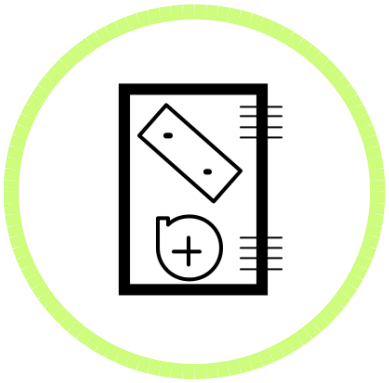
FORCE FLOW HEATERS



TECHNICAL CATALOG

SIGMA

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PRODUCT OVERVIEW

Sigma force flow cabinet unit heaters are styled to fit into any room and provide efficient, individualized room temperature control. The outer cabinet is constructed from corrosion resistant 16Ga steel and is available in left or right hand configuration.

Sigma force flow heaters have been designed so that as the unit size increases, the depth and height of the units remains constant. Only the length of the unit increases with capacity, resulting in uniform heights between models. The removable front panel provides easy access to the internal structure for servicing the motor, fans, controls and coils.

The standard cabinet is easily installed and may be ordered in any of several different airflow configurations. Installation collars shipped with recessed models provide further standardization and product simplification. These collars are field installed permitting units to be fully or partially recessed to suit field conditions and are adaptable to both floor mount or above-floor installations. The Sigma force flow cabinet heaters are available in flat top, upright, inverted recessed or sloped top configurations to suit varying design and specification requirements.

Finishes

Force flow cabinet heaters are available in various standard finishes, from the economical primer finish to a choice of industry-standard baked enamel colours and custom baked enamel colours are available upon request.

Heating Coils

Manufactured from 1/2" outside diameter seamless copper tubes expanded within corrugated aluminum fins allowing quiet operation at a working pressure of up to 150 psi.

Fans and Motors

Twin centrifugal double-inlet, double-width fans are mounted onto double shafted motors for a quiet operation and optimal air flow distribution across the coil and through the unit. Select larger units employ a pair of twin fan/motor assemblies and all fan wheels and housing are corrosion resistant.

Motors are permanent split-capacitor type with self-aligning sleeve bearings for durability, low operating cost and reduced noise levels. A motor controller provides infinitely adjustable blower speed.

Media Filter

Washable Aluminum mesh filters are standard. They are designed for quick and cost effective replacement.

MERV 8 rated 1" thick pleated throwaway type filters are available as an addon.

UNIT SPECIFICATIONS

Furnish and install where shown on the drawings, Sigma force flow cabinet heater as described in this specification.

Cabinets

The outer cabinet shall be constructed of heavy duty corrosion resistant 16 Ga steel. The removable front panel shall provide uninhibited access to the motor, fans, controls and coil. Cabinets shall be available in a left or right hand configurations. Cabinets shall be a standard factory finish in grey primer.

Coils

Heating coils shall be manufactured from 1/2" outside diameter seamless copper tubes which are expanded within corrugated aluminum fins. The coils shall be designed for working pressures up to 150 psi.

Blowers

Blowers shall be twin centrifugal double-inlet double-width fans are mounted onto double-shafted motors. Where 1200 and 1500 cfm units are specified, they shall employ a pair of twin fan & motor assemblies. All fan wheels and fan housings shall be corrosion resistant.

Motors

Motors shall be permanent split capacitor type with self aligning sleeve bearings and internal overload protection.

Filters

Filters shall be supplied with wire framed polyester media filters as standard.

Controls and Other Standard Options

Units shall include optional features as follows:

1. 3 Speed Control with Off Position
2. Remote or unit mounted line voltage thermostat
3. Remote mounted line voltage thermostat
4. Unit mounted aquastat
5. Manual starter switch with overloads
6. High static motor for ducted units (not an option for 1000 and 1500 CFM units)
7. Factory applied powder coat finish
8. Grey primer finish for field paint
9. Inlet and discharge:
   - Punched Louver
   - Aluminum bargrille (clear anodized finish)
9. Torx-plus security fasteners for main access panel
10. Slotted or keyed access door
11. 1/2” thick glass fiber black mat insulation
12. One, two, or three row water coils

Special Options

1. High-efficiency electronically commutated motor (ECM), optional 0-10 VDC variable input or 3 speed setup
2. Unit mounted 120/24 VAC 40VA transformer and relay for on-off control
3. 14 gauge steel optional for entire cabinet or front cover only
4. Brushed stainless steel optional for entire cabinet or front cover only
5. Oversized front covers for retrofit application
6. 4 way adjustable discharge
7. Perforated inlet and discharge
8. Custom paint finish
9. Steam coils
10. MERV 8 rated 1” thick pleated throwaway filter

3. PRODUCT OPTIONS

3.1 MODEL NUMBER BREAKDOWN

Sample Product Number:

SFF	D.1	04	STD	120/1/60	W	11	WTR2	ILV	OLV	RH	AQ	TS	FSC	KAD	PRM
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

1. Product

2. Generation

3. Size
   02 - 200 CFM
   03 - 300 CFM
   04 - 400 CFM
   06 - 600 CFM
   08 - 800 CFM
   10 - 1000 CFM
   12 - 1200 CFM
   15 - 1500 CFM

4. Application
   STD– Hot Water (EWT < 200 F)
   (Consult Factory for Steam Application)

5. Voltage/Phases/Frequency
   120/1/60 208/1/60 230/1/60

6. Model
   Refer to Table ….

7. Arrangement
   Refer to Table ….

8. Coil
   WTR1- 1 Row Coil (Only for Water)
   WTR2- 2 Row Coil (Only for Water)
   WTR3- 3 Row Coil (Only for Water)

8. Inlet Type
   ILV - Inlet Stamped Louver
   IBG - Inlet Bargrille

9. Outlet Type
   OLV - Outlet Stamped Louver
   OBG - Outlet Bargrille

10. Piping Handing
    LH- Left Hand Piping
    RH– Right Hand Piping

11. Unit Mounted Aquastat
    NAQ - No Aquastat
    AQ - Unit mounted Aquastat

12. Unit Mounted Thermostat
    NTS- No Thermostat
    TS- Unit mounted Thermostat

13. Unit Mounted Fan Speed Control
    NFSC - No Fan Speed Control
    FSC - Unit mounted Fan Speed Control

14. Cabinet Insulation
    NIS - No Insulation
    INS - Insulated Unit

15. Access Door
    NAD - No Access Door
    SAD - Slotted Access Door
    KAD - Keyed Access Door

16. Cabinet Finish
    PRM - Primer Finish
    WPRM - White Primer Finish
    NSW - New Snow White Enamel Finish
    TWHT - Tinted White Baked Enamel Finish
    CMW - Cameo Baked Enamel Finish
    SFD - Soft Dove Baked Enamel Finish
    BGE - Beige Baked Enamel Finish
    GRY - Gray Baked Enamel Finish
    BLK - Satin Black Baked Enamel Finish
    CST - Custom Baked Enamel Finish

DIMENSIONS AND WEIGHTS

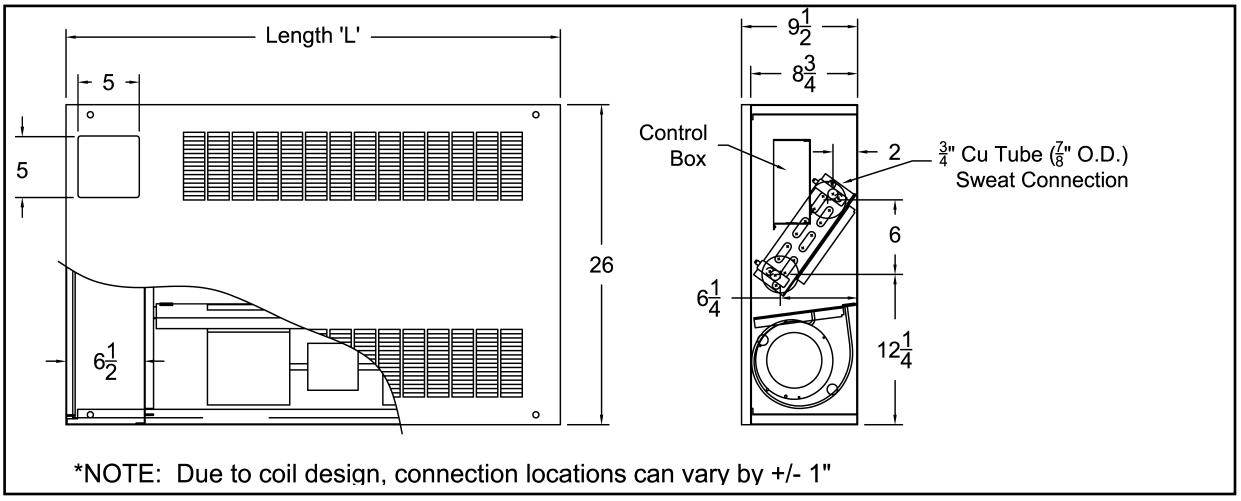


Figure 1: Fully Exposed Front and Side View

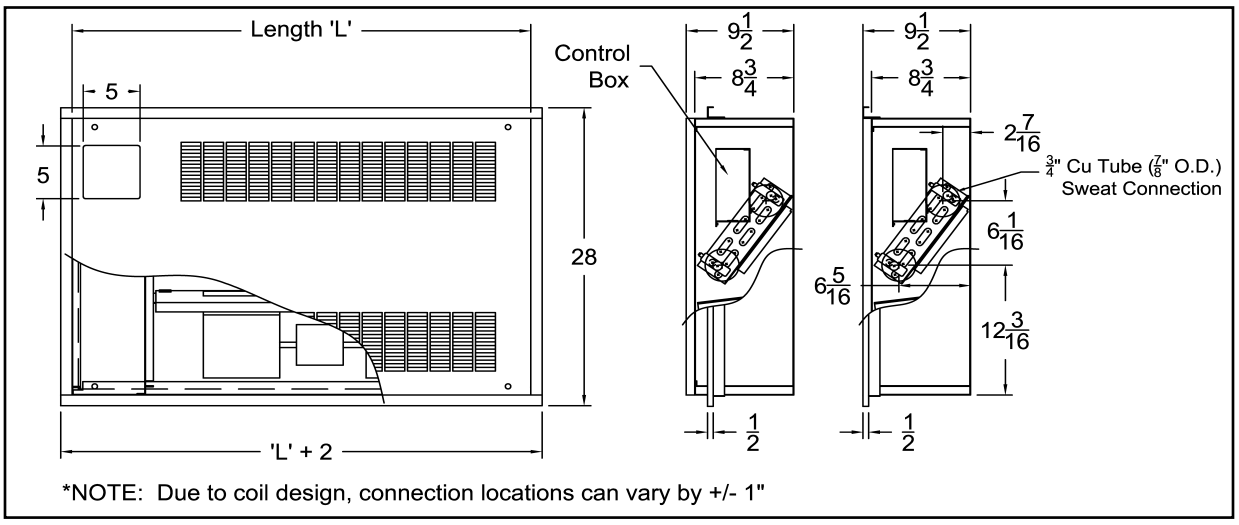


Figure 2: Semi and Fully Recessed Front and Side View
Unit shown as Left Hand

Table 1. Model Dimensions

Model	Nominal Air Flow (CFM)	No. of Motors	Motor Power (HP)	Motor Speed (RPM)	Motor Current (AMPS)	No. of Fans	Length "L" (in)	Duct Collar Size (in)	Filter Size (in)	Total Weight (lbs)
SFF-02	200	1	1/10	1075	1.9	1	26.0	5 x 14	7.5 x 18	75
SFF-03	300	1	1/10	1075	1.9	2	40.5	5 x 28	7.5 x 32	125
SFF-04	400	1	1/10	1075	1.9	2	40.5	5 x 28	7.5 x 32	125
SFF-06	600	1	1/10	1075	1.9	2	40.5	5 x 28	7.5 x 32	125
SFF-08	800	1	1/10	1075	1.9	2	50.5	5 x 38	7.5 x 42	150
SFF-10	1000	1	1/6	1500	2.2	2	50.5	5 x 38	7.5 x 42	150
SFF-12	1200	2	1/10	1075	3.8	4	70.5	5 x 58	7.5 x 62	200
SFF-15	1500	2	1/6	1500	4.4	4	70.5	5 x 58	7.5 x 62	200

DIMENSIONS AND WEIGHTS

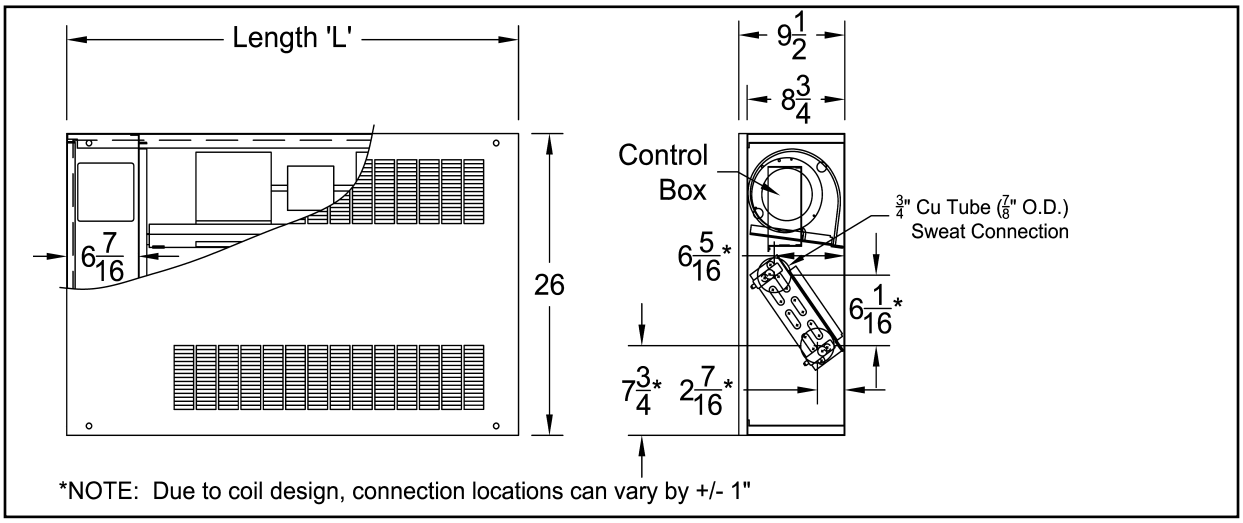


Figure 3: Fully Exposed Inverted Front and Side View
Unit shown as Left Hand

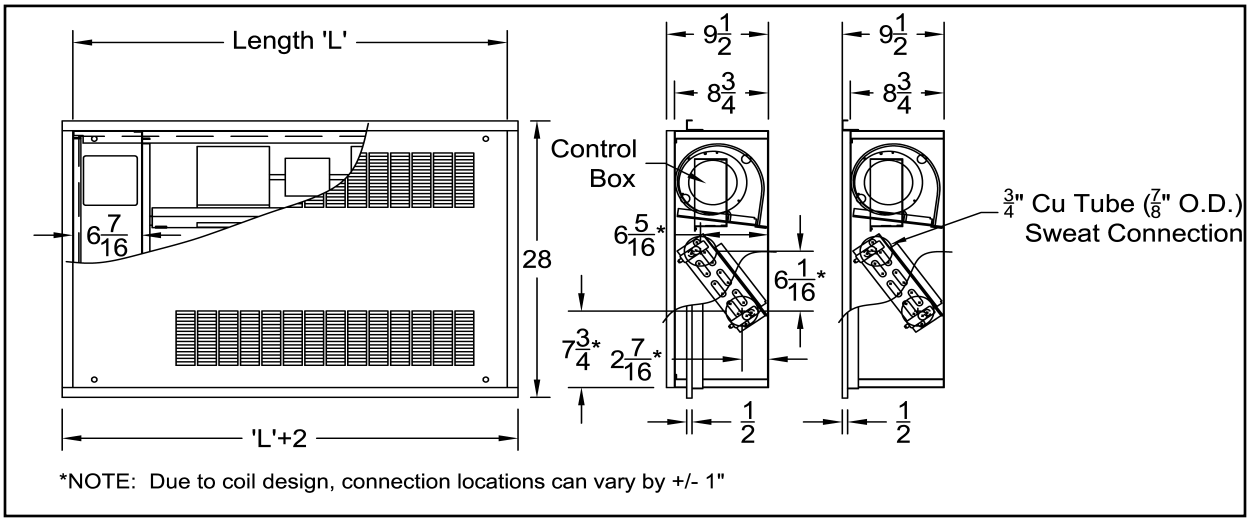


Figure 4: Semi and Fully Recessed Inverted Front and Side View
Unit shown as Left Hand

Table 1. Model Dimensions

Model	Nominal Air Flow (CFM)	No. of Motors	Motor Power (HP)	Motor Speed (RPM)	Motor Current (AMPS)	No. of Fans	Length "L" (in)	Duct Collar Size (in)	Filter Size (in)	Total Weight (lbs)
SFF-02	200	1	1/10	1075	1.9	1	26.0	5 x 14	7.5 x 18	75
SFF-03	300	1	1/10	1075	1.9	2	40.5	5 x 28	7.5 x 32	125
SFF-04	400	1	1/10	1075	1.9	2	40.5	5 x 28	7.5 x 32	125
SFF-06	600	1	1/10	1075	1.9	2	40.5	5 x 28	7.5 x 32	125
SFF-08	800	1	1/10	1075	1.9	2	50.5	5 x 38	7.5 x 42	150
SFF-10	1000	1	1/6	1500	2.2	2	50.5	5 x 38	7.5 x 42	150
SFF-12	1200	2	1/10	1075	3.8	4	70.5	5 x 58	7.5 x 62	200
SFF-15	1500	2	1/6	1500	4.4	4	70.5	5 x 58	7.5 x 62	200

DIMENSIONS AND WEIGHTS

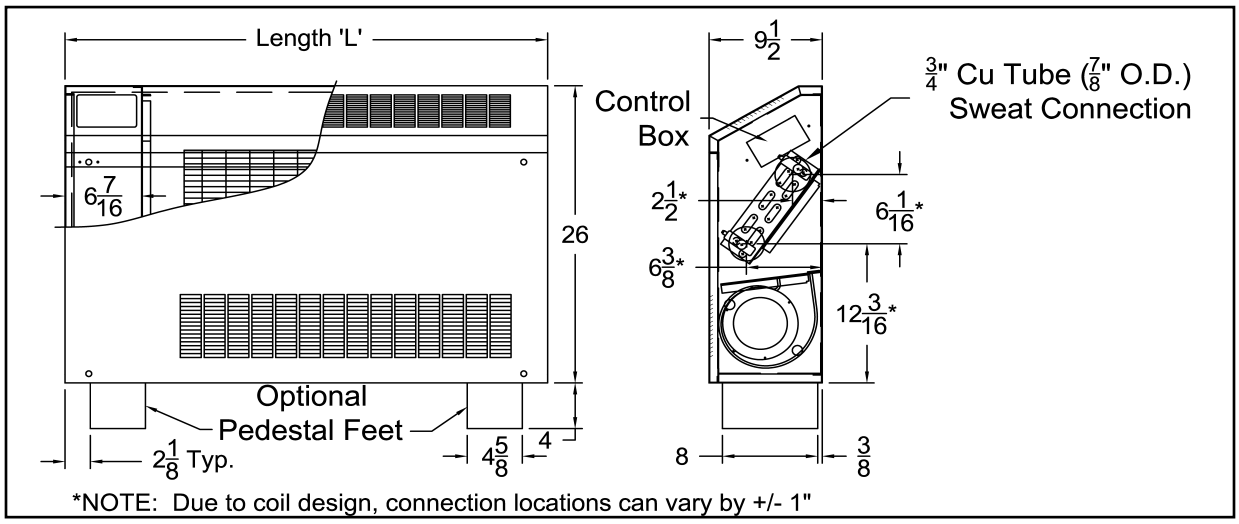


Figure 5: Slop Top Floor Mounted Front and Side View
Unit shown as Left Hand

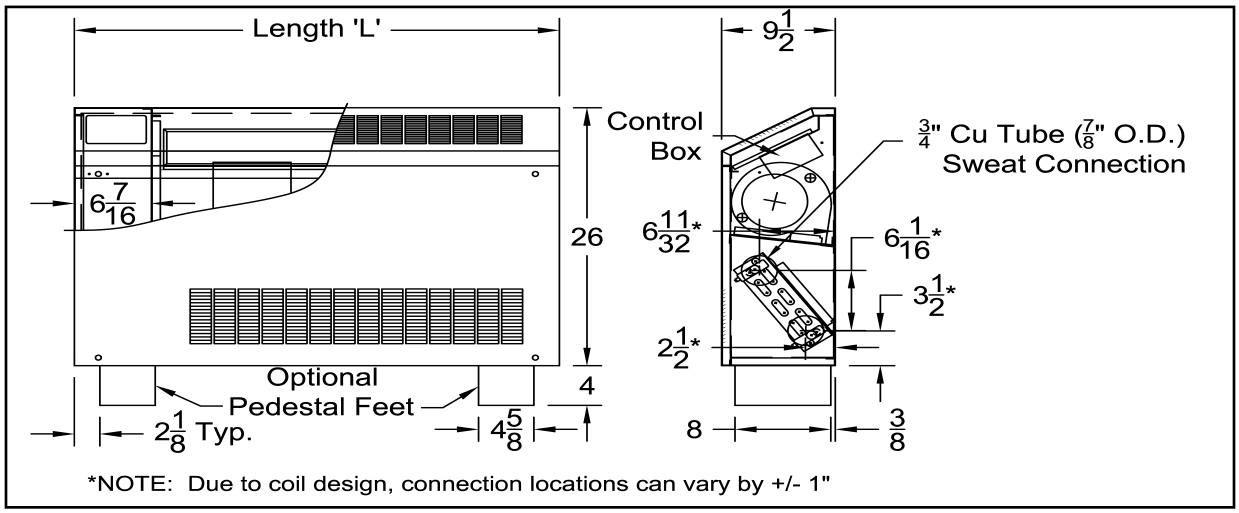
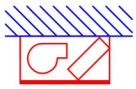
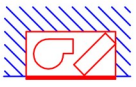
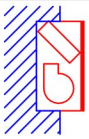


Figure 6: Slop Top Inverted Front and Side View
Unit shown as Left Hand

Table 1. Model Dimensions

Model	Nominal Air Flow (CFM)	No. of Motors	Motor Power (HP)	Motor Speed (RPM)	Motor Current (AMPS)	No. of Fans	Length "L" (in)	Duct Collar Size (in)	Filter Size (in)	Total Weight (lbs)
SLPSFF-02	200	1	1/10	1075	1.9	1	26.0	5 x 14	7.5 x 18	75
SLPSFF-03	300	1	1/10	1075	1.9	2	40.5	5 x 28	7.5 x 32	125
SLPSFF-04	400	1	1/10	1075	1.9	2	40.5	5 x 28	7.5 x 32	125
SLPSFF-06	600	1	1/10	1075	1.9	2	40.5	5 x 28	7.5 x 32	125
SLPSFF-08	800	1	1/10	1075	1.9	2	50.5	5 x 38	7.5 x 42	150
SLPSFF-10	1000	1	1/6	1500	2.2	2	50.5	5 x 38	7.5 x 42	150
SLPSFF-12	1200	2	1/10	1075	3.8	4	70.5	5 x 58	7.5 x 62	200
SLPSFF-15	1500	2	1/6	1500	4.4	4	70.5	5 x 58	7.5 x 62	200

FORCE FLOW CONFIGURATIONS

Model		Arrangement			
	W Fully Exposed Wall Mounted	11 Front Top Out / Front Bottom In	12 Top Out / Front Bottom In	13 Front Top Out / Bottom In	14 Top In / Bottom Out
	WI Fully Exposed Inverted Wall Mounted	21 Front Top In / Front Bottom Out	22 Front Top In / Bottom Out	23 Top In / Front Bottom Out	24 Top In / Bottom Out
	R Fully Recessed Wall Mounted	31 Front Top Out / Front Bottom In	32 Top Out / Front Bottom In	33 Front Top Out / Bottom In	34 Top In / Bottom Out
	RI Fully Recessed Inverted Wall Mounted	41 Front Top In / Front Bottom Out	42 Front Top In / Bottom Out	43 Top In / Front Bottom Out	44 Top In / Bottom Out
	F Floor Mounted with Pedestals	51 Front Top Out / Front Bottom In	52 Top Out / Front Bottom In	53 Front Top Out / Bottom In	54 Top In / Bottom Out
	FI Inverted Floor Mounted with Pedestals	61 Front Top In / Front Bottom Out	62 Front Top In / Bottom Out	63 Top In / Front Bottom Out	64 Top In / Bottom Out
	C Exposed Ceiling Mounted	71 Front In / Front Out	72 Front In / Top Out	73 Bottom In / Front Out	74 Bottom In / Top Out
	CR Fully Recessed Ceiling Mounted	81 Front In / Front Out	82 Front In / Top Out	83 Bottom In / Front Out	84 Bottom In / Top Out
	SR Semi Recessed Wall Mounted	91 Front Top Out / Front Bottom In			
	SRI Semi Recessed Inverted Wall Mounted	101 Front Top In / Front Bottom Out			

SELECTION PROCEDURE

Hot Water Applications

1. If required selection is at tabulated conditions (60°F EAT & 10/20/30/40/50°F ΔT), then the resulting performance can be looked up directly from the Heating Performance Data (Table 2).
2. If the conditions are as above but with a non-standard DT, then the performance can be interpolated from data in Table 2 between the adjacent DT values.
3. If required selection is not at tabulated conditions (60°F EAT), one must first calculate the equivalent required performance at standard conditions (200°F EWT & 60°F) by applying a Correction Factor from Table 3, then lookup in the Heating Performance Data (Table 2) under 200°F EWT to find the unit which best matches the equivalent required capacity at the same gpm (See example on page 5).

Table 2. Force Flow Heaters Performance Data at 60 °F Entering Air Temperature and 200 °F Entering Air Temperature

Model	Air Flow (CFM)	WTD (°F)	200° F @ 1 Row				200° F @ 2 Row				200° F @ 3 Row			
			Cap. (MBH)	Flow (GPM)	WPD (FT WG)	LAT (°F)	Cap. (MBH)	Flow (GPM)	WPD (FT WG)	LAT (°F)	Cap. (MBH)	Flow (GPM)	WPD (FT WG)	LAT (°F)
SFF02	220	10	17.5	3.6	4.7	133	22.5	4.6	2.1	154	27.1	5.6	1.5	174
		20	16.3	1.7	1.2	128	21.2	2.2	0.6	149	25.7	2.6	0.4	168
		30	15.1	1.0	0.5	123	19.8	1.4	0.3	143	24.3	1.7	0.2	162
		40	13.9	0.7	0.3	118	18.3	0.9	0.1	137	22.6	1.2	0.1	155
		50	12.7	0.5	0.2	113	16.5	0.7	0.08	129	20.5	0.8	0.06	146
SFF03	300	10	26.9	5.5	2.4	143	34.4	7.0	7.6	166	40.0	8.2	4.8	183
		20	25.2	2.6	0.6	137	33.1	3.4	2.1	162	38.8	4.0	1.4	179
		30	23.5	1.6	0.3	132	31.7	2.2	1.0	157	37.5	2.6	0.6	175
		40	21.7	1.1	0.1	127	30.2	1.6	0.5	153	36.1	1.9	0.4	171
		50	19.5	0.8	0.08	120	28.6	1.2	0.3	148	34.4	1.4	0.2	166
SFF04	400	10	33.2	6.8	3.4	136	43.1	8.9	11.2	159	51.2	10.6	7.5	178
		20	31.0	3.2	0.9	131	41.3	4.3	3.1	155	49.4	5.1	2.1	174
		30	28.8	2.0	0.4	126	39.4	2.7	1.4	151	47.6	3.3	1.0	170
		40	26.6	1.4	0.2	121	37.5	1.9	0.8	146	45.6	2.4	0.6	165
		50	24.1	1.0	0.1	116	35.4	1.5	0.5	142	43.5	1.8	0.3	160
SFF06	600	10	44.1	9.1	5.6	128					71.2	14.7	13.3	169
		20	41.0	4.2	1.5	123	55.6	5.7	5.2	145	68.5	7.0	3.7	165
		30	37.9	2.6	0.6	118	52.8	3.6	2.4	141	65.6	4.5	1.7	161
		40	34.8	1.8	0.3	114	50.0	2.6	1.3	137	62.5	3.2	1.0	156
		50	31.7	1.3	0.2	109	47.0	1.9	0.8	132	59.2	2.4	0.6	151

Table Continued on next page.

SELECTION PROCEDURE

Hot Water Applications - Continued

1. If required selection is at tabulated conditions (60°F EAT & 10/20/30/40/50°F ΔT), then the resulting performance can be looked up directly from the Heating Performance Data (Table 2).
2. If the conditions are as above but with a non-standard DT, then the performance can be interpolated from data in Table 2 between the adjacent DT values.
3. If required selection is not at tabulated conditions (60°F EAT), one must first calculate the equivalent required performance at standard conditions (200°F EWT & 60°F) by applying a Correction Factor from Table 3, then lookup in the Heating Performance Data (Table 2) under 200°F EWT to find the unit which

Table 2. Force Flow Heaters Performance Data at 60 °F Entering Air Temperature and 200 °F Entering Air Temperature

Model	Air Flow (CFM)	WTD (°F)	200° F @ 1 Row				200° F @ 2 Row				200° F @ 3 Row			
			Cap. (MBH)	Flow (GPM)	WPD (FT WG)	LAT (°F)	Cap. (MBH)	Flow (GPM)	WPD (FT WG)	LAT (°F)	Cap. (MBH)	Flow (GPM)	WPD (FT WG)	LAT (°F)
SFF08	800	10	58.2	12.0	1.7	127	77.6	16.0	5.8	149	86.8	17.9	10.9	160
		20	53.3	5.5	0.4	121	73.4	7.6	1.6	145	83.2	8.6	3.0	156
		30	48.4	3.3	0.2	116	69.2	4.8	0.7	140	79.5	5.5	1.4	152
		40	43.6	2.2	0.1	110	64.9	3.3	0.4	135	75.6	3.9	0.8	147
		50	37.0	1.5	0.05	103	60.4	2.5	0.2	130	71.4	2.9	0.5	142
SFF10	1000	10	67.7	13.9	2.2	122	90.8	18.7	7.7	144	102.4	21.1	14.6	154
		20	61.7	6.4	0.6	117	85.7	8.8	2.1	139	98.0	10.1	4.0	150
		30	55.9	3.8	0.2	112	80.6	5.5	0.9	134	93.4	6.4	1.8	146
		40	50.2	2.6	0.1	106	75.4	3.9	0.5	130	88.6	4.6	1.0	142
		50	43.5	1.8	0.06	100	70.0	2.9	0.3	125	83.5	3.4	0.6	137
SFF12	1200	10	79.1	16.3	4.3	121	115.7	23.9	8.5	149	129.6	26.7	15.7	160
		20	73.6	7.6	1.1	117	113.0	11.6	4.9	147	127.2	13.1	9.2	158
		30	68.3	4.7	0.5	112	107.7	7.4	2.3	143	122.2	8.4	4.3	154
		40	62.9	3.2	0.3	108	102.0	5.3	1.2	138	117.1	6.0	2.4	150
		50	57.4	2.4	0.2	104	96.2	4.0	0.8	134	111.6	4.6	1.5	146
SFF15	1500	10	91.7	18.9	5.5	116	135.5	27.9	11.2	143				
		20	85.2	8.8	1.4	112	132.3	13.6	6.5	141	149.9	15.5	12.3	152
		30	78.8	5.4	0.6	108	125.7	8.6	3.0	137	143.8	9.9	5.7	148
		40	72.4	3.7	0.3	105	118.8	6.1	1.6	133	137.4	7.1	3.2	144
		50	65.9	2.7	0.2	101	111.6	4.6	1.0	129	130.7	5.4	2.0	140

SELECTION PROCEDURE

Hot Water Applications

Design Conditions

Heating Load = 56.0 MbH
Entering Water Temp. = 215°F
Water Temp. Drop = 40°F
Entering Air Temp. = 55°F

Required Equivalent Capacity (at 200°F EWT / 60°F EAT)

From Table 3, since there are no factors for 215°F entering water, the correction factor must be Interpolated between 210°F and 220°F EWT:

Factor at 55°F EAT & 210°F EWT = 1.115

Factor at 55°F EAT & 220°F EWT = 1.187

Factor at 55°F EAT & 215°F EWT (Average) = 1.151

The equivalent required capacity at standard conditions (200°F water and 60°F entering air) is:

$$\text{Cap}_{\text{at\_std\_conditions}} = \frac{56.0}{1.151} = 48.7 \text{ MBH}$$

Calculate GPM

$$Q = \frac{\text{Cap}_{\text{design}}}{0.5 \text{x} \Delta T_{\text{design}}} = \frac{56.0}{0.5 \text{ x } 40.0} = 2.80 \text{ GPM}$$

Unit Selection and Actual Capacity

From the standard hot water capacities (Table 2), at 200°F EWT, model SFF-06 which delivers 50.0 MBH at 2.60 gpm (and 40°F DT) meets the capacity requirements. Note, that to utilize this method, the gpm is to be matched as closely as possible (DT will vary). To obtain the actual capacity, multiply the capacity (at std conditions) by the correction factor as follows:

$$\text{Cap}_{\text{actual}} = \text{Cap}_{\text{at\_std\_condition}} \text{ x } 1.151 = 50.0 \text{ x } 1.151 = 57.6 \text{ MBH}$$

Determining GPM and Water Pressure Drop

The required water flow can be found by:

$$Q_{\text{actual}} = \frac{\text{Cap}_{\text{actual}}}{0.5 \text{ x } \Delta T_{\text{actual}}} = \frac{57.6}{0.5 \text{ x } 40.0} = 2.88 \text{ GPM}$$

The water pressure drop can be approximated using the following equation:

$$\Delta P_{\text{actual}} = \text{WPD}_{\text{at\_std\_condition}} \text{ x } \left(\frac{Q_{\text{actual}}}{Q_{\text{at\_std\_condition}}}\right)^{1.8}$$

$$= 1.9 \text{ x } \left(\frac{2.88}{2.6}\right)^{1.8} = 2.28 \text{ ft of water}$$

Determining Final Air Temperature

$$\text{FAT}_{\text{actual}} = \text{EAT} + \Delta T_{\text{air}} = \text{EAT} + \frac{\text{Cap}_{\text{actual}} \left(\frac{\text{BTU}}{\text{Hr}}\right)}{\text{CFM x } 1.085}$$

$$= 55\,^{\circ} + \frac{57600}{600 \text{ x } 1.085}$$

$$= 143.5\,^{\circ}\text{F}$$

SELECTION PROCEDURE

Hot Water Application

Table. 3 Hot Water correction Factors (Applied at 200 °F EWT / 60° F EAT Capacity Data)															
Entering Air Temp. (°F)	Entering Water Temperature (°F)														
	100	110	120	130	140	150	160	170	180	190	200	210	220	230	240
30	0.518	0.592	0.666	0.740	0.814	0.889	0.963	1.042	1.120	1.194	1.268	1.338	1.408	1.480	1.550
35	0.479	0.553	0.626	0.700	0.773	0.847	0.921	0.997	1.073	1.147	1.220	1.292	1.363	1.435	1.507
40	0.439	0.513	0.585	0.659	0.731	0.805	0.878	0.952	1.025	1.099	1.172	1.245	1.317	1.391	1.464
45	0.400	0.474	0.546	0.619	0.691	0.765	0.837	0.911	0.983	1.057	1.129	1.202	1.274	1.348	1.420
50	0.361	0.434	0.506	0.579	0.651	0.724	0.796	0.869	0.941	1.013	1.085	1.159	1.231	1.303	1.375
55	0.324	0.396	0.468	0.540	0.611	0.684	0.756	0.828	0.899	0.971	1.043	1.115	1.187	1.259	1.331
60	0.286	0.358	0.429	0.501	0.571	0.643	0.715	0.787	0.857	0.929	1.000	1.072	1.143	1.215	1.286
65	0.249	0.321	0.391	0.463	0.533	0.605	0.676	0.747	0.817	0.889	0.959	1.031	1.102	1.173	1.244
68	0.227	0.298	0.368	0.440	0.509	0.582	0.652	0.723	0.793	0.864	0.934	1.006	1.077	1.148	1.218
70	0.212	0.283	0.353	0.424	0.494	0.566	0.636	0.707	0.777	0.848	0.918	0.990	1.060	1.131	1.201
72	0.198	0.268	0.338	0.409	0.479	0.550	0.620	0.691	0.761	0.832	0.902	0.974	1.043	1.114	1.184
75	0.176	0.246	0.316	0.387	0.457	0.527	0.597	0.668	0.738	0.808	0.878	0.949	1.019	1.089	1.159
80	0.140	0.210	0.279	0.349	0.419	0.489	0.558	0.628	0.698	0.768	0.837	0.907	0.977	1.047	1.117
85	0.105	0.175	0.243	0.313	0.382	0.452	0.521	0.591	0.660	0.730	0.798	0.868	0.937	1.007	1.076
90	0.069	0.139	0.207	0.277	0.345	0.415	0.483	0.553	0.621	0.691	0.759	0.829	0.897	0.967	1.035
95	0.035	0.104	0.172	0.241	0.309	0.378	0.446	0.516	0.584	0.653	0.721	0.790	0.858	0.927	0.995
100	0.000	0.069	0.137	0.205	0.273	0.341	0.409	0.478	0.546	0.614	0.682	0.750	0.818	0.887	0.955

Note: Apply the given correction factor to the 200F EWT MBH output at the given GPM as GPM remains same for derated MBH. Delta T will need to be calculated for the derated output with given GPM.

SELECTION PROCEDURE

Steam Application

Table 4. Sigma (Optional1 Row Steam Coils)		
Model	MBH @ 2 PSI	Cond lbs/Hr
SFF02	22.5	23.3
SFF03	34.8	36.1
SFF04	42.6	44.1
SFF06	56.5	58.4
SFF08	73.4	76.0
SFF10	85.0	88.0
SFF12	101.4	105.0
SFF15	117.5	121.7

Note: Above heating performance data is based on 60F EAT and 2 psi steam. Please contact factory for steam application.

Seam Pressure (PSI)	Table 5. Steam Correction Factors						
	Entering Air Temperature (°F)						
	30	40	50	60	70	80	90
2	1.24	1.16	1.08	1.00	0.93	0.85	0.78
5	1.29	1.21	1.13	1.05	0.97	0.90	0.83
10	1.38	1.29	1.21	1.13	1.06	0.98	0.91
15	1.44	1.34	1.28	1.19	1.12	1.04	0.97
20	1.50	1.42	1.33	1.25	1.17	1.10	1.02
30	1.60	1.51	1.43	1.35	1.27	1.19	1.12
40	1.68	1.60	1.51	1.43	1.35	1.27	1.19
50	1.70	1.60	1.58	1.50	1.42	1.34	1.26

Note: To obtain capacities at conditions other than 60°F EAT, multiply MBH from Table 4 by the appropriate correction factor from table 5, steam correction factors.

ADDITIONAL CORRECTION FACTORS

Table 6. Elevation Correction Factor		
Altitude	Ferrous Unit (Steel)	Non-Ferrous (Cu/Al)
Sea Level	1	1
1,000 Ft	0.984	0969
2,000 Ft	0.968	0.938
3,000 Ft	0.952	0.908
4,000 Ft	0.936	0.878
5,000 Ft	0.920	0.850
6,000 Ft	0.904	0.822
7,000 Ft	0.889	0.795
8,000 Ft	0.874	0.768
9,000 Ft	0.859	0.743
10,000 Ft	0.844	0.718
15,000 Ft	0.771	0.603
20,000 Ft	0.703	0.502

Note: Apply correction factor from above Table 6 against BTU at design condition to determine capacity at given elevation.

Table 7. Glycol correction factors		
Solution	Ethylene Glycol	Propylene Glycol
20% Solution	0.95	0.98
30% Solution	0.91	0.96
40% Solution	0.88	0.93
50% Solution	0.84	0.9
Pressure Drop	1.23	1.23
GPM	1.14	1.1

Note: Apply correction factor from above Table 7 against BTU at design condition to determine capacity at specified glycol and water mix ratio.

ADDITIONAL CORRECTION FACTORS

Table 8. Units with standard motor (1/10 HP, 1075 RPM)									
Speed	BTU Correction Factor	CFM for Given Model							
		SFF02	SFF03	SFF04	SFF06	SFF08	SFF10	SFF12	SFF15
High	1	220	300	400	600	800	1000	1200	1500
Med	0.9	180	246	328	492	656	820	984	1230
Low	0.82	154	210	280	420	560	700	840	1060

*BTU correction factor to be applied to given capacity for given unit.

Table 8.1 Units with high static motor (1/6 HP)									
Speed	BTU Correction Factor	CFM for Given Model							
		SFF02	SFF03	SFF04	SFF06	SFF08	SFF10	SFF12	SFF15
High	1.15	279	380	506	759	1012		1518	
Med	1.01	229	312	415	623	830	-	1245	-
Low	0.91	196	267	355	532	709		1063	

*BTU correction factor to be applied to given capacity for given unit.

Notes:
1. BTU correction factor to be applied to high speed capacity at given conditions for given unit model.
2. CFMs based on 0" ESP.
3. GPM and WPD remain the same as referenced high speed performance.

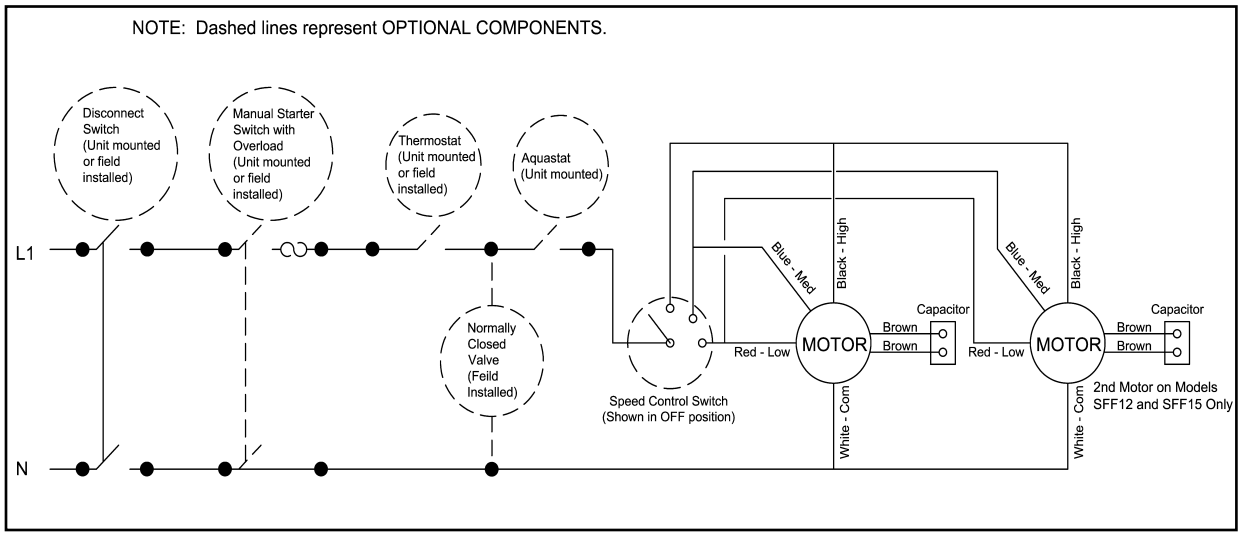
Table 9. Units with standard motor (1/10 HP, 1075 RPM)									
Speed	BTU Correction Factor	CFM for Given Model							
		SFF02	SFF03	SFF04	SFF06	SFF08	SFF10	SFF12	SFF15
0	1	220	300	400	600	800	1000	1200	1500
0.05	0.92	189	258	344	515	687	858	1030	1287
0.1	0.82	153	209	278	417	556	695	834	1043
0.125	0.79	133	181	241	362	482	602	723	903

*BTU correction factor to be applied to given capacity for given unit.

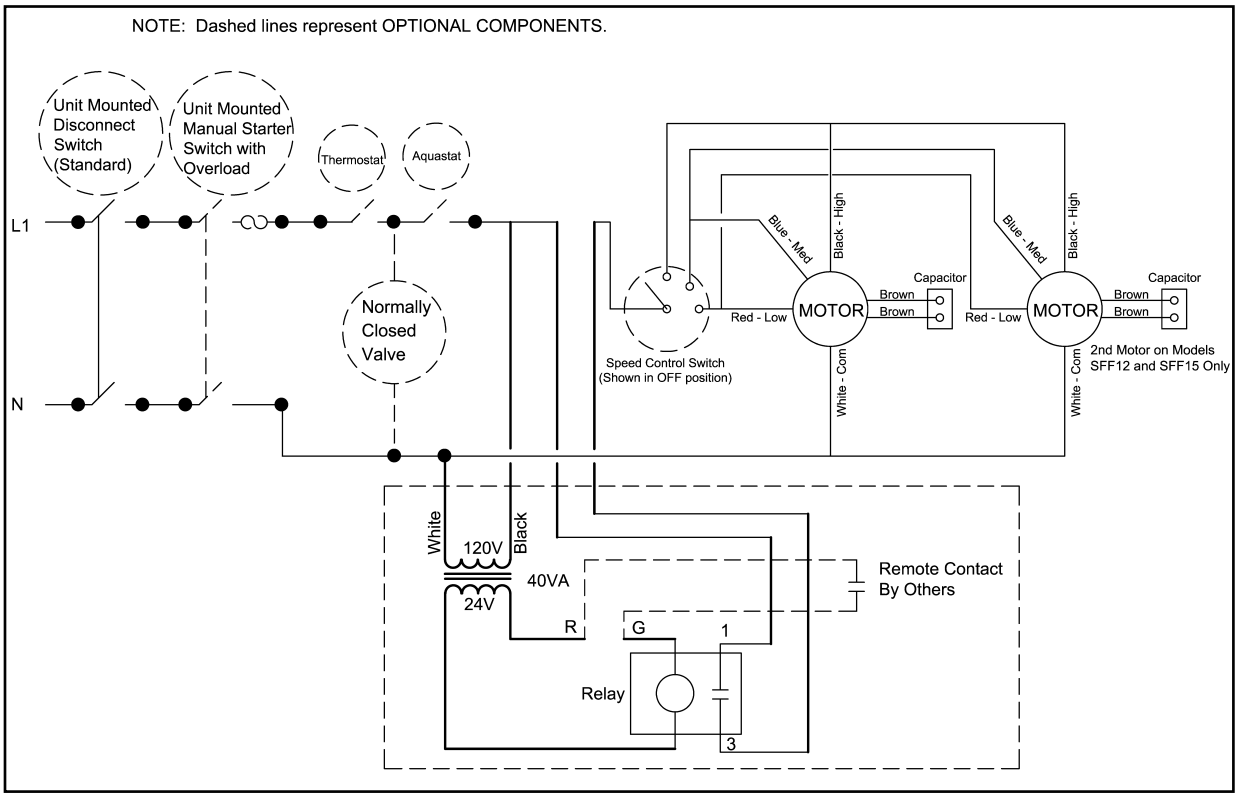
Table 9.1 Units with high static motor (1/6 HP)									
Speed	BTU Correction Factor	CFM for Given Model							
		SFF02	SFF03	SFF04	SFF06	SFF08	SFF10	SFF12	SFF15
0	1.15	279	380	506	759	1012		1518	
0.05	1.05	240	327	435	652	869	-	1303	-
0.1	0.93	206	281	374	560	746		1118	
0.125	0.86	117	242	321	481	641		960	

*BTU correction factor to be applied to given capacity for given unit.

WIRING DIAGRAM



Figure#10: Force Flow wiring diagram with standard optional controls



Figure#11: Force Flow wiring diagram with 120/24VAC 40VA transformer and relay and other standard optional controls