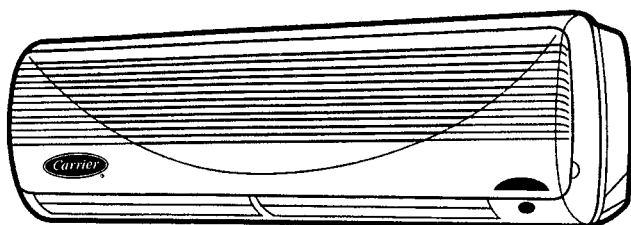




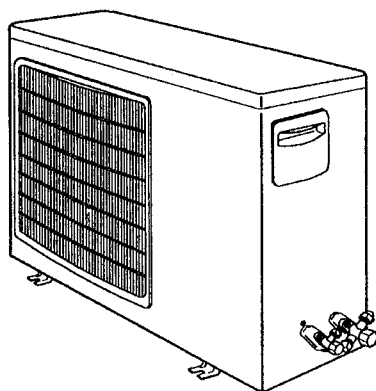
Advance Product Data

40QNB,QNE High Wall Duct-Free Split Systems

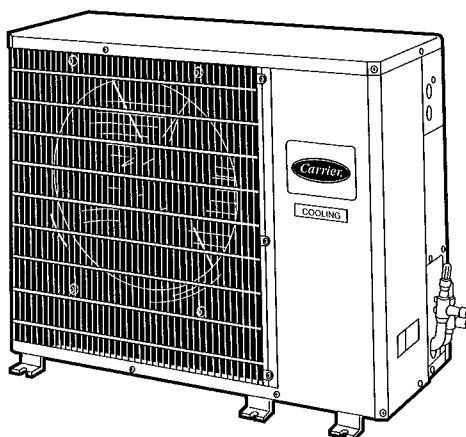
$\frac{3}{4}$ to 4 Nominal Tons



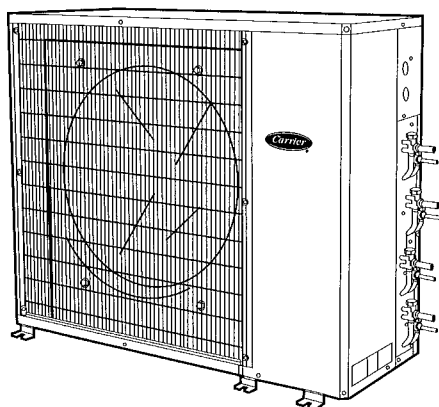
40QNB,QNE



38AN,BK (009,012 shown)



38HDC



38HDS

The Ideal Complement to Your Ducted System When It Is Impractical or Prohibitively Expensive to Use Ductwork

- newly designed high wall units
- cooling and heating (heat pump systems only) duty
- year-round comfort control (heat pump systems only)
- wireless remote controller included standard

Features/Benefits

An inexpensive and creative solution to design problems

Carrier's duct-free split systems are a matched combination of an outdoor unit and one or more (multi-split systems only) decorative indoor fan coil unit(s) connected only by refrigerant tubing and wires.

The fan coils can be mounted on the wall and permit inexpensive and creative solutions to design problems such as:

- add-ons to current space (an office or family room addition)
- special space requirements (a computer room)
- when changes in the cooling or heating (heat pump systems only) load cannot be handled by the existing system (when adding heat-generating equipment to a currently conditioned space)
- historical renovations or any application where preserving the looks of the original structure is essential

These compact indoor fan coil units take up very little space in the room and will not obstruct windows. The fan coils are attractively styled to blend with most room decors.

Advanced system components incorporate innovative technology to provide reliable cooling and heating (heat pump systems only) performance at high efficiencies and low sound levels.

Carrier's duct-free split systems offer the solution of choice. The compressor is outdoors linked by refrigerant lines to an indoor fan coil located directly in the room it will cool or heat (heat pump systems only). These systems have minimal impact on the existing structure, and the design and interior of the conditioned space is not compromised by bulky ductwork. Because of these features, Carrier's duct-free split systems can be installed in places where conventional ducted cooling and heating (heat pump systems only) simply cannot go.

Low sound levels

When noise is a concern, the duct-free split systems are the answer because you do not have to worry about duct design. There are no compressors indoors, either in the conditioned space or directly over it, and there is none of the noise usually generated by air being forced through ductwork. These indoor units are whisper quiet. The outdoor units operate at sound levels as low as 65 decibels, and are the perfect answer to sound level ordinances.

When sound ordinances and proximity to neighbors demand ultra-quiet operation, the duct-free outdoor unit is the right choice: The advanced, horizontal airflow design distributes air more evenly over the coil. The coil then acts as an extra sound-muffling agent before the air is discharged and directed toward the building at a very low velocity.

High efficiency

With SEERs (seasonal energy efficiency ratios) up to 12.0 and HSPFs (heating seasonal performance factors; heat pump systems only) of 6 8, the Carrier duct-free split systems save energy and may qualify for utility company rebates in some areas.

Secure operation

If security is an issue, outdoor and indoor units are connected only by refrigerant piping and wiring to prevent intruders from crawling through ductwork. In addition, since outdoor units may be installed 6 in. away from outside walls, coils are protected from vandals and severe weather.

Fast installation

Carrier's compact duct-free split systems take just a few hours to install, since only wire and piping need to be run. The fast and easy installation permits minimal disruption

to customers in the home or workplace. This is an added advantage of Carrier's duct-free split systems, especially in retrofit situations.

Also, features like mounting brackets and templates make the unit very easy to install.

Simple servicing and maintenance

Removing a single panel on outdoor units provides immediate access to the isolated compressor and control compartment, allowing a service technician access to check unit operation without a loss of condenser airflow. In addition, on outdoor units, the blow-thru design of the outdoor section means that dirt accumulates on the inside surface of the coil. Coils can be cleaned quickly from the outside using a pressure hose and detergent without removing grilles or using fin combs.

On indoor units, service and maintenance expense is reduced due to easy-to-change cleanable filters on all units. In addition, the systems have extensive self-diagnostics to assist in troubleshooting. Units have easy-access coils and cleanable condensate pans to assist in meeting indoor-air quality standards.

Outdoor unit refrigerant service valves are brass, back-seating type with sweat (38BK018,024, 38HDC, 38HDS units) or flare (38AN/BK009,012 units) connections (with the exception of 38BK018,024 unit liquid lines which have flare connections). The valves are externally located so refrigerant tube connections can be made quickly and easily. Each valve has a service port for ease of checking operating refrigerant pressures (38BK018,024, 38HDC, 38HDS units). Internal service ports (38BK018,024, 38HDC, 38HDS units) are also provided to

make servicing even easier, and the heating refrigerant metering device is conveniently located in the liquid-line service valve (38BK only)

Built-in reliability

Carrier duct-free split system indoor and outdoor units are designed to provide years of trouble-free operation

The indoor units include protection against freeze-up, high discharge temperature protection, and self diagnostics to ensure reliability.

Carrier's duct-free split system outdoor units are the only dedicated commercial units with all safety features standard to ensure high performance and lasting reliability under the most demanding situations. For example, an accumulator safeguards the compressor against loss of lubrication, while start capacitors and relays (non-scroll units) assure dependable start-ups, especially during low voltage conditions down to 187 v. High and liquid line low-pressure safety switches, crankcase heater (non-scroll units), bi-flow liquid line filter drier (heat pump systems only), and lockout protection are standard on most sizes and Time Guard® compressor protection is included.

The totally-enclosed outdoor-fan motor means greater reliability under rain conditions, ensuring dependable performance for many years.

Individual room comfort

Maximum comfort is provided because each space can have individual set points and may be controlled based on actual usage. The air sweep feature permits optimal room air mixing to eliminate hot and cold spots and enhance occupant comfort.

Warm-start features mean occupants are never subjected to cold drafts on start-up or defrost.

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Features/Benefits (cont)

Economical operation

Carrier's duct-free split system design allows individual room cooling and heating (heat pump systems only) only when required. There is no need to run large supply-air fans or chilled water pumps to handle a few spaces with unique load patterns. In addition, because air is moved only in the space required, no energy is wasted moving air through ducts.

Features like the permanent split-capacitor type motors provide more economical operation, and the rifled copper tube with louvered aluminum plate fin coil provides maximum heat transfer.

When demand defrost (heat pump systems only) is used, only the minimum amount of energy is used to defrost the coil. In addition, the blow-thru design of the outdoor heat pump units results in even lower energy usage in defrost mode.

Lightweight, compact size

The small footprint of these units provides additional benefits. Carrier's

exclusive "aeroacoustic design" makes these units the most compact in the industry due to compression of space possible through fan technology. Because they require minimal service and airflow clearances, outdoor units can be located virtually anywhere — on the ground, roof, balcony, under a deck, or even mounted to an outside wall.

The outdoor unit can be mounted on any type or weight roof, and the indoor units take up very little valuable, rentable space. Because they are duct-free, not having to run large ductwork leaves additional space to be rented or utilized, making the building even more profitable.

In addition, the small size makes these units easily moveable. When floor plans change, these units can be moved to meet the new plan, providing savings and flexibility in accommodating building changes.

Easy-to-use controls

The microprocessor-based controls are easy to use, permitting quick

changes and maximum comfort. The microprocessor offers the ultimate in comfort and efficiency. Units provide an automatic restart after a power failure and retain their memory, eliminating unnecessary service calls or disruption of service. All units may be easily integrated into most building control systems, and offer auto-changeover (heat pump systems only) from heating to cooling mode and back.

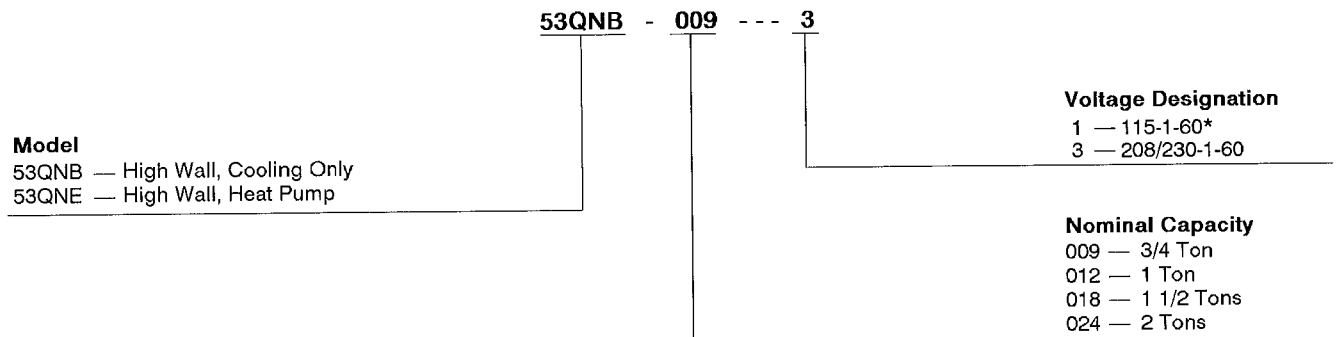
Available accessories

Customizing the Carrier duct-free split systems to your application is easily accomplished through the accessories available. Low-ambient capability (permitting cooling operation down to -20 F outdoor ambient) is easily added on all units.

Accessories for the high-wall fan coils also include an internal condensate pump to provide installation flexibility.

Model number nomenclature

53 SERIES DUCT-FREE SPLIT SYSTEMS



*009 systems only.

NOTE: System voltage is the voltage of the outdoor unit

Model number nomenclature (cont)

40 SERIES FAN COILS

40QNE 024 - - - 3

Model

40QNB — High Wall Cooling Only
40QNE — High Wall Heat Pump

Voltage Designation

1 — 115-1-60*
3 — 208/230-1-60

Nominal Capacity

009 — 3/4 Ton
012 — 1 Ton
018 — 1 1/2 Tons
024 — 2 Tons

*009 systems only

38 SERIES OUTDOOR UNITS

38HD - C - 024 - 3

Model

38AN,HD — Air-Cooled Condensing Units
38BK — Air-Cooled Heat Pump Units

Voltage Designation

1 — 115-1-60*
3 — 208/230-1-60

Nominal Capacity

009 — 3/4 Ton†
012 — 1 Ton†
018 — 1 1/2 Tons**
024 — 2 Tons††
048 — 4 Tons||

C — For Commercial Duty (HD Units Only)
S — For Multi-Split Duty (HD Units Only)

*009 systems only
†38AN,BK only
**38BK,HDC only
††38BK,HDC,HDS only.
||38HDS only

System capacities

SYSTEM TYPE	NOMINAL SYSTEM CAPACITY (Tons)	FAN COIL TYPE(S)	INDOOR SECTIONS			OUTDOOR SECTION 38-	TOTAL STANDARD CFM (AT HIGH SPEED)	SYSTEM NET COOLING (Btuh)	SYSTEM NET HEATING* (Btuh)	SEER	HSPF*	OUTDOOR SOUND RATING (Decibels)
			Ckt	Qty	Model No. 40-							
COOLING ONLY	¾	High Wall	—	1	QNB009	AN009	286	8,500	—	10.5	—	65
	1	High Wall	—	1	QNB012	AN012	358	11,800	—	11.0	—	65
	1½	High Wall	—	1	QNB018	HDC018	534	17,300	—	11.5	—	70
	2	High Wall	—	1	QNB024	HDC024	521	22,600	—	12.0	—	68
HEAT PUMP	¾	High Wall	—	1	QNE009	BK009	293	9,000	9,000	10.5	6.8	65
	1	High Wall	—	1	QNE012	BK012	350	12,500	12,500	10.5	6.8	65
	1½	High Wall	—	1	QNE018	BK018	502	17,300	16,900	11.5	6.8	70
	2	High Wall	—	1	QNE024	BK024	574	23,200	21,400	11.0	6.8	68
MULTI-SPLIT	2	High Wall	A	2	QNB018	HDS024	1000	23,000	—	11.0	—	68
		In-Ceiling Cassette	A	1	QKB024	HDS024	1059	23,000	—	11.0	—	68
		High Wall	A	1	QNB018							
	4	Ceiling Suspended	A	1	QAB024†	HDS024	1034	23,000	—	11.0	—	68
		High Wall	A	1	QNB018							
		High Wall	A	2	QNB018	HDS048	1068	46,000	—	11.0	—	72
		High Wall	B	2	QNB018							
		High Wall	A	1	QNB024	HDS048	1589	46,000	—	11.0	—	72
		High Wall	B	2	QNB018							
		High Wall	A	1	QNB024	HDS048	1042	46,000	—	11.0	—	72
		High Wall	B	1	QNB024							
		High Wall	A	2	QNB018	HDS048	2102	46,000	—	11.0	—	72
		High Wall	B	1	QNB018							
		Ceiling Suspended	B	1	QAB024†	HDS048	2127	46,000	—	11.0	—	72
		In-Ceiling Cassette	A	2	QKB024							
		High Wall	B	1	QNB018	HDS048	2068	47,000	—	11.0	—	72
		High Wall	B	1	QNB018							
		In-Ceiling Cassette	A	2	QKB024	HDS048	2118	46,000	—	11.0	—	72
		High Wall	B	2	QNB018							
		High Wall	A	2	QNB018	HDS048	2059	46,000	—	11.0	—	72
		Ceiling Suspended	B	1	QAB024†							
		In-Ceiling Cassette	B	1	QKB024	HDS048	2034	47,000	—	11.0	—	72
		Ceiling Suspended	A	2	QAB024†							
		Ceiling Suspended	B	1	QAB024†	HDS048	2059	47,000	—	11.0	—	72
		In-Ceiling Cassette	B	1	QKB024							
		High Wall	A	2	QAB024†	HDS048	2109	46,000	—	11.0	—	72
		In-Ceiling Cassette	B	1	QKB024							
		High Wall	A	2	QKB024	HDS048	2084	46,000	—	11.0	—	72
		Ceiling Suspended	B	1	QAB024†							
		High Wall	B	1	QNB018	HDS048	1983	47,000	—	11.0	—	72
		In-Ceiling Cassette	A	2	QKB036							
		High Wall	A	2	QNB018	HDS048	1668	45,800	—	11.0	—	72
		Ceiling Suspended	B	1	QAB024							
		High Wall	A	2	QAB024†	HDS048	1521	46,800	—	11.0	—	72
		Ceiling Suspended	B	1	QNB024							
		High Wall	A	1	QAB024†	HDS048	1559	45,800	—	11.0	—	72
		In-Ceiling Cassette	A	1	QKB024							
		High Wall	B	1	QNB024	HDS048	1436	46,800	—	11.0	—	72
		In-Ceiling Cassette	A	1	QKB036							
		High Wall	A	1	QNB024	HDS048	1121	45,600	—	11.0	—	72
		Ceiling Suspended	B	1	QAB024							

LEGEND

Decibels — Sound Levels
Ckt — Circuit
HSPF — Heating Seasonal Performance Factors
SEER — Seasonal Energy Efficiency Ratio

*Heat pump systems only

†Unit must be reconfigured for 1½ ton (18,000 Btuh) operation. Refer to installation instructions included with the fan coil unit for more details.

NOTES:

- 1 Rating condition is 80 F db, 67 F wb air entering indoor air section and 95 F db air entering outdoor air section
- 2 Total kW is for total system, including compressor and outdoor and indoor fans
- 3 Ratings are based on 25 ft of interconnecting refrigerant line
- 4 All system ratings are based on fan coil units operating at high fan speed. Consult Physical Data tables for airflows at all available fan speeds

Accessories (field installed)

STANDARD FEATURES AND FIELD-INSTALLED HIGH WALL UNIT ACCESSORIES

STANDARD FEATURE/FIELD-INSTALLED ACCESSORY	
Internal Condensate Pump	A
Mounting Brackets	S
Microprocessor Controls	S
Cleanable Filters	S
3-Speed Indoor-Fan Motor	S
Automatic Indoor-Fan Speed Control	S
Extensive Diagnostics	S
Wireless Remote Controller	S
Fully Insulated Indoor Unit Cabinet	S
Automatic Air Sweep	S
Auto. Restart Function	S
24-Hour Automatic Start/Stop Timer	S
Refrigerant Line Turn Elbow*	S
Thermistor Cable Assembly	S
High- and Low-Voltage Terminal Blocks (Indoor)	S
AccuRater® Refrigerant Metering Device	S†
Manual Defrost**	S
Demand Defrost**	S
Warm Start (in heating)**	S
Evaporator Coil Freeze Protection	S
Outdoor High- and Low-Voltage Terminal Block	S
Accumulator	S
Crankcase Heater (Reciprocating Compressor Units)	S
Crankcase Heater (Scroll Compressor Units)	A
High-Pressure Switch*	S
Low-Pressure Switch*	S
5-Year Compressor Warranty	S
Compressor Start Assistance (non-scroll units)	S
Cycle-LOC™ Device*	S
Suction and Discharge Service Taps††	S
Totally Enclosed Outdoor Fan Motor	S
Acoustically-Lined Compressor Compartment	S
Low Ambient Temperature Controls (down to -20 F)†	A
Heating Operation to -20 F**	S
Auto. Changeover from Cooling to Heating**	S
Time Guard® Cycle Protector*	S
Liquid Solenoid Valve*	A
Condensing Unit Wall Mount Kit*	A
Winter Start (38HDS)	A

LEGEND

A — Field-Installed Accessory
S — Standard from the Factory

*For size 018 and larger.

†Not used on 38HDS systems

**Heat pump systems only

††The outdoor units are equipped with 4 taps; one for each service valve, and one each on compressor suction and discharge

Outdoor units

Low-ambient kit (38AN,BK,HDC) is a solid-state head pressure controller designed to control outdoor fan cycling, and is activated by a pressure sensor. It is specifically designed to control fan-motor cycles in response to saturated condensing pressure. This device maintains a constant saturated condensing temperature of 100 F ± 10 F at outdoor-air temperatures between 55 F and -20 F, and may be used on all outdoor units without changing the outdoor-fan motor.

Liquid solenoid valve (size 018 and larger) is an electrically operated shutoff valve to be installed at the outdoor unit, and closes and opens in response to compressor operation. The valve maintains a column of refrigerant in the liquid line between compressor operation cycles and is required for certain long-line applications. The valve should be used with all long-line applications (over 100 ft).

Crankcase heaters are available for units with scroll compressors, and should be used when using low-ambient kits to minimize liquid refrigerant accumulation in compressor during shutdown. Heaters also prevent refrigerant dilution of oil.

Wall mount kit (size 018 and larger) includes brackets to be mounted to the outside of the structure to raise unit from ground level, or to mount the unit on a wall adjacent to a sloping roof. The wall mount kit is also useful in areas of heavy snowfall or where space is at a premium. The wall mount kit may be used with any outdoor unit.

Winter start (38HDC/HDS) is a field-installed accessory which permits start-up for cooling operation under low-load conditions and at low ambient temperatures by bypassing the low-pressure switch for 3 minutes. It is required when the unit is operated in cooling at outdoor ambients below 40 F.

Fan Coils

Condensate pump provides lift capability of 10 feet. The pump mounts above the unit using a "quick plug" connection, and is recommended when adequate drain line pitch cannot be provided.

Physical data — 38AN,HDC condensing units

UNIT 38	AN009	AN012	HDC018	HDC024
NOMINAL CAPACITY (Tons)	¾	1	1½	2
OPERATING WEIGHT (lb)	55 0	62 0	150	154
REFRIGERANT TYPE	Capillary		R-22	
Control	1.5		AccuRater® Piston at Fan Coil Unit	
Factory Charge (lb)*	1.5		4 6	
COMPRESSOR TYPE	Carlyle Rotary		Tecumseh Reciprocating	
Model	EAA090111A		AW5517G	
OUTDOOR FAN	1050		Propeller Type	
Rpm	—		850	
Nominal Air Cfm (High Speed)	—		1720	
OUTDOOR COIL	Copper Tube, Aluminum Fin		Copper Tube, Aluminum Fin	
Face Area (sq ft)...No. of Rows	3 5 .1		6 1 1 5	
Fins/in.	18		15	
CONTROLS	—		320 ± 20	
High-Pressure (psig)	—		426 ± 7	
Cut-in	—		22 ± 5	
Cutout	—		7 ± 3	
Low-Pressure (psig)	—		210 F	
Cut-in	—		24	
Cutout	210 F		210 F	
Fusible Plug	115		230	
Control Voltage†	115		230	
REFRIGERANT LINES	Flare		Sweat	
Connection Type	¼		¾	
Liquid Line OD (in.)	½		¾	
Vapor Line OD (in.)	35		200	
Maximum Length (ft)	16		65	
Maximum Lift (Fan Coil Above Outdoor) (ft)	30		150	
Maximum Lift (Fan Coil Below Outdoor) (ft)	30		150	
EXTERNAL FINISH	Grey		Alpine Mist (Beige)	

*See Piston Guide tables in Application Data section on page 22 for proper charge and piston with each fan coil type. Charge is based on duct-free fan coil requiring smallest amount of refrigerant and 25 ft of interconnecting line.

†24 v and a minimum of 40 va is provided in the fan coil unit.

Physical data — 38BK heat pump units

UNIT 38BK	009	012	018	024
NOMINAL CAPACITY (Tons)	¾	1	1½	2
OPERATING WEIGHT (lb)	60.7	66.5	154	167
REFRIGERANT TYPE	R-22			
Control (Cooling)	Fixed Orifice at Outdoor Unit		AccuRater® Piston at Fan Coil Unit	
Control (Heating)	Fixed Orifice at Outdoor Unit		AccuRater Piston at Outdoor Unit	
Factory Charge (lb)*	1.5	2.0	5.0	5.1
COMPRESSOR TYPE	Carlyle Rotary		Tecumseh Reciprocating	
Model	EBA095111H	EBB130111H	AW5519G	AW5524G
OUTDOOR FAN	Propeller Type			
Rpm (Cooling and Heating)	1050	1050	850	850
Nominal Cfm (High Speed)	—	—	1720	1720
OUTDOOR COIL	Copper Tube, Aluminum Fin			
Face Area (sq ft)...No. of Rows	3.5 1	3.5 2	6 1.1 5	6 1.2
Fins/in.	18	18	15	15
CONTROLS				
High-Pressure (psig)				
Cutout	—	—	320 ± 20	
Cut-in	—	—	426 ± 7	
Liquid Line Low-Pressure (psig)				
Cutout	—	—	7 ± 3	
Cut-in	—	—	22 ± 5	
Fusible Plug	210 F	210 F	210 F	
Defrost Method†	Time and Temperature Defrost	Time and Temperature Defrost	Time and Temperature Defrost	
Accumulator	Yes	Yes	Yes	
Control Voltage**	230	230	24	
REFRIGERANT LINES				
Connection Type	Flare		Sweat—Suction, Flare—Liquid	
Liquid Line OD (in.)	¼	¼	⅜	⅜
Vapor Line OD (in.)	½	½	⅝	⅝
Maximum Length (ft)	35	35	200	200
Maximum Lift (Fan Coil Above) (ft)	16	16	65	65
Maximum Lift (Fan Coil Below) (ft)	30	30	150	150
EXTERNAL FINISH	Grey		Alpine Mist (Beige)	

*See Piston Guide tables on page 22 for proper charge

†Demand defrost.

**A 24-v transformer is provided in the 018,024 fan coil unit

Physical data — 38HDS condensing units

UNIT 38HDS	024	048
NOMINAL CAPACITY (Tons)	2	4
OPERATING WEIGHT (lb)	159	292
REFRIGERANT TYPE Control (Cooling) Factory Charge (lb)* Circuit A Circuit B	R-22 TXV in Condensing Unit 5 0 —	
COMPRESSOR TYPE Quantity...Model Oil (Recharge) (oz)	Copeland Scroll 1 . ZR23K1 25	
OUTDOOR FAN Rpm Nominal Air Cfm	Propeller, Direct Drive 850 1720	
OUTDOOR COIL Face Area (sq ft)...No. of Rows Fins/in.	Copper Tube, Aluminum Fin 6 1 2 15	
CONTROLS High-Pressure (psig) Cut-in Cutout Low-Pressure (psig) Cut-in Cutout Fusible Plug Control Voltage	320 ± 20 426 ± 7 22 ± 5 7 ± 3 210 F 24	
REFRIGERANT LINES Connection Type Vapor Supply Line Quantity...OD (in.) Vapor Return Line Quantity...OD (in.) Maximum Length (ft) Maximum Lift (Fan Coil Above Outdoor) (ft) Maximum Lift (Fan Coil Below Outdoor) (ft)	Sweat 2 . 3/8 2 .. 5/8 50 30† 30†	
EXTERNAL FINISH	Alpine Mist (Beige)	

LEGEND

TXV — Thermostatic Expansion Valve

*Charges are preliminary estimates and are based on 25 ft of interconnecting line

†Maximum system lift is 30 ft between lowest system component and highest system component.

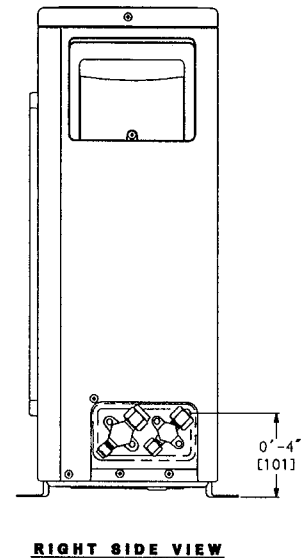
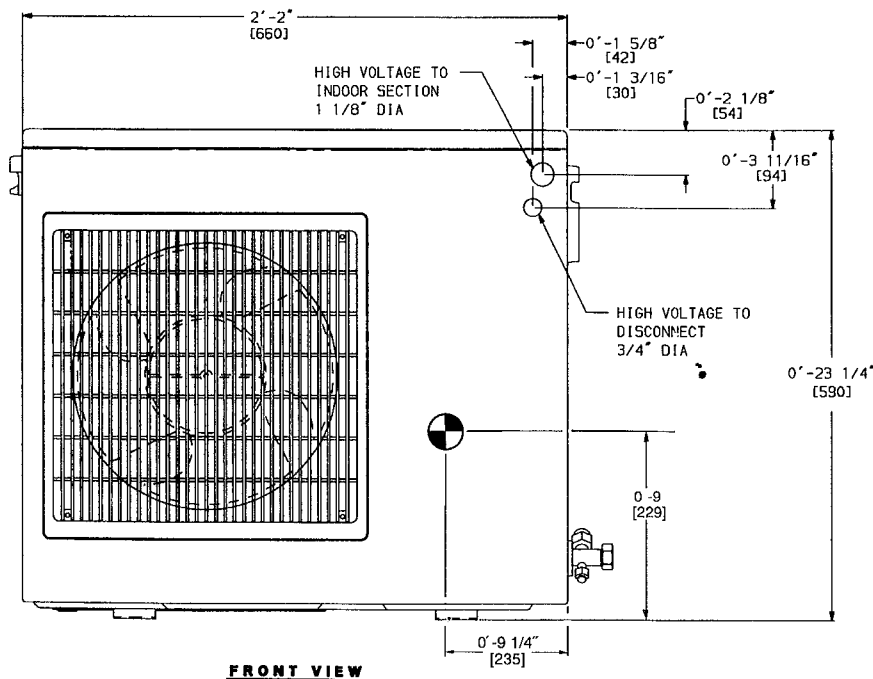
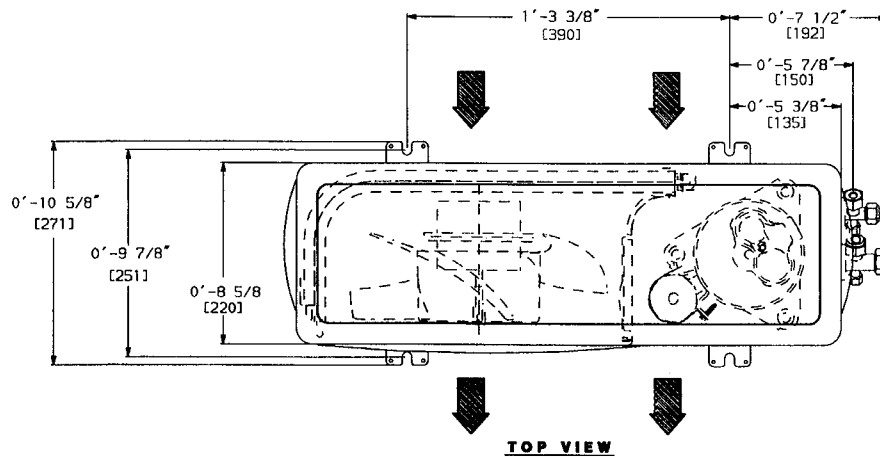
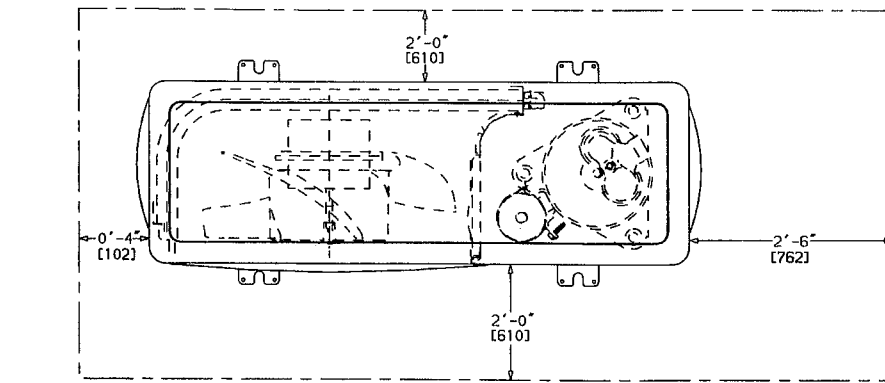
Physical data — 40QN fan coil units

UNIT 40QN	B009	B012	E009	E012	B/E018	B/E024
OPERATING WEIGHT (lb)	18 7	24 2	18.7	24 2	39	43
REFRIGERANT	R-22 with AccuRater® Control or TXV (38HDS systems)					
FAN Rpm Nominal Cfm (High Speed)	Centrifugal Blower 1250 215					
COIL Face Area (sq ft)...Rows Fins/in.	1 45 2 18	1.60 ..3 17	1.45 .2 18	1 60 ..3 17	2 56. 2 15 9	2.56. 3 18 1
CONNECTIONS (MPT) Vapor (in.) Flare Liquid (in.) Flare Condensate Drain	1/2 1/4 5/8				5/8 3/8 5/8	
LINE SIZES Vapor (in.) Liquid (in.) Condensate Drain	1/2 1/4 5/8				5/8 3/8 5/8	

TXV — Thermostatic Expansion Valve

*Cooling only/Heat pump

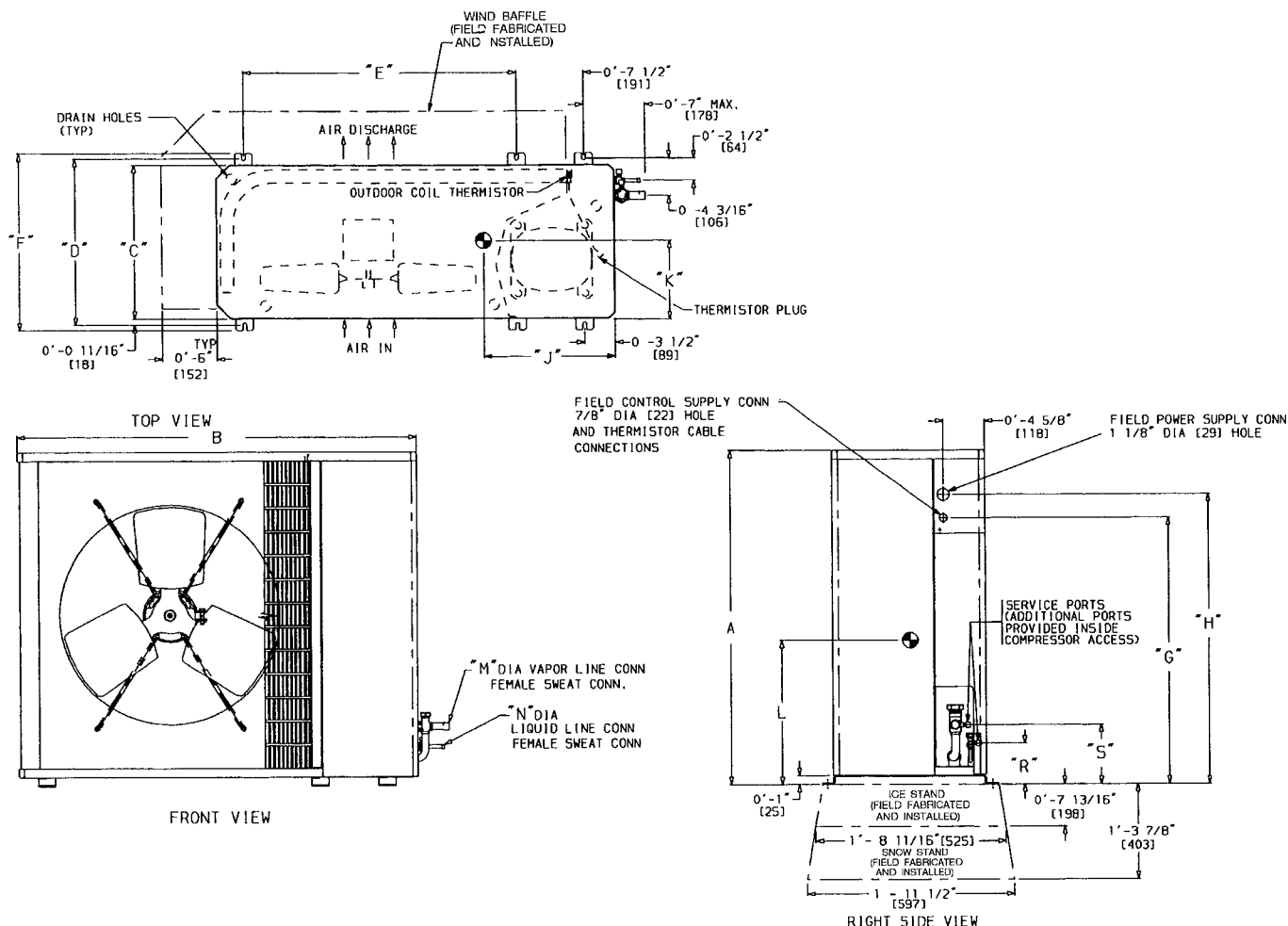
Base unit dimensions — 38AN/BK009,012 outdoor units



- 1 Dimensions in [] are in millimeters
- 2 Direction of airflow
3. Center of Gravity
- 4 Minimum clearances 4 in. on coil sides, 24 in. on fan side, and 30 in. service side

UNIT 38	WEIGHT	
	Lb	Kg
AN009	55.0	25.0
AN012	62.0	28.1
BK009	60.7	27.5
BK012	66.5	30.2

Base unit dimensions — 38HDC condensing units



UNIT 38HDC	A		B		C		D		E		F		G		H		J	
	ft-in.	mm	ft-in.	mm	ft-in.	mm	ft-in.	mm	ft-in.	mm	ft-in.	mm	ft-in.	mm	ft-in.	mm	ft-in.	mm
018	2-1 1/8	638.2	3-0 15/16	938.2	1-2 9/16	369.9	1-4	406.4	1-11 7/16	595.3	1-5 9/16	436.6	1-5 1/2	444.5	1-8 1/8	511.2	1-1 1/4	336.6
024	2-1 1/8	638.2	3-0 15/16	938.2	1-2 9/16	369.9	1-4	406.4	1-11 7/16	595.3	1-5 9/16	436.6	1-5 1/2	444.5	1-8 1/8	511.2	1-2 1/16	366.7

UNIT 38HDC	K		L		M		N		R		S		OPERATING WT	
	ft-in.	mm	ft-in.	mm	ft-in.	mm	ft-in.	mm	ft-in.	mm	ft-in.	mm	Lb	kg
018	0-6 5/8	168.3	0-10 13/16	274.6	0-0 5/8	15.00	0-0 3/8	9.52	0-4 1/2	115.0	0-6 1/2	166.0	150	68.0
024	0-6 3/4	171.4	1-0	304.8	0-0 5/8	15.00	0-0 3/8	9.52	0-4 1/2	115.0	0-6 1/2	166.0	154	69.0

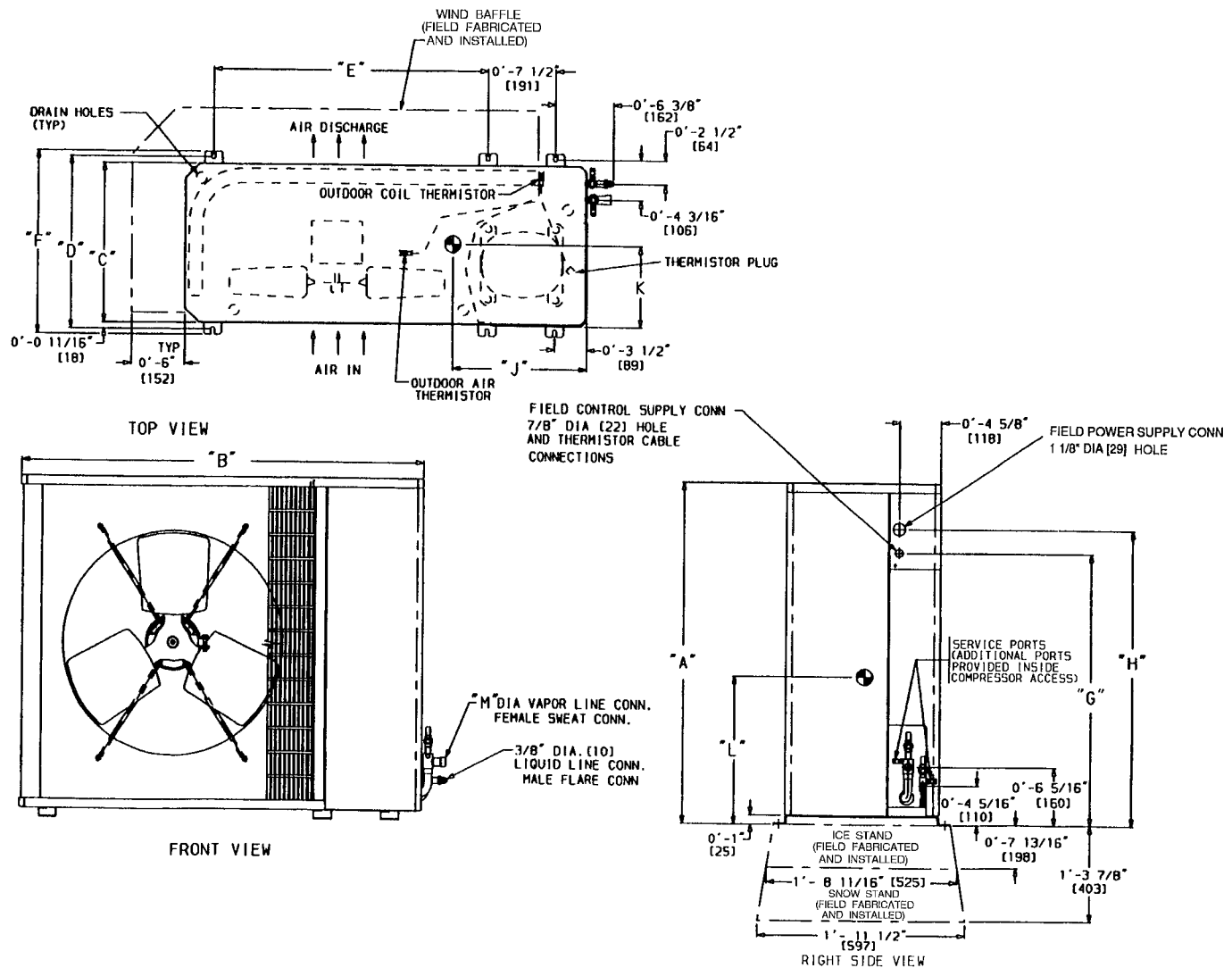
MINIMUM MOUNTING PAD DIMENSIONS

Support Feet		Snow Stand		Ice Stand	
ft-in.	mm	ft-in.	mm	ft-in.	mm
1-11 x 3-6	584.2 x 1066.8	2-2 x 3-6	660.4 x 1066.8	2-2 x 3-6	660.4 x 1066.8

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 clearance on compressor end and coil side. With multi-unit application, arrange units so discharge of one does not enter inlet of another.
- Dimensions in parenthesis are in millimeters.
- Center of Gravity

Base unit dimensions — 38BK heat pump units



UNIT 38BK	A		B		C		D		E		F		G		H		J	
	ft-in.	mm	ft-in.	mm	ft-in.	mm	ft-in.	mm	ft-in.	mm	ft-in.	mm	ft-in.	mm	ft-in.	mm	ft-in.	mm
018	2-1 1/8	638.2	3-0 15/16	938.2	1-2 9/16	369.9	1-4	406.4	1-11 7/16	595.3	1-5 3/16	436.6	1-5 1/2	444.5	1-8 1/8	511.2	1-1	330.2
024	2-1 1/8	638.2	3-0 15/16	938.2	1-2 9/16	369.9	1-4	406.4	1-11 7/16	595.3	1-5 3/16	436.6	1-5 1/2	444.5	1-8 1/8	511.2	1-1	330.2

UNIT 38BK	K		L		M		OPERATING WEIGHT	
	ft-in.	mm	ft-in.	mm	ft-in.	mm	lb	Kg
018	0-6 5/8	168.3	0-11 1/4	285.8	0-0 5/8	15.88	154	69.8
024	0-6 3/4	171.5	0-11 5/8	295.3	0-0 5/8	15.88	167	75.7

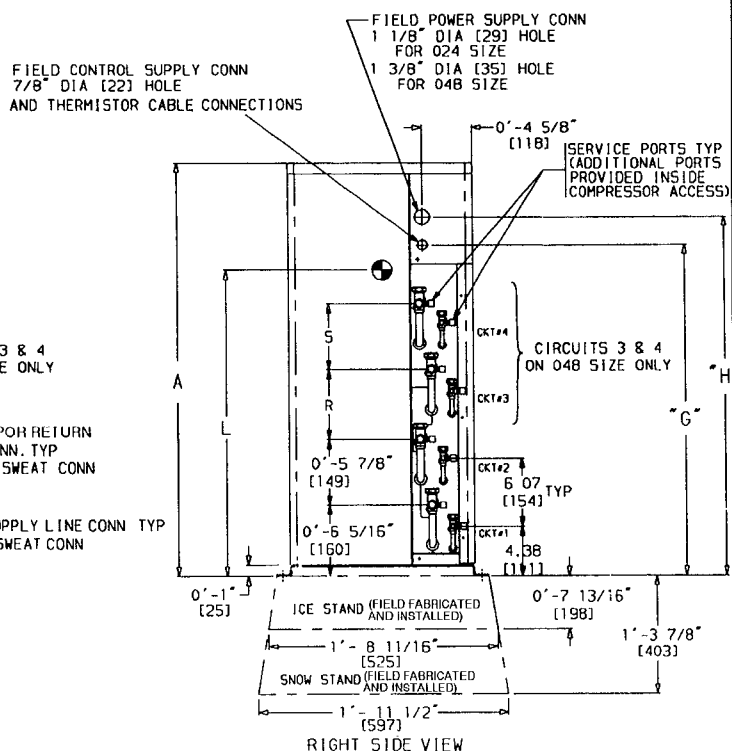
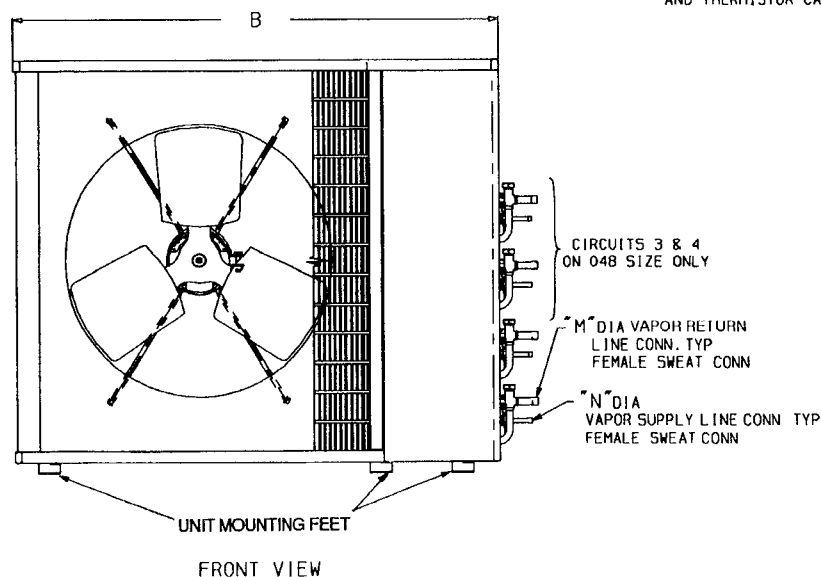
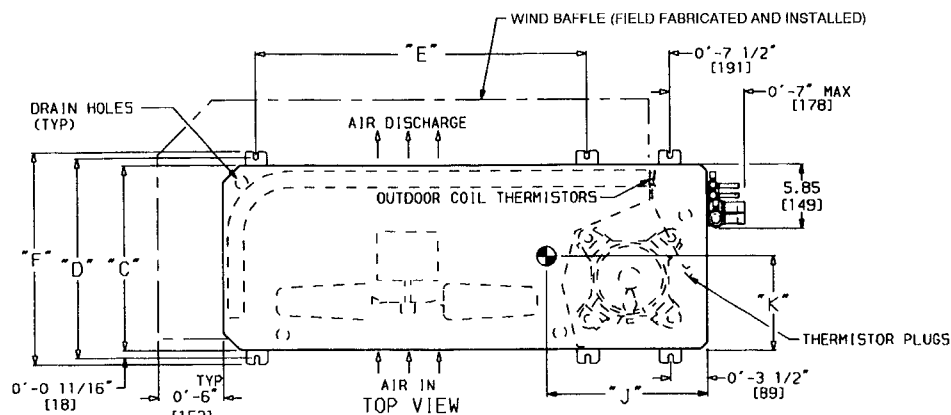
NOTES:

- 1 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 clearance on compressor end and coil side. With multi unit application; arrange units so discharge of one does not enter inlet of another.
- 2 Dimensions in [] are in millimeters.
- 3  Center of gravity

MINIMUM MOUNTING PAD DIMENSIONS					
Support Feet		Snow Stand		Ice Stand	
ft-in.	mm	ft-in.	mm	ft-in.	mm
1-11 x 3-6	584.2 x 1066.8	2-2 x 3-6	660.4 x 1066.8	2-2 x 3-6	660.4 x 1066.8

LEGEND
CONN — Connection

Base unit dimensions — 38HDS condensing units



UNIT 38HDS	A		B		C		D		E		F		G		H	
	Ft-in.	mm	Ft-in.	mm	Ft-in.	mm	Ft-in.	mm	Ft-in.	mm	Ft-in.	mm	Ft-in.	mm	Ft-in.	mm
024	2-1 $\frac{5}{8}$	638	3-0 $\frac{1}{4}$ $\frac{1}{16}$	938	1-2 $\frac{3}{16}$	370	1-4	406	1-11 $\frac{7}{16}$	595	1-5 $\frac{3}{16}$	437	1-5 $\frac{1}{2}$	445	1-8 $\frac{1}{8}$	511
048	3-1 $\frac{3}{16}$	945	3-8 $\frac{1}{16}$	1132	1-5 $\frac{1}{16}$	433	1-6 $\frac{7}{16}$	468	2- 6 $\frac{1}{2}$	775	1-7 $\frac{7}{8}$	499	2-5 $\frac{3}{8}$	753	2-8 $\frac{3}{16}$	818

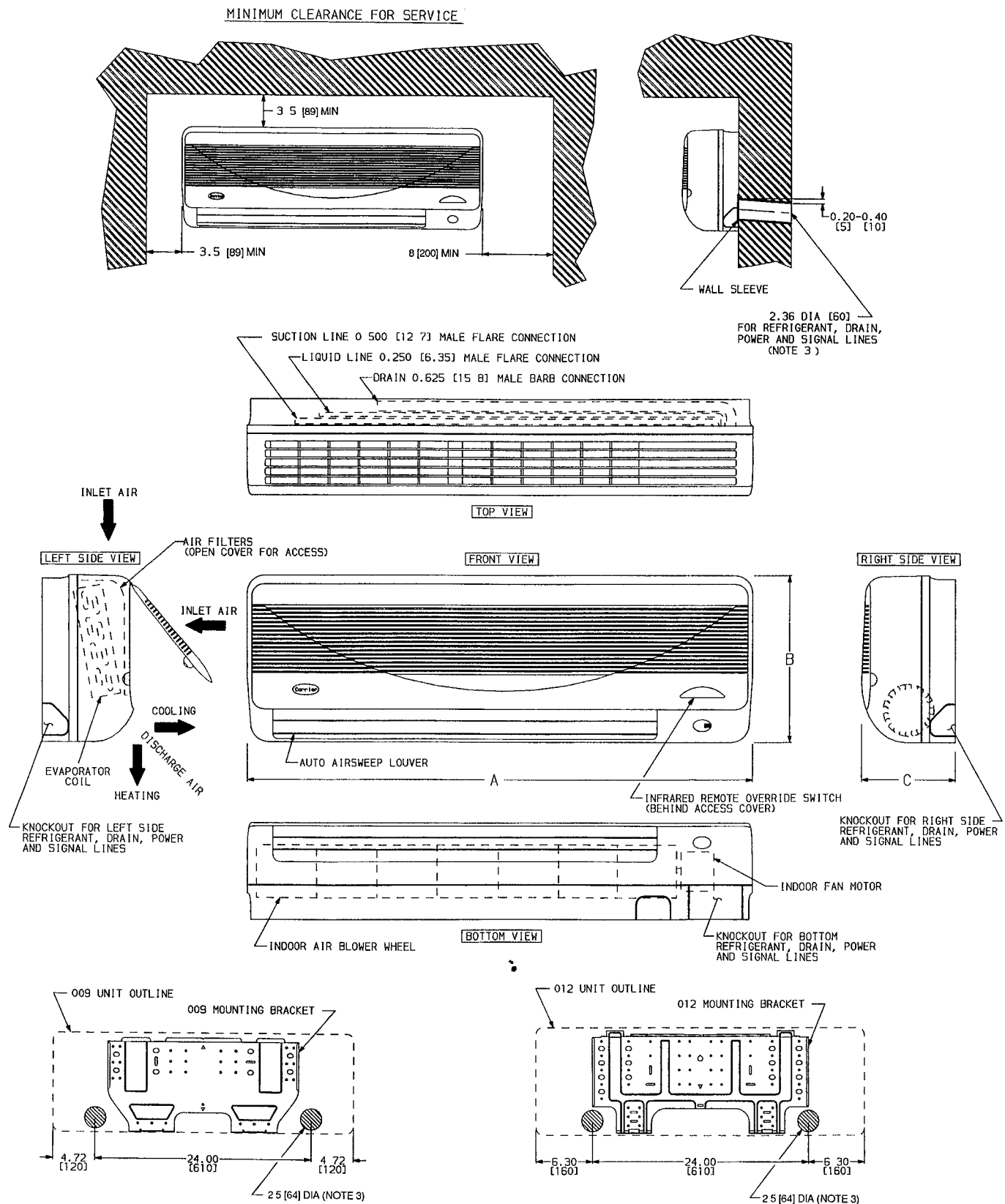
UNIT 38HDS	J		K		L		M		N		R		S		OPERATING WEIGHT	
	Ft-in.	mm	Ft-in.	mm	Ft-in.	mm	Ft-in.	mm	Ft-in.	mm	Ft-in.	mm	Ft-in.	mm	Lb	Kg
024	1-2 $\frac{1}{16}$	367	0-6 $\frac{3}{4}$	171	1-0	305	0-0 $\frac{5}{8}$	16	0-0 $\frac{5}{8}$	10	—	—	—	—	159	72 0
048	1-2 $\frac{3}{4}$	375	0-7 $\frac{1}{2}$	191	1-6	457	0-0 $\frac{5}{8}$	16	0-0 $\frac{5}{8}$	10	0-6 $\frac{1}{16}$	160	0-5 $\frac{7}{8}$	149	292	132 3

UNIT 38HDS	MINIMUM MOUNTING PAD DIMENSIONS					
	SUPPORT FEET		SNOW STAND		ICE STAND	
	Ft-in.	mm	Ft-in.	mm	Ft-in.	mm
024	1-11 x 3-6	584 x 1067	2-2 x 3-6	660 x 1067	2-2 x 3-6	660 x 1067
048	2-0 x 4-2	610 x 1270	2-4 x 4-4	711 x 1270	2-2 x 4-2	660 x 1270

NOTES:

- NOTES:
- 1 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 clearance on compressor end and coil side With multi-unit application: arrange units so discharge of one does not enter inlet of another
 - 2 Dimensions in [] are in millimeters
 - 3 Center of gravity 

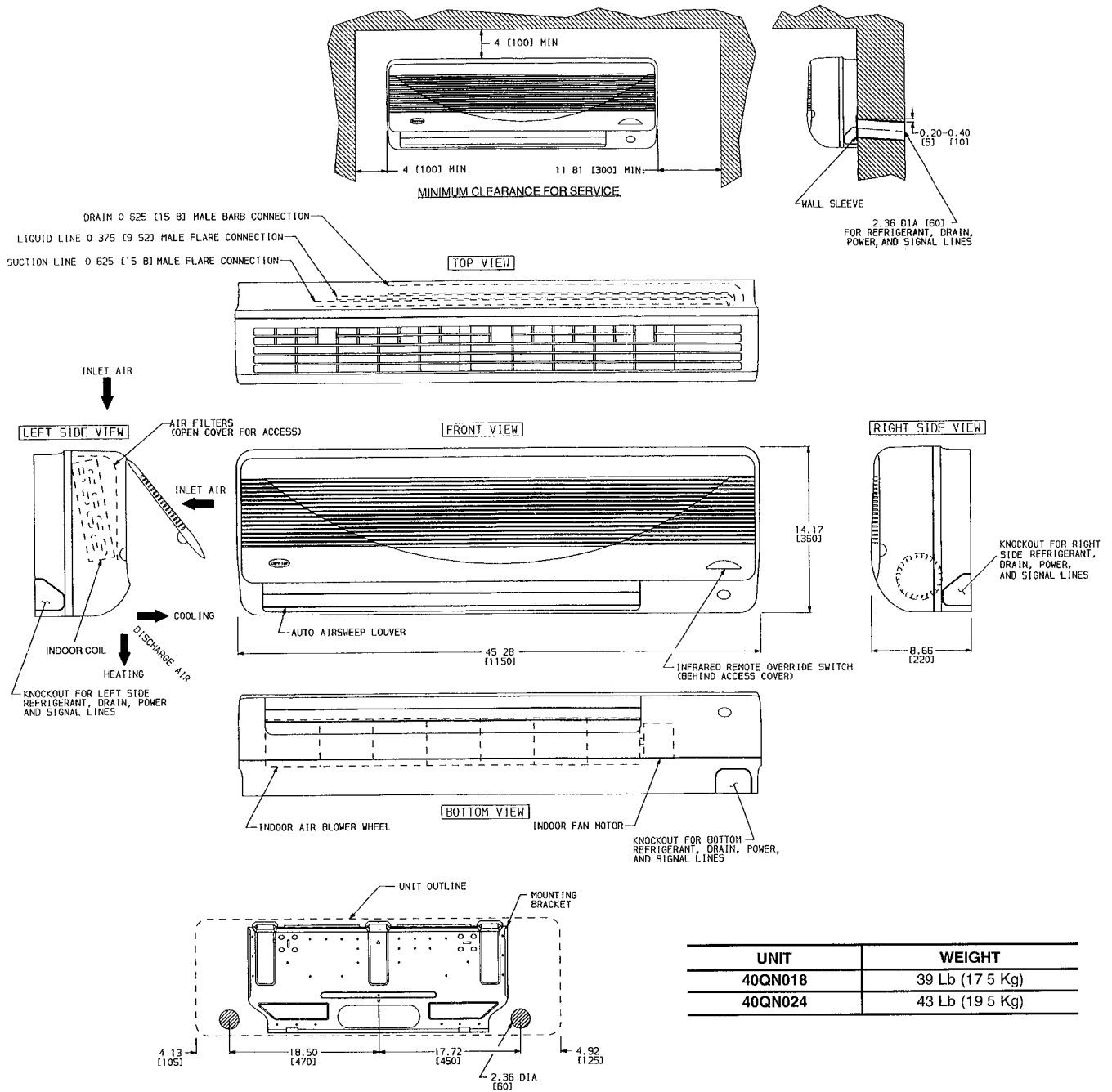
Base unit dimensions — 40QN009,012 fan coil units



1. Dimensions are in inches. Dimensions in [] are in millimeters
2. ➡ Direction of airflow
3. Refrigerant, drain, and power connections may be made rear, left side or right side
4. Refrigerant is metered by capillary tubes in the outdoor unit. Insulate both refrigerant lines
5. Clearances of 3½" on top of and to the left of the fan coil unit are absolute minimums. Clearances of 10" are recommended

UNIT 40QN	WEIGHT		A		B		C	
	Lb	Kg	in.	mm	in.	mm	in.	mm
009	18.7	8.5	33.46	850	11.02	280	6.29	160
012	24.2	11.0	36.61	930	11.81	300	7.28	185

Base unit dimensions — 40QN018,024 fan coil units



- 1 Dimensions in () are in millimeters
- 2  Direction of airflow
- 3 Refrigerant, drain, and power connections may be made in unit rear, bottom, left side, or right side.
- 4 Refrigerant is metered by AccuRater® device at the fan coil unit on 38HDC and BK applications. A thermostatic expansion valve is used in the outdoor unit on 38HDS applications. Insulate both refrigerant lines on 38HDS and BK applications
- 5 The 4" top and left side clearances are absolute minimums. Clearances of 10" are recommended

UNIT	WEIGHT
40QN018	39 Lb (17.5 Kg)
40QN024	43 Lb (19.5 Kg)

Electrical data

38AN,HDC CONDENSING UNITS

UNIT SIZE 38	VOLTAGE (Single Ph, 60 Hz)	OPERATING VOLTAGE MINIMUM*	OPERATING VOLTAGE MAXIMUM*	COMP RLA	FAN FLA	POWER	
						MCA	MOCP
AN009	115	104	127	7.6	0.76	12.1	15
AN012	208/230	187	253	5.5	0.35	8.5	15
HDC018	208/230	187	254	8.0	0.70	10.7	15
HDC024	208/230	187	254	12.9	0.70	16.8	25

38BK HEAT PUMPS

UNIT SIZE 38BK	VOLTAGE (Single Ph, 60 Hz)	OPERATING VOLTAGE — MINIMUM*	OPERATING VOLTAGE — MAXIMUM*	COMP RLA	FAN FLA	POWER	
						MCA	MOCP
009	115	104	127	9.0	0.76	11.2	15
012	208/230	187	253	5.8	0.35	13.9	15
018	208/230	187	253	9.8	0.70	13.0	20
024	208/230	187	253	11.7	0.70	15.3	25

38HDS CONDENSING UNITS

UNIT SIZE 38HDS	V-PH-Hz	OPERATING VOLTAGE MINIMUM*	OPERATING VOLTAGE MAXIMUM*	COMPRESSOR			FAN	POWER SUPPLY	
				Quantity	RLA (Ea)	LRA (Ea)	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
MOCP — Maximum Overcurrent Protection
NEC — National Electrical Code
RLA — Rated Load Amps (Compressor)

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

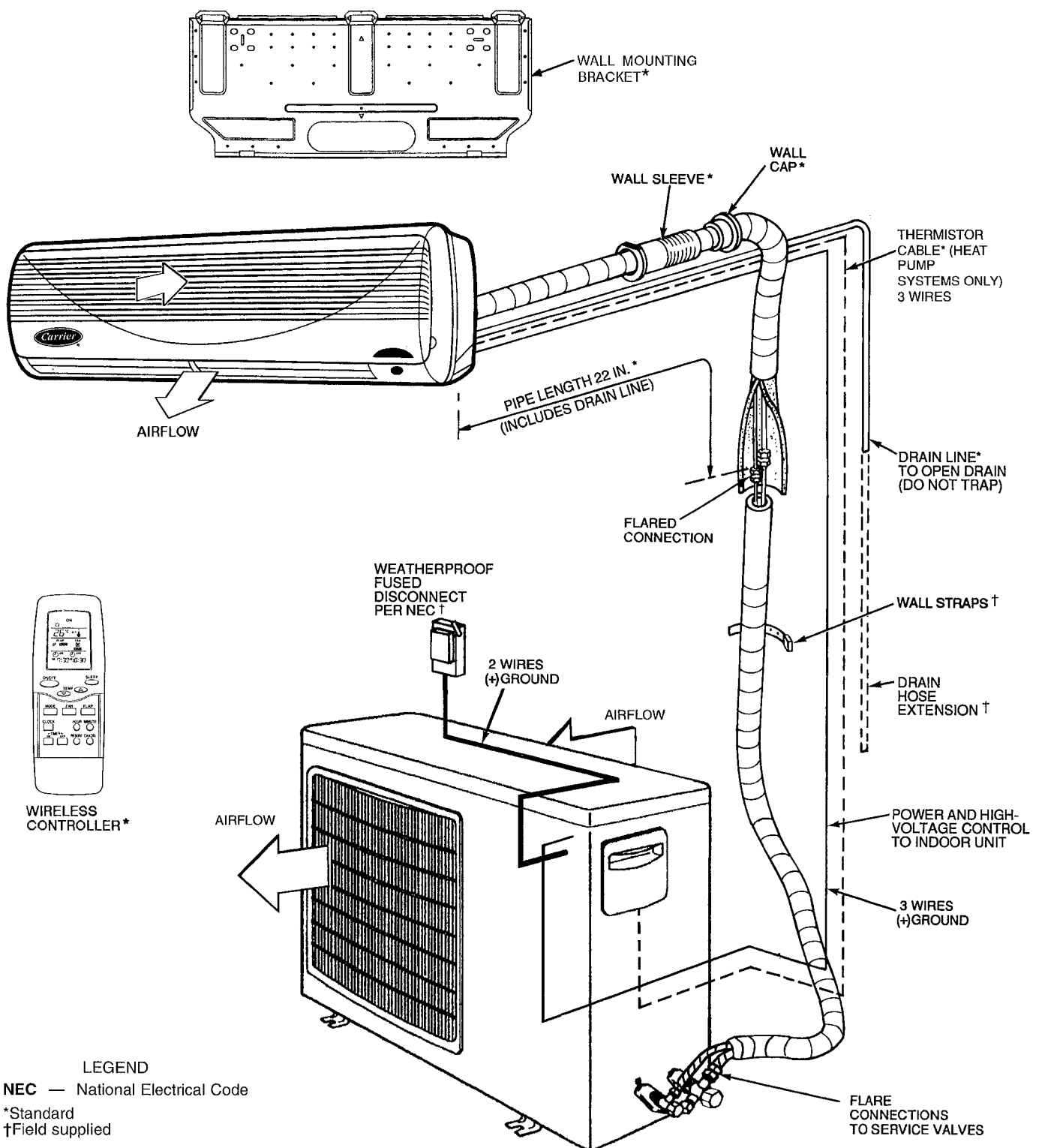
NOTES:

- 1 The 018,024, and 048 outdoor units contain a 24-v transformer, additional transformers are not required. The 009,012 outdoor units use 230-v (high voltage) controls.
- 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 1995.

40QN FAN COIL UNITS

INDOOR UNIT 40QN	VOLTAGE (Single Ph, 60 Hz)	OPERATING VOLTAGE*		FAN
		Max	Min	FLA
B009	115	104	127	0.41
B012	208/230	187	253	0.23
B018	208/230	253	187	0.53
B024				
E009	115	104	127	0.41
E012	208/230	187	253	0.23
E018	208/230	253	187	0.53
E024				

Typical piping and wiring — high wall systems, 9,000 and 12,000 Btuh (heat pump system shown)



LEGEND

NEC — National Electrical Code

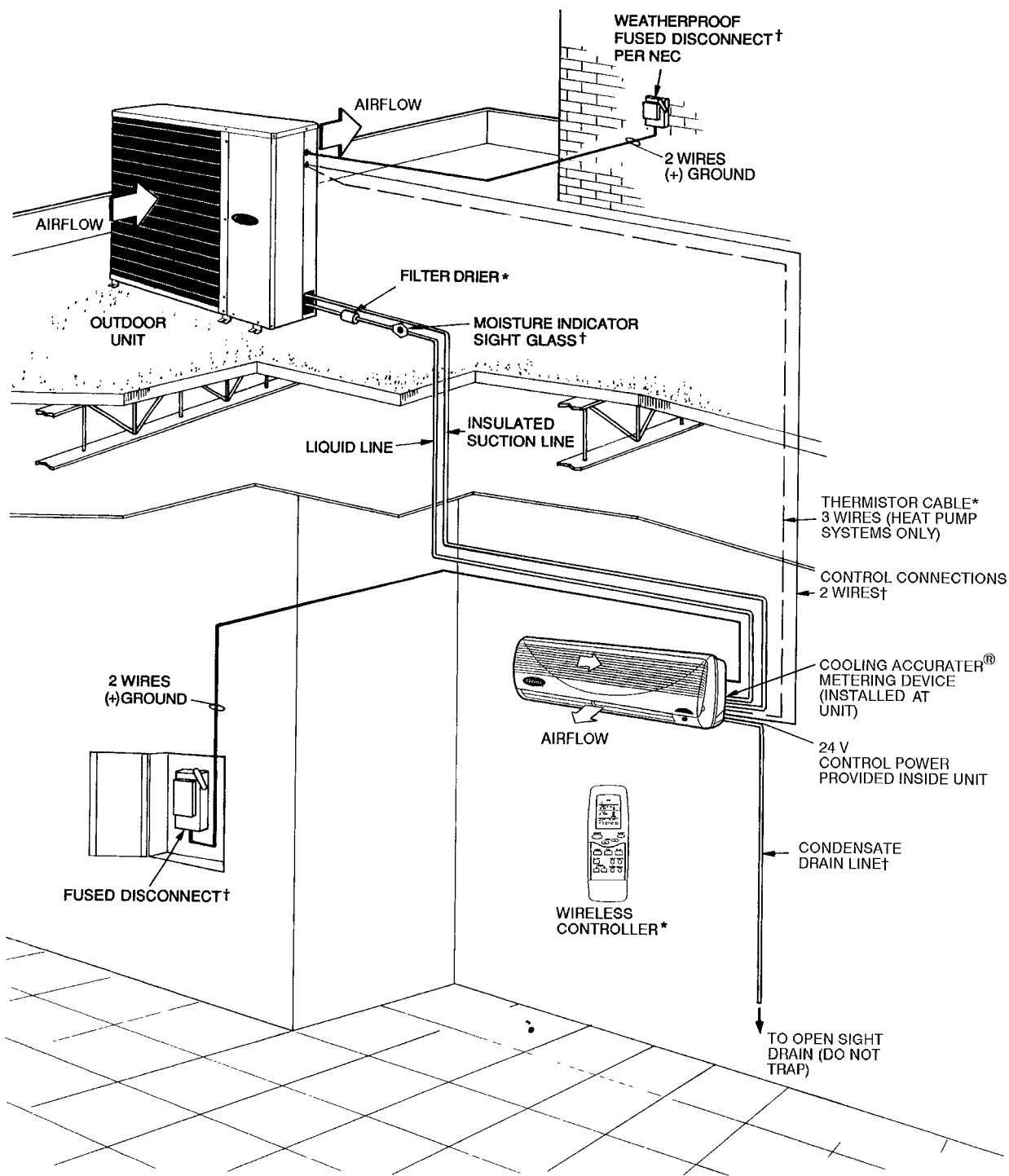
*Standard

†Field supplied

NOTES

- 1 All piping must follow standard refrigerant techniques. Refer to Carrier System Design Manual for details.
- 2 Do not install a filter drier in mixed phase liquid line.
- 3 All wiring must comply with applicable local and national codes.
- 4 Capillary tube expansion device (cooling-only systems only) is located in the outdoor unit. Both refrigerant lines must be insulated.
- 5 Wiring and piping shown are general points-of-connection guides only and are not intended to include all details for a specific installation.
- 6 Insulate condensate line drain if installed in a conditioned space.

Typical piping and wiring — high-wall systems, 18,000 and 24,000 Btuh (cooling only system shown)



LEGEND

NEC — National Electrical Code

—— Piping

—— Line Voltage

—— 24 V

----- Thermistor

*Standard
†Field supplied

NOTES

1. All piping must follow standard refrigerant piping techniques. Refer to Carrier System Design Manual.
2. All wiring must comply with the applicable local and national codes.
3. Liquid line need not be insulated.
4. Wiring and piping shown are general points-of-connection guides only and are not intended for a specific installation.
5. Insulate condensate drain if installed in a conditioned space.

Application data

Unit selection

Select equipment to either match or be slightly less than anticipated peak cooling load. This provides better humidity control, fewer unit cycles, and less part-load operation.

On heat pump systems, heating and cooling design loads must both be checked.

For units used in spaces with high sensible loads, base equipment selection on unit sensible load, not on total anticipated load. Adjust for anticipated room wet bulb temperature to avoid undersizing equipment.

On heat pump systems, heating load using outdoor air must be checked in addition to cooling load. Heating load of outdoor air can greatly reduce heating capability.

When selecting equipment which has outdoor air introduced into the unit, determine the mix conditions of room air and outdoor air at design conditions. The cooling capacity tables in this literature are based on 80 F edb. Adjust for actual dry-bulb and wet-bulb conditions with the required outdoor air to select the proper equipment.

Unit combinations and coil mixed matches

The 38AN,BK,HDC,HDS units are the only units approved for use with the Carrier 40QN duct-free split systems. These outdoor units may also be used with other fan coil units (in approved combinations).

Unit mounting (outdoor)

Unit leveling — For reliable operation, units should be level in all planes.

Clearance — Adequate clearance must be provided for airflow. See dimensional drawings for proper clearances. The outdoor units are designed for free-blow application. Air inlets and outlets should not be restricted. Outdoor fan external static pressure available is less than 0.1 in wg.

Unit location — Heat pump units should not be stacked. Defrosted condensate from upper unit will refreeze on lower unit. All other outdoor units may be stacked 2 high if desired. Field-fabricated and installed hardware is required. Contact your local Carrier representative for details.

All units may be wall mounted, pad mounted at ground level, roof mounted, or mounted on or under a deck. Be sure water drainage from roof will not drain directly onto the unit.

Units must be mounted so that snow will not obstruct airflow and so that defrosting coil ice (heat pump systems only) may drain freely from the outdoor unit drain pan. Snow and ice stands can be field fabricated and installed to raise units to meet these conditions if necessary.

NOTE: Accessory kits are available for wall mounting 018 and larger units.

If 018,024,048 outdoor units are being mounted near a wall, the condenser air should discharge toward the wall. This will provide inherent coil protection and the best possible sound and airflow performance. The 38AN/BK009,012 units should be mounted with fan discharge pointing away from the wall.

Unit mounting (indoor)

Unit leveling — For reliable operation, units should be level in all planes.

Clearance — Provide adequate clearance for airflow. The unit return and discharge should not be obstructed by furniture, curtains, or anything which may cause unit short cycling or air recirculation. See base unit dimensional drawings on pages 10-15 for required clearances.

Unit location — When selecting high wall unit location, select a location which will provide the best air circulation for the room.

Units should be positioned as high as possible on the wall for best air circulation. Allow adequate clearances above the unit for servicing (removing unit covers). Center the unit in the middle (horizontally) of the wall selected (if possible). Select an outside wall if available to make piping easier, and place the unit so it faces the normal location of room occupants.

Mounting template

The fan coil units are furnished with a mounting template to mark the location of the mounting brackets, wiring, and refrigeration hole locations.

Support

Adequate support must be provided to support the weight of all fan coils. Refer to the Physical Data section on pages 7-9 for fan coil weights, and the base unit dimensional drawings on pages 10-15 for the location of mounting brackets.

System operating conditions

Operating limits:

OUTDOOR UNITS

CONDITION	009,012	018-048
Maximum Cooling Ambient (F)	125	125
Minimum Cooling Ambient (F) (without accessory low-ambient kit)	55	55
Minimum Cooling Ambient (F) (with accessory low-ambient kit)	-20	-20
Minimum Cooling Return-Air Temperature (F)	55	55
Maximum Cooling Return-Air Temperature (F)	95	95
Maximum Heating Return-Air Temperature (F)*	80/71†	80/71†
Minimum Heating Return-Air Temperature (F)*	55	55
Minimum Heating Ambient Temperature (F)*	0	-20
Maximum Heating Ambient Temperature (F)*	80	80
Saturated Suction Temperature Range		
Minimum (F)	-15	-15
Maximum (F)	55	55
Saturated Condensing Temperature Range		
Minimum (F)	85	80
Maximum (F)	150	150
Maximum Compressor Discharge Temperature (F)	275	275
Minimum Discharge Superheat (F)	60	60

*Heat pump units only

†Dry bulb/wet bulb

Application data (cont)

FAN COIL UNITS

CONDITION	LIMIT
Maximum Room Temperature (F)	84
Minimum Room Temperature (F)	64
Maximum Return Air (F) Dry-Bulb Wet-Bulb	85 72
Maximum Saturated Suction Temperature (F)	55
Minimum Saturated Suction Temperature (F)	27

Low-ambient operation

Units can operate in cooling down to 55 F (38AN,BK,HDC) under all conditions without a low-ambient or winter start kit

Units equipped with accessory low-ambient or winter start kits should also be equipped with field fabricated and installed wind baffle, field supplied isolation relay, and crankcase heater (scroll units)

Winter Start (Accessory) — Use on 38HDC or 38HDS units when operation in cooling at outdoor ambient temperatures below 40 F is anticipated.

Freezestat (Heat Pump Systems Only) — Freeze-up protection is provided on all Carrier duct-free fan coil units.

Crankcase heater — Scroll compressor units with low-ambient control or winter start or scroll compressor units in long-line applications should be equipped with crankcase heaters to prevent refrigerant migration during compressor off cycle.

Metering devices

38AN,BK009,012 units — The 38AN,BK009,012 units have capillary tubes for refrigerant metering (in both cooling and heating) located in the outdoor unit.

38BK,HDC018,024 units — The 38BK,HDC018,024 units use a piston-type metering device located in the indoor unit (for cooling) and in the outdoor liquid service valve (for heating; 38BK only). Pistons function as check valves in addition to being metering devices.

NOTE: All 38BK,HDC018,024 Carrier duct-free split systems use Chatteff style AccuRater® pistons DO NOT mix piston types. All 38BK009,012 systems use Aeroquip type pistons See Long-Lines Applications section on page 21 for changes in piston sizes due to long lines.

Drain connections

Install drains to meet local sanitation codes. If adequate gravity drainage cannot be provided, unit should be equipped with accessory condensate pump.

High wall fan coil unit condensate pumps have a 10 ft lift capability above the condensate pan level.

See base unit dimensional drawings on pages 10-15 for drain locations and sizes.

NOTE: Fan coil units have internal condensate traps

Drain connections may be routed through alternate locations on most fan coils. See base unit dimensional drawings on pages 10-15 for possible alternate locations

Refrigerant lines

General refrigerant line sizing:

- 1 All charges, line sizing, and capacities are based on runs of 25 ft. For runs over 25 ft, consult long-lines section on page 21 for proper line sizing, charge, and AccuRater refrigerant metering device sizing

NOTE: For runs less than 25 ft, some of the charge may need to be removed to obtain the correct system superheat. The minimum line length should be 8 ft.

MAXIMUM LINE LENGTHS

UNIT	MAXIMUM EQUIVALENT FT	MAXIMUM LIFT — FAN COIL BELOW CONDENSING UNIT	MAXIMUM LIFT — FAN COIL ABOVE CONDENSING UNIT
38AN,BK009	35	35	16
38AN,BK012	49	35	16
38BK,HDC018,024	200	150	65
38HDS	50	30*	30*

*Maximum distance permitted is 30 ft from lowest system component to highest system component

2. Refrigerant lines should not be buried in the ground. If it is necessary to bury the lines, not more than 36 in. should be buried. Provide a minimum 6-in. vertical rise to the service valves to prevent refrigerant migration
3. The vapor line must be insulated. Use a minimum of 1/2-in. thick insulation. Closed-cell insulation is recommended in all long-line (over 25 ft) applications.
4. Special consideration should be given to isolating interconnecting tubing from the building structure. Isolate the tubing so that vibration or noise is not transmitted into the structure.

38AN,BK009,012 UNITS

- 1 These units are shipped with a charge of R-22 refrigerant. Check the charge using the superheat method. Since all refrigerant lines are on the low side of the system, it is not normally necessary to add or remove charge.
2. The 009,012 units have mixed-phase refrigerant flow in the liquid line **DO NOT install a filter drier in the liquid line. The liquid line must be insulated.**
- 3 No line size changes should be made on 38BK009,012 units

38BK,HDC018,024 UNITS

1. These units are shipped with a charge of R-22 refrigerant. See Piston Guide tables on page 22 for system charges. Add additional charge by weight as necessary and check the charge with a superheat calculator
- 2 For the 38BK018,024 units, install the filter drier provided with the unit in the liquid line. A field-supplied moisture indicator may also be used.

38HDS UNITS

1. The 38HDS units are shipped with a full charge of R-22 refrigerant. Charge is based on 25 ft of line.
2. For the 38HDS units, filter driers are provided in the unit.
3. Vapor supply lines on all 38HDS units should be $\frac{5}{8}$ in. only. DO NOT resize vapor supply lines for additional length.
4. When sizing vapor return line, determine line length by finding equivalent ft of tubing. Equivalent line lengths equal the linear length (measured length) of the interconnecting vapor return tubing plus losses due to elbows (see Fitting Loss in Equivalent Ft For Elbows table at right). If the number of elbows is not yet known, assume 50% additional length for equivalent length. In determining line size, be sure oil can be properly returned to the compressor. Consult the Carrier System Design Guide for proper oil return recommendations. For line lengths from 25 to 50 ft, no special tubing requirements are normally required. Adjust charge to required amount by adding charge per subcooling method. Refer to 38HDS base unit installation instructions for charging details.

Long-lines applications, 38BK,HDC018,024 units:

1. Liquid lines on all 38BK,HDC018,024 units should be $\frac{3}{8}$ in. only. DO NOT resize liquid lines for additional length.
2. When sizing vapor line, determine line length by finding equivalent ft of pipe. Equivalent line lengths equal the linear length (measured length) of the interconnecting vapor tubing plus losses due to elbows (see Fitting Loss in Equivalent Ft For Elbows table on this page). If the number of elbows is not yet known, assume 50% additional length for equivalent length. In determining line size, be sure oil can be properly returned to the compressor. Consult the Carrier System Design Guide for proper oil return recommendations. For line lengths from 25 to 49 ft, no special piping requirements are normally required. Adjust charge to required amount by adding charge per Step 7 on page 22 and checking superheat.

For line lengths over 50 ft (38BK,HDC018 and 024 only):

1. A crankcase heater should be added to scroll compressor units (all non-scroll compressor units have standard crankcase heaters). Crankcase heaters help prevent refrigerant migration to the compressor during the off cycle.
2. Any time the equivalent line length is over 100 ft, a liquid line solenoid must be used. A liquid line solenoid may also be required for vertical lift applications. See Step 6 on page 22, and locate solenoid at the outdoor unit if required.

3. The accessory wind baffle is recommended.
4. The Effective Capacity Loss table on this page provides the estimated percentage of nominal cooling capacity losses based on the standard required vapor line size versus what is selected for long-line applications. Heating capacity is not generally affected by long-lines applications.
 - a. Select the desired vapor line size from the Effective Capacity Loss table below based on equivalent ft and desired vapor line size.
 - b. Subtract the nominal percentage loss from the unit cooling capacities for the given indoor and outdoor combination

FITTING LOSS IN EQUIVALENT FT FOR ELBOWS

TUBE SIZE OD (in.)	90-DEGREE SHORT RADIUS	90-DEGREE LONG RADIUS	45-DEGREE SHORT RADIUS
$\frac{5}{8}$	1.6	1.0	0.8
$\frac{3}{4}$	1.8	1.2	0.9

5. Changes in piston size — The metering device for a long-line application must be adjusted to compensate for the frictional losses due to the long refrigerant lines, refrigerant lines accessories, and indoor coil above or below the outdoor unit. The AccuRater® refrigerant metering device pistons (heating and cooling) may need to be changed to provide this adjustment. The AccuRater piston should be changed for the indoor unit and at the outdoor unit service valve depending upon system configuration and line length. Use the Change in Indoor and Outdoor Unit Piston Size for Elevation tables on page 23 to determine correct AccuRater piston size. The standard piston size is shown in the Piston Guide tables on page 22.
 - a. Horizontal configuration — If the total equivalent horizontal length is 100 ft or longer, the indoor and outdoor pistons must be increased one full piston size, in addition to the charge change in Step 7, page 22. If exact size is not available, use next smaller size per Chattleff Common Piston Sizes table on page 22.
 - b. Elevated configuration — After finding the appropriate change in piston size, add or subtract the change from the original piston size number. If the piston size is decreased, round down to the next common piston size. If the piston size is increased, round the new piston size up to the next common piston size.

Application data (cont)

CHATTLEFF COMMON PISTON SIZES

PISTON SIZE	PISTON SIZE	PISTON SIZE
32	53	80
33	55	81
35	57	82
36	59	84
37	61	86
38	62	88
39	63	89
40	65	90
41	67	92
42	68	93
43	70	96
45	71	98
47	73	101
49	74	104
51	76	—
52	78	—

PISTON GUIDE — COOLING-ONLY SYSTEMS

UNIT		COOLING PISTON SIZE	REQUIRED SYSTEM CHARGE (Lb)*
Indoor 40QNB	Outdoor 38---		
009	009	CAP†	1 5
012	012	CAP†	1 8
018	018	49	4 6
024	024	57	5 3

*Charge is based on 25 ft of interconnecting tubing. Charge may need to be added for longer tubing runs or when used with certain fan coils. Check unit nameplate for required charge.

†Capillary tube (CAP) is located on the outdoor unit.

NOTE: All pistons are Chatleff type.

PISTON GUIDE — HEAT PUMP SYSTEMS

UNIT		COOLING PISTON SIZE	HEATING PISTON SIZE	REQUIRED SYSTEM CHARGE (Lb)*
Indoor 40QNE	Outdoor 38BK			
009	009	30	32	1.5
012	012	42	42	2.0
018	018	51	47	5.0
024	024	59	52	5 1

*Charge is based on 25 ft of interconnecting tubing. Charge may need to be added for longer tubing runs or when used with certain fan coils. Check unit nameplate for required charge.

NOTES:

- 1 All 009,012 pistons are Aeroquip type. All 018,024 pistons are Chatleff type.
- 2 All 38BK heat pumps have a holding charge only as shipped from the factory.

6. Liquid line solenoid and tubing configuration — The solenoid has a flow arrow stamped on the valve body. When the valve is closed (not energized), the pressure is applied in the direction of the flow arrow, and complete shut off will occur. If pressure is applied against the direction of the arrow, leakage through the valve will occur. When determining the proper location for a solenoid in a system liquid line, consider both flow direction

and location of the valve in the system. See the diagram on page 23 for proper location, and install as follows:

- a. Horizontal configuration (see figure below) —

- 1) Install a biflow (38BK only) or standard liquid line solenoid valve within 2 ft of the outdoor unit with the flow arrow pointing toward the heat pump unit if equivalent ft of piping is 100 ft or more.
- 2) Slope the vapor line toward the indoor unit to provide for refrigerant migration protection during the off cycle due to temperature differences caused by slight elevation changes between indoor and outdoor units.

NOTE: When installing a liquid line solenoid, a low-voltage transformer may be required.

- b. Elevated configuration — Indoor unit installed above the outdoor unit (see figure at right):

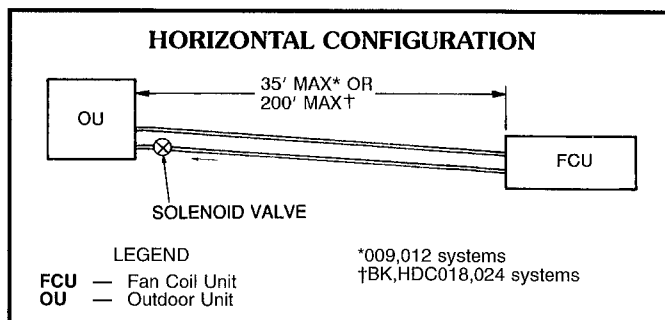
- 1) A biflow (38BK only) or standard solenoid valve is required in the liquid line within 2 ft of the heat pump unit with the arrow pointing toward the heat pump unit.
- 2) The maximum elevation difference is 65 ft, and the maximum equivalent ft of piping is 200.
- 3) Install an inverted trap in the vapor line. The top of the trap must be above the top of the fan coil. This prevents the refrigerant from collecting in the vapor line.
- 4) If there is over 25 ft of lift, a solenoid valve is required in the liquid line.

- c. Lowered configuration — Indoor unit installed below the outdoor unit (see figure at right):

- 1) For lines with less than 25 ft of lift, no solenoid valve is required in the liquid line. For lines with over 25 ft of lift, install a biflow (38BK only) or standard solenoid valve in the liquid line within 2 ft of the heat pump unit with the arrow pointing toward the heat pump unit.
- 2) The maximum elevation difference is 65 ft, and the maximum equivalent ft is 200.

7. Additional charge — The unit should be charged by weighing in the appropriate charge. Add charge based on the actual length of line which is over 25 ft of **liquid line**. Add 0.58 oz of refrigerant per 1 ft increase over the 25 ft line to the charge listed in Piston Guide tables on this page.

NOTE: This only applies to systems where the piston is located at the indoor unit (BK018,024 and HDC018,024).



EFFECTIVE CAPACITY LOSS

NOMINAL UNIT SIZE*	STANDARD VAPOR LINE (in.)	LONG-LINE VAPOR LINE (in.)†	PERCENT COOLING CAPACITY LOSS						
			50 ft	75 ft	100 ft	125 ft	150 ft	175 ft	200 ft
18,000	5/8	5/8	2	4	6	7	9	10	12
	5/8	3/4	0	0	1	2	3	4	6
24,000	5/8	5/8	4	6	9	11	13	15	**
	5/8	3/4	0	1	2	3	4	5	6

*Nominal cooling capacity of the unit being specified.

†The vapor line diameter that may be selected for long-line application. If smaller vapor lines than are specified in the table are selected, a larger capacity loss will occur. If larger vapor lines are selected, refrigerant oil return will be impaired due to velocity loss.

**Not recommended due to excessive loss of capacity.

NOTE: Long-line applications (50 ft and longer) are not permitted on 009,012 and HDS systems.

CHANGE IN INDOOR UNIT PISTON SIZE FOR ELEVATION

OUTDOOR UNIT ABOVE INDOOR UNIT	
Ft	Piston Change
0- 25	0
26- 50	-3
51- 75	-5
76-100	-7
101-125	-9
126-150	-10
INDOOR UNIT ABOVE OUTDOOR UNIT	
Ft	Piston Change
0-25	0
26-65	+4

CHANGE IN OUTDOOR UNIT PISTON SIZE FOR ELEVATION

OUTDOOR UNIT ABOVE INDOOR UNIT	
Ft	Piston Change
0- 50	0
51- 75	+4
76-100	+6
101-125	+8
126-150	+10
OUTDOOR UNIT BELOW INDOOR UNIT	
Ft	Piston Change
0-65	0

Group control

The fan coil units may be group controlled from a single timeclock or energy management system by interrupting the 24-v power to the control board.

Thermistors

Thermistors (heat pump systems only) are used on both indoor and outdoor units to determine operating conditions. Proper thermistor location is critical to unit operation. All thermistors have identical resistance values. See Thermistor Equivalence charts on typical system wiring schematics (pages 25-28).

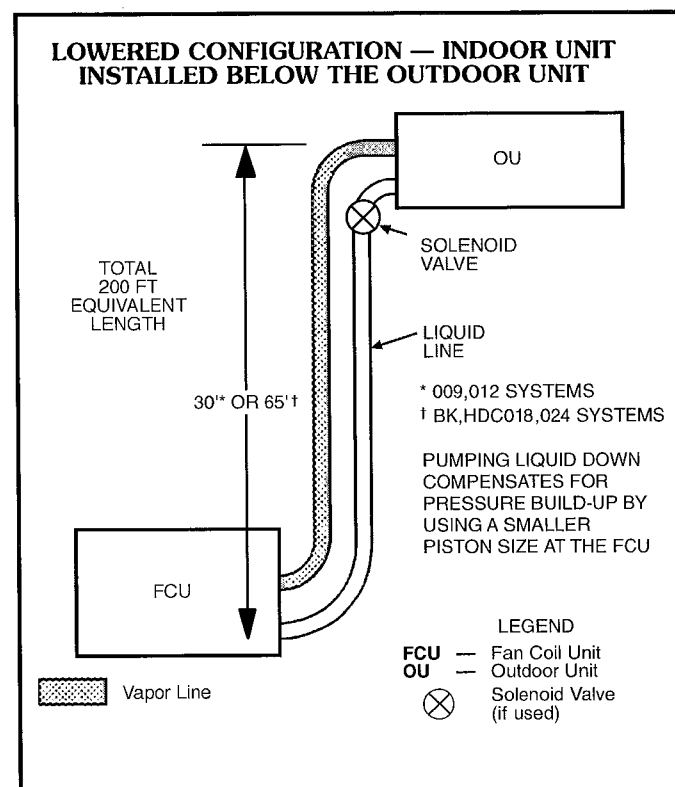
Thermistor cable assemblies are provided with fan coil units to run between indoor and outdoor units. High-voltage and thermistor cable assemblies should not touch each other, and cable runs may be extended up to 200 ft.

Wiring

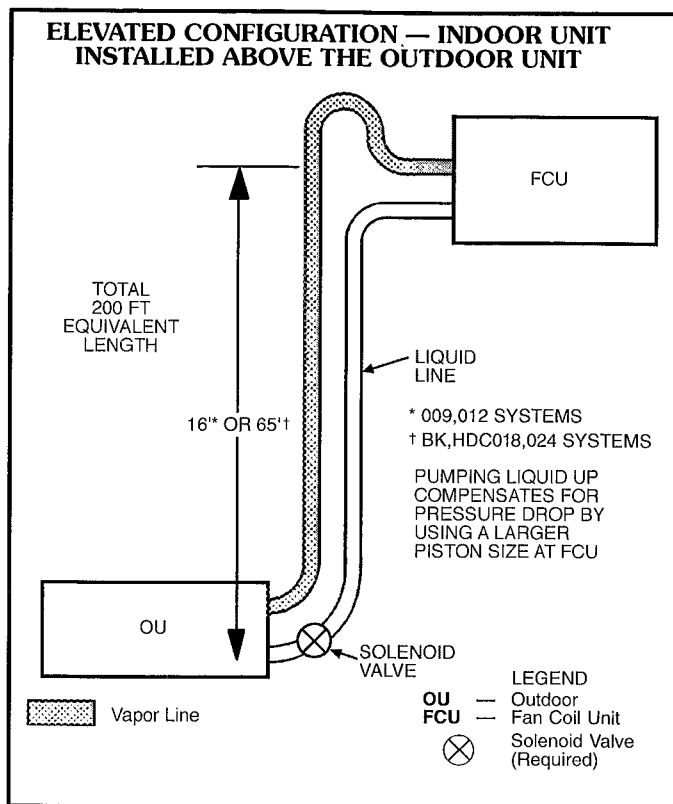
Use only copper wires from the disconnect to the unit terminal block. Aluminum and copper-clad aluminum wires are not acceptable.

All duct-free split systems (except the 009,012 outdoor units) provide 24-v power for the outdoor unit in the duct-free fan coil. The 009,012 outdoor unit systems use high-voltage (230 v) controls.

The 009,012 fan coil units must have power wires run from the outdoor condensing unit to the indoor unit to prevent out-of-phase wiring.



Application data (cont)



Air throw

Refer to Air Throw Data table below for system air throw capabilities

AIR THROW DATA

SIZE	HIGH SPEED CFM	APPROXIMATE AIR THROW (FT)
009	215/252*	16
012	302	24
018	480/455*	30
024	550/525*	35

*Cooling only unit/Heat pump unit.

NOTE: Air throw data is for unit mounted application with typical clearances in a 10-ft high room

Sound data

CONDENSING UNIT SOUND RATINGS

UNIT	SOUND RATING (Decibels)	FREE FIELD dBA*
38AN,BK009	66	55.7
38AN,BK012	66	55.7
38BK,HDC,HDS018	68	57.7
38BK,HDC,HDS024	68	57.7

LEGEND

Decibels — Sound levels
dBA — Decibels on the A Scale

*Free field is a rating with no reflective surfaces near the unit. Data sound pressure is measured at 1 m from the unit. See Sound Power Data Octave Bands table for more information

SOUND POWER DATA OCTAVE BANDS — A WEIGHTED (Fan Coil Units Only)

UNIT	FAN SPEED	OCTAVE BAND DATA (dBA)						
		125	250	500	1000	2000	4000	8000
B009	High	36.5	40.3	45.2	48.2	42.3	33.2	31.2
	Medium	32.8	37.9	43.6	44.9	39.1	29.8	31.2
	Low	31.7	36.6	41.6	41.6	35.4	27.7	31.2
B012	High	36.7	43.5	50.2	51.1	46.5	38.6	31.7
	Medium	33.6	42.5	47.1	48.8	43.4	36.2	33.4
	Low	33.5	41.6	43.8	45.6	39.8	33.0	32.7
B018	High	40.8	49.1	53.7	55.2	49.1	41.3	32.3
	Medium	38.0	46.7	50.6	51.7	44.9	35.8	31.6
	Low	37.3	44.4	47.5	48.6	40.4	32.0	31.6
B024	High	44.9	51.9	59.1	59.5	54.8	48.0	36.7
	Medium	43.7	50.5	57.2	57.0	51.8	44.4	33.6
	Low	40.7	47.7	55.1	54.7	49.0	40.5	32.2
E009	High	38.2	41.1	46.2	47.9	43.0	33.6	31.2
	Medium	31.7	39.8	45.0	45.3	42.0	36.8	36.8
	Low	29.2	38.4	43.9	41.9	38.6	28.1	31.2
E012	High	35.1	43.8	50.3	51.1	46.4	38.0	31.2
	Medium	31.7	43.3	46.3	48.6	42.9	34.2	31.2
	Low	29.1	42.2	42.9	45.6	39.1	30.3	31.2
E018	High	37.0	44.4	49.3	50.4	43.4	35.6	31.9
	Medium	39.8	46.9	52.2	53.7	47.4	40.1	32.7
	Low	43.2	49.1	54.0	56.0	50.7	44.0	34.0
E024	High	43.8	51.5	58.5	58.8	53.5	46.2	36.0
	Medium	41.4	49.5	56.5	56.2	50.4	42.5	36.0
	Low	38.9	47.3	54.4	53.7	47.4	39.0	36.0

LEGEND

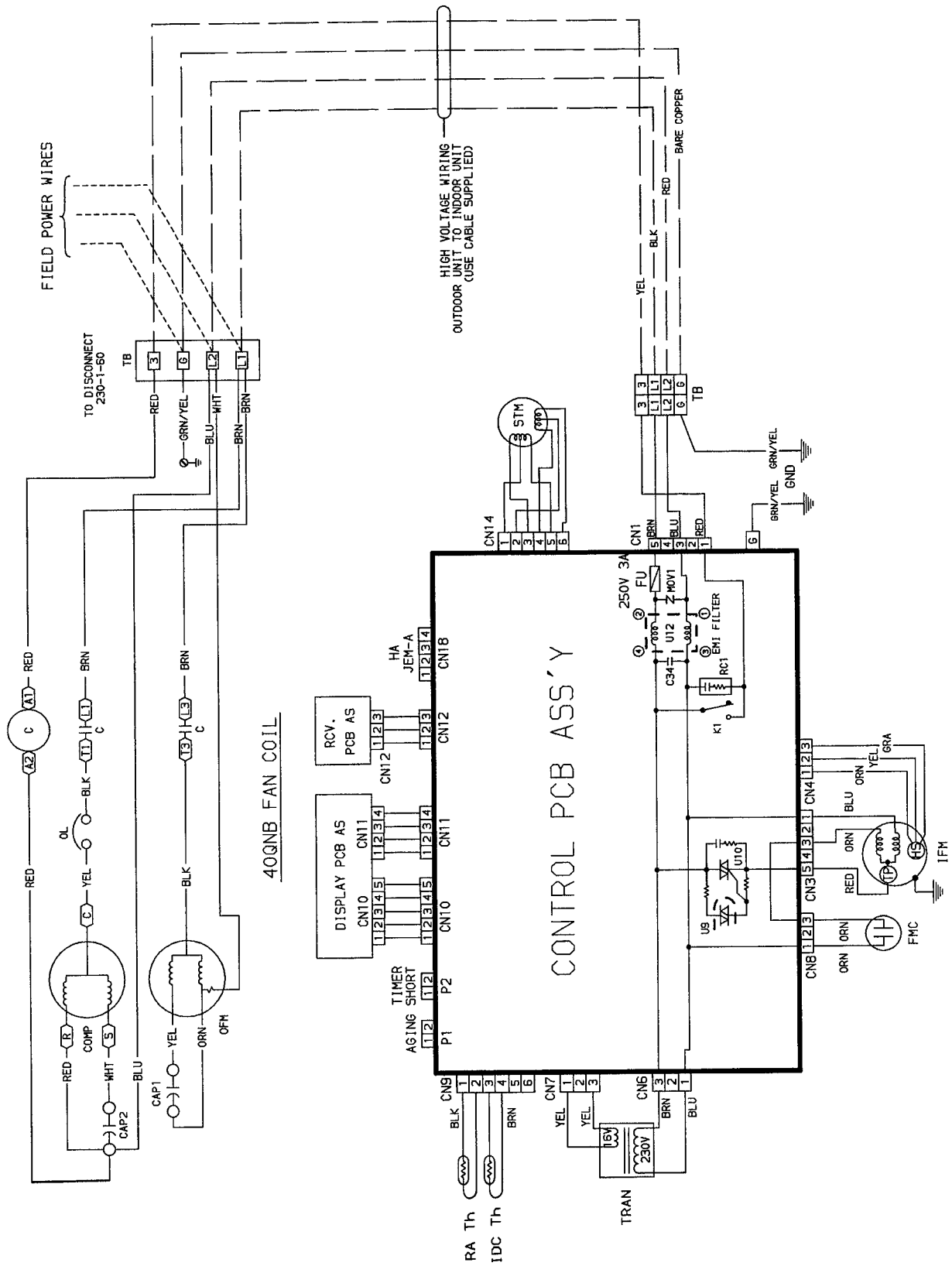
ARI — Air Conditioning & Refrigeration Institute
dBA — Decibels on the A scale

NOTES:

- Outdoor sound levels are tone corrected values taken in accordance with ARI Sound Standard 270.
- Indoor sound levels are tone corrected values taken in accordance with ARI Sound Standard 350.

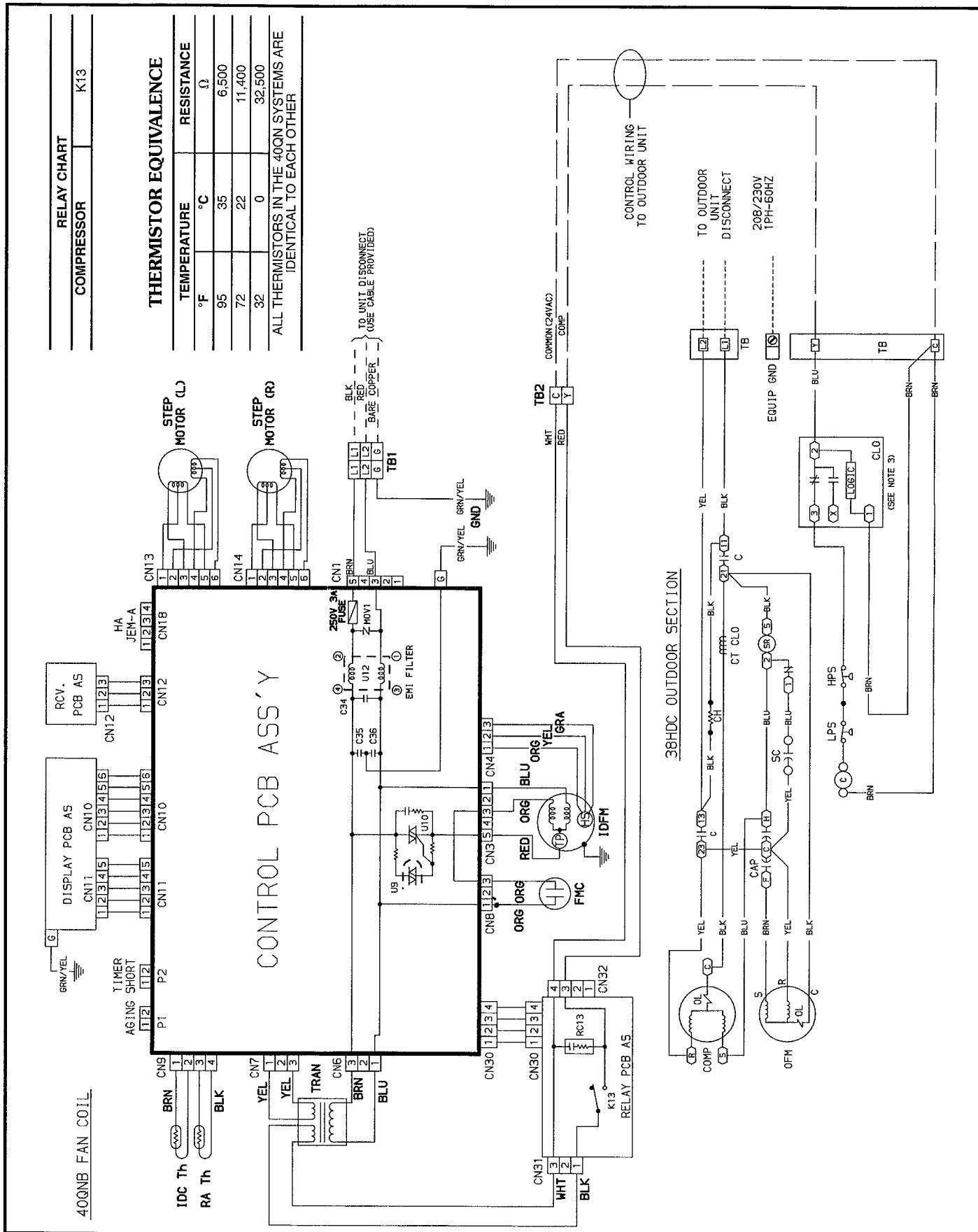
Typical wiring schematic, 38AN009,012 cooling-only system (012 shown)

38AN OUTDOOR SECTION



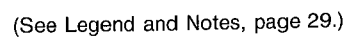
(See Legend and Notes, page 29)

Typical wiring schematic, 38HDC018,024 cooling only system

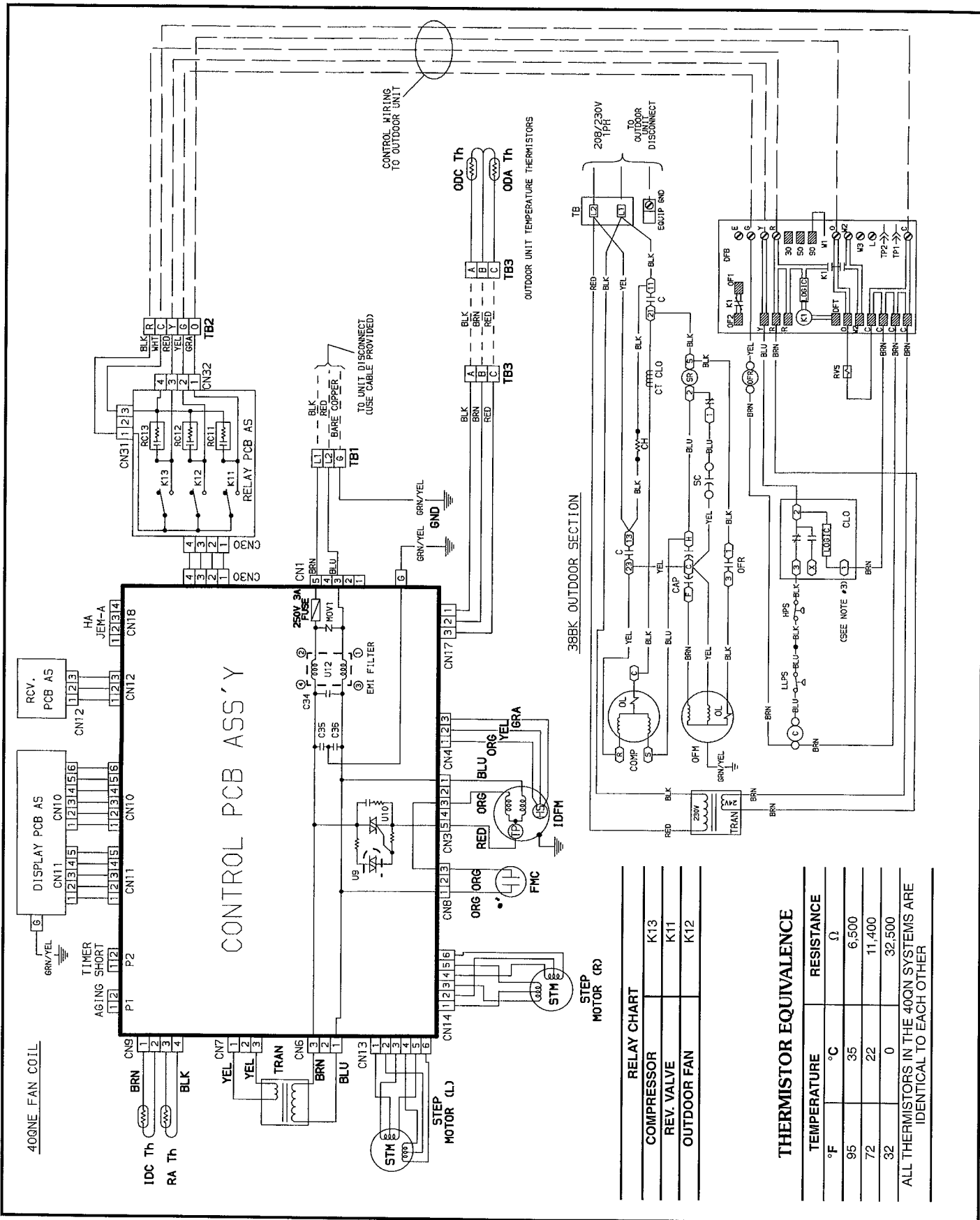


(See Legend and Notes, page 29)

38BK OUTDOOR SECTION



Typical wiring schematic, 38BK018,024 heat pump system



(See Legend and Notes, page 29.)

Typical wiring schematics

LEGEND AND NOTES FOR TYPICAL WIRING SCHEMATICS

AGING	— For Burn-In Test (short terminals)	OFM	— Outdoor-Fan Motor
AS	— Assembly	OFR	— Outdoor-Fan Relay
C	— Contactor	OL	— Overload
CAP	— Capacitor	PCB	— Printed Circuit Board
CH	— Crankcase Heater	PTC	— Start Thermistor
CLO	— Compressor Lockout	RA TH	— Return-Air Thermistor
CN	— Connector	RC	— Resistor Capacitor
COMP	— Compressor	RCV	— Receiver
CT CLO	— Current Sensing Loop (Lockout)	RVS	— Reversing Valve Solenoid
DFB	— Defrost Board	SC	— Start Capacitor
DFT	— Defrost Thermostat	SR	— Start Relay
EMI	— Electromagnetic Interference	STM	— Step Motor
FMC	— Fan Motor Capacitor	TB	— Terminal Block
FU	— Fuse	TP	— Thermal Protector
GND	— Ground	TRAN	— Transformer
HA	— Home Automation		Terminal (Marked)
HPS	— High-Pressure Switch		Terminal (Unmarked)
IDC TH	— Indoor-Coil Thermistor		Splice
IDFM	— Indoor-Fan Motor		Terminal Block
JEM-A	— Japan Electric Manufacturing Industry Association		Factory Wiring
K	— Relay		Field Control Wiring
LLPS	— Liquid Low Pressure Switch		Field Power Wiring
LPS	— Low-Pressure Switch		Accessory or Optional Wiring
ODA TH	— Outdoor-Air Thermistor		
ODC TH	— Outdoor-Coil Thermistor		

NOTES:

- 1 If any of the original wire furnished must be replaced, it must be replaced with type 90 C wire or its equivalent
- 2 Wire in accordance with National Electrical Code (NEC) and local codes
- 3 The CLO locks out the compressor to prevent short cycling on compressor overloads and safety devices. Before replacing CLO, check these other devices. A minimum 1 amp turn is required to hold contacts closed
- 4 A thermistor wiring cable is provided with the fan coil unit
- 5 Compressor and fan motors are protected by internal thermal overloads
- 6 Transformer has an internal 2 amp thermal fuse on the primary side

Controls

40QN control system — The 40QN unit is equipped with a microprocessor control which operates the system. This control is located in the control box of the fan coil unit, with thermistors located in the fan coil inlet and on the indoor coil. The 40QNE heat pump fan coil units also have thermistors located on the outdoor coil and in the outdoor air inlet. These thermistors monitor system operation and control the operating mode. To change settings or modes of operation, use the factory-supplied infrared wireless remote controller. This controller allows the fan coil unit to be operated from within the same room without any wire connections to the unit.

The remote controller includes a wall-mounted bracket. To install the bracket, attach bracket to the wall using factory-supplied, double-sided tape. Install factory-supplied batteries into the remote controller and place the controller into the bracket so that it will be ready for use.

Operating mode memory — After the system is turned off or after a power failure, the system remains in the last operating mode selected. When the system is turned back on, or when power is automatically restored, operation continues in the same operating mode as when power shut down.

Automatic operation (Auto) mode — If auto mode is selected, the system automatically switches the operating mode from heating (heat pump system only) to cooling, or from cooling to heating (heat pump system only) depending on the selected temperature.

NOTE: Between the cooling cycle and the heating cycle there is a neutral zone of approximately 2° F above and

2° F below the selected temperature when only the fan is operating.

Operating fault diagnosis — The system includes an automatic diagnosis feature which is activated under difficult or unacceptable operating conditions. If such conditions occur, the system stops automatically, the operating fault signal appears (green "UNIT ON" light on the front of the fan coil unit flashes), and an analysis of the system operating conditions is initiated. The system will then be restarted automatically, as soon as normal conditions have been restored, or it will remain off. If the system does not start again, the green "UNIT ON" light will flash an error code.

Microprocessor control operation — This system is controlled by a microprocessor designed to give optimum levels of comfort and operating efficiency. The control is located in the 40QN unit. To operate the unit, the factory-supplied remote controller is required.

There are 9 (QNB systems) or 11 (QNE systems) operating modes (including the off mode) for the unit. Each mode operates as follows:

- **Off Mode** — When the unit is in the off mode, all functions (compressor, outdoor fan, indoor fan, and air sweep) are off, except the reversing valve (QNE only), which will stay energized if the unit was last operated in the cooling mode.
- **Air Circulation Mode (Fan Operation Only)** — When air circulation mode is selected, the indoor fan will operate continuously in the selected speed (high, medium, low, or auto). If the auto mode is selected, the indoor fan will

Controls (cont)

operate at low speed. The compressor and outdoor fan are off. The reversing valve (QNE only) will remain in the last operating mode

- **Cooling Mode** — When the cooling mode is selected, the indoor fan will operate continuously at the selected speed if the speed is high, medium, or low. If the indoor fan is in auto mode, the fan will change operating speeds depending on the difference between the room temperature and the set point. The reversing valve (QNE only) will be on. The compressor cannot run for 3 minutes from the time the system starts up or for 3 minutes from the time the compressor last operated. When the temperature of the room is equal to or greater than the selected temperature, the compressor and outdoor fan will operate until the room temperature is 2° F below the set point, and then shut off. When the room temperature is less than the selected temperature, the compressor and outdoor fan remain off
- **Maximum Dehumidification Mode** — When the dehumidification mode is selected, the indoor fan will operate continuously at the selected speed if the speed is high, medium, or low. If the indoor fan is in auto. mode, the fan will change operating speeds depending on the room temperature. If the room temperature is below the set point, the indoor fan will run at ultra-low speed, and the compressor could run for up to 4 minutes. (Ultra-low speed is a control-driven speed [not user configurable] used to sample the space when the fan would normally be off) The reversing valve (QNE only) will be on. The compressor cannot run for 3 minutes from the time the system starts up or for 3 minutes from the time the compressor last operated.

Initial Operation — When the mode is first selected, one of the following occurs:

1. If the room temperature is above or equal to the selected temperature, the unit will operate for 16 minutes, and the compressor and outdoor fan will operate. The indoor fan will operate as in the cooling mode. After 16 minutes of operation (or when the room reaches 2° F below set point), the unit switches to normal dehumidification operation.
2. If the room temperature is below the selected temperature, the unit will operate for 8 minutes as follows: the compressor and outdoor fan will operate for 3 minutes. The indoor fan will operate in low speed, and 30 seconds after the compressor stops, the indoor fan stops. The unit remains off for 1 minute, and then the indoor fan starts in ultra-low speed for 30 seconds. The unit then switches to normal dehumidification operation.

Normal Operation — One of the following will take place:

1. When the temperature of the room is equal to or greater than the selected temperature (by not more than 3° F), the unit will operate for 8 minutes as follows: the compressor and outdoor fan will operate for 3 minutes. The indoor fan will operate in low speed, and 30 seconds after the compressor stops, the indoor fan stops. The unit remains off for 1 minute, and then the indoor fan starts in ultra-low speed for 30 seconds. The normal dehumidification operation is repeated for the newly sensed room temperature.

2. If the room temperature is equal to or greater than the selected temperature, but not by more than between 4° F and 6° F, the compressor and outdoor fan operate for 4 minutes. The indoor fan will run at ultra-low speed and will stop 30 seconds after the compressor stops. After 3 minutes, the indoor fan runs at ultra-low speed for 30 seconds. The normal dehumidification operation is repeated for the newly sensed room temperature.
3. When the room temperature is equal to or greater than 4° F below the selected temperature, the system operates as follows: The compressor and outdoor fan operate for 3 minutes. The indoor fan will operate at ultra-low speed and will stop 30 seconds after the compressor stops. After 4 or 5 minutes, the indoor fan starts in ultra-low speed for 30 seconds. The normal dehumidification operation is repeated for the newly sensed room temperature. If the room temperature is still 4° F below the selected temperature, the compressor, outdoor fan, and indoor fan remain off. After 7½ minutes, the indoor fan operates at ultra-low speed for 30 seconds. The normal dehumidification operation is repeated for the newly sensed room temperature.
- **Heat Pump Heating Mode (Heat Pump Systems Only)** — When the heat pump mode is selected, the indoor fan will operate at the selected speed if the speed is high, medium, or low, unless overridden by the coil temperature (to prevent cold drafts). If the indoor fan is in auto. mode, the fan will change operating speeds depending on the difference between the room temperature, the set point, and the coil temperature. The reversing valve will be off. The compressor cannot run for 3 minutes from the time the system starts up or for 3 minutes from the time it last operated. When the temperature of the room is 8° F below the selected temperature, the unit will operate in heat pump mode until the temperature is 6° F above the selected temperature, or the compressor runs for 40 minutes (whichever comes first). If the temperature of the room is less than 7° F below or equal to the selected temperature, the unit operates in heat pump mode until the selected set point temperature plus 2° F is reached.
- **Demand Defrost Mode (Heat Pump Systems Only)** — This unit uses a demand defrost system to remove frost from the outdoor coil during heating operation. The indoor and outdoor fans are shut off during defrost mode. See Electronic Control Defrost Regions Map on page 31 for defrost region details.
- **Sleep Mode** — The sleep mode timer will turn the unit off when the timer reaches zero minutes. During the first 1½ hours from the time the sleep mode timer starts, the room temperature is set back from the selected temperature a total of 4° F in cooling and 6° F in heating (38BK only).
- **Awake Mode** — The awake timer will turn the unit on when the timer reaches zero minutes. The unit will start in the same mode and at the same selected temperature as when the system shut off.
- **Automatic Operation Mode for Cooling Only Systems** — The unit samples the air in the room. Based on the room temperature, the unit selects one of the following modes:
 1. **Cooling Mode** — If the room temperature is more than 82.4 F with a preset temperature of 78.8 F

2. Dry Mode — If the room temperature is more than 75.2 F and less than 82.4 F with a preset temperature of 77 F.
3. Fan Only Mode — If the room temperature is less than 75.2 F
The preset temperature can be changed by $\pm 4^\circ$ F using the remote control.
- Automatic Operation Mode for Heat Pump Systems (38BK) — The operation mode will be determined after 20 seconds of room monitoring (to determine the room temperature and the outdoor air temperature)
- Test Mode — The test mode can be selected by setting the slide switch on the fan coil unit to TEST position. The slide switch is located on the front of the unit. The fan coil unit will start immediately (there is no compressor time delay when using test mode) in cooling mode with an infinitely low set point. The indoor fan speed will be at the high setting, and the swing louvers will be on (moving up and down).

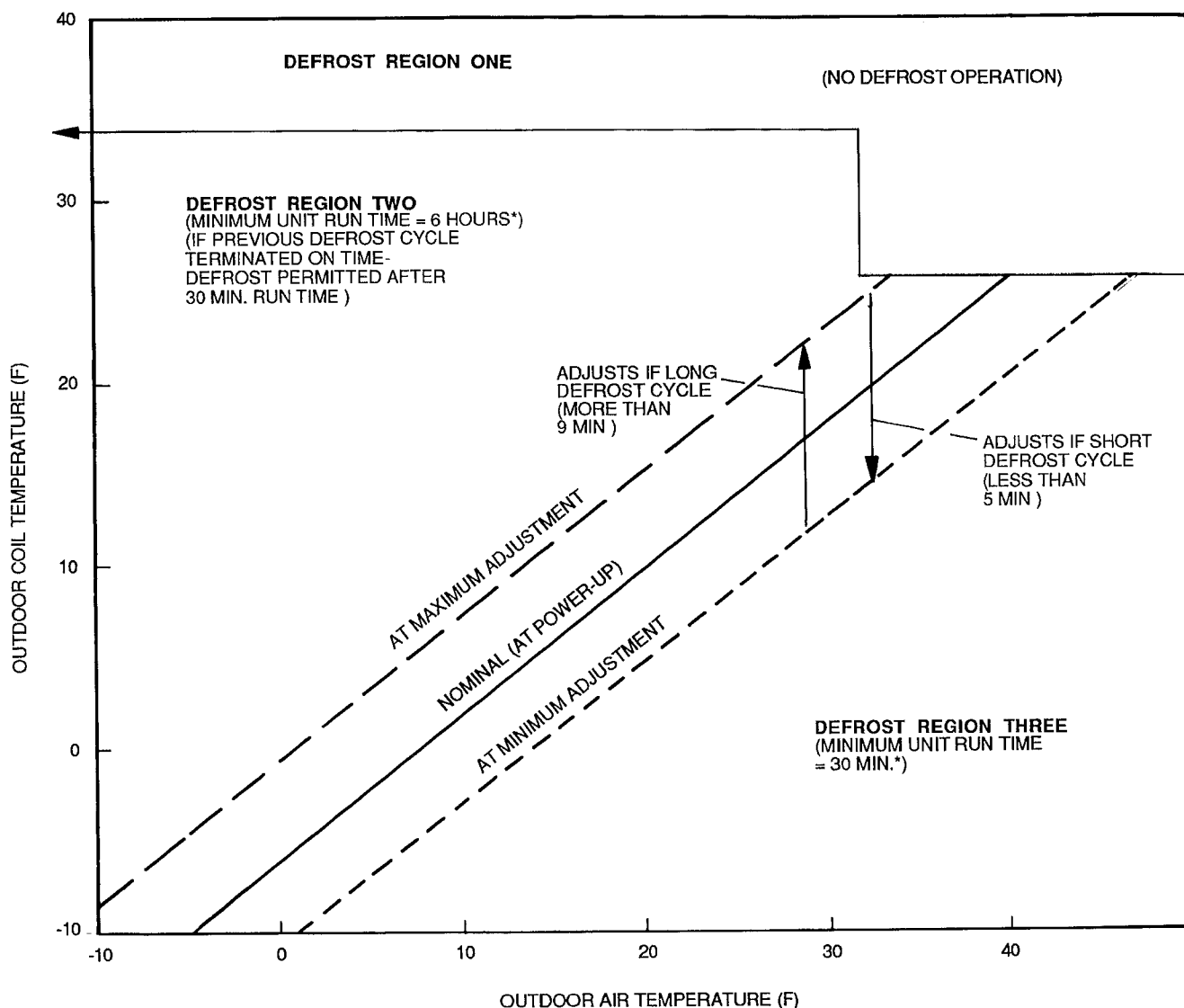
NOTE: The unit cannot be controlled by the remote controller until the slide switch is returned to the REMOTE position.

- Emergency Mode — This mode is only to be used if the remote controller is lost, damaged, or the batteries are discharged. To initiate emergency mode, manually move the slide switch on the fan coil unit to the EMER position. The unit is automatically operated in cooling or heating (38BK units only) mode according to room temperature. Emergency operation settings are as follows:

1. Operation mode: AUTO.
2. Fan Speed: AUTO.
3. Cooling set point: 77 F
4. Timer Mode: Continuous

NOTE: The unit cannot be controlled by the remote controller until the slide switch is returned to the REMOTE position.

ELECTRONIC CONTROL DEFROST REGIONS MAP



*Minimum unit run time starts when outdoor coil temperature drops below 34 F, then accumulates regardless of coil temperature

Guide specifications — outdoor units

Commercial Condensing, Heat Pump, and Multi-Split Units

HVAC Guide Specifications

Size Range: $\frac{3}{4}$ to 4 Tons Cooling Capacity

8700 to 48,000 Btuh

Heating Capacity

Carrier Model Number: **38AN, 38BK**
38HDC, 38HDS

Part 1 — General

1.01 SYSTEM DESCRIPTION

- A. Outdoor-mounted, air-cooled split system outdoor section suitable for on-the-ground, rooftop, wall hung, balcony, or under-deck installation. Unit shall consist of a hermetic or rotary compressor, an air-cooled coil, propeller-type blow-thru outdoor fans, reversing valve (38BK only), accumulator (38AN,BK,HDC only), holding refrigerant charge, heating mode metering device (38BK only), and control box. Unit shall discharge air horizontally as shown on the contract drawings. Units shall function as the outdoor component of an air-to-air cooling and heating (38BK only) system.
- B. Units shall be used in a refrigeration circuit matched to a duct-free cooling fan coil unit or an approved ducted cooling fan coil unit.

1.02 QUALITY ASSURANCE

- A. Unit construction shall comply with ANSI/ASHRAE 15, latest revision, and with the NEC.
- B. Units shall be constructed in accordance with UL standards.
- C. Units shall be listed in the CEC directory.
- D. Unit cabinet shall be capable of withstanding Federal Test Standard No. 141 (method 6061) 500-hour salt spray test.
- E. Air-cooled condenser coils shall be leak tested at 350 psig air pressure with the coil submerged in water.

1.03 DELIVERY, STORAGE, AND HANDLING

- A. Units shall be shipped in one piece and shall be stored and handled per unit manufacturer's recommendations.

1.04 WARRANTY (For Inclusion By Specifying Engineer)

Part 2 — Products

2.01 EQUIPMENT

A. General:

Factory assembled, single piece, air-cooled outdoor unit. Contained within the unit enclosure shall be all factory wiring, piping, controls, compressor, holding (38BK) or full (AN,HDC,HDS) charge of R-22 refrigerant, and special features required prior to field start-up.

B. Unit Cabinet:

1. Unit cabinet shall be constructed of galvanized-steel, bonderized and coated with a baked-enamel finish.
2. Unit access panels shall be removable with minimal screws and shall provide full access to the compressor, fan, and control components.
3. Outdoor compartment shall be isolated and have an acoustic lining to assure quiet operation.

C. Fans:

1. Outdoor fans shall be direct-drive propeller type, shall discharge air horizontally, and shall blow air through the outdoor coil.
2. Outdoor fan motors shall be totally-enclosed, single-phase motors with class B insulation and permanently-lubricated sleeve bearings. Motor shall be protected by internal thermal overload protection.
3. Shaft shall have inherent corrosion resistance.
4. Fan blades shall be corrosion resistant and shall be statically and dynamically balanced.
5. Outdoor fan openings shall be equipped with PVC coated protection grille over fan and coil.

D. Compressor:

1. Compressor shall be fully hermetic reciprocating or scroll type.
2. Compressor shall be equipped with oil system, operating oil charge, and motor. Internal overloads shall protect the compressor from overtemperature and overcurrent. Scroll compressors shall also have high discharge gas temperature protection if required.
3. Motor shall be NEMA rated class F, suitable for operation in a refrigerant atmosphere.
4. Reciprocating compressors shall be equipped with crankcase heaters to minimize liquid refrigerant accumulation in compressor during shutdown and to prevent refrigerant dilution of oil.
5. Compressor assembly shall be installed on rubber vibration isolators and shall have internal spring isolation.
6. Compressors shall be single phase as specified on the contract drawings.

E. Outdoor Coil:

Coil shall be constructed of aluminum fins mechanically bonded to internally enhanced, seamless copper tubes which are cleaned, dehydrated, and sealed.

F. Refrigeration Components:

Refrigerant circuit components shall include brass external liquid line service valve with service gage port connections, suction line service valve with service gage connection port, service gage port connections on compressor suction and discharge lines with Schrader-type fittings with brass caps, accumulator (38AN, BK,HDC only), bi-flow filter drier (38BK only), pressure relief, reversing valve (38BK only), heating mode metering device (38BK only), and a full charge of refrigerant.

G. Controls and Safeties:

Operating controls and safeties shall be factory selected, assembled, and tested. The minimum control function shall include:

1. Controls:

- a. Time delay restart to prevent compressor reverse rotation on single-phase scroll compressors.
- b. Automatic restart on power failure.
- c. Safety lockout if any outdoor unit safety is open.
- d. A time delay control sequence is also provided standard through the fan coil board
- e. High-pressure and liquid line low-pressure switches.
- f. Automatic outdoor-fan motor protection.
- g. Start capacitor and relay (single-phase units without scroll compressors).

2. Safeties:

- a. System diagnostics.
- b. Compressor motor current and temperature overload protection.
- c. High pressure relief.
- d. Outdoor fan failure protection.

H. Electrical Requirements:

1. Unit shall operate on single-phase, 60 cycle power at 208/230 v.
2. Unit electrical power shall be a single point connection.
3. Unit control voltage to the indoor-fan coil shall be 24 v.
4. All power and control wiring must be installed per NEC and all local building codes.
5. High- and low-voltage terminal block connections.

I. Special Features (Field Installed):

Certain features are not applicable when the features designated by * are specified. For assistance in amending the specifications, contact your local Carrier Sales Office.

* 1. Low-Ambient Kit (38AN,BK,HDC):

Control shall regulate fan-motor cycles in response to saturated condensing pressure of the unit. The control shall be capable of maintaining a condensing temperature of $100\text{ F} \pm 10\text{ F}$ with outdoor temperatures to -20 F . Installation of kit shall not require changing the outdoor-fan motor.

* 2. Liquid Solenoid Valve:

This electronically operated shutoff valve shall close and open in response to compressor operation. The valve should be used with all long-lines applications (over 100 ft).

3. Wall Mount Kit:

The kit shall include brackets to raise unit up from ground level, and allow unit to be mounted to the building walls.

* 4. Winter Start Control (38HDC/HDS):

Field-installed winter start control shall permit start-up for cooling operation under low-load conditions and at low-ambient temperatures by bypassing the low-pressure switch for a 3-minute delay period.

NOTE: Winter start control shall be required when unit is intended to operate in cooling at outdoor ambients below 40 F .

5. Crankcase Heater (units with scroll compressors only):

Unit shall be shipped with a clamp-on compressor oil sump heater.

Guide specifications — high-wall units

Commercial High-Wall Fan Coil Units

HVAC Guide Specifications

Size Range: $\frac{3}{4}$ to 2 Tons Cooling Capacity

9600 to 21,400 Btuh Heating Capacity
(QNE only)

Carrier Model Number: **40QNB**
40QNE

Part 1 — General

1.01 SYSTEM DESCRIPTION

- A. Indoor, wall-mounted, direct-expansion fan coil to be matched with the commercial condensing or heat pump units.

1.02 QUALITY ASSURANCE

Unit shall be rated per ARI Standards 210/240 and listed in the ARI directory as a matched system.

1.03 DELIVERY, STORAGE, AND HANDLING

- A. Units shall be stored and handled per unit manufacturer's recommendations

1.04 WARRANTY (For Inclusion By Specifying Engineer)

Part 2 — Products

2.01 EQUIPMENT

A. General:

Indoor, direct-expansion, wall-mounted fan coil. Unit shall be complete with cooling/heating (heat pump systems only) coil, electric heater (heat pump systems only), fan, fan motor, piping connectors, electrical controls, microprocessor control system, and integral temperature sensing. Unit shall be furnished with integral wall-mounting bracket, mounting hardware, and thermistor interconnection cable (heat pump only).

B. Unit Cabinet:

Cabinet discharge and inlet grilles shall be attractively styled, high-impact polystyrene. Cabinet shall be fully insulated for improved thermal and acoustic performance.

C. Fans:

Fan shall be tangential direct-drive blower type with air intake at the upper front face of the unit and discharge at the bottom front. Automatic, motor-driven vertical air sweep shall be provided standard.

Air sweep operation shall be user selectable. Horizontal direction may be manually adjusted (using remote controller) and vertical air sweep may be manually set.

D. Coil:

Coil shall be copper tube with aluminum fins and galvanized steel tube sheets. Fins will be bonded to the tubes by mechanical expansion. A drip pan under the coil shall have a drain connection for hose attachment to remove condensate. Condensate pan shall have internal trap and auxiliary drip pan under coil header.

NOTE: The 40QN009,012 units use capillary tubes in the OUTDOOR unit for refrigerant control, and the 40QN018,024 units use the accessory AccuRater® piston refrigerant metering device in the INDOOR unit

(for cooling) and at the OUTDOOR UNIT LIQUID LINE SERVICE VALVE (for heating; heat pump units only), except system using 38HDS outdoor units. These systems have a thermostatic expansion valve in the outdoor unit

E. Motors:

Motors shall be open drip proof, permanently lubricated ball bearing with inherent overload protection. Fan motors shall be 3 speed.

F. Controls:

Controls shall consist of a microprocessor-based control system which shall control space temperature, determine optimum fan speed, and run self diagnostics. The temperature control range shall be from 64 F to 84 F. The unit shall have the following functions as a minimum:

1. An automatic restart after power failure at the same operating conditions as at failure.
2. A timer function to provide a minimum 15-hour timer cycle for system Auto. Start/Stop
3. Temperature-sensing controls shall sense return-air temperature. Indoor-air high discharge temperature shutdown shall be provided.
4. Indoor coil freeze protection (heat pump only).
5. Wireless infrared remote control to enter set points and operating conditions (required accessory).
6. Auto. Stop features shall have integral setback control.
7. Automatic airsweep control provides on or off activation of airsweep louvers
8. Dehumidification mode provides increased latent removal capability by modulating fan speed and set point temperature
9. Fan only operation provides room air circulation when no cooling is required.
10. Diagnostics provide continuous checks of unit operation and warn of possible malfunctions. Error messages shall be displayed at the unit and at the remote controller.
11. An indoor to outdoor thermistor connection cable shall be provided with the fan coil unit.
12. Fan speed control shall be user-selectable: high, medium, low, or microprocessor automatic operation during all operating modes
13. A time delay shall prevent compressor restart in less than 3 minutes.
14. Auto heating-to-cooling changeover (heat pump units) to provide automatic heating and cooling operation. Control shall include deadband to prevent rapid mode cycling
15. Demand defrost shall be provided (heat pump units) and shall minimize defrost cycles by internally adjusting defrost timing based on frost accumulation
16. Indoor coil high temperature protection shall be provided to detect excessive indoor discharge temperature when unit is in heat pump mode.

G. Filters:

Unit shall have filter track with factory-supplied cleanable filters.

H. Electrical Requirements:

Unit shall operate on 115 v (009), 208-v (012-024), or 230-v (012-024), 60 Hz power supply as specified on the equipment schedule. Power and control connections shall have terminal block connections.

I. Operating Characteristics:

1. The unit shall be matched with an outdoor unit. The combination of the outdoor unit and the indoor-fan coil unit shall have a total net cooling capacity of _____ Btuh or greater at conditions of _____ fan speed and entering-air temperature at the evaporator coil of _____ F dry bulb and _____ F wet bulb. Outdoor ambient temperature of air entering the condenser of _____ F.
2. The 40QNE system shall have a minimum listed SEER (seasonal energy efficiency ratio) of _____ at ARI conditions, and a minimum HSPF of _____.
3. Outdoor unit shall be rated at _____ bels or less at ARI conditions.

4. The 40QNE heating capacity shall be _____ Btuh or greater at conditions of _____ fan speed entering-air temperature at indoor coil of _____ F dry bulb and outdoor ambient of _____ F dry bulb and _____ F wet bulb

J. Refrigerant Lines:

The 009 and 012 units shall have rotatable refrigerant lines for penetration through the wall using flare connections. All units shall have flare connections and a 90-degree suction elbow shall be provided for rear connection.

K. Special Features (Field Installed):

Condensate Pump:

The condensate pump shall remove condensate from the drain pan when gravity drainage cannot be used. Pump shall be designed for quiet operation and shall not be mounted external to the unit in the space. Pump shall consist of two parts: an internal reservoir/sensor assembly, and a remote sound-shielded pump assembly. The lift capability of the condensate pump shall be 10 ft. A level sensor on the condensate pan shall stop cooling operation if the level in the condensate pan is unacceptable.



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