Project:	
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VSCS SERIES - SUBMITTAL

VERTICAL STACKED WATER-SOURCE HEAT PUMP UNIT SPECIFICATIONS

Model Series	09	12	15	18	24	30	36
Nominal Cooling (Ton)[1]	0.75	1.0	1.25	1.5	2.0	2.5	3.0
Compressor Type	Rotary			Scroll			
Refrigerant Charge (oz)	21	25	34	38	44	48	50
Air Coil-Type	Enhanced Copper Tubes, Enhanced Aluminum Fins						
Face Area (sq ft)	1.46	1.56	2.35	2.35	2.63	3.33	3.33
Rows/FPI	2/16	3/14	3/14	3/14	3/14	3/14	3/14
Water Coil-Type	Enhanced Surface Co-Axial						
Standard PSC Blower/Motor	DWDI Forward-Curved Centrifugal / PSC Direct-Drive						
Diameter x Width (in)	9x4T	9x4T	9x7T	9x7T	9x7	9x8	9x8
Motor HP	0.10	0.10	0.17	0.17	0.25	0.33	0.50
Hi-Static PSC Blower/Motor	DWDI Forward-Curved Centrifugal / PSC Direct-Drive						
Diameter x Width (in)	9x4T	9x4T	9x7T	9x7T	10x7T	10x8T	10x8T
Motor HP	0.10	0.10	0.17	0.25	0.33	0.33	0.50
ECM Blower/Motor	DWDI Forward-Curved Centrifugal / ECM Direct-Drive						
Diameter x Width (in)	9x4T	9x4T	9x7T	9x7T	9x7	9x8	9x8
Motor HP	0.33	0.33	0.33	0.33	0.33	0.50	0.50
Hi-Static ECM Blower/Motor	DWDI Forward-Curved Centrifugal / ECM Direct-Drive						
Diameter x Width (in)	9x4T	9x4T	9x7T	9x7T	10x7T	10x8T	10x8T
Motor HP	0.33	0.33	0.33	0.33	0.33	0.50	0.50
Filter Quantity-Size (in)	1-14x25x1	1-14x25x1	1-16x30x1	1-16x30x1	1-16x30x1	1-20x30x1	1-20x30x1
Cabinet Weight (lb)[2]	130	130	145	145	150	175	175
Chassis Weight (lb)	70	75	95	100	140	155	160

Note:

1) Nominal Capacity calculated in accordance with ARI/ISO Standard 13256-1 for Water Loop Application
2) Cabinet weight is approximate and does not include weight of risers.

PSC MOTOR

PERFORMANCE DATA - ARI/ISO 13256-1 WATER LOOP CONDITIONS*

Model	Flow Rate (USGPM)	Air Flow (SCFM)	Cooling Capacity (Btuh)	EER	Heating Capacity (Btuh)	COP
09	2.6	340	8,900	13.0	11,800	4.7
12	3.2	430	12,200	13.0	14,900	4.4
15	4.0	550	14,700	13.5	17,200	4.7
18	4.8	685	18,100	13.2	22,300	4.6
24	6.2	850	24,400	13.4	30,200	4.6
30	7.8	1075	29,700	13.3	33,900	4.4
36	9.5	1220	34,900	12.8	36,400	4.3

*Water Loop capacities are rated at 86°F EWT Cooling, 68°F EWT Heating.

PERFORMANCE DATA - ARI/ISO 13256-1 GROUND WATER CONDITIONS*

Model	Flow Rate (USGPM)	Air Flow (SCFM)	Cooling Capacity (Btuh)	EER	Heating Capacity (Btuh)	COP
09	2.6	340	10,100	19.5	9,300	3.9
12	3.2	430	14,400	19.8	12,200	3.6
15	4.0	550	16,800	21.8	13,900	4.0
18	4.8	685	20,900	20.6	17,900	4.0
24	6.2	850	27,600	21.5	23,800	3.8
30	7.8	1075	33,500	20.5	27,500	3.6
36	9.5	1220	39,200	19.4	29,100	3.6

*Ground Water capacities are rated at 59°F EWT Cooling, 50°F EWT Heating.

PERFORMANCE DATA - ARI/ISO 13256-1 GROUND LOOP CONDITIONS*

Model	Flow Rate (USGPM)	Air Flow (SCFM)	Cooling Capacity (Btuh)	EER	Heating Capacity (Btuh)	COP
09	2.6	340	9,300	14.2	7,000	3.1
12	3.2	430	13,100	14.5	9,600	3.1
15	4.0	550	15,100	15.8	11,000	3.1
18	4.8	685	18,800	15.2	14,000	3.1
24	6.2	850	25,900	15.7	18,100	3.1
30	7.8	1075	31,800	15.2	20,500	3.1
36	9.5	1220	36,400	14.0	22,900	3.1

*Ground Loop capacities are rated at 77°F EFT Cooling, 32°F EFT Heating.

Note:

1) All Cooling capacities based upon 80.6°F DB, 66.2°F WB entering air temperature.
2) All Heating capacities based upon 68°F DB, 59°F WB entering air temperature.

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ECM

PERFORMANCE DATA - ARI/ISO 13256-1 WATER LOOP CONDITIONS*

Model	Flow Rate (USGPM)	Air Flow (SCFM)	Cooling Capacity (Btuh)	EER	Heating Capacity (Btuh)	COP
09	2.6	340	9,100	14.5	11,600	4.9
12	3.2	430	12,400	13.4	14,700	4.6
15	4.0	550	14,800	14.5	17,100	5.0
18	4.8	685	18,400	13.6	22,000	4.9
24	6.2	850	24,600	13.8	30,000	4.8
30	7.8	1075	30,100	14.0	33,400	4.8
36	9.5	1220	35,500	13.2	35,400	4.7

*Water Loop capacities are rated at 86°F EWT Cooling, 68°F EWT Heating.

PERFORMANCE DATA - ARI/ISO 13256-1 GROUND WATER CONDITIONS

Model	Flow Rate (USGPM)	Air Flow (SCFM)	Cooling Capacity (Btuh)	EER	Heating Capacity (Btuh)	COP
09	2.6	340	10,200	20.0	9,100	4.1
12	3.2	430	14,600	20.2	12,000	3.8
15	4.0	550	16,900	22.0	13,800	4.1
18	4.8	685	21,200	21.0	17,600	4.3
24	6.2	850	27,800	21.7	23,600	4.0
30	7.8	1075	33,900	21.2	27,100	4.0
36	9.5	1220	39,800	19.9	28,100	4.0

*Ground Water capacities are rated at 59°F EWT Cooling, 50°F EWT Heating.

PERFORMANCE DATA - ARI/ISO 13256-1 GROUND LOOP CONDITIONS*

Model	Flow Rate (USGPM)	Air Flow (SCFM)	Cooling Capacity (Btuh)	EER	Heating Capacity (Btuh)	COP
09	2.6	340	9,400	14.7	6,800	3.3
12	3.2	430	13,300	14.9	9,400	3.3
15	4.0	550	15,200	16.0	10,900	3.3
18	4.8	685	19,100	15.7	13,700	3.3
24	6.2	850	26,100	15.9	17,900	3.3
30	7.8	1075	32,200	15.8	20,100	3.3
36	9.5	1220	37,100	14.5	21,900	3.3

*Ground Loop capacities are rated at 77°F EFT Cooling, 32°F EFT Heating.

Note:

1) All Cooling capacities based upon 80.6°F DB, 66.2°F WB entering air temperature.
2) All Heating capacities based upon 68°F DB, 59°F WB entering air temperature.

ENVIRO-TEC®

PSC MOTOR - STANDARD BLOWER PERFORMANCE (CFM)

Unit Size	Motor Speed	Rated CFM	Min. CFM	External Static Pressure (in w.g.)										
				0	0.05	0.1	0.15	0.2	0.25	0.3	0.35	0.4	0.45	0.5
09	HIGH	340	220	340	330	320	310	300	285	270	255	240	225	-
	LOW			255	250	240	230	220	210	-	-	-	-	-
12	HIGH	430	290	445	435	425	415	400	385	370	355	340	320	295
	LOW			350	345	335	325	315	305	290	-	-	-	-
15	HIGH	550	335	580	570	560	550	535	520	505	485	465	445	425
	LOW			385	380	375	370	365	355	345	335	-	-	-
18	HIGH	685	430	700	690	675	660	635	615	595	575	550	525	495
	LOW			450	445	440	435	430	425	-	-	-	-	-
24	HIGH	850	575	880	855	835	815	795	770	740	710	680	650	615
	LOW			715	710	705	690	670	650	630	605	580	-	-
30	HIGH	1075	700	1115	1100	1075	1050	1020	990	960	930	895	850	800
	LOW			965	960	950	935	915	895	870	840	810	780	745
36	HIGH	1220	840	1230	1200	1170	1140	1110	1075	1040	1000	960	915	870
	LOW			1115	1100	1075	1050	1020	990	960	930	895	855	805

PSC MOTOR - HIGH STATIC BLOWER PERFORMANCE (CFM)

Unit Size	Motor Speed	Rated CFM	Min. CFM	External Static Pressure (in w.g.)														
				0	0.05	0.1	0.15	0.2	0.25	0.3	0.35	0.4	0.45	0.5	0.55	0.6	0.65	0.7	0.75
09	HIGH	340	220	375	370	360	350	340	330	315	300	285	265	245	220	-	-	-	-
	LOW			330	320	310	300	290	280	270	255	240	225	-	-	-	-	-	-
12	HIGH	430	290	485	475	465	455	440	425	410	395	380	360	340	315	-	-	-	-
	LOW			390	385	380	370	360	350	335	320	305	-	-	-	-	-	-	-
15	HIGH	550	335	665	650	635	615	595	575	555	540	520	500	475	450	420	395	370	340
	LOW			580	570	560	550	535	520	505	485	465	445	425	400	375	350	-	-
18	HIGH	685	430	750	735	715	695	675	655	630	605	580	555	525	495	465	435	-	-
	LOW			670	655	640	625	605	585	560	535	510	485	460	435	-	-	-	-
24	HIGH	850	575	990	970	950	930	910	890	865	845	820	795	770	740	710	680	650	615
	LOW			795	785	775	760	745	730	715	695	675	655	630	605	580	-	-	-
30	HIGH	1075	700	1180	1170	1160	1145	1130	1110	1090	1070	1050	1025	1000	970	940	910	875	840
	LOW			985	980	975	970	960	950	940	935	920	905	895	875	850	825	795	765
36	HIGH	1220	840	1340	1320	1295	1270	1245	1220	1190	1160	1130	1100	1070	1040	1010	980	945	910
	LOW			1180	1170	1160	1145	1130	1110	1090	1070	1050	1025	1000	970	940	910	875	840

Note: All airflow ratings are at lowest voltage rating of dual rating (ie. 208 volt)

Airflow ratings include resistance of wet coil and clean air filters.

ENVIRO-TEC®

ECM STANDARD BLOWER PERFORMANCE (CFM)

Unit Size	Motor Speed	Rated CFM	Min. CFM	External Static Pressure (in w.g.)										
				0	0.05	0.1	0.15	0.2	0.25	0.3	0.35	0.4	0.45	0.5
09	HIGH	340	180	342	317	292	276	259	247	236	228	220	214	207
	LOW			278	252	226	212	198	189	180	-	-	-	-
12	HIGH	430	236	463	431	399	378	356	340	324	317	310	299	289
	LOW			342	317	292	276	259	247	236	-	-	-	-
15	HIGH	550	268	600	567	534	500	466	445	424	396	367	340	312
	LOW			495	447	399	372	346	307	268	-	-	-	-
18	HIGH	685	396	760	726	693	667	642	615	587	574	561	529	497
	LOW			600	567	534	500	466	445	424	396	-	-	-
24	HIGH	850	574	891	863	835	809	784	757	730	689	648	601	554
	LOW			760	726	693	667	642	615	587	574	-	-	-
30	HIGH	1075	718	1131	1105	1079	1058	1037	1016	994	972	949	934	918
	LOW			918	894	870	852	835	808	781	762	743	718	-
36	HIGH	1220	861	1265	1235	1206	1184	1163	1141	1118	1085	1051	1008	965
	LOW			1065	1037	1009	987	965	949	934	910	886	874	861

ECM HIGH STATIC BLOWER PERFORMANCE (CFM)

Unit Size	Motor Speed	Rated CFM	Min. CFM	External Static Pressure (in w.g.)														
				0	0.05	0.1	0.15	0.2	0.25	0.3	0.35	0.4	0.45	0.5	0.55	0.6	0.65	0.7	0.75
09	HIGH	340	220	411	382	354	334	315	300	286	279	272	263	254	242	231	220	-	-
	LOW			342	317	292	276	259	247	236	228	220	-	-	-	-	-	-	-
12	HIGH	430	290	554	529	504	477	451	430	408	393	378	360	341	330	319	300	-	-
	LOW			463	431	399	378	356	340	324	317	310	299	290	-	-	-	-	-
15	HIGH	550	312	659	623	587	564	541	511	482	462	441	419	397	372	346	320	-	-
	LOW			600	567	534	500	466	445	424	396	367	340	312	-	-	-	-	-
18	HIGH	685	408	891	863	835	809	784	757	730	689	648	601	554	518	482	446	408	-
	LOW			760	726	693	667	642	615	587	574	561	529	497	469	441	412	-	-
24	HIGH	850	571	1002	971	940	912	883	854	826	800	774	749	724	698	671	643	615	586
	LOW			866	827	789	762	735	708	682	659	636	612	587	571	-	-	-	-
30	HIGH	1075	701	1265	1235	1206	1184	1163	1141	1118	1085	1051	1008	965	913	861	808	756	701
	LOW			1065	1037	1009	987	965	949	934	910	886	874	861	839	818	-	-	-
36	HIGH	1220	840	1462	1418	1375	1331	1287	1241	1194	1153	1112	1053	994	964	934	903	872	840
	LOW			1265	1235	1206	1184	1163	1141	1118	1085	1051	1008	965	913	861	-	-	-

Note: All airflow ratings are at lowest voltage rating of dual rating (ie. 208 volt)

Airflow ratings include resistance of wet coil and clean air filters.

PSC STANDARD BLOWER

Unit Size	SUPPLY VOLTAGE	COMPRESSOR QTY		RLA	LRA	BLOWER HP	FLA	MIN. CCT. AMPACITY	MAX FUSE / CCT. BKR. AMP
09	208-230/1/60	1	@	3.7	22.0	0.10	0.8	5.43	15
12	208-230/1/60	1	@	4.7	25.0	0.10	0.8	6.68	15
15	208-230/1/60	1	@	5.6	29.0	0.17	1.2	8.20	15
18	208-230/1/60	1	@	9.0	48.0	0.17	1.2	12.45	20
24	208-230/1/60	1	@	12.8	58.3	0.25	1.5	17.50	30
30	208-230/1/60	1	@	14.1	73.0	0.33	2.6	20.23	30
36	208-230/1/60	1	@	16.7	79.0	0.50	3.2	24.08	40

PSC OPTIONAL HI-STATIC BLOWER

Unit Size	SUPPLY VOLTAGE	COMPRESSOR QTY		RLA	LRA	BLOWER HP	FLA	MIN. CCT. AMPACITY	MAX FUSE / CCT. BKR. AMP
09	208-230/1/60	1	@	3.7	22.0	0.10	0.8	5.43	15
12	208-230/1/60	1	@	4.7	25.0	0.17	1.2	7.08	15
15	208-230/1/60	1	@	5.6	29.0	0.17	1.2	8.20	15
18	208-230/1/60	1	@	9.0	48.0	0.25	1.5	12.75	20
24	208-230/1/60	1	@	12.8	58.3	0.33	2.6	18.60	30
30	208-230/1/60	1	@	14.1	73.0	0.33	2.6	20.23	30
36	208-230/1/60	1	@	16.7	79.0	0.50	3.2	24.08	40

265 VOLT

PSC STANDARD BLOWER

Unit Size	SUPPLY VOLTAGE	COMPRESSOR QTY		RLA	LRA	BLOWER HP	FLA	MIN. CCT. AMPACITY	MAX FUSE / CCT. BKR. AMP
09	265/1/60	1	@	3.4	23.0	0.10	0.7	4.95	15
12	265/1/60	1	@	4.8	26.3	0.10	0.7	6.70	15
15	265/1/60	1	@	5.0	28.0	0.17	0.8	7.05	15
18	265/1/60	1	@	7.1	43.0	0.17	0.8	9.68	15
24	265/1/60	1	@	9.6	54.0	0.25	1.3	13.30	20
30	265/1/60	1	@	11.2	60.0	0.33	1.9	15.90	25
36	265/1/60	1	@	13.5	72.0	0.50	2.2	19.08	30

PSC OPTIONAL HI-STATIC BLOWER

Unit Size	SUPPLY VOLTAGE	COMPRESSOR QTY		RLA	LRA	BLOWER HP	FLA	MIN. CCT. AMPACITY	MAX FUSE / CCT. BKR. AMP
09	265/1/60	1	@	3.4	23.0	0.10	0.7	4.95	15
12	265/1/60	1	@	4.8	26.3	0.17	0.8	6.80	15
15	265/1/60	1	@	5.0	28.0	0.25	1.3	7.55	15
18	265/1/60	1	@	7.1	43.0	0.25	1.3	10.18	15
24	265/1/60	1	@	9.6	54.0	0.33	1.9	13.90	20
30	265/1/60	1	@	11.2	60.0	0.33	1.9	15.90	25
36	265/1/60	1	@	13.5	72.0	0.50	2.2	19.08	30

ENVIRO-TEC®

ECM STANDARD BLOWER

Unit Size	SUPPLY VOLTAGE	COMPRESSOR QTY		RLA	LRA	BLOWER HP	FLA	MIN. CCT. AMPACITY	MAX FUSE / CCT. BKR. AMP
09	208-230/1/60	1	@	3.7	22.0	0.33	1.0	5.63	15
12	208-230/1/60	1	@	4.7	25.0	0.33	1.0	6.88	15
15	208-230/1/60	1	@	5.6	29.0	0.33	2.0	9.00	15
18	208-230/1/60	1	@	9.0	48.0	0.33	2.0	13.25	20
24	208-230/1/60	1	@	12.8	58.3	0.33	2.0	18.00	30
30	208-230/1/60	1	@	14.1	73.0	0.50	2.4	20.03	30
36	208-230/1/60	1	@	16.7	79.0	0.50	2.4	23.28	35

ECM OPTIONAL HI-STATIC BLOWER

Unit Size	SUPPLY VOLTAGE	COMPRESSOR QTY		RLA	LRA	BLOWER HP	FLA	MIN. CCT. AMPACITY	MAX FUSE / CCT. BKR. AMP
09	208-230/1/60	1	@	3.7	22.0	0.33	1.0	5.63	15
12	208-230/1/60	1	@	4.7	25.0	0.33	1.0	6.88	15
15	208-230/1/60	1	@	5.6	29.0	0.33	2.0	9.00	15
18	208-230/1/60	1	@	9.0	48.0	0.33	2.0	13.25	20
24	208-230/1/60	1	@	12.8	58.3	0.33	2.0	18.00	30
30	208-230/1/60	1	@	14.1	73.0	0.50	2.4	20.03	30
36	208-230/1/60	1	@	16.7	79.0	0.50	2.4	23.28	35

265 VOLT

ECM STANDARD BLOWER

Unit Size	SUPPLY VOLTAGE	COMPRESSOR QTY		RLA	LRA	BLOWER HP	FLA	MIN. CCT. AMPACITY	MAX FUSE / CCT. BKR. AMP
09	265/1/60	1	@	3.4	23.0	0.33	1.0	5.25	15
12	265/1/60	1	@	4.8	26.3	0.33	1.0	7.00	15
15	265/1/60	1	@	5.0	28.0	0.33	2.0	8.25	15
18	265/1/60	1	@	7.1	43.0	0.33	2.0	10.88	15
24	265/1/60	1	@	9.6	54.0	0.33	2.0	14.00	20
30	265/1/60	1	@	11.2	60.0	0.50	2.4	16.40	25
36	265/1/60	1	@	13.5	72.0	0.50	2.4	19.28	30

ECM OPTIONAL HI-STATIC BLOWER

Unit Size	SUPPLY VOLTAGE	COMPRESSOR QTY		RLA	LRA	BLOWER HP	FLA	MIN. CCT. AMPACITY	MAX FUSE / CCT. BKR. AMP
09	265/1/60	1	@	3.4	23.0	0.33	1.0	5.25	15
12	265/1/60	1	@	4.8	26.3	0.33	1.0	7.00	15
15	265/1/60	1	@	5.0	28.0	0.33	2.0	8.25	15
18	265/1/60	1	@	7.1	43.0	0.33	2.0	10.88	15
24	265/1/60	1	@	9.6	54.0	0.33	2.0	14.00	20
30	265/1/60	1	@	11.2	60.0	0.50	2.4	16.40	25
36	265/1/60	1	@	13.5	72.0	0.50	2.4	19.28	30

MECHANICAL SPECIFICATIONS

GENERAL

All 3/4 ~ 3 ton ship factory tested. Both cabinets and refrigeration chassis are completely factory wired and pre-piped.

CABINET

The self-supporting cabinet assembly is constructed of heavy gauge corrosion-resistant coated steel (minimum 20-gauge thickness for exterior panels). The entire cabinet interior is insulated with 1/2" thick, high-density thermal and acoustic insulation. A removable inner service panel seals the fan and compressor compartment during operation. The cabinet base section contains a 14 gauge galvanized steel drain pan, with integral guide rails for the slide-in heat-pump chassis.

The drain pan outlet is readily accessible for cleaning (removal of inner service panel required). The drain pan comes standard with a normally closed condensate overflow switch. The drain pan outlet, including a P-trap, is factory connected to the condensate riser.

Full-length supply, return, and condensate risers can be either factory assembled onto the cabinet or shipped loose on separate skids. Maximum factory installed riser length is 120 inches. When the slab-to-slab dimension for a given floor is in excess of 118 inches, separate riser extension pieces can be factory provided to reach the required total riser length (riser extensions are field installed). The top of all risers, and riser extensions is internally expanded (3” depth) to allow connection of each subsequent riser section without the use of couplings. Type ‘M’ copper for risers is standard, type ‘L’ copper is optional.

Riser placement may be on any of three sides of the cabinet (right, left, or back). Riser knock-outs are located on all three sides allowing field conversion of riser placement if necessary.

Risers are internally piped into the cabinet assembly, including ball shut-off valves, and threaded hose connection stubs. The condensate drain riser is insulated with 3/8” wall thickness 'Armaflex' insulation.

☐ Optional Type ‘L’ copper risers.

☐ Optional Stainless Steel Drain Pan for added corrosion resistance. Entire drain pan is fabricated out of heavy gauge stainless steel.

☐ Optional 80 inch cabinet. Reduced height cabinet for applications where additional ceiling clearance is required.

☐ Optional protective risers cover to prevent riser damage during shipping, handling and installation.

☐ Optional 4 inch cabinet stand. Stand is factory installed to the base of the cabinet (80 inch cabinet only).

☐ Optional 8 inch cabinet stand. Stand is factory installed to the base of the cabinet (80 inch cabinet only).

The removable fan and motor assembly is suspended horizontally from an 18-gauge blower mounting deck, which creates an insulated discharge plenum in the upper section of the cabinet. Supply air openings are factory cut according to customer specifications. A noise attenuating insulated privacy air baffle is provided for horizontal supply air openings. All cabinet openings are provided with standard 1 inch drywall flange around the full opening perimeter.

☐ Optional surface-mount thermostat connection. Allows mounting of the space thermostat directly above the unit's return air panel or mounted remotely (requires optional extended harness). Electrical connection to the unit is by a plug-in Molex pigtail connector. Molex pigtail is field wired to thermostat terminals.

☐ Optional 4 inch round Outside Air Opening through top of unit (left or right hand configurations available). Unit comes with 4-1/4 inch return air flange.

☐ Optional 4 inch round Outside Air Opening with motorized damper through top of unit (left or right hand configurations available). Unit comes with 4-1/4 inch return air flange.

REFRIGERATION CHASSIS

Each removable heat-pump chassis assembly includes an air-to-refrigerant coil, a water-to-refrigerant coil, a primary condensate collection pan, and features a high efficiency rotary or scroll compressor. The chassis base is fabricated from heavy gauge galvanized steel (14 Ga). A metal enclosure isolates the compressor from the moving air stream in the lower fan compartment. The compressor enclosure is insulated with ½ inch thick, 2- pound density insulation.

Electrical connection between the cabinet and the chassis is by locking quick-connect plugs (separate high voltage and low voltage plugs). Water supply and return connection to the chassis is by factory supplied reinforced high-pressure flexible hoses, with quick sealing swivel couplings. The hose assemblies are rated for a minimum 350 psig working pressure.

Rotary and scroll compressors are mounted on rubber vibration isolators. Compressor motors are provided with internal overload protection. Each refrigeration circuit is thoroughly evacuated, and fully charged with R-410A refrigerant before shipment. An external high-pressure switch and a low-suction temperature switch are included in each compressor control circuit. The refrigeration circuit includes an adjustable bi-flow thermal expansion valve, with external equalizer. Service gauge ports are provided for field diagnosis and service. The 4-way reversing valve is a pilot operated, sliding piston type with a replaceable magnetic solenoid coil.

Refrigerant-to-air heat transfer coils are constructed of internally enhanced copper tubes; mechanically bonded to enhanced aluminum plate fins. The coaxial refrigerant-to-water heat exchangers feature a convoluted inner tube design for high heat transfer efficiency. Standard models feature a copper inner tube surrounded by a steel outer tube, and carry a 400-psig waterside working pressure rating.

☐ Optional corrosion resistant air-to-refrigerant coil (E-Coat). Coil shall receive a 1-mil thickness of cathodic epoxy type electro-deposit coating to increase corrosion resistance and prevent microbial contamination.

☐ Optional Cupro-Nickel water coil. Water side coaxial condenser coil shall be constructed of cupro-nickel metal alloy for increased resistance to corrosion and contamination buildup.

☐ Optional automatic water flow regulator, factory installed as an integral part of the refrigeration chassis. The automatic flow control valve shall be selected for the nominal rated flow rate, and provides constant flow over a 2-80 psi differential pressure range.

☐ Optional Y-strainer with #20 mesh screen is factory installed.

☐ Optional 2-way water control valve. A factory installed 2-way motorized valve is wired in parallel with the compressor control circuit, to shut-off water flow to the unit when the compressor is off. This feature can significantly reduce power consumption in variable-speed, or staged, pumping applications. The valve is rated for a 60 psi operating pressure differential. The actuator is of a slow-closing design, to eliminate hydraulic shock.

☐ Optional 3-way water control valve. A factory installed 3-way motorized valve is wired in parallel with the compressor control circuit, to shut-off water flow to the unit when the compressor is off. This feature allows loop water to circulate back to return column riser when unit is not in operation, and can

significantly reduce power consumption in variable-speed, or staged, pumping applications. The valve is rated for a 60 psi operating pressure differential. The actuator is of a slow-closing design, to eliminate hydraulic shock.

☐ Optional chassis mounted Circulating Pump for single riser systems. Unit chassis is fitted with a circulating pump in applications where supply and return water is circulated in the building through a single riser.

INDOOR FAN

Forward curved, double inlet and double width, direct-drive centrifugal blowers are used for air movement. Large diameter blower wheels are employed to provide required airflow performance at minimum noise levels. Standard fan motors are PSC types, and feature permanently lubricated bearings and internal thermal overload protection. Optional EC motors feature soft start and stop for added occupant comfort, consume less power compared to standard motors, and maintain good fan performance when subjected to higher external static pressures. The fan motors are attached to the blower housings by means of an integral 'flex-mount' system, with additional vibration isolation provided by rubber mounting grommets. A manual selector switch is accessible through the hinged return air panel, allowing switching between the two available fan speeds (Hi – Low).

☐ Optional Hi-Static PSC motor and blower assembly, for applications with extended ☐ ductwork layout.

☐ Optional EC motor (ECM).

Optional Hi-Static ECM motor and blower assembly, for applications with extended ☐ Optional EC motor (ECM) with Continuous Low ☐ Speed fan option. Fan continuously circulates air at low fan speed.

Optional Hi-Static EC motor (ECM) with Continuous Low Speed fan option. Fan continuously circulates air at low fan speed.

ELECTRICAL/CONTROLS

All units are completely factory wired with all necessary operating controls. A standard factory installed non-fused electrical disconnect is provided for service convenience and maintenance.

☐ Optional Non-Fused Disconnect.

☐ Optional Disconnect with Fusing added to the internal line voltage switch circuit.

☐ 2-Speed Fan Control at Thermostat.

☐ 3-Speed Fan Control at Thermostat (with ECM motors only).

Standard unit consists of a 24-volt microprocessor board control package. The cabinet mounted electrical box contains a 50VA Class II transformer, blower motor power relay, single-pole contactor for compressor operation. The reversing valve solenoid coil is energized in cooling mode only.

COMPRESSOR PROTECTION

In addition to the external pressure switches, the compressor also has inherent (internal) protection. If there is an abnormal temperature rise in a compressor, the internal protection will immediately shut down the compressor. The microprocessor control incorporates features to minimize compressor wear and damage. An anti-short cycle delay (ASCD) is utilized to prevent short cycling of the compressor. Additionally, a minimum run time is imposed any time a compressor is energized. The ASCD is initiated on unit start-up and on any compressor reset or lockout.

ACOUSTIC RETURN AIR PANEL

The flush-mounted return air panel is designed to minimize line-of-sight noise transmission. The panel assembly is fabricated from heavy gauge steel. An insulated, hinged center section allows convenient user access to the unit control panel and filter.

The perimeter frame of the panel is mounted to the drywall/framing opening at the front of the cabinet. The heat-pump chassis is fully accessible and

removable through the hinged door section. The panel is supplied in standard 'Appliance White' painted finish.

SUPPLY AIR GRILLES

Optional supply air grilles shall be supplied for each free discharge outlet directly from the cabinet (non-ducted outlets). All unit mounted supply grilles will be supplied as double-deflection type. Grilles for unequal airflow applications shall be provided with integral opposed-blade dampers (volume dampers). Grilles will be supplied in standard 'Appliance White' painted finish.

FILTERS

All units are supplied with a 1-inch thick throwaway filter. Filters are accessible through the hinged return air panel, without removing the inner service panel.

☐ Optional MERV 8 Filters.

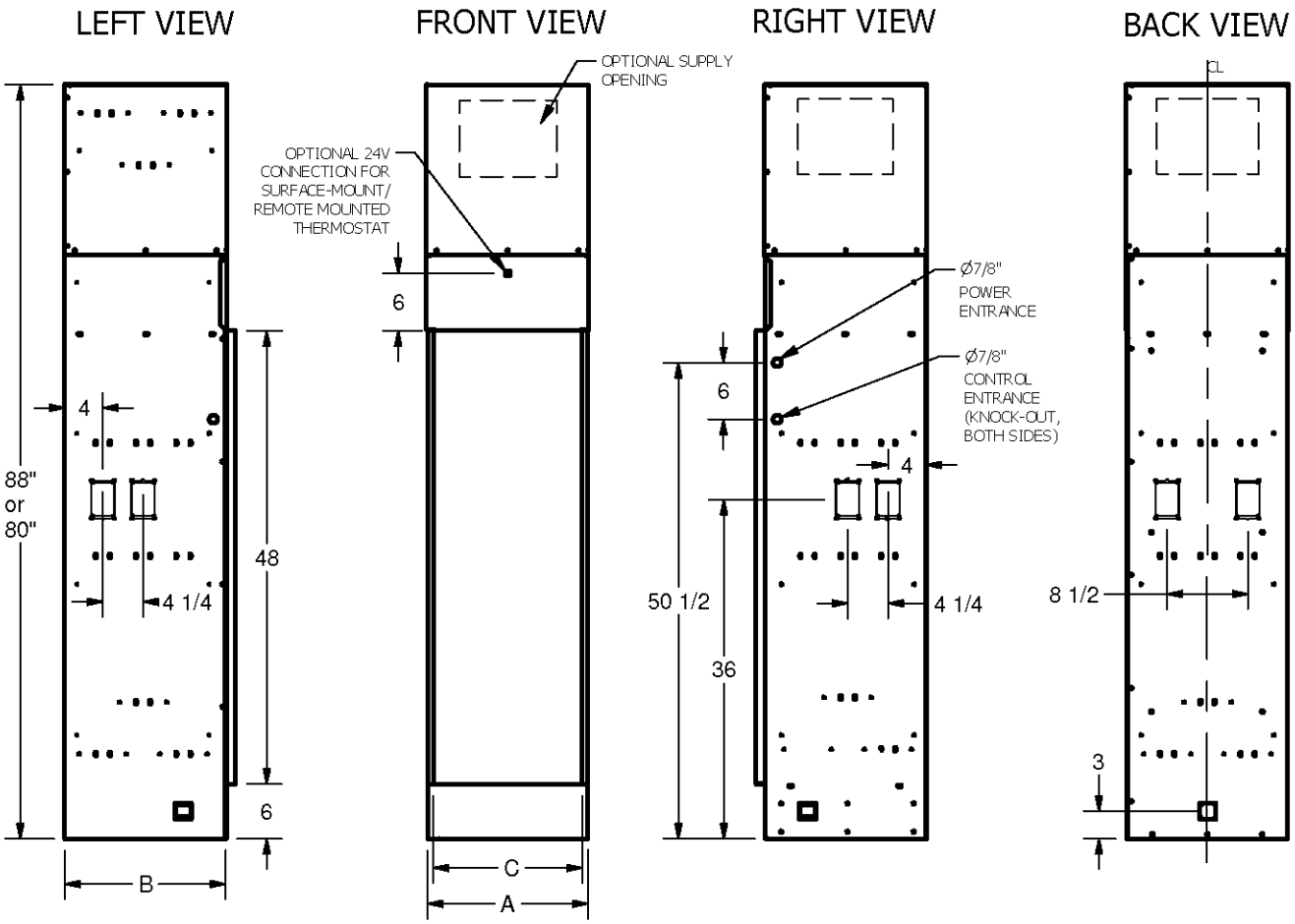
UNIT TAGGING

Each unit shall be individually tagged with factory and customer supplied information. Units can be tagged with specific room number, riser number, or any other special requirement of the project.

MICROPROCESSOR CONTROLS

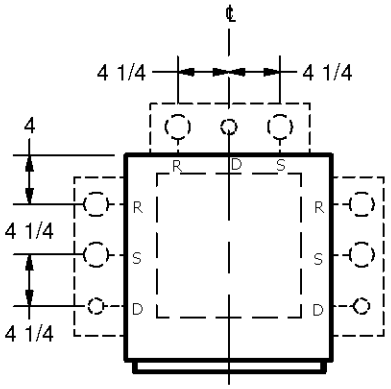
The control system microprocessor board is specifically designed for water source heat pump operation. The control system interfaces with a conventional type thermostat.

- Unit shall be complete with self-contained low-voltage control circuit
- Unit shall incorporate a lockout circuit which provides reset capability at the space thermostat or base unit, should any of the following standard safety devices trip and shut off compressor.
  - Loss-of-charge/Low-pressure switch
  - High-pressure switch
  - Freeze-protection thermostat, unit shutdown on low water temperature.
  - Condensate Overflow protection switch
- Unit shall operate with conventional thermostat designs and have a low voltage terminal strip for easy hook-up.
- Unit control board shall have on-board diagnostics and an LED fault code display.
- Standard controls shall include anti-short cycle and low voltage protection
- Control board shall monitor each refrigerant safety switch independently.
- Control board energizes reversing valve solenoid in cooling only.
- Control board shall have random start feature
- Control board shall retain last 5 fault codes in non volatile memory which will not be lost in the event of a power loss.



MODEL	A	B	C
VSCS09 VSCS12	17	17	16
VSCS15 VSCS18 VSCS24	20	20	19
VSCS30 VSCS36	24	24	23

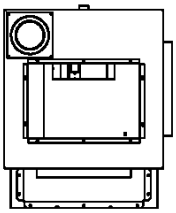
ALL DIMENSIONS IN INCHES.



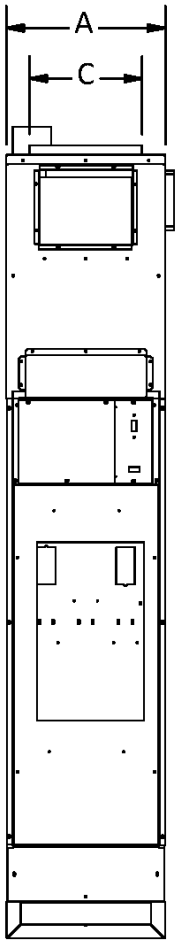
R - RETURN RISER
S - SUPPLY RISER
D - DRAIN RISER

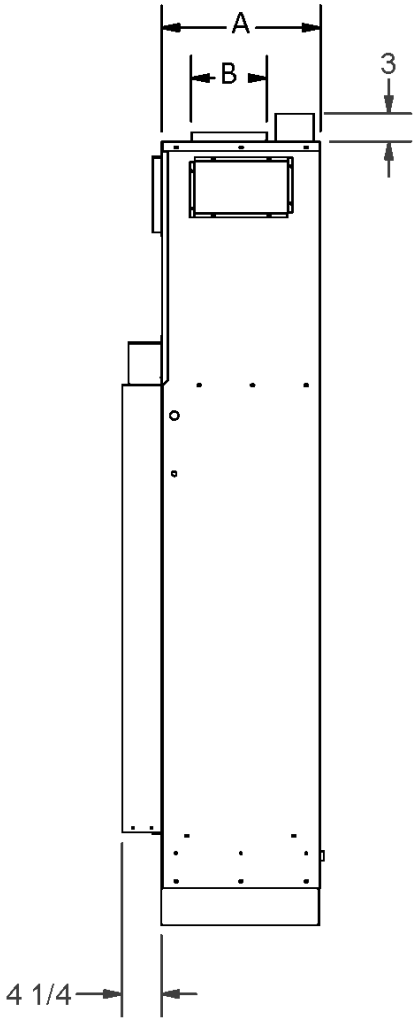
TOP VIEW

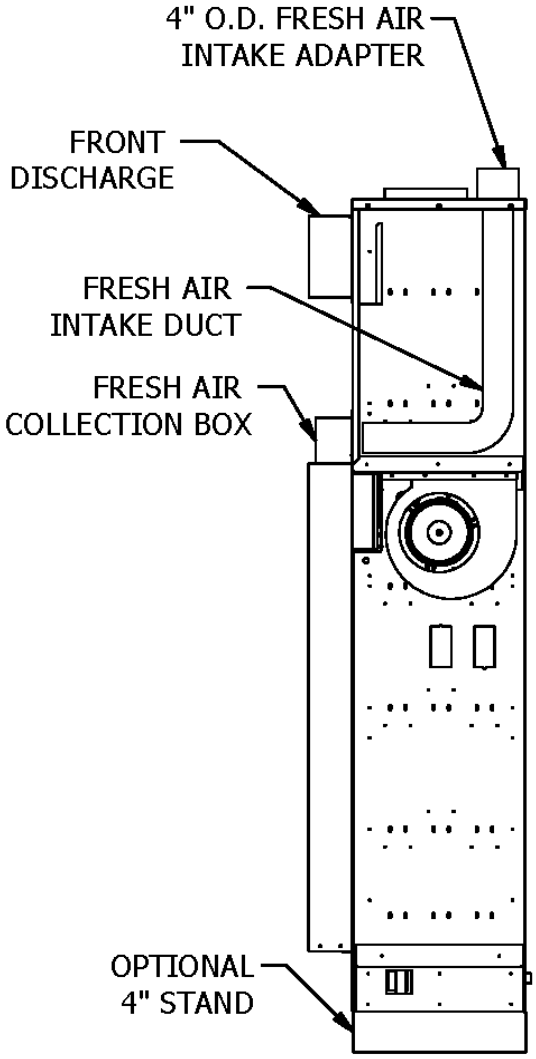
OPTIONAL FRESH AIR INTAKE OPTION (LEFT HAND VERSION SHOWN)



VB CABINET DIMENSION			
MODEL	A	B	C
09-12	17"	8"	12"
18-24	20"	12"	14"
30-36	24"	16"	18"

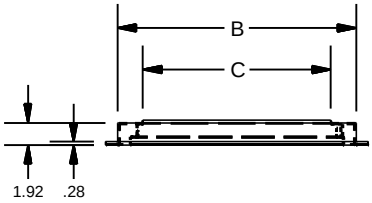






Note:

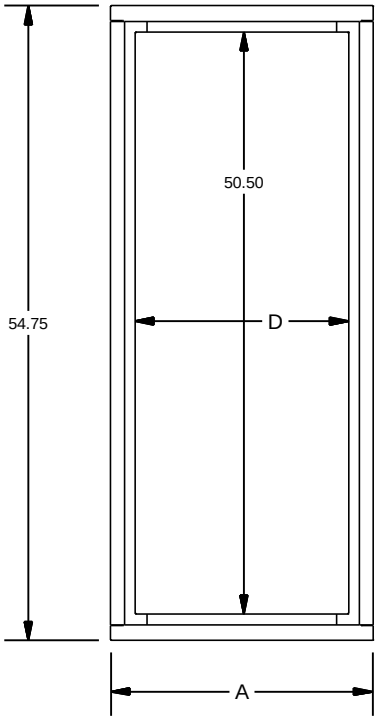
1) Optional front supply discharge opening will be provided with 4-1/4 inch outlet flange.
2) Any factory cut discharge opening (other than front) will be provided with 1 inch outlet flange.

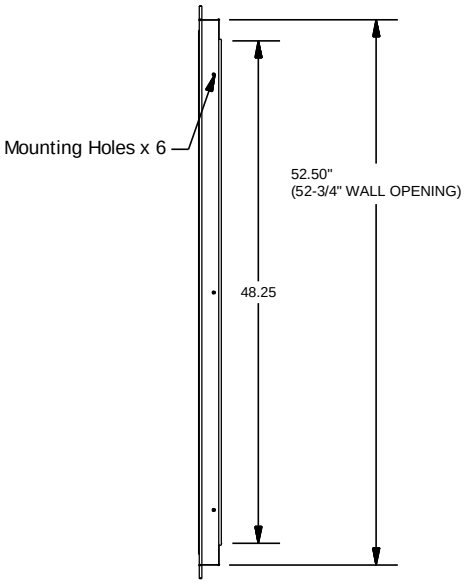


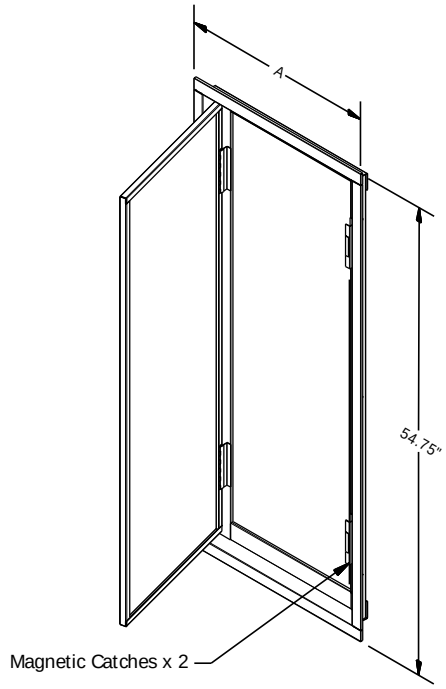
ALL DIMENSIONS ARE IN INCHES				
Panel Size	A	B	C	D
VSCS09/12	22.75	20.50	16.25	18.50
VSCS15/18/24	25.75	23.50	19.25	21.50
VSCS30/36	29.75	27.50	23.25	25.50

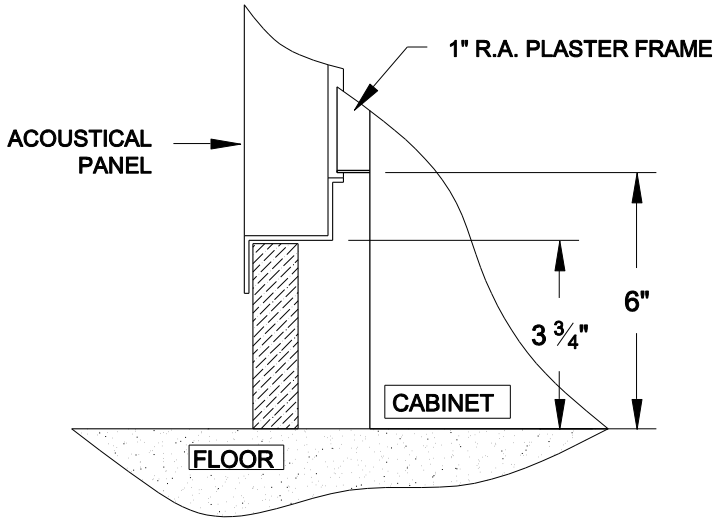
NOTES:
- Acoustic Panel powder coated in 'Appliance White'
- Acoustic Panel may be installed on the right hand side, or left hand side

IMPORTANT: For maximum R.A. flow, flush mounted acoustic panel must be centered vertically and horizontally over the Return Air opening of the cabinet. Supply air duct collar extensions may be required to prevent short cycling.

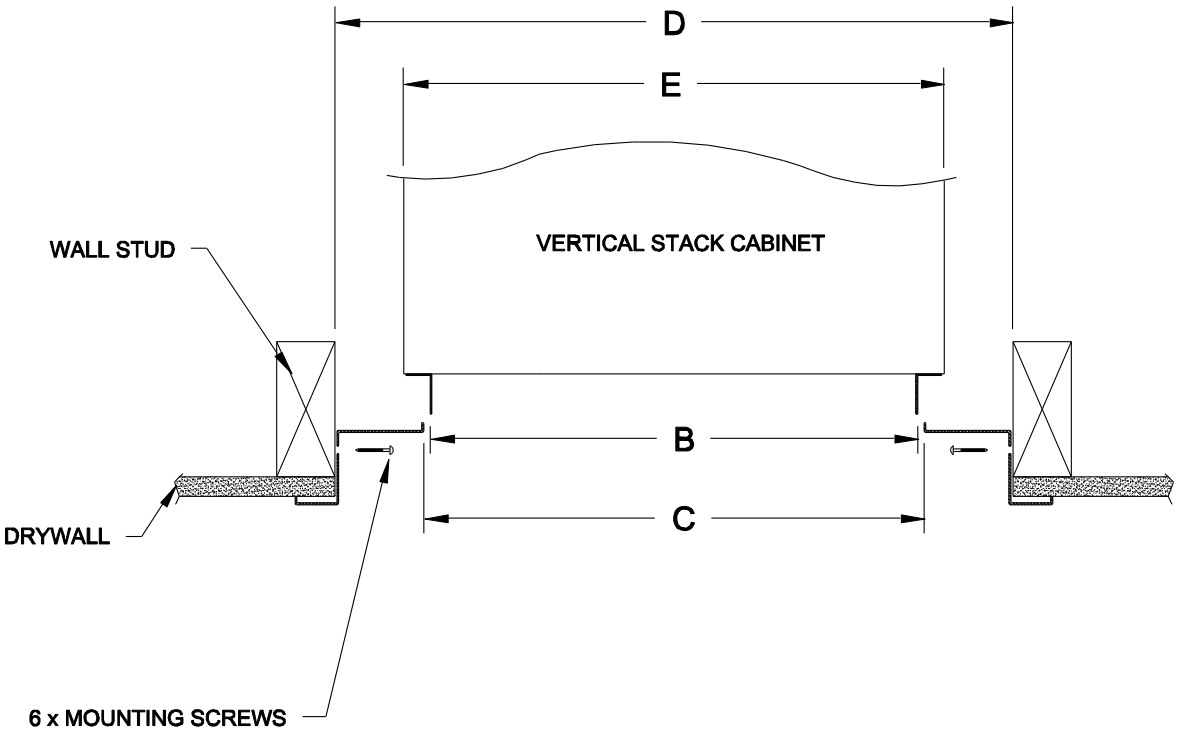




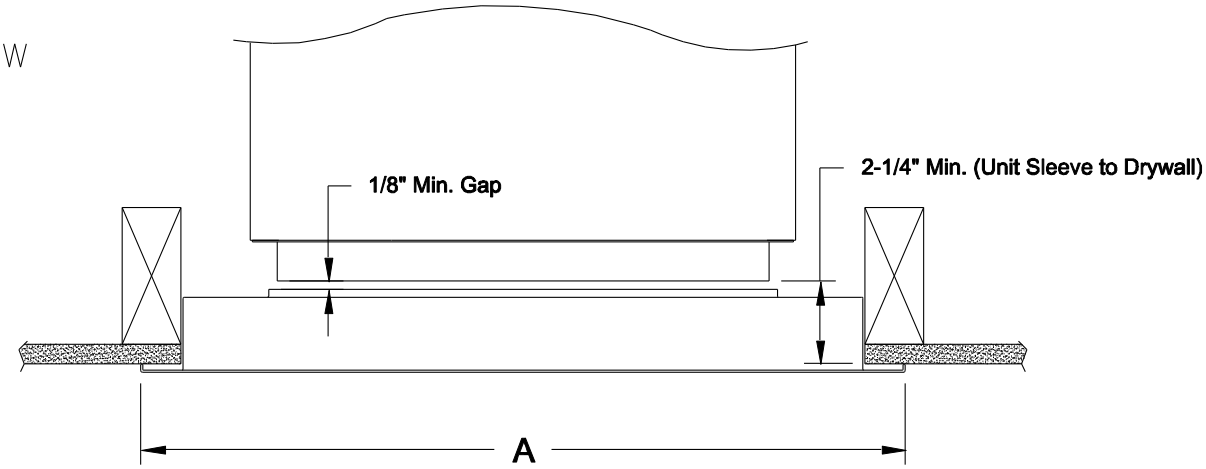




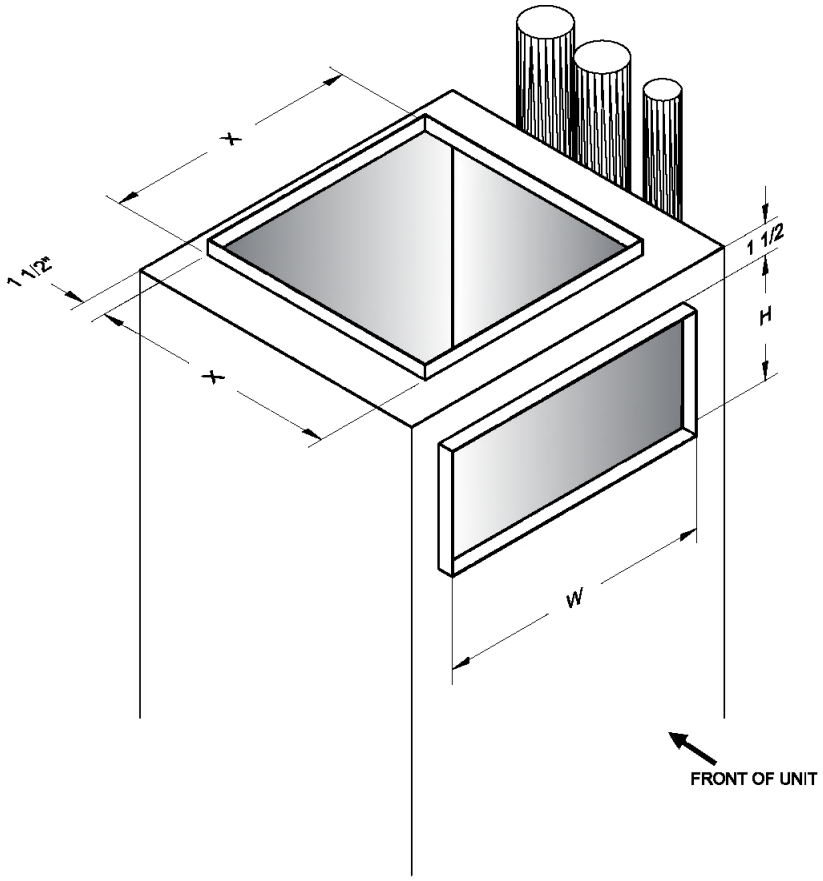
CUT AWAY VIEW



TOP VIEW



UNIT SIZE	A (Panel Width)	B (Sleeve Width)	C (R/A Panel Opening)	D (Rough In Width)	E (Unit Width)
09 / 12	22 3/4	16	16 1/4	20 3/4 ± 1/8	17
15/18/24	25 3/4	19	19 1/4	23 3/4 ± 1/8	20
30 / 36	29 3/4	23	23 1/4	27 3/4 ± 1/8	24
ALL DIMENSIONS ARE IN INCHES					

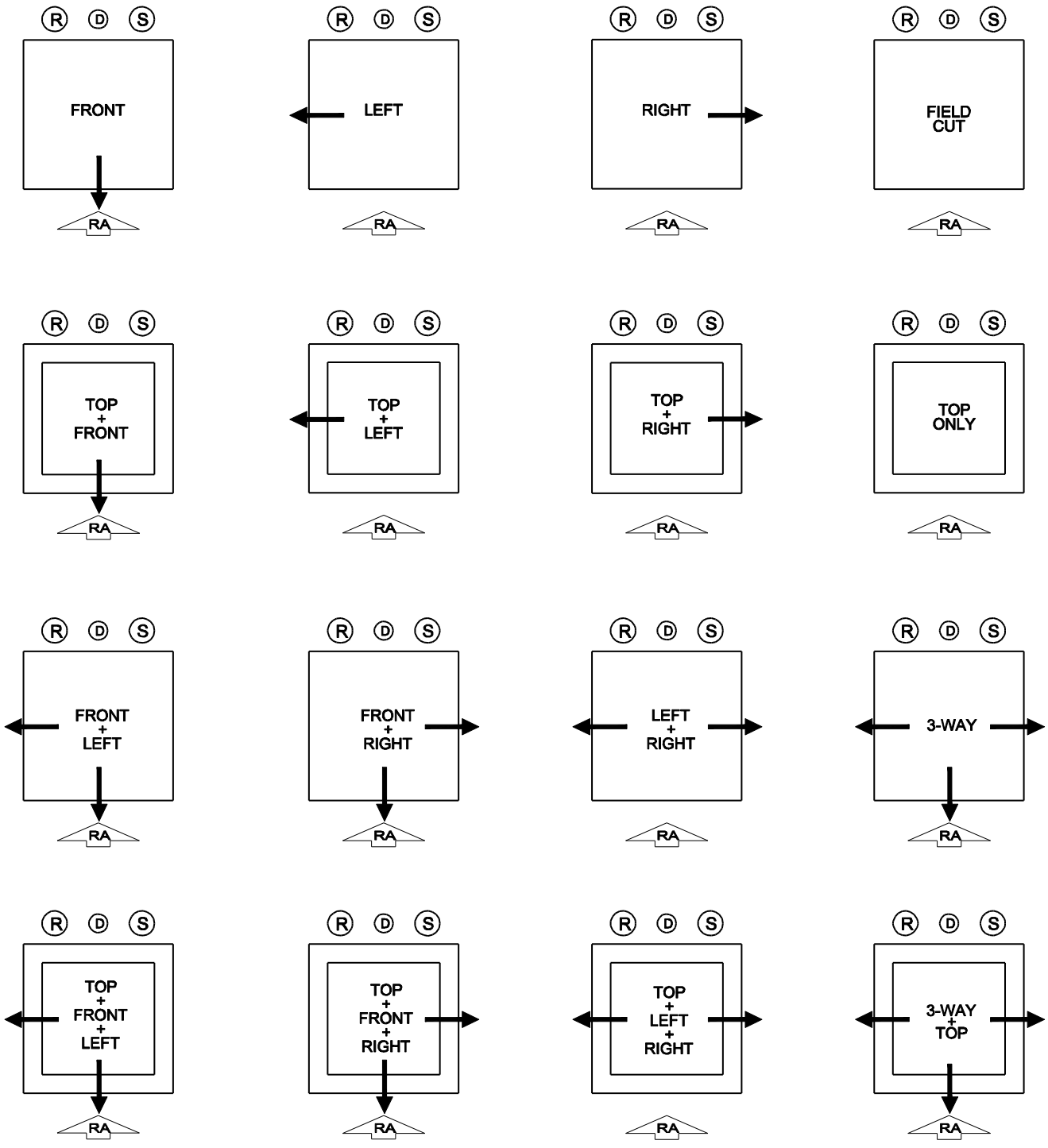


Discharge Opening Sizes (in.)

Model	Horizontal Openings					Top Opening
	Single Horizontal		Double Horizontal		Triple Horizontal	
	No Top Opening	w/ Top Opening	No Top Opening	w/ Top Opening	No Top Opening	
9	14W x 12H	14W x 6H	14W x 8H	Not Available	Not Available	12 x 8
12	14W x 14H	14W x 6H	14W x 10H	Not Available	Not Available	12 x 8
15	16W x 14H	14W x 6H	14W x 10H	Not Available	14W x 8H	14 x 12
18	Not Available	14W x 6H	14W x 12H	14W x 6H	14W x 10H	14 x 12
24	Not Available	14W x 10H	16W x 14H	14W x 6H	14W x 10H	14 x 12
30	Not Available	14W x 6H	20W x 14H	14W x 6H	16W x 12H	18 x 16
36	Not Available	14W x 10H	Not Available	14W x 6H	16W x 14H	18 x 16

1) Unit mounted supply grilles will be supplied as double-deflection type.
2) Grilles for unequal airflow applications (unit-mounted plus ducted supply) shall be provided with integral opposed-blade dampers.
3) All grilles will be supplied in standard 'Appliance White' painted finish
4) Grilles are shipped loose, for field installation upon completion of cabinet / ductwork / drywall installation.

REAR RISER – DISCHARGE CONFIGURATION



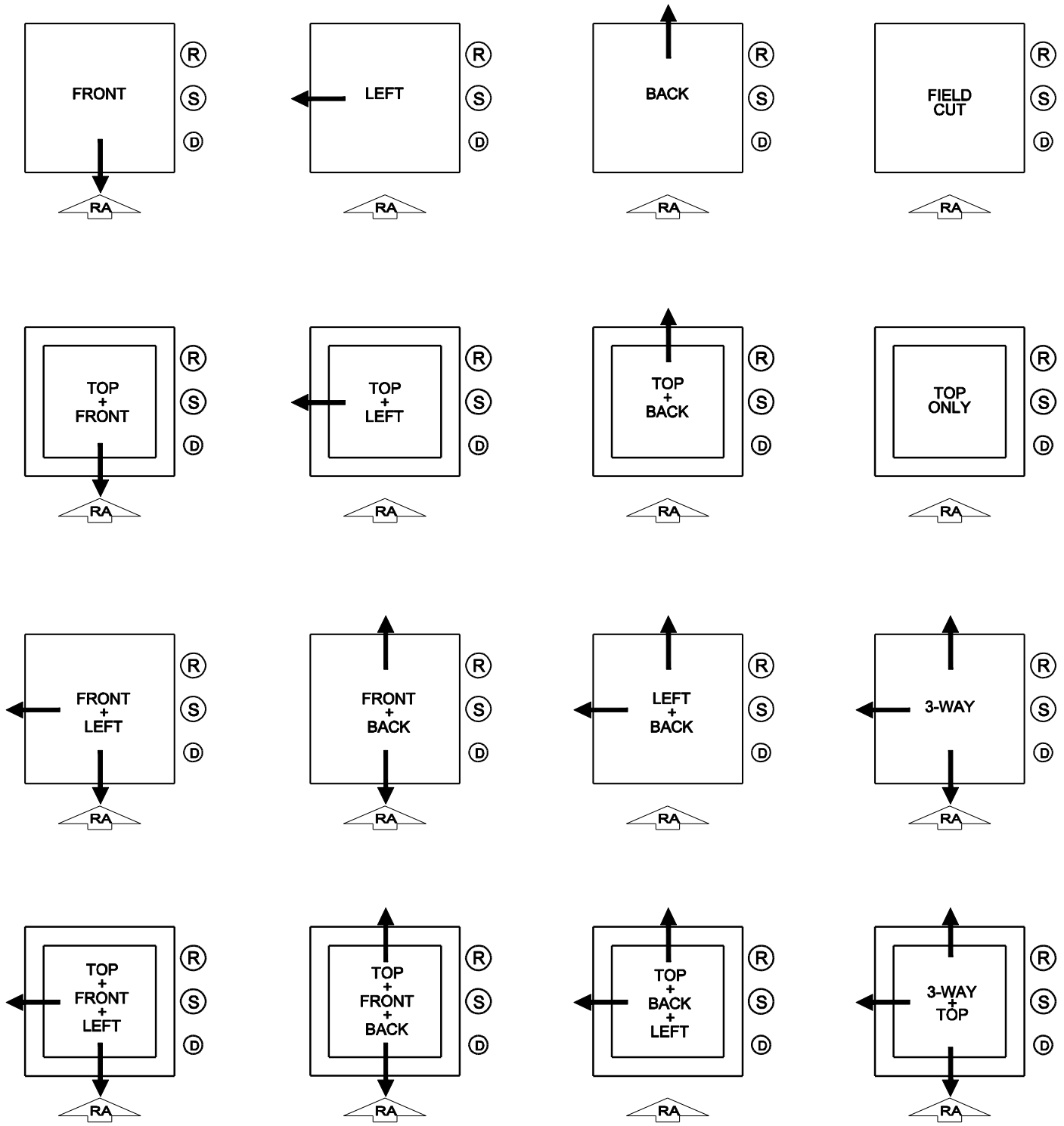
NOTES:

1) RETURN AIR OPENING SIDE IS DEFINED AS FRONT OF UNIT (CHASSIS AND CONTROL SERVICE ACCESS).

2) 3-WAY DISCHARGE ARRANGEMENT IS NOT RECOMMENDED FOR UNIT SIZES 009, 012

3) SINGLE DISCHARGE OPENING (EXCEPT TOP DISCHARGE) IS NOT RECOMMENDED FOR UNIT SIZES 030, 036

RIGHT HAND RISER – DISCHARGE CONFIGURATION



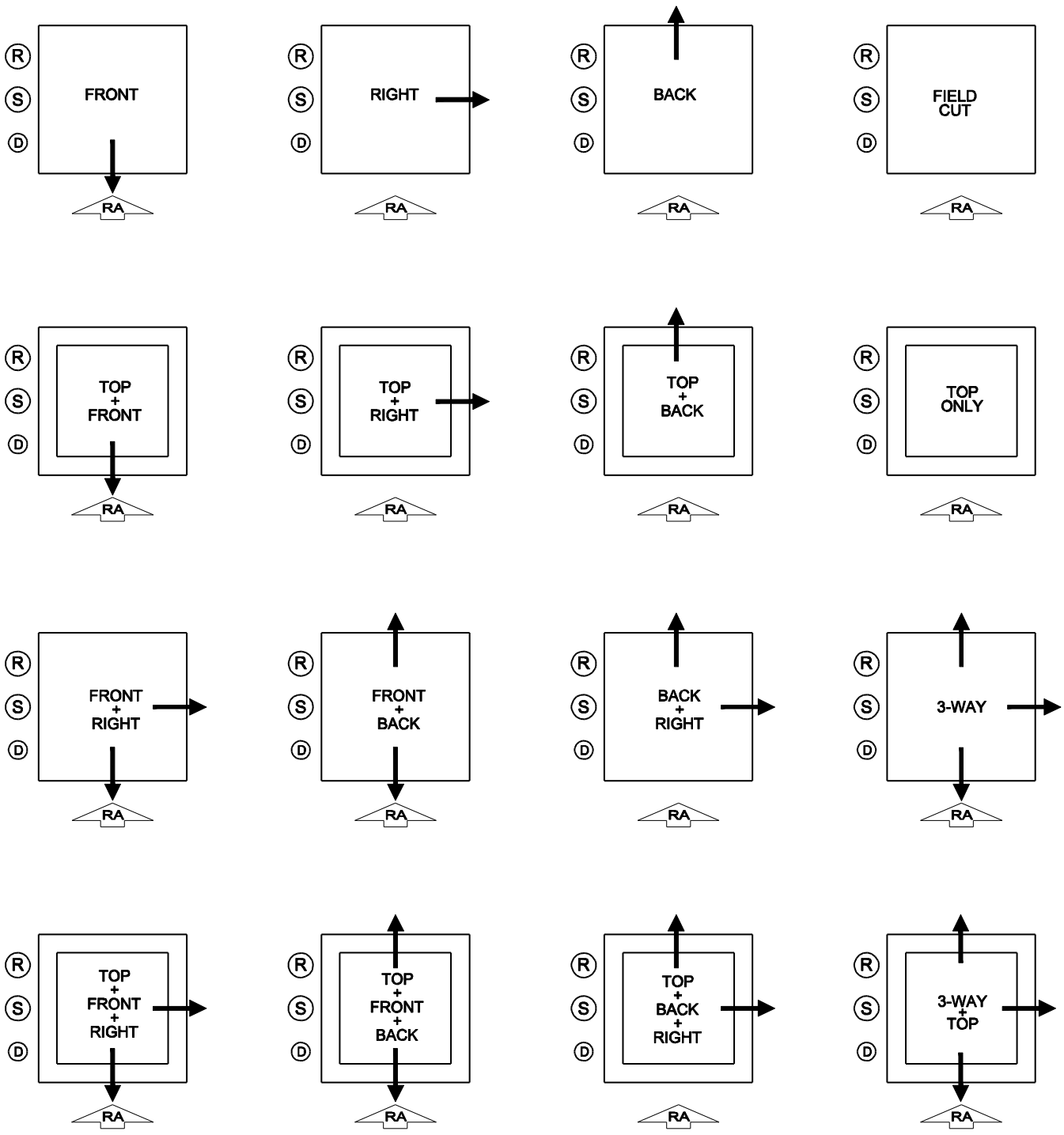
NOTES:

1) RETURN AIR OPENING SIDE IS DEFINED AS FRONT OF UNIT (CHASSIS AND CONTROL SERVICE ACCESS).

2) 3-WAY DISCHARGE ARRANGEMENT IS NOT RECOMMENDED FOR UNIT SIZES 009, 012

3) SINGLE DISCHARGE OPENING (EXCEPT TOP DISCHARGE) IS NOT RECOMMENDED FOR UNIT SIZES 030, 036

LEFT HAND RISER – DISCHARGE CONFIGURATION



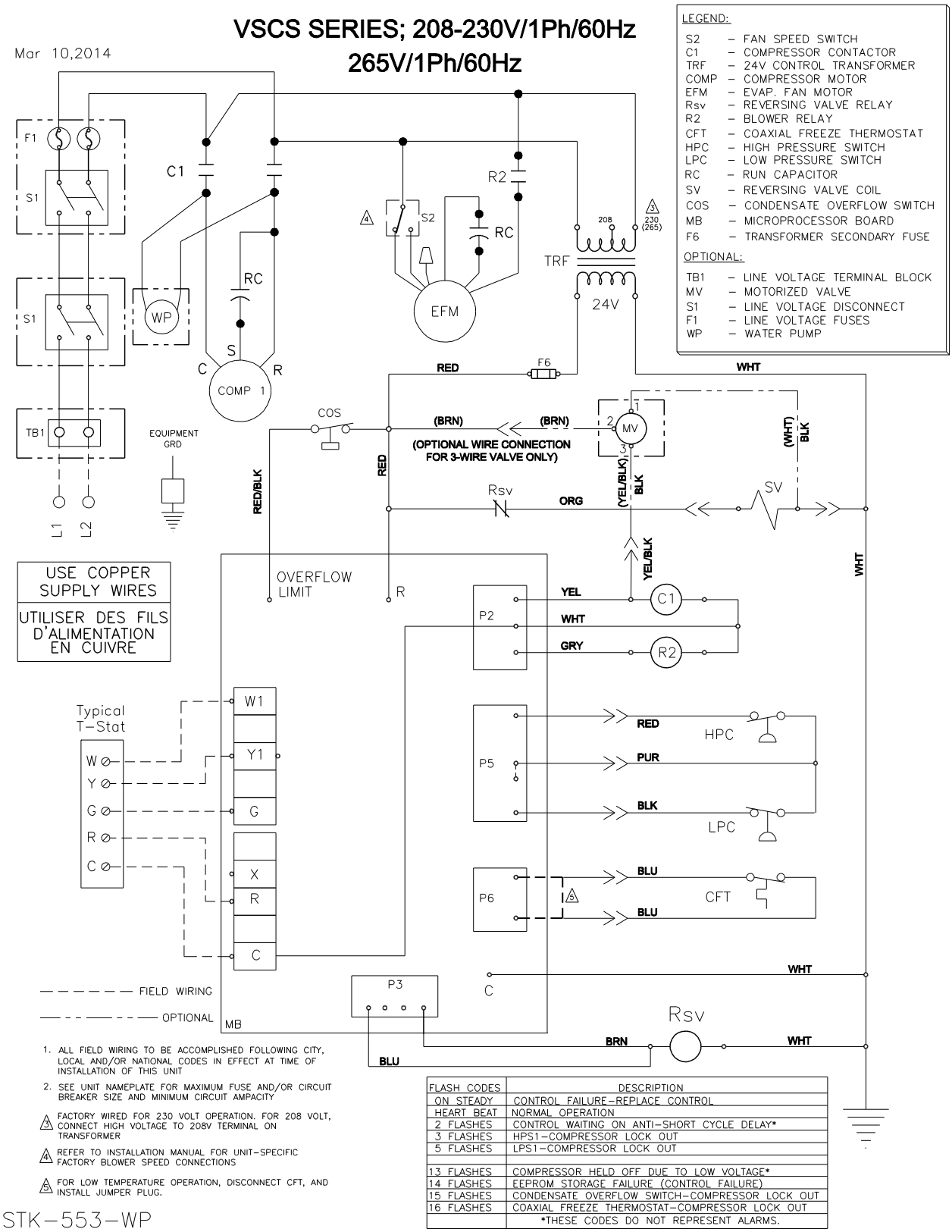
NOTES:

1) RETURN AIR OPENING SIDE IS DEFINED AS FRONT OF UNIT (CHASSIS AND CONTROL SERVICE ACCESS).

2) 3-WAY DISCHARGE ARRANGEMENT IS NOT RECOMMENDED FOR UNIT SIZES 009, 012

3) SINGLE DISCHARGE OPENING (EXCEPT TOP DISCHARGE) IS NOT RECOMMENDED FOR UNIT SIZES 030, 036

ELECTRICAL SCHEMATIC – PSC MOTOR



ELECTRICAL SCHEMATIC – EC MOTOR