

PACKAGE HEAT PUMP UNIT R-410A SINGLE PACKAGE ROOFTOP 6 – 12.5 TONS

BUILT TO LAST, EASY TO INSTALL AND SERVICE

- One-piece, high efficiency electric heating and electric cooling units, prewired, tested, and charged at the factory
- All units are convertible from downflow to horizontal air flow; no special adapter curbs are necessary
- Full perimeter base rail with built-in rigging adapters and fork truck slots
- Pre-painted exterior panels and primer-coated interior panels tested to 500 hours salt spray protection
- Fully insulated cabinet
- Scroll compressors with internal line-break overload protection
- Single stage cooling on 6 ton models, 2 stage cooling on 7.5 to 12.5 ton.
- All units have high and low pressure switches
- Two inch disposable fiberglass type return air filters in dedicated rack with tool-less filter access door
- Refrigerant circuits contain a liquid line filter drier to trap dirt and moisture
- Precision sized suction line accumulator to provide high reliability
- 4-way reversing valve rapidly changes the flow of refrigerant to quickly changeover from cooling to heating and heating to cooling
- Belt drive evaporator-fan motor and pulley combinations available on all sizes to meet any application
- Crankcase heaters on all models
- Indoor and outdoor coils constructed of aluminum fins mechanically bonded to seamless copper tubes
- Newly-designed indoor refrigerant header for easier maintenance and replacement
- Exclusive non-corrosive composite condensate pan in accordance with ASHRAE 62 Standard, sloping design; side or center drain
- Access panels with easy grip handles provide quick and easy access to the blower and blower motor, control box, and compressor.
- "No-strip" screw system has superior holding power and guides screws into position while preventing the screw from stripping the unit's metal.
- Newly designed terminal board facilitates simple safety circuit troubleshooting and simplified control box arrangement
- Outdoor temperature cooling operation range up to 115°F (46°C) and down to 25°F (-4°C) using accessory winter start kit
- Fixed orifice metering devices on all models to precisely control refrigerant flow
- Large, laminated control wiring and power wiring drawings are affixed to unit to make troubleshooting easy
- Standard, medium, and high static fan motor options available
- Provisions for thru-the-bottom power entry capability
- Single point electrical connections



RHS072



RHS090-102

WARRANTY

- 5 Year compressor limited warranty
- 1 Year parts limited warranty



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



UNIT PERFORMANCE DATA									
BASE MODEL	Nominal Tons	COOLING			HEATING			Unit Dimensions H x W x L	Unit Weight lbs (kg)
		Net Cap. (Btuh)	SEER	EER	High Cap. (Btuh)	HSPF	COP		
RHS072*0AA0AAA	6	70,000	N/A	11.10	67,000	N/A	3.3	41-3/8" x 46-3/4" x 74-3/8"	630 (286)
RHS090*0AA0AAA	7 1/2	88,000	N/A	11.20	86,000	N/A	3.3	49-3/8" x 59-1/2" x 88-1/8"	885 (401)
RHS102*0AA0AAA	8 1/2	99,000	N/A	11.20	96,000	N/A	3.3	49-3/8" x 59-1/2" x 88-1/8"	910 (413)
RHS120*0AA0AAA	10	117,000	N/A	11.00	116,000	N/A	3.3	49-3/8" x 59-1/2" x 88-1/8"	1050 (476)
RHS150*0AA0AAA	12.5	142,000	N/A	10.60	142,000	N/A	3.2	57-3/8" x 63-3/8" x 115-7/8"	1370 (623)

* Indicates Unit voltage: H = 208/230-3-60, L = 460-3-60, S = 575-3-60

TABLE OF CONTENTS

	PAGE		PAGE
MODEL NUMBER NOMENCLATURE	3	HEATING TABLES	39
FACTORY OPTIONS AND/OR ACCESSORIES	4	STATIC PRESSURE ADDERS	42
AHRI CAPACITY RATINGS	9	FAN PERFORMANCE	43
SOUND PERFORMANCE TABLE	10	OUTDOOR AIR INTAKE & EXHAUST PERF	49
PHYSICAL DATA	11	ELECTRICAL INFO	50
ELECTRIC HEAT DATA	13	MCA / MOCP	52
WEIGHTS & DIMENSIONS	18	TYPICAL WIRING DIAGRAMS	58
APPLICATION DATA	32	SEQUENCE OF OPERATION	62
COOLING TABLES	34	GUIDE SPECIFICATIONS	64

MODEL NOMENCLATURE

MODEL SERIES	R	H	S	0	9	0	H	0	A	A	0	A	A	A
Position Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14
R = Rooftop														
A = Air Conditioning (Cooling Only) H = Heat Pump G = Gas/Electric														
Type														
S = Standard ASHRAE 90.1-2010														
Efficiency														
072 = 6 Tons 090 = 7.5 Tons (Dual Compressor) 102 = 8.5 Tons (Dual Compressor) 120 = 10 Tons (Dual Compressor) 150 = 12.5 Tons (Dual Compressor)														
Nominal Cooling Capacity														
H = 208/230-3-60 L = 460-3-60 S = 575-3-60														
Voltage														
0 = No Heat														
Heating Capacity														
A = Standard Static Option - Belt Drive (6-12.5 Ton) C = Medium Static Option (Belt Drive) 6-12.5 Ton) B = High Static Option (Belt Drive) (6-12.5 Ton)														
Motor Option														
A = None B = Economizer w/Bara-relief, OA Temp sensor E = Economizer w/Bara-relief + CO2 Sensor, OA Temp sensor H = Economizer w/Bara-relief, enthalpy sensor L = Economizer w/Bara-relief + CO2 Sensor, enthalpy sensor P = 2-Position damper w/Baro-relief														
Outdoor Air Options / Control														
0A = No Options 4B = Non-Fused Disconnect AT = Non-powered 115v C.O. BA = Supply Air Smoke Detector + Non-Powered 115v C.O. 7C = Non-Fused Disconnect + Non-Powered 115v C.O. 7K = Non-Fused Disconnect + Non-Powered 115v C.O.+ SA Smoke detector 8A = Non-Fused Disconnect + SA Smoke detector														
Factory Installed Options														
A = Aluminum / Cu Cond & Evap Coil B = Precoat Alum/Cu Cond & Alum / Cu Evap C = E-Coated Alum/Cu Cond & Alum / Cu Evap D = E-Coated Alum / Cu Cond & Evap E = Cu / Cu Cond & Alum / Cu Evap F = Cu/Cu Cond & Evap														
Condenser / Evaporator Coil Configuration														
A = Sales Digit														

Table 1 – FACTORY INSTALLED OPTIONS AND FIELD INSTALLED ACCESSORIES

CATEGORY	ITEM	FACTORY INSTALLED OPTION	FIELD INSTALLED ACCESSORY
Cabinet	Thru-the-base electrical connections		X
Coil Options	Cu/Cu indoor and/or outdoor coils	X	
	Pre-coated outdoor coils	X	
	Premium, E-coated outdoor coils	X	
Condenser Protection	Condenser coil hail guard (louvered design)		X
Controls	Thermostats, temperature sensors, and subbases		X
	Smoke detector (supply air)	X	
	Time Guard II compressor delay control circuit		X
	Phase Monitor		X
Economizers & Outdoor Air Dampers	Economizer (for electro-mechanical controlled RTUs)	X	X
	Motorized 2 position outdoor-air damper	X	X
	Manual outdoor-air damper		X
	Barometric relief ²	X	X
	Power exhaust		X
Economizer Sensors & IAQ Devices	Single dry bulb temperature sensors ³	X	X
	Differential dry bulb temperature sensors ³		X
	Single enthalpy sensors ³	X	X
	Differential enthalpy sensors ³		X
	CO ₂ sensor (wall, duct, or unit mounted) ³		X
Electric Heat	Electric Resistance Heaters		X
	Single Point Kit		X
Indoor Motor & Drive	Multiple motor and drive packages	X	
Low Ambient Control	Motormaster head pressure controller ⁴		X
Power Options	Convenience outlet (unpowered)	X	
	Non-fused disconnect	X	
Roof Curbs	Roof curb 14" (356mm)		X
	Roof curb 24" (610mm)		X

NOTES:

1. Use in conjunction with specialized thermostat or controls device.
2. Included with economizer.
3. Sensors used to optimize economizer performance.
4. See application data for assistance.

FACTORY OPTIONS AND/OR ACCESSORIES

Economizer (dry–bulb or enthalpy)

Economizers bring in fresh, outside air for ventilation; and provide cool, outside air to cool your building. This is the preferred method of low–ambient cooling. When coupled to CO₂ sensors, Economizers can provide even more savings by coupling the ventilation air to only that amount required based on occupancy.

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

CO₂ Sensor

Improves productivity and saves money by working with the economizer to intake only the correct amount of outside air for ventilation. As occupants fill your building, the CO₂ sensor detects their presence through increasing CO₂ levels, and opens the economizer appropriately.

When the occupants leave, the CO₂ levels decrease, and the sensor appropriately closes the economizer. This intelligent control of the ventilation air, called Demand Control Ventilation (DCV) reduces the overall load on the rooftop, saving money. CO₂ sensors are available with the economizer, installed and tested by the factory.

Smoke Detectors (Optional)

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

Louvered Hail Guards

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

Convenience Outlet (un–powered)

Lower service bills by including a convenience outlet in your specification. Provides a convenient, 15 amp, 115v GFCI receptacle.

Non–fused Disconnect

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

Barometric Relief (included with economizer)

Gravity controlled, barometric relief equalizes building pressure and ambient air pressures. This can be a cost effective solution to prevent building pressurization.

Power Exhaust

Superior internal building pressure control. This field–installed accessory may eliminate the need for costly, external pressure control fans.

Time Guard II Control Circuit

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

Filter or Fan Status Switches

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

Motorized 2–Position Damper

A 2–position, motorized outdoor air damper is available factory installed and admits up to 100% outside air. Using reliable, gear–driven technology, the 2–position damper opens to allow ventilation air and closes when the rooftop stops, stopping unwanted infiltration.

Manual OA Damper

Accessory manual outdoor air dampers are an economical way to bring in ventilation air.

Head Pressure Controller

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

Alternate Motors and Drives

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

Thru–the–Base Connections

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

Electric Heaters

RHS units offer a full–line of accessory heaters. The heaters are very easy to use, install and are pre–engineered and certified.

ACCESSORIES – RHS072–150

FLAT ROOF CURBS		
Model Number	Description	Use With Model Size
CRRFCURB001A01	14" High Roof Curb. Ductwork attaches to the roof curb. Includes thru-the-bottom capability.	072
CRRFCURB003A01	14" High Roof Curb. Ductwork attaches to the roof curb. Includes thru-the-bottom capability.	090 – 120
CRRFCURB002A01	24" High Roof Curb. Ductwork attaches to the roof curb. Includes thru-the-bottom capability.	072
CRRFCURB004A01	24" High Roof Curb. Ductwork attaches to the roof curb. Includes thru-the-bottom capability.	090 – 120
CRRFCURB072A00	14" High Roof Curb. Ductwork attaches to the roof curb. Includes thru-the-bottom capability.	150
CRRFCURB073A00	24" High Roof Curb. Ductwork attaches to the roof curb. Includes thru-the-bottom capability.	150

ECONOMIZERS		
Model Number	Description	Use With Model Size
DNECOMZR020A02	Vertical EconoMi\$er IV with solid-state controller, gear-driven, 3-position modulating damper, spring return actuator, up to 100% barometric relief, supply and outdoor air sensors, and CO2 sensor compatible.	072
DNECOMZR021A03	Vertical EconoMi\$er IV with solid-state controller, gear-driven, 3-position modulating damper, spring return actuator, up to 100% barometric relief, supply and outdoor air sensors, and CO2 sensor compatible.	090 – 120
DNECOMZR062A00	Vertical EconoMi\$er IV with solid-state controller, gear-driven, 3-position modulating damper, spring return actuator, up to 100% barometric relief, supply and outdoor air sensors, and CO2 sensor compatible.	150
DNECOMZR024A02	Horizontal EconoMi\$er IV with solid-state controller, gear-driven, 3-position modulating damper, spring return actuator, up to 100% barometric relief, supply and outdoor air sensors, and CO2 sensor compatible.	072
DNECOMZR025A02	Horizontal EconoMi\$er IV with solid-state controller, gear-driven, 3-position modulating damper, spring return actuator, up to 100% barometric relief, supply and outdoor air sensors, and CO2 sensor compatible.	090 – 120
DNECOMZR064A00	Horizontal EconoMi\$er IV with solid-state controller, gear-driven, 3-position modulating damper, spring return actuator, up to 100% barometric relief, supply and outdoor air sensors, and CO2 sensor compatible.	150

POWER EXHAUST		
Model Number	Description	Use With Model Size
DNPWREXH030A01	Vertical Power Exhaust 208/230 volt (1 or 3 Phase)	072
DNPWREXH021A01	Vertical Power Exhaust 460 volt	072
DNPWREXH022A01	Vertical Power Exhaust 208/230 volt (3 Phase)	090 – 120
DNPWREXH023A01	Vertical Power Exhaust 460 volt	090 – 120
DNPWREXH080A00	Horizontal Power Exhaust 208/230 & 575 volt	150
DNPWREXH081A00	Horizontal Power Exhaust 460 volt	150
DNPWREXH028A01	Horizontal Power Exhaust 208/230 & 575 volt (1 or 3 Phase)	072 – 120
DNPWREXH029A01	Horizontal Power Exhaust 460 volt	072 – 120
DNPWREXH082A00	Horizontal Power Exhaust 208/230 & 575 volt	150
DNPWREXH083A00	Horizontal Power Exhaust 460 volt	150

ACCESSORIES – RHS072–150

MANUAL OUTDOOR AIR DAMPERS		
Model Number	Description	Use With Model Size
DNMANDPR001A03	25% Open Manual Fresh Air Damper	072
CRMANDPR001A02	50% Open Manual Fresh Air Damper	072
DNMANDPR002A03	25% Open Manual Fresh Air Damper	090 – 120
CRMANDPR002A02	50% Open Manual Fresh Air Damper	090 – 120
CRMANDPR011A00	50% Open Manual Fresh Air Damper	150
MOTORIZED OUTDOOR AIR DAMPERS		
Model Number	Description	Use With Model Size
CRTWOPOS010A00	Motorized 2 position outdoor air damper (25–100% Outdoor Air)	072
CRTWOPOS011A00	Motorized 2 position outdoor air damper	090 – 120
CRTWOPOS014A00	Motorized 2 position outdoor air damper	150
ECONOMIZER SENSORS		
Model Number	Description	Use With Model Size
DNTEMPSN002A00	Outdoor or Return Dry Bulb Temperature Sensor used with Electro–Mechanical control.	ALL Economizers
DNCBDIOX005A00	CO ₂ Sensor for use in return airstream. Also includes Aspirator Box required for Duct Mounting.	ALL Economizers
DNENTDIF004A00	Return Air Enthalpy Sensor used with Electro–Mechanical controls, use with AXB078ENT for differential enthalpy control.	ALL Economizers
AXB078ENT	Economizer Differential Enthalpy Control Upgrade	ALL Economizers
CONTROL UPGRADE KITS		
Model Number	Description	Use With Model Size
DNSTATUS001A00	Fan/Filter Status Switch – Indicator light not included	072 – 150
NRTIMEGD001A00	Time Guard II – Automatically prevents the compressor from restarting for at least 4 minutes and 45 seconds after shutdown of the compressor. Not required when a corporate programmable thermostat is applied or the commercial thermostat has a minimum 5 min time delay between cooling cycles available	072 – 150
11781842 ²	Remote keyed attenuator / test / reset station for use with factory installed smoke detectors. Includes power, alarm & trouble indicator lights.	072 – 150
DNPHASE3001A01	Phase Monitor Control – Provides phase loss/phase reversal protection (3 phase models only)	072 – 150
575V TRANSFORMER		
Model Number	Description	Use With Model Size
1171494 ²	Transformer for conversion from 575v to 208/230v power exhaust applications.	072 – 150

² Available from Fast parts.

ACCESSORIES – RHS072–150 (cont.)

LOW AMBIENT CONTROLS*		
Model Number	Description	Use With Model Size
32LT900301 ¹	Motormaster I Single-Phase Solid-State Variable Speed Motor Controller enables cooling down to -20° F by varying the speed on the condenser fan.	072 – 120 208/203–3–60
32LT900611 ¹	MotorMaster I Single-Phase Solid-State Variable Speed Motor Controller enables cooling down to -20° F by varying the speed on the condenser fan.	072 – 120 460–3–60, 575–3–60
CPLOWAMB001A00	Motormaster® II Low Ambient Control – Enables cooling system to operate down to 0° F by cycling condenser fan on and off. The control is activated by a temperature sensor. No motor change-out required.	072 – 120 208/203–3–60, 460–3–60
CRLOWAMB030A00 ³	Motormaster V Low Ambient Kit. Mechanical cooling operation down to -20° F (- 29° C)	120 208/230–3–60
CRLOWAMB031A00 ³	Motormaster V Low Ambient Kit. Mechanical cooling operation down to -20° F (- 29° C)	120 460–3–60
CRLOWAMB032A00 ³	Motormaster V Low Ambient Kit. Mechanical cooling operation down to -20° F (- 29° C).	120 575–3–60
CRLOWAMB039A00	Motormaster I Low Ambient Kit. Mechanical cooling operation down to -20° F (- 29° C). Kit includes 3 motors, MotorMaster controller, wiring label, and required wire ties and connectors. CRLWHPK001A00 also required.	150 208/203–3–60
CRLOWAMB040A00	Motormaster I Low Ambient Kit. Mechanical cooling operation down to -20° F (- 29° C). Kit includes 3 motors, MotorMaster controller, wiring label, and required wire ties and connectors) 575 Volt models also require CRTRXKIT002A00. CRLWHPK001A00 also required	150 460–3–60, 575–3–60
CRLWHPKT001A00	Low Ambient Heat Pump Relay Kit – This kit provides the necessary relay and hardware required for heat pump duty MotorMaster I operation. Typically separate field installed relay and relay base, now all combined into one.	All 150
CRTRXKIT002A00	Motormaster I Low Ambient Control – Transformer Kit. Must use in conjunction with CRLOWAMB040A00 if used on 575–3–60 volt models.	150 575–3–60
THROUGH-THE-BOTTOM/CURB POWER CONNECTION		
Model Number	Description	Use With Model Size
CRBTMPWR001A01	Thru-the-bottom electrical connections and thru-the-curb (not thru-the-bottom) gas connections	072
CRBTMPWR002A01		090 – 120
CRBTMPWR003A01	Thru-the-bottom power, control, and gas connections	072
CRBTMPWR004A01		090 – 120
CRBTMPWR005A00		150
CRBTMPWR006A00		150
CRBTMPWR007A00		150
LOUVERED HAIL GUARDS – CONDENSER COIL		
Model Number	Description	Use With Model Size
DNLVHLGD013A00	Louvered Condenser Coil Hail Guard – Includes louvered panel(s) to protect condenser coil from damage and vandalism.	072
DNLVHLGD004A00		090 – 120
DNLVHLGD024A00		150
RHS150 SPECIFIC ACCESSORIES		
Model Number	Description	Use With Model Size
CRDISBKT001A00	Disconnect Switch Bracket	150
CRDUCTCV001A00	Supply Duct Cover	150

See pages 13 to 17 for Electric heater and single point wiring kit models and usage.

* See usage tables in kit instructions.

¹ Requires motor change out.

² Available from Fast parts.

³ No motor change is required on these specific models

Field supplied relay also required when using with 120 size heat pumps: Relay Base (1179470), Relay (1179471)

Table 2 – AHRI COOLING RATING TABLE

UNIT RHS	NOM. CAPACITY (TONS)	NET COOLING CAPACITY (BTUH)	TOTAL POWER (KW)	SEER	EER	IEER
072	6	70,000	6.3	N/A	11.10	12.2
090	7.5	88,000	7.8	N/A	11.20	12.2
102	8.5	99,000	8.8	N/A	11.20	12.2
120	10	117,000	10.6	N/A	11.00	11.3
150	12.5	142,000	13.3	N/A	10.60	10.7

NOTE:

All AHRI ratings are based on 230, 460 and 575 volt.

* Electric Drive (direct drive) X13 5 speed/torque motor. SEER rating is 13.0 for belt drive.

NA Not applicable

Table 2 – AHRI HEATING RATING TABLE

UNIT RHS	HSPF	HEATING LOW		HEATING HIGH	
		CAPACITY (BTUH)	COP	CAPACITY (BTUH)	COP
072	N/A	34,800	2.25	67,000	3.30
090	N/A	48,000	2.25	86,000	3.30
102	N/A	54,500	2.25	96,000	3.30
120	N/A	62,300	2.25	116,000	3.30
150	N/A	76,000	2.05	142,000	3.20

LEGEND

- AHRI – Air-Conditioning, Heating & Refrigeration Institute
- ASHRAE – American Society of Heating, Refrigerating and Air Conditioning, Inc.
- EER – Energy Efficiency Ratio
- IEER – Integrated Energy Efficiency Ratio
- SEER – Seasonal Energy Efficiency Ratio
- IPLV – Integrated Part Load Value

NOTES:

1. Rated and certified under AHRI Standard 210/240-06 or 340/360-04, as appropriate.
2. Ratings are based on:
Cooling Standard: 80°F (27°C) db, 67°F (19°C) wb indoor air temp and 95°F (35°C) db outdoor air temp.
IPLV Standard: 80°F (27°C) db, 67°F (19°C) wb indoor air temp and 80°F (27°C) db outdoor air temp.
3. All RHS units comply with ASHRAE 90.1 2001, 2004 Energy Standard for minimum SEER and EER requirements.
4. RHS units comply with US Energy Policy Act (2005). To evaluate code compliance requirements, refer to state and local codes or visit the following website: <http://bcap-energy.org>.



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Table 3 – MINIMUM – MAXIMUM AIRFLOWS ELECTRIC HEAT

UNIT RHS	COOLING		ELECTRIC HEATERS	
	Minimum	Maximum	Minimum	Maximum
072	1800	3000	1800	3000
090	2250	3750	2250*	3750
102	2550	4250	2250*	4250
120	3000	4000	3000	4000
150	3750	6250	3750	6250

***Minimum electric heat CFM exceptions:**

UNIT RHS	UNIT VOLTAGE	HEATER kW	UNIT CONFIGURATION	REQUIRED MINIMUM CFM
090 – 102	575	17.0	Horizontal or Vertical	2800
		34.0		2350

Table 4 – SOUND PERFORMANCE TABLE

UNIT RHS	OUTDOOR SOUND (dB)								
	A-Weighted	63	125	250	500	1000	2000	4000	8000
072	78	88.0	79.5	76.2	75.8	72.5	68.6	65.7	62.4
090	82	89.7	81.5	80.5	79.2	77.1	73.2	70.2	67.4
102	84	90.8	85.2	81.6	79.5	78.1	74.0	70.4	66.5
120	87	88.1	90.0	85.9	83.0	81.6	78.5	76.4	75.5
150	83	89.3	85.2	80.3	78.0	77.0	74.4	73.7	68.9

LEGEND

dB – Decibel

NOTES:

1. Outdoor sound data is measure in accordance with AHRI standard 270–95.
2. Measurements are expressed in terms of sound power. Do not compare these values to sound pressure values because sound pressure depends on specific environmental factors which normally do not match individual applications. Sound power values are independent of the environment and therefore more accurate.
3. A-weighted sound ratings filter out very high and very low frequencies, to better approximate the response of “average” human ear. A-weighted measurements are taken in accordance with AHRI standard 270–95.

Table 5 – PHYSICAL DATA (COOLING) 6 TONS

		RHS072
Refrigeration System		
# Circuits / # Comp. / Type		1 / 1 / Scroll
R-410A charge per circuit A/B (lbs-oz)		16 – 13 / –
Oil A/B (oz)		56 / –
Metering Device		Fixed Orifice
High-pressure Trip / Reset (psig)		630 / 505
Loss of Charge Pressure Trip / Reset (psig)		27 / 44
Evap. Coil		
Material		Cu / Al
Coil type		3/8" RTPF
Rows / FPI		4/ 15
Total Face Area (ft ²)		7.3
Condensate Drain Conn. Size		3/4"
Evap. Fan and Motor		
Standard Static 3 phase	Motor Qty / Drive Type	1 / Belt
	Max BHP	1.5
	RPM Range	878–1192
	Motor Frame Size	56
	Fan Qty / Type	1 / Centrifugal
	Fan Diameter x Length (in)	10 x 10
Medium Static 3 phase	Motor Qty / Drive Type	1 / Belt
	Max BHP	2.9
	RPM Range	1066–1380
	Motor Frame Size	56
	Fan Qty / Type	1 / Centrifugal
	Fan Diameter x Length (in)	10 x 10
High Static 3 phase	Motor Qty / Drive Type	1 / Belt
	Max BHP	2.9
	RPM Range	1208–1639
	Motor Frame Size	56
	Fan Qty / Type	1 / Centrifugal
	Fan Diameter x Length (in)	10 x 10
Cond. Coil		
Material		Cu / Al
Coil type		3/8" RTPF*
Rows / FPI		2 / 17
Total Face Area (ft ²)		21.25
Cond. fan / motor		
Qty / Motor Drive Type		1 / direct
Motor HP / RPM		1/4 / 1100
Fan diameter (in)		22
Filters		
RA Filter # / Size (in)		4 / 16 x 16 x 2
OA inlet screen # / Size (in)		1 / 20 x 24 x 1

* RTPF = Round tube plate fin coil design.

Table 5 – (cont.) PHYSICAL DATA (COOLING) 7.5 – 12.5 TONS

		RHS090	RHS102	RHS120	RHS150
Refrigeration System					
# Circuits / # Comp. / Type		2 / 2 / Scroll	2 / 2 / Scroll	2 / 2 / Scroll	2 / 2 / Scroll
R-410A charge per circuit A/B (lbs-oz)		10 – 3 / 10 – 3	11 – 2 / 11 – 2	12 – 2 / 11 – 2	14 – 8 / 13 – 8
Metering Device			Fixed Orifice		
High-pressure Trip / Reset (psig)		630 / 505	630 / 505	630 / 505	630 / 505
Loss of Charge Pressure Trip / Reset (psig)		27 / 44	27 / 44	27 / 44	27 / 44
Compressor Capacity Staging (%)		50% / 100%	50% / 100%	50% / 100%	50% / 100%
Evap. Coil					
Material		Cu / Al	Cu / Al	Cu / Al	Cu / Al
Coil type		3/8" RTPF	3/8" RTPF	3/8" RTPF	3/8-in RTPF
Rows / FPI		3 / 15	4 / 15	15 / Apr	3 / 15
Total Face Area (ft ²)		11.1	11.1	11.1	17.5
Condensate Drain Conn. Size		3/4"	3/4"	3/4"	3/4"
Evap. Fan and Motor					
Standard Static 3 phase	Motor Qty / Drive Type	1 / Belt	1 / Belt	1 / Belt	1 / Belt
	Max BHP	1.2	1.2	1.2	2.9
	RPM Range	460–652	460–652	460–652	507–676
	Motor Frame Size	56	56	56	56
	Fan Qty / Type	1 / Centrifugal	1 / Centrifugal	1 / Centrifugal	1 / Centrifugal
	Fan Diameter x Length (in)	15 x 15	15 x 15	15 x 15	18 x 18
Medium Static 3 phase	Motor Qty / Drive Type	1 / Belt	1 / Belt	1 / Belt	1 / Belt
	Max BHP	2.9	2.9	2.9	2.9
	RPM Range	591–838	591–838	591–838	634–833
	Motor Frame Size	56	56	56	56
	Fan Qty / Type	1 / Centrifugal	1 / Centrifugal	1 / Centrifugal	1 / Centrifugal
	Fan Diameter x Length (in)	15 x 15	15 x 15	15 x 15	18 x 18
High Static 3 phase	Motor Qty / Drive Type	1 / Belt	1 / Belt	1 / Belt	1 / Belt
	Max BHP	2.9	2.9	2.9	6.1
	RPM Range	838–1084	838–1084	838–1084	792–971
	Motor Frame Size	56	56	56	S184T
	Fan Qty / Type	1 / Centrifugal	1 / Centrifugal	1 / Centrifugal	1 / Centrifugal
	Fan Diameter x Length (in)	15 x 15	15 x 15	15 x 15	18 x 18
Cond. Coil					
Material		Cu / Al	Cu / Al	Cu / Al	Cu / Al
Coil type		3/8" RTPF*	3/8" RTPF*	3/8" RTPF*	3/8-in RTPF
Rows / FPI		2 / 17	2 / 17	3 / 17	2 / 17
Total Face Area (ft ²)		25.1	25.1	25.1	36.1
Cond. fan / motor					
Qty / Motor Drive Type		2 / direct	2 / direct	1 / direct	3 / Direct
Motor HP / RPM		1/4 / 1100	1/4 / 1100	1/4 / 1175	1/4 / 1100
Fan diameter (in)		22.0	22.0	30.0	22
Filters					
RA Filter # / Size (in)		4 / 16 x 20 x 2	4 / 20 x 20 x 2	4 / 20 x 20 x 2	6 / 18 x 24 x 2 2 / 24 x 27 x 1 (Vertical)
OA inlet screen # / Size (in)		1 / 20 x 24 x 1	1 / 20 x 24 x 1	1 / 20 x 24 x 1	1 / 30 x 39 x 1 (Horizontal)

* RTPF = Round tube plate fin coil design.

Table 6 – ELECTRIC HEAT – ELECTRICAL DATA, 6 – 12.5 TONS

Unit	Nominal Volt-Ph-Hz	IFM TYPE	ELECTRIC HEATER PART NUMBER CRHEATERXXXXXX	NOM PWR (kW)	APP PWR (kW)	SINGLE POINT KIT PART NUMBER CRSINGLEXXXXXX	
						WITHOUT C.O. or UNPWRD C.O.	
						WITHOUT P.E.	WITH P.E.
RHS072	208/230-3-60	STD	102A00	6.5	4.9/6.0	-	037A00
			104B00	10.5	7.9/9.6	038A00	038A00
			105A00	16.0	12.0/14.7	038A00	038A00
			104B00,104B00	21.0	15.8/19.3	039A00	039A00
			104B00,105A00	26.5	19.9/24.3	039A00	039A00
		MED	102A00	6.5	4.9/6.0	037A00	037A00
			104B00	10.5	7.9/9.6	038A00	038A00
			105A00	16.0	12.0/14.7	038A00	038A00
			104B00,104B00	21.0	15.8/19.3	039A00	039A00
			104B00,105A00	26.5	19.9/24.3	039A00	039A00
		HIGH	102A00	6.5	4.9/6.0	037A00	037A00
			104B00	10.5	7.9/9.6	038A00	038A00
			105A00	16.0	12.0/14.7	038A00	038A00
			104B00,104B00	21.0	15.8/19.3	039A00	039A00
			104B00,105A00	26.5	19.9/24.3	039A00	039A00
	460-3-60	STD	106A00	6.0	5.5	-	-
			108A00	11.5	10.6	-	-
			109A00	14.0	12.9	-	-
			108A00,108A00	23.0	21.1	037A00	037A00
			108A00,109A00	25.5	23.4	037A00	037A00
		MED	106A00	6.0	5.5	-	-
			108A00	11.5	10.6	-	-
			109A00	14.0	12.9	-	-
			108A00,108A00	23.0	21.1	037A00	037A00
HIGH	106A00	6.0	5.5	-	-		
	108A00	11.5	10.6	-	-		
	109A00	14.0	12.9	-	-		
	108A00,108A00	23.0	21.1	037A00	037A00		
	108A00,109A00	25.5	23.4	037A00	037A00		

LEGEND

- APP PWR – 208 / 230V / 460V / 575V
- C.O. – Convenient outlet
- DD – Electric Drive X13 5 speed/torque motor
- FLA – Full load amps
- IFM – Indoor fan motor
- NOM PWR – 240V / 480V / 600V
- P.E. – Power exhaust
- UNPWRD – Unpowered convenient outlet

Table 6 – (cont.) ELECTRIC HEAT – ELECTRIC DATA 6 – 12.5 TONS

Unit	Nominal Volt-Ph-Hz	IFM TYPE	ELECTRIC HEATER PART NUMBER CRHEATERXXXXXX	NOM PWR (kW)	APP PWR (kW)	SINGLE POINT KIT PART NUMBER CRSINGLEXXXXXX	
						WITHOUT C.O. or UNPWRD C.O.	
						WITHOUT P.E.	WITH P.E.
RHS090 (2-Stage Cool)	208/230-3-60	STD	117A00	10.4	7.8/9.6	049A00	049A00
			110A00	16.0	12.0/14.7	049A00	049A00
			111A00	24.8	18.6/22.8	051A00	051A00
			112A00	32.0	24.0/29.4	051A00	051A00
			112A00,117A00	42.4	31.8/38.9	053A00	053A00
		MED	117A00	10.4	7.8/9.6	049A00	049A00
			110A00	16.0	12.0/14.7	049A00	049A00
			111A00	24.8	18.6/22.8	051A00	051A00
			112A00	32.0	24.0/29.4	051A00	051A00
			112A00,117A00	42.4	31.8/38.9	053A00	053A00
		HIGH	117A00	10.4	7.8/9.6	049A00	049A00
			110A00	16.0	12.0/14.7	049A00	049A00
	111A00		24.8	18.6/22.8	051A00	051A00	
	112A00		32.0	24.0/29.4	051A00	051A00	
	112A00,117A00		42.4	31.8/38.9	053A00	053A00	
	460-3-60	STD	116A00	13.9	12.8	047A00	047A00
			113A00	16.5	15.2	047A00	047A00
			114A00	27.8	25.5	047A00	050A00
			115A00	33.0	30.3	050A00	050A00
			114A00,116A00	41.7	38.3	052A00	052A00
		MED	116A00	13.9	12.8	047A00	047A00
			113A00	16.5	15.2	047A00	047A00
			114A00	27.8	25.5	050A00	050A00
			115A00	33.0	30.3	050A00	050A00
114A00,116A00			41.7	38.3	052A00	052A00	
HIGH		116A00	13.9	12.8	047A00	047A00	
		113A00	16.5	15.2	047A00	047A00	
	114A00	27.8	25.5	050A00	050A00		
	115A00	33.0	30.3	050A00	050A00		
	114A00,116A00	41.7	38.3	052A00	052A00		
575-3-60	STD	118A00	17.0	17.0	047A00	047A00	
		119A00	34.0	34.0	050A00	050A00	
	MED	118A00	17.0	17.0	047A00	047A00	
		119A00	34.0	34.0	050A00	050A00	
	HIGH	118A00	17.0	17.0	047A00	047A00	
		119A00	34.0	34.0	050A00	050A00	

LEGEND

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

Table 6 – (cont.) ELECTRIC HEAT – ELECTRIC DATA 6 – 12.5 TONS

Unit	Nominal Volt-Ph-Hz	IFM TYPE	ELECTRIC HEATER PART NUMBER CRHEATERXXXXXX	NOM PWR (kW)	APP PWR (kW)	SINGLE POINT KIT PART NUMBER CRSINGLEXXXXXX	
						WITHOUT C.O. or UNPWRD C.O.	
						WITHOUT P.E.	WITH P.E.
RHS102 (2-Stage Cool)	208/230-3-60	STD	117A00	10.4	7.8/9.6	049A00	049A00
			110A00	16.0	12.0/14.7	049A00	049A00
			111A00	24.8	18.6/22.8	051A00	051A00
			112A00	32.0	24.0/29.4	051A00	051A00
			112A00,117A00	42.4	31.8/38.9	053A00	053A00
		MED	117A00	10.4	7.8/9.6	049A00	049A00
			110A00	16.0	12.0/14.7	049A00	049A00
			111A00	24.8	18.6/22.8	051A00	051A00
			112A00	32.0	24.0/29.4	051A00	051A00
			112A00,117A00	42.4	31.8/38.9	053A00	053A00
		HIGH	117A00	10.4	7.8/9.6	049A00	049A00
			110A00	16.0	12.0/14.7	049A00	049A00
	111A00		24.8	18.6/22.8	051A00	051A00	
	112A00		32.0	24.0/29.4	051A00	051A00	
	460-3-60	STD	116A00	13.9	12.8	047A00	047A00
			113A00	16.5	15.2	047A00	047A00
			114A00	27.8	25.5	050A00	050A00
			115A00	33.0	30.3	050A00	050A00
			114A00,116A00	41.7	38.3	052A00	052A00
		MED	116A00	13.9	12.8	047A00	047A00
			113A00	16.5	15.2	047A00	047A00
			114A00	27.8	25.5	050A00	050A00
			115A00	33.0	30.3	050A00	050A00
			114A00,116A00	41.7	38.3	052A00	052A00
HIGH		116A00	13.9	12.8	047A00	047A00	
		113A00	16.5	15.2	047A00	047A00	
	114A00	27.8	25.5	050A00	050A00		
	115A00	33.0	30.3	050A00	050A00		
575-3-60	STD	118A00	17.0	17.0	047A00	047A00	
		119A00	34.0	34.0	050A00	050A00	
		118A00	17.0	17.0	047A00	047A00	
	MED	119A00	34.0	34.0	050A00	050A00	
		118A00	17.0	17.0	047A00	047A00	
		119A00	34.0	34.0	050A00	050A00	
	HIGH	118A00	17.0	17.0	047A00	047A00	
		119A00	34.0	34.0	050A00	050A00	
		118A00	17.0	17.0	047A00	047A00	

LEGEND

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

Table 6 – (cont.) ELECTRIC HEAT – ELECTRIC DATA 6 – 12.5 TONS

UNIT	Nominal Volt–Ph–Hz	IFM TYPE	ELECTRIC HEATER PART NUMBER CRHEATERXXXXXX	NOM PWR (kW)	APP PWR (kW)	SINGLE POINT KIT PART NUMBER CRSINGLEXXXXXX	
						WITHOUT C.O. or UNPWRD C.O.	
						WITHOUT P.E.	WITH P.E.
RHS120 (2–Stage Cool)	208/230–3–60	STD	117A00	10.4	7.8/9.6	049A00	049A00
			110A00	16.0	12.0/14.7	049A00	049A00
			112A00	32.0	24.0/29.4	051A00	051A00
			112A00,117A00	42.4	31.8/38.9	053A00	053A00
			112A00,110A00	50.0	37.6/45.9	053A00	053A00
		MED	117A00	10.4	7.8/9.6	049A00	049A00
			110A00	16.0	12.0/14.7	049A00	049A00
			112A00	32.0	24.0/29.4	051A00	051A00
			112A00,117A00	42.4	31.8/38.9	053A00	053A00
			112A00,110A00	50.0	37.6/45.9	053A00	053A00
		HIGH	117A00	10.4	7.8/9.6	051A00	051A00
			110A00	16.0	12.0/14.7	051A00	051A00
	112A00		32.0	24.0/29.4	053A00	053A00	
	112A00,117A00		42.4	31.8/38.9	054A00	054A00	
	112A00,110A00		50.0	37.6/45.9	054A00	054A00	
	460–3–60	STD	116A00	13.9	12.8	047A00	047A00
			113A00	16.5	15.2	047A00	047A00
			115A00	33.0	30.3	050A00	050A00
			114A00,116A00	41.7	38.3	052A00	052A00
			115A00,113A00	50.0	45.9	052A00	052A00
		MED	116A00	13.9	12.8	047A00	047A00
			113A00	16.5	15.2	047A00	047A00
			115A00	33.0	30.3	050A00	050A00
			114A00,116A00	41.7	38.3	052A00	052A00
115A00,113A00			50.0	45.9	052A00	052A00	
HIGH		116A00	13.9	12.8	047A00	047A00	
		113A00	16.5	15.2	047A00	047A00	
	115A00	33.0	30.3	050A00	050A00		
	114A00,116A00	41.7	38.3	052A00	052A00		
	115A00,113A00	50.0	45.9	052A00	052A00		
575–3–60	STD	118A00	17.0	17.0	047A00	047A00	
		119A00	34.0	34.0	050A00	050A00	
		118A00,119A00	51.0	51.0	052A00	052A00	
	MED	118A00	17.0	17.0	047A00	047A00	
		119A00	34.0	34.0	050A00	050A00	
		118A00,119A00	51.0	51.0	052A00	052A00	
	HIGH	118A00	17.0	17.0	047A00	047A00	
		119A00	34.0	34.0	050A00	050A00	
		118A00,119A00	51.0	51.0	052A00	052A00	

LEGEND

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

Table 6 – (cont.) ELECTRIC HEAT – ELECTRIC DATA 6 – 12.5 TONS

Unit	Nominal Volt.–Ph–Hz	IFM TYPE	ELECTRIC HEATER PART NUMBER CRHEATERXXXXXX	NOM PWR (kW)	APP PWR (kW)	SINGLE POINT KIT PART NUMBER CRSINGLEXXXXXX	
						WITHOUT C.O. or UNPWRD C.O.	
						WITHOUT P.E.	WITH P.E.
RHS150 (Two Stage Cool)	208/230–3–60	STD	291A00	16.5	12.4/15.2	051A00	051A00
			288A00,291A00	26.5	19.9/24.3	053A00	053A00
			294A00	33.5	25.2/30.8	053A00	053A00
			288A00,294A00	43.5	32.7/40.0	054A00	054A00
			291A00,294A00	50.0	37.6/45.9	054A00	054A00
		MED	291A00	16.5	12.4/15.2	051A00	051A00
			288A00,291A00	26.5	19.9/24.3	053A00	053A00
			294A00	33.5	25.2/30.8	053A00	053A00
			288A00,294A00	43.5	32.7/40.0	054A00	054A00
			291A00,294A00	50.0	37.6/45.9	054A00	054A00
		HIGH	291A00	16.5	12.4/15.2	051A00	051A00
			288A00,291A00	26.5	19.9/24.3	053A00	053A00
	294A00		33.5	25.2/30.8	053A00	053A00	
	288A00,294A00		43.5	32.7/40.0	054A00	054A00	
	460–3–60	STD	292A00	16.5	15.2	047A00	047A00
			289A00,292A00	26.5	24.3	050A00	050A00
			295A00	33.5	30.8	050A00	050A00
			289A00,295A00	43.5	40.0	052A00	052A00
			292A00,295A00	50.0	45.9	052A00	052A00
		MED	292A00	16.5	15.2	047A00	047A00
			289A00,292A00	26.5	24.3	050A00	050A00
			295A00	33.5	30.8	050A00	050A00
			289A00,295A00	43.5	40.0	052A00	052A00
			292A00,295A00	50.0	45.9	052A00	052A00
HIGH		292A00	16.5	15.2	047A00	050A00	
		289A00,292A00	26.5	24.3	050A00	050A00	
	295A00	33.5	30.8	050A00	050A00		
	289A00,295A00	43.5	40.0	052A00	052A00		
575–3–60	STD	293A00	16.5	15.2	047A00	047A00	
		290A00,293A00	26.5	24.3	047A00	047A00	
		296A00	33.5	30.8	050A00	050A00	
		290A00,296A00	43.5	40.0	052A00	052A00	
		293A00,296A00	50.0	45.9	052A00	052A00	
	MED	293A00	16.5	15.2	047A00	047A00	
		290A00,293A00	26.5	24.3	047A00	047A00	
		296A00	33.5	30.8	050A00	050A00	
		290A00,296A00	43.5	40.0	052A00	052A00	
		293A00,296A00	50.0	45.9	052A00	052A00	
	HIGH	293A00	16.5	15.2	047A00	047A00	
		290A00,293A00	26.5	24.3	047A00	050A00	
296A00		33.5	30.8	050A00	050A00		
290A00,296A00		43.5	40.0	052A00	052A00		
575–3–60	HIGH	293A00	16.5	15.2	047A00	047A00	
		290A00,293A00	26.5	24.3	047A00	050A00	
		296A00	33.5	30.8	050A00	050A00	
		290A00,296A00	43.5	40.0	052A00	052A00	
575–3–60	HIGH	293A00	16.5	15.2	047A00	047A00	
		290A00,293A00	26.5	24.3	047A00	050A00	
		296A00	33.5	30.8	050A00	050A00	
		290A00,296A00	43.5	40.0	052A00	052A00	
575–3–60	HIGH	293A00	16.5	15.2	047A00	047A00	
		290A00,293A00	26.5	24.3	047A00	050A00	
		296A00	33.5	30.8	050A00	050A00	
		290A00,296A00	43.5	40.0	052A00	052A00	
575–3–60	HIGH	293A00	16.5	15.2	047A00	047A00	
		290A00,293A00	26.5	24.3	047A00	050A00	
		296A00	33.5	30.8	050A00	050A00	
		290A00,296A00	43.5	40.0	052A00	052A00	
575–3–60	HIGH	293A00	16.5	15.2	047A00	047A00	
		290A00,293A00	26.5	24.3	047A00	050A00	
		296A00	33.5	30.8	050A00	050A00	
		290A00,296A00	43.5	40.0	052A00	052A00	

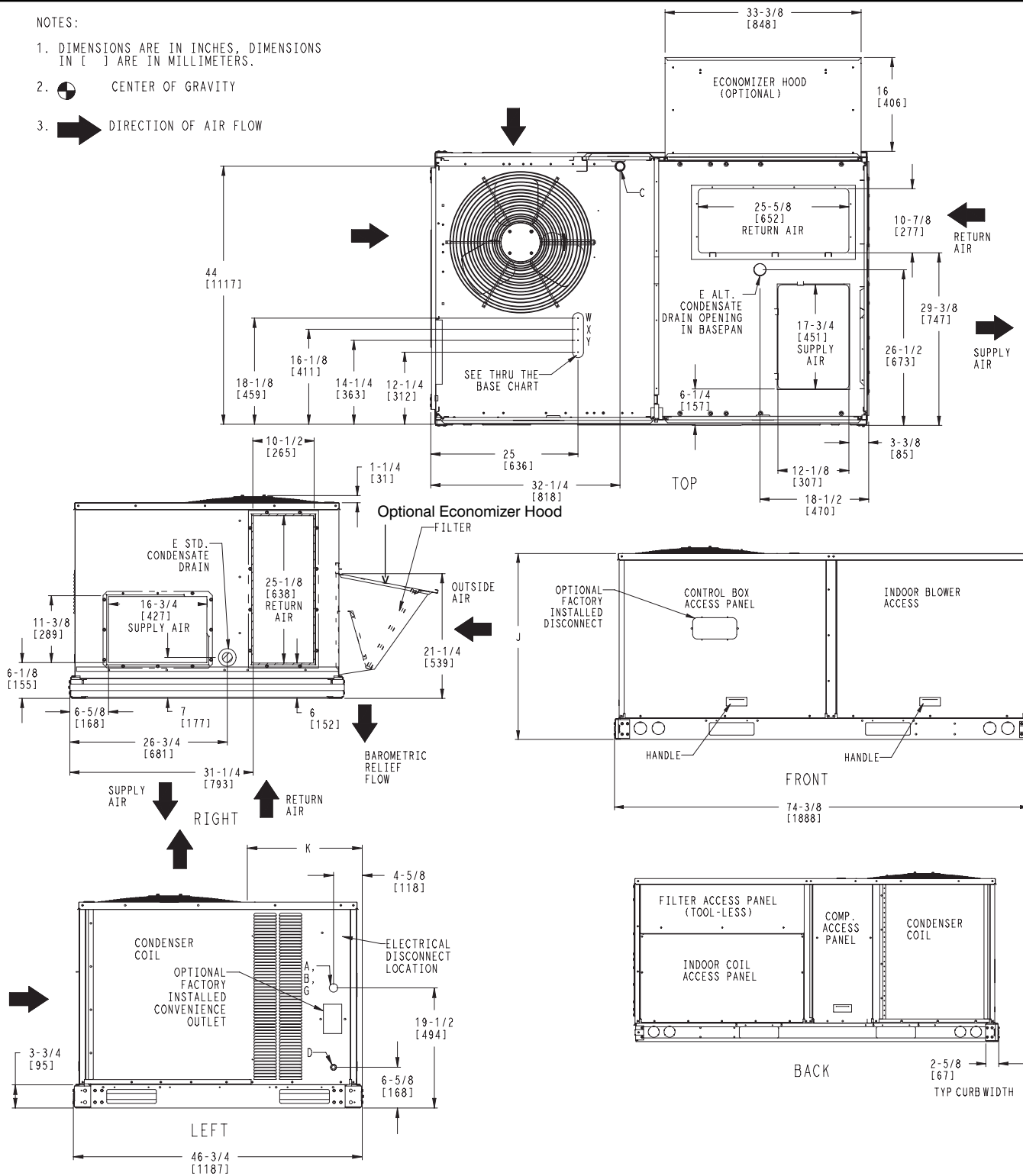
LEGEND

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

BASE UNIT DIMENSIONS – RHS072

NOTES:

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

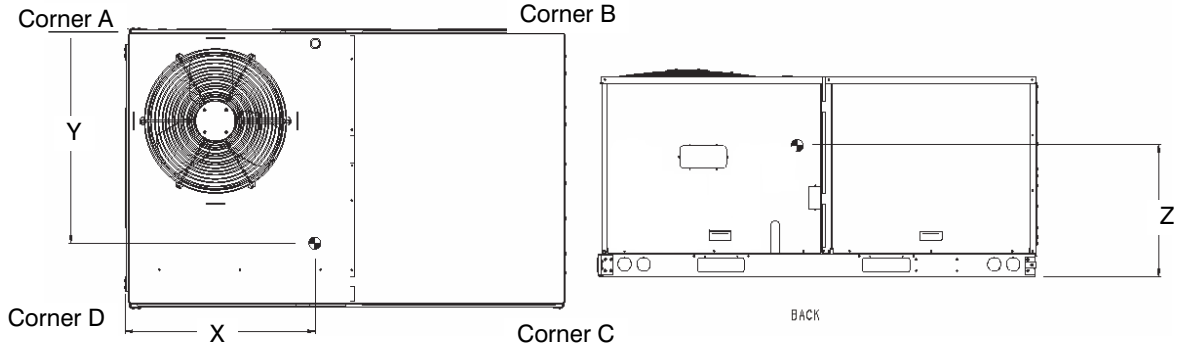


Connection Sizes		Thru the Base Chart These Holes Req'd For Use CRBTMPWR001A01			Unit	J	K
		Threaded Conduit Size	Wire Use	Req'd Hole Sizes (Max.)			
A	1-3/8" [35] DIA Field Power Supply Hole	W	1/2"	Acc.	7/8" [22.2]	072	41-3/8 [1051] 14-7/8 [377]
B	2" [51] DIA Power Supply Knockout	X	1/2"	24V	7/8" [22.2]		
C	1-3/4" [44] DIA Gauge Access Plug	Y*	3/4" (001)	Power*	1-1/8" [28.4]		
D	7/8" [22] DIA Field Control Wiring Hole						
E	3/4" 14 NPT Condensate Drain						
G	2" [51] DIA Power Supply Knockout						

* Select either 3/4" or 1-1/4" for power, depending on wire size.

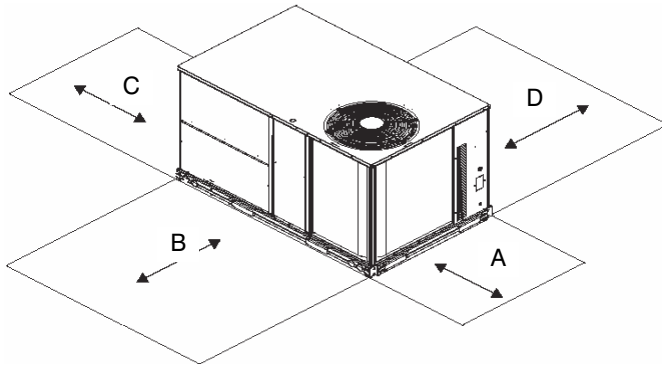
WEIGHTS & DIMENSIONS – RHS072 (cont.)

UNIT	BASE UNIT WEIGHT		Corner Weight A		Corner Weight B		Corner Weight C		Corner Weight D		Center of Gravity In [mm]		
	LBS	KG	LBS	KG	LBS	KG	LBS	KG	LBS	KG	X	Y	Z
RHS072	630	286	166	75	166	75	149	68	149	68	37–1/4 [946]	22–1/8 [562]	20–3/4 [527]



UNIT CLEARANCES

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



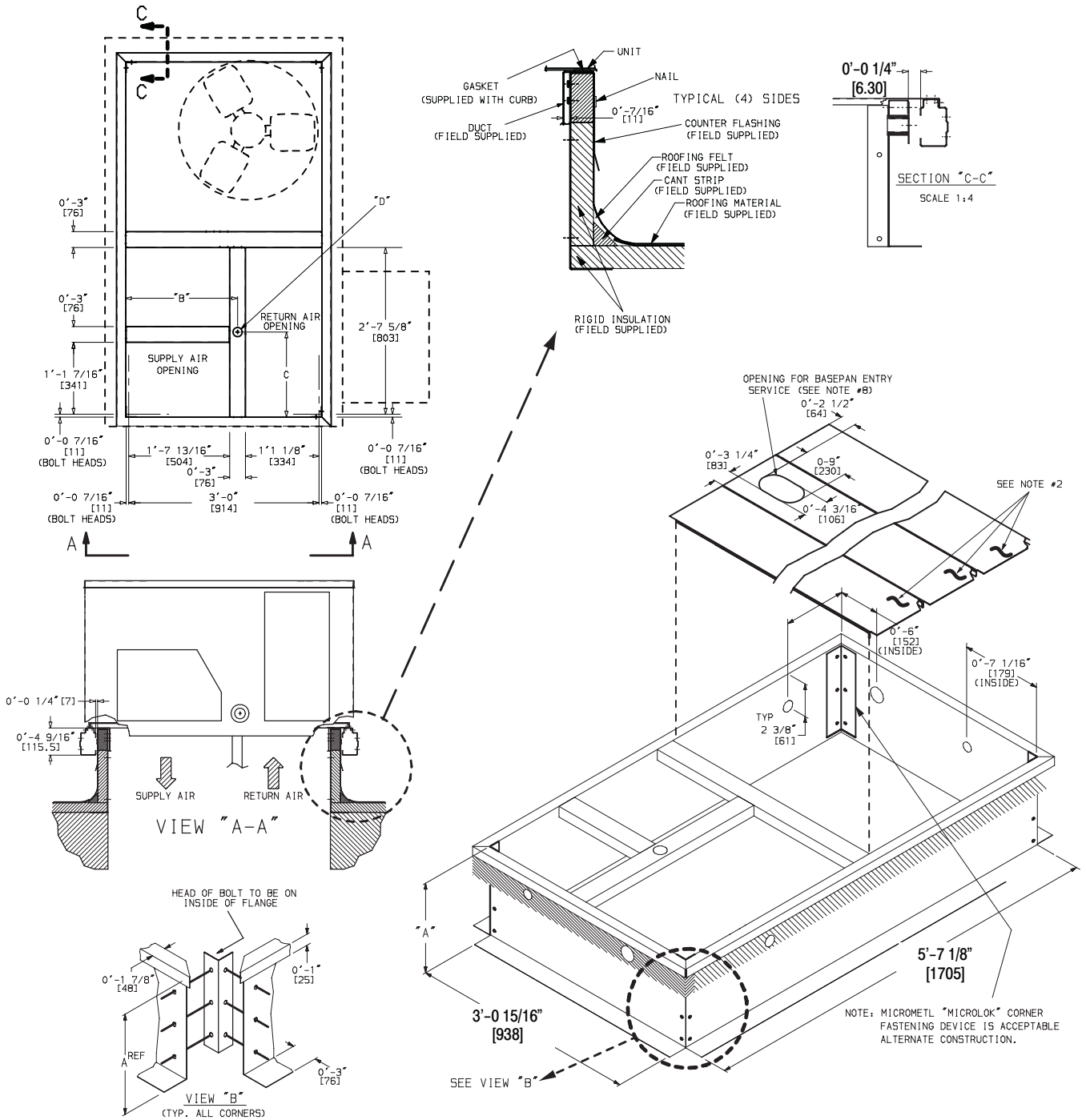
ROOF CURB DETAILS – RHS072

RoofCurb Accessory	A	Unit Size
CRRFCURB001A01	1' 2" [356]	RHS072
CRRFCURB002A01	2' 0" [610]	

NOTES:

1. Roofcurb accessory is shipped disassembled.
2. Insulated panels, 1" thick polyurethane foam, 1-3/4# density.
3. Dimensions in. [] in millimeters.
4. Roofcurb 18 ga steel on 14" curb, 16 ga steel on 24" curb.
5. Attach ductwork to curb (Flanges of duct rest on curb)
6. Service clearance 4' on each side.
7. ➡ Direction of airflow.
8. Connector pkg. CRBTMPWR001A01 and 2A01 are for thru-the-curb connections. Pkg. CRBTMPWR003A01 and 4A01 are for thru-the-bottom connections.

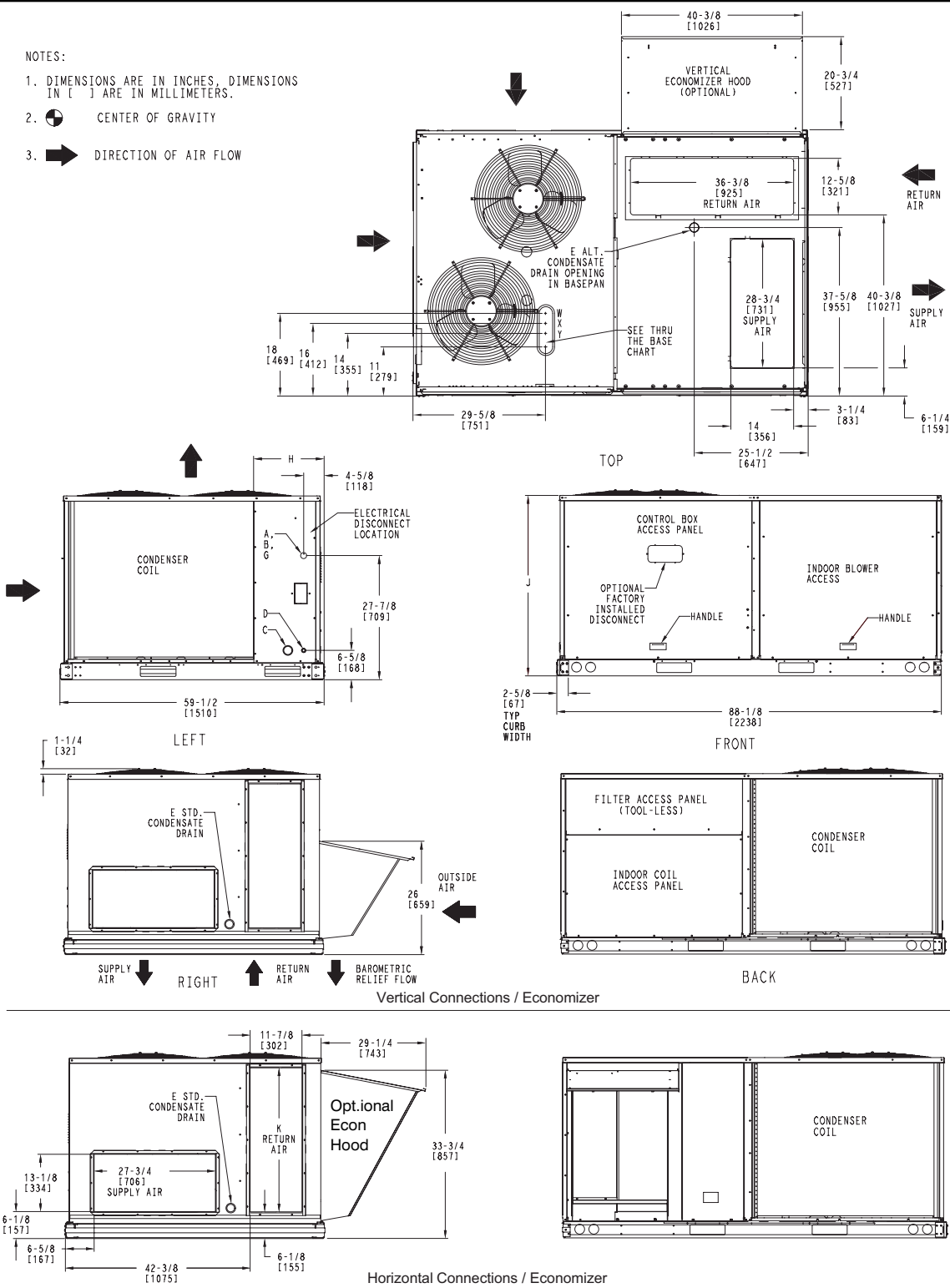
Connector Pkg. Acc.	B	C	D Alt. Drain Hole	Power	Control	Accessory Power
CRBTMPWR001A01	2'-8 ⁷ / ₁₆ " [827]	1'-10 ¹⁵ / ₁₆ " [583]	1-3/4" [44.5]	3/4" [19] NPT	1/2" [12.7] NPT	1/2" [12.7] NPT
CRBTMPWR002A01				3/4" [19] NPT		
CRBTMPWR003A01				1 1/4" [19] NPT		
CRBTMPWR004A01				1 1/4" [19] NPT		



BASE UNIT DIMENSIONS – RHS090–102

NOTES:

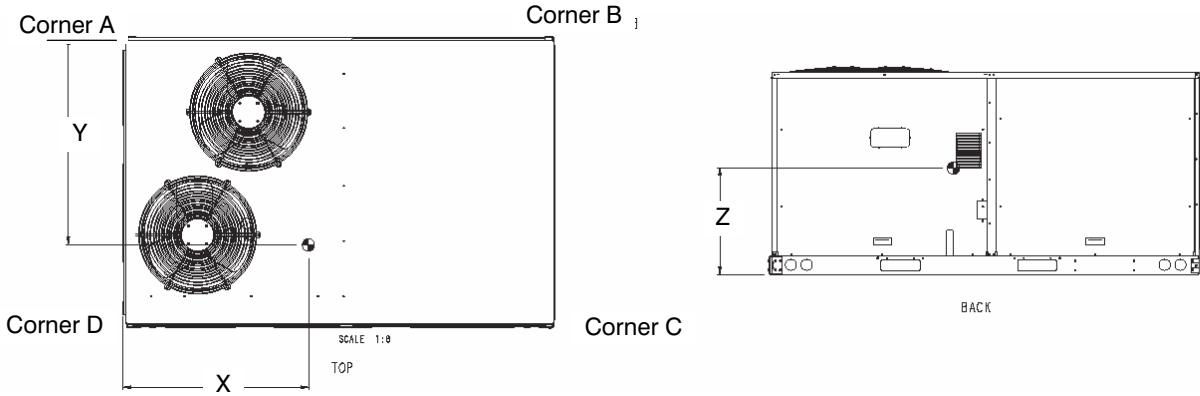
1. DIMENSIONS ARE IN INCHES, DIMENSIONS IN [] ARE IN MILLIMETERS.
2. CENTER OF GRAVITY
3. DIRECTION OF AIR FLOW



Connection Sizes		Thru the Base Chart These Holes Req'd For Use CRBTMPWR002A01			Unit	J	K	H		
		Threaded Conduit Size	Wire Use	Req'd Hole Sizes (Max.)						
A	1-3/8" [35] DIA Field Power Supply Hole	W	1/2"	Acc.	090	49-3/8 [1253]	37-1/4 [946]	23-7/8 [609]		
B	2-1/2" [64] DIA Power Supply Knockout	X	1/2"	24V	102	49-3/8 [1253]	37-1/4 [946]	23-7/8 [609]		
C	1-3/4" [44] DIA Gauge Access Plug	Y	1-1/4" (002)	Power*						
D	7/8" [22] DIA Field Control Wiring Hole	For "Thru-the-Basepan" option, fittings for only X & Y are provided.								
E	3/4" 14 NPT Condensate Drain									
G	2" [51] DIA Power Supply Knockout									

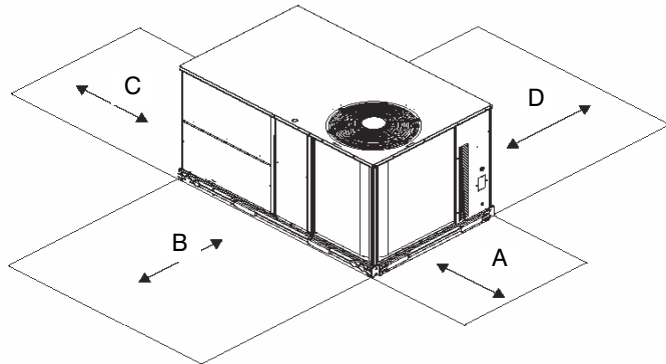
WEIGHT & CLEARANCE DIMENSIONS – RHS090–102 (cont.)

UNIT	BASE UNIT WEIGHT		Corner Weight A		Corner Weight B		Corner Weight C		Corner Weight D		Center of Gravity In [mm]		
	LBS	KG	LBS	KG	LBS	KG	LBS	KG	LBS	KG	X	Y	Z
RHS090	885	401	187	85	158	72	247	112	293	133	40 [1014]	35-1/4 [895]	23-1/2 [597]
RHS102	910	413	200	91	166	75	247	112	297	135	39-5/8 [1006]	34-1/2 [876]	23-1/2 [597]



UNIT CLEARANCES

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



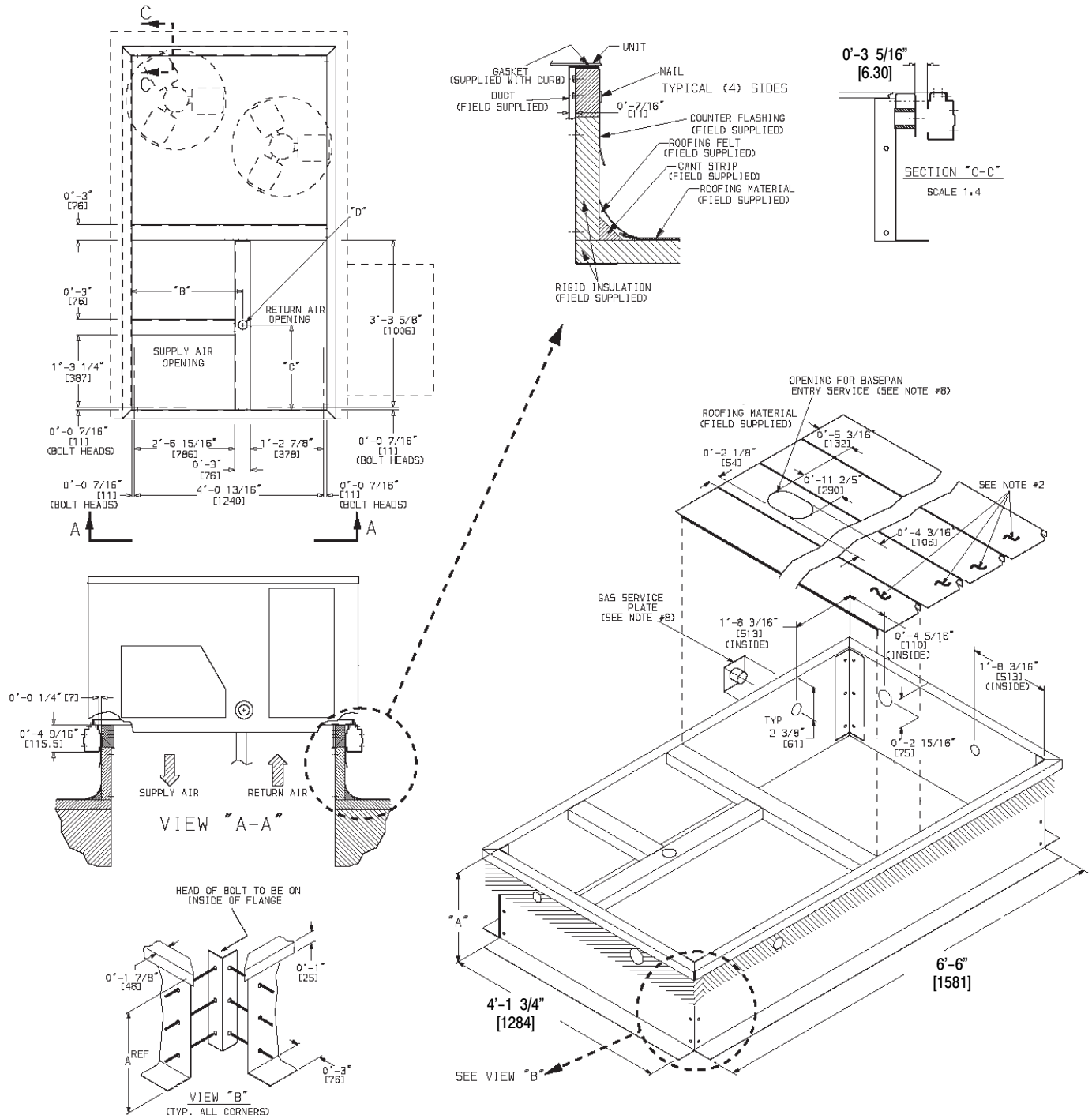
ROOF CURB DETAILS – RHS090 – 102

RoofCurb Accessory	A	Unit Size
CRRFCURB003A01	1' 2" [356]	RHS090-102
CRRFCURB004A01	2' 0" [610]	

NOTES:

1. Roofcurb accessory is shipped disassembled.
2. Insulated panels, 1" thick polyurethane foam, 1-3/4# density.
3. Dimensions in. [] in millimeters.
4. Roofcurb 18 ga steel on 14" curb, 16 ga steel on 24" curb.
5. Attach ductwork to curb (Flanges of duct rest on curb)
6. Service clearance 4" on each side.
7. Direction of airflow.
8. Connector pkg. CRBTMPWR001A01 and 2A01 are for thru-the-curb connections. Pkg. CRBTMPWR003A01 and 4A01 are for thru-the-bottom connections.



Connector Pkg. Acc.	B	C	D Alt. Drain Hole	Power	Control	Accessory Power
CRBTMPWR001A01	2' 8-7/16" [827]	1' 10-15/16" [583]	1-3/4" [44.5]	3/4" [19] NPT	1/2" [12.7] NPT	1/2" [12.7] NPT
CRBTMPWR002A01				1-1/4" [31.7]		
CRBTMPWR003A01				1-1/4" [31.7] NPT		
CRBTMPWR004A01				1-1/4" [31.7] NPT		

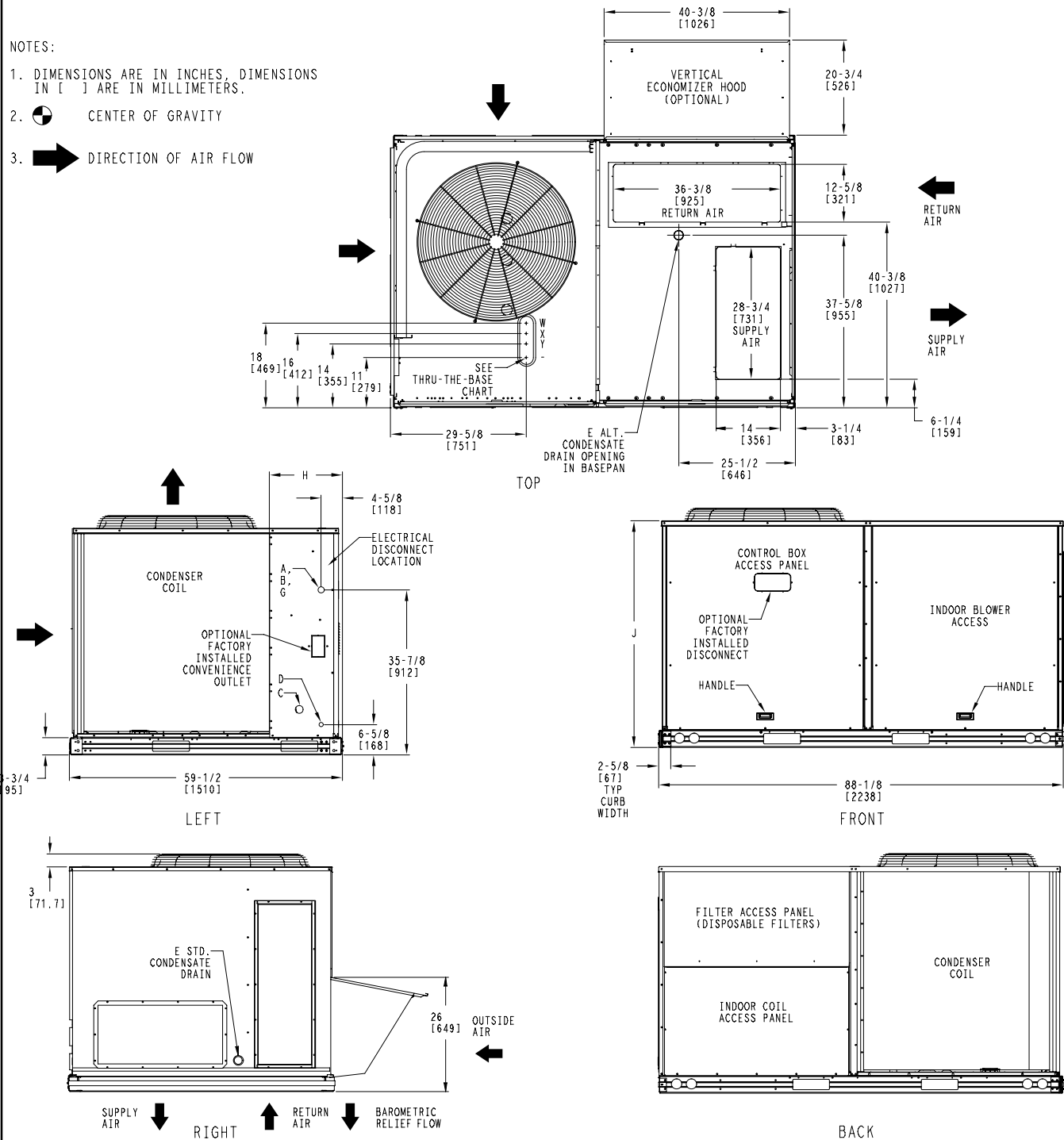


WEIGHT & CLEARANCE DIMENSIONS – RHS120

Vertical Connections / Economizer

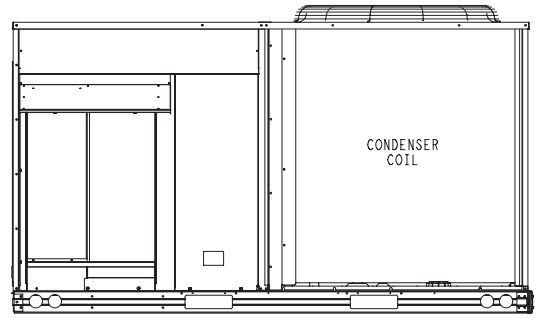
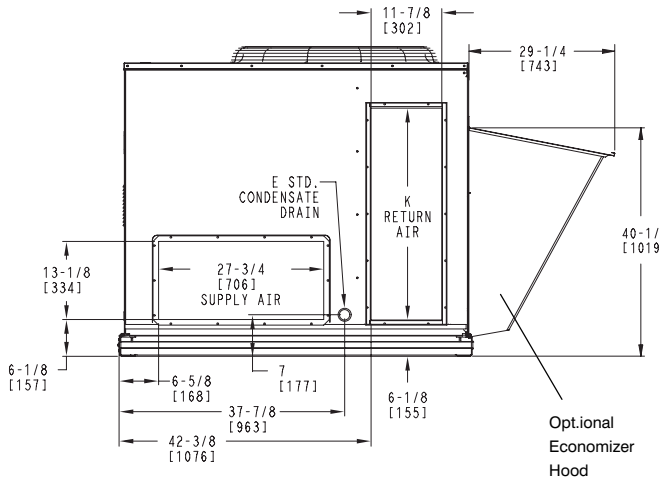
NOTES:

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



WEIGHT & CLEARANCE DIMENSIONS – RHS120 (cont.)

Horizontal Connections / Economizer



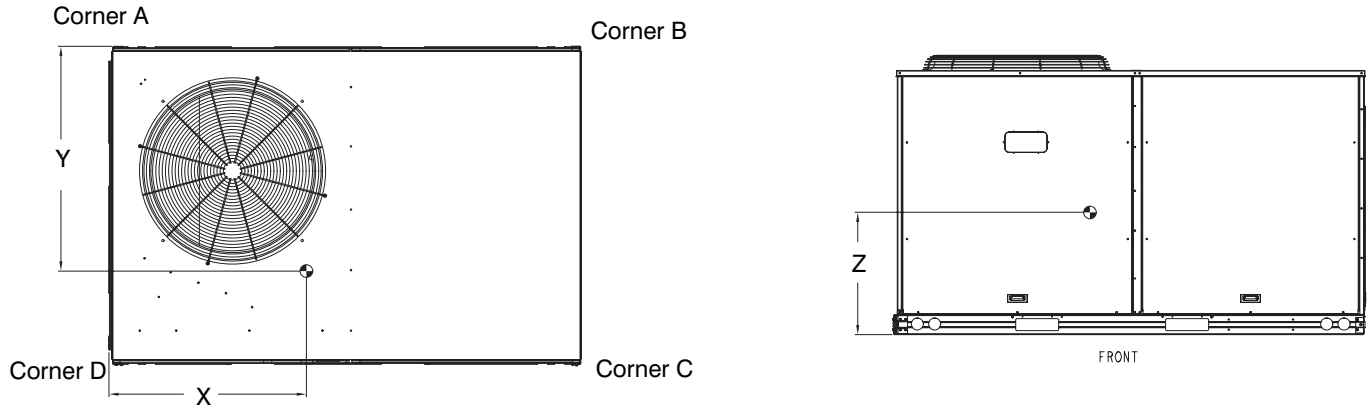
	CONNECTION SIZES
A	1 3/8" [35] DIA FIELD POWER SUPPLY HOLE
B	2 1/2" [64] DIA POWER SUPPLY KNOCKOUT
C	1 3/4" [51] DIA GAUGE ACCESS PLUG
D	7/8" [22] DIA FIELD CONTROL WIRING HOLE
E	3/4"-14 NPT CONDENSATE DRAIN
G	2" [51] DIA POWER SUPPLY KNOCK-OUT

THRU-THE-BASE CHART THESE HOLES REQUIRED FOR USE CRBTMPWR002A01			
	THREADED CONDUIT SIZE	WIRE USE	REQ'D HOLE SIZES (MAX.)
W	1/2"	ACC.	7/8" (22.2)
X	1/2"	24V	7/8" (22.2)
Y	1 1/4" (002)	POWER	1 3/4" (44.4)
FOR "THRU-THE-BASEPAN" FACTORY OPTION, FITTINGS FOR ONLY X & Y ARE PROVIDED			

UNIT	H	J	K
RHS120	15 7/8 [403]	49 3/8 [1253]	36 3/8 [924]

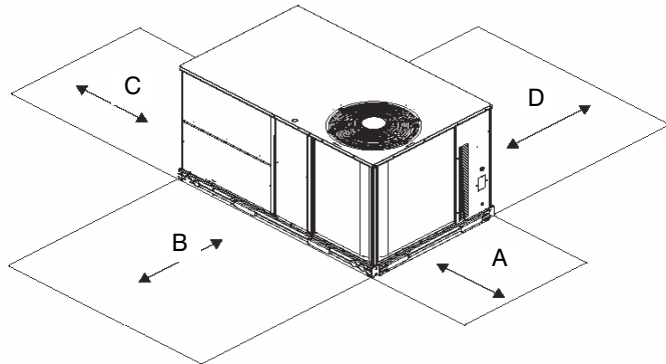
WEIGHT & CLEARANCE DIMENSIONS – RHS120 (cont.)

UNIT	BASE UNIT WEIGHT		Corner Weight A		Corner Weight B		Corner Weight C		Corner Weight D		Center of Gravity In [mm]		
	LBS	KG	LBS	KG	LBS	KG	LBS	KG	LBS	KG	X	Y	Z
RHS120	1050	476	284	129	201	91	234	106	331	150	36-1/2 [927]	32 [813]	23-1/2 [597]



UNIT CLEARANCES

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



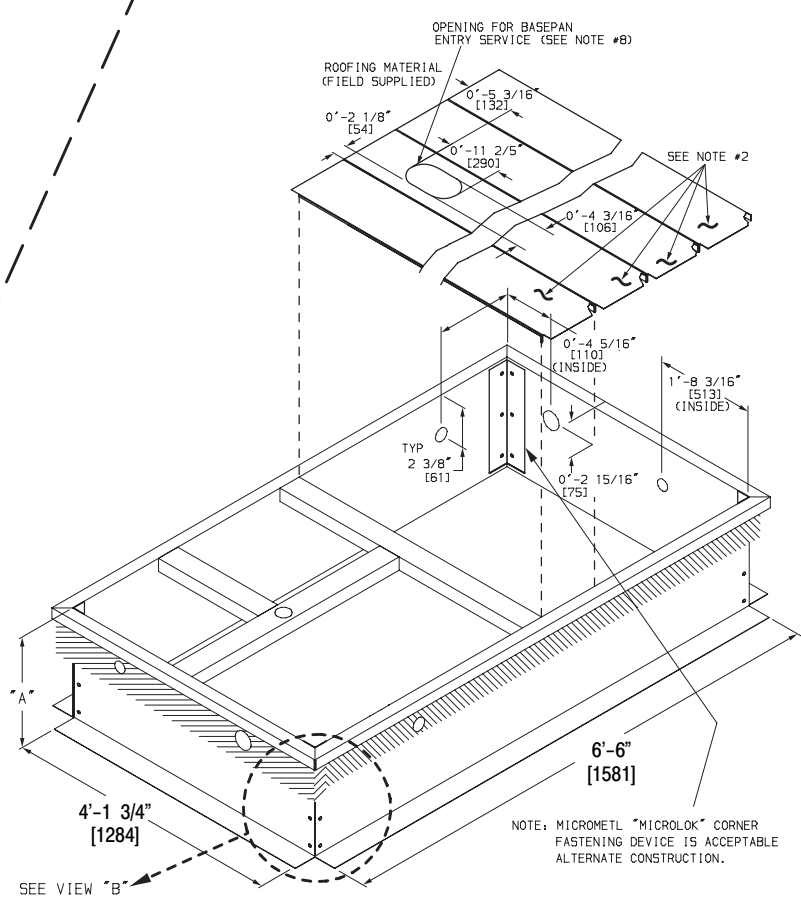
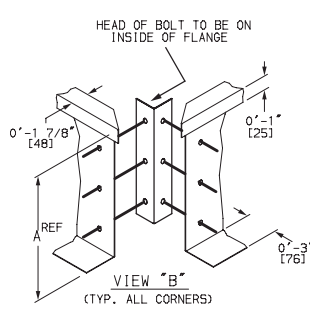
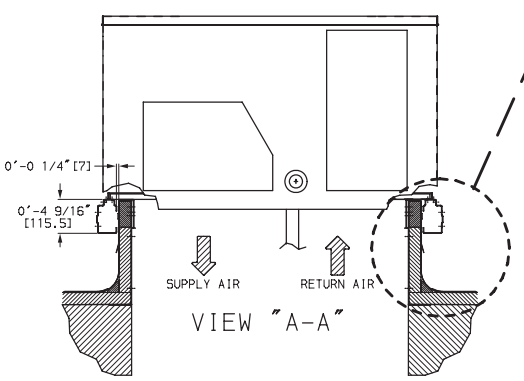
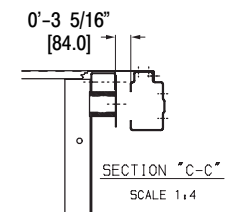
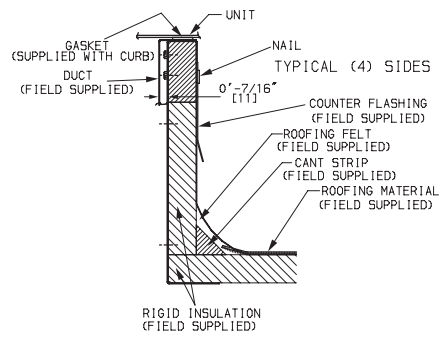
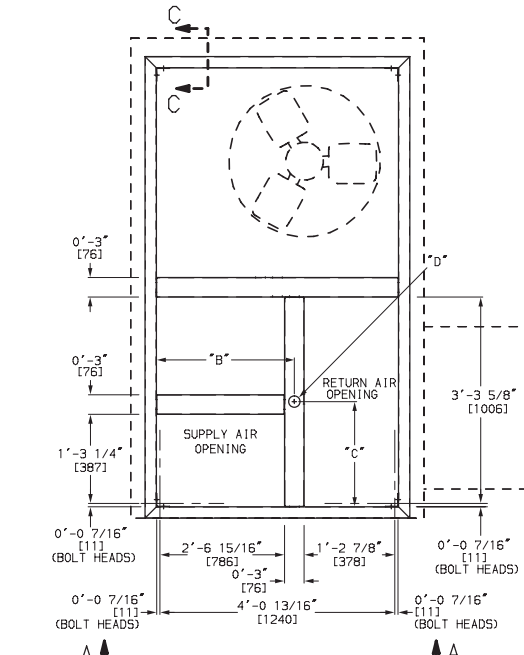
ROOF CURB DETAILS – RHS120

RoofCurb Accessory	A	Unit Size
CRRFCURB003A01	1' 2" [356]	RHS120
CRRFCURB004A01	2' 0" [610]	

NOTES:

1. Roofcurb accessory is shipped disassembled.
2. Insulated panels, 1" thick polyurethane foam, 1-3/4# density.
3. Dimensions in. [] in millimeters.
4. Roofcurb 18 ga steel on 14" curb, 16 ga steel on 24" curb.
5. Attach ductwork to curb (Flanges of duct rest on curb)
6. Service clearance 4' on each side.
7. Direction of airflow.
8. Connector pkg. CRBTMPWR001A01 and 2A01 are for thru-the-curb connections. Pkg. CRBTMPWR003A01 and 4A01 are for thru-the-bottom connections.

Connector Pkg. Acc.	B	C	D Alt. Drain Hole	Power	Control	Accessory Power
CRBTMPWR001A01	2' 8-7/16" [827]	1' 10-15/16" [583]	1-3/4" [44.5]	3/4" [19] NPT	1/2" [12.7] NPT	1/2" [12.7] NPT
CRBTMPWR002A01				1-1/4 [31.7]		
CRBTMPWR003A01				3/4" [19] NPT		
CRBTMPWR004A01				1-1/4" [31.7] NPT		

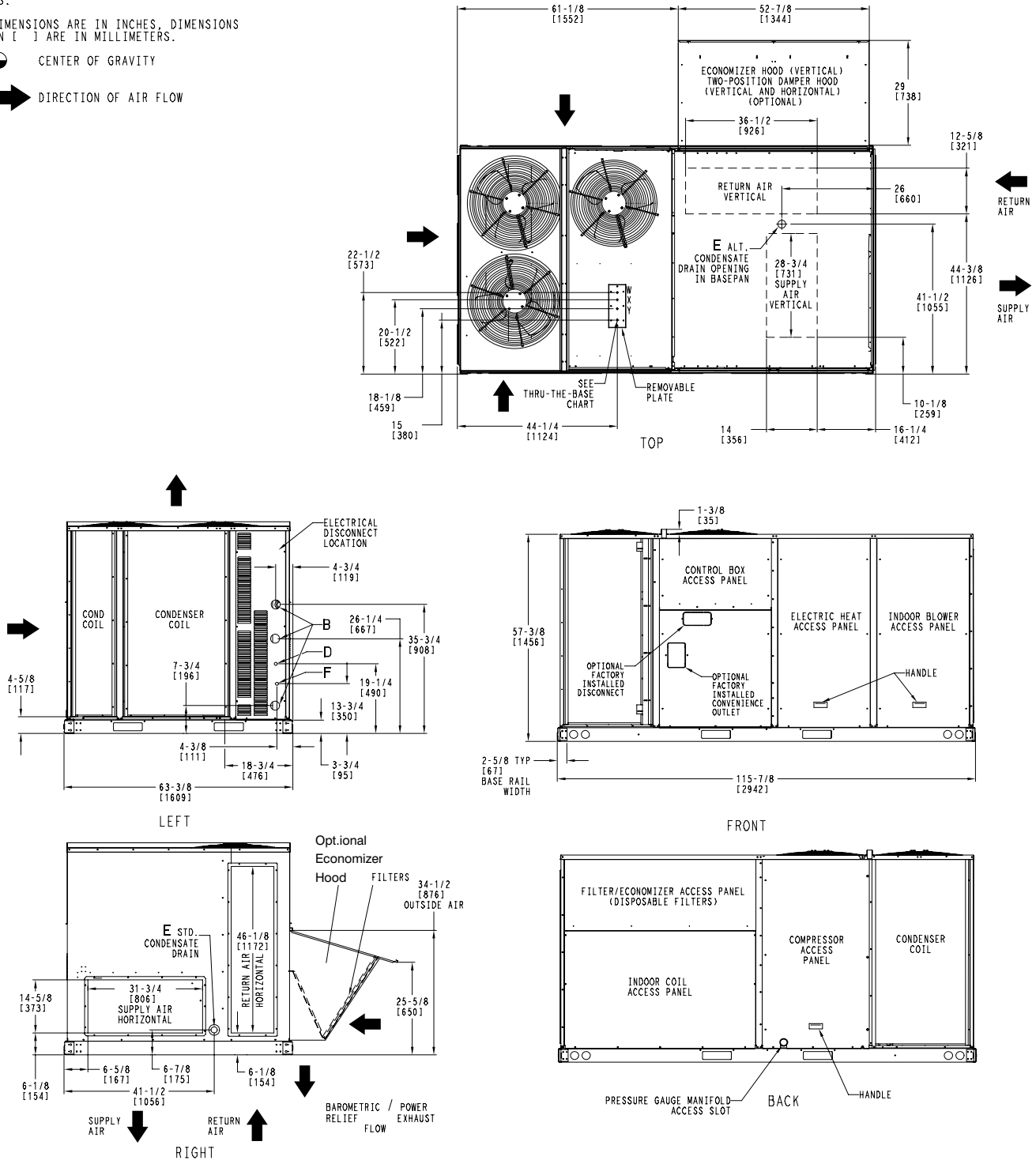


BASE UNIT DIMENSIONS – RHS150

Vertical Connections / Economizer

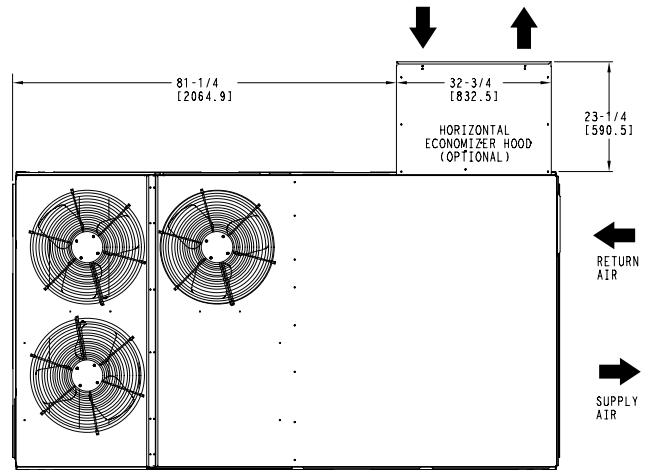
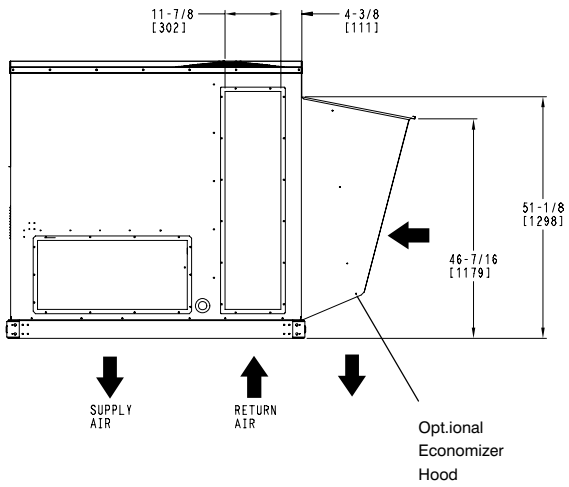
NOTES:

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



BASE UNIT DIMENSIONS – RHS150 (CONT.)

Horizontal Connections / Economizer

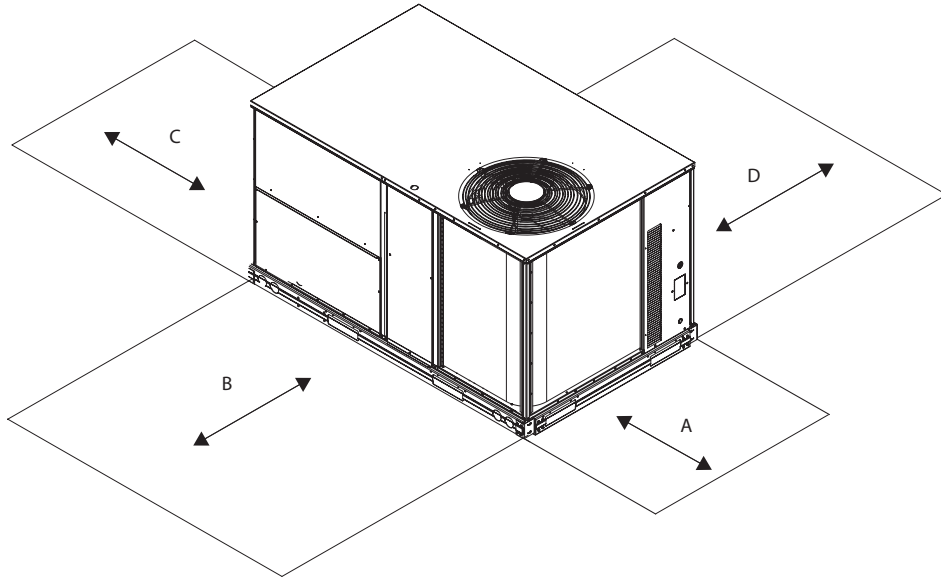
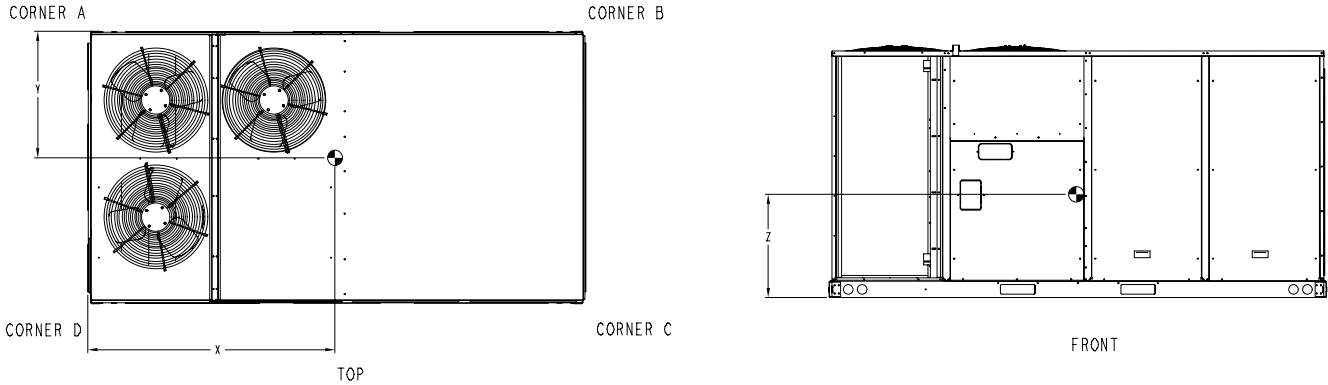


CONNECTION SIZES	
B	2 1/2" [64] DIA POWER SUPPLY HOLE
D	7/8" [22] DIA FIELD CONTROL WIRING HOLE
E	3/4"-14 NPT CONDENSATE DRAIN
F	7/8" [22] DIA FIELD CONVENIENCE OUTLET HOLE

THRU-THE-BASE CHART THESE HOLES REQUIRED FOR USE CRBTMPWR005A00, 006A00, 007A00				
ACCESSORY NO.		THREADED CONDUIT SIZE	WIRE USE	REQ'D HOLE SIZES (MAX.)
005	W	1/2"	ACC.	7/8" [22.2]
	X	1/2"	24V	7/8" [22.2]
	Y	1 1/4"	POWER	1 1/2" [38.1]
006	W	1/2"	ACC.	7/8" [22.2]
	X	1/2"	24V	7/8" [22.2]
	Y	1 1/2"	POWER	2" [50.8]
007	W	1/2"	ACC.	7/8" [22.2]
	X	1/2"	24V	7/8" [22.2]
	Y	2"	POWER	2 1/2" [63.5]
FOR "THRU-THE-BASEPAN" FACTORY OPTION, FITTINGS FOR X & Y ARE PROVIDED AS SPECIFIED ON "006".				

WEIGHT & CLEARANCE DIMENSIONS – RHS150 (cont.)

UNIT	BASE UNIT WEIGHT		Corner Weight A		Corner Weight B		Corner Weight C		Corner Weight D		Center of Gravity In [mm]		
	LBS	KG	LBS	KG	LBS	KG	LBS	KG	LBS	KG	X	Y	Z
RHS150	1370	623	369	168	361	164	316	144	324	147	57-1/2 [1460]	29-1/2 [750]	24[610]



Service Clearance

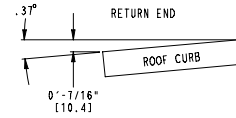
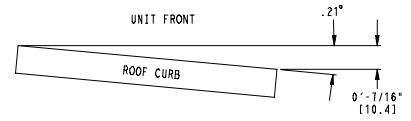
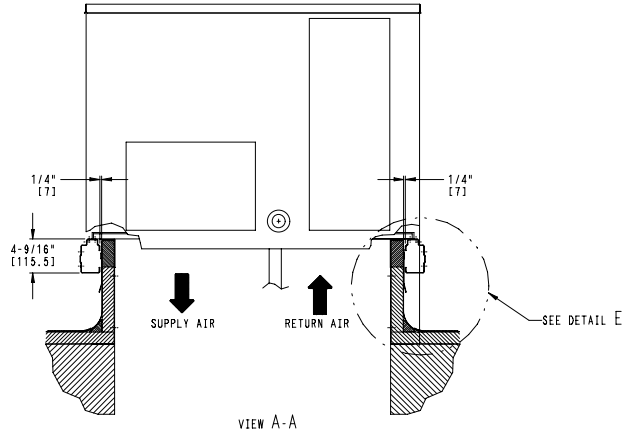
LOC	DIMENSION	CONDITION
A	48-in. (1219 mm)	Unit disconnect is mounted on panel
	18-in. (457 mm)	No disconnect, convenience outlet option
	18-in. (457 mm)	Recommended service clearance
	12-in. (305 mm)	Minimum clearance
B	42-in. (1067 mm)	Surface behind servicer is grounded (e.g., metal, masonry wall)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

WEIGHT & CLEARANCE DIMENSIONS – RHS150 (cont.)

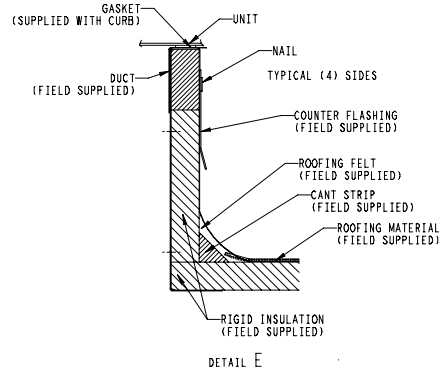
ROOF CURB ACCESSORY #	A
CRRFCURB072A00	14" [356]
CRRFCURB073A00	24" [610]

NOTES:

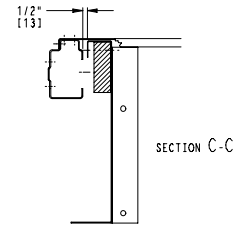
1. ROOFCURB ACCESSORY IS SHIPPED DISASSEMBLED.
2. INSULATED PANELS: 1/2" THK. NEOPRENE FOAM, 1.0# DENSITY.
3. DIMENSIONS IN [] ARE IN MILLIMETERS.
4. ROOFCURB SIDEWALLS: 16 GAGE STEEL.
5. ATTACH DUCTWORK TO CURB. (FLANGES OF DUCT REST ON CURB).
6. SERVICE CLEARANCE 4 FT ON EACH SIDE.
7. DIRECTION OF AIR FLOW.
8. "L" & "S" DESIGNATIONS DENOTE LOCATION OF COMMON CROSS RAIL. (POSITION "S" FOR SMALL DUCT OPENING CURB).



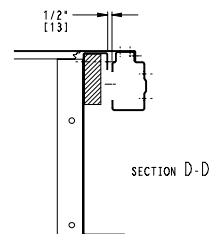
MAX CURB LEVELING TOLERANCES



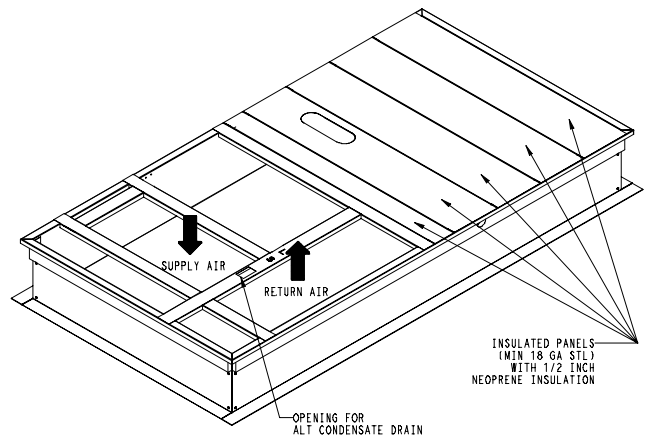
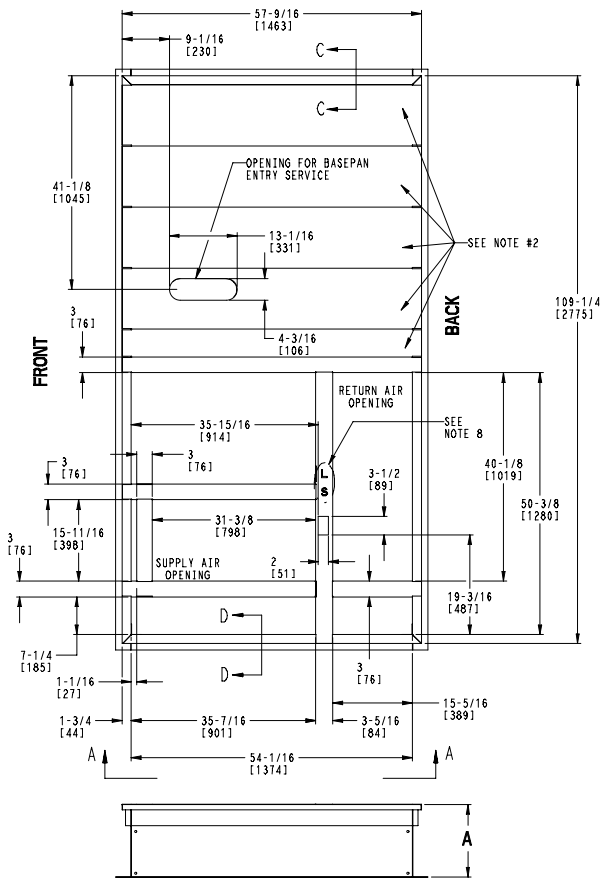
DETAIL E



SECTION C-C



SECTION D-D



APPLICATION DATA

Min operating ambient temp (cooling):

In mechanical cooling mode, your rooftop can safely operate down to an outdoor ambient temperature of 25°F (-4°C), with an accessory winter start kit; 40°F (4°C) standard minimum operating temperature. It is possible to provide cooling at lower outdoor ambient temperatures by using less outside air, economizers, and/or accessory low ambient kits.

Max operating ambient temp (cooling):

The maximum operating ambient temperature for cooling mode is 115°F (46°C). While cooling operation above 115°F (46°C) may be possible, it could cause either a reduction in performance, reliability, or a protective action by the unit's internal safety devices.

Min and max airflow (cooling):

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

Airflow:

All units are draw-through in cooling mode and blow-through in heating mode.

Outdoor air application strategies:

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

Motor limits, break horsepower (BHP):

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

Sizing a rooftop

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

Using higher design temperatures than ASHRAE recommends for your location, adding "safety factors" to the calculated load, are all signs of oversizing air conditioners. Oversizing the air conditioner leads to short cycling (quick on-off cycles) which results in: poor humidity control, reduced efficiency, higher utility bills, larger indoor temperature swings, excessive noise, and increased wear and tear on the air conditioner.

Rather than oversizing an air conditioner, engineers should "right-size" or even slightly undersize air conditioners. Correctly sizing an air conditioner controls humidity better; promotes efficiency; reduces utility bills; extends equipment life, and maintains even, comfortable temperatures. Please contact your local representative for assistance.

Low ambient applications

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

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

Winter start

The accessory winter start kit extends the low ambient limit of your rooftop from 40°F (4°C) to 25°F (-4°C). The kit bypasses the low pressure switch, preventing nuisance tripping of the low pressure switch. Other low ambient precautions may still be prudent.

SELECTION PROCEDURE (WITH RHS072 EXAMPLE)

I. Determine cooling and heating loads.

Given:

Mixed Air Drybulb	80°F
Mixed Air Wetbulb	67°F
Ambient Drybulb	95°F
TC _{Load}	65.0 MBH
SHC _{Load}	46.0 MBH
HC _{Load}	45.0 MBH
Outdoor–Air Winter Design Temp	0°F (–18°C)
Indoor–Air Winter Design Temp	70°F (21°C)
Vertical Supply Air	2100 CFM
External Static Pressure	0.66 in.wg
Electrical Characteristics	230–3–60

II. Make an initial guess at cooling tons.

Refrig. tons = TC_{Load} / 12 MBH per ton
 Refrig. tons = 65.0 / 12 = 5.42 tons
 In this case, start by looking at the RHS072.

III. Look up the rooftop's TC and SHC.

Table 7 shows that, at the application's supply air CFM, mixed air and ambient temperatures, the RHS072 supplies:
 TC_{Load} = 69.0 MBH
 SHC_{Load} = 50.7 MBH.

IV. Calculate the building Latent Heat Load.

LHC_{Load} = TC_{Load} – SHC_{Load}
 LHC_{Load} = 65.0 MBH – 46.0 MBH = 19.0 MBH

V. Select Electric Heat

Enter the Instantaneous and Integrated Heating Ratings, Table 13 at 2100 cfm. At 70°F (21°C) return indoor air and 0°F (–18°C) air entering outdoor coil, the integrated heating capacity after interpolation, is 24,300 Btuh. (Select integrated heating capacity value since deductions for outdoor–coil frost and defrosting have already been made. No correction is required.)

The required heating capacity is 45,000 Btuh. Therefore, 20,700 Btuh (45,000 – 24,300) additional electric heat is required.

Determine additional electric heat capacity in kW.

$$\frac{20,700 \text{ Btuh}}{3413 \text{ Btuh/kW}} = 6.1 \text{ kW of heat required.}$$

Enter the Electric Heating Capacities table for RHS072 at 208/230, 3–phase. The 6.5-kW heater at 230V most closely satisfies the heating required.

$$6.5 \text{ kW} \times 3413 = 22,185 \text{ Btuh}$$

Total unit heating capacity is 46,485 Btuh (22,185 + 24,300).

VI. Calculate RTU Latent Heat Capacity

LHC = TC – SHC
 LHC = 69.0 MBH – 50.7 MBH = 18.3 MBH

VII. Compare RTU capacities to loads.

Compare the rooftop's SHC and LHC to the building's Sensible and Latent Heat Loads.
 See notes 1 and 2.

VIII. Select factory options (FIOP)

Local code requires an economizer for any unit with TC larger than 65.0 MBH.

IX. Calculate the total static pressure.

External static pressure	0.66 in. wg
Sum of FIOP/Accessory static (Table 17)	<u>+0.14 in. wg</u>
Total Static Pressure	0.80 in. wg

X. Look up the Indoor Fan RPM & BHP.

Table 18 shows, at 2100 CFM & ESP= 0.8, RPM = 1268 & BHP = 1.52

XI. Determine electrical requirements

Table 34 shows the MCA and MOCP of a RHS072 (without convenience outlet) with 6.5 kW electric heater as:

MCA = 52.3 amps & MOCP = 60 amps
 Min. Disconnect Size: FLA = 50 & LRA = 199.

Legend

BHP	— Break horsepower
FLA	— Full load amps
HC	— Heating Capacities
LC	— Latent capacity
LRA	— Lock rotor amp
MBH	— (1,000) BTUH
MCA	— Min. circuit ampacity
MOCP	— Max. over–current protection
RPM	— Revolutions per minute
RTU	— Rooftop unit
SHC	— Sensible heat capacity
TC	— Total capacity

NOTES:

- Selecting a unit with a SHC slightly lower than the SHC_{Load} is often better than oversizing. Slightly lower SHC's will help control indoor humidity, and prevent temperature swings.
- If the rooftop's capacity meets the Sensible Heat Load, but not the Latent Heat Load.

Table 7 – COOLING CAPACITIES 1-Stage Cooling 6 TONS

RHS072				AMBIENT TEMPERATURE											
				85			95			105			115		
				EA (dB)			EA (dB)			EA (dB)			EA (dB)		
				75	80	85	75	80	85	75	80	85	75	80	85
1800 Cfm	EAT (wb)	58	TC	61.1	61.1	68.9	58.3	58.3	66.1	55.2	55.2	63.2	51.8	51.8	59.9
			SHC	53.3	61.1	68.9	50.4	58.3	66.1	47.2	55.2	63.2	43.7	51.8	59.9
		62	TC	64.1	64.1	65.2	60.5	60.5	63.6	56.5	56.5	61.8	52.1	52.1	59.7
			SHC	49.6	57.4	65.2	47.8	55.7	63.6	45.8	53.8	61.8	43.4	51.6	59.7
		67	TC	70.8	70.8	70.8	67.2	67.2	67.2	63.1	63.1	63.1	58.6	58.6	58.6
			SHC	40.7	48.5	56.3	39.1	47.0	54.9	37.3	45.3	53.3	35.3	43.5	51.7
		72	TC	77.4	77.4	77.4	73.7	73.7	73.7	69.5	69.5	69.5	64.9	64.9	64.9
			SHC	31.1	38.9	46.7	29.6	37.5	45.5	27.9	36.0	44.0	26.0	34.2	42.5
		76	TC	-	82.0	82.0	-	78.4	78.4	-	73.9	73.9	-	68.8	68.8
			SHC	-	30.9	38.8	-	29.7	37.6	-	28.1	36.2	-	26.4	34.6
2100 Cfm	EAT (wb)	58	TC	64.6	64.6	73.7	61.6	61.6	70.8	58.4	58.4	67.7	54.8	54.8	64.3
			SHC	55.5	64.6	73.7	52.5	61.6	70.8	49.1	58.4	67.7	45.3	54.8	64.3
		62	TC	66.1	66.1	71.7	62.5	62.5	69.9	58.5	58.5	67.8	54.9	54.9	64.4
			SHC	53.4	62.5	71.7	51.5	60.7	69.9	49.2	58.5	67.8	45.3	54.9	64.4
		67	TC	72.8	72.8	72.8	69.0	69.0	69.0	64.8	64.8	64.8	60.2	60.2	60.2
			SHC	43.1	52.2	61.3	41.5	50.7	59.9	39.7	49.1	58.4	37.7	47.3	56.8
		72	TC	79.2	79.2	79.2	75.4	75.4	75.4	71.0	71.0	71.0	66.2	66.2	66.2
			SHC	31.9	41.1	50.2	30.5	39.7	49.0	28.7	38.1	47.5	26.7	36.3	45.9
		76	TC	-	83.1	83.1	-	79.8	79.8	-	75.1	75.1	-	69.7	69.7
			SHC	-	32.0	41.2	-	30.7	39.9	-	29.1	38.5	-	27.3	36.9
2400 Cfm	EAT (wb)	58	TC	67.4	67.4	77.8	64.4	64.4	74.9	61.0	61.0	71.7	57.3	57.3	68.2
			SHC	57.0	67.4	77.8	53.9	64.4	74.9	50.3	61.0	71.7	46.4	57.3	68.2
		62	TC	67.8	67.8	77.4	64.4	64.4	74.9	61.0	61.0	71.7	57.3	57.3	68.3
			SHC	56.5	66.9	77.4	53.9	64.4	74.9	50.3	61.0	71.7	46.4	57.3	68.3
		67	TC	74.3	74.3	74.3	70.4	70.4	70.4	66.1	66.1	66.1	61.4	61.4	61.7
			SHC	45.3	55.7	66.1	43.7	54.2	64.7	41.9	52.6	63.3	39.9	50.8	61.7
		72	TC	80.4	80.4	80.4	76.6	76.6	76.6	72.1	72.1	72.1	67.1	67.1	67.1
			SHC	32.6	43.0	53.4	31.2	41.7	52.3	29.3	40.1	50.8	27.2	38.2	49.2
		76	TC	-	84.0	84.0	-	80.7	80.7	-	76.0	76.0	-	70.4	70.4
			SHC	-	32.6	43.1	-	31.6	42.2	-	30.0	40.8	-	28.1	39.1
2700 Cfm	EAT (wb)	58	TC	69.7	69.7	81.5	66.6	66.6	78.5	63.1	63.1	75.2	59.3	59.3	71.6
			SHC	58.0	69.7	81.5	54.8	66.6	78.5	51.1	63.1	75.2	47.0	59.3	71.6
		62	TC	69.8	69.8	81.5	66.6	66.6	78.4	63.2	63.2	75.2	59.4	59.4	71.7
			SHC	58.0	69.8	81.5	54.8	66.6	78.4	51.2	63.2	75.2	47.1	59.4	71.7
		67	TC	75.4	75.4	75.4	71.4	71.4	71.4	67.1	67.1	67.9	62.3	62.3	66.4
			SHC	47.2	59.0	70.7	45.7	57.6	69.4	43.9	55.9	67.9	41.8	54.1	66.4
		72	TC	81.3	81.3	81.3	77.5	77.5	77.5	72.9	72.9	72.9	67.8	67.8	67.8
			SHC	33.0	44.8	56.5	31.7	43.6	55.5	29.8	41.9	54.0	27.7	40.0	52.4
		76	TC	-	84.9	84.9	-	81.3	81.3	-	76.6	76.6	-	70.8	70.8
			SHC	-	33.4	45.2	-	33.0	44.9	-	30.8	43.0	-	28.8	41.3
3000 Cfm	EAT (wb)	58	TC	71.7	71.7	84.7	68.5	68.5	81.7	64.9	64.9	78.3	61.0	61.0	74.7
			SHC	58.7	71.7	84.7	55.4	68.5	81.7	51.6	64.9	78.3	47.3	61.0	74.7
		62	TC	71.7	71.7	84.8	68.6	68.6	81.7	65.0	65.0	78.3	61.0	61.0	74.7
			SHC	58.7	71.7	84.8	55.4	68.6	81.7	51.6	65.0	78.3	47.4	61.0	74.7
		67	TC	76.4	76.4	76.4	72.3	72.3	73.8	67.9	67.9	72.4	63.0	63.0	70.8
			SHC	49.0	62.1	75.1	47.5	60.7	73.8	45.7	59	72.4	43.4	57.1	70.8
		72	TC	82.0	82.0	82.0	78.2	78.2	78.2	73.5	73.5	73.5	68.2	68.2	68.2
			SHC	33.4	46.5	59.5	32.1	45.3	58.5	30.2	43.6	57.1	28.0	41.7	55.5
		76	TC	-	85.5	85.5	-	81.8	81.8	-	77.1	77.1	-	71.3	71.3
			SHC	-	34.2	47.2	-	33.0	46.3	-	31.6	45.1	-	29.5	43.3

/// = Indicates standard rating point

LEGEND:

- = Do not operate in this region (Points are outside SST and SDT permissible operating range)
- Cfm = Cubic feet per minute (supply air)
- EAT(db) = Entering air temperature (dry bulb)
- EAT(wb) = Entering air temperature (wet bulb)
- SHC = Sensible heat capacity
- TC = Total cooling capacity

Table 8 – COOLING CAPACITIES 2-Stage Cooling 7.5 TONS

RHS090				AMBIENT TEMPERATURE											
				85			95			105			115		
				EA (dB)			EA (dB)			EA (dB)			EA (dB)		
				75	80	85	75	80	85	75	80	85	75	80	85
2250 Cfm	EAT (wb)	58	TC	77.4	77.4	87.8	74.1	74.1	84.1	69.8	69.8	79.2	65.2	65.2	74.1
			SHC	66.9	77.4	87.8	64.0	74.1	84.1	60.3	69.8	79.2	56.4	65.2	74.1
		62	TC	81.8	81.8	83.7	77.2	77.2	81.4	71.9	71.9	78.9	66.6	66.6	75.9
			SHC	60.6	72.1	83.7	58.4	69.9	81.4	55.9	67.4	78.9	53.2	64.5	75.9
		67	TC	90.6	90.6	90.6	86.0	86.0	86.0	80.8	80.8	80.8	75.1	75.1	75.1
			SHC	50.4	62.0	73.5	48.4	60.0	71.6	46.2	57.8	69.3	43.9	55.4	67.0
		72	TC	99.4	99.4	99.4	94.7	94.7	94.7	89.5	89.5	89.5	83.8	83.8	83.8
			SHC	39.6	51.3	62.9	37.7	49.4	61.0	35.8	47.4	59.0	33.6	45.2	56.8
		76	TC	-	105.7	105.7	-	100.8	100.8	-	95.5	95.5	-	89.7	89.7
			SHC	-	42.1	54.5	-	40.4	52.8	-	38.6	50.9	-	36.5	48.8
2625 Cfm	EAT (wb)	58	TC	81.8	81.8	92.8	78.0	78.0	88.6	74.1	74.1	84.2	69.5	69.5	78.9
			SHC	70.7	81.8	92.8	67.5	78.0	88.6	64.1	74.1	84.2	60.1	69.5	78.9
		62	TC	84.7	84.7	91.7	79.9	79.9	89.2	75.2	75.2	86.2	69.8	69.8	81.6
			SHC	65.2	78.5	91.7	62.9	76.1	89.2	60.3	73.3	86.2	56.8	69.2	81.6
		67	TC	93.4	93.4	93.4	88.6	88.6	88.6	83.2	83.2	83.2	77.4	77.4	77.4
			SHC	53.4	66.7	80.1	51.4	64.7	78.1	49.2	62.5	75.9	46.8	60.2	73.5
		72	TC	101.9	101.9	101.9	97.1	97.1	97.1	91.8	91.8	91.8	86.0	86.0	86.0
			SHC	40.8	54.1	67.5	38.9	52.3	65.6	36.9	50.3	63.6	34.8	48.1	61.5
		76	TC	-	107.7	107.7	-	102.6	102.6	-	97.2	97.2	-	91.2	91.2
			SHC	-	43.7	58.1	-	41.9	56.0	-	39.9	53.9	-	37.9	51.6
3000 Cfm	EAT (wb)	58	TC	85.6	85.6	97.2	81.8	81.8	92.9	77.6	77.6	88.0	72.9	72.9	82.8
			SHC	74.1	85.6	97.2	70.7	81.8	92.9	67.1	77.6	88.0	63.0	72.9	82.8
		62	TC	87.0	87.0	98.9	82.5	82.5	95.4	78.0	78.0	90.5	73.3	73.3	85.6
			SHC	69.4	84.1	98.9	66.6	81.0	95.4	63.1	76.8	90.5	59.6	72.6	85.6
		67	TC	95.5	95.5	95.5	90.5	90.5	90.5	85.1	85.1	85.1	79.0	79.0	79.6
			SHC	56.1	71.2	86.2	54.1	69.2	84.2	51.9	67.0	82.1	49.5	64.6	79.6
		72	TC	103.8	103.8	103.8	98.8	98.8	98.8	93.4	93.4	93.4	87.5	87.5	87.5
			SHC	41.8	56.7	71.6	39.9	54.8	69.8	37.9	52.9	67.8	35.8	50.7	65.7
		76	TC	-	109.1	109.1	-	104.0	104.0	-	98.3	98.3	-	92.2	92.2
			SHC	-	44.9	60.6	-	43.1	58.6	-	41.1	56.4	-	39.0	54.2
3375 Cfm	EAT (wb)	58	TC	88.9	88.9	100.9	84.9	84.9	96.4	80.5	80.5	91.4	75.7	75.7	86.0
			SHC	76.9	88.9	100.9	73.4	84.9	96.4	69.6	80.5	91.4	65.5	75.7	86.0
		62	TC	89.6	89.6	103.8	85.1	85.1	100.4	81.0	81.0	94.1	75.8	75.8	89.5
			SHC	72.4	88.1	103.8	69.7	85.0	100.4	65.6	79.8	94.1	62.1	75.8	89.5
		67	TC	97.1	97.1	97.1	92.1	92.1	92.1	86.5	86.5	87.9	80.3	80.3	85.4
			SHC	58.7	75.3	92.0	56.7	73.4	90.1	54.5	71.2	87.9	52.0	68.7	85.4
		72	TC	105.2	105.2	105.2	100.0	100.0	100.0	94.5	94.5	94.5	88.5	88.5	88.5
			SHC	42.6	59.0	75.3	40.7	57.1	73.5	38.8	55.2	71.6	36.6	53.1	69.5
		76	TC	-	110.1	110.1	-	105.0	105.0	-	99.2	99.2	-	92.9	92.9
			SHC	-	45.9	62.8	-	44.1	60.9	-	42.1	58.7	-	40.0	56.4
3750 Cfm	EAT (wb)	58	TC	91.6	91.6	104.0	87.5	87.5	99.4	83.0	83.0	94.3	78.1	78.1	88.7
			SHC	79.2	91.6	104.0	75.7	87.5	99.4	71.8	83.0	94.3	67.6	78.1	88.7
		62	TC	91.7	91.7	108.3	87.7	87.7	103.5	83.1	83.1	98.1	78.2	78.2	92.3
			SHC	75.2	91.7	108.3	71.8	87.7	103.5	68.1	83.1	98.1	64.1	78.2	92.3
		67	TC	98.4	98.4	98.4	93.3	93.3	95.6	87.7	87.7	93.4	81.5	81.5	90.9
			SHC	61.1	79.3	97.5	59.1	77.3	95.6	56.9	75.2	93.4	54.5	72.7	90.9
		72	TC	106.2	106.2	106.2	101.0	101.0	101.0	95.4	95.4	95.4	89.3	89.3	89.3
			SHC	43.4	61.1	78.8	41.5	59.2	76.9	39.5	57.3	75.0	37.4	55.2	73.0
		76	TC	-	111.0	111.0	-	105.8	105.8	-	99.8	99.8	-	93.5	93.5
			SHC	-	46.8	64.9	-	45.1	63.1	-	43.0	60.8	-	40.9	58.4

/// = Indicates standard rating point

LEGEND:

- = Do not operate in this region (Points are outside SST and SDT permissible operating range)
- Cfm = Cubic feet per minute (supply air)
- EAT(db) = Entering air temperature (dry bulb)
- EAT(wb) = Entering air temperature (wet bulb)
- SHC = Sensible heat capacity
- TC = Total cooling capacity

Table 9 – COOLING CAPACITIES 2–Stage Cooling 8.5 TONS

RHS102				AMBIENT TEMPERATURE											
				85			95			105			115		
				EA (dB)			EA (dB)			EA (dB)			EA (dB)		
				75	80	85	75	80	85	75	80	85	75	80	85
2550 Cfm	EAT (wb)	58	TC	91.1	91.1	102.9	86.4	86.4	97.5	81.2	81.2	91.7	75.7	75.7	85.5
			SHC	79.4	91.1	102.9	75.2	86.4	97.5	70.8	81.2	91.7	66.0	75.7	85.5
		62	TC	96.0	96.0	99.4	89.2	89.2	96.4	83.0	83.0	93.4	76.5	76.5	88.0
			SHC	72.7	86.0	99.4	69.6	83.0	96.4	66.7	80.0	93.4	62.4	75.2	88.0
		67	TC	106.4	106.4	106.4	100.4	100.4	100.4	92.9	92.9	92.9	86.0	86.0	86.0
			SHC	60.4	73.8	87.2	57.7	71.1	84.5	54.7	68.1	81.6	51.8	65.2	78.6
		72	TC	117.3	117.3	117.3	111.2	111.2	111.2	104.3	104.3	104.3	97.0	97.0	97.0
			SHC	47.4	60.9	74.4	45.1	58.5	72.0	42.4	55.9	69.4	39.7	53.1	66.6
		76	TC	–	126.1	126.1	–	119.9	119.9	–	113.0	113.0	–	105.6	105.6
			SHC	–	50.3	64.3	–	48.0	61.8	–	45.6	59.4	–	43.0	56.7
2975 Cfm	EAT (wb)	58	TC	96.5	96.5	109.0	91.7	91.7	103.5	86.7	86.7	97.9	80.5	80.5	90.9
			SHC	84.1	96.5	109.0	79.9	91.7	103.5	75.5	86.7	97.9	70.1	80.5	90.9
		62	TC	98.2	98.2	109.0	92.9	92.9	105.4	87.0	87.0	100.5	80.6	80.6	94.5
			SHC	78.1	93.6	109.0	75.1	90.2	105.4	71.3	85.9	100.5	66.7	80.6	94.5
		67	TC	109.5	109.5	109.5	103.0	103.0	103.0	96.3	96.3	96.3	87.6	87.6	87.6
			SHC	64.1	79.6	95.2	61.4	76.9	92.5	58.7	74.3	89.8	55.3	70.9	86.5
		72	TC	120.6	120.6	120.6	114.2	114.2	114.2	107.3	107.3	107.3	99.5	99.5	99.5
			SHC	49.1	64.7	80.3	46.7	62.3	77.9	44.1	59.7	75.3	41.3	56.9	72.5
		76	TC	–	129.2	129.2	–	122.9	122.9	–	115.7	115.7	–	108.1	108.1
			SHC	–	52.3	68.4	–	50.0	65.8	–	47.6	63.5	–	45.0	60.8
3400 Cfm	EAT (wb)	58	TC	101.0	101.0	114.0	96.7	96.7	109.1	90.9	90.9	102.6	84.9	84.9	95.8
			SHC	88.0	101.0	114.0	84.2	96.7	109.1	79.2	90.9	102.6	74.0	84.9	95.8
		62	TC	102.3	102.3	116.5	96.9	96.9	112.5	90.7	90.7	106.3	84.6	84.6	99.1
			SHC	82.9	99.7	116.5	79.7	96.1	112.5	75.1	90.7	106.3	70.0	84.6	99.1
		67	TC	112.1	112.1	112.1	105.5	105.5	105.5	98.4	98.4	98.4	90.8	90.8	94.2
			SHC	67.7	85.3	102.9	65.1	82.7	100.2	62.2	79.8	97.3	59.2	76.7	94.2
		72	TC	123.0	123.0	123.0	116.5	116.5	116.5	109.4	109.4	109.4	101.6	101.6	101.6
			SHC	50.5	68.2	85.9	48.2	65.8	83.5	45.6	63.2	80.8	42.8	60.4	78.1
		76	TC	–	131.5	131.5	–	124.9	124.9	–	117.7	117.7	–	109.9	109.9
			SHC	–	54.1	72.1	–	51.8	69.7	–	49.4	67.2	–	46.8	64.6
3825 Cfm	EAT (wb)	58	TC	104.5	104.5	118.0	99.8	99.8	112.6	94.4	94.4	106.6	87.9	87.9	99.2
			SHC	91.1	104.5	118.0	86.9	99.8	112.6	82.3	94.4	106.6	76.6	87.9	99.2
		62	TC	105.0	105.0	123.0	100.3	100.3	117.5	93.4	93.4	109.5	87.3	87.3	102.3
			SHC	86.9	105.0	123.0	83.0	100.3	117.5	77.4	93.4	109.5	72.3	87.3	102.3
		67	TC	114.1	114.1	114.1	107.4	107.4	107.6	99.4	99.4	104.6	92.0	92.0	101.3
			SHC	71.2	90.8	110.4	68.5	88.1	107.6	65.4	85.0	104.6	62.4	81.9	101.3
		72	TC	124.9	124.9	124.9	118.2	118.2	118.2	111.0	111.0	111.0	103.1	103.1	103.1
			SHC	51.9	71.5	91.1	49.5	69.1	88.7	47.0	66.6	86.2	44.2	63.8	83.4
		76	TC	–	133.3	133.3	–	126.5	126.5	–	119.2	119.2	–	111.2	111.2
			SHC	–	55.7	75.6	–	53.5	73.3	–	51.1	70.8	–	48.5	68.1
4250 Cfm	EAT (wb)	58	TC	108.6	108.6	122.6	102.7	102.7	115.9	97.4	97.4	110.0	90.8	90.8	102.5
			SHC	94.6	108.6	122.6	89.5	102.7	115.9	84.9	97.4	110.0	79.1	90.8	102.5
		62	TC	109.0	109.0	126.4	103.4	103.4	121.2	97.5	97.5	114.2	91.3	91.3	106.9
			SHC	89.5	107.9	126.4	85.6	103.4	121.2	80.7	97.5	114.2	75.6	91.3	106.9
		67	TC	115.6	115.6	117.4	108.9	108.9	114.7	101.6	101.6	111.4	93.6	93.6	108.1
			SHC	74.3	95.9	117.4	71.7	93.2	114.7	68.7	90.1	111.4	65.6	86.8	108.1
		72	TC	126.4	126.4	126.4	119.7	119.7	119.7	112.3	112.3	112.3	104.2	104.2	104.2
			SHC	53.1	74.6	96.1	50.8	72.3	93.8	48.2	69.8	91.4	45.4	67.0	88.5
		76	TC	–	134.6	134.6	–	127.8	127.8	–	120.3	120.3	–	112.3	112.3
			SHC	–	57.2	78.8	–	55.0	76.6	–	52.6	74.1	–	50.0	71.5

/// = Indicates standard rating point

LEGEND:

- = Do not operate in this region (Points are outside SST and SDT permissible operating range)
- Cfm = Cubic feet per minute (supply air)
- EAT(db) = Entering air temperature (dry bulb)
- EAT(wb) = Entering air temperature (wet bulb)
- SHC = Sensible heat capacity
- TC = Total cooling capacity

Table 11 – COOLING CAPACITIES 2–Stage Cooling 12.5 TONS


RHS150			AMBIENT TEMPERATURE												
			85			95			105			115			
			EAT (DB)			EAT (DB)			EAT (DB)			EAT (DB)			
			75	80	85	75	80	85	75	80	85	75	80	85	
3750 Cfm	EAT (wb)	58	THC	126.4	126.4	143.6	119.1	119.1	135.3	111.8	111.8	127.0	104.0	104.0	118.2
			SHC	109.2	126.4	143.6	102.9	119.1	135.3	96.5	111.8	127.0	89.8	104.0	118.2
		62	THC	134.5	134.5	138.4	124.7	124.7	133.4	114.9	114.9	128.1	105.8	105.8	120.8
			SHC	100.3	119.4	138.4	95.5	114.4	133.4	90.5	109.3	128.1	84.6	102.7	120.8
		67	THC	149.6	149.6	149.6	140.5	140.5	140.5	130.0	130.0	130.0	118.8	118.8	118.8
		SHC	83.5	102.5	121.4	79.8	98.9	118.1	75.4	94.6	113.7	70.8	89.9	109.1	
	72	THC	161.4	161.4	161.4	155.2	155.2	155.2	146.4	146.4	146.4	135.7	135.7	135.7	
		SHC	64.5	83.5	102.5	62.1	81.2	100.4	58.8	78.1	97.3	54.8	74.1	93.3	
		76	THC	–	169.5	169.5	–	163.1	163.1	–	156.8	156.8	–	147.7	147.7
			SHC	–	68.1	88.7	–	65.7	86.2	–	63.4	83.7	–	60.3	80.3
4375 Cfm	EAT (wb)	58	THC	134.6	134.6	152.9	126.8	126.8	144.1	118.8	118.8	135.0	110.5	110.5	125.6
			SHC	116.3	134.6	152.9	109.6	126.8	144.1	102.7	118.8	135.0	95.5	110.5	125.6
		62	THC	139.9	139.9	151.3	130.0	130.0	145.7	120.7	120.7	138.1	111.2	111.2	130.1
			SHC	107.9	129.6	151.3	102.8	124.2	145.7	96.7	117.4	138.1	90.4	110.3	130.1
		67	THC	153.7	153.7	153.7	145.2	145.2	145.2	134.5	134.5	134.5	122.9	122.9	122.9
		SHC	87.9	109.4	131.0	84.8	106.8	128.8	80.6	102.6	124.7	75.8	97.9	120.0	
	72	THC	164.6	164.6	164.6	158.2	158.2	158.2	150.5	150.5	150.5	139.9	139.9	139.9	
		SHC	66.0	87.2	108.5	63.6	85.1	106.5	60.9	82.8	104.8	57.0	79.1	101.2	
		76	THC	–	172.4	172.4	–	165.7	165.7	–	159.3	159.3	–	150.8	150.8
			SHC	–	70.2	93.5	–	67.8	91.0	–	65.7	88.8	–	62.8	85.8
5000 Cfm	EAT (wb)	58	THC	141.4	141.4	160.6	133.5	133.5	151.6	125.0	125.0	142.0	116.2	116.2	132.0
			SHC	122.1	141.4	160.6	115.3	133.5	151.6	108.0	125.0	142.0	100.4	116.2	132.0
		62	THC	144.4	144.4	162.1	135.4	135.4	155.1	125.9	125.9	147.1	116.4	116.4	137.6
			SHC	114.3	138.2	162.1	108.5	131.8	155.1	102.2	124.6	147.1	95.3	116.4	137.6
		67	THC	156.6	156.6	156.6	148.8	148.8	148.8	138.1	138.1	138.1	126.3	126.3	130.2
		SHC	91.7	115.6	139.5	89.3	113.9	138.6	85.3	110.2	135.0	80.6	105.4	130.2	
	72	THC	167.0	167.0	167.0	160.5	160.5	160.5	153.3	153.3	153.3	142.9	142.9	142.9	
		SHC	67.3	90.6	113.9	64.9	88.6	112.2	62.5	87.0	111.4	58.9	83.7	108.5	
		76	THC	–	174.6	174.6	–	167.5	167.5	–	160.7	160.7	–	152.9	152.9
			SHC	–	72.2	98.1	–	69.8	95.6	–	67.4	92.9	–	64.8	90.2
5625 Cfm	EAT (wb)	58	THC	146.6	146.6	166.6	139.0	139.0	157.9	130.3	130.3	148.1	121.2	121.2	137.7
			SHC	126.6	146.6	166.6	120.0	139.0	157.9	112.6	130.3	148.1	104.7	121.2	137.7
		62	THC	148.4	148.4	169.8	139.9	139.9	163.3	130.5	130.5	154.3	121.3	121.3	143.4
			SHC	118.8	144.3	169.8	113.5	138.4	163.3	106.8	130.5	154.3	99.2	121.3	143.4
		67	THC	158.8	158.8	158.8	151.5	151.5	151.5	140.9	140.9	144.6	129.1	129.1	140.0
		SHC	95.1	121.2	147.3	93.3	120.4	147.4	89.6	117.1	144.6	85.0	112.5	140.0	
	72	THC	168.9	168.9	168.9	162.1	162.1	162.1	155.3	155.3	155.3	145.1	145.1	145.1	
		SHC	68.4	93.7	118.9	66.1	91.7	117.3	63.9	90.6	117.3	60.6	87.9	115.2	
		76	THC	–	176.2	176.2	–	168.9	168.9	–	161.7	161.7	–	154.3	154.3
			SHC	–	73.9	101.8	–	71.3	98.8	–	68.8	96.1	–	66.6	94.1
6250 Cfm	EAT (wb)	58	THC	150.6	150.6	171.1	143.5	143.5	163.1	134.9	134.9	153.3	125.5	125.5	142.6
			SHC	130.0	150.6	171.1	123.9	143.5	163.1	116.5	134.9	153.3	108.4	125.5	142.6
		62	THC	151.4	151.4	176.1	143.7	143.7	169.9	135.1	135.1	159.7	125.6	125.6	148.5
			SHC	122.6	149.3	176.1	117.6	143.7	169.9	110.5	135.1	159.7	102.7	125.6	148.5
		67	THC	160.4	160.4	160.4	153.4	153.4	155.3	143.2	143.2	153.4	131.3	131.3	148.7
		SHC	98.2	126.4	154.5	96.8	126.0	155.3	93.6	123.5	153.4	88.9	118.8	148.7	
	72	THC	170.3	170.3	170.3	163.4	163.4	163.4	156.7	156.7	156.7	146.8	146.8	146.8	
		SHC	69.5	96.5	123.5	67.1	94.5	121.9	65.1	93.8	122.5	62.0	91.7	121.3	
		76	THC	–	177.5	177.5	–	170.1	170.1	–	162.7	162.7	–	155.4	155.4
			SHC	–	75.2	104.7	–	72.6	101.8	–	70.2	99.2	–	68.2	97.7


LEGEND:

- = Do not operate in this region (Points are outside SST and SDT permissible operating range)
- Cfm = Cubic feet per minute (supply air)
- EAT(db) = Entering air temperature (dry bulb)
- EAT(wb) = Entering air temperature (wet bulb)
- SHC = Sensible heat capacity
- TC = Total cooling capacity

Table 12 – HEATING CAPACITIES 6 TONS

RETURN AIR (°F DB)	CFM (STANDARD AIR)		TEMPERATURE AIR ENTERING OUTDOOR COIL (°F DB AT 70% RH)								
			-10	0	10	17	30	40	47	50	60
55	1800	Capacity	22.4	29.8	37.1	42.5	53.5	62.4	68.6	71.2	80.3
		Int. Cap.	20.7	27.4	34.1	38.8	46.9	62.4	68.6	71.2	80.3
	2400	Capacity	24.6	32.1	39.6	45.1	56.4	65.6	71.5	74.2	83.8
		Int. Cap.	22.7	29.5	36.3	41.1	49.4	65.6	71.5	74.2	83.8
	3000	Capacity	27.4	35.0	42.5	48.2	59.5	68.6	74.5	77.2	86.8
		Int. Cap.	25.3	32.2	39.0	43.9	52.1	68.6	74.5	77.2	86.8
70	1800	Capacity	17.7	25.5	33.2	38.6	49.5	58.5	65.0	67.7	76.5
		Int. Cap.	16.4	23.5	30.5	35.2	43.4	58.5	65.0	67.7	76.5
	2400	Capacity	19.9	27.9	35.8	41.4	52.7	62.0	68.4	71.0	80.3
		Int. Cap.	18.4	25.7	32.9	37.7	46.2	62.0	68.4	71.0	80.3
	3000	Capacity	22.8	30.9	38.9	44.5	56.1	65.5	71.7	74.4	83.9
		Int. Cap.	21.1	28.4	35.7	40.6	49.2	65.5	71.7	74.4	83.9
80	1800	Capacity	13.9	21.9	29.9	35.5	46.2	55.3	62.0	64.9	73.7
		Int. Cap.	12.8	20.2	27.4	32.3	40.5	55.3	62.0	64.9	73.7
	2400	Capacity	16.0	24.4	32.6	38.4	49.6	59.0	65.8	68.6	77.5
		Int. Cap.	14.8	22.5	29.9	35.0	43.5	59.0	65.8	68.6	77.5
	3000	Capacity	18.8	27.4	35.8	41.6	53.1	62.7	69.4	72.1	81.4
		Int. Cap.	17.4	25.2	32.8	37.9	46.6	62.7	69.4	72.1	81.4

 = Indicates standard rating point

 – Indicates operation not permissible

LEGEND

- Capacity – Instantaneous Capacity (1000 Btuh) includes indoor fan motor heat @AHRI static conditions
- Int. Cap. – Integrated Capacity is Instantaneous Capacity minus the effects of frost on the outdoor coil and the heat required to defrost
- rh – Relative Humidity
- db – Dry Bulb

Table 13 – HEATING CAPACITIES 7.5 TONS

RETURN AIR (°F db)	CFM (STANDARD AIR)		TEMPERATURE AIR ENTERING OUTDOOR COIL (°F db at 70% rh)									
			-10	0	10	17	30	40	47	50	60	
55	2250	Capacity	/		46.9	53.5	66.3	77.2	86.2	89.4	103.3	
		Int. Cap.			43.1	48.7	58.1	77.2	86.2	89.4	103.3	
	3000	Capacity	/					68.5	80.2	89.8	93.1	106.7
		Int. Cap.						60.0	80.2	89.8	93.1	106.7
	3750	Capacity	/			58.9	72.5	84.6	94.5	97.6	110.6	
		Int. Cap.				53.7	63.5	84.6	94.5	97.6	110.6	
70	2250	Capacity	25.9	34.6	43.6	50.2	62.7	73.0	81.4	84.5	98.0	
		Int. Cap.	23.9	31.8	40.0	45.7	55.0	73.0	81.4	84.5	98.0	
	3000	Capacity	27.4	36.2	45.5	52.2	65.1	75.9	85.0	88.2	102.1	
		Int. Cap.	25.3	33.4	41.8	47.6	57.0	75.9	85.0	88.2	102.1	
	3750	Capacity	31.0	40.0	49.3	56.1	69.1	80.4	89.8	93.2	106.5	
		Int. Cap.	28.6	36.8	45.3	51.1	60.6	80.4	89.8	93.2	106.5	
80	2250	Capacity	22.5	31.5	40.7	47.3	60.1	70.3	78.2	81.2	94.3	
		Int. Cap.	20.8	29.0	37.3	43.1	52.6	70.3	78.2	81.2	94.3	
	3000	Capacity	24.1	33.3	42.7	49.5	62.5	73.1	81.6	84.7	98.6	
		Int. Cap.	22.3	30.6	39.2	45.2	54.8	73.1	81.6	84.7	98.6	
	3750	Capacity	27.8	37.1	46.6	53.5	66.7	77.5	86.4	89.7	103.4	
		Int. Cap.	25.7	34.1	42.8	48.8	58.4	77.5	86.4	89.7	103.4	

Table 14 – HEATING CAPACITIES 8.5 TONS

RETURN AIR (°F db)	CFM (STANDARD AIR)		TEMPERATURE AIR ENTERING OUTDOOR COIL (°F db at 70% rh)								
			-10	0	10	17	30	40	47	50	60
55	2550	Capacity	33.1	42.7	52.7	60.0	75.6	87.4	97.5	100.6	113.8
		Int. Cap.	30.7	39.3	48.3	54.7	66.2	87.4	97.5	100.6	113.8
	3400	Capacity	34.4	44.0	54.2	61.8	77.5	89.9	100.2	103.1	115.7
		Int. Cap.	31.8	40.5	49.8	56.4	67.9	89.9	100.2	103.1	115.7
	4250	Capacity	38.0	47.7	58.0	65.8	81.5	94.2	103.9	106.6	118.2
		Int. Cap.	35.2	43.9	53.2	60.0	71.4	94.2	103.9	106.6	118.2
70	2550	Capacity	29.0	38.6	48.6	55.9	70.7	83.5	93.1	96.2	109.5
		Int. Cap.	26.8	35.5	44.6	51.0	61.9	83.5	93.1	96.2	109.5
	3400	Capacity	30.3	40.2	50.4	58.0	73.5	86.1	96.5	99.2	111.9
		Int. Cap.	28.0	37.0	46.3	52.9	64.4	86.1	96.5	99.2	111.9
	4250	Capacity	34.0	44.0	54.4	62.1	77.8	90.5	100.5	103.3	115.2
		Int. Cap.	31.5	40.5	50.0	56.6	68.2	90.5	100.5	103.3	115.2
80	2550	Capacity	25.3	35.0	45.2	52.6	67.1	80.0	90.0	93.2	106.5
		Int. Cap.	23.4	32.2	41.5	48.0	58.8	80.0	90.0	93.2	106.5
	3400	Capacity	26.6	36.7	47.2	54.8	69.8	83.0	93.1	96.2	109.2
		Int. Cap.	24.6	33.8	43.3	50.0	61.2	83.0	93.1	96.2	109.2
	4250	Capacity	30.4	40.6	51.2	59.0	74.4	87.7	97.7	100.7	112.8
		Int. Cap.	28.1	37.4	47.0	53.8	65.1	87.7	97.7	100.7	112.8

/ = Indicates standard rating point

/ = Indicates operation not permissible

LEGEND

- Capacity – Instantaneous Capacity (1000 Btuh) includes indoor fan motor heat @AHRI static conditions
- Int. Cap. – Integrated Capacity is Instantaneous Capacity minus the effects of frost on the outdoor coil and the heat required to defrost
- rh – Relative Humidity
- db – Dry Bulb

Table 15 – HEATING CAPACITIES 10 TONS

RETURN AIR (°F db)	CFM (STANDARD AIR)		TEMPERATURE AIR ENTERING OUTDOOR COIL (°F db AT 70% RH)								
			-10	0	10	17	30	40	47	50	60
			55	3000	Capacity	41.8	52.4	64.1	72.8	90.4	105.3
Int. Cap.	38.7	48.2			58.8	66.3	79.2	105.3	118.0	121.9	140.3
4000	Capacity	43.3		54.0	66.0	74.5	92.7	107.8	120.2	124.1	142.1
	Int. Cap.	40.0		49.7	60.6	68.0	81.2	107.8	120.2	124.1	142.1
5000	Capacity	46.9		57.7	69.7	78.2	96.6	111.5	123.5	127.3	142.3
	Int. Cap.	43.3		53.1	64.0	71.3	84.6	111.5	123.5	127.3	142.3
70	3000	Capacity	37.4	48.2	59.7	68.5	86.2	100.6	113.0	117.1	135.3
		Int. Cap.	34.6	44.4	54.8	62.4	75.5	100.6	113.0	117.1	135.3
	4000	Capacity	39.0	49.9	61.6	70.7	88.5	103.3	115.9	119.8	137.6
		Int. Cap.	36.1	45.9	56.6	64.5	77.5	103.3	115.9	119.8	137.6
	5000	Capacity	42.6	53.7	65.5	74.8	92.5	107.5	119.6	123.4	140.6
		Int. Cap.	39.4	49.4	60.1	68.2	81.1	107.5	119.6	123.4	140.6
80	3000	Capacity	33.9	44.8	56.5	65.1	83.2	97.3	109.5	113.4	131.6
		Int. Cap.	31.4	41.3	51.8	59.3	72.9	97.3	109.5	113.4	131.6
	4000	Capacity	35.5	46.6	58.5	67.3	85.5	100.0	112.5	116.5	134.2
		Int. Cap.	32.8	42.9	53.7	61.4	75.0	100.0	112.5	116.5	134.2
	5000	Capacity	39.1	50.4	62.3	71.3	89.6	104.3	116.6	120.4	137.5
		Int. Cap.	36.2	46.4	57.2	65.0	78.5	104.3	116.6	120.4	137.5

/// = Indicates standard rating point

LEGEND

- Capacity – Instantaneous Capacity (1000 Btuh) includes indoor fan motor heat @AHRI static conditions
- Int. Cap. – Integrated Capacity is Instantaneous Capacity minus the effects of frost on the outdoor coil and the heat required to defrost
- RH – Relative Humidity
- dB – Dry Bulb

Table 16 – HEATING CAPACITIES 12.5 TONS

RETURN AIR (°F db)	CFM (STANDARD AIR)		TEMPERATURE AIR ENTERING OUTDOOR COIL (°F db AT 70% RH)								
			-10	0	10	17	30	40	47	50	60
			55	3750	Capacity	33.7	47.5	69.8	83.1	109.3	131.7
Int. Cap.	31.2	43.7			64.0	75.8	95.8	131.7	149.7	155.6	180.1
5000	Capacity	35.7		49.7	72.4	85.8	112.9	136.1	152.9	158.1	178.7
	Int. Cap.	33.0		45.7	66.5	78.2	99.0	136.1	152.9	158.1	178.7
6250	Capacity	38.9		53.0	76.2	89.5	117.1	139.4	153.5	158.0	175.6
	Int. Cap.	36.0		48.8	70.0	81.6	102.6	139.4	153.5	158.0	175.6
70	3750	Capacity	24.4	38.2	59.4	73.1	99.8	121.2	138.5	144.5	169.7
		Int. Cap.	22.6	35.2	54.5	66.7	87.4	121.2	138.5	144.5	169.7
	5000	Capacity	26.4	40.4	62.1	76.6	103.2	125.4	143.0	148.6	170.3
		Int. Cap.	24.4	37.2	57.0	69.8	90.4	125.4	143.0	148.6	170.3
	6250	Capacity	29.6	43.8	65.9	80.7	107.3	129.8	145.5	150.4	169.1
		Int. Cap.	27.3	40.3	60.5	73.6	94.0	129.8	145.5	150.4	169.1
80	3750	Capacity	17.5	31.4	52.6	65.6	93.3	114.2	131.1	137.0	162.4
		Int. Cap.	16.2	28.9	48.3	59.8	81.8	114.2	131.1	137.0	162.4
	5000	Capacity	19.3	33.4	55.2	68.7	96.6	118.2	135.7	141.5	164.0
		Int. Cap.	17.8	30.8	50.7	62.6	84.6	118.2	135.7	141.5	164.0
	6250	Capacity	22.4	40.3	58.8	72.7	100.6	122.6	139.3	144.3	163.8
		Int. Cap.	20.7	37.1	54.0	66.3	88.2	122.6	139.3	144.3	163.8

/// = Indicates standard rating point

LEGEND

- Capacity – Instantaneous Capacity (1000 Btuh) includes indoor fan motor heat @AHRI static conditions
- Int. Cap. – Integrated Capacity is Instantaneous Capacity minus the effects of frost on the outdoor coil and the heat required to defrost
- RH – Relative Humidity
- dB – Dry Bulb

Table 17 – STATIC PRESSURE ADDERS (Factory Options and/or Accessories)

Economizer

6 TONS											
CFM (in. wg)	600	800	1000	1250	1500	1750	2000	2250	2500	2750	3000
Vertical Economizer	0.01	0.02	0.04	0.05	0.07	0.09	0.12	0.15	0.18	0.22	0.26
Horizontal Economizer	0.02	0.03	0.04	0.06	0.08	0.10	0.13	0.15	0.18	0.23	0.28

7.5 – 12.5 TONS																
CFM (in. wg)	2250	2500	2750	3000	3250	3500	3750	4000	4250	4500	4750	5000	5250	5500	5750	6000
Vertical Economizer	0.06	0.08	0.09	0.12	0.13	0.15	0.17	0.20	0.22	0.25	0.29	0.33	0.36	0.40	0.44	0.48
Horizontal Economizer	0.08	0.10	0.13	0.15	0.18	0.21	0.25	0.28	0.30	0.34	0.39	0.43	0.47	0.51	0.56	0.60

Electric Heaters *

6 TONS											
CFM (in. wg)	600	900	1200	1400	1600	1800	2000	2200	2400	2600	
1 Electric Heater Module	0.03	0.05	0.07	0.09	0.09	0.10	0.11	0.11	0.12	0.13	
2 Electric Heater Modules	0.13	0.15	0.16	0.16	0.16	0.17	0.17	0.17	0.18	0.18	

7.5 – 12.5 TONS																
CFM (in. wg)	2250	2500	2750	3000	3250	3500	3750	4000	4250	4500	4750	5000	5250	5500	5750	6000
1 Electric Heater Module	0.03	0.04	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15	0.16	0.18
2 Electric Heater Modules	0.04	0.05	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.15	0.16	0.17	0.19	0.20

* Available as field installed accessories only.

General fan performance notes:

1. Interpolation is permissible. Do not extrapolate.
2. External static pressure is the static pressure difference between the return duct and the supply duct plus the static pressure caused by any FIOPs or accessories.
3. Tabular data accounts for pressure loss due to clean filters, unit casing, and wet coils. Factory options and accessories may add static pressure losses, as shown in Table 17. Selection software is available, through your salesperson, to help you select the best motor/drive combination for your application.
4. The Fan Performance tables offer motor/drive recommendations. In cases when two motor/drive combinations would work, recommend the lower horsepower option.
5. For information on the electrical properties of motors, please see the Electrical information section of this book.
6. For more information on the performance limits of motors, see the application data section of this book.

FAN PERFORMANCE

Table 18 – RHS072, 6 TON HORIZONTAL SUPPLY

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (IN. WG)									
	0.2		0.4		0.6		0.8		1.0	
	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
1800	822	0.51	927	0.66	1018	0.82	1100	0.98	1174	1.15
1950	872	0.62	973	0.79	1061	0.95	1140	1.13	1213	1.31
2100	923	0.75	1019	0.92	1104	1.10	1182	1.29	1253	1.48
2250	974	0.90	1067	1.08	1149	1.27	1224	1.46	1294	1.66
2400	1026	1.06	1115	1.26	1195	1.46	1268	1.66	1336	1.87
2550	1079	1.25	1164	1.46	1241	1.67	1312	1.88	1379	2.10
2700	1132	1.46	1214	1.67	1289	1.90	1358	2.12	1422	2.35
2850	1186	1.69	1264	1.92	1336	2.15	1404	2.39	1467	2.63
3000	1240	1.94	1315	2.18	1385	2.43	1451	2.68	1512	2.93

Std static – 878–1192, 1.5 HP (motor is 1.7 HP 3 ph)

Med static – 1066–1380, 2.9 HP (motor is 2.4 HP 3 ph)

High static – 1208–1639, 2.9 max HP (motor is 2.9 HP 3 ph)

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (IN. WG)									
	1.2		1.4		1.6		1.8		2.0	
	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
1800	1244	1.33	1308	1.51	1369	1.70	1427	1.90	1483	2.10
1950	1281	1.49	1345	1.68	1405	1.88	1462	2.09	1517	2.30
2100	1320	1.67	1382	1.87	1441	2.08	1498	2.29	1552	2.51
2250	1359	1.87	1420	2.08	1479	2.29	1534	2.51	1587	2.74
2400	1400	2.09	1460	2.31	1517	2.53	1572	2.76	1624	2.99
2550	1441	2.33	1500	2.55	1557	2.79	1610	3.03	1662	3.27
2700	1483	2.59	1541	2.83	1597	3.07	1650	3.32	–	–
2850	1527	2.87	1583	3.12	1638	3.37	–	–	–	–
3000	1571	3.18	1626	3.44	1680	3.70	–	–	–	–

Std static – 878–1192, 1.5 HP (motor is 1.7 HP 3 ph)

Med static – 1066–1380, 2.9 HP (motor is 2.4 HP 3 ph)

High static – 1208–1639, 2.9 max HP (motor is 2.9 HP 3 ph)

Table 19 – RHS072, 6 TON VERTICAL SUPPLY

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (IN. WG)									
	0.2		0.4		0.6		0.8		1.0	
	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
1800	907	0.63	1006	0.80	1092	0.97	1169	1.14	1239	1.32
1950	965	0.77	1060	0.95	1143	1.13	1218	1.32	1287	1.51
2100	1024	0.93	1115	1.12	1195	1.32	1268	1.52	1335	1.72
2250	1083	1.11	1170	1.32	1248	1.53	1319	1.74	1385	1.96
2400	1143	1.32	1227	1.54	1302	1.76	1371	1.99	1435	2.22
2550	1203	1.55	1284	1.78	1357	2.02	1424	2.26	1487	2.50
2700	1264	1.81	1342	2.06	1412	2.31	1478	2.56	1539	2.82
2850	1326	2.09	1400	2.36	1469	2.62	1532	2.89	1592	3.16
3000	1387	2.41	1459	2.69	1525	2.97	1587	3.25	1646	3.53

Std static – 878–1192, 1.5 HP (motor is 1.7 HP 3 ph)

Med static – 1066–1380, 2.9 HP (motor is 2.4 HP 3 ph)

High static – 1208–1639, 2.9 max HP (motor is 2.9 HP 3 ph)

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (IN. WG)									
	1.2		1.4		1.6		1.8		2.0	
	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
1800	1304	1.51	1365	1.69	1422	1.88	1477	2.08	1528	2.28
1950	1350	1.71	1410	1.91	1467	2.11	1520	2.31	1572	2.52
2100	1398	1.93	1457	2.14	1512	2.35	1565	2.57	1616	2.79
2250	1446	2.18	1504	2.40	1559	2.62	1611	2.85	1661	3.09
2400	1496	2.45	1552	2.68	1606	2.92	1658	3.16	–	–
2550	1546	2.75	1601	2.99	1654	3.24	–	–	–	–
2700	1597	3.07	1651	3.33	–	–	–	–	–	–
2850	1648	3.43	–	–	–	–	–	–	–	–
3000	–	–	–	–	–	–	–	–	–	–

Std static – 878–1192, 1.5 HP (motor is 1.7 HP 3 ph)

Med static – 1066–1380, 2.9 HP (motor is 2.4 HP 3 ph)

High static – 1208–1639, 2.9 max HP (motor is 2.9 HP 3 ph)

FAN PERFORMANCE (cont.)

Table 20 – RHS090, 7.5 TON HORIZONTAL SUPPLY

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (IN. WG)									
	0.2		0.4		0.6		0.8		1.0	
	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
2250	423	0.28	509	0.40	587	0.52	659	0.66	725	0.80
2438	444	0.34	525	0.46	600	0.59	669	0.73	733	0.88
2625	465	0.40	543	0.53	614	0.67	680	0.82	743	0.97
2813	487	0.47	561	0.61	629	0.76	693	0.91	753	1.08
3000	510	0.55	580	0.70	646	0.86	707	1.02	765	1.19
3188	534	0.65	600	0.80	663	0.96	722	1.13	779	1.31
3375	557	0.75	621	0.91	681	1.08	738	1.26	793	1.44
3563	582	0.86	642	1.03	700	1.21	755	1.39	808	1.58
3750	606	0.99	664	1.17	720	1.35	773	1.54	824	1.74

Std static – 460–652, 1.2 BHP

Med static – 591–838, 2.9 HP

High static – 838–1084, 2.9 HP

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (IN. WG)									
	1.2		1.4		1.6		1.8		2.0	
	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
2250	788	0.94	847	1.09	903	1.25	957	1.41	1009	1.58
2438	794	1.03	852	1.19	907	1.36	959	1.52	1010	1.70
2625	802	1.13	858	1.30	911	1.47	963	1.64	1012	1.82
2813	811	1.24	865	1.41	917	1.59	967	1.77	1016	1.96
3000	821	1.36	874	1.54	925	1.72	974	1.91	1021	2.11
3188	832	1.49	884	1.68	933	1.87	981	2.06	1028	2.26
3375	845	1.63	895	1.82	943	2.02	990	2.22	1035	2.43
3563	858	1.78	907	1.98	954	2.19	1000	2.40	1044	2.61
3750	873	1.94	920	2.15	966	2.36	1011	2.58	1054	2.80

Std static – 460–652, 1.2 BHP

Med static – 591–838, 2.9 HP

High static – 838–1084, 2.9 HP

Table 21 – RHS090, 3 PHASE, 7.5 TON VERTICAL SUPPLY

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (IN. WG)									
	0.2		0.4		0.6		0.8		1.0	
	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
2250	447	0.31	528	0.43	597	0.54	658	0.66	713	0.78
2438	470	0.37	548	0.50	615	0.62	675	0.75	729	0.88
2625	494	0.45	569	0.58	634	0.71	692	0.85	745	0.99
2813	518	0.53	590	0.67	653	0.82	710	0.96	763	1.11
3000	543	0.62	612	0.77	673	0.93	729	1.08	780	1.24
3188	568	0.72	635	0.89	694	1.05	749	1.21	799	1.38
3375	593	0.84	658	1.01	716	1.19	769	1.36	818	1.53
3563	619	0.97	681	1.15	737	1.33	789	1.52	837	1.70
3750	645	1.11	705	1.30	760	1.49	810	1.68	857	1.88

Std static – 460–652, 1.2 BHP

Med static – 591–838, 2.9 HP

High static – 838–1084, 2.9 HP

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (IN. WG)									
	1.2		1.4		1.6		1.8		2.0	
	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
2250	764	0.89	812	1.02	856	1.14	899	1.26	939	1.39
2438	779	1.00	826	1.13	870	1.26	912	1.40	952	1.53
2625	795	1.12	841	1.26	885	1.40	926	1.54	966	1.68
2813	811	1.25	857	1.40	900	1.55	941	1.69	980	1.84
3000	828	1.39	873	1.55	916	1.70	956	1.86	995	2.02
3188	846	1.54	890	1.71	932	1.87	972	2.04	1010	2.21
3375	864	1.70	907	1.88	949	2.05	988	2.23	1026	2.40
3563	882	1.88	925	2.06	966	2.25	1005	2.43	1042	2.62
3750	902	2.07	944	2.26	984	2.45	1022	2.65	1059	2.84

Std static – 460–652, 1.2 BHP

Med static – 591–838, 2.9 HP

High static – 838–1084, 2.9 HP

FAN PERFORMANCE (cont.)

Table 22 – RHS102, 8.5 TON HORIZONTAL SUPPLY

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (IN. WG)									
	0.2		0.4		0.6		0.8		1.0	
	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
2550	468	0.39	546	0.52	618	0.66	684	0.80	747	0.96
2763	493	0.47	567	0.61	635	0.76	699	0.91	760	1.07
2975	520	0.57	589	0.72	654	0.87	716	1.03	774	1.20
3188	547	0.68	613	0.83	675	1.00	733	1.17	789	1.34
3400	575	0.80	637	0.96	696	1.14	752	1.31	806	1.50
3613	603	0.94	662	1.11	719	1.29	773	1.48	824	1.67
3825	631	1.09	688	1.27	742	1.46	794	1.66	843	1.86
4038	660	1.26	714	1.45	766	1.65	816	1.85	864	2.06
4250	689	1.45	741	1.65	790	1.86	838	2.07	885	2.29

Std static – 460–652, 1.2 BHP

Med static – 591–838, 2.9 HP

High static – 838–1084, 2.9 HP

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (IN. WG)									
	1.2		1.4		1.6		1.8		2.0	
	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
2550	806	1.11	863	1.28	916	1.45	968	1.62	1018	1.80
2763	817	1.24	871	1.41	924	1.59	974	1.77	1022	1.95
2975	829	1.37	882	1.55	932	1.74	981	1.93	1028	2.12
3188	843	1.53	894	1.71	943	1.90	990	2.10	1036	2.30
3400	858	1.69	907	1.88	955	2.09	1001	2.29	1046	2.50
3613	874	1.87	922	2.07	968	2.28	1013	2.49	1057	2.71
3825	891	2.07	938	2.28	983	2.49	1027	2.71	1069	2.94
4038	910	2.28	955	2.50	999	2.72	1041	2.95	1083	3.19
4250	930	2.51	973	2.74	1015	2.97	1057	3.21	1097	3.45

Std static – 460–652, 1.2 BHP

Med static – 591–838, 2.9 HP

High static – 838–1084, 2.9 HP

Table 23 – RHS102, 8.5 TON VERTICAL SUPPLY

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (IN. WG)									
	0.2		0.4		0.6		0.8		1.0	
	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
2550	495	0.43	570	0.56	634	0.70	693	0.83	746	0.96
2763	524	0.53	595	0.67	657	0.81	714	0.95	766	1.09
2975	552	0.63	620	0.79	681	0.94	736	1.09	787	1.24
3188	582	0.76	647	0.92	705	1.08	759	1.25	808	1.41
3400	611	0.89	674	1.07	730	1.24	782	1.42	831	1.59
3613	641	1.05	701	1.23	756	1.42	806	1.60	854	1.79
3825	672	1.22	729	1.42	782	1.61	831	1.81	877	2.00
4038	702	1.41	758	1.62	809	1.83	857	2.03	901	2.24
4250	733	1.62	787	1.84	836	2.06	883	2.28	926	2.49

Std static – 460–652, 1.2 BHP

Med static – 591–838, 2.9 HP

High static – 838–1084, 2.9 HP

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (IN. WG)									
	1.2		1.4		1.6		1.8		2.0	
	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
2550	795	1.09	841	1.23	885	1.36	926	1.50	965	1.64
2763	814	1.24	859	1.38	902	1.53	943	1.68	982	1.82
2975	834	1.40	878	1.55	921	1.71	961	1.86	999	2.02
3188	855	1.57	898	1.74	940	1.90	979	2.07	1017	2.24
3400	876	1.76	919	1.94	960	2.12	998	2.29	1036	2.47
3613	898	1.97	940	2.16	980	2.34	1018	2.53	1055	2.72
3825	921	2.20	962	2.40	1001	2.59	1039	2.79	1075	2.99
4038	944	2.45	984	2.65	1023	2.86	1060	3.07	1096	3.27
4250	968	2.71	1007	2.93	1045	3.15	1081	3.36	1117	3.58

Std static – 460–652, 1.2 BHP

Med static – 591–838, 2.9 HP

High static – 838–1084, 2.9 HP

FAN PERFORMANCE (cont.)

Table 24 – RHS120, 10 TON HORIZONTAL SUPPLY

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (IN. WG)									
	0.2		0.4		0.6		0.8		1.0	
	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
3000	579	0.70	660	0.89	732	1.09	799	1.29	860	1.50
3250	613	0.85	690	1.06	760	1.27	823	1.49	883	1.71
3500	648	1.03	721	1.25	788	1.48	850	1.71	907	1.95
3750	683	1.23	753	1.47	817	1.71	877	1.96	933	2.21
4000	719	1.45	786	1.71	848	1.97	905	2.23	959	2.50
4250	756	1.71	819	1.98	879	2.26	934	2.53	987	2.81
4500	792	1.99	853	2.28	910	2.57	964	2.87	1015	3.16
4750	830	2.31	888	2.62	943	2.92	995	3.23	1044	3.54
5000	867	2.66	923	2.98	976	3.30	1026	3.63	1074	3.95

Std static – 591–839, 2.4 HP

Med static – 733–949, 2.9 HP

High static – 838–1084, 3.7 HP

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (IN. WG)									
	1.2		1.4		1.6		1.8		2.0	
	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
3000	917	1.70	970	1.91	1021	2.13	1070	2.34	1117	2.56
3250	938	1.93	991	2.16	1041	2.38	1089	2.61	1134	2.85
3500	961	2.18	1013	2.42	1062	2.66	1108	2.91	1153	3.15
3750	985	2.46	1035	2.71	1083	2.97	1129	3.23	1173	3.49
4000	1011	2.76	1059	3.03	1106	3.30	1151	3.58	1194	3.85
4250	1037	3.09	1084	3.38	1130	3.66	1174	3.95	1216	4.24
4500	1064	3.46	1110	3.76	1155	4.06	1198	4.36	–	–
4750	1091	3.85	1137	4.16	1180	4.48	–	–	–	–
5000	1120	4.28	1164	4.61	–	–	–	–	–	–

Std static – 591–839, 2.4 HP

Med static – 733–949, 2.9 HP

High static – 838–1084, 3.7 HP

Table 25 – RHS120, 10 TON VERTICAL SUPPLY

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (IN. WG)									
	0.2		0.4		0.6		0.8		1.0	
	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
3000	616	0.79	689	0.97	757	1.16	821	1.36	882	1.57
3250	655	0.96	724	1.16	788	1.37	849	1.58	907	1.80
3500	695	1.17	760	1.38	821	1.60	879	1.83	934	2.06
3750	736	1.41	797	1.63	855	1.86	910	2.10	963	2.35
4000	777	1.68	834	1.91	889	2.16	942	2.41	993	2.67
4250	818	1.98	873	2.23	925	2.49	976	2.75	1025	3.02
4500	860	2.32	912	2.58	962	2.85	1010	3.13	1057	3.41
4750	902	2.69	951	2.97	999	3.26	1046	3.55	1091	3.84
5000	944	3.11	991	3.40	1037	3.70	1082	4.00	1125	4.31

Std static – 591–839, 2.4 HP

Med static – 733–949, 2.9 HP

High static – 838–1084, 3.7 HP

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (IN. WG)									
	1.2		1.4		1.6		1.8		2.0	
	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
3000	939	1.79	994	2.01	1047	2.24	1098	2.47	1147	2.71
3250	962	2.03	1015	2.26	1066	2.50	1115	2.75	1163	3.00
3500	987	2.30	1038	2.54	1088	2.80	1135	3.05	1181	3.32
3750	1014	2.60	1063	2.86	1111	3.12	1157	3.39	1202	3.66
4000	1042	2.93	1090	3.20	1136	3.48	1180	3.76	1224	4.04
4250	1072	3.30	1118	3.58	1162	3.87	1205	4.16	1247	4.46
4500	1103	3.70	1147	4.00	1190	4.29	1232	4.60	–	–
4750	1135	4.14	1177	4.45	–	–	–	–	–	–
5000	1167	4.63	–	–	–	–	–	–	–	–

Std static – 591–839, 2.4 HP

Med static – 733–949, 2.9 HP

High static – 838–1084, 3.7 HP

FAN PERFORMANCE (cont.)

Table 26 – RHS150, 12.5 TON HORIZONTAL SUPPLY

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (IN. WG)									
	0.2		0.4		0.6		0.8		1.0	
	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
3750	381	0.53	452	0.74	520	0.98	584	1.26	645	1.56
4063	401	0.63	468	0.86	531	1.11	592	1.39	651	1.69
4375	421	0.75	484	0.99	544	1.25	601	1.53	657	1.85
4688	441	0.89	501	1.14	558	1.40	612	1.70	666	2.02
5000	462	1.04	519	1.30	573	1.58	625	1.88	675	2.21
5313	483	1.21	537	1.49	589	1.77	638	2.08	686	2.42
5625	504	1.40	556	1.69	605	1.99	653	2.31	699	2.65
5938	525	1.61	575	1.91	622	2.22	668	2.55	712	2.90
6250	546	1.84	595	2.15	640	2.48	684	2.82	726	3.17

Std static – 507–676, 2.9 HP

Med static – 634–833, 2.9 HP

High static – 792–971, 208V: 5.0 HP; 230V/460V: 6.1 HP; 575V: 5.9 HP

Bold Face requires standard static drive package with 1183310 motor pulley (338–507)

Italics requires high static drive package with 1170699 motor pulley (684–864)

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (IN. WG)											
	1.2		1.4		1.6		1.8		1.9		2.0	
	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
3750	703	1.88	757	2.23	808	2.59	855	2.97	878	3.17	900	3.36
4063	707	2.03	760	2.38	810	2.75	857	3.14	880	3.34	902	3.55
4375	711	2.18	763	2.55	812	2.93	859	3.33	882	3.53	904	3.74
4688	717	2.36	767	2.73	815	3.12	862	3.52	884	3.73	906	3.94
5000	725	2.55	773	2.93	820	3.32	865	3.73	887	3.95	908	4.16
5313	734	2.77	780	3.15	825	3.55	869	3.96	890	4.18	912	4.40
5625	744	3.01	788	3.39	832	3.79	874	4.22	895	4.44	916	4.66
5938	755	3.27	798	3.65	840	4.06	881	4.49	901	4.71	921	4.94
6250	768	3.55	808	3.94	849	4.36	888	4.79	908	5.01	927	5.24

Std static – 507–676, 2.9 HP

Med static – 634–833, 2.9 HP

High static – 792–971, 208V: 5.0 HP; 230V/460V: 6.1 HP; 575V: 5.9 HP

Italics requires high static drive package with 1170699 motor pulley (684–864)

Table 27 – RHS150, 12.5 TON VERTICAL SUPPLY

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (IN. WG)									
	0.2		0.4		0.6		0.8		1.0	
	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
3750	441	0.65	513	0.88	582	1.15	647	1.45	707	1.78
4063	466	0.78	533	1.03	598	1.30	660	1.61	718	1.95
4375	491	0.94	554	1.19	615	1.48	674	1.80	730	2.14
4688	517	1.11	576	1.38	634	1.68	690	2.00	744	2.36
5000	543	1.31	599	1.59	653	1.90	706	2.23	758	2.59
5313	570	1.54	622	1.82	674	2.14	724	2.48	774	2.85
5625	596	1.78	646	2.08	695	2.41	743	2.76	790	3.14
5938	623	2.06	671	2.37	717	2.71	763	3.07	808	3.45
6250	650	2.36	695	2.69	740	3.03	784	3.40	827	3.80

Std static – 507–676, 2.9 HP

Med static – 634–833, 2.9 HP

High static – 792–971, 208V: 5.0 HP; 230V/460V: 6.1 HP; 575V: 5.9 HP

Bold Face requires standard static drive package with 1183310 motor pulley (338–507)

Italics requires high static drive package with 1170699 motor pulley (684–864)

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (IN. WG)											
	1.2		1.4		1.6		1.8		1.9		2.0	
	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
3750	764	2.12	816	2.48	866	2.86	912	3.24	935	3.44	956	3.64
4063	773	2.31	825	2.68	874	3.07	921	3.47	943	3.68	965	3.88
4375	784	2.51	835	2.90	883	3.30	929	3.72	951	3.93	973	4.14
4688	795	2.73	845	3.13	893	3.54	938	3.98	960	4.19	981	4.42
5000	808	2.98	856	3.38	903	3.81	947	4.25	969	4.48	990	4.71
5313	822	3.25	868	3.66	914	4.10	957	4.55	978	4.78	999	5.02
5625	837	3.54	882	3.96	925	4.41	968	4.87	989	5.11	1009	5.35
5938	852	3.86	896	4.30	938	4.75	980	5.22	1000	5.46	1020	5.71
6250	869	4.22	911	4.65	952	5.12	992	5.59	1012	5.84	1032	6.09

Std static – 507–676, 2.9 HP

Med static – 634–833, 2.9 HP

High static – 792–971, 208V: 5.0 HP; 230V/460V: 6.1 HP; 575V: 5.9 HP

Bold Face requires standard static drive package with 1183310 motor pulley (338–507)

Italics requires high static drive package with 1170699 motor pulley (684–864)

Underline requires high static drive package with 1178187 motor pulley (864–1061).

FAN PERFORMANCE (cont.)

Table 28 – PULLEY ADJUSTMENT

UNIT RHS		MOTOR/ DRIVE COMBO	MOTOR PULLEY TURNS OPEN											5.5	6
			0	0.5	1	1.5	2	2.5	3	3.5	4	4.5	5		
072	3 phase	Standard Static	1192	1161	1129	1098	1066	1035	1004	972	941	909	878	–	–
		Medium Static	1380	1349	1317	1286	1254	1223	1192	1160	1129	1097	1066	–	–
		High Static	1639	1596	1553	1510	1467	1424	1380	1337	1294	1251	1208	–	–
090	3 phase	Standard Static	652	633	614	594	575	556	537	518	498	479	460	–	–
		Medium Static	838	813	789	764	739	715	690	665	640	616	591	–	–
		High Static	1084	1059	1035	1010	986	961	936	912	887	863	838	–	–
102	3 phase	Standard Static	652	633	614	594	575	556	537	518	498	479	460	–	–
		Medium Static	838	813	789	764	739	715	690	665	640	616	591	–	–
		High Static	1084	1059	1035	1010	986	961	936	912	887	863	838	–	–
120	3 phase	Standard Static	652	633	614	594	575	556	537	518	498	479	460	–	–
		Medium Static	838	813	789	764	739	715	690	665	640	616	591	–	–
		High Static	1084	1059	1035	1010	986	961	936	912	887	863	838	–	–
150	3 phase	Standard Static	676	659	642	625	608	592	575	558	541	524	507	*	*
		Medium Static	**	**	833	813	793	773	753	734	714	694	674	654	634
		High Static	**	**	971	953	935	917	899	882	864	846	828	810	792

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

■ – Factory settings

* Do not set motor pulley above 5 turns open for A or AX section belts

** Do not set motor pulley below 1 turn open for B or BX section belts

ECONOMIZER, BAROMETRIC RELIEF, AND PERFORMANCE

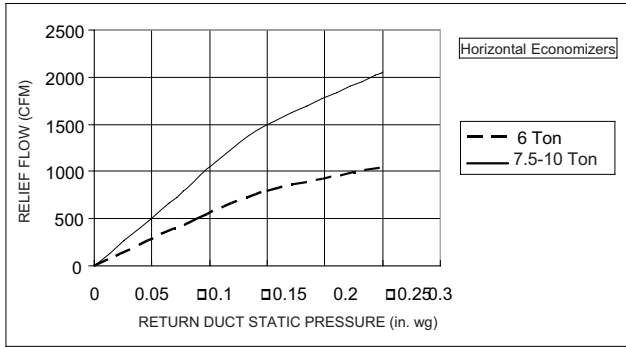


Fig 1 – Barometric Relief Flow Capacity

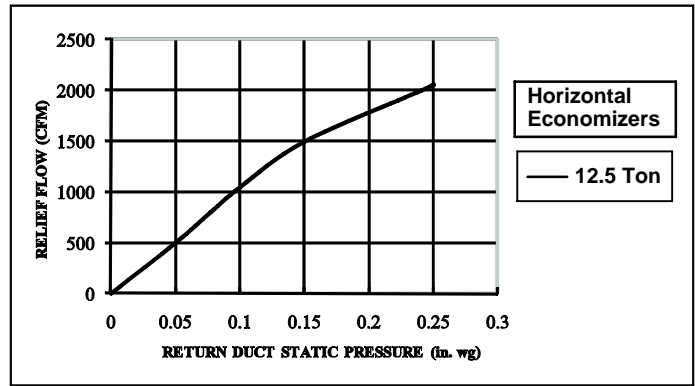


Fig 5 – Relief Flow

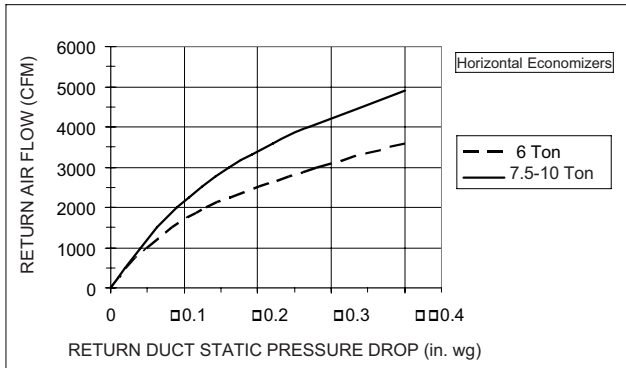


Fig 2 – Return Air Pressure Drop

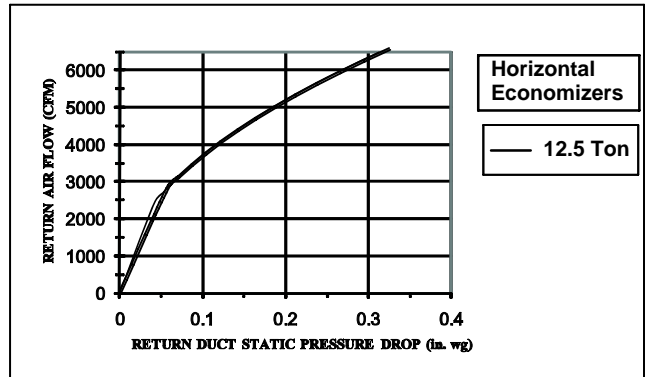


Fig 6 – Return Air Flow

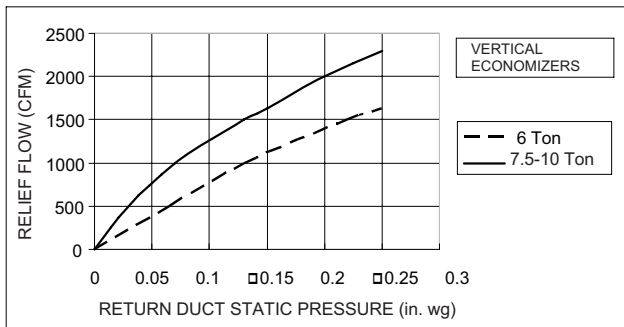


Fig 3 – Barometric Relief flow Capacity

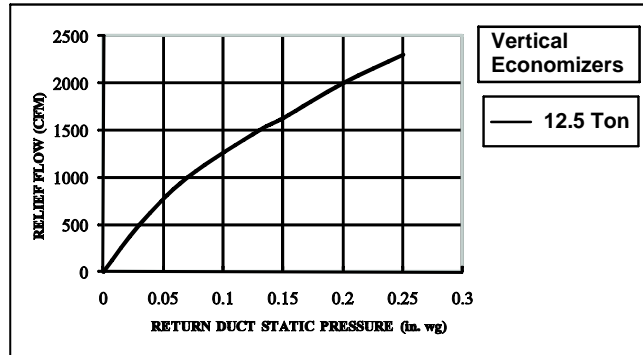


Fig 7 – Relief Flow

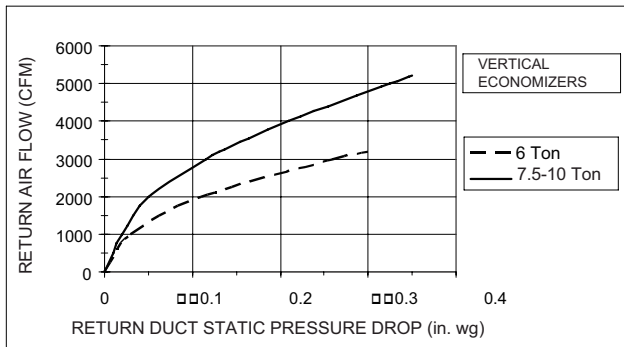


Fig 4 – Return Air Pressure Drop

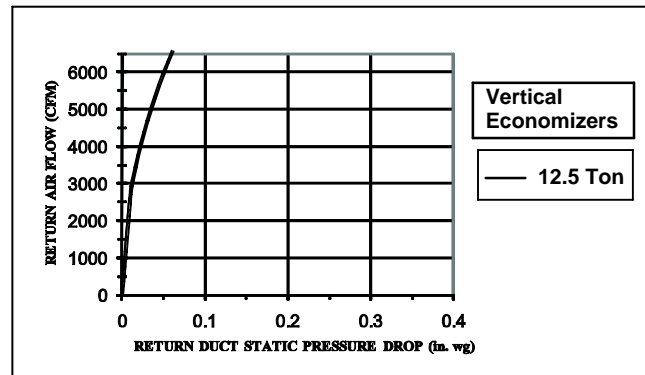


Fig 8 – Return Air Flow

ELECTRICAL INFORMATION

Table 29 – RHS072, 6 TONS.....1–Stage Cooling

V–Ph–Hz	VOLTAGE RANGE		COMP (ea)		OFM (ea)		IFM				
	MIN	MAX	RLA	LRA	WATTS	FLA	TYPE	Max WATTS	Max AMP Draw	EFF at Full Load	FLA
208–3–60	187	253	19.0	123	325	1.5	STD	1600	5.5	80%	5.2
							MED	2770	7.9	81%	7.5
							HIGH	2770	7.9	81%	7.5
230–3–60	187	253	19.0	123	325	1.5	STD	1600	5.5	80%	5.2
							MED	2770	7.9	81%	7.5
							HIGH	2770	7.9	81%	7.5
460–3–60	414	506	9.7	62	325	0.8	STD	1600	2.7	80%	2.6
							MED	2770	3.6	81%	3.4
							HIGH	2770	3.6	81%	3.4
575–3–60	518	633	7.4	50	325	0.6	STD	1600	2.5	80%	2.4
							MED	2770	2.9	81%	2.8
							HIGH	2770	2.9	81%	2.8

Table 30 – RHS090, 7.5 TONS.....2–Stage Cooling

V–Ph–Hz	VOLTAGE RANGE		COMP (Cir 1)		COMP (Cir 2)		OFM (ea)		IFM				
	MIN	MAX	RLA	LRA	RLA	LRA	WATTS	FLA	TYPE	Max WATTS	Max AMP Draw	EFF at Full Load	FLA
208–3–60	187	253	13.1	83	13.1	83	325	1.5	STD	1310	5.5	80%	5.2
									MED	2770	7.9	81%	7.5
									HIGH	2770	7.9	81%	7.5
230–3–60	187	253	13.1	83	13.1	83	325	1.5	STD	1310	5.5	80%	5.2
									MED	2770	7.9	81%	7.5
									HIGH	2770	7.9	81%	7.5
460–3–60	414	506	6.1	41	6.1	41	325	0.8	STD	1310	2.7	80%	2.6
									MED	2770	3.6	81%	3.4
									HIGH	2770	3.6	81%	3.4
575–3–60	518	633	4.4	33	4.4	33	325	0.6	STD	1310	2.5	80%	2.4
									MED	2770	2.9	81%	2.8
									HIGH	2770	2.9	81%	2.8

Table 31 – RHS102, 8.5 TONS.....2–Stage Cooling

V–Ph–Hz	VOLTAGE RANGE		COMP (Cir 1)		COMP (Cir 2)		OFM (ea)		IFM				
	MIN	MAX	RLA	LRA	RLA	LRA	WATTS	FLA	TYPE	Max WATTS	Max AMP Draw	EFF at Full Load	FLA
208–3–60	187	253	16.0	91	13.7	83	325	1.5	STD	1310	5.5	80%	5.2
									MED	2770	7.9	80%	7.5
									HIGH	2770	7.9	80%	7.5
230–3–60	187	253	16.0	91	13.7	83	325	1.5	STD	1310	5.5	80%	5.2
									MED	2770	7.9	80%	7.5
									HIGH	2770	7.9	80%	7.5
460–3–60	414	506	7.0	46	6.2	41	325	0.8	STD	1310	2.7	80%	2.6
									MED	2770	3.6	80%	3.4
									HIGH	2770	3.6	80%	3.4
575–3–60	518	633	5.6	37	4.8	37	325	0.6	STD	1310	2.5	80%	2.4
									MED	2770	2.9	80%	2.8
									HIGH	2770	2.9	81%	2.8

Table 32 – RHS120, 10 TONS.....2-Stage Cooling

V-Ph-Hz	VOLTAGE RANGE		COMP (Cir 1)		COMP (Cir 2)		OFM (ea)		IFM				
	MIN	MAX	RLA	LRA	RLA	LRA	WATTS	FLA	TYPE	Max WATTS	Max AMP Draw	EFF at Full Load	FLA
208-3-60	187	253	16.0	91	13.7	83	325	1.5	STD	1310	5.5	80%	5.2
									MED	2770	7.9	80%	7.5
									HIGH	2770	7.9	80%	7.5
230-3-60	187	253	16.0	91	13.7	83	325	1.5	STD	1310	5.5	80%	5.2
									MED	2770	7.9	80%	7.5
									HIGH	2770	7.9	80%	7.5
460-3-60	414	506	7.0	46	6.2	41	325	0.8	STD	1310	2.7	80%	2.6
									MED	2770	3.6	80%	3.4
									HIGH	2770	3.6	80%	3.4
575-3-60	518	633	5.6	37	4.8	37	325	0.6	STD	1310	2.5	80%	2.4
									MED	2770	2.9	80%	2.8
									HIGH	2770	2.9	81%	2.8

Table 33 – RHS150, 12.5 TONS.....2-Stage Cooling

V-Ph-Hz	VOLTAGE RANGE		COMP (Cir 1)		COMP (Cir 2)		OFM (ea)		IFM				
	MIN	MAX	RLA	LRA	RLA	LRA	WATTS	FLA	TYPE	Max WATTS	Max AMP Draw	EFF at Full Load	FLA
208-3-60	187	253	22.4	149	22.4	149	325	1.5	STD	2770	7.9	80%	7.5
									MED	2770	7.9	80%	7.5
									HIGH	4500	15.8	84%	16.7
230-3-60	187	253	22.4	149	22.4	149	325	1.5	STD	2770	7.9	80%	7.5
									MED	2770	7.9	80%	7.5
									HIGH	5200	15.8	88%	15.2
460-3-60	414	506	10.6	75	10.6	75	325	0.8	STD	2770	3.6	80%	3.4
									MED	2770	3.6	80%	3.4
									HIGH	5200	7.9	88%	7.6
575-3-60	518	633	8.5	54	8.5	54	325	0.7	STD	2770	2.9	80%	2.8
									MED	2770	2.9	80%	2.8
									HIGH	5000	6.0	88%	6.1

Table 34 – MCA/MOCP DETERMINATION NO C.O. OR UNPWRD C.O.

UNIT RHS	V–Ph–Hz*	IFM TYPE	ELEC. HTR		WITHOUT C.O. or UNPWR C.O.							
			Nom (kW)	FLA	WITHOUT P.E.				WITH P.E.			
					MCA	MOCP	DISC. SIZE		MCA	MOCP	DISC. SIZE	
							FLA	LRA			FLA	LRA
072	208/230–3–60	STD	–	–	30.5	45	30	146	32.4	50	32	148
			4.9/6.5	13.6/15.6	47.5/50.0	60/60	45/47	160/162	49.4/51.9	60/60	47/50	162/164
			7.9/10.5	21.9/25.3	57.8/62.1	60/70	55/59	168/171	59.7/64.0	60/70	57/61	170/173
			12.0/16.0	33.4/38.5	72.2/78.6	80/80	68/74	179/185	74.1/80.5	80/90	70/76	181/187
			15.8/21.0	43.8/50.5	85.2/93.6	90/100	80/88	234/247	87.1/95.5	90/100	82/90	236/249
		19.9/26.5	55.2/63.8	99.5/110.2	100/125	93/103	256/274	101.4/112.1	110/125	95/105	258/276	
		MED	–	–	32.8	50	32	183	34.7	50	34	185
			4.9/6.5	13.6/15.6	49.8/52.3	60/60	48/50	197/199	51.7/54.2	60/60	50/52	199/201
			7.9/10.5	21.9/25.3	60.1/64.4	70/70	57/61	205/208	62.0/66.3	70/70	60/63	207/210
	12.0/16.0		33.4/38.5	74.5/80.9	80/90	71/76	216/222	76.4/82.8	80/90	73/79	218/224	
	15.8/21.0		43.8/50.5	87.5/95.9	90/100	83/90	271/284	89.4/97.8	90/100	85/92	273/286	
	19.9/26.5	55.2/63.8	101.8/112.5	110/125	96/106	293/311	103.7/114.4	110/125	98/108	295/313		
	HIGH	–	–	32.8	50	32	183	34.7	50	34	185	
		4.9/6.5	13.6/15.6	49.8/52.3	60/60	48/50	197/199	51.7/54.2	60/60	50/52	199/201	
		7.9/10.5	21.9/25.3	60.1/64.4	70/70	57/61	205/208	62.0/66.3	70/70	60/63	207/210	
		12.0/16.0	33.4/38.5	74.5/80.9	80/90	71/76	216/222	76.4/82.8	80/90	73/79	218/224	
		15.8/21.0	43.8/50.5	87.5/95.9	90/100	83/90	271/284	89.4/97.8	90/100	85/92	273/286	
	19.9/26.5	55.2/63.8	101.8/112.5	110/125	96/106	293/311	103.7/114.4	110/125	98/108	295/313		
	460–3–60	STD	–	–	15.5	25	15	73	16.5	25	16	74
			6.0	7.2	24.5	30	23	80	25.5	30	24	81
			11.5	13.8	32.8	35	31	87	33.8	40	32	88
			14.0	16.8	36.5	40	34	90	37.5	40	36	91
			23.0	27.7	50.2	60	47	128	51.2	60	48	129
		25.5	30.7	53.9	60	50	134	54.9	60	52	135	
MED		–	–	16.3	25	16	92	17.3	25	17	93	
		6.0	7.2	25.3	30	24	99	26.3	30	25	100	
		11.5	13.8	33.6	35	32	106	34.6	40	33	107	
		14.0	16.8	37.3	40	35	109	38.3	40	36	110	
		23.0	27.7	51.0	60	48	147	52.0	60	49	148	
25.5		30.7	54.7	60	51	153	55.7	60	52	154		
HIGH		–	–	16.3	25	16	92	17.3	25	17	93	
		6.0	7.2	25.3	30	24	99	26.3	30	25	100	
		11.5	13.8	33.6	35	32	106	34.6	40	33	107	
	14.0	16.8	37.3	40	35	109	38.3	40	36	110		
	23.0	27.7	51.0	60	48	147	52.0	60	49	148		
25.5	30.7	54.7	60	51	153	55.7	60	52	154			
575–3–60	STD	–	–	12.3	15	12	59	14.2	20	14	61	
	MED	–	–	12.7	20	12	74	14.6	20	15	76	
	HIGH	–	–	12.7	20	12	74	14.6	20	15	76	

*Nominal values, listed as 208/240V, 480V or 600V as appropriate.

See Legend and calculations on page 57.

Table 34 (cont.) MCA/MOCP DETERMINATION NO C.O. OR UNPWRD C.O.

UNIT RHS	V-Ph-Hz	IFM TYPE	ELEC. HTR		WITHOUT C.O. or UNPWR C.O.									
			Nom (kW)	FLA	WITHOUT P.E.				WITH P.E.					
					MCA	MOCP	DISC. SIZE		MCA	MOCP	DISC. SIZE			
							FLA	LRA			FLA	LRA		
090	208/23-3-60	STD	-	-	37.7	50	40	193	41.5	50	44	197		
			7.8/10.4	21.7/25.0	64.8/68.9	70/70	65/68	215/218	68.6/72.7	70/80	69/73	219/222		
			12.0/16.0	33.4/38.5	79.4/85.8	80/90	78/84	226/232	83.2/89.6	90/90	82/88	230/236		
			18.6/24.8	51.7/59.7	102.3/112.3	110/125	99/108	245/253	106.1/116.1	110/125	103/113	249/257		
			24.0/32.0	66.7/77.0	121.1/133.9	125/150	116/128	260/270	124.9/137.7	125/150	121/132	264/274		
		31.8/42.4	88.4/102.0	148.2/165.2	150/175	141/157	370/397	152.0/169.0	175/175	146/161	374/401			
		MED	-	-	40.0	50	42	230	43.8	50	47	234		
			7.8/10.4	21.7/25.0	67.1/71.2	70/80	67/71	252/255	70.9/75.0	80/80	72/75	256/259		
			12.0/16.0	33.4/38.5	81.7/88.1	90/90	81/86	263/269	85.5/91.9	90/100	85/91	267/273		
	18.6/24.8		51.7/59.7	104.6/114.6	110/125	102/111	282/290	108.4/118.4	110/125	106/115	286/294			
	HIGH	-	-	40.0	50	42	230	43.8	50	47	234			
		7.8/10.4	21.7/25.0	67.1/71.2	70/80	67/71	252/255	70.9/75.0	80/80	72/75	256/259			
		12.0/16.0	33.4/38.5	81.7/88.1	90/90	81/86	263/269	85.5/91.9	90/100	85/91	267/273			
		18.6/24.8	51.7/59.7	104.6/114.6	110/125	102/111	282/290	108.4/118.4	110/125	106/115	286/294			
	460-3-60	STD	-	-	17.9	20	19	95	19.7	25	21	97		
			13.9	16.7	38.8	40	38	112	40.6	45	40	114		
			16.5	19.8	42.7	45	42	115	44.5	45	44	117		
			27.8	33.4	59.7	60	57	128	61.5	70	59	130		
			33.0	39.7	67.6	70	65	135	69.4	70	67	137		
		41.7	50.2	80.7	90	77	195	82.5	90	79	197			
		MED	-	-	18.7	25	20	114	20.5	25	22	116		
			13.9	16.7	39.6	40	39	131	41.4	45	41	133		
			16.5	19.8	43.5	45	43	134	45.3	50	45	136		
	27.8		33.4	60.5	70	58	147	62.3	70	60	149			
	HIGH	-	-	18.7	25	20	114	20.5	25	22	116			
		13.9	16.7	39.6	40	39	131	41.4	45	41	133			
		16.5	19.8	43.5	45	43	134	45.3	50	45	136			
27.8		33.4	60.5	70	58	147	62.3	70	60	149				
575-3-60	STD	-	-	13.5	15	14	77	17.3	20	19	81			
		17.0	20.4	39.0	40	38	97	42.8	45	42	101			
	MED	-	-	13.9	20	15	92	17.7	20	19	96			
		17.0	20.4	39.4	40	38	112	43.2	45	43	116			
	HIGH	-	-	13.9	20	15	92	17.7	20	19	96			
		17.0	20.4	39.4	40	38	112	43.2	45	43	116			
					34.0	40.9	65.0	70	62	133	68.8	70	66	137

*Nominal values, listed as 208/240V, 480V or 600V as appropriate.
See Legend and calculations on page 57.

Table 34 (cont.) MCA/MOCP DETERMINATION NO C.O. OR UNPWRD C.O.

UNIT RHS	V—Ph—Hz	IFM TYPE	ELEC. HTR		WITHOUT C.O. or UNPWR C.O.							
			Nom (kW)	FLA	WITHOUT P.E.				WITH P.E.			
					MCA	MOCP	DISC. SIZE		MCA	MOCP	DISC. SIZE	
							FLA	LRA			FLA	LRA
102	208/230—3—60	STD	—	—	41.9	50	44	201	45.7	60	48	205
			7.8/10.4	21.7/25.0	69.0/73.2	70/80	69/72	223/226	72.8/77.0	80/80	73/77	227/230
			12.0/16.0	33.4/38.5	83.7/90.0	90/100	82/88	234/240	87.5/93.8	90/100	86/92	238/244
			18.6/24.8	51.7/59.7	106.5/116.5	110/125	103/112	253/261	110.3/120.3	125/125	107/117	257/265
			24.0/32.0	66.7/77.0	125.3/138.2	150/150	120/132	268/278	129.1/142.0	150/150	125/137	272/282
		31.8/42.4	88.4/102.0	152.4/169.4	175/175	145/161	378/405	156.2/173.2	175/175	150/165	382/409	
		MED	—	—	44.2	60	46	238	48.0	60	51	242
			7.8/10.4	21.7/25.0	71.3/75.5	80/80	71/75	260/263	75.1/79.3	80/80	76/79	264/267
			12.0/16.0	33.4/38.5	86.0/92.3	90/100	85/91	271/277	89.8/96.1	90/100	89/95	275/281
	18.6/24.8		51.7/59.7	108.8/118.8	110/125	106/115	290/298	112.6/122.6	125/125	110/119	294/302	
	24.0/32.0		66.7/77.0	127.6/140.5	150/150	123/135	305/315	131.4/144.3	150/150	127/139	309/319	
	31.8/42.4	88.4/102.0	154.7/171.7	175/175	148/164	415/442	158.5/175.5	175/200	152/168	419/446		
	HIGH	—	—	44.2	60	46	238	48.0	60	51	242	
		7.8/10.4	21.7/25.0	71.3/75.5	80/80	71/75	260/263	75.1/79.3	80/80	76/79	264/267	
		12.0/16.0	33.4/38.5	86.0/92.3	90/100	85/91	271/277	89.8/96.1	90/100	89/95	275/281	
		18.6/24.8	51.7/59.7	108.8/118.8	110/125	106/115	290/298	112.6/122.6	125/125	110/119	294/302	
		24.0/32.0	66.7/77.0	127.6/140.5	150/150	123/135	305/315	131.4/144.3	150/150	127/139	309/319	
	31.8/42.4	88.4/102.0	154.7/171.7	175/175	148/164	415/442	158.5/175.5	175/200	152/168	419/446		
	460—3—60	STD	—	—	19.2	25	20	100	21.0	25	22	102
			13.9	16.7	40.0	45	39	117	41.8	45	41	119
			16.5	19.8	43.9	45	43	120	45.7	50	45	122
			27.8	33.4	60.9	70	58	133	62.7	70	60	135
			33.0	39.7	68.8	70	66	140	70.6	80	68	142
		41.7	50.2	81.9	90	78	200	83.7	90	80	202	
MED		—	—	20.0	25	21	119	21.8	25	23	121	
		13.9	16.7	40.8	45	40	136	42.6	45	42	138	
		16.5	19.8	44.7	45	44	139	46.5	50	46	141	
		27.8	33.4	61.7	70	59	152	63.5	70	61	154	
		33.0	39.7	69.6	70	67	159	71.4	80	69	161	
41.7		50.2	82.7	90	79	219	84.5	90	81	221		
HIGH		—	—	20.0	25	21	119	21.8	25	23	121	
		13.9	16.7	40.8	45	40	136	42.6	45	42	138	
		16.5	19.8	44.7	45	44	139	46.5	50	46	141	
	27.8	33.4	61.7	70	59	152	63.5	70	61	154		
	33.0	39.7	69.6	70	67	159	71.4	80	69	161		
41.7	50.2	82.7	90	79	219	84.5	90	81	221			
575—3—60	STD	—	—	15.4	20	16	85	19.2	25	20	89	
		17.0	20.4	40.9	45	40	105	44.7	45	44	109	
	34.0	40.9	66.5	70	63	126	70.3	80	68	130		
	MED	—	—	15.8	20	17	100	19.6	25	21	104	
		17.0	20.4	41.3	45	40	120	45.1	50	44	124	
		34.0	40.9	66.9	70	64	141	70.7	80	68	145	
	HIGH	—	—	15.8	20	17	100	19.6	25	21	104	
		17.0	20.4	41.3	45	40	120	45.1	50	44	124	
		34.0	40.9	66.9	70	64	141	70.7	80	68	145	
34.0		40.9	66.9	70	64	141	70.7	80	68	145		

*Nominal values, listed as 208/240V, 480V or 600V as appropriate.
See Legend and calculations on page 57.

Table 34 (cont.) MCA/MOCP DETERMINATION NO C.O. OR UNPWRD C.O.

Unit RHS	V-Ph-Hz	IFM TYPE	ELEC. HTR		WITHOUT C.O. or UNPWR C.O.									
			Nom (kW)	FLA	WITHOUT P.E.						WITH P.E.			
					MCA	MOCP	DISC. SIZE		MCA	MOCP	DISC. SIZE			
							FLA	LRA			FLA	LRA		
120	208/230-3-60	STD	-	-	46.9	60	49	282	50.7	60	54	286		
			7.8/10.4	21.7/25.0	74.0/78.1	80/80	74/78	304/307	77.8/81.9	80/90	79/82	308/311		
			12.0/16.0	33.4/38.5	88.6/95.0	90/100	88/94	315/321	92.4/98.8	100/100	92/98	319/325		
			24.0/32.0	66.7/77.0	130.3/143.1	150/150	126/138	349/359	134.1/146.9	150/150	130/142	353/363		
			31.8/42.4	88.4/102.0	157.4/174.4	175/175	151/167	459/486	161.2/178.2	175/200	155/171	463/490		
			37.6/50.0	104.2/120.3	177.1/167.2	200/175	169/188	490/523	180.9/171.0	200/175	174/192	494/527		
		MED	-	-	51.7	60	55	325	55.5	60	59	329		
			7.8/10.4	21.7/25.0	78.8/82.9	80/90	80/84	347/350	82.6/86.7	90/90	84/88	351/354		
			12.0/16.0	33.4/38.5	93.4/99.8	100/100	93/99	358/364	97.2/103.6	100/110	98/104	362/368		
	24.0/32.0		66.7/77.0	135.1/147.9	150/150	132/143	392/402	138.9/151.7	150/175	136/148	396/406			
	31.8/42.4		88.4/102.0	162.2/179.2	175/200	157/172	502/529	166.0/183.0	175/200	161/177	506/533			
	37.6/50.0		104.2/120.3	181.9/172.0	200/200	175/193	533/566	185.7/175.8	200/200	179/198	537/570			
	HIGH	-	-	56.7	70	61	334	60.5	70	65	338			
		7.8/10.4	21.7/25.0	83.8/87.9	90/90	86/89	356/359	87.6/91.7	90/100	90/94	360/363			
		12.0/16.0	33.4/38.5	98.4/104.8	100/110	99/105	367/373	102.2/108.6	110/110	103/109	371/377			
		24.0/32.0	66.7/77.0	140.1/152.9	150/175	137/149	401/411	143.9/156.7	150/175	142/154	405/415			
		31.8/42.4	88.4/102.0	167.2/184.2	175/200	162/178	511/538	171.0/188.0	175/200	167/182	515/542			
		37.6/50.0	104.2/120.3	186.9/177.0	200/200	180/199	542/575	190.7/180.8	200/200	185/203	546/579			
	460-3-60	STD	-	-	23.0	30	24	135	24.8	30	26	137		
			13.9	16.7	43.9	45	43	152	45.7	50	46	154		
			16.5	19.8	47.8	50	47	155	49.6	50	49	157		
			33.0	39.7	72.7	80	70	175	74.5	80	72	177		
			41.7	50.2	85.8	90	82	235	87.6	90	84	237		
			50.0	60.1	83.1	90	93	255	84.9	90	95	257		
		MED	-	-	24.8	30	26	157	26.6	30	28	159		
			13.9	16.7	45.7	50	46	174	47.5	50	48	176		
			16.5	19.8	49.6	50	49	177	51.4	60	51	179		
33.0			39.7	74.5	80	72	197	76.3	80	74	199			
41.7			50.2	87.6	90	84	257	89.4	90	86	259			
50.0			60.1	84.9	90	95	277	86.7	90	98	279			
HIGH		-	-	27.8	30	30	161	29.6	35	32	163			
		13.9	16.7	48.7	50	49	178	50.5	60	51	180			
		16.5	19.8	52.6	60	53	181	54.4	60	55	183			
		33.0	39.7	77.5	80	75	201	79.3	80	78	203			
		41.7	50.2	90.6	100	88	261	92.4	100	90	263			
		50.0	60.1	87.9	90	99	281	89.7	100	101	283			
575-3-60	STD	-	-	17.5	20	18	105	21.3	25	23	109			
		17.0	20.4	43.0	45	42	125	46.8	50	46	129			
		34.0	40.9	68.6	70	65	146	72.4	80	70	150			
		51.0	61.3	78.8	90	89	228	82.6	90	93	232			
	MED	-	-	18.3	20	19	116	22.1	25	24	120			
		17.0	20.4	43.8	45	43	136	47.6	50	47	140			
		34.0	40.9	69.4	70	66	157	73.2	80	71	161			
		51.0	61.3	79.6	90	90	239	83.4	90	94	243			
	HIGH	-	-	21.1	25	23	130	24.9	30	27	134			
		17.0	20.4	46.6	50	46	150	50.4	60	50	154			
		34.0	40.9	72.2	80	70	171	76.0	80	74	175			
		51.0	61.3	82.4	90	93	253	86.2	90	97	257			

*Nominal values, listed as 208/240V, 480V or 600V as appropriate.

See Legend and calculations on page 57.

Table 34 (cont.) MCA/MOCP DETERMINATION NO C.O. OR UNPWRD C.O.

UNIT	NOM. V-Ph-Hz	IFM TYPE	ELEC. HTR		NO C.O. or UNPWR C.O.							
			Nom (kW)	FLA	NO PE.				w/ P.E. (pwrd fr/unit)			
					MCA	MOCP	DISC. SIZE		MCA	MOCP	DISC. SIZE	
							FLA	LRA			FLA	LRA
RHS150	208/230-3-60	STD	-	-	62.4	80.0	65.0	366.0	66.2	80.0	70.0	370.0
			12.4/16.5	34.4/39.7	105.4/112.0	110/125	105/111	400/406	109.2/115.8	110/125	109/115	404/410
			19.9/26.5	55.3/63.8	131.5/142.2	150/150	129/139	477/494	135.3/146.0	150/150	133/143	481/498
			25.2/33.5	69.9/80.6	149.8/163.2	150/175	146/158	436/447	153.6/167.0	175/175	150/162	440/451
			32.7/43.5	90.7/104.7	175.8/193.3	200/200	170/186	547/575	179.6/197.1	200/200	174/190	551/579
		37.6/50.0	104.3/120.3	192.8/182.7	200/200	185/204	575/607	196.6/186.5	200/200	190/208	579/611	
		MED	-	-	62.4	80.0	65.0	366.0	66.2	80.0	70.0	370.0
			12.4/16.5	34.4/39.7	105.4/112.0	110/125	105/111	400/406	109.2/115.8	110/125	109/115	404/410
			19.9/26.5	55.3/63.8	131.5/142.2	150/150	129/139	477/494	135.3/146.0	150/150	133/143	481/498
	25.2/33.5		69.9/80.6	149.8/163.2	150/175	146/158	436/447	153.6/167.0	175/175	150/162	440/451	
	32.7/43.5		90.7/104.7	175.8/193.3	200/200	170/186	547/575	179.6/197.1	200/200	174/190	551/579	
	37.6/50.0	104.3/120.3	192.8/182.7	200/200	185/204	575/607	196.6/186.5	200/200	190/208	579/611		
	HIGH	-	-	71.6/70.1	80/80	76/74	394.0	75.4/73.9	90/80	80/79	398.0	
		12.4/16.5	34.4/39.7	114.6/119.7	125/125	115/120	428/434	118.4/123.5	125/125	120/124	432/438	
		19.9/26.5	55.3/63.8	140.7/149.9	150/150	139/148	505/522	144.5/153.7	150/175	144/152	509/526	
		25.2/33.5	69.9/80.6	159.0/170.9	175/175	156/167	464/475	162.8/174.7	175/175	161/171	468/479	
		32.7/43.5	90.7/104.7	185.0/201.0	200/225	180/195	575/603	188.8/204.8	200/225	185/199	579/607	
	37.6/50.0	104.3/120.3	202.0/190.4	225/200	196/213	603/635	205.8/194.2	225/200	200/217	607/639		
	460-3-60	STD	-	-	29.7	40.0	31.0	184.0	31.5	40.0	33.0	186.0
			16.5	19.9	54.5	60	54	204	56.3	60	56	206
			26.5	31.9	69.5	70	68	248	71.3	80	70	250
			33.5	40.3	80.0	90	77	224	81.8	90	79	226
			43.5	52.3	95.0	100	91	289	96.8	100	93	291
		50.0	60.2	89.9	100	100	304	91.7	100	102	306	
MED		-	-	29.7	40.0	31.0	184.0	31.5	40.0	33.0	186.0	
		16.5	19.9	54.5	60	54	204	56.3	60	56	206	
		26.5	31.9	69.5	70	68	248	71.3	80	70	250	
		33.5	40.3	80.0	90	77	224	81.8	90	79	226	
		43.5	52.3	95.0	100	91	289	96.8	100	93	291	
50.0		60.2	89.9	100	100	304	91.7	100	102	306		
HIGH		-	-	33.9	40.0	36.0	198.0	35.7	45.0	38.0	200.0	
		16.5	19.9	58.7	60	59	218	60.5	70	61	220	
		26.5	31.9	73.7	80	73	262	75.5	80	75	264	
	33.5	40.3	84.2	90	82	238	86.0	90	84	240		
	43.5	52.3	99.2	100	96	303	101.0	110	98	305		
50.0	60.2	94.1	100	105	318	95.9	100	107	320			
575-3-60	STD	-	-	24.0	30.0	25.0	136.0	27.8	30.0	30.0	140.0	
		16.5	15.9	43.9	45	43	152	47.7	50	48	156	
		26.5	25.5	55.9	60	55	187	59.7	60	59	191	
		33.5	32.2	64.3	70	62	168	68.1	70	67	172	
		43.5	41.8	76.3	80	73	220	80.1	90	78	224	
	50.0	48.1	72.1	80	81	232	75.9	80	85	236		
	MED	-	-	24.0	30.0	25.0	136.0	27.8	30.0	30.0	140.0	
		16.5	15.9	43.9	45	43	152	47.7	50	48	156	
		26.5	25.5	55.9	60	55	187	59.7	60	59	191	
		33.5	32.2	64.3	70	62	168	68.1	70	67	172	
		43.5	41.8	76.3	80	73	220	80.1	90	78	224	
	50.0	48.1	72.1	80	81	232	75.9	80	85	236		
	HIGH	-	-	27.3	30.0	29.0	139.0	31.1	35.0	33.0	143.0	
		16.5	15.9	47.2	50	47	155	51.0	60	52	159	
		26.5	25.5	59.2	60	58	190	63.0	70	63	194	
33.5		32.2	67.6	70	66	171	71.4	80	70	175		
43.5		41.8	79.6	80	77	223	83.4	90	81	227		
50.0	48.1	75.4	80	84	235	79.2	90	89	239			

*Nominal values, listed as 208/240V, 480V or 600V as appropriate.
See Legend and calculations on page 57.

LEGEND:

- CO - Convenient outlet
- DISC - Disconnect
- FLA - Full load amps
- IFM - Indoor fan motor
- LRA - Locked rotor amps
- MCA - Minimum circuit amps
- MOCP - Maximum over current protection
- PE - Power exhaust
- UNPWRD CO - Unpowered convenient outlet



NOTES:

1. In compliance with NEC requirements for multimotor and combination load equipment (refer to NEC Articles 430 and 440), the overcurrent protective device for the unit shall be fuse or HACR breaker. Canadian units may be fuse or circuit breaker.

2. Unbalanced 3-Phase Supply Voltage

Never operate a motor where a phase imbalance in supply voltage is greater than 2%. Use the following formula to determine the percentage of voltage imbalance.

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

Example: Supply voltage is 230-3-60



AB = 224 v

BC = 231 v

AC = 226 v

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

Determine maximum deviation from average voltage.

(AB) 227 - 224 = 3 v

(BC) 231 - 227 = 4 v

(AC) 227 - 226 = 1 v

Maximum deviation is 4 v.

Determine percent of voltage imbalance.

$$\begin{aligned} \% \text{ Voltage Imbalance} &= 100 \times \frac{4}{227} \\ &= 1.76\% \end{aligned}$$

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

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

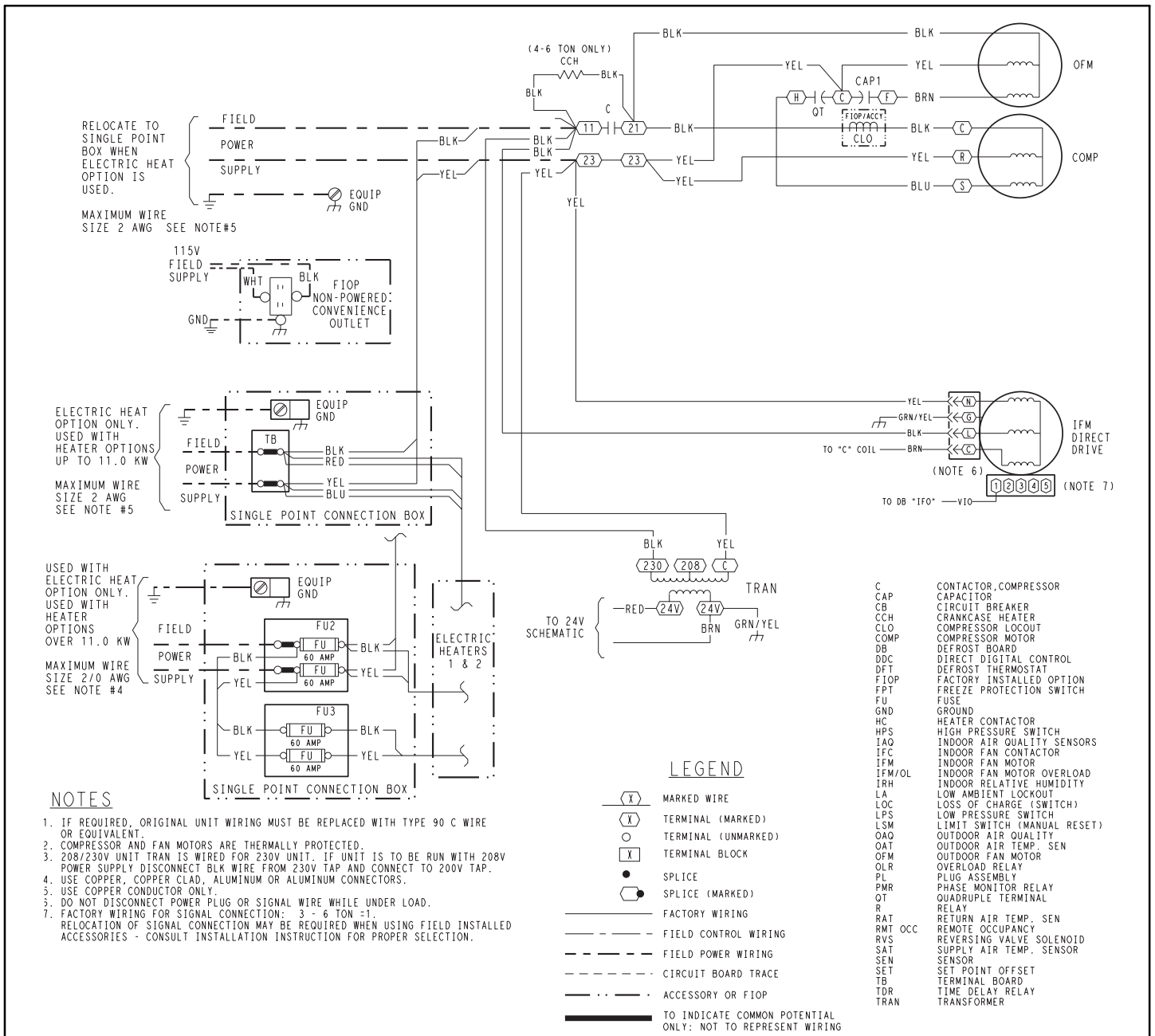


Fig. 9, 1-Stage Typical Power Diagram

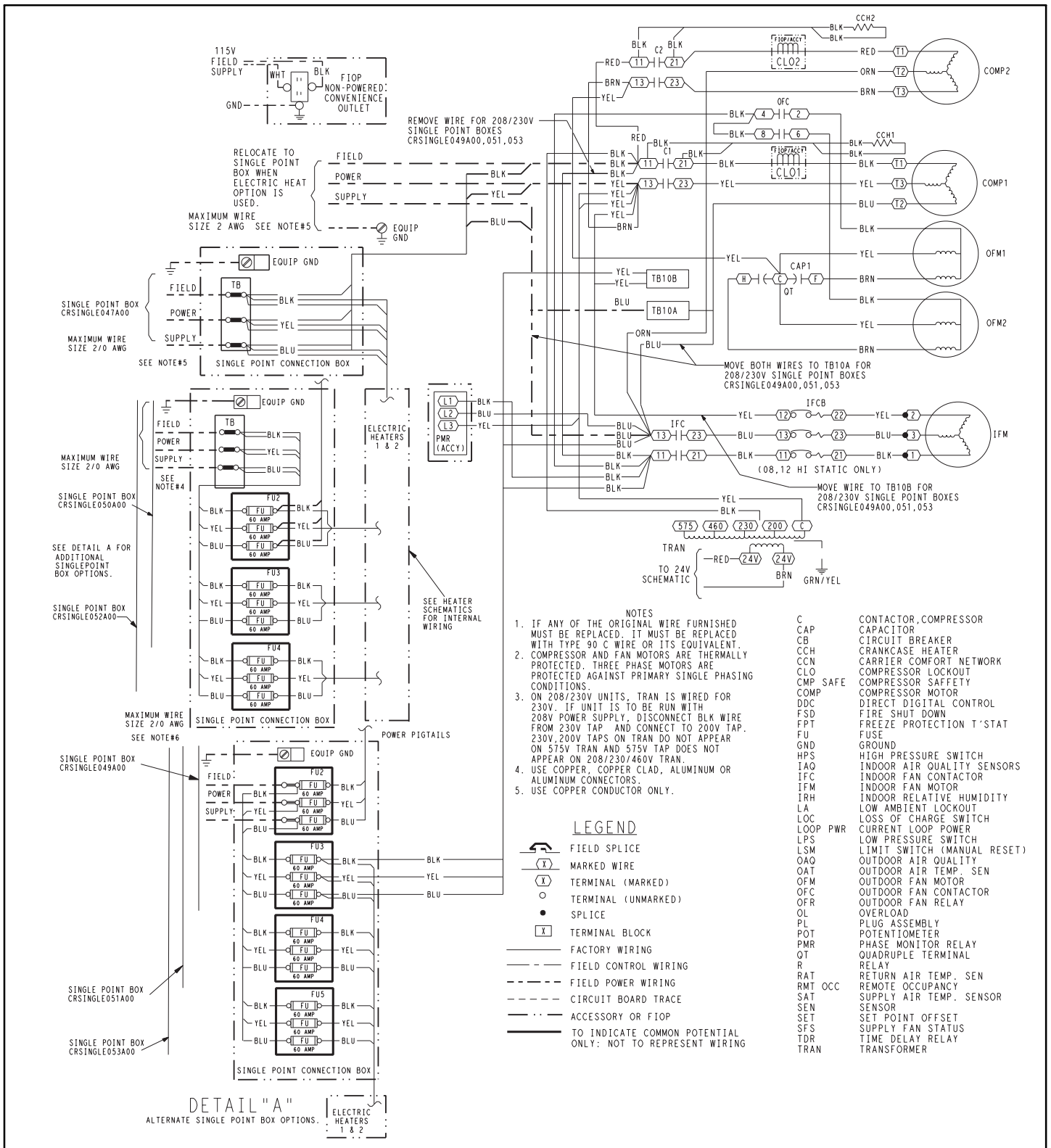


Fig. 10, 2 - Stage Cooling Typical Power Diagram

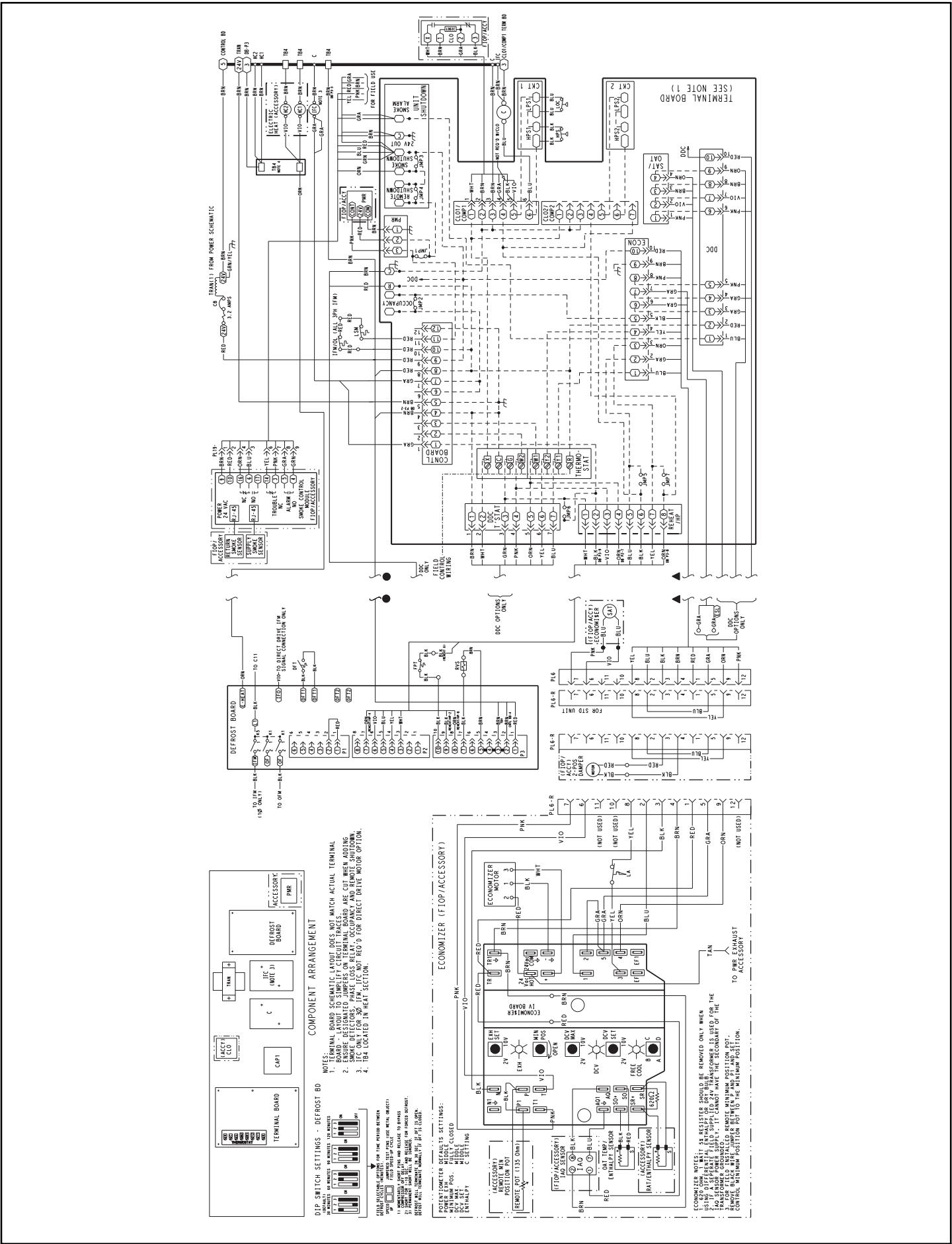


Fig. 11, 1 – Stage Typical Wiring Diagram

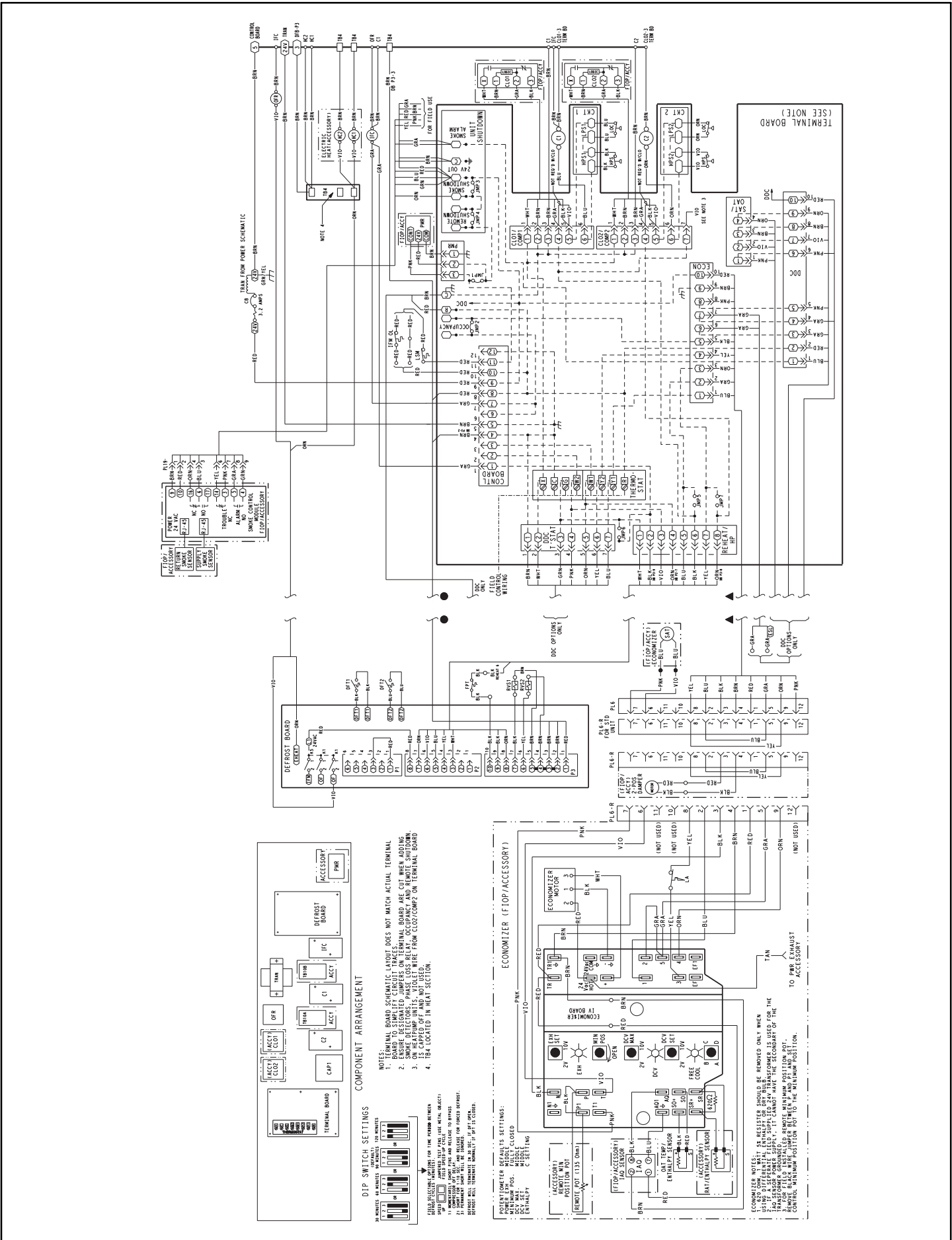


Fig. 12, 2 – Stage Typical Wiring Diagram

SEQUENCE OF OPERATION

Cooling, unit without economizer

When thermostat calls for cooling, terminals G and Y1 are energized. The indoor fan contactor (IFC), reversing valve solenoid (RVS) and compressor contactor are energized and indoor fan motor, compressor, and outdoor fan starts. The outdoor fan motor runs continuously while unit is cooling.

Two-stage models: If Stage 1 cooling does not satisfy the space load, the space temperature will rise until thermostat calls for Stage 2 cooling (Y2 closes). Defrost Board activates Stage 2 Compressor. Reversing valve 2 switches to Cooling position. Compressor 2 contactor is energized; Compressor 2 starts and Circuit 2 operates in Cooling mode.

When Cooling Stage 2 is satisfied, thermostat Y2 opens. Compressor 2 contactor is de-energized; Compressor 2 stops. Reversing Valve 2 remains energized.

When Cooling Stage 1 is satisfied, thermostat Y1 opens. Compressor 1 contactor is de-energized; Compressor 1 stops. Outdoor fan relay is de-energized; outdoor fans stop. After the Fan Delay period, the Indoor fan contactor is de-energized; indoor fan stops (unless Continuous Fan operation has been selected). Reversing Valve 1 remains energized.

Reversing valve solenoids are energized in Cooling modes. Each solenoid will remain energized until the next Heating mode is initiated for this circuit.

Heating, unit without economizer

Upon a request for heating from the space thermostat, terminal W1 will be energized with 24V. The IFC, outdoor fan contactor (OFC), C1, and C2 will be energized. The indoor fan, outdoor fans, and compressor no. 1, and compressor no. 2 are energized and reversing valves are de-energized and switch position.

If the space temperature continues to fall while W1 is energized, W2 will be energized with 24V, and the heater contactor(s) (HC) will be energized, which will energize the electric heater(s).

When the space thermostat is satisfied, W2 will be de-energized first, and the electric heater(s) will be de-energized.

Upon a further rise in space temperature, W1 will be de-energized.

Two compressor models: When the thermostat calls for heating, terminal W1 is energized. Defrost Board de-energizes both reversing valve solenoids and reversing valves move to Heating position. The indoor fan contactor is energized; indoor fan motor starts. Outdoor fan relay is energized; both outdoor fan motors run. Compressor contactors C1 and C2 are energized; both refrigeration circuits operate in Heating mode.

If Stage 1 heating does not satisfy the space load, the space temperature will fall until thermostat calls for Stage 2 heating (W2 closes). Terminal W2 is energized. Defrost Board issues an output at EHEAT. Heater contactor 1 and heater contactor 2 (if installed) are energized; all electric heaters are energized.

When space heating load is partially satisfied, thermostat terminal W2 is de-energized; heater contactors are de-energized and all electric heat is terminated. Stage 1 heating continues.

When the space heating load is fully satisfied, thermostat terminal W1 is also de-energized.

Reversing valve solenoids remain de-energized until the next call for Cooling mode is initiated.

Cooling, unit with economizer

When free cooling is not available, the compressors will be controlled by the zone thermostat. When free cooling is available, the outdoor-air damper is modulated by the economizer control to provide a 50°F to 55°F (10° to 13°C) mixed-air temperature into the zone. As the mixed-air temperature fluctuates above 55°F or below 50°F (13° to 10°C), the dampers will be modulated (open or close) to bring the mixed-air temperature back within control.

If mechanical cooling is utilized with free cooling, the outdoor-air damper will maintain its current position at the time the compressor is started. If the increase in cooling capacity causes the mixed-air temperature to drop below 45°F (7°C), then the outdoor-air damper position will be decreased to the minimum position. If the mixed-air temperature continues to fall, the outdoor-air damper will close. Control returns to normal once the mixed-air temperature rises above 48°F (9°C).

If optional power exhaust is installed, as the outdoor-air damper opens and closes, the power exhaust fans will be energized and deenergized.

If field-installed accessory CO₂ sensors are connected to the economizer control, a demand controlled ventilation strategy will begin to operate. As the CO₂ level in the zone increases above the CO₂ setpoint, the minimum position of the damper will be increased proportionally. As the CO₂ level decreases because of the increase in fresh air, the outdoor-air damper will be proportionally closed.

For economizer operation, there must be a thermostat call for the fan (G). If the unit is occupied and the fan is on, the damper will operate at minimum position. Otherwise, the damper will be closed.

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

On the initial power to the economizer control, it will take the damper up to 2¹/₂ minutes before it begins to position itself. Any change in damper position will take up to 30 seconds to initiate. Damper movement from full closed to full open (or vice versa) will take between 1¹/₂ and 2¹/₂ minutes.

If free cooling can be used as determined from the appropriate changeover command (switch, dry bulb, enthalpy curve, differential dry bulb, or differential enthalpy), then the control will modulate the dampers open to maintain the mixed-air temperature setpoint at 50°F to 55°F (10° to 13°C).

If there is a further demand for cooling (cooling second stage — Y2 is energized), then the control will bring on compressor stage 1 to maintain the mixed-air temperature setpoint. The economizer damper will be open at maximum position. economizer operation is limited to a single compressor.

Heating, unit with economizer

When the room temperature calls for heat through terminal W1, the indoor (evaporator) fan contactor (IFC) and heater contactor no. 1 (HC1) are energized and the reversing valve(s) deenergize and switches position. On units equipped for 2 stages of heat, when additional heat is needed, heater contactor no. 2 is energized through W2. The economizer damper moves to the minimum position. When the thermostat is satisfied, the damper moves to the fully closed position.

Defrost

When the temperature of the outdoor coil drops below 28°F (-2°C) as sensed by the defrost thermostat (DFT2) and the defrost timer is at the end of a timed period (adjustable at 30, 60, 90 or 120 minutes), reversing valve solenoids (RVS1 and RVS2) are energized and the OFC is deenergized. This switches the position of the reversing valves and shuts off the outdoor fan. The electric heaters (if installed) will be energized.

The unit continues to defrost until the coil temperature as measured by DFT2 reaches 65°F (18°C), or the duration of defrost cycle completes a 10-minute period.

During the Defrost mode, if circuit 1 defrosts first, RVS1 will oscillate between Heating and Cooling modes until the Defrost mode is complete.

At the end of the defrost cycle, the electric heaters (if installed) will be deenergized; the reversing valves switch and the outdoor-fan motor will be energized. The unit will now operate in the Heating mode.

If the space thermostat is satisfied during a defrost cycle, the unit will continue in the Defrost mode until the time or temperature constraints are satisfied.

Automatic changeover

When the system selection switch is set at AUTO. position, unit automatically changes from heating operation to cooling operation when the temperature of the conditioned space rises to the cooling level setting. When the temperature of the conditioned space falls to the heating level setting, unit automatically changes from cooling to heating operation (with a 3°F deadband in between).

Continuous air circulation

Turn unit power on. Set system control (field supplied commercial thermostat) at OFF position. Set fan switch at ON position. The indoor-fan contactor is energized through the thermostat switch and the indoor fan runs continuously.

Emergency heat

When the switch is on (thermostat is set to the EM HT position), compressor circuit and outdoor thermostats are bypassed, and the second stage of thermostat energizes the indoor blower and the electric resistance heaters.

Rooftop Packaged Heat Pump

HVAC Guide Specifications

Size Range: 6 to 12.5 Nominal Tons

<u>Section</u>	<u>Description</u>
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23 06 80 Schedules for Decentralized HVAC Equipment

- 23 06 80.13 Decentralized Unitary HVAC Equipment Schedule
- 23 06 80.13.A. Rooftop unit schedule
 1. Schedule is per the project specification requirements.

23 07 16 HVAC Equipment Insulation

- 23 07 16.13 Decentralized, Rooftop Units:
- 23 07 16.13.A. Evaporator fan compartment:
 1. Interior cabinet surfaces shall be insulated with a minimum 1/2-in. thick, minimum 1 1/2 lb density, flexible fiberglass insulation bonded with a phenolic binder, neoprene coated on the air side.
 2. Insulation and adhesive shall meet NFPA 90A requirements for flame spread and smoke generation.
- 23 07 16.13.B. Electric heat compartment:
 1. Aluminum foil-faced fiberglass insulation shall be used.
 2. Insulation and adhesive shall meet NFPA 90A requirements for flame spread and smoke generation.

23 09 13 Instrumentation and Control Devices for HVAC

- 23 09 13.23 Sensors and Transmitters
- 23 09 13.23.A. Thermostats
 1. Thermostat must
 - a. have capability to energize 2 different stages of cooling, and 2 different stages of heating.
 - b. include capability for occupancy scheduling.

23 09 23 Direct-digital Control system for HVAC

- 23 09 23.13
- 23 09 23.13.A.
- 23 09 23.13.B.

23 09 33 Electric and Electronic Control System for HVAC

- 23 09 33.13 Decentralized, Rooftop Units:
- 23 09 33.13.A. General:
 1. Shall be complete with self-contained low-voltage control circuit protected by a resettable circuit breaker on the 24-v transformer side. Transformer shall have 75VA capability.
 2. Shall utilize color-coded wiring.
 3. Shall include a central control terminal board to conveniently and safely provide connection points for vital control functions such as: smoke detectors, phase monitor, economizer, thermostat, loss of charge, freeze switch, high pressure switches.
 4. Unit shall include a minimum of one 8-pin screw terminal connection board for connection of control wiring.
 5. Shall include integrated defrost system to prevent excessive frost accumulation during heating duty, and shall be controlled as follows:
 - a. Defrost shall be initiated on the basis of time and coil temperature.
 - b. A 30,60,90,120 minute timer shall activate the defrost cycle only if the coil temperature is low enough to indicate a heavy frost condition.
 - c. Defrost cycle shall terminate when defrost thermostat are satisfied and shall have a positive termination time of 10 minutes.
 6. Defrost system shall also include:
 - a. Defrost Cycle Indicator LED.
 - b. Dip switch selectable defrost time between 30,60,90 and 120 minutes. Factory set at 30 minutes.
 - c. Molded plug connection to insure proper connection.
- 23 09 33.23.B. Safeties:
 1. Compressor over-temperature, over current.
 2. Loss of charge switch.
 - a. Units with 2 compressors shall have different sized connectors for the circuit 1 and circuit 2 low and high pressure switches. They shall physically prevent the cross-wiring of the safety switches between circuits 1 and 2.
 - b. Loss of charge switch shall use different color wire than the high pressure switch. The purpose is to assist the installer and service technician to correctly wire and or troubleshoot the rooftop unit.

3. High-pressure switch.
 - a. Units with 2 compressors shall have different sized connectors for the circuit 1 and circuit 2 low and high pressure switches. They shall physically prevent the cross-wiring of the safety switches between circuits 1 and 2.
 - b. High pressure switch shall use different color wire than the low pressure switch. The purpose is to assist the installer and service technician to correctly wire and or troubleshoot the rooftop unit.
4. Freeze protection thermostat, evaporator coil (one per refrigerant circuit).
5. Automatic reset, motor thermal overload protector.

23 09 93 Sequence of Operations for HVAC Controls

- 23 09 93.13 Decentralized, Rooftop Units:
 23 09 93.13 INSERT SEQUENCE OF OPERATION

23 40 13 Panel Air Filters

- 23 40 13.13 Decentralized, Rooftop Units:
 23 40 13.13.A. Standard filter section
1. Shall consist of factory-installed, low velocity, throwaway 2-in. thick fiberglass filters of commercially available sizes.
 2. Unit shall use only one filter size. Multiple sizes are not acceptable.
 3. Filters shall be accessible through an access panel with "no-tool" removal as described in the unit cabinet section of this specification (23 81 19.13.H).

23 81 19 Self-Contained Air Conditioners

- 23 81 19.13 Small-Capacity Self-Contained Air Conditioners (RHS072-150)
 23 81 19.13.A. General
1. Outdoor, rooftop mounted, electrically controlled, heating and cooling unit utilizing a(n) hermetic scroll compressor(s) for cooling duty and heat pump for heating duty.
 2. Factory assembled, single-piece heating and cooling rooftop unit. Contained within the unit enclosure shall be all factory wiring, piping, controls, and special features required prior to field start-up.
 3. Unit shall use environmentally safe, R-410A refrigerant.
 4. Unit shall be installed in accordance with the manufacturer's instructions.
 5. Unit must be selected and installed in compliance with local, state, and federal codes.
- 23 81 19.13.B. Quality Assurance
1. Unit meets ASHRAE 90.1-2004 minimum efficiency requirements.
 2. 3-phase units are Energy Star qualified.
 3. Unit shall be rated in accordance with AHRI Standards 210/240 and 340/360.
 4. Unit shall be designed to conform to ASHRAE 15, 2001.
 5. Unit shall be UL-tested and certified in accordance with ANSI Z21.47 Standards and UL-listed and certified under Canadian standards as a total package for safety requirements.
 6. Insulation and adhesive shall meet NFPA 90A requirements for flame spread and smoke generation.
 7. Unit casing shall be capable of withstanding 500-hour salt spray exposure per ASTM B117 (scribed specimen).
 8. Unit casing shall be capable of withstanding Federal Test Method Standard No. 141 (Method 6061) 5000-hour salt spray.
 9. Unit shall be designed in accordance with ISO 9001:2000, and shall be manufactured in a facility registered by ISO 9001:2000.
 10. Roof curb shall be designed to conform to NRCA Standards.
 11. Unit shall be subjected to a completely automated run test on the assembly line. The data for each unit will be stored at the factory, and must be available upon request.
 12. Unit shall be designed in accordance with UL Standard 1995, including tested to withstand rain.
 13. Unit shall be constructed to prevent intrusion of snow and tested to prevent snow intrusion into the control box up to 40 mph.
 14. Unit shake tested to assurance level 1, ASTM D4169 to ensure shipping reliability.
- 23 81 19.13.C. Delivery, Storage, and Handling
1. Unit shall be stored and handled per manufacturer's recommendations.
 2. Lifted by crane requires either shipping top panel or spreader bars.
 3. Unit shall only be stored or positioned in the upright position.
- 23 81 19.13.D. Project Conditions
1. As specified in the contract.
- 23 81 19.13.E. Project Conditions
1. As specified in the contract.
- 23 81 19.13.F. Operating Characteristics
1. Unit shall be capable of starting and running at 115°F (46°C) ambient outdoor temperature, meeting maximum load criteria of AHRI Standard 210/240 or 340/360 at ± 10% voltage.
 2. Compressor with standard controls shall be capable of operation from 25°F (-4°C), ambient outdoor temperatures. Accessory winter start kit is necessary if mechanically cooling at ambient temperatures below 25°F (-4°C).
 3. Unit shall be capable of simultaneous heating duty and defrost cycle operation when using accessory electric heaters.

4. Unit shall discharge supply air vertically or horizontally as shown on contract drawings.
 5. Unit shall be factory configured for vertical supply & return configurations.
 6. Unit shall be field convertible from vertical to horizontal configuration
 7. Unit shall be capable of mixed operation: vertical supply with horizontal return or horizontal supply with vertical return.
- 23 81 19.13.G. Electrical Requirements
1. Main power supply voltage, phase, and frequency must match those required by the manufacturer.
- 23 81 19.13.H. Unit Cabinet
1. Unit cabinet shall be constructed of galvanized steel, and shall be bonderized and coated with a pre-painted baked enamel finish on all externally exposed surfaces.
 2. Unit cabinet exterior paint shall be: film thickness, (dry) 0.003 inches minimum, gloss (per ASTM D523, 60°F): 60, Hardness: H-2H Pencil hardness.
 3. Evaporator fan compartment interior cabinet insulation shall conform to AHRI Standards 210/240 or 340/360 minimum exterior sweat criteria. Interior surfaces shall be insulated with a minimum 1/2-in. thick, 1 lb density, flexible fiberglass insulation, neoprene coated on the air side. Aluminum foil-faced fiberglass insulation shall be used in the heat compartment.
 4. Base of unit shall have a minimum of three locations for thru-the-base electrical connections (field installed), standard.
 5. Base Rail
 - a. Unit shall have base rails on a minimum of 2 sides.
 - b. Holes shall be provided in the base rails for rigging shackles to facilitate maneuvering and overhead rigging.
 - c. Holes shall be provided in the base rail for moving the rooftop by fork truck.
 - d. Base rail shall be a minimum of 16 gauge thickness.
 6. Condensate pan and connections:
 - a. Shall be a sloped condensate drain pan made of a non-corrosive material.
 - b. Shall comply with ASHRAE Standard 62.
 - c. Shall use a 3/4" -14 NPT drain connection, possible either through the bottom or end of the drain pan. Connection shall be made per manufacturer's recommendations.
 7. Top panel:
 - a. Shall be a single piece top panel on 072 thru 120 sizes.
 8. Electrical Connections
 - a. All unit power wiring shall enter unit cabinet at a single, factory-prepared, knockout location.
 - b. Thru-the-base capability
 - (1.) Standard unit shall have a thru-the-base electrical location(s) using a raised, embossed portion of the unit basepan.
 - (2.) Optional, factory-approved, water-tight connection method must be used for thru-the-base electrical connections.
 - (3.) No basepan penetration, other than those authorized by the manufacturer, is permitted.
 9. Component access panels (standard)
 - a. Cabinet panels shall be easily removable for servicing.
 - b. Unit shall have one factory installed, tool-less, removable, filter access panel.
 - c. Panels covering control box, indoor fan, indoor fan motor, and compressors shall have molded composite handles.
 - d. Handles shall be UV modified, composite. permanently attached, and recessed into the panel.
 - e. Screws on the vertical portion of all removable access panel shall engage into heat resistant, molded composite collars.
 - f. Collars shall be removable and easily replaceable using manufacturer recommended parts.
- 23 81 19.13.I. N/A
- 23 81 19.13.J. Coils
1. Standard Aluminum/Copper Coils: on all models.
 - a. Standard evaporator and condenser coils shall have aluminum lanced plate fins mechanically bonded to seamless internally grooved copper tubes with all joints brazed.
 - b. Evaporator coils shall be leak tested to 150 psig, pressure tested to 450 psig, and qualified to UL 1995 burst test at 1775 psig.
 - c. Condenser coils shall be leak tested to 150 psig, pressure tested to 650 psig, and qualified to UL 1995 burst test at 1980 psig.
 2. Optional Pre-coated aluminum-fin condenser coils: on all models.
 - a. Shall have a durable epoxy-phenolic coating to provide protection in mildly corrosive coastal environments.
 - b. Coating shall be applied to the aluminum fin stock prior to the fin stamping process to create an inert barrier between the aluminum fin and copper tube.
 - c. Epoxy-phenolic barrier shall minimize galvanic action between dissimilar metals.
 3. Optional Copper-fin evaporator and condenser coils: on all models.
 - a. Shall be constructed of copper fins mechanically bonded to copper tubes and copper tube sheets.
 - b. Galvanized steel tube sheets shall not be acceptable.
 - c. A polymer strip shall prevent coil assembly from contacting the sheet metal coil pan to minimize potential for galvanic corrosion between coil and pan.

4. Optional E-coated aluminum-fin evaporator and condenser coils: on all models.
 - a. Shall have a flexible epoxy polymer coating uniformly applied to all coil surface areas without material bridging between fins.
 - b. Coating process shall ensure complete coil encapsulation of tubes, fins and headers.
 - c. Color shall be high gloss black with gloss per ASTM D523-89.
 - d. Uniform dry film thickness from 0.8 to 1.2 mil on all surface areas including fin edges.
 - e. Superior hardness characteristics of 2H per ASTM D3363-92A and cross-hatch adhesion of 4B-5B per ASTM D3359-93.
 - f. Impact resistance shall be up to 160 in.-lb (ASTM D2794-93).
 - g. Humidity and water immersion resistance shall be up to minimum 1000 and 250 hours respectively (ASTM D2247-92 and ASTM D870-92).
 - h. Corrosion durability shall be confirmed through testing to be no less than 1000 hours salt spray per ASTM B117-90.

23 81 19.13.K. Refrigerant Components

1. Refrigerant circuit shall include the following control, safety, and maintenance features:
 - a. Fixed orifice metering system shall prevent mal-distribution of two-phase refrigerant by including multiple fixed orifice devices in each refrigeration circuit. Each orifice is to be optimized to the coil circuit it serves.
 - b. Refrigerant filter drier.
 - c. Service gauge connections on suction and discharge lines.
 - d. Pressure gauge access through a specially designed access port in the top panel of the unit.
 - e. Suction line accumulator to provide protection in all operating modes from cooling, heating and reverse cycle switching.
2. There shall be gauge line access port in the top of the rooftop, covered by a black, removable plug.
 - a. The plug shall be easy to remove and replace.
 - b. When the plug is removed, the gauge access port shall enable maintenance personnel to route their pressure gauge lines.
 - c. This gauge access port shall facilitate correct and accurate condenser pressure readings by enabling the reading with the compressor access panel on.
 - d. The plug shall be made of a leak proof, UV-resistant, composite material.
3. Compressors
 - a. Unit shall use one fully hermetic, scroll compressor for each independent refrigeration circuit.
 - b. Models shall be available with single compressor designs on 072 models, plus additional 2 compressor (stage) models from 090-150 sizes.
 - c. Compressor motors shall be cooled by refrigerant gas passing through motor windings.
 - d. Compressors shall be internally protected from high discharge temperature conditions.
 - e. Compressors shall be protected from an over-temperature and over-amperage conditions by an internal, motor overload device.
 - f. Compressor shall be factory mounted on rubber grommets.
 - g. Compressor motors shall have internal line break thermal, current overload and high pressure differential protection.
 - h. Crankcase heaters shall be utilized on all models to protect compressor with specific refrigerant charge.

23 81 19.13.L. Filter Section

1. Filters access is specified in the unit cabinet section of this specification.
2. Filters shall be held in place by a pivoting filter tray, facilitating easy removal and installation.
3. Shall consist of factory-installed, low velocity, throw-away 2-in. thick fiberglass filters.
4. Filters shall be standard, commercially available sizes.
5. Only one size filter per unit is allowed.

23 81 19.13.M. Evaporator Fan and Motor

1. Evaporator fan motor:
 - a. Shall have permanently lubricated bearings.
 - b. Shall have inherent automatic-reset thermal overload protection or circuit breaker.
 - c. Shall have a maximum continuous bhp rating for continuous duty operation; no safety factors above that rating shall be required.
2. Belt-driven Evaporator Fan:
 - a. Belt drive shall include an adjustable-pitch motor pulley.
 - b. Shall use sealed, permanently lubricated ball-bearing type.
 - c. Blower fan shall be double-inlet type with forward-curved blades.
 - d. Shall be constructed from steel with a corrosion resistant finish and dynamically balanced.
 - e. Standard on all 072 - 150 size models.

23 81 19.13.N. Condenser Fans and Motors

1. Condenser fan motors:
 - a. Shall be a totally enclosed motor.
 - b. Shall use permanently lubricated bearings.
 - c. Shall have inherent thermal overload protection with an automatic reset feature.

- d. Shall use a shaft-down design on 072 to 150 models.
2. Condenser Fans:
- a. Shall be a direct-driven propeller type fan.
 - b. Shall have aluminum blades riveted to corrosion-resistant steel spiders and shall be dynamically balanced.
- 23 81 19.13.O. Special Features, Options (factory installed) and Accessories (field installed)
1. Integrated Economizers:
- a. Integrated, gear-driven parallel modulating blade design type capable of simultaneous economizer and compressor operation.
 - b. Independent modules for vertical or horizontal return configurations shall be available. Vertical return modules shall be available as a factory installed option.
 - c. Damper blades shall be galvanized steel with composite gears. Plastic or composite blades on intake or return shall not be acceptable.
 - d. Shall include all hardware and controls to provide free cooling with outdoor air when temperature and/or humidity are below setpoints.
 - e. Shall be equipped with gear driven dampers for both the outdoor ventilation air and the return air for positive air stream control.
 - f. Shall be equipped with low-leakage dampers, not to exceed 2% leakage at 1 in. wg pressure differential.
 - g. Shall be capable of introducing up to 100% outdoor air.
 - h. Shall be equipped with a barometric relief damper capable of relieving up to 100% return air.
 - i. Shall be designed to close damper(s) during loss-of-power situations with spring return built into motor.
 - j. Dry bulb outdoor-air temperature sensor shall be provided as standard. Outdoor air sensor setpoint shall be adjustable and shall range from 40 to 100°F / 4 to 38°C. Additional sensor options shall be available as accessories.
 - k. The economizer controller shall also provide control of an accessory power exhaust unit function. Factory set at 100%, with a range of 0% to 100%.
 - l. The economizer shall maintain minimum airflow into the building during occupied period and provide design ventilation rate for full occupancy. A remote potentiometer may be used to override the damper setpoint.
 - m. Dampers shall be completely closed when the unit is in the unoccupied mode.
 - n. Economizer controller shall accept a 2-10Vdc CO₂ sensor input for IAQ/DCV control. In this mode, dampers shall modulate the outdoor-air damper to provide ventilation based on the sensor input.
 - o. Compressor lockout sensor shall open at 35°F (2°C) and closes at 50°F (10°C).
 - p. Actuator shall be direct coupled to economizer gear. No linkage arms or control rods shall be acceptable.
 - q. Economizer controller shall provide indications when in free cooling mode, in the DCV mode, or the exhaust fan contact is closed.
2. Two-Position Motorized Damper
- a. Damper shall be a Two-Position Motorized Damper. Damper travel shall be from the full closed position to the field adjustable %-open setpoint.
 - b. Damper shall include adjustable damper travel from 25% to 100% (full open).
 - c. Damper shall include single or dual blade, gear driven dampers and actuator motor.
 - d. Actuator shall be direct coupled to damper gear. No linkage arms or control rods shall be acceptable.
 - e. Damper will admit up to 100% outdoor air for applicable rooftop units.
 - f. Damper shall close upon indoor (evaporator) fan shutoff and/or loss of power.
 - g. The damper actuator shall plug into the rooftop unit's wiring harness plug. No hard wiring shall be required.
 - h. Outside air hood shall include aluminum water entrainment filter
3. Manual damper
- a. Manual damper package shall consist of damper, air inlet screen, and rain hood which can be preset to admit up to 50% outdoor air for year round ventilation.
4. Head Pressure (low ambient operation) Control Package
- a. Controller shall control coil head pressure by condenser-fan speed modulation or condenser-fan cycling and wind baffles.
 - b. Shall consist of solid-state control and condenser-coil temperature sensor to maintain condensing temperature between 90°F (32°C) and 110°F (43°C) at outdoor ambient temperatures down to -20°F (-29°C).
5. Condenser Coil Hail Guard Assembly
- a. Shall protect against damage from hail.
 - b. Shall be louvered design.
6. Unit-Mounted, Non-Fused Disconnect Switch (80 amp max.):
- a. Switch shall be factory-installed, internally mounted.
 - b. National Electric Code (NEC) and UL approved non-fused switch shall provide unit power shutoff.
 - c. Shall be accessible from outside the unit
 - d. Shall provide local shutdown and lockout capability.
7. Convenience Outlet:
- a. Non-Powered convenience outlet.

- (1.) Outlet shall be powered from a separate 115–120v power source.
 - (2.) A transformer shall not be included.
 - (3.) Outlet shall be factory–installed and internally mounted with easily accessible 115–v female receptacle.
 - (4.) Outlet shall include 15 amp GFI receptacles.
 - (5.) Outlet shall be accessible from outside the unit.
8. Thru–the–Base Connectors:
 - a. Kits shall provide connectors to permit electrical connections to be brought to the unit through the unit basepan.
 - b. Minimum of three connection locations per unit.
 9. Fan/Filter Status Switch:
 - a. Switch shall provide status of indoor evaporator fan (ON/OFF) or filter (CLEAN/DIRTY).
 - b. Status shall be displayed either over communication bus (when used with direct digital controls) or with an indicator light at the thermostat.
 10. Propeller Power Exhaust:
 - a. Power exhaust shall be used in conjunction with an integrated economizer.
 - b. Independent modules for vertical or horizontal return configurations shall be available.
 - c. Horizontal power exhaust shall be mounted in return ductwork.
 - d. Power exhaust shall be controlled by economizer controller operation. Exhaust fans shall be energized when dampers open past the 0–100% adjustable setpoint on the economizer control.
 11. Roof Curbs (Vertical):
 - a. Full perimeter roof curb with exhaust capability providing separate air streams for energy recovery from the exhaust air without supply air contamination.
 - b. Formed galvanized steel with wood nailer strip and shall be capable of supporting entire unit weight.
 - c. Permits installation and securing of ductwork to curb prior to mounting unit on the curb.
 12. High–Static Indoor Fan Motor(s) and Drive(s) (072–150):
 - a. High–static motor(s) and drive(s) shall be factory–installed to provide additional performance range.
 13. Thru–the–Bottom Utility Connectors:
 - a. Kit shall provide connectors to permit electrical connections to be brought to the unit through the basepan.
 14. Fan/Filter Status Switch:
 - a. Provides status of indoor (evaporator) fan (ON/ OFF) or filter (CLEAN/DIRTY). Status shall be displayed over communication bus when used with direct digital controls or with an indicator light at the thermostat.
 15. Outdoor Air Enthalpy Sensor:
 - a. The outdoor air enthalpy sensor shall be used to provide single enthalpy control. When used in conjunction with a return air enthalpy sensor, the unit will provide differential enthalpy control. The sensor allows the unit to determine if outside air is suitable for free cooling.
 16. Return Air Enthalpy Sensor:
 - a. The return air enthalpy sensor shall be used in conjunction with an outdoor air enthalpy sensor to provide differential enthalpy control.
 17. Indoor Air Quality (CO₂) Sensor:
 - a. Shall be able to provide demand ventilation indoor air quality (IAQ) control.
 - b. The IAQ sensor shall be available in duct mount. The setpoint shall have adjustment capability.
 18. Smoke detectors (where applicable):
 - a. Shall be a Four–Wire Controller and Detector.
 - b. Shall be environmental compensated with differential sensing for reliable, stable, and drift–free sensitivity.
 - c. Shall use magnet–activated test/reset sensor switches.
 - d. Shall have tool–less connection terminal access.
 - e. Shall have a recessed momentary switch for testing and resetting the detector.
 - f. Controller shall include:
 - (1.) One set of normally open alarm initiation contacts for connection to an initiating device circuit on a fire alarm control panel.
 - (2.) Two Form–C auxiliary alarm relays for interface with rooftop unit or other equipment.
 - (3.) One Form–C supervision (trouble) relay to control the operation of the Trouble LED on a remote test/reset station.
 - (4.) Capable of direct connection to two individual detector modules.
 - (5.) Can be wired to up to 14 other duct smoke detectors for multiple fan shutdown applications.
 19. Time Guard
 - a. Shall prevent compressor short cycling by providing a 5–minute delay (± 2 minutes) before restarting a compressor after shutdown for any reason.
 - b. One device shall be required per compressor.

20. Electric Heat:

a. Heating Section

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