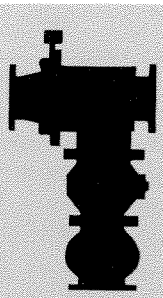
Instructions for INSTALLATION
OPERATION • MAINTENANCE

INSTRUCTION BULLETIN SBC-3468
(Replaces Bulletins SB-3, SB-8 & Form 3007)

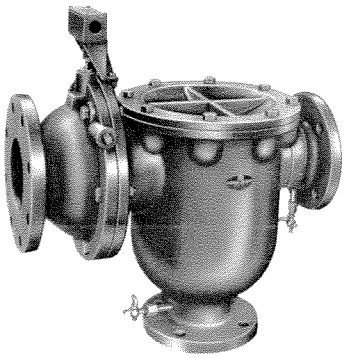
of the SELAS
BLOWOUTS

CATALOG NUMBERS

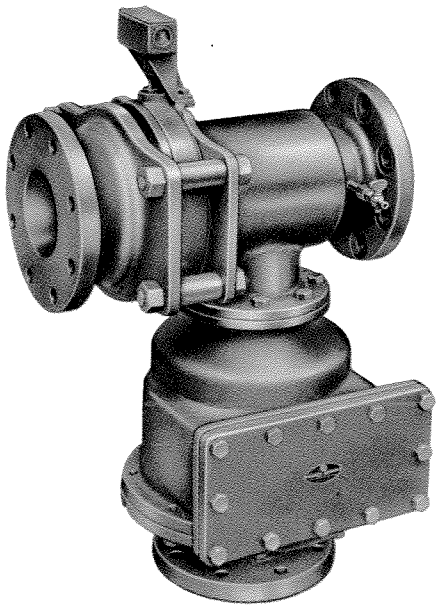
SBC-3A • SBC-4A
SBC-6A • SBC-8B



SELAS BLOWOUTS



Type SBC-3A



Types SBC-4A
SBC-6A

Type SBC-8B

CONTENTS Page

selas®
The Heat Technology Company

SELAS HEAT TECHNOLOGY COMPANY LLC

130 KEYSTONE DRIVE, MONTGOMERYVILLE, PA 18936
TELEPHONE (215) 646-6600 • (800) 523-6500 • FAX (215) 646-3536

IMPORTANT FLASHBACK CAUTION

Flashback is the unwanted intrusion of flame behind a burner nozzle resulting in uncontrolled fire within the premix supply conduit. If not smothered or terminated, flashback can seriously damage burners, control valves and mixing equipment and also endanger personnel.

Proper installation and maintenance are essential. Therefore these tasks should be delegated only to competent and responsible personnel. They must carefully read and adhere to manufacturer's instructions concerning installation and use, abide by all codes, government regulations and insurance requirements.

DESCRIPTION AND METHOD OF OPERATION

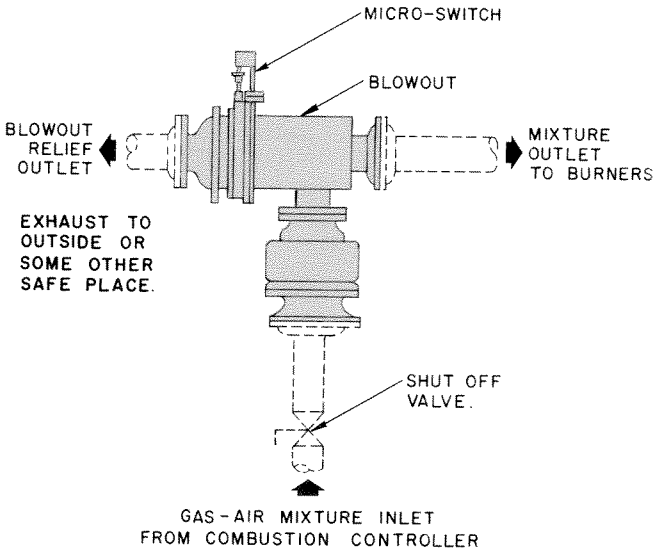
The Selas blowout is a pressure relief device which combines a rupture disc, a check valve, a flame arresting screen and a mechanical trip electric switch. The unit protects combustion controllers from damage caused by excessive pressure resulting from inadvertent combustion of premixed gas/air in distribution pipe lines. It cannot, itself, prevent flashbacks. Blowouts are normally used in premixed combustion systems operating with such fuel gases as natural gas, propane, butane or the common manufactured gases.

In normal operation, combustible gas/air mixture passes easily through the blowout to the burners. When flashback occurs, an increase in backpressure will cause the check valve to close, thus momentarily impeding the normal flow of premixed fuel and isolating the combustion controller from the excessive pressure. Simultaneously, the pressure buildup shatters the rupture disc and pivots the trip baffle. Hot gases and shattered disc pieces exit through the vent opening. The baffle operates an electrical switch to shut off gas supply and stop the combustion controller; it can also initiate an alarm. The flame arresting screen serves to delay residual flame from regressing farther while the fuel supply is being stopped.

INSTALLATION

The Selas blowout must be installed close to the combustion controller, atop the vertical leg of the premix fuel discharge piping. See Figure 1. The orientation of vertical inlet and horizontal outlet must be maintained to provide effective operation of the check valve and the trip baffle assembly. Throttling control valves should be placed downstream of the blowout.

FIGURE 1—TYPICAL BLOWOUT INSTALLATION



IMPORTANT

The blowout relief vent must be directed to a safe discharge area, preferably outdoors. Do not locate exhaust vent near work stations, traffic routes or vulnerable equipment. Prohibit access to vent zone while combustion controller is operating. If a backfire occurs, high velocity hot gases and pieces of shattered disc are discharged through vent opening.

Assemble vent piping with the fewest number of elbows possible, avoiding long piping runs or obstructions. Such restrictions, if excessive, may not provide sufficient pressure relief to protect the combustion controller.

Install in a place which provides accessibility for maintenance of flame screen, check valve or for replacement of rupture disc. If access for side removal of flame screen is restrictive (except for SBC-3A which has top access), remove flange bolts and rotate housing to a more convenient position.

Support the blowout independently of the combustion controller to avoid unnecessary weight on the combustion controller connection. Also support the vent piping independently of the blowout. This is specifically required for the SBC-3A to allow removal of vent flange for access to rupture disc and trip baffle assembly.

Sheet metal ducts are NOT approved for use as vent exhaust lines.

See Figures 6 & 7 for installation into typical combustion systems.

ELECTRICAL WIRING

The Selas blowout includes an electrical switch rated at 15 amps; 125, 250 or 480 volts AC. This microswitch should be wired to close the manual reset shutoff valve in gas supply line and stop the combustion controller motor when rupture disc shatters. Safety circuit is closed when trip baffle assembly is in operating (vertical) position. See Figure 6 for wiring diagram of a typical combustion system.

PRESSURE TEST

When pressure testing piping for leaks, consider the pressure exposure limits of all apparatus installed, such as regulators, burners, firechecks and blowouts. Selas blowouts are normally used in premix combustion systems not exceeding 6 psi (41 kPa); pressures above 10 psi (69 kPa) may cause rupture disc to break. It might prove convenient to test for leaks when operating the connected combustion system blower, with air only, at its maximum pressure; a centrifugal blower usually develops its highest pressure at about 50% of its rated capacity.

OPERATION

Once installed the Selas blowout is ready for operation upon demand. No handling is required except for periodic maintenance and repair after backfire. Both situations are covered in more detail under "Maintenance."

MAINTENANCE

CAUTION

Turn off combustion controller fuel gas and power supply before beginning blowout inspection or repair procedures.

Routine maintenance is comprised of two categories; 1) replacing rupture disc when shattered, and 2) periodic inspection of flame screen, check valve and trip switch assembly.

When a rupture disc breaks, it becomes imperative to find the reason for flashback into the combustion piping. The most common causes are defective burners; line pressure is too low at burners; or a power failure, which results in diminishing line pressure at burners and with combustible mixture in the line. Chronic flashbacks suggest that mixture pressure settings are too low for the specific fuel gas being used and/or that there are problems in the combustion control system.

Periodic preventive checks should be planned every three months until an appropriate schedule can be developed. Inspection cycles will vary with the type of burners used, the type of duty and the quality of fuel and air.

The flame arresting screen consists of a wound, corrugated strip forming many small holes which are susceptible to blockage by dust or fine particles entrained in the combustion air supply. Fouling of the screen will reduce the pressure delivery and/or mixture flow to the burners. Monitoring the pressure differential across the flame screen at a consistent flow rate can indicate the degree of fouling even without shutting down for inspection. Petcocks are provided for this purpose on each blowout.

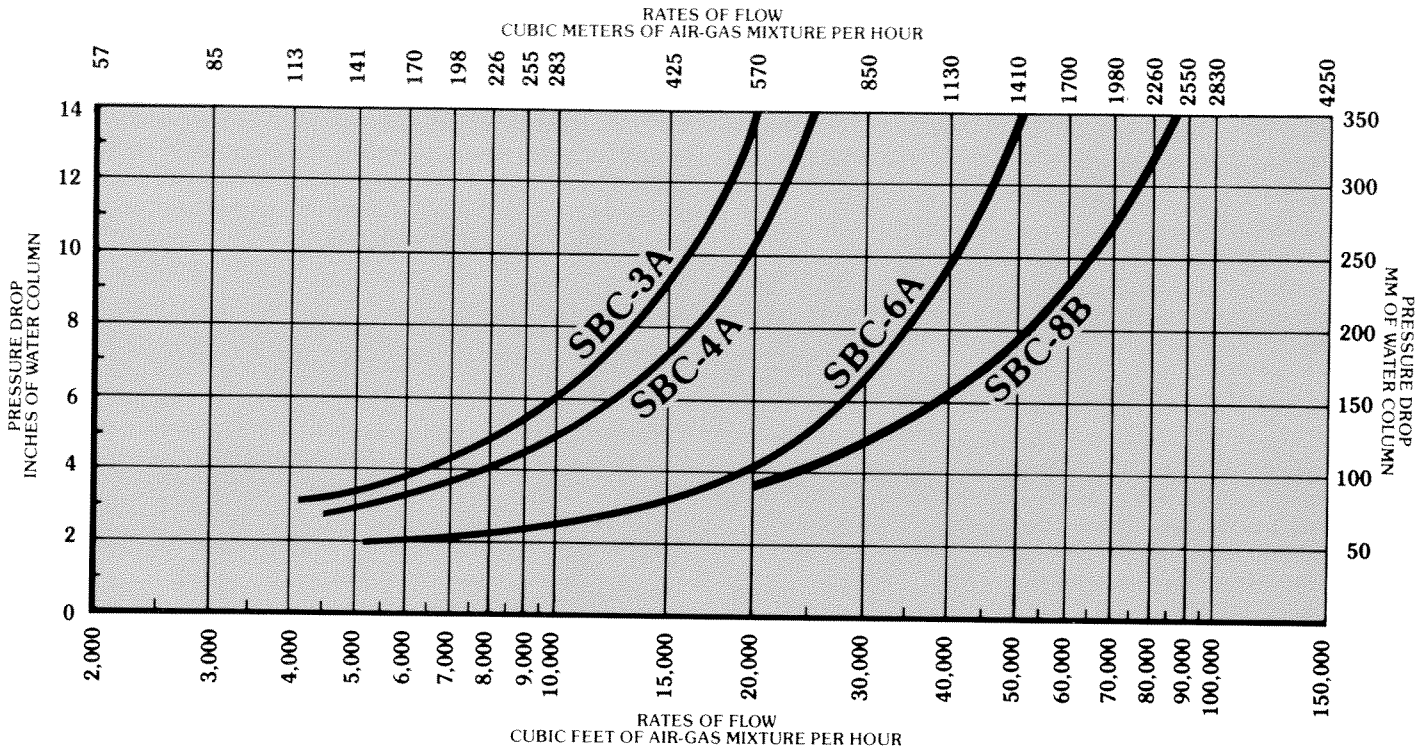
A reference standard can be established if the pressure drop across the blowout is measured and recorded while the system is operating at the maximum flow rate when installation is completed. Subsequent pressure drop measurements at identical flow rates can be compared to the original pressure drop to reveal the degree of fouling. Use the pressure capacity data in Figure 2 as a guide. Fouling usually can be minimized by better filtration at the combustion air intake.

Flame arrester screens are best cleaned by soaking in nontoxic, nonflammable solvent, then blowing out the dirt with compressed air from the reverse direction of normal flow. Screens should then be rinsed and dried before replacement. Oily screens will become blocked sooner. When flame arrester screen is removed, protect it from mechanical impact because the crimped aluminum strip which forms the screen is easily damaged.

Inspect the check valve and the trip switch assembly at periodic intervals and whenever a shattered rupture disc is replaced, or during cleaning of flame screen. The check valve should slide smoothly throughout full stroke on its stem (lubricate only with dry-type lubricant as needed, DO NOT use oil or grease). Replace check valve disc or stem when worn. The trip switch assembly also should be checked for smooth movement when pivoted away from the rupture disc. The electrical switch must have open contacts when trip baffle assembly is in the tripped (near-horizontal) position.

Instructions for servicing blowouts are detailed in two categories: "General Procedures" (common to all Selas blowouts) and "Specific Blowout Procedures" (describing the special requirements of individual models). Consult both sections.

FIGURE 2—PRESSURE DROP VS. RATE OF FLOW DATA, SELAS BLOWOUTS



REPAIR OR INSPECTION PROCEDURES

GENERAL PROCEDURES

CAUTION—

Turn off fuel gas and power supply.

RUPTURE DISC REPLACEMENT

a. Remove rupture disc assembly using the appropriate "Specific Blowout Details" procedure on pages 5, 6, & 7.
b. Remove fragments including ring of shattered disc from blowout and vent pipe.
c. Inspect trip baffle assembly and verify that it has free and smooth movement about its pivot. If baffle is damaged, replace or restore to original form.
d. Verify electrical switch operation to assure that it has not been damaged.
e. Install replacement rupture disc and gasket.
f. Check condition of trip switch assembly to make sure that electrical contacts close and open at correct baffle positions.
g. Check clearance between reset knob and electrical switch with trip baffle assembly in tripped (near-horizontal) position. There should be a nominal gap of 3/64 in. (1 mm) between switch plunger and reset knob. If necessary adjust reset knob and lock adjustment with adjacent nut. Replace all covers and pipe plugs as required to restore blowout to original operating condition.
h. Test the unit for leaks by operating the combustion controller on air only. Especially check those joints that were disturbed.
i. Determine if cause for flashback has been remedied before restoring combustion system to service.
j. Check inventory and make sure that spare rupture discs and gaskets are available in case of another flashback.

REASSEMBLY

After inspection or repair, reassemble, using care that mating parts seat squarely, worn or damaged gaskets are replaced and sealing surfaces are leak-tight. Test for leaks by operating combustion controller with air only before restoring to combustible service. Seating faces of check valve must be clean, dry and free of nicks.

SPECIFIC PROCEDURES

Applicable to particular models only. Use in conjunction with "General Procedures" on page 4.

SBC-3A RUPTURE DISC REPLACEMENT

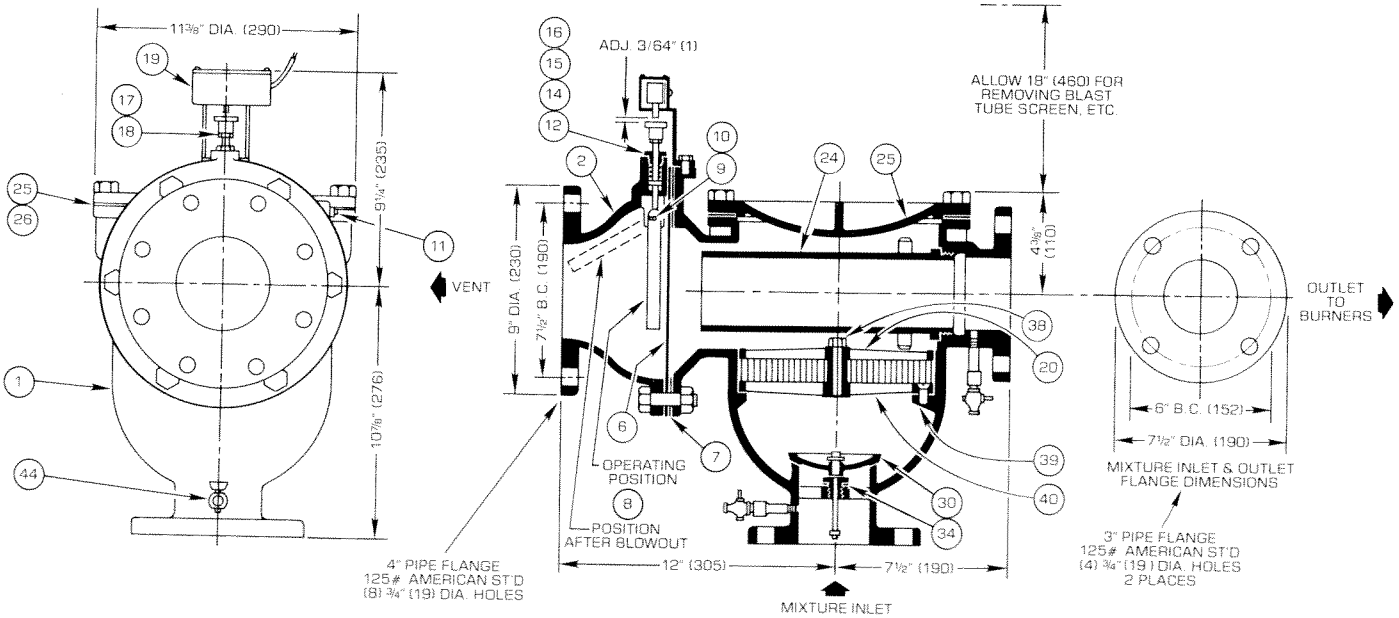
1. Disengage vent pipe from blowout (remove or support vent pipe independently of blowout).
2. Remove vent flange (2) and drop flange assembly away from electrical switch contact.
3. Refer back to "General Procedures" steps b through e on page 4.
4. When replacing new rupture disc, gasket must be between disc and blowout body (1). Note that gap between electrical switch and trip assembly reset knob can be affected by normal play between bolts and bolt holes of the mating flanges. Readjust bolt hole alignment if reset knob adjustment is not adequate to restore the nominal gap of 3/64 in. (1 mm) as specified in step g of "General Procedures" on page 4.
5. Verify that movement of the trip baffle corresponds with electrical switch operation by either of two ways. If vent pipe does not obstruct access, simply reach through vent flange (2) and trip baffle by hand. Otherwise, remove pivot access plug (11) at side of assembly, and insert screwdriver into slot of baffle pivot shaft (9). A quarter-turn rotation will effect full movement of baffle trip switch assembly. Clockwise rotation imitates the tripping action; counterclockwise rotation restores baffle to the operating (vertical) position.
6. Follow "General Procedures" steps f and g on page 4.
7. Replace pivot access plug (11).
8. Proceed through remaining "General Procedures" steps h, i, and j on page 4.

FLAME SCREEN & CHECK VALVE

Flame screen and check valve are accessible from the top of the unit.

1. Remove top cover plate (25), unscrew blast directing tube (24) by tapping lightly on lugs welded to tube (right-hand thread). Extract tube through top to expose the flame screen assembly (20).
2. Unscrew holding nut (38) and remove flame screen.
3. For access to check valve, remove screen holder screws (39) and lift out screen holder (40).
4. At check valve, remove cotter pin and washer, lift off valve disc (30) and unscrew hex gland.
5. See "Reassembly" on page 4.

FIGURE 3—SBC-3A DIMENSIONS & PARTS LIST (mm equivalents in parentheses)



PARTS LIST

INDEX NO.	PART
1	BODY
2	VENT FLANGE
*6	RUPTURE DISC
7	RUPTURE DISC GASKET
8	TRIP BAFFLE
9	BAFFLE PIVOT
10	PIVOT SET SCREW
11	PIVOT ACCESS PLUG
12	TRIP STEM
14	TRIP SPRING
15	SPRING GLAND
16	SPRING RETAINER
17	ADJUSTMENT KNOB
18	ADJUSTMENT LOCK NUT
19	MICROSWITCH
20	FLAME SCREEN ASS'Y
24	BLAST DIRECTING TUBE
25	TOP COVER PLATE
26	TOP COVER PLATE GASKET
30	CHECK VALVE DISC ASS'Y
34	LOCK WASHER
38	FLAME SCREEN HOLDING NUT
39	SCREEN HOLDER SCREWS
40	SCREEN HOLDER
44	PRESSURE TEST COCKS (2)

*Imperative to inventory spares

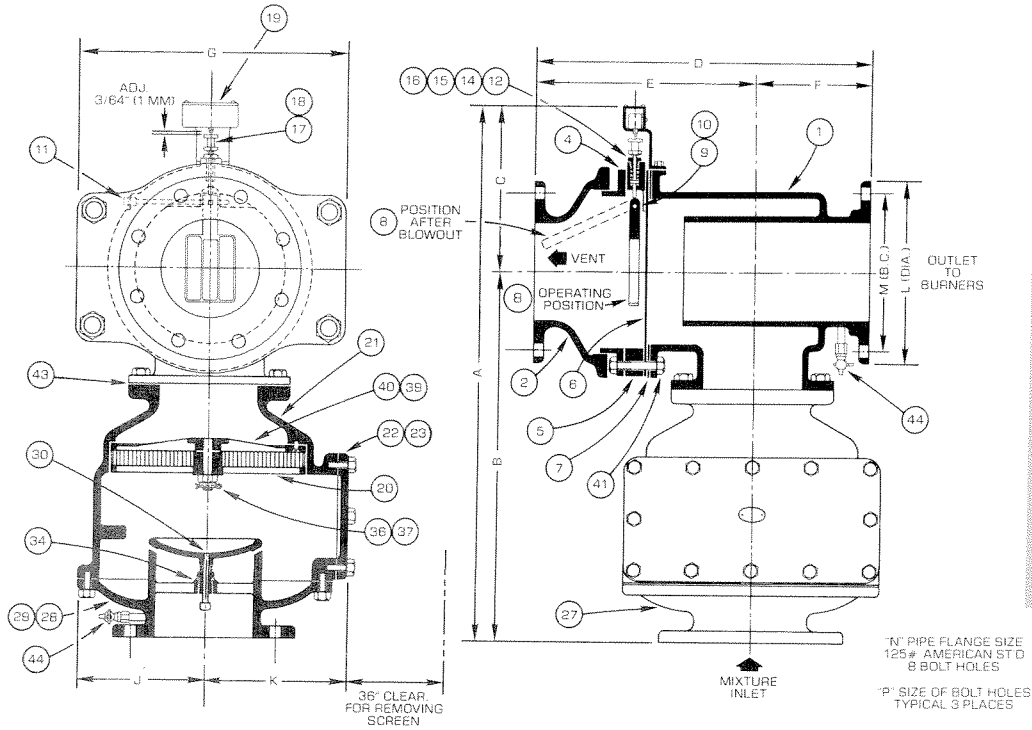
SBC-4A & SBC-6A RUPTURE DISC REPLACEMENT

1. Remove pivot access plug (11) at side of vent flange (2). Insert screwdriver into slot of baffle pivot shaft (9) and rotate quarter-turn clockwise. This motion will rotate baffle (8) to operating (vertical) position for unobstructed withdrawal.
2. Remove nuts from both slip ring bolts (41), leaving bolts in place, and pry slip ring (4) rearward. Unfasten the six screws still holding baffle mount ring (5) several turns, then screw heads can be tapped lightly to separate gasket surface. Remove the six screws completely. Remove the two bolts (41) which will allow the baffle mount ring (5) to drop through aperture.
3. Refer back to "General Procedures" steps b through e on page 4.
4. When replacing new rupture disc, gasket must be between disc and blowout body (1). Remember that two of the bolt holes are reserved for through-bolts to engage slip ring (4). Note that gap between electrical switch and trip assembly reset knob can be affected by normal play between bolts and bolt holes of mating flanges. Readjust bolt holes alignment if reset knob adjustment is not adequate to restore the nominal gap of 3/64 in. (1 mm) as specified in step g of "General Procedures" on page 4. Install the two slip ring bolts (41) and pull slip ring (4) against trip assembly flange. Tighten all six screws and two bolts uniformly.
5. The relationship of the electrical switch contacts with respect to trip baffle position can be verified by inserting a screwdriver in the pivot access plug hole to engage slot of baffle pivot (9). A quarter-turn rotation will effect full movement of trip switch baffle. Clockwise rotation imitates the tripping action; counterclockwise rotation restores baffle to the operating (vertical) position.
6. Follow "General Procedures" steps f and g on page 4.
7. Replace pivot access plug (11).
8. Proceed through remaining "General Procedures" steps h, i, and j on page 4.

FLAME SCREEN AND CHECK VALVE

The flame screen (20) and check valve (30) are accessible for inspection or repair by removing screen cover plate (22). The flame screen is held by a safety nut (36), locked with

FIGURE 4—SBC-4A & 6A DIMENSIONS & PARTS LIST



DIMENSIONS - INCHES (MM)		
LETTER	SBC-4A	SBC-6A
A	28-3/16 (716)	33-11/16 (856)
B	19-11/16 (500)	23-9/16 (600)
C	8-1/2 (216)	10-1/8 (257)
D	16-3/4 (425)	21-1/4 (540)
E	11 (280)	13-1/4 (337)
F	5-3/4 (146)	8 (203)
G	12-5/8 (320)	16-1/4 (413)
J	6-1/8 (156)	7-3/4 (200)
K	6-7/8 (175)	8-1/2 (216)
L	9 (230)	11 (280)
M	7-1/2 (190)	9-1/2 (241)
N	4	6
P	3/4 (19)	7/8 (22)

PARTS LIST

INDEX NO.	PART
1	BODY
2	VENT FLANGE
4	SLIP RING
5	BAFFLE MOUNT RING
*6	RUPTURE DISC
7	RUPTURE DISC GASKET
8	TRIP BAFFLE
9	BAFFLE PIVOT
10	PIVOT SET SCREW
11	PIVOT ACCESS PLUG
12	TRIP STEM
14	TRIP SPRING
15	SPRING GLAND
16	SPRING RETAINER
17	ADJUSTMENT KNOB
18	ADJUSTMENT LOCK NUT
19	MICROSWITCH
20	FLAME SCREEN ASS'Y
21	FLAME SCREEN HOUSING
22	SCREEN COVER PLATE
23	COVER PL. GASKET
27	CHECK VALVE HOUSING ASS'Y
28	CHECK VALVE HOUSING
29	CHECK VALVE HOUSING GASKET
30	CHECK VALVE DISC ASS'Y
34	LOCKWASHER
36	SAFETY NUT
37	COTTER PIN
39	SCREEN HOLDER SCREWS
40	SCREEN HOLDER
41	SLIP RING SCREWS (6)
43	PIPE FLANGE GASKET (2)
44	PRESSURE TEST COCKS (2)

*Imperative to inventory spares

cotter pin (37). Because the flame screen can weigh as much as 9 lbs. (4 kg), the use of a protective pad or board placed under the screen is recommended to assist in removal. The check valve can be removed from blowout housing by unscrewing nut above lock washer (34).

See "Reassembly" on page 4.

SBC-8B RUPTURE DISC REPLACEMENT

1. Remove four screws of disc access plate (3) which is at bottom of vent flange (2) and attached with a chain.
2. Loosen six jam nuts and back off clamp screws (46) about 5/8 in. (16 mm). Slide baffle mount ring (5) rearward to clear two locating dowel pins (42) at bottom and remove ring assembly through aperture.
3. Refer back to "General Procedures" steps b through e on page 4.
4. When replacing rupture disc, place a gasket on each side, positioning components on the locating dowel pins (42). Install baffle mount ring (5) and tighten clamp screws (46) into firm contact with ring.
5. The relationship of the electrical switch contacts with respect to trip baffle position can be verified by reaching through access aperture and manually actuating baffle between tripped and operating (vertical) position. Follow "General Procedures" steps f and g on page 4.
6. Replace disc access plate (3). Back off the two jam nuts and clamp screws (46) two turns before fastening to body. Tighten all eight clamp screws (46) which back up baffle mount ring (5). Snug jam nuts firmly to lock screws in place.
7. Continue through "General Information" steps h, i, and j on page 4.

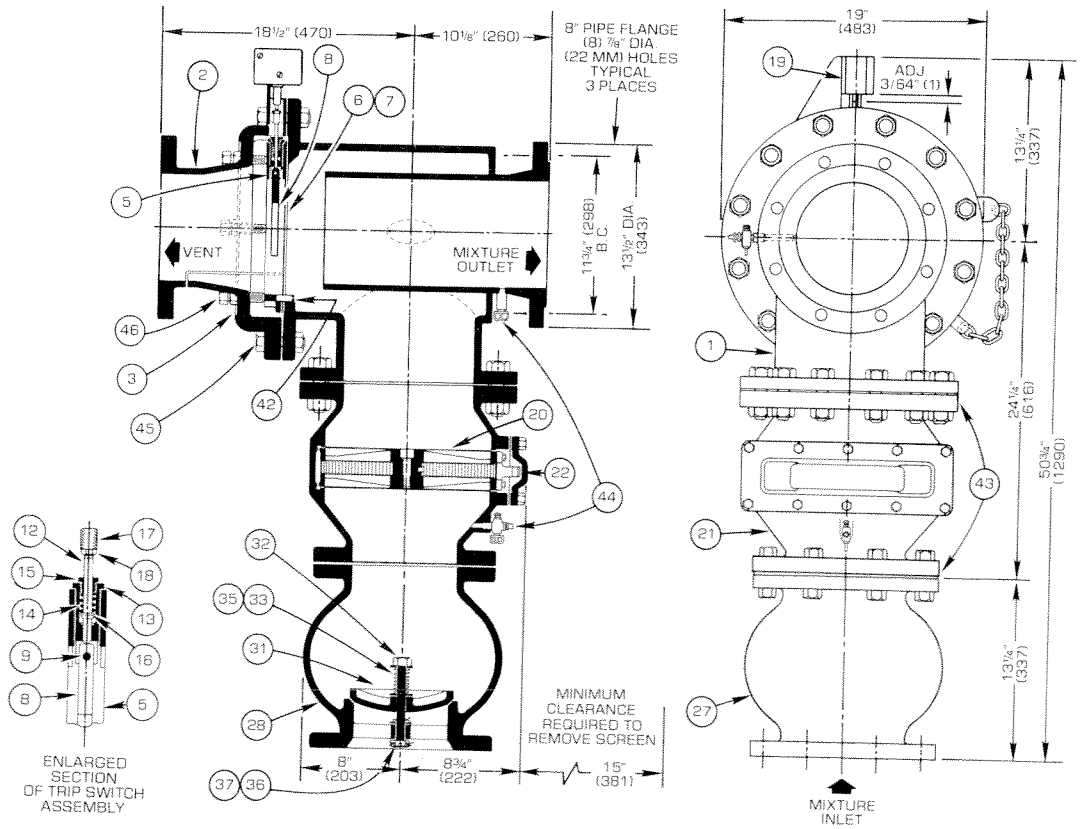
FLAME SCREEN AND CHECK VALVE

The flame screen is located in a separate housing (21) below blowout body (1) and is accessible by removing flame screen cover (22). Flame screen assembly (20) can be removed by its handle for service or replacement; it is not secured with fasteners. Instead it is locked in place by close confinement within the chamber space. When removed, protect the flame screen because its crimped aluminum strip is easily damaged. A gasket is not necessary between flame screen housing (21) and flame screen cover (22) but a seal is required. Use a heavy-duty automotive grease or other non-hardening substance.

The check valve (31) is a self-contained, integral unit mounted in its own housing (27). Repair or parts replacement usually requires removal of complete check valve housing from the pipe line. In some cases, however, it may be possible to test for free check valve movement, without removal from line, by reaching in and down through side aperture of flame screen housing (21) after flame screen cover (22) and flame screen (20) have been removed.

See "Reassembly" on page 4.

FIGURE 5—SBC-8B DIMENSIONS & PARTS LIST



PARTS LIST

INDEX NO.	PART
1	BODY
2	VENT FLANGE
3	DISC ACCESS PLATE
5	BAFFLE MOUNT RING
*6	RUPTURE DISC
7	RUPTURE DISC GASKETS (2)
8	TRIP BAFFLE
9	BAFFLE PIVOT
12	TRIP STEM
13	STEM HOLDER
14	TRIP SPRING
15	SPRING GLAND
16	SPRING RETAINER
17	ADJUSTMENT KNOB
18	ADJUSTMENT LOCK NUT
19	MICROSWITCH
20	FLAME SCREEN ASS'Y
21	FLAME SCREEN HOUSING
22	FLAME SCREEN COVER
27	CHECK VALVE HOUSING ASS'Y
28	CHECK VALVE HOUSING
31	CHECK VALVE DISC
32	CHECK VALVE STEM
33	CHECK VALVE SPRING
35	CHECK VALVE WASHERS (3)
36	SLOTTED NUT
37	COTTER PINS (2)
42	LOCATING DOWEL PINS
43	PIPE FLANGE GASKETS
44	PRESSURE TEST COCKS (2)
45	ACCESS PLATE SCREWS
46	CLAMP SCREWS & JAM NUTS

*Imperative to inventory spares

TYPICAL COMBUSTION SYSTEM EQUIPPED WITH SELAS BLOWOUTS

FIGURE 6—WIRING DIAGRAM

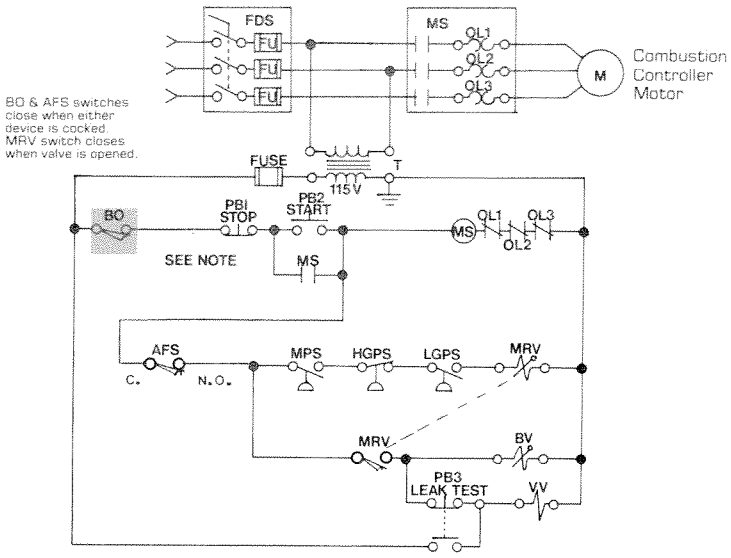
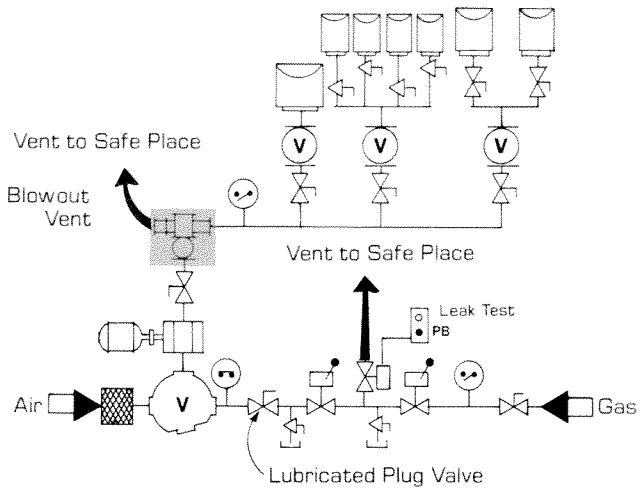


FIGURE 7—PIPING DIAGRAM



LEGEND		DESCRIPTION
AF		AUTOMATIC FIRECHECK
BV		BLOCKING VALVE
FDS		FUSIBLE DISCONNECT SWITCH
HGPS		HIGH GAS PRESSURE SWITCH
LGPS		LOW GAS PRESSURE SWITCH
LT		LEAK TEST ASSEMBLY
M		MOTOR (COMB. CONT.)

LEGEND		DESCRIPTION
MPS		MIXTURE PRESSURE SWITCH
MRV		MANUAL RESET VALVE
MS		MOTOR STARTER
OL		OVERLOAD
PB		PUSH BUTTON
BO		BLOWOUT
VV		VENT VALVE

Max.Graph.6/82

PRINTED IN U.S.A.

selas®
The Heat Technology Company

SELAS HEAT TECHNOLOGY COMPANY LLC
130 KEYSTONE DRIVE, MONTGOMERYVILLE, PA 18936
TELEPHONE (215) 646-6600 • (800) 523-6500 • FAX (215) 646-3536