CC-ACCMX | MAR 2016
Replaces CC-TB-ACCMX | APR 2015

HEATCRAFT™
Worldwide Refrigeration

Air-Cooled Condenser

with Microchannel Coil Technology

Models NRG | NRJ

CLIMATE CONTROL

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Nomenclature

NR	G	D	02	A	014
Product Line	**Motor Identifier**	**Width**	**# of Fans**	**Model Identifier**	**Standard Capacity**
NR = Air-cooled Condenser with Microchannel Coil	G = 710 mm VSEC J = 710 mm AC	D = Dual	02 = 2 04 = 4 06 = 6 08 = 8	A = Current Revision	(MBH/Degree TD, R-404A)

Features & Benefits

Standard Features

- Microchannel heat exchanger
- R-404A, R-407A/F, R-407C, R-448A, R-449A, R-507, R-422D, and R-410A compatible
- 208-230/3/60 or 460/3/60
- Factory installed manifolding (Single circuit standard)
- 20” clearance legs
- Copper connection points with Schrader access valves
- NRG units are factory wired for customer supplied analog signal
- NRG units are direct acting, series wired motor control
- Through-the-door non-fused disconnect switch
- End access panels for coil-cleaning
- Internal baffles between all fan cells
- NRJ units come standard with individual motor fusing

Optional Features

All Models

- 40” clearance legs
- Export crating

NRG Models

- Individual motor circuit breakers
- Individual motor fusing
- Factory installed analog board (CPC, Danfoss or Novar)
- Motor control & wiring
  - Direct acting (parallel wired)
  - Reverse acting (series or parallel wired)
- Proportional pressure control

NRJ Models

- Ambient fan cycling (electronic)
- Pressure fan cycling (mechanical or electronic)
- Microprocessor relay board (CPC, Danfoss or Novar)
- Control circuit transformer (230/115/24)

Key Benefits

Refrigerant Charge Reduction

Microchannel coils offer a very high primary to secondary surface area ratio. This provides very efficient heat exchange while maintaining a low internal tube volume. As a result, the microchannel condenser reduces condenser refrigerant charge by over 70% (NRGD02A014 vs. BNED02A015).

Energy Efficient

The microchannel air-cooled condensers are available with variable speed EC motors, which vary speed based on system requirements to provide optimal energy and sound performance. These condensers are also available with VFD compatible AC motors.

Corrosion Resistance

The mono-metal construction of the microchannel coils virtually eliminates the risk of galvanic corrosion. A zinc cladding standard on all coils provides additional corrosion resistance for harsh environments.

Sound

Microchannel air-cooled condensers feature quiet variable speed EC fan motors as a standard. Optional VFD compatible AC fan motors are also available.

Lighter Weight

Over 20% lighter than comparable round-tube, plate fin air-cooled condensers.

Lower Height

Approximately 25% lower cabinet height (with same clearance) than comparable round-tube, plate fin condensers.

Structural Robustness

The coils used in this unit are extremely rigid and resistant to damage.

Warranty

Microchannel air-cooled condensers feature a standard 2 year product warranty and a 7 year warranty on the microchannel coil. The VFD compatible AC motors have a 2 year warranty while the variable speed EC motors come with a 3 year warranty.

Environmentally Friendly

100% recyclable, all -aluminum coil.

Condenser Capacities & Specifications

Model	Air Mover	Capacity (MBH/1°F)					Full Speed Airflow (ft³/min)	Flooded Refrigerant Charge (lbs)			Net Wt. (lbs)	Ship Wt. (lbs	Coil Connection Sizes	
		R-404A	R-407C*	R-407A/ 407F*	R-448A*	R-449A*		R-404A	R-407C/ 448A/ 449A	R-407A/ 407F			Inlet (in.)	Outlet (in.)
NRGD02A014	710 mm VSEC	13.5	12.7	13.2	13.0	13.4	13,700	10	10	11	510	640	(1) 1-1/8	(1) 7/8
NRGD04A027	710 mm VSEC	27.0	25.4	26.5	25.9	26.7	27,400	20	21	21	1015	1230	(2) 1-1/8	(2) 7/8
NRGD06A041	710 mm VSEC	40.5	38.1	39.7	38.9	40.1	41,100	30	31	32	1520	1810	(3) 1-1/8	(3) 7/8
NRGD08A054	710 mm VSEC	54.0	50.8	52.9	51.8	53.5	54,800	40	42	42	2005	2360	(4) 1-1/8	(4) 7/8
NRJD02A014	710 mm AC	13.5	12.7	13.2	13.0	13.4	13,700	10	10	11	510	640	(1) 1-1/8	(1) 7/8
NRJD04A027	710 mm AC	27.0	25.4	26.5	25.9	26.7	27,400	20	21	21	1015	1230	(2) 1-1/8	(2) 7/8
NRJD06A041	710 mm AC	40.5	38.1	39.7	38.9	40.1	41,400	30	31	32	1520	1810	(3) 1-1/8	(3) 7/8
NRJD08A054	710 mm AC	54.0	50.8	52.9	51.8	53.5	54,800	40	42	42	2005	2360	(4) 1-1/8	(4) 7/8

*Based on midpoint condensing temperature
† Does not include manifolding

Condenser Manifolding Specifications for Single Circuit

Model	Connection Sizes	
	Inlet (in.)	Outlet (in.)
NR*D02A014	(1) 1-1/8	(1) 7/8
NR*D04A027	(1) 2-1/8	(1) 1-5/8
NR*D06A041	(1) 2-1/8	(1) 1-5/8
NR*D08A054	(1) 2-5/8	(1) 2-1/8

** = G for VSEC, J for AC*
Contact factory for connection size if not single circuit

Circuiting Options

Model	Connection Sizes
NR*D02A014	Only single circuit available
NR*D04A027	Single circuit and 50/50 split available
NR*D06A041	Single circuit, 33/33/33 and 66/33 split available
NR*D08A054	Single Circuit, 50/50 split and 75/25 split available, also 25/25/25/25 and 50/25/25

** = G for VSEC, J for AC*

Condenser Electrical Specifications

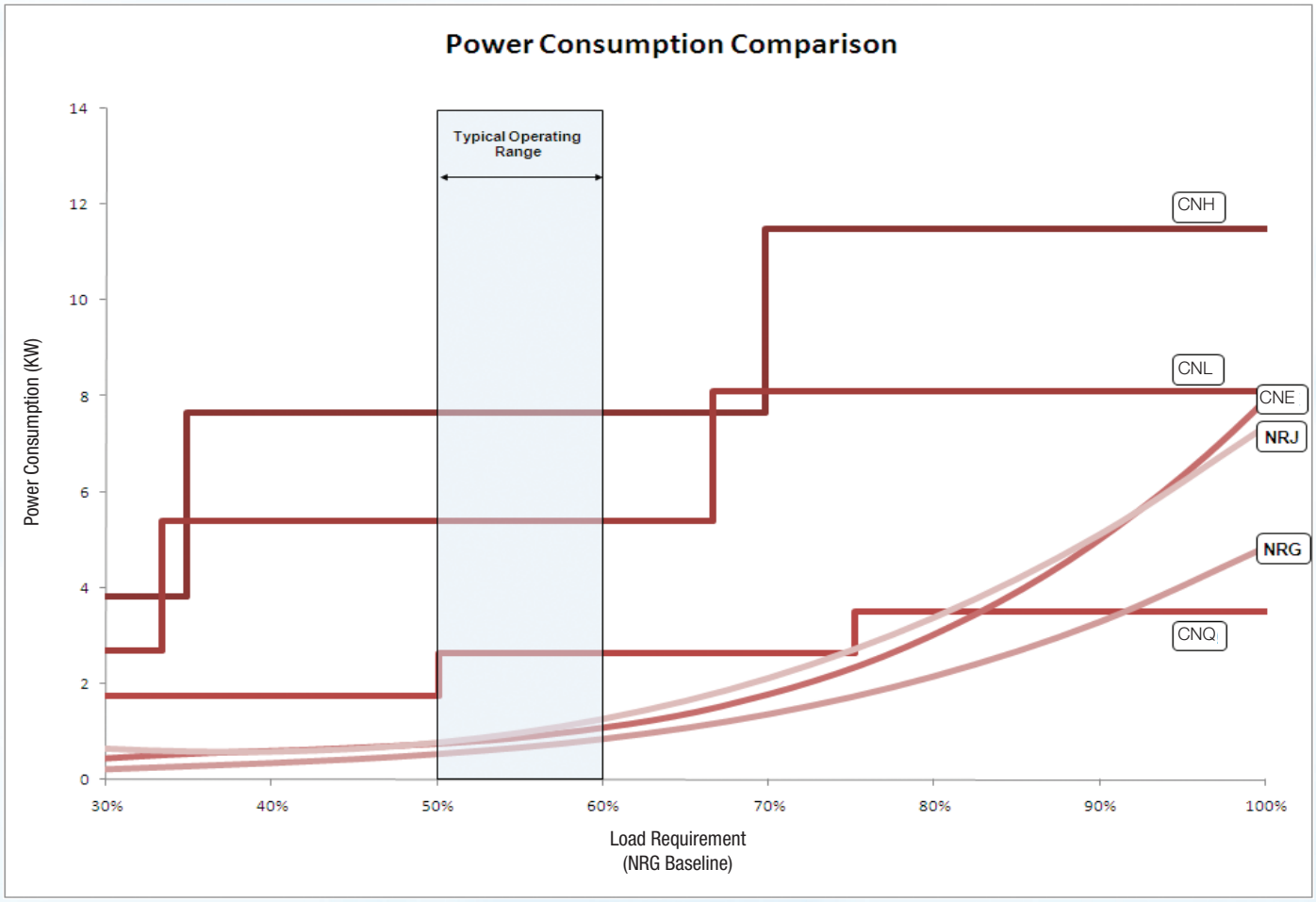
Model	208-230/3/60			460/3/60		
	FLA	MCA	MOPD	FLA	MCA	MOPD
NRGD02A014	4.0	15.0	15	2.0	15.0	15
NRGD04A027	8.0	15.0	15	4.0	15.0	15
NRGD06A041	12.0	15.0	15	6.0	15.0	15
NRGD08A054	16.0	20.0	20	8.0	15.0	15
NRJD02A014	9.6	15.0	20	5.6	15.0	15
NRJD04A027	19.2	20.4	30	11.2	15.0	15
NRJD06A041	28.8	30.0	40	16.8	20.0	25
NRJD08A054	38.4	39.6	50	22.4	23.1	30

Note: These units are optimized for operation at, or below, 15°F TD. Operation above 15°F TD may result in excessive pressure drop.

Condenser Performance: Energy Consumption

Model	Energy Consumption (kW)			
	At 30% Speed	At 50% Speed	At 70% Speed	At 100% Speed
NRGD02A014	0.1	0.3	0.6	1.6
NRGD04A027	0.2	0.5	1.2	3.2
NRGD06A041	0.3	0.8	1.8	4.9
NRGD08A054	0.3	1.0	2.4	6.5
NRJD02A014	0.3	0.5	1.0	2.4
NRJD04A027	0.6	1.0	2.0	4.8
NRJD06A041	0.8	1.5	3.0	7.2
NRJD08A054	1.1	2.0	4.0	9.6

Power Consumption Performance



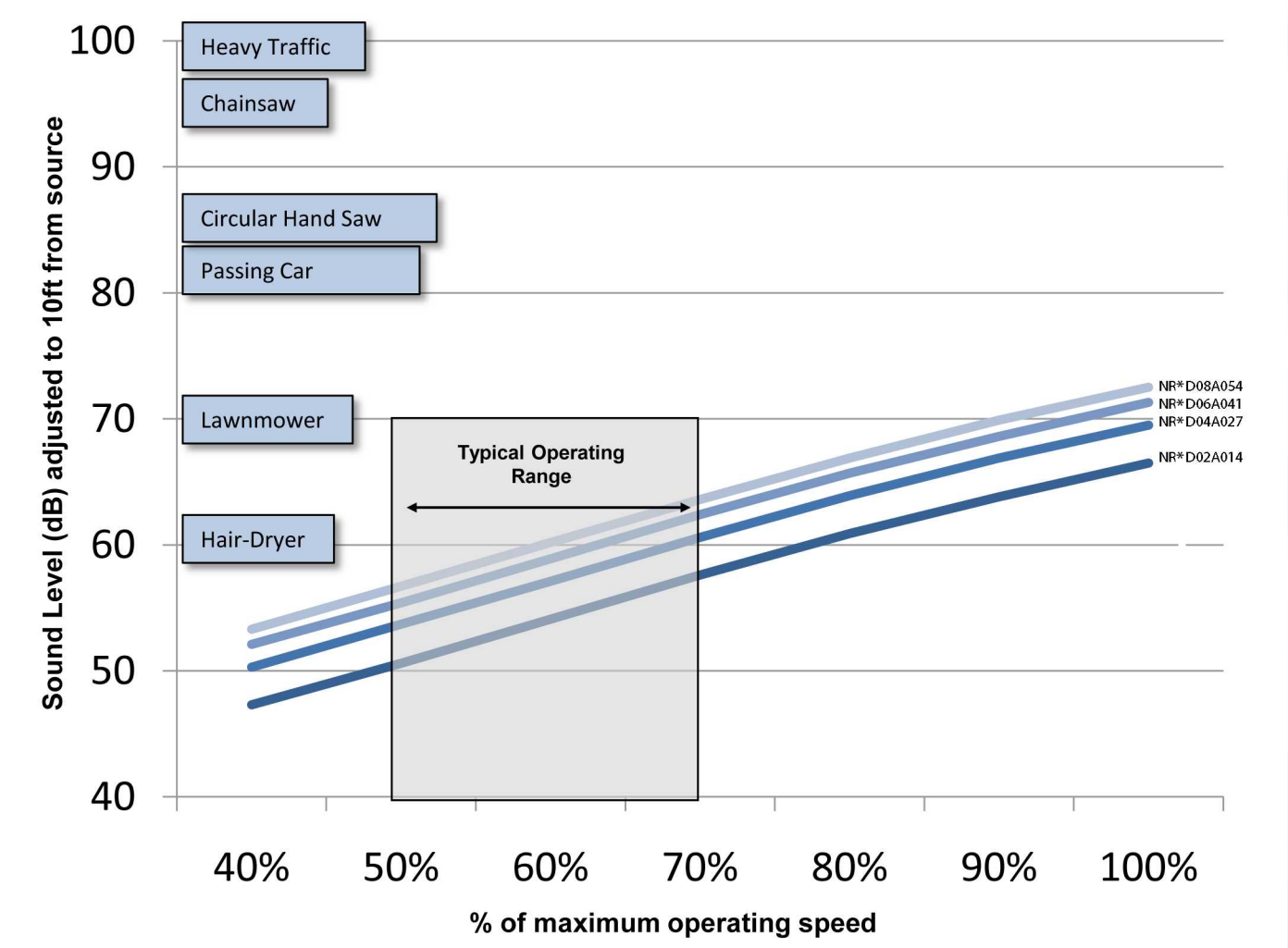
NRJ shown with use of a VFD

Condenser Performance: Sound Pressure

Model	Sound Pressure (dBA @ 10 ft)			
	At 30% Speed	At 50% Speed	At 70% Speed	At 100% Speed
NR*D02A014	44.3	50.6	57.6	66.5
NR*D04A027	47.3	53.7	60.6	69.5
NR*D06A041	49.1	55.4	62.4	71.3
NR*D08A054	50.3	56.7	63.6	72.5

** = G for VSEC, J for AC*

Sound Comparison Chart



Source: http://www.sengpielaudio.com/tableofsoundpressurelevels.htm > Adjusted to 10ft

Capacity for air-cooled condensers are based on Total Heat of Rejection (THR) at the condenser. Total heat of rejection is equal to net refrigeration at the evaporator (compressor capacity) plus the energy input into the refrigerant by the compressor (heat of compression). The heat of compression will vary depending on the compressor manufacturer, type of compressor and the operating conditions of the compressor. Whenever possible, it is recommended that you obtain the heat of compression value from the compressor manufacturer.

If this is not available, the THR can be estimated using the following formula:

THR = (Compressor Capacity) * (Heat of Compression Factor, Tables 1 & 2)

Table 1 contains heat of compression factors for suction cooled compressors and Table 2 contains factors for open drive compressors. For refrigeration systems beyond the range of Tables 1 and 2, use the following equations to estimate THR:

Open Compressors:
THR = Compressor Capacity (BTUH) + (2545) * (Break Horsepower, BHP)

Suction Cooled Compressors:
THR = Compressor Capacity (BTUH) + (3413 * KW)
The compressor capacity is affected by its altitude. If the condenser location is above sea level, an additional correction is required to the THR, as follows:

THR (altitude) = THR * Altitude Correction Factor, Table 3
Selection Example

Compressor capacity:	270,000 BTUH
Evaporator temperature:	+25° F
Condensing temperature:	110° F
Ambient temperature	95° F
Refrigerant:	R-404A
Compressor type:	Semi-hermetic, suction cooled
Condenser type:	NRG
Condenser altitude:	1,000 feet

Step 1: Estimate Condenser THR
From Table 1 for suction cooled compressors, at +25° F suction and 115° F condensing temperature, select a heat of compressor factor of 1.335.

THR = Compressor Capacity * Heat of Compression Factor
= 270,000 * 1.335
= 360,450

Step 2: Correct for Altitude
From Table 3 obtain an altitude correction factor of 1.02 for 1,000 feet.
THR = THR (from step 1) * Altitude Correction Factor (design)
= 360,450 * 1.02
= 367,659

Step 3: Calculate Design Condenser T.D.
Design Condenser T.D. = Condensing Temp — Ambient Temp
= 110°F - 95
= 15° T.D.

Step 4: Condenser Selection
Condenser capacities are located on page 4. These capacities are given in MBH/°TD. Convert the THR calculated in step 2 to MBH/°TD by dividing by 1,000 to get THR in MBH. Then divide the THR by the design TD to get MBH/°TD.
THR (MBH) = 367,659 / 1,000 = 367.7
THR (MBH/°TD) = 367.7 / 15 = 24.5
Locate the capacity column and read down until you locate a value equal to or just larger than 24.5. This value is 27.0. Read horizontally to the left to obtain a condenser model of NRGD04A027

Step 5: Calculate Actual T.D. and Condensing Temperature
The actual condenser T.D. can be calculated by dividing the design THR by the condenser rating.
Actual T.D. = THR (Design) / (Rating @ 1° T.D.)
= 367.7 / 27.0
= 13.6°F. T.D.

The actual condensing temperature is the actual T.D. plus the ambient temperature.
Actual Condensing Temperature = (Actual T.D.) + (Ambient)
= 13.6 + 95
= 108.6°F.

**Correction factors based on midpoint condensing temperature.*

Table 1. Heat of Compression Factor for Suction Cooled Compressors

Suction Temp. °F	Condensing Temperature °F				
	90°	100°	110°	120°	130°
-40°	1.56	1.63	1.72	1.81	1.94
-30°	1.49	1.55	1.62	1.70	1.80
-20°	1.43	1.49	1.55	1.62	1.70
-10°	1.38	1.43	1.49	1.55	1.63
0°	1.34	1.38	1.43	1.49	1.56
5°	1.31	1.36	1.41	1.48	1.55
10°	1.29	1.34	1.39	1.44	1.52
15°	1.26	1.31	1.36	1.41	1.48
20°	1.24	1.28	1.33	1.38	1.44
25°	1.22	1.26	1.31	1.36	1.42
30°	1.20	1.24	1.28	1.33	1.39
40°	1.17	1.20	1.24	1.28	1.33
50°	1.13	1.16	1.20	1.24	1.28

Table 2. Heat of Compression Factor for Open Drive Compressors

Evap. Temp. °F	Condensing Temperature °F					
	90°	100°	110°	120°	130°	140°
-30°	1.37	1.42	1.47	—	—	—
-20°	1.33	1.37	1.42	1.47	—	—
-10°	1.28	1.32	1.37	1.42	1.47	—
0°	1.24	1.28	1.32	1.37	1.41	1.47
5°	1.23	1.26	1.30	1.35	1.39	1.45
10°	1.21	1.24	1.28	1.32	1.36	1.42
15°	1.19	1.22	1.26	1.30	1.34	1.40
20°	1.17	1.20	1.24	1.28	1.32	1.37
25°	1.16	1.19	1.22	1.26	1.30	1.35
30°	1.14	1.17	1.20	1.24	1.27	1.32
40°	1.12	1.15	1.17	1.20	1.23	1.28
50°	1.09	1.12	1.14	1.17	1.20	1.24

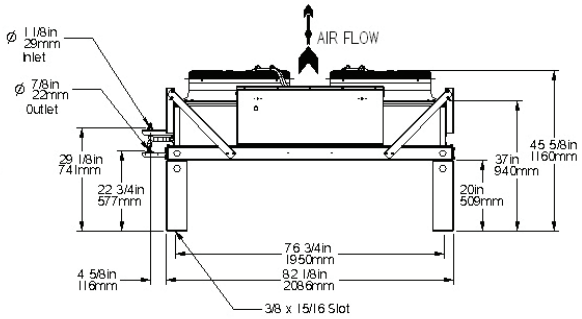
Table 3. Altitude Correction Factors

Altitude	Correction Factor	Altitude	Correction Factor
0	1.00	**4,000**	1.10
1,000	1.02	**5,000**	1.12
2,000	1.05	**6,000**	1.15
3,000	1.07	**7,000**	1.17

Table 4. Capacity & Refrigerant Charge Correction Factors

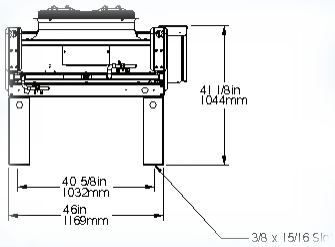
Correction Factor	Capacity	Refrigerant Charge
R-404A	1.00	1.00
R-407A	0.98*	1.04
R-407C	0.94*	1.05
R-407F	0.98*	1.07
R-448A	0.96*	1.05
R-449A	0.99*	1.05
R-22	1.02	1.09
R-410A	1.02	1.07
R-507	1.00	1.00
NRG 50 Hz Power Supply	1.00	-
NRJ 50 Hz Power Supply	0.92	-

Front View

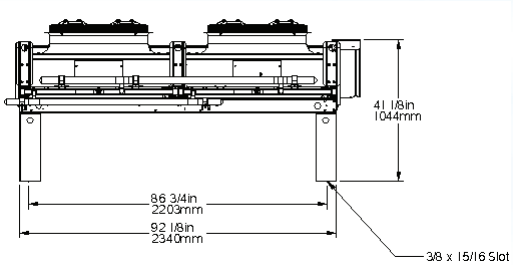


Side View

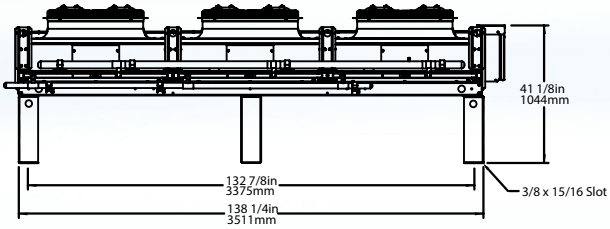
2 Fan



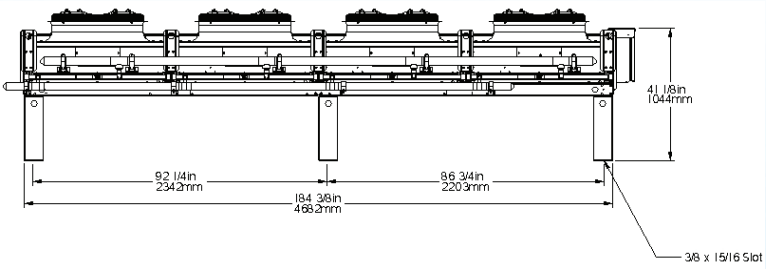
4 Fan



6 Fan



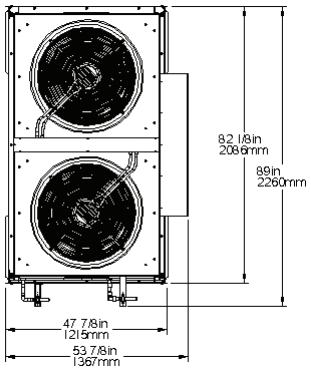
8 Fan



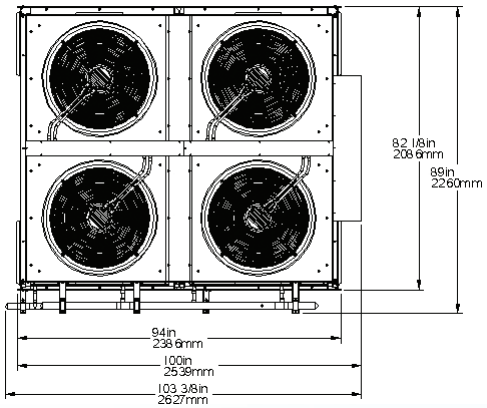
Notes: *Dimensional drawings include factory manifold*
Drawing shown with standard 20" leg

Top View

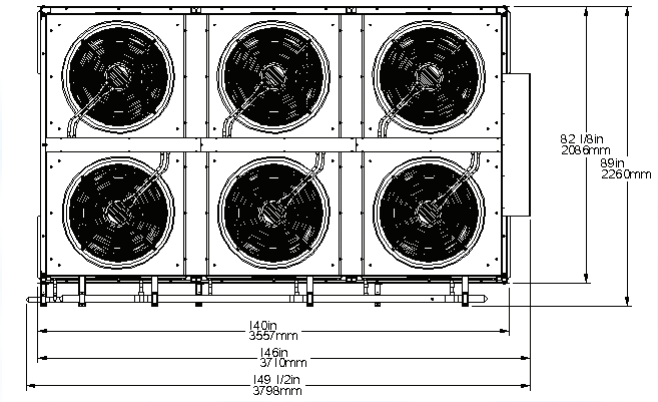
2 Fan



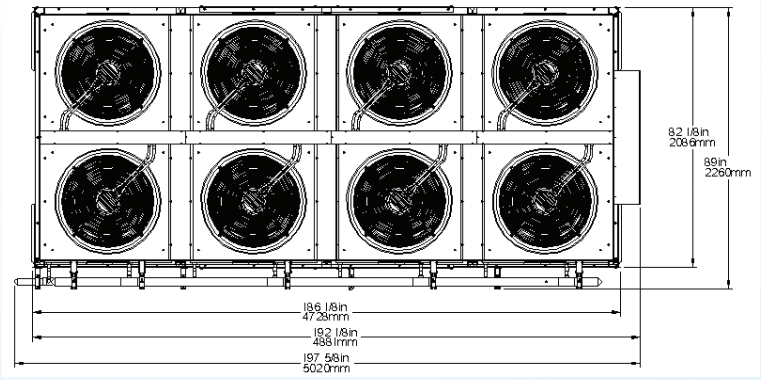
4 Fan



6 Fan



8 Fan



Notes: *Dimensional drawings include factory manifold*

Diagram 1

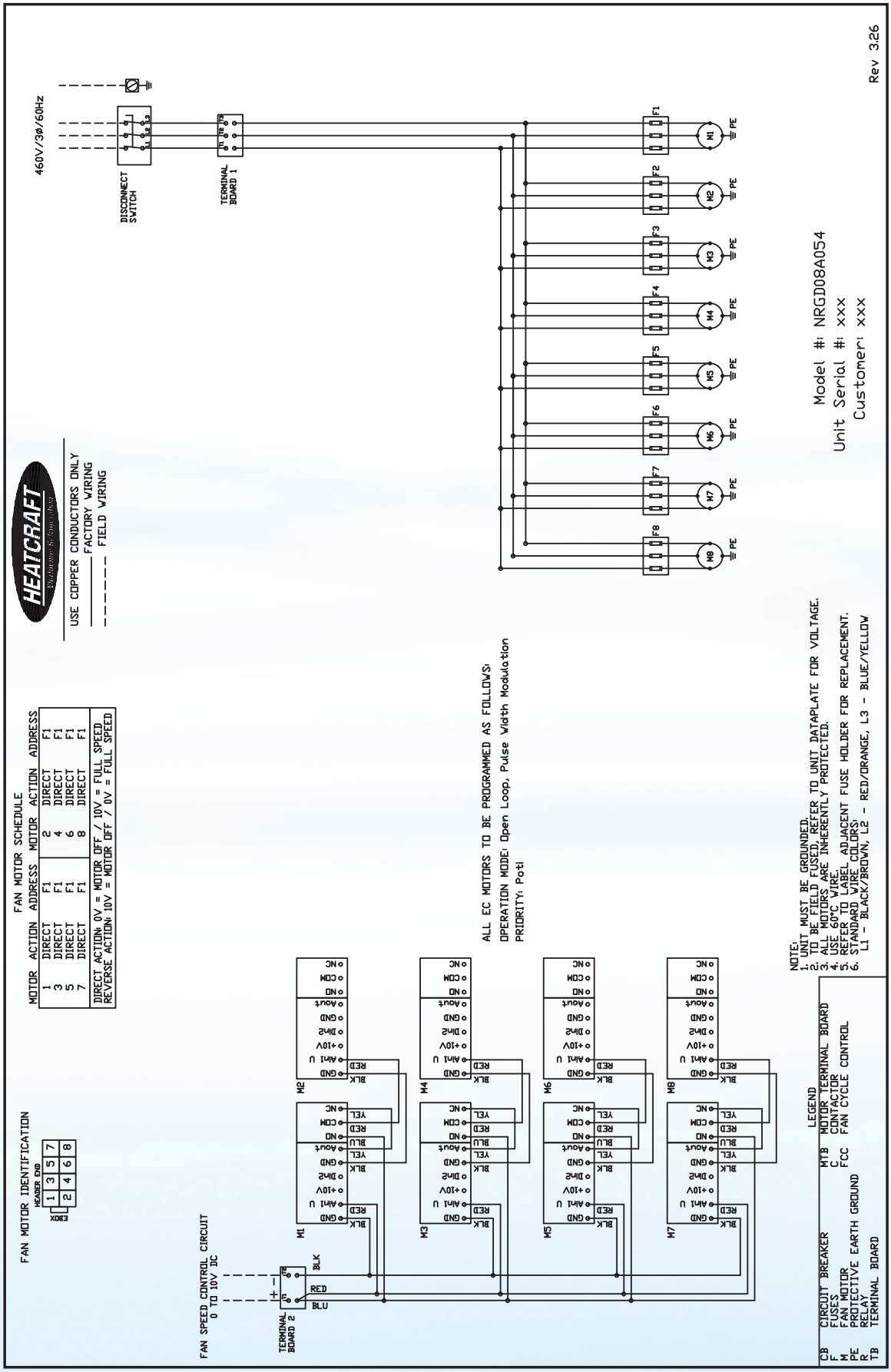
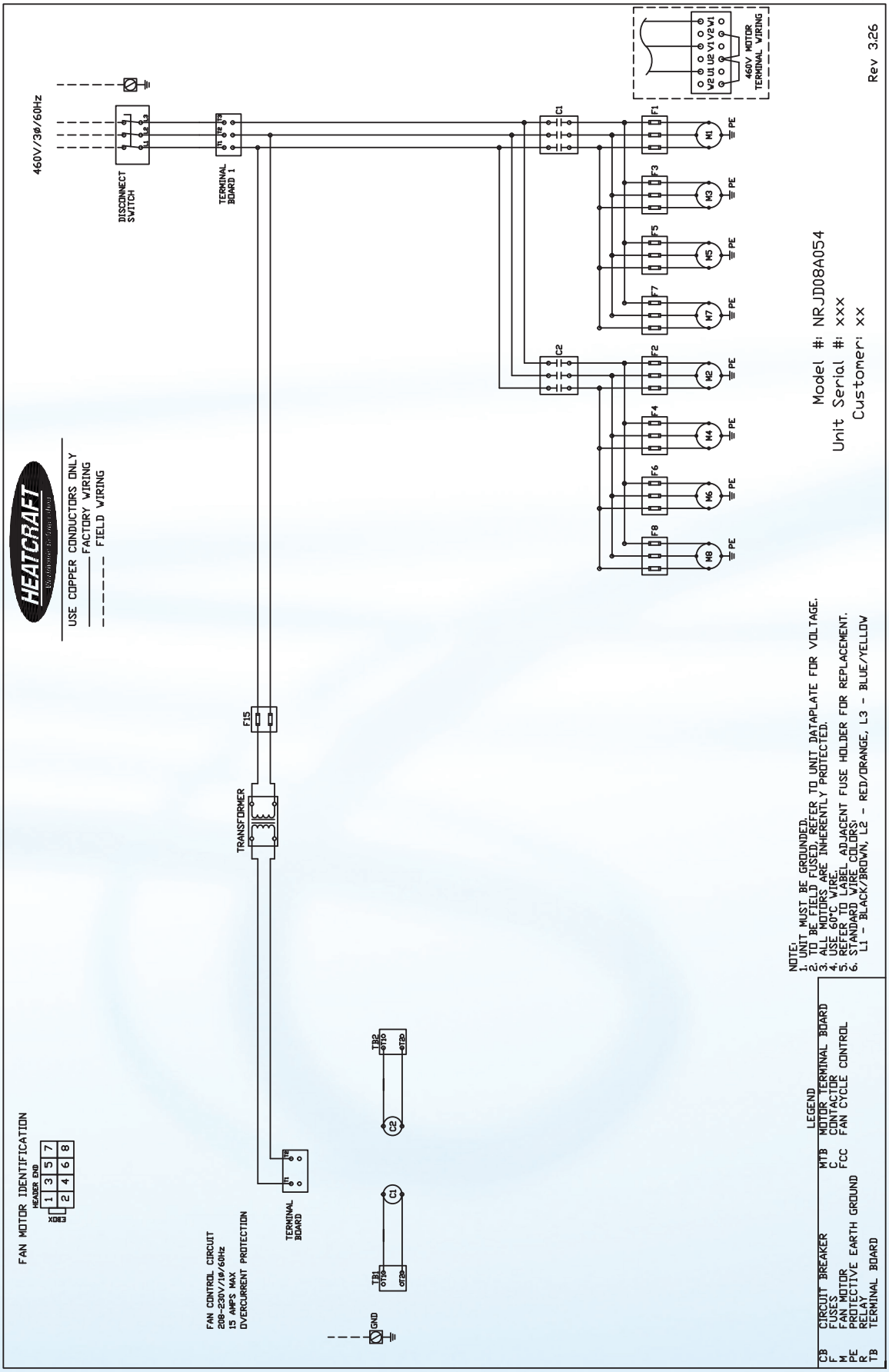

460V/3Ø/60Hz
DISCONNECT SWITCH
TERMINAL BOARD 1
HEATCRAFT
USE COPPER CONDUCTORS ONLY
FACTORY WIRING
FIELD WIRING
FAN MOTOR SCHEDULE
MOTOR ACTION ADDRESS MOTOR ACTION ADDRESS
1 DIRECT F1 2 DIRECT F1
3 DIRECT F1 4 DIRECT F1
5 DIRECT F1 6 DIRECT F1
7 DIRECT F1 8 DIRECT F1
DIRECT ACTION: 0V = MOTOR OFF / 10V = FULL SPEED
REVERSE ACTION 10V = MOTOR OFF / 0V = FULL SPEED
ALL EC MOTORS TO BE PROGRAMMED AS FOLLOWS:
OPERATION MODE: Open Loop, Pulse Width Modulation
PRIORITY: Poti
Model #: NRGD08A054
Unit Serial #: xxx
Customer: xxx
Rev 3.26
FAN MOTOR IDENTIFICATION
HEADER END
BOX
FAN SPEED CONTROL CIRCUIT
0 TO 10V DC
TERMINAL BOARD 2
M1
M2
M3
M4
M5
M6
M7
M8
F1
F2
F3
F4
F5
F6
F7
F8
PE
NOTE:
1. UNIT MUST BE GROUNDED.
2. TO BE FIELD FUSED. REFER TO UNIT DATAPLATE FOR VOLTAGE.
3. ALL MOTORS ARE INHERENTLY PROTECTED.
4. USE 60°C WIRE.
5. REFER TO LABEL ADJACENT FUSE HOLDER FOR REPLACEMENT.
6. STANDARD WIRE COLORS:
L1 - BLACK/BROWN, L2 - RED/ORANGE, L3 - BLUE/YELLOW
LEGEND
CB CIRCUIT BREAKER
F FUSES
M FAN MOTOR
PE PROTECTIVE EARTH GROUND
R RELAY
TB TERMINAL BOARD
MTB MOTOR TERMINAL BOARD
C CONTACTOR
FCC FAN CYCLE CONTROL

Diagram 2


460V/3Ø/60Hz
DISCONNECT SWITCH
TERMINAL BOARD 1
460V MOTOR TERMINAL WIRING
C1
C2
F1
F2
F3
F4
F5
F6
F7
F8
M1
M2
M3
M4
M5
M6
M7
M8
PE
F15
TRANSFORMER
TERMINAL BOARD
TB2
TB1
GND
FAN CONTROL CIRCUIT
208-230V/1Ø/60Hz
15 AMPS MAX
OVERCURRENT PROTECTION
FAN MOTOR IDENTIFICATION
HEADER END
XDE3
USE COPPER CONDUCTORS ONLY
FACTORY WIRING
FIELD WIRING
HEATCRAFT
Model #: NRJD08A054
Unit Serial #: xxx
Customer: xx
Rev 3.26
NOTE:
1. UNIT MUST BE GROUNDED.
2. TO BE FIELD FUSED, REFER TO UNIT DATAPLATE FOR VOLTAGE.
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L1 - BLACK/BROWN, L2 - RED/ORANGE, L3 - BLUE/YELLOW
LEGEND
CB CIRCUIT BREAKER
F FUSES
M FAN MOTOR
PE PROTECTIVE EARTH GROUND
R RELAY
TB TERMINAL BOARD
MTB MOTOR TERMINAL BOARD
C CONTACTOR
FCC FAN CYCLE CONTROL

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CLIMATE CONTROL

Since product improvement is a continuing effort, we reserve the right to make changes in specifications without notice.

CC-ACCMX | Version 001

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