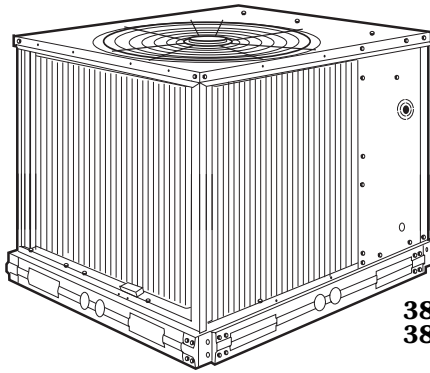




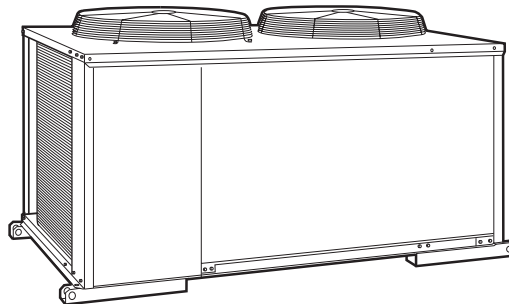
Product Data

38AK007-012 38AKS008-044 with 40RM007-034 Commercial Air-Cooled Split Systems 50 Hz

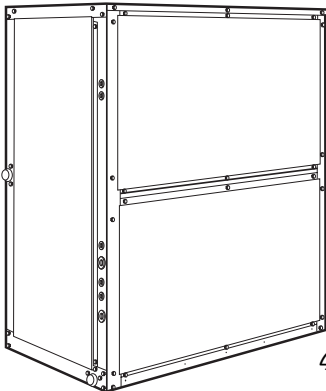
Nominal: 19.0 to 127.0 kW (5.3 to 35.8 Tons)



38AK007,008,012
38AKS008,009,012



38AKS013-024



40RM007-012

Features/Benefits

These dependable split systems match Carrier's indoor-air handlers with outdoor condensing units for a wide selection of commercial cooling solutions.

Constructed for long life

Model 38AK (hermetic compressor units) and 38AKS (semi-hermetic compressor) units are designed and built to last. The copper tube-aluminum fin outdoor coil construction provides years of trouble-free operation. Where conditions require them, copper fin coils are also available. Cabinets are constructed of prepainted galvanized steel, delivering unparalleled protection from the environment. Inside and outside surfaces are protected to ensure long life, good looks, and reliable operation. Safety controls are used for enhanced system protection and reliability.

Efficient operation

Building owners will appreciate the high unit EERs (Energy Efficiency Ratios) offered by the 38AK and 38AKS units. These units provide greater efficiency than similar units in the marketplace, which translates into year-round operating savings.



Controls for performance dependability

The 38AK and 38AKS condensing units offer the building owner operating controls and components designed for performance dependability. The highly efficient hermetic and semi-hermetic compressors are engineered for long life and durability. The compressors include overload protection and vibration isolation for enhancement of quiet operation. The high-pressure switch protects the entire refrigeration system from abnormally high operating pressures. A low-pressure switch protects the system from low-pressure conditions, including loss of charge.

The 38AK007-012 and 38AKS008-012 units include Cycle-LOC™ anti-short-cycling protection which helps to protect the units against compressor failure. The 38AKS013-044 units include a compressor recycle delay timer to prevent short-cycling. The 24-v control circuit transformer permits quick, easy wiring of standard and programmable 24-v thermostats.

The 38AK012 and 38AKS008-044 units include a crankcase heater to eliminate liquid slugging at start-up. Units with semi-hermetic compressors are also equipped with an oil-level sight glass.

Latest safety standards for 38AK and 38AKS units are assured through UL (Underwriters' Laboratories) (U.S.A. standard) and CSA (Canadian Standards Association) listings.

Innovative Carrier 40RM packaged air handlers are custom matched to 38AK and 38AKS condensing units

The 40RM Series has excellent fan performance, efficient direct-expansion (DX) coils, a unique combination of indoor-air quality features, and easy installation. Its versatility and

state-of-the-art features help to ensure that your split system provides economical performance now and in the future.

Indoor-air quality (IAQ) features — The unique combination of IAQ features in the 40RM Series air handlers help to ensure that only clean, fresh, conditioned air is delivered to the occupied space.

Direct-expansion (DX) cooling coils prevent the build-up of humidity in the room, even during part-load conditions. Unit sizes 012 and above feature dual-circuit coils for improved temperature control.

Standard 51-mm (2-in.) disposable filters remove dust and airborne particles from the occupied space.

Thermal insulation contains an immobilized anti-microbial agent to inhibit the growth of bacteria and fungi. The anti-microbial agent is registered with the U.S.A. Environmental Protection Agency (EPA).

The pitched PVC drain pan can be adjusted for a right- or left-hand connection to suit many applications and provide positive drainage, and prevent standing condensate.

The 40RM accessory economizer can provide ventilation air to improve indoor air quality. When used in conjunction with CO₂ sensors, the economizer admits fresh outdoor air to replace stale, recirculated indoor air.

Economy — The 40RM Series packaged air handlers have low initial costs, and they continue to save money by providing reduced installation expense and energy-efficient performance.

Quick installation is ensured by the multipoise design. Units can be installed in either the horizontal or vertical (upflow) configuration without modifications. Fan motors and contactors are prewired and thermostatic

expansion valves (TXVs) are factory-installed on all 40RM models.

High efficiency, precision-balanced fans minimize air turbulence, surging, and unbalanced operation, cutting operation expenses.

The economizer accessory precisely controls the blend of outdoor air and room air to achieve comfort levels. When the outside air enthalpy is suitable, outside air dampers can fully open to provide "free" cooling without energizing mechanical cooling.

Rugged dependability — 40RM units are made to last. The die-formed galvanized steel panels ensure structural integrity under all operating conditions. Galvanized steel fan housings are securely mounted to a die-formed galvanized steel fan deck.

Rugged pillow-block bearings (40RM014-034) are securely fastened to the solid steel fan shaft with split collets and clamp locking devices. Smaller unit sizes have spider-type bearings.

Coil flexibility — Model 40RM direct-expansion coils have galvanized steel casings; inlet and outlet connections are on the same end. The coils are designed for use with Refrigerant 22 and have copper tubes mechanically bonded to aluminum sine-wave fins. The coils include matched, factory-installed TXVs with matching distributor nozzles.

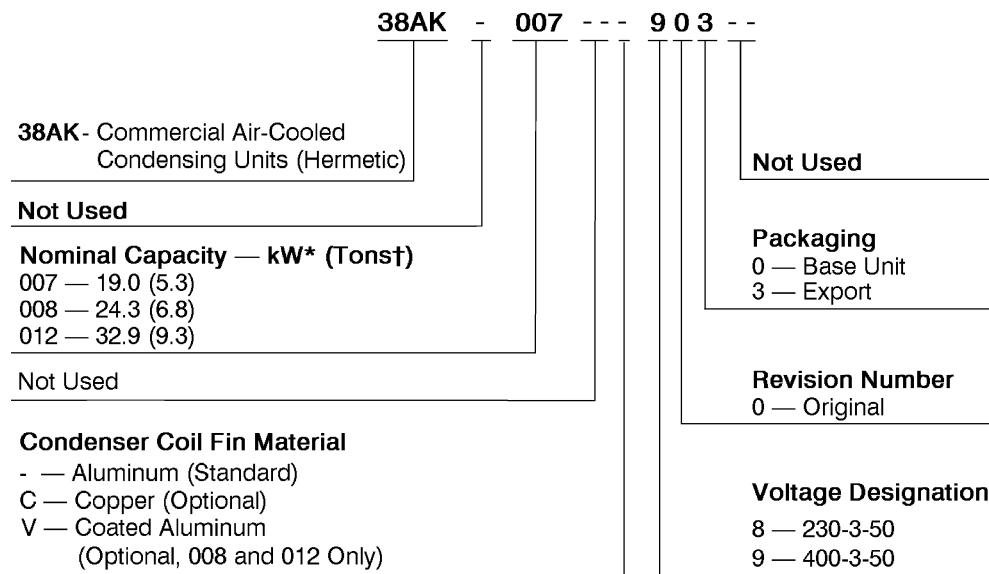
Easier installation and service — The multipoise design and component layout help you to get the unit installed and running quickly. Units can be converted from horizontal to vertical operation by simply repositioning the unit. Drain pan connections are duplicated on both sides of the unit. The filters, motor, drive, TXVs, and coil connections are all easily accessed by removing a single side panel.

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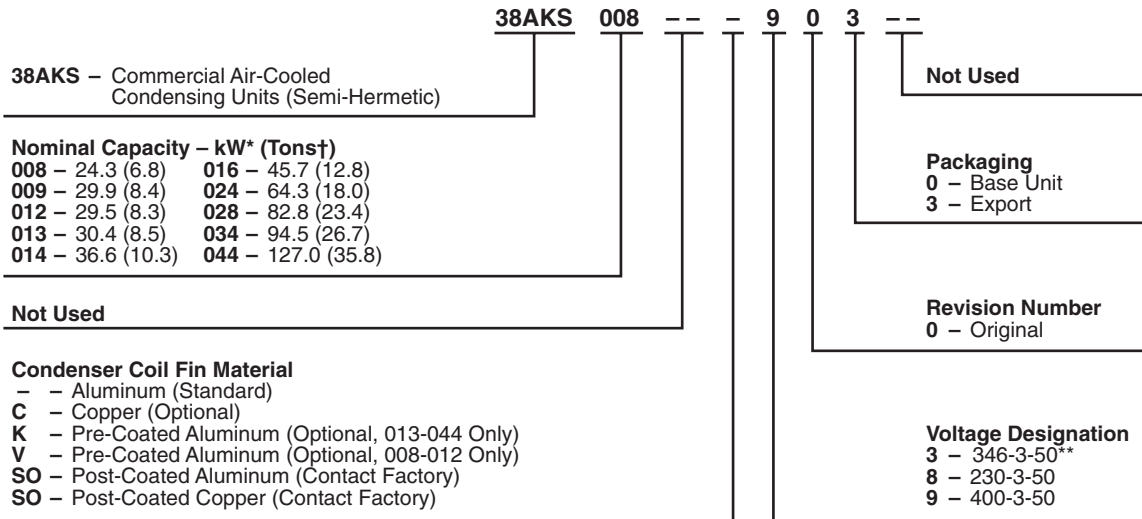
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Model number nomenclature — 38AK units



*Gross capacity based on 36 C air temperature entering condenser and 8 C saturated suction temperature.
 †Gross capacity based on 95 F air temperature entering condenser and 45 F saturated suction temperature.

Model number nomenclature — 38AKS units



LEGEND

SO — Special Order

*Gross capacity based on 36 C air temperature entering condenser and 8 C saturated suction temperature.

†Gross capacity based on 95 F air temperature entering condenser and 45 F saturated suction temperature.

**024-044 only.

Quality Assurance



Approvals:
 ISO 9001
 EN 29002
 BS5750 PART 2
 ANSI/ASQC Q92

38AK, 38AKS008-012 UNITS

Quality Assurance



Approvals:
 ISO 9002
 EN 29002
 BS5750 PART 2
 ANSI/ASQC Q92

38AKS013-044 UNITS

Model number nomenclature — 40RM units



40RM - 016 - - B 9 0 3 GC

40RM — Commercial Packaged Air Handler

Cooling Coil

- - Direct Expansion

Nominal Capacity - kW (Tons)

007 — 21 (6)	016 — 52 (15)
008 — 26 (7 1/2)	024 — 70 (20)
012 — 35 (10)	028 — 87 (25)
014 — 43 (12 1/2)	034 — 105 (30)

Not Used

Expansion Device

B — Thermostatic Expansion Valves
H — High-Capacity 4-Row Coil

Voltage Designation (V-Ph-Hz)

8 — 230-3-50
9 — 400-3-50

Factory-Installed Options

GC — Unpainted, Standard Motor, and Standard Drive

HC — Unpainted, Standard Motor, and Medium-Static Drive
(Not available for sizes 016-028)

TC — Unpainted, Alternate Motor, and Medium-Static Drive
(sizes 016-028 only)

YC — Unpainted, Alternate Motor, and High-Static Drive*

ED — Painted, Standard Motor, and Standard Drive

FD — Painted, Standard Motor, and Medium-Static Drive
(Not available for sizes 016-028)

RD — Painted, Alternate Motor, and Medium-Static Drive
(sizes 016-028 only)

WD — Painted, Alternate Motor, and High-Static Drive*

Packaging

3 — Export

Revision Number

0 — Original Model

*The YC and WD option codes for all 034 size units designate standard motor and high-static drive.

Quality Assurance



Certificate No FM 21837

40RM UNITS

Approvals:

- ISO 9002
- EN 29002
- BS5750 PART 2
- ANSI/ASQC Q92

Capacity summary



CONDENSING UNIT	AIR-HANDLING UNIT	AIR-HANDLING UNIT AIRFLOW		SYSTEM GROSS CAPACITY (Standard 3-Row Coil)		SYSTEM GROSS CAPACITY (High-Capacity 4-Row Coil)		CONDENSING UNIT ONLY GROSS CAPACITY	
		L/s	Cfm	kW*	Btuht†	kW*	Btuht†	kW**	Btuht††
38AK007	40RM007	1150	2,400	17.8	60,800	19.7	67,100	19.0	64,000
	40RM008	1400	3,000	19.9	68,000	20.8	71,000		
38AK008	40RM007	1150	2,400	21.0	71,700	23.7	80,900	24.2	81,500
	40RM008	1400	3,000	22.7	77,500	25.2	86,100		
	40RM012	1900	4,000	25.2	86,000	27.0	92,000		
38AKS008	40RM007	1150	2,400	22.6	77,000	23.2	79,000	24.3	81,700
	40RM008	1400	3,000	24.2	82,000	24.7	84,300		
	40RM012	1900	4,000	26.3	89,000	26.5	90,500		
38AKS009	40RM008	1400	3,000	28.0	95,000	28.8	98,100	29.9	101,000
	40RM012	1900	4,000	30.6	104,000	31.1	106,200		
38AK012	40RM008	1400	3,000	28.7	98,000	30.4	103,600	31.9	108,000
	40RM012	1900	4,000	30.5	104,000	33.1	112,900		
	40RM014	2350	5,000	31.6	108,000	34.8	118,700		
38AKS012	40RM008	1400	3,000	27.7	94,000	28.8	98,100	29.5	99,200
	40RM012	1900	4,000	30.3	103,000	31.1	106,200		
	40RM014	2350	5,000	31.5	107,000	32.9	112,400		
38AKS013	40RM008	1400	3,000	28.3	96,000	30.0	102,400	30.4	102,000
	40RM012	1900	4,000	31.0	105,000	32.4	110,600		
	40RM014	2350	5,000	32.2	109,000	34.3	117,000		
38AKS014	40RM012	1900	4,000	35.2	120,000	37.0	126,100	36.6	123,000
	40RM014	2350	5,000	36.8	125,000	39.0	133,000		
	40RM016	2800	6,000	39.1	133,000	41.9	143,000		
38AKS016	40RM014	2350	5,000	43.1	146,000	48.4	165,000	45.7	154,000
	40RM016	2800	6,000	46.2	157,000	51.2	174,600		
	40RM024	3800	8,000	49.6	167,000	54.7	186,500		
38AKS024	40RM016	2800	6,000	58.0	197,000	59.5	203,100	64.3	216,000
	40RM024	3800	8,000	63.3	215,000	65.7	224,100		
	40RM028	4700	10,000	67.0	226,000	69.3	236,300		
38AKS028	40RM024	3800	8,000	75.6	256,000	83.8	285,800	82.8	281,000
	40RM028	4700	10,000	80.4	273,000	84.3	287,700		
	40RM034	5650	12,000	84.6	288,000	88.7	302,800		
38AKS034	40RM028	4700	10,000	88.2	298,000	89.9	306,800	94.5	320,000
	40RM034	5650	12,000	93.1	316,000	94.8	323,500		
38AKS044	40RM034	5650	12,000	113.8	385,000	111.8	381,600	127.0	429,000

LEGEND

- db — Dry Bulb
- wb — Wet Bulb
- SST — Saturated Suction Temperature

*System gross capacities are rated according to indoor unit airflow, 35 C air temperature entering condenser, and 20 C wb air temperature entering evaporator.

†System gross capacities are rated according to indoor unit airflow, 95 F air temperature entering condenser, and 67 F wb air temperature entering evaporator.

**Condensing unit gross capacity based on 36 C air temperature entering condenser and 8 C SST.

††Condensing unit gross capacity based on 95 F air temperature entering condenser and 45 F SST.

Options and accessories



38AK, 38AKS options

Condenser coil options are available to match coil construction to site conditions for the best corrosion durability. Pre-coated coils provide protection in mild coastal environments. All copper coils are best suited for moderate coastal applications, while post-coated coils provide superior protection in severe coastal and industrial applications.

38AK, 38AKS accessories

Electric unloader package (38AKS012-044) includes hardware and solenoid valve to convert a pressure-operated unloader to electric unloading.

-20 F low-ambient temperature kit (Motormaster® I — 38AK007, 38AKS013-044; Motormaster III — 38AK008,012, 38AKS008-012) controls outdoor-fan motor operation to maintain the correct head pressure at low outdoor ambient temperatures. Only one low ambient temperature kit is required per unit.

Gage panel package provides a suction and a discharge pressure gage for the refrigerant circuit.

Carrier's line of thermostats provide both programmable and non-programmable capability with the new **Debonair®** line of commercial programmable thermostats. The **TEMP System** controls offer communication capability with staged heating and cooling, the **Commercial Electronic** thermostats provide 7-day programmable

capability for economical applications, while the **non-programmable** thermostats offer a multitude of staged heating and cooling subbase options.

Winter start package (38AK007-012, 38AKS008-024) bypasses the low-pressure switch to permit unit start-up at low ambient temperatures.

Hail guard package (38AK007-012, 38AKS008-012) protects coils against damage from flying debris and hail.

ModuPanel™ control box allows 38AKS028-044 systems to operate as VAV (variable air volume) systems. Includes microprocessor, satellite sequencer, 4 status lights, 5-hour bypass timer, and locked enclosure.

Hot-gas bypass kit (38AKS028-044) prevents the indoor coil from freezing up during low airflow or low return-air temperature applications by maintaining minimum suction pressure.

Condenser coil grille package (38AK007-012, 38AKS008-024) protects condensing unit coil from impact by large objects and vandalism.

Part-winding-start timing relay (38AKS028-044) reduces inrush current and locked rotor amps on start-up. The 220-v and 346-v units have part-winding start as a standard feature. All 400-v units require a special order to change circuit breakers, contactors, and compressor before timing relay can be added for part-winding start.

CONDENSER COIL PROTECTION APPLICATIONS

DESCRIPTION (Enviro-Shield™ Option)	ENVIRONMENT*					
	Standard Non-Corrosive	Mild Coastal	Moderate Coastal	Severe Coastal	Industrial	Combined Coastal and Industrial
Standard, Al/Cu	X					
Pre-Coated Al/Cu		X				
Cu/Cu			X			
Post-Coated Al/Cu					X	
Post-Coated Cu/Cu				X		X

LEGEND

Al/Cu — Aluminum Fin with Copper Tube Coil
 Cu/Cu — Copper Fin with Copper Tube Coil
 Enviro-Shield — Family of Coil Protection Options
 Post-Coated — Organic Coating Applied to Entire Coil Assembly
 Pre-Coated — Epoxy Coating Applied to Fin Stock Material

*See "Selection Guide: Environmental Corrosion Protection" Catalog No. 811-217 for more information.

Options and accessories (cont)



40RM factory-installed options

Alternate fan motors and drives are available to provide the widest possible range of performance.

High-capacity 4-row coils are available to provide increased latent and sensible capacities (40RM only).

Prepainted steel units are available from the factory for applications that require painted units. Units are painted with American Sterling Gray color.

40RM field-installed accessories

Two-row hot water coils have copper tubes mechanically bonded to aluminum plate fins and non-ferrous headers.

One-row steam coil has copper tubes and aluminum fins. The Inner Distributing Tube (IDT) design provides uniform temperatures across the coil face. The steam coil has a broad operating pressure range; up to 175 psig (1207 kPag) at 400 F (204.4 C) and up to 300 psig (2069 kPag) at 300 F (148.9 C). The IDT steam coils are especially suited to applications where sub-freezing air enters the unit.

Electric resistance heat coils have an open-wire design and are mounted in a rigid frame. Safety cutouts for high temperature conditions are standard. Terminal block for single-point power connection is included.

Economizer (enthalpy controlled) provides ventilation air and "free" cooling if outside ambient temperature and humidity are suitable. Can also be used with CO₂ sensors to help meet indoor air quality requirements.

Discharge plenum directs the air discharge directly into the occupied space; integral horizontal and vertical louvers enable redirection of airflow. Accessory is available unpainted or painted. Field assembly required.

Return-air grille provides a protective barrier over the return-air opening and gives a finished appearance to units installed in the occupied space. Accessory is available unpainted or painted.

Subbase provides a stable, raised platform and room for condensate drain trap connection for vertical floor-mounted units. Accessory is available unpainted or painted.

Overhead suspension package includes necessary brackets to support units in horizontal ceiling installations.

CO₂ sensors can be used in conjunction with the economizer accessory to help meet indoor air quality requirements. The sensor signals the economizer to open when the CO₂ level in the space exceeds the set point. A Carrier Comfort System programmable thermostat can be used to override the sensor if the outside air temperature is too high or too low.

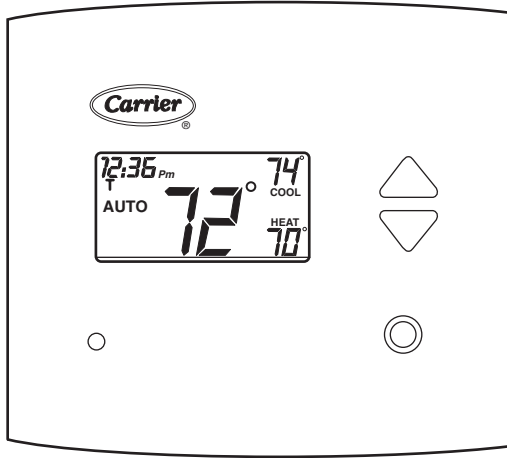
Carrier's line of thermostats provide both programmable and non-programmable capability with the new **Debonair®** line of commercial programmable thermostats, the TEMP System controls offer communication capability with staged heating and cooling, the **Commercial Electronic** thermostats provide 7-day programmable capability for economical applications, while the **Non-Programmable** thermostats offer a multitude of staged heating and cooling subbase options.

Condensate drain trap includes an overflow shutoff switch that can be wired to turn off the unit if the trap becomes plugged. Kit also includes a wire harness that can be connected to an alarm if desired. The transparent trap is designed for easy service and maintenance.

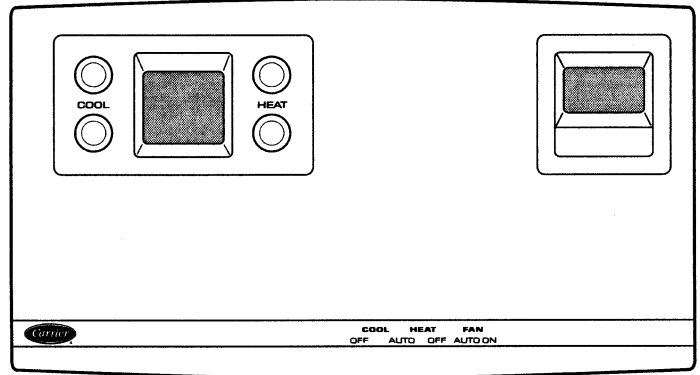
UV-C germicidal lamps kill mold and fungus, which may grow on evaporator coil and condensate pan surfaces. The use of UV-C germicidal lamps eliminates the foul odors that result from this growth of mold and fungus. It also provides a self-cleaning function for the evaporator coil and drain pan.

CARRIER THERMOSTATS

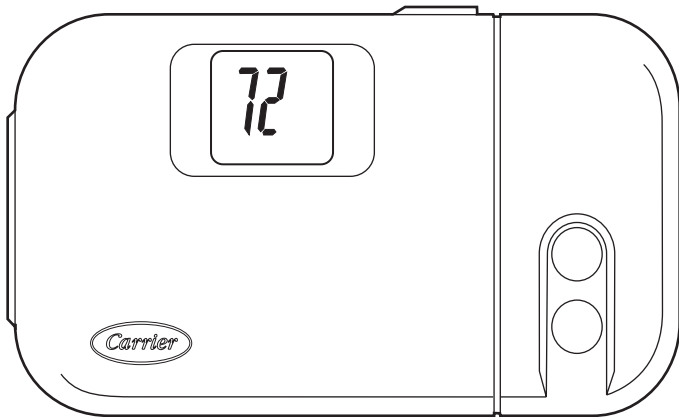
DEBONAIR® COMMERCIAL PROGRAMMABLE THERMOSTAT



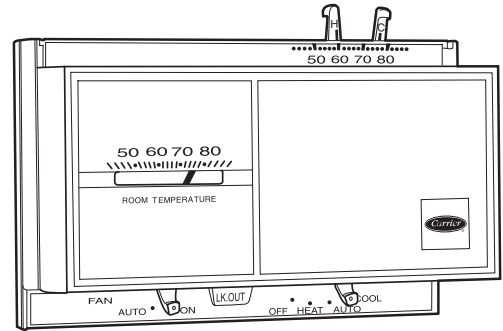
TEMP SYSTEM THERMOSTAT WITH TIMECLOCK



COMMERCIAL ELECTRONIC THERMOSTAT



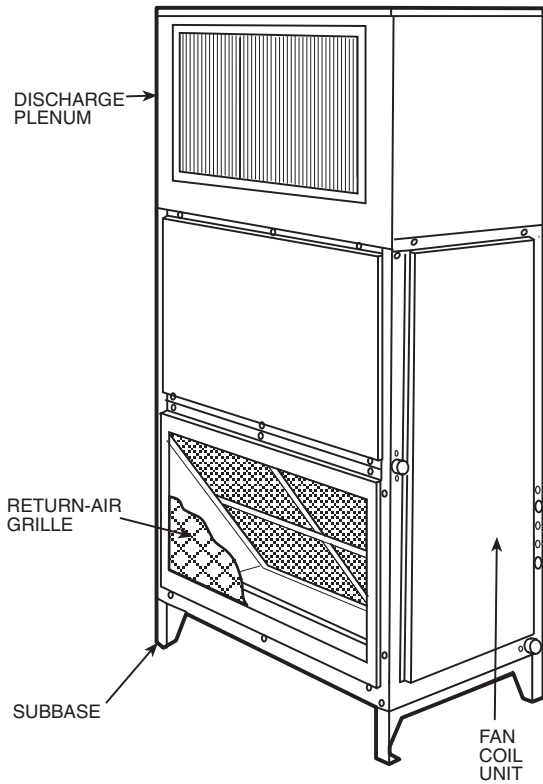
NON-PROGRAMMABLE THERMOSTAT



Options and accessories (cont)



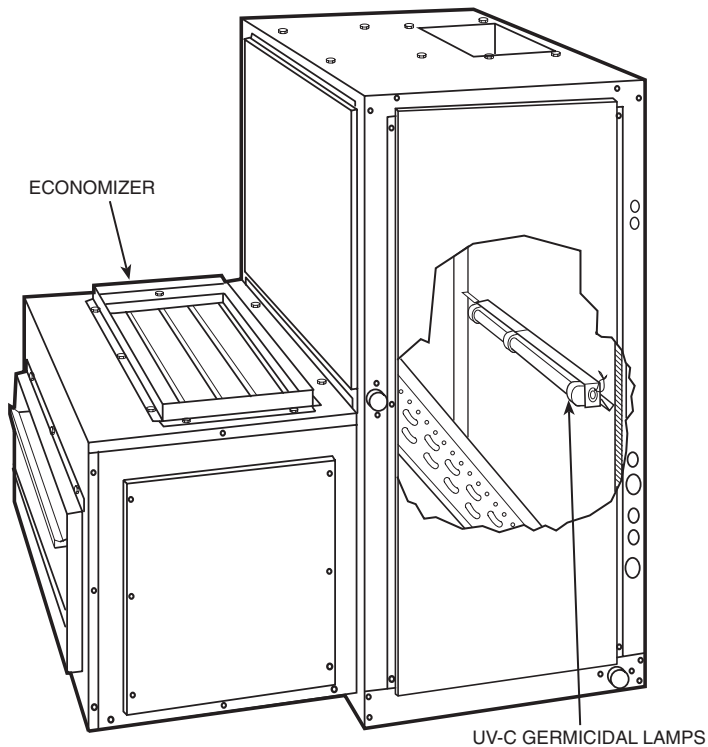
40RM WITH DISCHARGE PLENUM, RETURN GRILLE, AND SUBBASE



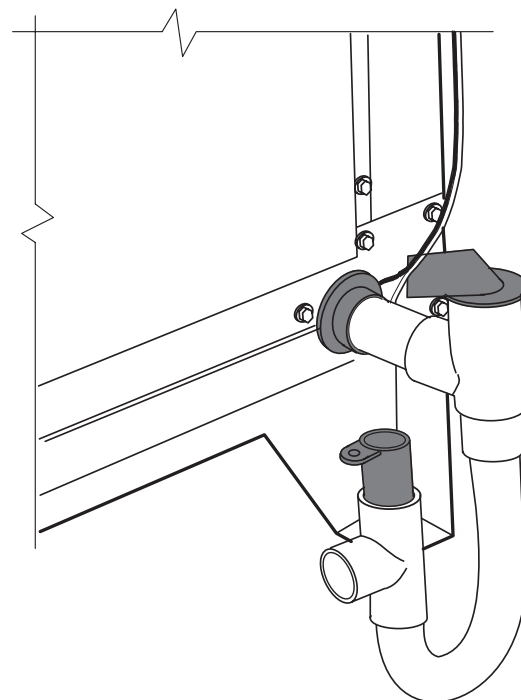
40RM WITH HOT WATER OR STEAM COIL



40RM WITH ECONOMIZER AND UV-C GERMICIDAL LAMPS



40RM WITH CONDENSATE TRAP



Physical data — SI



38AK007-012, 38AKS008-012

UNIT 38	AK007	AK008	AK012	AKS008	AKS009	AKS012
NOMINAL CAPACITY (kW)*	19.0	24.3	32.9	24.3	29.9	29.5
OPERATING WEIGHT (kg)						
Aluminum-Fin Coils (Standard)	154	178	193	231	256	256
Copper-Fin Coils (Optional)	175	208	228	262	287	287
RIGGING WEIGHT (kg)						
Aluminum-Fin Coils (Standard)	176	200	215	254	279	279
Copper-Fin Coils (Optional)	198	228	250	285	309	309
REFRIGERANT†	R-22					
Operating Charge, Typical (kg)**	5.17	6.17	7.48	6.49	7.44	7.44
Shipping Charge (kg)	0.91	0.91	0.91	0.91	0.91	0.91
COMPRESSOR	Reciprocating, Hermetic	Scroll Hermetic		Reciprocating, Semi-Hermetic		
Model	H26A72Q	ZR94KC	ZR125KC	06DA818	06DA824	06DH824 (See Note)
No. Cylinders (ea)	2	—	—	4	6	6
Speed (r/s)	48.4	48.4	48.4	24.2	24.2	24.2
Oil Charge (L) (ea)	1.92	2.51	3.25	2.60	3.78	3.78
CONDENSER FAN	Propeller; Direct Drive					
Qty...r/s	1...16.0					
Diameter (mm)	660					
Motor kW (NEMA)	0.25					
Nominal Airflow (L/s)	1490	2550	2750	2550	2550	2550
CONDENSER COIL	Enhanced Copper Tubes, Aluminum Lanced Fins					
Rows...Fins/m	2...670					
Face Area (m ²)	1.14	1.67	1.90	1.67	1.67	1.67
Storage Capacity (kg)	5.1	7.5	8.6	7.5	7.5	7.5
CONTROLS	Pressurestat Settings (kPa)					
High Cutout	2937 ± 48					
Cut-in	2206 ± 138					
Low Cutout	48 ± 20					
Cut-in	151 ± 34					
PIPING CONNECTIONS (Sweat)						
Suction (in.)	1 ¹ / ₈	1 ¹ / ₈	1 ¹ / ₈	1 ¹ / ₈	1 ¹ / ₈	1 ¹ / ₈
Liquid (in.)	1 ¹ / ₂	1 ¹ / ₂	5 ⁵ / ₈	1 ¹ / ₂	5 ⁵ / ₈	5 ⁵ / ₈

LEGEND

NEMA — National Electrical Manufacturers Association (U.S.A. Standard)

*Based on operation at 8 C saturated suction temperature and 36 C outdoor ambient temperature.

†Unit is factory supplied with holding charge only.

**Typical operating charge with 7.6 m of interconnecting piping.

NOTE: Unit 38AKS012 has one step of unloading. Full load is 100% of capacity, and one step of unloading is 67% capacity. Unit 38AKS012 has the following unloader settings: Load is 483 kPa ± 6.9 kPa and unload is 414 kPa ± 13.8 kPa.

Physical data — SI (cont)



38AKS013-024

UNIT 38AKS	013	014	016	024
NOMINAL CAPACITY (kW)*	30.4	36.6	45.7	64.3
OPERATING WEIGHT (kg) With Aluminum-Fin Coil With Copper-Fin Coil	332 374	353 417	358 421	408 472
REFRIGERANT† Operating Charge, Typical (kg)** Shipping Charge (kg)	R-22 10.0 0.95	10.4 1.40	10.4 1.40	12.7 1.40
COMPRESSOR Model No. Cylinders Speed (r/s) Oil Charge (L) Capacity Steps (%) Accessory Standard Unloader Settings (kPa) Load Unload Crankcase Heater Watts	06DD824 6 24.2 4.73 33††, 66, 100 66, 100	Reciprocating, Semi-Hermetic 06DD328 6 4.73 33††, 66, 100 66, 100	06DD537 6 4.73 33††, 66, 100 66, 100	06E4250 4 7.33 — 50, 100
CONDENSER FANS Qty...r/s Diameter (mm) Nominal kW Nominal Airflow (L/s Total) Watts (total)	Axial Flow, Direct Drive 2...15.0 660 0.37 4660 1050			
CONDENSER COIL Rows...Fins/m Face Area (sq m) Storage Capacity (kg)	2...590 2.71 12.3	Copper Tubes, Aluminum Fins 3...590 2.71 18.3		3...590 2.71 18.1
CONTROLS Pressurestat (kPa) High Pressure Cutout Cut-in Low-Pressure Cutout Cut-in	2724 ± 69 2034 ± 138 186 ± 28 462 ± 48			
FAN CYCLING CONTROLS Operating Pressure (kPa) No. 2 Fan, Close Open	1758 ± 69 1103 ± 69			
PRESSURE RELIEF Location Temperature (C)	Compressor 93.3	Compressor 93.3	Fusible Plug Compressor 93.3	Liquid Line 98.9
PIPING CONNECTIONS (in. ODM) Suction Liquid Hot Gas Stub	1 ¹ / ₈	1 ³ / ₈	5 ⁵ / ₈ 3 ³ / ₈	1 ⁵ / ₈

*Based on operation at 8 C saturated suction temperature and 36 C outdoor ambient temperature.

†Unit is factory-supplied with holding charge only.

**With 7.6 m of interconnecting piping. Operating charge is approximate for maximum system capacity.

††Indicates capacity step (%) with electric unloader accessory.

||Storage capacity is measured at liquid saturated temperatures of 51.7 C for 38AKS013, 50.6 C for 38AKS014, and 54.4 C for 38AKS016 and 024.



38AKS028-044

UNIT 38AKS	028	034	044
NOMINAL CAPACITY (kW)*	82.8	94.5	127.0
OPERATING WEIGHTS (kg) With Aluminum-Fin Coils With Copper-Fin Coils	748 818	818 911	1106 1246
REFRIGERANT Operating Charge, Typical (kg)	13.8	R-22 19.7	29.5
COMPRESSOR Model No. Cylinders (ea) Speed (r/s) Oil (L) Capacity Steps Unloader Settings (kPag) No. 1 Load Unload No. 2 Load Unload Crankcase Heater Watts	06E9265 6 8.99	Reciprocating, Semi-hermetic 06E9275 6 24.2 8.99 100%, 66%, 33% 524 400 538 414 180	06E9299 6 9.46
CONDENSER FANS Qty...r/s Diameter (mm) Nominal kW Nominal Airflow (L/s) Watts (Total)	1490	Propeller Type — Direct Drive 2...15.8 762 0.75 7400 1750	3...15.8 11,180 1520
CONDENSER COIL Rows...Fins/m Face Area (sq m) Storage Capacity (kg) — 80% Full at 51.7 C	2...748 3.64 17.1	Enhanced Copper Tubes, Lanced Aluminum Fins 3...670 3.64 25.7	3...670 5.43 38.3
CONTROLS High-Pressure Switch (kPag) Cutout Cut-in Low-Pressure Switch (kPag) Cutout Cut-in Oil Pressure Switch (kPag) Close on Rise Open on Fall		2937 ± 48 2206 ± 138 186 ± 21 303 ± 34 62 43	
FAN CYCLING CONTROLS Operating Pressure (kPag) No. 2 Fan, Close Open		1758 ± 69 1103 ± 69	
PRESSURE RELIEF Location Temperature (C)		Fusible Plug Liquid and Suction Line 98.9	
PIPING CONNECTIONS (in. OD) Suction Liquid Hot Gas Stub	1 ⁵ / ₈	2 ¹ / ₈ 7 ⁷ / ₈ 5 ⁵ / ₈	2 ¹ / ₈

*Based on operation at 8 C saturated suction temperature and 36 C outdoor ambient temperature.

Physical data — SI (cont)



40RM

UNIT 40RM	007	008	012	014	016	024	028	034
NOMINAL CAPACITY (kW)	21	26	35	43	52	70	87	105
OPERATING WEIGHT (kg)								
Base Unit with TXV (3-Row/4-Row)	173/181	175/183	184/193	304/315	311/323	313/331	463/470	467/482
Plenum	80	80	80	102	102	102	148	148
FANS								
Qty...Diam. (mm)	1...381	1...381	1...381	2...381	2...381	2...381	2...457	2...457
Nominal Airflow (L/s)	1133	1604	1888	2360	2831	3775	4719	5663
Airflow Range (L/s)	850-1416	1203-2006	1416-2360	1770-2949	2124-3539	2831-4719	3539-5899	4247-7079
Nominal Motor kW (Standard Motor)								
230-3-50, 400-3-50	1.79	1.79	2.16	2.16	2.16	3.73	5.60	7.46
Motor Speed (r/s)								
230-3-50, 400-3-50	23.8	23.8	23.8	23.8	23.8	23.8	23.8	23.8
REFRIGERANT								
Operating charge (kg)								
(approx per circuit)*	1.36	1.36	0.68/0.68	0.90/0.90	1.13/1.13	1.59/1.59	2.04/2.04	2.27/2.27
DIRECT-EXPANSION COIL								
Max Working Pressure (kPag)								
Face Area (sq m)	0.62	0.77	0.93	0.93	1.64	1.85	2.30	2.77
No. of Splits	1	1	2	2	2	2	2	2
No. of Circuits per Split (3-Row/4-Row)	12/12	15/15	9/9	9/16	12/16	13/18	15/20	18/24
Split Type...Percentage					Face...50/50			
Fins/m	591	591	670	591	591	670	591	591
STEAM COIL								
Max Working Pressure (kPag at 204.4 C)								
Total Face Area (sq m)	0.62	0.62	0.62	1.24	1.24	1.24	1.39	1.39
Rows...Fins/m	1...355	1...355	1...355	1...394	1...394	1...394	1...394	1...394
HOT WATER COIL								
Max Working Pressure (kPag)								
Total Face Area (sq m)	0.62	0.62	0.62	1.24	1.24	1.24	1.39	1.39
Rows...Fins/m	2...335	2...335	2...335	2...335	2...335	2...335	2...493	2...493
Water Volume (L)		31.4			52.6		54.1	
(m ³)		0.031			0.052		0.054	
PIPING CONNECTIONS,								
Quantity...Size (in.)								
DX Coil — Suction (ODF)	1...1 ¹ / ₈	1...1 ¹ / ₈	2...1 ¹ / ₈	2...1 ¹ / ₈	2...1 ¹ / ₈	2...1 ¹ / ₈	2...1 ³ / ₈	2...1 ³ / ₈
DX Coil — Liquid Refrigerant (ODF)						2... ⁵ / ₈		
Steam Coil, In (MPT)	1...2 ¹ / ₂					1...2 ¹ / ₂		
Steam Coil, Out (MPT)	1...1 ¹ / ₂					1...2 ¹ / ₂		
Hot Water Coil, In (MPT)	1...1 ¹ / ₂	1...1 ¹ / ₂				1...2		
Hot Water Coil, Out (MPT)	1...1 ¹ / ₂	1...1 ¹ / ₂				1...2		
Condensate (Male PVC)					1...1 ¹ / ₄			
FILTERS								
Quantity...Size (mm)	4...406 x 610 x 51						4...508 x 610 x 51	4...508 x 635 x 51
Access Location					Throwaway — Factory Supplied			
					4...406 x 508 x 51			
					4...406 x 610 x 51			
					Right or Left Side			

LEGEND

DX — Direct Expansion
TXV — Thermostatic Expansion Valve

*Units are shipped without refrigerant charge.

Physical data — English



38AK007-012, 38AKS008-012

UNIT 38	AK007	AK008	AK012	AKS008	AKS009	AKS012
NOMINAL CAPACITY (tons)*	5.3	6.8	9.3	6.8	8.4	8.3
OPERATING WEIGHT (lb)						
Aluminum Coils (Standard)	340	392	426	510	564	564
Copper Coils (Optional)	386	460	503	578	632	632
RIGGING WEIGHT (lb)						
Aluminum Fin Coils (Standard)	390	442	476	560	614	614
Copper Fin Coils (Optional)	436	510	553	628	682	682
REFRIGERANT†				R-22		
Operating Charge, Typical (lb)**	11.4	13.6	16.5	14.3	16.4	16.4
Shipping Charge (lb)	2.0	2.0	2.0	2.0	2.0	2.0
COMPRESSOR	Reciprocating, Hermetic	Scroll Hermetic		Reciprocating, Semi-Hermetic		
Model	H26A72Q	ZR94KC	ZR125KC	06DA818	06DA824	06DH824 (See Note)
No. Cylinders (ea)	2	—	—	4	6	6
Speed (rpm)	3500	3500	3500	1460	1460	1460
Oil Charge (oz) (ea)	65	85	110	88	128	128
CONDENSER FAN						
Qty...Rpm				Propeller; Direct Drive 1...960		
Diameter (in.)				26		
Motor Hp (NEMA)				1/3		
Nominal Airflow (Cfm)	3800	6500	7000	6500	6500	6500
CONDENSER COIL						
Rows...Fins/in.				Enhanced Copper Tubes, Aluminum Lanced Fins 2...17		
Face Area (sq ft)	12.24	18.0	20.50	18.0	18.0	18.0
Storage Capacity (lb)	11.26	16.56	18.87	16.56	16.56	16.56
CONTROLS						
Pressurestat Settings (psig)						
High Cutout				426 ± 7		
Cut-in				320 ± 20		
Low Cutout				7 ± 3		
Cut-in				22 ± 5		
PIPING CONNECTIONS (Sweat)						
Suction (in.)	1 1/8	1 1/8	1 1/8	1 1/8	1 1/8	1 1/8
Liquid (in.)	1/2	1/2	5/8	1/2	5/8	5/8

LEGEND

NEMA — National Electrical Manufacturers Association

*Based on operation at 45 F saturated suction temperature and 95 F outdoor ambient.

†Unit is factory supplied with holding charge only.

**Typical operating charge with 25 ft of interconnecting piping.

NOTE: Unit 38AKS012 has one step of unloading. Full load is 100% of capacity, and one step of unloading is 67% capacity. Unit 38AKS012 has the following unloader settings: Load is 70 ± 1 psig and unload is 60 ± 2 psig.

Physical data — English (cont)



38AKS013-024

UNIT 38AKS	013	014	016	024
NOMINAL CAPACITY (tons)*	8.5	10.3	12.8	18.0
OPERATING WEIGHTS (lb)				
With Aluminum-Fin Coil	732	779	789	900
With Copper-Fin Coil	825	919	929	1040
REFRIGERANT†			R-22	
Operating Charge, Typical (lb)**	22	23	23	28
Shipping Charge (lb)	2.1	3.1	3.1	3.1
COMPRESSOR				
Model	06DD824	06DD328	06DD537	06E4250
No. Cylinders	6	6	6	4
Speed (rpm)			1450	
Oil Charge (pt)	10	10	10	15.5
Capacity Steps				
Accessory	33††, 66, 100	33††, 66, 100	33††, 66, 100	—
Standard	66, 100	66, 100	66, 100	50, 100
Unloader Setting (psig)				
Load			70 ± 1	
Unload			60 ± 2	
Crankcase Heater Watts			125	
CONDENSER FANS				
Qty...Rpm			Axial Flow, Direct Drive	
Diameter (in.)			2...900	
Nominal Hp			26	
Nominal Airflow (cfm, total)			1/2	
Watts (total)			9210	
			1050	
CONDENSER COIL				
Rows...Fins/in.	2...15	3...15	3...15	3...15
Face Area (sq ft)	29.2	29.2	29.2	29.2
Storage Capacity (lb)	27.2	40.0	39.8	39.8
CONTROLS				
Pressurestat (psig)				
High Pressure				
Cutout			395 ± 10	
Cut-in			295 ± 20	
Low Pressure				
Cutout			27 ± 4	
Cut-in			67 ± 7	
FAN CYCLING CONTROLS				
Operating Pressure (psig)				
No. 2 Fan, Close (psig)			255 ± 10	
Open (psig)			160 ± 10	
PRESSURE RELIEF				
Location	Compressor	Compressor	Fusible Plug	Liquid Line
Temperature (F)	200	200	200	210
PIPING CONNECTIONS (in. ODM)				
Suction	1 1/8	1 3/8	1 3/8	1 5/8
Liquid			5/8	
Hot Gas Stub			3/8	

*Based on operation at 45 F saturated suction temperature and 95 F outdoor ambient.

†Unit is factory-supplied with holding charge only.

**With 25 ft of interconnecting piping. Operating charge is approximate for maximum system capacity.

††Indicates capacity step (%) with electric unloader accessory.

||Storage capacity is measured at liquid saturated temperatures of 125 F for 38AKS013, 123 F for 38AKS014, and 130 F for 38AKS016 and 024.



38AKS028-044

UNIT 38AKS	028	034	044
NOMINAL CAPACITY (tons)*	23.4	26.7	35.8
OPERATING WEIGHTS (lb) With Aluminum-Fin Coils With Copper-Fin Coils	1650 1804	1803 2009	2437 2745
REFRIGERANT Operating Charge, Typical (lb)	30.5	R-22 43.5	65.0
COMPRESSOR Model No. Cylinders (ea) Speed (rpm) Oil (pt) Capacity Steps Unloader Setting (psig) No. 1 Load Unload No. 2 Load Unload Crankcase Heater Watts	06E9265 6 20.0	Reciprocating, Semi-Hermetic 06E9275 6 1450 20.0 100%, 66%, 33% 76 58 78 60 180	06E9299 6 19.0
CONDENSER FANS Qty...Rpm Diameter (in.) Nominal Hp Nominal Airflow (cfm) Watts (Total)	1490	Propeller Type — Direct Drive 2...950 30 1.0 15,700 1750	3...950 23,700 1520
CONDENSER COIL Rows...Fins/in. Face Area (sq ft) Storage Capacity (lb) — 80% Full at 125 F	2...19 39.2 37.7	Enhanced Copper Tubes, Lanced Aluminum Fins 3...17 39.2 56.6	3...17 58.4 84.4
CONTROLS High-Pressure Switch (psig) Cutout Cut-in Low-Pressure Switch (psig) Cutout Cut-in Oil Pressure Switch (psig) Close on Rise Open on Fall		426 ± 7 320 ± 20 27 ± 3 44 ± 5 9.0 6.2	
FAN CYCLING CONTROLS Operating Pressure (psig) No. 2 Fan, Close Open		255 ± 10 160 ± 10	
PRESSURE RELIEF Location Temperature (F)		Fusible Plug Liquid and Suction Line 210	
PIPING CONNECTIONS (in. OD) Suction Liquid Hot Gas Stub	1 ⁵ / ₈	2 ¹ / ₈ 7 ⁷ / ₈ 5 ⁵ / ₈	2 ¹ / ₈

*Based on operation at 45 F saturated suction temperature and 95 F outdoor ambient.

Physical data — English (cont)



40RM

UNIT 40RM	007	008	012	014	016	024	028	034
NOMINAL CAPACITY (Tons)	6	7 ¹ / ₂	10	12 ¹ / ₂	15	20	25	30
OPERATING WEIGHT (lb)								
Base Unit with TXV (3-Row/4-Row)	381/399	385/404	405/425	670/695	685/713	690/730	1020/1050	1030/1062
Plenum	175	175	175	225	225	225	325	325
FANS								
Qty...Diam. (in.)	1...15	1...15	1...15	2...15	2...15	2...15	2...18	2...18
Nominal Airflow (cfm)	2400	3000	4000	5000	6000	8000	10,000	12,000
Airflow Range (cfm)	1800-3000	2250-3750	3000-5000	3750-6250	4500-7500	6000-10,000	7500-12,500	9000-15,000
Nominal Motor Hp (Standard Motor)								
230-3-50, 400-3-50	2.4	2.4	2.9	2.9	2.9	5.0	7.5	10.0
Motor Speed (rpm)					1425			
230-3-50, 400-3-50								
REFRIGERANT								
Operating charge (lb)					R-22			
(approx per circuit)*	3.0	3.0	1.5/1.5	2.0/2.0	2.5/2.5	3.5/3.5	4.5/4.5	5.0/5.0
DIRECT-EXPANSION COIL								
Max Working Pressure (psig)					Enhanced Copper Tubes, Aluminum Sine-Wave Fins			
Face Area (sq ft)	6.67	8.33	10.0	13.25	17.67	19.88	24.86	29.83
No. of Splits	1	1	2	2	2	2	2	2
Split Type...Percentage					Face...50/50			
No. of Circuits per Split (3-Row/4-Row)	12/12	15/15	9/9	9/12	12/16	13/18	15/20	18/24
Fins/in.	15	15	17	15	15	17	15	15
STEAM COIL								
Max Working Pressure (psig at 400 F)					175			
Total Face Area (sq ft)	6.67	6.67	6.67	13.33	13.33	13.33	15.0	15.0
Rows...Fins/in.	1...9	1...9	1...9	1...10	1...10	1...10	1...10	1...10
HOT WATER COIL								
Max Working Pressure (psig)					150			
Total Face Area (sq ft)	6.67	6.67	6.67	13.33	13.33	13.33	15.0	15.0
Rows...Fins/in.	2...8.5	2...8.5	2...8.5	2...8.5	2...8.5	2...8.5	2...12.5	2...12.5
Water Volume								
(gal)		8.3			13.9			14.3
(ft ³)		1.1			1.85			1.90
PIPING CONNECTIONS,								
Quantity...Size (in.)								
DX Coil — Suction (ODF)	1...1 ¹ / ₈	1...1 ¹ / ₈	2...1 ¹ / ₈	2...1 ¹ / ₈	2...1 ¹ / ₈	2...1 ¹ / ₈	2...1 ³ / ₈	2...1 ³ / ₈
DX Coil — Liquid Refrigerant (ODF)	1...5 ⁵ / ₈				1...5 ⁵ / ₈			
Steam Coil, In (MPT)	1...2 ¹ / ₂				1...2 ¹ / ₂			
Steam Coil, Out (MPT)	1...1 ¹ / ₂				1...2 ¹ / ₂			
Hot Water Coil, In (MPT)	1...1 ¹ / ₂		1...1 ¹ / ₂			1...2		
Hot Water Coil, Out (MPT)	1...1 ¹ / ₂		1...1 ¹ / ₂			1...2		
Condensate (Male PVC)					1...1 ¹ / ₄			
FILTERS								
Quantity...Size (in.)		4...16 x 24 x 2			Throwaway — Factory Supplied			
Access Location					4...16 x 20 x 2		4...20 x 24 x 2	
					4...16 x 24 x 2		4...20 x 25 x 2	
					Right or Left Side			

LEGEND

TXV — Thermostatic Expansion Valve

*Units are shipped without refrigerant charge.

38AK007-012, 38AKS008-012

DIMENSION CHART

UNIT 38AK	UNIT W/ ALUMINUM COIL		UNIT W/ COPPER COIL		DIM. C	DIM. D	DIM. E	DIM. F
	DIM. A	DIM. B	DIM. A	DIM. B				
007	1'-6 1/2" [470]	1'-2 3/4" [375]	1'-8" [508]	1'-3" [381]	—	1'-2 1/4" [362]	1'-4 5/16" [415]	2'-9 5/16" [847]
008	1'-8" [508]	1'-6 1/2" [470]	1'-9 1/2" [546]	1'-6" [457]	2'-9 13/16" [859]	1'-3" [381]	2'-5 1/16" [613]	3'-5 7/16" [1053]
012	1'-9" [533]	1'-8" [508]	1'-10" [559]	1'-7" [482]	2'-0" [610]	1'-3" [381]	2'-5 1/16" [613]	3'-5 7/16" [1053]
S008	1'-8" [457]	1'-4 3/4" [426]	1'-7 1/2" [495]	1'-4 1/2" [419]	2'-9 13/16" [859]	1'-3" [381]	2'-5 1/16" [613]	3'-5 7/16" [1053]
S009,S012	1'-7" [483]	1'-5" [432]	1'-7 1/2" [495]	1'-4" [406]	2'-9 13/16" [859]	1'-3" [381]	2'-5 1/16" [613]	3'-5 7/16" [1053]

ELECTRICAL CONNECTIONS

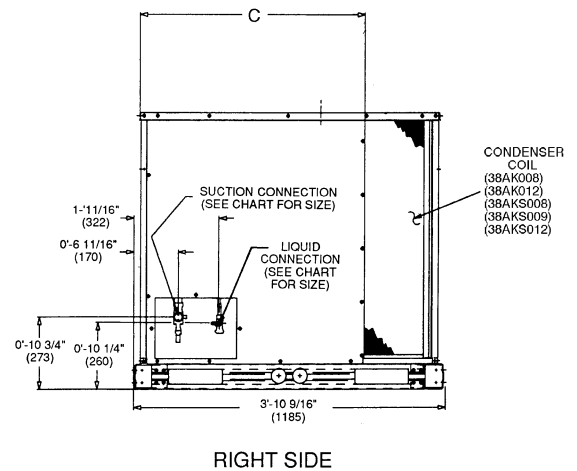
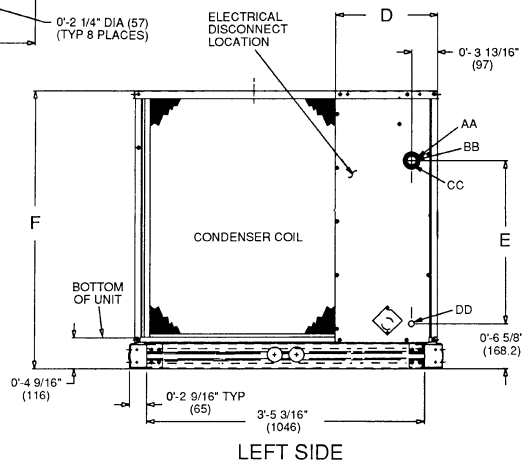
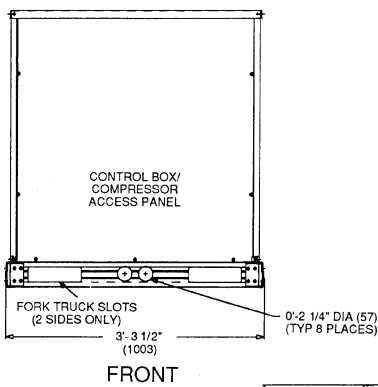
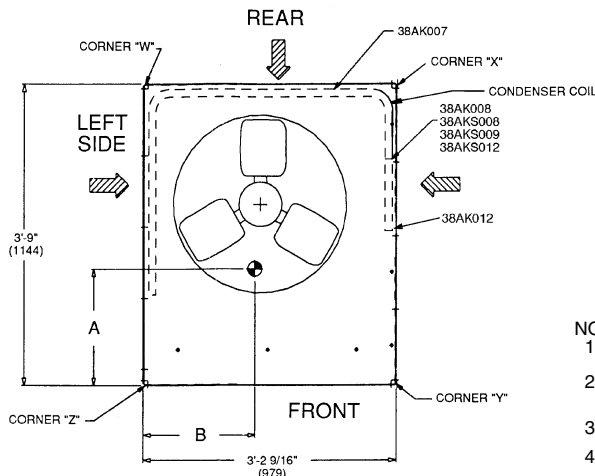
CONNECTION SIZES	
AA	1 3/8" Dia [35] Field Power Supply Hole
BB	2" Dia [51] Power Supply Knockout
CC	2 1/2" Dia [64] Power Supply Knockout
DD	7/8" Dia [22] Field Control Wiring Hole

SERVICE VALVE CONNECTIONS

UNIT 38AK	SUCTION	LIQUID
007	1 1/8" [28.6]	1/2" [12.7]
008	1 1/8" [28.6]	1/2" [12.7]
012	1 1/8" [28.6]	5/8" [15.9]
S008	1 1/8" [28.6]	1/2" [12.7]
S009,012	1 1/8" [28.6]	5/8" [15.9]

WEIGHT DISTRIBUTION

UNIT 38AK	STD UNIT		CORNER W		CORNER X		CORNER Y		CORNER Z	
	Kg	Lb	Kg	Lb	Kg	Lb	Kg	Lb	Kg	Lb
With Aluminum Coil										
007	154	340	39	86	24	53	35	77	86	124
008	178	392	41	91	38	84	48	105	51	113
012	193	426	44	96	45	99	53	117	51	113
S008	231	510	52	114	40	89	60	133	78	173
S009,S012	256	564	60	133	44	97	64	141	88	193
With Copper Coil										
007	175	386	48	106	30	65	37	82	60	133
008	209	460	54	120	45	100	51	113	58	127
012	228	503	57	126	57	126	51	113	58	127
S008	262	578	65	143	48	106	78	173	85	187
S009,S012	287	632	73	161	52	114	88	193	94	207



NOTES:

- Dimensions in [] are in millimeters.
- Center of Gravity. See chart for dimensions.
- Direction of airflow.
- Minimum clearance shall be as follows: (local codes or jurisdiction may prevail)
 - Bottom to combustible surfaces, 0 in. [0 mm].
 - Either left or rear side of condensing unit must have 36-in. [914] clearance for proper airflow; the remaining side(s) must have 12-in. [305] clearance each.
 - Overhead, 60 in. [1524], to assure proper condenser fan operation.
 - Between units, control box side, 42 in. [1067] per NEC (National Electrical Code) (U.S.A. Standard) or equivalent local electrical code.
 - Between unit and ungrounded surfaces, control box side, 36 in. [914] per NEC or equivalent local electrical code.
 - Between unit and block or concrete walls and other grounded surfaces: control box side, 42 in. [1067] per NEC or equivalent local electrical code.
- With the exception of the clearance for the condenser coil as stated in note 4b, a removable fence or barricade requires no clearance.
- Units may be installed on combustible floors made from wood or Class A, B, or C roof covering material.
- Certified dimension drawings available on request.

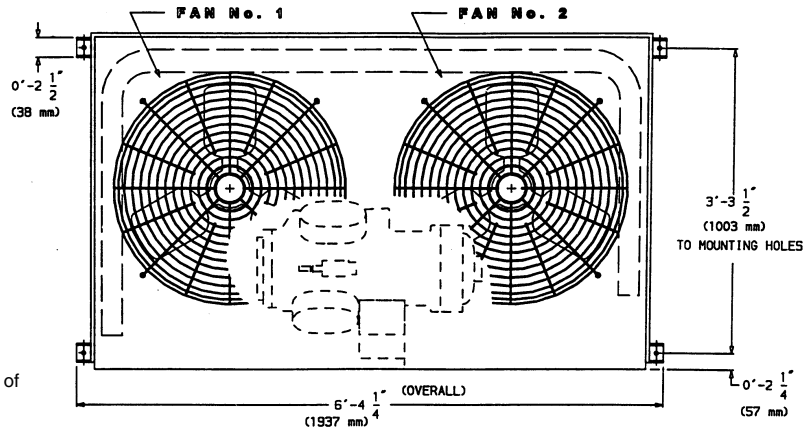
Dimensions (cont)



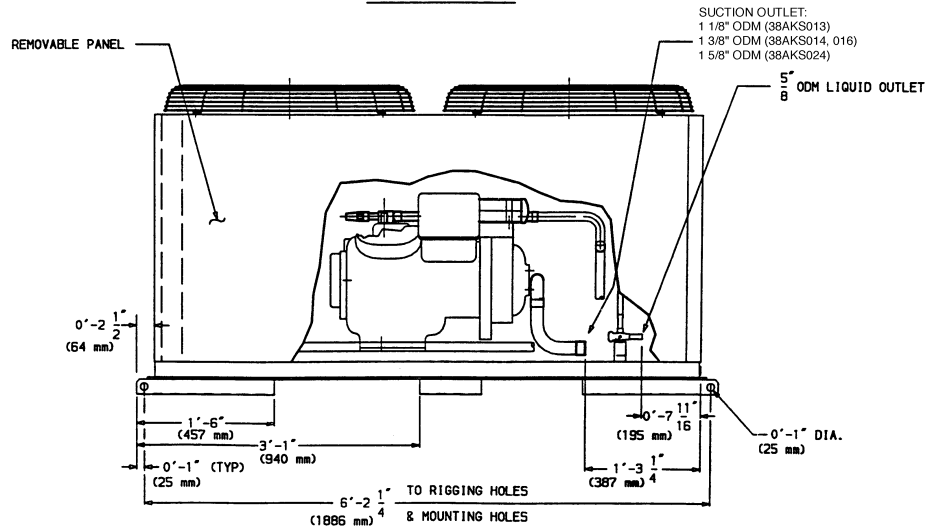
38AKS013-024

NOTES:

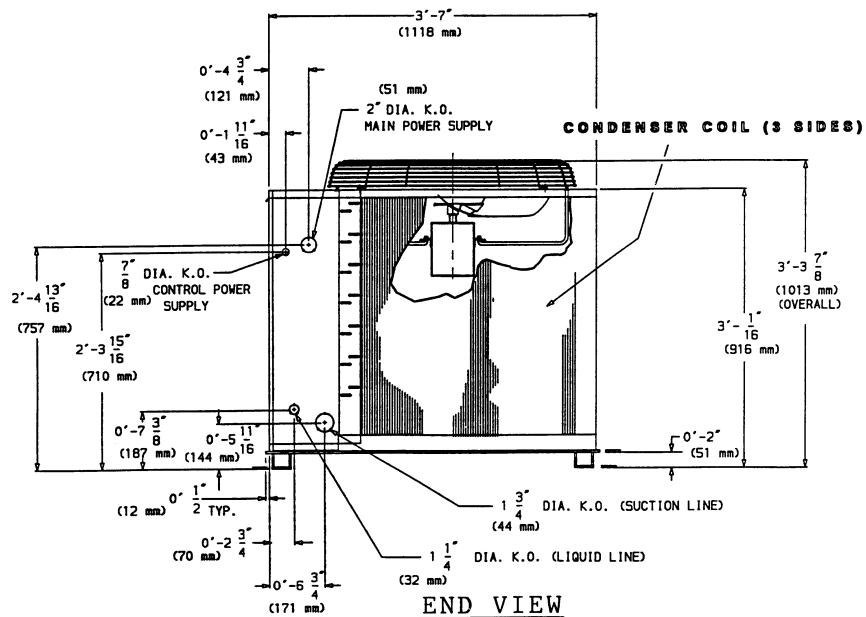
- Service clearances are as follows:
 Side (compressor) — 3½ ft (1067 mm)
 Side (opposite compressor) — 3 ft (914 mm)
 Ends — 2 ft (610 mm)
 Top — 5 ft (1524 mm)
- See page 21 for corner weights and unit center of gravity.



TOP VIEW

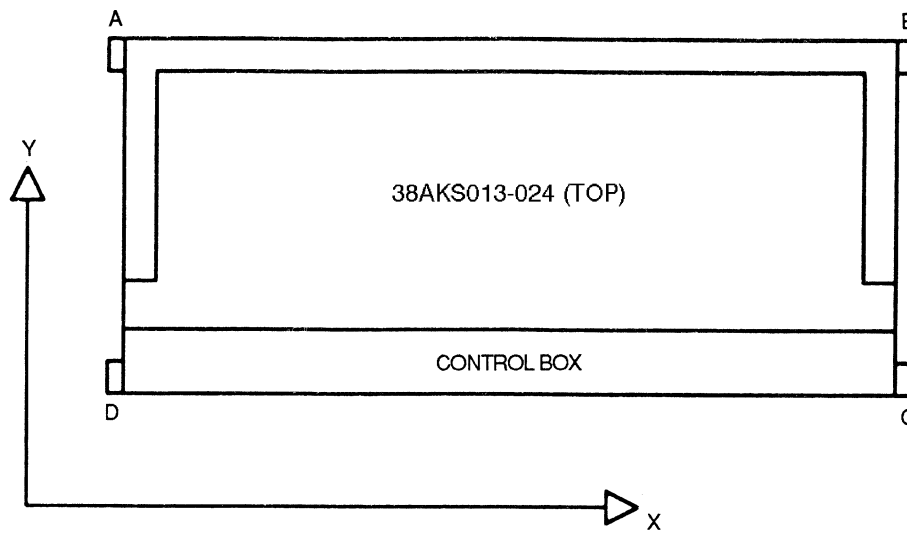


SIDE VIEW



END VIEW

38AKS013-024 (cont)



UNIT 38AKS	CENTER OF GRAVITY (in.)			
	X		Y	
	in.	mm	in.	mm
013	38	965	17	432
013C	38	965	19	483
014	38	965	16	406
014C	38	965	18	457
016	38	965	16	406
016C	38	965	18	457
024	37	940	17	432
024C	37	940	19	483

UNIT 38AKS	TOTAL WEIGHT		OPERATIONAL CORNER WEIGHTS							
			A		B		C		D	
	lb	kg	lb	kg	lb	kg	lb	kg	lb	kg
013	732	332	142	64	138	63	225	102	227	103
013C	825	374	178	81	172	78	236	107	239	108
014	779	353	143	65	140	64	247	112	249	113
014C	919	417	197	89	191	87	264	120	267	121
016	789	358	143	65	143	65	250	113	253	115
016C	929	421	197	89	194	88	267	121	271	123
024	900	409	178	81	168	76	269	122	285	129
024C	1040	472	232	105	219	99	286	130	303	137

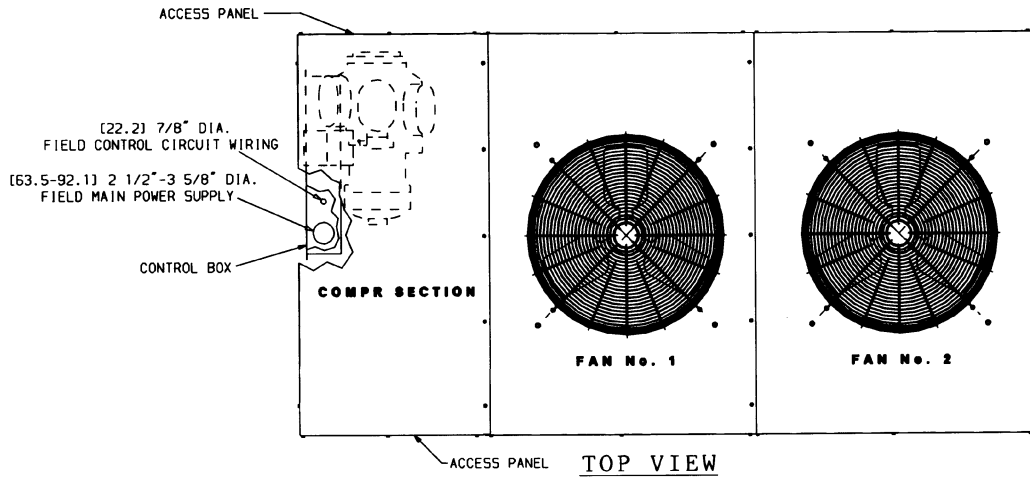
LEGEND

C — Copper Fin Coils

Dimensions (cont)



38AKS028, 034



NOTES:

1. There must be 4 ft [1220 mm] for service and for unrestricted airflow on all sides of unit.
2. There must be minimum 8 ft [2440 mm] clear air space above unit.
3. The approximate operating weight of the unit is:

UNIT	WEIGHT (lb)	WEIGHT (kg)
38AKS		
028	1650	748
028C	1804	818
034	1803	818
034C	2009	911

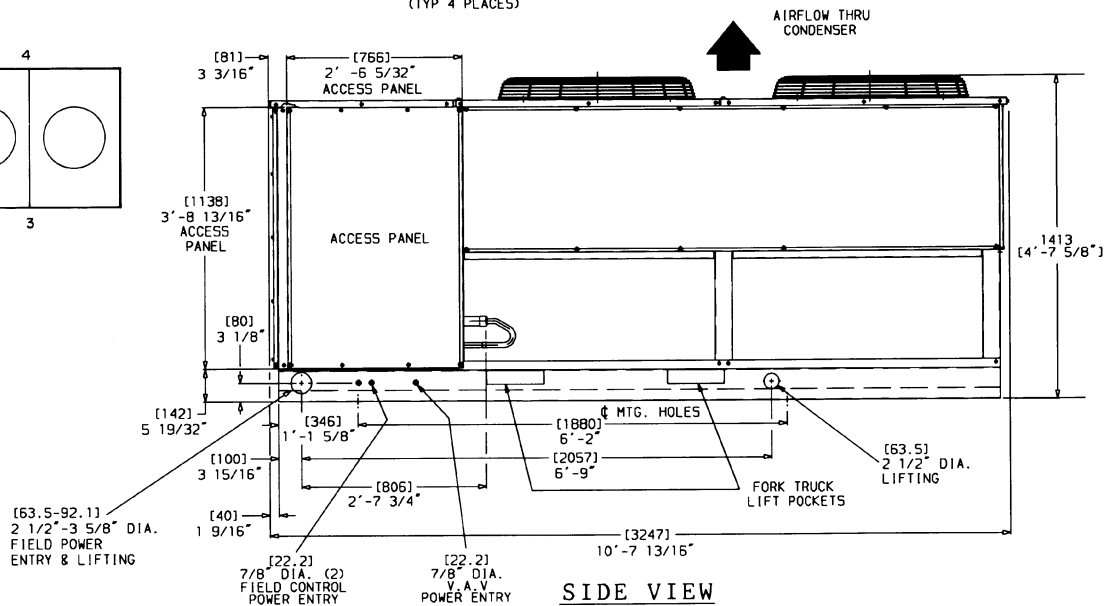
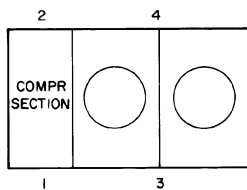
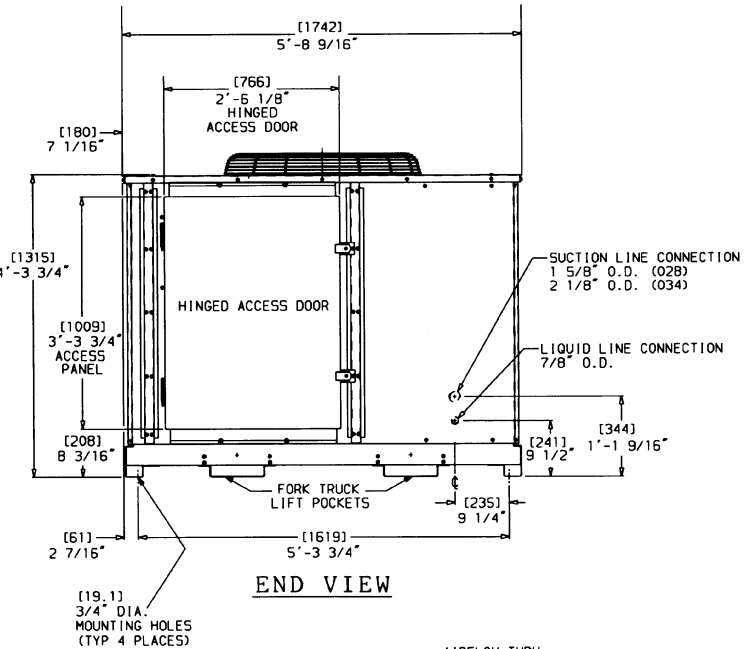
NOTE: A "C" in model number indicates unit has optional factory-installed copper-fin coil.

4. Dimensions in [] are millimeters.

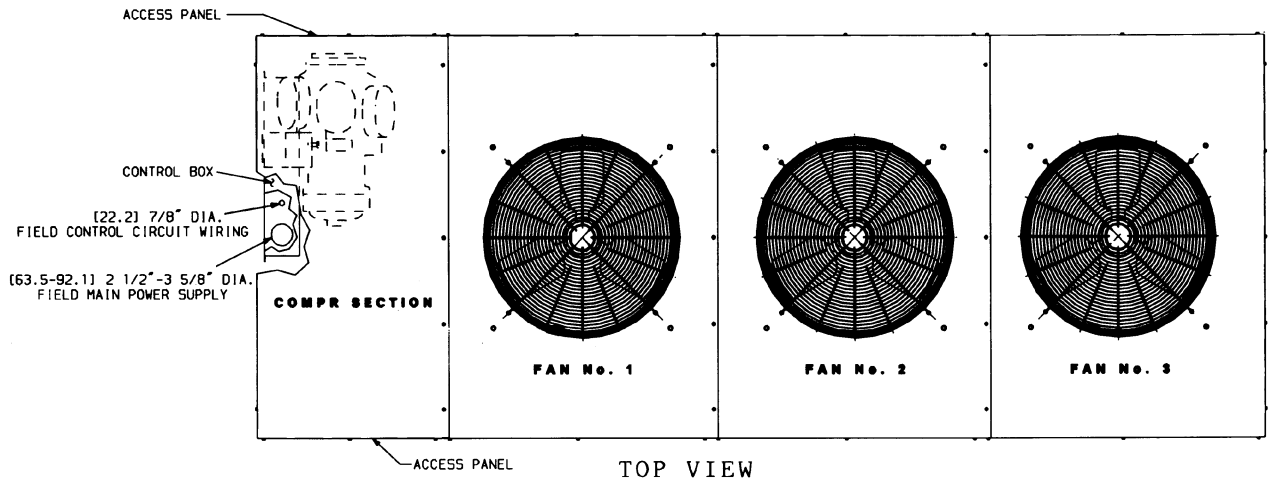
APPROXIMATE OPERATING WEIGHT* AT SUPPORT POINTS — LB (KG)*

UNIT	1	2	3	4	TOTAL
38AKS					
028	418 (189.6)	626 (284.0)	242 (109.8)	364 (165.1)	1650 (748.4)
034	459 (208.2)	673 (305.3)	272 (123.4)	399 (181.0)	1803 (817.8)

*Standard copper tube aluminum-fin coil.



38AKS044



NOTES:

1. There must be 4 ft [1220 mm] for service and for unrestricted airflow on all sides of unit.
2. There must be minimum 8 ft [2440 mm] clear air space above unit.
3. The approximate operating weight of the unit is:

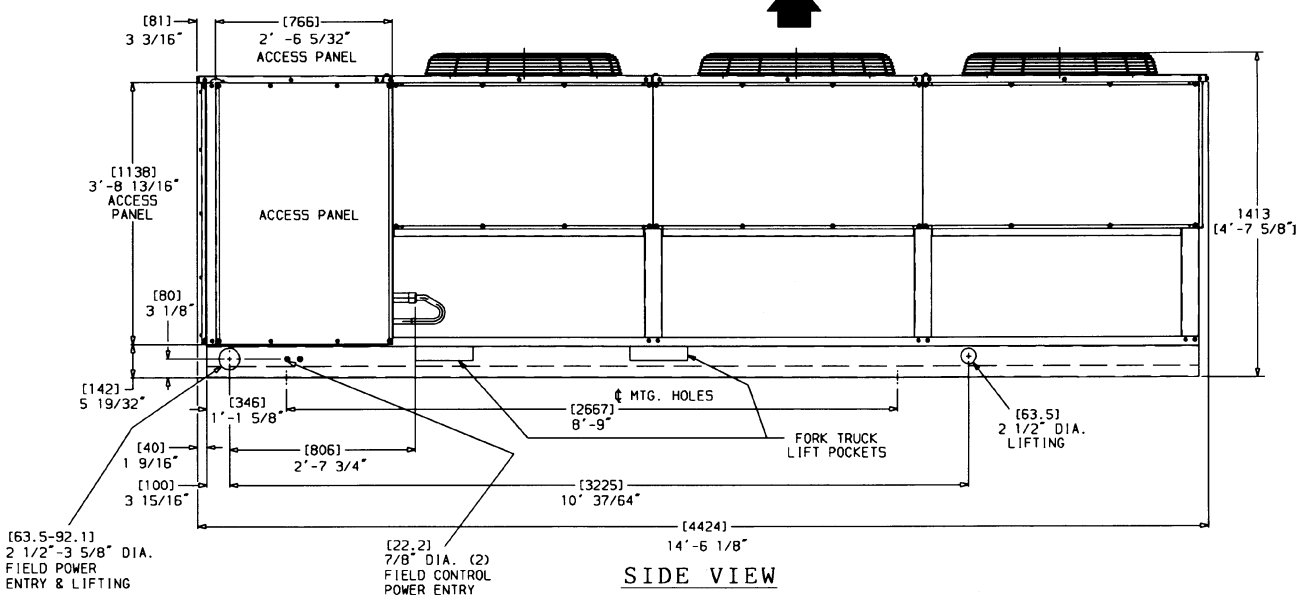
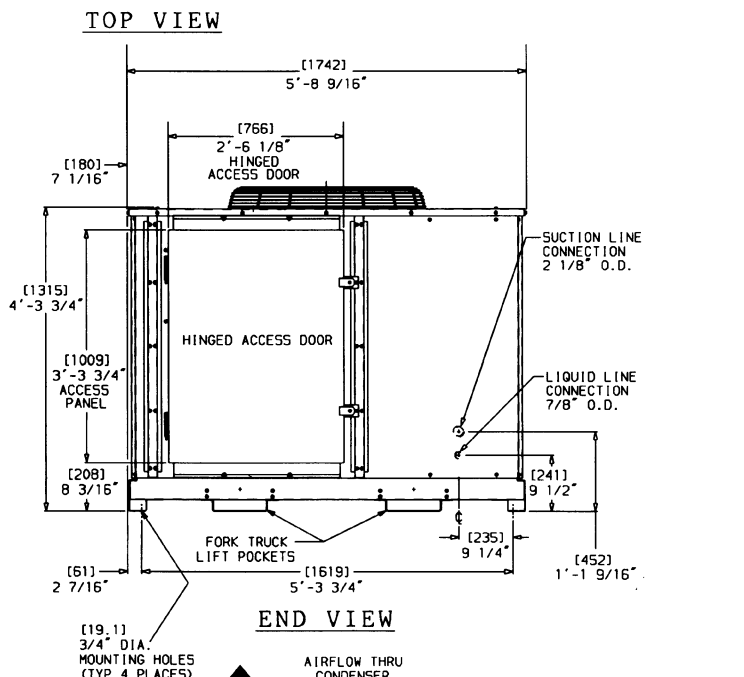
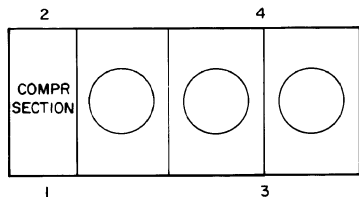
UNIT	WEIGHT (lb)	WEIGHT (kg)
38AKS		
044	2437	1106
044C	2745	1246

NOTE: A "C" in model number indicates unit has optional factory-installed copper-fin coil.

APPROX. OPER. WT* AT LIFTING HOLES — LB (KG)*

UNIT	1	2	3	4	TOTAL
38AKS					
044	864 (391.9)	1077 (488.5)	221 (100.2)	275 (124.7)	2437 (1106)

*Standard copper tube aluminum-fin coil.

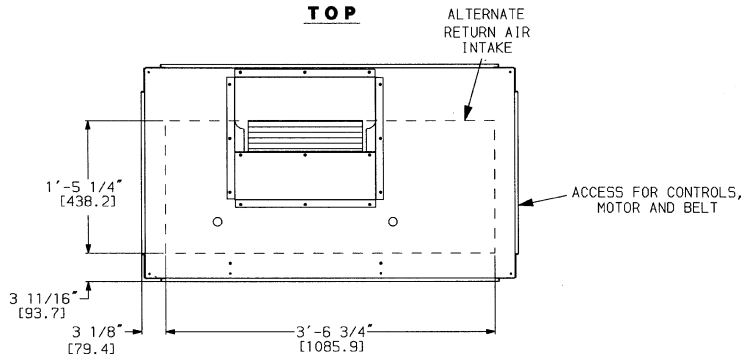


Dimensions (cont)



40RM007-012

TOP

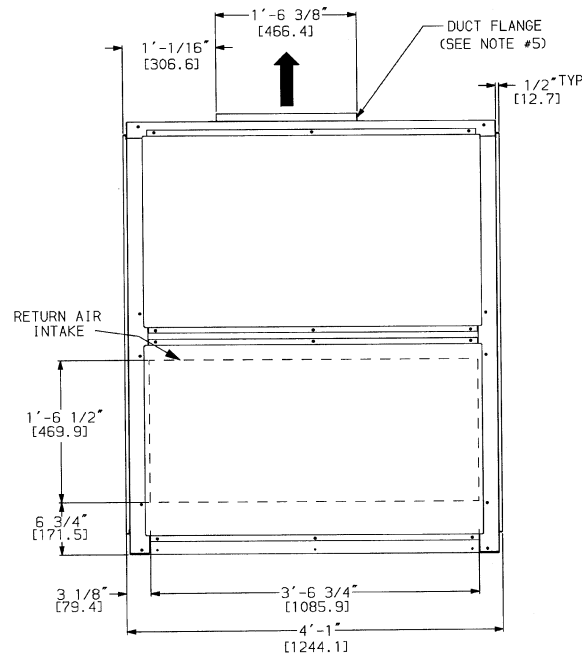
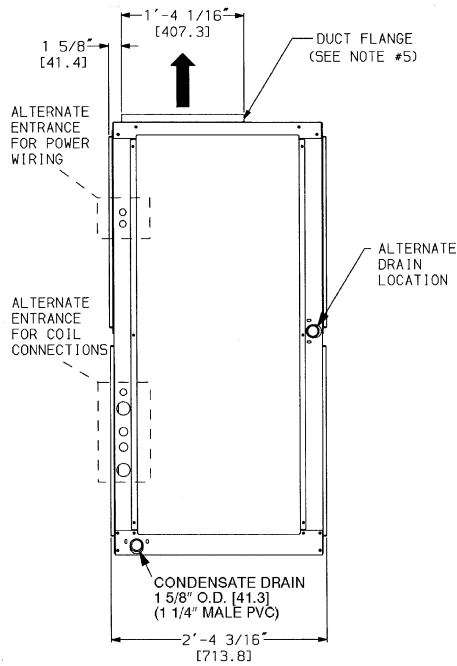


LEGEND

TXV — Thermostatic Expansion Valve

NOTES:

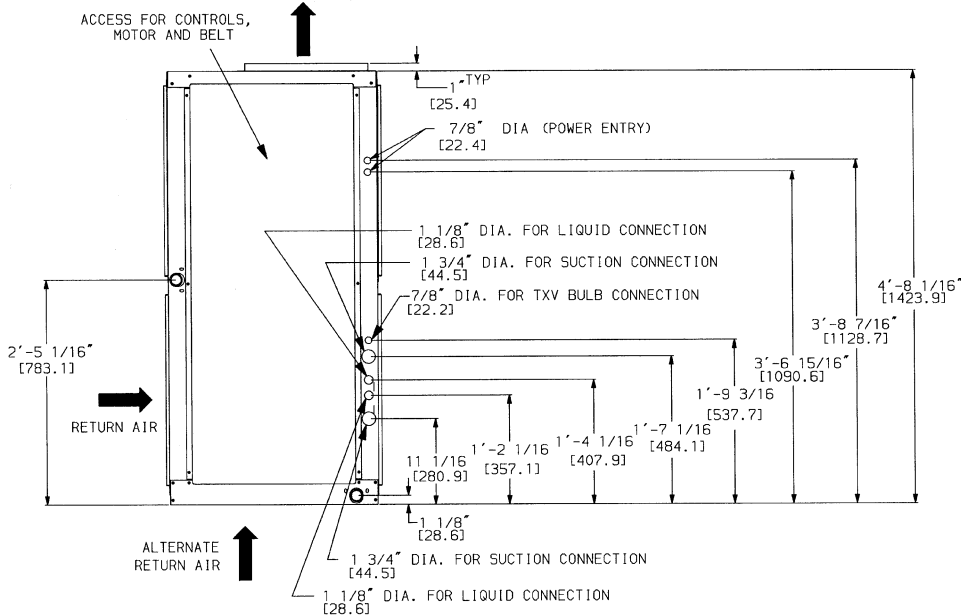
- Dimensions in [] are in millimeters.
- Direction of airflow.
- Recommended clearance:
 - Rear: 76 mm (3 in.), 762 mm (2'-6") with electric heat accessory
 - Front: 762 mm (2'-6")
 - Right Side: 762 mm (2'-6")
 - Left Side: 762 mm (2'-6")
 - Local codes or jurisdiction may prevail.
- Liquid piping not supplied by Carrier.
- Duct flange is factory supplied and field installed.



LEFT SIDE

FRONT

ACCESS FOR CONTROLS,
MOTOR AND BELT

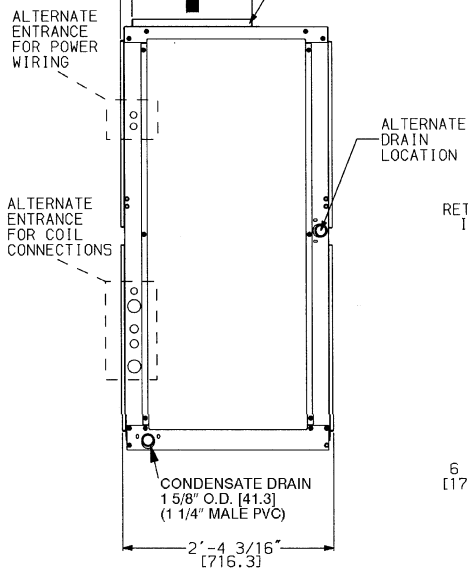
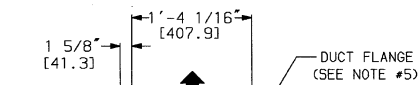
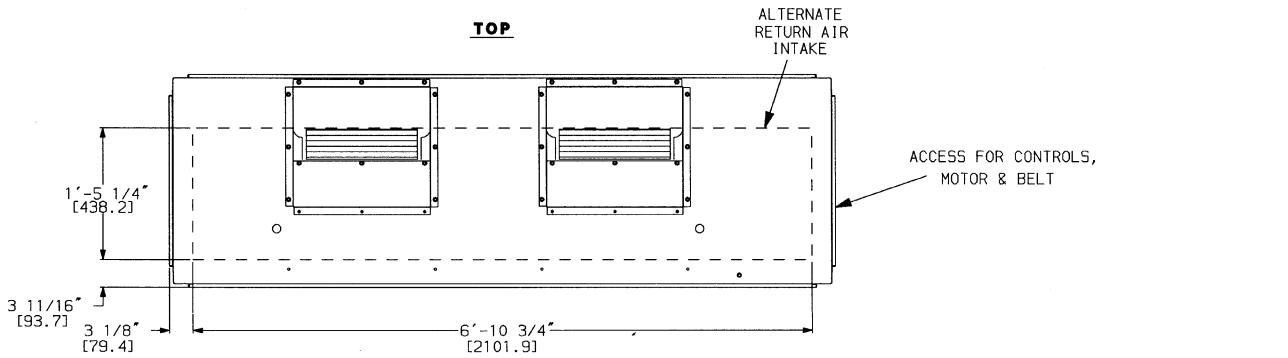


RIGHT SIDE

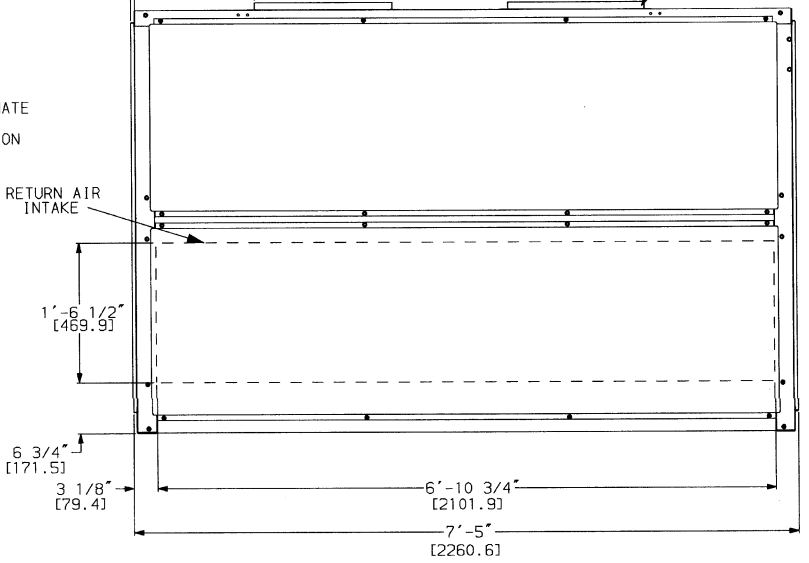
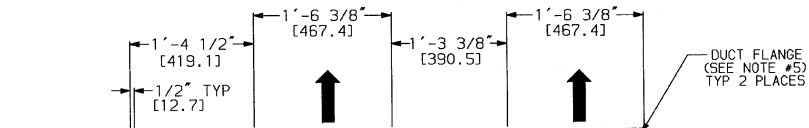
UNIT 40RM	UNIT WEIGHT — LB (KG)
007 Standard 3-Row Coil	381 (173)
008 Standard 3-Row Coil	385 (175)
012 Standard 3-Row Coil	405 (184)
007 High-Capacity 4-Row Coil	399 (181)
008 High-Capacity 4-Row Coil	404 (184)
012 High-Capacity 4-Row Coil	425 (193)

4ORM014-024

TOP



LEFT SIDE



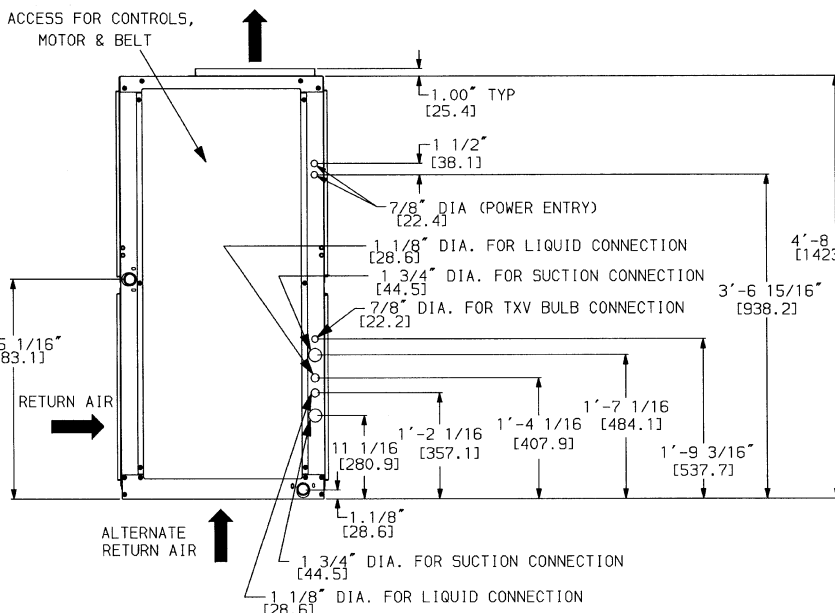
FRONT

LEGEND

TXV — Thermostatic Expansion Valve

NOTES:

- Dimensions in [] are in millimeters.
- Direction of airflow.
- Recommended clearance:
 - Rear: 76 mm (3 in.), 762 mm (2'-6") with electric heat accessory
 - Front: 762 mm (2'-6")
 - Right Side: 762 mm (2'-6")
 - Left Side: 762 mm (2'-6")
- Local codes or jurisdiction may prevail.
- Liquid piping not supplied by Carrier.
- Duct flange is factory supplied and field installed.



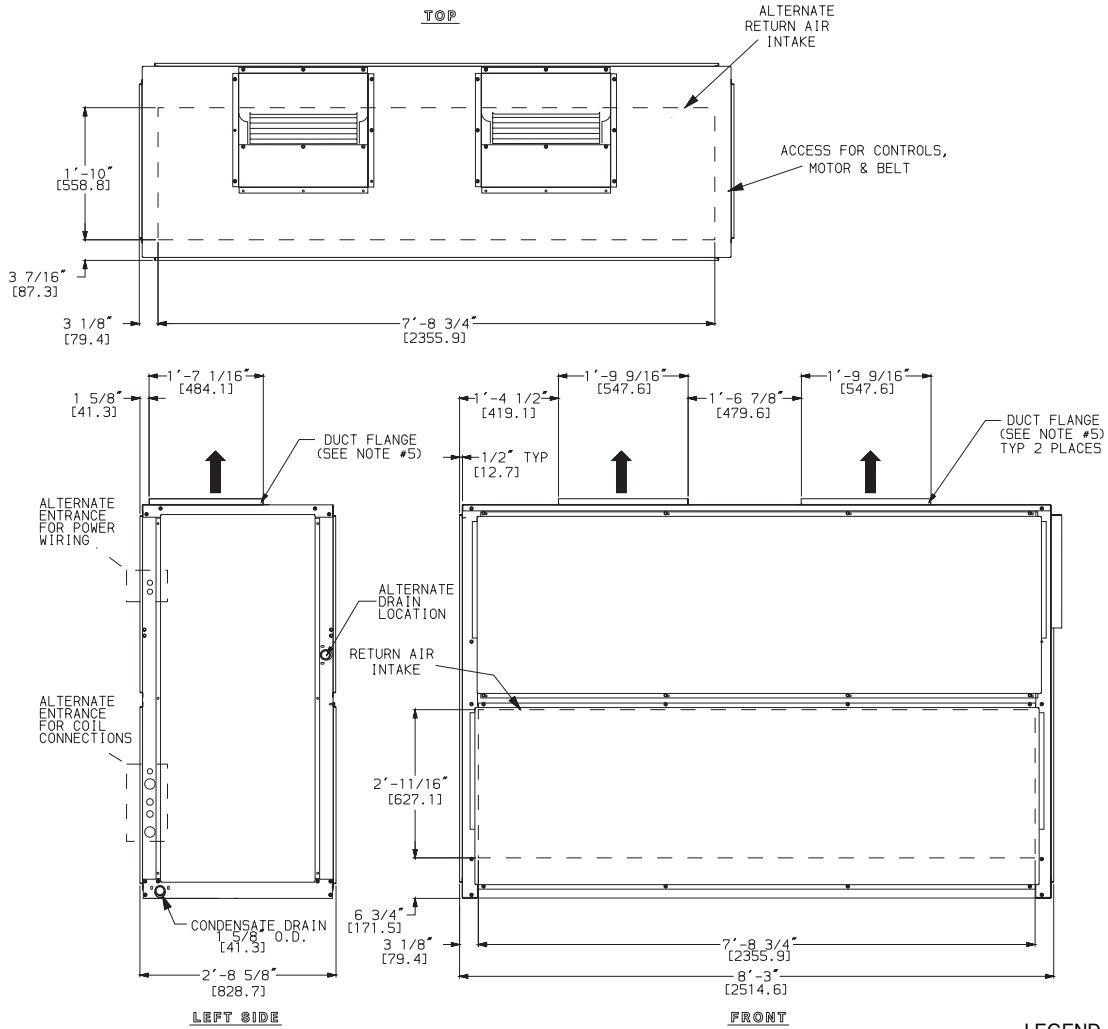
RIGHT SIDE

UNIT 4ORM	UNIT WEIGHT — LB (KG)
014 Standard 3-Row Coil	670 (304)
016 Standard 3-Row Coil	685 (311)
024 Standard 3-Row Coil	690 (313)
014 High-Capacity 4-Row Coil	695 (315)
016 High-Capacity 4-Row Coil	713 (323)
024 High-Capacity 4-Row Coil	730 (331)

Dimensions (cont)



40RM028, 034

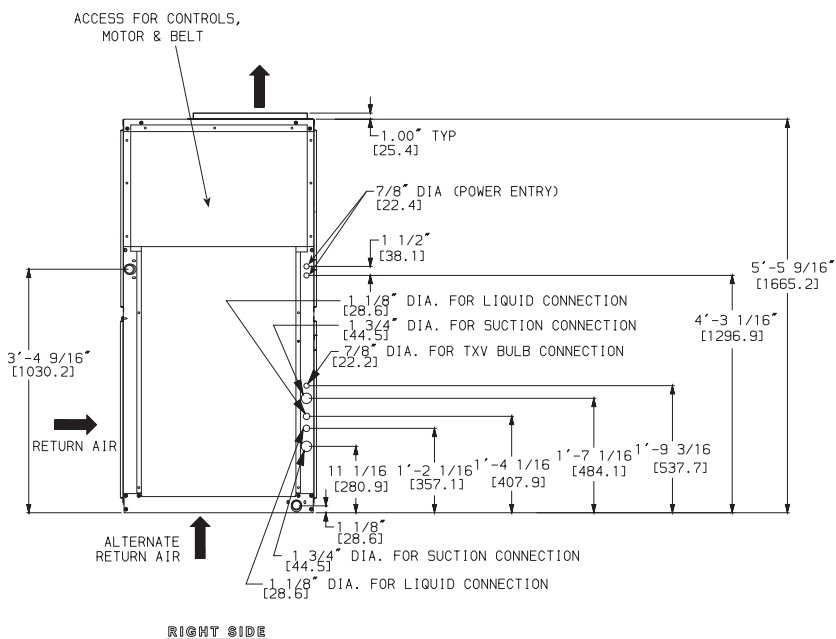


LEGEND

TXV — Thermostatic Expansion Valve

NOTES:

- Dimensions in [] are in millimeters.
- Direction of airflow.
- Recommended clearance:
 - Rear: 76 mm (3 in.), 762 mm (2'-6") with electric heat accessory
 - Front: 762 mm (2'-6")
 - Right Side: 762 mm (2'-6")
 - Left Side: 762 mm (2'-6")
- Local codes or jurisdiction may prevail.
- Liquid piping not supplied by Carrier.
- Duct flange is factory supplied and field installed.



UNIT 40RM	UNIT WEIGHT — LB (KG)
028 Standard 3-Row Coil	1020 (463)
034 Standard 3-Row Coil	1030 (467)
028 High-Capacity 4-Row Coil	1050 (470)
034 High-Capacity 4-Row Coil	1062 (482)

Selection procedure — SI



NOTE: Pages 35-43 and 52-57 contain combination ratings for the 38AK and 38AKS units matched with 40RM Series air handlers.

I Determine cooling load, evaporator-air temperature, and quantity.

Given:

Total Cooling Capacity	
Required (TC)	62 kW
Sensible Heat Capacity	
Required (SHC)	48 kW
Temperature Air Entering Condenser (Edb) . . .	36 C
Temperature Air Entering	
Evaporator (db/wb)	26.7 C db, 20 C wb
Evaporator Air Quantity	3800 L/s
External Static Pressure	100 Pa
Length of Interconnecting	
Refrigerant Piping	8 m (Linear)

II Select condensing unit air-handler combination.

For this example, select a 38AKS024 matched with a 40RM024. (See Combination Ratings table, page 41.) This 38AKS024/40RM024 condensing unit-air handler combination provides 62.7 kW of total cooling capacity and 49.3 kW of sensible capacity at the given conditions. If other temperatures or airflow values are required, interpolate the values from the combination ratings.

III Determine sizes of liquid and suction lines.

Enter Refrigerant Piping Sizes table (page 90). The sizes shown are based on an equivalent length of pipe.

This equivalent length is equal to the linear length of pipe indicated at the top of each sizing column, plus a 50% allowance for fitting losses. (For a more accurate determination of actual equivalent length in place of using the estimated 50% value, refer to Carrier System Design Manual.) For this example, note in the linear length column that the proper pipe size is $\frac{5}{8}$ in. for the liquid line and $1\frac{5}{8}$ in. for the suction line.

IV Determine fan rpm and bhp (brake horsepower).

At the Air Handler Fan Performance table (page 64), enter the 40RM024 section at 3800 L/s and move to the 100 Pa External Static Pressure (ESP) column. Note that the conditions require 12.84 r/s at 2.52 kW.

V Determine motor and drive.

For the 40RM024 units, find the type of drive that satisfies the 12.84 r/s requirement in the 40RM Drive Data tables on pages 95 and 96. The Standard Drive — SI table shows an r/s range of 11.9 to 14.6 for the 40RM024 unit, which satisfies the r/s requirement for the example described.

Next, enter the 40RM Fan Motor Data tables on page 94, and find that for the 40RM024 unit, an standard motor has a motor kW of 3.73 which satisfies the bhp requirement for the example described. Select the standard motor and standard drive combination (option code GC or ED).

Selection procedure — English

NOTE: Pages 44-51 and 58-63 contain combination ratings for the 38AK and 38AKS units matched with 40RM Series air handlers.

I Determine cooling load, evaporator-air temperature, and quantity.

Given:

Total Cooling Capacity	
Required (TC)	210,000 Btuh
Sensible Heat Capacity	
Required (SHC)	175,000 Btuh
Temperature Air Entering Condenser (Edb) . . .	95 F
Temperature Air Entering	
Evaporator (db/wb)	80 F db, 67 F wb
Evaporator Air Quantity	8000 cfm
External Static Pressure	0.8 in. wg
Length of Interconnecting	
Refrigerant Piping	40 ft (Linear)

II Select condensing unit air-handler combination.

For this example, select a 38AKS024 matched with a 40RM024. (See Combination Ratings table, page 49.) This 38AKS024/40RM024 condensing unit-air handler combination provides 214,600 Btuh of total cooling capacity and 179,000 Btuh of sensible capacity at the given conditions. If other temperatures or airflow values are required, interpolate the values from the combination ratings.

III Determine sizes of liquid and suction lines.

Enter Refrigerant Piping Sizes table (page 90). The sizes shown are based on an equivalent length of pipe.

This equivalent length is equal to the linear length of pipe indicated at the top of each sizing column, plus a 50% allowance for fitting losses. (For a more accurate determination of actual equivalent length in place of using the estimated 50% value, refer to Carrier System Design Manual.) For this example, note in the linear length column that the proper pipe size is $\frac{5}{8}$ in. for the liquid line and $1\frac{5}{8}$ in. for the suction line.

IV Determine fan rpm and bhp (brake horsepower).

At the Air Handler Fan Performance table (page 66), enter the 40RM024 section at 8000 cfm and move to the 0.80 in. wg External Static Pressure (ESP) column. Note that the conditions require 876 rpm at 4.21 bhp.

V Determine motor and drive.

For the 40RM024 units, find the type of drive that satisfies the 876 rpm requirement in the 40RM Drive Data tables on pages 97 and 98. The Medium-Static Drive — English table shows an rpm range of 814 to 1018 for the 40RM024 unit, which satisfies the rpm requirement for the example described.

Next, enter the 40RM Fan Motor Data tables on page 95, and find that for the 40RM024 unit, an alternate motor has a motor hp of 7.5 which satisfies the bhp requirement for the example described. Select the alternate motor and medium-static drive combination (option code TC or RD).



CONDENSING UNIT RATINGS — SI (cont)

38AKS044								
SST (C)		Air Temperature Entering Condenser (C)						
		28	32	36	40	44	48	52
-6	TC	82.8	78.8	74.8	70.9	67.1	63.3	59.5
	kW	27.3	28.1	29.0	29.7	30.4	31.0	31.5
	CDT	41.4	45.3	49.3	53.3	57.3	61.3	65.3
-4	TC	90.9	86.5	82.3	78.0	73.9	69.8	65.7
	kW	28.3	29.3	30.3	31.1	31.9	32.6	33.2
	CDT	41.3	45.3	49.3	53.3	57.3	61.3	65.3
-2	TC	97.3	92.7	88.2	83.7	79.4	75.0	70.7
	kW	29.0	30.1	31.2	32.2	33.0	33.8	34.5
	CDT	41.4	45.3	49.3	53.3	57.3	61.3	65.3
0	TC	106.0	101.0	96.5	91.7	87.1	82.4	77.8
	kW	30.0	31.2	32.4	33.5	34.5	35.4	36.2
	CDT	41.8	45.6	49.4	53.4	57.3	61.3	65.3
2	TC	115.0	110.0	105.0	99.9	95.1	90.2	85.3
	kW	31.2	32.5	33.7	34.9	36.0	37.0	37.9
	CDT	42.5	46.2	50.0	53.7	57.5	61.4	65.4
4	TC	121.0	116.0	111.0	106.0	101.0	96.1	91.1
	kW	32.1	33.5	34.8	36.0	37.2	38.2	39.2
	CDT	43.2	46.9	50.5	54.2	58.0	61.7	65.5
6	TC	130.0	125.0	120.0	114.0	109.0	104.0	98.8
	kW	33.3	34.8	36.2	37.6	38.8	40.0	41.1
	CDT	44.2	47.8	51.5	55.1	58.7	62.4	66.1
8	TC	138.0	132.0	127.0	121.0	116.0	110.0	105.0
	kW	34.2	35.8	37.3	38.8	40.1	41.3	42.5
	CDT	45.0	48.6	52.2	55.8	59.4	63.0	66.7
10	TC	148.0	142.0	136.0	130.0	124.0	118.0	113.0
	kW	35.5	37.2	38.8	40.4	41.8	43.2	44.4
	CDT	46.1	49.7	53.2	56.8	60.4	64.0	67.6

LEGEND

- Out of Range
- CDT — Saturated Discharge Temperature at Compressor (C)
- kW — Compressor Power
- SST — Saturated Suction Temperature (C)
- TC — Gross Cooling Capacity (kW)

CONDENSING UNIT RATINGS — ENGLISH

38AK007									
SST (F)		Air Temperature Entering Condenser (F)							
		80	85	95	100	105	115	120	125
25	TC	46.8	44.9	40.9	38.9	36.9	32.9	31.0	29.0
	kW	4.30	4.39	4.54	4.62	4.70	4.85	4.93	5.01
	CDT	101	106	115	120	125	135	140	144
30	TC	52.3	50.4	46.4	44.4	42.4	38.4	36.4	34.4
	kW	4.50	4.60	4.78	4.87	4.96	5.14	5.23	5.32
	CDT	103	107	116	121	126	135	139	144
35	TC	58.1	56.2	52.1	50.0	48.0	43.8	41.8	39.7
	kW	4.69	4.81	5.02	5.12	5.23	5.44	5.54	5.65
	CDT	105	109	118	123	127	136	141	145
40	TC	64.1	62.1	57.9	55.8	53.7	49.5	47.4	45.2
	kW	4.90	5.03	5.26	5.38	5.50	5.74	5.86	5.98
	CDT	107	111	120	125	129	138	142	147
45	TC	70.4	68.4	64.0	61.8	59.6	55.3	53.1	50.9
	kW	5.10	5.25	5.51	5.65	5.78	6.05	6.18	6.31
	CDT	109	113	122	127	131	140	144	149
50	TC	77.0	74.9	70.4	68.1	65.8	61.3	59.0	56.7
	kW	5.32	5.47	5.77	5.91	6.06	6.36	6.50	6.65
	CDT	111	116	124	129	133	142	146	151

38AK008									
SST (F)		Air Temperature Entering Condenser (F)							
		80	85	95	100	105	115	120	125
25	TC	62.0	60.3	56.6	54.7	52.8	48.7	46.6	44.6
	kW	5.31	5.50	5.91	6.13	6.35	6.79	7.01	7.23
	CDT	102	107	116	121	126	136	141	146
30	TC	68.1	66.2	62.3	60.3	58.2	54.0	51.9	49.7
	kW	5.42	5.61	6.01	6.22	6.44	6.89	7.11	7.34
	CDT	103	108	117	122	127	137	142	146
35	TC	74.5	72.5	68.3	66.2	63.9	59.4	57.2	54.9
	kW	5.54	5.73	6.13	6.34	6.55	7.00	7.22	7.44
	CDT	104	109	119	123	128	138	143	147
40	TC	81.1	79.1	74.7	72.4	70.1	65.2	62.8	60.3
	kW	5.67	5.87	6.27	6.48	6.69	7.13	7.35	7.57
	CDT	106	111	120	125	130	139	144	148
45	TC	88.1	86.1	81.5	79.1	76.5	71.3	68.7	66.1
	kW	5.82	6.02	6.43	6.64	6.85	7.28	7.50	7.72
	CDT	108	112	122	127	131	141	145	150
50	TC	95.4	93.3	88.6	86.0	83.4	77.8	75.1	72.3
	kW	5.97	6.18	6.60	6.81	7.02	7.46	7.58	7.89
	CDT	110	114	124	128	133	142	147	151

LEGEND

- Out of Range
- CDT — Saturated Discharge Temperature at Compressor (F)
- kW — Compressor Power
- SST — Saturated Suction Temperature (F)
- TC — Gross Cooling Capacity (1000 Btuh)

Performance data (cont)



CONDENSING UNIT RATINGS — ENGLISH (cont)

38AK012		Air Temperature Entering Condenser (F)							
SST (F)		80	85	95	100	105	115	120	125
		25	TC kW CDT	82.7 7.83 101	80.7 8.12 106	76.5 8.75 116	74.4 9.09 121	72.2 9.45 125	67.6 10.2 135
30	TC kW CDT	90.3 8.04 103	88.1 8.32 107	83.6 8.92 117	81.3 9.24 121	78.9 9.58 126	74.1 10.3 136	71.7 10.7 141	69.2 11.0 145
35	TC kW CDT	98.2 8.28 104	95.9 8.56 109	91.1 9.14 118	88.6 9.45 123	86.0 9.78 127	80.8 10.5 137	78.2 10.8 142	75.5 11.1 146
40	TC kW CDT	107 8.55 106	104 8.83 111	99.1 9.40 120	96.3 9.70 124	93.6 10.0 129	87.9 10.7 138	85.1 11.0 143	82.2 11.3 147
45	TC kW CDT	115 8.84 108	113 9.12 113	108 9.70 122	105 10.0 126	102 10.3 131	95.6 10.9 140	92.6 11.3 144	89.5 11.6 149
50	TC kW CDT	124 9.15 111	122 9.43 115	116 10.0 124	113 10.3 128	110 10.6 133	104 11.2 142	100 11.6 146	97.2 11.9 150

38AKS009		Air Temperature Entering Condenser (F)							
SST (F)		80	85	95	100	105	115	120	125
		25	TC kW CDT	72.3 6.22 105	69.5 6.41 109	63.7 6.76 118	61.0 6.92 123	58.2 7.07 127	52.4 7.30 136
30	TC kW CDT	82.2 6.54 108	79.1 6.76 112	73.0 7.16 121	70.0 7.35 125	66.9 7.52 130	60.8 7.80 139	57.7 7.94 143	54.6 8.09 147
35	TC kW CDT	92.1 6.87 110	88.8 7.11 115	82.2 7.56 123	79.0 7.77 128	75.7 7.96 132	69.1 8.30 141	65.8 8.48 145	62.6 8.65 150
40	TC kW CDT	102 7.19 113	98.5 7.46 117	91.5 7.96 126	88.0 8.19 130	84.5 8.41 135	77.5 8.81 143	74.0 9.01 148	70.5 9.20 152
45	TC kW CDT	112 7.51 116	108 7.81 120	101 8.36 129	97.0 8.62 133	93.2 8.86 137	85.8 9.31 146	82.1 9.54 150	78.4 9.76 154
50	TC kW CDT	122 7.85 119	118 8.16 123	110 8.76 132	106 9.05 136	102 9.32 140	94.6 9.82 149	90.7 10.1 153	— — —

38AKS008		Air Temperature Entering Condenser (F)							
SST (F)		80	85	95	100	105	115	120	125
		25	TC kW CDT	57.8 4.72 101	55.6 4.88 105	51.2 5.18 114	49.1 5.32 119	46.9 5.44 124	42.5 5.64 133
30	TC kW CDT	65.9 4.89 103	63.5 5.08 107	58.9 5.43 117	56.5 5.58 121	54.2 5.73 126	49.4 5.98 135	47.1 6.10 140	44.7 6.23 144
35	TC kW CDT	74.0 5.06 105	71.5 5.27 109	66.5 5.67 119	63.9 5.85 123	61.4 6.02 128	56.4 6.32 137	53.8 6.47 142	51.3 6.62 146
40	TC kW CDT	82.1 5.23 107	79.4 5.47 112	74.1 5.91 121	71.4 6.11 125	68.7 6.31 130	63.3 6.65 139	60.6 6.83 144	57.9 7.00 148
45	TC kW CDT	90.2 5.40 109	87.4 5.66 114	81.7 6.15 123	78.8 6.38 127	76.0 6.59 132	70.3 6.99 141	67.4 7.19 145	64.5 7.39 150
50	TC kW CDT	98.7 5.57 112	95.8 5.85 116	89.7 6.39 125	86.7 6.64 129	83.6 6.88 134	77.5 7.33 143	74.5 7.55 147	71.4 7.77 152

38AKS012		Air Temperature Entering Condenser (F)							
SST (F)		80	85	95	100	105	115	125	
		25	TC kW CDT	71.0 6.20 104	68.2 6.40 109	62.8 6.76 118	60.0 6.91 122	57.1 7.06 127	51.5 7.30 136
30	TC kW CDT	80.8 6.51 107	77.8 6.74 111	71.9 7.15 120	68.8 7.33 125	65.8 7.50 129	59.8 7.79 138	53.8 8.02 147	
35	TC kW CDT	90.6 6.83 110	87.4 7.08 114	81.0 7.54 123	77.7 7.75 127	74.5 7.94 132	68.0 8.29 141	61.7 8.58 149	
40	TC kW CDT	100 7.15 113	97.0 7.42 117	90.1 7.93 126	86.6 8.16 130	83.1 8.38 134	76.3 8.79 143	69.5 9.13 152	
45	TC kW CDT	110 7.47 115	107 7.76 120	99.2 8.32 128	95.5 8.58 132	91.8 8.83 137	84.6 9.28 145	77.4 9.68 154	
50	TC kW CDT	121 7.79 118	117 8.11 122	109 8.72 131	105 9.00 135	101 9.28 139	93.2 9.79 148	85.5 10.2 156	

LEGEND

- Out of Range
- CDT — Saturated Discharge Temperature at Compressor (F)
- kW — Compressor Power
- SST — Saturated Suction Temperature (F)
- TC — Gross Cooling Capacity (1000 Btu/h)



CONDENSING UNIT RATINGS — ENGLISH (cont)

38AKS013							
SST (F)		Air Temperature Entering Condenser (F)					
		70	85	95	100	115	125
20	TC	73	66	61	59	52	47
	kW	5.8	6.4	6.7	6.9	7.3	7.5
	CDT	91	104	113	118	132	141
25	TC	82	74	68	66	58	53
	kW	6.0	6.7	7.1	7.3	7.7	8.0
	CDT	93	106	115	120	134	143
30	TC	90	82	76	73	65	60
	kW	6.3	7.0	7.5	7.7	8.2	8.5
	CDT	95	108	117	122	135	144
35	TC	100	90	84	81	72	67
	kW	6.5	7.4	7.9	8.1	8.7	9.1
	CDT	97	111	120	124	137	146
40	TC	110	100	93	90	80	74
	kW	6.8	7.7	8.3	8.5	9.2	9.6
	CDT	99	113	122	126	140	148
45	TC	120	109	102	99	89	82
	kW	7.0	8.0	8.6	8.9	9.7	10.2
	CDT	102	115	124	128	142	151
50	TC	131	120	112	108	97	90
	kW	7.3	8.4	9.0	9.3	10.2	10.7
	CDT	105	118	127	131	144	153

38AKS016							
SST (F)		Air Temperature Entering Condenser (F)					
		70	85	95	100	115	125
20	TC	112	101	94	90	80	73
	kW	9.7	10.6	11.0	11.3	11.8	12.1
	CDT	96	109	118	122	136	145
25	TC	125	112	104	101	89	82
	kW	10.3	11.2	11.8	12.0	12.7	13.0
	CDT	98	111	120	125	138	149
30	TC	138	124	116	112	99	91
	kW	10.8	11.9	12.5	12.8	13.5	13.9
	CDT	101	114	123	127	140	147
35	TC	152	137	128	123	110	—
	kW	11.4	12.5	13.2	13.5	14.4	—
	CDT	103	117	125	130	143	—
40	TC	166	151	141	136	121	—
	kW	12.0	13.2	14.0	14.4	15.3	—
	CDT	107	119	128	132	145	—
45	TC	181	165	154	149	133	—
	kW	12.6	14.0	14.8	15.2	16.2	—
	CDT	110	122	131	135	148	—
50	TC	198	180	168	163	—	—
	kW	13.2	14.7	15.6	16.0	—	—
	CDT	113	126	134	138	—	—

38AKS014							
SST (F)		Air Temperature Entering Condenser (F)					
		70	85	95	100	115	125
20	TC	89	80	74	71	63	58
	kW	6.8	7.6	8.1	8.3	8.9	9.3
	CDT	91	105	114	118	132	141
25	TC	98	89	83	80	71	65
	kW	7.2	8.0	8.5	8.8	9.5	9.9
	CDT	93	106	116	120	134	143
30	TC	109	99	92	89	79	73
	kW	7.5	8.4	9.0	9.2	10.0	10.5
	CDT	95	109	118	122	136	145
35	TC	120	109	102	98	88	81
	kW	7.8	8.8	9.4	9.7	10.6	11.1
	CDT	97	111	120	124	138	147
40	TC	132	120	112	108	97	90
	kW	8.1	9.2	9.9	10.2	11.1	11.7
	CDT	100	113	122	126	140	149
45	TC	145	132	123	119	107	99
	kW	8.5	9.6	10.4	10.7	11.7	12.4
	CDT	102	115	124	129	142	151
50	TC	158	144	135	130	117	109
	kW	8.8	10.1	10.8	11.2	12.3	13.0
	CDT	105	118	127	131	144	153

38AKS024							
SST (F)		Air Temperature Entering Condenser (F)					
		80	85	95	100	115	125
25	TC	152	146	134	128	122	109
	kW	13.1	13.5	14.2	14.5	14.8	15.2
	CDT	102	107	116	120	125	134
30	TC	174	168	155	148	141	128
	kW	13.9	14.3	15.1	15.5	15.8	16.3
	CDT	106	110	119	123	128	136
35	TC	196	189	175	168	161	147
	kW	14.7	15.2	16.1	16.5	16.9	17.5
	CDT	109	113	122	126	130	139
40	TC	218	211	196	188	181	166
	kW	15.4	16.0	17.0	17.5	17.9	18.6
	CDT	112	116	125	129	133	142
45	TC	240	232	216	209	201	184
	kW	16.2	16.8	17.9	18.4	18.9	19.8
	CDT	115	119	128	132	136	144
50	TC	262	254	237	229	220	203
	kW	17.0	17.6	18.9	19.4	20.0	20.9
	CDT	118	122	130	135	139	147

LEGEND

- — Out of Range
- CDT — Saturated Discharge Temperature at Compressor (F)
- kW — Compressor Power
- SST — Saturated Suction Temperature (F)
- TC — Gross Cooling Capacity (1000 Btuh)

Performance data (cont)



CONDENSING UNIT RATINGS (cont)

38AKS028								
SST (F)		Air Temperature Entering Condenser (F)						
		85	95	100	105	115	120	125
20	TC	181.0	167.0	161.0	154.0	141.0	134.0	128.0
	kW	17.4	18.3	18.6	19.0	19.6	19.8	20.0
	CDT	108.0	117.0	122.0	126.0	136.0	141.0	145.0
25	TC	202.0	187.0	180.0	173.0	159.0	152.0	145.0
	kW	18.5	19.4	19.8	20.2	20.9	21.2	21.5
	CDT	110.0	119.0	124.0	128.0	137.0	142.0	146.0
30	TC	225.0	209.0	201.0	193.0	178.0	171.0	163.0
	kW	19.5	20.6	21.0	21.5	22.3	22.7	23.0
	CDT	112.0	121.0	126.0	130.0	139.0	143.0	148.0
35	TC	249.0	231.0	223.0	215.0	198.0	190.0	182.0
	kW	20.6	21.7	22.3	22.8	23.7	24.2	24.6
	CDT	115.0	123.0	128.0	132.0	141.0	145.0	150.0
40	TC	274.0	256.0	246.0	237.0	220.0	211.0	202.0
	kW	21.6	23.0	23.6	24.1	25.2	25.7	26.2
	CDT	117.0	126.0	130.0	135.0	143.0	148.0	152.0
45	TC	301.0	281.0	271.0	261.0	242.0	233.0	224.0
	kW	22.8	24.2	24.9	25.5	26.7	27.3	27.8
	CDT	120.0	129.0	133.0	137.0	146.0	150.0	154.0
50	TC	329.0	307.0	297.0	287.0	266.0	256.0	246.0
	kW	23.9	25.5	26.2	26.9	28.3	28.9	29.5
	CDT	123.0	131.0	136.0	140.0	148.0	152.0	157.0

38AKS044								
SST (F)		Air Temperature Entering Condenser (F)						
		85	95	100	105	115	120	125
20	TC	271.0	252.0	243.0	234.0	216.0	208.0	199.0
	kW	27.3	28.5	29.0	29.5	30.3	30.7	31.0
	CDT	109.0	119.0	124.0	129.0	139.0	144.0	149.0
25	TC	305.0	284.0	274.0	264.0	245.0	235.0	225.0
	kW	28.6	30.0	30.7	31.3	32.3	32.8	33.2
	CDT	109.0	119.0	124.0	129.0	139.0	144.0	149.0
30	TC	341.0	319.0	308.0	297.0	275.0	265.0	254.0
	kW	29.9	31.5	32.3	33.0	34.2	34.8	35.3
	CDT	109.0	119.0	124.0	129.0	139.0	144.0	149.0
35	TC	377.0	355.0	343.0	332.0	309.0	297.0	286.0
	kW	31.3	33.1	33.9	34.7	36.1	36.8	37.4
	CDT	111.0	120.0	125.0	129.0	139.0	144.0	149.0
40	TC	415.0	391.0	379.0	367.0	343.0	331.0	319.0
	kW	32.9	34.8	35.7	36.6	38.2	38.9	39.6
	CDT	113.0	122.0	126.0	131.0	140.0	145.0	150.0
45	TC	455.0	429.0	416.0	403.0	377.0	365.0	352.0
	kW	34.5	36.6	37.6	38.6	40.3	41.1	41.9
	CDT	115.0	124.0	128.0	133.0	142.0	147.0	151.0
50	TC	497.0	468.0	455.0	441.0	413.0	400.0	386.0
	kW	36.1	38.4	39.5	40.6	42.5	43.5	44.3
	CDT	117.0	126.0	131.0	135.0	144.0	149.0	153.0

LEGEND

- Out of Range
- CDT — Saturated Discharge Temperature at Compressor (F)
- kW — Compressor Power
- SST — Saturated Suction Temperature (F)
- TC — Gross Cooling Capacity (1000 Btuh)

38AKS034								
SST (F)		Air Temperature Entering Condenser (F)						
		85	95	100	105	115	120	125
20	TC	203.0	187.0	178.0	170.0	153.0	145.0	136.0
	kW	20.0	20.8	21.1	21.4	21.8	21.8	21.8
	CDT	110.0	120.0	125.0	130.0	140.0	145.0	150.0
25	TC	230.0	212.0	204.0	195.0	176.0	167.0	158.0
	kW	21.0	22.0	22.4	22.8	23.4	23.6	23.7
	CDT	110.0	120.0	125.0	130.0	140.0	145.0	150.0
30	TC	256.0	239.0	230.0	221.0	202.0	192.0	182.0
	kW	22.0	23.2	23.7	24.1	24.9	25.3	25.5
	CDT	112.0	121.0	126.0	130.0	140.0	145.0	150.0
35	TC	283.0	265.0	256.0	247.0	228.0	218.0	208.0
	kW	23.1	24.4	25.0	25.5	26.5	26.9	27.2
	CDT	114.0	123.0	127.0	132.0	141.0	146.0	150.0
40	TC	311.0	292.0	282.0	273.0	253.0	243.0	233.0
	kW	24.3	25.7	26.4	27.0	28.1	28.6	29.0
	CDT	117.0	125.0	130.0	134.0	143.0	147.0	152.0
45	TC	340.0	320.0	310.0	300.0	279.0	269.0	259.0
	kW	25.4	27.0	27.8	28.5	29.7	30.3	30.8
	CDT	119.0	128.0	132.0	136.0	145.0	149.0	154.0
50	TC	371.0	350.0	339.0	328.0	307.0	296.0	285.0
	kW	26.6	28.4	29.2	30.0	31.4	32.1	32.7
	CDT	122.0	130.0	135.0	139.0	148.0	152.0	156.0



COMBINATION RATINGS — SI (cont)

Table with columns for Temp (C) Air Entering Condenser (Edb), Evaporator Air — L/s (1000/1400/1800), and Evaporator Air — Ewb (C) (22/20/16). Rows include TC SHC kW for temperatures 20, 28, 32, 36, 40, 44, 48, and 52.

Table with columns for Temp (C) Air Entering Condenser (Edb), Evaporator Air — L/s (1750/2350/2950), and Evaporator Air — Ewb (C) (22/20/16). Rows include TC SHC kW for temperatures 20, 28, 32, 36, 40, 44, 48, and 52.

Table with columns for Temp (C) Air Entering Condenser (Edb), Evaporator Air — L/s (1450/1900/2350), and Evaporator Air — Ewb (C) (22/20/16). Rows include TC SHC kW for temperatures 20, 28, 32, 36, 40, 44, 48, and 52.

Table with columns for Temp (C) Air Entering Condenser (Edb), Evaporator Air — L/s (1450/1900/2350), and Evaporator Air — Ewb (C) (22/20/16). Rows include TC SHC kW for temperatures 20, 28, 32, 36, 40, 44, 48, and 52.

See Legend and Notes on page 43.



COMBINATION RATINGS — SI (cont)

38AKS034/40RM034 WITH STANDARD 3-ROW COIL										
Temp (C) Air Entering Condenser (Edb)		Evaporator Air — L/s								
		4250			5650			7050		
		Evaporator Air — Ewb (C)								
		22	20	16	22	20	16	22	20	16
20	TC	107.5	100.9	92.9	111.2	104.4	97.3	113.4	107.4	100.9
	SHC kW	57.1	68.9	92.9	64.7	79.0	97.3	71.7	88.3	100.9
28	TC	101.9	95.0	87.8	105.1	98.4	92.1	107.0	101.3	95.7
	SHC kW	55.0	66.4	87.8	62.6	76.4	92.1	69.6	85.5	95.7
32	TC	99.1	92.0	85.1	102.1	95.3	89.5	104.0	98.2	93.0
	SHC kW	53.9	65.2	85.1	61.5	75.1	89.5	68.6	84.2	93.0
36	TC	96.2	89.0	82.7	98.9	92.3	86.9	100.7	95.1	90.4
	SHC kW	52.8	64.0	82.7	60.4	73.8	86.9	67.5	82.8	90.4
40	TC	93.3	86.0	80.0	95.8	89.2	84.2	97.4	92.0	87.7
	SHC kW	51.7	62.7	80.0	59.3	72.4	84.2	66.4	81.4	87.7
44	TC	90.2	82.8	77.3	92.5	86.0	81.5	94.0	88.7	84.9
	SHC kW	50.5	61.4	77.3	58.2	71.0	81.5	65.3	79.9	84.9
48	TC	89.0	80.3	74.1	91.6	84.0	79.0	93.4	87.1	83.0
	SHC kW	50.0	60.3	74.1	57.9	70.1	79.0	65.0	79.2	83.0
52	TC	—	77.2	71.5	—	80.8	76.3	—	83.8	80.2
	SHC kW	—	59.0	71.5	—	68.7	76.3	—	77.7	80.2
		—	31.25	29.88	—	32.12	31.04	—	32.85	31.98

38AKS044/40RM034 WITH STANDARD 3-ROW COIL										
Temp (C) Air Entering Condenser (Edb)		Evaporator Air — L/s								
		4250			5650			7050		
		Evaporator Air — Ewb (C)								
		22	20	16	22	20	16	22	20	16
20	TC	125.9	118.7	105.4	132.8	123.7	111.1	136.7	128.1	115.8
	SHC kW	64.2	76.3	105.4	72.2	87.5	111.1	79.4	97.5	115.8
28	TC	121.1	114.0	102.1	127.1	118.6	107.5	130.6	122.6	112.0
	SHC kW	62.4	74.3	102.1	70.3	85.2	107.5	77.4	95.1	112.0
32	TC	118.8	112.0	101.3	124.2	116.3	106.3	127.2	119.9	110.4
	SHC kW	61.5	73.5	101.3	69.2	84.2	106.3	76.2	93.9	110.4
36	TC	115.9	108.8	98.4	120.9	113.0	103.5	123.9	116.7	107.7
	SHC kW	60.3	72.1	98.4	68.1	82.8	103.5	75.2	92.4	107.7
40	TC	112.3	104.9	95.0	117.1	109.1	100.1	119.9	112.7	104.3
	SHC kW	59.0	70.5	95.0	66.8	81.1	100.1	73.8	90.6	104.3
44	TC	109.3	101.6	92.2	113.9	105.8	97.3	116.6	109.4	101.5
	SHC kW	57.8	69.2	92.2	65.7	79.6	97.3	72.7	89.2	101.5
48	TC	106.5	97.9	88.3	111.2	102.4	93.9	114.0	106.3	98.4
	SHC kW	56.8	67.6	88.3	64.7	78.2	93.9	71.9	87.8	98.4
52	TC	103.5	94.7	85.7	107.9	99.2	91.2	110.5	103.0	95.7
	SHC kW	55.6	66.3	85.7	63.6	76.7	91.2	70.7	86.3	95.7
		42.27	40.10	37.87	43.34	41.19	39.22	43.99	42.13	40.33

LEGEND

- — Out of Range
- Edb — Entering Dry Bulb
- Ewb — Entering Wet Bulb
- kW — Compressor Motor Power Input
- SHC — Sensible Heat Capacity (kW) Gross
- TC — Total Capacity (kW) Gross

NOTES:

1. Direct interpolation is permissible. Do not extrapolate.
2. SHC is based on 26.7 C db air entering indoor coil.

3. Formulas:

$$Ldb\ C = Edb\ C - \frac{SHCkW \times 1000}{1.23 \times L/s}$$

Lwb = wet-bulb temperature corresponding to enthalpy air leaving indoor coil (h_{lwb})

$$Ldb\ C: h_{lwb} = h_{ewb} - \frac{TCkW \times 1000}{1.20 \times L/s}$$

where h_{ewb} = enthalpy of air entering evaporator coil (kJ/kg).

4. Capacities are based on 7.6 actual m (12.2 equivalent m) of interconnecting piping sized to the outdoor unit field connections. (Equivalent length is equal to the actual length plus a 50% allowance for fitting losses.) For other equivalent lengths, refer to the Carrier System Design Manual, Part 3, for line losses.



COMBINATION RATINGS — ENGLISH (cont)

Table for 38AKS016/40RM014 WITH STANDARD 3-ROW COIL. Columns include Temp (F) Air Entering Condenser (Edb), Evaporator Air — Cfm (3750, 5000, 6250), and Evaporator Air — Ewb (F) (72, 67, 62). Rows include TC, SHC, kW for various capacities (85, 95, 100, 105, 115, 125).

Table for 38AKS024/40RM016 WITH STANDARD 3-ROW COIL. Columns include Temp (F) Air Entering Condenser (Edb), Evaporator Air — Cfm (4500, 6000, 7500), and Evaporator Air — Ewb (F) (72, 67, 62). Rows include TC, SHC, kW for various capacities (85, 95, 100, 105, 115, 125).

Table for 38AKS016/40RM016 WITH STANDARD 3-ROW COIL. Columns include Temp (F) Air Entering Condenser (Edb), Evaporator Air — Cfm (4500, 6000, 7500), and Evaporator Air — Ewb (F) (72, 67, 62). Rows include TC, SHC, kW for various capacities (85, 95, 100, 105, 115, 125).

Table for 38AKS024/40RM024 WITH STANDARD 3-ROW COIL. Columns include Temp (F) Air Entering Condenser (Edb), Evaporator Air — Cfm (6000, 8000, 10,000), and Evaporator Air — Ewb (F) (72, 67, 62). Rows include TC, SHC, kW for various capacities (85, 95, 100, 105, 115, 125).

Table for 38AKS016/40RM024 WITH STANDARD 3-ROW COIL. Columns include Temp (F) Air Entering Condenser (Edb), Evaporator Air — Cfm (6000, 8000, 10,000), and Evaporator Air — Ewb (F) (72, 67, 62). Rows include TC, SHC, kW for various capacities (85, 95, 100, 105, 115, 125).

NOTES:
1. Direct interpolation is permissible. Do not extrapolate.
2. SHC is based on 80 F db air entering indoor coil.
3. Formulas: Ldb F = Edb F - (SHC*Btuh / (1.10 x cfm))
Lwb = wet-bulb temperature corresponding to enthalpy air leaving indoor coil (h_lwb)
Ldb F: h_lwb = h_ewb - (TC*Btuh / (4.5 x cfm))
where h_ewb = enthalpy of air entering evaporator coil (Btuh/lb).
4. Capacities are based on 25 actual ft (40 equivalent ft) of interconnecting piping sized to the outdoor unit field connections.

LEGEND
— — Out of Range
Edb — Entering Dry Bulb
Ewb — Entering Wet Bulb
kW — Compressor Motor Power Input
SHC — Sensible Heat Capacity (1000 Btuh) Gross
TC — Total Capacity (1000 Btuh) Gross



COMBINATION RATINGS — ENGLISH (cont)

38AKS034/40RM034 WITH STANDARD 3-ROW COIL										
Temp (F) Air Entering Condenser (Edb)		Evaporator Air — Cfm								
		9000			12,000			15,000		
		Evaporator Air — Ewb (F)								
		72	67	62	72	67	62	72	67	62
85	TC	344.6	317.4	294.0	256.9	330.1	311.5	363.8	340.6	326.0
	SHC	182.5	235.1	288.2	209.0	272.7	311.5	231.3	307.3	326.0
	kW	25.57	24.55	23.65	26.04	25.02	24.32	26.30	25.42	24.87
95	TC	331.0	304.2	282.8	342.5	316.2	300.1	348.8	326.6	314.3
	SHC	177.3	229.8	278.1	204.1	267.1	300.1	226.3	301.1	314.3
	kW	27.51	26.27	25.27	28.05	26.82	26.08	28.34	27.31	26.74
100	TC	324.3	297.3	276.8	335.5	309.2	294.1	341.6	319.6	308.3
	SHC	174.8	227.1	272.6	201.7	264.2	294.1	223.9	298.0	308.3
	kW	28.51	27.16	26.14	29.08	27.76	27.00	29.38	28.28	27.72
105	TC	317.1	290.6	271.3	327.8	302.1	288.4	333.5	312.2	302.3
	SHC	172.0	224.4	267.7	199.1	261.4	288.4	221.2	294.8	302.3
	kW	29.45	27.98	26.91	30.05	28.62	27.85	30.36	29.18	28.63
115	TC	302.2	276.0	258.9	312.1	286.9	275.7	317.2	296.8	289.3
	SHC	166.4	218.6	256.4	193.8	255.2	275.6	215.7	288.0	289.3
	kW	31.12	29.51	28.46	31.74	30.19	29.49	32.05	30.80	30.33
125	TC	288.3	261.8	246.5	—	272.5	263.3	—	282.5	276.9
	SHC	161.1	213.0	245.1	—	249.4	263.3	—	281.7	276.9
	kW	32.83	30.99	29.93	—	31.73	31.10	—	32.43	32.04

38AKS044/40RM034 WITH STANDARD 3-ROW COIL										
Temp (F) Air Entering Condenser (Edb)		Evaporator Air — Cfm								
		9000			12,000			15,000		
		Evaporator Air — Ewb (F)								
		72	67	62	72	67	62	72	67	62
85	TC	413.7	382.6	344.5	432.1	399.8	364.9	443.5	412.4	382.2
	SHC	208.7	260.9	334.0	234.4	300.7	364.9	257.8	338.8	382.2
	kW	32.85	31.60	30.08	33.58	32.29	30.89	34.04	32.80	31.59
95	TC	399.2	368.7	333.6	416.4	384.9	353.6	426.9	397.2	370.5
	SHC	203.2	255.4	324.2	229.1	294.7	353.6	252.3	332.2	370.5
	kW	35.19	33.74	32.08	36.00	34.51	33.03	36.50	35.10	33.83
100	TC	391.8	361.5	328.0	408.3	377.3	347.7	418.3	389.4	364.4
	SHC	200.4	252.5	319.0	226.4	291.7	347.7	249.4	328.7	364.4
	kW	36.36	34.80	33.08	37.21	35.61	34.09	37.72	36.24	34.95
105	TC	384.2	354.1	322.2	400.1	369.5	341.7	409.6	381.5	358.2
	SHC	197.5	249.6	313.8	223.6	288.5	341.7	246.5	325.2	358.2
	kW	37.55	35.88	34.11	38.44	36.74	35.20	38.97	37.41	36.11
115	TC	368.5	339.0	310.2	383.1	353.5	329.2	391.7	365.1	345.2
	SHC	191.5	243.6	302.9	217.8	282.1	329.2	240.6	318.1	345.2
	kW	39.77	37.95	36.17	40.68	38.85	37.35	41.21	39.57	38.33
125	TC	352.6	323.3	297.2	366.4	337.2	316.0	374.3	348.7	331.7
	SHC	185.5	237.4	291.1	212.2	275.5	316.0	234.8	310.8	331.7
	kW	41.94	39.90	38.08	42.91	40.87	39.39	43.45	41.67	40.48

LEGEND

- Out of Range
- Edb Entering Dry Bulb
- Ewb Entering Wet Bulb
- kW Compressor Motor Power Input
- SHC Sensible Heat Capacity (1000 Btuh) Gross
- TC Total Capacity (1000 Btuh) Gross

1. Direct interpolation is permissible. Do not extrapolate.
2. SHC is based on 80 F db air entering indoor coil.
3. Formulas:

$$Ldb F = Edb F - \frac{SHCBtuh}{1.10 \times cfm}$$

Lwb = wet-bulb temperature corresponding to enthalpy air leaving indoor coil (hlwb)

$$Ldb F: hlwb = hewb - \frac{TCBtuh}{4.5 \times cfm}$$

where hewb = enthalpy of air entering evaporator coil (Btuh/lb).

4. Capacities are based on 25 actual ft (40 equivalent ft) of interconnecting piping sized to the outdoor unit field connections. (Equivalent length is equal to the actual length plus a 50% allowance for fitting losses.) For other equivalent lengths, refer to the Carrier System Design Manual, Part 3, for line losses.



COMBINATION RATINGS — 4-ROW HIGH-CAPACITY COILS — SI (cont)

Table for 38AK012/40RM012 WITH 4-ROW HIGH-CAPACITY COILS. Columns include Temp (C) Air Entering Condenser (Edb) and Evaporator Air - L/s (1420, 1890, 2360) and Evaporator Air - Ewb (C) (17, 19, 22).

Table for 38AKS008/40RM008 WITH 4-ROW HIGH-CAPACITY COILS. Columns include Temp (C) Air Entering Condenser (Edb) and Evaporator Air - L/s (1060, 1420, 1770) and Evaporator Air - Ewb (C) (17, 19, 22).

Table for 38AK012/40RM014 WITH 4-ROW HIGH-CAPACITY COILS. Columns include Temp (C) Air Entering Condenser (Edb) and Evaporator Air - L/s (1770, 2360, 2950) and Evaporator Air - Ewb (C) (17, 19, 22).

Table for 38AKS008/40RM012 WITH 4-ROW HIGH-CAPACITY COILS. Columns include Temp (C) Air Entering Condenser (Edb) and Evaporator Air - L/s (1420, 1890, 2360) and Evaporator Air - Ewb (C) (17, 19, 22).

Table for 38AKS008/40RM007 WITH 4-ROW HIGH-CAPACITY COILS. Columns include Temp (C) Air Entering Condenser (Edb) and Evaporator Air - L/s (850, 1130, 1420) and Evaporator Air - Ewb (C) (17, 19, 22).

Table for 38AKS009/40RM008 WITH 4-ROW HIGH-CAPACITY COILS. Columns include Temp (C) Air Entering Condenser (Edb) and Evaporator Air - L/s (1060, 1420, 1770) and Evaporator Air - Ewb (C) (17, 19, 22).

See Legend and Notes on page 57.



COMBINATION RATINGS — 4-ROW HIGH-CAPACITY COILS — ENGLISH (cont)

Table for 38AKS028/40RM034 WITH 4-ROW HIGH-CAPACITY COILS. Columns: Temp (F) Air Entering Condenser (Edb), TC, SHC, kW. Rows: 85, 95, 100, 105, 115. Sub-headers: Evaporator Air — Cfm (9,000, 12,000, 15,000) and Evaporator Air — Ewb (F) (62, 67, 72).

Table for 38AKS034/40RM034 WITH 4-ROW HIGH-CAPACITY COILS. Columns: Temp (F) Air Entering Condenser (Edb), TC, SHC, kW. Rows: 85, 95, 100, 105, 115. Sub-headers: Evaporator Air — Cfm (9,000, 12,000, 15,000) and Evaporator Air — Ewb (F) (62, 67, 72).

Table for 38AKS034/40RM028 WITH 4-ROW HIGH-CAPACITY COILS. Columns: Temp (F) Air Entering Condenser (Edb), TC, SHC, kW. Rows: 85, 95, 100, 105, 115. Sub-headers: Evaporator Air — Cfm (7,500, 10,000, 12,500) and Evaporator Air — Ewb (F) (62, 67, 72).

Table for 38AKS044/40RM034 WITH 4-ROW HIGH-CAPACITY COILS. Columns: Temp (F) Air Entering Condenser (Edb), TC, SHC, kW. Rows: 85, 95, 100, 105, 115. Sub-headers: Evaporator Air — Cfm (9,000, 12,000, 15,000) and Evaporator Air — Ewb (F) (62, 67, 72).

LEGEND

- Out of Range
Edb — Entering Dry Bulb
Ewb — Entering Wet Bulb
kW — Compressor Motor Power Input
SHC — Sensible Heat Capacity (1000 Btuh) Gross
TC — Total Capacity (1000 Btuh) Gross

- 1. Direct interpolation is permissible. Do not extrapolate.
2. SHC is based on 80 F db air entering indoor coil.

3. Formulas:

Ldb F = Edb F - (SHCBtuh / (1.10 x cfm))

Lwb = wet-bulb temperature corresponding to enthalpy air leaving indoor coil (h_lwb)

Ldb F: h_lwb = h_ewb - (TCBtuh / (4.5 x cfm))

where h_ewb = enthalpy of air entering evaporator coil (Btuh/lb).

- 4. Capacities are based on 25 actual ft (40 equivalent ft) of interconnecting piping sized to the outdoor unit field connections. (Equivalent length is equal to the actual length plus a 50% allowance for fitting losses.) For other equivalent lengths, refer to the Carrier System Design Manual, Part 3, for line losses.



**FAN PERFORMANCE DATA — 40RM WITH HIGH-CAPACITY COIL —
350-600 Pa ESP — 50 Hz, SI**

UNIT 40RM (High-Capacity 4-Row Coil)	AIRFLOW (L/s)	EXTERNAL STATIC PRESSURE (Pa)											
		350		400		450		500		550		600	
		r/s	kW	r/s	kW	r/s	kW	r/s	kW	r/s	kW	r/s	kW
007	850	15.34	0.80	16.25	0.92	17.10	1.03	17.90	1.16	18.66	1.28	19.39	1.41
	850	15.69	0.94	16.61	1.07	17.47	1.20	18.28	1.33	19.04	1.47	19.77	1.61
	1130	16.04	1.09	16.95	1.23	17.81	1.38	18.63	1.53	19.40	1.67	—	—
	1270	16.44	1.27	17.32	1.42	18.17	1.58	18.97	1.74	19.75	1.90	—	—
	1420	16.91	1.49	17.75	1.64	18.56	1.81	19.34	1.97	—	—	—	—
008	1060	15.50	0.96	16.43	1.10	17.31	1.23	18.14	1.37	18.93	1.51	19.68	1.66
	1230	15.84	1.14	16.75	1.28	17.62	1.43	18.45	1.58	19.24	1.74	—	—
	1420	16.34	1.38	17.19	1.54	18.01	1.70	18.81	1.86	19.59	2.03	—	—
	1600	16.97	1.69	17.76	1.85	18.52	2.02	19.27	2.19	—	—	—	—
	1770	17.61	2.01	18.35	2.18	19.07	2.35	19.77	2.53	—	—	—	—
012	1420	16.02	1.33	16.87	1.48	17.71	1.64	18.52	1.80	19.30	1.97	—	—
	1650	16.76	1.70	17.53	1.85	18.29	2.02	19.04	2.19	19.77	2.37	—	—
	1890	17.64	2.16	18.35	2.33	19.05	2.51	19.74	2.69	—	—	—	—
	2120	18.60	2.73	19.28	2.91	19.93	3.10	—	—	—	—	—	—
	2360	19.61	3.40	—	—	—	—	—	—	—	—	—	—
014	1770	15.21	1.78	16.19	2.06	17.13	2.34	18.04	2.64	18.91	2.94	19.75	3.25
	2030	15.46	2.05	16.37	2.33	17.26	2.63	18.12	2.94	18.96	3.26	19.78	3.59
	2360	15.94	2.46	16.78	2.77	17.60	3.08	18.40	3.40	19.18	3.73	19.94	4.07
	2690	16.51	2.95	17.32	3.28	18.09	3.62	18.84	3.96	19.57	4.31	—	—
	2950	16.99	3.39	17.78	3.74	18.54	4.10	19.26	4.47	19.96	4.84	—	—
016	2120	15.21	2.05	16.11	2.33	16.98	2.62	17.83	2.93	18.66	3.24	19.47	3.57
	2500	15.69	2.49	16.54	2.80	17.35	3.12	18.14	3.44	18.90	3.77	19.64	4.11
	2830	16.18	2.94	17.01	3.28	17.79	3.63	18.54	3.97	19.27	4.33	19.97	4.69
	3210	16.75	3.52	17.57	3.90	18.34	4.29	19.08	4.67	19.78	5.06	—	—
	3540	17.26	4.09	18.07	4.50	18.84	4.93	19.57	5.35	—	—	—	—
024	2830	16.01	2.88	16.85	3.22	17.64	3.56	18.39	3.91	19.12	4.26	—	—
	3300	16.67	3.57	17.50	3.96	18.28	4.36	19.03	4.75	19.73	5.15	—	—
	3780	17.35	4.39	18.17	4.82	18.95	5.27	19.68	5.72	—	—	—	—
	4250	18.11	5.37	18.88	5.83	19.63	6.31	—	—	—	—	—	—
	4720	18.96	6.58	19.67	7.05	—	—	—	—	—	—	—	—
028	3540	14.57	3.97	14.95	4.41	15.67	5.07	16.50	5.59	—	—	—	—
	4130	14.76	3.99	15.51	4.57	16.36	5.46	17.00	6.04	—	—	—	—
	4720	15.49	4.92	16.15	5.37	16.78	5.88	17.42	6.50	—	—	—	—
	5310	16.26	6.15	16.91	6.61	17.51	7.08	18.10	7.58	—	—	—	—
	5900	17.04	7.61	17.68	8.11	18.28	8.62	—	—	—	—	—	—
034	4250	14.68	4.00	15.38	4.49	16.12	5.14	17.00	6.15	—	—	—	—
	4960	15.51	5.20	16.17	5.63	16.80	6.09	17.41	6.61	—	—	—	—
	5660	16.35	6.72	17.01	7.21	17.64	7.69	18.23	8.18	—	—	—	—
	6370	17.24	8.54	17.87	9.10	—	—	—	—	—	—	—	—
	7080	18.22	10.70	—	—	—	—	—	—	—	—	—	—

See Legend and Notes on page 72.



**FAN PERFORMANCE DATA — 40RM WITH HIGH-CAPACITY COIL —
1.4-2.4 in. wg ESP — 50 Hz, ENGLISH**

UNIT 40RM (High-Capacity 4-Row Coil)	AIRFLOW (Cfm)	EXTERNAL STATIC PRESSURE (in. wg)											
		1.4		1.6		1.8		2.0		2.2		2.4	
		Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
007	1,800	921	1.07	975	1.23	1026	1.39	1074	1.55	1120	1.72	1164	1.90
	2,100	942	1.26	997	1.43	1048	1.61	1097	1.79	1143	1.97	1186	2.16
	2,400	963	1.47	1017	1.66	1069	1.85	1118	2.05	1164	2.25	—	—
	2,700	987	1.71	1039	1.91	1090	2.12	1138	2.33	1185	2.55	—	—
	3,000	1015	1.99	1065	2.20	1113	2.42	1161	2.65	—	—	—	—
008	2,250	930	1.29	986	1.47	1039	1.65	1089	1.84	1136	2.03	1181	2.22
	2,600	950	1.53	1005	1.72	1057	1.92	1107	2.13	1154	2.33	—	—
	3,000	980	1.86	1031	2.06	1081	2.27	1129	2.49	1175	2.72	—	—
	3,400	1018	2.26	1065	2.48	1111	2.70	1156	2.93	—	—	—	—
	3,750	1057	2.69	1101	2.92	1144	3.15	1186	3.39	—	—	—	—
012	3,000	961	1.78	1012	1.98	1062	2.19	1111	2.41	1158	2.64	—	—
	3,500	1005	2.27	1052	2.49	1098	2.71	1142	2.94	1186	3.18	—	—
	4,000	1058	2.90	1101	3.13	1143	3.36	1184	3.60	—	—	—	—
	4,500	1116	3.66	1157	3.91	1196	4.16	—	—	—	—	—	—
	5,000	1176	4.56	—	—	—	—	—	—	—	—	—	—
014	3,750	912	2.39	971	2.76	1028	3.14	1083	3.54	1135	3.95	1185	4.36
	4,300	928	2.75	982	3.13	1036	3.53	1087	3.94	1138	4.37	1187	4.81
	5,000	956	3.30	1007	3.71	1056	4.13	1104	4.56	1151	5.00	1196	5.46
	5,700	990	3.96	1039	4.40	1086	4.85	1130	5.31	1174	5.78	—	—
	6,250	1019	4.54	1067	5.02	1112	5.50	1156	5.99	1198	6.49	—	—
016	4,500	912	2.75	967	3.12	1019	3.52	1070	3.92	1120	4.35	1168	4.79
	5,300	942	3.34	992	3.76	1041	4.18	1088	4.61	1134	5.06	1179	5.52
	6,000	971	3.95	1020	4.40	1067	4.86	1112	5.33	1156	5.81	1198	6.29
	6,800	1005	4.72	1054	5.23	1101	5.75	1145	6.27	1187	6.79	—	—
	7,500	1036	5.48	1084	6.04	1131	6.61	1174	7.17	—	—	—	—
024	6,000	961	3.86	1011	4.31	1058	4.77	1104	5.24	1147	5.71	—	—
	7,000	1000	4.79	1050	5.32	1097	5.85	1142	6.38	1184	6.91	—	—
	8,000	1041	5.88	1090	6.47	1137	7.07	1181	7.67	—	—	—	—
	9,000	1086	7.21	1133	7.82	1178	8.47	—	—	—	—	—	—
	10,000	1138	8.83	1180	9.46	—	—	—	—	—	—	—	—
028	7,500	874	5.33	897	5.91	940	6.80	990	7.50	—	—	—	—
	8,750	886	5.36	930	6.13	982	7.32	1020	8.10	—	—	—	—
	10,000	930	6.60	969	7.20	1007	7.89	1045	8.71	—	—	—	—
	11,250	976	8.25	1014	8.86	1051	9.49	1086	10.17	—	—	—	—
	12,500	1023	10.20	1061	10.88	1097	11.56	—	—	—	—	—	—
034	9,000	881	5.37	923	6.03	967	6.89	1020	8.25	—	—	—	—
	10,500	930	6.97	970	7.55	1008	8.17	1045	8.86	—	—	—	—
	12,000	981	9.02	1021	9.67	1058	10.32	1094	10.97	—	—	—	—
	13,500	1035	11.45	1072	12.20	—	—	—	—	—	—	—	—
	15,000	1093	14.35	—	—	—	—	—	—	—	—	—	—

See Legend and Notes on page 72.

Performance data (cont)



LEGEND AND NOTES FOR STANDARD AND HIGH-CAPACITY COIL FAN PERFORMANCE DATA TABLES (English)

LEGEND

Bhp — Brake Horsepower Input to Fan
ESP — External Static Pressure

Bold indicates field-supplied drive is required.
Plain type indicates standard motor and standard drive.
Underline indicates a different motor and drive combination other than the standard motor and standard drive combination is required. Refer to fan motor and drive tables, pages 94-98, to complete selection.

NOTES:

1. Maximum allowable fan speed is 1100 rpm for unit sizes 028 and 034; 1200 rpm for all other sizes.
2. Fan performance is based on deductions for wet coil, clean 2-in. filters, and unit casing. See table at right for factory-supplied filter pressure drop.
3. For 50 Hz units, the medium-static drive and standard motor combination is not available for 016-028 sizes. Use alternate motor if medium-static drive is required for these sizes.

FACTORY-SUPPLIED FILTER PRESSURE DROP — ENGLISH

UNIT 40RM	AIRFLOW (Cfm)	PRESSURE DROP (in. wg)
007	1,800	0.05
	2,400	0.08
	3,000	0.11
008	2,250	0.07
	3,000	0.11
	3,750	0.15
012	3,000	0.11
	4,000	0.17
	5,000	0.23
014	3,750	0.06
	5,000	0.10
	6,250	0.13
016	4,500	0.08
	6,000	0.12
	7,500	0.17
024	6,000	0.12
	8,000	0.19
	10,000	0.26
028	7,500	0.15
	10,000	0.22
	12,500	0.30
034	9,000	0.19
	12,000	0.29
	15,000	0.40

LEGEND AND NOTES FOR STANDARD AND HIGH CAPACITY COIL FAN PERFORMANCE DATA TABLES (SI)

LEGEND

ESP — External Static Pressure

Bold indicates field-supplied drive is required.
Plain type indicates standard motor and standard drive.
Underline indicates a different motor and drive combination other than the standard motor and standard drive combination is required. Refer to fan motor and drive tables, pages 94-98, to complete the selection.

NOTES:

1. Maximum allowable fan speed is 18.3 r/s for unit sizes 028 and 034; 20 r/s for all other sizes.
2. Fan performance is based on deductions for wet coil, clean 51-mm filters, and unit casing. See table at right for factory-supplied filter pressure drop.
3. For 50 Hz units, the medium-static drive and standard motor combination is not available for 016-028 sizes. Use alternate motor if medium-static drive is required for these sizes.

FACTORY-SUPPLIED FILTER PRESSURE DROP — SI

UNIT 40RM	AIRFLOW (L/s)	PRESSURE DROP (Pa)
007	850	13
	1150	20
	1450	28
008	1000	17
	1400	27
	1800	38
012	1450	28
	1900	42
	2350	56
014	1750	15
	2350	24
	2950	33
016	2100	20
	2800	30
	3500	42
024	2900	32
	3800	47
	4700	64
028	3500	36
	4700	55
	5900	76
034	4250	47
	5650	71
	7050	98



40RM ACCESSORY PLENUM AIR THROW DATA — SI (m)

UNIT 40RM	AIRFLOW (L/s)	VANE DEFLECTION		
		Straight	22½°	45°
007	1150	11.71	9.91	7.20
008	1400	13.87	11.71	8.63
012	1900	16.65	13.93	9.99
014	2350	13.77	11.63	8.57
016	2800	15.41	13.25	9.55
024	3800	18.17	15.44	11.20
028	4700	23.26	19.89	14.38
034	5650	25.97	22.00	15.89

NOTE: Throw distances shown are for 0.381 m/sec terminal velocity. Use the following multipliers to determine throw values for other terminal velocities.

TERMINAL VELOCITY (m/sec)	THROW FACTOR
0.254	X 1.50
0.508	X 0.75
0.762	X 0.50

40RM ACCESSORY PLENUM AIR THROW DATA — ENGLISH (Ft)

UNIT 40RM	AIRFLOW (Cfm)	VANE DEFLECTION		
		Straight	22½°	45°
007	2,400	39	33	24
008	3,000	45	38	28
012	4,000	55	46	33
014	5,000	45	38	28
016	6,000	50	43	31
024	8,000	60	51	37
028	10,000	76	65	47
034	12,000	85	72	52

NOTE: Throw distances shown are for 75 fpm terminal velocity. Use the following multipliers to determine throw values for other terminal velocities.

TERMINAL VELOCITY (Fpm)	THROW FACTOR
50	X 1.50
100	X 0.75
150	X 0.50

40RM ACCESSORY PRESSURE DROP — SI (Pa)

UNIT 40RM	AIRFLOW (L/s)	DISCHARGE PLENUM	RETURN AIR GRILLE	HEATING COILS			ECONOMIZER
				Hot Water	Steam	Electric	
007	850	15	2	25	25	9	12
	1150	25	3	41	41	16	18
	1450	36	5	60	60	26	23
008	1000	20	2	33	33	12	13
	1400	34	5	57	57	24	22
	1800	51	8	85	85	39	39
012	1450	36	5	60	60	26	23
	1900	56	10	93	93	43	43
	2350	79	15	132	132	65	69
014	1750	18	2	26	26	10	12
	2350	29	5	43	43	17	17
	2950	43	5	62	62	26	27
016	2100	24	2	36	36	14	15
	2800	39	5	57	57	24	22
	3500	56	7	82	82	37	37
024	2900	41	5	60	60	26	23
	3800	64	10	93	93	43	43
	4700	91	15	132	132	65	69
028	3500	37	5	67	67	22	15
	4700	59	7	109	109	39	22
	5900	86	12	157	157	60	35
034	4250	50	7	92	92	32	20
	5650	80	12	147	147	56	35
	7050	114	17	210	210	85	52

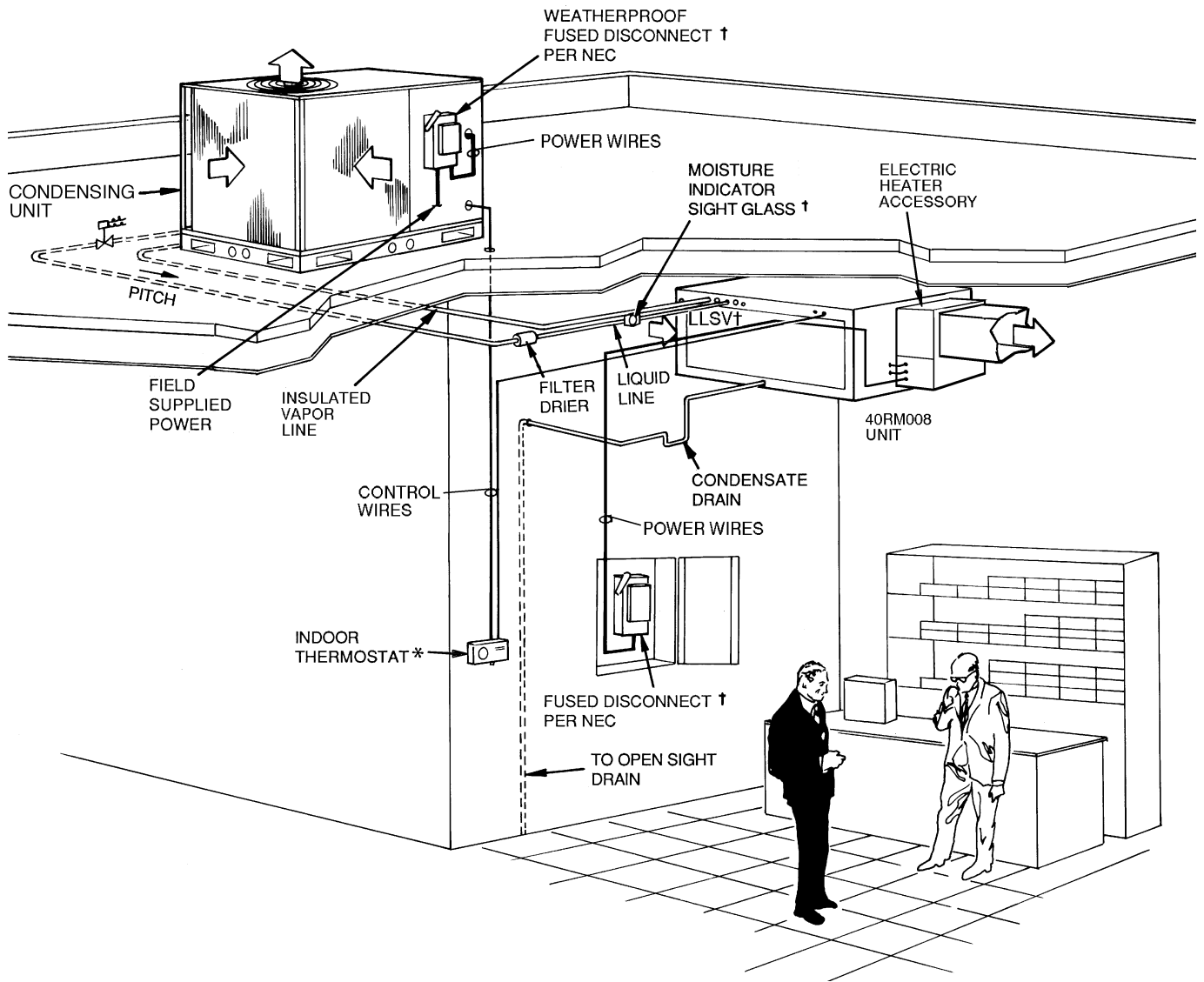
40RM ACCESSORY PRESSURE DROP — ENGLISH (in. wg)

UNIT 40RM	AIRFLOW (Cfm)	DISCHARGE PLENUM	RETURN AIR GRILLE	HEATING COILS			ECONOMIZER
				Hot Water	Steam	Electric	
007	1,800	0.06	0.01	0.10	0.10	0.04	0.05
	2,400	0.10	0.01	0.16	0.16	0.06	0.07
	3,000	0.14	0.02	0.23	0.23	0.10	0.09
008	2,250	0.09	0.01	0.15	0.15	0.06	0.06
	3,000	0.14	0.02	0.23	0.23	0.10	0.09
	3,750	0.21	0.03	0.35	0.35	0.15	0.15
012	3,000	0.14	0.02	0.23	0.23	0.10	0.09
	4,000	0.22	0.04	0.37	0.37	0.17	0.17
	5,000	0.32	0.06	0.53	0.53	0.26	0.28
014	3,750	0.07	0.01	0.11	0.11	0.04	0.05
	5,000	0.12	0.02	0.17	0.17	0.07	0.07
	6,250	0.17	0.02	0.25	0.25	0.11	0.11
016	4,500	0.10	0.01	0.15	0.15	0.06	0.06
	6,000	0.16	0.02	0.23	0.23	0.10	0.09
	7,500	0.23	0.03	0.33	0.33	0.15	0.15
024	6,000	0.16	0.02	0.23	0.23	0.10	0.09
	8,000	0.26	0.04	0.37	0.37	0.17	0.17
	10,000	0.37	0.06	0.53	0.53	0.26	0.28
028	7,500	0.15	0.02	0.28	0.28	0.09	0.06
	10,000	0.24	0.03	0.44	0.44	0.16	0.09
	12,500	0.34	0.05	0.63	0.63	0.24	0.14
034	9,000	0.20	0.03	0.37	0.37	0.13	0.08
	12,000	0.32	0.05	0.59	0.59	0.22	0.14
	15,000	0.46	0.07	0.85	0.85	0.34	0.21

Typical piping and wiring



ROOFTOP INSTALLATION — 38AK007-012, 38AKS008-012



LEGEND

- LLSV** — Liquid Line Solenoid Valve
- NEC** — National Electrical Code
- TXV** — Thermostatic Expansion Valve

*Accessory item.
†Field supplied.

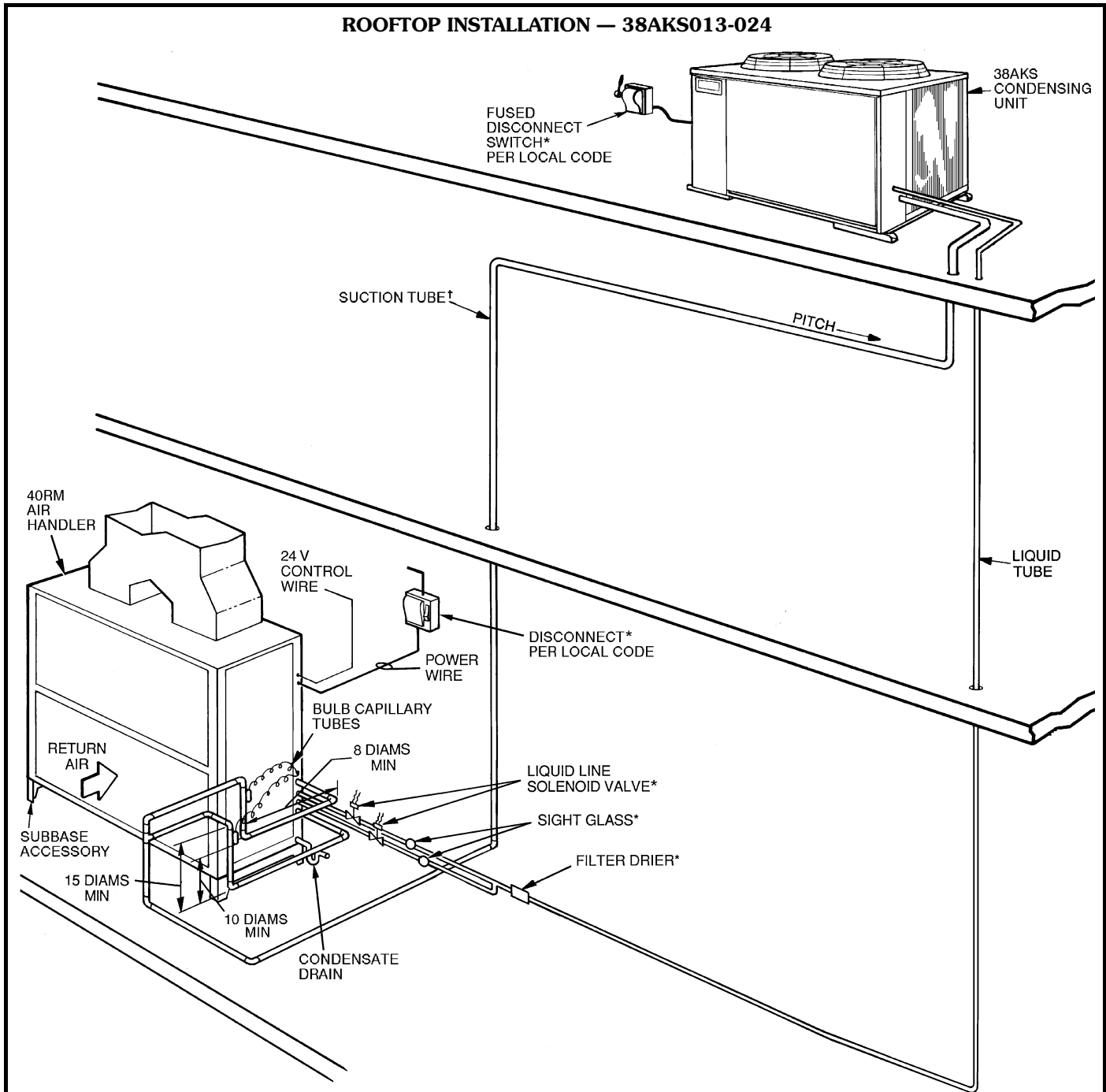
NOTES:

1. All piping must follow standard refrigerant piping techniques. Refer to Carrier System Design Manual for details.
2. All wiring must comply with the applicable local and national codes.
3. Wiring and piping shown are general points-of-connection guides only and are not intended for, or to include all details for, a specific installation.
4. Liquid line solenoid valve (solenoid drop control) is recommended to prevent refrigerant migration to the compressor.
5. Internal factory-supplied TXVs not shown.

Typical piping and wiring (cont)



ROOFTOP INSTALLATION — 38AKS013-024



LEGEND

- TXV** — Thermostatic Expansion Valve
- Piping

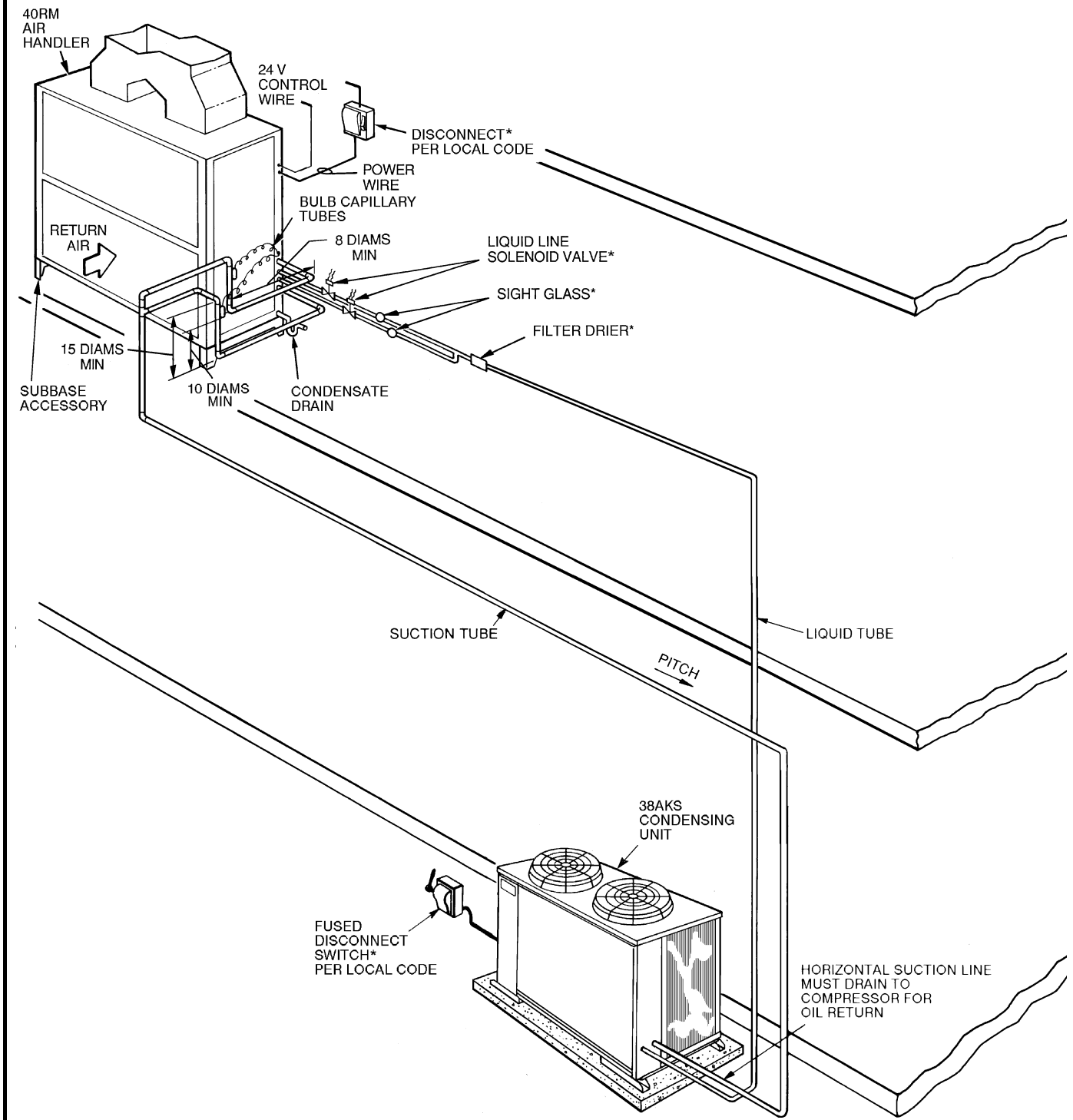
*Field supplied.

†Double riser may be required. See Application Data, page 90.

NOTES:

1. All piping must follow standard refrigerant piping techniques. Refer to Carrier System Design Manual for details.
2. All wiring must comply with the applicable local and national codes.
3. Wiring and piping shown are general points-of-connection guides only and are not intended for, or to include all details for, a specific installation.
4. Liquid line solenoid valve (solenoid drop control) is recommended to prevent refrigerant migration to the compressor.
5. Internal factory-supplied TXVs not shown.

GROUND LEVEL INSTALLATION — 38AKS013-024



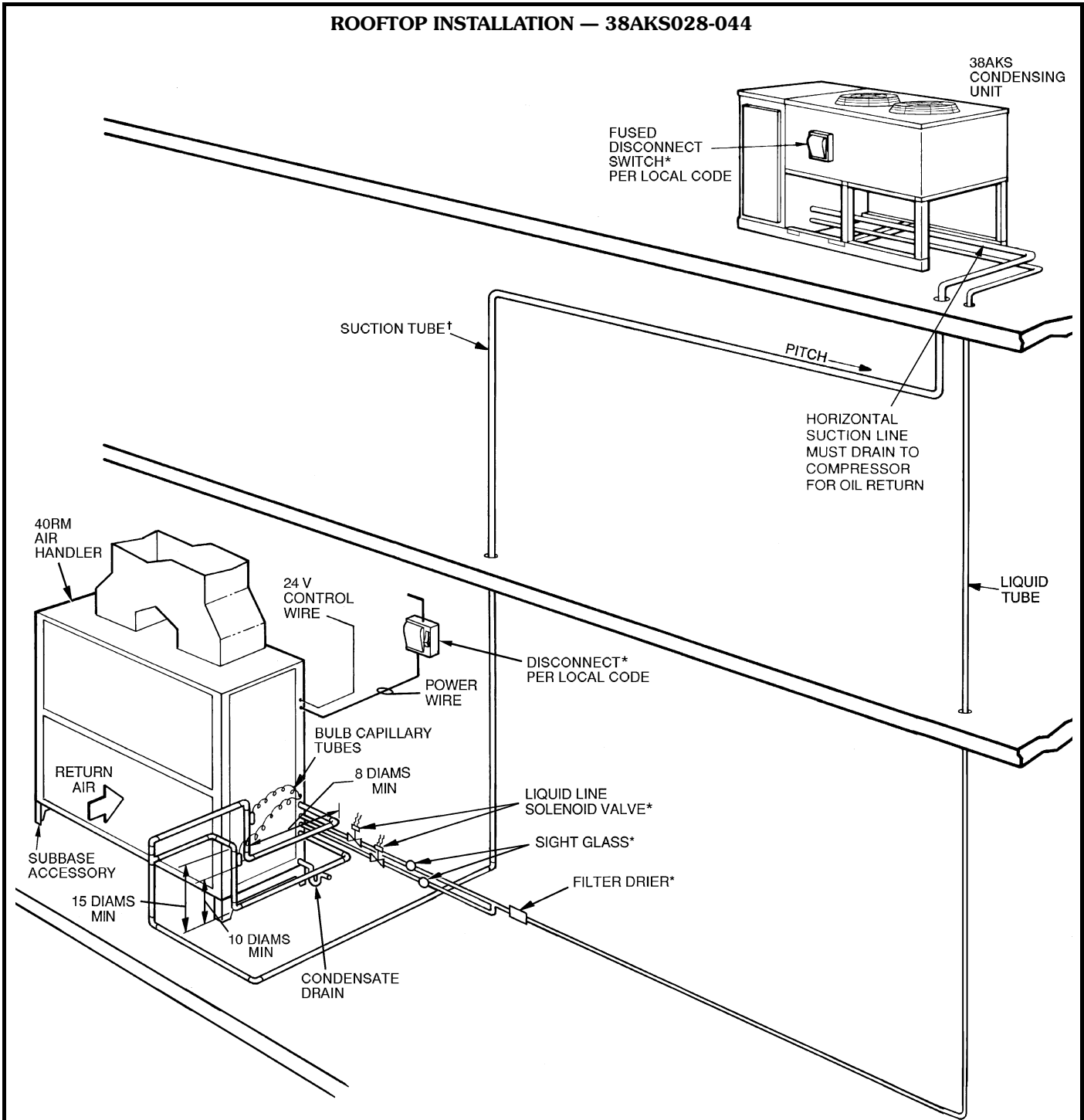
LEGEND
TXV — Thermostatic Expansion Valve
 Piping
 *Field supplied.

- NOTES:**
1. All piping must follow standard refrigerant piping techniques. Refer to Carrier System Design Manual for details.
 2. All wiring must comply with the applicable local and national codes.
 3. Wiring and piping shown are general points-of-connection guides only and are not intended for, or to include all details for, a specific installation.
 4. Liquid line solenoid valve (solenoid drop control) is recommended to prevent refrigerant migration to the compressor.
 5. Internal factory-supplied TXVs not shown.

Typical piping and wiring (cont)



ROOFTOP INSTALLATION — 38AKS028-044



LEGEND

TXV — Thermostatic Expansion Valve

Piping

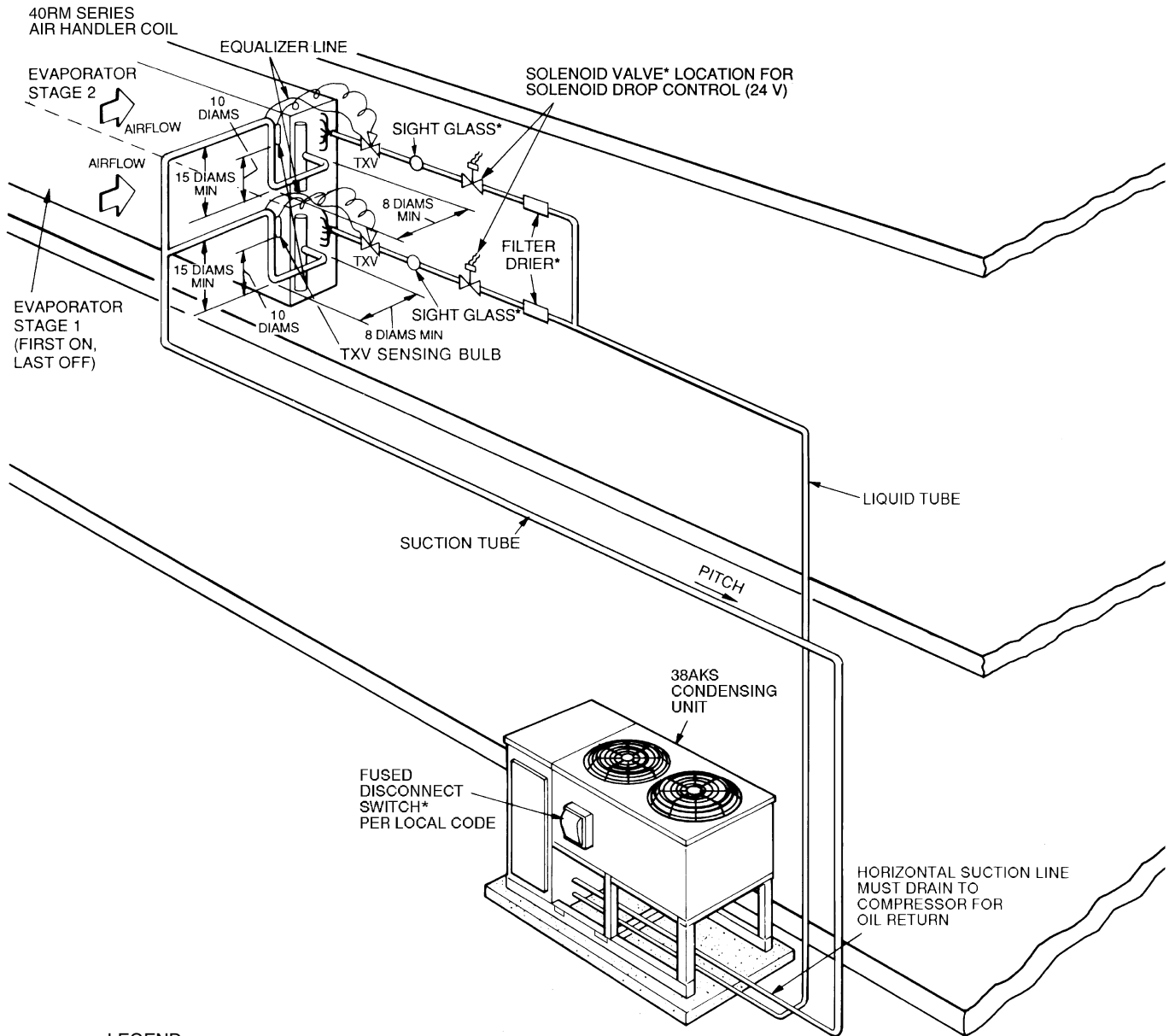
*Field supplied.

†Double riser may be required. See Application Data on page 93.

NOTES:

1. All piping must follow standard refrigerant piping techniques. Refer to Carrier System Design Manual for details.
2. All wiring must comply with the applicable local and national codes.
3. Wiring and piping shown are general points-of-connection guides only and are not intended for, or to include all details for, a specific installation.
4. Liquid line solenoid valve (solenoid drop control) is recommended to prevent refrigerant migration to the compressor.
5. Internal factory-supplied TXVs not shown.

GROUND-LEVEL INSTALLATION — 38AKS028-044



LEGEND

TXV — Thermostatic Expansion Valve

Piping

*Field supplied.

NOTES:

1. All piping must follow standard refrigerant piping techniques. Refer to Carrier System Design Manual for details.
2. All wiring must comply with the applicable local and national codes.
3. Wiring and piping shown are general points-of-connection guides only and are not intended for, or to include all details for, a specific installation.
4. Liquid line solenoid valve (solenoid drop control) is recommended to prevent refrigerant migration to the compressor.

Electrical data



38AK007-012, 38AKS008-044

UNIT 38AK	NOMINAL VOLTAGE (V-Ph-Hz)	VOLTAGE RANGE*		COMPRESSOR		OFM		POWER SUPPLY	
		Min	Max	RLA	LRA	Qty	FLA (ea)†	MCA	MOCP**
007	230-3-50	198	242	21.8	158	1	1.5	28.8	35
	400-3-50	360	440	10.0	79	1	1.5	14.0	20
008	230-3-50	198	242	28.8	195	1	1.5	37.5	45
	400-3-50	360	440	14.7	95	1	1.5	19.9	25
012	230-3-50	198	242	37.8	239	1	1.5	48.8	60
	400-3-50	360	440	17.2	125	1	1.5	23.0	30
S008	230-3-50	198	253	31.5	160	1	1.5	40.9	50
	400-3-50	342	460	15.7	80	1	1.5	21.1	25
S009	230-3-50	198	253	39.7	198	1	1.5	51.1	60
	400-3-50	342	460	19.9	99	1	1.5	26.4	30
S012	230-3-50	198	253	39.7	198	1	1.5	52.7	60
	400-3-50	342	460	19.9	99	1	1.5	26.3	30
S013	230-3-50	198	264	32.9	128	2	3.5 (2.9)	47.5	80
	400-3-50	342	457	20.0	74	2	3.5 (2.9)	31.4	50
S014	230-3-50	198	264	35.7	143	2	3.5 (2.9)	51.0	80
	400-3-50	342	457	22.1	83	2	3.5 (2.9)	34.0	50
S016	230-3-50	198	264	47.9	200	2	3.5 (2.9)	66.9	100
	400-3-50	342	457	29.3	115	2	3.5 (2.9)	43.0	70
S024	346-3-50	311	380	33.3	115	2	3.5 (2.9)	50.5	80
	230-3-50	198	254	67.9	207	2	3.5 (2.9)	88.1	150
	400-3-50	342	440	34.6	173	2	3.5 (2.9)	49.3	80
S028	346-3-50	311	380	44.9	155	2	4.4	64.9	100
	230-3-50	198	254	76.9	205	2	6.4	109.0	175
	400-3-50	342	440	43.6	223	2	3.0	60.5	100
S034	346-3-50	311	380	53.9	176	2	4.4	76.1	125
	230-3-50	198	254	85.9	220	2	6.4	120.2	200
	400-3-50	342	440	50.0	253	2	3.0	68.5	110
S044	346-3-50	311	380	79.5	240	3	4.4	112.6	175
	230-3-50	198	254	105.1	327	3	6.4	150.6	250
	400-3-50	342	440	65.4	345	3	3.0	90.8	150

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 (U.S.A. Standard)
OFM — Outdoor-Fan Motor
RLA — Rated Load Amps (Compressor)

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

†Value in parenthesis () is FLA of second fan motor.

**Fuse or HACR circuit breaker.

NOTES:

- Control circuit is 24 v on all units and requires an external power source.
- MCA and MOCP values are calculated in accordance with NEC (National Electric Code) (U.S.A. Standard), Article 440.
- Motor FLA and RLA values are established in accordance with UL (Underwriters' Laboratories) Standard 1995 (U.S.A. standard).
- 38AKS028-044 Units Only:**
220-v and 346-v units are part-wind-start units; the value under compressor LRA is for the first winding energized. The 400-v units are across-the-line-start units; value shown is for all windings energized.

FIELD POWER WIRE SIZE

UNIT 38AKS	VOLTAGE (3 Ph, 50 Hz)	FIELD POWER WIRE SIZE TB1 WILL ACCEPT
028	346	14 to 2/0 AWG
	230	
	400	
034	346	14 to 2/0 AWG 6 AWG to 350 kcmil 14 to 2/0 AWG
	230	
	400	
044	346	14 to 2/0 AWG 6 AWG to 350 kcmil 14 to 2/0 AWG
	230	
	400	

LEGEND

- AWG** — American Wire Gage
kcmil — Thousand circular mils (formerly MCM)
TB — Terminal Block



40RM STANDARD MOTORS

UNIT 40RM	V*-PH-Hz	VOLTAGE LIMITS	FAN MOTOR		POWER SUPPLY	
			kW (Hp)	FLA	Minimum Circuit Amps	MOCP
007	230-3-50	207-253	1.79 (2.4)	5.2	6.5	15
	400-3-50	360-440	1.79 (2.4)	2.6	3.3	15
008	230-3-50	207-253	1.79 (2.4)	5.2	6.5	15
	400-3-50	360-440	1.79 (2.4)	2.6	3.3	15
012	230-3-50	207-253	2.16 (2.9)	7.5	9.4	15
	400-3-50	360-440	2.16 (2.9)	3.4	4.3	15
014	230-3-50	207-253	2.16 (2.9)	7.5	9.4	15
	400-3-50	360-440	2.16 (2.9)	3.4	4.3	15
016	230-3-50	207-253	2.16 (2.9)	7.5	9.4	15
	400-3-50	360-440	2.16 (2.9)	3.4	4.3	15
024	230-3-50	207-253	3.73 (5.0)	13.2	16.5	25
	400-3-50	360-440	3.73 (5.0)	7.6	9.5	15
028	230-3-50	207-253	5.59 (7.5)	19.8	24.8	40
	400-3-50	360-440	5.59 (7.5)	11.4	14.3	25
034	230-3-50	207-253	7.46 (10.0)	28.0	35.0	60
	400-3-50	360-440	7.46 (10.0)	16.1	20.1	30

LEGEND

FLA — Full Load Amps
MOCP— Maximum Overcurrent Protection

*Motors are designed for satisfactory operation within 10% of nominal voltages shown. Voltages should not exceed the limits shown in the Voltage Limits column.

40RM ALTERNATE MOTORS

UNIT 40RM	V*-PH-Hz	VOLTAGE LIMITS	FAN MOTOR		POWER SUPPLY	
			kW (Hp)	FLA	Minimum Circuit Amps	MOCP
007	230-3-50	207-253	1.79 (2.4)	5.2	6.5	15
	400-3-50	360-440	1.79 (2.4)	2.6	3.3	15
008	230-3-50	207-253	2.16 (2.9)	7.5	9.4	15
	400-3-50	360-440	2.16 (2.9)	3.4	4.3	15
012	230-3-50	207-253	3.73 (5.0)	13.2	16.5	25
	400-3-50	360-440	3.73 (5.0)	7.6	9.5	15
014	230-3-50	207-253	3.73 (5.0)	15.2	19.0	30
	400-3-50	360-440	3.73 (5.0)	7.6	9.5	15
016	230-3-50	207-253	3.73 (5.0)	13.2	16.5	25
	400-3-50	360-440	3.73 (5.0)	7.6	9.5	15
024	230-3-50	207-253	5.59 (7.5)	19.8	24.8	40
	400-3-50	360-440	5.59 (7.5)	11.4	14.3	25
028	230-3-50	207-253	7.46 (10.0)	28.0	35.0	60
	400-3-50	360-440	7.46 (10.0)	16.1	20.1	30

LEGEND

FLA — Full Load Amps
MOCP— Maximum Overcurrent Protection

*Motors are designed for satisfactory operation within 10% of nominal voltages shown. Voltages should not exceed the limits shown in the Voltage Limits column.

40RM FAN CONTACTOR COIL

UNIT 40RM	VOLTAGE (vac)	MAXIMUM HOLDING VA
007-034	24	10



40RM ELECTRIC HEATER DATA (cont)

UNIT 40RM	HEATER PART NO.	V-PH-Hz	FAN MOTOR			ELECTRIC HEATER(S)					MCA*	MOCP*
			Hp	kW	FLA	Nominal Capacity (kW)	Actual Capacity (kW)			FLA		
							Stage 1	Stage 2	Total			
028,034	CAELHEAT028A00	240-3-50	7.5	5.59	19.8	20	19.9	—	19.9	47.9	84.6	90
			10.0	7.46	28.0	20	19.9	—	19.9	47.9	94.8	110
	CAELHEAT029A00	400-3-50	7.5	5.59	11.4	20	13.9	—	13.9	20.0	39.3	40
			10.0	7.46	16.1	20	13.9	—	13.9	20.0	45.2	50
	CAELHEAT031A00	240-3-50	7.5	5.59	19.8	40	20.0	20.0	40.0	96.2	145.0	150
			10.0	7.46	22.8	40	20.0	20.0	40.0	96.2	155.3	175
	CAELHEAT032A00	400-3-50	7.5	5.59	11.4	40	13.8	13.8	27.8	39.9	64.1	70
			10.0	7.46	16.1	40	13.8	13.8	27.8	39.9	70.0	80
	CAELHEAT034A00	240-3-50	7.5	5.59	22.8	50	30.0	20.0	50.0	120.3	175.1	200
			10.0	7.46	32.2	50	30.0	20.0	50.0	120.3	185.4	200
	CAELHEAT035A00	400-3-50	7.5	5.59	11.4	50	20.8	13.9	34.7	50.1	76.9	80
			10.0	7.46	16.1	50	20.8	13.9	34.7	50.1	82.8	90
	CAELHEAT037A00	240-3-50	7.5	5.59	19.8	70	40.0	30.0	70.0	168.4	193.1	200
			10.0	7.46	28.8	70	40.0	30.0	70.0	168.4	208.4	225
	CAELHEAT038A00	400-3-50	7.5	5.59	11.4	70	27.8	20.8	48.6	70.2	84.4	90
			10.0	7.46	16.1	70	27.8	20.8	48.6	70.2	90.3	100

LEGEND

- FLA** — Full Load Amps
Hp — Horsepower
MCA — Minimum Circuit Amps
MOCP — Maximum Overcurrent Protection

*Values shown are for single-point connection of electric heat accessory and air handler.

NOTES:

- MCA and MOCP values apply to both standard and alternate factory-supplied motors.
- Electric resistance heaters are rated at 240 v and 480 v. To determine heater capacity (kW) at unit nameplate multiply the 240-v or 480-v capacity (kW) by the multipliers shown in the table below.

HEATER RATING VOLTAGE	ACTUAL HEATER VOLTAGE AT SITE							
	200	208	230	240	400	440	460	480
240	0.694	0.751	0.918	1.0	—	—	—	—
480	—	—	—	—	0.694	0.840	0.918	1.0

- Heater coils are 24 v and require 8 va holding current.
- The following equation converts kW of heat energy to Btuh:
 $\text{kW} \times 3,412 = \text{Btuh}$
- Approximate shipping weights:
 CAELHEAT001A00 – 014A00 = 55 lbs each
 CAELHEAT016A00 – 026A00 = 60 lbs each
 CAELHEAT028A00 – 038A00 = 75 lbs each

Operating sequence — 38AK007-012, 38AKS008-012

At start-up, the thermostat calls for cooling. With all safety devices satisfied, the compressor contactor and fan contactor energize, causing the compressor and outdoor-fan motor to operate. Contacts energize, allowing the field-supplied and -installed indoor-fan contactor to function. A field-supplied and -installed liquid line valve also opens, allowing the system to function in Cooling mode. As cooling demand is satisfied, the thermostat contacts break, deenergizing the contactor and causing the system to shut off. The liquid line solenoid valve closes, minimizing the potential for refrigerant migration. The compressor does not restart until the thermostat again calls for cooling. If a demand for cooling occurs within 5 minutes after the thermostat is satisfied, the system will not restart because of the Time Guard® II device. After the 5-minute time period, the system will restart as normal on thermostat demand. The system is protected with a Cycle-LOC™ device so that the compressor will not start if a high-pressure or low-pressure fault occurs. To reset the Cycle-LOC device, set the thermostat to eliminate the cooling demand, then return to original set point. This should be done only once, and if system shuts down due to the same fault, determine the problem before attempting to reset the Cycle-LOC device.

Operating sequence — 38AKS013-024

When the first stage of cooling thermostat closes, the timer starts. After approximately 3 seconds, the timer activates the compressor and fan motor no. 1 contactors. When the liquid pressure builds to approximately 1772 kPag (257 psig), fan motor no. 2 is energized.

On demand for additional cooling capacity, the second stage of the cooling thermostat closes, energizing a field-supplied liquid line solenoid (LLS) valve, which opens. This increases the suction pressure, causing the compressor to operate at higher capacity (compressor loads).

When the fan switch is set at AUTO, the indoor-air fan cycles with the compressor. When the switch is set at CONT, the indoor-air fan runs continuously.

At shutdown, the Time Guard II timer prevents the compressor from restarting for approximately 5 minutes.

In addition, a field-supplied solenoid valve wired in parallel with the compressor contactor coil shuts off the liquid line to prevent refrigerant migration back to the compressor during the off cycle.

Operating sequence — 38AKS028-044

When space thermostat calls for cooling, the no. 1 condenser fan and compressor starts after control module (CM) initial time delay of 3 (+2/-1) seconds. If an optional airflow switch is used, compressor and no. 1 condensing fan will not start until sufficient indoor airflow has closed the switch. After 3 seconds the compressor starts and the liquid line solenoid valve (for solenoid drop control) opens. The crankcase heater is deenergized. If the head pressure reaches 1793 kPag (260 psig), the second condenser fan starts.

If cooling demand is low, suction pressure at the compressor drops. As the pressure drops, the compressor unloads 2 banks of cylinders as required. If cooling demand is high and 2-stage operation is used, the second step of the thermostat activates the capacity control liquid line solenoid which activates the second stage evaporator coil. The compressor cylinders load or unload in response to compressor suction pressure to meet evaporator load.

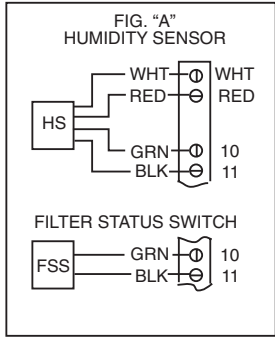
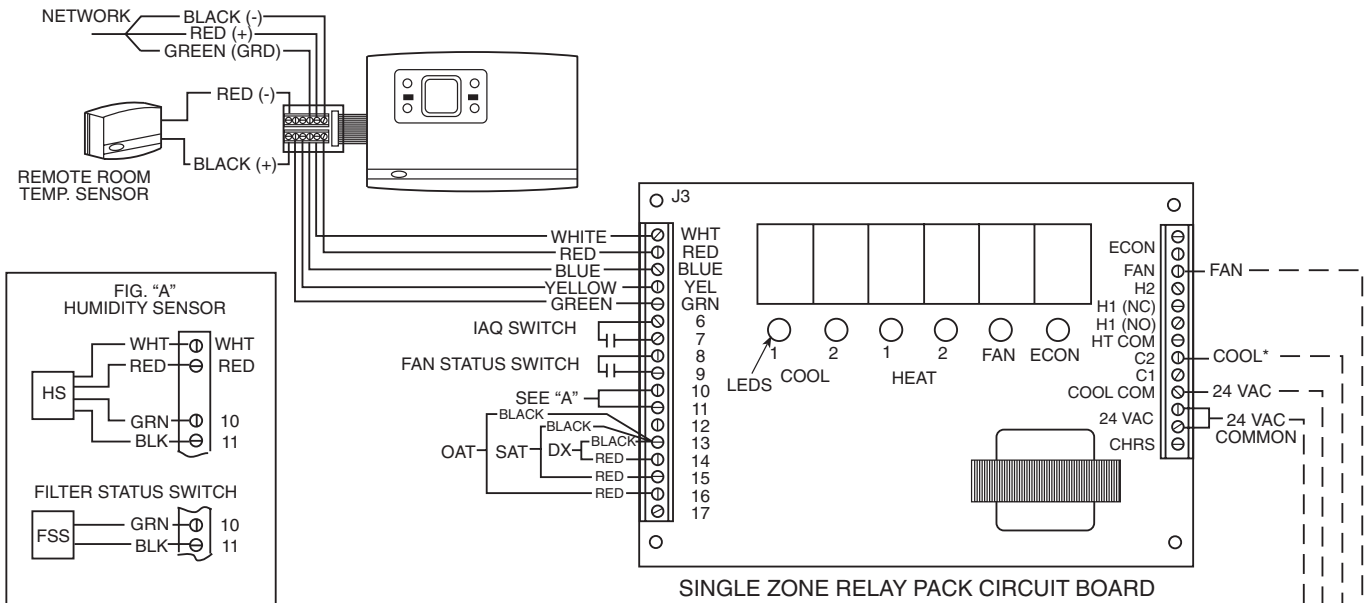
Two minutes after the compressor starts, the bypass relay (BPR) timer is deenergized and the low-pressure switch (LPS) bypass is deactivated. If the LPS trips during the first 2 minutes of operation, the compressor remains operational. If a high-pressure switch (HPS) trips at any time, or the LPS trips after 2 minutes, the compressor cannot restart until the control circuit power is interrupted due to the CM lockout feature.

As the space cooling load is satisfied, the second stage of the thermostat opens, and closes the field-supplied capacity control liquid line solenoid valve to deactivate the second stage coil. The compressor adjusts the number of active cylinders to meet the new load. When the space temperature is satisfied, the first stage of the thermostat opens and the control relay and the BPR open. This closes the solenoid drop control valve. The compressor stops and the crankcase heater is energized, preventing refrigerant from migrating to the compressor during the off cycle (solenoid drop refrigerant control). The CM anti-short-cycling timer is energized and runs for approximately 5 minutes. During this time, the compressor is not able to restart.

Typical control wiring



TEMP SYSTEM APPLICATIONS — 38AK007-012, 38AKS008-012

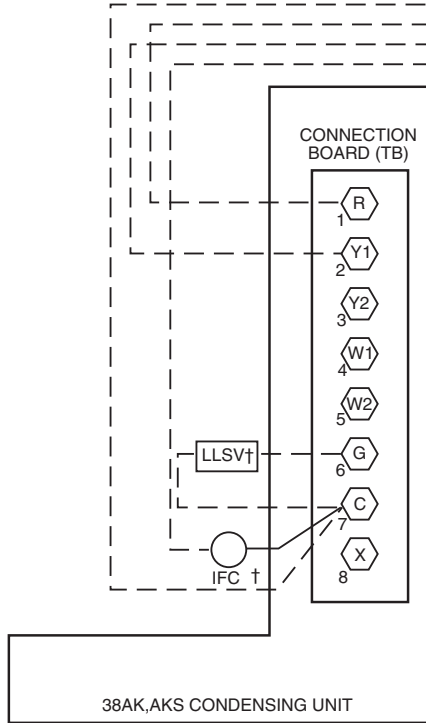


LEGEND

- DX** — Direct Expansion Coil Sensor
- FSS** — Filter Status Switch
- HS** — Humidity Sensor
- IAQ** — Indoor Air Quality
- IFC** — Indoor-Fan Contactor
- LED** — Light-Emitting Diode
- LLSV** — Liquid Line Solenoid Valve
- OAT** — Outdoor Air Temperature Sensor
- SAT** — Supply Air Temperature Sensor
- TB** — Terminal Block
- Marked Terminal
- Factory Wiring
- Field Control Wiring

*Single zone relay pack requires 10 va.
 †Field-supplied.

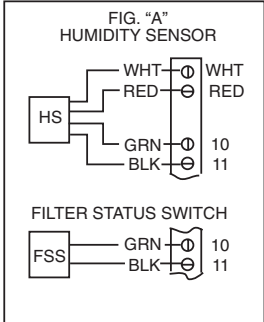
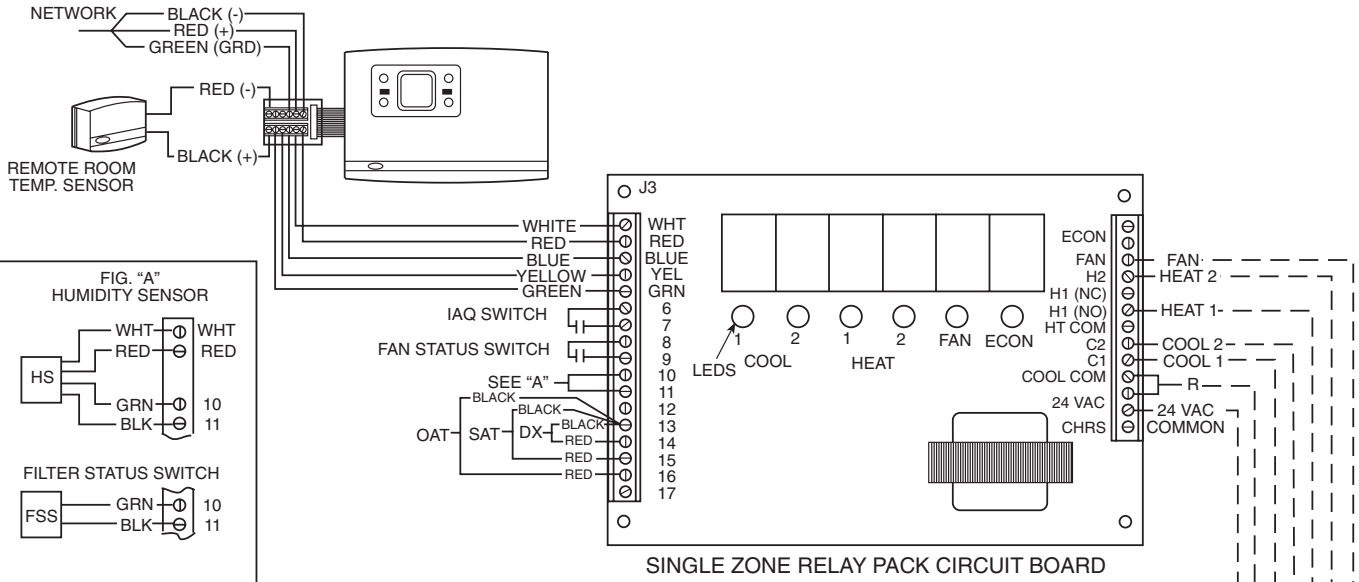
NOTE: Humidity Sensor and filter status switch cannot be wired at the same time.



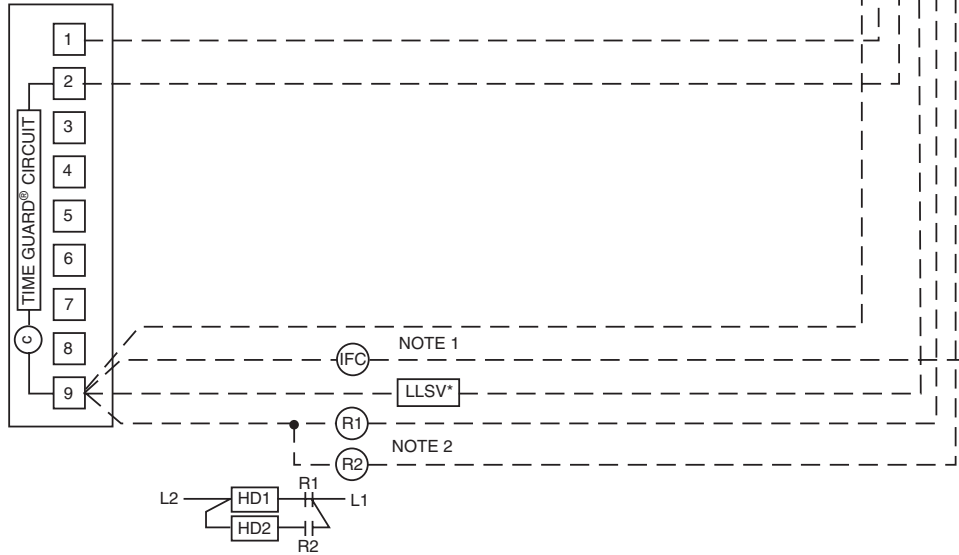
Typical control wiring (cont)



TEMP SYSTEM APPLICATIONS — 38AKS013-024



TERMINAL BLOCK (TB2) IN CONTROL BOX



LEGEND

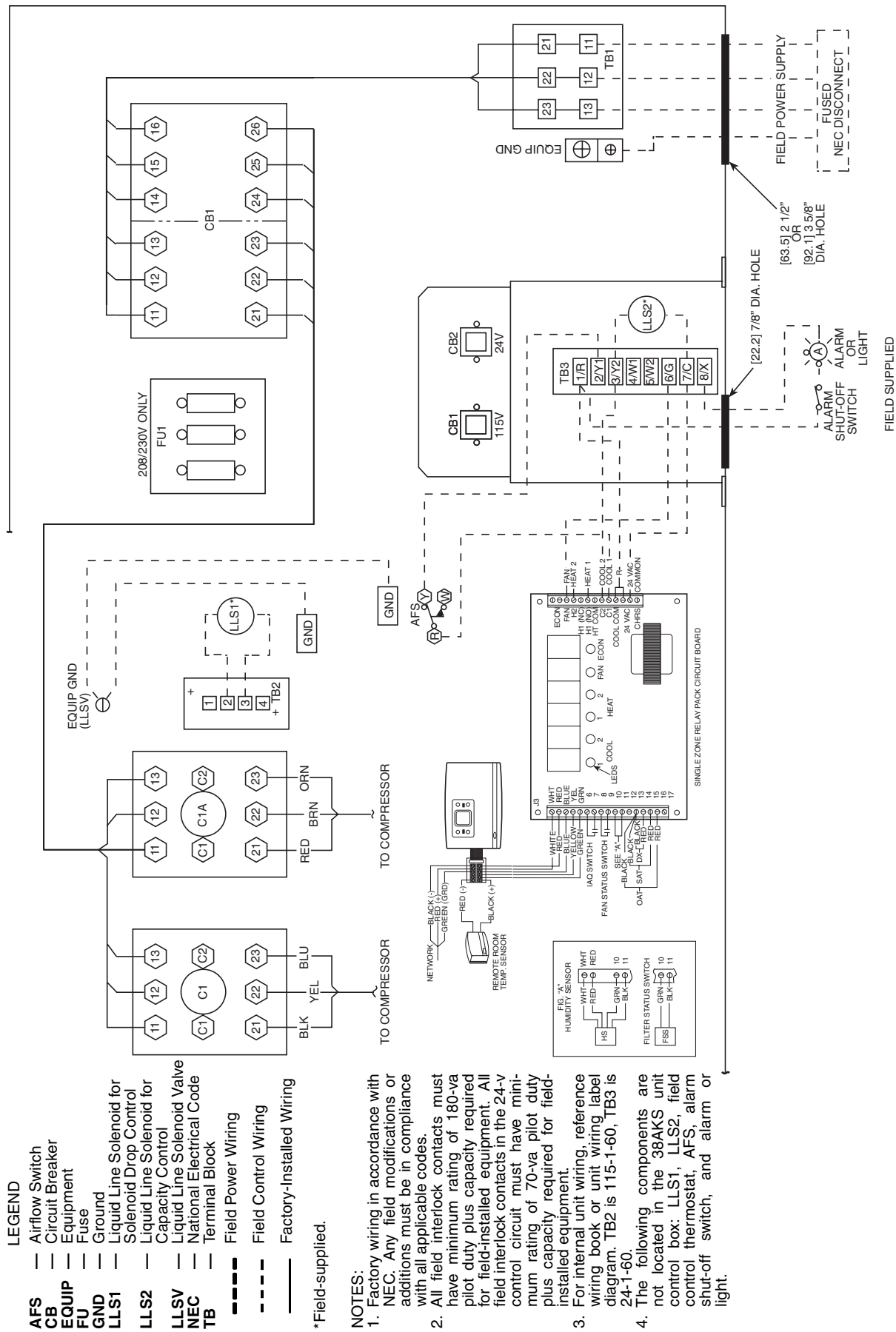
- C** — Compressor Contactor
- DX** — Direct Expansion Coil Sensor
- FSS** — Filter Status Switch
- HD** — Heating Device
- HS** — Humidity Sensor
- IAQ** — Indoor Air Quality
- IFC** — Indoor Fan Contactor
- LED** — Light-Emitting Diode
- LLSV** — Liquid Line Solenoid Valve
- OAT** — Outdoor Air Temperature Sensor
- R** — Heat Control Relay (field-supplied, 24-volt seated coil, 10-va max rating)
- SAT** — Supply Air Temperature Sensor
- Factory Wiring
- - - - Field Control Wiring

*Field supplied.

NOTES:

1. Combination LLSV plus IFC VA should not exceed 30 VA.
2. Do not exceed 5 VA (24 VAC) per coil.
3. If the VA values in Notes 1 and 2 must be exceeded, use accessory relay-transformer package 38AE900001.
4. Wiring diagrams are general guides only and are not intended for a specific installation. Refer to individual product installation and wiring literature.
5. Humidity Sensor and filter status switch cannot be wired at the same time.

TEMP SYSTEM APPLICATIONS — 38AKS028-044



Application data — 38AK007-012, 38AKS008-012



Operating limits — SI

Maximum outdoor ambient	52 C
Minimum return-air temperature	13 C
Maximum return-air temperature	35 C
Range of acceptable saturation suction temperature.	-4 to 13 C
Maximum discharge temperature	135 C
Minimum discharge superheat	33° C

NOTES:

1. Select air handler at no less than 40 L/s per kW (nominal condensing unit capacity).
2. Total combined draw of the field-supplied liquid line solenoid valve and air handler fan contactor must not exceed 20 volt-amperes (va). If the specified volt-amperes must be exceeded, use a remote relay to control the load.

Operating limits — English

Maximum outdoor ambient	125 F
Minimum return-air temperature	55 F
Maximum return-air temperature	95 F
Range of acceptable saturation suction temperature	25 to 55 F
Maximum discharge temperature	275 F
Minimum discharge superheat	60° F

NOTES:

1. Select air handler at no less than 300 cfm/ton (nominal condensing unit capacity).
2. Total combined draw of the field-supplied liquid line solenoid valve and air handler fan contactor must not exceed 20 volt-amperes (va). If the specified volt-amperes must be exceeded, use a remote relay to control the load.

REFRIGERANT PIPING SIZES

LINEAR LENGTH OF PIPING — m (ft)								
UNIT 38AK	0-7.6 (0-25)		7.6-15.2 (25-50)		15.2-22.9 (50-75)		22.9-30.5 (75-100)	
	Line Size (in. OD)							
	L	S	L	S	L	S	L	S
007	1/2	1 1/8	1/2	1 1/8	1/2	1 1/8	1/2	1 1/8
008	1/2	1 1/8	1/2	1 1/8	5/8	1 3/8	5/8	1 3/8
012	1/2	1 1/8	5/8	1 3/8	5/8	1 3/8	5/8	1 3/8
S008	1/2	1 1/8	1/2	1 1/8	5/8	1 3/8	5/8	1 3/8
S009	1/2	1 1/8	5/8	1 1/8	5/8	1 3/8	5/8	1 3/8
S012	1/2	1 1/8	5/8	1 1/8	5/8	1 3/8	5/8	1 3/8

LEGEND

L — Liquid Line S — Suction Line

NOTES:

1. Pipe sizes are based on a 1° C (2° F) loss for liquid and suction lines.
2. Pipe sizes are based on the maximum linear length, shown for each column, plus a 50% allowance for fittings.
3. Charge units with R-22 in accordance with unit installation instructions.
4. Line size conversion to mm:

in.	mm
1/2	12.7
5/8	15.9
1 1/8	28.6
1 3/8	34.9

LIQUID LINE DATA

UNIT 38AK	MAX ALLOWABLE LIQUID LIFT		LIQUID LINE			
	M	Ft	Max Allowable Pressure Drop		Max Allowable Temp Loss	
			kPa	psi	C	F
007	23.2	76	48.3	7	1	2
008	15.2	50				
012	17.4	57				
S008	15.2	50				
S009	15.8	52				
S012	15.8	52				

NOTE: Values shown are for units operating at 7.2 C (45 F) saturated suction and 35 C (95 F) entering air.

MINIMUM OUTDOOR-AIR OPERATING TEMPERATURE

UNIT 38AK	COM- PRESSOR CAPACITY (%)	SATURATED CONDENSING TEMP		MINIMUM OUTDOOR TEMP		
		C	F	Base Unit		With Low Ambient Control†
				C	F	
007	100	32	90	12	53	-29 (-20)
008	100	32	90	15	60	
012	100	32	90	11	52	
S008	100	32	90	15	60	
S009	100	32	90	12	53	
S012*	100 67	32 27	90 60	9 11	48 52	

*Unit has one step of unloading.
†38AK007 — Motormaster® I Control only. 38AK008, 38AK012, 38AKS008, 38AKS009, 38AKS012 — Motormaster III Control only. (Motor change required on 38AK007.)

Application data — 38AKS013-024



Installation

Select equipment to match or to be slightly less than peak load. This provides better humidity control, less unit cycling, and less part-load operation.

When selecting vapor line sizes, oil return must be evaluated, particularly at part-load conditions.

The indoor fan must always be operating when outdoor unit is operating.

Ductwork should be sized according to unit size, not building load.

To minimize the possibility of air recirculation, avoid the use of concentric supply/return grilles.

Indoor equipment should be selected at no less than 40 L/s per kW (300 cfm/ton).

OPERATING LIMITS

Maximum Outdoor Ambient	52 C (125 F)
Minimum Outdoor Ambient	See Minimum Outdoor-Air Operating Temperature table below.
Minimum Return-Air Temperature	12.8 C (55 F)
Maximum Return-Air Temperature	35 C (95 F)
Normal Acceptable Saturation Suction Temperature Range	-3.9 to 12.8 C (25 to 55 F)
Maximum Discharge Temperature	135 C (275 F)
Minimum Discharge Superheat	15.6 C (60 F)

MINIMUM OUTDOOR-AIR OPERATING TEMPERATURE

UNIT 38AKS	COMPRESSOR CAPACITY (%)	SATURATED CONDENSING TEMP		MINIMUM OUTDOOR-AIR OPERATING TEMPERATURE			
				Base Unit		With Low-Ambient Control†	
				C	F	C	F
013	100	32	90	1.7	35		
	67	27	80	7.2	45		
	33*	21	70	12.8	55		
014	100	32	90	2.8	37	-29	-20
	67	27	80	8.9	48		
	33*	21	70	13.9	57		
016	100	32	90	-5.0	23		
	67	27	80	2.2	36		
	33*	21	70	10.0	50		
024	100	32	90	-9.4	15		
	50	27	80	-6.7	20		

*Requires field-installed unloader.

†Motormaster® I control — 38AKS013-024.

LIQUID LINE DATA

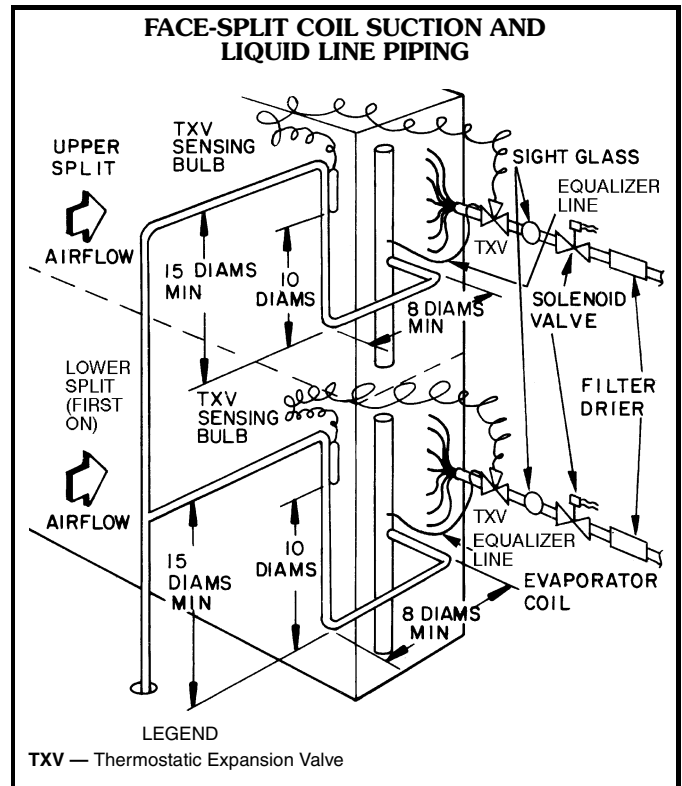
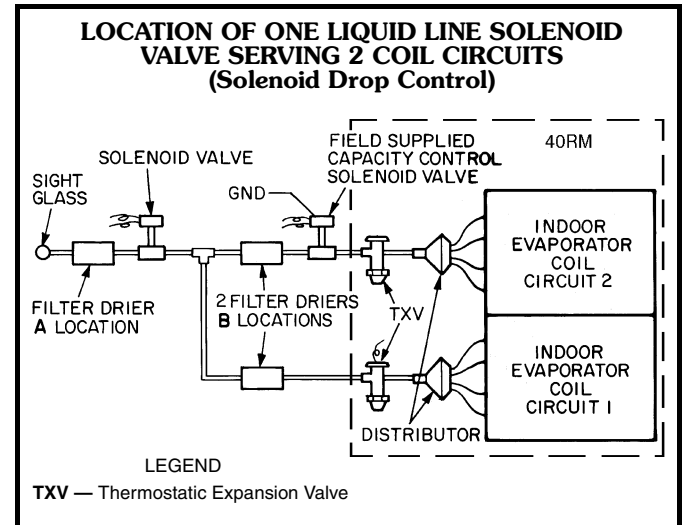
UNIT 38AKS	MAX ALLOW. LIFT — m (ft)	LIQUID LINE	
		Max Allow. Pressure Drop — kPa (psi)	Max Allow. Temp Loss — C (°F)
013	15.8 (52)	48 (7)	1 (2)
014	20.4 (67)		
016	25.0 (82)		
024	26.5 (87)		

NOTE: Data above is for units operating at 8 C (45 F) saturated suction and 35 C (95 F) entering air.

Use of liquid line solenoid valves

A liquid line solenoid valve is recommended.

For dual coil applications, a single liquid line solenoid valve is required to deactivate upper second-stage coil.



Application data — 38AKS013-024 (cont)



Oil return

Condensing units with multiple-step unloading may require double suction risers to assure proper oil return at minimum load operating conditions. Reduction of evaporator coil surface should be analyzed to provide sufficient refrigerant velocity to return oil to the compressor. Liquid line solenoid valves may be used in certain situations to accomplish this. Hot gas bypass, if used, should be introduced before the evaporator. Consult Carrier System Design manual.

REFRIGERANT PIPING SIZES — SI

COND UNIT 38AKS	LENGTH OF INTERCONNECTING PIPING (m)									
	0-4.5		4.5-7.5		7.5-15		15-23		23-30	
	Line Size (in. OD)									
	L	S	L	S	L	S	L	S	L	S
013	1/2	1 1/8	1/2	1 1/8	5/8	1 3/8	5/8	1 3/8	5/8	1 3/8*
014	1/2	1 1/8	5/8	1 3/8	5/8	1 3/8	7/8	1 5/8*	7/8	1 5/8*
016	5/8	1 3/8	5/8	1 3/8	5/8	1 5/8*	7/8	1 5/8*	7/8	1 5/8*
024	5/8	1 3/8	5/8	1 3/8	5/8	1 5/8	7/8	1 5/8	7/8	1 5/8

*Requires a double suction riser if 2 unloaders are used and the evaporator is below the condensing unit. See Refrigerant Piping Sizes — Double Suction Risers table below and Suction Line Piping figure at right for more information.

NOTES:

- Pipe sizes are based on a 1.1 C max loss for liquid lines and 0.8 C max loss for suction lines, selected at maximum length for each interval and for matched systems at nominal rating conditions nominal airflow.
- Pipe sizes are based on an equivalent length equal to the maximum length of interconnecting piping plus 50% for fittings. A more accurate estimate may result in smaller sizes.
- Units must be charged in accordance with the unit installation instructions.
- Line size conversion to mm:

in.	mm
1/2	12.7
5/8	15.9
7/8	22.2
1 1/8	28.6
1 3/8	34.9
1 5/8	41.3
2 1/8	54.0
2 5/8	66.7
3 1/8	79.4

REFRIGERANT PIPING SIZES — DOUBLE SUCTION RISERS — SI

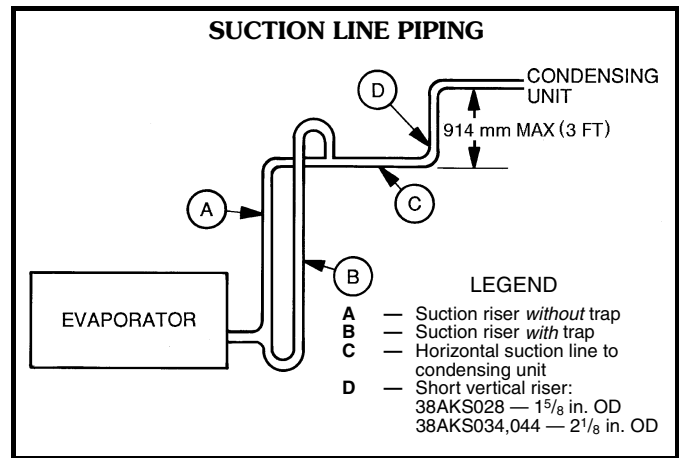
COND UNIT 38AKS	LENGTH OF INTERCONNECTING PIPING (m)								
	7.5-15			18-23			23-30		
	Line Size (in. OD)								
	A	B	C	A	B	C	A	B	C
013	—	—	—	—	—	—	1 1/8	1 3/8	1 5/8
014	—	—	—	1 1/8	1 3/8	1 5/8	1 1/8	1 3/8	1 5/8
016	1 1/8	1 3/8	1 5/8	1 1/8	1 3/8	1 5/8	1 1/8	1 3/8	1 5/8

NOTES:

- See Suction Line Piping figure for "A," "B," and "C" dimensions.
- No double suction risers are needed for unit size 024.

Insulation

Refrigerant suction piping should be insulated in accordance with guidelines set forth in the Carrier System Design Manual.



REFRIGERANT PIPING SIZES — ENGLISH

COND UNIT 38AKS	LENGTH OF INTERCONNECTING PIPING (FT)									
	0-15		16-25		25-50		50-75		75-100	
	Line Size (in. OD)									
	L	S	L	S	L	S	L	S	L	S
013	1/2	1 1/8	1/2	1 1/8	5/8	1 3/8	5/8	1 3/8	5/8	1 3/8*
014	1/2	1 1/8	5/8	1 3/8	5/8	1 3/8	7/8	1 5/8*	7/8	1 5/8*
016	5/8	1 3/8	5/8	1 3/8	5/8	1 5/8*	7/8	1 5/8*	7/8	1 5/8*
024	5/8	1 3/8	5/8	1 3/8	5/8	1 5/8	7/8	1 5/8	7/8	1 5/8

*Requires a double suction riser if 2 unloaders are used and the evaporator is below the condensing unit. See Refrigerant Piping Sizes — Double Suction Risers table and Suction Line Piping figure above for more information.

NOTES:

- Pipe sizes are based on a 2 F max loss for liquid lines and a 1.5 F max loss for suction lines, selected at maximum length for each interval and for matched systems at nominal rating conditions, nominal airflow.
- Pipe sizes are based on an equivalent length equal to the maximum length of interconnecting piping plus 50% for fittings. A more accurate estimate may result in smaller sizes.
- Units must be charged in accordance with the unit installation instructions.

REFRIGERANT PIPING SIZES — DOUBLE SUCTION RISERS — ENGLISH

COND UNIT 38AKS	LENGTH OF INTERCONNECTING PIPING (FT)								
	25-50			50-75			75-100		
	Line Size (in. OD)								
	A	B	C	A	B	C	A	B	C
013	—	—	—	—	—	—	1 1/8	1 3/8	1 5/8
014	—	—	—	1 1/8	1 3/8	1 5/8	1 1/8	1 3/8	1 5/8
016	1 1/8	1 3/8	1 5/8	1 1/8	1 3/8	1 5/8	1 1/8	1 3/8	1 5/8

NOTES:

- See Suction Line Piping figure above for "A," "B," and "C" dimensions.
- No double suction risers are needed for unit size 024.

Multiple condensing unit arrangements*

<p style="text-align: center;">38AKS013-024</p> <p style="text-align: center;">PERPENDICULAR</p>	<p style="text-align: center;">38AKS013-024</p> <p style="text-align: center;">END-TO-END</p>									
<p style="text-align: center;">38AKS013-024</p> <p style="text-align: center;">SIDE-BY-SIDE†</p>	<p> Space for Service and Airflow </p> <p> *For clearances between controls and grounded surfaces, check local codes. †Observe minimum recommended space requirements. </p> <table border="1" style="width: 100%; border-collapse: collapse; margin-top: 10px;"> <thead> <tr> <th style="text-align: center;">38AKS</th> <th colspan="2" style="text-align: center;">DIMENSIONS (ft)</th> </tr> <tr> <th style="text-align: center;">013-028</th> <th style="text-align: center;">A</th> <th style="text-align: center;">B</th> </tr> </thead> <tbody> <tr> <td></td> <td style="text-align: center;">4</td> <td style="text-align: center;">4</td> </tr> </tbody> </table>	38AKS	DIMENSIONS (ft)		013-028	A	B		4	4
38AKS	DIMENSIONS (ft)									
013-028	A	B								
	4	4								

Application data — 38AKS028-044



Installation

Select equipment to match or to be slightly less than peak load. This provides better humidity control, less unit cycling, and less part-load operation.

When selecting vapor line sizes, oil return should be evaluated, particularly at part-load conditions.

The evaporator fan must always be operating when outdoor fan is operating.

Unit cycles should be limited to 3 or less.

Multiple outdoor units may be used with a single indoor unit. This involves multiple refrigeration circuits.

IMPORTANT: When application is in a variable air volume (VAV) system, total building load is not the sum of the individual peak loads. If individual peak loads are summed, the equipment tends to be oversized for the load.

To minimize return-air temperature extremes, use the equipment room as a return-air plenum when applying VAV systems with supply-to-return air recycle as used with Carrier VVT® (variable volume and temperature) Control Systems.

Indoor equipment should be selected at no less than 40 L/s per kW (300 cfm/ton).

OPERATING LIMITS

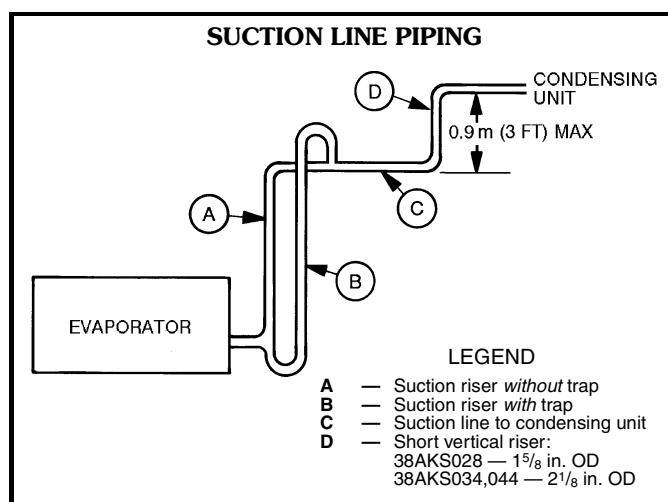
Maximum Cooling Load	46 C (115 F)
Minimum Cooling Load	Additional head pressure control may be required below 1.7 C (35 F) outdoor ambient.
Minimum Return-Air Temperature	12.8 C (55 F)
Maximum Return-Air Temperature	35 C (95 F)
Normal Acceptable Saturation Suction Temperature Range	1.1 to 12.8 C (30 to 55 F)
Maximum Discharge Temperature	146 C (295 F)
Minimum Discharge Superheat	15.6 C (60 F)

MINIMUM OUTDOOR-AIR OPERATING TEMPERATURE

UNIT 38AKS	COM-PRESSOR CAPACITY (%)	SATURATED CONDENSING TEMPERATURE		MIN OUTDOOR TEMPERATURE			
		C	F	Base Unit		With Low Ambient Control	
				C	F	C	F
028	100	32	90	-6	31	-29	-20
	67	27	80	1.7	35		
	33	21	70	1	34		
034	100	32	90	-1	30		
	67	27	80	1	34		
	33	21	70	5.5	42		
044	100	32	90	-3.9	25		
	67	27	80	-1	30		
	33	21	70	1.7	35		

MAXIMUM LIQUID LIFT

UNIT 38AKS	MAXIMUM LIQUID LIFT	
	m	ft
028	23	76
034	20	67
044	23	76



REFRIGERANT PIPE SIZES (Single Suction Risers)

UNIT 38AKS	LENGTH OF INTERCONNECTING PIPING — m (ft)									
	4.9-7.6 (16-25)		7.9-15.2 (26-50)		15.5-22.8 (51-75)		23.2-30.5 (76-100)		30.8-60.9 (101-200)	
	L	S	L	S	L	S	L	S	L	S
028	7/8	1 5/8	7/8	2 1/8*	7/8	2 1/8*	7/8	2 1/8*	7/8	2 1/8*
034	7/8	2 1/8	7/8	2 1/8	7/8	2 1/8	1 1/8	2 1/8	1 1/8	2 5/8*
044	7/8	2 1/8	7/8	2 1/8	1 1/8	2 5/8*	1 1/8	2 5/8*	1 1/8	3 1/8*

LEGEND

- L — Liquid Line
- S — Suction Line

NOTE: All line sizes are inches OD. See notes on page 73 for metric conversions.

*IMPORTANT — If condensing unit is above air handler, a double suction riser is required. See table below for sizing.

REFRIGERANT PIPING SIZES (Double Suction Risers)

UNIT 38AKS	LENGTH OF INTERCONNECTING PIPING — m (ft)											
	7.9-15.2 (26-50)			15.5-22.8 (51-75)			23.2-30.5 (76-100)			30.8-60.9 (101-200)		
	A	B	C	A	B	C	A	B	C	A	B	C
028	1 5/8	1 5/8	2 1/8	1 5/8	1 5/8	2 1/8	1 5/8	1 5/8	2 1/8	1 5/8	1 5/8	2 1/8
034	—	—	—	—	—	—	—	—	—	1 5/8	2 1/8	2 5/8
044	—	—	—	1 5/8	2 1/8	2 5/8	1 5/8	2 1/8	2 5/8	1 5/8	2 1/8	2 5/8

NOTE: A, B, C dimensions relate to reference diagram.

Multiple condensing unit arrangements*

38AKS028-044

PERPENDICULAR

38AKS028-044

END-TO-END

38AKS028-044 ONLY

SIDE-BY-SIDE†

Space for Service and Airflow

*For clearances between controls and grounded surfaces, check local codes.
†Observe minimum recommended space requirements.

38AKS	DIMENSIONS (ft)	
028-044	A	B
	4	4

Application data — 40RM



Operating limits

Maximum fan speed —
 40RM007-024 20 r/s (1200 rpm)
 Maximum fan speed —
 40RM028,034 18.3 r/s (1100 rpm)

General

Select equipment to match or to be slightly less than peak load. This provides better humidity control, less unit cycling, and less part-load operation. Equipment should be selected to perform at no less than 40 L/s per kW (300 cfm/ton).

The air handler fan must always be operating when the condensing unit is operating.

Ductwork should be sized according to unit size, not building load. For larger units with two fans, a split duct transition is recommended at the fan outlets, but a plenum can be used with slight reduction in external static pressure capability.

For variable air volume (VAV) systems with supply-to-return air recycling, use the equipment room as a return air plenum.

40RM FACTORY-INSTALLED NOZZLE AND DISTRIBUTOR DATA

UNIT 40RM	TXV Qty...Part No.	DISTRIBUTOR Qty...Part No.	FEEDER TUBES PER DISTRIBUTOR*	NOZZLE Qty...Part No.
007	TDEBX8	1...1116	12	1...E5
008	TDEBX8	1...1126	15	1...C6
012	TDEBX6	2...1115	9	2...E4
014	TDEBX8	2...1115	9	2...E5
016	TDEBX8	2...1116	12	2...E6
024	TDEBXE11	2...1116	13	2...E8
028	TDEBX11	2...1126	15	2...C10
034	TDEBX16	2...1126	18	2...C12

*Feeder tube size is 6.35 mm (1/4 in.)

NOTE: Hot gas bypass applications require field-supplied auxiliary side connector.

40RM FAN MOTOR DATA STANDARD MOTOR — SI

UNIT 40RM	007	008	012	014	016	024	028	034
230-3-50 and 400-3-50								
Speed (r/s)	23.75	23.75	23.75	23.75	23.75	23.75	23.75	23.75
Shaft kW	1.79	1.79	2.16	2.16	2.16	3.73	5.60	7.46
Frame (NEMA)	56Y	56Y	56Y	56Y	56Y	184T	S213T	S215T
Shaft Dia (mm)	15.9	15.9	22.2	22.2	22.2	28.6	34.9	34.9

LEGEND

NEMA — National Electrical Manufacturers Association (U.S.A.)

ALTERNATE MOTOR — SI

UNIT 40RM	007	008	012	014	016	024	028
230-3-50 and 400-3-50							
Speed (r/s)	23.75	23.75	23.75	23.75	23.75	23.75	23.75
Shaft kW	1.79	2.16	3.73	3.73	3.73	5.60	7.46
Frame (NEMA)	56Y	56Y	S184T	S184T	S184T	S213T	S215T
Shaft Dia (mm)	15.9	22.2	22.2	28.6	28.6	34.9	34.9

LEGEND

NEMA — National Electrical Manufacturers Association (U.S.A.)



40RM FAN MOTOR DATA (cont)
STANDARD MOTOR — ENGLISH

UNIT 40RM	007	008	012	014	016	024	028	034
230-3-50 and 400-3-50								
Speed (rpm)	1425	1425	1425	1425	1425	1425	1425	1425
Hp	2.4	2.4	2.9	2.9	2.9	5.0	7.5	10.0
Frame (NEMA)	56Y	56Y	56Y	56Y	56Y	184T	S213T	S215T
Shaft Dia (in.)	5/8	5/8	7/8	7/8	7/8	1 1/8	1 3/8	1 3/8

LEGEND

NEMA — National Electrical Manufacturers Association (U.S.A.)

ALTERNATE MOTOR — ENGLISH

UNIT 40RM	007	008	012	014	016	024	028
230-3-50 and 400-3-50							
Speed (rpm)	1425	1425	1425	1425	1425	1425	1425
Hp	2.4	2.9	5.0	5.0	5.0	7.5	10.0
Frame (NEMA)	56Y	56Y	S184T	S184T	S184T	S213T	S215T
Shaft Dia (in.)	5/8	7/8	7/8	1 1/8	1 1/8	1 3/8	1 3/8

LEGEND

NEMA — National Electrical Manufacturers Association (U.S.A.)

40RM DRIVE DATA

STANDARD DRIVE — SI

UNIT 40RM	007	008	012	014	016	024	028	034
MOTOR DRIVE								
Motor Pulley Pitch Diameter (mm)	61.0- 86.4	71.1- 96.5	86.4- 111.8	86.4- 111.8	86.4- 111.8	109.2- 134.6	109.2- 134.6	109.2- 134.6
Pulley Factory Setting Full Turns Open	2.5	2.5	2.5	2.5	2.5	3.0	3.0	3.0
FAN DRIVE								
Pulley Pitch Dia (mm)	203	203	203	229	229	218	279	279
Pulley Bore (mm)	25.4	25.4	25.4	36.5	36.5	36.5	49.2	49.2
Belt No. — Section	1—A	1—A	1—A	1—A	1—A	1—B	2—B	2—B
Belt Pitch (mm)	998	998	1024	1074	1074	1062	1113	1113
FAN SPEEDS (r/s)								
Factory Setting	8.6	9.8	11.6	10.3	10.3	13.3	10.4	10.4
Range	7.1- 10.1	8.3- 11.3	10.1- 13.1	9.0- 11.6	9.0- 11.6	11.9- 14.6	9.3- 11.5	9.3- 11.5
Max Allowable Speed (r/s)	20.0	20.0	20.0	20.0	20.0	20.0	18.3	18.3
Change per 1/2 Turn of Moveable Motor Pulley Flange	0.297	0.297	0.297	0.265	0.265	0.230	0.180	0.180
MAX FULL TURNS FROM CLOSED POSITION	5	5	5	5	5	6	6	6
SHAFTS CENTER DISTANCE (mm)	265-313	265-313	265-313	265-313	265-313	232-279	169-240	169-240

Application data — 40RM (cont)



40RM DRIVE DATA (cont) MEDIUM-STATIC DRIVE — SI

UNIT 40RM	007	008	012	014	016	024	028	034
MOTOR DRIVE								
Motor Pulley Pitch Diameter (mm)	86.4-111.8	86.4-111.8	86.4-111.8	86.4-111.8	94.0-119.4	101.6-127.0	109.2-134.6	109.2-134.6
Pulley Factory Setting Full Turns Open	2.5	2.5	2.5	2.5	3.0	2.5	3.0	3.0
FAN DRIVE								
Pulley Pitch Dia (mm)	203	178	152	191	201	178	239	239
Pulley Bore (mm)	25.4	25.4	25.4	36.5	36.5	36.5	49.2	49.2
Belt No. — Section	1—A	1—A	1—A	1—A	1—B	2—A	2—B	2—B
Belt Pitch (mm)	1024	1049	947	998	1011	922	1011	1011
FAN SPEEDS (r/s)								
Factory Setting	11.6	13.2	15.4	12.4	12.6	15.3	12.1	12.1
Range	10.1-13.1	11.5-14.9	13.5-17.4	10.8-13.9	11.1-14.1	13.6-17.0	10.9-13.4	10.9-13.4
Max Allowable Speed (r/s)	20.0	20.0	20.0	20.0	20.0	20.0	18.3	18.3
Change per 1/2 Turn of Moveable Motor Pulley Flange	0.297	0.340	0.395	0.317	0.252	0.340	0.210	0.210
MAX FULL TURNS FROM CLOSED POSITION	5	5	5	5	6	5	6	6
SHAFTS CENTER DISTANCE (mm)	265-313	265-313	265-313	265-313	232-279	232-279	169-240	169-240

HIGH-STATIC DRIVE — SI

UNIT 40RM	007	008	012	014	016	024	028	034
MOTOR DRIVE								
Motor Pulley Pitch Diameter (mm)	86.4-111.8	86.4-111.8	101.6-127.0	86.4-111.8	101.6-127.0	101.6-127.0	109.2-134.6	109.2-134.6
Pulley Factory Setting Full Turns Open	2.5	2.5	3.0	2.5	3.0	3.0	3.0	3.0
FAN DRIVE								
Pulley Pitch Dia (mm)	152	140	140	152	178	163	203	218
Pulley Bore (mm)	25.4	25.4	25.4	36.5	36.5	36.5	49.2	49.2
Belt No. — Section	1—A	1—A	1—A	2—A	2—A	2—A	2—B	2—B
Belt Pitch (mm)	947	947	922	922	998	871	935	960
FAN SPEEDS (r/s)								
Factory Setting	15.4	16.8	19.4	15.4	15.3	16.7	14.3	13.3
Range	13.5-17.4	14.7-19.0	17.3-20.0*	13.5-17.4	13.6-17.0	14.9-18.6	12.8-15.7	11.9-14.6
Max Allowable Speed (r/s)	20.0	20.0	20.0	20.0	20.0	20.0	18.3	18.3
Change per 1/2 Turn of Moveable Motor Pulley Flange	0.395	0.432	0.360	0.395	0.283	0.308	0.247	0.230
MAX FULL TURNS FROM CLOSED POSITION	5	5	6	5	6	6	6	6
SHAFTS CENTER DISTANCE (mm)	265-313	265-313	234-279	232-279	232-279	207-255	169-240	169-240

*It is possible to adjust drive so that fan speed exceeds maximum allowable. DO NOT exceed 20 r/s.



40RM DRIVE DATA (cont)
STANDARD DRIVE — ENGLISH

UNIT 40RM	007	008	012	014	016	024	028	034
MOTOR DRIVE								
Motor Pulley Pitch Diameter (in.)	2.4-3.4	2.8-3.8	3.4-4.4	3.4-4.4	3.4-4.4	4.3-5.3	4.3-5.3	4.3-5.3
Pulley Factory Setting Full Turns Open	2.5	2.5	2.5	2.5	2.5	3.0	3.0	3.0
FAN DRIVE								
Pulley Pitch Dia (in.)	8.0	8.0	8.0	9.0	9.0	8.6	11.0	11.0
Pulley Bore (in.)	1	1	1	1 ^{7/16}	1 ^{7/16}	1 ^{7/16}	1 ^{15/16}	1 ^{15/16}
Belt No. — Section	1—A	1—A	1—A	1—A	1—A	1—B	2—B	2—B
Belt Pitch (in.)	39.3	39.3	40.3	42.3	42.3	41.8	43.8	43.8
FAN SPEEDS (rpm)								
Factory Setting	517	588	695	618	18	795	622	622
Range	428-606	499-677	606-784	538-697	538-697	713-878	557-687	557-687
Max Allowable Speed (rpm)	1200	1200	1200	1200	1200	1200	1100	1100
Change per 1/2 Turn of Moveable Motor Pulley Flange	17.8	17.8	17.8	15.9	15.9	13.8	10.8	10.8
MAX FULL TURNS FROM CLOSED POSITION	5	5	5	5	5	6	6	6
SHAFTS CENTER DISTANCE (in.)	10.44- 12.32	10.44- 12.32	10.44- 12.32	10.44- 12.32	10.44- 12.32	9.12- 10.99	6.67- 9.43	6.67- 9.43

MEDIUM-STATIC DRIVE — ENGLISH

UNIT 40RM	007	008	012	014	016	024	028	034
MOTOR DRIVE								
Motor Pulley Pitch Diameter (in.)	3.4-4.4	3.4-4.4	3.4-4.4	3.4-4.4	3.7-4.7	4.0-5.0	4.3-5.3	4.3-5.3
Pulley Factory Setting Full Turns Open	2.5	2.5	2.5	2.5	3.0	2.5	3.0	3.0
FAN DRIVE								
Pulley Pitch Dia (in.)	8.0	7.0	6.0	7.5	7.9	7.0	9.4	9.4
Pulley Bore (in.)	1	1	1	1 ^{7/16}	1 ^{7/16}	1 ^{7/16}	1 ^{15/16}	1 ^{15/16}
Belt No. — Section	1—A	1—A	1—A	1—A	1—B	2—A	2—B	2—B
Belt Pitch (in.)	40.3	41.3	37.3	39.3	39.8	36.8	39.8	39.8
FAN SPEEDS (rpm)								
Factory Setting	695	794	926	741	756	916	728	728
Range	606-784	692-896	808-1045	646-836	667-848	814-1018	652-803	652-803
Max Allowable Speed (rpm)	1200	1200	1200	1200	1200	1200	1100	1100
Change per 1/2 Turn of Moveable Motor Pulley Flange	17.8	20.4	23.7	19.0	15.1	20.4	12.6	12.6
MAX FULL TURNS FROM CLOSED POSITION	5	5	5	5	6	6	6	6
SHAFTS CENTER DISTANCE (in.)	10.44- 12.32	10.44- 12.32	10.44- 12.32	10.44- 12.32	9.16- 10.99	9.16- 10.99	6.67- 9.43	6.67- 9.43

Application data — 40RM (cont)



40RM DRIVE DATA (cont) HIGH-STATIC DRIVE DATA

UNIT 40RM	007	008	012	014	016	024	028	034
MOTOR DRIVE								
Motor Pulley Pitch Diameter (in.)	3.4-4.4	3.4-4.4	4.0-5.0	3.4-4.4	4.0-5.0	4.0-5.0	4.3-5.3	4.3-5.3
Pulley Factory Setting Full Turns Open	2.5	2.5	3.0	2.5	3.0	3.0	3.0	3.0
FAN DRIVE								
Pulley Pitch Dia (in.)	6.0	5.5	5.5	6.0	7.0	6.4	8.0	8.6
Pulley Bore (in.)	1	1	1	1 ⁷ / ₁₆	1 ⁷ / ₁₆	1 ⁷ / ₁₆	1 ¹⁵ / ₁₆	1 ¹⁵ / ₁₆
Belt No. — Section	1—A	1—A	1—A	2—A	2—A	2—A	2—B	2—B
Belt Pitch (in.)	37.3	37.3	36.3	36.3	39.3	34.3	36.8	37.8
FAN SPEEDS (rpm)								
Factory Setting	926	1010	1166	926	916	1002	855	795
Range	808-1045	881-1140	1036-1200*	808-1045	814-1018	891-1113	766-944	713-878
Max Allowable Speed (rpm)	1200	1200	1200	1200	1200	1200	1100	1100
Change per 1/2 Turn of Moveable Motor Pulley Flange	23.7	25.9	21.6	23.7	17.0	18.5	14.8	13.8
MAX FULL TURNS FROM CLOSED POSITION								
	5	5	6	5	6	6	6	6
SHAFTS CENTER DISTANCE (in.)								
	10.44- 12.32	10.44- 12.32	9.16- 10.99	9.16- 10.99	9.16- 10.99	8.16- 10.02	6.67- 9.43	6.67- 9.43

*It is possible to adjust drive so that fan speed exceeds maximum allowable. DO NOT exceed 1200 rpm.

Guide specifications — 38AKS007-012, 38AKS008-012



Commercial Air-Cooled Condensing Units

HVAC Guide Specifications

Size Range: **19.0 to 32.9 kW (5.4 to 9.4 Tons)**
Nominal

Carrier Model Numbers: **38AK, Sizes 007 to 012**
38AKS, Sizes 008 to 012

Part 1 — General

1.01 SYSTEM DESCRIPTION

Outdoor-mounted, air-cooled condensing unit suitable for on-the-ground or rooftop installation. Unit shall consist of a reciprocating air-conditioning compressor assembly, an air-cooled coil, propeller-type condenser fan, and a control box. Unit shall discharge supply air upward as shown on contract drawings. Unit shall be used in a refrigeration circuit matched with a packaged air-handling unit.

1.02 QUALITY ASSURANCE

- A. Unit shall be rated in accordance with ARI Standard 210/240-89 and 270-84 (U.S.A. standards).
- B. Unit shall be manufactured in a facility registered to ISO 9001 manufacturing quality standard.
- C. Unit construction shall comply with ASHRAE 15 (U.S.A. standard) safety code latest revision and comply with NEC (U.S.A. standard).
- D. Unit cabinet shall be capable of withstanding 500-hour salt spray exposure per ASTM B117 (U.S.A.) (scribed specimen).
- E. Air-cooled condenser coils for semi-hermetic compressor units (38AKS) shall be leak tested at 1034 kPag (150 psig) and pressure tested at 3309 kPag (480 psig). Air-cooled condenser coils for hermetic compressor units (38AK) shall be leak tested at 1379 kPag (200 psig), and pressure tested at 2951 kPag (428 psig).

1.03 DELIVERY, STORAGE, AND HANDLING

Unit shall be shipped as single package only, and shall be stored and handled according to 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 condensing unit. Contained within the unit enclosure shall be all factory wiring, piping, controls, compressor, holding charge (R-22), 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 prepainted baked enamel finish.

2. A heavy-gage roll-formed perimeter base rail with forklift slots and lifting holes shall be provided to facilitate rigging.

C. Fans:

1. Condenser fans shall be direct driven, propeller-type, discharging air vertically upward.
2. Fan blades shall be balanced.
3. Condenser fan discharge openings shall be equipped with PVC-coated steel wire safety guards.
4. Condenser fan and motor shaft shall be corrosion resistant.

D. Compressor:

1. Compressor shall be of the hermetic type (AK) or semi-hermetic reciprocating type (AKS).
2. Compressor shall be mounted on vibration isolators.
3. Semi-hermetic compressors (AKS units) shall have crankcase heaters, oil level sight glasses, discharge service valve, and a totally reversible positive displacement oil pump.
4. Unloader (33% reduction) shall be standard (on 38AKS012 units only).
5. Compressors shall include overload protection.
6. The 38AK012 unit shall have a crankcase heater.

E. Condenser Coil:

1. Condenser coil shall be air-cooled and circuited for integral subcooler.
2. Coil shall be constructed of aluminum fins (copper fins optional) mechanically bonded to internally grooved seamless copper tubes which are then cleaned, dehydrated, and sealed.

F. Refrigeration Components:

Refrigeration circuit components shall include liquid line service valve, suction line service valve, liquid filter drier, a full charge of compressor oil, and a holding charge of refrigerant. Unit 38AK012 shall include an accumulator.

G. Controls and Safeties:

1. Minimum control functions shall include:
 - a. Power and control terminal blocks.
 - b. Compressor lockout on auto-reset safety until reset from thermostat.
2. Minimum safety devices which are equipped with automatic reset (after resetting first at thermostat), shall include:
 - a. High discharge pressure cutout.
 - b. Low suction pressure cutout.

H. Operating Characteristics:

1. The capacity of the condensing unit shall meet or exceed Btuh at a suction temperature of _____. The power consumption at full load shall not exceed _____ kW.

Guide specifications — 38AKS007-012, 38AKS008-012 (cont)



2. The combination of the condensing unit and the evaporator or fan coil unit shall have a total net cooling capacity of _____ or greater at conditions of _____ entering-air temperature at the evaporator at _____ wet bulb and _____ dry bulb, and air entering the condensing unit at _____.
- I. Electrical Requirements:
1. Nominal unit electrical characteristics shall be _____ v, 3-ph, 50 Hz. The unit shall be capable of satisfactory operation within voltage limits of _____ v to _____ v.
 2. Unit electrical power shall be single-point connection.
 3. Unit control circuit shall contain a 24-v transformer for unit control.
- J. Special Features:
1. Low-Ambient Temperature Control Accessory:
Low-ambient control shall regulate speed of condenser-fan motor in response to the saturated condensing temperature of the unit. The control shall maintain correct condensing pressure at outdoor temperatures down to -29 C (-20 F). (Motor change required.)
 2. Gage Panel Package:
Gage panel package shall include a suction and discharge pressure gage.
 3. Optional Condenser Coil Materials:
 - a. Pre-Coated Aluminum-Fin Coils:
Shall have a durable epoxy-phenolic coating to provide protection in mildly corrosive coastal environments. Coating shall be applied to the aluminum fin stock prior to the fin stamping process to create an inert barrier between the aluminum fin and copper tube. Epoxy-phenolic barrier shall minimize galvanic action between dissimilar metals.
 - b. Copper-Fin Coils:
Shall be constructed of copper-fins mechanically bonded to copper-tubes. All copper construction shall provide protection in moderate coastal environments.
 - c. Post-Coated Aluminum-Fin Coils:
Shall have a durable organic coating uniformly applied over all coil surfaces. Coating shall be deep brown color applied by a dip and bake process to ensure complete encapsulation of all coil surfaces. Coated coil shall withstand 1,000-hour salt spray test in accordance with ASTM B117 (U.S.A.). Coil construction shall be aluminum fins mechanically bonded to copper tubes.
 - d. Post-Coated Copper-Fin Coils:
Shall have a durable organic coating uniformly applied over all coil surfaces. Coating shall be deep brown color applied by a dip and bake process to ensure complete encapsulation of all coil surfaces. Coated coil shall withstand 1,000-hour salt spray test in accordance with ASTM B117 (U.S.A.). Coil construction shall be copper fins mechanically bonded to copper tubes.
4. Thermostat Controls:
- a. Debonair® programmable multi-stage thermostat with 7-day clock, holiday scheduling, large Thermoglow™ display, remote sensor capability, and Title 24 compliance.
 - b. TEMP System programmable communicating multi-stage thermostat with fan switch, timeclock, LCD display, °F/°C capability, and CCN (Carrier Comfort Network) compatibility.
 - c. Commercial Electronic Thermostat with 7-day timeclock, auto-changeover, multi-stage capability, and large LCD temperature display.
 - d. Non-programmable thermostat with fan switch subbase.
5. Hail Guard Package:
Hail guard package shall protect coils against damage from hail and other flying debris.
6. Winter Start Package:
Package shall provide a timed bypass of low-pressure switch on start-up at low-ambient temperatures.
7. Condenser Coil Grille:
Grille shall add decorative appearance to unit and protect condenser coil after installation.
8. Electric Solenoid Unloader:
Electric unloader valve piston, coil, and hardware shall be supplied to convert the pressure-operated compressor unloader to electric unloading (38AKS012 only).



Commercial Air-Cooled Condensing Units

HVAC Guide Specifications

Size Range: **30.4 to 64.3 kW (8.5 to 18.0 Tons),
Nominal**

Carrier Model Number: **38AKS, Sizes 013-024**

Part 1 — General

1.01 SYSTEM DESCRIPTION

Outdoor-mounted, air-cooled condensing unit suitable for on-the-ground or rooftop installation. Unit shall consist of a semi-hermetic reciprocating compressor, an air-cooled coil, propeller-type condenser fans, and a control box. Unit shall discharge supply air upward as shown on contract drawings. Unit shall be used in a refrigeration circuit to match a packaged air-handling unit.

1.02 QUALITY ASSURANCE

- A. Unit shall be rated in accordance with ARI Standard 360 (U.S.A. standard), latest edition.
- B. Unit shall be manufactured in a facility registered to ISO 9002 manufacturing quality standard.
- C. Unit construction shall comply with latest edition of ANSI/ASHRAE and with NEC (U.S.A. standard).
- D. Unit cabinet shall be capable of withstanding 500-hour salt spray exposure per ASTM B117 (U.S.A. standards) (scribed specimen).
- E. Air-cooled condenser coils shall be leak tested at 1034 kPag (150 psig) and pressure tested at 3310 kPag (480 psig).

1.03 DELIVERY, STORAGE, AND HANDLING

Unit shall be shipped as a single package only, and shall be stored and handled per 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 condensing unit. Contained within the unit enclosure shall be all factory wiring, piping, controls, compressor, holding charge (R-22), and special features required prior to field start-up.

B. Unit Cabinet:

Unit cabinet shall be constructed of galvanized steel, bonderized and coated with a prepainted, baked enamel finish.

C. Fans:

1. Condenser fans shall be direct-drive propeller type, discharging air vertically upward.
2. Condenser fan motor no. 1 shall be ball bearing type compatible with accessory Motormaster® I low-ambient control.
3. Shafts shall have inherent corrosion resistance.

4. Fan blades shall be statically and dynamically balanced.
5. Condenser fan openings shall be equipped with PVC-coated steel wire safety guards.

D. Compressor:

1. Compressor shall be serviceable, reciprocating, semi-hermetic type.
2. Compressor shall be equipped with an automatically reversible oil pump, operating oil charge, suction and discharge shutoff valves, and an insert-type, factory-sized crankcase heater to control oil dilution.
3. Compressor shall be mounted on spring vibration isolators with an isolation efficiency of no less than 95%.
4. Compressor speed shall not exceed 24.2 r/s (1450 rpm).
5. Compressor shall unload using suction cutoff unloading (electrical solenoid unloading shall be available as an accessory).

E. Condenser Coil:

1. Condenser coil shall be air cooled, circuited for integral subcooler.
2. Coil shall be constructed of aluminum fins mechanically bonded to copper tubes which are then cleaned, dehydrated, and sealed. Aluminum fins with an epoxy phenolic coating and copper fins shall be available as options.

F. Refrigeration Components:

Refrigeration circuit components shall include hot gas muffler, high-side pressure relief device, liquid line shutoff valve, suction and discharge shutoff valves, holding charge of refrigerant R-22, and compressor oil.

G. Controls and Safeties:

1. Minimum control functions shall include:
 - a. Power and control terminal blocks.
 - b. Five-minute Time Guard® II protection to prevent compressor short-cycling.
 - c. Capacity control on the compressor shall be by suction cutoff unloader in response to compressor suction pressure. Electric solenoid unloading shall be available as an accessory.
 - d. Head pressure control to -9.4 C (15 F) by fan cycling. One condenser fan shall be cycled by discharge pressure to maintain proper head pressure.
2. Minimum safety devices shall include:

Automatic reset (after resetting first at thermostat)

 - a. High discharge-pressure cutout.
 - b. Low suction pressure cutout.



- c. Condenser fan motors to be protected against overload condition by internal overloads.

Manual reset at the unit

Electrical overload protection through the use of definite-purpose contactors and calibrated, ambient compensated, magnetic trip circuit breakers. Circuit breakers shall open all 3 phases in the event of an overload in any one of the phases or a single-phase condition.

H. Operating Characteristics:

- 1. The capacity of the condensing unit shall meet or exceed _____ at a suction temperature of _____. The power consumption at full load shall not exceed _____ kW.
- 2. The combination of the condensing unit and the evaporator or fan coil unit shall have a total net cooling capacity of _____ or greater at conditions of _____ entering-air temperature at the evaporator at _____ wet bulb and _____ dry bulb, and air entering the condensing unit at _____.

I. Electrical Requirements:

- 1. Nominal unit electrical characteristics shall be _____ v, 3-ph, 50 Hz. The unit shall be capable of satisfactory operation within voltage limits of _____ v to _____ v.
- 2. Unit electrical power shall be single point connection.
- 3. Unit control circuit shall contain a 24-v transformer for unit control, with capacity to operate an indoor fan interlock.

J. Special Features:

- 1. Low-Ambient Control:
Control shall regulate fan motor speed in response to the saturated condensing temperature of the unit. The control shall allow the unit to operate down to an ambient temperature of -29 C (-20 F).
- 2. Electric Solenoid Unloader:
Unloader valve piston, coil, and hardware shall be supplied to convert the pressure-operated compressor unloader to electric unloading.
- 3. Winter Start:
A winter start control shall be provided to prevent nuisance tripouts at low ambient temperatures.
- 4. Condenser Coil Grille Package:
Grilles shall protect the condenser coils after unit installation.

5. Gage Panel Package:

Gage panel package shall include a suction and discharge pressure gage.

6. Optional Condenser Coil Materials:

a. Pre-Coated Aluminum-Fin Coils:

Shall have a durable epoxy-phenolic coating to provide protection in mildly corrosive coastal environments. Coating shall be applied to the aluminum fin stock prior to the fin stamping process to create an inert barrier between the aluminum fin and copper tube. Epoxy-phenolic barrier shall minimize galvanic action between dissimilar metals.

b. Copper-Fin Coils:

Shall be constructed of copper-fins mechanically bonded to copper-tubes. All copper construction shall provide protection in moderate coastal applications.

c. Post-Coated Aluminum-Fin Coils:

Shall have a durable organic coating uniformly applied to all coil surfaces. Coating shall be deep brown color applied by a dip and bake process to ensure complete encapsulation of all coil surfaces. Coated coil shall withstand 1,000-hour salt spray test in accordance with ASTM B117 (U.S.A.). Coil construction shall be aluminum fins mechanically bonded to copper tubes.

d. Post-Coated Copper-Fin Coils:

Shall have a durable organic coating uniformly applied to all coil surfaces. Coating shall be deep brown color applied by a dip and bake process to ensure complete encapsulation of all coil surfaces. Coated coil shall withstand 1,000-hour salt spray test in accordance with ASTM B117 (U.S.A.). Coil construction shall be copper fins mechanically bonded to copper tubes.

7. Thermostat Controls:

- a. Debonair® programmable multi-stage thermostat with 7-day clock, holiday scheduling, large Thermoglow™ display, remote sensor capability, and Title 24 compliance.
- b. TEMP System programmable communicating multi-stage thermostat with fan switch, timeclock, LCD display, °F/°C capability, and CCN (Carrier Comfort Network) compatibility.
- c. Commercial Electronic Thermostat with 7-day timeclock, auto-changeover, multi-stage capability, and large LCD temperature display.
- d. Non-programmable thermostat with fan switch subbase.

Commercial Air-Cooled Condensing Units

HVAC Guide Specifications

Size Range: **82.8 to 127.0 kW (23.5 to 35.8 Tons),
Nominal**

Carrier Model Number: **38AKS, Sizes 028-044**

Part 1 — General

1.01 SYSTEM DESCRIPTION

Outdoor-mounted, air-cooled condensing unit suitable for on-the-ground or rooftop installation. Unit shall consist of a semi-hermetic reciprocating compressor, an air-cooled coil, propeller-type condenser fans, and a control box. Unit shall discharge supply air upward as shown on contract drawings. Unit shall be used in a refrigeration circuit to match a packaged air-handling unit.

1.02 QUALITY ASSURANCE

- A. Unit shall be rated in accordance with ARI Standard 360 (U.S.A. standard), latest edition.
- B. Unit shall be manufactured in a facility registered to ISO 9002 manufacturing quality standard.
- C. Unit construction shall comply with ANSI/ASHRAE 15 latest revision safety code and comply with NEC (U.S.A. standards).
- D. Unit shall be constructed in accordance with UL standards (U.S.A.).
- E. Unit cabinet shall be capable of withstanding 500-hour salt spray exposure per ASTM B117 (U.S.A.) (scribed specimen).
- F. Air-cooled condenser coils shall be leak tested at 1034 kPa (150 psig) and pressure tested at 3310 kPa (480 psig).

1.03 DELIVERY, STORAGE AND HANDLING

Unit shall be shipped as single package only, 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 condensing unit. Contained within the unit enclosure shall be all factory wiring, piping, controls, compressor, holding charge (R-22), 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 prepainted, baked enamel finish.
2. End unit access panel shall be hinged for compressor and control box service access.
3. Lifting holes shall be provided to facilitate rigging.

C. Fans:

1. Condenser fans shall be direct-driven propeller type, discharging air vertically upward.
2. Condenser fan motors shall be totally enclosed, 3-phase type with class B insulation and with permanently lubricated bearings.
3. Shafts shall have inherent corrosion resistance.
4. Fan blades shall be statically and dynamically balanced.
5. Condenser fan openings shall be equipped with PVC-coated steel wire safety guards.

D. Compressor:

1. Compressor shall be reciprocating, serviceable, semi-hermetic type.
2. Compressor shall be equipped with an automatically reversible oil pump, operating oil charge, suction and discharge shutoff valves, and an insert-type, factory-sized crankcase heater to control oil dilution.
3. Compressor shall be mounted on spring vibration isolators with an isolation efficiency of no less than 95%.
4. Compressor speed shall not exceed 24.2 r/s (1450 rpm).
5. Compressor shall unload using suction cutoff unloading (electrical solenoid unloading shall be available as an accessory).

E. Condenser Coil:

1. Condenser coil shall be air cooled, circuited for integral subcooler.
2. Coil shall be constructed of aluminum fins mechanically bonded to internally grooved, seamless copper tubes which are then cleaned, dehydrated, and sealed. Epoxy phenolic fin coating shall be available as an option.
3. Coil shall be protected by a sheet metal casing to eliminate the need for wind baffles for low ambient temperature operation.
4. Coil shall be protected to avoid damage due to the elements and vandalism.

F. Refrigeration Components:

Refrigeration circuit components shall include hot gas muffler, high-side pressure relief device, liquid line shut-off valve, suction and discharge shutoff valves, holding charge of refrigerant R-22, and compressor oil.

G. Controls and Safeties:

1. Minimum control functions shall include:
 - a. Power and control terminal blocks.
 - b. Five-minute recycle protection to prevent compressor short-cycling.
 - c. Lockout on auto-reset safety until reset from thermostat.
 - d. Capacity control on the compressor shall be by suction cutoff unloaders in response to compressor suction pressure. Electric



solenoid unloading shall be available as an accessory.

- e. A solenoid valve shall be provided for solenoid drop control.
- f. Head pressure control to -6 C (31 F) by fan cycling. One condenser fan shall be cycled by discharge pressure to maintain proper head pressure.
- g. Winter start control to prevent nuisance trip-outs at low ambient temperatures.

2. Minimum safety devices shall include:

Automatic reset (after resetting first at control circuit power supply)

- a. High discharge-pressure cutout.
- b. Low suction-pressure cutout.
- c. Condenser fan motors to be protected against overload or single-phase condition by internal overloads.

Manual reset at the unit

- a. Low oil-pressure cutout.
- b. Compressor electrical overload protection through the use of definite-purpose contactors and calibrated, ambient-compensated, magnetic-trip circuit breakers. Circuit breakers shall open all 3 phases in the event of an overload in any one of the phases or a single-phase condition.

H. Operating Characteristics:

- 1. The capacity of the condensing unit shall meet or exceed _____ at a suction temperature of _____. The power consumption at full load shall not exceed _____ kW.
- 2. The combination of the condensing unit and the evaporator or fan coil unit shall have a total net cooling capacity of _____ or greater at conditions of: _____ entering-air temperature at the evaporator at _____ wet bulb and _____ dry bulb, and air entering the condensing unit at _____.

I. Electrical Requirements:

- 1. Nominal unit electrical characteristics shall be _____ v, 3-ph, 50 Hz. The unit shall be capable of satisfactory operation within voltage limits of _____ v to _____ v.
- 2. Unit electrical power shall be single point connection.
- 3. Unit control circuit shall contain a 24-v transformer for unit control, with capacity to operate an indoor fan interlock.

J. Special Features:

1. Low-Ambient Control:

Control shall regulate fan motor speed in response to the saturated condensing temperature of the unit. The control shall be capable of

maintaining a condensing temperature of 37.8 C (100 F) $\pm 5.6\text{ C}$ (10° F) with outdoor temperatures at -28 C (-20 F). (Motor change required.)

2. Electric Solenoid Unloader:

Unloader valve piston, coil, and hardware shall be supplied to convert any pressure-operated compressor unloader to 220-v electric unloading. Accessory ModuPanel™ control box or field-supplied step controller shall be provided for electrical unloading.

3. Hot-Gas Bypass:

A hot-gas bypass valve and a pilot line solenoid valve shall be provided for low-load operation of the refrigeration system.

4. Part-Winding Start:

Part-winding start shall be provided to reduce inrush current and locked rotor amps on start-up.

5. Gage Panel:

A gage panel package shall be provided which includes a suction and discharge pressure gage for the refrigerant circuit.

6. ModuPanel Control Box:

Control box shall be provided to allow system to operate as a VAV (variable air volume) system.

7. Optional Condenser Coil Materials:

a. Pre-Coated Aluminum-Fin Coils:

Shall have a durable epoxy-phenolic coating to provide protection in mildly corrosive coastal environments. Coating shall be applied to the aluminum fin stock prior to the fin stamping process to create an inert barrier between the aluminum fin and copper tube. Epoxy-phenolic barrier shall minimize galvanic action between dissimilar metals.

b. Copper-Fin Coils:

Shall be constructed of copper-fins mechanically bonded to copper-tubes. All copper construction shall provide protection in moderate coastal environments.

c. Post-Coated Aluminum-Fin Coils:

Shall have a durable organic coating uniformly applied to all coil surfaces. Coating shall be deep brown color applied by a dip and bake process to ensure complete encapsulation of all coil surfaces. Coated coil shall withstand 1,000-hour salt spray test in accordance with ASTM B117 (U.S.A.). Coil construction shall be aluminum fins mechanically bonded to copper tubes.



- d. Post-Coated Copper-Fin Coils:
Shall have a durable organic coating uniformly applied to all coil surfaces. Coating shall be deep brown color applied by a dip and bake process to ensure complete encapsulation of all coil surfaces. Coated coil shall withstand 1,000-hour salt spray test in accordance with ASTM B117 (U.S.A.). Coil construction shall be copper fins mechanically bonded to copper tubes.
- 8. Thermostat Controls:
 - a. Debonair® programmable multi-stage thermostat with 7-day clock, holiday scheduling, large Thermoglow™ display, remote sensor capability, and Title 24 compliance.
 - b. TEMP System programmable communicating multi-stage thermostat with fan switch, timeclock, LCD display, °F/°C capability, and CCN (Carrier Comfort Network) compatibility.
 - c. Commercial Electronic Thermostat with 7-day timeclock, auto-changeover, multi-stage capability, and large LCD temperature display.
 - d. Non-programmable thermostat with fan switch subbase.



Commercial Packaged Air-Handling Unit

HVAC Guide Specifications

Size Range: **1150 to 5650 L/s (2400 to 12,000 Cfm)**

Nominal Airflow

21 to 105 kW (6 to 30 Tons)

Nominal Cooling

Carrier Model Number: **40RM**

Part 1 — General

1.01 SYSTEM DESCRIPTION

- A. Indoor, packaged air-handling unit for use in commercial split systems. Unit shall have a multiposition design and shall be capable of horizontal or vertical (upflow) installation on a floor or in a ceiling, with or without ductwork. (Only vertical units are to be applied without ductwork.)
- B. Unit shall be used in a refrigerant circuit with a matching air-cooled condensing unit.

1.02 QUALITY ASSURANCE

- A. Coils shall be designed and tested in accordance with ASHRAE 15 Safety Code for Mechanical Refrigeration (U.S.A.), latest edition.
- B. Unit shall be constructed in accordance with ETL (U.S.A.) and ETL, Canada standards.
- C. Unit insulation and adhesive shall comply with NFPA 90A (U.S.A.) requirements for flame spread and smoke generation. Insulation shall contain an EPA-registered immobilized anti-microbial agent to effectively resist the growth of bacteria and fungi as proven by tests in accordance with ASTM standards G21 and 22 (U.S.A.).
- D. Unit shall be manufactured in a facility registered to the ISO 9002/BS 5750, Part 2 manufacturing quality standard.
- E. Direct-expansion and chilled water coils shall be burst tested at 2999 kPag (435 psig) and leak tested at 1034 kPag (150 psig).

1.03 DELIVERY AND STORAGE

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

1.04 WARRANTY (FOR INCLUSION BY SPECIFYING ENGINEER)

Part 2 — Products

2.01 EQUIPMENT

Indoor mounted, draw-thru, packaged air-handling unit that can be used in a suspended horizontal configuration or vertical (upflow) configuration. Unit shall consist of forward-curved belt-driven centrifugal fan(s), motor and drive assembly, prewired fan motor contactor, factory-installed refrigerant metering devices, cooling coil, 51-mm (2-in.) disposable air filters, and condensate drain pans for vertical or horizontal configurations.

A. Base Unit:

1. Cabinet shall be constructed of mill-galvanized steel.
2. Cabinet panels shall be fully insulated with 12.7-mm (1/2-in.) fire-retardant material. Insulation shall contain an U.S.A. EPA-registered immobilized anti-microbial agent to effectively resist the growth of bacteria and fungi as proven by tests in accordance with ASTM standards G21 and 22 (U.S.A.).
3. Unit shall contain PVC condensate drain pans for both vertical and horizontal applications. Drain pans shall have connections on right and left sides of unit to facilitate field connection. Drain pans shall have the ability to be sloped toward the right or left side of the unit to prevent standing water from accumulating in pans.
4. Unit shall have factory-supplied 51-mm (2-in.) throwaway-type filters installed upstream from the cooling coil. Filter access shall be from either the right or left side of the unit.

B. Coils:

Coils shall consist of 3 rows of copper tubes with sine-wave aluminum fins bonded to the tubes by mechanical expansion. Coil tubing shall be internally rifled to maximize heat transfer. Suction and liquid line connections or supply and discharge connections shall be made on the same side of the coil.

Direct-expansion coils shall feature factory-installed thermostatic expansion valves (TXVs) for refrigerant control. The TXVs shall be capable of external adjustment.

C. Operating Characteristics:

Unit shall be capable of providing _____ L/s (cfm) airflow at an external static pressure of _____ kPag (in. wg).

D. Motor:

Fan motor of the size and electrical characteristics specified on the equipment schedule shall be factory supplied and installed.

E. Factory-Installed Options:

1. High Capacity Coil:

The high capacity coil consists of 4 rows of 3/8-in. copper tubes with sine-wave aluminum fins bonded to the tubes by mechanical expansion. Coil tubing shall be internally rifled to maximize heat transfer. Suction and liquid line connections shall be made on the same side of the coil. Direct-expansion coils shall feature factory-installed thermostatic expansion valves (TXVs) for refrigerant control. The TXVs shall be capable of external adjustment.



2. Alternate Motor and Drive:

An alternate motor and/or medium- or high-static drive shall be available to meet the airflow and external static pressure requirements specified on the equipment schedule.

3. External Paint:

Where conditions require, units shall be painted with an American Sterling Gray finish.

F. Field-Installed Accessories:

1. Hot Water Coil:

Coil shall be 2-row, U-bend coil with copper tubes and aluminum plate fins bonded to the tubes by mechanical expansion. Coil shall be mounted in a galvanized steel housing that shall be fastened to the unit's fan deck for blow-thru heating operation. Coil shall have maximum working pressure of 1034 kPag (150 psig).

2. Steam Distributing Coil:

Coil shall consist of one row of copper tubes with aluminum plate fins, and shall have inner steam distributing tubes. Coil shall be mounted in a galvanized steel housing and shall be fastened to the unit's fan deck for blow-thru heating operation. Coil shall have maximum working pressure of 1207 kPag at 204.4 C (175 psig at 400 F).

3. Electric Heaters:

Heaters for nominal 230 or 400-volt, 3-phase power supply shall be factory-supplied for field installation as shown on the equipment drawings. Electric heat assembly shall be ETL (U.S.A) and ETL Canada agency approved, and shall have single-point power wiring. Heater assembly shall include contactors with 24-v coils, power wiring, 24-v control wiring terminal blocks, and a hinged access panel. Electric heaters shall not be used with air discharge plenum.

4. Air Discharge Plenum:

Plenum shall be factory supplied to provide free-blow air distribution for vertical floor-mounted units. A grille with moveable vanes for horizontal or vertical airflow adjustment shall be included. Plenum shall be field-assembled and field-installed on the unit's fan deck for blow-thru air distribution. Plenum shall not be used with electric heaters.

5. Return-Air Grille:

Grille shall be factory supplied for field installation on the unit's return air opening.

6. Unit Subbase:

Subbase assembly shall be factory supplied for field installation. Subbase shall elevate floor-mounted vertical units to provide access for correct condensate drain connection.

7. Economizer:

Economizer for ventilation or "free" cooling shall be factory provided for field installation. For free cooling applications, economizer shall be compatible with factory-supplied thermostat; economizer dampers shall open when outdoor air enthalpy is suitable for free cooling. Economizer shall be compatible with separate CO₂ sensor accessory; economizer dampers shall open when indoor CO₂ level rises above predetermined set point. Economizer shall include enthalpy control and damper actuator.

8. Thermostat Controls:

- a. Debonair® programmable multi-stage thermostat with 7-day clock, holiday scheduling, large Thermoglow™ display, remote sensor capability, and Title 24 compliance.
- b. TEMP System programmable communicating multistage thermostat with fan switch, time-clock, LCD display, °F/°C capability, and CCN (Carrier Comfort Network) compatibility.
- c. Commercial Electronic Thermostat with 7-day timeclock, auto-changeover, multi-stage capability, and large LCD temperature display.
- d. Non-programmable thermostat with fan switch subbase.

9. Overhead Suspension Package:

Package shall include necessary brackets to support units in a horizontal ceiling installation.

10. CO₂ Sensor:

Sensor shall provide the ability to signal the economizer to open when the space CO₂ level exceeds the predetermined set point. Sensor shall have the capability of being directly connected to Comfort System relay pack or to economizer using field-supplied and -installed Honeywell dc adapter no. Q769C1004.

11. Condensate Drain Trap:

Trap accessory shall include an integral overflow switch that shall cause the air conditioning system to shut down if the trap fails to drain.

12. UV-C Germicidal Lamps:

- a. UV-C emitters and fixtures shall be specifically designed for use inside an HVAC system. An ASME nozzleed test apparatus using a 45 F (7.2 C) airstream moving at not less than 400 fpm (189 liters/sec.) shall measure individual lamp output. Lamp output at 253.7 nm shall not be less than 10µW/cm² per inch of arc length measured at a distance of one meter.
- b. UV-C power supplies shall be high efficiency, electric type which are matched to the emitters and are capable of producing the specified output intensity with an input power no more than 80 watts.

Guide specifications — 40RM (cont)



- c. Emitters and fixtures shall be installed in sufficient quantity and arranged so as to provide an equal distribution of UV-C energy on the coil and drain pan.
- d. The minimum UV-C energy striking the leading edge of the coil fins shall be not less than $820 \mu\text{W}/\text{cm}^2$ at the closest point and through placement, not less than 60% of that value at the farthest point. Equal amounts are to strike the drain pan,

- either directly or indirectly through reflection.
- e. Emitters and fixtures shall be installed at right angles to the conforming lines of the coil fins, such that through incident angle reflection, UV-C energy strikes all target surfaces of the coil, drain pan, and the available line of sight airstream.

