TECHNICAL GUIDE

SERIES 40®

SINGLE PACKAGE ROOFTOP UNITS

V52, V53 & V54 (R-410A)

25, 30, & 40 TON

25, 30 & 40 Ton (Efficiencies up to 10.5 EER)

40 TON UNIT SHOWN

ISO 9001
Certified Quality
Management System

TOMORROW'S UNIT TODAY

GENERAL

Introducing the Johnson Controls 25, 30, & 40 ton Series 40 rooftop line - units designed to provide peak performance and value both today and for years to come. Series 40 units are manufactured at an ISO 9001 registered facility, and each rooftop is completely computer-run tested prior to shipment.

The Series 40 is designed to be flexible enough to meet your needs today and in the future. The true value of Johnson Controls Series 40 is that it can be designed to fit any need, from cooling only, constant volume applications to variable air volume systems with variable frequency drive.

FEATURING:

- Cooling Only Units
- Cooling/Gas Heating Units (Natural) Standard or Modulating Gas Heat available
- Cooling/Electric Heating Units
- Cooling/Hot Water Heating Units
- Cooling/Steam Heating Units
- Industry Leading Efficiency
- Double Wall Construction
- Stainless Steel or Powder Coated Drain Pan
- Multiple Scroll Compressors
- Multiple Refrigeration Circuits
- Upgradable Motor Efficiency
- Enhanced Filtration
- Vibration Isolated Supply Fan and Motor
- TechniCoated Evaporator and Condenser Coils
- Single Power Point Connection
- Easy Access Hinged Doors
- Variable Air Volume
- Constant Air Volume
- Factory Installed Economizers/Disconnect/Convenience Outlet/Control Options
- Low Profile

UNIT CONTROL BOARD FEATURES:

- Built-in LCD display and easy to use navigation joystick and buttons allowing the user to quickly navigate the menus displaying unit status, options, current function, supply, return and outdoor temperatures, fault codes and other information.
- Designed to operate on both constant and variable air volume units
- 365-Day real time clock
- Occupancy Schedule allowing two schedules per day
- 20 Holiday schedules with programmable schedules that can start at any time, day or night
- Patented Comfort Ventilation operation for economical and comfortable economizer operation
- Demand Ventilation option to assure proper IAQ conditions based on available space or return air CO_2 levels
- Temperature/Humidity programming algorithm allows programmable limits to help control humidity in the space
- Smoke Purge automatically ventilates the space when smoke is detected
- Monitors dirty filters and proves airflow before starting heating or cooling
- Intelligent recovery to bring the space temperature up to occupied setting quicker and more economically

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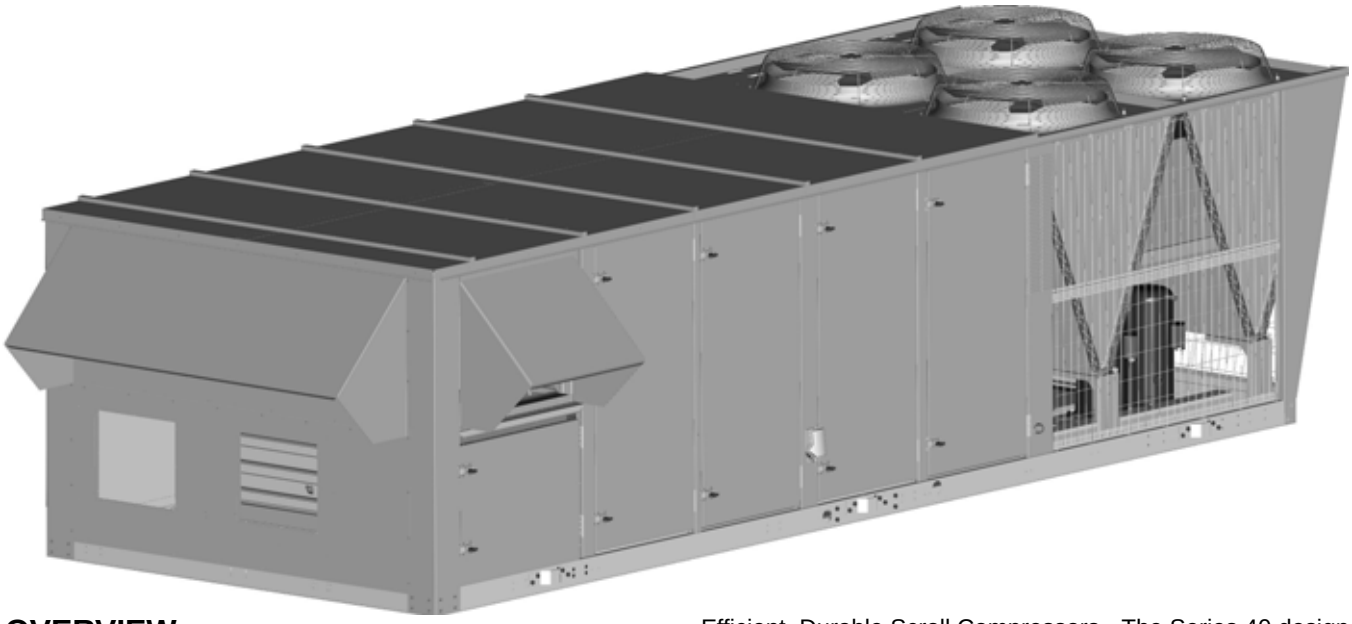


OVERVIEW

Introducing the Johnson Controls 25, 30, & 40 ton Series 40 rooftop line - units designed to provide peak performance and value both today and for years to come. When we asked our customers what they wanted in a new rooftop line, we were careful to listen to both the needs of today and tomorrow. So, you'll find that Series 40 units not only help you solve today's problems, but can handle tomorrow's difficulties as well:

Industry Leading Efficiency - The Series 40 with EER ratings of up to 10.5 make it the most frugal energy consumer in its class. When it comes to lower operating costs, they simply outperform the competition.

Double Wall Construction - Series 40 units come double walled as standard. The galvanized sheet metal liner provides the best protection against microbial growth, helping both the unit and the indoor air stay fresh and clean. And, the rigid sheet metal inner liner keeps the insulation completely out of the air stream, eliminating concerns about fiberglass particles.

Drain Pan Whisks Away Condensate - Condensate is frequently the source of microbial contamination. Competitive drain pans often are insufficiently sloped to properly drain all of the condensate, causing drain pan corrosion and bacterial growth to begin almost immediately. The Johnson Controls design is sloped at the 1/4” per foot recommended by the ASHRAE 62.1-2004 ventilation draft standard, with an extra large drain connection capable of removing up to three gallons of condensate per minute. It is available in either powder coat painted steel or stainless steel for long life.

Efficient, Durable Scroll Compressors - The Series 40 design uses industrial grade hermetic scroll compressors for peak efficiency and low noise operation. The compressor design is so durable that it can actually hold more liquid charge without slugging than is present in each refrigerant circuit at shipment, dramatically reducing the chances of ever slugging a compressor with liquid charge.

Multiple Refrigeration Circuits for Greater Turndown - The Johnson Controls Series 40 unit has intertwined circuits giving the best unloading capability in the industry. With more and more designs requiring higher outside air quantities, the lower capacity capability is an outstanding way to neutralize outside air without over-conditioning the space on off-peak days. And, Series 40's high quality balance-port thermal expansion valves are more effective at metering refrigerant flow in part-load conditions, making them a peak-performer across a wide capacity range.

FEATURES AND BENEFITS

When it comes to flexibility, Series 40 units really shine. Our customers were clear about one thing - not all installations are the same. Some have very simple needs, others are more involved. The Johnson Controls Series 40 serves both markets - and all of those in between - extremely well. Johnson Controls engineers crafted a design which is both uniquely flexible and competitive, giving you the best of both worlds. In addition to a competitive base product, Series 40 offers unparalleled flexibility. Optional features include:

Variable Air Volume - Johnson Controls gives you the ability to vary air volume by inlet guide vanes or variable frequency drive - the choice is yours. All Series 40 VAV units come standard with hot gas bypass to give extended operation range.

Optional Head Pressure Control - For those applications where mechanical cooling is required below 40°F, optional low ambient operation allows compressor operation down to 0°F.

Easily Upgrade Motor Efficiency to Meet Tighter Codes - Optional high efficiency motors help you make simple upgrades to meet more demanding building and energy codes.

Enhanced Filtration Options - Series 40 units give designers the flexibility to meet various IAQ requirements with a full range of rigid and throwaway filters at different efficiency levels.

Vibration Isolation - The Series 40's neoprene mounts are typically sufficient for most applications but when sound and vibration transmission are a major concern, Johnson Controls offers 1" and 2" isolation springs for even greater protection from supply air fan noise and vibration.

Corrosion Resistant Coils- Many industrial and seacoast applications require enhanced protection from corrosive environments.

Optional TechniCoated Coated Condenser and Evaporator Coils - Many industrial and seacoast applications require enhanced protection from corrosive environments. The special dipped phenolic coating process provides a high level of protection for the exposed condenser coil.

Optional Copper-Copper Condenser and Evaporator Coils - For corrosion resistance.

Variety of Exhaust Air Options - Johnson Controls Series 40 offers a wide variety of exhaust air options, including barometric relief, non-modulating power exhaust, and modulating power exhaust. And, because Series 40 units use forward-curved blowers for power exhaust fans, they can exhaust up to 100% of the nominal supply air at much greater static pressure loads than competitive units. **Not available on end return.**

NOTE: In most applications, the supply fan will keep the return at negative pressure. A barometric relief will function better when ducted to building space, not the return.

Optional Factory Installed Economizers - Series 40 units offer economizers with Standard or Optional low leak dampers. Comparative enthalpy, single enthalpy and dry bulb control are available.

Optional Factory Installed Disconnect- A factory installed power disconnect is offered to easily allow shut off of power to the unit. The factory installed disconnect eliminates the need for a bulky, unattractive field installed disconnect to be mounted on the side of the unit. The factory disconnect is mounted internally to the unit, just behind the electrical box access panel and can also be ordered with a powered 120 volt convenience outlet that remains powered after the unit power has been disconnected.

Optional Factory Installed Powered Convenience Outlet- A factory installed powered 120 volt convenience outlet option prevents the need for a separate 120 volt circuitry on the roof to meet local codes and provides easily accessible power for tools, lighting and other 120 volt items. The optional factory convenience outlet is only available in conjunction with a factory installed disconnect.

Heating Done Your Way - Series 40 offers the choice of natural gas standard or modulating gas heat, electric resistance heat, hot water heat, steam, or no heat at all. Very simply, the choice is yours.

INSTALLATION FEATURES

With Johnson Controls Series 40, high performance doesn't mean high complexity. Johnson Controls Series 40 is as simple as possible, and service convenience comes standard with each unit. From a single curb size to the easy service access, you'll find that they are designed to be easy from start to finish.

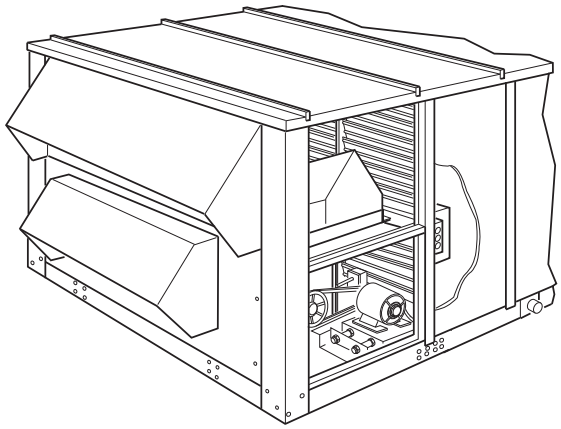
Full Range of Air Flows and Static Pressures - The Series 40 design gives a complete offering of supply air flows and static pressure combinations to meet most every application requirement.

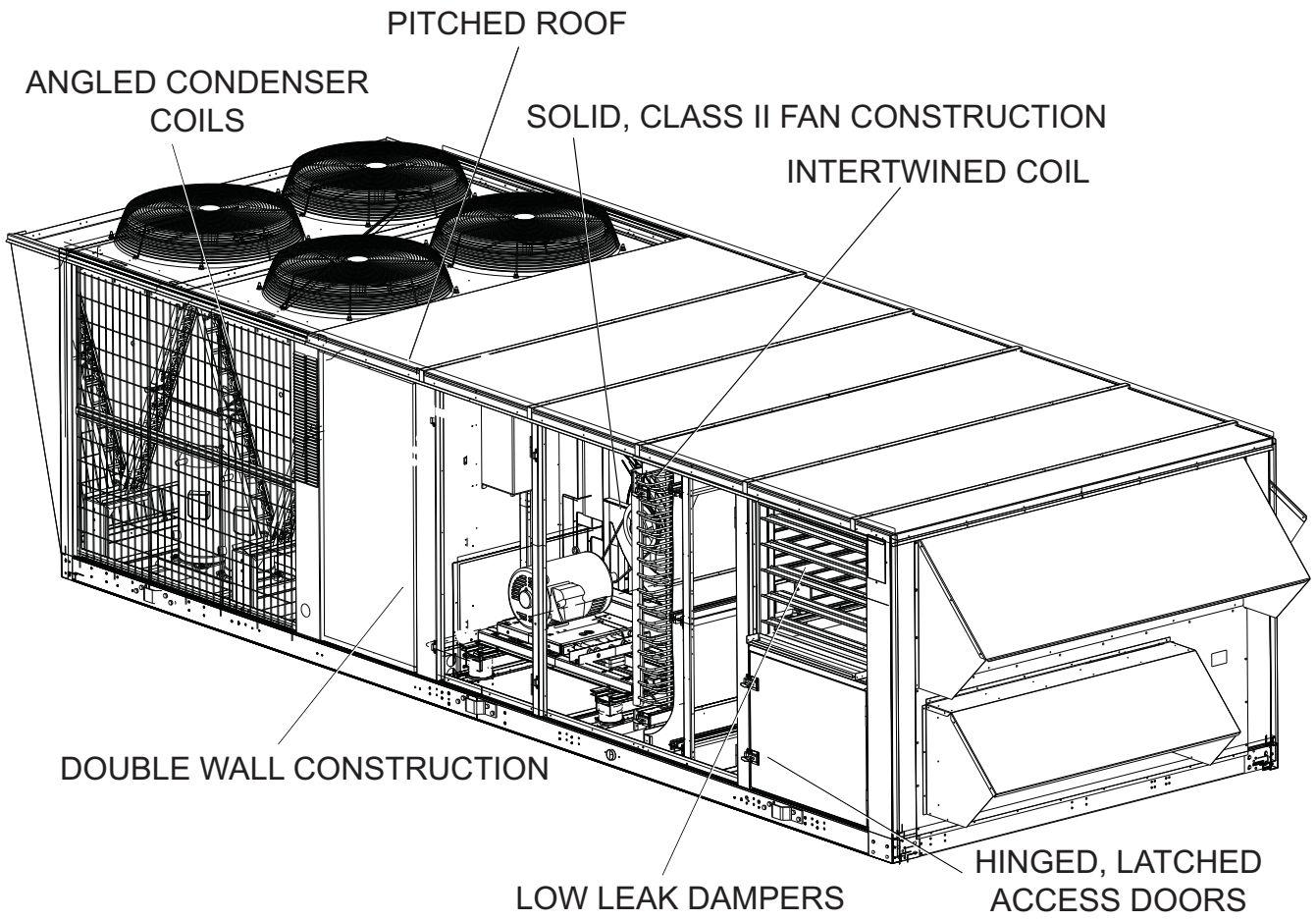
Single Power Point Connection - Series 40 units have a single gas and electric connection, minimizing time at the job site. For further installation flexibility, power and gas connections may be brought up from the curb or through the side of the unit.

Simple Controls - Series 40's controls system is easy to understand and apply, and it doesn't lock you into proprietary devices. A choice for Johnson Controls Series 40 today does not limit your choices tomorrow.

Rain Hoods Rotate Into Place - No bulky, field--installed rain hoods here. Series 40 rain hoods ship rotated inside the unit. Once on the job, installer merely rotates the hood upward and puts in a few screws - an easy one-person job.

Excellent Access for Service - Service access on Series 40 is a snap. Hinged and latched doors give access on both sides of the unit to all major components. All doors have positive action slide latches for even greater ease of access. All service fittings are conveniently located to minimize time and effort.





CONSTRUCTION FEATURES

Johnson Controls Series 40 rooftop line is built for the long haul, with high end features and construction offered at a competitive price. Series 40 units are manufactured at an ISO 9001 registered facility, and each rooftop is completely computer-run tested prior to shipment. Some of the valuable construction features of the Series 40 which are not found on competitive units include:

Double Wall Construction - Each unit has both an exterior and an interior wall, which make for a more rigid design with panels and doors that are solid, not flimsy. The unit features a fully framed construction for even greater stability.

Powder Paint - Industry leading 1000 salt spray hour paint keeps the unit in great condition for years to come.

Low Profile - Units stand only 64” above their curb, minimizing potential aesthetic conflicts.

Extended flue connection - Each gas unit ships with a field mounted external flue. The flue lifts all products of furnace combustion far above the unit - eliminating the possibility of corrosion in the furnace heat exchanger from recirculating flue gases.

Protective Covering - Special polyurethane sleeves which cover the distributor tubing keep distributor tubes from contacting each other and wearing out.

Built-in Hail Guard - Condenser coils angled at 30 degrees from the vertical are inherently protected from damage due to shipment, hail, etc.

Induced Draft Furnace - This design provides a positive exhaust of all combustion products.

LIST OF FEATURES AND BENEFITS

Standard Features

- Efficiencies up to 10.5 EER
- R-410A Refrigerant
- Double wall construction
- Major components have hinged and latched access doors
- Industrial duty scroll compressors
- Sturdy framed construction
- Sloped stainless steel or powder coated drain pan
- Four independent cooling circuits
- Intertwined evaporator coil
- Angled condenser coils for superior protection
- Single power point connection
- Through-the-curb or through-the-base utility connections
- Retractable outside air hoods
- Powder paint tested to 1000 salt spray hours
- Mechanical cooling from 40° F to 125° F
- 1-1/2” insulation
- Sloped unit roof with drip lip
- High and low refrigerant pressure protection
- Polyurethane sleeves to protect small diameter tubing
- Steel framing around blowers with deflection springs or rubber isolators for low vibration
- Fully factory packaged and run-tested
- 10 year gas heat exchanger warranty
- One year compressor warranty
- One year warranty on all parts

Factory Installed Options

- Economizer with standard or low leak dampers
- Natural gas standard or modulating gas heat with reliable induced draft design
- Electric heat in three sizes
- Variable air volume with either inlet guide vanes wired for VFD variable frequency drive, or factory installed VFD.
- 1, 2” blower isolator springs or rubber isolators
- A variety of blower horsepower offerings
- High efficiency motors
- High efficiency filtration
- Barometric relief
- Power exhaust of 100% of nominal air flow
- TechniCoat corrosive resistant coating on condenser and evaporator coils
- Copper-Copper corrosive resistant condenser and evaporator coils
- 0°F low ambient operation of mechanical cooling
- Hot gas bypass (standard on all VAV units)
- Single unit disconnect
- Convenience outlet and transformer factory wired
- Hot water heating coil with one or two rows
- One row steam heating coil
- Commercial Comfort System (CCS)
- FDD (Fault Detection and Diagnostics) - Refrigerant side

Field Installed Accessories

- 7-Day Programmable Wall Thermostat-Can be used with or without remote sensors. Can be used on CV and VAV units when wall thermostat is required for scheduling and temperature control.
- Energy Recovery Ventilators- 8,000 and 13,000 CFM models available. Great for applications involving 30% or more of required outdoor air where energy use and comfort must be optimized.
- Wall Sensors- Remote space sensors used with CV or VAV unit for unit control via the unit control. Standard sensor, sensor with override and sensor with override and + 5 degree adjustment.
- Phase Monitor Kit- Includes control and wiring to monitor and protect the unit from phase reversal, phase loss and low voltage.
- Burglar Bars- Prevent any type of building entry through the RTU unit with bars that block the return and supply openings on downflow applications.
- Partial perimeter roofcurb- Designed for application on all 25-40 ton Series 40 rooftop units. 14" height.
- Barometric Relief Kit- Provides barometric relief hood and dampers for duct mounting on units requiring end return.
- Natural Gas to Propane Conversion Kits- Contains orifices and gas valves parts to convert from Natural Gas to Propane. (Not available on modulating heat.)
- High Altitude Kit- Natural gas kit designed for natural gas heating applications between 2,000 and 6,000 feet above sea level.

NOMENCLATURE

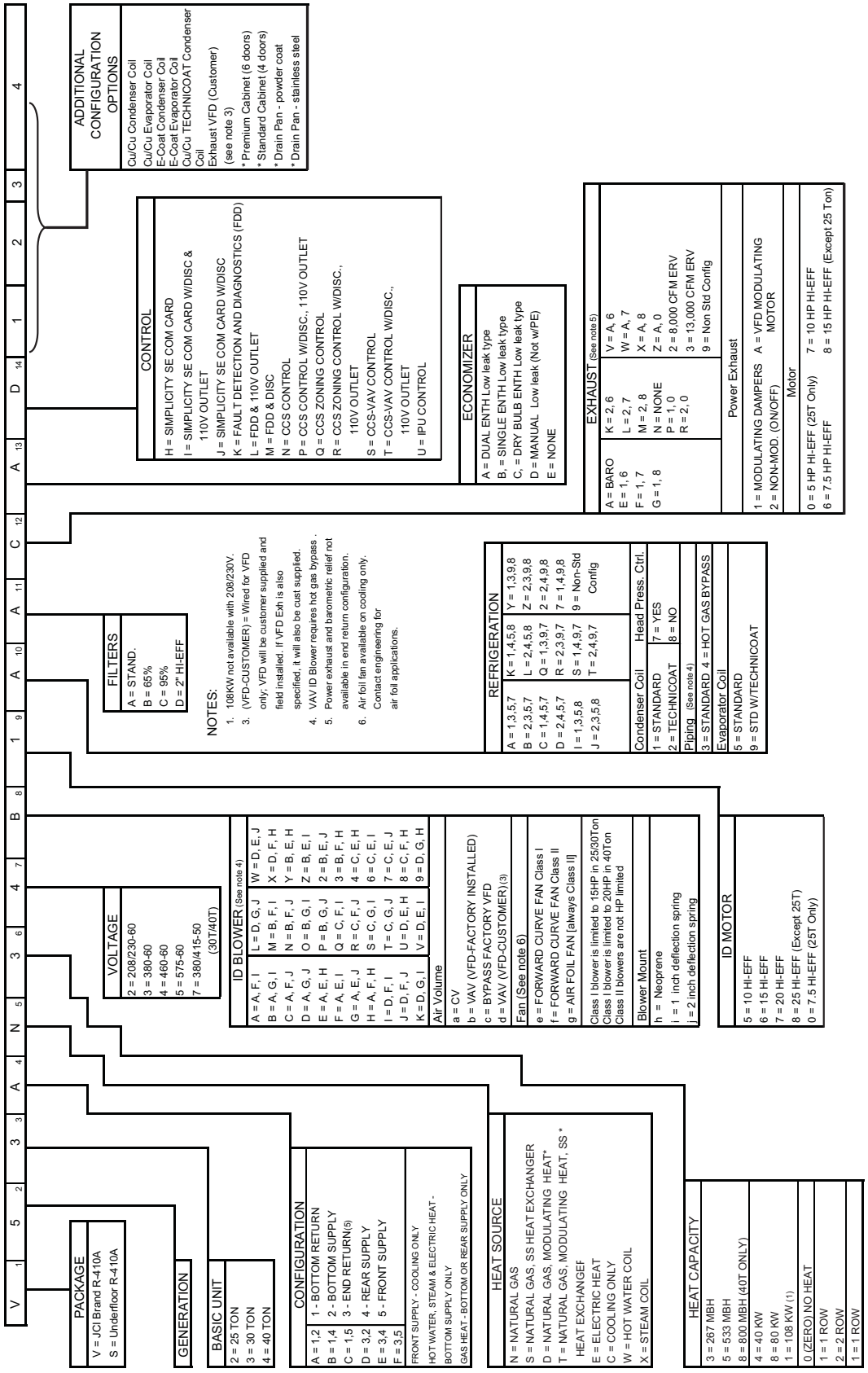


TABLE 1: GENERAL PHYSICAL DATA

Unit Size	25 TON	30 TON	40 TON
UNIT EER / IEER (Standard Capacity Evaporator)	10.5 / 11.5	10.1[1] / 11.1	10.0[1] / 10.5
Compressor Data			
Number/Size	4 x 5.7Ton	4 x 7 Ton	4 x 8.6 Ton
Type	Scroll	Scroll	Scroll
Unit Capacity Steps	25%, 50%, 75%, 100%	25%, 50%, 75%, 100%	25%, 50%, 75%, 100%
Indoor Fan and Drive			
Number / Type	1 / FC	1 / FC	1 / FC
Diameter x Width (inches)	22 x20	22 x 20	25 x 22
HP Range	7.5 - 20	10 - 25	10 - 25
CFM Range (full load)	6,000 - 12,500	6,000 - 15,000	8,000 - 18,000
ESP Range	0.2" - 4.0"	0.2" - 4.0"	0.2" - 4.0"
Exhaust Fan			
Number/Size/Type	1/FC	2/FC	2/FC
HP Range (single motor)	5 - 10	7.5 - 15	7.5 - 15
CFM	3,000 - 9,000	4,000 - 15,000	4,000 - 18,000
Evaporator Coil			
Size (sq. ft.)	26.0	26.0	30.4
Rows/FPI	3 / 16	4 / 16	4 / 16
Condenser Coil			
Size (sq. ft.)	65	78	104
Rows/FPI	2/16	2 /20	2 /16
Condenser Fans			
Quantity / Diameter (inches)	4 / 24	4 / 24	4 / 30
Nominal CFM	6,800	7,200	9,600
Motor HP	1.0	1.5	1.5
Electric Heat			
kW Range	40 - 108	40 - 108	40 - 108
40 kW / Capacity Steps (CV/VAV)	1	1	1
80 kW / Capacity Steps (CV/VAV)	2 / 1	2 / 1	2 / 1
108 kW / Capacity Steps (CV/VAV)	3 / 1[2]	3 / 1[2]	3 / 1[2]
Natural Gas Heat			
Unit Size	**25 TON**	**30 TON**	**40 TON**
267 MBH Capacity Steps (CV/VAV)	1 / 1	1 / 1	1 / 1
533 MBH Capacity Steps (CV/VAV)	2 / 1	2 / 1	2 / 1
800 MBH Capacity Steps (CV/VAV)	-	-	3 / 1[2]
267 MBH "Modulating" Capacity Steps (CV Only)	6 / 1	6 / 1	6 / 1
533 MBH "Modulating" Capacity Steps (CV Only)	12 / 2	12 / 2	12 / 2
800 MBH "Modulating" Capacity Steps (CV Only)	-	-	17 / 3
Hot Water Coil			
Size (inches)	22.5" x 65"	22.5" X 65"	22.5" X 65"
Capacity	25 Ton	30 Ton	40 Ton
Steam Coil			
Size (inches)		21" X 65"	
Type		Steam Coil	
Filters 2" TA			
Number / Size	4 / 16 x 25 & 6 / 20 x 25	4 / 16 x 25 & 6 / 20 x 25	4 / 16 x 25 & 6 / 20 x 25
Face Area (sq. ft.)	30.4	30.4	30.4
Filters 2" Pleated, 30%			
Number / Size	4 / 16 x 25 & 6 / 20 x 25	4 / 16 x 25 & 6 / 20 x 25	4 / 16 x 25 & 6 / 20 x 25
Face Area (sq. ft.)	30.4	30.4	30.4
Filters 65% Rigid w/ 2" TA Prefilters			
Number / Size	4 / 16 x 25 & 6 / 20 x 25	4 /16 x 25 & 6 / 20 x 25	4 / 16 x 25 & 6 / 20 x 25
Face Area (sq. ft.)	30.4	30.4	30.4
Filters 95% Rigid w/ 2" TA Prefilters			
Number / Size	4 ea. 16 x 25 / 6 ea. 20 x 25	4 ea. 16 x 25 / 6 ea. 20 x 25	4 ea. 16 x 25 / 6 ea. 20 x 25
Face Area (sq. ft.)	30.4	30.4	30.4

1. Cooling Only Unit Efficiency/ Gas Electric Unit Efficiency is V53 (10.0 / 10.6) and V54 (10.0 / 10.5)
2. Unit Control Board with 3 heating outputs only, all other Unit Control Boards 2 / 1.

TABLE 2: REFRIGERANT FACTORY CHARGE R-410A

UNIT (TONS)	MODEL	CHARGE			
		SYSTEM #1	SYSTEM #2	SYSTEM #3	SYSTEM #4
25	wo/HGBP	13lb 8oz	12lb 8oz	12lb 8oz	12lb 8oz
25	w/HGBP	14lb	12lb 8oz	12lb 8oz	12lb 8oz
30	wo/HGBP	15lb 8oz	15lb 8oz	15lb 8oz	16lb
30	w/HGBP	16lb 2oz	15lb 8oz	15lb 8oz	16lb
40	wo/HGBP	17lb 10oz	17lb 10oz	19lb 13oz	19lb 13oz
40	w/HGBP	18lb 2oz	18lb 2oz	20lb 5oz	20lb 5oz

SELECTION PROCEDURE

GIVEN:

Required Cooling Capacity	460,000 Btuh
Required Sensible Cooling	390,000 Btuh
Required Heating (Gas)	320,000 Btuh
Entering Air on Evaporator	83° F DB/ 67° F WB
Outside Design Temperature	95° F
Supply Fan CFM	13,000 CFM
External Static Pressure	1.25 IWG
Electrical Supply Voltage	460-3-60

Economizer Required

2” Throw Away Filters

Constant Volume

SELECT UNIT:

1. Determine nominal tons:

   460,000 / 12,000 = 38.33 Tons

   Thus, a nominal 40 ton unit is selected.

2. Reference Cooling Capacity Table for a 40 ton unit.

   a. Locate the table for the 40 ton evaporator coil with 95° F air on the condenser.

   b. Enter table at 13,000 CFM and 67°F WB air on evaporator

   c. Trace to 83° F Entering Dry Bulb column.

   d. Read 493 MBH total capacity and 403 MBH sensible capacity.

   The 40 ton unit will meet the cooling requirements. From the nomenclature, the unit will be a V54. Choose the appropriate configuration for the next digit. Assuming bottom return and supply, the fourth digit would be an “A,” making the model V54A.

3. Find Gas Heating Capacity Table.

   a. Trace down Output column.

   b. Find output which exceeds 320,000 Btuh requirement. The N5 option gives 426 MBH output.

   c. Ensure that it is offered in the V54 unit. Read option model as N5.

   From the basic nomenclature, the model now becomes V54AN5. Add voltage code of “4” for 460-3-60. Nomenclature becomes V54AN44.

SELECT FAN SPEED AND HORSEPOWER REQUIREMENTS OF SUPPLY AIR FAN

1. Find Supply Air Performance Tables for the 40 ton unit.

   a. Check footnotes and make necessary additions or deductions to static resistance of ductwork:

   Ductwork static resistance 1.25 IWG

   Economizer static resistance addition (interpolate) =.25 IWG + Gas Heat (High) = 0.5 IWG

   Total Static Resistance 2.0 IWG

   b. Enter Fan Performance Table at 13,000 CFM and 2.0 IWG static pressure:

   RPM = 733

   BHP = 11.8

NOTE: Either Class I or Class II blower could be used.

   c. Enter the Fan Motor Drive Tables. Selecting a 15 hp motor allows (service factor of 1.5) for a maximum operating BHP greater than the 11.8 BHP requirement.

SIZE OVERCURRENT PROTECTION DEVICE AND DETERMINE CIRCUIT AMPACITY

1. Find electrical tables for the basic 40 ton unit.

   a. Enter table for 460-3-60 voltage.

   b. Find 15 hp in the Supply Air Fan column.

   c. Trace to Minimum Circuit Ampacity column - read 105.

   d. Trace to Max. Fuse/Breaker Size column - read 125 amps.

   e. Size wire and overprotection device accordingly.

   f. Check all footnotes.

TABLE 3: STANDARD GAS HEATING CAPACITIES

Gas Heat Option	Available on Models	Input Capacity (MBH)[1]		Output Capacity (MBH)[2]	Gas Rate, Cu. Ft./hr.[3]	
		1st Stage	Total		1st Stage	Total
N3	V52/V53/V54	267	267	213	247	247
N5	V52/V53/V54	267	533	426	247	495
N8	V54 ONLY	267[4]	800	638	247	742

1. Heating capacity is only staged on CV models. VAV models use only one stage at full capacity.
2. Blower motor heat not included.
3. Based on a heat content of 1075 Btu/Ft.[3]

$$\text{GAS RATE} = \frac{\text{Input MBH}}{(1.075 MBH)/Ft}.^{3}$$

4. Unit Control Board with 3 heating outputs only. For all other Unit Control Boards the 1st Stage is 533 MBH.

TABLE 4: TEMPERATURE RISE

Ton	Modules		
	1	2	3
25	5-35	25-55	-
30	5-35	20-50	-
40	5-30	10-45	25-55

TABLE 5: MINIMUM HEATING CFM

Ton	Modules		
	1	2	3
25	5,644	7,183	-
30	5,644	7,901	-
40	6,584	8,779	13,169

TABLE 6: MODULATING GAS HEATING CAPACITIES

Gas Heat Option	Available on Models	Input Capacity (MBH)		Steps	Output Capacity (MBH)[1]	Gas Rate, Cu. Ft./hr.	
		Minimum	Maximum			Minimum	Maximum
D3[2]	V52/V53/V54	69	267	6	213	64	247
D5[2]	V52/V53/V54	69	533	12	426	64	495
D8[2]	V54 ONLY	69	800	17	638	64	744

1. Output Capacity at Full Fire.
2. Modulating Gas Heat available on CV models only.

TABLE 7: MODULATING HEAT

Stages of Gas Control (% of Full Heat Output)					
Gas Heat Option	Available on Models	Step	Input	Output	% of total output
D3 (Turn down ratio 3.8 to 1)	V52, V53, V54	1	69,333	55,466	26%
		2	106,666	85,333	40%
		3	165,332	132,266	62%
		4	202,665	162,132	76%
		5	229,332	183,466	86%
		6	266,666	213,333	100%
D5 (Turn down ratio 7.7 to 1)	V52, V53, V54	1	69,333	55,466	13%
		2	106,666	85,333	20%
		3	165,332	132,266	31%
		4	202,665	162,132	38%
		5	229,332	183,466	43%
		6	266,666	213,333	50%
		7	325,331	260,265	61%
		8	362,664	290,132	68%
		9	389,331	311,465	73%
		10	426,664	341,331	80%
		11	495,997	396,798	93%
		12	533,330	426,664	100%
D8 (Turn down ratio 11.5 to 1)	V54 Only	1	69,333	55,466	9%
		2	106,666	85,333	13%
		3	165,332	132,266	21%
		4	202,665	162,132	25%
		5	229,332	183,466	29%
		6	266,666	213,333	33%
		7	325,331	260,265	41%
		8	362,664	290,132	45%
		9	389,331	311,465	49%
		10	426,664	341,331	53%
		11	495,997	396,798	62%
		12	533,330	426,664	67%
		13	586,663	469,330	73%
		14	655,996	524,797	82%
		15	693,329	554,663	87%
		16	762,662	610,130	95%
		17	799,995	639,996	100%

TABLE 8: ELECTRIC HEATING CAPACITIES

Electric Heat Option	Available on Models	Rated Voltage	Nominal KW	Nominal MBH[1]	MBH and KW per Stage[2]			
					Stage 1		Stage 2	
					KW	MBH	KW	MBH
E4	V52, V53, V54	240[3]/480[4]/575	40	137	40	137	0	0
E8	V52, V53, V54	240[2]/480[3]/575	80	273	40	137	40	137
E1	V52, V53, V54 (460 & 575 volt only)	480[3]/575	108	369	72	246	36	123

1. Supply air fan motor heat not included.
2. Heating capacity is only staged on CV models. VAV models use only one stage at full capacity.
3. For 208 volts, multiply kW and MBH values by .751. For 230 volts, multiply kW and MBH values by .918
4. For 460 volts, multiply kW and MBH values by .918.

HOT WATER HEATING[1]

The Johnson Controls Series 40 Rooftop units (30 - 40 Ton sizes) can be furnished with a Unitary Products hot water coil as the source of heat (Bottom Supply Only). A one or two row coil will be factory installed in the heating section downstream of the supply air fan and just above the supply air opening in the bottom of the unit.

The hot water control valve will not be provided. The installer will need to field supply a water valve. The installer must also connect the hot water piping, and valve wiring at the job site for the hot water heat section to be operational.

For all hot water coils the entering water temperature should not exceed 200°F.

PHYSICAL DATA HOT WATER COIL - 1 ROW

Coil Casing . . . . . Galvanized Steel
Coil Construction. . . . . Al Fin / Cu. Tube
Rows Deep 1
Fin Thickness . . . . . .006”
Tube Wall . . . . . .016”
Tubes / Circuit. 2
Fins Per Inch. 8
Tubes High . . . . . 22.50”
Tube Length . . . . . 65”
Face Area . . . . . 10.16ft.^{2}
Weight. . . . . 71lbs.
Operating Weight . . . . . 83lbs.

TABLE 9: WATER PRESSURE DROP (1 ROW, 25 & 30 TON)

GPM	10	20	30	40
WATER PRESSURE DROP	0.9	3.0	6.0	10.0

TABLE 10: STATIC RESISTANCE HOT WATER COIL (25 & 30 TON)

CFM	6000	8000	10000	15000
AIR PRESSURE DROP 1 ROW	0.07	0.11	0.16	0.32
AIR PRESSURE DROP 2 ROW	0.14	0.23	0.33	0.65

NOTE: Water pressure drop numbers are based on 60°F entering air temperature, 2.00” maximum air pressure drop across the hot water coil(s). AHRI certified ratings at other conditions are available upon request. Hot water coils are approved for use with glycol (rates available upon request).

WARNING

DO NOT use tin based solder. Brazing with tin based solder could cause equipment damage or possible injury to OCCUPANTS of the structure that is being conditioned.

TABLE 11: HOT WATER COIL (1 ROW, 25 & 30 TON)[1]

GPM	CFM	CAPACITY (MBH) AT ENTERING WATER TEMPERATURE			
		140 °F	160 °F	180 °F	200 °F
10	6000	91.4	115.3	139.3	163.6
	8000	102	128.8	155.8	182.9
	10000	110.4	139.5	168.8	198.4
	12000	117.3	148.4	179.6	211.2
	15000	125.9	159.2	192.9	226.9
20	6000	103	129.4	156	182.7
	8000	116.8	147	177.2	207.7
	10000	128.2	161.3	194.7	228.2
	12000	137.8	173.6	209.5	245.6
	15000	150	189	228.2	267.8
30	6000	107.6	135	162.5	190.1
	8000	122.8	154.3	185.8	217.5
	10000	135.5	170.3	205.1	240.2
	12000	146.4	184	221.8	259.7
	15000	160.3	201.6	243	284.8
40	6000	110.1	138	166	194.1
	8000	126.1	158.2	190.5	222.8
	10000	139.6	175.2	210.9	246.8
	12000	151.2	189.8	228.5	267.5
	15000	166.1	208.6	251.3	294.1

1. Based on 60°F entering air temperature, 2.00” maximum pressure drop across the hot water coil.

PIPING CONNECTIONS

The hot water piping must enter the unit through the floor of the heat section compartment. The access doors to the compartment are gasketed so the compartment can be sealed. However, as added protection for water leakage into the space, the piping access holes should be sealed with a heat resistant mastic (see the following illustration for approximate location of the compartment and piping connections.

1. Hot water, steam or electric heat is not available for front or rear supply.

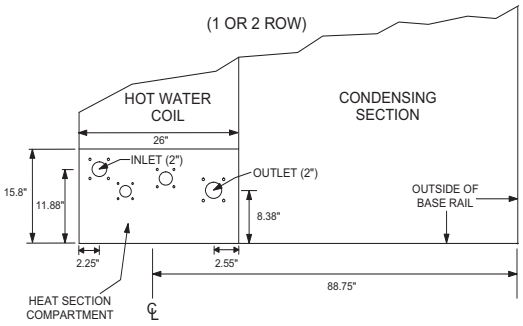


FIGURE 1 - HOT WATER PIPING CROSS-SECTION

TABLE 12: STATIC RESISTANCE HOT WATER COIL (1 ROW, 40 TON)

CFM	8000	11000	14000	20000
AIR PRESSURE DROP 1 ROW	0.11	0.19	0.29	0.52
AIR PRESSURE DROP 2 ROW	0.23	0.39	0.58	1.06

TABLE 13: HOT WATER COIL (1 ROW 40 TON)[1]

GPM	CFM	CAPACITY (MBH) AT ENTERING WATER TEMPERATURE			
		140 °F	160 °F	180 °F	200 °F
10	8000	102	128.8	155.8	182.9
	11000	114	144.1	174.4	205.1
	14000	123.2	155.9	188.8	222.1
	17000	130.6	165.4	200.4	235.8
	20000	136.8	173.3	210.1	247.3
20	8000	116.8	147	177.2	207.7
	11000	133.2	167.7	202.3	237.2
	14000	146.2	184.2	222.4	260.8
	17000	157	197.9	239	280.5
	20000	166.2	209.6	253.2	297.3
30	8000	122.8	154.3	185.8	217.5
	11000	141.2	177.4	213.8	250.3
	14000	155.9	196.1	236.4	276.9
	17000	168.3	211.8	255.4	299.3
	20000	179.1	225.3	271.8	318.6
40	8000	126.1	158.2	190.5	222.8
	11000	145.6	182.7	220	257.5
	14000	161.4	202.6	244.1	285.8
	17000	174.7	219.5	264.5	309.7
	20000	186.3	234.2	282.3	330.6

1. Based on 60°F entering air temperature, 2.00” maximum pressure drop across the hot water coil.

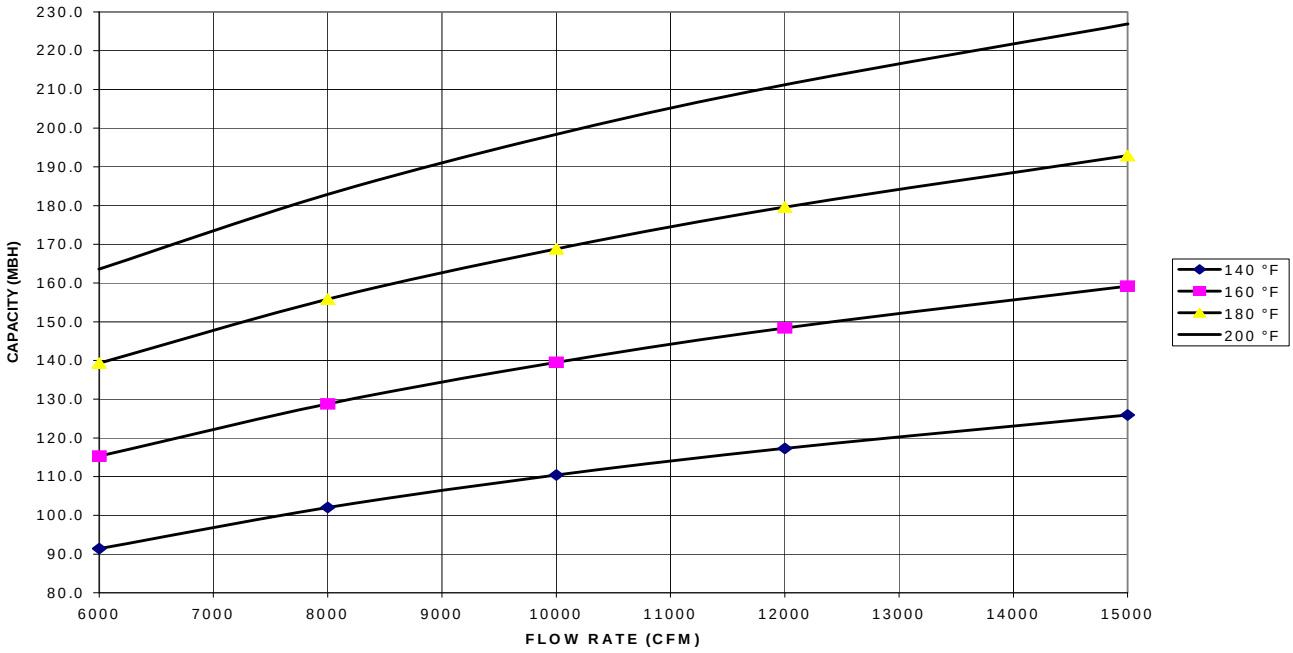


FIGURE 2 - HOT WATER COIL - 25 & 30 TON, 1 ROW, AT 10 GPM

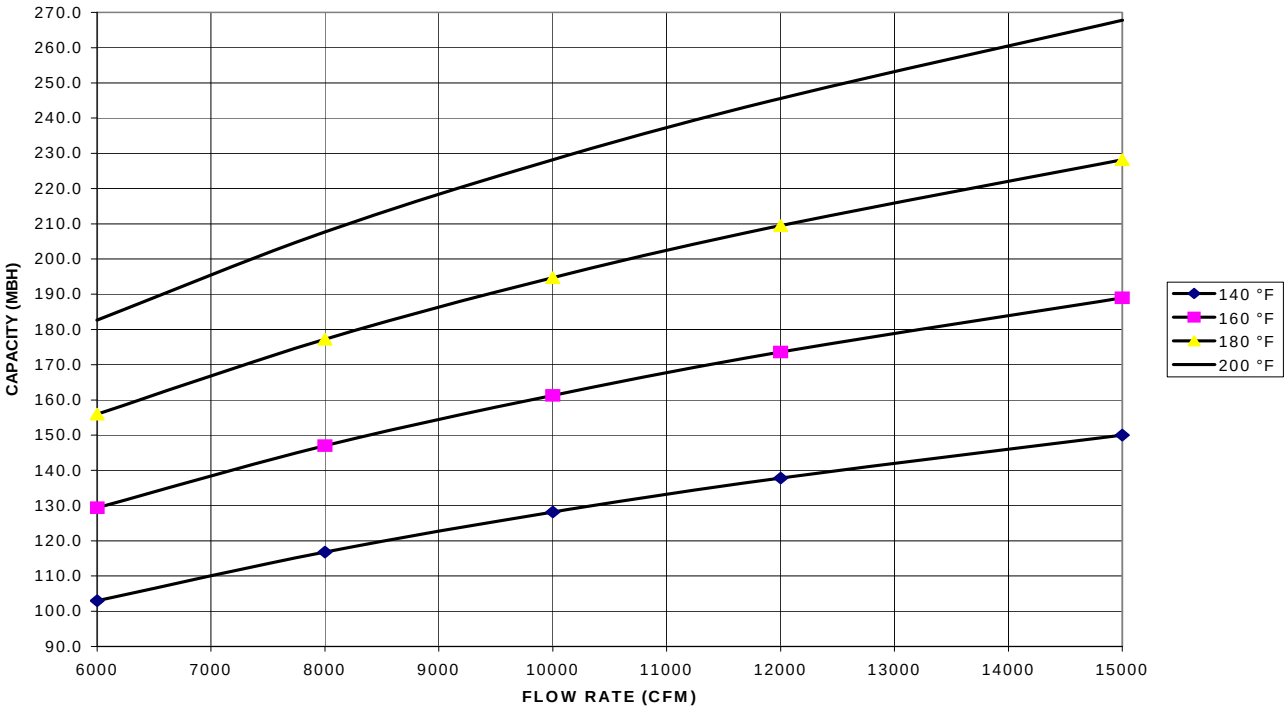


FIGURE 3 - HOT WATER COIL - 25 & 30 TON, 1 ROW, AT 20 GPM

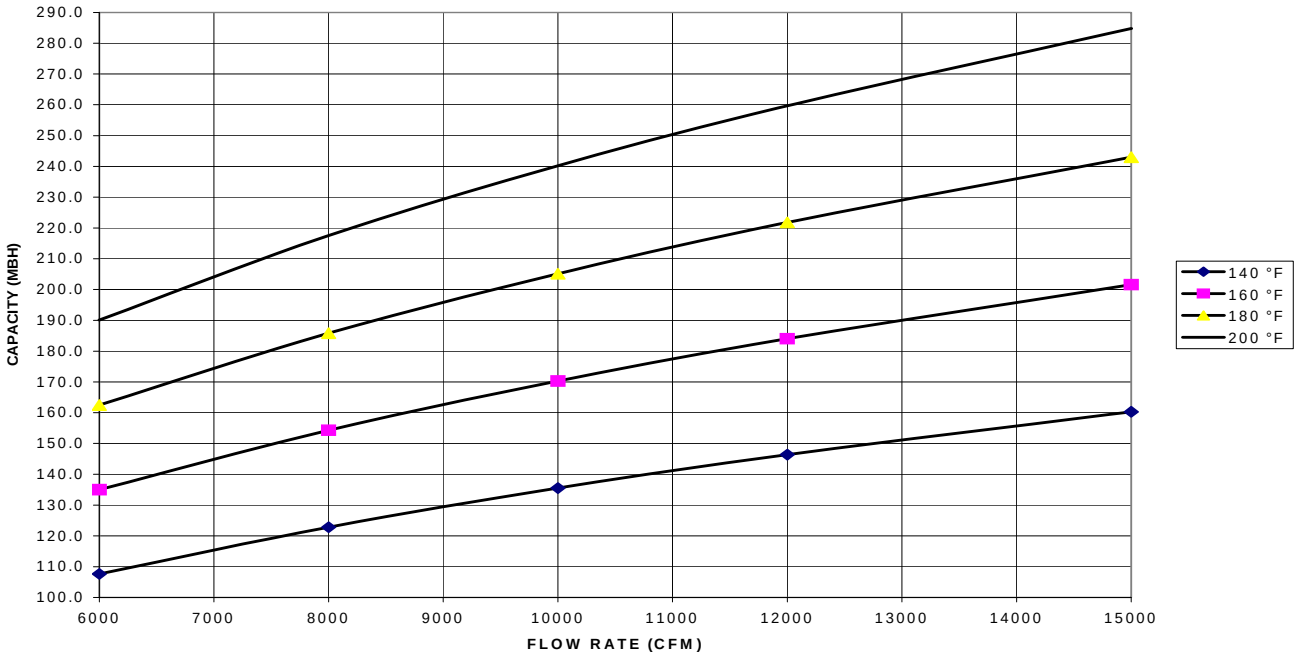


FIGURE 4 - HOT WATER COIL - 25 & 30 TON, 1 ROW, AT 30 GPM

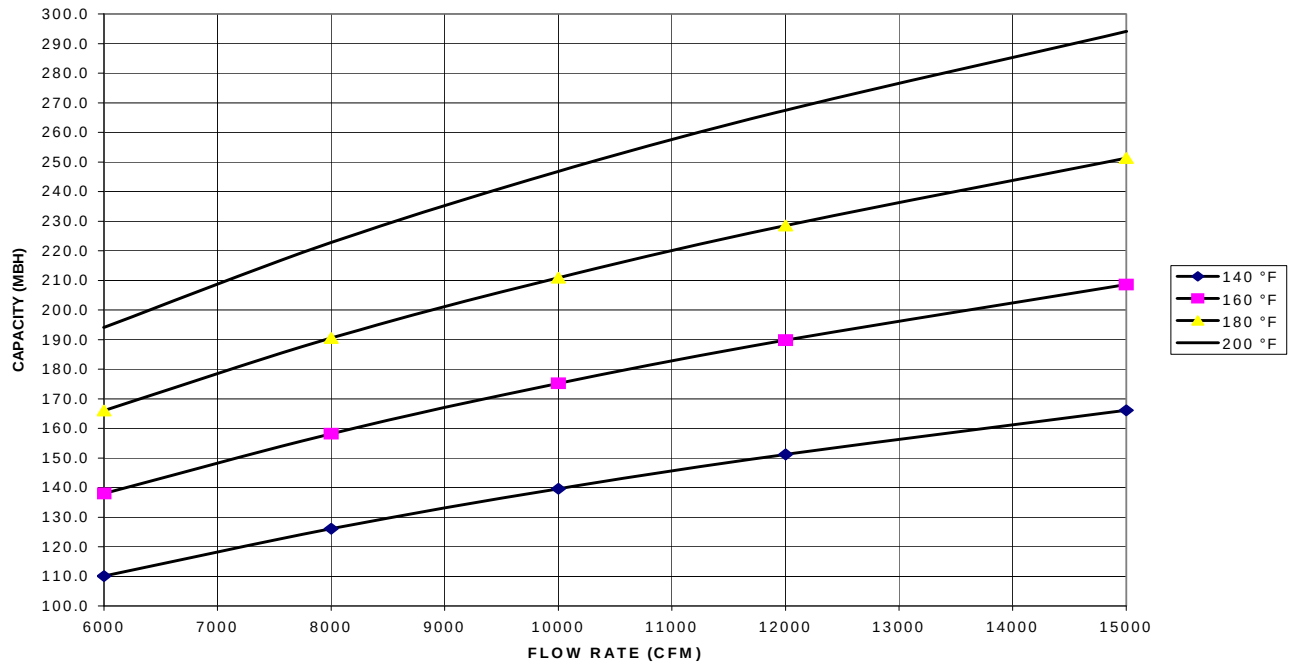


FIGURE 5 - HOT WATER COIL - 25 & 30 TON, 1 ROW, AT 40 GPM

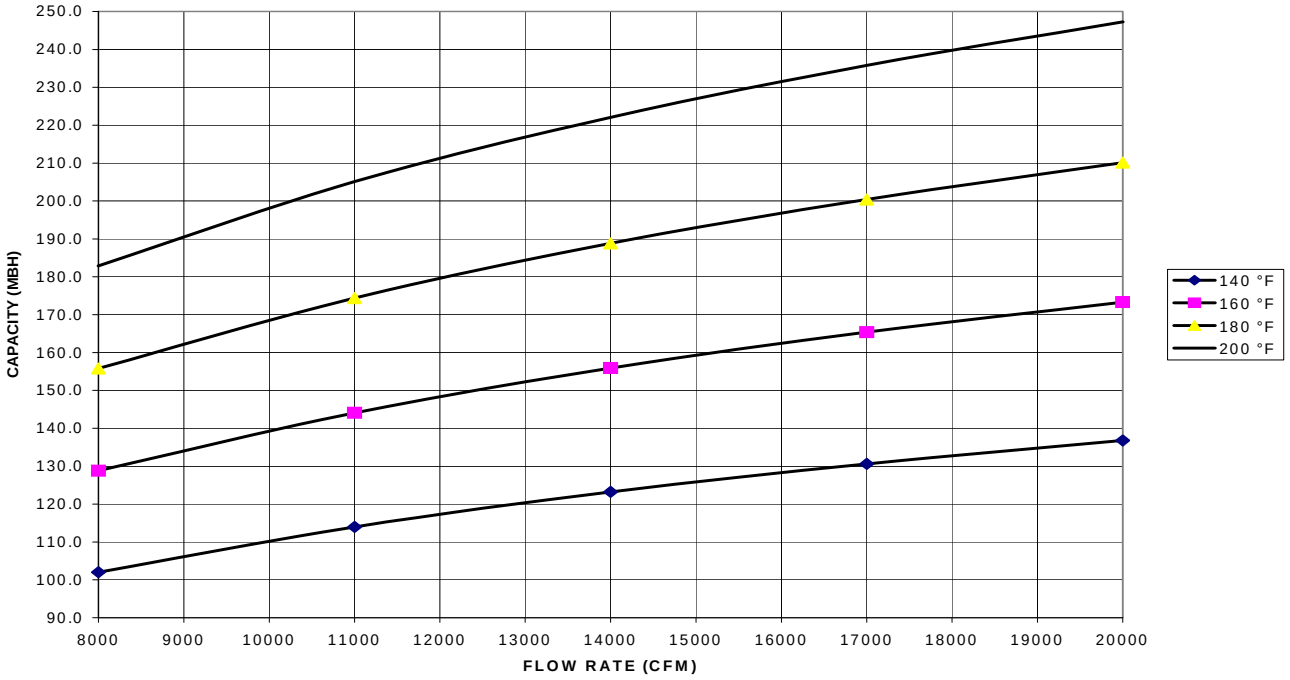


FIGURE 6 - HOT WATER COIL - 40 TON, 1 ROW, AT 10 GPM

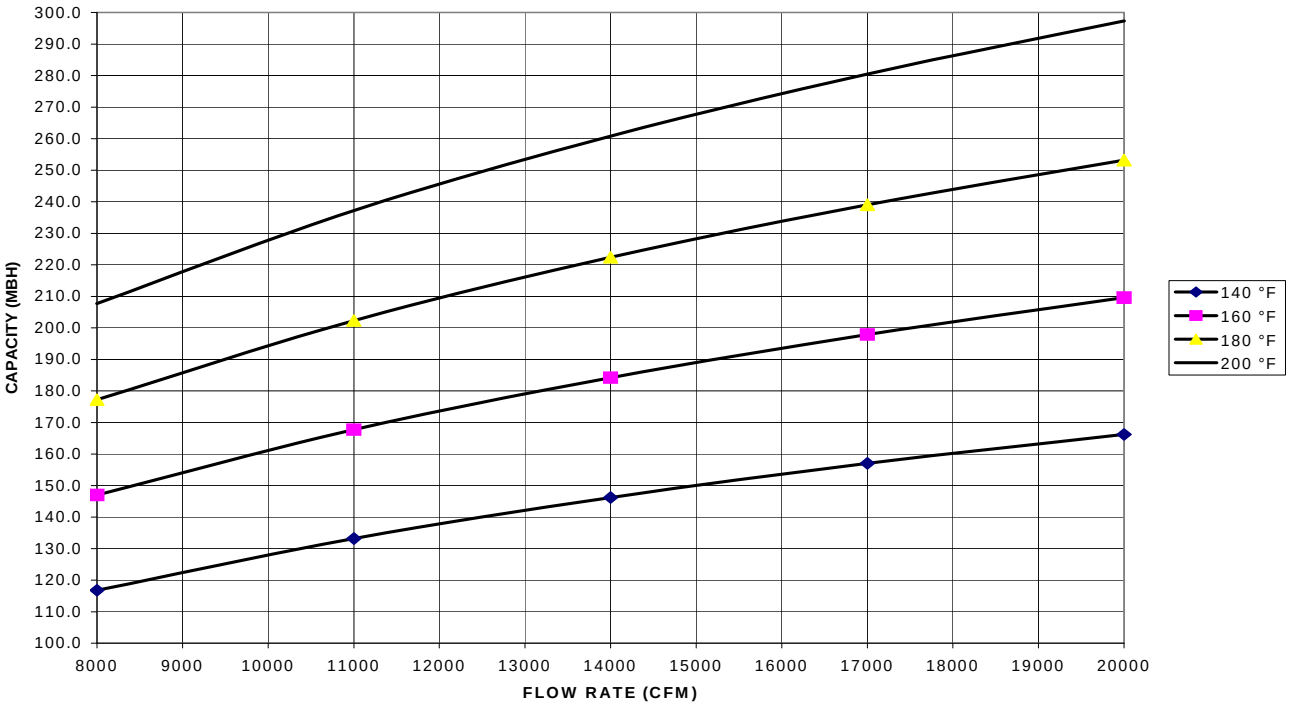


FIGURE 7 - HOT WATER COIL - 40 TON, 1 ROW, AT 20 GPM

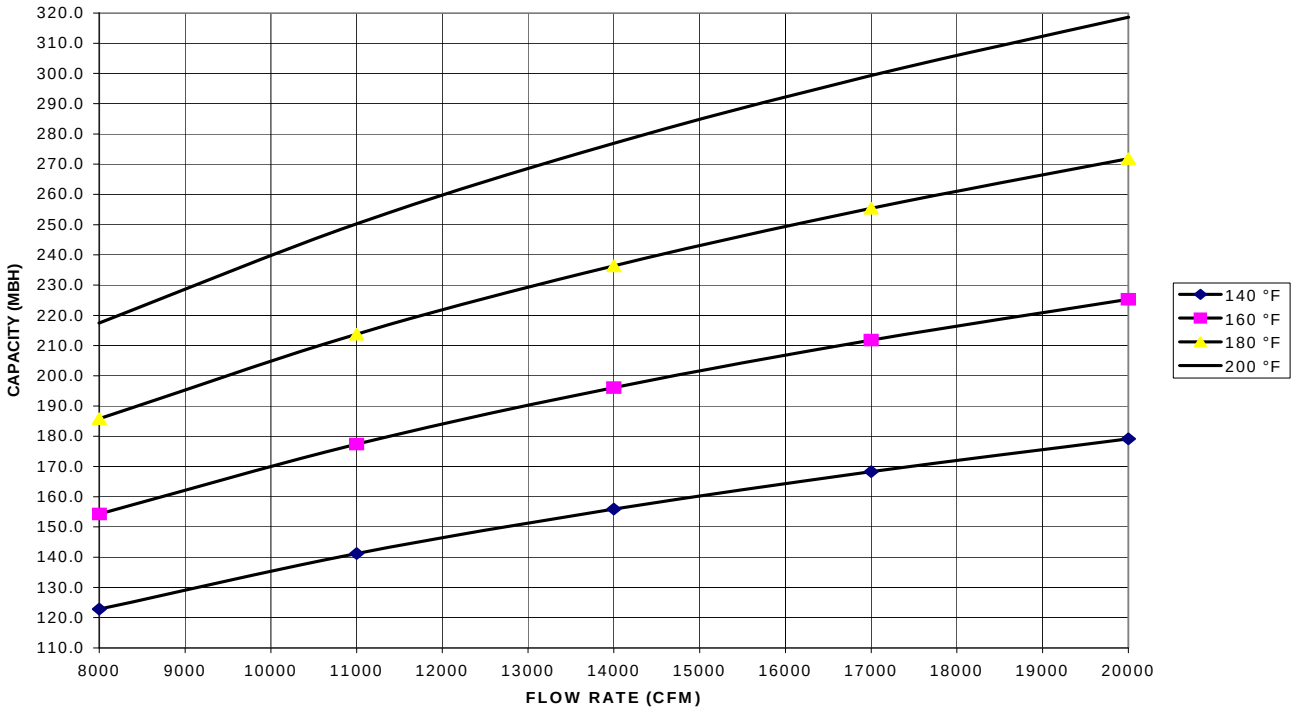


FIGURE 8 - HOT WATER COIL - 40 TON, 1 ROW, AT 30 GPM

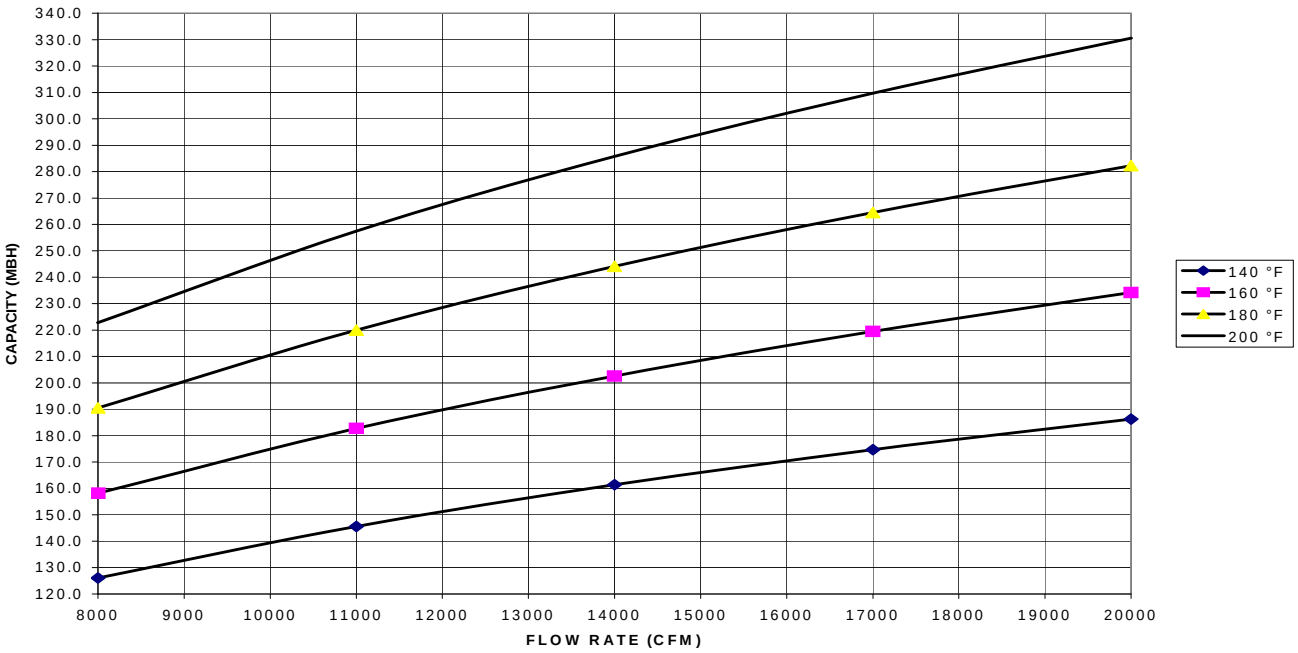


FIGURE 9 - HOT WATER COIL - 40 TON, 1 ROW, AT 40 GPM

PHYSICAL DATA HOT WATER COIL - 2 ROW

Coil Casing . . . . . Galvanized Steel

Coil Construction. . . . . Al Fin / Cu. Tube

Rows Deep 2

Fin Thickness . . . . . .006”

Tube Wall . . . . . .016”

Tubes / Circuit 2

Fins Per Inch. 8

Tubes High . . . . . 22.50”

Tube Length . . . . . 65”

Face Area . . . . . 10.16 ft.^{2}

Weight. . . . . .90 lbs

Operating Weight . . . . . .110 lbs

TABLE 14: WATER PRESSURE DROP (2 ROW, 25 & 30 TON)

GPM	20	40	60	80
WATER PRESSURE DROP	0.9	3.0	6.0	10.0

TABLE 15: STATIC RESISTANCE HOT WATER COIL (25 & 30 TON)

CFM	6000	8000	10000	15000
AIR PRESSURE DROP 1 ROW	0.07	0.11	0.16	0.32
AIR PRESSURE DROP 2 ROW	0.14	0.23	0.33	0.65

NOTE: Water pressure drop numbers are based on 60°F entering air temperature, 2.00” maximum air pressure drop across the hot water coil(s). AHRI certified ratings at other conditions are available upon request. Hot water coils are approved for use with glycol (rates available upon request.)

TABLE 16: HOT WATER COIL (2 ROW, 25 & 30 TON)[1]

GPM	CFM	CAPACITY (MBH) AT ENTERING WATER TEMPERATURE			
		140 °F	160 °F	180 °F	200 °F
20	6000	177.5	223.8	270.4	317.3
	8000	203.8	257.2	311.1	365.5
	10000	224.8	284.1	343.9	404.2
	12000	242.2	306.4	371.1	436.4
	15000	263.6	333.8	404.6	476.1
40	6000	198.1	248.9	300.0	351.3
	8000	232.2	292.0	352.2	412.7
	10000	260.7	328.1	395.9	464.1
	12000	285.0	359.0	433.4	508.3
	15000	316.0	398.4	481.3	564.8
60	6000	206.1	258.7	311.4	364.2
	8000	243.6	305.9	368.4	431.1
	10000	275.3	345.9	416.8	488.0
	12000	302.9	380.7	458.9	537.6
	15000	338.4	425.7	513.4	601.7
80	6000	210.5	263.9	317.4	371.1
	8000	249.8	313.3	377.1	441.1
	10000	283.3	355.6	428.2	501.0
	12000	312.7	392.7	473.0	553.6
	15000	351.0	440.9	531.3	622.1

1. Based on 60°F entering air temperature, 2.00” maximum pressure drop across the hot water coil.

TABLE 17: HOT WATER COIL (2 ROWS, 40 TON)[1]

GPM	CFM	CAPACITY (MBH) AT ENTERING WATER TEMPERATURE			
		140 °F	160 °F	180 °F	200 °F
20	8000	203.8	257.2	311.1	365.5
	11000	233.9	295.7	358.1	421.0
	14000	257.0	325.3	394.2	463.8
	17000	275.5	349.0	423.3	498.3
	20000	290.9	368.7	447.4	526.9
40	8000	232.2	292.0	352.2	412.7
	11000	273.3	344.1	415.3	487.0
	14000	306.3	386.0	466.3	547.1
	17000	333.9	421.1	508.9	597.3
	20000	357.5	451.1	545.4	640.5
60	8000	243.6	305.9	368.4	431.1
	11000	289.5	363.9	438.5	513.6
	14000	327.2	411.5	496.3	581.5
	17000	359.2	452.0	545.3	639.2
	20000	386.9	487.1	587.9	689.4
80	8000	249.8	313.3	377.1	441.1
	11000	298.5	374.7	451.2	528.1
	14000	338.9	425.7	512.8	600.5
	17000	373.4	469.3	565.6	662.5
	20000	403.6	507.5	611.8	716.8

1. Based on 60°F entering air temperature, 2.00” maximum air pressure drop across the hot water coil.
AHRI certified ratings at other conditions available upon request.
Hot water coils are approved for use with glycol (ratings available upon request).

TABLE 18: STATIC RESISTANCE HOT WATER COIL (40 TON)

CFM	8000	11000	14000	20000
AIR PRESSURE DROP 1 ROW	0.11	0.19	0.29	0.52
AIR PRESSURE DROP 2 ROW	0.23	0.39	0.58	1.06

TABLE 19: WATER PRESSURE DROP (2 ROW, 40 TON)

GPM	20	40	60	80
WATER PRESSURE DROP	0.9	3.0	6.0	10.0

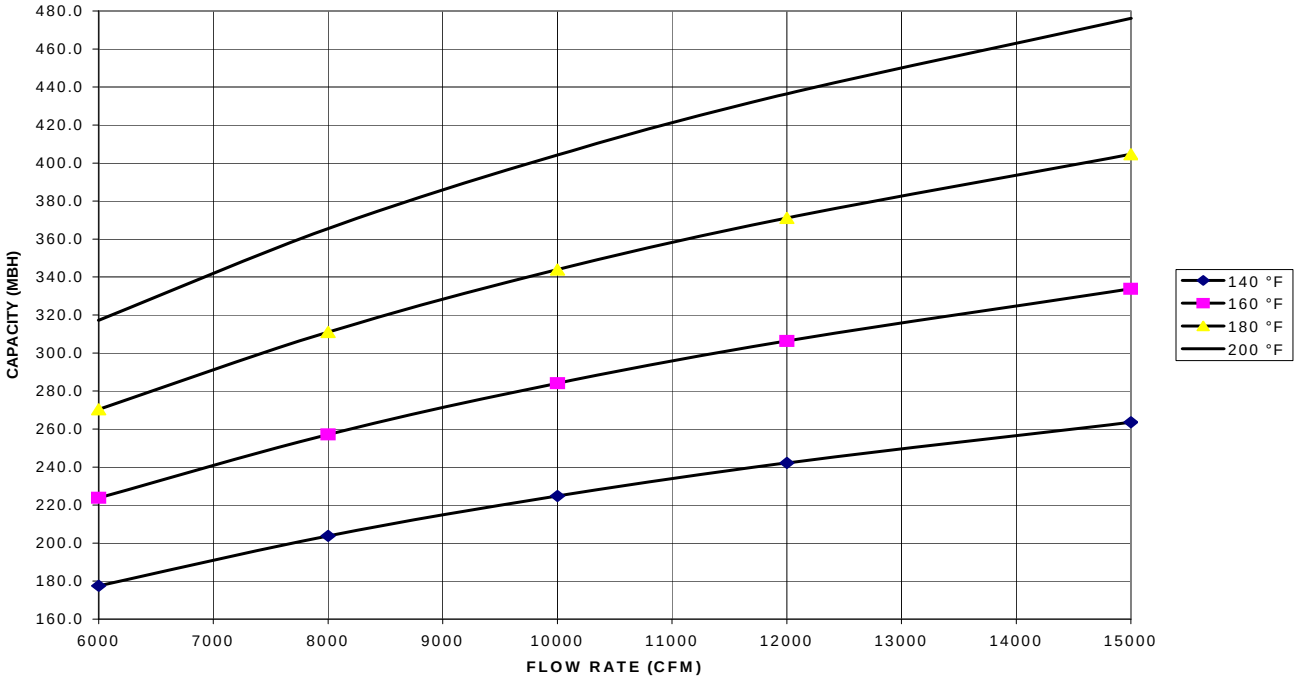


FIGURE 10 - HOT WATER COIL - 25 & 30 TON, 2 ROW, AT 20 GPM

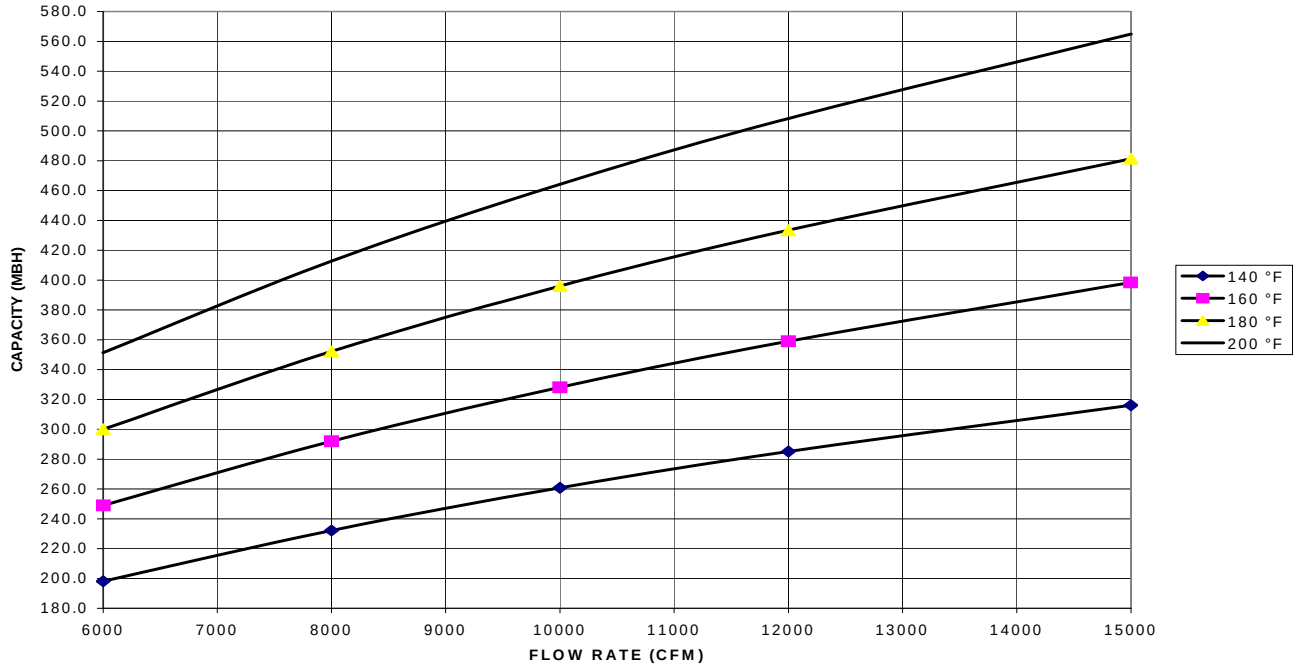


FIGURE 11 - HOT WATER COIL - 25 & 30 TON, 2 ROW, AT 40 GPM

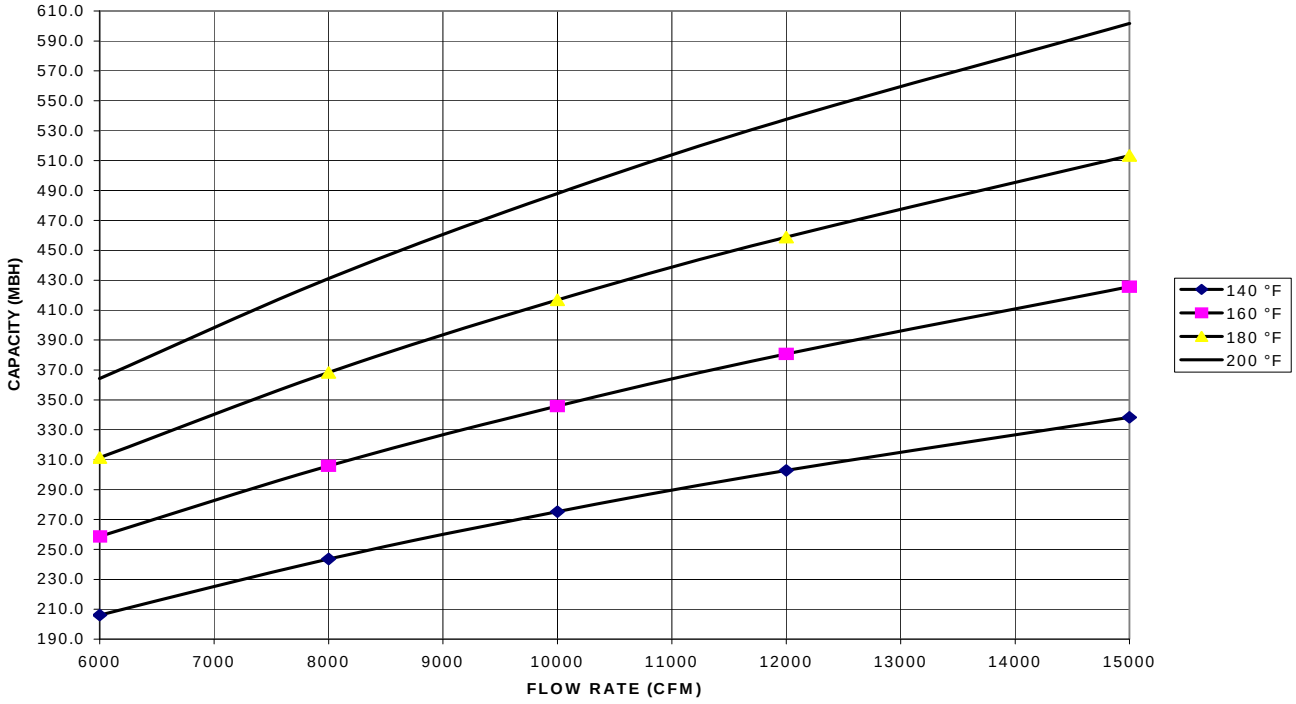


FIGURE 12 - HOT WATER COIL - 25 & 30 TON, 2 ROW, AT 60 GPM

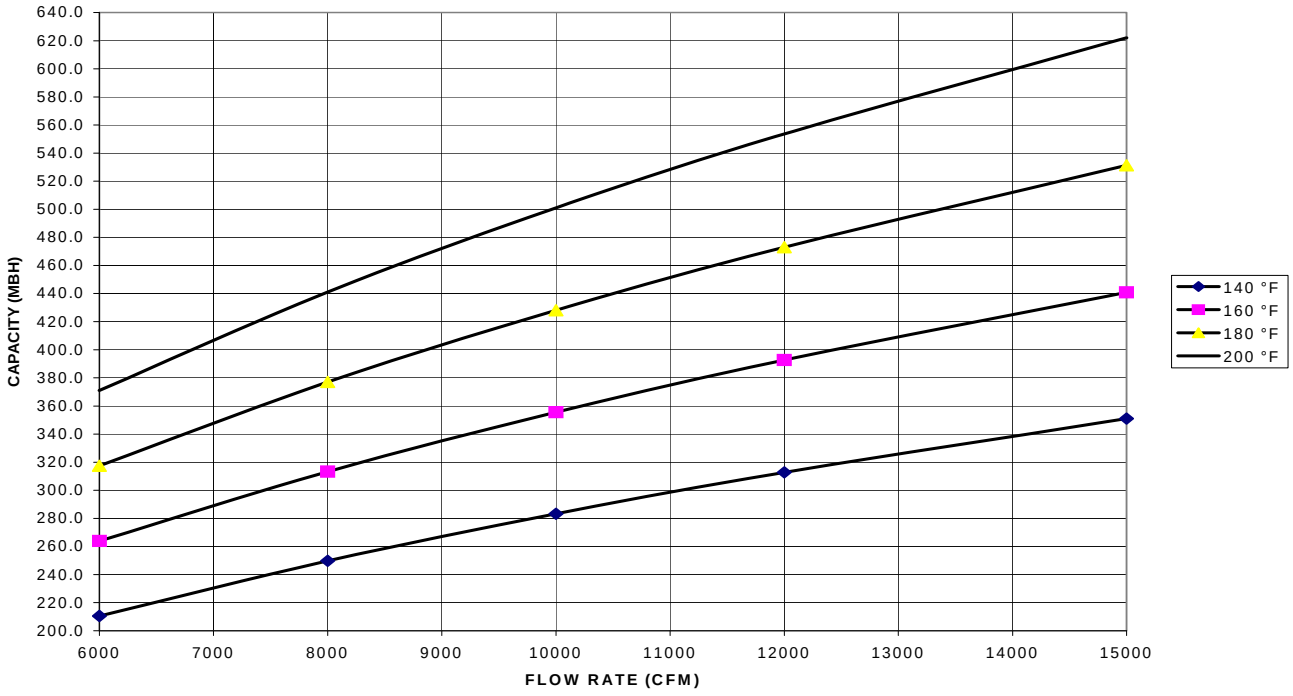


FIGURE 13 - HOT WATER COIL - 25 & 30 TON, 2 ROW, AT 80 GPM

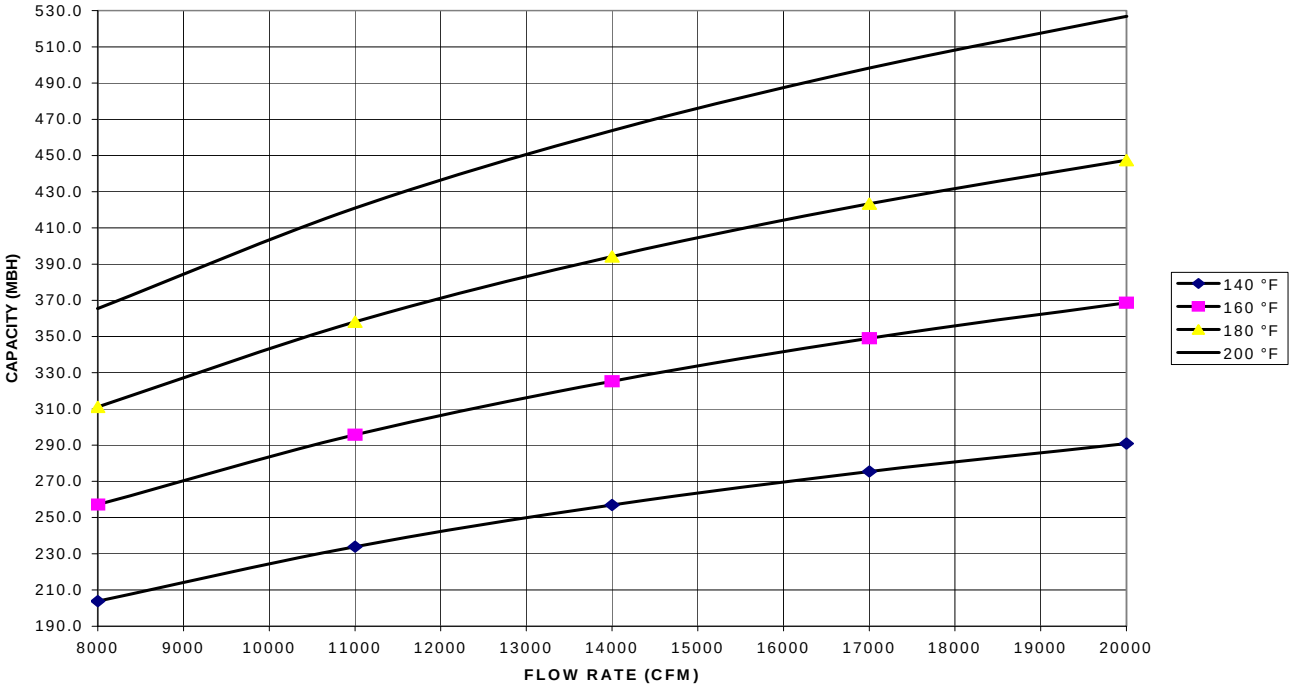


FIGURE 14 - HOT WATER COIL - 40 TON, 2 ROW, AT 20 GPM

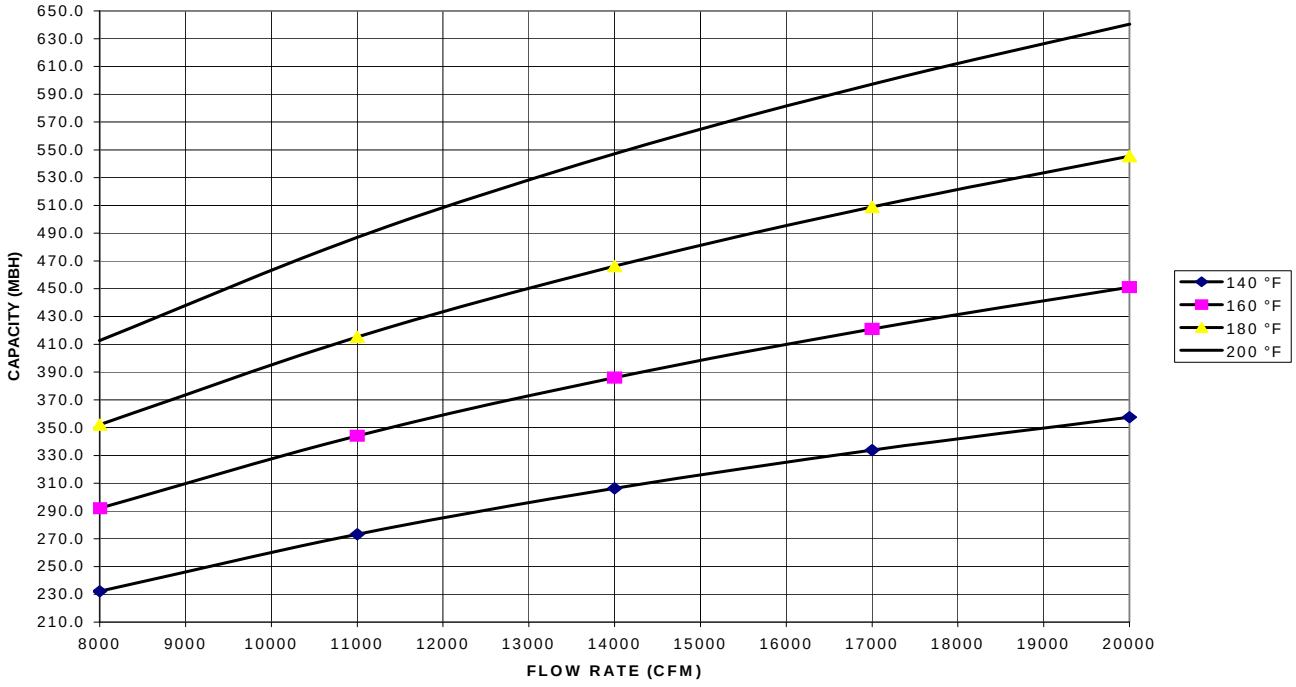


FIGURE 15 - HOT WATER COIL - 40 TON, 2 ROW, AT 40 GPM

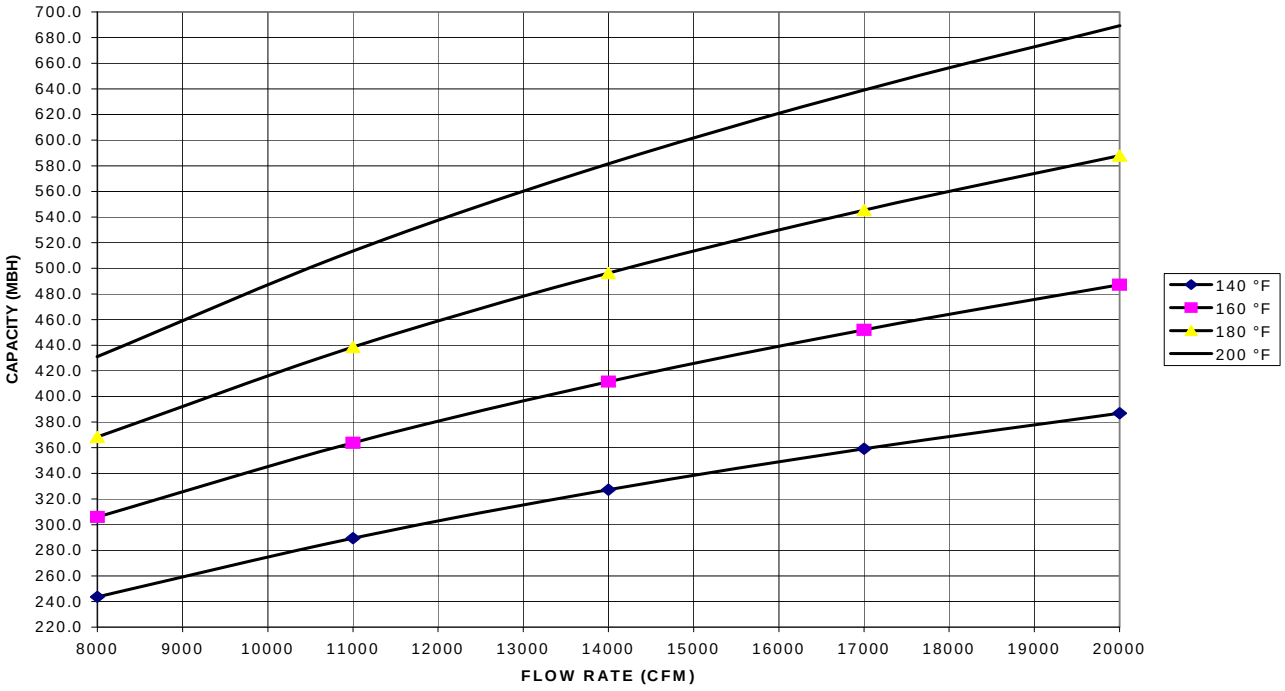


FIGURE 16 - HOT WATER COIL - 40 TON, 2 ROW, AT 60 GPM

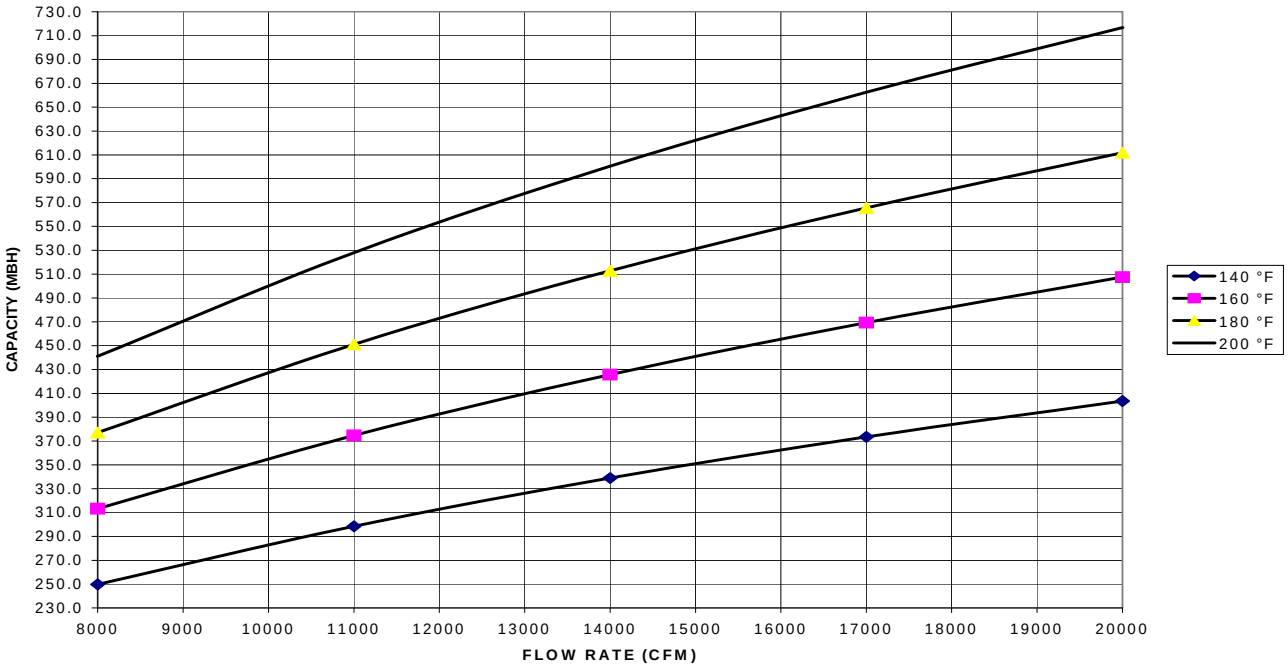


FIGURE 17 - HOT WATER COIL - 40 TON, 2 ROW, AT 80 GPM

STEAM HEATING

The Johnson Controls Series 40 units (25, 30, and 40 ton sizes) can be manufactured with a steam heat coil (Bottom Supply only). Unitary Product's one row steam coil is installed in the heating section just downstream of the supply air fan and just above the supply air opening in the bottom of the unit.

The steam control valve will not be provided. The installer will need to field supply a steam control valve. Connect the steam piping and valve power wiring at the job site for the steam heat section to be operational.

There are no provisions in the coil or control sequence to prevent freezing of condensate. The control valve, piping and field installed wiring connections are particularly vulnerable because they are installed in the vestibule outside of the conditioned air stream.

All piping, control valves, and wiring that is field installed must conform to all local and national codes

Condensate can freeze on the control valve and piping if they are not properly insulated.

PHYSICAL DATA STEAM COIL - 1 ROW

Coil Casing . . . . . Galvanized Steel
Coil Construction . . . . . Al Fin / Cu. Tube
Rows Deep 1
Fin Thickness . . . . . .010”
Tube Wall . . . . . .035”
Tubes / Circuit. 2
Fins Per Inch 6
Tubes High . . . . . 21”
Tube Length . . . . . 65”
Face Area . . . . . 9.48 ft.^{2}
Weight. . . . . 92 lbs.

*Hot water, steam coil or electric heat not available for front or rear supply.

TABLE 20: STEAM COIL (1 ROW, 25 & 30 TON)[1]

CFM	Capacity (MBH) at Steam Pressure (PSI)			
	2	6	10	15
6000	194.1	207.9	219.8	232.6
8000	221.1	236.9	250.4	265.0
10000	243.2	260.5	275.4	291.4
12000	261.9	280.6	296.6	313.9
15000	285.6	306.0	323.5	342.4

1. Based on 60°F entering air temperature, 2.00” maximum air pressure drop across the coil.

TABLE 21: STATIC RESISTANCE STEAM COIL (1 ROW, 25 & 30 TON)

CFM	6000	8000	10000	12000	15000
Air Pressure Drop	0.11	0.18	0.26	0.36	0.54

TABLE 22: STEAM COIL (1 ROW, 40 TON)[1]

CFM	Capacity (MBH) at Steam Pressure (PSI)			
	2	6	10	15
8000	221.1	236.9	250.4	265.0
11000	252.9	271.0	286.4	303.1
14000	278.2	298.0	315.0	333.4
17000	299.4	320.7	339.0	358.8
20000	317.6	340.2	359.6	380.6

1. Based on 60°F entering air temperature, 2.00” maximum air pressure drop across the coil.

TABLE 23: STATIC RESISTANCE STEAM COIL (1 ROW, 40 TON)

CFM	8000	11000	14000	17000	20000
Air Pressure Drop	0.18	0.31	0.48	0.67	0.88

PIPING CONNECTIONS

The steam piping must enter the unit through the floor of the heat section compartment. The access doors to the compartment are gasketed to the compartment can be sealed. However, as added protection for condensate leakage into the space, the piping access holes should be sealed with a heat resistant mastic. The following figure illustrates the approximate location of the compartment and piping connections.

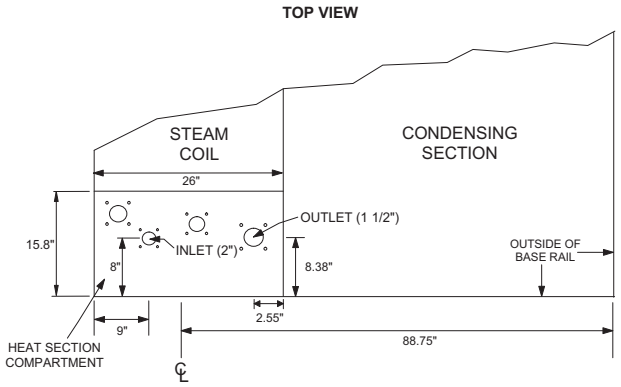


FIGURE 18 - STEAM PIPING CROSS SECTION

⚠WARNING

DO NOT use tin based solder. Brazing with tin based solder could cause equipment damage or possible injury to OCCUPANTS of the structure that is being conditioned.

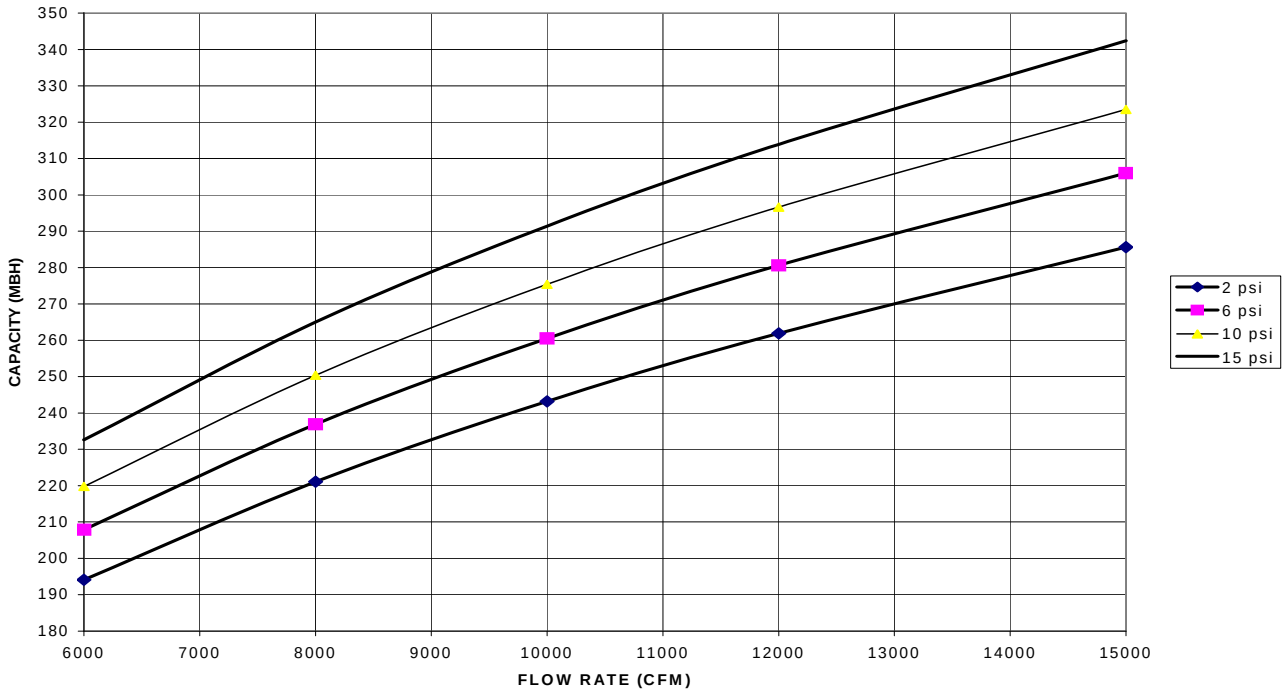


FIGURE 19 - STEAM COIL - 25 & 30 TON, 1 ROW

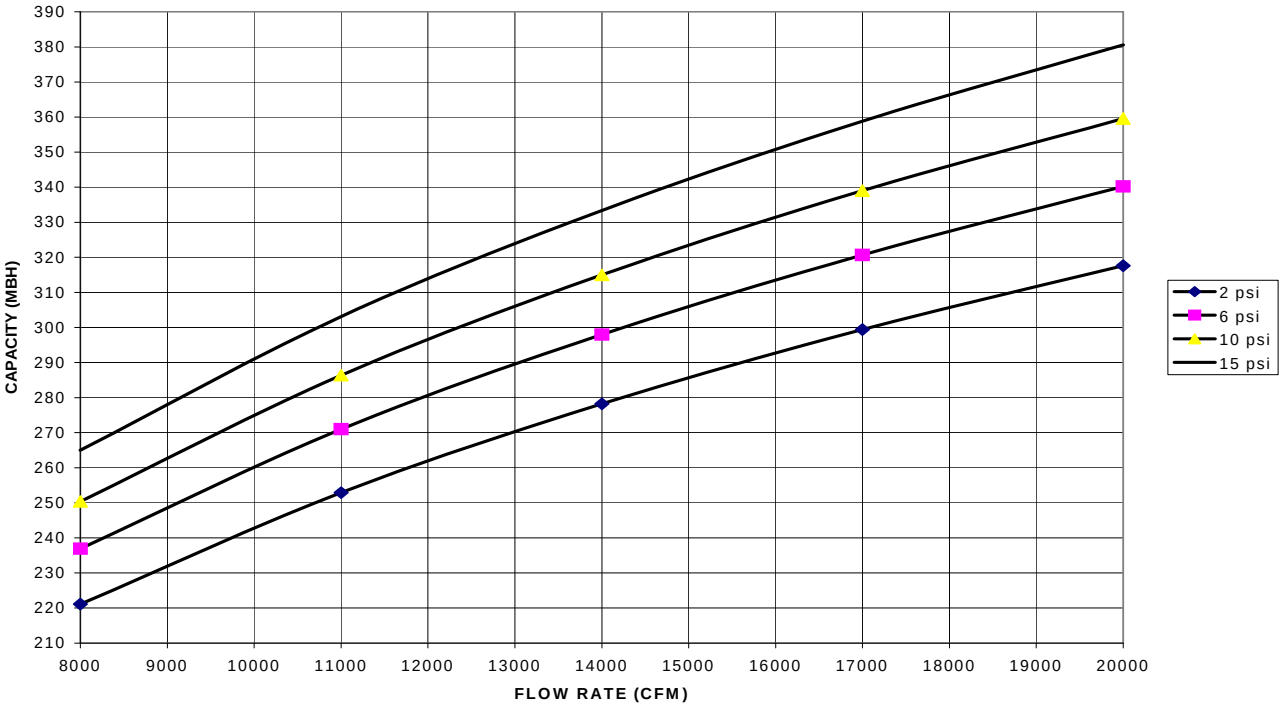


FIGURE 20 - STEAM COIL - 40 TON, 1 ROW

TABLE 24: EXHAUST FAN DRIVE DATA

Model	Blower RPM Range	Motor				Motor Pulley		Blower Pulley		Belts	
		HP	Frame Size	Motor Eff (Std. Motor)	Motor Eff (Hi Eff opt)	Pitch Dia (Inches)	Bore (Inches)	Pitch Dia (Inches)	Bore (Inches)	Designation	Qty
25 Ton	758	5	213T	87.5	89.5	4.9	1-3/8	11.3	2-3/16	BX63	2
	852	7.5	215T	88.5	91.7	5.5	1-3/8	11.3	2-3/16	BX63	2
	976	10	215T	89.5	91	6.3	1-5/8	11.3	2-3/16	BX63	2
30 Ton	852	7.5	213T	84	86.5	5.5	1-3/8	11.3	1-11/16	B65	2
	976	10	215T	86.5	89.5	6.3	1-3/8	11.3	1-11/16	B65	2
	1069	15	254T	85.7	89.5	6.9	1-3/8	11.3	1-11/16	B65	2
40 Ton	852	7.5	184T	84	86.5	5.5	1-3/8	11.3	1-11/16	B65	2
	976	10	215T	86.5	89.5	6.3	1-3/8	11.3	1-11/16	B65	2
	1069	15	254T	85.7	89.5	6.9	1-3/8	11.3	1-11/16	B65	2

TABLE 25: SUPPLY FAN MOTOR AND DRIVE DATA

Model	Blower RPM Range	Motor				Motor Pulley		Blower Pulley		Belts	
		HP	Frame Size	Motor Efficiency (Std. Motor)	Motor Efficiency (Ultra Hi Eff Opt)	Pitch Dia (Inches)	Bore (Inches)	Pitch Dia (Inches)	Bore (Inches)	Designation	Qty
25 Ton	567	7.5	213T	88.5	91.7	4.5	1-3/8	13.9	2-3/16	BX56	2
	692	10	215T	89.5	91	5.5	1-3/8	13.9	2-3/16	BX56	2
	793	15	254T	91	91.7	6.3	1-5/8	13.9	2-3/16	BX56	2
	894	20	256T	91	93	7.1	1-5/8	13.9	2-3/16	BX56	2
30 Ton	617	10	215T	89.5	91	4.9	1-3/8	13.9	2-3/16	BX56	2
	743	15	254T	91	91.7	5.9	1-5/8	13.9	2-3/16	BX56	2
	856	20	256T	91	93	6.7	1-5/8	13.7	2-3/16	5VX610	2
	907	25	284T	91.7	93.6	7.1	1-7/8	13.7	2-3/16	5VX610	2
40 Ton	617	10	215T	89.5	91	4.9	1-3/8	13.9	2-7/16	BX67	2
	652	15	254T	91	91.7	5.1	1-5/8	13.7	2-7/16	5VX710	2
	728	20	256T	91	93	5.7	1-5/8	13.7	2-7/16	5VX710	2
	780	25	284T	91.7	93.6	6.1	1-7/8	13.7	2-7/16	5VX710	2

SUPPLY AIR DRIVE ADJUSTMENT

At unit start-up, the measured CFM may be higher or lower than the specified CFM shown in Figures 22, 23, and 24. To achieve the specified CFM, the speed of the drive may have to be decreased or increased by changing the pitch diameter (PD) of the motor sheave as outlined below:

$$\frac{\text{Specified CFM}}{\text{Measured CFM}} \bullet \text{PD of Standard Sheave} = \text{PD of New Sheave}$$

⚠WARNING

Failure to properly adjust the total system air quantity can result in extensive blower damage.

⚠ CAUTION

Before making any blower speed changes review the installation for any installation errors, leaks or undesirable systems effects that can result in loss of air flow.

⚠ CAUTION

Even small changes in blower speed can result in substantial changes in static pressure and bhp. Bhp or amp draw of the blower motor will increase (see table) by the cube ratio of the blower speed. Static pressure will increase by the square ratio of the blower speed. Tables 26, 27 and 28 are for reference only. All blower speed changes must be made by qualified personnel with strict adherence to the fan laws.

Example:

A 30-ton unit was selected to deliver 12,000 CFM with a 20 HP motor and a 856 RPM drive, but the unit is only delivering 11,000 CFM per Figure 23.

Use the equation to determine the required PD for the new motor sheave (12,000 CFM / 11,000 CFM) x 6.7” = 7.31”.

Use the 30 ton table to select a Browning 2B5V74 which will increase the speed of the unit’s drive and its supply air CFM to 111.9%. Thus select the 7.5” PD at 112% increase over standard.

New drive speed = 1.119 x 856 = 957.9 RPM

New supply air = 1.119 x 11,000 = 12,309 CFM

Re-use the existing belts and blower sheave.

New motor BHP = (speed increase)3 x estimated motor BHP at original start-up with 11,000 CFM and 856 RPM = (1.119)3 x 11 BHP = 1.4012 x 11 BHP = 15.41 BHP New motor amps = (speed increase)3 x measured motor amps at original start-up with 11,000 CFM and 856 RPM.

TABLE 26: 25 TON DRIVE ADJUSTMENT

7.5 HP MOTOR & 567 RPM DRIVE			10 HP MOTOR & 692 RPM DRIVE			15 HP MOTOR & 793 RPM DRIVE			20 HP MOTOR & 894 RPM DRIVE		
%RPM & CFM	REQ'D PD	BROWNING 2B5V_ _	%RPM & CFM	REQ'D PD	BROWNING 2B5V_ _	%RPM & CFM	REQ'D PD	BROWNING 2B5V_ _	%RPM & CFM	REQ'D PD	BROWNING 2B5V_ _
-	-	-	82	4.5	42	84	5.3	50	86	6.1	58
-	-	-	86	4.7	44	87	5.5	52	89	6.3	60
100	(Std.)4.5	42	89	4.9	46	90	5.7	54	91	6.5	62
104	4.7	44	93	5.1	48	94	5.9	56	94	6.7	64
109	4.9	46	96	5.3	50	97	6.1	58	97	6.9	66
113	5.1	48	100	(Std.)5.5	52	100	(Std)6.3	60	100	(Std.)7.1	68
118	5.3	50	104	5.7	54	103	6.5	62	103	7.3	70
122	5.5	52	107	5.9	56	106	6.7	64	108	7.7	74
126	5.7	54	111	6.1	58	110	6.9	66	117	8.3	80
-	-	-	115	6.3	60	113	7.1	68	125	8.9	86
-	-	-	118	6.5	62	116	7.3	70	-	-	-
-	-	-	122	6.7	64	122	7.7	74	-	-	-

TABLE 27: 30 TON DRIVE ADJUSTMENT

10 HP MOTOR & 617 RPM DRIVE			15 HP MOTOR & 743 RPM DRIVE			20 HP MOTOR & 856 RPM DRIVE			25 HP MOTOR & 907 RPM DRIVE		
%RPM & CFM	REQ'D PD	BROWNING 2B5V_ _	%RPM & CFM	REQ'D PD	BROWNING 2B5V_ _	%RPM & CFM	REQ'D PD	BROWNING 2B5V_ _	%RPM & CFM	REQ'D PD	BROWNING 2B5V_ _
91.8	4.5	42	86.4	5.1	48	82.1	5.5	54	86.3	6.1	60
95.9	4.7	44	89.8	5.3	50	85.1	5.7	56	89.0	6.3	62
100.0	(Std.) 4.9	46	93.2	5.5	52	88.1	5.9	58	91.8	6.5	64
104.1	5.1	48	96.6	5.7	54	91.0	6.1	60	94.5	6.7	66
108.2	5.3	50	100.0	(Std.) 5.9	56	94.0	6.3	62	97.3	6.9	68
112.2	5.5	52	103.4	6.1	58	97.0	6.5	64	100.0	(Std.) 7.1	70
116.3	5.7	54	106.8	6.3	60	100.0	(Std.) 6.7	66	105.5	7.5	74
120.4	5.9	56	110.2	6.5	62	103.0	6.9	68	113.7	8.1	80
124.5	6.1	58	113.6	6.7	64	106.0	7.1	70	121.9	8.7	86
-	-	-	116.9	6.9	66	112.0	7.5	74	-	-	-
-	-	-	120.3	7.1	68	120.9	8.1	80	-	-	-
-	-	-	123.7	7.3	70	129.9	8.7	86	-	-	-

TABLE 28: 40 TON DRIVE ADJUSTMENT

10 HP MOTOR & 617 RPM DRIVE			15 HP MOTOR & 652 RPM DRIVE			20 HP MOTOR & 728 RPM DRIVE			25 HP MOTOR & 780 RPM DRIVE		
%RPM & CFM	REQ'D PD	BROWNING 2B5V_ _	% RPM & CFM	REQ'D PD	BROWNING 2B5V_ _	%RPM & CFM	REQ'D PD	BROWNING 2B5V_ _	%RPM & CFM	REQ'D PD	BROWNING 2B5V_ _
91.8	4.5	42	88.2	4.5	44	82.5	4.7	46	83.7	5.1	50
95.9	4.7	44	92.1	4.7	46	86.0	4.9	48	86.9	5.3	52
100.0	(Std.) 4.9	46	96.0	4.9	48	89.5	5.1	50	90.2	5.5	54
104.1	5.1	48	100.0	(Std.) 5.1	50	93.0	5.3	52	93.4	5.7	56
108.2	5.3	50	103.9	5.3	52	96.5	5.5	54	96.7	5.9	58
112.2	5.5	52	107.8	5.5	54	100.0	(Std.) 5.7	56	100.0	(Std.) 6.1	60
116.3	5.7	54	111.7	5.7	56	103.5	5.9	58	103.3	6.3	62
-	-	-	115.6	5.9	58	107.0	6.1	60	106.6	6.5	64
-	-	-	119.5	6.1	60	110.5	6.3	62	109.8	6.7	66
-	-	-	123.4	6.3	62	114.0	6.5	64	113.1	6.9	68
-	-	-	127.4	6.5	64	117.5	6.7	66	116.4	7.1	70
-	-	-	-	-	66	121.1	6.9	68	119.7	7.5	74

TABLE 29: DRIVE ADJUSTMENT FOR POWER EXHAUST - 25 TON

5 HP Motor & 758 RPM Drive			7.5 HP Motor & 852 RPM Drive			10 HP Motor & 976 RPM Drive		
%RPM & CFM	Req'd PD	Browning 2b5v_ _	%RPM & CFM	Req'd PD	Browning 2b5v_ _	%RPM & CFM	Req'd PD	Browning 2b5v_ _
100	4.9 (Std.)	46	92	5.1	48	93	5.9	56
104	5.1	48	96	5.3	50	97	6.1	58
109	5.3	50	100	5.5 (Std.)	52	100	6.3 (Std.)	60
113	5.5	52	104	5.7	54	103	6.5	62
117	5.7	54	108	5.9	56	107	6.7	64
122	5.9	56	112	6.1	58	110	6.9	66

TABLE 30: DRIVE ADJUSTMENT FOR POWER EXHAUST - 30 & 40 TON

7.5 HP Motor & 852 RPM Drive			10 HP Motor & 976 RPM Drive			15 HP Motor & 1069 RPM Drive		
% RPM & CFM	REQ'D PD (in)	Browning 2B5V_ _	% RPM & CFM	REQ'D PD (in)	Browning 2B5V_ _	% RPM & CFM	REQ'D PD (in)	Browning 2B5V_ _
96.4	5.3	52	93.7	5.9	58	94.2	6.5	64
100.0	(Std.) 5.5	54	96.8	6.1	60	97.1	6.7	66
103.6	5.7	56	100.0	(Std.) 6.3	62	100.0	(Std.) 6.9	68
107.3	5.9	58	103.2	6.5	64	102.9	7.1	70
110.9	6.1	60	106.3	6.7	66	108.7	7.5	74
114.5	6.3	62	109.5	6.9	68	117.4	8.1	80

TABLE 31: COOLING PERFORMANCE - 25 TON R-410A

Air on Evaporator Coil		Temperature of Air on Condenser Coil																		
		75°F									85°F									
CFM	WB (°F)	Total Cap.[1] (MBH)	Total[2] Input (kW)	Sensible Capacity (MBH)* Return Dry Bulb (°F)							Total Cap.[1] (MBH)	Total[2] Input (kW)	Sensible Capacity (MBH)* Return Dry Bulb (°F)						
				86	83	80	77	74	71	68			86	83	80	77	74	71	68
7500	72	365.8	21.0	202.1	183.9	165.7	147.5	129.3	-	-	352.2	23.2	192.9	174.9	156.9	138.9	120.9	-	-
	67	342.4	20.5	248.8	230.6	212.4	194.2	176.1	157.9	139.7	325.5	22.9	239.4	221.5	203.5	185.5	167.5	149.5	131.5
	62	311.7	20.4	302.2	284.0	265.8	247.6	229.4	211.2	193.0	299.6	22.4	286.0	268.0	250.0	232.0	214.0	196.0	178.0
	57	300.0	19.7	300.0	299.5	281.3	263.1	244.9	226.7	208.6	289.8	22.0	289.8	284.4	266.5	248.5	230.5	212.5	194.5
8750	72	376.3	21.2	214.5	193.8	173.1	152.4	131.7	-	-	357.7	23.5	205.1	184.6	164.2	143.7	123.2	-	-
	67	352.0	20.7	263.3	242.6	221.9	201.2	180.5	159.8	139.1	330.6	23.2	253.8	233.3	212.8	192.4	171.9	151.5	131.0
	62	320.6	20.6	315.9	298.4	277.7	257.0	236.3	215.6	194.9	304.3	22.6	297.5	282.0	261.6	241.1	220.6	200.2	179.7
	57	308.6	19.9	308.6	308.4	293.9	273.2	252.5	231.8	211.1	294.3	22.2	294.3	291.6	278.8	258.3	237.8	217.4	196.9
10000	72	386.7	21.4	226.9	203.7	180.5	157.3	134.1	-	-	363.2	23.7	217.3	194.3	171.4	148.5	125.6	-	-
	67	361.7	20.9	277.8	254.6	231.4	208.2	185.0	161.8	138.6	335.7	23.4	268.1	245.2	222.2	199.3	176.4	153.4	130.5
	62	329.5	20.8	329.5	312.8	289.6	266.4	243.2	220.0	196.8	309.0	22.9	309.0	296.0	273.1	250.2	227.3	204.3	181.4
	57	317.2	20.1	317.2	317.2	306.4	283.2	260.0	236.8	213.6	298.8	22.5	298.8	298.8	291.1	268.1	245.2	222.3	199.3
11250	72	400.1	21.5	248.4	223.6	198.7	173.9	149.1	-	-	377.0	23.7	237.8	213.3	188.8	164.3	139.8	-	-
	67	374.2	21.0	304.4	279.6	254.8	229.9	205.1	180.3	155.5	348.5	23.4	293.8	269.3	244.8	220.3	195.8	171.3	146.8
	62	340.9	20.9	340.9	332.5	318.8	294.0	269.2	244.4	219.5	320.7	22.9	320.7	314.2	300.8	276.3	251.8	227.3	202.8
	57	328.2	20.2	328.2	328.2	322.8	298.0	273.1	248.3	223.5	310.2	22.5	310.2	310.2	306.3	281.8	257.3	232.8	208.3
12500	72	413.5	21.6	269.8	243.4	217.0	190.5	164.1	-	-	390.8	23.7	258.3	232.2	206.2	180.1	154.0	-	-
	67	386.8	21.1	331.0	304.6	278.1	251.7	225.3	198.8	172.4	361.2	23.4	319.4	293.4	267.3	241.2	215.2	189.1	163.0
	62	352.3	21.0	352.3	352.3	348.1	321.6	295.2	268.8	242.3	332.4	22.8	332.4	332.4	328.5	302.4	276.4	250.3	224.2
	57	339.1	20.3	339.1	339.1	339.1	312.7	286.2	259.8	233.4	321.5	22.5	321.5	321.5	321.5	295.5	269.4	243.3	217.3
		95°F									105°F									
7500	72	338.5	25.4	183.8	166.0	148.2	130.3	112.5	-	-	310.7	28.6	171.7	154.3	136.8	119.3	101.9	-	-
	67	308.7	25.4	230.1	212.3	194.5	176.7	158.9	141.1	123.2	286.0	28.3	219.1	201.6	184.1	166.7	149.2	131.7	114.3
	62	287.4	24.4	269.9	252.1	234.2	216.4	198.6	180.8	163.0	266.3	27.5	257.5	241.5	224.0	206.6	189.1	171.6	154.2
	57	279.5	24.3	279.5	269.4	251.6	233.8	216.0	198.2	180.4	264.1	27.5	264.1	252.8	235.3	217.8	200.4	182.9	165.4
8750	72	339.0	25.7	195.7	175.5	155.2	135.0	114.8	-	-	310.9	28.7	184.1	164.1	144.1	124.0	104.0	-	-
	67	309.2	25.7	244.2	224.0	203.8	183.5	163.3	143.1	122.9	286.1	28.5	234.0	214.0	193.9	173.9	153.9	133.8	113.8
	62	287.9	24.7	279.1	265.7	245.5	225.2	205.0	184.8	164.5	266.4	27.7	262.0	251.7	236.0	215.9	195.9	175.9	155.8
	57	280.0	24.6	280.0	274.9	263.6	243.4	223.2	202.9	182.7	264.2	27.6	264.2	258.5	247.8	227.8	207.7	187.7	167.7
10000	72	339.6	26.1	207.7	185.0	162.3	139.7	117.0	-	-	311.0	28.9	196.5	173.9	151.3	128.7	106.1	-	-
	67	309.7	26.0	258.4	235.7	213.1	190.4	167.8	145.1	122.5	286.2	28.6	248.9	226.3	203.8	181.2	158.6	136.0	113.4
	62	288.4	25.0	288.4	279.3	256.7	234.0	211.3	188.7	166.0	266.5	27.8	266.5	261.9	247.9	225.3	202.7	180.1	157.5
	57	280.4	24.9	280.4	280.4	275.7	253.0	230.4	207.7	185.0	264.3	27.8	264.3	264.3	260.3	237.7	215.1	192.5	169.9
11250	72	353.9	25.9	227.2	203.0	178.9	154.7	130.5	-	-	324.0	28.9	214.9	190.8	166.8	142.7	118.6	-	-
	67	322.7	25.8	283.1	259.0	234.8	210.6	186.4	162.2	138.1	298.2	28.7	272.6	248.6	224.5	200.5	176.4	152.3	128.3
	62	300.5	24.8	300.5	295.9	282.8	258.6	234.4	210.3	186.1	277.6	27.9	277.6	275.4	267.4	243.4	219.3	195.3	171.2
	57	292.2	24.8	292.2	292.2	289.8	265.6	241.5	217.3	193.1	275.4	27.8	275.4	275.4	273.4	249.3	225.3	201.2	177.2
12500	72	368.1	25.8	246.8	221.1	195.4	169.7	144.0	-	-	337.1	29.0	233.2	207.7	182.2	156.7	131.1	-	-
	67	335.7	25.7	307.9	282.2	256.5	230.8	205.1	179.4	153.7	310.2	28.7	296.3	270.8	245.3	219.7	194.2	168.7	143.2
	62	312.6	24.7	312.6	312.6	308.9	283.2	257.5	231.8	206.1	288.8	27.9	288.8	288.8	287.0	261.5	235.9	210.4	184.9
	57	304.0	24.6	304.0	304.0	304.0	278.3	252.6	226.9	201.2	286.5	27.9	286.5	286.5	286.5	261.0	235.5	209.9	184.4
		115°F									125°F									
7500	72	283.0	31.7	159.7	142.6	125.5	108.3	91.2	-	-	255.3	34.9	147.7	130.9	114.1	97.3	80.5	-	-
	67	263.3	31.3	208.0	190.9	173.8	156.7	139.5	122.4	105.3	240.6	34.2	197.0	180.2	163.5	146.7	129.9	113.1	96.3
	62	245.1	30.7	245.1	230.9	213.8	196.7	179.5	162.4	145.3	223.9	33.8	223.9	220.4	203.6	186.8	170.0	153.2	136.4
	57	248.8	30.6	248.8	236.1	219.0	201.9	184.7	167.6	150.5	233.4	33.8	233.4	219.5	202.7	185.9	169.1	152.3	135.6
8750	72	282.7	31.8	172.6	152.7	132.9	113.1	93.2	-	-	254.5	34.8	161.0	141.3	121.7	102.1	82.5	-	-
	67	263.0	31.3	223.8	203.9	184.1	164.3	144.4	124.6	104.8	239.9	34.1	213.5	193.9	174.3	154.6	135.0	115.4	95.7
	62	244.8	30.7	244.8	237.7	226.5	206.6	186.8	167.0	147.2	223.3	33.7	223.3	223.3	217.0	197.4	177.7	158.1	138.5
	57	248.5	30.7	248.5	242.2	232.0	212.2	192.3	172.5	152.7	232.8	33.7	232.8	225.8	216.2	196.5	176.9	157.3	137.6
10000	72	282.4	31.8	185.4	162.9	140.3	117.8	95.3	-	-	253.7	34.6	174.3	151.8	129.3	106.9	84.4	-	-
	67	262.7	31.3	239.5	217.0	194.4	171.9	149.3	126.8	104.3	239.2	34.0	230.0	207.6	185.1	162.6	140.1	117.6	95.2
	62	244.5	30.7	244.5	244.5	239.2	216.6	194.1	171.5	149.0	222.6	33.6	222.6	222.6	222.6	207.9	185.5	163.0	140.5
	57	248.2	30.7	248.2	248.2	245.0	222.4	199.9	177.4	154.8	232.1	33.5	232.1	232.1	229.6	207.2	184.7	162.2	139.7
11250	72	294.2	32.0	202.5	178.6	154.6	130.7	106.8	-	-	264.4	35.0	190.2	166.4	142.5	118.7	94.9	-	-
	67	273.7	31.5	262.1	238.2	214.2	190.3	166.4	142.4	118.5	249.2	34.3	249.2	227.8	204.0	180.2	156.3	132.5	108.7
	62	254.8	30.9	254.8	254.8	252.1	228.2	204.2	180.3	156.4	232.0	33.9	232.0	232.0	232.0	212.9	189.1	165.3	141.5
	57	258.6	30.9	258.6	258.6	257.0	233.1	209.1	185.2	161.3	241.8	33.9	241.8	241.8	240.6	216.8	193.0	169.1	145.3
12500	72	306.0	32.2	219.6	194.3	169.0	143.6	118.3	-	-	275.0	35.4	206.1	180.9	155.7	130.6	105.4	-	-
	67	284.8	31.7	284.7	259.4	234.1	208.7	183.4	158.1	132.7	259.3	34.7	259.3	248.0	222.9	197.7	172.6	147.4	122.2
	62	265.0	31.1	265.0	265.0	265.0	239.7	214.4	189.0	163.7	241.3	34.3	241.3	241.3	241.3	218.0	192.8	167.6	142.5
	57	269.0	31.1	269.0	269.0	269.0	243.7	218.3	193.0	167.7	251.6	34.3	251.6	251.6	251.6	226.4	201.2	176.1	150.9

1. These capacities are gross ratings. For net capacity, deduct the supply air blower motor heat (MBH = 3.415 x kW). Refer to the appropriate Blower Performance Table for the kW of the supply air blower motor.
2. These ratings include the condenser fan motors and the compressor motors but not the supply air blower motor.

TABLE 32: COOLING PERFORMANCE - 30 TON R-410A

Air on Evaporator Coil		Temperature of Air on Condenser Coil																		
		75°F									85°F									
CFM	WB (°F)	Total Cap.[1] (MBH)	Total[2] Input (kW)	Sensible Capacity (MBH)* Return Dry Bulb (°F)							Total Cap.[1] (MBH)	Total[2] Input (kW)	Sensible Capacity (MBH)* Return Dry Bulb (°F)						
				86	83	80	77	74	71	68			86	83	80	77	74	71	68
9000	72	438.1	25.5	255.0	231.9	208.9	185.8	162.8	-	-	417.5	27.8	247.3	224.4	201.6	178.7	155.8	-	-
	67	411.1	25.1	316.7	293.6	270.6	247.5	224.5	201.4	178.4	391.4	27.4	307.6	284.7	261.9	239.0	216.1	193.3	170.4
	62	383.5	24.6	383.5	357.8	334.8	311.7	288.7	265.6	242.6	366.6	27.0	366.6	347.4	324.6	301.7	278.8	255.9	233.1
	57	381.2	24.6	381.2	372.6	349.6	326.5	303.5	280.4	257.3	365.6	26.9	365.6	356.5	333.7	310.8	287.9	265.0	242.2
10500	72	449.0	25.7	276.2	250.1	224.0	197.9	171.8	-	-	427.7	27.9	268.2	242.4	216.6	190.8	165.0	-	-
	67	421.4	25.3	342.4	316.3	290.2	264.1	238.0	211.9	185.8	401.0	27.5	333.0	307.2	281.4	255.6	229.9	204.1	178.3
	62	393.2	24.8	393.2	380.3	359.1	333.0	306.9	280.8	254.7	375.6	27.1	375.6	366.0	348.8	323.0	297.2	271.4	245.7
	57	390.8	24.7	390.8	386.5	374.9	348.8	322.7	296.6	270.5	374.5	27.1	374.5	370.0	358.6	332.8	307.0	281.2	255.4
12000	72	460.0	25.8	297.5	268.3	239.2	210.0	180.9	-	-	437.9	28.1	289.0	260.3	231.7	203.0	174.3	-	-
	67	431.7	25.5	368.1	339.0	309.8	280.7	251.5	222.4	193.3	410.6	27.6	358.3	329.7	301.0	272.3	243.6	214.9	186.2
	62	402.8	25.0	402.8	402.8	383.3	354.2	325.1	295.9	266.8	384.5	27.3	384.5	384.5	373.0	344.3	315.6	286.9	258.2
	57	400.3	24.9	400.3	400.3	400.3	371.2	342.0	312.9	283.7	383.5	27.2	383.5	383.5	383.5	354.8	326.1	297.4	268.7
13500	72	466.7	25.9	316.2	284.7	253.1	221.6	190.0	-	-	444.3	28.1	308.7	277.3	245.9	214.6	183.2	-	-
	67	438.0	25.5	391.0	359.4	327.9	296.3	264.8	233.2	201.6	416.6	27.7	382.3	350.9	319.5	288.1	256.8	225.4	194.0
	62	408.7	25.0	408.7	408.7	399.0	367.4	335.9	304.3	272.8	390.2	27.3	390.2	390.2	384.4	353.0	321.6	290.3	258.9
	57	406.2	25.0	406.2	406.2	406.2	374.6	343.1	311.5	280.0	389.1	27.3	389.1	389.1	389.1	357.7	326.3	294.9	263.6
15000	72	473.5	26.0	335.0	301.0	267.0	233.1	199.1	-	-	450.7	28.2	328.4	294.3	260.2	226.2	192.1	-	-
	67	444.4	25.6	413.8	379.9	345.9	311.9	278.0	244.0	210.0	422.6	27.8	406.2	372.2	338.1	304.0	270.0	235.9	201.8
	62	414.6	25.1	414.6	414.6	414.6	380.6	346.7	312.7	278.7	395.8	27.4	395.8	395.8	395.8	361.7	327.7	293.6	259.5
	57	412.1	25.1	412.1	412.1	412.1	378.1	344.1	310.2	276.2	394.7	27.4	394.7	394.7	394.7	360.6	326.6	292.5	258.4
		95°F									105°F									
9000	72	396.9	30.0	239.6	216.9	194.3	171.6	148.9	-	-	375.8	32.9	231.0	208.5	186.1	163.6	141.2	-	-
	67	371.8	29.6	298.5	275.9	253.2	230.5	207.8	185.1	162.4	352.1	32.5	289.7	267.2	244.7	222.3	199.8	177.4	154.9
	62	349.7	29.3	349.7	337.0	314.3	291.6	268.9	246.2	223.6	333.9	32.2	333.9	322.6	300.2	277.7	255.3	232.8	210.3
	57	350.0	29.3	350.0	340.4	317.8	295.1	272.4	249.7	227.0	334.1	32.2	334.1	324.3	301.9	279.4	257.0	234.5	212.1
10500	72	406.4	30.1	260.1	234.7	209.2	183.7	158.3	-	-	384.5	33.0	251.4	226.1	200.8	175.4	150.1	-	-
	67	380.6	29.7	323.6	298.1	272.6	247.2	221.7	196.2	170.8	360.2	32.6	314.7	289.4	264.1	238.8	213.5	188.1	162.8
	62	358.0	29.4	358.0	351.7	338.5	313.0	287.6	262.1	236.6	341.7	32.3	341.7	336.0	323.9	298.5	273.2	247.9	222.6
	57	358.3	29.4	358.3	353.5	342.2	316.7	291.3	265.8	240.3	341.8	32.3	341.8	336.9	325.7	300.4	275.1	249.8	224.5
12000	72	415.8	30.3	280.6	252.4	224.1	195.9	167.7	-	-	393.2	33.2	271.8	243.6	215.5	187.3	159.1	-	-
	67	389.5	29.8	348.6	320.3	292.1	263.9	235.6	207.4	179.1	368.4	32.7	339.8	311.6	283.4	255.2	227.1	198.9	170.7
	62	366.3	29.5	366.3	366.3	362.7	334.4	306.2	277.9	249.7	349.4	32.5	349.4	349.4	347.6	319.4	291.2	263.0	234.9
	57	366.6	29.5	366.6	366.6	366.6	338.4	310.2	281.9	253.7	349.5	32.5	349.5	349.5	349.5	321.4	293.2	265.0	236.9
13500	72	421.9	30.4	301.2	270.0	238.8	207.6	176.4	-	-	398.7	33.2	291.7	260.7	229.7	198.7	167.7	-	-
	67	395.2	29.9	373.6	342.4	311.2	280.0	248.8	217.6	186.4	373.6	32.8	358.7	333.2	302.2	271.2	240.2	209.2	178.2
	62	371.7	29.6	371.7	371.7	369.8	338.6	307.4	276.2	245.0	354.3	32.5	354.3	354.3	353.4	322.4	291.4	260.4	229.3
	57	372.0	29.6	372.0	372.0	372.0	340.8	309.6	278.4	247.1	354.4	32.5	354.4	354.4	354.4	323.4	292.4	261.4	230.4
15000	72	428.0	30.4	321.8	287.6	253.4	219.3	185.1	-	-	404.2	33.3	311.7	277.8	244.0	210.2	176.3	-	-
	67	400.9	30.0	398.7	364.5	330.3	296.1	261.9	227.7	193.6	378.7	32.9	377.6	354.8	321.0	287.1	253.3	219.5	185.6
	62	377.0	29.7	377.0	377.0	377.0	342.8	308.7	274.5	240.3	359.2	32.6	359.2	359.2	359.2	325.3	291.5	257.7	223.8
	57	377.4	29.7	377.4	377.4	377.4	343.2	309.0	274.8	240.6	359.3	32.6	359.3	359.3	359.3	325.5	291.7	257.8	224.0
		115°F									125°F									
9000	72	354.6	35.8	222.3	200.1	177.9	155.7	133.4	-	-	333.5	38.7	213.6	191.7	169.7	147.7	125.7	-	-
	67	332.4	35.4	280.8	258.5	236.3	214.1	191.9	169.7	147.5	312.7	38.3	271.9	249.9	227.9	205.9	183.9	162.0	140.0
	62	318.2	35.1	318.2	308.2	286.0	263.8	241.6	219.4	197.1	302.4	38.0	302.4	293.8	271.8	249.9	227.9	205.9	183.9
	57	318.2	35.1	318.2	308.2	286.0	263.8	241.6	219.3	197.1	302.3	38.0	302.3	292.1	270.1	248.1	226.1	204.2	182.2
10500	72	362.6	35.9	242.6	217.5	192.3	167.2	142.0	-	-	340.7	38.8	233.9	208.9	183.9	158.9	133.9	-	-
	67	339.8	35.5	305.8	280.7	255.5	230.4	205.2	180.0	154.9	319.5	38.4	297.0	272.0	247.0	222.0	196.9	171.9	146.9
	62	325.3	35.3	325.3	320.3	309.2	284.1	258.9	233.8	208.6	309.0	38.2	309.0	304.7	294.6	269.6	244.6	219.6	194.6
	57	325.3	35.3	325.3	320.3	309.2	284.1	258.9	233.7	208.6	308.8	38.2	308.8	303.7	292.7	267.7	242.7	217.7	192.7
12000	72	370.6	36.0	263.0	234.9	206.8	178.7	150.6	-	-	347.9	38.9	254.2	226.1	198.1	170.1	142.0	-	-
	67	347.3	35.6	330.9	302.8	274.7	246.6	218.5	190.4	162.3	326.2	38.5	322.1	294.1	266.0	238.0	210.0	181.9	153.9
	62	332.5	35.4	332.5	332.5	332.5	304.4	276.3	248.2	220.0	315.5	38.3	315.5	315.5	315.5	289.3	261.3	233.3	205.2
	57	332.4	35.4	332.4	332.4	332.4	304.3	276.2	248.1	220.0	315.3	38.3	315.3	315.3	315.3	287.3	259.3	231.2	203.2
13500	72	375.5	36.1	282.3	251.5	220.7	189.9	159.1	-	-	352.3	38.9	272.8	242.2	211.6	181.0	150.4	-	-
	67	351.9	35.7	343.8	324.0	293.2	262.4	231.6	200.8	170.0	330.3	38.6	328.8	314.8	284.2	253.6	223.0	192.4	161.8
	62	336.9	35.4	336.9	336.9	336.9	306.1	275.3	244.5	213.7	319.5	38.3	319.5	319.5	319.5	289.8	259.2	228.6	198.1
	57	336.9	35.4	336.9	336.9	336.9	306.1	275.3	244.5	213.7	319.3	38.3	319.3	319.3	319.3	288.7	258.1	227.5	196.9
15000	72	380.5	36.1	301.6	268.1	234.6	201.1	167.6	-	-	356.7	39.0	291.4	258.3	225.1	192.0	158.8	-	-
	67	356.6	35.7	356.6	345.1	311.7	278.2	244.7	211.2	177.7	334.4	38.6	334.4	334.4	302.3	269.2	236.0	202.9	169.7
	62	341.3	35.5	341.3	341.3	341.3	307.8	274.3	240.9	207.4	323.5	38.3	323.5	323.5	323.5	290.3	257.2	224.0	190.9
	57	341.3	35.5	341.3	341.3	341.3	307.8	274.3	240.8	207.3	323.3	38.3	323.3	323.3	323.3	290.2	257.0	223.8	190.7

1. These capacities are gross ratings. For net capacity, deduct the supply air blower motor heat (MBH = 3.415 x kW). Refer to the appropriate Blower Performance Table for the kW of the supply air blower motor.
2. These ratings include the condenser fan motors and the compressor motors but not the supply air blower motor.

TABLE 33: COOLING PERFORMANCE - 40 TON R-410A

Air on Evaporator Coil		Temperature of Air on Condenser Coil																		
		75°F										85°F								
CFM	WB (°F)	Total Cap.[1] (MBH)	Total[2] Input (kW)	Sensible Capacity (MBH)* Return Dry Bulb (°F)							Total Cap.[1] (MBH)	Total[2] Input (kW)	Sensible Capacity (MBH)* Return Dry Bulb (°F)						
				86	83	80	77	74	71	68			86	83	80	77	74	71	68
12000	72	570.6	32.2	340.7	309.3	277.8	246.4	215.0	-	-	542.3	35.4	330.1	298.7	267.4	236.0	204.7	-	-
	67	532.3	31.6	420.3	388.9	357.4	326.0	294.5	263.1	231.7	506.1	34.9	409.3	378.0	346.6	315.3	283.9	252.6	221.2
	62	495.7	31.1	495.7	474.7	443.3	411.8	380.4	348.9	317.5	475.2	34.4	475.2	458.9	427.5	396.2	364.8	333.5	302.1
	57	495.9	31.1	495.9	484.4	453.0	421.5	390.1	358.6	327.2	475.3	34.4	475.3	463.7	432.4	401.0	369.7	338.3	307.0
14000	72	584.8	32.4	369.1	333.8	298.5	263.2	227.9	-	-	555.3	35.6	358.0	322.9	287.7	252.6	217.4	-	-
	67	545.5	31.8	454.7	419.4	384.1	348.8	313.5	278.2	242.9	518.2	35.0	443.3	408.2	373.0	337.8	302.7	267.5	232.4
	62	508.0	31.3	508.0	497.5	476.3	441.0	405.7	370.4	335.1	486.6	34.6	486.6	478.5	460.0	424.9	389.7	354.6	319.4
	57	508.2	31.3	508.2	502.5	486.7	451.4	416.1	380.8	345.5	486.7	34.6	486.7	480.9	465.3	430.1	394.9	359.8	324.6
16000	72	598.9	32.6	397.6	358.4	319.3	280.1	240.9	-	-	568.3	35.8	386.0	347.0	308.0	269.1	230.1	-	-
	67	558.7	32.0	489.0	449.8	410.7	371.5	332.4	293.2	254.1	530.4	35.2	477.3	438.3	399.4	360.4	321.4	282.5	243.5
	62	520.3	31.5	520.3	520.3	509.3	470.2	431.0	391.9	352.7	498.0	34.7	498.0	498.0	492.6	453.6	414.6	375.6	336.7
	57	520.5	31.5	520.5	520.5	520.5	481.4	442.2	403.0	363.9	498.1	34.7	498.1	498.1	498.1	459.2	420.2	381.2	342.3
18000	72	608.2	32.7	422.8	380.6	338.4	296.3	254.1	-	-	576.8	35.9	411.0	369.1	327.1	285.2	243.3	-	-
	67	567.4	32.2	525.1	477.5	435.4	393.2	351.0	308.9	266.7	538.2	35.4	508.0	466.1	424.1	382.2	340.3	298.3	256.4
	62	528.3	31.6	528.3	528.3	522.8	480.7	438.5	396.3	354.2	505.4	34.9	505.4	505.4	502.7	460.7	418.8	376.9	334.9
	57	528.6	31.6	528.6	528.6	528.6	486.4	444.2	402.0	359.9	505.5	34.9	505.5	505.5	505.5	463.6	421.6	379.7	337.8
20000	72	617.4	32.9	448.0	402.8	357.6	312.5	267.3	-	-	585.2	36.1	436.0	391.1	346.2	301.3	256.4	-	-
	67	576.0	32.3	561.2	505.2	460.0	414.9	369.7	324.5	279.3	546.1	35.5	538.7	493.8	448.9	404.0	359.1	314.2	269.3
	62	536.4	31.7	536.4	536.4	536.4	491.2	446.0	400.8	355.6	512.8	35.0	512.8	512.8	512.8	467.9	423.0	378.1	333.2
	57	536.6	31.7	536.6	536.6	536.6	491.4	446.2	401.0	355.9	512.9	35.0	512.9	512.9	512.9	468.0	423.1	378.2	333.3
		95°F									105°F									
12000	72	514.0	38.7	319.4	288.2	256.9	225.7	194.4	-	-	485.9	42.7	308.8	277.7	246.7	215.7	184.6	-	-
	67	479.8	38.1	398.4	367.1	335.9	304.6	273.3	242.1	210.8	453.8	42.1	387.0	356.0	325.0	293.9	262.9	231.9	200.8
	62	454.7	37.7	454.7	443.1	411.8	380.5	349.3	318.0	286.8	433.8	41.7	433.8	421.7	390.7	359.6	328.6	297.6	266.5
	57	454.7	37.7	454.7	443.0	411.8	380.5	349.3	318.0	286.8	433.8	41.7	433.8	421.7	390.7	359.6	328.6	297.6	266.5
14000	72	525.9	38.9	346.9	311.9	276.9	241.9	206.8	-	-	496.8	42.8	336.1	301.2	266.4	231.6	196.8	-	-
	67	490.9	38.3	432.0	397.0	361.9	326.9	291.9	256.9	221.9	463.9	42.3	420.6	385.8	350.9	316.1	281.3	246.5	211.7
	62	465.3	37.9	465.3	459.4	443.8	408.8	373.7	338.7	303.7	443.4	41.9	443.4	437.4	421.9	387.1	352.2	317.4	282.6
	57	465.2	37.9	465.2	459.4	443.8	408.7	373.7	338.7	303.7	443.4	41.9	443.4	437.4	421.9	387.0	352.2	317.4	282.6
16000	72	537.8	39.0	374.4	335.6	296.8	258.1	219.3	-	-	507.6	43.0	363.4	324.8	286.1	247.5	208.9	-	-
	67	502.0	38.4	465.6	426.8	388.0	349.3	310.5	271.7	232.9	474.0	42.4	454.1	415.5	376.9	338.3	299.7	261.1	222.5
	62	475.8	38.0	475.8	475.8	475.8	437.0	398.2	359.4	320.6	453.1	42.0	453.1	453.1	453.1	414.5	375.9	337.3	298.7
	57	475.8	38.0	475.8	475.8	475.8	437.0	398.2	359.4	320.6	453.1	42.0	453.1	453.1	453.1	414.5	375.9	337.2	298.6
18000	72	545.4	39.2	399.2	357.5	315.8	274.1	232.4	-	-	514.8	43.1	388.0	346.4	304.9	263.3	221.7	-	-
	67	509.1	38.6	490.9	454.6	412.9	371.2	329.5	287.8	246.1	480.8	42.5	470.8	443.1	401.6	360.0	318.5	276.9	235.3
	62	482.5	38.1	482.5	482.5	482.5	440.8	399.1	357.4	315.7	459.5	42.2	459.5	459.5	459.5	418.0	376.4	334.8	293.3
	57	482.5	38.1	482.5	482.5	482.5	440.8	399.1	357.4	315.7	459.5	42.2	459.5	459.5	459.5	417.9	376.4	334.8	293.2
20000	72	552.9	39.3	424.1	379.5	334.8	290.2	245.6	-	-	522.0	43.2	412.6	368.1	323.6	279.1	234.6	-	-
	67	516.2	38.7	516.2	482.3	437.7	393.1	348.5	303.9	259.3	487.5	42.7	487.5	470.6	426.3	381.7	337.2	292.7	248.2
	62	489.2	38.3	489.2	489.2	489.2	444.6	400.0	355.4	310.8	466.0	42.3	466.0	466.0	466.0	421.5	376.9	332.4	287.9
	57	489.2	38.3	489.2	489.2	489.2	444.6	400.0	355.4	310.7	466.0	42.3	466.0	466.0	466.0	421.4	376.9	332.4	287.9
		115°F									125°F									
12000	72	457.9	46.7	298.1	267.3	236.5	205.7	174.9	-	-	429.9	50.6	287.5	256.9	226.3	195.7	165.1	-	-
	67	427.9	46.2	375.7	344.9	314.1	283.3	252.5	221.7	190.8	402.0	50.2	364.4	333.8	303.2	272.6	242.0	211.4	180.9
	62	412.8	45.8	412.8	400.4	369.5	338.7	307.9	277.1	246.3	391.9	49.8	391.9	379.0	348.4	317.8	287.3	256.7	226.1
	57	412.8	45.8	412.8	400.3	369.5	338.7	307.9	277.1	246.3	391.9	49.8	391.9	379.0	348.4	317.8	287.2	256.7	226.1
14000	72	467.6	46.8	325.2	290.6	256.0	221.4	186.7	-	-	438.5	50.8	314.4	279.9	245.5	211.1	176.7	-	-
	67	437.0	46.3	409.2	374.6	339.9	305.3	270.7	236.1	201.5	410.1	50.3	397.8	363.4	328.9	294.5	260.1	225.7	191.3
	62	421.6	45.9	421.6	415.4	400.0	365.4	330.7	296.1	261.5	399.8	50.0	399.8	393.4	378.1	343.7	309.2	274.8	240.4
	57	421.6	45.9	421.6	415.4	400.0	365.3	330.7	296.1	261.5	399.8	50.0	399.8	393.3	378.1	343.6	309.2	274.8	240.4
16000	72	477.4	46.9	352.3	313.9	275.4	237.0	198.6	-	-	447.2	50.9	341.3	303.0	264.8	226.5	188.2	-	-
	67	446.1	46.4	442.7	404.2	365.8	327.4	288.9	250.5	212.1	418.2	50.4	418.2	393.0	354.7	316.4	278.2	239.9	201.7
	62	430.4	46.1	430.4	430.4	430.4	392.0	353.5	315.1	276.7	407.7	50.1	407.7	407.7	407.7	369.5	331.2	293.0	254.7
	57	430.4	46.1	430.4	430.4	430.4	392.0	353.5	315.1	276.6	407.7	50.1	407.7	407.7	407.7	369.4	331.2	292.9	254.7
18000	72	484.2	47.0	376.8	335.3	293.9	252.5	211.0	-	-	453.6	51.0	365.5	324.2	282.9	241.6	200.3	-	-
	67	452.5	46.5	450.8	431.6	390.3	348.9	307.4	266.0	224.6	424.2	50.5	424.2	420.1	379.0	337.7	296.4	255.1	213.8
	62	436.6	46.2	436.6	436.6	436.6	395.1	353.7	312.3	270.8	413.6	50.2	413.6	413.6	413.6	372.3	331.0	289.7	248.4
	57	436.6	46.2	436.6	436.6	436.6	395.1	353.7	312.2	270.8	413.6	50.2	413.6	413.6	413.6	372.3	331.0	289.7	248.4
20000	72	491.0	47.1	401.2	356.8	312.4	267.9	223.5	-	-	460.1	51.1	389.8	345.5	301.1	256.8	212.4	-	-
	67	458.9	46.6	458.9	458.9	414.8	370.4	326.0	281.5	237.1	430.2	50.6	430.2	430.2	403.4	359.0	314.7	270.3	226.0
	62	442.7	46.3	442.7	442.7	442.7	398.3	353.9	309.4	265.0	419.5	50.3	419.5	419.5	419.5	375.2	330.8	286.5	242.1
	57	442.7	46.3	442.7	442.7	442.7	398.3	353.8	309.4	265.0	419.5	50.3	419.5	419.5	419.5	375.1	330.8	286.4	242.1

1. These capacities are gross ratings. For net capacity, deduct the supply air blower motor heat (MBH = 3.415 x kW). Refer to the appropriate Blower Performance Table for the kW of the supply air blower motor.
2. These ratings include the condenser fan motors and the compressor motors but not the supply air blower motor.

CFM, STATIC PRESSURE, AND POWER - ALTITUDE AND TEMPERATURE CORRECTIONS

The information below should be used to assist in application of product when being applied at altitudes at or exceeding 1000 feet above sea level.

The air flow rates listed in the standard blower performance tables are based on standard air at sea level. As the altitude or temperature increases, the density of air decreases. In order to use the indoor blower tables for high altitude applications, certain corrections are necessary.

A centrifugal fan is a "constant volume" device. This means that, if the rpm remains constant, the CFM delivered is the same regardless of the density of the air. However, since the air at high altitude is less dense, less static pressure will be generated and less power will be required than a similar application at sea level. Air density correction factors are shown in Table 34 and Figure 21.

TABLE 34: ALTITUDE CORRECTION FACTORS

AIR TEMP	ALTITUDE (FEET)										
	0	1000	2000	3000	4000	5000	6000	7000	8000	9000	10000
40	1.060	1.022	0.986	0.950	0.916	0.882	0.849	0.818	0.788	0.758	0.729
50	1.039	1.002	0.966	0.931	0.898	0.864	0.832	0.802	0.772	0.743	0.715
60	1.019	0.982	0.948	0.913	0.880	0.848	0.816	0.787	0.757	0.729	0.701
70	1.000	0.964	0.930	0.896	0.864	0.832	0.801	0.772	0.743	0.715	0.688
80	0.982	0.947	0.913	0.880	0.848	0.817	0.787	0.758	0.730	0.702	0.676
90	0.964	0.929	0.897	0.864	0.833	0.802	0.772	0.744	0.716	0.689	0.663
100	0.946	0.912	0.880	0.848	0.817	0.787	0.758	0.730	0.703	0.676	0.651

The examples below will assist in determining the airflow performance of the product at altitude.

Example 1: What are the corrected CFM, static pressure, and BHP at an elevation of 5,000 ft. if the blower performance data is 6,000 CFM, 1.5 IWC and 4.0 BHP?

Solution: At an elevation of 5,000 ft the indoor blower will still deliver 6,000 CFM if the rpm is unchanged. However, Table 34 must be used to determine the static pressure and BHP. Since no temperature data is given, we will assume an air temperature of 70°F. Table 34 shows the correction factor to be 0.832.

Corrected static pressure = 1.5 x 0.832 = 1.248 IWC

Corrected BHP = 4.0 x 0.832 = 3.328

Example 2: A system, located at 5,000 feet of elevation, is to deliver 6,000 CFM at a static pressure of 1.5". Use the unit blower tables to select the blower speed and the BHP requirement.

Solution: As in the example above, no temperature information is given so 70°F is assumed.

The 1.5" static pressure given is at an elevation of 5,000 ft. The first step is to convert this static pressure to equivalent sea level conditions.

Sea level static pressure = 1.5 / .832 = 1.80"

Enter the blower table at 6000 sCFM and static pressure of 1.8". The rpm listed will be the same rpm needed at 5,000 ft.

Suppose that the corresponding BHP listed in the table is 3.2. This value must be corrected for elevation.

BHP at 5,000 ft = 3.2 x .832 = 2.66

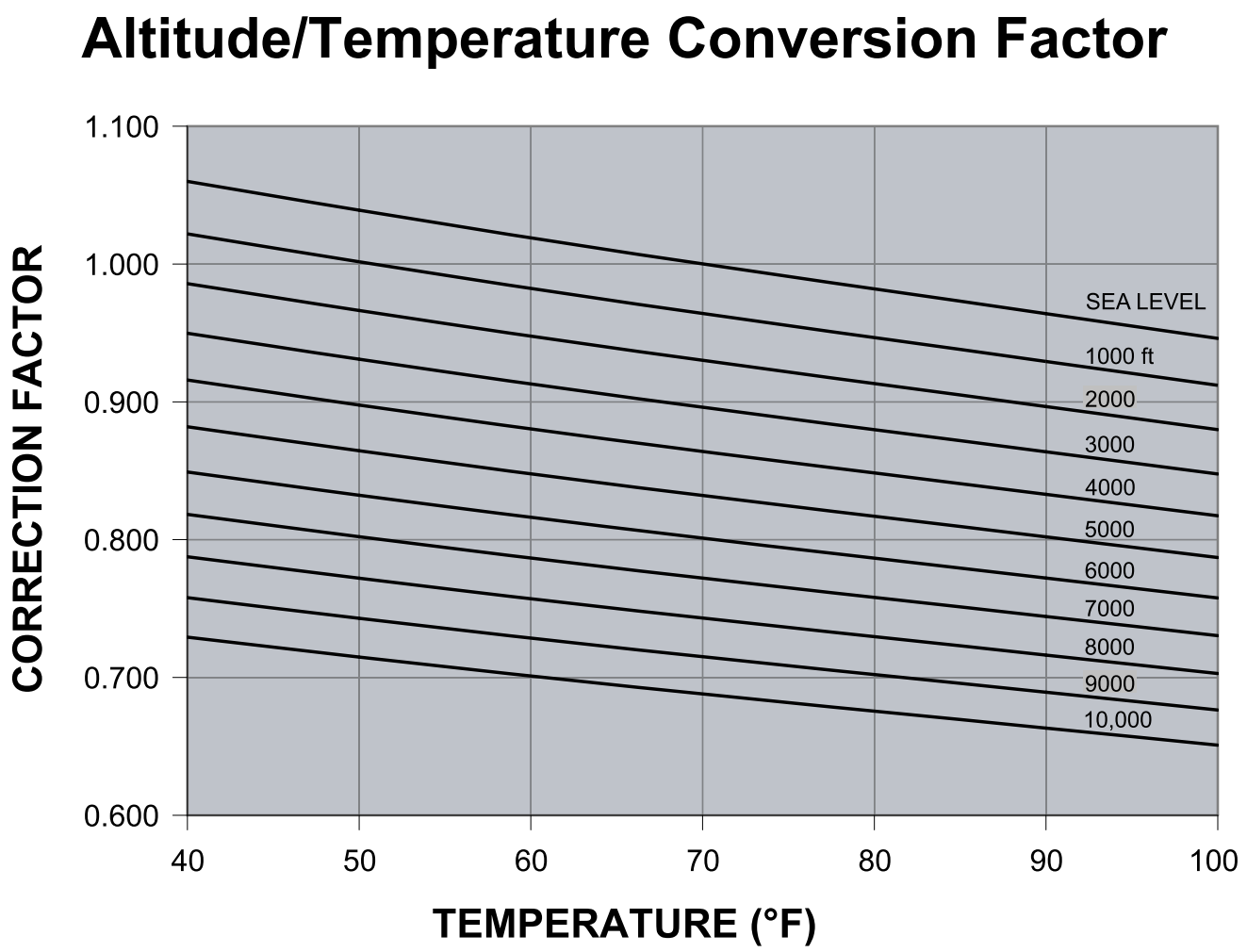


FIGURE 21 - ALTITUDE/TEMPERATURE CONVERSION FACTOR

TABLE 35: FAN PERFORMANCE - 25 TON[1, 2]

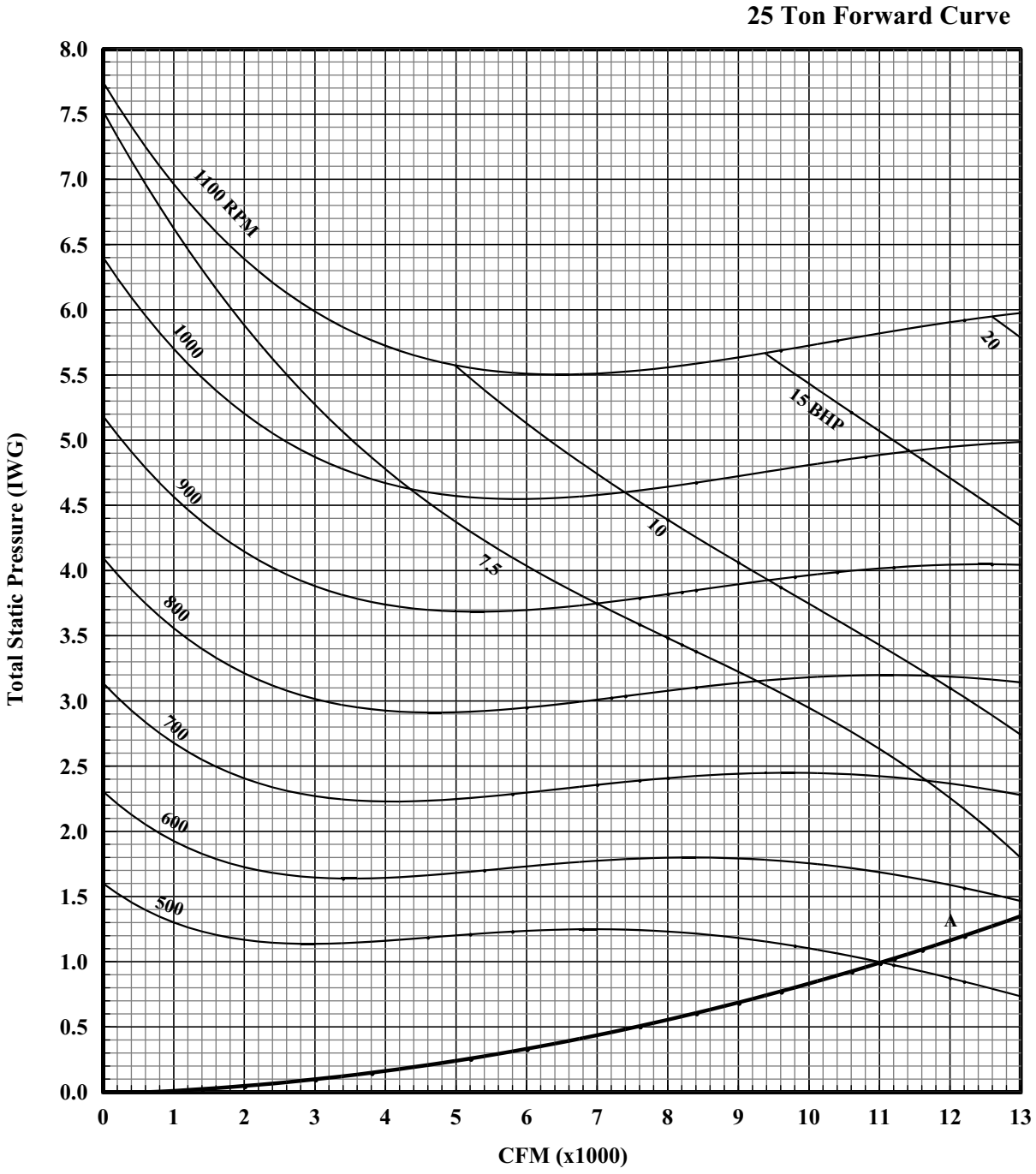
AIRFLOW CFM	AVAILABLE EXTERNAL STATIC PRESSURE (IWG)									
	0.2		0.4		0.6		0.8		1.0	
	RPM	BHP[3]	RPM	BHP[3]	RPM	BHP[3]	RPM	BHP[3]	RPM	BHP[3]
4000	302	0.5	365	0.7	422	1.0	475	1.3	523	1.5
5000	341	0.9	396	1.1	447	1.4	495	1.7	540	2.0
6000	380	1.2	427	1.5	473	1.8	516	2.1	557	2.5
7000	416	1.8	459	2.1	500	2.5	540	2.8	578	3.2
8000	452	2.3	491	2.7	528	3.1	565	3.5	600	3.9
9000	492	3.2	527	3.6	561	4.0	594	4.5	626	4.9
10000	532	4.2	563	4.5	594	4.9	624	5.4	653	5.8
11000	578	5.5	605	5.9	632	6.3	659	6.7	686	7.2
12000	623	6.8	647	7.2	671	7.6	695	8.1	719	8.6
12500	639	7.4	664	7.9	688	8.4	712	8.9	736	9.5

AIRFLOW CFM	AVAILABLE EXTERNAL STATIC PRESSURE (IWG)									
	1.2		1.4		1.6		1.8		2.0	
	RPM	BHP[3]	RPM	BHP[3]	RPM	BHP[3]	RPM	BHP[3]	RPM	BHP[3]
4000	568	1.8	609	2.2	646	2.5	681	2.8	713	3.2
5000	582	2.4	621	2.7	657	3.1	692	3.5	724	3.9
6000	596	2.9	633	3.3	669	3.7	702	4.1	735	4.5
7000	615	3.6	650	4.0	683	4.5	716	4.9	747	5.4
8000	633	4.4	666	4.8	698	5.3	729	5.7	759	6.2
9000	658	5.3	688	5.8	718	6.3	747	6.8	776	7.3
10000	682	6.3	710	6.8	738	7.3	766	7.8	793	8.4
11000	713	7.7	739	8.2	765	8.8	791	9.3	816	9.9
12000	743	9.1	767	9.7	791	10.2	815	10.8	839	11.4
12500	760	10.0	784	10.6	807	11.2	830	11.7	853	12.3

AIRFLOW CFM	AVAILABLE EXTERNAL STATIC PRESSURE (IWG)									
	2.2		2.4		2.6		2.8		3.0	
	RPM	BHP[3]	RPM	BHP[3]	RPM	BHP[3]	RPM	BHP[3]	RPM	BHP[3]
4000	743	3.5	770	3.9	796	4.3	821	4.6	844	5.0
5000	754	4.3	783	4.7	810	5.1	836	5.5	861	5.9
6000	766	5.0	795	5.4	824	5.9	851	6.4	878	6.8
7000	777	5.8	806	6.3	834	6.8	861	7.3	888	7.8
8000	788	6.7	817	7.2	844	7.7	871	8.2	898	8.8
9000	804	7.8	831	8.3	857	8.9	883	9.5	909	10.0
10000	819	8.9	845	9.5	870	10.1	896	10.7	920	11.3
11000	841	10.5	866	11.1	890	11.7	914	12.3	938	12.9
12000	863	12.0	887	12.6	910	13.2	933	13.9	956	14.5
12500	876	12.9	899	13.6	921	14.2	943	14.8	965	15.5

AIRFLOW CFM	AVAILABLE EXTERNAL STATIC PRESSURE (IWG)									
	3.2		3.4		3.6		3.8		4.0	
	RPM	BHP[3]	RPM	BHP[3]	RPM	BHP[3]	RPM	BHP[3]	RPM	BHP[3]
4000	867	5.4	890	5.8	912	6.2	935	6.6	958	6.9
5000	885	6.4	909	6.8	932	7.2	956	7.6	979	8.0
6000	903	7.3	928	7.8	953	8.2	976	8.7	1000	9.1
7000	914	8.3	939	8.8	963	9.4	988	9.9	1012	10.5
8000	924	9.3	949	9.9	974	10.5	999	11.2	1023	11.8
9000	934	10.6	959	11.2	983	11.9	1007	12.5	1030	13.2
10000	944	11.9	968	12.6	992	13.2	1015	13.8	1037	14.5
11000	961	13.6	984	14.2	1007	14.9	1029	15.6	1051	16.2
12000	978	15.2	1000	15.9	1022	16.6	1043	17.3	1064	18.0
13000	986	16.2	1008	16.8	1029	17.5	1050	18.2	1070	19.0

1. Fan performance is based on wet evaporator coils, clean 2" throwaway filters and system/cabinet effects at standard air density and 0 feet elevation.
2. Refer to Tables 10, 15, 21 and 38 for component additions and deductions to fan performance tables.
3. BHP includes drive losses.
4. **Shaded RPMs require Class II blower.**



A - Standard Unit

Note: Standard Unit includes wet evaporator coil, clean 2" throwaway filters, system and cabinet effects at standard air density and 0' elevation.

FIGURE 22 - FAN PERFORMANCE - 25 TON

TABLE 36: FAN PERFORMANCE - 30 TON [1, 2]

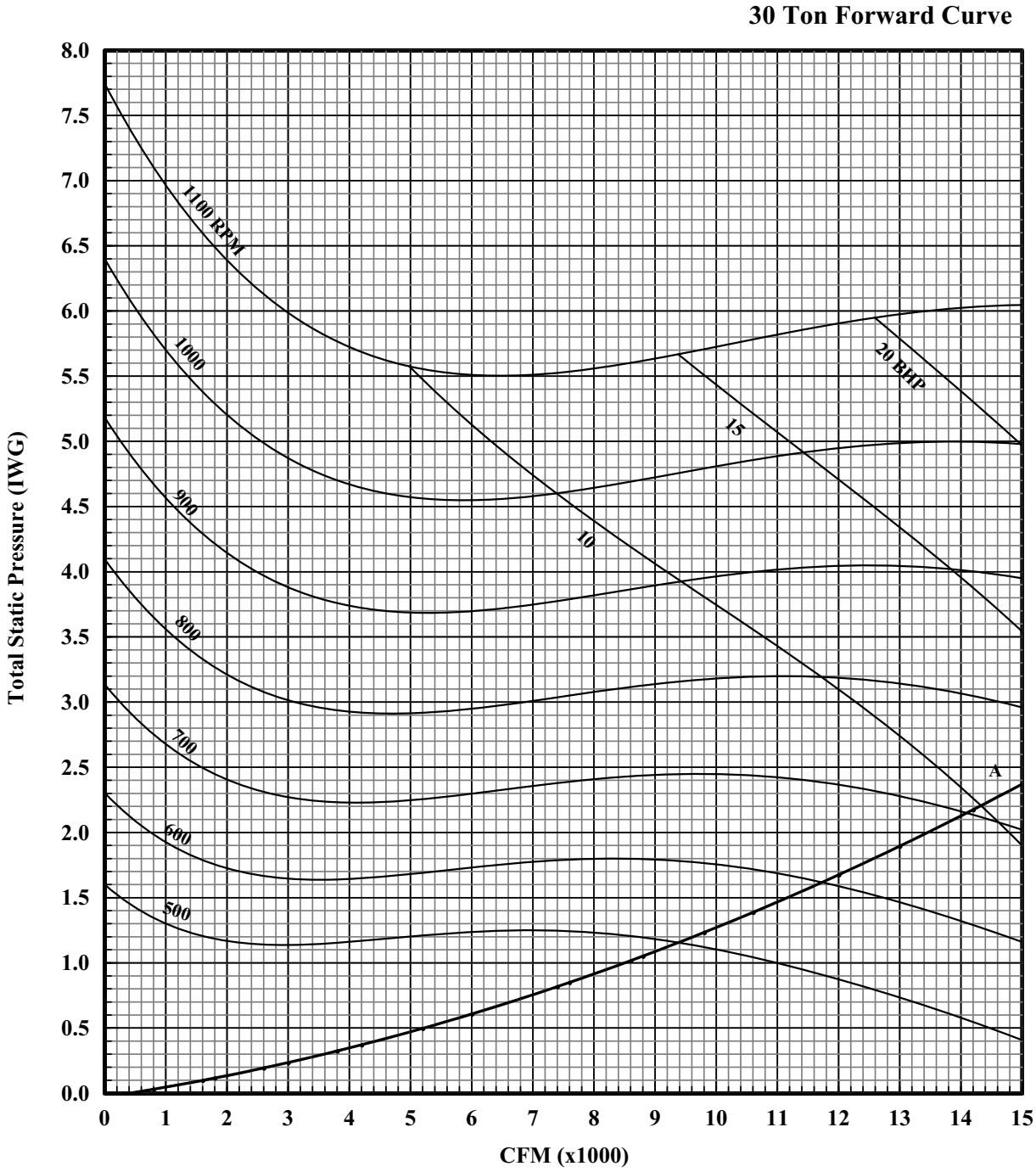
AIRFLOW (CFM)	AVAILABLE EXTERNAL STATIC PRESSURE (IWG)									
	0.2		0.4		0.6		0.8		1.0	
	RPM	BHP[3]	RPM	BHP[3]	RPM	BHP[3]	RPM	BHP[3]	RPM	BHP[3]
6000	405	1.3	450	1.6	494	2.0	535	2.3	575	2.7
7000	444	1.9	485	2.3	524	2.7	562	3.0	599	3.4
8000	483	2.6	519	2.9	555	3.3	589	3.7	623	4.2
9000	520	3.5	554	3.9	586	4.3	618	4.7	649	5.2
10000	558	4.5	588	4.8	618	5.2	647	5.7	676	6.2
11000	603	5.7	629	6.2	656	6.7	683	7.2	709	7.7
12000	647	7.0	671	7.5	695	8.1	718	8.6	742	9.2
13000	687	8.9	709	9.3	731	9.9	753	10.4	776	10.9
14000	728	10.7	748	11.2	768	11.6	789	12.2	809	12.7
15000	767	12.7	786	13.2	805	13.8	825	14.4	845	15.0

AIRFLOW (CFM)	AVAILABLE EXTERNAL STATIC PRESSURE (IWG)									
	1.2		1.4		1.6		1.8		2.0	
	RPM	BHP[3]	RPM	BHP[3]	RPM	BHP[3]	RPM	BHP[3]	RPM	BHP[3]
6000	612	3.1	649	3.5	683	3.9	717	4.3	748	4.7
7000	634	3.8	668	4.3	701	4.7	733	5.1	763	5.6
8000	655	4.6	687	5.1	719	5.5	749	6.0	779	6.5
9000	680	5.6	710	6.1	739	6.6	768	7.2	796	7.7
10000	704	6.7	732	7.2	760	7.7	787	8.3	813	8.9
11000	735	8.2	761	8.7	787	9.3	812	9.8	837	10.4
12000	766	9.7	790	10.3	814	10.8	837	11.4	861	12.0
13000	798	11.5	820	12.1	843	12.7	865	13.3	887	13.9
14000	830	13.3	851	13.9	872	14.6	893	15.2	914	15.9
15000	864	15.6	884	16.3	904	16.9	923	17.6	943	18.3

AIRFLOW (CFM)	AVAILABLE EXTERNAL STATIC PRESSURE (IWG)									
	2.2		2.4		2.6		2.8		3.0	
	RPM	BHP[3]	RPM	BHP[3]	RPM	BHP[3]	RPM	BHP[3]	RPM	BHP[3]
6000	779	5.1	808	5.5	837	6.0	864	6.4	890	6.9
7000	793	6.1	822	6.6	850	7.0	877	7.5	903	8.1
8000	807	7.0	836	7.6	863	8.1	890	8.6	916	9.2
9000	823	8.3	850	8.8	877	9.4	902	10.0	928	10.6
10000	839	9.5	865	10.1	890	10.7	915	11.3	940	12.0
11000	862	11.0	886	11.6	910	12.2	934	12.9	957	13.5
12000	884	12.5	907	13.2	930	13.8	953	14.4	975	15.0
13000	909	14.6	931	15.2	953	15.9	975	16.5	996	17.2
14000	935	16.6	956	17.3	976	18.0	997	18.7	1017	19.4
15000	963	18.9	982	19.6	1002	20.4	1021	21.1	1040	21.8

AIRFLOW (CFM)	AVAILABLE EXTERNAL STATIC PRESSURE (IWG)									
	3.2		3.4		3.6		3.8		4.0	
	RPM	BHP[3]	RPM	BHP[3]	RPM	BHP[3]	RPM	BHP[3]	RPM	BHP[3]
6000	916	7.4	940	7.9	964	8.3	988	8.8	1011	9.3
7000	928	8.6	953	9.1	977	9.6	1000	10.1	1023	10.7
8000	941	9.8	965	10.3	989	10.9	1013	11.5	1035	12.0
9000	952	11.2	976	11.8	1000	12.4	1023	13.0	1045	13.6
10000	964	12.6	987	13.2	1010	13.9	1033	14.5	1055	15.1
11000	981	14.1	1003	14.8	1025	15.5	1047	16.1	1069	16.8
12000	997	15.7	1019	16.4	1040	17.1	1061	17.8	1082	18.5
13000	1017	17.9	1038	18.6	1058	19.4	1078	20.1	1097	20.8
14000	1037	20.2	1056	20.9	1076	21.6	1094	22.4	1113	23.1
15000	1059	22.6	1078	23.3	1097	24.1	1115	24.9	1134	25.7

1. Fan performance is based on wet evaporator coils, clean 2" throwaway filters and system/cabinet effects at standard air density and 0 feet elevation.
2. Refer to Tables 10, 15, 21 and 38 for component additions and deductions to fan performance tables.
3. BHP includes drive losses.
4. **Shaded RPMs require Class II blower.**



A - Standard Unit

Note: Standard Unit includes wet evaporator coil, clean 2" throwaway filters, system and cabinet effects at standard air density and 0' elevation.

FIGURE 23 - FAN PERFORMANCE - 30 TON

TABLE 37: FAN PERFORMANCE - 40 TON[1,2]

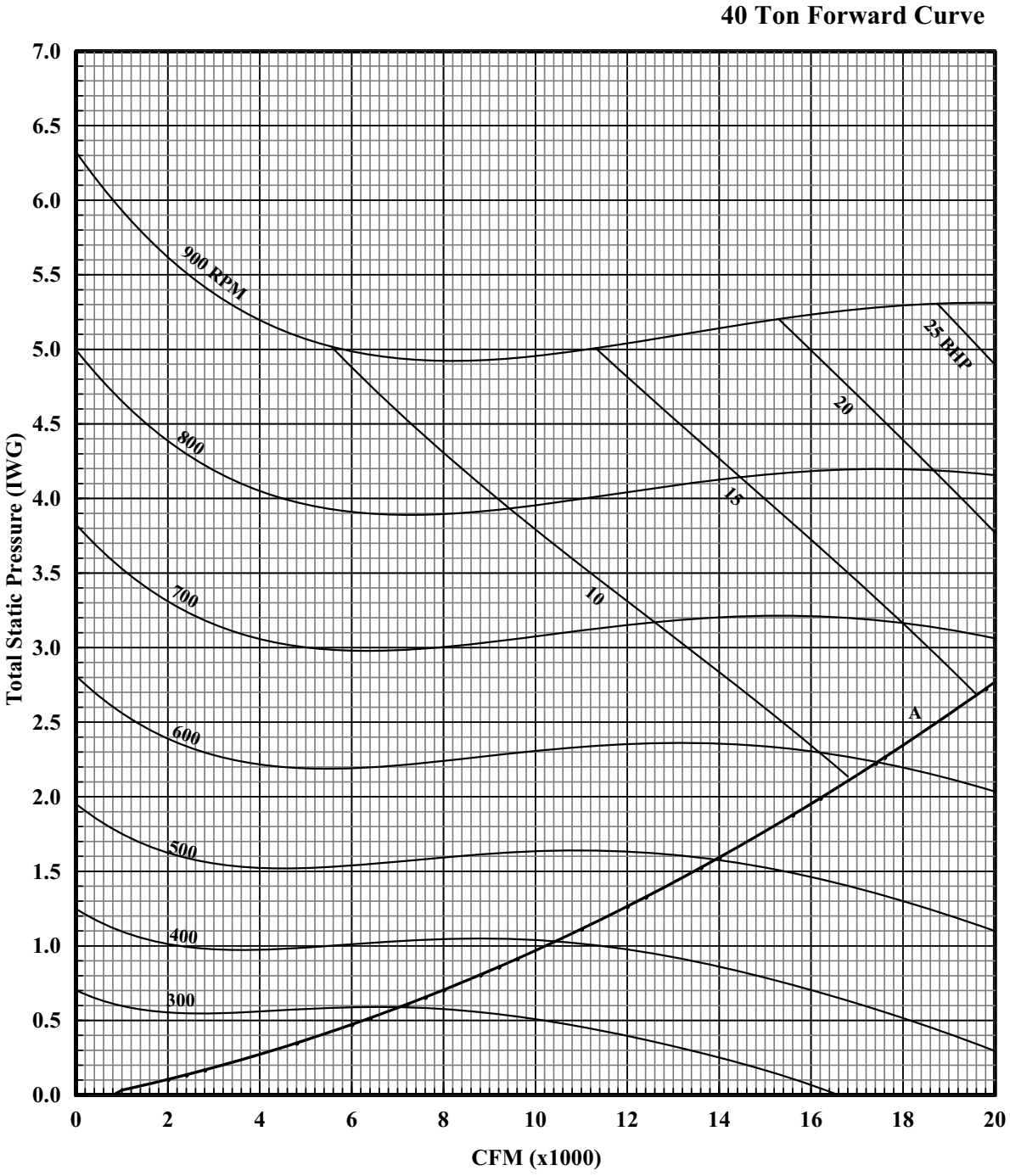
AIRFLOW (CFM)	AVAILABLE EXTERNAL STATIC PRESSURE (IWG)									
	0.2		0.4		0.6		0.8		1.0	
	RPM	BHP[3]	RPM	BHP[3]	RPM	BHP[3]	RPM	BHP[3]	RPM	BHP[3]
8000	367	1.9	409	2.3	448	2.8	485	3.3	519	3.8
9000	396	2.5	433	3.0	469	3.5	504	4.0	536	4.5
10000	424	3.1	458	3.6	491	4.1	523	4.6	553	5.2
11000	454	4.0	486	4.5	516	5.1	546	5.6	574	6.2
12000	484	5.0	513	5.5	542	6.1	569	6.6	596	7.2
13000	507	5.9	535	6.5	562	7.1	589	7.8	614	8.4
14000	530	6.9	557	7.6	583	8.2	608	8.9	633	9.6
15000	560	8.4	584	9.1	609	9.7	632	10.4	655	11.2
16000	589	9.8	612	10.5	634	11.3	656	12.0	678	12.7
17000	613	11.7	635	12.4	657	13.1	678	13.8	699	14.6
18000	638	13.6	659	14.3	680	15.0	700	15.7	721	16.5

AIRFLOW (CFM)	AVAILABLE EXTERNAL STATIC PRESSURE (IWG)									
	1.2		1.4		1.6		1.8		2.0	
	RPM	BHP[3]	RPM	BHP[3]	RPM	BHP[3]	RPM	BHP[3]	RPM	BHP[3]
8000	552	4.2	583	4.7	612	5.2	639	5.7	665	6.2
9000	567	5.0	596	5.5	624	6.0	651	6.6	677	7.1
10000	582	5.7	610	6.3	637	6.9	663	7.4	688	8.0
11000	602	6.8	628	7.4	654	8.0	679	8.6	703	9.2
12000	621	7.9	647	8.5	671	9.1	695	9.8	718	10.4
13000	639	9.1	664	9.7	687	10.4	710	11.1	733	11.8
14000	657	10.3	681	11.0	704	11.7	726	12.5	748	13.2
15000	678	11.9	700	12.6	722	13.3	744	14.1	765	14.9
16000	699	13.5	720	14.2	741	15.0	761	15.8	781	16.5
17000	720	15.4	740	16.1	760	16.9	780	17.8	799	18.6
18000	740	17.3	760	18.1	780	18.9	799	19.7	818	20.6

AIRFLOW (CFM)	AVAILABLE EXTERNAL STATIC PRESSURE (IWG)									
	2.2		2.4		2.6		2.8		3.0	
	RPM	BHP[3]	RPM	BHP[3]	RPM	BHP[3]	RPM	BHP[3]	RPM	BHP[3]
8000	690	6.7	713	7.2	736	7.7	758	8.2	779	8.8
9000	701	7.7	725	8.2	747	8.8	769	9.4	790	10.0
10000	712	8.7	736	9.3	759	9.9	781	10.6	802	11.2
11000	726	9.9	749	10.5	771	11.2	793	11.9	814	12.6
12000	740	11.1	762	11.8	784	12.5	805	13.2	826	13.9
13000	755	12.5	776	13.3	797	14.0	818	14.7	838	15.5
14000	769	14.0	790	14.7	811	15.5	831	16.3	851	17.1
15000	785	15.6	805	16.4	825	17.2	845	18.0	864	18.9
16000	801	17.3	820	18.1	839	19.0	858	19.8	877	20.6
17000	819	19.4	837	20.3	856	21.1	874	22.0	892	22.9
18000	836	21.5	855	22.4	873	23.3	890	24.2	908	25.1

AIRFLOW (CFM)	AVAILABLE EXTERNAL STATIC PRESSURE (IWG)									
	3.2		3.4		3.6		3.8		4.0	
	RPM	BHP[3]	RPM	BHP[3]	RPM	BHP[3]	RPM	BHP[3]	RPM	BHP[3]
8000	799	9.3	819	9.9	839	10.6	859	11.2	879	11.9
9000	811	10.6	831	11.3	851	11.9	871	12.6	891	13.3
10000	823	11.9	843	12.6	863	13.3	883	13.9	902	14.6
11000	834	13.3	855	14.0	874	14.7	894	15.4	913	16.1
12000	846	14.6	866	15.4	885	16.1	905	16.8	924	17.5
13000	858	16.3	877	17.0	896	17.8	915	18.6	934	19.3
14000	870	17.9	889	18.7	908	19.5	926	20.3	944	21.1
15000	882	19.7	901	20.5	919	21.4	937	22.2	955	23.1
16000	895	21.5	913	22.4	931	23.3	948	24.2	966	25.1
17000	910	23.8	928	24.7	945	25.6	962	-	-	-
18000	925	26.0	-	-	-	-	-	-	-	-

1. Fan performance is based on wet evaporator coils, clean 2" throwaway filters and system/cabinet effects at standard air density and 0 feet elevation.
2. Refer to Tables 12, 18, 23 and 38 for component additions and deductions to fan performance tables.
3. BHP includes drive losses.
4. **Shaded RPMs require Class II blower.**



A - Standard Unit

Note: Standard Unit includes wet evaporator coil, clean 2" throwaway filters, system and cabinet effects at standard air density and 0' elevation.

FIGURE 24 - FAN PERFORMANCE - 40 TON

TABLE 38: COMPONENT STATIC RESISTANCE[1, 2]

COMPONENT COIL LOSSES	CFM							
	4,000	6,000	8,000	10,000	12,000	14,000	16,000	18,000
COIL LOSSES 25T								
3 Row, 16 FPI, dry	-0.14	-0.18	-0.24	-0.34	-0.45	-	-	-
3 Row, 16 FPI, wet	Baseline	Baseline	Baseline	Baseline	Baseline	-	-	-
COIL LOSSES 30T								
4 Row, 16 FPI, dry	-0.18	-0.22	-0.32	-0.45	-0.60	-0.76	-	-
4 Row, 16 FPI, wet	Baseline	Baseline	Baseline	Baseline	Baseline	Baseline	-	-
COIL LOSSES 40T								
4 Row, 16 FPI, dry	-0.15	-0.22	-0.26	-0.31	-0.42	-0.53	-.0.65	-0.79
4 Row, 16 FPI, wet	Baseline	Baseline	Baseline	Baseline	Baseline	Baseline	Baseline	Baseline
FILTER LOSSES								
2" TA or HI EFF.	Baseline	Baseline	Baseline	Baseline	Baseline	Baseline	Baseline	Baseline
Rigid 6", 65%	0.06	0.12	0.19	0.27	0.36	0.46	0.58	0.70
Rigid 6", 95%	0.13	0.26	0.41	0.60	0.81	1.04	1.29	1.57
IGV LOSSES								
25 & 30 Ton F.C.	0.02	0.05	0.08	0.13	0.19	0.26	0.34	0.43
40 Ton F.C.	0.01	0.03	0.05	0.08	0.11	0.15	0.19	0.25
GAS HEAT								
267 MBH Heat	0.07	0.11	0.14	0.18	0.21	0.25	0.28	0.32
533 MBH Heat	0.14	0.21	0.28	0.35	0.42	0.49	0.57	0.64
800 MBH Heat	0.21	0.32	0.42	0.53	0.64	0.74	0.85	0.95
ELECTRIC HEAT								
40KW	0.01	0.02	0.04	0.06	0.10	0.20	0.31	0.40
80KW	0.01	0.04	0.08	0.13	0.20	0.31	0.44	0.56
108KW	0.02	0.05	0.10	0.15	0.31	0.43	0.53	0.68
ECONOMIZER	0.03	0.06	0.10	0.15	0.21	0.28	0.35	0.43
POWER EXHAUST	0.02	0.05	0.08	0.13	0.18	0.25	0.32	0.41

1. Baseline losses based on system/cabinet effects, wet standard coil and 2" throwaway filters at 70°F, 0 feet elevation with standard air.
2. See Tables 10, 12, 15, 18 and 21 for hot water and steam water coil static resistance.

TABLE 39: POWER EXHAUST - ONE FORWARD CURVED FAN 25 TON[1]

AIRFLOW CFM	AVAILABLE EXTERNAL STATIC PRESSURE (IWG)									
	0.2		0.4		0.6		0.8		1.0	
	RPM	BHP[2]	RPM	BHP[2]	RPM	BHP[2]	RPM	BHP[2]	RPM	BHP[2]
2000	---	---	---	---	524	0.3	609	0.4	685	0.6
3000	---	---	450	0.4	531	0.5	605	0.7	672	0.8
4000	442	0.7	496	0.8	562	0.9	626	1.1	687	1.2
5000	524	1.2	566	1.4	609	1.5	663	1.7	717	1.8
6000	612	1.9	646	2.2	679	2.4	717	2.6	762	2.7
7000	703	3.0	731	3.3	759	3.5	787	3.7	820	4.0
8000	791	3.8	821	4.3	844	4.8	868	5.2	892	5.5
9000	877	5.8	911	6.2	932	6.5	953	6.9	974	7.3
10000	967	8.4	1004	8.8	1022	9.1	1041	9.4	1059	9.8

AIRFLOW CFM	AVAILABLE EXTERNAL STATIC PRESSURE (IWG)									
	1.2		1.4		1.6		1.8		2.0	
	RPM	BHP[2]	RPM	BHP[2]	RPM	BHP[2]	RPM	BHP[2]	RPM	BHP[2]
2000	754	0.7	819	0.8	878	0.9	933	1.1	986	1.2
3000	736	1.0	797	1.1	854	1.3	909	1.5	961	1.7
4000	743	1.4	799	1.5	850	1.7	900	1.9	948	2.1
5000	768	2.0	818	2.2	865	2.4	911	2.6	955	2.8
6000	806	2.9	850	3.1	895	3.3	937	3.6	978	3.8
7000	857	4.2	895	4.4	933	4.6	972	4.8	1010	5.0
8000	921	5.7	953	6.0	985	6.2	1018	6.5	1052	6.8
9000	995	7.6	1020	8.0	1048	8.3	1075	8.5	1103	8.8
10000	1077	10.1	1096	10.4	1119	10.8	1143	11.1	1167	11.4

1. Fan performance is based on system/cabinet effects and back draft damper effects at standard air density and 0 feet of elevation.
2. BHP includes 5% drive losses.

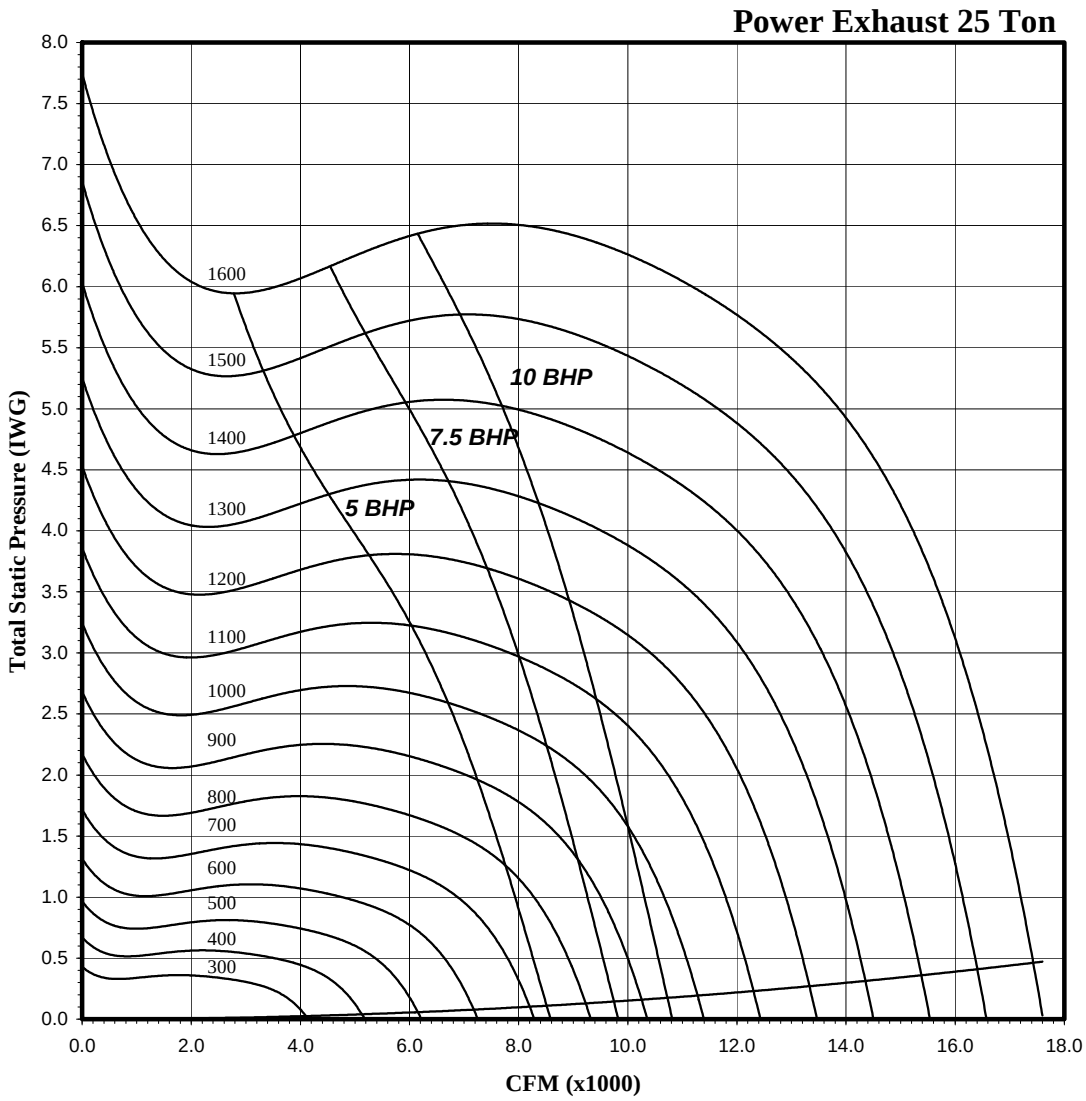


FIGURE 25 - POWER EXHAUST - ONE FORWARD CURVE FAN - 25 TONS

TABLE 40: POWER EXHAUST - TWO FORWARD CURVED FANS - 30 & 40 TON[1]

AIRFLOW CFM	AVAILABLE EXTERNAL STATIC PRESSURE (IWG)									
	0.2		0.4		.06		0.8		1.0	
	RPM	BHP[2 3]	RPM	BHP[2 3]	RPM	BHP[2 3]	RPM	BHP[2 3]	RPM	BHP[2 3]
4000	363	0.3	468	0.5	560	0.7	641	0.9	716	1.2
5000	402	0.5	494	0.7	576	1.1	652	1.3	722	1.5
6000	445	0.8	527	1.1	602	1.4	670	1.7	735	2.0
7000	494	1.3	565	1.6	633	1.8	697	2.1	757	2.5
8000	544	1.8	609	2.1	670	2.4	729	2.7	784	3.2
9000	597	2.4	654	2.8	711	3.2	765	3.5	817	3.9
10000	651	3.3	703	3.7	754	4.0	805	4.4	853	4.8
11000	705	4.3	753	4.7	801	5.1	847	5.6	893	6.0
12000	761	5.5	805	5.9	849	6.3	893	6.8	934	7.2
13000	817	6.9	858	7.4	899	7.8	939	8.3	979	8.8
14000	874	8.5	912	9.0	950	9.6	988	10.0	1025	10.5
15000	932	10.4	967	10.9	1002	11.6	1037	12.1	1072	12.6
16000	989	12.6	1022	13.2	1055	13.8	1088	14.3	---	---

AIRFLOW CFM	AVAILABLE EXTERNAL STATIC PRESSURE (IWG)									
	1.2		1.4		1.6		1.8		2	
	RPM	BHP[2 3]	RPM	BHP[2 3]	RPM	BHP[2 3]	RPM	BHP[2 3]	RPM	BHP[2 3]
4000	783	1.5	844	1.7	903	1.9	956	2.2	1008	2.4
5000	788	1.8	848	2.1	906	2.4	959	2.6	1011	2.9
6000	798	2.2	855	2.6	911	2.9	963	3.3	1014	3.6
7000	814	2.8	869	3.2	922	3.5	972	3.9	1021	4.2
8000	837	3.5	889	3.9	938	4.2	987	4.6	1033	5.0
9000	866	4.3	915	4.7	961	5.1	1007	5.6	1050	6.0
10000	900	5.3	945	5.7	989	6.2	1032	6.6	1073	7.1
11000	936	6.4	979	6.9	1020	7.4	1061	7.9	1101	8.3
12000	976	7.8	1016	8.3	1055	8.7	1094	9.2	1131	9.8
13000	1018	9.3	1055	9.9	1093	10.4	1129	10.9	1165	11.6
14000	1061	11.1	1098	11.7	1133	12.3	1167	12.9	1202	13.4
15000	1107	13.2	1141	13.8	1175	14.4	1208	14.9	1240	15.5
16000	---	---	---	---	---	---	---	---	---	---

1. Fan performance is based on system/cabinet effects and back draft damper effects at standard air density and 0 feet of elevation.
2. BHP includes the sum of both exhaust fan blowers.
3. BHP includes 5% drive losses.

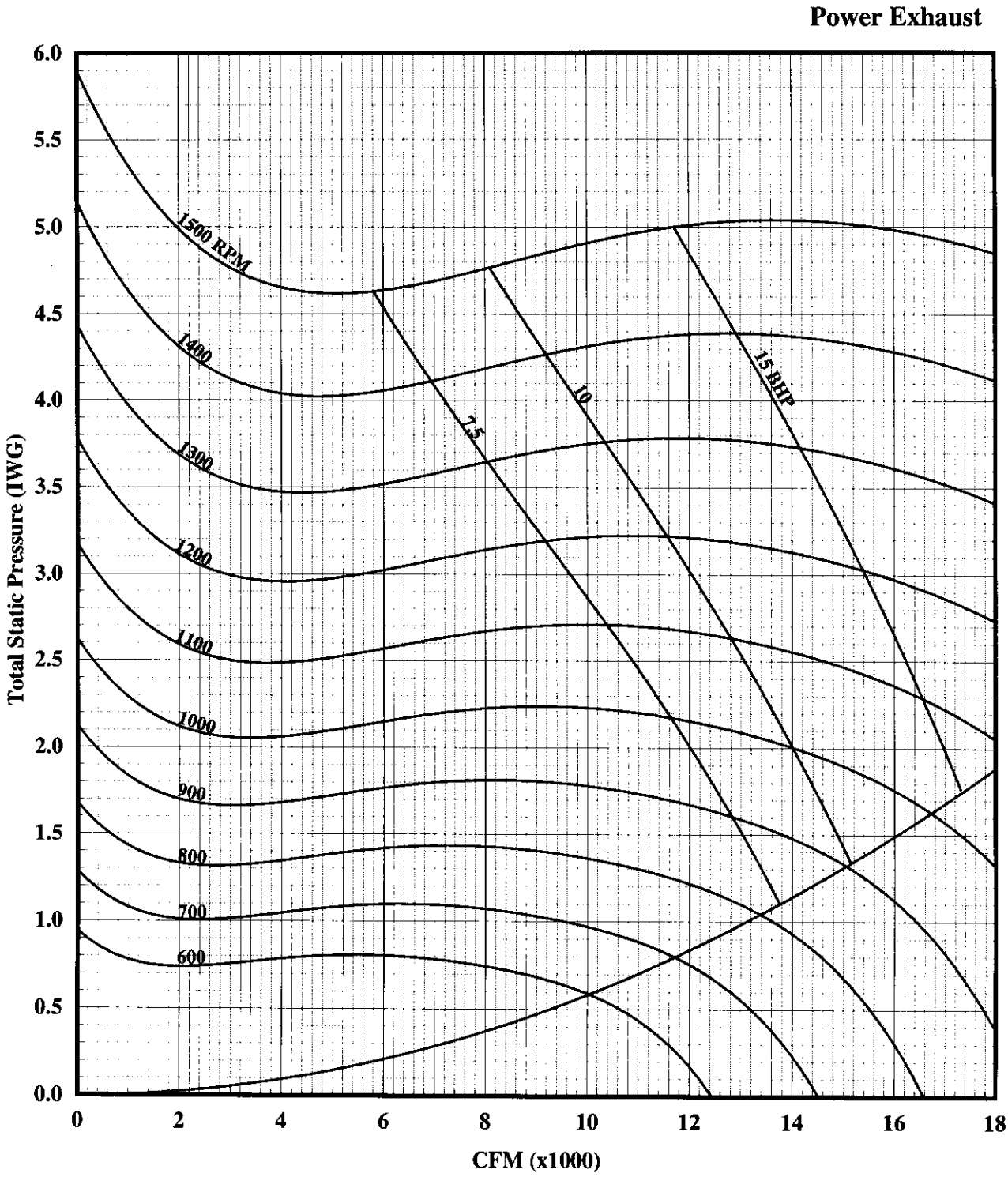


FIGURE 26 - POWER EXHAUST - TWO FORWARD CURVED FANS - 30 & 40 TONS

TABLE 41: ELECTRICAL DATA 25 TON BASIC UNIT R-410A

Voltage	Compressors (each)				OD Fan Motors		Supply Blower Motor		MCA[1] (Amps)	Max Fuse[2]/ Breaker[3] Size (Amps)
	Qty	RLA	LRA	MCC	Qty	FLA	HP	FLA		
208-3-60	4	22.4	149	35	4	4.5	7.5	24.2	138	150
							10	30.8	146	175
							15	46.2	165	200
							20	59.4	182	225
230-3-60	4	22.4	149	35	4	4.3	7.5	22	134	150
							10	28	142	150
							15	42	159	200
							20	54	174	225
460-3-60	4	10.6	75	16.5	4	2.15	7.5	11	65	70
							10	14	69	80
							15	21	77	90
							20	27	85	110
575-3-60	4	7.7	54	12	4	1.7	7.5	9	49	50
							10	11	51	60
							15	17	59	70
							20	22	65	80

1. Minimum Circuit Ampacity.
2. Dual Element, Time Delay Type.
3. HACR type per NEC.

TABLE 42: ELECTRICAL DATA 30 TON BASIC UNIT R-410A

Voltage	Compressors (each)				OD Fan Motors		Supply Blower Motor		MCA[1] (Amps)	Max Fuse[2]/ Breaker[3] Size (Amps)
	Qty	RLA	LRA	MCC	Qty	FLA	HP	FLA		
208-3-60	4	25.0	164	39	4	5.8	10	30.8	162	175
							15	46.2	181	225
							25	74.8	217	250
							20	59.4	197	250
230-3-60	4	25.0	164	39	4	5.8	10	28	158	175
							15	42	176	200
							25	68	208	250
							20	54	191	225
460-3-60	4	12.0	100	19	4	2.9	10	14	77	90
							15	21	86	100
							20	27	93	110
							25	34	102	125
575-3-60	4	9.0	78	14	4	2.2	10	11	59	60
							15	17	66	80
							20	22	72	90
							25	27	79	100

1. Minimum Circuit Ampacity.
2. Dual Element, Time Delay Type.
3. HACR type per NEC.

TABLE 43: ELECTRICAL DATA 40 TON BASIC UNIT R-410A

Voltage	Compressors (each)				OD Fan Motors		Supply Blower Motor		MCA[1] (Amps)	Max Fuse[2]/ Breaker[3] Size (Amps)
	Qty	RLA	LRA	MCC	Qty	FLA	HP	FLA		
208-3-60	4	30.1	255	47	4	5.8	10	30.8	182	200
							15	46.2	201	225
							20	59.4	218	250
							25	74.8	237	300
230-3-60	4	30.1	255	47	4	5.8	10	28	179	200
							15	42	196	225
							20	54	211	250
							25	68	229	250
460-3-60	4	16.7	114	26	4	2.9	10	14	97	110
							15	21	105	125
							20	27	112	125
							25	34	121	150
575-3-60	4	12.2	80	19	4	2.2	10	11	72	80
							15	17	79	90
							20	22	85	100
							25	27	91	110

1. Minimum Circuit Ampacity.
2. Dual Element, Time Delay Type.
3. HACR type per NEC.

TABLE 44: ELECTRICAL DATA 25 TON w/ELECTRIC HEAT R-410A

Voltage	Compressors (each)				OD Fan Motors (each)	Supply Blower Motor		Electric Heat Option					MCA[1] (Amps)	Max Fuse[2]/ Breaker[3] Size (Amps)
	Qty	RLA	LRA	MCC	FLA	HP	FLA	Option	KW	Applied	Stages	Amps		
208-3-60	4	22.4	149	35	4.5	7.5	24.2	E4	40	30	1	83	138	150
						10	30.8						146	175
						15	46.2						165	200
						20	59.4						182	225
						7.5	24.2	E8	80	60	2	167	197	225
						10	30.8						205	225
						15	46.2						225	250
						20	59.4						241	300
230-3-60	4	22.4	149	35	4.3	7.5	22	E4	40	36.8	1	92	143	150
						10	28						150	150
						15	42						168	200
						20	54						183	225
						7.5	22	E8	80	73.6	2	184	212	250
						10	28						220	250
						15	42						237	250
						20	54						252	300
460-3-60	4	10.6	75	16.5	2.15	7.5	11	E4	40	36.8	1	46	71	80
						10	14						75	80
						15	21						84	90
						20	27						91	110
						7.5	11	E8	80	73.6	2	92	106	125
						10	14						110	125
						15	21						119	125
						20	27						126	150
						7.5	11	E1	108	99.4	3	125	138	150
						10	14						142	175
						15	21						151	175
						20	27						158	175
575-3-60	4	7.7	54	12	1.7	7.5	9	E4	40	36.8	1	40	62	70
						10	11						64	70
						15	17						72	80
						20	22						78	80
						7.5	9	E8	80	73.6	2	80	92	110
						10	11						94	110
						15	17						102	110
						20	22						108	125
						7.5	9	E1	108	99.4	3	108	120	150
						10	11						122	150
						15	17						130	150
						20	22						136	150

1. Minimum Circuit Ampacity.
2. Dual Element, Time Delay Type.
3. HACR type per NEC.

TABLE 45: ELECTRICAL DATA 30 TON w/ELECTRIC HEAT R-410A

Voltage	Compressors (each)				OD Fan Motors (each)	Supply Blower Motor		Electric Heat Option					MCA[1] (Amps)	Max Fuse[2]/ Breaker[3] Size (Amps)
	Qty	RLA	LRA	MCC	FLA	HP	FLA	Option	KW	Applied	Stages	Amps		
208-3-60	4	25.0	164	39	5.8	10	30.8	E4	40	30	1	83	162	175
						15	46.2						181	225
						20	59.4						197	250
						25	74.8						217	250
						10	30.8	E8	80	60	2	167	205	225
						15	46.2						225	250
						20	59.4						241	300
						25	74.8						260	300
230-3-60	4	25.0	164	39	5.8	10	28	E4	40	36.8	1	92	158	175
						15	42						176	200
						20	54						191	225
						25	68						208	250
						10	28	E8	80	73.6	2	184	220	250
						15	42						237	250
						20	54						252	300
						25	68						270	300
460-3-60	4	12.0	100	19	2.9	10	14	E4	40	36.8	1	46	77	90
						15	21						86	100
						20	27						93	110
						25	34						102	125
						10	14	E8	80	73.6	2	92	110	125
						15	21						119	125
						20	27						126	150
						25	34						135	150
						10	14	E1	108	99.4	3	125	142	175
						15	21						151	175
						20	27						158	175
						25	34						167	200
575-3-60	4	9.0	78	14	2.2	10	11	E4	40	36.8	1	40	64	70
						15	17						72	80
						20	22						78	90
						25	27						84	100
						10	11	E8	80	73.6	2	80	94	110
						15	17						102	110
						20	22						108	125
						25	27						114	125
						10	11	E1	108	99.4	3	108	122	150
						15	17						130	150
						20	22						136	150
						25	27						142	150

1. Minimum Circuit Ampacity.
2. Dual Element, Time Delay Type.
3. HACR type per NEC.

TABLE 46: ELECTRICAL DATA 40 TON w/ELECTRIC HEAT R-410A

Voltage	Compressors (each)				OD Fan Motors (each)	Supply Blower Motor		Electric Heat Option					MCA[1] (Amps)	Max Fuse[2]/ Breaker[3] Size (Amps)
	Qty	RLA	LRA	MCC	FLA	HP	FLA	Option	KW	Applied	Stages	Amps		
208-3-60	4	30.1	255	47	5.8	10	30.8	E4	40	30	1	83	182	200
						15	46.2						201	225
						20	59.4						218	250
						25	74.8						237	300
						10	30.8	E8	80	60	2	167	205	225
						15	46.2						225	250
						20	59.4						241	300
						25	74.8						260	300
230-3-60	4	30.1	255	47	5.8	10	28	E4	40	36.8	1	92	179	200
						15	42						196	225
						20	54						211	250
						25	68						229	250
						10	28	E8	80	73.6	2	184	220	250
						15	42						237	250
						20	54						252	300
						25	68						270	300
460-3-60	4	16.7	114	26	2.9	10	14	E4	40	36.8	1	46	97	110
						15	21						105	125
						20	27						112	125
						25	34						121	150
						10	14	E8	80	73.6	2	92	110	125
						15	21						119	125
						20	27						126	150
						25	34						135	150
						10	14	E1	108	99.4	3	125	142	175
						15	21						151	175
						20	27						158	175
						25	34						167	200
575-3-60	4	12.2	80	19	2.2	10	11	E4	40	36.8	1	40	72	80
						15	17						79	90
						20	22						85	100
						25	27						91	110
						10	11	E8	80	73.6	2	80	94	110
						15	17						102	110
						20	22						108	125
						25	27						114	125
						10	11	E1	108	99.4	3	108	122	150
						15	17						130	150
						20	22						136	150
						25	27						142	150

1. Minimum Circuit Ampacity.
2. Dual Element, Time Delay Type.
3. HACR type per NEC.

TABLE 47: ELECTRICAL DATA 25 TON w/POWER EXHAUST R-410A

Voltage	Compressors (each)				OD Fan Motors (each)	Supply Blower Motor		Pwr Exh Motor		MCA[1] (Amps)	Max Fuse[2]/ Breaker[3] Size (Amps)
	Qty	RLA	LRA	MCC	FLA	HP	FLA	HP	FLA		
208-3-60	4	22.4	149	35	4.5	7.5	24.2	5	16.7	155	175
								7.5	24.2	162	175
								10	30.8	170	200
						10	30.8	5	16.7	163	175
								7.5	24.2	170	200
								10	30.8	177	200
						15	46.2	5	16.7	182	225
								7.5	24.2	190	225
								10	30.8	196	225
						20	59.4	5	16.7	199	250
								7.5	24.2	206	250
								10	30.8	213	250
230-3-60	4	22.4	149	35	4.3	7.5	22	5	15.2	150	150
								7.5	22	156	175
								10	28	164	175
						10	28	5	15.2	157	175
								7.5	22	164	175
								10	28	170	175
						15	42	5	15.2	175	200
								7.5	22	181	200
								10	28	187	225
						20	54	5	15.2	190	225
								7.5	22	196	250
								10	28	202	250
460-3-60	4	10.6	75	16.5	2.15	7.5	11	5	7.6	72	80
								7.5	11	76	80
								10	14	80	90
						10	14	5	7.6	76	90
								7.5	11	80	90
								10	14	83	90
						15	21	5	7.6	85	100
								7.5	11	88	100
								10	14	91	110
						20	27	5	7.6	92	110
								7.5	11	96	110
								10	14	99	125
575-3-60	4	7.7	54	12	1.7	7.5	9	5	6.1	55	60
								7.5	9	58	60
								10	11	60	70
						10	11	5	6.1	57	60
								7.5	9	60	70
								10	11	62	70
						15	17	5	6.1	65	80
								7.5	9	68	80
								10	11	70	80
						20	22	5	6.1	71	90
								7.5	9	74	90
								10	11	76	90

1. Minimum Circuit Ampacity.
2. Dual Element, Time Delay Type.
3. HACR type per NEC.

TABLE 48: ELECTRICAL DATA 30 TON w/POWER EXHAUST R-410A

Voltage	Compressors (each)				OD Fan Motors (each)		Supply Blower Motor		Pwr Exh Motor		MCA[1] (Amps)	Max Fuse[2]/ Breaker[3] Size (Amps)
	Qty	RLA	LRA	MCC	Qty	FLA	HP	FLA	HP	FLA		
208-3-60	4	25.0	164	39	4	5.8	10	30.8	7.5	24.2	186	200
									10	30.8	193	200
									15	46.2	212	250
							15	46.2	7.5	24.2	205	250
									10	30.8	212	250
									15	46.2	227	250
							20	59.4	7.5	24.2	222	250
									10	30.8	228	250
									15	46.2	244	300
							25	74.8	7.5	24.2	241	300
									10	30.8	248	300
									15	46.2	263	300
230-3-60	4	25.0	164	39	4	5.8	10	28	7.5	22	180	200
									10	28	186	200
									15	42	204	225
							15	42	7.5	22	198	225
									10	28	204	225
									15	42	218	250
							20	54	7.5	22	213	250
									10	28	219	250
									15	42	233	250
							25	68	7.5	22	230	250
									10	28	236	300
									15	42	250	300
460-3-60	4	12.0	100	19	4	2.9	10	14	7.5	11	88	100
									10	14	91	100
									15	21	100	110
							15	21	7.5	11	97	110
									10	14	100	110
									15	21	107	125
							20	27	7.5	11	104	125
									10	14	107	125
									15	21	114	125
							25	34	7.5	11	113	125
									10	14	116	150
									15	21	123	150
575-3-60	4	9.0	78	14	4	2.2	10	11	7.5	9	68	70
									10	11	70	80
									15	17	77	90
							15	17	7.5	9	75	90
									10	11	77	90
									15	17	83	100
							20	22	7.5	9	81	100
									10	11	83	100
									15	17	89	110
							25	27	7.5	9	88	110
									10	11	90	110
									15	17	96	110

1. Minimum Circuit Ampacity.
2. Dual Element, Time Delay Type.
3. HACR type per NEC.

TABLE 49: ELECTRICAL DATA 40 TON w/POWER EXHAUST R-410A

Voltage	Compressors (each)				OD Fan Motors (each)		Supply Blower Motor		Pwr Exh Motor		MCA[1] (Amps)	Max Fuse[2]/ Breaker[3] Size (Amps)
	Qty	RLA	LRA	MCC	Qty	FLA	HP	FLA	HP	FLA		
208-3-60	4	30.1	225	47.0	4	5.8	10	30.8	7.5	24	206	225
									10	31	213	225
									15	46	232	250
							15	46.2	7.5	24	226	250
									10	31	232	250
									15	46	248	250
							20	59.4	7.5	24	242	300
									10	31	249	300
									15	46	264	300
							25	74.8	7.5	24	261	300
									10	31	268	300
									15	46	283	350
230-3-60	4	30.1	225	47.0	4	5.2	10	28.0	7.5	22	199	225
									10	28	205	225
									15	42	222	250
							15	42.0	7.5	22	216	250
									10	28	222	250
									15	42	236	250
							20	54.0	7.5	22	231	250
									10	28	237	250
									15	42	251	300
							25	68.0	7.5	22	248	300
									10	28	254	300
									15	42	268	300
460-3-60	4	16.7	114	26.0	4	2.6	10	14.0	7.5	11	108	110
									10	14	111	125
									15	21	119	125
							15	21.0	7.5	11	116	125
									10	14	119	125
									15	21	126	150
							20	27.0	7.5	11	123	150
									10	14	126	150
									15	21	133	150
							25	34.0	7.5	11	132	150
									10	14	135	150
									15	21	142	175
575-3-60	4	12.2	80	19.0	4	2.2	10	11.0	7.5	9	81	90
									10	11	83	90
									15	17	90	100
							15	17.0	7.5	9	88	100
									10	11	90	100
									15	17	96	110
							20	22.0	7.5	9	94	110
									10	11	96	110
									15	17	102	110
							25	27.0	7.5	9	100	125
									10	11	102	125
									15	17	108	125

1. Minimum Circuit Ampacity.
2. Dual Element, Time Delay Type.
3. HACR type per NEC.

TABLE 50: ELECTRICAL DATA 25 TON w/ELECTRIC HEAT and POWER EXHAUST R-410A

Voltage	Electric Heat Option				Compressors (each)				OD Fan Motors (each)		Supply Blower Motor		Pwr Exh Motor		MCA[1] (Amps)	Max Fuse[2]/ Breaker[3] Size (Amps)
	Model	KW	Stages	Amps	Qty	RLA	LRA	MCC	Qty	FLA	HP	FLA	HP	FLA		
208-3-60	E4	40	1	83	4	22.4	149	35	4	4.5	7.5	24.2	5	16.7	155	175
													7.5	24.2	162	175
													10	30.8	170	200
											10	30.8	5	16.7	163	175
													7.5	24.2	170	200
													10	30.8	177	200
											15	46.2	5	16.7	182	225
													7.5	24.2	190	225
													10	30.8	196	225
											20	59.4	5	16.7	199	250
													7.5	24.2	206	250
													10	30.8	213	250
	E8	80	2	167	4	22.4	149	35	4	4.5	7.5	24.2	5	16.7	214	225
													7.5	24.2	221	225
													10	30.8	230	250
											10	30.8	5	16.7	222	250
													7.5	24.2	230	250
													10	30.8	236	250
											15	46.2	5	16.7	241	250
													7.5	24.2	249	250
													10	30.8	256	300
											20	59.4	5	16.7	258	300
													7.5	24.2	265	300
													10	30.8	272	300
230-3-60	E4	40	1	92	4	22.4	149	35	4	4.3	7.5	22	5	15.2	158	175
													7.5	22	165	175
													10	28	172	175
											10	28	5	15.2	166	175
													7.5	22	172	175
													10	28	178	200
											15	42	5	15.2	183	200
													7.5	22	190	200
													10	28	196	225
											20	54	5	15.2	198	225
													7.5	22	205	250
													10	28	211	250
	E8	80	2	184	4	22.4	149	35	4	4.3	7.5	22	5	15.2	227	250
													7.5	22	234	250
													10	28	242	250
											10	28	5	15.2	235	250
													7.5	22	242	250
													10	28	248	250
											15	42	5	15.2	252	300
													7.5	22	259	300
													10	28	265	300
											20	54	5	15.2	267	300
													7.5	22	274	300
													10	28	280	300

TABLE 50: ELECTRICAL DATA 25 TON w/ELECTRIC HEAT and POWER EXHAUST R-410A (CONT.)

Voltage	Electric Heat Option				Compressors (each)				OD Fan Motors (each)		Supply Blower Motor		Pwr Exh Motor		MCA[1] (Amps)	Max Fuse[2]/ Breaker[3] Size (Amps)
	Model	KW	Stages	Amps	Qty	RLA	LRA	MCC	Qty	FLA	HP	FLA	HP	FLA		
460-3-60	E4	40	1	46	4	10.6	75	16.5	4	2.15	7.5	11	5	7.6	79	80
													7.5	11	82	90
													10	14	86	90
											10	14	5	7.6	83	90
													7.5	11	86	90
													10	14	89	90
											15	21	5	7.6	92	100
													7.5	11	95	100
													10	14	98	110
											20	27	5	7.6	99	110
													7.5	11	102	110
													10	14	105	125
	E8	80	2	92	4	10.6	75	16.5	4	2.15	7.5	11	5	7.6	114	125
													7.5	11	117	125
													10	14	121	125
											10	14	5	7.6	117	125
													7.5	11	121	125
													10	14	124	125
											15	21	5	7.6	126	150
													7.5	11	130	150
													10	14	133	150
											20	27	5	7.6	134	150
													7.5	11	137	150
													10	14	140	150
	E1	108	3	125	4	10.6	75	16.5	4	2.15	7.5	11	5	7.6	146	175
													7.5	11	149	175
													10	14	153	175
											10	14	5	7.6	150	175
													7.5	11	153	175
													10	14	156	175
											15	21	5	7.6	158	175
													7.5	11	162	175
													10	14	165	175
											20	27	5	7.6	166	175
													7.5	11	169	175
													10	14	172	175

TABLE 50: ELECTRICAL DATA 25 TON w/ELECTRIC HEAT and POWER EXHAUST R-410A (CONT.)

Voltage	Electric Heat Option				Compressors (each)				OD Fan Motors (each)		Supply Blower Motor		Pwr Exh Motor		MCA[1] (Amps)	Max Fuse[2]/ Breaker[3] Size (Amps)
	Model	KW	Stages	Amps	Qty	RLA	LRA	MCC	Qty	FLA	HP	FLA	HP	FLA		
575-3-60	E4	40	1	40	4	7.7	54	12	4	1.7	7.5	9	5	6.1	68	70
													7.5	9	71	70
													10	11	73	80
											10	11	5	6.1	70	70
													7.5	9	73	80
													10	11	75	80
											15	17	5	6.1	78	80
													7.5	9	81	90
													10	11	83	90
											20	22	5	6.1	84	90
													7.5	9	87	90
													10	11	89	100
	E8	80	2	80	4	7.7	54	12	4	1.7	7.5	9	5	6.1	98	110
													7.5	9	101	110
													10	11	103	110
											10	11	5	6.1	100	110
													7.5	9	103	110
													10	11	105	110
											15	17	5	6.1	108	110
													7.5	9	111	125
													10	11	113	125
											20	22	5	6.1	114	125
													7.5	9	117	125
													10	11	119	125
	E1	108	3	108	4	4	7.7	54	12	4	7.5	9	5	6.1	126	150
													7.5	9	129	150
													10	11	131	150
											10	11	5	6.1	128	150
													7.5	9	131	150
													10	11	133	150
											15	17	5	6.1	136	150
													7.5	9	139	150
													10	11	141	150
											20	22	5	6.1	142	150
													7.5	9	145	150
													10	11	147	150

1. Minimum Circuit Ampacity.
2. Dual Element, Time Delay Type.
3. HACR type per NEC.

TABLE 51: ELECTRICAL DATA 30 TON w/ELECTRIC HEAT and POWER EXHAUST R-410A

Voltage	Electric Heat Option				Compressors (each)				OD Fan Motors (each)		Supply Blower Motor		Pwr Exh Motor		MCA[1] (Amps)	Max Fuse[2]/ Breaker[3] Size (Amps)
	Model	KW	Stages	Amps	Qty	RLA	LRA	MCC	Qty	FLA	HP	FLA	HP	FLA		
208-3-60	E4	40	1	83	4	25.0	164	39	4	5.8	10	30.8	7.5	24.2	186	200
													10	30.8	193	200
													15	46.2	212	250
											15	46.2	7.5	24.2	205	250
													10	30.8	212	250
													15	46.2	227	250
											20	59.4	7.5	24.2	222	250
													10	30.8	228	250
													15	46.2	244	300
											25	74.8	7.5	24.2	241	300
													10	30.8	248	300
													15	46.2	263	300
	E8	80	2	167	4	25.0	164	39	4	5.8	10	30.8	7.5	24.2	230	250
													10	30.8	236	250
													15	46.2	256	300
											15	46.2	7.5	24.2	249	250
													10	30.8	256	300
													15	46.2	271	300
											20	59.4	7.5	24.2	265	300
													10	30.8	272	300
													15	46.2	287	300
											25	74.8	7.5	24.2	285	350
													10	30.8	291	350
													15	46.2	307	350
230-3-60	E4	40	1	92	4	25.0	164	39	4	5.8	10	28	7.5	22	180	200
													10	28	186	200
													15	42	204	225
											15	42	7.5	22	198	225
													10	28	204	225
													15	42	218	250
											20	54	7.5	22	213	250
													10	28	219	250
													15	42	233	250
											25	68	7.5	22	230	250
													10	28	236	300
													15	42	250	300
	E8	80	2	184	4	25.0	164	39	4	5.8	10	28	7.5	22	242	250
													10	28	248	250
													15	42	265	300
											15	42	7.5	22	259	300
													10	28	265	300
													15	42	279	300
											20	54	7.5	22	274	300
													10	28	280	300
													15	42	294	300
											25	68	7.5	22	292	350
													10	28	298	350
													15	42	312	350

TABLE 51: ELECTRICAL DATA 30 TON w/ELECTRIC HEAT and POWER EXHAUST R-410A (CONT.)

Voltage	Electric Heat Option				Compressors (each)				OD Fan Motors (each)		Supply Blower Motor		Pwr Exh Motor		MCA[1] (Amps)	Max Fuse[2]/ Breaker[3] Size (Amps)
	Model	KW	Stages	Amps	Qty	RLA	LRA	MCC	Qty	FLA	HP	FLA	HP	FLA		
460-3-60	E4	40	1	46	4	12.0	100	19	4	2.9	10	14	7.5	11	88	100
													10	14	91	100
													15	21	100	110
											15	21	7.5	11	97	110
													10	14	100	110
													15	21	107	125
											20	27	7.5	11	104	125
													10	14	107	125
													15	21	114	125
											25	34	7.5	11	113	125
													10	14	116	150
													15	21	123	150
	E8	80	2	92	4	12.0	100	19	4	2.9	10	14	7.5	11	121	125
													10	14	124	125
													15	21	133	150
											15	21	7.5	11	130	150
													10	14	133	150
													15	21	140	150
											20	27	7.5	11	137	150
													10	14	140	150
													15	21	147	150
											25	34	7.5	11	146	175
													10	14	149	175
													15	21	156	175
	E1	108	3	125	4	12.0	100	19	4	2.9	10	14	7.5	11	153	175
													10	14	156	175
													15	21	165	175
											15	21	7.5	11	162	175
													10	14	165	175
													15	21	172	175
											20	27	7.5	11	169	175
													10	14	172	175
													15	21	179	200
											25	34	7.5	11	178	200
													10	14	181	200
													15	21	188	200

TABLE 51: ELECTRICAL DATA 30 TON w/ELECTRIC HEAT and POWER EXHAUST R-410A (CONT.)

Voltage	Electric Heat Option				Compressors (each)				OD Fan Motors (each)		Supply Blower Motor		Pwr Exh Motor		MCA[1] (Amps)	Max Fuse[2]/ Breaker[3] Size (Amps)
	Model	KW	Stages	Amps	Qty	RLA	LRA	MCC	Qty	FLA	HP	FLA	HP	FLA		
575-3-60	E4	40	1	40	4	9.0	78	14	4	2.2	10	11	7.5	9	73	80
													10	11	75	80
													15	17	83	90
											15	17	7.5	9	81	90
													10	11	83	90
													15	17	89	100
											20	22	7.5	9	87	100
													10	11	89	100
													15	17	95	110
											25	27	7.5	9	93	110
													10	11	95	110
													15	17	101	110
	E8	80	2	80	4	9.0	78	14	4	2.2	10	11	7.5	9	103	110
													10	11	105	110
													15	17	113	125
											15	17	7.5	9	111	125
													10	11	113	125
													15	17	119	125
											20	22	7.5	9	117	125
													10	11	119	125
													15	17	125	125
											25	27	7.5	9	123	150
													10	11	125	150
													15	17	131	150
	E1	108	3	108	4	9.0	78	14	4	2.2	10	11	7.5	9	131	150
													10	11	133	150
													15	17	141	150
											15	17	7.5	9	139	150
													10	11	141	150
													15	17	147	150
											20	22	7.5	9	145	150
													10	11	147	150
													15	17	153	175
											25	27	7.5	9	151	175
													10	11	153	175
													15	17	159	175

1. Minimum Circuit Ampacity.
2. Dual Element, Time Delay Type.
3. HACR type per NEC.

TABLE 52: ELECTRICAL DATA 40 TON w/ELECTRIC HEAT and POWER EXHAUST R-410A

Voltage	Electric Heat Option				Compressors (each)				OD Fan Motors (each)		Supply Blower Motor		Pwr Exh Motor		MCA[1] (Amps)	Max Fuse[2]/ Breaker[3] Size (Amps)
	Model	KW	Stages	Amps	Qty	RLA	LRA	MCC	Qty	FLA	HP	FLA	HP	FLA		
208-3-60	E4	40	1	83	4	30.1	255	47	4	5.8	10	30.8	7.5	24.2	206	225
													10	30.8	213	225
													15	46.2	232	250
											15	46.2	7.5	24.2	226	250
													10	30.8	232	250
													15	46.2	248	250
											20	59.4	7.5	24.2	242	300
													10	30.8	249	300
													15	46.2	264	300
											25	74.8	7.5	24.2	261	300
													10	30.8	268	300
													15	46.2	283	350
	E8	80	2	167	4	30.1	255	47	4	5.8	10	30.8	7.5	24.2	230	250
													10	30.8	236	250
													15	46.2	256	300
											15	46.2	7.5	24.2	249	250
													10	30.8	256	300
													15	46.2	271	300
											20	59.4	7.5	24.2	265	300
													10	30.8	272	300
													15	46.2	287	300
											25	74.8	7.5	24.2	285	350
													10	30.8	291	350
													15	46.2	307	350
230-3-60	E4	40	1	92	4	30.1	255	47	4	5.8	10	28	7.5	22	201	225
													10	28	207	225
													15	42	224	250
											15	42	7.5	22	218	250
													10	28	224	250
													15	42	238	250
											20	54	7.5	22	233	250
													10	28	239	250
													15	42	253	300
											25	68	7.5	22	251	300
													10	28	257	300
													15	42	271	300
	E8	80	2	184	4	30.1	255	47	4	5.8	10	28	7.5	22	242	250
													10	28	248	250
													15	42	265	300
											15	42	7.5	22	259	300
													10	28	265	300
													15	42	279	300
											20	54	7.5	22	274	300
													10	28	280	300
													15	42	294	300
											25	68	7.5	22	292	350
													10	28	298	350
													15	42	312	350

TABLE 52: ELECTRICAL DATA 40 TON w/ELECTRIC HEAT and POWER EXHAUST R-410A (CONT.)

Voltage	Electric Heat Option				Compressors (each)				OD Fan Motors (each)		Supply Blower Motor		Pwr Exh Motor		MCA[1] (Amps)	Max Fuse[2]/ Breaker[3] Size (Amps)
	Model	KW	Stages	Amps	Qty	RLA	LRA	MCC	Qty	FLA	HP	FLA	HP	FLA		
460-3-60	E4	40	1	46	4	16.7	114	26	4	2.9	10	14	7.5	11	108	110
													10	14	111	125
													15	21	119	125
											15	21	7.5	11	116	125
													10	14	119	125
													15	21	126	150
											20	27	7.5	11	123	150
													10	14	126	150
													15	21	133	150
											25	34	7.5	11	132	150
													10	14	135	150
													15	21	142	175
	E8	80	2	92	4	16.7	114	26	4	2.9	10	14	7.5	11	121	125
													10	14	124	125
													15	21	133	150
											15	21	7.5	11	130	150
													10	14	133	150
													15	21	140	150
											20	27	7.5	11	137	150
													10	14	140	150
													15	21	147	150
											25	34	7.5	11	146	175
													10	14	149	175
													15	21	156	175
	E1	108	3	125	4	16.7	114	26	4	2.9	10	14	7.5	11	153	175
													10	14	156	175
													15	21	165	175
											15	21	7.5	11	162	175
													10	14	165	175
													15	21	172	175
											20	27	7.5	11	169	175
													10	14	172	175
													15	21	179	200
											25	34	7.5	11	178	200
													10	14	181	200
													15	21	188	200

TABLE 52: ELECTRICAL DATA 40 TON w/ELECTRIC HEAT and POWER EXHAUST R-410A (CONT.)

Voltage	Electric Heat Option				Compressors (each)				OD Fan Motors (each)		Supply Blower Motor		Pwr Exh Motor		MCA[1] (Amps)	Max Fuse[2]/ Breaker[3] Size (Amps)
	Model	KW	Stages	Amps	Qty	RLA	LRA	MCC	Qty	FLA	HP	FLA	HP	FLA		
575-3-60	E4	40	1	40	4	12.2	80	19	4	2.2	10	11	7.5	9	81	90
													10	11	83	90
													15	17	90	100
											15	17	7.5	9	88	100
													10	11	90	100
													15	17	96	110
											20	22	7.5	9	94	110
													10	11	96	110
													15	17	102	110
											25	27	7.5	9	100	125
													10	11	102	125
													15	17	108	125
	E8	80	2	80	4	12.2	80	19	4	2.2	10	11	7.5	9	103	110
													10	11	105	110
													15	17	113	125
											15	17	7.5	9	111	125
													10	11	113	125
													15	17	119	125
											20	22	7.5	9	117	125
													10	11	119	125
													15	17	125	125
											25	27	7.5	9	123	150
													10	11	125	150
													15	17	131	150
	E1	108	3	108	4	12.2	80	19	4	2.2	10	11	7.5	9	131	150
													10	11	133	150
													15	17	141	150
											15	17	7.5	9	139	150
													10	11	141	150
													15	17	147	150
											20	22	7.5	9	145	150
													10	11	147	150
													15	17	153	175
											25	27	7.5	9	151	175
													10	11	153	175
													0	0	0	0

1. Minimum Circuit Ampacity.
2. Dual Element, Time Delay Type.
3. HACR type per NEC.

TABLE 53: UNIT WEIGHTS

COMPONENT	25 TON	30 TON	40 TON
Basic Unit	4410	4605	4845
Gas Heat			
267 MBH	180	180	180
533 MBH	320	320	320
800 MBH	-	-	450
Electric Heat			
40KW	40	40	40
80KW	105	105	105
108KW	110	110	110
Hot Water Heat			
1 Row Coil	70	70	70
2 Row Coil	85	85	85
Steam Heat			
1 Row Coil	85	85	85
Blower			
Forward Curve Fan (Std Fan)	0	0	0
FC IGV	155	155	175
Air Foil Fan	135	135	155
AF IGV	155	155	180
Motor - Supply Fan			
7.5hp	110	-	-
10hp	145	145	145
15hp	200	200	200
20hp	240	240	240
25hp	-	300	300
Supply Fan Motor VFD	See Table 54		
Refrigeration			
T-Coat Evap.	32	30	40
T-Coat cond.	32	30	40
Hot Gas Bypass	10	10	10
Low Ambient Head Pressure Control			
208-230/380/460	5	5	5
575	25	25	25
Filters			
6" Rigid	70	70	70
Exhaust[1]			
Exhaust Type			
Barometric	45	65	65
Modulated	140	275	275
Exhaust Motor			
5hp	80	80	80
7.5hp	110	110	110
10hp	145	145	145
15hp	200	200	200
Exhaust Motor VFD	See Table 55		
Economizer			
Std. Econ.	235	235	235
Econ. w/ERV	50	50	50
Control			
Disconnect	15	15	15
110V outlet	55	55	55
IPU	20	20	20
Roof Curb			
Partial Curb	415	415	415

1. If ERV and Supply Fan VAV are selected, add the weight of an Exhaust VFD, Table 54.

TABLE 54: SUPPLY FAN MOTOR VFD WEIGHTS

Supply Fan Motor VFD	230V	460V	575V
W/O Bypass			
7.5hp	60	25	30
10hp	60	25	30
15hp	75	50	60
20hp	75	50	60
25hp	115	50	60
W/Bypass			
7.5hp	155	90	120
10hp	155	90	120
15hp	185	140	155
20hp	185	140	155
25hp	255	140	155

TABLE 55: EXHAUST FAN MOTOR VFD WEIGHTS

Exhaust Fan Motor	230V	460V	575V
W/O Bypass			
5hp	15	10	20
7.5hp	50	15	20
10hp	50	15	20
15hp	65	40	50

NOTE: If the unit is VAV with ERV, add the weight of an exhaust VFD - it will be in the unit.

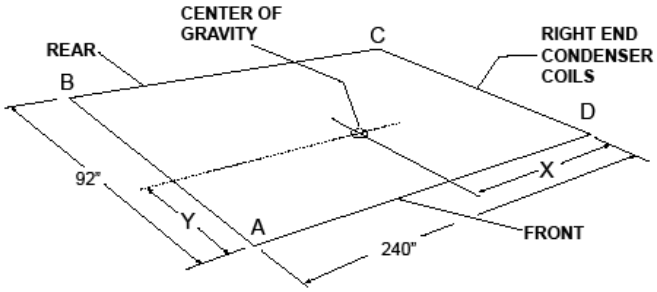


FIGURE 27 - CENTER OF GRAVITY

TABLE 56: UNIT CENTER OF GRAVITY

MODEL	25 TON		30 TON		40 TON	
	X*	Y	X*	Y	X*	Y
BASIC UNIT	99"	48"	99"	47"	96"	46"
BASIC UNIT /W ECON.	110"	48"	109"	47"	100"	46"
BASIC UNIT /W ECON. & GAS OR ELECT. HEAT, STEAM OR HOT WATER HEAT	104"	48"	103"	46"	99"	45"
BASIC UNIT /W ECON. & GAS OR ELECT. HEAT, & POWER EXHAUST	118"	47"	113"	46"	111"	45"

TABLE 57: UNIT CORNERWEIGHT

UNIT DESCRIPTION	25 TON				30 TON				40 TON			
	A	B	C	D	A	B	C	D	A	B	C	D
BASIC UNIT	870	949	1352	1239	930	972	1380	1323	969	969	1454	1454
BASIC UNIT WITH ECONOMIZER	1018	1111	1313	1203	1076	1124	1348	1292	1058	1058	1482	1482
BASIC UNIT WITH ECONOMIZER AND GAS OR ELECTRIC HEAT	994	1084	1418	1300	1073	1073	1423	1423	1102	1055	1503	1570
BASIC UNIT WITH ECONOMIZER AND GAS OR ELECTRIC HEAT AND POWER EXHAUST	1220	1275	1318	1262	1275	1275	1430	1420	1335	1278	1485	1551

NOTES:Basic Unit = cooling only, 10hp FC fan.
+ Econ = +235lb
+ Heat = single stage gas, 180 lb
+ Power Exhaust = modulating 7.5hp

TABLE 58: INDOOR SOUND POWER RATING

MODEL NUMBER	CFM	ESP	BLOWER		SOUND POWER (dB 10-12 WATTS)								
					OCTAVE BAND CENTERLINE FREQUENCY (Hz)								dba
		IWG	RPM	BHP	63	125	250	500	1000	2000	4000	8000	
V52	10,000	1.5	750	7.5	90	88	85	85	80	78	74	68	87
V53	12750	1.5	840	12.8	93	91	88	88	83	81	77	71	90
V54	17500	1.3	800	20	95	92	89	89	84	83	78	72	91

Sound Power Ratings for Supply Air Blowers in our Series 40 units with High Gas Heat, Economizer, 2: T/A Filters and Wet DX Sound power calculations complements of Lau's revised "Whirlwind" application selection software for air moving components.

The sound ratings above occur at the blower wheel. To determine the sound rating at a unit's supply and return air duct connection, subtract the attenuation factors listed below.

TABLE 59: ATTENUATION FACTORS

LOCATION	OCTAVE BAND CENTERLINE FREQUENCY (Hz)							
	63	125	250	500	1000	2000	4000	8000
	SOUND ATTENUATION (dB[12] WATTS)							
SUPPLY AIR	11	13	18	10	21	21	23	23
RETURN AIR	13	15	22	23	25	25	29	29

TABLE 60: OUTDOOR SOUND POWER RATING

MODEL	Octave Band Centerline Frequency (Hertz)								db(A)
	65	125	250	500	1000	2000	4000	8000	
	Sound Power Level, db (10)-12 Watts								
V52	88	91	89	86	82	79	76	72	88
V53	87	90	88	86	82	80	77	73	88
V54	88	91	89	86	82	80	77	73	88

NOTE: These values have been accessed using a model of sound propagation from a point source into the hemispheric free field (AMCA 303-79). The dBA values provided are to be used for reference only. Calculation of dBA values cover matters of system design, and the fan manufacturer has no way of knowing the details of each system. This constitutes an exception to any specification or guarantee requiring a dBA value or sound data in any other form than sound power level ratings.

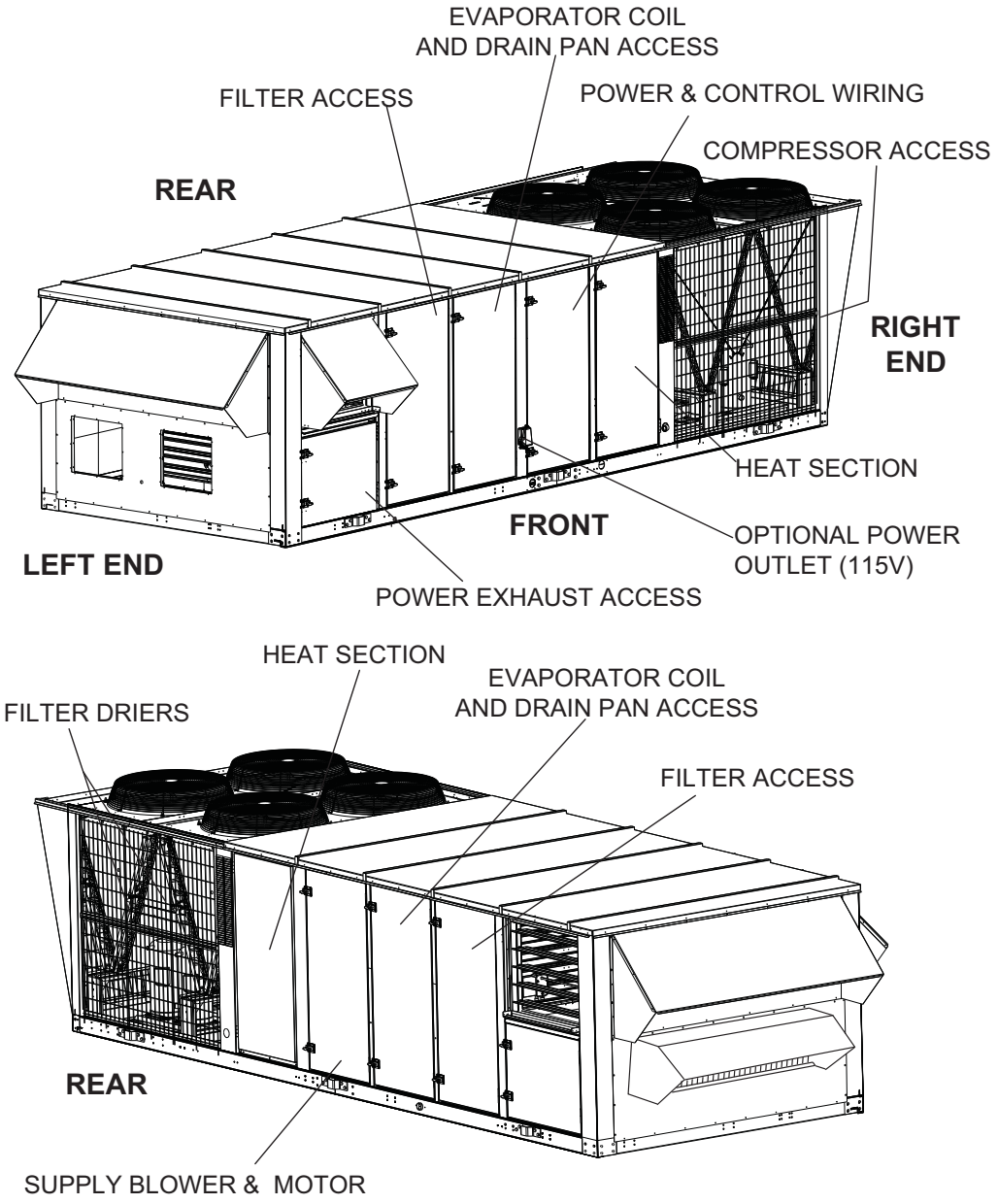


FIGURE 28 - COMPONENT LOCATION

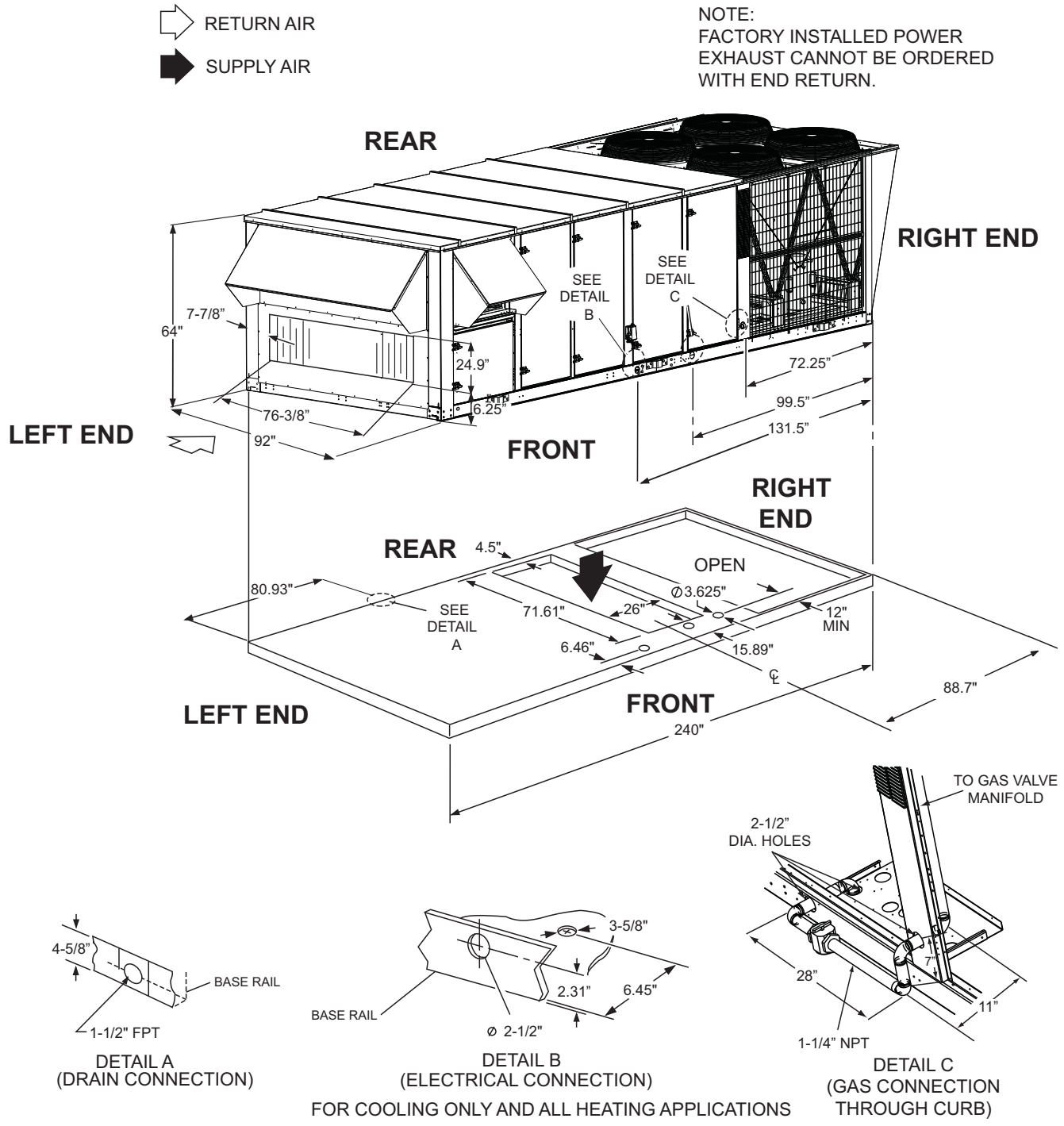


FIGURE 29 - END RETURN, BOTTOM SUPPLY

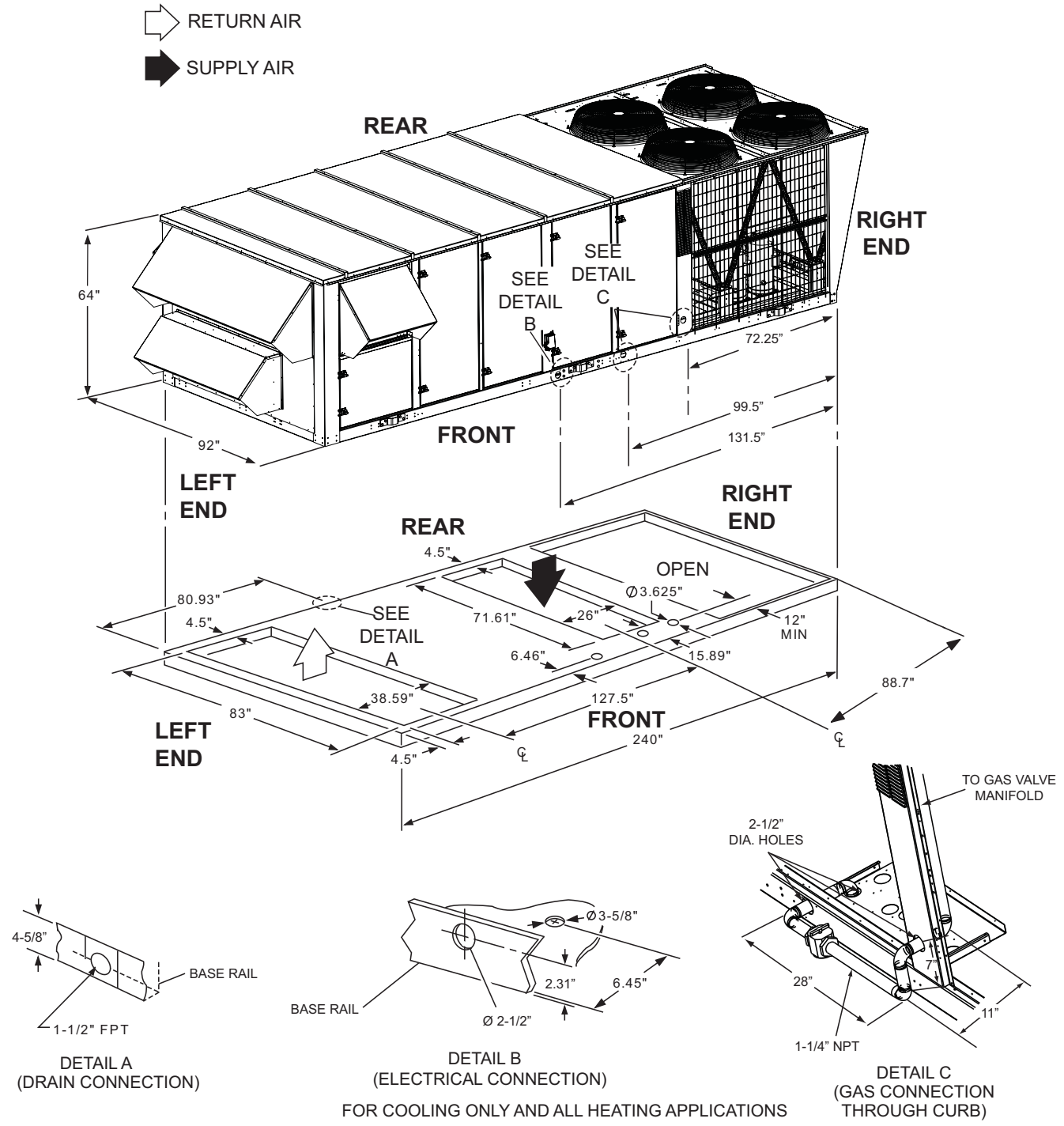


FIGURE 30 - BOTTOM SUPPLY AND RETURN

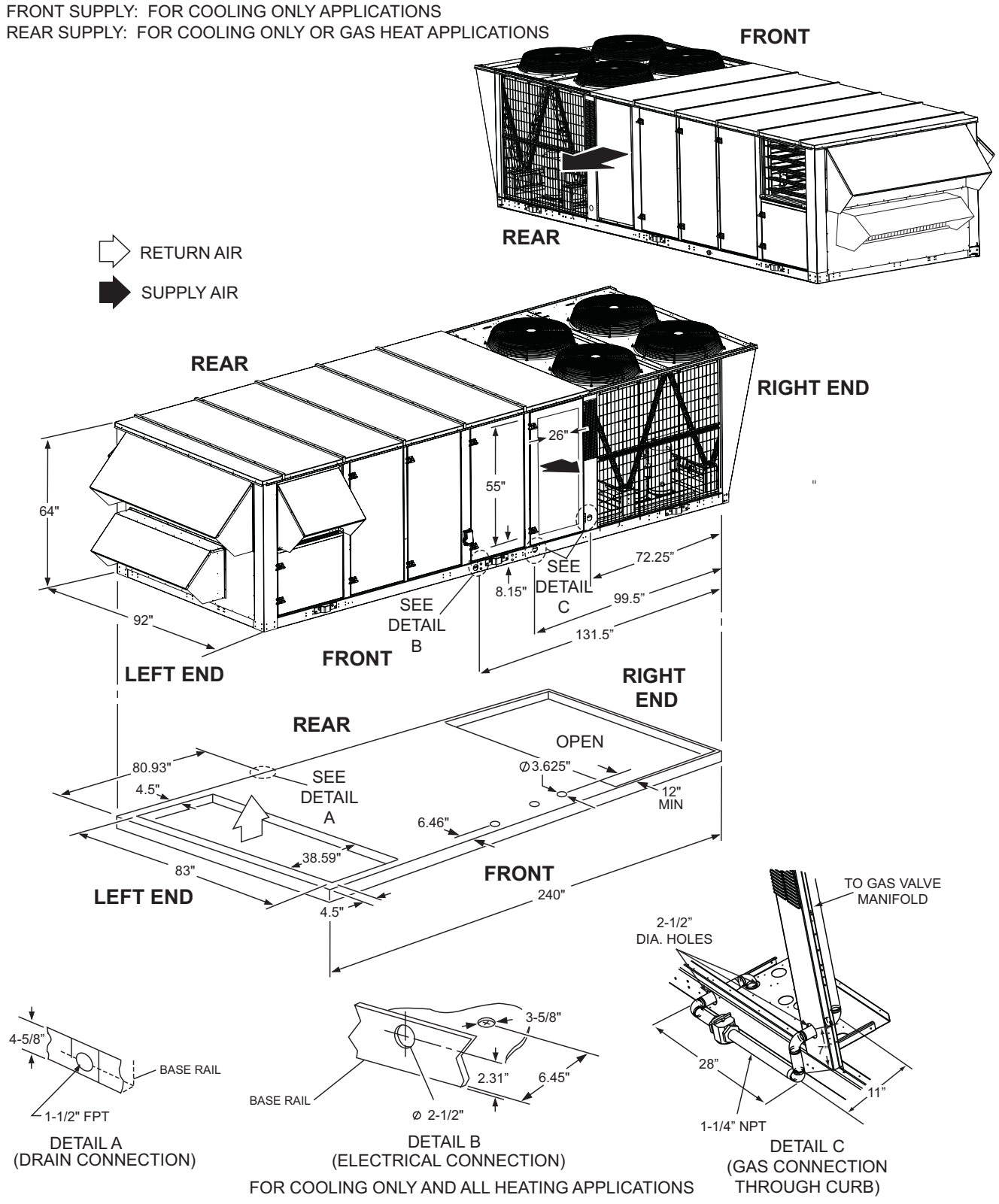


FIGURE 31 - BOTTOM RETURN, FRONT & REAR SUPPLY

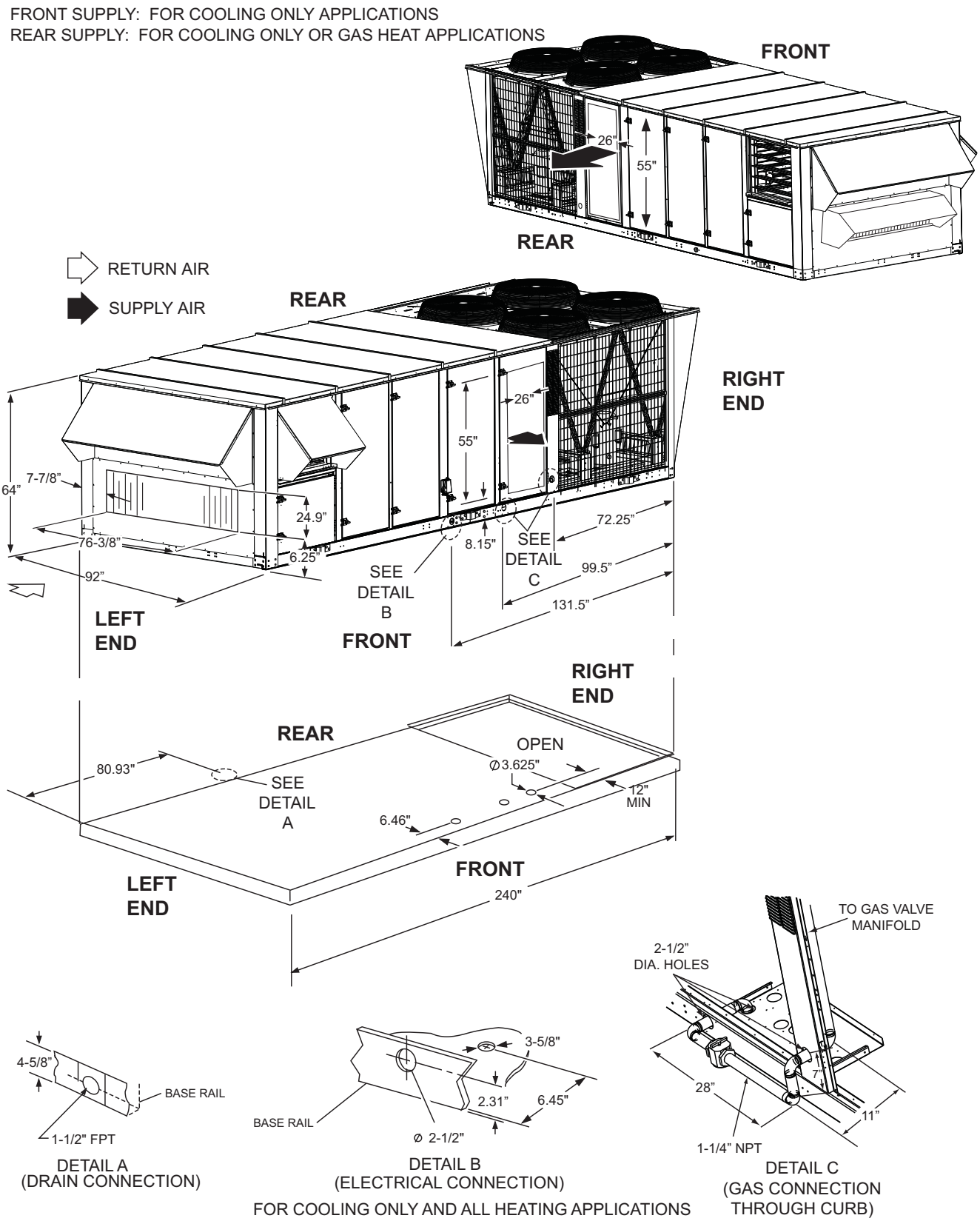


FIGURE 32 - END RETURN, FRONT & REAR SUPPLY

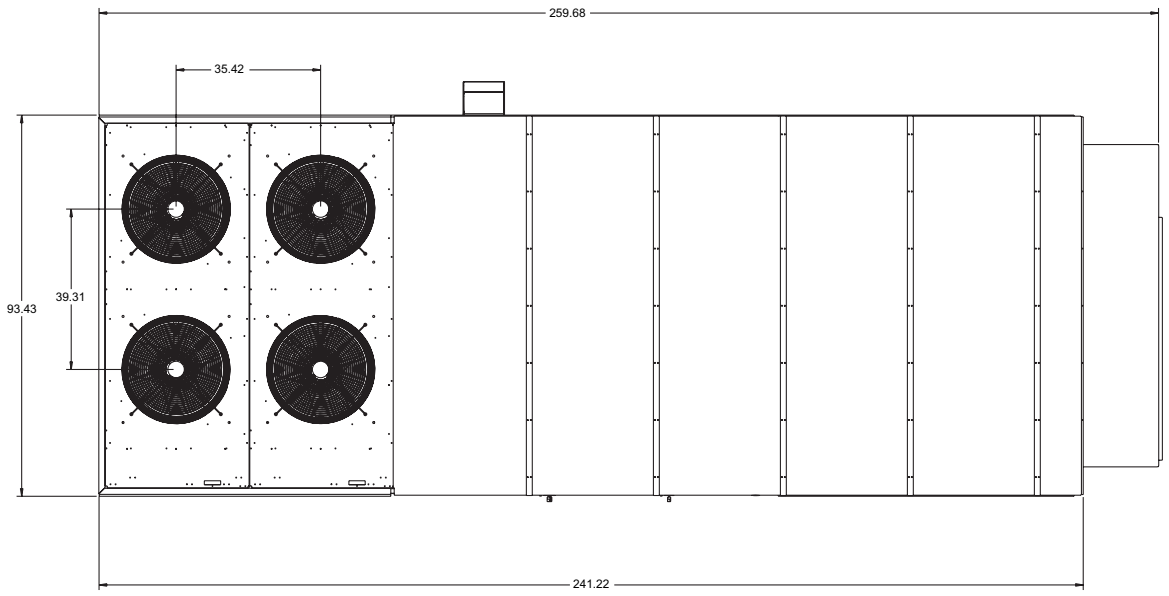


FIGURE 33 - 25 AND 30 TON SERIES 40 OVERHEAD VIEW

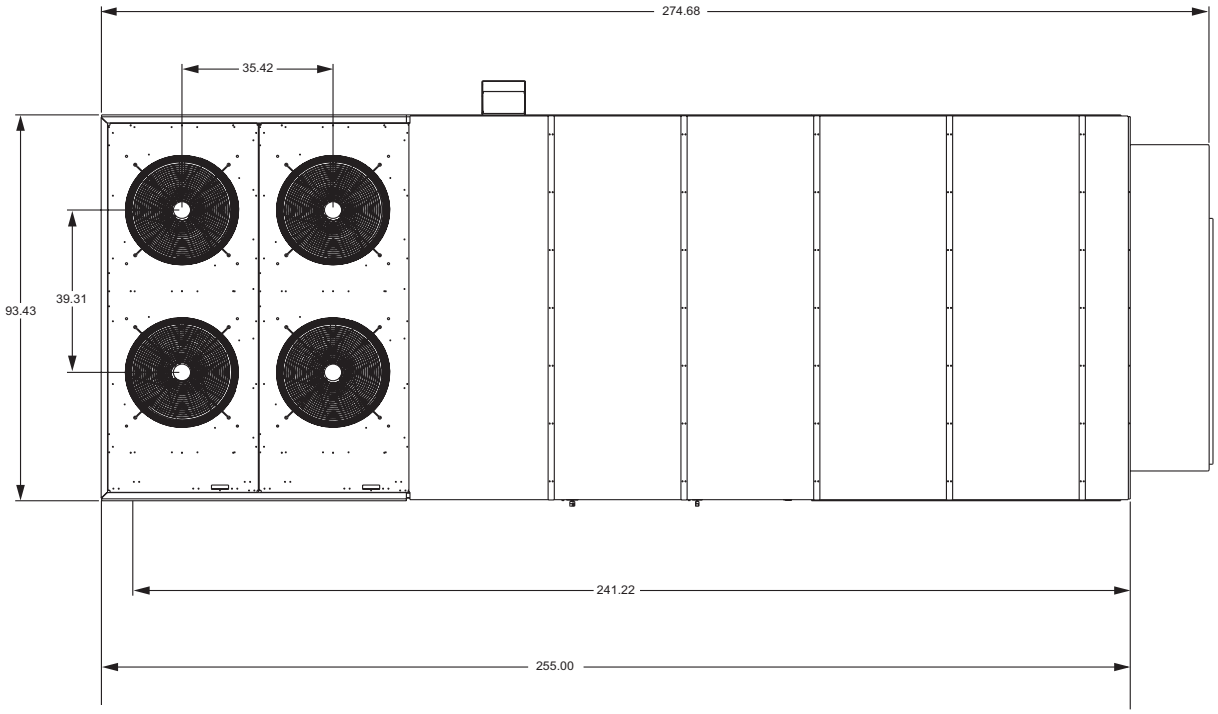


FIGURE 34 - 40 TON SERIES 40 OVERHEAD VIEW

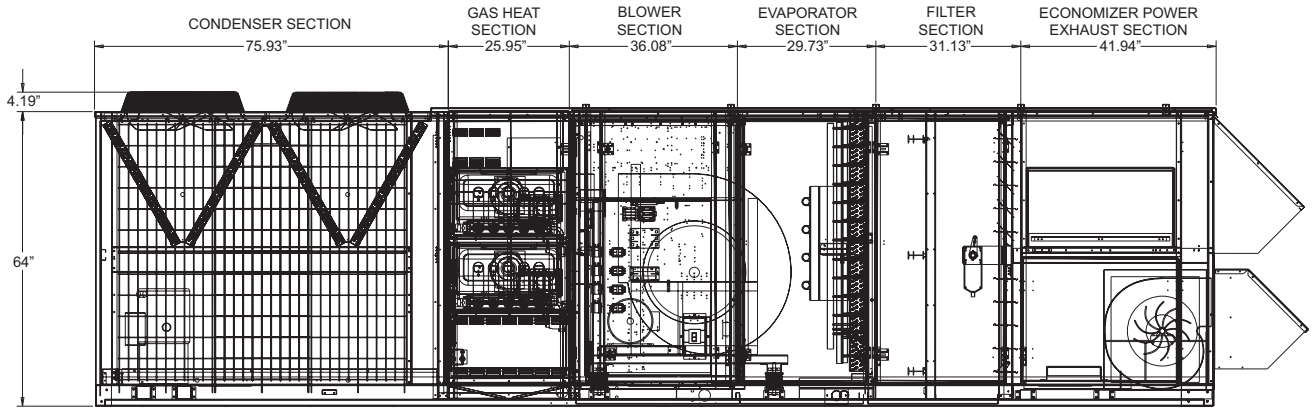


FIGURE 35 - 25 AND 30 TON SERIES 40 MAJOR COMPONENT LAYOUT

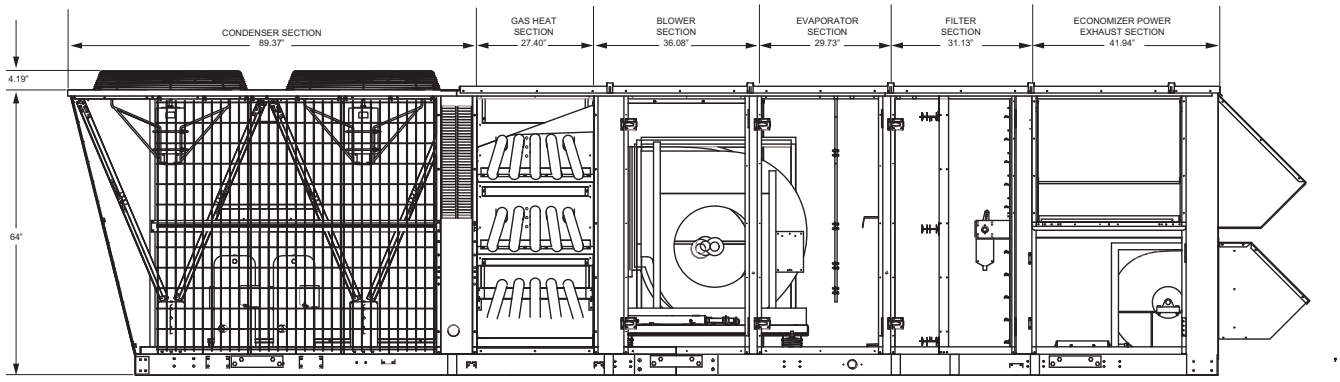
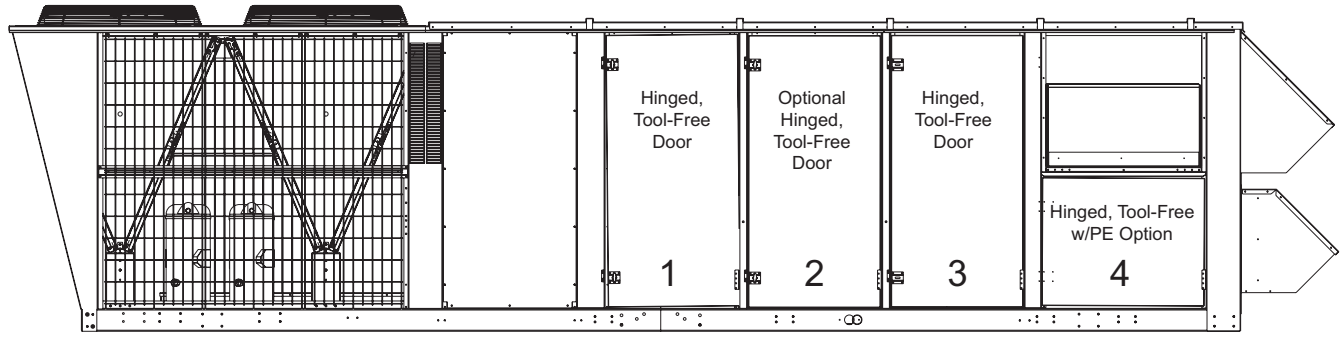
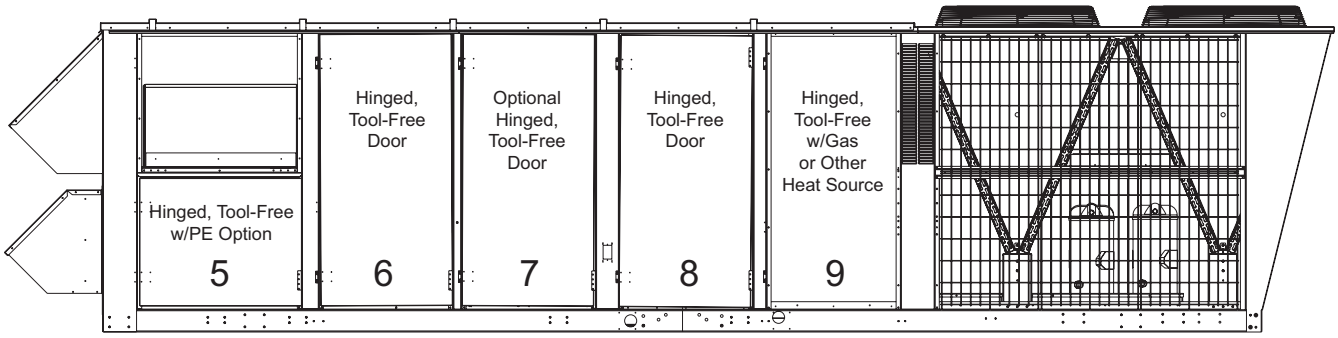


FIGURE 36 - 40 TON SERIES 40 MAJOR COMPONENT LAYOUT



BACK VIEW



FRONT VIEW

1. STD Cabinet Option includes Hinged, Tool-Free Doors # 1, 3, 6, 8.
2. Premium Cabinet Option includes Hinged, Tool-Free Doors # 1, 2, 3, 6, 7, 8.
3. Doors # 4, 5, 9 are dependent upon unit Heating and Power Exhaust Options.
4. Doors 1, 2, 3, 6, 7, 8 & 9 are 56.31 inches high by 27.33 inches wide.
5. Doors 4 & 5 are 26.5 inches high by 33.63 inches wide.
6. Door configurations are the same on all tonnages (40 ton shown).

FIGURE 37 - SERIES 40 CABINET DOOR CONFIGURATION

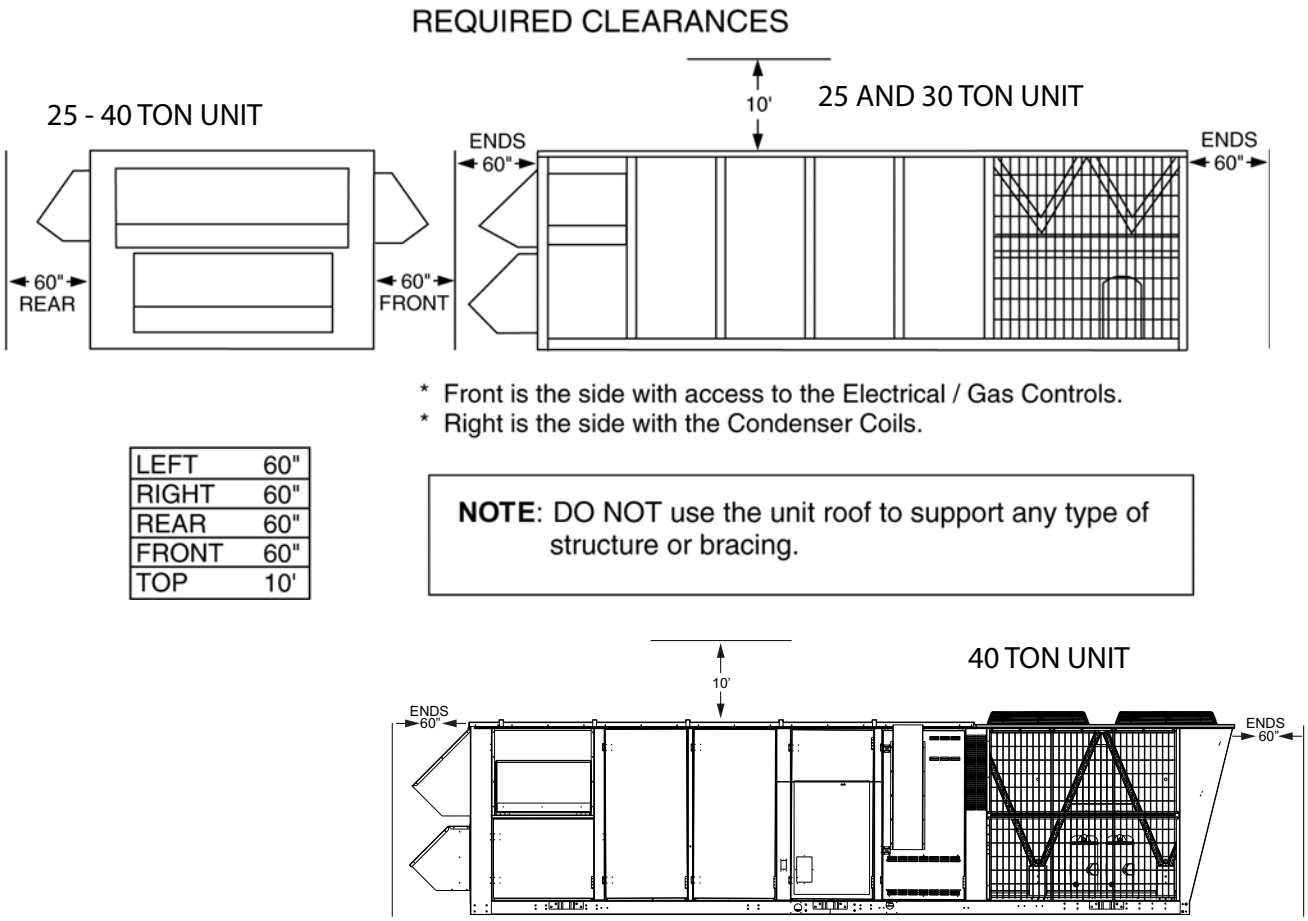


FIGURE 38 - CLEARANCES - HOOD/ECONOMIZER & MOTOR DRIVE - SIDE

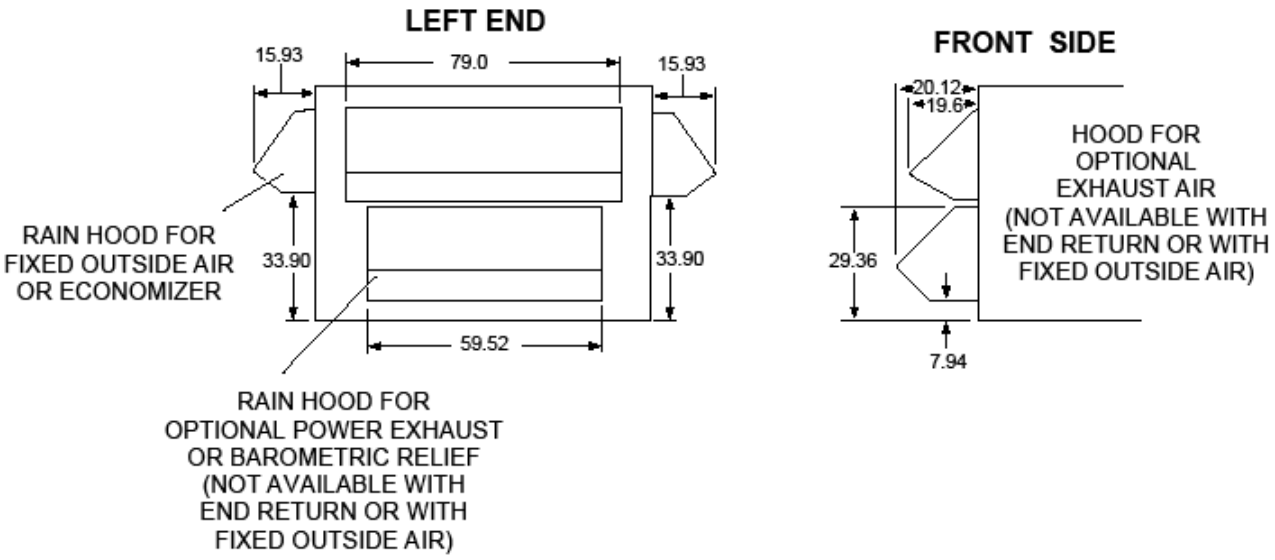
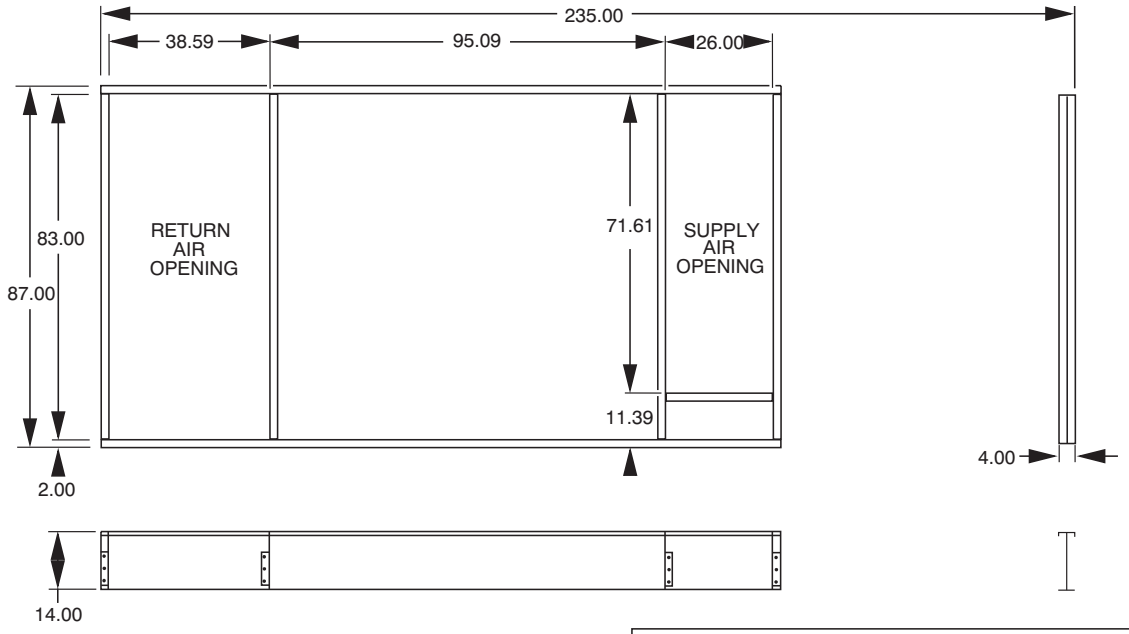
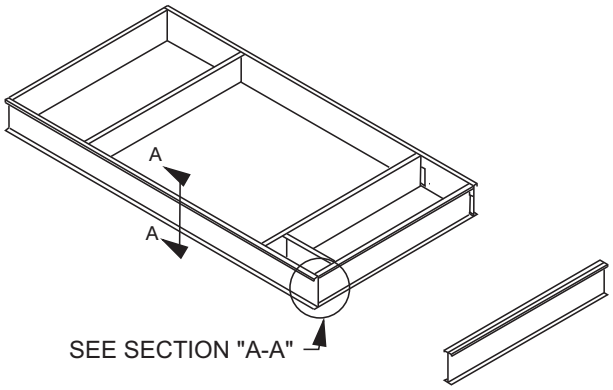
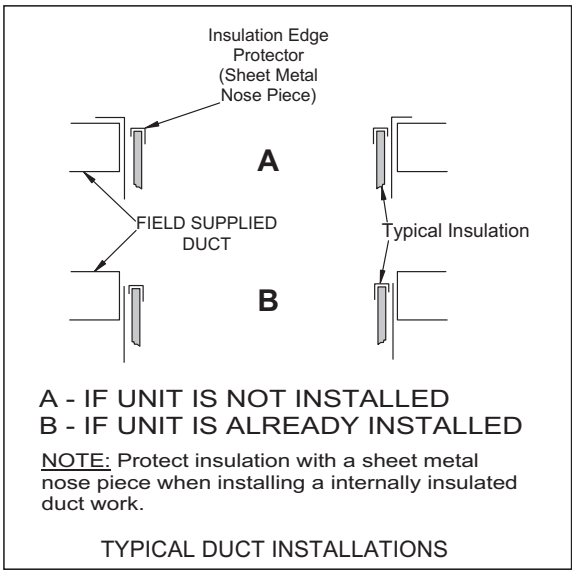
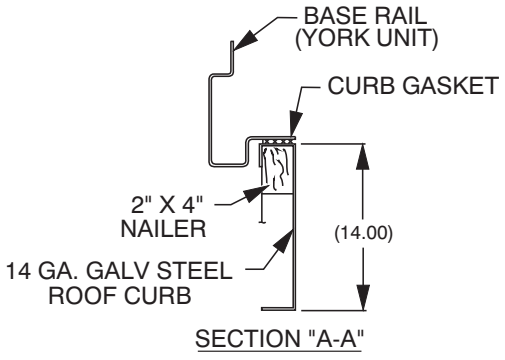


FIGURE 39 - CLEARANCES - HOOD/ECONOMIZER & MOTOR DRIVE - FRONT & END









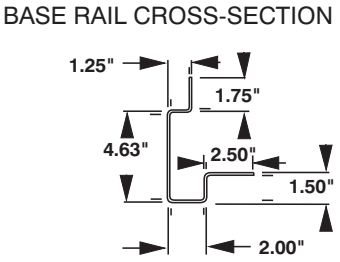


FIGURE 40 - PARTIAL ROOF CURB MODEL 1RC0455P

GUIDE SPECIFICATIONS - JOHNSON CONTROLS 25, 30, & 40 TON SERIES 40 UNITS

GENERAL

Series 40 shall be manufactured by Johnson Controls Unitary Products in an ISO 9001 certified facility. Introducing the Johnson Controls 25, 30, & 40 ton Series 40 rooftop line - units designed to provide peak performance and value both today and for years to come. Units are manufactured at an ISO 9001 registered facility, and each rooftop is completely computer-run tested prior to shipment. The Series 40 is designed to be flexible enough to meet your needs today and in the future. The true value of Series 40 is that it can be designed to fit any need, from cooling only, constant volume applications to variable air volume systems with variable frequency drive.

DESCRIPTION

Supply Johnson Controls Series 40 packaged rooftop system in accordance with the capacities in the plans. Units shall be rated by the manufacturer at a minimum 10.0 EER according to AHRI 360. Units shall be shipped in a single package, fully charged with R-410A refrigerant. The manufacturing facility shall be registered under ISO 9001 Quality Standards for Manufacturing. Units shall carry both ETL and CSA safety approval ratings. Tags and decals to aid in the service or indicate caution areas shall be provided. Installation and maintenance manuals shall be supplied with each unit. Units shall be capable of providing mechanical cooling down to 40°F (0°F with low ambient kit). Unit shall be capable of starting and running at 125°F. Unit electric and gas connections shall be either through the curb or the side of the unit.

CONSTRUCTION

Base

The base rail shall be constructed of 12 gauge galvanized steel, extending the full perimeter of the unit. All components shall be supported from the base, and the base shall include integral lifting lugs. The unit base rail shall overhang the roof curb for water runoff and shall have a fabricated recess with a continuous flat surface to seat on the roof curb gasket, providing a positive, weather tight seal between the unit and the curb.

Casing

The unit cabinet shall be double wall construction to provide both maximum resistance to bacterial growth in the air stream and superior structural integrity. All sheet metal shall be G90 mill galvanized sheet metal, formed and reinforced to provide a rigid assembly. Sheet metal shall be cleaned in an alkaline and zinc phosphate bath, and the exterior surfaces shall be coated with a 1.5 mil powder paint, capable of withstanding 1000 salt spray hours in accordance with ASTM B-117. The unit shall be insulated with 1-1/2," 1 pound fiberglass insulation between the two sheet metal skins. Insulation shall meet NFPA-90A regulations for smoke and flame spread ratings. The cabinet corner post and the intermediate side supports shall be 16 gauge steel. All access doors shall be 18 gauge on the exterior surfaces, and 20 gauge on the interior. Floor shall be 18 gauge, and 24 gauge. All serviceable sections shall have hinged access doors with latches on both sides of the unit. All access doors shall be constructed of 20 gauge steel on the outside, with 24 gauge on the inside. Each door shall seal against a rubber gasket to prevent air and water leakage. The roof shall be double wall, with 18 gauge on the external surface and 24 gauge on the interior. The roof shall be formed with a 45 degree drip lip overhanging the sidewalls to prevent precipitation drainage from streaming down the side of the unit. Roof sections shall be connected together via integral channels fastened with screws and sealed with rubber gasketing. Each fastened seam shall be further protected by a sheet metal channel covering the full length of the gasket surface, making a completely water tight seal.

SUPPLY AIR SYSTEM

SUPPLY AIR FAN

Fans shall be centrifugal type - Class I or Class II, statically and dynamically balanced in the factory. Fan wheels shall be designed for continuous operation at the maximum rate of fan speed and motor HP. The fan and motor assembly shall be mounted on a common base to allow consistent belt tension with no relative motion between the fan and motor shafts. The entire assembly shall be isolated from the unit base with (optional 1”, 2" deflection springs or rubber isolators). The fan discharge shall be connected to the cabinet through a reinforced neoprene flexible connection to eliminate vibration transmission from the fan to the unit casing. Fans shall be double-width, double-inlet with forward curved blades.

OPTIONAL

On variable air volume units without variable frequency drives, fans shall be provided with heavy gauge, corrosion resistant blades, with zinc-plated steel inter-locking operating mechanism. Both inlet vanes must operate from a single shaft and be synchronized for precise control.

Units equipped with variable frequency drive on supply fan must be controlled by a duct static transducer providing a 2-10 VDC signal to the drive. Supply fan variable frequency drives shall have factory option of being equipped with a manual drive bypass.

BEARINGS AND DRIVES

Bearings shall be self-aligning pillow-block re-greasable ball bearings with an average life expectancy of 200,000 hours. Grease fittings shall be accessible through access doors. Fan motors shall be NEMA designed, Standard efficiency (option,

Hi-efficiency) ball bearing type with electrical characteristics and horsepower as specified. Motors shall be 1750 RPM, open drip proof type. The motor shall be located within the unit on an adjustable, heavy steel base. All fan motor drives shall be selected for a minimum service factor of 1.2 and have fixed pitched sheaves.

AIR FILTERING SYSTEM

All filter holding frames shall be of heavy duty construction designed for industrial applications. All filters shall be either side accessible or front loading with access doors provided on both sides of the filter section. All filter media shall be Class II listed under UL Standard 900. Filter efficiencies shall be rated in accordance with ASHRAE Standard 52-76 2" Throwaway Filters with fiberglass media multiple shall be standard

OPTIONAL

Two inch pleated, throwaway filters with 30% efficiency. Rigid filters shall be high performance, expanded area, disposable type filters. Rigid filter sections shall be preceded by a 2 throwaway prefilter assembly. Filter efficiency shall be 95% (Option: 65%) based on ASHRAE Standard 52-76.

AIR INLET SYSTEM

General

Outside Air inlet openings shall be covered by a factory installed rain hood permanently attached to the cabinet to prevent windblown precipitation from entering the unit. The rain hoods on the front and back of the unit shall be rotated into the cabinet and secured for shipment so that upon installation they need only be rotated upwards and screwed into place. The outside air hood shall contain a removable and cleanable filter with an efficiency rating of 50% based on ASHRAE 52- 76. All damper assemblies shall be of low leak design. Damper blades shall be fabricated from a minimum of 16 gauge galvanized steel. Blade ends and edges shall be covered with vinyl seals. Damper shafts shall be fabricated from solid steel and mounted in the frame with bronze bearings.

Economizer (Optional)

An economizer shall have outdoor air and return air dampers that are interlocked and positioned by fully modulating, solid state damper actuators. The actuators shall be spring loaded so that the outside air damper will close when power to the unit is interrupted. The operation of the economizer shall be fully integrated into the cooling control system. The economizer shall be available for control via a dry bulb sensor (Optional: single or dual enthalpy sensors).

RELIEF SYSTEM (Optional)

All units with relief must have an economizer.

On all units not equipped with an economizer, an option shall be available for a manually adjustable outside air damper that shall be capable of admitting 0-25% outside air.

Barometric Relief (Optional)

Building air exhaust shall be accomplished through barometric relief dampers installed in the return air plenum. The dampers will open relative to the building pressure. The opening pressure shall be adjustable.

Exhaust Air Fans (Optional)

General - forward curved centrifugal fan(s) shall be installed in the return air plenum for positive power exhaust. Fans shall be on a common shaft, driven by a single motor. The fans, motors and drives shall be of the same quality and design as specified for the Supply Air Fan, except the fans shall be Class I. Fans shall be capable of exhausting up to 100% of the nominal CFM of the unit. Non-modulating Exhaust - Units with non-modulating power exhaust shall have a barometric relief damper to prevent outside air from entering in the off cycle. The fans shall cycle on and off with building pressure. Modulating Operation - The fans shall be capable of modulating the amount of air from 0% to 100% of nominal CFM. Modulation shall be through discharge dampers or variable frequency motor speed modulation. Dampers or VFD shall be controlled by static pressure in the conditioned space or return air duct.

ENERGY RECOVERY VENTILATION (FIELD INSTALLED OPTION)

General

The packaged rooftop unit shall have attached at the jobsite a powered exhaust combined with an air intake through a rotating energy receovery wheel, which captures sensible and latent heat from the exhaust air stream and returns it to the incoming air stream. The energy recovery module will be contained in a separate enclosure designed to attach to the end of the Series 40 packaged rooftop unit equipped with standard unit control.

The Energy Recovery Ventilation module will be capable of exhausting up to 8,000 (13,000) CFM.

Control parameters for the ERV will be preset in the unit control.

HEATING SYSTEM

Gas-fired Heating Section (Optional)

One or more gas-fired heating modules shall be installed to provide the heating requirements per the schedule shown on the plans. The heat exchanger shall be of tubular design. Tubes shall be 2-1/4” OD and constructed of minimum 20 gauge, G160 aluminized steel (1.6 mil aluminum silicone alloy) for corrosion resistance (Optional: 409 Stainless Steel).

Flue baffles shall be made of 430 stainless steel. Each gas-fired heat module shall have an induced draft combustion fan with energy efficient intermittent pilot spark ignition and redundant main gas valves with pressure regulator. Units with standing pilot ignition shall not be acceptable. An induced draft fan shall be provided to maintain a positive flow of air through each tube, to expel the flue gas and to maintain a negative pressure within the heat exchanger relative to the conditioned space. Induced draft fans shall be direct-drive. One (1) high limit controller per heating module, with automatic reset to prevent the heat exchanger from operating at an excessive temperature will be installed. A pressure switch on the combustion section must be provided to prevent ignition until sufficient air flow is established through the heat exchanger. Secondary airflow safety shall be provided by rollout switch protection. The rollout switch shall discontinue furnace operation if the flue becomes restricted. Units shall ship with an external flue to be shipped in the unit and mounted on the job site. The flue shall discharge products of combustion above the unit, preventing recycling of corrosive combustion gases back through the heat exchanger. Gas heating sections shall be both ETL and CSA approved to both US and Canadian safety standards.

Optional Modulating Furnace control or Single Stage control available.

Electric Heating Section

An electric slip-in heater shall be installed within the rooftop unit to provide the heating requirements per the schedule shown on the plans. The electric heater shall be wired in such a manner as to provide two equal steps of capacity (80 and 108 kW) or a single step of capacity (40 kW). The furnace shall be an industrial grade design using an open coil(s) made of the highest grade resistance wire containing 80% nickel and 20% chromium. The resistance coil(s) shall be adequately supported in the air stream using ceramic bushings in the supporting framework. Terminals of the coil(s) shall be stainless steel with high temperature ceramic bushings. The primary high temperature protection shall be an automatic reset type thermal cut out. Secondary protection shall be an automatic reset type thermal cut out. Secondary protection shall be a replaceable thermal link. The operation of the electric heater shall be an integral part of the roof top control system. Power connection to the strip heater shall be through the single power point connection for the entire unit. Electric heat shall be ETL certified to both US and Canadian safety standards.

Hot Water Heating Coil

The manufacturer shall furnish and factory install a hot water coil in the rooftop units, as described in the following specifications. Water coil capacities and pressure drops shall be certified in accordance with AHRI Standard 410. The hot water coil shall have eight fins per inch, 2 tubes per circuit, and 2" inlet and outlet connection. Primary surface shall be 1/2" OD copper tube, staggered in direction of airflow. Tubes shall be mandrel expanded to form fin bond and provide burnished, work-hardened interior surface. Return bends shall be die formed and silver-brazed to tubes. Headers shall be of heavy seamless copper tubing, silver-brazed to tubes. Connections shall be of red brass, with male pipe threads, silver brazed to headers. Connections also have 1/4" FPT drain plug on each connection. Extended surface shall consist of die-formed, continuous, aluminum fins with formed channels, and surface treatment to minimize moisture carry-over. Fins shall have fully drawn collars to accurately space fins, and to form a protective sheath for the primary surface. A structural galvanized steel casing shall protect the coil. Tube sheets on each end shall have drawn collars to support tubes. An intermediate coil support shall be provided. The coil shall be circuited to provide free draining and venting, through one vent and drain. Completed coil, including headers, connections and return bends shall be tested with 325 pounds compressed air under water. Coils shall be designed for operation at 250 psig design working pressure.

Steam Heating Coil

The manufacturer shall furnish and factory install a steam heating coil in the rooftop units, as described in the following specifications. Steam coil capacities and pressure drops shall be certified in accordance with AHRI standard 410. The steam coil shall be constructed in the non-freeze style. The steam coil shall have six fins per inch, and 2" inlet, and 1 1/2" outlet connection. Tubes shall be 1" OD seamless copper tubing with a minimum wall thickness of 0.035" and expanded into the fin collars for maximum fin-tube bond. Inner distributing tubes shall be 5/8" OD seamless copper tubing with a minimum wall thickness of 1/4". The copper to copper joints shall be joined with high temperature, silver solder. Corrugated fins with integral spacing collars shall cover the entire tube surface. Headers shall be constructed of seamless copper. The header tube holes shall be extruded providing better tube to header contact for a stronger braze connection. All header connections shall be of red brass or steel, with male pipe threads and silver braze to headers. Casing shall be 16 gauge galvanized steel. Chafing shall be prevented by extruding and flaring the holes in the tube sheet and intermediate tube sheet. The core shall be pitched in the direction of the condensate connection for proper drainage. The completed coil (including headers and connections) shall be tested underwater with 325 lbs. compressed air to ensure a leak free coil.

REFRIGERATION SYSTEM

Units shall have four independent refrigerant circuits for maximum load-matching capability. Each refrigerant circuit shall be controlled with a balance-port thermal expansion valve for maximum control at low load conditions.

Evaporator Coils

Evaporator coils shall be direct expansion type with intertwined circuiting to assure complete coil face activity during part load operation. Coil fins shall be enhanced aluminum

type. Coil types shall be 3/8” OD copper, internally enhanced and mechanically expanded to bond with the fins. Coil casing shall be fabricated from heavy gauge galvanized steel. All coils shall be pressure tested at a minimum of 450 PSIG. A galvanized powder painted steel drain pan shall be provided under the entire length and width of the evaporator coil, including all return bends. The main drain pan shall be sloped a total of 1/4” per foot towards the drainage point. Main drain pan shall be easily cleanable in the field. The condensate drain opening shall be flush with the bottom of the drain pan to allow complete drainage. Coils in excess of 48 inches high shall have an intermediate drain pan, also fabricated of galvanized powder painted steel extending the entire finned length of the coil to provide better water drainage. Drainage from the intermediate drain pan shall be to the primary drain pan. OPTIONAL: Drain pans shall be constructed of stainless steel. OPTIONAL: Evaporator coils shall be protected by the TechniCoat 10-1 four coat process. Coils shall be dipped in a phenolic coating, which provides substantial resistance to corrosion of aluminum and copper. OPTIONAL: Copper-tube/Copper-finned evaporator coil assemblies.

Compressors

Units shall have four industrial duty hermetic scroll compressors, independently piped and charged. Compressors shall have an enlarged liquid carrying capacity to withstand rugged operating conditions. Compressor frame shall be cast iron, with cast iron fixed and orbiting scrolls. Each compressor shall feature a solid state protection module, designed to protect the compressor from over temperature and overcurrent conditions. Each compressor shall include the following safety and convenience devices: replaceable suction screen, discharge line check valve, and oil sight glass. Compressors shall be vibration isolated from the unit, and installed in an easily accessible area of the unit.

Condenser Coils

Condenser coils shall have 3/8” seamless copper tubes, arranged in staggered rows, mechanically expanded into aluminum fins. Coils shall be protected from hail damage with a V configuration, with individual flat coils rotated 30 from the vertical plane for each condensing circuit. Condensing coils shall have an integral subcooler for more efficient, stable operation. OPTIONAL: Condenser coils shall be protected by the TechniCoat 10-1 four coat process. Coils shall be dipped in a phenolic coating, which provides substantial resistance to corrosion of aluminum and copper. OPTIONAL: Copper-tube/Copper-finned condenser coil assemblies.

Condenser Fans and Motors

Condenser fans shall be direct drive, propeller type, discharging vertically. Condenser fan motors shall be 3 phase, totally enclosed air over (TEAO) type, with built in thermal overload protection.

Refrigerant Piping

All interconnecting piping between refrigeration components shall be copper tubing with brazed joints. Each refrigerant circuit shall be equipped with liquid line filter drier, and moisture indicating sight glass. Each circuit shall also have both high and low pressure switches installed on either side of the compressor and include shrader depressors for replacement of the pressure switches without removing charge. All small diameter distributor tubing to the evaporator coil shall be protected by polyurethane sleeves over the length of the tubing to prevent the tubes from copper-to-copper contact during shipment or operation.

Hot Gas Bypass (Optional on CV; standard on VAV)

Unit shall have hot gas bypass factory installed on the lead compressor.

CONTROLS

GENERAL DESCRIPTION

Equipment with standard controls shall be factory run-tested through the control, after the test is complete; there will be no wires to re-connect. All control wiring points shall be tested and verified through communication.

The control shall be UL or CSA recognized. The control shall be manufactured in a manufacturing facility that is certified to ISO 9001.

COMPRESSOR CONTROL

The control shall have a five-minute Anti-Short Cycle Delay to prevent excessive compressor cycling. The control shall have a three-minute minimum run time to insure that oil gets returned to the compressor each time it starts. The minimum runtime shall be programmable up to 10 minutes.

The control shall monitor the High Pressure switch, the Low Pressure switch, and the Compressor Overloads separately for each refrigeration circuit. The control shall have a 30 second Low Pressure Switch bypass when it starts any compressor.

A hard compressor lockout shall occur if the control detects the same switch trip three times in a two-hour window, which starts when the first trip occurs. On the first and second trips, the control will turn the compressor off and wait five-minutes after the switch re-closes, before restarting the compressor.

The control shall be capable of operating both compressors and the economizer when there is a call for both stages of cooling.

The control shall have a means of locking out mechanical compression below a programmable low ambient trip point. This must be done without adding extra components to the unit.

The control shall have a means of locking out the mechanical compression when the economizer is operating in free cooling mode without additional components

The control shall have a means of starting the compressor before the indoor Fan comes on when operating with a Thermostat in the AUTO FAN mode.

FAN CONTROL

The control shall have fully adjustable Fan ON and Fan OFF delays for both Heating and Cooling settable at the control or via communication.

The control's default Fan OFF delay for Cooling shall be 30 seconds to take advantage of the remaining capacity in the coil after the compressor has been turned off.

The control shall lock on the Fan if the high temperature limit trips three times in one hour of operation.

The control will have a software programmable Fan Mode Switch for Auto operation or Continuous operation.

When the Fan is in the Continuous mode, it will run continuously during the occupied schedule and in the Auto mode when in an unoccupied schedule.

The control shall be capable of operating the fan without a G or fan signal from the thermostat.

EQUIPMENT CONTROL FEATURES

Units will come with the new state of the art Simplicity SE (Smart Equipment) control system. - The new unit control incorporates the best of the already proven Simplicity™ unitary controls and creates a more robust, intelligent control. The goal of this control is to utilize cutting edge technology making the equipment easier to install, operate, and service. All units are Factory commissioned, configured, and run tested.

Versatile - The Simplicity SE control can be configured to use with a standard thermostat (easy to connect screw terminals), A zone sensor, or can be setup to communicate with multiple BAS communication protocols to integrate with building automation systems.

Reduce field installed complexity - Each unit will comes equipped with factory installed supply air, return air, and outdoor air temperature sensors providing key temperature readings thus reduce field installed complexity.

On-board USB Port - The new control comes with a long list of features including data logging, current and previous system faults and software update capabilities using the on board USB port and common flash drive. Energy use monitoring capabilities allow custom tailoring to allow a system to work more efficiently at all times and occupancy levels. Self test and start-up reports also available from the board VIA the USB port.

Embedded LCD Display - The board has a easy to read, built-in LCD display and easy to use navigation joystick and buttons allowing the user to quickly navigate the menus displaying unit status, options, current function, supply, return and outdoor temperatures, fault codes and other information.

Safety Monitoring - The control monitors the outdoor, supply, and return air temperatures and the high and low pressure switch status on the independent refrigerant circuits. On units with heating the gas valve and high temperature limit switches are monitored on gas and electric heating units. The control also monitors the voltage supplied to the unit and will protect the unit if low voltage due to a brown out, or other electrical issue occurs.

Low Ambient - An integrated low-ambient control allows units to operate in the cooling mode down to 0°F outdoor ambient without additional components or intervention. Optionally, the control board can be programmed to lockout the compressors when the outdoor air temperature is low or when free cooling is available.

Anti-Short Cycle Protection - To aid compressor life, an anti-short cycle delay is incorporated into the standard control. Compressor reliability is further ensured by programmable minimum run times. For testing, the anti-short cycle delay can be temporarily overridden with the push of a button.

Fan Delays - Fan on and fan off delays are fully programmable. Furthermore, the heating and cooling fan delay times are independent of one another. All units are programmed with default values based upon their configuration of cooling and/or heating capacity.

Nuisance Trip Protection and Three Strikes - To prevent nuisance calls, the control board uses a three times, you're out philosophy. The high, low-pressure switch, anti-freeze protection, low voltage or heating high limit must trip three times within two hours before the unit control board will lock out the associated compressor. The same safety The same safety must trip three times before a hard lockout will occur.

The control will operate and monitor up to 3 stages of heat independently.

The control shall monitor the Gas Heat operation in the heating mode. It shall monitor the gas valve when there is a call for heating. The control shall alarm when there is a call for heat and no gas valve voltage after 5 minutes.

There will only be one control board for this series of units, for both CV and VAV operation.

COMFORT CONTROL FEATURES

The control will be installed and tested at the factory where the equipment is assembled.

The control will use a Wall Senor that has a means of overriding the unoccupied mode for a programmable amount of time.

The Unoccupied Override time will be programmed in minutes up to 4 hours.

The control will use a Wall Sensor that has a warmer/cooler dial so the occupants can offset the programmed setpoint by a programmed amount between 1 and 5 degrees.

The control will have a Supply Air Sensor as standard.

The control will have a Return Air Sensor as standard.

The control will have an Outside Air Sensor as standard.

The control will use the Return Air Sensor in place of the Space Sensor if the Space Sensor fails for any reason, the control will have a 365 day Real Time Clock.

The Real Time Clock will be able to do automatic Daylight Savings Time adjustment.

The control will have an Occupancy Schedule that allows two different Occupied schedules per day for each of the seven days of the week individually.

The control will have 20 Holiday Schedules, each capable of 99 days.

The control's Holiday Schedules will have a start time associated with each schedule.

The control will control the Economizer directly.

The control will be capable of operating the Economizer using Dry Bulb, Outside Enthalpy, or Differential Enthalpy.

When the control is using Enthalpy to control the Economizer, it will also have an Outside Air Temperature enable Setpoint.

The control will use two setpoints for Supply Air Temperature for the Economizer operation. One will be for a small space cooling demand and one for a large space cooling demand.

The control will have the ability to do Demand Ventilation using one CO_2 sensor.

The control will have a programmable maximum Outside Air Damper Position for IAQ operation.

The control will have the ability to temper the ventilation air during times when heating or cooling is not required.

The control will have the ability to offset the operating setpoint based on high Humidity in the Space.

The control will have programmable limits when offsetting the Operating Setpoint to control Humidity.

The control must be able to lockout Cooling below a programmable Outside Air Temperature Setpoint.

The control will be able to lockout Heating above a programmable Outside Air Temperature Setpoint.

The control will have a Space Temperature Alarm.

The control will have a Supply Air Temperature Alarm for Heating and Cooling. The Alarm temperature will be programmable

The Control will be able to do a Pre-Occupancy Purge at a Programmable Time.

The control will have a hardware Smoke-Purge input.

The control will have the ability to read a dirty filter switch.

The control will have the capability of reading a Fan proving switch.

The control will have an intelligent recovery function that will bring the space to the Occupied Setpoint just before or at the beginning of the first Occupied schedule each day. The control will learn and apply the minimum run time required to heat or cool the space to setpoint for the first Occupied period of a day.

The control will have Software controllable Mode Switches (Heat, Cool, and Fan).

The control will meter and track Unoccupied Override Time for billing purposes.

OPTIONAL CONTROL

Johnson Commercial Comfort System (CCS)

Provides rooftop system integration for CCS single zone, change-over bypass and VAV systems.

FDD (Fault Detection and Diagnostics) - Refrigerant side

A factory installed control system option on the commercial equipment that constantly monitors refrigerant circuit pressures, refrigerant circuit temperatures, as well as the environmental temperatures and humidity via multiple sensor inputs.

- Provides a building owner, technician or contractor with the operational characteristics of the RTUs entire refrigerant circuit to ensure the unit is functioning at its specified performance level.
- Provides alarms if the unit is not functioning optimally.
- Remotely accessible via the Mobile Access Portal (MAP) gateway as well as scrolled on the UCB LCD screen.

AVAILABLE ACCESSORIES

The following accessories shall be available:

Partial perimeter roof curbs

14" high roof curb with wood nailer. The partial perimeter roof curb surrounds the portion of the unit which has airflow, and includes a support at the compressor end of the unit.

Burglar Bars

This accessory mounts in the supply and return opening of the partial perimeter curb to prevent entry into the building through the ductwork.

Field Installed Barometric Relief

This accessory is a set of barometric relief dampers and hood used for the barometric relief option that is fully assembled for mounting to return ductwork. This accessory is intended for use on horizontal return applications.

Programmable thermostat, with or without remote sensor (required for constant volume units)

Provides 2 Heat/4 Cool control and 7 day programming.

Remote Wall Mounted Temperature Sensors

Attractive wall mounted temperature sensors are available to precisely control multiple or individual zone temperature. Sensors are available without adjustment, with override and override with programmable setpoint adjustment.

Dirty Filter Switch

A Dirty Filter pressure switch kit is available for field installation. Switches will monitor pressure drop across the units air filters and provide an alarm when filters become dirty.

Propane conversion kits

Contains the necessary orifices and gas valve parts to convert from natural gas to propane. Propane cannot be used on modulating gas heat units.

High altitude conversion kits

These kits are required for natural gas applications between 2,000 and 6,000 feet.

Energy Recovery Ventilators

8,000 and 13,000 CFM models available. Great applications involving 30% or more of required outdoor air where energy use and comfort must be optimized.

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