AIR TERMINALS & DUCT HEATERS.

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VAV AIR TERMINAL UNITS

SINGLE DUCT
PRESSURE-INDEPENDENT

SVT 500 SERIES

Description

SAFID SVT 500 Series VAV air terminal units are designed to achieve variable air volume supply of conditioned air to a room in single duct air distribution systems. The SVT air terminals are equipped with air flow sensor in the unit's inlet to allow pressure-independent control of air flow on the basis of a control signal and fitted with Belimo actuator/controller. The Belimo actuator/controller is linearized with the SVT 500 Series in order to achieve a high standard performance of the VAV air terminals. They have a wide range of sizes with capacities from 150CFM to 7850CFM. The SVT 500 Series will work equally well in Variable Air Volume (VAV) and Constant Air Volume (CAV) systems. The air volume supplied to the room varies in direct response of actuator to signals from the room thermostat to maintain the room designed temperature while the air flow controller maintain the maximum and minimum amount of designed air flows to be supplied to the room. The SVT air terminals are available with a variety of accessories. They can be specified sound attenuators, electric heaters, hot water coils, multiple outlet plenums and other optional accessories. The accessories (except the multiple outlet plenums) are shipped factory attached to SVT air terminals and have a standard slip and drive connection.

SCVT 500 Series:
Model SCVT 500 Series are Constant Air Volume Air Terminal Units which has the same construction as SVT 500 Series but the calibration of SCVT 500 Series will be with constant air volume flow.

Standard Construction

Casing:
Air Terminal casing, Inlet & Damper are built of 22 gauge galvanized steel sheet, conform to ASTM A653, LFQ, G90 zinc coating.

Insulation:
25mm thk. Acoustic lining with a strong and dimensionally stable Woven Glass Fiber Fabric (WGF) facing, 48kg/M3 density, complies with the requirements of NFPA 90A.

Air Flow Sensor:
Aluminum multiple averaging flow probe that offers an excellent air flow sensing capability.

Controls:
The SVT air terminals can be specified with electric controls. Standard Controls are Belimo Actuator/controller modulating type.

Standard Connections: S-Slip and Drive Slip connection for discharge side.

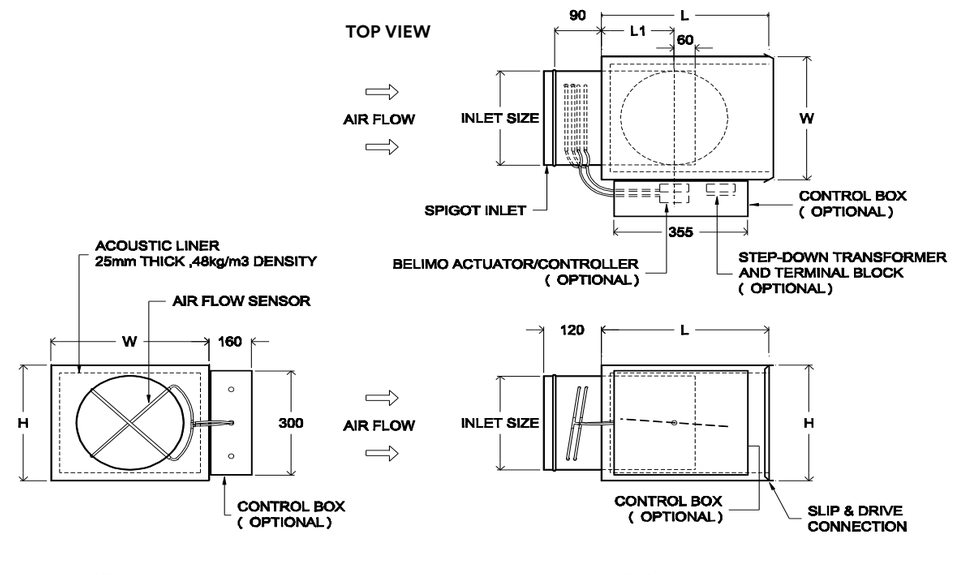
Option 1: Code SF
Slide on Flange connections for discharge side.
Option 2: Code P
Air Terminal with galvanized perforated sheet behind the acoustic lining.
Option 3: Code S
Air Terminal with double wall casing and solid inner wall.
Option 4: Code SA
Air Terminal with factory-mounted Sound Attenuator on the discharge side of the air terminal casing.
Option 5: Code OP
Air Terminal with factory-mounted Multiple Outlet Plenum.
Option 6: Code EH
Air Terminal with factory-mounted Electric Heater on the discharge side of the air terminal casing.
Option 7: Code HW
Air Terminal with factory-mounted Hot Water Coil on the discharge side of the air terminal casing.
Option 8: Code FC
Air Terminal with Flexible Connector mounted on the inlet collar of the air terminal casing.
Option 9: Code M
Air Terminal with Belimo Actuator/controller.
Option 10: Code CB
Air Terminal with Control Box.
Option 11: Code TC
Air Terminal with Digital Temperature Controller.

AHRI Standard 880

SINGLE DUCT PRESSURE - INDEPENDENT VAV

SVT 500: BASIC AIR TERMINALS

Dimensions



FRONT VIEW **SIDE VIEW**

SVT 500: Dimensions

MODEL	UNIT SIZE (in)	INLET SIZE DIA (mm)	Casing Size (mm)			
			W	H	L	L1
SVT 506	6	152	300	300	425	155
SVT 508	8	200	350	300	425	155
SVT 510	10	250	400	325	450	180
SVT 512	12	305	450	375	475	205
SVT 514	14	350	500	420	495	225
SVT 516	16	400	550	470	520	250
SVT 518	18	450	600	520	545	275
SVT 520	20	500	650	570	570	300
SVT 524	24	600	750	670	670	350

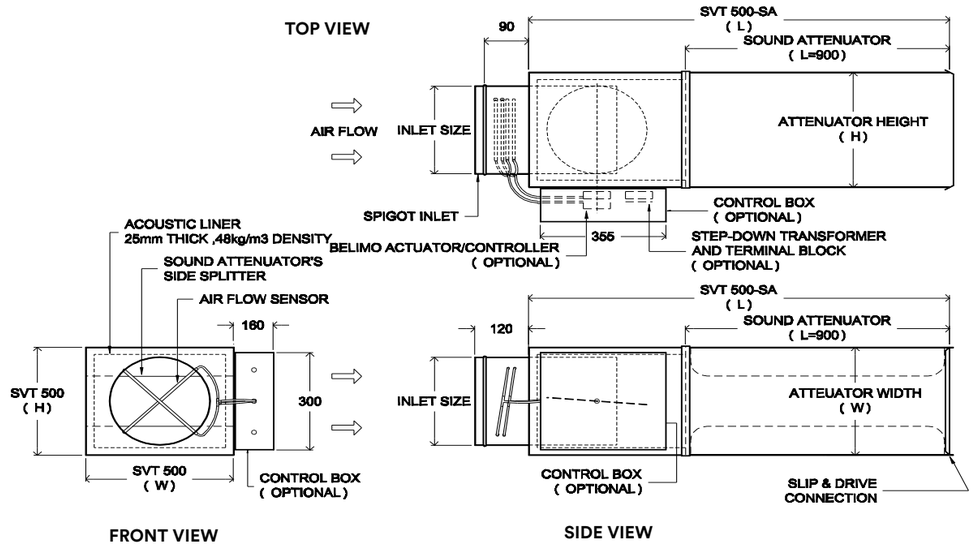
NOTE

The minimum straight portion before the VAV must be equal to 2 times the diameter of the size of VAV to maintain the integtiry of airflow senso'rs performance.

VAV AIR TERMINAL UNITS

SVT 500 - SA: AIR TERMINALS WITH DOWNSTREAM SOUND ATTENUATOR

Dimensions

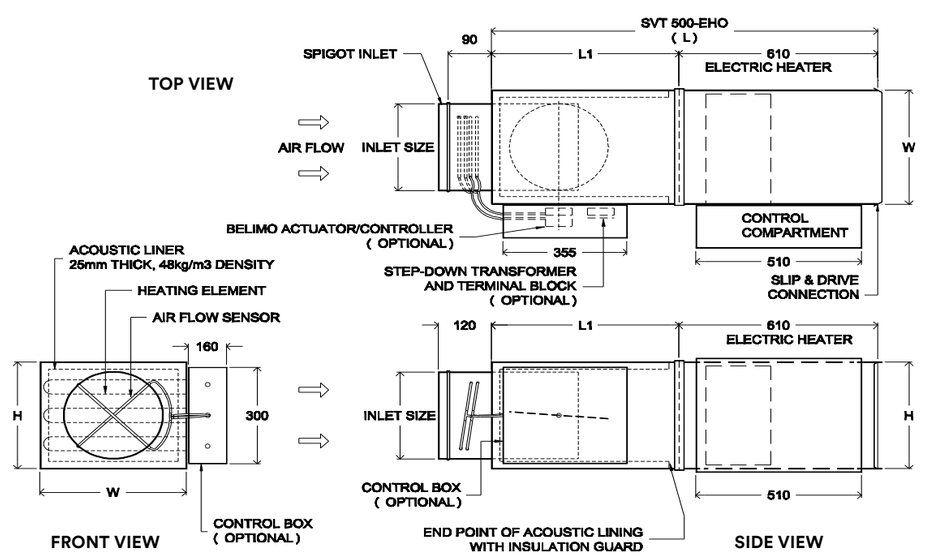


SVT 500 - SA: Dimensions

MODEL	UNIT SIZE (in)	INLET SIZE DIA (mm)	SVT 500 - SA			SOUND ATTENUATOR (SA)		
			W	H	L	W	H	L
SVT 506-SA	6	152	300	300	1325	300	300	900
SVT 508-SA	8	200	350	300	1325	300	350	900
SVT 510-SA	10	250	400	325	1350	325	400	900
SVT 512-SA	12	305	450	375	1375	375	450	900
SVT 514-SA	14	350	500	420	1395	420	500	900
SVT 516-SA	16	400	550	470	1420	470	550	900
SVT 518-SA	18	450	600	520	1445	520	600	900
SVT 520-SA	20	500	650	570	1470	570	650	900
SVT 524-SA	24	600	750	670	1570	750	670	900

SVT 500 - EH: AIR TERMINALS WITH DOWNSTREAM ELECTRIC HEATER

SVT 500 - EHO, EHT, EHFT: Dimensions with Open, Tubular or Fin-Tubular Coil



SVT 500 - EHO: Dimensions

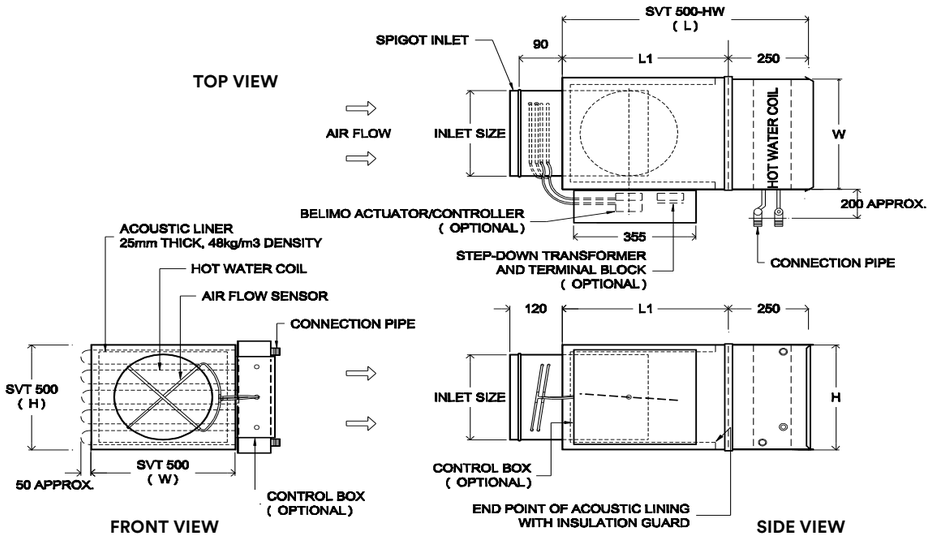
MODEL	UNIT SIZE (in)	INLET SIZE DIA (mm)	SVT 500 - EHO			
			W (mm)	H (mm)	L (mm)	L1 (mm)
SVT 506 - EH	6	152	300	300	1035	425
SVT 508 - EH	8	200	350	300	1035	425
SVT 510 - EH	10	250	400	325	1060	450
SVT 512 - EH	12	305	450	375	1085	475
SVT 514 - EH	14	350	500	420	1105	495
SVT 516 - EH	16	400	550	470	1130	520
SVT 518 - EH	18	450	600	520	1155	545
SVT 520 - EH	20	500	650	570	1180	570
SVT 524 - EH	24	600	750	670	1280	670

NOTE

1. The minimum straight portion before the VAV must be equal to 2 times the diameter of the inlet size of VAV to maintain the integrity of airflow sensor's performance.
2. The straight portion after the electric heater up to elbow or any fittings that will change the airflow's direction must be equal to minimum length of 610mm.
3. Contact SAFID for electric heater details.

SVT 500 - HW: AIR TERMINALS WITH DOWNSTREAM HOT WATER COIL

Dimensions



SVT 500 - HW: Dimensions

MODEL	UNIT SIZE (in)	INLET SIZE DIA (mm)	COIL CODE	SVT 500 - HW			
				W (mm)	H (mm)	L (mm)	L1 (mm)
SVT 506 - HW	6	152	HW - 506	300	300	675	425
SVT 508 - HW	8	200	HW - 508	350	300	675	425
SVT 510 - HW	10	250	HW - 510	400	325	700	450
SVT 512 - HW	12	305	HW - 512	450	375	725	475
SVT 514 - HW	14	350	HW - 514	500	420	745	495
SVT 516 - HW	16	400	HW - 516	550	470	770	520
SVT 518 - HW	18	450	HW - 518	600	520	795	545
SVT 520 - HW	20	500	HW - 520	650	570	820	570
SVT 524 - HW	24	600	HW - 524	750	670	920	670

NOTE

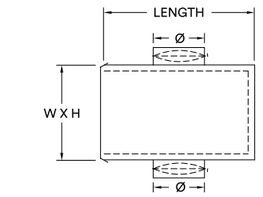
1. The minimum straight portion before the VAV must be equal to 2 times the diameter of the inlet size of VAV to maintain the integrity of airflow sensor's performance.
2. The minimum straight portion after the hot water coil must be equal to the diagonal of the electric heater's internal dimension.
3. Contact SAFID for hot water coil details.

SINGLE DUCT PRESSURE - INDEPENDENT VAV

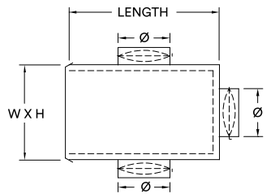
SVT 500 - OP: AIR TERMINALS WITH MULTIPLE OUTLET PLENUM BOX

Plenum Arrangement

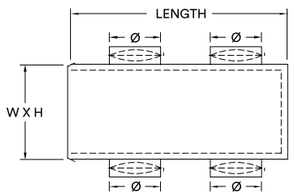
Multiple outlet plenums can be supplied in the following arrangement and the dimensions will be as per the customer's requirement.



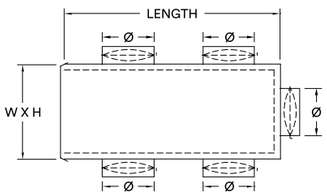
ARANGEMENT- A



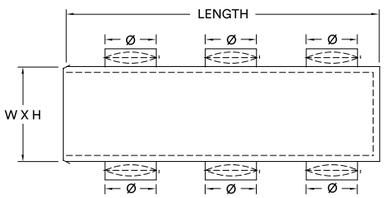
ARANGEMENT- B



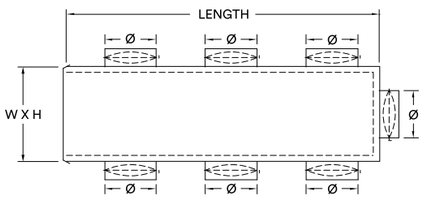
ARANGEMENT- C



ARANGEMENT- D



ARANGEMENT- E



ARANGEMENT- F

NOTE

1. Plenum construction: 22 Ga. GI or as required, Lining: 25 mm x 48 kg/m^3 or as required.
2. Lined and unlined plenums can be provided to required collar dia. as per above arrangements.
3. All the collars to be provided with manual VCD (volume control damper) and hand quadrant.

Table 1

Size	Rated CFM	Rated m³/s	Rated FPM	Inlet S.P.	Min.S.P. NC	Discharge Sound Power Level (dB) @ 1 in. W.G. S.P. Octave Band 2	3	4	5	6	7	NC	@ 2 in. W.G. S.P. Octave Band 2	3	4	5	6	7	NC	@ 3 in. W.G. S.P. Octave Band 2	3	4	5	6	7	NC
6	150	0.071	764	0.020	<20	61	56	49	38	36	39	<20	62	58	62	46	45	47	20	62	62	61	52	50	49	23
	250	0.118	1273	0.036	<20	64	62	55	45	41	43	24	66	64	61	48	46	48	27	68	67	63	53	51	51	30
	350	0.165	1783	0.080	<20	68	67	61	51	45	46	25	73	69	60	49	47	50	29	74	72	66	54	52	53	33
	450	0.212	2292	0.120	<20	70	67	62	51	45	47	27	73	71	63	49	47	50	31	74	74	66	54	52	54	35
	550	0.260	2801	0.220	<20	72	69	62	51	45	47	29	74	72	65	48	46	50	33	74	76	66	55	53	54	37
8	200	0.094	573	0.026	<20	60	53	48	39	40	41	<20	62	57	55	47	46	49	22	64	60	58	52	50	52	25
	400	0. 189	1146	0.036	<20	65	57	50	41	41	41	<20	68	65	58	50	48	49	24	71	67	63	56	52	52	27
	600	0.283	1719	0.076	<20	70	60	53	44	41	41	23	74	70	62	54	50	49	30	77	73	67	59	55	53	33
	800	0.378	2292	0.136	<20	73	64	57	47	45	43	24	79	71	64	55	51	50	32	80	76	69	61	56	54	35
	1000	0.472	2865	0.200	<20	75	67	60	51	48	45	27	83	73	66	57	53	51	37	83	78	71	62	58	55	37
10	400	0.189	733	0.028	<20	64	57	49	42	43	43	<20	70	63	57	51	50	50	23	71	64	60	56	53	53	24
	700	0.330	1283	0.036	<20	68	61	55	47	47	46	20	74	67	59	53	51	51	28	76	70	64	58	55	55	31
	1000	0.472	1833	0.076	<20	73	66	61	52	51	50	24	78	70	61	54	53	52	30	79	74	67	59	57	56	33
	1300	0.613	2383	0.116	<20	75	68	63	54	53	52	27	79	72	63	56	54	53	32	81	75	67	60	57	57	35
	1600	0.755	2934	0.172	<20	77	70	65	56	55	55	30	81	73	65	57	55	54	35	83	76	68	60	58	57	37
12	700	0.330	891	0.027	<20	63	55	48	45	45	42	<20	73	68	57	53	51	50	28	73	72	65	59	55	54	33
	1050	0.495	1337	0.032	<20	66	56	50	46	46	44	<20	77	73	59	55	52	52	30	78	75	65	60	56	55	34
	1400	0.661	1783	0.040	<20	67	57	52	47	46	45	<20	79	71	60	55	53	52	32	82	74	65	60	57	56	36
	1750	0.826	2228	0.072	<20	68	60	55	49	47	46	<20	80	73	63	57	55	54	33	83	75	66	61	59	57	37
	2100	0.991	2674	0.120	<20	71	62	58	50	47	46	20	82	76	65	60	57	56	36	84	77	67	62	60	58	39
14	800	0.378	748	0.019	<20	57	51	48	45	44	42	<20	72	66	56	52	51	51	23	73	72	62	58	55	55	30
	1350	0.637	1263	0.032	<20	61	54	50	47	46	44	<20	74	66	58	54	52	53	26	77	74	63	59	57	57	33
	1900	0.897	1777	0.048	<20	65	57	53	49	48	47	<20	76	66	60	56	54	55	28	81	74	64	61	59	59	35
	2450	1.156	2292	0.076	<20	70	60	57	51	49	48	20	77	68	62	57	55	55	30	82	75	66	62	59	59	36
	3000	1.416	2806	0.116	<20	72	64	61	54	51	49	22	79	70	64	59	56	56	32	84	75	67	63	60	60	39
16	1000	0.472	716	0.015	<20	66	53	48	47	47	46	<20	76	68	56	55	53	53	28	78	70	64	60	57	56	31
	1750	0.826	1253	0.028	<20	68	56	52	50	49	47	<20	78	69	59	57	54	54	31	80	71	66	61	59	58	33
	2500	1.180	1790	0.036	<20	70	59	56	52	50	48	20	80	70	61	59	56	55	33	82	72	67	62	60	59	36
	3250	1.534	2328	0.056	<20	72	62	60	54	51	49	23	81	71	64	61	57	56	35	83	73	68	64	62	60	37
	4000	1.888	2865	0.084	<20	74	65	64	57	53	50	26	83	72	66	62	59	57	37	85	74	69	65	63	61	40
18	1300	0.613	736	0.015	<20	65	54	51	49	48	48	<20	74	68	58	57	57	58	26	74	73	64	63	61	61	31
	2225	1.050	1259	0.026	<20	68	56	52	50	49	48	<20	76	69	60	58	58	58	28	79	73	65	63	61	62	32
	3150	1.486	1783	0.032	<20	69	58	52	51	50	48	<20	78	69	62	59	59	58	31	81	73	65	64	61	62	35
	4075	1.923	2306	0.042	<20	72	61	59	54	52	49	23	80	70	63	60	59	58	33	83	74	67	64	62	62	37
	5000	2.360	2829	0.055	<20	75	65	66	56	54	51	27	82	70	65	61	60	58	36	85	74	68	65	64	62	40
20	1600	0.755	733	0.019	<20	64	52	50	49	49	46	<20	73	63	58	57	57	56	24	75	70	64	63	63	61	29
	2950	1.392	1352	0.025	<20	68	56	50	50	50	49	<20	75	63	59	57	57	56	27	78	70	64	64	63	61	31
	4300	2.029	1971	0.032	<20	77	62	54	51	51	49	30	80	67	60	58	57	57	33	84	72	65	64	64	62	39
	5150	2.430	2361	0.045	<20	80	66	58	53	52	50	33	84	71	62	60	58	58	39	87	75	66	64	64	63	43
	6000	2.831	2750	0.061	<20	84	70	62	56	54	52	39	88	7	65	61	59	59	44	90	77	68	65	65	64	46
24	2250	1.062	739	0.020	<20	65	53	50	49	49	46	<20	74	63	58	57	57	56	25	76	70	64	63	63	61	28
	3600	1.699	1183	0.023	<20	67	55	50	50	50	48	<20	75	63	59	57	57	56	26	77	70	64	64	63	61	30
	4950	2.336	1626	0.028	<20	72	59	52	51	51	49	23	77	65	60	58	57	57	30	81	71	65	64	64	62	35
	6400	3.020	2103	0.036	<20	78	64	56	52	52	50	31	82	69	61	59	58	58	36	85	73	66	64	64	63	40
	7850	3.704	2579	0.054	<20	82	69	61	55	53	51	36	87	73	64	61	59	59	42	88	76	67	64	64	63	43

NOTE

1. The performance data shown is based on tests conducted in accordance with ANSI/AHRI Standard 880 and ANSI/ASHRAE Standard 130.
2. Measurement of Sound Power Levels is in accordance with International Standard ISO 3741 comparison method.
3. The Noise Criteria (NC) calculation is based on AHRI Standard 885. See Table 4 for sound attenuation calculation.

Table 2

Size	Rated CFM	Rated m³/s	Rated FPM	Inlet S.P.	Min.S.P. NC	Radiated Sound Power Level (dB) @ 1 in. W.G. S.P. Octave Band 2	3	4	5	6	7	NC	@ 2 in. W.G. S.P. Octave Band 2	3	4	5	6	7	NC	@ 3 in. W.G. S.P. Octave Band 2	3	4	5	6	7	NC
6	150	0.071	764	0.020	<20	48	41	31	17	12	12	<20	46	43	43	25	20	20	<20	49	46	43	31	26	22	<20
	250	0.118	1273	0.036	<20	52	46	37	23	16	15	<20	54	51	43	26	22	21	<20	55	53	45	32	27	24	21
	350	0.165	1783	0.080	<20	55	51	42	29	20	19	<20	61	54	42	28	23	22	23	62	56	47	33	27	26	24
	450	0.212	2292	0.120	<20	58	52	42	29	20	19	<20	61	56	44	28	23	23	24	62	59	47	33	28	27	28
	550	0.260	2801	0.220	<20	60	54	44	30	21	20	22	62	57	46	29	24	23	25	63	61	48	34	29	28	30
8	200	0.094	573	0.026	<20	48	38	30	17	15	14	<20	50	42	36	25	22	22	<20	52	44	40	31	26	24	<20
	400	0.189	1146	0.036	<20	53	41	32	20	16	14	<20	56	50	40	29	24	22	<20	58	52	44	34	28	25	<20
	600	0.283	1719	0.076	<20	58	45	35	22	17	15	<20	62	54	44	33	26	22	24	65	57	49	38	30	26	28
	800	0.378	2292	0.136	<20	60	48	38	26	20	16	22	66	56	46	34	27	23	30	68	61	51	39	32	27	32
	1000	0.472	2865	0.200	<20	63	52	42	29	24	18	26	70	58	48	36	29	24	35	71	62	52	41	33	28	36
10	400	0.189	733	0.028	<20	52	42	30	21	19	15	<20	58	48	38	30	26	23	<20	59	49	42	34	29	26	20
	700	0.330	1283	0.036	<20	56	46	37	26	23	19	<20	62	51	41	31	27	24	24	63	55	45	36	31	27	26
	1000	0.472	1833	0.076	<20	60	50	43	31	26	23	22	65	55	43	33	28	25	28	67	59	49	38	33	29	31
	1300	0.613	2383	0.116	<20	63	52	45	33	29	25	26	67	57	45	34	30	26	31	69	60	49	39	33	29	33
	1600	0.755	2934	0.172	<20	65	55	47	35	31	27	28	69	58	47	36	31	27	33	71	61	50	39	34	30	36
12	700	0.330	891	0.027	<20	51	39	29	24	21	15	<20	61	53	39	32	26	23	23	61	57	46	38	31	26	25
	1050	0.495	1337	0.032	<20	54	41	32	25	21	17	<20	64	57	41	33	28	24	27	65	60	47	38	32	28	29
	1400	0.661	1783	0.040	<20	56	44	34	26	22	18	<20	67	55	42	34	29	25	31	70	59	47	38	33	29	35
	1750	0.826	2228	0.072	<20	56	44	37	27	22	18	<20	68	58	44	36	30	27	32	71	60	48	40	34	30	36
	2100	0.991	2674	0.120	<20	58	47	39	29	23	18	<20	70	60	47	38	32	29	35	72	62	49	41	36	31	37
14	800	0.378	748	0.019	<20	45	35	30	23	20	15	<20	60	50	37	31	26	24	22	60	57	44	37	31	27	25
	1350	0.637	1263	0.032	<20	49	39	32	26	22	17	<20	62	50	39	33	28	26	24	64	62	45	38	33	29	31
	1900	0.897	1777	0.048	<20	53	42	34	28	23	19	<20	64	50	41	35	29	27	27	69	62	46	39	34	31	33
	2450	1.156	2292	0.076	<20	57	45	38	30	25	20	<20	65	52	43	36	31	28	28	70	63	48	40	35	32	35
	3000	1.416	2806	0.116	<20	59	48	42	32	27	21	20	67	55	46	37	32	28	31	71	63	49	41	36	32	36
16	1000	0.472	716	0.015	<20	54	38	30	26	23	19	<20	63	53	38	34	29	26	26	66	55	46	38	33	29	30
	1750	0.826	1253	0.028	<20	56	41	34	28	24	20	<20	66	54	40	36	30	27	30	68	56	47	40	35	30	32
	2500	1.180	1790	0.036	<20	58	44	38	31	26	21	<20	68	55	43	37	32	28	32	69	57	48	41	36	32	33
	3250	1.534	2328	0.056	<20	60	46	42	33	27	22	22	69	56	45	39	33	29	33	70	58	49	42	37	33	35
	4000	1.888	2865	0.084	<20	62	49	45	35	28	23	24	71	57	48	41	34	30	36	73	59	51	44	39	34	39
18	1300	0.613	736	0.015	<20	53	38	33	28	24	21	<20	62	53	39	36	33	31	24	62	58	56	40	36	35	27
	2225	1.050	1259	0.026	<20	56	40	33	29	25	21	<20	64	53	41	37	34	31	27	67	57	46	41	36	34	31
	3150	1.486	1783	0.032	<20	57	43	34	30	26	21	<20	66	54	43	38	34	31	30	69	56	47	42	37	34	33
	4075	1.923	2306	0.042	<20	60	46	41	32	28	22	22	68	54	45	39	35	32	32	71	58	48	43	38	34	36
	5000	2.360	2829	0.055	<20	63	49	48	35	29	23	26	70	55	47	40	35	33	35	73	59	50	44	40	36	39
20	1600	0.755	733	0.019	<20	52	37	29	28	24	19	<20	60	48	38	35	33	29	22	63	55	45	40	39	33	26
	2950	1.392	1352	0.025	<20	56	41	32	29	25	21	<20	62	48	39	36	33	29	24	66	56	46	41	39	33	30
	4300	2.029	1971	0.032	<20	65	47	35	30	27	22	28	68	52	41	37	33	29	32	72	57	46	42	40	34	37
	5150	2.430	2361	0.045	<20	68	51	39	32	28	23	32	72	56	44	39	34	31	37	75	60	47	43	41	36	41
	6000	2.831	2750	0.061	<20	71	55	44	34	30	25	36	76	59	47	40	35	31	43	78	62	50	45	42	37	45
24	2250	1.062	739	0.020	<20	54	39	29	28	24	19	<20	61	48	38	35	33	29	23	64	55	45	40	39	33	27
	3600	1.699	1183	0.023	<20	56	42	32	29	25	21	<20	62	48	39	36	33	29	25	66	56	46	41	39	33	30
	4950	2.336	1626	0.028	<20	64	45	34	30	26	22	27	65	51	40	37	33	29	28	70	57	46	42	40	34	35
	6400	3.020	2103	0.036	<20	66	49	35	31	28	23	30	70	54	42	38	34	30	35	73	58	47	43	41	35	38
	7850	3.704	2579	0.054	<20	70	54	43	34	30	25	35	75	58	46	40	35	31	41	77	62	49	45	42	37	43

NOTE

1. The performance data shown is based on tests conducted in accordance with ANSI/AHRI Standard 880 and ANSI/ASHRAE Standard 130.
2. Measurement of Sound Power Levels is in accordance with International Standard ISO 3741 comparison method.
3. The Noise Criteria (NC) calculation is based on AHRI Standard 885. See Table 4 for sound attenuation calculation.

SVT 500 - SA: AIR TERMINAL WITH DOWNSTREAM SOUND ATTENUATOR

Table 3: Static Pressure and Insertion Loss of Sound Attenuator

Air Terminal With Attenuator Model	Rated Air Flows		Downstream Sound Attenuator								
	CFM	m³/s	Static Pressure (in. W.G.)	Attenuator Model	Attenuator Size (mm) (W x H x L)	Insertion Loss (dB) Octave Band Center Frequency (Hz) 125	250	500	1kHz	2kHz	4kHz
SVT 506 - SA	150 250 350 450 550	0.071 0.118 0.165 0.212 0.260	0.02 0.04 0.06 0.10 0.14	SA20 - 100	300 × 300 × 900	12	22	37	50	46	36
SVT 508 - SA	200 400 600 800 1000	0.094 0.189 0.283 0.378 0.472	0.02 0.06 0.12 0.22 0.34	SA20 - 100	300 × 350 × 900	12	22	37	50	46	36
SVT 510 - SA	400 700 1000 1300 1600	0.189 0.330 0.472 0.613 0.755	0.02 0.06 0.14 0.24 0.34	SA20 - 125	325 × 400 × 900	12	21	37	48	41	31
SVT 512 - SA	700 1050 1400 1750 2100	0.330 0.495 0.661 0.826 0.991	0.02 0.04 0.08 0.14 0.20	SA20 - 175	375 × 450 × 900	12	19	35	41	29	25
SVT 514 - SA	800 1350 1900 2450 3000	0.378 0.637 0.897 1.156 1.416	0.02 0.04 0.10 0.16 0.22	SA22 - 200	420 × 500 × 900	12	18	30	33	26	23
SVT 516 - SA	1000 1750 2500 3250 4000	0.472 0.826 1.180 1.534 1.888	0.02 0.06 0.12 0.22 0.34	SA27 - 200	470 × 550 × 900	12	18	30	33	26	23
SVT 518 - SA	1300 2225 3150 4075 5000	0.613 1.050 1.486 1.923 2.360	0.02 0.08 0.18 0.28 0.44	SA32 - 200	520 × 600 × 900	12	18	30	33	26	23
SVT 520 - SA	1600 2950 4300 5150 6000	0.755 1.392 2.029 2.430 2.831	0.04 0.12 0.28 0.40 0.54	SA37 - 200	570 × 650 × 900	12	18	30	33	26	23
SVT 524 - SA	2250 3600 4950 6400 7850	1.062 1.699 2.336 3.020 3.704	0.03 0.07 0.12 0.19 0.29	SA20 - 175	750 × 670 × 900	13	19	35	41	29	25

NOTE

1. Static Pressure on the above table is for sound attenuator only.
2. If SVT 500 Series with downstream sound attenuator shall be selected because it can be also a source of noise due to the flow self generated noise.
3. To obtain the Static Pressure of SVT 500 Series with integral downstream sound attenuator, the Static Pressure of sound attenuator from the above table shall be added to Static Pressure of the SVT 500 Series Air Terminal.
4. Refer to Table 1 and Table 2 for NC levels and Static Pressure of SVT – 500 Series Air Terminal.

NOISE CRITERIA (NC) CALCULATION

Table 4: Sound Attenuation Calculation as per AHRI 885

Table 4A AHRI 885	DISCHARGE SOUND ATTENUATION ASSUMPTION Octave Band Center Frequency (Hz)					
DISCHARGE <300 CFM	**125**	**250**	**500**	**1kHz**	**2kHz**	**4kHz**
1. Environmental effect	2	1	0	0	0	0
2. Duct lining 1” thk, 15” x 15” x 5ft	2	3	9	18	17	8
3. Flexible duct 5ft, Ø8”	6	10	18	20	21	12
4. End reflection	9	5	2	0	0	0
5. Sound Power division (1 space supplied)	0	0	0	0	0	0
6. Space effect	5	6	7	8	9	10
Total Attenuation (dB)	24	25	36	46	47	30

Table 4B AHRI 885	DISCHARGE SOUND ATTENUATION ASSUMPTION Octave Band Center Frequency (Hz)					
DISCHARGE 300 - 700 CFM	**125**	**250**	**500**	**1kHz**	**2kHz**	**4kHz**
1. Environmental effect	2	1	0	0	0	0
2. Duct lining 1” thk, 15” x 15” x 5ft	2	3	9	18	17	8
3. Flexible duct 5ft, Ø8”	6	10	18	20	21	12
4. End reflection	9	5	2	0	0	0
5. Sound Power division (2 spaces supplied)	3	3	3	3	3	3
6. Space effect	5	6	7	8	9	10
Total Attenuation (dB)	27	28	39	49	50	33

Table 4C AHRI 885	DISCHARGE SOUND ATTENUATION ASSUMPTION Octave Band Center Frequency (Hz)					
DISCHARGE >700 CFM	**125**	**250**	**500**	**1kHz**	**2kHz**	**4kHz**
1. Environmental effect	2	1	0	0	0	0
2. Duct lining 1” thk, 15” x 15” x 5ft	2	3	9	18	17	8
3. Flexible duct 5ft, Ø8”	6	10	18	20	21	12
4. End reflection	9	5	2	0	0	0
5. Sound Power division (2 spaces supplied)	5	5	5	5	5	5
6. Space effect	5	6	7	8	9	10
Total Attenuation (dB)	29	30	41	51	52	35

Table 4D AHRI 885	RADIATED SOUND ATTENUATION ASSUMPTION Octave Band Center Frequency (Hz)					
RADIATED	**125**	**250**	**500**	**1kHz**	**2kHz**	**4kHz**
1. Environmental effect	2	1	0	0	0	0
2. Mineral Tile, Space/Ceiling effect	16	18	20	26	31	36
Total Attenuation (dB)	18	19	20	26	31	36

NOTE

If split air flows will be supplied to the same conditioned space, the Sound Power division outlined on the above table has no effect. Therefore the value of Sound Power division in all freaquencies from 2 to 7 (125Hz to 4kHz) is equal to zero, then the total attenuation will be less than the above calculation. Noise Criteria can be recalculated using the above calculation to apply the actual site conditions.

NOISE CRITERIA (NC) CALCULATION

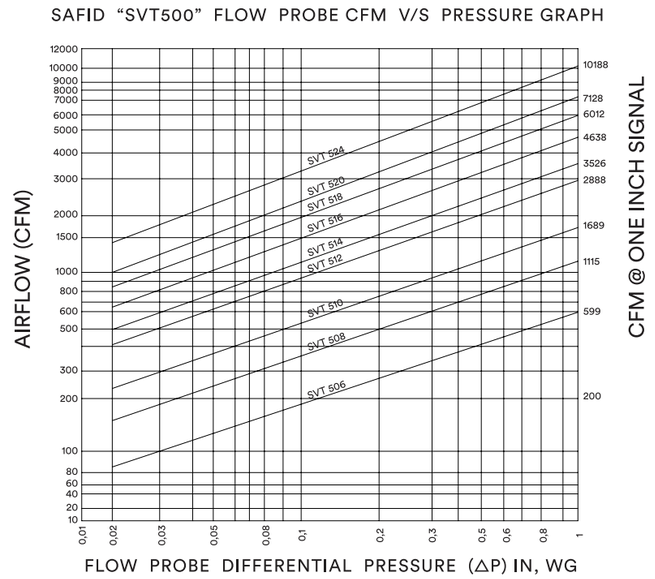
Table 5: Tabular Representation of NC Curves (dB)

NC	Octave Band Center Frequency, Hz					
	2 (125)	3 (250)	4 (500)	5 (1 KHz)	6 (2 KHz)	7 (4 KHz)
15	36	29	22	17	14	12
20	40	33	26	22	19	17
25	44	37	31	27	24	22
30	48	41	35	31	29	28
35	52	45	40	36	34	33
40	56	50	45	41	39	38
45	60	54	49	46	44	43
50	64	58	54	51	49	48
55	67	62	58	56	54	53
60	71	67	63	61	59	58
65	75	71	68	66	64	63

NOTE

The above tabular representation of NC curves can be caused to determine the new NC level whenever recalculation of discharge or radiated NC level is required.

Flow Calibration Chart



Airflow Range

MODEL	UNIT SIZE (in)	INLET SIZE DIA (mm)	K Factor	Iniet Area ft²	Airflow Range (CFM) Min	Heating	Max
SVT 506	6	152	1.79	0.2	60	138	550
SVT 508	8	200	1.58	0.35	110	250	1000
SVT 510	10	250	1.7	0.55	170	400	1600
SVT 512	12	305	1.2	0.79	290	525	2100
SVT 514	14	350	1.48	1.07	352	750	3000
SVT 516	16	400	4.46	1.4	464	1000	4000
SVT 518	18	450	1.39	1.77	600	1250	5000
SVT 520	20	500	1.5	2.18	710	1500	6000
SVT 524	24	600	1.52	3.14	1020	1950	7850

NOTE

Maximum Airflow is based on 3000 FPM inlet velocity. At Heat mode minimum 0.03"WG discharge pressure is required to energize flow switch.

SVT 500 - EH: AIR TERMINALS WITH DOWNSTREAM ELECTRIC HEATER

Optional Electric Heaters

OPTION NO. 1 - Stainless Steel Tube Coil:

Construction:

The heating element of the electric heater is made from stainless steel tube, SS type 2337, EN 1.4541. The stainless steel tube heating element is not electrified and it will get hot (300-500°C) but you will not get an electric shock if you should reach it. It has a density which will keep it warm for approximately 3 minutes after the power is switched off and therefore very good to control with a time proportional thyristor regulation or with a thermostat. All electric heaters are tested for electrical safety and approved for EMC by SEMKO and comply with European standards EN 50081-1 and EN 50082-1, It also comply with the requirements in the Low Voltage Directive, LVD 72/23 EEC.

The casing is made from steel sheet with aluminum zinc coating which is more corrosion resistive that the galvanized steel sheet.

Basic Electric Heater - Code EHT:

1. The basis electric heater have no built-in temperature regulation controller.
2. In case of thermal over load, It has two built-in over heating protections, one is automatic reset and the other to be manually reset.
3. The basic electric heater have built-in pressure switch to detect the pressence of air flow passing through electric heater. The power supply to the electric heater must be interrupted if the supply fan or air flow stopped. function can be connected to the incoming power supply to the electric heater.
4. The number of kW steps is available from 1 to 3 steps.
5. The power supply is 230V/1PH/60HZ from 0.5kW up to 10kW and 400V/3PH/60HZ from 3kW up to 86kW.

Electric Heater with Built - In Temperature Regulation Controller - Code EHTR:

1. The electric heater with built-in electric temperature regulation controller calles thyristor controls heating by means of so calles time proportional regulation (Pulse/Pause Technology). This gives a very precise continuous variable temperature regulation control of the heaters in response to the temperature requirements of the room sensor. The built-in controller is made for an external 0-10V control signal from BMS or similar.
2. It has also a built-in automatic and manual reset over heating protection and a pressure switch to detect the presence of air flow passing through the electric heater.
3. The power supply is 230V/1PH/60HZ from 0.2kW up to 5.5kW and 400V/3PH/60HZ from 6kW up to 86kW.

NOTE

For more details, please refer to the Electric Duct Heater section of this catalogue.

ELECTRIC HEATERS FOR VAV TERMINALS

SVT 500 - EH: AIR TERMINALS WITH DOWNSTREAM ELECTRIC HEATER

Optional Electric Heaters

OPTION NO. 2 - Open Coil:

Construction:

The open coil type heating element is made from a high grade resistance wire. Each heating coil element is designed to the customer's wattage specification. A guage heavier that a normal guage wire is used, giving a longer coil to maintain the required resistance for a given wattage.

The casing is made from galvanized steel sheet as standard. Optional casing can be made from aluminimized or stainless steel.

Basic Electric Heater - Code EHO:

1. The basic electric heater have no-built temperature regulation controller.
2. In case of thermal over load, It has two built-in over heating protections, one is automatic reset and the other one is to be manually reset.
3. The basic electric heater have a built-in flow switch to detect the presence of air flow passing through the electric heater. The power supply to the electric heater must be interrupted if the supply fan or air flow stopped.
4. The number of kW steps is available from 1 to 3 steps.
5. The power supply available is 230V/1PH/60HZ or 440V/3PH/60HZ.
6. The maximum kW rating is 200kW.

Electric Heater with Built - In solid state proportional Controller - Code EHOS

1. The heating element is controlled simultaneously with the built-in solid state controller. The built-in controller is made for an external 0— 10 VDC control signal from BMS.
2. It has also a built-in automatic and manual reset over heating protection and air flow switch to detect the presence of air flow passing through the electric heater.
3. The power supply available is 230V/1PH/60HZ or 440V/3PH/60HZ.
4. The maximum kW rating is 200kW.

NOTE

For more details, please refer to the Electric Duct Heater section of this catalogue.

SVT 500 Series for Variable Air Volume (VAV) Systems

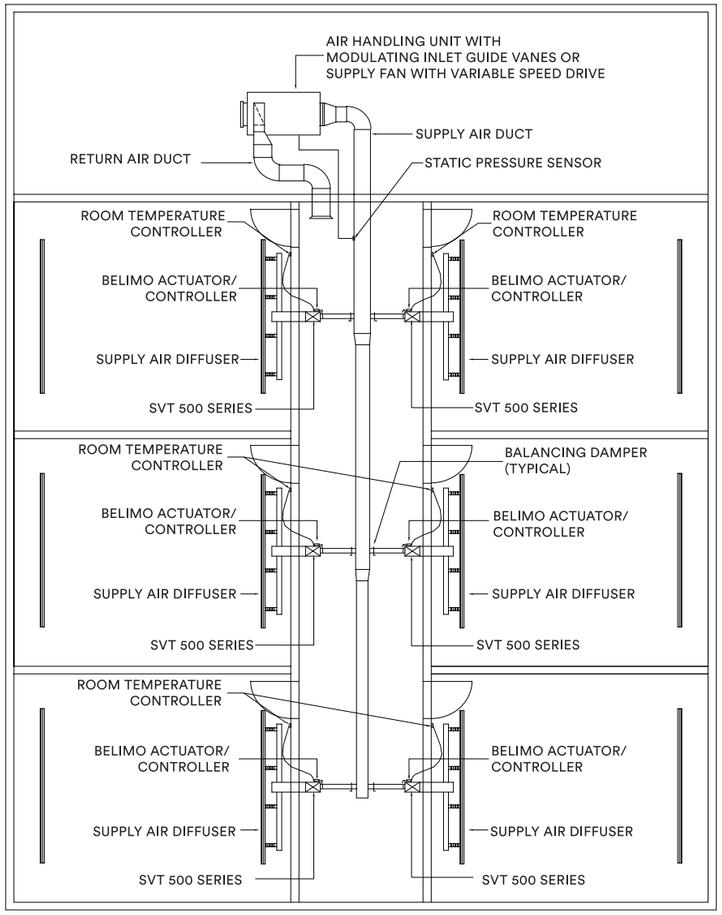


Figure-1

Figure-1 shows SVT 500 Series for Variable Air Volume (VAV) Systems. The volume of air supply to the room varies depend on the requirement of room thermostat.The air terminal will be fully open when the room under its control experiences a maximum load. When the room temperature reached the thermostat setting, the air terminal will close down to the minimum volumetric flow setting and the air volume from supply fan varies.

When the room load decreases in other areas, the air terminal start to throttle at partial load or close down to the minimum volumetric flow setting that will cause to increase the duct static pressure. By using a supply fan with inlet guide vanes or supply fan with variable speed drive, a signal from duct static pressure sensor will start to modulate the fan inlet guide vanes or modulate the fan speed to reduce the air flow. This air flow reduction is the major cause of energy savings of Variable Air Volume (VAV) Systems.

SVT 500 Series for Constant Air Volume (CAV) Systems

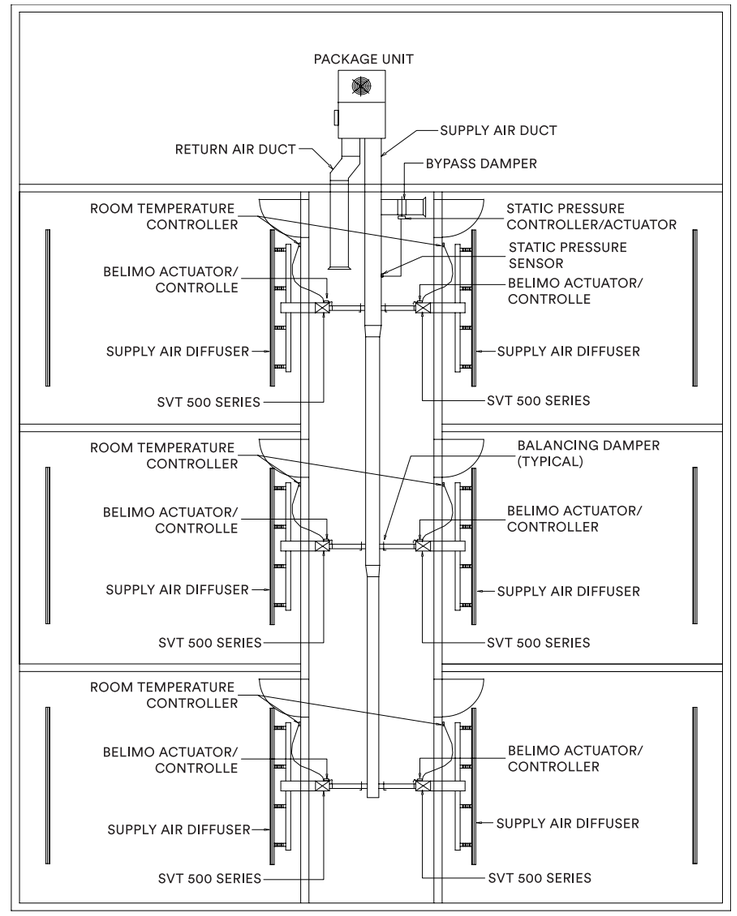
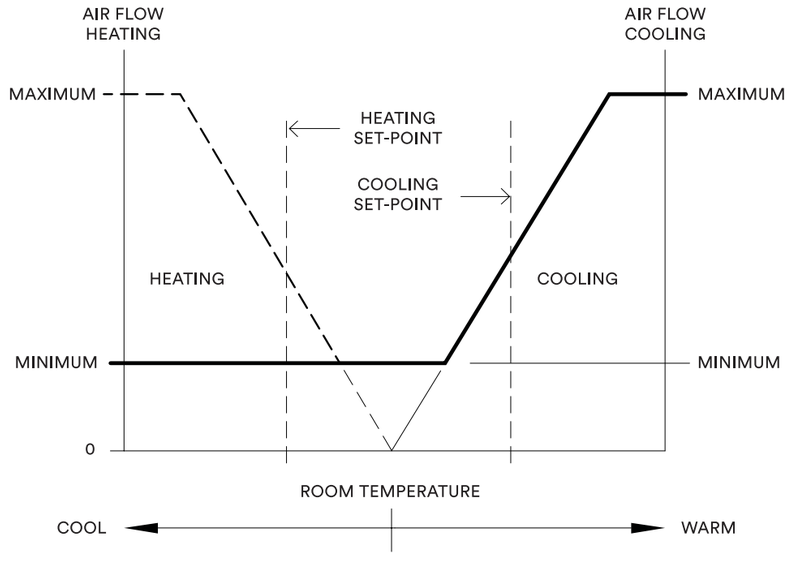


Figure-2

Figure-2 shows SVT 500 Series for Constant Air Volume (CAV) Systems. The volume of air supply to the room varies depend on the requirement of room thermostat.The air terminal will be fully open when the room under its control experiences a maximum load. When the room temperature reached the thermostat setting, the air terminal will close down to the minimum volumetric flow setting while the air volume from supply fan remain constant.

When the room load decreases in other areas, the air terminal start to throttle at partial load or close down to the minimum volumetric flow setting that will cause to increase the duct static pressure. At this point a signal from duct static pressure sensor will start the static pressure controller to open the bypass damper. Care should be taken that the bypassed air will not be thrown directly or near the main return opening or bellmouth to avoid short-circuiting of supply and return air.

Controls Sequence



Cooling Mode:
During summer, the room thermostat signals the damper actuator to regulate the damper position. The cooling set-point decide the room temperature. When the room temperature rises above the cooling set-point, the damper will be modulated to maximum air flow. When the room temperature fall below the cooling set-point, the damper will be modulated to minimum air flow.

Heating Mode:
During winter, the room thermostat signals the damper actuator to regulate the damper position at minimum air flow. When the room temperature continuous to fall below the temperature set-point, the room thermostat will energize the electric heater while the damper position will be at minimum air flow.

Selection Procedure

Example No. 1:

Customer Requirements:

1. Space (room) supplied = 3 spaces
2. Cooling only application
3. Maximum cooling air flow (Vnom) = 1750 CFM
4. Inlet static pressure at fully open damper (minimum S.P.) = 0.1 W.G.
5. Maximum system static pressure setting = 2 in W.G.
6. Maximum NC level = NC 35

From Performance Data - Table 1:

1. Select Inlet Size 12 from Table 1 which has a minimum static pressure of 0.072 in. W.G. at 1750 CFM. The value of the selected minimum static pressure shall not exceed the required minimum static pressure of 0.1 in W. G.
2. The NC levels in Table 1 were calculated using Table 4C as per AHRI 885 where above 700 CFM, the sound power division supplied 3 spaces. The discharge NC level from Table 1 at 2 in. W.G. S.P. is NC 33 and the radiated NC level from Table 2 is NC 32.

SVT 512 (Inlet Size 12) will meet the required pressure drop (less than 0.1 in W.G.) and NC level (NC 35) for this example.

Example No. 2:

Customer Requirements:

1. Space (room) supplied = 1 space
2. Cooling only application
3. Maximum cooling air flow (Vnom) = 1750 CFM
4. Inlet Static pressure at fully open damper (minimum S. P.) = 0.1 in W. G.
5. Maximum system static pressure setting = 2 in. W.G.
6. Maximum NC level = NC 35

From Performance Data - Table 1:

Since the published NC levels for Inlet Size 12 at 1750 CFM were calculated as supplied 3 spaces while the actual customer requirement is to be supplied 1 space only, recalculation of Noise Criteria (NC) using Table 4A is required.

1. Selecting Inlet Size 14 from Table 1, the minimum static pressure at 1750 CFM by interpolation is 0.044 in W. G.
2. By interpolation and recalculation using Table 4A, the discharge NC level at 1750 CFM is NC 35 and the radiated NC level from Table 2 is NC 27.

SVT 514 (Inlet Size 14) will meet the required pressure drop (less than 0.1 in W.G.) and NC level (NC 35) for this sample.

Order Details

SVT aaa- bb- cc- dd ee ff gg hh ii jj kk ll mm nn

Model No:

506 = Inlet Size No. 6″
508 = Inlet Size No. 8″
510 = Inlet Size No. 10″
512 = Inlet Size No. 12″
514 = Inlet Size No. 14″
516 = Inlet Size No. 16″
518 = Inlet Size No. 18″
520 = Inlet Size No. 20″
524 = Inlet Size No. 24″

Options:

SA = With discharge sound attenuator
OP = With Mulitple outlet plenum
EHT = With stainless steel tube coil electric heater
EHTR = With stainless steel tube coil electric heater and built - in temperature regulation controller powered by external 0-10V control signal from a BMS or similar.
EHO = With open coil electric heater
EHOS = With open coil electric heater and built-in solid state proportional controller powered by external 0-10V control signal from a BMS or similar.
HW = With discharge hot water coil
kW = Power rating of electric heater
1,2,3 = Required number of steps
M = With Belimo actuator/Controller
TC = With digital room temperature controller
T = With step-down transformer from 220V to 24V for actuator/controller
TB = With terminal block for transformer
CB = With control box
P = With perforated sheet behind acoustic lining
SF = With slide on flange on discharge side
FC = With flexible connector
S = Double wall casing with solid liner wall

Air Flow Setting:

CFM = Vmax (% maximum airflow setting of Vnom)
CFM = Vmin (% airflow setting based on Vmax)

NOTE

1. If the discharge side connection is not specified, slip & drive is the standard connection.
2. If the actuator/controller, transformer, terminal block and control box is not specified, the standard supply.

Order Example

Example No. 1:

Requirements:
Variable Air Volume Terminal, Pressure - Independent is capable of delivering 1750 CFM (Vnom) at 0.05 in W.G. minimum static pressure at fully open damper blade and with maximum discharge NC 35 at 2 in W. G. maximum system static pressure setting. Maximum air flow (Vmax) is 100% of Vnom and minimum air flow (Vmin of Vmax) is 30%, Air Terminal should be with Belimo actuator/controller and control box. The space supplied is one room only.

Selected Mode: SVT 514 - By interpolation and recalculation using Table 4A, SVT 514 will meet the required 0.05 in W.G. pressure drop and the discharge NC 35 at 2 in W. G. Static Pressure.

Ordering:
Make :SAFID
Type :SVT 514-M-CB-1750CFM-525CFM
Qty :1 pc

Example No. 2:

Requirements:
Same as Example No. 1 but with discharge Sound Attenuator at Inlet & Attenuator static pressure of 0.15 in W. G.

Selected Model: SVT 514

Ordering:
Make : SAFID
Type : SVT 514-SA-M-CB-1750 CFM-525CFM
Qty :1 pc

Example No. 3:

Requirements:
Same as Example No. 1 but with open coil electric heater, 3kW, 1 step.

Ordering:
Make :SAFID
Type :SVT 514-EHO-3kW-1-M-CB-1750CFM-525CFM
Qty :1 pc

Example No. 4

Requirements:
Same as Example No. 1 but with open coil electric heater, 6kW, 2 steps with digital room temperature controller.

Selected Model: SVT 514

Ordering:
Make :SAFID
Type :SVT 514-EHO-6kW-2-M-TC-CB-1750CFM-525CFM
Qty :1 pc

CAV AIR TERMINAL UNITS

CONSTANT AIR VOLUME FLOW REGULATOR

SCVT 600 SERIES

Description

SAFID SCVT 600 Series CAV air terminals are designed to achieve constant air volume supply of conditioned air to a room in single duct air distribution systems. The SCVT air terminals are equipped with a velocity controller to regulate air flow on the basis of a control signal. The velocity controller (air flow sensor and electric actuator) maintain the required maximum amount of designed air flow to be supplied in the room. The SCVT 600 Series is fitted with Belimo actuator/ controller as standard. The Belimo actuator is linearized with the SCVT 600 Series in order to achieve a high standard performance of the CAV air terminals. They have a wide range of sizes with capacities from 150 to 6000 CFM. The SCVT 600 Series will work well in Constant Air Volume (CAV) systems where air volume supplied to the room remain constant.

Standard Construction

Body:
Built of 22 gauge galvanized steel sheet, conform to ASTM A653, LFQ, G90 zinc coating.

Blade:
Built of 22 gauge galvanized steel sheet, conform to ASTM A653, LFQ, G90 zinc coating, double skin with rubber blade seal.

Case Bearing:
Brass bearing as standard.

Air Flow Sensor:
Aluminum multiple averaging flow probe that offers an excellent air flow sensing capability.

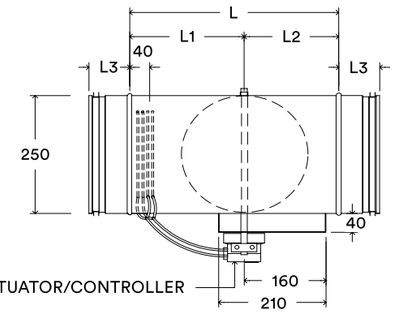
Controls:
The SCVT 600 Air terminals can be specified with electric controls. Standard control are Belimo Actuator modulating type.

Control Box:
To required suitable size (as optional)

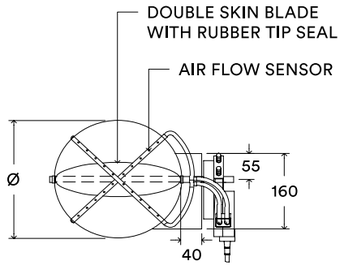
Option: Model No. SCVTH 600 Series
General construction as type SCVT 600 Series but body, blades, control shaft and case bearing from stainless steel Type 304.

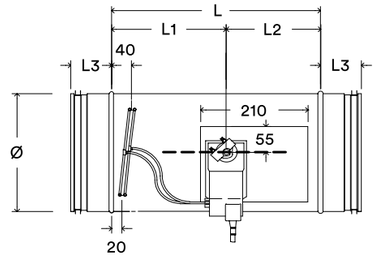
Dimensions

TOP VIEW



BELIMO ACTUATOR/CONTROLLER





FRONT VIEW

SIDE VIEW

MODEL	UNIT SIZE (in)	INLET SIZE DIA (mm)	L (mm)	L1 (mm)	L2 (mm)	L3 (mm)
SCVT 506	6	152	361	176	185	60
SCVT 508	8	200	385	200	185	60
SCVT 510	10	250	410	225	185	80
SCVT 512	12	305	437	252	185	80
SCVT 514	14	350	460	275	185	80
SCVT 516	16	400	485	300	185	100
SCVT 518	18	450	510	325	185	100
SCVT 520	20	500	535	350	185	100
SCVT 524	24	600	585	400	185	100

NOTE

The minimum straight portion before the CAV must be equal to 2 minutes the diameter of the inlet size of CAV to maintain the integrity of airflow sensor's performance.

Table 1

Size	Rated Inlet Air Flows		Velocity	Inlet S.P.	Min.S.P.	Discharge Sound Power Level (dB)																		
						@ 1 in. W.G. S.P.							@ 2 in. W.G. S.P.							@ 3 in. W.G. S.P.					
						Octave Band						NC	Octave Band						NC	Octave Band						NC
	CFM	m³/s	FPM			2	3	4	5	6	7		2	3	4	5	6	7		2	3	4	5	6	7	
6	150	0.071	764	0.020	<20	61	56	49	38	36	39	<20	62	58	62	46	45	47	20	62	62	61	52	50	49	23
	250	0.118	1273	0.036	<20	64	62	55	45	41	43	24	66	64	61	48	46	48	26	68	67	63	53	51	51	29
	350	0.165	1783	0.080	<20	68	67	61	51	45	46	25	73	69	60	49	47	50	27	74	72	66	54	52	53	31
	450	0.212	2292	0.120	<20	70	67	62	51	45	47	26	73	71	63	49	47	50	30	74	74	66	54	52	54	33
	550	0.260	2801	0.220	<20	72	69	62	51	45	47	27	74	72	65	48	46	50	31	74	76	66	55	53	54	35
8	200	0.094	573	0.026	<20	60	53	48	39	40	41	<20	62	57	55	47	46	49	22	64	60	58	52	50	52	24
	400	0.189	1146	0.036	<20	65	57	50	41	41	41	23	68	65	58	50	48	49	23	71	67	63	56	52	52	25
	600	0.283	1719	0.076	<20	70	60	53	44	41	41	24	74	70	62	54	50	49	30	77	73	67	59	55	53	33
	800	0.378	2292	0.136	<20	73	64	57	47	45	43	25	79	71	64	55	51	50	32	80	76	69	61	56	54	36
	1000	0.472	2865	0.200	<20	75	67	60	51	48	45	28	83	73	66	57	53	51	37	83	78	71	62	58	55	38
10	400	0.189	733	0.028	<20	64	57	49	42	43	43	<20	70	63	57	51	50	50	23	71	64	60	56	53	53	25
	700	0.330	1283	0.036	<20	68	61	55	47	47	46	22	74	67	59	53	51	51	28	76	70	64	58	55	55	31
	1000	0.472	1833	0.076	<20	73	66	61	52	51	50	25	78	70	61	54	53	52	31	79	74	67	59	57	56	33
	1300	0.613	2383	0.116	<20	75	68	63	54	53	52	27	79	72	63	56	54	53	33	81	75	67	60	57	57	36
	1600	0.755	2934	0.172	<20	77	70	65	56	55	55	30	81	73	65	57	55	54	36	83	76	68	60	58	57	37
12	700	0.330	891	0.027	<20	63	55	48	45	45	42	<20	73	68	57	53	51	50	27	73	72	65	59	55	54	31
	1050	0.495	1337	0.032	<20	66	56	50	46	46	44	<20	77	73	59	55	52	52	31	78	75	65	60	56	55	34
	1400	0.661	1783	0.040	<20	67	57	52	47	46	45	<20	79	71	60	55	53	52	33	82	74	65	60	57	56	36
	1750	0.826	2228	0.072	<20	68	60	55	49	47	46	20	80	73	63	57	55	54	35	83	75	66	61	59	57	37
	2100	0.991	2674	0.120	<20	71	62	58	50	47	46	22	82	76	65	60	57	56	37	84	77	67	62	60	58	39
14	800	0.378	748	0.019	<20	57	51	48	45	44	42	<20	72	66	56	52	51	51	25	73	72	62	58	55	55	31
	1350	0.637	1263	0.032	<20	61	54	50	47	46	44	<20	74	66	58	54	52	53	27	77	74	63	59	57	57	33
	1900	0.897	1777	0.048	<20	65	57	53	49	48	47	<20	76	66	60	56	54	55	30	81	74	64	61	59	59	35
	2450	1.156	2292	0.076	<20	70	60	57	51	49	48	21	77	68	62	57	55	55	31	82	75	66	62	59	59	37
	3000	1.416	2806	0.116	<20	72	64	61	54	51	49	23	79	70	64	59	56	56	32	84	75	67	63	60	60	39
16	1000	0.472	716	0.015	<20	66	53	48	47	47	46	<20	76	68	56	55	53	53	28	78	70	64	60	57	56	32
	1750	0.826	1253	0.028	<20	68	56	52	50	49	47	20	78	69	59	57	54	54	32	80	71	66	61	59	58	35
	2500	1.180	1790	0.036	<20	70	59	56	52	50	48	22	80	70	61	59	56	55	34	82	72	67	62	60	59	36
	3250	1.534	2328	0.056	<20	72	62	60	54	51	49	25	81	71	64	61	57	56	35	83	73	68	64	62	60	37
	4000	1.888	2865	0.084	<20	74	65	64	57	53	50	27	83	72	66	62	59	57	38	85	74	69	65	63	61	41
18	1300	0.613	736	0.015	<20	65	54	51	49	48	48	<20	74	68	58	57	57	58	29	74	73	64	63	61	61	32
	2225	1.050	1259	0.026	<20	68	56	52	50	49	48	20	76	69	60	58	58	58	30	79	73	65	63	61	62	33
	3150	1.486	1783	0.032	<20	69	58	52	51	50	48	21	78	69	62	59	59	58	32	81	73	65	64	61	62	36
	4075	1.923	2306	0.042	<20	72	61	59	54	52	49	25	80	70	63	60	59	58	35	83	74	67	64	62	62	38
	5000	2.360	2829	0.055	<20	75	65	66	56	54	51	28	82	70	65	61	60	58	37	85	74	68	65	64	62	41
20	1600	0.755	733	0.019	<20	64	52	50	49	49	46	<20	73	63	58	57	57	56	27	75	70	64	63	63	61	31
	2950	1.392	1352	0.025	<20	68	56	50	50	50	49	21	75	63	59	57	57	56	28	78	70	64	64	63	61	32
	4300	2.029	1971	0.032	<20	77	62	54	51	51	49	31	80	67	60	58	57	57	35	84	72	65	64	64	62	40
	5150	2.430	2361	0.045	<20	80	66	58	53	52	50	35	84	71	62	60	58	58	40	87	75	66	64	64	63	43
	6000	2.831	2750	0.061	<20	84	70	62	56	54	52	39	88	74	65	61	59	59	45	90	77	68	65	65	64	47
24	2250	1.062	739	0.020	<20	65	53	50	49	49	46	<20	74	63	58	57	57	56	28	76	70	64	63	63	61	33
	3600	1.699	1183	0.023	<20	67	55	50	50	50	48	21	75	63	59	57	57	56	29	77	70	64	64	63	61	33
	4950	2.336	1626	0.028	<20	72	59	52	51	51	49	25	77	65	60	58	57	57	31	81	71	65	64	64	62	35
	6400	3.020	2103	0.036	<20	78	64	56	52	52	50	32	82	69	61	59	58	58	37	85	73	66	64	64	63	41
	7850	3.704	2579	0.054	<20	82	69	61	55	53	51	37	87	73	64	61	59	59	44	88	76	67	64	64	63	45

NOTE

1. The performance data shown is based on tests conducted in accordance with ANSI / AHRI Standard 880 and ANSI / ASHRAE Standard 130.
2. Measurement of Sound Power Levels is in accordance with International Standard ISO 3741 comparison method.
3. The Noise Criteria (NC) calculation is based on AHRI Standard 885. Refer Table 3 for sound attenuation calculation.

Table 2

Size	Rated Inlet Air Flows		Velocity	Inlet S.P.	Min.S.P.	Radiated Sound Power Level (dB)																		
						@ 1 in. W.G. S.P.							@ 2 in. W.G. S.P.							@ 3 in. W.G. S.P.					
						Octave Band						NC	Octave Band						NC	Octave Band						NC
	CFM	m³/s	FPM			2	3	4	5	6	7		2	3	4	5	6	7		2	3	4	5	6	7	
6	150	0.071	764	0.020	<20	48	41	31	17	12	12	<20	46	43	43	25	20	20	<20	49	46	43	31	26	22	<20
	250	0.118	1273	0.036	<20	52	46	37	23	16	15	<20	54	51	43	26	22	21	<20	55	53	45	32	27	24	21
	350	0.165	1783	0.080	<20	55	51	42	29	20	19	<20	61	54	42	28	23	22	23	62	56	47	33	27	26	24
	450	0.212	2292	0.120	<20	58	52	42	29	20	19	<20	61	56	44	28	23	23	24	62	59	47	33	28	27	28
	550	0.260	2801	0.220	<20	60	54	44	30	21	20	22	62	57	46	29	24	23	25	63	61	48	34	29	28	30
8	200	0.094	573	0.026	<20	48	38	30	17	15	14	<20	50	42	36	25	22	22	<20	52	44	40	31	26	24	<20
	400	0.189	1146	0.036	<20	53	41	32	20	16	14	<20	56	50	40	29	24	22	<20	58	52	44	34	28	25	<20
	600	0.283	1719	0.076	<20	58	45	35	22	17	15	<20	62	54	44	33	26	22	24	65	57	49	38	30	26	28
	800	0.378	2292	0.136	<20	60	48	38	26	20	16	22	66	56	46	34	27	23	30	68	61	51	39	32	27	32
	1000	0.472	2865	0.200	<20	63	52	42	29	24	18	26	70	58	48	36	29	24	35	71	62	52	41	33	28	36
10	400	0.189	733	0.028	<20	52	42	30	21	19	15	<20	58	48	38	30	26	23	<20	59	49	42	34	29	26	20
	700	0.330	1283	0.036	<20	56	46	37	26	23	19	<20	62	51	41	31	27	24	24	63	55	45	36	31	27	26
	1000	0.472	1833	0.076	<20	60	50	43	31	26	23	22	65	55	43	33	28	25	28	67	59	49	38	33	29	31
	1300	0.613	2383	0.116	<20	63	52	45	33	29	25	26	67	57	45	34	30	26	31	69	60	49	39	33	29	33
	1600	0.755	2934	0.172	<20	65	55	47	35	31	27	28	69	58	47	36	31	27	33	71	61	50	39	34	30	36
12	700	0.330	891	0.027	<20	51	39	29	24	21	15	<20	61	53	39	32	26	23	23	61	57	46	38	31	26	25
	1050	0.495	1337	0.032	<20	54	41	32	25	21	17	<20	64	57	41	33	28	24	27	65	60	47	38	32	28	29
	1400	0.661	1783	0.040	<20	56	42	34	26	22	18	<20	67	55	42	34	29	25	31	70	59	47	38	33	29	35
	1750	0.826	2228	0.072	<20	56	44	37	27	22	18	<20	68	58	44	36	30	27	32	71	60	48	40	34	30	36
	2100	0.991	2674	0.120	<20	58	47	39	29	23	18	<20	70	60	47	38	32	29	35	72	62	49	41	36	31	37
14	800	0.378	748	0.019	<20	45	35	30	23	20	15	<20	60	50	37	31	26	24	22	60	57	44	37	31	27	25
	1350	0.637	1263	0.032	<20	49	39	32	26	22	17	<20	62	50	39	33	28	26	24	64	62	45	38	33	29	31
	1900	0.897	1777	0.048	<20	53	42	34	28	23	19	<20	64	50	41	35	29	27	27	69	62	46	39	34	31	33
	2450	1.156	2292	0.076	<20	57	45	38	30	25	20	<20	65	52	43	36	31	28	28	70	63	48	40	35	32	35
	3000	1.416	2806	0.116	<20	59	48	42	32	27	21	20	67	55	46	37	32	28	31	71	63	49	41	36	32	36
16	1000	0.472	716	0.015	<20	54	38	30	26	23	19	<20	63	53	38	34	29	26	26	66	55	46	38	33	29	30
	1750	0.826	1253	0.028	<20	56	41	34	28	24	20	<20	66	54	40	36	30	27	30	68	56	47	40	35	30	32
	2500	1.180	1790	0.036	<20	58	44	38	31	26	21	<20	68	55	43	37	32	28	32	69	57	48	41	36	32	33
	3250	1.534	2328	0.056	<20	60	46	42	33	27	22	22	69	56	45	39	33	29	33	70	58	49	42	37	33	35
	4000	1.888	2865	0.084	<20	62	49	45	35	28	23	24	71	57	48	41	34	30	36	73	59	51	44	39	34	39
18	1300	0.613	736	0.015	<20	53	38	33	28	24	21	<20	62	53	39	36	33	31	24	62	58	56	40	36	35	27
	2225	1.050	1259	0.026	<20	56	40	33	29	25	21	<20	64	53	41	37	34	31	27	67	57	46	41	36	34	31
	3150	1.486	1783	0.032	<20	57	43	34	30	26	21	<20	66	54	43	38	34	31	30	69	56	47	42	37	34	33
	4075	1.923	2306	0.042	<20	60	46	41	32	28	22	22	68	54	45	39	35	32	32	71	58	48	43	38	34	36
	5000	2.360	2829	0.055	<20	63	49	48	35	29	23	26	70	55	47	40	35	33	35	73	59	50	44	40	35	39
20	1600	0.755	733	0.019	<20	52	37	29	28	24	19	<20	60	48	38	35	33	29	22	63	55	45	40	39	33	26
	2950	1.392	1352	0.025	<20	56	41	32	29	25	21	<20	62	48	39	36	33	29	24	66	56	46	41	39	33	30
	4300	2.029	1971	0.032	<20	65	47	35	30	27	22	28	68	52	41	37	33	29	32	72	57	46	42	40	34	37
	5150	2.430	2361	0.045	<20	68	51	39	32	28	23	32	72	56	44	39	34	31	37	75	60	47	43	41	36	41
	6000	2.831	2750	0.061	<20	71	55	44	34	30	25	36	76	59	47	40	35	31	43	78	62	50	45	42	37	45
24	2250	1.062	739	0.020	<20	54	39	29	28	24	19	<20	61	48	38	35	33	29	23	64	55	45	40	39	33	27
	3600	1.699	1183	0.023	<20	56	42	32	29	25	21	<20	62	48	39	36	33	29	25	66	56	46	41	39	33	30
	4950	2.336	1626	0.028	<20	60	45	34	30	26	22	27	65	51	40	37	33	29	28	70	57	46	42	40	34	35
	6400	3.020	2103	0.036	<20	66	49	35	31	28	23	30	70	54	42	38	34	30	35	73	58	47	43	41	35	38
	7850	3.704	2579	0.054	<20	70	54	43	34	30	25	35	75	58	46	40	35	31	41	77	62	49	45	42	37	43

NOTE

1. The performance data shown is based on tests conducted in accordance with ANSI / AHRI Standard 880 and ANSI / ASHRAE Standard 130.
2. Measurement of Sound Power Levels is in accordance with International Standard ISO 3741 comparison method.
3. The Noise Criteria (NC) calculation is based on AHRI Standard 885. Refer Table 3-1 for sound attenuation calculation.

NOISE CRITERIA (NC) CALCULATION

Table 3: Sound Attenuation Calculation as per AHRI 885

Table 3A	DISCHARGE SOUND ATTENUATION ASSUMPTION					
AHRI 885 DISCHARGE <300 CFM	Octave Band Center Frequency, Hz					
	125	250	500	1kHz	2kHz	4kHz
1. Environmental effect	2	1	0	0	0	0
2. Acoustical double wall round duct, 1" insulation, Ø 10" x 5ft	1.7	3.8	8	11	10.8	8.2
3. Flexible duct 5ft, Ø 8"	6	10	18	20	21	12
4. End reflection	9	5	2	0	0	0
5. Sound Power division (1 space supplied)	0	0	0	0	0	0
6. Space effect	5	6	7	8	9	10
Total Attenuation (dB)	23.7	25.8	35.0	39.0	40.8	30.2

Table 3B	DISCHARGE SOUND ATTENUATION ASSUMPTION					
AHRI 885 DISCHARGE 300 - 700 CFM	Octave Band Center Frequency, Hz					
	125	250	500	1kHz	2kHz	4kHz
1. Environmental effect	2	1	0	0	0	0
2. Acoustical double wall round duct, 1" insulation, Ø 12" x 5ft	1.5	5	7.6	11.1	10.2	7.3
3. Flexible duct 5ft, Ø 8"	6	10	18	20	21	12
4. End reflection	9	5	2	0	0	0
5. Sound Power division (2 spaces supplied)	3	3	3	3	3	3
6. Space effect	5	6	7	8	9	10
Total Attenuation (dB)	26.5	30.0	37.6	42.1	43.2	32.3

Table 3C	DISCHARGE SOUND ATTENUATION ASSUMPTION					
AHRI 885 DISCHARGE >700 CFM	Octave Band Center Frequency, Hz					
	125	250	500	1kHz	2kHz	4kHz
1. Environmental effect	2	1	0	0	0	0
2. Acoustical double wall round duct, 1" insulation, Ø 16" x 5ft	1.4	3.2	6.4	10	8.4	5.3
3. Flexible duct 5ft, Ø 8"	6	10	18	20	21	12
4. End reflection	9	5	2	0	0	0
5. Sound Power division (3 spaces supplied)	5	5	5	5	5	5
6. Space effect	5	6	7	8	9	10
Total Attenuation (dB)	28.4	30.2	38.4	43.0	43.4	32.3

NOTE

If split air flows will be supplied to the same conditioned space, the Sound Power division outlined on the above table has no effect. Therefore the value of Sound Power division in all freaquencies from 2 to 7 (125hz to 4khz) is equal to zero, then the total attenuation will be less than the above calculation. Noise Critea can be recalculated using the above calculation to apply the actual site conditions.

PERFORMANCE DATA

NOISE CRITERIA (NC) CALCULATION

Table 3-1: Sound Attenuation Calculation as per AHRI 885

Table 3D	DISCHARGE SOUND ATTENUATION ASSUMPTION					
AHRI 885 DISCHARGE >700 CFM	Octave Band Center Frequency, Hz					
	125	250	500	1kHz	2kHz	4kHz
1. Environmental effect	2	1	0	0	0	0
2. Acoustical double wall round duct, 1" insulation, Ø 18" x 5ft	1.2	3	6.1	9.6	7.2	4.7
3. Flexible duct 5ft, Ø 8"	6	10	18	20	21	12
4. End reflection	9	5	2	0	0	0
5. Sound Power division (3 spaces supplied)	5	5	5	5	5	5
6. Space effect	5	6	7	8	9	10
Total Attenuation (dB)	28.2	30.0	38.1	42.6	42.2	31.7

Table 3E	DISCHARGE SOUND ATTENUATION ASSUMPTION					
AHRI 885 DISCHARGE >700 CFM	Octave Band Center Frequency, Hz					
	125	250	500	1kHz	2kHz	4kHz
1. Environmental effect	2	1	0	0	0	0
2. Acoustical double wall round duct, 1" insulation, Ø 20" x 5ft	1.2	2.9	5.8	9.1	6.2	4
3. Flexible duct 5ft, Ø 8"	6	10	18	20	21	12
4. End reflection	9	5	2	0	0	0
5. Sound Power division (3 spaces supplied)	5	5	5	5	5	5
6. Space effect	5	6	7	8	9	10
Total Attenuation (dB)	28.2	29.9	37.8	42.1	41.2	31.0

Table 3CF	DISCHARGE SOUND ATTENUATION ASSUMPTION					
AHRI 885 DISCHARGE >700 CFM	Octave Band Center Frequency, Hz					
	125	250	500	1kHz	2kHz	4kHz
1. Environmental effect	2	1	0	0	0	0
2. Acoustical double wall round duct, 1" insulation, Ø 24" x 5ft	1.1	2.7	5	8.1	4.5	2.6
3. Flexible duct 5ft, Ø 8"	6	10	18	20	21	12
4. End reflection	9	5	2	0	0	0
5. Sound Power division (3 spaces supplied)	5	5	5	5	5	5
6. Space effect	5	6	7	8	9	10
Total Attenuation (dB)	28.1	29.7	37.0	41.1	39.5	29.6

Table 3CF	DISCHARGE SOUND ATTENUATION ASSUMPTION					
AHRI 885 DISCHARGE >700 CFM	Octave Band Center Frequency, Hz					
	125	250	500	1kHz	2kHz	4kHz
1. Environmental effect	2	1	0	0	0	0
2. Mineral tile, Space/Ceiling effect	16	18	20	26	31	36
Total Attenuation (dB)	18	19	20	26	31	36

NOTE

If split air flows will be supplied to the same conditioned space, the Sound Power division outlined on the above table has no effect. Therefore the value of Sound Power division in all freaquencies from 2 to 7 (125hz to 4khz) is equal to zero, then the total attenuation will be less than the above calculation. Noise Critea can be recalculated using the above calculation to apply the actual site conditions.

NOISE CRITERIA (NC) CALCULATION

Table 4: Tabular Representation of NC Curves (dB)

NC	Octave Band Center Frequency (Hz) 2 (125)	3 (250)	4 (500)	5 (1 KHz)	6 (2 KHz)	7 (4 KHz)
15	36	29	22	17	14	12
20	40	33	26	22	19	17
25	44	37	31	27	24	22
30	48	41	35	31	29	28
35	52	45	40	36	34	33
40	56	50	45	41	39	38
45	60	54	49	46	44	43
50	64	58	54	51	49	48
55	67	62	58	56	54	53
60	71	67	63	61	59	58
65	75	71	68	66	64	63

NOTE

The above tabular representaion of NC curves can be used to determine the new NC level whenever recalculation of discharge or radiated NC level is required.

Selection of Air Terminal Size

Selection Procedure:

Example No. 1:

Customer Requirements:

1. Space (room) supplied = 2 spaces
2. Cooling only application
3. Maximum cooling air flow = 1000 CFM
4. Inlet static pressure at fully open damper (minimum S.P.) = 0.1 in. W.G.
5. Maximum inlet static pressure (system static pressure)= 2 in. W.G.
6. Maximum NC level = NC 35

From Performance Data - Table 1:

1. Select Inlet Size 10 from Table 1 which has a minimum static pressure of 0.076 in. W.G. at 1000 CFM. The value of the selected minimum static pressure shall not exceed the required minimum static pressure of 0.1 in. W.G.
2. The NC levels in Table 1 were calculated using Table 3C as per AHRI 885 where above 700 CFM, the sound power division supplied 3 spaces. Using Table 3B to calculate for 2 spaces, the discharge NC level at 2 in. W.G. is NC 35 and the radiated NC level from Table 2 is NC 28.
SCVT 610 (Inlet Size 10) will meet the required pressure drop (less than 0.1 in W.G.) and NC level is NC 31 for this example.

Example No. 2:

Customer Requirements:

1. Space (room) supplied = 1 space
2. Cooling only application
3. Maximum cooling air flow = 700 CFM
4. Inlet static pressure at fully open damper (minimum S.P.) = 0.1 in. W.G.
5. Maximum inlet static pressure (system static pressure) = 2 in. W.G.
6. Maximum NC Level = NC 35

From Performance Data - Table 1:

1. Select Inlet Size 10 from Table 1, the minimum static pressure at 700 CFM is 0.036 in. W.G.
Since the published NC level in Table 1 for Inlet Size 10 at 700CFM were calculated using Table 3B as supplied 2 spaces while the customer required to be supplied 1 space only, recalculation of Noise Criteria (NC) using Table 3A is required.
2. With the new calculated total attenuation in Table 3A, deduct it from the Discharge Sound Power Level of 700CFM from Table 1. Compare the resultant sound level in Table 4 to determine the NC level. The discharge NC level at 700 CFM is NC 33 and the radiated NC level from Table 2 is NC 24.

SCVT 610 (Inlet Size 10) will meet the required pressure drop (less than 0.1 in W.G.) and NC level is NC 33 for this example.

Order Details

SVT aaa- bb- cc- dd-

Model No:

606 = Inlet Size No. 6″
608 = Inlet Size No. 8″
610 = Inlet Size No. 10″
612 = Inlet Size No. 12″
614 = Inlet Size No. 14″
616 = Inlet Size No. 16″
618 = Inlet Size No. 18″
620 = Inlet Size No. 20″
624 = Inlet Size No. 24″

M = with Belimo actuator/controller as standard

Options:

T= with step-down transformer from 220V to 24V for actuator/controller
TB= with terminal block for transformer

Airflow Setting

CFM= maximum airflow setting

NOTE

1. Both end connection is with U-profile homogeneous EPDM rubber as the standard connection.
2. The standard supply is with Belimo actuator/controller without step-down transformer and terminal block.

Order Example

Example No. 1:

Requirements:
Constant Air Volume Air Terminal Unit, size Ø10″, capable of delivering 1000 CFM at constant air flow with Belimo actuator/controller.

Ordering:
Make :SAFID
Type :SCVT 610 - M - 1000CFM
Qty :1 pc

Example No. 2:

Requirements:
Same as Example No. 1 but with Belimo actuator/controller and step-down transformer.

Ordering:
Make : SAFID
Type : CSVT 610 - M - T - 1000CFM
Qty :1 pc

Example No. 3:

Requirements:
Same as Example No. 1 but with Belimo actuator/controller, step-down transformer and terminal block.

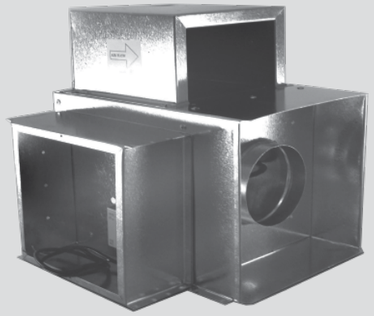
Ordering:
Make :SAFID
Type :SCVT 610 - M - T - TB - 1000CFM
Qty :1 pc

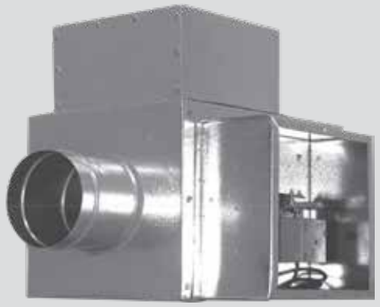
سافید
SAFID

BYPASS AIR TERMINAL UNITS

SINGLE DUCT
PRESSURE DEPENDENT

SBP 400 SERIES





Description

SAFID SBP 400 Series bypass air terminals are designed for single duct constant air volume (CAV) systems in order to deliver variable air flows to occupied spaces. Variable air volume control is achieved by directing supply air flow either to the room or to the bypass port in direct response from the room thermostat. When the room temperature rises above the cooling set-point,the actuator will modulate the primary damper at fully open position while the air flow is at maximum. When the room temperature fall below the cooling set-point, the actuator will modulate or close the primary damper, then the bypass port damper will open to divert or dump the excess supply air into the return air ceiling plenum. Dumping supply air into return air ceiling plenum varies the zone supply air volume while the supply fan system remain at constant air volume.

The SBP air terminals are supplied with round or oval spigot inlet. They are available with a variety of accessories. They can be specified with sound attenuator, electric heater, hot water coil, multiple outlet plenum and other optional accessories.The accessories (except for the multiple outlet plenums) are shipped factory attached and have standard slip & drive oulet connections.

Standard Construction

Casing:
Terminal casing, inlet plate & damper built of 22 gauge galvanized steel sheet, conform to ASTM A653, LFQ, G90 zinc coating.

Insulation:
25mm thick acoustic lining with a strong and dimensionally stable Woven Glass Fiber Fabric (WGF) facing, 48kg/M3 density, complies with the requirements of NFPA 90A.

Height and Length:
All basic terminals are 300 mm in height and 380 mm in over all length except unit with EH and HW at down stream will have 480 mm length.

Controls:
The SBP Air terminals can be specified with electric controls. Standard control are Belimo actuator modulating type.

Standard Connections: S-Slip and Drive Slip connection.

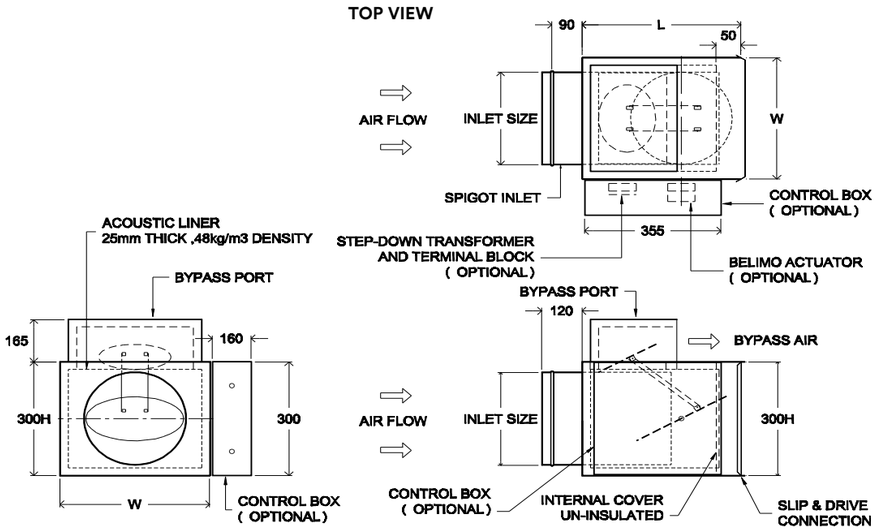
Options
Option 1: Code SF
Slide on Flange connections for discharge side.
Option 2: Code SA
Air Terminal with factory-mounted Sound Attenuator.
Option 3: Code OP
Air Terminal with factory-made Multiple Outlet Plenum. Outlets extend 100mm beyond either side of the air terminal casing.
Option 4: Code EH
Air Terminal with factory-made Multiple Outlet Plenum. Outlets extend 100mm beyond either side of the air terminal casing.
Option 5: Code HW
Air Terminal with factory-mounted Hot Water Coil on the outlet of the Air Terminal casing.
Option 6: Code FC
Air Terminal with mounted Flexible Connector on the inlet collar of the Air Terminal casing.
Option 7: Code M
Air Terminal with Belimo Actuator (modulating type).
Option 8: Code CB
Air Terminal with Control Box.
Option 9: Code TC
Air Terminal with a Digital Room Temperature Controller.

AHRI Standard 880

SINGLE DUCT PRESSURE DEPENDENT BYPASS
AIR TERMINAL UNITS

SBP 400: BASIC AIR TERMINALS

SBP 400: Dimensions



FRONT VIEW

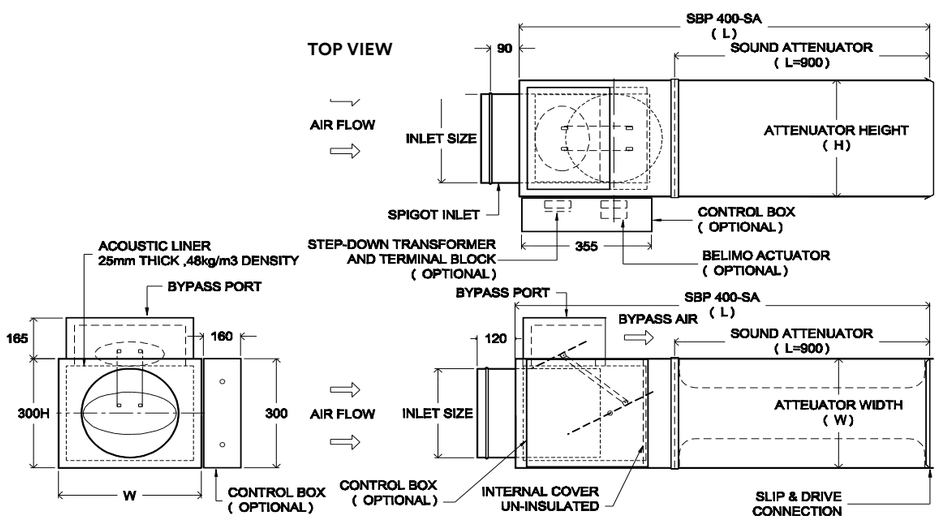
SIDE VIEW

MODEL	UNIT SIZE (in)	INLET SIZE		CASING SIZE		
		ROUND (mm)	FLAT OVAL (mm)	W (mm)	H (mm)	L (mm)
SBP 406	6	152	-	300	300	380
SBP 408	8	200	-	350	300	380
SBP 410	10	250	-	400	300	380
SBP 412	12	-	350 x 250	450	300	380
SBP 414	14	-	475 x 250	600	300	380
SBP 416	16	-	625 x 250	700	300	380

BYPASS AIR TERMINAL UNITS

SBP 400 - SA: AIR TERMINALS WITH DOWNSTREAM SOUND ATTENUATOR

SBP 400 - SA: Dimensions

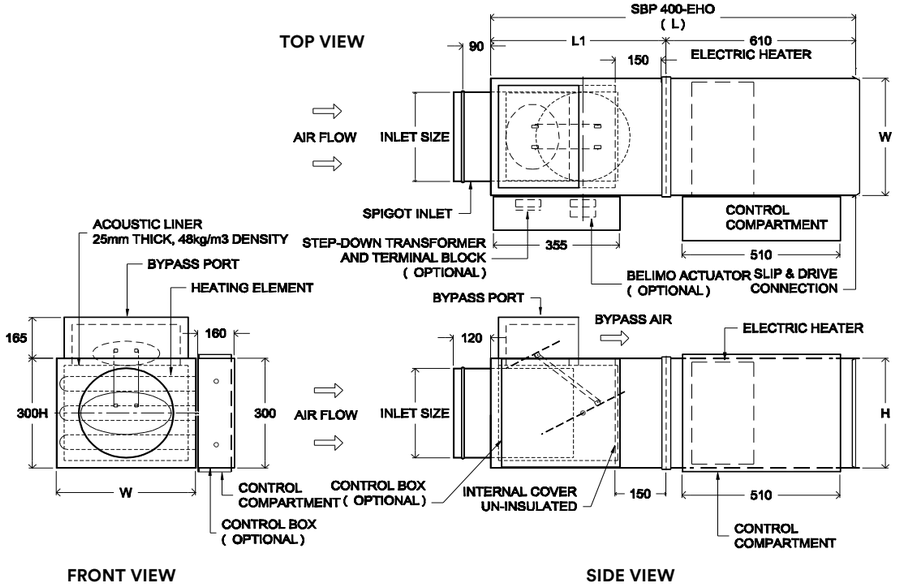


MODEL	UNIT SIZE (inches)	INLET SIZE		SBP 400 - SA			SOUND ATTENUATOR (SA)		
		ROUND (mm)	FLAT OVAL (mm)	W (mm)	H (mm)	L (mm)	W (mm)	H (mm)	L (mm)
SBP 406 - SA	6	152	-	300	300	1280	300	300	900
SBP 408 - SA	8	200	-	350	300	1280	300	350	900
SBP 410 - SA	10	250	-	400	300	1280	300	400	900
SBP 412 - SA	12	-	350 x 250	450	300	1280	300	450	900
SBP 414 - SA	14	-	475 x 250	600	300	1280	300	600	900
SBP 416 - SA	16	-	625 x 250	700	300	1280	300	700	900

SINGLE DUCT PRESSURE DEPENDENT BYPASS
AIR TERMINAL UNITS

SBP 400 - EH: AIR TERMINALS WITH DOWNSTREAM ELECTRIC HEATER

SBP 400 - EHO, EHT, EHFT: Dimensions with Open, Tubular or Fin-Tubular Coil



MODEL	UNIT SIZE (inches)	INLET SIZE		SBP 400 - EHO			
		ROUND (mm)	FLAT OVAL (mm)	W (mm)	H (mm)	L (mm)	L 1 (mm)
SBP 406 - EH	6	152	-	300	300	1090	480
SBP 408 - EH	8	200	-	350	300	1090	480
SBP 410 - EH	10	250	-	400	300	1090	480
SBP 412 - EH	12	-	350 x 250	450	300	1090	480
SBP 414 - EH	14	-	475 x 250	600	300	1090	480
SBP 416 - EH	16	-	625 x 250	700	300	1090	480

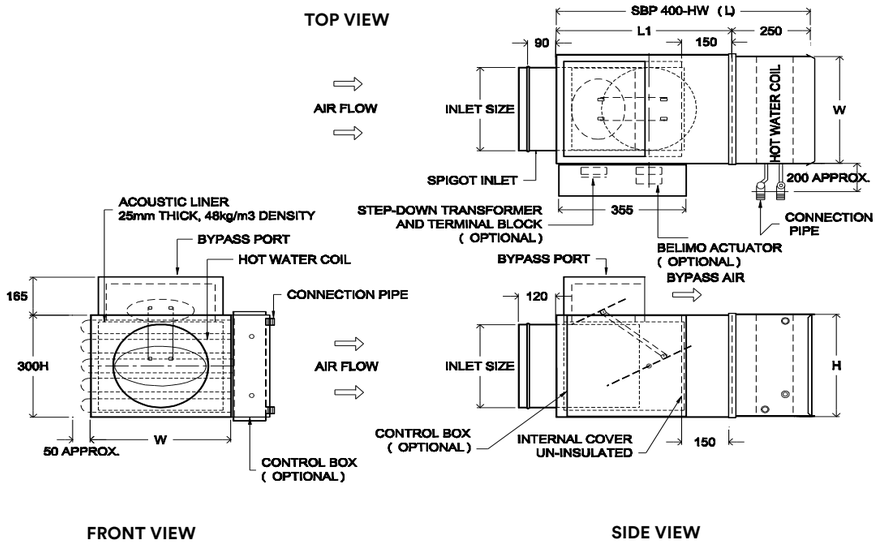
NOTE

1. The minimum straight portion after the electric heater up to elbow or any fittings that will change the airflow's direction must be equal to minimum length of 610mm.
2. Contact SAFID for electric heater details.

BYPASS AIR TERMINAL UNITS

SBP 400 - HW: AIR TERMINALS WITH DOWNSTREAM HOT WATER COIL

SBP 400 - HW: Dimensions



MODEL	UNIT SIZE (inches)	INLET SIZE		SBP 400 - HW			
		ROUND (mm)	FLAT OVAL (mm)	W (mm)	H (mm)	L (mm)	L1 (mm)
SBP 406 - HW	6	152	-	300	300	730	480
SBP 408 - HW	8	200	-	350	300	730	480
SBP 410 - HW	10	250	-	400	300	730	480
SBP 412 - HW	12	-	350 x 250	450	300	730	480
SBP 414 - HW	14	-	475 x 250	600	300	730	480
SBP 416 - HW	16	-	625 x 250	700	300	730	480

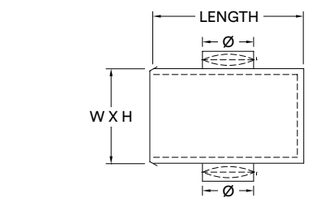
NOTE

1. The minimum straight portion after the hot water coil must be equal to the diagonal of the electric heater's internal dimension.
2. Contact SAFID for hot water coil details.

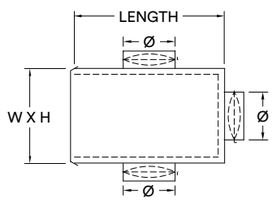
SBP 400 - OP: AIR TERMINALS WITH MULTIPLE OUTLET PLENUM

Plenum Arrangement

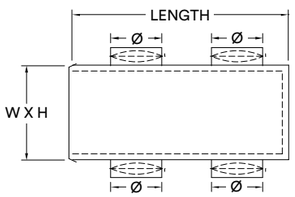
Multiple outlet plenums can be supplied in the following arrangement and the dimensions will be as per the customer's requirement.



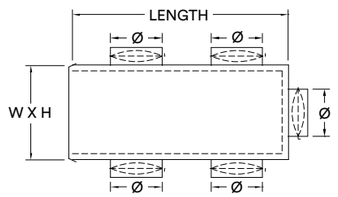
ARRANGEMENT-A



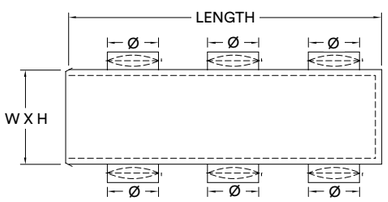
ARRANGEMENT-B



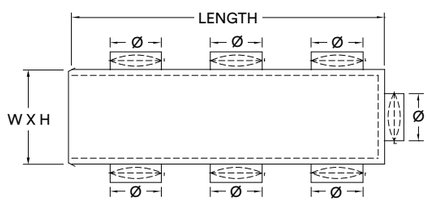
ARRANGEMENT-C



ARRANGEMENT-D



ARRANGEMENT-E



ARRANGEMENT-F

NOTE

Plenum construction: 22 Ga. GI or as required, Lining: 25mm x 48 kg/m3 or as required. Lined and unlined plenums can be provided to required collar dia. As per above arrangements. All the collars to be provided with manual VCD (volume control damper) and hand quadrant.

Table 1: NC Levels if Lined Rectangular Duct is Fixed to the Downstream Side of Terminal box

Terminal Size (in)	Air Flow		Inlet Static Pressure (in W.G.)	Inlet and Attenuator Static Pressure (in W.G.)	Discharge Sound Power Level						NC
					Octave Band Center Frequency (Hz)						
	CFM	m^3/s			125	250	500	1kHz	2kHz	4kHz	
6	200	0.094	0.04	0.06	39	36	31	18	15	15	<20
	300	0.142	0.10	0.14	48	46	42	31	27	20	<20
	400	0.189	0.16	0.24	51	51	49	38	36	31	<20
	600	0.283	0.40	0.56	57	60	59	49	49	46	28
8	400	0.189	0.04	0.10	42	37	28	28	16	14	<20
	500	0.236	0.05	0.13	45	43	34	35	26	18	<20
	700	0.330	0.10	0.26	51	51	43	43	37	31	<20
	1000	0.472	0.20	0.52	55	59	53	53	47	43	27
10	600	0.283	0.03	0.13	40	33	24	19	15	15	<20
	800	0.378	0.04	0.20	44	40	32	28	22	17	<20
	1000	0.472	0.08	0.34	47	46	38	37	32	24	<20
	1600	0.755	0.20	0.84	56	57	52	49	45	43	24
12	1100	0.519	0.04	0.28	40	36	33	34	23	17	<20
	1200	0.566	0.05	0.33	45	39	36	37	28	18	<20
	1700	0.802	0.10	0.68	50	47	45	47	40	34	<20
	2200	1.038	0.16	1.12	55	53	53	53	47	42	21
14	1500	0.708	0.04	0.30	39	40	40	34	27	17	<20
	1800	0.849	0.05	0.41	43	43	44	38	33	31	<20
	2400	1.133	0.08	0.72	50	50	52	46	42	36	<20
	3000	1.416	0.10	1.12	56	58	58	52	48	43	25
16	2000	0.944	0.02	0.34	44	39	43	32	25	18	<20
	2800	1.321	0.03	0.67	53	47	52	43	39	29	<20
	3200	1.510	0.04	0.88	56	51	56	47	44	35	20
	3600	1.699	0.05	1.10	58	54	59	52	48	39	23
	4000	1.888	0.06	1.38	61	58	62	55	51	43	26

NOTE

1. The performance data shown is based on tests conducted in accordance with AHRI Standard 880 and ASHRAE Standard 130.
2. Measurement of Sound Power Levels is in accordance with International Standard ISO 3741 comparison method.
3. Discharge NC levels on this table reflect a reduction of environmental affect, 5 feet of lined metal duct the same size as the air terminal discharge, 3 feet lined flexible duct, outlet reflection and space effect.

Table 2: NC Levels if Unined Rectangular Duct is Fixed to the Downstream Side of Terminal

Terminal Size (in)	Air Flow		Inlet Static Pressure (in W.G.)	Inlet and Attenuator Static Pressure (in W.G.)	Discharge Sound Power Level						NC
					Octave Band Center Frequency (Hz)						
	CFM	m^3/s			125	250	500	1kHz	2kHz	4kHz	
6	200	0.094	0.04	0.06	39	36	31	18	15	15	<20
	300	0.142	0.10	0.14	48	46	42	31	27	20	<20
	400	0.189	0.16	0.24	51	51	49	38	36	31	22
	600	0.283	0.40	0.56	57	60	59	49	49	46	33
8	400	0.189	0.04	0.10	42	37	28	28	16	14	<20
	500	0.236	0.05	0.13	45	43	34	35	26	18	<20
	700	0.330	0.10	0.26	51	51	43	43	37	31	21
	1000	0.472	0.20	0.52	55	59	53	53	47	43	30
10	600	0.283	0.03	0.13	40	33	24	19	15	15	<20
	800	0.378	0.04	0.20	44	40	32	28	22	17	<20
	1000	0.472	0.08	0.34	47	46	38	37	32	24	<20
	1600	0.755	0.20	0.84	56	57	52	49	45	43	30
12	1100	0.519	0.04	0.28	40	36	33	34	23	17	<20
	1200	0.566	0.05	0.33	45	39	36	37	28	18	<20
	1700	0.802	0.10	0.68	50	47	45	47	40	34	23
	2200	1.038	0.16	1.12	55	53	53	53	47	42	30
14	1500	0.708	0.04	0.30	39	40	40	34	27	17	<20
	1800	0.849	0.05	0.41	43	43	44	38	33	31	<20
	2400	1.133	0.08	0.72	50	50	52	46	42	36	25
	3000	1.416	0.10	1.12	56	58	58	52	48	43	32
16	2000	0.944	0.02	0.34	44	39	43	32	25	18	<20
	2800	1.321	0.03	0.67	53	47	52	43	39	29	25
	3200	1.510	0.04	0.88	56	51	56	47	44	35	30
	3600	1.699	0.05	1.10	58	54	59	52	48	39	33
	4000	1.888	0.06	1.38	61	58	62	55	51	43	36

NOTE

1. The performance data shown is based on tests conducted in accordance with AHRI Standard 880 and ASHRAE Standard 130.
2. Measurement of Sound Power Levels is in accordance with International Standard ISO 3741 comparison method.
3. Discharge NC levels on this table reflect a reduction of environmental effect, 5 feet of lined metal duct the same size as the air terminal discharge, 3 feet lined flexible duct, outlet reflection and space effect.

SBP 400 - EH : AIR TERMINAL WITH DOWNSTREAM ELECTRIC HEATER

Optional Electric Heaters

OPTION NO. 1 - Stainless Steel Tube Coil:

Construction:
The heating element of electric heater is made from stainless steel tube, SS type 2337, EN 1.4541. The stainless steel tube heating element is not electrified and it will get hot (300-350°) but you will not get an electric shock if you shoud reach it. It has a density which will keep it warm for approximately 3 minutes after the power is switched off and therefore very good to control with a time proportional thyristor regulation or with European standards EN heaters are tested for electrical safety and approved for EMC by SEMKO and comply with European standards EN 50081-1 and EN 50082-1. It also comply with the requirements in the Low Voltage Directive, LVD 72/23 EEC.

The casing is made from steel sheet with aluminum zinc coating which is more corrosion resistive than the galvanized steel sheet.

Basic Electric Heater - Code EHT:
1. The basic electric heater have no built-in temperature regulation controller.
2. In case of thermal over load, it has two built-in over heating protections, one is automatic reset and other one is to be manually reset.
3. The basic electric heater have a built-in pressure switch to detect the pressence of air flow passing through the electric heater. The power supply to the electric heater must be interrupted if the supply fan or air flow stopped. This function can be connected to the incoming power supply to the electric heater.
4. The number of kW steps is available from 1 to 3 steps.
5. The power supply is 230V/1PH/60HZ from 0.5 kW up to 10kW and 400V/3PH/60HZ from 3kw up to 86kw.

Electric Heater with Built - In Temperature Regulation Controller - Code EHTR:
1. The electric heater with built-in electronic temperature regulation controller called thyristor controls heating by means of so called time proportional regulation (Pulsi/Pause Technology). This gives a very precise continuous variable temperature regulation control of the heaters in response to the temperature requirements of the room sensor. The built-in controller is made for an external 0-10V control signal from BMS or similar.
2. It has also built-in automatic and manual reset over heating protection and a pressure switch to detect the pressence of air flow passing through the electric heater.
3. The power supply is 230V/1PH/60HZ from 0.2kW up to 5.5kw and 400V/3PH/60HZ from 6kW up to 86kW.

NOTE
For more details, refer to the Electric Duct Heater section of this catalogue.

ELECTRIC HEATERS FOR BYPASS TERMINALS

SBP 400 - EH: AIR TERMINALS WITH DOWNSTREAM ELECTRIC HEATER

Optional Electric Heaters

OPTION NO. 2 - Open Coil:

Contructions:
The open coil type heating element is made from a high grade resistance wire. Each heating coil element is designed to the customer's wattage specification. A guage heavier that a normal guage wire is used, giving a longer coil to maintain the required resistance for a given wattage.

The casing is made from galvanized steel sheet as standard. Optional casing can be made from alumized or stainless steel.

Basic Electric Heater - Code EHO:
1. The basic electric heater have no built-in temperature regulation controller.
2. In case of thermal over load, it has two built-in over heating protections, one is automatic reset and the other on is to be manually reset.
3. The basic electric heater has a built-in air flow switch to detect the presence of air flow passing through the electric heater. The power supply to the electric heater must be interrupted if the supply fan or air flow stopped.
4. The number of kW steps is available from 1 to 3 steps.
5. The power supply available is 230V/1PH/60HZ or 440V/3PH/60HZ.
6. The maximum kW rating is 200kW.

Electric Heater with Built-In solid state proportinal controller - Code EHOS
1. The heating element is controlled simultaneously with the built-in solid state controller. The built-in controller is made for an external 0-10 VDC control signal from BMS.
2. It has also a built-in automatic and manual reset over heating protection and air flow switch to detect the presence of air flow available is 230V/1PH/60HZ or 440V/3PH/60HZ.
4. The maximum kW rating is 200kW.

NOTE
For more details, refer to the Electric Duct Heater section of this catalogue.

Order Details

Order Code:

SBP aaa- bb- cc- dd ee ff gg hh ii jj kk

Model No:

406 =Inlet Size No.6
408 =Inlet Size No.8
410 =Inlet Size No.10
412 =Inlet Size No.12
414 =Inlet Size No.14
416 =Inlet Size No.16

Options:

SA =With discharge sound attenuator
OP =With multiple outlet plenum
EHT =With stainless steel tube coil electric heater
EHTR =With stainless steel tube coil electric heater and built-in temperature regulation controller powered by external 0....10V control signal from BMS or similar.
EHO =With electric heater with open coil
EHOS =With electric heater with open coil and built-in solid state proportional controller powered by external 0....10V control signal from BMS or similar.
HW =With discharge hot water coil
kW =Power rating of electric heater
1,2,3 =Required number of steps
M =With Belimo actuator
TC =With digital room temperature controller
T =With step-down transformer from 220V to 24V for actuator/controller
TB =With terminal block for transformer
CB =With control box
P =With perforated sheet behind acoustic lining
SF =With slide on flange on discharge side
FC =With flexible connector

NOTE

1. If the dischage side connection is not specified, slip & drive is the standard connection.
2. If the actuator, transformer, terminal block and control box is not specified, the standard supply is with extended shaft only for actuator connection.

Order Example

Example No. 1
Requirements:

Bypass Air Terminals are capable of delivering 1200 CFM at 0.05 in W.G. Inlet static pressure with maximum discharge NC 25. Air terminal should be with Belimo actuator and control box.

Selected Model: **SBP 412** - Using Table1, SBP 412 will meet the required 0.05 in W.G. inlet static pressure and the discharge NC level is <NC 20.

Ordering:
Make :SAFID
Type :SBP 412-M-CB
Qty :1 pc

Example No. 2
Requirements:
Same as Example No. 1 but with discharge Sound Attenuator at Inlet & Attenuator pressure of 0.33 in W. G.

Selected Model: **SBP 412**

Ordering:
Make :SAFID
Type :SBP 412-SA-M-CB
Qty :1 pc

Example No. 3:
Requirements:
Same as Example No.1 but with open coil electric heater, 2.5kW, 1 step.

Selected Model: **SBP 412**

Ordering:
Make :SAFID
Type :SBP 412-EHO-2.5kW 1-M - CB
Qty :1 pc

Example No. 4
Requirements:
Same as Example No. 1 but with open coil electric heater, 5kW, 2 steps with digital room temperature controller.

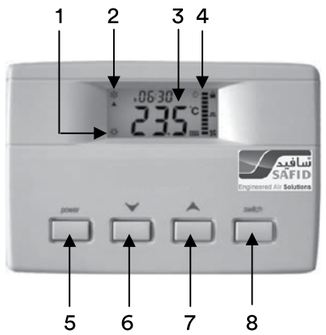
Selected Model: **SBP 412**

Ordering:
Make :SAFID
Type :SBP 412-EHO - 5kW-2-M-TC-CB
Qty :1 pc

DIGITAL THERMOSTATS FOR AIR TERMINAL UNITS

DIGITAL ROOM THERMOSTAT

Propotional Action Control for VAV and Bypass Air Terminal Units **F2000LV-A Series**



1- Heating
2- Cooling
3- Set point temperature
4- DC 0-10V analog output
5- Turn ON/OFF
6- Down
7- Up
8- Mode switch (cooling/heating)

Buttons and LCD Display

Models and Descriptions

Type	Model	Characteristics
Room Thermostat VAV, CAV systems Power Supply	F2000LV-A-N	1X0-10V output for an actuator of VAV or Bypass air terminal with cool/heat manual switch.
	F2000LV-A01	1x0-10V output for an actuator, 1X on/off contact output for a 1-stage heater. Cool/heat manual switch.
	F2000LV-A02	1x0-10V output for an actuator, 2X on/off contact output for a 2-stage heater. Cool/heat manual switch.

Standard Features

- Designed to control the room temperature for VAV and Bypass air terminals with 1×0-10V VDC output to cooling/ heating or 2×0-10 VDC outputs to cooling and heating dampers. Also one or two relay outputs to control one or two stages electric aux. heater.
- LCD can display working status such as room temperature, set point, analog output, etc. Makes reading and operating easy and accurate
- All models feature user-friendly setting buttons.
- Up to two -stage electric aux. Heater control makes temperature controlling more accurate and energy saving.
- Large set point adjustment, the min and max limit of temperature preset by end users.
- Low temperature protection.
- Celsius or Fahrenheit degree selectable.
- Cooling/heating mode auto changeover or manual switch selectable.
- 12 Hours Timer Option can be preset 0.5-12 hours to turn off the thermostat automatically
- Two parts structure and quick wire terminal blocks make mounting easily.
- Infrared Remote Control (Optional)
- Blue backlight (Optional)
- RS 485 communication interface (optional) makes the thermostat connection with a PC or the center control system.

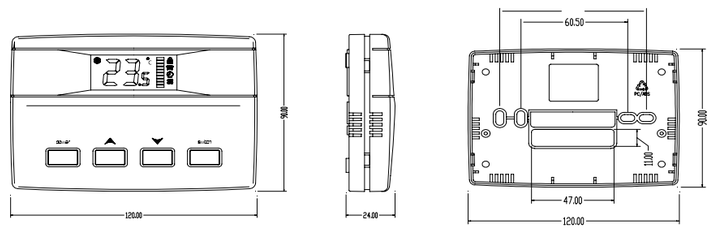
PROPORTIONAL ACTION CONTROL FOR
VAV AND BYPASS AIR TERMINAL UNITS

DIGITAL ROOM THERMOSTAT

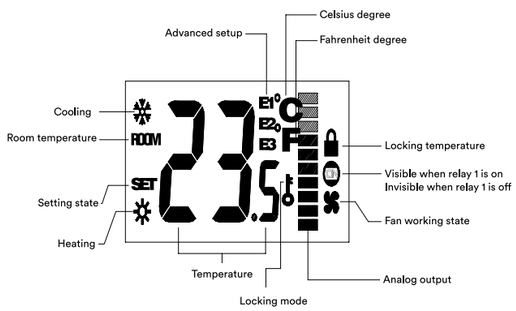
Standard Specifications **F2000LV-A Series**

Power Supply	24 VAC ± 20% 50/60HZ
Electrical Rating	2 amp load per terminal
Sensor	NTC 5k
Temperature control range	5 - 60°C (41 -95°F)
Accuracy	± 0.5°C (1°F) @ 25°C
Analog Output	One or two analog outputs
	Voltage DC 0V-DC 10V
	Current 1 mA
Protection Class	IP30
Environment Condition	Operating temperature: 0 - 50 °c
	Operating humidity: 5 - 99% RH
	Storage temperature: -10 - 60°C
	Storage humidity: <95% RH
Display	LCD
Net Weight	240g
Dimensions	120mm(L)x90mm(W)x24mm(H)
Material and Colors	PC/ABS Fireproofing house with white color
Mounting Standard	Mounting on the wall, or 2”x4” 65mmx65mm pipe box

Mounting and Dimensional Details



LCD Display Details



DIGITAL THERMOSTATS
FOR AIR TERMINAL UNITS

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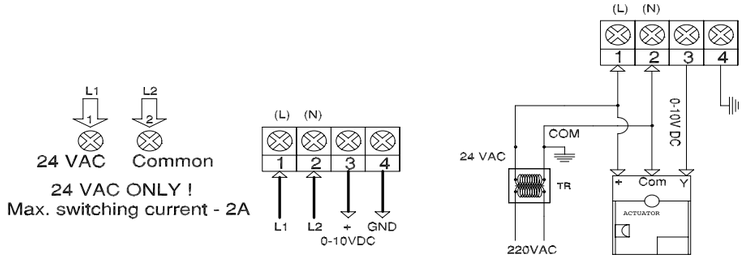
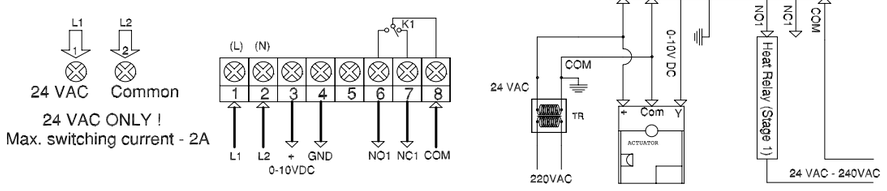
DIGITAL ROOM THERMOSTAT

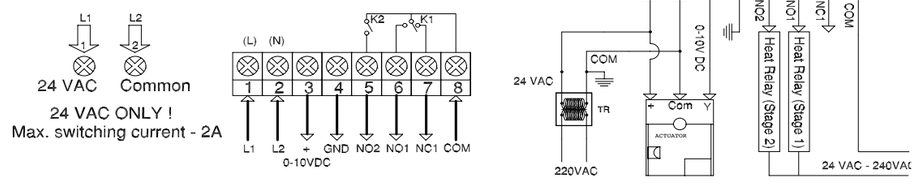
Wiring Layout - F2000LV-A-N - Thermostat for an Actuator Only (Without Heater)



Wiring Layout - F2000LV-A01 - Thermostat for an Actuator and 1-Stage Heater



Wiring Layout - F2000LV-A02 - Thermostat for an Actuator and 2-Stage Heater



DIGITAL THERMOSTATS
FOR AIR TERMINAL UNITS

PROPORTIONAL ACTION CONTROL FOR
VAV AND BYPASS AIR TERMINAL UNITS

DIGITAL ROOM THERMOSTAT

With 1XAnalog and Optional One or Two On/Off Outputs **User's Manual**

Model: F2000LV-A-N, F2000LV-A01, F2000LV-A02

Important Safety Information

- Always turn off power before mounting, removing, and cleaning thermostat.
- Read all of the information in this manual before mounting the thermostat.
- Notice of the supply power voltage of the thermostat is 24 VAC. Do not mount it on voltages higher than 24VAC±10%.

Mounting and Wiring

- Cut off power and simultaneously depress the 2 clips on either of the sides of the thermostat gently with your nails or other unsharp tools to open the thermostat cover.
- Mount the thermostat on the wall, 1.2-1.3 meter above the floor. Do not behind a door, in a corner, in direct sunlight, or near any heat or steam generating fixtures.
-Mount the wall plate first and make sure wires will be drilled through holes on the wall plate. See Fig 1. There are two dimensions usable.
-Connect wires to terminal strip. Wiring diagrams is as figure 2 and figure 3. K1 means the 1st stage relay, and K2 means the 2nd stage relay. K2 is useless for F2000LV-A01, K1 and K2 are useless for F2000LV-A-N.
- Mount the cover on the wall plate.

Operation

1. After electrifying, OFF displays on the right-down corner of LCD.

Buttons and LCD Display

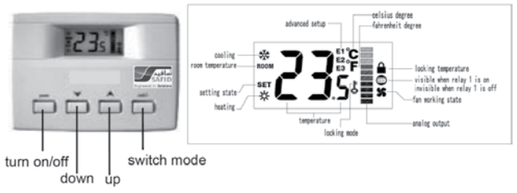


Figure 3. Connection

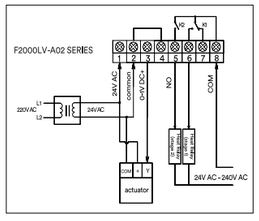
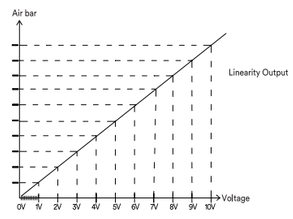


Figure 4. Analog Output



2. Press power key to turn on the thermostat. Then room temperature displays on LCD. Press ▲ or ▼ to see the set point.
3. Setting temperature: press ▲ or ▼ key and 0.5° changes each time. When adjusting, the number of temperature is blinking, it indicates that the set point is not be confirmed until 6 seconds, it stops to blink and return back to display room temperature. Then the setting is confirmed. The range of adjusting temperature is from 5° to 35°.
4. Locking set point: Press ▼ and ▲ keys at the same time about 5 seconds, then the 🔒 symbol appears on the right top of LCD and the temperature is locked. After that, you cannot adjust set point.
5. Unlocking set point :Under the locking mode, press ▼▲ keys at the same time about 5 seconds until 🔒 disappears and the temperature is unlocked. Then you can adjust the room temperature as you want.
6. Switch working mode: Press switch key to switch heating ☼ or cooling ❄ . After the working mode has been selected and its symbol blinks on the left of LCD for about 6 seconds, the mode is confirmed.
7. Lock the working mode of cooling or heating: press switch for more than 6 seconds up to 🔒 symbol appearing on the right of LCD. It means that the working mode is locked successfully. Now you cannot switch working mode by pressing switch key.

Figure 1. Wall Plate

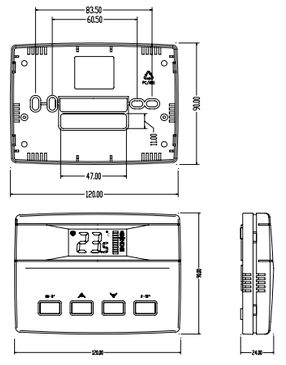
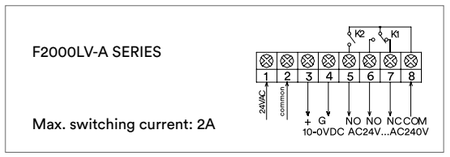


Figure 2. Wiring Diagram



DIGITAL THERMOSTATS
FOR AIR TERMINAL UNITS

8. Unlock the working mode: press switch for more than 6 seconds up to symbol disappearing on the LCD.
9. For F2000LV-A-N, following contents are useless. They are just effective for F2000LV-A-01 and F2000LV-A-02.
The first stage heating: Under the heating mode, if the room temperature≤ the set point -1ºC, the first stage heating is on with appearing. If the room temperature ≥the set point+ 1ºC, the first stage heating is off with disappearing. Under the cooling mode, you may preset the 1st relay is not work or on work. If you set it on work, the control way likes as in heating mode.
10. The second stage heating (just for F2000LV-A02):
Under heating mode, if the room temperature≤the set point-3°C(differential temperature which is set in Advanced Setup), the second stage heating is on. If the room temperature ≥the set point, the second stage heating is off. Under the cooling mode the second stage heating is always off.

Attention:
1.The damper actuator is controlled by the analog output between the minimum limited and the maximum limited. Under the cooling mode, if the room temperature < the set point, the output is limited by minimum; If the room temperature > the set point, the output is limited by maximum.
2.The scale bars corresponds with 0~10V output (see figure 4). The symbol on the right of LCD running indicates the analog output is more than 0V DC.

Advanced Setup (V.LV-12-S_27)

Cut off power first, simultaneously depress the 2 clips on either of the sides of the thermostat gently to open the cover of the thermostat with your nails or other unsharp tools. There are four DIP switches at the top-right corner on the circuit board. Put the DIP up to ON, put it down to OFF.

DIP1: ON- set parameters (see below table)	OFF- normal operation	(factory preset: OFF)
DIP2: ON- Fahrenheit display	OFF- Celsius display	(factory preset: OFF)
DIP3: ON- the relays doesn't work in heating	OFF- the relays works in heating	(factory preset: OFF)
DIP4: ON- the 1st relay doesn't work in cooling	OFF- the 1st relay works in cooling	(factory preset: ON)

(DIP3 and DIP4 setting are useless for F2000LV-A-N)

When DIP1=ON, press switch key to select the parameters and press▲or▼key to set values. The parameters guiding symbol will display on the upper line of LCD

PROPORTIONAL ACTION CONTROL FOR
VAV AND BYPASS AIR TERMINAL UNITS

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With 1XAnalog and Optional One or Two On/Off Outputs User's Manual

Guiding Symbol	Parameter	Set Range	Default
E1	The minimum limited of the analog output in heating	00~maximum (corresponding 0V~max DC)	20 (2VDC)
E2	The maximum limited of the analog output in heating	Minimum~99 (corresponding min~10V DC)	99 (10VDC)
E3	The minimum limited of the analog output in cooling	00~maximum (corresponding 0V~max DC)	20 (2VDC)
E1E2	The maximum limited of the analog output in cooling	Minimum~99 (corresponding min~10V DC)	99 (10VDC)
E1E3	Adjusting the change rate of the analog output	0.5 ~ 99.5 (The less is the number, the quicker is the change of analog output. The figure 3 indicates the correspond-ing relation of analog output with the time under the different setting number (at the same temperature difference).	5
E2E3	Just for adjusting before leaving factory		10 (don't change it)
E1E2E3	Just for adjusting before leaving factory		0.5 (don't change it)
E1 +	Just for adjusting before leaving factory		7.5 (don't change it)
E2 +	The state of thermostat electrifying after power broken	-00 Turn off as electrifying -01 Keep the last state before power broken	00
E3 +	Un-effective for the model		0
E1E2 +	Un-effective for the model		0
E1E3 +	Un-effective for the model		0
E2E3 +	Measured temperature modification	+3°C~ −3°C	0
E1E2E3 +	The delay time of 0VAC output as pressing power key to turn off	0~99.5 (0~199 second)	15 (30')
E1 +	The state of analog output once room temperature reaches at the set point	00— The output is 0V DC as room temperature reaches at the set point. 01— The output is minimum as room temperature reaches at the set point.	01
E2 +	Set the maximum limit of the set point	18 °C~90 °C	35.0 °C
E3 +	Set the differential of temperature for starting the second stage heating (just for F2000LV-A02)	-1.5 °C~-5 °C	-3.0 °C

RESET: Put the DIP1 up to ON and then turn the thermostat on, keep to press power key for about 40 seconds until the thermostat turning off. Then the reset is successfully. All parameters will be returned back the defaults.

Special Attention:
On the circuit board, you may see there is a X1 jumper at upper of the terminal P1. The relay will be a dry contact output when X1 jumper is disconnection (default) or will be a source contact output when X1 jumper is connection.

DIGITAL THERMOSTATS
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ELECTRIC DUCT HEATERS

General Information

EHO, EHT, EHFT Series

SAFID electric duct heaters series “EHO”, “EHT” and “EHFT” are designed for a trouble free operation at a competive price. We designed these heaters for easy installation into a duct either in slip-in insert type or in flagned type as to meet with the project requirements. Safid can manufature the Duct Heaters with any size, capacity, power supply and optional controls/ accessories as per the project requirement and according to the specifications here under. Most of our products are custom designed, so that you meet these products with your project specifications with a competitve price and trusted years of operation.

Description

Duct heater are primarily use as as source for space heating. Duct heaters are self contained and designed to install in a duct system either in a horizontal or vertical duct. It can be installed as a stand alone or combined with any source of heating and cooling systems. SAFID heaters can be use as for primary heating, secondary heating, auxillary heating reheat and humidity control or multi zone with VAV systems to meet the maximum comfort conditions. SAFID duct heaters are custom engineered and designed with the help of our newly developed Computer Software packages which will specify the element size, sheet metal, support racks with insulator, controls configurations and all optional accessories. The software will alow us to prepare and immediate custom design or qoutation and it will help to any design or modification of controls without any delay.

As standard, SAFID duct heaters are manufactured with the following specifications and components. You can select the optional controls in accordance with the project specifications and requirements. Please contact SAFID for more information you may require.

1. 1mm thick galvanized steel casing with NEMA-1 type control panel.
2. De-energizing type magnetic contractor per each step.
3. Class-II type step down control transformer.
4. Auto reset thermal cut-out. (Disc Type).
5. Manual reset thermal cut-out. (Disc Type).
6. Diffential airflow switch.
7. Terminal blocks for power and ontrols cable terminations.
8. Type- A, 80/20 Nickel.Chromium alloy wire.
9. Stainless steel tube for “EHT” series.
10. Stainless steel tube and fins for “EHFT” series.

In addition to the above standard package, a variety of controls and designs are available for you to choose from. Please refer to the rest of this section for more controls and designs available at SAFID, or contact us for assistance.

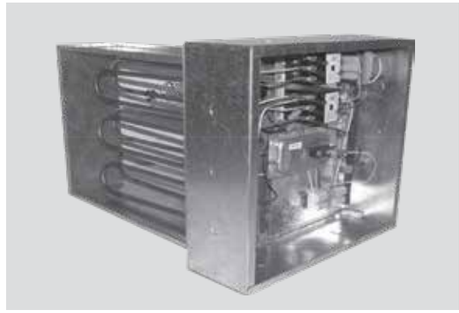
EHO Series: Open Coil Series

Description

SAFID electric duct heaters, EHO series, or open coil duct heaters, are very rugged and efficient duct mounting type air heaters. They are designed to heat large volume of air in ducts based in capacity. These heaters are designed with very low air pressure drops across the heaters. This will allow to select and install smaller and more economical blowers due to duct heaters low pressure drop and it will be more efficient.

The open frame duct heaters have a long history of trouble free operation in field. The inherent efficiency of the “EHO” series design assures that exessive temperatures don’t built up in the heater to shorten its life. Since the heater is so open, it does not obstruct of tax the overall air delivery system. These heaters are essentially very competent, since the circuits are open directly to the airflow. This case the heat transfer from wire to air is direct and immediate. As a result these heaters give their heat readilly to the air and remain cool themselves which offer long life for heater elements. Fast warm up and cool down times are inherent advantage of this construction.

EHT Series: Tubular Coil Series



Description

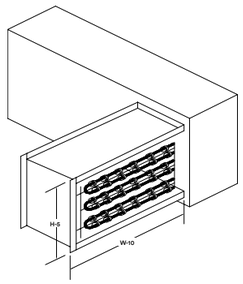
SAFID’s EHT electric dust series are manufactured with tubular heater elements. The heat resistance coils are passing through a magnesium-filled stainless steel tube and coil ends are fitted with high temperature rated ceramics.

EHFT Series: Finned Tubular Coil Series

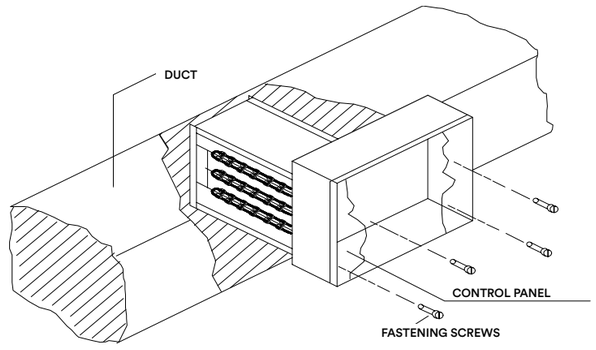
Description

SAFID’s EHFT electric dust series are manufactured with finned tubular heater elements. The heat resistance coils are passing through a magnesium-filled stainless steel tube and coil ends are fitted with high temperature rated ceramics. Tubes are fitted with stainless steel fins.

1. Slip-In Insert Type



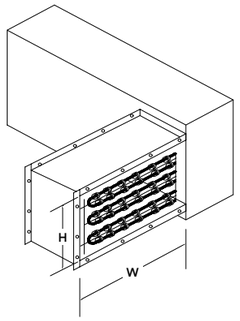
INSERT TYPE



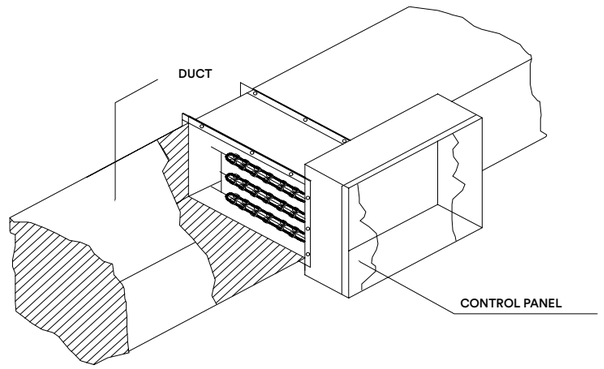
INSERT TYPE INSTALLATION

This is the most commonly used type due to its simple installation. It can be inserted in to a duct from the side by cutting an opeaning to match with the heater size and fastened by metallic screws thru inside the control panel. In this type of installation, the heater height is everlapped by 25mmm that the element enclousure, so the panel will cover all rough opening in duct.

2. Flanged Type



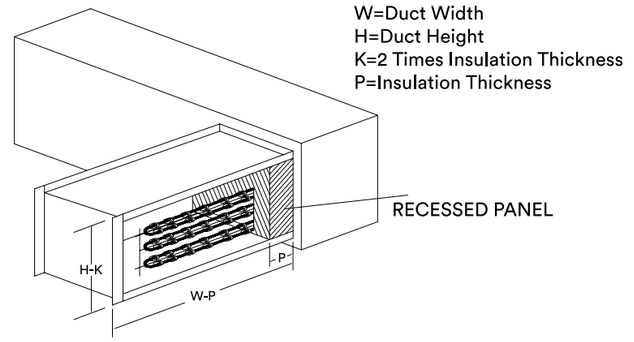
FLANGED TYPE



FLANGED TYPE INSTALLATION

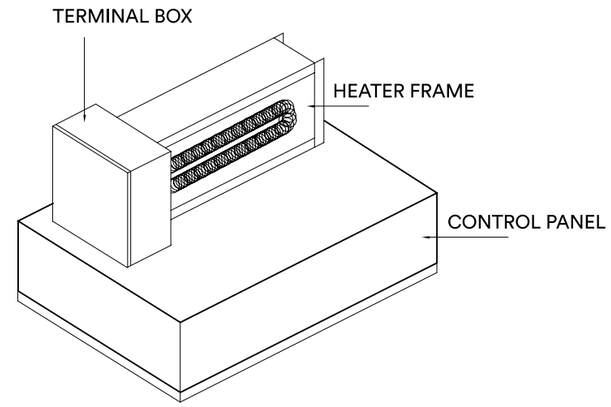
This type of installation provides maximum duct rigidity. Heater has to be installed in between two ducts by means of joining the flanges in ducts and heater. Element enclosures inside dimensions are same as the opening size of ducts. 25mm flanges are provided in heater as standard unless otherwise specified. All flanges are to be joined with proper bolts & nuts to secure the heater in between the duct and fastened by metallic screws through the control panel.

3. Recessed Type



This type of installation is suitable for internally insulated ducts where other obstructions restrict the full duct face area. The recessed panel is designed to project beyond the insulation, so that the element termination and thermal cut-out surfaces are exposed in airflow. The depth of the recessed panel wil be depends the internal insulation thickness.

4. Bottom Terminal Box

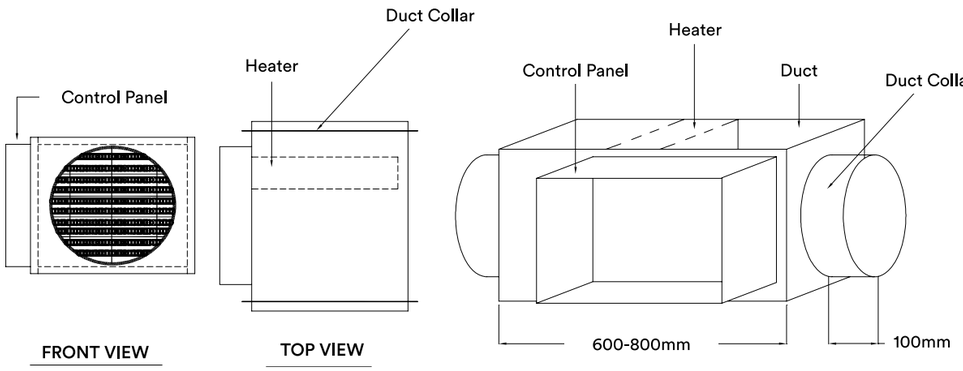


This type of designs are allow the heater installation by bottom where the space retriction is for side mounting. This will provide maximum ease of serviceability in limited space. Element termination and thermal limits cut-outs are installed in side terminal box and remaining controls except Mercury Contactors, SCR Controls and Power Fusing are built-in bottom control panel. SCR Controller, Mercury Controller are Power Fusing are to be installed in separate remote control panel.

5. Remote Control Panel

If there are any space restrictions for service acces, select the heater with remote control panel for easy service and maintenance. The contorl panel can be mounted in a convenient space in near proximity to the duct heater. Connection between the heater terminals and control panels are easy made through the terminals installed in both sections. All components and accessories are factory wired and only the connections made between the heater and panel need to be field connected. All contactors should be disconnecting type as per UL requirements for remote panels.

6. Round Duct Heater



This type allows for an easy method of installing duct heaters in a round duct. The heater section is fitted with factory installed adaptor as sized to round duct connections provided at the inlet and outlet for field connection.

Vapour Barrier

To avoid condensation, heaters can be supplied with factory installed insulation on the back side of the control panel. This will avoid the contact between metal to metal and prevent the possible condensation.

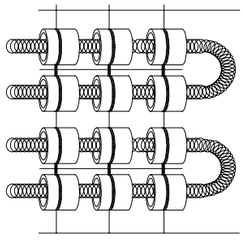
Heater Element Design

As standard all SAFID open coil heaters “EHO” series are built with Type -A, 80% Nickel/20% Chromium high temperature alloy resistance heating elements. These elements are desigend to operated with maximum 55 watts per square inch and below than the maximum allowable operating temperature recommended by the alloy manufacturer. This unique designs eleminates most problems with hot spots and red color caused by poor airlfow pattern. It will also increase the life of heating elements and guaranteed a trouble free operation.

These elements are passing through high quality anti thermal shock, moisture resistant stealite cylindrical bushing ceramics. Ceramics are free floating within wire support and eliminating any binding. Ceramics and heating elements are supported by corrosion resistant heavy guage steel rod contruction and rods are welded or bolted in between and with the control panel. This design allows for free flow of air around the ceramics and reducing the pressure drop through element and supports.

SAFID Tubular Duct Heaters series “EHT” are manufactured with stainless steel tube heater elements. Type -A 80/20 Nichrome wire precisely centered in a Magnesium filled SS316 tube and element is welded to a 10-32 SS pin terminal for field electric termination.

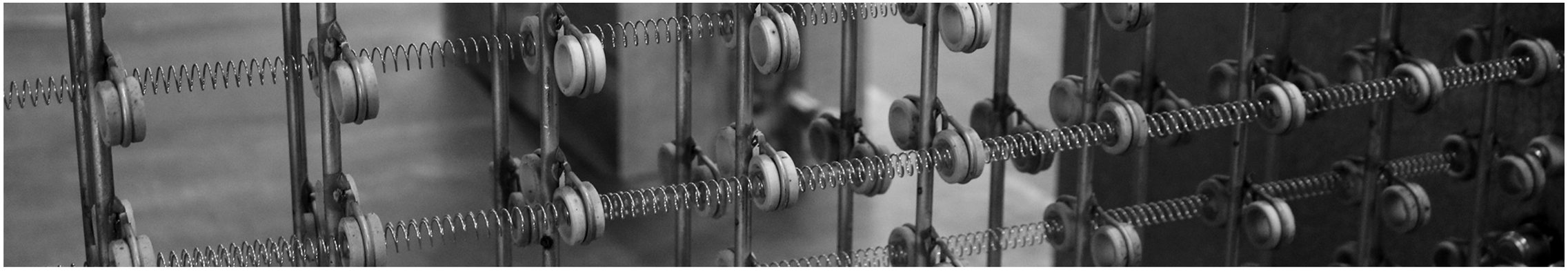
SAFID Finned Tubular Duct Heaters series “EHFT” are manufatured with stainless steel tube & fins heater elements. Type -A 80/20 Nichrome wire precisely centered in a Magnesium filled SS316 tube and element is welded to a 10-32 SS pin terminal for field electric termination. Tubes are wounded with SS304 hellical fins for maximum heat transfer.



Open Coil Heater

Tubular Heater

Finned Tubular Heater



UL & NEC Requirements

The design and installation of electric duct heater must conform all local and national standards and regulations in addition to the below requirements. The below listed information are offered as guideline for electric duct heaters and it is based on UL & NEC space heating standards.

1. Over Temperature Protection: UL & NEC requires the manufacturer to provide two types of over temperature protection. As standard all SAFID duct heaters are supplied with one primary and one secondary thermal cut-outs to comply with this requirement. Disc type Auto reset thermal limit switch de-energize the heater control-circuit in the event of an over temperature occur and work as a primary protection. Disc type Manual reset cut-out will work as secondary protection in case of failure primary limit switch and it is rated for higher temperature then primary cut-out.

2. Over Current Protection: UL & NEC require that a heater in excess of total 48 ampere must be subdivided into number of circuits having less than 48 ampere and protected by built in fuses or circuit breakers and this over current protection must be rated for 125% of the circuit load. SAFID complies this requirements with fuses when and required. Fuses and circuit breakers are optional for all duct heaters (with exception to the above conditions).

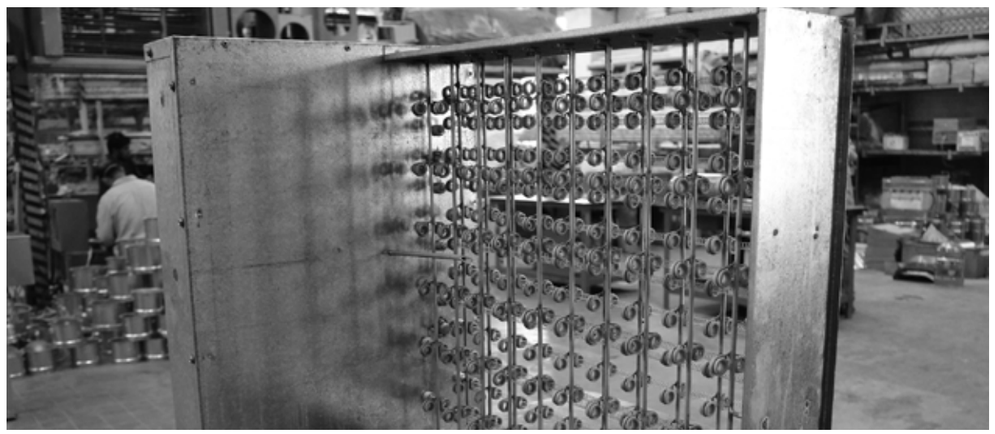
3. Loss of Airflow Protection: UL & NEC require that a method to be provided to prevent the duct heater element from being energized unless the fan circuit is on and airflow is available in duct. To comply with this all SAFID duct heaters are equipped with built in deferential airflows switch as standard. In addition, we can provide optional fan interlock relay or volt-free contacts for fan connection to meet this requirement.

4. Transformer Protection: Control transformers are required for heater operation unless an external control voltage source is available and the heater supply voltage is different from the control voltage. This transformer should be with primary over current protection. Generally Class -II transformers are with built-in over current protection and others have to protect with separate fusing. Secondary protection is available as an option and it is not necessary by UL.

5. Contactors: UL require that built in contactors is required to on-off the circuits in each heater. SAFID provide de-energizing type magnetic contactors as standard for all our duct heaters to comply with this requirements Disconnecting Type and Mercury Contactors are optional.

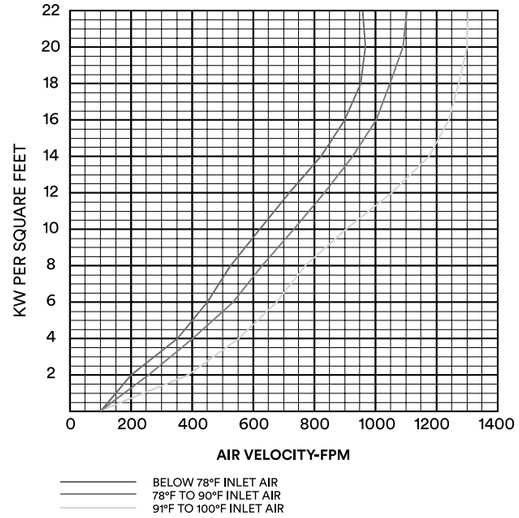
6. Disconnect Means: As per NEC, an equipment disconnect switch to be installed as built in or within the sight of the heater. SAFID offer an optional door interlock or non interlock type of disconnect switch as built in or separate for field installation to meet this.

7. Grounding Lugs: UL requires a built in grounding lug to be installed for field wiring terminations. All SAFID. heaters built in grounding lugs to comply this requirement.



MINIMUM AIR VELOCITY FOR ELECTRIC DUCT HEATER

Minimum Air Velocities for Open Coil Terminal



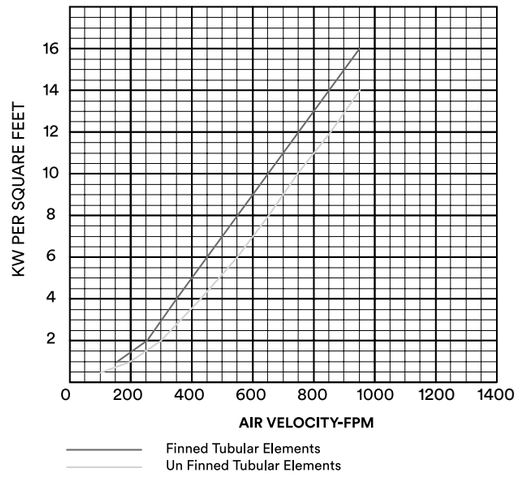
The minimum airlfow across the electric heater is directly related to the inlet air temperature. Consideration must be given to both airflow across the electric heater and the inlet air temperature.

To calculate the watts per square foot (watts/sq.ft) of duct area, divide the total required watts by the duct cross sectional area.

To determine the minimum air velocity across the electric heater. Draw a horizontal line from the required watts/sq.ft up to the designed inlet air temperatre line. From this point of intersection on the inlet temperature line, draw a vertical line to established the air velocity.

The velocity across the electric heater should never be lower than the determined velocity from the chart.

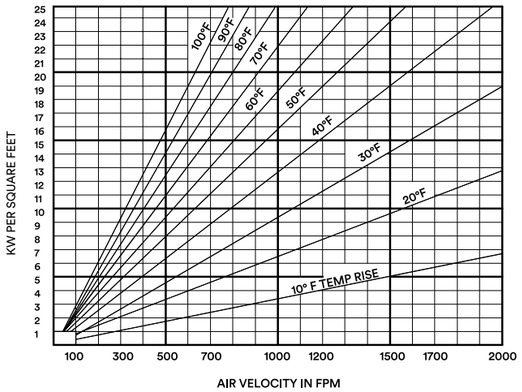
Minimum Air Velocities for Finned & Unfinned Coil Heater



The air velocity across the electric heater must be minimum 1.5 m/s to give a surface temperature of the heating elements of about 300-350 degrees Celsius.

TEMPERATURE RISE CHART AND PRESSURE DROP

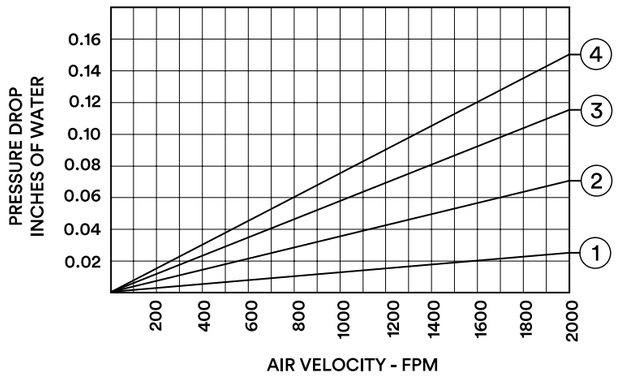
Temperature Rise Chart



Temperature rise of a duct heater is an important factor in the selection of duct heater. By this chart you can calculate the approximate temperature rise if you know the airflow and heater capacity used.

Draw line vertically up from the required air velocity on the bottom scale up to the design temperature rise line. From that point, draw a horizontal line to the left side scale to know the required heater capacity per square feet of duct area to maintain the required temperature rise at design air velocity.

Pressure Drop Across Open Coil Heater



The pressure drop across the electric heater depends on the air velocity and the number of rows of heating coils.

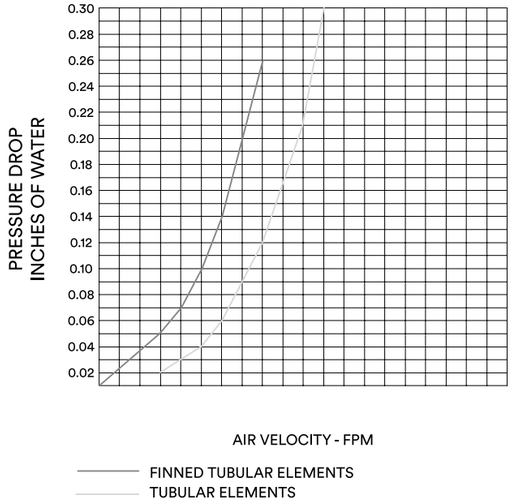
If the number of rows of heating coils is unknown, assume 4 rows for the selection.

NOTE

1. ① ② ③ ④ are the number of rows of heater elements.
2. The pressure drop that can be selected from the above graph is for the electric heater only.

PRESSURE DROP

Pressure Drop For Tubular Coil Heater



The pressure drop across the electric heater depends on the air velocity and the number of installed heating coils of the heater.

The Pressure drop shown is for 2 rows of elements.

Major Advantages and Disadvantages of Coils

Open Coil:

Advantages: Very low pressure drop. Fast heat transferring. More heater capacity per area. Quick response time. Quick manufacturing and fast delivery.

Disadvantages: Not suitable for dusty and high humidity environments due to direct contact with air. Chance to damage the coils during maintanance or service period.

Tubular Coil:

Advantages: Compare to open coil, less sensitive to dust and humidity environments. Elements are enclosed type. Excellent mechanical resistance. Shock proof construction. Can be replace easily. More stronger than open coils.

Disadvantages: Pressure drop is higher than open coil. Slow response. Manufacturing time is more compare to open coil. Less heater capacity per area.

Finned Tubular Coil:

Advantages: Compare to open coil less sensitive to dust and humidity environments. Elements are enclosed type. Excellent mechanical resistance. Shock proof construction. Can be replace easily. More stronger than open coils. Good controllability.

Disadvantages: Pressure drop is higher. Slow response. Manufacturing time is more compare to open coil. Less heater capacity per area.

Contactor Wiring Configurations

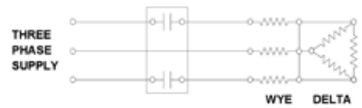
Typical Contactor Power Circuitry

De-energizing Contactor

Single Phase - Single Line Break

Heater is de-energized by breaking only one power line through the action of single contact. By opening the contactor contacts the undergrounded line would be disconnected from single phase power supply.

Three Phase - Two Line Break



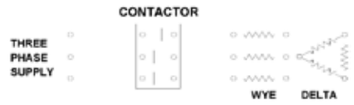
Above shown is for a two line break which will de-energize the heater. Heating elements those used in three phase balanced configurations are factory wired as manufacturers standard in two basic configurations either in Delta or in Wye. General standard is Delta Connection.

Disconnecting Contactor

Single Phase - Two Line Break

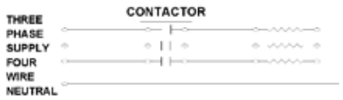
Heater power supply is completely disconnected by opening both side of the contactor contacts. All undergrounded power conductors are disconnected.

Three Phase - Three Line Break



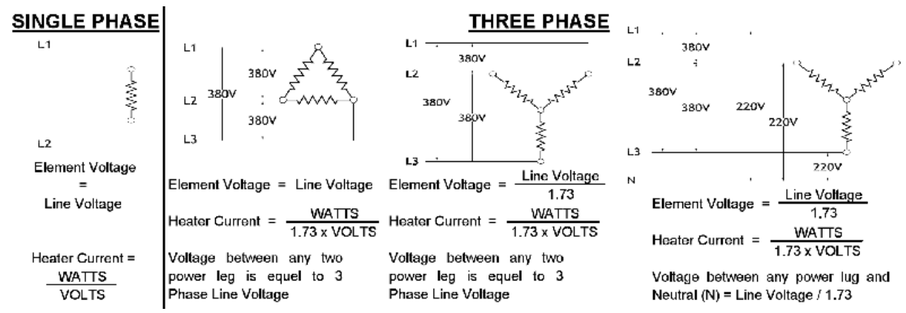
Heater power supply is completely disconnected by opening all sides of the contactor contacts. All undergrounded power conductors are disconnected.

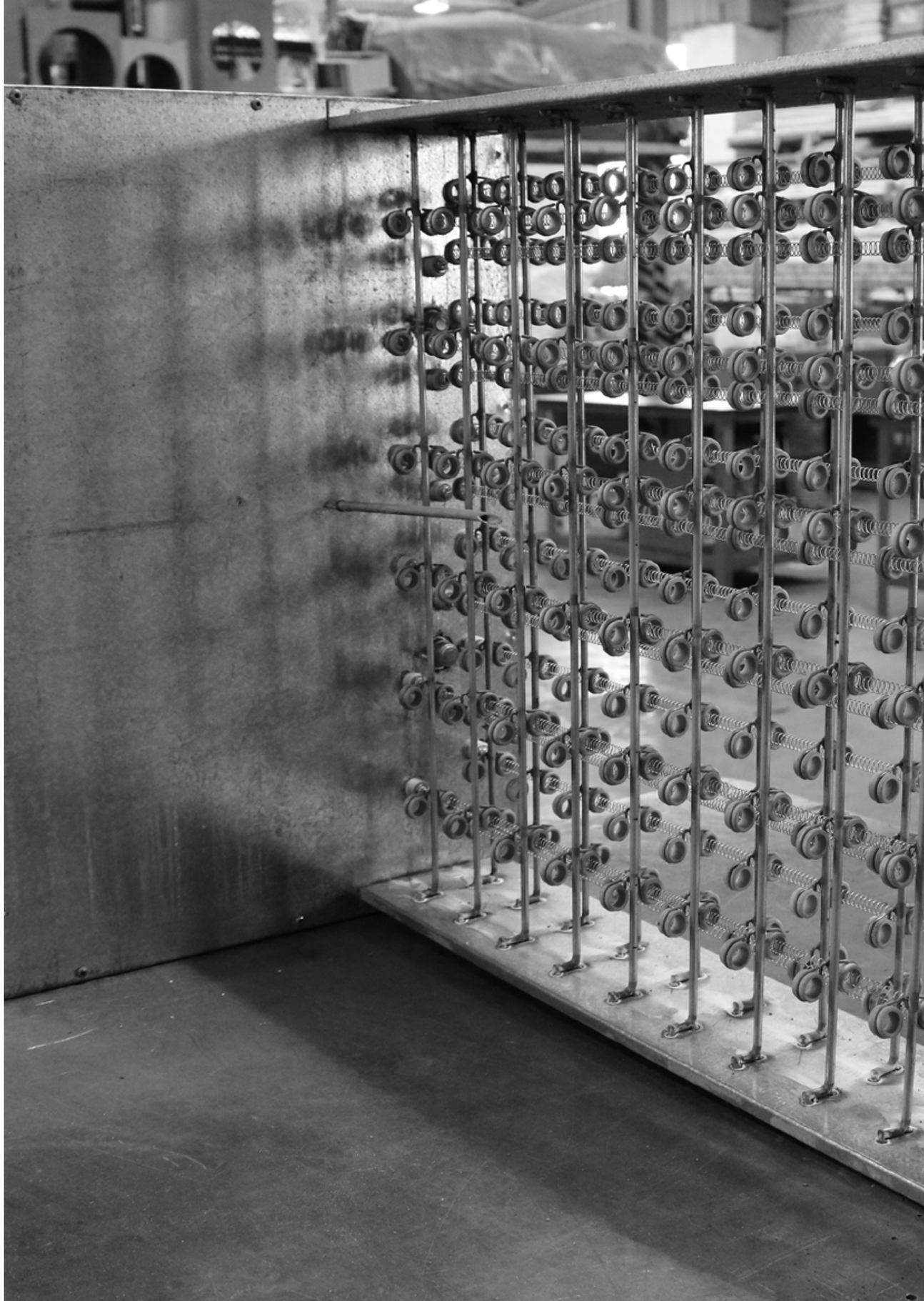
Four Wire “WYE” (Optional)



In this configuration, each element may be operated independently through individual contacts. A three pole Disconnecting contactor must be used to open all elements from power supply.

Heating Element Wiring Configurations and Properties





Magnetic Contactors

De-energizing Magnetic Contactors are built in as standard for all heaters. These contactors are UL approved for 100,000 cycle operation and listed as a defenite purpose. Coil voltage may be 24, 120 or 240. This contactor will open/ close the minimum number of power lines to control the current flow to each stage being controlled. This can be used as a primary or backup controlling contactor. If required with break all power lines, use Disconnecting Type Contactors.

Mercury Contactors

When silent operation or frequent cycling is required use Mercury Contactors instead of Magnetic Type. These are UL approved for 100,000 cycle operation and listed. This will eliminate contact noise and have long life under continuous heavy duty. All Mercury Contactors must be installed in the upright vertical position.

Control Transformer

A step down transformer may be built in to supply the correct control voltage when control voltage is differ from line voltage. Class-II transformers are primary over current protected and do not required additional protection unless specified. Class-I transformers must have primary protection by fusing. Secondary protection is not necessary. It is available as an option when specified.

Airflow Switch

This switch sense the air pressure across the heater face and energize / de-energize the contactors based on airflow. Airflow switch is available for positive or negetive pressure sensing type and switch is set at 0.05”+/- 0.02”. The heater will deactivate when the fan is not on or at less air pressure than the setting.

Power Fusing

Heaters in excess of 48 ampere must be subdivided into branch circuits of 48 ampere or less and protected with fuses of 125% rated load. Fusing is optional for heaters drawing less than 48 amperes.

Thermal Cut-Outs

A disc type automatic reset thermal cut-out de-energize the heater on overheating and energize the heater automatically after the temperature has lowered. The standard cut-out temperature is 140°F.

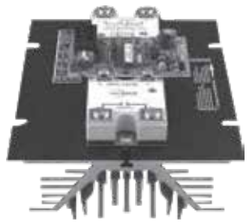
Disc type manual reset cut-out is provided as a secondary limit control in case of failure the auto cut-outs. This device requires a reset button to restore the power after over temperature occur. The standard cut-outs temperature is 185°F.

Both cut-out should be UL listed and suitable for 100,000 cycles of operation. Above cut-outs can be wired in power circuits or control circuit within the rated capacity. Both cut-outs are built or control circuits within the rated capacity. Both cut-outs are built in as standard in all SAFID duct heaters.

Disconnect Switch

Door interlocking type disconnect switch can be provided to prevent the door opening until disconnect the power to heater. The door will remain close until to switch off the disconnect. Fused or non-fused switches can be supplied as an option.

SCR Controls



The SCR controller has been safe and reliable control of electric heaters and suitable for applications where noise is a factor. This provides continuous modulation from zero to maximum heater output in proportion to the room temperature demand. The built in anodized heat sink improves heat dissipation. Availble in different voltage, ampere and with multiple input control signal. The controller can be connected to modulation thermostats or directly to any BMS. The SCR controller also has built-in LED indication for proper operation.

Step Controller

Step controllers are availabe for multiple staged heaters in a predetermined time sequence. This microcomputer based low voltage step controller is suitable for precise control of applications typically found in duct heater. This has a built in intesrtage adjustable time delay and a test button to by-pass the time delay and also accepts modulating signals from thermostats or BMS.

Fan Interlock Relay

This optional relay is used to interlock the fan circuit with heater to prevent the heater from energizing unless the fan is on. External control voltage from fan starter is required to operate this relays. The control voltage must be specified when ordering with this option.

Also volt free contacts can be provided from this relays to interlock with fan control circuits. Then the relay will use heater control voltage as supply.

Pilot Switch

This consist of a toggle switch wired with the heater control circuit and used to on/off each heater stages or the complete heater by manually. This can not be used as a disconnect swicth.

Pilot Lights

To show the heater operation modes, pilot lights can be installed in control panel door or on the side of the control panel. Following indications are available.

1. Heater on/off (entire heater or step by step)
2. Thermal cut-outs open
3. Low airflow
4. Common alarms
5. Power on (control circuit)

Pilot Relay

Pilot Relay can be provided when the load of contatcors coils exceed the rated capacity of thermostat or control transformers.

These relays can also be use to get volt free contact signals from heater to a DDC panels or BMS for remote monitoring.

Terminal Blocks

High voltage terminal blocks are built in as standard for power supply terminations. All terminal blocks are sized to accommodate either copper or aluminun conductors.

Low voltage terminal blocks are provided for ease of field connections.

Circuit Breaker

A circuit breaker can be supplied as optional instead of pwer fusing. This will trip in when an over-current situation occurs. You will have to reset it manually after rectifying the problems that caused it to trip.

Protective Screen

An optional protective screen by wire mesh can be installed on either side of the heater or at the air entering side to protect the elements and or for personnel protection.

Conversion Tables

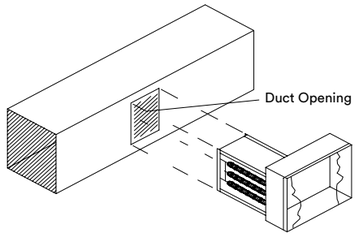
KW	=	$\frac{\text{BTU}}{3413}$
KW	=	$\frac{\text{Airflow (CFM)} \times \text{Temperature rise (°F)}}{3160}$
WATTS	=	$\frac{(\text{Volts})^2}{\text{Resistance}}$
Ampere (1 - Phase)	=	$\frac{\text{Watts}}{\text{Volts}}$
Ampere (3 - Phase)	=	$\frac{\text{Watts}}{\text{Volts (1.732)}}$
KW per square foot	=	$\frac{\text{KW}}{\text{Duct area in square foot}}$
Velocity (fpm)	=	$\frac{\text{Airflow (CFM)}}{\text{Duct area in square foot}}$

BTU/h - KW/Ampere Chart

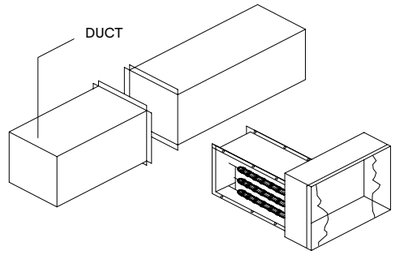
BTU/h	KW	120	208		220		240		277	380	415	440	460	480	KW
		1ø	1ø	3ø	1ø	3ø	1ø	3ø	1ø	3ø	3ø	3ø	3ø	3ø	
3413	1	8.3	4.8	2.8	4.5	2.6	4.2	2.4	3.6	1.5	1.4	1.3	1.3	1.2	1
6826	2	16.7	9.6	5.5	9.1	5.2	8.3	4.8	7.2	3.0	2.8	2.6	2.5	2.4	2
10239	3	25.0	14.4	8.3	13.6	7.9	12.5	7.2	10.8	4.6	4.2	3.9	3.8	3.6	3
13652	4	33.3	19.2	11.1	18.2	10.5	16.6	9.6	14.4	6.1	5.6	5.2	5.0	4.8	4
17065	5	41.7	24.0	13.9	22.7	13.1	20.8	12.0	18.1	7.6	7.0	6.6	6.3	6.0	5
20478	6	50.0	28.9	16.6	27.2	15.7	25.0	14.4	21.7	9.1	8.3	7.9	7.5	7.2	6
23891	7	58.3	33.7	19.4	31.8	18.3	29.1	16.8	25.3	10.6	9.7	9.2	8.8	8.4	7
27304	8	66.6	38.5	22.2	36.3	21.0	33.3	19.2	28.9	12.2	11.1	10.5	10.0	9.6	8
30717	9	75.0	43.3	24.9	40.9	23.6	37.4	21.6	32.5	13.7	12.5	11.8	11.3	10.8	9
34130	10	83.3	48.1	27.7	45.4	26.2	41.6	24.0	36.1	15.2	13.9	13.1	12.5	12.0	10
37543	11	91.6	52.9	30.5	49.9	28.8	45.8	26.4	39.7	16.7	15.3	14.4	13.8	13.2	11
40956	12	100.0	57.7	33.2	54.5	31.4	49.9	28.8	43.3	18.2	16.7	15.7	15.0	14.4	12
44369	13	108.3	62.5	36.0	59.0	34.1	54.1	31.2	46.9	19.8	18.1	17.0	16.3	15.6	13
47782	14	116.6	67.3	38.8	63.6	36.7	58.2	33.6	50.5	21.3	19.5	18.3	17.5	16.8	14
51195	15	125.0	72.1	41.6	68.1	39.3	62.4	36.0	54.2	22.8	20.9	19.7	18.6	18.0	15
54608	16	133.3	76.9	44.3	72.6	41.9	66.6	38.4	57.8	24.3	22.3	21.0	20.0	19.2	16
58021	17	141.6	81.8	47.1	77.2	44.5	70.7	40.8	61.4	25.8	23.7	22.3	21.3	20.4	17
61434	18	150.0	86.5	49.9	81.7	47.2	74.9	43.2	65.0	27.3	25.0	23.6	22.5	21.6	18
64847	19	158.3	91.4	52.6	86.3	49.8	79.0	45.6	68.6	28.8	26.4	24.9	23.8	22.8	19
68260	20	166.6	96.2	55.4	90.8	52.4	83.2	48.0	72.2	30.4	27.8	26.2	25.0	24.0	20
71673	21	174.9	101.0	58.2	95.3	55.0	87.4	50.4	75.8	31.9	29.2	27.5	26.3	25.2	21
75086	22	183.3	105.8	60.9	99.9	57.6	91.5	52.8	79.4	33.4	30.6	28.8	27.5	26.4	22
78499	23	191.6	110.6	63.7	104.4	60.3	95.7	55.2	83.0	34.9	32.0	30.1	28.8	27.6	23
81912	24	200.0	115.4	66.5	109.0	62.9	99.8	57.6	86.6	36.5	33.4	31.4	30.0	28.8	24
85325	25	208.3	120.2	69.3	113.5	65.5	104.0	60.0	90.3	38.0	34.8	32.8	31.3	30.0	25
88738	26	218.6	125.1	72.0	118.0	68.1	108.2	62.4	93.9	39.5	36.2	34.1	32.5	31.2	26
92151	27	225.0	129.9	74.8	122.6	70.7	112.3	64.8	97.5	41.0	37.6	35.4	33.8	32.4	27
95564	28	233.3	134.7	77.6	127.1	73.4	116.5	67.2	101.1	42.5	39.0	36.7	35.0	33.6	28
98977	29	241.6	139.5	80.3	131.7	76.0	120.6	69.6	104.7	44.1	40.3	38.0	36.3	34.8	29
102390	30	250.0	144.3	83.1	136.2	78.6	124.8	72.0	108.3	45.6	41.7	39.3	37.5	36.0	30
105803	31	258.3	149.1	85.9	140.7	81.2	129.0	74.4	111.9	47.1	43.1	40.6	38.8	37.2	31
109216	32	266.6	153.9	88.6	145.3	83.8	133.1	76.8	115.5	48.6	44.5	41.9	40.0	38.4	32
112629	33	275.0	158.7	91.4	149.8	86.5	137.3	79.2	119.1	50.1	45.9	43.2	41.3	39.6	33
116042	34	283.3	163.5	94.2	154.4	89.1	141.4	81.6	122.7	51.7	47.3	44.5	42.5	40.8	34
119455	35	291.7	168.4	97.0	159.0	91.7	145.6	84.0	126.4	53.2	48.7	45.9	43.8	42.0	35
122868	36	300.0	173.2	99.7	163.4	94.3	149.8	86.4	130.0	54.7	50.1	47.2	45.2	43.2	36
126281	37	308.3	178.0	102.5	168.0	96.9	153.9	88.8	133.6	56.2	51.5	48.5	46.3	44.4	37
129694	38	316.7	182.8	105.3	172.5	99.6	158.1	91.2	137.2	57.7	52.9	49.8	47.5	45.6	38
133107	39	325.0	187.6	108.0	177.1	102.2	162.2	93.6	140.8	59.3	54.3	51.1	48.8	46.8	39
136520	40	333.3	192.4	110.8	181.6	104.8	166.4	96.0	144.4	60.8	55.6	52.4	50.0	48.0	40
139993	41	341.7	197.2	113.6	186.1	107.4	170.6	98.4	148.0	62.3	57.0	53.7	51.3	49.0	41
143346	42	350.0	202.0	116.3	190.7	110.0	174.7	100.8	151.6	63.8	58.4	55.0	52.5	50.4	42
146759	43	358.3	206.8	119.1	195.2	112.7	178.9	103.2	155.2	65.3	59.8	56.3	53.8	51.6	43
150172	44	366.7	211.7	121.9	199.8	115.3	183.0	105.6	158.8	66.9	61.2	57.6	55.0	52.8	44
153582	45	375.0	216.5	124.7	204.3	117.9	187.2	108.0	162.5	68.4	62.6	59.0	56.3	54.0	45
156998	46	383.3	221.3	127.4	208.8	120.5	191.4	110.4	166.1	69.9	64.0	60.3	57.5	55.2	46
160411	47	391.7	226.1	130.2	213.4	123.1	195.5	112.8	169.7	71.4	65.4	61.6	58.8	56.4	47
163824	48	400.0	230.9	133.0	217.9	125.8	199.7	115.2	173.3	72.9	66.8	62.9	60.0	57.6	48
167237	49	408.3	235.7	135.7	222.5	128.4	203.8	117.6	176.9	74.4	68.2	64.2	61.3	58.8	49
170650	50	416.6	240.5	138.5	227.0	131.10	208.0	120.0	180.5	76.0	69.6	65.5	62.5	60.0	50

Installation Instructions

1. Before proceeding heater installation, inspect all heater assembly for any damage during transportation or site mishandling. Check physically all ceramic insulators for breakage and check coils that none have been damaged.
2. The duct which the duct heater to be installed should be constructed in accordance with the standards of the National Fire Protection Association (NFPA-90A & 90B) for the installation of Air-Conditioning and Ventilation Systems.
3. Heaters should be installed in the duct with atleast 4 feet downstream from an Air Handler Unit. This will allow any change in direction of airflow to ensure even airflow over the entire heater area.
4. Install heaters with at least 4 feet away from the heat pumps or central air conditioners.
5. All Cooling Coils, Dampers, Air Filters or Humidifiers must be installed at least 4 feet length away from the heater.
6. Provide 4 feet length between heater and any canvas duct connector of transition sections and provide 2 feet length between heater and an elbow or turn.
7. The minimum air velocity is required for the satisfactory operation of heaters. Please refer the attached required minimum velocity chart. Entering air temperature is limited to 100°F.
8. For Insert type installation, cut a hole in the side of the duct, 3mm larger than the element metal enclosure portion. Insert the heater into this opening and attach control panel to the side of the duct by means of sheet metal screws. For bottom mount type heaters follow the same procedure except, making hole in bottom side instead of side. If duct is internally insulated used a recessed type construction to cover the insulation.
9. For Flanged type installation, the flange portion of the heater to be matched with the out turned flanges of the duct. No duct flange in the control panel side as shown below. Join heater and duct flanges by means of metal screws or bolts & nuts. Fasten control panel to duct with steel metal screws.
10. Follow the air flow direction arrow in heater control panel and position the heater to match with duct air flow
11. Heater control panel should not be covered by any insulation.
12. Provide enough space to open the door and ease access for maintenance and service.



INSERT TYPE INSTALLATION



FLANGED TYPE INSTALLATION

1. Follow the schematic wiring diagram pasted inside the heater to make proper power cable and control cable termination. Minimum wire size, fuse sizes are shown in the wiring diagram. All electrical connections, wire sizes and type of conduit sizes are according to National Electric Codes (NEC) and local codes.
2. All incoming power cables must be rated for 125% of the total load that handle and rated for minimum 75°C. If heater is supplied with Fan Interlock Relay, connect the circuit with fan circuit to energize the heater after energize the fan.
3. Provide disconnect switch near heater as per NEC, if not supplied with built in heater.
4. Do not bundle or tie the power cables.
5. Over current protection (power fuse or circuit breaker) must be provided at site if not supplied with heater.
6. Provide enough space for air circulation in heat sink if heater supplied with SCR controls.

OPERATION AND MAINTENANCE

Operation

Check the installation instructions and wiring diagrams to make sure that the heater was wired and installed properly.

1. Before proceeding heater operation, make sure that all electrical terminations are tight as these may have loose during transportation, installation or improper site handling. It is recommended to retighten all connection after complete the installation process.

2. Clean all dirts, dust and moisture from heater. Check for any missing insulation on cables that terminated inside the heater.

3. Check all fuses and circuit breakers are in position and rating are adequate.

4. Check all control circuit wiring and power supply to the controller are match with their requirement.

5. Turn the heater power to on and measure the supply voltage and compare with rated name plate.

6. Power on the control circuit or select the thermostat to heat mode. Check the steps are energizing step by step. with a time delay. Don't allow to energize all steps together of entire heater battery if load is more, Use propoer time delay between stages to energize the heater.

7. Measure heater ampere to record, either total or step by step for multi-step heater. Measure airlfow and inlet and outlet temperature to record.

Maintenance and Service

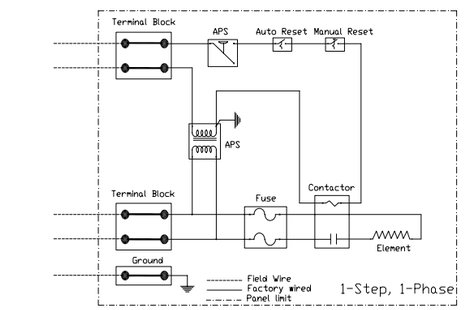
Always shut down the Power supply before doing any work on duct heater.

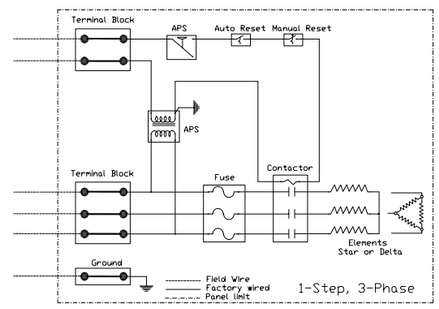
1. All SAFID Duct Heaters are manufactured with little or no maintenance requirements. We propose following a periodic service plan to maintain the long life of heater.
2. Check for any loose contacts, and retighten all screws if necessary.
3. Clean for any dust inside the panel, especially in magnetic contactors.

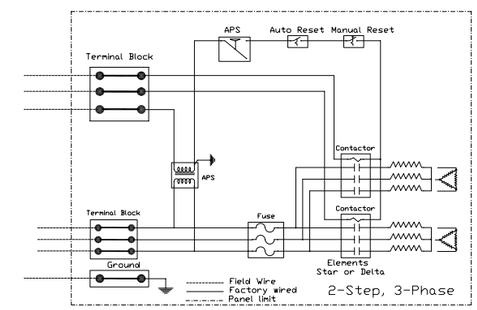
If the heater is not operating, please check the below. These often help solve general problems for duct heaters:

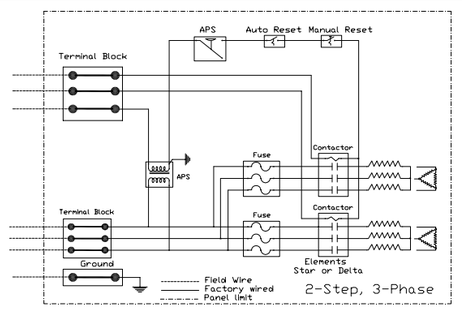
1. Power supply to heater.
2. Check for any loose contacts or connections.
3. Power fuses blow or not.
4. Check for control supply and transformer.
5. Thermostat is working or not.
6. Check fan is operating and maintain the airflow to sense the air pressure for airflow switch.
7. Check high-temperature cut-outs (Automatic/Manual) are close.
8. Check airflow switch is closed.

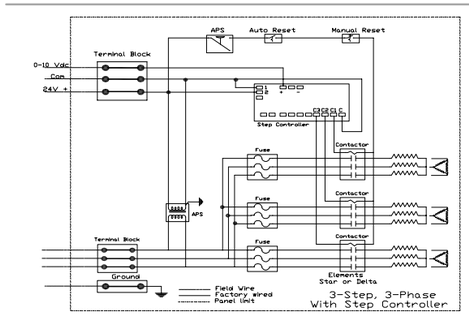
Typical Wiring Diagrams

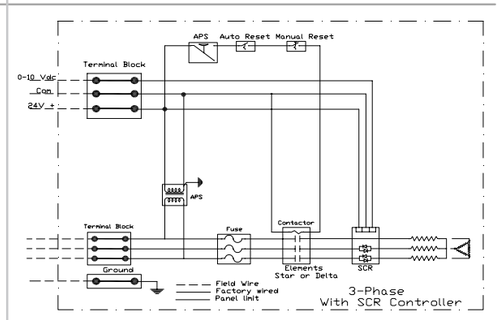


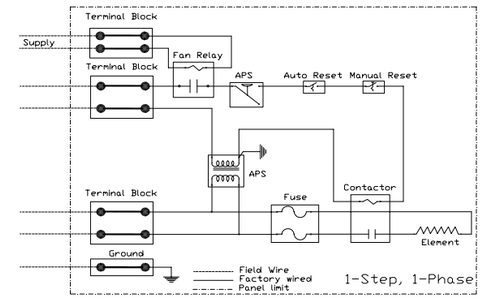


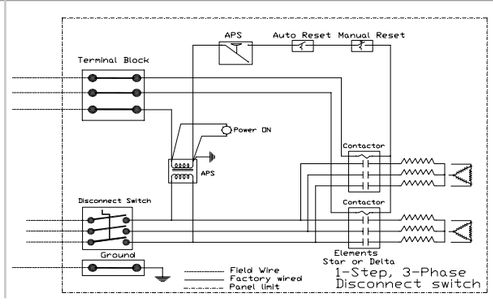




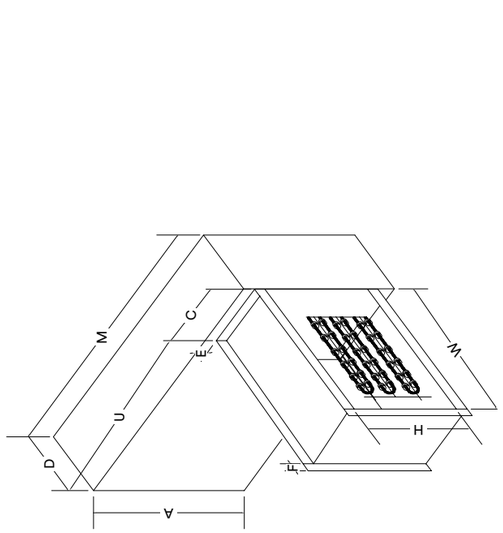








Duct Heater Submittal

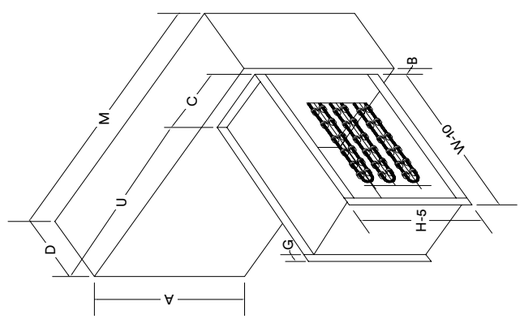


FLANGED TYPE

Duct Heater Submittal

Quatation No.:
Customer:
Project:
Date:
Model:
Location:

No.	Tag	Duct Size	Qty.KW	Step	Volts	Ph	Hz	S/F	Amps	Kw/Step	Ctl	Vlt	W	H	A	B	C	D	E	F	G	M	U



SLIP-IN INSERT TYPE

Standard Built-In Accessories

1. De-Energizing Magnetic Contactor
2. Airlflow Switch
3. Power and Control Terminal Blocks
4. Dics Type Auto and Manual Thermal Cut-Outs
5. NEMA -1 Type Control Panel
6. 1mm Thick Galvanized Steel Construction
7. Grounding Lugs
8. Class-II Control Transformer

Optional Accessories

1. Disconnecting Contactor
2. Mercury Contators
3. Transformer Secondary Fusing
4. Power Fusing
5. Door Interlocking Disconnect Switch (Non-Fused)
6. Door Interlocking Disconnect Switch (Fused)
7. Disconnect Switch
8. Circuit Breaker
9. Modulating SCR (Thyristor) Controller
10. Step Controller
11. Room Thermostat
12. Fan Interlock Relay
13. Pilot Light Indications
14. Volt Free Contacts for Remote Monitoring
15. Remote Control Panel
16. Recessed Control Panel
17. Bottom Mount Control Panel
18. Dust Proof Control Panel
19. Stainless Steel Construction
20. Aluminized Steel Construction
21. Weather Proof Control Panel
22. Derated Element Below 35 Watts per Square Inch
23. Powder/Epoxy Coating
24. SCR with Venier System

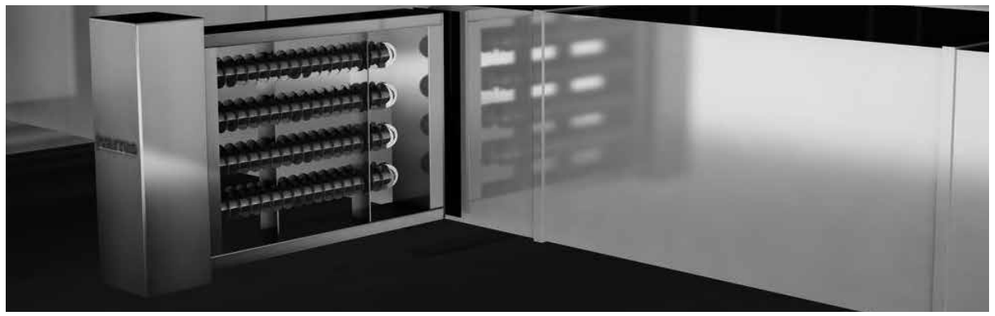
Sample Specifications for Duct Heaters

Sample Specifications for Open Coil

1. Electric duct heaters are referred to as an Open Coil type or series EHO as manufactured by SAFID.
2. Capacity, power supply, voltage, phase, duct size, no. of steps & control to be as per project requirement.
3. All heaters shall meet the requirements of UL and NEC specifications.
4. Heaters shall be either Slip-In Insert type or Flanged type as per project requirement.
5. Heating element shall be Type-A, high grade Nickel (80%) Chromium (20%) alloy resistance.
6. Heater frames and Control Panel shall be constructed of 20 gauge galvanized steel sheet.
7. Heater element insulator mounting shall be suitable for free floating type and allowing expansion of the insulators under high temperature conditions without cracking or breaking.
8. All heaters shall have its load divided into equal step to a maximum of 48A per steps. Fuses and neccassary controls shall be provided in heaters if total current is more than 48A and subdivide all the steps to limit the load within 48A per steps.
9. All heaters shall be with built in primary & secondary over temperature protections, airflow switch and neccesary magnetic contactors per each steps.
10. All safety devices shall be servicable through the control panel without removing the heater from the duct.
11. A wiring diagram showing wire size, fuse size and complete control and power termination shall be placed on each heater's door.

Sample Specifications for Finned or Unfinned Tubular Heater

1. Electric duct heater are referred to as Finned or Unfinned type, series EHFT or EHT as manufactured by SAFID.
2. Capacity, power supply, voltage, phase, duct size, number of steps and control will be customized according project requirement.
3. All heaters shall meet the requirement of UL & NEC specifications.
4. Heaters shall be either Slip-In Insert type of Flanged type as per project requirement
5. Heating element shall be Type- A, high grade Nickel (80%) Chromium (20%) alloy resistance.
6. Heater frames and Control panel shall be constructed of 20 gauge galvanized steel sheet.
7. Heater element shall be covered wih Stainless Steel Tube (for "EHT") & rounded with Stainless Steel Fins (for 'EHFT" series) and annealed after assembly.
8. All heaters shall have their load divided into equal steps to a maximum of 48A per steps Fused and necessary controls shall be provided in heaters if total current is more then 48A and subdivided all the steps to limit the load within 48A per steps.
9. All heaters shall be with built in primary & secondary over temperature protections, airflow switch and necessary magnetic contactors per each steps.
10. All safety devices shall be servicable through the control panel without removing the heater from the duct.
11. A wiring diagram showing wire size, fuse size and complete control and power termination shall be placed on each heater's door.



Order Details

Order Code:

SEH- aaa- bb- cc- dd- ee- ff- gg- hh- ii-

Model:

O = Open Coil Element
T = Tubular Element
FT = Finned Tubular Element

I = Slip-In Insert Type
F = Flanged Type

S = Standard Controls & Construction
O = Optional Controls & Construction

K = Heater Capacity

S = No. of Steps

V = Power Supply

P = No. of Phase

H = Frequency

D = Duct Size (W x H)

Order Example

Requirements:
Open Coil Heater, slip-in type with standard controls and construction, 5 kilowatts, 2 step, 380 volts, 3 phase, 60Hz, suitable for 500mm width x 300mm height duct.

Ordering:
Make : SAFID
Type : SE H - O - I - S -5 - 2 - 380 -3 - 60 - 500 X 300
Qty. : 1pc

NOTE
Please refer to the accessories page for standard/optional controls and constructions.