



Project:

Model: SHFCe —Vertical Stack Fan Coil
With Integrated ERV

Dev. B

Date:

Revision:

SIGMA Job #:

SUBMITTAL SET

Document: SIGMA-SHFCe-SUB-2406



Presented By:



SUMMARY PAGE

Standard Features

- Vertical Stack Fan Coil w/ Integrated ERV (SHFCe)
 - 120V/1Ph/60Hz
 - 208-240V/1Ph/60Hz
- Pipe System
 - 2-Pipe with Electric Heater
 - 2-Pipe without Electric Heater
 - 4-Pipe
 - 4-Pipe with 6-Way Valve
- Cabinet: 20 Gauge Galvanized Steel with 1/2" Sound Insulation
- Unit Mounted Disconnect Switch
- ECM Fan Motor with 3-speeds
- Dual ECM ERV Fans
- ERV Port Configurations as per schedule
- Polymer ERV Core:
 - Standard Efficiency Polymer ERV Core
 - Optional High Efficiency Polymer ERV Core
- Outdoor Air (OA) Motorized Damper, Spring Return
- "Whisper" Mode for Constant Low CFM Air Circulation
- Coil Pack as per schedule
- Hose Kits
- Isolation Ball Valves:
 - Sweat x NPSM
 - FNPT x FNPT
 - FNPT x FNPT w/ PT Ports

Optional Accessories

- Optional Auto-Flow Balancing Valves
- Optional 2-Way Motorized Zone Valves
- Optional 3-Way Motorized Zone Valves
- Optional 6-Way Motorized Zone Valves
- Pressure Independent Balancing Control Valves (PICV)
- Y-Strainer
- Return Air Panel
 - Optional Panel Mounted Front Discharge Supply Grille
- Thermostat with backlit LCD display, with 3-Speed Fan:
 - 7-Day Programmable, Auto Change-Over (ACO)
 - Wi-Fi Smart, Programmable, Auto Change-Over (ACO), ERV on/off
 - Non-Programmable, Auto Change-Over (ACO)
- ERV Bathroom Timer
- ERV Kill Switch
- Freeze Protection Sensor
- Flood Protection Package
- BTU Meter Installation
- Condensate Overflow Switch
- Filters
 - 1-inch MERV 8 Pleated Filters
 - Optional 2-inch MERV 13 Pleated Filters
- Type M, or Type L Supply and Return Risers as per schedule
- Type M, or Type L Condensate Risers as per schedule
- 1-in Supply and Return Riser Fiber Glass Insulation
- Optional 3/4-in Supply and Return Riser Closed Cell Insulation
- Optional 3/8-in Condensate Riser Closed Cell Insulation



**SIGMA SHFCe - HI-RISE VERTICAL STACK
FAN COIL W/ INTEGRATED ERV**

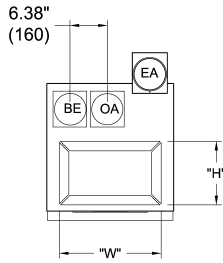
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SIGMA-SHFCe-SUB-2406

UNIT AND RISER COUNT SUMMARY



SHFCe - CABINET DIMENSIONS



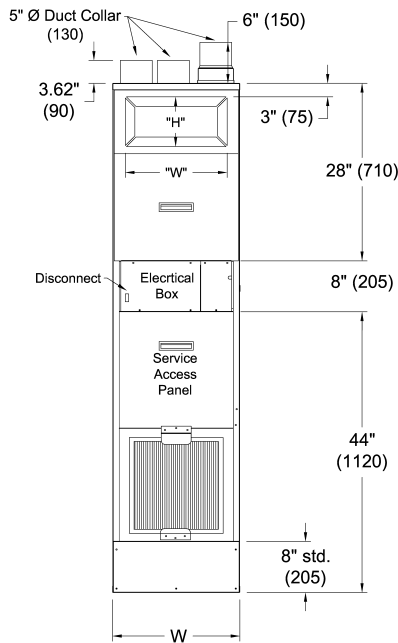
TOP VIEW

See ERV Fan Performance for ERV static pressure drop.

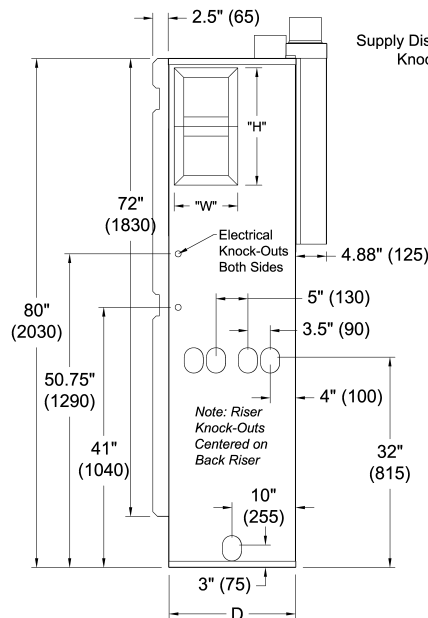
Recommended air velocity through supply grill between 300-500FPM

EA - Exhaust Air to Outside
BE - Bathroom Exhaust to ERV
OA - Outside Fresh Air to ERV

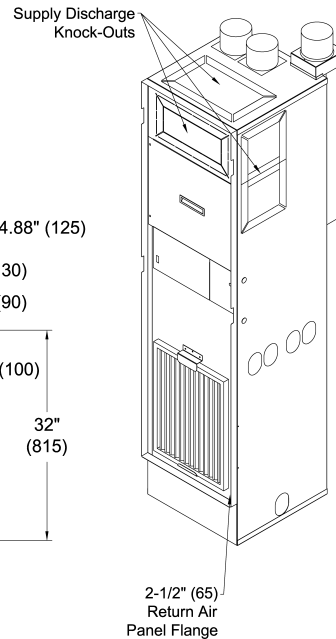
Exhaust Air (EA) Snorkel is shipped loose to be field mounted.



FRONT VIEW



RIGHT VIEW



SHFCe - CABINET DIMENSIONS & SUPPLY DISCHARGE OPENING SIZES

Model	Nominal CFM	Cabinet Dimensions (in)			Discharge Openings (in)		
		Width (W)	Depth (D)	Height (H)	Front (WxH)	Left/Right (WxH)*	Top (WxH)
SHFCe 03	350	20	20	80	17 x 7	10 x 8 (10 x 16)	10 x 16
SHFCe 04	450	20	20	80	17 x 7	10 x 8 (10 x 16)	10 x 16
SHFCe 06	600	20	20	80	17 x 7	10 x 8 (10 x 16)	10 x 16
SHFCe 08	800	20	22	80	17 x 7	10 x 8 (10 x 16)	12 x 16
SHFCe 10	1000	20	22	80	17 x 7	10 x 8 (10 x 16)	12 x 16
SHFCe 12	1200	20	22	80	17 x 7	10 x 8 (10 x 16)	12 x 16

Note:

*Discharge on right and left side can be opened up to large size as shown in table.

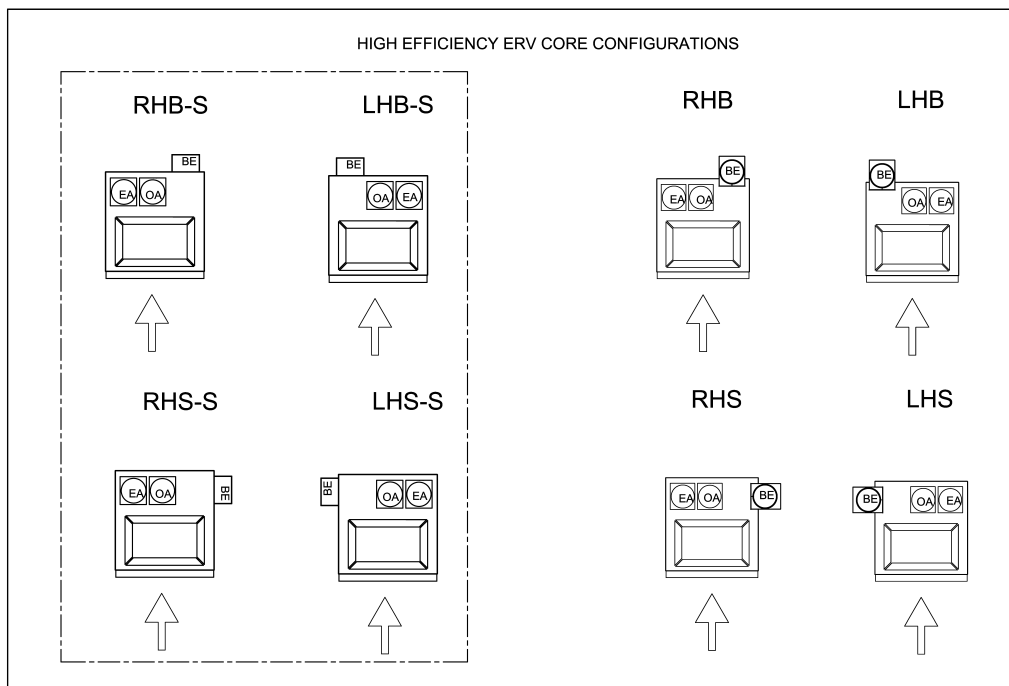
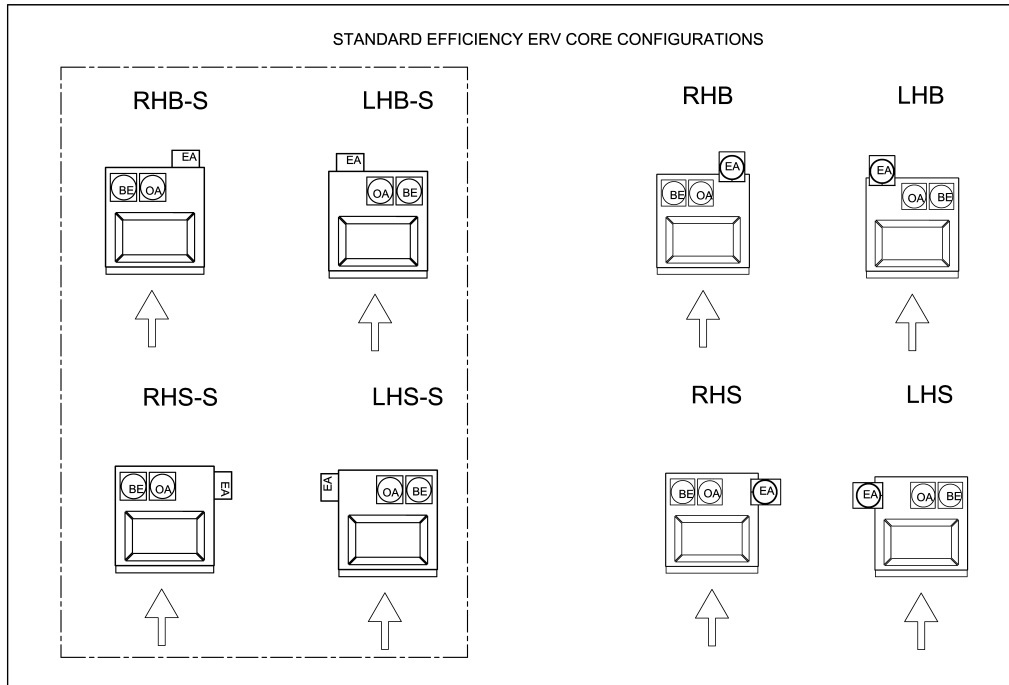
Discharge opening sizes shown (WxH) are customer configurable. Published sizes shown are maximum default factory sizes. Customer to verify discharge opening sizes match design requirements for proper airflow and confirm appropriate discharge openings at time of order.

Unit base height of 8"(205mm) is standard. Taller heights are available in 1-inch (25mm) increments.

SHFCe - ERV CONFIGURATIONS (TOP VIEW)

Side Exhaust Air (EA) is connected to the side of the unit. No snorkel extension is provided to the top.

Top Snorkel Exhaust Air (EA) is connected at the top of the unit. Unit comes with shipped loose snorkel to be field installed.



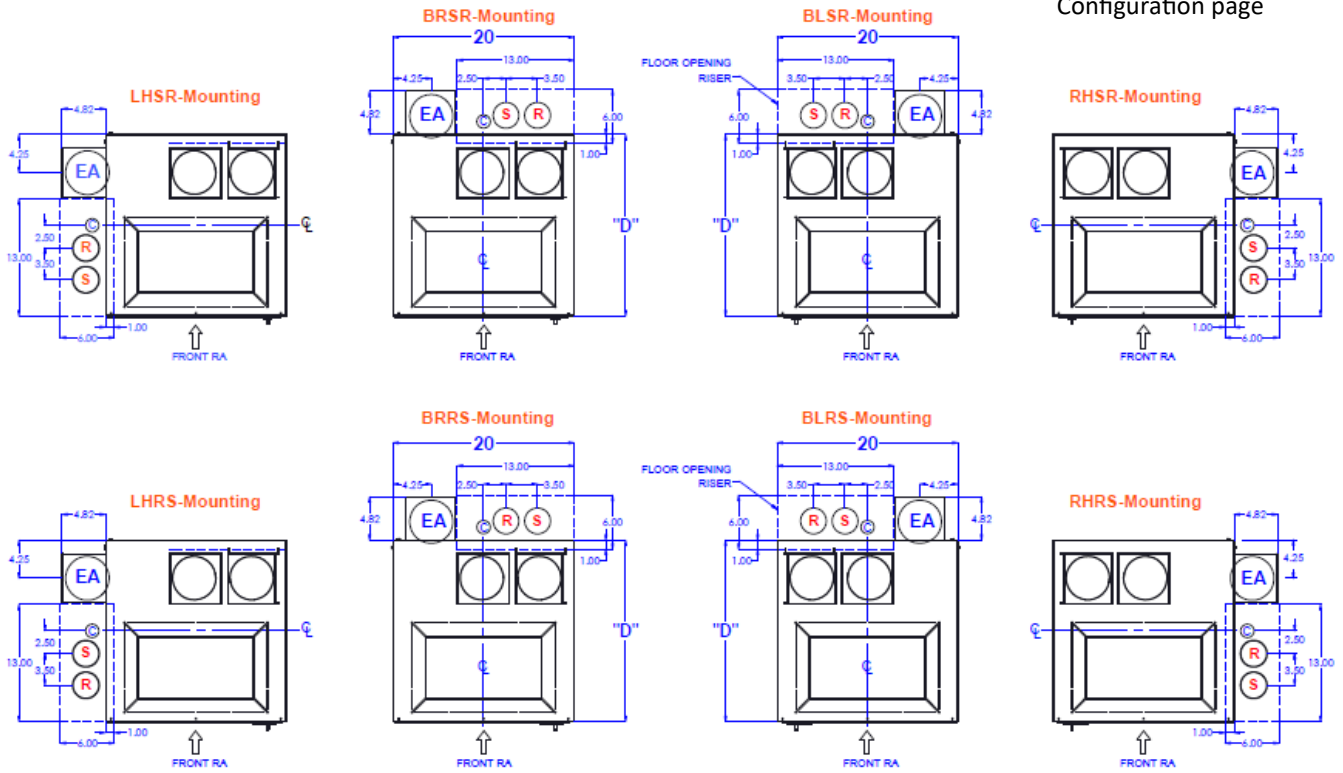
Notes:

Available in 8 ERV Configurations.
Standard Top Snorkel & Optional Side Exhaust Air with no snorkel.
Risers are not available on same side as Exhaust Air (EA) snorkel.

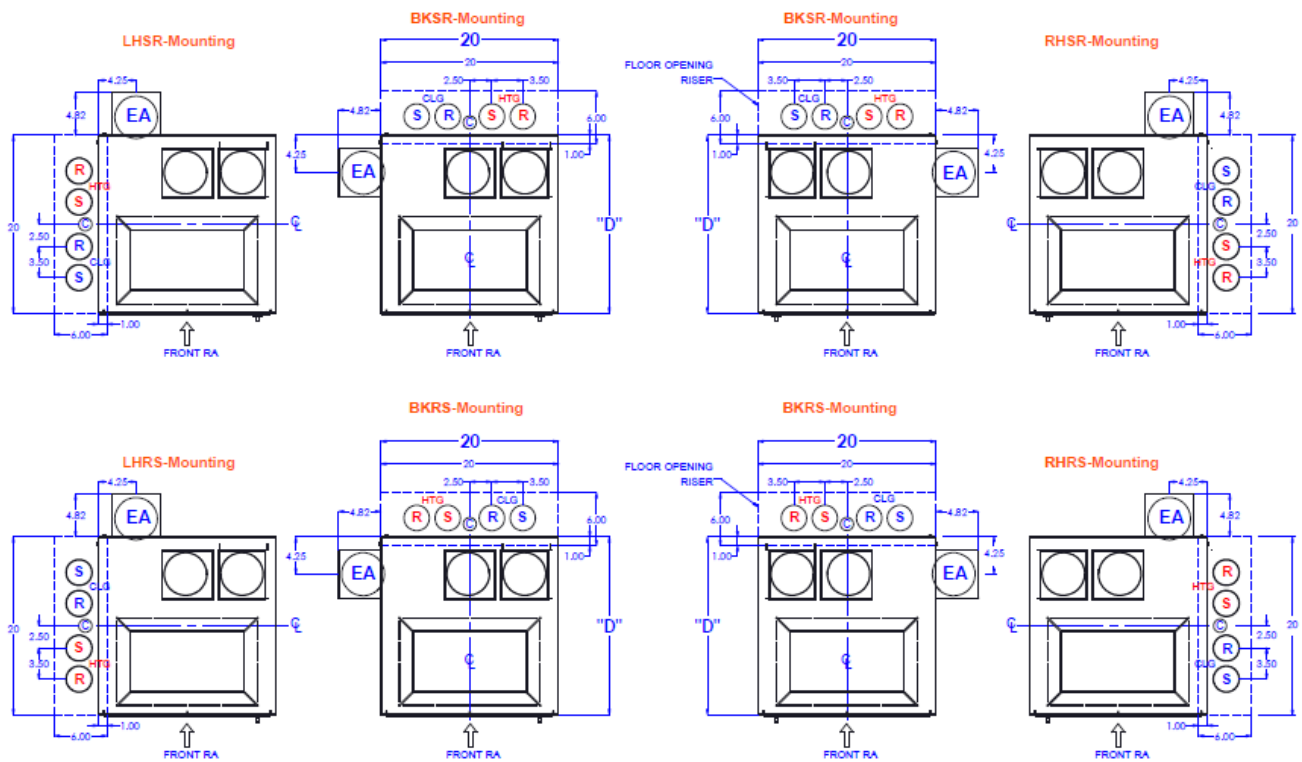
EA - Exhaust Air to Outside
BE - Bathroom Exhaust to ERV
OA - Outside Air to ERV

SHFCe - RISER LAYOUT (2-PIPE)

Note: The EA options are not all shown, refer to ERV Configuration page



SHFCe- RISER LAYOUT (4-PIPE)



Note:



SIGMA SHFCe - HI-RISE VERTICAL STACK FAN COIL W/ INTEGRATED ERV

SHFCe - ELECTRICAL DATA (120V - 2 PIPE w/ ECM)

ELECTRICAL DATA - ECM MOTOR (NO HEATER)

MODEL	SUPPLY VOLTAGE	Fan Motor		Electric Heater kW (120V)	ERV FLA	Total Unit FLA	MIN. CCT. AMPACITY	(MOP)	MAX FUSE /CCT. BKR. AMP	MAX PRESSURE (PSI)	MAX EWT TEMPERATURE (F) (2Pipe/4Pipe)
		HP	FLA								
SHFCe03	120V/1/60	0.25	1.8	0.0	1.1	2.9	3.63	5.15	15	300	140 / 160
SHFCe04	120V/1/60	0.25	2.4	0.0	1.1	3.5	4.31	6.39	15	300	140 / 160
SHFCe06	120V/60/1	0.33	2.4	0.0	1.1	3.5	4.31	6.39	15	300	140 / 160
SHFCe08	120V/60/1	0.33	4.4	0.0	1.1	5.5	6.88	11.00	15	300	140 / 160
SHFCe10	120V/60/1	0.50	5.1	0.0	1.1	6.2	7.75	12.58	15	300	140 / 160
SHFCe12	120V/60/1	0.50	6.0	0.0	1.1	7.1	8.81	14.49	15	300	140 / 160

ELECTRICAL DATA - ECM MOTOR- 2 PIPE SYSTEM ONLY (0.5 KW HEATER)

MODEL	SUPPLY VOLTAGE	Fan Motor		Electric Heater kW (120V)	ERV FLA	Total Unit FLA	MIN. CCT. AMPACITY	(MOP)	MAX FUSE /CCT. BKR. AMP	MAX PRESSURE (PSI)	MAX EWT TEMPERATURE (F)*
		HP	FLA								
SHFCe03	120V/1/60	0.25	1.8	0.5	1.1	7.1	8.83	9.32	15	300	140
SHFCe04	120V/1/60	0.25	2.4	0.5	1.1	7.6	9.52	10.55	15	300	140
SHFCe06	120V/60/1	0.33	2.4	0.5	1.1	7.6	9.52	10.55	15	300	140
SHFCe08	120V/60/1	0.33	4.4	0.5	1.1	9.7	12.08	15.17	15	300	140
SHFCe10	120V/60/1	0.50	5.1	0.5	1.1	10.4	12.96	16.74	15	300	140
SHFCe12	120V/60/1	0.50	6.0	0.5	1.1	11.2	14.02	18.65	15	300	140

ELECTRICAL DATA - ECM MOTOR- 2 PIPE SYSTEM ONLY (1.0 KW HEATER)

MODEL	SUPPLY VOLTAGE	Fan Motor		Electric Heater kW (120V)	ERV FLA	Total Unit FLA	MIN. CCT. AMPACITY	(MOP)	MAX FUSE /CCT. BKR. AMP	MAX PRESSURE (PSI)	MAX EWT TEMPERATURE (F)*
		HP	FLA								
SHFCe03	120V/1/60	0.25	1.8	1.0	1.1	11.2	14.04	13.48	15	300	140
SHFCe04	120V/1/60	0.25	2.4	1.0	1.1	11.8	14.73	14.72	15	300	140
SHFCe06	120V/60/1	0.33	2.4	1.0	1.1	11.8	14.73	14.72	15	300	140
SHFCe08	120V/60/1	0.33	4.4	1.0	1.1	13.8	17.29	19.33	20	300	140
SHFCe10	120V/60/1	0.50	5.1	1.0	1.1	14.5	18.17	20.91	20	300	140
SHFCe12	120V/60/1	0.50	6.0	1.0	1.1	15.4	19.23	22.82	20	300	140

ELECTRICAL DATA - ECM MOTOR- 2 PIPE SYSTEM ONLY (1.5KW HEATER)

MODEL	SUPPLY VOLTAGE	Fan Motor		Electric Heater kW (120V)	ERV FLA	Total Unit FLA	MIN. CCT. AMPACITY	(MOP)	MAX FUSE /CCT. BKR. AMP	MAX PRESSURE (PSI)	MAX EWT TEMPERATURE (F)*
		HP	FLA								
SHFCe03	120V/1/60	0.25	1.8	1.5	1.1	15.4	19.25	17.65	20	300	140
SHFCe04	120V/1/60	0.25	2.4	1.5	1.1	16.0	19.94	18.89	20	300	140
SHFCe06	120V/60/1	0.33	2.4	1.5	1.1	16.0	19.94	18.89	20	300	140
SHFCe08	120V/60/1	0.33	4.4	1.5	1.1	18.0	22.50	23.50	25	300	140
SHFCe10	120V/60/1	0.50	5.1	1.5	1.1	18.7	23.38	25.08	25	300	140
SHFCe12	120V/60/1	0.50	6.0	1.5	1.1	19.6	24.44	26.99	25	300	140

SHFCe - OPTIONAL ELECTRIC HEATER DATA

Model Size	CFM	Electric Heater Air Temp Rise		
		0.5	1	1.5
SHFC03	350	4.5	9.0	13.5
SHFC04	450	3.5	7.0	10.5
SHFC06	600	2.6	5.3	7.9
SHFC08	800	2.0	4.0	5.9
SHFC10	1000	1.6	3.2	4.7
SHFC12	1200	1.3	2.6	4.0

Air Temp Rise (Delta T) = (kW*3160)/CFM = (MBH*925)/CFM



SIGMA SHFCe - HI-RISE VERTICAL STACK FAN COIL W/ INTEGRATED ERV

SHFCe - ECM FAN DATA

Model	Rated SCFM	Speed	External Static Pressure (in w.g.)						
			0	0.1	0.2	0.3	0.4	0.5	0.6
			SCFM	SCFM	SCFM	SCFM	SCFM	SCFM	SCFM
03	350	LOW	275	235	220	200	180	-	-
		MED	310	275	250	230	210	185	-
		HIGH	405	370	350	315	280	235	200
04	450	LOW	340	300	275	240	220	-	-
		MED	410	370	350	338	315	290	260
		HIGH	500	470	455	435	420	400	360
06	600	LOW	450	410	370	320	275	-	-
		MED	610	580	555	525	490	460	-
		HIGH	700	675	655	640	610	580	550
08	800	LOW	560	520	480	440	410	-	-
		MED	740	695	640	595	550	500	-
		HIGH	895	860	805	780	760	735	700
10	1000	LOW	760	720	660	620	560	-	-
		MED	890	840	800	750	700	650	600
		HIGH	1080	1040	990	950	900	860	820
12	1200	LOW	800	740	695	640	600	-	-
		MED	1120	1090	1050	1010	970	920	-
		HIGH	1350	1275	1240	1205	1175	1140	1100

Note: All airflow ratings are taken at lowest voltage rating of dual rating (ie. 208 volt).
Airflow ratings include resistance of dry coil, Return Air panel and clean MERV10 air filters.

SHFCe - ERV FAN DATA

% PWM Signal / Power	Potentiometer Dial Setting	ESP (External Static) inwg									
		0.00	0.05	0.10	0.15	0.20	0.25	0.30	0.40	0.50	0.60
25% Speed @ 6 Watts	10 O'clock	57	42	31	22	-	-	-	-	-	-
37% Speed @ 13 Watts	11 O'clock	80	59	38	27	19	-	-	-	-	-
45% Speed @ 18 Watts	12 O'clock	95	71	52	40	32	-	-	-	-	-
57% Speed @ 30 Watts	1 O'clock	110	90	78	64	53	46	40	35	30	-
69% Speed @ 43 Watts	2 O'clock	131	122	115	105	95	86	75	65	57	49
82% Speed @ 61 Watts	3 O'clock	147	144	140	135	130	125	118	109	98	85
95% Speed @ 82 Watts	4 O'clock	164	160	153	150	148	145	142	136	129	121

Notes:

- All airflow ratings (CFM) are taken at lowest voltage rating of dual rating (ie. 208 volt).
- ERV external static setting is based on exhaust duct run.
- ESP capability shown per fan.
- Recommended ERV fan speeds are field set to match duct static. Default factory settings may not match site conditions and requirements.
- Watts includes both ERV fans.



SIGMA SHFCe - HI-RISE VERTICAL STACK FAN COIL W/ INTEGRATED ERV

SHFCe - SOUND DATA

Sigma Fan Coil Unit Sound Pressure Test Data										
Unit Size	Motor Speed	NC	Sound Pressure Levels (Db)							
			Octave Band Center Frequency (Hz)							
			63Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz
03	Whisper	24	46	43	32	23	15	10	9	10
	Low	32	55	48	43	33	27	22	19	11
	Medium	35	56	49	46	34	29	25	21	12
	High	37	57	51	47	36	31	26	23	13
04	Whisper	24	46	43	32	23	15	10	9	10
	Low	35	56	49	46	34	29	25	21	12
	Medium	37	57	51	47	36	31	26	23	13
	High	39	58	52	49	37	33	28	24	14
06	Whisper	24	47	44	33	24	17	12	10	10
	Low	32	52	48	44	36	29	26	26	20
	Medium	35	54	49	46	37	31	28	29	23
	High	38	54	50	48	39	33	29	31	26
08	Whisper	29	55	47	39	32	25	24	27	14
	Low	35	54	49	46	37	31	28	29	23
	Medium	38	54	50	48	39	33	29	31	26
	High	45	67	59	54	47	39	39	39	32
10	Whisper	29	55	47	39	32	25	24	27	14
	Low	38	54	50	48	39	33	29	31	26
	Medium	45	67	59	54	47	39	39	39	32
	High	52	71	66	59	52	44	44	46	39
12	Whisper	29	55	47	39	32	25	24	27	14
	Low	49	70	62	57	50	42	42	43	35
	Medium	52	71	66	59	52	44	44	46	39
	High	54	72	67	60	53	45	46	47	40

Sigma Fan Coil Unit Sound Power Test Data										
Unit Size	Motor Speed	Sound Rating (dBA), LA	Sound Power Levels (Db)							
			Octave Band Center Frequency (Hz)							
			125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz	
03	Whisper	36	47	40	33	24	17	16	19	
	Low	48	57	53	46	36	28	25	21	
	Medium	51	58	56	48	39	30	28	22	
	High	52	60	57	50	41	32	29	23	
04	Whisper	36	47	40	33	24	17	16	19	
	Low	51	58	56	48	39	30	28	22	
	Medium	52	60	57	50	41	32	29	23	
	High	54	61	59	51	43	33	31	24	
06	Whisper	36	47	40	34	25	19	17	19	
	Low	47	55	51	45	37	32	33	28	
	Medium	50	57	54	47	40	35	36	31	
	High	51	58	55	48	41	36	37	33	
08	Whisper	44	53	47	39	32	32	30	23	
	Low	50	57	54	47	40	35	36	31	
	Medium	51	58	55	48	41	36	37	33	
	High	55	63	59	49	45	44	44	38	
10	Whisper	44	53	47	39	32	32	30	23	
	Low	51	58	55	48	41	36	37	33	
	Medium	55	63	59	49	45	44	44	38	
	High	60	69	64	53	48	49	50	45	
12	Whisper	44	53	47	39	32	32	30	23	
	Low	58	67	62	51	47	47	47	42	
	Medium	60	69	64	53	48	49	50	45	
	High	61	70	65	54	49	50	51	46	

Note: Above sound data may vary with actual site conditions. Sound Power: Sigma test room/2023 config.

Units fully furred in with 1/2-inch drywall and 2x4 wood frame construction.

Closet insulation: 3-1/2" Rockwool batt insulation inside stud space.

Configuration: Top Ducted and Front Supply Discharge. Return Air Panel - Acoustic Style, no baffle.

* Whisper mode is constant fresh air circulation, optional. Standard with SHFCe units.

Unit configuration: Free Inlet, Ducted and Front Supply Discharge.

Sound measurements taken from a distance of 1.0m away.



SHFCe - ERV LOW SPEED EFFECIENCY

Core Structure			
Shape	CrossFlow		IS01
Type	PP		
Flow	50	CFM	
Dimension	L	12	in
	L1		in
	W	12	in
	H	7.008	in
	H1	0.0709	in
Core exchange area	10.80	yd ²	
Core Volume	0.5838	ft ³	
IS- for injection total heat type PP- for PP hollow total heat type PS- for PP hollow sensible type Design by Fortuneway R&D			
Total Power	0	BTU	
Power Rate	0.00	BTU/CMH	
Cooling			Final
Temp. Increase	32.00	°F	
Temp. Decrease	0.00%		77.97%
Enth. Decrease	0.00%		75.42%
Heating			
Temp. Increase	32.00	°F	
Temp. Increase	0.00%		81.93%
Enth. Increase	0.00%		80.94%

Inlet		Unit		IP	
		Cooling		Heating	
		OA	RA	OA	RA
Dry bulb	95	75	32	72	°F
Wet bulb	79	63	28	57	°F
Humidity	49.9	51.6	61.4	39.0	%
Moisture	124.039	66.759	16.176	45.318	gr/lb
Enthalpy	19.279	11.540	1.381	9.271	BTU/lb
Density	0.071	0.074	0.081	0.074	lb/ft ³
Dew point	72.868	55.836	21.565	45.704	°F
Heat capacity	243.9	242.1	240.7	241.5	BTU/lb/°F
Kinematic viscosity	1.77E-04	1.66E-04	1.43E-04	1.64E-04	ft ² /s
Flow	50.0	50.0	50.0	50.0	CFM
Inner velocity	5.38	5.38	5.38	5.38	ft/s
Face velocity	2.69	2.69	2.69	2.69	ft/s

Outlet		Cooling		Heating	
		SA	EA	SA	EA
Dry bulb	79.41	90.59	64.77	39.23	°F
Moisture	81.61	109.19	39.17	22.32	gr/lb
Enthalpy	13.44	17.38	7.77	2.89	BTU/lb
Humidity	54.36	50.34	43.23	63.85	%
Density	0.073	0.071	0.075	0.079	lb/ft ³
Dew point	61.24	69.28	41.99	28.09	°F
Temp. Rate	77.97		81.93		%
Humi. Rate	74.07		78.91		%
Enth. Rate	75.42		80.94		%
Temp. Recovery	821.1485		1778.7304		BTU/h
Humi. Recovery	1484.2492		617.2088		BTU/h
Enth. Recovery	2305.3976		2595.9392		BTU/h
Enth. Rate	46.11		51.92		BTU/h/CMH
Flow	50.0	50.0	50.0	50.0	CFM
Pressure drop	0.14	0.13	0.12	0.13	in H2O

Note: Due to the heat from the machine motor and the heat insulation of the chassis, the simulated value of efficiency may have a deviation of 3-5% from the measured.

SHFCe - ERV HIGH SPEED EFFECIENCY

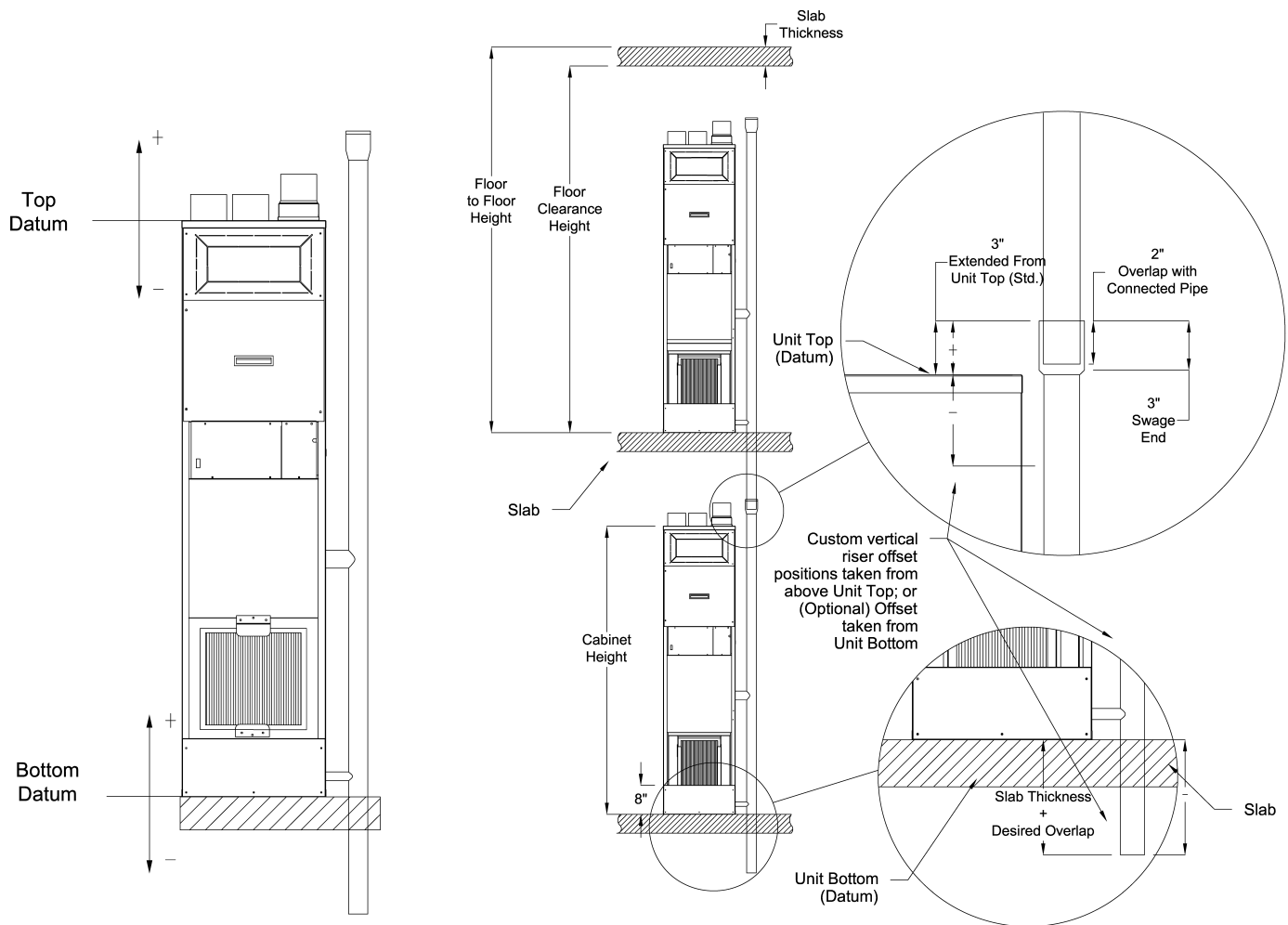
Core Structure			
Shape	CrossFlow		IS01
Type	PP		
Flow	100	CFM	
Dimension	L	12	in
	L1		in
	W	12	in
	H	7.008	in
	H1	0.0709	in
Core exchange area	10.80	yd ²	
Core Volume	0.5838	ft ³	
IS- for injection total heat type PP- for PP hollow total heat type PS- for PP hollow sensible type Design by Fortuneway R&D			
Total Power	0	BTU	
Power Rate	0.00	BTU/CMH	
Cooling			Final
Temp. Increase	32.00	°F	
Temp. Decrease	0.00%		69.33%
Enth. Decrease	0.00%		65.38%
Heating			
Temp. Increase	32.00	°F	
Temp. Increase	0.00%		75.03%
Enth. Increase	0.00%		72.45%

Inlet		Unit		IP	
		Cooling		Heating	
		OA	RA	OA	RA
Dry bulb	95	75	32	72	°F
Wet bulb	79	63	28	57	°F
Humidity	49.9	51.6	61.4	39.0	%
Moisture	124.039	66.759	16.176	45.318	gr/lb
Enthalpy	19.279	11.540	1.381	9.271	BTU/lb
Density	0.071	0.074	0.081	0.074	lb/ft ³
Dew point	72.868	55.836	21.565	45.704	°F
Heat capacity	243.9	242.1	240.7	241.5	BTU/lb/°F
Kinematic viscosity	1.77E-04	1.66E-04	1.43E-04	1.64E-04	ft ² /s
Flow	100.0	100.0	100.0	100.0	CFM
Inner velocity	10.76	10.76	10.76	10.76	ft/s
Face velocity	5.38	5.38	5.38	5.38	ft/s

Outlet		Cooling		Heating	
		SA	EA	SA	EA
Dry bulb	81.13	88.87	62.01	41.99	°F
Moisture	87.80	103.00	36.61	24.88	gr/lb
Enthalpy	14.22	16.60	7.18	3.48	BTU/lb
Humidity	55.20	50.21	44.58	63.91	%
Density	0.073	0.072	0.076	0.079	lb/ft ³
Dew point	63.24	67.65	40.28	30.72	°F
Temp. Rate	69.33		75.03		%
Humi. Rate	63.26		70.12		%
Enth. Rate	65.38		73.45		%
Temp. Recovery	1454.8418		3275.8211		BTU/h
Humi. Recovery	2529.5038		1459.1961		BTU/h
Enth. Recovery	3984.3456		4735.0172		BTU/h
Enth. Rate	39.84		47.35		BTU/h/CMH
Flow	100.0	100.0	100.0	100.0	CFM
Pressure drop	0.33	0.32	0.30	0.33	in H2O

Note: Due to the heat from the machine motor and the heat insulation of the chassis, the simulated value of efficiency may have a deviation of 3-5% from the measured.

SHFCe - RISER INSTALL DETAIL

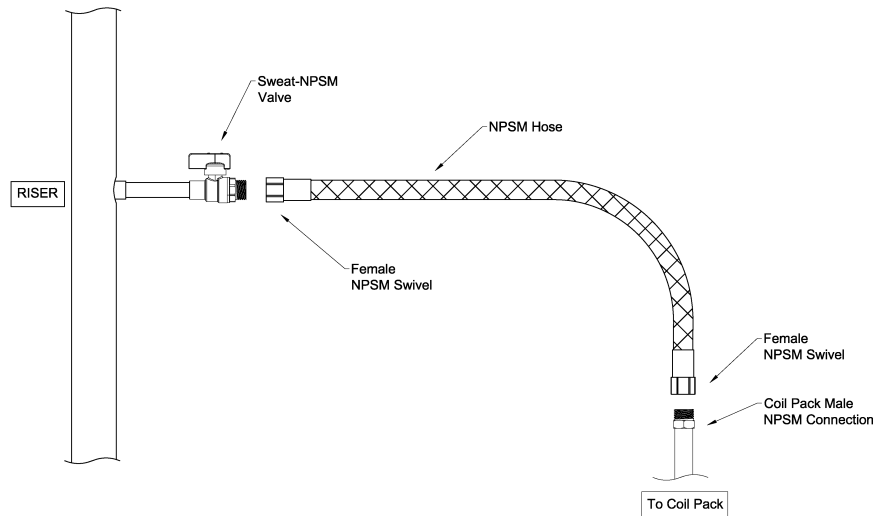


Notes:

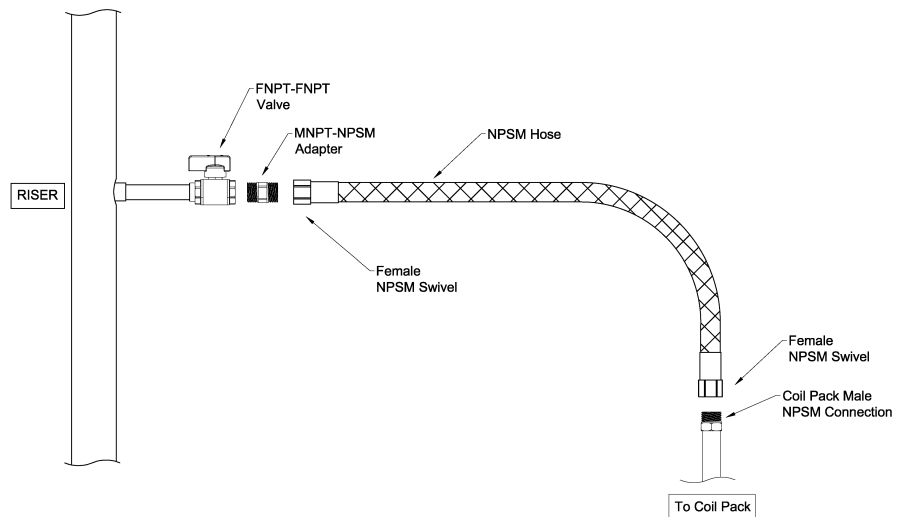
- Risers are sized using a "Top" and "Base" Datum reference. A specified Top Datum Offset indicates where top of riser will be located relative to top of cabinet. A Base Datum indicates where bottom of riser will be located relative to floor.
- Upon request Sigma will provide 3-inch (75mm) deep swage on risers .
- Risers should insert 2-inches (50mm) into the 3-inch (75mm) deep swage connection.
- Riser Length = Floor Clearance Height + Slab Thickness + 2-inch overlap (Rounded up to 120" or 144").
- Sigma supplies two standard riser lengths, 120" (10') and 144" (12').
- Supply extension tailpieces or transition riser pieces for joining dissimilar piping sizes are field supplied.
- Risers available in Type L and Type M copper.
- Condensate riser are available with optional 3/8-inch (10mm) thick closed cell insulation to prevent condensation.
- Supply and Return risers are available with 1/2-inch (13mm), or optional 3/4-inch (19mm) closed cell insulation.

SHFCe - RISER INSTALL DETAIL

STANDARD VALVE - SWEAT CONNECTED NPSM



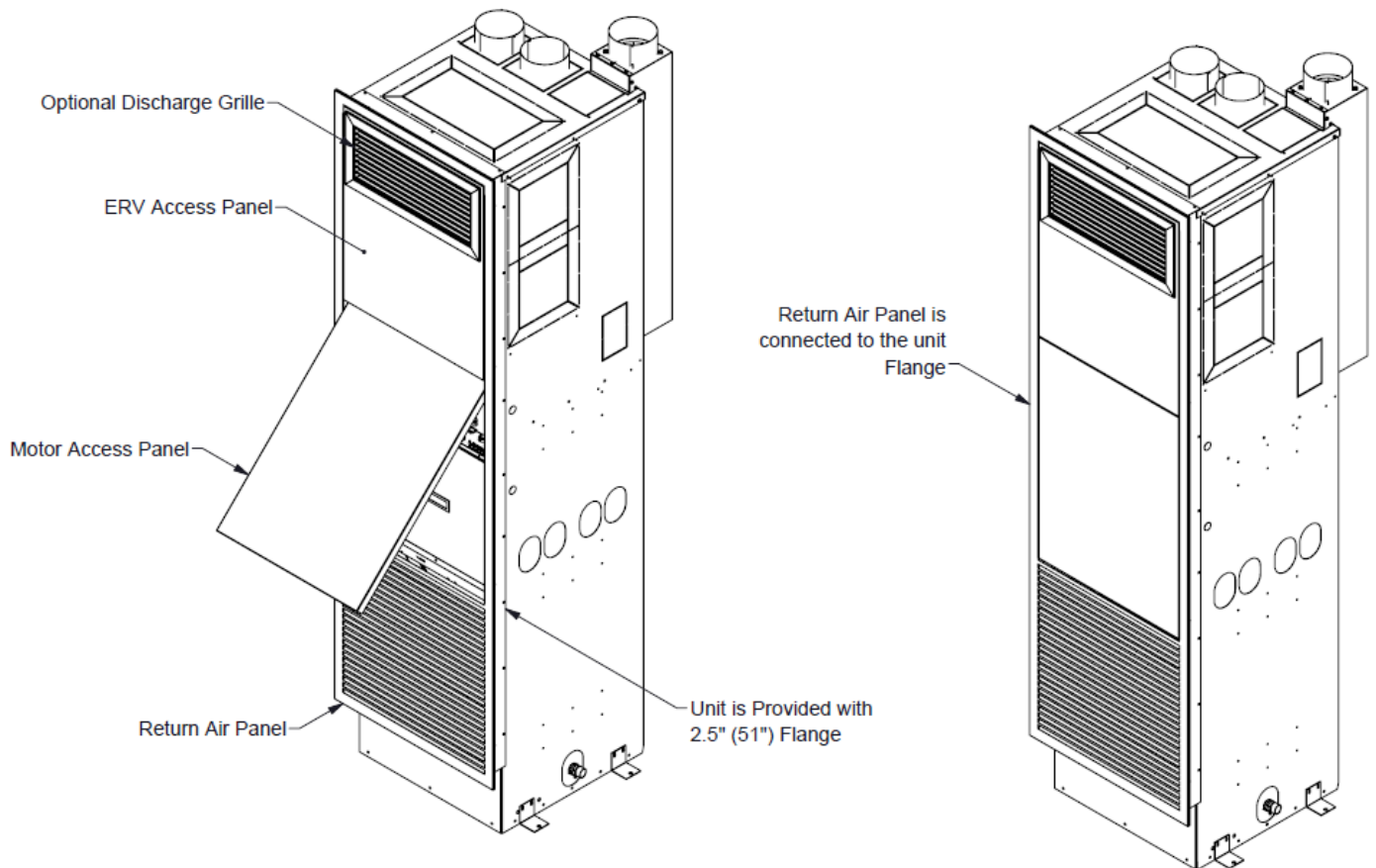
OPTIONAL FPT VALVE - FPT to FPT



Isolation Valve Notes:

- Standard NPSM sweat connected isolation valves are for Factory or Field Supplied Copper Risers.
- Optional Female NPT valves are for Field Supplied Risers only. Includes MNPT-MNPSM hose adaptors with hose kit.
- Optional Female NPT valves with PT ports are available.

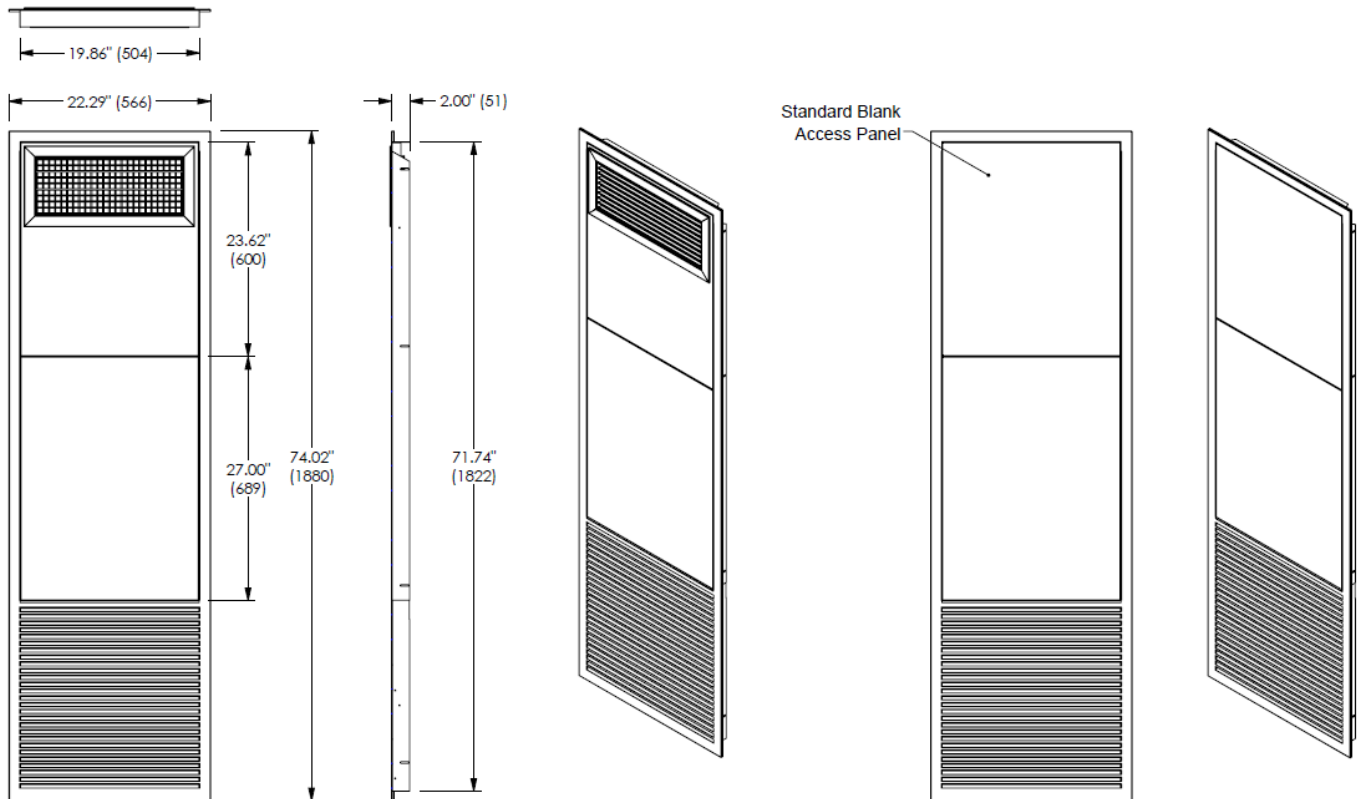
SHFCe - RETURN AIR PANEL



Notes:

Return Air Panel with optional Supply Discharge Grille shown.
 Unit ERV configuration Right Hand Back shown (RHB).
 Supply Discharge Grille may not be to scale.
 Unit shown with optional anchoring flange.

SHFCe - RETURN AIR PANEL DETAILS



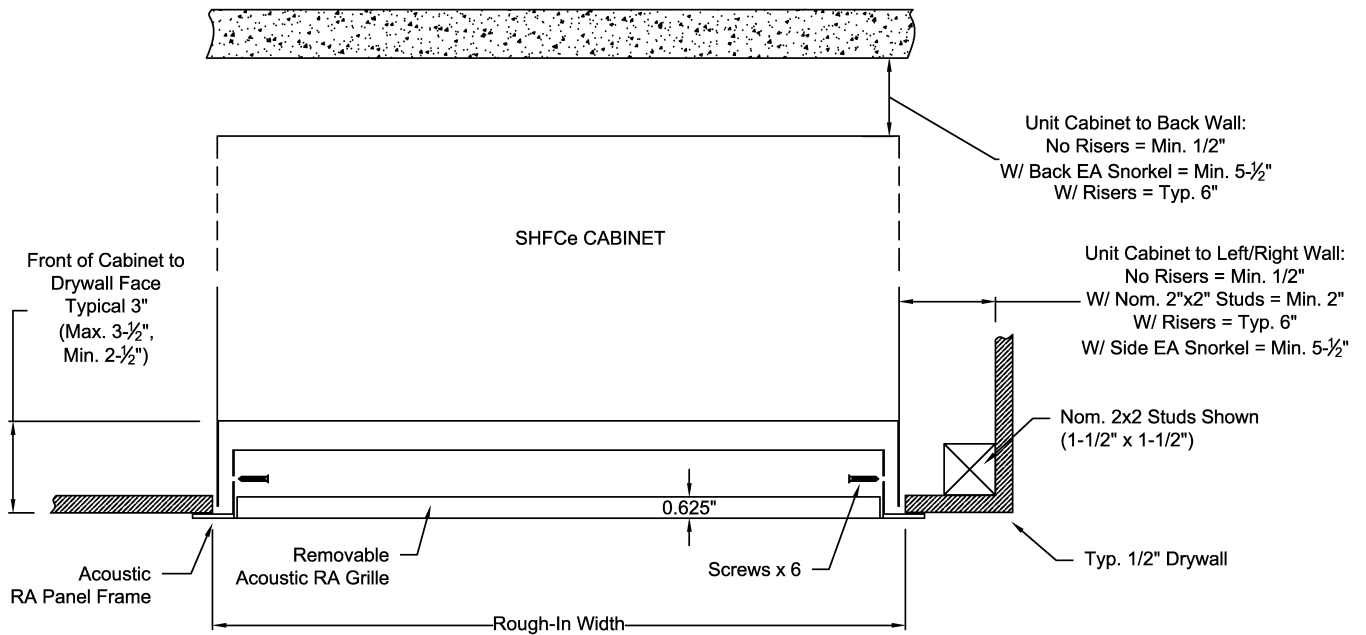
Return Air Panel Selections:

- Return Air Panel with Blank Access Panel
- Return Air Panel with Supply Discharge Grille Double Deflection (DD)
- Return Air Panel with Supply Discharge Grille Double Deflection with Opposed Blade Damper (DDOBD)

Notes:

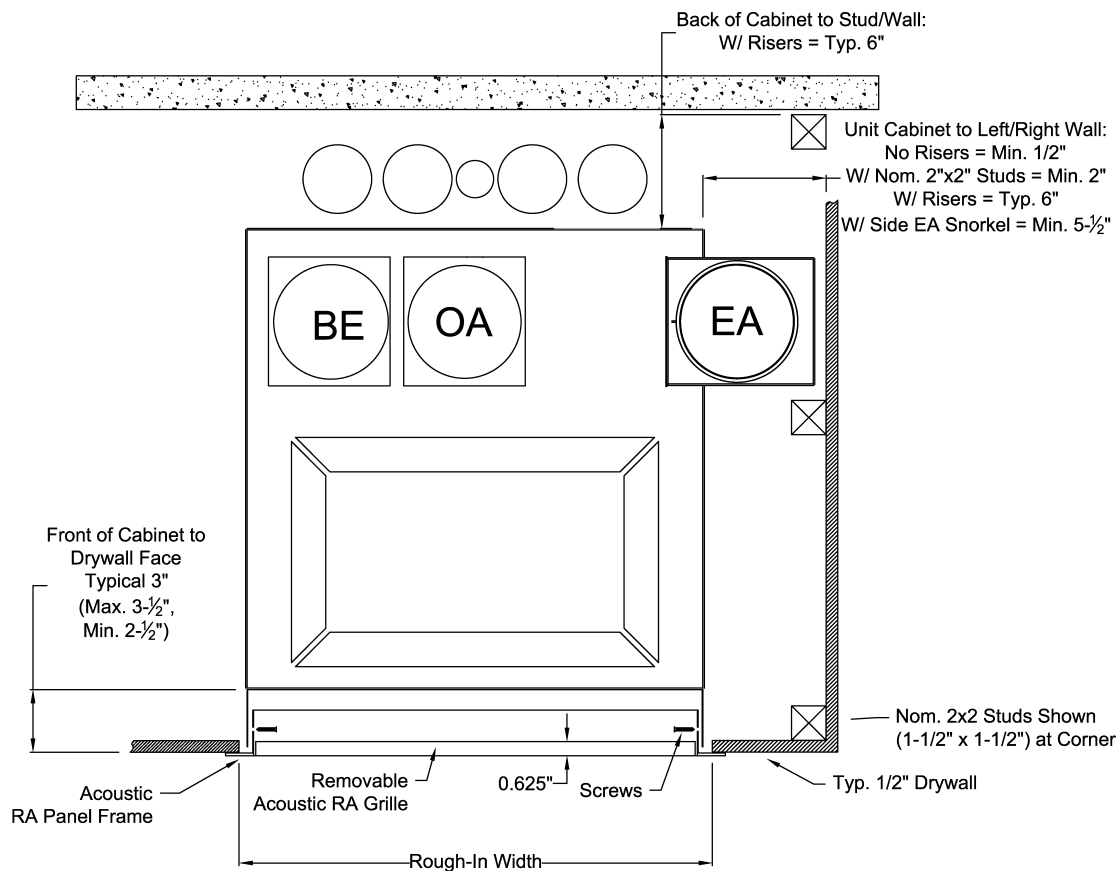
Return Air Panel is made in two sections for servicing.
 Return Air Panel is fastened to unit flange.
 Panel supplied in standard powder coat 'appliance white' finish.
 Supply discharge grilles are optional. Blank opening is provided by default.
 Supply Discharge grille may not be to scale.

SHFCe - RETURN AIR PANEL FURRING DETAILS (TYPICAL PLAN VIEW)



Notes:

- 1) Return air panel should be centered in front of the unit return air opening.
- 2) Return Air Panel is attached to unit flange - no drywall framing is required.
- 3) Standard Efficiency ERV ports shown.

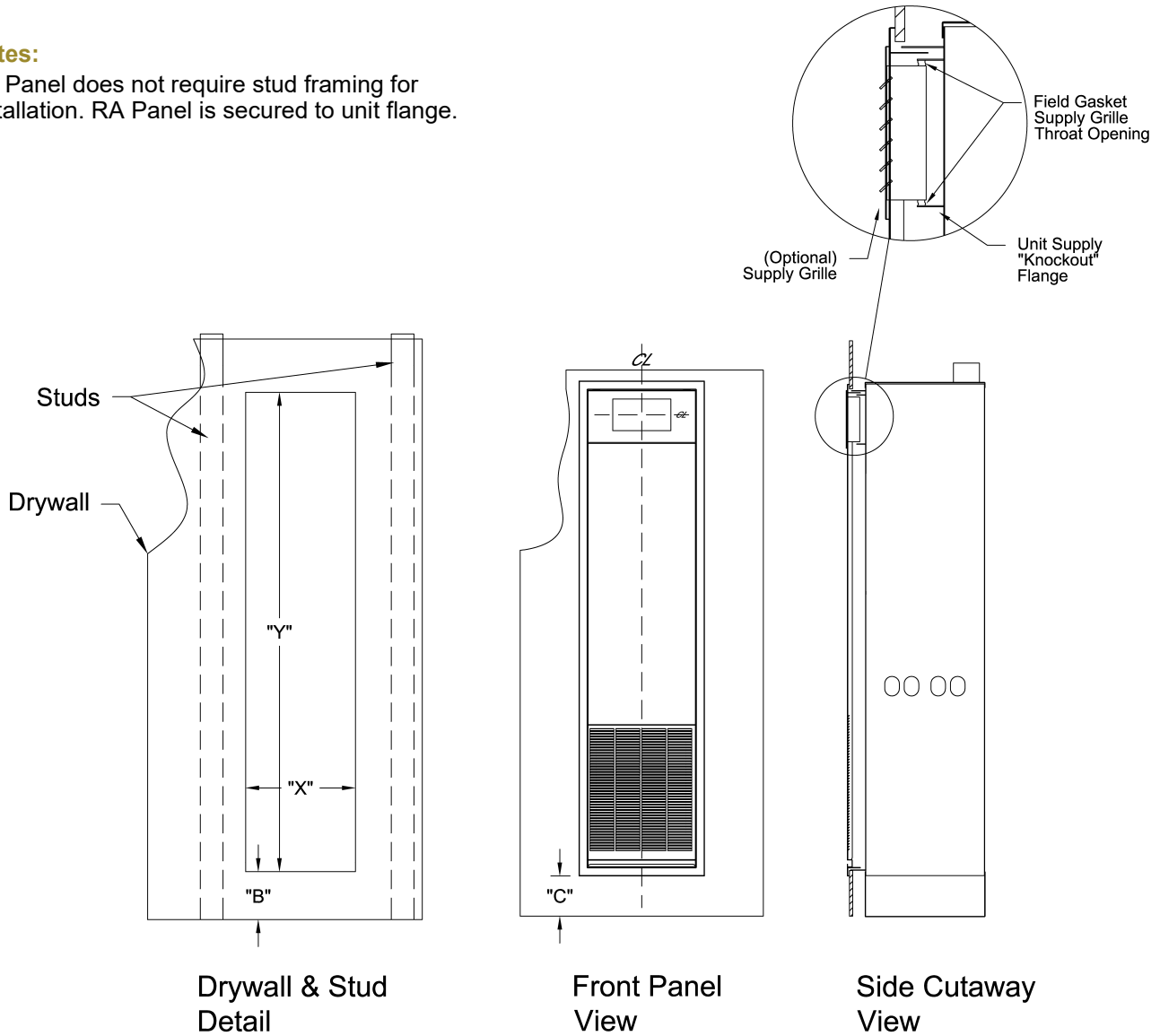




SHFCe - RETURN AIR PANEL ROUGH IN DETAILS

Notes:

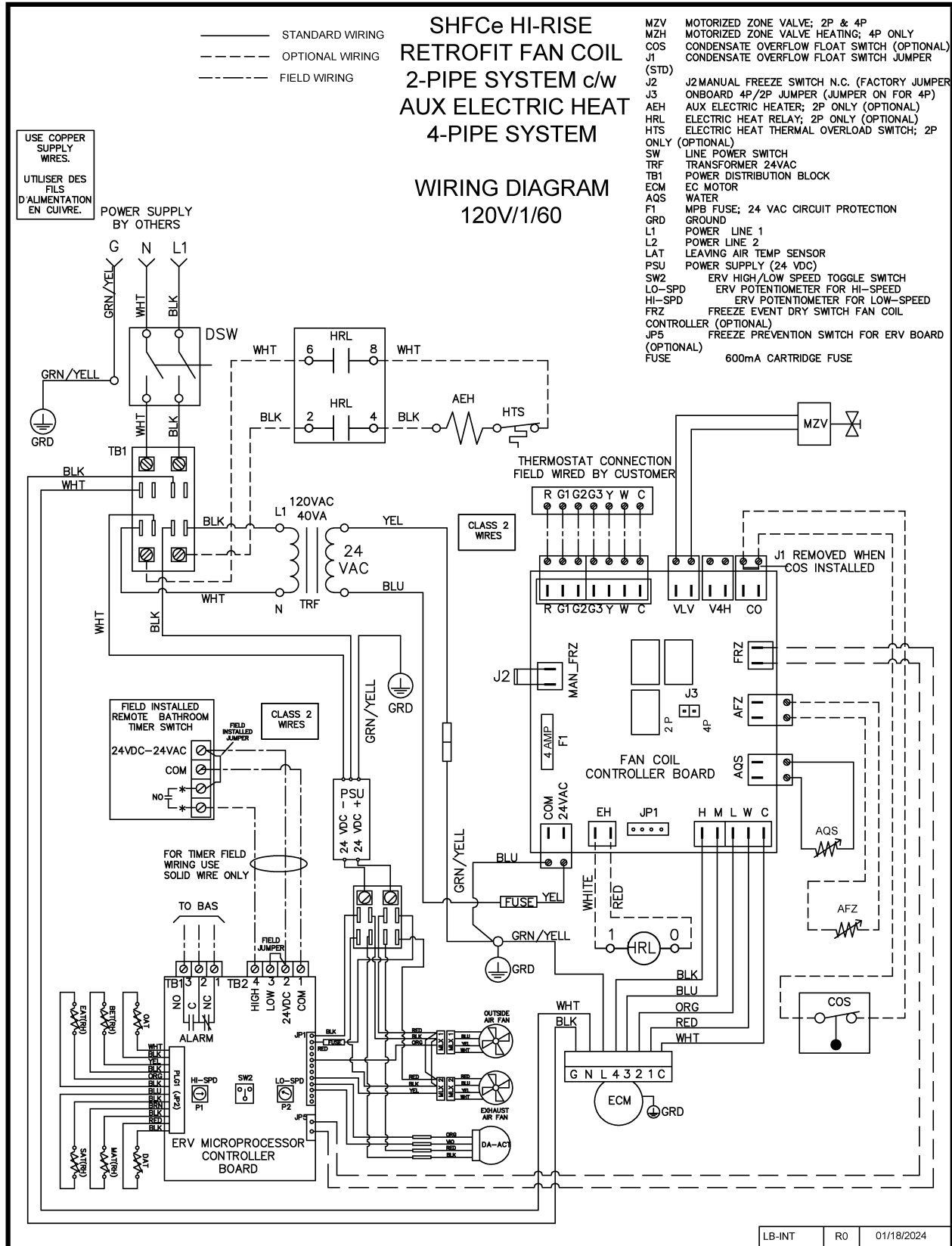
RA Panel does not require stud framing for installation. RA Panel is secured to unit flange.



Return Air Panel Rough-In Dimensions

Model	Cabinet Size	Cabinet Dimensions (in)		Rough-In (in)			
		W	D	"X"	"Y"	"B"	"C"
SHFCe 03	Y	20	20	20 1/4	72 1/4	7 3/4	6 1/2
SHFCe 04							
SHFCe 06							
SHFCe 08	Z	20	22	20 1/4	72 1/4	7 3/4	6 1/2
SHFCe 10							
SHFCe 12							

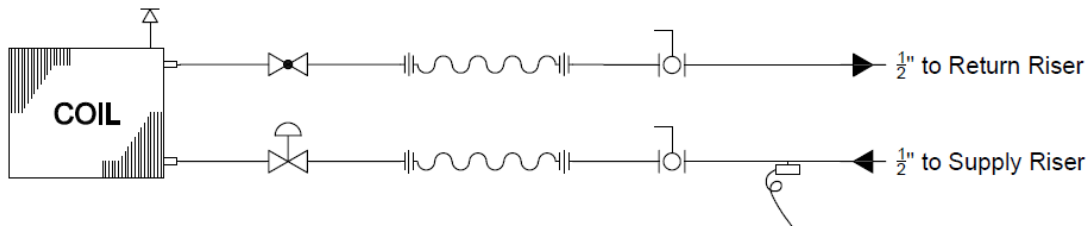
SHFCe - ELECTRICAL SCHEMATIC (2-PIPE or 4-PIPE)



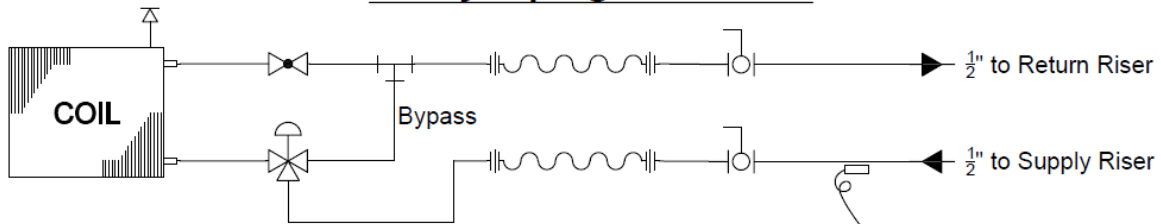
LB-INT	R0	01/18/2024
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SHFCe - PIPING DIAGRAM—2 Way and 3 Way

2 Way Piping Schematic



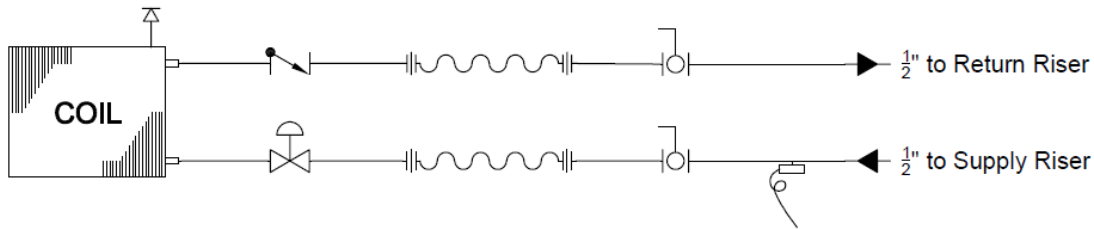
3 Way Piping Schematic



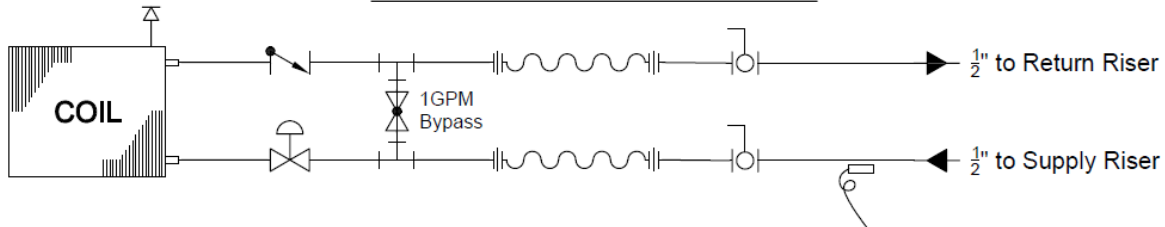
- Air Vent
- Auto Balancing Valve
- Flexible Hose
- Shut Off Ball Valve
- 2 Way Control Valve (NC to Coil, Failed safe close to coil)
- 3 Way Control Valve (NC to Coil, Failed safe close to coil)
- Pipe Sensor for 2 Pipe System









SHFCe - PIPING DIAGRAM—2 Way and 3 Way—Flood Protection


2 Way Piping Schematic



3 Way Piping Schematic



-  Air Vent
-  Auto Balancing Valve
-  Check Valve
-  Flexible Hose
-  Shut Off Ball Valve
-  2 Way Control Valve (NC, Failed to Last Position) - (PICV)
-  3 Way Control Valve (NC to Coil, Failed to Last Position)
-  Pipe Sensor for 2 Pipe System

	Manufacturers of Hydronic Heating Products 3325A Orlando Dr., Mississauga, Ontario, Canada, L4V 1C5 Tel: 905-670-3200, Fax: 905-670-3822	PLOT SCALE: 1=1	PROJECT: Monsheong	<p>Submittal for Monsheong Stouffville 2 LTC.</p>
	DO NOT SCALE PRINT DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED	DRWN: HG	ARCH:	
		DATE: 24/02/07	ENG: Yonghong Wang	
		REVISION: 1.001	OUR FILE: J97869	
			Piping Diagram Schematic	SHEET 1 OF -



SHFCe - CONTROLS

Discrete Speed Control EC Motors (ECM)

Fan motors are programmed with 3 pre-programmed speeds for Low, Medium, High and optional 'Whisper'. With optional 'Whisper' mode when there is a no request for cooling or heating, unit will operate in 'Whisper Mode' for constant low fan speed air circulation.

Thermostat

It is recommended to use a fan coil compatible, 3-speed thermostat to control heating and cooling operation to maximizing staging. Single fan speed thermostats will need to be wired to the desired fan speed on unit terminal strip.

Whisper Mode

With optional Whisper Mode unit fan will operate at ultra low fan speed for fresh air circulation.

SEQUENCE OF OPERATION

Call for Heating and Cooling

When a call for cooling is made, the optional motorized auto shut-off control valve will open. The contactor will then be energized so long as none of the following fault conditions are present:

- Condensate Over Flow Alarm (Optional)

When call for cooling request is terminated, the optional motorized auto shut-off control valve will be de-energized (close) and fan operation will end.

ERV Control Board

The ERV control board is powered by a 24VDC switching power supply mounted in the electrical box.

Units features six temperature sensors:

OA – Outside Air

MA – Mixed Air (Mix of Outside Air and Discharge Air)

SA – Supply Air

DA – Discharge Air

BA – Bathroom Exhaust Air (Before Core)

EA – Exhaust Air (After Core)

ERV Timer Switch (24VDC)

The optional ERV bathroom timer switch consists of a push button and timer option (10, 20,30 & 60min).

When the timer switch puts the unit on high speed mode for the set time and the high speed LED (LD2) lights up.

After the timer cycle is expired the unit ERV fans return to low speed (normal) mode and the low speed LED (LD4) lights up on

the control board. Low speed mode is default on initial power-up.

Airflow Balancing—EA Fan Speed Adjustment

The exhaust air fans are field calibrated on site during start-up and commissioning for both high speed mode (P1) and low speed mode (P2).

On the ERV board low (**LO-SPD**) and high speed (**HI-SPD**) potentiometers are field adjusted to meet design CFM requirements based on site conditions.

See following page for recommended factory settings as a starting point for setting ERV fan speeds.

OA Fan Speed Adjustment

During normal operation the OA fan speed is automatically set by the controller's potentiometer settings.

Defrost Mode

If the unit senses incoming OA temperature below 14°F (-10°C) the unit will enter defrost mode. During defrost mode the unit operates in 40-minute cycles modulating between fresh air and recycled air.

During fresh air cycles, the ERV controller will maintain the supply air temperature above 50°F by controlling OA damper.

Supply Air Control

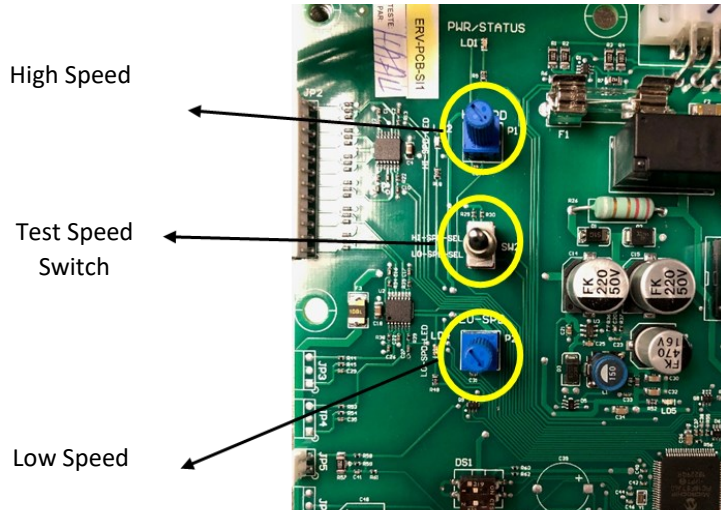
When the supply air (SA) temperature drops below 50°F (10°C) the ERV controller will activate the OA damper to maintain SA temperatures above this threshold to avoid the dumping of cold air.

This mode is disabled during the recycled air defrost mode.

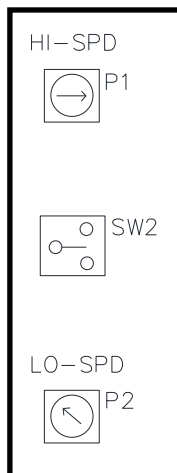
ERV FAN SETTINGS

The ERV fans are factory set to default position. A field air balance is recommended to determine required fan speeds - Low and High. The potentiometers located on the ERV board controls the Low and High fan speeds. These speeds are controlled using a PWM signal from 0% to 95% Torque. The range of the potentiometer is 8 o'clock to 4 o'clock.

SHFCe - CONTROLS - SETTING ERV FAN SPEEDS



Rotate clockwise to increase fan speed, rotate counter-clockwise to reduce fan speed.



- 1) Check that SW1 ON/OFF Switch is set to ON.
- 2) Set Hi-Speed to 3 o'clock position (80% Torque)
- 3) Set Lo-Speed to 12 o'clock position (45% Torque).
- 4) Site to verify toggle switch SW2 is in the middle position.

Site conditions may require different setpoints based on duct static and bathroom CFM fan requirements.



SHFCe - MECHANICAL SPECIFICATION

1 GENERAL

Vertical stacked fan coil units shall be Sigma SHFCe Series with integrated ERV. Units shall provide scheduled capacities at the ampacity and voltage shown on the drawings. Specified airflow shall be at the scheduled external static pressure and shall include the effects of a wet coil and clean filter.

Each unit shall be factory tested. Each unit shall have factory affixed label showing ETL logo. Cabinets shall be factory wired and pre-piped when applicable.

2 CABINET

2.1 The vertical stacked fan coil units shall be Sigma with an integrated ERV. Units shall provide scheduled capacities at the ampacity and voltage specified.

2.2 The cabinet shall be 20-gauge galvanized steel. Cabinet shall have internal surfaces insulated with 1/2 inch thick, 3.5 lbs. high-density, mold resistant, thermal and acoustic insulation. Insulation shall meet NFPA 90, UL-181, and ASTM-C1071 standards and insulation shall have a flame spread of less than 25, and a smoke developed classification of less than 50 per ASTM E-84 and UL 723.

2.3 Physical dimensions of each unit shall be accommodated within furring / ceiling-slab spaces provided as shown on the architectural drawings

2.4 A removable inner service panel allowing service access to the fan, valves and coil pack compartment shall be provided with each unit.

2.5 A removable inner ERV service panel allowing front service access to the ERV, ERV fans and filters shall be provided with each unit.

2.6 The drain pan shall be stainless steel. The drain pan outlet shall be readily accessible for cleaning with a 7/8 inch OD (22mm) copper drain connection. Unit shall be provided with a flexible p-trap condensate hose for connection to the condensate riser.

2.7 (Factory) (Field) supplied supply and return risers shall be (Type L) (Type M) copper, with (factory) (field) mounted shut-off ball valves on each supply and return riser. Valves shall be brass and rated for 300 psig (2060kPa). A (Type M) condensate riser shall be (factory) (field) supplied and field installed. Risers sizes shall be installed according to building plans.

2.8 Risers shall have optional factory provided 3-inch (75mm) deep swage. Reducers and caps shall be field provided and field installed. Anchors, and compensators shall be field supplied and field installed.

2.9 Unit cabinet shall come with supply discharge opening "knockouts". All cabinet discharge openings shall include 1-1/2 inch drywall flange around the full opening perimeter. Supply discharge "knockouts" are cut and field selected.

2.10 Supply ducts shall not be rigidly attached to the cabinet and shall be acoustically isolated from cabinet using flexible connections. Contractor shall install flex connection on all discharge openings. There shall be no rigid connection to supply-air discharge grilles or supply ducts.

2.11 Each unit shall have a sectionalized removable Return Air

panel. The panels shall be easily removable without tools. The lower panel section shall have access to the filter, blower assembly, and service disconnect. The upper panel shall provide access to the ERV section, including a removable ERV core, fans and sensors.

2.12 (Optional) Perimeter Return Air Panel shall be provided. Return air panel is sectionalized into 3 sections and all panels removable without tools.

2.13 (Optional) Front supply discharge grille shall be provided that integrates with ERV Return Air Panel. Supply discharge grille shall be provided as double deflection or with optional opposed blade dampers.

2.14 Each ERV shall be factory configured for the handing specified on the room schedule. Each ERV shall be factory installed in the Vertical Stack cabinet and factory wired. ERV's that ship loose and/or are not configured, installed, and wired at factory and/or require field installation are not accepted. ERV power supply shall be factory wired to main unit disconnect. Single source power is required for entire fan coil and ERV. Units requiring separate external power feed for ERV module are not accepted.

2.15 ERV casing shall be constructed with 22GA galvanized steel. The ERV cabinet shall be fully insulated. Cabinet is furnished with 5-in (125mm) diameter ERV duct connections. Field Outdoor Air, Bathroom Exhaust and Exhaust Air duct diameters shall be 5-in (125mm) in diameter. ERV shall be integral to the cabinet and is factory installed in the fan cabinet section.

2.16 Energy recovery core material shall be Polymeric membrane with sensible and latent recovery. ERV core shall have no odor crossover (AHRI 1060 certified for <0.5% crossover), mold and bacteria resistant (certified to ISO 846), and water washable. Cellulose (paper), plastic cores shall not be accepted.

2.17 Each of the two air streams shall have independent MERV 6 washable filter media. Each filter shall have a face area of no less than 80 square inches.

2.18 ERV shall be fitted with a modulating outside air damper controlled by an electronic actuator that will modulate outside air (OA) as required to maintain fresh air introduction and shut-off if required by the freeze protection sequence.

2.19 (Optional) Unit shall be provided with a High Efficiency ERV Core. ERV Core shall provided minimum 80% sensible effectiveness at 50CFM in heating mode.

2.20 (Optional) Provide each unit with 2-inch thick MERV 13 pleated filters.

3 FAN & BLOWER

3.1 Each unit shall include a factory mounted forward curved, double inlet double width centrifugal direct drive fan and motor assembly with internal overload protection. The blower fan assembly shall be positioned horizontally from a sheet metal blower deck.

3.2 Units shall be supplied with an ECM fan motor as standard. Fan motors speeds shall be field selectable by wiring thermostat to required fan speed terminals.

3.3 ERV unit shall be fitted with two ERV fans. Fan motor speed shall be fully controllable via internal signal.

3.4 ERV unit shall provide heat exchange when bathroom exhaust is activated at all times. ERVs that have bathroom air bypass



SHFCe - MECHANICAL SPECIFICATION CONT'D

ERV heat exchanger are not accepted.

4 COIL PACK

- 4.1. Provide high temperature and pressure rated water hoses for connection of the risers to the coil pack. The hoses supplied shall be constructed with an inner core of rubber, a stainless-steel metal braid, and rubber outer covering. Fittings shall be brass construction. Hoses shall carry a working pressure rating of 600 psig.
- 4.2. The coil pack shall be mounted inside the fan cabinet. Air side coils shall have copper tubes mechanically bonded to aluminum fins. Coil shall be sized to meet scheduled performance for cooling and heating. Provide 1" T/A filter on coil face.
- 4.3. The coil pack shall have factory installed 2-way control valves, as specified on the mechanical drawings.
- 4.4. (Optional) The coil pack shall employ an optional 3-way motorized auto shut-off valve to shut off water to the unit. Valve shall be factory installed as part of the coil pack assembly.
- 4.5. (Optional) The coil pack shall employ an optional 6-way motorized auto shut-off valve to shut off water to the unit. Valve shall divert cooling or heating water to the single coil pack. Coil pack shall be factory installed as part of the coil pack assembly.
- 4.6. (Optional) The coil pack shall employ an optional pressure independent control valve (PICV) to shut off water to the unit and balance water flow.
- 4.7. (Optional) The coil pack shall employ optional autoflow balancing valve factory installed in the coil pack to maintain specified unit water flow rate over 2-80 psig differential water pressure. Auto flow balancing valve shall be field serviceable.
- 4.8. (Optional) The coil pack shall come with optional y-strainer with #20 mesh screen to filter any debris and shall be field serviceable.

5 CONTROLS

- 5.1. Each unit shall be factory wired with all necessary controls. Each unit shall come standard with a fan motor contactor, 24-volt control power transformer, terminal block for low voltage field wiring connection, and terminal block for main power electrical connection, (optional) unit mounted service disconnect switch.
- 5.2. (Optional) Condensate Overflow Switch shall be installed in the drain pan and wired to the electrical box compartment.
- 5.3. Thermostats shall be 24VAC, field wired to the unit terminal strip. Thermostats shall be (non-programmable) (programmable). Thermostats shall be suitable for fan coil operation and have 3 fan speed control capability with Auto Change-Over and LCD backlit display.
- 5.4. Fan operation shall have an ultra low fan speed "whisper mode" for air circulation when there is no call for heating or cooling to circulate Outdoor Fresh Air.

6 ERV CONTROLS

- 6.1. ERV shall be integrated into the Vertical Stack cabinet and configured, fully wired at factory. Units that require field installation, field configuration and / or field wiring of ERV are not accepted.
- 6.2. The built-in ERV control algorithm shall operate to thermody-

namicly equalize outside air (OA) and exhaust air (EA) flow, which may vary considerably depending on stack effect. ERV shall be controlled with an on-board microprocessor controller. ERV shall measure 6 temperature sensors: Outside Air (OA), Mixed Air (MA), Supply Air (SA), Discharge Air (DA), Bathroom Exhaust Air (BA), and Exhaust Air (EA).

- 6.3. **Air Flow:** ERV shall contain two potentiometer speed settings, one for each high and low speed modes. Fan speeds are field configurable to meet design ERV CFM conditions in Low and High ERV fan speed requests.
- 6.4. **Defrost Mode:** ERV unit shall contain a Normally Closed, spring return outdoor damper for tempering outside air. Manual outside air dampers are not accepted. ERV unit shall enter defrost mode once OA temperatures are below 14°F (-10°C), to maintain supply air (SA) temperature above 50°F (10°C).
- 6.5. **Supply Air Temperature:** Recirculation damper shall temper outside air (OA) to maintain a minimum supply air (SA) temperature of 50°F (10°C) to avoid dumping of cold air into the conditioned space.
- 6.6. **Whisper Mode** shall provide constant air circulation to distribute the Outdoor Fresh Air throughout the occupied space.
- 6.7. ERV shall provide bathroom exhaust requirements without the need for additional field installed bathroom exhaust fan and wiring. Units that require bathroom fan to be field installed are not accepted.
- 6.8. ERV shall operate continuously even when unit heating and cooling demand is not required. Units that do not have continuous ERV fan on capability shall not be accepted.

7 TESTING & WARRANTY

- 7.1. Each unit shall be factory tested using a multi-step controlled testing equipment to prevent operator error during factory testing.
- 7.2. Warranty shall be for parts, 1 year not to exceed 18 months from date of shipment.

8 EXECUTION

- 8.1. Units shall be installed neat and level.
- 8.2. Flush the system per manufacturer instructions before connecting fan coil. Contractor shall join supply and return riser flexible hoses together, at the top/bottom on every riser and at the farthest point from the pump for flushing purposes. Contractor shall not flush or clean riser system through the unit coil pack.
- 8.3. Installing contractor shall install risers and install riser transition piece connections where riser sizes change.
- 8.4. The hoses shall be installed in the field by the contractor to the riser isolation valves. The flare fittings on the hoses shall be connected according to industry standard (Finger tighten then tighten with wrench while always using back-up wrench).
- 8.5. Flush the system per manufacturer instructions before connecting coil pack. The riser system shall be flushed, cleaned and commissioned before connecting fan coil units to the riser system.
- 8.6. Contractor shall make all necessary provisions to bring in ducts for "outside air", "bathroom exhaust", and "bathroom air to outside" and field connect each duct to unit mounted take-offs.
- 8.7. Contractor shall provide flexible duct connections on all single piece units.

SHFCe - ACCESSORIES—SUPPLY AIR GRILLE



SUBMITTAL SHEET

Rev. 21

GSA20/GSA27 - GAA20/GAA27 Series All dimensions are in inches

Double Deflection Supply Grille

Material: Extruded Aluminum Frame

Air Pattern: Adjustable Air Pattern

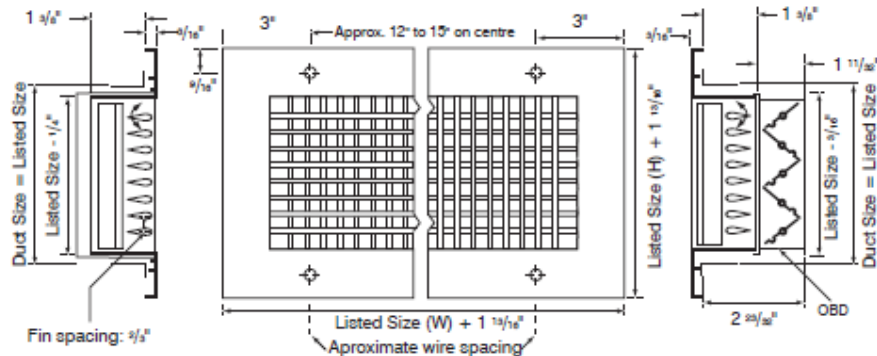
Horizontal Face Bars (Standard)
(Mullion required for w>18")

- GSA20** Steel fins
- GSA27** Steel fins with OBD
- GAA20** Aluminum fins
- GAA27** Aluminum fins with OBD



Vertical Face Bars

- GSA20-V** Steel fins
- GSA27-V** Steel fins with OBD
- GAA20-V** Aluminum fins
- GAA27-V** Aluminum fins with OBD



Options			
<input type="checkbox"/> -GK Flange Gasket	<input checked="" type="checkbox"/> -GN Neok Gasket	<input type="checkbox"/> -GR Rear Gasket	
<input type="checkbox"/> -SF Supplied w/ sub frame	<input type="checkbox"/> -DS Debris (Bird) Screen	<input type="checkbox"/> -IS Inset Screen	<input type="checkbox"/> -FB Fixed Blades 0 degrees



Finish				
<input checked="" type="checkbox"/> /W White (Initial)	<input type="checkbox"/> /B Brushed Aluminium	<input type="checkbox"/> /M Mill Finish	<input type="checkbox"/> /L Brushed and Lacquered	<input type="checkbox"/> /C Custom (Please Specify)

Panel Option for T-bar lay-in Ceiling		
	Steel (WxH)	Aluminum (WxH)
	<input type="checkbox"/> -X1212	<input type="checkbox"/> -Y1212
	<input type="checkbox"/> -X1224	<input type="checkbox"/> -Y1224
	<input type="checkbox"/> -X2412	<input type="checkbox"/> -Y2412
	<input type="checkbox"/> -X2424	<input type="checkbox"/> -Y2424
	<input type="checkbox"/> -X2448	<input type="checkbox"/> -Y2448
	<input type="checkbox"/> -X4824	<input type="checkbox"/> -Y4824
	<input type="checkbox"/> -X2020	<input type="checkbox"/> -Y2020
	No fastening options available	

Fastening Method				
<input type="checkbox"/> -1 No Fastening	<input checked="" type="checkbox"/> -2 Spring clip	<input type="checkbox"/> -3 Screw holes (Standard)	<input type="checkbox"/> -4 Concealed	<input type="checkbox"/> -6 Adhesive tape
Schedule type: _____ Job: _____ Architect: _____ Engineer: _____ Contractor: _____				



SHFCe - ACCESSORIES — WI-FI SMART THERMOSTAT—ESC Pro 2



Key Features

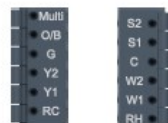
- › Up to 3heat/2cool
- › 3 speeds/Auto Fan for High Rise Fancoil
- › Auxiliary ERV On/Off control
- › 3 selectable states: ECO, Comfort, Scheduling
- › Temperature and Humidity display
- › Local weather forecast display
- › Compatible with gas/oil/electric boiler, furnace, heat pump, air-conditioning, High Rise Fancoil
- › Compressor protection
- › 24VAC power (C-wire required)



Main Menu



Main Menu Of Auto Changeover



Terminal Block



SHFCe - ACCESSORIES — BATHROOM TIMER

ERV TIMER CUT SHEET

The ERV timer is powered by the 24 Volt DC terminals from the ERV PCB board inside the cabinet. Its output will be a dry contact to engage the ERV for the given timer. Run a 4-wire harness (min. 22 AWG), **solid wire**, between the timer and the PCB ERV board in the fan cabinet. **Do not use stranded wire, as this is not a best practice for securing wiring with screw terminals.** Install a jumper on control board pins 2 and 3, and install jumper on ERV timer at across 24VAC & * terminal, as indicated in electrical schematic. Incorrect wiring of the ERV timer will result in premature failure of timer.

The ERV timer includes an ON/OFF switch and 4 timing indicators (10, 20, 30, 60 minutes). LEDs are blue. The operation is described below:



- 1) On power up, all LEDs are off and relay is open.
- 2) On the first switch press the 10 min light turns ON and the relay is closed for 10 minutes.
- 3) On the second press (inside the 10 minutes), the 20 min light turns ON and the relay is closed for 20 minutes (timer count is reset).
- 4) On the third press (inside the 20 minutes), the 30 min light turns ON and the relay is closed for 30 minutes (timer count is reset).
- 5) On the fourth press (inside the 30 minutes), the 60 min light turns ON and the relay is closed for 60 minutes (timer count is reset).
- 6) On the fifth press (inside the 60 minutes), all LEDs are turned OFF and the relay remains open.
- 7) At the end of the timer count the LEDs light turns OFF and the relay is opened.