

Installation and Maintenance Manual

Forbes Marshall Full Lift Safety Valves

SRV (DN25-200)



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PLEASE NOTE - Throughout this manual this cautionary symbol is used to describe a potential damage or injury that might occur if the safety considerations are overlooked. This symbol denotes **CAUTION**, **WARNING** or **DANGER**.



1. Preface:

This manual is intended for anyone using, commissioning, servicing, or disposing the below mentioned products safely and efficiently.

Forbes Marshall Full Lift Safety Valves [SRV (DN25-200)]

Sizes: DN25 (1"), DN40 (1 ½"), DN50 (2"), DN80 (3"), DN100 (4"), DN150 (6"), DN200 (8")

PLEASE NOTE:

Throughout this manual the following cautionary symbol is used to describe a potential damage or injury that might occur if the safety considerations are overlooked.

2. Important Safety Notes:



Read this section carefully before installing/operating/maintaining the product. The precautions listed in this manual are provided for personnel and equipment safety. Furthermore, Forbes Marshall accepts no responsibility for accidents or damage occurring as a result of failure to observe these precautions. Note that the product is designed to perform for non-contaminated fluids only. A contamination in the form of chemical, foreign particle etc. can lead to problem with product performance and life of the product.

If these products in compliance with the operating instructions are, properly installed, commissioned, maintained and installed by qualified personnel (refer Section 2.7) the safety operations of these products can be guaranteed. General instructions for proper use of tools and safety of equipments, pipeline and plant construction must also be complied with.

2.1 Intended use:

Check if the product is suitable for intended use/ application by referring to the installation and maintenance instructions, name plates and technical information sheets.

- i) The product is suitable for use as defined in the technical information sheet. In case the need arises to use the product on any other fluid please contact Forbes Marshall for assistance.
- ii) Check for the suitability in conformance to the limiting conditions specified in technical information sheet of the product.
- iii) The correct installation and direction of fluid flow has to be determined.
- iv) Forbes Marshall products are not intended to resist external stresses, hence precautions to be taken to minimize the same.

2.2 Accessibility and Lighting:

Safe accessibility and working conditions are to be ensured prior to working on the product.

2.3 Hazardous environment and media:

The product has to be protected from hazardous environment and check to ensure that no hazardous liquids or gases pass through the product.

2.4 Depressurizing of systems and normalizing of temperature:

Ensure isolation and safety venting of any pressure to the atmospheric pressure. Even if the pressure gauge indicates zero, do not make an assumption that the system has been depressurized.

To avoid danger of burns allow temperature to normalize after isolation.

2.5 Tools and consumables:

Ensure you have appropriate tools and / or consumables available before starting the work. Use of original Forbes Marshall replacement parts is recommended.

2.6 Protective clothing:

Consider for the requirement of any protective clothing for you/ or others in the vicinity for protection against hazards of temperature (high or low), chemicals, radiation, dangers to eyes and face, noise and falling objects.

2.7 Permits to work:

All work to be carried out under supervision of a competent person. Training should be imparted to operating personnel on correct usage of product as per Installation and Maintenance instruction. "Permit to work" to be complied with (wherever applicable), in case of absence of this system a responsible person should have complete information and knowledge on what work is going on and where required, arrange to have an assistant with his primary goal and responsibility being safety. "Warning Notices" should be posted wherever necessary

2.8 Handling:

There is a risk of injury if heavy products are handled manually. Analyze the risk and use appropriate handling method by taking into consideration the task, individual, the working environment and the load.

2.9 Freezing:

Provision should be made to protect systems which are not self-draining, against frost damage (in environment where they may be exposed to temperatures below freezing point) to be made.

2.10 Product Disposal:

It is necessary to dispose this product only in accordance with local regulations at the authorized, qualified collecting point specified for equipment's and its parts—Please refer the part details mentioned in the material table of this manual.

Please follow all waste disposal guidelines (Management & Handling) as published by governing authorities in India & abroad local

2.11 Returning products:

Customers and Stockist are reminded that, when returning products to Forbes Marshall they must provide information on any hazards and the precautions to be taken due to contamination residues or mechanical damage which may present a health, safety or environmental risk.

This information must be provided in writing including Health and Safety data sheets relating to any substances identified as hazardous or potentially hazardous.

3. Brief Product Information:

3.1 Description:

The Forbes Marshall Full Lift Safety Valves SRV is a angle pattern spring loaded safety relief valve with carbon steel or stainless steel seat, valve and internals suitable for use on steam, gas and liquids.

3.2 Size and Pipe Connections:

DN 25, 40, 50, 80, 100, 150 and 200

Flanged ASME B16.5 # 150, # 300 or suitable

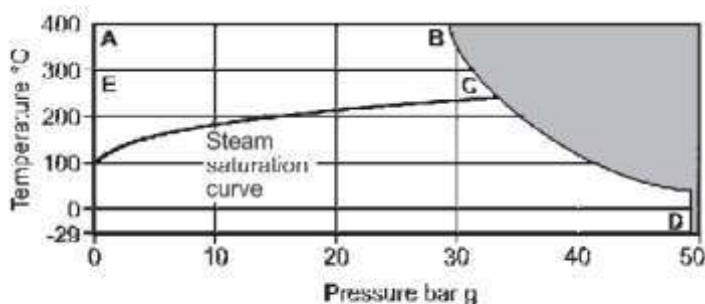
These valves designed as per IBR, API 526 & meets ASME section VIII Div

Available with IBR certificate Form III C

3.3 Limiting Conditions:

PMO maximum operating pressure	As per size prgroup & Flange class
TMO maximum operating temperature	425°C / 537°C for CS or SS internals
Cold hydraulic test pressure	As per size, pr. group & PMO

3.4 Operating Range:



 The product must not be used in this region.

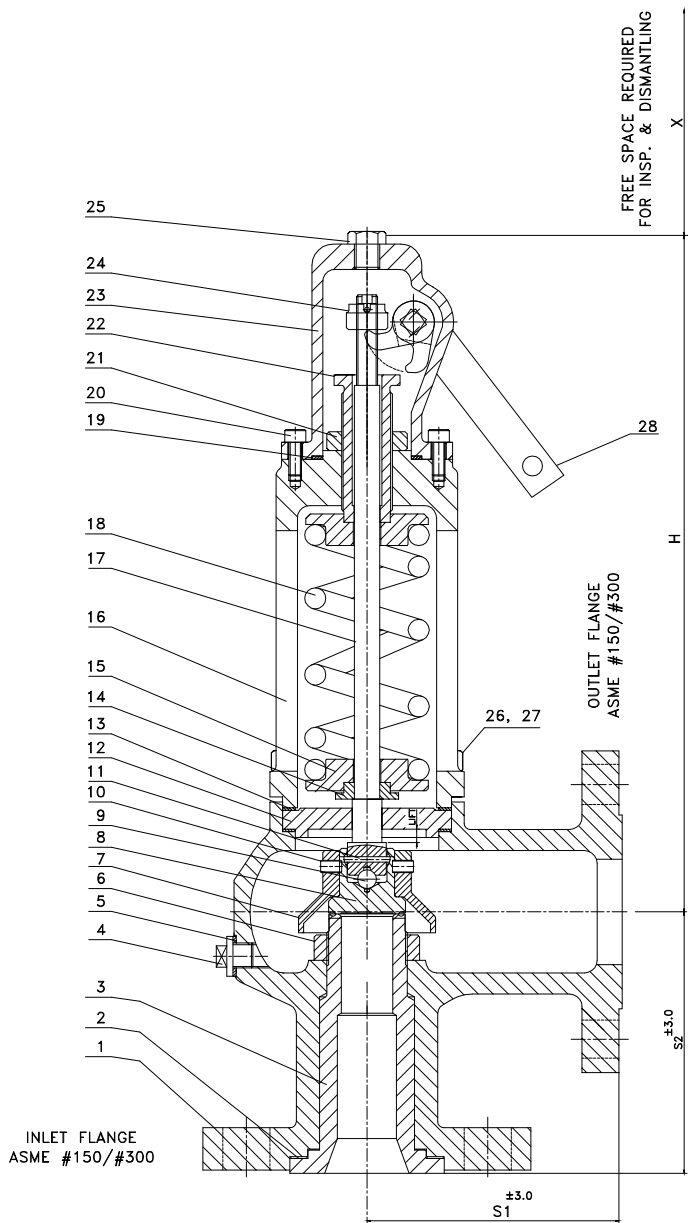


Figure 1: Forbes Marshall Full Lift Safety Valve

Materials:

28	EASING LEVER	S.G. IRON GGG40
27	STUD	ASTM A 193 Gr. B7
26	NUT	ASTM A 194 Gr. 2H
25	PLUG	C 20
24	LOCK NUT	Gr.8
23	CAP	C 20
22	ADJUSTMENT BOLT	ASTM A276 Gr. 410
21	LOCK NUT	ASTM A276 Gr. 410
20	ALLEN SCREW	Gr. 12.9
19	GASKET	GRAPHITE
18	SPRING	50 Cr V4
17	SPINDLE	ASTM A276 Gr. 410
16	BONNET	ASTM A216 WCB
15	SPRING GUIDE	ASTM A276 Gr. 410
14	PROTECTION RING	ASTM A276 Gr. 410
13	GASKET	GRAPHIE
12	COVER / GUIDE BUSH	ASTM A 351 CF8
11	PIN	SS 304
10	GRUB SCREW	HIGH TENSILE
9	BALL	SS 304
8	DISC	ASTM A276 Gr. 431
7	BLOWDOWN RING	ASTM A 351 CF8
6	LOCK NUT	ASTM A276 Gr. 410
5	GASKET	SOFT IRON
4	DRAIN PLUG	SS 304
3	NOZZLE	ASTM A 105
2	GASKET	GRAPHITE
1	BODY	ASTM A 216 WCB
S.No.	PART	MATERIAL

Dimensions: (approx.) in mm (Refer to Figure 1)

SIZE (DN)	INLET ORIFICE OUTLET	S1	S2	H	X
25	1 DA 2	114	105	320	300
	1 EA 2	114	105	320	300
40	1-1/2 FA 2	121	124	320	300
	1-1/2 GA 2-1/2	121	124	320	300
50	2 HA 3	124	130	320	300
	2 JA 3	124	137	390	300
80	3 KA 4	162	156	390	300
100	4 LA 6	180	181	710	600
	4 MA 6	179	181	710	600
	4 NA 6	210	197	710	600
	4 PA 6	229	183	970	800
150	6 QA 8	241	240	970	800
	6 RA 8	241	240	990	800
200	8 TA 10	280	276	1030	800

4. Product Working Principle : (Refer to Figure 1)

The Forbes Marshall safety relief valve is normally set at a pressure which is 10% above the working pressure of the system. This is referred to as a set pressure. When the safety pressure reaches blow off pressure the safety relief valve opens to its full lift to discharge full capacity. The valve closes at reset pressure.

The steam enters the safety relief valve through the inlet from the bottom. When the steam reaches the set point, it lifts the disc **(8)** off the nozzle **(3)**, working against the spring **(18)** present inside the valve body. (The set pressure can be changed using the adjustment bolts **(22)**). As long as the steam pressure exceeds the set pressure, the valve remains open. As soon as it comes below the set pressure, the spring force pushes the disc **(8)** back onto the nozzle **(3)**.

The guide bush **(12)** guides the disc **(8)** back to the nozzle **(3)**.

4.0 a) Operating Pressure :

This is the gauge pressure existing at normal operating conditions within the system to be protected.

b) Set Pressure :

Gauge pressure at which the pressure relieving device commences its lift. The first audible (Hissing sound when testing of gases or steam) or visual indications (Spa bubble bursting in case of testing on gases).

c) Opening Pressure :

Gauge pressure at which the lift is sufficient to discharge the predetermined discharge capacity the pressure relieving device is sized for.

d) Reseat Pressure :

Gauge pressure at which the pressure relieving device closes and there is no further leakage or passing of steam from between the seat and disc.

e) Over Pressure :

This is the pressure rise over the set pressure at which the pressure relieving device reaches the full lift required for capacity to be discharged.

f) Blowdown :

This is the difference between the set pressure and the reseal pressure. This is calculated by observing the gauge pressure at which the pressure relieving device commences its lift (Set pressure) and the gauge pressure at which the pressure relieving device recloses (Reseat pressure). The difference in the gauge pressures i.e. Set pressure – Reseat pressure=Blowdown.

4.1 Precaution related to pressure relieving devices:

a) Valve Selection:

- 1) Do not use an over sized pressure relieving device. This will lead to unstable behavior such as chattering or vibration.
- 2) Select a conventional pressure relieving device when the back pressure is not more than 15% of the set pressure value. For higher back pressure use of below sealed valve is recommended.
- 3) Closed bonnet pressure relieving devices should be used on liquids and gases.

b) Valve piping connection:

- 1) Ensure that the pipe upstream of the pressure relieving device is as short as possible and that the pressure loss from the vessel to be protected to the valve nozzle is not more than 3%. If possible valve shall be located directly on the vessel or header.
- 2) Upstream pipe should be of a diameter equal to the pressure relieving device inlet as a minimum requirement.
- 3) Avoid bend close to the valve nozzle. This can lead to chattering and vibrations of the valve. Number of bends upstream of the valve should be such that the pressure loss does not exceed 3%.
- 4) Pressure relieving device and piping upstream of the device should be free from vibrations from effects of water hammer and from dynamic forces produced by restrained heat expansion. Provide proper support to the valve.
- 5) On steam, gas and vapor applications, discharge line of the pressure relieving device should have a slope to avoid accumulation of condensed medium at the valve outlet line. A drain in the discharge line is recommended at the lowest point of the discharge line.
- 6) Discharge line size should be equal to or larger than the valve outlet size of the pressure relieving device.
- 7) A pressure relieving device should always be installed with its bonnet in vertical position. Valve in inclined position may not open properly due to friction in the valve internals.

4.2 Pressure Test At Manufacturers Shop:

This is to be carried out by Blocking this Spindle (17) with a Spindle test Gag (28) Provided on the Cap.

The Valve is Placed on the Test Rig on this Nozzle inlet flange (1) and in a vertical position with the inlet flange resting on the base plate of Rig.

A test Gag (28) is provided with threads on either ends of its head assembled on the cap. In the supply condition the smaller length end is screwed into the cap.

The Operator has to rotate the test Gag (28) anti clockwise to disassemble it from the valve cap and rotate the test Gag before assembling the Test Gag with the longer threaded section onto the cap.

The operator has to screw the long end section of test Gag into the cap till it is not possible to tighten if further. The valve spindle (17) is now block and the operator can carry out the pressure test.

After carrying out the pressure test, the operator must ensure that the longer end test Gag is removed from the cap and the smaller end of the test Gag is screwed in to the cap.

4.3 Set Pressure Test At Manufacturers Works:

Set pressure test is carried out on a safety valve testing Rig.

Valve is tested on Air/Nitrogen when the safety valve is to be used on steam or gases.

The test is carried out with water when the valve is to be used on liquid service.

The valve inlet flange (1) is clamped firmly on the test Rig baseplate and care is taken to see that there is no leakage of test medium from between the test Rig base plate and the valve inlet flange.

(in case of butt weld end a spacial fixture is made with "O" ring in it for assembling onto the test Rig).

The valve outlet is kept open before carrying out the test for set pressure on a test Rig, the area around the valve seat and disc section and body bonnet joint is dried with dry pressurised air and all traces of water are removed.

When testing with Air/nitrogen, The valve outlet flange is covered with a thin film of soap.

the valve inlet is pressurized with the test medium and the valve outlet is observed for change in shape of soap film.

The gauge pressure at which the soap film starts changing its shape/bursts, is an indication that the valve has started to open and that the set pressure value has been reached. At this pressure the operator will also notice that there is no further increase in the pressure to the valve and the pressure start dropping.

In case of testing for liquids, the operator has to check for the first traces of liquid leaking from the valve seat. Beyond this point there will be no further increase in pressure possible and the pressure will start reducing.

The pressure on the dial gauge on the test Rig continues to drop till the valve reseal and there is no further leakage of test medium past the valve seat.

This pressure is the reseal pressure of the valve.

To check for leakage rate at the valve seat, the outlet flange is assembled with a counter flange with a tube arrangement as specified under the requirements of API 526.

This arrangement is used to check the leakage of test medium and the number of bubbles escaping from the nozzle per minute is counted.

(It is not possible to test the valve for full lift on a test bench as needs to have the test medium reservoir below the test Rig to allow for a uninterrupted flow of test medium and in large quantity (especially for larger size of valves)

5. Installation Guidelines:



Note: Before implementing any installations observe the 'Important Safety notes" in section 2. Referring to the Installation and Maintenance Instructions, name-plate and Technical Information Sheet, check that the product is suitable for the intended installation.

1. The valve should always be mounted vertically upwards with its main axis kept vertical.
2. There should be no intervening valve or any fitting between the piping and the safety relief valve which could isolate the SRV (Refer to 2a).
3. The inlet connection should never be smaller than the valve inlet and output pipe should be either equal or larger than the valve outlet.
4. Where the outlet pipework is directed upwards a small bore drain should be provided at the lowest point. Take the drain to a place where discharge will not create any hazard or inconvenience (Refer to 2b).
5. Each safety relief valve should have its own discharge pipe.
6. Make sure that safety relief valve is set to the correct pressure.
7. safety relief valves should not be insulated.
8. Excessive pressure loss at the inlet of a safety relief valve when it operates will cause extremely rapid opening and closing of the valve, observed as chattering or hammering. This may result in reduced capacity as well as damage to seating faces and the other parts of the valve. When normal pressure is restored it is possible that the valve will leak. Therefore the Valve should be fitted 8-10 pipe diameters downstream of Converging or Diverging Fittings or Bends (Refer to 2c)

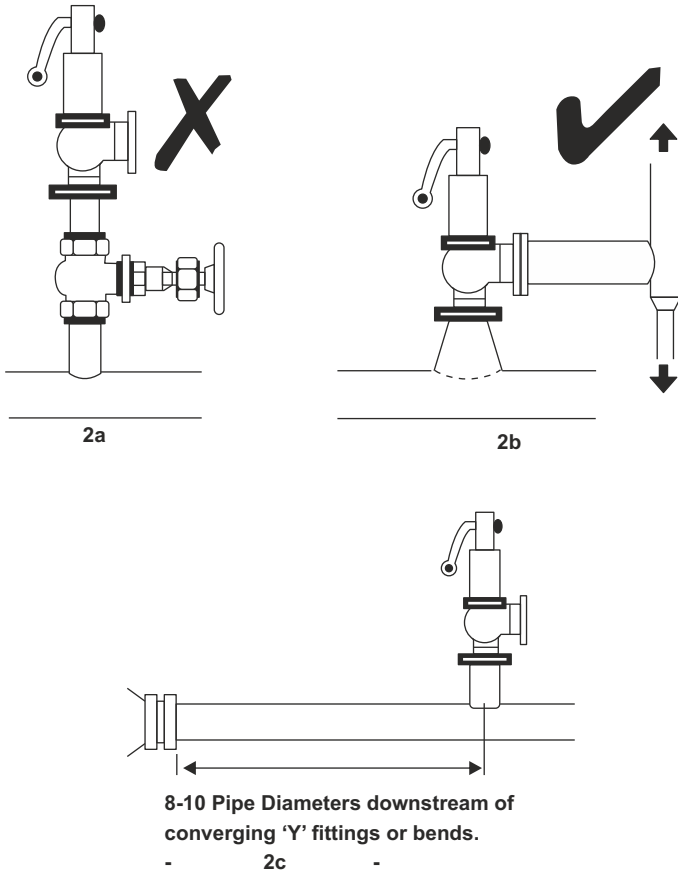


Figure 2: Correct Installation of Forbes Marshall Full Lift Safety Valve

6. Startup and Commissioning

6.1 Flushing of lines:

As part of pre-installation all fluid handling equipment particularly piping should be thoroughly cleaned of scale and the internal debris which accumulates during construction. This is accomplished by blowing or flushing with air, steam, water and other suitable medium.

Note: For a detailed procedure on flushing of lines please visit Forbes Marshall website.

6.2 Safety relief valve setting : (Refer to Figure 1)

1. The safety relief valve should be set at a pressure, which is 10% above the working pressure of the system.
2. Forbes Marshall safety relief valve, SRV (DN25-200) comes with predefined set pressure ranges.

The range is marked on the safety relief valve body outlet flange ; safety relief valve is be set in this range.
3. To set the safety relief valve, please remove cap assembly **(23)**.
4. Before setting of safety relief valve, please ensure that the safety relief valve discharge is routed at safe location.
5. Charge the steam line and ensure that the steam pressure is 10% more than the system operating pressure and test the safety relief valve by shutting down the downstream stop valve without the chance of downstream process being over pressurized.
6. If safety relief valve is not blowing at that pressure, then loosen the adjustment lock nut **(24)** and do the set pressure adjustment with adjustment bolt **(22)**. By rotating adjustment bolt in clockwise direction, set pressure increases and it decreases by rotating it in anticlockwise direction.
7. After setting the required set pressure, hold the adjustment bolt and tighten the adjustment lock nut **(24)**.

7. Maintenance Guidelines :



Before undertaking any maintenance on the product it must be isolated from both supply line and return line and any pressure should be allowed to safely normalize to atmosphere. The product should then be allowed to cool.

7.1 Routine and Preventive Maintenance:

Sr.No	Parameters to be checked	Frequency for checking and maintaining						
		Immediately	Daily	Weekly	Monthly	Quarterly	Half yearly	Annually
1	Visual inspection for leakages		Y					
2	Testing of safety relief valve					Y		
3	Cleaning of internals							Y

*Re-certification by respective regulatory authorities as and when required.

7.2 Inspection and Maintenance of safety valve:

Safety valve offers best and reliable service if taken care of properly and a strict inspection routine is followed.

a) During Patrols:

The maintenance crew has to listen for possible indications of leakage at the valve seat or at the gasket joints. Audible indications such as hissing sound, whistling noise around the safety valve, Fluid at drain branch or discharge line are indications of possible leakage at valve seat. Fluid leaking from the body bonnet gasket is also to be checked for from time to time.

b) Annual Inspection:

Check all gasket and replace them every time the valve is opened for inspection.

Check seating surface for visible scratches or damage.

Rework valve seat and disc with a lapping paste suggested by valve manufacturer. If necessary replace disc with new one.

Clean all guiding surfaces of the valve with a soft clean cloth. Use a new cloth every time.

c) Long Interval Inspection (3 year) :

Completely disassemble the valve. If possible number the parts according to the serial number of disassembly

Clean every valve with a fresh new cloth.

Disassembly to be done in a dust and oil and grease free area.

Rework valve seat and disc with a lapping paste suggested by valve manufacturer. If necessary replace disc with new one.

Replace spring in case you observe corrosion on its surface or temperature damage.

Lubricate bearings and adjusting screw.

7.3 Tool Kit:

To carry out any maintenance of the SRV use the tools mentioned in the table below.

VALVE SIZE	PART	TOOL	TOOL SIZE
DN25	ALLEN SCREW CAP ASLY	ALLEN KEY	6mm (A/F)
	LOCK NUT AT SPINDLE	OPEN SPANNER	17mm (A/F)
	STUD NUT (BODY ASSEMBLY)	OPEN SPANNER	17mm (A/F)
	ADJUSTMENT BOLT	OPEN SPANNER	27mm (A/F)
DN40	ALLEN SCREW CAP ASLY	ALLEN KEY	6mm (A/F)
	LOCK NUT AT SPINDLE	OPEN SPANNER	17mm (A/F)
	STUD NUT (BODY ASSEMBLY)	OPEN SPANNER	17mm (A/F)
	ADJUSTMENT BOLT	OPEN SPANNER	27mm (A/F)
DN50	ALLEN SCREW CAP ASLY	ALLEN KEY	6mm (A/F)
	LOCK NUT AT SPINDLE	OPEN SPANNER	17mm (A/F)
	STUD NUT (BODY ASSEMBLY)	OPEN SPANNER	17mm (A/F)
	ADJUSTMENT BOLT	OPEN SPANNER	36mm (A/F)
DN80	ALLEN SCREW CAP ASLY	ALLEN KEY	6mm (A/F)
	LOCK NUT AT SPINDLE	OPEN SPANNER	17mm (A/F)
	STUD NUT (BODY ASSEMBLY)	OPEN SPANNER	24mm (A/F)
	ADJUSTMENT BOLT	OPEN SPANNER	36mm (A/F)
DN100	ALLEN SCREW CAP ASLY	ALLEN KEY	8mm (A/F)
	LOCK NUT AT SPINDLE	OPEN SPANNER	17mm (A/F)
	STUD NUT (BODY ASSEMBLY)	OPEN SPANNER	24mm (A/F)
	ADJUSTMENT BOLT	OPEN SPANNER	50mm (A/F)
DN150	ALLEN SCREW CAP ASLY	ALLEN KEY	14mm (A/F)
	LOCK NUT AT SPINDLE	OPEN SPANNER	36mm (A/F)
	STUD NUT (BODY ASSEMBLY)	OPEN SPANNER	30mm (A/F)
	ADJUSTMENT BOLT	OPEN SPANNER	75mm (A/F)
DN200	ALLEN SCREW CAP ASLY	ALLEN KEY	14mm (A/F)
	LOCK NUT AT SPINDLE	OPEN SPANNER	36mm (A/F)
	STUD NUT (BODY ASSEMBLY)	OPEN SPANNER	36mm (A/F)
	ADJUSTMENT BOLT	OPEN SPANNER	75mm (A/F)

7.4 A) Disassembling the Safety Valve:

Observe and number the parts as per the Sequence of Disassembly to ease identification and reassembly

1. Disassembly of Cap:

Un screw the Bolts (20) on the Cap and Lever (28) in counter clockwise direction so that the Lift Fork in the Cap does not Foul with the Spindle Nut(24) Lift the Cap assembly from the Valve Bonnet.

2. Disassembly of Bonnet:

Remove the Spindle Nut (24) by with the help of Spanner. Measure and Record the distance from the top end of Spindle to top edge of Spring adjusting screw (22). Loosen the Bonnet Hexagonal Nuts (26) and unscrew the Lock Nut (21) Lift the Bonnet (16) along with the Spring Tension Adjusting Bolt(22).

3. Disassembly of Spring Assembly:

After removing the bonnet, remove the top Spring Plate. Observe and record the end of the spring facing the operator upwards. Lift the spring (18). Lift the lower spring plate followed by spacer and Protection ring(14) Remove Gasket and lift Guide cover.

4. Disassembly of Disc Assembly:

Lift the spindle (17) from the Valve body along with cover (12) and place it to one side on a clean surface, preferably on a soft clean cloth.

Lift the cover (12) from over the spindle (17) and place it aside.

Unscrew the Grub Screws (10) to Disengage the Blowdown Ring (7) from the spindle (17). Lift the Blowdown Ring (7) from the spindle (17).

Remove the Pin (11) to release the Disc and Ball(9) from the spindle (17).

Remove the Inlet Nozzle (3) only if necessary

B) Assembly of Disassembled Valve:

Screw in the Inlet Nozzle (3) into the Valve Body (1). Care should be taken to place new Gaskets (2) between the Inlet Flange Nozzle and Body.

Place Disc (8) with ball (9) on lower end of spindle (17) and engage it onto the spindle with Pin (11).

Pass the Blow Down Ring (7) from the top end of the spindle (17) till it touches the back end of the disc (8). Screw in the Grub screw (10) to fasten the blowdown ring to the spindle

Lower the cover(12) onto the spindle from the top end of the spindle.

Now lower the spindle assembly along the disc , Blowdown Ring and Cover into the Valve Body Ensure that a new set of Gaskets(13) are placed before placing the cover into the valve body.

Initially, it is advisable to keep valve spindle lifted slightly with one hand while the balance parts are lowered onto the valve spindle. This prevents and disc getting accidentally rubbed onto the nozzle.

Lower the Protecting ring(14), followed by spacer rings, lower spring plate, spring(18) and upper spring guide from the top end of the spindle.

Carefully lower the spindle held up with one hand , downwards so that the Disc rests onto the Nozzle.

Now the Bonnet (16) along with the Adjustment ring(22) can be lowered onto the valve body(1) and assembled firmly onto the valve body by Bonnet Hexagonal Nut(26)

Screw on the Lock Nut(21) onto the spring tension adjustment bolt(22) and tighten it to a length noted at the time of disassembly.

Screw the castle nut(24) onto the top threaded section of the spindle and assemble the split pin onto the spindle.

Lift the cap assembly with the lever and lower it onto the Bonnet and fix with cap Allen screw (20). Ensure that a fresh Gasket(19) is placed on the Bonnet before placing the cap (23) on the Bonnet.

Finally, screw in the short threaded end of the test gag onto the cap(23) after placing a new "O" ring in the groove provided on the cap.

C) Adjusting the Spring Set Pressure:

Remove the Lead Valve Seal. Un screw the bolts(20) on the cap and lift the lever(28) in counter clockwise direction so that the lift fork in the cap does not foul with the Spindle Nut (24). Lift the cap assembly from the Valve Bonnet

Hold the Spindle Nut(24) firmly with the help of spanner and with the other spanner rotate the spring tension adjusting bolt(22) clockwise to increase the set pressure. If the Spindle Nut(24) is not held firmly, it will rotate the spindle and therefore the disc (8) and damage the disc.

After adjusting the set pressure the lock nut(24) is tightened and cap assembled onto the valve bonnet

8. Troubleshooting:

If the expected performance is unachievable after the installation of the valve, check the following points for appropriate corrective measures.

Failure Mode	Possible Cause	Remedy
Safety valve opens at different set pressure	Condensate in Admission line	Provide better insulation to the inlet line.
	Pressure change due to vibration.	Provide proper support to the valve to reduce valve vibration.
Safety valve chatters or opens and closes rapidly	Pressure loss in inlet line to valve is higher than the closing pressure difference The inlet pipe to the valve is smaller than the valve inlet.	Increase closing pressure difference. Reduce flow resistance in inlet line.
	Valve installed is oversized	Reduce lift of the valve to reduce discharge capacity. Better install a lower orifice size valve
	High back pressure in the discharge line	Reduce Resistance to flow in the discharge line by enlarging the discharge line or shortening the length of the line.
Safety valve remains open after discharge	Foreign matter between the disc and seat or in the valve internals.	Use lifting lever provided on cap to flush out foreign matter between disc and seat. if problem persists, remove the valve for inspection and cleaning at the first opportunity.
Safety valve does not close tightly	Insufficient pressure difference between set pressure and operating pressure.	Increase the pressure
	Deformation of valve body due to excessive piping forces	Lay piping with proper hangers and support.
	Damage to valve seat	Disassemble the valve and lap the seat and disc. if problem persists, replace with new disc.

9. Available Spares:

Product	SPARE TYPE	SPARE CONSIST OF	SPARE SPECIFICATION	SPARE CODE
SRV1	GASKET SPARE KITS	NOZZLE-BODY GASKET, LOCKING SCREW GASKET, BODY BUSH; PACK OF 1 EACH	DA-HA	SPARE-SRV1-SRV2-DA-HA-GKIT
			JA-KA	SPARE-SRV1-SRV2-JA-GKIT
			MA-LA	SPARE-SRV1-SRV2-MA-LA-GKIT
			PA-QA	SPARE-SRV1-SRV2-PA-QA-GKIT
			RA	SPARE-SRV1-SRV2-RA-GKIT
			TA	SPARE-SRV1-SRV2-TA-GKIT
	SPINDLE SPARE KITS	SPINDLE, DISC, BALL, DOWEL PIN, BLOW DOWN RING PROTECTION RING/COVERS, GRUB SCREW, SPRG GUIDE BUSH; PACK OF 1 EACH	DA	SPARE-SRV1-SRV2-DA-SPKIT
			EA-HA	SPARE-SRV1-SRV2-EA-HA-SPKIT
			JA-KA	SPARE-SRV1-SRV2-JA-KA-SPKIT
			MA	SPARE-SRV1-SRV2-MA-SPKIT
			EA	SPARE-SRV1-SRV2-LA-SPKIT
			PA	SPARE-SRV1-SRV2-PA-SPKIT
			QA	SPARE-SRV1-SRV2-QA-SPKIT
			RA	SPARE-SRV1-SRV2-RA-SPKIT
			TA	SPARE-SRV1-SRV2-TA-SPKIT
			DA	SPARE-SRV1-SRV2-DA-NZKIT
			EA	SPARE-SRV1-SRV2-EA-NZKIT
	NOZZLE SPARE KITS	NOZZLE, BODY-NOZZLE GASKET, ADJUSTMENT NUT; PACK OF 1 EACH	FA	SPARE-SRV1-SRV2-FA-NZKIT
			GA	SPARE-SRV1-SRV2-GA-NZKIT
			HA	SPARE-SRV1-SRV2-HA-NZKIT
			JA	SPARE-SRV1-SRV2-JA-NZKIT
			KA	SPARE-SRV1-SRV2-KA-NZKIT
			LA	SPARE-SRV1-SRV2-LA-NZKIT
			MA	SPARE-SRV1-SRV2-MA-NZKIT
			PA	SPARE-SRV1-SRV2-PA-NZKIT
			QA	SPARE-SRV1-SRV2-QA-NZKIT
			RA	SPARE-SRV1-SRV2-RA-NZKIT
			TA	SPARE-SRV1-SRV2-TA-NZKIT
			AS PER SPRING NOS	SPARE-SRV-713260000-SGDKIT
SRV1	SPRING & GUIDE SPARES	SPRING NO-713280000,QTY 01,SPRING GUIDE 02 QTY	AS PER SPRING NOS	SPARE-SRV-713280000-SGDKIT
		SPRING NO-713300000,QTY 01,SPRING GUIDE 02 QTY	AS PER SPRING NOS	SPARE-SRV-713300000-SGDKIT
		SPRING NO-713320000,QTY 01,SPRING GUIDE 02 QTY	AS PER SPRING NOS	SPARE-SRV-713320000-SGDKIT
		SPRING NO-713340000,QTY 01,SPRING GUIDE 02 QTY	AS PER SPRING NOS	SPARE-SRV-713340000-SGDKIT
		SPRING NO-713380000,QTY 01,SPRING GUIDE 02 QTY	AS PER SPRING NOS	SPARE-SRV-713380000-SGDKIT
		SPRING NO-713400000,QTY 01,SPRING GUIDE 02 QTY	AS PER SPRING NOS	SPARE-SRV-713400000-SGDKIT
		SPRING NO-713420000,QTY 01,SPRING GUIDE 02 QTY	AS PER SPRING NOS	SPARE-SRV-713420000-SGDKIT
		SPRING NO-713440000,QTY 01,SPRING GUIDE 02 QTY	AS PER SPRING NOS	SPARE-SRV-713440000-SGDKIT
		SPRING NO-713460000,QTY 01,SPRING GUIDE 02 QTY	AS PER SPRING NOS	SPARE-SRV-713460000-SGDKIT
		SPRING NO-713480000,QTY 01,SPRING GUIDE 02 QTY	AS PER SPRING NOS	SPARE-SRV-713480000-SGDKIT
		SPRING NO-713500000,QTY 01,SPRING GUIDE 02 QTY	AS PER SPRING NOS	SPARE-SRV-713500000-SGDKIT
		SPRING NO-713520000,QTY 01,SPRING GUIDE 02 QTY	AS PER SPRING NOS	SPARE-SRV-713520000-SGDKIT
		SPRING NO-713540000,QTY 01,SPRING GUIDE 02 QTY	AS PER SPRING NOS	SPARE-SRV-713540000-SGDKIT
		SPRING NO-713550000,QTY 01,SPRING GUIDE 02 QTY	AS PER SPRING NOS	SPARE-SRV-713550000-SGDKIT
		SPRING NO-713570000,QTY 01,SPRING GUIDE 02 QTY	AS PER SPRING NOS	SPARE-SRV-713570000-SGDKIT
		SPRING NO-713580000,QTY 01,SPRING GUIDE 02 QTY	AS PER SPRING NOS	SPARE-SRV-713580000-SGDKIT
		SPRING NO-713590000,QTY 01,SPRING GUIDE 02 QTY	AS PER SPRING NOS	SPARE-SRV-713590000-SGDKIT
		SPRING NO-713610000,QTY 01,SPRING GUIDE 02 QTY	AS PER SPRING NOS	SPARE-SRV-713610000-SGDKIT
		SPRING NO-713620000,QTY 01,SPRING GUIDE 02 QTY	AS PER SPRING NOS	SPARE-SRV-713620000-SGDKIT
		SPRING NO-713640000,QTY 01,SPRING GUIDE 02 QTY	AS PER SPRING NOS	SPARE-SRV-713640000-SGDKIT
		SPRING NO-713684000,QTY 01,SPRING GUIDE 02 QTY	AS PER SPRING NOS	SPARE-SRV-713684000-SGDKIT
		SPRING NO-713700000,QTY 01,SPRING GUIDE 02 QTY	AS PER SPRING NOS	SPARE-SRV-713700000-SGDKIT
		SPRING NO-713720000,QTY 01,SPRING GUIDE 02 QTY	AS PER SPRING NOS	SPARE-SRV-713720000-SGDKIT
		SPRING NO-713740000,QTY 01,SPRING GUIDE 02 QTY	AS PER SPRING NOS	SPARE-SRV-713740000-SGDKIT
		SPRING NO-713760000,QTY 01,SPRING GUIDE 02 QTY	AS PER SPRING NOS	SPARE-SRV-713760000-SGDKIT
		SPRING NO-713780000,QTY 01,SPRING GUIDE 02 QTY	AS PER SPRING NOS	SPARE-SRV-713780000-SGDKIT
		SPRING NO-713790000,QTY 01,SPRING GUIDE 02 QTY	AS PER SPRING NOS	SPARE-SRV-713800000-SGDKIT
		SPRING NO-713800000,QTY 01,SPRING GUIDE 02 QTY	AS PER SPRING NOS	SPARE-SRV-713820000-SGDKIT
		SPRING NO-713810000,QTY 01,SPRING GUIDE 02 QTY	AS PER SPRING NOS	SPARE-SRV-713840000-SGDKIT
		SPRING NO-713850000,QTY 01,SPRING GUIDE 02 QTY	AS PER SPRING NOS	SPARE-SRV-713850000-SGDKIT
		SPRING NO-713020000,QTY 01,SPRING GUIDE 02 QTY	AS PER SPRING NOS	SPARE-SRV-723020000-SGDKIT
		SPRING NO-713180000,QTY 01,SPRING GUIDE 02 QTY	AS PER SPRING NOS	SPARE-SRV-723060000-SGDKIT

[illegible]

How to Order:

Example: 1 No. Forbes Marshall Forbes Marshall Full Lift Safety Valve, SRV1, DN25 #300 Inlet Flanged ends & DN50 # 150 outlet, Steam service & a set pressure of 10.5 barg, Discharge Temperature 186° C, Discharge Capacity kg/hr. Sizing basis IBR /ASME section VIII/ API 520/ API520 Fire.

For replacement valves information required additionally: Inlet size and rating pipe/ vessel material outlet size and Pressure rating.

How to Order Spares:

Always order spares by using the description given in the column headed available spares.
For codes refer user manual.

10. Warranty Period:

As per the ordering information and agreement in the contract.



www.forbesmarshall.com

Forbes Marshall Arca

Codel International

Krohne Marshall

Forbes Vyncke

Forbes Marshall Steam Systems

A: Forbes Marshall Pvt. Ltd.

Opp. 106th Milestone, CTS 2220,
Mumbai-Pune Road, Kasarwadi,
Pune MH 411034 INDIA

P: +91(0)20-68138555

F: +91(0)20-68138402

E: ccmidc@forbesmarshall.com

Forbes Marshall International Pte. Ltd.

16A, Tuas Avenue 1,
#05-21, JTC Space @Tuas
Singapore - 639533

P: +65 6219 3890

CIN No: U28996PN1985PTC037806