



# WSHCE/WSHXE

*Water Source Heat Pump*



11" Horizontal

1/2 thru 1 Tons



R454B

# NOMENCLATURE

**WSHC E06 D 2 L C F T 0 0 0 0 0 000 F**

**MODEL**

WSVC - R454B VERTICAL  
 WSVX - R454B VERTICAL ECM  
 WSHC - R454B HORIZONTAL  
 WSHX - R454B HORIZONTAL ECM

**CAPACITY**

E06 - 6,000 Btuh (WSHC/WSHX Low Profile 11")  
 E09 - 9,000 Btuh (WSHC/WSHX Low Profile 11")  
 E12 - 12,000 Btuh (WSHC/WSHX Low Profile 11")  
 009 - 9,000 Btuh  
 012 - 12,000 Btuh  
 018 - 18,000 Btuh  
 024 - 24,000 Btuh  
 030 - 30,000 Btuh  
 036 - 36,000 Btuh  
 040 - 40,000 Btuh  
 042 - 42,000 Btuh  
 048 - 48,000 Btuh  
 060 - 60,000 Btuh

**REVISION**

D - R454B Initial Release

**VOLTAGE**

2 - 208-230V/1Ph/60Hz (PSC)  
 3 - 265V/1Ph/60Hz (PSC)  
 6 - 208-230V/1Ph/60Hz (ECM)  
 7 - 265V/1Ph/60Hz (ECM)  
 E - 208-230V/3Ph/60Hz (PSC)  
 F - 460V/3Ph/60Hz (PSC) (WSHC/WSHX) (Does not include 11" Unit)  
 M - 208-230V/3Ph/60Hz (ECM)  
 N - 460V/3Ph/60Hz (ECM) (WSHC/WSHX) (Does not include 11" Unit)

**RETURN LOCATION**

L - Left Hand  
 R - Right Hand

**HEAT EXCHANGER**

C - Copper  
 N - Cupro-Nickel

**WATER CIRCUIT OPTIONS**

F - Front

**FACTORY**

F - First Co.

**OPTION**

000 - None

**INSULATION**

0 - Fiberglass Standard Insulation  
 A - Closed Cell Foam  
 B - Foil Faced Insulation  
 C - Compressor Jacket  
 S - Closed Cell + Compressor Jacket

**REHEAT**

0 - None

**CONTROLS**

0 - Standard Controls  
 A - Standard with Service Switch

**FILTER TYPE**

0 - 1" Throwaway Standard  
 A - 2" MERV 8  
 B - 2" MERV 11  
 C - 2" MERV 13  
 D - 4" MERV 11  
 E - 4" MERV 13  
 F - 4" MERV 14  
 G - 1" MERV 8  
 H - 1" MERV 11  
 J - 1" MERV 13  
 K - Permanent + 4" MERV 11  
 L - Permanent + 4" MERV 13  
 M - Permanent + 4" MERV 14

**FILTER FRAME**

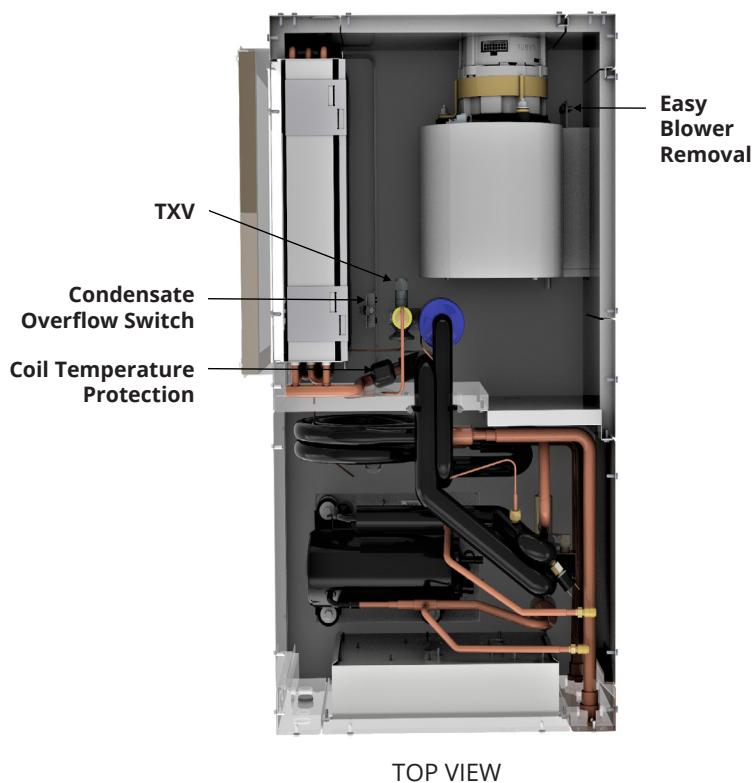
0 - 1" 2-Sided (WSHC/WSHX E06,E09, E12 Low Profile 11")  
 1 - 1" 4-Sided (WSHC/WSHX E06,E09, E12 Low Profile 11")  
 2 - 1" + 2" 4-Sided (WSHC/WSHX E06,E09, E12 Low Profile 11")  
 0 - 1" + 2" 2-Sided (WSVC/WSVX/WSHC/WSHX 009-060)

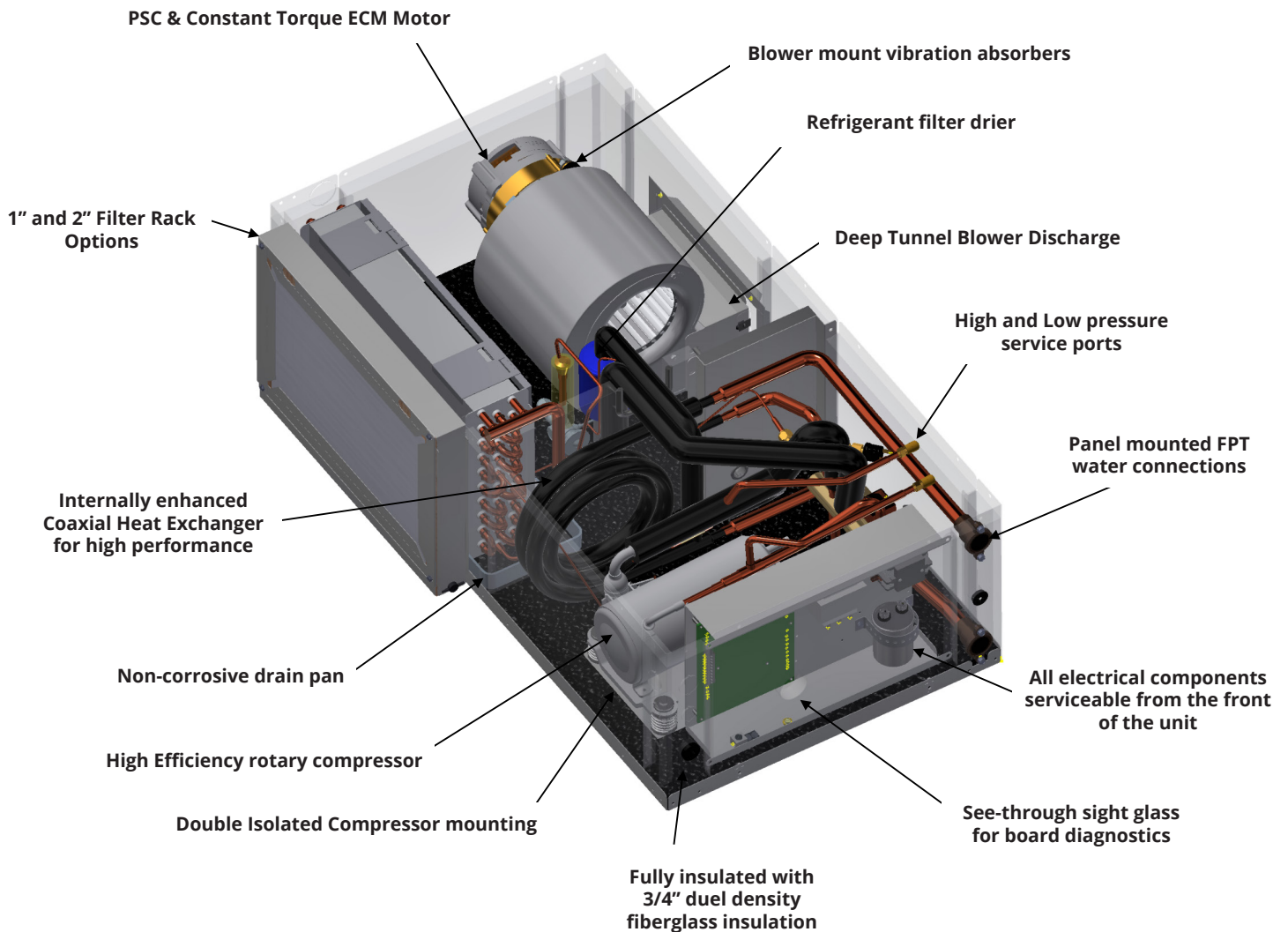
**SUPPLY AIR LOCATION**

E - End  
 S - Straight  
 T - Top (Vertical Only)

## STANDARD FEATURES

- 100% Factory run tested.
- All units operate with environmentally friendly R-454B refrigerant.
- Heavy gauge galvanized steel cabinet.
- Cabinets insulated with ¾" dual density fiberglass insulation treated with an anti-microbial agent.
- Non-corrosive thermoplastic condensate pan, sloped for positive drainage.
- Field convertible discharge air arrangement from end to straight or straight to end
- Large removable panels for service access.
- TXV metering device.
- High and low pressure service ports.
- Refrigerant filter-drier and discharge muffler.
- Coaxial water-to-refrigerant heat exchanger.
- Heat exchanger available in copper or cupronickel.
- Digital Control Module (DCM).
- Multi-speed blower motor.
- Panel-mounted FPT Water Connections.
- High efficiency rotary compressor.
- System reversing valve (4-way ).
- Factory mounted hanger brackets.
- 50 VA Transformer.
- 1" throwaway filter.
- 208-230/1/60
- See-through sight glass for troubleshooting without removing the panels.





## STANDARD FEATURES (CONT.)

### Unit Cabinet

Fabricated from a minimum of 18 gauge galvanized steel with a durable baked-on powder coat finish. Post and panel construction allows for large access panels to permit full access to internal components. The structural integrity of the cabinets remain unaffected by the removal of any or all access panels.

### Cabinet Insulation

The cabinets are insulated with  $\frac{3}{4}$ " dual density fiberglass insulation, which offers greater sound absorption and better thermal efficiency. The insulation has a special acrylic coating that's formulated with an EPA registered anti-microbial agent.

### Evaporative Coils, R-454B Refrigerant with TXV metering device

$\frac{3}{8}$ " inch staggered tube type construction with seamless copper tubes, and high performance aluminum fins with straight edges. Fins are manufactured with full depth collars, drawn in the fin stock to provide accurate control of fin spacing and completely cover the copper tubes to lengthen coil life. The tubes are mechanically expanded into the fins for a permanent primary to secondary surface bond, assuring maximum heat transfer efficiency. Coil includes moisture carryover diffuser.

### Coaxial Heat Exchanger

Features a tube in tube coaxial water-to-refrigerant heat exchanger constructed of a convoluted copper (optional cupronickel) inner tube and steel outer tube with a designed refrigerant working pressure of 600 PSIG (4100 kPa) and designed water side working pressure up to 400 PSIG (2750 kPa)

### FPT Water Connection

Panel-mounted female pipe thread- No back-up wrench needed.

### Service Port

High side and low side service ports.

### Drain pan

Made from an UL94-5V rated, rigid PVC **Non-corrosive** material with a three-way slope for positive drainage.

### Blower assemblies

Wheels are double width, double inlet (**DWDI**), forward curved, centrifugal type. They are statically and dynamically balanced for a smooth, quiet operation. The Class I housing is constructed of heavy gauge steel with die-formed inlet cones.

### Motors

Constant torque multi-speed, 230V, single phase, 60-Hz, permanent split capacitor (PSC) type, are factory mounted to the blower assembly with rubber isolators.

### Compressor

Unit contains a high efficiency rotary compressor. External vibration isolation is provided by rubber mounting devices located underneath the mounting base of the compressor. Internal thermal overload protection is provided. Protection against excessive discharge pressure is provided by means of a high pressure switch. Loss of charge protection is provided by a low pressure safety.

### Reversing Valve

A system reversing valve (4-way valve) is included with all heating/cooling units. This valve is piped to be energized in the cooling mode to allow the system to provide heat if valve failure were to occur. Once the valve is energized for cooling, it will remain energized until the control system is turned to the OFF position, or a heating cycle is initiated. Units with the cooling only option will not receive a reversing valve.

### Discharge arrangement

Field convertible discharge air arrangement from end to straight or straight to end.

### Filter Section

Includes 1" disposable type fiberglass filters.

**Digital Control Module (DCM)**-Controls unit operation and monitors all safety controls. (Patent Pending)

### Refrigerant circuit

Features a filter-drier and a discharge muffler for quiet operation.

### 50 VA Transformer

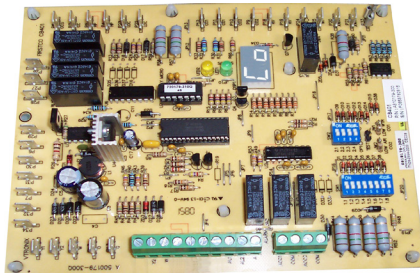
Assists in accommodating accessory loads.

### 100% Factory performed run test

Every unit is run test prior to packaging.

### Field selectable settings:

- 5 Second Compressor Delay-Blower starts before the compressor, attenuates compressor start up sound.
- 45 Second Blower-off Delay-Increases cooling efficiency.
- **Dehumidification Mode**-Selects low speed fan operation for increased humidity removal.
- **VPC Switch**-Selects either one or two hour daily operation. (Requires Optional Kit)
- **Low water temperature**-and low coil temperature cutout options-Optional 10 degree F. cutouts for applications where water temperature is below 50 degrees F. (requires antifreeze solution).
- **Accessory Relays (2)**-Relays can be selected to cycle with either the fan or compressor. Relay "1" can be configured for use with slow opening water valves (60 second pre-compressor initialization) and relay "2" can be configured for a 30 second post fan delay.



Digital Control Module (DCM)



Drain pan

## OPTIONS

**Vacated Premises Control (VPC) with reset feature**-Ensures the unit will operate a minimum of one or two hours per day during extended periods of none occupancy. This option also includes an automatic reset feature. If a fault occurs, the system will shut down, but then automatically reset every 24 hours. If the same fault exists each day, the unit will lockout on the fourth day and have to be manually reset.

**Cupro-nickel Coaxial Heat Exchanger**-Features a tube in tube coaxial water-to-refrigerant heat exchanger and constructed of a convoluted cupro-nickel inner tube and Steel outer tube with a designed refrigerant working pressure of 600 PSIG (4100 kPa) and designed water side working pressure up to 400 PSIG (2750 kPa)

**E-Coat**-Coil will have a flexible epoxy polymer e-coat uniformly applied to all coil surface areas with no material bridging between fins. The coating process will ensure complete coil encapsulation and a uniform dry film thickness from 0.6 – 1.2 mils on all surface areas, including fin edges and meet 5B rating cross-hatch adhesion per ASTM B3359-93.

**Motorized Water Valve**-When extreme fluid temperature conditions do not exist with a open loop system, a motorized water valve can be applied to each water-source heat pump. The motorized valve shall stop the flow to the unit, causing pressures to rise. This rise in pressure will halt pump operation to provide greater energy savings of the entire system.

**Pump Module**-The pump module can be a complete self contained pumping package for an earth coupled heat pump system. The module can consist of a single bronze pump, and a brass 3-way shut-off valve. These kits can contain the necessary components for the installation, operation, and maintenance of water circuit of a closed-loop distributed pumping application.

**Hoses**-Hoses need to consist of stainless steel outer braid with an inner core of tube made of a nontoxic synthetic polymer material. The hoses shall be suitable for water temperatures ranging between 33°F and 211°F without the use of glycol.

**Ball Valve**-Ball Valves can be field installed between the unit and the supply and return lines of the loop to stop water flow to the unit in a maintenance or service situation.

**Automatic Flow Devices**-The automatic flow kit can contain a Hays Mesurflo® automatic flow control valve, two ball valves, two flexible hoses, a high flow strainer, and may include a strainer blow-down and various other accessories. The automatic flow control valve needs to be factory set to a rated flow, and shall automatically control the flow to within 10% of the rated value over 40 to 1 differential pressure, operating range (2 to 80 PSID). Operational temperatures should be rated from fluid 32°F to 225°F. The valve body is constructed from hot forged brass UNS C37700 per ASTM B-283 latest revision.



Vacated Premises  
Control Option

# PHYSICAL DATA

MODEL-SIZE	WSHCE	PSC MOTOR		
		006	09	012
Compressor (1 Each)	1 Each	Rotary		
Refrigerant Type	R-454B			
Factory Charge	lb [kg]	1.6 [.73]	1.8 [.82]	1.73 [.78]
Motor	Type	PSC		
	Speeds	3		
	HP [kw]	1/8 [.09]	1/5 [.15]	
Blower Wheel (Dia x W)	Size in.	5.25 x 6.00		
Water connection	(FPT) in.	3/4		
COAX Volume	(US Gallons)	0.083	0.116	0.116
Condensate connection	(FPT) in.	3/4		
Standard TA Filter 1"	Size in. [cm]	(1) 10x16x1 [25.4 x 38.1 x 2.54]		
Operating Weight	lbs [kg]	108 [49]	110 [50]	110 [50]
Shipping Weight	lbs [kg]	123 [56]	125 [57]	125 [57]

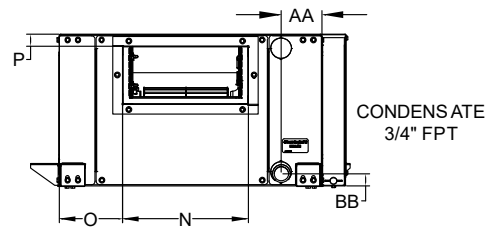
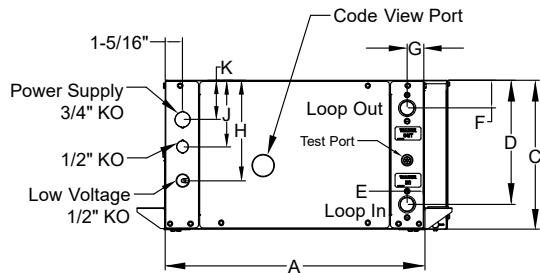
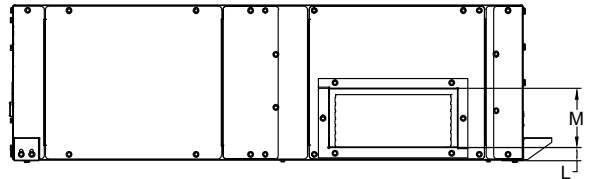
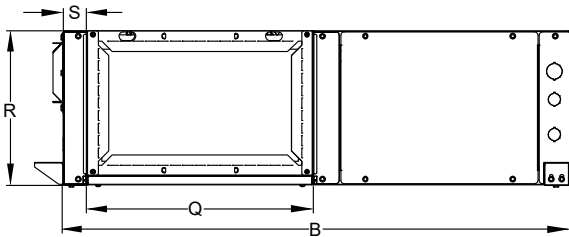
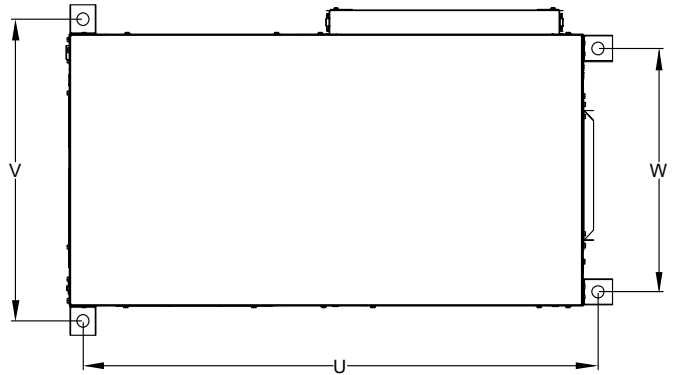
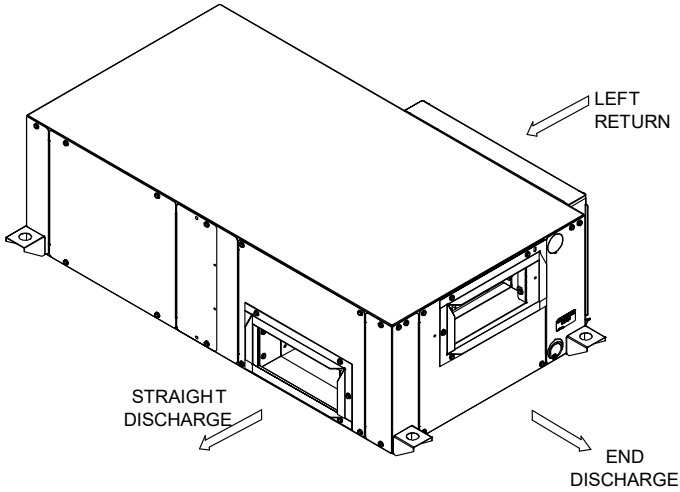
MODEL-SIZE	WSHXE	ECM MOTOR		
		006	009	012
Compressor (1 Each)	1 Each	Rotary		
Refrigerant Type	R-454B			
Factory Charge	lb [kg]	1.8 [.82]	1.8 [.82]	1.73 [.78]
Motor	Type	ECM		
	Speeds	Multiple		
	HP [kw]	1/4 [.18]		
Blower Wheel (Dia x W)	Size in.	5.25 x 6.00	6 x 5	
Water connection	(FPT) in.	3/4		
COAX Volume	(US Gallons)	0.083	0.116	0.116
Condensate connection	(FPT) in.	3/4		
Standard TA Filter 1"	Size in. [cm]	(1) 10x16x1 [25.4 x 38.1 x 2.54]		
Operating Weight	lb [kg]	108 [49]	110 [50]	110 [50]
Shipping Weight	lb [kg]	123 [56]	125 [57]	125 [57]

WATER PRESSURE DROP						
WSH(C,X)E06	GPM	1	1.25	1.5	1.75	2
	PSI	0.1	0.4	0.8	1.2	1.6
WSH(C,X)E09	GPM	1	1.5	2	2.5	3
	PSI	0.6	1	1.6	2.3	3
WSH(C,X)E12	GPM	2	2.5	3	3.5	4
	PSI	1.3	1.9	2	3.3	3.8
GPM - Flow Rate PSI - Pressure Drop						





# DIMENSIONS



SIZE	OVERALL CABINET			CONNECTIONS				LOOP IN/OUT	ELECTRIC KNOCKOUT			DISCHARGE DUCT FLANGE					RETURN DUCT FLANGE			
	W	L	H	LOOP IN		LOOP OUT			FPT	LOW VOLTAGE		LINE	L	M	N	O	P	Q	R	S
	A	B	C	D	E	F	G	H 1/2"		J 1/2"	K 3/4"									
006	19	36	11	9.2	1.3	2.1	1.3	3/4	7.4	4.4	2.9	0.9	4.3	9.1	4.6	5.8	18.3	10.9	0.6	0.9
009	19	36	11	9.2	1.3	2.1	1.3	3/4	7.4	4.4	2.9	0.9	4.3	9.1	4.6	5.8	18.3	10.9	0.6	0.9
012	19	36	11	9.2	1.3	2.1	1.3	3/4	7.4	4.4	2.9	0.9	4.3	9.1	4.6	5.8	18.3	10.9	0.6	0.9

SIZE	U	V	W	CONDENSATE		NOMINAL FILTER SIZE
	MOUNTING BRACKET CENTER DISTANCE			3/4" FPT		
	AA	BB				
006	34.1	21.3	16.8	3	1-1/8	10X16
009	34.1	21.3	16.8	3	1-1/8	10X16
012	34.1	21.3	16.8	3-3/8	1-1/8	10X16



# BLOWER DATA

PSC Motor												Factory Blower Settings		
Model	Fan Speed	Rated Airflow	CFM VS. Static Pressure (in. w.g)										Cooling	Heating
			0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0		
WSHCE06	High	300	330	300	260	230	200	---	---	---	---	---		
	Medium		320	290	250	220	180	---	---	---	---	---	x	x
	Low		310	280	240	210	170	---	---	---	---	---		
WSHCE09	High	330	330	300	260	230	200	---	---	---	---	---		
	Medium		320	290	250	220	180	---	---	---	---	---	x	x
	Low		310	280	240	210	170	---	---	---	---	---		
WSHCE12	High	450	480	450	420	390	360	330	---	---	---	---		
	Medium		430	400	370	340	310	---	---	---	---	---	x	x
	Low		370	340	320	300	---	---	---	---	---	---		

Airflow data shown is with a dry coil at 70°F DB EAT and with standard 1" filter

ECM Motor												Factory Blower Settings			
Model	Fan Speed	Rated Airflow	CFM VS. Static Pressure (in. w.g)										Cooling		Heating
			0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0	1-10 Min	10+ Min	
WSHXE06	T3	300	390	370	340	300	250	230	210	190	---	---			
	T2		310	300	280	270	230	210	190	---	---	---		x	x
	T1		210	190	170	150	---	---	---	---	---	---	x		
WSHXE09	T3	330	420	390	360	320	280	260	230	---	---	---			
	T2		390	370	340	300	250	230	210	---	---	---		x	x
	T1		310	300	280	270	230	210	---	---	---	---	x		
WSHXE12	T3	400	450	420	390	360	320	280	---	---	---	---			
	T2		390	370	340	300	280	---	---	---	---	---		x	x
	T1		360	340	320	290	---	---	---	---	---	---	x		

Airflow data shown is with a dry coil at 70°F DB EAT and with standard 1" filter

# ELECTRICAL DATA

PSC Motor							
Model	Voltage	Compressor		Blower		MCA	MOP
		RLA	LRA	FLA	HP		
WSHCE06	208/230V-1-60	3.0	16	0.65	1/8	5	15
	265V-1-60	2.3	13.2	0.6	1/8	4	15
WSHCE09	208/230V-1-60	4.3	25	0.65	1/8	7	15
	265V-1-60	3.6	20	0.6	1/8	6	15
WSHCE12	208/230V-1-60	5.4	30	1.2	1/5	8	15
	265V-1-60	4.5	24	1.1	1/5	7	15

ECM Motor							
Model	Voltage	Compressor		Blower		MCA	MOP
		RLA	LRA	FLA	HP		
WSHXE06	208/230V-1-60	3	16	2.3	1/4	7	15
	265V-1-60	2.3	13.2	2.3	1/4	6	15
WSHXE09	208/230V-1-60	4.3	25	2.3	1/4	8	15
	265V-1-60	3.6	20	2.3	1/4	7	15
WSHXE12	208/230V-1-60	5.4	30	2.3	1/4	10	15
	265V-1-60	4.5	24	2.3	1/4	8	15

# PERFORMANCE DATA

Model	V/Ph/Hz	Rated Airflow	GPM	Water Loop (Entering Water Temperature)				Ground Water (Entering Water Temperature)			
				86 Deg.F		68 Deg.F		59 Deg.F		50 Deg.F	
				Cooling	EER	Heating	COP	Cooling	EER	Heating	COP
WSHCE06	208-230/1/60	300	2.0	7,000	14.0	7,900	4.9	8,000	22.3	6,400	4.0
WSHCE09	208-230/1/60	330	2.5	10,000	13.2	12,000	4.3	12,000	22.0	10,000	3.7
WSHCE12	208-230/1/60	450	3.0	12,000	12.2	15,000	4.3	14,000	20.0	12,500	3.7

Model	V/Ph/Hz	Rated Airflow	GPM	Water Loop (Entering Water Temperature)				Ground Water (Entering Water Temperature)			
				86 Deg.F		68 Deg.F		59 Deg.F		50 Deg.F	
				Cooling	EER	Heating	COP	Cooling	EER	Heating	COP
WSHXE06	208-230/1/60	300	2.0	7,000	15.0	7,900	5.2	7,800	23.5	6,400	4.3
WSHXE09	208-230/1/60	330	2.5	10,000	14.0	12,000	4.3	12,000	22.0	10,000	3.7
WSHXE12	208-230/1/60	400	3.0	12,500	13.6	16,000	4.3	15,000	21.0	13,000	3.7

**Cooling:** Entering air = 80.6 DB / 66.2 WB (F)  
 Entering fluid temperature = 86 (F)

**Heating:** Entering air = 70 DB (F)  
 Entering fluid temperature = 68 (F)

**DATA AT 208V**



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