

OPERATING INSTRUCTIONS

Category IV Safety Accessory
Type 3600 Relief Valve



Application

Suitable for compressed air, gas, water, oil and steam service.



Operation

The set pressure can be varied as required by compressing or relaxing the spring using the adjusting screw:

Clockwise turns compress the spring increasing the set pressure.
Anti-clockwise turns relax the spring decreasing the set pressure.

Lifting and Handling

Wooden cases shall be lifted using either a Fork Lift Vehicle or a Crane with adequate Safety Approved slings applied to carry the weight, which will be evenly distributed within the case.

Important: All manual handling operations should be carried out in compliance with the Manual Handling Operations Regulations 1992 (SI 1992/2793) (EC Directive 90/269/EEC).



Storage

Valves with Screwed ends shall have plugs fitted in their connections to prevent ingress of dirt etc. Flanged valves shall have their bores blanked off.

We recommend that plugs/blanks be removed immediately prior to installation.



General

1. When a new valve leaves Broady Flow Control, it has been manufactured and tested by trained and experienced personnel. When you remove a valve from your system and perform the maintenance tasks that are outlined herein, you will need proper training.

Do not attempt to accomplish these tasks without adequate training and understanding of the valve operation.

2. Any and all stated or implied warranties that are in effect during the purchase of a new Broady valve are null and void once the valve has been disassembled by someone other than approved Broady personnel.

3. The contents of this document are subject to change without notice.

Safety Warning!
Discharge from outlet may be violent and must not be allowed to create a hazard to persons or property.



Testing

It is recommended that the following tests be carried out before installation of the valve: Seat tightness and set pressure.

Test Equipment

Connect valve inlet to a pressure vessel in which pressure may be raised gradually and measured by means of a precision pressure gauge.

Seat Tightness Test

The valve outlet should be fitted with an appropriately sized leakage detector (see Fig. 1) in accordance with API 527.

Raise inlet pressure to 90% of set pressure and check that not more than 40 air bubbles per minute pass through the water.

Should the leakage exceed the stated value, refer to table "Faults in Operation" (Fig. 2)

EQUIPMENT FOR SEAT TIGHTNESS TEST

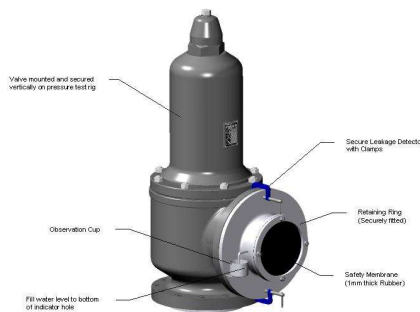


Fig. 1 - API 527 compliant leakage detector

Set Pressure Test

Check that valve starts opening at required set pressure (refer to Valve Nameplate for correct value).

Changes outside the stated tolerances must be corrected by varying the spring compression using the Adjusting Screw (9).

To regulate the set pressure:

1. Fit valve to Test Rig with no pressure on valve inlet.
2. Remove the cap (10).

3. Prevent Disc Holder (5) rotating by holding Spindle (7) with screwdriver in slot on Spindle end.

4. Loosen Locknut (11) (fitted to Adjusting Screw (9))

5. Adjust using Adjusting Screw (9) until the desired set pressure is achieved. Do not allow Disc Holder (5) to rotate.

6. Reassemble Cap (10).

Note: For each successive set pressure check; Locknut (11) must be tightened.



Installation and Commissioning

It is most important that the pipeline and valve connections be clean and free from dirt, scale, etc.

Avoid bumping or shaking valve to prevent misalignment of trim and damage to flange faces.

Fit valve in pipeline with flow direction as indicated by arrow cast on valve body; with inlet down and Adjusting Screw in vertical position above pipeline.

If required remove plastic plug for vent port on side of body and fit bug filter or to be piped away for hazardous mediums

It is also advisable to fit a stop valve on high-pressure side of line.

Use inlet and outlet pipework as short as possible and of dimensions equal to the valve connections.

Uniformly tighten fasteners securing valve connections to pipework.

Secure outlet pipework in order to reduce vibration and avoid strain on outlet flange.

Avoid elbows with small curvature radii on the outlet pipe: for high temperature gas and vapour discharge, use expansion joints.

After valve has been installed, make it pop at least twice to allow automatic alignment of trim.



Maintenance

Regular Checks:

Check at regular intervals for signs of obvious faults.

Leakages must be repaired immediately, especially when the medium is poisonous, highly volatile or very explosive.

When valve is fitted with lifting device, vent periodically (at least three or four times a year) to check operation. During these tests, the pressure must be at least 75% of the full working pressure.

Annual Checks:

Examine annually for signs of defect, damage or deterioration.

Give special attention to contact/seating faces. If damaged, these must be re-machined and lapped in.

Springs should be replaced if there is any sign of deterioration.

All parts should move freely in their respective guides.

Note: Quote the unique valve serial number when ordering spare parts.

Lapping the Disc

Use a cast iron or plate glass block of suitable size, with a perfectly smooth and flat surface. Apply a small quantity of lapping compound to smooth surface of block. Pass Disc (3) across smooth surface in a figure of eight movement. Lift Disc periodically away from block so that lapping compound may flow from edges towards centre.

Lapping the Nozzle Seat

Use a cast iron or plate glass block of suitable size; check that it does not tilt, to avoid rounding off edges. Apply lapping compound to smooth surface of block. Pass Nozzle seating surface across smooth surface in a figure of eight movement. During lapping operation, make sure no foreign matter is on either lapped surface or block.

Note: Lapped parts must be carefully cleaned before assembling, to remove every trace of lapping compound.

Safety Warning!
Before dismantling, ensure that the valve has been isolated from the pressure and the adjusting screw has been removed.



Dismantling and Reassembly

Dismantling: Note - Small Loose Parts in Valve

1. Remove Cap and Joint (10 & 19).
2. Measure position of the Adjusting screw (9) and record for re-assembly purposes.
3. Slacken Locknut (11) and unscrew Adjusting screw (9).
4. Remove Lockscrew (15).
5. Unscrew Nozzle (2), lift off Body(1), remove (Huddling ring Liquid Trim Only) (22) and O-ring (16) attached to Nozzle
6. Remove Disc(3) & Ball (4) from Disc holder(5)
7. Remove Disc Holder(5), Spindle(7) & O-ring(17) from valve.

8. Remove Guide Ring(6), O-ring(18), Spring Carriers(8) & Spring(12) from Body(1) by firmly tapping Body on a clean wooden surface to knock out Guide Ring(6).

Note: Replace all Joints & O-Ring with new ones.

Danger of Explosion!
Oxygen Service - Carefully degrease all components before assembling valves. Failure to do so will result in an explosion.

Reassembly:

Carry out the operations listed for disassembly in reverse, taking care to avoid scratching lapped surfaces.

To prevent damage to Disc/Nozzle faces, hold Spindle (7) with screwdriver in the slot on the Spindle end whilst turning Adjusting Screw(9) & compressing Spring(12)

Clean the trim thoroughly throughout. Lubricate Adjusting Screw, Spring Carrier and all threads with graphite grease.

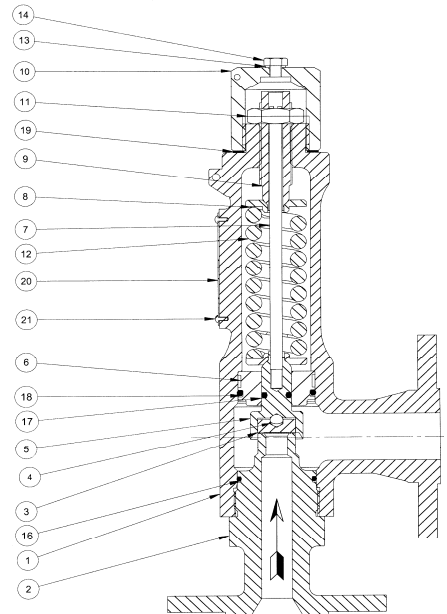


Fig 3- 3600 Gas / Steam Service

3600 Gas / Steam Parts List		
Item	Description	Qty
1	Valve Body	1
2	Nozzle	1
3	Disc	1
4	Ball	1
5	Disc Holder	1
6	Guide Ring	1
7	Spindle	1
8	Spring Carrier	2
9	Adjusting Screw	1
10	Cap	1
11	Locknut	1
12	Spring	1
✳ 13	Joint , Plugs	2
14	Cap Plug	1
15	Lockscrew	1
✳ 16	O Ring	1
✳ 17	O Ring	1
✳ 18	O Ring	1
✳ 19	Cap Joint	1
20	Nameplate	1
21	Rivets	2

✳ Recommended spare parts

OPERATING INSTRUCTIONS

Fig. 2 - Faults in Operation

FAULT	CAUSES	SOLUTIONS
Leakage	<p>(1) Presence of foreign matter between seat and disc</p> <p>(2) Scratching or pitting on seat surface</p> <p>(3) Valve used with a medium other than specified when ordering</p> <p>(4) Valve not mounted vertically.</p>	<p>(1) Discharge valve once or twice consecutively. Should leakage continue, disassemble valve and clean trim.</p> <p>(2) Disassemble valve, grind and lap seat.</p> <p>(3) Lap seat and disc more finely if the valve originally ordered for liquid service is used with gas</p> <p>(4) Correct installation.</p>
Discharge at incorrect pressure	<p>(1) Variable back pressure</p> <p>(2) Back pressures different from specified when ordered</p> <p>(3) Loosening of lock nut on spring adjusting screw.</p> <p>(4) Poor trim alignment.</p>	<p>(1) Check that discharge takes place in piping, whose dimensions are equal to or greater than those of the outlet connections of the valve, and that the discharge piping is free from obstruction.</p> <p>(2) The valve must be re-calibrated, correcting the spring compression for the revised set pressure.</p> <p>(3) Tighten lock nut after re-calibrating the valve.</p> <p>(4) Discharge the valve 2 or 3 times to allow self-alignment of the trim.</p>
Chatter (rapid opening and closing cycle).	<p>(1) Blowdown ring incorrectly adjusted.</p> <p>(2) Insufficient discharge capacity.</p>	<p>(1) Ensure that the blowdown ring is in the lowest position for liquid service. For valves used on gas; regulate suitably.</p> <p>(2) Check that the discharge piping is not too long. Check that the valve is not undersized.</p>

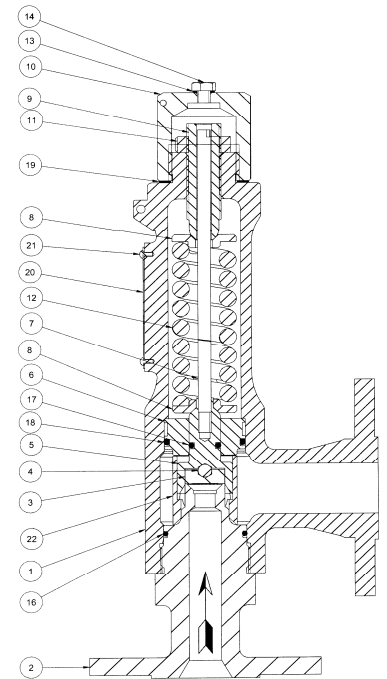


Fig 4 - 3600 Liquid Service

3600 Liquid Service Parts List		
Item	Description	Qty
1	Valve Body	1
2	Nozzle	1
3	Disc	1
4	Ball	1
5	Disc Holder	1
6	Guide Ring	1
7	Spindle	1
8	Spring Carrier	2
9	Adjusting Screw	1
10	Cap	1
11	Locknut	1
12	Spring	1
✖ 13	Joint, Plugs	2
14	Cap Plug	1
15	Lockscrew	1
✖ 16	O Ring	1
✖ 17	O Ring	1
✖ 18	O Ring	1
✖ 19	Cap Joint	1
20	Nameplate	1
21	Rivets	2
22	Huddling Ring (Liquid Service Only)	1

✖ Recommended spare parts

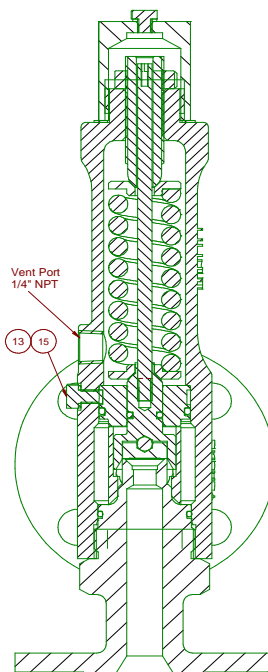


Fig 5 End View Showing Vent Port