



Directflow SBDR/SBD SERIES

DIRECT GAS-FIRED MAKE-UP AIR SYSTEMS

Cooling Can Be Added



E.T.L. Available (100% Outside Air Only)

A MODEL
FOR EVERY
APPLICATION

SBD

Direct Gas-Fired
Make-up Air
Heaters

SBDR

Direct Gas-Fired
Make-up Air Heater
with Return Air
Capability

SBDF

Direct Gas-Fired
Duct Furnaces

AIR DELIVERIES
FROM 2,000 TO
120,000 SCFM.
HEAT INPUT FROM
94 TO 15,552 MBH

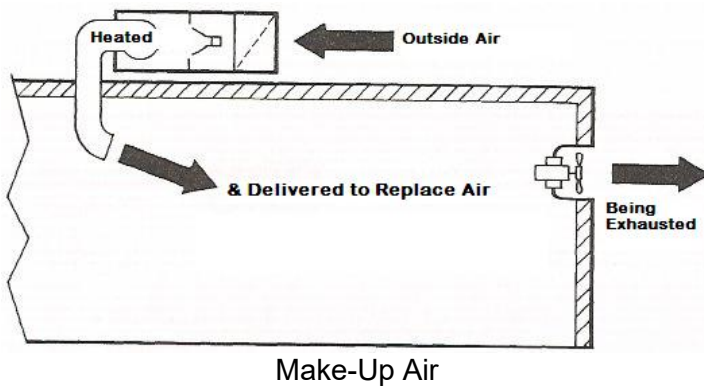
SBD DIRECT GAS-FIRED SERIES

The Need for Make-Up Air

Air exhausted from industrial or commercial buildings must be replaced. If provisions are not made for make-up air, there likely will be air starvation creating negative pressure within the building. This negative pressure, in turn, causes: outside air infiltration and cold drafts; down or back drafts in heating equipment flues, ventilators and stacks; reduced exhaust fan air volumes resulting in inadequate removal of contaminants; uncomfortable, and in many instances, unhealthy working conditions; and other problems.

The Source of Make-Up Air

With most applications requiring exhaust air provisions, replacement air must enter buildings either by infiltration through openings such as doors or windows, or supplied by a make-up air system. Infiltrated air is unheated, draft ridden and unfiltered resulting in an uncomfortable, uneven, and often unclean environment. A controlled source of make-up air eliminates the many problems of infiltration.



The SBD Direct Gas-Fired Systems

The SBD series of direct gas-fired make-up air systems was designed to furnish fresh, clean and heated air from a controlled source by the most fuel-efficient and cost effective means. The SBD systems employ a method of supplying heated air into a building by passing fresh air directly over a gas flame in the air stream. The burner utilizes the kinetic energy of the airflow to complete combustion with the products of combustion well within code prescribed safety limits. The direct gas-fired burner, depicted in Figure 1, consists of drilled port cast iron pipe and two perforated stainless steel combustion baffles. The arrangement and shape of the air holes in the baffles provide the injection of proper combustion air at all rates of firing over a wide turndown range of up to 22:1. Since all the heat of the fuel goes into the air stream being heated, the direct gas-fired unit has 100% combustion efficiency and 92% overall thermal efficiency (with 8% of the total heat lost in the latent heat of water formed in combustion). Combustion products are limited to a 5 ppm (parts per million) of carbon monoxide and 0.5 ppm of NOX. These are the levels accepted by ANSI standards for Direct-Fired Heating Equipment.

HOW CAN YOU RECOGNIZE THE NEED FOR MAKE-UP AIR?

Symptoms:

- Back drafts and frequent pilot outages on natural draft heating equipment
- Doors difficult to open
- Exhaust fans not exhausting air

Cause:

Negative inside pressure from too little air replacing the air being exhausted

Symptoms:

- Heaters not heating buildings
- Cold drafts
- Dust and dirt being drawn into building

Cause:

Untreated outside air infiltrated into building because of negative inside pressure

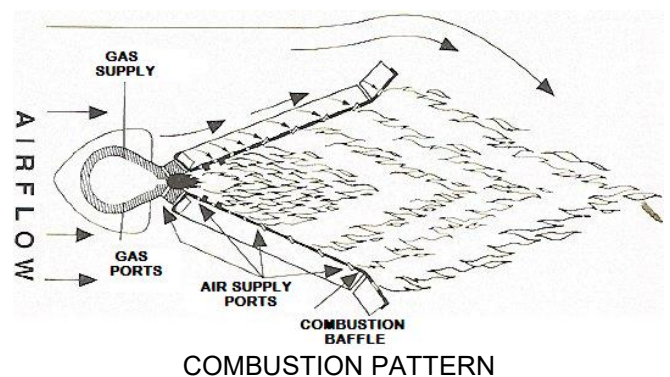
Symptoms:

Employees develop nausea and headaches

Cause:

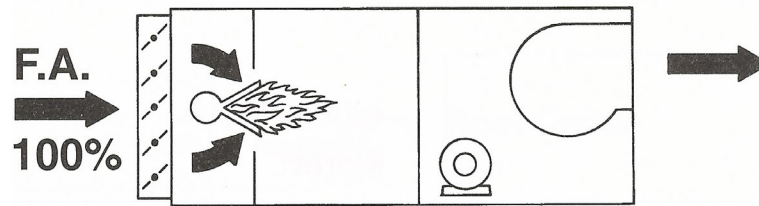
Build-up of inside contaminants due to inadequate ventilation

Figure 1



Direct Fired Line Burner

SBD – 100% FRESH AIR APPLICATIONS



The basic SBD system is designed to introduce heated 100% outside air into a building to replace that amount of air which is exhausted. It is often desirable to bring in an excess of make-up air over that exhausted to insure a positive pressure in the area. This eliminates the many problems of negative pressure.

Normally the exhaust system is interlocked with the SBD make-up air system so that the units are in operation at the same time.

During operation of the SBD, airflow is continuous with discharge air temperature regulated by modulating controls. The air temperature controls will

be electronic gas flame modulation. Each of these control systems allow the burner to operate at any point on its turndown range to provide a constant heater air discharge temperature

The SBD system, in addition to its primary function as a make-up air heater, can also serve as a space heater. In many industrial and commercial applications it is practical and economically sound to use a single source of space heat and make-up air. In these instances, over-riding space air temperature controls are added to the basic discharge air temperature control system.

Unit construction based on ANSI Z83.4 standard.

SBDF – DUCT FURNACE



The SBDF system consists of the basic SBD direct gas-fired burner section without a blower section. The burner section is applied as a duct furnace in field-fabricated ventilation systems.

All control and gas manifold options listed for the SBD systems are available with the SBDF direct gas-fired duct furnaces. Such accessories as filters, dampers and intake hoods can also be furnished with the furnaces.

To avoid stratification's of the heated make-up air, the SBDF duct furnace should be located on the suc-

tion side of the blower to take advantage of the mixing effect of the fans.

While the performance data of the SBDF duct furnace is the same as that listed for the SBD system, a smaller size duct furnace may often be used with a field fabricated ventilation application. The burner section size is no longer predicated on the physical size of the SBD blower section. Consult your local Hastings sales representative for selection and dimensional information.

SBDF model cannot bear ETL label.

SBDR – 80% RETURN AIR CAPABILITY

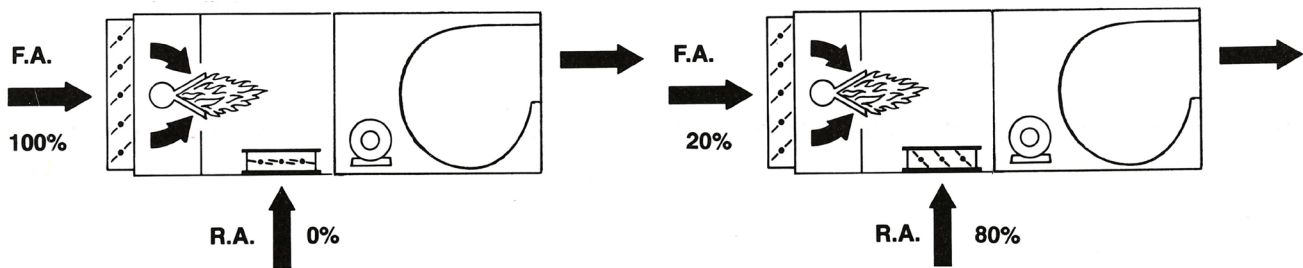
The SBDR system incorporates a return air damper downstream of the direct gas-fired burner which provides an option of up to 80% return air and 20% fresh air, or 100% fresh air and no return air. The SBDR system is recommended for buildings requiring varying indoor air requirements or applications with variable exhaust air requirements. With the SBDR, less fuel is expended to heat less make-up air.

Redesigned internal adjustable profile plates keep the velocity of the incoming air across the burner constant, regardless of the amount of fresh air and return air required.

The SBDR lends itself to those ventilation applications incorporating supplemental space heating with make-up air requirements. The total air volume

being circulated need not be 100% make-up air but can be a mixture of fresh air and return air to provide enough air to meet varying indoor air requirements. The variable volume of outdoor air allows unit to maintain a positive building pressure. The heated incoming air moves toward cold areas of infiltration and pressurizes the space eliminating stratification. Indoor air quality is maintained by a continual introduction of fresh outdoor air.

The SBDR system retains the basic SBD system modulating discharge air control. In addition, a fresh air/return air selector switch is furnished (as standard). Manual potentiometer or room pressure control is available.



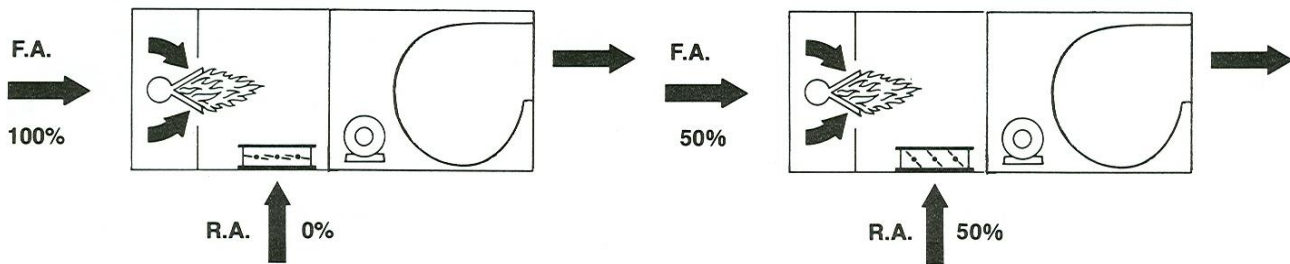
SBDR – 50% RETURN AIR CAPABILITY

The SBDR system incorporates a return air damper downstream of the direct gas-fired burner which provides an option of either 50% fresh air and 50% return air, or 100% fresh air and no return air. The SBDR system is recommended for multiple exhaust fan installations and other applications with variable exhaust air requirements. With the SBDR, less fuel is expended to heat less make-up air.

In multiple exhaust fan applications the SBDR will deliver 100% fresh air damper position when both exhaust fans are operating. With only one fan in operation, the unit can be switched to handle 50% make-up air and 50% return air.

The SBDR also lends itself to those ventilation applications incorporating supplemental space heating with make-up air requirements. The total air volume being circulated need not be 100% make-up air but can be a mixture of 50% fresh air and 50% return air. Since the heat output of the burner at the 50% fresh air and 50% return air position must not be allowed to exceed one-half that of the 100% fresh air position, the unit selected must be capable of providing needed supplementary heat at the reduced firing rate.

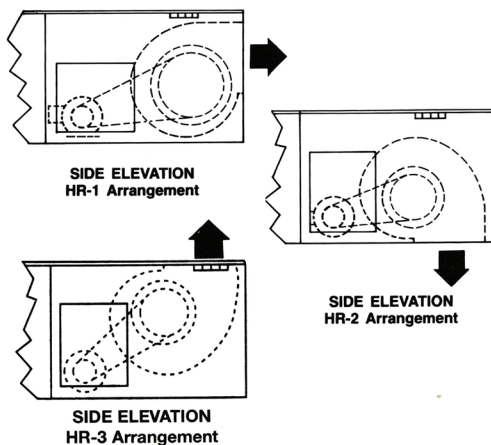
The SBDR system retains the basic SBD system modulating discharge air control. In addition, a fresh air/return air selector switch is furnished.



Standard Equipment

General:

Three horizontal blower arrangements are available as illustrated below. Standard: HR-1 – horizontal discharge, and HR-2 – down discharge, and Optional: HR-3 – vertical up discharge.



Blower:

Centrifugal forward curved, double width, double inlet, class 1 fan(s) (except SB-240 Backward Incline Fans) with solid turned ground shaft and self-aligning, 200,000 hour lubricatable ball bearings. All blower wheels are statically and dynamically balanced.

Blower housings, bearings and adjustable motor base are mounted on a reinforced frame to insure rigidity and quiet operation. Adjustable drives are standard through 10 HP, fixed drives with 15 HP and larger motors. V-belt drives are sized for 135% of motor horsepower.

Fan motors and drives are mounted within the blower cabinet. This affords motor protection and eliminates the operation hazard of V-belt drives external to the unit.

Blower section interior is insulated with 1"-2# density Foil Face insulation.

Cabinet:

Bolted construction of aluminized steel; SBD-112/115 of 18 gauge, SBD-215/218 of 16 gauge, SBD-222/227/233 with 16 gauge sides and 14 gauge top, and SBD-240 with 14 gauge cabinet. Access panels are provided to allow easy access to motors, drives and filters. Outside surface is primed with zinc-chromate and finished with a coat of enamel.

Motor:

Premium Energy Efficient (E+), T-frame, open drip-proof, 1800 RPM prelubricated ball bearing type for all standard voltages.

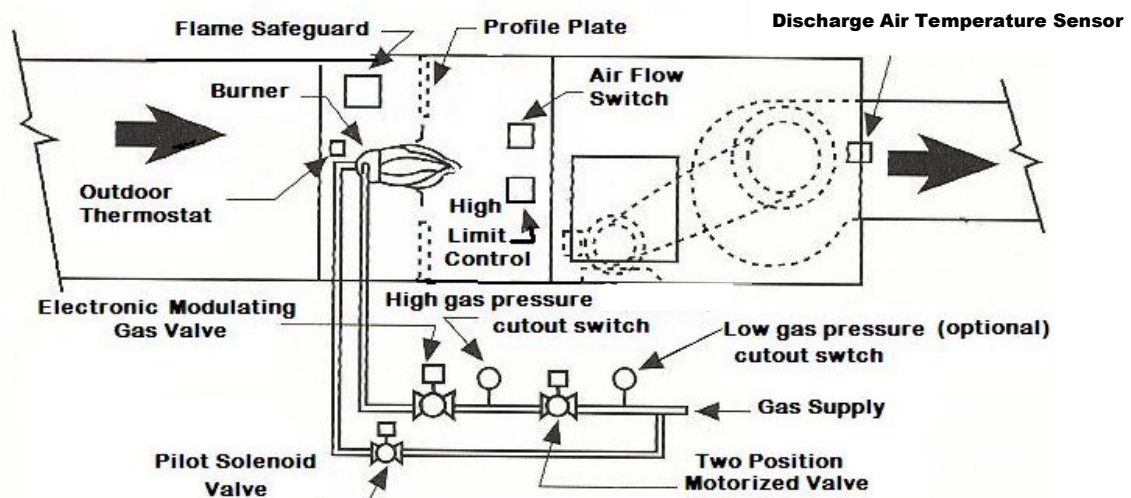
Burner:

Direct gas-fired line burner with spark ignited intermittent pilot for natural gas at inlet pressure from 6 oz. through 1 PSIG with up to 22:1 turndown ratio.

Gas and Electric Controls:

- Main gas hand shut-off valve.
- Main and pilot gas pressure regulators
- Pilot controls
- Electric safety shut-off valve.
- Electronic modulating gas valve with temperature controller
- Electronic flame safeguard system.
- High temperature limit switch.
- Airflow switch
- Ignition transformer.
- Automatic mild weather burner lockout.
- Motor starter
- Control transformer.
- NEMA 1 control box.
- Remote control station with system switches and indicating lights.

SAFETY AND LIMIT CONTROLS OF SBD SYSTEMS



Options and Accessories

General:

Horizontal unit blower arrangement – horizontal up flow (HR-3) available.

Vertical unit blower arrangement – three Vertical Up and three vertical Down as illustrated below.

Components:

Weatherproof unit – for outdoor installation including hinged and latched weatherproof control enclosure.

Insulated burner section – available on all units.

Stormproof weatherhood – with birdscreen. Installed on air intake of horizontal, HR-1, HR-2 and HR-3, weatherproof units. Not available with optional vertical blower arrangements.

Birdscreen – for installation on the air intake of units with optional vertical blower arrangement.

Filter section – with “V” or “Z” frames for mounting 2 inch cleanable or pleated filters. A clogged filter switch with indicating light is available as an optional item. Filter section can also be insulated.

Shut-off dampers – complete with two position damper motor and end switch. Discharge air damper suggested for outdoor installations. Low leakage dampers are also available.

Discharge air louvers – adjustable horizontal or vertical bladed louvers are available for mounting on the blower outlet. These louvers can be combined for double deflection air control.

Service platform – with guardrail per OSHA standard. Service platforms are available for indoor horizontal units only.

Vibration isolators – either “rubber-in-shear” or “spring type” for floor or roof mounting, or indoor suspension. Not compatible with curb mounted units. Vibration isolators are shipped unmounted. Internal fan/motor isolation is also available. (Horizontal only.)

Extended grease lines – for remote greasing of fan bearings from the control side of unit.

Panels – U .L. labeled main or remote panels.

Variable pitch sheave – for motors 15 HP and larger. Variable pitch sheaves are standard for motors 10 HP and smaller.

Note: Burner and Gas Control options on page 7.

Motors:

Totally enclosed, two speed (10 HP and below), explosion proof, automotive duty or chemical duty motors available on all units.

For two speed applications – 15 HP and above – a field provided and installed variable speed drive is required. Furnished by others.

Roof Curbs:

Adapter frames and roof curbs available for horizontal units. Roof curbs are shipped knocked down.

Unit/roof curb side flashing is recommended for roof curb applications on models SBD-222, 227, 233, and 240

Miscellaneous:

Motor and controls can be mounted on opposite side. Matching cooling coil, heat reclaim coil and evaporative cooling sections available for all models.

Electric Controls:

Fused disconnect switch – dead front fused disconnect switch or circuit breaker mounted in main control box with dead front handle mechanism.

Blocked intake switch – complete with indicating light. Warning light is turned on in case of excessive pressure drop across intake.

Low outlet temperature shut-off – Shuts off blower, after time delay, if unit delivers cold air due to burner failure.

Pre-purge cycle – Blower purges unit cabinet for selected time, 7-second minimum, before burner turns on. Not normally required unless unit can fill with combustible vapors between cycles. This item furnished as standard with GE-GAPS controls.

Circuit analyzer – provides a network of indicating lights to check circuit continuity. Simplifies identification of malfunction control.

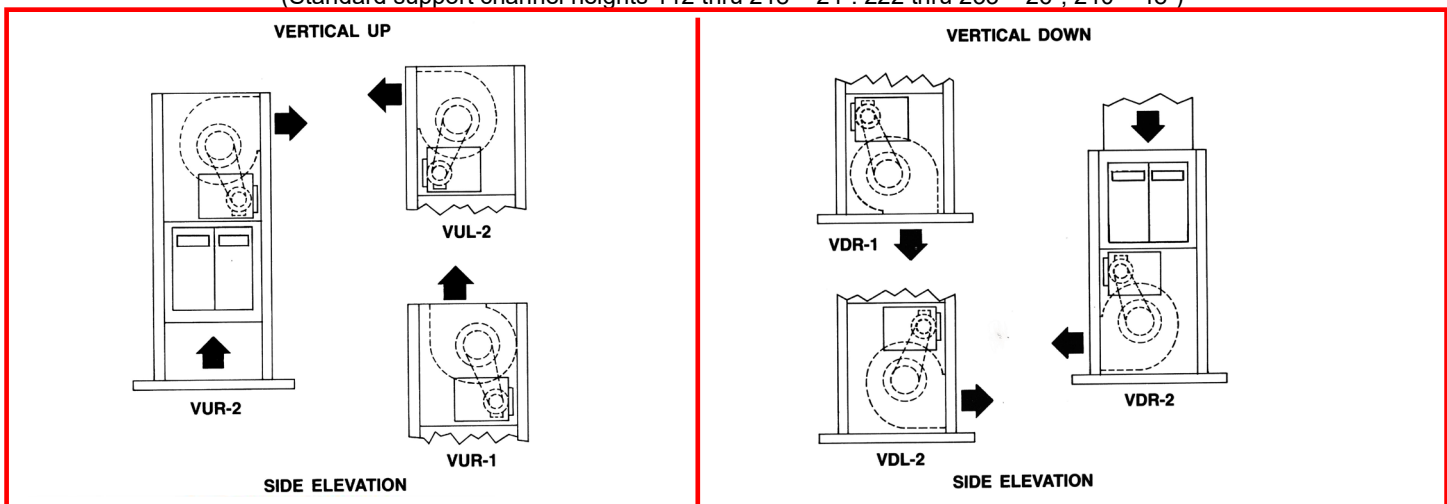
Ultra-violet flame sensor – ultra violet flame sensing is used in place of standard flame rod system. Desirable for applications where excessive condensation of moisture is encountered.

Night setback thermostat – cycles blower-burner on basis of space temperature. Night control can either be energized manually or by a time clock.

VERTICAL UNIT BLOWER DISCHARGE ARRANGEMENTS

(All sections and components are supported by special base frame and vertical support channels)

*(Standard support channel heights 112 thru 218 – 24”, 222 thru 233 – 26”, 240 – 48”)



Options and Accessories

Burners:

Propane firing – primary fuel – a propane line burner is furnished with this option. Not available with ETL units.

Propane firing – standby fuel – a three way hand valve is factory mounted. The pilot, however, stays on natural gas. This option is not designed for use with mixed propane-air gas with properties similar to natural gas. A standard burner will be furnished. Contact your Hastings sales representative for special applications with two speed motors being used with dual-fuel. Not available with ETL units.

Gas Controls

FM or GE-GAPS approved controls – additional gas manifold controls are furnished to meet insurance authority requirements.

High gas pressure regulator – a high gas pressure regulator is substituted for the standard regulator with inlet gas pressures over 1 PSIG.

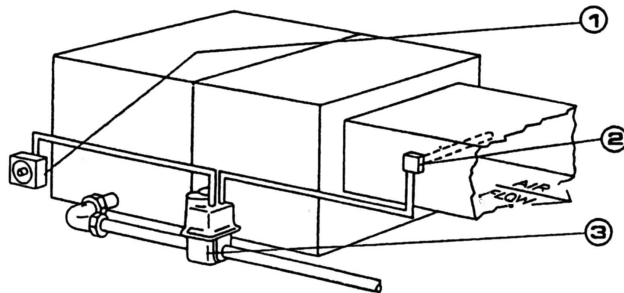
Low gas pressure switch – manual reset type with adjustable set point. Offered to meet special code requirements or where added protection is desired.

Modulating room control system – a solid state electronic temperature control system is available for space temperature control.

SC-10 (Non ETL) / SC-25 (ETL) modulation system – a solid state signal conditioner to accept a 4-20MA or 0 - 10VDC signal for gas valve modulation.

Gas Pilot Ignition with pilot solenoid valve, pilot gas regulator, needle valve and manual shut-off valve

Series 14 Electronic Modulating Discharge Air Control Series (Standard)



The Electronic gas flame modulation system features precise discharge air temperature control, decreasing variations or temperature “swings.”

All components are pre-calibrated – not requiring matching sets.

Temperature selector is mounted in any convenient location or the dial can be incorporated on the remote control panel lid. Discharge air temperature can be quickly and easily reset to meet changing requirements.

Sensor in the discharge air continuously senses outlet air temperature and transmits an instantaneous signal, through a solid state amplifier, to the modulator/regulator gas valve.

Immediately responding to the signal from the sensor, the modulator/regulator valve changes gas pressure to control burner input and maintain discharge air temperature at a constant level.

Options include:

Over-riding two position room thermostat controls space temperature.

Indoor-outdoor reset raises discharge air temperature one degree for every eight-degree drop in outdoor temperature.

Series 44 Electronic Modulating Room Control Series (Optional)

Electronic modulating system converts a single purpose make-up air unit into one with dual operating characteristics, heating the ventilating air while controlling the space temperature.

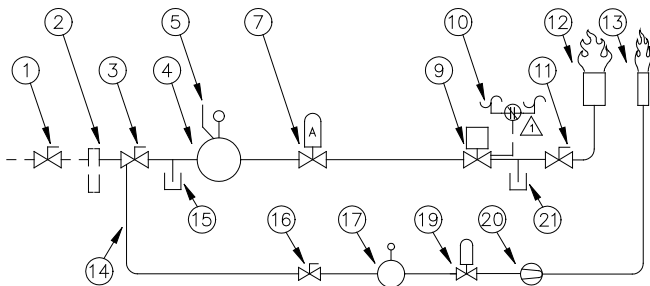
The electronic modulating space temperature sensor maintains the room temperature, while the discharge air sensor prevents objectionable leaving air extremes.

The basic system includes a solid state amplifier/control center, a discharge air monitor with high and low temperature sensor, a modulator/regulator valve, and a space temperature sensor with integral temperature selector.

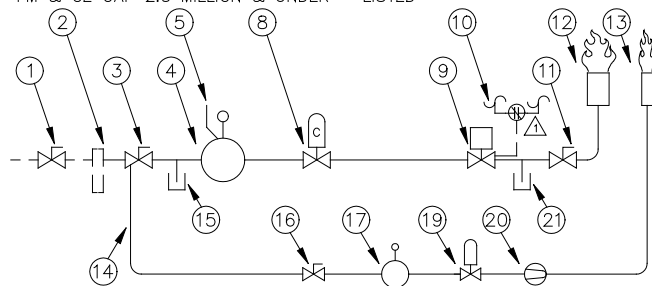
As an alternative, a selectrstat and thermistor sensing remote space temperature is also available.

SCHEMATIC PIPING DIAGRAMS

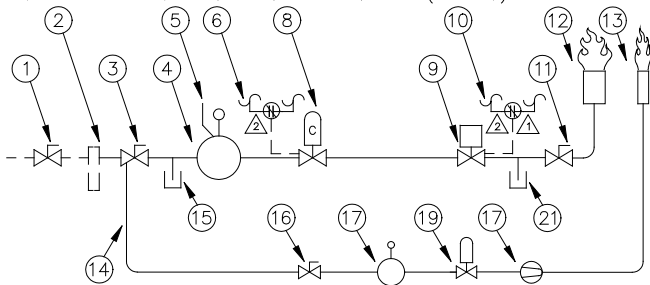
—UNLISTED UNIT 1 MILLION BTU'S & UNDER
—FM UNDER 400,000 — UNLISTED



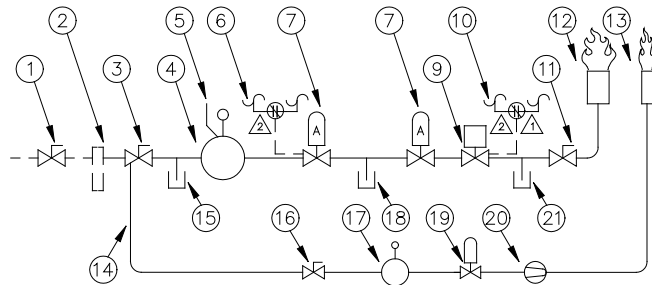
—UNLISTED UNIT ABOVE 1 MILLION
—LISTED UNIT 5 MILLION & UNDER
—FM 2.5 MILLION & UNDER — LISTED
—FM 400,000 TO 2.5 MILLION — UNLISTED
—GE GAP 5 MILLION & UNDER — LISTED
—FM & GE GAP 2.5 MILLION & UNDER — LISTED



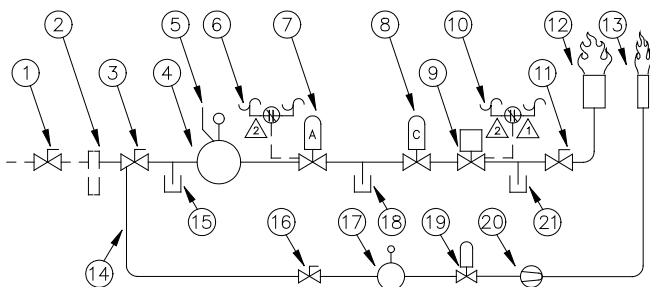
—FM ABOVE 2.5 MILLION TO 5 MILLION — LISTED/UNLISTED
—GE GAP 1 MILLION & UNDER — UNLISTED (CUSTOM)
—FM & GE GAP ABOVE 2.5 MILLION TO 5 MILLION — LISTED
—FM & GE GAP 1 MILLION & UNDER — UNLISTED (CUSTOM)



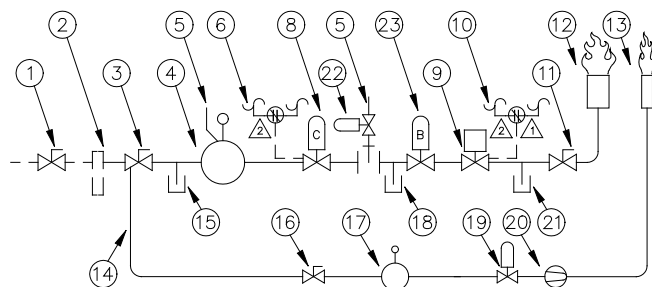
—LISTED UNIT ABOVE 5 MILLION
—GE GAP ABOVE 5 MILLION — LISTED
—FM ABOVE 5 MILLION TO 12.5 MILLION — LISTED
—FM AND GE GAP ABOVE 5 MILLION TO 12.5 MILLION — LISTED



—FM OVER 12.5 MILLION — UNLISTED / LISTED
—FM AND GE GAP OVER 12.5 MILLION — LISTED



—GE GAP ABOVE 1 MILLION — UNLISTED (CUSTOM)
—FM & GE GAP ABOVE 1 MILLION — UNLISTED (CUSTOM)



FURNISHED & INSTALLED BY OTHERS		
FACTORY FURNISHED & INSTALLED		
ITEM	DESCRIPTION	
1	MAIN GAS HAND SHUT-OFF VALVE (IF RECOMMENDED BY FM)	X
2	DRIP LEG	X
3	MAIN GAS HAND SHUT-OFF VALVE NPT	X
4	MAIN GAS PRESSURE REGULATOR	X
5	VENT LINE THRU ROOF TO OUTSIDE ATMOSPHERE	X
6	LOW GAS PRESSURE SWITCH	X
7	SAFETY SHUT-OFF VALVE (SSOV)	X
8	SAFETY SHUT-OFF VALVE WITH PROOF OF CLOSURE	X
9	SELECTRA VALVE	X
10	HIGH GAS PRESSURE SWITCH	X
11	MANUAL LEAK TEST HAND VALVE	X
12	MAIN GAS BURNER	X
13	PILOT GAS BURNER	X
14	PILOT GAS SUPPLY LINE	X
15	TEST CONNECTION UPSTREAM OF ITEM 4	X
16	PILOT GAS HAND VALVE	X
17	PILOT PRESSURE REGULATOR	X
18	TEST CONNECTION BETWEEN SSOV'S	X
19	PILOT SOLENOID VALVE	X
20	PILOT NEEDLE VALVE (IF REQUIRED)	X
21	TEST CONNECTION DOWNSTREAM OF ITEM 9	X
22	VENT VALVE (NORMALLY OPEN)	X
23	SLOW OPENING SAFETY SHUT-OFF VALVE (SSOV)	X

△ 1 HIGH GAS PRESSURE SWITCH REQUIRED FOR:
—FM UNITS WITH INLET PRESSURES ABOVE 14" W.C.
—FM & GE GAP UNITS WITH INLET PRESSURES ABOVE 14" W.C.
—ETL UNITS WITH PRESSURES ABOVE 14" W.C. AFTER REGULATOR

△ 2 PRESSURE SWITCH REQUIRED:
—FM OVER 2.5 MILLION — LISTED/UNLISTED
—FM & GE GAP OVER 2.5 MILLION — LISTED

SBDR DIRECT GAS-FIRED SERIES


NON ETL

SBDR SERIES SELECTION TABLE

Model (Non ETL)	Air Delivery - SCFM	Outlet Velocity - FPM	Approx. Shipping Weight Lbs.	MBH Input									Motor Horsepower							
				Air Temperature Rise									Total Static Pressure (Refer to Notes Below)							
				40	50	60	70	80	90	100	110	120	¾"	1"	1¼"	1½"	1 ¾"	2"	2½"	
SBDR 112	2000	1307	480	94	117	141	164	188	211	235	258	282	¾	¾	1	1	CHO	CHO	CHO	
	3000	1961	490	141	176	211	247	282	317	352	387	423	1½	1½	1½	2	CHO	CHO	CHO	
SBDR 115	4000	1754	700	188	235	282	329	376	423	470	517	563	1½	1½	2	2	3	3	CHO	
	5000	2193	700	235	293	352	411	470	528	587	646	704	2	2	3	3	3	5	5	
	6000	2632	725	282	352	423	493	563	634	704	775	845	3	3	5	5	5	5	5	
	7000	3070	735	329	411	493	575	657	740	822	904	986	5	5	5	5	7½	7½	7½	
	8000	3509	735	376	470	563	657	751	845	939	1033	1127	5	7½	7½	7½	7½	7½	CHO	
SBDR 215	6000	1202	1200	282	352	423	493	563	634	704	775	845	1 1/2	3	3	5	5	5	7½	
	7000	1403	1200	329	411	493	575	657	740	822	904	986	2	3	3	5	5	5	7½	
	8000	1603	1200	376	470	563	657	751	845	939	1033	1127	3	3	5	5	5	7½	7½	
	9000	1804	1200	423	528	634	740	845	951	1057	1162	1268	3	5	5	5	7½	7½	10	
	10000	2004	1225	470	587	704	822	939	1057	1174	1291	1409	3	5	5	7½	7½	7½	10	
	12000	2405	1230	563	704	845	986	1127	1268	1409	1550	1690	5	7½	7½	7½	7½	10	10	
	14000	2806	1230	657	822	986	1150	1315	1479	1643	1808	1972	7½	7½	10	10	10	10	CHO	
SBDR 218	16000	3206	1275	751	939	1127	1315	1503	1690	1878	2066	2254	10	10	10	10	CHO	CHO	CHO	
	10000	1745	1720	470	587	704	822	939	1057	1174	1291	1409	3	3	5	5	5	CHO	CHO	
	12000	2094	1730	563	704	845	986	1127	1268	1409	1550	1690	5	5	5	7½	7½	7½	10	
	14000	2443	1730	657	822	986	1150	1315	1479	1643	1808	1972	5	7½	7½	7½	7½	10	10	
	16000	2792	1775	751	939	1127	1315	1503	1690	1878	2066	2254	7½	7½	10	10	10	15	15	
SBDR 222	18000	3141	1775	845	1057	1268	1479	1690	1902	2113	2324	2536	10	10	15	15	15	15	15	
	20000	3490	1800	939	1174	1409	1643	1878	2113	2348	2583	2817	15	15	15	15	15	NA	NA	
	18000	1929	2730	845	1057	1268	1479	1690	1902	2113	2324	2536	10	10	15	15	15	15	20	
	20000	2144	2730	939	1174	1409	1643	1878	2113	2348	2583	2817	10	15	15	15	15	15	20	
	22000	2358	2780	1033	1291	1550	1808	2066	2324	2583	2841	3099	15	15	15	15	20	20	20	
	24000	2573	2800	1127	1409	1690	1972	2254	2536	2817	3099	3381	15	15	20	20	20	20	25	
	26000	2787	2800	1221	1526	1831	2137	2442	2747	3052	3357	3663	15	20	20	20	20	25	25	
SBDR 227	28000	3001	2850	1315	1643	1972	2301	2630	2958	3287	3616	3944	20	20	20	25	25	25	NA	
	30000	3215	2875	1409	1761	2113	2465	2817	3170	3522	3874	4226	20	25	25	25	25	NA	NA	
	32000	3430	2900	1503	1878	2254	2630	3005	3381	3757	4132	4508	25	25	25	NA	NA	NA	NA	
	28000	1713	3600	1315	1643	1972	2301	2630	2958	3287	3616	3944	10	10	15	15	15	20	25	
	30000	1835	3620	1409	1761	2113	2465	2817	3170	3522	3874	4226	10	15	15	15	20	20	25	
	35000	2141	3685	1643	2054	2465	2876	3287	3698	4109	4520	4930	15	15	20	20	25	25	30	
	40000	2446	3685	1878	2348	2817	3287	3757	4226	4696	5165	5635	20	20	25	25	25	30	40	
	45000	2752	3720	2113	2641	3170	3698	4226	4754	5283	5811	6339	25	25	30	30	30	40	40	
SBDR 233	50000	3058	3810	2348	2935	3522	4109	4696	5283	5870	NA	NA	30	40	40	40	40	50	50	
	55000	3364	3870	2583	3228	3874	4520	5165	5811	NA	NA	NA	40	40	50	50	50	50	CHO	
	60000	3670	3920	2817	3522	4226	4930	5635	6339	NA	NA	NA	50	50	50	CHO	CHO	CHO	CHO	
	40000	1888	5100	1878	2348	2817	3287	3757	4226	4696	5165	5635	15	15	20	20	20	25	30	
	45000	2124	5100	2113	2641	3170	3698	4226	4754	5283	5811	6339	15	20	20	25	25	30	40	
	50000	2360	5140	2348	2935	3522	4109	4696	5283	5870	NA	NA	20	25	25	30	30	40	40	
	55000	2596	5200	2583	3228	3874	4520	5165	5811	NA	NA	NA	25	30	30	40	40	40	50	
	60000	2832	5235	2817	3522	4226	4930	5635	6339	7043	7748	NA	30	40	40	40	40	50	50	
SBDR 240	65000	3067	5330	3052	3815	4578	5341	6104	6867	7630	NA	NA	40	40	40	50	50	50	60	
	70000	3303	5330	3287	4109	4930	5752	6574	7396	NA	NA	NA	40	50	50	50	60	60	CHO	
	75000	3539	5380	3522	4402	5283	6163	7043	NA	NA	NA	NA	50	60	60	60	CHO	CHO	CHO	
	70000	2300	8260	3287	4109	4930	5752	6574	7396	8217	9039	9812	25	25	30	40	40	40	CHO	
	80000	2630	8310	3757	4696	5635	6574	7513	8452	9391	10330	NA	30	40	40	40	50	50	60	
	90000	2960	8400	4226	5283	6339	7396	8452	9509	10565	NA	NA	40	40	50	50	60	60	CHO	
	100000	3290	8450	4696	5870	7043	8217	9391	10565	NA	NA	NA	50	60	60	60	75	75	CHO	
	110000	3620	8550	5165	6457	7748	9039	10330	NA	NA	NA	NA	60	75	75	75	100	100	CHO	
	120000	3950	8625	5635	7043	NA	NA	NA	NA	NA	NA	NA	75	100	100	100	CHO	CHO	CHO	

NOTES: 1. Use Total Static Pressure column that will overcome total system resistance. Approximate pressure drop for components and accessory items; burner ½", filter (dirty) ¼", intake hood 1/8", birdscreen 1/8", discharge louver 1/8". Damper resistance may be ignored.

2. NA – Not available, CHO – Contact Home Office.

Key:  Maximum R.A./O.A. capabilities is 50% return air – 50% outside air.

SBD DIRECT GAS-FIRED SERIES

SBD SERIES SELECTION TABLE

Model	Air Delivery - SCFM	Outlet Velocity - FPM	Approx. Shipping Weight LBS.	MBH Input									Motor Horsepower						
				Air Temperature Rise									Total Static Pressure (Refer to Notes Below)						
				40	50	60	70	80	90	100	110	120	¾"	1"	1¼"	1½"	1 ¾"	2"	2½"
SBD 112	2000	1307	480	94	117	141	164	188	211	235	258	NA	¾"	¾"	1	1	NA	NA	NA
	3000	1961	490	141	176	211	247	282	317	352	387	NA	1½"	1½"	1½"	2	NA	NA	NA
SBD 115	4000	1754	700	188	235	282	329	376	423	470	517	NA	1½"	1½"	2	2	3	3	NA
	5000	2193	700	235	293	352	411	470	528	587	646	NA	2	2	3	3	3	5	5
	6000	2632	725	282	352	423	493	563	634	704	775	NA	3	3	5	5	5	5	5
	7000	3070	735	329	411	493	575	657	740	822	904	NA	5	5	5	5	7½"	7½"	7½"
	8000	3509	735	376	470	563	657	751	845	939	1033	NA	5	7½"	7½"	7½"	7½"	7½"	NA
SBD 215	6000	1202	1200	282	352	423	493	563	634	704	775	845	1 1/2"	3	3	5	5	5	7½"
	7000	1403	1200	329	411	493	575	657	740	822	904	986	2	3	3	5	5	5	7½"
	8000	1603	1200	376	470	563	657	751	845	939	1033	1127	3	3	5	5	5	7½"	7½"
	9000	1804	1200	423	528	634	740	845	951	1057	1162	1268	3	5	5	5	7½"	7½"	10
	10000	2004	1225	470	587	704	822	939	1057	1174	1291	1409	3	5	5	7½"	7½"	7½"	10
	12000	2405	1230	563	704	845	986	1127	1268	1409	1550	1690	5	7½"	7½"	7½"	7½"	10	10
	14000	2806	1230	657	822	986	1150	1315	1479	1643	1808	1972	7½"	7½"	10	10	10	10	NA
	16000	3206	1275	751	939	1127	1315	1503	1690	1878	2066	2254	10	10	10	10	NA	NA	NA
SBD 218	10000	1745	1720	470	587	704	822	939	1057	1174	1291	1409	3	3	5	5	5	NA	NA
	12000	2094	1730	563	704	845	986	1127	1268	1409	1550	1690	5	5	5	7½"	7½"	7½"	10
	14000	2443	1730	657	822	986	1150	1315	1479	1643	1808	1972	5	7½"	7½"	7½"	7½"	10	10
	16000	2792	1775	751	939	1127	1315	1503	1690	1878	2066	2254	7½"	7½"	10	10	10	15	15
	18000	3141	1775	845	1057	1268	1479	1690	1902	2113	2324	2536	10	10	15	15	15	15	15
	20000	3490	1800	939	1174	1409	1643	1878	2113	2348	2583	2817	15	15	15	15	15	NA	NA
SBD 222	18000	1929	2730	845	1057	1268	1479	1690	1902	2113	2324	2536	10	10	15	15	15	15	20
	20000	2144	2730	939	1174	1409	1643	1878	2113	2348	2583	2817	10	15	15	15	15	15	20
	22000	2358	2780	1033	1291	1550	1808	2066	2324	2583	2841	3099	15	15	15	15	20	20	20
	24000	2573	2800	1127	1409	1690	1972	2254	2536	2817	3099	3381	15	15	20	20	20	20	25
	26000	2787	2800	1221	1526	1831	2137	2442	2747	3052	3357	3663	15	20	20	20	20	25	25
	28000	3001	2850	1315	1643	1972	2301	2630	2958	3287	3616	3944	20	20	20	25	25	25	NA
	30000	3215	2875	1409	1761	2113	2465	2817	3170	3522	3874	4226	20	25	25	25	25	NA	NA
	32000	3430	2900	1503	1878	2254	2630	3005	3381	3757	4132	4508	25	25	25	NA	NA	NA	NA
SBD 227	28000	1713	3600	1315	1643	1972	2301	2630	2958	3287	3616	3944	10	10	15	15	15	20	25
	30000	1835	3620	1409	1761	2113	2465	2817	3170	3522	3874	4226	10	15	15	15	20	20	25
	35000	2141	3685	1643	2054	2465	2876	3287	3698	4109	4520	4930	15	15	20	20	25	25	30
	40000	2446	3685	1878	2348	2817	3287	3757	4226	4696	5165	5635	20	20	25	25	25	30	40
	45000	2752	3720	2113	2641	3170	3698	4226	4754	5283	5811	6339	25	25	30	30	30	40	40
	50000	3058	3810	2348	2935	3522	4109	4696	5283	5870	6457	7043	30	40	40	40	40	50	50
	55000	3364	3870	2583	3228	3874	4520	5165	5811	6457	7102	7748	40	40	50	50	50	50	NA
	60000	3670	3920	2817	3522	4226	4930	5635	6339	7043	7748	8452	50	50	50	NA	NA	NA	NA
SBD 233	40000	1888	5100	1878	2348	2817	3287	3757	4226	4696	5165	5635	15	15	20	20	20	25	30
	45000	2124	5100	2113	2641	3170	3698	4226	4754	5283	5811	6339	15	20	20	25	25	30	40
	50000	2360	5140	2348	2935	3522	4109	4696	5283	5870	6457	7043	20	25	25	30	30	40	40
	55000	2596	5200	2583	3228	3874	4520	5165	5811	6457	7102	7748	25	30	30	40	40	40	50
	60000	2832	5235	2817	3522	4226	4930	5635	6339	7043	7748	8452	30	40	40	40	40	50	50
	65000	3067	5330	3052	3815	4578	5341	6104	6867	7630	8393	9157	40	40	40	50	50	50	60
	70000	3303	5330	3287	4109	4930	5752	6574	7396	8217	9039	9861	40	50	50	50	60	60	CH0
SBD 240	75000	3539	5380	3522	4402	5283	6163	7043	7924	8804	9685	10565	50	60	60	60	CH0	CH0	NA
	70000	2300	7560	3287	4109	4930	5752	6574	7396	8217	9039	9812	25	25	30	40	40	40	CH0
	80000	2630	7660	3757	4696	5635	6574	7513	8452	9391	10330	11270	30	40	40	40	50	50	60
	90000	2960	7700	4226	5283	6339	7396	8452	9509	10565	11739	12678	40	40	50	50	60	60	CH0
	100000	3290	7750	4696	5870	7043	8217	9391	10565	11739	12913	14087	50	60	60	60	75	75	CH0
	110000	3620	7850	5165	6457	7748	9039	10330	11622	12913	14204	15496	60	75	75	75	100	100	CH0
	120000	3950	7925	5635	7043	8452	9861	11270	12678	14087	15496	16904	75	100	100	100	CH0	CH0	CH0

NOTES: 1. Use Total Static Pressure column that will overcome total system resistance. Approximate pressure drop for components and accessory items; burner ½", filter (dirty) ¼", intake hood 1/8", birdscreen 1/8", discharge louver 1/8". Damper resistance may be ignored.

2. NA- Not Available, CH0 – Contact Home Office

Selection Procedure:

1. Choose the SBD system for 100% outside air.
2. Determine required model size from selection table with desired SCFM of make-up air and MBH input or air temperature rise in °F.
Please note that:
Air temp rise = $\frac{920 \times \text{MBH Input}}{1.08 \times \text{SCFM}}$
3. For model size selected, read required motor horsepower to overcome total static pressure resistance. Approximate static pressure losses for component and accessory items are: burner 1/2", filter (dirty) 1/4", intake hood 1/8", discharge louver 1/8". Damper resistance may be ignored.

Also specify type of gas and gas pressure, mounting location, blower discharge arrangement, and motor electric characteristic

Example:

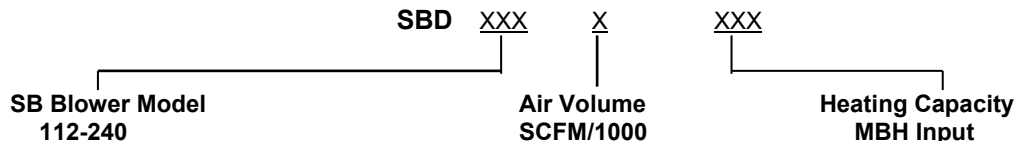
Select a direct gas-fired heating system to heat 18,000 SCFM of 100% outside air with an air temperature rise of 90°F. Total static pressure required is 1.75" w.c. Unit to be rooftop mounted with down discharge through roof, and furnished with throwaway filters and intake hood. Fuel is natural gas at 1 PSIG inlet pressure.

1. SBD system is chosen for 100% outside air.
2. At 18,000 SCFM and 90°F temperature rise, select model size 218. Heat input will be 1,902 MBH.
3. For size 218 with 1.75" w.c. total static pressure, selection table indicates that a 15 HP motor is required.

Selection is thus complete:

Model SBD-218-18-1902 with 15 HP motor. Unit to be natural gas fired with 1 PSIG pressure, rooftop mounted, weatherproofed, HR-2 blower arrangement, 230/60/3 power, and furnished with 2" throwaway filters and intake hood.

MODEL DESIGNATION



REMOTE CONTROL STATION



Remote control station with switches and indicating lights is standard with SBD and SBDF direct gas-fired make-up air systems. The panel shown is typical for SBD unit. Front panel and wiring will change according to items furnished.

Standard remote control station is 8 inches high, 5 inches wide and 3½ inches deep. A flush mounted panel is available as an optional item

GAS MANIFOLD SIZE

Based on standard 10" inlet gas pressure
(Above 6900 MBH – C.H.O.)

Manifold Size NPT	Maximum MBH – Natural Gas	
	Electronic Modulation	Electronic Modulation with GE-GAPS or FM
1"	1000	940
1 ¼"	1410	1255
1 ½"	2170	1860
2"	3420	3060
2 ½"	5200	4470
3"	6900	5840

FAN PERFORMANCE CURVES

The following fan curves were developed from test data taken in accordance with AMCA standards. Belt losses are not included.

FAN SELECTION EXAMPLE

PROBLEM:

Select SB ventilating unit and motor horsepower to deliver 6,000 SCFM at 1.50" w.c. total static pressure. Desired motor type is single speed, 1800 RPM, dripproof

SOLUTION:

- Check fan performance curves for smallest SB model which will handle the specified air flow and static pressure. This proves to be the SB-115.
- Locate 6,000 SCFM on the horizontal axis of the SB-115 fan performance curve and move vertically to the point of intersection with the 1.50" w.c. total static pressure line. This defines the operating point: fan speed will be 920 RPM and the motor will draw 3.5 HP. The next larger size of motor, 5 HP, is required.
- From the Reference Table on this page, we find that the 5 HP, 1800 RPM, dripproof motor has a 184T frame size. This size is smaller than the maximum motor frame size of 213T shown on SB-115 fan performance curve, so selection is acceptable.
- From the SB-115 performance curve, the fan outlet velocity is shown to equal SCFM/2.28. At the operating point of the selected unit, the outlet velocity is 6,000/2.28 or 2,632 FPM.

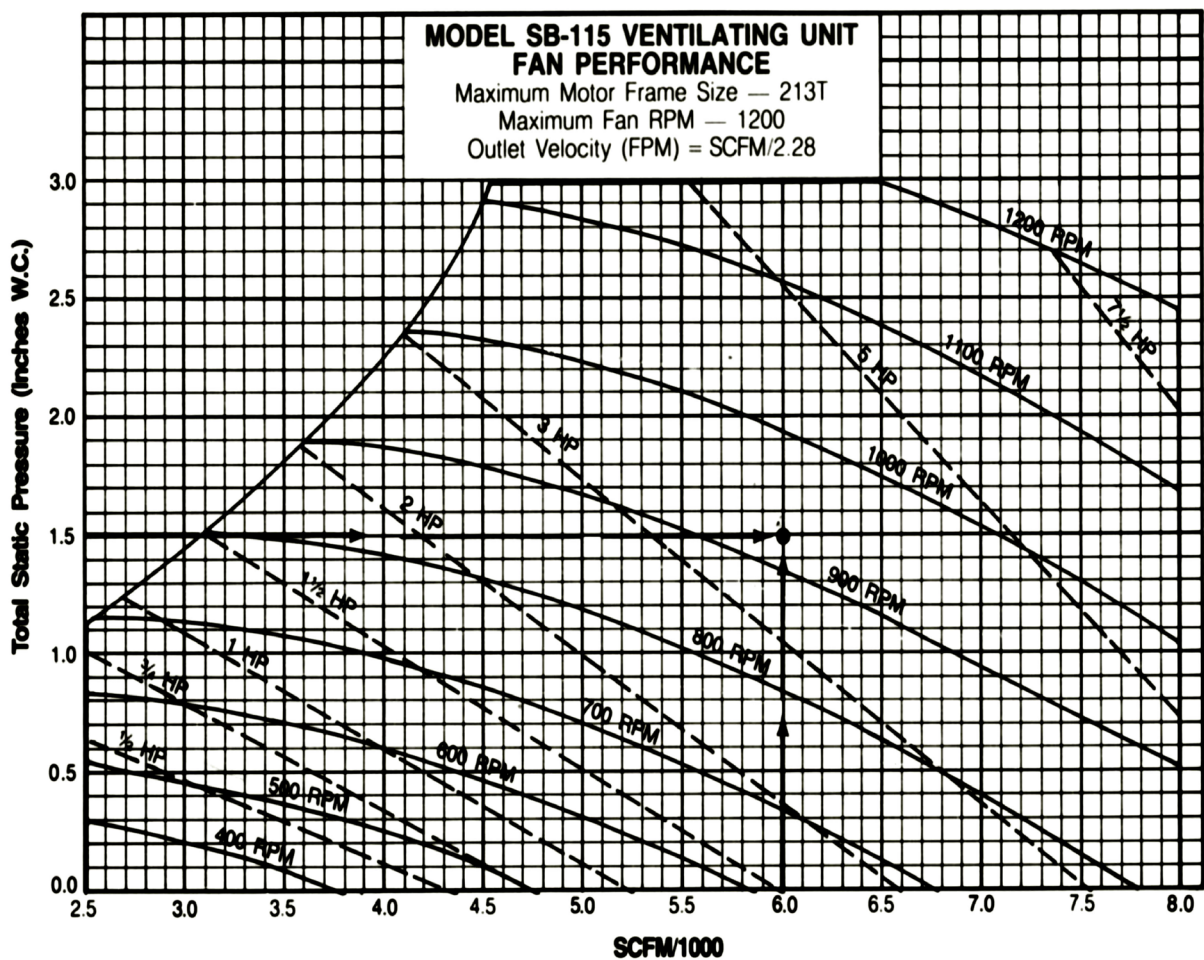
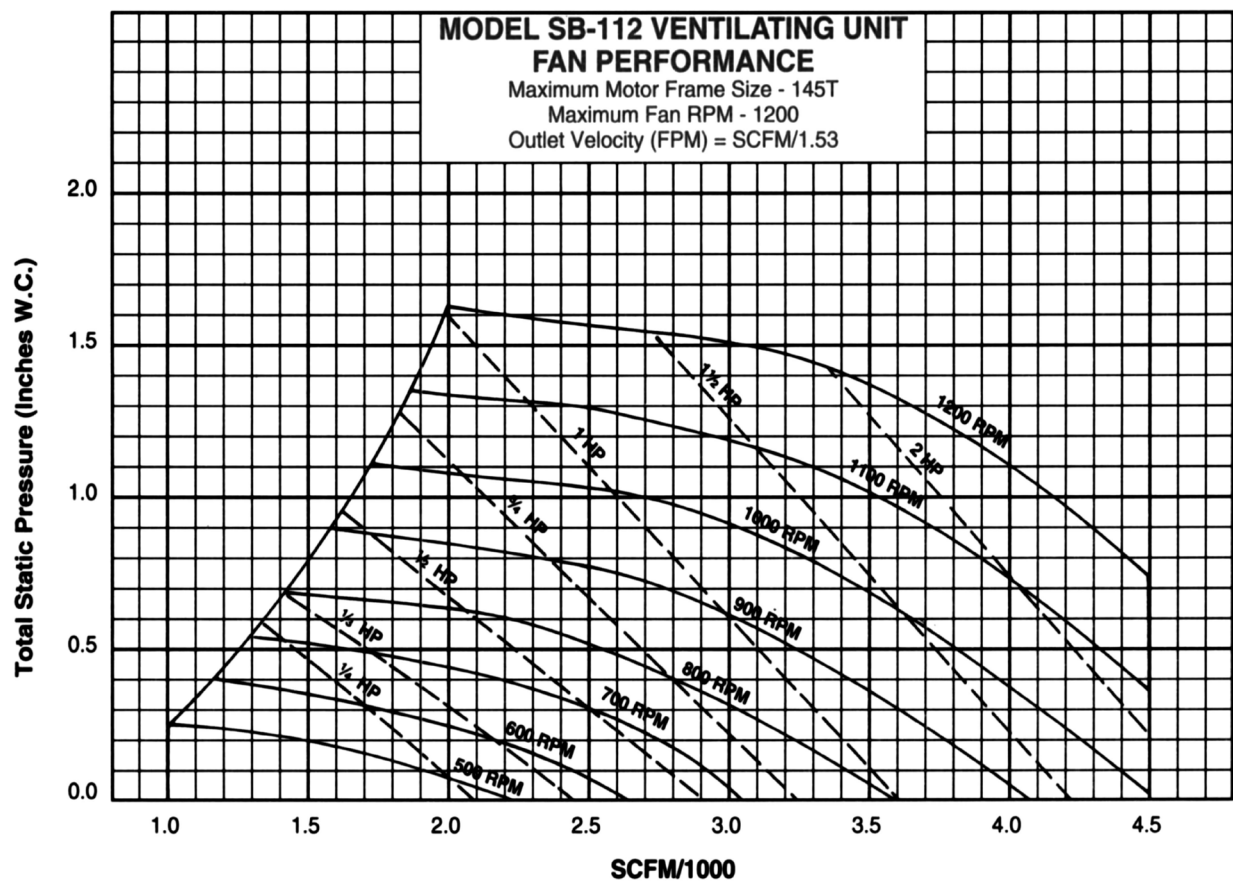
MOTOR FRAME SIZE REFERENCE TABLE

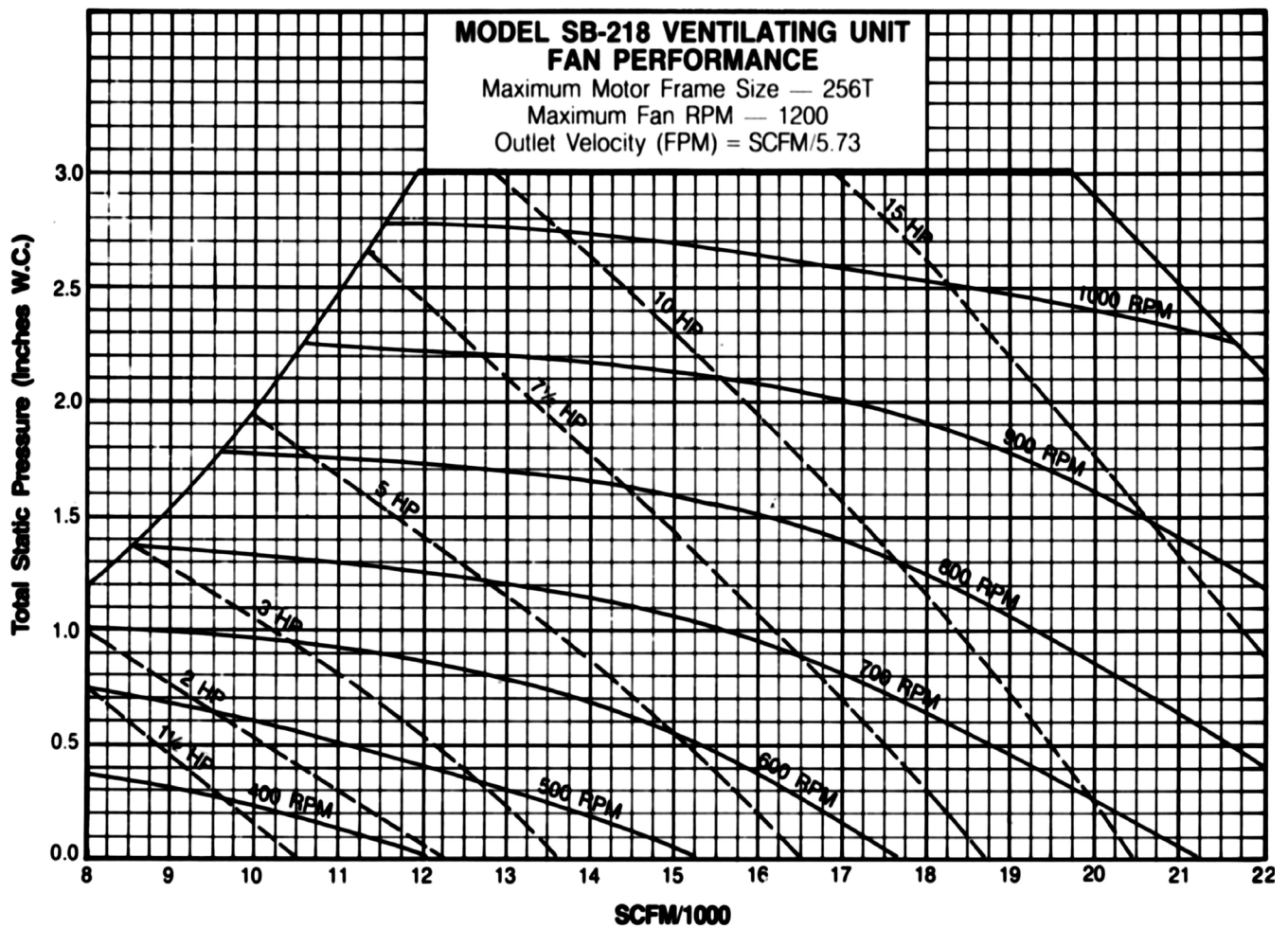
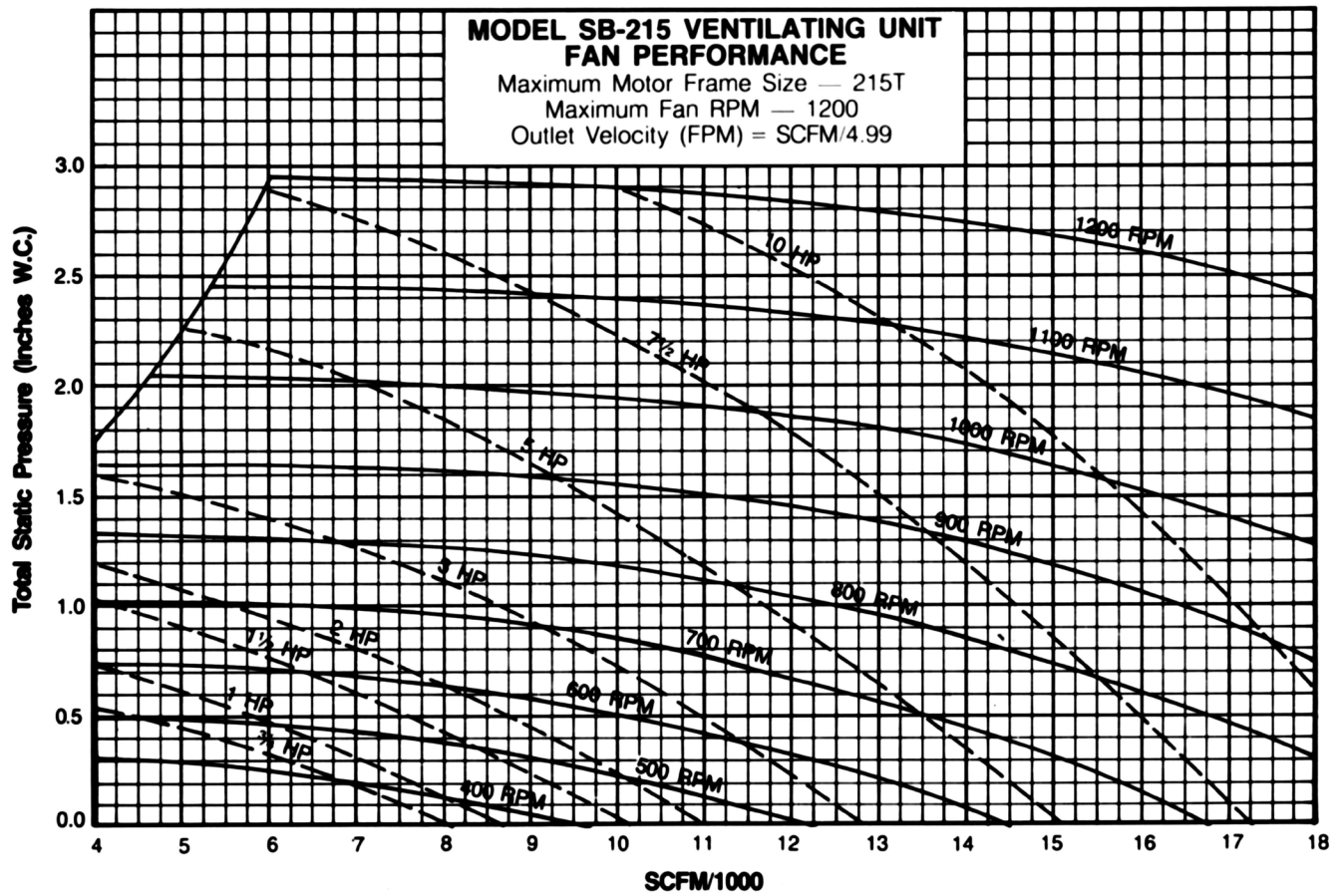
Motor HP	MOTOR TYPE				
	1800 RPM Dripproof or TEFC	1800/900 RPM One Winding		1800/1200RPM Two Winding	
		Drip-proof	TEFC	Drip-Proof	TEFC
1	143T	143T	143T	145T	145T
1.5	145T	145T	145T	145T	145T
2	145T	145T	145T	182T	182T
3	182T	182T	182T	184T	184T
5	184T	184T	184T	215T	215T
7.5	213T	213T	215T	254T	254T
10	215T	215T	215T	256T	256T
15	254T	—	—	—	—
20	256T	—	—	—	—
25	284T	—	—	—	—
30	286T	—	—	—	—
40	324T	—	—	—	—
50	326T	—	—	—	—
60	364T	—	—	—	—
75	365T	—	—	—	—
100	405T	—	—	—	—

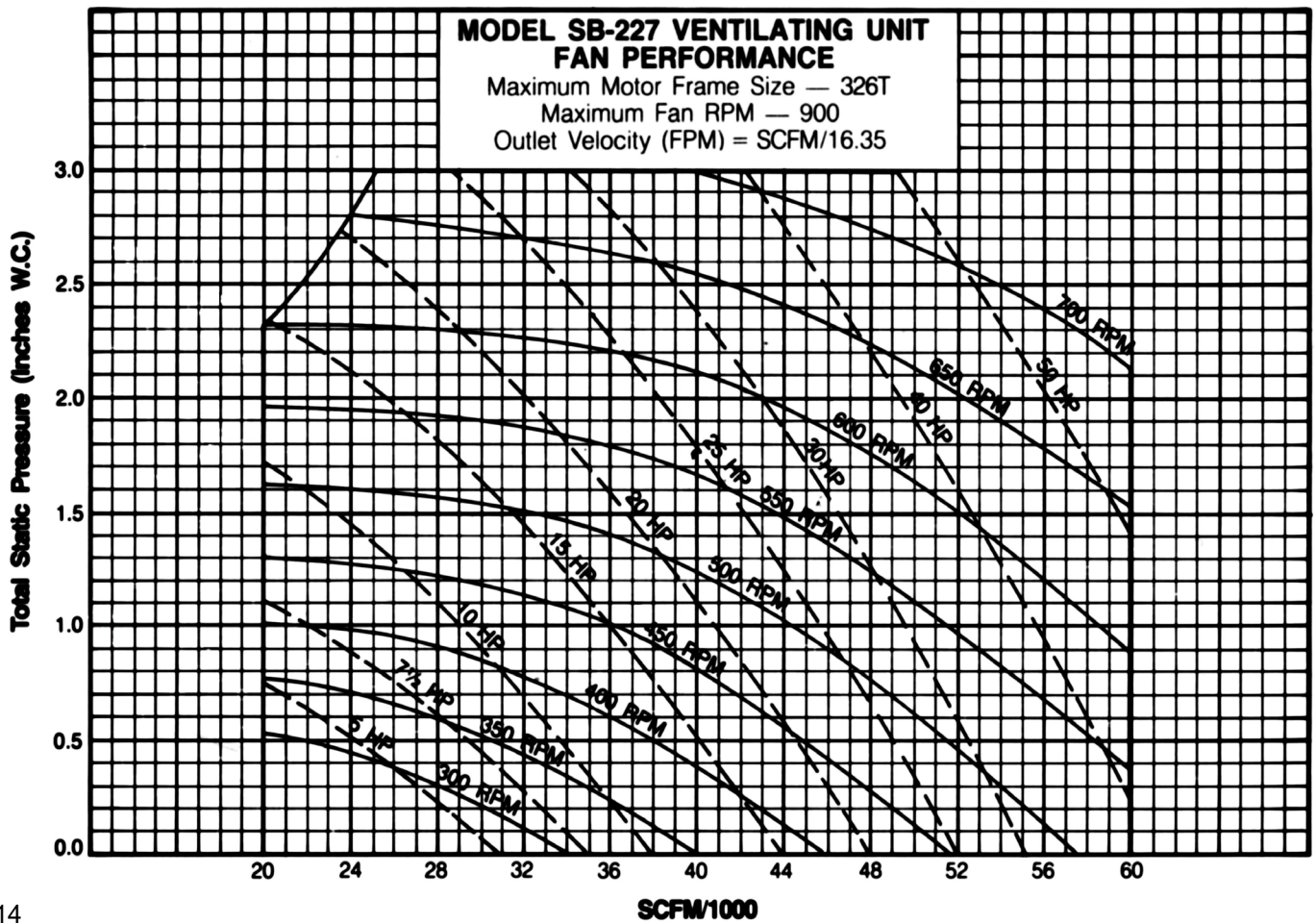
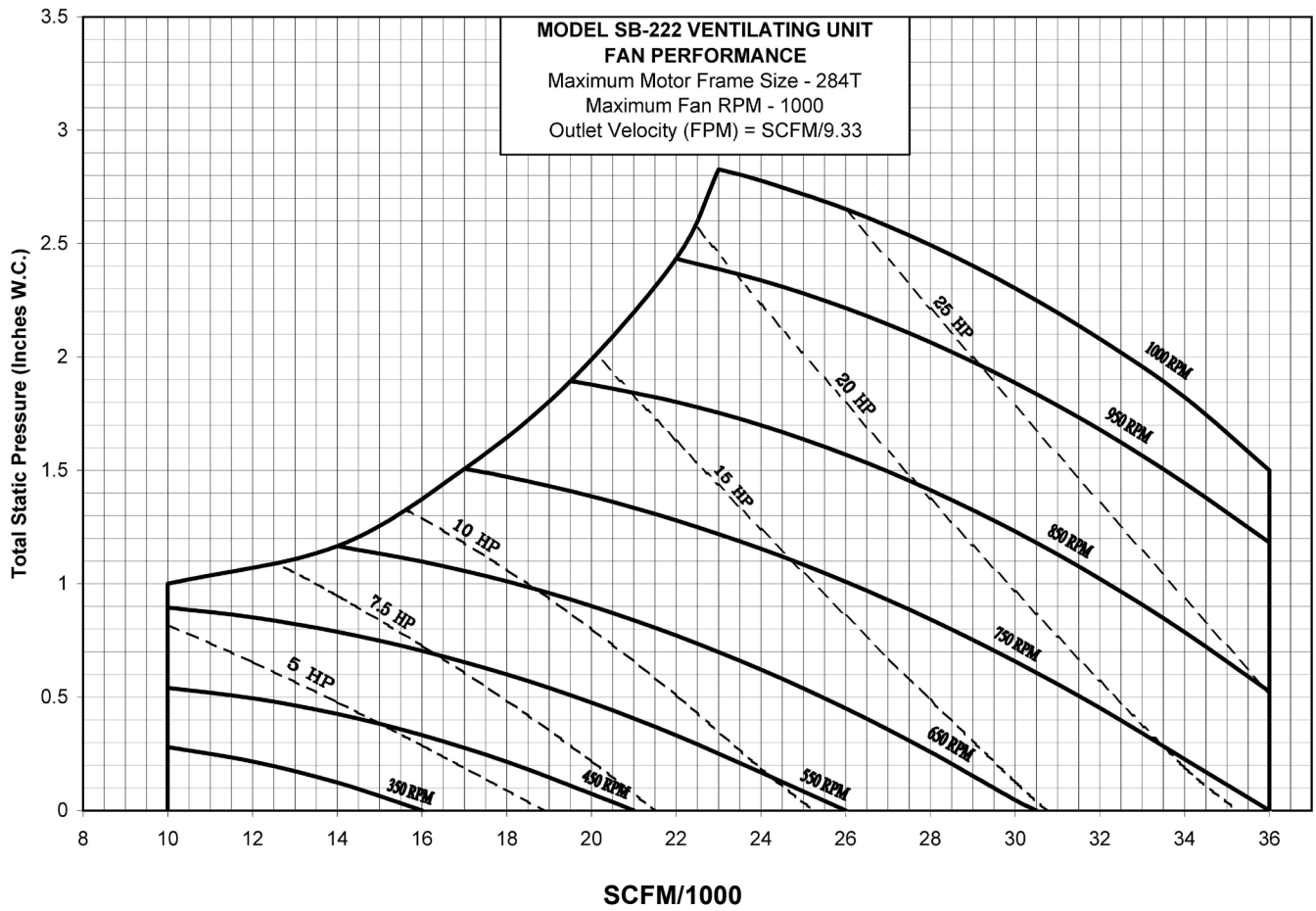
NOTES: 1) All motors three phase.

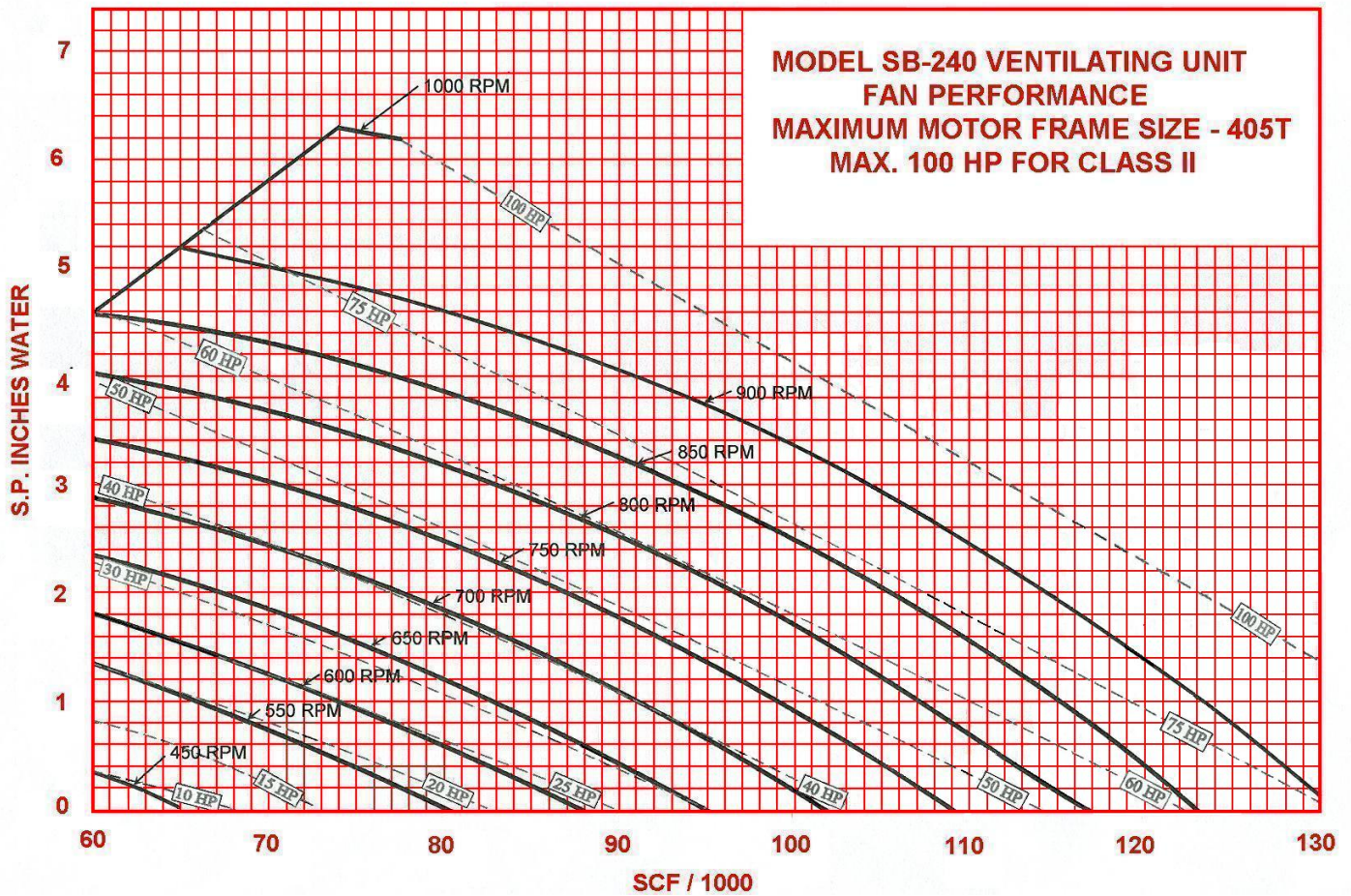
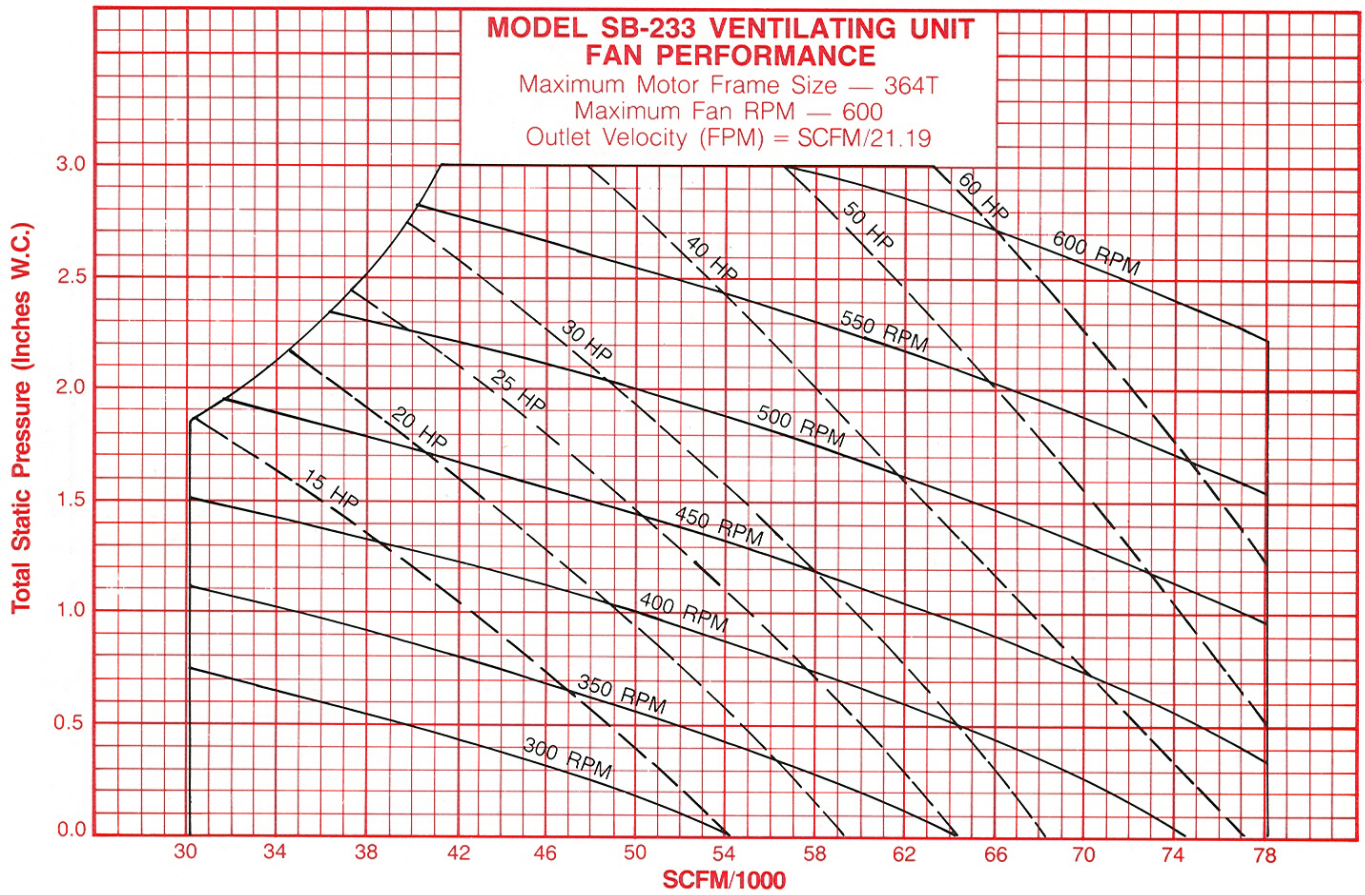
2) Motors less than 1 HP have frame sizes that will fit within any SB model ventilating unit cabinet.

3) SB-240 maximum frame size, 405T. For larger frame sizes consult factory.





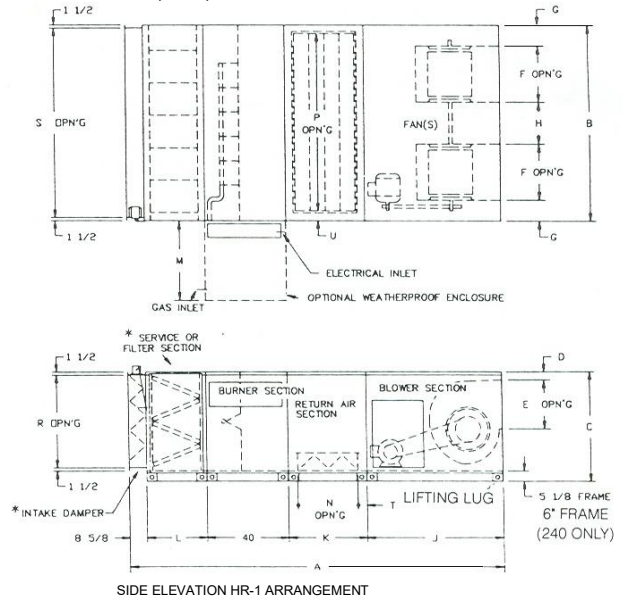
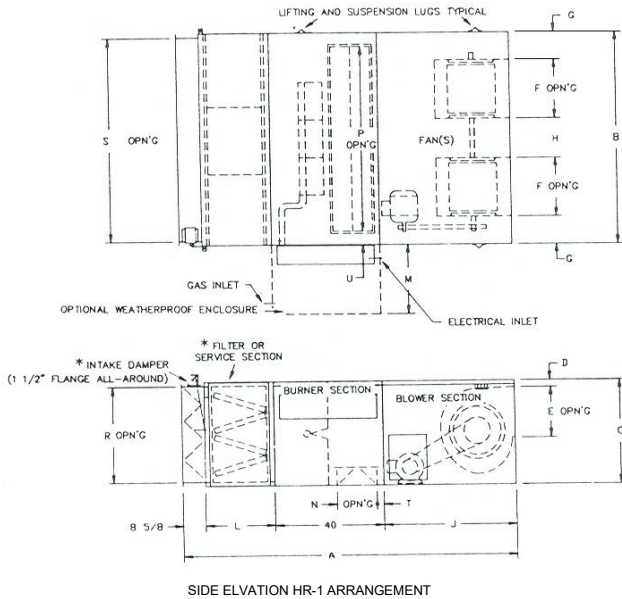




SBDR (NON-ETL APPROVED) HORIZONTAL MODEL BASE UNIT (UP TO 80% R.A.)

SBDR – 112 THRU 218

SBDR – 222, 227, 233 240



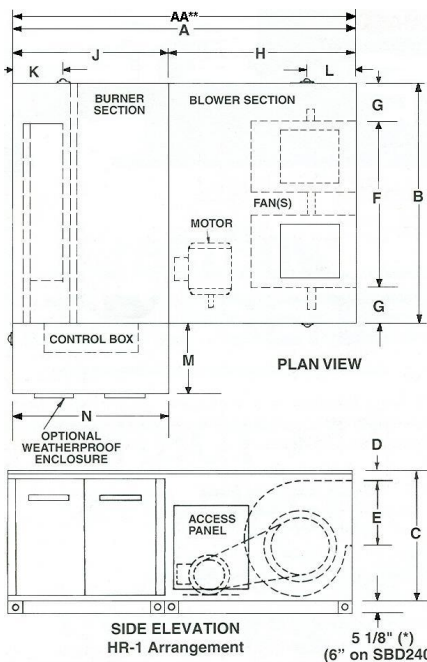
NOTES:

1. UNITS WITH MORE THAN 50% RETURN AIR CAPABILITY WILL HAVE AN INTAKE DAMPER & FILTER (OR SERVICE) SECTION AS STANDARD.
2. ON UNITS FROM 0 TO 50% RETURN AIR ONLY (NON-ETL), THESE ITEMS ARE OPTIONAL.
3. SEE PAGE 5 AND 6 FOR DISCHARGE DAMPER LAYOUTS.
4. ALL DIMENSIONS IN INCHES.
5. LIFTING LUGS LOCATED ON EACH CORNER OF INDIVIDUAL SECTIONS.
6. C.H.O. FOR DIMENSIONS FOR ETL/CETL UNITS.

SBD MODELS

SIZE	A	B	C	D	E	F	G	H	J	K	L	M	N	P	R	S	T	U
112	106 ³ / ₈	33	26 ¹ / ₂	2 ⁵ / ₈	13 ¹ / ₂	16 ¹ / ₄	8 ³ / ₈	--	36 ⁷ / ₈	--	24 ³ / ₄	26	8	23	23 ³ / ₈	29 ³ / ₈	6 ³ / ₄	5
115	118 ³ / ₈	40	35	2 ⁵ / ₈	16 ⁵ / ₈	19 ³ / ₄	10 ¹ / ₈	--	43 ³ / ₄	--	26	26	15 ⁷ / ₈	30 ¹ / ₂	31 ⁷ / ₈	36 ⁷ / ₈	2 ¹ / ₂	4 ³ / ₄
215	122 ³ / ₄	75 ⁵ / ₈	35	2 ⁵ / ₈	18 ¹ / ₄	19 ³ / ₄	9 ⁷ / ₈	15 ⁵ / ₈	48 ⁵ / ₈	--	26	26	14 ³ / ₄	65	31 ⁷ / ₈	72	2 ¹ / ₂	5 ¹ / ₁₆
218	123 ³ / ₄	79 ⁵ / ₈	39	2 ⁵ / ₈	18 ⁷ / ₈	21 ⁷ / ₈	10 ³ / ₈	14 ⁵ / ₈	49 ⁵ / ₈	--	26	26	14 ³ / ₄	69	35 ⁵ / ₈	76	2 ¹ / ₂	5 ¹ / ₁₆
222	183 ³ / ₈	96 ⁵ / ₈	54 ¹ / ₈	4	24 ¹ / ₄	27 ³ / ₄	10 ¹ / ₄	20 ⁵ / ₈	67 ⁵ / ₈	38 ⁵ / ₈	30	32	29 ¹ / ₄	87 ¹ / ₂	45 ⁵ / ₈	93 ¹ / ₂	4 ¹ / ₂	4 ⁹ / ₁₆
227	212 ³ / ₈	114 ³ / ₈	63 ¹ / ₈	5 ³ / ₈	34 ³ / ₈	34 ¹ / ₄	12 ³ / ₄	20 ⁵ / ₈	83	49 ⁵ / ₈	30 ⁷ / ₈	32	40 ⁷ / ₈	105 ¹ / ₄	54 ⁵ / ₈	111 ¹ / ₄	4 ¹ / ₂	4 ⁹ / ₁₆
233	228 ⁷ / ₈	141	72 ¹ / ₈	4	34 ¹ / ₈	44 ³ / ₄	13	25 ¹ / ₂	89 ⁵ / ₈	60 ³ / ₈	30 ³ / ₄	32	51 ³ / ₈	131 ³ / ₄	63 ⁵ / ₈	137 ³ / ₈	4 ¹ / ₂	4 ⁵ / ₈
240	261	186	86	6 ⁹ / ₁₆	40 ⁵ / ₈	53 ³ / ₄	19 ⁵ / ₈	39 ¹ / ₄	110	66 ³ / ₈	36	32	56 ³ / ₈	176 ³ / ₄	76 ⁵ / ₈	182 ⁵ / ₈	5	4 ⁵ / ₈

SBD – HORIZONTAL MODEL BASE UNIT



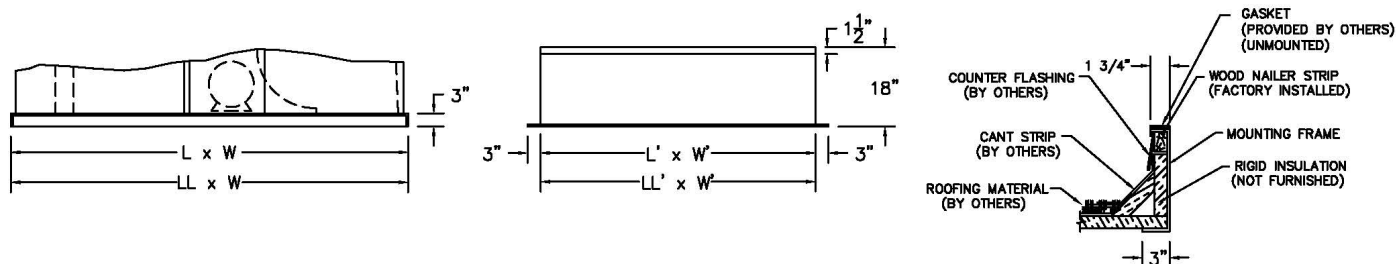
Size	AA	A	B	C	D	E	F	G	H	J	K	L	M	N	P
112	110 ⁷ / ₈	76 ³ / ₈	33	26 ¹ / ₂	2 ⁵ / ₈	13 ¹ / ₂	16 ¹ / ₄	8 ³ / ₈	36 ⁷ / ₈	40	12 ¹ / ₂	11	26	39 ³ / ₄	1 ⁵ / ₈
115	117 ³ / ₄	83 ³ / ₄	40	35	2 ⁵ / ₈	16 ⁵ / ₈	19 ³ / ₄	10 ¹ / ₈	43 ³ / ₄	40	12 ¹ / ₂	13 ³ / ₈	26	39 ³ / ₄	1 ⁵ / ₈
215	-	88 ⁵ / ₈	75 ⁵ / ₈	35	2 ⁵ / ₈	18 ¹ / ₄	55 ⁵ / ₈	9 ⁷ / ₈	48 ⁵ / ₈	40	12 ¹ / ₂	15 ⁵ / ₈	26	39 ³ / ₄	1 ⁵ / ₈
218	-	89 ⁵ / ₈	79 ⁵ / ₈	39	2 ⁵ / ₈	18 ⁷ / ₈	58 ⁵ / ₈	10 ³ / ₈	49 ⁵ / ₈	40	12 ¹ / ₂	12 ⁵ / ₈	26	39 ³ / ₄	1 ⁵ / ₈
222	-	107 ¹ / ₂	96 ⁵ / ₈	49	4	24 ¹ / ₄	76 ⁵ / ₈	10 ¹ / ₄	67 ⁵ / ₈	40	-	-	32	39 ³ / ₄	1
227	-	123	114 ³ / ₈	58	5 ³ / ₈	34 ³ / ₈	88 ³ / ₈	12 ³ / ₄	83	40	-	-	32	39 ³ / ₄	8
233	-	129 ⁵ / ₈	141	67	4	34 ¹ / ₈	115	13	89 ⁵ / ₈	40	-	-	32	39 ³ / ₄	8
240	-	150	186	80	4 ³ / ₈	42 ⁵ / ₈	150 ¹ / ₄	17 ⁵ / ₈	110	40	-	-	32	39 ³ / ₄	8

All dimensions in inches.

NOTES:

1. SBD-112 through SBD-218 have combination lifting and hanging lugs.
 2. SBD-222, SBD-227, SBD-233 and SBD-240 have channel base frames with combination lifting-hanging lugs.
- (*) Base channel on SBD-222, SBD-227, SBD-233 and SBD-240 only.
- (**) 34" increase in length required per ETL.

SBD – OPTIONAL ROOF CURB



Curb Adaptor Frame ①

MODEL	112	115	215	218
L' **	82 5/8	89 3/8	93 7/8	94 7/8
LL' ***	116 5/8	123 3/8	-	-
W'	34	41	76 1/8	80 1/8

Roof Curb

MODEL	112	115	215	218	222	227	233	240
L' **	81 1/8	87 7/8	92 3/8	93 3/8	107 1/8	123	129	186*
LL' ***	115 1/8	121 7/8	-	-	-	-	-	-
W'	32 1/2	39 1/2	74 5/8	78 5/8	96 5/8	114 1/4	141	186

All Dimensions in inches

① Channel frame for SBD-222, SBD-227, SBD-233 and SBD-240 mounts directly to roof curb.

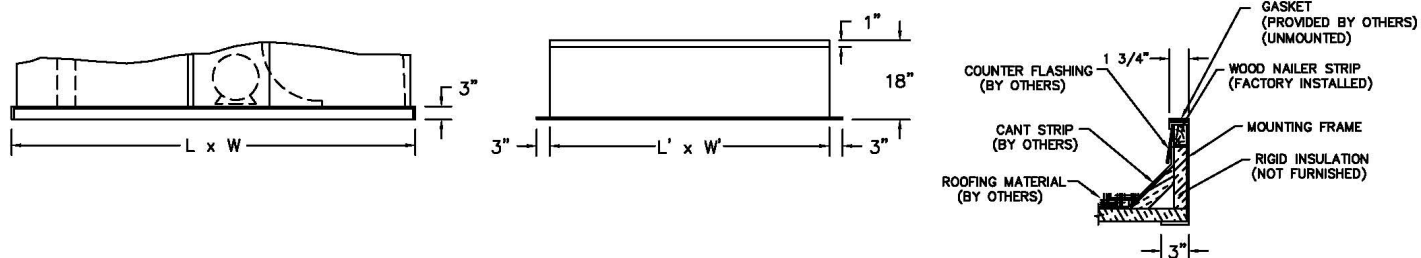
NOTE: Duct adaptor for HR-2 curb mounted unit is furnished as standard equipment when Hastings curbs are supplied.

*Includes Filter Section (SBD-240 only).

**L' dimensions for non-ETL Approved Units.

***LL' dimensions for ETL Approved Units.

SBDR – OPTIONAL ROOF CURB



Curb Adapter Frame ①

MODEL	112	115	215	218	
L'	82 5/8	89 3/8	93 7/8	94 7/8	SBDR (Non ETL)
W'	34	41	76 1/8	80 1/8	

All dimensions in inches.

① Channel frame for SBD and SBDR 222, 227, 233 and 240 mounts directly to roof curb.

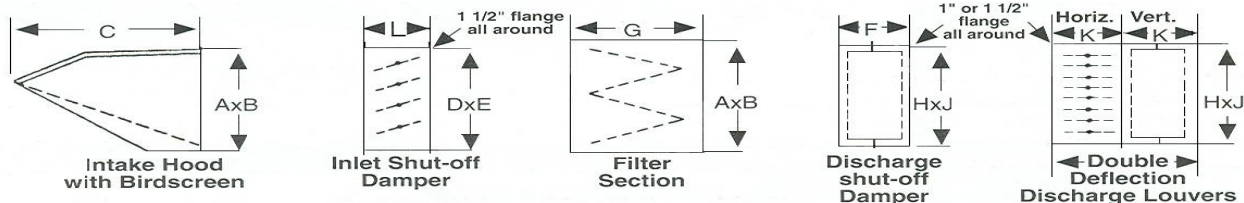
Roof Curb

Model	112	115	215	218	222	227	233	240	
L'	81 1/8	87 7/8	92 3/8	93 3/8	144 1/2	172 1/8	188 5/8	*252 3/8	SBDR (Non ETL)
W'	32 1/2	39 1/2	74 5/8	78 5/8	106 3/8	113 1/2	140 1/4	185 1/8	

NOTE: Duct adaptor for HR-2 curb mounted units is furnished as standard equipment. (Provided only if Roof Curb is ordered.)

*Curb length includes filter section for SBD-240 only.

SBD – ACCESSORY ITEMS



SBD – ACCESSORY ITEMS												
SIZE	A	B	C	D	E	F	G	H	J	K	L	Filters – No. & Sizes
112	26 1/2	33	35 7/8	23 3/8	29 7/8	12	24 3/4	13 1/2	16 5/16	4"	8 5/8	(4) 16 x 20 x 2
115	35	40	43 3/4	31 7/8	36 7/8	12	26	16 21/32	19 11/16	4"	8 5/8	(8) 20 x 20 x 2
215	35	75 1/8	43 3/4	31 7/8	72	12	26	(2) 18 3/8	(2) 19 11/16	4"	8 5/8	(12) 20 x 25 x 2
218	39	79 1/8	47 1/4	35 7/8	76	12	26	(2) 19	(2) 22	4"	8 5/8	(12) 20 x 25 x 2
222	49	96 5/8	56 3/8	45 7/8	93 7/8	12	30	(2) 24 7/32	(2) 27 3/4	4"	8 5/8	(24) 16 x 25 x 2
227	58	114 3/8	59 3/8	54 7/8	111 1/4	12	30 7/8	(2) 34 5/16	(2) 34 5/16	4"	8 5/8	(30) 20x25x2 & (6) 16x25x2
233	67	141	58 7/8	63 7/8	137 7/8	12	30 3/4	(2) 34 5/16	(2) 44 3/4	4"	8 5/8	(49) 20 x 25 x 2
240	80	186 1/32	66	76 7/8	182 29/32	12	36	(2) 42 5/8	(2) 57 3/16	4"	8 5/8	(49) 24x24x2 & (7) 12x24x2

All dimensions in inches

EQUIPMENT SPECIFICATIONS

SECTION	DESCRIPTION	SB-112	SB-115	SB-215	SB-218	SB-222	SB-227	SB-233	SB-240
BLOWER	Discharge Arrangement	Horizontal Unit with Choice of HR-1 (Horizontal), HR-2 (Horizontal Down), or Optional HR-3 (Vertical up or Vertical Down)							
	Construction	Aluminized Steel Casing – Bolted Construction							
	Casing Gauge	18	18	16	16	16/14	16/14	16/14	14
	Outside Surface Finish	Primed with Zinc-Chromate, Finish Coat of Enamel							
	Type of Fans	Centrifugal, Forward Curved, DWDI, Class 1							
	Number of Fans	1	1	2	2	2	2	2	2
	Outlet Area (Sq. Ft.)	1.53	2.28	4.99	5.73	9.33	16.35	21.19	30.4
	Ball Bearings	Self Aligned and Greaseable Pillow Block or Flange Mounted							
	Lubrication	Means for Relubrication							
	Bearing Size (inches)	1	1 3/16	1 11/16	1 11/16	1 7/16	1 11/16	1 15/16	2 7/16
	Shaft Diameter (inches)	1	1 3/16	1 11/16	1 11/16	1 7/16	1 11/16	1 15/16	2 7/16
	Motor Location	Internal Mounting							
	Drives	Adjustable Standard thru 10 HP; Fixed Standard above 10 HP, Adjustable Optional							
	General	Wheels Staticly & Dynamically Balanced, Mounting on Separate Frame							
FILTER (OPTIONAL)	Arrangement	V-Bank							
	Casing Gauge	18	18	16	16	14/16	14/16	14/16	14
	Number of Filters	4	8	12	12	24	30 and 6	49	49 and 7
	Size (inches)	16x20x2	20x20x2	20x25x2	20x25x2	16x25x2	(30) 20x25x2 and (6) 16x25x2	20x25x2	(49)24x24x2 and (7) 12x24x2

SBD DIRECT GAS-FIRED SERIES

Engineers Specifications

Furnish and install the following Hastings direct gas-fired make-up air system.

Blower Section

- A. Blower wheels shall be statically and dynamically balanced forwardly curved, double width, double inlet, class 1 except SB-240 with backward incline fans.
- B. Blower wheels shall be mounted on solid turned ground shaft with keyway for driven shaft.
- C. Bearings shall be 200,000 hour ball bearing, self aligning, and greaseable, pillow-block or flange mounted.
- D. Blower housings, bearings and adjustable motor base shall be mounted on a reinforced frame to insure rigidity and quiet operation.
- E. The driver and driven sheaves shall be of the keyed hub type. The driven sheave shall be of a fixed pitch diameter and the driver sheave shall be of a variable pitch diameter through 10 HP and fixed pitch above 10 HP. V-belt drives shall be sized for 135% of motor horsepower.
- F. Cabinet shall be constructed of high quality (18) (16) (14) gauge aluminized steel to insure long rust-free life.
- G. Cabinet interior insulated with 1 - 2# density foil face insulation.
- H. Access panels shall be provided to allow easy access to motors and filters (if ordered).
- I. Outside cabinet surface is primed with zinc-chromate and finished with air dried enamel.

Burner Section:

- A. The burner shall be a direct gas-fired burner suitable for complete combustion of natural gas, propane or propane-air mixture, and having a turndown ratio of up to 22:1.
- B. Burner combustion must be clean and odorless. Combustion efficiency must limit the products of combustion to a maximum of 5ppm carbon monoxide and a maximum of 0.5ppm nitrogen dioxide.

- C. The burner shall have stainless steel combustion baffles, non-clogging gas ports, spark ignition and flame safeguard system.
- D. Observation port shall be provided in burner cabinet.
- E. Profile plates to control proper air velocity across the burner shall be factory installed, adjusted during an actual firing test and locked in place before shipment.

Motor:

A Premium Energy Efficient (E+) T-frame, ODP, 1800 RPM prelubricated ball bearing type motor shall be furnished for voltage as scheduled.

Gas and Electric Controls:

The following controls shall be furnished with the direct gas-fired make-up air system:

Main gas hand shut-off valve.
Main and pilot gas pressure regulators.
Pilot controls.
Electric safety shut-off valve.
Electronic modulating gas valve with Discharge air controller.
Electronic flame safeguard system.
High temperature limit switch.
Airflow switch.
Ignition transformer.
Automatic mild weather burner lockout.
Motor starter.
Control transformer
NEMA 1 control box.
Remote control station with system switches and indicating lights.

Assembly:

The system shall be factory assembled and wired with the exception of controls that are remote to the unit.

Options and Accessories:

The following items are to be furnished (Insert desired items from page 6 and 7 of this bulletin.)

In order to maintain our policy of continuous product improvement, we reserve the right to change prices, specification, ratings or dimensions without notice obligation.



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