Velan Valves Ltd
Leicester,England

TYPE SSF - 125/200/400/600

INSTALLATION, SERVICING AND MAINTENANCE INSTRUCTIONS

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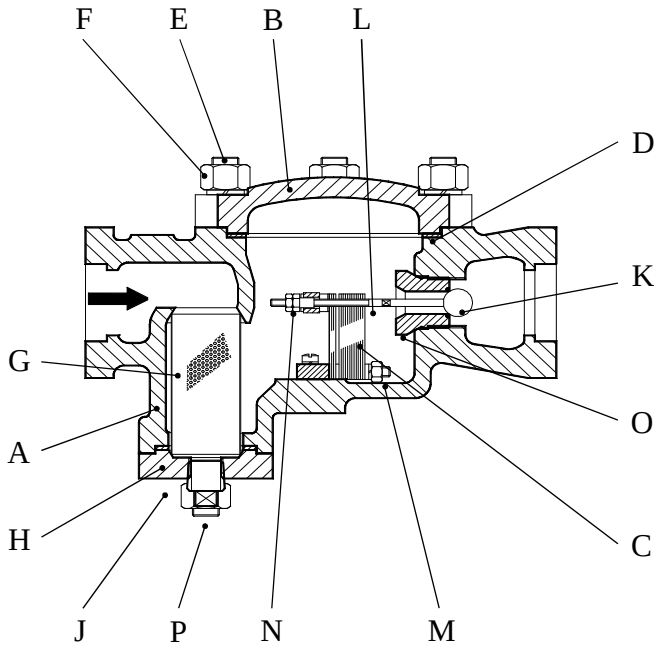
INSTALLATION, SERVICING AND MAINTENANCE INSTRUCTIONS

SSF Steam traps provide high capacity discharge to service large volume process applications, operating up to 600 psig (42 barg) and 850 deg F (454 deg C).

Typical applications include: High pressure mains, Re-boilers, Heat exchangers, storage **tank coils - In power plants, refineries, chemical plants, general process industries and marine service.**

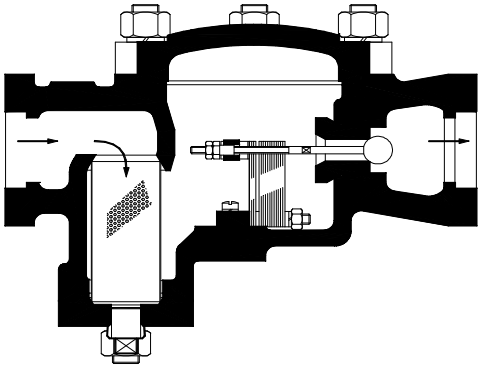


A. Body : Cast Carbon Steel
B. Cover : Carbon Steel
C. Bimetal Element : Ruflex GB-14
D. Cover Gasket : S/S Spiral wound Non-Asbestos filler.
E. Cover Studs : Alloy Steel - B7
F. Cover Nut : Carbon Steel - 2H
G. Strainer : Stainless Steel
H. Strainer Cover Gasket : S/S Spiral wound Non-Asbestos filler.
J. Strainer Cover Pad : Carbon Steel
K. Ball : Stainless Steel
L. Valve Stem : Stainless Steel
M. Bimetal Battery Fixing Screw : Stainless Steel
N. Adjusting Nut and Locknut : Stainless Steel
O. Valve Seat – Stainless Steel - Stellited Hardfaced
P. Plug 1/2 NPT : Carbon Steel

1. FEATURES

a. Fast warm up with automatic air venting

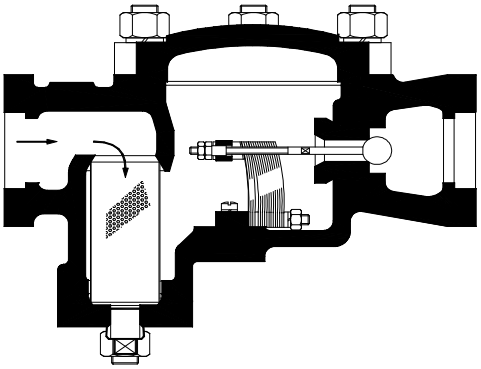
When cold the bi-metal relaxes and the discharge valve is wide open allowing air, gasses and cold water to clear quickly, ensuring no air binding or water logging occurs to delay equipment warm up. Steam wasting by-passes, or other secondary air venting systems are unnecessary.



2. POSITIVE STEAM TRAPPING

a : Saturated Steam

Incoming steam contacting the bimetal element causes the bimetal to deflect and develops thermal power to act on the valve stem, overcoming the line pressure and closing the valve tight. The power of the bimetal element increases or decreases as a function of the relative temperature of saturated steam. The same element operates efficiently at any given pressure within its range.

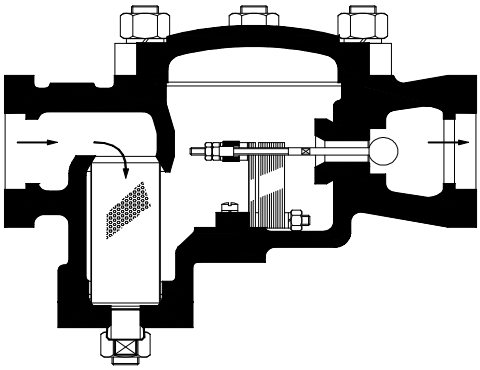


b : Superheated steam

As for saturated steam, but the higher steam temperature develops more bimetal pull and shuts the valve even tighter.

3. Condensate Discharge

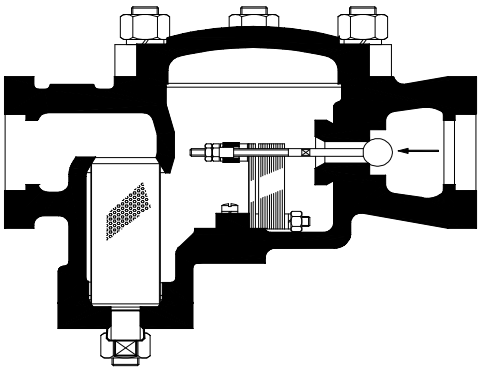
Cooler condensate gradually reduces the bimetal force until the unbalanced pressure on the valve cracks the orifice and releases the flow. This is the first stage of the smooth opening. The second stage occurs as the flow is released , the unbalanced pressure acts on the full valve area, increasing its force, fully opening the orifice for maximum capacity flow.



4. Check Valve

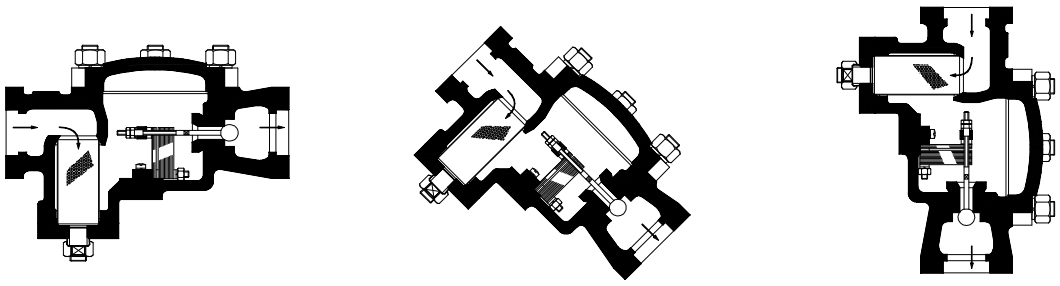
Excess back pressure, a drop in line pressure or discharge to overhead return lines, can cause a reverse flow of condensate through a trap.

The Free floating valve inside plenty traps will close immediately when reverse flow is present, and no additional valve is required.



2. INSTALLATION AND OPERATION

a. The trap can be installed in any position without loss of operating efficiency - see figure 1. In the vertical position the trap is self draining and therefore freezeproof provided the condensate can drain away. Direction of flow is indicated by an arrow cast on the body inlet connection.



(A) (B) (C)

Fig. 1

b. Install the trap 5' - 8' (1.5m - 2.5m) from the equipment drain point when possible. The minimum distance is 3' (1.0m). This cooling leg acts as a storage chamber improving the trap operation.

Figures 2a and 2b indicate correct methods for collecting condensate from steam mains, ensuring that most of the condensate flowing along the main can be collected.

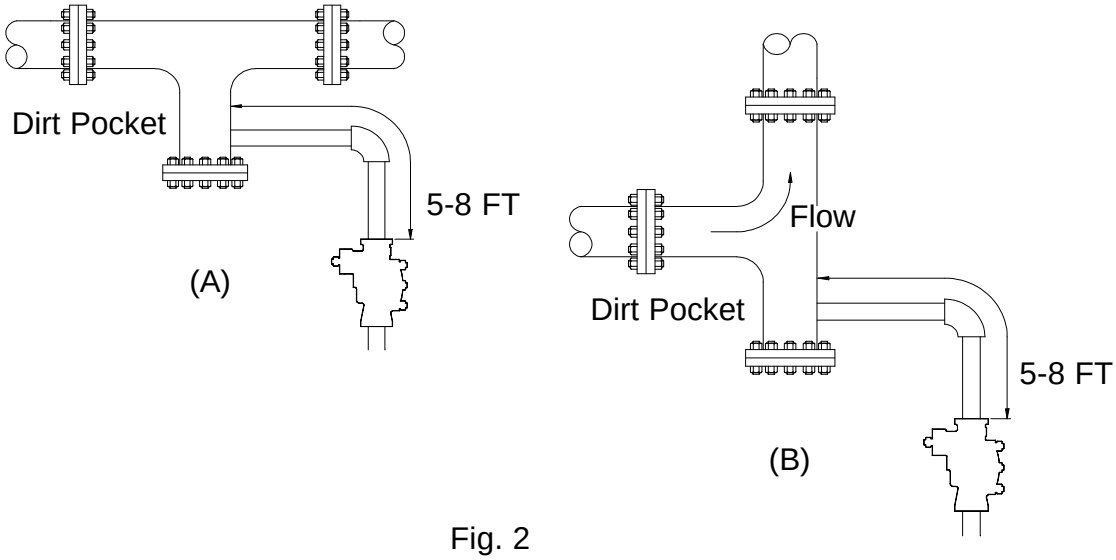
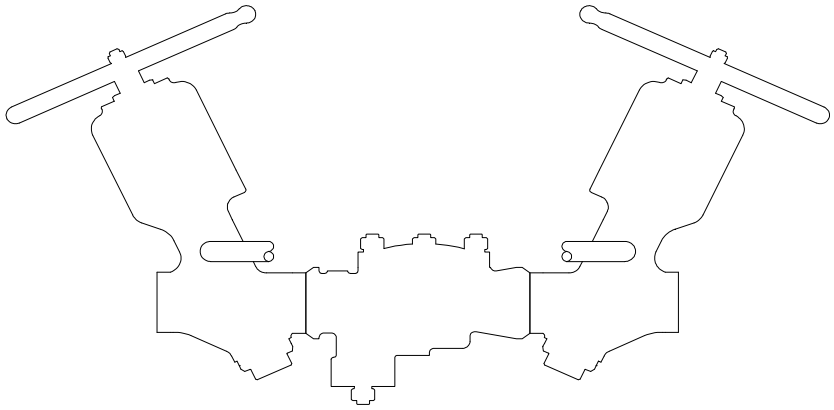


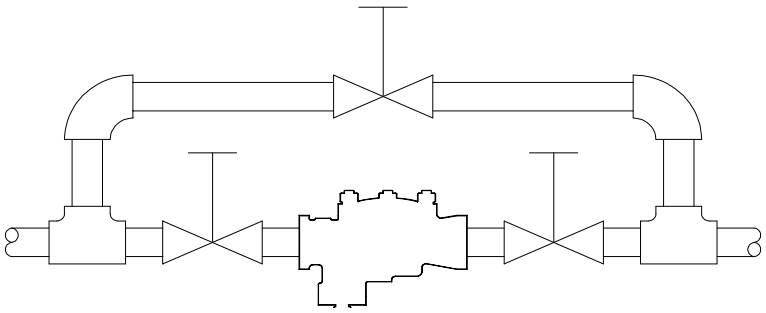
Fig. 2

c. Secondary air vents, check valves and strainers are not necessary, these are incorporated in the trap.

d. Where a bypass is required the equivalent piping king should be used. This provides considerable savings in space and construction costs compared to the standard bypass, see fig 3. The piping king unit allows “in line” maintenance.



Plenty Piping King Unit



Standard Bypass Configuration

Fig. 3

e. Blow out the line or unit with air, or steam if possible, before installing the trap, to remove dirt and scale.

f. The trap and at least the last 2 - 3 feet (0.6m - 1.0m) of the cooling leg should not be insulated, otherwise the trap performance will be affected.

g. It is not necessary to disassemble the trap when welding into position. However correct welding procedures must be used without excessive heat input.

h. When operating, the trap will adjust to the quantity and flow condition of the condensate. If intermittent, the trap will discharge intermittently. However if condensate flow is continuous the trap will also discharge continuously.

I. For checking operation of the trap when installed in a closed return system a test valve can be fitted as shown as in fig 4. Alternatively the trap can be supplied with a thermometer fitted to the outlet connection, or a contact temperature recorder used to measure the temperature differential across the trap. Ultrasonic meters must be used with care if the trap is operating in a continuous discharge mode as the results indicated can be misleading.

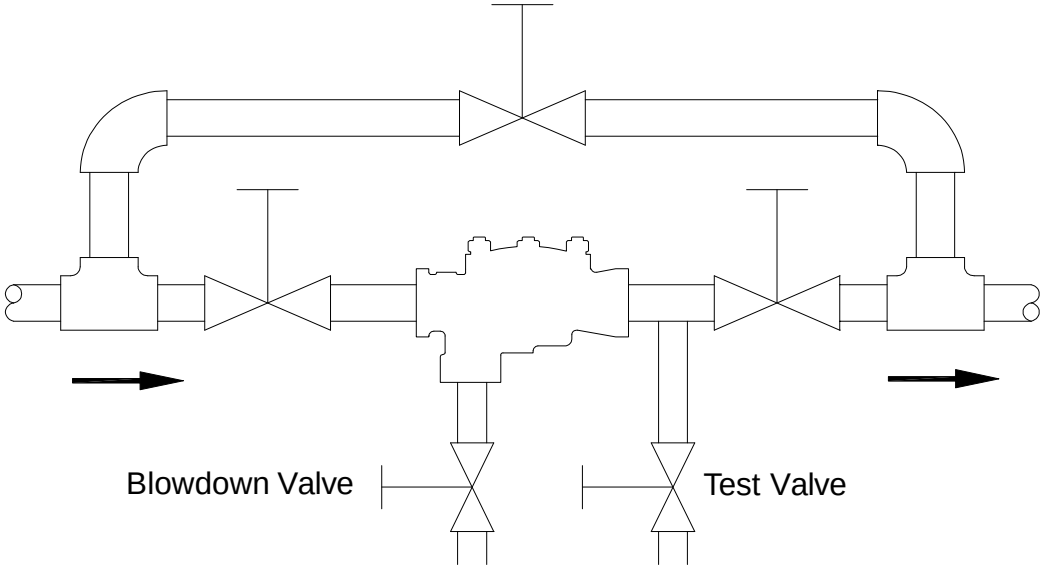


Fig. 4

j. Pressure waves (water hammer) in excess of normal operating pressure will overcome the bimetal closing force, opening the valve and dissipating the excess pressure downstream, preventing damage to the internals.

3. ADJUSTMENT

NOTE: Before undertaking any adjustment or repair work, always ensure that the steam trap is fully isolated from the system. Before removing any covers, loosen bolting and break gasket seal to release any pressurised steam trapped in the body.

a. BIMETAL/VALVE CLEARANCE

The discharge temperature of condensate is dependent upon the clearance setting ' X ' Fig 5. Increasing the clearance reduces the force exerted on the valve by the bimetal, allowing a closer to saturation discharge temperature. It will also increase capacity, conversely, reducing this clearance increases the bimetal force requiring an increased amount of sub-cooling before discharge can take place. This will hold back condensate utilising its heat before discharge giving efficient energy utilisation. It will also reduce discharge capacity.

b. The clearance is measured at point ' X ' (Fig 5.) between the top of the rocker plate and the underside of the adjusting nut. The standard factory setting is made at an ambient temperature of 65 Deg F (18 deg C) and will allow the valve to commence opening at 15 Deg F (8 Deg C) approx. Below saturation, with fulldischarge, as shown in the individual capacity diagrams for each model, around 40 Deg F (22 Deg C) sub - cooling.

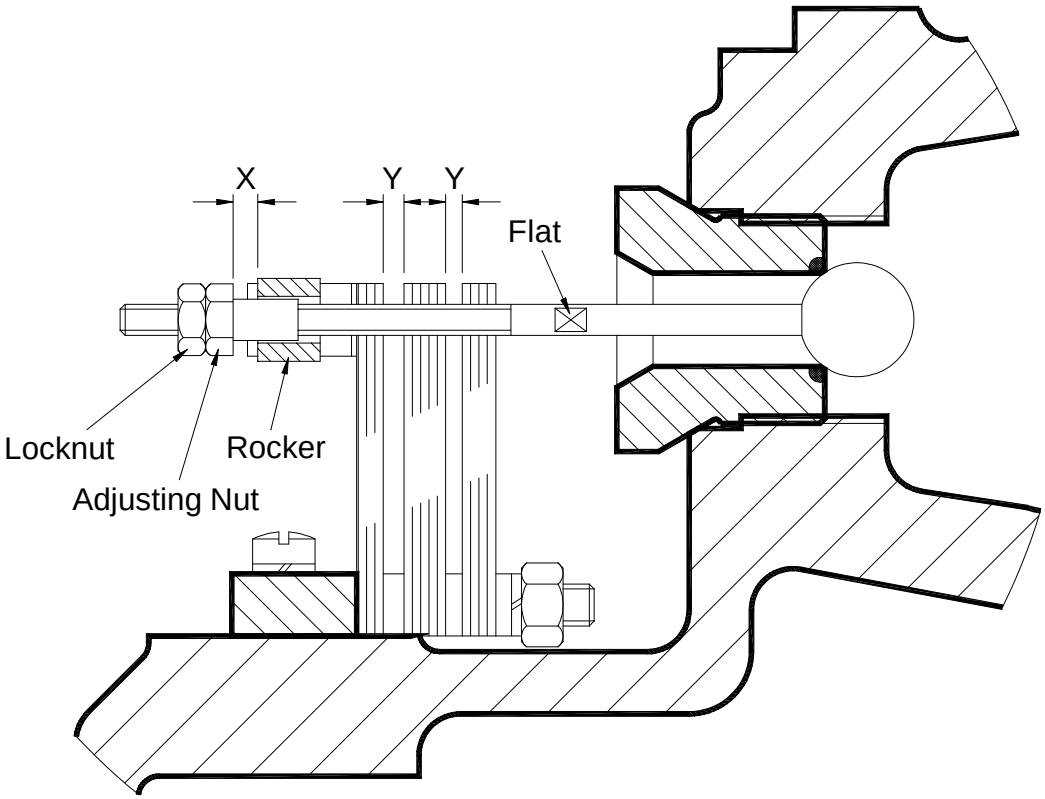


Fig. 5

BIMETAL PLATES – RUFLEX GB-14

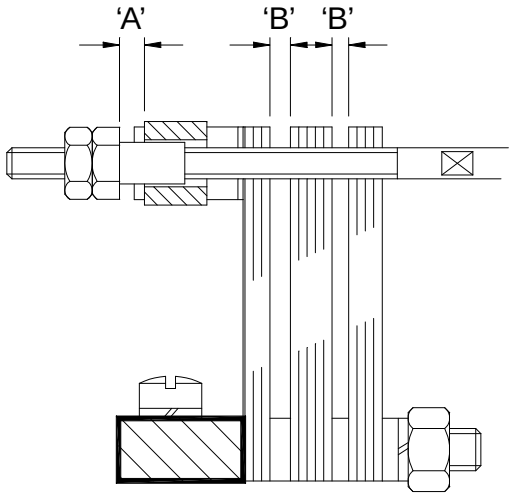
NOTE

A) Cold clearance should be a sliding fit between the locknut and rocker.

B) When checking the clearance ‘A’ with the gauge do not reduce the clearance ‘B’ between the bimetal segments. This must always be equal to the spacer in the element.

Room Temp.		SSF
°F	°C	
50	10	.086
55	12.8	.084
60	15.6	.081
65	18.3	.078
70	21.1	.075
75	23.4	.072
80	26.7	.070
85	29.4	.067
90	32.2	.064
95	35	.061
100	37.8	.058

Adjustment Chart



To alter clearance, release the locknut from the adjusting nut, fit a stem key - see tool part numbers - to the flat on the stem below the bimetal (Fig 6.). Turn the adjusting nut anti - clockwise to increase the clearance or clockwise to reduce the clearance, which will increase sub - cooling.

Do not increase the clearance beyond the point where the trap passes steam.

On completing the setting operation, re-lock the adjusting nut with locknut. (When locked check the clearance has not changed).

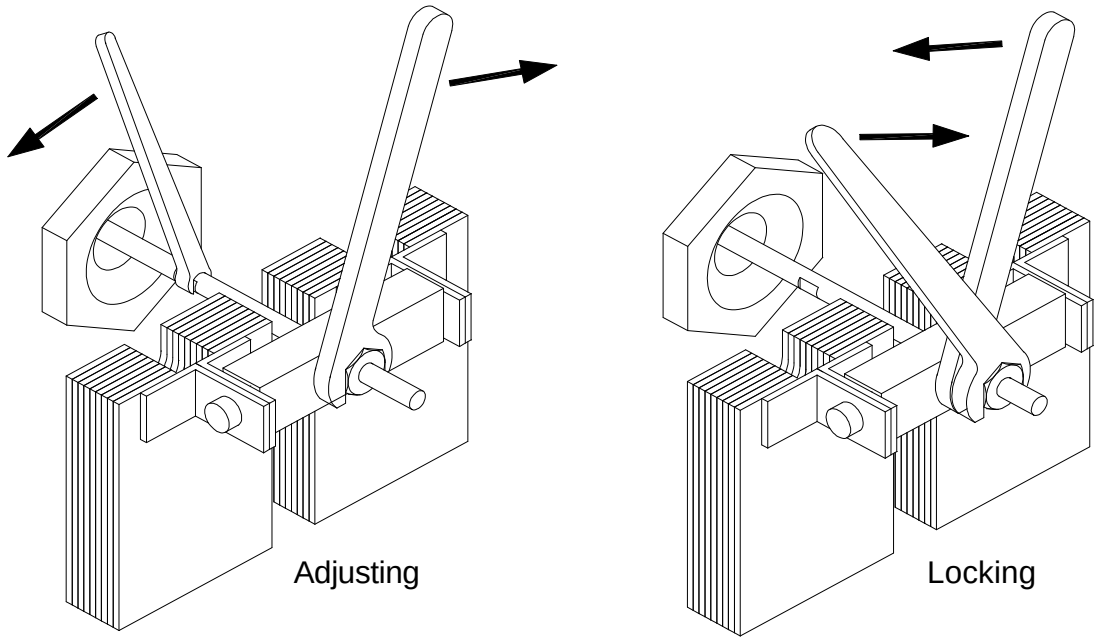


Fig. 6

c. HIGH BACK PRESSURE

The trap will operate against high back pressures, but the discharge temperature and discharge capacity will be correspondingly affected. For effective operation against back pressures in excess of 30%, the clearance should be increased gradually, up to a maximum of one full turn of the locknut approximately, ensuring that the trap continues to close tight on steam.Do not confuse with the discharge of flash steam released by the hot condensate.

4. MAINTENANCE

After completely isolating from live steam alterations can be performed with the trap in line by removing the cover. The strainer screen is removed through the strainer cover.

A. Dis-assembly

(i) : Remove the cover nuts and cover to gain access to the terminals.

(ii) : To remove the bimetal, first remove the valve stem locknut and adjusting nut. If the trap is still in the line, make sure that the valve and stem do not pass through the valve orifice into the pipeline. Remove the bimetal holding screws and ease the valve stem through the hole in the rockerplate, whilst moving the bimetal towards the inlet connection. When clear of the valve stem, lift the bimetal block clear of the trap.

(iii) : Fit appropriate ring or box spanner (wrench) to the valve seat hexagon and turn anti - clockwise to remove seat and valve assembly.

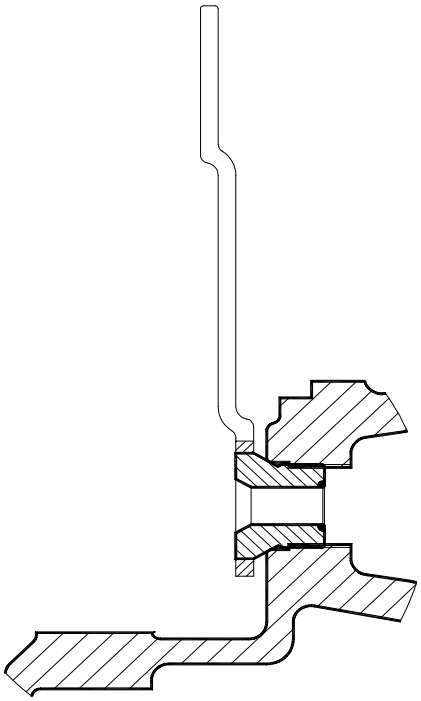


Fig. 7

B. Re-assembly

1. Valve / Valve Seat

(i) : Inspect the valve/valve seat for damage. If slight, repair by lapping (grinding) valve to valve seat using appropriate compound. If there is severe pitting or wire drawing (cutting) of the seating surfaces, replace with a new assembly.

(ii) : Before replacing in body, examine seat/body contact faces for damage. If worn, the body/seat joint can be re-machined. Use a portable air tool with right angle mounting and a 60 Deg (Fig 8) countersink, or remove body to workshop and use reverse countersink tool working through the outlet connection.

NOTE: For models SSF - 400 / 600 the body seating area is stellited to provide greater resistance to erosion.

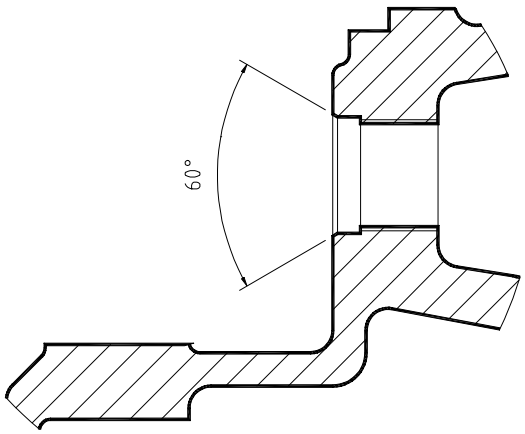


Fig. 8

(iii) : If the body is still mounted in the line, the valve assembly must be inserted through the valve orifice before,the valve seat is replaced into the valve body. Using the box spanner (wrench), tighten the valve seat firmly into the body seating area in a clockwise direction. Ensure the valve assembly can not pass through the orifice into the outlet piping. If the body is in the workshop, the seating faces can be checked for tightness by pressurising with air under the valve, and water above the valve. (Fig 9) Check for no leakage at body/seat and valve/seat faces.

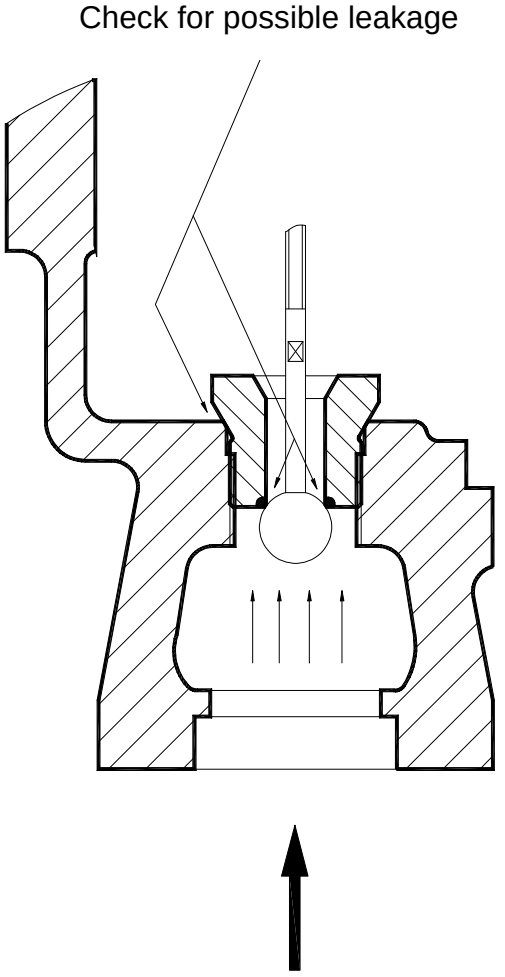


Fig. 9

2. Bimetal

Inspect the bimetal for dirt lodging in the space between the segments and clean if necessary. Where older type B1 bimetals were fitted, if plating shows sign of damage or corrosion replace with GB14.
The bimetal assembly should not be dis-assembled for any reason. Each plate must be concentric and in line with each other. Any plates out of alignment may interfere with the free movement of the valve and will reduce the closing force exerted by the bimetal assembly. Bimetal plates must also be fitted the correct way up or they will exert a negative force and movement. Markings on the underside and on the rear edge of the plates indicate whether the plates are assembled correctly.
If the body is mounted in the line, insert the bimetal into the body, rocker plate to the top and facing the inlet connection, threading the valve stem through the hole in the rocker. Attach the adjusting nut to the stem which will secure the valve into the body. Fit the bimetal holding screws through the holder into the body tightening only lightly.
The bimetal must be aligned with the axis through the seat orifice and with the valve lying along the centre line of the bimetal segments and through the centre of the rocker hole. Make any adjustments to the bimetal block position, using a screw driver or similar bar to achieve this. Firmly tighten the bimetal holding screws to lock in position.
This procedure is simplified if assembling in the workshop, by inserting the appropriate liner bar (see tool part numbers) through the seat orifice locating the bimetal through the rocker plate - Fig 10. Firmly tighten the bimetal holding screw, remove the liner bar, and fit the valve assembly through the outlet connection.

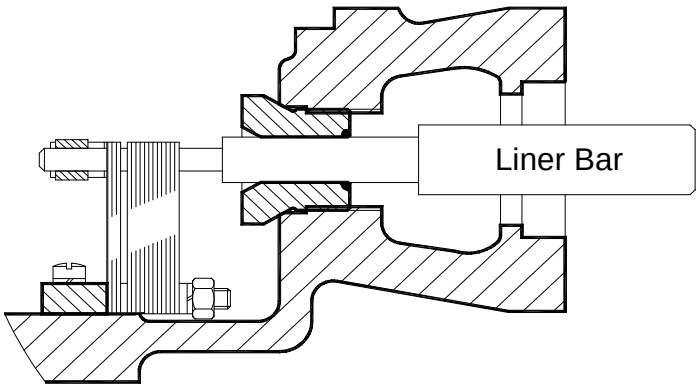


Fig. 10

3. Cover Gasket and cover

Check that the body and cover gasket seating faces are clean and undamaged. Fit new spiral wound gasket into the body recess, ensuring that the inner ring is fully supported for 100% of its periphery. Important- If any part of this first ring is not fully supported by the body and cover gasket faces, leakage may occur. Replace the cover tightening the nuts evenly and diagonally opposite. To ensure no leakage spiral wound gaskets must be compressed correctly. Plenty Steam Products ensures this by machining the recess and spigot, so that the correct compression is applied when the cover is in full metal to metal contact with the body flange. Recommended belting torque is 95 ft / lbs. (129 NM)

4. Strainer

Ensure the strainer is clean. If damaged or partially blocked replace with a new screen. Fit the strainer through the strainer cover flange locating into the recess inside the body. Clean the gasket faces in the strainer cover and body, fit new spiral woundgasket and replace the strainer cover tightening the nuts evenly until the cover is in full metal to metal contact with the body. Bolting torque is 95ft / lbs. (129 NM).
Refit the blowdown plug in Th strainer cover ensuring gasket faces are clean and using a new gasket. Alternatively a 1/2" NPT plug may be fitted to some models.

5. TOOL PART NUMBERS

Model Orifice mm Inch	SSF-125 25,4 1,0	SSF-200 22,2 7/8	SSF-400 14,3 9/16	SSF-600 12,7 1/2
Stem Key	L99001	L99001	L99001	L99001
Setting Gauge (GB14 Only)	L99005/B5	L99005/B5	L99005/B5	L99005/B5
Liner Bar (GB14 Only)	L99026	L99025	L99013	L99024