



Product Data

Gemini™ Select Commercial Air-Cooled Condensing Units

25 to 130 Nominal Tons
(88 to 457 Nominal kW)



38RCS025-050, 38RCD025-130
Commercial Air-Cooled Condensing Units
and 38RCS025-050, 38RCD025-130
Commercial Air-Cooled Condensing Units with Greenspeed® Intelligence
with R-32
60 Hz

The 38RC condensing unit offers the utmost in system configuration and control adaptability. Its premium-quality standard components ensure durable, efficient, and reliable operation.

These dependable split systems match Carrier's 39 Series indoor-air handlers with the versatile outdoor 38RC condensing units for a wide selection of commercial cooling solutions.

- Split condensing units compatible with ASHRAE 90.1.
- Chlorine-free, non-ozone depleting Puron refrigerant (R-32).
- Coil design flexibility - Microchannel and RTPF coil technology available on all units.
- 38RCS single-circuit unit has up to 3 rotary scroll compressors.
- 38RCD unit has up to 6 rotary scroll compressors with 2 independent circuits.
- Standard scroll compressor units operate as low as 33% (single circuit) or 17% (dual circuit) of nominal capacity.
- Optional digital scroll compressors allow incremental unloading down to 16% (single circuit) or 7% (dual circuit) of nominal capacity for VAV applications. The digital scroll is always on the lead circuit (one per unit).
- Optional high-efficiency, variable-speed condenser fans with Greenspeed® intelligence.
- Protection against high discharge and low suction refrigerant pressure, and high discharge temperature.

The 38RC units offer high unit EERs (Energy Efficiency Ratios).

These units provide greater efficiency than similar units in the marketplace, which translates into year-round operating savings.

The latest safety standards for 38RC units are tested per UL (Underwriters Laboratories) and CSA (Canadian Standards Association) standards and certified by ETL.

Versatility

The 38RC Series condensing units feature up to 6 compressors and 2 refrigerant circuits, and can be matched with a wide variety of air-handling units. Single circuit condensing units can operate with a single air handler. Dual circuit condensing units can operate with a single air handler or two separate air handlers. Standard units have multiple scroll compressors. A digital scroll option is available. This option of digital control closely matches building loads and allows fine incremental adjustments to the variance in load.

Durable construction

All 38RC 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, painted components shall withstand 1000 hours in constant neutral salt spray under ASTM (American Society for Testing and Materials) B-117 Standard conditions with a 1 mm scribe per ASTM D1654. After test, painted parts shall show no signs of wrinkling or cracking, no loss of adhesion, and no evidence of blistering, and the mean creepage shall not exceed 1/4 in. (Rating ≥ 4 per ASTM D1654) on either side of the scribe line.

All 38RC units are available with 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 as well as e-coated Al/Cu coils can be offered as an option for harsh industrial or coastal conditions, and these coils can withstand an 10,000-hour salt spray test in accordance with the ASTM B-117 Standard. 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 cracking, no loss of adhesion, no evidence of blistering, and the mean creepage shall not exceed 1/4 in. (Rating ≥ 4 per ASTM D1654) on either side of the scribe line.

Reliability

The 38RC condensing units feature highly reliable, hermetic scroll compressors. Each 38RC unit is capable of unloading in staging sequence of scroll compressors. Compressors are mounted on rails with vibration isolators to provide quiet operation and reduced component stress.

The 38RC units have single or dual independent circuits; they provide inherent backup capability. Each circuit is also protected by the following safety features:

- Short-cycle protection
- Low superheat protection
- Loss of refrigerant charge protection
- Reverse rotation protection
- Suction and discharge pressure transducers
- High refrigerant pressure switch (discharge)
- Circuit breakers or fuses for short circuit protection of compressors and outdoor fans
- Suction line accumulator for each refrigerant circuit

38RC condensing units with Greenspeed intelligence feature a high-efficiency, variable-speed condenser fan option along with fine-tuned Carrier Controller controls, which together provide premium part load efficiency to facilitate reduced utility costs over the lifespan of the unit. Additionally, the lower sound levels achieved at part load conditions can be very beneficial for sensitive acoustic applications.

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Features/Benefits (cont)



Standard DC link reactor for 38RC units with Greenspeed intelligence is included in all drives for the fans. The use of this component mitigates customer concern over electrical system harmonics; therefore, AC line reactors should not be required for applications employing 38RC units with Greenspeed intelligence.

Easier installation and service
The 38RC units are equipped with hinged control-box access doors, control interface terminal boards, liquid line shutoff valves, and suction line service valves.

Carrier Controller controls

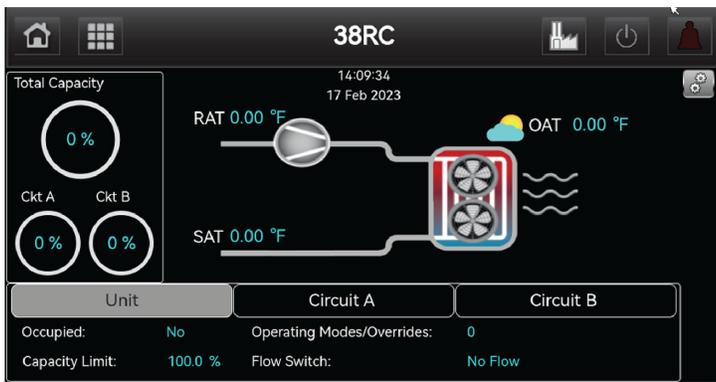
The Carrier Controller controls communicate in plain English, making it as easy as possible to monitor and control each Gemini™ Select condensing unit while accurately maintaining air temperatures. The large display acts as a window into the unit's operation, providing easy-to-read information about chiller performance and over 15 diagnostic functions.

Carrier's 38 Series condensing units' controller controls provide features such as supply air temperature reset, demand limit, 4 to 20 mA input compressor wear minimization and protection, temperature and pressure

displays and diagnostic functions. These controls result in higher chiller reliability, simplified training and more productive service calls with correspondingly lower operational and maintenance costs.

All Gemini Select units are ready to be used with the Carrier Comfort Network® (CCN) system. A BACnet¹ communication option is also available for the i-Vu® Open control system or a BACnet¹ building automation system.

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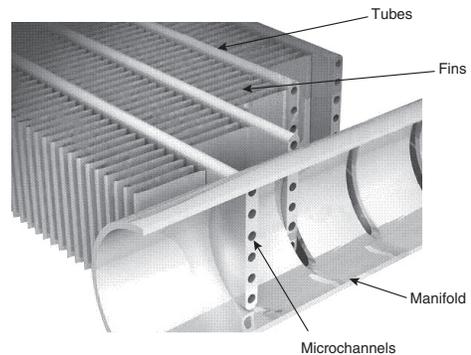
Carrier Controller Display



Low-Noise Aeroacoustic™ Fan



Optional Al/Cu, Al/Cu E-Coat



Novation® Heat Exchanger Technology with Microchannel Condenser Coils

Model number nomenclature



38RC D 025 6 4 A 1 D 0 0 0

38RC – Split System Condensing Unit

Refrigeration Circuit Options¹

- D – Dual Refrigeration Circuit
- S – Single Refrigeration Circuit

Unit Size

025	040	070	100
027	050	080	110
030	060	090	130

Power Supply

- 1 – 575-3-60
- 2 – 380-3-60
- 5 – 280/230-3-60
- 6 – 460-3-60

Condenser Coil/Low Sound Options

- 0 – Aluminum Fin / Copper Tube, Std Sound Treatment
- 3 – Aluminum E-Coat Fin / Copper Tube, Std Sound Treatment
- 4 – Micro Channel (MCHX), Std Sound Treatment
- 5 – E-coat Micro Channel (MCHX), Std Sound Treatment
- G – Aluminum Fin / Copper Tube, Low Sound, Compressor Blankets
- H – Micro Channel (MCHX), Low Sound, Compressor Blankets
- J – E-coat Micro Channel (MCHX), Low Sound, Compressor Blankets
- M – Aluminum E-Coat Fin / Copper Tube, Low Sound, Compressor Blankets

Revision Level

- A – Current revision level

Line Length Options

- 1 – Standard Line Length, MCHX
- 2 – Long Line Length Check valves (shipped loose), MCHX
- 3 – Standard Line Length, RTPF
- 4 – Long Line Length Check valves (shipped loose), RTPF
- 5 – Standard Line Length, MCHX, Pressure Relief Valve
- 6 – Long Line Length Check valves (shipped loose), MCHX, Pressure Relief Valve
- 7 – Standard Line Length, RTPF, Pressure Relief Valve
- 8 – Long Line Length Check valves (shipped loose), RTPF, Pressure Relief Valve

LEGEND

- EMM — Energy Management Module
- MCHX — Microchannel Heat Exchanger
- RTPF — Round Tube, Plate Fin
- SCCR — Short Circuit Current Rating
- XL — Across-the-Line Start

NOTES:

1. 38RCS units available in sizes 025-050.

Quality Assurance

Packaging/Security Options (Sizes 025-060)

- 0 – Std Packaging
- 4 – Full Hail Guards
- 8 – Skid Only
- D – Skid, Full Hail Guards
- J – Export Packaging (Skid + Bag)
- N – Export Packaging (Skid + Bag), Full Hail Guards

Packaging/Security Options (Sizes 070-130)

- 0 – Coil Face Shipping Protection (CFSP)
- 1 – CFSP, Coil Trim Panels
- 2 – CFSP, Coil Trim Panels, Security Grilles
- 3 – Coil Trim Panels, Security Grilles, End Hail Guards
- 4 – Full Hail Guards
- 5 – Export Packaging (Skid and Bag), Coil Trim Panels

Controls/Communications Options (Sizes 025-060)

- 0 – PIC6
- 1 – PIC6, EMM
- 2 – PIC6, EMM, Remote Connectivity & GFI
- 3 – PIC6, GFI, Remote Connectivity
- 8 – PIC6 BACnet IP or MS/TP
- 9 – PIC6, EMM, BACnet IP or MS/TP
- B – PIC6, EMM, Remote Connectivity & GFI, BACnet IP or MS/TP
- C – PIC6, GFI, Remote Connectivity, BACnet IP or MS/TP

Controls/Communications Options (Sizes 070-130)

- B – PIC6, EMM, Remote Connectivity & GFI, BACnet IP or MS/TP
- F – PIC6, EMM, Remote Connectivity, BACnet IP or MS/TP
- L – PIC6, EMM, Remote Connectivity & GFI, BACnet IP or MS/TP, LON Translator
- P – PIC6, EMM, Remote Connectivity, BACnet IP or MS/TP, LON Translator

Electrical Options

- 0 – Single Point Power, XL, Terminal Block
- 1 – Single Point Power, XL, Non-Fused Disconnect
- 2 – Dual Point Power, XL, Non-Fused Disconnect

Ambient/Capacity Control/Interrupt Options

- D – Std Ambient, Std Compressor, Std SCCR, Variable Speed Fans
- G – Std Ambient, Digital Compressor, Std SCCR, Variable Speed Fans
- H – Std Ambient, Std Compressor, High SCCR, Variable Speed Fans
- K – Std Ambient, Digital Compressor, High SCCR, Variable Speed Fans

38RC025-030 Unit Physical Data — English

38RC UNIT SIZE	025		027		030	
Nominal Capacity (tons)	25		27		30	
Circuit	Dual	Single	Dual	Single	Dual	Single
Operating Weights (lb)						
MCHX	1223	1223	1338	1338	1372	1372
Cu-AI RTPF	1295	1295	1428	1428	1461	1461
REFRIGERANT CHARGE (lb)						
Total MCHX ^a	30	27.5	32	29.5	33	33.9
Circuit A/Circuit B MCHX	15/15	27.5	16/16	29.5	16.5/16.5	33.9
Total RTPF ^a	48	44.5	54.6	51	55.6	56.4
Circuit A/Circuit B RTPF	24/24	44.5	27.3/27.3	51	27.8/27.8	56.4
NITROGEN SHIPPING CHARGE	15 psig					
COMPRESSOR hp (Qty) (CKT A/CKT B)	10 (1) / 10(1)	10 (2)	13 (1) / 13 (1)	13 (2)	15 (1) / 15 (1)	15 (2)
CAPACITY STEPS						
Standard	2	2	2	2	2	2
Digital Option	17	17	17	17	17	17
CRANKCASE HEATER (W) (each compressor)	90 (60 Hz)					
CONDENSER FANS						
Low Noise	Plastic Type, Axial, Vertical Discharge					
Quantity	2	2	2	2	2	2
rpm	850 (60 Hz)					
Diameter (in.)	30					
Total Watts (60 Hz)	2750	2750	2750	2750	2750	2750
Total Airflow (60 Hz) (cfm)	17,500		19,400		19,400	
CONDENSER COIL						
No. Coils per Circuit	1	1	1	1	1	1
sq ft	27.1	27.1	33.9	33.9	33.9	33.9
TEMPERATURE RELIEF	Fusible Plug on Liquid Lines of Each Circuit - 210°F					
CONNECTIONS (in.) ODF (CKT A/CKT B)						
Suction Line	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 Line	5/8 / 5/8	5/8	5/8 / 5/8	5/8	5/8 / 5/8	7/8
MAXIMUM HEIGHT FOR 3°F SUBCOOLING (ft) ^b	75	75	75	75	75	75
Capacity Per Circuit (%) (CKT A/CKT B)	50/50	100	50/50	100	50/50	100
MINIMUM UNIT CAPACITY (%) ^c						
Standard Compressor	50	50	50	50	50	50
Digital Compressor	22	22	22	22	22	22

NOTE(S):

- Typical operating charge with 25 ft of interconnecting piping. Operating charge is approximate for maximum system capacity. Unit is factory supplied with nitrogen holding charge. Refrigerant charge for dual circuit units is the total for both circuits.
- Maximum vertical separation between evaporator coil and condensing unit If condensing unit is below the evaporator.
- Refer to Loading Sequences tables in Application Data.

LEGEND

- CKT** — Circuit
MCHX — Microchannel Heat Exchanger
ODF — Outside Diameter, Female
RTPF — Round Tube Plate Fin

38RC025-030 Unit Physical Data — SI

38RC UNIT SIZE	025		027		030	
Nominal Capacity (kW)	88		95		106	
Circuit	Dual	Single	Dual	Single	Dual	Single
Operating Weights (kg)						
MCHX	555	555	607	607	622	622
Cu-AI RTPF	587	587	648	648	663	663
REFRIGERANT CHARGE (kg)						
Total MCHX ^a	13.6	12.5	14.6	13.4	15	15.4
Circuit A/Circuit B MCHX	6.8/6.8	12.5	7.3/7.3	13.4	7.5/7.5	15.4
Total RTPF ^a	21.8	20.2	24.8	23.1	25.2	25.6
Circuit A/Circuit B RTPF	10.9/10.9	20.2	12.4/12.4	23.1	12.6/12.6	25.6
NITROGEN SHIPPING CHARGE	103 kPa					
Compressor hp (Qty) (CKT A/CKT B)	10 (1) / 10 (1)	10 (2)	13 (1) / 13 (1)	13 (2)	15 (1) / 15 (1)	15 (2)
CAPACITY STEPS						
Standard	2	2	2	2	2	2
Digital Option	17	17	17	17	17	17
CRANKCASE HEATER (W) (each compressor)	90 (60 Hz)					
CONDENSER FANS						
Low Noise	Plastic Type, Axial, Vertical Discharge					
Quantity	2	2	2	2	2	2
rpm	850 (60 Hz)					
Diameter (mm)	762					
Total Watts (60 Hz)	2750	2750	2750	2750	2750	2750
Total Airflow (60 Hz) (cu m/s)	29733		32961		32961	
CONDENSER COIL	MCHX Type					
No. Coils per Circuit	1	1	1	1	1	1
sq m	2.52	2.52	3.15	3.15	3.15	3.15
TEMPERATURE RELIEF	Fusible Plug on Liquid Lines of Each Circuit - 99°C					
CONNECTIONS (in.) ODF (CKT A/CKT B)						
Suction Line	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 Line	5/8 / 5/8	5/8	5/8 / 5/8	5/8	5/8 / 5/8	7/8
MAXIMUM HEIGHT FOR 1.8°C SUBCOOLING (m) ^b	22.9	22.9	22.9	22.9	22.9	22.9
Capacity Per Circuit (%) (CKT A/CKT B)	50/50	100	50/50	100	50/50	100
MINIMUM UNIT CAPACITY (%) ^c						
Standard Compressor	50	50	50	50	50	50
Digital Compressor	22	22	22	22	22	22

NOTE(S):

- Typical operating charge with 7.62 m of interconnecting piping. Operating charge is approximate for maximum system capacity. Unit is factory supplied with nitrogen holding charge. Refrigerant charge for dual circuit units is the total for both circuits.
- Maximum vertical separation between evaporator coil and condensing unit If condensing unit is below the evaporator.
- Refer to Loading Sequences tables in Application Data.

LEGEND

- CKT** — Circuit
MCHX — Microchannel Heat Exchanger
ODF — Outside Diameter, Female
RTPF — Round Tube Plate Fin

38RC040-060 Unit Physical Data — English

38RC UNIT SIZE	040		050		060
Nominal Capacity (tons)	40		50		60
Circuit	Dual	Single	Dual	Single	Dual
Operating Weights (lb)					
MCHX	2149	2023	2223	2080	2325
Cu-AI RTPF	2294	2168	2402	2259	2403
REFRIGERANT CHARGE (lb)					
Total MCHX ^a	43.1	43.9	55.7	53.1	66.2
Circuit A/Circuit B MCHX	23.6/19.5	43.9	24.6/31.1	53.1	32.1/34.1
Total RTPF ^a	88.1	88.8	100.7	98	111.1
Circuit A/Circuit B RTPF	46.1/42	88.8	47.1/53.6	98	54.6/56.5
NITROGEN SHIPPING CHARGE	15 psig				
Compressor hp (Qty) (CKT A/CKT B)	10 (2) / 9 (2)	13 (3)	11 (2) / 13 (2)	15 (3)	13 (2) /15 (2)
CAPACITY STEPS					
Standard	4	3	4	3	4
Digital Option	36	27	36	27	36
CRANKCASE HEATER (W) (each compressor)	90 (60 Hz)				
CONDENSER FANS					
Low Noise	Plastic Type, Axial, Vertical Discharge				
Quantity	3	3	3	3	4
rpm	850 (60 Hz)				
Diameter (in.)	30				
Total Watts (60 Hz)	3500	3500	3500	3500	5200
Total Airflow (60 Hz) (cfm)	30,501		30,501		38,800
CONDENSER COIL	MCHX Type				
No. Coils per Circuit	1	2	1	2	1
sq ft	67.8	67.8	67.8	67.8	67.8
TEMPERATURE RELIEF	Fusible Plug on Liquid Lines of Each Circuit - 210°F				
CONNECTIONS (in.) ODF (CKT A/CKT B)					
Suction Line	1-5/8 / 1-5/8	2-1/8	1-5/8 / 1-5/8	2-1/8	1-5/8 / 1-5/8
Liquid Line	5/8 / 5/8	7/8	5/8 / 5/8	7/8	5/8 / 5/8
MAXIMUM HEIGHT FOR 3°F SUBCOOLING (ft) ^b	75	75	75	75	75
Capacity Per Circuit (%) (CKT A/CKT B)	54/46	100	48/52	100	46/54
MINIMUM UNIT CAPACITY (%) ^c					
Standard Compressor	27	33	23	33	23
Digital Compressor	13	16	11	16	11

NOTE(S):

- Typical operating charge with 25 ft of interconnecting piping. Operating charge is approximate for maximum system capacity. Unit is factory supplied with nitrogen holding charge. Refrigerant charge for dual circuit units is the total for both circuits.
- Maximum vertical separation between evaporator coil and condensing unit if condensing unit is below the evaporator.
- Refer to Loading Sequences tables in Application Data.

LEGEND

- CKT** — Circuit
MCHX — Microchannel Heat Exchanger
ODF — Outside Diameter, Female
RTPF — Round Tube Plate Fin

38RC040-060 Unit Physical Data — SI

38RC UNIT SIZE	040		050		060
Nominal Capacity (kW)	141		176		211
Circuit	Dual	Single	Dual	Single	Dual
Operating Weights (kg)					
MCHX	975	918	1008	943	1055
Cu-AI RTPF	1041	983	1090	1025	1090
REFRIGERANT CHARGE (kg)					
Total MCHX ^a	19.5	19.9	25.3	24.1	29.9
Circuit A/Circuit B MCHX	10.7/8.8	19.9	11.2/14.1	24.1	14.5/15.4
Total RTPF ^a	40	40.3	45.7	44.4	50.4
Circuit A/Circuit B RTPF	20.9/19.1	40.3	21.4/24.3	44.4	24.7/25.7
NITROGEN SHIPPING CHARGE	103 kPa				
Compressor hp (Qty) (CKT A/CKT B)	10 (2) / 9 (2)	13 (3)	11 (2) / 13 (2)	15 (3)	13 (2) / 15 (2)
CAPACITY STEPS					
Standard	4	3	4	3	4
Digital Option	36	27	36	27	36
CRANKCASE HEATER (W) (each compressor)	90 (60 Hz)				
CONDENSER FANS					
Low Noise	Plastic Type, Axial, Vertical Discharge				
Quantity	3	3	3	3	4
rpm	850 (60 Hz)				
Diameter (mm)	762				
Total Watts (60 Hz)	3500	3500	3500	3500	5200
Total Airflow (60 Hz) (cu m/s)	51,821		51,821		65,921
CONDENSER COIL	MCHX Type				
No. Coils per Circuit	1	2	1	2	1
sq m	6.30	6.30	6.30	6.30	6.30
TEMPERATURE RELIEF CONNECTIONS (in.) ODF (CKT A/CKT B)	Fusible Plug on Liquid Lines of Each Circuit - 99°C				
Suction Line	1-5/8 1-5/8	2-1/8	1-5/8 / 1-5/8	2-1/8	1-5/8 / 1-5/8
Liquid Line	5/8 / 5/8	7/8	5/8 / 5/8	7/8	5/8 / 5/8
MAXIMUM HEIGHT FOR 1.8°C SUBCOOLING (m) ^b	22.9	22.9	22.9	22.9	22.9
Capacity Per Circuit (%) (CKT A/CKT B)	54/46	100	48/52	100	46/54
MINIMUM UNIT CAPACITY (%) ^c					
Standard Compressor	27	33	23	33	23
Digital Compressor	13	16	11	16	11

NOTE(S):

- Typical operating charge with 7.62 m of interconnecting piping. Operating charge is approximate for maximum system capacity. Unit is factory supplied with nitrogen holding charge. Refrigerant charge for dual circuit units is the total for both circuits.
- Maximum vertical separation between evaporator coil and condensing unit If condensing unit is below the evaporator.
- Refer to Loading Sequences tables in Application Data.

LEGEND

- CKT — Circuit
- MCHX — Microchannel Heat Exchanger
- ODF — Outside Diameter, Female
- RTPF — Round Tube Plate Fin

38RC070-130 Unit Physical Data — English

38RC UNIT SIZE	070	080	090	100	110	130
Nominal Capacity (tons)	70	80	90	100	110	130
Circuit	Dual	Dual	Dual	Dual	Dual	Dual
Operating Weights (lb)						
MCHX	3345	4358	4549	4557	5599	5818
Cu-Al RTPF	3665	4795	5029	5037	6197	6457
REFRIGERANT CHARGE (lb)						
Total MCHX ^a	57.1	68.2	76.1	84.3	95.1	103.7
Circuit A/Circuit B MCHX	28.4/29.7	28.4/39.8	34.1/42.0	42.1/42.2	43.1/52.0	51.7/52.0
Total RTPF ^a	116.4	142.4	150.2	173.4	199.0	222.4
Circuit A/Circuit B RTPF	58.0/58.4	58.0/84.4	63.8/86.4	86.7/86.7	87.7/111.3	111.0/111.4
NITROGEN SHIPPING CHARGE	15 psi					
Compressor hp (Qty) (CKT A/CKT B)	15 (2)/15 (2)	15 (2)/15 (3)	13 (3)/15 (3)	15 (3)/15 (3)	15 (3)/20 (3)	20 (3)/20 (3)
CAPACITY STEPS						
Standard	4	5	6	6	6	6
Digital Option	36	45	54	54	54	NA
CRANKCASE HEATER (W) (each compressor)	90 (60 Hz)					
CONDENSER FANS						
Quantity	4	5	5	6	7	8
No. Blades...Diameter (in.)	9...30					
Motor HP (per fan)	1.25					
Fan Speed (rpm) Standard 8 Pole	850 (60 Hz)					
Airflow (cfm) Al-Cu coil	40575	50719	50719	60863	71007	81151
Airflow (cfm) MCHX Coil	41906	52383	52383	62860	73336	83813
Motor HP (per fan)	3.00					
Fan Speed (rpm) Standard 6 Pole	1140					
Airflow (cfm) AL-CU coil	55877	69847	69847	83816	97785	111755
Airflow (cfm) MCHX Coil	57633	72041	72041	86449	100857	115266
CONDENSER COIL						
No. Coils per Circuit	2	2 / 3	2 / 3	3	3 / 4	4
sq ft	107.8	107.8 / 161.7	107.8 / 161.7	161.7	161.7 / 215.6	215.6
TEMPERATURE RELIEF Connections (in.) ODF (CKT A/CKT B)						
Suction Line	1-5/8 / 1-5/8	1-5/8 / 2-1/8	2-1/8 / 2-1/8	2-1/8 / 2-1/8	2-1/8 / 2-5/8	2-5/8 / 2-5/8
Liquid Line	7/8 / 7/8	7/8 / 7/8	7/8 / 7/8	7/8 / 7/8	7/8 / 7/8	7/8 / 7/8
MAXIMUM HEIGHT FOR 3°F SUBCOOLING (ft) ^b	75	75	75	75	75	75
Capacity Per Circuit (%) (CKT A/CKT B)	50/50	40/60	46/54	50/50	43/57	50/50
MINIMUM UNIT CAPACITY (%) ^c						
Standard Compressor	25	20	15	17	14	17
Digital Compressor	19	9	7	8	7	NA

NOTE(S):

- Typical operating charge with 25 ft of interconnecting piping. Operating charge is approximate for maximum system capacity. Unit is factory supplied with nitrogen holding charge. Refrigerant charge for dual circuit units is the total for both circuits.
- Maximum vertical separation between evaporator coil and condensing unit If condensing unit is below the evaporator.
- Refer to Loading Sequences tables in Application Data.

LEGEND

- cfm — Cubic Feet per Minute
- CKT — Circuit
- MCHX — Microchannel Heat Exchanger
- ODF — Outside Diameter, Female
- RTPF — Round Tube Plate Fin

38RC070-130 Unit Physical Data — SI

38RC UNIT SIZE	070	080	090	100	110	130
Nominal Capacity (kW)	246	281	317	352	387	457
Circuit	Dual	Dual	Dual	Dual	Dual	Dual
Operating Weights (kg)						
MCHX	1517	1977	2063	2067	2540	2639
Cu-AI RTPF	1662	2175	2281	2285	2811	2929
REFRIGERANT CHARGE (kg)						
Total MCHX ^a	25.9	30.9	34.5	38.2	43.1	47.0
Circuit A/Circuit B MCHX	12.9/13.5	12.9/18.1	15.4/19.1	19.1/19.1	19.6/23.5	23.5/23.5
Total RTPF ^a	52.8	64.6	68.1	78.7	90.3	100.9
Circuit A/Circuit B RTPF	26.3/26.5	26.3/38.3	28.9/39.2	39.3/39.4	39.8/50.5	50.4/50.5
NITROGEN SHIPPING CHARGE	103 kPa					
Compressor hp (Qty) (CKT A/CKT B)	15 (2)/15 (2)	15 (2)/15 (3)	13 (3)/15 (3)	15 (3)/15 (3)	15 (3)/20 (3)	20 (3)/20 (3)
CAPACITY STEPS						
Standard	4	5	6	6	6	6
Digital Option	36	45	54	54	54	NA
CRANKCASE HEATER (W) (each compressor)	90 (60 Hz)					
CONDENSER FANS						
Quantity	4	5	5	6	7	8
No. of Blades...Diameter (mm)	9...762					
Motor kW (per fan)	0.93					
Fan Speed (rpm) Standard 8 Pole	850 (60 Hz)					
Airflow (cu m/s) Al-Cu Coil	68937	86172	86172	103406	120641	137876
Airflow (cu m/s) MCHX Coil	71198	88999	88999	106799	124598	142398
Motor kW (per fan)	2.24					
Fan Speed (rpm) Standard 6 Pole	1140					
Airflow (cu m/s) Al-Cu Coil	94935	118670	118670	142403	166137	189872
Airflow (cu m/s) MCHX Coil	97918	122398	122398	146877	171356	195837
CONDENSER COIL						
No. Coils per Circuit	2	2 / 3	2 / 3	3	3 / 4	4
sq m	10.01	10.01 / 12.52	10.01 / 12.52	15.02	15.02 / 20.03	20.03
TEMPERATURE RELIEF CONNECTIONS (in.) ODF (CKT A/CKT B)						
Suction Line	1-5/8 / 1-5/8	1-5/8 / 2-1/8	2-1/8 / 2-1/8	2-1/8 / 2-1/8	2-1/8 / 2-5/8	2-5/8 / 2-5/8
Liquid Line	7/8 / 7/8	7/8 / 7/8	7/8 / 7/8	7/8 / 7/8	7/8 / 7/8	7/8 / 7/8
MAXIMUM HEIGHT FOR 1.8°C SUBCOOLING (m) ^b	22.9	22.9	22.9	22.9	22.9	22.9
Capacity Per Circuit (%) (CKT A/CKT B)	50/50	40/60	46/54	50/50	43/57	50/50
MINIMUM UNIT CAPACITY (%) ^c						
Standard Compressor	25	20	15	17	14	17
Digital Compressor	19	9	7	8	7	NA

NOTE(S):

- Typical operating charge with 7.62 m of interconnecting piping. Operating charge is approximate for maximum system capacity. Unit is factory supplied with nitrogen holding charge. Refrigerant charge for dual circuit units is the total for both circuits.
- Maximum vertical separation between evaporator coil and condensing unit If condensing unit is below the evaporator.
- Refer to Loading Sequences tables in Application Data.

LEGEND

- cfm — Cubic Feet per Minute
- CKT — Circuit
- MCHX — Microchannel Heat Exchanger
- ODF — Outside Diameter, Female
- RTPF — Round Tube Plate Fin

Options and accessories



ITEM	FACTORY-INSTALLED OPTION	FIELD-INSTALLED ACCESSORY
Condenser Coil/Low Sound Options		
E-Coated MCHX	X	
Aluminum Fin/Copper Tube	X	
Aluminum E-Coat Fin/Copper Tube	X	
Low Sound Compressor Blankets	X	X
Vibration Isolation Pads		X
Line Length Options		
Long Line Length Check Valve	X	X
Pressure Relief Valve	X	
Ambient/Capacity Control/Options		
Digital Compressor ^a	X	
High-Efficiency Variable Speed Condenser Fans	X	
Electrical Options^b		
High Short Circuit Current Rating (SCCR) ^c	X	
Non-Fused Disconnect	X	
115V GFI Convenience Outlet	X	X
Airflow Switch		X
Controls/Communications Options		
EMM	X	X
BACnet IP or MS/TP Communication	X	
LonWorks Translator Control	X ^d	X
Remote Connectivity	X	
Packaging/Security Options		
Bottom Skid	X	
Export Packaging (Skid and Bag)	X	
Full Hail Guards	X	X
Security Grilles	X	X
Security Grilles and End Hail Guards	X	X
Wind Baffles		X

NOTE(S):

- a. Digital compressors provide incremental unloading from full capacity down to a minimum value which varies with unit size.
- b. Std SCCR (short circuit current rating) (5 kA).
- c. High SCCR 460-v and 380/415-v (65 kA), 208/230-v (65 kA), 575-v (25 kA).
- d. LonWorks translator control is available as a factory-installed option on sizes 070-130 only.

LEGEND

- E-Coated** — Epoxy Coating Applied to Entire Coil Assembly
- EMM** — Energy Management Module
- LON** — Local Operating Network
- MCHX** — Microchannel Heat Exchanger
- SCCR** — Short Circuit Current Rating

Factory-installed options

Condenser coil

Options 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 13 or the appropriate selection guide for more information.

Low sound compressor blankets

Blankets reduce unit sound levels by providing an acoustic blanket on each compressor. Compressor blankets are also available as field-installed accessory.

Security grilles

Security grilles protect the unit from damage with coated wire grilles with openings 1 by 4 in. (25 by 102 mm). This option is available on unit sizes 070-130.

Security grilles (sides) and hail guards (ends)

This option consists of louvered panels on the ends of the machine and security grilles on the sides of the machine. These coverings firmly fasten to the machine frame and provide complete 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 required when this option is selected. This option is available on unit sizes 070-130.

Full hail guards

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 required when this option is selected.

Long line length check valves

Check valves are required for liquid line installation on all linear line length applications of more than 100 ft (30.5 m). When MCHX condenser is selected and evaporator is located higher than the condensing unit, a check valve is required for linear line length above 30 ft, for 040, 050 single-circuit and 025-060 size dual-circuit units, and above 50 ft for 025-030 single-circuit and 070-130 size dual-circuit unit. The check valve option prevents charge migration to compressor. As an option, the check valves are shipped with the unit but require field installation. Check valves are also available as field-installed accessories shipped separately from the unit.

Pressure relief valve

This option consists of reseating-type pressure relief valves that are installed on the discharge lines. They are designed to relieve an abnormal pressure condition if one arises. The use of these valves meets Chicago code requirements on all unit sizes.

Digital compressor control

Digital compressors allow incremental unloading for a closer match to building load, improved compressor reliability in the reduced compressor cycling, and improved efficiency as compared to hot gas bypass and other modulating methods. Refer to Loading Sequences table in Application Data section on page 24.

High-efficiency variable speed condenser fans

High-efficiency variable speed 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. Varying the speed of all fans on a circuit to a prescribed speed provides accurate head pressure control to the most efficient point while achieving optimum usage of the coils to accomplish excellent part load efficiency. These fans are the key component of the 38RC condensing unit with Greenspeed® intelligence.

High short circuit current rating (SCCR) interrupt

High SCCR interrupt provides a short circuit current rating protection for the unit up to 65 kA on 460-v, 380/415-v, and 208/230-v units or 25 kA on 575-v units. The high SCCR option is strictly available in conjunction with a non-fused disconnect and only with single-point power connection.

Non-fused disconnect

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

Remote connectivity (includes GFI convenience outlet)

Remote connectivity provides a secure cellular system which communicates information such as equipment parameters, operating conditions and equipment status to a central operating site. This feature is automatically included on sizes 070-130.

115V GFI convenience outlet (includes remote connectivity)

GFI convenience outlet is a factory-installed convenience outlet that includes a 4-amp GFI (ground fault interrupter) receptacle with independent fuse protection. The convenience outlet is a 115-v female receptacle. The GFI convenience outlet is also available as a stand-alone, field-installed accessory.

Bottom skid

This option includes bottom skid with standard coil protection.

Export packaging

This option includes bottom skid, top crate with bag. Standard coil protection is also included on all unit packaging.

Energy management module (EMM)

This module provides energy management capabilities to minimize condensing unit energy consumption. The EMM is also available as a field-installed accessory. This feature is automatically included on sizes 070-130.

BACnet IP or MS/TP communication

This option provides factory-installed communication capability with a BACnet IP or MS/TP network. Allows integration with i-Vu® Open control system or a BACnet building automation system. This feature is automatically included on sizes 070-130.

LonWorks (local operating network) translator control (sizes 070-130 only)

LonWorks control provides an interface between the unit and a local operating network (i.e., LonWorks¹ FT-10A ANSI/EIA-709.1).

Field-installed accessories

Vibration isolation pads

Isolation pads reduce vibration transmission from the compressor through the floor and into the conditioned space. The neoprene isolator pads measure 1/4 in. thick (24 in. x 3 in.).

Long line length check valves

Check valves are required for liquid line installation on units with linear line length applications of more than 100 ft (30.5 m). When MCHX condenser is selected and evaporator is located higher than the condensing unit, a check valve is required for linear line length above 30 ft, for 040, 050 single-circuit and 025-060 size dual-circuit units, and above 50 ft for 025-030 single-circuit and 070-130 size dual-circuit unit. The check valve option prevents charge migration to compressor. Field installation is required. Check valves are also available as an option that ships with the unit.

115V GFI convenience outlet

GFI convenience outlet is a factory-installed convenience outlet that includes a 4-amp GFI (ground fault interrupter) receptacle with independent fuse protection. The convenience outlet is a 115-v female receptacle. The GFI convenience outlet is also available as a stand-alone, factory-installed option.

Energy management module (EMM)

The module provides energy management capabilities to minimize condensing unit energy consumption. The EMM is also available as a factory-installed option.

LonWorks (local operating network) translator control

LonWorks control provides an interface between the unit and a local operating network (i.e., LonWorks¹ FT-10A ANSI/EIA-709.1).

Low sound compressor blankets

Low sound compressor blankets reduce unit sound levels by providing an acoustic blanket on each compressor. Compressor blankets are also available as factory installed option.

Security grilles

Security grilles protect the unit from damage with coated wire grilles with openings 1 by 4 in. (25 by 102 mm). This accessory is available on unit sizes 070-130.

Security grilles (sides) and hail guards (ends)

This option consists of louvered panels on the ends of the machine and security grilles on the sides of the machine. These coverings firmly fasten to the machine frame and provide complete 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 required when this accessory is selected. This accessory is available on unit sizes 070-130.

Full hail guards

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 required when this option is selected.

Wind baffles

Wind baffles facilitate operation down to -20°F (-29°C) when used in conjunction with high-efficiency variable condenser fans. Use of wind baffles alone, without the use of high-efficiency variable condenser fans, does not reduce the minimum standard ambient values. Wind baffles are available on unit sizes 025-130.

Airflow switch

An airflow switch must be installed at the air-handling unit to confirm airflow, thus allowing the 38RC condensing unit to operate.

1. Third-party trademarks and logos are property of their respective owners.

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

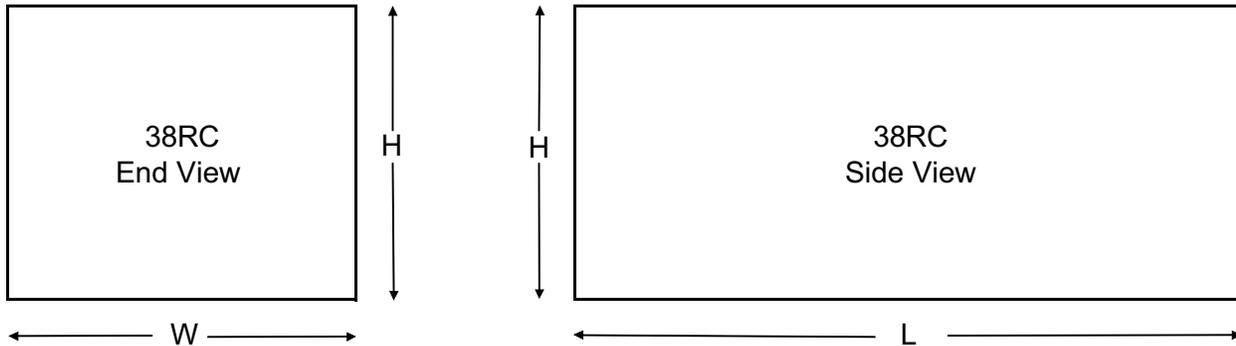
NOTE(S):

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

Condensing Unit Layout Dimensions



Chiller Layout Dimensions - English

38RC UNIT	LENGTH (in.)	WIDTH (in.)	HEIGHT (in.)
S025	89	46	79
S027	89	46	79
S030	89	46	79
S040	89	98	79
S050	89	98	79
D025	89	98	79
D027	89	98	79
D030	89	98	79
D040	89	98	79
D050	89	98	79
D060	89	98	79
D070	89	98	99
D080	89	146	99
D090	89	146	99
D100	89	146	99
D110	89	193	99
D130	89	193	99

Chiller Layout Dimensions - SI

38RC UNIT	LENGTH (mm)	WIDTH (mm)	HEIGHT (mm)
S025	2241	1168	1996
S027	2241	1168	1996
S030	2241	1168	1996
S040	2241	2486	1996
S050	2241	2486	1996
D025	2241	2486	1996
D027	2241	2486	1996
D030	2241	2486	1996
D040	2241	2486	1996
D050	2241	2486	1996
D060	2241	2486	1996
D070	2241	2486	2513
D080	2241	3710	2513
D090	2241	3710	2513
D100	2241	3710	2513
D110	2241	4910	2513
D130	2241	4910	2513

NOTES:

1. When determining the suitability of a given chiller for a space, do not forget to consider the availability of adequate airflow to that location. Airflow guidelines and clearances are presented in the Application Section of this publication.
2. More precise unit dimensions are available in the chiller submittal drawing manager.

To select a 38RC stand-alone condensing unit:

Use Carrier's **Commercial Split Systems Builder** program to select a stand-alone outdoor unit from the Installation Configuration drop down menu and input the job requirements. From the list presented, select a 38RC condensing unit that is estimated to meet capacity requirements. The 38RCS single-circuit unit is offered in sizes 025-050 and the 38RCD dual-circuit unit is offered in sizes 025-130. After a 38RC unit is selected, the program will calculate the condensing unit performance.

To select 38RC systems:

For systems with 39 Series air handler

Carrier's **AHUBuilder**® selection program is available to select 38RC outdoor units with a matching 39 Series air handler with direct-expansion (DX) coils. The 38RCS single-circuit unit is offered in sizes 025-050 and 38RCD dual-circuit unit is offered in sizes 025-130. Enter the software program and input the job requirements. From the list presented, select a 38RC condensing unit that is estimated to meet capacity requirements. After selecting a 38RC unit, check its performance with one or several DX coils. From the DX coil list presented on the screen, match

the 38RC with any coil or all coils. The program calculates the combined performance of the condensing unit and each DX coil and presents the resulting system capacities and operating temperatures. Matching thermostatic expansion valves and nozzles for the DX coils are automatically selected and displayed.

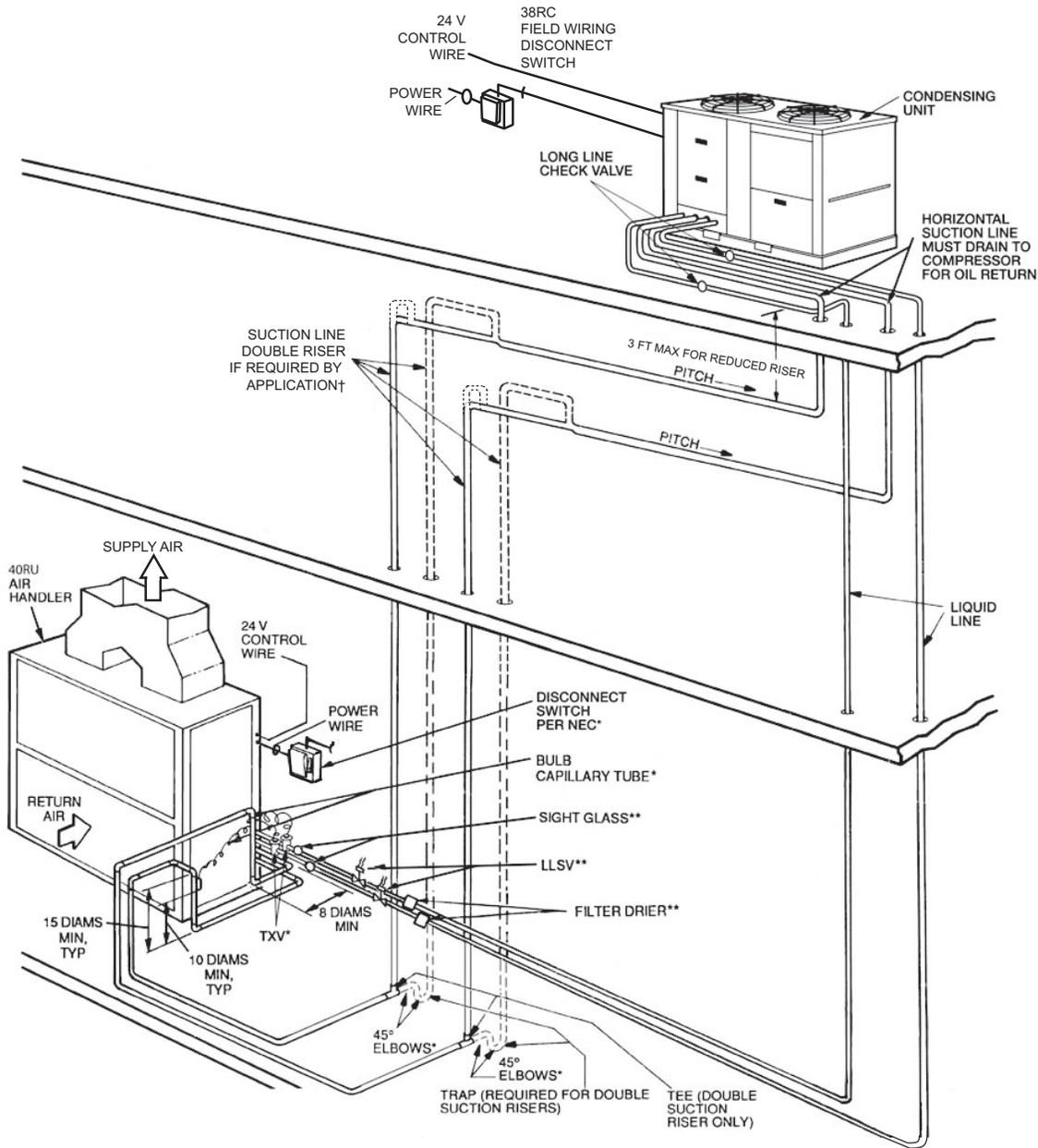
For systems with two air handlers

Use Carrier's **AHUBuilder**® selection program to select one size 025-130 38RC outdoor unit to match with two 39 Series air handlers with DX coils. For the first air handler, enter the **AHUBuilder** selection program and input the job requirements. To choose a condensing unit, select the "Specify Your Own" option. The program asks for condensing unit capacities and SDT (saturated discharge temperature) at 30°F (-1.1°C) and 50°F (10°C) SST (saturated suction temperature). The SDT must first be determined by running a standalone outdoor unit in the **Commercial Split Systems Builder** program. Enter the capacities from condenser circuit A or B and SDT for circuits A and B into the **AHUBuilder** program (remember to use the correct air temperature entering condenser column when locating the circuit capacities). For the second air handler, repeat the procedure to select the second DX coil for the condenser circuit (A or B) not used in the first selection.

Performance data

Performance data for both MCHX and RTPF coils may be found in the Product Library of the **Commercial Split Systems Builder**.

Rooftop Installation — 38RC Units



LEGEND

- LLSV — Liquid Line Solenoid Valve
- NEC — National Electrical Code
- TXV — Thermostatic Expansion Valve
- Piping
- Double Riser Piping (if required)

* Field supplied.

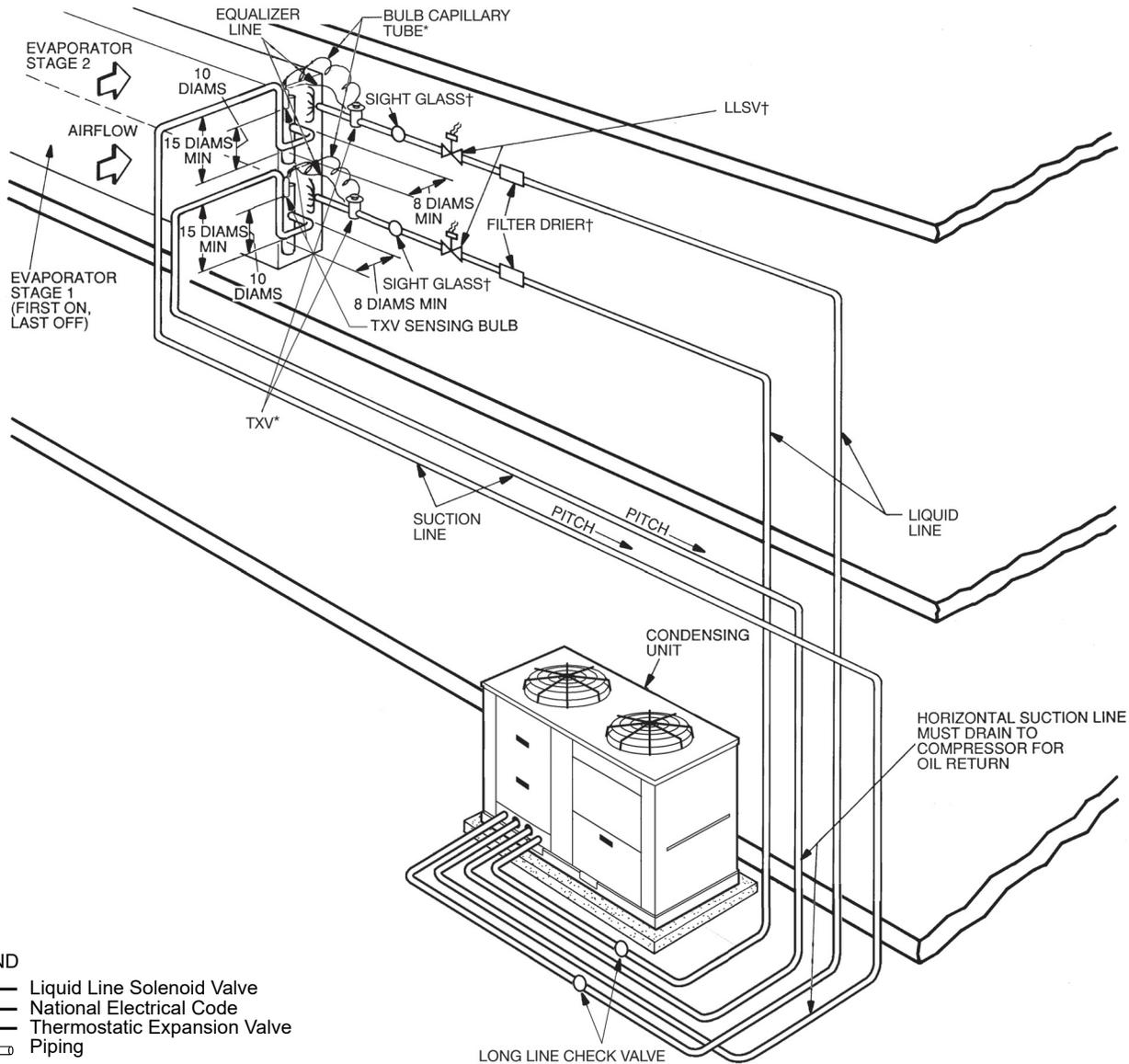
† If double suction riser is required for piping system, size pipe diameter of 3 ft (0.9 m) (maximum) riser according to application data.

** 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. Install field-supplied disconnect switch in accordance with all local and national electrical codes.
5. Liquid line solenoid valves (solenoid drop control) are recommended on all applications to prevent refrigerant migration to the compressor. Liquid line solenoid valves are required on applications having 75 ft (23 m) or greater pipe length or if the evaporator surface area exceeds limits defined in the installation instructions.
6. Factory-supplied accumulator not shown.
7. Dual-circuit piping shown. Single-circuit piping is similar but would only have one suction line and one liquid line.
8. A field-supplied, 5 to 15% bleed port TXV is required for every application.
9. Sight glass, LLSV, and filter drier are field supplied, and details are available in the 38RC Installation Instructions.
10. Long line length check valves are required for liquid line installation on all linear line length applications of more than 100 ft (30.5 m). For any 025-030 size dual-circuit unit application where evaporator is located higher than the condensing unit, check valves are required for linear line length above 55 ft (16.8 m).
11. Do not use soft solder.
12. Maximum vertical separation between evaporator and condensing unit is 75 ft (22.8 m).

Ground Level Installation — 38RC Units



LEGEND

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

* Field supplied.

† 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. Install field-supplied disconnect switch in accordance with all local and national electrical codes.
5. Liquid line solenoid valves (solenoid drop control) are recommended on all applications to prevent refrigerant migration to the compressor. Liquid line solenoid valves are required on applications having 75 ft (23 m) or greater pipe length or if the evaporator surface area exceeds limits defined in the installation instructions.
6. Factory-supplied accumulator not shown.
7. Dual-circuit piping shown. Single-circuit piping is similar but would only have one suction line and one liquid line.
8. A field-supplied, 5 to 15% bleed port TXV is required for every application.
9. Sight glass, LLSV, and filter drier are field supplied, and details are available in the 38RC Installation Instructions.
10. Long line length check valves are required for liquid line installation on all linear line length applications of more than 100 ft (30.5 m). For any 025-030 size dual-circuit unit application where evaporator is located higher than the condensing unit, check valves are required for linear line length above 55 ft (16.8 m).
11. Do not use soft solder.
12. Maximum vertical separation between evaporator and condensing unit is 75 ft (22.8 m).

Field Wiring Sizes^{a,b}

CONNECTION TYPE	38RC UNIT SIZES	MCA RANGE	WIRE SIZE RANGE	MAXIMUM NUMBER OF WIRES PER PHASE	HIGH SCCR FUSE TYPE
TERMINAL BLOCK	020-060	MCA up to 175	14 AWG to 2/0 AWG	1	J, T, RK1, RK5, G, CC
		MCA 175.1 to 420	2 AWG to 600 kcmil	1	J, T, RK1, RK5, G, CC
	070-130	Up to 760A	4 AWG to 500 kcmil	2	J, T, RK1, RK5, G, CC
NON-FUSED DISCONNECT	020-060	MCA up to 125	14 AWG to 3/0 AWG	1	—
		MCA 125.1 to 225	4 AWG to 4/0	1	—
		MCA 225.1 to 400	2/0 AWG to 500 kcmil	1	—
			2/0 AWG to 250 kcmil	2	—
	070-130	Up to 400A	2/0 to 500 kcmil	2	—
		400 to 600A	2 AWG to 500 kcmil	2	—
		600-800A	3/0 AWG to 400 kcmil	3	—
			500 to 750 kcmil	2	—

NOTE(S):

- a. Wiring for main field supply must be rated 75°C. Use copper conductors only.
- b. Units with high SCCR option and terminal block must use approved fuses to meet high SCCR rating.

LEGEND

- AWG** — American Wire Gauge
- kcmil** — kilo Circular Mills
- MCA** — Minimum Circuit Amps
- SCCR** — Short Circuit Current Rating

Microprocessor

The Carrier microprocessor controls overall unit operation. Its central executive routine controls a number of processes simultaneously. These include internal timers, reading inputs, analog to digital conversions, fan control, display control, diagnostic control, output relay control, demand limit, capacity control, head pressure control, and temperature reset. Some processes are updated almost continuously, others every 2 to 3 seconds, and some every 30 seconds. The microprocessor also has the capability of communicating with the Carrier Comfort Network® (CCN) devices using the CCN protocol and when the accessory translator is used, other popular protocols including BACnet, Modbus¹, and LonWorks may also be used.

The microprocessor routine is started by switching the Emergency ON-OFF switch to ON position.

Cooling control options

When mechanical cooling is required PIC6 controls have the capability to control the staging of the compressors in several different ways. The control checks on various other operation parameters in the units to make sure that safety limits are not exceeded and the compressors are reliably operated.

The 38RC unit's PIC6 controls offer two basic control approaches to mechanical cooling: constant volume (CV) with 2 stages of cooling, and variable air volume (VAV) with multiple stages of cooling. In addition to these traditional methods of control, the 38RC Series PIC6 controls offer the ability to run multiple stages of cooling in constant volume applications and accept an external input for desired percentage of capacity.

CONTROL TYPE	COOLING CONTROL METHOD	UNIT SIZE	STAGING CONTROLLED BY
CV Thermostat 2-Stage	Thermostat	025 to 030	2-Stage Thermostat
CV Thermostat Multiple Stage	Thermostat	025 to 130	Supply Air Temperature
CV SPT Multiple Stage	Space Temperature, T-55/T-56	025 to 130	Supply Air Temperature
VAV	Supply Air Temperature	025 to 130	Supply Air Temperature
% Capacity	4-20 mA Input	025 to 130	Supply Air Temperature

LEGEND

CV — Constant Volume
 SPT — Space Temperature Sensor
 VAV — Variable Air Volume

High-efficiency variable condenser fans (38RC units with Greenspeed® intelligence only)

All fans on a circuit run at the same speed and are controlled by a VFD with special CCN software to maintain SCT (saturated condensing temperature) set point. The set point is calculated from operating conditions and adjusted to the most efficient operating point. The high-efficiency variable condenser fan option uses Danfoss VLT 102 variable frequency drives, each with a display. Drives are connected to the LEN communication bus. Fan speed is determined by the unit controller and communicated to the drive to provide excellent part load efficiency and reduced sound level operation over the life of the condensing unit.

1. Third-party trademarks and logos are property of their respective owners.

Digital compressor

The 38RC units offer a digital compressor factory-installed option composed of one digital compressor per unit to operate in combination with the remaining standard scroll compressor(s). The digital compressor has the ability to load and unload rapidly, and the load/unload timing can be varied to achieve unit capacity and closely match the load. The digital scroll option provides better capacity control by digitally modulating capacity, effectively increasing the number of compression stages. The digital scroll compressor modulates the capacity output using a digital unloader solenoid (DUS) which is activated by a signal from the Carrier controller to allow the scroll sets to rapidly separate (stop compressing) and reengage (resume compressing) during operation. Supply and return air sensors provide the input to the Carrier controller necessary to stage unloading for all digital compressor units. The % capacity control function does not require input from supply and return air sensors. The digital scroll operates in two stages, the loaded state when the solenoid valve is normally closed and the unloaded state when the solenoid valve is energized. These two states rapidly alternate between full capacity and zero capacity where during the loaded state the compressor operates like a standard scroll and delivers full capacity and mass flow, and during the unloaded state, the compressor does not flow refrigerant. The timing of the load/unload states is then tuned to match the desired output.

Control type

The control type determines the selection of the type of cooling control as well as the technique for selecting a cooling mode. The control types are:

VAV

This configuration refers to standard VAV operation. If the control is occupied and fan status input closed, the controls vary capacity based on supply-air temperature.

CV TSTAT-2 Stage

This configuration will force the control to monitor the thermostat inputs (Y1,Y2) to make a determination of mode and capacity.

CV TSTAT-Multiple Stage

This configuration will force the control to monitor the thermostat inputs (Y1,Y2) to make a determination of mode. Unlike traditional 2-stage thermostat control, the unit is allowed to use multiple stages of cooling control and perform VAV-style capacity control.

CV SPT-Multiple Stage

This configuration will force the control to monitor a space temperature sensor to make a determination of mode. The unit is allowed to use multiple stages of cooling control and perform VAV-style capacity control.

% Capacity Control

This configuration will force the control to monitor a 4 to 20 mA external input and vary compressor capacity from 0 to 100% depending on the 4 to 20 mA input.

Cooling control method

Three different cooling control methods are used to step through the available stages of capacity depending on the unit size, circuiting, compressor type and cooling control method. Refer to Loading Sequences tables in the Application Data section on page 23 for specific capacity control.

Multiple-Stage Supply Air Temperature (SAT)

The capacity of the compressors is controlled based on the supply-air temperature and supply air temperature set point. This control method uses an adaptive PID (proportional, integral, derivative) algorithm to calculate the estimated change in supply-air temperature before engaging or disengaging the next stage of cooling. The algorithm compensates for varying conditions, including changing flow rates across the evaporator coil, to provide better overall control of compressor staging.

Multiple Adaptive Demand

This control method will base the capacity of the compressors on the supply air discharge temperature and one of two supply air temperature set points. The control will be able to call out a LOW COOL or a HIGH COOL mode and maintain a low or high cool supply air set point. The unit will use either the input from a conventional thermostat to turn the Y1, Y2 signals into a high and low demand signal, or with a space temperature sensor use a differential from set point to determine the mode. Once the mode has been established the control uses the same algorithm as with VAV control.

Two-Stage Demand

The unit will operate 2 stages of compressor capacity control.

Demand limiting

The control supports demand limiting using one or two fixed capacity limits initiated by discrete input switches or a variable capacity limit function based on an analog input signal. On CCN systems this can be done through the network, or for non-CCN network jobs this can be done by adding the energy management module.

Diagnostics

The Carrier controls have fully integrated all controls and sensors into a common control system. The control monitors these inputs as well as many of the routines to provide advanced diagnostics. These include adaptive logic to allow the unit to continue to operate in a reduced output mode and automatic resets where applicable. The last 10 alarms and alerts are stored in memory and can be accessed through the display. The alarms can also be monitored through the Carrier Comfort Network[®] connection. The unit also supports the use of the hand held Navigator[™] display which can be plugged in at the main control box.

Some of the diagnostics that are included are:

- Monitoring of all sensors
- Suction and discharge pressure transducers to provide compressor protection and coil freeze protection
- Monitoring of compressor status using compressor logic routines in the controls
- Low refrigerant charge protection
- Compressor reverse rotation protection
- Low superheat protection

Control interface

The Carrier controller can interface with the Carrier Comfort Network devices through the R-485 communications port. This will allow for the use of all system control programs.

These include:

- Network Service Tool

- ComfortVIEW[™] software
- CCN Web software

The control can also provide interface with non-Carrier energy management systems with the addition of either the BACnet/MODBUS Carrier translator or the LonWorks Carrier translator. Several contact connection points have been provided in the main control box for interface to external controls and systems.

Constant volume applications

The units can be configured to operate in CV applications. The unit operates with either a standard (mechanical or electronic) 2-stage cool thermostat, or with an electronic room temperature sensor and a timeclock to establish unit start and stop times. With a standard thermostat (programmable is optional), cooling operation is set by space temperature. With a space sensor and field-supplied timeclock, the machine will operate at default values unless they are changed using appropriate input devices.

Features with thermostat control of unit include:

- Two-stage cooling or adaptive multiple stage cooling which can provide 2 to 6 stages of capacity when supply air sensors installed. Refer to Loading Sequences tables in the Application Data section on page 23 for specific capacity control.
- Control of unit using Y1, Y2 thermostat or T55, T56, or T58 space sensors.
- Control of a condenser fan based on outdoor-air and condensing pressures.
- Compressor time guard override (power up and minimum on and off timers) to assure air return in low load conditions.
- Features with sensor control (three options available) of unit include:
 - T55 sensor will monitor room temperature and provide unoccupied override capability (1 to 4 hours).
 - T56 sensor will monitor room temperature, provide unoccupied override capability (1 to 4 hours), and provide a temperature offset of 5°F (2.7°C) maximum.
 - T58 CCN communicating sensor will provide the set point and space temperature values.

Standard features include:

- Two-stage cooling or adaptive multiple stage cooling which can provide 2 to 6 stages of capacity when supply air sensors installed. Refer to Loading Sequences tables in the Application Data section on page 23 for specific capacity control.
- Adjustment of space temperature set points of $\pm 5^\circ\text{F}$ (2.7°C) when using a T56 sensor.
- 365-day timeclock with backup (supports minute, hour, and day of week, date, month, and year access). The timeclock includes the following features:
 - Daylight savings time function
 - Occupancy control with 8 periods for unit operation
 - Holiday table containing up to 18 holiday schedules
- Ability to initiate timed override from T55 or T56 sensors (for a timed period of 1 to 4 hours).
- For units connected into a CCN network the timeclock can be integrated into the overall building energy management system and be updated remotely.

Variable air volume (VAV) applications

Units that are configured to operate in VAV applications are designed to control the leaving-air temperature in cooling to a configurable set point. Some of the features for VAV units in a stand-alone application include:

- The units are shipped as operable, stand-alone units with the addition of a field-supplied timeclock to establish unit start and stop times or they can use PIC6 time of day scheduling routine.
- Provide cooling control.
- Supports an optional space temperature sensor for mode control and supply air temperature reset.
- If space sensor is equipped with an override feature, the sensor will allow operation during the unoccupied period for a fixed length of time.
- Control board diagnostics.
- Control of an outdoor-air fan based upon outdoor-air temperature and saturated condensing temperature.
- Support of remote occupied/unoccupied input to start.
- Support a field test for field check out.
- Cooling capacity control of 2 to 6 stages plus economizer. Refer to Loading Sequences tables in the Application Data section on page 23 for specific capacity control.
- Compressor time delays to prevent rapid cycling of compressors.
- Automatic lead-lag control of compressors to reduce the number of compressor cycles. (When unit is equipped with digital scroll option, Sequence A is always used.)
- With the addition of the energy management board, the PIC6 controls will also support demand limiting and remote set point control.

When the unit is connected to a CCN (Carrier Comfort Network®) system, the following additional features can be used:

- Interface of the unit clock with the CCN network clock and allow for remote configuration of the schedules.
- CCN demand limit participation.

Sequence of operation

Cooling, constant volume (CV) units

On power up, the control module will activate the initialization software. The initialization software will determine the

unit configuration and also initialize any controls loops and input/output devices. All alarms and configurations are saved in memory and maintained during power outages. All alarms will be maintained in memory and must be cleared through the display.

Constant volume conventional thermostat control

If the unit is equipped with a conventional thermostat with Y1, Y2 connections, then the control will perform the following sequence.

If Y1 is closed and the fan status input is closed then the control will stage the first compressor be sequenced on. If Y2 closes the control will stage the second compressor on. For units configured for TSTAT Multi, the control will add and remove compressor stages to maintain the low and high demand leaving air set points. If Y1 is closed at least one compressor stage will be turned on.

Constant volume space temperature sensor control

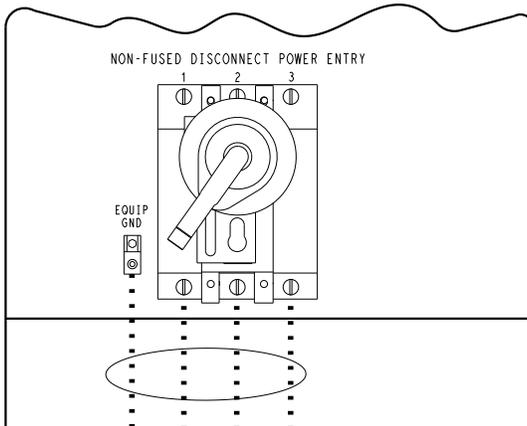
If the space temperature operation has been selected using a T55, T56, or T58 sensor then the following logic will be used to control the operation of the unit. If the internal timeclock is used, the control module determines the occupancy state based on the system time schedules. The set point for cooling is configurable through the display. If a T56 sensor is being used then the set point can be shifted by as much as 5 degrees. If the space temperature goes above the cooling set point then the unit will go into Cooling mode. The set point will depend on the space temperature. Once the fan status input is closed then the compressors will be sequenced on to maintain either the low or high load temperature set points.

Variable air volume control

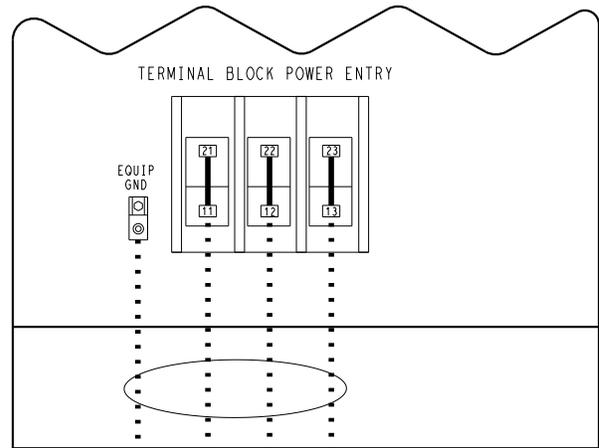
On power up, the control module will activate the initialization software. The initialization software will determine the unit configuration and also initialize any controls loops and input/output devices. All alarms and configurations are saved in memory and maintained during power outages. All alarms will be maintained in memory and must be cleared through the display.

The unit will first determine the mode of operation. If the Cooling mode is required and the fan status input closed, then the controlling set point will be the leaving air temperature set point; then the leaving-air temperature will sequence to compressors on and off using a PID control loop.

Power Schematic



NON-FUSED DISCONNECT



TERMINAL BLOCK

NOTES:

1. Factory wiring is in accordance with UL 60335-40-2 standards. Field modifications or additions must be in compliance with all applicable codes.
2. All units or modules have single point primary power connection. Main power must be supplied from a field or factory-supplied disconnect.
3. Wiring for main field supply must be rated 75 C. Use copper conductors only. See field wiring sizes table on page 18.
4. Refer to certified dimensional drawings for exact locations of the main power and control power entrance locations.
5. Outputs for alarm, running, LLSV, HGBP have a maximum load for the alarm relay of 5 VA sealed. 10 VA inrush at 24 V. Field power supply is not required.
6. The connection for demand limit and ice done Y1-Y4, remote start, RL, FS options must be rated for dry circuit application capable of handling a 24 VAC load up to 50 mA.
7. Units with high SCCR option and terminal; block must use approved fuses to meet high SCCR rating.

LEGEND

EQUIP GND	—	Equipment Ground
FS	—	Fan Status
HGBP	—	Hot Gas Bypass
NEC	—	National Electrical Code
RL	—	Refrigerant Leak
SCCR	—	Short Circuit Current Rating
Y1-Y4	—	Cooling Stages

Installation

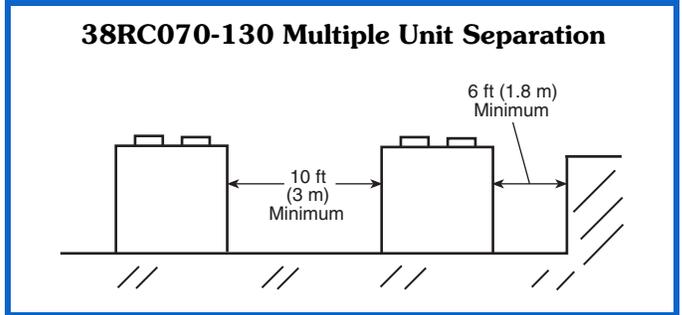
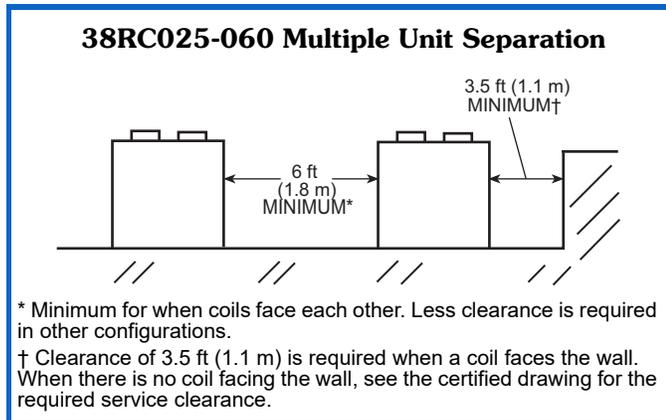
The 38RC unit must be installed outdoors.

The 38RC condensing units are not designed for refrigeration duty. If applying with a third-party air-handling unit, a crossplot is required to determine the saturation temperature.

When considering location of the unit, be sure to consult National Electrical Code (NEC, U.S.A.) and local code requirements. Allow sufficient space for airflow, wiring, piping, and service. The placement area must be level and strong enough to support the operating weight of the unit. When unit is in proper location, use of mounting holes in base rails is recommended for securing unit to supporting structure. For mounting unit on vibration isolators, 4 x 24 in. (102 x 610 mm) perimeter support ASTM "C" channels between unit and the isolators are recommended with a minimum of 4 channels per unit for 025-100, 6 channels per unit for 110-130. Fasteners for mounting unit are field supplied.

For unit sizes 025-060, when parallel condensing units are aligned such that coils face each other, a minimum of 6 ft (1829 mm) is recommended. When the parallel arrangement has only one coil drawing air from the space between condensing units, a minimum of 3.5 ft (1067 mm) is recommended. When parallel condensing units have no coils facing each other (a back-to-back arrangement), be sure to maintain the larger of the recommended service clearances associated with each chiller (see the certified drawings). Due to NEC (National Electric Code, U.S.A.) regulations, a minimum clearance of 4 ft (1219 mm) must be maintained on the side of the chiller that has an electrical box. Condensing unit fan discharge must be at least as high as adjacent solid walls.

For 38RC070-130 units, acceptable clearance on the evaporator connection side or end opposite the control box of the unit can be reduced to 3 ft (1 m) without sacrificing performance as long as the remaining 3 sides are unrestricted. Acceptable clearance on the side with a control box can be reduced to 4 ft (1.3 m), due to NEC (National Electric Code) regulations, without sacrificing performance, as long as the remaining 3 sides are unrestricted. Clearances between chillers in dual chiller applications may be reduced to 6 ft (1.8 m) without sacrificing performance, provided the remaining sides are unrestricted.



The 38RC condensing units are not intended for remote cooler applications. For such purposes, please select a 30 Series chiller with remote cooler.

IMPORTANT: Be sure to mount unit level to ensure proper oil return to compressors.

IMPORTANT: Do NOT bury refrigerant piping underground. Failure to comply could result in equipment damage.

Operating limits

- Maximum outdoor ambient:
- Full capacity 122°F (50°C)
- Unloaded 125°F (51.6°C)
- 100% outdoor air application; return air temperature maximum 95°F (35°C)
- Minimum operating outdoor air temperature with installed high-efficiency variable condenser fans and wind baffles or hail guards -20°F (-28.8°C)
- Minimum return air temperature 55°F (-12.8°C)
- Maximum return air temperature 95°F (35°C)
- Range of acceptable saturation suction temperature 40 to 65°F (4.4 to 18.3°C)
- Maximum discharge temperature 268°F (131°C)
- Minimum suction superheat 15° F (8.3°C)
- Maximum vertical liquid lift separation 75 ft (22.8 m)
- Maximum vertical suction lift separation without digital scroll option 100 ft (30.5 m)
- Maximum vertical suction lift separation with digital scroll option 50 ft (15.2 m)
- Check valves required with all units with Microchannel (MCHX) condenser coils.
- Check valves required for all units with linear line length more than 100 ft (30.5 m).
- Check valves required for any 38RC025-030 dual circuit units where evaporator is located higher than the condensing unit and the linear line length is more than 55 ft (16.8 m).
- Maximum linear separation between condensing unit and air handling unit 200 ft (61 m).

NOTES:

1. Select indoor equipment at a saturated suction temperature, SST, of more than 40°F at all expected conditions.
2. The total combined draw of the 2 field-supplied liquid line solenoid valves and one air handler fan contactor must not exceed 90 va. If the specified va must be exceeded, use a remote relay to control the load.
3. 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.
4. Due to compressor reliability considerations, oil management is critical on split systems. Evaluate oil return when selecting vapor line sizes, especially for partial load conditions.
5. The indoor fan must operate when the outdoor unit is operating.
6. For VAV systems, the total building load is NOT the sum of the individual peak loads. Equipment selected for the sum of the individual peak loads will be oversized.
7. For VAV systems with supply-to-return air recycling, use the equipment room as a return-air plenum.
8. To minimize air recirculation, do not use concentric supply and return grilles.
9. All 38RC condensing units will come with one accumulator per circuit to protect compressors from liquid migration.
10. Ductwork should be sized according to unit size, not building load.
11. A field-supplied 5 to 15% bleed port TXV (thermostatic expansion valve) is required for every application. EXVs are not acceptable.
12. The 38RC condensing units are not suitable for hot gas reheat applications.

38RC Unit Ambient Limitations

Single Circuit

38RCS UNIT SIZE	MINIMUM LOW AMBIENT ^{a,b} (Standard Unit)	MINIMUM LOW AMBIENT WITH HIGH-EFFICIENCY VARIABLE CONDENSER FANS ^c	MAXIMUM AMBIENT ^d
025-050	45°F (7.2°C)	-20°F (-28.9°C)	122°F (50°C)

Dual Circuits

38RCD UNIT SIZE	MINIMUM LOW AMBIENT ^{a,b} (Standard Unit)	MINIMUM LOW AMBIENT WITH HIGH-EFFICIENCY VARIABLE CONDENSER FANS ^c	MAXIMUM AMBIENT ^d
025-030	32°F (0°C)	-20°F (-28.9°C)	122°F (50°C)
040-060	45°F (-7.2°C)	-20°F (-28.9°C)	122°F (50°C)
070-130	32°F (0°C)	-20°F (-28.9°C)	122°F (50°C)

NOTE(S):

- a. Temperatures calculated with the minimum number of fans operating per circuit.
- b. Minimum outdoor-air operating temperature is based on 90°F (32°C) saturated condensing temperature and 100% capacity.
- c. Wind baffles or hail guards must be included.
- d. Operation above listed temperature depends on the saturated suction temperature at which the unit is operating. Refer to E-Cat for exact limitations.

38RC Loading Sequences

Loading Sequences — Single Circuit

38RCS UNIT SIZE	LOADING SEQUENCES			
	Standard Unit		Digital Option	
	Range (%)	Number of Steps	Range (%)	Number of Steps
025-030	50, 100	2	22-100	17
040-050	33, 66, 100	3	16-100	27

Loading Sequences — Dual Circuit

38RCD UNIT SIZE	LOADING SEQUENCES			
	Standard Unit		Digital Option	
	Range (%)	Number of Steps	Range (%)	Number of Steps
025-030	50, 100	2	22-100	17
040	27, 50, 73, 100	4	13-100	36
050-060	23, 50, 73, 100	4	11-100	36
070	25, 50, 75, 100	4	19-100	36
080	20, 40, 60, 80, 100	5	9-100	45
090	15, 33, 49, 67, 82, 100	6	7-100	54
100	17, 33, 50, 67, 83, 100	6	8-100	54
110	14, 33, 48, 67, 81, 100	6	7-100	54
130	17, 33, 50, 67, 83, 100	6	NA	NA

Commercial Air-Cooled Condensing Units

HVAC Guide Specifications

Size Range:

25 to 130 Nominal Tons at 60 Hz

88 to 457 Nominal kW at 60 Hz

Carrier Model Number: **38RCD, 38RCS**

Part 1 — General

1.01 SYSTEM DESCRIPTION

Outdoor-mounted, air-cooled condensing unit with R-32 refrigerant suitable for on-the-ground or roof-top installation. 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 a central station air-handling unit or direct-expansion coils.

The 38RCS unit shall have one refrigeration circuit and shall consist of two or three rotary scroll compressors.

The 38RCD unit shall have two independent refrigeration circuits and shall consist of two to six rotary scroll compressors.

For units that incorporate Greenspeed® Intelligence, all fans are controlled with variable speed fan drive motors. Unit software shall be specifically developed to coordinate optimal fan speed for application conditions and provide refrigerant circuit optimization, resulting in higher part load efficiency and reduced acoustic levels.

1.02 QUALITY ASSURANCE

- A. Unit performance shall be rated in accordance with AHRI (Air-Conditioning, Heating, and Refrigeration Institute) Standard 365, latest edition (U.S.A).
- B. Unit construction shall comply with latest edition of ASHRAE (American Society of Heating, Refrigerating, and Air-Conditioning Engineers) 15 Safety Code, UL 60335-40-2, and ASME (American Society of Mechanical Engineers) applicable codes (U.S.A. codes).
- C. The management system governing the manufacturer of the product is ISO (International Organization for Standardization) 9001: 2015 certified.
- D. Base unit shall be constructed in accordance with UL (Underwriters Laboratories) standards and CSA (Canadian Standards Association).
- E. 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 cracking, no loss of adhesion, no evidence of blistering, and the mean creepage shall not exceed 1/4 in. (rating ≥ 4 per ASTM D1654) on either side of the scribe line.
- F. Design pressure shall be 650 psig (4482 kPa).
- G. Unit shall be functional checked at the factory.
- H. Lifting holes shall be provided to facilitate rigging.

1.03 DELIVERY, STORAGE, AND HANDLING

Unit shall be shipped as single package and shall be stored and handled per the 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, compressors, 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. Control box access panels shall be hinged for service access.

C. Fans:

1. Standard condenser fans shall be direct-driven (VFD [variable frequency drive] controlled on units with Greenspeed intelligence), 9-blade air-foil cross-section, reinforced polymer construction, shrouded-axial type, and shall be statically and dynamically balanced with inherent corrosion resistance.
2. The variable speed drives for the condenser fans on 38RC units with Greenspeed intelligence shall include a DC link reactor.
3. Fan operation shall allow reduced sound levels during scheduled unoccupied operating periods. Manufacturers without unoccupied reduced sound capability shall submit 1/3 octave band data and sound power data as measured according to AHRI 370 as confirmation of unit sound characteristics.
4. Air shall be discharged vertically upward.
5. Fans shall be protected by coated steel wire safety guards.
6. Fan blades shall have serrated edges to minimize the sound that is produced.

D. Compressors:

1. Compressors shall be fully hermetic direct-drive, rotary scroll.
2. Operating oil charge and a crankcase heater control oil dilution.
3. Compressors shall be mounted on two rails having rubber in shear vibration isolators.
4. Staging of compressors shall provide unloading capability.
5. Digital compressor unloading control shall be available as an option on one circuit.
6. Compressor motors shall be cooled by refrigerant gas passing through motor windings and

shall have either internal line break thermal and current overload protection or external current overload modules with compressor temperature sensors.

E. 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).

F. Refrigeration Components:

1. Refrigeration circuit components shall include liquid line temperature relief device, pressure transducers, liquid line shutoff valve, suction shutoff valve, suction line accumulators, nitrogen holding charge, and compressor oil.
2. Long line length check valves are required for liquid line installation on all linear line length applications of more than 100 ft (30.5 m) to prevent liquid migration during unit shutdown.
3. For any 025-030 size dual circuit unit application where evaporator is located higher than the condensing unit, check valves are required for linear line length above 55 ft (16.8 m).
4. Units shall include one factory-installed suction line accumulator for each refrigerant circuit.

G. Controls, Safeties, and Diagnostics:

1. Unit controls shall include the following minimum components:
 - a. Microprocessor with non-volatile memory. Battery backup system shall not be accepted.
 - b. Separate terminal block for power and controls.
 - c. Control transformer to serve all controllers, relays, and control components.
 - d. ON/OFF control switch.
 - e. Replaceable solid-state controllers.
 - f. Pressure sensors installed to measure suction and discharge pressures. Thermistors installed to measure cooler entering and leaving fluid temperatures.
 - g. Service run test capability.
 - h. Compressor minimum run time (3 minutes) and minimum off time (3 minutes).
 - i. Service diagnostic mode.
 - j. Self-contained low voltage control circuit.
 - k. Cycle condenser fans to maintain proper head pressure control.

- l. Capacity control with staging compressors.
- m. Optional digital scrolls to stage compressors and cycle digital compressor for maintaining desired leaving air temperature set point.
- n. Alarm relay output to indicate when unit is in alarm condition.

2. Minimum unit safety devices shall include:

- Solid-state compressor lockout to provide optional reset capability at the space thermostat if any of the following safety devices trip and shut off compressor.
- a. Compressor lockout protection for internal or external overload.
 - b. Low pressure protection.
 - c. High pressure protection (high pressure switch or internal).
 - d. Compressor reverse rotation protection.
 - e. Loss of charge protection.
 - f. Low suction superheat protection.
 - g. Short cycle protection.
 - h. Suction and discharge pressure transducers.
 - i. Circuit breakers or fuses for short circuit protection of compressors.

H. Operating Characteristics:

1. The capacity of the condensing unit shall meet or exceed ___ Btuh (___ kW) at a suction temperature of ___°F (___°C). The power consumption at full load shall not exceed ___ Btuh (___ kW).
2. The combination of the condensing unit and the evaporator or air-handling unit shall have a total net cooling capacity of ___ Btuh (___ kW) or greater at conditions of ___ cfm (___ L/s) entering-air temperature at the evaporator at ___°F (___°C) wet bulb and ___°F (___°C) dry bulb, and air entering the condensing unit at ___°F (___°C).
3. The system shall have an Energy Efficiency Ratio (EER) of ___ Btuh/watt or greater at standard AHRI conditions.

I. Electrical Requirements:

All unit power wiring shall enter unit cabinet at a single location.

J. Special Features:

1. High-efficiency variable speed condenser fans:

All fans on the unit shall have 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 with display. Variable speed drives are rated IP-55 enclosures and UL Listed. The use of this option, with the addition of wind baffles or hail guards, shall allow running with outdoor ambient temperatures down to -20°F (-28.9°C).

2. 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 coils are not recommended for corrosive environments.

c. E-coated aluminum-fin coils:

Coil shall have a flexible epoxy polymer coating uniformly applied to all coil surface areas without material bridging between fins. Coating process shall ensure complete coil encapsulation. Color shall be high gloss black with gloss; 60° of 65 to 90% per ASTM ID523-89. Uniform dry film thickness from 0.8 to 1.2 mil on all surface areas including fin edges. Superior hardness characteristics of 2H per ASTM D3363-92A and cross hatch adhesion of 4B-5B per ASTM D3359-93. Impact resistance shall be up to 160 in./lb (ASTM D2794-93). Humidity and water immersion resistance shall be up to minimum 1000 and 250 hours respectively (ASTM D2247-92 and ASTM D870-92). E-coated aluminum-fin coils shall be capable of withstanding an 10,000-hour salt spray test in accordance with the ASTM (American Society for Testing and Materials) (U.S.A.) B-117 Standard. Coil construction shall be aluminum fins mechanically bonded to copper tubes.

3. Sound Reduction:

- a. Low sound compressor blankets are available as a factory-installed option or as a field-installed accessory.

4. Digital Compressor Option:

The digital compressor shall be available as a factory-installed option for all units to provide incremental steps for tighter temperature control.

5. Non-Fused Disconnect:

A non-fused disconnect is available as a factory-installed option for all units.

6. 115V GFI Convenience Outlet:

Shall be factory or field-installed to provide the unit with a 4 amp GFCI outlet. The receptacle shall have independent fuse protection. The convenience outlet is a 115-v female receptacle. This feature shall be factory-installed on all size 070-130 units.

7. Long Line Length Check Valves:

Long line length check valves are available as options shipped with the unit or accessories shipped separately. In either case, field installation is required.

8. High Short Circuit Current Rating (SCCR):

The optional high SCCR interrupt capability shall allow the unit to tolerate a 65 kA (208/230-v, 380-v 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. High interrupt shall be available as a factory-installed option strictly in conjunction with a non-fused disconnect.

9. BACnet IP or MS/TP Communication:

The BACnet Communication for i-Vu shall provide factory-installed communication capability with a BACnet MS/TP network. Allows integration with i-Vu® Open control system or a BACnet building automation system. This feature shall be automatically provided on unit sizes 070-130.

10. LonWorks Translator Control:

Unit shall be supplied with an interface between the chiller and a Local Operating Network (LON, i.e., LonWorks FT-10A ANSI/EIA-709.1).

LON shall be available as a field-installed accessory for all units.

This feature is available as a factory-installed option on all size 070-130 units.

11. Energy Management Module (EMM):

The factory or field-installed EMM shall provide remote set point, demand limit control, and percent capacity input. The EMM is not needed

Guide specifications (cont)

with use of BACnet or LON. This feature is factory-installed on all size 070-130 units.

12. 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.

13. Wind Baffle Kit:

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

14. Security Grilles:

Unit shall be equipped with factory or field-installed wire grilles to provide additional protection from damage. This feature is available on size 070-130 units only.

15. Security Grilles (Sides) and Hail Guard (Ends):

Unit shall be equipped with a factory or field installed option consisting of louvered panels on the ends of the machine and security grilles on the sides of the machine. These coverings shall firmly fasten to the machine frame and provide coverage from top to the bottom of the unit. This feature also provides the functionality of a wind baffle. This feature is available on size 070-130 units only.

16. Full Hail Guard:

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

17. Remote Connectivity:

Shall be factory-installed to provide a secure cellular system which communicates operating information to a central operating site. The selection of this option automatically includes GFI convenience outlet. This feature is factory-installed on all size 070-130 units.

18. Export Packaging:

This factory-installed option includes standard circuit protection, a bottom skid, a top crate, and a shipping bag.

19. Airflow Switch:

Shall be field-installed at the air handling unit to confirm airflow, thus allowing the condensing unit to operate.

20. Pressure Relief Valve:

Unit shall be provided with reseating-type pressure relief valves on the discharge lines. The use of these valves meets Chicago code requirements on all unit sizes.