Product Data

Air-Cooled Condensers
50/60 Hz

20 to 60 Nominal Tons (70 to 211 Nominal kW)

09RCS020-035, 09RCM050-060
Air-Cooled Condensers
50/60 Hz

Features/Benefits

The 09RC condensers offer the utmost in system configuration ideal for clinics, motels, schools, apartments, office buildings, and factories. These premium quality standard components ensure durable, efficient, and reliable operation.

These dependable split systems match Carrier's 30MPA (R-32) and 30HXA (R-513A) air-cooled condenserless chillers with the versatile outdoor 09RC remote air-cooled condensers for a wide selection of commercial cooling solutions.

- Matching 30MPA or 30HXA chillers and 09RC condensers are compatible with ASHRAE 90.1
- Condenser coil options featuring the Novation® heat exchanger with microchannel coil technology
- Optional high-efficiency, variable-speed condenser fans with Greenspeed® intelligence
- 09RC single-circuit units are offered in 20 to 35 ton sizes
- 09RC single or dual-circuit units are offered in 50 to 60 ton sizes

The latest safety standards for 09RC units are certified to UL (Underwriters Laboratories) and CSA (Canadian Standards Association) standards, ETL approved.

Versatility

The 09RC series air-cooled remote condensers feature up to 2 refrigerant circuits, and can be matched with a wide variety of air-cooled condenserless chillers. Single-circuit condensers can operate with single chillers. Dual-circuit condensers can operate with single or dual chillers.

Durable construction

All 09RC units have weatherized cabinets constructed of heavy-duty galvanized steel prepainted with corrosion resistant baked enamel. Inside and outside surfaces are protected to ensure long life and good appearance. The durable, galvanized steel, prepainted components shall withstand 1000 hours in constant neutral salt spray under ASTM B117 conditions with a 1mm scribe per ASTM D1654. After test, painted parts shall show no signs of wrinkling or cracking, no loss of adhesion, no evidence of blistering, and the mean creepage shall not exceed 1/4 in. (Rating ≥ per ASTM D1654) on either side of the scribe line.

09RC condensers have the availability of Novation heat exchangers with microchannel coil technology. The microchannel heat exchanger (MCHX) coils provide long-term reliability, high performance heat transfer, and significant savings in refrigerant charge. E-coated MCHX is offered as an option for harsh industrial or coastal conditions. As an individual component, the e-coated MCHX coil (as well as the e-coated version of the Al/Cu coil) can withstand a 10,000-hour salt spray test in accordance with ASTM B-117 standard.

Refrigerant circuiting

The 09RCM units have single or dual independent circuit capability with factory included kit on all 09RCM units (field installation required). Each circuit is protected by a temperature fusible plug for safety.

Easier installation and service

The 09RC units are available with factory-installed options (multiple coil options, high short circuit current rating [SCCR] interrupt, non-fused disconnect, and security grilles/hail guards) for every installation.

Greater system economy

Subcooling offers more cooling capacity. A specially designed liquid refrigerant circuit provides subcooling for increased capacity without additional power consumption. Subcooling liquid refrigerant also expands condenser applications by permitting condenser installation below the evaporator without subjecting the refrigerant to flashing before the expansion valve.

Quieter, more efficient operation

Standard, AeroAcoustic™ low sound fans provide efficient airflow and quiet operation.

Multi-circuit, multi-refrigerant capability

Choose the single-circuit 09RC or single/dual-circuit 09RC unit and realize separate cooling system economy on each circuit. Single-circuit units are offered in sizes 020 to 035. Dual-circuit units are offered in sizes 050 and 060. Using the 09RCM unit, save space and satisfy installation needs without the expense of smaller condensers with single circuitry. Units are shipped with factory-installed pressure switches which are compatible with R-32, R-410A and R-454B. Use of other refrigerants requires field-supplied and installed pressure switches.

Note that for all units employing high efficiency variable condenser fans, no pressure switches are required or installed.

Individual unit features

The 09RCS020-035 condenser units are available in 20, 30, and 35 ton sizes using a single coil design (with integral subcooling) that is used as single system. Units have vertical air discharge and contain a control box, 2 direct-drive fans and motors and motor mounts. The 020 and 030 have a single coil. The 035 has 2 coils. For all units, fan motors are 3-phase, TEAO (totally enclosed, air over).

The 09RCM050-060 condenser units are available in 50 and 60 ton sizes. The 09RCM050,060 units have 4 direct-drive fans, 4 motors and motor mounts. For all units, fan motors are 3-phase, TEAO (totally enclosed, air over). All units are equipped with a control box and 2 condenser coils with integral subcooling circuits. Each condenser is shipped from the factory as a dual cir-

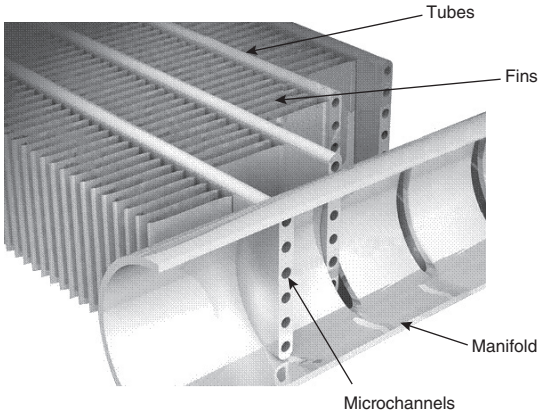
Table of contents

Features/Benefits (cont)

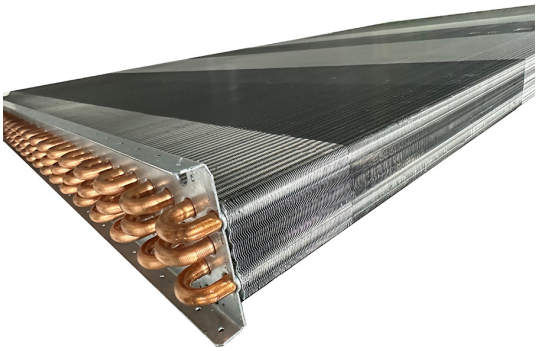
cuit unit. A kit is included with the unit to convert it to single circuit when needed.

Coil split versatility

Model 09RCM coils can be split into one or 2 condensing circuits. Each 09RCM unit ships standard as a dual-circuit unit but can be field-modified to a single-circuit unit by installing the manifold kit that ships with the unit. Each circuit may handle a separate cooling system, using a different refrigerant if desired. Each circuit has a refrigerant subcooling circuit. This saves space and provides installation flexibility.



Novation Heat Exchanger Technology with Microchannel Condenser Coils

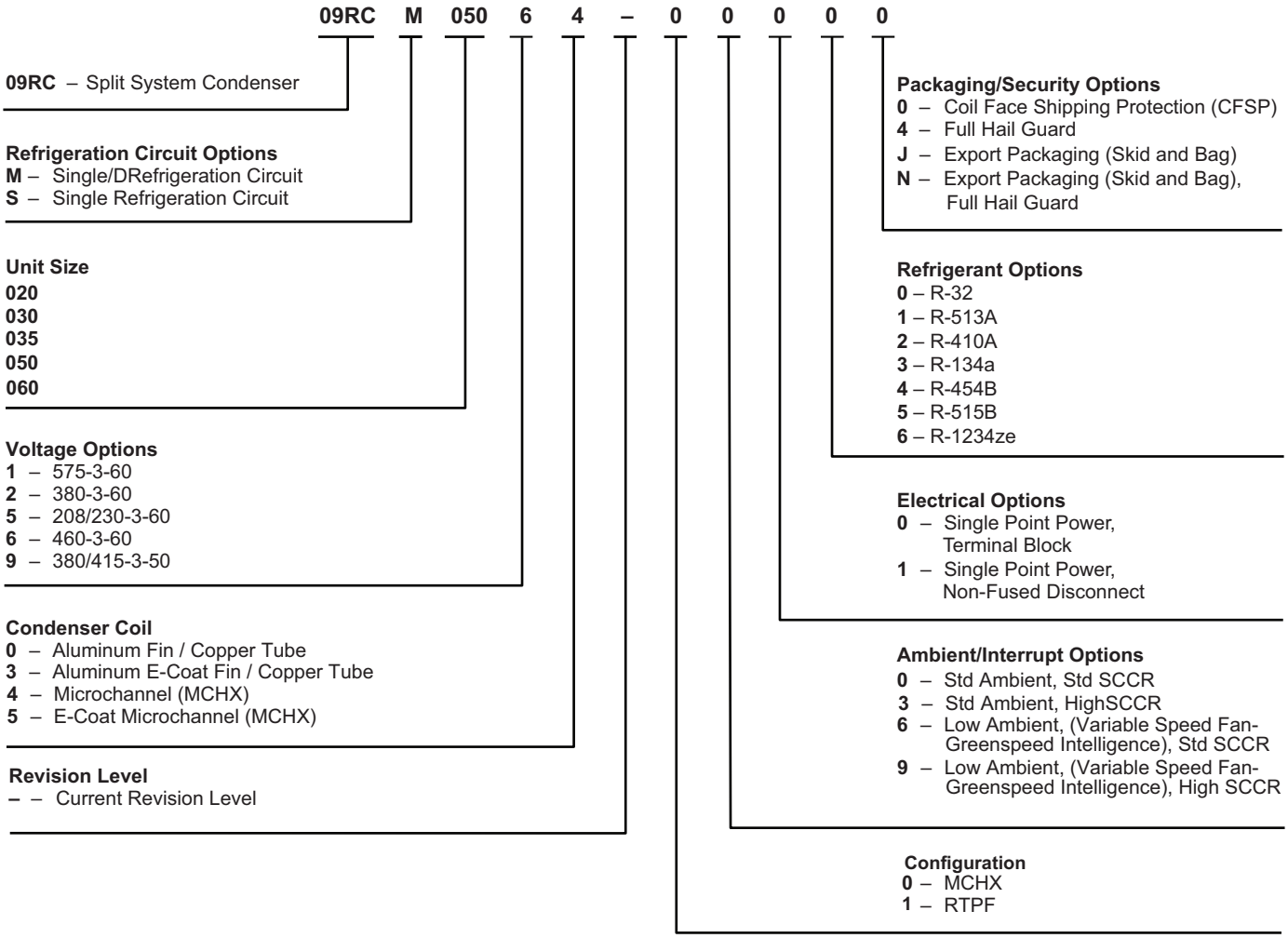


Optional Al/Cu, Al/Cu E-Coat

Variable Speed Condenser Fan Option

Low-Noise Aeroacoustic Fan

Model number nomenclature



LEGEND
MCHX — Microchannel Heat Exchanger
RTPF — Round Tube Plate Fin

Quality Assurance

ISO 9001: 2015-certified processes

Physical data

09RC 020-060 Units — English

09RC UNIT SIZE	09RCS020	09RCS030	09RCS035	09RCM050		09RCM060	
CIRCUIT	Single	Single	Single	Dual	Single	Dual	Single
CHASSIS DIMENSIONS							
Length (in.)	88.3	88.3	97.8	97.8		97.8	
Width (in.)	46.1	46.1	88.3	88.3		88.3	
Height (in.)	66.5	78.5	66.5	66.5		78.5	
UNIT WEIGHTS (lb)							
MCHX Standard	805	955	1212	1484		1682	
Cu-Al RTPF	860	1020	1322	1594		1812	
NITROGEN SHIPPING CHARGE (psi)	5-15						
CONDENSER FANS – Axial FB6							
Quantity	2	2	2	4		4	
No. Blades… Diameter (in.)	9...30						
Motor HP (per fan)	1.5						
Rpm	850 (60 Hz), 700 (50 Hz)						
Airflow (cfm) Al-Cu Coil (60 Hz)[a]	17,908	20,231	21,973.6	37,994		40,462	
Airflow (cfm) MCHX Coil (60 Hz)[a]	18,500	20,900	22,700	39,250		41,800	
Airflow (cfm) Al-Cu Coil (50 Hz)[a]	14,927	16,863	18,315	31,663		33,715	
Airflow (cfm) MCHX Coil (50 Hz)[a]	15,420	17,420	18,920	32,710		34,830	
VARIABLE SPEED (RPM) 8 POLE	850						
Airflow (cfm) Al-Cu Coil (60/50 Hz)[a]	17,908	20,231	21,973.6	37,994		40,462	
Airflow (cfm) MCHX Coil (60/50 Hz)[a]	18,500	20,900	22,700	39,250		41,800	
COIL DETAIL							
No. Coils per Circuit (Ckt A/Ckt B)	1	1	2	1/1	2	1/1	2
Circuit % (Ckt A/Ckt B)	N/A	N/A	N/A	50/50	N/A	50/50	N/A
Total Coils	1	1	2	2	2	2	2
sq ft	27.1	33.9	54.2	54.2	54.2	67.8	67.8
PIPING							
Pressure Relief	Fusible Plug on liquid line - 210°F						
Hot Gas Connection Line Size (in.)	1-3/8	1-3/8	1-5/8	1-3/8 + 1-3/8	1-5/8	1-3/8 + 1-3/8	1-5/8
Liquid Connection Line Size (in.)	5/8	5/8	7/8	5/8+ 5/8	7/8	5/8 + 5/8	7/8

NOTE(S):

a. Condenser fan airflow and power are for units operating at full load and 95°F ambient.

LEGEND
MCHX — Microchannel Heat Exchanger
RTPF — Round Tube Plate Fin

Physical data (cont)

09RC 020-060 Units — SI

09RC UNIT SIZE	09RCS020	09RCS030	09RCS035	09RCM050		09RCM060	
CIRCUIT	Single	Single	Single	Dual	Single	Dual	Single
CHASSIS DIMENSIONS							
Length (mm)	2 242	2 242	2 485	2 485		2 485	
Width (mm)	1 170	1 170	2 242	2 242		2 242	
Height (mm)	1 689	1 994	1 689	1 689		1 994	
UNIT WEIGHTS (kg)							
MCHX Standard	365	433	550	673		763	
Cu-Al RTPF	390	463	600	723		822	
NITROGEN SHIPPING CHARGE (bar)	0.35-3.03						
CONDENSER FANS – Axial FB6							
Quantity	2	2	2	4		4	
No. Blades… Diameter (in.)	9...30						
Motor kW (per fan)	1.12						
Rpm	850 (60 Hz), 700 (50 Hz)						
Airflow (l/sec) Al-Cu Coil (60 Hz)[a]	8 451	9 547	10 369	9 593		9 593	
Airflow (l/sec) MCHX Coil (60 Hz)[a]	8 730	9 863	10 712	9 910		9 910	
Airflow (l/sec) Al-Cu Coil (50 Hz)[a]	7 040	7 953	8 638	7 954		7 954	
Airflow (l/sec) MCHX Coil (50 Hz)[a]	7 272	8 216	8 923	8 217		8 217	
VARIABLE SPEED (RPM) 8 POLE	850						
Airflow (cfm) Al-Cu Coil (60/50 Hz)[a]	8 451	9 547	10 369	9 593		9 593	
Airflow (cfm) MCHX Coil (60/50 Hz)[a]	8 730	9 863	10 712	9 910		9 910	
COIL DETAIL							
No. Coils per Circuit (Ckt A/Ckt B)	1	1	2	1/1	2	1/1	2
Circuit % (Ckt A/Ckt B)	N/A	N/A	N/A	50/50	N/A	50/50	N/A
Total Coils	1	1	2	2	2	2	2
sq m	2.5	2.5	3.1	5	5	6.3	6.3
PIPING							
Pressure Relief	Fusible Plug on liquid line - 99°C						
Hot Gas Connection Line Size (in.)	1-3/8	1-3/8	1-5/8	1-3/8 + 1-3/8	1-5/8	1-3/8 + 1-3/8	1-5/8
Liquid Connection Line Size (in.)	5/8	5/8	7/8	5/8+ 5/8	7/8	5/8 + 5/8	7/8

NOTE(S):

a. Condenser fan airflow and power are for units operating at full load and 35°C ambient.

LEGEND
MCHX — Microchannel Heat Exchanger
RTPF — Round Tube Plate Fin

Options and accessories

ITEM	FACTORY-INSTALLED OPTION	FIELD-INSTALLED ACCESSORY
Refrigeration Circuit Options		
E-Coated MCHX	X	
Aluminum Fin/Copper Tube	X	
Aluminum E-Coat Fin/Copper Tube	X	
Electrical Options		
High Short Circuit Current Rating Interrupt	X	
Non-Fused Disconnect	X	
Variable Speed Condenser Fans	X	
Packaging/Security Options		
Export Packaging (Skid and Bag)	X	
Full Hail Guards	X	
Wind Baffles		X
Vibration Isolation Pads		X

LEGEND
E-Coated — Epoxy Coating Applied to Entire Coil Assembly
MCHX — Microchannel Heat Exchanger

NOTES:
1. Std Interrupt - SCCR (short circuit current rating) (10K)
2. High Interrupt - SCCR 460-v and 380/415-v (65K), 208/230-v (65K), 575-v (25K)

Factory-installed options

Condenser coils

Condenser coils are available to match coil construction to the site conditions for the best durability. Refer to the Condenser Coil Corrosion Protection Options table on page 8 or to the appropriate selection guide for more information.

High short circuit current rating interrupt

High short circuit current rating interrupt provides a short circuit current rating protection for the unit up to 65,000 A on 460-v, 380/415-v, and 208/230-v units or 25,000 A on 575-v units.

Non-fused disconnect

Non-fused disconnect includes factory-installed non-fused disconnect capability for power and control located at the unit.

Export packaging

Export packaging provides a skid underneath the condenser as well as a bag covering the full condenser.

High-efficiency variable condenser fans

High-efficiency variable condenser fans control the speed of all fans for improvement in part load efficiency and sound levels. Additionally, high-efficiency variable condenser fans maintain head pressure control down to –20°F (–29°C) ambient temperature with the use of wind baffles or hail guards.

Full hail guard

The full hail guard consists of louvered panels on the sides and ends of the machine. These hail guards firmly fasten to the machine, and they provide coverage from the top to the bottom of the unit. Note that this factory option also functions as a wind baffle, and the wind baffle accessory is not available when this option is selected.

Field-installed accessories

Wind baffles

Wind baffles facilitate operation down to –20°F (–29°C) when used in conjunction with high-efficiency variable condenser fans.

Vibration isolation

Vibration isolation consists of field-installed 1/4-in. (0.64 cm) neoprene isolator pads (24-in. x 3-in.) (61.0 cm x 7.6 cm) that reduce vibration transmission from the compressor through the floor and into the conditioned space.

Options and accessories (cont)

Condenser Coil Corrosion Protection Options

ENVIRO-SHIELD™ OPTION[a]	ENVIRONMENT				
	Standard	Mild Coastal	Severe Coastal	Industrial	Combined Industrial/Coastal
Novation Heat Exchanger (Standard)	See NACO Packaged Chiller Builder				
Novation Heat Exchanger (E-Coat)	See NACO Packaged Chiller Builder				
AL Fins	X				
AL Fins, E-coat			X	X	X

NOTE(S):

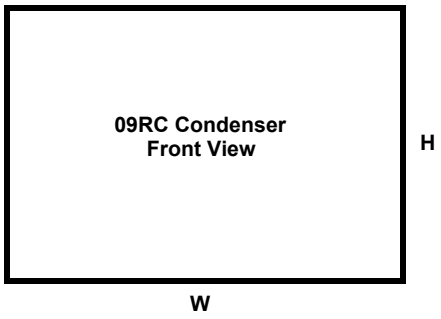
a. See NACO Packaged Chiller Builder for details. Additional corrosion protection is available. For Novation or round tube/plate fin (RTPF) heat exchangers, see selection guide “Environmental Corrosion Protection” (Publication 04-581061-01).

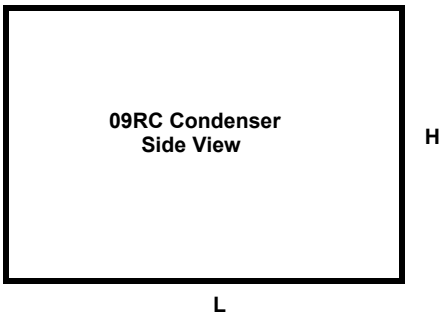
LEGEND

AL — Aluminum
NACO — North American Commercial Operations

Dimensions

09RC020-060 Condenser Layout Dimensions





Chiller Layout Dimensions - English

09RC UNIT	LENGTH (in.)	WIDTH (in.)	HEIGHT (in.)
020	89	46	67
030	89	46	79
035	98	89	67
050	98	89	67
060	98	89	79

Chiller Layout Dimensions - SI

09RC UNIT	LENGTH (mm)	WIDTH (mm)	HEIGHT (mm)
020	2243	1171	1690
030	2243	1171	1994
035	2485	2243	1690
050	2485	2243	1690
060	2485	2243	1994

NOTES:

1. The dimensions presented here are intended to determine the suitability of a given condenser for a given space. **Detailed dimensions may be determined from the Chiller Submittal Drawing Manager.**
2. When determining the suitability of a given condenser for a given space, do not forget to consider the availability of adequate airflow to that location. Contact your Carrier representative for guidelines.

Selection procedure

I Select minimum or maximum charge ratings.

List the refrigerant, total heat rejection (THR), suction and discharge temperatures as determined from compressor data.

II Determine condensing temperature (saturated discharge temperature minus discharge line loss).

III Determine the desired entering air temperature.

IV Use 09RC eCAT to select the appropriate model to meet the total heat rejection target.

Performance data

MCHX Condenser Ratings Using R-32, All 60 Hz Units and 50 Hz Units with Greenspeed Intelligence (English)

MAXIMUM SUBCOOLING CHARGE (15°F)					
TD (F)	TOTAL HEAT REJECTION (TONS)				
	09RC				
	020	030	035	050	060
20	23.83	26.34	27.56	42.97	52.75
25	31.76	34.70	36.02	56.85	69.64
30	38.69	42.12	43.69	69.73	84.65
35	45.24	49.22	51.26	82.09	99.03
40	51.71	56.18	58.65	94.18	113.11

MCHX Condenser Ratings Using R-32, All 60 Hz Units and 50 Hz Units with Greenspeed Intelligence (SI)

MAXIMUM SUBCOOLING CHARGE (8.3°C)					
TD (C)	TOTAL HEAT REJECTION (kW)				
	09RC				
	020	030	035	050	060
11.11	83.82	92.65	96.91	151.11	185.51
13.89	111.70	122.02	126.67	199.94	244.91
16.67	136.05	148.11	153.66	245.24	297.72
19.44	159.11	173.11	180.27	288.72	348.26
22.22	181.86	197.58	206.28	331.23	397.80

MCHX Condenser Ratings Using R-32, 50 Hz Units with Fixed-Speed Fans (English)

MAXIMUM SUBCOOLING CHARGE (15°F)					
TD (F)	TOTAL HEAT REJECTION (TONS)				
	09RC				
	020	030	035	050	060
20	20.85	23.05	24.11	37.60	46.15
25	27.79	30.36	31.52	49.74	60.93
30	33.85	36.85	38.23	61.02	74.07
35	39.59	43.07	44.85	71.83	86.65
40	45.25	49.16	51.32	82.41	98.97

MCHX Condenser Ratings Using R-32, 50 Hz Units with Fixed-Speed Fans (SI)

MAXIMUM SUBCOOLING CHARGE (8.3°C)					
TD (C)	TOTAL HEAT REJECTION (kW)				
	09RC				
	020	030	035	050	060
11.11	73.34	81.07	84.80	132.22	162.32
13.89	97.74	106.77	110.84	174.94	214.29
16.67	119.05	129.60	134.45	214.58	260.50
19.44	139.23	151.47	157.73	252.63	304.73
22.22	159.13	172.88	180.49	289.83	348.08

NOTE(S):

a. Minimum charge gives higher heat rejection, since entire surface of condenser and subcooling circuit is used for condensing only. Minimum charge ratings, however, do not represent greatest potential system capacity. They are comparable to competitive ratings without subcooling.

b. Use maximum charge when compressor, condenser, and evaporator are selected as a package and the components balanced to secure maximum benefits of 15°F (8.3°C) subcooling (for example, in selecting 09RC condensers with Carrier compressor rated at 15°F (8.3°C) subcooling). Maximum charge activates the subcooling circuit, resulting in higher system capacity at slightly higher head pressure and corresponding condensing temperature. Liquid refrigerant leaves the system subcooled to a stable condition to allow greater length of refrigerant run or lift. See Application Data section, for available liquid lift information.

c. Condenser subcooling = Saturated condensing temperature of refrigerant – Actual temperature of refrigerant leaving the coil.

d. TD (Temperature Difference) = Saturated Condensing Temperature (entering) – Entering-Air Temperature.

Performance data (cont)

RTPF Condenser Ratings Using R-32, All 60 Hz Units and 50 Hz Units with Greenspeed Intelligence (English)

MAXIMUM SUBCOOLING CHARGE (15°F)					
TD (F)	TOTAL HEAT REJECTION (TONS)				
	09RC				
	020	030	035	050	060
20	22.90	25.91	25.81	41.04	50.66
25	29.94	33.66	34.09	54.45	66.25
30	36.35	40.80	41.58	66.50	80.60
35	42.48	47.66	48.79	78.06	94.37
40	48.42	54.27	55.77	89.27	107.67

RTPF Condenser Ratings Using R-32, All 60 Hz Units and 50 Hz Units with Greenspeed Intelligence (SI)

MAXIMUM SUBCOOLING CHARGE (8.3°C)					
TD (C)	TOTAL HEAT REJECTION (kW)				
	09RC				
	020	030	035	050	060
11.11	80.55	91.11	90.76	144.35	178.15
13.89	105.31	118.36	119.90	191.48	233.01
16.67	127.84	143.49	146.22	233.88	283.45
19.44	149.41	167.60	171.60	274.54	331.88
22.22	170.27	190.85	196.14	313.96	378.67

RTPF Condenser Ratings Using R-32, 50 Hz Units with Fixed-Speed Fans (English)

MAXIMUM SUBCOOLING CHARGE (15°F)					
TD (F)	TOTAL HEAT REJECTION (TONS)				
	09RC				
	020	030	035	050	060
20	20.04	22.67	22.58	35.91	44.32
25	26.20	29.45	29.83	47.64	57.97
30	31.81	35.70	36.38	58.19	70.52
35	37.17	41.70	42.70	68.31	82.57
40	42.36	47.48	48.80	78.12	94.22

RTPF Condenser Ratings Using R-32, 50 Hz Units with Fixed-Speed Fans (SI)

MAXIMUM SUBCOOLING CHARGE (8.3°C)					
TD (C)	TOTAL HEAT REJECTION (kW)				
	09RC				
	020	030	035	050	060
11.11	70.48	79.72	79.42	126.30	155.88
13.89	92.15	103.57	104.91	167.54	203.88
16.67	111.86	125.56	127.94	204.64	248.02
19.44	130.73	146.65	150.15	240.22	290.39
22.22	148.99	166.99	171.62	274.72	331.34

NOTE(S):

a. Minimum charge gives higher heat rejection, since entire surface of condenser and subcooling circuit is used for condensing only. Minimum charge ratings, however, do not represent greatest potential system capacity. They are comparable to competitive ratings without subcooling.

b. Use maximum charge when compressor, condenser, and evaporator are selected as a package and the components balanced to secure maximum benefits of 15°F (8.3°C) subcooling (for example, in selecting 09RC condensers with Carrier compressor rated at 15°F (8.3°C) subcooling). Maximum charge activates the subcooling circuit, resulting in higher system capacity at slightly higher head pressure and corresponding condensing temperature. Liquid refrigerant leaves the system subcooled to a stable condition to allow greater length of refrigerant run or lift. See Application Data section, for available liquid lift information.

c. Condenser subcooling = Saturated condensing temperature of refrigerant – Actual temperature of refrigerant leaving the coil.

d. TD (Temperature Difference) = Saturated Condensing Temperature (entering) – Entering-Air Temperature.

Performance data (cont)

MCHX Condenser Ratings Using R-410A, All 60 Hz Units and 50 Hz Units with Greenspeed Intelligence (English)

MAXIMUM SUBCOOLING CHARGE (15°F)					
TD (F)	TOTAL HEAT REJECTION (TONS)				
	09RC				
	020	030	035	050	060
20	21.30	24.31	26.11	39.09	48.58
25	29.44	32.51	34.23	53.33	65.16
30	36.20	39.73	41.95	65.83	79.73
35	42.42	46.50	49.34	77.83	93.44
40	48.09	52.96	56.51	89.15	106.54

MCHX Condenser Ratings Using R-410A, All 60 Hz Units and 50 Hz Units with Greenspeed Intelligence (SI)

MAXIMUM SUBCOOLING CHARGE (8.3°C)					
TD (C)	TOTAL HEAT REJECTION (kW)				
	09RC				
	020	030	035	050	060
11.11	74.89	85.50	91.82	137.49	170.84
13.89	103.53	114.34	120.40	187.54	229.16
16.67	127.33	139.71	147.54	231.53	280.39
19.44	149.19	163.52	173.51	273.70	328.62
22.22	169.12	186.26	198.73	313.54	374.69

MCHX Condenser Ratings Using R-410A, 50 Hz Units with Fixed-Speed Fans (English)

MAXIMUM SUBCOOLING CHARGE (15°F)					
TD (F)	TOTAL HEAT REJECTION (TONS)				
	09RC				
	020	030	035	050	060
20	18.63	21.27	22.84	34.21	42.51
25	25.76	28.45	29.95	46.66	57.02
30	31.68	34.76	36.71	57.60	69.76
35	37.12	40.68	43.17	68.10	81.76
40	42.08	46.34	49.44	78.01	93.22

MCHX Condenser Ratings Using R-410A, 50 Hz Units with Fixed-Speed Fans (SI)

MAXIMUM SUBCOOLING CHARGE (8.3°C)					
TD (C)	TOTAL HEAT REJECTION (kW)				
	09RC				
	020	030	035	050	060
11.11	65.53	74.81	80.34	120.30	149.49
13.89	90.59	100.05	105.35	164.10	200.51
16.67	111.41	122.24	129.10	202.59	245.34
19.44	130.54	143.08	151.82	239.49	287.54
22.22	147.98	162.97	173.89	274.35	327.85

NOTE(S):

a. Minimum charge gives higher heat rejection, since entire surface of condenser and subcooling circuit is used for condensing only. Minimum charge ratings, however, do not represent greatest potential system capacity. They are comparable to competitive ratings without subcooling.

b. Use maximum charge when compressor, condenser, and evaporator are selected as a package and the components balanced to secure maximum benefits of 15°F (8.3°C) subcooling (for example, in selecting 09RC condensers with Carrier compressor rated at 15°F (8.3°C) subcooling). Maximum charge activates the subcooling circuit, resulting in higher system capacity at slightly higher head pressure and corresponding condensing temperature. Liquid refrigerant leaves the system subcooled to a stable condition to allow greater length of refrigerant run or lift. See Application Data section, for available liquid lift information.

c. Condenser subcooling = Saturated condensing temperature of refrigerant – Actual temperature of refrigerant leaving the coil.

d. TD (Temperature Difference) = Saturated Condensing Temperature (entering) – Entering-Air Temperature.

Performance data (cont)

RTPF Condenser Ratings Using R-410A, All 60 Hz Units and 50 Hz Units with Greenspeed Intelligence (English)

MAXIMUM SUBCOOLING CHARGE (15°F)					
TD (F)	TOTAL HEAT REJECTION (TONS)				
	09RC				
	020	030	035	050	060
20	20.88	23.84	24.82	37.55	46.50
25	27.95	31.62	32.97	51.32	62.22
30	34.08	38.49	40.47	63.03	76.07
35	39.79	44.96	47.57	74.00	89.11
40	45.22	51.05	54.34	84.37	101.39

RTPF Condenser Ratings Using R-410A, All 60 Hz Units and 50 Hz Units with Greenspeed Intelligence (SI)

MAXIMUM SUBCOOLING CHARGE (8.3°C)					
TD (C)	TOTAL HEAT REJECTION (kW)				
	09RC				
	020	030	035	050	060
11.11	73.44	83.83	87.27	132.06	163.52
13.89	98.28	111.20	115.95	180.47	218.82
16.67	119.85	135.38	142.33	221.66	267.54
19.44	139.94	158.11	167.31	260.24	313.38
22.22	159.02	179.53	191.12	296.70	356.58

RTPF Condenser Ratings Using R-410A, 50 Hz Units with Fixed-Speed Fans (English)

MAXIMUM SUBCOOLING CHARGE (15°F)					
TD (F)	TOTAL HEAT REJECTION (TONS)				
	09RC				
	020	030	035	050	060
20	18.27	20.86	21.71	32.86	40.68
25	24.45	27.67	28.85	44.90	54.44
30	29.82	33.68	35.41	55.15	66.56
35	34.82	39.34	41.63	64.75	77.97
40	39.56	44.67	47.55	73.82	88.72

RTPF Condenser Ratings Using R-410A, 50 Hz Units with Fixed-Speed Fans (SI)

MAXIMUM SUBCOOLING CHARGE (8.3°C)					
TD (C)	TOTAL HEAT REJECTION (kW)				
	09RC				
	020	030	035	050	060
11.11	64.26	73.35	76.36	115.55	143.08
13.89	86.00	97.30	101.46	157.91	191.46
16.67	104.87	118.46	124.54	193.95	234.10
19.44	122.45	138.35	146.40	227.71	274.21
22.22	139.14	157.09	167.23	259.61	312.01

NOTE(S):

a. Minimum charge gives higher heat rejection, since entire surface of condenser and subcooling circuit is used for condensing only. Minimum charge ratings, however, do not represent greatest potential system capacity. They are comparable to competitive ratings without subcooling.

b. Use maximum charge when compressor, condenser, and evaporator are selected as a package and the components balanced to secure maximum benefits of 15°F (8.3°C) subcooling (for example, in selecting 09RC condensers with Carrier compressor rated at 15°F (8.3°C) subcooling). Maximum charge activates the subcooling circuit, resulting in higher system capacity at slightly higher head pressure and corresponding condensing temperature. Liquid refrigerant leaves the system subcooled to a stable condition to allow greater length of refrigerant run or lift. See Application Data section, for available liquid lift information.

c. Condenser subcooling = Saturated condensing temperature of refrigerant – Actual temperature of refrigerant leaving the coil.

d. TD (Temperature Difference) = Saturated Condensing Temperature (entering) – Entering-Air Temperature.

Performance data (cont)

MCHX Condenser Ratings Using R-515B, All 60 Hz Units and 50 Hz Units with Greenspeed Intelligence (English)

MAXIMUM SUBCOOLING CHARGE (15°F)					
TD (F)	TOTAL HEAT REJECTION (TONS)				
	09RC				
	020	030	035	050	060
20	9.16	11.96	18.47	20.73	23.92
25	15.57	20.01	28.79	34.49	40.03
30	20.71	26.39	36.05	45.44	52.79
35	25.55	32.34	42.91	55.78	64.70
40	30.39	38.17	49.74	65.76	76.40

MCHX Condenser Ratings Using R-515B, All 60 Hz Units and 50 Hz Units with Greenspeed Intelligence (SI)

MAXIMUM SUBCOOLING CHARGE (8.3°C)					
TD (C)	TOTAL HEAT REJECTION (kW)				
	09RC				
	020	030	035	050	060
11.11	32.22	42.05	64.97	72.92	84.13
13.89	54.75	70.38	101.27	121.31	140.78
16.67	72.83	92.82	126.77	159.80	185.67
19.44	89.87	113.73	150.90	196.16	227.56
22.22	106.89	134.24	174.92	231.26	268.68

MCHX Condenser Ratings Using R-515B, 50 Hz Units with Fixed-Speed Fans (English)

MAXIMUM SUBCOOLING CHARGE (15°F)					
TD (F)	TOTAL HEAT REJECTION (TONS)				
	09RC				
	020	030	035	050	060
20	8.02	10.46	16.17	18.14	20.93
25	13.62	17.51	25.20	30.18	35.03
30	18.12	23.09	31.54	39.76	46.19
35	22.36	28.30	37.54	48.80	56.62
40	26.59	33.40	43.52	57.54	66.85

MCHX Condenser Ratings Using R-515B, 50 Hz Units with Fixed-Speed Fans (SI)

MAXIMUM SUBCOOLING CHARGE (8.3°C)					
TD (C)	TOTAL HEAT REJECTION (kW)				
	09RC				
	020	030	035	050	060
11.11	28.19	36.80	56.85	63.81	73.61
13.89	47.90	61.58	88.61	106.15	123.18
16.67	63.73	81.22	110.92	139.82	162.46
19.44	78.64	99.51	132.04	171.64	199.11
22.22	93.53	117.46	153.05	202.35	235.09

NOTE(S):

a. Minimum charge gives higher heat rejection, since entire surface of condenser and subcooling circuit is used for condensing only. Minimum charge ratings, however, do not represent greatest potential system capacity. They are comparable to competitive ratings without subcooling.

b. Use maximum charge when compressor, condenser, and evaporator are selected as a package and the components balanced to secure maximum benefits of 15°F (8.3°C) subcooling (for example, in selecting 09RC condensers with Carrier compressor rated at 15°F (8.3°C) subcooling). Maximum charge activates the subcooling circuit, resulting in higher system capacity at slightly higher head pressure and corresponding condensing temperature. Liquid refrigerant leaves the system subcooled to a stable condition to allow greater length of refrigerant run or lift. See Application Data section, for available liquid lift information.

c. Condenser subcooling = Saturated condensing temperature of refrigerant – Actual temperature of refrigerant leaving the coil.

d. TD (Temperature Difference) = Saturated Condensing Temperature (entering) – Entering-Air Temperature.

Performance data (cont)

RTPF Condenser Ratings Using R-515B, All 60 Hz Units and 50 Hz Units with Greenspeed Intelligence (English)

MAXIMUM SUBCOOLING CHARGE (15°F)					
TD (F)	TOTAL HEAT REJECTION (TONS)				
	09RC				
	020	030	035	050	060
20	8.89	11.60	17.92	20.11	23.20
25	15.10	19.41	25.88	33.72	39.63
30	20.09	25.60	32.59	43.67	51.04
35	24.79	31.37	38.80	53.18	61.79
40	29.48	37.02	44.93	62.58	72.37

RTPF Condenser Ratings Using R-515B, All 60 Hz Units and 50 Hz Units with Greenspeed Intelligence (SI)

MAXIMUM SUBCOOLING CHARGE (8.3°C)					
TD (C)	TOTAL HEAT REJECTION (kW)				
	09RC				
	020	030	035	050	060
11.11	31.26	40.79	63.02	70.73	81.61
13.89	53.11	68.27	91.03	118.60	139.37
16.67	70.65	90.03	114.60	153.59	179.49
19.44	87.17	110.32	136.46	187.02	217.31
22.22	103.68	130.21	158.00	220.07	254.51

RTPF Condenser Ratings Using R-515B, 50 Hz Units with Fixed-Speed Fans (English)

MAXIMUM SUBCOOLING CHARGE (15°F)					
TD (F)	TOTAL HEAT REJECTION (TONS)				
	09RC				
	020	030	035	050	060
20	7.78	10.15	15.68	17.60	20.30
25	13.21	16.98	22.65	29.51	34.68
30	17.58	22.40	28.51	38.21	44.66
35	21.69	27.45	33.95	46.53	54.07
40	25.80	32.40	39.31	54.75	63.32

RTPF Condenser Ratings Using R-515B, 50 Hz Units with Fixed-Speed Fans (SI)

MAXIMUM SUBCOOLING CHARGE (8.3°C)					
TD (C)	TOTAL HEAT REJECTION (kW)				
	09RC				
	020	030	035	050	060
11.11	27.35	35.69	55.14	61.89	71.41
13.89	46.47	59.73	79.65	103.77	121.95
16.67	61.82	78.78	100.28	134.39	157.06
19.44	76.28	96.53	119.40	163.64	190.14
22.22	90.72	113.93	138.25	192.56	222.69

NOTE(S):

a. Minimum charge gives higher heat rejection, since entire surface of condenser and subcooling circuit is used for condensing only. Minimum charge ratings, however, do not represent greatest potential system capacity. They are comparable to competitive ratings without subcooling.

b. Use maximum charge when compressor, condenser, and evaporator are selected as a package and the components balanced to secure maximum benefits of 15°F (8.3°C) subcooling (for example, in selecting 09RC condensers with Carrier compressor rated at 15°F (8.3°C) subcooling). Maximum charge activates the subcooling circuit, resulting in higher system capacity at slightly higher head pressure and corresponding condensing temperature. Liquid refrigerant leaves the system subcooled to a stable condition to allow greater length of refrigerant run or lift. See Application Data section, for available liquid lift information.

c. Condenser subcooling = Saturated condensing temperature of refrigerant – Actual temperature of refrigerant leaving the coil.

d. TD (Temperature Difference) = Saturated Condensing Temperature (entering) – Entering-Air Temperature.

Performance data (cont)

MCHX Condenser Ratings Using R-454B, All 60 Hz Units and 50 Hz Units with Greenspeed Intelligence (English)

MAXIMUM SUBCOOLING CHARGE (15°F)					
TD (F)	TOTAL HEAT REJECTION (TONS)				
	09RC				
	020	030	035	050	060
20	11.73	16.13	21.58	26.42	32.23
25	28.26	31.25	33.07	51.13	62.59
30	35.55	38.87	40.95	64.34	77.99
35	42.19	46.00	48.60	76.75	92.42
40	48.51	52.82	56.05	88.81	106.24

MCHX Condenser Ratings Using R-454B, All 60 Hz Units and 50 Hz Units with Greenspeed Intelligence (SI)

MAXIMUM SUBCOOLING CHARGE (8.3°C)					
TD (C)	TOTAL HEAT REJECTION (kW)				
	09RC				
	020	030	035	050	060
11.11	41.24	56.73	75.90	92.91	113.36
13.89	99.38	109.91	116.29	179.80	220.13
16.67	125.04	136.69	144.00	226.26	274.29
19.44	148.39	161.79	170.93	269.92	325.03
22.22	170.61	185.78	197.13	312.34	373.64

MCHX Condenser Ratings Using R-454B, 50 Hz Units with Fixed-Speed Fans (English)

MAXIMUM SUBCOOLING CHARGE (15°F)					
TD (F)	TOTAL HEAT REJECTION (TONS)				
	09RC				
	020	030	035	050	060
20	10.26	14.11	18.88	23.12	28.20
25	24.73	27.35	28.93	44.73	54.77
30	31.11	34.01	35.83	56.29	68.24
35	36.92	40.25	42.53	67.16	80.87
40	42.45	46.22	49.05	77.71	92.96

MCHX Condenser Ratings Using R-454B, 50 Hz Units with Fixed-Speed Fans (SI)

MAXIMUM SUBCOOLING CHARGE (8.3°C)					
TD (C)	TOTAL HEAT REJECTION (kW)				
	09RC				
	020	030	035	050	060
11.11	36.08	49.64	66.41	81.30	99.19
13.89	86.96	96.17	101.75	157.32	192.61
16.67	109.41	119.61	126.00	197.98	240.01
19.44	129.84	141.57	149.56	236.18	284.40
22.22	149.28	162.55	172.49	273.30	326.93

NOTE(S):

a. Minimum charge gives higher heat rejection, since entire surface of condenser and subcooling circuit is used for condensing only. Minimum charge ratings, however, do not represent greatest potential system capacity. They are comparable to competitive ratings without subcooling.

b. Use maximum charge when compressor, condenser, and evaporator are selected as a package and the components balanced to secure maximum benefits of 15°F (8.3°C) subcooling (for example, in selecting 09RC condensers with Carrier compressor rated at 15°F (8.3°C) subcooling). Maximum charge activates the subcooling circuit, resulting in higher system capacity at slightly higher head pressure and corresponding condensing temperature. Liquid refrigerant leaves the system subcooled to a stable condition to allow greater length of refrigerant run or lift. See Application Data section, for available liquid lift information.

c. Condenser subcooling = Saturated condensing temperature of refrigerant – Actual temperature of refrigerant leaving the coil.

d. TD (Temperature Difference) = Saturated Condensing Temperature (entering) – Entering-Air Temperature.

Performance data (cont)

RTPF Condenser Ratings Using R-454B, All 60 Hz Units and 50 Hz Units with Greenspeed Intelligence (English)

MAXIMUM SUBCOOLING CHARGE (15°F)					
TD (F)	TOTAL HEAT REJECTION (TONS)				
	09RC				
	020	030	035	050	060
20	11.37	16.70	20.49	24.48	32.70
25	26.93	30.69	31.52	50.27	60.00
30	33.41	37.90	39.15	62.97	74.50
35	39.41	44.64	46.39	74.58	88.03
40	45.10	51.08	53.33	85.63	100.98

RTPF Condenser Ratings Using R-454B, All 60 Hz Units and 50 Hz Units with Greenspeed Intelligence (SI)

MAXIMUM SUBCOOLING CHARGE (8.3°C)					
TD (C)	TOTAL HEAT REJECTION (kW)				
	09RC				
	020	030	035	050	060
11.11	40.00	58.73	72.05	86.10	115.00
13.89	94.69	107.92	110.86	176.81	211.03
16.67	117.50	133.29	137.68	221.46	262.01
19.44	138.59	157.00	163.14	262.30	309.60
22.22	158.60	179.65	187.56	301.16	355.14

RTPF Condenser Ratings Using R-454B, 50 Hz Units with Fixed-Speed Fans (English)

MAXIMUM SUBCOOLING CHARGE (15°F)					
TD (F)	TOTAL HEAT REJECTION (TONS)				
	09RC				
	020	030	035	050	060
20	9.95	14.61	17.93	21.42	28.61
25	23.56	26.85	27.58	43.99	52.50
30	29.23	33.16	34.25	55.10	65.19
35	34.48	39.06	40.59	65.26	77.03
40	39.46	44.70	46.66	74.93	88.36

RTPF Condenser Ratings Using R-454B, 50 Hz Units with Fixed-Speed Fans (SI)

MAXIMUM SUBCOOLING CHARGE (8.3°C)					
TD (C)	TOTAL HEAT REJECTION (kW)				
	09RC				
	020	030	035	050	060
11.11	35.00	51.39	63.04	75.34	100.62
13.89	82.86	94.43	97.00	154.71	184.65
16.67	102.81	116.63	120.47	193.78	229.26
19.44	121.27	137.37	142.75	229.51	270.90
22.22	138.78	157.20	164.11	263.52	310.75

NOTE(S):

a. Minimum charge gives higher heat rejection, since entire surface of condenser and subcooling circuit is used for condensing only. Minimum charge ratings, however, do not represent greatest potential system capacity. They are comparable to competitive ratings without subcooling.

b. Use maximum charge when compressor, condenser, and evaporator are selected as a package and the components balanced to secure maximum benefits of 15°F (8.3°C) subcooling (for example, in selecting 09RC condensers with Carrier compressor rated at 15°F (8.3°C) subcooling). Maximum charge activates the subcooling circuit, resulting in higher system capacity at slightly higher head pressure and corresponding condensing temperature. Liquid refrigerant leaves the system subcooled to a stable condition to allow greater length of refrigerant run or lift. See Application Data section, for available liquid lift information.

c. Condenser subcooling = Saturated condensing temperature of refrigerant – Actual temperature of refrigerant leaving the coil.

d. TD (Temperature Difference) = Saturated Condensing Temperature (entering) – Entering-Air Temperature.

Performance data (cont)

MCHX Condenser Ratings Using R-513A, All 60 Hz Units and 50 Hz Units with Greenspeed Intelligence (English)

MAXIMUM SUBCOOLING CHARGE (15°F)					
TD (F)	TOTAL HEAT REJECTION (TONS)				
	09RC				
	020	030	035	050	060
20	11.34	15.08	21.71	25.48	30.16
25	19.15	24.68	30.90	41.33	49.35
30	25.47	31.64	38.18	53.76	63.35
35	31.14	37.88	45.27	64.81	75.92
40	36.44	43.93	52.33	75.27	88.12

MCHX Condenser Ratings Using R-513A, All 60 Hz Units and 50 Hz Units with Greenspeed Intelligence (SI)

MAXIMUM SUBCOOLING CHARGE (8.3°C)					
TD (C)	TOTAL HEAT REJECTION (kW)				
	09RC				
	020	030	035	050	060
11.11	39.88	53.05	76.35	89.60	106.06
13.89	67.33	86.81	108.68	145.37	173.54
16.67	89.56	111.28	134.27	189.07	222.80
19.44	109.53	133.21	159.22	227.94	266.99
22.22	128.15	154.49	184.04	264.73	309.90

MCHX Condenser Ratings Using R-513A, 50 Hz Units with Fixed-Speed Fans (English)

MAXIMUM SUBCOOLING CHARGE (15°F)					
TD (F)	TOTAL HEAT REJECTION (TONS)				
	09RC				
	020	030	035	050	060
20	9.92	13.20	19.00	22.29	26.39
25	16.75	21.60	27.04	36.17	43.18
30	22.28	27.69	33.41	47.04	55.43
35	27.25	33.14	39.61	56.71	66.43
40	31.88	38.44	45.79	65.86	77.10

MCHX Condenser Ratings Using R-513A, 50 Hz Units with Fixed-Speed Fans (SI)

MAXIMUM SUBCOOLING CHARGE (8.3°C)					
TD (C)	TOTAL HEAT REJECTION (kW)				
	09RC				
	020	030	035	050	060
11.11	34.90	46.42	66.81	78.40	92.80
13.89	58.92	75.96	95.10	127.19	151.85
16.67	78.36	97.37	117.48	165.44	194.95
19.44	95.84	116.56	139.32	199.45	233.62
22.22	112.13	135.18	161.04	231.64	271.17

NOTE(S):

a. Minimum charge gives higher heat rejection, since entire surface of condenser and subcooling circuit is used for condensing only. Minimum charge ratings, however, do not represent greatest potential system capacity. They are comparable to competitive ratings without subcooling.

b. Use maximum charge when compressor, condenser, and evaporator are selected as a package and the components balanced to secure maximum benefits of 15°F (8.3°C) subcooling (for example, in selecting 09RC condensers with Carrier compressor rated at 15°F (8.3°C) subcooling). Maximum charge activates the subcooling circuit, resulting in higher system capacity at slightly higher head pressure and corresponding condensing temperature. Liquid refrigerant leaves the system subcooled to a stable condition to allow greater length of refrigerant run or lift. See Application Data section, for available liquid lift information.

c. Condenser subcooling = Saturated condensing temperature of refrigerant – Actual temperature of refrigerant leaving the coil.

d. TD (Temperature Difference) = Saturated Condensing Temperature (entering) – Entering-Air Temperature.

Performance data (cont)

RTPF Condenser Ratings Using R-513A, All 60 Hz Units and 50 Hz Units with Greenspeed Intelligence (English)

MAXIMUM SUBCOOLING CHARGE (15°F)					
TD (F)	TOTAL HEAT REJECTION (TONS)				
	09RC				
	020	030	035	050	060
20	11.00	14.63	21.06	24.71	29.25
25	18.57	23.45	28.93	39.64	46.84
30	25.02	29.47	35.63	51.05	59.00
35	29.90	35.01	42.11	61.61	70.23
40	34.59	40.40	48.49	71.79	81.15

RTPF Condenser Ratings Using R-513A, All 60 Hz Units and 50 Hz Units with Greenspeed Intelligence (SI)

MAXIMUM SUBCOOLING CHARGE (8.3°C)					
TD (C)	TOTAL HEAT REJECTION (kW)				
	09RC				
	020	030	035	050	060
11.11	38.69	51.46	74.06	86.91	102.87
13.89	65.31	82.47	101.74	139.42	164.72
16.67	87.99	103.63	125.32	179.52	207.48
19.44	105.14	123.12	148.09	216.66	246.98
22.22	121.66	142.08	170.54	252.47	285.39

RTPF Condenser Ratings Using R-513A, 50 Hz Units with Fixed-Speed Fans (English)

MAXIMUM SUBCOOLING CHARGE (15°F)					
TD (F)	TOTAL HEAT REJECTION (TONS)				
	09RC				
	020	030	035	050	060
20	9.63	12.80	18.43	21.62	25.60
25	16.25	20.52	25.31	34.69	40.98
30	21.89	25.78	31.18	44.66	51.62
35	26.16	30.63	36.85	53.90	61.45
40	30.27	35.35	42.43	62.82	71.01

RTPF Condenser Ratings Using R-513A, 50 Hz Units with Fixed-Speed Fans (SI)

MAXIMUM SUBCOOLING CHARGE (8.3°C)					
TD (C)	TOTAL HEAT REJECTION (kW)				
	09RC				
	020	030	035	050	060
11.11	33.85	45.03	64.81	76.05	90.01
13.89	57.15	72.16	89.02	122.00	144.13
16.67	76.99	90.68	109.65	157.08	181.55
19.44	92.00	107.73	129.58	189.58	216.11
22.22	106.45	124.32	149.22	220.92	249.72

NOTE(S):

a. Minimum charge gives higher heat rejection, since entire surface of condenser and subcooling circuit is used for condensing only. Minimum charge ratings, however, do not represent greatest potential system capacity. They are comparable to competitive ratings without subcooling.

b. Use maximum charge when compressor, condenser, and evaporator are selected as a package and the components balanced to secure maximum benefits of 15°F (8.3°C) subcooling (for example, in selecting 09RC condensers with Carrier compressor rated at 15°F (8.3°C) subcooling). Maximum charge activates the subcooling circuit, resulting in higher system capacity at slightly higher head pressure and corresponding condensing temperature. Liquid refrigerant leaves the system subcooled to a stable condition to allow greater length of refrigerant run or lift. See Application Data section, for available liquid lift information.

c. Condenser subcooling = Saturated condensing temperature of refrigerant – Actual temperature of refrigerant leaving the coil.

d. TD (Temperature Difference) = Saturated Condensing Temperature (entering) – Entering-Air Temperature.

Performance data (cont)

MCHX Condenser Ratings Using R-1234ze, All 60 Hz Units and 50 Hz Units with Greenspeed Intelligence (English)

MAXIMUM SUBCOOLING CHARGE (15°F)					
TD (F)	TOTAL HEAT REJECTION (TONS)				
	09RC				
	020	030	035	050	060
20	9.34	12.15	18.75	21.13	24.31
25	15.86	20.31	29.03	35.10	40.63
30	21.09	26.78	36.23	46.18	53.56
35	26.00	32.79	43.10	56.58	65.60
40	30.92	38.66	49.93	66.67	77.39

MCHX Condenser Ratings Using R-1234ze, All 60 Hz Units and 50 Hz Units with Greenspeed Intelligence (SI)

MAXIMUM SUBCOOLING CHARGE (8.3°C)					
TD (C)	TOTAL HEAT REJECTION (kW)				
	09RC				
	020	030	035	050	060
11.11	32.86	42.74	65.93	74.33	85.51
13.89	55.79	71.43	102.08	123.46	142.89
16.67	74.17	94.17	127.41	162.42	188.38
19.44	91.44	115.30	151.58	198.99	230.71
22.22	108.72	135.98	175.61	234.47	272.18

MCHX Condenser Ratings Using R-1234ze, 50 Hz Units with Fixed-Speed Fans (English)

MAXIMUM SUBCOOLING CHARGE (15°F)					
TD (F)	TOTAL HEAT REJECTION (TONS)				
	09RC				
	020	030	035	050	060
20	8.18	10.63	16.40	18.49	21.27
25	13.88	17.77	25.40	30.72	35.55
30	18.45	23.43	31.70	40.41	46.87
35	22.75	28.69	37.71	49.51	57.40
40	27.05	33.83	43.69	58.34	67.72

MCHX Condenser Ratings Using R-1234ze, 50 Hz Units with Fixed-Speed Fans (SI)

MAXIMUM SUBCOOLING CHARGE (8.3°C)					
TD (C)	TOTAL HEAT REJECTION (kW)				
	09RC				
	020	030	035	050	060
11.11	28.76	37.40	57.68	65.04	74.82
13.89	48.82	62.50	89.32	108.03	125.03
16.67	64.90	82.40	111.48	142.12	164.83
19.44	80.01	100.89	132.63	174.11	201.87
22.22	95.13	118.98	153.66	205.16	238.15

NOTE(S):

a. Minimum charge gives higher heat rejection, since entire surface of condenser and subcooling circuit is used for condensing only. Minimum charge ratings, however, do not represent greatest potential system capacity. They are comparable to competitive ratings without subcooling.

b. Use maximum charge when compressor, condenser, and evaporator are selected as a package and the components balanced to secure maximum benefits of 15°F (8.3°C) subcooling (for example, in selecting 09RC condensers with Carrier compressor rated at 15°F (8.3°C) subcooling). Maximum charge activates the subcooling circuit, resulting in higher system capacity at slightly higher head pressure and corresponding condensing temperature. Liquid refrigerant leaves the system subcooled to a stable condition to allow greater length of refrigerant run or lift. See Application Data section, for available liquid lift information.

c. Condenser subcooling = Saturated condensing temperature of refrigerant – Actual temperature of refrigerant leaving the coil.

d. TD (Temperature Difference) = Saturated Condensing Temperature (entering) – Entering-Air Temperature.

Performance data (cont)

RTPF Condenser Ratings Using R-1234ze, All 60 Hz Units and 50 Hz Units with Greenspeed Intelligence (English)

MAXIMUM SUBCOOLING CHARGE (15°F)					
TD (F)	TOTAL HEAT REJECTION (TONS)				
	09RC				
	020	030	035	050	060
20	9.06	11.79	18.18	20.50	23.58
25	15.39	19.60	26.04	34.26	39.73
30	20.46	25.17	32.73	44.33	51.13
35	25.22	30.41	38.97	53.94	61.86
40	29.94	35.54	45.10	63.45	72.40

RTPF Condenser Ratings Using R-1234ze, All 60 Hz Units and 50 Hz Units with Greenspeed Intelligence (SI)

MAXIMUM SUBCOOLING CHARGE (8.3°C)					
TD (C)	TOTAL HEAT REJECTION (kW)				
	09RC				
	020	030	035	050	060
11.11	31.88	41.46	63.95	72.10	82.94
13.89	54.12	68.92	91.57	120.50	139.71
16.67	71.94	88.53	115.12	155.89	179.81
19.44	88.70	106.94	137.03	189.70	217.55
22.22	105.30	124.97	158.62	223.15	254.62

RTPF Condenser Ratings Using R-1234ze, 50 Hz Units with Fixed-Speed Fans (English)

MAXIMUM SUBCOOLING CHARGE (15°F)					
TD (F)	TOTAL HEAT REJECTION (TONS)				
	09RC				
	020	030	035	050	060
20	7.93	10.31	15.91	17.94	20.64
25	13.46	17.15	22.78	29.98	34.76
30	17.90	22.03	28.64	38.78	44.74
35	22.07	26.61	34.09	47.20	54.13
40	26.20	31.09	39.46	55.52	63.35

RTPF Condenser Ratings Using R-1234ze, 50 Hz Units with Fixed-Speed Fans (SI)

MAXIMUM SUBCOOLING CHARGE (8.3°C)					
TD (C)	TOTAL HEAT REJECTION (kW)				
	09RC				
	020	030	035	050	060
11.11	27.89	36.27	55.95	63.08	72.57
13.89	47.35	60.30	80.13	105.44	122.25
16.67	62.95	77.47	100.73	136.40	157.33
19.44	77.61	93.57	119.91	165.99	190.35
22.22	92.14	109.35	138.79	195.26	222.79

NOTE(S):

a. Minimum charge gives higher heat rejection, since entire surface of condenser and subcooling circuit is used for condensing only. Minimum charge ratings, however, do not represent greatest potential system capacity. They are comparable to competitive ratings without subcooling.

b. Use maximum charge when compressor, condenser, and evaporator are selected as a package and the components balanced to secure maximum benefits of 15°F (8.3°C) subcooling (for example, in selecting 09RC condensers with Carrier compressor rated at 15°F (8.3°C) subcooling). Maximum charge activates the subcooling circuit, resulting in higher system capacity at slightly higher head pressure and corresponding condensing temperature. Liquid refrigerant leaves the system subcooled to a stable condition to allow greater length of refrigerant run or lift. See Application Data section, for available liquid lift information.

c. Condenser subcooling = Saturated condensing temperature of refrigerant – Actual temperature of refrigerant leaving the coil.

d. TD (Temperature Difference) = Saturated Condensing Temperature (entering) – Entering-Air Temperature.

Performance data (cont)

MCHX Condenser Ratings Using R-134a, All 60 Hz Units and 50 Hz Units with Greenspeed Intelligence (English)

MAXIMUM SUBCOOLING CHARGE (15°F)					
TD (F)	TOTAL HEAT REJECTION (TONS)				
	09RC				
	020	030	035	050	060
20	12.37	15.89	22.70	27.62	31.76
25	20.59	25.66	31.48	44.15	51.36
30	27.20	32.40	38.80	56.81	64.92
35	33.20	38.67	45.85	67.52	77.55
40	38.80	44.80	52.84	78.96	89.92

MCHX Condenser Ratings Using R-134a, All 60 Hz Units and 50 Hz Units with Greenspeed Intelligence (SI)

MAXIMUM SUBCOOLING CHARGE (8.3°C)					
TD (C)	TOTAL HEAT REJECTION (kW)				
	09RC				
	020	030	035	050	060
11.11	43.51	55.89	79.84	97.15	111.70
13.89	72.41	90.24	110.70	155.28	180.61
16.67	95.65	113.96	136.45	199.79	228.32
19.44	116.77	135.98	161.24	237.45	272.72
22.22	136.47	157.54	185.84	277.69	316.22

MCHX Condenser Ratings Using R-134a, 50 Hz Units with Fixed-Speed Fans (English)

MAXIMUM SUBCOOLING CHARGE (15°F)					
TD (F)	TOTAL HEAT REJECTION (TONS)				
	09RC				
	020	030	035	050	060
20	10.82	13.91	19.86	24.17	27.79
25	18.01	22.45	27.54	38.63	44.94
30	23.80	28.35	33.95	49.71	56.81
35	29.05	33.83	40.12	59.08	67.85
40	33.95	39.20	46.24	69.09	78.68

MCHX Condenser Ratings Using R-134a, 50 Hz Units with Fixed-Speed Fans (SI)

MAXIMUM SUBCOOLING CHARGE (8.3°C)					
TD (C)	TOTAL HEAT REJECTION (kW)				
	09RC				
	020	030	035	050	060
11.11	38.07	48.91	69.86	85.01	97.74
13.89	63.36	78.96	96.86	135.87	158.03
16.67	83.69	99.71	119.39	174.82	199.78
19.44	102.17	118.98	141.08	207.77	238.63
22.22	119.41	137.85	162.61	242.98	276.69

NOTE(S):

a. Minimum charge gives higher heat rejection, since entire surface of condenser and subcooling circuit is used for condensing only. Minimum charge ratings, however, do not represent greatest potential system capacity. They are comparable to competitive ratings without subcooling.

b. Use maximum charge when compressor, condenser, and evaporator are selected as a package and the components balanced to secure maximum benefits of 15°F (8.3°C) subcooling (for example, in selecting 09RC condensers with Carrier compressor rated at 15°F (8.3°C) subcooling). Maximum charge activates the subcooling circuit, resulting in higher system capacity at slightly higher head pressure and corresponding condensing temperature. Liquid refrigerant leaves the system subcooled to a stable condition to allow greater length of refrigerant run or lift. See Application Data section, for available liquid lift information.

c. Condenser subcooling = Saturated condensing temperature of refrigerant – Actual temperature of refrigerant leaving the coil.

d. TD (Temperature Difference) = Saturated Condensing Temperature (entering) – Entering-Air Temperature.

Performance data (cont)

RTPF Condenser Ratings Using R-134a, All 60 Hz Units and 50 Hz Units with Greenspeed Intelligence (English)

MAXIMUM SUBCOOLING CHARGE (15°F)					
TD (F)	TOTAL HEAT REJECTION (TONS)				
	09RC				
	020	030	035	050	060
20	12.00	15.42	22.02	26.80	30.81
25	19.97	24.49	29.36	41.26	48.43
30	26.12	30.88	36.20	52.90	61.11
35	31.24	36.69	42.70	63.78	72.72
40	36.20	42.35	49.13	74.37	84.07

RTPF Condenser Ratings Using R-134a, All 60 Hz Units and 50 Hz Units with Greenspeed Intelligence (SI)

MAXIMUM SUBCOOLING CHARGE (8.3°C)					
TD (C)	TOTAL HEAT REJECTION (kW)				
	09RC				
	020	030	035	050	060
11.11	42.20	54.22	77.44	94.24	108.35
13.89	70.23	86.14	103.24	145.12	170.31
16.67	91.85	108.59	127.31	186.05	214.90
19.44	109.88	129.04	150.16	224.31	255.75
22.22	127.30	148.95	172.78	261.54	295.65

RTPF Condenser Ratings Using R-134a, 50 Hz Units with Fixed-Speed Fans (English)

MAXIMUM SUBCOOLING CHARGE (15°F)					
TD (F)	TOTAL HEAT REJECTION (TONS)				
	09RC				
	020	030	035	050	060
20	10.50	13.49	19.27	23.45	26.96
25	17.47	21.43	25.69	36.11	42.37
30	22.85	27.02	31.68	46.29	53.47
35	27.34	32.11	37.36	55.81	63.63
40	31.67	37.06	42.99	65.07	73.56

RTPF Condenser Ratings Using R-134a, 50 Hz Units with Fixed-Speed Fans (SI)

MAXIMUM SUBCOOLING CHARGE (8.3°C)					
TD (C)	TOTAL HEAT REJECTION (kW)				
	09RC				
	020	030	035	050	060
11.11	36.92	47.44	67.76	82.46	94.81
13.89	61.45	75.38	90.33	126.98	149.02
16.67	80.36	95.01	111.40	162.79	188.04
19.44	96.15	112.91	131.39	196.27	223.78
22.22	111.38	130.33	151.18	228.85	258.69

NOTE(S):

a. Minimum charge gives higher heat rejection, since entire surface of condenser and subcooling circuit is used for condensing only. Minimum charge ratings, however, do not represent greatest potential system capacity. They are comparable to competitive ratings without subcooling.

b. Use maximum charge when compressor, condenser, and evaporator are selected as a package and the components balanced to secure maximum benefits of 15°F (8.3°C) subcooling (for example, in selecting 09RC condensers with Carrier compressor rated at 15°F (8.3°C) subcooling). Maximum charge activates the subcooling circuit, resulting in higher system capacity at slightly higher head pressure and corresponding condensing temperature. Liquid refrigerant leaves the system subcooled to a stable condition to allow greater length of refrigerant run or lift. See Application Data section, for available liquid lift information.

c. Condenser subcooling = Saturated condensing temperature of refrigerant – Actual temperature of refrigerant leaving the coil.

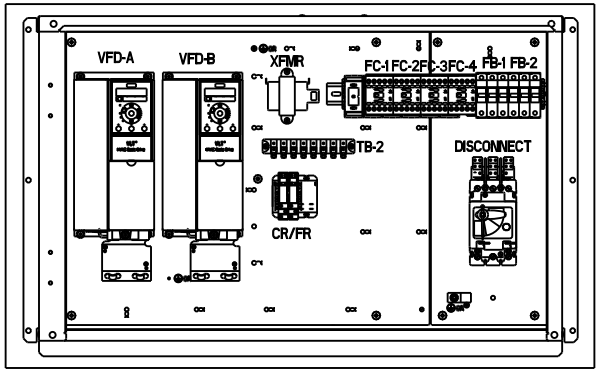
d. TD (Temperature Difference) = Saturated Condensing Temperature (entering) – Entering-Air Temperature.

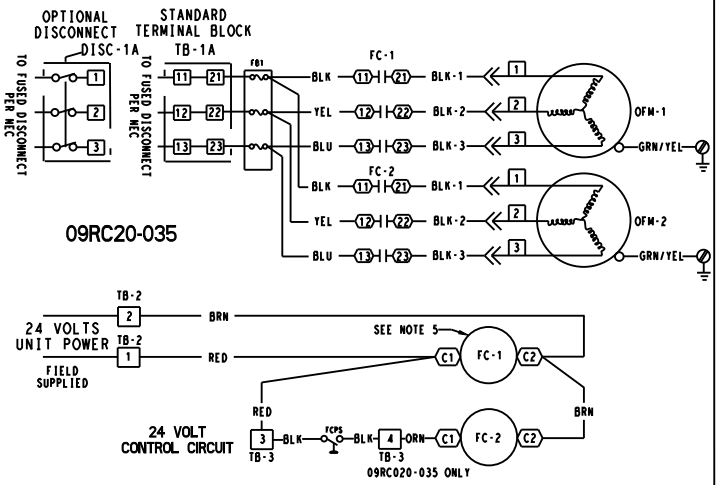
Electrical data

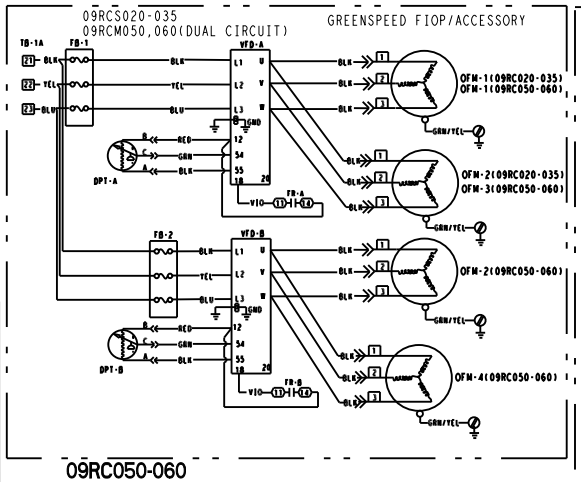
09RC electrical data is located in the 09RC Installation Instructions.

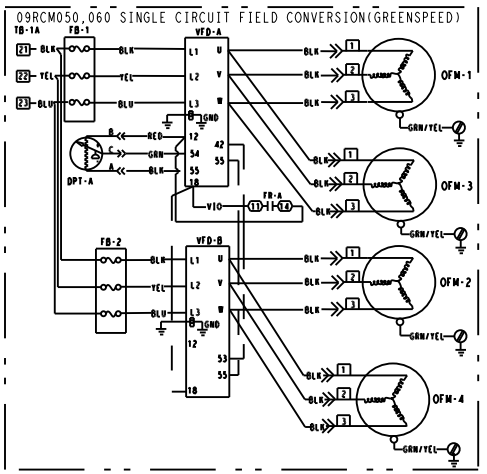
09RC Power Schematic and Component Arrangement

09RC020-060 POWER SCHEMATIC & COMPONENT ARRANGEMENT

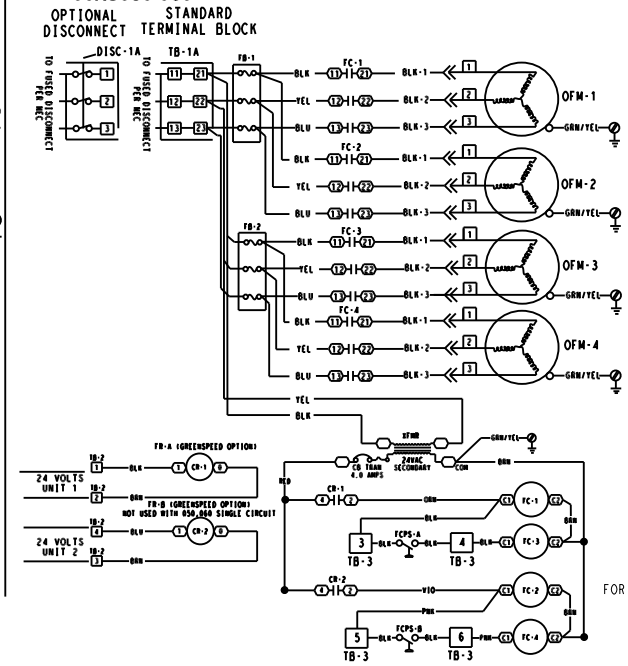








09RC050-060



LEGEND:

CB	- CIRCUIT BREAKER
CR	- CONTROL RELAY
DPT	- DISCHARGE PRESSURE TRANSDUCER
FC	- FAN CONTACTOR
FCPS	- FAN CYCLING PRESSURE SWITCH
FIOP	- FACTORY INSTALLED OPTION
FB	- FUSE BLOCK
FR	- FAN RELAY
OFM	- OUTDOOR FAN MOTOR
TB	- TERMINAL BLOCK
XFMR	- TRANSFORMER
PS	- POWER SUPPLY
DISC	- DISCONNECT

FIELD WIRING
FACTORY WIRING
FIOP/ACCESSORY

FUSE REPLACEMENT TABLE		
	FB-1/FB-2	
VOLTS	W/O GREENSPEED	GREENSPEED
208/230V	FNQ-R-15	JKS-15
380V	FNQ-R-10	JKS-15
460V	FNQ-R-10	JKS-15
575V	FNQ-R-10	JKS-15

FOR UNITS W/O GREENSPEED, USE TIME DELAY FUSES ONLY, FNQ-R.

NOTES:
1. FACTORY WIRING IS IN ACCORDANCE WITH UL 60335-2-40 STANDARDS. ANY FIELD MODIFICATIONS OR ADDITIONS MUST BE IN COMPLIANCE WITH ALL APPLICABLE CODES.
2. USE 75°C MIN WIRE FOR FIELD POWER SUPPLY.
3. FAN MOTORS ARE THERMALLY PROTECTED. THREE PHASE MOTORS ARE PROTECTED AGAINST PRIMARY SINGLE PHASE CONDITIONS.
4. FOR 500 SERIES UNIT OPERATION AT 208-3-60V LINE VOLTAGE, TRAN1 PRIMARY CONNECTION MUST BE MOVED TO TERMINAL MARKED 208.
5. FOR UNITS WITH LOW AMBIENT FIOP/ACCESSORY, FAN CONTACTOR FC1 IS REPLACED WITH FAN RELAY FR-A.
6. UNITS ARE SUPPLIED WITH (2) R-32 FCPS. REFER TO INSTALLATION INSTRUCTIONS FOR PROPER INSTALLATION AND ALTERNATE REFRIGERANT APPLICATIONS.

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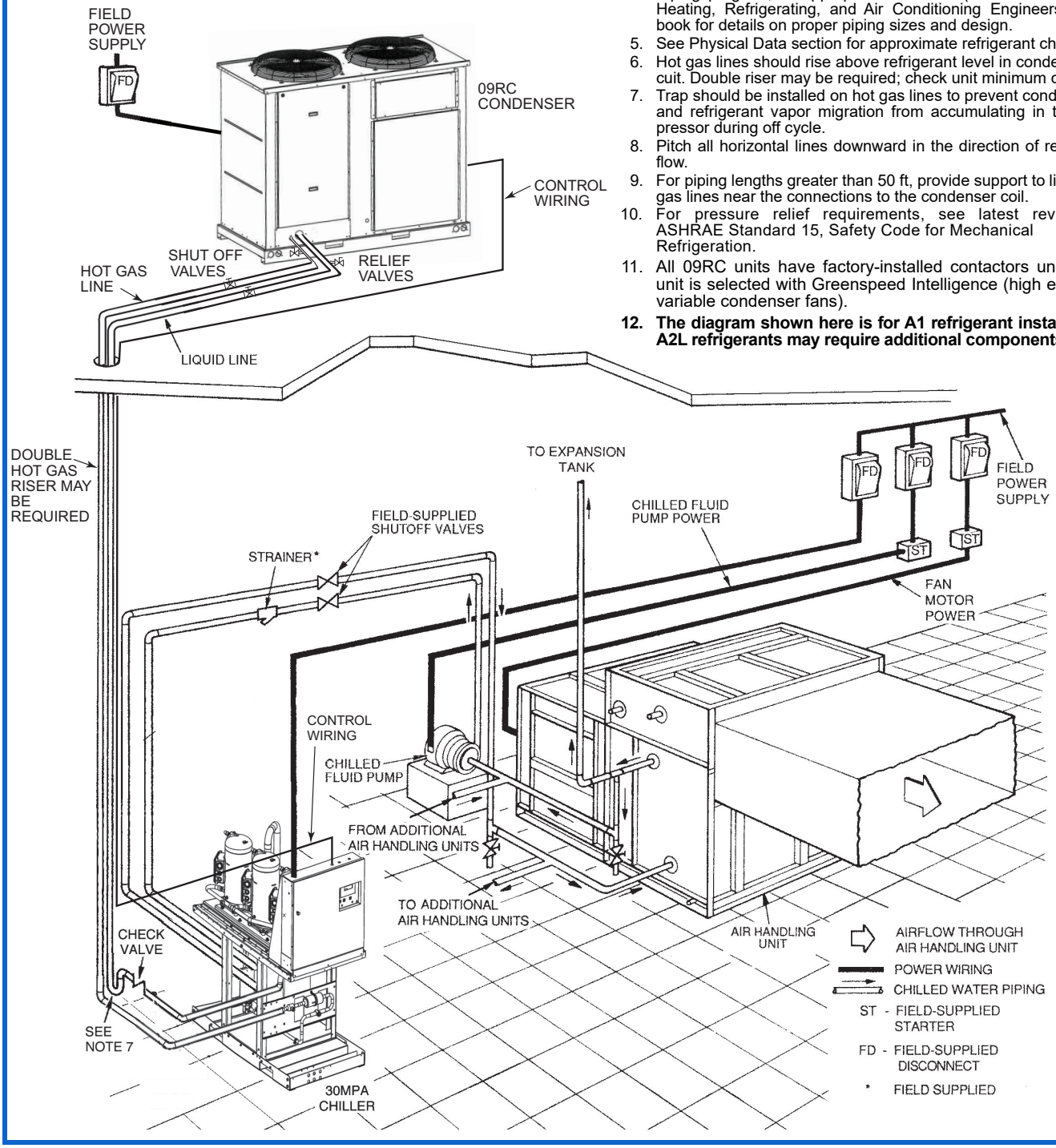
Typical piping and wiring

Typical 30MPA Refrigerant Piping to 09RC Remote Condenser (30MPA031 and 09RCS030 Units Shown)

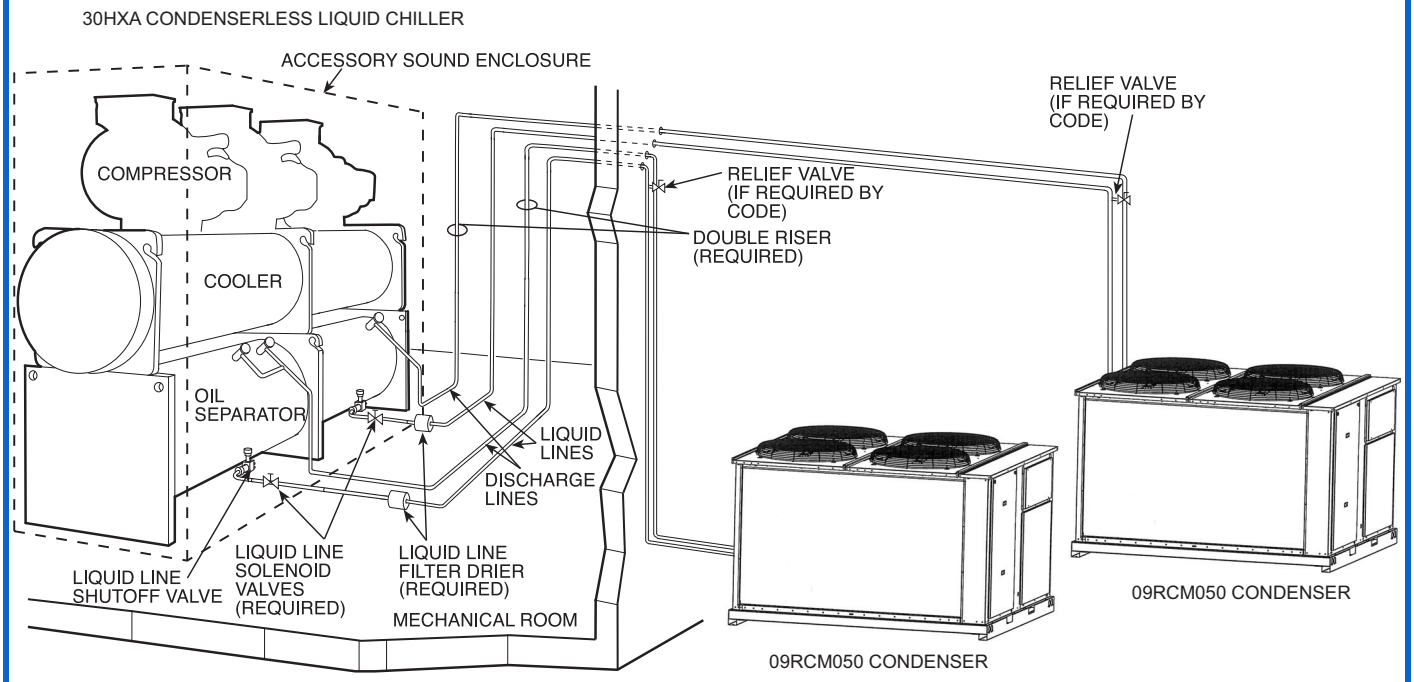
NOTES:

1. Chiller and condenser must be installed *levelly* to maintain proper compressor oil return.
2. Wiring and piping shown are general points-of-connection guides only and are not intended for a specific installation. Wiring and piping shown are for a quick overview of system and are not in accordance with recognized standards.
3. All wiring must comply with applicable local and national codes.
4. All piping must follow standard piping techniques. Refer to Carrier System Design Manual part 3, Carrier E20-II software Refrigerant Piping program, or appropriate ASHRAE (American Society of Heating, Refrigerating, and Air Conditioning Engineers) handbook for details on proper piping sizes and design.
5. See Physical Data section for approximate refrigerant charge.
6. Hot gas lines should rise above refrigerant level in condenser circuit. Double riser may be required; check unit minimum capacity.
7. Trap should be installed on hot gas lines to prevent condenser oil and refrigerant vapor migration from accumulating in the compressor during off cycle.
8. Pitch all horizontal lines downward in the direction of refrigerant flow.
9. For piping lengths greater than 50 ft, provide support to liquid and gas lines near the connections to the condenser coil.
10. For pressure relief requirements, see latest revision of ASHRAE Standard 15, Safety Code for Mechanical Refrigeration.
11. All 09RC units have factory-installed contactors unless the unit is selected with Greenspeed Intelligence (high efficiency variable condenser fans).
12. **The diagram shown here is for A1 refrigerant installations. A2L refrigerants may require additional components.**



Typical piping and wiring (cont)

Typical 30HXA Condenserless Liquid Chiller Refrigerant Piping to 09RC Remote Condensers (30HXA076 and 09RCM050 Units Shown)



NOTES:

1. Chiller and condenser must be installed *levelly* to maintain proper compressor oil return.
2. Wiring and piping shown are general points-of-connection guides only and are not intended for a specific installation. Wiring and piping shown are for a quick overview of system and are not in accordance with recognized standards.
3. All wiring must comply with applicable local and national codes.
4. All piping must follow standard piping techniques. Refer to Carrier System Design Manual part 3, Carrier E20-II software Refrigerant Piping program, or appropriate ASHRAE (American Society of Heating, Refrigerating, and Air Conditioning Engineers) handbook for details on proper piping sizes and design.
5. See Physical Data section for approximate refrigerant charge.
6. Hot gas lines should rise above refrigerant level in condenser circuit. Double riser may be required; check unit minimum capacity.
7. Trap should be installed on hot gas lines to prevent condenser oil and refrigerant vapor migration from accumulating in the compressor during off cycle.
8. Pitch all horizontal lines downward in the direction of refrigerant flow.
9. For piping lengths greater than 50 ft (15.2 m), provide support to liquid and gas lines near the connections to the condenser coil.
10. For pressure relief requirements, see latest revision of ASHRAE Standard 15, Safety Code for Mechanical Refrigeration.
11. All 09RC units have factory-installed contactors unless the unit is selected with Greenspeed Intelligence (high efficiency variable condenser fans).
12. **The diagram shown here is for A1 refrigerant installations. A2L refrigerants may require additional components.**

Application data

Liquid lift

The amount of liquid lift available before refrigerant flashing occurs depends on the amount of liquid subcooling in the system.

All 09RC condensers have positive subcooling when applied with an optimum charge. With subcooling, it is possible to overcome an appreciable friction drop and/or static head (due to the elevation of the liquid metering device above the condenser).

When 09RC condensers are applied with a minimum charge, minimal subcooling in the condenser is realized; therefore, if subcooling is required it must be obtained by external means such as a liquid suction interchanger.

The average amount of liquid lift available from the 09RC condensers is shown in the accompanying table.

Head Pressure Control

Head pressure control is used primarily during intermediate seasons, and this function may be accomplished by any of 2 means. One method of providing head pressure control is through the use of fan cycling. When this method is employed, one fan is cycled for 09RCS020-030 and 09RCS035 units. Two fans are cycled on 09RCM050 and 060 units. Units are shipped standard with head pressure switches that can be used with R-32, R-410A or R-454B refrigerants. Use of other refrigerants would require field-supplied and installed pressure switches. Carrier 30HXA units are shipped with head pressure switches for use with R-513A refrigerant.

Head pressure control may also be accomplished by employing high efficiency variable condenser fans. When this method is employed, no pressure switches are required or installed. The VFD control setpoints will require field adjustment.

Process applications

09RC condensers may be used in process applications. Process applications are defined as heat rejection loads that are not related to or significantly affected by outside ambient conditions. Process applications tend to have constant heat rejection requirements throughout the year.

Available Liquid Lift (ft)* — English

REFRIGERANT	AVAILABLE LIQUID LIFT (ft)
R-410A	75
R-32	85
R-454B	75
R-134a	50
R-513A	50
R-515B	30
R-1234ze	30

*Allows 7 psi drop for liquid line accessories with maximum charge.

NOTES:

1. Data based on 15°F subcooling.
2. Subcooling = Saturated condensing temperature of refrigerant – Actual temperature of refrigerant leaving the coil.

Available Liquid Lift (m)* — SI

REFRIGERANT	AVAILABLE LIQUID LIFT (m)
R-410A	22.9
R-32	25.9
R-454B	22.9
R-134a	15.2
R-513A	15.2
R-515B	9.1
R-1234ze	9.1

*Allows 48 kPa drop for liquid line accessories with maximum charge.

NOTES:

1. Data based on 8.3°C subcooling.
2. Subcooling = Saturated condensing temperature of refrigerant – Actual temperature of refrigerant leaving the coil.

Novation heat exchanger technology microchannel coil (aluminum fin/aluminum tube) condenser

The Novation microchannel coil is available for optimum durability. Novation heat exchangers with microchannel coil technology are offered coated or uncoated to match coil protection to site conditions. The Carrier Electronic Catalog (E-Cat) can be used to determine whether or not corrosion protection is recommended for particular applications in coastal/marine environments. Following the input of the requested data, the E-Cat program output will advise the appropriate coil to be used. Other factors described in "Selection Guide: Environmental Corrosion Protection, Novation Heat Exchanger with Microchannel Coil Technology" catalog number 04-581061-01 must also be considered to determine if corrosion protection is required.

NOTE: Applications employing 30HX chillers must use RTPF coils and cannot use microchannel technology.

Application data (cont)

Minimum Outdoor-Air Operating Temperature — English [a,b,c]

09RC UNIT SIZE	TD (F)[d]	MINIMUM AMBIENT (F)			
		100% Capacity	75% Capacity	50% Capacity	25% Capacity
020	30	27	38	50	63
	25	35	44	54	65
	20	43	50	59	67
030	30	27	38	50	63
	25	35	44	54	65
	20	43	50	59	67
035	30	27	38	50	63
	25	35	44	54	65
	20	43	50	59	67
050	30	27	38	50	63
	25	35	44	54	65
	20	43	50	59	67
060	30	27	38	50	63
	25	35	44	54	65
	20	43	50	59	67

NOTE(S):

a. Based on 80°F condensing temperature at 100% and 75% capacity and a 75°F condensing temperature at 50% and 25% capacity.
b. Units 050 to 060 are based on dual circuit operation. Dual circuit low ambient option should be based on circuit with lowest TD (Temperature Difference).
c. The minimum outdoor-air operating temperature for variable speed fans is –20°F.
d. TD (Temperature Difference) = Saturated Condensing Temperature (entering) – Entering Air Temperature.

LEGEND
TD — Temperature Difference

Minimum Outdoor-Air Operating Temperature — SI [a,b,c]

09RC UNIT SIZE	TD (C)[d]	MINIMUM AMBIENT (C)			
		100% Capacity	75% Capacity	50% Capacity	25% Capacity
020	16.7	–2.78	3.26	10.14	17.22
	13.9	1.67	6.70	12.43	18.33
	11.1	6.11	10.14	14.72	19.44
030	16.7	–2.78	3.26	10.14	17.22
	13.9	1.67	6.70	12.43	18.33
	11.1	6.11	10.14	14.72	19.44
035	16.7	–2.78	3.26	10.14	17.22
	13.9	1.67	6.70	12.43	18.33
	11.1	6.11	10.14	14.72	19.44
050	16.7	–2.78	3.26	10.14	17.22
	13.9	1.67	6.70	12.43	18.33
	11.1	6.11	10.14	14.72	19.44
060	16.7	–2.78	3.26	10.14	17.22
	13.9	1.67	6.70	12.43	18.33
	11.1	6.11	10.14	14.72	19.44

NOTE(S):

a. Based on 26.7°C condensing temperature at 100% and 75% capacity and a 23.9°C condensing temperature at 50% and 25% capacity.
b. Units 050 to 060 are based on dual circuit operation. Dual circuit low ambient option should be based on circuit with lowest TD (Temperature Difference).
c. The minimum outdoor-air operating temperature for variable speed fans is –28.9°C.
d. TD (Temperature Difference) = Saturated Condensing Temperature (entering) – Entering Air Temperature.

LEGEND
TD — Temperature Difference

Guide specifications

Commercial Air-Cooled Condensers 50/60 Hz

HVAC Guide Specifications

Size Range: **20 to 60 Nominal Tons**
(70 to 211 Nominal kW)

Carrier Model Number: **09RCM, 09RCS**

Part 1 — General

1.01 SYSTEM DESCRIPTION

Outdoor-mounted, air-cooled condenser on the ground or rooftop installation. The 09RCS unit shall have one refrigeration circuit and the 09RCM unit shall have two independent refrigeration circuits capable of field conversion to single circuit. Unit shall have air-cooled coils, aeroacoustic condenser fans, a control box, and shall discharge condenser air vertically upward as shown on certified drawings. Unit shall be used in refrigeration circuit with 30MPA or 30HXA air-cooled condenserless chillers.

1.02 QUALITY ASSURANCE

A. Unit construction shall comply with latest edition of ASHRAE 15 Safety Code, UL 60335-2-40, and ASME applicable codes (U.S.A. codes).

B. Unit shall be manufactured in a facility registered to ISO 9001: 2015 Manufacturing Quality Standard.

C. Base unit shall be constructed in accordance with UL standards and CSA.

D. Painted parts shall withstand 1000 hours in constant neutral salt spray under ASTM B117 conditions with a 1mm scribe per ASTM D1654. After test, painted parts shall show no signs of wrinkling or crackling, no loss of adhesion, no evidence of blistering, and the main creepage shall not exceed 1/4 in. (rating ≥ 4 per ASTM D1654) on either side of the scribe line.

E. Design pressure shall be 650 psig (4482 kPa).

F. Unit shall be functional checked at the factory.

G. Unit shall be rated using refrigerants R-32, R-454B, R-515B, R-513A, R-1234ze, R-410A, and R-134a.

1.03 DELIVERY, STORAGE, AND HANDLING

Unit shall be shipped as single package 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 remote condenser. Contained within the unit enclosure shall be all factory wiring, piping, controls, nitrogen holding charge, and special features required prior to field start-up.

B. Unit Cabinet:

1. Cabinet shall be galvanized steel casing with a baked enamel powder or pre-painted finish.
2. Painted parts shall withstand 1000 hours in constant neutral salt spray under ASTM B117 conditions with a 1 mm scribe per ASTM D1654. After test, painted parts shall show no signs of wrinkling or crackling, no loss of adhesion, no evidence of blistering, and the main creepage shall not exceed 1/4-in. (rating ≥ 4 per ASTM D1654) on either side of the scribe line.
3. Control box access panels shall be removable for service access.
4. Lifting holes shall be provided to facilitate rigging.

C. Fans:

1. Condenser fans shall be direct-drive aeroacoustic, discharging air vertically upward.
2. All condenser fan motors shall be totally enclosed 3-phase type with permanently lubricated ball bearings, class F insulation, and internal, automatic-reset thermal overload protection.
3. Shafts shall have inherent corrosion resistance.
4. Fan blades shall be statically and dynamically balanced.

D. Condenser Coils:

1. Coil shall be air-cooled microchannel heat exchanger (MCHX) and shall have a series of flat tubes containing a series of multiple, parallel flow microchannels layered between the refrigerant manifolds. Microchannel coils shall consist of a two-pass arrangement. Coil construction shall consist of aluminum alloys for the fins, tubes and manifolds in combination with a corrosion-resistant coating on the tubes.
2. Tubes shall be cleaned, dehydrated, and sealed.
3. Assembled condenser coils shall be leak tested and pressure tested at 650 psig (4482 kPa).

E. Refrigeration Components:

Refrigeration circuit components shall include liquid line temperature relief device and nitrogen holding charge.

F. Controls and Safeties:

Unit controls shall include:

1. Unit shall have a temperature fusible plug for safety on each refrigerant circuit.
2. Self-contained low voltage control circuit.
3. Cycle condenser fans to maintain proper head pressure control.

G. Operating Characteristics:

1. Unit shall be capable of rejecting the required heat at the required cfm and be capable of operating down to moderate ambient temperatures with standard factory supplied fan cycling.
2. Head pressure fan cycling control utilizes pressure switches for all units.

H. Electrical Requirements:

1. A dual power supply of the correct voltage shall be required for each series unit. A 3-phase power circuit voltage and a 24 volt single-phase control circuit shall be required.

2. The number of control circuits shall depend on the unit application, whether it is matched with one unit or two units.
3. Power supplies for all units shall enter the control box through factory-punched entrance holes in the control box shelf.
4. Terminal blocks shall be supplied for field wiring connections.
5. Units shall utilize electromechanical fan cycling head pressure controls to control proper head pressure.

I. Special Features:

1. Optional Condenser Coil Materials:

a. E-coated microchannel coils:

E-coated aluminum microchannel coil shall have a flexible epoxy polymer coating uniformly applied to all coil external surface areas without material bridging between fins or louvers. Coating process shall ensure complete coil encapsulation, including all exposed fin edges. E-coat shall have a thickness of 0.8 to 1.2 mil with top coat having a uniform dry film thickness from 1.0 to 2.0 mil on all external coil surface areas including fin edges. E-coated coils shall have superior hardness characteristics of 2H per ASTM D3363-00 and cross hatch adhesion of 4B-5B per ASTM D3359-02. Impact resistance shall be up to 160 in./lb (ASTM D2794-93). E-coated coil shall have superior impact resistance with no cracking, chipping, or peeling per NSF/ANSI 51-2002 Method 10.2. E-coated aluminum microchannel coils shall be capable of withstanding 10,000-hour salt spray test in accordance with the ASTM (American Society for Testing and Materials) B-117 Standard.

b. Aluminum fin/copper tube coils:

Coil shall be constructed of seamless copper tubes mechanically bonded to aluminum fins. Fins shall have wavy enhancements. These condenser coils are recommended with remote cooler applications. These coils are not recommended for corrosive environments.

c. E-coated microchannel coils:

E-coated aluminum microchannel coil shall have a flexible epoxy polymer coating uniformly applied to all coil external surface areas without material bridging between fins or louvers. Coating process shall ensure complete coil encapsulation, including all exposed fin edges. E-coat shall have a thickness of 0.8 to 1.2 mil with top coat having a uniform dry film thickness from 1.0 to 2.0 mil on all external coil surface areas including fin edges. E-coated coils shall have superior hardness characteristics of 2H per ASTM D3363-00 and cross hatch adhesion of 4B-5B per ASTM D3359-02. Impact resistance shall be up to 160 in./lb (ASTM D2794-93). E-coated coil shall have superior impact resistance with no cracking, chipping, or peeling per NSF/ANSI 51-2002 Method 10.2. E-coated aluminum microchannel coils shall be capable of withstanding 10,000-hour salt spray test in accordance with the ASTM (American Society for Testing and Materials) B-117 Standard.

2. Non-Fused Disconnect:

Units shall be factory-installed with non-fused disconnect capability for power and control located at the unit.

3. High Short Circuit Current Rating (SCCR):

The optional high SCCR interrupt capability shall allow the unit to tolerate a 65 kA (208/230v, 380v and 460-v units) or 25 kA (575-v units) short circuit current for a brief period of time while protecting downstream components. The high SCCR option shall provide a higher level of protection than the standard unit (option for 60 Hz only). High interrupt shall be available as factory-installed option on all units.

4. Full Hail Guard:

Unit shall be equipped with factory-installed louvered panels on the sides and ends of the unit which firmly fasten to the condenser frame. These panels shall cover the unit from top to bottom. The full hail guard also provides the functionality of a wind baffle.

5. Vibration Isolation Pads:

Neoprene vibration isolation pads (24 in. x 3 in. x 1/4 in.) shall be available for field installation to reduce vibration transmission from the compressor through the floor and into the conditioned space.

6. Low Ambient Head Pressure Control:

Unit shall be provided with factory or field-installed low ambient head pressure control to permit operation to –20°F (–29°C) outdoor ambient temperature when field-installed wind baffles or factory-installed hail guards are provided.

7. Variable Speed Condenser Fans:

All fans on the unit shall have factory installed variable speed fan motors to provide higher part load efficiency and reduced acoustic levels. Each fan circuit shall have a factory-installed, independent variable speed drive. Variable speed drives are rated IP-55 enclosures and UL Listed. The use of this option or accessory, with the addition of wind baffles or hail guards and antifreeze in the evaporator circuit, shall allow Carrier chillers to run with outdoor ambient temperatures down to –20°F (–28.9°C).

8. Wind Baffles:

Wind baffles shall be field installed to facilitate operation down to –20°F (–29°C) when used in conjunction with high-efficiency variable condenser fans.

9. Export Packaging:

Unit shall be provided with a skid underneath the condenser as well as a bag covering the complete package.

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