

Installation Manual

VSHPW

**Vertical
Stack Unit**

Water Source Heat Pump





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Thank you for purchasing and installing the Ice Air VSHPW (Water Source Heat Pump). Ice Air is a leading supplier of VSHPWs, offering superior quality, reliability and efficiency for our customers.

This is a general guide only, and should be treated as such. The information contained in this manual, including but not limited to installation instructions, unit dimensions, and physical/performance data, may vary by project and unit configuration. Ice Air will not be held liable for any information contained in this manual. For questions about installation and unit performance, please contact your local Ice Air representative. Installation and start-up should always be performed by a trained professional.

ATTENTION INSTALLING PROFESSIONAL

Read this manual and familiarize yourself with the specific terms and safety warnings that must be adhered to before attempting to install or service this unit. Precautions listed are intended as supplemental to existing practices. As a professional, you have an obligation to know the product better than the customer. This includes all safety precautions and related items. It is your responsibility to install the product safely and know it well enough to be able to instruct a customer in its safe use as required.

RECOGNIZE THIS SYMBOL AS A SAFETY PRECAUTION.

▲ WARNING: Ice Air will not be responsible for any injury or property damage arising from improper service or service procedures. If you install or perform service on this unit, you assume responsibility for any personal injury or property damage which may result. Many jurisdictions require a license to install or service heating and air conditioning equipment.

▲ WARNING, HIGH VOLTAGE: Disconnect all power before servicing or installing unit. Multiple power sources may be present. Failure to do so may cause property damage, personal injury or death.

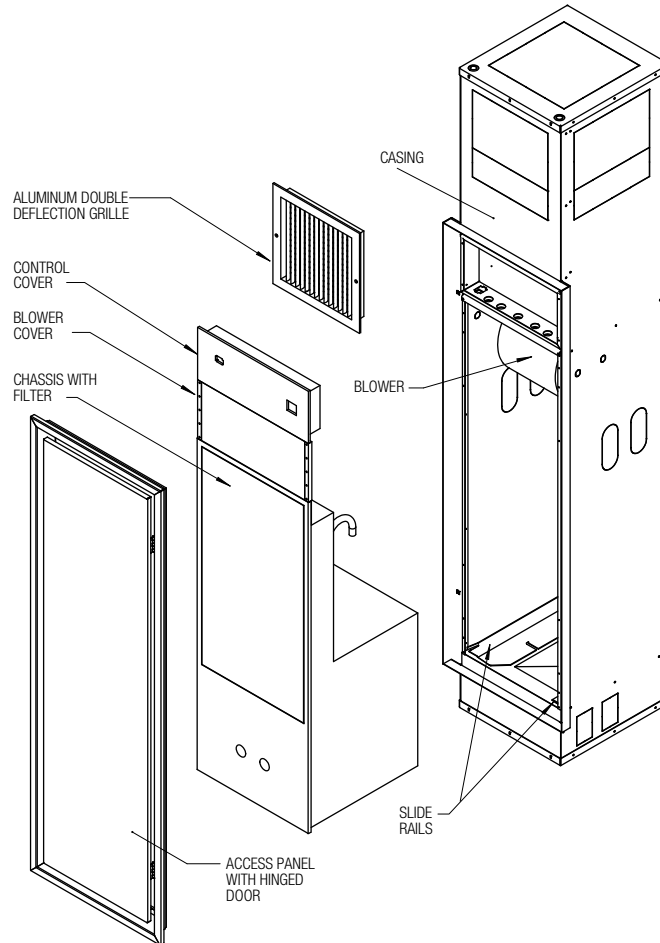
To ensure that the unit operates safely and efficiently, it must be installed according to these installation instructions and all local codes and ordinances, utilizing the best standards and practices at the time of installation or, in their absence, with the latest edition of the National Electric Code. The proper installation of this unit is described in the following sections. Following the steps in the order presented should ensure proper installation.

Overview

Ice Air Vertical Stack Water Source Heat Pumps are quality units, which should only be installed by a trained professional. Please ensure all sections are read thoroughly before installing the unit.

Application Note

It is important for heating/cooling systems to be properly sized for each application in order to achieve desired temperature and humidity levels. It is highly recommended that a professional engineer match the WSHP units you are about to install with the building structure and climate.



Inspection

1. Check the shipment against the Bill of Lading. Ensure all components are intact upon delivery and free from damage. Note any damage on the delivering carrier's Bill of Lading*.
2. The Ice Air unit(s) arrive prefabricated with an enclosure. Ensure both the unit and the enclosure are properly attached.
3. Make sure the floor is level in both directions so the unit's airflow will be aligned. Confirm adequate drainage is available to ensure adequate and continuous water flow during unit operation.
4. Remove the access panel is BEFORE installing.
5. Verify amperage to the unit(s) is correct and the unit can reach the power supply.

* Purchaser's responsibility includes filing all claims with the delivering carrier in a timely fashion.

Due to Ice Air's ongoing product development programs, the information in this document is subject to change without notice.



Physical Data

Model		VSHPW09	VSHPW12	VSHPW15	VSHPW18	VSHPW24	VSHPW30	VSHPW36
Compressor Type (1 Each)		Rotary						
Factory Charge R410A (oz)		28.2	32.5	32.5	38.8	40.9	52.9	67.0
Motor & Blower	208-230V PSC (Watts)	35			150		200	
	Blower Wheel Size (diam x w) - (in)	7 x 7					8 x 8	
Chassis Air Coil	Air Coil Dimensions (h x w) - (in)	20.0 x 11.4			26.0 x 12.2		28.0 x 17.3	
	Return Air Filter Dimensions (h x w) - (in)	29.5 x 13.9			31.1 x 15.9		31.6 x 19.8	
Weight	Chassis - (lbs)	100	102		137	138	160	165
	88" Cabinet - (lbs)	156			183		260	264

Regardless of the system being utilized, optimum performance can only be achieved through adjustment to the recommended water flow at each individual unit. Refer to unit requirements in the following table below:

Typical Water Side Data

Model	VSHPW09	VSHPW12	VSHPW15	VSHPW18	VSHPW24	VSHPW30	VSHPW36
Flow Rate (GPM)	2.3	3.0	3.8	4.5	6.0	7.5	9.0
Water Connection (in)	1/2			3/4			
Condensate Connection (in)	3/4						

Unit Operating Limits

Mode	Cooling °F	Heating °F
Ambient Air min-max DB	50-100	50-85
Return Air Min DB/WB	65/60	50
Return Air Max DB/WB	95/75	80
Entering Water Min*-Max	60-110	60-90

* Additional insulation may be required



Performance Data

Model	VSHPW09	VSHPW12	VSHPW15	VSHPW18	VSHPW24	VSHPW30	VSHPW36
Cooling Capacity (BTUH)	9,000	12,500	13,000	18,000	23,000	27,000	36,000
Sensible Capacity (BTUH)	7,100	9,700	10,600	12,800	17,100	22,200	26,200
EER	13.3	14.1	14.4	14.1	13.3	13.7	13
Heating Capacity (BTUH)	12,000	14,000	15,000	19,000	27,000	32,000	41,000
COP	4.4	4.3	4.5	4.4	4.3	4.4	4.3
Flow Rate (GPM)	2.3	3.0	3.8	4.5	6.0	7.5	9.0
Air Flow (CFM)	420	500	540	630	770	1000	1150

Cooling Capacity BTUH Rated at @ 80.6°F, 66.2°F WB EAT 86°F EWT @ 3 GPM/TON

Heating Capacity BTUH Rated at @ 68°F DB, 59°F WB EAT 68°F EWT @ 3 GPM/TON

The performance data shown above is based on standard equipment under the provided design conditions. Performance may vary depending on equipment configuration and project site conditions.

Electrical Data

Model	VSHPW09	VSHPW12	VSHPW15	VSHPW18	VSHPW24	VSHPW30	VSHPW36
Voltage/Ph/Hz	208-230/60/1						
Compressor RLA	4.05	5.4	5.4	7.35	9.9	11.6	15.45
Compressor LRA	20	27	27	42	55.4	60.2	75.6
Fan Motor FLA	0.7	0.7	2.0	2.0	1.85	1.85	3.98
MCA	5.8	7.5	8.0	11.2	14.4	16.5	23.3
MOP	10	12	13	19	24	28	39
Fuse Size	15	15	15	15	20	25	35

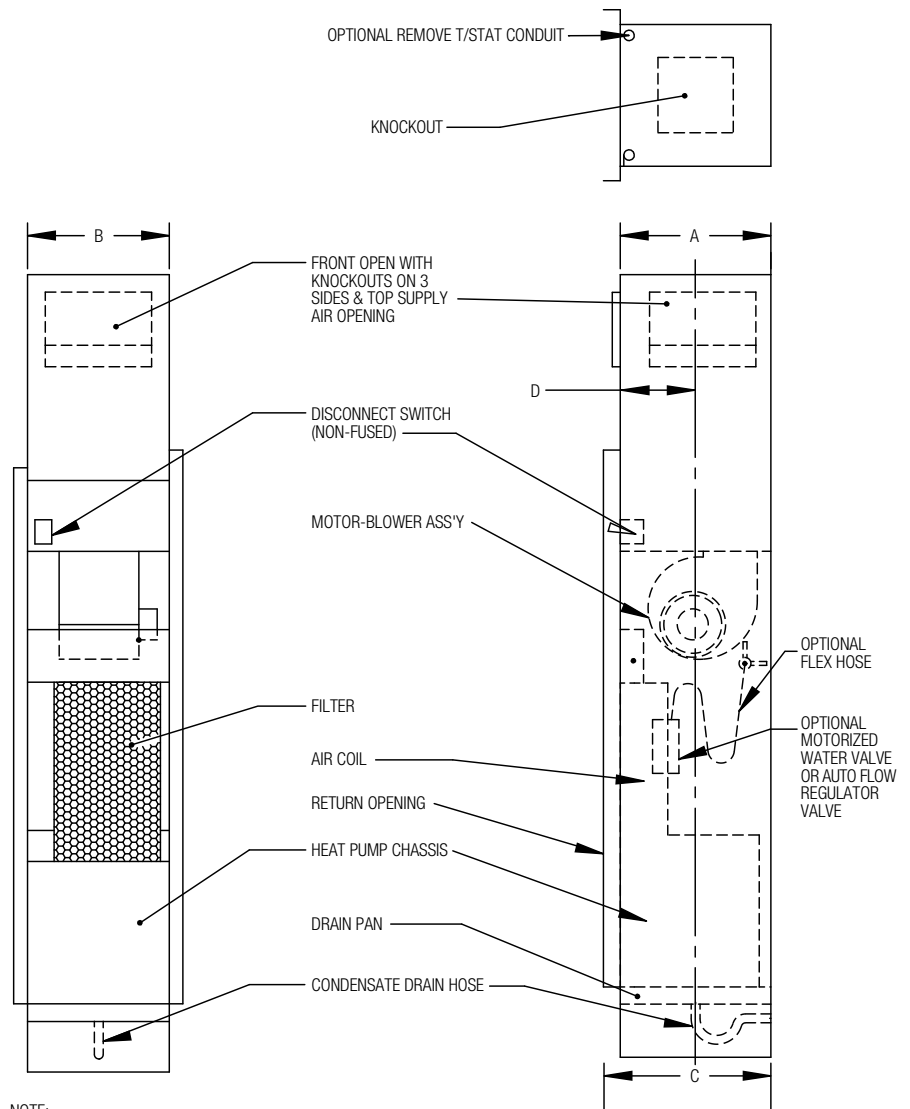
Before You Begin

1. Locate the unit where it can evenly distribute air throughout the room without obstructions. Units should be installed no closer than 12" apart when two units are side by side. A vertical clearance of 60" should be maintained between units.
2. Ensure the wall is structurally sound to support the weight of the unit.
3. Adequate and continuous water flow must be maintained for proper and safe unit operation. Ensure adequate drainage is also available.
4. Follow all applicable codes for installation.
5. Dedicated electrical circuitry and power supply is required to properly energize the Ice Air unit. Verify the amperage of the dedicated electrical service to the unit is correct and the unit can reach the power supply.
6. Position the unit so the air filter can be removed easily and required maintenance can be performed without interference.
7. A minimum obstructed distance of 36" should be kept around the unit.

IMPORTANT: To avoid permanent damage to the unit, DO NOT operate during construction in an open space or as a supplemental heating and cooling source during construction.

Inspection

1. Upon receipt of the equipment, carefully check the shipment again on the Bill of Lading.
2. Make sure all units have been received.
3. Inspect the packaging for any damage.
4. Ensure that any damage is noted on the delivering carrier's Bill of Lading.



NOTE:
RISER ARE OPTIONAL.

UNIT	Dimensions (inches)			
	A	B	C	D
VSHPW-09/12/15K	16"	17"	19"	8"
VSHPW-18/20/24K	18"	20"	21"	9"
VSHPW-30/36K	22"	24"	25"	11"

NOTE: It is the responsibility of the purchaser to file all necessary claims with the delivering carrier in a timely fashion. Many carriers have a 15 day notice period from receipt of delivery to file any and all claims.

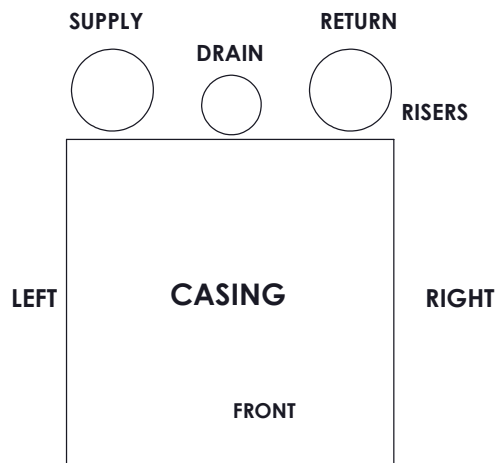
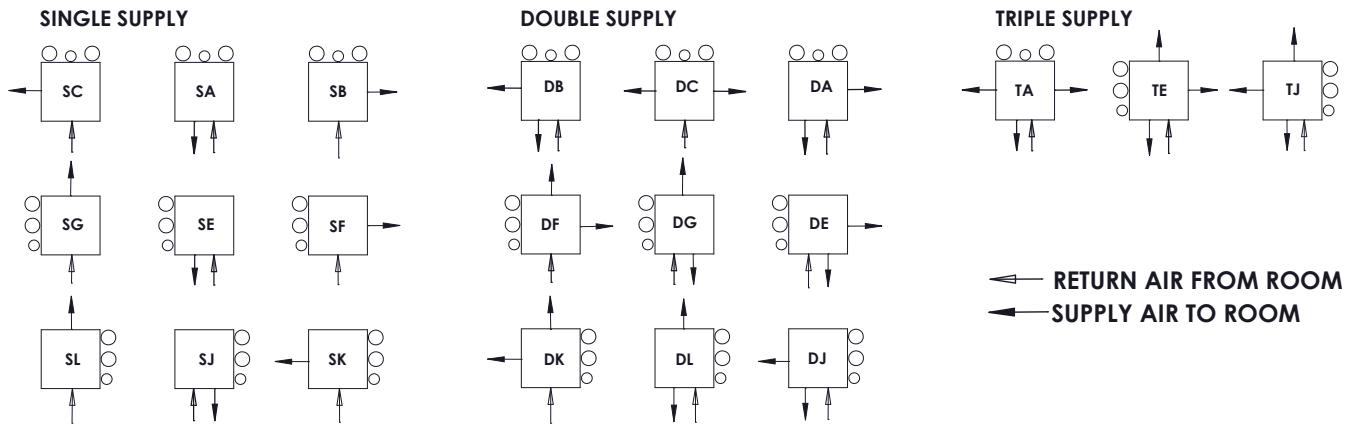
Installation

Casing and Riser Installation Configurations

Riser system design is the responsibility of the building mechanical designer and/or the installing contractor. Because it affects individual unit performance and efficiency, it is important that the system be properly designed, installed and balanced prior to operation of the equipment.

IMPORTANT: Please do not attempt to install risers without the help of a certified plumber.

Configuration Options



Riser Sizing and Insulation

Riser sizing is generally based on the water flow requirements of each unit and will vary depending on unit location within the building (units on higher and lower floors that tie into the same riser column may require different size risers, depending on the piping system chosen). The riser material, diameter, length and insulation thickness must be determined for each unit based on its positioning within the building and the overall system requirements.

IMPORTANT: Please consult an engineer before proceeding with riser installation.

Riser Expansion

Generally, in medium to high-rise buildings, allowances must be made for pipe expansion. In applications supplemented with factory- or field-supplied between floor riser extensions, assemble and install extensions before installing the unit cabinet.

NOTES: Riser assemblies are designed to accommodate a maximum of 1-1/8" expansion and contraction up to a total movement of 2-1/4". If the total calculated rise expansion exceeds 2-1/4", expansion devices must be used (field provided).

All riser modification necessitated by variations in floor-to-floor dimensions, including cutting off or extending risers, or providing extensions, are the sole responsibility of the installing contractor.

In cases where piping movement is expected to exceed the factory allowances, additional expansion compensation must be made to the riser system in the field. The graph below displays the expansion characteristics of risers compared to water temperature differential.

Assuming a minimum water temperature of 20°F and a maximum water temperature of 120°F, the temperature difference of 100°F indicates 90 feet of riser will expand or contract 1". To eliminate stress, a riser system must be anchored at least once to the building structure. Technical information on pipe expansion, contraction and anchoring can be found in the *ASHRAE HVAC Systems and Equipment Handbook*. Riser expansion and the anchoring of both the riser system and each unit is the responsibility of the design engineer and installing contractor.

Riser Connection

Install cabinet with risers as follows:

1. Move cabinet into position. **CAUTION:** Keep risers off the floor while moving the cabinet.
2. Be sure that all the copper fittings are clean and free of dirt.
3. Raise the cabinet upright and lower it so the attached risers fit into the risers from the unit previously installed on the floor below.

NOTE: The top of each riser is equipped with a 3" deep swaged connection. There is sufficient extension at the bottom to allow insertion of approximately 2" of the riser into the swaged top of the riser below.
4. Center the risers in the pipe chase and shim the unit cabinet to a level position. Plumb the risers in two planes to assure proper unit operation and condensate drainage.
5. Attach the cabinet assembly to the floor and to the building structure on at least two sides using sheet metal angles (field provided).

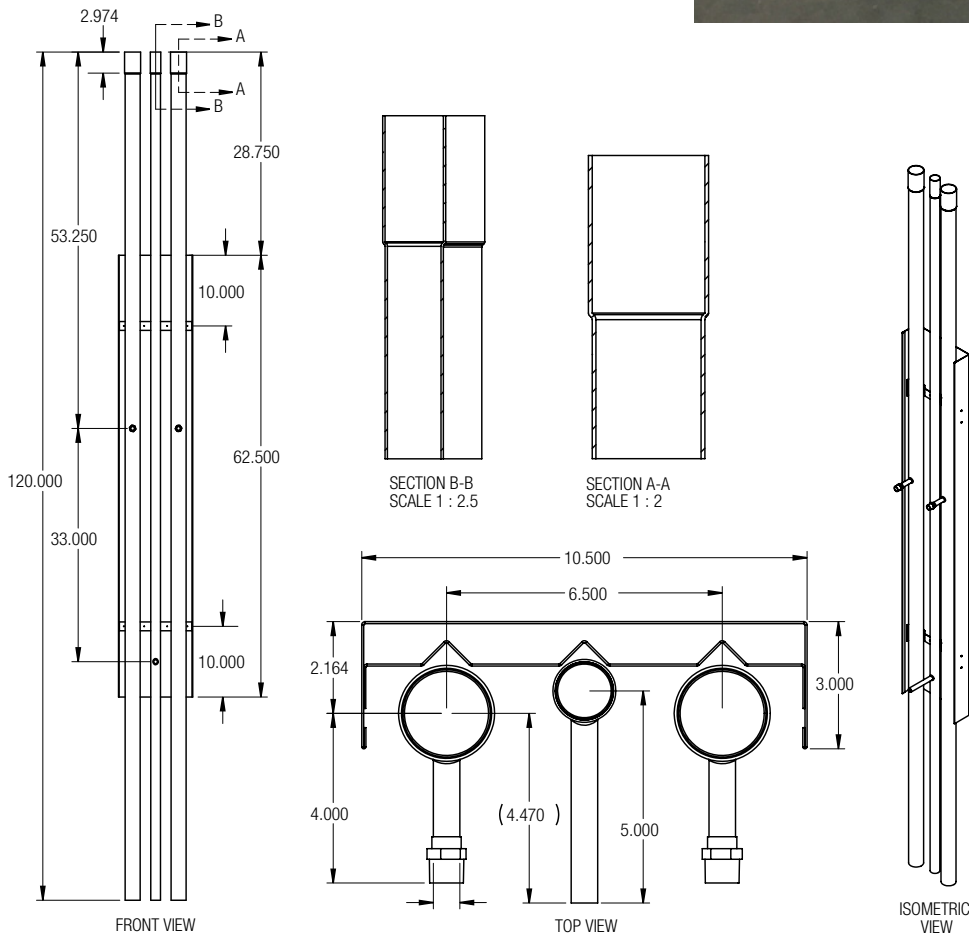
NOTE: A field provided base vibration dampening pad can be used to help eliminate transfer of any vibration from the unit to the building structure. If vibration dampening pads are used, some rough-in dimensional changes will need to be considered before installation due to the type and thickness of the pads. Additional anchorage can be provided by installing brackets at the top of the cabinet (field provided).
6. DO NOT attach drywall studs to the equipment cabinet.
7. When all units on a riser are anchored into place, complete riser joints as follows:
 - Verify that all riser joints are vertically aligned and that risers penetrate at least 1" into the swaged joint of the riser below. DO NOT let riser joint bottom out.
 - Braze riser joints with a high-temperature alloy using proper Phos-copper or Silfos. Soft solder 50-50, 60-40, 85-15, 95-5 and low temperature alloys are not suitable riser weld materials.
 - Anchor built-in risers to the building structure with at least one contact point. To accommodate vertical expansion and contraction DO NOT fasten risers rigidly within the unit.
 - Verify that unit shut-off valves are closed. DO NOT OPEN VALVES until the system has been cleaned and flushed.
 - Flush system, refer to "System Cleaning and Flushing" section of this manual for more information.
 - Install vents in piping loop as required to bleed the system of air accumulated during installation.

Installing Modular Risers

Ice Air Modular Riser System is a unique riser system designed to increase efficiency for the contractor and building mechanical designer. Each riser set is encased and palletized separately prior to shipping, allowing minimal installation efforts.

In order to install the Modular Riser System, carefully review the mechanical plans and place the risers in the designated location. Once the system is in place, the exposed joints allow for easy pressure testing. To attach the unit, align the unit's cabinet to each riser set and ensure the riser stubs correspond to the unit's piping diagram.

NOTE: Riser dimensions vary by floor and project.



Storage

- Ensure all equipment is stored in a clean and dry area.
- Ensure all equipment is properly covered and protected while at job site. Keep coverings on units until installation is complete. Precautions must be taken in areas where construction is still underway to prevent any damage to the equipment.

Casing Pre-Installation

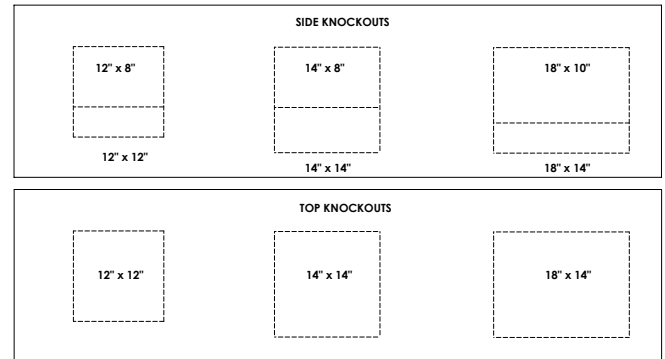
- Ensure all nameplate data is accurate.
- Check that all electrical connections are clean and secure.
- Remove supply air opening knockouts as shown on building plans.
- Remaining knockouts must remain covered. Do not remove unused knockouts.
- Remove correct riser knockouts.
- Apply vibration isolation pads to the bottom of the cabinet (if applicable).

Chassis Pre-Installation

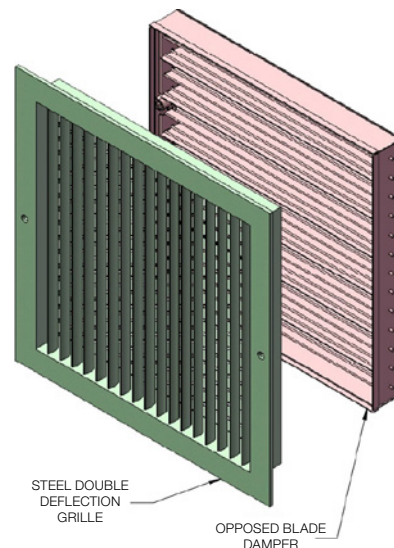
- Ensure refrigerant circuit is free of all damages and kinks.
- Check that all electrical connections are clean and secure.

Discharge Knockouts and Grilles

Discharge Knockout Sizes (88" Cabinet)		
Model	Top	Back, Front, Side
09 thru 15	12 x 12	12 x 8 and 12 x 12
18 thru 24	14 x 14	14 x 8 and 14 x 14
30 thru 36	18 x 14	18 x 10 and 18 x 14

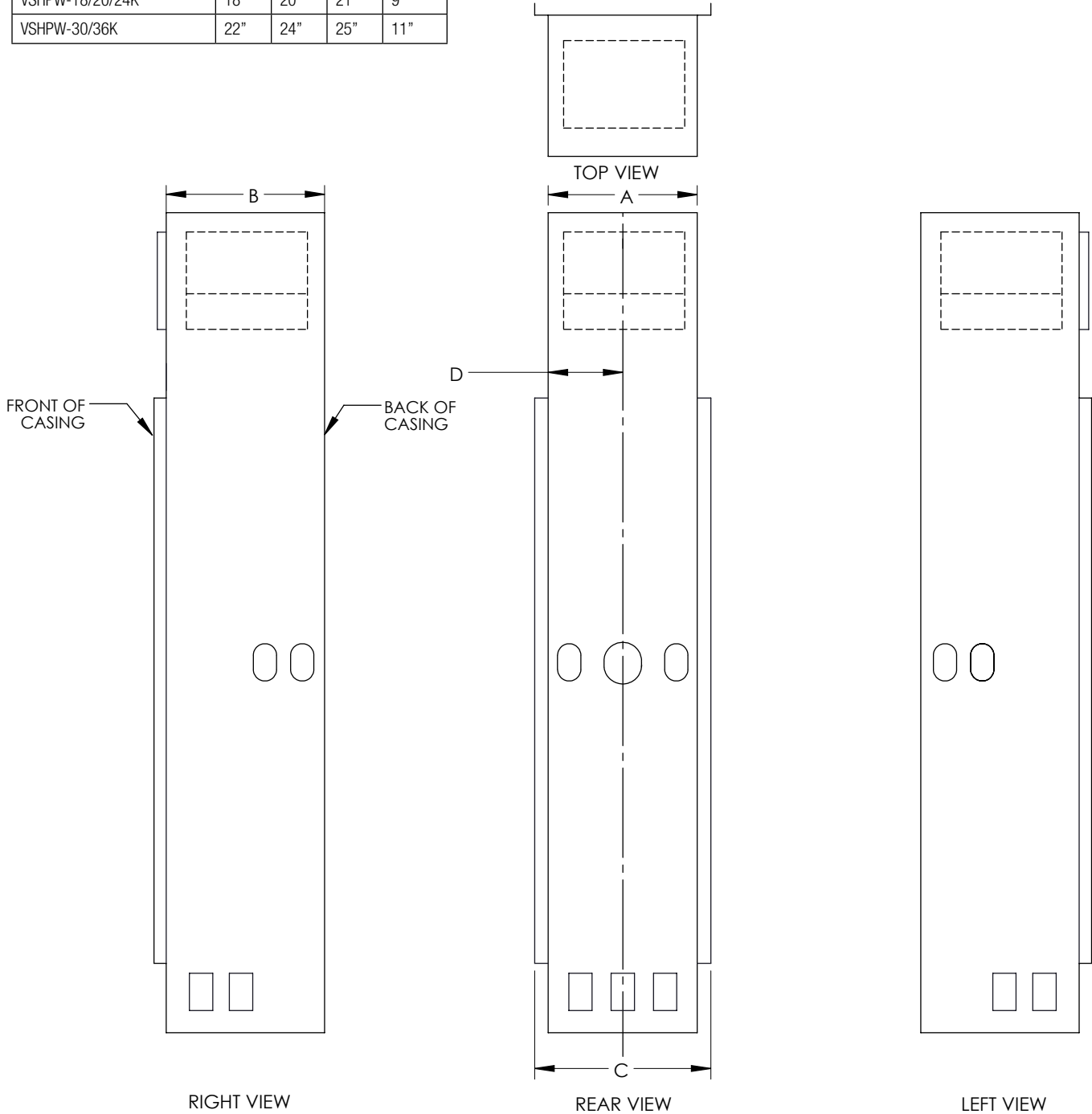


Model	Discharge			
	Single	Double	Triple	Top
VSHPW09	12 x 12	12 x 8	Not Recommended	12 x 12
VSHPW12	12 x 12	12 x 8	Not Recommended	12 x 12
VSHPW15	12 x 12	12 x 8	12 x 8	12 x 12
VSHPW18	14 x 14	14 x 8	14 x 8	14 x 14
VSHPW24	14 x 14	14 x 8	14 x 8	14 x 14
VSHPW30	Not Recommended	18 x 10	18 x 10	18 x 14
VSHPW36	Not Recommended	18 x 10	18 x 10	18 x 14



Casing Dimensions

UNIT	Dimensions (inches)			
	A	B	C	D
VSHPW-09/12/15K	16"	17"	19"	8"
VSHPW-18/20/24K	18"	20"	21"	9"
VSHPW-30/36K	22"	24"	25"	11"



Installing the Casing

1. Ensure all preparations are met within the “Prerequisite Section.”
2. Concealed wall must be prefabricated for the entire length of the casing. Additional wall features must be fitted after the unit installation is complete.
3. Position the unit so the opening on the casing sits on the edge of where the outer wall is planned.
4. Bolt the unit to the ground. The brackets are supplied by the installer and should provide enough support to remove all vibrational effects.
5. Bring the Removable Chassis within range of the Ice Air casing.
6. Follow “Piping Connection” and “Hose Kit Installation” sections.
7. Secure the Removable Chassis to the unit’s encasing. Follow “Installing the Chassis” section.
8. The walls are now ready to be installed
9. Attach the Access Panel to the wall and ensure it is aligned to the casing for access to the control panel and filter.
10. Run the casing.

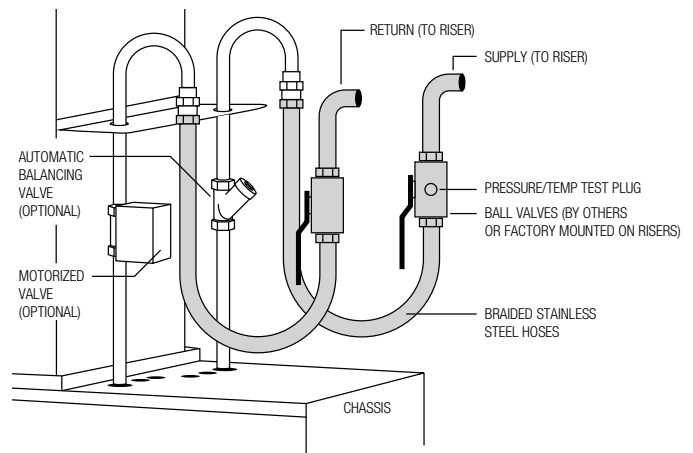
Piping Connection

Ice Air’s Water Source Heat Pumps are manufactured with a removable chassis for a matching cabinet. The removable chassis houses the intake and outtake pipes as well as the condensate tubes that link to the drain pan on the cabinet. Each chassis must be connected to the risers before installing to the cabinet. Using a Braided Steel Hose (provided by Ice Air), attach the risers to their respective pipes (labeled as shown in image below). The removable chassis is now ready to be installed.



Hose Kit Installation

1. Refer to the hose kit installation detail drawing (below) for an illustration of a typical supply/return hose kit assembly.
2. Unpack and examine hose kit. Remove all shipping and/or packing material such as rubber bands, plastic caps, and Styrofoam. Hose kit should contain (2) hoses.
3. Attach the hoses to the shut-off valves supplied with risers. Always use a back-up wrench when tightening the hose to the valve.
4. Attach flex hoses. Let the universal ends of the hoses hang inside the casing. NOTE: When valves and P/T ports are used, be sure the valve handles and P/T ports are in a position that enables them to be opened and closed and used for system readings after hose installation. Check the swivel ends of the hoses. Gaskets must be in the hose for proper seal.
5. Slide the chassis partially into the cabinet. Match the SUPPLY hose to the SUPPLY tube on the chassis and the RETURN hose to the RETURN tube. Tighten the swivel connections, keeping the unit copper tubes parallel to the sides of the chassis, and then tighten the hoses to the copper tubes, making sure the hose hangs straight without twisting or turning.
NOTE: Always use back-up wrench on the fittings being tightened.
6. With the hoses properly installed, you can proceed to slide the chassis into place in the casing.



Optional Valve Accessories



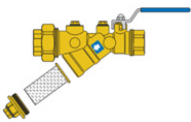
Motorized Valve

The optional factory supplied motorized valve comes with a 2-way or 3-way valve body and a 2-position electric actuator. The actuator can be normally open or normally closed. When powered, the actuator moves to the desired position. When power is removed, the actuator returns to the normal position.



Autoflow Valve

The optional automatic balancing valve provides accurate flow control. Valves are factory set to a rated flow. Flow will automatically be controlled within a given tolerance of the set flow rate.



Strainer

The optional y-strainer collects and removes debris, extending coil lifetime and preventing damage to controls and heat transfer components. Optional blowdown valve allows for clean-out without removing mesh screen.



Isolation Valve

The optional isolation valve is a manual shutoff valve. Water flow is controlled by rotating the valve handle.



Stainless Steel Hoses

The optional stainless-steel hoses comes with swivel connections for union of chassis and risers. Two hoses are provided per unit for connection of supply and return lines.



Purge Valve

Purge valves facilitate the removal of excess or unwanted liquids/gases within a piping system, storage tank, or other container.

Installing the Chassis

1. Open the unit water valves and check piping for leaks.
2. Complete the electrical connections between the unit cabinet and the chassis by mating the quick-connect plugs on the chassis cables to the plugs located in the bottom surface of the blower deck, directly under the control box, within the unit cabinet.
3. Before installing the chassis, perform the following checks:
 - Ensure that fan wheel rotates freely and does not rub against housing. If rough handling during shipping has caused fan wheel to shift, adjust as necessary.
 - Verify that water piping connections to the chassis are complete and that unit service valves, which were closed during system piping flushing, have been re-opened.
 - Verify that power between the cabinet and chassis is properly connected.
 - Re-attach the upper electrical access panel. Do not start the unit with access panel removed, as this is an electric shock hazard and system lockout and possible equipment damage can occur.

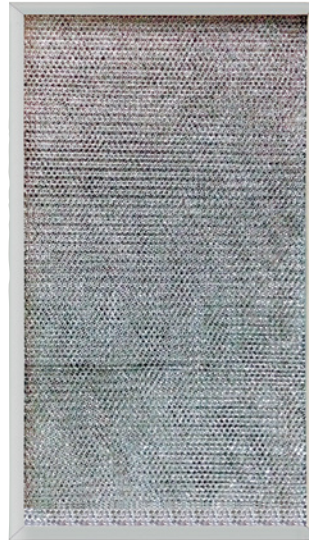
NOTE: After the system has been filled and system pump is started, all connections should be re-checked for water leaks. Proper installation and checking of the piping system is the responsibility of the installing contractor and Ice Air WILL NOT be responsible or liable for any damage caused by any water leaks from field installed water connection(s).

Drywall Installation

All rough-in drawings and instructions are designed for 5/8" thick drywall. Rough-in dimensions will be affected if 5/8" drywall is not used. Additionally, the air supply panel will not fit properly to the wall. Poor fit up will affect unit air flow and performance. Install drywall using standard construction practices. Proper mechanical fasteners are required for installation.

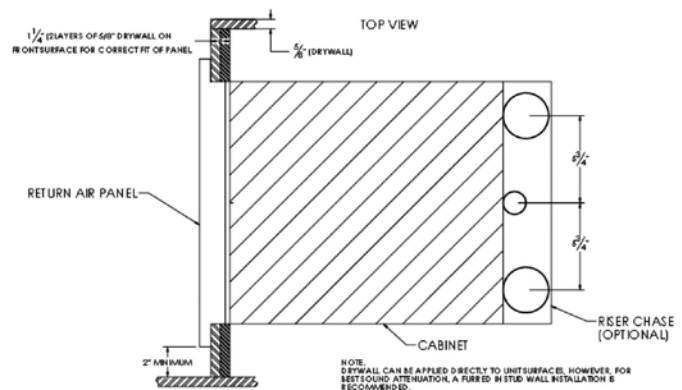
Filter Installation

Each unit is delivered with a filter for the filter rack. In order to install the filter, slide the filter up into the inner portion of the upper rack. Push forward and lower the filter into the bottom slot.



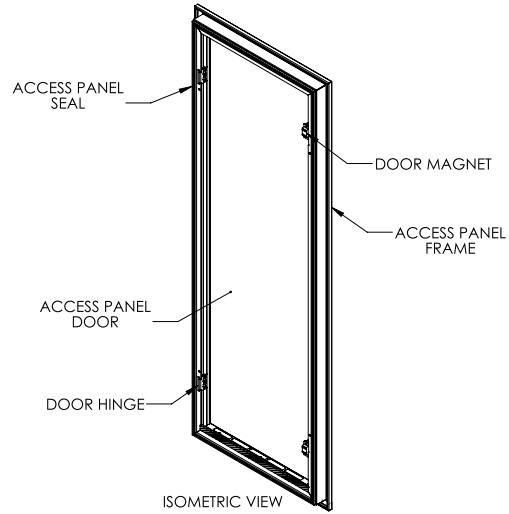
Filter Replacement

To replace the filter, gauge whether the left or right side allows for easier access to the filter. Remove the screws securing the plenum to filter rack. Then remove the (left or right) filter flange and slide the filter out. Replace the filter with a new one and attach the vertical filter flange back fixing it to the chassis. Ensure the plenum is in the correct place inside the filter rack and secure with screws.

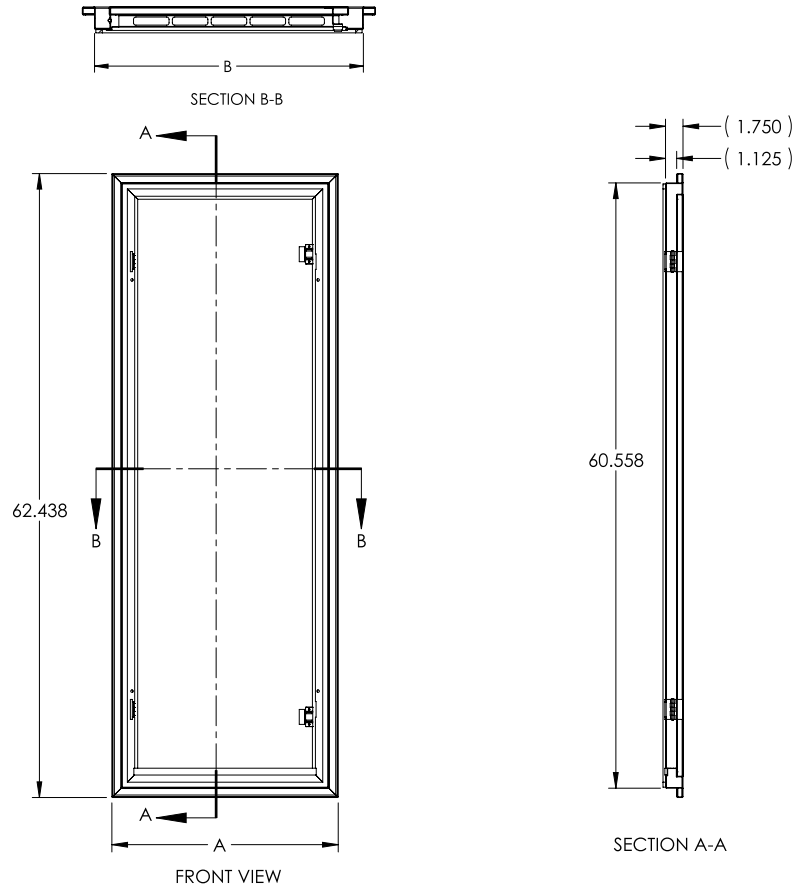


Installing the Access Panel

1. Install the provided adhesive backed gasket material on the outer perimeter of the cabinet to seal the return panel to the cabinet.
2. Install the return cabinet panel. Refer to the illustration below for details.



Overall Dimensions	VSHPW09	VSHPW12	VSHPW15	VSHPW18	VSHPW24	VSHPW30	VSHPW36
Frame Width (in) A		20.65		22.65		26.65	
Frame Height (in)		62.44					
Inner Panel Width (in) B		18.76		20.76		24.76	
Inner Panel Height (in)		60.56					
Depth (in)		1.75					



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Commercial Water Loop Application

Commercial systems typically include a number of units connected to a common piping system. Any system or unit piping maintenance work can introduce air into the piping system. Therefore, air elimination equipment is a major portion of the mechanical room plumbing. In piping systems expected to utilize water temperatures below 60°, 1/2" closed-cell insulation is required on all piping surfaces to eliminate condensation. Metal-to-plastic threaded joints should never be used due to their tendency to leak over time.

Balancing valves, flow control valves, motorized solenoid valves and variable speed pumping systems may also be used.

The piping system should be flushed to remove dirt, pipe shavings, chips, and other foreign material prior to operation (refer to "System Cleaning and Flushing" section). The flow rate is usually set between 2.25 and 3.5 GPM per ton of cooling for most applications of water loop heat pumps. To ensure proper maintenance and servicing, P/T ports are imperative for temperature and flow verification, as well as performance checks.

Water loop heat pump (cooling tower/boiler) systems typically utilize a common loop, maintained between 60 - 90°F. The use of a closed circuit evaporative cooling tower with a secondary heat exchanger between the tower and the water loop is recommended. If an open type cooling tower is used continuously, chemical treatment and filtering will be necessary.

Cleaning and Flushing

System Cleaning and Flushing

Cleaning and flushing the unit is the most important step to ensure proper startup and continued efficient operation of the system. Follow the instructions below to properly clean and flush the system.

1. Verify that electrical power to the unit is OFF.
2. Verify that supply and return riser service valves are closed at each unit.
3. Fill the system with water, leaving the air vents open. Bleed all air from the system, but do not allow the system to overflow. Check the system for leaks and make any required repairs.
4. Adjust the water and air level in the expansion tank.
5. With strainers in place, start the pumps. Systematically check each vent to ensure that all the air is bled from the system.
6. Verify that make-up water is available and adjusted to properly replace any space remaining when all air is purged. Check the system for leaks and make any additional repairs if needed.
7. Raise the loop temperature to approximately 85°F. Open the drain at the lowest point in the system. Verify that make-up water replacement rate equals rate of bleed. Continue to bleed the system until the water appears clean or for at least three hours, whichever is longer.
8. Completely drain the system.

Flushing the Risers

1. Close shut-off valves at each unit on the riser except the top floor shut-off valve.
2. Flush solution through supply riser. NOTE: The solution passes through the top floor connection and down the return riser.
3. When the building has more than 10 floors, connect the supply and return run-outs on the top two floors to divide the water flow and reduce pressure drop at the pump.
4. Repeat flushing procedure for each set of risers in the building.
5. Refill the system and add in a proportion of trisodium phosphate approximately one pound per 150 gallons of water.
6. Reset the boiler to raise the loop temperature to about 100°F.
7. Circulate the solution for 8 to 24 hours. At the end of this period, turn OFF the circulating pump and drain the solution. Repeat system cleaning as needed.
8. Open the supply and return riser service valves at each unit. Refill the system and bleed off all air.
9. Test the system pH with litmus paper. The system water should have a pH of 6 to 8.5. Add chemicals as appropriate to maintain pH levels.
10. When the cleaning process is complete, remove the short-circuited hoses. Reconnect the hoses to the proper supply, and return the connections to each of the units. Refill the system and bleed off all air.

NOTE: DO NOT use "Stop Leak" or similar chemical agent in this system. Addition of chemicals of this type to the loop water will corrode the heat exchanger and inhibit unit performance.

General Wiring

Line Voltage

Wiring, including the electrical ground, must comply with the National Electrical Code as well as all applicable local codes. Consult the wiring diagram below for field connections on the right of the electrical diagram located on the back of the unit electrical compartment front panel. All electrical connections must be made by the installing (or electrical) contractor. All final electrical connections must be made with a length of flexible conduit to minimize vibration and sound transmission to the building.

General Line Voltage Wiring

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

⚠ WARNING: Electrical shock can cause personal injury or death while installing or servicing the system. Always turn OFF the main power to system. There may be more than one disconnect switch.

Power Connection

Units equipped with disconnect: Connect incoming line voltage to the disconnect switch and connect ground wire to the ground lug provided inside the electrical compartment.

Units without disconnect: Line voltage connection is made by connecting the incoming line voltage wires to the terminal block.

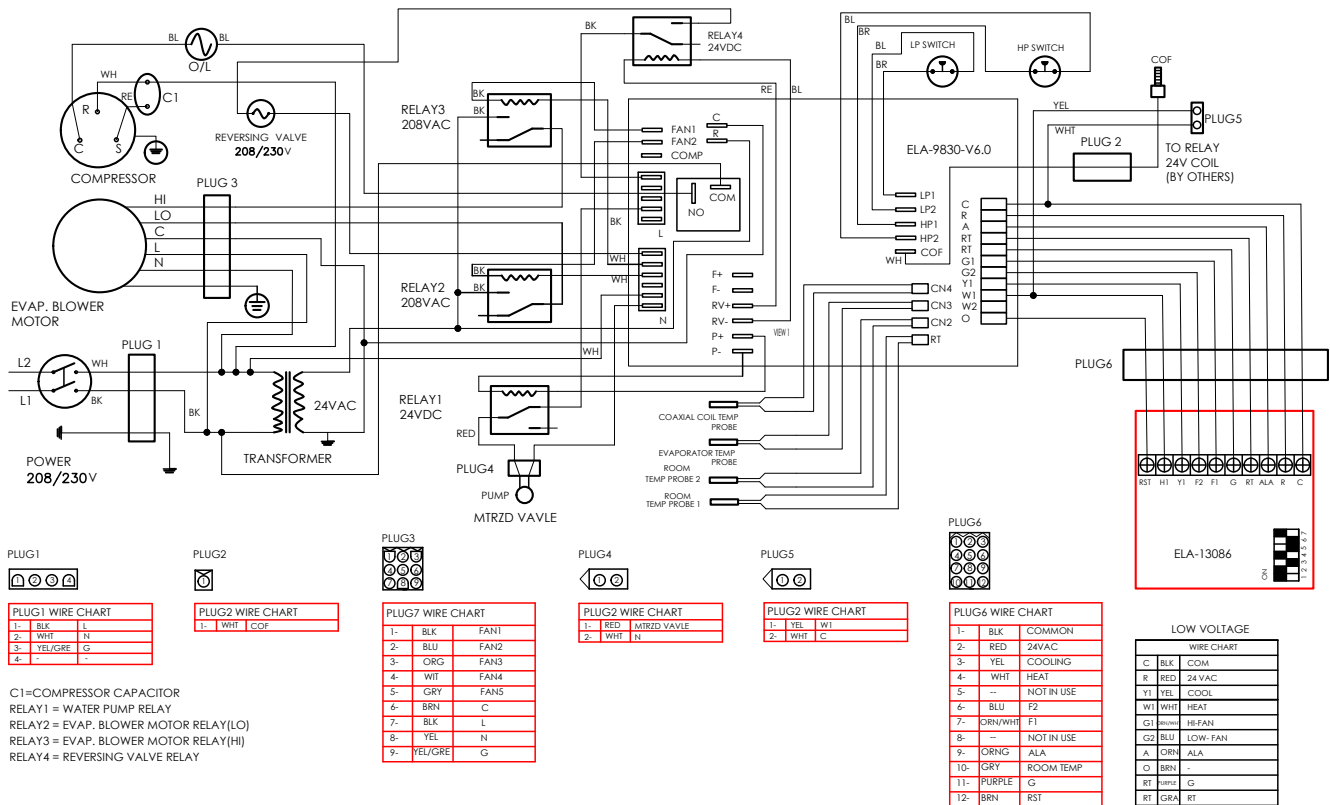
Volt Operation

All commercial units are factory-wired for specific voltages. These include:

- 115 VAC
- 208-230 VAC
- 265-277 VAC

For 230 volt single-phase operation, the primary voltage to the transformer must be changed.

NOTE: Failure to change the primary voltage lead when using 230 VAC line voltage may result in electrical component damage and intermittent system failure.





System Start

Start-Up Preparation

Prior to start up, ensure that all unit and system components are in good condition, water quality standards have been met, and ambient air and water temperatures are within the operating range. The manufacturer will not be held liable for any damage incurred due to improper system checkout or improper startup procedure. Startup should only be performed by a certified licensed technician.

Inspect each unit individually, ensuring the following conditions have been met.

Pre-Startup Checklist

1. Power is supplied to unit.
2. Motorized valve is installed.
3. Clean filter is installed.
4. Casing/cabinet is installed.
5. Thermostat is installed.
6. Grilles are installed.
7. Access panel is installed.
8. Supply and return valve are open.
9. Condensate drains through primary and secondary drain pan.
Dump water into secondary drain pan to ensure proper drainage.

Start-Up Procedure

1. Adjust all valves to their fully open position.
2. Turn on power to the unit.
3. Turn the thermostat fan speed to "High." Fan should start.
Check airflow. Balance airflow at registers.
4. Set thermostat mode to "Cool." Wait several minutes.
Check for cold air delivery at registers.
5. Set thermostat mode to "Heat." Wait several minutes.
Check for hot air delivery at registers.
6. If unit fails to operate properly, refer to troubleshooting section for possible solutions.

Startup Checklist

1. Compressor comes on.
2. Motorized valve opens and closes.
3. Fan speed works properly in cooling mode.
4. Fan speed works properly in heating mode.
5. Thermostat operates properly.
6. Condensate overflow switch is functional.
7. Fan rotates properly.
8. No water leaks.

NOTE: Cooling, heating or fan mode operation is determined by thermostat setting. For operational control please see Ice Air's thermostat manual. Please review 3rd party thermostat manuals when controls are provided by others.



System Check List

Installer: Complete unit and system checkout and follow unit start-up procedures provided with the unit. Use this form to record information, temperatures and pressures during start-up. Keep this form for future reference.

Location Information

Owner: _____

Address: _____

Model Number: _____

Serial Number: _____

Unit Location in Building: _____

Date: _____

Sales Order No: _____

In order to minimize troubleshooting and costly system failures, complete the following checks and data entries before the system is put into full operation.

Temperatures: (Circle) F or C

Antifreeze: _____ Type: _____ %

Pressures: (Circle) PSIG or kPa

Allow unit to run 15 minutes in each mode before taking data.

Do not connect service manifold gauges during start up unless instructed by Ice Air service tech.

	Cooling Mode	Heating Mode
Return-Air Temperature DB (°F)		
Supply-Air Temperature DB (°F)		
Temperature Differential		
Entering Fluid Temperature (°F)		
Leaving Fluid Temperature (°F)		
Temperature Differential		
Water Pressure IN		
Water Pressure OUT (PSI)		
Pressure Differential (PSI)		
Flow Rate (GPM)		
Supply Voltage at Contactor (V)		
Transformer Low Side Volts (V)		
Compressor Amps (A)		
Motor Amps (A)		

Troubleshooting

IMPORTANT: It is not the intent of this maintenance manual to resolve any problems with the operation of your Ice Air unit. Please contact a trained servicer or building maintenance staff immediately if your unit fails to perform properly.

1. Contact a trained service technician to conduct full unit diagnostics and repair to equipment.
2. Record any unit that does not operate noting the unit serial number on your report.

If unit is not operating, conduct the following checks:

1. Check the electrical connections.
2. Check the voltage and current against the electrical specifications on the unit nameplate.
3. Look for wiring errors. Check for loose screw connections in both line and low voltage terminals.
4. Check the water supply piping for proper water connection.
5. Check for dirty filters.
6. Check indoor fan for proper operation.
7. Check that unit did not cycle off due to improper thermostat settings.
8. Check for fault codes on the control board – consult the Board Troubleshooting Table.

Board Troubleshooting Table

Display (Fault Code)	LED		
	Yellow	Green	Red
Normal Mode	OFF	ON	OFF
HPS (Refrigerant Pressure) (E1)	OFF	OFF	FLASH
LPS (Refrigerant Pressure) (E2)	FLASH	OFF	OFF
Evaporator coil low temperature protection (E3)	FLASH	OFF	FLASH
Coaxial Coil Anti-freeze protection (E4)	FLASH	ON	OFF
Temperature probe fault (E5)	OFF	FLASH	OFF
High/Low Voltage Protection (E6)	OFF	OFF	ON
Low Pressure Protection (E7)	OFF	ON	ON
Condensate Overflow Electronic Protection (E8)	ON	OFF	OFF
Coaxial Coil water flow low temperature Protection (E9)	ON	OFF	FLASH
Low Ambience Temperature Protection (E10)	ON	FLASH	OFF

⚠️ RECOGNIZE THIS SYMBOL AS A SAFETY PRECAUTION.

⚠️ WARNING: Ice Air will not be responsible for any injury or property damage arising from improper service or service procedures. If you install or perform service on this unit, you assume responsibility for any personal injury or property damage which may result. Many jurisdictions require a license to install or service heating and air conditioning equipment.

⚠️ WARNING HIGH VOLTAGE: Disconnect all power before servicing or installing unit. Multiple power sources may be present. Failure to do so may cause property damage, personal injury or death.

Preventive Maintenance

Cabinet

Carefully clean the inside of the cabinet at least once a year, ensuring no damage is done to the internal components.

Water Coil

Standard coil cleaning should be performed in areas where the water mineral content is 125 PPM or greater. High mineral content can cause sediment deposits and lead to scaling. The risk of scaling is increased with lower flow rates. Therefore, it is best to maintain a minimum flow rate of 2 GPM/ton.

Air Coil

Air Coil must be periodically cleaned to prevent airflow restrictions and debris buildup. Precautions must be taken to ensure coil fins are not damaged.

Filters

Units should not be operated without a filter. The filter should be periodically checked to ensure cleanliness and prevent airflow restrictions.

Condensate Drain

The condensate drain and drain pan should be checked at least once every six months to prevent blockages and backflow. Chemical treatment may be necessary if there is slime buildup in the drain pan. Slime buildup, and dust/sediment deposits, can prevent proper condensate disposal.

Compressor

Compressor should be checked at least once a year to ensure amperage draw is no higher than 10% above rating shown on nameplate.

Fan Motors

Fan Motors should be checked at least once a year to ensure amperage draw is no higher than 10% above rating shown on nameplate.

NOTE: This is not an exhaustive list. Additional preventive maintenance steps may be required on a case-by-case basis. Preventive maintenance should only be performed by a certified licensed technician. Consult a professional before creating a maintenance plan.



Product Nomenclature

Casing Nomenclature

Model Selection **8 VSHPW 12 P N F 1 S I X U U G**
 1 2 3 4 5 6 7 8 9 10 11 12 13
 Primary Part

Item #	Matrix Name	Code String Value	Description
1	POWER	8	208V/1PH/60HZ
		7	277V/1PH/60HZ
		5	115V/1PH/60HZ
2	UNIT TYPE	VSHPW	Vertical Stack WSHP
3	CAPACITY (BTUH)	09	9,000 (3/4-Ton)
		12	12,000 (1-Ton)
		15	15,000 (1-1/4-Ton)
		18	18,000 (1-1/2-Tons)
		24	24,000 (2-Tons)
		30	30,000 (2.5-Tons)
4	MOTOR	P	PSC Motor
		E	EC Motor
		B	BLDC
5	ELECTRICAL CONNECTION	F	Fused Disconnect
		N	Non-Fused Disconnect
		P	Line Cord With Plug
		X	Default: Terminal Block
6	CASING CONFIG.	N	Not Applicable
7	CASING DETAILS	S	Standard 88" Casing
		C	Custom Casing
		P	Casing 68" (Reduction From The Top)
		R	Casing 86" (Reduction From The Top)
		A	Standard 88" Casing with 1" Stand
		B	Standard 88" Casing with 2" Stand
		C	Standard 88" Casing with 3" Stand
		D	Standard 88" Casing with 4" Stand
		E	Standard 88" Casing with 5" Stand
		F	Standard 88" Casing with 6" Stand
8	INSULATION	F	1/2" Foil Faced Insulation
		C	Closed Cell Foam Insulation
9	P-TRAP	I	Internal P-Trap
		E	External P-Trap
		X	No P-Trap
10	RISERS	X	No Risers
		H	Unit Mounted Half Risers
		G	Unit Mounted Half Risers (Geothermal Units Only)
		F	Unit Mounted Full Risers

Item #	Matrix Name	Code String Value	Description
11	PIPING ORIENTATION	L	Left Hand Connection
		R	Right Hand Connection
		M	Left Hand with Bypass and Ball Valves (Half Riser Only)
		N	Right Hand with Bypass and Ball Valves (Half Riser Only)
		A	Rear
		B	Rear with Bypass and Ball Valves (Half Riser Only)
12	WIRE WHIPS	X	Piping Orientation Not Applicable
		A	6.5' Wire Whip for Remote Mounted Thermostat
		B	10' Wire Whip for Remote Mounted Thermostat
		C	12' Wire Whip for Remote Mounted Thermostat
		D	30' Wire Whip for Remote Mounted Thermostat
		E	50' Wire Whip for Remote Mounted Thermostat
		F	Standard 18" wire whip
13	DRAIN PAN	U	Unit Mounted Thermostat
		G	Powder Coated Galvanized Drain Pan
		S	Stainless Steel Drain Pan
		X	No Drain Pan

Due to Ice Air's ongoing product development programs, the information in this document is subject to change without notice.



Product Nomenclature

Chassis Nomenclature

Model Selection **8** **V****S****H****P****W** **12** **B** **C** **A** **A** **I** **A** **M** **A**
 1 2 3 4 5 6 7 8 9 10 11
 └──────────┘
 Primary Part

Item #	Matrix Name	Code String Value	Description
1	POWER	8	208V/1PH/60HZ
		7	277V/1PH/60HZ
		5	115V/1PH/60HZ
2	UNIT TYPE	VSHPW	Vertical Stack WSHP
3	CAPACITY (BTUH)	09	9,000 (3/4-Ton)
		12	12,000 (1-Ton)
		15	15,000 (1-1/4-Ton)
		18	18,000 (1-1/2-Tons)
		24	24,000 (2-Tons)
		30	30,000 (2.5-Tons)
		36	36,000 (3-Tons)
4	COMPRESSOR BLANKET	B	Sound Attenuation Blanket
		X	No Compressor Blanket
5	CONTROLS	C	Non-Programmable LCD Touchpad Thermostat (ELA-12690)
		D	Non-Programmable LCD Thermostat (ELA-8842 via dip switch)
		E	7-Day Programmable LCD Thermostat (ELA-8842)
		F	7-Day Programmable Touchscreen Thermostat (ELA-13086)
		G	Nest Thermostat (ELA-10665)
		H	Habitat Wireless Wi-Fi Thermostat with Water Leak Detector (ELA-13161)
		I	Non-Programmable LED Touchpad Thermostat (ELA-10328)
		X	Thermostat Field Mounted By Others
6	MOTORIZED VALVES	A	2-Way, 2-Position Motorized Valve NO
		B	2-Way, 2-Position Motorized Valve NC
		C	Custom
		D	3-Way, 2-Position Motorized Valve NO
		E	3-Way, 2-Position Motorized Valve NC
		X	No Motorized Valve

Item #	Matrix Name	Code String Value	Description
7	FLOW VALVES	A	Autoflow Valve (HAYS 2510/2517)
		B	Autoflow Valve/Shutoff combo (HAYS 2519)
		H	Autoflow Valve (HAYS 2515) [high GPM only]
		C	Autoflow Valve w/PT Ports (YR Flow Valve)
		M	Manual Balancing Valve
		Y	Y-Strainer
		F	Autoflow Valve w/PT Ports (YR Flow Valve) and Y-Strainer
		D	Autoflow Valve (HAYS 2510/2517) and Y-Strainer
		E	Autoflow Valve/Shutoff combo (HAYS 2519) and Y-Strainer
		G	Manual Balancing Valve and Y-Strainer
8	CONDENSATE PUMP	X	No Flow Valves
		I	Internal Condensate Pump
		E	External Condensate Pump
9	FILTER	X	No Condensate Pump
		A	MERV 8 Filter
		B	MERV 12 Filter
		C	MERV 13 Filter
		W	Washable Filter
		P	Fiberglass Filter
		X	No Filter
10	AIR VENTS	M	Manual Air Vent
		T	Bleed Tee
		X	No Air Vents
11	VALVE SHIPPING OPTIONS	A	Assembled
		S	Shipped Loose
		X	None

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Notes or Technical Comments



Notes or Technical Comments



Notes or Technical Comments



Limited Warranty

Twelve (12) Month Warranty of entire Packaged Terminal Equipment

Ice-Air, LLC ("Ice Air" or the "Company") warrants, solely to the person or entity that directly purchased the packaged terminal system from the Company (the "Original Owner"), that the entire packaged terminal system is free from defects in material and workmanship for a period of twelve (12) months from the date of delivery (the "Twelve Month Warranty"). Any part or portion thereof which becomes defective under normal use during the period of this warranty will be repaired or replaced, provided Ice Air's examination shall prove to its satisfaction that the part was or became defective under normal use. Ice Air's obligations under this warranty are subject to the satisfaction of the conditions set forth in the last paragraph of this Section and are limited to: (a) repairing the defective part or (b) furnishing a replacement part provided the defective part is returned to Ice Air, without shipping damage, transporting charges prepaid. No reimbursement will be made for expenses incurred in making field adjustments or replacements unless specifically authorized in writing by the Company.

Except as otherwise provided in the last sentence of this paragraph, the Company is not obligated under this warranty for field labor such as service for inspection, removing, packing and/or reinstalling water source unit, nor for the return transportation charges. In addition, the Company is not obligated under this warranty to make reimbursement of the labor or service charges of any other party. Notwithstanding the foregoing, labor provided by or at the direction of the Company during the twelve (12) month period from the date of delivery referred to in the initial paragraph above, in connection with the Twelve Month Warranty of parts provided in the initial paragraph above, is included in such warranty, solely in the case in which a packaged terminal system is sold by the Company to an Original Owner for use in a new facility to be constructed and located in the greater New York City metropolitan area. For the avoidance of doubt, except in the case described in the preceding sentence, the Company has no obligation under this warranty to provide for field labor or to make reimbursement of the labor or services charges of any other party, provided, however, that the Company, in its sole and absolute discretion, may elect to do so, so long as (i) such election is set forth in a writing signed by the Company and (ii) the facility at which the applicable packaged terminal system is or will be installed is located in the greater New York City metropolitan area (the "Metropolitan Area").

The obligations of the Company set forth in the preceding paragraphs of this Section are in all cases subject to the satisfaction of the following conditions: (x) the Company shall have received proof, satisfactory to the Company, of the purchase by the Original Owner from the Company of the packaged terminal system that is the subject of the Original Owner's claim, (y) all amounts due and payable to the Company on or prior to the date of such claim in respect of such packaged terminal system shall have been paid in full and (z) nothing shall exist or occur that relieves the Company, in accordance with the terms of this agreement, from the performance of its warranty obligations hereunder.

OPTIONAL Extended Refrigeration Circuit Warranty

2nd – 5th year compressor parts only; labor not included

The Optional Extended Refrigeration Circuit Warranty MUST be purchased from Ice Air within thirty (30) days from date of delivery to be valid. The hermetically sealed refrigeration circuit (consisting of the motor, compressor assembly, evaporator coil, coaxial / condenser coil, and interconnecting tubing) is warranted to the Original Owner for four additional years from date of the expiration of the twelve-month Warranty. Components under this warranty will be supplied at Ice Air's expense provided the failed component is returned to Ice Air. This optional warranty does not include any other parts of the equipment such as fans, fan motors, controls, cabinet parts, electrical relays, capacitors, protective devices, or wiring. Ice Air is not obligated under this warranty for field labor such as service for inspection, removing, packing, and/or reinstalling the refrigeration circuit, nor for return transportation charges. In addition, the Company is not obligated under this warranty to make reimbursement of the labor or service charges of any other party. Ice Air reserves the right to make a handling and inspection charge in the case of parts or equipment improperly returned as defective and/or as being in warranty.

To obtain assistance under the parts warranty or to purchase the optional extended warranty, simply contact Ice Air Customer Service at 80 Hartford Avenue, Mount Vernon, New York 10553 Phone 914-668-4700.

Additional warranty options include:

2nd – 5th year full unit parts only warranty

2nd – 5th year compressor parts and labor warranty, so long as such labor is performed in the NY Metropolitan Area

2nd – 5th year complete parts and labor warranty (Full unit coverage), so long as such labor is performed in the NY Metropolitan Area.

All Warranties (which must be purchased separately) constitute the Original Owner's sole remedy. They are given in lieu of all other warranties. Ice Air is not liable for incidental or consequential damages, whether the theory is breach of this or any warranty, negligence, or strict tort. No person (including any agent, salesman, dealer, or distributor) has authority to expand Ice Air's obligation beyond the terms of these express warranties, or to state that the performance of the product is other than that published by Ice Air. In addition, neither the Original Owner nor any such person has the right to sell, transfer or assign, or attempt to sell, transfer or assign, any rights of the Original Owner in or to the warranties provided for herein, no such sale, transfer or assignment shall be binding upon Ice Air and any such sale, transfer or assignment is null and void and of no force or effect.

General Conditions

The above warranties are void if Ice Air's equipment has been damaged, misused, subjected to abnormal use or service or its serial number has been altered, defaced, or removed, or payment for the equipment is in default. Ice Air is not responsible for service to correct conditions due to misapplication, faulty or improper installation, inadequate wiring, incorrect voltage conditions or unauthorized opening of the refrigeration circuit, nor for consequential damages. In case Ice Air's equipment is installed in conjunction with cabinets, grills, louvers, controls, or other parts manufactured by others, these warranties shall apply only to Ice Air's manufactured portion of the equipment. The conditions of the standard warranty plan are effective for 12 months from the date of equipment delivery. Ice Air reserves the right to make a handling and inspection charge in the case of parts or equipment improperly returned as defective and/or as being warranty.

Important Disclaimers

Ice Air Has No Responsibility For:

(A) Certain Damages

The following are the responsibility of the user. None of the following constitutes a manufacturing defect, and each is expressly excluded from the warranty plan:

- 1) Failure of unit to operate satisfactorily due to improper amount of air on evaporator coil or air supply to air cooled condensers.
- 2) Damage to unit or unsatisfactory operation due to improper cleaning of evaporator coil or use of unit in corrosive atmosphere locations such as chemical plants, refineries, or salt spray areas.
- 3) Damage to unit from unsatisfactory operation due to blown fuses, inadequate or interrupted electrical service, use of improper electrical protective devices or operation of unit on power supply other than covered by nameplate rating of unit.
- 4) Damage due to failure to properly maintain unit.
- 5) Damage due to transportation or handling prior to and during installation.
- 6) Damage due to accident or from alteration, improper installation or tampering.
- 7) Failure to clean or replace filter timely.
- 8) Misapplication of equipment.
- 9) Damage due to deviation from original design and intended use of equipment.
- 10) Damage due to use of additional accessories either unapproved or approved but modified or manipulated.

(B) Installation

Ice Air is not responsible for the design, execution, and performance of the installation method or any of the accessory items used during installation such as seals, caulking, weatherproofing, supporting structures, attachment means, louvers and frames supplied by others.

(C) Check, Test and Start

Check, Test and Start of the air conditioners by an experienced person is the responsibility of the installing contractor. This consists of physically confronting each conditioner operating in both heating and cooling modes and correcting any minor deficiencies noted. After the equipment leaves the factory, it may become damaged or maladjusted during transportation or on the job. Sometimes wires are disconnected accidentally, or fan motors move on their bases due to rough handling, causing fans to strike; a component(s) may be inoperable. The correction of such conditions is part of the Check, Test and Start. Note that unless otherwise specifically agreed to in writing, Ice Air has no obligation to perform, nor does the price of its equipment include field labor in connection with the performance of, these Check, Test, and Start procedures (or the like).



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