

FIRST CO. P.O. BOX 270969 - DALLAS, TEXAS 75227 PH. (214) 388-5751 | FAX (214) 388-2255 WWW.FIRSTCO.COM





WATER SOURCE HEAT PUMP HORIZONTAL • 16EER

3/4 thru 6 Tons

HIGHLY EFFICIENT

HIGH PERFORMANCE

QUIET OPERATION







MODEL NOMENCLATURE

	WSH6	009	Α	6	L	С	F	Ε	1	0	0	0	0	00	00	F
Model			Т	Т	Т	Τ	Т	Т	Т	Т	Τ	Т	Τ			٦
WSH6																
Capacity																
009 - 9,000 Btuh																
012 - 12,000 Btuh																
018 - 18,000 Btuh																
024 - 24,000 Btuh																
030 - 30,000 Btuh																
036 - 36,000 Btun																
042 - 42,000 Bluin																
060 - 60.000 Btuh																
072 - 72 000 Btub																
Revision Level																
Noltono																
voltage																
0 - 208-230/ 1/60 ECM	VI															
M - 208-230/3/60 FC	М															
N - 460/3/60 ECM																
Peturn Air Loc	ation															
R - Right Hand	.ation															
L - Left Hand																
	ar.															
N Cupro Nickol																
Wator Circuit /	Ontions															
water circuit	options															
F - Front																
Supply Air Loc	ation															
S - Straight																
Filter Frame																
1 - 1" or 2" 2-Sided (Convertible Filter	Rail														
Filter Options																
0 - 1" TA Standard																
A - 2" MERV 8																
B - 2" MERV 11																
C - 2" MERV 13																
G - 1" MEKV 8																
Controls																
0 - Standard Without	t Sanvica Switch															
		lanc														
kerrigeration/	Denum Opt	ions														
U - None																
Cabinet/Sound	d Options															
0 - Standard Insulatio	on (Foil Face)															
A - Close Cell Foam																
C - Compressor Jacke	et Coothorr!															
E - Extended Range (Jeotnermal	II + Commercia	orlas	ot)												
s - Sound Kit (Closed	und Nit (Close Cel I Cell + Compress	or lacket)	or Jack	el)												
	Cen + Compress	or jacket)														
Special Option																
000 - No Options																
00E - E-Coating																
0V0 - Vacated Premis Brand	se Switch															
Branu																

A - AE-AIr F - First Co.

First Co. is proud to announce the release of the **HydroTech WSH6**, our premium high efficiency, geothermal unit, available in sizes 0.75 to 6 tons. **ENERGY STAR** certified for ground water and ground loop applications.

The **HydroTech WSH6** series water to air heat pump is designed from the ground up to address the needs of architects, owners, and contractors. It provides the best combination of performance, efficiency and reliability in a compact design. The **WSH6** series comes standard with ECM blower motors for high efficiency and comfort. All **WSH6** models feature double compressor vibration isolation for quiet operation, easy to remove blower housing for quick service, as well as a single compressor designs to maximize reliability and improve serviceability.

All WSH6 models are certified to AHRI ISO Standard 13256-1.



Standard Features:

- 100% Factory Tested!
- R-410A Refrigerant All units operate with environmentally friendly R-410A refrigerant.
- Non-corrosive thermoplastic condensate pan-sloped for positive drainage.
- Superior insulation: Fully insulated cabinet with 1" foil face insulation for the air handling section, and 1" Tuf-Skin insulation for the compressor section.
- High and Low pressure Service Ports
- Refrigerant filter-drier
- Panel-mounted FPT water connections - no back-up wrench needed.
- 50 VA Transformer
- 1" to 2" Convertible filter rail
- Water Coil Freeze Sensor

Optional Features:

- · Cupronickel coaxial heat exchanger
- Vacated premises control Allows the unit to operate for either 1 or 2 hours per day (total) during extended periods of unoccupancy (requires optional kit).
- E-Coated air coil corrosion protection
- Sound atenuation kit
- Extended range (Geothermal)

- Air coil freeze sensor
- Condensate overflow sensor
- Digital Diagnostic Display A two-digit display indicates either the current operational mode or a fault code Thru the door site glass to read display.
- 24V Status LED Green light indicates 24V power to the control module
- Nuisance Trip Protection Unit will attempt to start up to three times with a fault signal. If the fault continues, the unit locks out.
- Over/Under voltage protection
- Random sequencing start timer
- Test Mode With LED Indicator Speeds up control timers for service personnel
- Alarm Relay Activated if the unit locks out



DIGITAL CONTROL MODULE

Controls unit operation and monitors all safety controls. (Patent Pending)

Standard Features

- Digital Diagnostic Display A two-digit display indicates either the current operational mode or a fault code
- 24V Status LED Green light indicates 24V power to the control module
- Nuisance Trip Protection Unit will attempt to start up to three times with a fault signal. If the fault continues, the unit locks out.
- Condensate Overflow Lockout
- High and Low Pressure Controls
- Water Coil Low Temperature Protection
- Over / Under Voltage Protection
- Random sequencing start timer
- Anti-short Cycle Timer
- Test Mode With LED Indicator Speeds up control timers for service personnel
- Alarm Relay Activated if the unit locks out
- Conformal Coating on both sides of control board for humidity and condensation protection

Dip Switches (field selectable settings):

- 5 Second Compressor Delay Blower starts before the compressor, which helps attenuate compressor start up sound.
- 45 Second Blower-off Delay Increases cooling efficiency.
- Continuous Dehumidification Mode Selects continuous low speed fan operation for increased humidity removal.
- VPC Switch Selects either one or two hour daily operation (requires optional kit)
- Lower Water and Air Coil Temperature Cutout Options -Optional 10 degree F. cutouts for applications where water temperature is below 50 degrees F. (requires antifreeze solution).
- Two Accessory Relays The relays can cycle with either the fan or compressor. In addition, relay number one can be configured for use with slow opening water valves (60 second pre-compressor initialization) and relay number 2 can be configured for a 30 second post fan delay.



Electronic Control Module



Sight Glass on Door



Thermoplastic Drain Pan



Optional Vacated Premises Selector Switch (Kit# 9WS01)

PHYSICAL DATA

Madal						Si	ze				
Model		9	12	18	24	30	36	42	48	60	72
Compressor (1 Ea	ich)		Rotary					Scroll			
Refrigerant Typ	e					R4:	10A				
Factory Charge (oz) [kg]	22.2 [0.63]	32.5 [0.92]	42.5 [1.21]	50.9 [1.44]	54.1 [1.53]	62.1 [1.76]	86.1 [2.44]	80.9 [2.29]	100.3 [2.84]	138.9 [3.94]
	Туре					EC	СM				
Motor	Speeds				ι	Jp to 4 Speed	Taps Availab	le			
	HP [kw]	1/4 [.18]	1/4 [.18]	1/3 [.24]	1/2 [.37]*	1/2 [.37]*	1/2 [.37]*	3/4 [.56]	3/4 [.56]	1 [0.75]	1 [0.75]
Blower Wheel Si (Dia x W) in. [m	ize m]	6.75 x 7 [171 x 178]		9 x 7 [229 x 178]	9 x 8 [229 x 203]		10 x 8 [254 x 203]		10 x 10 [254 x 254]		1 x 10 9 x 254]
COAX Volume (US Gallons) [lite	ers]	0.116 [0.44]	6 0.144 0.238 0.359 0.432 0.533 0.624 0.88 0 4] [0.55] [0.90] [1.36] [1.64] [2.02] [2.36] [3.33] [3		0.88 [3.33]	1.084 [4.10]					
Water Connectio FTP (in)	on	3/4	3/4	3/4	3/4	3/4	3/4	1	1	1	1
Condensate Conne FTP (in)	ction	3/4	3/4	3/4	3/4	3/4	3/4	3/4	3/4	3/4	3/4
Air Coil Dimensi (H x L) (in) [mm	on 1]	16 x 1 [406 x	15.5 394]	16 x 22 [406 x 559]		20 x 25 [508 x 635]			20 x 35 [508 x 889]		20 x 45 [508 x 1143]
Standard TA Filter 1" [2 (in) [mm]	25.4mm]	16 x [406 x	20 508]	16 x 25 [406 x 635]		20 x 30 [508 x 762]			20 x 20 [508 x 508]		20 x 25 [508 x 635]
Filter Qty		1 1 1 1 1 1 2 2 2		2							
Operating Weight Ik	os [kg]	137 [62.2]	142 [64.4]	189 [85.8]	245 [111.2]	254 [115.3]	271 [123]	335 [152]	356 [161.5]	365 [165.6]	404 [183.3]
Shipping Weight Ib	s [kg]	159 [72.2]	164 [74.4]	214 [97.1]	289 [131.1]	289 [131.1]	306 [138.8]	378 [171.5]	399 [181]	408 [185.1]	450 [204.2]

NOTE: *3/4HP for 460V Models

PERFORMANCE DATA

			Wat	er Loop (Entering	g Water Temperature)		
Model	Rated Airflow	GPM	86°F		68°F		
	Annow		Cooling	EER	Heating	СОР	
WSH6009	350	3.0	9,000	16.0	10,000	5.1	
WSH6012	450	3.0	12,000	16.0	13,500	5.4	
WSH6018	600	4.5	18,000	16.0	20,000	5.0	
WSH6024	800	6.0	25,000	16.0	28,500	5.0	
WSH6030	1025	7.5	29,000	16.0	32,000	5.0	
WSH6036	1050	9.0	36,000	16.0	41,500	4.6	
WSH6042	1400	10.5	42,000	16.0	47,000	5.0	
WSH6048	1500	12.0	48,000	16.0	56,500	4.8	
WSH6060	1750	15.0	60,000	16.0	67,000	4.8	
WSH6072	2100	18.0	72,000	15.3	86,000	4.3	

			Ground Water (Entering Water Temperature)								
Model	Rated Airflow	GPM	59°F		50°F						
			Cooling	EER	Heating	СОР					
WSH6009	350	3.0	10,000	23.0	8,500	4.2					
WSH6012	450	3.0	12,500	23.1	11,000	4.6					
WSH6018	600	4.5	20,500	26.0	16,000	4.3					
WSH6024	800	6.0	28,500	25.8	23,000	4.3					
WSH6030	1025	7.5	32,000	24.0	26,000	4.2					
WSH6036	1050	9.0	39,000	23.2	34,000	4.1					
WSH6042	1400	10.5	44,500	23.3	40,000	4.3					
WSH6048	1500	12.0	53,000	23.6	46,000	4.2					
WSH6060	1750	15.0	67,000	23.5	55,500	4.3					
WSH6072	2100	18.0	79,000	21.8	69,000	4.1					

			Ground Loop (Entering Water Temperature)								
Model	Rated Airflow	GPM	77°F		32°F						
			Cooling	EER	Heating	СОР					
WSH6009	350	3.0	9,500	18.9	6,800	3.6					
WSH6012	450	3.0	12,000	18.2	8,500	3.8					
WSH6018	600	4.5	19,000	19.0	12,000	3.6					
WSH6024	800	6.0	26,500	18.4	18,500	3.6					
WSH6030	1025	7.5	30,000	18.4	21,000	3.6					
WSH6036	1050	9.0	36,500	18.0	27,000	3.6					
WSH6042	1400	10.5	43,000	18.5	31,500	3.8					
WSH6048	1500	12.0	49,500	18.1	36,000	3.6					
WSH6060	1750	15.0	62,500	18.1	45,000	3.6					
WSH6072	2100	18.0	73,000	17.1	55,000	3.6					

Cooling capacities based on 80.6°F DB, 66.2°F WB entering air tempature Heating capacities based on 68°F DB, 59°F WB entering air tempature

All ratings based upon operation at lower voltage of dual voltage rated models

Tested to ASHRAE/AHRI/ISO 13256-1

AIRFLOW DATA

WSH6 Blower Data													Factory Blower Settings		
Madal	Fan Gaoad	Rated			CFN	/I VS. Ext	ternal Sta	atic Pres	sure (in.	wg)			Coo	oling	llesting
iviodei	Fan Speed	Airflow	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0	1-10	10+	неатіпд
	WHITE		-	-	370	340	310	280	250	-	-	-		х	х
WSH6009	VIOLET	350 - ТЗ	-	370	340	310	280	250	-	-	-	-	х		
	GRAY		375	350	320	290	260	-	-	-	-	-			Ì
	WHITE		-	-	470	440	410	380	350	320	-	-		х	х
WSH6012	VIOLET	450 - T3	-	460	430	400	370	340	310	-	-	-	х		
	GRAY		440	410	380	350	320	-	-	-	-	-			
	T4		-	-	-	-	675	650	600	530	490	-			
	Т3		-	-	-	675	630	590	540	480	-	-		х	х
WSH6018	T2	600-13	-	-	660	620	570	540	490	-	-	-	х		
	T1	1	675	650	610	560	510	480	-	-	-	-			
	T4		-	-	-	-	920	880	840	810	780	720			
W6U6024	Т3	000 70	-	-	-	900	860	820	790	760	720	-		х	х
WSH6024	T2	800-13	-	-	890	840	800	760	730	690	-	-	х		
	T1		-	880	830	770	740	710	680	-	-	-			
	T4		-	-	-	-	1,170	1,050	950	850	750	-			
	Т3	4005 50	-	-	1,160	1,130	1,090	1,000	900	800	-	-		х	х
WSH6030	T2	1025 - 13	1,130	1,090	1,060	1,030	990	940	850	-	-	-	х		
	T1		1,030	1,000	970	940	900	860	-	-	-	-			
	Т3		-	1,380	1,350	1,310	1,200	1,090	1,000	900	-	-		х	х
WSH6036	T2	1050 - T3	1,330	1,280	1,240	1,200	1,140	1,030	930	-	-	-	х		
	T1		1,240	1,190	1,160	1,130	1,090	970	-	-	-	-			
	T4		-	-	-	-	1,570	1,530	1,500	1,470	1,440	1,350			
	Т3	1400 73	-	1,550	1,520	1,490	1,460	1,430	1,400	1,370	1,340	1,280		х	х
WSH6042	T2	1400 - 13	1,450	1,420	1,390	1,360	1,330	1,300	1,260	1,230	1,200	1,170	х		
	T1		1,380	1,350	1,320	1,290	1,260	1,230	1,200	1,170	-	-			
	T4		-	-	-	-	1,760	1,700	1,540	1,430	1,300	1,200			
WELLCOAR	Т3	1500 72	-	1,750	1,720	1,690	1,660	1,610	1,500	1,400	1,300	-		х	х
VV5H0U48	T2	1500 - 15	1,700	1,640	1,600	1,570	1,540	1,510	1,450	1,370	-	-	х		
	T1		1,560	1,520	1,490	1,460	1,420	1,380	1,330	-	-	-			
	T4		-	-	-	-	2,240	2,210	2,150	2,080	2,000	1,900			
	Т3		2,240	2,210	2,180	2,150	2,100	2,070	2,030	1,970	1,920	1,830		х	х
WSH6060	T2	1/50 - 12	2,100	2,060	2,030	2,000	1,960	1,920	1,880	1,870	1,830	1,760	х		
	T1		1,940	1,910	1,880	1,840	1,790	1,750	1,710	1,680	-	-			
	Т3		2,420	2,380	2,360	2,320	2,260	2,240	2,210	2,130	2,040	1,960		х	х
WSH6072	T2	2100 - ТЗ	2,290	2,250	2,220	2,180	2,140	2,110	2,070	2,010	1,950	-	Х		
	T1		2,160	2,120	2,090	2,040	2,010	1,970	1,940			-			

---NOTE: not recommended

NOTE: Airflow data shown is with a wet coil at 80°F DB, 67°F WB EAT and with standard 1" MERV 8 filter

ELECTRICAL DATA

	WSH6 Electrical Data												
Madal	Valtage	Comp	ressor	Blo	wer	MCA	MOD						
Iviodei	voitage	RLA	LRA	FLA	НР		MOP						
WELLCOOD	208/230V-1-60	3.7	22	2.3	1/4	7	15						
W3H0009	265V-1-60	3.5	22	2.3	1/4	7	15						
W6U6012	208/230V-1-60	4.7	26	2.3	1/4	9	15						
W3H0012	265V-1-60	3.8	23	2.3	1/4	8	15						
WCUC019	208/230V-1-60	7	38	2.8	1/3	12	15						
W3H0018	265V-1-60	6	30	2.6	1/3	11	15						
	208/230V-1-60	16.8	55	4.6	1/2	26	40						
WCHC024	265V-1-60	9.6	54	3.6	1/2	16	25						
VV3H0024	208/230V-3-60	7.7	55.4	4.6	1/2	15	20						
	460V-3-60	3.6	28	3.2	3/4	8	15						
	208/230V-1-60	12.8	67.8	4.6	1/2	21	30						
WCHC020	265V-1-60	10.9	60	3.6	1/2	18	25						
W3H0030	208/230V-3-60	8.3	58	4.6	1/2	15	20						
	460V-3-60	4	38	3.2	3/4	9	15						
	208/230V-1-60	15.4	83.9	4.6	1/2	24	35						
WCHCO2C	265V-1-60	13.5	72	3.6	1/2	21	30						
W3H0030	208/230V-3-60	10.4	73	4.6	1/2	18	25						
	460V-3-60	5.8	38	3.2	3/4	11	15						
	208/230V-1-60	19.2	123.9	6.3	3/4	31	45						
WSH6042	265V-1-60	16	87	4.9	3/4	25	40						
W3H0042	208/230V-3-60	13.5	88	6.3	3/4	24	35						
	460V-3-60	6	44	3.2	3/4	11	15						
	208/230V-1-60	19.6	130	6.3	3/4	31	50						
WCHC048	265V-1-60	16.3	98	4.9	3/4	26	40						
W3H0048	208/230V-3-60	13.7	83.1	6.3	3/4	24	35						
	460V-3-60	6.2	41	3.2	3/4	11	15						
	208/230V-1-60	24.4	144.2	7.6	1	39	60						
WSHEDED	265V-1-60	19.9	130	6.6	1	32	50						
W3H0000	208/230V-3-60	16	110	7.6	1	28	40						
	460V-3-60	7.8	52	4	1	14	20						
	208/230V-1-60	30.8	178	7.6	1	47	70						
WSH6072	208/230V-3-60	19.6	136	7.6	1	33	50						
	460V-3-60	8.2	66.1	4	1	15	20						

WATER PRESSURE DROP

	WSH6 Watersid	de Pressure Dro	p	
WELLCOOD	Flow Rate (GPM)	1.1	1.7	2.3
WSH6009	Pressure Drop (PSI)	0.2	0.7	1.2
W6U6012	Flow Rate (GPM)	1.5	2.5	3.0
WSH6012	Pressure Drop (PSI)	0.5	1.5	2.0
WCUC019	Flow Rate (GPM)	2.3	3.4	4.5
W3H0010	Pressure Drop (PSI)	0.5	1.4	2.4
WELLCOOA	Flow Rate (GPM)	3.0	4.5	6.0
VV5H6024	Pressure Drop (PSI)	0.3	1.1	2.0
WSH6030	Flow Rate (GPM)	3.8	5.6	7.5
VV5H6030	Pressure Drop (PSI)	1.0	2.1	3.5
WELLEOSE	Flow Rate (GPM)	4.5	6.8	9.0
W3H0030	Pressure Drop (PSI)	0.3	1.3	2.4
W646042	Flow Rate (GPM)	5.3	7.9	10.5
W3H0042	Pressure Drop (PSI)	0.3	1.6	2.8
WELLCOAR	Flow Rate (GPM)	6.0	9.0	12.0
VV5H0U48	Pressure Drop (PSI)	1.1	2.2	3.5
WELLEGED	Flow Rate (GPM)	7.5	11.3	15.0
VVSHOUDU	Pressure Drop (PSI)	1.4	3.2	5.3
WELLCO72	Flow Rate (GPM)	9.0	13.5	18.0
VV3FI6072	Pressure Drop (PSI)	1.6	3.0	5.1

All values based on pure water at 70°F

DIMENSIONS



DIMENSIONS

				Dim	ensional D	ata							
	0	verall Cabine	et	Wate	er Connect	ions		Electrical Knockouts					
Model	Width	Depth	Height	L	oop In/Ou	t	Loop In/	6					
	Α	В	С	D	E	F		G			1		
WSH6009	22.1	41.1	17	14.6	4.9	1.6	3/4	1.5	11	1.2	9		
WSH6012	22.1	41.1	17	14.6	4.9	1.6	3/4	1.5	11	1.2	9		
WSH6018	22.1	48.1	17	14.6	4.9	1.6	3/4	1.5	11	1.2	9		
WSH6024	25.1	60.1	21	18.6	4.9	1.6	3/4	17.5	15	1.2	13		
WSH6030	25.1	60.1	21	18.6	4.9	1.6	3/4	17.5	15	1.2	13		
WSH6036	25.1	60.1	21	18.6	4.9	1.6	3/4	17.5	15	1.2	13		
WSH6042	25.1	74.1	21	18.6	4.9	1.6	1	17.5	15	1.2	13		
WSH6048	25.1	74.1	21	18.6	4.9	1.6	1	17.5	15	1.2	13		
WSH6060	25.1	74.1	21	18.6	4.9	1.6	1	17.5	15	1.2	13		
WSH6072	25.1	84.1	21	18.6	4.9	1.6	1	17.5	15	1.2	13		

	Dimensional Data														
Madal	Di	scharge Du	ict Flange		Retu	Return Duct Flange			Mounting Brackets Center Distances				Condensate 3/4" FTP		
Wodel	к	L	м	N	0	Р	Q	R	S	т	U	AA	BB		
WSH6009	10.1	3.9	9	5.6	20	16.2	2	41	24.2	19.9	-	3.4	1.1		
WSH6012	10.1	3.9	9	5.6	20	16.2	2	41	24.2	19.9	-	3.4	1.1		
WSH6018	4.6	11.4	9.7	4.8	25	16.2	2	48	24.2	19.9	-	3.4	1.1		
WSH6024	6.9	11.5	10.7	5.7	30	20.3	2	60	27.2	22.9	-	3.4	1.1		
WSH6030	6.9	11.5	10.7	5.7	30	20.3	2	60	27.2	22.9	-	3.4	1.1		
WSH6036	6.9	11.5	10.7	5.7	30	20.3	2	60	27.2	22.9	-	3.4	1.1		
WSH6042	7.4	11.5	10.7	5.7	40	20.3	2	74	27.2	22.9	27.5	3.4	1.1		
WSH6048	7.4	11.5	13.1	4.6	40	20.3	2	74	27.2	22.9	27.5	3.4	1.1		
WSH6060	6	12.5	13.3	4.5	40	20.3	2	74	27.2	22.9	27.5	3.4	1.1		
WSH6072	6	12.5	13.3	4.5	50	20.3	2	84	27.2	22.9	27.5	3.4	1.1		

GUIDE SPECIFICATION

GENERAL

Equipment is completely assembled, piped, internally wired, fully charged with R410A refrigerant and factory tested. Filters, thermostat field interfaces, and all safety controls are factory installed.

Units shall be capable of operating over entering fluid temperature ranges of 50°- 110° in cooling mode and 50°- 90° in heating mode in standard configuration.

All equipment is tested and certified in accordance with (AHRI/ISO 13256-1) and comply with safety standards UL-1995 and CAN/CSA-C22./2. All units have AHRI/ISO and ETL labels.

UNIT CONSTRUCTION

CONFIGURATIONS

Horizontal units are configurable in the following arrangements: left return/end discharge, left return/side discharge, right return/end discharge, right return/end discharge.

For all systems, water, refrigerant and electrical connections are accessible from the front service access panel.

CABINET CONSTRUCTION

Units are built with a corner post and base design using a minimum of 18 gauge galvanized steel on any weight bearing component. Corner posts and panels are designed to allow for service access to all internal components. Structural integrity of the cabinets is unaffected by the removal of any or all of the access panels.

Air handling section interior surfaces are lined with 1" thick foil faced insulation. The insulation is placed such that there is no exposed section of the fiberglass fibers into the airstream.

The condensing section interior surfaces are lined with 1" on the condensing section base pan, mid pan, and all lower access panels.

SERVICE CONNECTIONS

Water connections are accessible from the front of the unit. Water connections shall be made through factory installed brass FPT fittings which will be flush to the water panel. The water fittings shall be rigidly attached to the corner posts to forgo the use of a backup wrench when connecting the supply water.

SUPPLY AIR CONNECTIONS

Horizontal systems have 1" integral supply duct collars to allow for connection of the supply duct. All duct collars are installed on the unit from the factory.

DRAIN PAN

All units, except WSH6072 (stainless steel), use a thermoplastic drain pan to increase corrosion resistance with the drain pan port located near the back of the unit. The drain pan will be internally two-way sloped, with the drain port located near the front of the unit. The unit comes standard with an electronic condensate overflow sensor attached to the edge of the drain pan.

REFRIGERATION CIRCUIT

GENERAL

All systems use R410A refrigerant. All units have factory charged refrigeration circuits, each with its own compressor, reversing valve, bi-flow TXV, coaxial heat exchanger and finned tube refrigerant to air heat exchanger. Each circuit includes a high pressure switch, low pressure switch, and heat exchanger freeze sensors. The circuits each have a high-side and low-side Schrader valve to allow for service access to the refrigeration systems. All service ports are accessible from the front of the unit.

COMPRESSOR

All systems use a high efficiency compressor. The scroll compressor is attached to a 12 gauge double-isolated compressor mounting plate to dampen vibration throughout the system.

For additional sound attenuation, an optional sound package is available which offers a compressor blanket.

COAXIAL HEAT EXCHANGER

The systems use one high efficiency coaxial heat exchanger. The coaxial heat exchanger is designed for working refrigerant pressures up to 600psi and working water pressures up to 400psi. The heat exchanger is coated in an epoxy resin to protect against corrosion. Optional cupro-nickel coaxial heat exchangers are offered to provide additional corrosion resistance in certain hard water and open loop

applications.

GUIDE SPECIFICATION (Cont.)

REVERSING VALVE

A system reversing valve (4-way valve) is included with all heat pump systems. The valve is piped to be energized in cooling mode to provide heat if a valve failure were to occur. Once the valve is energized in cooling mode, it will remain energized as long as the "O" call is provided to the unit control board.

THERMOSTATIC EXPANSION VALVE

Each independent refrigeration circuit has its own balanced port, externally equalized bi-flow thermostatic expansion valve. The thermostatic expansion valve has sweat connections on the inlet/outlet and feature a screw on equalizer port connection.

EVAPORATOR COIL

Internally finned, 3/8-inch copper tubes mechanically bonded to a configured aluminum finned plate is standard. Coils are leak tested at the factory to ensure the pressure integrity. The coils are leak tested to 450 psig and pressure tested to 650 psig. The tubes are completely evacuated of air and correctly charged with proper volume of refrigerant prior to shipment. The refrigerant coil distributor assembly is of orifice style with round copper distributor tubes. The tubes are sized consistently with the capacity of the coil. Suction header is fabricated from rounded copper pipe.

ELECTRICAL AND CONTROLS

VPC (Vacated Premises Control) - Allows the unit to operate for either 1 or 2 hours a day (total) during extended periods of un-occupancy (requires optional kit).

Nuisance Trip Protection - Unit will attempt to start up to three times with a fault signal. If the fault continues, the unit locks out.

Dip Switches (field selectable settings):

- 5 Second Compressor Delay- Blower starts before the compressor, which helps attenuate compressor start up sound.
- 45 Second Blower Off Delay Increases cooling efficiency.
- VPC Switch Selects either one or two hour daily operation (requires optional kit).
- Lower Water and Air Cil Temperature Cutout Options Optional 10°F cutouts for applications where water temperature is below 50°F (requires antifreeze solution).

•Two Accessory Relays - The relays can cycle with either the fan or compressor. In addition, relay number one can be configured for use with a slow opening water valves (60 second pre-compressor initialization) and relay number two can be configured for a 30 second post fan delay.

GENERAL

All units have a control box mounted in the condensing section compartment which houses all necessary electrical components for unit operation. This control box serves as the location for wiring of the high voltage and low voltage circuits for unit operation.

The unit is controlled via 24V low voltage terminals, which connects to an external thermostat or controller which will control the heating and cooling provided by the unit.

The electrical control box contains the following components.

- 1. Compressor Contactors
- 2. Blower motor contactors
- 3. Control Board
- 4. Low Voltage Wiring Connections
- 5. High Voltage terminal block
- 6. 24V Transformer for low voltage control
- 7. Phase monitor

WATER SOURCE CONTROL MODULE

All units will come standard with a WSCM electromechanical module that will control unit operation and contain safety features to protect the compressors, coaxial heat exchangers and fin-tube heat exchangers. The board will contain the following features:

- 1. Single cooling and Single heating control modes for optimal temperature and pressure control
- 2. Anti-short cycle protection
- 3. Random sequencing start timer
- 4. High and Low Pressure Safeties
- 5. Water Coil Freeze Protection
- 6. Air-coil Freeze protection
- 7. Over/under voltage protection
- 8. Fault Retry
- 9. Lockout with soft and hard reset
- 10. Condensate overflow sensor
- 11. Diagnostic LED display
- 12. Test Mode
- 13. Alarm Relay
- 14. Accessory Relays