

**50TC**

**Cooling Only/Electric Heat**

**Packaged Rooftop**

**Vertical Models**

**Nominal Tons 15, 17.5, 20, 25, 27.5**

**Model Sizes 17, 20, 24, 28, 30**



turn to the experts 

## Product Data



**WeatherMaker<sup>®</sup>**



(Unit shown with economizer and power exhaust.)

C12590



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turn to the experts

The 15 to 27.5 ton WeatherMaker 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 WeatherMaker units are designed for dedicated factory supplied vertical 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 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. Carrier rooftops have high and low pressure switches, a filter drier, and 2-in (51mm) filters standard.

**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.

## FEATURES AND BENEFITS

- 2-stage cooling capacity with independent circuits and control.
- Round tube/plate fin (RTPF) available on all sizes or NOVATION all aluminum condenser (outdoor) coils available on 17-28 sizes only. Special coil-coating also available for coastal and industrial environments
- EER's up to 11.0.
- IEER's up to 12.2 with single speed indoor fan motor and up to 12.9 with 2-speed/VFD indoor fan motor
- Dedicated vertical 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. Field supplied couplings are required.
- 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.
- Proven Acutrol refrigerant metering system.
- Easy-adjust, belt-drive motor available. 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 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, large, 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 (115°F to 30°F / 46°C to -1°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. Available on 17-28 sizes with RTPF condenser coil models only.
- Standard Parts Warranty: 10 year aluminized heat exchanger, 5 year compressor, 3 year NOVATION™ condenser coil, 1 year others.
- Optional Staged Air Volume (SAV) system utilizes a Variable Frequency Drive (VFD) to automatically adjust the indoor fan motor speed between cooling stages. Available on 2-stage cooling models 17-30 with electromechanical controls or RTU Open.

# MODEL NUMBER NOMENCLATURE

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

## Product Type

50 = Elect Heat Pkg. Rooftop

## Model Series

TC = Standard Efficiency

## Heat Size

- = No heat

## Refrigerant System Options

D = 2 stage Cooling

E = 2 stg cooling w/Al/Cu cond. coil and with Humidi-MiZer (17-28 sizes w/RTPF)

## Cooling Tons (vertical air flow models only)

17 = 15 ton

20 = 17.5 ton

24 = 20 ton

28 = 25 ton

30 = 27.5 ton

## Sensor Options

A = None

B = RA Smoke Detector

C = SA Smoke Detector

D = RA + SA Smoke Detector

E = CO<sub>2</sub> Sensor

F = RA Smoke Detector + CO<sub>2</sub>

G = SA Smoke Detector + CO<sub>2</sub>

H = RA + SA Smoke Detector + CO<sub>2</sub>

## Indoor Fan Options (vertical air flow models only)

1 = Standard Static Option

2 = Medium Static Option

3 = High Static Option

B = Medium Static High Eff Motor/Vertical Supply, Return, Airflow

C = High Static ; High Eff Motor/Vertical Supply, Return, Airflow

## Coil Options

### Round Tube Plate Fin (RTPF) (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

Q = E-coat Al/Cu - E-Coat Al/Cu - Louvered

R = Cu/Cu - Al/Cu - Louvered

S = Cu/Cu - Cu/Cu - Louvered

### Novation Coils Only (Outdoor-Indoor-Hail Guard)

G = Al/Al - Al/Cu

H = Al/Al - Cu/Cu

J = Al/Al - E-coat Al/Cu

K = Al/Al E-coat - Al/Cu

L = Al/Al E-coat - E-coat Al/Cu

T = Al/Al - Al/Cu, Louvered Hail Guard

U = Al/Al - Cu/Cu, Louvered Hail Guard

V = Al/Al - E-coat Al/Cu, Louvered Hail Guard

W = Al/Al E-coat - Al/Cu, Louvered

X = Al/Al E-coat - Al/Cu E-coat, Louvered

Not all possible options can be displayed above - see price pages or contact your Carrier Expert for more details.

## Packaging

0 = Standard

3 = CA Seismic Compliant

## Electrical Options

A = None

C = Non-fused disconnect

G = 2-speed indoor fan (VFD) controller

J = 2-spd contr (VFD) & non-fused disc.

## Service Options

0 = None

1 = Un-powered Convenience Outlet

2 = Powered Convenience Outlet

3 = Hinged Panels

4 = Hinged Panels, un-powered C.O.

5 = Hinged Panels, powered C.O.

## Intake / Exhaust Options

A = None

B = Temperature Economizer w/Barometric Relief

F = Enthalpy Economizer w/Barometric Relief

K = 2 position Damper

U = Temp Ultra Low Leak Economizer w/Baro Relief

V = Temp Ultra Low Leak Econo w/PE (vertical)

W = Enthalpy Ultra Low Leak Econo w/Baro Relief

X = Enthalpy Ultra Low Leak Econo w/PE (vertical)

## Base Unit Controls

0 = Electro mechanical controls. Can be used with W7212 EconoMi\$er IV (Non-Fault Detection & Diagnostic)

1 = PremierLink Controller

2 = RTU Open Multi-Protocol Controller

6 = Electro mechanical controls. Can be used with W7220 EconoMi\$er X (Fault Detection & Diagnostic)

## Design Revision

- = Factory Design Revision

## Voltage

1 = 575/3/60

5 = 208-230/3/60

6 = 460/3/60

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

CATEGORY	ITEM	FACTORY INSTALLED OPTION	FIELD INSTALLED ACCESSORY
<b>Cabinet</b>	Hinged Access Panels	X	
	California Seismic Compliant Labeling (17–28 sizes only)	X	
<b>Coil Options</b>	Cu/Cu (indoor) coils	X	
	E–coated indoor & outdoor coils	X	
<b>Humidity Control</b>	Humidi–MiZer Adapt. Dehumidification System (17–28 RTPF)	X	
<b>Condenser Protection</b>	Condenser coil hail guard (louvered design)	X	X
<b>Controls</b>	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
	Carrier Energy Demand System (EDS)		X
<b>Economizers &amp; Outdoor Air Dampers</b>	EconoMi\$er IV for electro–mechanical controls –Non FDD (Standard air leak damper models) <sup>6</sup>	X	X
	EconoMi\$er2 (for DDC controls, complies with FDD (Standard and Ultra Low Leak air damper models) <sup>6,7</sup>	X	X
	Motorized 2 position outdoor–air damper	X	X
	Manual outdoor–air damper (25%)	X	X
	Barometric relief <sup>1</sup>	X	X
	Power exhaust–centrifugal blower	X	X
	EconoMi\$er X for electro–mechanical controls, complies with FDD. (Standard and Ultra Low Leak air damper models) <sup>6</sup>	X	X
<b>Economizer Sensors &amp; IAQ Devices</b>	Single dry bulb temperature sensors <sup>2</sup>	X	X
	Differential dry bulb temperature sensors <sup>2</sup>		X
	Single enthalpy sensors <sup>2</sup>	X	X
	Differential enthalpy sensors <sup>2</sup>		X
	CO <sub>2</sub> sensor (wall, duct, or unit mounted) <sup>3</sup>	X	X
<b>Electric Heat</b>	Electric Resistance Heaters		X
	Single Point Kit		X
<b>Indoor Motor &amp; Drive</b>	Multiple motor and drive packages	X	
	Staged Air Vol (SAV) system w/VFD controller (2–stage cool only with electrical mechanical and RTU Open controls)	X	
	Display Kit for SAV system with VFD		X
<b>Low Ambient Control</b>	Winter start kit <sup>3</sup>		X
	Motormaster head pressure controller <sup>3</sup>		X
<b>Power Options</b>	Convenience outlet (powered)	X	
	Convenience outlet (unpowered)	X	
	Non–fused disconnect <sup>4</sup>	X	
<b>Roof Curbs</b>	Roof curb 14–in (356mm)		X
	Roof curb 24–in (610mm)		X
	Adapter Curb (Adapts to Models – DP/DR/HJ/TM/TJ) <sup>5</sup> (17–24)		X

**NOTES:**

- Included with economizer.
- Sensors for optimizing economizer.
- See application data for assistance.
- Non–fused disconnect switch cannot be used when unit FLA rating exceeds 200 amps on 208/230 volt and 100 amps on 460/575 volt units. Carrier Packaged RTUBuilder selects this automatically.
- Not for 48TJE028–028 models using 48DP900041, 48DP900051 or 48DP900061 roofcurbs.
- FDD – (Fault Detection and Diagnostic) capability per California Title 24 section 120.2.
- Models with RTU Open DDC controls comply with California Title 24 Fault Dection and Diagnostic (FDD). PremierLink is non FDD.

# FACTORY OPTIONS AND/OR ACCESSORIES

## **Economizer (dry-bulb or enthalpy)**

Economizers save energy, money and improve comfort levels in the conditioned space. They bring in fresh, outside air for ventilation; and provide cool outside air to cool your building. This also is the preferred method of low ambient cooling. When integrated with CO<sub>2</sub> sensors, economizers can provide even more savings by coupling the ventilation air to only that amount required based on space occupancy. Economizers are available, installed and tested by the factory, with either enthalpy or temperature dry-bulb inputs. There are also models for electromechanical, direct digital controllers and single speed fan or 2-speed indoor fan motors. Additional sensors are available as accessories to optimize the economizer. Economizers include gravity controlled barometric relief that helps equalize building pressure and ambient air pressures. This can be a cost effective solution to prevent building pressurization. Economizers are available in Ultra Low Leak and standard low leak versions.

## **CO<sub>2</sub> 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<sub>2</sub> sensor detects their presence through increasing CO<sub>2</sub> levels, and opens the economizer appropriately.

When the occupants leave, the CO<sub>2</sub> 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. Not available with 2-speed indoor fan motor.

## **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 WeatherMaker 50TC17-28 rooftop unit.

This system expands the envelope of operation of Carrier's WeatherMaker 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 WeatherMaker 50TC17-28 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.

### Staged Air Volume (SAV) Indoor Fan Speed System

Carrier's Staged Air Volume (SAV) system saves energy and installation time by utilizing a Variable Frequency Drive (VFD) to automatically adjust the indoor fan motor speed in sequence with the units cooling operation. Per ASHRAE 90.1 2010 standard section 6.4.3.10.b, during the first stage of cooling operation the VFD will adjust the fan motor to provide 2/3rd of the total cfm established for the unit. When a call for the second stage of cooling is required, the VFD will allow the total cfm for the unit established (100%). During the heating mode the VFD will allow total design cfm (100%) operation and during the ventilation mode the VFD will allow operation to 2/3rd of total cfm.

Compared to single speed indoor fan motor systems, Carrier's SAV system can save substantial energy, 25%+\*, versus single speed indoor fan motor systems.

The VFD used in Carrier's SAV system has soft start capabilities to slowly ramp up the speeds, thus eliminating any high inrush air volume during initial start-up. It also has internal over current protection for the fan motor and a field installed display kit that allows adjustment and in depth diagnostics of the VFD.

This SAV system is available on models with 2-stage cooling operation with electrical mechanical or RTU Open, Multi Protocol controls. Both space sensor and conventional thermostats controls can be used to provide accurate control in any application.

The SAV system is very flexible for initial fan performance set up and adjustment. The standard factory shipped VFD is pre-programmed to automatically stage the fan speed between the first and second stage of cooling. The unit fan performance static pressure and cfm can be easily adjusted using the traditional means of pulley adjustments. The other means to adjust the unit static and cfm performance is to utilize the field installed Display Kit and adjust the frequency and voltage in the VFD to required performance requirements. In either case, once set up, the VFD will automatically adjust the speed between the cooling stage operations.

\*Data based on .10 (\$/kWh) in an office application utilizing Carrier's HAP 4.6 simulation software program

### 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.

MotorMaster allows cooling operation down to -20°F (-29°C) ambient conditions.

### 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 provisions/connection points are available as standard with every unit. When bottom connections are required, field furnished couplings are required.

## FACTORY OPTIONS AND/OR ACCESSORIES (cont.)

### Hinged Access Panels

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

### 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.

### Carrier Energy Demand System(EDS)

Carrier's wireless automated demand management and demand response controllers can be easily installed onto any packaged rooftop unit. Once installed, the controllers work together like a swarm of bees, intelligently communicating and managing the duty cycles of the units being controlled.

Utilizing patented intelligence, the controllers dramatically reduce peak electrical demand by up to 30 percent in commercial and light industrial properties and allow for effective scheduling of overnight and weekend loads. This platform can easily be installed when a full building automation system is not required.

The Energy Demand System is as easy to install as thermostats, and requires no special training. Every controller has a built-in self-configuring wireless network. The controllers work together to establish a wireless network, eliminating the need for expensive wiring. The secure web portal allows property managers to easily access multiple sites from any internet connection to monitor building performance and reconfigure controllers for demand response or the scheduling of loads.

- Simple, affordable, wireless electrical demand management
- Automated demand response, including Open ADR
- Energy consumption reduction through efficient schedule-based control
- Intelligent, adaptive energy management
- Web-based interface
- Electrical demand reductions
- Reduce energy costs, not comfort

### California OSHPD Seismic Certification Label (17-28 sizes)

Units meet the seismic requirements of the International Code Council Evaluation Service (ICC-ES) document AC156 (Acceptance Criteria for Seismic Qualification by Shake-Table Testing of Nonstructural Components and Systems) and per International Building Code (IBC 2009) at an SDS (g) value of 2.00 z/h=1.0, Ip=1.5 and certified by independent structural engineers. A certification label is applied to the unit that meets the CA OSHPD Special Seismic Certification pre-approval labeling requirements on the external chassis of the unit.



**Table 2 – AHRI COOLING RATING TABLE 2-STAGE COOLING**

UNIT	COOLING STAGES	NOM. CAPACITY (TONS)	NET COOLING CAPACITY (MBH)	TOTAL POWER (kW)	EER	IEER WITH SINGLE SPEED INDOOR MOTOR	IEER WITH 2-SPEED INDOOR MOTOR
17	2	15	202.0	18.4	11.0	12.2	12.9
20	2	17.5	208.0	18.9	11.0	11.9	12.9
24	2	20	242.0	24.2	10.0	10.8	11.9
28	2	25	280.0	28.0	10.0	10.6	11.7
30	2	27.5	330.0	31.7	10.4	10.6	11.7

**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



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](http://www.ahridirectory.org).



**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 50TC units comply with ASHRAE 90.1 Energy Standard for minimum EER and IEER requirements.
4. Where appropriate, 50TC 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 (CFM) COOLING AND ELECTRIC HEAT**

Model Size	COOLING		Electric Heaters		Nominal KW
	Minimum	Maximum	Minimum	Maximum	
17	4500	7500	4500	7500	25
					50
					75
20	5250	9000	5200	9000	25
					50
					75
24	6000	10000	6000	10000	25
					50
					75
28	7500	12500	7000	12500	25
					50
					75
30	8250	13750	8500	13750	25
					50
					75

**Table 4 – SOUND PERFORMANCE TABLE**

MODE SIZE	CLG STAGES	OUTDOOR SOUND (dB)									
		A-Wgt	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
30	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 depends on specific environmental factors which normally 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 “average” human ear. A-weighted measurements for Carrier units are taken in accordance with AHRI standard 270–2008.

**Table 5 – PHYSICAL DATA  
RTPF (Round Tube/Plate Fin Coil Design)**

**(COOLING)**

**15-27.5 TONS**

		<b>50TC–D17</b>	<b>50TC–E17</b>	<b>50TC–D20</b>	<b>50TC–E20</b>
<b>Refrigeration System</b>		RTPF	RTPF	RTPF	RTPF
# Circuits / # Comp. / Type		2 / 2 / Scroll	2 / 2 / Scroll	2 / 2 / Scroll	2 / 2 / Scroll
R–410a charge A/B (lbs)		16.3/17.5	25.9/25.7	16.3/17.5	25.9/25.7
Metering device		Acutrol	TXV	Acutrol	TXV
High–press. Trip / Reset (psig)		630 / 505	630 / 505	630 / 505	630 / 505
Low–press. Trip / Reset (psig)		54 / 117	27 / 44	54 / 117	27 / 44
<b>Evap. Coil</b>					
Material		Cu / Al	Cu / Al	Cu / Al	Cu / Al
Tube Diameter		3/8"	3/8"	3/8"	3/8"
Rows / FPI		4 / 15	4 / 15	4 / 15	4 / 15
total face area (ft <sup>2</sup> )		22.00	22.00	22.00	22.00
Condensate drain conn. size		3/4"	3/4"	3/4"	3/4"
<b>Humidimizer Coil</b>					
Material		n/a	Cu / Al	n/a	Cu / Al
Tube Diameter		n/a	3/8"	n/a	3/8"
Rows / FPI		n/a	1 / 17	n/a	1 / 17
total face area (ft <sup>2</sup> )		n/a	22.00	n/a	22.00
<b>Evap. fan and motor</b>					
<b>VERTICAL</b>					
<b>Standard Static</b>	Motor Qty / Belt Qty / Driver Type	1 / 1 / Belt	1 / 1 / Belt	1 / 1 / Belt	1 / 1 / Belt
	Max BHP	2.2	2.2	3.3	3.3
	RPM range	514–680	514–680	622–822	622–822
	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
<b>Medium Static</b>	Motor Qty / Belt Qty / Driver Type	1 / 1 / Belt	1 / 1 / Belt	1 / 1 / Belt	1 / 1 / Belt
	Max BHP	3.3	3.3	4.9	4.9
	RPM range	679–863	679–863	713–879	713–879
	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
<b>High Static</b>	Motor Qty / Belt Qty / Driver Type	1 / 1 / Belt	1 / 1 / Belt	n/a	n/a
	Max BHP	4.9	4.9	n/a	n/a
	RPM range	826–1009	826–1009	n/a	n/a
	motor frame size	56	56	n/a	n/a
	Fan Qty / Type	2 / Centrifugal	2 / Centrifugal	n/a	n/a
	Fan Diameter (in)	15 x 15	15 x 15	n/a	n/a
<b>High Static– High Efficiency</b>	Motor Qty / Belt Qty / Driver Type	n/a	n/a	1 / 1 / Belt	1 / 1 / Belt
	Max BHP (208/230/460/575v)	n/a	n/a	6.5/ 6.9/ 7.0/ 8.3	6.5/ 6.9/ 7.0/ 8.3
	RPM range	n/a	n/a	882–1078	882–1078
	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

**Table 5 PHYSICAL DATA (cont.)  
RTPF (Round Tube/Plate Fin Coil Design)**

**(COOLING)**

**15-27.5 TONS**

		<b>50TC-D24</b>	<b>50TC-E24</b>	<b>50TC-D28</b>	<b>50TC-E28</b>	<b>50TC-D30</b>
<b>Refrigeration System</b>		RTPF	RTPF	RTPF	RTPF	RTPF
# Circuits / # Comp. / Type		2 / 2 / Scroll	2 / 2 / Scroll	2 / 2 / Scroll	2 / 2 / Scroll	2 / 2 / Scroll
R-410a charge A/B (lbs)		20.6/14.7	27.9/20.5	19.8/ 20.4	27.9/ 28.9	27.0/ 28.5
Metering device		Acutrol	TXV	Acutrol	TXV	Acutrol
High-press. Trip / Reset (psig)		630 / 505	630 / 505	630 / 505	630 / 505	630 / 505
Low-press. Trip / Reset (psig)		54 / 117	27 / 44	54 / 117	27 / 44	54 / 117
<b>Evap. Coil</b>						
Material		Cu / Al	Cu / Al	Cu / Al	Cu / Al	Cu / Al
Tube Diameter		3/8"	3/8"	3/8"	3/8"	3/8"
Rows / FPI		4 / 15	4 / 15	4 / 15	4 / 15	4 / 15
total face area (ft <sup>2</sup> )		22.00	22.00	23.11	23.11	26
Condensate drain conn. size		3/4"	3/4"	3/4"	3/4"	3/4"
<b>Humidimizer Coil</b>						
Material		n/a	Cu / Al	n/a	Cu / Al	n/a
Tube Diameter		n/a	3/8"	n/a	3/8"	n/a
Rows / FPI		n/a	1 / 17	n/a	1 / 17	n/a
total face area (ft <sup>2</sup> )		n/a	22.00	n/a	23.11	n/a
<b>Evap. fan and motor</b>						
<b>VERTICAL</b>						
Standard Static	Motor Qty / Belt Qty / Driver Type	1 / 1 / Belt	1 / 1 / Belt	1 / 1 / Belt	1 / 1 / Belt	n/a
	Max BHP	4.9	4.9	4.9	4.9	n/a
	RPM range	690-863	690-863	717-911	717-911	n/a
	motor frame size	56	56	56	56	n/a
	Fan Qty / Type	2 / Centrifugal	2 / Centrifugal	2 / Centrifugal	2 / Centrifugal	n/a
	Fan Diameter (in)	15 x 15	15 x 15	15 x 15	15 x 15	n/a
Standard Static - High Efficiency	Motor Qty / Belt Qty / Driver Type	n/a	n/a	n/a	n/a	1 / 1 / Belt
	Max BHP	n/a	n/a	n/a	n/a	6.5/ 6.9/ 7.0/ 8.3
	RPM range	n/a	n/a	n/a	n/a	751-954
	motor frame size	n/a	n/a	n/a	n/a	184T
	Fan Qty / Type	n/a	n/a	n/a	n/a	2 / Centrifugal
	Fan Diameter (in)	n/a	n/a	n/a	n/a	15 x 15
Medium Static - High Efficiency	Motor Qty / Belt Qty / Driver Type	1 / 1 / Belt	1 / 1 / Belt	1 / 1 / Belt	1 / 1 / Belt	1 / 1 / Belt
	Max BHP (208/230/460/575v)	6.5/ 6.9/ 7.0/ 8.3	6.5/ 6.9/ 7.0/ 8.3	6.5/ 6.9/ 7.0/ 8.3	6.5/ 6.9/ 7.0/ 8.3	10.5/11.9/11.9/11
	RPM range	835-1021	835-1021	913-1116	913-1116	920-1190
	motor frame size	184T	184T	184T	184T	213T
	Fan Qty / Type	2 / Centrifugal	2 / Centrifugal	2 / Centrifugal	2 / Centrifugal	2 / Centrifugal
	Fan Diameter (in)	15 x 15	15 x 15	15 x 15	15 x 15	15 x 15
High Static - High Efficiency	Motor Qty / Belt Qty / Driver Type	1 / 1 / Belt	1 / 1 / Belt	1 / 1 / Belt	1 / 1 / Belt	1 / 2 Belt
	Max BHP (208/230/460/575v)	10.5/11.9/11.9/11	10.5/11.9/11.9/11	10.5/11.9/11.9/11	10.5/11.9/11.9/11	11.9/12.9/12.9/14.1
	RPM range	941-1176	941-1176	941-1176	941-1176	1116-1400
	motor frame size	213T	213T	213T	213T	215T
	Fan Qty / Type	2 / Centrifugal	2 / Centrifugal	2 / Centrifugal	2 / Centrifugal	2 / Centrifugal
	Fan Diameter (in)	15 x 15	15 x 15	15 x 15	15 x 15	15 x 15

**Table 5 PHYSICAL DATA (cont.)  
RTPF (Round Tube/Plate Fin Coil Design)**

**(COOLING)**

**15-27.5 TONS**

	50TC-D17	50TC-E17	50TC-D20	50TC-E20	50TC-D24	50TC-E24	50TC-D28	50TC-E28	50TC-D30
<b>Cond. Coil (Circuit A)</b>									
Coil type	RTPF	RTPF	RTPF	RTPF	RTPF	RTPF	RTPF	RTPF	RTPF
Coil Length (in)	70	70	70	70	82	82	75	75	95
Coil Height (in)	44	44	44	44	44	44	52	52	52
Rows / FPI	2 / 17	2 / 17	2 / 17	2 / 17	2 / 17	2 / 17	2 / 17	2 / 17	2 / 17
total face area (ft2)	21.4	21.4	21.4	21.4	25.1	25.1	27.1	27.1	34.3
<b>Cond. Coil (Circuit B)</b>									
Coil type	RTPF	RTPF	RTPF	RTPF	RTPF	RTPF	RTPF	RTPF	RTPF
Coil Length (in)	70	70	70	70	57	57	75	75	95
Coil Height (in)	44	44	44	44	44	44	52	52	52
Rows / FPI	2 / 17	2 / 17	2 / 17	2 / 17	2 / 17	2 / 17	2 / 17	2 / 17	2 / 17
total face area (ft2)	21.4	21.4	21.4	21.4	17.4	17.4	27.1	27.1	34.3
<b>Cond. fan / motor</b>									
Qty / Motor drive type	3 / direct	3 / direct	3 / direct	3 / direct	4 / direct	4 / direct	4 / direct	4 / direct	6 / direct
Motor HP / RPM	1/4 / 1100	1/4 / 1100	1/4 / 1100	1/4 / 1100	1/4 / 1100	1/4 / 1100	1/4 / 1100	1/4 / 1100	1/4 / 1100
Fan diameter (in)	22	22	22	22	22	22	22	22	22
<b>Filters</b>									
RA Filter # / size (in)	6 / 20 x 25 x 2	6 / 20 x 25 x 2	6 / 20 x 25 x 2	6 / 20 x 25 x 2	6 / 20 x 25 x 2	6 / 20 x 25 x 2	9 / 16 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	4 / 16 x 25 x 1	4 / 16 x 25 x 1	4 / 16 x 25 x 1	4 / 16 x 25 x 1	4 / 16 x 25 x 1



**Table 6 – PHYSICAL DATA**  
**Novation - All Aluminum Coil Design**

(COOLING)

15-27.5 TONS

		50TC*17	50TC*20	50TC*24	50TC*28
<b>Refrigeration System</b>		MCHX	MCHX	MCHX	MCHX
# Circuits / # Comp. / Type		2 / 2 / Scroll	2 / 2 / Scroll	2 / 2 / Scroll	2 / 2 / Scroll
R-410a charge A/B (lbs)		9.5/12.0	9.5/12.0	14.4/12.5	12.5/13.0
Metering device		Acutrol	Acutrol	Acutrol	Acutrol
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
<b>Evap. Coil</b>					
Material		Cu / Al	Cu / Al	Cu / Al	Cu / Al
Tube Diameter		3/8"	3/8"	3/8"	3/8"
Rows / FPI		4 / 15	4 / 15	4 / 15	4 / 15
total face area (ft <sup>2</sup> )		19.56	19.56	22.00	23.11
Condensate drain conn. size		3/4"	3/4"	3/4"	3/4"
<b>Evap. fan and motor</b>					
<b>VERTICAL</b>					
Standard Static	Motor Qty / Belt Qty / Driver Type	1 / 1 Belt	1 / 1 Belt	1 / 1 Belt	1 / 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 / Belt Qty / Driver Type	1 / 1 Belt	1 / 1 Belt	1 / 1 Belt	1 / 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 / Belt Qty / Driver Type	1 / 1 Belt	1 / 1 Belt	1 / 1 Belt	1 / 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 Efficiency	Motor Qty / Belt Qty / Driver Type	n/a	n/a	1 / 1 Belt	1 / 1 Belt
	Max BHP (208/230/460/575v)	n/a	n/a	6.5/ 6.9/ 7.0/ 8.3	6.5/ 6.9/ 7.0/ 8.3
	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 Efficiency	Motor Qty / Belt Qty / Driver Type	n/a	1 / 1 Belt	1 / 1 Belt	1 / 1 Belt
	Max BHP (208/230/460/575v)	n/a	6.5/ 6.9/ 7.0/ 8.3	10.5/11.9/11.9/11	10.5/11.9/11.9/11
	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

**Table 6 PHYSICAL DATA (cont.)**  
**Novation - All Aluminum Coil Design**

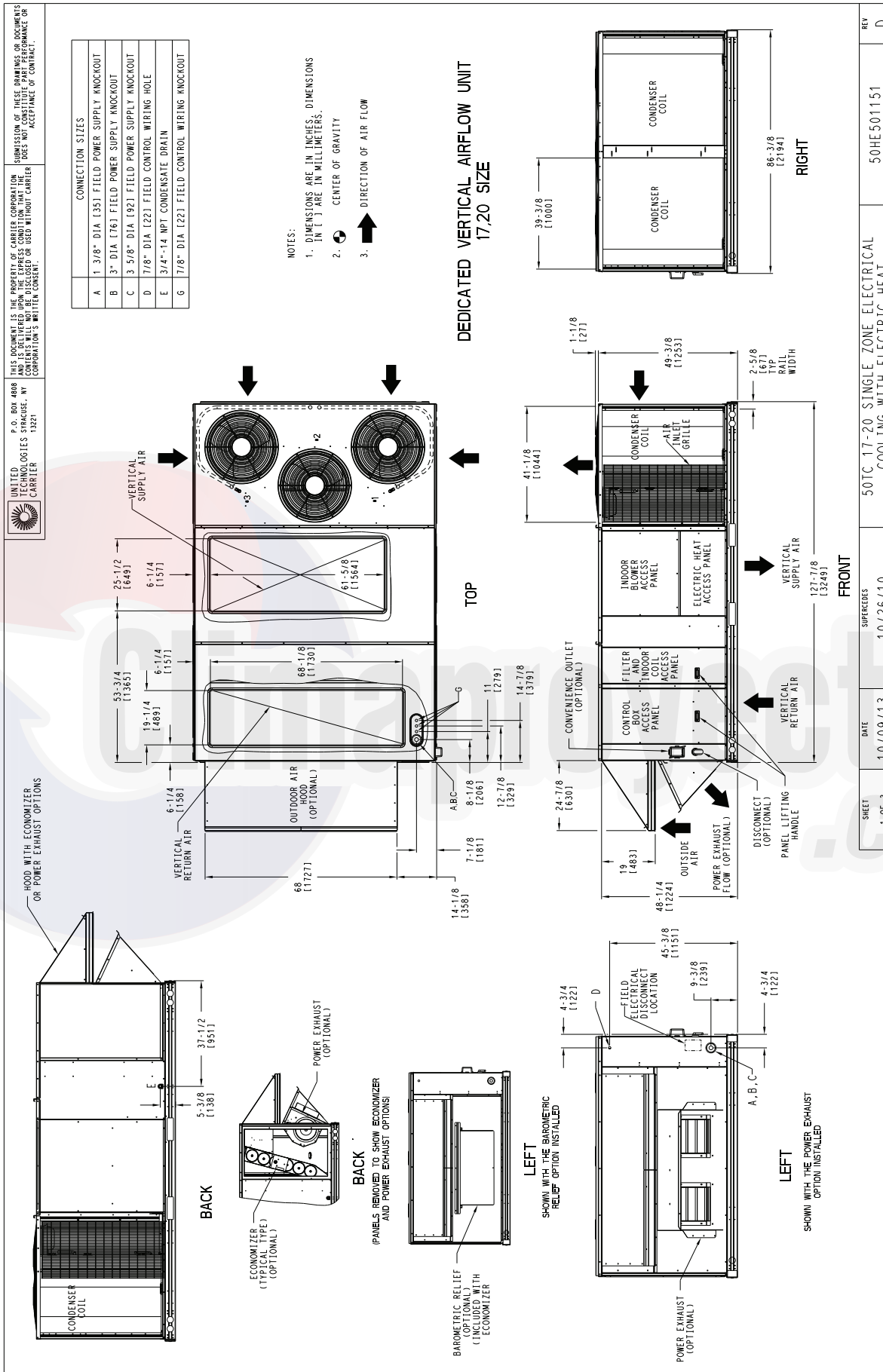
**(COOLING)**

**15-27.5 TONS**

	<b>50TC*17</b>	<b>50TC*20</b>	<b>50TC*24</b>	<b>50TC*28</b>
<b>Cond. Coil (Circuit A)</b>				
Coil type	Novation	Novation	Novation	Novation
Coil Length (in)	70	70	82	75
Coil Height (in)	44	44	44	52
Number of Passes   Rows / FPI	2	2	2	2
total face area (ft2)	21.4	21.4	25.1	27.1
<b>Cond. Coil (Circuit B)</b>				
Coil type	Novation	Novation	Novation	Novation
Coil Length (in)	70	70	57	75
Coil Height (in)	44	44	44	52
Rows / FPI	2	2	2	2
total face area (ft2)	21.4	21.4	17.4	27.1
<b>Cond. fan / motor</b>				
Qty / Motor drive type	3 / direct	3 / direct	4 / direct	4 / direct
Motor HP / RPM	1/4 / 1100	1/4 / 1100	1/4 / 1100	1/4 / 1100
Fan diameter (in)	22	22	22	22
<b>Filters</b>				
RA Filter # / size (in)	6 / 20 x 25 x 2	6 / 20 x 25 x 2	6 / 20 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

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# DIMENSIONS



SHEET 1 OF 3

DATE 10/09/13

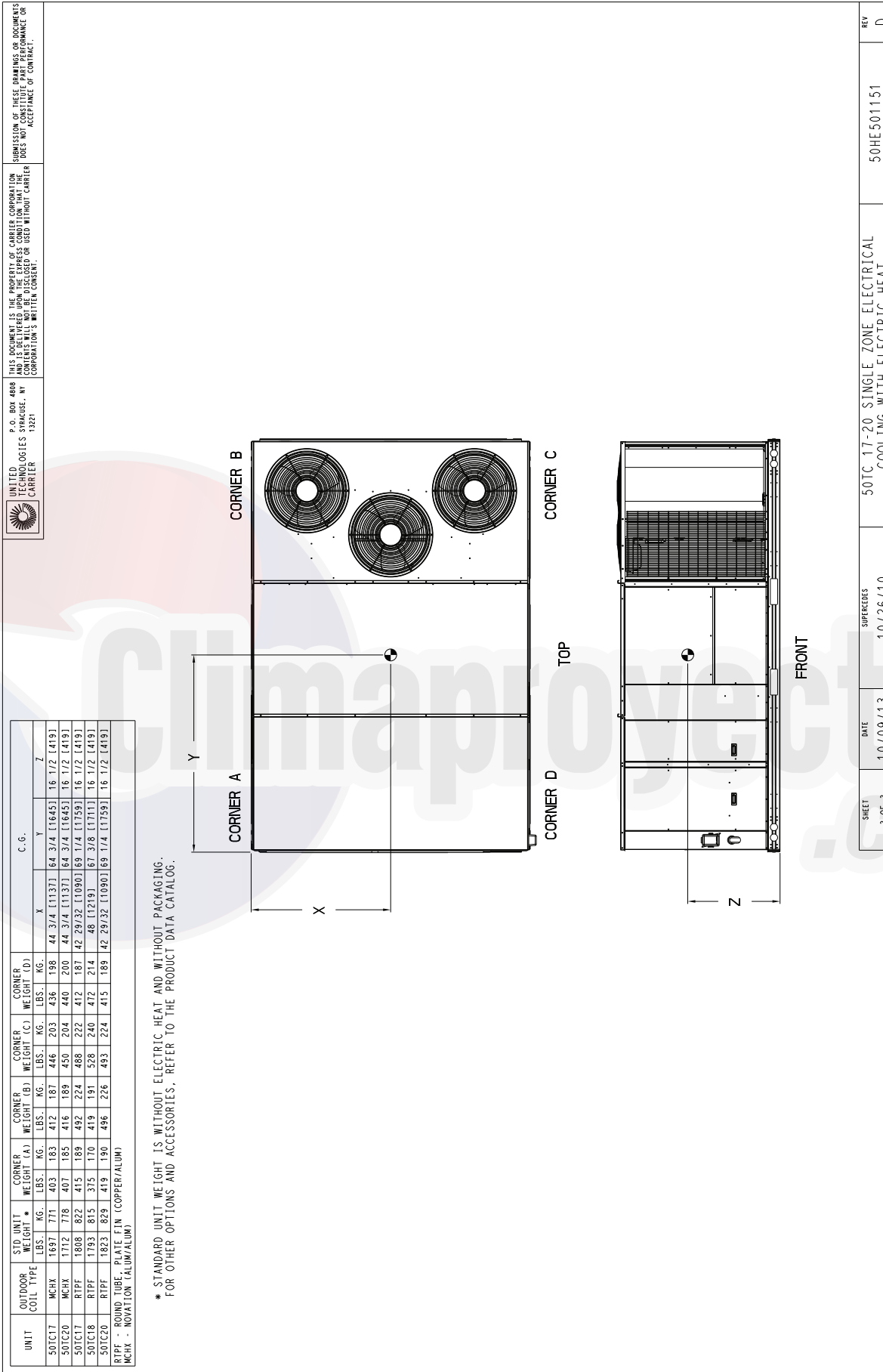
SUPERCEDES 10/26/10

50TC 17-20 SINGLE ZONE ELECTRICAL COOLING WITH ELECTRIC HEAT

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**Fig. 1 - Unit Dimensional Drawing – 17 and 20 Size Units**

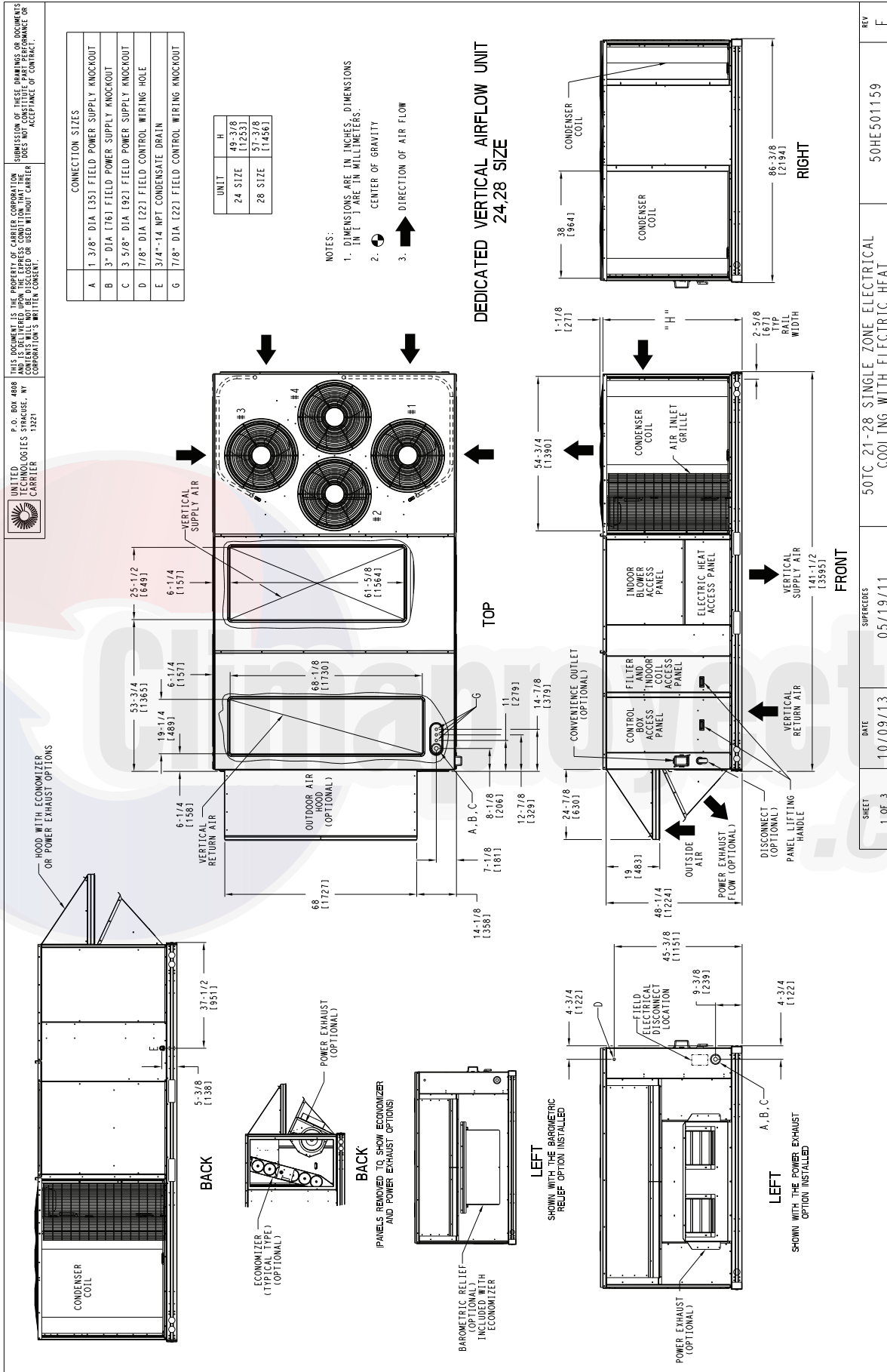
# DIMENSIONS (cont.)



**Fig. 1 - Unit Dimensional Drawing – 17 and 20 Size Units (cont.)**

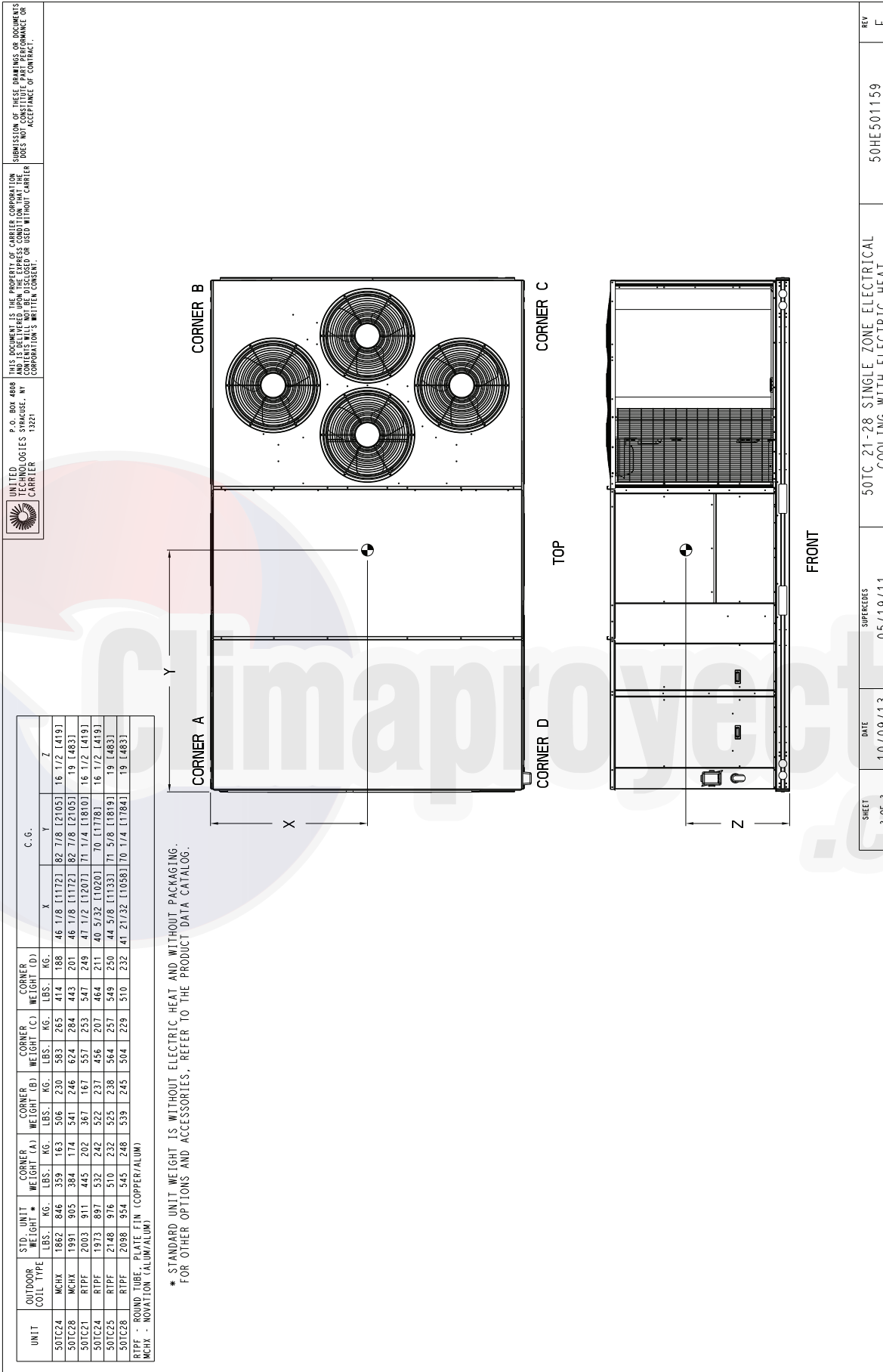


# DIMENSIONS (cont.)



**Fig. 2 - Unit Dimensional Drawing – 24 and 28 Size Units**

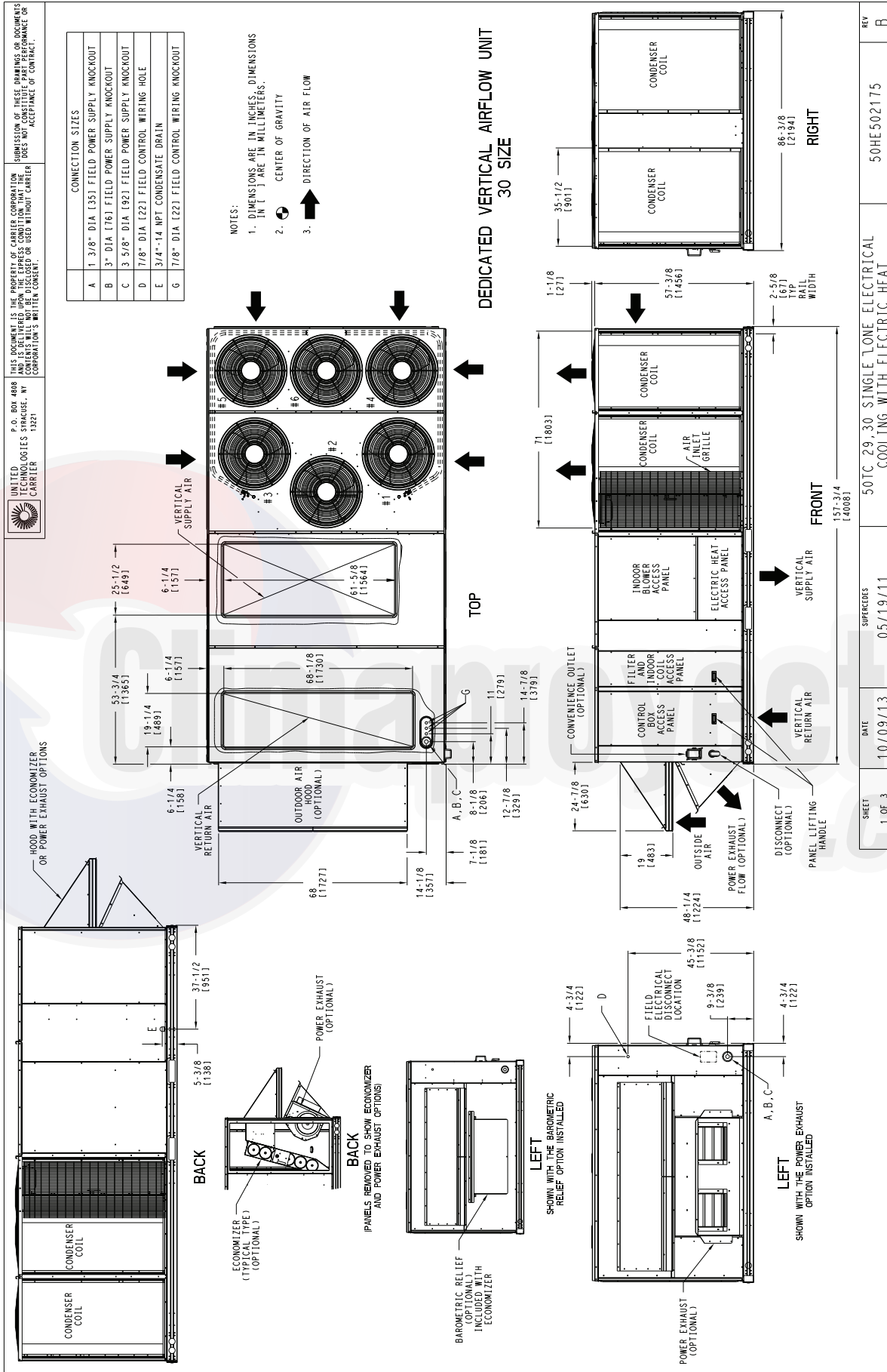
# DIMENSIONS (cont.)



SHEET 3 OF 3	DATE 10/09/13	SUPERCEDES 05/19/11	50TC 21-28 SINGLE ZONE ELECTRICAL COOLING WITH ELECTRIC HEAT	REV F
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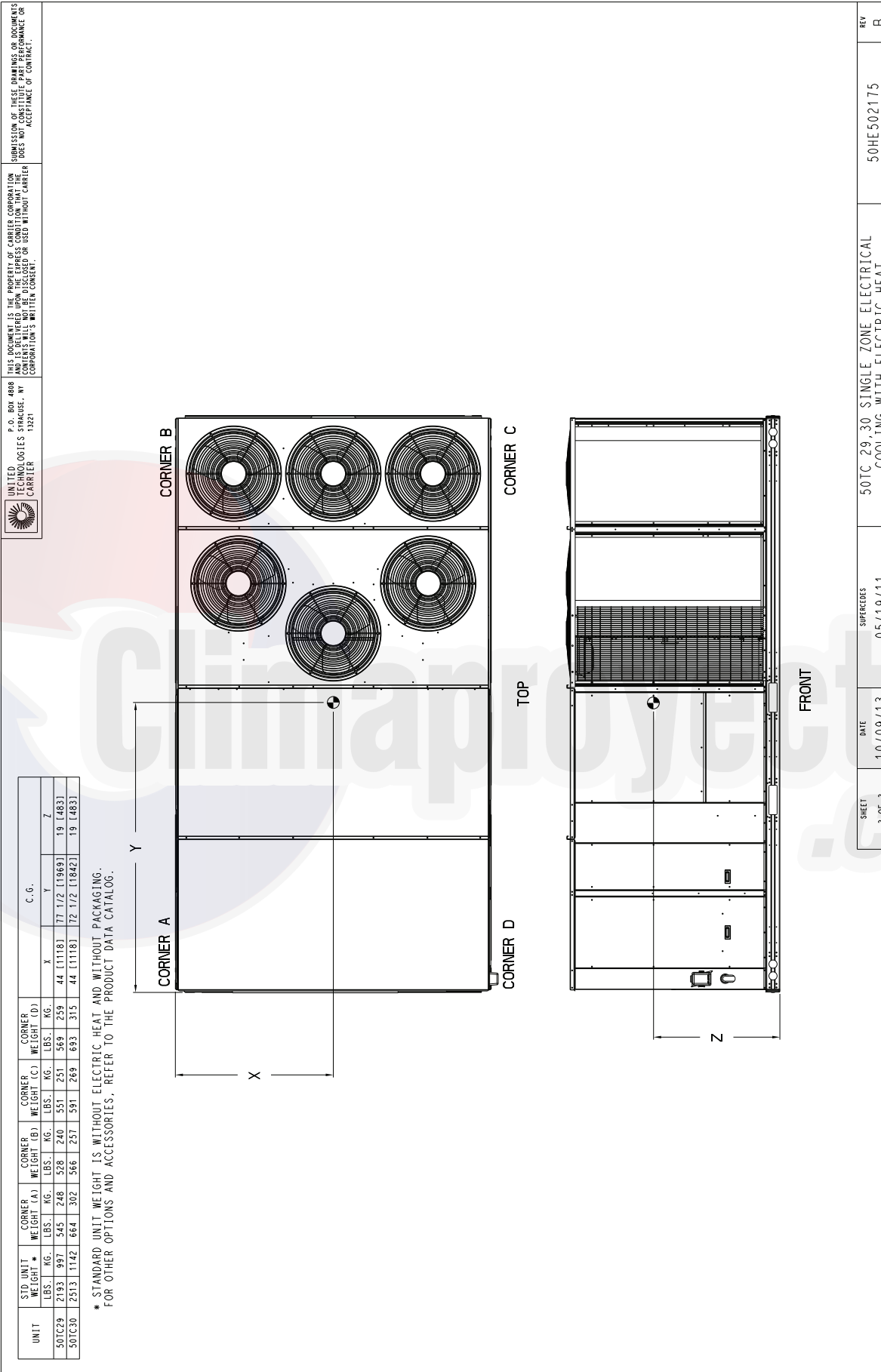
**Fig. 2 - Unit Dimensional Drawing – 24 and 28 Size Units (cont.)**

# DIMENSIONS (cont.)



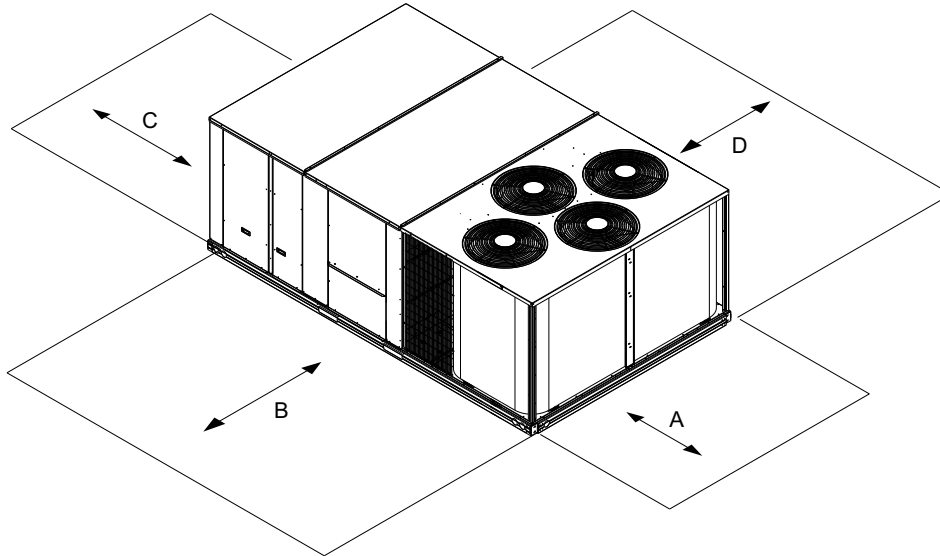
**Fig. 3 - Unit Dimensional Drawing – 30 Size Units**

# DIMENSIONS (cont.)



**Fig. 3 - Unit Dimensional Drawing – 30 Size Units (cont.)**

## DIMENSIONS (cont.)



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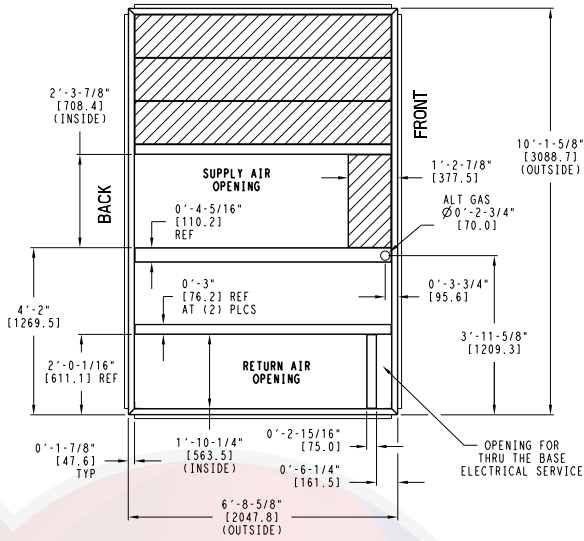
LOCATION	DIMENSION	CONDITION
A	36-in (914 mm)	<ul style="list-style-type: none"> <li>Recommended clearance for air flow and service</li> </ul>
B	42-in (1067 mm)	<ul style="list-style-type: none"> <li>Recommended clearance for air flow and service</li> </ul>
C	18-in (457 mm)	<ul style="list-style-type: none"> <li>No Convenience Outlet</li> <li>No Economizer</li> <li>No field installed disconnect on economizer hood side (Factory –installed disconnect installed).</li> </ul>
	36-in (914 mm)	<ul style="list-style-type: none"> <li>Convenience Outlet installed.</li> <li>Vertical surface behind servicer is electrically non –conductive (e.g.: wood, fiberglass).</li> </ul>
	42-in (1067 mm)	<ul style="list-style-type: none"> <li>Convenience Outlet installed.</li> <li>Vertical surface behind servicer is electrically conductive (e.g.: metal, masonry).</li> </ul>
	96-in (2438 mm)	<ul style="list-style-type: none"> <li>Economizer and/or Power Exhaust installed.</li> <li>Check for sources of flue products with 10 feet (3 meters) of economizer fresh air intake.</li> </ul>
D	42-in (1067 mm)	<ul style="list-style-type: none"> <li>Recommended clearance for service.</li> </ul>

**NOTE:** Unit not designed to have overhead obstruction. Contact Application Engineering for guidance on any application planning overhead obstruction or for vertical clearances.

**Fig. 4 - Service Clearance Dimensional Drawing**

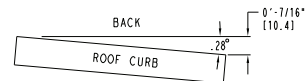
# DIMENSIONS (cont.)

UNIT SIZE	"A"	ROOF CURB ACCESSORY
17, 20	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

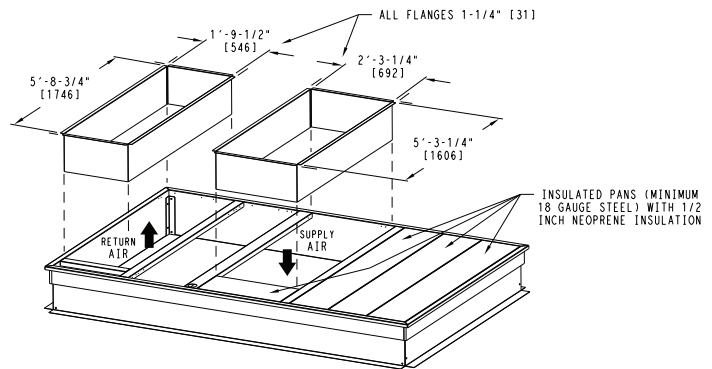
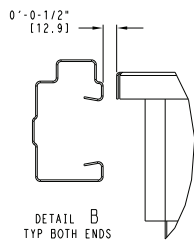
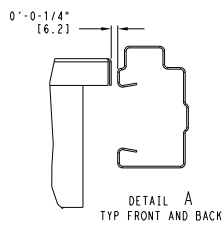
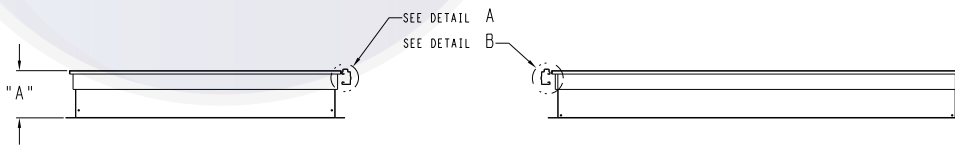
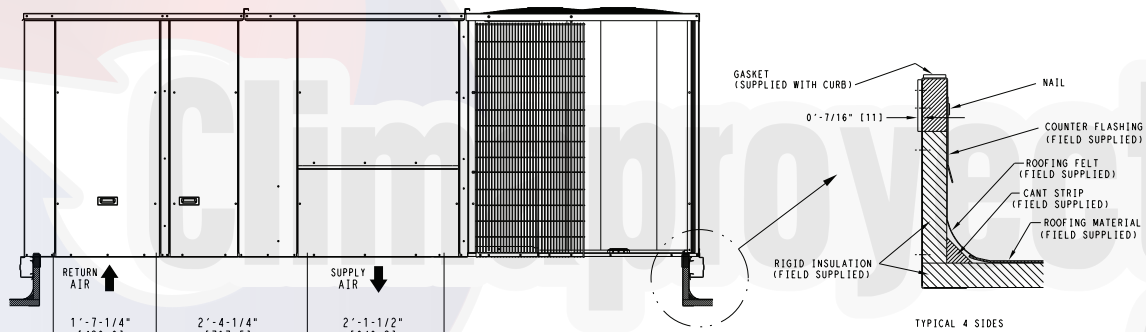
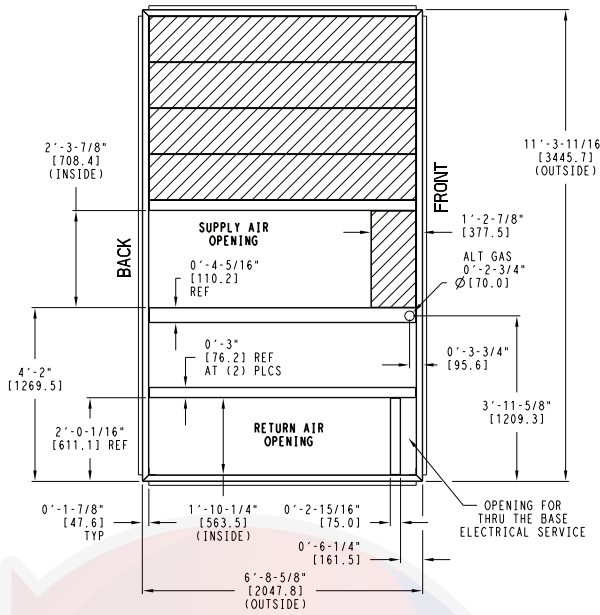


Fig. 5 - Roof Curb Details - 17 and 20 Size Units

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# DIMENSIONS (cont.)

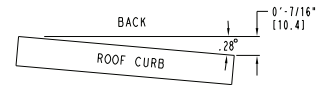
UNIT SIZE	"A"	ROOF CURB ACCESSORY
24, 28	1'-2" [356.0] 2'-0" [610.0]	CRRFCURB047A00 CRRFCURB048A00



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

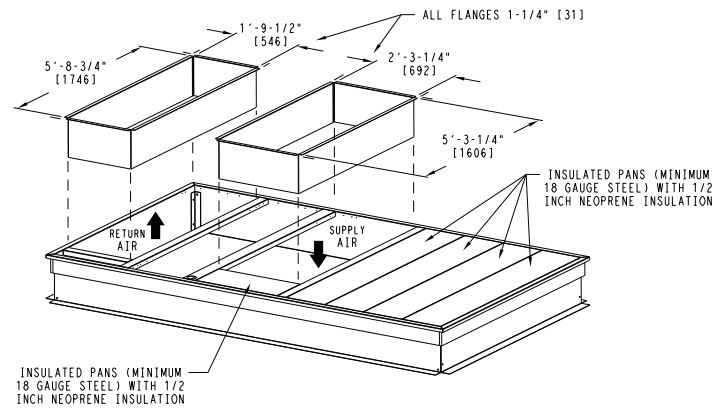
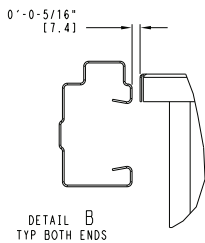
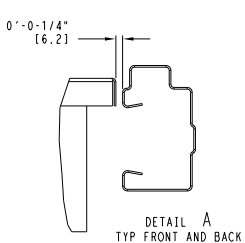
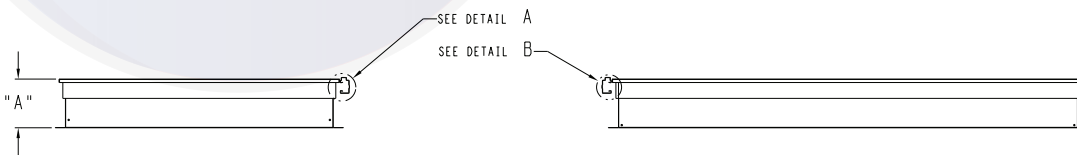
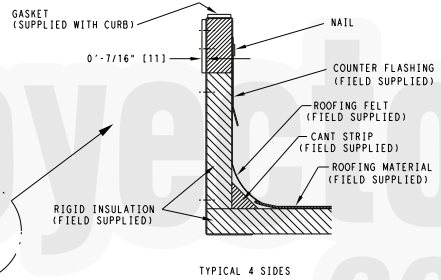
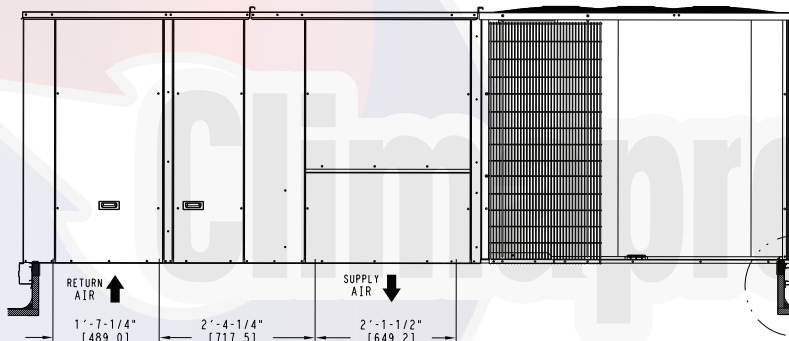
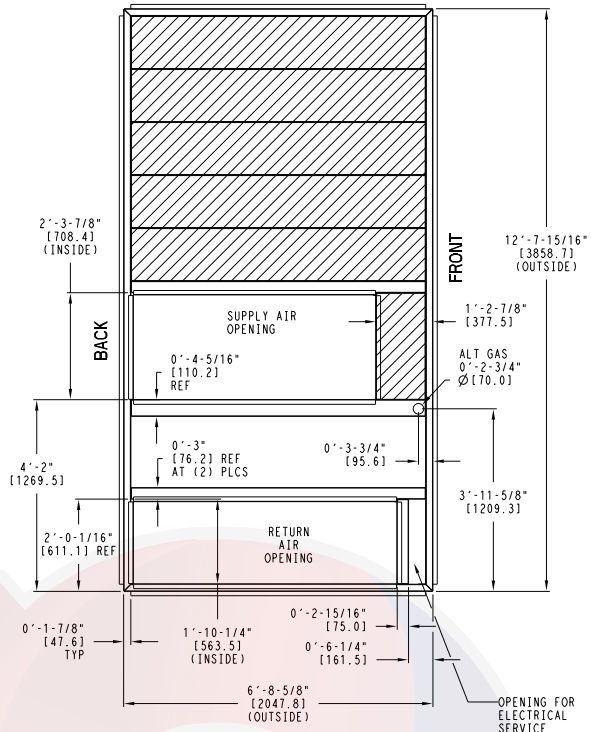


Fig. 6 - Roof Curb Details – 24 and 28 Size Units

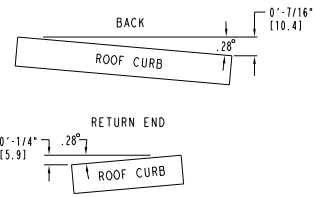
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# DIMENSIONS (cont.)

UNIT SIZE	"A"	ROOF CURB ACCESSORY
30	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 [1] 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
- ➔ DIRECTION OF AIR FLOW



MAX CURB LEVELING TOLERANCES

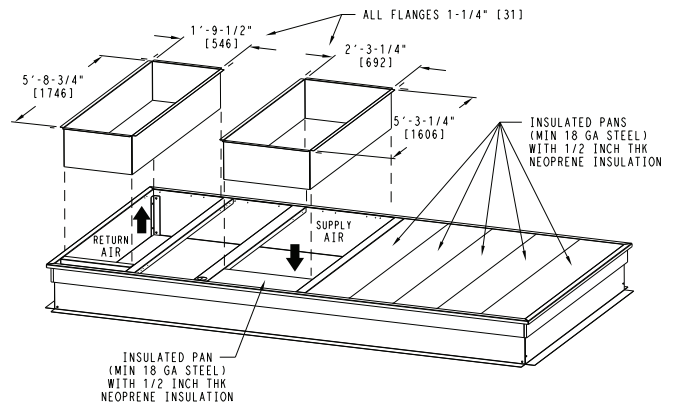
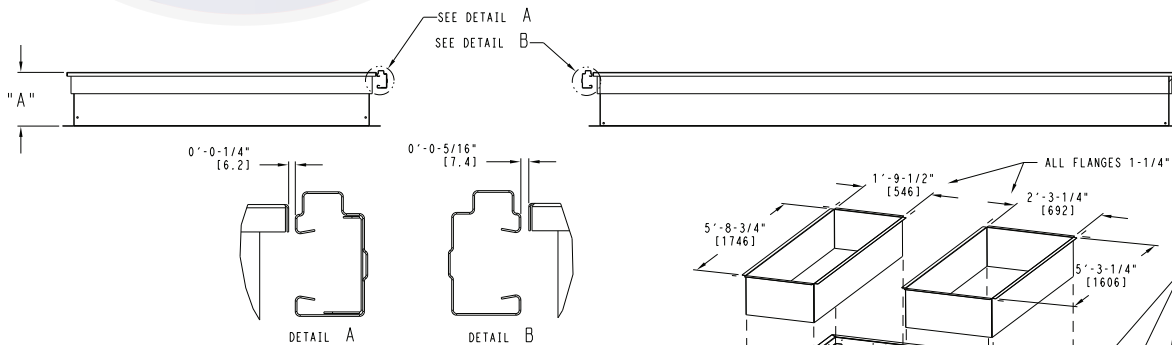
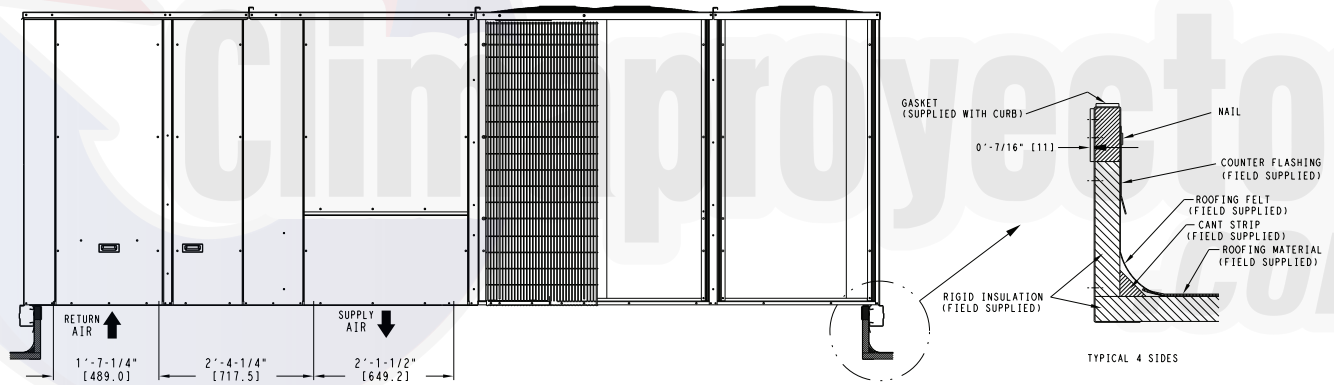


Fig. 7 - Roof Curb Details – 30 Size Unit

C11251



## OPTIONS AND ACCESSORIES WEIGHT ADDERS

BASE UNIT WITH OPTIONS AND ACCESSORIES (Weight Adders)	MAX WEIGHT ADDER									
	50TC**17		50TC**20		50TC**24		50TC**28		50TC**30	
	lb	kg	lb	kg	lb	kg	lb	kg	lb	kg
Humidi-MiZer <sup>1</sup>	110	50	110	50	120	55	120	55	---	---
Power Exhaust	125	57	125	57	125	57	125	57	125	57
EconoMi\$er (IV, X, or 2)	246	112	246	112	246	112	246	112	246	112
Cu/Cu Condenser Coil <sup>2</sup>	28	13	28	13	30	14	34	15	34	15
Cu/Cu Condenser and Evaporator Coils <sup>2</sup>	53	24	53	24	58	26	64	29	64	29
Roof Curb 14-in (356mm)	240	109	240	109	255	116	255	116	255	116
Roof Curb 24-in (610mm)	340	154	340	154	355	161	355	161	355	161
Louvered Hail Guard	60	27	60	27	120	54	150	68	150	68
CO2 sensor	5	2	5	2	5	2	5	2	5	2
Return Smoke Detector	5	2	5	2	5	2	5	2	5	2
Supply Smoke Detector	5	2	5	2	5	2	5	2	5	2
Fan/Filter Status Switch	2	1	2	1	2	1	2	1	2	1
Non-Fused Disconnect	15	7	15	7	15	7	15	7	15	7
Powered Convenience Outlet	35	16	35	16	35	16	35	16	35	16
Non-Powered Convenience Outlet	5	2	5	2	5	2	5	2	5	2
Enthalpy Sensor	2	1	2	1	2	1	2	1	2	1
Differential Enthalpy Sensor	3	1	3	1	3	1	3	1	3	1
Two Position Motorized Damper	50	23	50	23	50	23	65	29	65	29
Manual Damper	35	16	35	16	35	16	-	-	-	-
Field Filter Track 4-in (102mm)	22	10	22	10	22	10	22	10	22	10
MotorMaster Controller	35	16	35	16	35	16	35	16	35	16
Medium Static Motor/Drive	5	2	6	3	6	3	6	3	10	5
High Static Motor/Drive	11	5	12	5	16	7	16	7	20	9
SAV System with VFD	20	9	20	9	20	9	20	9	20	9

1 For Humidi-MiZer add MotorMaster Controller

2 Where available.

--- Not Available

## 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 30°F (-1°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 115°F (46°C). While cooling operation above 115°F (46°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

50TC-D17			AMBIENT TEMPERATURE												
			85			95			105			115			
			EAT (db)			EAT (db)			EAT (db)			EAT (db)			
			75	80	85	75	80	85	75	80	85	75	80	85	
4500 CFM	EAT (wb)	58	TC	159.6	159.1	163.4	148.7	148.4	155.2	136.1	137.1	146.0	122.4	127.2	136.2
			SHC	132.6	149.6	163.4	127.0	143.9	155.2	120.7	137.1	146.0	113.9	127.2	136.2
		62	TC	173.9	173.6	173.3	163.1	162.6	162.2	150.5	150.2	149.9	136.8	136.2	136.9
			SHC	119.4	136.8	153.9	114.1	131.5	148.6	108.2	125.7	142.6	101.9	119.2	135.8
		67	TC	193.4	193.0	192.5	182.5	182.1	181.7	169.9	169.5	169.1	156.0	155.5	155.2
			SHC	102.3	119.7	137.0	97.3	114.8	132.3	91.7	109.4	126.9	85.7	103.5	121.1
		72	TC	213.7	213.2	212.6	203.5	203.0	202.5	191.0	190.5	189.9	177.1	176.6	176.1
			SHC	84.0	101.7	119.2	79.7	97.4	115.0	74.6	92.4	109.9	69.1	86.9	104.6
76	TC	-	227.8	228.5	-	219.6	219.1	-	207.9	207.4	-	194.1	193.5		
	SHC	-	89.9	103.7	-	82.5	100.2	-	78.1	95.8	-	73.0	97.2		
5250 CFM	EAT (wb)	58	TC	168.7	168.5	176.4	157.0	158.2	167.7	143.9	148.2	158.0	129.5	137.5	147.4
			SHC	161.3	163.9	176.4	138.9	157.2	167.7	132.4	148.2	158.0	125.4	137.5	147.4
		62	TC	184.2	183.8	183.2	172.3	171.8	171.5	159.1	158.5	159.3	144.4	143.8	147.8
			SHC	129.4	149.6	168.9	123.9	144.0	163.5	117.9	137.9	156.4	111.4	131.3	147.8
		67	TC	204.7	204.0	203.5	193.1	192.6	192.2	179.7	179.2	178.7	164.8	164.3	163.6
			SHC	109.3	129.5	149.6	104.3	124.7	144.9	98.6	119.1	139.4	92.5	113.1	133.3
		72	TC	224.6	224.1	223.6	214.4	213.7	213.1	202.0	201.4	200.7	187.0	186.4	185.8
			SHC	87.5	107.9	128.2	83.4	103.9	124.3	78.6	99.2	119.6	72.9	93.6	114.1
76	TC	-	239.1	239.6	-	230.6	230.1	-	218.4	217.7	-	204.4	203.7		
	SHC	-	92.6	110.2	-	86.4	107.0	-	82.0	102.6	-	77.1	97.8		
6000 CFM	EAT (wb)	58	TC	176.9	178.5	188.9	164.3	168.9	179.6	150.3	158.4	169.1	136.1	146.9	157.7
			SHC	157.4	178.5	188.9	151.1	168.9	179.6	144.3	158.4	169.1	136.1	146.9	157.7
		62	TC	193.2	192.7	192.2	180.4	179.7	180.7	166.2	165.6	170.1	150.5	150.0	158.1
			SHC	140.2	162.8	184.2	134.4	156.9	177.8	128.1	150.6	168.9	121.3	143.5	158.1
		67	TC	214.4	213.7	213.0	202.1	201.6	201.0	187.7	187.1	186.4	171.8	171.1	170.4
			SHC	117.3	140.3	163.0	112.1	135.3	158.2	106.2	129.4	152.2	99.8	123.1	145.9
		72	TC	234.9	234.6	234.2	224.0	223.3	222.5	210.9	210.1	209.3	194.9	194.1	193.4
			SHC	92.7	115.9	139.1	88.4	111.8	134.8	83.4	106.8	130.0	77.5	101.0	124.3
76	TC	-	250.7	250.9	-	240.9	240.1	-	227.5	226.7	-	212.7	211.8		
	SHC	-	95.7	118.9	-	92.1	115.3	-	87.4	110.8	-	82.4	105.8		
6750 CFM	EAT (wb)	58	TC	182.5	187.4	198.5	169.3	177.4	188.7	156.0	166.4	177.8	142.9	154.4	165.9
			SHC	167.5	187.4	198.5	161.2	177.4	188.7	153.0	166.4	177.8	142.9	154.4	165.9
		62	TC	199.3	198.7	199.6	186.0	185.2	188.9	171.2	170.5	208.4	154.7	155.5	166.2
			SHC	148.6	173.7	196.6	142.8	167.6	188.9	136.4	161.1	208.4	115.2	152.6	166.2
		67	TC	220.4	219.6	218.8	208.2	207.4	206.6	193.2	192.5	191.7	176.8	176.1	175.2
			SHC	122.6	148.2	173.6	117.6	143.4	168.7	111.6	137.6	162.9	97.2	131.3	156.3
		72	TC	241.2	240.5	240.2	229.8	228.9	228.1	216.3	215.4	214.6	200.2	199.4	198.6
			SHC	95.1	120.9	146.6	90.8	116.8	142.6	85.8	111.9	137.8	80.0	106.2	118.0
76	TC	-	257.2	256.7	-	246.6	245.9	-	233.0	232.1	-	217.6	216.7		
	SHC	-	98.4	124.2	-	94.8	120.7	-	90.2	116.3	-	85.1	111.3		
7500 CFM	EAT (wb)	58	TC	187.3	195.3	206.8	174.4	184.9	196.8	161.5	173.5	185.5	148.9	161.1	173.2
			SHC	177.5	195.3	206.8	169.9	184.9	196.8	161.5	173.5	185.5	148.9	161.1	173.2
		62	TC	204.3	203.5	207.1	190.6	189.9	197.1	175.1	175.4	185.7	158.4	161.2	173.5
			SHC	156.5	183.9	207.1	150.7	177.9	197.1	144.1	170.2	185.7	137.1	161.2	173.5
		67	TC	225.2	224.4	223.4	213.1	212.2	211.3	197.8	197.0	196.2	180.8	179.9	179.1
			SHC	127.5	155.8	183.5	122.8	151.2	178.9	116.8	145.5	173.1	110.3	139.0	166.3
		72	TC	246.1	245.5	244.9	234.5	233.6	232.8	220.6	219.7	218.6	204.7	203.7	202.7
			SHC	97.1	125.6	153.8	92.9	121.6	150.1	87.9	116.8	145.3	82.3	111.2	139.9
76	TC	-	262.3	261.6	-	251.3	250.5	-	237.3	236.3	-	221.6	220.6		
	SHC	-	100.9	129.2	-	97.3	125.8	-	92.8	121.5	-	87.7	116.6		

Note: See Minimum–Maximum Airflow Ratings in Table 3. Do not operate outside these limits.

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

50TCE17 (15 TONS) – UNIT WITH HUMIDI-MIZER IN SUBCOOLING MODE										
Temp (F) Air Entering Condenser (Edb)		AIR ENTERING EVAPORATOR – CFM								
		4,500			6,000			7,500		
		Air Entering Evaporator -- Ewb (F)								
75	TC	208.5	190.6	172.6	229.2	208.6	188.1	247.8	224.9	202.0
	SHC	94.0	114.5	135.0	104.5	125.2	145.9	113.0	133.8	154.6
	kW	13.42	13.05	12.70	13.60	13.21	12.80	13.82	13.36	13.15
85	TC	198.3	180.7	163.0	214.9	194.8	174.6	229.8	207.4	185.1
	SHC	74.1	99.6	125.1	85.2	110.9	136.7	94.1	120.0	145.9
	kW	14.79	14.42	14.10	14.97	14.58	14.20	15.19	14.73	14.51
95	TC	188.2	170.8	153.4	200.6	180.9	161.1	211.9	190.0	168.1
	SHC	54.4	84.8	115.3	65.9	96.7	127.5	75.1	106.2	137.2
	kW	16.23	15.86	15.50	16.41	16.02	15.60	16.63	16.17	15.95
105	TC	178.1	160.9	143.8	186.4	167.0	147.7	193.9	172.5	151.2
	SHC	34.6	70.0	105.4	46.5	82.4	118.2	56.1	92.3	128.5
	kW	17.47	17.10	16.80	17.65	17.26	16.90	17.87	17.41	17.25
115	TC	167.9	151.1	134.2	172.1	153.2	134.2	175.9	155.1	134.5
	SHC	14.8	55.2	95.6	27.2	68.1	109.0	37.1	78.5	119.8
	kW	18.87	18.50	18.20	19.05	18.66	18.30	19.27	18.81	18.55

50TCE17 (15 TONS) – UNIT WITH HUMIDI-MIZER IN HOT GAS REHEAT MODE										
Temp (F) Air Entering 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								
		4,500	6,000	7,500	4,500	6,000	7,500	4,500	6,000	7,500
80	TC	80.10	85.50	91.30	82.70	90.90	97.10	86.00	95.40	100.50
	SHC	12.70	22.30	34.20	5.10	12.10	21.20	-2.10	4.20	10.50
	kW	12.44	12.67	12.78	12.55	12.88	13.10	12.65	13.02	13.12
75	TC	<b>82.30</b>	<b>87.60</b>	<b>93.40</b>	<b>84.70</b>	<b>93.00</b>	<b>99.20</b>	<b>88.10</b>	<b>97.30</b>	<b>102.50</b>
	SHC	<b>14.30</b>	<b>24.20</b>	<b>36.00</b>	<b>6.70</b>	<b>13.70</b>	<b>23.10</b>	<b>-0.50</b>	<b>5.80</b>	<b>12.60</b>
	kW	<b>12.38</b>	<b>12.62</b>	<b>12.73</b>	<b>12.50</b>	<b>12.83</b>	<b>13.05</b>	<b>12.62</b>	<b>12.98</b>	<b>13.07</b>
70	TC	84.40	89.60	94.70	87.00	95.10	101.30	90.30	99.50	104.60
	SHC	16.10	25.70	37.30	8.20	15.80	24.50	1.10	7.50	13.70
	kW	12.34	12.58	12.69	12.47	12.78	13.03	12.59	12.93	13.02
60	TC	88.50	93.90	99.80	91.20	99.40	105.50	94.40	103.70	108.90
	SHC	19.40	29.20	40.70	11.50	18.60	27.80	4.60	10.50	16.90
	kW	12.28	12.52	12.63	12.41	12.73	12.97	12.53	12.84	12.94
50	TC	92.80	98.10	104.80	95.40	103.60	110.50	98.80	108.00	113.90
	SHC	22.70	32.20	43.80	14.80	22.10	31.30	7.70	13.90	20.50
	kW	12.21	12.45	12.56	12.34	12.68	12.91	12.46	12.75	12.85
40	TC	97.10	102.50	108.50	99.60	108.00	114.30	103.00	112.40	117.70
	SHC	26.00	35.40	46.90	17.90	25.30	34.40	10.80	17.10	23.80
	kW	12.14	12.38	12.49	12.27	12.60	12.84	12.40	12.70	12.80

**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

50TC*D20			AMBIENT TEMPERATURE												
			85			95			105			115			
			EAT (db)			EAT (db)			EAT (db)			EAT (db)			
			75	80	85	75	80	85	75	80	85	75	80	85	
5250 CFM	EAT (wb)	58	TC	180.4	185.6	196.3	167.7	176.1	186.9	154.7	165.3	176.6	142.2	153.6	164.9
			SHC	166.5	185.6	196.3	160.6	176.1	186.9	152.7	165.3	176.6	142.2	153.6	164.9
		62	TC	196.2	195.5	196.9	183.6	182.9	187.2	169.3	168.7	176.9	153.4	154.1	165.2
			SHC	146.8	172.1	194.7	141.4	166.6	187.2	135.4	160.5	176.9	128.6	152.5	165.2
		67	TC	216.7	215.9	215.2	204.9	204.1	203.1	190.6	189.7	189.0	174.8	174.0	173.3
	SHC		120.0	146.1	171.8	115.4	141.5	167.1	109.8	136.1	161.7	103.8	130.2	155.6	
	72	TC	237.4	236.8	236.0	226.0	225.1	224.2	212.8	211.9	211.0	197.3	196.4	195.5	
		SHC	92.0	118.3	144.3	87.8	114.3	140.4	83.0	109.6	135.8	77.6	104.2	130.6	
	76	TC	-	252.9	253.0	-	242.5	241.6	-	229.1	228.2	-	214.1	213.1	
		SHC	-	95.1	121.4	-	91.7	118.0	-	87.3	113.8	-	82.5	107.1	
6125 CFM	EAT (wb)	58	TC	188.8	198.5	209.3	176.5	188.2	200.2	164.5	176.7	189.0	151.9	164.2	176.7
			SHC	180.4	198.5	209.3	174.4	188.2	200.2	164.5	176.7	189.0	151.9	164.2	176.7
		62	TC	205.2	204.6	209.6	191.8	191.5	200.4	176.6	177.6	189.2	159.9	164.2	176.9
			SHC	159.9	188.7	209.6	154.2	183.0	200.4	147.9	174.8	189.2	141.0	164.2	176.9
		67	TC	225.5	224.5	223.5	213.5	212.5	211.7	199.1	198.3	197.4	182.3	181.4	180.9
	SHC		128.3	158.4	187.8	123.8	154.1	183.5	118.4	148.9	178.1	112.2	142.7	171.6	
	72	TC	245.6	245.3	244.6	234.7	233.6	232.6	220.9	219.9	218.8	205.5	204.4	203.4	
		SHC	95.4	125.9	155.7	91.7	122.2	152.4	86.9	117.7	148.1	81.7	112.5	143.1	
	76	TC	-	262.0	261.2	-	250.7	250.1	-	237.3	236.2	-	221.6	220.6	
		SHC	-	99.5	129.4	-	95.9	126.2	-	91.8	122.4	-	87.0	117.8	
7000 CFM	EAT (wb)	58	TC	197.4	209.8	221.3	186.1	199.1	211.7	173.8	186.9	200.1	160.3	173.5	186.9
			SHC	196.8	209.8	221.3	186.1	199.1	211.7	173.8	186.9	200.1	160.3	173.5	186.9
		62	TC	212.7	212.4	221.5	198.4	199.8	212.0	182.3	186.9	200.3	164.7	173.8	187.1
			SHC	173.4	205.1	221.5	167.4	197.4	212.0	160.8	186.8	200.3	153.4	173.8	187.1
		67	TC	233.7	232.5	231.4	220.8	219.8	218.9	205.6	204.5	204.1	187.8	186.8	188.0
	SHC		138.0	172.0	205.0	133.4	167.6	200.4	127.8	162.0	194.4	121.3	155.6	185.6	
	72	TC	254.3	253.3	252.8	242.7	241.5	240.3	228.0	226.8	225.7	211.8	210.6	209.3	
		SHC	101.3	135.4	169.2	97.3	131.8	165.9	92.3	127.2	161.5	86.9	121.8	156.3	
	76	TC	-	270.7	269.9	-	259.0	258.1	-	245.0	243.6	-	228.5	227.1	
		SHC	-	106.1	140.0	-	102.4	136.5	-	98.2	132.7	-	93.2	127.9	
7875 CFM	EAT (wb)	58	TC	205.0	217.2	229.1	193.4	206.9	219.3	180.6	194.3	207.9	166.6	180.5	194.5
			SHC	205.0	217.2	229.1	193.4	206.9	219.3	180.6	194.3	207.9	166.6	180.5	194.5
		62	TC	216.7	217.4	229.4	202.5	207.1	219.6	185.9	194.5	208.4	168.4	180.7	194.7
			SHC	183.9	217.4	229.4	178.2	207.1	219.6	171.5	194.5	208.4	141.2	180.7	194.7
		67	TC	237.8	236.7	235.7	224.7	223.5	223.0	209.5	208.3	209.2	191.5	190.3	195.0
	SHC		144.6	182.4	219.3	140.3	178.2	213.7	134.9	172.7	205.9	113.6	166.2	195.0	
	72	TC	258.6	257.5	256.5	246.8	245.7	244.3	231.8	230.5	229.2	215.3	213.9	212.5	
		SHC	103.9	141.8	179.2	100.0	138.3	176.1	95.1	133.9	172.1	89.7	128.6	142.0	
	76	TC	-	275.4	274.2	-	262.7	261.8	-	248.7	247.6	-	231.9	230.5	
		SHC	-	109.5	147.0	-	105.7	143.6	-	101.5	139.9	-	96.6	135.4	
8750 CFM	EAT (wb)	58	TC	211.3	223.6	235.9	199.7	213.4	225.7	186.4	200.7	214.3	172.1	186.5	200.9
			SHC	211.3	223.6	235.9	199.7	213.4	225.7	186.4	200.7	214.3	172.1	186.5	200.9
		62	TC	220.0	223.7	236.3	206.0	213.6	226.1	189.3	200.9	214.5	172.2	186.7	201.2
			SHC	194.0	223.7	236.3	188.5	213.6	226.1	181.3	200.9	214.5	172.2	186.7	201.2
		67	TC	241.1	240.1	239.7	227.9	226.6	226.9	212.7	211.4	214.9	194.4	193.0	201.4
	SHC		151.0	192.1	230.2	146.9	188.3	225.2	141.6	182.9	214.8	135.3	176.3	201.4	
	72	TC	262.2	261.0	259.7	250.0	248.8	247.7	235.0	233.5	232.1	218.1	216.6	215.2	
		SHC	106.5	148.1	189.0	102.5	144.5	186.0	97.8	140.4	182.1	92.4	135.3	177.1	
	76	TC	-	278.9	277.4	-	266.0	264.8	-	251.5	250.6	-	234.7	233.0	
		SHC	-	112.7	153.7	-	108.9	150.4	-	104.7	146.7	-	100.0	142.4	

Note: See Minimum-Maximum Airflow Ratings in Table 3. Do not operate outside these limits.

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

Table 7 - COOLING CAPACITIES (cont.) 2-STAGE COOLING

17.5 TONS

50TCE20 (17.5 TONS) – UNIT WITH HUMIDI-MIZER IN SUBCOOLING MODE										
Temp (F) Air Entering Condenser (Edb)		AIR ENTERING EVAPORATOR – CFM								
		5,250			7,000			8,750		
		Air Entering Evaporator -- Ewb (F)								
		72	67	62	72	67	62	72	67	62
75	TC	218.7	199.6	180.5	241.4	219.4	197.4	261.7	237.2	212.7
	SHC	99.9	123.9	147.8	112.7	136.9	161.1	122.9	147.3	171.7
	kW	11.81	11.56	11.20	13.81	13.48	13.16	14.82	14.58	14.16
85	TC	206.6	187.9	169.1	224.9	203.4	181.9	241.3	217.3	193.4
	SHC	78.9	108.4	137.9	92.2	122.1	152.0	103.0	133.1	163.3
	kW	13.18	12.53	12.53	15.18	14.85	14.52	16.21	15.85	15.54
95	TC	194.7	176.2	157.8	208.4	187.4	166.4	220.8	197.4	174.1
	SHC	57.8	92.9	128.0	71.7	107.3	142.9	83.0	118.9	154.9
	kW	14.56	14.21	13.88	16.56	16.21	15.87	17.56	17.22	16.01
105	TC	182.7	164.5	146.4	191.9	171.4	150.8	200.3	177.6	154.8
	SHC	36.8	77.4	118.1	51.3	92.5	133.8	63.0	104.7	146.4
	kW	15.93	15.58	15.20	17.94	17.58	17.22	18.95	18.59	18.24
115	TC	170.6	152.8	135.0	175.4	155.4	135.3	179.8	157.7	135.5
	SHC	15.7	62.0	108.2	30.8	77.8	124.7	43.0	90.5	128.0
	kW	17.31	16.95	16.58	19.32	18.95	18.58	20.32	19.96	19.59

50TCE20 (17.5 TONS) – UNIT WITH HUMIDI-MIZER IN HOT GAS REHEAT MODE										
Temp (F) Air Entering 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								
		5,250	7,000	8,750	5,250	7,000	8,750	5,250	7,000	8,750
80	TC	82.20	90.50	92.40	86.70	96.40	97.80	91.60	99.80	101.20
	SHC	18.20	29.40	41.60	8.60	17.20	27.50	0.50	9.30	13.20
	kW	12.64	12.73	12.88	12.78	13.06	13.15	12.96	13.07	13.22
75	TC	84.40	92.70	94.40	88.80	98.60	99.70	93.70	102.00	103.40
	SHC	19.70	31.30	43.50	10.10	18.80	29.20	12.10	10.80	15.30
	kW	12.60	12.71	12.85	12.75	13.02	13.12	12.93	13.03	13.19
70	TC	86.70	94.90	96.60	91.00	100.70	102.00	95.90	104.10	105.40
	SHC	21.30	32.80	44.80	11.60	20.40	30.70	3.80	12.30	16.50
	kW	12.56	12.66	12.82	12.70	12.99	13.08	12.89	13.00	13.14
60	TC	90.90	99.10	100.80	95.20	105.00	106.30	100.20	108.30	109.70
	SHC	24.80	36.00	48.20	14.90	23.90	35.90	7.20	15.60	19.60
	kW	12.49	12.60	12.75	12.64	12.92	13.02	12.83	12.93	13.09
50	TC	95.00	103.40	105.10	99.50	109.40	110.50	104.40	112.50	113.90
	SHC	28.10	39.30	51.30	18.20	27.20	37.40	10.30	18.90	23.20
	kW	12.43	12.53	12.67	12.57	12.86	12.95	12.76	12.87	13.02
40	TC	99.20	107.70	109.30	103.70	113.70	114.70	108.60	116.70	118.10
	SHC	31.40	42.50	54.40	21.30	30.40	40.50	13.40	22.00	26.50
	kW	12.35	12.45	12.61	12.50	12.79	12.87	12.68	12.80	12.94

**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:

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

$$t_{lwb} = \text{Wet-bulb temperature corresponding to enthalpy of air leaving evaporator coil } (h_{lwb})$$

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

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

50TC-D24				AMBIENT TEMPERATURE												
				85			95			105			115			
				EA (db)			EA (db)			EA (db)			EA (db)			
				75	80	85	75	80	85	75	80	85	75	80	85	
6000 CFM	EAT (wb)	58	TC	213.1	217.2	228.7	199.9	207.5	219.4	184.8	195.8	208.4	169.6	182.6	195.6	
			SHC	194.3	217.2	228.7	188.0	207.5	219.4	179.0	195.8	208.4	169.6	182.6	195.6	
		62	TC	230.0	229.4	230.4	217.5	217.0	219.7	202.5	201.9	208.8	184.9	184.9	195.9	
			SHC	170.0	199.9	225.9	164.6	194.5	219.7	158.3	187.8	208.8	150.9	178.7	195.9	
		67	TC	251.5	251.1	250.6	239.4	238.7	238.1	225.4	224.7	224.0	208.8	208.2	207.4	
			SHC	137.5	168.1	198.4	132.9	163.4	193.7	127.5	158.1	188.2	121.1	151.9	181.9	
	72	TC	274.0	273.8	273.5	262.3	261.7	261.0	248.2	247.4	246.6	232.2	231.3	230.5		
		SHC	104.3	135.1	165.6	100.1	130.9	161.4	95.1	125.9	156.6	89.6	120.5	151.3		
	76	TC	-	292.9	292.2	-	280.5	279.9	-	266.3	265.6	-	250.6	249.8		
		SHC	-	108.1	138.6	-	104.1	134.9	-	99.6	130.4	-	94.6	125.5		
	7000 CFM	EAT (wb)	58	TC	220.8	229.7	241.7	208.4	219.7	232.2	194.3	208.1	221.0	180.1	194.2	207.9
				SHC	211.0	229.7	241.7	203.1	219.7	232.2	194.3	208.1	221.0	180.1	194.2	207.9
62			TC	237.8	237.3	241.9	225.1	224.6	232.3	209.6	210.2	221.3	191.3	196.0	208.2	
			SHC	183.3	217.8	241.9	178.2	212.1	232.3	171.8	203.8	221.3	164.3	196.0	208.2	
67			TC	260.0	259.2	258.5	247.2	246.4	245.7	232.7	231.9	231.7	215.8	215.0	214.3	
			SHC	146.0	181.0	215.7	141.3	176.5	211.2	136.0	171.3	206.3	129.8	165.3	199.4	
72		TC	283.3	282.5	281.8	270.6	269.8	268.9	255.9	255.0	254.1	240.0	238.9	238.0		
		SHC	107.9	143.2	178.1	103.6	139.0	174.1	98.6	134.2	169.5	93.2	129.0	164.4		
76		TC	-	302.3	301.6	-	289.1	288.4	-	274.4	273.6	-	257.9	256.8		
		SHC	-	112.3	147.5	-	108.3	143.7	-	103.9	139.4	-	98.9	134.5		
8000 CFM		EAT (wb)	58	TC	232.1	243.6	256.1	219.8	233.4	246.0	206.9	221.3	234.5	192.1	206.8	221.2
				SHC	227.5	243.6	256.1	219.8	233.4	246.0	206.9	221.3	234.5	192.1	206.8	221.2
	62		TC	247.8	247.1	256.4	234.7	235.5	246.2	218.7	221.1	234.7	199.5	207.0	221.4	
			SHC	199.5	236.7	256.4	194.3	229.1	246.2	187.8	221.1	234.7	179.9	207.0	221.4	
	67		TC	270.2	269.3	268.3	257.0	256.1	255.2	242.1	241.0	240.3	224.5	223.5	223.1	
			SHC	157.6	197.1	235.6	152.7	192.6	231.0	147.3	187.2	225.3	141.0	181.0	215.6	
	72	TC	294.1	293.1	292.2	280.7	279.7	278.4	265.9	264.7	263.8	248.9	247.6	246.6		
		SHC	114.8	154.6	193.9	110.3	150.4	190.0	105.4	145.6	185.5	99.7	140.1	180.2		
	76	TC	-	313.1	312.3	-	299.3	298.2	-	283.8	282.8	-	266.7	265.4		
		SHC	-	120.2	159.6	-	116.0	155.9	-	111.4	151.5	-	106.2	146.6		
	9000 CFM	EAT (wb)	58	TC	238.5	252.5	266.0	226.8	241.6	255.6	213.1	228.2	243.0	197.5	213.0	229.2
				SHC	238.5	252.5	266.0	226.8	241.6	255.6	213.1	228.2	243.0	197.5	213.0	229.2
62			TC	253.0	254.1	266.3	238.6	241.6	255.7	221.0	228.4	243.3	201.1	213.2	229.4	
			SHC	211.9	249.1	266.3	206.2	241.6	255.7	199.2	228.4	243.3	164.2	213.2	229.4	
67			TC	276.9	275.8	274.8	263.0	261.8	261.0	246.5	245.2	246.6	228.2	225.9	229.6	
			SHC	165.6	209.9	252.2	160.7	205.1	247.0	154.9	199.3	238.5	132.3	192.7	229.6	
72		TC	302.2	301.0	299.7	287.9	286.6	285.4	272.3	270.9	269.6	254.3	252.9	251.6		
		SHC	118.2	162.8	206.8	113.5	158.4	202.9	108.5	153.4	198.0	102.7	147.8	165.1		
76		TC	-	322.0	320.8	-	307.7	306.1	-	291.4	289.9	-	275.1	272.5		
		SHC	-	124.5	168.7	-	120.4	164.9	-	115.6	160.5	-	110.9	155.3		
10,000 CFM		EAT (wb)	58	TC	245.7	259.8	273.9	233.8	248.7	263.2	219.8	235.3	250.5	203.7	219.8	236.5
				SHC	245.7	259.8	273.9	233.8	248.7	263.2	219.8	235.3	250.5	203.7	219.8	236.5
	62		TC	256.8	260.7	274.2	242.2	249.0	263.3	224.6	235.6	250.6	205.6	220.0	236.8	
			SHC	223.8	258.4	274.2	218.1	249.0	263.3	211.0	235.6	250.6	199.3	220.0	236.8	
	67		TC	280.8	279.6	266.3	266.6	265.4	265.8	249.9	248.6	251.0	231.4	229.8	237.3	
			SHC	173.2	221.8	266.3	168.3	217.0	258.7	162.6	211.4	250.7	156.4	204.7	237.3	
	72	TC	306.4	305.0	274.8	292.1	290.6	289.3	276.0	274.3	273.0	257.5	256.0	254.6		
		SHC	121.2	170.1	252.2	116.6	165.9	214.8	111.5	161.0	210.0	105.7	155.4	204.5		
	76	TC	-	326.2	299.7	-	311.4	310.0	-	295.2	293.2	-	277.0	275.3		
		SHC	-	128.2	206.8	-	124.0	172.9	-	119.5	168.9	-	114.3	163.8		

Note: See Minimum-Maximum Airflow Ratings in Table 3. Do not operate outside these limits.

**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

50TCE24 (20 TONS) – UNIT WITH HUMIDI-MIZER IN SUBCOOLING MODE										
Temp (F) Air Entering Condenser (Edb)		AIR ENTERING EVAPORATOR – CFM								
		6,000			8,000			10,000		
		Air Entering Evaporator – Ewb (F)								
		72	67	62	72	67	62	72	67	62
75	TC	263.0	240.4	217.7	301.0	274.0	246.9	336.9	305.6	274.4
	SHC	125.3	151.6	178.0	144.4	171.1	198.0	160.0	186.9	213.9
	kW	15.63	15.20	14.65	15.91	15.62	14.98	16.26	15.92	15.21
85	TC	248.2	226.1	204.0	279.2	252.9	226.6	308.4	278.2	248.0
	SHC	98.9	131.7	164.5	118.6	152.0	185.3	134.6	168.4	202.2
	kW	17.50	17.04	16.50	17.74	17.51	16.75	18.08	17.73	17.03
95	TC	233.4	211.8	190.2	257.3	231.8	206.4	279.8	250.7	221.5
	SHC	72.4	111.8	151.1	92.7	132.8	172.9	109.3	149.9	190.6
	kW	19.36	18.96	18.35	19.61	19.37	18.67	20.02	19.62	18.97
105	TC	218.6	197.5	176.5	235.4	210.7	186.1	251.3	223.2	195.1
	SHC	46.0	91.8	137.7	66.9	113.6	160.4	83.9	131.4	178.9
	kW	21.23	20.76	20.18	21.53	21.22	20.52	21.91	21.52	20.77
115	TC	203.7	183.3	162.8	213.5	189.7	165.8	222.7	195.7	168.7
	SHC	19.5	71.9	124.2	41.0	94.4	147.9	58.5	112.9	157.2
	kW	23.02	22.58	22.02	23.42	23.02	22.38	23.73	23.41	22.57

50TCE24 (20 TONS) – UNIT WITH HUMIDI-MIZER IN HOT GAS REHEAT MODE										
Temp (F) Air Entering 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	91.50	100.80	109.50	95.80	105.70	112.40	102.30	110.80	118.60
	SHC	12.30	31.20	44.50	0.90	15.10	25.70	-6.50	3.60	13.90
	kW	14.82	15.01	15.24	15.35	15.45	15.52	15.56	15.65	15.73
75	TC	94.00	103.40	112.00	98.70	108.10	115.10	104.70	113.10	121.10
	SHC	13.60	32.40	45.70	2.00	16.00	26.60	-5.60	4.70	15.10
	kW	14.90	15.07	15.33	15.43	15.56	15.64	15.69	15.77	15.85
70	TC	96.50	106.00	114.30	100.90	110.60	117.20	107.20	115.80	123.50
	SHC	14.50	33.20	45.70	3.30	17.30	28.00	-4.00	5.90	16.20
	kW	14.97	15.17	15.41	15.50	15.66	15.75	15.80	15.87	15.94
60	TC	101.80	111.30	119.30	106.20	115.60	122.20	112.60	119.40	128.00
	SHC	16.70	35.50	48.60	5.60	19.40	30.30	-1.80	8.20	18.50
	kW	15.14	15.32	15.58	15.66	15.88	15.97	16.05	16.10	16.19
50	TC	107.20	116.40	124.30	111.50	120.70	127.30	117.70	125.20	132.90
	SHC	18.60	37.60	50.70	8.00	22.00	32.70	0.50	10.50	21.00
	kW	15.27	15.46	15.76	15.81	16.10	16.23	16.27	16.34	16.41
40	TC	112.20	121.80	129.20	116.60	125.70	132.00	123.20	130.00	138.00
	SHC	21.80	39.50	52.90	10.20	24.40	35.20	2.90	13.00	23.40
	kW	15.42	15.63	15.93	15.96	16.32	16.44	16.52	16.57	16.65

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

$$t_{lwb} = \text{Wet-bulb temperature corresponding to enthalpy of air leaving evaporator coil } (h_{lwb})$$

$$h_{lwb} = h_{ewb} - \frac{\text{total capacity (Btuh)}}{4.5 \times \text{cfm}}$$
 Where:  $h_{ewb}$  = Enthalpy of air entering evaporator coil



50TC-D28				AMBIENT TEMPERATURE													
				85			95			105			115				
				EA (db)			EA (db)			EA (db)			EA (db)				
				75	80	85	75	80	85	75	80	85	75	80	85		
7,500 CFM	EAT (wb)	58	TC	257.3	266.5	279.6	247.5	255.4	269.0	231.5	243.3	257.2	214.3	229.2	243.7		
			SHC	247.5	266.5	279.6	231.1	255.4	269.0	223.5	243.3	257.2	213.2	229.2	243.7		
		62	TC	281.4	280.5	280.6	267.5	267.0	269.3	251.3	251.0	257.6	232.7	232.5	244.1		
			SHC	208.2	244.0	278.0	202.3	238.4	269.3	195.8	231.5	257.6	188.1	223.4	244.1		
		67	TC	307.4	306.4	305.7	293.0	292.2	291.4	276.9	276.2	275.4	259.7	259.2	258.8		
			SHC	168.7	205.7	242.3	163.2	200.3	236.9	157.1	194.4	230.7	150.6	188.4	224.8		
		72	TC	333.9	333.2	332.5	320.1	319.3	318.6	304.5	303.7	302.7	287.2	285.3	284.5		
			SHC	128.1	165.4	202.3	123.1	160.6	197.8	117.6	155.1	192.5	111.5	149.0	186.6		
		76	TC	-	356.0	355.2	-	342.0	341.2	-	326.0	325.2	-	308.0	307.4		
			SHC	-	132.7	169.9	-	128.1	165.6	-	123.0	160.7	-	117.3	154.5		
		8,750 CFM	EAT (wb)	58	TC	269.8	280.2	294.4	255.3	268.9	283.2	241.1	256.1	270.7	225.5	241.3	257.3
					SHC	257.9	280.2	294.4	250.4	268.9	283.2	241.1	256.1	270.7	225.5	241.3	257.3
62	TC			289.9	289.3	294.6	275.3	274.9	283.6	258.7	258.2	271.0	238.8	241.6	257.6		
	SHC			224.2	265.0	294.6	218.6	258.6	283.6	212.0	251.7	271.0	203.9	241.6	257.6		
67	TC			316.2	315.7	314.5	301.7	300.8	299.8	285.1	284.2	283.4	266.7	266.0	265.2		
	SHC			179.0	221.6	263.1	173.5	216.4	257.9	167.5	210.5	251.9	161.0	204.5	245.1		
72	TC			343.7	342.7	341.6	315.3	327.9	327.0	313.1	311.4	310.4	294.3	293.2	292.2		
	SHC			132.4	175.4	217.7	127.6	170.7	213.3	122.0	165.3	208.3	115.6	159.2	202.5		
76	TC			-	366.0	364.9	-	351.2	350.1	-	334.2	333.2	-	315.4	314.3		
	SHC			-	138.0	180.7	-	133.4	176.5	-	128.2	171.6	-	122.5	166.1		
10,000 CFM	EAT (wb)			58	TC	277.1	291.8	306.8	264.9	280.2	295.3	251.2	267.0	282.3	235.1	252.2	268.1
					SHC	275.3	291.8	306.8	264.9	280.2	295.3	251.2	267.0	282.3	235.1	252.2	268.1
		62	TC	296.8	296.0	307.2	281.8	281.8	295.6	264.7	267.1	282.6	244.9	252.4	268.4		
			SHC	239.8	283.9	307.2	234.0	276.8	295.6	227.5	267.1	282.6	219.4	252.4	268.4		
		67	TC	323.5	322.6	321.4	308.5	307.4	306.5	291.3	290.2	289.3	272.5	271.5	270.8		
			SHC	188.8	236.9	282.9	183.5	231.9	277.4	177.5	226.1	271.2	171.2	219.7	264.3		
		72	TC	351.8	350.5	349.2	336.6	335.4	334.1	319.7	318.3	317.1	300.2	298.9	297.8		
			SHC	136.6	185.1	232.8	131.6	180.4	228.6	126.0	175.1	223.7	119.7	169.1	217.9		
		76	TC	-	374.2	372.8	-	358.6	357.3	-	340.9	339.7	-	321.3	320.1		
			SHC	-	143.1	191.2	-	138.5	187.1	-	133.3	182.3	-	127.6	176.8		
		11,250 CFM	EAT (wb)	58	TC	285.8	301.5	317.0	273.8	289.0	305.1	259.8	276.1	291.7	244.0	260.9	277.4
					SHC	285.8	301.5	317.0	273.8	289.0	305.1	259.8	276.1	291.7	244.0	260.9	277.4
62	TC			302.2	302.3	317.4	286.3	289.5	305.4	269.6	276.4	208.4	249.3	261.1	277.6		
	SHC			254.3	300.2	317.4	245.8	289.5	305.4	242.1	276.4	208.4	201.5	261.1	277.6		
67	TC			328.7	327.7	326.7	313.5	312.2	311.1	296.0	294.8	294.3	277.5	275.7	277.9		
	SHC			197.9	251.1	301.0	192.8	246.4	295.4	187.0	240.4	288.0	160.9	234.6	277.9		
72	TC			357.4	355.9	354.4	341.8	340.3	339.0	324.4	322.8	321.6	304.8	303.2	302.0		
	SHC			140.2	193.9	246.7	135.2	189.4	242.8	129.7	184.3	238.2	123.5	178.4	198.1		
76	TC			-	379.7	378.2	-	363.9	362.3	-	345.7	344.2	-	327.5	324.0		
	SHC			-	147.6	200.8	-	143.1	196.9	-	138.0	192.3	-	132.9	187.1		
12,500 CFM	EAT (wb)			58	TC	293.7	309.8	325.6	280.3	297.3	313.5	267.0	283.5	299.8	250.8	268.3	284.8
					SHC	293.7	309.8	325.6	280.3	297.3	313.5	267.0	283.5	299.8	250.8	268.3	284.8
		62	TC	310.5	310.2	326.1	290.7	297.6	313.9	273.7	283.7	300.1	253.1	268.5	285.0		
			SHC	264.9	310.1	326.1	262.1	297.6	313.9	255.7	283.7	300.1	246.9	268.5	285.0		
		67	TC	333.1	331.7	330.9	317.5	316.2	315.9	299.8	298.7	300.3	280.7	279.6	285.5		
			SHC	206.6	264.7	317.6	201.9	260.2	311.0	196.2	254.9	300.3	190.0	248.1	285.5		
		72	TC	362.1	360.3	358.7	346.0	344.3	343.0	328.2	326.6	325.1	308.4	306.6	305.3		
			SHC	143.6	202.4	260.2	138.7	198.1	256.5	133.2	193.2	252.1	127.1	187.5	246.5		
		76	TC	-	384.3	382.5	-	368.1	366.3	-	349.5	347.8	-	331.0	328.7		
			SHC	-	151.9	210.1	-	147.5	206.4	-	142.5	201.9	-	137.4	195.2		

Note: See Minimum-Maximum Airflow Ratings in Table 3. Do not operate outside these limits.

**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

50TCE28 (25 TONS) – UNIT WITH HUMIDI-MIZER IN SUBCOOLING MODE										
Temp (F) Air Entering Condenser (Edb)		AIR ENTERING EVAPORATOR – CFM								
		7,500			10,000			12,500		
		Air Entering Evaporator -- Ewb (F)								
		72	67	62	72	67	62	72	67	62
75	TC	335.3	305.5	275.8	368.3	334.4	300.5	398.1	360.5	322.9
	SHC	149.6	181.7	213.7	172.8	205.5	238.2	191.7	224.9	258.2
	kW	19.50	18.70	17.70	19.50	18.70	17.70	19.70	18.80	17.90
85	TC	316.3	287.0	257.7	341.5	308.4	275.3	364.3	327.8	291.2
	SHC	120.8	160.5	200.2	144.6	185.2	225.8	164.0	205.4	246.7
	kW	21.90	21.30	20.10	22.30	21.30	20.30	22.50	21.70	20.60
95	TC	297.3	268.5	239.6	314.7	282.4	250.1	330.5	295.0	259.5
	SHC	92.1	139.4	186.7	116.4	164.9	213.5	136.3	185.8	235.3
	kW	24.30	23.50	22.50	24.40	23.50	22.60	24.40	23.60	22.50
105	TC	278.2	249.9	221.6	287.9	256.4	224.9	296.7	262.3	227.8
	SHC	63.3	118.2	173.2	88.3	144.7	201.1	108.7	166.3	223.9
	kW	26.70	26.00	25.00	27.30	26.00	25.00	27.30	26.10	25.10
115	TC	259.2	231.4	203.5	261.1	230.4	199.7	262.9	229.5	196.1
	SHC	34.5	97.1	159.7	60.1	124.4	188.7	81.0	146.7	191.2
	kW	28.70	28.00	27.10	29.30	28.10	26.90	29.10	27.90	27.20

50TCE28 (25 TONS) – UNIT WITH HUMIDI-MIZER IN HOT GAS REHEAT MODE										
Temp (F) Air Entering 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								
		7,500	10,000	12,500	7,500	10,000	12,500	7,500	10,000	12,500
80	TC	132.40	136.80	148.40	138.20	142.40	154.60	144.30	146.40	162.50
	SHC	37.80	61.50	85.50	21.80	44.40	52.40	16.10	32.10	48.90
	kW	17.90	18.15	18.21	18.05	18.33	18.43	18.26	18.55	18.62
75	TC	138.00	142.20	154.10	143.50	148.00	160.30	148.90	151.00	167.10
	SHC	44.20	68.00	91.80	28.10	51.50	58.80	22.70	38.20	56.00
	kW	17.77	18.00	18.07	17.92	18.19	18.29	18.14	18.40	18.48
70	TC	143.80	148.10	160.00	149.30	154.00	165.90	155.50	157.60	173.80
	SHC	50.50	73.80	98.10	34.20	56.50	65.30	28.30	44.00	62.30
	kW	17.63	17.86	17.93	17.78	18.04	18.14	18.03	18.26	18.34
60	TC	154.80	159.50	171.10	160.20	165.20	177.20	166.70	168.80	185.10
	SHC	63.10	84.50	110.10	46.50	69.50	75.70	41.40	56.50	74.30
	kW	17.35	17.58	17.65	17.50	17.76	17.85	17.70	17.97	18.04
50	TC	166.30	170.50	181.20	171.30	176.40	188.40	178.00	180.00	196.40
	SHC	75.80	96.50	122.20	58.30	79.80	87.80	53.70	69.10	85.90
	kW	17.06	17.30	17.37	17.22	17.46	17.56	17.42	17.69	17.76
40	TC	177.50	181.70	192.30	182.40	187.60	199.70	189.30	191.20	207.70
	SHC	85.70	109.80	134.30	71.50	92.30	100.50	66.10	79.50	97.90
	kW	16.76	17.01	17.09	16.93	17.18	17.28	17.14	17.41	17.47

**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:

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

$$t_{lwb} = \text{Wet-bulb temperature corresponding to enthalpy of air leaving evaporator coil } (h_{lwb})$$

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

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

Table 7 - COOLING CAPACITIES (cont.) 2-STAGE COOLING

27.5 TONS

50TC*D30			Ambient Temperature													
			85			95			105			115				
			EA (dB)			EA (dB)			EA (dB)			EA (dB)				
			75	80	85	75	80	85	75	80	85	75	80	85		
7,500 CFM	EAT (wb)	58	THC	298	298	336.8	285.3	285.3	322.4	270.1	270.1	305.3	253.5	253.5	286.5	
			SHC	259.2	298	336.8	248.2	285.3	322.4	235	270.1	305.3	220.5	253.5	286.5	
		62	THC	318.3	318.3	318.3	301.9	301.9	309	282.4	282.4	299.5	260.5	260.5	288.5	
			SHC	233.5	275.2	316.9	225.8	267.4	309	216.6	258.1	299.5	206.1	247.3	288.5	
		67	THC	352.3	352.3	352.3	335.9	335.9	335.9	317.1	317.1	317.1	294	294	294	
			SHC	193.3	235	276.8	186.4	228.3	270.1	178.7	220.5	262.4	169.3	211.1	252.9	
	72	THC	383.6	383.6	383.6	368.5	368.5	368.5	350.7	350.7	350.7	329.6	329.6	329.6		
		SHC	149.7	191.9	234.2	144	186.2	228.4	137.3	179.5	221.7	129.6	171.7	213.8		
	76	THC	-	404	404	-	390.3	390.3	-	373.1	373.1	-	353.4	353.4		
		SHC	-	154.8	200.2	-	150.2	195.6	-	144.5	189.9	-	138	183.2		
	8,750 CFM	EAT (wb)	58	THC	315.7	315.7	356.8	302.4	302.4	341.8	286.8	286.8	324.1	269.2	269.2	304.3
				SHC	274.6	315.7	356.8	263	302.4	341.8	249.4	286.8	324.1	234.2	269.2	304.3
62			THC	329.7	329.7	346.7	312.7	312.7	338.3	293	293	328	271.1	271.1	314.6	
			SHC	251.3	299	346.7	243.3	290.8	338.3	233.7	280.9	328	222	268.3	314.6	
67			THC	363.1	363.1	363.1	346.4	346.4	346.4	327.1	327.1	327.1	303.7	303.7	303.7	
			SHC	204.4	252.2	299.9	197.8	245.7	293.6	190.2	238.3	286.3	181	229.1	277.2	
72		THC	392.4	392.4	392.4	377.4	377.4	377.4	359.5	359.5	359.5	338.6	338.6	338.6		
		SHC	153.8	201.6	249.3	148.4	196.3	244.3	141.9	190	238	134.5	182.7	230.8		
76		THC	-	410.9	410.9	-	397.4	397.4	-	380	380	-	359.9	359.9		
		SHC	-	160.7	213.6	-	156.2	208.9	-	150.1	201.8	-	143.2	194.1		
10,000 CFM		EAT (wb)	58	THC	330.4	330.4	373.4	316.6	316.6	357.8	300.7	300.7	339.9	282.3	282.3	319
				SHC	287.4	330.4	373.4	275.4	316.6	357.8	261.6	300.7	339.9	245.6	282.3	319
	62		THC	338.9	338.9	373.5	321.8	321.8	364.5	301.9	301.9	354.3	282.6	282.6	331.6	
			SHC	267.2	320.3	373.5	258.9	311.7	364.5	249.5	301.9	354.3	233.5	282.6	331.6	
	67		THC	371.1	371.1	371.1	354.3	354.3	354.3	334.7	334.7	334.7	310.9	310.9	310.9	
			SHC	214.5	267.9	321.3	208.2	262	315.7	200.9	254.9	308.9	191.9	246	300.1	
	72	THC	398.6	398.6	398.6	383.8	383.8	383.8	365.7	365.7	365.7	344.9	344.9	344.9		
		SHC	157.3	210.1	262.8	152.2	205.4	258.7	145.8	199.4	252.9	138.7	192.5	246.3		
	76	THC	-	415.7	415.7	-	402.3	402.3	-	384.9	384.9	-	364.5	364.5		
		SHC	-	165.2	223.6	-	160.5	218	-	154.6	211.3	-	147.8	203.9		
	11,250 CFM	EAT (wb)	58	THC	342.7	342.7	387.3	328.7	328.7	371.4	312.7	312.7	353.3	293.5	293.5	331.7
				SHC	298.1	342.7	387.3	285.9	328.7	371.4	272	312.7	353.3	255.3	293.5	331.7
62			THC	346.8	346.8	396.7	329.7	329.7	387	313	313	367.3	293.8	293.8	344.8	
			SHC	281.1	338.9	396.7	272.5	329.7	387	258.6	313	367.3	242.8	293.8	344.8	
67			THC	377.2	377.2	377.2	360.4	360.4	360.4	340.7	340.7	340.7	316.6	316.6	321.8	
			SHC	223.7	282.5	341.2	217.9	277.2	336.5	210.8	270.5	330.2	202.1	261.9	321.8	
72		THC	403.1	403.1	403.1	388.6	388.6	388.6	370.3	370.3	370.3	349.5	349.5	349.5		
		SHC	160.3	217.7	275.1	155.5	213.7	271.9	149.3	208	266.7	142.4	201.4	260.5		
76		THC	-	419.3	419.3	-	406	406	-	388.5	388.5	-	367.8	367.8		
		SHC	-	168.8	231.3	-	164.4	226.3	-	158.6	220	-	151.9	212.8		
12,500 CFM		EAT (wb)	58	THC	353	353	398.9	338.8	338.8	382.9	322.5	322.5	364.5	303.1	303.1	342.5
				SHC	307.1	353	398.9	294.7	338.8	382.9	280.6	322.5	364.5	263.7	303.1	342.5
	62		THC	353.9	353.9	415.3	339.1	339.1	397.9	322.8	322.8	378.9	303.4	303.4	356	
			SHC	292.4	353.9	415.3	280.2	339.1	397.9	266.8	322.8	378.9	250.7	303.4	356	
	67		THC	381.9	381.9	381.9	365.2	365.2	365.2	345.3	345.3	350.4	321.3	321.3	342.2	
			SHC	232.3	296.1	360	227	291.6	356.3	220.1	285.2	350.4	211.5	276.8	342.2	
	72	THC	406.6	406.6	406.6	392.2	392.2	392.2	373.9	373.9	373.9	352.9	352.9	352.9		
		SHC	163.1	224.8	286.6	158.5	221.4	284.3	152.5	216.1	279.6	145.7	209.8	273.9		
	76	THC	-	422.1	422.1	-	408.9	408.9	-	391.2	391.2	-	370.3	370.3		
		SHC	-	172.2	238.5	-	167.9	234	-	162.3	228.1	-	155.7	221.2		

NOTES: 1. See Minimum–Maximum Airflow Ratings in Table 3. Do not operate outside these limits.  
 2. Humidi–MiZer not available for 27.5 ton units.

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

**Table 8 – STATIC PRESSURE ADDERS (IN. WG) - FACTORY OPTIONS AND/OR ACCESSORIES**

**Economizer - Vertical Duct Configuration**

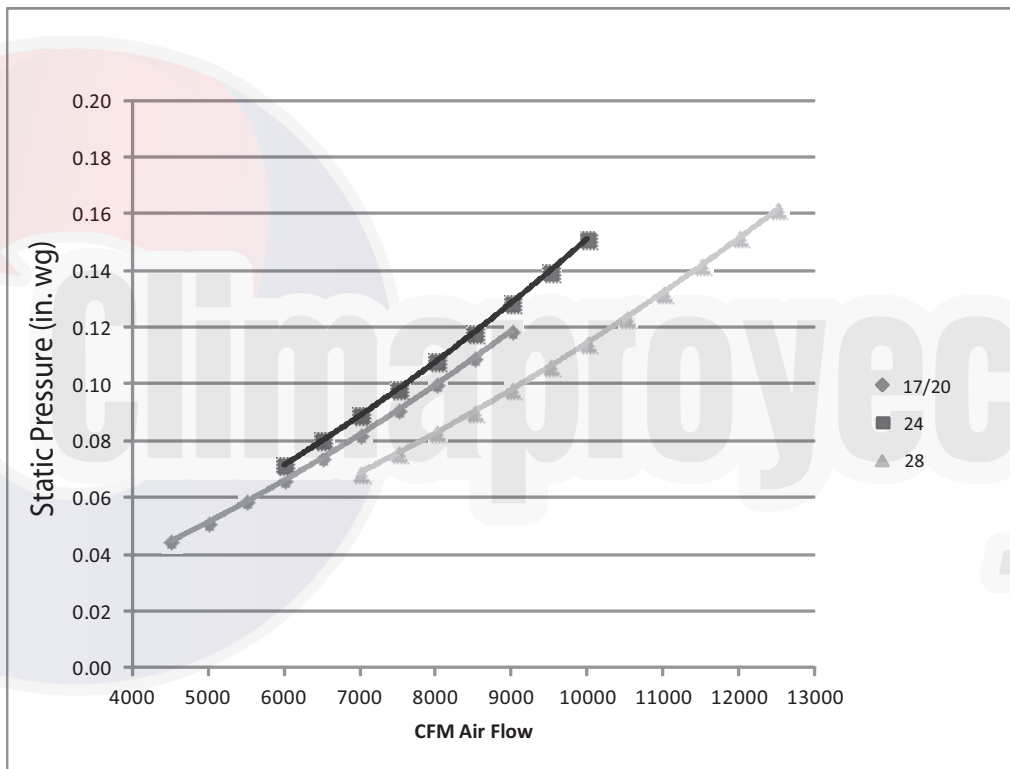
MODEL SIZES 17 – 30								
CFM	4500	5000	5500	6000	6500	7000	7500	8000
Static Pressure Adder (in. wg)	0.047	0.052	0.057	0.062	0.067	0.072	0.077	0.082

MODEL SIZES 17 – 30									
CFM	8500	9000	9500	10000	10500	11000	11500	12000	12500
Static Pressure Adder (in. wg)	0.088	0.093	0.098	0.103	0.109	0.114	0.119	0.125	0.131

**Electric Heaters - Vertical Duct Configuration**

MODEL SIZES 17 – 30								
CFM	4800	5000	6000	7000	8000	9000	10000	11500
25 kW Heater	0.010	0.010	0.020	0.030	0.040	0.050	0.060	0.090
50 kW Heater	0.020	0.020	0.040	0.060	0.080	0.100	0.130	0.180
75 kW Heater	0.030	0.040	0.060	0.080	0.120	0.150	0.200	0.270

**Humidi-MiZer Coil**



C11175A

# DAMPER, BAROMETRIC RELIEF AND PE PERFORMANCE

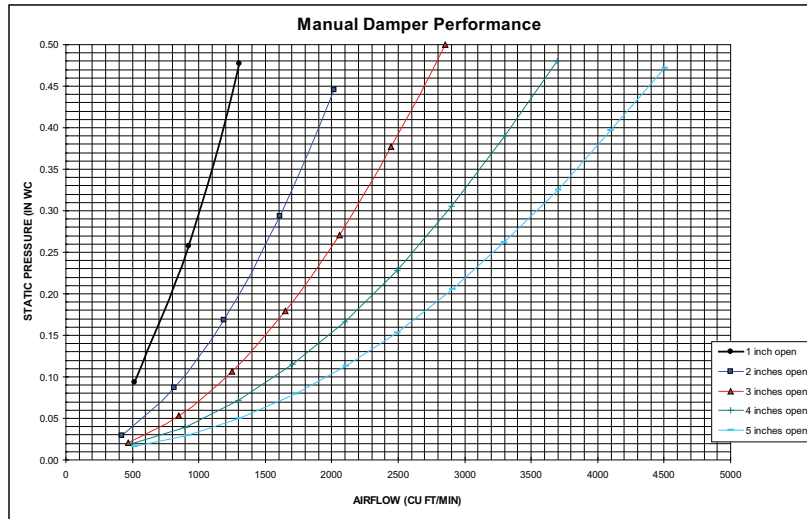


Fig. 8 - Manual Damper Performance

C09264

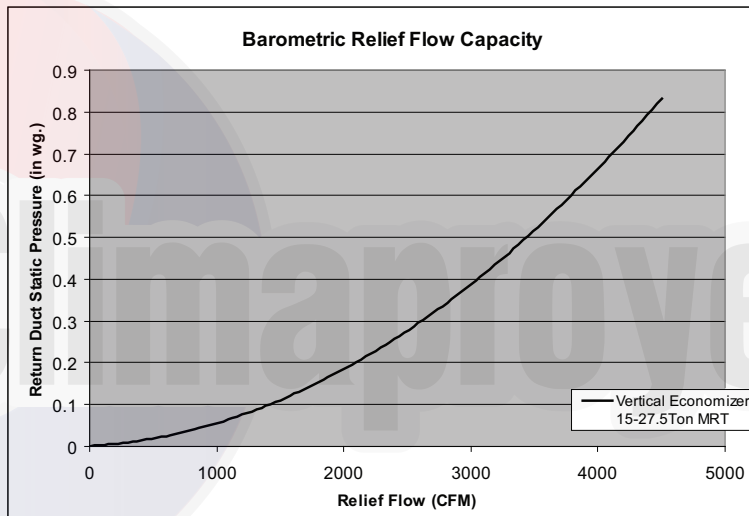


Fig. 9 - Barometric Relief Flow Capacity

C11307

## Power Exhaust Fan Performance

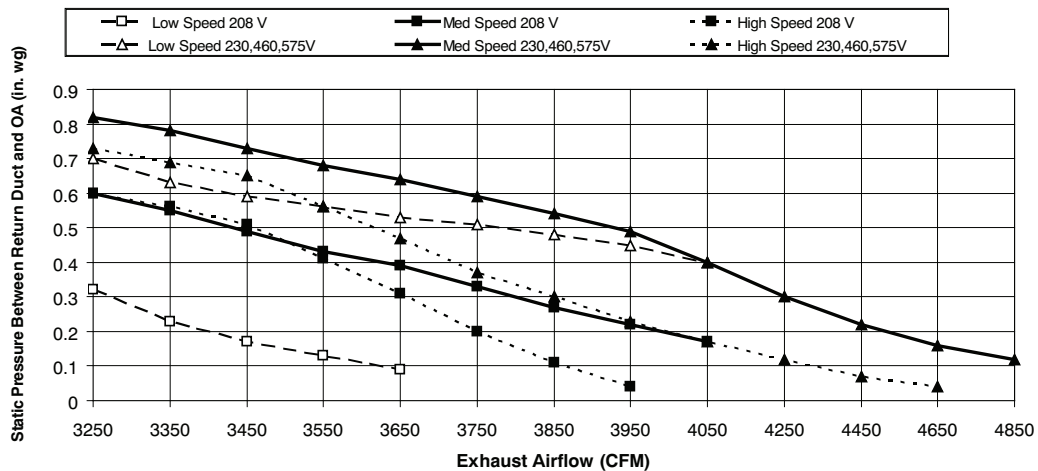


Fig. 10 - Power Exhaust Fan Performance

C11308

## 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. 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 9 – 50TC-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	<b>436</b>	<b>0.60</b>	530	0.90	611	1.22	684	1.57	751	1.94
4900	<b>456</b>	<b>0.71</b>	546	1.03	625	1.37	695	1.73	760	2.12
5250	<b>473</b>	<b>0.83</b>	560	1.16	637	1.51	706	1.89	770	2.30
5600	<b>491</b>	<b>0.95</b>	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	<b>665</b>	<b>2.33</b>	729	2.79	788	3.27	<b>844</b>	<b>3.77</b>
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	<b>1024</b>	<b>4.08</b>
4900	821	2.53	877	2.95	931	3.40	981	3.86	<b>1030</b>	<b>4.34</b>
5250	829	2.72	885	3.16	938	3.61	988	4.09	<b>1036</b>	<b>4.57</b>
5600	838	2.92	893	3.37	945	3.84	994	4.33	<b>1042</b>	<b>4.83</b>
6000	849	3.17	903	3.63	954	4.12	1003	4.62	<i>1050</i>	<i>5.14</i>
6400	861	3.43	914	3.92	964	4.42	<b>1012</b>	<b>4.94</b>	<i>1058</i>	<i>5.47</i>
6750	872	3.69	924	4.18	973	4.70	<i>1021</i>	<i>5.23</i>	<i>1066</i>	<i>5.78</i>
7100	883	3.95	934	4.47	983	5.00	<i>1030</i>	<i>5.54</i>	----	----
7500	897	4.28	947	4.81	995	5.36	<i>1041</i>	<i>5.92</i>	----	----
Std Static Motor and Drive – 514–680 RPM, Max BHP 2.29					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					
<b>Boldface</b> – Field Supplied Drive					<i>ITALIC</i> – Field Supplied Motor and Drive					

Table 9 - 50TC-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	<b>541</b>	<b>1.08</b>	<b>618</b>	<b>1.42</b>	688	1.79	754	2.19	817	2.62
5700	<b>573</b>	<b>1.31</b>	645	1.67	712	2.06	775	2.48	835	2.93
6100	<b>602</b>	<b>1.55</b>	670	1.93	734	2.34	795	2.77	852	3.23
6500	631	1.81	696	2.21	757	2.64	815	3.09	871	3.57
7000	668	2.19	729	2.61	787	3.06	843	3.53	896	4.03
7500	706	2.62	763	3.06	819	3.54	871	4.03	922	4.55
7900	736	3.00	791	3.47	844	3.96	895	4.47	944	5.00
8300	767	3.42	819	3.90	870	4.41	919	4.94	967	5.49
8750	801	3.94	852	4.44	900	4.97	948	5.52	993	6.09
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	876	3.08	932	3.56	986	4.07	1038	4.60	<b>1088</b>	<b>5.15</b>
5700	892	3.40	946	3.90	998	4.42	1049	4.96	<b>1097</b>	<b>5.52</b>
6100	907	3.72	960	4.23	1011	4.76	1060	5.31	<b>1107</b>	<b>5.89</b>
6500	924	4.07	975	4.59	1025	5.13	1072	5.70	<b>1119</b>	<b>6.28</b>
7000	947	4.55	996	5.09	1044	5.65	<b>1090</b>	<b>6.23</b>	<i>1135</i>	<i>6.83</i>
7500	971	5.08	1019	5.64	1064	6.22	<i>1109</i>	<i>6.82</i>	<i>1152</i>	<i>7.44</i>
7900	992	5.55	1038	6.13	<i>1082</i>	<i>6.72</i>	<i>1126</i>	<i>7.34</i>	----	----
8300	1013	6.06	<i>1057</i>	<i>6.65</i>	<i>1101</i>	<i>7.26</i>	----	----	----	----
8750	<i>1038</i>	<i>6.68</i>	<i>1081</i>	<i>7.29</i>	----	----	----	----	----	----
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					
<b>Boldface</b> – Field Supplied Drive					<i>ITALIC</i> – Field Supplied Motor and Drive					

## FAN PERFORMANCE (cont.)

**Table 9 - 50TC-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	<b>506</b>	<b>1.12</b>	<b>593</b>	<b>1.43</b>	<b>668</b>	<b>1.74</b>	736	2.07	798	2.40
6500	<b>533</b>	<b>1.36</b>	<b>616</b>	<b>1.70</b>	689	2.04	754	2.39	815	2.74
7000	<b>561</b>	<b>1.64</b>	<b>640</b>	<b>2.01</b>	710	2.37	774	2.74	833	3.11
7500	<b>588</b>	<b>1.96</b>	<b>664</b>	<b>2.35</b>	732	2.74	795	3.13	852	3.53
8000	<b>617</b>	<b>2.32</b>	689	2.74	755	3.15	816	3.57	872	3.99
8500	<b>645</b>	<b>2.73</b>	715	3.17	779	3.60	837	4.04	892	4.49
9000	<b>674</b>	<b>3.18</b>	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	<b>1054</b>	<b>4.24</b>
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					
<b>Boldface</b> – Field Supplied Drive										

**Table 9 - 50TC-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	<b>541</b>	<b>1.50</b>	<b>636</b>	<b>1.88</b>	<b>716</b>	<b>2.27</b>	787	2.66	850	3.06
8000	<b>563</b>	<b>1.76</b>	<b>656</b>	<b>2.17</b>	735	2.58	804	3.00	867	3.42
8500	<b>585</b>	<b>2.05</b>	<b>676</b>	<b>2.50</b>	753	2.93	822	3.37	884	3.81
9000	<b>608</b>	<b>2.37</b>	<b>697</b>	<b>2.85</b>	772	3.31	840	3.77	901	4.24
9500	<b>631</b>	<b>2.73</b>	717	3.24	791	3.73	858	4.21	918	4.70
10000	<b>654</b>	<b>3.12</b>	738	3.66	811	4.18	876	4.69	936	5.20
10500	<b>678</b>	<b>3.56</b>	759	4.12	831	4.67	<b>895</b>	<b>5.21</b>	954	5.74
11000	<b>701</b>	<b>4.02</b>	781	4.62	<b>851</b>	<b>5.20</b>	914	5.76	972	6.33
11500	725	4.53	<b>802</b>	<b>5.16</b>	<b>871</b>	<b>5.77</b>	933	6.36	991	6.95
12000	<b>748</b>	<b>5.09</b>	<b>824</b>	<b>5.75</b>	<b>892</b>	<b>6.38</b>	953	7.00	1010	7.62
12500	<b>772</b>	<b>5.68</b>	<b>846</b>	<b>6.38</b>	<b>912</b>	<b>7.04</b>	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
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	<b>1122</b>	<b>5.68</b>
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					
<b>Boldface</b> – Field Supplied Drive										



## FAN PERFORMANCE (cont.)

Table 9 - 50TC-D30

VERTICAL SUPPLY / RETURN

27.5 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
8250	<b>620</b>	<b>1.85</b>	<b>705</b>	<b>2.31</b>	778	2.77	843	3.22	903	3.68
8800	<b>650</b>	<b>2.18</b>	<b>731</b>	<b>2.67</b>	802	3.16	866	3.64	925	4.13
9350	<b>679</b>	<b>2.54</b>	758	3.07	828	3.59	890	4.10	948	4.62
9900	<b>710</b>	<b>2.95</b>	786	3.51	853	4.06	915	4.60	971	5.15
10450	<b>740</b>	<b>3.40</b>	814	3.99	879	4.57	939	5.15	995	5.73
11000	771	3.90	842	4.52	906	5.14	965	5.75	1020	6.35
11550	802	4.45	871	5.10	933	5.75	991	6.39	1044	7.03
12100	833	5.04	900	5.73	961	6.41	1017	7.09	1070	7.76
12650	865	5.70	930	6.42	989	7.13	1044	7.84	1095	8.54
13200	897	6.40	959	7.16	1017	7.90	1071	8.64	1121	9.38
13750	929	7.17	990	7.96	1046	8.74	1098	9.51	1148	10.27
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
8250	959	4.14	1011	4.61	1059	5.08	1106	5.56	1150	6.05
8800	980	4.62	1031	5.11	1080	5.61	1126	6.12	1169	6.63
9350	1002	5.14	1052	5.66	1100	6.18	1146	6.72	1189	7.25
9900	1024	5.70	1074	6.25	1121	6.80	1166	7.36	<b>1209</b>	<b>7.92</b>
10450	1047	6.30	1096	6.88	1143	7.47	1187	8.05	1230	8.64
11000	1071	6.96	1119	7.57	1165	8.18	1209	8.79	1251	9.41
11550	1095	7.66	1142	8.30	1188	8.94	1231	9.58	1273	10.23
12100	1119	8.42	1166	9.09	1211	9.76	1253	10.43	1295	11.10
12650	1144	9.24	1190	9.93	1234	10.63	1276	11.33	-----	-----
13200	1169	10.10	1215	10.83	1258	11.56	<i>1300</i>	<i>12.29</i>	-----	-----
13750	1195	11.03	1240	11.79	1282	12.55	-----	-----	-----	-----
Std Static Motor and Drive – 751–954 RPM, Max BHP 6.5					Medium Static Motor and Drive – 920–1190 RPM, Max BHP 10.5					
High Static Motor & Drive – 1116–1400 RPM, Max BHP 11.9					----- Outside operating range					
<b>Boldface</b> – Field Supplied Drive					<i>ITALIC</i> – Field Supplied Motor					

## FAN PERFORMANCE (cont.)

**Table 10 – PULLEY ADJUSTMENT - VERTICAL**

UNIT	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
30	Standard Static	954	934	913	893	873	853	832	812	792	771	751
	Medium Static	1190	1163	1136	1109	1082	1055	1028	1001	974	947	920
	High Static	1400	1372	1343	1315	1286	1258	1230	1201	1173	1144	1116

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

■ – Factory settings

### Legend and Notes

**LEGEND:**

- BRKR – Circuit breaker
- CO – Convenience outlet
- DISC – Disconnect
- FLA – Full load amps
- LRA – Locked rotor amps
- MCA – Minimum circuit amps
- PE – Power exhaust
- PWRD CO – Powered convenient outlet
- UNPWR CO – Unpowered convenient outlet



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

(BC)  $231 - 227 = 4$  v

(AC)  $227 - 226 = 1$  v

Maximum deviation is 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.

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

# ELECTRICAL INFORMATION

**Table 11 – 2-STAGE COOLING WITH SINGLE SPEED INDOOR FAN MOTOR**

**15 - 27.5 TONS**

UNIT	V-Ph-Hz	VOLTAGE RANGE		COMP 1		COMP 2		OFM (ea)		IFM		
				RLA	LRA	RLA	LRA	WATTS	FLA	TYPE	EFF at Full Load	FLA
		MIN	MAX									
50TC**17	208-3-60	187	253	29.5	195	30.1	225	350	1.5	STD	88.6%	8.4
										MED	87.0%	10.6
										HIGH	82.9%	13.6
	230-3-60	187	253	29.5	195	30.1	225	350	1.5	STD	88.6%	8.3
										MED	87.0%	10.6
										HIGH	82.9%	12.7
	460-3-60	414	506	14.7	95	16.7	114	277	0.9	STD	88.6%	4.2
										MED	87.0%	5.3
										HIGH	82.9%	6.4
	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
50TC**20	208-3-60	187	253	29.5	195	30.1	225	350	1.5	STD	87.0%	10.6
										MED	82.9%	13.6
										HIGH-High Eff.	89.5%	17.1
	230-3-60	187	253	29.5	195	30.1	225	350	1.5	STD	87.0%	10.6
										MED	82.9%	12.7
										HIGH-High Eff.	89.5%	17.1
	460-3-60	414	506	14.7	95	16.7	114	277	0.9	STD	87.0%	5.3
										MED	82.9%	6.4
										HIGH-High Eff.	89.5%	8.6
	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-High Eff.	89.5%	7.6
50TC**24	208-3-60	187	253	48.1	245	29.5	195	350	1.5	STD	82.9%	13.6
										MED-High Eff.	89.5%	17.1
										HIGH-High Eff.	91.7%	28.5
	230-3-60	187	253	48.1	245	29.5	195	350	1.5	STD	82.9%	12.7
										MED-High Eff.	89.5%	17.1
										HIGH-High Eff.	91.7%	28.5
	460-3-60	414	506	18.6	125	14.7	95	277	0.9	STD	82.9%	6.4
										MED-High Eff.	89.5%	8.6
										HIGH-High Eff.	91.7%	14.3
	575-3-60	518	633	14.7	100	12.2	80	397	0.6	STD	83.6%	5.6
										MED-High Eff.	89.5%	7.6
										HIGH-High Eff.	91.7%	9.5

See: "Legend and Notes" on page 42

## ELECTRICAL INFORMATION cont.

**Table 11 - 2-STAGE COOLING WITH SINGLE INDOOR FAN MOTOR**

**15 - 27.5 TONS (CONTINUED)**

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
50TC**28	208-3-60	187	253	48.1	245	48.1	245	350	1.5	STD	82.9%	13.6
										MED-High Eff.	89.5%	17.1
										HIGH-High Eff.	91.7%	28.5
	230-3-60	187	253	48.1	245	48.1	245	350	1.5	STD	82.9%	12.7
										MED-High Eff.	89.5%	17.1
										HIGH-High Eff.	91.7%	28.5
	460-3-60	414	506	18.6	125	18.6	125	277	0.9	STD	82.9%	6.4
										MED-High Eff.	89.5%	8.6
										HIGH-High Eff.	91.7%	14.3
	575-3-60	518	633	14.7	100	14.7	100	397	0.6	STD	83.6%	5.6
										MED-High Eff.	89.5%	7.6
										HIGH-High Eff.	91.7%	9.5
50TC**30	208-3-60	187	253	51.3	300	51.3	300	350	1.5	STD	89.5%	17.1
										MED-High Eff.	91.7%	28.5
										HIGH-High Eff.	91.7%	30.4
	230-3-60	187	253	51.3	300	51.3	300	350	1.5	STD	89.5%	17.1
										MED-High Eff.	91.7%	28.5
										HIGH-High Eff.	91.7%	30.4
	460-3-60	414	506	23.1	150	23.1	150	277	0.9	STD	89.5%	8.6
										MED-High Eff.	91.7%	14.3
										HIGH-High Eff.	91.7%	15.2
	575-3-60	518	633	19.9	109	19.9	109	397	0.6	STD	89.5%	7.6
										MED-High Eff.	91.7%	9.5
										HIGH-High Eff.	91.7%	12.4

See: "Legend and Notes" on page 42

## ELECTRICAL INFORMATION cont.

**Table 12 – 2-STAGE COOLING WITH 2-SPEED INDOOR FAN MOTOR**

**15 - 27.5 TONS**

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
50TC**17	208-3-60	187	253	29.5	195	30.1	225	350	1.5	STD	85.0%	8.6
										MED	81.5%	10.8
										HIGH	83.6%	13.6
	230-3-60	187	253	29.5	195	30.1	225	350	1.5	STD	85.0%	7.8
										MED	81.5%	9.8
										HIGH	83.6%	12.7
	460-3-60	414	506	14.7	95	16.7	114	277	0.9	STD	85.0%	3.8
										MED	81.5%	4.9
										HIGH	83.6%	6.4
	575-3-60	518	633	12.2	80	12.2	80	397	0.6	STD	81.1%	4.5
										MED	81.1%	4.5
										HIGH	83.6%	6.2
50TC**20	208-3-60	187	253	29.5	195	30.1	225	350	1.5	STD	81.5%	10.8
										MED	83.6%	13.6
										HIGH	89.5%	17.1
	230-3-60	187	253	29.5	195	30.1	225	350	1.5	STD	81.5%	9.8
										MED	83.6%	12.7
										HIGH	89.5%	17.1
	460-3-60	414	506	14.7	95	16.7	114	277	0.9	STD	81.5%	4.9
										MED	83.6%	6.4
										HIGH	89.5%	8.6
	575-3-60	518	633	12.2	80	12.2	80	397	0.6	STD	81.1%	4.5
										MED	83.6%	6.2
										HIGH	89.5%	7.6
50TC**24	208-3-60	187	253	48.1	245	29.5	195	350	1.5	STD	83.6%	13.6
										MED	89.5%	17.1
										HIGH	91.7%	28.5
	230-3-60	187	253	48.1	245	29.5	195	350	1.5	STD	83.6%	12.7
										MED	89.5%	17.1
										HIGH	91.7%	28.5
	460-3-60	414	506	18.6	125	14.7	95	277	0.9	STD	83.6%	6.4
										MED	89.5%	8.6
										HIGH	91.7%	14.3
	575-3-60	518	633	14.7	100	12.2	80	397	0.6	STD	83.6%	6.2
										MED	89.5%	7.6
										HIGH	91.7%	9.5
50TC**28	208-3-60	187	253	48.1	245	48.1	245	350	1.5	STD	83.6%	13.6
										MED	89.5%	17.1
										HIGH	91.7%	28.5
	230-3-60	187	253	48.1	245	48.1	245	350	1.5	STD	83.6%	12.7
										MED	89.5%	17.1
										HIGH	91.7%	28.5
	460-3-60	414	506	18.6	125	18.6	125	277	0.9	STD	83.6%	6.4
										MED	89.5%	8.6
										HIGH	91.7%	14.3
	575-3-60	518	633	14.7	100	14.7	100	397	0.6	STD	83.6%	6.2
										MED	89.5%	7.6
										HIGH	91.7%	9.5
50TC**30	208-3-60	187	253	51.3	300	51.3	300	350	1.5	STD	89.5%	17.1
										MED	91.7%	28.5
										HIGH	91.7%	30.4
	230-3-60	187	253	51.3	300	51.3	300	350	1.5	STD	89.5%	17.1
										MED	91.7%	28.5
										HIGH	91.7%	30.4
	460-3-60	414	506	23.1	150	23.1	150	277	0.9	STD	89.5%	8.6
										MED	91.7%	14.3
										HIGH	91.7%	15.2
	575-3-60	518	633	19.9	109	19.9	109	397	0.6	STD	89.5%	7.6
										MED	91.7%	9.5
										HIGH	91.7%	12.4

See: "Legend and Notes" on page 42

# ELECTRIC HEAT - ELECTRICAL INFORMATION cont.

Table 13 – 50TC\*\*17

## 1-SPEED INDOOR FAN MOTOR

Model Number 50TC**	NOM. V-Ph-Hz	IFM TYPE	Electric Heater Part Number CRHEATERXXXXX	Nominal (kW)	Application (kW)	Application Output (MBH)	Single Point or Junction Kit Part Number CRSINGLEXXA00			
							NO C.O. Or Unpowered C.O.		w/PWRD C.O.	
							NO P.E.	w/ P.E. (pwrd fr/unit)	NO P.E.	w/ P.E. (pwrd fr/unit)
17	208/230-3-60	STD	279A00	25.0	18.8/23.0	64.1/78.3	-	-	-	-
			280A00	50.0	37.6/45.9	128.1/156.7	056	056	056	056
			281A00	75.0	56.3/68.9	192.2/235.0	056	056	056	056
		MED	279A00	25.0	18.8/23.0	64.1/78.3	-	-	-	-
			280A00	50.0	37.6/45.9	128.1/156.7	056	056	056	056
			281A00	75.0	56.3/68.9	192.2/235.0	056	056	056	056
		HIGH	279A00	25.0	18.8/23.0	64.1/78.3	-	-	-	-
			280A00	50.0	37.6/45.9	128.1/156.7	056	056	056	056
			281A00	75.0	56.3/68.9	192.2/235.0	056	056	056	056
	460-3-60	STD	282A00	25.0	23.0	78.3	-	-	-	-
			283A00	50.0	45.9	156.7	-	057	057	057
			284A00	75.0	68.9	235.0	057	057	057	057
		MED	282A00	25.0	23.0	78.3	-	-	-	-
			283A00	50.0	45.9	156.7	057	057	057	057
			284A00	75.0	68.9	235.0	057	057	057	057
		HIGH	282A00	25.0	23.0	78.3	-	-	-	-
			283A00	50.0	45.9	156.7	057	057	057	057
			284A00	75.0	68.9	235.0	057	057	057	057
	575-3-60	STD	285A00	24.8	22.8	77.7	-	-	-	-
			286A00	49.6	45.6	155.4	-	-	-	057
			287A00	74.4	68.3	233.1	057	057	057	057
		MED	285A00	24.8	22.8	77.7	-	-	-	-
			286A00	49.6	45.6	155.4	-	-	-	057
			287A00	74.4	68.3	233.1	057	057	057	057
		HIGH	285A00	24.8	22.8	77.7	-	-	-	-
			286A00	49.6	45.6	155.4	-	057	-	057
			287A00	74.4	68.3	233.1	057	057	057	057

See: "Legend and Notes" on page 42

# ELECTRIC HEAT - ELECTRICAL INFORMATION cont.

**Table 14 – 50TC\*\*20**

## 1-SPEED INDOOR FAN MOTOR

Model Number 50TC**	NOM. V-Ph-Hz	IFM TYPE	Electric Heater Part Number CRHEATERXXXXX	Nominal (kW)	Application (kW)	Application Output (MBH)	Single Point or Junction Kit Part Number CRSINGLEXXXXA00			
							NO C.O. Or Unpowered C.O.		w/PWRD C.O.	
							NO P.E.	w/ P.E. (pwrd fr/unit)	NO P.E.	w/ P.E. (pwrd fr/unit)
<b>20</b>	208/230-3-60	STD	279A00	25.0	18.8/23.0	64.1/78.3	-	-	-	-
			280A00	50.0	37.6/45.9	128.1/156.7	056	056	056	056
			281A00	75.0	56.3/68.9	192.2/235.0	056	056	056	056
		MED	279A00	25.0	18.8/23.0	64.1/78.3	-	-	-	-
			280A00	50.0	37.6/45.9	128.1/156.7	056	056	056	056
			281A00	75.0	56.3/68.9	192.2/235.0	056	056	056	056
		HIGH- High Eff.	279A00	25.0	18.8/23.0	64.1/78.3	-	-	-	-
			280A00	50.0	37.6/45.9	128.1/156.7	056	056	056	056
			281A00	75.0	56.3/68.9	192.2/235.0	056	056	056	056
	460-3-60	STD	282A00	25.0	23.0	78.3	-	-	-	-
			283A00	50.0	45.9	156.7	057	057	057	057
			284A00	75.0	68.9	235.0	057	057	057	057
		MED	282A00	25.0	23.0	78.3	-	-	-	-
			283A00	50.0	45.9	156.7	057	057	057	057
			284A00	75.0	68.9	235.0	057	057	057	057
		HIGH- High Eff.	282A00	25.0	23.0	78.3	-	-	-	-
			283A00	50.0	45.9	156.7	057	057	057	057
			284A00	75.0	68.9	235.0	057	057	057	057
	575-3-60	STD	285A00	24.8	22.8	77.7	-	-	-	-
			286A00	49.6	45.6	155.4	-	-	-	057
			287A00	74.4	68.3	233.1	057	057	057	057
		MED	285A00	24.8	22.8	77.7	-	-	-	-
			286A00	49.6	45.6	155.4	-	057	-	057
			287A00	74.4	68.3	233.1	057	057	057	057
		HIGH- High Eff.	285A00	24.8	22.8	77.7	-	-	-	-
			286A00	49.6	45.6	155.4	-	057	057	057
			287A00	74.4	68.3	233.1	057	057	057	057

See: "Legend and Notes" on page 42

# ELECTRIC HEAT - ELECTRICAL INFORMATION cont.

**Table 15 – 50TC\*\*24**

## 1-SPEED INDOOR FAN MOTOR

Model Number 50TC**	NOM. V-Ph-Hz	IFM TYPE	Electric Heater Part Number CRHEATERXXXXX	Nominal (kW)	Application (kW)	Application Output (MBH)	Single Point or Junction Kit Part Number CRSINGLEXXXXA00			
							NO C.O. Or Unpowered C.O.		w/PWRD C.O.	
							NO P.E.	w/ P.E. (pwrd fr/unit)	NO P.E.	w/ P.E. (pwrd fr/unit)
24	208/203-3-60	STD	279A00	25.0	18.8/23.0	64.1/78.3	056	056	056	056
			280A00	50.0	37.6/45.9	128.1/156.7	056	056	056	056
			281A00	75.0	56.3/68.9	192.2/235.0	056	056	056	056
		MED-High Eff.	279A00	25.0	18.8/23.0	64.1/78.3	056	056	056	056
			280A00	50.0	37.6/45.9	128.1/156.7	056	056	056	056
			281A00	75.0	56.3/68.9	192.2/235.0	056	056	056	056
		HIGH-High Eff.	279A00	25.0	18.8/23.0	64.1/78.3	056	056	056	056
			280A00	50.0	37.6/45.9	128.1/156.7	056	056	056	056
			281A00	75.0	56.3/68.9	192.2/235.0	056	056	056	056
	460-3-60	STD	282A00	25.0	23.0	78.3	-	-	-	-
			283A00	50.0	45.9	156.7	057	057	057	057
			284A00	75.0	68.9	235.0	057	057	057	057
		MED-High Eff.	282A00	25.0	23.0	78.3	-	-	-	-
			283A00	50.0	45.9	156.7	057	057	057	057
			284A00	75.0	68.9	235.0	057	057	057	057
		HIGH-High Eff.	282A00	25.0	23.0	78.3	-	057	-	057
			283A00	50.0	45.9	156.7	057	057	057	057
			284A00	75.0	68.9	235.0	057	057	057	057
	575-3-60	STD	285A00	24.8	22.8	77.7	-	-	-	-
			286A00	49.6	45.6	155.4	-	057	-	057
			287A00	74.4	68.3	233.1	057	057	057	057
		MED-High Eff.	285A00	24.8	22.8	77.7	-	-	-	-
			286A00	49.6	45.6	155.4	-	057	057	057
			287A00	74.4	68.3	233.1	057	057	057	057
		HIGH-High Eff.	285A00	24.8	22.8	77.7	-	-	-	-
			286A00	49.6	45.6	155.4	057	057	057	057
			287A00	74.4	68.3	233.1	057	057	057	057

See: "Legend and Notes" on page 42



# ELECTRIC HEAT - ELECTRICAL INFORMATION cont.

**Table 16 – 50TC\*\*28**

## 1-SPEED INDOOR FAN MOTOR

Model Number 50TC**	NOM. V-Ph-Hz	IFM TYPE	Electric Heater Part Number CRHEATERXXXXX	Nominal (kW)	Application (kW)	Application Output (MBH)	Single Point or Junction Kit Part Number CRSINGLEXXA00			
							NO C.O. Or Unpowered C.O.		w/PWRD C.O.	
							NO P.E.	w/ P.E. (pwrd fr/unit)	NO P.E.	w/ P.E. (pwrd fr/unit)
<b>28</b>	208/230-3-60	STD	279A00	25.0	18.8/23.0	64.1/78.3	056	056	056	056
			280A00	50.0	37.6/45.9	128.1/156.7	056	056	056	056
			281A00	75.0	56.3/68.9	192.2/235.0	056	056	056	056
		MED- High Eff.	279A00	25.0	18.8/23.0	64.1/78.3	056	056	056	056
			280A00	50.0	37.6/45.9	128.1/156.7	056	056	056	056
			281A00	75.0	56.3/68.9	192.2/235.0	056	056	056	056
		HIGH- High Eff.	279A00	25.0	18.8/23.0	64.1/78.3	056	056	056	056
			280A00	50.0	37.6/45.9	128.1/156.7	056	056	056	056
			281A00	75.0	56.3/68.9	192.2/235.0	056	056	056	056
	460-3-60	STD	282A00	25.0	23.0	78.3	-	-	-	-
			283A00	50.0	45.9	156.7	057	057	057	057
			284A00	75.0	68.9	235.0	057	057	057	057
		MED- High Eff.	282A00	25.0	23.0	78.3	-	-	-	057
			283A00	50.0	45.9	156.7	057	057	057	057
			284A00	75.0	68.9	235.0	057	057	057	057
		HIGH- High Eff.	282A00	25.0	23.0	78.3	-	057	057	057
			283A00	50.0	45.9	156.7	057	057	057	057
			284A00	75.0	68.9	235.0	057	057	057	057
	575-3-60	STD	285A00	24.8	22.8	77.7	-	-	-	-
			286A00	49.6	45.6	155.4	-	057	-	057
			287A00	74.4	68.3	233.1	057	057	057	057
		MED- High Eff.	285A00	24.8	22.8	77.7	-	-	-	-
			286A00	49.6	45.6	155.4	-	057	057	057
			287A00	74.4	68.3	233.1	057	057	057	057
		HIGH- High Eff.	285A00	24.8	22.8	77.7	-	-	-	-
			286A00	49.6	45.6	155.4	057	057	057	057
			287A00	74.4	68.3	233.1	057	057	057	057

See: "Legend and Notes" on page 42

# ELECTRIC HEAT - ELECTRICAL INFORMATION cont.

Table 17 – 50TC\*\*30

## 1-SPEED INDOOR FAN MOTOR

Model Number 50TC**	NOM. V-Ph-Hz	IFM TYPE	Electric Heater Part Number CRHEATERXXXXX	Nominal (kW)	Application (kW)	Application Output (MBH)	Single Point or Junction Kit Part Number CRSINGLEXXXA00			
							NO C.O. Or Unpowered C.O.		w/PWRD C.O.	
							NO P.E.	w/ P.E. (pwrd fr/unit)	NO P.E.	w/ P.E. (pwrd fr/unit)
25	208/203-3-60	STD	270A00	25.0	18.8/23.0	64.1/78.3	-	-	-	-
			271A00	50.0	37.6/45.9	128.1/156.7	056	056	056	056
			272A00	75.0	56.3/68.9	192.2/235.0	056	056	056	056
		MED-High Eff.	270A00	25.0	18.8/23.0	64.1/78.3	-	-	-	-
			271A00	50.0	37.6/45.9	128.1/156.7	056	056	056	056
			272A00	75.0	56.3/68.9	192.2/235.0	056	056	056	056
		HIGH-High Eff.	270A00	25.0	18.8/23.0	64.1/78.3	-	056	-	056
			271A00	50.0	37.6/45.9	128.1/156.7	056	056	056	056
			272A00	75.0	56.3/68.9	192.2/235.0	056	056	056	056
	460-3-60	STD	273A00	25.0	23.0	78.3	-	-	-	-
			274A00	50.0	45.9	156.7	057	057	057	057
			275A00	75.0	68.9	235.0	057	057	057	057
		MED-High Eff.	273A00	25.0	23.0	78.3	-	-	-	-
			274A00	50.0	45.9	156.7	057	057	057	057
			275A00	75.0	68.9	235.0	057	057	057	057
		HIGH-High Eff.	273A00	25.0	23.0	78.3	-	-	-	057
			274A00	50.0	45.9	156.7	057	057	057	057
			275A00	75.0	68.9	235.0	057	057	057	057
	575-3-60	STD	276A00	24.8	22.8	77.7	-	-	-	-
			277A00	49.6	45.6	155.4	-	057	-	057
			278A00	74.4	68.3	233.1	057	057	057	057
		MED-High Eff.	276A00	24.8	22.8	77.7	-	-	-	-
			277A00	49.6	45.6	155.4	-	057	057	057
			278A00	74.4	68.3	233.1	057	057	057	057
		HIGH-High Eff.	276A00	24.8	22.8	77.7	-	-	-	-
			277A00	49.6	45.6	155.4	057	057	057	057
			278A00	74.4	68.3	233.1	057	057	057	057

See: "Legend and Notes" on page 42

# ELECTRIC HEAT - ELECTRICAL INFORMATION cont.

Table 18 – 50TC\*\*17

## 2-SPEED INDOOR FAN MOTOR

Model Number 50TC	NOM. V-Ph-Hz	IFM TYPE	Electric Heater Part Number CRHEATERXXXXXX	Nominal (kW)	Application (kW)	Application Output (MBH)	Single Point or Junction Kit Part Number CRSINGLEXXXXA00			
							NO C.O. Or Unpowered C.O.		w/PWRD C.O.	
							NO P.E.	w/ P.E. (pwrd fr/unit)	NO P.E.	w/ P.E. (pwrd fr/unit)
<b>**17</b>	208/230-3-60	STD	279A00	25.0	18.8/23.0	64.1/78.3	-	-	-	-
			280A00	50.0	37.6/45.9	128.1/156.7	056	056	056	056
			281A00	75.0	56.3/68.9	192.2/235.0	056	056	056	056
		MED	279A00	25.0	18.8/23.0	64.1/78.3	-	-	-	-
			280A00	50.0	37.6/45.9	128.1/156.7	056	056	056	056
			281A00	75.0	56.3/68.9	192.2/235.0	056	056	056	056
		HIGH	279A00	25.0	18.8/23.0	64.1/78.3	-	-	-	-
			280A00	50.0	37.6/45.9	128.1/156.7	056	056	056	056
			281A00	75.0	56.3/68.9	192.2/235.0	056	056	056	056
	460-3-60	STD	282A00	25.0	23.0	78.3	-	-	-	-
			283A00	50.0	45.9	156.7	-	057	057	057
			284A00	75.0	68.9	235.0	057	057	057	057
		MED	282A00	25.0	23.0	78.3	-	-	-	-
			283A00	50.0	45.9	156.7	057	057	057	057
			284A00	75.0	68.9	235.0	057	057	057	057
		HIGH	282A00	25.0	23.0	78.3	-	-	-	-
			283A00	50.0	45.9	156.7	057	057	057	057
			284A00	75.0	68.9	235.0	057	057	057	057
	575-3-60	STD	285A00	24.8	22.8	77.7	-	-	-	-
			286A00	49.6	45.6	155.4	-	-	-	057
			287A00	74.4	68.3	233.1	057	057	057	057
		MED	285A00	24.8	22.8	77.7	-	-	-	-
			286A00	49.6	45.6	155.4	-	-	-	057
			287A00	74.4	68.3	233.1	057	057	057	057
		HIGH	285A00	24.8	22.8	77.7	-	-	-	-
			286A00	49.6	45.6	155.4	-	057	-	057
			287A00	74.4	68.3	233.1	057	057	057	057

See: "Legend and Notes" on page 42

# ELECTRIC HEAT - ELECTRICAL INFORMATION cont.

Table 19 – 50TC\*\*20

## 2-SPEED INDOOR FAN MOTOR

Model Number 50TC	NOM. V-Ph-Hz	IFM TYPE	Electric Heater Part Number CRHEATERXXXXXX	Nominal (kW)	Application (kW)	Application Output (MBH)	Single Point or Junction Kit Part Number CRSINGLEXXXXA00			
							NO C.O. Or Unpowered C.O.		w/PWRD C.O.	
							NO P.E.	w/ P.E. (pwrd fr/unit)	NO P.E.	w/ P.E. (pwrd fr/unit)
<b>**20</b>	208/230-3-60	STD	279A00	25.0	18.8/23.0	64.1/78.3	-	-	-	-
			280A00	50.0	37.6/45.9	128.1/156.7	056	056	056	056
			281A00	75.0	56.3/68.9	192.2/235.0	056	056	056	056
		MED	279A00	25.0	18.8/23.0	64.1/78.3	-	-	-	-
			280A00	50.0	37.6/45.9	128.1/156.7	056	056	056	056
			281A00	75.0	56.3/68.9	192.2/235.0	056	056	056	056
		HIGH- High Eff.	279A00	25.0	18.8/23.0	64.1/78.3	-	-	-	-
			280A00	50.0	37.6/45.9	128.1/156.7	056	056	056	056
			281A00	75.0	56.3/68.9	192.2/235.0	056	056	056	056
	460-3-60	STD	282A00	25.0	23.0	78.3	-	-	-	-
			283A00	50.0	45.9	156.7	057	057	057	057
			284A00	75.0	68.9	235.0	057	057	057	057
		MED	282A00	25.0	23.0	78.3	-	-	-	-
			283A00	50.0	45.9	156.7	057	057	057	057
			284A00	75.0	68.9	235.0	057	057	057	057
		HIGH- High Eff.	282A00	25.0	23.0	78.3	-	-	-	-
			283A00	50.0	45.9	156.7	057	057	057	057
			284A00	75.0	68.9	235.0	057	057	057	057
	575-3-60	STD	285A00	24.8	22.8	77.7	-	-	-	-
			286A00	49.6	45.6	155.4	-	-	-	057
			287A00	74.4	68.3	233.1	057	057	057	057
		MED	285A00	24.8	22.8	77.7	-	-	-	-
			286A00	49.6	45.6	155.4	-	057	-	057
			287A00	74.4	68.3	233.1	057	057	057	057
		HIGH- High Eff.	285A00	24.8	22.8	77.7	-	-	-	-
			286A00	49.6	45.6	155.4	-	057	057	057
			287A00	74.4	68.3	233.1	057	057	057	057

See: "Legend and Notes" on page 42

# ELECTRIC HEAT - ELECTRICAL INFORMATION cont.

Table 20 – 50TC\*\*24

## 2-SPEED INDOOR FAN MOTOR

Model Number 50TC	NOM. V-Ph-Hz	IFM TYPE	Electric Heater Part Number CRHEATERXXXXXX	Nominal (kW)	Application (kW)	Application Output (MBH)	Single Point or Junction Kit Part Number CRSINGLEXXXXA00			
							NO C.O. Or Unpowered C.O.		w/PWRD C.O.	
							NO P.E.	w/ P.E. (pwrd fr/unit)	NO P.E.	w/ P.E. (pwrd fr/unit)
<b>**24</b>	208/203-3-60	STD	279A00	25.0	18.8/23.0	64.1/78.3	056	056	056	056
			280A00	50.0	37.6/45.9	128.1/156.7	056	056	056	056
			281A00	75.0	56.3/68.9	192.2/235.0	056	056	056	056
		MED- High Eff.	279A00	25.0	18.8/23.0	64.1/78.3	056	056	056	056
			280A00	50.0	37.6/45.9	128.1/156.7	056	056	056	056
			281A00	75.0	56.3/68.9	192.2/235.0	056	056	056	056
		HIGH- High Eff.	279A00	25.0	18.8/23.0	64.1/78.3	056	056	056	056
			280A00	50.0	37.6/45.9	128.1/156.7	056	056	056	056
			281A00	75.0	56.3/68.9	192.2/235.0	056	056	056	056
	460-3-60	STD	282A00	25.0	23.0	78.3	-	-	-	-
			283A00	50.0	45.9	156.7	057	057	057	057
			284A00	75.0	68.9	235.0	057	057	057	057
		MED- High Eff.	282A00	25.0	23.0	78.3	-	-	-	-
			283A00	50.0	45.9	156.7	057	057	057	057
			284A00	75.0	68.9	235.0	057	057	057	057
		HIGH- High Eff.	282A00	25.0	23.0	78.3	-	057	-	057
			283A00	50.0	45.9	156.7	057	057	057	057
			284A00	75.0	68.9	235.0	057	057	057	057
	575-3-60	STD	285A00	24.8	22.8	77.7	-	-	-	-
			286A00	49.6	45.6	155.4	-	057	-	057
			287A00	74.4	68.3	233.1	057	057	057	057
		MED- High Eff.	285A00	24.8	22.8	77.7	-	-	-	-
			286A00	49.6	45.6	155.4	-	057	057	057
			287A00	74.4	68.3	233.1	057	057	057	057
HIGH- High Eff.		285A00	24.8	22.8	77.7	-	-	-	-	
		286A00	49.6	45.6	155.4	057	057	057	057	
		287A00	74.4	68.3	233.1	057	057	057	057	

See: "Legend and Notes" on page 42

# ELECTRIC HEAT - ELECTRICAL INFORMATION cont.

Table 21 – 50TC\*\*28

## 2-SPEED INDOOR FAN MOTOR

Model Number 50TC	NOM. V-Ph-Hz	IFM TYPE	Electric Heater Part Number CRHEATERXXXXXX	Nominal (kW)	Application (kW)	Application Output (MBH)	Single Point or Junction Kit Part Number CRSINGLEXXXXA00			
							NO C.O. Or Unpowered C.O.		w/PWRD C.O.	
							NO P.E.	w/ P.E. (pwrd fr/unit)	NO P.E.	w/ P.E. (pwrd fr/unit)
<b>**28</b>	208/230-3-60	STD	279A00	25.0	18.8/23.0	64.1/78.3	056	056	056	056
			280A00	50.0	37.6/45.9	128.1/156.7	056	056	056	056
			281A00	75.0	56.3/68.9	192.2/235.0	056	056	056	056
		MED- High Eff.	279A00	25.0	18.8/23.0	64.1/78.3	056	056	056	056
			280A00	50.0	37.6/45.9	128.1/156.7	056	056	056	056
			281A00	75.0	56.3/68.9	192.2/235.0	056	056	056	056
		HIGH- High Eff.	279A00	25.0	18.8/23.0	64.1/78.3	056	056	056	056
			280A00	50.0	37.6/45.9	128.1/156.7	056	056	056	056
			281A00	75.0	56.3/68.9	192.2/235.0	056	056	056	056
	460-3-60	STD	282A00	25.0	23.0	78.3	-	-	-	-
			283A00	50.0	45.9	156.7	057	057	057	057
			284A00	75.0	68.9	235.0	057	057	057	057
		MED- High Eff.	282A00	25.0	23.0	78.3	-	-	-	057
			283A00	50.0	45.9	156.7	057	057	057	057
			284A00	75.0	68.9	235.0	057	057	057	057
		HIGH- High Eff.	282A00	25.0	23.0	78.3	-	057	057	057
			283A00	50.0	45.9	156.7	057	057	057	057
			284A00	75.0	68.9	235.0	057	057	057	057
	575-3-60	STD	285A00	24.8	22.8	77.7	-	-	-	-
			286A00	49.6	45.6	155.4	-	057	-	057
			287A00	74.4	68.3	233.1	057	057	057	057
		MED- High Eff.	285A00	24.8	22.8	77.7	-	-	-	-
			286A00	49.6	45.6	155.4	-	057	057	057
			287A00	74.4	68.3	233.1	057	057	057	057
HIGH- High Eff.		285A00	24.8	22.8	77.7	-	-	-	-	
		286A00	49.6	45.6	155.4	057	057	057	057	
		287A00	74.4	68.3	233.1	057	057	057	057	

See: "Legend and Notes" on page 42

# ELECTRIC HEAT - ELECTRICAL INFORMATION cont.

Table 22 – 50TC\*\*30

## 2-SPEED INDOOR FAN MOTOR

Model Number 50TC	NOM. V-Ph-Hz	IFM TYPE	Electric Heater Part Number CRHEATERXXXXXX	Nominal (kW)	Application (kW)	Application Output (MBH)	Single Point or Junction Kit Part Number CRSINGLEXXXXA00			
							NO C.O. or Un- powered C.O.		w/PWRD C.O.	
							NO P.E.	w/ P.E. (pwrd fr/unit)	NO P.E.	w/ P.E. (pwrd fr/unit)
<b>**30</b>	208/230-3-60	STD	279A00	25.0	18.8/23.0	64.1/78.3	056	056	056	056
			280A00	50.0	37.6/45.9	128.1/156.7	056	056	056	056
			281A00	75.0	56.3/68.9	192.2/235.0	056	056	056	056
		MED- High Eff.	279A00	25.0	18.8/23.0	64.1/78.3	056	056	056	056
			280A00	50.0	37.6/45.9	128.1/156.7	056	056	056	056
			281A00	75.0	56.3/68.9	192.2/235.0	056	056	056	056
		HIGH- High Eff.	279A00	25.0	18.8/23.0	64.1/78.3	056	056	056	056
			280A00	50.0	37.6/45.9	128.1/156.7	056	056	056	056
			281A00	75.0	56.3/68.9	192.2/235.0	056	056	056	056
	460-3-60	STD	282A00	25.0	23.0	78.3	057	057	057	057
			283A00	50.0	45.9	156.7	057	057	057	057
			284A00	75.0	68.9	235.0	057	057	057	057
		MED- High Eff.	282A00	25.0	23.0	78.3	057	057	057	057
			283A00	50.0	45.9	156.7	057	057	057	057
			284A00	75.0	68.9	235.0	057	057	057	057
		HIGH- High Eff.	282A00	25.0	23.0	78.3	057	057	057	057
			283A00	50.0	45.9	156.7	057	057	057	057
			284A00	75.0	68.9	235.0	057	057	057	057
	575-3-60	STD	285A00	24.8	22.8	77.7	-	057	-	057
			286A00	49.6	45.6	155.4	-	057	057	057
			287A00	74.4	68.3	233.1	057	057	057	057
		MED- High Eff.	285A00	24.8	22.8	77.7	-	057	-	057
			286A00	49.6	45.6	155.4	057	057	057	057
			287A00	74.4	68.3	233.1	057	057	057	057
HIGH- High Eff.		285A00	24.8	22.8	77.7	057	057	057	057	
		286A00	49.6	45.6	155.4	057	057	057	057	
		287A00	74.4	68.3	233.1	057	057	057	057	

See: "Legend and Notes" on page 42

# ELECTRICAL INFORMATION cont.

**Table 23 – Unit Wire/Fuse or HACR Breaker Sizing Data with Single Speed Indoor Fan Motor**

UNIT	IFM TYPE	ELEC. HTR				NO C.O. or UNPWR C.O.				w/ PWRD C.O.								
		CRHEATER*****	Nom (kW)	FLA	MCA	NO P.E.		w/ P.E. (pwrd fr/unit)		NO P.E.		w/ P.E. (pwrd fr/unit)						
						MAX FUSE or HACR BRKR	DISC. SIZE	FLA	LRA	MCA	DISC. SIZE	FLA	LRA	MCA	DISC. SIZE	FLA	LRA	
50TC**17	STD	NONE	18.8/25.0	52.1/60.1	80.0/79.9	100/100	83/83	501	97/97	521	84.8/84.7	100/100	89/89	506	96.6/96.5	125/125	102/102	526
						100/100	83/83	501/501	97/97	521/521	84.8/91.5	100/100	89/89	508/506	96.6/106.3	125/125	102/102	526/526
						150/150	129/148	501/501	149/161	521/521	146.8/136.7	150/150	135/153	508/506	161.5/151.4	175/175	149/167	526/526
						200/200	190/217	501/501	203/231	521/521	172.9/196.8	200/225	195/223	508/506	187.7/211.5	200/225	209/236	526/526
						100	86	515	99	535	87.0	100	91	520	98.8	125	105	540
						100/100	86/86	515/515	99/99	535/535	87.0/94.4	100/100	91/91	520/520	99.1/109.1	125/125	105/105	540/540
						150/150	132/151	515/515	146/164	535/535	149.5/139.6	150/150	138/156	520/520	164.3/154.3	175/175	151/170	540/540
						200/225	192/220	515/515	206/233	535/535	175.7/199.7	200/225	198/225	520/520	190.4/214.4	200/225	211/239	540/540
						100/100	89/88	517	103/102	537	90.0/89.1	100/100	95/94	522	101.8/100.9	125/125	108/107	542
						100/100	89/88	517/517	103/102	537/537	90.0/97.1	100/100	95/94	522/522	102.9/111.8	125/125	108/107	542/542
						150/150	135/153	517/517	149/167	537/537	153.3/142.2	175/175	141/158	522/522	168.0/156.9	175/175	155/172	542/542
						200/225	196/222	517/517	209/236	537/537	179.4/202.3	200/225	201/228	522/522	194.2/217.0	200/250	215/241	542/542
460-3-60	STD	NONE	25	30.1	42.5	50	44	251	51	263	44.7	60	47	253	50.9	60	54	265
						50	44	251	51	263	45.6	60	47	253	53.4	60	54	265
						70	74	251	81	263	68.1	80	76	253	75.9	80	84	265
						100	109	251	116	263	98.2	100	111	253	106	110	118	265
						60	45	258	52	270	45.8	60	48	260	52.0	60	55	272
						60	45	258	52	270	47	60	48	260	54.8	60	55	272
						80	75	258	82	270	69.5	80	78	260	77.2	80	85	272
						100	110	258	117	270	99.6	110	112	260	107.3	125	119	272
						60	47	259	54	271	46.9	60	49	261	53.1	60	56	273
						60	47	259	54	271	48.4	60	49	261	56.1	60	56	273
						80	76	259	84	271	70.9	80	79	261	78.6	80	86	273
						100	111	259	118	271	101	110	114	261	108.7	125	121	273
575-3-60	STD	NONE	24.8	23.9	32.1	40	33	188	39	196	33.8	45	35	190	38.6	50	41	198
						40	33	188	39	196	35.5	45	35	190	41.5	50	41	198
						70	58	188	64	196	65.3	70	60	190	71.3	80	66	198
						80	86	188	91	196	77.2	80	88	190	83.2	90	93	198
						40	33	188	39	196	36.9	45	35	190	38.6	50	41	198
						40	33	188	39	196	39.4	45	35	190	41.5	50	41	198
						70	58	188	64	196	69.1	70	60	190	71.3	80	66	198
						80	86	188	91	196	81.1	90	88	190	83.2	90	93	198
						40	33	188	39	196	36.9	45	35	190	38.6	50	41	198
						40	33	188	39	196	39.4	45	35	190	41.5	50	41	198
						70	58	188	64	196	69.1	70	60	190	71.3	80	66	198
						80	86	188	91	196	81.1	90	88	190	83.2	90	93	198
HIGH	NONE	24.8	23.9	34.9	45	37	202	42	210	36.6	45	39	204	41.4	50	44	212	
					45	37	202	42	210	39	45	39	204	45	50	44	212	
					70	61	202	67	210	68.8	70	63	204	74.8	80	69	212	
					90	89	202	94	210	80.7	90	91	204	86.7	90	96	212	
					45	37	202	42	210	39.7	45	39	204	41.4	50	44	212	
					45	37	202	42	210	42.9	45	39	204	45	50	44	212	

See: "Legend and Notes" on page 42







# ELECTRICAL INFORMATION cont.

**Table 23 - Unit Wire/Fuse or HACR Breaker Sizing Data with Single Speed Indoor Fan Motor (cont)**

UNIT	NO M, V-Ph-HZ	ELEC. HTR				NO C.O. or UNPWR C.O.						W/ PWRD C.O.									
		IFM TYPE	CRHEATER*****	Nom (kW)	FLA	NO PE.			w/ PE. (pwrd fr/unit)			NO PE.			w/ PE. (pwrd fr/unit)						
						MCA	MAX FUSE or HACR BRKR	DISC. SIZE FLA LRA	MCA	MAX FUSE or HACR BRKR	DISC. SIZE FLA LRA	MCA	MAX FUSE or HACR BRKR	DISC. SIZE FLA LRA	MCA	MAX FUSE or HACR BRKR	DISC. SIZE FLA LRA				
50TC**28	460-3-60	MEDIUM - High Eff.	NONE	-	-	127.8/126.9	175/175	133/132	590	139.6/138.7	175/175	147/146	610	132.6/131.7	175/175	139/138	595	144.4/143.5	175/175	152/151	615
			279A00	18.8/25.0	52.1/60.1	127.8/126.9	175/175	133/132	590/590	139.6/138.7	175/175	147/146	610/610	132.6/131.7	175/175	139/138	595/595	144.4/143.5	175/175	152/151	615/615
			280A00	37.6/50.0	104.2/120.3	147.3/136.2	175/175	135/153	590/590	162.0/150.9	175/175	149/167	610/610	153.3/142.2	175/175	141/158	595/595	168.0/156.9	175/175	155/172	615/615
			281A00	56.3/75.0	156.4/180.4	173.4/196.3	200/225	196/222	590/590	188.2/211.0	200/225	209/236	610/610	179.4/202.3	200/225	201/228	595/595	194.2/217.0	200/250	215/241	615/615
50TC**28	460-3-60	MEDIUM - High Eff.	NONE	-	-	142.7	175	150	665	154.5	200	164	685	147.5	175	156	670	159.3	200	169	690
			279A00	18.8/25.0	52.1/60.1	142.7/142.7	175/175	150/150	665/665	154.5/154.5	200/200	164/164	685/685	147.5/147.5	175/175	156/156	670/670	159.3/159.3	200/200	169/169	690/690
			280A00	37.6/50.0	104.2/120.3	165.9/155.9	175/175	153/171	665/665	180.6/170.7	200/200	166/185	685/685	171.9/161.9	175/175	158/177	670/670	186.6/176.7	200/200	172/190	690/690
			281A00	56.3/75.0	156.4/180.4	192.0/216.0	200/250	213/240	665/665	206.8/230.8	225/250	226/254	685/685	198.0/222.0	225/250	218/246	670/670	212.8/236.8	225/250	232/259	690/690
50TC**28	460-3-60	MEDIUM - High Eff.	NONE	-	-	51.9	60	54	302	58.1	70	61	314	54.1	60	57	304	60.3	70	64	316
			282A00	25	30.1	51.9	60	54	302	58.1	70	61	314	54.1	60	57	304	60.3	70	64	316
			283A00	50	60.1	68.2	80	76	302	75.9	80	84	314	70.9	80	79	304	78.6	80	86	316
			284A00	75	90.2	98.2	100	111	302	106	125	118	314	101	110	114	304	108.7	125	121	316
50TC**28	460-3-60	MEDIUM - High Eff.	NONE	-	-	54.1	60	57	300	60.3	70	64	312	56.3	70	59	302	62.5	80	66	314
			282A00	25	30.1	54.1	60	57	300	60.3	70	64	312	56.3	70	59	302	62.5	80	66	314
			283A00	50	60.1	70.9	80	79	300	78.6	80	86	312	73.6	80	82	302	81.4	90	89	314
			284A00	75	90.2	101	110	114	300	108.7	125	121	312	103.7	125	116	302	111.5	125	123	314
50TC**28	460-3-60	HIGH	NONE	-	-	59.8	70	63	340	66.0	80	70	352	62.0	80	66	342	68.2	80	73	354
			282A00	25	30.1	59.8	70	63	340	66	80	70	352	62	80	66	342	68.2	80	73	354
			283A00	50	60.1	78	90	86	340	85.7	90	93	352	80.7	90	88	342	88.5	100	95	354
			284A00	75	90.2	108.1	125	120	340	115.8	125	127	340	110.8	125	123	342	118.6	125	130	354
50TC**28	460-3-60	MEDIUM - High Eff.	NONE	-	-	41.1	50	43	244	45.9	60	49	252	42.8	50	45	246	47.6	60	50	254
			285A00	24.8	23.9	41.1	50	43	244	45.9	60	49	252	42.8	50	45	246	47.6	60	50	254
			286A00	49.6	47.7	66.6	70	61	244	72.6	80	67	252	68.8	70	63	246	74.8	80	69	254
			287A00	74.4	71.6	78.6	90	89	244	84.6	90	94	252	80.7	90	91	246	86.7	90	96	254
50TC**28	460-3-60	MEDIUM - High Eff.	NONE	-	-	43.1	50	45	242	47.9	60	51	250	44.8	50	47	244	49.6	60	53	252
			285A00	24.8	23.9	43.1	50	45	242	47.9	60	51	250	44.8	50	47	244	49.6	60	53	252
			286A00	49.6	47.7	69.1	70	64	242	75.1	80	69	250	71.3	80	66	244	77.3	80	71	252
			287A00	74.4	71.6	81.1	90	91	242	87.1	90	97	250	83.2	90	93	244	89.2	90	99	252
50TC**28	460-3-60	HIGH	NONE	-	-	45.0	50	47	269	49.8	60	53	277	46.7	60	49	271	51.5	60	55	279
			285A00	24.8	23.9	45	50	47	269	49.8	60	53	277	46.7	60	49	271	51.5	60	55	279
			286A00	49.6	47.7	71.5	80	66	269	77.5	80	71	277	73.6	80	68	271	79.6	80	73	279
			287A00	74.4	71.6	83.5	90	93	269	89.5	100	99	277	85.6	90	95	271	91.6	100	101	279

See: "Legend and Notes" on page 42



# ELECTRICAL INFORMATION cont.

**Table 24 – Unit Wire/Fuse or HACR Breaker Sizing Data with Factory Installed 2 Speed Indoor Fan Option**

UNIT	NO M, V-PH-HZ	ELEC. HTR				NO C.O. or UNPWR C.O.								w/ PWRD C.O.							
		CRHEATER*****	Nom (kW)	FLA	NO PE.				w/ P.E. (pwrd fr/unit)				NO PE.				w/ P.E. (pwrd fr/unit)				
					MCA	MAX FUSE or HACR BRKR	FLA	DISC. SIZE	MCA	MAX FUSE or HACR BRKR	FLA	DISC. SIZE	MCA	MAX FUSE or HACR BRKR	FLA	DISC. SIZE	MCA	MAX FUSE or HACR BRKR	FLA	DISC. SIZE	
STD		NONE	-	-	80.2/79.4	100/100	84/83	482	92.0/91.2	100/100	97/96	502	85.0/84.2	100/100	89/88	487	96.8/96.0	125/125	103/102	507	
		279A00	18.8/25.0	52.1/60.1	80.2/84.9	100/100	84/83	482/482	92.0/99.6	100/100	97/96	502/502	85.0/90.9	100/100	89/88	487/487	96.8/105.6	125/125	103/102	507/507	
		280A00	37.6/50.0	104.2/120.3	141.0/130.1	150/150	130/147	482/482	155.8/144.8	175/150	149/161	502/502	147.0/136.1	150/150	135/153	487/487	161.8/150.8	175/175	149/166	507/507	
		281A00	56.3/75.0	156.4/180.4	187.2/190.2	200/200	190/216	482/482	181.9/204.9	200/225	203/230	502/502	173.2/196.2	200/225	195/222	487/487	187.9/210.9	200/225	209/236	507/507	
MED	208/230-3-60	NONE	-	-	82.4/81.4	100/100	86/85	506	94.2/93.2	110/110	100/99	526	87.2/86.2	100/100	92/91	511	98.0/98.0	125/125	105/104	531	
		279A00	18.8/25.0	52.1/60.1	82.4/87.4	100/100	86/85	506/506	94.2/102.1	110/110	100/99	526/526	87.2/93.4	100/100	92/91	511/511	99.4/108.1	125/125	105/104	531/531	
		280A00	37.6/50.0	104.2/120.3	143.8/132.6	150/150	132/150	506/506	158.5/147.3	175/175	146/163	526/526	149.8/138.6	150/150	138/155	511/511	164.5/153.3	175/175	151/169	531/531	
		281A00	56.3/75.0	156.4/180.4	189.9/192.7	200/225	192/219	506/506	184.7/207.4	200/225	206/232	526/526	175.9/198.7	200/225	198/224	511/511	190.7/213.4	200/225	211/238	531/531	
HIGH		NONE	-	-	85.2/84.3	100/100	89/88	517	97.0/96.1	125/125	103/102	537	90.0/89.0	100/100	95/94	522	101.8/100.9	125/125	108/107	542	
		279A00	18.8/25.0	52.1/60.1	85.2/91.0	100/100	89/88	517/517	97.0/105.8	125/125	103/102	537/537	90.0/97.0	100/100	95/94	522/522	102.9/111.8	125/125	108/107	542/542	
		280A00	37.6/50.0	104.2/120.3	147.3/136.2	150/150	135/153	517/517	162.0/150.9	175/175	149/167	537/537	153.3/142.2	175/175	141/158	522/522	168.0/156.9	175/175	155/172	542/542	
		281A00	56.3/75.0	156.4/180.4	173.4/196.3	200/225	196/222	517/517	188.2/211.0	200/225	208/236	537/537	179.4/202.3	200/225	201/228	522/522	194.2/217.0	200/250	215/241	542/542	
STD	460-3-60	NONE	-	-	42.1	50	44	242	48.3	60	51	254	44.3	60	46	244	50.5	60	53	256	
		282A00	25.0	30.1	42.4	50	44	242	50.1	60	51	254	45.1	60	46	244	52.9	60	53	256	
		283A00	50.0	60.1	64.9	70	73	242	72.6	80	81	254	67.6	80	76	244	75.4	80	83	256	
		284A00	75.0	90.2	95.0	100	108	242	102.7	110	115	254	97.7	100	111	244	105.5	110	118	256	
MED		NONE	-	-	43.2	50	45	254	49.4	60	52	266	45.4	60	47	256	51.6	60	55	268	
		282A00	25.0	30.1	43.8	50	45	254	51.5	60	52	266	46.5	60	47	256	54.3	60	55	268	
		283A00	50.0	60.1	66.2	80	75	254	74.0	80	82	266	69.0	80	77	256	76.7	80	84	268	
		284A00	75.0	90.2	96.3	100	109	254	104.1	110	116	266	99.1	100	112	256	106.8	110	119	268	
HIGH		NONE	-	-	44.7	60	47	259	50.9	60	54	271	46.9	60	49	261	53.1	60	56	273	
		282A00	25.0	30.1	45.6	60	47	259	53.4	60	54	271	48.4	60	49	261	56.1	60	56	273	
		283A00	50.0	60.1	68.1	80	76	259	75.9	80	84	271	70.9	80	79	261	78.6	80	86	273	
		284A00	75.0	90.2	98.2	100	111	259	106.0	125	118	271	101.0	100	114	261	108.7	125	121	273	
STD		NONE	-	-	33.8	45	35	188	38.6	50	41	196	35.5	45	37	190	40.3	50	43	198	
		285A00	24.8	23.9	35.5	45	35	188	41.5	50	41	196	37.6	45	37	190	43.6	50	43	198	
		286A00	49.6	47.7	65.3	70	60	188	71.3	80	66	196	67.4	70	62	190	73.4	80	68	198	
		287A00	74.4	71.6	77.2	90	88	188	83.2	90	93	196	79.4	90	89	190	85.4	90	95	198	
MED	575-3-60	NONE	-	-	33.8	45	35	188	38.6	50	41	196	35.5	45	37	190	40.3	50	43	198	
		285A00	24.8	23.9	35.5	45	35	188	41.5	50	41	196	37.6	45	37	190	43.6	50	43	198	
		286A00	49.6	47.7	65.3	70	60	188	71.3	80	66	196	67.4	70	62	190	73.4	80	68	198	
		287A00	74.4	71.6	77.2	90	88	188	83.2	90	93	196	79.4	90	89	190	85.4	90	95	198	
HIGH		NONE	-	-	35.5	45	37	202	40.3	50	43	210	37.2	45	39	204	42.0	50	45	212	
		285A00	24.8	23.9	37.6	45	37	202	43.6	50	43	210	39.8	45	39	204	45.8	50	45	212	
		286A00	49.6	47.7	67.4	70	62	202	73.4	80	68	210	69.5	70	64	204	75.5	80	69	212	
		287A00	74.4	71.6	79.4	90	89	202	85.4	90	95	210	81.5	90	91	204	87.5	90	97	212	

See: "Legend and Notes" on page 42

# ELECTRICAL INFORMATION cont.

**Table 24 - Unit Wire/Fuse or HACR Breaker Sizing Data with Factory Installed 2 Speed Indoor Fan Option (cont)**

UNIT	NO M. V-PH-HZ	ELEC. HTR				NO C.O. or UNPWR C.O.				w/ PWRD C.O.					
		CHRHEATER*****	Nom (kW)	FLA	NO P.E.		w/ P.E. (pwrd fr/unit)		NO P.E.		w/ P.E. (pwrd fr/unit)				
					MCA	MAX FUSE or HACR BRKR	FLA	DISC. SIZE	MCA	MAX FUSE or HACR BRKR	FLA	DISC. SIZE	MCA	MAX FUSE or HACR BRKR	FLA
STD		NONE	-	-	86/85	506	100/99	526	87.2/86.2	100/100	92/91	511	99.0/98.0	105/104	531
		279A00	18.8/25.0	52.1/60.1	86/85	506/506	110/110	526/526	87.2/93.4	100/100	92/91	511/511	99.4/108.1	105/104	531/531
		280A00	37.6/50.0	104.2/120.3	132/150	506/506	175/175	526/526	149.8/138.6	150/150	138/155	511/511	164.5/153.3	151/169	531/531
		281A00	56.3/75.0	156.4/180.4	192/219	506/506	200/225	526/526	175.9/198.7	200/225	198/224	511/511	190.7/213.4	200/225	211/238
MED	208/230-3-60	NONE	-	-	89/88	517	103/102	537	90.0/89.1	100/100	95/94	522	101.8/100.9	108/107	542
		279A00	18.8/25.0	52.1/60.1	89/88	517/517	125/125	537/537	90.0/97.0	100/100	95/94	522/522	102.9/111.8	108/107	542/542
		280A00	37.6/50.0	104.2/120.3	135/153	517/517	175/175	537/537	153.3/142.2	175/175	141/158	522/522	168.0/156.9	155/172	542/542
		281A00	56.3/75.0	156.4/180.4	196/222	517/517	200/225	537/537	179.4/202.3	200/225	201/228	522/522	194.2/217.0	200/250	215/241
HIGH		NONE	-	-	93	513	107	533	93.5	110	99	518	105.3	112	538
		279A00	18.8/25.0	52.1/60.1	93/93	513/513	125/125	533/533	93.5/102.5	110/110	99/99	518/518	107.3/117.3	112/112	538/538
		280A00	37.6/50.0	104.2/120.3	139/158	513/513	175/175	533/533	157.6/147.7	175/175	145/164	518/518	172.4/162.4	159/177	538/538
		281A00	56.3/75.0	156.4/180.4	200/227	513/513	200/250	533/533	183.9/207.8	200/225	205/233	518/518	196.5/222.5	200/250	219/246
STD		NONE	-	-	45	254	52	266	45.4	60	47	256	51.6	55	268
		282A00	25.0	30.1	45	254	60	266	46.5	60	47	256	54.3	60	268
		283A00	50.0	60.1	75	254	80	266	69.0	80	77	256	76.7	80	268
		284A00	75.0	90.2	109	254	110	266	99.1	100	112	256	106.8	110	268
MED	460-3-60	NONE	-	-	47	259	54	271	46.9	60	49	261	53.1	60	273
		282A00	25.0	30.1	47	259	60	271	48.4	60	49	261	56.1	60	273
		283A00	50.0	60.1	76	259	80	271	70.9	80	79	261	78.6	80	273
		284A00	75.0	90.2	111	259	125	271	101.0	110	114	261	108.7	125	273
HIGH		NONE	-	-	49	257	56	269	49.1	60	52	259	55.3	60	271
		282A00	25.0	30.1	49	257	60	269	51.1	60	52	259	58.9	60	271
		283A00	50.0	60.1	79	257	80	269	73.6	80	82	259	81.4	90	271
		284A00	75.0	90.2	114	257	125	269	103.7	125	116	259	111.5	125	271
STD		NONE	-	-	35	188	41	196	35.5	45	37	190	40.3	43	198
		285A00	24.8	23.9	35	188	50	196	37.6	45	37	190	43.6	50	198
		286A00	49.6	47.7	60	188	80	196	67.4	70	62	190	73.4	80	198
		287A00	74.4	71.6	88	188	90	196	79.4	90	89	190	85.4	90	198
MED	575-3-60	NONE	-	-	37	202	43	210	37.2	45	39	204	42.0	45	212
		285A00	24.8	23.9	37	202	50	210	39.8	45	39	204	45.8	50	212
		286A00	49.6	47.7	62	202	80	210	69.5	70	64	204	75.5	80	212
		287A00	74.4	71.6	89	202	90	210	81.5	90	91	204	87.5	90	212
HIGH		NONE	-	-	39	200	44	208	38.6	50	41	202	43.4	46	210
		285A00	24.8	23.9	39	200	50	208	41.5	50	41	202	47.5	50	210
		286A00	49.6	47.7	64	200	80	208	71.3	80	66	202	77.3	80	210
		287A00	74.4	71.6	91	200	90	208	83.2	90	93	202	89.2	90	210

See: "Legend and Notes" on page 42

# ELECTRICAL INFORMATION cont.

**Table 24 - Unit Wire/Fuse or HACR Breaker Sizing Data with Factory Installed 2 Speed Indoor Fan Option (cont)**

UNIT	NO M, V-Ph-HZ	ELEC. HTR				NO C.O. or UNPWR C.O.						w/ PWRD C.O.								
		IFM TYPE	CRHEATER*****	Nom (kW)	FLA	NO PE.		w/ PE. (pwrdd fr/unit)		NO PE.		w/ PE. (pwrdd fr/unit)		NO PE.		w/ PE. (pwrdd fr/unit)				
						MCA	MAX FUSE or BRKR	FLA	LRA	MCA	MAX FUSE or BRKR	FLA	LRA	MCA	MAX FUSE or BRKR	FLA	LRA	MCA	MAX FUSE or BRKR	FLA
STD		NONE	-	-	-	109.2/108.3	150/150	112/111	540	125/124	560	114.0/113.1	150/150	117/116	545	125.8/124.9	150/150	131/130	565	
		279A00	18.8/25.0	52.1/60.1	109.2/108.3	150/150	112/111	540/540	125/124	560/560	114.0/113.1	150/150	117/116	545/545	125.8/124.9	150/150	131/130	565/565		
		280A00	37.6/50.0	104.2/120.3	147.3/136.2	150/150	135/153	540/640	149/167	560/560	153.3/142.2	175/175	141/158	545/545	168.0/156.9	175/175	155/172	565/565		
		281A00	56.3/75.0	156.4/180.4	173.4/196.3	200/225	196/222	540/640	209/236	560/560	179.4/202.3	200/225	201/228	545/545	194.2/217.0	200/250	215/241	565/565		
MED	208/230-3-60	NONE	-	-	-	112.7	150	116	536	129	556	117.5	150	121	541	129.3	175	135	561	
		279A00	18.8/25.0	52.1/60.1	112.7/112.7	150/150	116/116	536/536	124.5/124.5	150/150	117.5/117.5	150/150	121/121	541/541	129.3/129.3	175/175	135/135	561/561		
		280A00	37.6/50.0	104.2/120.3	151.6/141.7	175/175	139/158	536/536	166.4/156.4	175/175	157.6/147.7	175/175	145/164	541/541	172.4/162.4	175/175	159/177	561/561		
		281A00	56.3/75.0	156.4/180.4	177.8/201.8	200/225	200/227	536/536	192.5/216.5	200/250	213/241	556/556	183.8/207.8	200/225	205/233	541/541	198.5/222.5	200/250	219/246	561/561
HIGH		NONE	-	-	-	124.1	150	129	615	142	635	128.9	175	134	620	140.7	175	148	640	
		279A00	18.8/25.0	52.1/60.1	124.1/124.1	150/150	129/129	615/615	135.9/135.9	175/175	142/142	635/635	128.9/128.9	175/175	134/134	620/620	140.7/140.7	148/148	640/640	
		280A00	37.6/50.0	104.2/120.3	165.9/155.9	175/175	153/171	615/615	180.6/170.7	200/175	166/185	635/635	171.9/161.9	175/175	158/177	620/620	186.6/176.7	200/200	172/190	640/640
		281A00	56.3/75.0	156.4/180.4	192.0/216.0	200/250	213/240	615/615	206.8/230.8	225/250	226/254	635/635	198.0/222.0	225/250	218/246	620/620	212.8/236.8	225/250	232/259	640/640
STD	460-3-60	NONE	-	-	-	48.0	60	50	272	57	284	50.2	60	52	274	56.4	70	59	286	
		282A00	25.0	30.1	48.0	60	50	272	54.2	60	57	284	50.2	60	52	274	56.4	70	286	
		283A00	50.0	60.1	68.1	80	76	272	75.9	80	84	284	70.9	80	79	274	78.6	80	286	
		284A00	75.0	90.2	98.2	100	111	272	106.0	125	118	284	101.0	110	114	274	108.7	125	286	
MED		NONE	-	-	-	50.2	60	52	270	59	282	52.4	60	55	272	58.6	70	62	284	
		282A00	25.0	30.1	50.2	60	52	270	56.4	70	59	282	52.4	60	55	272	58.9	70	284	
		283A00	50.0	60.1	70.9	80	79	270	78.6	80	86	282	73.6	80	82	272	81.4	90	284	
		284A00	75.0	90.2	101.0	110	114	270	108.7	125	121	282	103.7	125	116	272	111.5	125	284	
HIGH		NONE	-	-	-	55.9	70	59	310	66	322	58.1	70	61	312	64.3	80	69	324	
		282A00	25.0	30.1	55.9	70	59	310	63.3	80	66	322	58.3	70	61	312	66.0	80	324	
		283A00	50.0	60.1	78.0	90	86	310	85.7	90	93	322	80.7	90	88	312	88.5	100	324	
		284A00	75.0	90.2	108.1	125	120	310	115.8	125	127	322	110.8	125	123	312	118.6	125	324	
STD	575-3-60	NONE	-	-	-	39.2	50	41	224	46	232	40.9	50	43	226	45.7	60	48	234	
		285A00	24.8	23.9	39.2	50	41	224	44.0	50	46	232	40.9	50	43	226	45.8	60	234	
		286A00	49.6	47.7	67.4	70	62	224	73.4	80	68	232	69.5	70	64	226	75.5	80	234	
		287A00	74.4	71.6	79.4	90	89	224	85.4	90	95	232	81.5	90	91	226	87.5	90	234	
MED		NONE	-	-	-	40.6	50	42	222	48	230	42.3	50	44	224	47.1	60	50	232	
		285A00	24.8	23.9	40.6	50	42	222	45.4	60	48	230	42.3	50	44	224	47.5	60	232	
		286A00	49.6	47.7	69.1	70	64	222	75.1	80	69	230	71.3	80	66	224	77.3	80	232	
		287A00	74.4	71.6	81.1	90	91	222	87.1	90	97	230	83.2	90	93	224	89.2	90	232	
HIGH		NONE	-	-	-	42.5	50	45	249	50	257	44.2	50	47	251	49.0	60	52	259	
		285A00	24.8	23.9	42.5	50	45	249	47.8	60	50	257	44.2	50	47	251	49.9	60	259	
		286A00	49.6	47.7	71.5	80	66	249	77.5	80	71	257	73.6	80	68	251	79.6	80	259	
		287A00	74.4	71.6	83.5	90	93	249	89.5	100	99	257	85.6	90	95	251	91.6	100	259	

See: "Legend and Notes" on page 42

# ELECTRICAL INFORMATION cont.

**Table 24 - Unit Wire/Fuse or HACR Breaker Sizing Data with Factory Installed 2 Speed Indoor Fan Option (cont)**

UNIT	ELEC. HTR				NO C.O. or UNPWR C.O.								w/ PWRD C.O.							
	IFM TYPE	CRHEATER*****	Nom (kW)	FLA	NO P.E.				w/ P.E. (pwrd fr/unit)				NO P.E.				w/ P.E. (pwrd fr/unit)			
					MCA	MAX FUSE OF HACR BRKR	FLA	DISC. SIZE	MCA	MAX FUSE OF HACR BRKR	FLA	DISC. SIZE	MCA	MAX FUSE OF HACR BRKR	FLA	DISC. SIZE	MCA	MAX FUSE OF HACR BRKR	FLA	DISC. SIZE
50TC*28	STD	NONE	-	-	127.8/126.9	175/175	133/132	590	147/146	610	132.6/131.7	175/175	139/138	595	144.4/143.5	175/175	152/151	615		
		279A00	18.8/25.0	52.1/60.1	127.8/126.9	175/175	133/132	590/590	147/146	610/610	132.6/131.7	175/175	139/138	595/595	144.4/143.5	175/175	152/151	615/615		
		280A00	37.6/50.0	104.2/120.3	147.3/136.2	175/175	135/153	590/590	149/167	610/610	153.3/142.2	175/175	141/158	595/595	168.0/156.9	175/175	155/172	615/615		
		281A00	56.3/75.0	156.4/180.4	173.4/196.3	200/225	196/222	590/590	209/236	610/610	179.4/202.3	200/225	201/228	595/595	194.2/217.0	200/250	215/241	615/615		
		NONE	-	-	131.3	175	137	586	151	606	136.1	175	143	591	147.9	175	156	611		
		279A00	18.8/25.0	52.1/60.1	131.3/131.3	175/175	137/137	586/586	151/151	606/606	136.1/136.1	175/175	143/143	591/591	147.9/147.9	175/175	156/156	611/611		
	MED	280A00	37.6/50.0	104.2/120.3	151.6/141.7	175/175	139/158	586/586	153/172	606/606	157.6/147.7	175/175	145/164	591/591	172.4/162.4	175/175	159/177	611/611		
		281A00	56.3/75.0	156.4/180.4	177.8/201.8	200/225	200/227	586/586	213/241	606/606	183.8/207.8	200/225	205/233	591/591	198.5/222.5	200/250	219/246	611/611		
		NONE	-	-	142.7	175	150	665	164	685	147.5	175	156	670	159.3	200	169	690		
		279A00	18.8/25.0	52.1/60.1	142.7/142.7	175/175	150/150	665/665	164/164	685/685	147.5/147.5	175/175	156/156	670/670	159.3/159.3	200/200	169/169	690/690		
		280A00	37.6/50.0	104.2/120.3	165.9/155.9	175/175	153/171	665/665	166/185	685/685	171.9/161.9	175/175	158/177	670/670	186.6/176.7	200/200	172/190	690/690		
		281A00	56.3/75.0	156.4/180.4	192.0/216.0	200/250	213/240	665/665	226/254	685/685	198.0/222.0	225/250	218/246	670/670	212.8/236.8	225/250	232/259	690/690		
460-3-60	STD	NONE	-	-	51.9	60	54	302	61	314	54.1	70	60	57	60.3	70	64	316		
		282A00	25.0	30.1	51.9	60	54	302	61	314	54.1	70	60	57	60.3	70	64	316		
		283A00	50.0	60.1	68.1	80	76	302	84	314	70.9	80	80	79	78.6	80	86	316		
		284A00	75.0	90.2	98.2	100	111	302	118	314	101.0	125	110	114	108.7	125	121	316		
		NONE	-	-	54.1	60	57	300	64	312	56.3	70	59	302	62.5	80	66	314		
		282A00	25.0	30.1	54.1	60	57	300	64	312	56.3	70	59	302	62.5	80	66	314		
	MED	283A00	50.0	60.1	70.9	80	79	300	86	312	73.6	80	82	302	81.4	90	89	314		
		284A00	75.0	90.2	101.0	110	114	300	121	312	103.7	125	116	302	111.5	125	123	314		
		NONE	-	-	59.8	70	63	340	70	352	62.0	80	66	342	68.2	80	73	354		
		282A00	25.0	30.1	59.8	70	63	340	70	352	62.0	80	66	342	68.2	80	73	354		
		283A00	50.0	60.1	78.0	90	86	340	93	352	80.7	90	88	342	88.5	100	95	354		
		284A00	75.0	90.2	108.1	125	120	340	127	352	110.8	125	123	342	118.6	125	130	354		
575-3-60	STD	NONE	-	-	41.7	50	44	244	49	252	43.4	60	46	246	48.2	60	51	254		
		285A00	24.8	23.9	41.7	50	44	244	49	252	43.4	60	46	246	48.2	60	51	254		
		286A00	49.6	47.7	67.4	70	62	244	68	252	69.5	70	64	246	75.5	80	69	254		
		287A00	74.4	71.6	79.4	90	89	244	95	252	81.5	90	91	246	87.5	90	97	254		
		NONE	-	-	43.1	50	45	242	51	250	44.8	60	47	244	49.6	60	53	252		
		285A00	24.8	23.9	43.1	50	45	242	51	250	44.8	60	47	244	49.6	60	53	252		
	MED	286A00	49.6	47.7	69.1	70	64	242	69	250	71.3	80	66	244	77.3	80	71	252		
		287A00	74.4	71.6	81.1	90	91	242	97	250	83.2	90	93	244	89.2	90	99	252		
		NONE	-	-	45.0	50	47	269	53	277	46.7	60	49	271	51.5	60	55	279		
		285A00	24.8	23.9	45.0	50	47	269	53	277	46.7	60	49	271	51.5	60	55	279		
		286A00	49.6	47.7	71.5	80	66	269	71	277	73.6	80	68	271	79.6	80	73	279		
		287A00	74.4	71.6	83.5	90	93	269	99	277	85.6	90	95	271	91.6	100	101	279		

See: "Legend and Notes" on page 42



# ELECTRICAL INFORMATION cont.

**Table 24 - Unit Wire/Fuse or HACR Breaker Sizing Data with Factory Installed 2 Speed Indoor Fan Option (cont)**

UNIT	NO M, V-PH-HZ	ELEC. HTR				NO C.O. or UNPWR C.O.								W/ PWRD C.O.													
		IFM TYPE	CRHEATER*****	Nom (kW)	FLA	NO PE.				w/ P.E. (pwrd fr/unit)				NO PE.				w/ P.E. (pwrd fr/unit)									
						MCA	MAX FUSE or BRKR	FLA	LRA	MCA	MAX FUSE or BRKR	FLA	LRA	MCA	MAX FUSE or BRKR	FLA	LRA	MCA	MAX FUSE or BRKR	FLA	LRA						
50TC**30	460-3-60	STD	NONE	25.0	30.1	66.0	80	69	354	72.2	90	76	366	68.2	90	72	356	74.4	90	79	368	79	368	79	368		
						66.0	80	69	354	72.2	90	76	366	68.2	90	72	356	74.4	90	79	368	79	368	79	368	79	368
						66.0	80	69	354	72.2	90	76	366	68.2	90	72	356	74.4	90	79	368	79	368	79	368	79	368
						66.0	80	69	354	72.2	90	76	366	68.2	90	72	356	74.4	90	79	368	79	368	79	368	79	368
50TC**30	460-3-60	MED	NONE	25.0	30.1	71.7	90	76	394	77.9	100	83	406	73.9	100	78	396	80.1	100	85	408	85	408	85	408		
						71.7	90	76	394	77.9	100	83	406	73.9	100	78	396	80.1	100	85	408	85	408	85	408		
						71.7	90	76	394	77.9	100	83	406	73.9	100	78	396	80.1	100	85	408	85	408	85	408	85	408
						71.7	90	76	394	77.9	100	83	406	73.9	100	78	396	80.1	100	85	408	85	408	85	408	85	408
50TC**30	460-3-60	HIGH	NONE	25.0	30.1	79.1	90	86	394	85.7	100	93	406	80.7	100	88	396	88.5	100	95	408	95	408	95	408		
						79.1	90	86	394	85.7	100	93	406	80.7	100	88	396	88.5	100	95	408	95	408	95	408		
						79.1	90	86	394	85.7	100	93	406	80.7	100	88	396	88.5	100	95	408	95	408	95	408	95	408
						79.1	90	86	394	85.7	100	93	406	80.7	100	88	396	88.5	100	95	408	95	408	95	408	95	408
50TC**30	460-3-60	STD	NONE	25.0	30.1	108.1	125	120	394	115.8	125	127	406	110.8	125	123	396	118.6	125	130	408	125	408	125	408		
						108.1	125	120	394	115.8	125	127	406	110.8	125	123	396	118.6	125	130	408	125	408	125	408		
						108.1	125	120	394	115.8	125	127	406	110.8	125	123	396	118.6	125	130	408	125	408	125	408		
						108.1	125	120	394	115.8	125	127	406	110.8	125	123	396	118.6	125	130	408	125	408	125	408		
50TC**30	460-3-60	HIGH	NONE	25.0	30.1	108.1	125	120	394	115.8	125	127	406	110.8	125	123	396	118.6	125	130	408	125	408	125	408		
						108.1	125	120	394	115.8	125	127	406	110.8	125	123	396	118.6	125	130	408	125	408	125	408		
						108.1	125	120	394	115.8	125	127	406	110.8	125	123	396	118.6	125	130	408	125	408	125	408		
						108.1	125	120	394	115.8	125	127	406	110.8	125	123	396	118.6	125	130	408	125	408	125	408		
575-3-60	575-3-60	STD	NONE	24.8	23.9	56.0	70	59	264	60.8	80	64	272	57.7	80	61	266	62.5	80	66	274	66	274	66	274		
						56.0	70	59	264	60.8	80	64	272	57.7	80	61	266	62.5	80	66	274	66	274	66	274		
						56.0	70	59	264	60.8	80	64	272	57.7	80	61	266	62.5	80	66	274	66	274	66	274		
						56.0	70	59	264	60.8	80	64	272	57.7	80	61	266	62.5	80	66	274	66	274	66	274		
575-3-60	575-3-60	MED	NONE	24.8	23.9	57.9	70	61	291	62.7	80	66	299	59.6	80	63	293	64.4	80	68	301	68	301	68	301		
						57.9	70	61	291	62.7	80	66	299	59.6	80	63	293	64.4	80	68	301	68	301	68	301		
						57.9	70	61	291	62.7	80	66	299	59.6	80	63	293	64.4	80	68	301	68	301	68	301		
						57.9	70	61	291	62.7	80	66	299	59.6	80	63	293	64.4	80	68	301	68	301	68	301		
575-3-60	575-3-60	HIGH	NONE	24.8	23.9	60.8	80	64	302	65.6	80	70	310	62.5	80	66	304	67.3	80	72	312	72	312	72	312		
						60.8	80	64	302	65.6	80	70	310	62.5	80	66	304	67.3	80	72	312	72	312	72	312		
						60.8	80	64	302	65.6	80	70	310	62.5	80	66	304	67.3	80	72	312	72	312	72	312		
						60.8	80	64	302	65.6	80	70	310	62.5	80	66	304	67.3	80	72	312	72	312	72	312		

See: "Legend and Notes" on page 42

# 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 and X (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 (Single speed indoor fan motor) —

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.

#### Cooling (2-speed indoor fan motor) —

Per ASHRAE 90.1 2010 standard section 6.4.3.10.b, during the first stage of cooling operation the VFD will adjust the fan motor to provide 2/3rd of the total cfm established for the unit. When a call for the second stage of cooling is required, the VFD will allow the total cfm for the unit established (100%).

#### Heating —

**NOTE:** The 50TC 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 2-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 and X 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<sub>2</sub> sensors are connected to the EconoMi\$er IV and X control, a demand controlled ventilation strategy will begin to operate. As the CO<sub>2</sub> level in the zone increases above the CO<sub>2</sub> setpoint, the minimum position of the damper will be increased proportionally. As the CO<sub>2</sub> level decreases because of the increase in fresh air, the outdoor-air damper will be proportionally closed. For EconoMi\$er IV and X 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.

**2-Speed Note:** When operating in ventilation mode only, the indoor fan motor will automatically adjust to 2/3rd of the total cfm established.

## SEQUENCE OF OPERATION (cont.)

### 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.

### 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.

The Humidi-MiZer system provides three sub-modes of operation: Cool, Reheat1, and Reheat2.

**Cool mode** - provides a normal ratio of Sensible and Latent Cooling effect from the evaporator coil.

**Reheat1** - provides increased Latent Cooling while slightly reducing the Sensible Cooling effect.

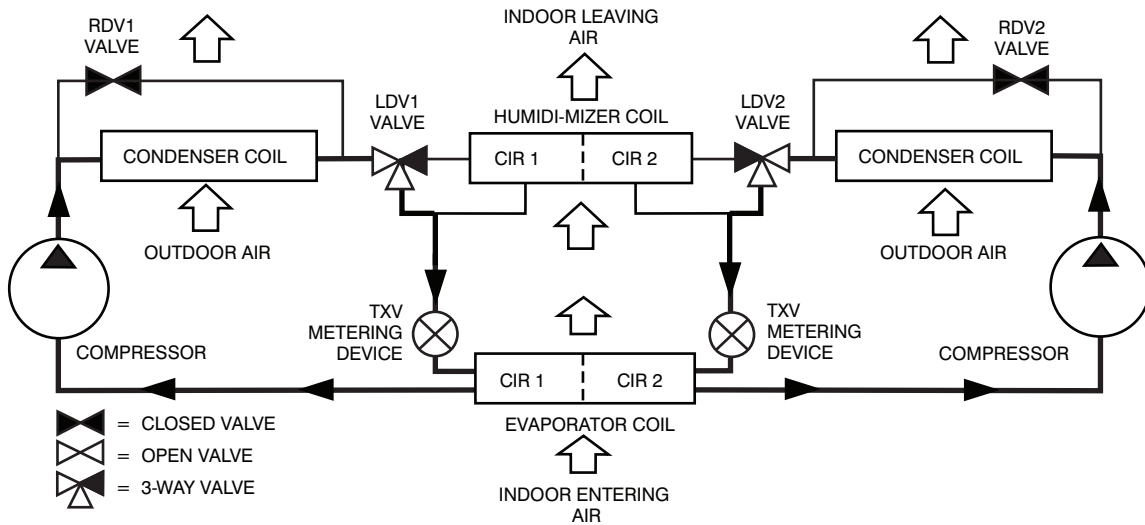
**Reheat2** - provides normal Latent Cooling but with null or minimum Sensible Cooling effect delivered to the space.

The Reheat1 and Reheat2 modes are available when the unit is not in a Heating mode and when the Low Ambient Lockout switch is closed.



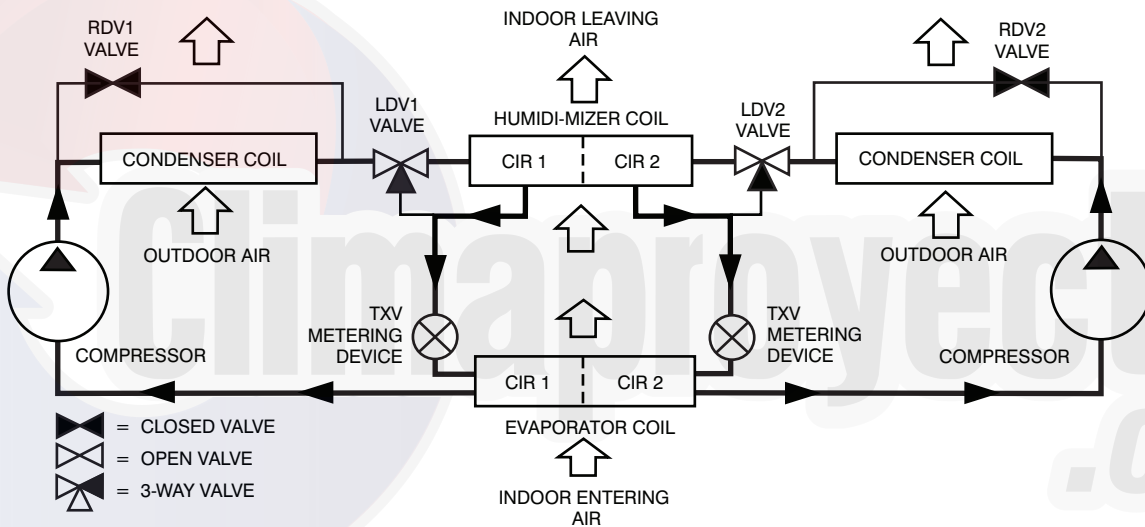
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## SEQUENCE OF OPERATION (cont.)



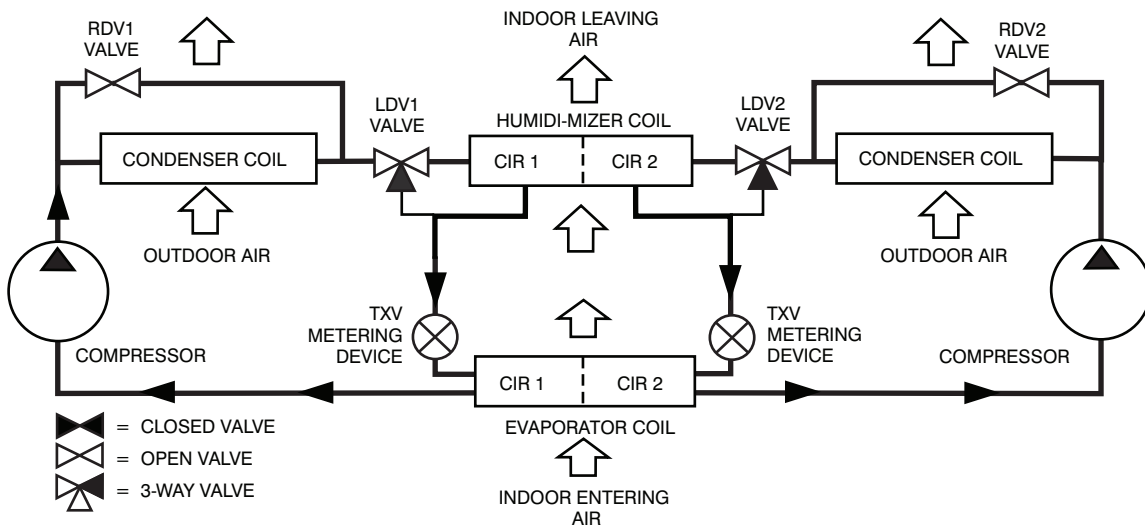
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### Normal Cooling Mode - Humidi-MiZer System



C13809

### Subcooling Mode (Reheat 1) - Humidi-MiZer System



C13793

### Hot Gas Reheat Mode (Reheat 2) - Humidi-MiZer System

# GUIDE SPECIFICATIONS - 50TC-D17-30

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 27.5 Nominal Tons

<u>Section</u>	<u>Description</u>
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<b>23 06 80</b>	<b>Schedules for Decentralized HVAC Equipment</b>
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- |                |   |
|----------------|---|
| 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. |

<b>23 07 16</b>	<b>HVAC Equipment Insulation</b>
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|----------------|---|
| 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.   |

<b>23 09 13</b>	<b>Instrumentation and Control Devices for HVAC</b>
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|----------------|---|
| 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.  |

<b>23 09 23</b>	<b>Direct-digital Control system for HVAC</b>
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|----------------|---|
| 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 <sub>2</sub> 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

23 81 19.13.A. General

1. Outdoor, rooftop mounted, electrically controlled, heating and cooling unit utilizing hermetic scroll compressor(s) for cooling duty and with optional electrical heating accessories 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. Unit shall be rated in accordance with AHRI Standard 340/360.
3. Unit shall be designed to conform to ASHRAE 15.
4. 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.
5. Insulation and adhesive shall meet NFPA 90A requirements for flame spread and smoke generation.
6. Unit casing shall be capable of withstanding 500-hour salt spray exposure per ASTM B117 (scribed specimen).
7. Unit casing shall be capable of withstanding Federal Test Method Standard No. 141 (Method 6061) 5000-hour salt spray.
8. Unit shall be designed and manufactured in accordance with ISO 9001.
9. Roof curb shall be designed to conform to NRCA Standards.
10. 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.
11. Unit shall be designed in accordance with UL Standard 1995, including tested to withstand rain.
12. Unit shall be constructed to prevent intrusion of snow and tested to prevent snow intrusion into the control box up to 40 mph.
13. Unit shake tested to assurance level 1, ASTM D4169 to ensure shipping reliability.
14. 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. Operating Characteristics

1. Unit shall be capable of starting and running at 115°F (46°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 30°F (-1°C) , ambient outdoor temperatures. Accessory kits are necessary if mechanically cooling at ambient temperatures below 30°F (-1°C).
3. Unit shall discharge supply air vertically as shown on contract drawings.
4. Unit shall be factory furnished for vertical configuration. No field conversion is required.

23 81 19.13.F. Electrical Requirements

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

23 81 19.13.G. 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 / 16°C): 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.) Thru-the base provisions/connections are available as standard with every unit. When bottom connections are required, field furnished couplings are required
    - (2.) 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, 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. They shall be 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.H. N/A

23 81 19.13.I. 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. Standard All Aluminum Novation Coils:
    - a. Standard condenser coils shall have all aluminum Novation Heat Exchanger Technology design consisting of aluminum multi port flat tube design and aluminum fin. Coils shall be a furnace brazed design and contain epoxy lined shrink wrap on all aluminum to copper connections.
    - b. Condenser coils shall be leak tested to 150 psig, pressure tested to 650 psig, and qualified to UL 1995 burst test at 1980 psig.
  6. 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.
    - 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.J. Refrigerant Components

1. Refrigerant circuit shall include the following control, safety, and maintenance features:
  - a. Fixed orifice metering system (on non-Humidifier units) shall prevent mal-distribution of two-phase refrigerant by including multiple fixed orifice devices in each refrigeration circuit. Each orifice is to be optimized to the coil circuit it serves.
  - b. 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 (for Humidi-MiZer units only).
  - c. Refrigerant filter drier - Solid core design.
  - d. Service gauge connections on suction and discharge lines.
  - e. 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.K. 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.L. 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.

23 81 19.13.M. 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 galvalum blades riveted to corrosion-resistant steel spiders and shall be dynamically balanced.

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

1. Staged Air Volume System (SAV) for 2-stage cooling models only
  - a. Evaporator fan motor:
    - (1.) Shall have permanently lubricated bearings.
    - (2.) Shall have a maximum continuous bhp rating for continuous duty operation; no safety factors above that rating.
    - (3.) Shall be Variable Frequency duty and 2-speed control.
    - (4.) Shall contain motor shaft grounding ring to prevent electrical bearing fluting damage by safely diverting harmful shaft voltages and bearing currents to ground.
2. Variable Frequency Drive (VFD). Only available on 2-speed indoor fan motor option (SAV):
  - a. Shall be installed inside the unit cabinet, mounted, wired and tested.
  - b. Shall contain Electromagnetic Interference (EMI) frequency protection.
  - c. Insulated Gate Bi-Polar Transistors (IGBT) used to produce the output pulse width modulated (PWM) waveform, allowing for quiet motor operation.
  - d. Self diagnostics with fault and power code LED indicator. Field accessory Display Kit available for further diagnostics and special setup applications.

- e. RS485 capability standard.
  - f. Electronic thermal overload protection.
  - g. 5% swinging chokes for harmonic reduction and improved power factor.
  - h. All printed circuit boards shall be conformal coated.
3. Integrated EconoMiSer IV, EconoMiSer 2, and EconoMiSer X standard leak rate models. (Factory or field installed)
- a. Integrated, gear driven opposing modulating blade design type capable of simultaneous economizer and compressor operation.
  - b. Independent modules for vertical return configuration shall be available.
  - 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. Standard leak rate models shall be equipped with dampers not to exceed 2% leakage at 1 in. wg pressure differential.
  - g. Economizer controller on EconoMiSer IV models shall be the Honeywell W7212 that provides:
    - (1.) Combined minimum and DCV maximum damper position potentiometers with compressor staging relay.
    - (2.) Functions with solid state analog enthalpy or dry bulb changeover control sensing.
    - (3.) Contain LED indicates for: when free cooling is available, when module is in DCV mode, when exhaust fan contact is closed.
  - h. Economizer controller on EconoMiSer X models shall be the Honeywell W7220 that provides:
    - (1.) 2-line LCD interface screen for setup, configuration and troubleshooting
    - (2.) On-board Fault Detection and Diagnostics (FDD) that senses and alerts when the economizer is not operating properly, per California Title 24.
    - (3.) Sensor failure loss of communication identification
    - (4.) Automatic sensor detection
    - (5.) Capabilities for use with multiple-speed indoor fan systems
    - (6.) Utilize digital sensors: Dry bulb and Enthalpy
  - i. Economizer controller on EconoMiSer 2 models with PremierLink shall be 4-20mA design and controlled by the PremierLink controller. PremierLink does not comply with California Title 24 Fault Detection & Diagnostic (FDD) requirements.
  - j. Economizer controller on EconoMiSer 2 models with RTU Open models shall be 4-20mA design controlled directly by the RTU Open controller. RTU Open meets California Title 24 Fault Detection & Diagnostic (FDD) requirements.
  - k. Shall be capable of introducing up to 100% outdoor air.
  - l. Shall be equipped with a barometric relief damper capable of relieving up to 100% return air and contain seals that meet ASHRAE 90.1 requirements.
  - m. Shall be designed to close damper(s) during loss-of-power situations with spring return built into motor.
  - n. Dry bulb outdoor air temperature sensor shall be provided as standard. Enthalpy sensor is also available on factory installed only. 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.
  - o. 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%.
  - p. The economizer shall maintain minimum airflow into the building during occupied period and provide design ventilation rate for full occupancy.
  - q. Dampers shall be completely closed when the unit is in the unoccupied mode.
  - r. Economizer controller shall accept a 2-10 Vdc CO2 sensor input for IAQ/DCV control. In this mode, dampers shall modulate the outdoor air damper to provide ventilation based on the sensor input.
  - s. Compressor lockout temperature on W7220 is adjustable from -45°F to 80°F, set at a factory default of 32°F. Others shall open at 35°F (2°C) and closes at 50°F (10°C).
  - t. Actuator shall be direct coupled to economizer gear. No linkage arms or control rods shall be acceptable.
  - u. Economizer controller shall provide indications when in free cooling mode, in the DCV mode, or the exhaust fan contact is closed.

4. Integrated EconoMiSer2, and EconoMiSer X **Ultra Low Leak rate models.** (Factory or field installed).
  - a. Integrated, gear driven opposing modulating blade design type capable of simultaneous economizer and compressor operation.
  - b. Independent modules for vertical return configuration shall be available.
  - 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. Ultra Low Leak design meets California Title 24 section 140.4 and ASHRAE90.1 requirements of 4 cfm per sq. ft. on the outside air dampers and 10 cfm per sq. ft. on the return dampers.
  - g. Economizer controller on EconoMiSer X models shall be the Honeywell W7220 that provides:
    - (1.) 2-line LCD interface screen for setup, configuration and troubleshooting
    - (2.) On-board Fault Detection and Diagnostics (FDD) that senses and alerts when the economizer is not operating properly, per California Title 24.
    - (3.) Sensor failure loss of communication identification
    - (4.) Automatic sensor detection
    - (5.) Capabilities for use with multiple-speed indoor fan systems
    - (6.) Utilize digital sensors: Dry bulb and Enthalpy
  - h. Economizer controller on EconoMiSer 2 models with RTU Open models shall be 4-20mA design controlled directly by the RTU Open controller. RTU Open meets California Title 24 Fault Detection & Diagnostic (FDD) requirements.
  - i. Shall be capable of introducing up to 100% outdoor air.
  - j. Shall be equipped with a barometric relief damper capable of relieving up to 100% return air and contain seals that meet ASHRAE 90.1 requirements.
  - k. Shall be designed to close damper(s) during loss-of-power situations with spring return built into motor.
  - l. Dry bulb outdoor air temperature sensor shall be provided as standard. Enthalpy sensor is also available on factory installed only. 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.
  - m. 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%.
  - n. The economizer shall maintain minimum airflow into the building during occupied period and provide design ventilation rate for full occupancy.
  - o. Dampers shall be completely closed when the unit is in the unoccupied mode.
  - p. Economizer controller shall accept a 2-10 Vdc CO2 sensor input for IAQ/DCV control. In this mode, dampers shall modulate the outdoor air damper to provide ventilation based on the sensor input.
  - q. Compressor lockout temperature on W7220 is adjustable from -45°F to 80°F, set at a factory default of 32°F. Others shall open at 35°F (2°C) and closes at 50°F (10°C).
  - r. Actuator shall be direct coupled to economizer gear. No linkage arms or control rods shall be acceptable.
  - s. Economizer controller shall provide indications when in free cooling mode, in the DCV mode, or the exhaust fan contact is closed.
5. 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
6. 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.

7. Humidi-MiZer Adaptive Dehumidification System (not available on 30 size models)
  - a. The Humidi-MiZer Adaptive Dehumidification System shall be factory-installed in 50TC17-28 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.
8. Head Pressure Control Package (MotorMaster)
  - 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).
9. Condenser Coil Hail Guard Assembly
  - a. Shall protect against damage from hail.
  - b. Shall be louvered style design.
10. 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.
11. 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.
12. 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.
13. Centrifugal Power Exhaust:
  - a. Power exhaust shall be used in conjunction with an integrated economizer.
  - b. 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.
14. 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.
15. 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 48TC17-28 models to past Carrier design curb models: DP, DR, HJ, TM, and TJ. (Not for 48TJE024-028 models.) Check with Carrier sales expert of further details and information.
16. 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.
17. 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.
18. 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.
19. Indoor Air Quality (CO<sub>2</sub>) 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.
20. 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.
21. 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).
22. 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.
23. 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.
24. California OSHPD Seismic Certification Label (17-28 sizes only)
  - a. Units meet the seismic requirements of the International Code Council Evaluation Service (ICC-ES) document AC156 (Acceptance Criteria for Seismic Qualification by Shake-Table Testing of Nonstructural Components and Systems) and per International Building Code (IBC 2009) at an SDS (g) value of 2.00 z/h=1.0, Ip=1.5 and certified by independent structural engineers.
  - b. Units shall include a certification label that meets the CA OSHPD Special Seismic Certification pre-approval labeling requirements on the external chassis of the unit.

25. Display Kit for Variable Frequency Drive
  - a. Kit allows the ability to access the VFD controller programs to provide special setup capabilities and diagnostics.
  - b. Kit contains display module and communication cable.
  - c. Display Kit can be permanently installed in the unit or used on any SAV system VFD controller as needed.
26. Hinged Access Panels:
  - a. Shall provide easy access through hinged access doors with vinyl coated door retainers.
  - b. Shall be on major panels of – filter, control box and fan motor.
27. Energy Demand System - EDS (field installed accessory):
  - a. Shall utilize wireless network communication to optimize rooftop unit energy usage, up to 875 yds and up to 49 load controllers for each gateway. A wireless cellular signal shall be utilized to communicate energy information to/from the customer web portal.
  - b. Shall utilize explicit algorithms to minimize rooftop electrical demand charges, customizable to each facility.
  - c. Shall allow scheduling of rooftop units and provide a “staggered start” approach to minimize electrical consumption charges, customized to each facility.
  - d. Scheduling, adjustments, and sub-metered electrical data shall be accessible through a web based customer portal.
  - e. Shall provide demand response capability, including compliance with Open ADR protocol.
  - f. Shall utilize an external 4-pole relay and an internal single pole relay.
  - g. Shall use (2) split core transformers to provide real-time sub-metered electrical usage.



