	89	91

SUBCOOLING METHOD (COOLING, TXV) — To check and adjust charge during cooling season, use Tables 6A and 6B and the following procedure:

1. Operate unit a minimum of 15 minutes before checking charge.
2. Measure liquid line temperature near liquid line service valve, and measure liquid pressure at liquid line service valve. Use a digital thermometer for all temperature measurements. DO NOT use mercury or dial-type thermometers.
3. Refer to Tables 6A and 6B. Find measured liquid pressure and read the liquid line temperature at the required subcooling temperature.
4. If the measured liquid line temperature does not agree with the required liquid line temperature, ADD refrigerant to lower the temperature, or REMOVE refrigerant to raise the temperature (allow a tolerance of $\pm 3^{\circ}\text{F}$).

**Table 5B — Required Suction-Tube
Temperature (C) — SI
(Entering Suction Service Valve)**

OUTDOOR TEMP (C)	SUCTION PRESSURE AT SERVICE PORT (kPa)								
	424	443	463	483	503	524	546	568	591
0	2	3	4	5	6	7	8	9	11
1	3	4	5	6	7	8	9	11	12
2	4	5	6	7	8	9	11	12	13
3	5	6	7	8	9	11	12	13	14
	6	7	8	9	11	12	13	14	15
	7	8	9	11	12	13	14	15	16
	8	9	11	12	13	14	15	16	17
	9	11	12	13	14	15	16	17	18
	11	12	13	14	15	16	17	18	19
	12	13	14	15	16	17	18	19	21
11	13	14	15	16	17	18	19	21	22
12	14	15	16	17	18	19	21	22	23
13	15	16	17	18	19	21	22	23	24
14	16	17	18	19	21	22	23	24	25
	17	18	19	21	22	23	24	25	26
	18	19	21	22	23	24	25	26	27
	19	21	22	23	24	25	26	27	28
19	21	22	23	24	25	26	27	28	29
20	22	23	24	25	26	27	28	29	31
21	23	24	25	26	27	28	29	31	32
22	24	25	26	27	28	29	31	32	33

Compressor Lockout Switch — 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 thermostat to OFF position and then to COOL position.

Discharge Temperature Switch (DTS) — Switch, used only on unit sizes 030C and 036C with scroll compressors, senses high discharge temperature levels reached under extreme operating conditions (low charge or low evaporator airflow). Approximate cut-in and cutout temperatures are 290 F and 140 F (143 C and 60 C), respectively. The switch is located on the top of the compressor shell.

Time-Delay Relay (TDR) — Relay (located in the control box), used only on unit sizes 030C and 036C with scroll compressors, ensures that the compressor comes to a complete stop before restarting. Time delay relay delays restart for 2 minutes after power to the unit is interrupted.

Outdoor-Coil Temperature Thermistor (OCT TH)

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

Table 6A – Required Liquid Line Temperature (F) – English (At Service Valve)

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

Table 6B – Required Liquid Line Temperature (C) – SI (At Service Valve)

REQUIRED SUBCOOLING (C)	LIQUID PRESSURE AT SERVICE VALVE (kPa)																							
	911	969	1030	1061	1121	1186	1219	1286	1360	1397	1471	1547	1588	1671	1755	1800	1885	1976	2026	2125	2222	2264	2379	2475
0	24	26	28	29	31	33	34	36	38	39	41	43	44	46	48	49	51	53	54	56	58	59	61	63
2	22	24	26	27	29	31	32	34	36	37	39	41	42	44	46	47	49	51	52	54	56	57	59	61
4	20	22	24	25	27	29	30	32	34	35	37	39	40	42	44	45	47	49	50	52	54	55	57	59
6	18	20	22	23	25	27	28	30	32	33	35	37	38	40	42	43	45	47	48	50	52	53	55	57
8	16	18	20	21	23	25	26	28	30	31	33	35	36	38	40	41	43	45	46	48	50	51	53	55
10	14	16	18	19	21	23	24	26	28	29	31	33	34	36	38	39	41	43	44	46	48	49	51	53
12	12	14	16	17	19	21	22	24	26	27	29	31	32	34	36	37	39	41	42	44	46	47	49	51
14	10	12	14	15	17	19	20	22	24	25	27	29	30	32	34	35	37	39	40	42	44	45	47	49

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 intervals described below:

- 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 Tables 1A and 1B for oil recharge and refer to Carrier Standard Service Techniques Manual, Chapter 1, page 1-21, for oil recharging procedure. See Table 7 for recommended compressor oils.

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 row 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.

Table 7 — Recommended Compressor Oils

RECOMMENDED OIL	UNIT 38HD							
	018C-3	024C-3	030C-3	036C-3	036C-5,6	048C (ALL)	060C (ALL)	007 (ALL)
3GS	•	•			•	•	•	
Calumet RO-15					•	•	•	
Cryol 150A	•	•						
Sontex 200LT			•	•				
Sontex RF300								•
Zerol 150TD	•							
Zerol 300		•						•

TROUBLESHOOTING CHART – COOLING CYCLE

TROUBLESHOOTING

