

INSTALLATION GUIDE

Versatec 500 Rooftop



R-454B
60Hz

IGV5-0013W

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⚠ WARNING

WARNING: Before performing service or maintenance operations on the system, turn off main power switches to the unit. Electrical shock could cause serious personal injury.

WARNING: All products are designed, tested, and manufactured to comply with the latest publicly released and available edition of UL 60335-2-40 for electrical safety certification. All field electrical connections must follow the National Electrical Code (NEC) guide standards and / or any local codes that may be applicable for the installation.

WARNING: Only factory authorized personnel are approved for startup, check test and commissioning of this unit.

INSTALLER: Please take the time to read and understand these instructions prior to any installation. Installer must give a copy of this manual to the owner.

⚠ WARNING

This appliance is not intended for use by persons (including children) with reduced physical, sensory, or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the appliance by a person responsible for their safety.

Children should be supervised to ensure that they do not play with the appliance.

Keep this manual in a safe place in order to provide your service personnel with necessary information.

NOTICE

NOTICE: To avoid equipment damage, do not leave the system filled in a building without heat during cold weather, unless adequate freeze protection levels of antifreeze are used. Heat exchangers do not fully drain and will freeze unless protected, causing permanent damage.

Definition of Warnings and Symbols

⚠ DANGER	Indicates a situation that results in death or serious injury.
⚠ WARNING	Indicates a situation that could result in death or serious injury.
⚠ CAUTION	Indicates a situation that could result in minor or moderate injury.
NOTICE	Indicates a situation that could result in equipment or property damage.



All Versatec 500 Series (Rooftop) models are safety listed and conforms to UL STDS 60335-1 & 60335-2-40 / Certified to CSA STDSC22.2 60335-1 & 60335-2-40 through ETL. Performance listed with AHRI in accordance with ASHRAE/ANSI/AHRI/ISO Standard 13256-1 (Models: 036, 048, 060, 072, 096, 120). Performance verified in accordance with ASHRAE/ANSI/AHRI/ISO Standard 13256-1 (Models: 150, 180, 181, 240, 300, 360)

General Installation Information

NOTICE: Do not store or install units in corrosive environments or in locations subject to temperature or humidity extremes. Corrosive conditions and high temperature or humidity can significantly reduce performance, reliability, and service life.

NOTICE: A minimum of 24 in. clearance should be allowed for access to front access panel.

NOTICE: To avoid equipment damage, DO NOT use these units as a source of heating or cooling during the construction process. The mechanical components and filters can quickly become clogged with construction dirt and debris, which may cause system damage and void product warranty.

For the Installer

If you are NOT sure how to install or operate the unit, contact your dealer.

Installing and servicing air conditioning and heating equipment can be hazardous due to system pressure and electrical components. Only trained and qualified service personnel should install, repair or service heating and air conditioning equipment. When working on heating and air conditioning equipment, observe precautions in the literature, tags and labels attached to the unit and other safety precautions that may apply.

This manual contains specific information about the required qualification of the working personnel for maintenance, service and repair operations. Every working procedure that affects safety means shall only be carried out by competent persons.

Examples for such working procedures are:

- breaking into the refrigerating circuit;
- opening of sealed components or ventilated enclosures.

Follow all safety codes. Wear safety glasses and work gloves. Use quenching cloth for brazing operations. Have fire extinguisher available for all brazing operations. Follow all procedures to remain in compliance with national gas regulations.

Prior to beginning work on systems containing FLAMMABLE REFRIGERANTS, safety checks are necessary to ensure that the risk of ignition is minimized. Work shall be undertaken under a controlled procedure so as to minimise the risk of a flammable gas or vapor being present while the work is being performed. All maintenance staff and others working in the local area shall be instructed on the nature of work being carried out. Work in confined spaces shall be avoided.

The area shall be checked with an appropriate refrigerant detector prior to and during work, to ensure the technician is aware of potentially toxic or flammable atmospheres. Ensure that the leak detection equipment being used is suitable for use with all applicable refrigerants, i.e. non-sparking, adequately sealed or intrinsically safe.

If any hot work is to be conducted on the refrigerating equipment or any associated parts, appropriate fire extinguishing equipment shall be available to hand. Have a dry powder or CO2 fire extinguisher adjacent to the charging area.

No person carrying out work in relation to a REFRIGERATING SYSTEM which involves exposing any pipe work shall use any sources of ignition in such a manner that it may lead to the risk of

fire or explosion. All possible ignition sources, including cigarette smoking, should be kept sufficiently far away from the site of installation, repairing, removing and disposal, during which refrigerant can possibly be released to the surrounding space. Prior to work taking place, the area around the equipment is to be surveyed to make sure that there are no flammable hazards or ignition risks. "No Smoking" signs shall be displayed.

Where electrical components are being changed, they shall be fit for the purpose and to the correct specification. At all times the manufacturer's maintenance and service guidelines shall be followed. If in doubt, consult the manufacturer's technical department for assistance.

The following checks shall be applied to installations using FLAMMABLE REFRIGERANTS:

- the actual REFRIGERANT CHARGE is in accordance with the room size within which the refrigerant containing parts are installed;
- the ventilation machinery and outlets are operating adequately and are not obstructed;
- if an indirect refrigerating circuit is being used, the secondary circuit shall be checked for the presence of refrigerant;
- marking to the equipment continues to be visible and legible. Markings and signs that are illegible shall be corrected;
- refrigerating pipe or components are installed in a position where they are unlikely to be exposed to any substance which may corrode refrigerant containing components, unless the components are constructed of materials which are inherently resistant to being corroded or are suitably protected against being so corroded.

WARNING

If the appliance locks out on E5: FREEZE PROTECTION FPI. The appliance must set for 5 hours before being restarted.

Instructions for Equipment Using R-454B Refrigerant

WARNING

- **Do NOT pierce or burn**
- **Do NOT use means to accelerate the defrosting process or to clean the equipment, other than those recommended by the manufacturer**
- **Be aware that refrigerants may not contain an odor**

WARNING

- **The Appliance should be stored so as to prevent mechanical damage and in a room without continuously operating ignition sources (example: open flames, an operating gas appliance or an operating electric heater)**

General Installation Information

WARNING

Ventilated Area: ensure that the area is in the open or that it is adequately ventilated before breaking into the system of conducting any hot work. A degree of ventilation should continue during the period that the work is carried out. The ventilation should safely disperse any released refrigerant and preferably expel it. Keep ventilation area clear of obstructions!

WARNING

Do NOT use potential sources of ignition in searching for or detection of refrigerant leaks. A halide torch (or any other detector using a naked flame) shall not be used.

The following leak detection methods are deemed acceptable for all refrigerant systems. Electronic leak detectors may be used to detect refrigerant leaks but, in the case of FLAMMABLE REFRIGERANTS, the sensitivity may not be adequate, or may need re-calibration. (Detection equipment shall be calibrated in a refrigerant-free area.) Ensure that the detector is not a potential source of ignition and is suitable for the refrigerant used. Leak detection equipment shall be set at a percentage of the LFL. of the refrigerant and shall be calibrated to the refrigerant employed, and the appropriate percentage of gas (25 % maximum) is confirmed. Leak detection fluids are also suitable for use with most refrigerants but the use of detergents containing chlorine shall be avoided as the chlorine may react with the refrigerant and corrode the copper pipe-work. NOTE Examples of leak detection fluids are bubble method, fluorescent method agents If a leak is suspected, all naked flames shall be removed/extinguished. If a leakage of refrigerant is found which requires brazing, all of the refrigerant shall be recovered from the system, or isolated (by means of shut off valves) in a part of the system remote from the leak. Removal of refrigerant shall follow the procedure outlined in this manual.

Installation Site

Maximum altitude for this equipment shall not exceed 3000 m. (9843 ft.) and should not be installed at an altitude greater than 3000 m. For installation only in locations not accessible to the general public.

WARNING

For appliances using A2L refrigerants connected via an air duct system to one or more rooms, only auxiliary devices approved by the appliance manufacturer or declared suitable with the refrigerant shall be installed in connecting ductwork. The manufacturer shall list in the instructions all approved auxiliary devices by manufacturer and model number for use with the specific appliance, if those devices have a potential to become an ignition source.

Installation Space Requirements

NOTE: Equipment with refrigerant charge less than 63 oz does not have a minimum floor area requirement and does not require a refrigerant leak detection sensor.

The sensor might be added as a feature.

WARNING

Equipment containing R-454B refrigerant shall be installed, operated, and stored in a room with floor area larger than the area defined in the “Minimum Floor Area” chart based on the total refrigerant charge in the system. This requirement applies to indoor equipment with or without a factory refrigerant leakage sensor.

CAUTION

This equipment requires connections to a water supply. See the “Water Quality Guidelines” section of this manual for more information on the quality of water required for this operation. If a potable water source is used for this equipment’s water supply, the source water supply shall be protected against back siphonage by the equipment.

WARNING

This equipment comes with a factory installed Refrigerant Detection Device which is capable of determining it’s specified end-of-life and replacement instructions. Refrigerant sensors for refrigerant detection systems shall only be replaced with sensors specified by the appliance manufacture.

WARNING

Take sufficient precautions in case of refrigerant leakage. If refrigerant gas leaks, ventilate the area immediately.
POSSIBLE RISKS: Excessive refrigerant concentrations in a closed room can lead to oxygen deficiency

WARNING

ALWAYS recover the refrigerant. Do NOT release them directly into the environment. Follow handling instructions carefully in compliance with national regulations.

General Installation Information: Refrigerant Detection and Mitigation



WARNING

Check that cabling will not be subject to wear, corrosion, excessive pressure, vibration, sharp edges or any other adverse environmental effects. The check shall also take into account the effects of aging or continual vibration from sources such as compressors or fans.

Determination of Minimum Floor Area

Determine the total refrigerant charge in the system. In packaged heat pump systems, the factory charge should be the total charge for the system and there should be no reason for adding charge in the field. The equipment serial plate and unit physical data table should serve as reference for the total charge. Heat pumps with a refrigerant charge of 63 oz or greater come with a refrigerant mitigation system factory installed.

The heat pump equipment is ducted and utilizes the blower for leak mitigation. Once the refrigerant leak sensor detects leaked refrigerant, the compressor and electric heat will be deactivated, and the blower will operate in the continuous fan setting. This will occur for a minimum of 5 minutes and an alarm in the control will remain until the sensor no longer detects a leak.

The minimum area where the unit can be installed, A_{min} , is based on the refrigerant charge and installation height of the unit, shown in the table below. Since this heat pump is ducted and is utilizing the blower for leak mitigation, the ducted/zoned floor area must be greater than the TA_{min} shown in the table below. If the heat pump is zoned, the dampers must open to allow the heat pump blower to mitigate the refrigerant leak. The continuous blower speed must be set higher than Q_{min} , shown in the table below. The continuous fan setting is factory set to exceed the minimum airflow required for mitigation.

H_{alt}		AF
meter	ft	
0	0	1.00
200	656	1.00
400	1312	1.00
600	1968	1.00
800	2624	1.02
1000	3280	1.05
1200	3937	1.07
1400	4593	1.10
1600	5249	1.12
1800	5905	1.15
2000	6561	1.18
2200	7217	1.21
2400	7874	1.25
2600	8530	1.28
2800	9186	1.32
3000	9842	1.36
3200	Not Recommended	

When the location of the installation is above 1969 ft (600m), the Altitude Adjustment Factor in the table is needed to calculate the minimum room size”.


Example: For instance, if you are installing a O60 vertical unit. If your elevation is 5249 ft (1600m) your area factor would be 1.12. If your charge weight is 76oz (2.154kg) at a floor height installation. The A_{min} would be 127.0 square Ft or (11.9 square meters). Take 113.4 square Ft X 1.12 for a new A_{min} of 127.0 square feet (11.9 square meters).

General Installation Information: Refrigerant Detection and Mitigation

Model	*H _o			Charge		A _{min}		Q _{min}		TA _{min}	
	in	ft	m	lbm	oz	ft2	m2	cfm	m3/h	ft2	m2
036	84	7	2.13	4.38	70	31	2.9	118	201	66	6.09
048	84	7	2.13	5.25	84	45	4.2	142	241	79	7.31
060	84	7	2.13	5.84	93.5	56	5.2	158	269	88	8.14
072	84	7	2.13	7.19	115	85	7.9	194	330	108	10.01
096	84	7	2.13	5.25	84	45	4.2	142	241	79	7.31
120	84	7	2.13	5.84	93.5	56	5.2	158	269	88	8.14
144	84	7	2.13	7.19	115	85	7.9	194	330	108	10.01
180	84	7	2.13	10.00	160	164	15.2	270	460	150	13.93
181	84	7	2.13	10.00	160	164	15.2	270	460	150	13.93
240	84	7	2.13	13.28	212.5	289	26.8	359	611	199	18.5
300	84	7	2.13	13.50	216	299	27.7	365	621	202	18.81
360	84	7	2.13	13.28	212.5	289	26.8	359	611	199	18.5

*H_o set at max 7ft to account for ceiling height.

Serial Plate

Unit Nomenclature and Serial Number	MODEL: _____ JOB #: _____	S/N: 999999999 Manufactured Fort Wayne, Indiana USA			
Unit Voltage	Electrical Service				
	VAC/PHASE	Hz	FLA	MIN CIRCUIT AMPS	MIN/MAX VAC
Fuse/Breaker Size	Short-Circuit Current			Fuse Circuit Breaker Size	
	kA Symmetrical	0	Max Fuse Time Delay	US Max HACR	Canada Max
	V Maximum	0			
Component Electrical Information	Component				
	Qty	LRA	RLA/MRC	FLA	VAC
	PH	HP	KW		
Unit Restrictions	Other Data				
	Min. distance to combustible surface (in/cm)				/
	Max. outlet air temperature (F/C)				/
	Max. external static pressure (in water/Pa)				/
	Max. inlet water temperature (F/C)				/
	Max. inlet water pressure (in water/Pa)				/
Auxillary Heater Kit Electrical Installation	CK BOX	Heater Model	Supply Circuit	KW	Min CIR AMP
	Mark heater installed with "X" in check box. For actual heater rating, see marking inside of unit.		Cocher "X" pour indiquer le modele installe pour les caracteristiques nominales des unites de chauffe voir le marquage a l'interieur.		
Unit Comments	Comments				
Installation Requirements	Warning: Floor area for storage or operation must meet the minimum requirements shown. Minimum room area (operating or storage) 0 ft ² 0 m ² Minimum installation height 0 ft 0 m Note: For Minimum room areas at higher installation heights, see installation and operation manual. "For Installation Only in Locations Not Accessible to the General Public"				
Refrigerant Type and Charge Amount	MRC=Maximum Rated Current (only applicable for variable speed compressors/drives) Maximum allowable refrigerant pressure = PSIG/Mpa: /				
	Refrigerant Type	Refrigerant Charge/Circuit	Design Pressure		
	R-454B	OZ kg	psi	Mpa	
			High:		
			Low:		



General Installation Information

Typical Unit Installation

Rigging the Unit

A rigging illustration and center-of-gravity dimensional data table are shown in this manual. Rigging is typically through a clevis (shackle) attached to each of the four cabinets corners (six on models 180-360) and then employing a lifting bar (spanner) to protect the unit. The unit is then set directly on the curb.

Unit Location and Mounting

If the unit is installed at ground level (horizontal discharge design), elevate it above the snow line. Provide concrete footings at each support location with a full perimeter support structure or a slab foundation for support (mounting on a curb can be used). The unit's operating and corner loading weights when constructing a footing foundation. If anchoring is required, anchor the unit to the slab using hold down bolts or isolators. To minimize the transmission of vibrations into the building, install isolators. For rooftop applications, ensure the roof is strong enough to support the combined unit and support structural weight.

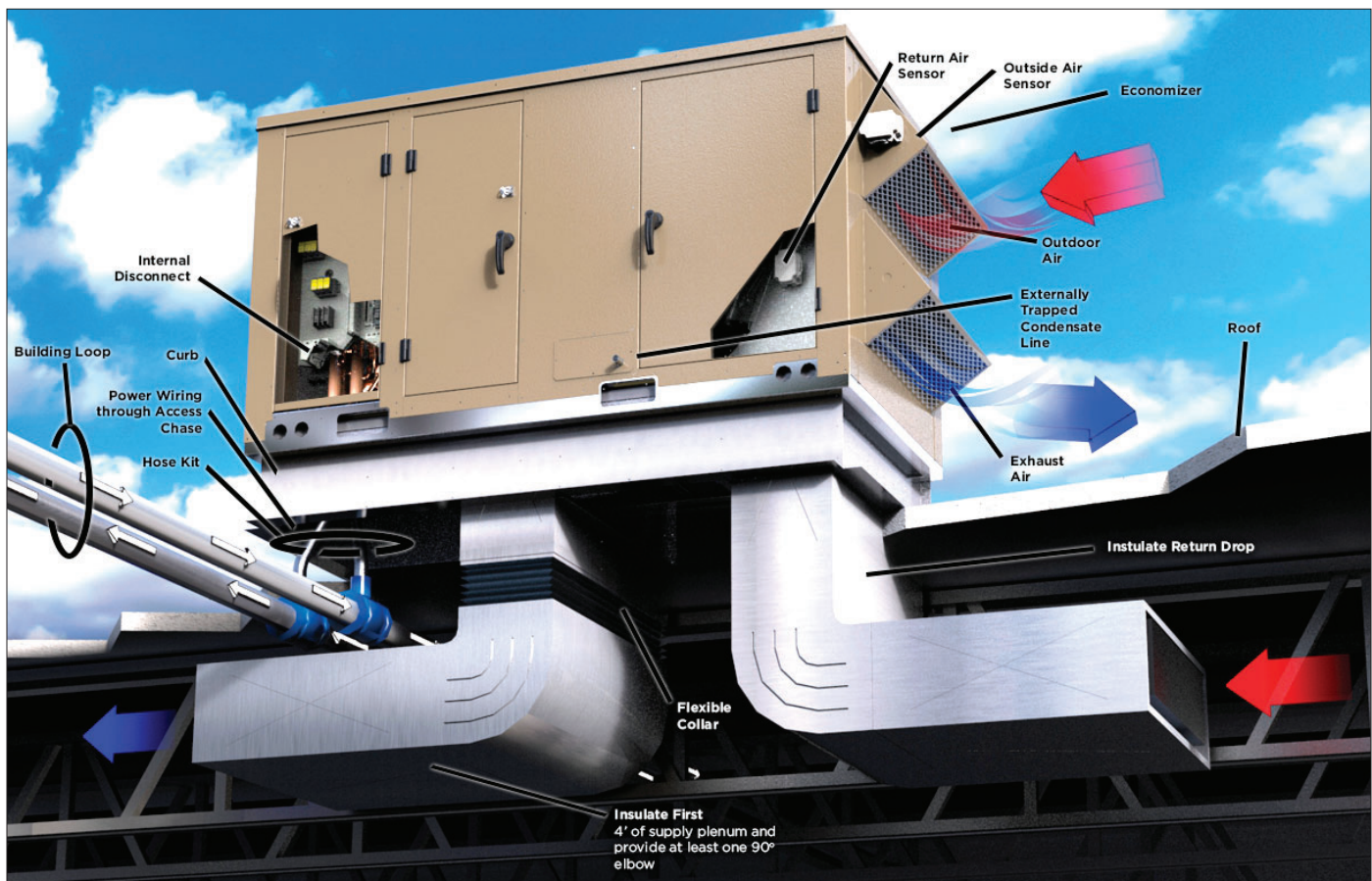
Duct Work

When attaching the duct work to the unit, provide a watertight flexible connector at the unit to prevent

operating sounds from transmitting through the ductwork. Elbows with turning vanes or splitters are recommended to minimize air noise due to turbulence and to reduce static pressure. All outdoor ductwork between the unit and the structure should be weather proofed after installation is complete. See dimensional data for connection sizes.

Roof Curbs

The roof curbs consist of a full perimeter enclosure to support the unit. Before installing any roof curb, verify that the correct roof curb is applied to the unit and that the roof curb includes the necessary gaskets and hardware. Also verify that the proposed installation location provides the required clearance for proper unit operation and ensure that the curb is level and square. The top surface of the curb must be true to assure an adequate curb-to-unit seal. Step-by-step curb assembly and installation instructions ship with each accessory roof curb kit. Follow the instructions carefully to assure proper fit-up when the unit is set into place. To assure proper condensate flow during operation, the unit (and curb) must be level. If the unit is elevated, a field constructed catwalk around the unit is strongly recommended to provide easy access for unit maintenance and service. Recommendations for installing the supply air and return air ductwork joining the roof curb are included in the curb instruction booklet.



General Installation Information cont.

Horizontal Discharge/Return Conversion

Units are factory shipped in the downflow discharge configuration, but can be field converted to a horizontal discharge configuration (036-144, plenum fan only). To convert remove the side panel covers of the discharge and return opening and seal provided panels.

Water Piping

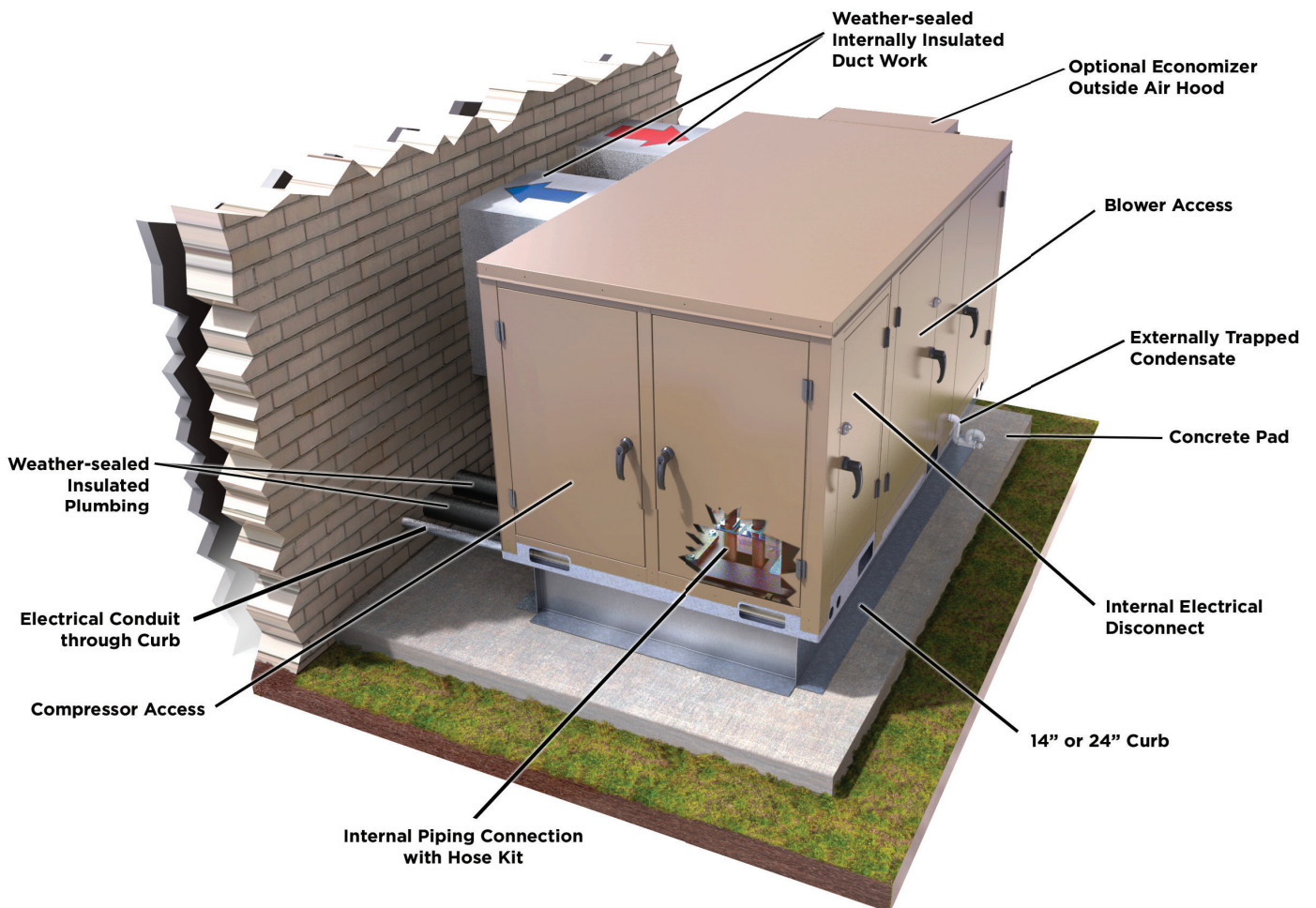
All piping access is within the curb in the compressor section. Piping is usually designed as 'reverse return' to equalize flow paths through each unit. A short flexible pressure rated hose is used to make connection to the fixed building piping system. This hose is typically stainless steel braid and includes a swivel fitting on one end for easy removal and is flexible to help isolate the unit for quieter operation. Isolation valves for servicing, y-strainers for filtering and memory-stop flow valve or a balancing valve can be provided for consistent water flow through the unit.

All unit source water connections are fittings that accept a male pipe thread (MPT). Insert the connectors by hand, then tighten the fitting with a wrench to provide a leakproof

joint. The open and closed loop piping system should include pressure/temperature ports for serviceability. The proper water flow must be provided to each unit whenever the unit operates. To assure proper flow, use pressure/ temperature ports to determine the flow rate. These ports should be located at the supply and return water connections on the unit. The proper flow rate cannot be accurately set without measuring the water pressure drop through the refrigerant-to-water heat exchanger. Never use flexible hoses smaller than the inside diameter of the water connection at the unit. Limit hose length to 10 feet per connection. Check carefully for water leaks.

Installing the Unit

Remove and discard the compressor hold down shipping bolt located at the front of the compressor mounting bracket prior to setting the unit in place. All piping and electric connections are 'thru the curb'. Follow installation manual detailed notes.



General Installation Information cont.

Acoustical Considerations and Equipment Sound Performance

Sound Performance

The Versatec Packaged Rooftop is third party sound rated in accordance with ARI WSHP 260. Please consult WaterFurnace Sound Performance Data Catalog for details on the AHRI standard and sound performance data.

Recommendations for Noise Reduction

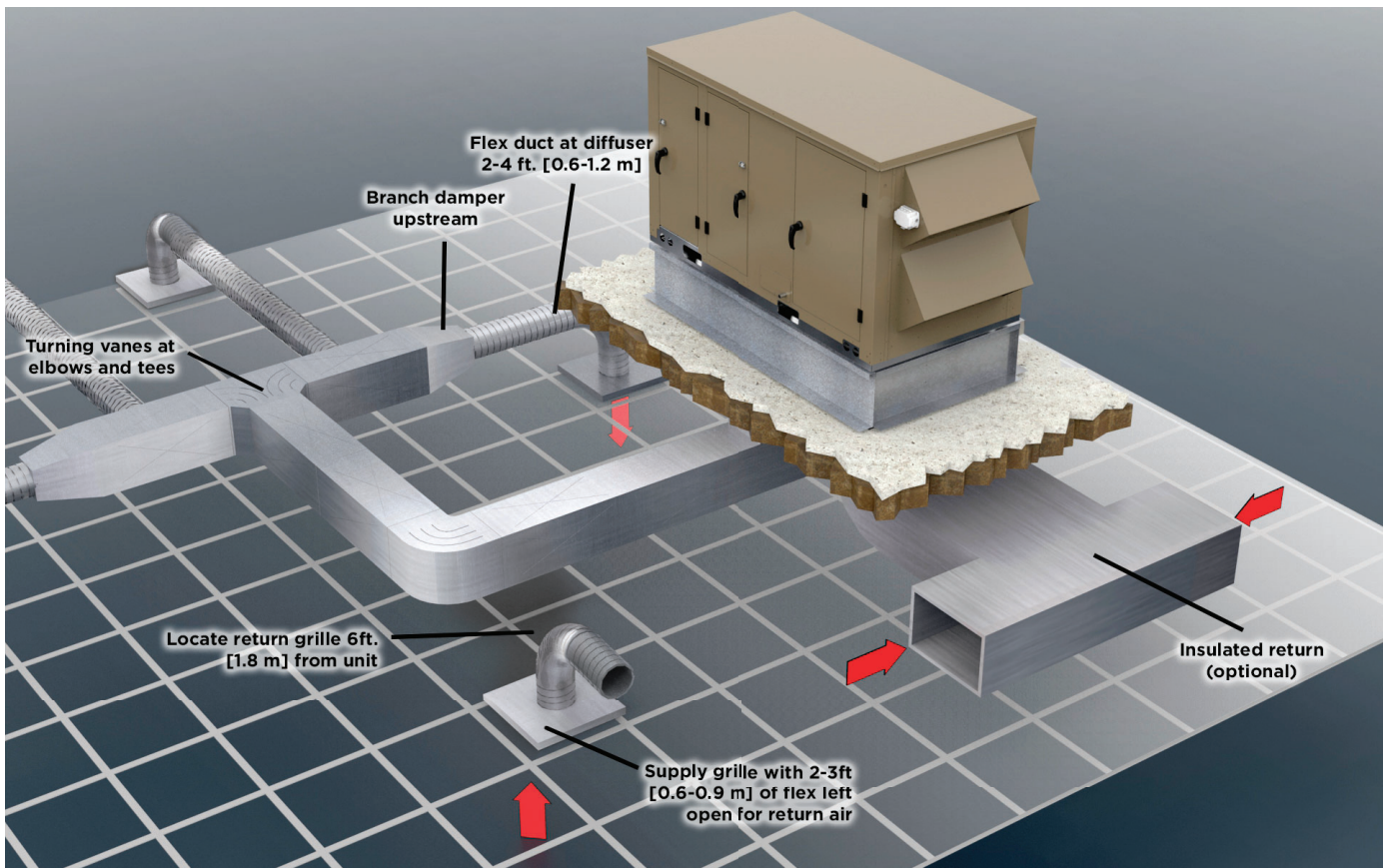
Unit Location

- Specify equipment with quietest sound power ratings
- Do not locate units above areas with a required NC 40 or less
- Space WSHP at least 10 ft (3m) apart to avoid noise summing of multiple units in a space.

Ductwork

- Ensure return air grilles will not allow line of site noise to transfer to adjacent space. Use a sound barrier or some other material to isolate the grille from the unit. A supply grille, boot and short piece of flex duct pointed away from the unit can greatly attenuate equipment noise.
- Use a canvas isolation duct connector at the supply and return duct connection of the unit.

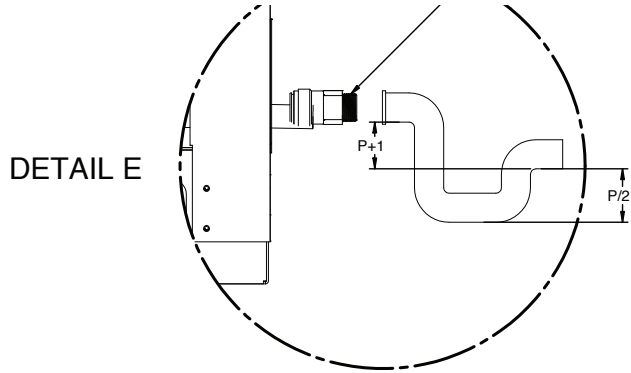
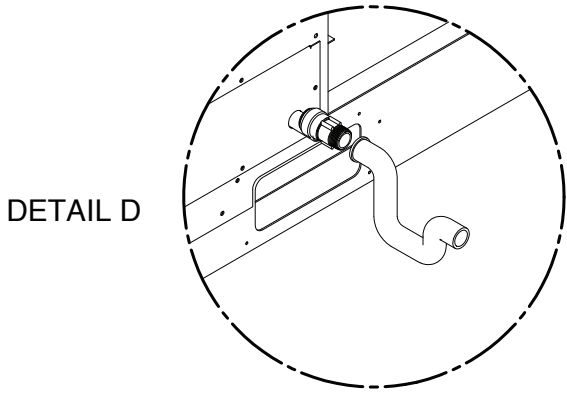
- Internally line the discharge and return duct within the first 4-8 feet of unit with acoustic insulation. Install an internally lined 'L' shaped return duct elbow at return grille. Face the elbow away from adjacent units.
- Always install at least one 90° elbow in the discharge duct to eliminate line of sight noise transmission of the blower.
- Use turning vanes at all elbows and tees to reduce turbulence.
- Limit supply duct velocities to less than 1,000 fpm
- Design and install ductwork as stiff as possible
- Allow 3 duct diameters both up and down stream of the unit before any fittings or transitions are installed.
- Use duct sealant on all duct joints.
- Install a short (2-4') of flex duct on all branch ducts just prior to discharge boot or diffuser to reduce vibration and duct sound prior to delivery in the room.
- Locate the branch duct balancing damper as far away from the diffuser as possible.
- In ceiling plenum systems, install an internally lined 'L' shaped return duct elbow at unit. Face the elbow away from adjacent units (horizontal).



Installation Information - Condensate Drain

The internal condensate drain assembly consists of a stainless steel drain tube which is connected to a stainless steel drain pan. The drain pan is installed in the equipment so that it is sloping in multiple directions to ensure the drain tube is at the lowest point to promote proper drainage. The drains are not internally trapped therefore this must be done in the field.

036-360 Condensate



* P=STATIC PRESSURE
INSIDE DRAIN PAN

Water Quality

In ground water situations where scaling could be heavy or where biological growth such as iron bacteria will be present, a closed loop system is recommended. The heat exchanger coils in ground water systems may, over a period of time, lose heat exchange capabilities due to a buildup of mineral deposits inside. These can be cleaned, but only by a qualified service mechanic, as special solutions and pumping equipment are required. Hot water generator coils can likewise become scaled and possibly plugged. In areas

with extremely hard water, the owner should be informed that the heat exchanger may require occasional flushing. Failure to adhere to the guidelines in the water quality table could result in loss of warranty.

Units with cupronickel heat exchangers are recommended for open loop applications due to the increased resistance to build-up and corrosion, along with reduced wear caused by acid cleaning.

Material		Copper	90/10 Cupronickel	316 Stainless Steel
pH	Acidity/Alkalinity	7 - 9	7 - 9	7 - 9
Scaling	Calcium and Magnesium Carbonate	(Total Hardness) less than 350 ppm	(Total Hardness) less than 350 ppm	(Total Hardness) less than 350 ppm
Corrosion	Hydrogen Sulfide	Less than 0.5 ppm (rotten egg smell appears at 0.5 ppm)	10 - 50 ppm	Less than 1 ppm
	Sulfates	Less than 125 ppm	Less than 125 ppm	Less than 200 ppm
	Chlorine	Less than 0.5 ppm	Less than 0.5 ppm	Less than 0.5 ppm
	Chlorides	Less than 20 ppm	Less than 125 ppm	Less than 300 ppm
	Carbon Dioxide	Less than 50 ppm	10 - 50 ppm	10 - 50 ppm
	Ammonia	Less than 2 ppm	Less than 2 ppm	Less than 20 ppm
	Ammonia Chloride	Less than 0.5 ppm	Less than 0.5 ppm	Less than 0.5 ppm
	Ammonia Nitrate	Less than 0.5 ppm	Less than 0.5 ppm	Less than 0.5 ppm
	Ammonia Hydroxide	Less than 0.5 ppm	Less than 0.5 ppm	Less than 0.5 ppm
	Ammonia Sulfate	Less than 0.5 ppm	Less than 0.5 ppm	Less than 0.5 ppm
	Total Dissolved Solids (TDS)	Less than 1000 ppm	1000 - 1500 ppm	1000 - 1500 ppm
	LSI Index	+0.5 to -0.5	+0.5 to -0.5	+0.5 to -0.5
Iron Fouling (Biological Growth)	Iron, FE ²⁺ (Ferrous) Bacterial Iron Potential	< 0.2 ppm	< 0.2 ppm	< 0.2 ppm
	Iron Oxide	Less than 1 ppm, above this level deposition will occur	Less than 1 ppm, above this level deposition will occur	Less than 1 ppm, above this level deposition will occur
Erosion	Suspended Solids	Less than 10 ppm and filtered for max. of 600 micron size	Less than 10 ppm and filtered for max. of 600 micron size	Less than 10 ppm and filtered for max. of 600 micron size
	Threshold Velocity (Fresh Water)	< 6 ft/sec	< 6 ft/sec	< 6 ft/sec

NOTES: Grains = ppm divided by 17
mg/L is equivalent to ppm

2/22/12

Freeze Detection

For Aurora Base Control, set SW2-1, FP1, on the printed circuit board for applications using a closed loop antifreeze solution to 15°F [-9.4°C]. On applications using an open loop/ground water system (or closed loop no antifreeze), set this dip switch to 30°F [-1.1°C], the factory default setting. (Refer to the Dip Switch Field Selection table).

Electrical Connections

General

Be sure the available power is the same voltage and phase as that shown on the unit serial plate. Line and low voltage wiring must be done in accordance with local codes or the National Electric Code, whichever is applicable.

Power Connection

Connect the incoming line voltage wires to L1 and L2 of the contactor for single-phase unit. Consult the Electrical Data tables for correct fuse sizes.

208 Volt Operation

All 208/230 units are factory wired for 230 volt operation. For 208 volt operation, the red and blue transformer wires must be switched on terminal strip PS.



CAUTION: When installing a unit with a forward curve, variable speed ECM blower motor in 460/60/3 voltage, a neutral wire is required to allow proper unit operation.

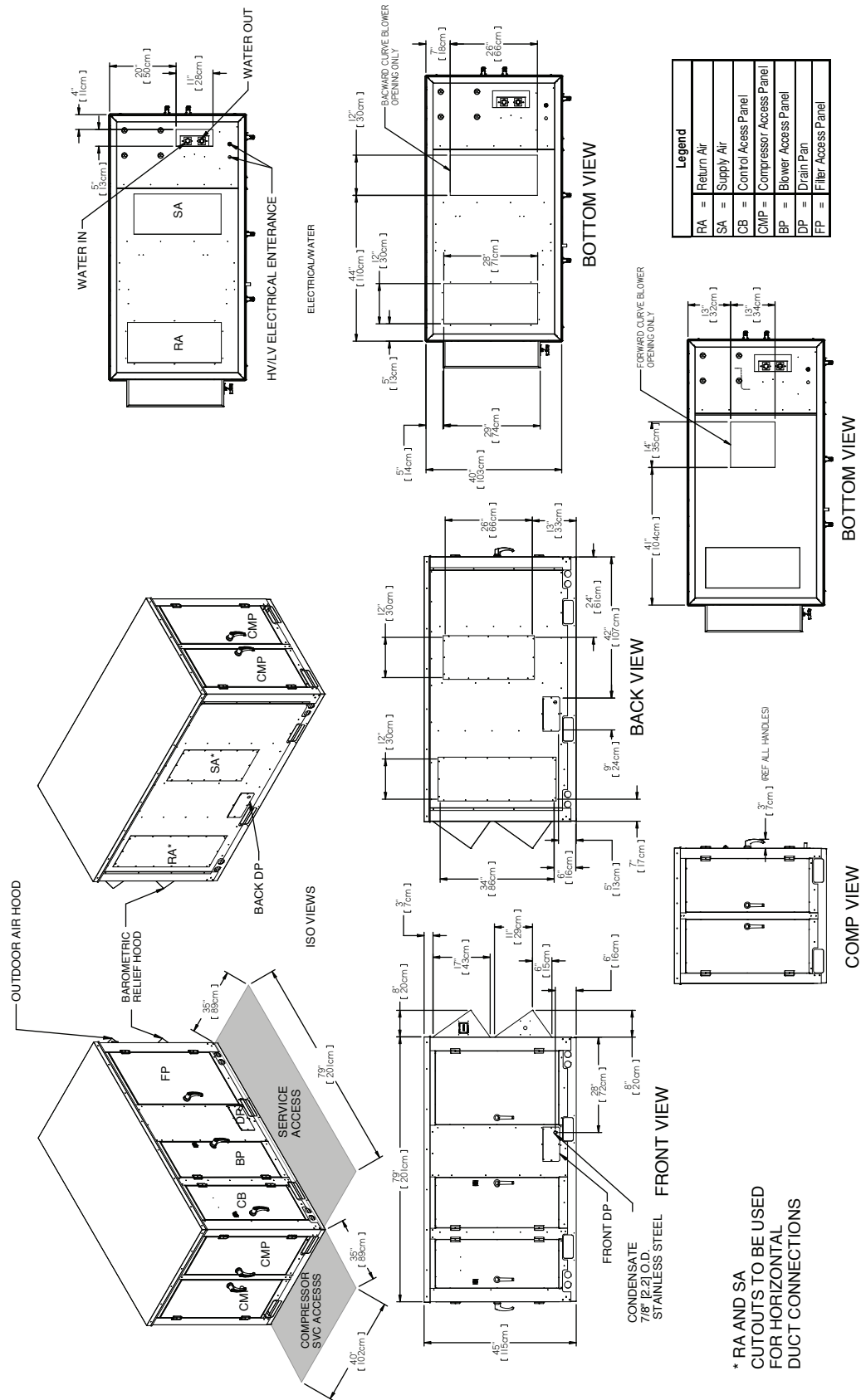
Aurora Base Control Box



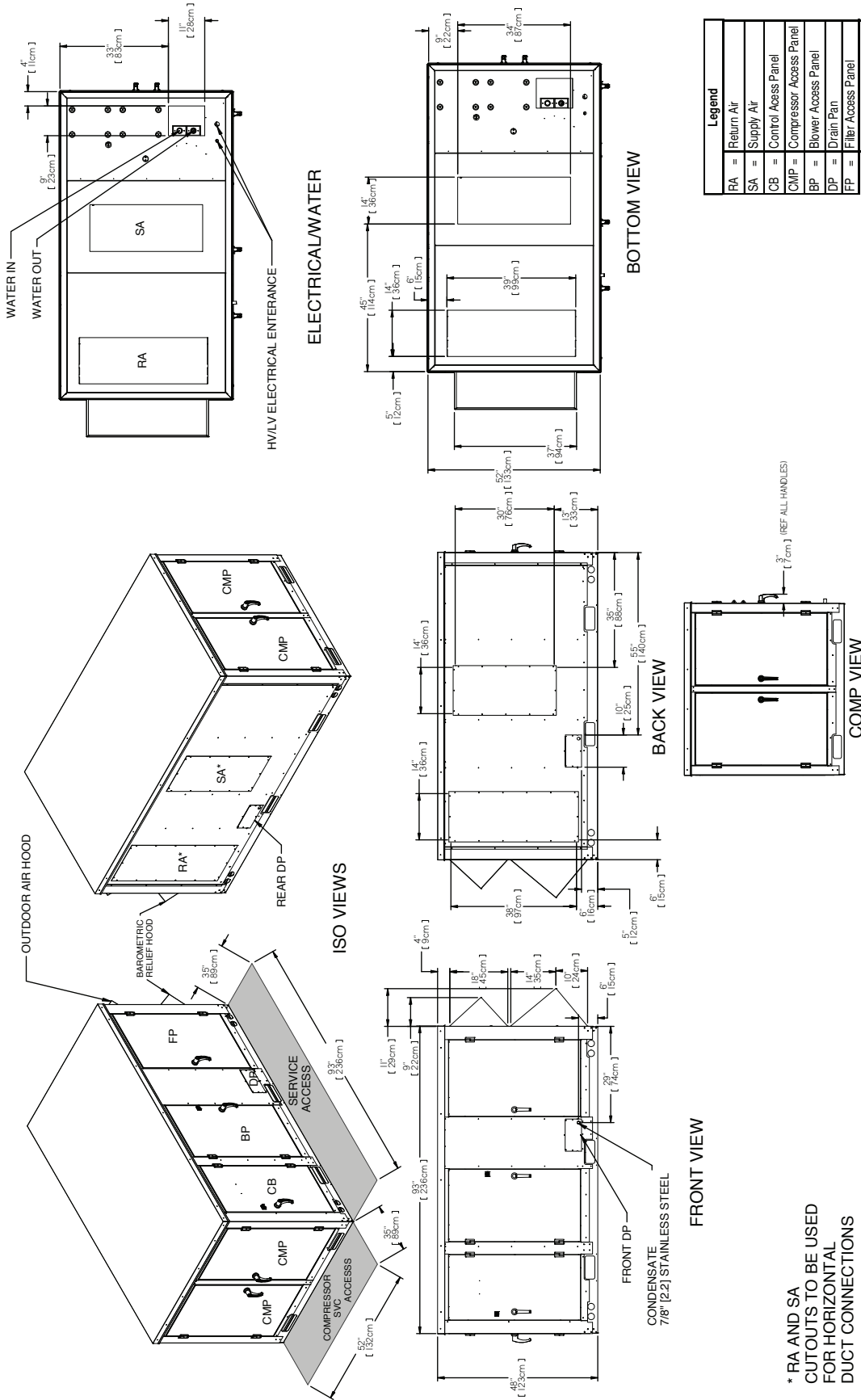
Compressor Crankcase Heaters

Each compressor is equipped with a crankcase heater that is controlled through a relay so that the heater is only operational when the compressor is off. The crankcase heater warms the oil temperature in the compressor to prevent liquid refrigerant migration back into the compressor where it could condense and mix with oil. This can cause a number of problems such as lack of lubrication on bearings and therefore lead to mechanical failure of the compressor.

Dimensional Data (036-072)

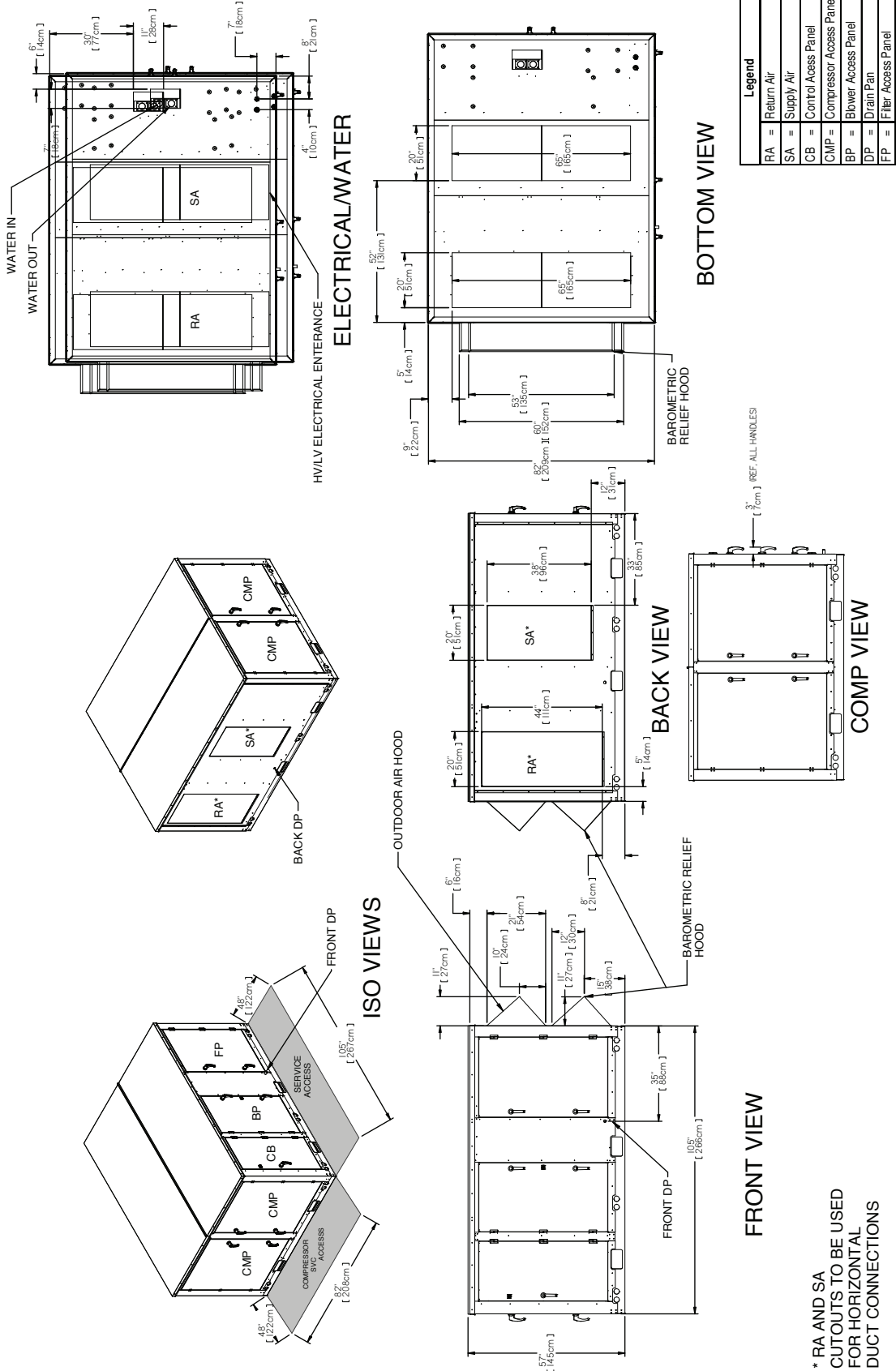


Dimensional Data (096-144)



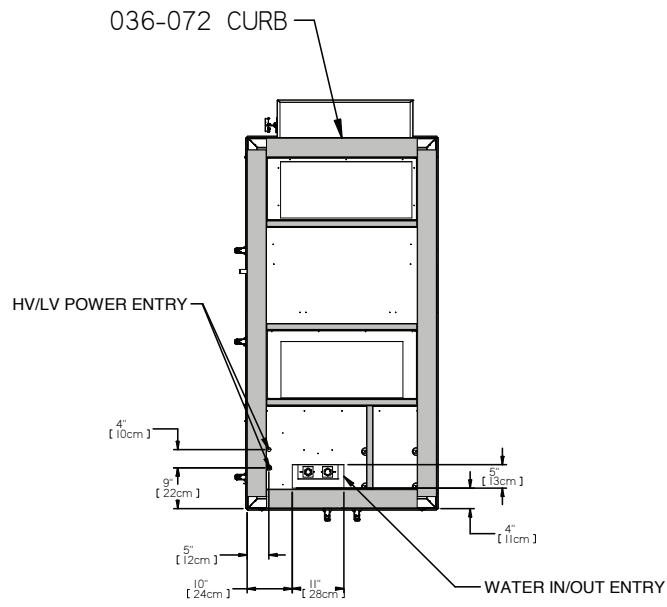
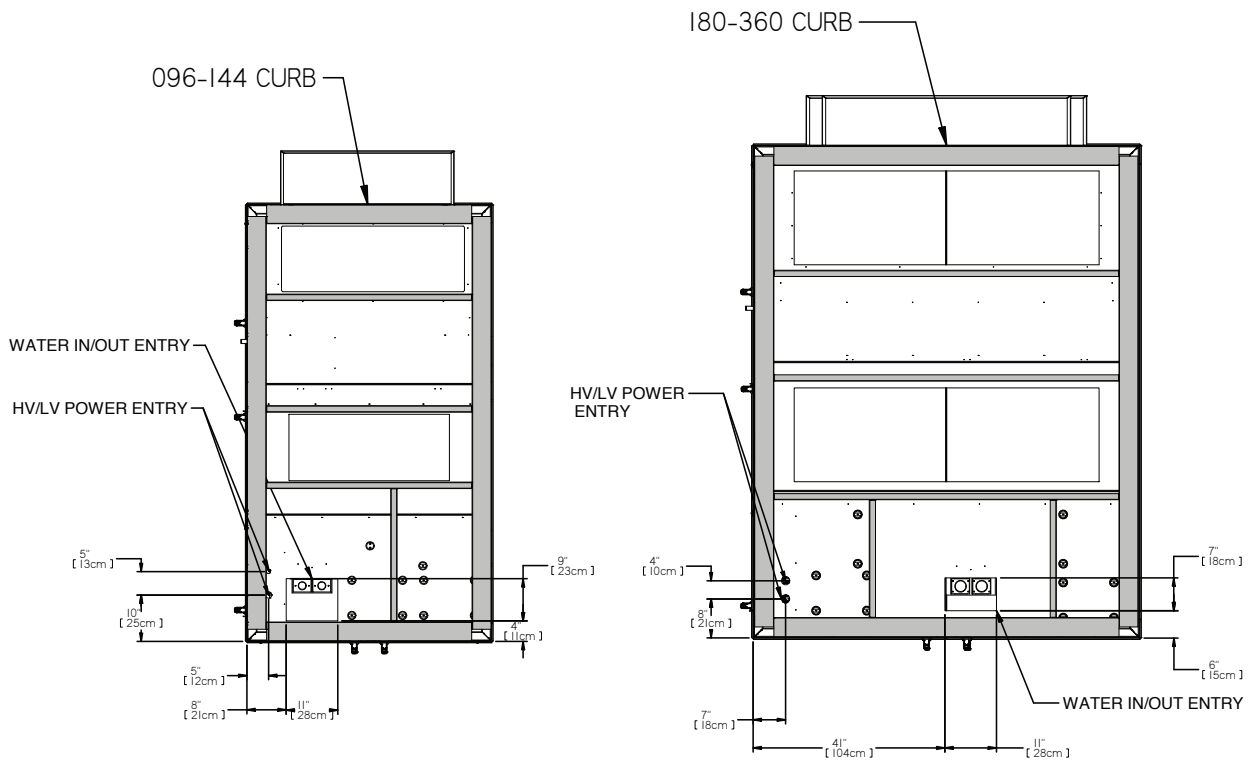
* RA AND SA
CUTOUTS TO BE USED
FOR HORIZONTAL
DUCT CONNECTIONS

Dimensional Data (180-360)

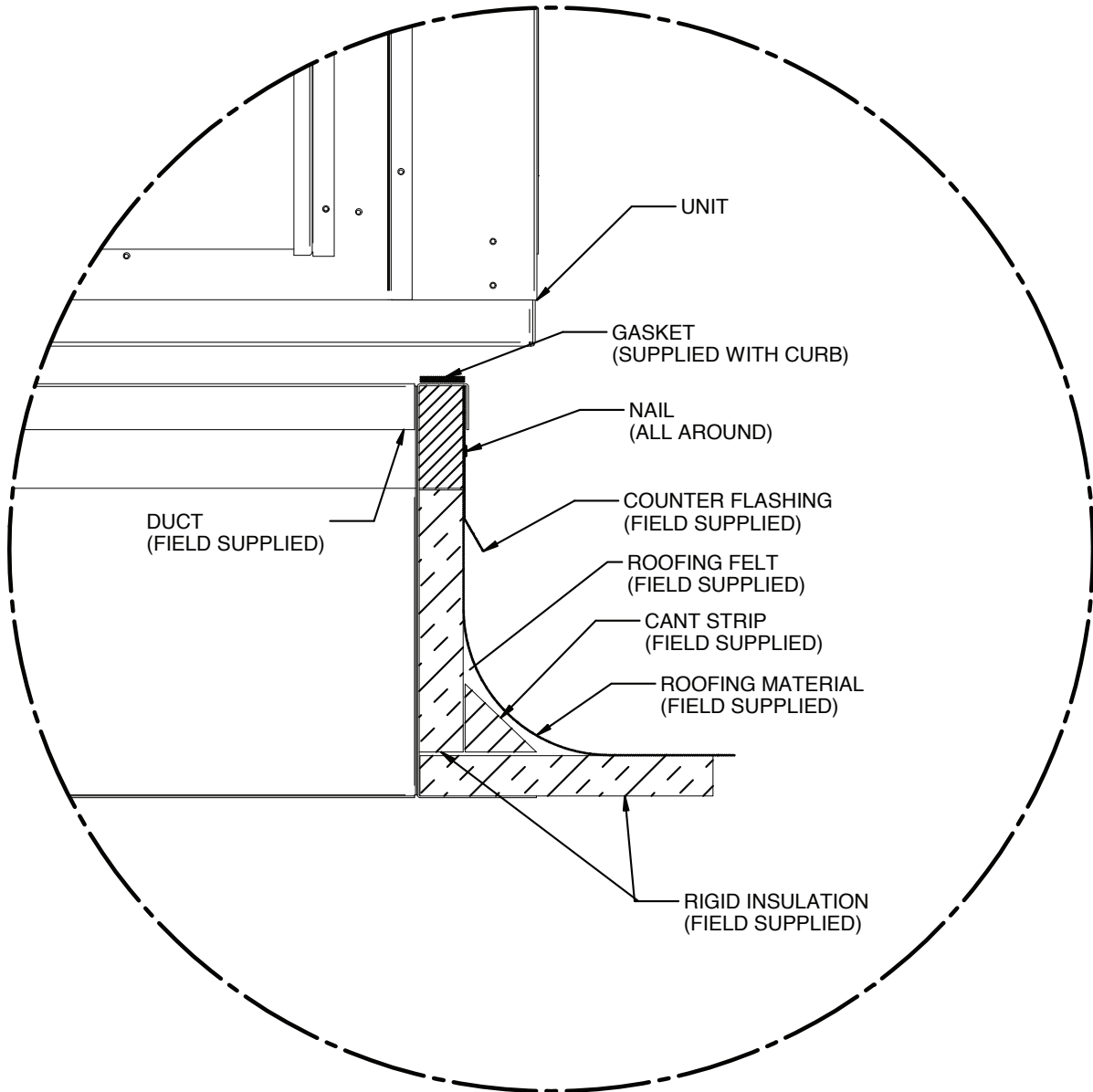


* RA AND SA
CUTOUTS TO BE USED
FOR HORIZONTAL
DUCT CONNECTIONS

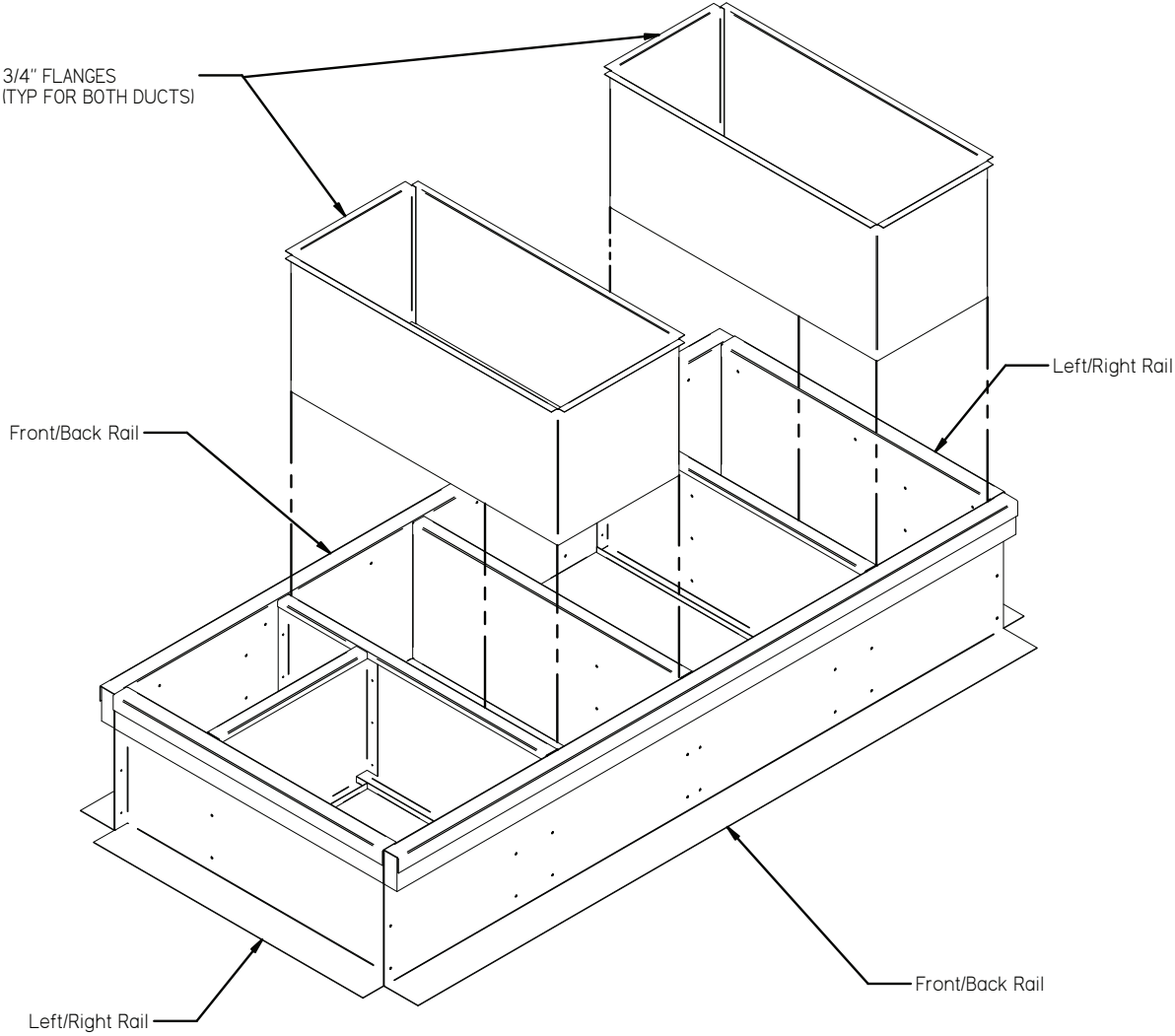
Dimensional Data - Electrical and Water



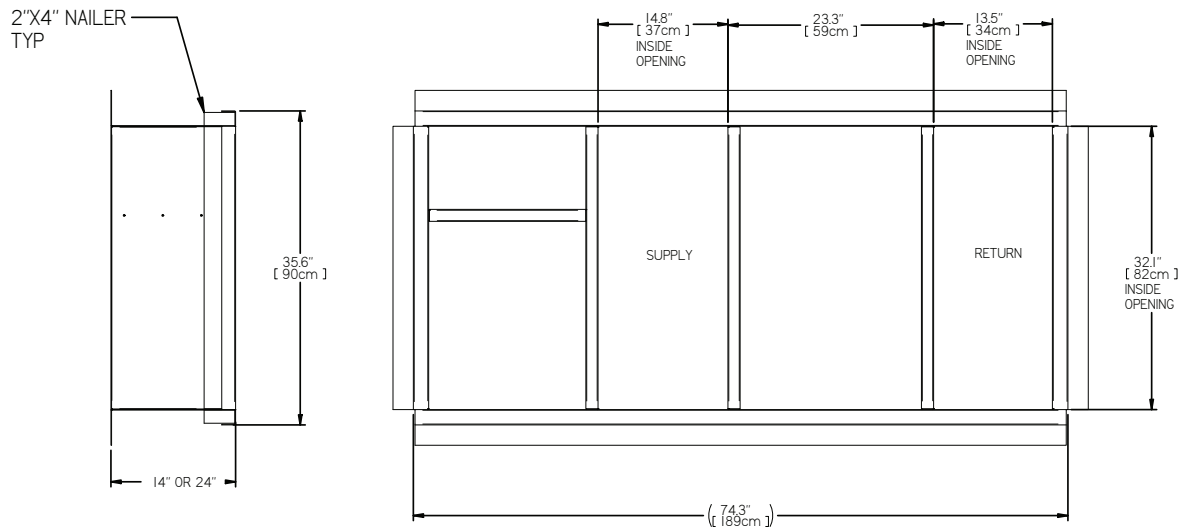
Dimensional Data - Curb Installation



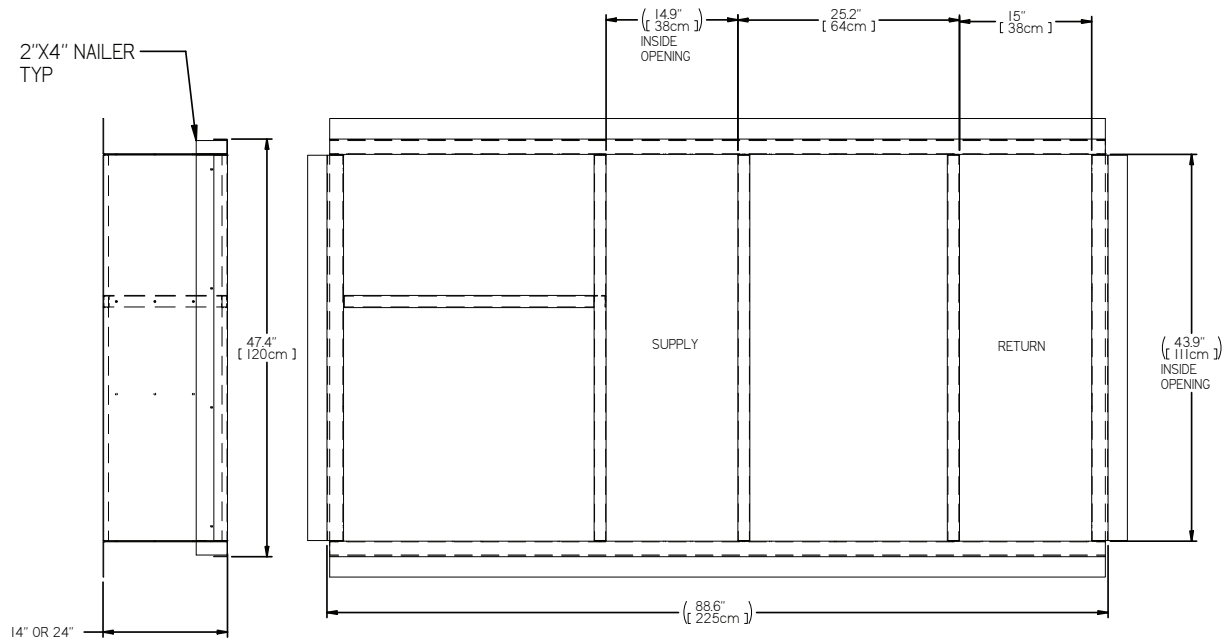
Dimensional Data - Curb (036-144)



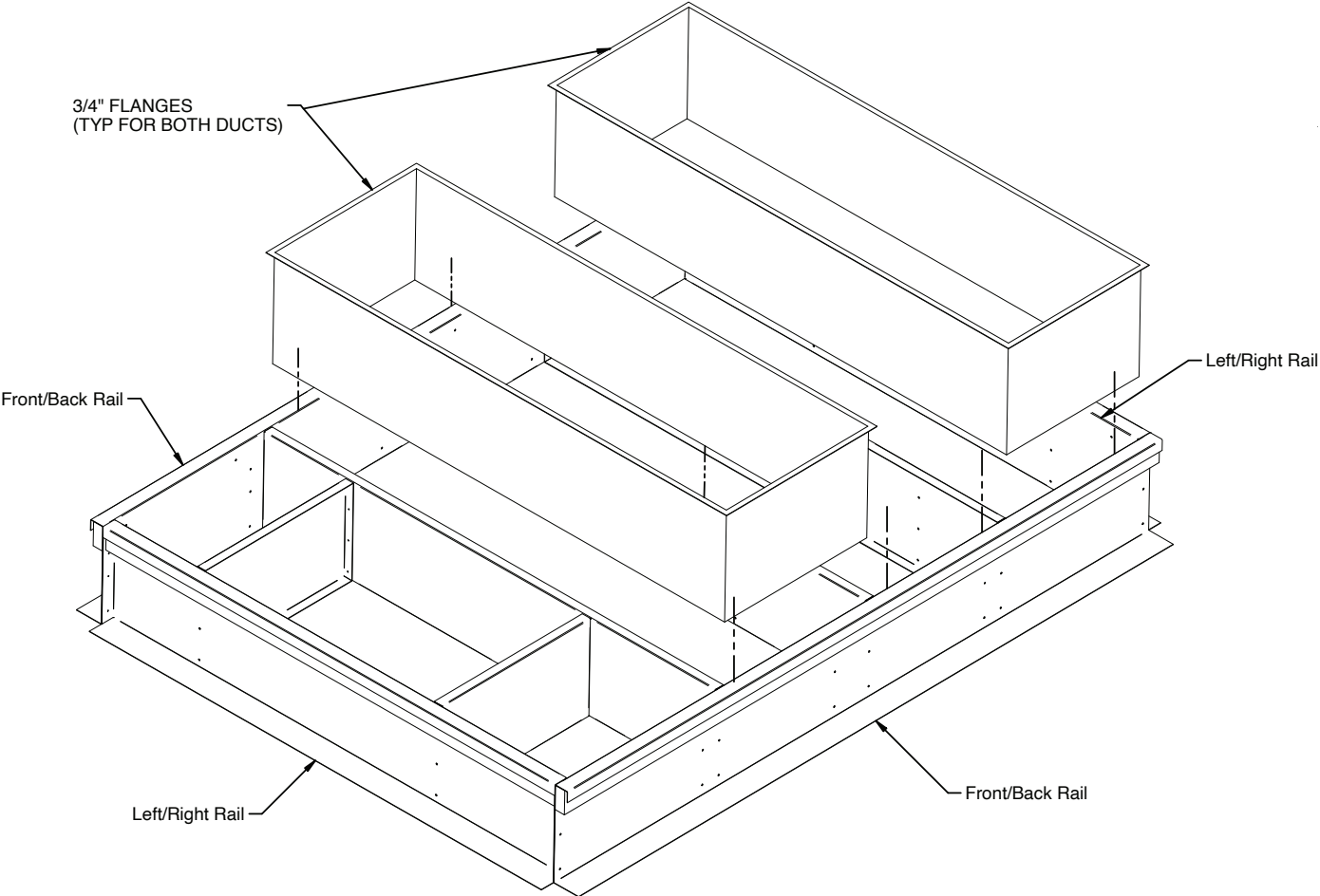
Dimensional Data - Curb (036-072)



Dimensional Data - Curb (096-144)

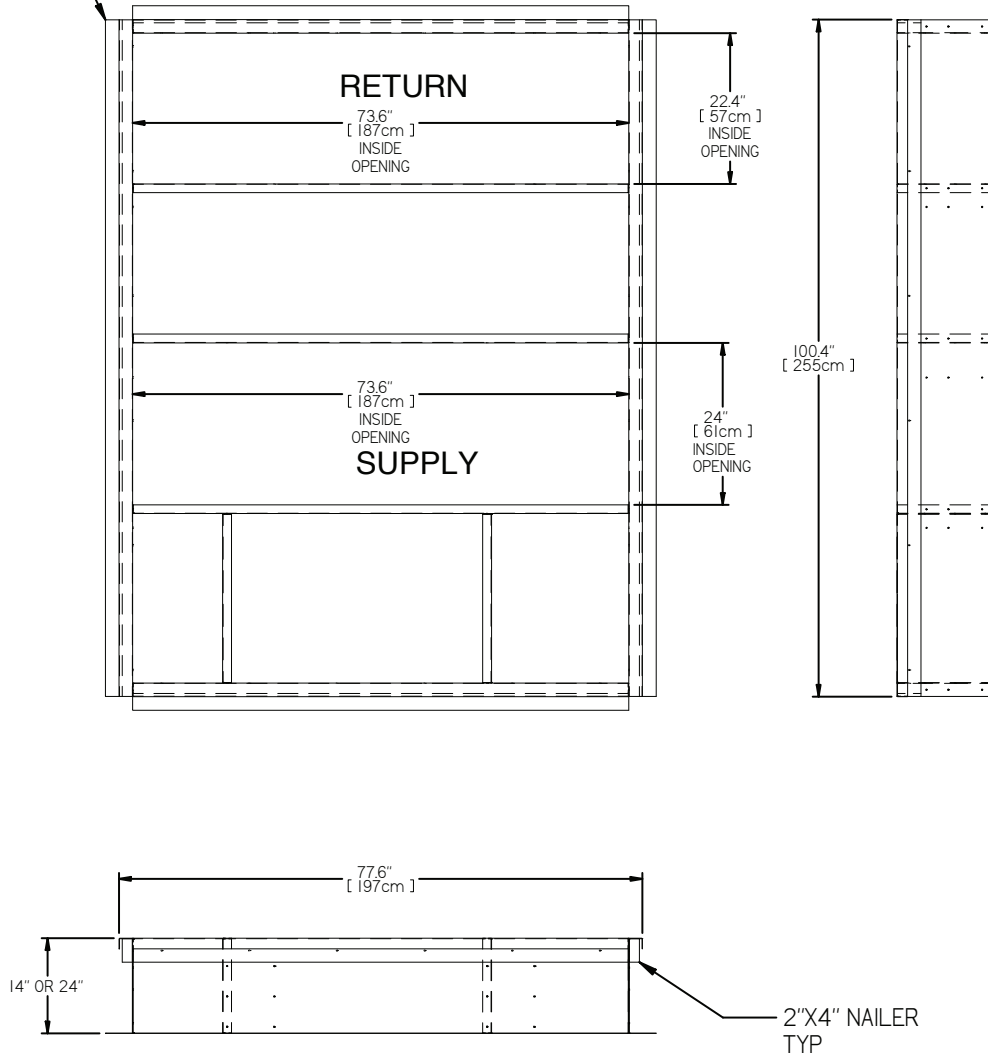


Dimensional Data - Curb (180-360)

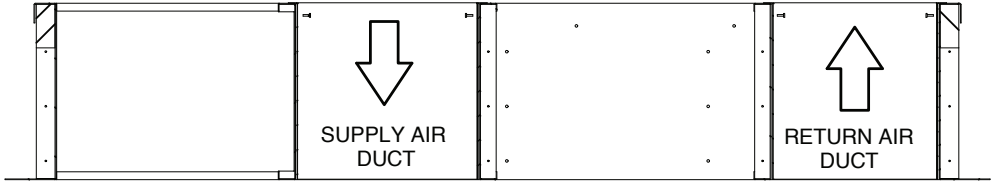
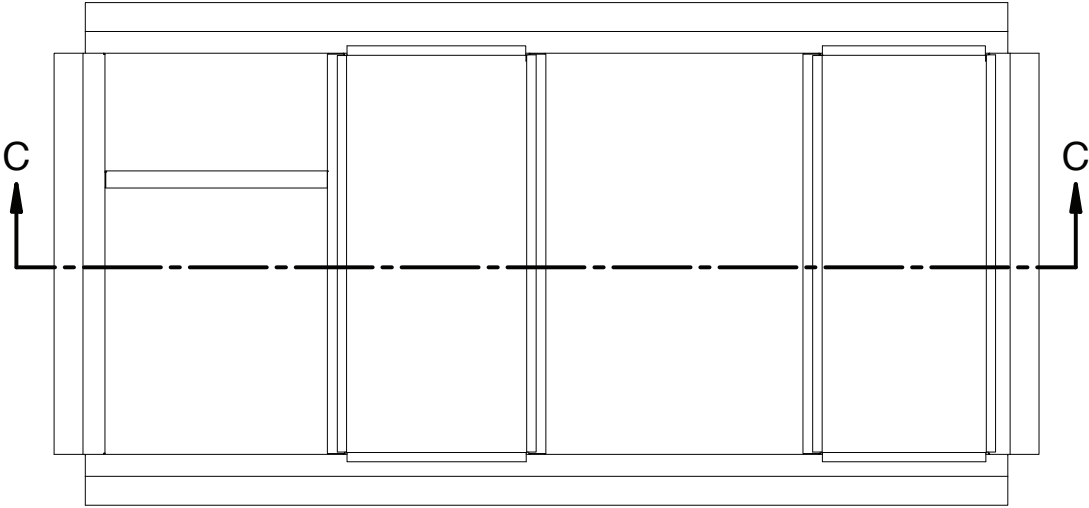


Dimensional Data - Curb cont. (180-360)

180-360 CURB DIMENSIONS

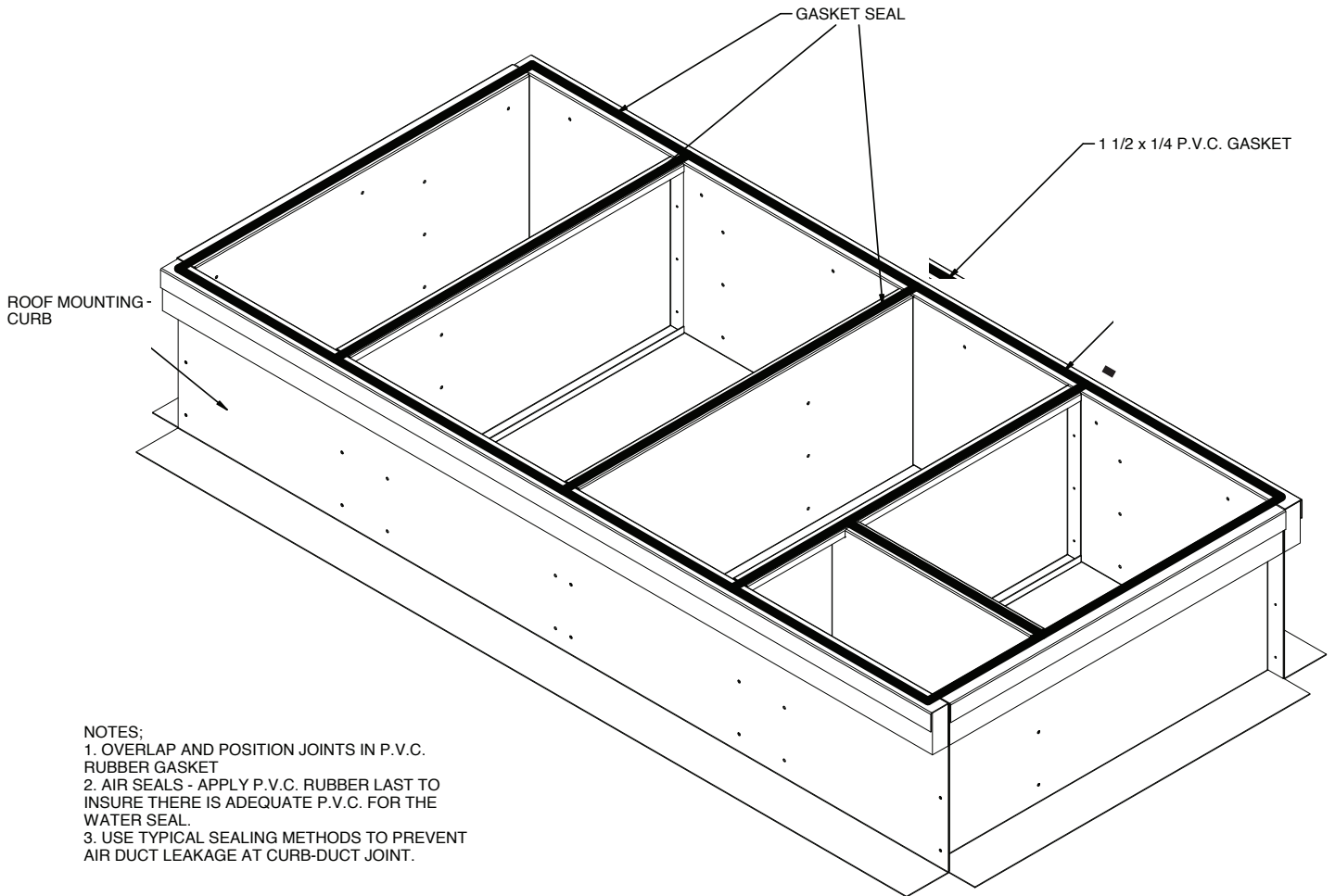


Dimensional Data - Curb cont.



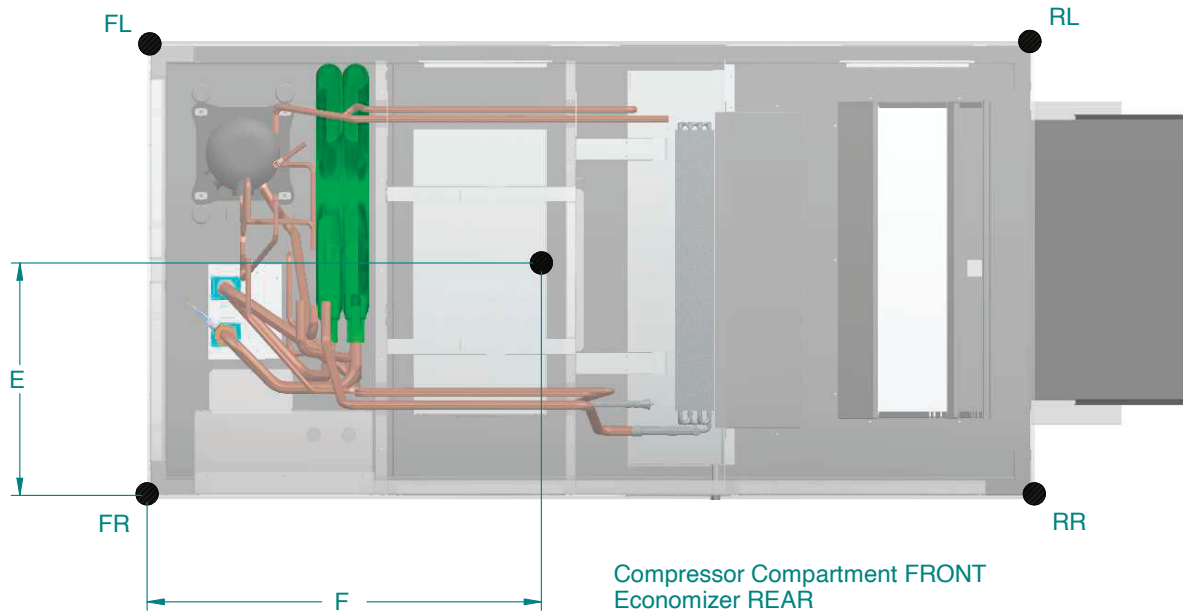
SECTION C-C

Dimensional Data - Curb cont.



- NOTES:
1. OVERLAP AND POSITION JOINTS IN P.V.C. RUBBER GASKET
 2. AIR SEALS - APPLY P.V.C. RUBBER LAST TO INSURE THERE IS ADEQUATE P.V.C. FOR THE WATER SEAL.
 3. USE TYPICAL SEALING METHODS TO PREVENT AIR DUCT LEAKAGE AT CURB-DUCT JOINT.

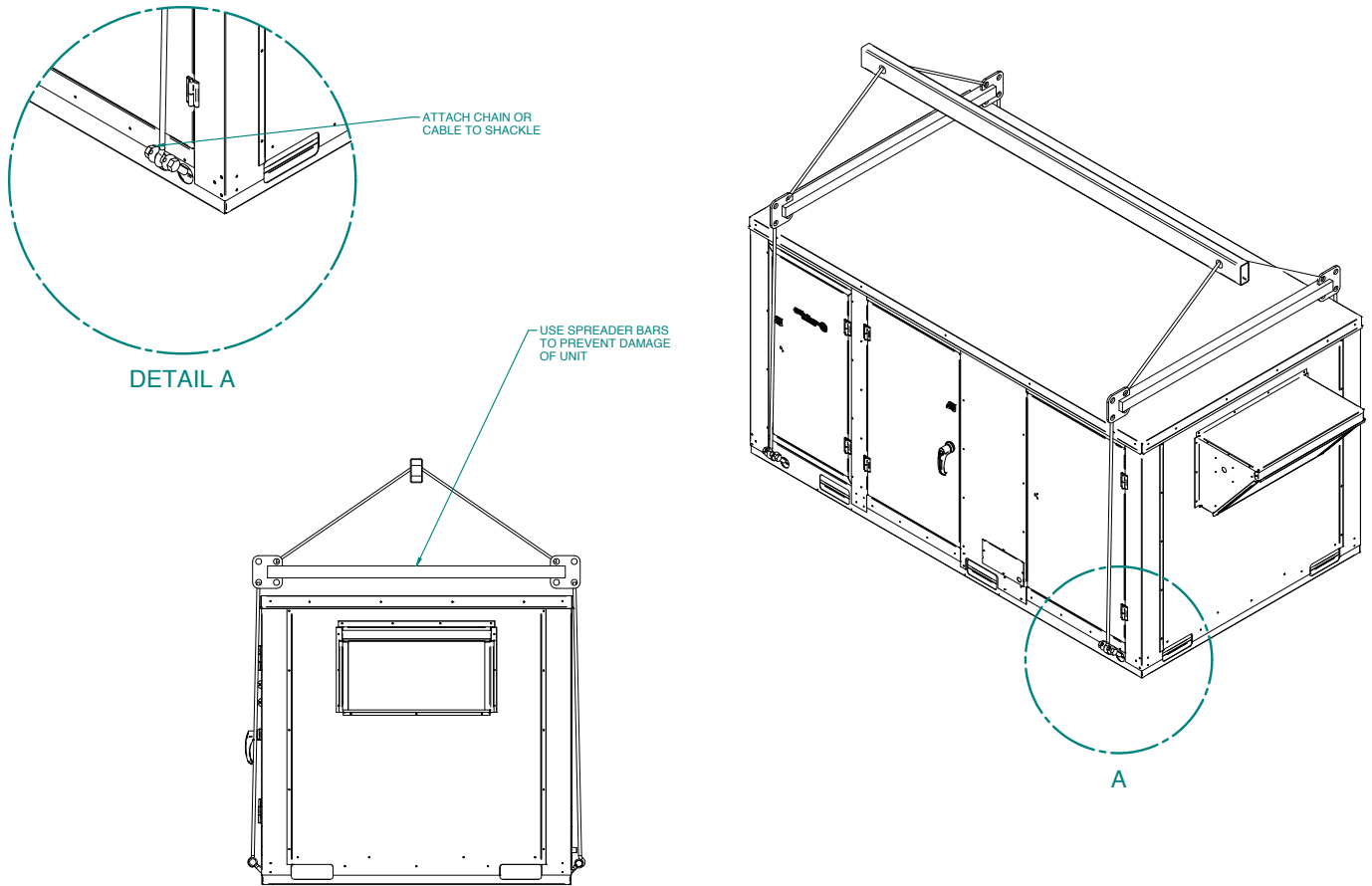
Dimensional Data - Center of Gravity



Unit Size	FL		FR		RL		RR		Total	
	LBS	Kg	LBS	Kg	LBS	Kg	LBS	Kg	LBS	Kg
49	313	142	205	93	207	94	164	74	889	403
64	318	144	208	94	210	95	166	75	902	409
96	504	229	330	150	333	151	263	119	1430	649
120	508	230	332	151	335	152	265	120	1440	653
144	512	232	335	152	338	153	267	121	1452	658
240	907	411	594	269	599	272	473	215	2574	1167
300	906	411	593	269	598	271	473	214	2570	1165

CENTER OF GRAVITY			
UNIT	URS-036-072	URT 096-144	URT 180-360
E	21	40	47
F	32	28	51

Dimensional Data - Weights



Minimum Spanner Width

Model	Min. Spanner Width
	in. [cm]
036-072	40 [101.6]
096-144	52 [132.4]
180-360	82 [208.3]

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Physical Data

Model	Single/Dual Capacity Compressor				
	036	048	060	070	
Compressor (1 each)	Scroll				
Factory Charge R454B, oz [kg]	70 [1.98]	84 [2.38]	93.5 [2.65]	115 [3.26]	
ECM Blower Motor & Blower					
Blower Motor Type/Speeds	5-Speed ECM/5				
	Variable Speed ECM/12				
Blower Motor- hp [W]	5-spd ECM	1/2 [373]	1 [746]	1 [746]	1 [746]
	VS ECM	1 [746]	1 [746]	1 [746]	1 [746]
Blower Wheel Size (Dia), in. [mm]	11" [279]	11" [279]	11" [279]	11" [279]	
Coax and Water Piping					
Water Connections Size - FPT - in [mm]	1" [25.4]	1" [25.4]	1" [25.4]	1" [25.4]	
Coax & Piping Water Volume - gal [l]	1.3 [4.9]	1.6 [6.1]	1.6 [6.1]	2.3 [8.7]	
Air Coil and Filters					
Air Coil Dimensions (H x W), in. [mm]	28 x 25 [711 x 635]	32 x 25 [813 x 635]	36 x 25 [914 x 635]	36 x 25 [914 x 635]	
Air Coil Total Face Area, ft2 [m2]	4.9 [0.451]	5.6 [0.520]	6.3 [0.585]	6.3 [0.585]	
Air Coil Tube Size, in [mm]	3/8 [9.5]	3/8 [9.5]	3/8 [9.5]	3/8 [9.5]	
Air Coil Number of rows	3	3	4	4	
Filter Standard - 1" [25mm] Pleated MERV 4 Throwaway, in [mm]	34 x 28 [864 x 711]	34 x 28 [864 x 711]	34 x 28 [864 x 711]	34 x 28 [864 x 711]	
Filter Standard - 2" [51mm] Pleated MERV 8 Throwaway, in [mm]	34 x 28 [864 x 711]	34 x 28 [864 x 711]	34 x 28 [864 x 711]	34 x 28 [864 x 711]	
Filter Standard - 2" [51mm] Pleated MERV 13 Throwaway, in [mm]	34 x 28 [864 x 711]	34 x 28 [864 x 711]	34 x 28 [864 x 711]	34 x 28 [864 x 711]	
Filter Standard - 4" [102mm] Pleated MERV 13 Throwaway, in [mm]	34 x 28 [864 x 711]	34 x 28 [864 x 711]	34 x 28 [864 x 711]	34 x 28 [864 x 711]	

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Physical Data - Plenum

Model	Single or Dual Cap Compressor and Fan			
	036	048	060	072
Compressor	Scroll (1 each)			
Factory Charge R454B, oz [kg] (each circuit)	70 [1.98]	84 [2.38]	93.5 [2.65]	115 [3.26]
Blower Motor & Blower				
Blower Motor - Quantity	1	1	1	1
Blower Motor Type/Speeds	EC Backward Inclined Plenum Fan/12			
Blower Motor 230V - hp [kW]	2.5 [1.9]	2.5 [1.9]	2.5 [1.9]	2.5 [1.9]
Blower Motor 460V - hp [kW]	2.9 [2.2]	2.9 [2.2]	3.4 [2.5]	3.4 [2.5]
Blower Wheel Size (Dia), in. [mm]	12" [310]	12" [310]	14" [355]	14" [355]
Coax and Water Piping				
Water Connections Size - FPT - in [mm]	1" [25.4]	1" [25.4]	1" [25.4]	1" [25.4]
Coax & Piping Water Volume - gal [l]	1.3 [4.9]	1.6 [6.1]	1.6 [6.1]	2.3 [8.7]
Air Coil and Filters				
Air Coil Dimensions (H x W), in. [mm]	28 x 25 [711 x 635]	32 x 25 [813 x 635]	36 x 25 [914 x 635]	36 x 25 [914 x 635]
Air Coil Total Face Area, ft2 [m2]	4.9 [0.451]	5.6 [0.520]	6.3 [0.585]	6.3 [0.585]
Air Coil Tube Size, in [mm]	3/8 [9.5]	3/8 [9.5]	3/8 [9.5]	3/8 [9.5]
Air Coil Number of rows	3	3	4	4
Filter Standard - 1" [25mm] Pleated MERV 4 Throwaway, in [mm]	34 x 28 [864 x 711]	34 x 28 [864 x 711]	34 x 28 [864 x 711]	34 x 28 [864 x 711]
Filter Standard - 2" [51mm] Pleated MERV 8 Throwaway, in [mm]	34 x 28 [864 x 711]	34 x 28 [864 x 711]	34 x 28 [864 x 711]	34 x 28 [864 x 711]
Filter Standard - 2" [51mm] Pleated MERV 13 Throwaway, in [mm]	34 x 28 [864 x 711]	34 x 28 [864 x 711]	34 x 28 [864 x 711]	34 x 28 [864 x 711]
Filter Standard - 4" [102mm] Pleated MERV 13 Throwaway, in [mm]	34 x 28 [864 x 711]	34 x 28 [864 x 711]	34 x 28 [864 x 711]	34 x 28 [864 x 711]

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Model	Two Compressors and Fan			Two Compressors and 2 Fans				
	096	120	150	180	181	240	300	360
Compressor	Scroll (2 each)			Scroll (2 each)				
Factory Charge R454B, oz [kg] (each circuit)	84[2.38]	93.5[2.65]	115[3.26]	160[4.54]	160[4.54]	212.5[6.02]	216[6.12]	212.5[6.02]
Blower Motor & Blower								
Blower Motor - Quantity	1	1	1	1	2	2	2	2
Blower Motor Type/Speeds	EC Backward Inclined Plenum Fan/12			Dual EC Backward Inclined Plenum Fan/12				
Blower Motor 230V - hp [kW]	4.8 [3.6]	4.8 [3.6]	4.8 [3.6]	4.8 [3.6]	4.8 [3.6]	4.8 [3.6]	4.8 [3.6]	4.8 [3.6]
Blower Motor 460V - hp [kW]	7.2 [5.4]	7.2 [5.4]	7.2 [5.4]	7.2 [5.4]	7.2 [5.4]	7.2 [5.4]	7.2 [5.4]	7.2 [5.4]
Blower Wheel Size (Dia), in. [mm]	20" [500]	20" [500]	20" [500]	20" [500]	20" [500]	20" [500]	20" [500]	20" [500]
Coax and Water Piping								
Water Connections Size - FPT - in [mm]	1-1/4" [31.8]	1-1/4" [31.8]	1-1/4" [31.8]	2" [50.8]	2" [50.8]	2" [50.8]	2" [50.8]	2" [50.8]
Coax & Piping Water Volume - gal [l]	3.20 [12.13]	3.46 [13.11]	3.46 [13.11]	6.50 [24.61]	6.50 [24.61]	7.00 [26.50]	7.00 [26.50]	7.4 [28.0]
Air Coil and Filters								
Air Coil Dimensions (H x W), in. [mm]	40 x 40 [1016 x 1016]	40 x 40 [1016 x 1016]	40 x 40 [1016 x 1016]	48 x 69 [1219 x 1753]	48 x 69 [1219 x 1753]	48 x 69 [1219 x 1753]	48 x 69 [1219 x 1753]	48 x 69 [1219 x 1753]
Air Coil Total Face Area, ft2 [m2]	11.1 [1.03]	11.1 [1.03]	11.1 [1.03]	23.0 [2.14]	23.0 [2.14]	23.0 [2.14]	23.0 [2.14]	23.0 [2.14]
Air Coil Tube Size, in [mm]	3/8 [9.5]	3/8 [9.5]	3/8 [9.5]	3/8 [9.5]	3/8 [9.5]	3/8 [9.5]	3/8 [9.5]	3/8 [9.5]
Air Coil Number of rows	3	3	3	3	3	3	3	3
Filter Standard - 1" [25mm] Pleated MERV 4 Throwaway, in [mm]	38 x 42 [965 x 1067]	38 x 42 [965 x 1067]	38 x 42 [965 x 1067]	22 x 35 (x4) [559 x 889]	22 x 35 (x4) [559 x 889]	22 x 35 (x4) [559 x 889]	22 x 35 (x4) [559 x 889]	22 x 35 (x4) [559 x 889]
Filter Standard - 2" [51mm] Pleated MERV 8 Throwaway, in [mm]	38 x 42 [965 x 1067]	38 x 42 [965 x 1067]	38 x 42 [965 x 1067]	22 x 35 (x4) [559 x 889]	22 x 35 (x4) [559 x 889]	22 x 35 (x4) [559 x 889]	22 x 35 (x4) [559 x 889]	22 x 35 (x4) [559 x 889]
Filter Standard - 2" [51mm] Pleated MERV 13 Throwaway, in [mm]	38 x 42 [965 x 1067]	38 x 42 [965 x 1067]	38 x 42 [965 x 1067]	22 x 35 (x4) [559 x 889]	22 x 35 (x4) [559 x 889]	22 x 35 (x4) [559 x 889]	22 x 35 (x4) [559 x 889]	22 x 35 (x4) [559 x 889]
Filter Standard - 4" [102mm] Pleated MERV 13 Throwaway, in [mm]	38 x 42 [965 x 1067]	38 x 42 [965 x 1067]	38 x 42 [965 x 1067]	22 x 35 (x4) [559 x 889]	22 x 35 (x4) [559 x 889]	22 x 35 (x4) [559 x 889]	22 x 35 (x4) [559 x 889]	22 x 35 (x4) [559 x 889]

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Blower Performance Data

5 Speed ECM Blower Performance Rooftop Series Single Speed

Model	Motor Speed	Motor Tap	T'Stat Cnct.	Blower Size	Motor HP	Airflow (cfm) at External Static Pressure (in. wg)															
						0.00	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.60	0.70	0.80	0.90	1.00
036	High	5	W	11 x 10	1/2	1530	1503	1476	1453	1429	1413	1397	1376	1355	1342	1329	1276	1231	1173	-	-
	Med High	4	Y1			1413	1388	1363	1342	1321	1303	1285	1263	1240	1226	1212	1173	1016	946	-	-
	Med	3				1355	1325	1294	1276	1258	1235	1212	1188	1164	1144	1123	982	909	883	-	-
	Med Low	2				1336	1299	1261	1242	1222	1202	1181	1157	1132	1111	1090	937	874	830	-	-
	Low	1	G			1243	1182	1121	1061	1000	964	928	856	784	744	703	647	592	-	-	
048	High	5		11 x 10	1	1934	1910	1886	1871	1855	1827	1799	1780	1760	1747	1734	1700	1659	1617	-	-
	Med High	4	W			1799	1783	1767	1744	1720	1693	1666	1649	1631	1617	1603	1560	1530	1492	-	-
	Med	3	Y1			1694	1680	1666	1642	1617	1592	1567	1552	1537	1519	1500	1453	1421	1372	-	-
	Med Low	2				1575	1560	1540	1520	1502	1487	1471	1448	1424	1409	1393	1351	1308	1266	-	-
	Low	1	G			1454	1406	1358	1333	1308	1285	1261	1239	1217	1198	1179	1072	1002	988	-	-
060	High	5	W	11 x 10	1	2230	2212	2193	2173	2152	2139	2125	2109	2092	2076	2059	2026	1992	1951	1892	1806
	Med High	4	Y1			2081	2065	2048	2032	2015	1998	1980	1963	1946	1928	1910	1880	1849	1806	1767	1728
	Med	3				1951	1931	1910	1889	1868	1850	1831	1812	1793	1774	1755	1722	1688	1654	1612	1562
	Med Low	2				1812	1790	1767	1748	1728	1708	1688	1671	1654	1640	1626	1584	1547	1510	1472	1417
	Low	1	G			1668	1651	1633	1612	1591	1566	1540	1525	1510	1491	1472	1433	1400	1351	1299	1208
070	High	5	W	11 x 10	1	2472	2454	2435	2414	2393	2371	2349	2328	2306	2289	2271	2236	2189	2121	2033	1936
	Med High	4	Y1			2271	2248	2225	2205	2184	2166	2147	2129	2110	2094	2078	2039	2011	1977	1930	1846
	Med	3				2133	2115	2096	2072	2047	2030	2013	1996	1979	1965	1950	1909	1873	1837	1793	1748
	Med Low	2				2008	1985	1962	1939	1915	1898	1880	1862	1843	1828	1812	1774	1742	1703	1669	1635
	Low	1	G			1806	1784	1761	1742	1722	1696	1669	1656	1642	1625	1607	1564	1527	1490	1443	1404

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Rooftop Series Dual Capacity

Model	Motor Speed	Motor Tap	T'stat Connection	Blower Size	Motor HP	Airflow (cfm) at External Static Pressure (in. wg)															
						0.00	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.60	0.70	0.80	0.90	1.00
038	High	5	W	11 x 10	1/2	1530	1503	1476	1453	1429	1413	1397	1376	1355	1342	1329	1276	1231	1173	-	-
	Med High	4	Y2			1413	1388	1363	1342	1321	1303	1285	1263	1240	1226	1212	1173	1016	946	-	-
	Med	3	Y1			1355	1325	1294	1276	1258	1235	1212	1188	1164	1144	1123	982	909	883	-	-
	Med Low	2				1336	1299	1261	1242	1222	1202	1181	1157	1132	1111	1090	937	874	830	-	-
	Low	1	G			1243	1182	1121	1061	1000	964	928	856	784	744	703	647	592	-	-	
049	High	5	W	11 x 10	1	1934	1910	1886	1871	1855	1827	1799	1780	1760	1747	1734	1700	1659	1617	-	-
	Med High	4				1799	1783	1767	1744	1720	1693	1666	1649	1631	1617	1603	1560	1530	1492	-	-
	Med	3	Y2			1694	1680	1666	1642	1617	1592	1567	1552	1537	1519	1500	1453	1421	1372	-	-
	Med Low	2	Y1			1575	1560	1540	1520	1502	1487	1471	1448	1424	1409	1393	1351	1308	1266	-	-
	Low	1	G			1454	1406	1358	1333	1308	1285	1261	1239	1217	1198	1179	1072	1002	988	-	-
064	High	5	W	11 x 10	1	2245	2230	2214	2194	2173	2155	2136	2120	2103	2087	2070	2032	1998	1957	1910	1825
	Med High	4	Y2			2092	2073	2054	2035	2015	1995	1975	1958	1940	1922	1904	1880	1843	1806	1767	1728
	Med	3				1951	1931	1910	1889	1868	1850	1831	1812	1793	1774	1755	1722	1688	1654	1612	1562
	Med Low	2	Y1			1812	1796	1780	1761	1741	1718	1695	1682	1668	1651	1633	1591	1555	1518	1480	1433
	Low	1	G			1682	1661	1640	1616	1591	1573	1555	1533	1510	1495	1480	1441	1400	1351	1316	1263
072	High	5	W	11 x 10	1	2472	2454	2435	2414	2393	2371	2349	2328	2306	2289	2271	2236	2189	2121	2033	1936
	Med High	4	Y2			2271	2248	2225	2205	2184	2166	2147	2129	2110	2094	2078	2039	2011	1977	1930	1846
	Med	3				2133	2115	2096	2072	2047	2030	2013	1996	1979	1965	1950	1909	1873	1837	1793	1748
	Med Low	2	Y1			2008	1985	1962	1939	1915	1898	1880	1862	1843	1828	1812	1774	1742	1703	1669	1635
	Low	1	G			1806	1784	1761	1742	1722	1696	1669	1656	1642	1625	1607	1564	1527	1490	1443	1404

Factory speed settings are in Bold

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Air flow values are with dry coil and standard filter

For wet coil performance first calculate the face velocity of the air coil (Face Velocity [fpm] = Airflow [cfm] / Face Area [sq ft]).

Then for velocities of 200 fpm reduce the static capability by 0.03 in. wg, 300 fpm by 0.08 in. wg, 400 fpm by 0.12 in. wg., and 500 fpm by 0.16 in. wg.

Highest setting is for auxiliary heat (W) and lowest setting is for constant blower (G). The "Y1" and "Y2" settings must be between the "G" and "W" settings.

Blower Performance Data cont.

Variable Speed ECM Blower Performance

Rooftop Single Speed

Model	Max ESP	Blower Size	Motor hp	Airflow DIP Switch Settings											
				1	2	3	4	5	6	7	8	9	10	11	12
036 w/1hp*	0.75	11 x 10	1	800	1000 G	1100 L	1300 H Aux	1500	1600	1800					
048 w/1hp*	0.75	11 x 10	1	800	900	1000 G	1200	1400 L	1600 H Aux	1700	1850	2000	2200	2300	2400
060	0.75	11 x 10	1	800	950	1100 G	1300	1500 L	1750	1950 H Aux	2100	2300			
070	0.75	11 x 10	1	800	950	1100 G	1300	1500	1750 L	1950	2100 H Aux	2300			

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Rooftop Dual Capacity

MODEL	MAX ESP	Blower Size	Motor hp	AIR FLOW DIP SWITCH SETTINGS											
				1	2	3	4	5	6	7	8	9	10	11	12
038 w/1hp*	0.75	11 x 10	1	800 G	1000	1100 L	1300 H Aux	1500	1600	1800					
049 w/1hp*	0.75	11 x 10	1	800 G	900	1000	1200	1400 L	1600 H Aux	1700	1850	2000	2200	2300	2400
064	0.75	11 x 10	1	800	950 G	1100	1300	1500 L	1750	1950 H Aux	2100	2300			
072	0.75	11 x 10	1	800	950	1100 G	1300	1500	1750 L	1950	2100 H Aux	2300			

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G = Continuous fan, L = Y1 first stage, H = Y2 second stage, Aux = Elect heat.

Factory settings are at recommended G-L-H-Aux in AID tool selection.

Aux should be located to deliver at least minimum airflow of installed electric heat.

L-H settings MUST be located within boldface CFM range

CFM is controlled within ±5% up to the maximum ESP

Max ESP includes allowance for wet coil and 1" MERV 4

Blower Performance Data cont.

Integrated EC Backward Curved Plenum Fan Performance

Model 036-038

Fan Speed	Fan RPM	Airflow [cfm] at External Static Pressure [in. wg.]																				
		0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2.0
1	1200	941	864	787	711	634	557	479														
2	1300	1021	951	876	812	749	672	595	521													
3	1400	1119	1050	964	914	864	788	711	637	562												
4	1500	1199	1137	1063	1012	961	896	832	762	693	619											
5	1600	1305	1243	1162	1110	1058	1005	952	888	823	740	656										
6	1700	1373	1318	1248	1200	1153	1105	1057	1002	946	871	797										
7	1800	1468	1414	1334	1291	1247	1205	1162	1116	1069	1003	937	859	780								
8	1900	1518	1474	1420	1381	1343	1300	1257	1214	1172	1115	1058	1018	971								
9	2000	1644	1594	1506	1472	1438	1395	1351	1313	1275	1227	1179	1126	1072	1003	934	823					
10	2200	1767	1728	1673	1642	1610	1570	1530	1499	1467	1426	1385	1346	1306	1259	1212	1150	1087	1035	982		
11	2300	1847	1810	1764	1733	1701	1663	1625	1591	1556	1520	1483	1447	1411	1370	1329	1278	1227	1179	1131		
12	2400	1926	1892	1855	1824	1792	1756	1720	1683	1645	1613	1581	1548	1515	1481	1446	1406	1366	1323	1279	1227	1174

7/22/17

Fan selection is accomplished through the Aurora Controls and allows four online selections of continuous fan (G), L = stage 1 (Y1), H = stage 2 (Y2), and Aux = electric heat. Continuous Fan (G) can be set at any airflow. Factory setting is 1.

L = Stage 1 (Y1) setting can be located anywhere other than **BOLD** highlighted points. The factory setting is 5.

H = Stage 2 (Y2) setting should be located in shaded portion. The factory setting is 8.

Elect heat Airflow (AUX) airflow setting should be configured for the minimum airflow needed to support the heater. Please consult heater manual.

Factory settings for 036-038 are continuous fan (G) speed 1, Part Load Stage 1(Y2)= Speed 5, Full Load Stage 2 (Y2) = Speed 8 and with Electric Heat Operation (AUX) = Speed 11

Model 048-049

Fan Speed	Fan RPM	Airflow [cfm] at External Static Pressure [in. wg.]																				
		0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2.0
1	1200	941	864	787	711	634	557	479														
2	1300	1021	951	876	812	749	672	595	521													
3	1400	1119	1050	964	914	864	788	711	637	562												
4	1500	1199	1137	1063	1012	961	896	832	762	693	619											
5	1600	1305	1243	1162	1110	1058	1005	952	888	823	740	656										
6	1700	1373	1318	1248	1200	1153	1105	1057	1002	946	871	797										
7	1800	1468	1414	1334	1291	1247	1205	1162	1116	1069	1003	937	859	780								
8	1900	1518	1474	1420	1381	1343	1300	1257	1214	1172	1115	1058	1018	971								
9	2000	1644	1594	1506	1472	1438	1395	1351	1313	1275	1227	1179	1126	1072	1003	934	823					
10	2200	1767	1728	1673	1642	1610	1570	1530	1499	1467	1426	1385	1346	1306	1259	1212	1150	1087	1035	982		
11	2300	1847	1810	1764	1733	1701	1663	1625	1591	1556	1520	1483	1447	1411	1370	1329	1278	1227	1179	1131		
12	2400	1926	1892	1855	1824	1792	1756	1720	1683	1645	1613	1581	1548	1515	1481	1446	1406	1366	1323	1279	1227	1174

7/22/17

Fan selection is accomplished through the Aurora Controls and allows four online selections of continuous fan (G), L = stage 1 (Y1), H = stage 2 (Y2), and Aux = electric heat. Continuous Fan (G) can be set at any airflow. Factory setting is 1.

L = Stage 1 (Y1) setting can be located anywhere other than **BOLD** highlighted points. The factory setting is 9.

H = Stage 2 (Y2) setting should be located in shaded portion. The factory setting is 12.

Elect heat Airflow (AUX) airflow setting should be configured for the minimum airflow needed to support the heater. Please consult heater manual.

Factory settings for 049-049 are continuous fan (G) speed 1, Part Load Stage 1(Y2)= Speed 9, Full Load Stage 2 (Y2) = Speed 12 and with Electric Heat Operation (AUX) = Speed 12.

Blower Performance Data cont.

Model 060-064

Fan Speed	Fan RPM	Airflow [cfm] at External Static Pressure [in. wg.]																				
		0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2.0
1	1400	1569	1498	1420	1356	1291	1220	1149	1062	974	862	749										
2	1500	1675	1612	1543	1484	1425	1361	1298	1222	1146	1049	952	858									
3	1600	1782	1726	1666	1613	1559	1503	1446	1382	1318	1236	1154	1062	969	769							
4	1700	1901	1847	1792	1741	1689	1636	1584	1524	1464	1394	1324	1247	1170	1032							
5	1800	2019	1969	1918	1869	1819	1770	1721	1666	1610	1552	1493	1432	1370	1294	1218	1135	1052	874			
6	1900	2129	2082	2035	1989	1944	1898	1852	1801	1749	1693	1637	1581	1525	1457	1389	1317	1246	1119			
7	2000	2239	2196	2151	2110	2069	2026	1983	1936	1888	1835	1781	1731	1680	1620	1559	1500	1440	1365	1289	1196	1103
8	2200	2321	2278	2244	2191	2137	2084	2105	2005	1954	1894	1834	1784	1733	1672	1611	1553	1495	1445	1395	1350	1303
9	2300	2445	2398	2352	2304	2256	2208	2159	2117	2075	2019	1963	1913	1864	1808	1752	1699	1647	1593	1540	1513	1452
10	2400	2591	2549	2509	2467	2425	2382	2338	2305	2271	2219	2167	2118	2069	2018	1967	1920	1873	1816	1759	1706	1653
11	2500			2622	2582	2542	2503	2464	2427	2390	2343	2296	2250	2204	2156	2108	2061	2014	1967	1921	1872	1823
12	2600			2735	2697	2658	2624	2590	2550	2509	2467	2425	2382	2338	2293	2248	2202	2155	2119	2082	2038	1993

7/22/17

Fan selection is accomplished through the Aurora Controls and allows four online selections of continuous fan (G), L = stage 1 (Y1), H = stage 2 (Y2), and Aux = electric heat.

Continuous Fan (G) can be set at any airflow. Factory setting is 1.

L = Stage 1 (Y1) setting can be located anywhere other than **BOLD** highlighted points. The factory setting is 5.

H = Stage 2 (Y2) setting should be located in shaded portion. The factory setting is 8.

Elect heat Airflow (AUX) airflow setting should be configured for the minimum airflow needed to support the heater. Please consult heater manual.

Factory settings for 060-064 are continuous fan (G) Speed 1, Part Load Stage 1(Y2)= Speed 5, Full Load Stage 2 (Y2) = Speed 8 and with Electric Heat Operation (AUX) = Speed 11 .

Model 070-072

Fan Speed	Fan RPM	Airflow [cfm] at External Static Pressure [in. wg.]																				
		0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2.0
1	1400	1569	1498	1420	1356	1291	1220	1149	1062	974	862	749										
2	1500	1675	1612	1543	1484	1425	1361	1298	1222	1146	1049	952	858									
3	1600	1782	1726	1666	1613	1559	1503	1446	1382	1318	1236	1154	1062	969	769							
4	1700	1901	1847	1792	1741	1689	1636	1584	1524	1464	1394	1324	1247	1170	1032							
5	1800	2019	1969	1918	1869	1819	1770	1721	1666	1610	1552	1493	1432	1370	1294	1218	1135	1052	874			
6	1900	2129	2082	2035	1989	1944	1898	1852	1801	1749	1693	1637	1581	1525	1457	1389	1317	1246	1119			
7	2000	2239	2196	2151	2110	2069	2026	1983	1936	1888	1835	1781	1731	1680	1620	1559	1500	1440	1365	1289	1196	1103
8	2200	2321	2278	2244	2191	2137	2084	2105	2005	1954	1894	1834	1784	1733	1672	1611	1553	1495	1445	1395	1350	1303
9	2300	2445	2398	2352	2304	2256	2208	2159	2117	2075	2019	1963	1913	1864	1808	1752	1699	1647	1593	1540	1513	1452
10	2400	2591	2549	2509	2467	2425	2382	2338	2305	2271	2219	2167	2118	2069	2018	1967	1920	1873	1816	1759	1706	1653
11	2500			2622	2582	2542	2503	2464	2427	2390	2343	2296	2250	2204	2156	2108	2061	2014	1967	1921	1872	1823
12	2600			2735	2697	2658	2624	2590	2550	2509	2467	2425	2382	2338	2293	2248	2202	2155	2119	2082	2038	1993

7/22/17

Fan selection is accomplished through the Aurora Controls and allows four online selections of continuous fan (G), L = stage 1 (Y1), H = stage 2 (Y2), and Aux = electric heat.

Continuous Fan (G) can be set at any airflow. Factory setting is 1.

L = Stage 1 (Y1) setting can be located anywhere other than **BOLD** highlighted points. The factory setting is 9.

H = Stage 2 (Y2) setting should be located in shaded portion. The factory setting is 12.

Elect heat Airflow (AUX) airflow setting should be configured for the minimum airflow needed to support the heater. Please consult heater manual.

Factory settings for 070-072 are continuous fan (G) Speed 1, Part Load Stage 1(Y2)= Speed 9, Full Load Stage 2 (Y2) = Speed 12 and with Electric Heat Operation (AUX) = Speed 12 .

Blower Performance Data cont.

Model 096

Fan Speed	Fan RPM	Airflow [cfm] at External Static Pressure [in. wg.]																				
		0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2.0
1	600	1840	1700	1512	1493	1334	1174	995	964													
2	700	2191	2057	1878	1847	1696	1542	1373	1331	1165	972	950	913									
3	800	2542	2415	2245	2202	2058	1911	1751	1698	1540	1358	1140	1288	1144	977							
4	900	2894	2771	2606	2523	2382	2235	2076	1982	1825	1632	1400	1447	1299	1139	970						
5	1000	3246	3128	2968	2844	2706	2559	2402	2265	2110	1907	1659	1607	1454	1301	1148	994					
6	1100	3591	3482	3339	3225	3102	2975	2832	2704	2560	2401	2212	2126	1977	1821	1653	1569	1536	1378	1239		
7	1200	3935	3836	3710	3605	3497	3391	3262	3142	3009	2894	2765	2645	2499	2341	2159	2061	1944	1816	1687	1358	1330
8	1300	4299	4204	4090	3995	3893	3791	3676	3569	3455	3343	3217	3106	2982	2846	2700	2594	2473	2270	2042	1708	1658
9	1400	4663	4572	4470	4385	4289	4190	4089	3996	3901	3792	3669	3567	3464	3351	3241	3149	3002	2725	2398	2002	1989
10	1500	5005	4922	4820	4745	4664	4560	4483	4388	4298	4208	4102	4010	3911	3801	3701	3609	3478	3203	2860	2592	2348
11	1600	5346	5271	5169	5104	5038	4930	4876	4779	4695	4623	4535	4452	4357	4250	4160	4069	3954	3681	3322	3060	2808
12	1700	5698	5627	5537	5470	5409	5308	5245	5161	5077	5010	4817	4749	4662	4568	4474	4380	4257	4024	3678	3383	3125

7/22/17

Fan selection is accomplished through the Aurora Controls and allows four online selections of continuous fan (G), L = stage 1 (Y1), H = stage 2 (Y2), and Aux = electric heat. Continuous Fan (G) can be set at any airflow. Factory setting is 1.
 L = Stage 1 (Y1) setting can be located anywhere other than **BOLD** highlighted points. The factory setting is 3.
 H = Stage 2 (Y2) setting should be located in shaded portion. The factory setting is 7.
 Elect heat Airflow (AUX) airflow setting should be configured for the minimum airflow needed to support the heater. Please consult heater manual.
 Factory settings for 096 are continuous fan (G) speed 1, Part Load Stage 1(Y2)= Speed 3, Full Load Stage 2 (Y2) = Speed 7 and with Electric Heat Operation (AUX) = Speed 10.

Model 120

Fan Speed	Fan RPM	Airflow [cfm] at External Static Pressure [in. wg.]																				
		0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2.0
1	600	1840	1700	1512	1493	1334	1174	995	964													
2	700	2191	2057	1878	1847	1696	1542	1373	1331	1165	972	950	913									
3	800	2542	2415	2245	2202	2058	1911	1751	1698	1540	1358	1140	1288	1144	977							
4	900	2894	2771	2606	2523	2382	2235	2076	1982	1825	1632	1400	1447	1299	1139	970						
5	1000	3246	3128	2968	2844	2706	2559	2402	2265	2110	1907	1659	1607	1454	1301	1148	994					
6	1100	3591	3482	3339	3225	3102	2975	2832	2704	2560	2401	2212	2126	1977	1821	1653	1569	1536	1378	1239		
7	1200	3935	3836	3710	3605	3497	3391	3262	3142	3009	2894	2765	2645	2499	2341	2159	2061	1944	1816	1687	1358	1330
8	1300	4299	4204	4090	3995	3893	3791	3676	3569	3455	3343	3217	3106	2982	2846	2700	2594	2473	2270	2042	1708	1658
9	1400	4663	4572	4470	4385	4289	4190	4089	3996	3901	3792	3669	3567	3464	3351	3241	3149	3002	2725	2398	2002	1989
10	1500	5005	4922	4820	4745	4664	4560	4483	4388	4298	4208	4102	4010	3911	3801	3701	3609	3478	3203	2860	2592	2348
11	1600	5346	5271	5169	5104	5038	4930	4876	4779	4695	4623	4535	4452	4357	4250	4160	4069	3954	3681	3322	3060	2808
12	1700	5698	5627	5537	5470	5409	5308	5245	5161	5077	5010	4817	4749	4662	4568	4474	4380	4257	4024	3678	3383	3125

7/22/17

Fan selection is accomplished through the Aurora Controls and allows four online selections of continuous fan (G), L = stage 1 (Y1), H = stage 2 (Y2), and Aux = electric heat. Continuous Fan (G) can be set at any airflow. Factory setting is 1.
 L = Stage 1 (Y1) setting can be located anywhere other than **BOLD** highlighted points. The factory setting is 4.
 H = Stage 2 (Y2) setting should be located in shaded portion. The factory setting is 9.
 Elect heat Airflow (AUX) airflow setting should be configured for the minimum airflow needed to support the heater. Please consult heater manual.
 Factory settings for 120 are continuous fan (G) speed 1, Part Load Stage 1(Y2)= Speed 4, Full Load Stage 2 (Y2) = Speed 9 and with Electric Heat Operation (AUX) = Speed 10.

Blower Performance Data cont.

Model 144

Fan Speed	Fan RPM	Airflow [cfm] at External Static Pressure [in. wg.]																				
		0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2.0
1	600	1840	1700	1512	1493	1334	1174	995	964													
2	700	2191	2057	1878	1847	1696	1542	1373	1331	1165	972	950	913									
3	800	2542	2415	2245	2202	2058	1911	1751	1698	1540	1358	1140	1288	1144	977							
4	900	2894	2771	2606	2523	2382	2235	2076	1982	1825	1632	1400	1447	1299	1139	970						
5	1000	3246	3128	2968	2844	2706	2559	2402	2265	2110	1907	1659	1607	1454	1301	1148	994					
6	1100	3591	3482	3339	3225	3102	2975	2832	2704	2560	2401	2212	2126	1977	1821	1653	1569	1536	1378	1239		
7	1200	3935	3836	3710	3605	3497	3391	3262	3142	3009	2894	2765	2645	2499	2341	2159	2061	1944	1816	1687	1358	1330
8	1300	4299	4204	4090	3995	3893	3791	3676	3569	3455	3343	3217	3106	2982	2846	2700	2594	2473	2270	2042	1708	1658
9	1400	4663	4572	4470	4385	4289	4190	4089	3996	3901	3792	3669	3567	3464	3351	3241	3149	3002	2725	2398	2002	1989
10	1500	5005	4922	4820	4745	4664	4560	4483	4388	4298	4208	4102	4010	3911	3801	3701	3609	3478	3203	2860	2592	2348
11	1600	5346	5271	5169	5104	5038	4930	4876	4779	4695	4623	4535	4452	4357	4250	4160	4069	3954	3681	3322	3060	2808
12	1700	5698	5627	5537	5470	5409	5308	5245	5161	5077	5010	4817	4749	4662	4568	4474	4380	4257	4024	3678	3383	3125

7/22/17

Fan selection is accomplished through the Aurora Controls and allows four online selections of continuous fan (G), L = stage 1 (Y1), H = stage 2 (Y2), and Aux = electric heat. Continuous Fan (G) can be set at any airflow. Factory setting is 1.

L = Stage 1 (Y1) setting can be located anywhere other than **BOLD** highlighted points. The factory setting is 6.

H = Stage 2 (Y2) setting should be located in shaded portion. The factory setting is 11.

Elect heat Airflow (AUX) airflow setting should be configured for the minimum airflow needed to support the heater. Please consult heater manual.

Factory settings for 144 are continuous fan (G) speed 1, Part Load Stage 1(Y2)= Speed 6, Full Load Stage 2 (Y2) = Speed 11 and with Electric Heat Operation (AUX) = Speed 12 .

Model 144 (High Static)

Fan Speed	Fan RPM	Airflow [cfm] at External Static Pressure [in. wg.]																				
		0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2.0
1	900	2894	2771	2606	2523	2382	2235	2076	1982	1825	1632	1400	1447	1299	1139	970	774					
2	1000	3246	3128	2968	2844	2706	2559	2402	2265	2110	1907	1659	1607	1454	1301	1148	994					
3	1100	3591	3482	3339	3225	3102	2975	2832	2704	2560	2401	2212	2126	1977	1821	1653	1454					
4	1200	3935	3836	3710	3605	3497	3391	3262	3142	3009	2894	2765	2645	2499	2341	2159	1913	1944	1816	1687	1558	1430
5	1300	4299	4204	4090	3995	3893	3791	3676	3569	3455	3343	3217	3106	2982	2846	2700	2531	2473	2270	2042	2080	1959
6	1400	4663	4572	4470	4385	4289	4190	4089	3996	3901	3792	3669	3567	3464	3351	3241	3149	3002	2725	2398	2602	2489
7	1500	5005	4922	4820	4745	4664	4560	4483	4388	4298	4208	4102	4010	3911	3801	3701	3609	3478	3203	2860	2831	2848
8	1600	5346	5271	5169	5104	5038	4930	4876	4779	4695	4623	4535	4452	4357	4250	4160	4069	3954	3681	3322	3060	3208
9	1700	5698	5627	5537	5470	5409	5308	5245	5161	5077	5010	4817	4749	4662	4568	4474	4380	4257	4024	3678	3383	3383
10	1800	6050	5983	5904	5836	5779	5685	5614	5543	5458	5396	5098	5046	4966	4885	4788	4690	4560	4366	4033	3705	3559
11*	1900				6080	6020	5941	5867	5804	5729	5664	5481	5421	5341	5271	5181	5096	5000	4860	4649	4434	4269
12*	2000				6324	6260	6196	6120	6065	5999	5932	5864	5796	5715	5656	5573	5501	5440	5353	5265	5163	4979

7/22/17

Fan selection is accomplished through the Aurora Controls and allows four online selections of continuous fan (G), L = stage 1 (Y1), H = stage 2 (Y2), and Aux = electric heat.

Continuous Fan (G) can be set at any airflow. Factory setting is 1.

L = Stage 1 (Y1) setting can be located anywhere other than **BOLD** highlighted points. The factory setting is 3.

H = Stage 2 (Y2) setting should be located in shaded portion. The factory setting is 8.

Elect heat Airflow (AUX) airflow setting should be configured for the minimum airflow needed to support the heater. Please consult heater manual.

Factory settings for 144HS are continuous fan (G) speed 1, Part Load Stage 1(Y2)= Speed 3, Full Load Stage 2 (Y2) = Speed 8 and with Electric Heat Operation (AUX) = Speed 10 .

* Speed not available on 208-230/3 Voltage

Blower Performance Data cont.

Model 180

Fan Speed	Fan RPM	Airflow [cfm] at External Static Pressure [in. wg.]																				
		0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2.0
1	900	2894	2771	2606	2523	2382	2235	2076	1982	1825	1632	1400	1447	1299	1139	970	774					
2	1000	3246	3128	2968	2844	2706	2559	2402	2265	2110	1907	1659	1607	1454	1301	1148	994					
3	1100	3591	3482	3339	3225	3102	2975	2832	2704	2560	2401	2212	2126	1977	1821	1653	1454					
4	1200	3935	3836	3710	3605	3497	3391	3262	3142	3009	2894	2765	2645	2499	2341	2159	1913	1944	1816	1687	1558	1430
5	1300	4299	4204	4090	3995	3893	3791	3676	3569	3455	3343	3217	3106	2982	2846	2700	2531	2473	2270	2042	2080	1959
6	1400	4663	4572	4470	4385	4289	4190	4089	3996	3901	3792	3669	3567	3464	3351	3241	3149	3002	2725	2398	2602	2489
7	1500	5005	4922	4820	4745	4664	4560	4483	4388	4298	4208	4102	4010	3911	3801	3701	3609	3478	3203	2860	2831	2848
8	1600	5346	5271	5169	5104	5038	4930	4876	4779	4695	4623	4535	4452	4357	4250	4160	4069	3954	3681	3322	3060	3208
9	1700	5698	5627	5537	5470	5409	5308	5245	5161	5077	5010	4817	4749	4662	4568	4474	4380	4257	4024	3678	3383	3383
10	1800	6050	5983	5904	5836	5779	5685	5614	5543	5458	5396	5098	5046	4966	4885	4788	4690	4560	4366	4033	3705	3559
11*	1900				6080	6020	5941	5867	5804	5729	5664	5481	5421	5341	5271	5181	5096	5000	4860	4649	4434	4269
12*	2000				6324	6260	6196	6120	6065	5999	5932	5864	5796	5715	5656	5573	5501	5440	5353	5265	5163	4979

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Fan selection is accomplished through the Aurora Controls and allows four online selections of continuous fan (G), L = stage 1 (Y1), H = stage 2 (Y2), and Aux = electric heat.

Continuous Fan (G) can be set at any airflow. Factory setting is 1.

L = Stage 1 (Y1) setting can be located anywhere other than BOLD highlighted points. The factory setting is 4.

H = Stage 2 (Y2) setting should be located in shaded portion. The factory setting is 10.

Elect heat Airflow (AUX) airflow setting should be configured for the minimum airflow needed to support the heater. Please consult heater manual.

Factory settings for 180 are continuous fan (G) speed 1, Part Load Stage 1(Y2)= Speed 4, Full Load Stage 2 (Y2) = Speed 10 and with Electric Heat Operation (AUX) = Speed 10 .

* Speed not available on 208-230/3 Voltage

Model 181 (High Static)

Fan Speed	Fan RPM	Airflow [cfm] at External Static Pressure [in. wg.]																				
		0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2.0
1	600	3681	3400	3024	2986	2667	2348	1991	1928													
2	700	4383	4115	3757	3695	3392	3085	2746	2663	2331	1944	1900	1827									
3	800	5085	4829	4490	4404	4117	3822	3501	3397	3080	2715	2280	2575	2288	1954							
4	900	5788	5543	5213	5046	4764	4470	4153	3963	3650	3265	2799	2895	2598	2278	1940						
5	1000	6492	6256	5936	5688	5412	5118	4804	4530	4220	3814	3318	3215	2908	2602	2295	1989					
6	1100	7181	6964	6678	6449	6203	5950	5664	5407	5119	4801	4424	4252	3953	3642	3307	3137					
7	1200	7870	7672	7420	7210	6994	6782	6524	6284	6018	5788	5530	5290	4998	4682	4318	4121	3889	3631	3374	2716	2660
8	1300	8598	8408	8180	7990	7786	7581	7351	7138	6910	6686	6434	6212	5963	5692	5400	5187	4946	4541	4085	3416	3316
9	1400	9326	9144	8940	8770	8578	8380	8178	7992	7802	7584	7338	7134	6928	6702	6482	6298	6004	5450	4796	4004	3978
10	1500	10009	9843	9639	9489	9327	9120	8965	8775	8596	8415	8204	8019	7821	7601	7401	7218	6956	6406	5720	5184	4696
11	1600	10692	10542	10338	10208	10076	9860	9752	9558	9390	9246	9070	8904	8714	8500	8320	8138	7908	7362	6644	6120	5616
12	1700	11396	11254	11073	10940	10817	10615	10490	10322	10153	10019	9633	9498	9323	9135	8948	8759	8514	8047	7355	6765	6250

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Airflow chart depicts combined airflow from both blowers.

Fan selection is accomplished through the Aurora Controls and allows four online selections of continuous fan (G), L = stage 1 (Y1), H = stage 2 (Y2), and Aux = electric heat.

Continuous Fan (G) can be set at any airflow. Factory setting is 1.

Stage 1 (Y1) setting can be located anywhere other than BOLD highlighted points. The factory setting is 3.

Stage 2 (Y2) setting should be located in shaded portion. The factory setting is 7.

Elect heat Airflow (AUX) airflow setting should be configured for the minimum airflow needed to support the heater. Please consult heater manual.

Factory settings for 180HS are continuous fan (G) speed 1, Part Load Stage 1(Y2)= Speed 3, Full Load Stage 2 (Y2) = Speed 7 and with Electric Heat Operation (AUX) = Speed 11 .

Blower Performance Data cont.

Model 240

Fan Speed	Fan RPM	Airflow [cfm] at External Static Pressure [in. wg.]																				
		0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2.0
1	600	3681	3400	3024	2986	2667	2348	1991	1928													
2	700	4383	4115	3757	3695	3392	3085	2746	2663	2331	1944	1900	1827									
3	800	5085	4829	4490	4404	4117	3822	3501	3397	3080	2715	2280	2575	2288	1954							
4	900	5788	5543	5213	5046	4764	4470	4153	3963	3650	3265	2799	2895	2598	2278	1940						
5	1000	6492	6256	5936	5688	5412	5118	4804	4530	4220	3814	3318	3215	2908	2602	2295	1989					
6	1100	7181	6964	6678	6449	6203	5950	5664	5407	5119	4801	4424	4252	3953	3642	3307	3137	3073	2756	2478		
7	1200	7870	7672	7420	7210	6994	6782	6524	6284	6018	5788	5530	5290	4998	4682	4318	4121	3889	3631	3374	2716	2660
8	1300	8598	8408	8180	7990	7786	7581	7351	7138	6910	6686	6434	6212	5963	5692	5400	5187	4946	4541	4085	3416	3316
9	1400	9326	9144	8940	8770	8578	8380	8178	7992	7802	7584	7338	7134	6928	6702	6482	6298	6004	5450	4796	4004	3978
10	1500	10009	9843	9639	9489	9327	9120	8965	8775	8596	8415	8204	8019	7821	7601	7401	7218	6956	6406	5720	5184	4696
11	1600	10692	10542	10338	10208	10076	9860	9752	9558	9390	9246	9070	8904	8714	8500	8320	8138	7908	7362	6644	6120	5616
12	1700	11396	11254	11073	10940	10817	10615	10490	10322	10153	10019	9633	9498	9323	9135	8948	8759	8514	8047	7355	6765	6250

7/22/17

Airflow chart depicts combined airflow from both blowers.
 Fan selection is accomplished through the Aurora Controls and allows four online selections of continuous fan (G), L = stage 1 (Y1), H = stage 2 (Y2), and Aux = electric heat. Continuous Fan (G) can be set at any airflow. Factory setting is 1.
 L = Stage 1 (Y1) setting can be located anywhere other than BOLD highlighted points. The factory setting is 4.
 H = Stage 2 (Y2) setting should be located in shaded portion. The factory setting is 9.
 Elect heat Airflow (AUX) airflow setting should be configured for the minimum airflow needed to support the heater. Please consult heater manual.
 Factory settings for 240 are continuous fan (G) speed 1, Part Load Stage 1(Y2)= Speed 4, Full Load Stage 2 (Y2) = Speed 9 and with Electric Heat Operation (AUX) = Speed 11.

Model 300

Fan Speed	Fan RPM	Airflow [cfm] at External Static Pressure [in. wg.]																				
		0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2.0
1	900	5788	5543	5213	5046	4764	4470	4153	3963	3650	3265	2799	2895	2598	2278	1940	1548					
2	1000	6492	6256	5936	5688	5412	5118	4804	4530	4220	3814	3318	3215	2908	2602	2295	1989					
3	1100	7181	6964	6678	6449	6203	5950	5664	5407	5119	4801	4424	4252	3953	3642	3307	2907					
4	1200	7870	7672	7420	7210	6994	6782	6524	6284	6018	5788	5530	5290	4998	4682	4318	3826	3889	3631	3374	3114	3011
5	1300	8598	8408	8180	7990	7786	7581	7351	7138	6910	6686	6434	6212	5963	5692	5400	5062	4946	4541	4085	3884	3812
6	1400	9326	9144	8940	8770	8578	8380	8178	7992	7802	7584	7338	7134	6928	6702	6482	6298	6004	5450	4796	4655	4613
7	1500	10009	9843	9639	9489	9327	9120	8965	8775	8596	8415	8204	8019	7821	7601	7401	7218	6956	6406	5720	5662	5697
8	1600	10692	10542	10338	10208	10076	9860	9752	9558	9390	9246	9070	8904	8714	8500	8320	8138	7908	7362	6644	6120	6415
9	1700	11396	11254	11073	10940	10817	10615	10490	10322	10153	10019	9633	9498	9323	9135	8948	8759	8514	8047	7355	6765	6767
10	1800	12100	11966	11808	11672	11558	11370	11228	11086	10916	10792	10196	10092	9932	9770	9576	9380	9120	8732	8066	7410	7118
11*	1900				12160	12039	11881	11734	11608	11457	11328	10962	10842	10681	10541	10361	10191	10000	9719	9298	8868	8538
12*	2000				12648	12520	12392	12240	12130	11998	11864	11728	11592	11430	11312	11146	11002	10880	10706	10530	10326	9958

7/22/17

Airflow chart depicts combined airflow from both blowers.
 Fan selection is accomplished through the Aurora Controls and allows four online selections of continuous fan (G), L = stage 1 (Y1), H = stage 2 (Y2), and Aux = electric heat. Continuous Fan (G) can be set at any airflow. Factory setting is 1.
 L = Stage 1 (Y1) setting can be located anywhere other than BOLD highlighted points. The factory setting is 3.
 H = Stage 2 (Y2) setting should be located in shaded portion. The factory setting is 8.
 Elect heat Airflow (AUX) airflow setting should be configured for the minimum airflow needed to support the heater. Please consult heater manual.
 Factory settings for 300 are continuous fan (G) speed 1, Part Load Stage 1(Y2)= Speed 3, Full Load Stage 2 (Y2) = Speed 8 and with Electric Heat Operation (AUX) = Speed 11.
 * Speed not available on 208-230/3 Voltage

Blower Performance Data cont.

Model 360

Fan Speed	Fan RPM	Airflow [cfm] at External Static Pressure [in. wg.]																				
		0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2.0
1	900	5788	5543	5213	5046	4764	4470	4153	3963	3650	3265	2799	2895	2598	2278	1940	1548					
2	1000	6492	6256	5936	5688	5412	5118	4804	4530	4220	3814	3318	3215	2908	2602	2295	1989					
3	1100	7181	6964	6678	6449	6203	5950	5664	5407	5119	4801	4424	4252	3953	3642	3307	2907					
4	1200	7870	7672	7420	7210	6994	6782	6524	6284	6018	5788	5530	5290	4998	4682	4318	3826	3889	3631	3374	3114	3011
5	1300	8598	8408	8180	7990	7786	7581	7351	7138	6910	6686	6434	6212	5963	5692	5400	5062	4946	4541	4085	3884	3812
6	1400	9326	9144	8940	8770	8578	8380	8178	7992	7802	7584	7338	7134	6928	6702	6482	6298	6004	5450	4796	4655	4613
7	1500	10009	9843	9639	9489	9327	9120	8965	8775	8596	8415	8204	8019	7821	7601	7401	7218	6956	6406	5720	5662	5697
8	1600	10692	10542	10338	10208	10076	9860	9752	9558	9390	9246	9070	8904	8714	8500	8320	8138	7908	7362	6644	6120	6415
9	1700	11396	11254	11073	10940	10817	10615	10490	10322	10153	10019	9633	9498	9323	9135	8948	8759	8514	8047	7355	6765	6767
10	1800	12100	11966	11808	11672	11558	11370	11228	11086	10916	10792	10196	10092	9932	9770	9576	9380	9120	8732	8066	7410	7118
11*	1900				12160	12039	11881	11734	11608	11457	11328	10962	10842	10681	10541	10361	10191	10000	9719	9298	8868	8538
12*	2000				12648	12520	12392	12240	12130	11998	11864	11728	11592	11430	11312	11146	11002	10880	10706	10530	10326	9958

7/22/17

Airflow chart depicts combined airflow from both blowers.

Fan selection is accomplished through the Aurora Controls and allows four online selections of continuous fan (G), L = stage 1 (Y1), H = stage 2 (Y2), and Aux = electric heat.

Continuous Fan (G) can be set at any airflow. Factory setting is 1.

L = Stage 1 (Y1) setting can be located anywhere other than BOLD highlighted points. The factory setting is 3.

H = Stage 2 (Y2) setting should be located in shaded portion. The factory setting is 10.

Elect heat Airflow (AUX) airflow setting should be configured for the minimum airflow needed to support the heater. Please consult heater manual.

Factory settings for 360 are continuous fan (G) speed 1, Part Load Stage 1(Y2)= Speed 3, Full Load Stage 2 (Y2) = Speed 10 and with Electric Heat Operation (AUX) = Speed 10.

* Speed not available on 208-230/3 Voltage

Blower Performance Data cont.

Setting Blower Speed - Variable Speed ECM

The ABC board's Yellow Config LED will flash the current variable speed ECM blower speed selections for low, med, and high continuously with a short pause in between. The speeds can also be confirmed with the AID Tool under the Setup/ECM Setup screen. The variable speed ECM blower motor speeds can be field adjusted with or without using an AID Tool.

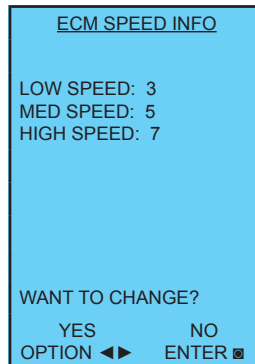
Variable Speed ECM Setup without an AID Tool

The blower speeds for Low (G only), Med (Y1), and High (Y2/Aux) can be adjusted directly at the Aurora ABC board which utilizes the push button (SW1) on the ABC board. This procedure is outlined in the Variable Speed ECM Configuration Mode portion of the Aurora 'Base' Control System section.

Variable Speed ECM Setup with an AID Tool

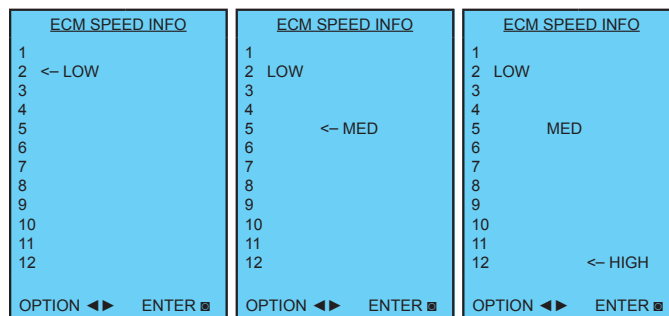
A much easier method utilizes the AID Tool to change the airflow using the procedure below. First navigate to the Setup screen and then select ECM Setup. This screen displays the current variable speed ECM settings. It allows the technician to enter the setup screens to change the variable speed ECM settings. Change the highlighted item using the ◀ and ▶ buttons and then press the ◻ button to select the item.

Variable Speed ECM Setup with an AID Tool cont.



Selecting YES will enter variable speed ECM speed setup, while selecting NO will return to the previous screen.

Variable Speed ECM Speed Setup - These screens allow the technician to select the low, medium, and high blower speed for the variable speed ECM blower motor. Change the highlighted item using the ▲ and ▼ buttons. Press the ◻ button to select the speed.



After the high speed setting is selected the AID Tool will automatically transfer back to the ECM Setup screen.

Unit Startup

Before Powering Unit, Check The Following:

NOTE: Remove and discard the compressor shipping bolts. The bolts can then be discarded.

- High voltage is correct and matches nameplate.
- Fuses, breakers and wire size correct.
- Low voltage wiring complete.
- Piping completed and water system cleaned and flushed.
- Air is purged from closed loop system.
- Isolation valves are open, water control valves or loop pumps wired.
- Condensate line open and correctly pitched.
- Transformer switched to 208V if applicable.
- Dip switches are set correctly.
- Blower rotates freely – foam shipping support has been removed.
- Blower speed correct.
- Air filter/cleaner is clean and in position.
- Service/access panels are in place.
- Return air temperature is between 50-80°F heating and 60-95°F cooling.
- Check air coil cleanliness to insure optimum performance. Clean as needed according to maintenance guidelines. To obtain maximum performance the air coil should be cleaned before startup. A 10-percent solution of dishwasher detergent and water is recommended for both sides of coil, a thorough water rinse should follow.

Startup Steps

NOTE: Complete the Equipment Start-Up/Commissioning Check Sheet during this procedure. Refer to thermostat operating instructions and complete the startup procedure.

1. Initiate a control signal to energize the blower motor. Check blower operation.
2. Initiate a control signal to place the unit in the cooling mode. Cooling setpoint must be set below room temperature.
3. Cooling will energize after a time delay. Check for correct rotation of scroll compressors in 3 phase applications. Incorrect rotation will cause low refrigerant pressures and possibly unusual noise. Switch any two power leads at the line voltage supply.
4. Be sure that the compressor and water control valve or loop pump(s) are activated.
5. Verify that the water flow rate is correct by measuring the pressure drop through the heat exchanger using the P/T plugs and comparing to the pressure drop table.
6. Check the temperature of both the supply and discharge water (Refer to Operating Parameters tables).
7. Check for an air temperature drop of 15°F to 25°F across the air coil, depending on the blower speed and entering water temperature.
8. Decrease the cooling set point several degrees and verify high-speed blower operation (variable speed ECM only).
9. Adjust the cooling setpoint above the room temperature and verify that the compressor and water valve or loop pumps deactivate.
10. Initiate a control signal to place the unit in the heating mode. Heating set point must be set above room temperature.
11. Heating will energize after a time delay.
12. Check the temperature of both the supply and discharge water (Refer to Unit Operating Parameters tables).
13. Check for an air temperature rise of 20°F to 35°F across the air coil, depending on the blower speed and entering water temperature.
14. If auxiliary electric heaters are installed, increase the heating setpoint until the electric heat banks are sequenced on. All stages of the auxiliary heater should be sequenced on when the thermostat is in the Emergency Heat mode. Check amperage of each element.
15. Adjust the heating setpoint below room temperature and verify that the compressor and water valve or loop pumps deactivate.
16. During all testing, check for excessive vibration, noise or water leaks. Correct or repair as required.
17. Set system to desired normal operating mode and set temperature to maintain desired comfort level.
18. Instruct the owner/operator in the proper operation of the thermostat and system maintenance.

NOTE: Be certain to fill out and forward all warranty registration papers.

Refrigerant Removal and Evacuation

When breaking into the refrigerant circuit to make repairs – or for any other purpose conventional procedures shall be used. However, for flammable refrigerants it is important that best practice be followed, since flammability is a consideration. The following procedure shall be adhered to:

- safely remove refrigerant following local and national regulations;
- evacuate;
- purge the circuit with inert gas (optional for A2L);
- evacuate (optional for A2L);
- continuously flush or purge with inert gas when using flame to open circuit; and
- open the circuit.

The refrigerant charge shall be recovered into the correct recovery cylinders if venting is not allowed by local and national codes. For appliances containing flammable refrigerants, the system shall be purged with oxygen-free nitrogen to render the appliance safe for flammable refrigerants.

This process might need to be repeated several times. Compressed air or oxygen shall not be used for purging refrigerant systems. For appliances containing flammable refrigerants, refrigerants purging shall be achieved by breaking the vacuum in the system with oxygen-free nitrogen and continuing to fill until the working pressure is achieved, then venting to atmosphere, and finally pulling down to a vacuum (optional for A2L). This process shall be repeated until no refrigerant is within the system (optional for A2L). When the final oxygen-free nitrogen charge is used, the system shall be vented down to atmospheric pressure to enable work to take place. The outlet for the vacuum pump shall not be close to any potential ignition sources, and ventilation shall be available.

Charging procedures

In addition to conventional charging procedures, the following requirements shall be followed.

- Ensure that contamination of different refrigerants does not occur when using charging equipment.
- Hoses or lines shall be as short as possible to minimise the amount of refrigerant contained in them.
- Cylinders shall be kept in an appropriate position according to the instructions.
- Ensure that the REFRIGERATING SYSTEM is earthed prior to charging the system with refrigerant.
- Label the system when charging is complete (if not already).
- Extreme care shall be taken not to overfill the REFRIGERATING SYSTEM.

Prior to recharging the system, it shall be pressure-tested with the appropriate purging gas. The system shall be leak-tested on completion of charging but prior to commissioning. A follow up leak test shall be carried out prior to leaving the site.

Refrigerant Recovery

When removing refrigerant from a system, either for servicing or decommissioning, it is recommended good practice that all refrigerants are removed safely.

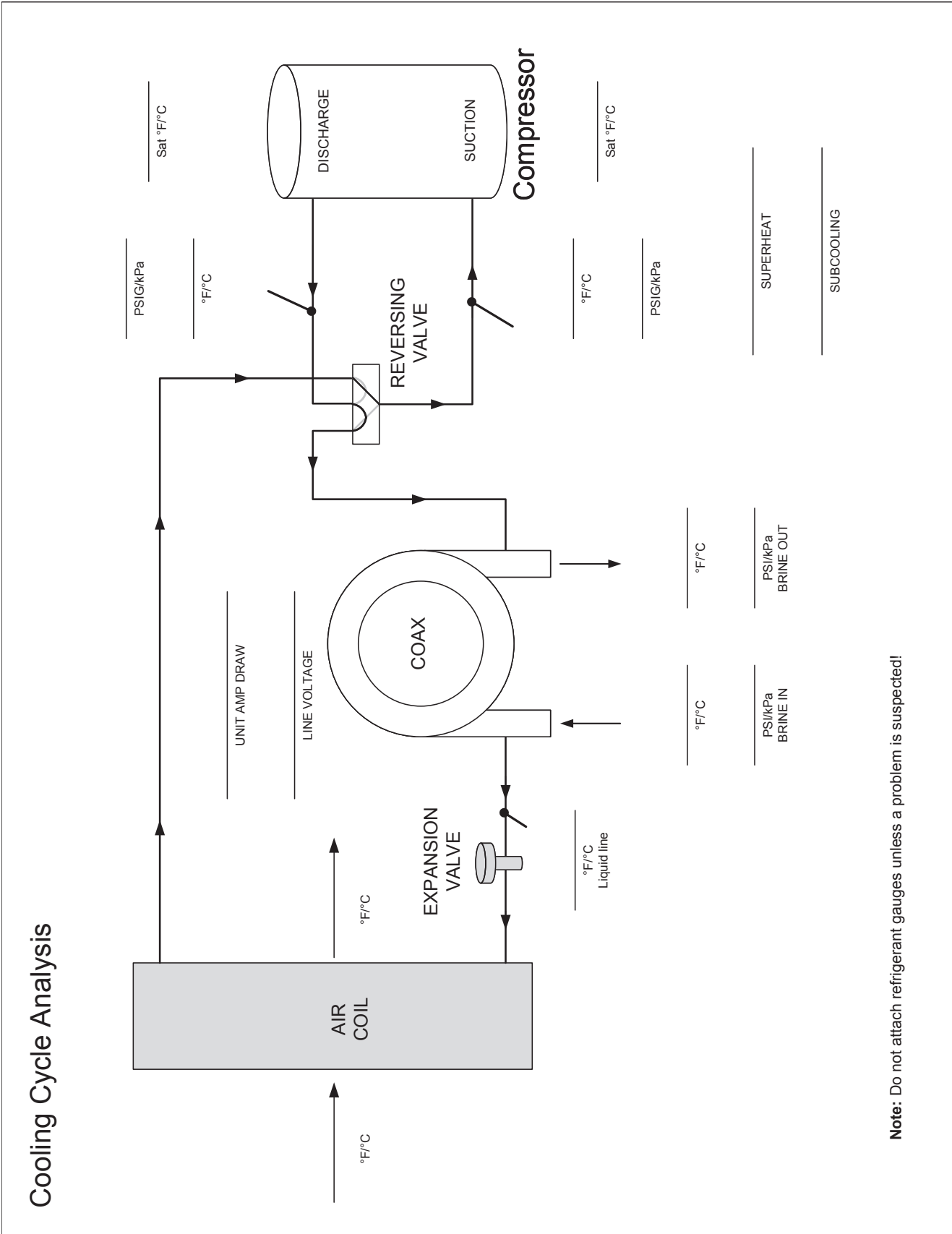
When transferring refrigerant into cylinders, ensure that only appropriate refrigerant recovery cylinders are employed. Ensure that the correct number of cylinders for holding the total system charge is available. All cylinders to be used are designated for the recovered refrigerant and labelled for that refrigerant (i.e. special cylinders for the recovery of refrigerant). Cylinders shall be complete with pressure-relief valve and associated shut-off valves in good working order. Empty recovery cylinders are evacuated and, if possible, cooled before recovery occurs.

The recovery equipment shall be in good working order with a set of instructions concerning the equipment that is at hand and shall be suitable for the recovery of the flammable refrigerant. If in doubt, the manufacturer should be consulted. In addition, a set of calibrated weighing scales shall be available and in good working order. Hoses shall be complete with leak-free disconnect couplings and in good condition.

The recovered refrigerant shall be processed according to local legislation in the correct recovery cylinder, and the relevant waste transfer note arranged. Do not mix refrigerants in recovery units and especially not in cylinders.

If compressors or compressor oils are to be removed, ensure that they have been evacuated to an acceptable level to make certain that flammable refrigerant does not remain within the lubricant. The compressor body shall not be heated by an open flame or other ignition sources to accelerate this process. When oil is drained from a system, it shall be carried out safely.

Refrigeration Cycle Analysis



Notes

Revision Guide

Pages:	Description:	Date:	By:
All	Document Creation	12 Nov 2024	MA



Manufactured by
WaterFurnace International, Inc.
9000 Conservation Way
Fort Wayne, IN 46809
www.waterfurnace.com



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Product:	Versatec 500
Type:	Water Source/Geothermal Heat Pump
Size:	7-30 Tons
Document:	Installation Guide