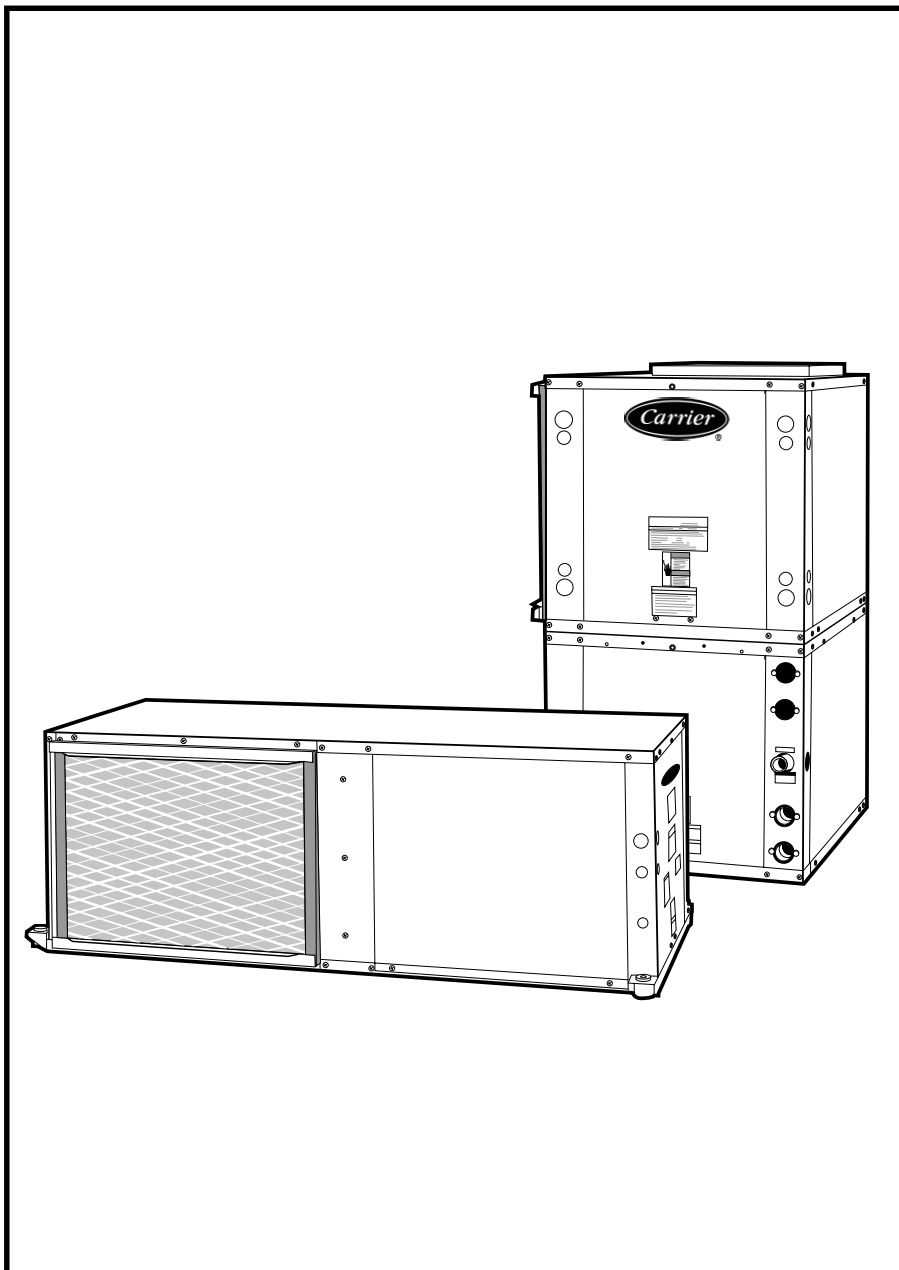




Advance Product Data

50RHR/50RVR/50RDR Horizontal, Vertical and Downflow Water Source Heat Pumps

Horizontal - 1/2 to 5 Nominal Tons
Vertical - 3/4 to 5 Nominal Tons
Downflow - 1-1/4 to 5 Nominal Tons



Single-Packaged Horizontal, Vertical and Downflow Water Source Heat Pumps with electronic unit controls

- System designed for high efficiency year-round cooling and heating
- Ideal for schools, offices, apartments, hotels/motels, and condominiums
- Choices in water coil heat exchangers allow use in closed-loop or open-loop applications

Features/Benefits

Operating efficiency

The Carrier water source heat pumps (WSHP) are designed for quality and performance over their lifetime. Models offer cooling EER's (Energy Efficiency Ratio) to 13.3 and COP's (Coefficient of Performance) to 4.6 under ISO Standard 13256-1.

Design flexibility

The WSHP units are offered in 11 horizontal sizes in 5 foot prints, 10 vertical and 8 downflow sizes in 5 foot prints. Various voltages are available to meet individual zone needs efficiently and effectively. Units shall be capable of operation with an entering water temperature range of 20 to 110 F. Horizontal units have field convertible discharge air to 5 tons (side return/side discharge to side return/back discharge).

Basic construction

Horizontal, Vertical and Downflow units will be fabricated from heavy gage galvanized sheet metal. All interior surfaces are lined with 1/2-in. thick,

1-1/2 lb acoustic type insulation. All vertical and downflow units are painted. Fan motors and compressors are sound isolated and the insulated cabinet makes unit operation even quieter.

All horizontal units have factory mounted hanging brackets. All units shipped on factory wooden palettes, with units bolted to the palettes through the hanging brackets. Spotweld free design. No external support rails. All units have removable blower inlet rings for easy motor and fan removal.

Factory testing

The units have ARI/ISO, NRTL or CSA labels. All units are factory run tested under normal operating conditions at nominal water flow rates. Testing report cards are shipped with each unit, these report cards state the performance of each unit in the cooling and heating modes.

Refrigeration circuit

Units have a sealed refrigerant circuit including a high efficiency rotary, reciprocating, or scroll compressor, a thermostatic expansion valve, a enhanced aluminum fin/rifled copper tube air coil, a reversing valve and a coaxial (tube in tube) refrigerant to water heat exchanger. All compressors are spring mounted. All units are designed to withstand 450 psig refrigerant and water working pressure.

Electronic controls

All units will have a solid state CXM (C)

control system. The standard features of this control are:

1. Unit performance Sentinel (UPS)
2. Anti-short cycle timer
3. Random Start relay
4. High and Low voltage protection
5. High and Low pressure protection
6. Water coil freeze protection (Selectable for water or anti-freeze)
7. Air coil freeze protection (check filter operation)
8. Condensate overflow sensor
9. Option to reset unit at thermostat or disconnect
10. Automatic intelligent reset. Resets 5 minutes, locks out after 3 faults
11. Service test mode
12. LED fault and status lights
13. Selectable 24-v or pilot duty dry contact alarm output
14. 24-v output to cycle a motorized water valve with compressor contactor
15. Electric heat controls/ outputs
16. 50 va transformer

Table of contents

	Page
Features/Benefits	1,2
Model Number Nomenclature	2
Options and Accessories	3
Physical Data	3
Dimensions	4-6
Performance Data	7-18
Application Data	19
Electrical Data	20
Typical Wiring Diagrams	21-26
Guide Specifications	27-29

Model number nomenclature

Horizontal, Vertical and Downflow Units

50RH R 006 S C C 3 0 1 3 0																																													
Water Source Heat Pump 50RH - Horizontal Configuration 50RV - Vertical Configuration 50RD - Downflow Configuration					Water Source Heat Pump 0-None																																								
Product Type R-High Efficiency					Operating Range 1-Commercial Extended Range 2-Commercial Extended Range-(Mute) 3-Commercial Standard Range 4-Commercial Standard Range-(Mute)																																								
Nominal Tons 006-1/2 024-2 060-5 009-3/4 030-2 1/2 012-1 036-3 015-1 1/4 042-3 1/2 019-1 1/2 048-4					Packing 1-Single Pack, Domestic																																								
Airflow Configurations <table><tr><th colspan="3">Horizontal</th></tr><tr><td>Option</td><td>Return</td><td>Discharge</td></tr><tr><td>Z</td><td>Right</td><td>Left</td></tr><tr><td>B</td><td>Right</td><td>Back</td></tr><tr><td>S</td><td>Left</td><td>Right</td></tr><tr><td>E</td><td>Left</td><td>Back</td></tr></table> <table><tr><th colspan="3">Vertical</th></tr><tr><td>L</td><td>Left</td><td>Top</td></tr><tr><td>R</td><td>Right</td><td>Top</td></tr></table> <table><tr><th colspan="3">Downflow</th></tr><tr><td>L</td><td>Left</td><td>Bottom</td></tr><tr><td>R</td><td>Right</td><td>Bottom</td></tr></table>					Horizontal			Option	Return	Discharge	Z	Right	Left	B	Right	Back	S	Left	Right	E	Left	Back	Vertical			L	Left	Top	R	Right	Top	Downflow			L	Left	Bottom	R	Right	Bottom	Revision Code 0-Current Revision				
Horizontal																																													
Option	Return	Discharge																																											
Z	Right	Left																																											
B	Right	Back																																											
S	Left	Right																																											
E	Left	Back																																											
Vertical																																													
L	Left	Top																																											
R	Right	Top																																											
Downflow																																													
L	Left	Bottom																																											
R	Right	Bottom																																											
					V-Ph-Hz 1-575V/3Ph/60Hz 3-208-230V/1Ph/60Hz 4-265V/1Ph/60Hz 5-208-230V/3Ph/60Hz 6-460V/3Ph/60Hz																																								
					Heat Exchanger C-Copper N-Cupro-Nickel X-Special																																								
Controls C-CXM D-DXM H-CXM With HWTS O-DXM With HWTS X-Special																																													

Options and accessories

Factory-installed options:

Cupronickel heat exchangers
 High water temperature switch
 Sound attenuation package (Mute Package).
 Enhanced DXM (D) control system. DXM controls include all CXM features and these additional features:

- Removable thermostat connectors
- Random Start on return from night set back
- Night set back with thermostat override
- Dry contact night set back for digital night setback thermostats
- Heat/Cool or Heat Pump Thermostats capable
- Boilerless system control
- Emergency shutdown
- 75 va transformer
- Dehumidistat input
- Pump restart

Hot water generators
 CCN compatible controls
 Insulated water circuit for low temperature application

Factory-installed accessories:

Hose kits (stainless steel or galvanized)
 Ball valves (with and without PT ports)
 Y strainers (with plugs and blow down valves)
 Solenoid valves
 Hose kit assemblies with GPM Autoflow valves
 Thermostats
 Loop controllers
 2-in. Filter racks

Physical data

50RHR/50VR/50RDR Physical Data

SIZE	006*	009†	012†	015	019	024	030	036	042	048	060
Compressor (1 each)	Rotary				Recip.						Scroll
Factory Charge R22 - (oz.)	12	15	15	30	30	30	41	44	46	54	80
PSC Fan Motor & Blower											
Fan Motor Type/Speeds	PSC/3	PSC/3	PSC/3	PSC/3	PSC/3	PSC/3	PSC/3	PSC/3	PSC/3	PSC/3	PSC/3
Fan Motor (hp)	1/25	1/10	1/10	1/6	1/5	1/3	1/2	3/4	3/4	3/4	1
Blower Wheel Size (Dia x W)	5 x 5	5 x 5	6 x 5	9 x 7	9 x 7	9 x 7	9 x 7	10 x 10	10 x 10	10 x 10	11 x 10
Water Connection Size											
FPT	1/2"	1/2"	1/2"	3/4"	3/4"	3/4"	3/4"	3/4"	1"	1"	1"
Vertical/Downflow											
Air Coil Dimensions (H x W)	—	10 x 16	10 x 16	16 x 16	16 x 16	16 x 16	20 x 20	20 x 20	28 x 20	28 x 20	28 x 25
Air Coil Total Face Area (ft2)	—	1.1	1.1	1.8	1.8	1.8	2.8	2.8	3.9	3.9	4.9
Air Coil Tube Size (in.)	—	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8
Air Coil Fin Spacing (fpi)	—	12	12	12	12	12	12	12	12	12	10
Air Coil Number of rows	—	2	3	3	3	3	3	3	3	3	4
Filter Standard - 1" Throwaway	—	10 x 20	10 x 20	16 x 20	16 x 20	16 x 20	20 x 24	20 x 24	28 x 24	28 x 24	28 x 30
Weight - Operating (lbs.)	—	112	121	147	169	193	219	229	257	267	323
Weight - Packaged (lbs.)	—	122	131	157	179	203	231	241	269	279	338
Horizontal											
Air Coil Dimensions (H x W)	10 x 16	10 x 16	10 x 16	16 x 16	16 x 16	16 x 16	18 x 22	18 x 22	18 x 31	18 x 31	20 x 35
Air Coil Total Face Area (ft2)	1.1	1.1	1.1	1.8	1.8	1.8	2.8	2.8	3.9	3.9	4.9
Air Coil Tube Size (in.)	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8
Air Coil Fin Spacing (fpi)	12	12	12	12	12	12	12	12	12	12	10
Air Coil Number of rows	2	2	3	3	3	3	3	3	3	3	4
Filter Standard - 1" Throwaway	10 x 20	10 x 20	10 x 20	16 x 20	16 x 20	16 x 20	18 x 24	18 x 24	2 - 18 x 18	2 - 18 x 18	1-12 x 20 1-25 x 20
Weight - Operating (lbs.)	110	112	121	147	169	193	219	229	257	267	323
Weight - Packaged (lbs.)	120	122	131	157	179	203	231	241	269	279	338

Note: All units have spring compressor mountings, TXV expansion devices, and 1/2" & 3/4" electrical knockouts.

* Size 006 available for 50RHR only

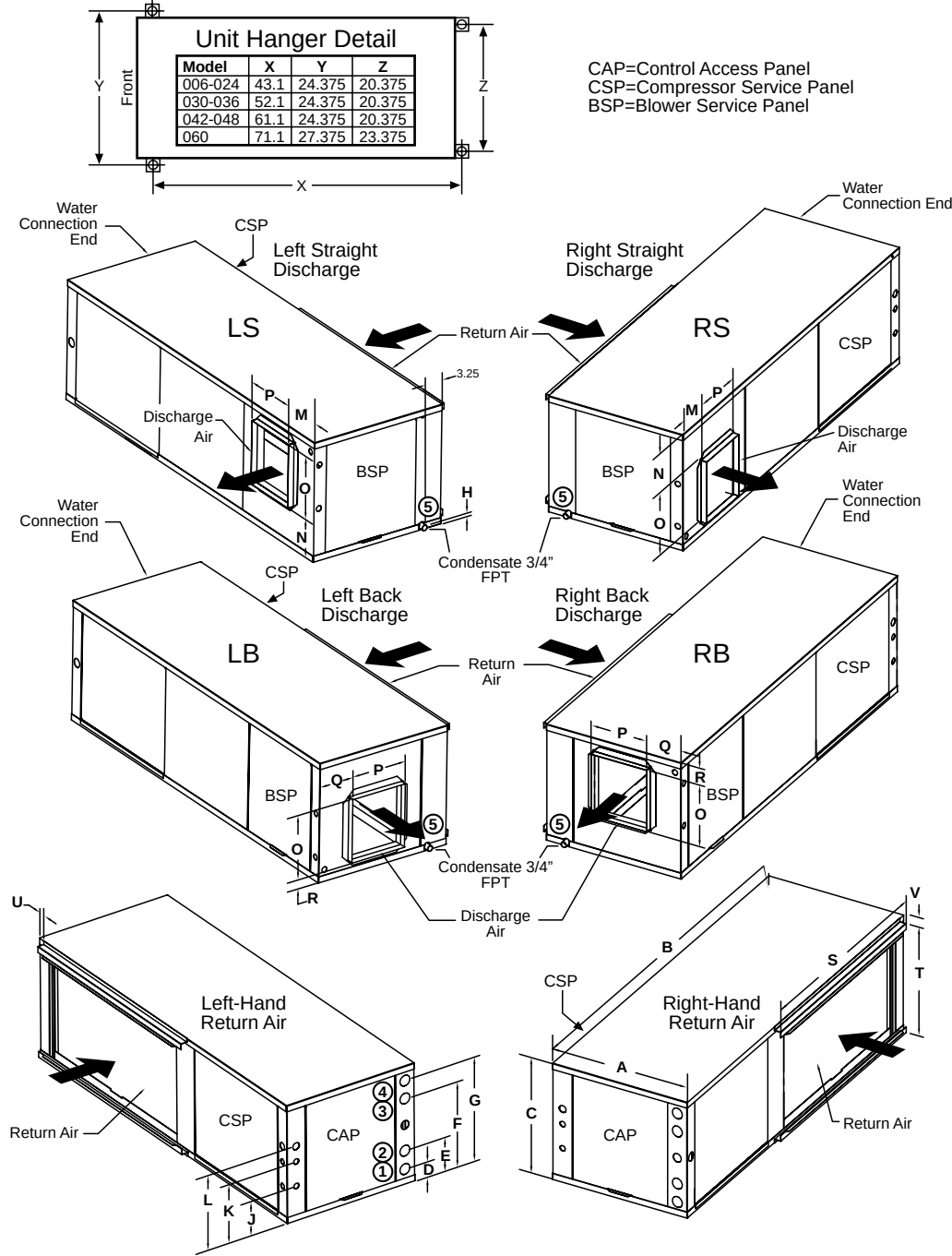
† Size 009 and 012 not available in Downflow configuration

Dimensions

Horizontal Dimensional Data

50RHR HORIZ MODEL	OVERALL CABINET			WATER CONNECTIONS*								ELECTRICAL KNOCKOUTS			DISCHARGE CONNECTION						RETURN CONNECTION			
				1	2	3	4	5	LOOP WATER FPT	HWG FPT	J LOW VOLTAGE	K	L POWER SUPPLY	M	N	O SUPPLY WIDTH	P SUPPLY DEPTH	Q	R	S RETURN DEPTH	T RETURN HEIGHT	U	V	
	A WIDTH	B DEPTH	C HEIGHT	D IN	E OUT	F HWG IN	G HWG OUT	H COND- ENSATE																
006-012	IN	22.4	43.1	11.3	2.4	5.4	N/A	N/A	0.6	0.5	0.5	3.5	5.5	8.0	5.8	4.0	5.8	8.0	5.8	1.5	20.0	8.0	1.0	1.0
015-024	IN	22.4	43.1	17.3	2.4	5.4	11.9	14.9	0.6	0.75	0.5	3.5	7.5	10.0	5.0	5.4	10.4	9.4	5.0	1.5	20.0	14.0	1.0	1.0
030	IN	22.4	52.1	19.3	2.4	5.4	13.9	16.9	0.6	0.75	0.5	6.0	9.5	12.0	5.0	6.8	10.4	9.4	5.0	2.1	22.1	17.0	2.5	1.0
036	IN	22.4	52.1	19.3	2.4	5.4	13.9	16.9	0.6	0.75	0.5	6.0	9.5	12.0	2.9	3.8	13.5	13.1	2.9	1.9	22.1	17.0	2.5	1.0
042-048	IN	22.4	61.1	19.3	2.4	5.4	13.9	16.9	0.6	1.0	0.5	6.0	9.5	12.0	2.9	3.8	13.5	13.1	2.9	1.9	31.1	17.0	3.5	1.0
060	IN	25.4	71.1	21.3	2.4	5.4	15.9	18.9	0.6	1.0	0.5	8.0	11.5	14.0	5.8	5.0	13.5	13.1	5.8	2.9	36.1	19.0	2.5	1.0

Notes:
1. * Water connections for HWG circuit are 1/2" FPT.

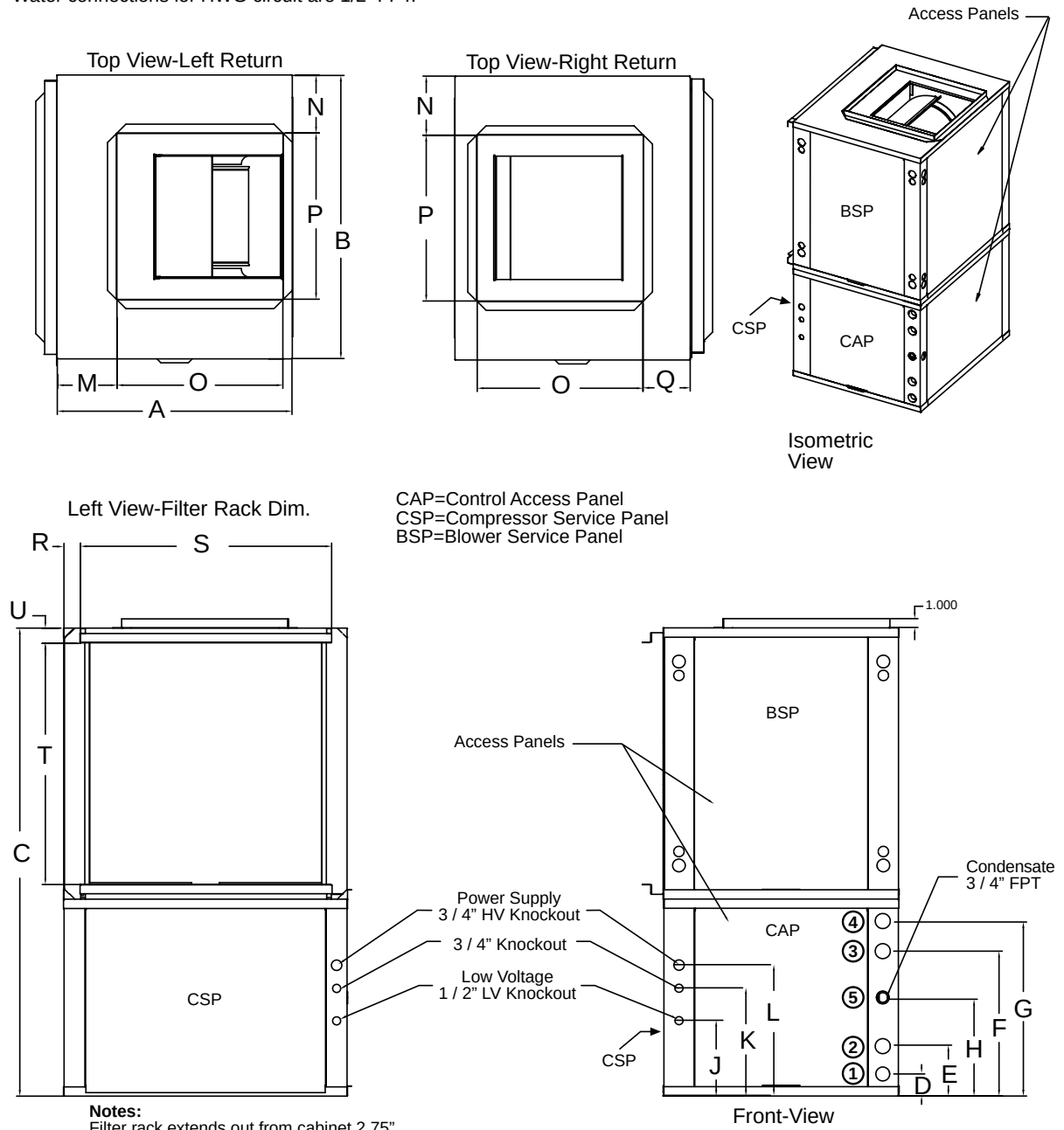


Vertical Dimensional Data

50RVR VERT MODEL		OVERALL CABINET			WATER CONNECTIONS*							ELECTRICAL KNOCKOUTS			DISCHARGE CONNECTION						RETURN CONNECTION		
					1	2	3	4	5	LOOP WATER FPT	HWG FPT												
		A	B	C	D	E	F HWG IN	G HWG OUT	H COND- ENSATE			J LOW VOLTAGE	K	L POWER SUPPLY	M	N	O SUPPLY WIDTH	P SUPPLY DEPTH	Q	R	S RETURN DEPTH	T RETURN HEIGHT	U
		WIDTH	DEPTH	HEIGHT	IN	OUT																	
009-012	IN	22.4	21.6	22.6	2.4	5.4	N/A	N/A	7.8	0.5	0.5	3.5	5.5	8.0	10.6	6.8	5.8	8.0	6.0	0.8	20.0	8.0	1.6
015-024	IN	22.4	21.6	34.6	2.4	4.8	11.9	14.9	8.5	0.75	0.5	3.5	7.5	10.0	7.2	3.8	14.0	14.0	4.3	0.8	20.0	14.0	1.6
030	IN	22.4	25.6	40.4	2.4	5.4	13.9	16.9	9.8	0.75	0.5	6.0	9.5	12.0	7.2	5.8	14.0	14.0	4.3	1.8	22.3	18.2	1.6
036	IN	22.4	25.6	40.4	2.4	5.4	13.9	16.9	9.8	0.75	0.5	6.0	9.5	12.0	7.2	5.8	14.0	14.0	4.3	1.8	22.3	18.2	1.6
042-048	IN	22.4	25.6	48.4	2.4	5.4	13.9	16.9	9.8	1.0	0.5	6.0	9.5	12.0	7.2	5.8	14.0	14.0	4.3	1.8	22.3	26.2	1.6
060	IN	25.4	30.6	50.4	2.4	5.4	15.9	18.9	10.8	1.0	0.5	8.0	11.5	14.0	6.2	6.3	18.0	18.0	5.1	1.5	27.8	26.2	1.5

Notes:

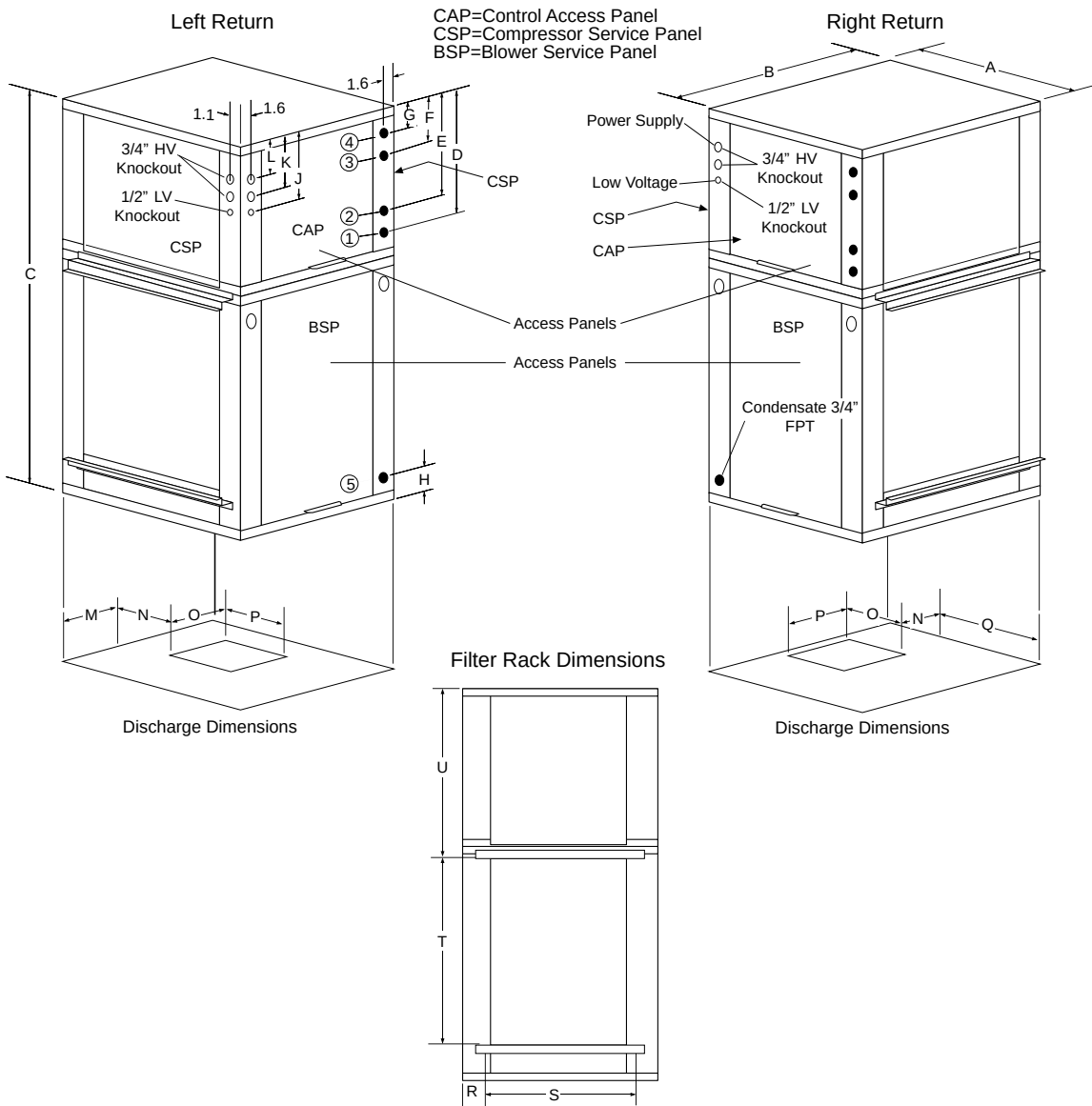
1. * Water connections for HWG circuit are 1/2" FPT.



Dimensions (cont)

Downflow Dimensional Data

50RDR DOWNFLOW MODEL		OVERALL CABINET			WATER CONNECTIONS							ELECT. KNOCKOUTS			DISCHARGE CONNECTION					RETURN CONNECTION			
					1	2	3	4	5	LOOP WATER FPT	HWG FPT												
		A WIDTH	B DEPTH	C HEIGHT	D IN	E OUT	F HWG IN	G HWG OUT	H COND- ENSATE			J LOW VOLTAGE	K	L POWER SUPPLY	M	N	O SUPPLY WIDTH	P SUPPLY DEPTH	Q	R	S RETURN DEPTH	T RETURN HEIGHT	U
015-024	in.	22.4	21.6	38.6	15.0	12.5	4.8	2.4	3.6	0.75	0.5	13.7	9.7	7.2	6.1	6.1	10.4	9.4	10.9	0.8	20.0	14.0	18.8
030	in.	22.4	25.6	44.4	17.0	14.0	5.4	2.4	3.6	0.75	0.5	13.7	9.7	7.2	6.1	8.2	10.4	9.4	10.9	1.8	22.3	18.2	21.1
036	in.	22.4	25.6	44.4	17.0	14.0	5.4	2.4	3.6	0.75	0.5	13.7	9.7	7.2	4.4	6.2	11.3	13.3	10.0	1.8	22.3	18.2	21.1
042-048	in.	22.4	25.6	52.4	17.0	14.0	5.4	2.4	3.6	1.0	0.5	13.7	9.7	7.2	4.4	6.2	11.3	13.3	10.0	1.8	22.3	26.2	21.1
060	in.	25.4	30.6	54.4	19.0	16.0	5.4	2.4	3.6	1.0	0.5	13.7	9.7	7.2	7.4	8.6	13.6	13.3	10.5	1.5	27.8	26.2	23.1



Performance data

50RHR 006

*ISO Certified @ 5,400 Btuh and 12.8 EER in cooling and 7,400 Btuh and 4.2 COP in Heating

200 CFM Nominal Airflow

Performance capacities shown in thousands

EWT °F	GPM	WPD		COOLING - EAT 80.6/66.2 °F						HEATING - EAT 68°F				
		PSI	FT	Total Cooling	Sensible Cooling	Sens/Tot Ratio	KW	Heat of Rej.	EER	Heat Capacity	KW	Heat of Ext.	LAT	COP
20	0.8	0.9	2.0	Operation Not Recommended										
	1.1	1.2	2.9											
	1.5	2.1	4.9											
30	0.8	0.8	2.0	7.4	5.1	0.69	0.23	8.2	32.0	5.1	0.51	3.4	93.6	2.93
	1.1	1.2	2.8	7.6	5.2	0.69	0.22	8.3	34.2	5.3	0.50	3.6	94.4	3.10
	1.5	2.0	4.7	7.7	5.3	0.69	0.21	8.5	36.5	5.4	0.49	3.8	95.1	3.28
40	0.8	0.8	1.9	7.1	5.0	0.70	0.29	8.1	24.2	5.6	0.53	3.8	96.1	3.14
	1.1	1.2	2.7	7.3	5.1	0.70	0.28	8.2	25.8	5.8	0.51	4.1	97.0	3.32
	1.5	2.0	4.5	7.5	5.2	0.69	0.27	8.4	27.6	6.0	0.50	4.3	97.8	3.51
50	0.8	0.8	1.8	6.8	4.8	0.70	0.36	8.1	19.2	6.2	0.54	4.3	98.6	3.33
	1.1	1.1	2.6	7.0	4.9	0.70	0.34	8.2	20.5	6.4	0.53	4.6	99.5	3.52
	1.5	1.9	4.4	7.2	5.0	0.70	0.33	8.3	21.9	6.6	0.52	4.8	100.4	3.72
60	0.8	0.8	1.8	6.6	4.7	0.71	0.42	8.0	15.7	6.7	0.56	4.8	101.1	3.52
	1.1	1.1	2.5	6.7	4.8	0.71	0.40	8.1	16.7	6.9	0.55	5.1	102.1	3.71
	1.5	1.8	4.2	6.9	4.8	0.70	0.39	8.2	17.9	7.1	0.53	5.3	103.1	3.92
70	0.8	0.7	1.7	6.3	4.5	0.71	0.48	8.0	13.1	7.3	0.58	5.3	103.6	3.69
	1.1	1.0	2.4	6.5	4.6	0.71	0.46	8.0	13.9	7.5	0.56	5.6	104.7	3.90
	1.5	1.8	4.0	6.6	4.7	0.71	0.44	8.1	14.9	7.7	0.55	5.8	105.8	4.12
80	0.8	0.7	1.6	6.0	4.3	0.72	0.55	7.9	11.1	7.8	0.59	5.8	106.1	3.85
	1.1	1.0	2.3	6.2	4.4	0.72	0.52	8.0	11.8	8.0	0.58	6.1	107.3	4.07
	1.5	1.7	3.9	6.3	4.5	0.71	0.50	8.0	12.6	8.3	0.57	6.4	108.4	4.30
90	0.8	0.7	1.6	5.8	4.2	0.73	0.61	7.9	9.5	8.3	0.61	6.3	108.6	4.00
	1.1	1.0	2.3	5.9	4.3	0.72	0.58	7.9	10.1	8.6	0.60	6.6	109.8	4.23
	1.5	1.7	3.8	6.0	4.4	0.72	0.56	8.0	10.8	8.9	0.58	6.9	111.1	4.47
100	0.8	0.7	1.6	5.5	4.0	0.73	0.67	7.8	8.2	Operation Not Recommended				
	1.1	1.0	2.2	5.6	4.1	0.73	0.65	7.8	8.7					
	1.5	1.6	3.7	5.8	4.2	0.73	0.62	7.9	9.3					
110	0.8	0.7	1.5	5.2	3.9	0.74	0.74	7.7	7.1					
	1.1	0.9	2.1	5.4	4.0	0.74	0.71	7.8	7.6					
	1.5	1.6	3.6	5.5	4.0	0.74	0.68	7.8	8.1					

Interpolation is permissible. Extrapolation is not.

All entering air conditions are 80.6°F DB and 66.2°F WB in cooling and 68°F DB and 59°F WB in heating.

All performance data is based upon the lower voltage of dual voltage rated units.

* ISO Certified conditions are 86°F EWT, 80.6°F DB and 66.2°F WB in cooling and 68°F EWT, 68°F DB and 59°F WB in heating.

Operation below 60°F EWT requires optional insulated water circuit.

See Performance Data Correction Tables for operation conditions other than those listed above.

Performance data (cont)

50RHR/50RVR 009

*ISO Certified @ 8,100 Btuh and 12.8 EER in cooling and 10,300 Btuh and 4.3 COP in Heating

300 CFM Nominal Airflow

Performance capacities shown in thousands

EWT °F	GPM	WPD		COOLING - EAT 80.6/66.2 °F						HEATING - EAT 68°F				
		PSI	FT	Total Cooling	Sensible Cooling	Sens/Tot Ratio	KW	Heat of Rej.	EER	Heat Capacity	KW	Heat of Ext.	LAT	COP
20	1.1	1.2	2.8	Operation Not Recommended										
	1.7	1.8	4.2											
	2.2	3.6	8.3											
30	1.1	1.2	2.7	10.6	7.4	0.70	0.40	11.9	26.7	5.9	0.62	3.8	88.3	2.81
	1.7	1.7	4.0	10.8	7.6	0.70	0.38	12.1	28.5	6.2	0.63	4.1	89.3	2.89
	2.2	3.5	8.0	11.1	7.7	0.69	0.36	12.3	30.5	6.6	0.65	4.3	90.2	2.95
40	1.1	1.1	2.6	10.0	7.2	0.72	0.46	11.6	21.6	6.8	0.64	4.6	91.1	3.11
	1.7	1.7	3.9	10.3	7.3	0.71	0.45	11.8	23.1	7.2	0.66	4.9	92.2	3.19
	2.2	3.4	7.8	10.5	7.5	0.71	0.43	12.0	24.7	7.6	0.68	5.2	93.3	3.27
50	1.1	1.1	2.5	9.5	7.0	0.73	0.53	11.3	17.8	7.8	0.67	5.5	93.9	3.39
	1.7	1.6	3.7	9.7	7.1	0.73	0.51	11.4	19.0	8.2	0.69	5.8	95.2	3.47
	2.2	3.2	7.5	9.9	7.2	0.73	0.49	11.6	20.4	8.6	0.71	6.2	96.4	3.56
60	1.1	1.0	2.4	8.9	6.7	0.76	0.60	11.0	14.9	8.7	0.70	6.3	96.8	3.64
	1.7	1.6	3.6	9.1	6.9	0.75	0.57	11.1	15.9	9.1	0.72	6.7	98.2	3.73
	2.2	3.1	7.2	9.4	7.0	0.75	0.55	11.2	17.0	9.6	0.73	7.1	99.5	3.82
70	1.1	1.0	2.3	8.4	6.5	0.78	0.67	10.7	12.6	9.6	0.72	7.1	99.6	3.88
	1.7	1.5	3.5	8.6	6.7	0.77	0.64	10.8	13.4	10.1	0.74	7.5	101.1	3.97
	2.2	3.0	6.9	8.8	6.8	0.77	0.61	10.9	14.3	10.6	0.76	8.0	102.7	4.07
80	1.1	1.0	2.2	7.8	6.3	0.80	0.73	10.3	10.7	10.5	0.75	7.9	102.4	4.09
	1.7	1.5	3.4	8.0	6.4	0.80	0.70	10.4	11.4	11.0	0.77	8.4	104.1	4.20
	2.2	2.9	6.7	8.2	6.5	0.80	0.67	10.5	12.2	11.6	0.79	8.9	105.8	4.30
90	1.1	0.9	2.2	7.3	6.1	0.83	0.80	10.0	9.1	11.4	0.78	8.8	105.2	4.30
	1.7	1.4	3.3	7.5	6.2	0.83	0.77	10.1	9.7	12.0	0.80	9.3	107.0	4.41
	2.2	2.8	6.6	7.6	6.3	0.83	0.74	10.1	10.4	12.6	0.82	9.8	108.9	4.51
100	1.1	0.9	2.1	6.7	5.9	0.87	0.87	9.7	7.7	Operation Not Recommended				
	1.7	1.4	3.2	6.9	6.0	0.87	0.83	9.7	8.3					
	2.2	2.8	6.4	7.0	6.1	0.86	0.80	9.8	8.8					
110	1.1	0.9	2.1	6.2	5.6	0.91	0.94	9.4	6.6					
	1.7	1.4	3.1	6.3	5.7	0.91	0.90	9.4	7.0					
	2.2	2.7	6.2	6.5	5.8	0.90	0.86	9.4	7.5					

Interpolation is permissible. Extrapolation is not.

All entering air conditions are 80.6°F DB and 66.2°F WB in cooling and 68°F DB and 59°F WB in heating.

All performance data is based upon the lower voltage of dual voltage rated units.

* ISO Certified conditions are 86°F EWT, 80.6°F DB and 66.2°F WB in cooling and 68°F EWT, 68°F DB and 59°F WB in heating.

Operation below 60°F EWT requires optional insulated water circuit.

See Performance Data Correction Tables for operation conditions other than those listed above.

50RHR/50RVR 012

*ISO Certified @ 11,800 Btuh and 12.7 EER in cooling and 14,600 Btuh and 4.1 COP in heating.

375 CFM Nominal Airflow

Performance capacities shown in thousands

EWT °F	GPM	WPD		COOLING - EAT 80.6/66.2 °F						HEATING - EAT 68°F				
		PSI	FT	Total Cooling	Sensible Cooling	Sens/Tot Ratio	KW	Heat of Rej.	EER	Heat Capacity	KW	Heat of Ext.	LAT	COP
20	1.5	2.0	4.7	Operation Not Recommended										
	2.3	4.6	10.5											
	3.0	10.0	23.0											
30	1.5	2.0	4.6	14.2	10.7	0.75	0.57	16.2	25.2	8.3	0.84	5.4	89.2	2.90
	2.3	4.4	10.2	14.6	11.0	0.75	0.54	16.4	26.8	8.7	0.86	5.8	90.2	2.97
	3.0	9.6	22.3	14.9	11.2	0.75	0.52	16.7	28.7	9.1	0.88	6.1	91.2	3.04
40	1.5	1.9	4.4	13.7	10.5	0.76	0.65	16.0	21.1	9.7	0.88	6.7	92.4	3.22
	2.3	4.3	9.8	14.1	10.7	0.76	0.62	16.2	22.5	10.2	0.91	7.1	93.6	3.30
	3.0	9.3	21.5	14.4	10.9	0.76	0.60	16.4	24.1	10.7	0.93	7.5	94.8	3.38
50	1.5	1.8	4.2	13.2	10.2	0.77	0.73	15.7	18.0	11.1	0.93	7.9	95.7	3.51
	2.3	4.1	9.5	13.5	10.4	0.77	0.70	15.9	19.2	11.7	0.95	8.4	97.0	3.60
	3.0	9.0	20.7	13.9	10.6	0.77	0.67	16.2	20.6	12.3	0.98	8.9	98.4	3.68
60	1.5	1.8	4.1	12.7	9.9	0.78	0.82	15.5	15.5	12.5	0.97	9.2	99.0	3.77
	2.3	4.0	9.1	13.0	10.1	0.78	0.78	15.7	16.6	13.2	1.00	9.8	100.5	3.87
	3.0	8.6	19.9	13.3	10.3	0.77	0.75	15.9	17.7	13.8	1.02	10.3	102.0	3.96
70	1.5	1.7	3.9	12.2	9.7	0.79	0.90	15.3	13.5	13.9	1.02	10.4	102.2	4.01
	2.3	3.8	8.8	12.5	9.9	0.79	0.87	15.5	14.4	14.6	1.04	11.1	103.9	4.11
	3.0	8.3	19.2	12.8	10.0	0.79	0.83	15.6	15.4	15.4	1.07	11.7	105.6	4.21
80	1.5	1.7	3.8	11.7	9.4	0.80	0.99	15.1	11.9	15.3	1.06	11.7	105.5	4.23
	2.3	3.7	8.5	12.0	9.6	0.80	0.95	15.2	12.7	16.1	1.09	12.4	107.3	4.34
	3.0	8.1	18.7	12.3	9.8	0.80	0.91	15.3	13.5	16.9	1.12	13.1	109.2	4.44
90	1.5	1.6	3.7	11.2	9.1	0.81	1.07	14.8	10.5	16.7	1.11	13.0	108.7	4.43
	2.3	3.6	8.3	11.5	9.3	0.81	1.03	15.0	11.2	17.6	1.13	13.7	110.8	4.55
	3.0	7.9	18.2	11.7	9.5	0.81	0.98	15.1	11.9	18.5	1.16	14.5	112.8	4.65
100	1.5	1.6	3.6	10.7	8.8	0.83	1.15	14.6	9.3	Operation Not Recommended				
	2.3	3.5	8.1	10.9	9.0	0.82	1.11	14.7	9.9					
	3.0	7.7	17.7	11.2	9.2	0.82	1.06	14.8	10.6					
110	1.5	1.5	3.5	10.2	8.6	0.84	1.24	14.4	8.2					
	2.3	3.4	7.9	10.4	8.7	0.84	1.19	14.5	8.8					
	3.0	7.5	17.3	10.7	8.9	0.84	1.14	14.5	9.4					

Interpolation is permissible. Extrapolation is not.

All entering air conditions are 80.6°F DB and 66.2°F WB in cooling and 68°F DB and 59°F WB in heating.

All performance data is based upon the lower voltage of dual voltage rated units.

* ISO Certified conditions are 86°F EWT, 80.6°F DB and 66.2°F WB in cooling and 68°F EWT, 68°F DB and 59°F WB in heating.

Operation below 60°F EWT requires optional insulated water circuit.

See Performance Data Correction Tables for operation conditions other than those listed above.

Performance data (cont)

50RHR/50RVR/50RDR 015

*ISO Certified @ 14,100 Btuh and 13.3 EER in cooling and 16,800 Btuh and 4.6 COP in heating.

500 CFM Nominal Airflow

Performance capacities shown in thousands

EWT °F	GPM	WPD		COOLING - EAT 80.6/66.2 °F						HEATING - EAT 68°F				
		PSI	FT	Total Cooling	Sensible Cooling	Sens/Tot Ratio	KW	Heat of Rej.	EER	Heat Capacity	KW	Heat of Ext.	LAT	COP
20	1.8	1.4	3.2	Operation Not Recommended										
	2.6	3.7	8.6											
	3.5	8.4	19.4											
30	1.8	1.3	3.1	17.8	13.6	0.77	0.67	20.0	26.5	10.5	0.93	7.3	89.4	3.31
	2.6	3.6	8.3	18.0	13.9	0.77	0.64	20.2	28.1	11.0	0.95	7.8	90.4	3.41
	3.5	8.1	18.8	18.2	14.2	0.78	0.61	20.3	29.9	11.6	0.97	8.3	91.4	3.51
40	1.8	1.3	3.0	17.1	13.1	0.77	0.76	19.7	22.4	12.0	0.97	8.7	92.1	3.63
	2.6	3.5	8.0	17.3	13.4	0.77	0.73	19.8	23.7	12.6	0.99	9.2	93.3	3.74
	3.5	7.8	18.1	17.5	13.7	0.78	0.69	19.9	25.2	13.2	1.01	9.8	94.5	3.85
50	1.8	1.3	2.9	16.4	12.6	0.77	0.86	19.3	19.0	13.5	1.01	10.0	94.9	3.92
	2.6	3.3	7.7	16.6	12.9	0.78	0.82	19.4	20.2	14.2	1.03	10.7	96.2	4.03
	3.5	7.6	17.5	16.8	13.2	0.78	0.78	19.5	21.5	14.9	1.05	11.3	97.6	4.15
60	1.8	1.2	2.8	15.7	12.1	0.77	0.96	19.0	16.3	14.9	1.05	11.4	97.7	4.17
	2.6	3.2	7.4	15.9	12.3	0.78	0.92	19.1	17.3	15.7	1.07	12.1	99.1	4.30
	3.5	7.3	16.8	16.1	12.6	0.78	0.88	19.1	18.4	16.5	1.09	12.8	100.6	4.42
70	1.8	1.2	2.7	15.1	11.6	0.77	1.07	18.7	14.1	16.4	1.09	12.7	100.4	4.41
	2.6	3.1	7.2	15.2	11.8	0.78	1.02	18.7	14.9	17.3	1.12	13.5	102.0	4.54
	3.5	7.0	16.2	15.4	12.1	0.78	0.97	18.7	15.9	18.2	1.14	14.3	103.6	4.67
80	1.8	1.1	2.6	14.4	11.0	0.77	1.18	18.4	12.2	17.9	1.14	14.0	103.2	4.62
	2.6	3.0	7.0	14.6	11.3	0.77	1.13	18.4	12.9	18.9	1.16	14.9	104.9	4.76
	3.5	6.8	15.7	14.7	11.5	0.78	1.07	18.4	13.7	19.8	1.19	15.8	106.7	4.89
90	1.8	1.1	2.5	13.7	10.5	0.76	1.30	18.1	10.6	19.4	1.18	15.3	105.9	4.81
	2.6	2.9	6.8	13.9	10.7	0.77	1.24	18.1	11.2	20.4	1.21	16.3	107.8	4.95
	3.5	6.6	15.3	14.1	11.0	0.78	1.18	18.1	11.9	21.4	1.23	17.2	109.7	5.09
100	1.8	1.1	2.5	13.1	9.9	0.76	1.42	17.9	9.2	Operation Not Recommended				
	2.6	2.9	6.6	13.2	10.2	0.77	1.35	17.8	9.8					
	3.5	6.5	14.9	13.4	10.4	0.78	1.29	17.8	10.4					
110	1.8	1.0	2.4	12.4	9.4	0.76	1.54	17.7	8.1					
	2.6	2.8	6.4	12.6	9.6	0.76	1.47	17.6	8.6					
	3.5	6.3	14.6	12.7	9.8	0.77	1.40	17.5	9.1					

Interpolation is permissible. Extrapolation is not.

All entering air conditions are 80.6°F DB and 66.2°F WB in cooling and 68°F DB and 59°F WB in heating.

All performance data is based upon the lower voltage of dual voltage rated units.

* ISO Certified conditions are 86°F EWT, 80.6°F DB and 66.2°F WB in cooling and 68°F EWT, 68°F DB and 59°F WB in heating.

Operation below 60°F EWT requires optional insulated water circuit.

See Performance Data Correction Tables for operation conditions other than those listed above.

50RHR/50RVR/50RDR 019

ARI 320 - EER=15.1/COP=5.0

*ISO Certified @ 18,900 Btuh and 12.5 EER in cooling and 22,500 Btuh and 3.6 COP in heating.

600 CFM Nominal Airflow

Performance capacities shown in thousands

EWT °F	GPM	WPD		COOLING - EAT 80.6/66.2 °F						HEATING - EAT 68°F				
		PSI	FT	Total Cooling	Sensible Cooling	Sens/Tot Ratio	KW	Heat of Rej.	EER	Heat Capacity	KW	Heat of Ext.	LAT	COP
20	2.3	1.9	4.4	Operation Not Recommended						11.8 1.13 8.0 88.2 3.07				
	3.4	3.5	8.0											
	4.5	6.8	15.8											
30	2.3	1.9	4.3	24.2	16.7	0.69	1.01	27.6	23.9	13.2	1.17	9.2	90.4	3.30
	3.4	3.4	7.8	25.0	17.0	0.68	0.98	28.4	25.7	13.9	1.21	9.8	91.4	3.37
	4.5	6.6	15.3	25.9	17.2	0.67	0.94	29.1	27.6	14.5	1.24	10.3	92.4	3.43
40	2.3	1.8	4.1	24.0	16.4	0.68	1.13	27.8	21.1	15.7	1.28	11.3	94.2	3.59
	3.4	3.3	7.5	24.8	16.6	0.67	1.09	28.5	22.7	16.5	1.32	12.0	95.4	3.67
	4.5	6.4	14.8	25.7	16.9	0.66	1.05	29.3	24.4	17.3	1.35	12.7	96.7	3.74
50	2.3	1.7	4.0	23.2	16.0	0.69	1.26	27.4	18.4	18.2	1.38	13.4	98.0	3.84
	3.4	3.1	7.2	24.0	16.3	0.68	1.21	28.1	19.8	19.1	1.43	14.2	99.4	3.92
	4.5	6.2	14.2	24.8	16.5	0.67	1.17	28.8	21.3	20.0	1.47	15.0	100.9	3.99
60	2.3	1.7	3.8	21.9	15.6	0.71	1.38	26.6	15.9	20.6	1.49	15.5	101.8	4.06
	3.4	3.0	7.0	22.7	15.8	0.70	1.33	27.3	17.1	21.7	1.54	16.4	103.5	4.14
	4.5	5.9	13.7	23.5	16.1	0.68	1.28	27.9	18.4	22.7	1.58	17.4	105.1	4.22
70	2.3	1.6	3.7	20.5	15.1	0.74	1.50	25.6	13.6	23.1	1.60	17.7	105.7	4.24
	3.4	2.9	6.7	21.2	15.3	0.72	1.45	26.1	14.6	24.3	1.65	18.7	107.5	4.33
	4.5	5.7	13.2	21.9	15.6	0.71	1.39	26.7	15.7	25.5	1.69	19.7	109.3	4.41
80	2.3	1.6	3.6	18.9	14.5	0.77	1.62	24.4	11.6	25.6	1.70	19.8	109.5	4.40
	3.4	2.8	6.5	19.6	14.7	0.75	1.56	24.9	12.5	26.9	1.76	20.9	111.5	4.49
	4.5	5.6	12.8	20.2	15.0	0.74	1.51	25.4	13.4	28.2	1.81	22.0	113.5	4.58
90	2.3	1.5	3.5	17.4	13.9	0.80	1.75	23.4	10.0	28.1	1.81	21.9	113.3	4.54
	3.4	2.7	6.3	18.0	14.1	0.78	1.68	23.8	10.7	29.5	1.87	23.1	115.5	4.64
	4.5	5.4	12.5	18.6	14.3	0.77	1.62	24.2	11.5	30.9	1.92	24.4	117.8	4.72
100	2.3	1.5	3.4	16.2	13.2	0.81	1.87	22.5	8.7	Operation Not Recommended				
	3.4	2.7	6.2	16.7	13.4	0.80	1.80	22.9	9.3					
	4.5	5.3	12.2	17.3	13.6	0.79	1.73	23.2	10.0					
110	2.3	1.4	3.3	15.3	12.4	0.81	1.99	22.1	7.7					
	3.4	2.6	6.0	15.9	12.6	0.80	1.92	22.4	8.3					
	4.5	5.1	11.9	16.4	12.8	0.78	1.85	22.7	8.9					

Interpolation is permissible. Extrapolation is not.

All entering air conditions are 80.6°F DB and 66.2°F WB in cooling and 68°F DB and 59°F WB in heating.

All performance data is based upon the lower voltage of dual voltage rated units.

* ISO Certified conditions are 86°F EWT, 80.6°F DB and 66.2°F WB in cooling and 68°F EWT, 68°F DB and 59°F WB in heating.

Operation below 60°F EWT requires optional insulated water circuit.

See Performance Data Correction Tables for operation conditions other than those listed above.

Performance data (cont)

50RHR/50RVR/50RDR 024

ARI 320 - EER=15.0/COP=4.8

*ISO Certified @ 23,000 Btuh and 12.3 EER in cooling and 27,600 Btuh and 3.6 COP in heating.

Performance capacities shown in thousands

800 CFM Nominal Airflow

Performance capacities shown in thousands

EWT °F	GPM	WPD		COOLING - EAT 80.6/66.2 °F						HEATING - EAT 68°F				
		PSI	FT	Total Cooling	Sensible Cooling	Sens/Tot Ratio	KW	Heat of Rej.	EER	Heat Capacity	KW	Heat of Ext.	LAT	COP
20	3.0	2.1	4.8	Operation Not Recommended										
	4.5	4.3	9.9											
	6.0	7.2	16.6											
30	3.0	2.0	4.6	29.7	20.5	0.69	1.12	33.5	26.5	13.6	1.35	9.0	85.8	2.95
	4.5	4.2	9.6	30.1	20.7	0.69	1.07	33.8	28.1	14.1	1.38	9.4	86.3	2.98
	6.0	7.0	16.1	30.6	20.8	0.68	1.03	34.1	29.8	14.5	1.41	9.7	86.7	3.02
40	3.0	2.0	4.5	28.2	20.7	0.73	1.34	32.8	21.1	16.3	1.49	11.2	88.8	3.21
	4.5	4.0	9.2	28.7	20.9	0.73	1.28	33.0	22.4	16.8	1.52	11.6	89.4	3.24
	6.0	6.7	15.5	29.1	21.1	0.72	1.22	33.3	23.8	17.3	1.54	12.0	90.0	3.28
50	3.0	1.9	4.3	26.9	20.1	0.75	1.48	32.0	18.1	19.8	1.65	14.2	93.0	3.53
	4.5	3.9	8.9	27.3	20.3	0.74	1.42	32.2	19.2	20.4	1.68	14.7	93.7	3.57
	6.0	6.5	15.0	27.8	20.4	0.74	1.36	32.4	20.4	21.0	1.71	15.2	94.4	3.60
60	3.0	1.8	4.1	25.6	19.2	0.75	1.62	31.2	15.9	23.6	1.81	17.4	97.3	3.82
	4.5	3.7	8.6	26.0	19.3	0.74	1.55	31.3	16.8	24.3	1.84	18.0	98.1	3.86
	6.0	6.2	14.4	26.4	19.5	0.74	1.48	31.5	17.9	25.0	1.88	18.6	98.9	3.90
70	3.0	1.7	4.0	24.3	18.4	0.76	1.77	30.3	13.8	26.7	1.94	20.1	100.9	4.03
	4.5	3.6	8.3	24.7	18.5	0.75	1.69	30.4	14.6	27.5	1.98	20.7	101.8	4.07
	6.0	6.0	13.9	25.0	18.7	0.75	1.62	30.6	15.5	28.3	2.01	21.4	102.7	4.11
80	3.0	1.7	3.9	22.9	17.9	0.78	1.94	29.5	11.8	28.4	2.02	21.5	102.8	4.12
	4.5	3.5	8.0	23.3	18.0	0.78	1.86	29.6	12.5	29.2	2.06	22.2	103.8	4.16
	6.0	5.8	13.5	23.6	18.2	0.77	1.78	29.7	13.3	30.1	2.09	22.9	104.8	4.21
90	3.0	1.6	3.8	21.5	17.7	0.82	2.14	28.8	10.0	27.9	2.01	21.0	102.3	4.06
	4.5	3.4	7.8	21.9	17.8	0.81	2.05	28.9	10.6	28.7	2.05	21.7	103.3	4.10
	6.0	5.7	13.1	22.2	17.9	0.81	1.96	28.9	11.3	29.6	2.09	22.4	104.2	4.15
100	3.0	1.6	3.7	20.3	17.4	0.86	2.33	28.3	8.7	Operation Not Recommended				
	4.5	3.3	7.6	20.6	17.6	0.85	2.23	28.2	9.2					
	6.0	5.5	12.8	20.9	17.7	0.84	2.13	28.2	9.8					
110	3.0	1.5	3.6	19.5	16.8	0.86	2.45	27.8	8.0					
	4.5	3.2	7.4	19.8	16.9	0.85	2.34	27.8	8.4					
	6.0	5.4	12.5	20.1	17.0	0.85	2.24	27.7	9.0					

Interpolation is permissible. Extrapolation is not.

All entering air conditions are 80.6 °F DB and 66.2°F WB in cooling and 68°F DB and 59°F WB in heating

All performance data is based upon the lower voltage of dual voltage rated units

50RHR/50RVR/50RDR 030

ARI 320 - EER=15.1/COP=4.8

*ISO Certified @ 28,500 Btuh and 13.2 EER in cooling and 33,300 Btuh and 4.4 COP in heating.

1000 CFM Nominal Airflow

Performance capacities shown in thousands

EWT °F	GPM	WPD		COOLING - EAT 80.6/66.2 °F						HEATING - EAT 68°F				
		PSI	FT	Total Cooling	Sensible Cooling	Sens/Tot Ratio	KW	Heat of Rej.	EER	Heat Capacity	KW	Heat of Ext.	LAT	COP
20	3.8	1.5	3.4	Operation Not Recommended										
	5.5	2.5	5.9											
	7.5	4.1	9.4											
30	3.8	1.4	3.3	39.4	30.5	0.77	1.46	44.4	27.0	19.0	1.75	13.0	87.6	3.18
	5.5	2.4	5.7	40.7	31.1	0.76	1.41	45.5	28.9	19.6	1.78	13.6	88.2	3.23
	7.5	3.9	9.1	42.1	31.7	0.75	1.36	46.7	31.0	20.3	1.81	14.1	88.8	3.29
40	3.8	1.4	3.2	34.5	27.2	0.79	1.58	39.9	21.8	22.1	1.88	15.7	90.4	3.44
	5.5	2.4	5.5	35.7	27.7	0.78	1.53	40.9	23.3	22.8	1.91	16.3	91.2	3.50
	7.5	3.8	8.8	36.8	28.2	0.77	1.47	41.9	25.0	23.6	1.94	17.0	91.9	3.56
50	3.8	1.3	3.0	31.3	25.1	0.80	1.74	37.3	18.0	25.4	2.01	18.5	93.5	3.69
	5.5	2.3	5.3	32.4	25.6	0.79	1.68	38.1	19.3	26.3	2.05	19.3	94.3	3.76
	7.5	3.7	8.5	33.4	26.1	0.78	1.62	39.0	20.7	27.1	2.08	20.0	95.1	3.83
60	3.8	1.3	2.9	29.4	24.0	0.82	1.92	36.0	15.3	28.7	2.14	21.4	96.6	3.94
	5.5	2.2	5.1	30.4	24.5	0.81	1.85	36.7	16.4	29.7	2.17	22.3	97.5	4.01
	7.5	3.5	8.1	31.4	25.0	0.79	1.79	37.5	17.6	30.7	2.21	23.2	98.5	4.08
70	3.8	1.2	2.8	28.3	23.5	0.83	2.11	35.5	13.4	32.0	2.26	24.3	99.7	4.16
	5.5	2.1	4.9	29.3	23.9	0.82	2.04	36.2	14.4	33.2	2.29	25.3	100.7	4.24
	7.5	3.4	7.8	30.2	24.4	0.81	1.96	36.9	15.4	34.3	2.33	26.3	101.8	4.31
80	3.8	1.2	2.7	27.5	23.1	0.84	2.30	35.3	11.9	35.2	2.36	27.1	102.6	4.36
	5.5	2.1	4.7	28.4	23.5	0.83	2.22	36.0	12.8	36.4	2.40	28.2	103.7	4.44
	7.5	3.3	7.6	29.3	24.0	0.82	2.14	36.6	13.7	37.7	2.44	29.3	104.9	4.52
90	3.8	1.2	2.7	26.5	22.6	0.85	2.50	35.0	10.6	38.1	2.45	29.7	105.2	4.54
	5.5	2.0	4.6	27.4	23.0	0.84	2.41	35.6	11.4	39.4	2.50	30.9	106.5	4.63
	7.5	3.2	7.4	28.2	23.5	0.83	2.32	36.2	12.2	40.7	2.54	32.1	107.7	4.70
100	3.8	1.1	2.6	24.7	21.7	0.88	2.68	33.9	9.2	Operation Not Recommended				
	5.5	1.9	4.5	25.6	22.1	0.87	2.59	34.4	9.9					
	7.5	3.1	7.2	26.4	22.5	0.85	2.50	34.9	10.6					
110	3.8	1.1	2.5	21.8	20.1	0.93	2.87	31.6	7.6					
	5.5	1.9	4.4	22.5	20.5	0.91	2.77	31.9	8.1					
	7.5	3.1	7.0	23.2	20.9	0.90	2.67	32.3	8.7					

Interpolation is permissible. Extrapolation is not.

All entering air conditions are 80.6°F DB and 66.2°F WB in cooling and 68°F DB and 59°F WB in heating.

All performance data is based upon the lower voltage of dual voltage rated units.

* ISO Certified conditions are 86°F EWT, 80.6°F DB and 66.2°F WB in cooling and 68°F EWT, 68°F DB and 59°F WB in heating.

Operation below 60°F EWT requires optional insulated water circuit.

See Performance Data Correction Tables for operation conditions other than those listed above.

Performance data (cont)

50RHR/50RVR/50RDR 036

ARI 320 - EER=15.0/COP=4.7 Rated Air Flow 1200 SCFM

*ISO Certified @ 34,000 Btuh and 13.0 EER in cooling and 41,700 Btuh and 4.2 COP in heating.

1200 CFM Nominal Airflow

Performance capacities shown in thousands

EWT °F	GPM	WPD		COOLING - EAT 80.6/66.2 °F						HEATING - EAT 68°F				
		PSI	FT	Total Cooling	Sensible Cooling	Sens/Tot Ratio	KW	Heat of Rej.	EER	Heat Capacity	KW	Heat of Ext.	LAT	COP
20	4.5	1.2	2.7	Operation Not Recommended										
	6.8	2.2	5.2											
	9.0	3.6	8.4											
30	4.5	1.1	2.6	41.0	30.0	0.73	1.94	47.6	21.1	23.0	2.17	15.6	87.7	3.10
	6.8	2.2	5.0	41.7	30.2	0.73	1.88	48.1	22.2	23.7	2.22	16.2	88.3	3.14
	9.0	3.5	8.1	42.4	30.5	0.72	1.83	48.6	23.2	24.4	2.26	16.7	88.9	3.17
40	4.5	1.1	2.5	39.0	30.4	0.78	2.04	46.0	19.1	27.2	2.36	19.1	91.0	3.37
	6.8	2.1	4.8	39.7	30.6	0.77	1.99	46.5	20.0	28.0	2.41	19.8	91.6	3.41
	9.0	3.4	7.8	40.4	30.8	0.76	1.93	47.0	21.0	28.9	2.46	20.5	92.3	3.45
50	4.5	1.1	2.4	37.9	29.9	0.79	2.23	45.5	17.0	31.5	2.56	22.8	94.3	3.61
	6.8	2.0	4.6	38.5	30.2	0.78	2.16	45.9	17.8	32.5	2.61	23.6	95.1	3.65
	9.0	3.3	7.5	39.2	30.4	0.78	2.10	46.4	18.7	33.5	2.66	24.4	95.9	3.69
60	4.5	1.0	2.4	36.9	29.1	0.79	2.42	45.2	15.2	35.9	2.75	26.5	97.7	3.82
	6.8	1.9	4.5	37.5	29.3	0.78	2.35	45.6	16.0	37.1	2.81	27.5	98.6	3.87
	9.0	3.1	7.2	38.2	29.6	0.77	2.28	46.0	16.7	38.2	2.86	28.4	99.5	3.91
70	4.5	1.0	2.3	35.6	28.1	0.79	2.61	44.5	13.7	40.3	2.95	30.3	101.1	4.01
	6.8	1.9	4.3	36.3	28.4	0.78	2.53	44.9	14.3	41.6	3.01	31.3	102.1	4.05
	9.0	3.0	7.0	36.9	28.6	0.77	2.46	45.3	15.0	42.8	3.06	32.4	103.1	4.10
80	4.5	1.0	2.2	33.9	27.2	0.80	2.78	43.4	12.2	44.6	3.14	33.9	104.4	4.16
	6.8	1.8	4.2	34.5	27.4	0.79	2.70	43.7	12.8	46.0	3.20	35.1	105.5	4.21
	9.0	2.9	6.8	35.1	27.6	0.79	2.62	44.1	13.4	47.4	3.26	36.3	106.6	4.26
90	4.5	0.9	2.1	31.9	26.3	0.83	2.95	42.0	10.8	48.8	3.32	37.5	107.7	4.30
	6.8	1.8	4.1	32.5	26.5	0.82	2.86	42.2	11.3	50.4	3.39	38.8	108.9	4.35
	9.0	2.9	6.6	33.0	26.7	0.81	2.78	42.5	11.9	51.9	3.46	40.1	110.0	4.40
100	4.5	0.9	2.1	29.8	25.5	0.86	3.17	40.6	9.4	Operation Not Recommended				
	6.8	1.7	4.0	30.3	25.7	0.85	3.07	40.8	9.9					
	9.0	2.8	6.4	30.8	25.9	0.84	2.98	41.0	10.3					
110	4.5	0.9	2.0	28.2	24.6	0.87	3.50	40.2	8.1					
	6.8	1.7	3.9	28.7	24.8	0.86	3.40	40.3	8.5					
	9.0	2.7	6.3	29.2	25.0	0.85	3.30	40.5	8.9					

Interpolation is permissible. Extrapolation is not.

All entering air conditions are 80.6°F DB and 66.2°F WB in cooling and 68°F DB and 59°F WB in heating.

All performance data is based upon the lower voltage of dual voltage rated units.

* ISO Certified conditions are 86°F EWT, 80.6°F DB and 66.2°F WB in cooling and 68°F EWT, 68°F DB and 59°F WB in heating.

Operation below 60°F EWT requires optional insulated water circuit.

See Performance Data Correction Tables for operation conditions other than those listed above.

50RHR/50RVR/50RDR 042

*ISO Certified @ 40,000 Btuh and 13.0 EER in cooling and 46,700 Btuh and 4.3 COP in heating.

1400 CFM Nominal Airflow

Performance capacities shown in thousands

EWT °F	GPM	WPD		COOLING - EAT 80.6/66.2 °F						HEATING - EAT 68°F				
		PSI	FT	Total Cooling	Sensible Cooling	Sens/Tot Ratio	KW	Heat of Rej.	EER	Heat Capacity	KW	Heat of Ext.	LAT	COP
20	5.3	1.5	3.4	Operation Not Recommended						24.5 2.34 16.5 86.2 3.07				
	7.9	3.0	6.9											
	10.5	4.7	10.9											
30	5.3	1.4	3.3	47.4	35.4	0.75	2.09	54.6	22.7	28.6	2.51	20.1	88.9	3.34
	7.9	2.9	6.6	47.9	35.6	0.74	2.03	54.8	23.6	29.4	2.55	20.7	89.4	3.38
	10.5	4.6	10.5	48.4	35.8	0.74	1.96	55.1	24.6	30.2	2.58	21.4	90.0	3.42
40	5.3	1.4	3.2	47.8	35.8	0.75	2.34	55.8	20.4	33.6	2.72	24.3	92.3	3.62
	7.9	2.8	6.4	48.3	36.1	0.75	2.27	56.0	21.3	34.5	2.76	25.1	92.8	3.66
	10.5	4.4	10.2	48.8	36.3	0.74	2.20	56.3	22.2	35.5	2.80	25.9	93.4	3.71
50	5.3	1.3	3.1	47.1	35.6	0.76	2.55	55.8	18.5	38.3	2.92	28.4	95.3	3.85
	7.9	2.7	6.2	47.6	35.9	0.75	2.48	56.1	19.2	39.3	2.96	29.3	96.0	3.90
	10.5	4.2	9.8	48.1	36.1	0.75	2.40	56.3	20.1	40.4	3.00	30.2	96.7	3.95
60	5.3	1.3	3.0	45.6	34.9	0.76	2.77	55.0	16.5	42.6	3.09	32.1	98.2	4.05
	7.9	2.6	5.9	46.1	35.1	0.76	2.68	55.2	17.2	43.8	3.13	33.1	99.0	4.10
	10.5	4.1	9.4	46.5	35.3	0.76	2.60	55.4	17.9	44.9	3.17	34.1	99.7	4.15
70	5.3	1.2	2.9	43.4	33.7	0.78	3.00	53.7	14.5	46.6	3.24	35.6	100.8	4.22
	7.9	2.5	5.7	43.9	34.0	0.77	2.90	53.8	15.1	47.9	3.28	36.7	101.7	4.27
	10.5	3.9	9.1	44.3	34.2	0.77	2.81	53.9	15.8	49.2	3.33	37.8	102.5	4.33
80	5.3	1.2	2.8	40.8	32.3	0.79	3.25	51.9	12.6	50.3	3.37	38.8	103.3	4.37
	7.9	2.4	5.6	41.2	32.6	0.79	3.15	52.0	13.1	51.7	3.42	40.0	104.2	4.43
	10.5	3.8	8.8	41.6	32.8	0.79	3.05	52.1	13.7	53.0	3.46	41.2	105.1	4.48
90	5.3	1.2	2.7	38.0	30.9	0.81	3.52	50.0	10.8	53.6	3.48	41.7	105.5	4.51
	7.9	2.3	5.4	38.4	31.1	0.81	3.41	50.0	11.3	55.1	3.53	43.0	106.4	4.57
	10.5	3.7	8.6	38.8	31.3	0.81	3.30	50.0	11.7	56.5	3.58	44.3	107.4	4.63
100	5.3	1.1	2.6	35.2	29.6	0.84	3.77	48.1	9.3	Operation Not Recommended				
	7.9	2.3	5.3	35.6	29.8	0.84	3.65	48.0	9.7					
	10.5	3.6	8.4	35.9	29.9	0.83	3.54	48.0	10.2					
110	5.3	1.1	2.6	32.7	28.6	0.87	3.97	46.3	8.2					
	7.9	2.2	5.1	33.1	28.8	0.87	3.85	46.2	8.6					
	10.5	3.5	8.1	33.4	29.0	0.87	3.72	46.1	9.0					

Interpolation is permissible. Extrapolation is not.

All entering air conditions are 80.6°F DB and 66.2°F WB in cooling and 68°F DB and 59°F WB in heating.

All performance data is based upon the lower voltage of dual voltage rated units.

* ISO Certified conditions are 86°F EWT, 80.6°F DB and 66.2°F WB in cooling and 68°F EWT, 68°F DB and 59°F WB in heating.

Operation below 60°F EWT requires optional insulated water circuit.

See Performance Data Correction Tables for operation conditions other than those listed above.

Performance data (cont)

50RHR/50RVR/50RDR 048

ARI 320 - EER=14.61/COP=4.8

*ISO Certified @ 47,000 Btuh and 12.8 EER in cooling and 58,000 Btuh and 4.2 COP in heating.

2000 CFM Nominal Airflow

Performance capacities shown in thousands

EWT °F	GPM	WPD		COOLING - EAT 80.6/66.2 °F						HEATING - EAT 68°F				
		PSI	FT	Total Cooling	Sensible Cooling	Sens/Tot Ratio	KW	Heat of Rej.	EER	Heat Capacity	KW	Heat of Ext.	LAT	COP
20	6.0	2.1	4.9	Operation Not Recommended										
	9.0	4.1	9.4											
	12.0	6.6	15.3											
30	6.0	2.1	4.7	51.4	37.8	0.74	2.49	59.9	20.7	33.7	2.98	23.5	89.5	3.31
	9.0	3.9	9.1	52.3	37.3	0.71	2.41	60.5	21.7	34.6	3.04	24.2	90.0	3.33
	12.0	6.4	14.8	53.2	36.8	0.69	2.34	61.2	22.7	35.4	3.10	24.9	90.5	3.35
40	6.0	2.0	4.6	55.2	41.2	0.75	2.75	64.6	20.0	38.9	3.19	28.0	92.5	3.57
	9.0	3.8	8.8	56.1	40.6	0.72	2.67	65.2	21.0	39.9	3.26	28.8	93.1	3.58
	12.0	6.2	14.2	57.1	40.1	0.70	2.59	65.9	22.0	41.0	3.33	29.6	93.7	3.60
50	6.0	1.9	4.4	54.8	41.8	0.76	3.01	65.0	18.2	44.7	3.45	32.9	95.9	3.80
	9.0	3.7	8.5	55.7	41.3	0.74	2.92	65.6	19.1	45.9	3.52	33.8	96.5	3.82
	12.0	5.9	13.7	56.6	40.7	0.72	2.83	66.3	20.0	47.0	3.59	34.8	97.2	3.83
60	6.0	1.8	4.3	52.4	41.1	0.78	3.26	63.5	16.1	51.2	3.71	38.5	99.6	4.04
	9.0	3.5	8.1	53.3	40.5	0.76	3.16	64.1	16.8	52.5	3.79	39.6	100.4	4.06
	12.0	5.7	13.2	54.2	40.0	0.74	3.07	64.7	17.7	53.9	3.87	40.6	101.2	4.07
70	6.0	1.8	4.1	49.6	39.7	0.80	3.53	61.7	14.1	58.0	3.99	44.3	103.5	4.26
	9.0	3.4	7.8	50.5	39.1	0.78	3.42	62.2	14.8	59.5	4.07	45.6	104.4	4.28
	12.0	5.5	12.7	51.3	38.6	0.75	3.32	62.6	15.5	61.0	4.16	46.8	105.3	4.30
80	6.0	1.7	4.0	47.2	38.1	0.81	3.80	60.2	12.4	64.2	4.27	49.6	107.1	4.41
	9.0	3.3	7.6	48.0	37.6	0.78	3.69	60.6	13.0	65.9	4.36	51.0	108.1	4.43
	12.0	5.4	12.4	48.8	37.1	0.76	3.58	61.0	13.7	67.6	4.45	52.4	109.1	4.45
90	6.0	1.7	3.9	45.3	36.7	0.81	4.09	59.2	11.1	68.4	4.55	52.9	109.6	4.40
	9.0	3.2	7.4	46.1	36.2	0.79	3.97	59.6	11.6	70.2	4.65	54.3	110.6	4.42
	12.0	5.2	12.0	46.8	35.7	0.76	3.85	60.0	12.2	72.0	4.75	55.8	111.7	4.44
100	6.0	1.6	3.8	43.1	35.3	0.82	4.38	58.1	9.8	Operation Not Recommended				
	9.0	3.1	7.2	43.9	34.8	0.79	4.25	58.4	10.3					
	12.0	5.1	11.7	44.6	34.3	0.77	4.12	58.7	10.8					
110	6.0	1.6	3.7	39.5	33.3	0.84	4.67	55.4	8.5					
	9.0	3.1	7.0	40.1	32.9	0.82	4.53	55.6	8.9					
	12.0	5.0	11.4	40.8	32.4	0.79	4.39	55.8	9.3					

Interpolation is permissible. Extrapolation is not.

All entering air conditions are 80.6°F DB and 66.2°F WB in cooling and 68°F DB and 59°F WB in heating.

All performance data is based upon the lower voltage of dual voltage rated units.

* ISO Certified conditions are 86°F EWT, 80.6°F DB and 66.2°F WB in cooling and 68°F EWT, 68°F DB and 59°F WB in heating.

Operation below 60°F EWT requires optional insulated water circuit.

See Performance Data Correction Tables for operation conditions other than those listed above.

50RHR/50RVR/50RDR 060

ARI 320 - EER=13.6/COP=4.8

*ISO Certified @ 59,000 Btuh and 12.8 EER in cooling and 68,000 Btuh and 4.2 COP in heating.

2000 CFM Nominal Airflow

Performance capacities shown in thousands

EWT °F	GPM	WPD		COOLING - EAT 80.6/66.2 °F						HEATING - EAT 68°F				
		PSI	FT	Total Cooling	Sensible Cooling	Sens/Tot Ratio	KW	Total Heat of Rej.	EER	Heat Capacity	KW	Heat of Ext.	LAT	COP
20	7.5	3.0	7.0	Operation Not Recommended										
	11.3	5.9	13.6											
	15.0	9.7	22.4											
30	7.5	2.9	6.8	54.0	40.0	0.74	3.28	65.2	16.4	43.3	3.93	29.9	90.1	3.23
	11.3	5.7	13.2	54.1	40.2	0.74	3.18	65.0	17.0	44.0	3.97	30.5	90.4	3.25
	15.0	9.4	21.7	54.3	40.3	0.74	3.07	64.8	17.7	44.7	4.00	31.1	90.7	3.27
40	7.5	2.8	6.5	62.3	47.2	0.76	3.63	74.7	17.2	49.5	4.07	35.6	92.9	3.56
	11.3	5.5	12.7	62.5	47.4	0.76	3.51	74.5	17.8	50.3	4.11	36.3	93.3	3.59
	15.0	9.1	20.9	62.6	47.5	0.76	3.39	74.2	18.5	51.1	4.15	37.0	93.7	3.61
50	7.5	2.7	6.3	65.0	50.1	0.77	3.92	78.4	16.6	56.1	4.24	41.6	96.0	3.88
	11.3	5.3	12.3	65.2	50.3	0.77	3.80	78.2	17.2	57.0	4.28	42.4	96.4	3.91
	15.0	8.7	20.2	65.4	50.4	0.77	3.67	77.9	17.8	57.9	4.31	43.2	96.8	3.93
60	7.5	2.6	6.1	64.6	50.4	0.78	4.20	78.9	15.4	62.8	4.41	47.7	99.1	4.17
	11.3	5.1	11.8	64.8	50.6	0.78	4.07	78.6	15.9	63.7	4.45	48.6	99.5	4.19
	15.0	8.4	19.4	64.9	50.7	0.78	3.93	78.3	16.5	64.7	4.49	49.4	100.0	4.22
70	7.5	2.5	5.8	62.7	49.6	0.79	4.49	78.0	14.0	68.9	4.58	53.3	101.9	4.41
	11.3	4.9	11.4	62.9	49.7	0.79	4.35	77.7	14.5	70.0	4.62	54.2	102.4	4.44
	15.0	8.1	18.7	63.0	49.9	0.79	4.20	77.4	15.0	71.1	4.67	55.2	102.9	4.46
80	7.5	2.5	5.7	60.5	48.3	0.80	4.82	77.0	12.5	73.7	4.72	57.6	104.1	4.58
	11.3	4.8	11.1	60.7	48.5	0.80	4.66	76.6	13.0	74.9	4.76	58.7	104.7	4.61
	15.0	7.9	18.2	60.8	48.6	0.80	4.51	76.2	13.5	76.1	4.80	59.7	105.2	4.64
90	7.5	2.4	5.5	58.4	47.2	0.81	5.21	76.1	11.2	76.0	4.77	59.7	105.2	4.67
	11.3	4.7	10.8	58.5	47.3	0.81	5.04	75.7	11.6	77.2	4.82	60.8	105.8	4.70
	15.0	7.7	17.7	58.7	47.4	0.81	4.87	75.3	12.1	78.4	4.86	61.8	106.3	4.73
100	7.5	2.3	5.4	56.1	45.9	0.82	5.66	75.4	9.9	Operation Not Recommended				
	11.3	4.5	10.5	56.2	46.1	0.82	5.48	74.9	10.3					
	15.0	7.5	17.3	56.4	46.2	0.82	5.29	74.4	10.6					
110	7.5	2.3	5.2	52.7	44.1	0.84	6.19	73.8	8.5					
	11.3	4.4	10.2	52.8	44.3	0.84	5.99	73.3	8.8					
	15.0	7.3	16.8	53.0	44.4	0.84	5.79	72.7	9.1					

Interpolation is permissible, Extrapolation is not.

All entering air conditions are 80.6 °F DB and 66.2°F WB in cooling and 68°F DB and 59°F WB in heating

All performance data is based upon the lower voltage of dual voltage rated units

* ISO Certification conditions are 86°F EWT, 80.6°F DB and 66.2°F WB in cooling and 68°F EWT, 68°F DB and 59°F WB in heating.

Operation below 60°F EWT requires optional insulated water circuit.

See Performance Data Correction Tables for operation conditions other than those listed above.

Performance data (cont)

Airflow Correction Table

Airflow		Cooling				Heating		
CFM Per Ton of Clg	% of Nominal	Total Cap	Sens Cap	Power	Heat of Rej	Htg Cap	Power	Heat of Ext
300	75%	1.019	0.902	0.964	1.007	0.957	1.061	0.922
325	81%	1.013	0.928	0.976	1.003	0.968	1.040	0.946
350	88%	1.007	0.953	0.988	1.000	0.979	1.020	0.970
375	94%	1.004	0.977	0.994	1.000	0.989	1.010	0.985
400	100%	1.000	1.000	1.000	1.000	1.000	1.000	1.000
425	106%	0.998	1.023	1.006	1.000	1.011	0.997	1.015
450	113%	0.997	1.047	1.012	1.000	1.021	0.994	1.030

400 CFM per ton of cooling capacity is nominal rated airflow for all models (bold print)
Use multipliers directly with unit data for correcting unit performance at other airflows than nominal

50RHR/50RVR EA Correction

Cooling Corrections											Heating Corrections			
Ent Air WB °F	Total Clg Cap	Sens Clg Cap Multiplier - Entering DB °F							Power	Heat of Rej	Ent Air DB °F	Htg Cap	Power	Heat of Ext
		70	75	80	80.6	85	90	95						
60	0.852	0.828	0.980	1.097	1.129	*	*	*	0.996	0.878	60	1.059	0.947	1.100
65	0.974	0.595	0.808	1.004	1.017	1.194	*	*	0.998	0.979	65	1.019	0.981	1.032
66.2	1.000	0.539	0.767	0.967	1.000	1.152	*	*	1.000	1.000	68	1.000	1.000	1.000
67	1.004	0.501	0.740	0.939	0.955	1.124	1.233	1.276	1.002	1.010	70	0.995	1.010	0.989
70	1.034		0.636	0.810	0.844	1.016	1.136	1.220	1.005	1.029	75	0.980	1.037	0.960
75	1.069			0.514	0.612	0.826	0.973	1.127	1.010	1.058	80	0.967	1.063	0.934

* Sensible capacity equals total capacity

Entering air corrections should be multiplied directly to unit performance data to derive performance at entering air condition other than ARI/ISO/ASHRAE 13256-1

ARI/ISO/ASHRAE 13256-1 uses entering air conditions of Clg- 80.6°F DB/66.2°F WB and Htg- 68°F DB/59°F WB (bold print)

Discontinued Standards ARI 320, 325, and 330 used entering air conditions of Clg- 80°F DB/67°F WB and Htg- 70°F DB

50RHR/50RVR/50RDR Blower Performance Table

208 volt with wet coil and clean air filter

SIZE	FAN SPEED	0	0.1	0.2	0.3	ESP 0.4	0.5	0.6	0.7	0.8	0.9	1
006	HI	296	279	259	239	213	156	108				
MIN CFM	MED	236	217	201	177	143	108					
150	LO	219	202	185	158	125						
009	HI	452	425	398	371	320	299	226				
MIN CFM	MED	413	387	360	337	311	265					
225	LO	366	347	323	305	277	239					
012	HI	473	451	432	399	382	353	325	291			
MIN CFM	MED	406	383	364	351	328	314	285				
300	LO	335	323	312	298	285						
015	HI	751	714	677	634	565	500	402				
MIN CFM	MED	660	618	585	548	495	436	367				
375	LO	581	546	516	476	433	365					
019	HI	847	789	735	672	602	522	454				
MIN CFM	MED	704	661	617	561	503	441					
450	LO	602	561	510	457							
024	HI	964	900	839	773	703	618	522				
MIN CFM	MED	847	802	744	686	620	544	463				
600	LO	704	663	626	588	527	470					
030	HI	1296	1225	1159	1069	970	886	797				
MIN CFM	MED	1214	1156	1096	1003	933	831	720				
750	LO	1054	1010	949	892	813	725					
036	HI	1583	1500	1436	1369	1283	1199	1086	940			
MIN CFM	MED	1400	1343	1283	1221	1154	1049	923				
900	LO	1096	1055	1013	946	886						
042	HI	1793	1733	1664	1587	1511	1440	1367	1272	1119		
MIN CFM	MED	1502	1470	1421	1376	1324	1265	1182	1072			
1050	LO	1110	1089	1064	1038							
048	HI	1885	1815	1733	1677	1578	1460	1359	1276	1160		
MIN CFM	MED	1833	1737	1662	1572	1498	1404	1321	1207	1115		
1200	LO	1702	1640	1563	1489	1428	1339	1252	1165			
060	HI	2207	2168	2100	2040	1990	1938	1862	1768	1639		
MIN CFM	MED	2041	1991	1940	1888	1834	1779	1712	1623			
1500	LO	1844	1811	1777	1729	1668	1601	1514				

Application data

Typical Unit Operating Pressures and Temperatures

Entering Water Temp °F	Water Flow GPM/ton	Cooling** - without HWG active						Heating – without HWG active					
		Suction Pressure PSIG	Discharge Pressure PSIG	Super-heat	Sub-cooling	Water Temp Rise °F	Air Temp* Drop °F DB	Suction Pressure PSIG	Discharge Pressure PSIG	Super-heat	Sub-cooling	Water Temp Drop °F DB	Air Temp* Rise °F
30	1.5	75-85	90-105	25-40	12-20	21-24	21-26	34-39	167-186	12-16	1-4	7.6-8.4	14-20
	2.3	74-84	80-95	25-40	11-18	13-16	21-26	37-43	172-191	12-16	1-4	4.8-5.6	16-22
	3.0	73-83	70-85	25-40	10-16	6-11	21-26	40-46	177-196	12-16	1-4	3.4-4.2	16-22
50	1.5	75-85	125-155	12-20	10-18	20-23	20-25	50-60	180-210	10-17	1-5	10.8-11.9	23-29
	2.3	74-84	120-142	12-20	9-16	12-15	20-25	53-62	185-215	10-17	1-5	6.7-8.1	24-30
	3.0	73-83	115-138	12-20	8-14	8-12	20-25	55-65	190-220	10-17	1-5	5.1-5.9	25-31
70	1.5	75-85	179-198	9-16	8-15	19-22	19-24	71-82	205-230	14-19	1-5	14.0-15.2	28-34
	2.3	74-84	168-186	9-16	8-14	12-17	19-24	73-85	210-238	14-19	1-5	9.0-10.2	30-37
	3.0	73-83	158-175	9-16	8-12	7-12	19-24	76-88	215-242	14-19	1-5	6.7-7.9	31-38
90	1.5	75-85	229-251	9-17	8-15	18-21	17-23	85-95	220-260	18-28	2-5	14.4-16.6	32-39
	2.3	74-84	218-241	9-17	8-14	10-14	17-23	90-100	225-265	18-28	2-5	10.8-12.4	33-41
	3.0	73-83	208-230	9-17	8-12	6-11	17-23	95-105	230-270	18-28	2-5	7.2-8.3	35-42
110	1.5	77-87	280-320	8-15	10-25	17-20	15-20						
	2.3	76-86	270-310	8-15	10-24	9-13	15-20						
	3.0	75-85	260-300	8-15	10-22	5-10	15-20						

HWG (Hot Water Generator) should be disabled for accurate chart comparison

* Based on Nominal 400 cfm per ton airflow and 70°F EAT htg and 80/67°F EAT cooling

** Cooling air and water numbers can vary greatly with changes in humidity

Subcooling is based upon the head pressure at compressor service port

Water Quality Standards

Acidity pH	7 to 9 range for copper. Cupro-nickel may be used in the 5-9 range.		
Total Hardness	Calcium and magnesium carbonate should not exceed 20 grains per gallon (350 ppm)		
Iron Oxides	Less than 1ppm		
Iron Bacteria	No level allowable		
Corrosiveness		<i>Max Allowable Level</i>	<i>Coax Mtl</i>
	Ammonia, Ammonium hydroxide	0.5 ppm	Cu
	Ammonium chloride, Ammonium nitrate	0.5 ppm	Cu
	Ammonium Sulfate	0.5 ppm	Cu
	Chlorine/Chlorides	0.5 ppm	CuNi
	Hydrogen Sulfide (rotten egg smell)	None Allowable	-
Brackish	Use Cupro-nickel heat exchanger when concentrations of calcium or sodium chloride greater than 125 ppm are present. (Seawater is approximately 25,000 ppm)		

Note: To convert ppm to grains per gallon, divide by 17. Hardness in mg/l is equivalent to ppm

Water Temperature Change Through Heat Exchanger

Water Flow Rate (GPM)	Rise (Cig)	Drop (Htg)
For Closed Loop: ground Source or Cooler/Broiler systems at 3 gpm/ton	9-12	4-8
For Open Loop: ground Water systems at 1.5 gpm/ton	20-26	10-17

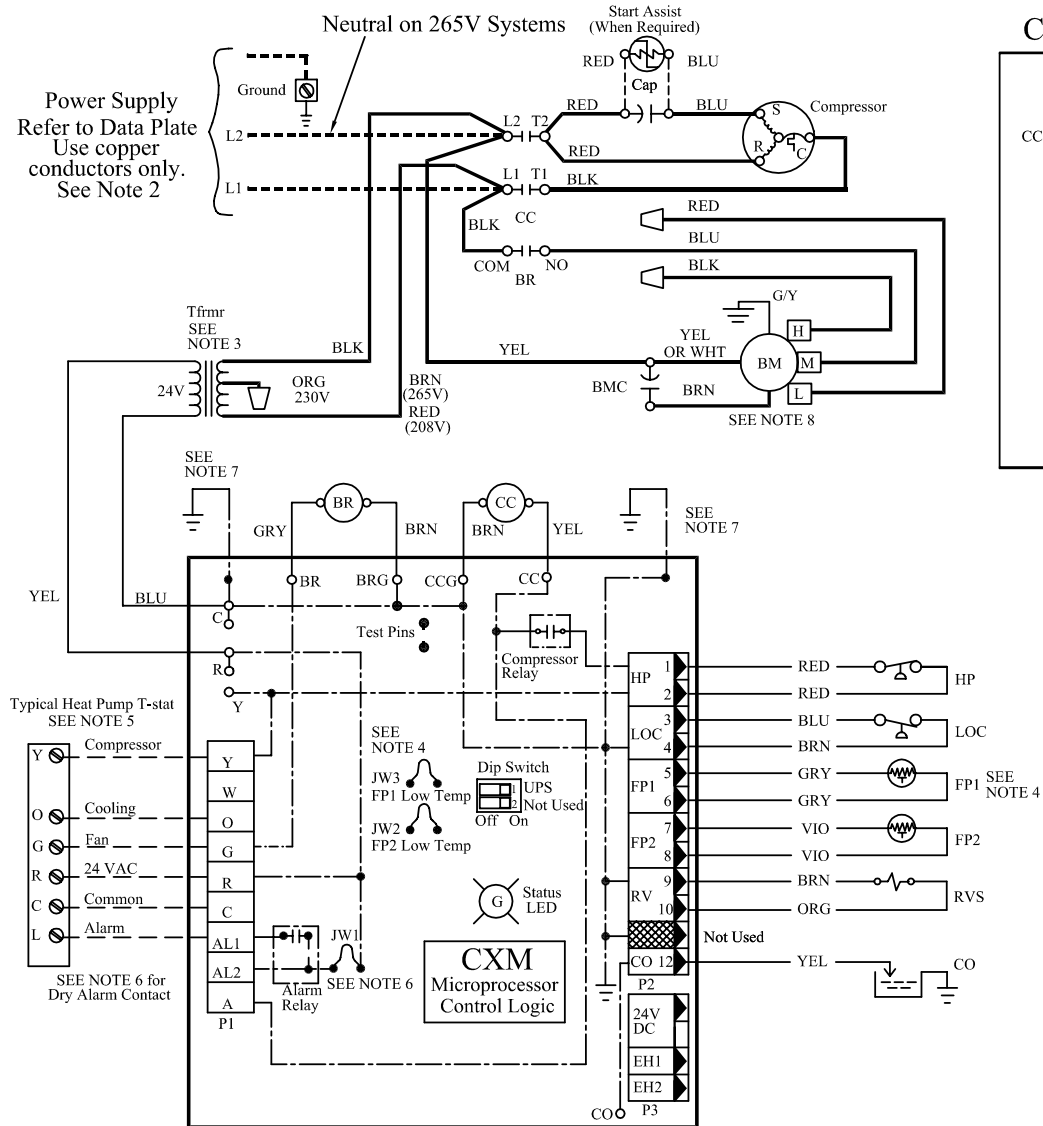
Electrical data

50RHR/50RVR/50RDR Electrical Data

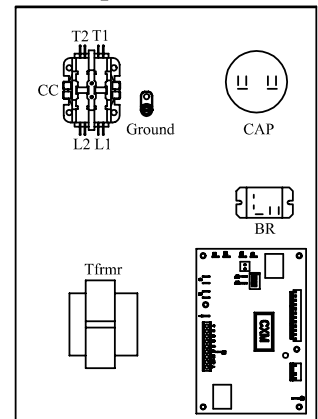
50RHR 50RVR 50RDR Model	Rated Voltage	Voltage Min/Max	Compressor			Fan Motor FLA	Total Unit FLA	Min Circ Amp	Max Fuse/ HACR	R-22 Charge Ounces
			RLA	LRA	Qty					
006	208-230/60/1	197/254	2.9	17.7	1	0.40	3.3	4.0	15	12
	265/60/1	239/292	2.5	15.0	1	0.35	2.8	3.5	15	12
009	208-230/60/1	197/254	3.9	22.2	1	0.80	4.7	5.7	15	15
	265/60/1	239/292	3.3	18.8	1	0.90	4.2	5.0	15	15
012	208-230/60/1	197/254	5.3	27.9	1	0.80	6.1	7.5	15	15
	265/60/1	239/292	4.2	22.2	1	0.90	5.1	6.2	15	15
015	208-230/60/1	197/254	5.9	29.0	1	1.00	6.9	8.4	15	30
	265/60/1	239/292	5.4	27.0	1	0.86	6.3	7.7	15	30
019	208-230/60/1	197/254	7.9	48.3	1	1.10	9.0	11.0	15	30
	265/60/1	239/292	7.1	41.0	1	0.90	8.0	9.7	15	30
024	208-230/60/1	197/254	8.7	48.3	1	1.30	10.0	12.1	20	30
	265/60/1	239/292	8.3	47.0	1	1.58	9.9	12.0	20	30
	208-230/60/3	197/254	6.0	50.0	1	1.30	7.3	8.8	15	30
	460/60/3	414/506	3.2	25.0	1	0.85	4.1	4.9	15	30
030	208-230/60/1	197/254	11.2	60.0	1	1.90	13.1	15.9	25	41
	265/60/1	239/292	10.3	58.0	1	1.66	11.9	14.5	20	41
	208-230/60/3	197/254	6.4	50.0	1	1.90	8.3	9.9	15	41
	460/60/3	414/506	3.2	25.0	1	1.00	4.2	5.0	15	41
036	208-230/60/1	197/254	14.1	84.0	1	3.00	17.1	20.6	30	44
	265/60/1	239/292	13.5	83.0	1	2.70	16.2	19.5	30	44
	208-230/60/3	197/254	8.2	63.4	1	3.00	11.2	13.3	20	44
	460/60/3	414/506	4.1	36.0	1	1.70	5.8	6.8	15	44
042	208-230/60/1	197/254	16.2	96.0	1	3.00	19.2	23.2	35	46
	208-230/60/3	197/254	10.3	75.0	1	3.00	13.3	15.8	25	46
	460/60/3	414/506	4.3	40.0	1	1.70	6.0	7.1	15	46
	575/60/3	518/633	3.7	31.0	1	1.5	5.2	6.1	15	46
048	208-230/60/1	197/254	18.3	102.0	1	3.40	21.7	26.2	40	54
	208-230/60/3	197/254	12.6	91.0	1	3.40	16.0	19.2	30	54
	460/60/3	414/506	5.7	42.0	1	1.80	7.5	8.9	15	54
	575/60/3	518/633	4.7	39.0	1	1.6	6.3	7.5	15	54
060	208-230/60/1	197/254	25.6	170.0	1	4.30	29.9	36.4	60	80
	208-230/60/3	197/254	14.7	124.0	1	4.30	19.0	22.7	35	80
	460/60/3	414/506	7.4	59.6	1	2.50	9.9	11.8	15	80
	575/60/3	518/633	5.9	49.4	1	2.2	8.1	9.8	15	80

Typical wiring diagrams

Single Phase Wiring Diagram 50RHR/50RVR/50RDR Units with CXM Controller



Component Location

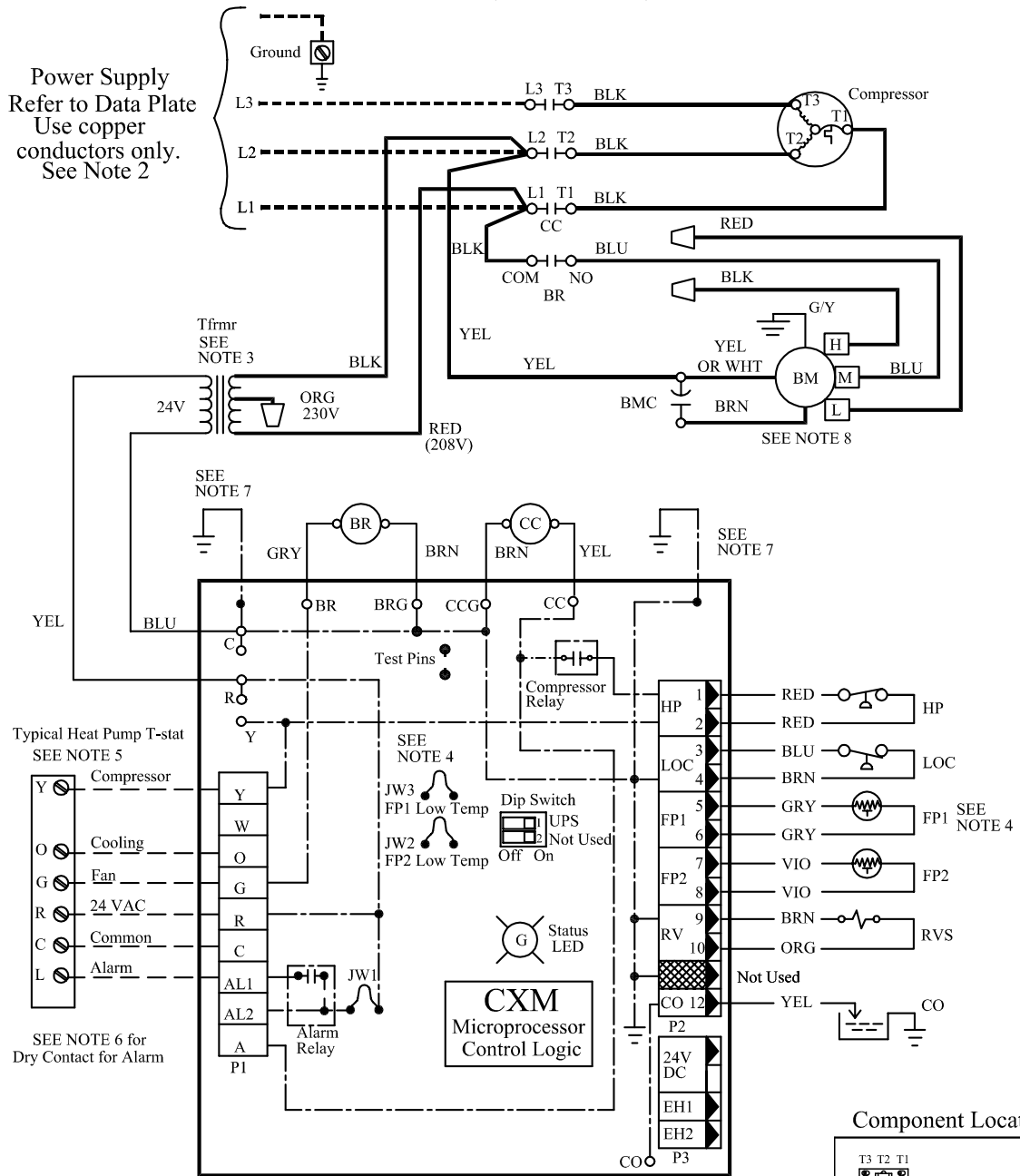


Legend			
	Field line voltage wiring	AL	Alarm Relay Contacts
	Field low voltage wiring	BM	Blower Motor
	Printed Circuit Trace	BMC	Blower Motor Capacitor
	Relay / Contactor Coil	BR	Blower Relay
	Condensate Pan	Cap	Compressor Capacitor
	Solenoid Coil	CB	Circuit Breaker
	Thermistor	CC	Compressor Contactor
	Ground	CO	Sensor, Condensate Overflow
	Wire Nut	FP1	Sensor, Water Coil Freeze Protection
		FP2	Sensor, Air Coil Freeze Protection
		HP	High Pressure Switch
		JW1	Jumper, Alarm
		LOC	Loss of Charge Pressure Switch
		P1	Field Wiring Terminal Block
		RVS	Reversing Valve Solenoid
		Tfmr	Transformer

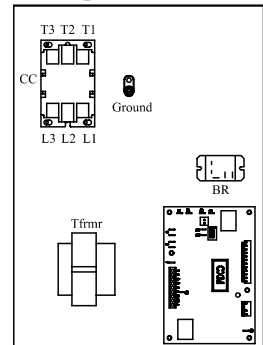
- NOTES:**
1. Compressor and Blower Motor thermally protected internally.
 2. All wiring to the unit must comply with NEC and local codes.
 3. Transformer is wired to 265V (BRN) Lead for 265/1/60 units, 230V (ORG) Lead for 220-240/1/50, or 208V (RED) Lead for 208/1/60. For 230/1/60 switch RED & ORG Leads at L1 and insulate RED Lead. Transformer is energy limiting or may have circuit breaker.
 4. FP1 Thermister provides freeze protection for WATER. When using ANTI-FREEZE solutions, cut JW3 jumper.
 5. Typical heat pump thermostat wiring shown. Refer to thermostat Installation Instructions for wiring to the unit. T-stat wiring must be "Class 1" and Voltage rating equal to or greater than unit supply voltage.
 6. 24V Alarm Signal shown. For Dry Alarm Contact, cut JW1 Jumper and Dry Contact will be available between AL1 and AL2.
 7. Transformer secondary ground via CXM board standoff(s) & screws to Control Box. (Ground available from top two standoffs as shown.)
 8. For Hi or Low speed remove BLK wire from BR 'NO' and replace with BLK or RED wire respectively. Tape off unused terminal.

Typical wiring diagrams (cont)

Three Phase Wiring Diagram 50RHR/50RVR/50RDR Units with CXM Controller (208/230 volt)



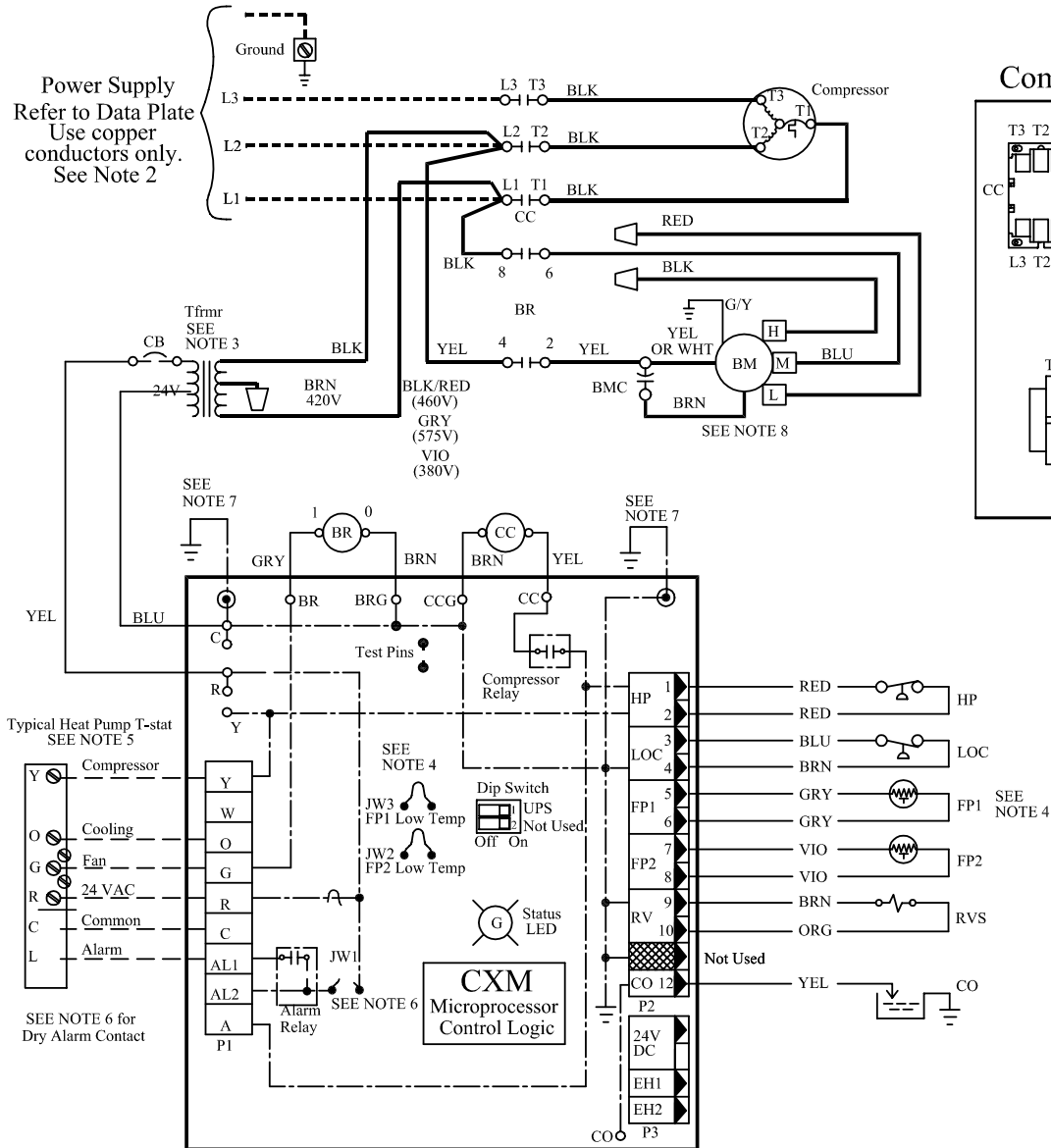
Component Location



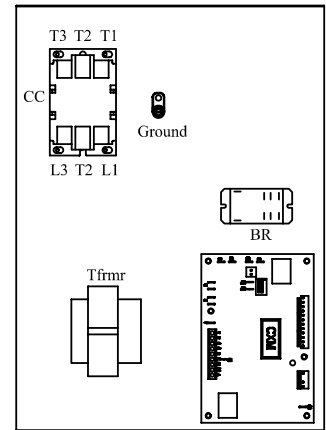
Legend		
----- Field line voltage wiring	AL Alarm Relay Contacts	FPI Sensor, Water Coil Freeze Protection
- - - - - Field low voltage wiring	BM Blower Motor	FP2 Sensor, Air Coil Freeze Protection
Printed Circuit Trace	BRM Blower Motor Capacitor	HP High Pressure Switch
 Relay / Contactor Coil	BRB Blower Relay	JW1 Jump Wire for Alarm
	Cap Compressor Capacitor	LOC Loss of Charge Pressure Switch
	CB Circuit Breaker	P1 Field Wiring Terminal Block
 Condensate Pan	CC Compressor Contactor	RVS Reversing Valve Solenoid
	CCH Crankcase Heater	Tfmr Transformer
 Solenoid Coil	CO Sensor, Condensate Overflow	
 Thermostat		
 Ground		
 Wire Nut		

- Compressor and Blower Motor thermally protected internally.
- All wiring to the unit must comply with NEC and local codes.
- Transformer is wired 208V (RED) Lead for 208/3/60. For 230/3/60 switch RED & ORG Leads at L1 and insulate RED Lead.
Transformer is energy limiting or may have circuit breaker.
- FPI Thermistor provides freeze protection for WATER. When using ANTI-FREEZE solutions, cut JW3 jumper.
- Typical heat pump thermostat wiring shown. Refer to thermostat Installation Instructions for wiring to the unit. T-stat wiring must be "Class 1" and Voltage rating equal to or greater than unit supply voltage.
- 24V Alarm Signal shown. For Dry Alarm signal, cut JW1 Jumper and Dry Contact will be available between AL1 and AL2.
- Transformer secondary ground via CXMB board standoffs & screws to Control Box. (Ground available from top two standoffs as shown.)
- For H or Low speed remove BLU wire from BR 'NO' and replace with BLK or RED wire respectively. Tape off unused terminal.

Three Phase Wiring Diagram 50RHR/50RVR/50RDR Units with CXM Controller (460/575 volt)



Component Location

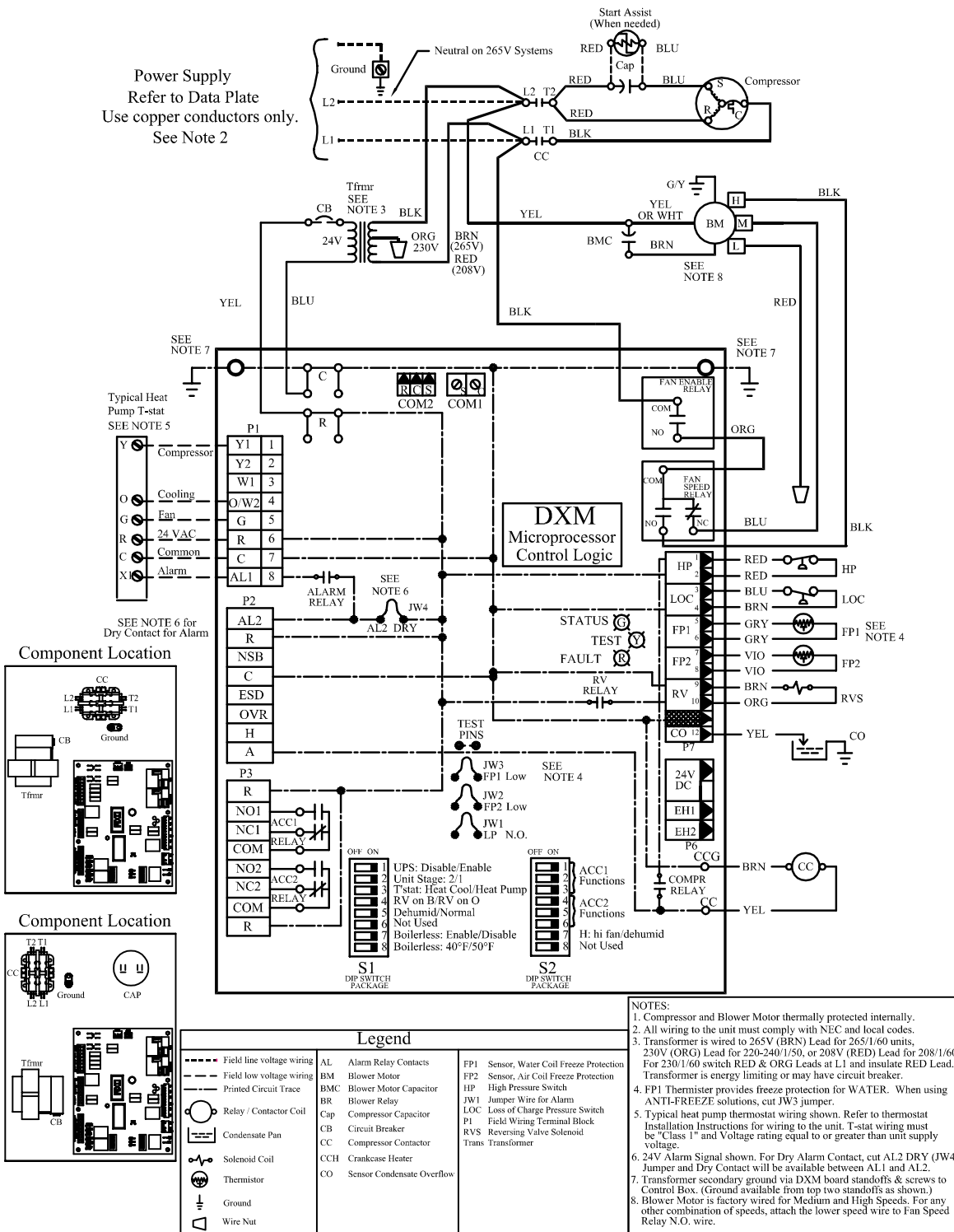


Legend

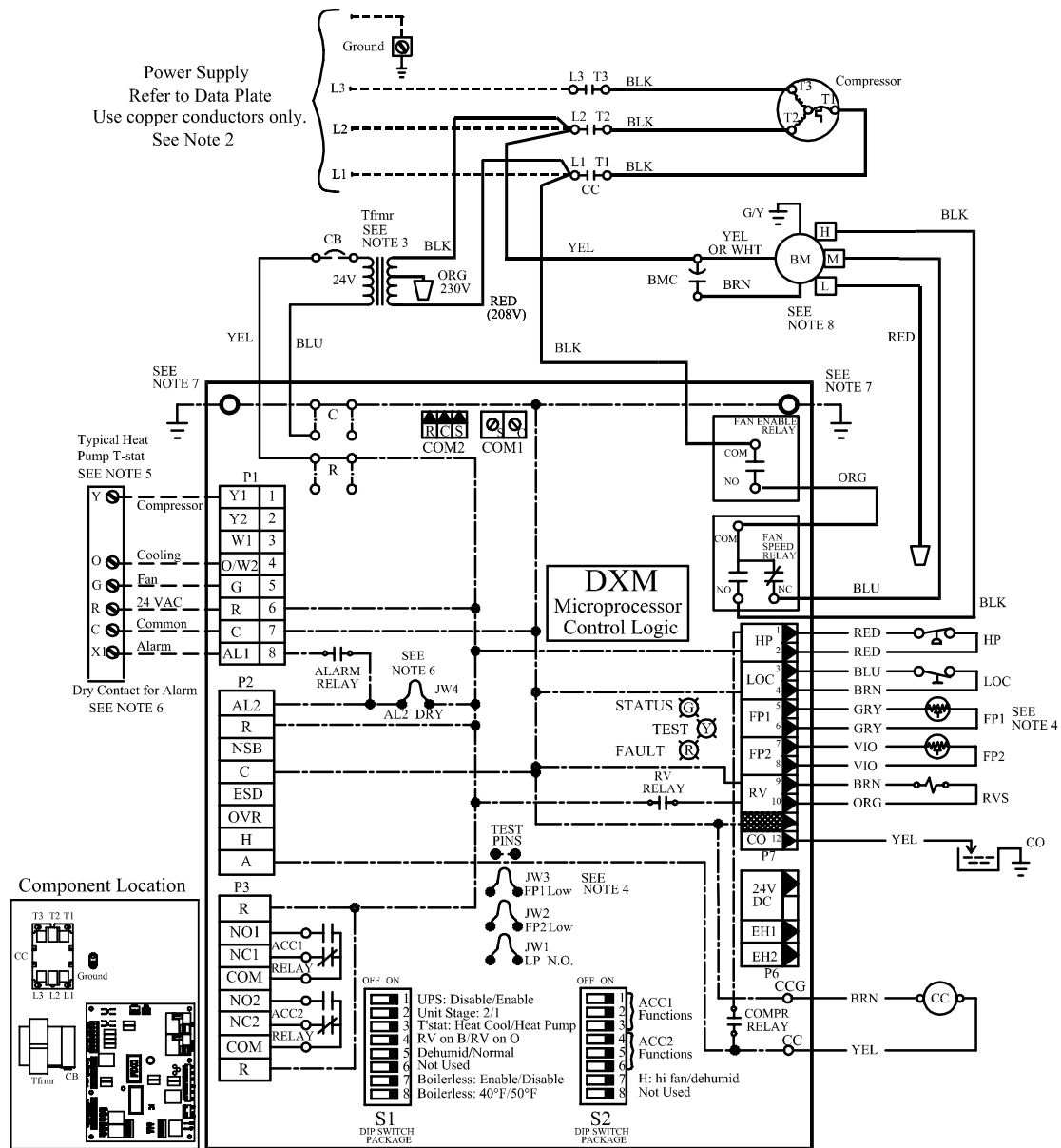
Field line voltage wiring Field low voltage wiring Printed Circuit Trace Relay / Contactor Coil Condensate Pan Solenoid Coil Thermistor Ground	AL Alarm Relay Contacts BMC Blower Motor Capacitor BR Blower Relay CB Circuit Breaker CC Compressor Contactor CO Sensor, Condensate Overflow FP1 Sensor, Water Coil Freeze Protection FP2 Sensor, Air Coil Freeze Protection HP High Pressure Switch JW1 Jumper, Alarm LOC Loss of Charge Pressure Switch P1 Field Wiring Terminal Block RVS Reversing Valve Solenoid Tfmr Transformer	NOTES: 1. Compressor and Blower Motor thermally protected internally. 2. All wiring to the unit must comply with NEC and local codes. 3. Tfmr is wired to 460V (BLK/RED) Lead for 460/3/60 units, 575V (GRY) Lead for 575/3/60, or 380V (VIO) Lead for 380/3/50. For 420/3/50 switch VIO & BRN Leads at L1 and insulate VIO Lead. Transformer is energy limiting or may have circuit breaker.	NOTES: (cont.) 4. FP1 Thermistor provides freeze protection for WATER. When using ANTI-FREEZE solutions, cut JW3 jumper. 5. Typical heat pump thermostat wiring shown. Refer to thermostat Installation Instructions for wiring to the unit. T-stat wiring must be "Class 1" and Voltage rating equal to or greater than unit supply voltage. 6. 24V Alarm Signal shown. For Dry Alarm Contact, cut JW1 Jumper and Dry Contact will be available between AL1 and AL2. 7. Transformer secondary ground via CXM board standoffs & screws to Control Box. (Ground available from top two standoffs as shown.) 8. For Hi or Low speed remove BLU wire from BR 'NO' and replace with BLK or RED wire respectively. Tape off unused terminal.
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Typical wiring diagrams (cont)

Single Phase Wiring Diagram 50RHR/50RVR/50RDR Units with DXM Controller

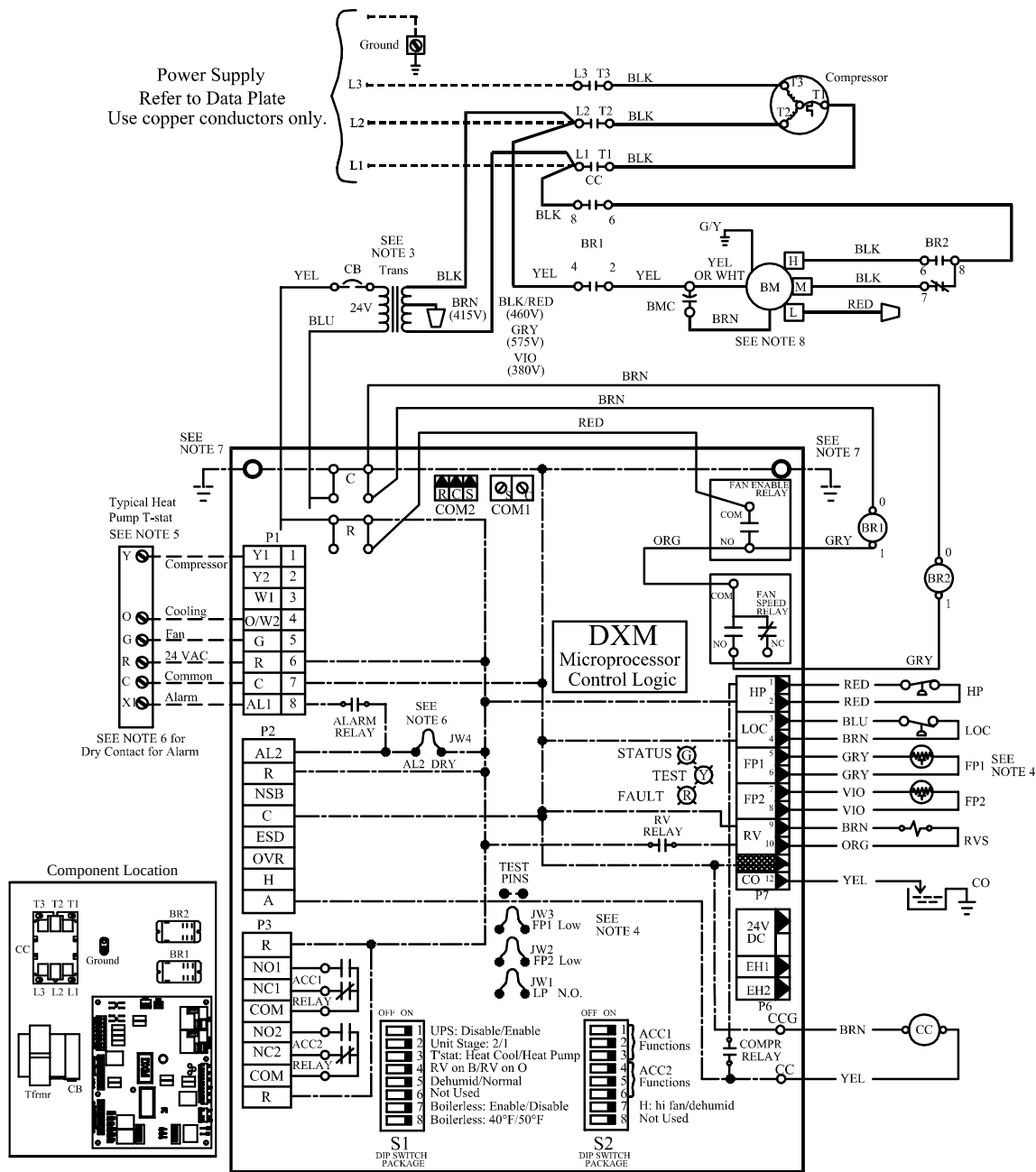


Three Phase Wiring Diagram 50RHR/50RVR/50RDR Units with DXM Controller (208/230 volt)



Typical wiring diagrams (cont)

Three Phase Wiring Diagram 50RHR/50RVR/50RDR Units with DXM Controller (460/575 volt)



NOTES:

- Compressor and Blower Motor thermally protected internally.
- All wiring to the unit must comply with NEC and local codes.
- Field low voltage wiring. 575V (GRY) Lead for 575/3/60, or 380V (VIO) Lead for 380/3/50. For 415/3/50 switch VIO & BRN Leads at L1 and insulate VIO Lead. Transformer is energy limiting or may have circuit breaker.
- FP1 Thermistor provides freeze protection for WATER. When using ANTI-FREEZE solutions, cut JW3 jumper.
- Typical heat pump thermostat wiring shown. Refer to thermostat Installation Instructions for wiring to the unit. T-stat wiring must be "Class 1" and Voltage rating equal to or greater than unit supply voltage.
- 24V Alarm Signal shown. For Dry Alarm Contact, cut AL2 DRY (JW4) Jumper and Dry Contact will be available between AL1 and AL2.
- Transformer secondary ground via DXM board standoffs & screws to Control Box. (Ground available from top two standoffs as shown.)
- Blower Motor is factory wired for Medium and High Speeds. For any other combination of speeds, attach the lower speed wire to BR2 '7' and Higher speed wire to BR2 '6'.

Legend

Field line voltage wiring	AL	Alarm Relay Contacts
Field low voltage wiring	BM	Blower Motor
Printed Circuit Trace	BMC	Blower Motor Capacitor
Relay / Contactor Coil	BR	Blower Relay
Condensate Pan	CB	Compressor Capacitor
Solenoid Coil	CC	Circuit Breaker
Thermistor	CC1	Compressor Contactor
Ground	CC1	Crankcase Heater
Wire Nut	CO	Sensor, Condensate Overflow
	FP1	Sensor, Water Coil Freeze Protection
	FP2	Sensor, Air Coil Freeze Protection
	HP	High Pressure Switch
	HWTS	High Water (Leaving) Temp Switch
	JW1	Jumper Wire for Alarm
	LOC	Loss of Charge Pressure Switch
	P1	Field Wiring Terminal Block
	RVS	Reversing Valve Solenoid
	Trans	Transformer

Guide specifications

Packaged Water Source Heat Pump

General

Furnish and install Carrier Water Source Heat Pumps, as indicated on the plans. Equipment shall be completely assembled, piped and internally wired. Capacities and characteristics as listed in the schedule and the specifications that follow.

Horizontal/vertical water source heat pumps

Units shall be supplied completely factory built and capable of operation with an entering water temperature range from 20 to 120 F (-6.7 to 49 C) as standard. Equivalent units from other manufacturers can be proposed provided approval to bid is given 10 days prior to bid closing. All equipment listed in this section must be rated and certified in accordance with ARI/ISO, NRTL or CSA. The units shall have ARI/ISO, NRTL or CSA labels. All units shall be factory run tested under normal operating conditions at nominal water flow rates. This testing shall generate a report card to be shipped with each unit stating performance in both heating and cooling modes. Serial numbers will be recorded by factory and furnished to contractor for ease of unit warranty status. Units tested without water flow ARE NOT acceptable.

Basic construction

Horizontal Units shall have one of the following air flow arrangements: Right-Discharge/Left-Inlet; Left-Discharge/Right-Inlet; Back-Discharge/Left-Inlet; or Back-Discharge/Right-Inlet as shown on the plans. Units must have the ability to be field convertible from side to back or back to side discharge with no additional parts or unit structure modification. Units will have factory installed hanger brackets and isolation grommets.

Vertical Units shall have one of the following air flow arrangements: Left-Return/Top-Discharge, Right-Return/Top-Discharge. All vertical units will be supplied from the factory internally trapped.

Downflow Units have the following arrangements: Right-Return/Bottom Discharge or Left-Return/Bottom Discharge as shown on the plans.

If units with these arrangements ARE NOT used, the contractor is responsible for any extra costs incurred by other trades. All units (horizontal and vertical) must have a minimum of three access panels for serviceability of compressor compartment. If other arrangements make servicing difficult, the contractor must provide access panels and clear routes to ease service. Architect must approve any changes in layout.

The horizontal heat pumps shall be fabricated from heavy gauge galvanized sheet metal. All interior surfaces shall be lined with 1/2 in. thick, 1-1/2 lb acoustic type fiberglass insulation. All fiberglass shall

be coated and have exposed edges tucked under flanges to prevent the introduction of glass fibers into the air stream. All insulation must meet NFPA 90A.

The vertical heat pumps shall be fabricated from heavy gauge galvanized sheet metal. All interior surfaces shall be lined with 1/2 in. thick, 1-1/2 lb acoustic type fiberglass insulation. All fiberglass shall be coated and have exposed edges tucked under flanges to prevent the introduction of glass fibers into the air stream. All insulation must meet NFPA 90A. All vertical heat pumps shall have a powder paint finish.

Option: *The Mute package shall consist of high technology sound attenuating materials that are strategically applied to the cabinet, in addition to the standard system, to further dampen sound.*

All units must have an insulated panel separating the fan compartment from the compressor compartment. Units with the compressor in the air stream ARE NOT acceptable. Units shall have a factory installed 1 in. wide filter bracket for filter removal from either side. Units shall have a 1 in. thick throwaway type fiberglass filter. The contractor shall purchase one spare set of filters and replace factory shipped filters on completion of start-up. Filters shall be standard sizes. If units utilize non-standard filter sizes then the contractor shall provide 12 spare filters for each unit.

Option: *Contractor shall install 2 in. filter brackets and 2 in. fiberglass throwaway filters on all units.*

Cabinets shall have separate openings and knockouts for entrance of line voltage and low voltage control wiring. Supply and return water connections shall be copper FPT fittings and shall be securely mounted flush to the cabinet corner post allowing for connection to a flexible hose without the use of a back-up wrench. Water connections that protrude through the cabinet or require the use of a backup wrench SHALL NOT be allowed. All water connections and electrical knockouts must be in the compressor compartment corner post as to not interfere with the serviceability of unit. Contractor shall be responsible for any extra costs involved in the installation of units that do not have this feature. Contractor must ensure that units can be easily removed for servicing and coordinate locations of electrical conduit and lights with the electrical contractor.

Fan and motor Assembly

Units rated 60,000 Btuh and under shall have a direct-drive centrifugal fan. The fan motor shall be 3-speed, permanently lubricated, PSC type with internal thermal overload protection. Blower shall have inlet rings to allow removal of wheel and motor from one side without removing housing. Units supplied without permanently lubricated motors must

Guide specifications (cont)

provide external oilers for easy service. The fan motor shall be isolated from the fan housing by torsionally flexible isolation grommets. The fan and motor assembly must be capable of overcoming the external static pressures as shown on the schedule. CFM/Static pressure rating of the unit shall be based on a wet coil and a clean filter in place. Ratings based on a dry coil and/or no filter SHALL NOT be acceptable.

Refrigerant circuit

Units shall have a sealed refrigerant circuit including a high efficient scroll, rotary or reciprocating compressor designed for heat pump operation, a thermostatic expansion valve for refrigerant metering, an enhanced aluminum lanced fin and rifled copper tube refrigerant to air heat exchanger, a reversing valve, a coaxial (tube-in-tube) refrigerant-to-water heat exchanger, and safety controls including a high-pressure switch, a low-pressure sensor, and a low water and low air temperature sensor. Access fittings shall be factory installed on high and low pressure refrigerant lines to facilitate field service. Activation of any safety device shall prevent compressor operation via a lockout device. The lockout shall be reset at the thermostat or at the contractor supplied disconnect switch. Units which may be reset only at the disconnect switch only SHALL NOT be acceptable.

Hermetic reciprocating compressors shall be internally sprung. The compressor will be mounted on external computer selected isolating springs. The external springs will be secured to rails that are isolated from the cabinet base. Compressor shall have thermal overload protection and be located in an insulated compartment away from airstream to minimize sound transmission. Refrigerant-to-air heat exchangers shall utilize enhanced lanced aluminum fins and rifled copper tube construction rated to withstand 450 psig refrigerant working pressure. Refrigerant-to-water heat exchangers shall be of copper inner water tube and steel refrigerant outer tube design, rated to withstand 450 psig working refrigerant pressure and 450 psig working water pressure. Plate-to-plate heat exchangers ARE NOT acceptable.

Option: The unit will be supplied with cupro nickel coaxial water-to-refrigerant heat exchangers.

Option: The unit will be supplied with insulated water circuit for units operating with entering water temperatures below dew point.

Refrigerant metering shall be accomplished by thermostatic expansion valve only. Units intended for use in factory standard built operating range with entering water temperatures from 20 to 120 F (-6.7 to 49 C). Reversing valves shall be four-way solenoid activated refrigerant valves which shall fail to heating operation should the solenoid fail to function. If the reversing valve solenoid fails to cooling, a low temperature thermostat must be provided to prevent over-cooling an already cold room.

Drain pan

The drain pan shall be constructed to inhibit corrosion and fully insulated. Drain outlet shall be located on pan as to allow complete and unobstructed drainage of condensate. Vertical units will be supplied with factory installed trap inside of cabinet. The unit as standard will be supplied with solid-state electronic condensate overflow protection. Mechanical float switches WILL NOT be accepted.

Electrical

A control box shall be located within the unit compressor compartment and shall contain a 50 va transformer, 24-volt activated, 2 or 3 pole compressor contactor, terminal block for thermostat wiring and solid-state controller for complete unit operation. Electro-mechanical operation WILL NOT be accepted. Units shall be name-plated for use with time delay fuses or HACR circuit breakers. Unit controls shall be 24-volt and provide heating or cooling as required by the remote thermostat/sensor.

Solid-state control system

Units shall have a solid-state control system (CXM). The control shall interface with a heat pump (Y,O) wall thermostat, mechanical or electronic. The control system microprocessor board shall be specifically designed to protect against building electrical system noise contamination, EMI, and RFI interference. The control system shall have the following features:

- a. Unit Performance Sentinel (UPS). The UPS warns when the heat pump is running inefficiently.
- b. Anti-short cycle time delay on compressor operation, time delay shall be 5 minutes minimum.
- c. Random start on power up mode.
- d. Low voltage protection.
- e. High voltage protection.
- f. Unit shutdown on high or low refrigerant pressures.
- g. Unit shutdown on low water temperature.
- h. Water coil freeze protection (selectable for water or anti-freeze).
- i. Air coil freeze protection (check filter switch).
- j. Condensate overflow shutdown.
- k. Option to reset unit at thermostat or disconnect. Fault type shall be retained in memory if reset at thermostat.
- l. Automatic intelligent reset. Unit shall automatically reset 5 minutes after trip if the fault has cleared. Should a fault reoccur 3 times sequentially then permanent lockout will occur.
- m. Ability to defeat time delays for servicing.
- n. Light-emitting diodes (LED) to indicate high pressure, low pressure, low voltage, high voltage, air/water freeze protection, condensate overflow and control status.
- o. The low-pressure switch SHALL NOT be monitored for the first 90 seconds after a compressor start command to prevent nuisance safety trips.
- p. Remote fault type indication at thermostat.
- q. Selectable 24-v or pilot duty dry contact alarm output.
- r. 24-v output to cycle a motorized water valve with compressor contactor.

Option: Enhanced control features (DXM)

Control shall have all the features of the CXM control with the following additional features:

- a. A removable thermostat connector.
- b. Random start on return from night setback.
- c. Minimized reversing valve operation for extended life and quiet operation.
- d. Night setback control from low temperature thermostat, with 2-hour override initiated by a momentary signal from the thermostat.
- e. Dry contact night setback output for digital night setback thermostats.
- f. Ability to work with heat/cool (Y, W) thermostats.
- g. Ability to work with heat pump thermostats using O or B reversing valve control.
- h. Single grounded wire to initiate night setback, or emergency shutdown.
- i. Boilerless system control can switch automatically to electric heat at low loop water temperature.



Manufacturer reserves the right to discontinue, or change at any time, specifications or designs without notice and without incurring obligations.