Product Catalog

Packaged Rooftop Air Conditioners

IntelliPak™ 3

Including eFlex™/eDrive™

20 to 75 Tons

August 2024

RT-PRC112A-EN

Introduction

Transform your rooftop experience

The next generation IntelliPak® goes beyond the rooftop to impact the entire customer lifecycle, maximizing outcomes with minimal energy. Advanced selection tools make designing your project a breeze while extensive product testing and lean manufacturing principles ensure quality at the source. Installation is fast and flexible with application specific and field programmable controls and advanced diagnostics deliver real-time building information to keep performance optimal.

From project inception to product replacement, Trane delivers a holistic solution through the IntelliPak rooftop unit completely engineered around the customer experience.

Select

We make it easier to specify, select and engineer.

- Industry leading energy efficiency integrated with Trace™ 3D Plus modeling capability.
- Application specific and field programmable controller with expansion hardware.
- Reengineered selection tools with the customer in mind.

Build

We have a culture of continuous improvement, committed to product quality.

- Extensive design validation and product testing.
- Lean 3P Tools (Production, Preparation, Process) tools in manufacturing operation.
- Enhanced training program for shop floor leadership and manufacturing associates.

Install

We built a flexible system and simplified integration to minimize cost and time.

- Multiple communication protocol (BACnet® MSTP, BACnet® IP, Air-Fi™ Wireless, Modbus, LonTalk®).
- Unit specific points list included with submittal and shipped in unit.
- 7-inch user interface improves navigation, data viewing and ability to make operation changes.

Perform

We deliver reliable operation and service through the entire life cycle.

- The Adaptive Control pre-empts potential equipment disruptions during rapidly changing conditions.
- Validate performance with factory installed power meter and Trane Intelligent Services.
- Improved diagnostics and connected capability enhances service monitoring.

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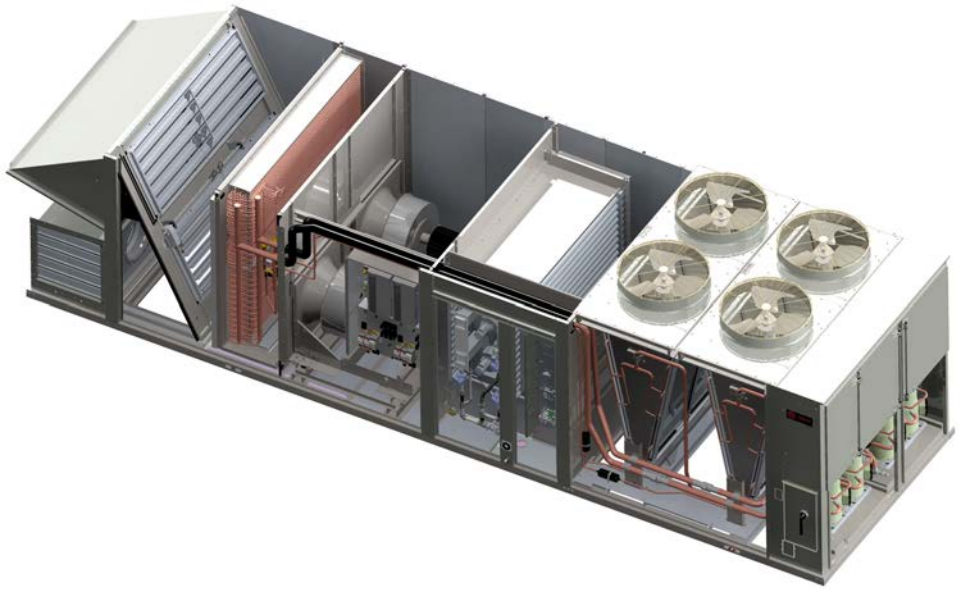
Features and Benefits

Figure 1. IntelliPak® 3

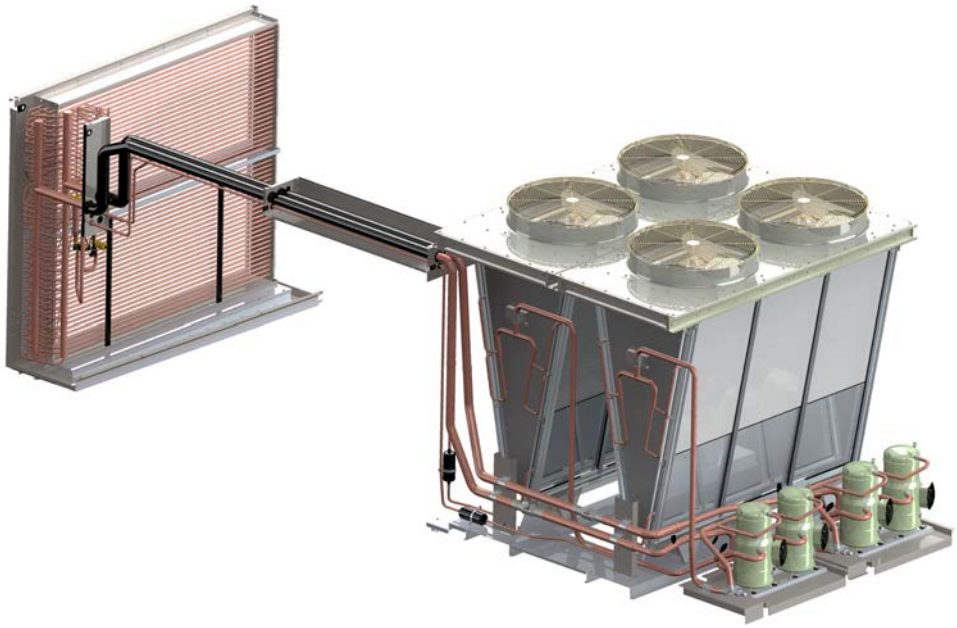


Cabinet

Features	Benefits
Double-wall foam injected panels (doors, base and roof) with thermal resistance of R-9	Quality construction enables industry leading efficiency and reliability
Thermal break in all door, roof and base panels	Eliminates degradation of the exterior cabinet due to sweating
Air infiltration (leakage rate) of 0.5% at 1 inch wg. static pressure	Reduces wasteful heating and cooling loss through the cabinet airstream, and improves energy efficiency
Unit cabinet that can operate at a static pressure of + 6 in wg. on the fan outlet and -4 in wg. on the fan inlet	Supports a wider range of applications and internal components
Size optimized cabinet with up to a 30% reduction in unit length	Increases flexibility for new construction applications, reduced weight of unit
Pre-painted exterior galvanized steel panels durable enough to withstand a minimum of 672 consecutive hours of salt spray application in accordance with standard ASTM B117	Exterior paint holds up in corrosive environments
Pitched roof over air handler section	Prevents water leakage in cabinet, pooling water on top of cabinet, as well as paint wear
Single point fastening hinged access doors with a latching mechanism	Holds door open during service and prevents unsafe closure from wind
Factory rain and wind tested units	Ensures water and cabinet integrity
Units undergo ASTM D4169 level II factory shake tests and full shipping tests	Thoroughly tested structural integrity of cabinet helps ensure the unit arrives at the job site in top condition

Refrigeration

Figure 2. Refrigeration piping

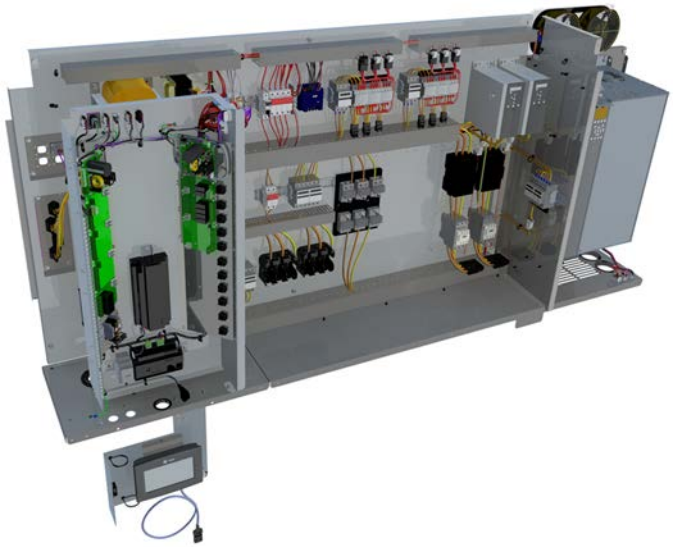


Features	Benefits
R-454B refrigerant	Low GWP HFC refrigerant
Leak detection system	Factory installed. Per Safety Standard UL 60335-2-40 monitors for leaks and activates mitigation if necessary • Reduces the risk of improper installation in the field • Bypasses the added cost in the field for installation
Industry leading energy efficiency for the Large Rooftop HVAC market	Energy savings for any application – most unit tonnages meet the Consortium for Energy Efficiency (CEE) Advanced tier for both EER & IEER and IECC path 2 for cooling
eFlex™ variable speed compressors available in all tonnages	Capacity control delivers industry leading energy efficiency, as well as more precise leaving air temperature control (+/- 1°F)
Electronic expansion valve	• Enables more accurate superheat reading and control • Provides a more consistent superheat setting that improves energy efficiency and compressor reliability • Adds compressor protection and reliability

Features	Benefits
Refrigeration pressure constantly monitored by a transducer	• Monitors compressor operation in real time to ensure it is functioning within reliability limits • Improves reading of system state points for better unit control and protection, as compared to temperature sensors. Temperature sensors indirectly measure pressure and are slow to respond as the reading lags actual unit performance. • Allows the service technician to read system pressure on the user interface, rather than attaching gauges. • Provides loss of charge protection
Variable speed condenser fan	• Enables unit to start down at temperatures to 0°F and operate down to -10°F to while improving head pressure control at any ambient condition • Minimizes fan cycling and maximizes part load efficiency by closer control to minimum head pressure
Corrosion protected condenser coil that will withstand ASTM B117 salt spray test for 6,000 hours and ASTM G85 A2 Cyclic Acified Salt Fog test for 2,400 hours	Optimizes coil protection in more corrosive environments
Compressors located at the edge of the unit	Reduces service time if repairs are needed
Discharge and compressor isolation valves	
Double sloped evaporator coil drain pan (galvanized or stainless steel)	Prevents standing water, eliminating harmful bacterial growth

Electrical

Figure 3. Control panel



Features	Benefits
Wired and tested at the factory	Reliable unit startup
Intelligent control components and multiple control boxes in unit	Easier troubleshooting due to minimized wiring and localized connections
High and low voltage wiring is separated in the raceway	Reduces signal interference and potential for a false signal sent to the controls
Variable frequency drives communicate via Modbus	Real time information available as the drive is connected directly to the building automated system
Exterior USB connection for controller access	Ability to access controller without opening the control panel

Gas Heat

Figure 4. Gas heat configuration

Features	Benefits
Tubular heat exchangers with induced draft burners tested under UL 795	Meets product safety regulations
81% steady state efficiency	All gas heaters meet the 2023 Department of Energy efficiency code
Flue to exhaust above the unit	Removes hot air away from the unit and prevents recirculation with the combustion intake
• Staged, modulating and ultra modulating offer for each MBh • Low, medium and high heat offering	Assortment of option combinations provides the best solution for a variety of applications, along with the ability to achieve turndown up to 20:1
Air rise capability up to 60°F	Range of capacity to meet discharge air temperature requirement

Electric Heat

Figure 5. Electric heat configuration

Features	Benefits
Full faced element coil	Creates a more consistent heat profile
• High grade element wire • Low watt density heater coils	Allows for increased reliability
30 to 190 kW range	Provides best solution for the application
Air rise capability up to 50°F	Range of capacity meets discharge air temperature requirements
SCR (Modulating) Electric Heat Capability	Meets discharge air temperature requirements with greater precision

Model Number Description

Digit 1 — Unit Type

R = Packaged Rooftop

Digit 2 — Unit Function

A = DX Cooling, No Heat
E = DX Cooling, Electric Heat
F = DX Cooling, Natural Gas Heat
X = DX Cooling, No Heat, Extended Casing

Digit 3, 4, 5 — Nominal Capacity

020 = 20 Tons
025 = 25 Tons
030 = 30 Tons
040 = 40 Tons
050 = 50 Tons
055 = 55 Tons
060 = 60 Tons
070 = 70 Tons
075 = 75 Tons

Digit 6— Heat Type and Capacity

0 = None
1 = Natural Gas — 250 MBh
2 = Natural Gas — 350 MBh
3 = Natural Gas — 500 MBh
4 = Natural Gas — 850 MBh
5 = Natural Gas — 1200 MBh
7 = External Heat
A = Electric — 30 kW
B = Electric — 60 kW
C = Electric — 90 kW
D = Electric — 120 kW
E = Electric — 150 kW
F = Electric — 190 kW

Digit 7 — Heat Performance

0 = None
1 = Gas — Staged, Aluminized Steel
2 = Gas — Staged, Stainless Steel
3 = Gas — Modulating, Stainless Steel
4 = Gas — Ultra Modulating, Stainless Steel
A = Electric — Staged
B = Electric — SCR Modulating

Digit 8 — Unit Voltage

E = 200/60/3
F = 230/60/3
4 = 460/60/3
5 = 575/60/3

Digit 9 — Refrigeration System Performance

1 = Standard Efficiency and Capacity
2 = High Efficiency and Capacity
3 = eFlex™ – Variable Speed Compressor w/ High Capacity

Digit 10, 11— Design Sequence

AA = Current Design Sequence

Digit 12 — Development Sequence

B = Development Sequence

Digit 13 — Airflow Direction

A = Downflow Supply and Upflow Return

Digit 14 — System Control

2 = Single Zone VAV (Zone Temperature)
3 = Multi Zone VAV (Discharge Air Temperature)

Digit 15 — Dual Supply Fan - Direct Drive

A = 16.5 inch, 80% width
B = 16.5 inch, 100% width
D = 18.2 inch, 100% width
E = 20.0 inch, 80% width
F = 20.0 inch, 100% width
G = 22.2 inch, 80% width
H = 22.2 inch, 100% width
J = 24.5 inch, 80% width
K = 24.5 inch, 100% width
M = 27.0 inch, 100% width

Digit 16 — Dual Supply Fan Motor Type

1 = ODP w/ RPM greater than or equal to 1600
2 = ODP w/ RPM less than 1600

Digit 17 — Dual Supply Fan Motor

A = 3 hp (1.5 hp per)
B = 6 hp (3 hp per)
C = 10 hp (5 hp per)
D = 15 hp (7.5 hp per)
E = 20 hp (10 hp per)
F = 30 hp (15 hp per)
G = 40 hp (20 hp per)
H = 50 hp (25 hp per)

Digit 18 — Relief Option

0 = None
1 = Barometric Relief
2 = Relief Fan - Direct Drive and Variable Speed

Digit 19 — Relief Fan Motor

0 = None
2 = 6 hp
3 = 8 hp
4 = 12 hp
5 = 15 hp
6 = 16 hp
7 = 23 hp

Digit 20 — Space Pressure Management

0 = None
1 = Statitrac

Digit 21 — Variable Frequency Drive (VFD) Bypass

0 = None
A = Supply

Digit 22 — Future Use

0 = None

Digit 23 — Ventilation Override Mode

0 = None
1 = Yes

Digit 24 — Pre-Evaporator Coil Filter

A = 2–in. MERV 4 Panel
B = 2–in. MERV 8 Panel
C = 4–in. MERV 8 Panel
D = 4–in. MERV 14 Panel
E = 2–in. MERV 8 Panel and MERV 14 Cartridge
F = Rack Only - 2–in. Panel
G = Rack Only - 4–in. Panel
H = Rack Only - 2–in. Panel and Cartridge

Digit 25 — Final Filter

0 = None
1 = 2–in. MERV 8 Panel and MERV 14 Cartridge
2 = Rack Only - 2–in. Panel and Cartridge

Digit 26 — Filter Monitoring

0 = None
A = Pre-Evaporator Filter
C = Pre-Evaporator and Final Filter

Model Number Description

Digit 27 — Outside Air

0 = None
1 = 0-25% Manual Damper
2 = 0-100% Economizer
3 = 0-100% Economizer w/Demand Ctrl Ventilation (DCV)
4 = 0-100% Economizer w/Traq and DCV

Digit 28 — Outside Air Control

0 = None
A = Economizer w/Dry Bulb
B = Economizer w/Reference Enthalpy
C = Economizer w/Comparative Enthalpy

Digit 29 — Damper w/ Fault Detection Diagnostics

0 = None
1 = Low Leak
2 = Ultra Low Leak

Digit 30-35 — Future Use

0 = None

Digit 36 — Hinged Access Doors

A = Single Side

Digit 37-38 — Future Use

0 = None

Digit 39 — Ambient Control

0 = Standard
1 = Low Ambient w/Variable Speed Condenser Fan

Digit 40 — Condenser Coil Coating

A = None
B = Corrosion Protected

Digit 41 — Modulating Hot Gas Reheat and Hot Gas Bypass

0 = None
1 = Hot Gas Reheat
3 = Hot Gas Bypass
4 = Hot Gas Reheat and Hot Gas Bypass

Digit 42 — Service Valves

A = Discharge
B = Compressor Isolation (Suction and Discharge)

Digit 43 — Evaporator Coil Drain Pan

1 = Galvanized Steel
2 = Stainless Steel
3 = Galvanized Steel w/Condensate Overflow Switch
4 = Stainless Steel w/Condensate Overflow Switch

Digit 44 — Power Supply

1 = Single Point

Digit 45 — Unit Mounted Power Connection

A = Terminal Block
B = Non-Fused Disconnect
C = Non-Fused Disconnect w/ Powered Convenience Outlet
D = Circuit Breaker w/ high fault SCCR
E = Circuit Breaker w/ SCCR and Powered Convenience Outlet

Digit 46 — Communication Protocol

0 = None
1 = BACnet®
2 = Air-Fi® Wireless
3 = LonTalk®
4 = Modbus

Digit 47 — Power Monitor

0 = None
1 = Yes

Digit 48 — Controls Expansion Hardware

0 = None
A = Expansion Module

Digit 49 — Rapid Restart

0 = None
1 = Yes

Digit 50-57 — Future Use

0 = None

Digit 58 — Agency Approval

1 = cULus Certification

Digit 59–60 — Future Use

0 = None

General Data

Table 1. General data — 20 to 50 ton

	20	25	30	40	50
Compressor Data-Standard Capacity					
Number/Size (Nominal)			1/5.9, 2/9.8	2/8.7, 2/9.5	1/9.8, 3/11.3
Model			Scroll	Scroll	Scroll
Unit Capacity Steps (%)			100/77/62/38/23	100/74/48/24	100/74/49/23
No. of Circuits			1	2	2
Compressor Data-High Capacity/High Efficiency					
Number/Size (Nominal)		1/5.9, 2/9.5	1/5.9, 2/11.3	2/8.7, 2/9.5	2/9.8, 2/11.3
Model		Scroll	Scroll	Scroll	Scroll
Unit Capacity Steps (%)		100/76/62/38/24	100/79/61/39/21	100/74/48/24	100/73/47/23
No. of Circuits		1	1	2	2
Compressor Data-eFlex™ Variable Speed					
Number/Size (Nominal)	1/3-13 VS, 1/9.5	1/3-13 VS, 1/11.3	1/4-17 VS, 1/12.8	1/4-17 VS, 2/9.5	1/6-25 VS, 2/11.3
Model	Scroll	Scroll	Scroll	Scroll	Scroll
Unit Capacity Steps (%)	15-100	15-100	15-100	15-100	15-100
No. of Circuits	1	1	1	2	2
Air-Cooled Condenser Coil-Standard Capacity					
Face area (ft²)			58	116	116
Rows/Fin Series			1/252	1/252	1/252
Type			Microchannel	Microchannel	Microchannel
Air-Cooled Condenser Coil-High Capacity/High Efficiency					
Face area (ft²)		58	58	116	116
Rows/Fin Series		1/252	2/252	1/252	2/252
Type		Microchannel	Microchannel	Microchannel	Microchannel
Air-Cooled Condenser Coil-eFlex™ Variable Speed					
Face area (ft²)	58	58	58	116	116
Rows/Fin Series	1/252	2/252	2/252	1/252	2/252
Type	Microchannel	Microchannel	Microchannel	Microchannel	Microchannel
Air-Cooled Condenser Fans					
Number/Size/Type	2/30"/Prop	2/30"/Prop	2/30"/Prop	4/30"/Prop	4/30"/Prop
Hp (each)	1.5	1.5	1.5	1.5	1.5
Evaporator Coil-Standard Capacity					
Face area (ft²)			30.2	35.7	35.7
Rows/Fin Series			4/168	3/168	4/168
Tube Diameter/Surface			1/2"/Enhanced	1/2"/Enhanced	1/2"/Enhanced
Evaporator Coil-High Capacity/High Efficiency					
Face area (ft²)		30.2	30.2	35.7	35.7
Rows/Fin Series		4/168	5/168	5/168	6/168
Tube Diameter/Surface		1/2"/Enhanced	1/2"/Enhanced	1/2"/Enhanced	1/2"/Enhanced
Evaporator Coil-eFlex™ Variable Speed					
Face area (ft²)	30.2	30.2	30.2	35.7	35.7
Rows/Fin Series	4/168	5/168	5/168	6/168	5/168
Tube Diameter/Surface	1/2"/Enhanced	1/2"/Enhanced	1/2"/Enhanced	1/2"/Enhanced	1/2"/Enhanced
Supply Fans - eDrive™ Direct Drive Plenum (DDP)					
Number/Size Options	2- 16.5", 20.0", 22.2"	2- 16.5", 20.0", 22.2"	2- 16.5", 20.0", 22.2"	2- 18.2", 20.0", 24.5"	2- 18.2", 20.0", 24.5"
Number of Motors / VFDs	2	2	2	2	2
Hp Range	3, 6, 10, 15, 20, 30, 40	3, 6, 10, 15, 20, 30, 40	3, 6, 10, 15, 20, 30, 40	6, 10, 15, 20, 30, 40	6, 10, 15, 20, 30, 40
CFM Range	4,000 - 9,000	5,000 - 11,250	6,000 - 14,000	8,000 - 18,000	10,000 - 22,500
Relief Fans - eDrive™ Motorized Impeller					
Number/Size	1/23"	1/23", 1/25.5"	1/25.5", 2/23"	1/25.5", 2/23"	2/23", 2/25.5"

Table 1. General data — 20 to 50 ton (continued)

	20	25	30	40	50
Number of Motors	1	1	1 or 2	1 or 2	2
hp Range	6 or 8	6 or 8	8 or 12	8 or 15	12 or 16
CFM Range	2,000-8,000	2,000-10,000	3,000-13,500	4,000-18,000	5,000-21,500
Pre-Evap Filters					
2" MERV 4 Panel					
Number/Size	4 - 16x20x2 6 - 20x20x2 2 - 20x24x2	4 - 16x20x2 6 - 20x20x2 2 - 20x24x2	4 - 16x20x2 6 - 20x20x2 2 - 20x24x2	3 - 20x20x2 7 - 20x24x2 2 - 24x24x2	3 - 20x20x2 7 - 20x24x2 2 - 24x24x2
Face area (ft²)	32.2	32.2	32.2	39.7	39.7
2" MERV 8 Panel					
Number/Size	4 - 16x20x2 6 - 20x20x2 2 - 20x24x2	4 - 16x20x2 6 - 20x20x2 2 - 20x24x2	4 - 16x20x2 6 - 20x20x2 2 - 20x24x2	3 - 20x20x2 7 - 20x24x2 2 - 24x24x2	3 - 20x20x2 7 - 20x24x2 2 - 24x24x2
Face area (ft²)	32.2	32.2	32.2	39.7	39.7
4" MERV 8 Panel					
Number/Size	4 - 16x20x4 6 - 20x20x4 2 - 20x24x4	4 - 16x20x4 6 - 20x20x4 2 - 20x24x4	4 - 16x20x4 6 - 20x20x4 2 - 20x24x4	3 - 20x20x4 7 - 20x24x4 2 - 24x24x4	3 - 20x20x4 7 - 20x24x4 2 - 24x24x4
Face area (ft²)	32.2	32.2	32.2	39.7	39.7
4" MERV 14 Panel					
Number/Size	4 - 16x20x4 6 - 20x20x4 2 - 20x24x4	4 - 16x20x4 6 - 20x20x4 2 - 20x24x4	4 - 16x20x4 6 - 20x20x4 2 - 20x24x4	3 - 20x20x4 7 - 20x24x4 2 - 24x24x4	3 - 20x20x4 7 - 20x24x4 2 - 24x24x4
Face area (ft²)	32.2	32.2	32.2	39.7	39.7
2" MERV 8 Panel & MERV 14 Cartridge					
Cartridge - Number/Size	4 - 16x20x12 4 - 20x20x12 4 - 20x24x12	4 - 16x20x12 4 - 20x20x12 4 - 20x24x12	4 - 16x20x12 4 - 20x20x12 4 - 20x24x12	2 - 20x20x12 6 - 20x24x12 4 - 24x24x12	2 - 20x20x12 6 - 20x24x12 4 - 24x24x12
Face area (ft²)	33.3	33.3	33.3	41.6	41.6
Panel - Number/Size	4 - 16x20x2 4 - 20x20x2 4 - 20x24x2	4 - 16x20x2 4 - 20x20x2 4 - 20x24x2	4 - 16x20x2 4 - 20x20x2 4 - 20x24x2	2 - 20x20x2 6 - 20x24x2 4 - 24x24x2	2 - 20x20x2 6 - 20x24x2 4 - 24x24x2
Face area (ft²)	33.3	33.3	33.3	41.6	41.6
Final Filters					
2" MERV 8 Panel & MERV 14 Cartridge					
Cartridge - Number/Size	4 - 16x20x12 4 - 20x20x12 4 - 20x24x12	4 - 16x20x12 4 - 20x20x12 4 - 20x24x12	4 - 16x20x12 4 - 20x20x12 4 - 20x24x12	4 - 20x20x12 6 - 20x24x12 2 - 24x24x12	4 - 20x20x12 6 - 20x24x12 2 - 24x24x12
Face area (ft²)	33.3	33.3	33.3	39.1	39.1
Panel - Number/Size	4 - 16x20x2 4 - 20x20x2 4 - 20x24x2	4 - 16x20x2 4 - 20x20x2 4 - 20x24x2	4 - 16x20x2 4 - 20x20x2 4 - 20x24x2	4 - 20x20x2 6 - 20x24x2 2 - 24x24x2	4 - 20x20x2 6 - 20x24x2 2 - 24x24x2
Face area (ft²)	33.3	33.3	33.3	39.1	39.1
Standard Unit Minimum Outside Air Temperature for Mechanical Cooling					
Economizer - A/C Applications (fixed speed/ eFlex™)	45°F/45°F	45°F/50°F	45°F/50°F	45°F/50°F	45°F/50°F
No Economizer - 80/67°F design return air (fixed speed/eFlex™)	45°F/45°F	45°F/55°F	45°F/55°F	45°F/55°F	45°F/55°F
No Economizer - 90/78°F design return air (fixed speed/eFlex™)	55°F/55°F	55°F/70°F	55°F/70°F	55°F/70°F	55°F/70°F
Low Ambient Unit Minimum Outside Air Temperature for Mechanical Cooling					
With or Without Hot Gas Bypass	0°F	0°F	0°F	0°F	0°F

Table 2. General data — 55 to 75 ton

	55	60	70	75
Compressor Data-Standard Capacity				
Number/Size (Nominal)	2/11.3, 2/12.3	2/12.8, 2/14.9	4/14.9	4/14.9
Model	Scroll	Scroll	Scroll	Scroll
Unit Capacity Steps (%)	100/74/48/24	100/73/46/23	100/75/50/25	100/75/50/25
No. of Circuits	2	2	2	2
Compressor Data-High Capacity/High Efficiency				
Number/Size (Nominal)	4/11.3	2/12.8, 2/14.9	4/14.9	4/14.9
Model	Scroll	Scroll	Scroll	Scroll
Unit Capacity Steps (%)	100/75/50/25	100/73/46/23	100/75/50/25	100/75/50/25
No. of Circuits	2	2	2	2
Compressor Data-eFlex™ Variable Speed				
Number/Size (Nominal)	1/6-25 VS, 2/12.3	1/6-25 VS, 2/14.9	1/6-25 VS, 1/15.6, 2/11.3	1/6-25 VS, 1/15.6, 2/14.9
Model	Scroll	Scroll	Scroll	Scroll
Unit Capacity Steps (%)	15-100	15-100	15-100	15-100
No. of Circuits	2	2	2	2
Air-Cooled Condenser Coil-Standard Capacity				
Face area (ft²)	116	136	136	136
Rows/Fin Series	1/252	1/252	1/252	1/252
Type	Microchannel	Microchannel	Microchannel	Microchannel
Air-Cooled Condenser Coil-High Capacity/High Efficiency				
Face area (ft²)	116	136	136	136
Rows/Fin Series	2/252	1/252	2/252	2/252
Type	Microchannel	Microchannel	Microchannel	Microchannel
Air-Cooled Condenser Coil-eFlex™ Variable Speed				
Face area (ft²)	116	136	136	136
Rows/Fin Series	2/252	1/252	2/252	2/252
Type	Microchannel	Microchannel	Microchannel	Microchannel
Air-Cooled Condenser Fans				
Number/Size/Type	4/30"/Prop	6/26"/Prop	6/26"/Prop	6/26"/Prop
Hp (each)	1.5	1	1	1
Evaporator Coil-Standard Capacity				
Face area (ft²)	35.7	46.3	46.3	46.3
Rows/Fin Series	5/168	3/168	5/168	6/168
Tube Diameter/Surface	1/2"/Enhanced	1/2"/Enhanced	1/2"/Enhanced	1/2"/Enhanced
Evaporator Coil-High Capacity/High Efficiency				
Face area (ft²)	35.7	46.3	66.9	66.9
Rows/Fin Series	6/168	6/168	6/168	6/168
Tube Diameter/Surface	1/2"/Enhanced	1/2"/Enhanced	3/8"/Enhanced	3/8"/Enhanced
Evaporator Coil-eFlex™ Variable Speed				
Face area (ft²)	35.7	46.3	66.9	66.9
Rows/Fin Series	5/168	6/168	6/168	6/168
Tube Diameter/Surface	1/2"/Enhanced	1/2"/Enhanced	3/8"/Enhanced	3/8"/Enhanced
Supply Fans - eDrive™ Direct Drive Plenum (DDP)				
Number/Size Options	2- 18.2", 20.0", 24.5"	2- 22.2", 27.0"	2- 22.2", 27.0"	2- 22.2", 27.0"
Number of Motors / VFDs	2	2	2	2
Hp Range	6, 10, 15, 20, 30, 40	6, 10, 15, 20, 30, 40, 50	6, 10, 15, 20, 30, 40, 50	6, 10, 15, 20, 30, 40, 50
CFM Range	11,000 - 24,750	12,000 - 27,000	14,000 - 30,000	15,000 - 30,000
Relief Fans - eDrive™ Motorized Impeller				
Number/Size	2/23", 2/25.5"	2/25.5", 3/23"	2/25.5", 3/23"	2/25.5", 3/23"
Number of Motors	2	2 or 3	2 or 3	2 or 3
hp Range	12 or 16	16 or 23	16 or 23	16 or 23
CFM Range	5,000-21,500	6,000-28,000	6,000-28,000	6,000-28,000

Table 2. General data — 55 to 75 ton (continued)

	55	60	70	75
Compressor Data-Standard Capacity				
Pre-Evap Filters				
2" MERV 4 Panel				
Number/Size	3 - 20x20x2 7 - 20x24x2 2 - 24x24x2	2 - 20x20x2 7 - 20x24x2 6 - 24x24x2	2 - 20x20x2 7 - 20x24x2 6 - 24x24x2	2 - 20x20x2 7 - 20x24x2 6 - 24x24x2
Face area (ft²)	39.7	52.9	52.9	52.9
2" MERV 8 Panel				
Number/Size	3 - 20x20x2 7 - 20x24x2 2 - 24x24x2	2 - 20x20x2 7 - 20x24x2 6 - 24x24x2	2 - 20x20x2 7 - 20x24x2 6 - 24x24x2	2 - 20x20x2 7 - 20x24x2 6 - 24x24x2
Face area (ft²)	39.7	52.9	52.9	52.9
4" MERV 8 Panel				
Number/Size	3 - 20x20x4 7 - 20x24x4 2 - 24x24x4	2 - 20x20x4 7 - 20x24x4 6 - 24x24x4	2 - 20x20x4 7 - 20x24x4 6 - 24x24x4	2 - 20x20x4 7 - 20x24x4 6 - 24x24x4
Face area (ft²)	39.7	52.9	52.9	52.9
4" MERV 14 Panel				
Number/Size	3 - 20x20x4 7 - 20x24x4 2 - 24x24x4	2 - 20x20x4 7 - 20x24x4 6 - 24x24x4	2 - 20x20x4 7 - 20x24x4 6 - 24x24x4	2 - 20x20x4 7 - 20x24x4 6 - 24x24x4
Face area (ft²)	39.7	52.9	52.9	52.9
2" MERV 8 Panel & MERV 14 Cartridge				
Cartridge - Number/Size	2 - 20x20x12 6 - 20x24x12 4 - 24x24x12	2 - 20x20x12 7 - 20x24x12 6 - 24x24x12	2 - 20x20x12 7 - 20x24x12 6 - 24x24x12	2 - 20x20x12 7 - 20x24x12 6 - 24x24x12
Face area (ft²)	41.6	52.9	52.9	52.9
Panel - Number/Size	2 - 20x20x2 6 - 20x24x2 4 - 24x24x2	2 - 20x20x2 7 - 20x24x2 6 - 24x24x2	2 - 20x20x2 7 - 20x24x2 6 - 24x24x2	2 - 20x20x2 7 - 20x24x2 6 - 24x24x2
Face area (ft²)	41.6	52.9	52.9	52.9
Final Filters				
2" MERV 8 Panel & MERV 14 Cartridge				
Cartridge - Number/Size	4 - 20x20x12 6 - 20x24x12 2 - 24x24x12	4 - 20x20x12 8 - 20x24x12 3 - 24x24x12	4 - 20x20x12 8 - 20x24x12 3 - 24x24x12	4 - 20x20x12 8 - 20x24x12 3 - 24x24x12
Face area (ft²)	39.1	49.8	49.8	49.8
Panel - Number/Size	4 - 20x20x2 6 - 20x24x2 2 - 24x24x2	4 - 20x20x2 8 - 20x24x2 3 - 24x24x2	4 - 20x20x2 8 - 20x24x2 3 - 24x24x2	4 - 20x20x2 8 - 20x24x2 3 - 24x24x2
Face area (ft²)	39.1	49.8	49.8	49.8
Standard Unit Minimum Outside Air Temperature for Mechanical Cooling				
Economizer - A/C Applications (fixed speed/ eFlex™)	45°F/50°F	45°F/45°F	45°F/45°F	45°F/45°F
No Economizer - 80/67°F design return air (fixed speed/eFlex™)	45°F/55°F	45°F/45°F	45°F/45°F	45°F/45°F
No Economizer - 90/78°F design return air (fixed speed/eFlex™)	55°F/70°F	55°F/55°F	55°F/55°F	55°F/55°F
Low Ambient Unit Minimum Outside Air Temperature for Mechanical Cooling				
With or Without Hot Gas Bypass	0°F	0°F	0°F	0°F

Table 3. Electric heating — general data

Electric Heat	20 - 30 Tons			40 - 55 Tons				60 - 75 Tons		
kW Range	30	60	90	60	90	120	150	90	120	190
Capacity Steps	2	4	3	4	3	4	4	3	4	5

Table 4. Natural gas heating — general data

Natural Gas Heat	20 - 30 Tons			40 - 55 Tons			60 - 75 Tons		
	Low	Med	High	Low	Med	High	Low	Med	High
MBh Input	250	350	500	350	500	850	500	850	1200
Efficiency (%)	81	81	81	81	81	81	81	81	81
Standard									
Capacity Steps	2	2	2	2	2	4	2	4	4
Modulating									
Standard Turndown	5:1	5:1	10:1	5:1	10:1	10:1	10:1	10:1	11:1
Ultra Turndown	9:1	11:1	16:1	11:1	16:1	20:1	16:1	20:1	21:1
Gas Connection Pipe Size (in.)	1	1	1	1	1	1-1/4	1	1-1/4	1-1/2

Table 5. EER/IEER ratings

Tons	Refrigeration System Performance	EER			VAV IEER		
		460V_CO	460V_EH	460V_GH	460V_CO	460V_EH	460V_GH
20	Variable_Stage	11.1	11.0	11.0	16.8	16.8	16.8
	Variable_LA	11.0	11.0	11.0	17.9	17.8	17.7
25	High Eff	10.6	10.6	10.5	15.8	15.7	15.7
	Variable_Stage	11.1	11.1	11.0	17.2	17.1	17.0
	Variable_LA	11.1	11.0	10.9	18.0	18.0	17.9
30	Std	10.3	10.2	10.0	16.0	15.9	15.7
	High Eff	10.8	10.7	10.6	16.5	16.5	16.3
	Variable_Stage	10.8	10.7	10.6	17.3	17.2	17.1
	Variable_LA	10.8	10.7	10.6	18.1	18.1	17.9
40	Std	10.2	10.0	9.8	14.3	14.2	14.0
	High Eff	11.0	10.8	10.6	15.6	15.4	15.2
	Variable_Stage	11.1	11.0	10.8	16.1	16.1	15.9
	Variable_LA	11.0	10.9	10.7	16.0	15.9	15.7
50	Std	10.4	10.2	9.8	15.2	15.1	14.7
	High Eff	11.5	11.3	11.1	15.9	15.8	15.6
	Variable_Stage	11.3	11.0	10.6	17.3	17.1	16.7
	Variable_LA	11.2	11.0	10.6	17.1	16.9	16.5
55	Std	10.4	10.3	10.0	15.4	15.2	15.0
	High Eff	11.3	11.2	11.0	16.0	15.9	15.7
	Variable_Stage	11.0	10.9	10.6	16.9	16.7	16.5
	Variable_LA	11.0	10.8	10.6	17.1	16.9	16.7
60	Std	10.2	10.0	–	15.4	15.2	–
	High Eff	10.7	10.5	10.3	16.1	15.9	15.7
	Variable_Stage	10.8	10.6	10.4	16.4	16.3	16.1
	Variable_LA	10.7	10.6	10.3	16.6	16.4	16.2
70	Std	10.5	10.2	–	16.1	15.9	–
	High Eff	11.5	11.2	10.9	17.2	17.0	16.7
	Variable_Stage	11.3	11.1	10.7	18.0	17.8	17.5
	Variable_LA	11.3	11.1	10.7	18.0	17.8	17.5

Table 5. EER/IEER ratings (continued)

Tons	Refrigeration System Performance	EER			VAV IEER		
		460V_CO	460V_EH	460V_GH	460V_CO	460V_EH	460V_GH
75	Std	10.5	10.3	–	16.3	16.0	–
	High Eff	11.3	10.9	10.3	17.4	17.1	16.5
	Variable_Stage	11.5	11.3	10.9	18.2	18.0	17.6
	Variable_LA	11.5	11.3	10.9	18.2	18.0	17.7

Notes:

1. CO = Cooling Only, EH = Electric Heat, GH = Gas Heat.
2. Cooling performance is rated at 95°F ambient, 80°F entering dry bulb, 67°F entering wet bulb. Gross capacity does not include the effect of fan motor heat. AHRI capacity is net and includes the effect of fan motor heat. Units are suitable for operation to +/- 20% of nominal CFM. Units are certified in accordance with the Unitary Air Conditioner Equipment certification program, which is based on AHRI Standard 340/360.
3. EER and/or IEER are rated at AHRI conditions and in accordance with DOE test procedures.
4. For simplified verifiation of your specific unit EER/IEER, and capacity at operating conditions, it is strongly recommended that a Trane® Select Assist™ (TSA) report is run.
5. "Variable_Stage" means variable speed combined with standard ambient condenser fan control option. "Variable_LA" means variable speed combined with low ambient condenser fan control.

Table 6. Economizer outdoor air damper leakage (at rated airflow, cfm/sq ft)

ΔP Across Dampers (in. wc)	1.0
Low Leak	10
Ultra Low Leak	4

Notes:

1. Above data for Standard and Low Leak based on tests completed in accordance with AMCA Standard 500-D
2. All dampers meet California Title 24 requirements.

Symbio™ 800 Controls

The Symbio™ 800 controller is a factory-installed, application specific and programmable controller designed to control chillers and large packaged HVAC equipment. A 7-inch user interface features a touch-sensitive color screen that provides facility managers at-a-glance operating status, performance monitoring, scheduling changes, and operating adjustments. Other advanced features include automated controller back-up, and optional features such as secure remote connectivity, wireless building communications, mobile device connectivity, and custom programming with expandable I/O.

Symbio 800 Advantages		Benefits
Connected	Convenient, on-the-go access to advanced monitoring, troubleshooting, and energy management	• Minimum first cost • Maximum comfort • Minimized downtime • Minimum operating costs • Superior building and occupant productivity
Flexible	Minimized installation hardware and labor costs – able to use existing devices for maximum convenience, lower controls upgrades and relocation	
Reliable	Maximum equipment uptime and life, minimized maintenance and troubleshooting cost	

Features and Benefits

Symbio™ 800 Feature	Benefits
Multiple, open standard protocol support • Air-Fi® Wireless (BACnet®/AirFi, optional) • BACnet MS/TP • BACnet/IP • LonTalk® (Optional) • Modbus RTU	Simplified, lower cost, and more flexible integration with all common open standard protocols using Trane or competitive BAS systems and controllers
Remote connection to building or equipment	Trane Connect™ provides an easy, secure option to connect remotely to a Tracer SC+ or directly to your Trane equipment
Common integration strategies and equipment specific points lists	Simplified, lower cost, and uncompromised integration
Application specific and configurable	Reduced project costs with superior reliability, comfort, performance - applications specific and configurable system ensures machine continues to run within operating envelope. Ability to upgrade firmware with a simple file transfer.
Smart Analytics	Smart analytics provide superior reliability through the life of the equipment with minimum downtime
Data logging	Standard, local or remote Intuitive review and analysis of equipment, zone, and building performance
Local scheduling	Capable of operating in stand-alone operation without a building automation system as a temporary back-up schedule for ongoing comfort and energy savings
Rugged, 7-inch color touch screen user interface	Easy, touch navigation for viewing data and making operational changes
Display preferences	Choose how to view dates, times, units (SI, IP), screen brightness, data format, and backlight timeout. 3 built-in languages are supported and selectable for all TD7 screens.
Intuitive navigation	Helps operators access data and alarms for quick and accurate response and resolution
At-a-glance status	Easily readable color display showing key operating parameters of major equipment components
Reports	Quickly summarizes data for clear understanding and interpretation to enable local monitoring of expected performance and operating efficiency
Graphs	Easily visualize trend data for local troubleshooting and fine-tuning
Multiple language support	Suitable for operation in multiple geographies
Adaptive Control™ Algorithms	Pre-empts potential equipment disruptions during rapidly changing conditions – providing consistent equipment performance and building comfort

Symbio™ 800 Feature	Benefits
SD card backup/restore	Faster, lower cost repairs with reduced downtime
Modbus device support	Capable of integrating optional Modbus devices for local or remote diagnostics — provides faster, lower cost troubleshooting and increased equipment performance

Options

Symbio™ 800 Feature	Benefits
Remote connection to building or equipment	Trane Connect™ provides an easy, secure option to connect remotely to a Tracer SC+ or directly to your Trane equipment
Programmable	Equipment application flexibility and cost-reduced control of nearby equipment
Expandable I/O	Field or factory installed I/O for programmable feature - Reduced installation costs and increased installation flexibility
User security with audit trail support	Flexible and secure access for multiple users allows monitoring, overriding/releasing points, release of all overrides, custom report editing, and tracking changes by user
Wi-Fi Adapter	Enables the operation of wireless service tools for increased technician productivity and flexibility
LonTalk®	Supports LonTalk® for Tracer building automation and other building control systems.
Air-Fi® Wireless (BACnet®, optional)	Air-Fi® Wireless enables wireless communications between system controls, unit controls, and wireless sensors for Trane control products that use the BACnet® protocol.

Discharge Air Pressure Control

Variable Frequency Drive (VFD) Control

Variable frequency drives are used for supply fan speed control. A pressure transducer measures duct static pressure, and the VFD is modulated to maintain the supply air static pressure within an adjustable user-defined range. The range is determined by the discharge air pressure setpoint and discharge air pressure deadband, which are set through the user interface. or BAS/Network.

The variable frequency drives provide supply fan motor speed modulation. The drive will accelerate or decelerate as required to maintain the discharge static pressure setpoint.

Discharge Air Static Pressure Limit

The opening of VAV terminals, and the amount of supply air provided by the variable frequency drive are coordinated during startup and transition to/from Occupied/Unoccupied modes to prevent over pressurization of the supply air ductwork. However, if for any reason the discharge air pressure exceeds the user-defined discharge air static pressure limit that was set at the user interface, the supply fan and VFD are shut down. The unit is then allowed to restart three times. If the over pressurization condition occurs on the third restart, the unit is shut down and a manual reset diagnostic is set and displayed at the user interface and BAS/Network.

Discharge Air Temperature Controls

Cooling/Economizer

During Occupied cooling mode of operation, the economizer (if available) and mechanical cooling are used to control the discharge air temperature. The discharge air temperature setpoint and deadband are user-defined at the user interface. The discharge air temperature setpoint may be user-defined from the BAS/Network. If the conditions of the outside air are appropriate to use “free cooling,” the economizer will be used first in an attempt to satisfy the discharge air setpoint; then, if required, the mechanical cooling will be staged on to maintain discharge air temperature setpoint. Minimum On/Off timing of the mechanical cooling prevents rapid cycling.

On units with economizer, a call for cooling will modulate the outside air dampers open. The rate of economizer modulation is based on deviation of the discharge air temperature from setpoint, i.e., the

further away from setpoint, the faster the outside air damper will open. First stage of cooling will be allowed to start after the economizer reaches full open.

The economizer is only allowed to function freely if one of the following conditions is met:

- For dry bulb economizer control the ambient temperature must be below the dry bulb temperature control setting.
- For reference enthalpy economizer control, outdoor air enthalpy must be below the enthalpy control setting. At outdoor air conditions above the enthalpy control setting, mechanical cooling only is used and the outside air dampers remain at minimum position.
- For comparative enthalpy economizer control, outdoor air enthalpy must be below the enthalpy of the return air.

If the unit does not include an economizer, mechanical cooling only is used to satisfy cooling requirements. The outdoor air dampers may be set for a maximum of 25% outdoor air, through a manually operated damper.

Heating

Modulating Gas

Modulating the gas heat output provides an improved discharge air temperature control, giving customers improved zone control. Modulating gas heat consists of a modulating bank of heat, and up to three additional fixed stages of heat – providing continuous modulation across the heaters range of output. Status and diagnostic messages are communicated to the user interface.

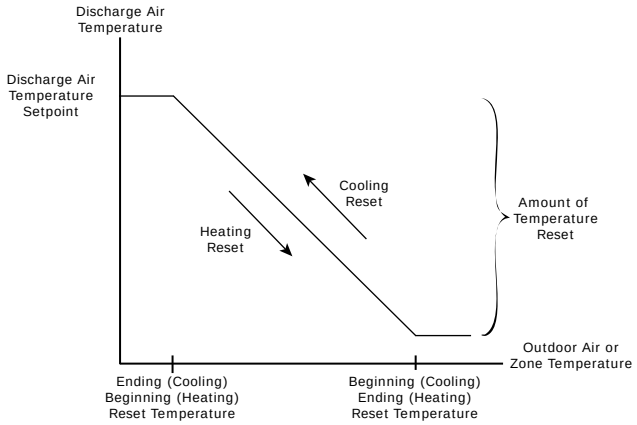
Electric Heating

The individual stages of electric heat will be sequenced on the zone demand. The number of available stages will depend on the unit voltage and heat capacity selected.

For units with SCR electric heat, the first stage is modulating. The modulating stage and the necessary additional stages are sequenced to precisely meet the zone demand.

Discharge Air Setpoint Temperature Reset

Figure 6. Discharge air temperature reset



Discharge air setpoint reset can be used to adjust the discharge air temperature setpoint on the basis of a zone temperature or on outdoor air temperature. Discharge air setpoint reset adjustment is available from the user interface for supply air heating and supply air cooling control

Outdoor Air Cooling Reset

Outdoor air cooling reset is sometimes used in applications where the outdoor temperature has a large effect on building load. When the outside air temperature is low and the building cooling load is low, the discharge air setpoint can be raised, thereby preventing sub-cooling of critical zones. This reset can lower usage of mechanical cooling, thus savings in compressor kW, but an increase in supply fan kW may occur.

Outdoor Air Heating Reset

Outdoor air heating reset is the inverse of cooling, with the same principles applied. For both outdoor air cooling reset and heating reset, there are three user-defined parameters that are adjustable through the user interface:

- Beginning reset temperature
- Ending reset temperature
- Amount of temperature reset

Zone Reset

Zone reset is applied to the zone(s) in a building that tend to be overly cool or overly hot. The discharge air temperature setpoint is adjusted based on the temperature of the critical zone(s). This can have the effect of improving comfort and/or lowering energy usage. The user-defined parameters are the same as for outdoor air reset.

Supply Air Tempering

A feature that is used with modulating gas option. Supply air tempering is enabled when the discharge ir temperature falls below the discharge air temperature deadband low end. The heat valve is then modulated open to maintain the set minimum discharge air temperature.

Zone Temperature Control

Unoccupied Zone Heating and Cooling

During Unoccupied mode, the unit is operated as a constant volume unit. Supply fan VFDs operate at 100% and VAV boxes are driven full open. The unit controls zone temperature to the Unoccupied zone cooling and heating (heating units only) setpoints.

Daytime Warmup

This feature is available on all types of heating units. During Occupied mode, if the zone temperature falls to a preset, user-defined zone low limit temperature setpoint, the unit is put into Unoccupied mode and Daytime Warmup is initiated. The system changes over to constant volume heating (full unit airflow), the VAV boxes are fully opened and full heating capacity is provided until the Daytime Warmup setpoint is reached. The unit is then returned to normal Occupied mode.

Outside Air Measurement

Trane air quality (Traq™) outside air measurement system utilizes velocity pressure sensing rings. Based on unit design CFM, the Symbio™ 800 monitors and controls the quantity of outside air entering the unit. The outside airflow can be calibrated to compensate for altitude.

An optional CO2 sensor may be connected to control outside air based on CO_2 Demand Control Ventilation (DCV).

Unit Feedback – Supply and Relief Fan Speed Setpoints

BACnet® network points are available to allow for communication of the Supply and Relief Fan Speed Setpoints to the BAS. These points are only available for multi-zone VAV units. These setpoints will be overridden by equipment protection functionality, when applicable.

Outside Airflow Compensation

As the supply fan modulates, this function proportionally adjusts the economizer minimum position to compensate for the change in total airflow, in order to maintain a constant percent of outside air. The modified economizer minimum position is computed as a linear function – based on VFD position – given the two endpoints:

- Minimum Position with VFD @ 0%
- Minimum Position with VFD @ 100%

Both are user adjustable at the user interface.

Single Zone Variable Air Volume (SZVAV) Operation

The IntelliPak® controls platform will support Single Zone VAV as an optional unit control type in order to meet ASHRAE 90.1. The basic control will be a hybrid variable air volume/constant volume configured unit that provides discharge temperature control to a varying discharge air temperature target setpoint based on the space temperature and/or humidity conditions. Concurrently, the unit will control and optimize the supply fan speed to maintain the zone temperature to a zone temperature setpoint.

VFD Control

The VFD will modulate the supply fan motor speed, accelerating or decelerating as required to maintain the zone temperature to the zone temperature setpoint. Bypass control is offered to provide full nominal airflow in the event of drive failure.

Supply Fan Output Control

Units configured for Single Zone VAV control will utilize the same supply fan output control scheme as on traditional VAV units except the VFD signal will be based on zone heating and cooling demand instead of the supply air pressure.

Space Pressure Control – Statitrac™

For units configured with Space Pressure Control with or without Statitrac, the new schemes implemented for economizer minimum position handling require changes to the existing Space Pressure Control scheme in order to prevent over/under pressurization. The overall scheme will remain very similar to VAV units with Space Pressure Control with the exception of the dynamic Relief Enable Setpoint.

For SZVAV, a Relief Enable Setpoint must be selected during the 100% Fan Speed Command. Once selected, the difference between the Relief Enable Setpoint and Design OA Damper Minimum Position at 100% Fan Speed Command will be calculated. The difference calculated will be used as an offset and added to the Active Building Design OA Minimum Position Target in order to calculate the dynamic Relief Enable Target, which will be used throughout the Supply Fan Speed/OA Damper Position range.

The Relief Enable Target could be above or below the Active Building Design OA Minimum Position Target Setpoint, based on the Active Relief Enable Setpoint being set above or below the Building Design Minimum Position at 100% Fan Speed Command. Note that an Relief Enable Setpoint of 0% will result in the same effect on Relief Fan control as on VAV applications with and without Statitrac.

Occupied Cooling Operation

For normal cooling operation, cooling capacity will be staged or modulated in order to meet the calculated discharge air target setpoint. If the current active cooling capacity is controlling the discharge air within the deadband, no additional cooling capacity change will be requested. As the Discharge Air Temperature rises above the deadband, the algorithm will request additional capacity as required (additional compressors or economizer). As the Discharge Air Temperature falls below the deadband, the algorithm will request a reduction in active capacity.

Default Economizer Operation

By default, the unit will be set up to optimize the minimum supply fan speed capability during Economizer Only operation. If the economizer is able to meet the demand alone, due to desirable ambient conditions, the supply fan speed will be allowed to increase above the minimum prior to utilizing mechanical cooling if discharge air setpoint falls below the discharge air Lower Limit (Cooling) setpoint.

Unoccupied Mode

In Unoccupied periods the unit will utilize setback setpoints, 0% Minimum OA Damper position, and Auto Fan Mode operation as on normal Constant Volume units. The Supply Fan speed will be forced to 100% to operate in a constant volume mode for all active heating and cooling requests.

Occupied Heating Operation

Occupied heating operation will utilize two separate control methodologies based on heating configurations. For all “Staged” Heating types, the unit will utilize full airflow during all active heating

periods exactly like traditional Constant Volume units. For “Modulating” Heating types the unit will have the ability to utilize SZVAV Heating, much like Active Cooling, in order to maintain the Zone Temperature to the Zone Heating setpoint. Also, on units configured with a Modulating Heat type, the customer will have the ability to select between SZVAV Heating control, or to utilize traditional Constant Volume, full airflow heating based on the associated unit setup.

Cooling Sequence

If the controller determines that there is a need for compressor stages in order to meet the calculated discharge air target setpoint, once supply fan proving has been made, the unit will begin to stage compressors accordingly.

Note: *The compressor staging order will be based on unit configuration and compressor balanced starts status.*

Once the discharge air target setpoint calculation has reached the user defined Minimum Setpoint and compressors are being utilized to meet the demand, if the cooling demand increases, the discharge air target setpoint value will continue to lower past the minimum setpoint and begin to ramp the supply fan speed upward toward 100%.

Once the discharge air target setpoint calculation has reached the Minimum Setpoint and compressors are being utilized to meet the demand, as the discharge air target setpoint value continues to calculate lower the algorithm will begin to ramp the supply fan speed up toward 100%. Note that the supply fan speed will remain at the compressor stage’s associated minimum value (as described below) until the discharge air target setpoint value is calculated below the discharge air temperature Minimum Setpoint (limited discharge air target setpoint).

As the cooling load in the zone decreases the zone cooling algorithm will reduce the speed of the fan down to minimum per compressor stage and control the compressors accordingly. As the compressors begin to de-energize, the supply fan speed will fall back to the Cooling Stage’s associated minimum fan speed, but not below. As the load in the zone continues to drop, cooling capacity will be reduced in order to maintain the discharge air within the ±½ discharge air target deadband.

SZVAV and VAV Operation

Note: *SZVAV exceptions are noted in parenthesis.*

Space Pressure Control - Statitrac

A pressure transducer is used to measure and report direct space (building) static pressure. The user-defined control parameters used in this control scheme are space static pressure setpoint, space pressure deadband and relief enable point. As the economizer opens, the building pressure rises and once above the relief enable point, enables the reflief fan and dampers. The relief dampers or relief fan then modulate to maintain space pressure within the deadband.

Morning Warmup Options (Not applicable to SZVAV)

This feature may be enabled on all types of factory installed heat units as well as cooling only units configured as “External Heat” (for example, VAV boxes with reheat). At the conclusion of Unoccupied mode, while the economizer (if supplied) is kept closed, the selected zone is heated to the user-defined Morning Warmup setpoint (see description below). The unit is then released to Occupied mode.

Cycling Capacity Morning Warmup (MWU)

Cycling capacity Morning Warmup provides a more gradual heating of the zone. Normal zone temperature control with varying capacity is used to raise the zone temperature to the MWU zone temperature setpoint. This method of warmup is used to overcome the “building sink” effect. Cycling capacity MWU will operate until the MWU setpoint is reached or for 60 minutes, then the unit switches to Occupied mode. A control algorithm is used to increase or decrease the amount of heat in order to achieve the MWU zone temperature setpoint.

Note: *When using the Morning Warmup option in a VAV heating/cooling rooftop, airflow must be maintained through the rooftop unit. This can be accomplished by electrically tying the VAV boxes to the VAV box output relay contacts on the Symbio™ 800 Controls or by using changeover thermostats. Either of these methods will assure adequate airflow through the unit and satisfactory heating of the building.*

Emergency Override

When a LonTalk® communication protocol or BACnet® control network is installed, the user can initiate from the Tracer® Ensemble™ building automation system (BAS), Tracer® SC+ or third party BAS one of five predefined, not available to configure, Emergency Override sequences. All compressors and condenser fans are de-energized for any Emergency Override sequence. Each Emergency Override sequence commands the unit operation as follows:

PRESSURIZE_EMERG: • Supply Fan VFD - Max • Relief Fan - Off; Relief Dampers - Closed (if so equipped) • OA Dampers - Open; Return Damper - Closed • Heat - All heat stages off; Mod Heat output - Off • Occupied/Unoccupied/VAV box output - Energized • VOM Relay - Energized (if so equipped)	**EMERG_DEPRESSURIZE:** • Supply Fan VFD - Min • Relief Fan - On; Relief Dampers - Open/Max • OA Dampers - Closed; Return Damper - Open • Heat - All heat stages off; Mod Heat output Off • Occupied/Unoccupied/VAV box output - Energized • VOM Relay - Energized
EMERG_PURGE: • Supply Fan VFD - Max • Relief Fan - On; Relief Dampers - Open • OA Dampers - Open; Return Damper - Closed • Heat - All heat stages off; Mod Heat output Off • Occupied/Unoccupied/VAV box output - Energized • VOM Relay - Energized	**EMERG_SHUTDOWN:** • Supply Fan VFD - Min • Relief Fan - Off; Relief Dampers - Closed (if so equipped) • OA Dampers - Closed; Return Damper - Open • Heat - All heat stages off; Mod Heat output Off • Occupied/Unoccupied/VAV box output - Energized • VOM Relay - Energized
EMERG_FIRE - Input from fire pull box/system: • Supply Fan - Off • Supply Fan VFD - Min • Relief Fan - Off; Relief Dampers - Closed (if so equipped) • OA Dampers - Closed; Return Damper - Open • Heat - All heat stages off; Mod Heat output Off • Occupied/Unoccupied/VAV box output - Energized • VOM Relay - Energized	

Ventilation Override (VOM)

The user can customize up to five different override sequences for purposes of ventilation override control. If more than one VOM sequence is being requested, the sequence with the highest priority is initiated first. Sequence hierarchy is the sequence “A” (UNIT OFF) is first, with sequence “E” (PURGE with Duct Pressure Control) last. A ventilation override mode can be initiated by closing any of the five corresponding binary inputs on the VOM module. A binary output is provided on the VOM module to provide remote indication of an active VOM mode. All compressors, condenser fans and the Humidification output are de-energized for any VOM sequence. The factory default definitions for each mode are as follows:

UNIT OFF sequence "A" When complete system shutdown is required the following sequence can be used. • Supply Fan VFD - Min • Relief Fan - Off; Relief Dampers - Closed (if so equipped) • OA Dampers - Closed; Return Damper - Open • Heat - All heat stages off; Mod Heat output Off • Occupied/Unoccupied/VAV box output - Deenergized • VOM Relay - Energized	**PRESSURIZE sequence "B"** Perhaps a positively pressurized space is desired instead of a negatively pressurized space. In this case, the supply fan should be turned on with VFD at 100% speed and relief fan should be turned off. • Supply Fan - On • Supply Fan VFD - Max • Relief Fan - Off; Relief Dampers - Closed (if so equipped) • OA Dampers - Open; Return Damper - Closed • Heat - All heat stages off; Mod Heat output Off • Occupied/Unoccupied/VAV box output - Energized • VOM Relay - Energized
RELIEF sequence "C" With only the relief fans running (supply fan off), the space that is conditioned by the rooftop would become negatively pressurized. This is desirable for clearing the area of smoke from the now-extinguished fire, possibly keeping smoke out of areas that were not damaged. • Supply Fan VFD - Min • Relief Fan - On; Relief Dampers Open (if so equipped) • OA Dampers - Closed; Return Damper - Open • Heat - All heat stages off; Mod Heat output Off • Occupied/Unoccupied/VAV box output - Deenergized • VOM Relay - Energized	**PURGE sequence "D"** Possibly this sequence could be used for purging the air out of a building before coming out of Unoccupied mode of operation on VAV units or for the purging of smoke or stale air if required after a fire. • Supply Fan VFD - Max • Relief Fan - On; Relief Dampers Open (if so equipped) • OA Dampers - Open; Return Damper - Closed • Heat - All heat stages off; Mod Heat output Off • Occupied/Unoccupied/VAV box output - Energized • VOM Relay - Energized
PURGE with duct pressure control sequence "E" This sequence can be used when supply air control is required for smoke control. • Supply Fan VFD - (If so equipped) Controlled by Supply Air Pressure Control function; Supply • Air Pressure High Limit disabled • Relief Fan - On; Relief Dampers Open (if so equipped) • Heat - All heat stages off; Mod Heat output Off • Occupied/Unoccupied/VAV box output - Energized • VOM Relay - Energized	

User Interface (UI)

A 7 inch user interface features a touch-sensitive color screen that provides operating status, performance monitoring, and scheduling changes and operating adjustments.

Demand Limit

This mode is used to reduce electrical consumption at peak load times. When demand limiting is needed, mechanical cooling and/or heating operation are either partially or completely disabled in order to save energy.

Frost Avoidance

Evaporator Coil Frost Protection - Frostat™

Temperature and pressure sensors on each refrigeration circuit are used to determine if the coil is approaching a freezing condition. Mechanical cooling capacity is shed as necessary to prevent icing. The Frostat™ system reduces the need for hot gas bypass and utilizes the suction line surface temperature sensor to shed cooling when coil frosting conditions occur. The supply fans are not shut off and will de-ice the coil. Timers prevent the compressors from rapid cycling.

Occupied/Unoccupied Switching

There are two ways to switch between Occupied or Unoccupied:

- Field-supplied contact closure (hard wired binary input to Symbio™ 800 Controls). This input accepts a field supplied switch or contacts closure, such as a time-of-day clock
- Tracer (or third party BAS with BACnet® or LON option).

Economizer Controls

Comparative Enthalpy Control of Economizer

An optional comparative enthalpy system is used to control the operation of the economizer, and measures the temperature and humidity of both return air and outside air to determine which source has lower enthalpy. This system allows true comparison of outdoor air and return air enthalpy by measurement of outdoor air and return air temperatures and humidities.

Reference Enthalpy Control of Economizer

The optional reference enthalpy compares outdoor air temperature and humidity to the economizer enthalpy control setpoint. If outdoor air temperature and humidity are below the economizer enthalpy control setpoint, the economizer will operate freely. This system provides more sophisticated control where outdoor air humidity levels may not be acceptable for building comfort and indoor air quality.

Dry Bulb Temperature Control of Economizer

The optional dry bulb system measures outdoor temperature comparing it to the economizer control temperature setpoint. If the outdoor temperature is below the economizer dry bulb temperature control setpoint, the economizer will operate freely. This system is best suited for arid regions where the humidity levels of outside air would not be detrimental to building comfort and indoor air quality.

Differential Dry Bulb

The optional differential dry bulb system measures outdoor air and compares it to the return air dry bulb temperature. If the outdoor air is below the return air and lower than the economizer enable offset, the economizer will operate freely. This system is best suited for arid regions where humidity levels of outside air would not be detrimental to building comfort and indoor air quality.

Refrigeration Balanced Starts

Balanced starts is a user-selectable feature through the user interface available on all units without the eFlex™ variable speed option. After each request for compressor operation, the lead refrigeration circuit switches, thereby causing a more equitable or balanced run time among compressors.

Emergency Stop Input

A binary input is provided for installation of field provided switch or contacts for immediate shutdown of all unit functions.

Anti-Short Cycle Protection

A standard feature provided to prevent excessive cycling and premature wear of the compressors, contactors and related components.

High Duct Temperature Limit

Two temperature sensors, Discharge Air and Return Air (if installed) are used to determine if duct temperatures are excessively high. If the discharge air temperature exceeds 200ºF or if the return air temperature exceeds 135ºF, the unit will be placed into Emergency Stop Mode.

CO_2 Control - Demand Control Ventilation (DCV)

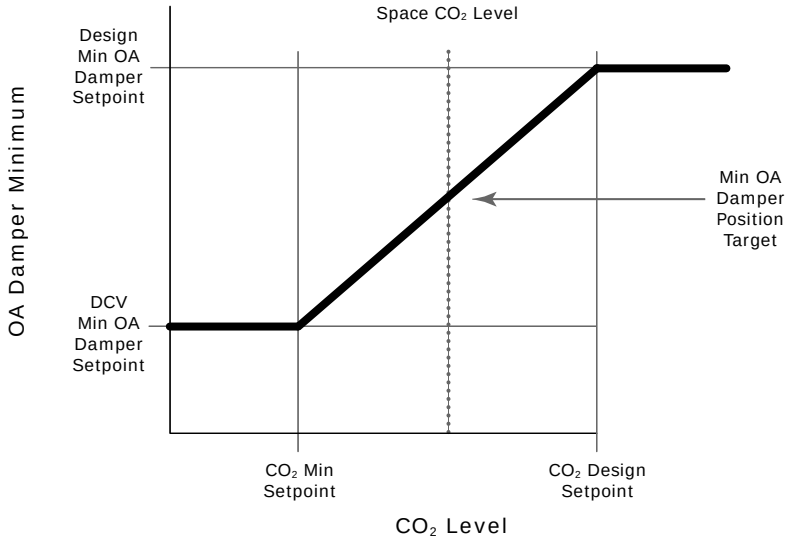
A ventilation reset function that provides the necessary ventilation for occupants and reduces energy consumption by minimizing the outdoor air damper position (or the OA flow setpoint with Traq) below the Building Design Minimum, while still meeting the ASHRAE Std 62.1 ventilation requirements.

- If the space CO_2 level is greater than or equal to the CO_2 Design Setpoint, the outdoor air damper will open to the Design Min Outdoor Air Damper (or OA Flow) Setpoint. If there is a call for economizer cooling, the outdoor air damper may be opened further to satisfy the cooling request.
- If the space CO_2 level is less than or equal to the CO_2 Minimum Setpoint, the outdoor air damper will close to the DCV Minimum Outdoor Air Damper (or OA Flow) Setpoint. If there is a call for economizer cooling, the outdoor air damper may be opened further to satisfy the cooling request.
- If the space CO_2 level is greater than the CO_2 Minimum Setpoint and less than the CO_2 Design Setpoint, the outdoor air damper position is (or OA flow) modulated proportionally to the Space CO_2

level relative to a point between the CO_2 Min Setpoint and the CO_2 Design Setpoint. If there is a call for economizer cooling, the outdoor air damper may be opened further to satisfy the cooling request.

Note: *CO_2 sensor used with Demand Control Ventilation must be powered from an external power source or separate 24 VAC transformer.*

Figure 7. CO_2 control



Low Charge Protection

A refrigerant charge estimate is calculated using a combination of measured temperatures, calculated saturated temperatures, refrigerant mass flow and the expansion valve opening. At the touch screen interface, a warning diagnostic is displayed when a low charge has been detected on the circuit, but is not critical enough to force a circuit shutdown. When a critical low charge has been detected on the circuit, a circuit shut down is triggered, and a shutdown diagnostic is displayed at the touch screen interface. Other diagnostic messages include the following:

- A diagnostic message displayed at the user interface, warning of a low charge situation when the unit is just slightly undercharged. The unit will be allowed to run.
- A diagnostic message displayed at the user interface, warning of a low charge situation when the unit is undercharged. The undercharged circuit will be locked out to protect the compressors.

Condenser Fan Cycling

The Symbio™ 800 controller cycles or modulates condenser fans based on ambient temperature and saturated condensing temperature to ensure the optimum operating conditions for the unit.

LonTalk® Building Automation System

The LonTalk® communication protocol for the Symbio™ 800 controller expands communications from the unit UCM network to a Tracer® Ensemble™ building automation system or third party building automation system. Utilizing LonTalk®, the BAS allows external setpoint and configuration adjustment and monitoring of status and diagnostics. The Symbio™ 800 utilizes an FTT-10A free topology transceiver, which supports non-polarity sensitive, free topology wiring—which in turn allows the system installer to utilize star, bus, and loop architectures. This controller works in standalone mode, peer-to-peer with one or more other units, or when connected to a Tracer® Ensemble™, Tracer SC+, or a third party building automation system that supports LonTalk®. The LON controller is available as a factory or field-installed kit.

BACnet® Building Automation Control Network

The BACnet® control network for Symbio™ 800 expands communications from the unit controller network to the Tracer® Ensemble™or Tracer SC+ building automation system or third party building automation system. Utilizing BACnet, the BAS allows external setpoint and configuration adjustment

and monitoring of status and diagnostics. The Symbio™ 800 utilizes the BACnet defined MS/TP protocol as defined in ASHRAE standard 135-2004. This controller works in standalone mode, with Tracer® Ensemble™, Tracer SC+ or when connected to a third party building automation system that supports BACnet.

AirFi® Wireless Communication Interface

Trane AirFi® Wireless Communication replaces the BACnet communication link and sensor wire on Tracer® building automation systems for faster, easier, lower-risk installation and life-cycle savings.

The Air-Fi Wireless Communications Interface (WCI) enables wireless communications between system controls, unit controls, and wireless sensors for Trane control products that use the BACnet® protocol. The WCI replaces the need for communications wire in all system applications. The Air-Fi® Wireless Communications Sensor (WCS) is compatible with any Trane controller that uses a WCI. The WCS provides the same functions as many currently available Trane wired sensors. No further software or hardware is necessary for site evaluation, installation, or maintenance.

Adherence to ANSI/ASHRAE® Standards 125-2016 (BACnet Zigbee®), enables secure and reliable wireless monitoring and control over commercial building systems. It also conforms to the IEEE® 802.15.4 standard, which ensures that your wireless BAS Communication system will reliably coexist with other wireless systems, including Bluetooth and Wi-Fi.

Modulating Hot Gas Reheat for Dehumidification

Modulating hot gas reheat involves adding a refrigerant-to-air heat exchanger downstream of the evaporator (cooling) coil. A valve diverts the hot refrigerant vapor leaving the compressor through this heat exchanger to reheat the dehumidified air leaving the evaporator coil. This allows the use of heat that is recovered from the refrigeration circuit of the rooftop unit to reduce system operating costs by avoiding the use of “new” energy for reheat.

The main function of the IntelliPak® rooftop unit is to provide zone temperature control. While modulating hot gas reheat will improve dehumidification performance at part-load conditions, it does not function as a standalone dehumidifier. In general, hot gas reheat requires a call for cooling to initiate. If there is a need for dehumidification when there is no need for sensible cooling, another solution may need to be investigated. IntelliPak packaged rooftop systems include non-standard solutions that might be considered for these applications.

Applications which should be investigated before using the standard modulating hot gas reheat option include:

- Process humidity control applications
- Makeup air or 100% outdoor air
- Zones with dramatically varying load conditions (sanctuaries, locker rooms, gymnasiums, etc.)

Low Ambient Compressor Lockout

This function will lock out the compressor if the outdoor air temperature is below the low ambient compressor lock out temperature setpoint. The factory setpoint is 50°F on standard units and 0°F on low ambient units. This setpoint is adjustable at the user interface. Compressors will be locked out when outdoor air temperatures fall below the selected temperature and will be allowed to start again when temperatures rise 5°F above the setpoint.

Refrigerant Detection and Mitigation

Equipment with R–454B refrigerant requires a refrigerant detection system. When the refrigerant detection system is in a normal state, the equipment provides normal heating, cooling, and ventilation.

The refrigerant sensor creates an alarm signal when the sensed refrigerant concentration has exceeded the refrigerant concentration alarm threshold. The alarm threshold is a non-adjustable preset value. Refrigerant concentration is read and reported from the leak detector.

While the refrigerant detection system is in an alarm state, the equipment is required to mitigate the alarm condition for a minimum of 5 minutes after the refrigerant detection system has reset to a normal state.

In the event the control system detects the refrigerant sensor has failed, become disconnected or unpowered; controls will respond with a diagnostic and mitigation becomes active. The unit shall

operate to provide mitigation actions for the duration of the sensor failure mode. The supply fan will operate continuously, and all compressor operation is disabled. In heating modes of operation, noncompressor heating and ventilation are allowed to maintain space comfort. Economizer cooling operation is also allowed.

Specifications

Controller Specifications	
Input power	24 Vdc +/- 10%, 400mA max.
Storage temperature	-67°F to 185°F (-55°C to 85°C), Humidity: Between 5% to 100% (Condensing).
Operating temperature	-40°F to 158°F (-40°C to 70°C).
Environmental rating (enclosure)	IP3x.
Time clock	On-board real time clock with 10 year battery backup.
Mounting weight	Mounting surface must support 1.3 lb. (0.6 kg).
Overall dimensions	5.65 in. (143.5 mm) wide x 4.00 in. (101.6 mm) high x 2.38 in. (60.6 mm) deep.
Agency Compliance	
• UL PAZX, Energy Management Equipment, UL 60730-1, 5th Ed. • UL94-5V Flammability. • CE EMC Directive 2004/108/EC • FCC CFR Title 47, Part 15.109: Class B Limit, (30 MHz—10 GHz). • BTL Listed—Advanced Application Profile (B-AAC).	
User Interface Specifications	
Input power	24 Vdc +/- 10%, 400 mA max
Storage temperature	-67°F to 203°F (-55°C to 95°C), Humidity: Between 5% to 100% (Condensing).
Operating temperature	-40°F to 158°F (-40°C to 70°C), Humidity: Between 5% to 100% (Condensing).
Environmental rating (enclosure)	IP56 (dust and strong water jet protected) with optional sealed Ethernet cable (PN: X19070632020).
Mounting weight	Mounting surface must support 1.6 lb. (0.74 kg).
Overall dimensions	8.3 in. (211.6 mm) wide x 6.3 in. (158.8 mm) high x 2.1 in. (53.2 mm) deep [bezel depth 0.4 in. (11.3 mm)].

Application Considerations

Clearance Requirements

The recommended clearances identified in “Dimensional Data,” p. 93 should be maintained to assure adequate service capability, maximum capacity and peak operating efficiency. A reduction in unit clearance could result in condenser coil starvation or warm condenser air recirculation. If the clearances shown are not possible on a particular job, consider the following:

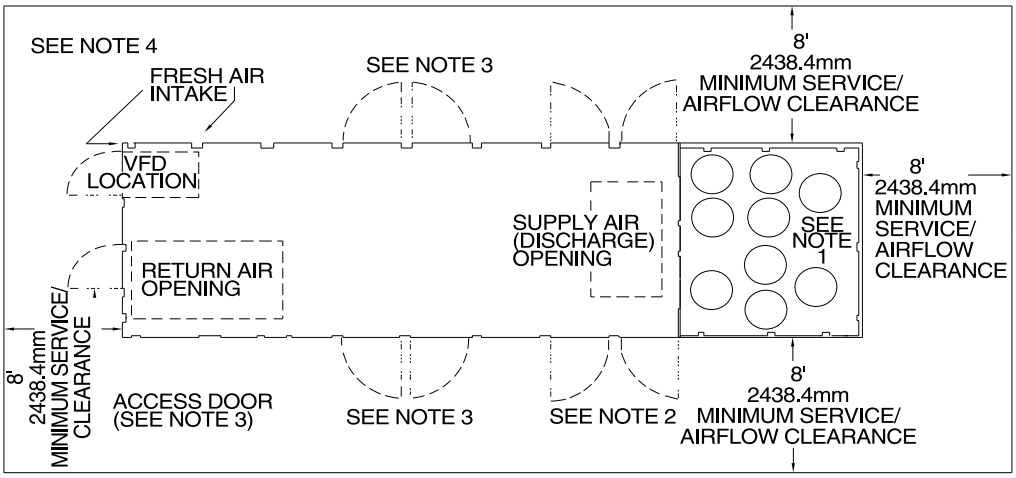
- Do the clearances available allow for major service work such as changing compressors or coils?
- Do the clearances available allow for proper outside air intake, relief air removal, and condenser airflow?
- If screening around the unit is being used, is there a possibility of air recirculation from the relief to the outside air intake, or from condenser exhaust to condenser intake?
- Do clearances meet all applicable codes?

Actual clearances which appear inadequate should be reviewed with a local Trane sales engineer.

When two or more units are to be placed side by side, the distance between the units should be increased to 150 percent of the recommended single unit clearance. The units should also be staggered for the following reasons:

- To reduce span deflection if more than one unit is placed on a single span. Reducing deflection discourages sound transmission.
- To assure proper diffusion of relief air before contact with the outside air intake of adjacent unit.

Figure 8. Service clearance — 90 to 130 tons air-cooled



Notes:

- *Provide unrestricted clearance over the condenser fans.*
- *A minimum clearance of 2' 4½" is required to open the hinged control panel doors. Both doors swing outward in a 180-degree arc.*
- *A minimum clearance of 2' 10¾" is required to open the access doors on the unit's supply fan, evaporator, filter and relief fan sections. All hinged doors swing outward in a 180-degree arc.*
- *90-130 ton models have two outdoor air intakes located at the back of the unit and one small outdoor air intake located at the end of the unit.*
- *A minimum clearance of 3' 7" is required to open the hinged access panel door to the VFD enclosure.*
- *Unit drawing is representative only and may not accurately depict all models.*

Modulating Hot Gas Reheat for Dehumidification

Modulating hot gas reheat involves adding a refrigerant-to-air heat exchanger downstream of the evaporator (cooling) coil. A valve diverts the hot refrigerant vapor leaving the compressor through this heat exchanger to reheat the dehumidified air leaving the evaporator coil. This allows the use of heat that is recovered from the refrigeration circuit of the rooftop unit to reduce system operating costs by avoiding the use of “new” energy for reheat.

The main function of the IntelliPak® rooftop unit is to provide zone temperature control. While modulating hot gas reheat will improve dehumidification performance at part-load conditions, it does not function as a standalone dehumidifier. In general, hot gas reheat requires a call for cooling to initiate. If there is a need for dehumidification when there is no need for sensible cooling, another solution may need to be investigated. IntelliPak packaged rooftop systems include non-standard solutions that might be considered for these applications.

Applications which should be investigated before using the standard modulating hot gas reheat option include:

- Process humidity control applications
- Makeup air or 100% outdoor air
- Zones with dramatically varying load conditions (sanctuaries, locker rooms, gymnasiums, etc.)

Ventilation Control

Ventilation is the process of delivering clean, fresh outdoor air into the building to dilute the build-up of contaminants and odors. ASHRAE Standard 62.1 defines the minimum ventilation rates and basic HVAC equipment and system requirements to provide “acceptable indoor air quality.” Units with a variable-speed supply fan should either be equipped with the Traq™ outdoor air measurement system or use the “Outdoor Air Compensation” control sequence to ensure proper ventilation at all operating conditions:

- The **Traq™ outdoor air measurement system** uses velocity pressure sensing rings to measure airflow in the outdoor air intake. This allows the outdoor airflow to be controlled to a desired setpoint, compensating for changing conditions.
- The **Outdoor Air CFM Compensation sequence** automatically adjusts the position of the OA dampers in proportion to the changing supply fan speed. This attempts to maintain the same CFM of outdoor airflow entering the unit, even as the supply fan speed changes.

Demand-controlled ventilation (DCV) is a control strategy that dynamically adjusts the outdoor airflow delivered to a zone based on the changing population in that zone, often by measuring the concentration of carbon dioxide (CO_2) in the zone. Zones that are densely-occupied and experience widely varying population—such as large conference rooms, auditoriums, and gymnasiums—are often good candidates for using CO_2-based DCV.

Ventilation Override Sequences

Trane can provide five (5) different ventilation override sequences on IntelliPak™ rooftops. For convenience, the sequences are factory preset but are fully field edited from the user interface or Tracer TU. Any or all five sequences may be “locked” in by the user at the user interface.

Typically, a manual switch is used and located near the fire protection control panel. This enables the fire department access to the control for use during or after a fire. It is also possible to initiate the sequence from a field-installed automatic smoke detector. In either case, a contact closure begins the ventilation override control sequence.

The user can customize up to five (5) different override sequences for purposes such as smoke control. The following parameters within the unit can be defined for each of the five sequences:

- Supply Fan - on/off
- Variable Frequency Drives - on (60 Hz)/off (0 Hz)/controlling
- Relief Fan - on/off
- Relief Air Dampers - open/closed
- Outdoor Air Dampers - open/closed
- Heat - off/controlling (output for) VAV Boxes - open/controlling

Compressors and condenser fans are shut down for any Ventilation Override sequence. Factory preset sequences include unit Off, Relief, Purge, Purge with duct pressure control, and Pressurization. Any of the user-defined Ventilation Override sequences can be initiated by closing a field supplied switch or contacts connected to an input on the Ventilation Override Module. If more than one ventilation override sequence is being requested, the sequence with the highest priority is initiated. Refer to the Ventilation Override Mode (VOM) information in the Control section of this catalog for more details on each override sequence.

Relief Fan Options

When the rooftop unit brings in outdoor air for ventilation, the same quantity of air must leave the building. Typically, some of this air is exhausted by dedicated fans from restrooms or other spaces. Some air also leaks out through the building envelope as a result of the pressure inside the building being maintained slightly higher than the pressure outside the building ("positive" building pressurization).

Particularly when the rooftop unit is equipped with an airside economizer, a properly-designed relief system should be used to avoid over-pressurizing the building when the outdoor-air dampers open to bring in a larger quantity of air from outside. A relief fan is often included in the rooftop unit to help control building pressure. The Trane modulating relief fan (with Statitrac™) is an excellent choice for controlling building pressure in the majority of applications.

In a unit with a relief fan, the supply fan motor and drives must be sized to create a high enough pressure at the supply fan outlet to overcome the pressure losses associated with the supply-air path, and also create a low enough pressure at the supply fan inlet to overcome the pressure losses associated with the return-air path and components inside the rooftop unit.

Barometric Relief Dampers

This approach uses non-motorized, gravity-operated relief dampers that are located in the return-air section of the rooftop unit. When the building pressure increases, the pressure inside the return-air section also increases, eventually forcing open the relief dampers and allowing air to leave the building.

Barometric relief dampers are typically used in small buildings that use an open ceiling plenum for the return-air path. They are relatively inexpensive and require no sensors or controls, but they may require the building pressure to increase significantly before relieving sufficient airflow.

Modulating Relief Fan with Statitrac™

This approach uses a powered relief fan located inside the return-air section of the rooftop unit. The fan is sized to relieve up to 100 percent of the nominal supply fan airflow, and its capacity is modulated to maintain measured building pressure at a desired setpoint.

The Trane Statitrac™ control system uses a differential pressure transducer to compare indoor (building) static pressure to atmospheric (outdoor) static pressure. The relief fan is turned on whenever needed to relieve air, then modulates the speed of the relief fan (or modulates the position of discharge dampers) to control the building pressure within the adjustable deadband, which can be set at the user interface.

The Trane modulating relief fan with Statitrac provides efficient control of building pressure in VAV applications. The relief fan operates only when needed to lower building pressure, meaning that in some buildings it may only need to operate when the unit is airside economizing. By directly measuring building pressure, the modulating relief fan can respond to pressure changes caused by wind, stack effect, the intermittent operation of local relief fans, and demand-controlled ventilation.

Acoustic Considerations

The best time to make provisions to reduce sound transmission to the occupied space is during the project design phase. Proper placement of rooftop equipment is critical to reducing sound transmitted into the building. The most economical means of avoiding an acoustical problem is to locate rooftop equipment away from acoustically-sensitive areas. If possible, locate rooftop equipment above corridors, utility rooms, restrooms, or other areas where higher sound levels are acceptable.

It is not possible to totally quantify the effect of the building structure on sound transmission, since this depends on the response of the roof and building members to the sound and vibration of the unit

components. However, the following guidelines have been proven through experience to help reduce sound transmission through the building structure:

- Never cantilever the condensing section of the rooftop unit; a structural cross member must support this end of the unit.
- Locate the unit's center of gravity close to (or over) a column or main support beam to minimize roof deflection and vibration-related noise.
- If the roof structure is very light, roof joists should be replaced by a structural shape in the critical areas described above.
- If several units are to be placed on one span, they should be staggered to reduce deflection over that span.

In addition, the Trane Acoustics Program™ (TAP) allows for modeling of various sound paths to predict sound levels in the occupied space. The software models airborne sound from supply- and return-air paths, as well as duct breakout and roof transmission sound, so that the designer can identify potential sound problems and make design alterations before equipment installation. TAP is also capable of modeling the effect of outdoor sound on adjacent properties. This program is available at www.trane.com. Ask your local Trane representative for additional information.

Corrosive Atmospheres

Trane's IntelliPak™ Rooftops are designed and built to industrial standards and will perform to those standards for an extended period depending on the hours of use, the quality of maintenance performed, and the regularity of that maintenance.

One factor that can have an adverse effect on unit life is operation in a corrosive environment. Since the Microchannel condenser coil is an all-aluminum design, it provides a high level of corrosion protection on its own. Uncoated, it withstands a salt spray test in accordance with ASTM B117 for 1,000 hours. When rooftops are operated in highly corrosive environments, Trane recommends the corrosion protected condenser coil option.

This corrosion protection option meets the most stringent testing in the industry, including ASTM B117 Salt Spray test for 6,000 hours and ASTM G85 A2 Cyclic Acidified Salt Fog test for 2,400 hours. The acid fog test is the most stringent available today. This coating is added after coil construction covering all tubes, headers, fins and edges. The design provides superior protection from any corrosive agent.

IntelliPak paint innately handles harsh weather, including most coastal and salt environments and direct sun. The unit paint was salt spray tested in accordance with ASTM B117 and UV weathering resistance tested in accordance with ASTM G155 Test cycle 1 for 2000 hours. For further detail on the paint testing, refer to PROD-SLB034*-EN.

Note: *Field coating is not allowed on Microchannel coils.*

Natural Gas Heating Considerations

Trane offers a 409 stainless steel option for its ETL-recognized, natural gas tubular heat exchangers.

These heat exchangers can be applied with confidence, particularly with full modulation control, when mixed air temperatures are below 50°F, and low ambient temperatures can cause condensation to form on the heat exchanger. The natural gas heat exchangers are not recommended for applications with mixed air conditions entering the heat exchanger below 30°F to ensure adequate leaving air heating temperature. For airflow limitations and temperature rise across the heat exchanger information, see Natural Gas Heating Capacities table in Performance Data.

High Entering Return Temperature

Some applications may have high mixed-air temperatures, such as data centers. It is recommended that the entering dry bulb temperatures in any application not exceed 95°F for extended periods of time. If this is a requirement, please work with in developing a specific assessment. Other factors, such as wet bulb and ambient temperatures, will also affect the system’s reaction.

A2L Application Considerations

This product is listed to UL standard 60335-2-40, Household and Similar Electrical Appliances – Safety – Part 2-40: Particular Requirements for Electrical Heat Pumps, Air-Conditioners and Dehumidifiers, which defines safe design and use strategies for equipment using A2L refrigerants. This standard limits the refrigerant concentration in a space in the event of a refrigerant leak. To meet the requirements, the UL standard defines minimum room area, refrigerant charge limit, minimum circulation airflow and/or ventilation airflow requirements, and limits the use of ignition sources in spaces. The standard may require a unit refrigerant leak detection system.

For equipment with R-454B and charge amounts less than or equal to 3.91 lbs per circuit, this UL standard does not prescribe a room area limit and does not require a refrigerant leak detection system or any circulation airflow or ventilation airflow mitigation strategies. However, ignition sources in ductwork must be evaluated.

Depending on the application, a specific requirement of ANSI/ASHRAE Standard 15, Safety Standard for Refrigeration Systems, could be more stringent than UL 60335-2-40 requirements. See *Refrigeration Systems and Machinery Rooms Application Considerations for Compliance with ASHRAE® Standard 15-2022 Application Engineering Manual* (APP-APM001*-EN) for more information.

Minimum Room Area Limits (Refrigerant charge greater than 3.91 lb per circuit)

Equipment with R-454B charge amounts greater than 3.91 lb per circuit may require additional circulation or ventilation airflow mitigation strategies. In this case, two minimum room area (A_{min}) thresholds:

- The first threshold defines when equipment serving a single room is required to provide circulation airflow, either continuous or activated by a leak detection system. A ducted system requires circulation airflow unless the smallest room it serves is larger than the adjusted A_{min} threshold. This product contains a leak detection system if a circuit charge is greater than 3.91 lbs. As a result, no further leak detection system evaluation is required.
- The second threshold defines when additional ventilation airflow is required. If the room area, A or TA, is below the adjusted A_{min} or TA_{min} threshold, additional ventilation is required to remove refrigerant in the event of a leak. Refer to UL 60335-2-40 Clause GG.8 and ANSI\ASHRAE Standard 15 Section 7 for natural and mechanical ventilation requirements. For minimum room area, see equipment nameplate or unit Installation, Operation, and Maintenance (IOM) manual.

Minimum Room Area (A_{min}) Adjustments

- **Altitude:** The A_{min} threshold changes with altitude. Multiple the altitude adjustment factor in the following table by Amin shown on the unit nameplate or in the Installation, Operation, and Maintenance (IOM) manual.

Table 7. Altitude adjustment factor

Altitude (ft)	Sea Level to 2000	2001 to 4000	4001 to 6000	6001 to 8000	8001 to 10000	10001 to 12000	12001 to 14000	14001 to 15000	Over 15000
A_{min} Adjustment	1	1.05	1.11	1.17	1.24	1.32	1.41	1.51	1.57

- **Height :** A_{min} can be adjusted if the unit is installed in a room at a height higher than the minimum height shown on the unit. Multiply A_{min} by the ratio of the unit minimum release height (in meters) / actual release height (in meters).
- **Institutional Occupancies:** For institutional occupancies, ASHRAE Standard 15 applies an additional adjustment factor, FOCC, to the amount of charge allowed in a space. To calculate the adjusted A_{min} for institutional occupancies, divide the A_{min} on the nameplate by 0.5.

Determining Room Area (A or TA)

The room area (A) is the room area enclosed by the projection to the floor of the walls, partitions, and doors of the space that the equipment serves. For ducted systems, total room area (TA) of all rooms connected by ducts, may be used instead of A.

Rooms connected by drop ceilings only are not considered a single room.

Rooms on the same floor of the building, and connected by an open passageway, can be considered part of the same room if the passageway is a permanent opening, extends to the floor and is intended for people to walk through.

Adjacent rooms on the same floor of the building and connected by permanent openings in the walls and/or doors between rooms (including gaps between the wall and the floor), can be considered part of the same room if the openings meet the following criteria.

- The opening is permanent and cannot be closed.
- Openings extending to the floor, such as door gaps, need to be at least 20 mm above the floor covering surface.
- Natural ventilations opening areas must meet the requirements of ANSI\ASHRAE Standard 15-2022, Section 7.2.3.2.

Rooms that are connected by a mechanical ventilation system can be considered a single room area if the mechanical ventilation system meets the requirements of ANSI\ASHRAE Standard 15-2022, Section 7.6.4.

Leak Detection System (Refrigerant charge greater than 3.91 lb per circuit)

The leak detection system consists of one or more refrigerant detection sensors. When the system detects a leak, the following mitigation actions will be initiated until refrigerant has not been detected for at least 5 minutes:

- Energize the supply fan(s) to deliver a required minimum amount of circulation airflow.
- Disable compressor operation.
- Provide an output signal to fully open all zoning dampers, such as VAV boxes.
- Provide an output to energize additional mechanical ventilation (if needed).
- Units without airflow proving will disable electric heat sources.

Building fire and smoke systems may override this function.

If the refrigerant sensor has a fault, is at the end of its life, or is disconnected, the unit will initiate the mitigation actions. Mitigation actions may be verified by disconnecting the sensor.

The refrigerant sensors do not need service. Use only manufacturer-approved sensors when replacement is required.

Performance Data

Performance Adjustment Factors

Table 8. Enthalpy of saturated air

Wet Bulb Temperature	Btu Per Lb.
40	15.23
41	15.70
42	16.17
43	16.66
44	17.15
45	17.65
46	18.16
47	18.68
48	19.21
49	19.75
50	20.30
51	20.86
52	21.44
53	22.02
54	22.62
55	23.22
56	23.84
57	24.48
58	25.12
59	25.78
60	26.46
61	27.15
62	27.85
63	28.57
64	29.31
65	30.06
66	30.83
67	31.62
68	32.42
69	33.25
70	34.09
71	34.95
72	35.83
73	36.74
74	37.66
75	38.61

Figure 9. Air density ratios

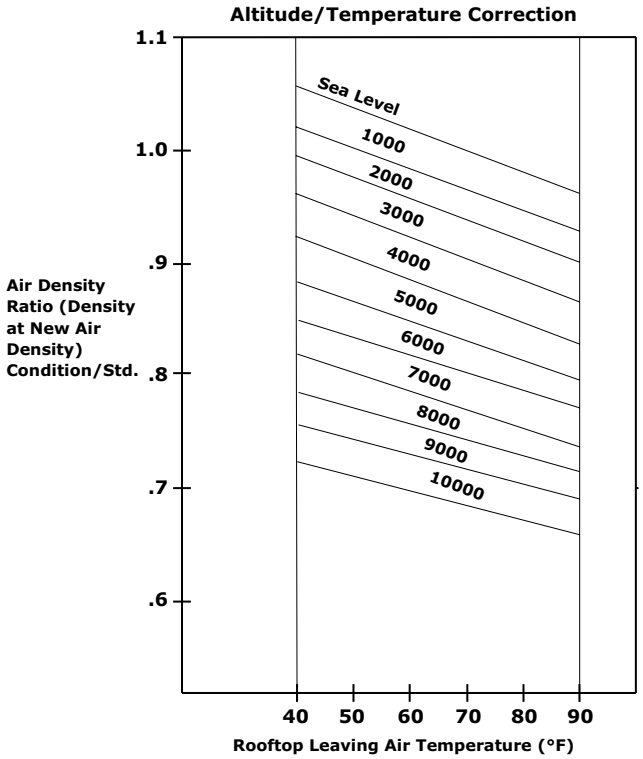


Table 9. Cooling capacity altitude correction factors

	Altitude (ft)								
	Sea Level	1000	2000	3000	4000	5000	6000	7000	8000
Cooling Capacity Multiplier	1.00	1.00	0.99	0.99	0.99	0.98	0.98	0.97	0.97
kW Correction Multiplier	1.00	1.00	1.00	1.00	1.01	1.01	1.01	1.02	1.02
Sensible Heat Ratio Correction Multiplier	1.00	0.97	0.94	0.92	0.89	0.87	0.84	0.81	0.79

Table 10. Gas heating capacity altitude correction factors

	Sea Level to 2000	2001 to 2500	2501 to 3500	3501 to 4500	4501 to 5500	5501 to 6500	6501 to 7500
Capacity Multiplier	1.00	0.92	0.88	0.84	0.80	0.76	0.72

Note: *Correction factors are per ANSI Z223.1/NFPA 54. Local codes may supersede.*

Table 11. Gross cooling capacities — 20 ton eFlex™ variable speed – high capacity (60 Hz)

CFM	Ent DB (°F)	Ambient Temperature (°F)																					
		85						95						105						115			
		Entering Wet Bulb (°F)						Entering Wet Bulb (°F)						Entering Wet Bulb (°F)						Entering Wet Bulb (°F)			
		61		67		73		61		67		73		61		67		73		61		67		73	
		CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC
4000	75	213	146	241	121	272	95	202	139	230	114	260	88	191	131	217	106	247	80	179	123	205	98	233	73
	80	213	168	242	143	272	117	203	160	230	136	260	110	191	153	218	128	247	103	179	145	205	121	233	95
	85	214	190	242	165	272	139	203	182	230	158	260	132	192	175	218	150	247	125	180	167	205	143	233	117
	90	214	211	242	187	273	161	204	204	231	180	260	154	193	193	218	172	247	147	182	182	206	165	234	139
5000	75	231	166	260	134	291	100	219	158	247	127	278	93	206	150	234	119	263	85	193	142	220	111	248	77
	80	231	194	261	162	291	128	220	186	248	154	278	121	207	178	235	146	263	113	194	170	221	138	248	105
	85	232	220	261	189	291	156	221	212	248	182	278	148	208	204	235	174	264	141	196	196	221	166	249	133
	90	237	237	261	217	292	183	227	227	249	209	278	176	217	217	236	201	264	168	206	206	222	193	249	160
6000	75	244	185	274	146	304	104	231	177	260	138	289	97	218	169	246	130	274	89	204	160	231	122	258	81
	80	245	218	274	179	304	137	232	210	261	171	290	130	219	200	247	163	274	122	205	192	232	155	258	114
	85	247	247	275	212	304	170	235	235	261	204	290	163	224	224	247	196	275	155	212	212	232	188	259	147
	90	259	259	275	245	304	204	249	249	262	237	290	196	237	237	248	228	275	189	225	225	234	219	259	180
7000	75	254	203	284	156	312	107	241	194	270	149	298	100	227	186	255	141	282	92	212	178	239	132	265	84
	80	256	240	284	195	313	146	242	231	270	187	298	139	229	223	256	179	282	131	215	214	240	171	265	123
	85	263	263	285	233	313	185	251	251	271	226	298	177	239	239	256	218	283	169	227	227	241	209	266	161
	90	277	277	286	270	313	223	266	266	273	262	298	216	254	254	258	254	283	208	241	241	243	243	266	200
8000	75	262	220	291	166	319	110	248	210	277	159	304	102	234	201	261	150	287	95	219	192	245	142	270	87
	80	265	262	292	210	319	154	251	251	277	203	304	147	238	238	262	195	288	139	224	224	246	186	270	131
	85	277	277	292	254	319	198	265	265	278	244	304	191	252	252	263	236	288	183	239	239	247	227	271	175
	90	292	292	295	295	319	242	280	280	281	281	304	235	267	267	267	267	288	227	253	253	253	253	271	219
9000	75	268	234	297	176	324	113	254	226	282	168	308	105	240	217	267	160	292	97	224	208	250	152	274	89
	80	273	273	298	225	324	162	260	260	283	218	308	155	247	247	267	210	292	147	233	233	251	201	274	139
	85	288	288	299	272	324	211	276	276	284	264	308	204	263	263	269	256	292	196	248	248	253	247	274	188
	90	303	303	303	303	323	261	290	290	291	291	308	253	277	277	277	277	292	243	262	262	263	263	274	234

Notes:

1. All capacities shown are gross and have not considered indoor fan heat. To obtain net cooling subtract indoor fan heat.
2. CAP = Total Gross Capacity, SHC = Sensible Heat Capacity.

Table 12. Gross cooling capacities— 25 ton – high efficiency and high capacity (60 Hz)

CFM	Ent DB (°F)	Ambient Temperature (°F)																							
		85						95						105						115					
		Entering Wet Bulb (°F)						Entering Wet Bulb (°F)						Entering Wet Bulb (°F)						Entering Wet Bulb (°F)					
		61		67		73		61		67		73		61		67		73		61		67		73	
		CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC
5000	75	260	180	293	148	328	114	246	171	279	140	313	106	232	162	263	131	296	97	217	152	247	121	278	87
	80	260	207	293	176	328	142	247	198	279	167	313	134	233	189	264	158	296	125	217	180	248	149	278	115
	85	261	235	294	203	328	170	247	226	280	195	313	161	233	217	264	186	296	152	218	206	248	176	279	143
	90	262	261	294	231	329	197	249	249	280	222	313	189	236	236	265	213	297	180	224	224	249	204	279	170
6250	75	280	204	314	164	347	119	265	195	298	155	330	111	250	186	281	145	312	101	233	176	263	135	292	92
	80	281	239	314	198	347	154	266	230	299	189	330	145	251	220	282	180	312	136	234	210	264	170	293	127
	85	282	272	315	232	347	189	268	263	299	224	331	180	253	253	283	214	313	171	237	237	265	204	293	161
	90	291	291	315	267	348	223	279	279	300	258	331	214	265	265	283	248	313	205	251	251	266	239	294	196
7500	75	295	227	328	177	359	123	279	218	312	168	341	114	263	208	294	158	322	105	245	198	275	148	301	95
	80	296	268	329	218	359	165	281	258	312	209	341	156	264	248	294	200	322	147	247	237	275	190	302	137
	85	300	300	329	260	359	206	286	286	313	251	342	197	272	272	295	241	323	188	257	257	276	231	302	178
	90	316	316	330	301	359	247	302	302	314	290	342	238	288	288	297	280	323	229	272	272	278	270	302	219
8750	75	306	249	338	190	367	126	289	239	321	180	349	117	272	229	302	171	329	108	254	219	283	161	308	98
	80	308	295	339	238	367	175	292	285	322	229	349	166	275	275	303	219	329	156	258	258	283	209	308	147
	85	318	318	339	286	367	223	304	304	322	277	349	214	289	289	304	267	329	205	273	273	284	254	308	195
	90	335	335	341	331	367	271	320	320	325	322	349	262	305	305	307	307	329	253	288	288	288	288	308	243
10000	75	314	268	346	202	373	129	298	258	328	192	354	120	280	248	309	183	333	111	261	237	288	172	311	101
	80	318	318	346	256	373	184	302	302	328	247	354	175	285	285	309	238	333	166	269	269	289	227	311	156
	85	333	333	347	308	373	239	318	318	330	299	354	230	302	302	311	289	333	221	285	285	291	278	311	211
	90	349	349	350	350	373	294	319	319	334	334	354	285	317	317	317	317	333	276	299	299	294	294	311	262
11250	75	321	287	351	213	378	132	304	277	333	204	358	123	286	267	314	194	336	114	267	256	293	184	314	104
	80	327	327	352	275	378	194	312	312	334	266	358	185	296	296	314	256	336	176	279	279	293	242	314	166
	85	345	345	353	333	378	256	329	329	335	323	358	247	312	312	316	313	336	237	294	294	296	296	314	227
	90	360	360	360	360	379	318	344	344	344	344	358	305	326	326	326	326	336	294	307	307	301	301	314	284

Notes:

1. All capacities shown are gross and have not considered indoor fan heat. To obtain net cooling subtract indoor fan heat.
2. CAP = Total Gross Capacity, SHC = Sensible Heat Capacity.

Table 13. Gross cooling capacities — 25 ton eFlex™ variable speed – high capacity (60 Hz)

CFM	Ent DB (°F)	Ambient Temperature (°F)																							
		85						95						105						115					
		Entering Wet Bulb (°F)						Entering Wet Bulb (°F)						Entering Wet Bulb (°F)						Entering Wet Bulb (°F)					
		61		67		73		61		67		73		61		67		73		61		67		73	
		CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC
5000	75	260	180	295	150	334	118	247	172	281	141	318	109	233	163	266	132	302	100	219	154	250	123	284	90
	80	260	208	295	177	334	145	248	199	281	169	318	137	234	190	266	160	302	128	219	181	250	150	284	118
	85	261	235	296	205	334	173	249	226	282	196	319	164	235	217	267	187	302	155	221	208	251	178	285	146
	90	264	262	296	232	335	201	251	251	282	224	319	192	239	239	267	215	303	183	227	227	251	205	285	174
6250	75	281	205	317	166	357	125	266	196	301	157	340	116	251	187	285	147	321	106	235	177	267	138	302	96
	80	282	240	318	200	357	159	267	231	302	191	340	150	252	220	286	182	322	141	237	210	268	172	302	131
	85	284	273	318	235	358	194	270	264	303	226	341	185	256	255	286	216	323	176	240	240	269	207	303	166
	90	294	294	319	269	358	229	282	282	304	260	342	220	269	269	288	251	323	210	255	255	270	240	304	201
7500	75	296	228	333	180	373	130	281	219	316	171	355	121	264	209	299	161	335	111	247	199	280	151	314	101
	80	298	268	334	222	374	172	283	259	317	212	356	163	267	249	300	203	336	153	250	239	281	193	315	143
	85	303	303	335	263	375	213	290	290	318	254	356	204	276	276	301	244	337	195	261	261	282	232	316	185
	90	321	321	337	303	375	255	307	307	321	293	357	246	281	281	303	284	338	236	263	263	285	273	317	226
8750	75	308	250	346	194	385	135	292	239	328	184	366	125	275	229	309	174	345	116	257	219	289	164	323	105
	80	311	297	346	242	386	183	296	287	329	233	367	174	279	277	310	223	346	164	262	262	290	212	325	154
	85	324	324	348	289	387	232	310	310	331	279	368	223	295	295	312	269	348	213	279	279	293	258	326	203
	90	343	343	352	336	387	280	311	311	334	327	369	271	313	313	317	317	349	261	297	297	298	298	327	251
10000	75	318	270	355	207	394	139	301	260	336	197	374	129	283	249	317	187	353	120	265	238	296	176	330	109
	80	323	323	356	262	395	194	307	307	338	252	375	185	291	291	318	242	354	175	274	274	298	229	332	165
	85	341	341	358	314	396	250	326	326	340	304	377	240	310	310	321	294	356	231	293	293	301	283	333	221
	90	362	362	364	364	397	305	346	346	347	347	378	296	330	330	331	331	357	283	312	312	313	313	335	273
11250	75	326	290	362	219	401	142	309	280	343	209	381	133	290	269	323	199	359	123	271	258	302	188	335	113
	80	335	335	364	281	402	205	319	319	345	268	382	196	303	303	325	258	361	186	286	286	304	247	338	176
	85	356	356	367	339	403	267	340	340	349	330	383	258	323	323	329	319	362	248	306	306	309	308	339	238
	90	377	377	378	378	405	326	361	361	362	362	385	316	344	344	344	344	364	306	325	325	334	311	342	296

Notes:

1. All capacities shown are gross and have not considered indoor fan heat. To obtain net cooling subtract indoor fan heat.
2. CAP = Total Gross Capacity, SHC = Sensible Heat Capacity.

Table 14. Gross cooling capacities — 30 ton – standard efficiency (60 Hz)

CFM	Ent DB (°F)	Ambient Temperature (°F)																							
		85						95						105						115					
		Entering Wet Bulb (°F)						Entering Wet Bulb (°F)						Entering Wet Bulb (°F)						Entering Wet Bulb (°F)					
		61		67		73		61		67		73		61		67		73		61		67		73	
		CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC
6000	75	279	200	315	162	351	121	264	191	298	153	333	111	248	181	281	142	315	102	231	170	262	132	294	91
	80	280	233	315	195	351	154	265	224	299	186	334	145	249	214	282	176	315	135	232	203	263	165	295	125
	85	281	265	316	228	352	188	266	256	300	219	334	178	251	245	282	209	315	168	234	234	264	198	295	158
	90	287	287	316	261	352	221	274	274	300	252	335	211	261	261	283	242	316	202	247	247	265	231	296	191
7500	75	299	228	334	179	368	126	282	218	316	169	349	117	265	208	298	159	329	107	246	197	277	148	307	96
	80	300	270	335	221	368	168	283	258	317	211	350	158	266	247	298	200	329	148	248	236	278	190	308	138
	85	303	303	335	262	369	209	288	288	318	252	350	200	274	274	299	242	330	190	258	258	279	231	308	179
	90	319	319	336	303	369	251	305	305	319	291	350	241	290	290	301	281	330	231	274	274	281	270	309	221
9000	75	312	255	347	195	379	130	295	244	329	185	359	121	276	234	309	174	338	111	257	223	288	163	315	100
	80	315	302	348	244	379	180	298	292	329	234	360	171	280	280	310	224	338	161	261	261	288	213	316	150
	85	326	326	348	293	380	230	311	311	330	284	360	220	295	295	311	271	339	210	278	278	290	260	316	200
	90	344	344	351	340	380	279	328	328	333	330	360	270	312	312	314	314	339	260	294	294	294	294	316	249
1050	75	323	278	356	209	387	134	305	267	337	199	366	125	286	256	317	189	345	115	266	244	295	178	321	104
	80	327	327	357	267	387	192	310	310	338	257	366	183	293	293	317	246	345	172	275	275	296	235	321	162
	85	344	344	358	321	387	250	328	328	339	311	366	240	311	311	319	300	345	230	292	292	298	289	321	220
	90	362	362	362	362	386	307	345	345	345	345	366	298	327	327	328	328	345	284	308	308	308	308	321	273
12000	75	331	301	363	223	391	138	312	290	344	213	371	128	293	279	323	203	348	118	273	267	300	192	324	108
	80	340	340	364	289	391	204	323	323	344	279	371	194	306	306	323	265	348	184	287	287	301	253	324	174
	85	358	358	366	351	391	270	341	341	347	340	371	260	323	323	326	326	348	250	303	303	305	305	325	239
	90	375	375	375	375	392	332	357	357	358	358	371	321	338	338	339	339	349	311	318	318	318	318	325	299
13500	75	338	324	369	237	394	142	319	314	348	227	373	132	299	299	327	216	351	122	279	279	304	205	327	112
	80	351	351	369	307	395	216	334	334	349	297	374	206	315	315	328	286	352	196	296	296	305	274	327	185
	85	369	369	372	372	396	290	351	351	353	353	374	280	332	332	332	332	352	265	312	312	312	312	327	254
	90	385	385	385	385	397	359	366	366	367	367	375	348	346	346	347	347	353	337	324	324	325	325	327	325

Notes:

1. All capacities shown are gross and have not considered indoor fan heat. To obtain net cooling subtract indoor fan heat.
2. CAP = Total Gross Capacity, SHC = Sensible Heat Capacity.

Table 15. Gross cooling capacities— 30 ton – high efficiency and high capacity (60 Hz)

CFM	Ent DB (°F)	Ambient Temperature (°F)																							
		85						95						105						115					
		Entering Wet Bulb (°F)						Entering Wet Bulb (°F)						Entering Wet Bulb (°F)						Entering Wet Bulb (°F)					
		61		67		73		61		67		73		61		67		73		61		67		73	
		CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC
6000	75	311	217	351	179	394	139	295	207	333	169	375	129	278	197	315	159	355	119	261	186	296	148	334	108
	80	311	250	351	212	394	173	295	240	334	202	376	163	279	230	316	192	356	152	261	219	296	181	334	142
	85	312	282	351	245	395	206	297	272	335	235	376	196	281	262	316	225	356	186	263	251	297	214	335	175
	90	315	315	352	278	395	239	301	301	335	268	377	229	287	287	317	258	357	219	272	272	298	247	336	208
7500	75	334	246	375	198	419	147	317	236	356	187	398	136	298	225	336	176	376	126	279	213	315	165	353	114
	80	335	288	376	239	419	188	318	276	357	229	399	178	300	265	337	218	377	167	281	253	316	206	354	156
	85	338	328	377	280	420	230	322	317	358	270	399	220	304	304	338	259	378	209	286	286	317	248	355	198
	90	351	351	378	322	420	271	329	329	359	311	400	261	321	321	340	299	378	251	294	294	319	287	355	239
9000	75	351	273	393	214	435	152	332	262	372	204	414	142	313	251	351	192	390	131	292	238	328	181	366	120
	80	354	321	394	264	436	202	335	310	373	253	414	192	316	299	352	242	391	181	296	287	329	231	367	170
	85	360	360	394	314	437	252	345	345	375	303	415	242	328	328	353	292	392	231	310	310	331	278	368	220
	90	381	381	397	361	437	302	365	365	378	350	416	292	347	347	357	339	393	281	329	329	335	327	369	270
1050	75	364	299	406	230	447	157	345	286	384	219	425	147	324	274	362	208	401	136	303	262	338	196	375	124
	80	368	355	407	288	448	215	349	344	385	277	426	205	330	330	363	266	402	194	309	309	339	254	377	183
	85	383	383	408	343	449	273	366	366	388	332	427	263	348	348	366	320	403	252	329	329	342	308	378	241
	90	405	405	412	400	449	331	387	387	392	389	427	321	369	369	371	371	404	310	349	349	350	350	379	299
12000	75	375	322	415	245	456	161	355	310	394	234	433	151	334	298	370	222	408	140	311	286	346	210	383	129
	80	381	381	416	311	457	228	362	362	395	300	434	218	343	343	372	289	410	207	324	324	347	273	385	196
	85	402	402	419	373	458	294	384	384	398	362	435	284	365	365	375	350	411	273	345	345	352	338	386	262
	90	424	424	426	426	458	360	406	406	407	407	436	346	386	386	387	387	412	335	366	366	366	366	387	324
13500	75	384	345	423	259	463	166	363	334	401	248	440	155	341	322	377	237	414	144	319	309	352	225	388	133
	80	394	394	424	330	464	240	376	376	402	319	441	230	357	357	379	307	416	219	336	336	354	294	390	208
	85	418	418	428	403	465	315	399	399	407	392	441	304	379	379	384	380	417	294	357	357	360	360	391	283
	90	440	440	441	441	466	384	421	421	422	422	443	374	401	401	401	401	419	362	379	379	380	380	394	351

Notes:

1. All capacities shown are gross and have not considered indoor fan heat. To obtain net cooling subtract indoor fan heat.
2. CAP = Total Gross Capacity, SHC = Sensible Heat Capacity.

Table 16. Gross cooling capacities — 30 ton eFlex™ variable speed – high capacity (60 Hz)

CFM	Ent DB (°F)	Ambient Temperature (°F)																							
		85						95						105						115					
		Entering Wet Bulb (°F)						Entering Wet Bulb (°F)						Entering Wet Bulb (°F)						Entering Wet Bulb (°F)					
		61		67		73		61		67		73		61		67		73		61		67		73	
		CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC
6000	75	310	217	349	179	391	138	295	207	333	169	374	129	279	197	315	159	355	119	262	187	297	148	334	108
	80	311	250	350	212	392	172	296	240	333	202	374	162	280	230	316	192	355	152	263	220	297	182	334	142
	85	312	282	350	245	392	205	297	272	334	235	374	195	281	262	317	225	355	185	265	252	298	215	335	175
	90	315	315	351	278	392	238	301	301	334	268	375	229	287	287	317	258	356	219	273	273	299	248	336	208
7500	75	333	246	373	197	415	145	317	236	355	187	395	135	299	225	336	176	375	125	280	214	316	165	352	114
	80	334	287	374	238	415	187	318	276	356	228	396	177	300	265	337	218	375	167	282	254	316	207	353	156
	85	337	327	374	280	416	228	321	317	357	270	397	219	305	305	338	259	376	208	287	287	317	248	354	198
	90	350	350	376	321	416	270	336	336	358	311	397	260	321	321	339	299	377	250	290	325	319	288	355	239
9000	75	350	273	390	213	430	150	332	262	371	203	410	141	313	251	350	192	388	130	293	238	329	181	365	119
	80	352	321	391	263	431	200	335	310	372	253	411	191	316	299	351	242	389	180	297	287	330	231	366	169
	85	359	359	391	312	432	250	344	344	373	302	411	240	328	328	353	292	390	230	311	311	331	278	367	219
	90	379	379	394	360	432	300	363	363	376	349	412	290	347	347	356	339	391	280	329	329	335	327	368	269
1050	75	362	297	402	228	442	155	344	286	382	218	421	145	324	274	361	207	398	135	304	263	338	196	374	124
	80	366	354	403	286	442	213	348	343	383	276	421	203	330	330	362	265	399	193	310	310	339	254	375	182
	85	381	381	405	342	443	271	365	365	385	331	422	261	348	348	364	320	400	251	329	329	342	308	376	240
	90	386	386	409	399	443	329	385	385	390	388	423	319	368	368	370	370	400	309	349	349	349	349	377	298
12000	75	373	321	411	243	450	159	354	310	391	233	429	149	334	298	369	222	405	139	312	286	346	210	381	128
	80	379	379	412	309	451	226	361	361	392	299	429	216	343	343	370	288	406	205	324	324	347	273	382	195
	85	399	399	415	371	451	292	382	382	395	361	430	282	364	364	374	350	407	272	344	344	351	338	383	261
	90	420	420	421	421	452	358	403	403	404	404	431	344	384	384	385	385	408	334	364	364	365	365	385	323
13500	75	381	344	419	257	457	163	362	333	398	247	435	153	341	321	375	236	411	143	319	309	351	224	386	132
	80	392	392	420	328	457	238	374	374	399	317	436	228	356	356	377	306	412	218	336	336	353	294	388	207
	85	414	414	423	401	457	312	396	396	403	390	436	302	377	377	382	379	413	292	357	357	359	359	388	282
	90	435	435	436	436	458	382	417	417	418	418	437	371	398	398	398	398	415	361	377	377	378	378	390	350

Notes:

1. All capacities shown are gross and have not considered indoor fan heat. To obtain net cooling subtract indoor fan heat.
2. CAP = Total Gross Capacity, SHC = Sensible Heat Capacity.

Table 17. Gross cooling capacities — 40 ton – standard efficiency (60 Hz)

CFM	Ent DB (°F)	Ambient Temperature (°F)																							
		85						95						105						115					
		Entering Wet Bulb (°F)						Entering Wet Bulb (°F)						Entering Wet Bulb (°F)						Entering Wet Bulb (°F)					
		61		67		73		61		67		73		61		67		73		61		67		73	
		CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC
8000	75	380	280	426	228	477	174	364	271	408	219	458	165	347	261	390	209	437	155	329	251	370	200	414	145
	80	381	324	426	272	477	218	364	314	409	263	458	209	347	305	390	254	437	200	329	295	370	244	414	190
	85	382	365	427	316	477	262	366	356	410	307	458	254	349	346	391	298	437	244	332	332	371	288	415	234
	90	387	387	427	360	478	307	373	373	410	351	459	298	360	360	392	341	438	288	345	345	372	332	416	279
10000	75	405	317	453	251	505	182	388	307	434	241	483	173	369	297	413	232	460	163	349	287	391	221	435	153
	80	406	371	454	306	505	238	388	362	435	297	483	229	370	349	414	287	460	219	351	338	392	277	435	208
	85	410	410	455	361	505	293	394	394	435	352	484	284	376	376	415	342	461	274	360	360	393	332	436	264
	90	428	428	455	416	506	349	413	413	436	403	485	339	397	397	416	393	462	329	381	381	395	382	437	319
12000	75	424	352	473	272	524	189	405	342	452	262	500	180	385	332	430	252	475	169	364	317	406	242	448	159
	80	426	413	474	338	524	256	408	403	453	329	500	246	388	388	431	319	476	236	367	367	407	308	449	225
	85	436	436	474	404	524	322	421	421	454	395	501	313	404	404	432	384	477	303	386	386	408	369	450	292
	90	461	461	477	465	525	389	445	445	457	455	502	379	427	427	435	435	477	369	408	408	409	409	450	358
14000	75	438	381	487	292	537	195	418	375	465	282	512	185	397	360	442	272	486	175	375	348	417	261	458	164
	80	442	442	488	369	537	273	423	423	466	360	513	263	403	403	443	349	487	253	383	383	418	338	458	242
	85	462	462	489	441	538	350	445	445	468	431	514	341	426	426	445	420	487	330	407	407	420	408	459	319
	90	487	487	491	488	539	428	469	469	470	470	514	418	450	450	451	451	488	407	429	429	430	430	460	396
16000	75	449	412	498	312	547	200	429	402	475	301	521	190	407	391	451	291	494	180	384	379	425	280	464	169
	80	456	456	500	400	547	289	438	438	477	390	522	279	419	419	452	379	494	269	399	399	426	361	465	258
	85	482	482	501	480	548	378	464	464	478	461	522	368	444	444	455	455	495	357	423	423	428	423	466	346
	90	508	508	509	509	548	466	489	489	490	490	523	456	468	468	469	469	496	437	446	446	446	446	466	425
18000	75	459	443	507	330	554	205	438	433	483	320	528	195	416	416	458	310	500	185	392	392	432	298	470	174
	80	472	472	508	430	555	305	453	453	485	416	528	295	433	433	460	401	501	285	412	412	433	389	470	274
	85	499	499	510	500	555	405	480	480	486	480	529	395	459	459	463	463	501	384	436	436	436	436	471	373
	90	525	525	526	526	556	495	505	505	506	506	530	484	483	483	483	483	502	473	458	458	459	459	472	460

Notes:

1. All capacities shown are gross and have not considered indoor fan heat. To obtain net cooling subtract indoor fan heat.
2. CAP = Total Gross Capacity, SHC = Sensible Heat Capacity.

Table 18. Gross cooling capacities— 40 ton – high efficiency and high capacity (60 Hz)

CFM	Ent DB (°F)	Ambient Temperature (°F)																							
		85						95						105						115					
		Entering Wet Bulb (°F)						Entering Wet Bulb (°F)						Entering Wet Bulb (°F)						Entering Wet Bulb (°F)					
		61		67		73		61		67		73		61		67		73		61		67		73	
		CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC
8000	75	407	293	457	241	511	187	389	283	437	231	490	177	370	272	416	221	467	167	350	261	393	209	442	156
	80	407	337	457	285	511	232	389	327	437	275	490	222	371	316	416	265	467	211	351	305	394	254	443	200
	85	409	381	457	329	512	276	391	370	438	319	490	266	373	359	417	309	467	256	354	348	395	298	443	245
	90	415	415	458	373	512	320	401	401	439	363	491	310	385	385	418	353	468	300	369	369	396	342	444	289
10000	75	434	330	486	264	541	196	414	320	464	254	517	185	393	308	441	243	492	175	371	297	416	231	465	164
	80	436	385	486	320	541	251	416	373	465	309	517	241	396	362	442	298	493	230	374	350	417	287	466	219
	85	440	439	487	375	542	307	422	422	465	364	518	296	404	404	442	353	493	286	385	385	418	342	467	275
	90	461	461	489	430	542	362	444	444	467	419	519	352	427	427	445	406	494	341	408	408	421	395	468	330
12000	75	454	365	506	286	561	202	433	354	483	275	536	192	410	343	458	263	509	181	387	328	433	252	481	170
	80	458	429	507	352	561	269	437	418	484	341	536	259	415	406	459	330	510	248	392	392	434	318	482	237
	85	471	471	508	418	562	336	453	453	485	407	537	325	434	434	461	396	511	315	414	414	436	381	483	303
	90	497	497	512	481	563	402	479	479	490	470	538	392	459	459	466	459	512	381	439	439	442	442	484	370
14000	75	470	397	522	306	575	208	447	385	497	295	549	198	424	373	471	283	521	187	399	360	445	271	492	176
	80	476	473	523	383	576	286	454	454	498	372	550	276	433	433	473	360	523	265	412	412	446	349	494	254
	85	499	499	525	457	577	364	480	480	501	445	551	353	459	459	476	434	524	343	438	438	450	422	495	331
	90	526	526	531	531	577	441	507	507	509	509	552	431	486	486	487	487	525	420	464	464	465	465	496	409
16000	75	482	428	533	325	586	214	459	416	508	314	559	203	435	404	482	302	530	192	410	391	454	291	500	181
	80	493	493	534	413	587	303	473	473	509	402	561	292	452	452	483	391	532	281	429	429	456	374	502	270
	85	522	522	538	497	588	391	501	501	514	485	562	381	480	480	489	474	533	370	457	457	462	461	503	358
	90	550	550	551	551	589	479	529	529	530	530	563	467	507	507	508	508	535	453	484	484	484	484	505	441
18000	75	493	460	543	344	595	219	469	448	516	333	567	208	444	435	490	321	538	197	419	419	461	309	506	186
	80	511	511	544	439	596	319	490	490	518	427	569	308	468	468	492	415	540	297	444	444	464	402	509	286
	85	541	541	550	536	596	418	519	519	525	524	569	408	497	497	499	499	540	397	472	472	473	473	510	386
	90	570	570	570	570	598	512	548	548	549	549	571	501	525	525	525	525	543	489	499	499	500	500	513	477

Notes:

1. All capacities shown are gross and have not considered indoor fan heat. To obtain net cooling subtract indoor fan heat.
2. CAP = Total Gross Capacity, SHC = Sensible Heat Capacity.

Table 19. Gross cooling capacities — 40 ton eFlex™ variable speed – high capacity (60 Hz)

CFM	Ent DB (°F)	Ambient Temperature (°F)																							
		85						95						105						115					
		Entering Wet Bulb (°F)						Entering Wet Bulb (°F)						Entering Wet Bulb (°F)						Entering Wet Bulb (°F)					
		61		67		73		61		67		73		61		67		73		61		67		73	
		CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC
8000	75	406	293	456	241	510	187	390	283	437	232	489	177	372	273	418	222	468	168	353	263	396	211	445	157
	80	407	337	456	285	510	231	391	327	438	276	490	222	373	318	418	266	468	212	354	306	397	255	445	202
	85	409	380	457	329	510	276	393	370	439	320	490	266	376	360	419	310	469	256	357	347	398	299	446	246
	90	416	416	458	373	511	320	403	403	440	364	491	310	388	388	420	354	469	301	373	373	399	343	447	291
10000	75	433	330	484	264	538	195	415	320	464	254	516	185	395	310	442	244	493	175	374	298	419	233	468	165
	80	436	384	485	319	539	251	417	373	465	309	517	241	398	363	443	299	494	231	377	351	420	288	469	221
	85	441	433	486	374	539	306	425	421	466	364	518	297	407	407	444	354	495	287	389	389	422	342	470	276
	90	462	462	488	429	540	361	446	446	469	418	518	352	430	430	447	407	496	342	412	412	425	396	471	331
12000	75	453	364	505	285	557	202	434	354	483	275	534	192	413	342	460	264	510	182	390	330	435	253	483	171
	80	458	429	506	351	558	268	438	418	484	341	536	259	418	407	461	331	511	249	396	389	437	320	485	238
	85	472	472	507	416	559	335	455	455	486	406	536	325	437	437	463	394	512	315	418	418	440	383	486	305
	90	498	498	512	481	560	401	481	481	491	470	537	391	462	462	469	457	513	381	443	443	447	440	487	371
14000	75	469	396	519	305	571	207	448	385	497	295	548	198	426	373	473	284	522	188	403	361	447	273	494	177
	80	476	465	521	382	572	285	457	452	498	370	549	276	436	436	474	360	524	266	416	416	449	348	496	255
	85	500	500	524	456	573	362	481	481	502	445	550	353	462	462	479	434	525	343	442	442	454	423	497	332
	90	527	527	532	521	574	438	508	508	511	508	551	428	489	489	490	490	526	418	468	468	469	469	499	405
16000	75	482	427	531	324	582	213	460	416	507	314	558	203	437	404	483	303	531	193	414	392	456	292	502	182
	80	494	494	532	410	583	301	475	475	509	398	559	292	455	455	485	387	533	282	434	434	459	375	505	271
	85	522	522	537	495	583	390	503	503	514	485	560	380	483	483	491	474	534	368	461	461	466	454	506	357
	90	550	550	551	551	585	473	531	531	531	531	562	463	510	510	511	511	536	453	488	488	488	488	509	441
18000	75	492	458	540	343	590	218	470	447	516	332	565	208	447	435	490	322	538	198	423	415	463	308	509	187
	80	511	511	542	437	591	317	491	491	518	426	567	308	471	471	494	415	540	298	449	449	467	403	511	287
	85	540	540	548	531	591	414	521	521	526	512	567	405	500	500	503	498	541	394	477	477	478	478	513	380
	90	569	569	569	569	594	509	549	549	549	549	570	499	527	527	528	528	544	488	503	503	504	504	516	477

Notes:

1. All capacities shown are gross and have not considered indoor fan heat. To obtain net cooling subtract indoor fan heat.
2. CAP = Total Gross Capacity, SHC = Sensible Heat Capacity.

Table 20. Gross cooling capacities — 50 ton – standard efficiency (60 Hz)

CFM	Ent DB (°F)	Ambient Temperature (°F)																							
		85						95						105						115					
		Entering Wet Bulb (°F)						Entering Wet Bulb (°F)						Entering Wet Bulb (°F)						Entering Wet Bulb (°F)					
		61		67		73		61		67		73		61		67		73		61		67		73	
		CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC
10000	75	483	354	540	289	603	220	462	343	517	277	578	209	440	331	493	265	551	197	416	318	467	253	522	184
	80	484	409	541	344	603	276	463	398	518	332	578	265	441	385	494	321	551	253	418	373	468	308	522	240
	85	486	462	542	399	603	331	466	450	519	387	579	320	445	438	495	376	552	308	423	421	469	363	523	295
	90	497	497	542	454	604	386	479	479	520	442	579	375	461	461	496	430	553	363	442	442	470	417	524	351
12500	75	514	400	572	317	635	230	490	388	547	305	607	218	466	375	521	292	577	206	440	362	492	279	545	193
	80	515	465	573	386	636	300	493	453	548	374	608	288	469	440	522	361	578	275	444	427	493	348	546	262
	85	523	523	574	454	636	369	502	502	550	442	609	357	481	481	523	430	579	345	459	459	495	417	547	331
	90	547	547	576	519	637	438	528	528	552	507	610	426	508	508	526	495	580	414	485	485	499	481	548	400
15000	75	536	443	595	342	657	238	511	430	568	330	627	226	485	415	540	317	595	213	458	399	509	304	560	200
	80	540	521	596	425	657	321	516	508	570	413	628	309	491	489	541	400	596	296	465	465	511	387	561	283
	85	557	557	598	505	658	404	536	536	571	493	629	392	515	515	543	478	597	380	491	491	513	464	562	366
	90	587	587	602	585	659	487	566	566	577	569	629	475	543	543	549	543	598	462	518	518	521	521	563	449
17500	75	552	479	612	367	672	245	527	466	584	355	641	232	500	452	554	342	607	220	472	438	522	328	571	206
	80	560	560	613	463	673	342	536	536	585	451	642	330	512	512	556	438	608	317	486	486	523	421	572	303
	85	587	587	616	553	674	439	565	565	588	541	643	427	541	541	559	527	609	414	515	515	528	512	573	400
	90	619	619	620	620	675	535	596	596	597	597	643	523	571	571	571	571	610	506	543	543	544	544	574	492
20000	75	566	518	625	391	684	251	540	505	596	378	651	239	512	491	565	365	616	226	483	475	531	351	579	212
	80	578	578	626	498	684	362	556	556	597	485	652	350	531	531	566	468	617	337	505	505	533	453	580	323
	85	612	612	630	603	685	473	588	588	602	589	653	460	562	562	570	559	618	447	534	534	535	535	580	433
	90	644	644	645	645	686	579	619	619	620	620	654	562	592	592	593	593	619	548	562	562	563	563	582	532
22500	75	577	556	635	414	692	257	551	542	605	402	659	245	523	521	573	388	623	232	493	493	539	374	585	218
	80	597	597	636	534	693	382	574	574	607	517	660	370	548	548	575	502	624	357	520	520	541	487	586	343
	85	631	631	640	630	694	507	606	606	612	611	660	494	579	579	580	580	625	481	550	550	550	550	586	461
	90	664	664	665	665	695	620	637	637	638	638	662	606	608	608	609	609	626	592	576	576	577	577	588	575

Notes:

1. All capacities shown are gross and have not considered indoor fan heat. To obtain net cooling subtract indoor fan heat.
2. CAP = Total Gross Capacity, SHC = Sensible Heat Capacity.

Table 21. Gross cooling capacities— 50 ton – high efficiency and high capacity (60 Hz)

CFM	Ent DB (°F)	Ambient Temperature (°F)																							
		85						95						105						115					
		Entering Wet Bulb (°F)						Entering Wet Bulb (°F)						Entering Wet Bulb (°F)						Entering Wet Bulb (°F)					
		61		67		73		61		67		73		61		67		73		61		67		73	
		CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC
10000	75	495	361	555	296	623	228	473	349	531	284	596	217	451	336	506	271	568	204	426	323	479	258	537	191
	80	496	415	556	351	623	284	475	404	532	339	596	272	452	392	507	327	568	260	428	377	480	314	538	247
	85	499	469	557	406	623	340	479	457	533	394	597	328	457	445	508	382	569	315	434	432	481	369	539	302
	90	511	511	558	461	624	395	494	494	535	449	598	383	475	475	510	437	570	371	455	455	484	422	540	358
12500	75	526	406	589	324	658	239	503	394	563	312	628	227	478	381	535	299	597	214	451	367	505	285	563	200
	80	530	473	590	393	658	309	507	460	564	381	629	296	482	447	536	368	598	283	456	433	507	354	565	270
	85	538	538	592	462	659	378	517	517	566	450	631	366	496	496	538	437	600	353	474	474	509	421	567	339
	90	566	566	595	529	660	447	546	546	570	516	632	435	524	524	543	503	601	422	502	502	514	489	568	409
15000	75	550	447	614	350	682	248	525	434	585	337	650	235	498	420	555	324	617	222	470	405	524	310	581	208
	80	556	529	615	433	683	331	532	516	587	420	652	319	506	502	557	407	619	305	479	479	525	393	584	292
	85	577	577	618	513	685	414	555	555	590	500	654	402	532	532	561	486	621	389	508	508	530	471	586	375
	90	610	610	624	595	686	497	587	587	597	582	655	485	564	564	569	569	623	472	538	538	540	540	588	458
17500	75	569	487	632	375	699	255	542	474	602	362	666	242	514	459	570	349	631	229	485	445	537	334	594	215
	80	579	579	633	472	701	353	553	553	604	459	669	340	529	529	573	443	634	327	503	503	540	426	598	313
	85	610	610	638	564	703	450	587	587	609	550	671	437	562	562	579	536	636	424	535	535	547	521	600	410
	90	645	645	649	649	705	546	621	621	622	622	673	529	595	595	596	596	639	515	567	567	568	568	603	501
20000	75	584	527	645	399	713	262	556	513	615	386	678	249	528	498	582	372	642	236	497	483	547	358	604	222
	80	601	601	648	505	715	373	577	577	617	491	682	361	551	551	585	476	646	347	524	524	552	461	608	333
	85	638	638	655	613	717	484	613	613	625	600	684	472	586	586	594	586	648	458	558	558	561	561	610	444
	90	675	675	676	676	720	589	649	649	650	650	687	575	621	621	622	622	653	561	591	591	592	592	616	546
22500	75	597	565	656	423	723	269	568	551	625	410	688	256	539	536	591	396	651	242	508	508	556	381	611	228
	80	623	623	660	540	726	394	597	597	629	526	692	381	570	570	596	511	655	368	541	541	561	496	616	354
	85	661	661	669	663	728	519	634	634	639	639	694	506	606	606	607	607	657	485	576	576	577	577	619	470
	90	699	699	700	700	732	634	672	672	673	673	699	621	642	642	643	643	663	606	611	611	612	612	626	591

Notes:

1. All capacities shown are gross and have not considered indoor fan heat. To obtain net cooling subtract indoor fan heat.
2. CAP = Total Gross Capacity, SHC = Sensible Heat Capacity.

Table 22. Gross cooling capacities — 50 ton eFlex™ variable speed – high capacity (60 Hz)

CFM	Ent DB (°F)	Ambient Temperature (°F)																							
		85						95						105						115					
		Entering Wet Bulb (°F)						Entering Wet Bulb (°F)						Entering Wet Bulb (°F)						Entering Wet Bulb (°F)					
		61		67		73		61		67		73		61		67		73		61		67		73	
		CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC
10000	75	493	359	553	294	619	227	472	348	530	283	593	215	450	336	506	271	566	203	427	324	480	258	537	191
	80	493	414	553	350	619	282	473	403	531	338	593	271	451	391	506	326	566	259	429	379	481	314	538	246
	85	496	469	554	405	619	338	476	456	531	393	594	326	455	445	507	381	567	314	433	426	482	369	538	302
	90	508	508	555	459	620	393	491	491	532	448	595	382	473	473	508	436	568	370	454	454	483	424	539	357
12500	75	524	405	586	323	653	237	502	393	561	311	625	225	478	380	534	298	595	213	452	367	506	285	563	200
	80	527	473	587	392	653	306	504	461	562	380	625	295	481	447	535	367	596	282	456	434	507	354	564	269
	85	535	530	588	460	654	376	515	515	563	448	626	364	494	494	537	436	597	352	472	472	508	423	565	339
	90	561	561	591	528	655	445	542	542	566	516	627	433	522	522	540	502	598	421	500	500	513	489	566	408
15000	75	547	448	610	349	676	245	523	436	583	336	646	233	497	421	554	324	614	220	470	408	524	310	580	207
	80	552	528	611	431	677	328	529	515	584	419	647	316	504	496	556	406	615	304	479	476	526	393	582	291
	85	572	572	613	514	678	412	551	551	586	500	648	400	529	529	558	487	617	387	506	506	528	472	583	374
	90	604	604	618	593	679	494	582	582	593	578	649	482	560	560	566	556	618	470	535	535	538	537	584	457
17500	75	565	488	628	373	692	252	540	473	599	361	661	240	513	460	569	348	628	227	485	445	537	334	592	214
	80	574	568	629	470	694	350	551	551	601	457	663	337	526	526	571	444	630	325	501	501	539	428	595	311
	85	604	604	632	564	695	446	582	582	605	549	664	434	558	558	575	536	631	422	532	532	544	521	596	408
	90	638	638	643	638	696	543	615	615	617	617	665	531	590	590	591	591	633	516	563	563	564	564	598	502
20000	75	580	526	641	397	705	259	553	513	612	385	672	246	526	499	581	371	638	234	497	484	548	358	601	220
	80	596	596	643	508	706	370	572	572	614	492	674	358	548	548	583	479	640	345	522	522	550	462	604	331
	85	631	631	648	612	707	481	607	607	620	599	676	469	581	581	590	578	642	456	554	554	558	553	606	442
	90	666	666	666	666	709	588	641	641	642	642	678	576	614	614	615	615	644	562	585	585	586	586	609	545
22500	75	592	565	652	421	714	265	565	550	622	408	681	253	537	529	590	395	646	240	507	506	556	381	609	226
	80	616	616	654	542	716	390	592	592	624	526	683	378	566	566	592	511	649	365	538	538	559	496	611	352
	85	652	652	661	649	717	515	627	627	633	628	685	503	600	600	603	603	650	486	571	571	572	572	613	472
	90	688	688	689	689	720	631	662	662	663	663	688	618	634	634	634	634	654	604	603	603	604	604	617	590

Notes:

1. All capacities shown are gross and have not considered indoor fan heat. To obtain net cooling subtract indoor fan heat.
2. CAP = Total Gross Capacity, SHC = Sensible Heat Capacity.

Table 23. Gross cooling capacities — 55 ton – standard efficiency (60 Hz)

CFM	Ent DB (°F)	Ambient Temperature (°F)																							
		85						95						105						115					
		Entering Wet Bulb (°F)						Entering Wet Bulb (°F)						Entering Wet Bulb (°F)						Entering Wet Bulb (°F)					
		61		67		73		61		67		73		61		67		73		61		67		73	
		CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC
11000	75	534	391	596	318	662	241	511	378	571	306	634	229	486	365	544	292	604	216	460	351	515	279	572	202
	80	535	451	597	379	662	302	512	438	572	366	634	290	487	425	545	353	604	277	462	412	516	339	572	263
	85	538	510	598	439	662	363	515	497	573	427	635	351	492	484	546	414	605	338	467	467	517	400	573	324
	90	552	552	598	500	663	424	533	533	574	487	635	412	513	513	547	474	605	398	491	491	519	460	573	385
13750	75	566	440	630	348	692	250	541	427	602	335	662	237	514	413	572	321	629	224	486	399	541	307	594	210
	80	569	513	631	424	693	327	544	500	603	411	662	314	518	486	574	397	630	300	490	471	542	383	595	286
	85	577	577	631	499	693	403	556	556	604	486	663	390	533	533	575	473	630	376	509	509	543	458	595	362
	90	607	607	634	574	693	478	585	585	607	559	663	466	562	562	579	545	631	452	537	537	548	530	596	438
16500	75	590	487	652	375	712	257	563	473	623	362	680	245	534	458	592	348	645	231	504	440	558	333	608	217
	80	595	574	653	466	712	349	569	560	624	453	680	336	542	542	593	439	646	323	513	513	559	424	609	308
	85	617	617	655	557	713	440	594	594	626	540	681	427	569	569	595	525	646	414	543	543	562	510	609	399
	90	649	649	660	643	713	531	625	625	632	630	681	518	599	599	602	602	647	504	571	571	572	572	610	490
19250	75	607	528	669	402	726	264	580	514	638	388	692	251	550	499	605	374	657	238	519	483	570	359	618	223
	80	617	617	669	507	726	371	591	591	639	494	693	358	565	565	606	480	657	344	537	537	571	465	619	330
	85	648	648	672	608	726	477	624	624	642	594	693	464	597	597	610	579	657	450	568	568	576	564	619	436
	90	681	681	681	681	726	583	655	655	655	655	693	570	626	626	627	627	658	556	595	595	596	596	619	535
22000	75	622	571	680	427	736	271	593	556	649	413	702	258	563	541	615	399	665	244	531	525	579	384	626	230
	80	639	639	681	548	736	392	613	613	650	532	702	379	586	586	617	514	665	366	557	557	581	498	626	351
	85	673	673	686	661	736	513	646	646	655	647	701	501	618	618	623	623	665	487	587	587	587	587	626	472
	90	704	704	705	705	737	631	677	677	677	677	702	614	646	646	647	647	666	599	613	613	613	613	626	583
24750	75	634	613	690	452	740	277	604	598	657	439	708	264	574	574	623	424	672	250	541	541	586	409	632	236
	80	658	658	691	581	742	414	632	632	659	567	708	401	603	603	625	551	672	387	572	572	589	535	632	372
	85	692	692	693	693	743	550	664	664	665	665	709	537	634	634	634	634	672	523	601	601	602	602	632	504
	90	723	723	723	723	745	677	693	693	694	694	710	662	661	661	661	661	672	647	626	626	626	626	632	629

Notes:

1. All capacities shown are gross and have not considered indoor fan heat. To obtain net cooling subtract indoor fan heat.
2. CAP = Total Gross Capacity, SHC = Sensible Heat Capacity.

Table 24. Gross cooling capacities— 55 ton – high efficiency and high capacity (60 Hz)

CFM	Ent DB (°F)	Ambient Temperature (°F)																							
		85						95						105						115					
		Entering Wet Bulb (°F)						Entering Wet Bulb (°F)						Entering Wet Bulb (°F)						Entering Wet Bulb (°F)					
		61		67		73		61		67		73		61		67		73		61		67		73	
		CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC
11000	75	534	392	599	321	672	246	511	380	574	308	643	234	487	366	546	295	612	221	461	353	517	281	579	207
	80	536	453	600	381	672	308	513	440	575	369	643	295	489	425	547	356	613	282	463	411	518	342	580	268
	85	540	512	601	442	672	369	518	499	575	429	644	356	494	486	548	416	614	343	469	468	519	402	582	329
	90	555	555	602	502	673	429	536	536	577	490	645	417	516	516	551	477	615	404	494	494	522	461	583	390
13750	75	568	442	635	351	708	258	542	429	606	338	677	245	515	415	576	324	643	231	487	398	544	310	607	216
	80	572	515	636	427	709	334	547	502	608	414	678	321	520	488	578	400	644	308	492	473	546	386	609	293
	85	582	582	638	503	710	411	560	560	610	490	679	398	537	537	580	476	646	384	513	513	549	459	611	370
	90	613	613	642	576	712	487	591	591	615	563	681	474	568	568	586	549	647	460	543	543	555	534	612	446
16500	75	592	486	660	380	734	267	565	472	630	366	700	253	537	457	598	352	664	239	506	442	563	337	625	225
	80	600	576	662	471	735	359	573	563	632	457	702	346	546	546	599	443	666	332	517	517	565	428	629	317
	85	624	624	665	558	737	450	601	601	635	544	704	437	576	576	604	530	668	423	549	549	571	514	631	409
	90	659	659	673	649	738	542	635	635	644	635	705	528	610	610	613	612	670	515	582	582	583	583	633	500
19250	75	612	530	679	407	752	275	584	516	647	393	717	261	554	501	613	379	679	247	522	485	578	364	639	232
	80	623	623	681	513	755	382	597	597	649	500	720	369	571	571	616	480	682	355	543	543	581	464	643	340
	85	659	659	687	614	756	489	634	634	656	600	722	476	607	607	623	585	685	462	578	578	589	569	645	447
	90	697	697	699	699	759	596	671	671	672	672	725	577	643	643	644	644	688	562	613	613	614	614	650	546
22000	75	628	573	694	433	766	283	598	558	660	419	729	269	568	543	625	405	690	255	535	527	588	390	649	240
	80	648	648	696	549	769	405	622	622	664	534	733	392	595	595	629	519	695	378	565	565	593	503	654	363
	85	688	688	704	669	771	527	661	661	673	654	735	514	632	632	639	639	697	500	602	602	604	604	657	481
	90	728	728	729	729	775	642	700	700	701	701	740	627	670	670	671	671	703	612	638	638	639	639	663	596
24750	75	641	616	705	459	777	290	611	601	671	445	739	276	580	580	635	431	699	262	547	547	597	415	657	247
	80	671	671	709	588	781	428	643	643	676	573	744	414	614	614	640	557	704	400	583	583	603	541	663	385
	85	712	712	720	720	783	565	684	684	687	687	746	548	654	654	654	654	707	528	621	621	622	622	666	512
	90	754	754	755	755	788	692	724	724	725	725	752	678	693	693	694	694	714	662	659	659	660	660	674	646

Notes:

1. All capacities shown are gross and have not considered indoor fan heat. To obtain net cooling subtract indoor fan heat.
2. CAP = Total Gross Capacity, SHC = Sensible Heat Capacity.

Table 25. Gross cooling capacities — 55 ton eFlex™ variable speed – high capacity (60 Hz)

CFM	Ent DB (°F)	Ambient Temperature (°F)																							
		85						95						105						115					
		Entering Wet Bulb (°F)						Entering Wet Bulb (°F)						Entering Wet Bulb (°F)						Entering Wet Bulb (°F)					
		61		67		73		61		67		73		61		67		73		61		67		73	
		CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC
11000	75	531	384	596	313	668	239	506	369	569	298	638	224	480	354	540	283	606	208	453	338	510	267	572	192
	80	532	445	597	374	668	300	507	430	570	359	638	285	481	414	541	344	606	270	454	399	511	327	572	253
	85	535	505	598	435	669	361	511	489	571	420	639	346	486	473	542	404	607	331	460	453	512	388	573	314
	90	548	548	599	495	669	422	527	527	572	480	639	407	505	505	544	465	608	391	482	482	514	449	574	375
13750	75	565	435	633	345	704	250	538	419	603	329	670	234	509	403	571	313	635	218	480	386	538	296	598	202
	80	568	509	634	421	704	326	541	494	604	405	671	311	513	476	572	389	636	295	484	459	539	372	599	278
	85	577	573	635	496	705	403	553	553	605	480	672	387	527	527	574	464	637	371	502	502	541	448	601	354
	90	606	606	638	571	706	479	583	583	609	555	673	463	558	558	578	537	639	447	532	532	546	520	602	430
16500	75	590	482	658	373	728	259	561	466	626	357	692	243	531	448	592	341	655	227	499	431	557	323	616	210
	80	596	570	659	464	728	350	567	554	627	448	693	335	538	531	594	432	657	318	509	506	559	415	618	301
	85	618	618	661	555	729	442	593	593	630	537	695	426	566	566	597	521	658	410	538	538	562	501	619	393
	90	652	652	667	642	730	533	626	626	637	624	696	517	599	599	605	599	659	501	570	570	573	573	620	484
19250	75	609	526	677	400	745	266	579	508	643	384	708	251	548	490	608	367	669	234	515	472	571	350	628	217
	80	619	616	678	506	746	373	591	591	645	490	709	358	562	562	610	473	671	341	533	533	573	454	631	324
	85	652	652	682	608	747	480	625	625	649	591	711	464	597	597	615	574	672	448	566	566	579	556	632	431
	90	688	688	693	692	748	586	660	660	663	663	712	570	631	631	631	631	674	551	599	599	600	600	634	534
22000	75	625	568	691	427	757	274	594	551	656	410	720	258	561	533	620	393	680	241	528	515	582	376	638	224
	80	642	642	692	548	759	396	614	614	658	529	721	380	585	585	622	511	682	363	554	554	584	490	640	346
	85	680	680	698	662	760	518	651	651	664	645	723	502	621	621	629	621	683	485	589	589	593	593	642	468
	90	717	717	718	718	761	636	687	687	688	688	725	619	656	656	656	656	686	599	622	622	622	622	645	580
24750	75	638	611	702	452	767	281	606	593	666	436	729	265	573	567	629	419	688	248	539	539	590	401	645	231
	80	664	664	704	585	769	418	635	635	669	565	731	402	604	604	632	547	690	385	572	572	594	528	648	368
	85	703	703	712	705	770	555	672	672	678	678	732	539	641	641	641	641	691	522	607	607	608	608	649	501
	90	740	740	741	741	772	683	709	709	710	710	735	666	675	675	663	663	695	648	640	640	640	640	653	630

Notes:

1. All capacities shown are gross and have not considered indoor fan heat. To obtain net cooling subtract indoor fan heat.
2. CAP = Total Gross Capacity, SHC = Sensible Heat Capacity.

Table 26. Gross cooling capacities — 60 ton – standard efficiency (60 Hz)

CFM	Ent DB (°F)	Ambient Temperature (°F)																							
		85						95						105						115					
		Entering Wet Bulb (°F)						Entering Wet Bulb (°F)						Entering Wet Bulb (°F)						Entering Wet Bulb (°F)					
		61		67		73		61		67		73		61		67		73		61		67		73	
		CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC
12000	75	569	419	636	340	706	257	545	405	609	326	676	243	518	391	579	311	643	228	490	375	547	295	607	212
	80	570	485	636	406	706	323	546	471	609	392	676	309	519	456	580	377	643	294	491	441	548	362	607	279
	85	572	551	637	472	706	390	548	534	610	458	676	376	522	519	581	443	643	361	494	494	549	428	607	345
	90	580	580	638	538	707	456	559	559	611	524	677	442	538	538	582	509	644	427	514	514	550	493	608	411
15000	75	606	474	673	373	742	267	579	459	643	359	708	253	549	444	610	343	672	237	518	427	575	327	632	221
	80	607	556	674	456	742	351	580	541	644	441	708	336	551	524	611	426	672	321	520	505	576	409	632	304
	85	613	613	675	538	742	434	587	587	645	524	709	419	560	560	612	508	673	404	534	534	577	492	633	388
	90	639	639	676	620	743	517	615	615	646	606	710	502	590	590	614	588	673	487	563	563	580	568	634	470
18000	75	632	525	699	404	766	276	603	510	666	389	730	262	571	494	631	373	691	246	537	477	594	356	648	229
	80	635	619	700	503	766	376	606	603	668	488	730	362	576	576	633	472	691	346	543	543	595	455	649	329
	85	650	650	701	602	766	476	625	625	669	587	731	461	598	598	634	571	692	445	569	569	597	554	649	428
	90	684	684	704	694	767	575	658	658	673	673	732	560	630	630	639	639	693	545	599	599	600	600	650	528
21000	75	651	575	717	433	783	284	620	560	684	418	745	269	587	543	647	401	704	253	552	519	608	384	660	236
	80	657	657	719	548	783	401	628	628	685	533	745	386	595	595	648	517	704	370	565	565	609	500	660	353
	85	684	684	720	664	783	517	657	657	686	645	746	502	628	628	650	624	705	486	596	596	612	606	661	469
	90	719	719	719	719	784	633	691	691	691	691	747	618	660	660	660	660	706	602	626	626	626	626	661	585
24000	75	666	620	732	461	795	292	635	601	696	446	756	276	601	583	659	429	714	260	565	563	618	412	668	243
	80	675	675	733	593	795	425	647	647	698	578	756	410	617	617	660	561	714	394	585	585	619	544	668	376
	85	711	711	735	716	796	558	682	682	701	699	757	542	651	651	664	664	715	526	617	617	620	617	669	509
	90	746	746	747	747	797	690	716	716	717	717	758	675	683	683	683	683	715	658	646	646	647	647	670	641
27000	75	679	663	743	489	805	299	646	646	706	473	764	283	612	612	668	457	721	267	575	575	626	439	674	250
	80	696	696	744	637	805	449	667	667	708	622	765	433	636	636	669	605	721	417	601	601	627	577	675	400
	85	733	733	745	733	806	598	702	702	709	703	765	583	669	669	675	675	722	566	633	633	633	633	675	549
	90	768	768	769	769	806	747	736	736	737	737	766	731	701	701	701	701	723	708	662	662	662	662	677	677

Notes:

1. All capacities shown are gross and have not considered indoor fan heat. To obtain net cooling subtract indoor fan heat.
2. CAP = Total Gross Capacity, SHC = Sensible Heat Capacity.

Table 27. Gross cooling capacities— 60 ton – high efficiency and high capacity (60 Hz)

CFM	Ent DB (°F)	Ambient Temperature (°F)																							
		85						95						105						115					
		Entering Wet Bulb (°F)						Entering Wet Bulb (°F)						Entering Wet Bulb (°F)						Entering Wet Bulb (°F)					
		61		67		73		61		67		73		61		67		73		61		67		73	
		CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC
12000	75	620	444	692	364	763	278	592	428	662	349	731	263	562	411	629	332	696	247	530	394	594	315	658	230
	80	621	510	692	430	763	344	593	494	663	415	731	330	564	477	630	398	696	314	532	460	595	381	658	297
	85	623	575	693	496	763	411	596	559	663	481	732	396	567	542	631	464	697	380	536	524	596	447	659	364
	90	632	632	693	562	763	477	609	609	664	547	732	462	585	585	632	530	697	446	559	559	597	513	660	430
15000	75	660	499	731	396	798	287	630	482	699	381	763	272	597	465	663	364	726	256	562	447	625	346	685	239
	80	663	581	731	479	798	370	633	563	699	463	764	355	601	545	664	447	726	340	566	526	626	429	685	323
	85	669	662	732	561	798	453	641	640	700	546	764	438	612	612	665	529	727	422	583	583	628	511	686	405
	90	697	697	734	644	798	535	672	672	703	626	764	521	644	644	669	609	727	505	614	614	631	590	686	488
18000	75	689	550	757	426	820	295	657	534	723	410	785	280	622	516	686	393	745	264	584	494	646	375	702	247
	80	693	646	757	525	820	394	662	629	724	509	785	379	628	611	687	492	745	364	592	590	647	474	703	347
	85	712	712	759	624	820	493	685	685	726	608	785	479	655	655	689	588	745	463	623	623	650	569	703	446
	90	746	746	763	718	820	592	718	718	731	702	784	577	688	688	695	685	745	561	655	655	657	656	703	545
21000	75	710	596	775	454	835	302	677	579	740	438	798	287	641	560	702	422	758	271	602	540	660	403	714	254
	80	717	710	775	569	835	418	686	686	741	554	798	403	653	653	703	537	758	387	619	619	661	517	714	370
	85	748	748	778	680	835	533	719	719	744	664	798	518	687	687	707	646	758	502	653	653	666	627	714	485
	90	782	782	785	782	836	649	752	752	753	753	798	634	720	720	721	721	758	615	684	684	685	685	714	594
24000	75	726	642	789	482	846	309	692	625	753	466	807	294	656	606	714	449	766	279	616	586	671	431	720	262
	80	740	740	789	613	848	441	710	710	754	595	807	426	678	678	715	575	766	410	642	642	673	555	721	393
	85	776	776	793	737	848	573	746	746	758	721	808	558	712	712	720	703	767	542	676	676	679	674	722	525
	90	809	809	810	810	851	699	778	778	779	779	809	682	743	743	744	744	767	665	705	705	705	705	723	646
27000	75	739	688	799	509	855	316	705	670	763	493	817	302	668	652	723	476	771	286	628	628	679	458	727	269
	80	762	762	800	650	858	465	732	732	764	633	818	449	698	698	725	615	772	433	661	661	682	596	728	417
	85	798	798	805	795	859	614	766	766	770	770	818	598	731	731	732	732	773	582	693	693	694	694	728	555
	90	831	831	832	832	863	753	797	797	798	798	819	735	760	760	761	761	774	717	720	720	721	721	729	698

Notes:

1. All capacities shown are gross and have not considered indoor fan heat. To obtain net cooling subtract indoor fan heat.
2. CAP = Total Gross Capacity, SHC = Sensible Heat Capacity.

Table 28. Gross cooling capacities — 60 ton eFlex™ variable speed – high capacity (60 Hz)

CFM	Ent DB (°F)	Ambient Temperature (°F)																							
		85						95						105						115					
		Entering Wet Bulb (°F)						Entering Wet Bulb (°F)						Entering Wet Bulb (°F)						Entering Wet Bulb (°F)					
		61		67		73		61		67		73		61		67		73		61		67		73	
		CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC
12000	75	615	441	685	361	753	274	588	426	657	347	723	260	560	411	626	331	690	245	530	394	593	315	654	230
	80	615	507	685	427	753	341	589	492	657	413	724	327	561	477	627	397	691	312	532	460	594	381	655	296
	85	618	572	686	493	753	407	592	558	658	479	724	393	565	541	628	463	691	378	536	518	595	447	655	363
	90	629	625	686	559	754	473	606	606	659	545	724	459	583	583	629	529	692	445	558	558	596	512	656	429
15000	75	654	496	722	393	786	283	625	481	692	378	754	269	594	464	659	363	718	254	561	447	623	346	680	238
	80	656	577	723	476	786	366	628	562	693	461	754	352	598	545	660	445	719	337	565	527	624	428	680	321
	85	664	647	724	558	786	449	639	628	694	543	754	435	611	608	661	528	719	420	582	582	625	510	680	404
	90	691	691	726	639	786	531	667	667	696	624	754	517	641	641	664	608	719	502	613	613	629	590	681	486
18000	75	681	547	747	422	807	290	651	530	716	408	773	276	619	513	681	392	736	261	584	495	643	375	696	245
	80	686	643	748	521	807	389	657	627	716	506	773	376	625	601	682	491	736	360	593	578	644	474	696	344
	85	705	705	749	618	807	489	679	679	718	603	774	475	651	651	684	587	737	459	621	621	647	568	696	443
	90	738	738	753	714	807	588	712	712	723	690	774	573	683	683	691	668	737	558	652	652	656	644	696	540
21000	75	702	594	765	450	822	297	671	576	732	435	786	283	637	559	696	419	746	268	601	540	657	402	705	252
	80	711	691	765	565	822	413	682	670	732	551	786	399	651	648	697	532	747	384	617	617	658	515	705	368
	85	740	740	767	675	823	529	713	713	735	660	786	514	683	683	700	643	747	499	650	650	662	626	705	483
	90	772	772	777	762	824	642	744	744	745	745	787	626	713	713	713	713	748	610	679	679	679	679	705	594
24000	75	718	639	777	477	834	304	686	622	744	463	795	290	652	605	707	447	753	275	615	586	667	430	711	259
	80	733	733	778	606	835	437	704	704	744	591	796	422	673	673	708	574	754	406	640	640	668	554	712	391
	85	766	766	781	733	837	570	737	737	749	714	797	554	706	706	713	684	754	535	671	671	676	659	712	518
	90	798	798	799	799	839	698	767	767	768	768	798	678	734	734	734	734	755	660	697	697	698	698	713	643
27000	75	731	684	787	504	844	311	699	667	753	490	801	297	664	640	716	474	762	282	627	612	675	453	714	267
	80	753	753	788	648	846	461	724	724	754	629	804	445	692	692	717	612	763	430	657	657	677	594	716	414
	85	786	786	793	766	848	606	756	756	761	744	805	589	723	723	726	721	763	572	687	687	687	687	717	555
	90	820	820	821	821	851	749	786	786	787	787	809	732	749	749	750	750	764	713	710	710	711	711	718	685

Notes:

1. All capacities shown are gross and have not considered indoor fan heat. To obtain net cooling subtract indoor fan heat.
2. CAP = Total Gross Capacity, SHC = Sensible Heat Capacity.

Table 29. Gross cooling capacities — 70 ton – standard efficiency (60 Hz)

CFM	Ent DB (°F)	Ambient Temperature (°F)																							
		85						95						105						115					
		Entering Wet Bulb (°F)						Entering Wet Bulb (°F)						Entering Wet Bulb (°F)						Entering Wet Bulb (°F)					
		61		67		73		61		67		73		61		67		73		61		67		73	
		CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC
14000	75	684	501	761	406	839	303	653	484	728	389	802	287	620	466	691	371	762	269	584	447	652	352	719	251
	80	685	580	762	484	839	383	654	562	729	468	803	366	621	544	692	450	763	349	586	525	653	431	720	330
	85	689	656	763	563	839	462	659	639	729	546	803	446	627	621	693	528	764	428	594	593	654	509	721	409
	90	708	708	764	641	840	541	682	682	731	625	804	524	655	655	695	607	764	507	625	625	656	588	721	488
17200	75	721	559	798	440	871	313	688	542	762	423	832	296	651	523	722	404	789	279	613	503	680	385	743	260
	80	724	655	799	537	871	411	691	635	763	519	833	394	656	616	724	501	790	376	618	595	681	481	744	357
	85	734	734	799	633	872	507	706	706	764	616	833	491	675	675	725	597	791	473	643	643	683	578	745	454
	90	771	771	803	726	872	604	742	742	768	708	834	588	711	711	730	689	791	570	677	677	689	669	745	551
20400	75	748	615	823	472	893	321	713	597	785	454	852	305	675	575	744	436	807	287	634	552	699	416	759	268
	80	754	724	824	586	893	437	720	706	786	569	852	420	683	683	745	550	808	402	645	645	700	531	760	383
	85	780	780	825	701	893	552	750	750	788	679	853	535	717	717	748	659	808	517	681	681	704	639	760	498
	90	818	818	832	809	893	666	787	787	795	791	853	649	753	753	756	756	809	631	715	715	716	716	761	613
23600	75	769	663	841	502	908	329	732	644	802	485	866	312	693	624	759	466	820	295	651	602	713	446	771	276
	80	779	779	842	635	908	462	745	745	803	617	866	446	710	710	760	599	820	428	673	673	714	576	771	409
	85	816	816	845	760	908	595	784	784	807	742	866	578	748	748	765	723	820	560	710	710	720	702	771	541
	90	854	854	855	855	908	727	821	821	822	822	867	711	784	784	784	784	821	693	743	743	744	744	772	665
26800	75	785	713	855	532	920	337	748	694	815	515	877	320	708	674	771	496	830	302	665	652	724	476	779	283
	80	804	804	856	683	920	488	771	771	816	665	877	471	735	735	772	638	830	453	695	695	726	617	779	434
	85	844	844	860	823	920	638	810	810	821	805	877	622	772	772	779	779	830	604	732	732	734	734	779	585
	90	881	881	882	882	920	780	846	846	847	847	877	762	806	806	807	807	830	743	763	763	764	764	780	722
30000	75	799	763	865	562	928	344	761	744	824	545	885	328	720	720	780	526	837	310	677	677	732	506	785	291
	80	826	826	867	721	929	513	792	792	826	703	885	496	754	754	782	683	837	478	713	713	734	661	786	459
	85	866	866	873	873	929	682	831	831	831	831	885	665	791	791	792	792	837	647	749	749	749	749	786	622
	90	903	903	903	903	930	838	865	865	866	866	885	819	824	824	824	824	838	800	779	779	779	779	787	779

Notes:

1. All capacities shown are gross and have not considered indoor fan heat. To obtain net cooling subtract indoor fan heat.
2. CAP = Total Gross Capacity, SHC = Sensible Heat Capacity.

Table 30. Gross cooling capacities— 70 ton – high efficiency and high capacity (60 Hz)

CFM	Ent DB (°F)	Ambient Temperature (°F)																							
		85						95						105						115					
		Entering Wet Bulb (°F)						Entering Wet Bulb (°F)						Entering Wet Bulb (°F)						Entering Wet Bulb (°F)					
		61		67		73		61		67		73		61		67		73		61		67		73	
		CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC
14000	75	717	518	803	424	895	326	685	499	767	406	855	307	650	480	728	386	814	289	612	460	687	366	769	269
	80	718	596	804	503	895	405	686	578	768	485	856	387	651	558	730	465	815	369	614	538	689	445	771	349
	85	720	673	805	582	896	484	688	655	769	563	857	466	653	635	731	544	816	448	618	613	690	524	772	428
	90	735	735	806	660	897	563	709	709	770	642	858	545	681	681	732	622	817	527	650	650	692	603	773	507
17200	75	760	577	847	460	937	338	724	558	807	441	895	320	685	538	765	422	851	301	644	517	722	401	802	281
	80	762	674	848	557	938	435	726	654	809	538	896	417	688	632	767	518	852	399	648	611	723	498	804	379
	85	770	763	849	654	939	532	737	737	810	635	898	515	706	706	769	615	854	496	672	672	725	595	806	476
	90	807	807	852	750	940	629	777	777	813	731	899	611	745	745	772	709	855	593	711	711	729	689	808	573
20400	75	791	634	878	494	966	348	752	614	836	475	923	330	712	593	792	455	875	311	668	570	746	434	825	291
	80	795	745	879	609	968	463	758	725	838	589	924	445	718	702	794	569	878	426	676	676	748	549	828	406
	85	821	821	881	723	969	578	789	789	840	704	926	561	754	754	797	683	880	542	718	718	751	660	830	522
	90	865	865	886	835	970	693	832	832	846	815	927	676	797	797	805	790	881	657	760	760	763	763	831	637
23600	75	814	687	901	526	988	357	775	667	857	506	942	339	732	643	812	486	894	320	688	620	764	465	841	299
	80	823	812	902	658	989	490	787	787	859	639	945	472	749	749	814	619	897	453	711	711	767	598	845	433
	85	865	865	906	789	990	623	830	830	863	767	946	606	794	794	820	747	898	587	755	755	773	725	846	567
	90	911	911	917	909	992	756	876	876	878	878	948	739	839	839	841	841	900	720	799	799	801	801	849	697
26800	75	834	737	918	557	1004	365	793	716	874	537	958	347	749	694	827	517	907	328	704	671	778	496	853	308
	80	853	853	920	707	1006	517	818	818	876	688	960	499	780	780	830	666	911	480	740	740	781	641	857	460
	85	902	902	926	852	1007	668	865	865	883	832	961	650	827	827	838	812	912	631	786	786	792	781	859	611
	90	949	949	950	950	1009	816	912	912	914	914	963	798	873	873	874	874	915	775	830	830	832	832	863	754
30000	75	850	788	932	587	1017	374	808	767	887	568	970	356	764	744	839	548	918	336	718	713	789	526	863	316
	80	882	882	935	753	1018	543	845	845	890	730	972	525	806	806	844	709	921	506	764	764	794	687	867	486
	85	932	932	943	917	1019	712	894	894	901	888	973	694	854	854	858	858	923	675	811	811	812	812	869	651
	90	980	980	981	981	1022	873	942	942	943	943	976	855	900	900	902	902	927	835	855	855	857	857	874	813

Notes:

1. All capacities shown are gross and have not considered indoor fan heat. To obtain net cooling subtract indoor fan heat.
2. CAP = Total Gross Capacity, SHC = Sensible Heat Capacity.

Table 31. Gross cooling capacities — 70 ton eFlex™ variable speed – high capacity (60 Hz)

CFM	Ent DB (°F)	Ambient Temperature (°F)																							
		85						95						105						115					
		Entering Wet Bulb (°F)						Entering Wet Bulb (°F)						Entering Wet Bulb (°F)						Entering Wet Bulb (°F)					
		61		67		73		61		67		73		61		67		73		61		67		73	
		CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC
14000	75	713	517	797	424	886	324	681	499	763	406	848	306	647	480	726	387	807	288	611	461	687	368	763	269
	80	713	596	798	502	887	403	681	577	763	484	849	386	647	557	727	466	808	367	612	538	688	447	764	348
	85	715	660	799	581	887	483	686	638	764	563	849	465	656	615	727	545	809	447	624	591	689	525	765	427
	90	734	717	799	659	888	561	706	695	765	640	850	544	678	678	729	622	810	526	649	649	690	602	766	506
17200	75	755	577	840	459	925	335	719	558	803	441	883	317	683	537	762	422	838	298	645	517	720	402	790	278
	80	757	672	841	556	926	432	720	649	804	538	885	414	686	621	764	519	840	396	650	595	721	499	793	376
	85	772	736	842	653	927	529	740	712	805	635	886	512	706	687	765	614	841	493	671	662	723	594	794	473
	90	802	802	844	747	927	626	773	773	806	720	886	608	742	742	770	694	842	590	709	709	732	667	795	570
20400	75	786	631	870	492	950	343	749	612	830	474	906	325	710	592	787	454	858	306	669	571	742	434	808	286
	80	792	726	871	607	951	459	758	701	831	588	908	441	722	675	789	569	861	422	684	647	744	546	811	402
	85	816	805	874	720	952	574	785	785	834	701	909	556	752	752	792	681	862	537	716	716	746	653	855	533
	90	859	859	884	809	953	689	827	827	847	783	910	671	793	793	808	757	863	649	756	756	767	727	872	629
23600	75	809	685	891	524	967	351	771	665	850	505	921	333	731	645	805	485	872	314	688	611	758	464	821	294
	80	825	777	893	656	970	485	789	751	852	635	923	466	751	725	808	615	875	447	711	697	761	594	823	427
	85	859	859	897	786	971	618	826	826	855	756	924	599	790	790	815	729	875	580	752	752	771	699	824	560
	90	904	904	917	868	973	748	869	869	878	842	926	729	832	832	837	814	877	709	791	791	817	794	827	689
26800	75	828	737	907	554	982	359	788	704	864	535	933	340	749	676	819	515	883	321	707	645	770	494	830	301
	80	852	827	909	701	984	511	815	802	867	682	936	492	777	777	822	662	885	472	737	737	774	640	832	452
	85	894	894	918	828	986	662	859	859	878	801	937	643	820	820	836	771	886	623	779	779	790	741	832	599
	90	938	938	942	926	989	809	901	901	903	903	940	790	861	861	862	862	890	769	818	818	819	819	837	747
30000	75	846	766	919	583	993	367	807	737	875	565	943	348	767	709	829	545	891	328	724	678	779	519	836	308
	80	876	876	923	748	997	537	840	840	879	728	946	517	801	801	833	708	893	498	760	760	784	684	839	477
	85	923	923	937	870	998	706	885	885	897	842	948	682	844	844	852	813	895	662	801	801	805	783	840	641
	90	965	965	966	966	1003	870	926	926	927	927	953	850	883	883	884	884	902	808	837	837	837	837	851	774

Notes:

1. All capacities shown are gross and have not considered indoor fan heat. To obtain net cooling subtract indoor fan heat.
2. CAP = Total Gross Capacity, SHC = Sensible Heat Capacity.

Table 32. Gross cooling capacities — 75 ton – standard efficiency (60 Hz)

CFM	Ent DB (°F)	Ambient Temperature (°F)																							
		85						95						105						115					
		Entering Wet Bulb (°F)						Entering Wet Bulb (°F)						Entering Wet Bulb (°F)						Entering Wet Bulb (°F)					
		61		67		73		61		67		73		61		67		73		61		67		73	
		CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC
15000	75	711	528	790	424	866	312	679	510	755	406	829	296	643	491	717	388	788	278	606	471	675	368	743	259
	80	713	612	790	508	866	398	681	595	756	491	829	381	646	573	718	473	788	364	609	553	677	453	744	345
	85	719	695	791	593	866	483	688	677	757	576	830	466	655	652	719	557	789	449	621	621	678	538	745	430
	90	744	744	793	677	867	567	717	717	759	660	830	551	688	688	722	642	790	533	656	656	682	619	745	514
18000	75	744	581	821	455	893	321	709	563	784	438	854	304	672	544	744	419	811	286	631	523	700	399	764	267
	80	748	680	821	557	893	423	714	661	785	539	854	407	678	642	745	520	811	389	638	621	701	500	765	370
	85	762	762	823	658	893	525	733	733	787	641	855	508	701	701	747	622	812	491	667	667	704	598	765	472
	90	799	799	827	756	893	626	770	770	791	738	855	610	738	738	752	719	812	592	702	702	710	698	766	573
21000	75	768	633	843	485	912	328	732	611	804	467	872	312	693	591	763	448	827	294	651	569	717	428	779	275
	80	775	747	843	603	912	447	741	728	805	585	872	431	703	703	764	567	827	413	664	664	718	547	779	394
	85	804	804	846	717	912	566	773	773	808	699	872	549	739	739	767	679	827	532	702	702	723	659	779	513
	90	842	842	852	833	912	684	810	810	816	814	872	668	775	775	778	778	828	650	737	737	738	738	780	631
24000	75	787	678	859	513	925	336	751	659	820	496	884	319	711	638	777	477	839	302	667	616	730	457	790	283
	80	798	798	859	648	925	471	765	765	821	631	884	455	729	729	778	612	839	437	691	691	732	586	790	418
	85	837	837	863	776	925	607	804	804	825	758	884	590	768	768	783	739	839	572	729	729	738	718	790	554
	90	874	874	875	875	925	742	841	841	842	842	884	722	804	804	805	805	839	700	763	763	764	764	790	680
27000	75	803	725	872	541	936	343	765	706	832	524	892	327	725	685	788	505	848	309	681	663	740	485	797	290
	80	823	823	872	690	936	495	789	789	833	669	893	479	753	753	789	649	848	461	713	713	742	627	798	442
	85	863	863	877	836	937	647	829	829	839	817	893	631	791	791	797	795	848	613	750	750	751	751	798	594
	90	900	900	901	901	937	791	864	864	865	865	894	773	825	825	826	826	848	754	782	782	783	783	798	733
30000	75	816	772	882	569	943	350	778	753	841	552	897	334	737	732	796	533	851	316	693	693	748	513	804	298
	80	844	844	883	729	945	519	810	810	843	710	898	503	772	772	799	690	852	485	730	730	751	669	804	466
	85	884	884	890	890	946	688	848	848	851	851	900	672	809	809	810	810	853	644	766	766	767	767	804	623
	90	919	919	920	920	948	846	883	883	883	883	901	827	841	841	842	842	854	807	796	796	797	797	804	787

Notes:

1. All capacities shown are gross and have not considered indoor fan heat. To obtain net cooling subtract indoor fan heat.
2. CAP = Total Gross Capacity, SHC = Sensible Heat Capacity.

Table 33. Gross cooling capacities— 75 ton – high efficiency and high capacity (60 Hz)

CFM	Ent DB (°F)	Ambient Temperature (°F)																							
		85						95						105						115					
		Entering Wet Bulb (°F)						Entering Wet Bulb (°F)						Entering Wet Bulb (°F)						Entering Wet Bulb (°F)					
		61		67		73		61		67		73		61		67		73		61		67		73	
		CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC
15000	75	736	540	824	439	917	332	703	521	787	420	876	314	666	502	746	401	833	296	628	481	704	380	787	276
	80	738	624	825	524	917	418	704	606	788	505	877	400	668	586	748	486	834	381	630	565	706	465	789	362
	85	741	707	826	608	918	503	708	689	789	590	878	485	673	666	749	570	836	467	639	639	707	550	790	447
	90	764	764	827	693	919	588	737	737	790	674	878	570	707	707	751	655	837	552	675	675	709	635	791	532
18000	75	773	595	861	472	953	343	736	576	821	453	910	325	697	556	778	433	864	306	655	534	734	413	815	286
	80	776	696	863	574	954	446	739	675	823	555	911	428	701	655	780	535	866	409	660	633	736	515	818	389
	85	786	786	864	676	955	548	756	756	824	657	913	530	723	723	782	637	868	511	689	689	738	616	819	491
	90	828	828	867	776	956	650	797	797	828	756	914	632	764	764	786	736	869	613	729	729	743	715	821	593
21000	75	800	648	889	503	979	352	762	628	846	484	934	334	720	606	802	464	886	315	677	584	755	443	835	295
	80	806	763	890	622	980	472	768	743	848	603	936	454	729	717	804	583	889	435	688	688	757	562	838	415
	85	835	835	893	741	981	591	802	802	851	722	938	573	767	767	807	698	891	554	731	731	761	677	840	534
	90	880	880	898	856	983	710	846	846	857	835	939	692	811	811	817	808	893	673	773	773	775	775	842	654
24000	75	822	698	910	533	998	361	782	675	866	514	953	343	740	654	820	494	903	324	695	631	772	473	850	303
	80	833	824	911	669	1000	498	795	795	868	649	955	480	758	758	823	630	906	461	720	720	774	609	854	440
	85	876	876	915	801	1001	634	841	841	872	781	957	616	804	804	828	760	908	597	765	765	781	738	856	577
	90	923	923	927	924	1003	769	887	887	889	889	958	752	850	850	852	852	910	733	810	810	811	811	859	710
27000	75	840	745	926	562	1014	369	799	724	881	543	967	351	755	702	835	523	916	332	710	679	784	502	861	311
	80	861	861	928	715	1016	523	825	825	884	696	970	505	787	787	838	673	920	485	747	747	788	648	866	465
	85	910	910	934	862	1017	676	873	873	891	842	971	658	835	835	846	821	921	639	794	794	799	790	868	619
	90	958	958	960	960	1019	826	921	921	923	923	973	808	882	882	883	883	924	785	839	839	840	840	872	764
30000	75	856	793	939	591	1026	377	814	771	894	572	978	359	769	748	846	551	926	340	725	718	795	530	871	319
	80	889	889	942	758	1028	547	851	851	897	735	981	529	812	812	850	714	930	510	770	770	800	691	875	490
	85	939	939	950	923	1029	717	901	901	908	894	982	699	861	861	864	864	931	680	818	818	819	819	877	656
	90	988	988	989	989	1032	880	950	950	951	951	986	861	908	908	910	910	936	841	863	863	864	864	883	819

Notes:

1. All capacities shown are gross and have not considered indoor fan heat. To obtain net cooling subtract indoor fan heat.
2. CAP = Total Gross Capacity, SHC = Sensible Heat Capacity.

Table 34. Gross cooling capacities — 75 ton eFlex™ variable speed – high capacity (60 Hz)

CFM	Ent DB (°F)	Ambient Temperature (°F)																							
		85						95						105						115					
		Entering Wet Bulb (°F)						Entering Wet Bulb (°F)						Entering Wet Bulb (°F)						Entering Wet Bulb (°F)					
		61		67		73		61		67		73		61		67		73		61		67		73	
		CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC	CAP	SHC
15000	75	759	555	846	453	936	344	727	537	811	435	897	327	692	519	773	417	857	309	656	499	733	398	813	291
	80	760	639	847	537	936	429	728	621	812	520	898	412	694	603	774	501	857	395	657	584	734	483	814	376
	85	763	722	848	621	936	514	731	704	813	604	898	497	698	678	775	586	858	480	665	654	736	567	815	461
	90	783	783	849	705	937	598	756	756	814	688	899	582	728	728	777	670	859	564	698	698	737	651	815	546
18000	75	797	610	884	485	970	353	762	591	845	467	929	336	724	572	805	449	885	318	685	552	763	430	838	300
	80	799	710	885	587	970	455	764	691	847	569	930	438	727	671	807	550	886	421	689	651	764	531	840	402
	85	805	805	886	688	971	557	777	777	848	670	930	540	746	746	808	652	887	523	713	713	766	633	841	504
	90	847	847	888	789	971	658	817	817	851	770	931	642	786	786	811	750	888	624	753	753	770	731	841	605
21000	75	825	662	910	515	993	361	788	643	871	497	950	344	748	624	829	479	905	326	707	602	784	459	855	307
	80	829	777	912	634	993	480	793	758	872	616	951	463	754	729	830	597	906	445	717	703	786	578	857	426
	85	854	854	914	752	994	598	823	823	874	734	952	581	790	790	833	714	907	564	755	755	789	692	857	545
	90	898	898	918	866	994	716	866	866	878	841	952	700	832	832	841	816	907	682	796	796	800	789	858	663
24000	75	846	713	931	544	1009	368	808	692	889	526	966	351	768	670	846	508	919	333	725	649	800	488	868	314
	80	855	831	932	680	1010	503	819	806	891	662	966	487	782	782	848	643	920	469	746	746	802	624	869	450
	85	895	895	935	811	1009	639	861	861	895	792	966	622	826	826	852	773	920	604	789	789	807	753	869	585
	90	939	939	945	925	1010	774	905	905	906	906	967	757	869	869	870	870	920	739	829	829	831	831	870	720
27000	75	864	758	946	573	1021	375	825	738	904	555	977	358	784	718	860	536	929	340	740	696	812	516	878	321
	80	881	881	948	725	1022	527	847	847	906	707	977	510	811	811	862	688	929	492	773	773	814	663	878	473
	85	927	927	952	871	1022	679	893	893	911	852	977	662	856	856	868	833	930	644	816	816	823	797	878	625
	90	971	971	973	973	1022	831	936	936	937	937	977	812	897	897	898	898	930	789	854	854	855	855	878	769
30000	75	880	805	958	601	1029	382	839	785	915	583	985	365	798	765	870	564	937	347	754	736	821	544	884	328
	80	908	908	960	770	1031	550	872	872	918	746	986	533	835	835	873	726	937	516	795	795	825	705	884	497
	85	954	954	967	931	1031	719	918	918	926	897	986	702	880	880	884	870	937	684	837	837	838	838	884	666
	90	997	997	998	998	1033	881	959	959	960	960	986	863	918	918	919	919	937	843	872	872	873	873	885	823

Notes:

1. All capacities shown are gross and have not considered indoor fan heat. To obtain net cooling subtract indoor fan heat.
2. CAP = Total Gross Capacity, SHC = Sensible Heat Capacity.

Heating Capacities

Table 35. Electric heat kW ranges

Tons	Nominal Voltage			
	200	230	460	575
20	22.5-45-67.5	30-60-90	30-60-90	30-60-90
25	22.5-45-67.5	30-60-90	30-60-90	30-60-90
30	22.5-45-67.5	30-60-90	30-60-90	30-60-90
40	45-67.5-84	60-90-112	60-90-120-150	60-90-120-150
50	45-67.5-84	60-90-112	60-90-120-150	60-90-120-150
55	45-67.5-84	60-90-112	60-90-120-150	60-90-120-150
60	67.5-84	90-112	90-120-187	90-120-190
70	67.5-84	90-112	90-120-187	90-120-190
75	67.5-84	90-112	90-120-187	90-120-190

Notes:

1. Actual limits may be + or - the values shown; to accurately calculate capacities, contact the local Trane Sales Office or utilize TOPSS.
2. Follow the supply CFM ranges posted in the General Data for each case size.

Table 36. Electric heat air temperature rise (°F)

kW Input	Total MBh	CFM									
		4000	6000	9000	12000	15000	18000	21000	24000	27000	30000
30	102.5	23.6	15.7	10.5	7.9						
60	204.9	47.2	31.5	21.0	15.7	12.6	10.5	9.0			
90	307.4		47.2	31.5	23.6	18.9	15.7	13.5	11.8	10.5	9.4
120	409.8			41.9	31.5	25.2	21.0	18.0	15.7	14.0	12.6
150	512.3			52.4	39.3	31.5	26.2	22.5	19.7		
190	648.9				49.8	39.8	33.2	28.5	24.9	22.1	19.9

Notes:

1. Air temperature rise = kW x 3415 ÷ (scfm x 1.085).
2. See Electrical Data for electrical sizing information.
3. 200 and 230 volt electric heat rooftops require dual power supplies to the control box. All other rooftops have single power connections.

Table 37. Natural gas heating capacities

Tons	Gas Heat Modules	Heat Input (MBh)	Heat Output (MBh)	Air Temperature Rise (°F) vs. Unit CFM									
				CFM									
				4000	5000	6000	6250	7000	8000	9000	10000	10625	11000
20	LOW	250	203	46.7	37.3	31.1	29.9	26.7	23.3	20.7			
	MEDIUM	350	284			43.5	41.8	37.3	32.7	29.0			
	HIGH	500	405				59.7	53.3	46.7	41.5			
25	LOW	250	203		37.3	31.1	29.9	26.7	23.3	20.7	18.7	17.6	17.0
	MEDIUM	350	284			43.5	41.8	37.3	32.7	29.0	26.1	24.6	23.8
	HIGH	500	405				59.7	53.3	46.7	41.5	37.3	35.1	33.9
30	LOW	250	203			31.1	29.9	26.7	23.3	20.7	18.7	17.6	17.0
	MEDIUM	350	284			43.5	41.8	37.3	32.7	29.0	26.1	24.6	23.8
	HIGH	500	405				59.7	53.3	46.7	41.5	37.3	35.1	33.9
40	LOW	350	284						32.7	29.0	26.1	24.6	23.8
	MEDIUM	500	405						46.7	41.5	37.3	35.1	33.9
	HIGH	850	689									59.7	57.7
50	LOW	350	284								26.1	24.6	23.8
	MEDIUM	500	405								37.3	35.1	33.9
	HIGH	850	689									59.7	57.7
55	LOW	350	284										23.8
	MEDIUM	500	405										33.9
	HIGH	850	689										57.7
60	LOW	500	405										
	MEDIUM	850	689										
	HIGH	1200	972										
70	LOW	500	405										
	MEDIUM	850	689										
	HIGH	1200	972										
75	LOW	500	405										
	MEDIUM	850	689										
	HIGH	1200	972										

Table 37. Natural gas heating capacities (continued)

Tons	Gas Heat Modules	Heat Input (MBh)	Heat Output (MBh)	Air Temperature Rise vs. Unit CFM									
				CFM									
				11250	12000	13500	14000	15000	18000	22500	24000	27000	30000
20	LOW	250	203										
	MEDIUM	350	284										
	HIGH	500	405										
25	LOW	250	203	16.6									
	MEDIUM	350	284	23.2									
	HIGH	500	405	33.2									
30	LOW	250	203	16.6	15.6								
	MEDIUM	350	284	23.2	21.8	19.4	18.7						
	HIGH	500	405	33.2	31.1	27.6	26.7						
40	LOW	350	284	23.2	21.8	19.4	18.7	17.4	14.5				
	MEDIUM	500	405	33.2	31.1	27.6	26.7	24.9	20.7				
	HIGH	850	689	56.4	52.9	47.0	45.3	42.3	35.3				
50	LOW	350	284	23.2	21.8	19.4	18.7	17.4	14.5				
	MEDIUM	500	405	33.2	31.1	27.6	26.7	24.9	20.7	16.6			
	HIGH	850	689	56.4	52.9	47.0	45.3	42.3	35.3	28.2			
55	LOW	350	284	23.2	21.8	19.4	18.7	17.4	14.5				
	MEDIUM	500	405	33.2	31.1	27.6	26.7	24.9	20.7	16.6	15.6		
	HIGH	850	689	56.4	52.9	47.0	45.3	42.3	35.3	28.2	26.4		
60	LOW	500	405		31.1	27.6	26.7	24.9	20.7	16.6	15.6		
	MEDIUM	850	689		52.9	47.0	45.3	42.3	35.3	28.2	26.4	23.5	
	HIGH	1200	972				64.0	60.0	50.0	40.0	38.0	33.0	30.0
70	LOW	500	405				26.7	24.9	20.7	16.6	15.6		
	MEDIUM	850	689				45.3	42.3	35.3	28.2	26.4	23.5	21.2
	HIGH	1200	972				64.0	60.0	50.0	40.0	38.0	33.0	30.0
75	LOW	500	405				26.7	24.9	20.7	16.6	15.6		
	MEDIUM	850	689				45.3	42.3	35.3	28.2	26.4	23.5	21.2
	HIGH	1200	972				64.0	60.0	50.0	40.0	38.0	33.0	30.0

Notes:

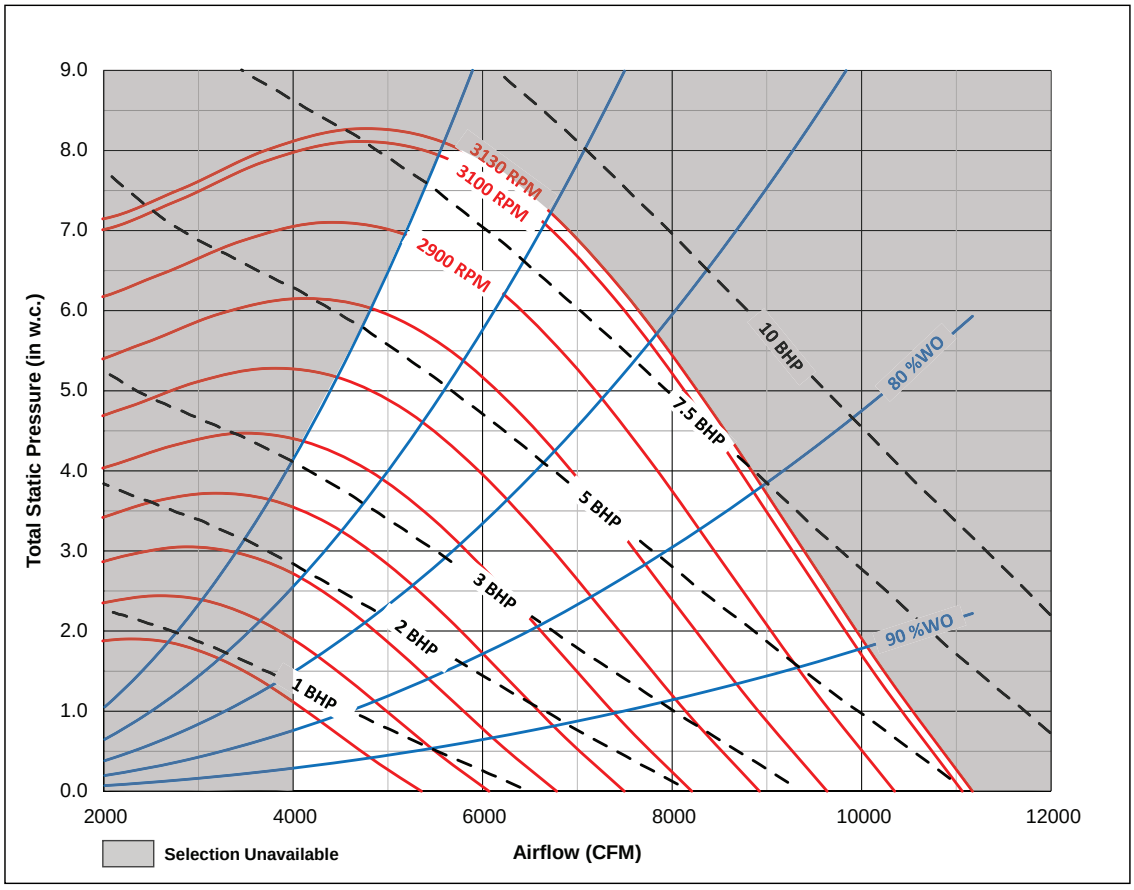
1. Actual limits may be + or - the values shown; to accurately calculate capacities, contact the local Trane Sales Office or utilize TOPSS.
2. Follow the supply CFM ranges posted in the General Data for each case size.
3. All heaters are 81% efficient.
4. CFM values below the minimum and above the maximum shown in this table are not cULus approved.
5. Air temperature rise = heat output (Btu) ÷ (CFM x 1.085).

Fan Performance

Supply Fan Curves

See notes below for all supply fan curves. For additional information or support, contact your local Trane sales office or Trane representative.

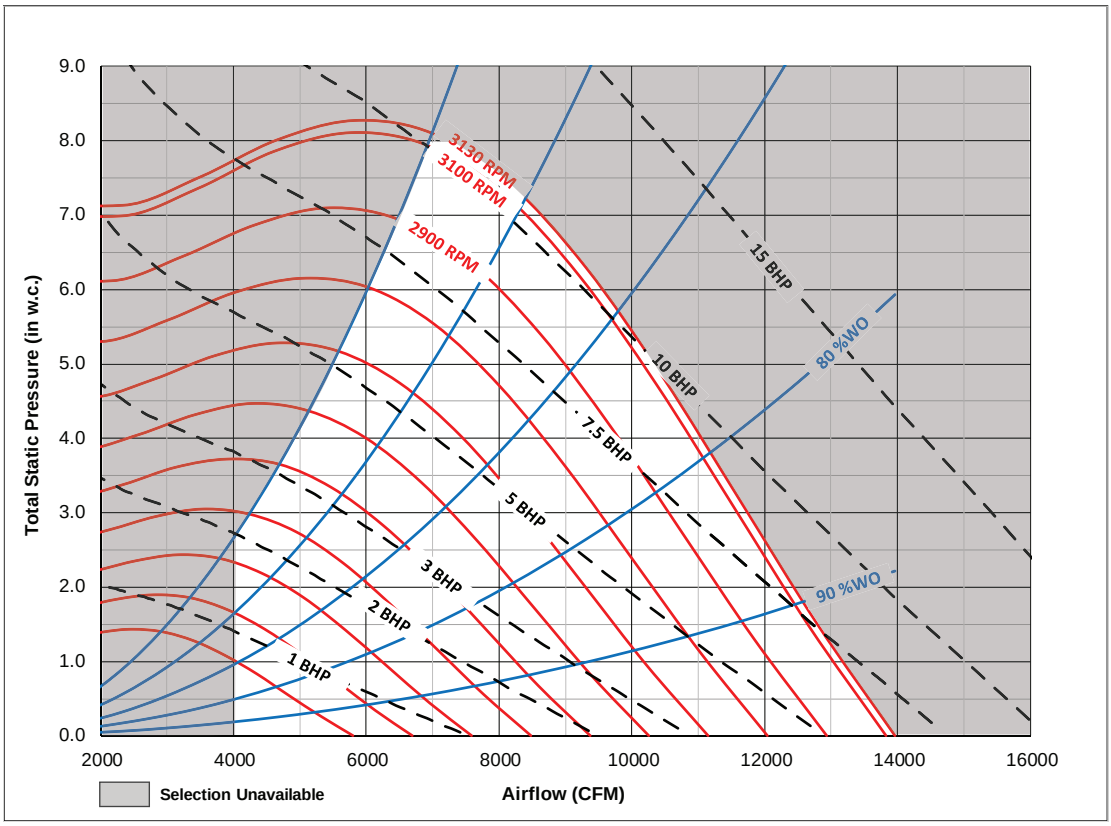
Figure 10. 20, 25 and 30 ton, 16.5 inch - 9 Blade - 80% width supply fan



Important:

1. *Supply fan performance curve includes internal resistance of rooftop. For total static pressure determination, system external static must be added to appropriate component (evaporator coil, filters, etc.) static pressure drops.*
2. *Static pressure drops from the supply fan to the space (optional heat + curb + supply ESP) cannot exceed 4.0 in w.c.*
3. *Curve can show combined operating min/max for multiple tonnages. Refer to general data for appropriate operating parameters such as motor horsepower and airflow ranges.*
4. *Shaded areas represent unavailable selections. Contact your local Trane® representative for more information on selections in these shaded regions.*
5. *Max RPM is indicated on curve and RPM values are in increments of 200 RPM unless otherwise shown.*
6. *Catalog curves represent fan data corrected to the following standard conditions: 70°F dry bulb temperature, barometric pressure of 14.696 psia, and an air density of 0.075 lb/ft^3. Utilize Trane® Select Assist™ to generate fan curves for unit-specific operating temperatures and elevations*

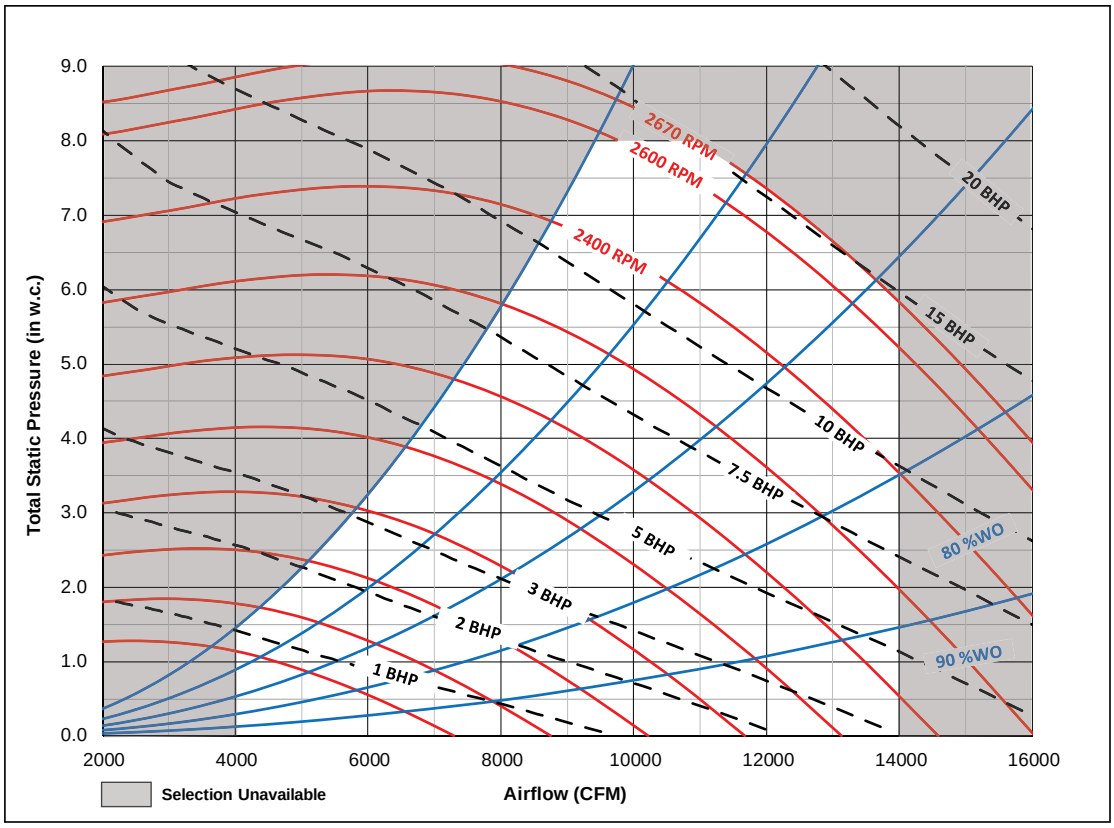
Figure 11. 20, 25 and 30 ton, 16.5 inches - 9 blade - 100% width supply fan



Important:

1. *Supply fan performance curve includes internal resistance of rooftop. For total static pressure determination, system external static must be added to appropriate component (evaporator coil, filters, etc.) static pressure drops.*
2. *Static pressure drops from the supply fan to the space (optional heat + curb + supply ESP) cannot exceed 4.0 in w.c.*
3. *Curve can show combined operating min/max for multiple tonnages. Refer to general data for appropriate operating parameters such as motor horsepower and airflow ranges.*
4. *Shaded areas represent unavailable selections. Contact your local Trane® representative for more information on selections in these shaded regions.*
5. *Max RPM is indicated on curve and RPM values are in increments of 200 RPM unless otherwise shown.*
6. *Catalog curves represent fan data corrected to the following standard conditions: 70°F dry bulb temperature, barometric pressure of 14.696 psia, and an air density of 0.075 lb/ft^3. Utilize Trane® Select Assist™ to generate fan curves for unit-specific operating temperatures and elevations*

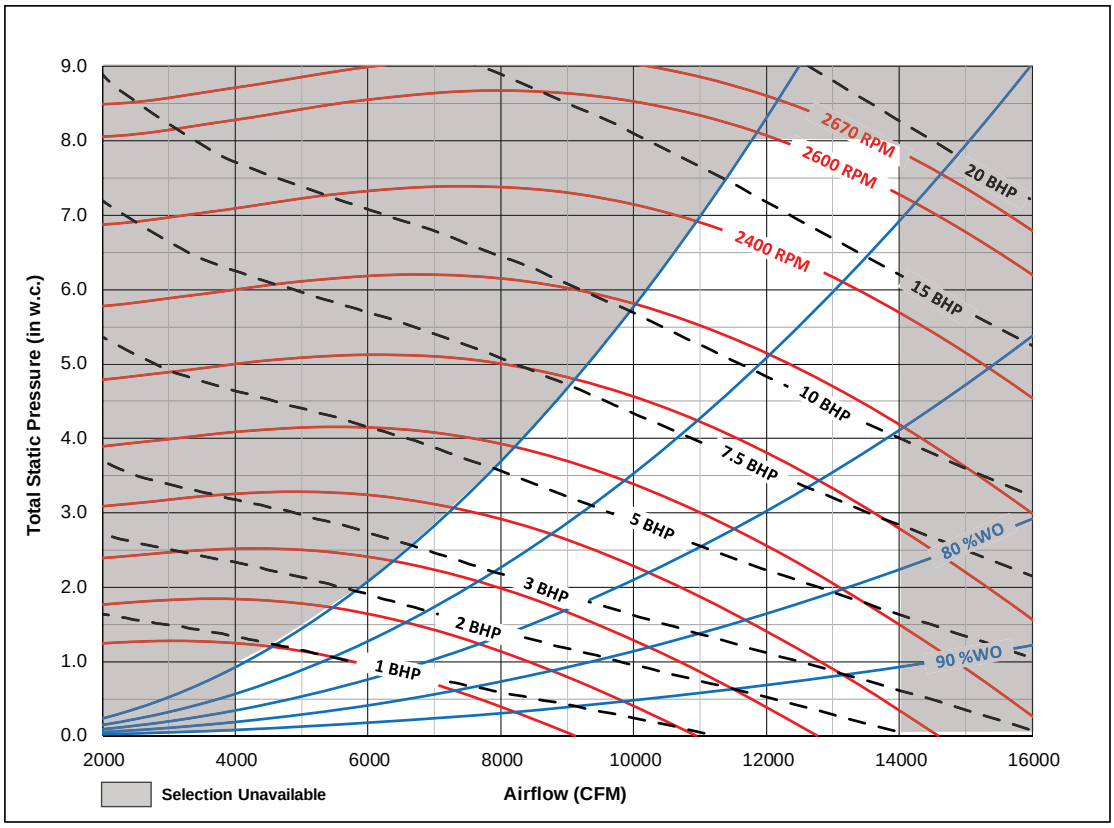
Figure 12. 20, 25 and 30 ton, 20.0 inch - 9 blade - 80% width supply fan



Important:

1. *Supply fan performance curve includes internal resistance of rooftop. For total static pressure determination, system external static must be added to appropriate component (evaporator coil, filters, etc.) static pressure drops.*
2. *Static pressure drops from the supply fan to the space (optional heat + curb + supply ESP) cannot exceed 4.0 in w.c.*
3. *Curve can show combined operating min/max for multiple tonnages. Refer to general data for appropriate operating parameters such as motor horsepower and airflow ranges.*
4. *Shaded areas represent unavailable selections. Contact your local Trane® representative for more information on selections in these shaded regions.*
5. *Max RPM is indicated on curve and RPM values are in increments of 200 RPM unless otherwise shown.*
6. *Catalog curves represent fan data corrected to the following standard conditions: 70°F dry bulb temperature, barometric pressure of 14.696 psia, and an air density of 0.075 lb/ft^3. Utilize Trane® Select Assist™ to generate fan curves for unit-specific operating temperatures and elevations*

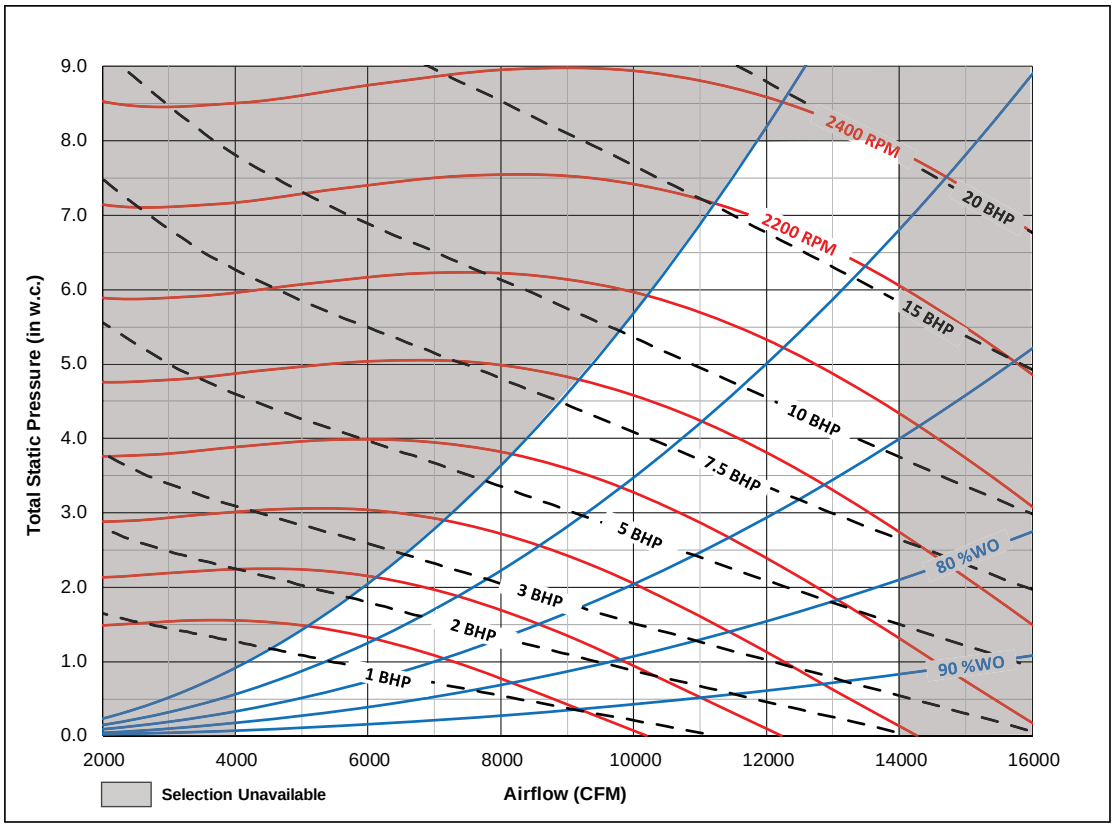
Figure 13. 20, 25 and 30 ton, 20.0 inch - 9 blade - 100% width supply fan



Important:

1. *Supply fan performance curve includes internal resistance of rooftop. For total static pressure determination, system external static must be added to appropriate component (evaporator coil, filters, etc.) static pressure drops.*
2. *Static pressure drops from the supply fan to the space (optional heat + curb + supply ESP) cannot exceed 4.0 in w.c.*
3. *Curve can show combined operating min/max for multiple tonnages. Refer to general data for appropriate operating parameters such as motor horsepower and airflow ranges.*
4. *Shaded areas represent unavailable selections. Contact your local Trane® representative for more information on selections in these shaded regions.*
5. *Max RPM is indicated on curve and RPM values are in increments of 200 RPM unless otherwise shown.*
6. *Catalog curves represent fan data corrected to the following standard conditions: 70°F dry bulb temperature, barometric pressure of 14.696 psia, and an air density of 0.075 lb/ft^3. Utilize Trane® Select Assist™ to generate fan curves for unit-specific operating temperatures and elevations*

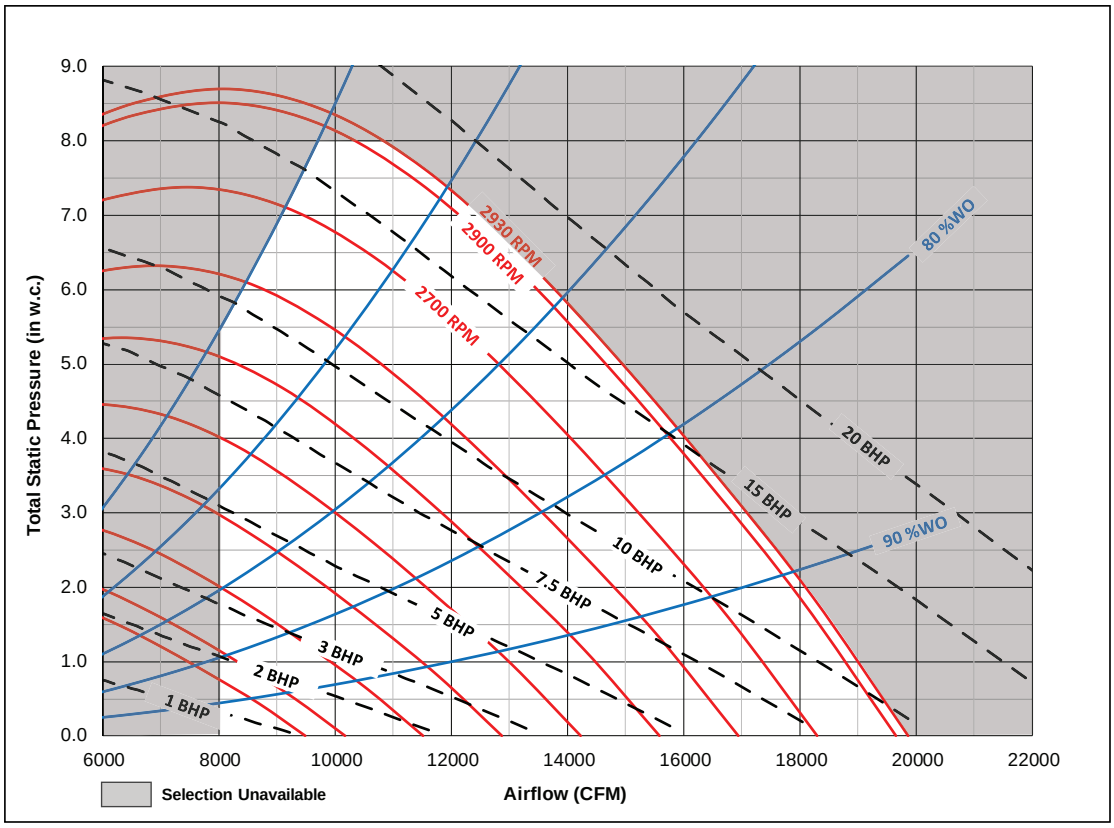
Figure 14. 20, 25 and 30 ton, 22.2 inch - 9 blade - 80% width supply fan



Important:

1. *Supply fan performance curve includes internal resistance of rooftop. For total static pressure determination, system external static must be added to appropriate component (evaporator coil, filters, etc.) static pressure drops.*
2. *Static pressure drops from the supply fan to the space (optional heat + curb + supply ESP) cannot exceed 4.0 in w.c.*
3. *Curve can show combined operating min/max for multiple tonnages. Refer to general data for appropriate operating parameters such as motor horsepower and airflow ranges.*
4. *Shaded areas represent unavailable selections. Contact your local Trane® representative for more information on selections in these shaded regions.*
5. *Max RPM is indicated on curve and RPM values are in increments of 200 RPM unless otherwise shown.*
6. *Catalog curves represent fan data corrected to the following standard conditions: 70°F dry bulb temperature, barometric pressure of 14.696 psia, and an air density of 0.075 lb/ft^3. Utilize Trane® Select Assist™ to generate fan curves for unit-specific operating temperatures and elevations*

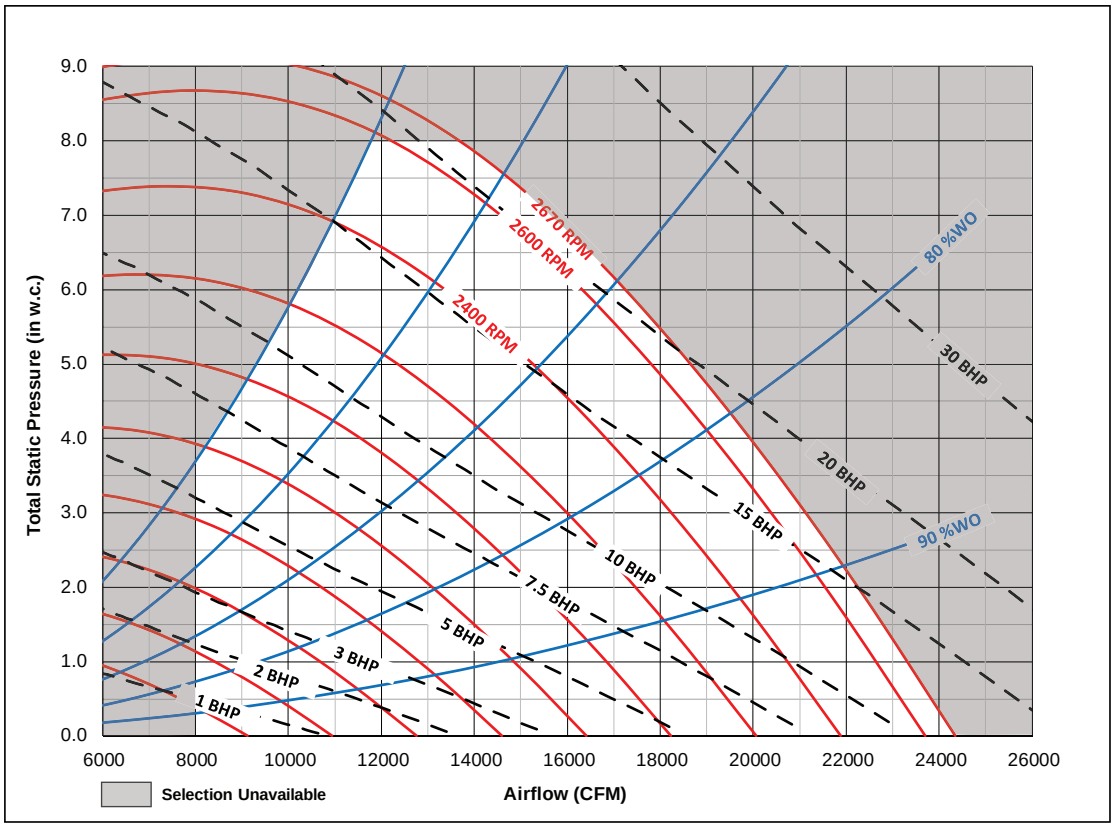
Figure 15. 40, 50 and 55 ton, 18.2 inch - 9 blade - 100% width supply fan



Important:

1. *Supply fan performance curve includes internal resistance of rooftop. For total static pressure determination, system external static must be added to appropriate component (evaporator coil, filters, etc.) static pressure drops.*
2. *Static pressure drops from the supply fan to the space (optional heat + curb + supply ESP) cannot exceed 4.0 in w.c.*
3. *Curve can show combined operating min/max for multiple tonnages. Refer to general data for appropriate operating parameters such as motor horsepower and airflow ranges.*
4. *Shaded areas represent unavailable selections. Contact your local Trane® representative for more information on selections in these shaded regions.*
5. *Max RPM is indicated on curve and RPM values are in increments of 200 RPM unless otherwise shown.*
6. *Catalog curves represent fan data corrected to the following standard conditions: 70°F dry bulb temperature, barometric pressure of 14.696 psia, and an air density of 0.075 lb/ft^3. Utilize Trane® Select Assist™ to generate fan curves for unit-specific operating temperatures and elevations*

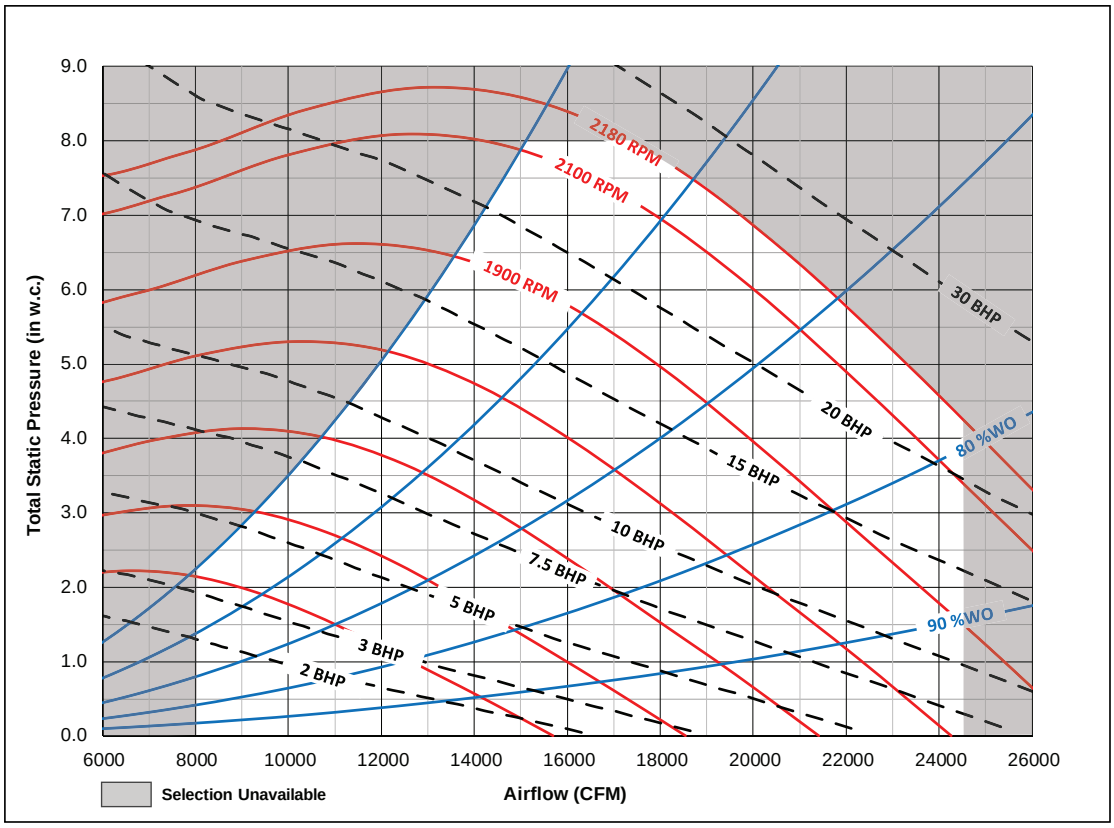
Figure 16. 40, 50 and 55 ton, 20.0 inch - 9 blade - 100% width supply fan



Important:

1. *Supply fan performance curve includes internal resistance of rooftop. For total static pressure determination, system external static must be added to appropriate component (evaporator coil, filters, etc.) static pressure drops.*
2. *Static pressure drops from the supply fan to the space (optional heat + curb + supply ESP) cannot exceed 4.0 in w.c.*
3. *Curve can show combined operating min/max for multiple tonnages. Refer to general data for appropriate operating parameters such as motor horsepower and airflow ranges.*
4. *Shaded areas represent unavailable selections. Contact your local Trane® representative for more information on selections in these shaded regions.*
5. *Max RPM is indicated on curve and RPM values are in increments of 200 RPM unless otherwise shown.*
6. *Catalog curves represent fan data corrected to the following standard conditions: 70°F dry bulb temperature, barometric pressure of 14.696 psia, and an air density of 0.075 lb/ft^3. Utilize Trane® Select Assist™ to generate fan curves for unit-specific operating temperatures and elevations*

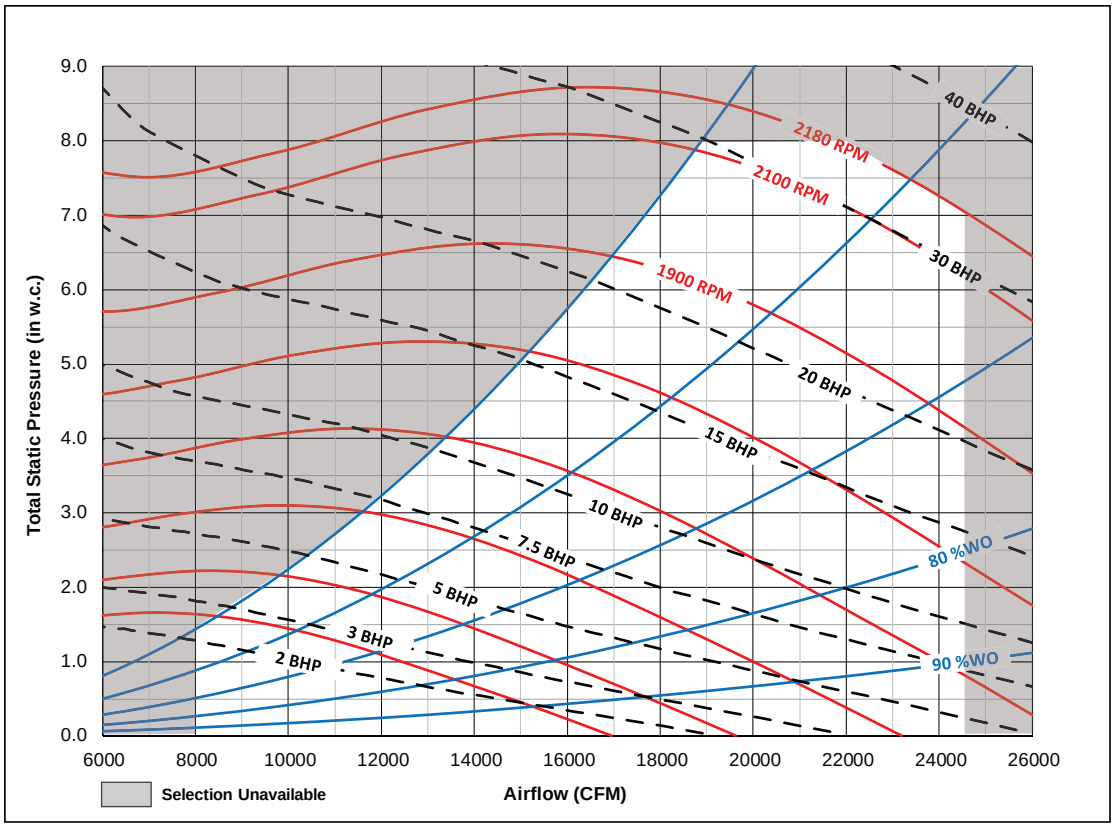
Figure 17. 40, 50 and 55 ton, 24.5 inch - 9 blade - 80% width supply fan



Important:

1. *Supply fan performance curve includes internal resistance of rooftop. For total static pressure determination, system external static must be added to appropriate component (evaporator coil, filters, etc.) static pressure drops.*
2. *Static pressure drops from the supply fan to the space (optional heat + curb + supply ESP) cannot exceed 4.0 in w.c.*
3. *Curve can show combined operating min/max for multiple tonnages. Refer to general data for appropriate operating parameters such as motor horsepower and airflow ranges.*
4. *Shaded areas represent unavailable selections. Contact your local Trane® representative for more information on selections in these shaded regions.*
5. *Max RPM is indicated on curve and RPM values are in increments of 200 RPM unless otherwise shown.*
6. *Catalog curves represent fan data corrected to the following standard conditions: 70°F dry bulb temperature, barometric pressure of 14.696 psia, and an air density of 0.075 lb/ft^3. Utilize Trane® Select Assist™ to generate fan curves for unit-specific operating temperatures and elevations*

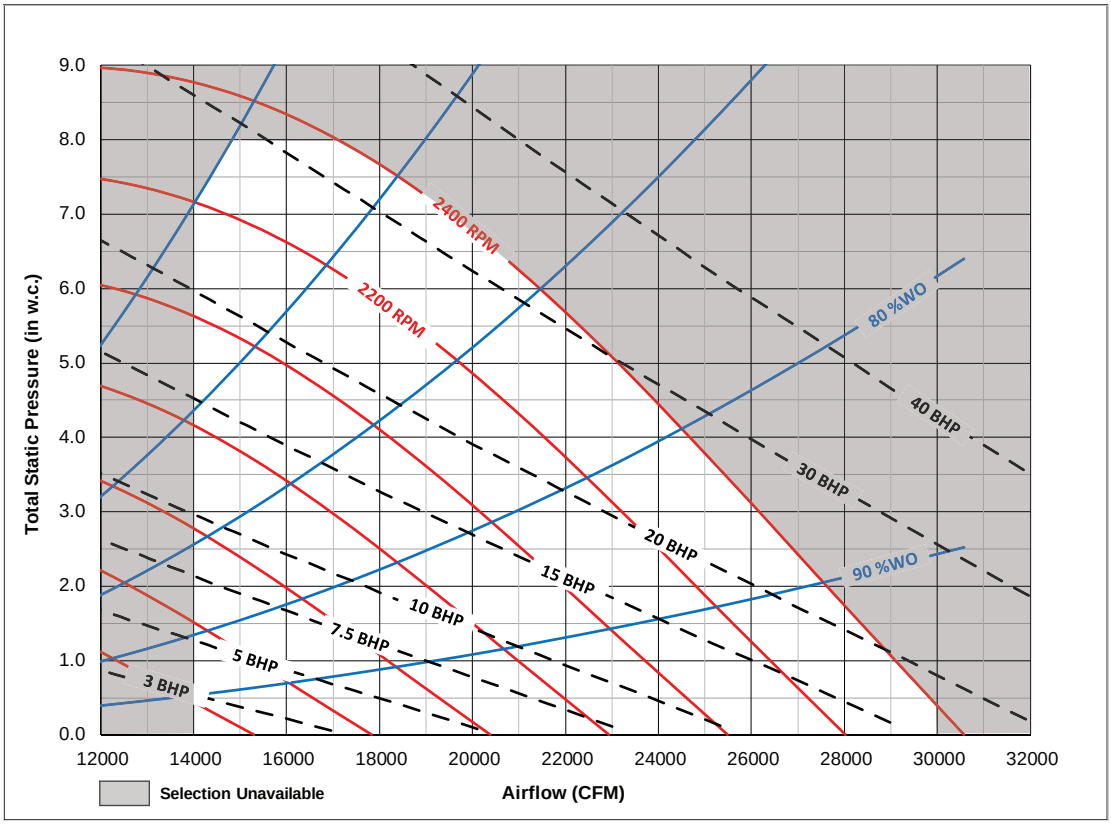
Figure 18. 40, 50 and 55 ton, 24.5 inch - 9 blade - 100% width supply fan



Important:

1. *Supply fan performance curve includes internal resistance of rooftop. For total static pressure determination, system external static must be added to appropriate component (evaporator coil, filters, etc.) static pressure drops.*
2. *Static pressure drops from the supply fan to the space (optional heat + curb + supply ESP) cannot exceed 4.0 in w.c.*
3. *Curve can show combined operating min/max for multiple tonnages. Refer to general data for appropriate operating parameters such as motor horsepower and airflow ranges.*
4. *Shaded areas represent unavailable selections. Contact your local Trane® representative for more information on selections in these shaded regions.*
5. *Max RPM is indicated on curve and RPM values are in increments of 200 RPM unless otherwise shown.*
6. *Catalog curves represent fan data corrected to the following standard conditions: 70°F dry bulb temperature, barometric pressure of 14.696 psia, and an air density of 0.075 lb/ft^3. Utilize Trane® Select Assist™ to generate fan curves for unit-specific operating temperatures and elevations*

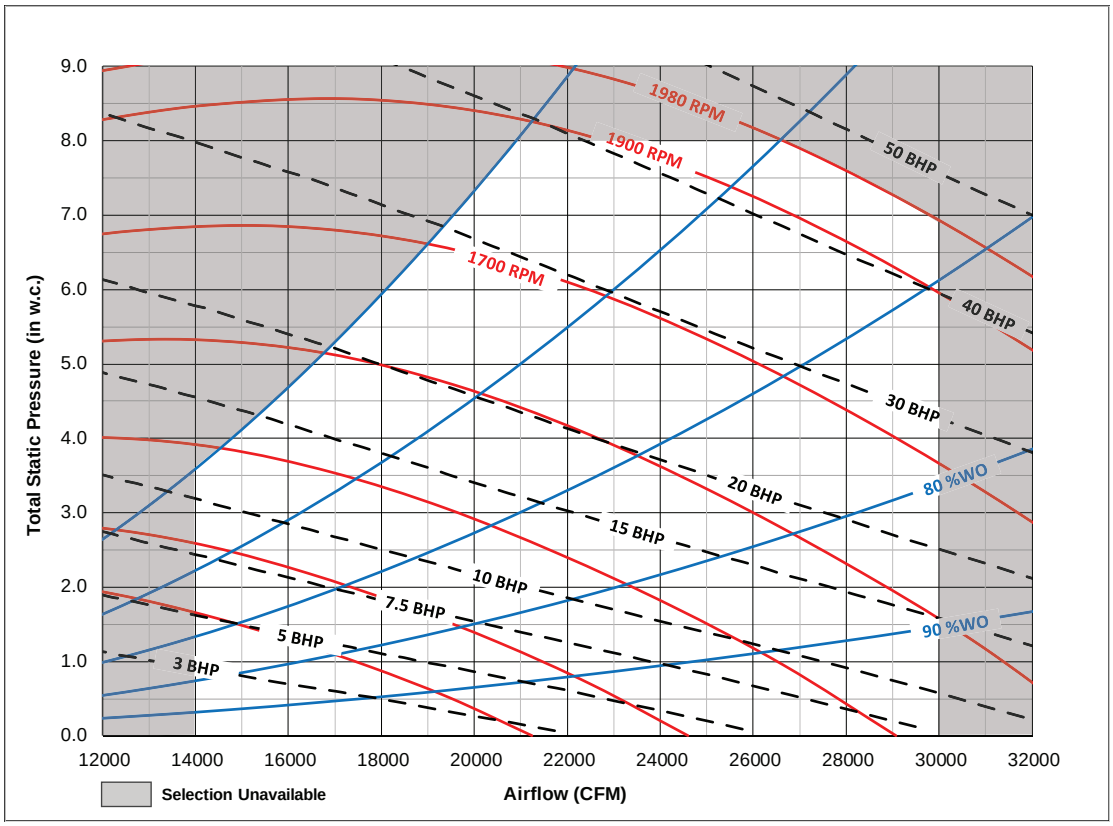
Figure 19. 60, 70 and 75 ton, 22.2 inch - 9 blade - 100% width supply fan



Important:

1. *Supply fan performance curve includes internal resistance of rooftop. For total static pressure determination, system external static must be added to appropriate component (evaporator coil, filters, etc.) static pressure drops.*
2. *Static pressure drops from the supply fan to the space (optional heat + curb + supply ESP) cannot exceed 4.0 in w.c.*
3. *Curve can show combined operating min/max for multiple tonnages. Refer to general data for appropriate operating parameters such as motor horsepower and airflow ranges.*
4. *Shaded areas represent unavailable selections. Contact your local Trane® representative for more information on selections in these shaded regions.*
5. *Max RPM is indicated on curve and RPM values are in increments of 200 RPM unless otherwise shown.*
6. *Catalog curves represent fan data corrected to the following standard conditions: 70°F dry bulb temperature, barometric pressure of 14.696 psia, and an air density of 0.075 lb/ft^3. Utilize Trane® Select Assist™ to generate fan curves for unit-specific operating temperatures and elevations*

Figure 20. 60 and 75 ton, 27.0 inch - 9 blade - 100% width supply fan



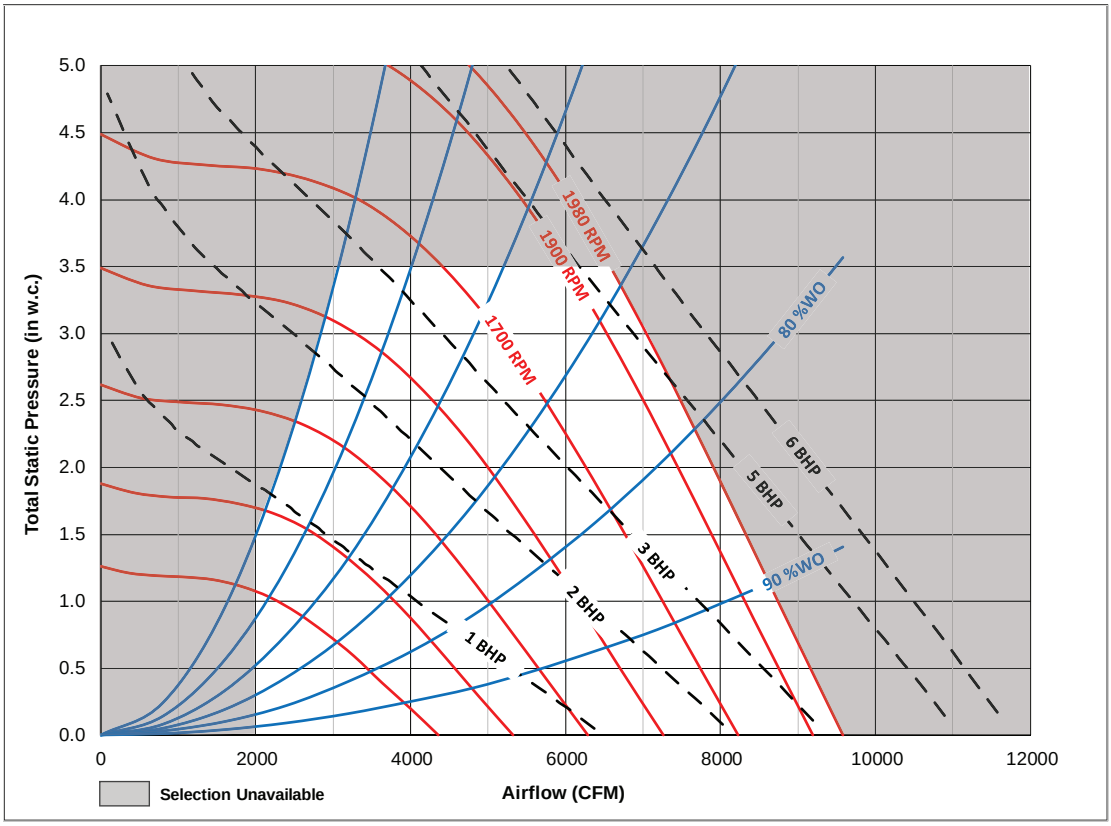
Important:

1. *Supply fan performance curve includes internal resistance of rooftop. For total static pressure determination, system external static must be added to appropriate component (evaporator coil, filters, etc.) static pressure drops.*
2. *Static pressure drops from the supply fan to the space (optional heat + curb + supply ESP) cannot exceed 4.0 in w.c.*
3. *Curve can show combined operating min/max for multiple tonnages. Refer to general data for appropriate operating parameters such as motor horsepower and airflow ranges.*
4. *Shaded areas represent unavailable selections. Contact your local Trane® representative for more information on selections in these shaded regions.*
5. *Max RPM is indicated on curve and RPM values are in increments of 200 RPM unless otherwise shown.*
6. *Catalog curves represent fan data corrected to the following standard conditions: 70°F dry bulb temperature, barometric pressure of 14.696 psia, and an air density of 0.075 lb/ft^3. Utilize Trane® Select Assist™ to generate fan curves for unit-specific operating temperatures and elevations*

Relief Fan Curves

Please see notes below for all supply fan curves. For additional information or support, contact your local Trane sales office or Trane representative.

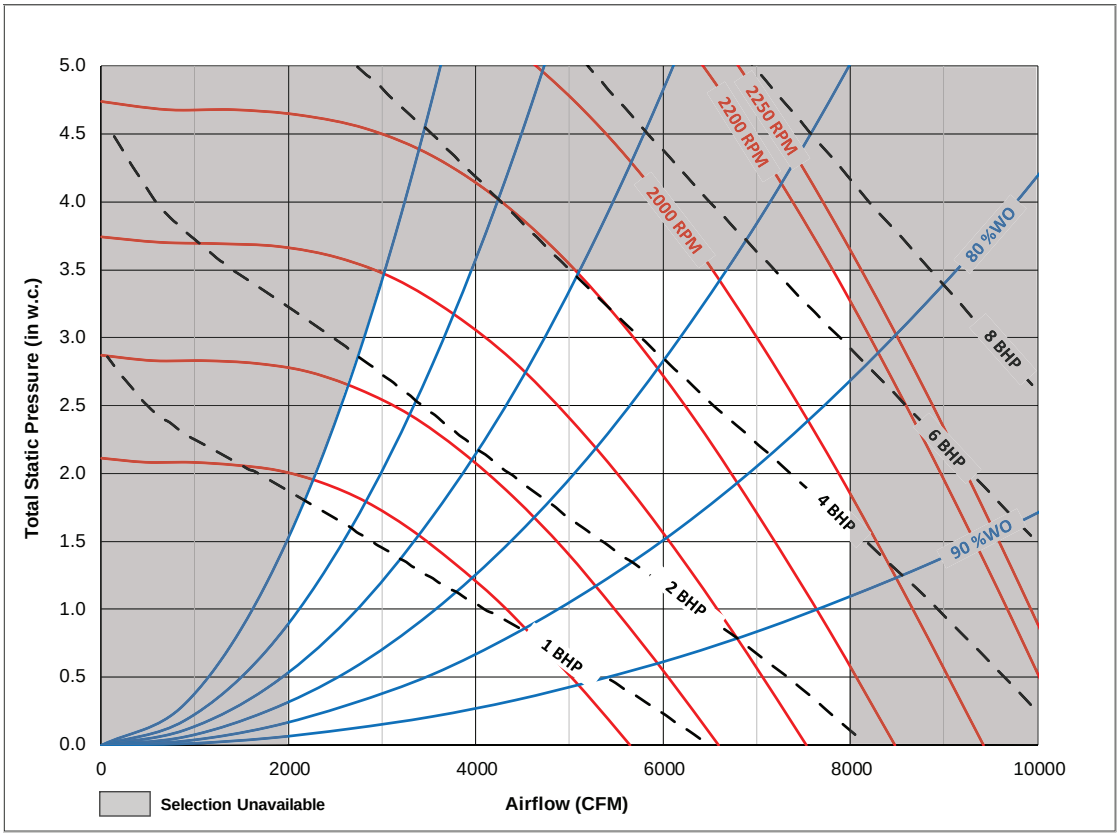
Figure 21. 20 to 25 ton, 6 hp relief fan, single fan



Important:

- *Relief fan performance curve includes internal resistance of rooftop. For total static pressure determination, add together return ESP and relief damper pressure drop.*
- *Static pressure drops from the space to the relief fan (relief damper + return ESP) cannot exceed 3.5 in w.c.*
- *Curve can show combined operating min/max for multiple tonnages. Refer to general data for appropriate operating parameters such as motor horsepower and airflow ranges.*
- *Shaded areas represent unavailable selections. Contact your local Trane® representative for more information on selections in these shaded regions.*
- *EC motors are not offered in integral horsepower increments. Fans will be offered with a nominal motor power rated to cover the operating envelope of the fan. Power limitation is indicated by the highest power shown on the curve.*
- *Max RPM is indicated on curve and RPM values are in increments of 200 RPM unless otherwise shown.*
- *Catalog curves represent fan data corrected to the following standard conditions: 70°F dry bulb temperature, barometric pressure of 14.696 psia, and an air density of 0.075 lb/ft^3. Utilize Trane Select Assist™ to generate fan curves for unit-specific operating temperatures and elevations.*

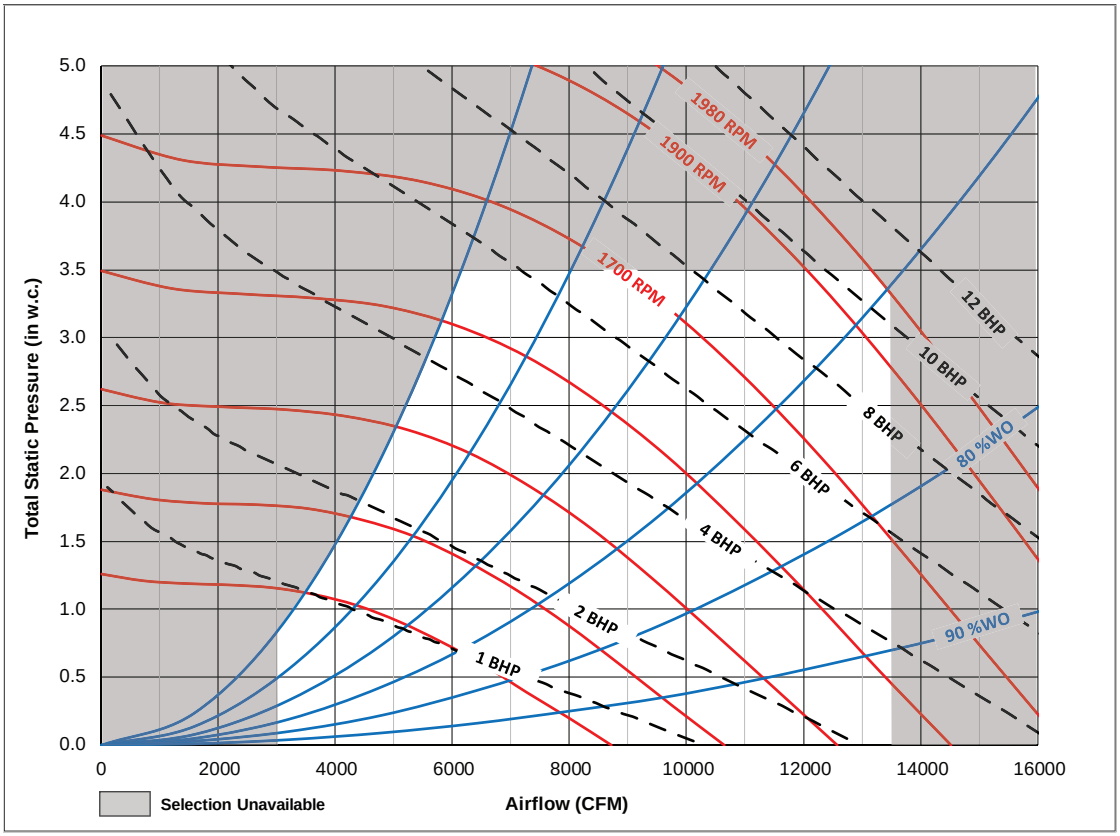
Figure 22. 20 ton, 8 hp relief fan, single fan



Important:

- *Relief fan performance curve includes internal resistance of rooftop. For total static pressure determination, add together return ESP and relief damper pressure drop.*
- *Static pressure drops from the space to the relief fan (relief damper + return ESP) cannot exceed 3.5 in w.c.*
- *Curve can show combined operating min/max for multiple tonnages. Refer to general data for appropriate operating parameters such as motor horsepower and airflow ranges.*
- *Shaded areas represent unavailable selections. Contact your local Trane® representative for more information on selections in these shaded regions.*
- *EC motors are not offered in integral horsepower increments. Fans will be offered with a nominal motor power rated to cover the operating envelope of the fan. Power limitation is indicated by the highest power shown on the curve.*
- *Max RPM is indicated on curve and RPM values are in increments of 200 RPM unless otherwise shown.*
- *Catalog curves represent fan data corrected to the following standard conditions: 70°F dry bulb temperature, barometric pressure of 14.696 psia, and an air density of 0.075 lb/ft^3. Utilize Trane Select Assist™ to generate fan curves for unit-specific operating temperatures and elevations.*

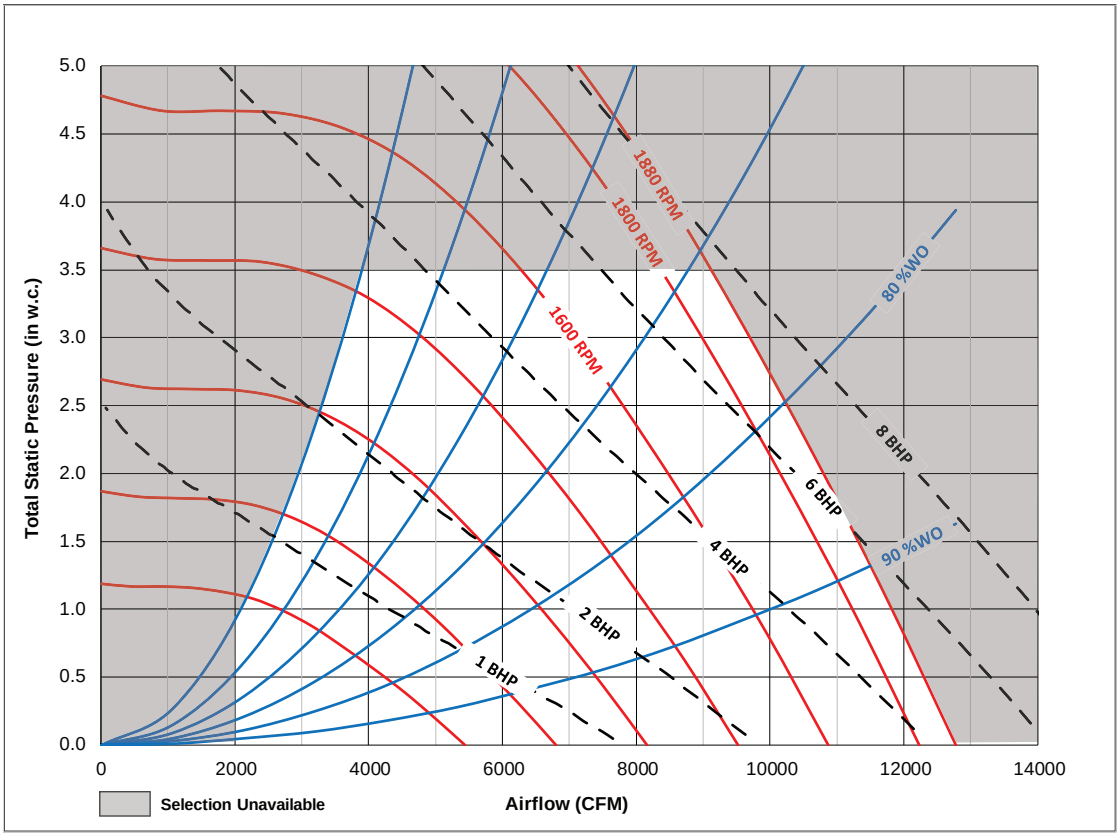
Figure 23. 30 ton, 12 hp relief fan, two-fan array



Important:

- *Relief fan performance curve includes internal resistance of rooftop. For total static pressure determination, add together return ESP and relief damper pressure drop.*
- *Static pressure drops from the space to the relief fan (relief damper + return ESP) cannot exceed 3.5 in w.c.*
- *Curve can show combined operating min/max for multiple tonnages. Refer to general data for appropriate operating parameters such as motor horsepower and airflow ranges.*
- *Shaded areas represent unavailable selections. Contact your local Trane® representative for more information on selections in these shaded regions.*
- *EC motors are not offered in integral horsepower increments. Fans will be offered with a nominal motor power rated to cover the operating envelope of the fan. Power limitation is indicated by the highest power shown on the curve.*
- *Max RPM is indicated on curve and RPM values are in increments of 200 RPM unless otherwise shown.*
- *Catalog curves represent fan data corrected to the following standard conditions: 70°F dry bulb temperature, barometric pressure of 14.696 psia, and an air density of 0.075 lb/ft^3. Utilize Trane Select Assist™ to generate fan curves for unit-specific operating temperatures and elevations.*

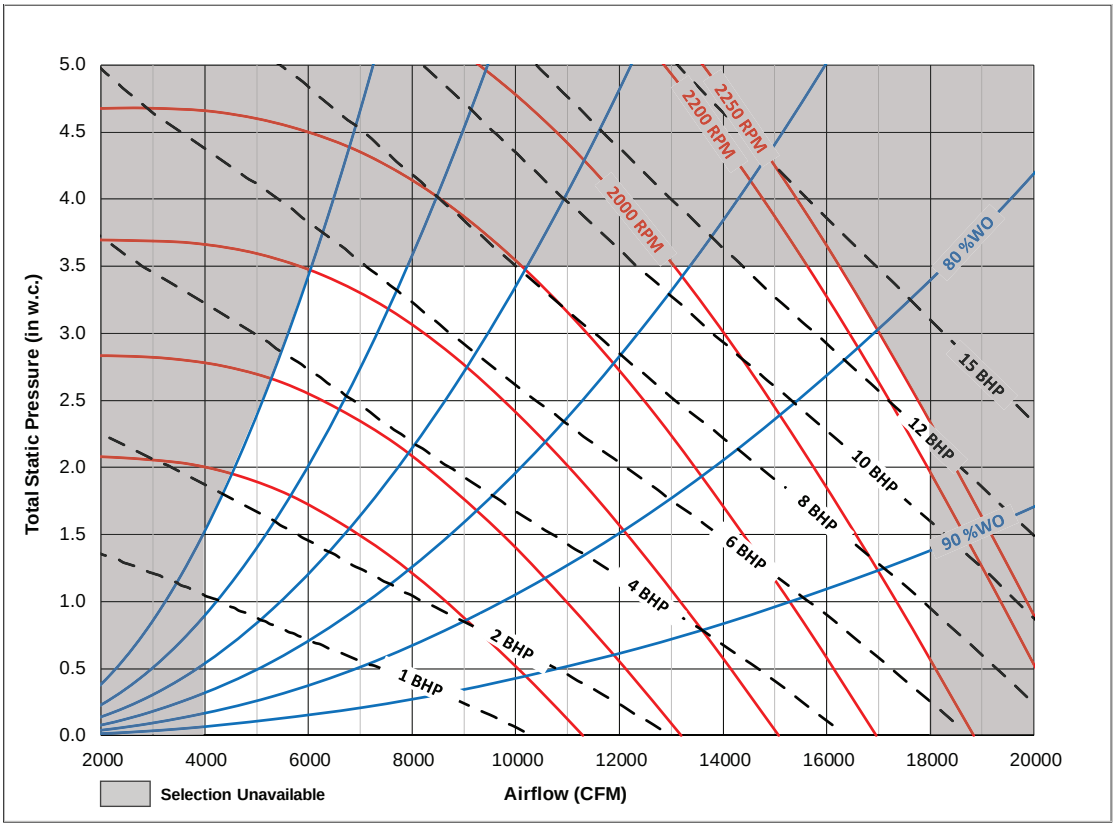
Figure 24. 25, 30 and 40 ton, 8 hp relief fan, single fan



Important:

- *Relief fan performance curve includes internal resistance of rooftop. For total static pressure determination, add together return ESP and relief damper pressure drop.*
- *Static pressure drops from the space to the relief fan (relief damper + return ESP) cannot exceed 3.5 in w.c.*
- *Curve can show combined operating min/max for multiple tonnages. Refer to general data for appropriate operating parameters such as motor horsepower and airflow ranges.*
- *Shaded areas represent unavailable selections. Contact your local Trane® representative for more information on selections in these shaded regions.*
- *EC motors are not offered in integral horsepower increments. Fans will be offered with a nominal motor power rated to cover the operating envelope of the fan. Power limitation is indicated by the highest power shown on the curve.*
- *Max RPM is indicated on curve and RPM values are in increments of 200 RPM unless otherwise shown.*
- *Catalog curves represent fan data corrected to the following standard conditions: 70°F dry bulb temperature, barometric pressure of 14.696 psia, and an air density of 0.075 lb/ft^3. Utilize Trane Select Assist™ to generate fan curves for unit-specific operating temperatures and elevations.*

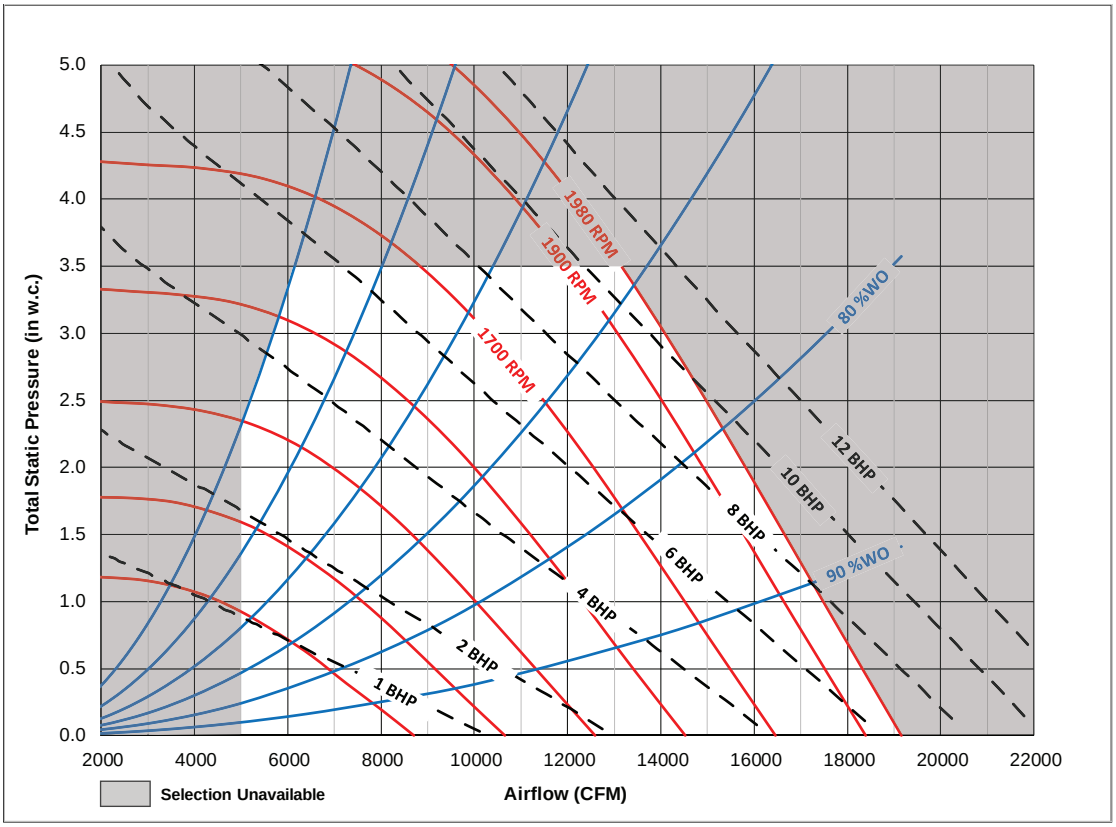
Figure 25. 40 ton, 15 hp relief fan, two-fan array



Important:

- *Relief fan performance curve includes internal resistance of rooftop. For total static pressure determination, add together return ESP and relief damper pressure drop.*
- *Static pressure drops from the space to the relief fan (relief damper + return ESP) cannot exceed 3.5 in w.c.*
- *Curve can show combined operating min/max for multiple tonnages. Refer to general data for appropriate operating parameters such as motor horsepower and airflow ranges.*
- *Shaded areas represent unavailable selections. Contact your local Trane® representative for more information on selections in these shaded regions.*
- *EC motors are not offered in integral horsepower increments. Fans will be offered with a nominal motor power rated to cover the operating envelope of the fan. Power limitation is indicated by the highest power shown on the curve.*
- *Max RPM is indicated on curve and RPM values are in increments of 200 RPM unless otherwise shown.*
- *Catalog curves represent fan data corrected to the following standard conditions: 70°F dry bulb temperature, barometric pressure of 14.696 psia, and an air density of 0.075 lb/ft^3. Utilize Trane Select Assist™ to generate fan curves for unit-specific operating temperatures and elevations.*

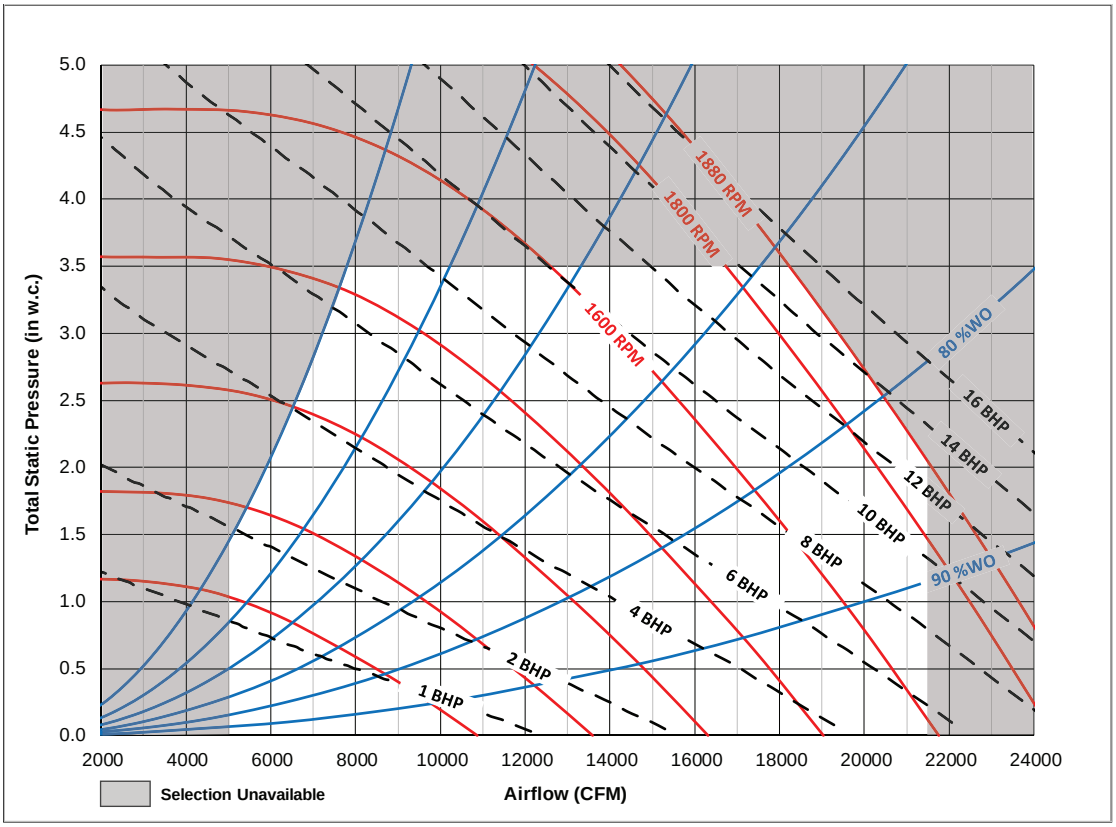
Figure 26. 50 and 55 ton, 12 hp relief fan, two-fan array



Important:

- *Relief fan performance curve includes internal resistance of rooftop. For total static pressure determination, add together return ESP and relief damper pressure drop.*
- *Static pressure drops from the space to the relief fan (relief damper + return ESP) cannot exceed 3.5 in w.c.*
- *Curve can show combined operating min/max for multiple tonnages. Refer to general data for appropriate operating parameters such as motor horsepower and airflow ranges.*
- *Shaded areas represent unavailable selections. Contact your local Trane® representative for more information on selections in these shaded regions.*
- *EC motors are not offered in integral horsepower increments. Fans will be offered with a nominal motor power rated to cover the operating envelope of the fan. Power limitation is indicated by the highest power shown on the curve.*
- *Max RPM is indicated on curve and RPM values are in increments of 200 RPM unless otherwise shown.*
- *Catalog curves represent fan data corrected to the following standard conditions: 70°F dry bulb temperature, barometric pressure of 14.696 psia, and an air density of 0.075 lb/ft^3. Utilize Trane Select Assist™ to generate fan curves for unit-specific operating temperatures and elevations.*

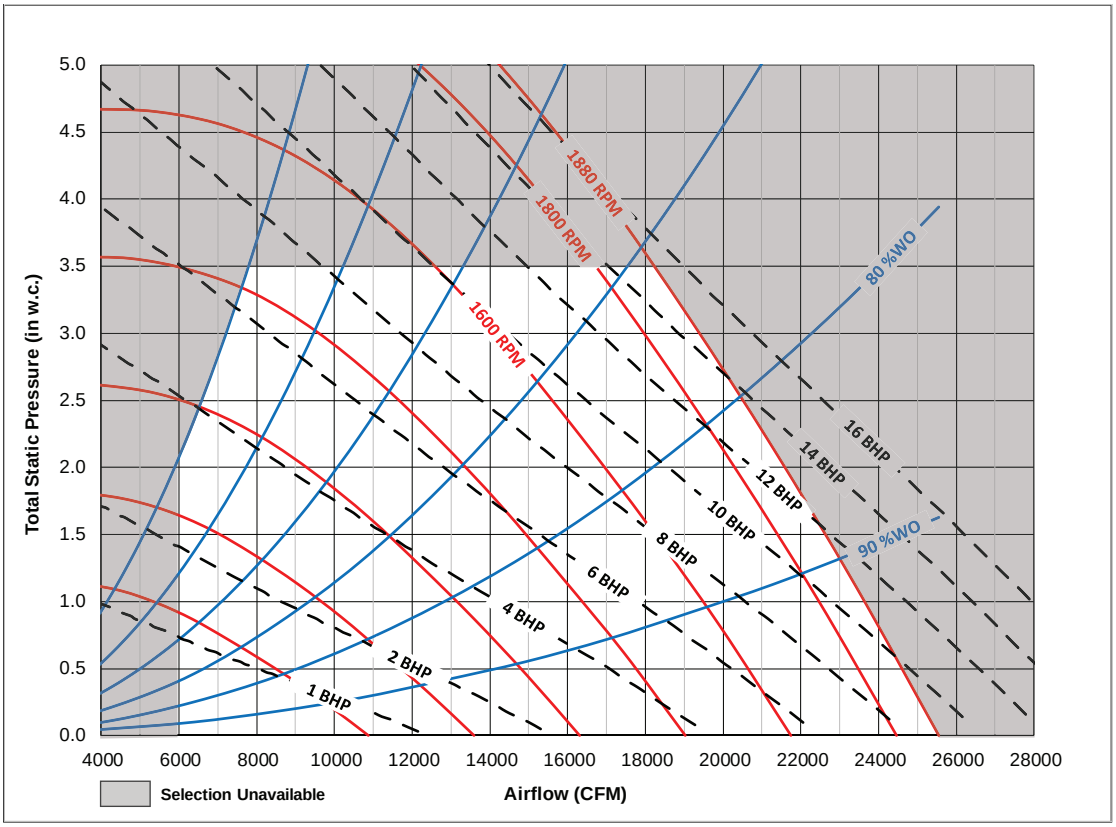
Figure 27. 50 and 55 ton, 16 hp relief fan, two-fan array



Important:

- *Relief fan performance curve includes internal resistance of rooftop. For total static pressure determination, add together return ESP and relief damper pressure drop.*
- *Static pressure drops from the space to the relief fan (relief damper + return ESP) cannot exceed 3.5 in w.c.*
- *Curve can show combined operating min/max for multiple tonnages. Refer to general data for appropriate operating parameters such as motor horsepower and airflow ranges.*
- *Shaded areas represent unavailable selections. Contact your local Trane® representative for more information on selections in these shaded regions.*
- *EC motors are not offered in integral horsepower increments. Fans will be offered with a nominal motor power rated to cover the operating envelope of the fan. Power limitation is indicated by the highest power shown on the curve.*
- *Max RPM is indicated on curve and RPM values are in increments of 200 RPM unless otherwise shown.*
- *Catalog curves represent fan data corrected to the following standard conditions: 70°F dry bulb temperature, barometric pressure of 14.696 psia, and an air density of 0.075 lb/ft^3. Utilize Trane Select Assist™ to generate fan curves for unit-specific operating temperatures and elevations.*

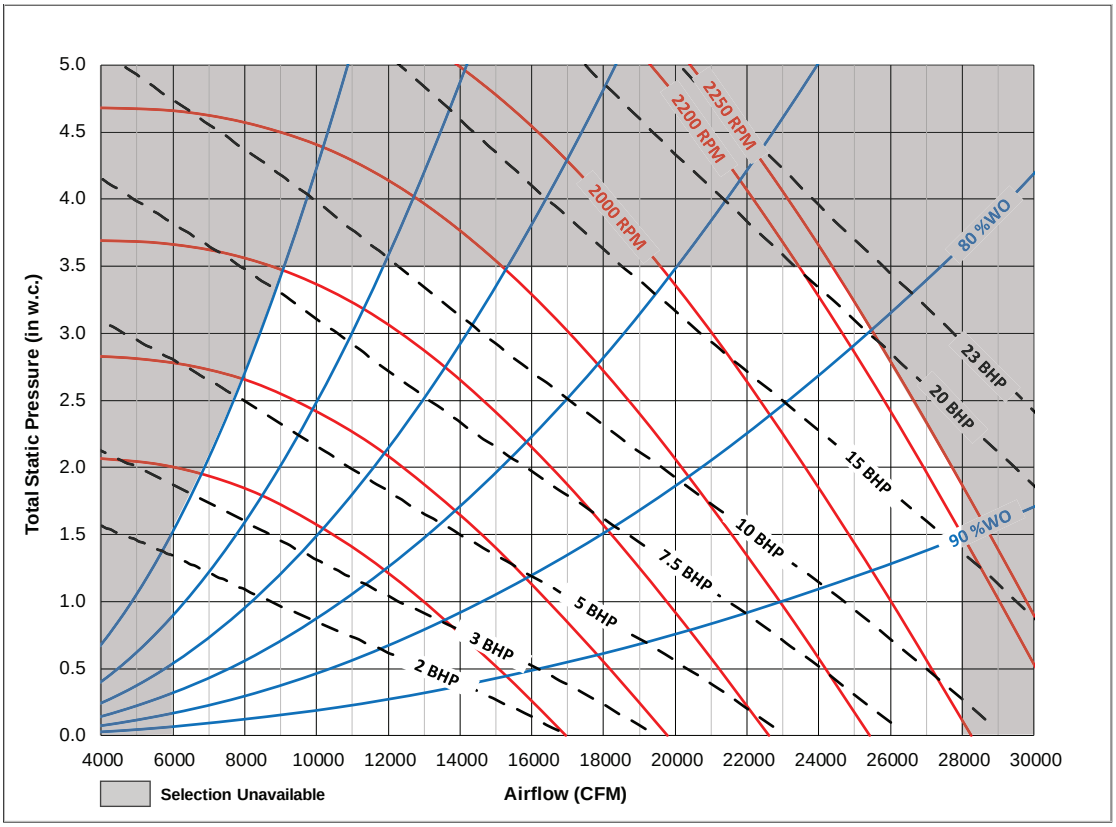
Figure 28. 60, 70 and 75 ton, 16 hp relief fan, two-fan array



Important:

- *Relief fan performance curve includes internal resistance of rooftop. For total static pressure determination, add together return ESP and relief damper pressure drop.*
- *Static pressure drops from the space to the relief fan (relief damper + return ESP) cannot exceed 3.5 in w.c.*
- *Curve can show combined operating min/max for multiple tonnages. Refer to general data for appropriate operating parameters such as motor horsepower and airflow ranges.*
- *Shaded areas represent unavailable selections. Contact your local Trane® representative for more information on selections in these shaded regions.*
- *EC motors are not offered in integral horsepower increments. Fans will be offered with a nominal motor power rated to cover the operating envelope of the fan. Power limitation is indicated by the highest power shown on the curve.*
- *Max RPM is indicated on curve and RPM values are in increments of 200 RPM unless otherwise shown.*
- *Catalog curves represent fan data corrected to the following standard conditions: 70°F dry bulb temperature, barometric pressure of 14.696 psia, and an air density of 0.075 lb/ft^3. Utilize Trane Select Assist™ to generate fan curves for unit-specific operating temperatures and elevations.*

Figure 29. 60, 70 and 75 ton, 23 hp relief fan, three-fan array

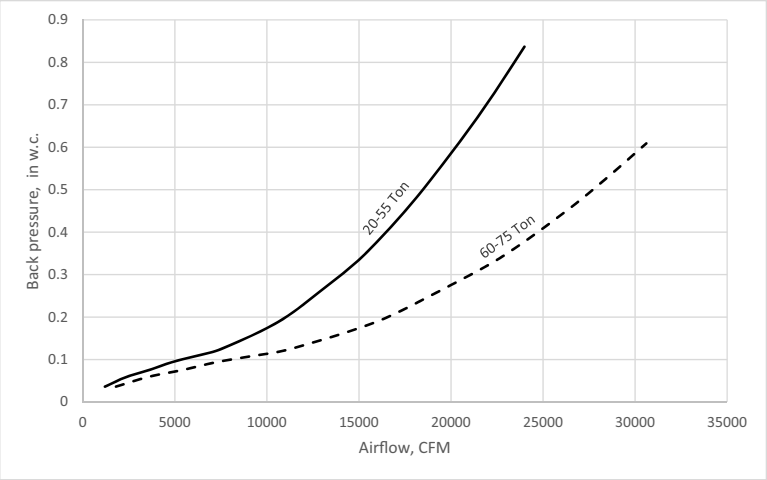


Important:

- *Relief fan performance curve includes internal resistance of rooftop. For total static pressure determination, add together return ESP and relief damper pressure drop.*
- *Static pressure drops from the space to the relief fan (relief damper + return ESP) cannot exceed 3.5 in w.c.*
- *Curve can show combined operating min/max for multiple tonnages. Refer to general data for appropriate operating parameters such as motor horsepower and airflow ranges.*
- *Shaded areas represent unavailable selections. Contact your local Trane® representative for more information on selections in these shaded regions.*
- *EC motors are not offered in integral horsepower increments. Fans will be offered with a nominal motor power rated to cover the operating envelope of the fan. Power limitation is indicated by the highest power shown on the curve.*
- *Max RPM is indicated on curve and RPM values are in increments of 200 RPM unless otherwise shown.*
- *Catalog curves represent fan data corrected to the following standard conditions: 70°F dry bulb temperature, barometric pressure of 14.696 psia, and an air density of 0.075 lb/ft^3. Utilize Trane Select Assist™ to generate fan curves for unit-specific operating temperatures and elevations.*

Barometric Relief Damper Performance

Figure 30. Barometric Relief Damper Performance



Component Static Pressure Drops

Table 38. Static pressure drops — relief dampers

Nominal Tons	CFM	Relief Damper Pressure Drop (in w.c.)
20-40 Single Fan	2,000	0.04
	4,000	0.16
	6,000	0.37
	8,000	0.65
	10,000	1.02
30-55 Dual Fan	4,000	0.04
	6,000	0.09
	8,000	0.16
	10,000	0.26
	12,000	0.37
	14,000	0.5
	16,000	0.65
	18,000	0.83
	20,000	1.02
	22,000	1.24
60-75 Dual or Three-Fan Array	6,000	0.07
	8,000	0.12
	10,000	0.19
	12,000	0.27
	14,000	0.37
	16,000	0.48
	18,000	0.61
	20,000	0.75
	22,000	0.91
	24,000	1.08
	26,000	1.27
	28,000	1.47

Notes:

1. Relief damper static pressure drop is used only for relief fan selections.
2. Use Relief CFM to determine pressure drop to add to return duct static pressure for relief fan selection.

Table 39. Component static pressure drops (in. H_2O)

Tons	CFM Std	Evap Coil						HGRH	Heating System						Filters						Economizer		
		Standard		High Efficiency		Variable			Gas					Electric	Pre Evap Panel				Pre Evap Cart	Final Cart	Return Air	Outside Air W/O Traq	Outside Air W/ Traq
		Dry	Wet	Dry	Wet	Dry	Wet		250 MBh	350 MBh	500 MBh	850 MBh	1200 MBh	All kW	2" Merv 4	2" Merv 8	4" Merv 8	4" Merv 14					
20	4000			0.08	0.08	0.08	0.08	0.01	0.08	0.05	0.04			0.03	0.03	0.05	0.04	0.09	0.08	0.08	0.05	0.04	0.05
	5000			0.11	0.12	0.11	0.12	0.01	0.12	0.08	0.06			0.04	0.05	0.07	0.07	0.14	0.12	0.12	0.07	0.06	0.07
	6000			0.14	0.16	0.14	0.16	0.02	0.17	0.11	0.09			0.06	0.07	0.10	0.10	0.20	0.18	0.18	0.10	0.08	0.10
	7000			0.17	0.20	0.16	0.20	0.02	0.23	0.15	0.12			0.08	0.10	0.14	0.13	0.28	0.24	0.24	0.14	0.11	0.14
	8000			0.19	0.25	0.19	0.25	0.03	0.30	0.20	0.16			0.11	0.13	0.18	0.17	0.36	0.32	0.32	0.18	0.15	0.18
	9000			0.23	0.30	0.23	0.30	0.04	0.38	0.25	0.20			0.13	0.17	0.23	0.22	0.46	0.40	0.40	0.23	0.19	0.23
25	5000	0.06	0.06	0.11	0.12	0.14	0.15	0.01	0.12	0.09	0.07			0.04	0.05	0.07	0.07	0.14	0.12	0.12	0.07	0.06	0.07
	6250	0.08	0.08	0.15	0.17	0.19	0.21	0.02	0.19	0.13	0.10			0.06	0.08	0.11	0.10	0.22	0.19	0.19	0.11	0.09	0.11
	7500	0.10	0.11	0.19	0.22	0.24	0.28	0.02	0.28	0.19	0.15			0.09	0.12	0.16	0.15	0.32	0.28	0.28	0.16	0.13	0.16
	8750	0.12	0.14	0.22	0.29	0.28	0.36	0.03	0.38	0.26	0.20			0.13	0.16	0.22	0.20	0.44	0.38	0.38	0.22	0.18	0.22
	10000	0.14	0.18	0.27	0.36	0.34	0.44	0.04	0.50	0.34	0.27			0.17	0.21	0.29	0.27	0.57	0.49	0.49	0.28	0.23	0.28
	11250	0.17	0.22	0.33	0.43	0.42	0.53	0.05	0.63	0.44	0.34			0.21	0.26	0.36	0.34	0.72	0.62	0.62	0.36	0.29	0.36
30	6000	0.15	0.00	0.19	0.19	0.18	0.19	0.01	0.17	0.13	0.10			0.06	0.07	0.10	0.10	0.20	0.18	0.18	0.10	0.08	0.10
	7500	0.20	0.00	0.25	0.28	0.25	0.28	0.02	0.26	0.21	0.15			0.09	0.12	0.16	0.15	0.32	0.28	0.28	0.16	0.13	0.16
	9000	0.23	0.00	0.32	0.38	0.31	0.38	0.03	0.38	0.30	0.22			0.13	0.17	0.23	0.22	0.46	0.40	0.40	0.23	0.19	0.23
	10500	0.30	0.00	0.37	0.48	0.37	0.48	0.04	0.52	0.40	0.30			0.18	0.23	0.32	0.29	0.63	0.54	0.54	0.31	0.25	0.31
	12000	0.37	0.00	0.46	0.60	0.46	0.59	0.05	0.68	0.53	0.39			0.24	0.30	0.41	0.38	0.82	0.71	0.71	0.41	0.33	0.41
	14000	0.48	0.00	0.59	0.75	0.59	0.75	0.07	0.92	0.72	0.53			0.33	0.41	0.56	0.52	1.12	0.97	0.97	0.56	0.45	0.55
40	8000	0.14	0.14	0.22	0.24	0.20	0.22	0.02		0.24	0.07	0.19		0.09	0.05	0.08	0.07	0.20	0.16	0.19	0.08	0.02	0.02
	10000	0.19	0.20	0.30	0.34	0.31	0.34	0.02		0.37	0.11	0.30		0.14	0.08	0.13	0.12	0.31	0.26	0.29	0.13	0.03	0.03
	12000	0.23	0.27	0.36	0.46	0.45	0.49	0.03		0.53	0.16	0.43		0.20	0.11	0.19	0.17	0.45	0.37	0.42	0.19	0.05	0.05
	14000	0.27	0.35	0.45	0.58	0.61	0.67	0.05		0.72	0.22	0.59		0.28	0.15	0.25	0.23	0.62	0.51	0.57	0.26	0.07	0.07
	16000	0.34	0.43	0.56	0.72	0.79	0.87	0.06		0.94	0.29	0.76		0.36	0.20	0.33	0.30	0.80	0.66	0.74	0.34	0.09	0.09
	18000	0.41	0.53	0.68	0.85	1.00	1.10	0.08		1.19	0.37	0.97		0.46	0.25	0.42	0.37	1.02	0.84	0.94	0.43	0.11	0.11
50	10000	0.25	0.27	0.38	0.41	0.31	0.34	0.02		0.38	0.13	0.32		0.14	0.08	0.13	0.12	0.31	0.26	0.29	0.13	0.03	0.03
	12500	0.34	0.39	0.50	0.58	0.42	0.48	0.04		0.59	0.20	0.50		0.22	0.12	0.20	0.18	0.49	0.40	0.45	0.21	0.05	0.05
	15000	0.41	0.52	0.60	0.78	0.52	0.65	0.05		0.85	0.28	0.72		0.32	0.17	0.29	0.26	0.71	0.58	0.65	0.30	0.08	0.08
	17500	0.52	0.67	0.77	1.00	0.65	0.83	0.07		1.16	0.38	0.98		0.43	0.23	0.40	0.35	0.96	0.79	0.89	0.41	0.11	0.11
	20000	0.64	0.83	0.96	1.22	0.80	1.02	0.09		1.51	0.50	1.29		0.57	0.31	0.52	0.46	1.26	1.03	1.16	0.53	0.14	0.14
	22500	0.78	0.99	1.17	1.46	0.98	1.22	0.12		1.91	0.63	1.63		0.72	0.39	0.65	0.59	1.59	1.31	1.47	0.67	0.17	0.17
55	11000	0.36	0.39	0.43	0.47	0.36	0.39	0.03		0.46	0.31	0.39		0.17	0.09	0.16	0.14	0.38	0.31	0.35	0.16	0.04	0.04
	13750	0.49	0.57	0.57	0.68	0.47	0.57	0.04		0.71	0.48	0.61		0.27	0.14	0.24	0.22	0.59	0.49	0.55	0.25	0.07	0.07
	16500	0.59	0.76	0.70	0.91	0.59	0.76	0.06		1.03	0.69	0.88		0.39	0.21	0.35	0.31	0.86	0.70	0.79	0.36	0.09	0.09
	19250	0.75	0.96	0.91	1.16	0.75	0.97	0.09		1.40	0.94	1.19		0.52	0.28	0.48	0.43	1.16	0.96	1.08	0.49	0.13	0.13
	22000	0.94	1.18	1.13	1.42	0.94	1.19	0.11		1.83	1.22	1.56		0.68	0.37	0.63	0.56	1.52	1.25	1.41	0.64	0.17	0.17
	24750	1.14	1.40	1.37	1.69	1.14	1.41	0.14		2.31	1.55	1.97		0.87	0.47	0.79	0.71	1.93	1.58	1.78	0.81	0.21	0.21
60	12000	0.17	0.18	0.34	0.36	0.33	0.36	0.03			0.36	0.44	0.40	0.17	0.05	0.09	0.08	0.24	0.22	0.25	0.14	0.16	0.16
	15000	0.23	0.26	0.45	0.51	0.44	0.51	0.05			0.56	0.69	0.63	0.26	0.08	0.14	0.13	0.38	0.34	0.38	0.22	0.25	0.25
	18000	0.29	0.34	0.53	0.69	0.56	0.69	0.07			0.80	1.00	0.90	0.38	0.11	0.21	0.18	0.55	0.49	0.55	0.32	0.36	0.36
	21000	0.34	0.44	0.68	0.88	0.68	0.88	0.09			1.10	1.36	1.23	0.52	0.15	0.28	0.25	0.74	0.66	0.75	0.44	0.49	0.49
	24000	0.43	0.55	0.85	1.07	0.85	1.07	0.12			1.43	1.78	1.60	0.68	0.20	0.37	0.33	0.97	0.87	0.98	0.57	0.63	0.63
	27000	0.52	0.66	1.03	1.28	1.03	1.27	0.15			1.81	2.25	2.03	0.86	0.25	0.47	0.41	1.23	1.10	1.24	0.73	0.80	0.80
70	14000	0.35	0.38	0.21	0.24	0.21	0.24	0.03			0.48	0.61	0.55	0.23	0.07	0.13	0.11	0.33	0.29	0.33	0.20	0.22	0.22
	17200	0.46	0.53	0.27	0.33	0.26	0.33	0.04			0.73	0.92	0.82	0.35	0.10	0.19	0.17	0.50	0.45	0.50	0.29	0.33	0.33
	20400	0.54	1.44	0.30	0.43	0.32	0.43	0.05			1.03	1.30	1.16	0.49	0.14	0.27	0.24	0.70	0.63	0.71	0.41	0.46	0.46
	23600	0.69	0.88	0.38	0.54	0.38	0.54	0.07			1.37	1.74	1.55	0.65	0.19	0.36	0.32	0.94	0.84	0.95	0.55	0.61	0.61
	26800	0.85	1.07	0.48	0.66	0.48	0.66	0.09			1.77	2.24	2.00	0.84	0.25	0.46	0.41	1.21	1.08	1.22	0.72	0.79	0.79
	30000	1.02	1.26	0.57	0.78	0.57	0.78	0.12			2.22	2.81	2.50	1.06	0.31	0.58	0.51	1.52	1.35	1.53	0.90	0.99	0.99

Table 39. Component static pressure drops (in. H_2O) (continued)

Tons	CFM Std	Evap Coil						HGRH	Heating System						Filters						Economizer		
		Standard		High Efficiency		Variable			Gas					Electric	Pre Evap Panel				Pre Evap Cart	Final Cart	Return Air	Outside Air W/O Traq	Outside Air W/ Traq
		Dry	Wet	Dry	Wet	Dry	Wet		250 MBh	350 MBh	500 MBh	850 MBh	1200 MBh	All kW	2" Merv 4	2" Merv 8	4" Merv 8	4" Merv 14					
75	15000	0.47	0.51	0.24	0.26	0.24	0.26	0.03			0.56	0.70	0.63	0.26	0.08	0.14	0.13	0.38	0.34	0.38	0.22	0.25	0.25
	18000	0.58	0.00	0.29	0.35	0.28	0.35	0.04			0.80	1.01	0.90	0.38	0.11	0.21	0.18	0.55	0.49	0.55	0.32	0.36	0.36
	21000	0.68	0.88	0.32	0.45	0.34	0.45	0.06			1.09	1.38	1.23	0.52	0.15	0.28	0.25	0.74	0.66	0.75	0.44	0.49	0.49
	24000	0.85	1.08	0.39	0.55	0.39	0.55	0.08			1.42	1.80	1.60	0.68	0.20	0.37	0.33	0.97	0.87	0.98	0.57	0.63	0.63
	27000	1.03	1.29	0.48	0.67	0.48	0.67	0.10			1.80	2.28	2.03	0.86	0.25	0.47	0.41	1.23	1.10	1.24	0.73	0.80	0.80
	30000	1.22	1.51	0.57	0.79	0.57	0.79	0.12			2.22	2.81	2.50	1.06	0.31	0.58	0.51	1.52	1.35	1.53	0.90	0.99	0.99

Notes:

1. Static pressure drops of accessory components must be added to determine total static pressure for fan selections.
2. Gas heat section maximum temperature rise of 60°F.
3. Economizer static pressure value for sizing supply fan is the highest of the following: a) Return air static pressure drop plus customer return duct static pressure and b) Outside air static pressure drop.

Electrical Data

Electrical Service Sizing

To correctly size electrical service wiring for a unit, find the appropriate calculations listed below. Each type of unit has its own set of calculations for MCA (Minimum Circuit Ampacity) and MOP (Maximum Overcurrent Protection). Read the load definitions that follow and then find the appropriate set of calculations based on unit type.

Note: *Set 1 is for cooling only and cooling with gas heat units, and set 2 is for cooling with electric heat units.*

Load Definitions: (To determine load values, see the Electrical Service Sizing Data Tables on the following page.)

Load Definitions	
LOAD 1	Current of the largest motor (compressor or fan motor)
LOAD 2	Sum of the currents of all remaining motors
LOAD 3	Current of electric heaters
LOAD 4	Any other load rated at 1 amp or more

Set 1: Cooling Only Rooftop Units and Cooling with Gas Heat Rooftop Units

MCA = (1.25 x LOAD1) + LOAD2 + LOAD4

MOP = (2.25 x LOAD1) + LOAD2 + LOAD4

Select a fuse rating equal to the MOP value. If the MOP value does not equal a standard fuse size as listed in NEC 240-6, select the next lower standard fuse rating.

Note: *If selected MOP is less than the MCA, then select the lowest standard maximum fuse size which is equal to or larger than the MCA, provided the selected fuse size does not exceed 800 amps.*

Set 2: Rooftop units with Electric Heat

Single Source Power units (460V and 575V)

To arrive at the correct MCA and MOP values for these units, two sets of calculations must be performed. First calculate the MCA and MOP values as if the unit was in cooling mode (use the equations given in Set 1). Then calculate the MCA and MOP values as if the unit were in heating mode as follows. (Keep in mind when determining LOADS that the compressors and condenser fan motors don't run while the unit is in heating mode).

For units using heaters less than 50 kW:

MCA = 1.25 x (LOAD1 + LOAD2 + LOAD4) + (1.25 x LOAD3)

For units using heaters equal to or greater than 50 kW:

MCA = 1.25 x (LOAD1 + LOAD2 + LOAD4) + (1.0 x LOAD3)

The nameplate MCA value will be the larger of the cooling mode MCA value or the heating mode MCA value calculated above.

MOP = (2.25 x LOAD1) + LOAD2 + LOAD3 + LOAD4

The selection MOP value will be the larger of the cooling mode MOP value or the heating mode MOP value calculated above.

Select a fuse rating equal to the MOP value. If the MOP value does not equal a standard fuse size as listed in NEC 240-6, select the next lower standard fuse rating. If the selected MOP value is less than 125 percent of the current rating of the electric heat load, select the next higher standard fuse rating.

Note: *If selected MOP is less than the MCA, then select the lowest standard maximum fuse size which is equal to or larger than the MCA, provided the selected fuse size does not exceed 800 amps.*

Dual Source Power units (200–230V with Electric Heat)

These units will have two circuit values shown on the nameplate. The first circuit value will be the refrigeration (cooling mode) values calculated per Set 1. The second set of circuit values shown on the nameplate will be for the electric heating circuit as follows.

For units using heaters less than 50 kW:

MCA = (1.25 x LOAD3)

For units using heaters equal to or greater than 50 kW:

MCA = (1.0 x LOAD3)

MOP = (1.25 x LOAD3)

Select a fuse rating for the electric heating circuit that is equal to the MOP value obtained in the equation above. If the MOP value does not equal a standard fuse size as listed in NEC 240-6, select the next lower standard fuse rating (see note below for exception). If the selected MOP value is less than 125 percent of the current rating of the electric heat load, select the next higher standard fuse rating.

Note: *If the available MOP option is less than the MCA obtained in the equation above, then reselect the lowest standard maximum fuse size which is equal to, or larger, than the MCA, provided the reselected fuse size does not exceed 800 amps.*

Service Sizing Data

Table 40. Compressor electrical service sizing data (20 to 75 tons)

Tons	No. of Compressors	200 V		230 V		460 V		575 V	
		RLA (ea.)	LRA (ea.)	RLA (ea.)	LRA (ea.)	RLA (ea.)	LRA (ea.)	RLA (ea.)	LRA (ea.)
20V	1[a]	48.4	NA	42.1	NA	21.1	NA	16.9	NA
	1	40.3	267	40.3	267	19.2	142	15.9	103
25H	1	27.8	203	27.8	203	14.6	98	12.6	84
	2	40.3	267	40.3	267	19.2	142	15.9	103
25V	1[a]	56.7	NA	49.3	NA	24.7	NA	19.7	NA
	1	44	304	42.3	304	21.8	147	17.2	122
30S	1	27.8	203	27.8	203	14.6	98	12.6	84
	2	40.3	267	40.3	267	19.2	142	15.9	103
30H	1	27.8	203	27.8	203	14.6	98	12.6	84
	2	44	304	42.3	304	21.8	147	17.2	122
30V	1[a]	63.5	NA	55.2	NA	27.6	NA	22.1	NA
	1	50.7	315	46.4	315	23.2	158	19.2	136
40S	2	34.4	267	31.5	267	17.9	142	15.2	103
	2	40.3	267	40.3	267	19.2	142	15.9	103
40H	2	34.4	267	31.5	267	17.9	142	15.2	103
	2	40.3	267	40.3	267	19.2	142	15.9	103
40V	1[a]	63.5	NA	55.6	NA	27.9	NA	22.3	NA
	2	40.3	267	40.3	267	19.2	142	15.9	103
50S	1	40.3	267	40.3	267	19.2	142	15.9	103
	3	44	304	42.3	304	21.8	147	17.2	122
50H	2	40.3	267	40.3	267	19.2	142	15.9	103
	2	44	304	42.3	304	21.8	147	17.2	122
50V	1[a]	74.4	NA	64.7	NA	32.4	NA	25.9	NA
	2	44	304	42.3	304	21.8	147	17.2	122
55S	2	44	304	42.3	304	21.8	147	17.2	122
	2	45.9	315	45.6	315	21.8	158	19.2	136
55H	4	44	304	42.3	304	21.8	147	17.2	122
55V	1[a]	85.1	NA	74	NA	37	NA	29.6	NA
	2	45.9	315	45.6	315	21.8	158	19.2	136
60S	2	50.7	315	46.4	315	23.2	158	19.2	136
	2	61.5	345	56.3	345	28.2	155	23.2	126

Table 40. Compressor electrical service sizing data (20 to 75 tons) (continued)

Tons	No. of Compressors	200 V		230 V		460 V		575 V	
		RLA (ea.)	LRA (ea.)	RLA (ea.)	LRA (ea.)	RLA (ea.)	LRA (ea.)	RLA (ea.)	LRA (ea.)
60H	2	50.7	315	46.4	315	23.2	158	19.2	136
	2	61.5	345	56.3	345	28.2	155	23.2	126
60V	1[a]	84.3	NA	73.3	NA	36.7	NA	29.4	NA
	2	61.5	345	56.3	345	28.2	155	23.2	126
70S	4	61.5	345	56.3	345	28.2	155	23.2	126
70H	4	61.5	345	56.3	345	28.2	155	23.2	126
70V	1[a]	80.7	NA	70.1	NA	35.1	NA	28.1	NA
	1	60.1	320	53.3	320	26.7	160	21.3	135
	2	44	304	42.3	304	21.8	147	17.2	122
75S	4	61.5	345	56.3	345	28.2	155	23.2	126
75H	4	61.5	345	56.3	345	28.2	155	23.2	126
75V	1[a]	65	NA	56.9	NA	28.5	NA	22.8	NA
	1	60.1	320	53.3	320	26.7	160	21.3	135
	2	61.5	345	56.3	345	28.2	155	23.2	126

[a] Variable Speed Compressor

Table 41. Condenser fan electrical service sizing data (20-75 ton)

Tonnage	No. of Motors	200 V	230 V	460 V	575 V
		FLA (ea.)	FLA (ea.)	FLA (ea.)	FLA (ea.)
20 Std	2	5.4	5.4	2.7	2.2
20 Low Ambient	1[a]	5.6	5.6	2.9	2.4
	1	5.4	5.4	2.7	2.2
25 Std	2	5.4	5.4	2.7	2.2
25 Low Ambient	1[a]	5.6	5.6	2.9	2.4
	1	5.4	5.4	2.7	2.2
30 Std	2	5.4	5.4	2.7	2.2
30 Low Ambient	1[a]	5.6	5.6	2.9	2.4
	1	5.4	5.4	2.7	2.2
40 Std	4	5.4	5.4	2.7	2.2
40 Low Ambient	2[a]	5.6	5.6	2.9	2.4
	2	5.4	5.4	2.7	2.2
50 Std	4	5.4	5.4	2.7	2.2
50 Low Ambient	2[a]	5.6	5.6	2.9	2.4
	2	5.4	5.4	2.7	2.2
55 Std	4	5.4	5.4	2.7	2.2
55 Low Ambient	2[a]	5.6	5.6	2.9	2.4
	2	5.4	5.4	2.7	2.2
60 Std	6	4.1	4.1	1.8	1.4
60 Low Ambient	2[a]	5.6	5.6	2.9	2.4
	4	4.1	4.1	1.8	1.4
70 Std	6	4.1	4.1	1.8	1.4
70 Low Ambient	2[a]	5.6	5.6	2.9	2.4
	4	4.1	4.1	1.8	1.4
75 Std	6	4.1	4.1	1.8	1.4
75 Low Ambient	2[a]	5.6	5.6	2.9	2.4
	4	4.1	4.1	1.8	1.4

[a] Variable Speed Fan

Table 42. Electrical service sizing data —electric heat module (electric heat units only) — 20 to 75 tons

Module kW	Voltage (Amps)			
	200 V	230 V	460 V	575 V
30	62.5	72.2	36.1	28.9
60	124.9	144.3	72.2	57.7
90	187.4	216.5	108.3	86.6
120	233.2	269.4	144.3	115.5
150	NA	NA	180.4	144.3

Table 42. Electrical service sizing data —electric heat module (electric heat units only) — 20 to 75 tons (continued)

Module kW	Voltage (Amps)			
	200 V	230 V	460 V	575 V
190	NA	NA	224.9	182.8

Note: Electric heat FLA are determined at 208, 240, 480 and 600 volts.

Table 43. Electrical service sizing data — Supply fan motors — 20 to 75 tons

	200 V	230 V	460 V	575 V
	FLA (ea.)	FLA (ea.)	FLA (ea.)	FLA (ea.)
Motor Horsepower	**Supply Fan Motor (4 pole) with VFD Bypass**			
1.5	5.6	5.6	3.5	3.7
3	14.1	14.1	4.7	3.7
5	21.0	14.1	8.3	5.3
7.5	41.0	21.0	11.2	8.7
10	41.0	41.0	15.1	11.9
15	52.7	41.0	22.1	16.5
20	56.1	52.7	29.9	22.5
25	70.1	65.0	35.2	27.0
Motor Horsepower	**Supply Fan Motor (6 pole) with VFD Bypass**			
1.5	6.1	5.6	3.5	3.7
3	14.1	14.1	4.7	3.7
5	21.0	14.8	8.3	5.6
7.5	41.0	22.0	11.2	11.9
10	41.0	41.0	22.1	16.5
15	52.7	41.0	22.1	16.5
20	65.0	54.0	29.9	27.0
Motor Horsepower	**Supply Fan Motor (4 pole) with out VFD Bypass**			
1.5	5.6	5.6	3.5	3.7
3	14.1	14.1	4.7	3.7
5	21.0	14.1	8.3	5.0
7.5	41.0	21.0	11.2	8.7
10	41.0	41.0	15.1	11.9
15	52.7	41.0	22.1	16.5
20	52.7	52.7	29.9	22.5
25	65.0	65.0	35.2	27.0
Motor Horsepower	**Supply Fan Motor (6 pole) with out VFD Bypass**			
1.5	5.6	5.6	3.5	3.7
3	14.1	14.1	4.7	3.7
5	21.0	14.1	8.3	5.0
7.5	41.0	21.0	11.2	11.9
10	41.0	41.0	22.1	16.5
15	52.7	41.0	22.1	16.5
20	52.7	52.7	29.9	27.0

Notes:

1. FLA is for individual motors by HP, not total unit supply and relief fan HP
2. Supply fans selected under 1,600 RPM will have 6-pole motors

Table 44. Electrical service sizing data — Relief fan motors — 20 to 75 tons

Tonnage	HP (Total)	No. of Motors	200 V	230 V	460 V	575 V
			FLA (ea.)	FLA (ea.)	FLA (ea.)	FLA (ea.)
20	6	1	12.8	12.8	6.3	N/A
20	8[a]	1	19.5	19.5	9.0	N/A
25	6	1	12.8	12.8	6.3	N/A
25	8[b]	1	18.2	18.2	9.3	N/A
30	8[b]	1	18.2	18.2	9.3	N/A
30	12	2	12.8	12.8	6.3	N/A
40	8[b]	1	18.2	18.2	9.3	N/A
40	15[a]	2	19.5	19.5	9.0	N/A
50	12	2	12.8	12.8	6.3	N/A
50	16[b]	2	18.2	18.2	9.3	N/A
55	12	2	12.8	12.8	6.3	N/A

Table 44. Electrical service sizing data — Relief fan motors — 20 to 75 tons (continued)

Tonnage	HP (Total)	No. of Motors	200 V	230 V	460 V	575 V
			FLA (ea.)	FLA (ea.)	FLA (ea.)	FLA (ea.)
55	16[b]	2	18.2	18.2	9.3	N/A
60	16[b]	2	18.2	18.2	9.3	N/A
60	23[a]	3	19.5	19.5	9.0	N/A
70	16[b]	2	18.2	18.2	9.3	N/A
70	23[a]	3	19.5	19.5	9.0	N/A
75	16[b]	2	18.2	18.2	9.3	N/A
75	23[a]	3	19.5	19.5	9.0	N/A

[a] 23" fan diameter
[b] 25.5" fan diameter

Table 45. Electrical service sizing data (amps) - control power transformer heating and cooling modes - 20 to 75 tons

Nom Tons	Digit 2 Unit Function	Voltage			
		200	230	460	575
		FLA	FLA	FLA	FLA
All	All	10	10	4.5	3.5

Table 46. Voltage utilization range

Unit Voltage	Voltage Utilization Range
200/60/3	180-220
230/60/3	207-253
460/60/3	414-506
575/60/3	517-633

Dimensional Data

Table 47. Unit Dimensions

Tons	Refrigeration System Performance		Unit Function		Relief Option		Outside Air		Pre-Evaporator Coil Filter		Overall Length (in.)	Footprint Length (in.)	H (in.)	W (in.)
	Type	Digit 9	Type	Digit 2	Type	Digit 18	Type	Digit 27	Type	Digit 24				
20-30	Std Eff High Eff eFlex™	1,2,3	No Heat	A	Relief Fan	2	Yes	1,2,3,4	Panel	A,B,C,D,F,G	220.90	212.90	81.70	90.90
									Cartridge	E,H	240.00	232.00		
					Barometric Relief	1	Yes	1,2,3,4	Panel	A,B,C,D,F,G	221.00	182.00		
									Cartridge	E,H	240.00	201.00		
					None	0	None	0	Panel	A,B,C,D,F,G	182.00	182.00		
									Cartridge	E,H	201.00	201.00		
		1,2,3	Electric Heat, Gas Heat, No Heat - Extended Casing	E, F, X	Relief Fan	2	Yes	1,2,3,4	Panel	A,B,C,D,F,G	270.60	262.60		
									Cartridge	E,H	289.60	281.60		
					Barometric Relief	1	Yes	1,2,3,4	Panel	A,B,C,D,F,G	270.70	231.70		
									Cartridge	E,H	289.60	250.60		
					None	0	None	0	Panel	A,B,C,D,F,G	231.70	231.70		
									Cartridge	E,H	250.60	250.60		
40-55	Std Eff High Eff eFlex™	1,2,3	No Heat	A	Relief Fan	2	Yes	1,2,3,4	Panel	A,B,C,D,F,G	260.60	260.60	81.70	90.70
									Cartridge	E,H	279.60	279.60		
					Barometric Relief	1	Yes	1,2,3,4	Panel	A,B,C,D,F,G	229.70	229.70		
									Cartridge	E,H	248.70	248.70		
					None	0	None	0	Panel	A,B,C,D,F,G	229.70	229.70		
									Cartridge	E,H	248.70	248.70		
		1,2,3	Electric Heat, Gas Heat, No Heat - Extended Casing	E, F, X	Relief Fan	2	Yes	1,2,3,4	Panel	A,B,C,D,F,G	312.90	312.90		
									Cartridge	E,H	331.90	331.90		
					Barometric Relief	1	Yes	1,2,3,4	Panel	A,B,C,D,F,G	281.90	281.90		
									Cartridge	E,H	300.90	300.90		
					None	0	None	0	Panel	A,B,C,D,F,G	281.90	281.90		
									Cartridge	E,H	300.90	300.90		
60	Std Eff High Eff eFlex™	1,2,3	No Heat	A	Relief Fan	2	Yes	1,2,3,4	Panel	A,B,C,D,F,G	274.10	266.10	81.70	116.30
									Cartridge	E,H	293.10	285.10		
					Barometric Relief	1	Yes	1,2,3,4	Panel	A,B,C,D,F,G	268.70	229.70		
									Cartridge	E,H	287.70	248.70		
					None	0	None	0	Panel	A,B,C,D,F,G	229.70	229.70		
									Cartridge	E,H	248.70	248.70		
		1,2,3	Electric Heat, Gas Heat, No Heat - Extended Casing	E, F, X	Relief Fan	2	Yes	1,2,3,4	Panel	A,B,C,D,F,G	326.40	318.40		
									Cartridge	E,H	345.40	337.40		
					Barometric Relief	1	Yes	1,2,3,4	Panel	A,B,C,D,F,G	320.90	281.90		
									Cartridge	E,H	339.90	300.90		
					None	0	None	0	Panel	A,B,C,D,F,G	281.90	281.90		
									Cartridge	E,H	300.90	300.90		

Table 47. Unit Dimensions (continued)

Tons	Refrigeration System Performance		Unit Function		Relief Option		Outside Air		Pre-Evaporator Coil Filter		Overall Length (in.)	Footprint Length (in.)	H (in.)	W (in.)
	Type	Digit 9	Type	Digit 2	Type	Digit 18	Type	Digit 27	Type	Digit 24				
70-75	Std Eff	1	No Heat	A	Relief Fan	2	Yes	1,2,3,4	Panel	A,B,C,D,F,G	274.10	266.10	81.70	116.13
									Cartridge	E,H	293.10	285.10		
					Barometric Relief	1	Yes	1,2,3,4	Panel	A,B,C,D,F,G	268.70	229.70		
									Cartridge	E,H	287.70	248.70		
					None	0	None	0	Panel	A,B,C,D,F,G	229.70	229.70		
									Cartridge	E,H	248.70	248.70		
			Electric Heat, Gas Heat, No Heat - Extended Casing	E, F, X	Relief Fan	2	Yes	1,2,3,4	Panel	A,B,C,D,F,G	326.40	318.40		
									Cartridge	E,H	345.40	337.40		
					Barometric Relief	1	Yes	1,2,3,4	Panel	A,B,C,D,F,G	320.90	281.90		
									Cartridge	E,H	339.90	300.90		
					None	0	None	0	Panel	A,B,C,D,F,G	281.90	281.90		
									Cartridge	E,H	300.90	300.90		
	High Eff eFlex™	2, 3	No Heat	A	Relief Fan	2	Yes	1,2,3,4	Panel	A,B,C,D,F,G	322.10	314.10		
									Cartridge	E,H	353.10	345.10		
					Barometric Relief	1	Yes	1,2,3,4	Panel	A,B,C,D,F,G	316.70	277.70		
									Cartridge	E,H	347.70	308.70		
					None	0	None	0	Panel	A,B,C,D,F,G	277.70	277.70		
									Cartridge	E,H	308.70	308.70		
			Electric Heat, Gas Heat, No Heat - Extended Casing	E, F, X	Relief Fan	2	Yes	1,2,3,4	Panel	A,B,C,D,F,G	374.40	366.40		
									Cartridge	E,H	405.40	397.40		
					Barometric Relief	1	Yes	1,2,3,4	Panel	A,B,C,D,F,G	368.90	329.90		
									Cartridge	E,H	399.90	360.90		
					None	0	None	0	Panel	A,B,C,D,F,G	329.90	329.90		
									Cartridge	E,H	360.90	360.90		

Notes:

1. Difference between overall length and footprint length is outside air hood.
2. Refrigeration System Performance impacts length in 70 and 75 ton due to staggered coil configuration.

Figure 31. 20 to 30 ton — front view (inches)

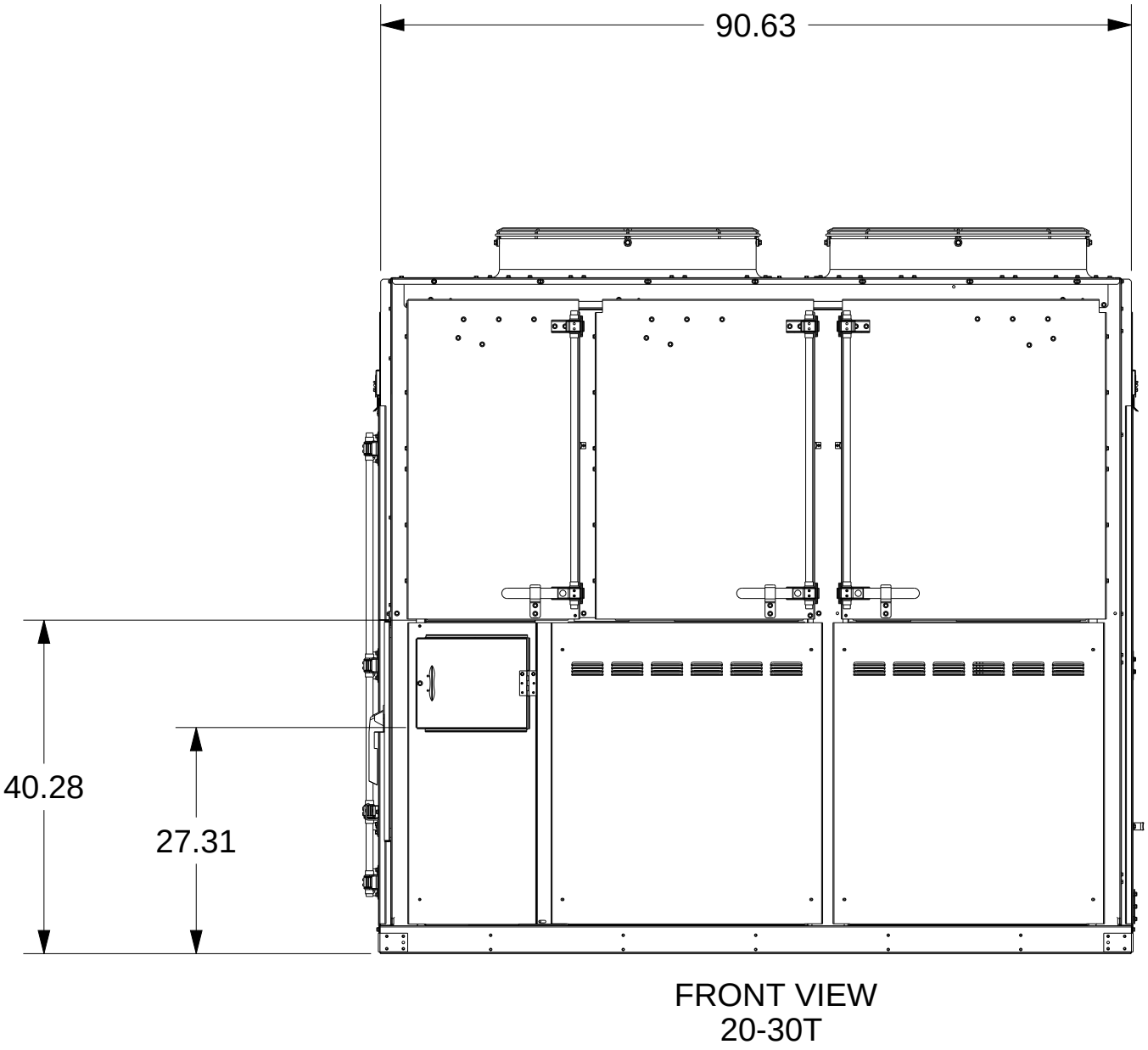
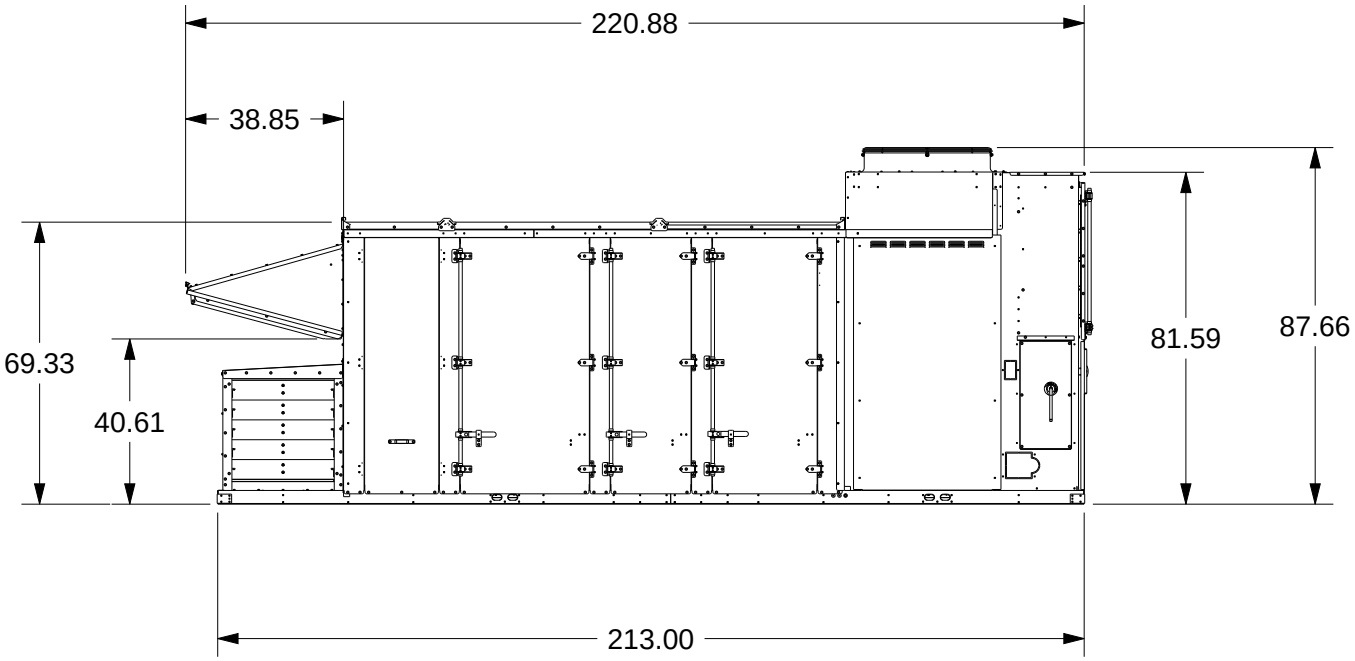


Figure 32. 20 to 30 ton — left view of sample configuration (inches)



LEFT SIDE VIEW
20-30T / NO HEAT / RELIEF FANS / PANEL FILTERS

Figure 33. 40 to 55 ton — front view (inches)

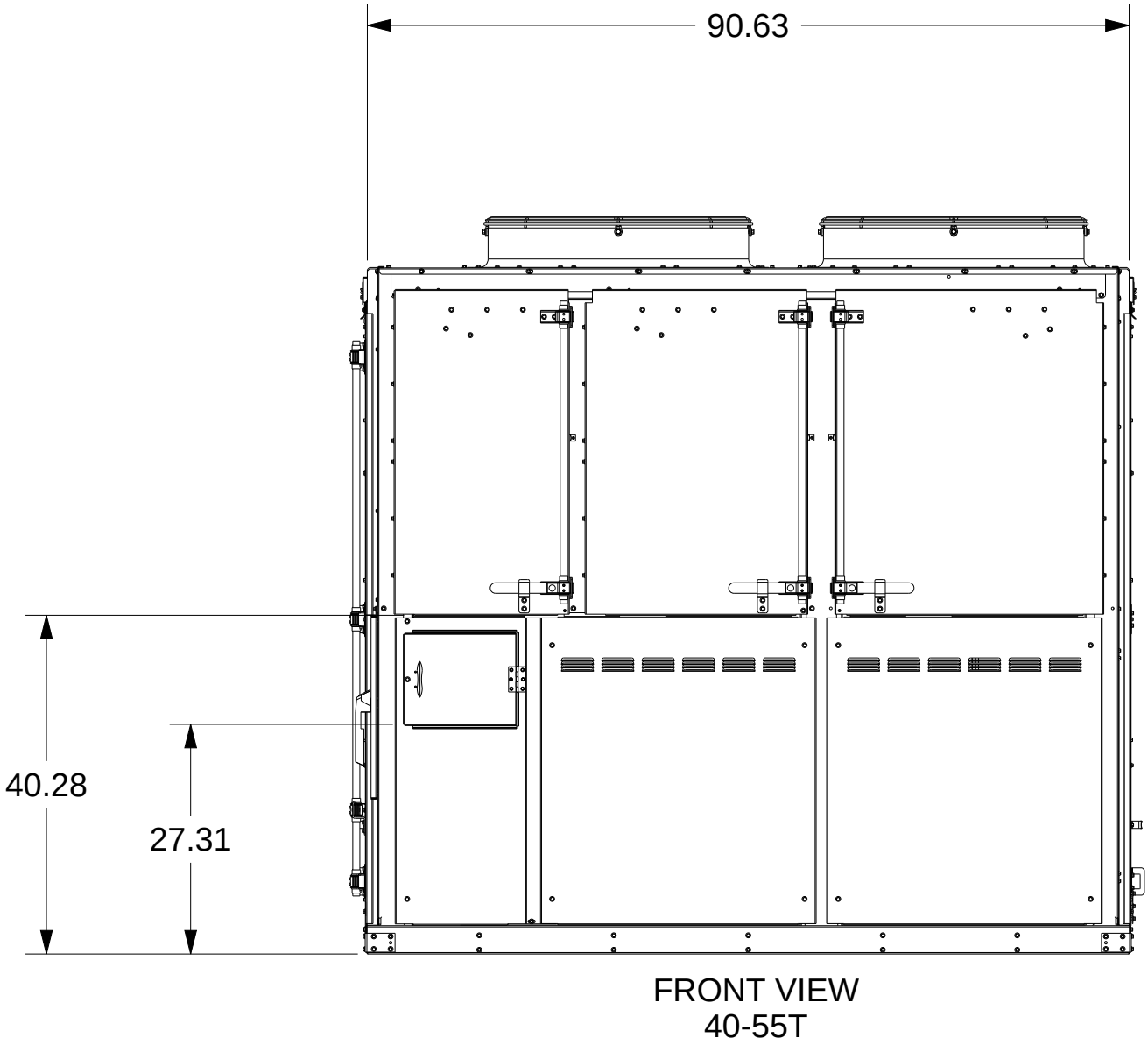
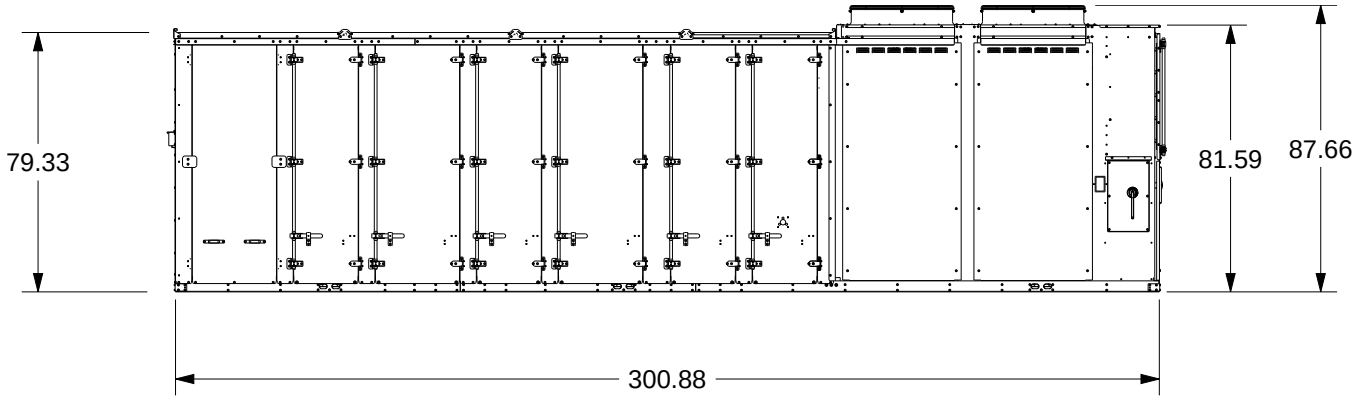
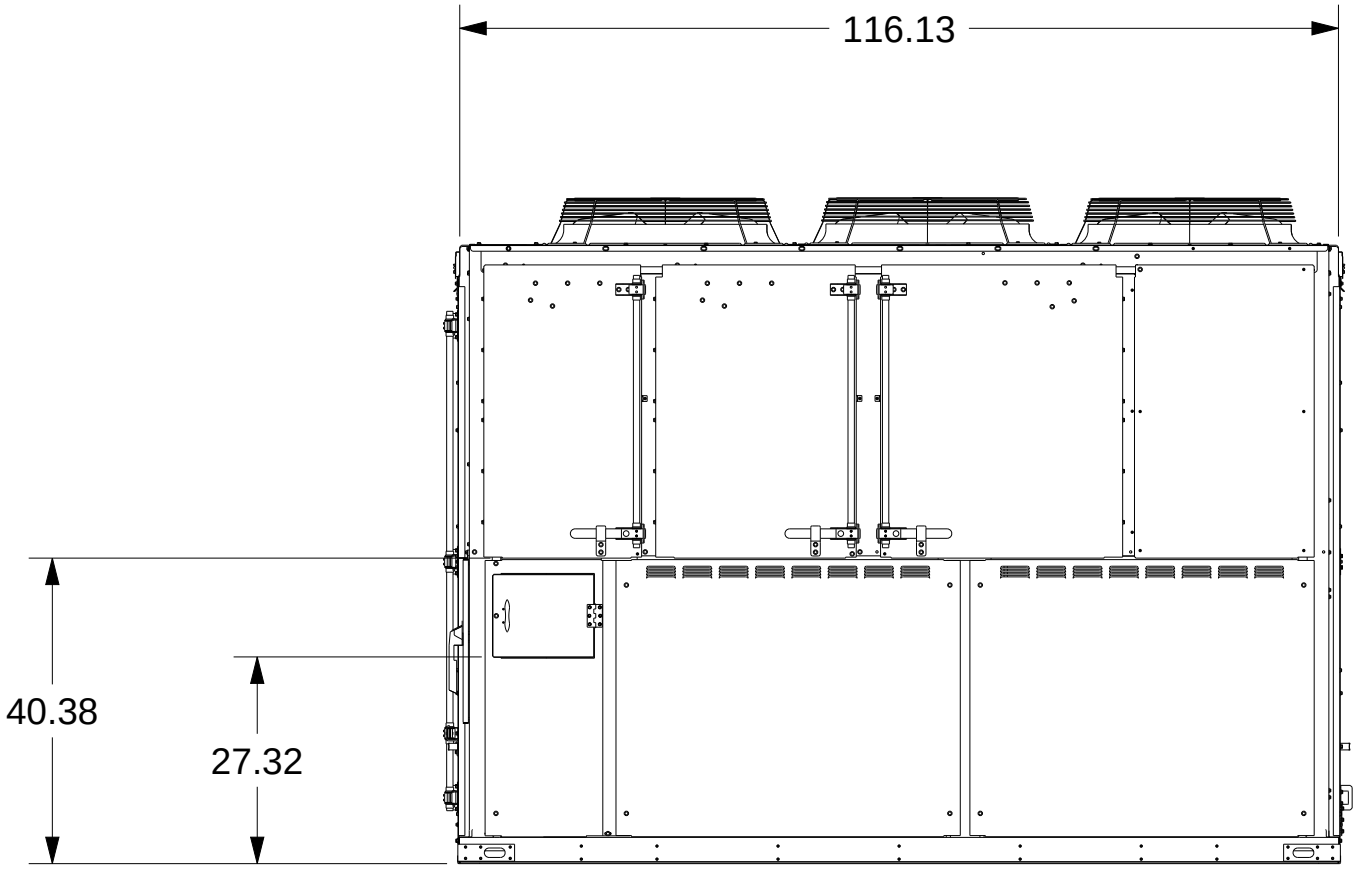


Figure 34. 40 to 55 ton — left view of sample configuration (inches)



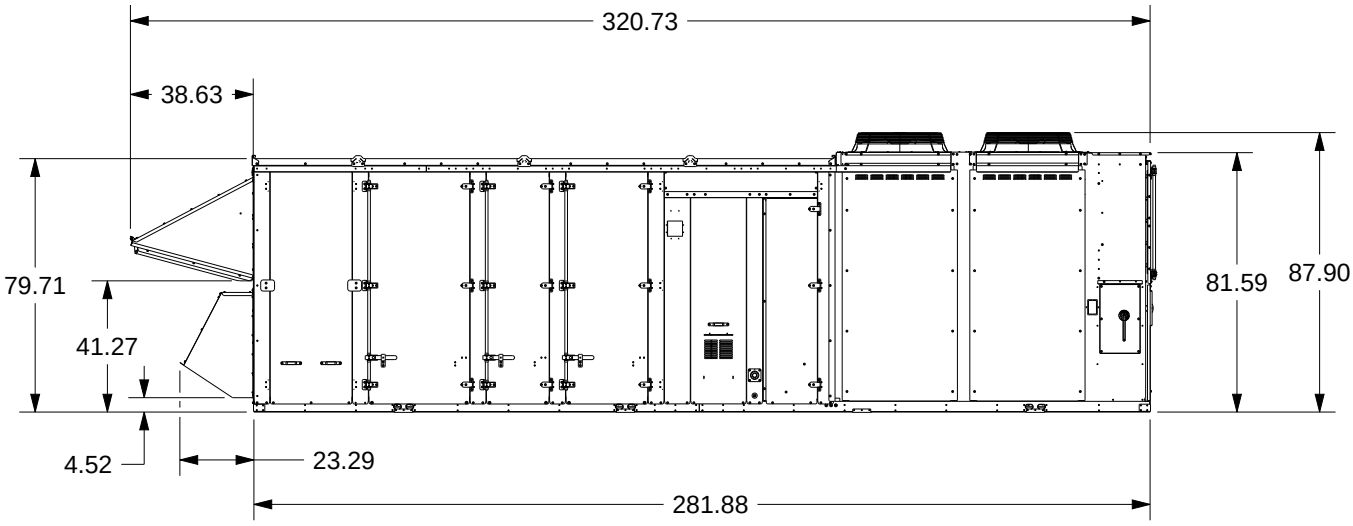
LEFT SIDE VIEW
40-55T / ELECT. HT. / CART. FILTERS

Figure 35. 60 to 75 ton — front view (inches)



FRONT VIEW
60-75T

Figure 36. 60 to 75 ton — left view of sample configuration (inches)



LEFT SIDE VIEW
60-75T / GAS HEAT / BAROMETRIC RELIEF / PANEL FILTERS

Optional Configurations

Figure 37. 20 – 30 ton options

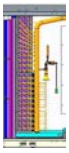
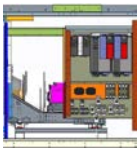
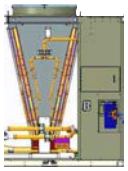
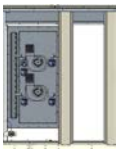
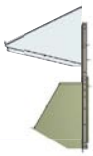
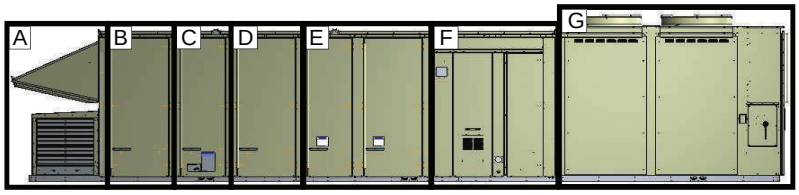
A	B	C	D	E	F	G
Relief Option	Return / Economizer	Filter	DX Coil	Supply Fan	Heat	Condenser / Control Panel
None 0.0"	Return Opening Only  30.0"	Panel  5.0"	Slab  24.5"	DDP Fan  59.5"	No Heat  3.5"	Condenser  59.0"
Outside Air  39.0"	0-25% Manual  30.0"	Cartridge  21.0"			Natural Gas  53.0"	
Barometric Relief  39.0"	Economizer  30.0"				Electric  53.0"	
Relief Fan  39.0"					Final Filter/Extended  53.0"	

Figure 38. 40 – 55 ton options



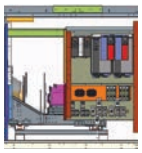
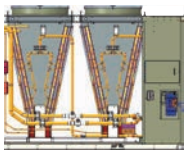
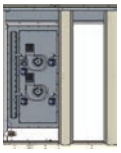
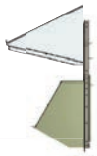
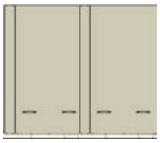
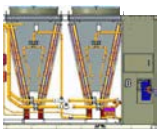
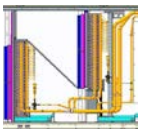
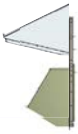
A	B	C	D	E	F	G
Relief Option	Return / Economizer	Filter	DX Coil	Supply Fan	Extended Casing	Condenser / Control Panel
None 0.0"	Return Opening Only  38.0"	Panel  5.0"	Slab  24.5"	DDP Fan  59.5"	No Heat  3.5"	Condenser  99.5"
Outside Air  39.0"	0-25% Manual  38.0"	Cartridge  21.0"			Natural Gas  55.5"	
Barometric Relief  39.0"	Economizer  38.0"				Electric  55.5"	
Relief Fan  39.0"					Final Filter/Extended  55.5"	

Figure 39. 60 – 75 ton options

A	B	C	D	E	F	G
Relief Option	Return / Economizer	Filter	DX Coil	Supply Fan	Extended Casing	Condenser / Control Panel
None 0.0"	Return Opening Only  38.0"	Panel  5.0"	Slab  24.5"	DDP Fan  59.5"	No Heat  3.5"	Condenser  99.5"
Outside Air  39.0"	0-25% Manual  38.0"	Cartridge*  21.0"	Staggered  72.5"		Natural Gas  55.5"	
Barometric Relief  39.0"	Economizer  38.0"	Cartridge*  36.0"			Electric  55.5"	
Relief Fan  39.0"	Economizer  38.0"				Final Filter/Extended  55.5"	

Roof Curb

Figure 40. Service clearance

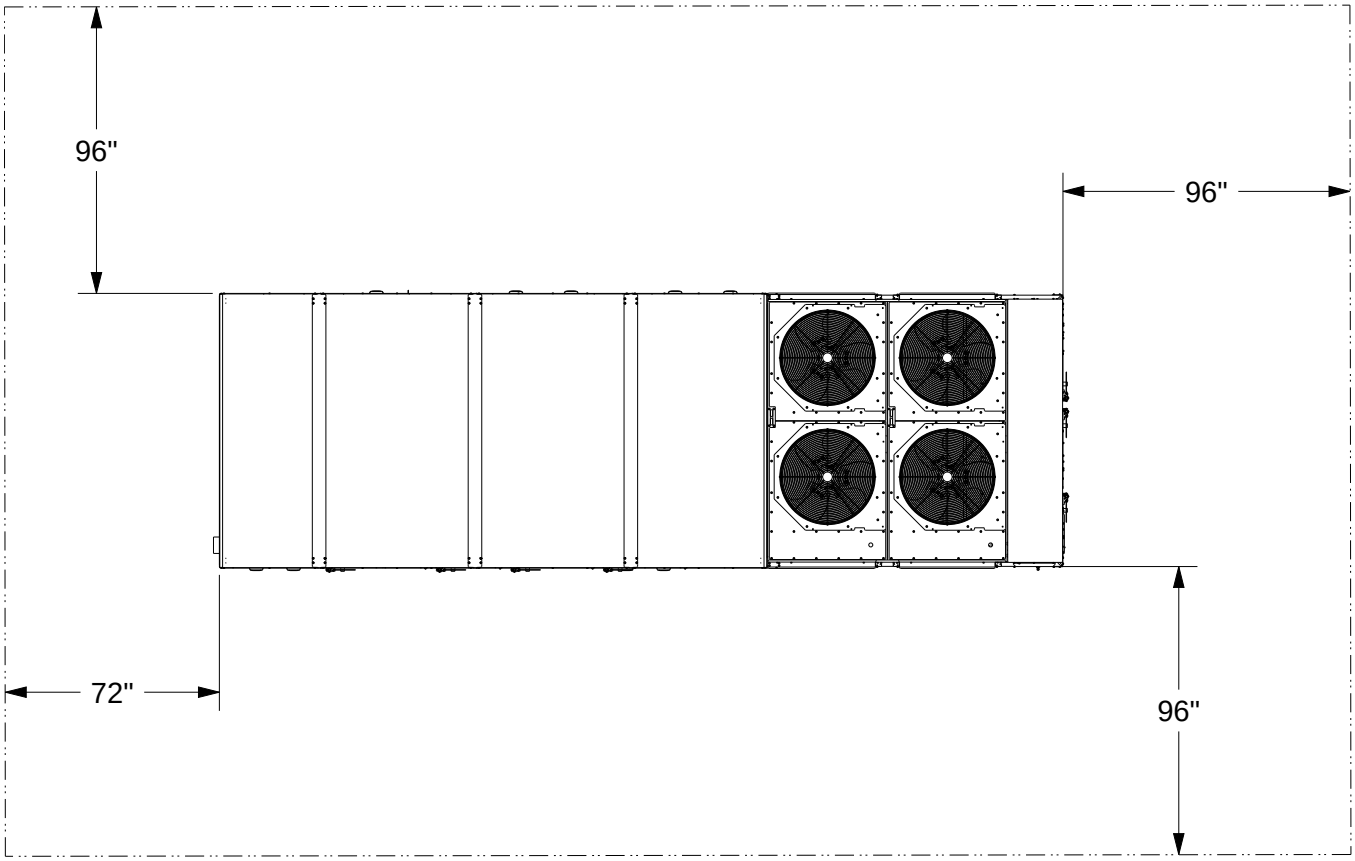


Figure 41. Roof curb dimensions (inches)

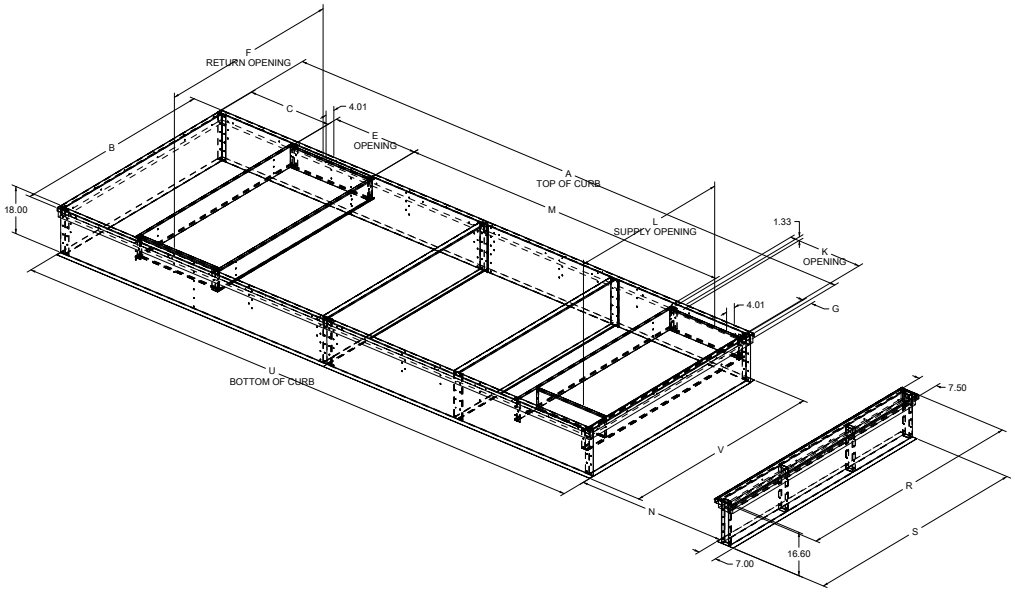


Table 48. Roof curb dimensional data (inches)

Unit Type	Tons	Filter	Relief	Efficiency	A	B	C	E	F	G	K	L	M	N	R	S	U	V	W	X
RE/RF/RX	20-30	PANEL	NONE or BR	STD/HI/ eFlex™	169.99	84.50	3.58	24.62	76.49	3.60	27.00	67.50	111.19	18.97	95.94	94.50	170.31	84.82	59.80	97.89
RE/RF/RX	20-30	PANEL	REL FAN	STD/HI/ eFlex™	200.97	84.50	33.05	26.13	76.49	3.60	27.00	67.50	111.19	18.97	95.94	94.50	201.29	84.82	90.78	128.88
RE/RF/RX	20-30	CART	NONE or BR	STD/HI/ eFlex™	188.99	84.50	3.58	24.62	76.49	3.60	27.00	67.50	130.19	18.97	95.94	94.50	189.31	84.82	80.01	116.89
RE/RF/RX	20-30	CART	REL FAN	STD/HI/ eFlex™	219.97	84.50	33.05	26.13	76.49	3.60	27.00	67.50	130.19	18.97	95.94	94.50	220.29	84.82	111.04	147.88
RA	20-30	PANEL	NONE or BR	STD/HI/ eFlex™	120.26	84.50	3.58	24.62	76.49	23.85	28.50	76.49	39.72	18.97	95.94	94.50	120.58	84.82	60.67	98.55
RA	20-30	PANEL	REL FAN	STD/HI/ eFlex™	151.25	84.50	33.05	26.13	76.49	23.85	28.50	76.49	39.72	18.97	95.94	94.50	151.57	84.82	91.83	129.56
RA	20-30	CART	NONE or BR	STD/HI/ eFlex™	139.26	84.50	3.58	24.62	76.49	23.85	28.50	76.49	58.72	18.97	95.94	94.50	139.58	84.82	79.85	117.58
RA	20-30	CART	REL FAN	STD/HI/ eFlex™	170.25	84.50	33.05	26.13	76.49	23.85	28.50	76.49	58.72	18.97	95.94	94.50	170.57	84.82	110.82	148.56
RE/RF/RX	40-55	PANEL	NONE or BR	STD/HI/ eFlex™	179.99	84.50	3.58	32.12	76.49	3.60	29.50	67.50	111.19	59.12	95.94	94.50	180.31	84.82	67.30	105.39
RE/RF/RX	40-55	PANEL	REL FAN	STD/HI/ eFlex™	210.97	84.50	33.05	33.63	76.49	3.60	29.50	67.50	111.19	59.12	95.94	94.50	211.29	84.82	98.29	136.38
RE/RF/RX	40-55	CART	NONE or BR	STD/HI/ eFlex™	198.99	84.50	3.58	32.12	76.49	3.60	29.50	67.50	130.19	59.12	95.94	94.50	199.31	84.82	87.55	124.39
RE/RF/RX	40-55	CART	REL FAN	STD/HI/ eFlex™	229.97	84.50	33.05	33.63	76.49	3.60	29.50	67.50	130.19	59.12	95.94	94.50	230.29	84.82	118.54	155.38
RA	40-55	PANEL	NONE or BR	STD/HI/ eFlex™	127.76	84.50	3.58	32.12	76.49	23.85	28.50	76.49	39.72	59.12	95.94	94.50	128.08	84.82	68.30	106.05
RA	40-55	PANEL	REL FAN	STD/HI/ eFlex™	158.75	84.50	33.05	33.63	76.49	23.85	28.50	76.49	39.72	59.12	95.94	94.50	159.07	84.82	99.29	137.03
RA	40-55	CART	NONE or BR	STD/HI/ eFlex™	146.76	84.50	3.58	32.12	76.49	23.85	28.50	76.49	58.72	59.12	95.94	94.50	147.08	84.82	87.30	125.05
RA	40-55	CART	REL FAN	STD/HI/ eFlex™	177.75	84.50	33.05	33.63	76.49	23.85	28.50	76.49	58.72	59.12	95.94	94.50	178.07	84.82	118.29	156.03

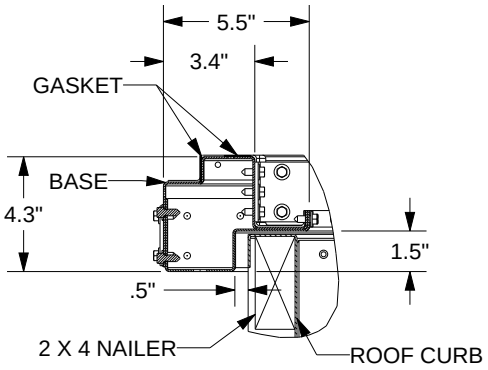
Table 48. Roof curb dimensional data (inches) (continued)

Unit Type	Tons	Filter	Relief	Efficiency	A	B	C	E	F	G	K	L	M	N	R	S	U	V	W	X
RE/RF/RX	60	PANEL	NONE or BR	STD/HI/ eFlex™	179.99	110.00	3.58	32.12	101.99	3.60	29.50	93.00	111.19	59.12	121.44	120.00	180.31	110.32		
RE/RF/RX	60	PANEL	REL FAN	STD/HI/ eFlex™	216.48	110.00	38.56	33.63	101.99	3.60	29.50	93.00	111.19	59.12	121.44	120.00	216.80	110.32		
RE/RF/RX	60	CART	NONE or BR	STD/HI/ eFlex™	198.99	110.00	3.58	32.12	101.99	3.60	29.50	93.00	130.19	59.12	121.44	120.00	199.31	110.32		
RE/RF/RX	60	CART	REL FAN	STD/HI/ eFlex™	235.48	110.00	38.56	33.63	101.99	3.60	29.50	93.00	130.19	59.12	121.44	120.00	235.80	110.32		
RA	60	PANEL	NONE or BR	STD/HI/ eFlex™	127.76	110.00	3.58	32.12	101.99	22.85	29.50	101.99	39.72	59.12	121.44	120.00	128.08	110.32		
RA	60	PANEL	REL FAN	STD/HI/ eFlex™	164.25	110.00	38.56	33.63	101.99	22.85	29.50	101.99	39.72	59.12	121.44	120.00	164.57	110.32		
RA	60	CART	NONE or BR	STD/HI/ eFlex™	146.76	110.00	3.58	32.12	101.99	22.85	29.50	101.99	58.72	59.12	121.44	120.00	147.08	110.32		
RA	60	CART	REL FAN	STD/HI/ eFlex™	183.25	110.00	38.56	33.63	101.99	22.85	29.50	101.99	58.72	59.12	121.44	120.00	183.57	110.32		
RE/RF/RX	70-75	PANEL	NONE or BR	STD	179.99	110.00	3.58	32.12	101.99	3.60	29.50	93.00	111.19	59.12	121.44	120.00	180.31	110.32		
RE/RF/RX	70-75	PANEL	REL FAN	STD	216.48	110.00	38.56	33.63	101.99	3.60	29.50	93.00	111.19	59.12	121.44	120.00	216.80	110.32		
RE/RF/RX	70-75	CART	NONE or BR	STD	198.99	110.00	3.58	32.12	101.99	3.60	29.50	93.00	130.19	59.12	121.44	120.00	199.31	110.32		
RE/RF/RX	70-75	CART	REL FAN	STD	235.48	110.00	38.56	33.63	101.99	3.60	29.50	93.00	130.19	59.12	121.44	120.00	235.80	110.32		
RA	70-75	PANEL	NONE or BR	STD	127.76	110.00	3.58	32.12	101.99	22.85	29.50	101.99	39.72	59.12	121.44	120.00	128.08	110.32		
RA	70-75	PANEL	REL FAN	STD	164.25	110.00	38.56	33.63	101.99	22.85	29.50	101.99	39.72	59.12	121.44	120.00	164.57	110.32		
RA	70-75	CART	NONE or BR	STD	146.76	110.00	3.58	32.12	101.99	22.85	29.50	101.99	58.72	59.12	121.44	120.00	147.08	110.32		
RA	70-75	CART	REL FAN	STD	183.25	110.00	38.56	33.63	101.99	22.85	29.50	101.99	58.72	59.12	121.44	120.00	183.57	110.32		
RE/RF/RX	70-75	PANEL	NONE or BR	HI/eFlex™	227.99	110.00	3.58	32.12	101.99	3.60	29.50	93.00	159.19	59.12	121.44	120.00	228.31	110.32		
RE/RF/RX	70-75	PANEL	REL FAN	HI/eFlex™	264.48	110.00	38.56	33.63	101.99	3.60	29.50	93.00	159.19	59.12	121.44	120.00	264.80	110.32		
RE/RF/RX	70-75	CART	NONE or BR	HI/eFlex™	258.99	110.00	3.58	32.12	101.99	3.60	29.50	93.00	190.19	59.12	121.44	120.00	259.31	110.32		
RE/RF/RX	70-75	CART	REL FAN	HI/eFlex™	295.48	110.00	38.56	33.63	101.99	3.60	29.50	93.00	190.19	59.12	121.44	120.00	295.80	110.32		
RA	70-75	PANEL	NONE or BR	HI/eFlex™	175.76	110.00	3.58	32.12	101.99	22.85	29.50	101.99	87.72	59.12	121.44	120.00	176.08	110.32		
RA	70-75	PANEL	REL FAN	HI/eFlex™	212.25	110.00	38.56	33.63	101.99	22.85	29.50	101.99	87.72	59.12	121.44	120.00	212.57	110.32		
RA	70-75	CART	NONE or BR	HI/eFlex™	206.76	110.00	3.58	32.12	101.99	22.85	29.50	101.99	118.72	59.12	121.44	120.00	207.08	110.32		
RA	70-75	CART	REL FAN	HI/eFlex™	243.25	110.00	38.56	33.63	101.99	22.85	29.50	101.99	118.72	59.12	121.44	120.00	243.57	110.32		

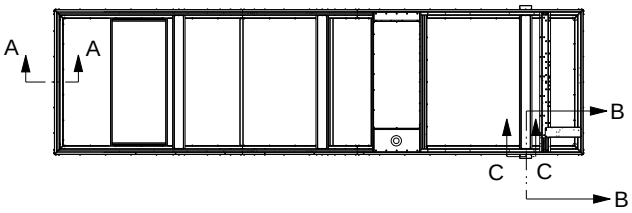
Notes:

1. High efficiency and eFlex™ refrigeration system performance for both 70 and 75 tons have a staggered evaporator coil.
2. There are three relief options - None, Barometric Relief (BR), or Relief Fan (REL FAN).
3. Panel or Cartridge filters refer to the Pre-Evaporator Coil filter selection. Panel Filters are Digit 24 = A,B,C,D,F,G and Cartridge Filters are Digit 24 = E,H

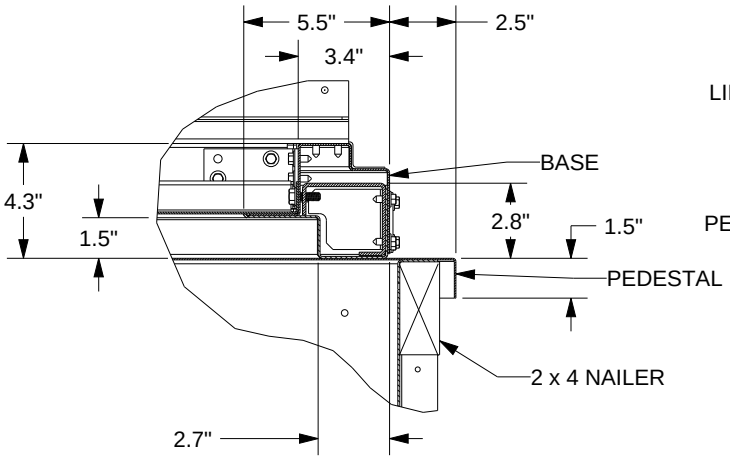
Figure 42. Base and pedestal



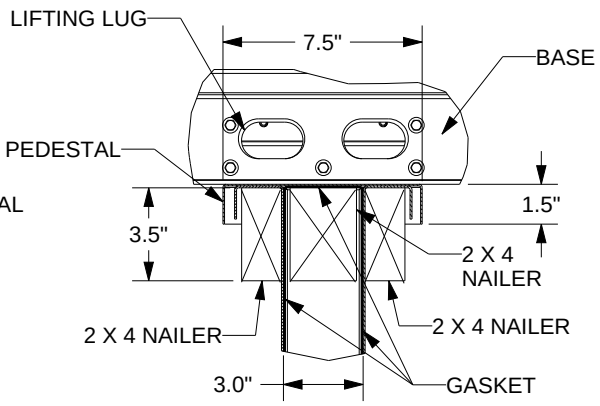
TYPICAL ROOF CURB & BASE DETAIL
SECT. A-A



PLAN VIEW



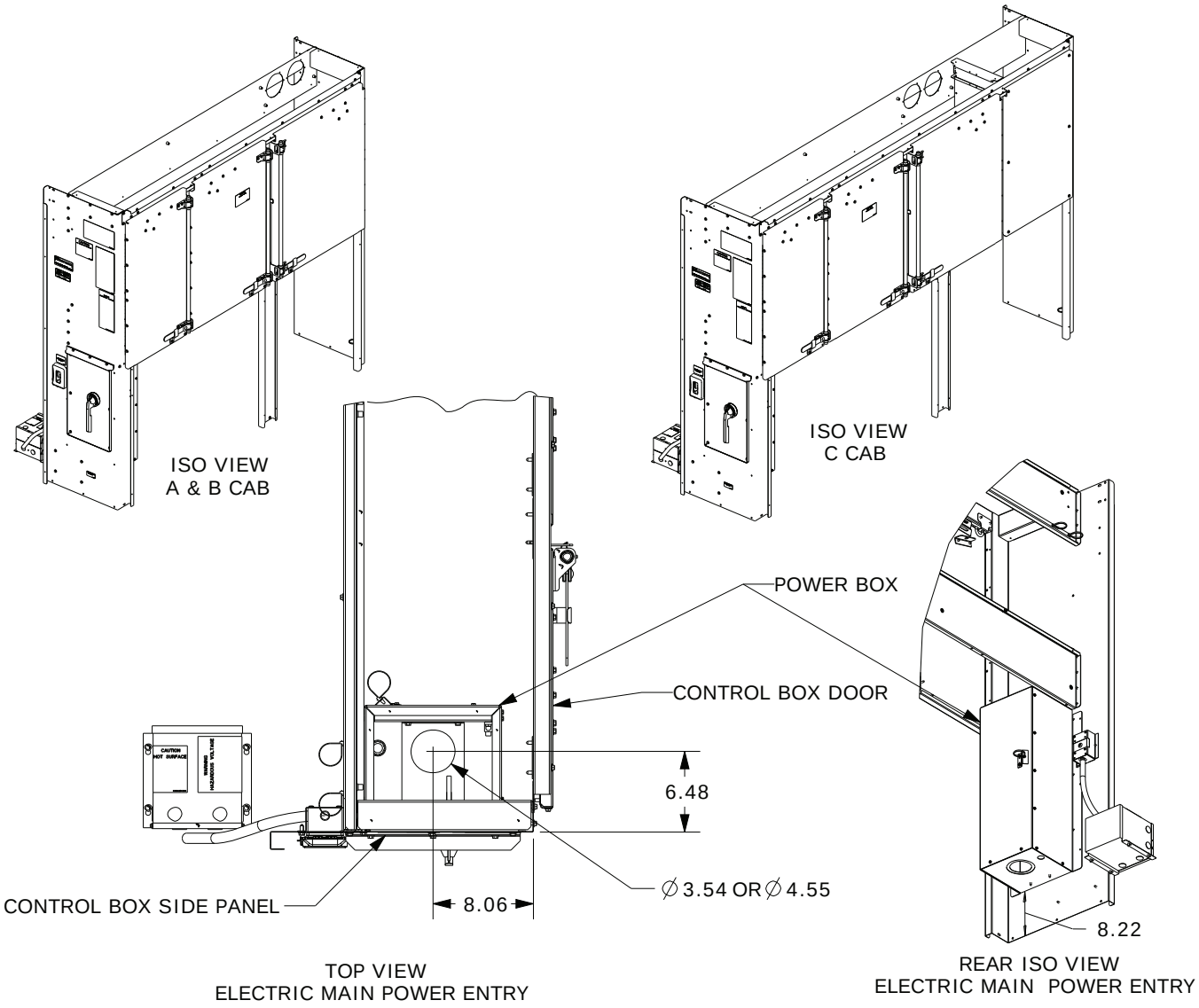
TYPICAL PEDESTAL & BASE DETAIL
SECT. B-B
(SIDE VIEW OF PEDESTAL)



TYPICAL PEDESTAL & BASE DETAIL
SECT. C-C
(END VIEW OF PEDESTAL)

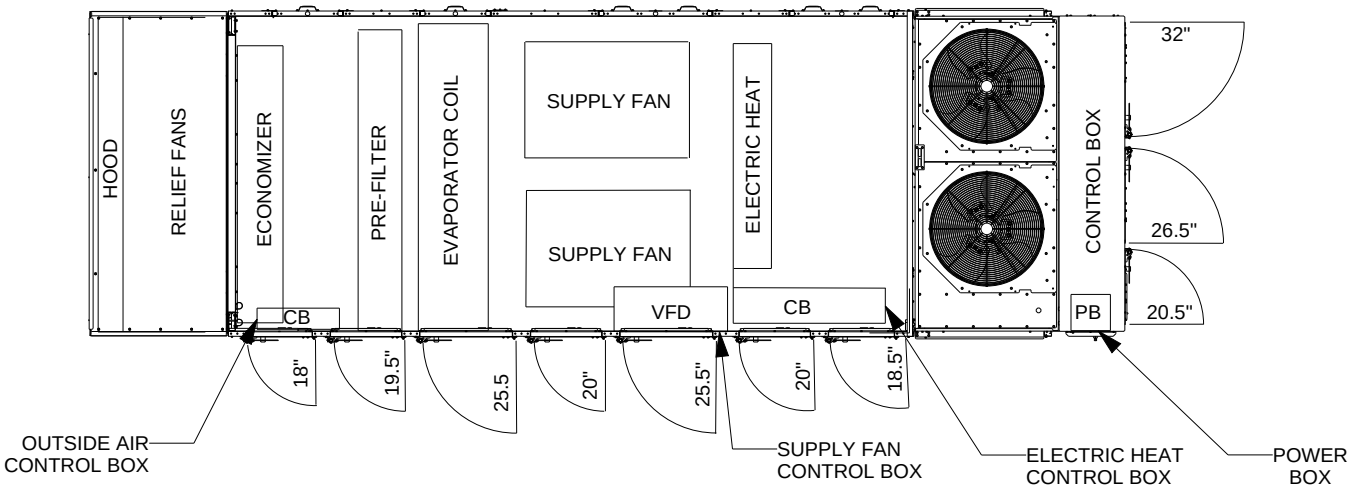
Electrical Entry Details

Figure 43. Electrical connections (inches)



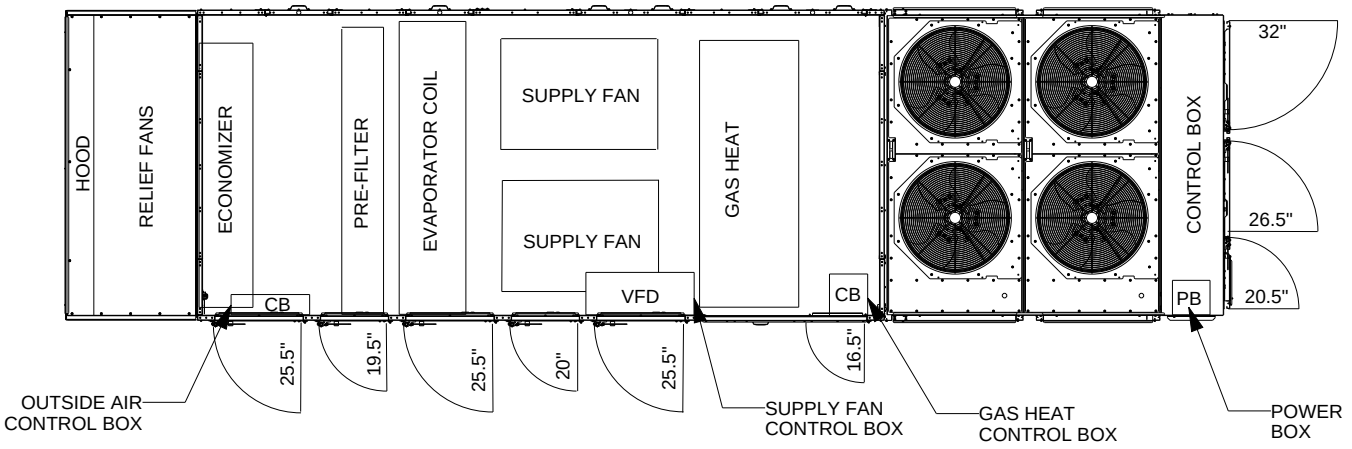
Access Clearances

Figure 44. Minimum access clearances – 20 to 30 ton



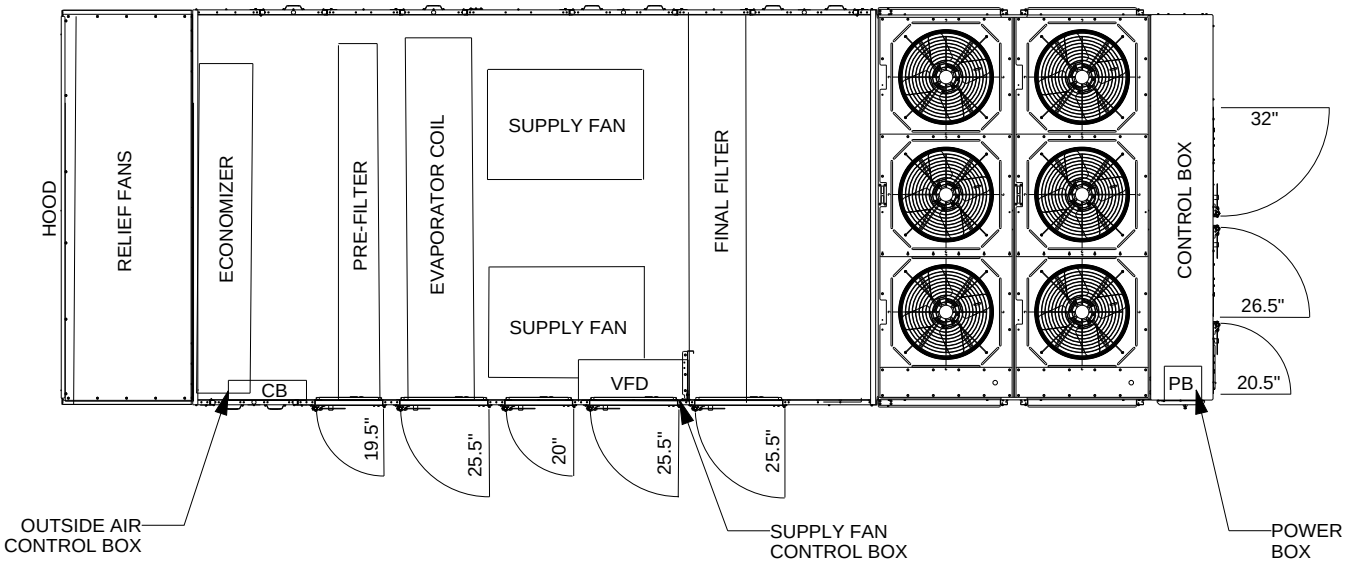
PLAN VIEW
20-30T DOOR LAYOUT

Figure 45. Minimum access clearances – 40 to 55 ton



PLAN VIEW
40-55T DOOR LAYOUT

Figure 46. Minimum access clearances – 60 to 75 ton



PLAN VIEW
60-75T DOOR LAYOUT

Mechanical Specifications

General

Units shall be specifically designed for outdoor rooftop installation on a roof curb and be completely factory assembled and tested, piped, internally wired, fully charged with R-454B compressor oil, factory run tested and shipped in one piece. Units shall be available for direct expansion cooling only, or direct expansion cooling with natural gas or electric. Filters, outside air system, air system, optional non-fused disconnect switches and all operating and safety controls shall be furnished factory installed.

All units shall be UL listed to US and Canadian Safety Standards. Cooling capacity shall be rated in accordance with AHRI Standard 340/360. All units shall have decals and tags to aid in service and indicate caution areas. Electrical diagrams shall be printed on long life water resistant material and shall ship attached to control panel doors.

Cabinet

Casing

Exterior panels shall be zinc-coated, galvanized steel painted with a slate gray baked enamel finish durable enough to withstand a minimum of 672 hours consecutive salt spray application in accordance with standard ASTM B117. Screws shall be magnigard coated.

Refrigeration components and compressor shall be accessible through removable louvered panels as standard.

Unit air handling section shall have a pitched roof and laminated double-wall construction with polyurethane foam core injected between sheet metal panels. Insulation value shall be R9. All interior surfaces shall be suitable for cleaning per ASHRAE 62. All access doors and panels shall have closed cell gaskets. All door, roof and base panels shall have a thermal break.

Unit base shall be watertight with heavy gauge formed load-bearing members and curb overhang. Unit lifting lugs shall accept chains or cables for rigging. Lifting lugs shall also serve as unit tie down points.

Access Doors

Access doors shall be hinged with a single, exterior mounted, height and tension adjustable handle to provide positive latching at three points. Access doors shall provide a door stop mechanism to latch the door in the open position to prevent unsafe door closure by wind. Serviceable compartments in the air handler such as filters, evaporator coil, supply fan and variable frequency drives shall have doors of laminated, double-wall construction. This construction shall use a polyurethane foam core between the exterior sheet metal pane and the interior line, with an insulating value of R9. Three single wall doors shall be provided for access to the control panel.

Heating

Electric Heating

All electric heat models shall be completely assembled and wired. Electric heat control shall be fully integrated with the unit controls. Heavy duty nickel chromium elements internally wired with a maximum density of 35.5 watts per square inch shall be provided. Heater circuits shall be 45 amps or less, each individually fused. Automatic reset high limit control shall operate through heater.

The 200 and 230 volt electric heating models shall have separate power supply to heating section with an optional factory mounted non-fused disconnect, located in the electric heat control panel.

Modulating Electric Heat

Modulating electric heat is an orderable option for all electric heat sizes. Modulating electric heat provides improved control over the amount of heat being generated by varying the time the heat is energized. The cycling of the heating elements adjusts the level of heat output. The heater is capable of fully modulating the capacity from 0 to 100 percent.

Gas-Fired Heating

All gas-fired units shall be completely assembled, wired, and fire tested prior to shipment. Units shall be cULus approved specifically for outdoor applications downstream from refrigerant cooling coils.

All gas heaters shall have 81 percent steady state efficiency, meeting the 2023 Department of Energy efficiency code. Gas-fired heating system control shall be fully integrated with the unit controls. Gas safety controls shall include electronic flame sensing capability, which proves combustion air prior to ignition sequence and during operation. The ignition sequence shall include a pre-purge cycle. Direct spark ignition shall be provided on all heat exchangers.

Heat exchangers shall have a tubular design with in-shot burners. Free-floating design shall eliminate expansion and contraction stresses and noises. All tubes shall be dimpled for proper heat transfer. Heating system shall incorporate induced draft fans and include a chimney that exhausts away from the air intake. All modulating gas heaters shall be made from grades of stainless steel suitable for condensing situations.

All gas piping shall be threaded connection with a pipe cap provided. Gas supply connection shall be provided through the side or bottom of unit. Heat exchanger shall be pressure and leak tested.

Staged Gas Heat

Heat exchanger material shall be corrosion-resistant aluminized or stainless steel. 60 second delay shall be provided between first and second stage gas valve operation on two-stage heaters. Continuous electronic flame supervision shall be provided as standard. Staged gas heat units shall be suitable for use with Natural Gas only.

Modulating Gas Heat

Modulating and ultra-modulating gas heaters shall be made from grades of stainless steel suitable for condensing situations. Burner shall be linkage-less for easy setup and use a variable speed motor for modulation. The modulating heater shall have turn down ratios of 5:1 for 250 MBh and 350 MBh, 10:1 for 500 MBh and 850 MBh, and 21:1 for 1200 MBh. The ultra modulating turn down ratios will have 10:1 for 250 MBh and 350 MBh, 16:1 for 500 MBh, 20:1 for 850 MBh, and 21:1 for 1200 MBh.

External Heat

Controller shall support standard heating operations with customer applied heat sources.

Airflow

System Control

Multi Zone Variable Air Volume (Discharge Air Temperature)

Option provides all necessary controls to operate a VAV rooftop from the discharge air temperature, including discharge air microprocessor controller and discharge air sensor.

The controller coordinates the economizer control and the stages of cooling with discharge air temperature reset capabilities. Option include factory installed and tested VFDs to provide supply fan motor speed modulation.

Single Zone Variable Air Volume (Zone Temperature)

Single zone VAV option provides all necessary controls to operate a rooftop unit based on maintaining two temperature setpoints; the discharge air and zone. Option includes factory-installed variable frequency drive (VFD) to provide supply fan motor speed modulation. During Single Zone VAV cooling, the unit maintains zone cooling setpoint by modulating the supply fan speed more or less to meet zone load demand, and the unit maintains discharge temperature to the discharge cooling setpoint by modulating economizer if available and staging DX cooling.

Dual Supply Fan - Direct Drive and Variable Speed

The eDrive™ ™ direct drive plenum supply fan shall be two single width, single inlet 9-blade plenum fans. Fan blades shall be aluminum airfoil. Plenum fans shall be direct-driven. Entire assembly shall be completely isolated from unit and fan board by 2-inch deflection spring isolation. Multiple fan widths

shall be available to optimize efficiency. Beltless fan shall not require routine maintenance such as fan bearing lubrication, belt tensioning and replacement, sheave alignment, and setscrew torque checks.

Dual Supply Fan Motor

Supply fan motors shall be open drip-proof. All supply fans shall be dynamically balanced in factory. Each motor shall have its own Variable Frequency Drive. Supply fan shall be test run in unit and shall reach rated rpm. All 60 Hz supply fan motors shall meet the Energy Independence Security Act of 2007 (EISA).

Variable Frequency Drive (VFD) Bypass

Supply fan bypass control shall provide airflow at 60Hz in the event of drive failure.

Relief Option

No Relief

Relief air opening shall be sealed with panel and made watertight.

Barometric Relief

Gravity dampers shall open to relieve positive pressure in the return air section of the rooftop. Barometric relief dampers shall relieve building overpressurization, when that overpressurization is great enough to overcome the return duct pressure drops.

Relief Fan - Direct Drive and Variable Speed

The eDrive™ relief fan shall be [one] [two] [three] single-width, single-inlet, 5-blade direct-drive plenum fan(s) with backward inclined, high efficiency welded aluminum impeller that is dynamically balanced as an assembly. Fan shall be beltless and maintenance free throughout its operating life. Fans shall be balanced to G6.3 per ISO 21940. No external vibration isolation shall be necessary.

Motor shall be electronically commutated (ECM) and contain power electronics for speed control. Motor modulation shall be managed by the equipment controller. Discharge dampers at unit outlet shall modulate with relief airflow in response to outside air damper position.

Relief Fan - Direct Drive and Variable Speed with Statitrac™ Control

The eDrive™ relief fan shall be [one] [two] [three] single-width, single-inlet, 5-blade direct-drive plenum fan(s) with backward inclined, high efficiency welded aluminum impeller that is dynamically balanced as an assembly. Fan shall be beltless and maintenance free throughout its operating life. Fan shall be balanced to G6.3 per ISO 21940. No external vibration isolation is necessary. Motor shall be electronically commutated (ECM) and contain power electronics for speed control. Motor modulation shall be managed by the equipment controller.

The modulating relief discharge dampers and ECM shall be modulated in response to building pressure. A differential pressure control system, (Statitrac™), shall use a differential pressure transducer to compare indoor building pressure to outdoor ambient atmospheric pressure. The relief fan shall be turned on when required to lower building static pressure setpoint.

The (Statitrac™) control system shall then modulate the discharge dampers and ECM to control the building pressure to within the adjustable, specified dead band that shall be adjustable at the User Interface.

Ventilation Override Mode

With the ventilation override option installed, the unit shall be programmed to transition to up to 5 different programmed sequences for Smoke Purge, Evacuation, Pressurization, Purge, Purge with duct control sequence and Unit off. The transition shall occur when a binary input on the VOM is closed (shorted); this would typically be a hard wired relay output from a smoke detector or fire control panel.

Filters

General

Filter options shall mount integral within unit and be accessible by hinged access panels.

Pre-Evaporator Filter Options (Available for All Units)

MERV 4 Panel Filters

Panel filters shall be 2-inch thick, MERV 4 disposable fiberglass media, and shall slide into an extruded aluminum rack.

MERV 8 Panel Filters

Filters shall be [2-inch][4-inch] thick, MERV 8 disposable synthetic media, and shall slide into an extruded aluminum rack.

MERV 14 Panel Filters

Filters shall be 4-inch thick, MERV 14 microglass media attached to 24 ga aluminized steel frame, and shall slide into an extruded aluminum rack.

MERV 14 Cartridge Filters

Cartridge filters shall be 12-inch thick, MERV 14 microglass paper media attached to 24 ga galvanized steel frame, and shall slide into a galvanized steel rack. Option shall also include 2-inch thick, MERV 8 panel pre-filters of disposable synthetic media to provide extended cartridge life.

Filter Rack Only

Option shall provide an extruded aluminum rack (less filter media) with [2-inch][4-inch] nominal thickness filter channels to accommodate applications which require field supplied panel filters.

Cartridge Filter Rack Only

Option shall provide a galvanized steel rack (less filter media) with 2-inch nominal thickness and 12-inch nominal thickness filter channels to accommodate applications which require field supplied cartridge filters with panel pre-filters.

Final Filter Options (Available for RX Units Only)

Final filter options shall mount integral within the blank section unit casing and be accessible by hinged access doors.

MERV 14 Cartridge Filters, Final Filter

Cartridge final filters shall be 12-inch thick, MERV 14 microglass paper media attached to 24 ga galvanized steel frame, and shall slide into a galvanized steel rack. Option shall also include 2-inch thick, MERV 8 panel pre-filters of disposable synthetic media to provide extended cartridge life.

Cartridge Filter Rack Only, Final Filter

Option shall provide a galvanized steel rack (less filter media) in the final filter position with 2-inch nominal thickness and 12-inch nominal thickness filter channels to accommodate applications which require field supplied final cartridge filters with panel pre-filters.

Filter Monitoring - Differential Pressure Transducer

A factory-installed, differential pressure transducer shall be piped to both sides of the [pre evaporator filter] [final filter] to indicate status. Transducer shall maintain a +/- 5 percent accuracy within operating temperature limits of -20°F to 120°F. Transducer shall be mounted in a unit control box and report status through unit control display.

Outside Air

0 to 25% Manual Damper

Manually controlled outside air damper shall provide up to 25 percent outside air. Manual outside air damper shall be set at desired position at unit start-up.

0 to 100% Modulating Economizer

Economizer option shall be operated through the primary temperature controls to automatically utilize outside air for “free” cooling. Automatically modulated return and outside air dampers shall maintain proper temperature in the conditioned space. Economizer shall be equipped with an automatic lockout when the outdoor high ambient temperature is too high for proper cooling.

Minimum position control shall be standard and adjustable at the user interface or through the building management system. A spring return motor shall ensure closure of OA dampers during unit shutdown or power interruption.

Demand Control Ventilation

When equipped with a CO_2 sensor, the outside air damper position shall modulate in response to a CO_2 sensor in the conditioned space, in order to minimize the unit energy consumption and simultaneously meet the ventilation requirements of ASHRAE Std 62.1. If ordered, the Traq™ airflow monitoring solution shall augment the system, allowing for measurement and control of outside airflow.

Outside Air Measurement (Traq™)

A factory mounted airflow measurement station (Traq™) shall be provided in the outside air opening to measure airflow. The airflow measurement station shall measure from 40 CFM/ton to maximum airflow. The airflow measurement station shall adjust for temperature variations. Measurement accuracy does not exceed 10 percent at minimum airflow and decreases to less than 5% at higher airflows, meeting requirements of LEED IE Q Credit 1 as defined by ASHRAE 62.1-2007.

Economizer Control with Dry Bulb

An outdoor temperature sensor shall be included for comparing the outdoor dry bulb temperature to a locally adjustable temperature setpoint. The setpoint shall be programmed at the user interface to determine if outdoor air temperature is suitable for economizer operation.

Economizer Control with Reference Enthalpy

An outdoor enthalpy sensor shall be provided to compare the total heat content of outdoor air to a locally adjustable setpoint. The setpoint shall be programmed at the user interface to determine if the outdoor enthalpy condition is suitable for economizer operation.

Economizer Control with Comparative Enthalpy

Two enthalpy sensors shall be provided to compare total heat content of the indoor air and outdoor air to determine the most efficient air source when economizing.

Low-Leak Economizer Damper

Low leak dampers shall be provided with rolled stainless steel jamb seals to the sides of the damper assembly. Low leak economizer dampers shall have a leakage rate of 10 CFM/sq ft or less tested in accordance with AMCA Standard 500.

Fault Detection and Diagnostic (FDD) control shall also be provided with Low Leak Economizers. FDD control shall monitor the commanded position of the economizer compared to the feedback position of the damper. If the damper position is outside +/-10 percent of the commanded position, a diagnostic shall be generated.

The economizer shall have a functional life of 60,000 opening and closing cycles, thus meeting the requirements of California Title 24. IntelliPak® units ordered 0 to100 percent economizer and dry bulb control shall be listed on the California Energy Commission Registry for factory compliance with Title 24 Economizer and FDD requirements. A label shall be applied to the unit identifying construction with the ultra low leak economizer and FDD controls.

Ultra Low-Leak Economizer Damper

Economizer return and outside air dampers shall be provided with chlorinated polyvinyl chloride gasketing added to the damper blades and rolled stainless steel jamb seals to the sides of the damper assembly. The economizer shall have a functional life of 60,000 opening and closing cycles, thus meeting the requirements of California Title 24. Dampers shall have a maximum leakage rate of 4 CFM/sq-ft at 1.0 inch wg. pressure differential thus meeting requirements of ASHRAE 90.1-2013 and IECC-2012.

Fault Detection and Diagnostic (FDD) control shall also be provided with ultra low leak economizers. FDD control shall monitor the commanded position of the economizer compared to the feedback position of the damper. If the damper position is outside +/-10 percent of the commanded position, a diagnostic shall be generated.

IntelliPak® units ordered with 0 to 100 percent economizer with dry bulb control shall be listed on the California Energy Commission Registry for factory compliance with Title 24 Economizer and FDD requirements. A label shall be applied to the unit identifying construction with the ultra low leak economizer and FDD controls.

Refrigeration System

Fixed Speed Compressors

Fixed speed compressors shall be industrial grade, energy efficient direct drive 3600 RPM speed scroll type with suction gas-cooled hermetic motor design. Compressor shall have a centrifugal oil pump with dirt separator, and oil charging valve. Each compressor shall have a crankcase heater installed and properly sized to minimize the amount of liquid refrigerant present in the oil sump during off cycles.

Compressor shall be provided with motor winding temperature control to protect against excessive motor temperatures resulting from over-/under-voltage or loss of charge, high and low pressure protection.

eFlex™ Variable Speed Compressors

Trane® eFlex™ variable speed compressors shall be capable of speed modulation from 25 Hz to a maximum of 100 Hz. The minimum unit capacity shall be 15% of full load or less. The compressor motor shall be a permanent magnet type. Each compressor shall have a crankcase heater installed, properly sized to minimize the amount of liquid refrigerant present in the oil sump during off cycles. Compressors shall be equipped with a bearing oil injection system that optimizes bearing and scroll set lubrication, sealing, and controls the oil circulation rate. Optimal bearing lubrication shall be provided by a gear oil pump.

Each variable speed compressor shall be matched with a specially designed variable frequency drive which modulates the speed of the compressor motor and provides several compressor protection functions. Control of the variable speed compressor and inverter shall be integrated with the Symbio™ 800 unit controller to ensure optimal equipment reliability and efficiency.

Air-Cooled Condenser Coil

Condenser coils shall have all aluminum microchannel coils. All coils shall be leak tested at the factory to ensure pressure integrity. The condenser coil shall be pressure tested to 650 psig. Subcooling circuit (s) shall be provided as standard.

Air-Cooled Condenser Fans and Motors

All condenser fans shall be vertical discharge, direct drive fans, statically balanced, with aluminum blades and zinc plated steel hubs. Condenser fan motors shall be three-phase motors with permanently lubricated ball bearings, built-in current and thermal overload protection and weather-tight slingers over motor bearings. Modulating condenser fans shall be provided on eFlex™ units.

Ambient Control

Low ambient variable speed condenser fan control shall be provided to allow the unit to start down to 0° F. Unit will shut off below 0 on low ambient control.

Corrosion Protected Condenser Coil

Optional protection on the all aluminum, microchannel condenser coil shall consist of a corrosion resistant coating that shall withstand ASTM B117 Salt Spray test for 6,000 hours and ASTM G85 A2 Cyclic Acidified Salt Fog test for 2,400 hours. This coating shall be added after coil construction covering all tubes, headers and fin edges, therefore providing optimum protection in more corrosive environments.

Leak Detection Sensors

Unit shall be furnished with a leak detection system from the factory when a circuit refrigerant charge exceeds 3.91 lbs. The leak detection system shall consist of one or more refrigerant detection sensors. When the system detects a leak, the unit controller shall initiate mitigation actions.

Evaporator Coil

Evaporator coil shall have internally enhanced copper tubing of 3/8 or 1/2-inch O.D. mechanically bonded to heavy-duty aluminum fins of configured design. All coils shall be equipped with electronic expansion valves and factory pressure and leak tested.

Electronic Expansion Valve

Expansion valves shall be electronically controlled by the Symbio™ 800 unit controller. This fully integrates expansion valve control with unit operation to ensure optimal equipment reliability and efficiency. Expansion valves shall be 2500 step valves for precise refrigerant control and shall be driven closed during off cycles to minimize refrigerant migration and protect compressors. Valve position shall be displayed at the user interface to assist field diagnostics.

Pressure Transducer

Stainless steel pressure transducer shall provide accurate measurement of high and low side refrigeration system pressure over the entire operating range. System pressures and saturation temperatures shall be displayed at the user interface to improve field diagnostics. The transducer is accessible as it shall be located close to the compressor manifold set. Durable weather proof automotive grade electrical connectors shall be used to ensure reliability.

Modulating Hot Gas Reheat Control

A reheat condenser coil shall be factory installed downstream of the unit evaporator coil. Modulating electronic valves shall control the flow of refrigerant between the indoor reheat and outdoor condensers in response to the unit discharge air temperature in order to dehumidify the space. Modulating reheat shall be included in circuit 1.

Modulating reheat valves shall be electronically controlled by the Symbio™ 800 unit controller. This fully integrates reheat valve control with unit operation to ensure optimal equipment reliability and efficiency. Modulating reheat valves shall be stepper type valves for precise refrigerant control. Valve position shall be displayed at the user interface to assist field diagnostics.

Hot Gas Bypass

Electronic Hot Gas Bypass valve piping and controls shall all be included on circuit 1 to allow operation at low airflow, avoiding coil frosting and damage to compressor. When suction pressure falls below valve adjustable setpoint, the valve shall modulate hot gas to the inlet of the evaporator. Valves sized to meet ASHRAE 90.1.

Modulating hot gas bypass valves shall be electronically controlled by the Symbio™ 800 unit controller, and shall integrate the hot gas bypass valve control with unit operation. Modulating hot gas bypass valves shall be stepper type valves for precise refrigerant control. Valve position shall be displayed at the user interface to assist field diagnostics.

Compressor Isolation (Suction and Standard Discharge Valves)

Factory installed valves both upstream and downstream of each compressor set shall enable isolation of compressors from the rest of the refrigeration system if service is required.

Evaporator Coil Drain Pan

Drain pan shall be double sloping [galvanized] [stainless] steel and promote runoff of standing water from condensation inside the unit. Drain pipe connection shall be installed through the side of the unit and connector size is 1.25 NPTI. The stainless steel option shall provide protection in corrosive environments.

Condensate Overflow Switch

Condensate overflow switch shall shut the unit down in the event that a clogged condensate drain line prevents proper condensate removal from the unit.

Electrical

Unit shall be completely factory wired with necessary control and contactor pressure lugs or terminal block for power wiring. Units shall provide an internal location for a non-fused disconnect with external handle for safety.

Unit Voltage

Rooftops shall be available with 200, 230, 460, and 575 voltage, 3 phase, 60 Hz power supplies.

Unit Interrupt Rating (Short Circuit Current Rating-SCCR)

A standard SCCR of 5,000 amps shall be applied to the unit enclosure. A high fault SCCR option is available that provides a 65,000A SCCR for 200V, 230V, and 460V units; 25,000A SCCR for 575V units.

Phase Monitor

Phase monitor shall protect 3-phase equipment from phase loss, phase reversal and phase imbalance. Any fault condition shall produce a Failure Indicator LED and send the unit into an auto stop condition.

Non-Fused Disconnect

An external handle mounted on the control box door shall be provided to disconnect unit power with the control box door closed for safety.

Powered Convenience Outlet

A 15A, 115V Ground Fault Interrupter convenience outlet shall be factory installed. It shall be wired and powered from a factory mounted transformer. Unit-mounted, non-fused disconnect with external handle shall be furnished with factory powered outlet.

Symbio™ 800 Controller

The Symbio 800 controller is an application-specific, programmable controller that is factory installed and designed to control packaged HVAC equipment. A 7” user interface features a touch-sensitive color screen that provides facility managers with at-a-glance operating status, performance monitoring, scheduling changes and operating adjustments. Other advanced features include automated controller backup and optional features such as secure remote connectivity, wireless building communications, mobile device connectivity and custom programming with expandable I/O.

BACnet® Communication Interface

Rooftop controller communication interface shall use the BACnet protocol with an Ethernet (IEEE 802.3) or RS485 (EIA-485) physical interface and an appropriate data link technology as defined in ANSI®/ ASHRAE® Standard 135-2012 (for example, BACnet/IP, BACnet/MSTP). The rooftop controller shall be BTL listed as a BACnet Advanced Application Controller (B-AAC) as defined in ANSI/ASHRAE Standard 135-2012.

AirFi® Wireless Communication Interface Module (WCI)

Rooftop controller communication interface shall use the BACnet protocol with a ZigBee (IEEE 802.15.4) physical interface and an appropriate data link technology as defined in ANSI®/ASHRAE® Standard 135-2012. Wireless communication shall utilize open standard protocols, of which BACnet and ZigBee shall be considered appropriate.

Each rooftop controller wireless communication interface shall self-heal to maintain operation in the event of network communication failure.

Each zone sensor wireless communication interface shall be capable of many-to-one sensors per controller to support averaging, monitoring, and multiple zone applications. Sensing options shall include temperature, relative humidity, CO_2, and occupancy.

Trane LonTalk® Communication Interface Module

The LonTalk module provides an interface to a Tracer building automation system or other control system that supports LonTalk and shall be factory installed, allowing for control and monitoring of the unit through a RS485, two-wire communication link. Requires an additional LonTalk Communication Kit be installed.

Modbus Communication Protocol

The Symbio™ 800 controller shall support standard Modbus® RTU communication protocol through an RS485, two-wire communication link.

Power Monitor

Factory installed power meter shall measure unit energy usage to 0.2% accuracy (ANSI C12.20) and communicate through the Symbio™ 800 controller enabling viewing through user interface or building automation system.

Controls Expansion Hardware

The rooftop controller shall have field applied controls capability. Factory installed expansion hardware (XM70) shall have 19 inputs/outputs. Additional expansions may be added in the field.

Rapid Restart

Option provides immediate start-up upon power failure. A backup generator shall be required on site before unit start-up. Rapid Restart shall begin immediately after recovery from a power loss and work by restarting the compressors and supply fan quickly to provide full cooling within 2 to 3 minutes.

Accessories

Roof Mounting Curb

Roof mounting curb shall be heavy gauge zinc coated steel with nominal two-inch by four-inch nailer setup. Supply/return air opening gasketing shall be provided. Curb shall ship knocked down for easy assembly. Curb shall be manufactured to National Roofing Contractors Association guidelines.

Wall Mounted CO_2 Sensor

The CO_2 (Carbon Dioxide) sensor shall have the ability to monitor space occupancy levels within the building by measuring the parts per million of CO_2 in the air. As the CO_2 levels increase, the outside air damper modulates to meet the CO_2 space ventilation requirements.

Duct Mounted CO_2 Sensor

The CO_2 (Carbon Dioxide) sensor shall have the ability to monitor space occupancy levels within the building by measuring the parts per million of CO_2 in the air. As the CO_2 levels increase, the outside air damper modulates to meet the CO_2 space ventilation requirements.

Air-Fi® Wireless Communication

Air-Fi® Wireless Communication Interface (WCI Indoor)

Factory installed wireless interface shall allow wireless communication to Air-Fi wireless sensors, service tools, equipment controls, and building controller.

Air-Fi® Wireless Communication Sensor – WCS-SB (temperature only)

Wall mounted wireless temperature sensor shall allow wireless communication to Air-Fi Wireless network, communicating space temperature to Symbio™ 800 equipment controller. Controls shall allow up to 6 WCS models to be used per IntelliPak® RTU.

Air-Fi® Wireless Communication Sensor – WCS-SD (temperature with display)

Wall mounted wireless temperature sensor shall allow wireless communication to Air-Fi Wireless network, communicating space temperature and occupancy status to Symbio™ 800 equipment controller. Digital interface with push buttons shall enable Heat, Cool, Auto operation mode settings and two fan mode settings. Dual temperature set points shall allow for automatic control of the zone temperature heating and cooling requirements when in the Automatic Changeover mode. Controls shall allow up to 6 WCS models to be used per IntelliPak® RTU.

Air-Fi® Wireless Communication Sensor - WCS-SO (temperature and occupancy)

Wall mounted wireless temperature sensor shall allow wireless communication to Air-Fi Wireless network, communicating space temperature and occupancy status to Symbio™ 800 equipment controller. Controls shall allow up to 6 WCS models to be used per IntelliPak® RTU.

Air-Fi® Wireless Communication Sensor - WCS-SCO_2 (temperature, occupancy, and CO_2)

Wall mounted wireless temperature sensor shall allow wireless communication to Air-Fi Wireless network, communicating space temperature, occupancy status, and CO_2 level to Symbio™ 800 equipment controller. Controls shall allow up to 6 WCS models to be used per IntelliPak® RTU.

Air-Fi® Wireless Communication Module - WCS-SH (relative humidity module for use with all WCS models)

2 percent accuracy relative humidity module shall be field installed in the Wall mounted WCS models for wireless communication of relative humidity level to Symbio™ 800 equipment controller.

Trane WiFi Adapter

The Trane Wi-Fi adapter kit (equipped with a USB cable) shall enable communication among devices on a Wi-Fi network to facilitate the wireless integration of client devices such as touch-screen displays and technician laptops as an access point.

Zone Sensors

Remote Zone Temperature Sensor with Timed Override

Electronic sensor shall be used in conjunction with a Trane ICS system. The Timed Override button shall allow the system to operate at the occupied setpoints while in an unoccupied status.

Remote Zone Temperature Sensor with Timed Override and Temperature Setpoint

Electronic sensor shall be used in conjunction with a Trane ICS system with zone temperature setpoint capability. The timed override button shall allow the system to operate at the occupied setpoints while in an unoccupied status.

Remote Zone Sensor

Thermistor shall be encased in a decorative wall mountable enclosure. It shall be used in conjunction with a Zone Temperature Sensor when remote sensing is desired. The sensor shall communicate temperature changes within a zone to the unit UCP.

Dual Set Point Temperature Sensor

Electronic sensor shall have Heat, Cool, Auto operation mode settings and two fan mode settings. Dual temperature setpoints shall allow for automatic control of the zone temperature heating and cooling requirements when in the Automatic Changeover mode.

Dual Set Point Display (BAYSENS131A)

Wall mounted zone sensor, communicating space temperature and occupancy status to Symbio™ 800 equipment controller. Digital interface with push buttons enables Heat, Cool, Auto operation mode settings and two fan mode settings. Dual temperature setpoints allow for automatic control of the zone temperature heating and cooling requirements when in the Automatic Changeover mode.

Humidity Sensor

A wall or duct-mounted humidity sensor shall be used to control activation of the hot gas reheat dehumidification option. The humidity sensor shall be set for humidity levels between 40 percent and 60 percent relative humidity.

Duct-mounted Humidity Sensor

Shall monitor the humidity levels in the space for 1) Humidification and/or 2) Modulating Hot Gas Reheat.

Wall-mounted Humidity Sensor

Shall monitor the humidity levels in the space for 1) Humidification and/or 2) Modulating Hot Gas Reheat.

Temperature Sensor

Bullet or pencil type sensor shall be used for temperature input such as return air duct temperature

LonTalk® Communication Kit

For future opportunities and upgrade flexibility, this kit shall contain a LonTalk® Communication Interface module for communication with a building automation system.

Trane Start-Up

A Trane technician shall provide unit startup after the unit is properly installed. The installation shall include:

- Unit and all ship-with items installed
- All utilities and drain pipes connected
- All refrigerant piping reconnected and all refrigerant charge adequately distributed throughout the system
- All ductwork attached to the unit

Prior to Trane Unit Start-Up

Prior to Trane start-up, the following work should be inspected and verified:

Unit Inspection - Cabinet

Review the overall unit for exterior damage (dents, bends, missing panels, doors working properly, etc). Verify the unit interior is free from debris/obstructions, the panels and doors are secured properly, the unit clearances are adequate to avoid air recirculation, and that the unit drain lines and traps are properly installed.

Wiring

Review the unit main power to ensure that the unit is properly grounded, the main power feed wire gauge is adequately sized, the correct voltage is supplied to the unit and electric heaters (if applicable), and the incoming voltage is phase balanced. Verify that all wiring connections are tight, all field installed control wiring is landed on correct terminals, and that all automation and remote controls, along with control wiring for VAV controls, are correctly installed/wired.

Refrigeration System

Review the refrigeration system to ensure the coil fins are straightened, shipping hardware and plastic covers for compressors have been removed, compressors contain the correct oil level, service valves are in the correct position, and the crankcase heaters have been operational for at least 12 hours prior to Trane start-up.

Fans

Check the unit fans to ensure the condenser fan blade set-screws to the motor shaft are tight, hold down bolts and channels from fan sections have been removed, proper adjustment of fan section spring isolators, proper fan rotation, and proper fan motor amperage.

Economizer

Check all damper linkages for proper adjustment. Verify proper damper operation and outside air pressure sensors.

Electric Heat

On units equipped with electric heaters, check to ensure the heating system matches the unit nameplate and verify that the correct voltage is supplied to the heaters.

Gas Heat

On units equipped with gas heaters, check to ensure that the flue assembly is secure and properly installed, sufficient gas pressure exists at the unit, no leaks exist in gas supply line, the gas heat piping includes a drip leg, and condensate line is run if required.

Trane Unit Start-Up

After the unit installation has been fully completed, a Trane technician shall do the following:

- Verify and log supply fan operation, proper compressor operation, and condenser fan operation, as well as correct levels of superheat and subcooling.
- Verify operation of all VAV modes per job requirements, which include: Supply Air Cooling and Heating, Daytime Warmup, Morning Warmup, and Supply Air Tempering.

Space Pressure Control — Verify that unit is sensing field installed building pressure input.

Ventilation Override — Verify that sequences are set up and functional per customer requirement.

Economizer — Adjust outside air or return air travel and verify all sensor inputs.

Dehumidification — Verify that dehumidification mode operates correctly and is set up per job requirements.

Outside Air Measurement — Verify that Demand Flow Ventilation function is correct.

Gas Heat — Startup gas heat per the unit Installation, Operation, Maintenance Manual (IOM) and record CO_2 and O_2 levels.

All Units — Verify user interface programming, including setpoints and sensor sources per customer requirements. Leave the unit in a running state or off per customer requirement. Once the IntelliPak® unit startup is complete, provide a startup activities communication and the associated operating log.

Certified AHRI Performance

Packaged Rooftop units cooling, heating capacities and efficiencies shall be rated within the scope of the Air-Conditioning, Heating and Refrigeration Institute (AHRI) Certification Program and display the AHRI Certified® mark as a visual confirmation of conformance to the certification sections of AHRI Standard 340-360 (I-P) and ANSIZ21.47 and 10 CFR Part 431 pertaining to Commercial Warm Air Furnaces. The applications in this catalog specifically excluded from the AHRI certification program are:

- Ventilation modes
- Heat Recovery
- Units larger than nominal 63 tons

Notes

The AHRI Certified mark indicates Trane U.S. Inc. participation in the AHRI Certification program. For verification of individual certified products, go to ahridirectory.org.

Trane - by Trane Technologies (NYSE: TT), a global innovator - creates comfortable, energy efficient indoor environments for commercial and residential applications. For more information, please visit trane.com or tranetechnologies.com.

Trane has a policy of continuous product and product data improvements and reserves the right to change design and specifications without notice. We are committed to using environmentally conscious print practices.

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