50HC
High Efficiency
Cooling Only/Electric Heat Packaged Rooftop
15 to 25 Nominal Tons

Carrier
turn to the experts

Product Data

WeatherMaster®

C101008

(Unit shown with optional economizer and power exhaust.)

ENERGY STAR

AHRI CERTIFIED
www.ahridirectory.org
Use of the AHRI Certified TM Mark indicates a manufacturer's participation in the program For verification of certification for individual products, go to www.ahridirectory.org.

C ETL US LISTED

ASHRAE 90.1 COMPLIANT

Puron™
the environmentally sound refrigerant

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Carrier
turn to the experts

Your new 15 to 25 ton WeatherMaster Carrier rooftop unit (RTU) was designed by customers for customers. With a newly designed cabinet that integrates “no-strip” screw collars, handled access panels, and more, we’ve made your unit easy to install, easy to maintain and easy to use and reliable.

Easy to install:

These new WeatherMaster units are designed for dedicated factory supplied vertical or horizontal air flow duct configurations. No special field kits are required. Designed to fit on pre-installed curbs by other another manufacturer, these units also fit on past designed Carrier installed curbs with a new certified and authorized adapter curb. This new cabinet design also integrates a large control box that gives you room to work and room to mount Carrier accessory controls.

Easy to maintain:

Easy access handles by Carrier provide quick and easy access to all major, normally serviced components. Our “no-strip” screw system has superior holding power and guides screws into position while preventing the screw from stripping the unit’s metal. Take accurate pressure readings by reading condenser pressure with panels in place as compressors are strategically located to eliminate any air bypass.

Easy to use:

The newly designed, central terminal board by Carrier puts all your connections and troubleshooting points in one convenient place, standard. Most low voltage connections are made to the same board and make it easy to find what you’re looking for and easy to access it.

Reliable:

Each unit comes with precision sized and tested scroll compressor that is internally protected from over temperature and pressures. In addition, each refrigerant circuit is further protected with a high pressure and low pressure switch as well as containing a liquid line filter drier. Each unit is factory tested prior to shipment to help ensure units operation once properly installed.

Carrier Comfort System
PremierLink

FEATURES AND BENEFITS

- Two stage cooling capacity with independent circuits and control.
- High performance copper tube/aluminum plate fin (RTPF) condenser and evaporator coils with optional coating.
- EER's up to 12.2.
- IEER's up to 13.4.
- Dedicated vertical and horizontal air flow duct configuration models. No field kits required.
- Utility connections through the side or bottom. Bottom connections are also in an enclosed environment to help prevent water entry.
- Standardized components and control box layout. Standardized components and controls make stocking parts and service easier.
- Scroll compressors on all units. This makes service, stocking parts, replacement, and trouble-shooting easier.
- Precision sized TXV metering device on each refrigerant circuit.
- Easy-adjust, belt-drive motor available. Carrier provides a factory solution for most points in the fan performance table. Motor assembly also contains a fan belt break protection system on all models and reliable pillow block bearing system that allows lubrication thru front of the unit.
- Capable of thru-the-base or thru-the-curb electrical routing.
- Full range of electric heaters and single point electric kits – pre engineered and approved for field installation.
- Single-point electrical connection.
- Sloped, composite drain pan sheds water; and won't rust.
- Standardized controls and control box layout. Standardized components and controls make stocking parts and service easier.
- Clean, easy to use control box.
- Color-coded wiring.
- Large, laminated wiring and power wiring drawings which are affixed to unit make troubleshooting easy.
- Single, central terminal board for test and wiring connections.
- Fast-access, handled, panels for easy access on normally accessed service panels.
- "No-strip" screw system guides screws into the panel and captures them tightly without stripping the screw, the panel, or the unit.
- Mechanical cooling (125°F to 35°F / 52°C to 2°C) standard on all models. Low ambient controller allows operation down to -20°F / -29°C.
- 2-in (51mm) disposable filters on all units, with 4-in (102mm) filter track - field installed.
- Refrigerant filter-drier on each circuit.
- High and low pressure switches. Added reliability with high pressure switch and low pressure switch.
- Many factory-installed options ranging from air management economizers, 2 position dampers, manual outdoor air dampers, plus convenience outlets, disconnect switch and smoke detectors.
- Factory-installed Humidi-MiZer® adaptive dehumidification system.
- Standard Parts Warranty: 5 year compressor, 5 year electric heater, 1 year others.

MODEL NUMBER NOMENCLATURE

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
5	0	H	C	–	D	2	4	A	1	A	5	–	0	A	0	A	0

Unit Heat Type
50 = Elect. Heat Pkg. Rooftop

Model Series – WeatherMaster
HC = High Efficiency

Heat Size
– = None (Field Installed)

Refrig. System Options
D = 2–Stg. Cooling models with Round Tube/Plate Fin Coils
E = 2–Stg. Cooling models with Humidi–MiZer

Cooling Tons
17 = 15 Ton
20 = 17.5 Ton
24 = 20 Ton
28 = 25 Ton

Sensor Options
A = None
B = RA Smoke Detector
C = SA Smoke Detector
D = RA + SA Smoke Detector
E = CO_2
F = RA Smoke Detector & CO_2
G = SA Smoke Detector & CO_2
H = RA + SA Smoke Detector & CO_2

Indoor Fan Options and Air Flow Configuration
1 = Standard Static/Vertical Supply, Return Air Flow
2 = Medium Static/Vertical Supply, Return Air Flow
3 = High Static/Vertical Supply, Return Air Flow
B = Medium Static High Eff Motor/Vertical Supply, Return Air Flow
C = High Static High Eff Motor/Vertical Supply, Return Air Flow
5 = Standard Static/Horizontal Supply, Return Air Flow
6 = Medium Static/Horizontal Supply, Return Air Flow
7 = High Static/Horizontal Supply, Return Air Flow
F = Medium Static High Eff Motor/Horz Supply, Return Air Flow
G = High Static, High Eff Motor/Horz Supply, Return Air Flow

Coil Options (Outdoor – Indoor – Hail Guard)
A = Al/Cu – Al/Cu
B = Pre–coat Al/Cu – Al/Cu
C = E–coat Al/Cu – Al/Cu
D = E–coat Al/Cu – E–coat Al/Cu
E = Cu/Cu – Al/Cu
F = Cu/Cu – Cu/Cu
M = Al/Cu – Al/Cu – Louvered Hail Guard
N = Pre–coat Al/Cu – Al/Cu – Louvered Hail Guard
P = E–coat Al/Cu – Al/Cu – Louvered Hail Guard
Q = E–coat Al/Cu – E–coat Al/Cu – Louvered Hail Guard
R = Cu/Cu – Al/Cu – Louvered Hail Guard
S = Cu/Cu – Cu/Cu – Louvered Hail Guard

Voltage
1 = 575/3/60
5 = 208–230/3/60
6 = 460/3/60

Design Revision
– = Factory Design Revision

Base Unit Controls
0 = Electromechanical
1 = PremierLink Controller
2 = RTU Open Protocol Controller

Intake / Exhaust Options
A = None
B = Temp Econo w/ Baro Relief
D = Temp Econo w/ PE (cent)–Vertical Air
F = Enthalpy Econo w/ Baro Relief
H = Enthalpy Econo w/PE (cent)–Vertical Air
K = 2 Position Damper
P = Manual Outdoor Air Damper

Service Options
0 = None
1 = Unpowered C.O.
2 = Powered C.O.
3 = Hinged Panels

Electrical Options
A = None
C = Non–Fused Disconnect
D = Thru The Base
F = Non–Fused Disc/Thru The Base

Packaging
0 = Standard

Table 1 – FACTORY-INSTALLED OPTIONS AND FIELD-INSTALLED ACCESSORIES

CATEGORY	ITEM	FACTORY INSTALLED OPTION	FIELD INSTALLED ACCESSORY
Cabinet	Dedicated Vertical Air Flow Duct Configuration	X	
	Dedicated Horizontal Air Flow Duct Configuration	X	
	Thru–the–base electrical connections	X	
	Hinged Access Panels	X	
Coil Options	Cu/Cu (indoor) coils	X	
	E–coated indoor & outdoor coils	X	
Humidity Control	Humidi–MiZer Adaptive Dehumidification System	X	
Condenser Protection	Condenser coil hail guard (louvered design)	X	X
Controls	Thermostats, temperature sensors, and subbases		X
	PremierLink DDC communicating controller	X	X
	RTU Open protocol controller	X	
	Smoke detector (supply and/or return air)	X	X
	Time Guard II compressor delay control circuit		X
	Phase Monitor		X
Economizers & Outdoor Air Dampers	EconoMi$er IV (for electro–mechanical controlled RTUs)	X	X
	EconoMi$er2 (for DDC controlled RTUs)	X	X
	Motorized 2 position outdoor–air damper	X	X
	Manual outdoor–air damper (25%)		X
	Barometric relief[1]	X	X
	Barometric hood (Horizontal economizer)		X
	Power exhaust	X	X
Economizer Sensors & IAQ Devices	Single dry bulb temperature sensors[2]	X	X
	Differential dry bulb temperature sensors[2]		X
	Single enthalpy sensors[2]	X	X
	Differential enthalpy sensors[2]		X
	CO_2 sensor (wall, duct, or unit mounted)[3]	X	X
Electric Heat	Electric Resistance Heaters		X
	Single Point Kit		X
Indoor Motor & Drive	Multiple motor and drive packages	X	
Low Ambient Control	Winter start kit[3]		X
	Motormaster head pressure controller[3]		X
Power Options	Convenience outlet (powered)	X	
	Convenience outlet (unpowered)	X	
	Non–fused disconnect[4]	X	
Roof Curbs	Roof curb 14–in (356mm)		X
	Roof curb 24–in (610mm)		X
	Adapter Curb (Adapts to Models – DP/DR/HJ/TM/TJ)[5]		X

NOTES:

1. Included with economizer.
2. Sensors for optimizing economizer.
3. See application data for assistance.
4. Non–fused disconnect switch cannot be used when MOCP electrical rating exceeds 70 amps at 460/575 volt and 150 amps at 208/230 volt. Carrier RTUBuilder selects this automatically.
5. Not for 48TJE028–028 models using 48DP900041, 48DP900051 or 48DP900061 roofcurbs.

FACTORY OPTIONS AND/OR ACCESSORIES

Economizer (dry-bulb or enthalpy)

Economizers save money. They bring in fresh, outside air for ventilation; and provide cool, outside air to cool your building. This is the preferred method of low-ambient cooling. When coupled to CO_2 sensors, Economizers can provide even more savings by coupling the ventilation air to only that amount required.

Economizers are available, installed and tested by the factory, with either enthalpy or dry-bulb temperature inputs. There are also models for electromechanical as well as direct digital controllers. Additional sensors are available as accessories to optimize the economizers.

Economizers include gravity controlled, barometric relief equalizes building pressure and ambient air pressures. This can be a cast effective solution to prevent building pressurization. If further control of exhaust air is required, a dual centrifugal fan power exhaust system is also available.

CO_2 Sensor

Improves productivity and saves money by working with the economizer to intake only the correct amount of outside air for ventilation. As occupants fill your building, the CO_2 sensor detects their presence through increasing CO_2 levels, and opens the economizer appropriately.

When the occupants leave, the CO_2 levels decrease, and the sensor appropriately closes the economizer. This intelligent control of the ventilation air, called Demand Control Ventilation (DCV) reduces the overall load on the rooftop, saving money.

Smoke Detectors

Trust the experts. Smoke detectors make your application safer and your job easier. Carrier smoke detectors immediately shut down the rooftop unit when smoke is detected. They are available, installed by the factory, for supply air, return air, or both.

Louvered Hail Guards

Sleek, louvered panels protect the condenser coil from hail damage, foreign objects, and incidental contact.

Convenience Outlet (powered or un-powered)

Reduce service and/or installation costs by including a convenience outlet in your specification. Carrier will install this service feature at our factory. Provides a convenient, 15 amp, 115v GFCI receptacle with “Wet in Use” cover. The “powered” option allows the installer to power the outlet from the line side of the disconnect as required by code. The “unpowered” option is to be powered from a separate 115/120v power source.

Non-Fused Disconnect

This OSHA-compliant, factory-installed, safety switch allows a service technician to locally secure power to the rooftop.

Power Exhaust with Barometric Relief

Superior internal building pressure control. This field-installed accessory or factory-installed option may eliminate the need for costly, external pressure control fans.

PremierLink™, DDC Controller

This CCN controller regulates your rooftop’s performance to tighter tolerances and expanded limits, as well as facilitates zoning systems and digital accessories. It also unites your Carrier HVAC equipment together on one, coherent CCN network. The PremierLink can be factory-installed, or easily field-installed.

RTU Open Protocol Controller

Connect the rooftop to an existing BAS without needing complicated translators or adapter modules using the RTU Open controller. This new controller speaks the 4 most common building automation system languages (Bacnet, Modbus, N2, and Lonworks). Use this controller when you have an existing BAS.

Time Guard II Control Circuit

This accessory protects your compressor by preventing short-cycling in the event of some other failure, prevents the compressor from restarting for 30 seconds after stopping. Not required with PremierLink®, RTU Open, or authorized commercial thermostats.

Filter or Fan Status Switches

Use these differential pressure switches to detect a filter clog or indoor fan motor failure. When used in conjunction with a compatible unit controller/thermostat, the switches will activate an alarm to warn the appropriate personnel.

Motorized 2-Position Damper

The new Carrier 2-position, motorized outdoor air damper admits up to 100% outside air. Using reliable, gear-driven technology, the 2-position damper opens to allow ventilation air and closes when the rooftop stops, stopping unwanted infiltration.

Manual OA Damper

Manual outdoor air dampers are an economical way to bring in ventilation air. The dampers are available in 25% versions.

FACTORY OPTIONS AND/OR ACCESSORIES (cont.)

Optional Humidi-MiZer Adaptive Dehumidification System

Carrier's Humidi-MiZer adaptive dehumidification system is an all-inclusive factory installed option that can be ordered with any WeatherMaster 50HC17-28 rooftop unit.

This system expands the envelope of operation of Carrier's WeatherMaster rooftop products to provide unprecedented flexibility to meet year round comfort conditions.

The Humidi-MiZer adaptive dehumidification system has the industry's only dual dehumidification mode setting. The Humidi-MiZer system includes two new modes of operation.

The WeatherMaster 50HC17-28 rooftop coupled with the Humidi-MiZer system is capable of operating in normal design cooling mode, subcooling mode, and hot gas reheat mode. Normal design cooling mode is when the unit will operate under its normal sequence of operation by cycling compressors to maintain comfort conditions.

Subcooling mode will operate to satisfy part load type conditions when the space requires combined sensible and a higher proportion of latent load control. Hot Gas Reheat mode will operate when outdoor temperatures diminish and the need for latent capacity is required for sole humidity control. Hot Gas Reheat mode will provide neutral air for maximum dehumidification operation.

Motormaster Head Pressure Controller

The Motormaster motor controller is a low ambient, head pressure controller kit that is designed to maintain the unit's condenser head pressure during periods of low ambient cooling operation. This device should be used as an alternative to economizer free cooling not when economizer usage is either not appropriate or desired. The Motormaster will either cycle the outdoor-fan motors or operate them at reduced speed to maintain the unit operation, depending on the model.

Winter Start Kit

The winter start kit by Carrier extends the low ambient limit of your rooftop to 25°F (-4°C). The kit bypasses the low pressure switch, preventing nuisance tripping of the low pressure switch. Other low ambient precautions may still be prudent.

Alternate Motors and Drives

Some applications need larger horsepower motors, some need more airflow, and some need both. Regardless of the case, your Carrier expert has a factory installed combination to meet your application. A wide selection of motors and pulleys (drives) are available, factory installed, to handle nearly any application.

Thru-the-Base Connections

Thru-the-base connections, available as a factory option, are necessary to ensure proper connection and seal when routing wire and piping through the rooftop's basepan and curb. These couplings eliminate roof penetration and should be considered for main power lines, as well as control power.

Electric Heaters / Single Point Kit

Carrier offers a full-line of field-installed accessory heaters and single point kits when required. The heaters are very easy to use, install and are all pre-engineered and certified.

Barometric Hood

For Horizontal Economizer applications where relief damper is installed in duct work. This kit provides the needed protection.

Hinged Access Panels

Allows access to unit's major components with specifically designed hinged access panels. Panels are filter, control box, indoor fan motor.

Table 2 – AHRI COOLING RATING TABLE 2-STAGE COOLING

UNIT	COOLING STAGES	NOM. CAPACITY (TONS)	NET COOLING CAPACITY (MBH)	TOTAL POWER (kW)	EER	IEER
17	2	15.0	174.0	14.3	12.2	13.2
20	2	17.5	202.0	16.6	12.2	13.2
24	2	20.0	236.0	19.3	12.2	13.4
28	2	25.0	282.0	25.2	11.4	12.2

LEGEND

AHRI – Air Conditioning, Heating and Refrigeration Institute
ASHRAE – American Society of Heating, Refrigerating and Air Conditioning, Inc.
EER – Energy Efficiency Ratio
IEER – Integrated Energy Efficiency Ratio

NOTES

1. Rated and certified under AHRI Standard 340/360, as appropriate.
2. Ratings are based on:
   Cooling Standard: 80°F (27°C) db, 67°F (19°C) wb indoor air temp and 95°F db outdoor air temp.
   IEER Standard: A measure that expresses cooling part–load EER efficiency for commercial unitary air conditioning and heat pump equipment on the basis of weighted operation at various load capacities.
3. All 50HC units comply with ASHRAE 90.1 and Energy Star Energy Standard for minimum EER and IEER requirements.
4. Where appropriate, 50HC units comply with US Energy Policy Act. Refer to state and local codes or visit the following website: http://bcap–energy. org to determine if compliance with this standard pertains to your state, territory, or municipality.

Table 3 – MINIMUM - MAXIMUM AIRFLOWS ELECTRIC HEAT

MODEL SIZE	NOMINAL kW	CFM	
		MINIMUM	MAXIMUM
17	25	4500	7500
17	50		
17	75		
20	25	5200	9000
20	50		
20	75		
24	25	6000	10,000
24	50		
24	75		
28	25	7000	12,500
28	50		
28	75		

Table 4 – SOUND PERFORMANCE TABLE

MODEL SIZE	COOLING STAGES	OUTDOOR SOUND (dB)									
		A–Wtg.	AHRI 370 Rating	63	125	250	500	1000	2000	4000	8000
17	2	84.1	84	92.2	83.9	80.4	81.8	78.7	76.5	72.2	65.4
20	2	84.1	84	92.2	83.9	80.4	81.8	78.7	76.5	72.2	65.4
24	2	86.5	87	95.6	87.5	84.2	84.2	81.7	77.9	73.2	66.3
28	2	85.9	86	97.1	88.3	84.4	83.3	80.7	77.4	73.4	67.3

LEGEND

dB – Decibel

NOTES:

1. Outdoor sound data is measure in accordance with AHRI standard 270–2008.
2. Measurements are expressed in terms of sound power. Do not compare these values to sound pressure values because sound pressure accounts for specific environmental factors which do not match individual applications. Sound power values are independent of the environment and therefore more accurate.
3. A–weighted sound ratings filter out very high and very low frequencies, to better approximate the response of an “average” human ear. A–weighted measurements for Carrier units are taken in accordance with 270–2008.

Table 5 – PHYSICAL DATA (COOLING) 15 - 25 TONS

		50HC*17	50HC*20	50HC*24	50HC*28
Refrigeration System					
# Circuits / # Comp. / Type		2 / 2 / Scroll	2 / 2 / Scroll	2 / 2 / Scroll	2 / 2 / Scroll
R–410a charge circuit A/B (lbs)		17/16.4	17.5/16.8	23.8/23.1	24.9/27.7
Humidi–MiZer R–410a charge circuit A/B (lbs)		24.5/25.7	25.5/25.5	30.0/30.7	35.1/35.4
Metering device		TXV	TXV	TXV	TXV
High–press. Trip / Reset (psig)		630 / 505	630 / 505	630 / 505	630 / 505
Low–press. Trip / Reset (psig)		54 / 117	54 / 117	54 / 117	54 / 117
Compressor Capacity Staging (%)		50% / 100%	50% / 100%	50% / 100%	50% / 100%
Evap. Coil					
Material		Cu / Al	Cu / Al	Cu / Al	Cu / Al
Tube Diameter		3/8" RTPF	3/8" RTPF	3/8" RTPF	3/8" RTPF
Rows / FPI		4 / 15	4 / 15	4 / 15	4 / 15
Total face area (ft2)		22	22	26	26
Condensate drain conn. size		3/4"	3/4"	3/4"	3/4"
Humidi–MiZer Coil					
Material		Cu / Al	Cu / Al	Cu / Al	Cu / Al
Tube Diameter		3/8" RTPF	3/8" RTPF	3/8" RTPF	3/8" RTPF
Rows / FPI		1 / 17	1 / 17	1 / 17	1 / 17
Total face area (ft2)		22	22	26	26
Evap. fan and motor					
VERTICAL					
Standard Static	Motor Qty / Drive type	1 / Belt	1 / Belt	1 / Belt	1 / Belt
	Max BHP	2.2	3.3	4.9	4.9
	RPM range	514–680	622–822	690–863	717–911
	Motor frame size	56	56	56	56
	Fan Qty / Type	2 / Centrifugal	2 / Centrifugal	2 / Centrifugal	2 / Centrifugal
	Fan Diameter (in)	15 x 15	15 x 15	15 x 15	15 x 15
Medium Static	Motor Qty / Drive type	1 / Belt	1 / Belt	1 / Belt	1 / Belt
	Max BHP	3.3	4.9	6.5	6.5
	RPM range	679–863	713–879	835–1021	913–1116
	Motor frame size	56	56	184T	184T
	Fan Qty / Type	2 / Centrifugal	2 / Centrifugal	2 / Centrifugal	2 / Centrifugal
	Fan Diameter (in)	15 x 15	15 x 15	15 x 15	15 x 15
High Static	Motor Qty / Drive type	1 / Belt	1 / Belt	1 / Belt	1 / Belt
	Max BHP	4.9	6.5	8.7	8.7
	RPM range	826–1009	882–1078	941–1176	941–1176
	Motor frame size	56	184T	213T	213T
	Fan Qty / Type	2 / Centrifugal	2 / Centrifugal	2 / Centrifugal	2 / Centrifugal
	Fan Diameter (in)	15 x 15	15 x 15	15 x 15	15 x 15
Medium Static High Eff *	Motor Qty / Drive type	n/a	n/a	1 / Belt	1 / Belt
	Max BHP	n/a	n/a	6.5	6.5
	RPM range	n/a	n/a	835–1021	913–1116
	Motor frame size	n/a	n/a	184T	184T
	Fan Qty / Type	n/a	n/a	2 / Centrifugal	2 / Centrifugal
	Fan Diameter (in)	n/a	n/a	15 x 15	15 x 15
High Static High Ef *	Motor Qty / Drive type	n/a	1 / Belt	1 / Belt	1 / Belt
	Max BHP	n/a	6.5	8.7	8.7
	RPM range	n/a	882–1078	941–1176	941–1176
	Motor frame size	n/a	184T	213T	213T
	Fan Qty / Type	n/a	2 / Centrifugal	2 / Centrifugal	2 / Centrifugal
	Fan Diameter (in)	n/a	15 x 15	15 x 15	15 x 15

* Section 313 of the Energy Independence and Security Act of 2007 (EISA 2007) mandates that the efficiency of general purpose motors we use in our Light Commercial Rooftops rated at 5.0 HP and larger be increased on or after December 19, 2010. We will offer both high and standard efficient motors until inventory is depleted and then shift over solely to the high efficient motors only.

Table 5 – PHYSICAL DATA (cont.) **(COOLING)** **15 - 25 TONS**

		50HC*17	50HC*20	50HC*24	50HC*28
HORIZONTAL					
Standard Static	Motor Qty / Drive type	1 / Belt	1 / Belt	1 / Belt	1 / Belt
	Max BHP	2.2	3.3	4.9	4.9
	RPM range	514–680	622–822	690–863	647–791
	Motor frame size	56	56	56	184T
	Fan Qty / Type	2 / Centrifugal	2 / Centrifugal	2 / Centrifugal	2 / Centrifugal
	Fan Diameter (in)	18 x 15/15 X 11	18 x 15/15 X 11	18 x 15/15 X 11	18 x 15/15 X 11
Medium Static	Motor Qty / Drive type	1 / Belt	1 / Belt	1 / Belt	1 / Belt
	Max BHP	3.3	4.9	6.5	6.5
	RPM range	614–780	713–879	835–1021	755–923
	Motor frame size	56	56	184T	184T
	Fan Qty / Type	2 / Centrifugal	2 / Centrifugal	2 / Centrifugal	2 / Centrifugal
	Fan Diameter (in)	18 x 15/15 X 11	18 x 15/15 X 11	18 x 15/15 X 11	18 x 15/15 X 11
High Static	Motor Qty / Drive type	1 / Belt	1 / Belt	1 / Belt	1 / Belt
	Max BHP	4.9	6.5	8.7	8.7
	RPM range	746–912	882–1078	941–1176	827–1010
	Motor frame size	56	184T	213T	213T
	Fan Qty / Type	2 / Centrifugal	2 / Centrifugal	2 / Centrifugal	2 / Centrifugal
	Fan Diameter (in)	18 x 15/15 X 11	18 x 15/15 X 11	18 x 15/15 X 11	18 x 15/15 X 11
Medium Static High Eff *	Motor Qty / Drive type	n/a	n/a	1 / Belt	1 / Belt
	Max BHP	n/a	n/a	6.5	6.5
	RPM range	n/a	n/a	835–1021	755–923
	Motor frame size	n/a	n/a	184T	184T
	Fan Qty / Type	n/a	n/a	2 / Centrifugal	2 / Centrifugal
	Fan Diameter (in)	n/a	n/a	18 x 15/15 x 11	18 x 15/15 x 11
High Static High Eff *	Motor Qty / Drive type	n/a	1 / Belt	1 / Belt	1 / Belt
	Max BHP	n/a	6.5	8.7	8.7
	RPM range	n/a	882–1078	941–1176	827–1010
	Motor frame size	n/a	184T	213T	213T
	Fan Qty / Type	n/a	2 / Centrifugal	2 / Centrifugal	2 / Centrifugal
	Fan Diameter (in)	n/a	18 x 15/15 x 11	18 x 15/15 x 11	18 x 15/15 x 11
Cond. Coil (Circuit A)					
	Coil type	RTPF	RTPF	RTPF	RTPF
	Coil Length (in)	70	72	82	95
	Coil Height (in)	44	44	52	52
	Rows / FPI (fins per inch)	2 /17	2 /17	2 /17	2 /17
	Total face area (ft2)	21.4	22.0	29.6	34.3
Cond. Coil (Circuit B)					
	Coil type	RTPF	RTPF	RTPF	RTPF
	Coil Length (in)	70	64	80	95
	Coil Height (in)	44	44	52	52
	Rows / FPI (fins per inch)	2 /17	2 /17	2 /17	2 /17
	Total face area (ft2)	21.4	19.5	29.6	34.3
Cond. fan / motor					
	Qty / Motor drive type	3 / direct	4 / direct	4/ direct	6 / direct
	Motor HP / RPM	1/4 / 1100	1/4 / 1100	1/4 / 1100	1/4 / 1100
	Fan diameter (in)	22	22	22	22
Filters					
	RA Filter # / size (in)	6 / 20 x 25 x 2	6 / 20 x 25 x 2	9 / 16 x 25 x 2	9 / 16 x 25 x 2
	OA inlet screen # / size (in)	4 / 16 x 25 x 1	4 / 16 x 25 x 1	4 / 16 x 25 x 1	4 / 16 x 25 x 1

* Section 313 of the Energy Independence and Security Act of 2007 (EISA 2007) mandates that the efficiency of general purpose motors we use in our Light Commercial Rooftops rated at 5.0 HP and larger be increased on or after December 19, 2010. We will offer both high and standard efficient motors until inventory is depleted and then shift over solely to the high efficient motors only.

Table 6 – ELECTRIC HEAT - ELECTRICAL DATA **15 - 25 TONS**

UNIT	NOM. V–PH–HZ	IFM TYPE	ELECTRIC HEATER PART NUMBER CRHEATER	NOMINAL (kW)	APPLICATION (kW)	APPLICATION OUTPUT (MBH)
50HC–D17	208/230–3–60	STD	279/270A00	25.0	18.8/23.0	64.1/78.3
			280/271A00	50.0	37.6/45.9	128.1/156.7
			281/272A00	75.0	56.3/68.9	192.2/235.0
		MED	279/270A00	25.0	18.8/23.0	64.1/78.3
			280/271A00	50.0	37.6/45.9	128.1/156.7
			281/272A00	75.0	56.3/68.9	192.2/235.0
		HIGH	279/270A00	25.0	18.8/23.0	64.1/78.3
			280/271A00	50.0	37.6/45.9	128.1/156.7
			281/272A00	75.0	56.3/68.9	192.2/235.0
	460–3–60	STD	282/273A00	25.0	23.0	78.3
			283/274A00	50.0	45.9	156.7
			284/275A00	75.0	68.9	235.0
		MED	282/273A00	25.0	23.0	78.3
			283/274A00	50.0	45.9	156.7
			284/275A00	75.0	68.9	235.0
		HIGH	282/273A00	25.0	23.0	78.3
			283/274A00	50.0	45.9	156.7
			284/275A00	75.0	68.9	235.0
	575–3–60	STD	285/276A00	24.8	22.8	77.7
			286/277A00	49.6	45.6	155.4
			287/278A00	74.4	68.3	233.1
		MED	285/276A00	24.8	22.8	77.7
			286/277A00	49.6	45.6	155.4
			287/278A00	74.4	68.3	233.1
		HIGH	285/276A00	24.8	22.8	77.7
			286/277A00	49.6	45.6	155.4
			287/278A00	74.4	68.3	233.1
50HC–D20	208/230–3–60	STD	279/270A00	25.0	18.8/23.0	64.1/78.3
			280/271A00	50.0	37.6/45.9	128.1/156.7
			281/272A00	75.0	56.3/68.9	192.2/235.0
		MED	279/270A00	25.0	18.8/23.0	64.1/78.3
			280/271A00	50.0	37.6/45.9	128.1/156.7
			281/272A00	75.0	56.3/68.9	192.2/235.0
		HIGH	279/270A00	25.0	18.8/23.0	64.1/78.3
			280/271A00	50.0	37.6/45.9	128.1/156.7
			281/272A00	75.0	56.3/68.9	192.2/235.0
		HIGH – High Eff	279/270A00	25.0	18.8/23.0	64.1/78.3
			280/271A00	50.0	37.6/45.9	128.1/156.7
			281/272A00	75.0	56.3/68.9	192.2/235.0
	460–3–60	STD	282/273A00	25.0	23.0	78.3
			283/274A00	50.0	45.9	156.7
			284/275A00	75.0	68.9	235.0
		MED	282/273A00	25.0	23.0	78.3
			283/274A00	50.0	45.9	156.7
			284/275A00	75.0	68.9	235.0
		HIGH	282/273A00	25.0	23.0	78.3
			283/274A00	50.0	45.9	156.7
			284/275A00	75.0	68.9	235.0
		HIGH – High Eff	282/273A00	25.0	23.0	78.3
			283/274A00	50.0	45.9	156.7
			284/275A00	75.0	68.9	235.0
	575–3–60	STD	285/276A00	24.8	22.8	77.7
			286/277A00	49.6	45.6	155.4
			287/278A00	74.4	68.3	233.1
		MED	285/276A00	24.8	22.8	77.7
			286/277A00	49.6	45.6	155.4
			287/278A00	74.4	68.3	233.1
		HIGH	285/276A00	24.8	22.8	77.7
			286/277A00	49.6	45.6	155.4
			287/278A00	74.4	68.3	233.1
		HIGH – High Eff	285/276A00	24.8	22.8	77.7
			286/277A00	49.6	45.6	155.4
			287/278A00	74.4	68.3	233.1

See Legend on page 13

Table 6 (cont.) - ELECTRIC HEAT - ELECTRICAL DATA **15 - 25 TONS**

UNIT	NOM. V–PH–HZ	IFM TYPE	ELECTRIC HEATER PART NUMBER CRHEATER	NOMINAL (kW)	APPLICATION (kW)	APPLICATION OUTPUT (MBH)
50HC–D24	208/203–3–60	STD	279/270A00	25.0	18.8/23.0	64.1/78.3
			280/271A00	50.0	37.6/45.9	128.1/156.7
			281/272A00	75.0	56.3/68.9	192.2/235.0
		MED	279/270A00	25.0	18.8/23.0	64.1/78.3
			280/271A00	50.0	37.6/45.9	128.1/156.7
			281/272A00	75.0	56.3/68.9	192.2/235.0
		HIGH	279/270A00	25.0	18.8/23.0	64.1/78.3
			280/271A00	50.0	37.6/45.9	128.1/156.7
			281/272A00	75.0	56.3/68.9	192.2/235.0
		MED–High Eff	279/270A00	25.0	18.8/23.0	64.1/78.3
			280/271A00	50.0	37.6/45.9	128.1/156.7
			281/272A00	75.0	56.3/68.9	192.2/235.0
		HIGH–High Eff	279/270A00	25.0	18.8/23.0	64.1/78.3
			280/271A00	50.0	37.6/45.9	128.1/156.7
			281/272A00	75.0	56.3/68.9	192.2/235.0
	460–3–60	STD	282/273A00	25.0	23.0	78.3
			283/274A00	50.0	45.9	156.7
			284/275A00	75.0	68.9	235.0
		MED	282/273A00	25.0	23.0	78.3
			283/274A00	50.0	45.9	156.7
			284/275A00	75.0	68.9	235.0
		HIGH	282/273A00	25.0	23.0	78.3
			283/274A00	50.0	45.9	156.7
			284/275A00	75.0	68.9	235.0
		MED–High Eff	282/273A00	25.0	23.0	78.3
			283/274A00	50.0	45.9	156.7
			284/275A00	75.0	68.9	235.0
		HIGH–High Eff	282/273A00	25.0	23.0	78.3
			283/274A00	50.0	45.9	156.7
			284/275A00	75.0	68.9	235.0
	575–3–60	STD	285/276A00	24.8	22.8	77.7
			286/277A00	49.6	45.6	155.4
			287/278A00	74.4	68.3	233.1
		MED	285/276A00	24.8	22.8	77.7
			286/277A00	49.6	45.6	155.4
			287/278A00	74.4	68.3	233.1
		HIGH	285/276A00	24.8	22.8	77.7
			286/277A00	49.6	45.6	155.4
			287/278A00	74.4	68.3	233.1
		MED–High Eff	285/276A00	24.8	22.8	77.7
			286/277A00	49.6	45.6	155.4
			287/278A00	74.4	68.3	233.1
		HIGH–High Eff	285/276A00	24.8	22.8	77.7
			286/277A00	49.6	45.6	155.4
			287/278A00	74.4	68.3	233.1

See Legend on page 13

Table 6 (cont.) - ELECTRIC HEAT - ELECTRICAL DATA 15 - 25 TONS

UNIT	NOM. V–PH–HZ	IFM TYPE	ELECTRIC HEATER PART NUMBER CRHEATER	NOMINAL (kW)	APPLICATION (kW)	APPLICATION OUTPUT (MBH)
50HC–D28	208/230–3–60	STD	279/270A00	25.0	18.8/23.0	64.1/78.3
			280/271A00	50.0	37.6/45.9	128.1/156.7
			281/272A00	75.0	56.3/68.9	192.2/235.0
		MED	279/270A00	25.0	18.8/23.0	64.1/78.3
			280/271A00	50.0	37.6/45.9	128.1/156.7
			281/272A00	75.0	56.3/68.9	192.2/235.0
		HIGH	279/270A00	25.0	18.8/23.0	64.1/78.3
			280/271A00	50.0	37.6/45.9	128.1/156.7
			281/272A00	75.0	56.3/68.9	192.2/235.0
		MED–High Eff	279/270A00	25.0	18.8/23.0	64.1/78.3
			280/271A00	50.0	37.6/45.9	128.1/156.7
			281/272A00	75.0	56.3/68.9	192.2/235.0
		HIGH–High Eff	279/270A00	25.0	18.8/23.0	64.1/78.3
			280/271A00	50.0	37.6/45.9	128.1/156.7
			281/272A00	75.0	56.3/68.9	192.2/235.0
	460–3–60	STD	282/273A00	25.0	23.0	78.3
			283/274A00	50.0	45.9	156.7
			284/275A00	75.0	68.9	235.0
		MED	282/273A00	25.0	23.0	78.3
			283/274A00	50.0	45.9	156.7
			284/275A00	75.0	68.9	235.0
		HIGH	282/273A00	25.0	23.0	78.3
			283/274A00	50.0	45.9	156.7
			284/275A00	75.0	68.9	235.0
		MED–High Eff	282/273A00	25.0	23.0	78.3
			283/274A00	50.0	45.9	156.7
			284/275A00	75.0	68.9	235.0
		HIGH–High Eff	282/273A00	25.0	23.0	78.3
			283/274A00	50.0	45.9	156.7
			284/275A00	75.0	68.9	235.0
	575–3–60	STD	285/276A00	24.8	22.8	77.7
			286/277A00	49.6	45.6	155.4
			287/278A00	74.4	68.3	233.1
		MED	285/276A00	24.8	22.8	77.7
			286/277A00	49.6	45.6	155.4
			287/278A00	74.4	68.3	233.1
		HIGH	285/276A00	24.8	22.8	77.7
			286/277A00	49.6	45.6	155.4
			287/278A00	74.4	68.3	233.1
		MED–High Eff	285/276A00	24.8	22.8	77.7
			286/277A00	49.6	45.6	155.4
			287/278A00	74.4	68.3	233.1
		HIGH–High Eff	285/276A00	24.8	22.8	77.7
			286/277A00	49.6	45.6	155.4
			287/278A00	74.4	68.3	233.1

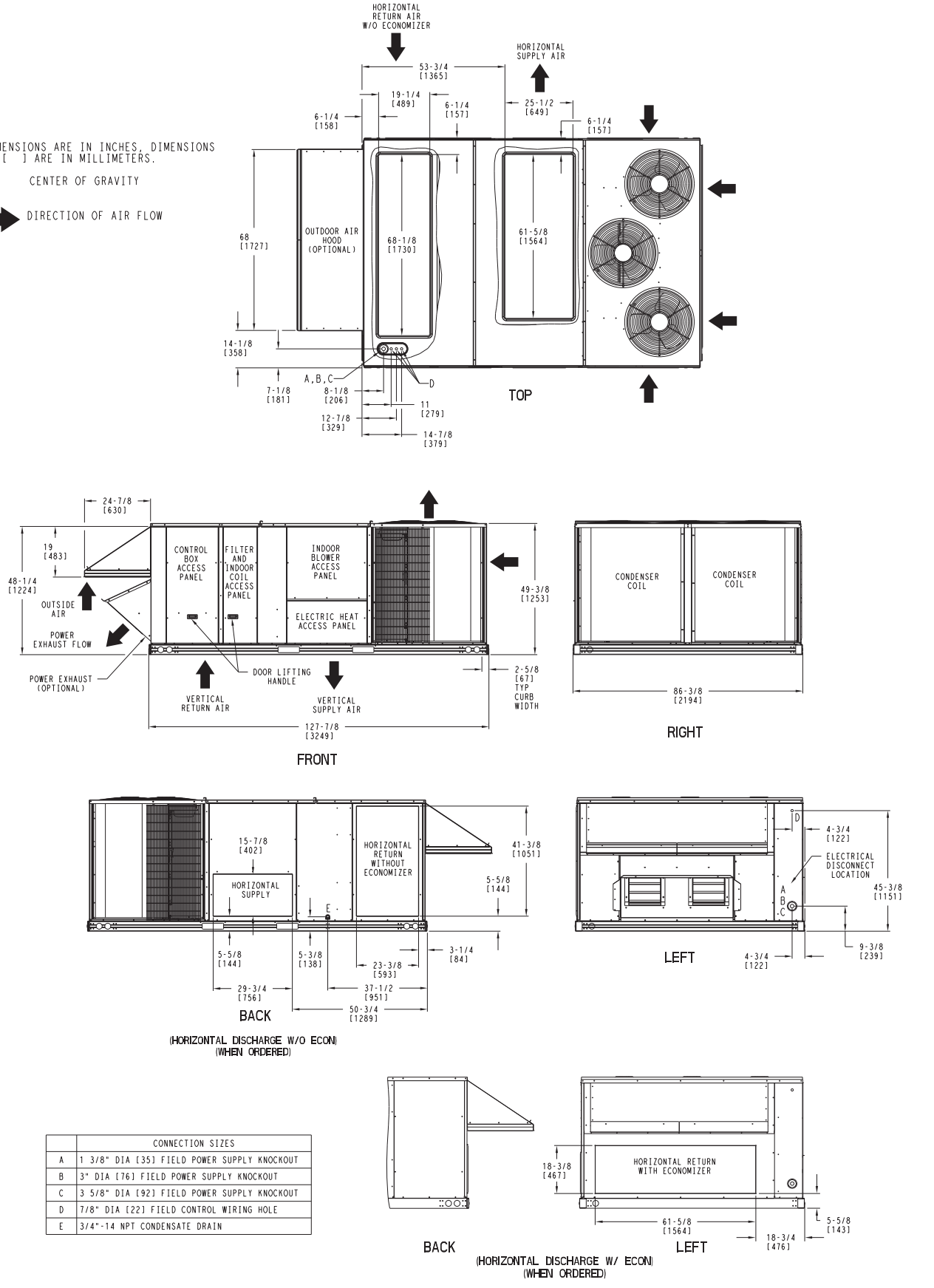
LEGEND

APP PWR – 208 / 230V / 460V / 575V
C.O. – Convenient outlet
FLA – Full load amps
IFM – Indoor fan motor
NOM PWR – 240V / 480V / 600V
P.E. – Power exhaust
PWRD – Powered convenient outlet
UNPWRD – Unpowered convenient outlet

DIMENSIONS

NOTES:

1. DIMENSIONS ARE IN INCHES, DIMENSIONS IN [ ] ARE IN MILLIMETERS.
2. CENTER OF GRAVITY
3. DIRECTION OF AIR FLOW



	CONNECTION SIZES
A	1 3/8" DIA [35] FIELD POWER SUPPLY KNOCKOUT
B	3" DIA [76] FIELD POWER SUPPLY KNOCKOUT
C	3 5/8" DIA [92] FIELD POWER SUPPLY KNOCKOUT
D	7/8" DIA [22] FIELD CONTROL WIRING HOLE
E	3/4"-14 NPT CONDENSATE DRAIN

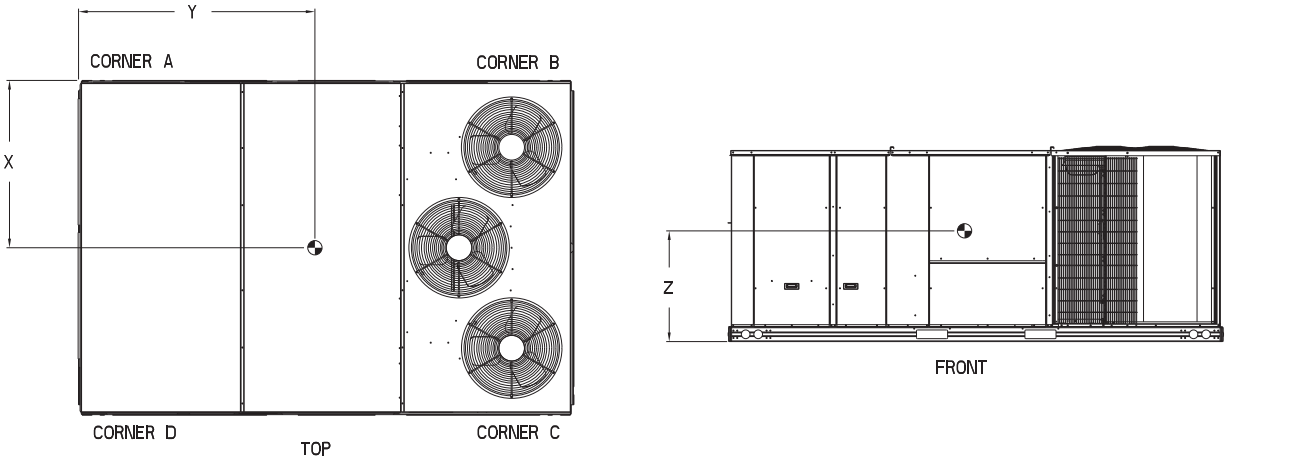
C10894

Fig. 1 - Dimensions 50HC-D17

DIMENSIONS (cont.)

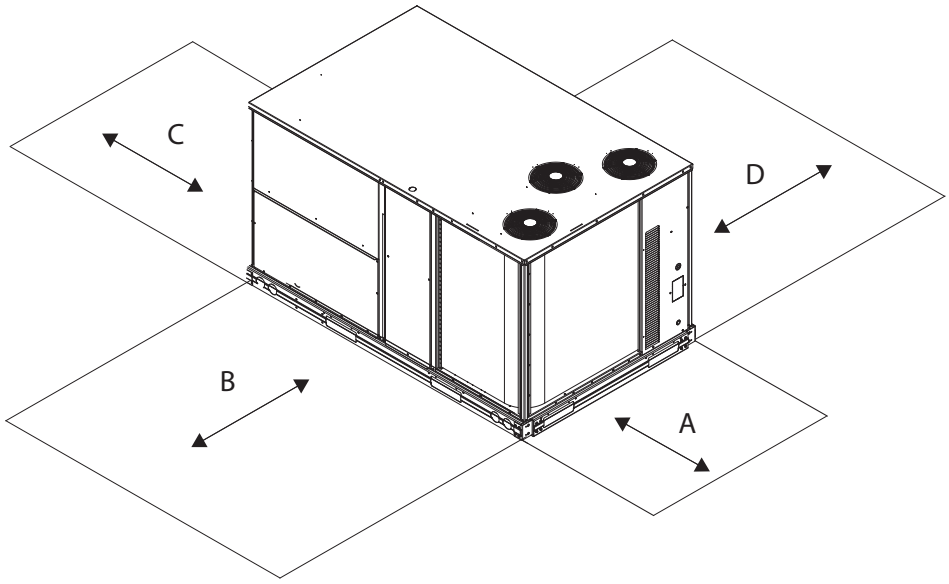
UNIT	STD UNIT WEIGHT*		CORNER WEIGHT (A)		CORNER WEIGHT (B)		CORNER WEIGHT (C)		CORNER WEIGHT (D)		C.G.		
	LBS.	KG.	LBS.	KG.	LBS.	KG.	LBS.	KG.	LBS.	KG.	X	Y	Z
50HC17	1793	815	375	170	419	191	528	240	472	214	48 [1219]	67 13/32 [1712]	16 1/2 [419]

* Standard unit weight is without electric heat and without packaging.
For other options and accessories, refer to the product data catalog.



C11171

Fig. 2 - Dimensions 50HC-D17



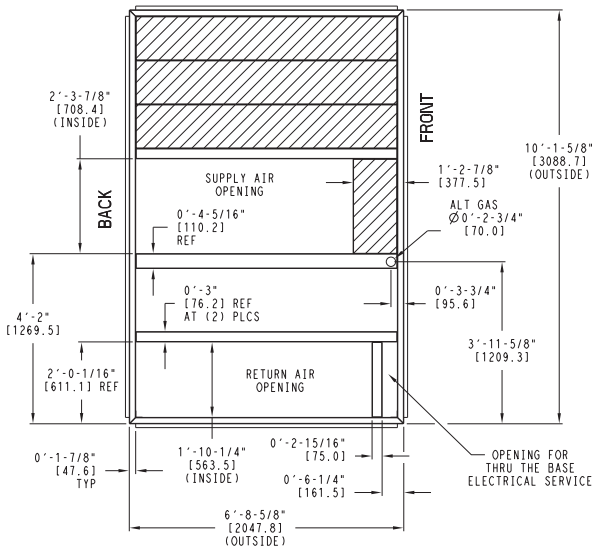
C09051

Fig. 3 - Service Clearance

LOC	DIMENSION	CONDITION
A	48 – in. (1219 mm)	Unit disconnect is mounted on panel
	18 – in. (457 mm)	No disconnect, convenience outlet option
	18 – in. (457 mm)	Recommended service clearance
	12 – in. (305 mm)	Minimum clearance
B	42 – in. (1067 mm)	Surface behind servicer is grounded (e.g., metal, masonry wall)
	36 – in. (914 mm)	Surface behind servicer is electrically non – conductive (e.g., wood, fiberglass)
	Special	Check for sources of flue products within 10 – ft of unit fresh air intake hood
C	36 – in. (914 mm)	Side condensate drain is used
	18 – in. (457 mm)	Minimum clearance
D	42 – in. (1067 mm)	Surface behind servicer is grounded (e.g., metal, masonry wall, another unit)
	36 – in. (914 mm)	Surface behind servicer is electrically non – conductive (e.g., wood, fiberglass)

DIMENSIONS (cont.)

UNIT SIZE	"A"	ROOF CURB ACCESSORY
17	1′-2" [356.0] 2′-0" [610.0]	CRRFCURB045A00 CRRFCURB046A00



NOTES:

1 ROOF CURB ACCESSORY IS SHIPPED UNASSEMBLED.

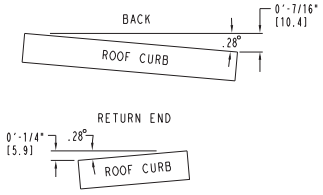
2 DIMENSIONS IN [ ] ARE IN MILLIMETERS.

3 ROOF CURB GALVANIZED STEEL.

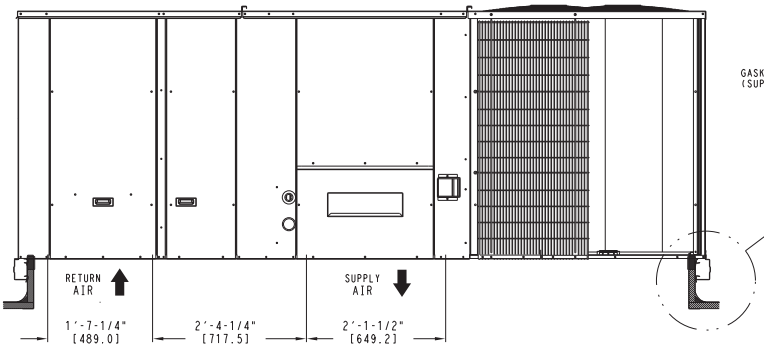
4 ATTACH DUCTWORK TO CURB (FLANGES ON DUCT REST ON CURB)

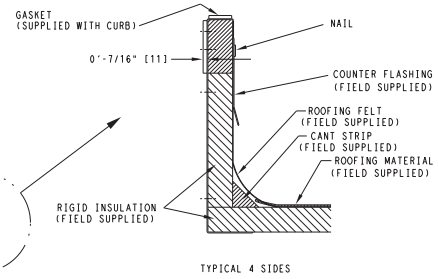
5 SERVICE CLEARANCE 4 ft ON EACH SIDE

DIRECTION OF AIR FLOW

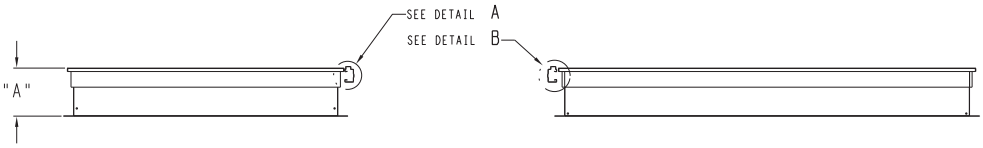


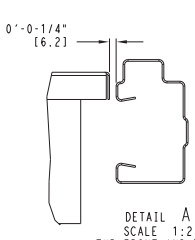
MAX CURB LEVELING TOLERANCES

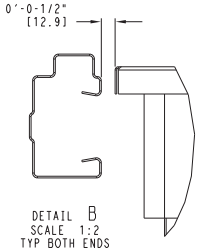


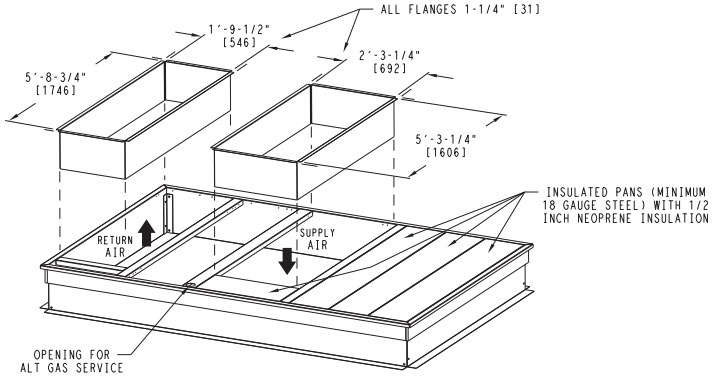


TYPICAL 4 SIDES









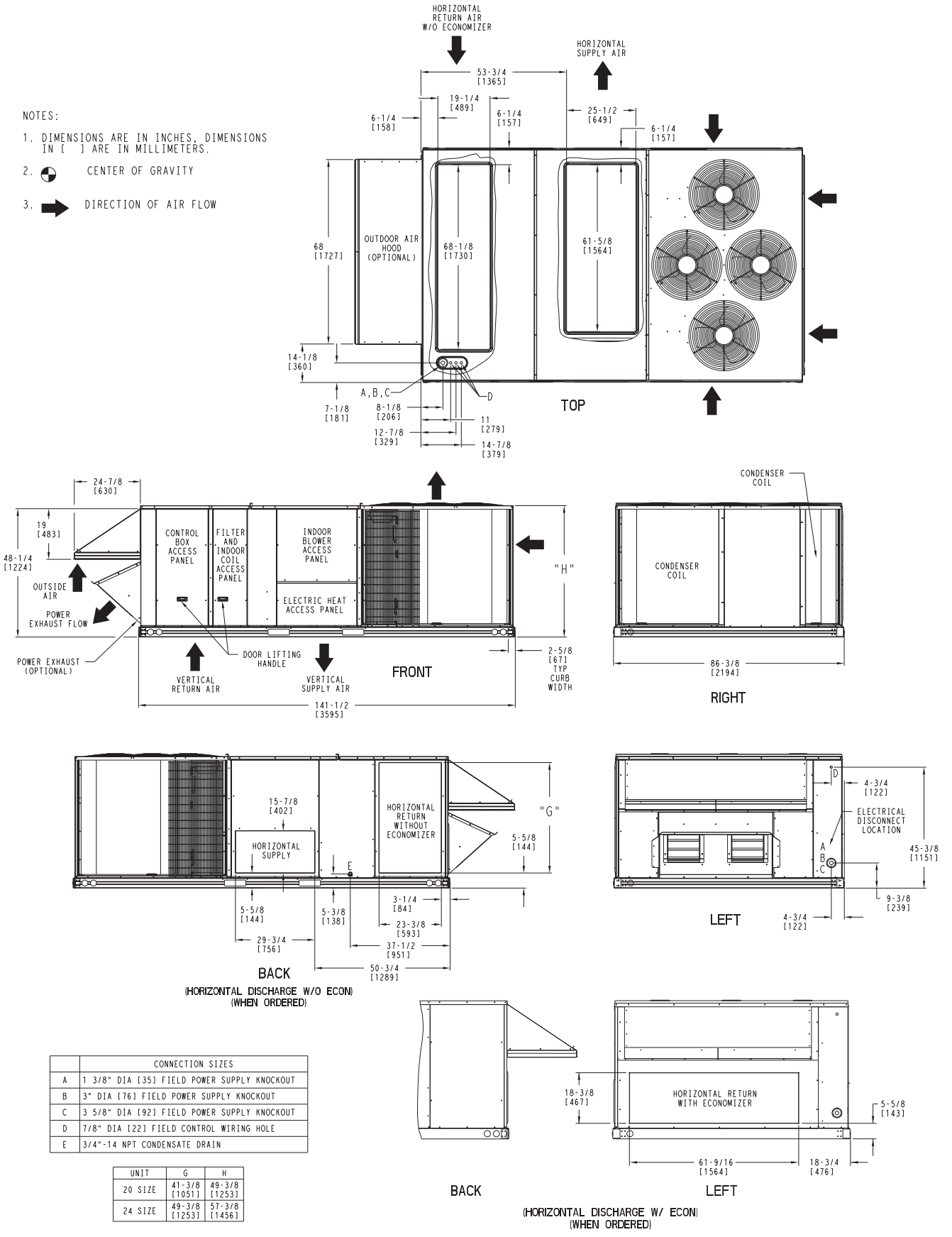
C10954

Fig. 4 - Curb Dimensions 50HC*D17

DIMENSIONS (cont.)

NOTES:

1. DIMENSIONS ARE IN INCHES, DIMENSIONS IN [ ] ARE IN MILLIMETERS.
2. CENTER OF GRAVITY
3. DIRECTION OF AIR FLOW



	CONNECTION SIZES
A	1 3/8" DIA [35] FIELD POWER SUPPLY KNOCKOUT
B	3" DIA [76] FIELD POWER SUPPLY KNOCKOUT
C	3 5/8" DIA [92] FIELD POWER SUPPLY KNOCKOUT
D	7/8" DIA [22] FIELD CONTROL WIRING HOLE
E	3/4"-14 NPT CONDENSATE DRAIN

UNIT	G	H
20 SIZE	41-3/8 [1051]	49-3/8 [1253]
24 SIZE	49-3/8 [1253]	57-3/8 [1456]

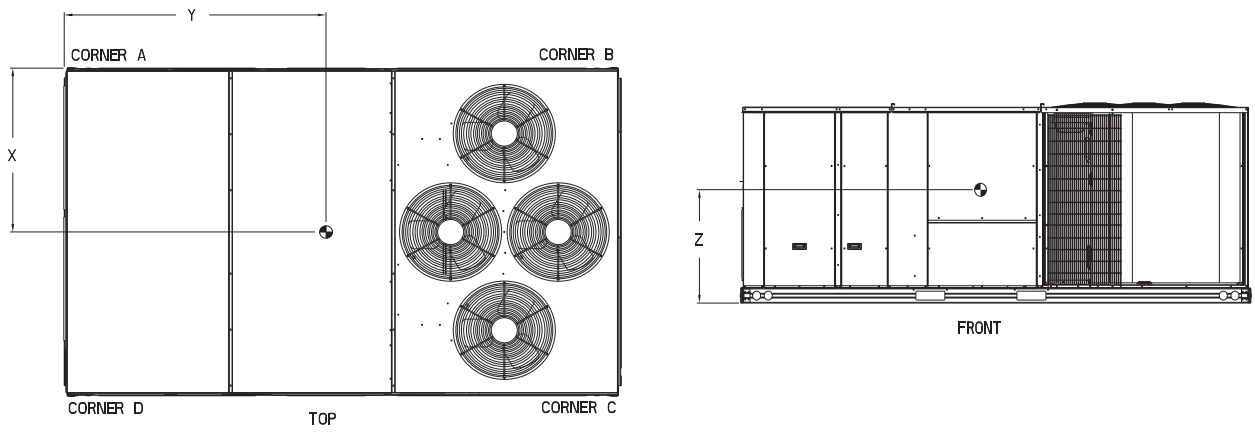
C10958

Fig. 5 - Dimensions 50HC-D20-24

DIMENSIONS (cont.)

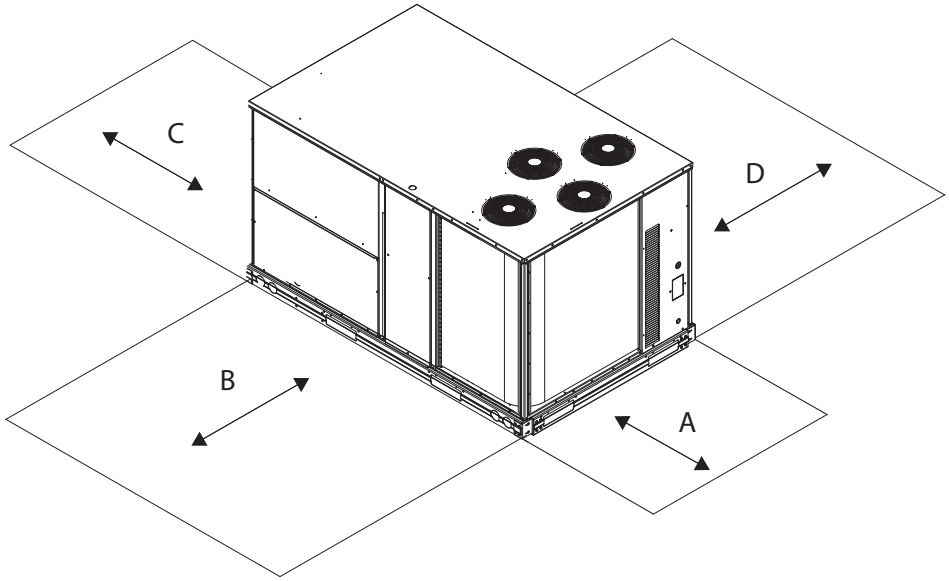
UNIT	STD UNIT WEIGHT*		CORNER WEIGHT (A)		CORNER WEIGHT (B)		CORNER WEIGHT (C)		CORNER WEIGHT (D)		C.G.		
	LBS.	KG.	LBS.	KG.	LBS.	KG.	LBS.	KG.	LBS.	KG.	X	Y	Z
50HC20	2003	911	445	202	367	167	557	253	547	249	47 1/2 [1207]	71 9/32 [1811]	16 1/2 [419]
50HC24	2148	976	510	232	525	238	564	257	549	250	44 21/32 [1135]	71 5/8 [1819]	19 [483]

* Standard unit weight is without electric heat and without packaging.
For other options and accessories, refer to the product data catalog.



C11172

Fig. 6 - Dimensions 50HC-D20-24



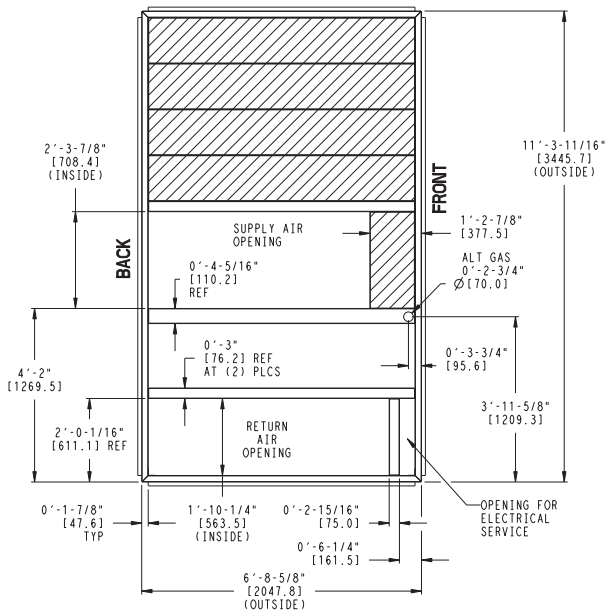
C10579

Fig. 7 - Service Clearance

LOC	DIMENSION	CONDITION
A	48–in. (1219 mm)	Unit disconnect is mounted on panel
	18–in. (457 mm)	No disconnect, convenience outlet option
	18–in. (457 mm)	Recommended service clearance
	12–in. (305 mm)	Minimum clearance
B	42–in. (1067 mm)	Surface behind servicer is grounded (e.g., metal, masonry wall)
	36–in. (914 mm)	Surface behind servicer is electrically non–conductive (e.g., wood, fiberglass)
	Special	Check for sources of flue products within 10–ft of unit fresh air intake hood
C	36–in. (914 mm)	Side condensate drain is used
	18–in. (457 mm)	Minimum clearance
D	42–in. (1067 mm)	Surface behind servicer is grounded (e.g., metal, masonry wall, another unit)
	36–in. (914 mm)	Surface behind servicer is electrically non–conductive (e.g., wood, fiberglass)

DIMENSIONS (cont.)

UNIT SIZE	"A"	ROOF CURB ACCESSORY
20, 24	1′-2" [356.0] 2′-0" [610.0]	CRRFCURB047A00 CRRFCURB048A00



NOTES:

1 ROOF CURB ACCESSORY IS SHIPPED UNASSEMBLED.

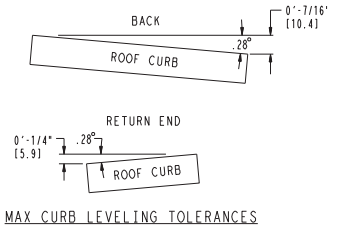
2 DIMENSIONS IN [ ] ARE IN MILLIMETERS.

3 ROOF CURB GALVANIZED STEEL.

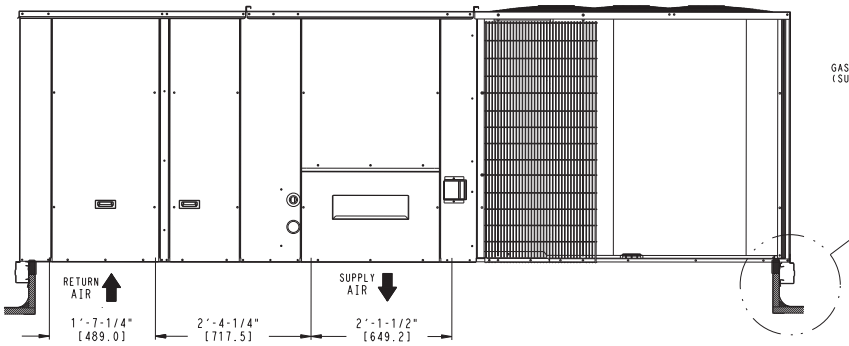
4 ATTACH DUCTWORK TO CURB (FLANGES ON DUCT REST ON CURB)

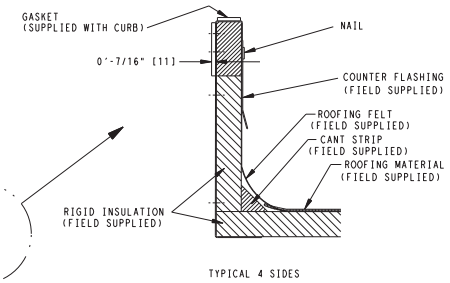
5 SERVICE CLEARANCE 4 ft ON EACH SIDE

DIRECTION OF AIR FLOW

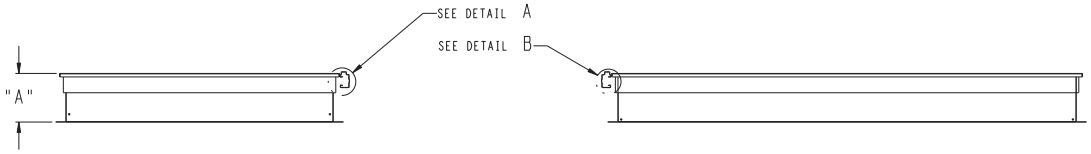


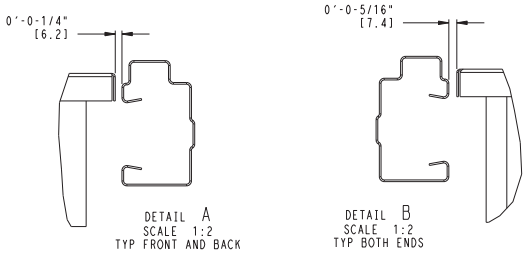
MAX CURB LEVELING TOLERANCES

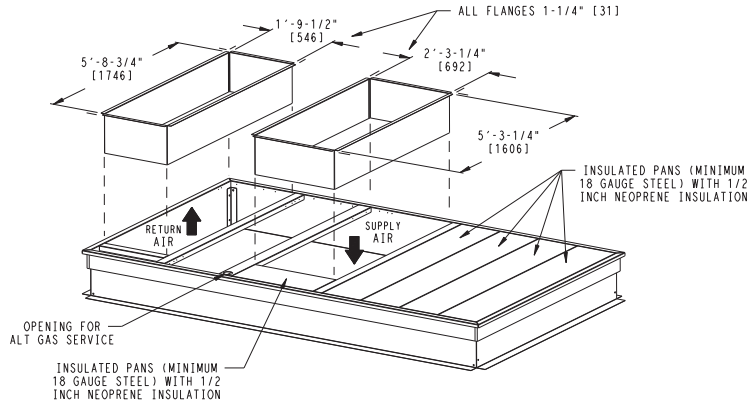




TYPICAL 4 SIDES



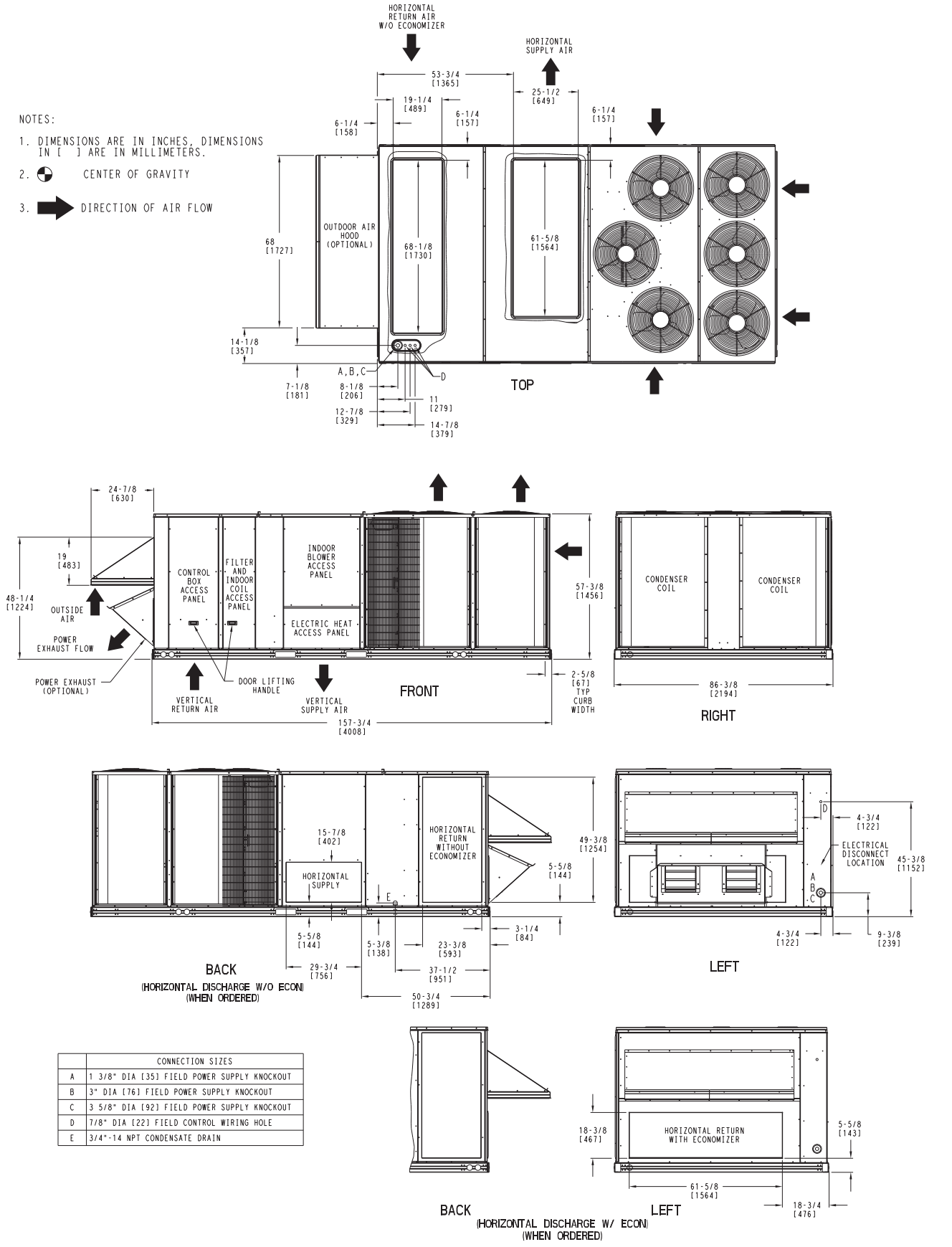




C10955

Fig. 8 - Curb Dimensions 50HC*D20 - 24

DIMENSIONS (cont.)



	CONNECTION SIZES
A	1 3/8" DIA [35] FIELD POWER SUPPLY KNOCKOUT
B	3" DIA [76] FIELD POWER SUPPLY KNOCKOUT
C	3 5/8" DIA [92] FIELD POWER SUPPLY KNOCKOUT
D	7/8" DIA [22] FIELD CONTROL WIRING HOLE
E	3/4"-14 NPT CONDENSATE DRAIN

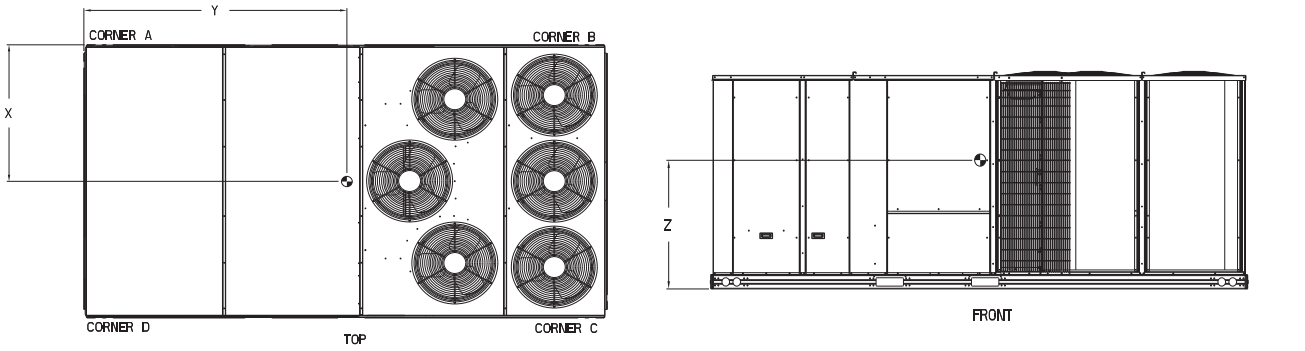
C10960

Fig. 9 - Dimensions 50HC*D28

DIMENSIONS (cont.)

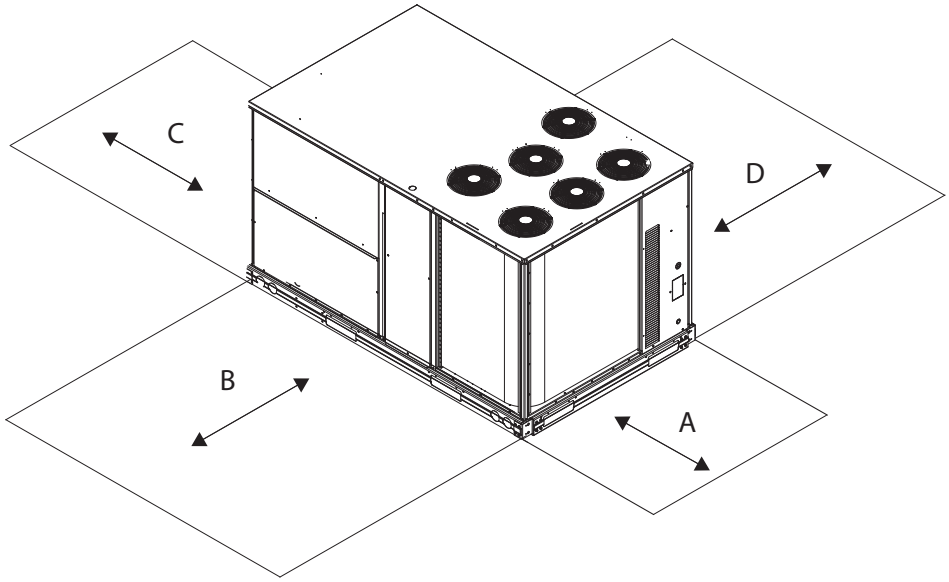
UNIT	STD UNIT WEIGHT*		CORNER WEIGHT (A)		CORNER WEIGHT (B)		CORNER WEIGHT (C)		CORNER WEIGHT (D)		C.G.		
	LBS.	KG.	LBS.	KG.	LBS.	KG.	LBS.	KG.	LBS.	KG.	X	Y	Z
50HC28	2193	997	545	248	528	240	551	251	569	259	44 [1118]	77 17/32 [1969]	19 [483]

* Standard unit weight is without electric heat and without packaging.
For other options and accessories, refer to the product data catalog.



C10961

Fig. 10 - Dimensions 50HC*D28



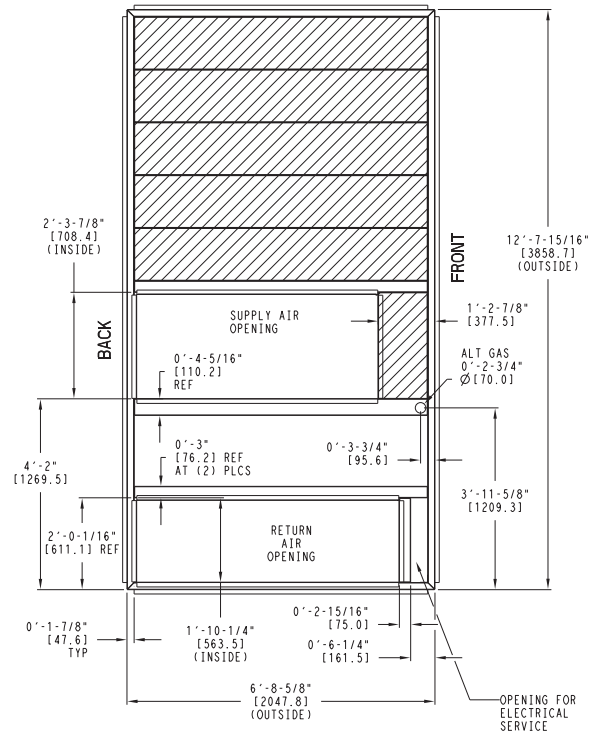
C10998

Fig. 11 - Service Clearance

LOC	DIMENSION	CONDITION
A	48 – in. (1219 mm)	Unit disconnect is mounted on panel
	18 – in. (457 mm)	No disconnect, convenience outlet option
	18 – in. (457 mm)	Recommended service clearance
	12 – in. (305 mm)	Minimum clearance
B	42 – in. (1067 mm)	Surface behind servicer is grounded (e.g., metal, masonry wall)
	36 – in. (914 mm)	Surface behind servicer is electrically non – conductive (e.g., wood, fiberglass)
	Special	Check for sources of flue products within 10 – ft of unit fresh air intake hood
C	36 – in. (914 mm)	Side condensate drain is used
	18 – in. (457 mm)	Minimum clearance
D	42 – in. (1067 mm)	Surface behind servicer is grounded (e.g., metal, masonry wall, another unit)
	36 – in. (914 mm)	Surface behind servicer is electrically non – conductive (e.g., wood, fiberglass)

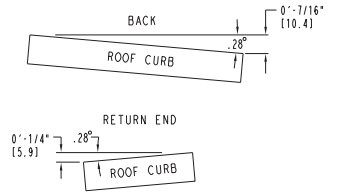
DIMENSIONS (cont.)

UNIT SIZE	"A"	ROOF CURB ACCESSORY
28	1′-2" [356.0] 2′-0" [610.0]	CRRFCURB049A00 CRRFCURB050A00

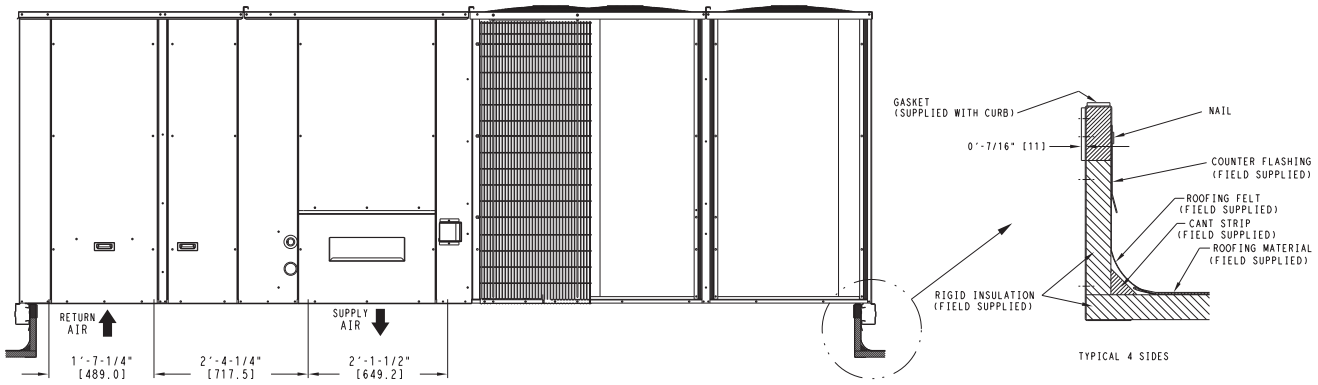


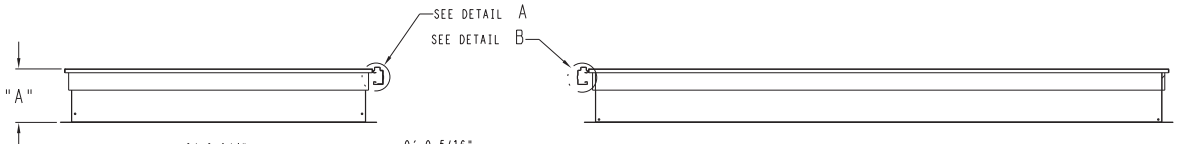
NOTES:
1 ROOF CURB ACCESSORY IS SHIPPED UNASSEMBLED.
2 BOLT HEADS TO BE ON INSIDE OF FLANGE. CLEARANCE IS [11] 0-0-7/16" TYP ALL CORNERS.
3 DIMENSIONS IN [ ] ARE IN MILLIMETERS.
4 ROOF CURB GALVANIZED STEEL.
5 ATTACH DUCTWORK TO CURB (FLANGES ON DUCT REST ON CURB)
6 SERVICE CLEARANCE 4 ft ON EACH SIDE
7 GAS SERVICE PLATE IS PART OF A SEPERATELY SHIPPED ACCESSORY PACKAGE.
8 GAS SERVICE PLATE CAN BE USED WITH EITHER ACCESSORY ROOFCURB.

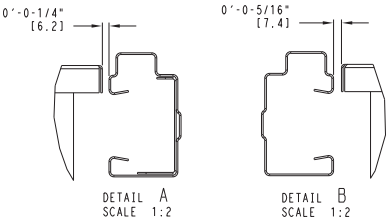
➡ DIRECTION OF AIR FLOW

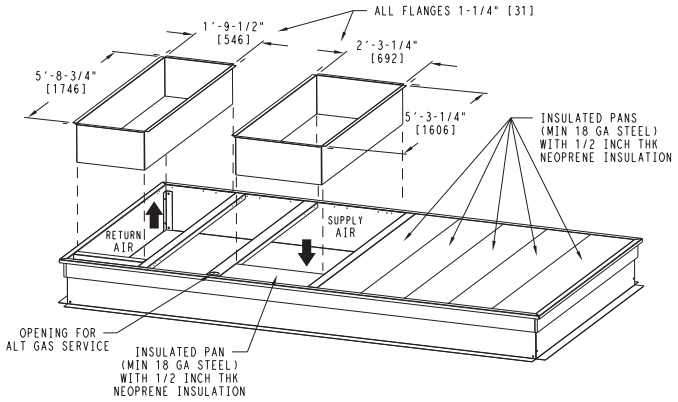


MAX CURB LEVELING TOLERANCES









C10956

Fig. 12 - Curb Dimensions 50HC*D28

OPTIONS AND ACCESSORIES WEIGHT ADDERS

BASE UNIT WITH OPTIONS AND ACCESSORIES (Weight Adders)	MAX WEIGHT ADD							
	50HC*17		50HC*20		50HC*24		50HC*28	
	lb	kg	lb	kg	lb	kg	lb	kg
Humidi–MiZer	83	38	83	38	88	40	92	42
Base Unit Operating Weight	1793	813	2003	909	2148	974	2193	975
Power Exhaust	125	57	125	57	125	57	125	57
Economizer	170	77	170	77	170	77	195	88
Copper Tube/Fin Evaporator Coil	110	50	110	50	135	61	161	73
Electric Heater	85	39	85	39	85	39	85	39
Single Point Kit	15	7	15	7	15	7	15	7
Roof Curb 14–in (356mm)	240	109	240	109	240	109	255	116
Roof Curb 24–in (610mm)	340	154	340	154	340	154	355	161
Louvered Hail Guard	60	27	60	27	120	54	150	68
CO_2 sensor	5	2	5	2	5	2	5	2
Return Smoke Detector	5	2	5	2	5	2	5	2
Supply Smoke Detector	5	2	5	2	5	2	5	2
Fan/Filter Status Switch	2	1	2	1	2	1	2	1
Non–Fused Disconnect	15	7	15	7	15	7	15	7
Powered Convenience Outlet	35	16	35	16	35	16	35	16
Non–Powered Convenience Outlet	5	2	5	2	5	2	5	2
Enthalpy Sensor	2	1	2	1	2	1	2	1
Differential Enthalpy Sensor	3	1	3	1	3	1	3	1
Two Position Motorized Damper	50	23	50	23	50	23	65	29
Manual Damper	35	16	35	16	35	16	40	18
Field Filter Track 4–in (102mm)	12	5	12	5	12	5	12	5
MotorMaster Controller	35	16	35	16	35	16	35	16
Standard Static Motor/Drive	0	0	0	0	0	0	0	0
Medium Static Motor/Drive	5	2	6	3	6	3	6	3
High Static Motor/Drive	11	5	12	5	16	7	16	7
Barometric Relief Hood (Horizontal)	25	11	25	11	25	11	25	11

APPLICATION/SELECTION DATA

Min operating ambient temp (cooling):

In mechanical cooling mode, your Carrier rooftop can safely operate down to an outdoor ambient temperature of 35°F (2°C). It is possible to provide cooling at lower outdoor ambient temperatures by using less outside air, economizers, and/or accessory low ambient kits.

Max operating ambient temp (cooling):

The maximum operating ambient temperature for cooling mode is 125°F (52°C). While cooling operation above 125°F (52°C) may be possible, it could cause either a reduction in performance, reliability, or a protective action by the unit's internal safety devices.

Min and max airflow (cooling mode):

To maintain safe and reliable operation of your rooftop, operate within the cooling airflow limits. Operating above the max may cause blow-off, undesired airflow noise, or airflow related problems with the rooftop unit. Operating below the min may cause problems with coil freeze-up.

Airflow:

All units are draw-through in cooling mode.

Outdoor air application strategies:

Economizers reduce operating expenses and compressor run time by providing a free source of cooling and a means of ventilation to match application changing needs. In fact, they should be considered for most applications. Also, consider the various economizer control methods and their benefits, as well as sensors required to accomplish your application goals. Please contact your local Carrier representative for assistance.

Motor limits, break horsepower (BHP):

Due to Carrier's internal unit design, air path, and specially designed motors, the full horsepower (maximum continuous BHP) band, as listed in Table 5, can be used with the utmost confidence. There is no need for extra safety factors, as Carrier's motors are designed and rigorously tested to use the entire, listed BHP range without either nuisance tripping or premature motor failure.

Sizing a rooftop

Bigger isn't necessarily better. While an air conditioner needs to have enough capacity to meet the load, it doesn't need excess capacity. In fact, having excess capacity typically results in very poor part load performance and humidity control.

Using higher design temperatures than ASHRAE recommends for your location, adding "safety factors" to the calculated load, and rounding up to the next largest unit, are all signs of oversizing air conditioners. Oversizing can cause short-cycling, and short cycling leads to poor humidity control, reduced efficiency, higher utility bills, drastic indoor temperature swings, excessive noise, and increased wear and tear on the air conditioner.

Rather than oversizing an air conditioner, wise contractors and engineers "right-size" or even slightly undersize air conditioners. Correctly sizing an air conditioner controls humidity better; promotes efficiency; reduces utility bills; extends equipment life, and maintains even, comfortable temperatures.

Low ambient applications

When equipped with a Carrier economizer, your rooftop unit can cool your space by bringing in fresh, cool outside air. In fact, when so equipped, accessory low-ambient kit may not be necessary. In low ambient conditions, unless the outdoor air is excessively humid or contaminated, economizer-based "free cooling" is the preferred less costly and energy conscious method.

In low ambient applications where outside air might not be desired (such as contaminated or excessively humid outdoor environments), your Carrier rooftop can operate to ambient temperatures down to -20°F (-29°C) using the recommended accessory Motormaster low ambient controller.

Winter start

Carrier's winter start kit extends the low ambient limit of your rooftop to 25°F (-4°C). The kit bypasses the low pressure switch, preventing nuisance tripping of the low pressure switch. Other low ambient precautions may still be prudent.

Application/Selection Option

Selection software by Carrier saves time by performing many of the steps above. Contact your Carrier sales representative for assistance.

Table 7 – COOLING CAPACITIES 2-STAGE COOLING 15 TONS

50HC*D17				AMBIENT TEMPERATURE													
				85			95			105			115			125		
				EA (dB)			EA (dB)			EA (dB)			EA (dB)			EA (dB)		
				75	80	85	75	80	85	75	80	85	75	80	85	75	80	85
4500 CFM	EAT (wb)	58	TC	158.3	158.3	179.2	152.6	152.6	172.9	146.6	146.6	166.1	140.2	140.2	158.8	133.2	133.2	150.8
			SHC	137.3	158.3	179.2	132.4	152.6	172.9	127.2	146.6	166.1	121.6	140.2	158.8	115.5	133.2	150.8
		62	TC	166.8	166.8	169.0	159.5	159.5	165.6	151.8	151.8	161.9	143.6	143.6	157.9	134.9	134.9	153.4
			SHC	123.1	146.1	169.0	119.7	142.6	165.6	116.1	139.0	161.9	112.3	135.1	157.9	108.2	130.8	153.4
		67	TC	182.9	182.9	182.9	174.9	174.9	174.9	166.3	166.3	166.3	157.2	157.2	157.2	147.6	147.6	147.6
			SHC	100.0	123.1	146.1	96.7	119.8	142.8	93.2	116.3	139.4	89.7	112.7	135.7	85.9	108.9	131.9
		72	TC	200.5	200.5	200.5	191.6	191.6	191.6	182.2	182.2	182.2	172.2	172.2	172.2	161.7	161.7	161.7
			SHC	76.1	99.5	122.8	72.9	96.2	119.5	69.5	92.8	116.1	66.0	89.3	112.5	62.4	85.6	108.8
		76	TC	–	215.4	215.4	–	205.8	205.8	–	195.6	195.6	–	184.8	184.8	–	173.6	173.6
			SHC	–	80.2	105.0	–	77.1	101.7	–	73.7	98.2	–	70.2	94.5	–	66.7	90.7
5250 CFM	EAT (wb)	58	TC	166.7	166.7	188.8	160.6	160.6	181.9	154.0	154.0	174.4	147.0	147.0	166.5	139.5	139.5	157.9
			SHC	144.6	166.7	188.8	139.3	160.6	181.9	133.6	154.0	174.4	127.6	147.0	166.5	121.0	139.5	157.9
		62	TC	172.0	172.0	185.1	164.3	164.3	181.2	156.3	156.3	177.0	147.8	147.8	172.4	139.6	139.6	164.3
			SHC	132.5	158.8	185.1	128.9	155.1	181.2	125.0	151.0	177.0	120.9	146.6	172.4	114.9	139.6	164.3
		67	TC	188.3	188.3	188.3	179.7	179.7	179.7	170.7	170.7	170.7	161.0	161.0	161.0	150.9	150.9	150.9
			SHC	106.1	132.7	159.3	102.8	129.3	155.9	99.3	125.8	152.4	95.6	122.1	148.6	91.7	118.2	144.7
		72	TC	206.1	206.1	206.1	196.7	196.7	196.7	186.7	186.7	186.7	176.2	176.2	176.2	165.3	165.3	165.3
			SHC	78.8	105.6	132.5	75.5	102.3	129.1	72.1	98.8	125.6	68.5	95.2	121.9	64.8	91.4	118.0
		76	TC	–	221.2	221.2	–	211.0	211.0	–	200.3	200.3	–	189.0	189.0	–	177.2	177.2
			SHC	–	83.6	111.7	–	80.3	108.2	–	76.9	104.6	–	73.3	100.9	–	69.7	97.1
6000 CFM	EAT (wb)	58	TC	173.8	173.8	196.8	167.2	167.2	189.4	160.2	160.2	181.4	152.7	152.7	173.0	144.7	144.7	163.8
			SHC	150.8	173.8	196.8	145.1	167.2	189.4	139.0	160.2	181.4	132.5	152.7	173.0	125.5	144.7	163.8
		62	TC	176.3	176.3	199.5	168.5	168.5	194.9	160.5	160.5	188.9	152.9	152.9	179.9	144.8	144.8	170.4
			SHC	140.9	170.2	199.5	136.9	165.9	194.9	132.1	160.5	188.9	125.8	152.9	179.9	119.2	144.8	170.4
		67	TC	192.3	192.3	192.3	183.4	183.4	183.4	173.9	173.9	173.9	164.0	164.0	164.0	153.4	153.4	156.9
			SHC	112.0	142.0	172.0	108.5	138.5	168.5	104.9	134.9	164.8	101.2	131.1	161.0	97.2	127.1	156.9
		72	TC	210.4	210.4	210.4	200.6	200.6	200.6	190.2	190.2	190.2	179.3	179.3	179.3	167.9	167.9	167.9
			SHC	81.2	111.4	141.7	77.9	108.0	138.2	74.4	104.5	134.6	70.7	100.8	130.8	67.0	96.9	126.9
		76	TC	–	225.6	225.6	–	215.0	215.0	–	203.8	203.8	–	192.1	192.1	–	180.0	180.0
			SHC	–	86.7	117.9	–	83.3	114.5	–	79.9	110.8	–	76.3	107.1	–	72.6	103.2
6750 CFM	EAT (wb)	58	TC	179.8	179.8	203.7	172.9	172.9	195.8	165.5	165.5	187.4	157.5	157.5	178.4	149.0	149.0	168.8
			SHC	156.0	179.8	203.7	150.0	172.9	195.8	143.5	165.5	187.4	136.7	157.5	178.4	129.3	149.0	168.8
		62	TC	180.5	180.5	210.7	173.0	173.0	203.6	165.6	165.6	194.9	157.7	157.7	185.5	149.1	149.1	175.5
			SHC	147.6	179.2	210.7	142.4	173.0	203.6	136.3	165.6	194.9	129.8	157.7	185.5	122.8	149.1	175.5
		67	TC	195.6	195.6	195.6	186.2	186.2	186.2	176.5	176.5	176.8	166.2	166.2	172.7	155.4	155.4	168.4
			SHC	117.5	150.8	184.1	114.0	147.3	180.5	110.4	143.6	176.8	106.5	139.6	172.7	102.4	135.4	168.4
		72	TC	213.8	213.8	213.8	203.6	203.6	203.6	192.9	192.9	192.9	181.6	181.6	181.6	169.9	169.9	169.9
			SHC	83.5	117.0	150.5	80.1	113.5	147.0	76.5	109.9	143.3	72.8	106.1	139.4	69.1	102.3	135.5
		76	TC	–	229.1	229.1	–	218.1	218.1	–	206.6	206.6	–	194.6	194.6	–	182.1	182.1
			SHC	–	89.6	124.0	–	86.2	120.5	–	82.7	116.8	–	79.0	113.0	–	75.2	109.0
7500 CFM	EAT (wb)	58	TC	185.1	185.1	209.6	177.7	177.7	201.3	170.0	170.0	192.5	161.6	161.6	183.0	152.8	152.8	173.0
			SHC	160.6	185.1	209.6	154.2	177.7	201.3	147.5	170.0	192.5	140.2	161.6	183.0	132.5	152.8	173.0
		62	TC	185.2	185.2	218.0	177.9	177.9	209.3	170.1	170.1	200.2	161.8	161.8	190.4	152.9	152.9	179.9
			SHC	152.5	185.2	218.0	146.4	177.9	209.3	140.0	170.1	200.2	133.2	161.8	190.4	125.8	152.9	179.9
		67	TC	198.1	198.1	198.1	188.6	188.6	192.1	178.6	178.6	188.1	168.1	168.1	183.8	157.2	157.2	179.1
			SHC	122.8	159.3	195.9	119.2	155.7	192.1	115.5	151.8	188.1	111.5	147.7	183.8	107.3	143.2	179.1
		72	TC	216.6	216.6	216.6	206.1	206.1	206.1	195.1	195.1	195.1	183.5	183.5	183.5	171.6	171.6	171.6
			SHC	85.6	122.3	159.0	82.2	118.8	155.5	78.6	115.2	151.7	74.9	111.3	147.8	71.1	107.4	143.8
		76	TC	–	231.9	231.9	–	220.7	220.7	–	208.9	208.9	–	196.5	196.5	–	183.8	183.8
			SHC	–	92.4	129.9	–	88.9	126.3	–	85.4	122.6	–	81.6	118.7	–	77.8	114.6

LEGEND:

– – Do not operate
Cfm – Cubic feet per minute (supply air)
EAT(db) – Entering air temperature (dry bulb)
EAT(wb) – Entering air temperature (wet bulb)
SHC – Sensible heat capacity
TC – Total capacity

50HC017 (15 TONS) – UNIT WITH HUMIDI–MIZER IN SUBCOOLING MODE										
Temp (F) Air Ent Condenser (Edb)		AIR ENTERING EVAPORATOR – CFM/BF								
		4,500			6,000			7,500		
		Air Entering Evaporator – – Ewb (F)								
		72	67	62	72	67	62	72	67	62
75	TC	202.9	184.6	166.2	213.7	194.6	175.4	222.3	202.5	182.7
	SHC	91.9	112.4	132.9	106.1	126.4	146.8	117.5	137.7	158.0
	kW	10.19	10.12	9.78	10.51	10.19	9.95	10.61	10.36	10.12
85	TC	189.8	171.8	153.8	201.0	182.2	163.3	209.9	190.4	170.8
	SHC	75.9	101.0	126.2	91.2	116.3	141.3	103.4	128.4	153.5
	kW	11.57	11.49	11.15	11.88	11.56	11.32	11.98	11.73	11.49
95	TC	176.7	159.1	141.4	188.3	169.7	151.2	197.5	178.2	159.0
	SHC	59.8	89.7	119.6	76.2	106.1	135.9	89.4	119.2	149.0
	kW	12.87	12.81	12.47	13.20	12.88	12.64	13.30	13.05	12.81
105	TC	163.6	146.3	129.0	175.6	157.3	139.1	185.1	166.1	147.1
	SHC	43.8	78.4	112.9	61.3	95.9	130.4	75.3	109.9	144.4
	kW	14.05	14.00	13.65	14.39	14.07	13.82	14.40	14.24	14.00
115	TC	150.5	133.5	116.5	162.9	144.9	127.0	172.7	154.0	135.3
	SHC	27.7	67.0	106.3	46.4	85.7	125.0	61.3	100.6	133.4
	kW	15.44	15.36	15.02	15.75	15.43	15.19	15.85	15.60	15.36
125	TC	137.4	120.8	104.1	150.2	132.5	114.9	160.3	141.9	123.5
	SHC	11.7	55.7	99.6	31.4	75.5	112.9	47.3	91.3	123.0
	kW	16.77	16.71	16.37	17.10	16.78	16.54	17.20	16.95	16.71

50HC017 (15 TONS) – UNIT WITH HUMIDI–MIZER IN HOT GAS REHEAT MODE										
Temp (F) Air Ent Condenser (Edb)		AIR ENTERING EVAPORATOR – Ewb (F)								
		75 Dry Bulb 62.5 Wet Bulb (50% Relative)			75 Dry Bulb 64 Wet Bulb (56% Relative)			75 Dry Bulb 65.3 Wet Bulb (60% Relative)		
		Air Entering Evaporator – Cfm								
		4,500	6,000	7,500	4,500	6,000	7,500	4,500	6,000	7,500
80	TC	64.50	71.00	73.30	68.40	74.50	77.30	71.20	79.70	80.60
	SHC	12.60	24.90	36.80	6.80	13.70	23.90	–0.80	5.50	13.80
	kW	10.10	10.26	10.42	10.18	10.40	10.56	10.33	10.47	10.67
75	TC	66.60	73.10	75.60	70.50	76.60	79.50	73.20	80.80	82.90
	SHC	14.30	26.70	38.50	8.10	14.90	25.70	0.70	7.00	15.00
	kW	10.05	10.22	10.36	10.14	10.36	10.52	10.28	10.43	10.62
70	TC	68.70	75.10	77.40	72.50	78.60	81.40	75.20	82.80	84.90
	SHC	15.40	27.80	40.00	9.50	16.20	26.80	2.10	8.40	16.30
	kW	10.00	10.18	10.33	10.10	10.31	10.47	10.23	10.40	10.58
60	TC	72.80	79.30	81.60	76.70	82.80	85.70	79.40	86.90	88.80
	SHC	19.00	31.10	43.20	12.70	19.90	30.10	5.30	11.60	20.00
	kW	9.92	10.09	10.24	10.01	10.22	10.37	10.14	10.31	10.49
50	TC	76.80	83.40	85.70	80.80	86.90	89.70	83.50	90.90	92.80
	SHC	21.70	34.20	46.20	15.80	22.70	33.20	8.40	14.70	22.80
	kW	9.83	10.00	10.15	9.92	10.13	10.29	10.05	10.21	10.39
40	TC	80.90	87.30	89.60	84.90	90.80	93.60	87.40	94.80	96.70
	SHC	24.90	37.10	49.30	19.00	26.00	36.10	11.60	17.90	26.20
	kW	9.74	9.91	10.06	9.83	10.04	10.20	9.96	10.12	10.30

LEGEND

Edb – Entering Dry–Bulb
Ewb – Entering Wet–Bulb
kW – Compressor Motor Power Input
ldb – Leaving Dry–Bulb
lwb – Leaving Wet–Bulb
SHC – Sensible Heat Capacity (1000 Btuh) Gross
TC – Total Capacity (1000 Btuh) Gross

NOTES:

1. Direct interpolation is permissible. Do not extrapolate.
2. The following formulas may be used:

$$t_{ldb} = t_{edb} - \frac{\text{sensible capacity (Btuh)}}{1.10 \times \text{cfm}}$$

t_{lwb} = Wet–bulb temperature corresponding to enthalpy of air leaving evaporator coil (h_{lwb})

$$h_{lwb} = h_{ewb} - \frac{\text{total capacity (Btuh)}}{4.5 \times \text{cfm}}$$

Where: h_{ewb} = Enthalpy of air entering evaporator coil

Table 9 – COOLING CAPACITIES 2-STAGE COOLING 17.5 TONS

50HC*D20				AMBIENT TEMPERATURE															
				85			95			105			115			125			
				EA (dB)			EA (dB)			EA (dB)			EA (dB)			EA (dB)			
				75	80	85	75	80	85	75	80	85	75	80	85	75	80	85	
5250 CFM	EAT (wb)	58	TC	185.1	185.1	209.2	178.7	178.7	201.9	171.8	171.8	194.1	164.5	164.5	185.8	156.7	156.7	177.0	
			SHC	161.1	185.1	209.2	155.4	178.7	201.9	149.4	171.8	194.1	143.1	164.5	185.8	136.3	156.7	177.0	
		62	TC	193.8	193.8	199.5	185.6	185.6	195.4	176.9	176.9	191.1	167.7	167.7	186.4	158.2	158.2	181.1	
			SHC	145.6	172.6	199.5	141.7	168.6	195.4	137.6	164.4	191.1	133.2	159.8	186.4	128.3	154.7	181.1	
		67	TC	212.2	212.2	212.2	203.3	203.3	203.3	193.8	193.8	193.8	183.8	183.8	183.8	173.1	173.1	173.1	
			SHC	119.0	146.0	173.1	115.3	142.3	169.4	111.4	138.4	165.4	107.3	134.3	161.3	103.0	130.0	157.0	
		72	TC	232.3	232.3	232.3	222.7	222.7	222.7	212.4	212.4	212.4	201.6	201.6	201.6	190.1	190.1	190.1	
			SHC	91.5	118.8	146.2	87.9	115.2	142.5	84.1	111.4	138.7	80.2	107.4	134.6	76.0	103.2	130.4	
		76	TC	–	249.5	249.5	–	239.2	239.2	–	228.2	228.2	–	216.6	216.6	–	204.3	204.3	
			SHC	–	96.7	125.3	–	93.2	121.7	–	89.5	117.9	–	85.6	113.8	–	81.5	109.5	
6125 CFM	EAT (wb)	58	TC	194.7	194.7	220.0	187.8	187.8	212.2	180.4	180.4	203.8	172.5	172.5	194.9	164.1	164.1	185.5	
			SHC	169.4	194.7	220.0	163.3	187.8	212.2	156.9	180.4	203.8	150.1	172.5	194.9	142.8	164.1	185.5	
		62	TC	199.6	199.6	218.0	191.1	191.1	213.5	182.1	182.1	208.4	173.0	173.0	201.2	164.3	164.3	192.8	
			SHC	156.5	187.2	218.0	152.3	182.9	213.5	147.7	178.0	208.4	141.8	171.5	201.2	135.8	164.3	192.8	
		67	TC	218.0	218.0	218.0	208.7	208.7	208.7	198.7	198.7	198.7	188.2	188.2	188.2	177.1	177.1	177.1	
			SHC	126.2	157.4	188.6	122.4	153.6	184.7	118.4	149.6	180.7	114.3	145.4	176.5	109.9	141.0	172.1	
		72	TC	238.5	238.5	238.5	228.4	228.4	228.4	217.7	217.7	217.7	206.3	206.3	206.3	194.3	194.3	194.3	
			SHC	94.7	126.1	157.5	91.0	122.4	153.8	87.2	118.5	149.8	83.1	114.4	145.7	78.9	110.1	141.4	
		76	TC	–	255.9	255.9	–	245.1	245.1	–	233.6	233.6	–	221.4	221.4	–	208.5	208.5	
			SHC	–	100.7	133.3	–	97.1	129.6	–	93.3	125.6	–	89.3	121.5	–	85.1	117.1	
7000 CFM	EAT (wb)	58	TC	202.7	202.7	229.1	195.4	195.4	220.8	187.5	187.5	211.9	179.2	179.2	202.5	170.3	170.3	192.4	
			SHC	176.4	202.7	229.1	170.0	195.4	220.8	163.1	187.5	211.9	155.9	179.2	202.5	148.1	170.3	192.4	
		62	TC	204.6	204.6	234.4	196.0	196.0	228.0	187.7	187.7	220.3	179.3	179.3	210.5	170.4	170.4	200.0	
			SHC	166.0	200.2	234.4	160.8	194.4	228.0	155.1	187.7	220.3	148.2	179.3	210.5	140.8	170.4	200.0	
		67	TC	222.5	222.5	222.5	212.8	212.8	212.8	202.4	202.4	202.4	191.5	191.5	191.5	180.0	180.0	186.4	
			SHC	133.0	168.2	203.4	129.2	164.3	199.5	125.1	160.3	195.4	120.9	156.0	191.0	116.4	151.4	186.4	
		72	TC	243.3	243.3	243.3	232.7	232.7	232.7	221.6	221.6	221.6	209.9	209.9	209.9	197.4	197.4	197.4	
			SHC	97.5	132.9	168.3	93.8	129.2	164.5	89.9	125.2	160.5	85.8	121.1	156.3	81.6	116.7	151.9	
		76	TC	–	260.8	260.8	–	249.6	249.6	–	237.7	237.7	–	225.1	225.1	–	211.7	211.7	
			SHC	–	104.4	140.8	–	100.7	137.0	–	96.9	133.0	–	92.8	128.8	–	88.5	124.4	
7875 CFM	EAT (wb)	58	TC	209.6	209.6	236.8	201.8	201.8	228.1	193.6	193.6	218.8	184.8	184.8	208.9	175.5	175.5	198.3	
			SHC	182.3	209.6	236.8	175.6	201.8	228.1	168.4	193.6	218.8	160.8	184.8	208.9	152.7	175.5	198.3	
		62	TC	209.8	209.8	246.2	202.0	202.0	237.1	193.8	193.8	227.4	185.0	185.0	217.1	175.6	175.6	206.1	
			SHC	173.4	209.8	246.2	167.0	202.0	237.1	160.1	193.8	227.4	152.9	185.0	217.1	145.1	175.6	206.1	
		67	TC	226.1	226.1	226.1	216.0	216.0	216.0	205.4	205.4	209.4	194.2	194.2	204.8	182.4	182.4	199.9	
			SHC	139.6	178.6	217.7	135.6	174.7	213.7	131.5	170.5	209.4	127.1	166.0	204.8	122.5	161.2	199.9	
		72	TC	247.0	247.0	247.0	236.2	236.2	236.2	224.7	224.7	224.7	212.7	212.7	212.7	199.9	199.9	199.9	
			SHC	100.2	139.5	178.8	96.5	135.7	174.9	92.5	131.7	170.9	88.4	127.5	166.6	84.1	123.1	162.1	
		76	TC	–	264.7	264.7	–	253.1	253.1	–	240.9	240.9	–	227.9	227.9	–	–	–	
			SHC	–	107.9	148.1	–	104.2	144.3	–	100.2	140.2	–	96.1	135.9	–	–	–	
8750 CFM	EAT (wb)	58	TC	215.4	215.4	243.4	207.3	207.3	234.3	198.7	198.7	224.6	189.6	189.6	214.2	179.9	179.9	203.2	
			SHC	187.4	215.4	243.4	180.3	207.3	234.3	172.9	198.7	224.6	164.9	189.6	214.2	156.5	179.9	203.2	
		62	TC	215.5	215.5	253.0	207.5	207.5	243.5	198.9	198.9	233.4	189.7	189.7	222.7	180.0	180.0	211.2	
			SHC	178.1	215.5	253.0	171.5	207.5	243.5	164.4	198.9	233.4	156.8	189.7	222.7	148.8	180.0	211.2	
		67	TC	228.9	228.9	231.5	218.7	218.7	227.3	207.8	207.8	222.8	196.4	196.4	217.9	184.5	184.5	212.6	
			SHC	145.8	188.6	231.5	141.8	184.5	227.3	137.5	180.1	222.8	133.0	175.5	217.9	128.2	170.4	212.6	
		72	TC	250.1	250.1	250.1	239.0	239.0	239.0	227.3	227.3	227.3	214.9	214.9	214.9	201.8	201.8	201.8	
			SHC	102.8	145.8	188.9	99.0	142.0	185.0	95.0	137.9	180.9	90.8	133.7	176.5	86.4	129.2	172.0	
		76	TC	–	267.8	267.8	–	256.0	256.0	–	243.5	243.5	–	230.2	230.2	–	–	–	
			SHC	–	111.2	155.2	–	107.4	151.3	–	103.5	147.1	–	99.3	142.8	–	–	–	

LEGEND:

– – Do not operate
Cfm – Cubic feet per minute (supply air)
EAT(db) – Entering air temperature (dry bulb)
EAT(wb) – Entering air temperature (wet bulb)
SHC – Sensible heat capacity
TC – Total capacity

50HC020 (17.5 TONS) – UNIT WITH HUMIDI–MIZER IN SUBCOOLING MODE										
Temp (F) Air Ent Condenser (Edb)		AIR ENTERING EVAPORATOR – CFM/BF								
		5,250			7,000			8,750		
		Air Entering Evaporator – – Ewb (F)								
		72	67	62	72	67	62	72	67	62
75	TC	232.0	211.3	190.6	242.4	221.0	199.7	250.7	228.9	207.0
	SHC	110.9	133.7	156.4	127.6	150.3	173.0	141.1	163.7	186.4
	kW	12.45	12.16	11.81	12.74	12.41	12.02	12.93	12.51	12.18
85	TC	215.9	195.7	175.5	226.0	205.2	184.4	234.2	212.8	191.5
	SHC	90.6	118.8	147.0	108.4	136.6	164.9	122.7	151.0	179.2
	kW	13.48	13.20	12.88	13.77	13.47	13.07	13.96	13.58	13.23
95	TC	199.7	180.0	160.3	209.7	189.4	169.1	217.6	196.8	176.1
	SHC	70.3	104.0	137.7	89.2	123.0	156.7	104.4	138.2	172.1
	kW	14.60	14.25	13.94	14.89	14.51	14.15	15.08	14.63	14.31
105	TC	183.6	164.5	145.2	193.3	173.5	153.8	201.0	180.8	160.6
	SHC	50.0	89.1	128.3	70.0	109.3	148.6	86.0	125.5	158.6
	kW	15.64	15.36	15.–01	15.93	15.60	15.21	16.12	15.72	15.37
115	TC	167.5	148.8	130.1	176.9	157.7	138.5	184.5	164.8	145.1
	SHC	29.7	74.3	118.9	50.7	95.6	138.1	67.7	112.7	145.1
	kW	16.70	16.38	15.82	16.98	16.63	16.03	17.17	16.75	16.19
125	TC	151.4	133.2	115.0	160.6	141.9	123.1	167.9	148.8	129.7
	SHC	9.4	59.5	109.6	31.5	81.9	123.0	49.3	100.0	129.7
	kW	17.71	17.39	17.09	18.01	17.65	17.30	18.20	17.76	17.46

50HC020 (17.5 TONS) – UNIT WITH HUMIDI–MIZER IN HOT GAS REHEAT MODE										
Temp (F) Air Ent Condenser (Edb)		AIR ENTERING EVAPORATOR – Ewb (F)								
		75 Dry Bulb 62.5 Wet Bulb (50% Relative)			75 Dry Bulb 64 Wet Bulb (56% Relative)			75 Dry Bulb 65.3 Wet Bulb (60% Relative)		
		Air Entering Evaporator – Cfm								
		5,250	7,000	8,750	5,250	7,000	8,750	5,250	7,000	8,750
80	TC	67.80	71.30	74.10	70.50	74.80	79.80	73.30	78.20	82.40
	SHC	9.00	26.50	41.70	2.20	13.20	26.90	–5.20	2.90	13.80
	kW	11.65	11.75	11.87	11.82	11.90	11.98	11.93	12.10	12.19
75	TC	72.50	76.00	78.80	75.00	79.20	84.30	78.00	83.00	86.90
	SHC	13.40	30.90	46.10	6.50	18.00	31.30	–2.10	7.20	17.90
	kW	11.44	11.54	11.66	11.61	11.68	11.75	11.70	11.86	11.95
70	TC	77.10	80.60	83.40	79.50	83.90	88.90	82.40	87.30	91.10
	SHC	17.60	34.70	49.90	10.80	22.20	35.10	3.20	11.50	22.20
	kW	11.22	11.33	11.45	11.40	11.46	11.54	11.49	11.64	11.75
60	TC	86.30	89.90	92.70	88.80	93.20	98.20	91.70	96.60	100.50
	SHC	26.20	43.20	58.40	19.40	30.80	43.60	11.60	20.10	30.70
	kW	10.76	10.86	10.98	10.93	11.00	11.07	11.03	11.18	11.28
50	TC	95.50	99.10	101.90	98.00	102.40	107.40	101.00	106.00	109.80
	SHC	34.80	51.80	67.00	28.00	39.40	52.20	20.10	28.70	39.40
	kW	10.33	10.43	10.55	10.50	10.52	10.63	10.59	10.74	10.85
40	TC	104.80	108.40	111.20	107.30	111.70	116.60	110.30	115.30	119.10
	SHC	43.40	60.40	75.60	36.60	48.00	60.80	28.80	37.30	47.90
	kW	9.87	9.97	10.09	10.04	10.11	10.18	10.14	10.28	10.40

LEGEND

Edb – Entering Dry–Bulb
Ewb – Entering Wet–Bulb
kW – Compressor Motor Power Input
ldb – Leaving Dry–Bulb
lwb – Leaving Wet–Bulb
SHC – Sensible Heat Capacity (1000 Btuh) Gross
TC – Total Capacity (1000 Btuh) Gross

NOTES:

1. Direct interpolation is permissible. Do not extrapolate.
2. The following formulas may be used:

$$t_{ldb} = t_{edb} - \frac{\text{sensible capacity (Btuh)}}{1.10 \times \text{cfm}}$$

t_{lwb} = Wet–bulb temperature corresponding to enthalpy of air leaving evaporator coil (h_{lwb})

$$h_{lwb} = h_{ewb} - \frac{\text{total capacity (Btuh)}}{4.5 \times \text{cfm}}$$

Where: h_{ewb} = Enthalpy of air entering evaporator coil

Table 11 – COOLING CAPACITIES 2-STAGE COOLING 20 TONS

50HC*D24				AMBIENT TEMPERATURE															
				85			95			105			115			125			
				EA (dB)			EA (dB)			EA (dB)			EA (dB)			EA (dB)			
				75	80	85	75	80	85	75	80	85	75	80	85	75	80	85	
6000 CFM	EAT (wb)	58	TC	214.4	214.4	242.5	207.0	207.0	234.2	199	199	225.1	190.2	190.2	215.2	180.6	180.6	204.3	
			SHC	186.3	214.4	242.5	179.9	207.0	234.2	173	199	225.1	165.3	190.2	215.2	157.0	180.6	204.3	
		62	TC	226.8	226.8	227.7	217.3	217.3	223.0	206.9	206.9	218	195.8	195.8	212.5	183.7	183.7	206.4	
			SHC	167.0	197.3	227.7	162.4	192.7	223.0	157.6	187.8	218	152.3	182.4	212.5	146.6	176.5	206.4	
		67	TC	248.4	248.4	248.4	237.9	237.9	237.9	226.6	226.6	226.6	214.3	214.3	214.3	201.0	201.0	201.0	
			SHC	136.5	167.1	197.6	132.2	162.7	193.2	127.5	158	188.4	122.5	152.9	183.4	117.2	147.6	178.0	
		72	TC	271.9	271.9	271.9	260.3	260.3	260.3	247.9	247.9	247.9	234.5	234.5	234.5	220.1	220.1	220.1	
			SHC	105.1	136.0	167.0	100.8	131.7	162.5	96.3	127.1	157.9	91.4	122.1	152.9	86.3	116.9	147.6	
		76	TC	–	291.7	291.7	–	279.2	279.2	–	265.7	265.7	–	251.3	251.3	–	235.8	235.8	
			SHC	–	110.7	143.7	–	106.5	139.5	–	102	134.7	–	97.2	129.7	–	92.1	124.3	
7000 CFM	EAT (wb)	58	TC	225.8	225.8	255.3	217.8	217.8	246.3	209.1	209.1	236.5	199.6	199.6	225.7	189.2	189.2	214.0	
			SHC	196.2	225.8	255.3	189.3	217.8	246.3	181.7	209.1	236.5	173.4	199.6	225.7	164.4	189.2	214.0	
		62	TC	233.9	233.9	248.8	223.8	223.8	243.8	213.1	213.1	238.2	201.4	201.4	231.8	190.0	190.0	221.5	
			SHC	179.4	214.1	248.8	174.6	209.2	243.8	169.4	203.8	238.2	163.7	197.8	231.8	155.9	188.7	221.5	
		67	TC	255.7	255.7	255.7	244.6	244.6	244.6	232.6	232.6	232.6	219.6	219.6	219.6	205.7	205.7	205.7	
			SHC	144.7	179.7	214.8	140.2	175.2	210.2	135.4	170.4	205.4	130.3	165.2	200.2	124.9	159.8	194.7	
		72	TC	279.4	279.4	279.4	267.3	267.3	267.3	254.1	254.1	254.1	240.1	240.1	240.1	224.9	224.9	224.9	
			SHC	108.7	144.1	179.6	104.3	139.7	175.1	99.6	135	170.3	94.7	129.9	165.1	89.5	124.6	159.7	
		76	TC	–	299.4	299.4	–	286.2	286.2	–	272.1	272.1	–	256.9	256.9	–	240.7	240.7	
			SHC	–	115.3	152.9	–	110.9	148.2	–	106.3	143.3	–	101.3	138.0	–	96.1	132.6	
8000 CFM	EAT (wb)	58	TC	235.3	235.3	266.2	226.8	226.8	256.5	217.5	217.5	246	207.4	207.4	234.5	196.3	196.3	222.0	
			SHC	204.5	235.3	266.2	197.1	226.8	256.5	189	217.5	246	180.2	207.4	234.5	170.6	196.3	222.0	
		62	TC	239.7	239.7	268.1	229.4	229.4	262.0	219	219	253.3	208.3	208.3	241.9	196.7	196.7	231.0	
			SHC	190.7	229.4	268.1	185.4	223.7	262.0	178.6	215.9	253.3	170.4	206.2	241.9	162.3	196.7	231.0	
		67	TC	261.3	261.3	261.3	249.6	249.6	249.6	237.1	237.1	237.1	223.6	223.6	223.6	209.2	209.2	210.6	
			SHC	152.3	191.8	231.2	147.7	187.1	226.6	142.9	182.2	221.6	137.7	177.0	216.3	132.2	171.4	210.6	
		72	TC	285.3	285.3	285.3	272.5	272.5	272.5	258.9	258.9	258.9	244.2	244.2	244.2	228.6	228.6	228.6	
			SHC	111.9	151.7	191.5	107.5	147.2	186.9	102.7	142.4	182	97.7	137.2	176.7	92.4	131.8	171.2	
		76	TC	–	305.4	305.4	–	291.6	291.6	–	276.8	276.8	–	261.2	261.2	–	244.4	244.4	
			SHC	–	119.4	161.0	–	114.9	156.2	–	110.1	151.2	–	105.1	146.0	–	99.8	140.4	
9000 CFM	EAT (wb)	58	TC	243.5	243.5	275.4	234.5	234.5	265.2	224.6	224.6	254	213.9	213.9	241.9	202.3	202.3	228.8	
			SHC	211.6	243.5	275.4	203.8	234.5	265.2	195.2	224.6	254	185.9	213.9	241.9	175.8	202.3	228.8	
		62	TC	245.4	245.4	282.9	235.4	235.4	274.6	225	225	264.3	214.4	214.4	251.7	202.5	202.5	237.8	
			SHC	199.7	241.3	282.9	193.2	233.9	274.6	185.6	224.9	264.3	176.8	214.3	251.7	167.1	202.5	237.8	
		67	TC	265.6	265.6	265.6	253.6	253.6	253.6	240.7	240.7	240.7	226.8	226.8	231.8	212.0	212.0	225.8	
			SHC	159.6	203.3	247.1	154.9	198.6	242.3	150	193.6	237.3	144.7	188.3	231.8	139.0	182.4	225.8	
		72	TC	289.9	289.9	289.9	276.7	276.7	276.7	262.6	262.6	262.6	247.5	247.5	247.5	231.4	231.4	231.4	
			SHC	114.9	159.0	203.0	110.4	154.4	198.3	105.6	149.5	193.3	100.5	144.2	188.0	95.2	138.7	182.3	
		76	TC	–	310.1	310.1	–	295.8	295.8	–	280.6	280.6	–	264.4	264.4	–	247.3	247.3	
			SHC	–	123.2	168.9	–	118.6	164.1	–	113.8	159	–	108.7	153.6	–	103.4	147.9	
10,000 CFM	EAT (wb)	58	TC	250.4	250.4	283.2	240.9	240.9	272.5	230.7	230.7	260.9	219.5	219.5	248.2	207.3	207.3	234.5	
			SHC	217.7	250.4	283.2	209.4	240.9	272.5	200.5	230.7	260.9	190.7	219.5	248.2	180.2	207.3	234.5	
		62	TC	250.8	250.8	294.6	241.1	241.1	283.3	231.1	231.1	271.4	219.6	219.6	258.0	207.5	207.5	243.7	
			SHC	207.0	250.8	294.6	199.0	241.1	283.3	190.7	231.1	271.4	181.2	219.6	258.0	171.2	207.5	243.7	
		67	TC	269.2	269.2	269.2	256.8	256.8	257.6	243.5	243.5	252.3	229.4	229.4	246.4	214.3	214.3	240.0	
			SHC	166.6	214.5	262.5	161.9	209.7	257.6	156.8	204.5	252.3	151.3	198.9	246.4	145.5	192.8	240.0	
		72	TC	293.7	293.7	293.7	280.1	280.1	280.1	265.6	265.6	265.6	250.2	250.2	250.2	233.7	233.7	233.7	
			SHC	117.8	166.0	214.2	113.2	161.3	209.3	108.3	156.3	204.3	103.2	151.0	198.8	97.8	145.4	193.1	
		76	TC	–	313.9	313.9	–	299.3	299.3	–	283.7	283.7	–	267.1	267.1	–	249.6	249.6	
			SHC	–	126.8	176.5	–	122.2	171.6	–	117.3	166.5	–	112.1	161.0	–	106.7	155.1	

LEGEND:

– – Do not operate
Cfm – Cubic feet per minute (supply air)
EAT(db) – Entering air temperature (dry bulb)
EAT(wb) – Entering air temperature (wet bulb)
SHC – Sensible heat capacity
TC – Total capacity

50HC024 (20 TONS) – UNIT WITH HUMIDI–MIZER IN SUBCOOLING MODE										
Temp (F) Air Ent Condenser (Edb)		AIR ENTERING EVAPORATOR – CFM/BF								
		6,000			8,000			10,000		
		Air Entering Evaporator – – Ewb (F)								
		72	67	62	72	67	62	72	67	62
75	TC	281.6	256.5	231.3	293.1	267.0	240.9	302.3	275.4	248.6
	SHC	114.7	141.0	167.4	140.6	166.6	192.6	161.6	187.3	212.9
	kW	13.52	13.25	12.95	13.82	13.46	13.21	13.97	13.60	13.31
85	TC	261.3	236.9	212.4	272.1	247.7	221.3	280.7	254.6	228.5
	SHC	90.9	123.5	156.1	118.8	151.1	183.3	141.4	173.4	205.4
	kW	14.95	14.68	14.48	15.25	14.89	14.64	15.40	15.03	14.74
95	TC	241.1	217.2	193.4	251.1	226.4	201.7	259.2	233.8	208.4
	SHC	67.2	106.0	144.8	97.1	120.1	174.1	121.2	159.5	197.8
	kW	16.52	16.25	15.95	16.82	16.46	16.21	16.97	16.60	16.31
105	TC	220.8	197.5	174.4	230.2	206.2	182.2	237.7	213.0	188.4
	SHC	43.4	88.4	133.5	75.3	120.1	164.9	101.0	145.7	178.9
	kW	18.09	17.82	17.52	18.39	18.03	17.78	18.54	18.17	17.88
115	TC	200.5	178.0	155.5	209.2	185.9	162.6	216.2	192.2	168.7
	SHC	19.7	70.9	122.2	53.5	104.6	155.7	80.9	131.8	161.2
	kW	19.65	19.38	19.08	19.95	19.59	19.34	20.10	19.73	19.44
125	TC	180.2	158.4	136.5	188.2	165.6	143.0	194.7	171.4	148.2
	SHC	–4.1	53.4	110.8	31.7	89.1	142.2	60.7	118.0	145.1
	kW	20.59	20.32	20.02	20.89	20.53	20.28	21.04	20.67	20.38

50HC024 (20 TONS) – UNIT WITH HUMIDI–MIZER IN HOT GAS REHEAT MODE										
Temp (F) Air Ent Condenser (Edb)		AIR ENTERING EVAPORATOR – Ewb (F)								
		75 Dry Bulb			75 Dry Bulb			75 Dry Bulb		
		62.5 Wet Bulb			64 Wet Bulb			65.3 Wet Bulb		
		(50% Relative)			(56% Relative)			(60% Relative)		
		Air Entering Evaporator – Cfm								
		6,000	8,000	10,000	6,000	8,000	10,000	6,000	8,000	10,000
80	TC	115.20	123.30	130.60	120.40	129.30	138.20	122.80	135.00	143.70
	SHC	40.80	58.30	76.10	32.30	45.50	60.40	20.10	34.30	48.00
	kW	13.24	13.32	13.39	13.43	13.57	13.65	13.49	13.68	13.74
75	TC	119.80	128.60	135.90	125.50	135.30	143.20	128.00	139.50	148.40
	SHC	45.60	62.80	82.10	37.00	49.80	65.20	24.30	38.70	52.60
	kW	13.05	13.10	13.17	13.21	13.35	13.43	13.27	13.46	13.52
70	TC	122.50	133.10	140.20	129.80	140.70	147.60	132.40	144.40	153.20
	SHC	49.80	76.00	86.10	41.10	54.30	69.20	28.80	41.40	56.80
	kW	12.80	12.87	12.94	12.98	13.12	13.20	13.04	13.23	13.29
60	TC	133.80	142.50	149.60	139.30	150.40	157.40	141.50	154.20	163.00
	SHC	58.60	76.00	95.00	50.20	63.50	78.10	37.80	52.10	65.90
	kW	12.34	12.42	12.49	12.53	12.67	12.75	12.59	12.78	12.84
50	TC	143.50	151.80	159.30	149.00	160.00	167.00	151.30	163.60	172.50
	SHC	67.70	84.80	103.80	59.10	72.40	87.00	46.70	61.00	74.90
	kW	11.88	11.95	12.03	12.07	12.21	12.29	12.13	12.32	12.38
40	TC	153.20	161.30	168.70	158.60	169.20	176.60	160.80	173.10	182.00
	SHC	76.50	93.60	111.60	68.00	81.50	95.80	55.80	69.80	84.00
	kW	11.42	11.49	11.56	11.60	11.74	11.82	11.66	11.85	11.91

LEGEND

Edb – Entering Dry–Bulb
Ewb – Entering Wet–Bulb
kW – Compressor Motor Power Input
ldb – Leaving Dry–Bulb
lwb – Leaving Wet–Bulb
SHC – Sensible Heat Capacity (1000 Btuh) Gross
TC – Total Capacity (1000 Btuh) Gross

NOTES:

1. Direct interpolation is permissible. Do not extrapolate.
2. The following formulas may be used:

$$t_{ldb} = t_{edb} - \frac{\text{sensible capacity (Btuh)}}{1.10 \times \text{cfm}}$$

t_{lwb} = Wet–bulb temperature corresponding to enthalpy of air leaving evaporator coil (h_{lwb})

$$h_{lwb} = h_{ewb} - \frac{\text{total capacity (Btuh)}}{4.5 \times \text{cfm}}$$

Where: h_{ewb} = Enthalpy of air entering evaporator coil

Table 13 – COOLING CAPACITIES 2-STAGE COOLING 25 TONS

50HC*D28				AMBIENT TEMPERATURE															
				85			95			105			115			125			
				EA (dB)			EA (dB)			EA (dB)			EA (dB)			EA (dB)			
				75	80	85	75	80	85	75	80	85	75	80	85	75	80	85	
7,500 CFM	EAT (wb)	58	TC	264.4	264.4	298.9	254.6	254.6	287.9	244.1	244.1	276.0	232.7	232.7	263.1	220.3	220.3	249.1	
			SHC	229.9	264.4	298.9	221.4	254.6	287.9	212.2	244.1	276.0	202.3	232.7	263.1	191.5	220.3	249.1	
		62	TC	278.7	278.7	282.4	266.3	266.3	276.4	252.8	252.8	269.8	238.5	238.5	262.4	223.9	223.9	251.3	
			SHC	206.8	244.6	282.4	200.9	238.7	276.4	194.6	232.2	269.8	187.7	225.0	262.4	178.7	215.0	251.3	
		67	TC	305.3	305.3	305.3	291.9	291.9	291.9	277.3	277.3	277.3	261.5	261.5	261.5	244.5	244.5	244.5	
			SHC	169.0	207.0	245.0	163.4	201.4	239.4	157.4	195.3	233.3	151.0	188.9	226.8	144.2	182.1	219.9	
		72	TC	334.0	334.0	334.0	319.4	319.4	319.4	303.6	303.6	303.6	286.5	286.5	286.5	268.1	268.1	268.1	
			SHC	129.9	168.5	207.1	124.5	163.0	201.5	118.7	157.1	195.5	112.5	150.8	189.2	106.0	144.2	182.3	
		76	TC	–	358.2	358.2	–	342.4	342.4	–	325.4	325.4	–	307.1	307.1	–	287.4	287.4	
			SHC	–	137.0	178.2	–	131.7	172.9	–	126.0	166.9	–	119.9	160.4	–	113.4	153.4	
8,750 CFM	EAT (wb)	58	TC	278.2	278.2	314.5	267.8	267.8	302.8	256.5	256.5	289.9	244.2	244.2	276.1	230.8	230.8	261.0	
			SHC	241.9	278.2	314.5	232.8	267.8	302.8	223.0	256.5	289.9	212.3	244.2	276.1	200.7	230.8	261.0	
		62	TC	287.2	287.2	308.3	274.3	274.3	301.5	260.8	260.8	291.7	247.0	247.0	280.9	232.0	232.0	269.1	
			SHC	222.1	265.2	308.3	215.7	258.6	301.5	207.7	249.7	291.7	199.0	240.0	280.9	189.7	229.4	269.1	
		67	TC	314.0	314.0	314.0	299.8	299.8	299.8	284.4	284.4	284.4	267.8	267.8	267.8	250.0	250.0	250.0	
			SHC	179.1	222.7	266.4	173.3	216.9	260.6	167.2	210.8	254.3	160.7	204.2	247.7	153.7	197.2	240.6	
		72	TC	343.0	343.0	343.0	327.7	327.7	327.7	311.1	311.1	311.1	293.1	293.1	293.1	273.8	273.8	273.8	
			SHC	134.3	178.5	222.6	128.8	172.9	216.9	122.9	166.9	210.8	116.6	160.4	204.3	109.9	153.6	197.3	
		76	TC	–	367.3	367.3	–	350.8	350.8	–	333.0	333.0	–	313.8	313.8	–	293.2	293.2	
			SHC	–	142.6	189.4	–	137.1	183.5	–	131.2	177.3	–	125.0	170.7	–	118.4	163.7	
10,000 CFM	EAT (wb)	58	TC	289.7	289.7	327.5	278.7	278.7	315.0	266.6	266.6	301.4	253.6	253.6	286.7	239.4	239.4	270.7	
			SHC	251.9	289.7	327.5	242.3	278.7	315.0	231.8	266.6	301.4	220.5	253.6	286.7	208.2	239.4	270.7	
		62	TC	294.6	294.6	329.6	282.2	282.2	319.7	268.7	268.7	309.1	254.1	254.1	298.4	239.7	239.7	281.4	
			SHC	234.7	282.1	329.6	226.8	273.3	319.7	218.4	263.7	309.1	209.7	254.1	298.4	197.9	239.7	281.4	
		67	TC	320.6	320.6	320.6	305.9	305.9	305.9	289.9	289.9	289.9	272.7	272.7	272.7	254.3	254.3	260.3	
			SHC	188.6	237.7	286.8	182.7	231.8	280.9	176.5	225.5	274.5	169.8	218.8	267.7	162.8	211.5	260.3	
		72	TC	350.0	350.0	350.0	334.0	334.0	334.0	316.8	316.8	316.8	298.2	298.2	298.2	278.3	278.3	278.3	
			SHC	138.4	187.9	237.5	132.8	182.2	231.7	126.8	176.1	225.5	120.4	169.6	218.8	113.6	162.6	211.7	
		76	TC	–	374.4	374.4	–	357.3	357.3	–	338.7	338.7	–	318.9	318.9	–	297.5	297.5	
			SHC	–	147.7	199.5	–	142.1	193.7	–	136.1	187.4	–	129.7	180.6	–	123.0	173.5	
11,250 CFM	EAT (wb)	58	TC	299.4	299.4	338.4	287.8	287.8	325.4	275.2	275.2	311.1	261.4	261.4	295.6	246.6	246.6	278.8	
			SHC	260.3	299.4	338.4	250.2	287.8	325.4	239.2	275.2	311.1	227.3	261.4	295.6	214.4	246.6	278.8	
		62	TC	302.2	302.2	346.0	289.3	289.3	335.7	275.5	275.5	323.5	262.1	262.1	307.7	246.8	246.8	289.8	
			SHC	244.8	295.4	346.0	236.7	286.2	335.7	227.5	275.5	323.5	216.4	262.1	307.7	203.8	246.8	289.8	
		67	TC	325.9	325.9	325.9	310.7	310.7	310.7	294.2	294.2	294.2	276.6	276.6	286.7	257.7	257.7	278.9	
			SHC	197.6	252.1	306.5	191.7	246.1	300.4	185.3	239.6	293.9	178.5	232.6	286.7	171.2	225.1	278.9	
		72	TC	355.5	355.5	355.5	339.1	339.1	339.1	321.3	321.3	321.3	302.2	302.2	302.2	281.8	281.8	281.8	
			SHC	142.1	197.0	251.8	136.4	191.2	245.9	130.4	185.0	239.6	123.9	178.3	232.8	117.1	171.3	225.5	
		76	TC	–	380.0	380.0	–	362.4	362.4	–	343.3	343.3	–	322.8	322.8	–	300.9	300.9	
			SHC	–	152.4	209.4	–	146.8	203.4	–	140.7	197.0	–	134.2	190.2	–	127.3	182.8	
12,500 CFM	EAT (wb)	58	TC	307.7	307.7	347.9	295.7	295.7	334.2	282.5	282.5	319.3	268.2	268.2	303.2	252.7	252.7	285.7	
			SHC	267.6	307.7	347.9	257.1	295.7	334.2	245.6	282.5	319.3	233.2	268.2	303.2	219.7	252.7	285.7	
		62	TC	308.4	308.4	362.2	295.9	295.9	347.4	283.1	283.1	332.4	268.4	268.4	315.2	252.8	252.8	296.9	
			SHC	254.6	308.4	362.2	244.4	295.9	347.4	233.8	283.1	332.4	221.7	268.4	315.2	208.8	252.8	296.9	
		67	TC	330.2	330.2	330.2	314.6	314.6	319.2	297.8	297.8	312.3	279.8	279.8	304.7	260.6	260.6	295.9	
			SHC	206.3	265.9	325.5	200.3	259.7	319.2	193.8	253.1	312.3	186.7	245.7	304.7	179.0	237.4	295.9	
		72	TC	360.1	360.1	360.1	343.2	343.2	343.2	325.0	325.0	325.0	305.4	305.4	305.4	284.6	284.6	284.6	
			SHC	145.7	205.7	265.7	139.9	199.8	259.7	133.8	193.5	253.3	127.3	186.8	246.3	120.4	179.7	238.9	
		76	TC	–	384.6	384.6	–	366.5	366.5	–	346.9	346.9	–	325.9	325.9	–	303.5	303.5	
			SHC	–	157.0	218.9	–	151.2	212.9	–	145.1	206.3	–	138.5	199.3	–	131.5	191.7	

LEGEND:

– – Do not operate
Cfm – Cubic feet per minute (supply air)
EAT(db) – Entering air temperature (dry bulb)
EAT(wb) – Entering air temperature (wet bulb)
SHC – Sensible heat capacity
TC – Total capacity

50HC028 (25 TONS) – UNIT WITH HUMIDI–MIZER IN SUBCOOLING MODE										
Temp (F) Air Ent Condenser (Edb)		AIR ENTERING EVAPORATOR – CFM/BF								
		7,500			10,000			12,500		
		Air Entering Evaporator – – Ewb (F)								
		72	67	62	72	67	62	72	67	62
75	TC	351.3	319.5	287.8	370.4	337.3	304.1	385.8	351.5	317.2
	SHC	166.5	199.4	232.3	191.2	245.6	258.5	211.4	245.6	279.9
	kW	16.75	16.55	15.20	17.30	16.75	15.85	17.80	17.50	16.50
85	TC	327.5	296.4	265.3	346.1	313.6	281.2	361.1	327.5	294.0
	SHC	137.4	178.2	219.0	162.6	204.5	246.4	183.3	226.0	268.7
	kW	18.65	18.45	17.25	19.20	18.65	17.80	19.45	19.15	18.15
95	TC	303.7	273.3	242.9	321.8	290.0	258.3	336.4	303.5	270.7
	SHC	108.2	157.0	205.8	134.0	184.1	234.3	155.1	206.4	257.6
	kW	20.60	20.40	19.34	21.15	20.60	19.95	21.60	21.30	20.30
105	TC	279.9	250.2	220.4	297.5	266.4	235.3	311.7	279.5	247.4
	SHC	79.0	135.8	192.5	105.4	163.8	222.2	127.1	186.7	246.4
	kW	22.85	22.65	21.45	23.40	22.85	22.05	23.70	23.40	22.40
115	TC	256.2	227.1	198.0	273.2	242.8	212.4	287.0	255.5	224.1
	SHC	49.9	114.5	179.2	76.8	143.4	210.1	98.9	167.1	223.8
	kW	25.05	24.85	23.65	25.60	25.05	24.25	25.90	25.60	24.60
125	TC	232.4	203.9	175.5	248.9	219.2	189.5	262.3	231.5	200.8
	SHC	20.7	93.3	166.0	48.2	123.1	188.9	70.8	147.4	200.8
	kW	27.25	27.05	25.80	27.80	27.25	26.50	28.15	27.85	26.85

50HC028 (25 TONS) – UNIT WITH HUMIDI–MIZER IN HOT GAS REHEAT MODE										
Temp (F) Air Ent Condenser (Edb)		AIR ENTERING EVAPORATOR – Ewb (F)								
		75 Dry Bulb 62.5 Wet Bulb (50% Relative)			75 Dry Bulb 64 Wet Bulb (56% Relative)			75 Dry Bulb 65.3 Wet Bulb (60% Relative)		
		Air Entering Evaporator – Cfm								
		7,500	10,000	12,500	7,500	10,000	12,500	7,500	10,000	12,500
80	TC	124.40	133.90	139.00	132.00	142.10	145.10	135.60	149.10	151.50
	SHC	37.60	60.70	82.20	27.80	45.40	65.80	17.50	34.20	50.10
	kW	15.83	15.90	16.00	15.97	16.13	16.16	16.11	16.31	16.38
75	TC	129.00	138.50	144.60	136.60	147.60	150.10	140.60	154.00	156.30
	SHC	47.10	70.60	92.10	37.30	55.30	75.70	27.00	43.70	60.00
	kW	15.77	15.83	15.94	15.91	16.07	16.10	16.05	16.25	16.32
70	TC	133.60	143.10	149.20	141.20	152.30	154.80	145.30	158.80	161.10
	SHC	57.30	80.70	102.20	47.50	65.40	85.80	37.20	53.90	70.10
	kW	15.68	15.75	15.86	15.83	16.00	16.04	15.88	16.08	16.15
60	TC	142.80	158.40	158.40	150.40	161.40	163.90	153.90	167.40	169.70
	SHC	76.50	121.40	121.40	66.70	84.60	105.00	56.40	73.10	89.30
	kW	15.54	15.60	15.71	15.68	15.84	15.87	15.82	16.02	16.09
50	TC	151.80	161.30	167.40	159.40	170.50	173.20	162.80	176.20	178.80
	SHC	94.10	117.50	139.00	84.30	102.20	122.60	74.00	90.70	106.90
	kW	15.40	15.47	15.58	15.54	15.68	15.71	15.66	15.86	15.93
40	TC	161.20	170.70	176.80	168.80	179.80	182.50	172.20	185.70	188.20
	SHC	114.10	137.60	159.10	104.30	122.30	142.70	94.00	110.70	127.00
	kW	15.24	15.31	15.42	15.39	15.55	15.58	15.53	15.73	15.80

LEGEND

Edb – Entering Dry–Bulb
Ewb – Entering Wet–Bulb
kW – Compressor Motor Power Input
ldb – Leaving Dry–Bulb
lwb – Leaving Wet–Bulb
SHC – Sensible Heat Capacity (1000 Btuh) Gross
TC – Total Capacity (1000 Btuh) Gross

NOTES:

1. Direct interpolation is permissible. Do not extrapolate.
2. The following formulas may be used:

$$t_{ldb} = t_{edb} - \frac{\text{sensible capacity (Btuh)}}{1.10 \times \text{cfm}}$$

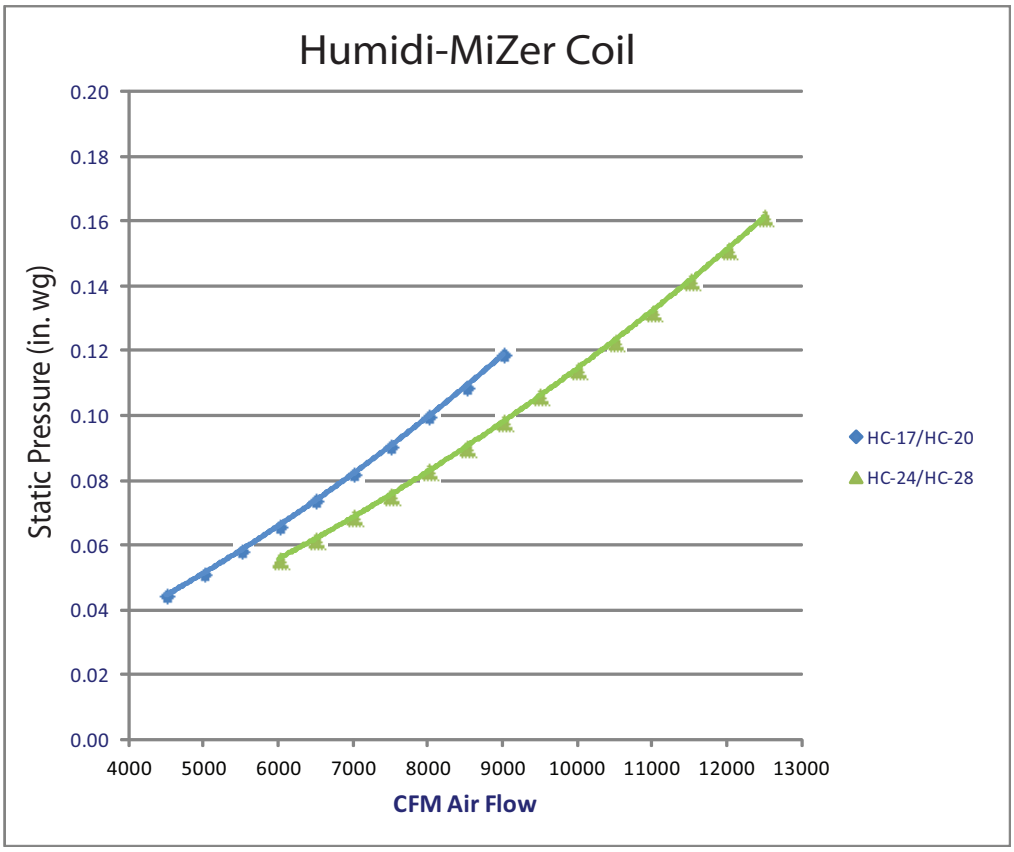
t_{lwb} = Wet–bulb temperature corresponding to enthalpy of air leaving evaporator coil (h_{lwb})

$$h_{lwb} = h_{ewb} - \frac{\text{total capacity (Btuh)}}{4.5 \times \text{cfm}}$$

Where: h_{ewb} = Enthalpy of air entering evaporator coil

TABLE 15 – STATIC PRESSURE ADDERS (in. wg) - Factory Options and/or Accessories

Humidi-MiZer



C11174

Economizer - Vertical and Horizontal Duct Configuration

MODEL SIZES 17 – 28								
CFM	**4500**	**5000**	**5500**	**6000**	**6500**	**7000**	**7500**	**8000**
	0.047	0.052	0.057	0.062	0.067	0.072	0.077	0.082

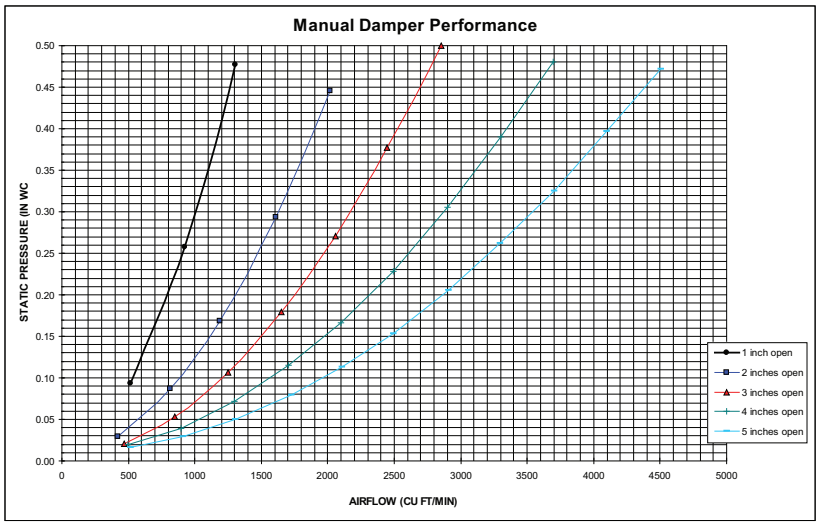
MODEL SIZES 17 – 28									
CFM	**8500**	**9000**	**9500**	**10000**	**10500**	**11000**	**11500**	**12000**	**12500**
	0.088	0.093	0.098	0.103	0.109	0.114	0.119	0.125	0.131

Electric Heaters - Vertical and Horizontal Duct Configuration

MODEL SIZES 17 – 28								
CFM	**4500**	**5000**	**5500**	**6000**	**6500**	**7000**	**7500**	**8000**
25 kW Heater	0.010	0.010	0.015	0.020	0.025	0.030	0.035	0.040
50 kW Heater	0.020	0.020	0.030	0.040	0.050	0.060	0.070	0.080
75 kW Heater	0.030	0.040	0.050	0.060	0.070	0.080	0.100	0.120

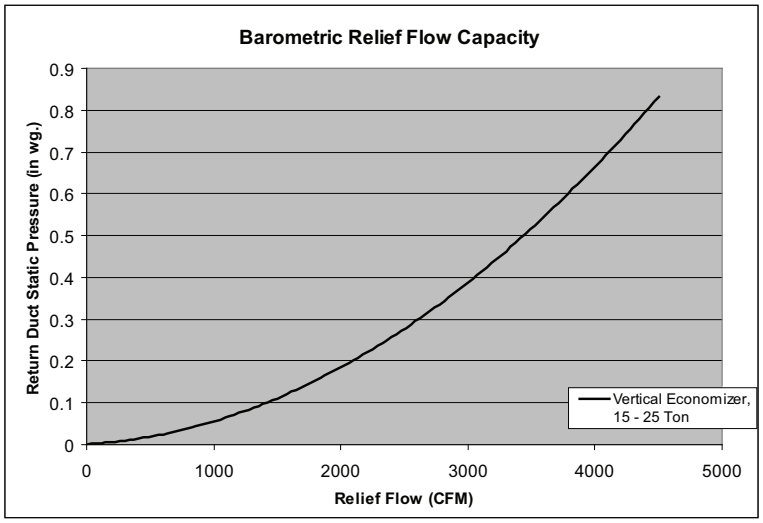
MODEL SIZES 17 – 28									
CFM	**8500**	**9000**	**9500**	**10000**	**10500**	**11000**	**11500**	**12000**	**12500**
25 kW Heater	0.045	0.050	0.055	0.060	0.070	0.080	0.090	0.100	0.105
50 kW Heater	0.090	0.100	0.120	0.130	0.150	0.160	0.180	0.200	0.230
75 kW Heater	0.140	0.150	0.180	0.200	0.230	0.250	0.270	0.300	0.330

DAMPER, BAROMETRIC RELIEF AND PE PERFORMANCE



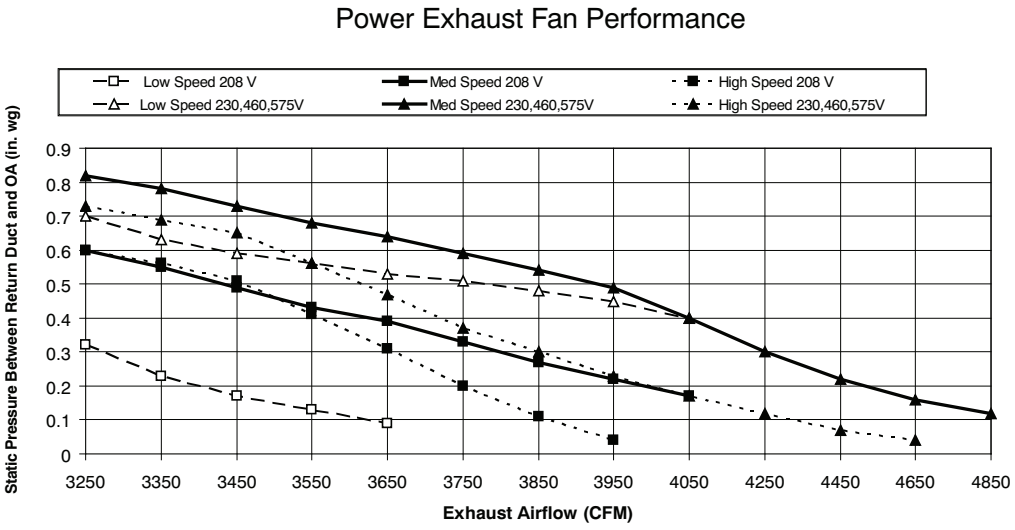
C09264

Fig. 13 - Manual Damper Performance



C10583

Fig. 14 - Barometric Relief Flow Capacity



C09270

Fig. 15 - Power Exhaust Fan Performance

General fan performance notes:

1. Interpolation is permissible. Do not extrapolate.
2. External static pressure is the static pressure difference between the return duct and the supply duct plus the static pressure caused by any FIOPs or accessories.
3. Tabular data accounts for pressure loss due to clean filters, unit casing, and wet coils. Factory options and accessories may add static pressure losses, as shown in the above table. Selection software is available, through your salesperson, to help you select the best motor/drive combination for your application.
4. The Fan Performance tables offer motor/drive recommendations. In cases when two motor/drive combinations would work, Carrier recommended the lower horsepower option.
5. For information on the electrical properties of Carrier motors, please see the Electrical information section of this book.
6. For more information on the performance limits of Carrier motors, see the application data section of this book.

FAN PERFORMANCE

Table 16 – 50HC-D17 **VERTICAL SUPPLY / RETURN** **15 TON**

CFM	Available External Static Pressure (in. wg)									
	0.2		0.4		0.6		0.8		1.0	
	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
4500	**436**	**0.60**	530	0.90	611	1.22	684	1.57	751	1.94
4900	**456**	**0.71**	546	1.03	625	1.37	695	1.73	760	2.12
5250	**473**	**0.83**	560	1.16	637	1.51	706	1.89	770	2.30
5600	**491**	**0.95**	575	1.30	650	1.67	717	2.07	780	2.48
6000	513	1.11	593	1.48	665	1.87	731	2.28	792	2.71
6400	534	1.29	611	1.68	681	2.09	745	2.52	805	2.97
6750	553	1.46	628	1.87	696	2.29	758	2.74	817	3.20
7100	573	1.65	645	2.07	711	2.51	772	2.98	829	3.46
7500	595	1.88	**665**	**2.33**	729	2.79	788	3.27	**844**	**3.77**

CFM	Available External Static Pressure (in. wg)									
	1.2		1.4		1.6		1.8		2.0	
	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
4500	812	2.33	869	2.74	924	3.17	975	3.62	**1024**	**4.08**
4900	821	2.53	877	2.95	931	3.40	981	3.86	**1030**	**4.34**
5250	829	2.72	885	3.16	938	3.61	988	4.09	**1036**	**4.57**
5600	838	2.92	893	3.37	945	3.84	994	4.33	**1042**	**4.83**
6000	849	3.17	903	3.63	954	4.12	1003	4.62	– – – –	– – – –
6400	861	3.43	914	3.92	964	4.42	**1012**	**4.94**	– – – –	– – – –
6750	872	3.69	924	4.18	973	4.70	– – – –	– – – –	– – – –	– – – –
7100	883	3.95	934	4.47	– – – –	– – – –	– – – –	– – – –	– – – –	– – – –
7500	897	4.28	947	4.81	– – – –	– – – –	– – – –	– – – –	– – – –	– – – –

Std Static Motor and Drive – 514–680 RPM, Max BHP 2.2
Medium Static Motor and Drive – 679–863 RPM, Max BHP 3.3
High Static Motor and Drive – 826–1009 RPM, Max BHP 4.9
– – – – Outside operating range
Boldface – Field–supplied Drive

Table 17 – 50HC-D20 **VERTICAL SUPPLY / RETURN** **17.5 TON**

CFM	Available External Static Pressure (in. wg)									
	0.2		0.4		0.6		0.8		1.0	
	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
5250	**473**	**0.83**	**560**	**1.16**	637	1.51	706	1.89	770	2.30
5700	**497**	**0.99**	**580**	**1.34**	654	1.72	721	2.12	783	2.54
6100	**518**	**1.15**	**598**	**1.53**	669	1.92	735	2.34	795	2.78
6500	**540**	**1.33**	**616**	**1.73**	685	2.14	749	2.58	808	3.03
7000	**567**	**1.59**	640	2.01	707	2.45	768	2.91	826	3.38
7500	**595**	**1.88**	665	2.33	729	2.79	788	3.27	844	3.77
7900	**618**	**2.14**	685	2.60	747	3.09	805	3.59	859	4.10
8300	641	2.42	705	2.91	765	3.41	822	3.93	875	4.46
8750	666	2.77	729	3.28	787	3.80	842	4.34	893	4.90

CFM	Available External Static Pressure (in. wg)									
	1.2		1.4		1.6		1.8		2.0	
	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
5250	829	2.72	885	3.16	938	3.61	988	4.09	1036	4.57
5700	841	2.98	895	3.43	947	3.91	997	4.40	1044	4.90
6100	852	3.23	906	3.70	957	4.19	1005	4.70	1052	5.22
6500	864	3.50	917	3.99	967	4.50	1015	5.02	1060	5.55
7000	**880**	**3.88**	931	4.38	980	4.91	1027	5.45	1072	6.01
7500	897	4.28	947	4.81	995	5.36	1041	5.92	**1085**	**6.49**
7900	911	4.63	960	5.18	1007	5.75	1052	6.32	– – – –	– – – –
8300	926	5.01	974	5.58	1020	6.16	– – – –	– – – –	– – – –	– – – –
8750	943	5.47	990	6.05	– – – –	– – – –	– – – –	– – – –	– – – –	– – – –

Std Static Motor and Drive – 622–822 RPM, Max BHP 3.3
Medium Static Motor and Drive – 713–879 RPM, Max BHP 4.9
High Static Motor and Drive – 882–1078 RPM, Max BHP 6.5
– – – – Outside operating range
Boldface – Field–supplied Drive

FAN PERFORMANCE (cont.)

Table 18 – 50HC-D24 **VERTICAL SUPPLY / RETURN** **20 TON**

CFM	Available External Static Pressure (in. wg)									
	0.2		0.4		0.6		0.8		1.0	
	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
6000	**506**	**1.12**	**593**	**1.43**	**668**	**1.74**	736	2.07	798	2.40
6500	**533**	**1.36**	**616**	**1.70**	689	2.04	754	2.39	815	2.74
7000	**561**	**1.64**	**640**	**2.01**	710	2.37	774	2.74	833	3.11
7500	**588**	**1.96**	**664**	**2.35**	732	2.74	795	3.13	852	3.53
8000	**617**	**2.32**	689	2.74	755	3.15	816	3.57	872	3.99
8500	**645**	**2.73**	715	3.17	779	3.60	837	4.04	892	4.49
9000	**674**	**3.18**	741	3.64	803	4.10	860	4.57	913	5.04
9500	703	3.67	767	4.16	827	4.65	883	5.14	935	5.64
10000	732	4.22	794	4.74	852	5.25	906	5.77	957	6.29

CFM	Available External Static Pressure (in. wg)									
	1.2		1.4		1.6		1.8		2.0	
	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
6000	855	2.75	909	3.11	959	3.47	1008	3.85	1054	4.24
6500	871	3.11	924	3.48	974	3.87	1022	4.26	1067	4.67
7000	888	3.50	940	3.89	989	4.30	1036	4.71	1081	5.13
7500	906	3.94	957	4.35	1005	4.77	1052	5.20	1096	5.64
8000	925	4.42	975	4.85	1022	5.29	1068	5.74	1111	6.20
8500	944	4.94	993	5.40	1040	5.86	1084	6.33	1127	6.81
9000	964	5.51	1012	5.99	1058	6.48	1102	6.97	1144	7.46
9500	984	6.13	1032	6.64	1077	7.14	1120	7.65	1161	8.17
10000	1006	6.81	1052	7.33	1096	7.86	1138	8.40	– – – –	– – – –

Std Static Motor and Drive – 690–863 RPM, Max BHP 4.9
Medium Static Motor and Drive – 835–1021 RPM, Max BHP 6.5
High Static Motor and Drive – 941–1176 RPM, Max BHP 8.7
– – – – Outside operating range
Boldface – Field–supplied Drive

Table 19 – 50HC-D28 **VERTICAL SUPPLY / RETURN** **25 TON**

CFM	Available External Static Pressure (in. wg)									
	0.2		0.4		0.6		0.8		1.0	
	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
7500	**541**	**1.50**	**636**	**1.88**	**716**	**2.27**	787	2.66	850	3.06
8000	**563**	**1.76**	**656**	**2.17**	735	2.58	804	3.00	867	3.42
8500	**585**	**2.05**	**676**	**2.50**	753	2.93	822	3.37	884	3.81
9000	**608**	**2.37**	**697**	**2.85**	772	3.31	840	3.77	901	4.24
9500	**631**	**2.73**	717	3.24	791	3.73	858	4.21	918	4.70
10000	**654**	**3.12**	738	3.66	811	4.18	876	4.69	936	5.20
10500	**678**	**3.56**	759	4.12	831	4.67	**895**	**5.21**	954	5.74
11000	**701**	**4.02**	781	4.62	**851**	**5.20**	914	5.76	972	6.33
11500	725	4.53	**802**	**5.16**	**871**	**5.77**	933	6.36	991	6.95
12000	**748**	**5.09**	**824**	**5.75**	**892**	**6.38**	953	7.00	1010	7.62
12500	**772**	**5.68**	**846**	**6.38**	**912**	**7.04**	973	7.69	1029	8.34

CFM	Available External Static Pressure (in. wg)									
	1.2		1.4		1.6		1.8		2.0	
	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
CFM	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
7500	909	3.47	963	3.89	1014	4.32	1062	4.77	1108	5.23
8000	925	3.85	978	4.29	1029	4.74	1077	5.20	1122	5.68
8500	941	4.26	994	4.72	1044	5.19	1092	5.67	1137	6.16
9000	957	4.71	1010	5.19	1060	5.67	1107	6.17	1152	6.68
9500	974	5.19	1027	5.69	1076	6.20	1123	6.72	1167	7.24
10000	991	5.72	1043	6.24	1092	6.77	1138	7.30	– – – –	– – – –
10500	1009	6.28	1060	6.83	1109	7.37	1155	7.93	– – – –	– – – –
11000	1026	6.89	1077	7.46	1125	8.03	1171	8.60	– – – –	– – – –
11500	1044	7.54	1095	8.13	1142	8.72	– – – –	– – – –	– – – –	– – – –
12000	1062	8.23	1112	8.85	– – – –	– – – –	– – – –	– – – –	– – – –	– – – –
12500	– – – –	– – – –	– – – –	– – – –	– – – –	– – – –	– – – –	– – – –	– – – –	– – – –

Std Static Motor and Drive – 717–911 RPM, Max BHP 4.9
Medium Static Motor and Drive – 913–1116 RPM, Max BHP 6.5
High Static Motor and Drive – 941–1176 RPM, Max BHP 8.7
– – – – Outside operating range
Boldface – Field–supplied Drive

FAN PERFORMANCE (cont.)

Table 20 – 50HC-D17 **HORIZONTAL SUPPLY / RETURN** **15 TON**

CFM	Available External Static Pressure (in. wg)									
	0.2		0.4		0.6		0.8		1.0	
	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
4500	**451**	**0.84**	533	1.21	605	1.63	668	2.12	726	2.67
4900	**476**	**1.01**	554	1.40	623	1.84	685	2.34	742	2.89
5250	**498**	**1.18**	573	1.60	640	2.05	701	2.55	756	3.11
5600	520	1.37	593	1.82	658	2.28	717	2.79	771	3.35
6000	546	1.61	616	2.10	679	2.58	736	3.10	789	3.67
6400	572	1.88	640	2.41	700	2.91	756	3.45	808	4.03
6750	595	2.13	661	2.70	720	3.23	774	3.79	825	4.38
7100	619	2.41	683	3.02	**740**	**3.59**	793	4.16	842	4.76
7500	646	2.75	**708**	**3.42**	764	4.02	815	4.62	– – – –	– – – –

CFM	Available External Static Pressure (in. wg)									
	1.2		1.4		1.6		1.8		2.0	
	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
4500	778	3.25	826	3.86	871	4.49	**913**	**5.15**	– – – –	– – – –
4900	794	3.49	842	4.12	887	4.78	– – – –	– – – –	– – – –	– – – –
5250	808	3.72	856	4.36	– – – –	– – – –	– – – –	– – – –	– – – –	– – – –
5600	822	3.97	870	4.62	– – – –	– – – –	– – – –	– – – –	– – – –	– – – –
6000	839	4.29	– – – –	– – – –	– – – –	– – – –	– – – –	– – – –	– – – –	– – – –
6400	857	4.65	– – – –	– – – –	– – – –	– – – –	– – – –	– – – –	– – – –	– – – –
6750	– – – –	– – – –	– – – –	– – – –	– – – –	– – – –	– – – –	– – – –	– – – –	– – – –
7100	– – – –	– – – –	– – – –	– – – –	– – – –	– – – –	– – – –	– – – –	– – – –	– – – –
7500	– – – –	– – – –	– – – –	– – – –	– – – –	– – – –	– – – –	– – – –	– – – –	– – – –

Std Static Motor and Drive – 514–680 RPM, Max BHP 2.2
Medium Static Motor and Drive – 614–780 RPM, Max BHP 3.3
High Static Motor and Drive – 746–912 RPM, Max BHP 4.9
– – – – Outside operating range
Boldface – Field–supplied Drive

Table 21 – 50HC-D20 **HORIZONTAL SUPPLY / RETURN** **17.5 TON**

CFM	Available External Static Pressure (in. wg)									
	0.2		0.4		0.6		0.8		1.0	
	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
5250	**498**	**1.18**	**573**	**1.60**	640	2.05	701	2.55	756	3.11
5700	**526**	**1.43**	**599**	**1.89**	663	2.35	721	2.86	776	3.43
6100	**552**	**1.67**	622	2.17	684	2.66	741	3.18	794	3.76
6500	**579**	**1.95**	646	2.49	706	3.00	761	3.54	813	4.12
7000	**612**	**2.33**	677	2.93	734	3.48	788	4.05	837	4.64
7500	646	2.75	**708**	**3.42**	764	4.02	815	4.62	**863**	**5.23**
7900	673	3.13	734	3.86	788	4.50	**838**	**5.12**	884	5.75
8300	**700**	**3.53**	760	4.33	**812**	**5.01**	**861**	**5.66**	906	6.32
8750	731	4.03	789	4.90	**840**	**5.63**	887	6.33	– – – –	– – – –

CFM	Available External Static Pressure (in. wg)									
	1.2		1.4		1.6		1.8		2.0	
	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
5250	808	3.72	856	4.36	901	5.04	943	5.75	983	6.48
5700	826	4.05	874	4.71	918	5.40	960	6.13	– – – –	– – – –
6100	843	4.38	890	5.05	934	5.75	976	6.50	– – – –	– – – –
6500	861	4.75	907	5.43	951	6.14	– – – –	– – – –	– – – –	– – – –
7000	885	5.28	929	5.96	– – – –	– – – –	– – – –	– – – –	– – – –	– – – –
7500	909	5.88	– – – –	– – – –	– – – –	– – – –	– – – –	– – – –	– – – –	– – – –
7900	929	6.42	– – – –	– – – –	– – – –	– – – –	– – – –	– – – –	– – – –	– – – –
8300	– – – –	– – – –	– – – –	– – – –	– – – –	– – – –	– – – –	– – – –	– – – –	– – – –
8750	– – – –	– – – –	– – – –	– – – –	– – – –	– – – –	– – – –	– – – –	– – – –	– – – –

Std Static Motor and Drive – 622–822 RPM, Max BHP 3.3
Medium Static Motor and Drive – 713–879 RPM, Max BHP 4.9
High Static Motor and Drive – 882–1078 RPM, Max BHP 6.5
– – – – Outside operating range
Boldface – Field–supplied Drive

FAN PERFORMANCE (cont.)

Table 22 – 50HC-D24 **HORIZONTAL SUPPLY / RETURN** **20 TON**

CFM	Available External Static Pressure (in. wg)									
	0.2		0.4		0.6		0.8		1.0	
	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
6000	**546**	**1.57**	**617**	**2.10**	**680**	**2.67**	738	3.29	790	3.93
6500	**579**	**1.90**	**646**	**2.46**	707	3.07	763	3.71	814	4.39
7000	**613**	**2.28**	**677**	**2.87**	735	3.51	789	4.19	839	4.89
7500	**648**	**2.71**	708	3.34	764	4.01	816	4.72	865	5.46
8000	**683**	**3.20**	740	3.86	794	4.57	846	5.30	892	6.08
8500	718	3.76	773	4.45	825	5.18	873	5.95	**919**	**6.75**
9000	754	4.37	**814**	**5.10**	856	5.87	**903**	**6.67**	947	7.50
9500	– – – –	– – – –	840	5.82	**887**	**6.51**	**933**	**7.45**	976	8.31
10000	– – – –	– – – –	874	6.50	**920**	**7.44**	965	8.30	– – – –	– – – –

CFM	Available External Static Pressure (in. wg)									
	1.2		1.4		1.6		1.8		2.0	
	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
6000	839	4.60	885	5.29	928	6.01	969	6.75	1008	7.51
6500	862	5.09	907	5.82	950	6.57	990	7.34	1028	8.13
7000	886	5.63	930	6.39	972	7.17	1012	7.97	1050	8.70
7500	911	6.22	954	7.01	995	7.83	1035	8.66	– – – –	– – – –
8000	**936**	**6.87**	979	7.69	1019	8.54	– – – –	– – – –	– – – –	– – – –
8500	965	7.58	1004	8.44	– – – –	– – – –	– – – –	– – – –	– – – –	– – – –
9000	990	8.36	– – – –	– – – –	– – – –	– – – –	– – – –	– – – –	– – – –	– – – –
9500	– – – –	– – – –	– – – –	– – – –	– – – –	– – – –	– – – –	– – – –	– – – –	– – – –
10000	– – – –	– – – –	– – – –	– – – –	– – – –	– – – –	– – – –	– – – –	– – – –	– – – –

Std Static Motor and Drive – 690–863 RPM, Max BHP 4.9
Medium Static Motor and Drive – 835–1021 RPM, Max BHP 6.5
High Static Motor and Drive – 941–1176 RPM, Max BHP 8.7
– – – – Outside operating range
Boldface – Field–supplied Drive

Table 23 – 50HC-D28 **HORIZONTAL SUPPLY / RETURN** **25 TON**

CFM	Available External Static Pressure (in. wg)									
	0.2		0.4		0.6		0.8		1.0	
	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
7500	**553**	**1.92**	**621**	**2.46**	683	3.07	741	3.72	795	4.42
8000	**575**	**2.21**	**639**	**2.77**	700	3.39	756	4.07	809	4.78
8500	**596**	**2.52**	658	3.10	716	3.73	771	4.43	823	5.16
9000	**616**	**2.86**	675	3.44	732	4.10	786	4.80	836	5.55
9500	**636**	**3.22**	693	3.82	747	4.48	800	5.20	849	5.97
10000	656	3.60	710	4.21	763	4.89	813	5.62	862	6.40
10500	675	4.02	727	4.64	778	5.32	827	6.07	874	6.86
11000	694	4.46	**744**	**5.09**	793	5.79	841	6.50	887	7.34
11500	**713**	**4.93**	761	5.57	808	6.27	854	7.03	899	7.84

CFM	Available External Static Pressure (in. wg)									
	1.2		1.4		1.6		1.8		2.0	
	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
7500	845	5.14	892	5.90	936	6.68	978	7.48	**1018**	**8.31**
8000	859	5.53	905	6.31	949	7.11	991	7.94	– – – –	– – – –
8500	872	5.93	918	6.73	961	7.56	1003	8.41	– – – –	– – – –
9000	884	6.34	930	7.16	973	8.01	– – – –	– – – –	– – – –	– – – –
9500	896	6.77	941	7.61	984	8.48	– – – –	– – – –	– – – –	– – – –
10000	908	7.22	953	8.08	– – – –	– – – –	– – – –	– – – –	– – – –	– – – –
10500	920	7.69	963	8.56	– – – –	– – – –	– – – –	– – – –	– – – –	– – – –
11000	931	8.18	– – – –	– – – –	– – – –	– – – –	– – – –	– – – –	– – – –	– – – –
11500	943	8.70	– – – –	– – – –	– – – –	– – – –	– – – –	– – – –	– – – –	– – – –

Std Static Motor and Drive – 647–791 RPM, Max BHP 4.9
Medium Static Motor and Drive – 755–923 RPM, Max BHP 6.5
High Static Motor and Drive – 827–1010 RPM, Max BHP 8.7
– – – – Outside operating range
Boldface – Field–supplied Drive

FAN PERFORMANCE (cont.)

Table 24 – PULLEY ADJUSTMENT

MODEL SIZE	MOTOR/DRIVE COMBO	MOTOR PULLEY TURNS OPEN										
		0	0.5	1	1.5	2	2.5	3	3.5	4	4.5	5
17	Standard Static	680	663	647	630	614	597	580	564	547	531	514
	Medium Static	863	845	826	808	789	771	753	734	716	697	679
	High Static	1009	991	972	954	936	918	899	881	863	844	826
20	Standard Static	822	802	782	762	742	722	702	682	662	642	622
	Medium Static	879	862	846	829	813	796	779	763	746	730	713
	High Static	1078	1058	1039	1019	1000	980	960	941	921	902	882
24	Standard Static	863	846	828	811	794	777	759	742	725	707	690
	Medium Static	1021	1002	984	965	947	928	909	891	872	854	835
	High Static	1176	1153	1129	1106	1082	1059	1035	1012	988	965	941
28	Standard Static	911	892	872	853	833	814	795	775	756	736	717
	Medium Static	1116	1096	1075	1055	1035	1015	994	974	954	933	913
	High Static	1176	1153	1129	1106	1082	1059	1035	1012	988	965	941

NOTE: Do not adjust pulley further than 5 turns open.

– Factory settings

ELECTRICAL INFORMATION

Table 25 – 2-STAGE COOLING

UNIT	V–PH–HZ	VOLTAGE RANGE		COMP 1		COMP 2		OFM (ea)		IFM		
		MIN	MAX	RLA	LRA	RLA	LRA	WATTS	FLA	TYPE	EFF at Full Load	FLA
50HC–D17	208–3–60	187	253	29.5	195	30.1	225	350	1.5	STD	81.3%	7.5
										MED	83.8%	10.2
										HIGH	83.6%	15.0
	230–3–60	187	253	29.5	195	30.1	225	350	1.5	STD	81.3%	7.5
										MED	83.8%	10.2
										HIGH	83.6%	15.0
	460–3–60	414	506	14.7	95	16.7	114	277	0.9	STD	81.3%	3.4
										MED	83.8%	4.8
										HIGH	83.6%	7.4
	575–3–60	518	633	12.2	80	12.2	80	397	0.6	STD	81.1%	2.8
										MED	81.1%	2.8
										HIGH	83.6%	5.6
50HC–D20	208–3–60	187	253	29.5	195	30.1	225	350	1.5	STD	83.8%	10.2
										MED	83.6%	15.0
										HIGH	87.5%	12.8
										HIGH–High Eff	89.5%	20.4
	230–3–60	187	253	29.5	195	30.1	225	350	1.5	STD	83.8%	10.2
										MED	83.6%	15.0
										HIGH	87.5%	12.8
										HIGH–High Eff	89.5%	20.4
	460–3–60	414	506	14.7	95	16.7	114	277	0.9	STD	83.8%	4.8
										MED	83.6%	7.4
										HIGH	87.5%	6.4
										HIGH–High Eff	89.5%	20.4
	575–3–60	518	633	12.2	80	12.2	80	397	0.6	STD	81.1%	2.8
										MED	83.6%	5.6
										HIGH	87.5%	5.1
										HIGH–High Eff	89.5%	9.0
50HC–D24	208–3–60	187	253	48.1	245	29.5	195	350	1.5	STD	83.6%	15.0
										MED	87.5%	12.8
										HIGH	88.5%	19.4
										MED–High Eff	89.5%	20.4
										HIGH–High Eff	91.7%	33.1
	230–3–60	187	253	48.1	245	29.5	195	350	1.5	STD	83.6%	15.0
										MED	87.5%	12.8
										HIGH	88.5%	19.4
										MED–High Eff	89.5%	20.4
										HIGH–High Eff	91.7%	33.1
	460–3–60	414	506	18.6	125	14.7	95	277	0.9	STD	83.6%	7.4
										MED	87.5%	6.4
										HIGH	88.5%	9.7
										MED–High Eff	89.5%	20.4
										HIGH–High Eff	91.7%	33.1
	575–3–60	518	633	14.7	100	12.2	80	397	0.6	STD	83.6%	5.6
										MED	87.5%	5.1
										HIGH	88.5%	7.8
										MED–High Eff	89.5%	9.0
										HIGH–High Eff	91.7%	9.5

Table 25 - 2-STAGE COOLING (con't)

UNIT	V–PH–HZ	VOLTAGE RANGE		COMP 1		COMP 2		OFM (ea)		IFM		
		MIN	MAX	RLA	LRA	RLA	LRA	WATTS	FLA	TYPE	EFF at Full Load	FLA
50HC–D28	208–3–60	187	253	48.1	245	48.1	245	350	1.5	STD	83.6%	15.0
										MED	87.5%	12.8
										HIGH	88.5%	19.4
										MED–High Eff	89.5%	20.4
										HIGH–High Eff	91.7%	33.1
	230–3–60	187	253	48.1	245	48.1	245	350	1.5	STD	83.6%	15.0
										MED	87.5%	12.8
										HIGH	88.5%	19.4
										MED–High Eff	89.5%	20.4
										HIGH–High Eff	91.7%	33.1
	460–3–60	414	506	18.6	125	18.6	125	277	0.9	STD	83.6%	7.4
										MED	87.5%	6.4
										HIGH	88.5%	9.7
										MED–High Eff	89.5%	20.4
										HIGH–High Eff	91.7%	33.1
	575–3–60	518	633	14.7	100	14.7	100	397	0.6	STD	83.6%	5.6
										MED	87.5%	5.1
										HIGH	88.5%	7.8
										MED–High Eff	89.5%	9.0
										HIGH–High Eff	91.7%	9.5

Table 26 – MCA/MOCP DETERMINATION NO C.O. OR UNPWRD C.O.

UNIT	NOM. V–PH–HZ	IFM TYPE	ELECTRIC HEATER		NO C.O. or UNPWR C.O.							
					NO P.E.				w/ P.E. (pwrd fr/unit)			
			Nom (kW)	FLA	MCA	MOCP	DISC. SIZE		MCA	MOCP	DISC. SIZE	
							FLA	LRA			FLA	LRA
50HC–D17	208/230–3–60	STD	–	–	68.3	90.0	71.0	393.0	80.1	100.0	85.0	413.0
			18.8/25.0	52.1/60.1	74.5/84.5	90/90	71/78	393/393	89.3/99.3	100/100	85/91	413/413
			37.6/50.0	104.2/120.3	139.6/129.7	150/150	128/147	393/393	154.4/144.4	175/150	142/161	413/413
			56.3/75.0	156.4/180.4	165.8/189.8	175/200	188/216	393/393	180.5/204.5	200/225	202/230	413/413
		MED	–	–	71.0	90.0	74.0	410.0	82.8	100.0	88.0	430.0
			18.8/25.0	52.1/60.1	77.9/87.9	90/90	74/81	410/410	92.6/102.6	100/110	88/94	430/430
			37.6/50.0	104.2/120.3	143.0/133.1	150/150	132/150	410/410	157.8/147.8	175/175	145/164	430/430
			56.3/75.0	156.4/180.4	169.2/193.2	200/225	192/219	410/410	183.9/207.9	200/225	205/233	430/430
		HIGH	–	–	75.8	100.0	80.0	419.0	87.6	100.0	93.0	439.0
			18.8/25.0	52.1/60.1	83.9/93.9	100/100	80/86	419/419	98.6/108.6	100/110	93/100	439/439
			37.6/50.0	104.2/120.3	149.0/139.1	150/175	137/156	419/419	163.8/153.8	175/175	151/169	439/439
			56.3/75.0	156.4/180.4	175.2/199.2	200/225	197/225	419/419	189.9/213.9	200/250	211/238	439/439
	460–3–60	STD	–	–	34.9	45.0	36.0	234.0	41.1	50.0	44.0	246.0
			25.0	30.1	41.9	45.0	39.0	234.0	49.6	50.0	46.0	246.0
			50.0	60.1	64.4	70.0	73.0	234.0	72.1	80.0	80.0	246.0
			75.0	90.2	94.5	100	108	234	102.2	110	115	246
		MED	–	–	36.3	45.0	38.0	243.0	42.5	50.0	45.0	255.0
			25.0	30.1	43.6	45.0	40.0	243.0	51.4	60.0	47.0	255.0
			50.0	60.1	66.1	80.0	75.0	243.0	73.9	80.0	82.0	255.0
			75.0	90.2	96.2	100	109	243	104.0	110	116	255
		HIGH	–	–	38.9	50.0	41.0	247.0	45.1	50.0	48.0	259.0
			25.0	30.1	46.9	50.0	43.0	247.0	54.6	60.0	50.0	259.0
			50.0	60.1	69.4	80.0	78.0	247.0	77.1	80.0	85.0	259.0
			75.0	90.2	99.5	110	112	247	107.2	125	119	259
	575–3–60	STD	–	–	26.2	30.0	27.0	184.0	31.0	40.0	33.0	192.0
			24.8	23.9	33.4	35.0	31.0	184.0	39.4	40.0	36.0	192.0
			49.6	47.7	63.1	70.0	58.0	184.0	69.1	70.0	64.0	192.0
			74.4	71.6	75.1	80	86	184	81.1	90	91	192
		MED	–	–	26.2	30.0	27.0	184.0	31.0	40.0	33.0	192.0
			24.8	23.9	33.4	35.0	31.0	184.0	39.4	40.0	36.0	192.0
			49.6	47.7	63.1	70.0	58.0	184.0	69.1	70.0	64.0	192.0
			74.4	71.6	75.1	80	86	184	81.1	90	91	192
		HIGH	–	–	29.0	35.0	31.0	198.0	33.8	40.0	36.0	206.0
			24.8	23.9	36.9	40.0	34.0	198.0	42.9	45.0	39.0	206.0
			49.6	47.7	66.6	70.0	61.0	198.0	72.6	80.0	67.0	206.0
			74.4	71.6	78.6	90	89	198	84.6	90	94	206

LEGEND:

C.O. – Convenient outlet
DISC – Disconnect
FLA – Full load amps
IFM – Indoor fan motor
LRA – Locked rotor amps
MCA – Minimum circuit amps
MOCP – Maximum over current protection
P.E. – Power exhaust
UNPWRD C.O. – Unpowered convenient outlet

NOTES:

1. In compliance with NEC requirements for multimotor and combination load equipment (refer to NEC Articles 430 and 440), the overcurrent protective device for the unit shall be fuse or HACR breaker. Canadian units may be fuse or circuit breaker.
2. **Unbalanced 3-Phase Supply Voltage**
   Never operate a motor where a phase imbalance in supply voltage is greater than 2%. Use the following formula to determine the percentage of voltage imbalance.

$$\% \text{ Voltage Imbalance} = 100 \times \frac{\text{max voltage deviation from average voltage}}{\text{average voltage}}$$

Example: Supply voltage is 230-3-60

AB = 224 v
BC = 231 v
AC = 226 v

$$\text{Average Voltage} = \frac{(224 + 231 + 226)}{3} = \frac{681}{3}$$

$$= 227$$

Determine maximum deviation from average voltage.
(AB) 227 – 224 = 3 v Maximum deviation is 4 v.
(BC) 231 – 227 = 4 v Determine percent of voltage imbalance.

$$\% \text{ Voltage Imbalance} = 100 \times \frac{4}{227}$$

$$= 1.76\%$$

This amount of phase imbalance is satisfactory as it is below the maximum allowable 2%.

IMPORTANT: If the supply voltage phase imbalance is more than 2%, contact your local electric utility company immediately.

Table 26 – (cont.) MCA/MOCP DETERMINATION NO C.O. OR UNPWRD C.O.

UNIT	NOM. V–PH–HZ	IFM TYPE	ELECTRIC HEATER		NO C.O. or UNPWR C.O.							
					NO P.E.				w/ P.E. (pwrd fr/unit)			
			Nom (kW)	FLA	MCA	MOCP	DISC. SIZE		MCA	MOCP	DISC. SIZE	
							FLA	LRA			FLA	LRA
50HC–D20	208/230–3–60	STD	–	–	75.7	100.0	79.0	440.0	87.5	100.0	93.0	460.0
			18.8/25.0	52.1/60.1	77.9/87.9	100/100	79/81	440/440	92.6/102.6	100/110	93/94	460/460
			37.6/50.0	104.2/120.3	143.0/133.1	150/150	132/150	440/440	157.8/147.8	175/175	145/164	460/460
			56.3/75.0	156.4/180.4	169.2/193.2	200/225	192/219	440/440	183.9/207.9	200/225	205/233	460/460
		MED	–	–	80.5	100.0	85.0	449.0	92.3	100.0	98.0	469.0
			18.8/25.0	52.1/60.1	83.9/93.9	100/100	85/86	449/449	98.6/108.6	100/110	98/100	469/469
			37.6/50.0	104.2/120.3	149.0/139.1	150/175	137/156	449/449	163.8/153.8	175/175	151/169	469/469
			56.3/75.0	156.4/180.4	175.2/199.2	200/225	197/225	449/449	189.9/213.9	200/250	211/238	469/469
		HIGH	–	–	78.3	100.0	82.0	451.0	90.1	100.0	96.0	471.0
			18.8/25.0	52.1/60.1	81.1/91.1	100/100	82/84	451/451	95.9/105.9	100/110	96/97	471/471
			37.6/50.0	104.2/120.3	146.3/136.3	150/150	135/153	451/451	161.0/151.1	175/175	148/167	471/471
			56.3/75.0	156.4/180.4	172.4/196.4	200/225	195/222	451/451	187.2/211.2	200/225	208/236	471/471
		HIGH–High Eff	–	–	85.9	100.0	91.0	459.0	97.7	125.0	104.0	479.0
			18.8/25.0	52.1/60.1	90.6/100.6	100/100	91/93	459/459	105.4/115.4	125/125	104/106	479/479
			37.6/50.0	104.2/120.3	155.8/145.8	175/175	143/162	459/459	170.5/160.6	175/175	157/175	479/479
			56.3/75.0	156.4/180.4	181.9/205.9	200/250	203/231	459/459	196.7/220.7	200/250	217/244	479/479
	460–3–60	STD	–	–	36.6	45.0	38.0	245.0	42.8	50.0	46.0	257.0
			25.0	30.1	43.6	45.0	40.0	245.0	51.4	60.0	47.0	257.0
			50.0	60.1	66.1	80.0	75.0	245.0	73.9	80.0	82.0	257.0
			75.0	90.2	96.2	100	109	245	104.0	110	116	257
		MED	–	–	39.2	50.0	41.0	249.0	45.4	50.0	49.0	261.0
			25.0	30.1	46.9	50.0	43.0	249.0	54.6	60.0	50.0	261.0
			50.0	60.1	69.4	80.0	78.0	249.0	77.1	80.0	85.0	261.0
			75.0	90.2	99.5	110	112	249	107.2	125	119	261
		HIGH	–	–	38.2	50.0	40.0	250.0	44.4	50.0	47.0	262.0
			25.0	30.1	45.6	50.0	42.0	250.0	53.4	60.0	49.0	262.0
			50.0	60.1	68.1	80.0	76.0	250.0	75.9	80.0	84.0	262.0
			75.0	90.2	98.2	100	111	250	106.0	125	118	262
		HIGH–High Eff	–	–	42.0	50.0	45.0	254.0	48.2	60.0	52.0	266.0
			25.0	30.1	50.4	60.0	46.0	254.0	58.1	60.0	53.0	266.0
			50.0	60.1	72.9	80.0	81.0	254.0	80.6	90.0	88.0	266.0
			75.0	90.2	103.0	125	115	254	110.7	125	123	266
	575–3–60	STD	–	–	26.2	30.0	27.0	186.0	31.0	40.0	33.0	194.0
			24.8	23.9	33.4	35.0	31.0	186.0	39.4	40.0	36.0	194.0
			49.6	47.7	63.1	70.0	58.0	186.0	69.1	70.0	64.0	194.0
			74.4	71.6	75.1	80	86	186	81.1	90	91	194
		MED	–	–	29.0	35.0	31.0	200.0	33.8	40.0	36.0	208.0
			24.8	23.9	36.9	40.0	34.0	200.0	42.9	45.0	39.0	208.0
			49.6	47.7	66.6	70.0	61.0	200.0	72.6	80.0	67.0	208.0
			74.4	71.6	78.6	90	89	200	84.6	90	94	208
		HIGH	–	–	28.5	35.0	30.0	189.0	33.3	40.0	36.0	197.0
			24.8	23.9	36.3	40.0	33.0	189.0	42.3	45.0	39.0	197.0
			49.6	47.7	66.0	70.0	61.0	189.0	72.0	80.0	66.0	197.0
			74.4	71.6	78.0	90	88	189	84.0	90	94	197
		HIGH–High Eff	–	–	32.4	40.0	35.0	198.0	37.2	45.0	40.0	206.0
			24.8	23.9	41.1	45.0	38.0	198.0	47.1	50.0	43.0	206.0
			49.6	47.7	70.9	80.0	65.0	198.0	76.9	80.0	71.0	206.0
			74.4	71.6	82.9	90	93	198	88.9	90	98	206

Table 26 – (cont.) MCA/MOCP DETERMINATION NO C.O. OR UNPWRD C.O.

UNIT	NOM. V–PH–HZ	IFM TYPE	ELECTRIC HEATER		NO C.O. or UNPWR C.O.							
					NO P.E.				w/ P.E. (pwrd fr/unit)			
			Nom (kW)	FLA	MCA	MOCP	DISC. SIZE		MCA	MOCP	DISC. SIZE	
							FLA	LRA			FLA	LRA
50HC–D24	208/230–3–60	STD	–	–	88.7	100.0	93.0	544.0	100.5	125.0	107.0	564.0
			18.8/25.0	52.1/60.1	88.7/93.9	100/100	93/93	544/544	100.5/108.6	125/125	107/107	564/564
			37.6/50.0	104.2/120.3	149.0/139.1	150/175	137/156	544/544	163.8/153.8	175/175	151/169	564/564
			56.3/75.0	156.4/180.4	175.2/199.2	200/225	197/225	544/544	189.9/213.9	200/250	211/238	564/564
		MED	–	–	86.5	100.0	91.0	546.0	98.3	125.0	104.0	566.0
			18.8/25.0	52.1/60.1	86.5/91.1	100/100	91/91	546/546	98.3/105.9	125/125	104/104	566/566
			37.6/50.0	104.2/120.3	146.3/136.3	150/150	135/153	546/546	161.0/151.1	175/175	148/167	566/566
			56.3/75.0	156.4/180.4	172.4/196.4	200/225	195/222	546/546	187.2/211.2	200/225	208/236	566/566
		HIGH	–	–	93.1	110.0	98.0	582.0	104.9	125.0	112.0	602.0
			18.8/25.0	52.1/60.1	93.1/99.4	110/110	98/98	582/582	104.9/114.1	125/125	112/112	602/602
			37.6/50.0	104.2/120.3	154.5/144.6	175/175	142/161	582/582	169.3/159.3	175/175	156/174	602/602
			56.3/75.0	156.4/180.4	180.7/204.7	200/225	202/230	582/582	195.4/219.4	200/250	216/243	602/602
		MED–High Eff	–	–	94.1	110.0	100.0	554.0	105.9	125.0	113.0	574.0
			18.8/25.0	52.1/60.1	94.1/100.6	110/110	100/100	554/554	105.9/115.4	125/125	113/113	574/574
			37.6/50.0	104.2/120.3	155.8/145.8	175/175	143/162	554/554	170.5/160.6	175/175	157/175	574/574
			56.3/75.0	156.4/180.4	181.9/205.9	200/250	203/231	554/554	196.7/220.7	200/250	217/244	574/574
		HIGH–High Eff	–	–	107.6	125.0	114.0	628.0	119.4	150.0	128.0	648.0
			18.8/25.0	52.1/60.1	107.6/116.5	125/125	114/114	628/628	121.3/131.3	150/150	128/128	648/648
			37.6/50.0	104.2/120.3	171.6/161.7	175/175	158/176	628/628	186.4/176.4	200/200	171/190	648/648
			56.3/75.0	156.4/180.4	197.8/221.8	225/250	218/246	628/628	212.5/236.5	225/250	231/259	648/648
	460–3–60	STD	–	–	48.6	60.0	51.0	277.0	54.8	60.0	58.0	289.0
			25.0	30.1	48.6	60.0	51.0	277.0	54.8	60.0	58.0	289.0
			50.0	60.1	69.4	80.0	78.0	277.0	77.1	80.0	85.0	289.0
			75.0	90.2	99.5	110	112	277	107.2	125	119	289
		MED	–	–	47.6	60.0	50.0	278.0	53.8	60.0	57.0	290.0
			25.0	30.1	47.6	60.0	50.0	278.0	53.8	60.0	57.0	290.0
			50.0	60.1	68.1	80.0	76.0	278.0	75.9	80.0	84.0	290.0
			75.0	90.2	98.2	100	111	278	106.0	125	118	290
		HIGH	–	–	50.9	60.0	54.0	296.0	57.1	70.0	61.0	308.0
			25.0	30.1	50.9	60.0	54.0	296.0	57.5	70.0	61.0	308.0
			50.0	60.1	72.2	80.0	80.0	296.0	80.0	90.0	87.0	308.0
			75.0	90.2	102.3	125	115	296	110.1	125	122	308
		MED–High Eff	–	–	51.4	60.0	54.0	282.0	57.6	70.0	61.0	294.0
			25.0	30.1	51.4	60.0	54.0	282.0	58.1	70.0	61.0	294.0
			50.0	60.1	72.9	80.0	81.0	282.0	80.6	90.0	88.0	294.0
			75.0	90.2	103.0	125	115	282	110.7	125	123	294
		HIGH–High Eff	–	–	57.4	70.0	61.0	319.0	63.6	80.0	68.0	331.0
			25.0	30.1	57.9	70.0	61.0	319.0	65.6	80.0	68.0	331.0
			50.0	60.1	80.4	90.0	88.0	319.0	88.1	100.0	95.0	331.0
			75.0	90.2	110.5	125	122	319	118.2	125	129	331

Table 26 – (cont.) MCA/MOCP DETERMINATION NO C.O. OR UNPWRD C.O.

UNIT	NOM. V–PH–HZ	IFM TYPE	ELECTRIC HEATER		NO C.O. or UNPWR C.O.							
					NO P.E.				w/ P.E. (pwrd fr/unit)			
			Nom (kW)	FLA	MCA	MOCP	DISC. SIZE		MCA	MOCP	DISC. SIZE	
							FLA	LRA			FLA	LRA
50HC–D24	575–3–60	STD	–	–	35.5	45.0	37.0	204.0	40.3	50.0	43.0	212.0
			24.8	23.9	36.9	45.0	37.0	204.0	42.9	50.0	43.0	212.0
			49.6	47.7	66.6	70.0	61.0	204.0	72.6	80.0	67.0	212.0
			74.4	71.6	78.6	90	89	204	84.6	90	94	212
		MED	–	–	35.0	45.0	37.0	193.0	39.8	50.0	42.0	201.0
			24.8	23.9	36.3	45.0	37.0	193.0	42.3	50.0	42.0	201.0
			49.6	47.7	66.0	70.0	61.0	193.0	72.0	80.0	66.0	201.0
			74.4	71.6	78.0	90	88	193	84.0	90	94	201
		HIGH	–	–	37.7	45.0	40.0	219.0	42.5	50.0	45.0	227.0
			24.8	23.9	39.6	45.0	40.0	219.0	45.6	50.0	45.0	227.0
			49.6	47.7	69.4	70.0	64.0	219.0	75.4	80.0	69.0	227.0
			74.4	71.6	81.4	90	91	219	87.4	90	97	227
		MED–High Eff	–	–	38.9	50.0	41.0	202.0	43.7	50.0	47.0	210.0
			24.8	23.9	41.1	50.0	41.0	202.0	47.1	50.0	47.0	210.0
			49.6	47.7	70.9	80.0	65.0	202.0	76.9	80.0	71.0	210.0
			74.4	71.6	82.9	90	93	202	88.9	90	98	210
		HIGH–High Eff	–	–	39.4	50.0	42.0	229.0	44.2	50.0	47.0	237.0
			24.8	23.9	41.8	50.0	42.0	229.0	47.8	50.0	47.0	237.0
			49.6	47.7	71.5	80.0	66.0	229.0	77.5	80.0	71.0	237.0
			74.4	71.6	83.5	90	93	229	89.5	100	99	237

LEGEND:

C.O. – Convenient outlet
DISC – Disconnect
FLA – Full load amps
IFM – Indoor fan motor
LRA – Locked rotor amps
MCA – Minimum circuit amps
MOCP – Maximum over current protection
P.E. – Power exhaust
UNPWRD C.O. – Unpowered convenient outlet

NOTES:

1. In compliance with NEC requirements for multimotor and combination load equipment (refer to NEC Articles 430 and 440), the overcurrent protective device for the unit shall be fuse or HACR breaker. Canadian units may be fuse or circuit breaker.
2. **Unbalanced 3-Phase Supply Voltage**
   Never operate a motor where a phase imbalance in supply voltage is greater than 2%. Use the following formula to determine the percentage of voltage imbalance.

$$\% \text{ Voltage Imbalance} = 100 \times \frac{\text{max voltage deviation from average voltage}}{\text{average voltage}}$$

Example: Supply voltage is 230-3-60

AB = 224 v
BC = 231 v
AC = 226 v

$$\text{Average Voltage} = \frac{(224 + 231 + 226)}{3} = \frac{681}{3}$$

$$= 227$$

Determine maximum deviation from average voltage.

(AB) 227 – 224 = 3 v Maximum deviation is 4 v.
(BC) 231 – 227 = 4 v Determine percent of voltage imbalance.

$$\% \text{ Voltage Imbalance} = 100 \times \frac{4}{227}$$

$$= 1.76\%$$

This amount of phase imbalance is satisfactory as it is below the maximum allowable 2%.

IMPORTANT: If the supply voltage phase imbalance is more than 2%, contact your local electric utility company immediately.

Table 26 – (cont.) MCA/MOCP DETERMINATION NO C.O. OR UNPWRD C.O.

UNIT	NOM. V–PH–HZ	IFM TYPE	ELECTRIC HEATER		NO C.O. or UNPWR C.O.							
					NO P.E.				w/ P.E. (pwrd fr/unit)			
			Nom (kW)	FLA	MCA	MOCP	DISC. SIZE		MCA	MOCP	DISC. SIZE	
							FLA	LRA			FLA	LRA
50HC–D28	208/230–3–60	STD	–	–	117.4	150.0	121.0	584.0	129.2	175.0	135.0	604.0
			18.8/25.0	52.1/60.1	117.4/117.4	150/150	121/121	584/584	129.2/129.2	175/175	135/135	604/604
			37.6/50.0	104.2/120.3	149.0/139.1	150/175	137/156	584/584	163.8/153.8	175/175	151/169	604/604
			56.3/75.0	156.4/180.4	175.2/199.2	200/225	197/225	584/584	189.9/213.9	200/250	211/238	604/604
		MED	–	–	115.2	150.0	119.0	586.0	127.0	175.0	132.0	606.0
			18.8/25.0	52.1/60.1	115.2/115.2	150/150	119/119	586/586	127.0/127.0	175/175	132/132	606/606
			37.6/50.0	104.2/120.3	146.3/136.3	150/150	135/153	586/586	161.0/151.1	175/175	148/167	606/606
			56.3/75.0	156.4/180.4	172.4/196.4	200/225	195/222	586/586	187.2/211.2	200/225	208/236	606/606
		HIGH	–	–	121.8	150.0	126.0	622.0	133.6	175.0	140.0	642.0
			18.8/25.0	52.1/60.1	121.8/121.8	150/150	126/126	622/622	133.6/133.6	175/175	140/140	642/642
			37.6/50.0	104.2/120.3	154.5/144.6	175/175	142/161	622/622	169.3/159.3	175/175	156/174	642/642
			56.3/75.0	156.4/180.4	180.7/204.7	200/225	202/230	622/622	195.4/219.4	200/250	216/243	642/642
		MED–High Eff	–	–	122.8	150.0	127.0	594.0	134.6	175.0	141.0	614.0
			18.8/25.0	52.1/60.1	122.8/122.8	150/150	127/127	594/594	134.6/134.6	175/175	141/141	614/614
			37.6/50.0	104.2/120.3	155.8/145.8	175/175	143/162	594/594	170.5/160.6	175/175	157/175	614/614
			56.3/75.0	156.4/180.4	181.9/205.9	200/250	203/231	594/594	196.7/220.7	200/250	217/244	614/614
		HIGH–High Eff	–	–	135.5	175.0	142.0	668.0	147.3	175.0	156.0	688.0
			18.8/25.0	52.1/60.1	135.5/135.5	175/175	142/142	668/668	147.3/147.3	175/175	156/156	688/688
			37.6/50.0	104.2/120.3	171.6/161.7	175/175	158/176	668/668	186.4/176.4	200/200	171/190	688/688
			56.3/75.0	156.4/180.4	197.8/221.8	225/250	218/246	668/668	212.5/236.5	225/250	231/259	688/688
	460–3–60	STD	–	–	54.0	60.0	57.0	303.0	60.2	70.0	64.0	315.0
			25.0	30.1	54.0	60.0	57.0	303.0	60.2	70.0	64.0	315.0
			50.0	60.1	69.4	80.0	78.0	303.0	77.1	80.0	85.0	315.0
			75.0	90.2	99.5	110	112	303	107.2	125	119	315
		MED	–	–	53.0	60.0	56.0	304.0	59.2	70.0	63.0	316.0
			25.0	30.1	53.0	60.0	56.0	304.0	59.2	70.0	63.0	316.0
			50.0	60.1	68.1	80.0	76.0	304.0	75.9	80.0	84.0	316.0
			75.0	90.2	98.2	100	111	304	106.0	125	118	316
		HIGH	–	–	56.3	70.0	59.0	322.0	62.5	80.0	66.0	334.0
			25.0	30.1	56.3	70.0	59.0	322.0	62.5	80.0	66.0	334.0
			50.0	60.1	72.2	80.0	80.0	322.0	80.0	90.0	87.0	334.0
			75.0	90.2	102.3	125	115	322	110.1	125	122	334
		MED–High Eff	–	–	56.8	70.0	60.0	308.0	63.0	80.0	67.0	320.0
			25.0	30.1	56.8	70.0	60.0	308.0	63.0	80.0	67.0	320.0
			50.0	60.1	72.9	80.0	81.0	308.0	80.6	90.0	88.0	320.0
			75.0	90.2	103.0	125	115	308	110.7	125	123	320
		HIGH–High Eff	–	–	62.8	80.0	67.0	345.0	69.0	80.0	74.0	357.0
			25.0	30.1	62.8	80.0	67.0	345.0	69.0	80.0	74.0	357.0
			50.0	60.1	80.4	90.0	88.0	345.0	88.1	100.0	95.0	357.0
			75.0	90.2	110.5	125	122	345	118.2	125	129	357

Table 26 – (cont.) MCA/MOCP DETERMINATION NO C.O. OR UNPWRD C.O.

UNIT	NOM. V–PH–HZ	IFM TYPE	ELECTRIC HEATER		NO C.O. or UNPWR C.O.							
					NO P.E.				w/ P.E. (pwrd fr/unit)			
			Nom (kW)	FLA	MCA	MOCP	DISC. SIZE		MCA	MOCP	DISC. SIZE	
							FLA	LRA			FLA	LRA
50HC–D28	575–3–60	STD	–	–	40.4	50.0	42.0	228.0	45.2	50.0	48.0	236.0
			24.8	23.9	40.4	50.0	42.0	228.0	45.2	50.0	48.0	236.0
			49.6	47.7	66.6	70.0	61.0	228.0	72.6	80.0	67.0	236.0
			74.4	71.6	78.6	90	89	228	84.6	90	94	236
		MED	–	–	39.9	50.0	42.0	217.0	44.7	50.0	47.0	225.0
			24.8	23.9	39.9	50.0	42.0	217.0	44.7	50.0	47.0	225.0
			49.6	47.7	66.0	70.0	61.0	217.0	72.0	80.0	66.0	225.0
			74.4	71.6	78.0	90	88	217	84.0	90	94	225
		HIGH	–	–	42.6	50.0	45.0	243.0	47.4	60.0	50.0	251.0
			24.8	23.9	42.6	50.0	45.0	243.0	47.4	60.0	50.0	251.0
			49.6	47.7	69.4	70.0	64.0	243.0	75.4	80.0	69.0	251.0
			74.4	71.6	81.4	90	91	243	87.4	90	97	251
		MED–High Eff	–	–	43.8	50.0	46.0	226.0	48.6	60.0	52.0	234.0
			24.8	23.9	43.8	50.0	46.0	226.0	48.6	60.0	52.0	234.0
			49.6	47.7	70.9	80.0	65.0	226.0	76.9	80.0	71.0	234.0
			74.4	71.6	82.9	90	93	226	88.9	90	98	234
		HIGH–High Eff	–	–	44.3	50.0	47.0	253.0	49.1	60.0	52.0	261.0
			24.8	23.9	44.3	50.0	47.0	253.0	49.1	60.0	52.0	261.0
			49.6	47.7	71.5	80.0	66.0	253.0	77.5	80.0	71.0	261.0
			74.4	71.6	83.5	90	93	253	89.5	100	99	261

LEGEND:

C.O. – Convenient outlet
DISC – Disconnect
FLA – Full load amps
IFM – Indoor fan motor
LRA – Locked rotor amps
MCA – Minimum circuit amps
MOCP – Maximum over current protection
P.E. – Power exhaust
UNPWRD C.O. – Unpowered convenient outlet

NOTES:

1. In compliance with NEC requirements for multimotor and combination load equipment (refer to NEC Articles 430 and 440), the overcurrent protective device for the unit shall be fuse or HACR breaker. Canadian units may be fuse or circuit breaker.
2. **Unbalanced 3-Phase Supply Voltage**
   Never operate a motor where a phase imbalance in supply voltage is greater than 2%. Use the following formula to determine the percentage of voltage imbalance.

$$\% \text{ Voltage Imbalance} = 100 \times \frac{\text{max voltage deviation from average voltage}}{\text{average voltage}}$$

Example: Supply voltage is 230-3-60

AB = 224 v
BC = 231 v
AC = 226 v

$$\text{Average Voltage} = \frac{(224 + 231 + 226)}{3} = \frac{681}{3}$$

$$= 227$$

Determine maximum deviation from average voltage.

(AB) 227 – 224 = 3 v Maximum deviation is 4 v.
(BC) 231 – 227 = 4 v Determine percent of voltage imbalance.

$$\% \text{ Voltage Imbalance} = 100 \times \frac{4}{227}$$

$$= 1.76\%$$

This amount of phase imbalance is satisfactory as it is below the maximum allowable 2%.

IMPORTANT: If the supply voltage phase imbalance is more than 2%, contact your local electric utility company immediately.

Table 27 – MCA/MOCP DETERMINATION W/ PWRD C.O.

UNIT	NOM. V–PH–HZ	IFM TYPE	ELECTRIC HEATER		w/ PWRD C.O.							
					NO P.E.				w/ P.E. (pwrd fr/unit)			
			Nom (kW)	FLA	MCA	MOCP	DISC. SIZE		MCA	MOCP	DISC. SIZE	
							FLA	LRA			FLA	LRA
50HC–D17	208/230–3–60	STD	–	–	73.1	90.0	77.0	398.0	84.9	100.0	90.0	418.0
			18.8/25.0	52.1/60.1	80.5/90.5	90/100	77/83	398/398	95.3/105.3	100/110	90/97	418/418
			37.6/50.0	104.2/120.3	145.6/135.7	150/150	134/152	398/398	160.4/150.4	175/175	148/166	418/418
			56.3/75.0	156.4/180.4	171.8/195.8	200/225	194/222	398/398	186.5/210.5	200/225	208/235	418/418
		MED	–	–	75.8	100.0	80.0	415.0	87.6	100.0	93.0	435.0
			18.8/25.0	52.1/60.1	83.9/93.9	100/100	80/86	415/415	98.6/108.6	100/110	93/100	435/435
			37.6/50.0	104.2/120.3	149.0/139.1	150/150	137/156	415/415	163.8/153.8	175/175	151/169	435/435
			56.3/75.0	156.4/180.4	175.2/199.2	200/225	197/225	415/415	189.9/213.9	200/225	211/238	435/435
		HIGH	–	–	80.6	100.0	85.0	424.0	92.4	100.0	99.0	444.0
			18.8/25.0	52.1/60.1	89.9/99.9	100/100	85/92	424/424	104.6/114.6	110/125	99/105	444/444
			37.6/50.0	104.2/120.3	155.0/145.1	175/175	143/161	424/424	169.8/159.8	175/175	156/175	444/444
			56.3/75.0	156.4/180.4	181.2/205.2	200/225	203/230	424/424	195.9/219.9	200/250	216/244	444/444
	460–3–60	STD	–	–	37.1	45.0	39.0	236.0	43.3	50.0	46.0	248.0
			25.0	30.1	44.6	45.0	41.0	236.0	52.4	60.0	48.0	248.0
			50.0	60.1	67.1	70.0	76.0	236.0	74.9	80.0	83.0	248.0
			75.0	90.2	97.2	100	110	236	105.0	110	117	248
		MED	–	–	38.5	50.0	41.0	245.0	44.7	50.0	48.0	257.0
			25.0	30.1	46.4	50.0	43.0	245.0	54.1	60.0	50.0	257.0
			50.0	60.1	68.9	80.0	77.0	245.0	76.6	80.0	84.0	257.0
			75.0	90.2	99.0	100	112	245	106.7	110	119	257
		HIGH	–	–	41.1	50.0	44.0	249.0	47.3	60.0	51.0	261.0
			25.0	30.1	49.6	50.0	46.0	249.0	57.4	60.0	53.0	261.0
			50.0	60.1	72.1	80.0	80.0	249.0	79.9	80.0	87.0	261.0
			75.0	90.2	102.2	110	115	249	110.0	125	122	261
	575–3–60	STD	–	–	27.9	35.0	29.0	186.0	32.7	40.0	35.0	194.0
			24.8	23.9	35.5	40.0	33.0	186.0	41.5	45.0	38.0	194.0
			49.6	47.7	65.3	70.0	60.0	186.0	71.3	80.0	66.0	194.0
			74.4	71.6	77.2	80	88	186	83.2	90	93	194
		MED	–	–	27.9	35.0	29.0	186.0	32.7	40.0	35.0	194.0
			24.8	23.9	35.5	40.0	33.0	186.0	41.5	45.0	38.0	194.0
			49.6	47.7	65.3	70.0	60.0	186.0	71.3	80.0	66.0	194.0
			74.4	71.6	77.2	80	88	186	83.2	90	93	194
		HIGH	–	–	30.7	40.0	33.0	200.0	35.5	45.0	38.0	208.0
			24.8	23.9	39.0	40.0	36.0	200.0	45.0	50.0	41.0	208.0
			49.6	47.7	68.8	70.0	63.0	200.0	74.8	80.0	69.0	208.0

LEGEND:

C.O. – Convenient outlet
DISC – Disconnect
FLA – Full load amps
IFM – Indoor fan motor
LRA – Locked rotor amps
MCA – Minimum circuit amps
MOCP – Maximum over current protection
P.E. – Power exhaust
UNPWRD C.O. – Unpowered convenient outlet

NOTES:

1. In compliance with NEC requirements for multimotor and combination load equipment (refer to NEC Articles 430 and 440), the overcurrent protective device for the unit shall be fuse or HACR breaker. Canadian units may be fuse or circuit breaker.
2. **Unbalanced 3-Phase Supply Voltage**
   Never operate a motor where a phase imbalance in supply voltage is greater than 2%. Use the following formula to determine the percentage of voltage imbalance.

$$\% \text{ Voltage Imbalance} = 100 \times \frac{\text{max voltage deviation from average voltage}}{\text{average voltage}}$$

Example: Supply voltage is 230-3-60

AB = 224 v
BC = 231 v
AC = 226 v

$$\text{Average Voltage} = \frac{(224 + 231 + 226)}{3} = \frac{681}{3} = 227$$

Determine maximum deviation from average voltage.
(AB) 227 – 224 = 3 v Maximum deviation is 4 v.
(BC) 231 – 227 = 4 v Determine percent of voltage imbalance.

$$\% \text{ Voltage Imbalance} = 100 \times \frac{4}{227} = 1.76\%$$

This amount of phase imbalance is satisfactory as it is below the maximum allowable 2%.

IMPORTANT: If the supply voltage phase imbalance is more than 2%, contact your local electric utility company immediately.

Table 27 – (cont.) MCA/MOCP DETERMINATION W/ PWRD C.O.

UNIT	NOM. V–PH–HZ	IFM TYPE	ELECTRIC HEATER		w/ PWRD C.O.							
					NO P.E.				w/ P.E. (pwrd fr/unit)			
			Nom (kW)	FLA	MCA	MOCP	DISC. SIZE		MCA	MOCP	DISC. SIZE	
							FLA	LRA			FLA	LRA
50HC–D20	208/230–3–60	STD	–	–	80.5	100.0	85.0	445.0	92.3	100.0	98.0	465.0
			18.8/25.0	52.1/60.1	83.9/93.9	100/100	85/86	445/445	98.6/108.6	100/110	98/100	465/465
			37.6/50.0	104.2/120.3	149.0/139.1	150/150	137/156	445/445	163.8/153.8	175/175	151/169	465/465
			56.3/75.0	156.4/180.4	175.2/199.2	200/225	197/225	445/445	189.9/213.9	200/225	211/238	465/465
		MED	–	–	85.3	100.0	90.0	454.0	97.1	110.0	104.0	474.0
			18.8/25.0	52.1/60.1	89.9/99.9	100/100	90/92	454/454	104.6/114.6	110/125	104/105	474/474
			37.6/50.0	104.2/120.3	155.0/145.1	175/175	143/161	454/454	169.8/159.8	175/175	156/175	474/474
			56.3/75.0	156.4/180.4	181.2/205.2	200/225	203/230	454/454	195.9/219.9	200/250	216/244	474/474
		HIGH	–	–	83.1	100.0	88.0	456.0	94.9	110.0	101.0	476.0
			18.8/25.0	52.1/60.1	87.1/97.1	100/100	88/89	456/456	101.9/111.9	110/125	101/103	476/476
			37.6/50.0	104.2/120.3	152.3/142.3	175/175	140/159	456/456	167.0/157.1	175/175	154/172	476/476
			56.3/75.0	156.4/180.4	178.4/202.4	200/225	200/228	456/456	193.2/217.2	200/250	214/241	476/476
		HIGH–High Eff	–	–	90.7	100.0	96.0	464.0	102.5	125.0	110.0	484.0
			18.8/25.0	52.1/60.1	96.6/106.6	100/110	96/98	464/464	111.4/121.4	125/125	110/112	484/484
			37.6/50.0	104.2/120.3	161.8/151.8	175/175	149/167	464/464	176.5/166.6	200/175	162/181	484/484
			56.3/75.0	156.4/180.4	187.9/211.9	200/250	209/236	464/464	202.7/226.7	225/250	222/250	484/484
	460–3–60	STD	–	–	38.8	50.0	41.0	247.0	45.0	50.0	48.0	259.0
			25.0	30.1	46.4	50.0	43.0	247.0	54.1	60.0	50.0	259.0
			50.0	60.1	68.9	80.0	77.0	247.0	76.6	80.0	84.0	259.0
			75.0	90.2	99.0	100	112	247	106.7	110	119	259
		MED	–	–	41.4	50.0	44.0	251.0	47.6	60.0	51.0	263.0
			25.0	30.1	49.6	50.0	46.0	251.0	57.4	60.0	53.0	263.0
			50.0	60.1	72.1	80.0	80.0	251.0	79.9	80.0	87.0	263.0
			75.0	90.2	102.2	110	115	251	110.0	125	122	263
		HIGH	–	–	40.4	50.0	43.0	252.0	46.6	50.0	50.0	264.0
			25.0	30.1	48.4	50.0	45.0	252.0	56.1	60.0	52.0	264.0
			50.0	60.1	70.9	80.0	79.0	252.0	78.6	80.0	86.0	264.0
			75.0	90.2	101.0	110	114	252	108.7	125	121	264
		HIGH–High Eff	–	–	44.2	50.0	47.0	256.0	50.4	60.0	54.0	268.0
			25.0	30.1	53.1	60.0	49.0	256.0	60.9	70.0	56.0	268.0
			50.0	60.1	75.6	80.0	83.0	256.0	83.4	90.0	91.0	268.0
			75.0	90.2	105.7	125	118	256	113.5	125	125	268
	575–3–60	STD	–	–	27.9	35.0	29.0	188.0	32.7	40.0	35.0	196.0
			24.8	23.9	35.5	40.0	33.0	188.0	41.5	45.0	38.0	196.0
			49.6	47.7	65.3	70.0	60.0	188.0	71.3	80.0	66.0	196.0
			74.4	71.6	77.2	80	88	188	83.2	90	93	196
		MED	–	–	30.7	40.0	33.0	202.0	35.5	45.0	38.0	210.0
			24.8	23.9	39.0	40.0	36.0	202.0	45.0	50.0	41.0	210.0
			49.6	47.7	68.8	70.0	63.0	202.0	74.8	80.0	69.0	210.0
			74.4	71.6	80.7	90	91	202	86.7	90	96	210
		HIGH	–	–	30.2	35.0	32.0	191.0	35.0	40.0	37.0	199.0
			24.8	23.9	38.4	40.0	35.0	191.0	44.4	45.0	41.0	199.0
			49.6	47.7	68.1	70.0	63.0	191.0	74.1	80.0	68.0	199.0
			74.4	71.6	80.1	90	90	191	86.1	90	96	199
		HIGH–High Eff	–	–	34.1	40.0	36.0	200.0	38.9	45.0	42.0	208.0
			24.8	23.9	43.3	45.0	40.0	200.0	49.3	50.0	45.0	208.0
			49.6	47.7	73.0	80.0	67.0	200.0	79.0	80.0	73.0	208.0
			74.4	71.6	85.0	90	95	200	91.0	100	100	208

Table 27 – (cont.) MCA/MOCP DETERMINATION W/ PWRD C.O.

UNIT	NOM. V–PH–HZ	IFM TYPE	ELECTRIC HEATER		w/ PWRD C.O.							
					NO P.E.				w/ P.E. (pwrd fr/unit)			
			Nom (kW)	FLA	MCA	MOCP	DISC. SIZE		MCA	MOCP	DISC. SIZE	
							FLA	LRA			FLA	LRA
50HC–D24	208/230–3–60	STD	–	–	93.5	110.0	99.0	549.0	105.3	125.0	112.0	569.0
			18.8/25.0	52.1/60.1	93.5/99.9	110/110	99/99	549/549	105.3/114.6	125/125	112/112	569/569
			37.6/50.0	104.2/120.3	155.0/145.1	175/175	143/161	549/549	169.8/159.8	175/175	156/175	569/569
			56.3/75.0	156.4/180.4	181.2/205.2	200/225	203/230	549/549	195.9/219.9	200/250	216/244	569/569
		MED	–	–	91.3	100.0	96.0	551.0	103.1	125.0	110.0	571.0
			18.8/25.0	52.1/60.1	91.3/97.1	100/100	96/96	551/551	103.1/111.9	125/125	110/110	571/571
			37.6/50.0	104.2/120.3	152.3/142.3	175/175	140/159	551/551	167.0/157.1	175/175	154/172	571/571
			56.3/75.0	156.4/180.4	178.4/202.4	200/225	200/228	551/551	193.2/217.2	200/250	214/241	571/571
		HIGH	–	–	97.9	125.0	104.0	587.0	109.7	125.0	118.0	607.0
			18.8/25.0	52.1/60.1	97.9/105.4	125/125	104/104	587/587	110.1/120.1	125/125	118/118	607/607
			37.6/50.0	104.2/120.3	160.5/150.6	175/175	148/166	587/587	175.3/165.3	200/175	161/180	607/607
			56.3/75.0	156.4/180.4	186.7/210.7	200/250	208/235	587/587	201.4/225.4	225/250	221/249	607/607
		MED–High Eff	–	–	98.9	125.0	105.0	559.0	110.7	125.0	119.0	579.0
			18.8/25.0	52.1/60.1	98.9/106.6	125/125	105/105	559/559	111.4/121.4	125/125	119/119	579/579
			37.6/50.0	104.2/120.3	161.8/151.8	175/175	149/167	559/559	176.5/166.6	200/175	162/181	579/579
			56.3/75.0	156.4/180.4	187.9/211.9	200/250	209/236	559/559	202.7/226.7	225/250	222/250	579/579
		HIGH–High Eff	–	–	112.4	125.0	120.0	633.0	124.2	150.0	133.0	653.0
			18.8/25.0	52.1/60.1	112.5/122.5	125/125	120/120	633/633	27.3/137.3	150/150	133/133	653/653
			37.6/50.0	104.2/120.3	177.6/167.7	200/175	163/182	633/633	192.4/182.4	200/200	177/196	653/653
			56.3/75.0	156.4/180.4	203.8/227.8	225/250	223/251	633/633	218.5/242.5	225/250	237/265	653/653
	460–3–60	STD	–	–	50.8	60.0	54.0	279.0	57.0	70.0	61.0	291.0
			25.0	30.1	50.8	60.0	54.0	279.0	57.4	70.0	61.0	291.0
			50.0	60.1	72.1	80.0	80.0	279.0	79.9	80.0	87.0	291.0
			75.0	90.2	102.2	110	115	279	110.0	125	122	291
		MED	–	–	49.8	60.0	52.0	280.0	56.0	70.0	60.0	292.0
			25.0	30.1	49.8	60.0	52.0	280.0	56.1	70.0	60.0	292.0
			50.0	60.1	70.9	80.0	79.0	280.0	78.6	80.0	86.0	292.0
			75.0	90.2	101.0	110	114	280	108.7	125	121	292
		HIGH	–	–	53.1	60.0	56.0	298.0	59.3	70.0	63.0	310.0
			25.0	30.1	53.1	60.0	56.0	298.0	60.3	70.0	63.0	310.0
			50.0	60.1	75.0	80.0	83.0	298.0	82.7	90.0	90.0	310.0
			75.0	90.2	105.1	125	117	298	112.8	125	125	310
		MED–High Eff	–	–	53.6	60.0	57.0	284.0	59.8	70.0	64.0	296.0
			25.0	30.1	53.6	60.0	57.0	284.0	60.9	70.0	64.0	296.0
			50.0	60.1	75.6	80.0	83.0	284.0	83.4	90.0	91.0	296.0
			75.0	90.2	105.7	125	118	284	113.5	125	125	296
		HIGH–High Eff	–	–	59.6	70.0	64.0	321.0	65.8	80.0	71.0	333.0
			25.0	30.1	60.6	70.0	64.0	321.0	68.4	80.0	71.0	333.0
			50.0	60.1	83.1	90.0	90.0	321.0	90.9	100.0	97.0	333.0
			75.0	90.2	113.2	125	125	321	121.0	125	132	333

Table 27 – (cont.) MCA/MOCP DETERMINATION W/ PWRD C.O.

UNIT	NOM. V–PH–HZ	IFM TYPE	ELECTRIC HEATER		w/ PWRD C.O.							
					NO P.E.				w/ P.E. (pwrd fr/unit)			
			Nom (kW)	FLA	MCA	MOCP	DISC. SIZE		MCA	MOCP	DISC. SIZE	
							FLA	LRA			FLA	LRA
50HC–D24	575–3–60	STD	–	–	37.2	45.0	39.0	206.0	42.0	50.0	45.0	214.0
			24.8	23.9	39.0	45.0	39.0	206.0	45.0	50.0	45.0	214.0
			49.6	47.7	68.8	70.0	63.0	206.0	74.8	80.0	69.0	214.0
			74.4	71.6	80.7	90	91	206	86.7	90	96	214
		MED	–	–	36.7	45.0	39.0	195.0	41.5	50.0	44.0	203.0
			24.8	23.9	38.4	45.0	39.0	195.0	44.4	50.0	44.0	203.0
			49.6	47.7	68.1	70.0	63.0	195.0	74.1	80.0	68.0	203.0
			74.4	71.6	80.1	90	90	195	86.1	90	96	203
		HIGH	–	–	39.4	50.0	42.0	221.0	44.2	50.0	47.0	229.0
			24.8	23.9	41.8	50.0	42.0	221.0	47.8	50.0	47.0	229.0
			49.6	47.7	71.5	80.0	66.0	221.0	77.5	80.0	71.0	229.0
			74.4	71.6	83.5	90	93	221	89.5	90	99	229
		MED–High Eff	–	–	40.6	50.0	43.0	204.0	45.4	50.0	49.0	212.0
			24.8	23.9	43.3	50.0	43.0	204.0	49.3	50.0	49.0	212.0
			49.6	47.7	73.0	80.0	67.0	204.0	79.0	80.0	73.0	212.0
			74.4	71.6	85.0	90	95	204	91.0	100	100	212
		HIGH–High Eff	–	–	41.1	50.0	44.0	231.0	45.9	50.0	49.0	239.0
			24.8	23.9	43.9	50.0	44.0	231.0	49.9	50.0	49.0	239.0
			49.6	47.7	73.6	80.0	68.0	231.0	79.6	80.0	73.0	239.0
			74.4	71.6	85.6	90	95	231	91.6	100	101	239

LEGEND:

C.O. – Convenient outlet
DISC – Disconnect
FLA – Full load amps
IFM – Indoor fan motor
LRA – Locked rotor amps
MCA – Minimum circuit amps
MOCP – Maximum over current protection
P.E. – Power exhaust
UNPWRD C.O. – Unpowered convenient outlet

NOTES:

1. In compliance with NEC requirements for multimotor and combination load equipment (refer to NEC Articles 430 and 440), the overcurrent protective device for the unit shall be fuse or HACR breaker. Canadian units may be fuse or circuit breaker.
2. **Unbalanced 3-Phase Supply Voltage**
   Never operate a motor where a phase imbalance in supply voltage is greater than 2%. Use the following formula to determine the percentage of voltage imbalance.

$$\% \text{ Voltage Imbalance} = 100 \times \frac{\text{max voltage deviation from average voltage}}{\text{average voltage}}$$

Example: Supply voltage is 230-3-60

AB = 224 v
BC = 231 v
AC = 226 v

$$\text{Average Voltage} = \frac{(224 + 231 + 226)}{3} = \frac{681}{3}$$

$$= 227$$

Determine maximum deviation from average voltage.

(AB) 227 – 224 = 3 v Maximum deviation is 4 v.
(BC) 231 – 227 = 4 v Determine percent of voltage imbalance.

$$\% \text{ Voltage Imbalance} = 100 \times \frac{4}{227}$$

$$= 1.76\%$$

This amount of phase imbalance is satisfactory as it is below the maximum allowable 2%.

IMPORTANT: If the supply voltage phase imbalance is more than 2%, contact your local electric utility company immediately.

Table 27 – (cont.) MCA/MOCP DETERMINATION W/ PWRD C.O.

UNIT	NOM. V–PH–HZ	IFM TYPE	ELECTRIC HEATER		w/ PWRD C.O.							
					NO P.E.				w/ P.E. (pwrd fr/unit)			
			Nom (kW)	FLA	MCA	MOCP	DISC. SIZE		MCA	MOCP	DISC. SIZE	
							FLA	LRA			FLA	LRA
50HC–D28	208/230–3–60	STD	–	–	122.2	150.0	127.0	589.0	134.0	175.0	140.0	609.0
			18.8/25.0	52.1/60.1	122.2/122.2	150/150	127/127	589/589	134.0/134.0	175/175	140/140	609/609
			37.6/50.0	104.2/120.3	155.0/145.1	175/175	143/161	589/589	169.8/159.8	175/175	156/175	609/609
			56.3/75.0	156.4/180.4	181.2/205.2	200/225	203/230	589/589	195.9/219.9	200/250	216/244	609/609
		MED	–	–	120.0	150.0	124.0	591.0	131.8	175.0	138.0	611.0
			18.8/25.0	52.1/60.1	120.0/120.0	150/150	124/124	591/591	131.8/131.8	175/175	138/138	611/611
			37.6/50.0	104.2/120.3	152.3/142.3	175/175	140/159	591/591	167.0/157.1	175/175	154/172	611/611
			56.3/75.0	156.4/180.4	178.4/202.4	200/225	200/228	591/591	193.2/217.2	200/250	214/241	611/611
		HIGH	–	–	126.6	150.0	132.0	627.0	138.4	175.0	145.0	647.0
			18.8/25.0	52.1/60.1	126.6/126.6	150/150	132/132	627/627	138.4/138.4	175/175	145/145	647/647
			37.6/50.0	104.2/120.3	160.5/150.6	175/175	148/166	627/627	175.3/165.3	200/175	161/180	647/647
			56.3/75.0	156.4/180.4	186.7/210.7	200/250	208/235	627/627	201.4/225.4	225/250	221/249	647/647
		MED–High Eff	–	–	127.6	175.0	133.0	599.0	139.4	175.0	147.0	619.0
			18.8/25.0	52.1/60.1	127.6/127.6	175/175	133/133	599/599	139.4/139.4	175/175	147/147	619/619
			37.6/50.0	104.2/120.3	161.8/151.8	175/175	149/167	599/599	176.5/166.6	200/175	162/181	619/619
			56.3/75.0	156.4/180.4	187.9/211.9	200/250	209/236	599/599	202.7/226.7	225/250	222/250	619/619
		HIGH–High Eff	–	–	140.3	175.0	148.0	673.0	152.1	200.0	161.0	693.0
			18.8/25.0	52.1/60.1	140.3/140.3	175/175	148/148	673/673	152.1/152.1	200/200	161/161	693/693
			37.6/50.0	104.2/120.3	177.6/167.7	200/175	163/182	673/673	192.4/182.4	200/200	177/196	693/693
			56.3/75.0	156.4/180.4	203.8/227.8	225/250	223/251	673/673	218.5/242.5	225/250	237/265	693/693
	460–3–60	STD	–	–	56.2	70.0	59.0	305.0	62.4	80.0	66.0	317.0
			25.0	30.1	56.2	70.0	59.0	305.0	62.4	80.0	66.0	317.0
			50.0	60.1	72.1	80.0	80.0	305.0	79.9	80.0	87.0	317.0
			75.0	90.2	102.2	110	115	305	110.0	125	122	317
		MED	–	–	55.2	60.0	58.0	306.0	61.4	70.0	65.0	318.0
			25.0	30.1	55.2	60.0	58.0	306.0	61.4	70.0	65.0	318.0
			50.0	60.1	70.9	80.0	79.0	306.0	78.6	80.0	86.0	318.0
			75.0	90.2	101.0	110	114	306	108.7	125	121	318
		HIGH	–	–	58.5	70.0	62.0	324.0	64.7	80.0	69.0	336.0
			25.0	30.1	58.5	70.0	62.0	324.0	64.7	80.0	69.0	336.0
			50.0	60.1	75.0	80.0	83.0	324.0	82.7	90.0	90.0	336.0
			75.0	90.2	105.1	125	117	324	112.8	125	125	336
		MED–High Eff	–	–	59.0	70.0	62.0	310.0	65.2	80.0	70.0	322.0
			25.0	30.1	59.0	70.0	62.0	310.0	65.2	80.0	70.0	322.0
			50.0	60.1	75.6	80.0	83.0	310.0	83.4	90.0	91.0	322.0
			75.0	90.2	105.7	125	118	310	113.5	125	125	322
		HIGH–High Eff	–	–	65.0	80.0	69.0	347.0	71.2	80.0	76.0	359.0
			25.0	30.1	65.0	80.0	69.0	347.0	71.2	80.0	76.0	359.0
			50.0	60.1	83.1	90.0	90.0	347.0	90.9	100.0	97.0	359.0
			75.0	90.2	113.2	125	125	347	121.0	125	132	359

Table 27 – (cont.) MCA/MOCP DETERMINATION W/ PWRD C.O.

UNIT	NOM. V–PH–HZ	IFM TYPE	ELECTRIC HEATER		w/ PWRD C.O.							
					NO P.E.				w/ P.E. (pwrd fr/unit)			
			Nom (kW)	FLA	MCA	MOCP	DISC. SIZE		MCA	MOCP	DISC. SIZE	
							FLA	LRA			FLA	LRA
50HC–D28	575–3–60	STD	–	–	42.1	50.0	44.0	230.0	46.9	60.0	50.0	238.0
			24.8	23.9	42.1	50.0	44.0	230.0	46.9	60.0	50.0	238.0
			49.6	47.7	68.8	70.0	63.0	230.0	74.8	80.0	69.0	238.0
			74.4	71.6	80.7	90	91	230	86.7	90	96	238
		MED	–	–	41.6	50.0	44.0	219.0	46.4	60.0	49.0	227.0
			24.8	23.9	41.6	50.0	44.0	219.0	46.4	60.0	49.0	227.0
			49.6	47.7	68.1	70.0	63.0	219.0	74.1	80.0	68.0	227.0
			74.4	71.6	80.1	90	90	219	86.1	90	96	227
		HIGH	–	–	44.3	50.0	47.0	245.0	49.1	60.0	52.0	253.0
			24.8	23.9	44.3	50.0	47.0	245.0	49.1	60.0	52.0	253.0
			49.6	47.7	71.5	80.0	66.0	245.0	77.5	80.0	71.0	253.0
			74.4	71.6	83.5	90	93	245	89.5	90	99	253
		MED–High Eff	–	–	45.5	60.0	48.0	228.0	50.3	60.0	54.0	236.0
			24.8	23.9	45.5	60.0	48.0	228.0	50.3	60.0	54.0	236.0
			49.6	47.7	73.0	80.0	67.0	228.0	79.0	80.0	73.0	236.0
			74.4	71.6	85.0	90	95	228	91.0	1000	100	236
		HIGH–High Eff	–	–	46.0	60.0	49.0	255.0	50.8	60.0	54.0	263.0
			24.8	23.9	46.0	60.0	49.0	255.0	50.8	60.0	54.0	263.0
			49.6	47.7	73.6	80.0	68.0	255.0	79.6	80.0	73.0	263.0
			74.4	71.6	85.6	90	95	255	91.6	100	101	263

LEGEND:

C.O. – Convenient outlet
DISC – Disconnect
FLA – Full load amps
IFM – Indoor fan motor
LRA – Locked rotor amps
MCA – Minimum circuit amps
MOCP – Maximum over current protection
P.E. – Power exhaust
UNPWRD C.O. – Unpowered convenient outlet

NOTES:

1. In compliance with NEC requirements for multimotor and combination load equipment (refer to NEC Articles 430 and 440), the overcurrent protective device for the unit shall be fuse or HACR breaker. Canadian units may be fuse or circuit breaker.
2. **Unbalanced 3-Phase Supply Voltage**
   Never operate a motor where a phase imbalance in supply voltage is greater than 2%. Use the following formula to determine the percentage of voltage imbalance.

$$\% \text{ Voltage Imbalance} = 100 \times \frac{\text{max voltage deviation from average voltage}}{\text{average voltage}}$$

Example: Supply voltage is 230-3-60

AB = 224 v
BC = 231 v
AC = 226 v

$$\text{Average Voltage} = \frac{(224 + 231 + 226)}{3} = \frac{681}{3}$$

$$= 227$$

Determine maximum deviation from average voltage.

(AB) 227 – 224 = 3 v Maximum deviation is 4 v.
(BC) 231 – 227 = 4 v Determine percent of voltage imbalance.

$$\% \text{ Voltage Imbalance} = 100 \times \frac{4}{227}$$

$$= 1.76\%$$

This amount of phase imbalance is satisfactory as it is below the maximum allowable 2%.

IMPORTANT: If the supply voltage phase imbalance is more than 2%, contact your local electric utility company immediately.

TYPICAL WIRING DIAGRAMS

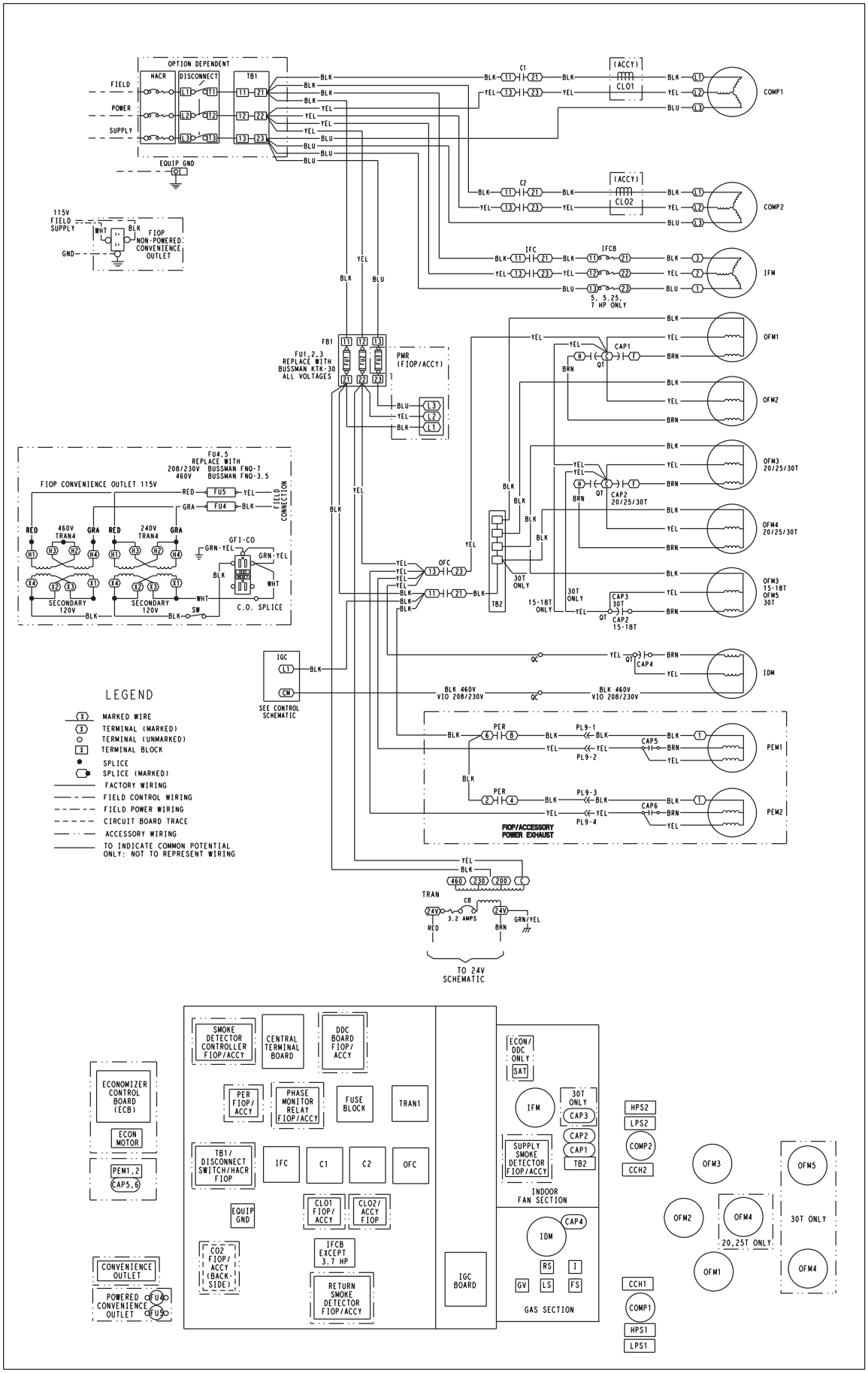


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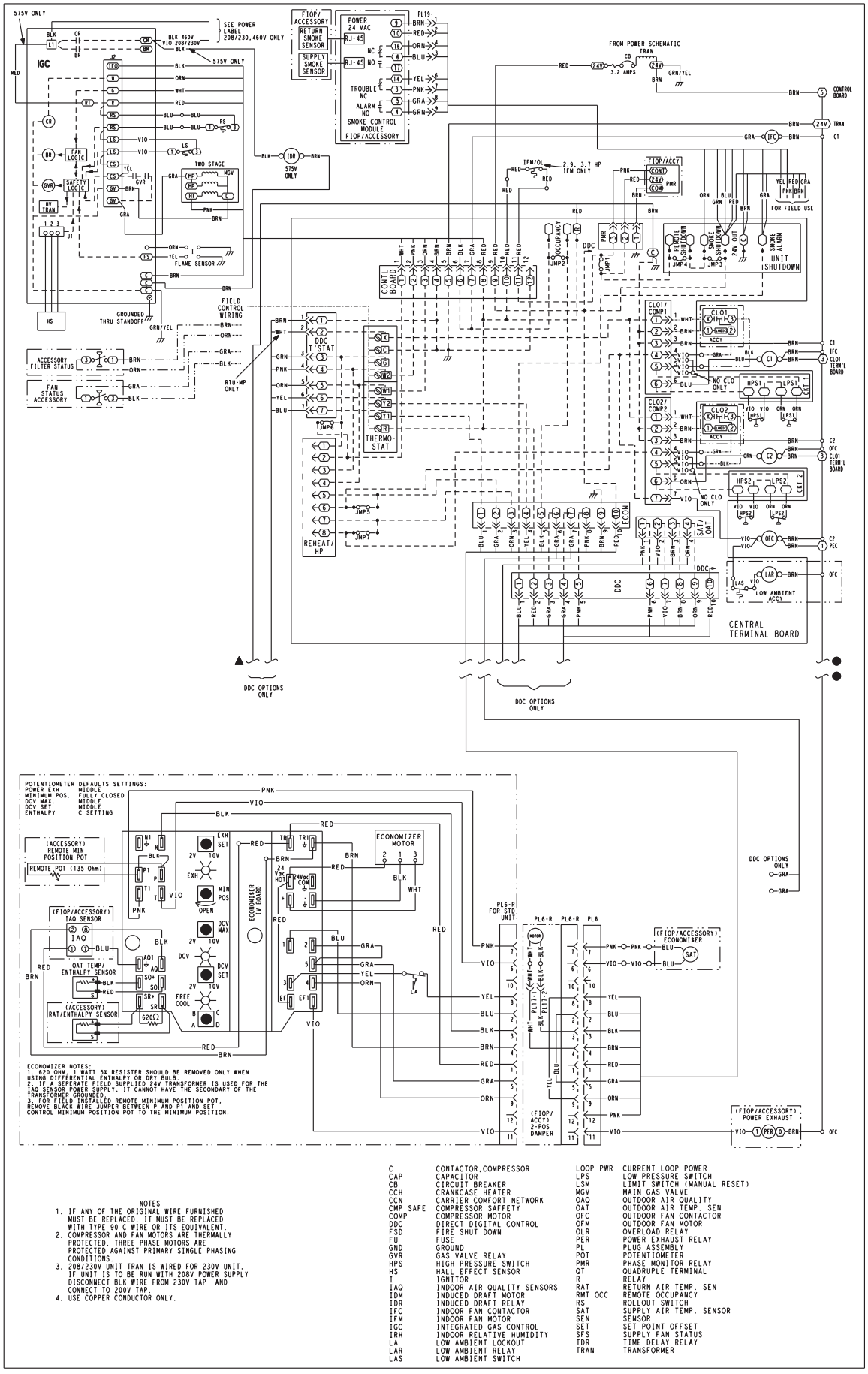
Fig. 16 - Typical Power Diagram (All Voltages)

TYPICAL WIRING DIAGRAMS (cont.)



NOTES
1. IF ANY OF THE ORIGINAL WIRE FURNISHED MUST BE REPLACED, IT MUST BE REPLACED WITH TYPE 90 C WIRE OR ITS EQUIVALENT.
2. COMPRESSOR AND FAN MOTORS ARE THERMALLY PROTECTED. THREE PHASE MOTORS ARE PROTECTED AGAINST PRIMARY SINGLE PHASING CONDITIONS.
3. 208/230V UNIT TRAN IS WIRED FOR 230V UNIT. IF UNIT IS TO BE RUN WITH 208V POWER SUPPLY DISCONNECT BLK WIRE FROM 230V TAP AND CONNECT TO 200V TAP.
4. USE COPPER CONDUCTOR ONLY.

C	CONTACTOR,COMPRESSOR
CAP	CAPACITOR
CB	CIRCUIT BREAKER
CCH	CRANKCASE HEATER
CCN	CARRIER COMFORT NETWORK
CMP SAFE	COMPRESSOR SAFFETY
COMP	COMPRESSOR MOTOR
DDC	DIRECT DIGITAL CONTROL
FSD	FIRE SHUT DOWN
FU	FUSE
GND	GROUND
GVR	GAS VALVE RELAY
HPS	HIGH PRESSURE SWITCH
HS	HALL EFFECT SENSOR
I	IGNITOR
IAQ	INDOOR AIR QUALITY SENSORS
IDM	INDUCED DRAFT MOTOR
IDR	INDUCED DRAFT RELAY
IFC	INDOOR FAN CONTACTOR
IFM	INDOOR FAN MOTOR
IGC	INTEGRATED GAS CONTROL
IRH	INDOOR RELATIVE HUMIDITY
LA	LOW AMBIENT LOCKOUT
LAR	LOW AMBIENT RELAY
LAS	LOW AMBIENT SWITCH
LOOP PWR	CURRENT LOOP POWER
LPS	LOW PRESSURE SWITCH
LSM	LIMIT SWITCH (MANUAL RESET)
MGV	MAIN GAS VALVE
OAQ	OUTDOOR AIR QUALITY
OAT	OUTDOOR AIR TEMP. SEN
OFC	OUTDOOR FAN CONTACTOR
OFM	OUTDOOR FAN MOTOR
OLR	OVERLOAD RELAY
PER	POWER EXHAUST RELAY
PL	PLUG ASSEMBLY
POT	POTENTIOMETER
PMR	PHASE MONITOR RELAY
QT	QUADRUPLE TERMINAL
R	RELAY
RAT	RETURN AIR TEMP. SEN
RMT OCC	REMOTE OCCUPANCY
RS	ROLLOUT SWITCH
SAT	SUPPLY AIR TEMP. SENSOR
SEN	SENSOR
SET	SET POINT OFFSET
SFS	SUPPLY FAN STATUS
TDR	TIME DELAY RELAY
TRAN	TRANSFORMER

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Fig. 17 - Typical Control Diagram (All Voltages)

SEQUENCE OF OPERATION

General

The sequence below describes the sequence of operation for an electro-mechanical unit with and without a factory installed EconoMi$er™ IV (called "economizer" in this sequence). For information regarding a direct digital controller, see the start-up, operations, and troubleshooting manual for the applicable controller.

Electro-mechanical units with no economizer

Cooling —

When the thermostat calls for cooling, terminals G and Y1 are energized. As a result, the indoor-fan contactor (IFC) and the compressor contactor (C1) are energized, causing the indoor-an motor (IFM), compressor #1, and outdoor fan to start. If the unit has 2 stages of cooling, the thermostat will additionally energize Y2. The Y2 signal will energize compressor contactor #2 (C2), causing compressor #2 to start. Regardless of the number of stages, the outdoor-fan motor runs continuously while unit is cooling.

Heating —

NOTE: The 50HC is sold as cooling only. If electric heaters are required, use only factory-approved electric heaters. They will operate as described below.

Units have either 1 or 2 stages of electric heat. When the thermostat calls for heating, power is applied to the W1 terminal at the unit. The unit control will energize the indoor fan contactor and the first stage of electric heat. On units with two-stage heating, when additional heating is required, the second stage of electric heat (if equipped) will be energized when power is applied at the W2 terminal on the unit.

Electro-mechanical units with an economizer

Cooling —

When free cooling is not available, the compressors will be controlled by the zone thermostat. When free cooling is available, the outdoor-air damper is modulated by the EconoMi$er IV control to provide a 50°F (10°C) to 55°F (13°C) mixed-air temperature into the zone. As the mixed air temperature fluctuates above 55°F (13°C) or below 50°F (10°C) dampers will be modulated (open or close) to bring the mixed-air temperature back within control. If mechanical cooling is utilized with free cooling, the outdoor-air damper will maintain its current position at the time the compressor is started. If the increase in cooling capacity causes the mixed-air temperature to drop below 45°F (9°C), then the outdoor-air damper position will be decreased to the minimum position. If the mixed-air temperature continues to fall, the outdoor-air damper will close. Control returns to normal once the mixed-air temperature rises above 48°F (9°C). The power exhaust fans will be energized and de-energized, if installed, as the outdoor-air damper opens and closes.

If field-installed accessory CO_2 sensors are connected to the EconoMi$er IV control, a demand controlled ventilation strategy will begin to operate. As the CO_2 level in the zone increases above the CO_2 setpoint, the minimum position of the damper will be increased proportionally. As the CO_2 level decreases because of the increase in fresh air, the outdoor-air damper will be proportionally closed. For EconoMi$er IV operation, there must be a thermostat call for the fan (G). If the unit is occupied and the fan is on, the damper will operate at minimum position. Otherwise, the damper will be closed.

When the EconoMi$er IV control is in the occupied mode and a call for cooling exists (Y1 on the thermostat), the control will first check for indoor fan operation. If the fan is not on, then cooling will not be activated. If the fan is on, then the control will open the EconoMi$er IV damper to the minimum position.

On the initial power to the EconoMi$er IV control, it will take the damper up to 2 1/2 minutes before it begins to position itself. After the initial power-up, further changes in damper position can take up to 30 seconds to initiate. Damper movement from full closed to full open (or vice versa) will take between 1 1/2 and 2 1/2 minutes. If free cooling can be used as determined from the appropriate changeover command (switch, dry bulb, enthalpy curve, differential dry bulb, or differential enthalpy), then the control will modulate the dampers open to maintain the mixed-air temperature setpoint at 50°F (10°C) to 55°F (13°C). If there is a further demand for cooling (cooling second stage - Y2 is energized), then the control will bring on compressor stage 1 to maintain the mixed-air temperature setpoint. The EconoMi$er IV damper will be open at maximum position. EconoMi$er IV operation is limited to a single compressor.

Heating —

The sequence of operation for the heating is the same as an electromechanical unit with no economizer. The only difference is how the economizer acts. The economizer will stay at the Economizer Minimum Position while the evaporator fan is operating. The outdoor-air damper is closed when the indoor fan is not operating.

Refer to Service and Maintenance Manual for further details.

SEQUENCE OF OPERATION (cont.)

Optional Humidi-MiZer Dehumidification System

Units with the factory-equipped Humidi-MiZer option are capable of providing multiple modes of improved dehumidification as a variation of the normal cooling cycle. The Humidi-MiZer option includes additional valves in the liquid line and discharge line of each refrigerant circuit, a small reheat condenser coil downstream of the evaporator, and Motormaster variable-speed control of some or all outdoor fans. Operation of the revised refrigerant circuit for each mode is described below.

NOTE: x = refrigerant circuit A, B, or C.

Normal Cooling

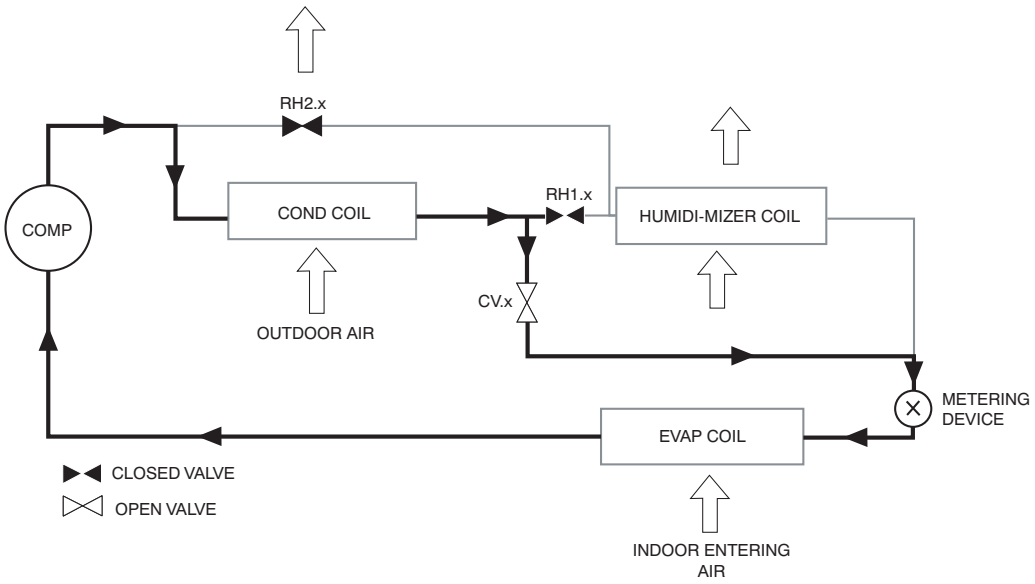
Refrigerant flows from the outdoor condenser through the normally open Cooling Valve (CV.x) to the expansion device. Reheat1 Valve (RH1.x) and Reheat2 Valve (RH2.x) are closed.

Reheat1 (Subcooling Mode) - 50HC17-28

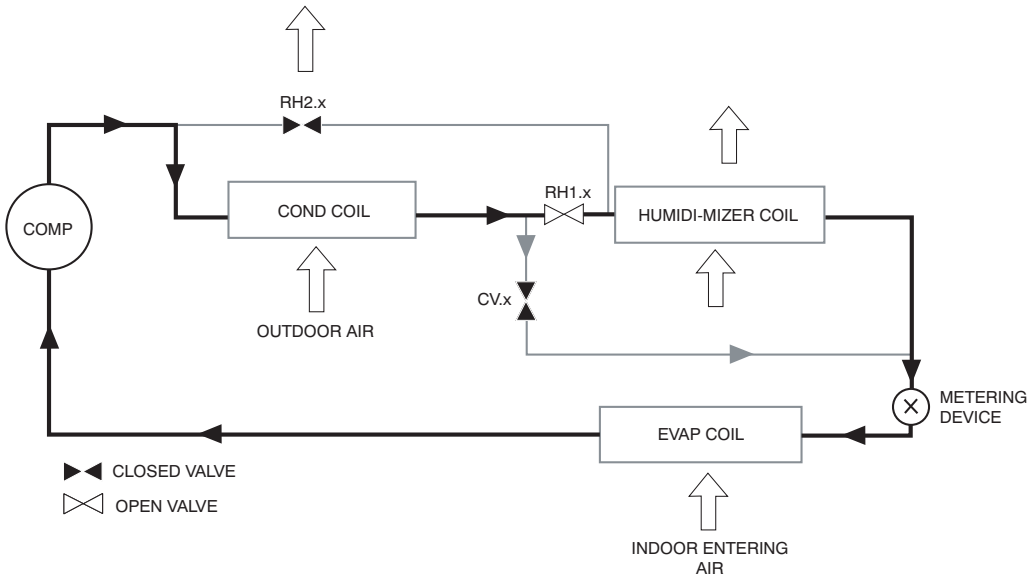
This mode increases latent cooling and decreases sensible cooling compared to normal cooling. Refrigerant flows from the outdoor condenser, through the normally open Reheat1 Valve (RH1.x), and through the reheat condenser coil to the expansion device. Cooling Valve (CV.x) and Reheat2 Valve (RH2.x) are closed.

Reheat2 (Hot Gas Reheat Mode) -50HC17-28

This mode provides maximum latent cooling with little to no sensible capacity. This mode can operate to provide dehumidification when there is no cooling demand. Like Reheat1 mode, refrigerant flows from the outdoor condenser, through the normally open Reheat1 Valve (RH1.x), and through the reheat condenser coil to the expansion device. The Cooling Valve (CV.x) is closed. Reheat2 Valve (RH2.x) is open which provides some compressor discharge gas to the reheat condenser to further increase the reheat of the evaporator airstream.



Normal Cooling Mode - Humidi-MiZer System (50HC17-28)



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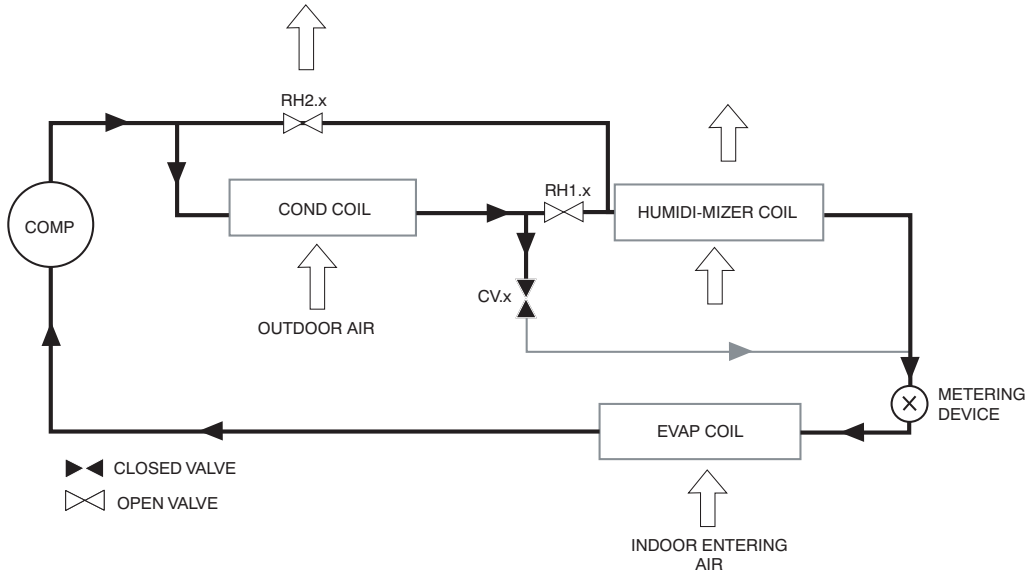
Subcooling Mode (Reheat 1) - Humidi-MiZer System (50HC17-28)



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Hot Gas Reheat Mode (Reheat2) - Humidi-MiZer System (50HC17-28)

GUIDE SPECIFICATIONS - 50HC-D17-28

Note about this specification:

These specifications are written in "Masterformat" as published by the Construction Specification Institute. Please feel free to copy this specification directly into your building spec.

Cooling Only/Electric Heat Packaged Rooftop

HVAC Guide Specifications

Size Range: **15 to 25 Nominal Tons**

Section **Description**

23 06 80 Schedules for Decentralized HVAC Equipment

23 06 80.13 Decentralized Unitary HVAC Equipment Schedule

23 06 80.13.A. Rooftop unit schedule

1. Schedule is per the project specification requirements.

23 07 16 HVAC Equipment Insulation

23 07 16.13 Decentralized, Rooftop Units:

23 07 16.13.A. Evaporator fan compartment:

1. Interior cabinet surfaces shall be insulated with a minimum 1/2-in. thick, minimum 1 1/2 lb density, flexible fiberglass insulation bonded with a phenolic binder, neoprene coated on the air side.
2. Insulation and adhesive shall meet NFPA 90A requirements for flame spread and smoke generation.

23 07 16.13.B. Electric heat compartment:

1. Aluminum foil-faced fiberglass insulation shall be used.
2. Insulation and adhesive shall meet NFPA 90A requirements for flame spread and smoke generation.

23 09 13 Instrumentation and Control Devices for HVAC

23 09 13.23 Sensors and Transmitters

23 09 13.23.A. Thermostats

1. Thermostat must
   a. energize both "W" and "G" when calling for heat.
   b. have capability to energize 2 different stages of cooling, and 2 different stages of heating.
   c. include capability for occupancy scheduling.

23 09 23 Direct-digital Control system for HVAC

23 09 23.13 Decentralized, Rooftop Units:

23 09 23.13.A. PremierLink controller

1. Shall be ASHRAE 62-2001 compliant.
2. Shall accept 18-32VAC input power.
3. Shall have an operating temperature range from -40°F (-40°C) to 158°F (70°C), 10% - 95% RH (non-condensing).
4. Shall include an integrated economizer controller to support an economizer with 4 to 20 mA actuator input and no microprocessor controller.
5. Controller shall accept the following inputs: space temperature, setpoint adjustment, outdoor air temperature, indoor air quality, outdoor air quality, indoor relative humidity, compressor lock-out, fire shutdown, enthalpy, fan status, remote time clock/door switch.
6. Shall accept a CO_2 sensor in the conditioned space, and be Demand Control Ventilation (DCV) ready.
7. Shall provide the following outputs: Economizer, fan, cooling stage 1, cooling stage 2, heat stage 1, heat stage 2, heat stage 3/ exhaust/ reversing valve/ dehumidify/ occupied.
8. Unit shall provide surge protection for the controller through a circuit breaker.
9. Shall be Internet capable, and communicate at a Baud rate of 38.4K or faster
10. Shall have an LED display independently showing the status of activity on the communication bus, and processor operation.
11. Shall include an EIA-485 protocol communication port, an access port for connection of either a computer or a Carrier technician tool, an EIA-485 port for network communication to intelligent space sensors and displays, and a port to connect an optional LonWorks plug-in communications card.

12. Shall have built-in Carrier Comfort Network (CCN) protocol, and be compatible with other CCN devices, including ComfortVIEW controllers.
13. Shall have built-in support for Carrier technician tool.
14. Software upgrades will be accomplished by local download. Software upgrades through chip replacements are not allowed.
15. Shall be shock resistant in all planes to 5G peak, 11ms during operation, and 100G peak, 11ms during storage.
16. Shall be vibration resistant in all planes to 1.5G @ 20-300 Hz.
17. Shall support a bus length of 4000 ft max, 60 devices per 1000 ft section, and 1 RS-485 repeater per 1000ft sections.

23 09 23.13.B. RTU Open protocol, direct digital controller:

1. Shall be ASHRAE 62-2001 compliant.
2. Shall accept 18-30VAC, 50-60Hz, and consumer 15VA or less power.
3. Shall have an operating temperature range from -40°F (-40°C) to 130°F (54°C), 10% - 90% RH (non-condensing).
4. Shall include built-in protocol for BACNET (MS/TP and PTP modes), Modbus (RTU and ASCII), Johnson N2 and LonWorks. LonWorks Echelon processor required for all Lon applications shall be contained in separate communication board.
5. Shall allow access of up to 62 network variables (SNVT). Shall be compatible with all open controllers
6. Baud rate Controller shall be selectable using a dipswitch.
7. Shall have an LED display independently showing the status of serial communication, running, errors, power, all digital outputs, and all analog inputs.
8. Shall accept the following inputs: space temperature, setpoint adjustment, outdoor air temperature, indoor air quality, outdoor air quality, compressor lock-out, fire shutdown, enthalpy switch, and fan status/filter status/ humidity/ remote occupancy.
9. Shall provide the following outputs: economizer, fan, cooling stage 1, cooling stage 2, heat stage 1, heat stage 2, heat stage 3/ exhaust/ reversing valve.
10. Shall have built-in surge protection circuitry through solid state polyswitches. Polyswitches shall be used on incoming power and network connections. Polyswitches will return to normal when the “trip” condition clears.
11. Shall have a battery back-up capable of a minimum of 10,000 hours of data and time clock retention during power outages.
12. Shall have built-in support for Carrier technician tool.
13. Shall include an EIA-485 protocol communication port, an access port for connection of either a computer or a Carrier technician tool, an EIA-485 port for network communication to intelligent space sensors and displays, and a port to connect an optional LonWorks communications card.
14. Software upgrades will be accomplished by either local or remote download. No software upgrades through chip replacements are allowed.

23 09 33 Electric and Electronic Control System for HVAC

23 09 33.13 Decentralized, Rooftop Units:

23 09 33.13.A. General:

1. Shall be complete with self-contained low-voltage control circuit protected by a resettable circuit breaker on the 24-v transformer side. Transformer shall have 75VA capability.
2. Shall utilize color-coded wiring.
3. Shall include a central control terminal board to conveniently and safely provide connection points for vital control functions such as: smoke detectors, phase monitor, economizer, thermostat, DDC control options, and low and high pressure switches.
4. Unit shall include a minimum of one 8-pin screw terminal connection board for connection of control wiring.

23 09 33.23.B. Safeties:

1. Compressor over-temperature, over current.
2. Low-pressure switch.
   a. Units shall have different sized connectors for the circuit 1 and circuit 2 low and high pressure switches. They shall physically prevent the cross-wiring of the safety switches between circuits 1 and 2.
   b. Low pressure switch shall use different color wire than the high pressure switch. The purpose is to assist the installer and service technician to correctly wire and or troubleshoot the rooftop unit.
3. High-pressure switch.
   a. Units compressors shall have different sized connectors for the circuit 1 and circuit 2 low and high pressure switches. They shall physically prevent the cross-wiring of the safety switches between circuits 1 and 2.

b. High pressure switch shall use different color wire than the low pressure switch. The purpose is to assist the installer and service technician to correctly wire and or troubleshoot the rooftop unit.

4. Automatic reset, motor thermal overload protector.

23 09 93 Sequence of Operations for HVAC Controls

23 09 93.13 Decentralized, Rooftop Units:

23 09 93.13 INSERT SEQUENCE OF OPERATION

23 40 13 Panel Air Filters

23 40 13.13 Decentralized, Rooftop Units:

23 40 13.13.A. Standard filter section

1. Shall consist of factory-installed, low velocity, throwaway 2-in. thick fiberglass filters of commercially available sizes.
2. Unit shall use only one filter size. Multiple sizes are not acceptable.
3. Filters shall be accessible through a dedicated, weather tight panel.
4. 4-in filter capabilities shall be capable with pre engineered and approved Carrier filter track field installed accessory. This kit requires field furnished filters.

23 81 19 Self-Contained Air Conditioners

23 81 19.13 Medium-Capacity Self-Contained Air Conditioners (50HC*D17-28)

23 81 19.13.A. General

1. Outdoor, rooftop mounted, electrically controlled, heating and cooling unit utilizing a(n) hermetic scroll compressor(s) for cooling duty and gas combustion for heating duty.
2. Factory assembled, single-piece heating and cooling rooftop unit. Contained within the unit enclosure shall be all factory wiring, piping, controls, and special features required prior to field start-up.
3. Unit shall use environmentally safe, Puron refrigerant.
4. Unit shall be installed in accordance with the manufacturer's instructions.
5. Unit must be selected and installed in compliance with local, state, and federal codes.

23 81 19.13.B. Quality Assurance

1. Unit meets ASHRAE 90.1 minimum efficiency requirements.
2. 3 phase units are Energy Star qualified where sizes are required.
3. Unit shall be rated in accordance with AHRI Standard 340/360.
4. Unit shall be designed to conform to ASHRAE 15.
5. Unit shall be ETL-tested and certified in accordance with ANSI Z21.47 Standards and ETL-listed and certified under Canadian standards as a total package for safety requirements.
6. Insulation and adhesive shall meet NFPA 90A requirements for flame spread and smoke generation.
7. Unit casing shall be capable of withstanding 500-hour salt spray exposure per ASTM B117 (scribed specimen).
8. Unit casing shall be capable of withstanding Federal Test Method Standard No. 141 (Method 6061) 5000-hour salt spray.
9. Unit shall be designed and manufactured in accordance with ISO 9001.
10. Roof curb shall be designed to conform to NRCA Standards.
11. Unit shall be subjected to a completely automated run test on the assembly line. The data for each unit will be stored at the factory, and must be available upon request.
12. Unit shall be designed in accordance with ETL Standard 1995, including tested to withstand rain.
13. Unit shall be constructed to prevent intrusion of snow and tested to prevent snow intrusion into the control box up to 40 mph.
14. Unit shake tested to assurance level 1, ASTM D4169 to ensure shipping reliability.
15. High Efficient Motors listed shall meet section 313 of the Energy Independence and Security Act of 2007 (EISA 2007)

23 81 19.13.C. Delivery, Storage, and Handling

1. Unit shall be stored and handled per manufacturer's recommendations.
2. Lifted by crane requires either shipping top panel or spreader bars.
3. Unit shall only be stored or positioned in the upright position.

23 81 19.13.D. Project Conditions

1. As specified in the contract.

23 81 19.13.E. Project Conditions

1. As specified in the contract.

23 81 19.13.F. Operating Characteristics

1. Unit shall be capable of starting and running at 125°F (52°C) ambient outdoor temperature, meeting maximum load criteria of AHRI Standard 340/360 at ± 10% voltage.
2. Compressor with standard controls shall be capable of operation from 35°F (2°C) , ambient outdoor temperatures. Accessory kits are necessary if mechanically cooling at ambient temperatures below 35°F (2°C).
3. Unit shall discharge supply air vertically or horizontally as shown on contract drawings.
4. Unit shall be factory configured and ordered for vertical supply & return configurations.
5. Unit shall be factory furnished for either vertical or horizontal configuration without the use of special conversion kits. No field kits conversion is possible.
6. Unit shall be capable of mixed operation: vertical supply with horizontal return or horizontal supply with vertical return.

23 81 19.13.G. Electrical Requirements

1. Main power supply voltage, phase, and frequency must match those required by the manufacturer.

23 81 19.13.H. Unit Cabinet

1. Unit cabinet shall be constructed of galvanized steel, and shall be bonderized and coated with a pre-painted baked enamel finish on all externally exposed surfaces.
2. Unit cabinet exterior paint shall be: film thickness, (dry) 0.003 inches minimum, gloss (per ASTM D523, 60°F): 60, Hardness: H-2H Pencil hardness.
3. Evaporator fan compartment interior cabinet insulation shall conform to AHRI Standards 340/360 minimum exterior sweat criteria. Interior surfaces shall be insulated with a minimum 1/2-in. thick, 1 lb density, flexible fiberglass insulation, neoprene coated on the air side. Aluminum foil-faced fiberglass insulation shall be used in the heat compartment.
4. Base of unit shall have a minimum of four locations for factory thru-the-base electrical connections. Connections shall be internal to the cabinet to protect from environmental issues.
5. Base Rail
   a. Unit shall have base rails on a minimum of 2 sides.
   b. Holes shall be provided in the base rails for rigging shackles to facilitate maneuvering and overhead rigging.
   c. Holes shall be provided in the base rail for moving the rooftop by fork truck.
   d. Base rail shall be a minimum of 16 gauge thickness.
6. Condensate pan and connections:
   a. Shall be a sloped condensate drain pan made of a non-corrosive material.
   b. Shall comply with ASHRAE Standard 62.
   c. Shall use a 3/4-in -14 NPT drain connection at the end of the drain pan. Connection shall be made per manufacturer's recommendations.
7. Top panel:

a. Shall be a multi-piece top panel linked with water tight flanges and interlocking systems.

8. Electrical Connections
   a. All unit power wiring shall enter unit cabinet at a single, factory-prepared, knockout location.
   b. Thru-the-base capability
   (1.) Standard unit shall have a thru-the-base electrical location(s) using a raised, embossed portion of the unit basepan.
   (2.) Optional, factory-approved, water-tight connection method must be used for thru-the-base electrical connections.
   (3.) No basepan penetration, other than those authorized by the manufacturer, is permitted.
9. Component access panels (standard)
   a. Cabinet panels shall be easily removable for servicing.
   b. Unit shall have one factory installed, tool-less, removable, filter access panel.
   c. Panels covering control box and filters shall have molded composite handles while the blower access door shall have an integrated flange for easy removal.
   d. Handles shall be UV modified, composite. permanently attached, and recessed into the panel.
   e. Screws on the vertical portion of all removable access panel shall engage into heat resistant, molded composite collars.

f. Collars shall be removable and easily replaceable using manufacturer recommended parts.

23 81 19.13.I. N/A

23 81 19.13.J. Coils

1. Standard Aluminum Fin/Copper Tube Coils:
   a. Standard evaporator and condenser coils shall have aluminum lanced plate fins mechanically bonded to seamless internally grooved copper tubes with all joints brazed.
   b. Evaporator coils shall be leak tested to 150 psig, pressure tested to 450 psig, and qualified to UL 1995 burst test at 1775 psig.
   c. Condenser coils shall be leak tested to 150 psig, pressure tested to 650 psig, and qualified to UL 1995 burst test at 1980 psig.
2. Optional Pre-coated aluminum-fin condenser coils:
   a. Shall have a durable epoxy-phenolic coating to provide protection in mildly corrosive coastal environments.
   b. Coating shall be applied to the aluminum fin stock prior to the fin stamping process to create an inert barrier between the aluminum fin and copper tube.
   c. Epoxy-phenolic barrier shall minimize galvanic action between dissimilar metals.
3. Optional Copper-fin evaporator and condenser coils:
   a. Shall be constructed of copper fins mechanically bonded to copper tubes and copper tube sheets.
   b. Galvanized steel tube sheets shall not be acceptable.
   c. A polymer strip shall prevent coil assembly from contacting the sheet metal coil pan to minimize potential for galvanic corrosion between coil and pan.
4. Optional E-coated aluminum-fin evaporator and condenser coils:
   a. Shall have a flexible epoxy polymer coating uniformly applied to all coil surface areas without material bridging between fins.
   b. Coating process shall ensure complete coil encapsulation of tubes, fins and headers.
   c. Color shall be high gloss black with gloss per ASTM D523-89.
   d. Uniform dry film thickness from 0.8 to 1.2 mil on all surface areas including fin edges.
   e. Superior hardness characteristics of 2H per ASTM D3363-92A and cross-hatch adhesion of 4B-5B per ASTM D3359-93.
   f. Impact resistance shall be up to 160 in.-lb (ASTM D2794-93).
   g. Humidity and water immersion resistance shall be up to minimum 1000 and 250 hours respectively (ASTM D2247-92 and ASTM D870-92).
   h. Corrosion durability shall be confirmed through testing to be no less than 1000 hours salt spray per ASTM B117-90.
5. Optional E-coated aluminum-fin, aluminum tube condenser coils:
   a. Shall have a flexible epoxy polymer coating uniformly applied to all coil external surface areas without material bridging between fins or louvers.
   b. Coating process shall ensure complete coil encapsulation, including all exposed fin edges.
   c. E-coat 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, shall be provided.
   d. Shall have superior hardness characteristics of 2H per ASTM D3363-00 and cross-hatch adhesion of 4B-5B per ASTM D3359-02.
   e. Shall have superior impact resistance with no cracking, chipping or peeling per NSF/ANSI 51-2002 Method 10.2.

23 81 19.13.K. Refrigerant Components

1. Refrigerant circuit shall include the following control, safety, and maintenance features:
   a. Thermostatic Expansion Valve (TXV) shall help provide optimum performance across the entire operating range. Shall contain removable power element to allow change out of power element and bulb without removing the valve body.
   b. Refrigerant filter drier.
   c. Service gauge connections on suction and discharge lines.
   d. Pressure gauge access through a specially designed screen on the side of the unit.
2. Compressors
   a. Unit shall use one fully hermetic, scroll compressor for each independent refrigeration circuit.
   b. Models shall be available with 2 compressor/2 stage cooling.
   c. Compressor motors shall be cooled by refrigerant gas passing through motor windings.

d. Compressors shall be internally protected from high discharge temperature conditions.
e. Compressors shall be protected from an over-temperature and over-amperage conditions by an internal, motor overload device.
f. Compressor shall be factory mounted on rubber grommets.
g. Compressor motors shall have internal line break thermal, current overload and high pressure differential protection.
h. Crankcase heaters shall not be required for normal operating range, unless provided by the factory.

23 81 19.13.L. Filter Section

1. Filters access is specified in the unit cabinet section of this specification.
2. Filters shall be held in place by a preformed slide out filter tray, facilitating easy removal and installation.
3. Shall consist of factory-installed, low velocity, throw-away 2-in. thick fiberglass filters.
4. Filters shall be standard, commercially available sizes.
5. Only one size filter per unit is allowed.
6. 4-in filter capability is possible with a field installed pre engineered slide out filter track accessory. 4-in filters are field furnished.

23 81 19.13.M. Evaporator Fan and Motor

1. Evaporator fan motor:
   a. Shall have inherent automatic-reset thermal overload protection or circuit breaker.
   b. Shall have a maximum continuous bhp rating for continuous duty operation; no safety factors above that rating shall be required.
2. Belt-driven Evaporator Fan:
   a. Belt drive shall include an adjustable-pitch motor pulley and belt break protection system..
   b. Shall use rigid pillow block bearing system with lubricate fittings at are accessible or lubrication line.
   c. Blower fan shall be double-inlet type with forward-curved blades.
   d. Shall be constructed from steel with a corrosion resistant finish and dynamically balanced.
   e. Standard on all 17-28 size models with Humidi-MiZer.

23 81 19.13.N. Condenser Fans and Motors

1. Condenser fan motors:
   a. Shall be a totally enclosed motor.
   b. Shall use permanently lubricated bearings.
   c. Shall have inherent thermal overload protection with an automatic reset feature.
   d. Shall use a shaft-down design.
2. Condenser Fans:
   a. Shall be a direct-driven propeller type fan.
   b. Shall have aluminum blades riveted to corrosion-resistant steel spiders and shall be dynamically balanced.

23 81 19.13.O. Special Features, Options and Accessories

1. Integrated Economizers:
   a. Integrated, gear-driven opposing blade design type capable of simultaneous economizer and compressor operation.
   b. Independent modules for vertical or horizontal return configurations shall be available. Vertical and horizontal return modules shall be available as a factory installed option.
   c. Damper blades shall be galvanized steel with composite gears. Plastic or composite blades on intake or return shall not be acceptable.
   d. Shall include all hardware and controls to provide free cooling with outdoor air when temperature and/or humidity are below setpoints.
   e. Shall be equipped with gear driven dampers for both the outdoor ventilation air and the return air for positive air stream control.
   f. Shall be equipped with low-leakage dampers, not to exceed 2% leakage at 1 in. wg pressure differential.
   g. Shall be capable of introducing up to 100% outdoor air.
   h. Shall be equipped with a barometric relief damper capable of relieving up to 100% return air.
   i. Shall be designed to close damper(s) during loss-of-power situations with spring return built into motor.
   j. Dry bulb outdoor-air temperature sensor shall be provided as standard. Outdoor air sensor setpoint shall be adjustable and shall range from 40 to 100°F / 4 to 38°C. Additional sensor options shall be available as accessories.

k. The economizer controller shall also provide control of an accessory power exhaust unit. function. Factory set at 100%, with a range of 0% to 100%.

l. The economizer shall maintain minimum airflow into the building during occupied period and provide design ventilation rate for full occupancy. A remote potentiometer may be used to override the damper setpoint.

m. Dampers shall be completely closed when the unit is in the unoccupied mode.

n. Economizer controller shall accept a 2-10Vdc CO_2 sensor input for IAQ/DCV control. In this mode, dampers shall modulate the outdoor-air damper to provide ventilation based on the sensor input.

o. Compressor lockout sensor shall open at 35°F (2°C) and close closes at 50°F (10°C).

p. Actuator shall be direct coupled to economizer gear. No linkage arms or control rods shall be acceptable.

q. Economizer controller shall provide indications when in free cooling mode, in the DCV mode, or the exhaust fan contact is closed.

2. Two-Position Motorized Damper

a. Damper shall be a Two-Position Damper. Damper travel shall be from the full closed position to the field adjustable %-open setpoint.

b. Damper shall include adjustable damper travel from 25% to 100% (full open).

c. Damper shall include single or dual blade, gear driven dampers and actuator motor.

d. Actuator shall be direct coupled to damper gear. No linkage arms or control rods shall be acceptable.

e. Damper will admit up to 100% outdoor air for applicable rooftop units.

f. Damper shall close upon indoor (evaporator) fan shutoff and/or loss of power.

g. The damper actuator shall plug into the rooftop unit's wiring harness plug. No hard wiring shall be required.

h. Outside air hood shall include aluminum water entrainment filter

3. Manual damper

a. Manual damper package shall consist of damper, air inlet screen, and rain hood which can be preset to admit up to 25% outdoor air for year round ventilation.

4. Humidi-MiZer Adaptive Dehumidification System:

a. The Humidi-MiZer Adaptive Dehumidification System shall be factory-installed in two stage 50HC17-28 models with RTPF (round tube plate fin) condenser coils, and shall provide greater dehumidification of the occupied space by two modes of dehumidification operations beside its normal design cooling mode:

(1.) Subcooling mode further subcools the hot liquid refrigerant leaving the condenser coil when both temperature and humidity in the space are not satisfied.

(2.) Hot gas reheat mode shall mix a portion of the hot gas from the discharge of the compressor with the hot liquid refrigerant leaving the condenser coil to create a two-phase heat transfer in the system, resulting in a neutral leaving- air temperature when only humidity in the space is not satisfied.

(3.) Includes Head Pressure Controller.

5. Head Pressure Control Package

a. Controller shall control coil head pressure by condenser-fan speed modulation or condenser-fan cycling and wind baffles.

b. Shall consist of solid-state control and condenser-coil temperature sensor to maintain condensing temperature between 90°F (32°C) and 110°F (43°C) at outdoor ambient temperatures down to -20°F (-29°C).

6. Condenser Coil Hail Guard Assembly

a. Shall protect against damage from hail.

b. Shall be louvered style design.

7. Unit-Mounted, Non-Fused Disconnect Switch:

a. Switch shall be factory-installed, internally mounted.

b. National Electric Code (NEC) and ETL approved non-fused switch shall provide unit power shutoff.

c. Shall be accessible from outside the unit

d. Shall provide local shutdown and lockout capability.

8. Convenience Outlet:

a. Powered convenience outlet.

(1.) Outlet shall be powered from main line power to the rooftop unit.

(2.) Outlet shall be powered from line side of disconnect by installing contractor, as required by code. If outlet is powered from load side of disconnect, unit electrical ratings shall be ETL certified and rated for additional outlet amperage.

(3.) Outlet shall be factory-installed and internally mounted with easily accessible 115-v female receptacle.

(4.) Outlet shall include 15 amp GFI receptacles with independent fuse protection.

(5.) Voltage required to operate convenience outlet shall be provided by a factory-installed step-down transformer.

(6.) Outlet shall be accessible from outside the unit.

(7.) Outlet shall include a field-installed "Wet in Use" cover.

b. Non-Powered convenience outlet.

(1.) Outlet shall be powered from a separate 115/120v power source.

(2.) A transformer shall not be included.

(3.) Outlet shall be factory-installed and internally mounted with easily accessible 115-v female receptacle.

(4.) Outlet shall include 15 amp GFI receptacles with independent fuse protection.

(5.) Outlet shall be accessible from outside the unit.

(6.) Outlet shall include a field-installed "Wet in Use" cover.

9. Thru-the-Base Connectors:
   a. Kits shall provide connectors to permit electrical connections to be brought to the unit through the unit basepan.
   b. Minimum of four connection locations per unit.
10. Fan/Filter Status Switch:
   a. Switch shall provide status of indoor evaporator fan (ON/OFF) or filter (CLEAN/DIRTY).
   b. Status shall be displayed either over communication bus (when used with direct digital controls) or with an indicator light at the thermostat.
11. Centrifugal Power Exhaust:
   a. Power exhaust shall be used in conjunction with an integrated economizer.
   b. Independent modules for vertical or horizontal return configurations shall be available.
   c. Horizontal power exhaust is shall be mounted in return ductwork.
   d. Power exhaust shall be controlled by economizer controller operation. Exhaust fans shall be energized when dampers open past the 0-100% adjustable setpoint on the economizer control.
12. Roof Curbs (Vertical):
   a. Full perimeter roof curb with exhaust capability providing separate air streams for energy recovery from the exhaust air without supply air contamination.
   b. Formed galvanized steel with wood nailer strip and shall be capable of supporting entire unit weight.
   c. Permits installation and securing of ductwork to curb prior to mounting unit on the curb.
13. Adapter Curb (Vertical):
   a. Full perimeter, fully assembled and welded roof curb with exhaust capability providing separate air streams for energy recovery from the exhaust air without supply air contamination.
   b. Formed galvanized steel with wood nailer strip and shall be capable of supporting entire unit weight.
   c. Permits installation of new 50HC17-28 models to past Carrier design curb models: DP,DR,HJ,TM, and TJ. Check with Carrier sales expert of further details and information.
14. High-Static Indoor Fan Motor(s) and Drive(s):
   a. High-static motor(s) and drive(s) shall be factory-installed to provide additional performance range.
15. Thru-the-Bottom Utility Connectors:
   a. Kit shall provide connectors to permit gas and electrical connections to be brought to the unit through the basepan.
16. Outdoor Air Enthalpy Sensor:
   a. The outdoor air enthalpy sensor shall be used to provide single enthalpy control. When used in conjunction with a return air enthalpy sensor, the unit will provide differential enthalpy control. The sensor allows the unit to determine if outside air is suitable for free cooling.
17. Return Air Enthalpy Sensor:
   a. The return air enthalpy sensor shall be used in conjunction with an outdoor air enthalpy sensor to provide differential enthalpy control.
18. Indoor Air Quality (CO_2) Sensor:
   a. Shall be able to provide demand ventilation indoor air quality (IAQ) control.
   b. The IAQ sensor shall be available in duct mount, wall mount, or wall mount with LED display. The setpoint shall have adjustment capability.
19. Smoke detectors:
   a. Shall be a Four-Wire Controller and Detector.
   b. Shall be environmental compensated with differential sensing for reliable, stable, and drift-free sensitivity.

c. Shall use magnet-activated test/reset sensor switches.
d. Shall have tool-less connection terminal access.
e. Shall have a recessed momentary switch for testing and resetting the detector.
f. Controller shall include:
(1.) One set of normally open alarm initiation contacts for connection to an initiating device circuit on a fire alarm control panel.
(2.) Two Form-C auxiliary alarm relays for interface with rooftop unit or other equipment.
(3.) One Form-C supervision (trouble) relay to control the operation of the Trouble LED on a remote test/reset station.
(4.) Capable of direct connection to two individual detector modules.
(5.) Can be wired to up to 14 other duct smoke detectors for multiple fan shutdown applications.

20. Winter start kit
a. Shall contain a bypass device around the low pressure switch.
b. Shall be required when mechanical cooling is required down to 25°F (-4°C).
c. Shall not be required to operate on an economizer when below an outdoor ambient of 40°F (4°C).

21. Time Guard
a. Shall prevent compressor short cycling by providing a 5-minute delay (±2 minutes) before restarting a compressor after shutdown for any reason.
b. One device shall be required per compressor.

22. Electric Heat:
a. Heating Section
(1.) Heater element open coil resistance wire, nickel-chrome alloy, 0.29 inches inside diameter, strung through ceramic insulators mounted on metal frame. Coil ends are staked and welded to terminal screw slots.
(2.) Heater assemblies are provided with integral fusing for protection of internal heater circuits not exceeding 48 amps each. Auto reset thermo limit controls, magnetic heater contactors (24 v coil) and terminal block all mounted in electric heater control box (minimum 18 ga galvanized steel) attached to end of heater assembly.

23. Barometric Hood (Horizontal Economizer Applications)
a. Shall be required when a horizontal economizer and barometric relief are required. Barometric relief damper must be installed in the return air (horizontal) duct work. This hood provides weather protection.

24. Hinged Access Panels
a. Shall provide easy access through integrated quarter turn latches.
b. Shall be on major panels of – filter, control box, fan motor and compressor

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