

HIGH TEMPERATURE HIGH PRESSURE CONTROL VALVES 1-4470 SERIES

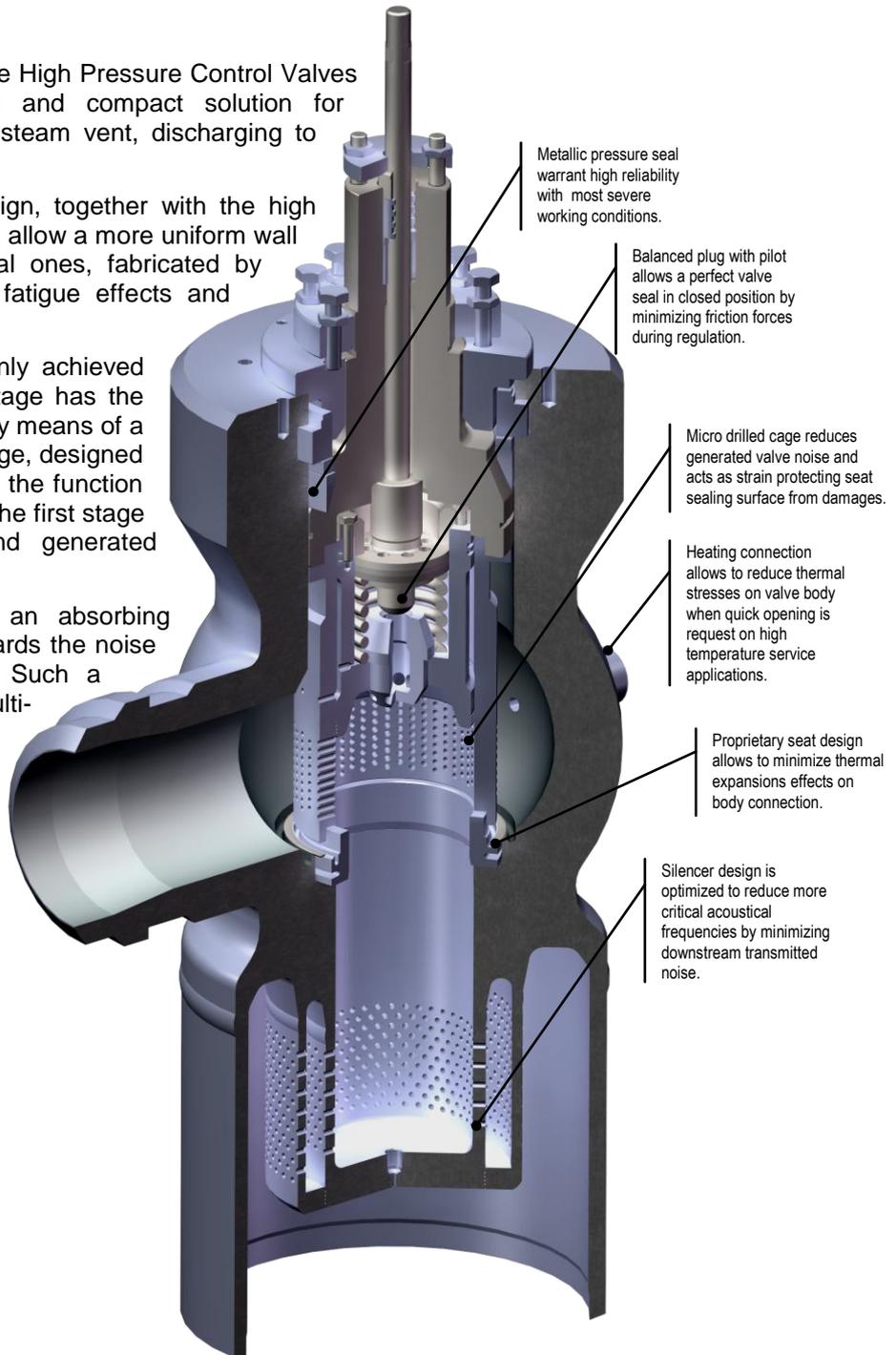
DESCRIPTION

Parcol 1-4470 High Temperature High Pressure Control Valves represent the most universal and compact solution for pressure reduction service on steam vent, discharging to atmospheric silencers.

The spherical body shape design, together with the high quality of construction materials, allow a more uniform wall thickness than the conventional ones, fabricated by welding bodies, reducing P/T fatigue effects and improving welded joints quality.

The pressure reduction is mainly achieved through two stages: the first stage has the function to adjust the flow rate by means of a drilled cage trim, the second stage, designed with fixed throttling section, has the function to generate a backpressure on the first stage by reducing fluid velocity and generated sound pressure level.

The second stage has also an absorbing function, acting as silencer towards the noise generated by the first stage. Such a function is remarkable in multi-cage figures, where the clearance between silencer is optimized to reduce noise frequencies between 1kHz to 4kHz, or when a Limiphon disk stack is installed as a silencer.

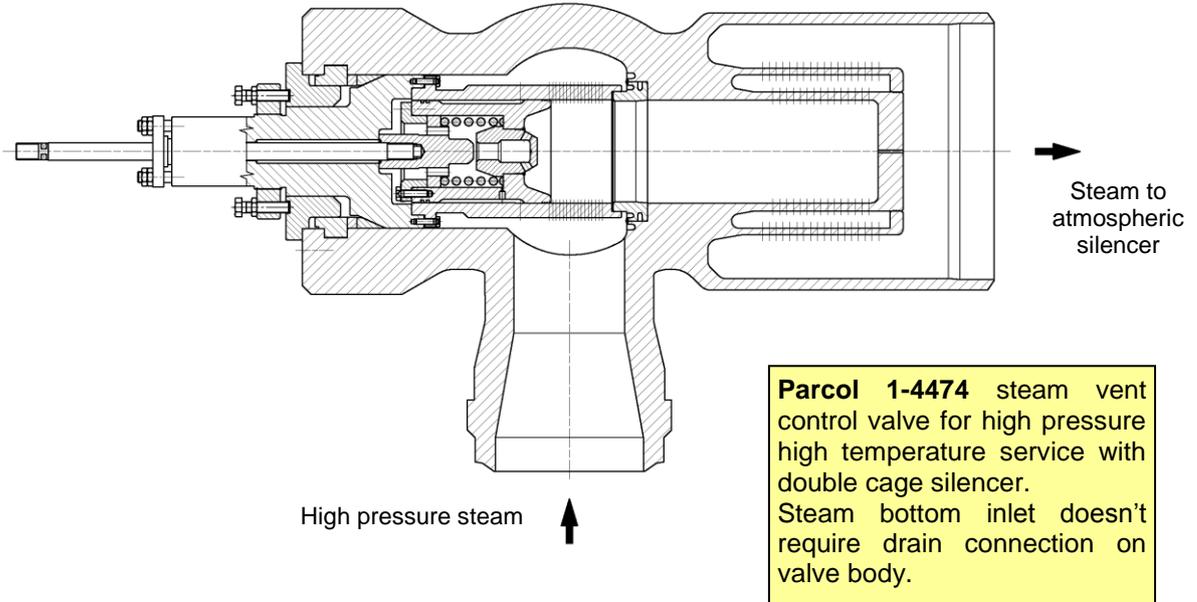


APPLICATIONS

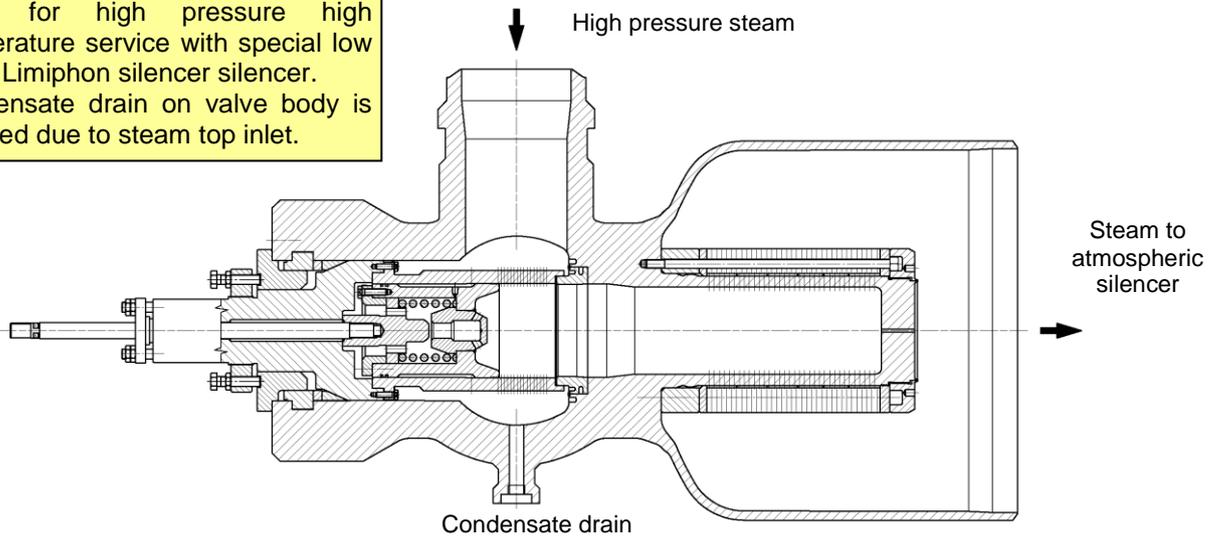
Parcol 1-4470 Series control valves are widely used as steam vent to atmosphere for critical applications where high reliability, low noise, perfect sealing are request.

Usually a final silencer to atmosphere producing moderate backpressure is installed. To reduce valve and downstream piping dimension in order to optimizie installation cost **Parcol 3-9811** Limiphon resistor producing elevated backpressure can be installed.

1-4470 series combined with 1-5700 are also suitable for on-off service (see 1-5700 PRDS bulletin).



Parcol 1-4476 steam vent control valve for high pressure high temperature service with special low noise Limiphon silencer. Condensate drain on valve body is required due to steam top inlet.



DESIGN FEATURES

Body

- manufactured from fully machined forgings with welded inlet connection;
- available sizes according to service conditions;
- ratings: up to ANSI 2500 (up to ANSI 4500 on request).

Bonnet

- up to ANSI 600: flanged bonnet;
- over ANSI 600: pressure seal.

Trim

- cage-guided balanced plug with pilot;
- first pressure reduction stage is performed by a specially drilled cage;
- seat ring is welded to the body through an easily removable tension free lip-seal;
- quick change seat ring is available on request as special construction.

Silencer

- two different designs are available:
 - 1 to 3 stages diffuser;
 - LIMIPHON silencer.
- the silencer is usually welded to valve body, however, when quick change seat ring is provided, the silencer is clamped between body and seat and can be removed through the bonnet cavity.

Materials of construction

- body and bonnet are usually made of carbon steel and CrMo alloy steels according to line class;
- trim parts are usually made of nitrided or stellited F6NM alloy steel;
- silencer is normally made of CrMo alloy steel, while LIMIPHON stack is normally made of AISI 430 or 12Cr special stainless steel for temperature above 400°C.

Leakage class (according to IEC 60534-4)

- up to class V both for balanced and unbalanced plug.

Packing

- Parcol GRF pure graphite packing specially designed for control application is supplied. Parcol GRF packing provides bi-directional tightness and it is therefore suitable also when vacuum seal is required.

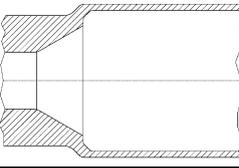
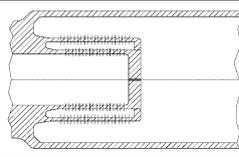
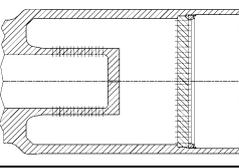
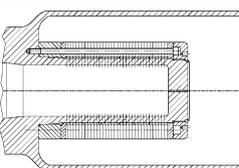


To atmospheric silencer valve 1-4474

- Inlet: DN 16" ANSI 150 BW
- Outlet: DN 18" ANSI 150 BW
- Port : 16"

Body material: SA182 F91 / SA182 F22

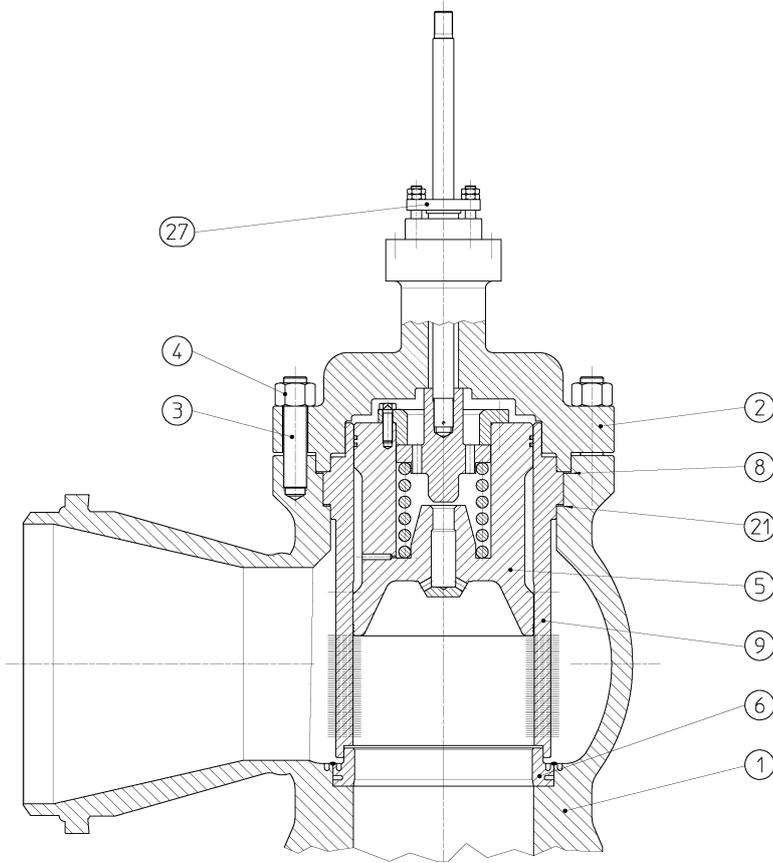
NUMBERING SYSTEM

| | | | | | | | | |
|---------------------------------|--------------------------------------|----------|----------|----------|----------|----------------|---|--|
| | | | | | | OPTIONS | | |
| 1 | - | 4 | 4 | 7 | X | X | QS Quick change Seat | |
| | | | | | | | QL Quick change Seat and Limiphon silencer (1-4476 only) | |
| DOWNSTREAM SILENCER TYPE | | | | | | | | |
| 0 | undefined | | | | | | -- | |
| 3 | without silencer | | | | | |  | |
| 4 | disk or drilled basket type silencer | | | | | |  | |
| 5 | HAS reactive absorption silencer | | | | | |  | |
| 6 | Limiphon disk stack silencer | | | | | |  | |



SECTIONAL DRAWINGS

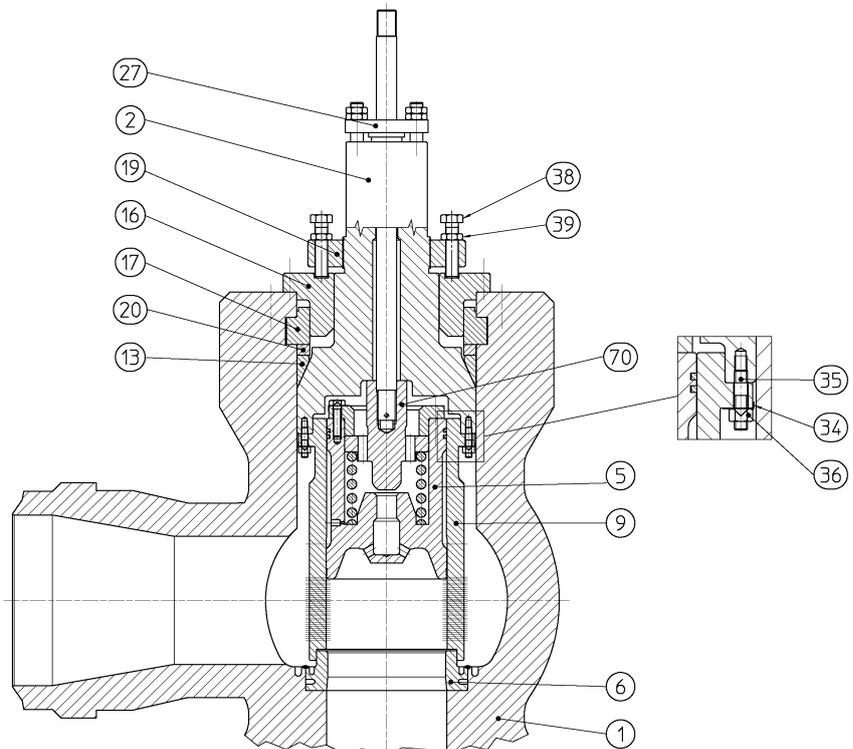
**Flanged Body – Bonnet connection
ANSI 150 ÷ 600**



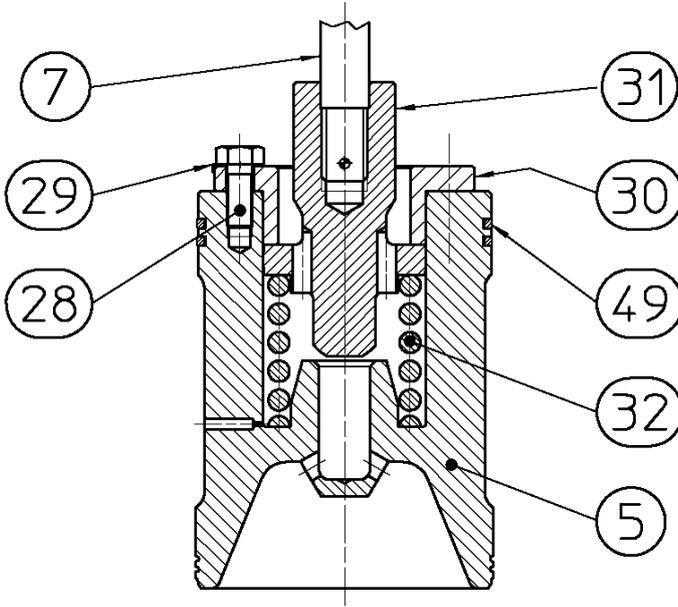
| ITEM | PART NAME |
|------|-------------|
| 1 | BODY |
| 2 | BONNET |
| 3 | STUD |
| 4 | NUT |
| 5 | PLUG |
| 6 | SEAT |
| 8 | GASKET |
| 9 | CAGE |
| 21 | GASKET |
| 27 | PACKING BOX |

**Pressure Seal – Bonnet connection
ANSI 900 ÷ 2500**

| ITEM | PART NAME |
|------|----------------|
| 1 | BODY |
| 2 | BONNET |
| 5 | PLUG |
| 6 | SEAT |
| 9 | CAGE |
| 13 | SEAL RING |
| 16 | FLANGE |
| 17 | RETAINING RING |
| 19 | RING NUT |
| 20 | SPACER |
| 27 | PACKING BOX |
| 34 | STOP RING |
| 35 | STUD |
| 36 | NUT |
| 38 | SCREW |
| 39 | NUT |



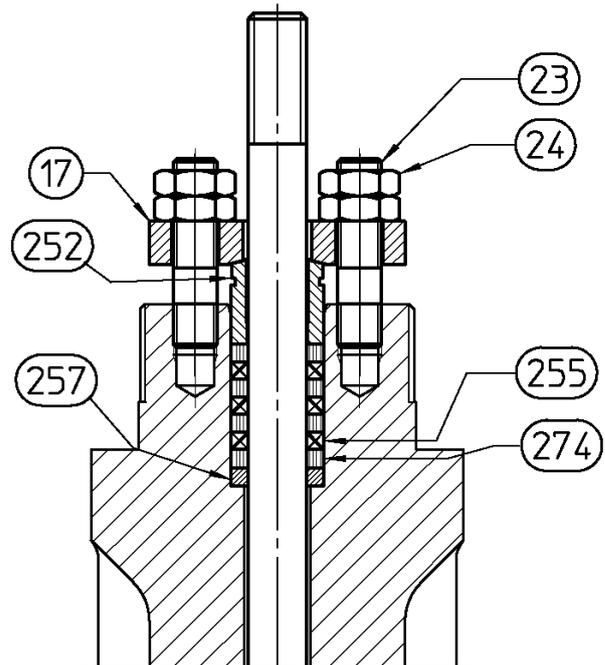
Balanced Plug with Pilot
ANSI 150 ÷ 2500



| ITEM | PART NAME |
|------|-----------|
| 5 | PLUG |
| 7 | STEM |
| 28 | SCREW |
| 29 | STOP RING |
| 30 | FLANGE |
| 31 | PILOT |
| 32 | SPRING |
| 49 | SEAL RING |

GRF – Pure Flexible Graphite Packing
Ratings: ANSI 150 ÷ 2500

| ITEM | PART NAME |
|------|-------------------|
| 17 | PACKING FLANGE |
| 23 | STUD |
| 24 | NUT |
| 252 | PACKING FOLLOWER |
| 255 | PACKING RING |
| 257 | END RING |
| 274 | INTERMEDIATE RING |



Spare parts

| ITEM | PART NAME | STARTUP ⁽¹⁾ | STRATEGIC ⁽²⁾ |
|-----------------------|---------------------|------------------------|--------------------------|
| 8 | GASKET | X | X |
| 13 | SEAL RING | X | X |
| 21 | GASKET | X | X |
| 50 (5+28+29+30+32+49) | PLUG ASSEMBLY | | X |
| 70 (7+31) | STEM+PILOT ASSEMBLY | | X |
| 255 | PACKING RING | X | |
| 274 | INTERMEDIATE RING | X | |

⁽¹⁾ commissioning and start-up suggested spare parts
⁽²⁾ two years suggested spare parts

MATERIALS OF CONSTRUCTION

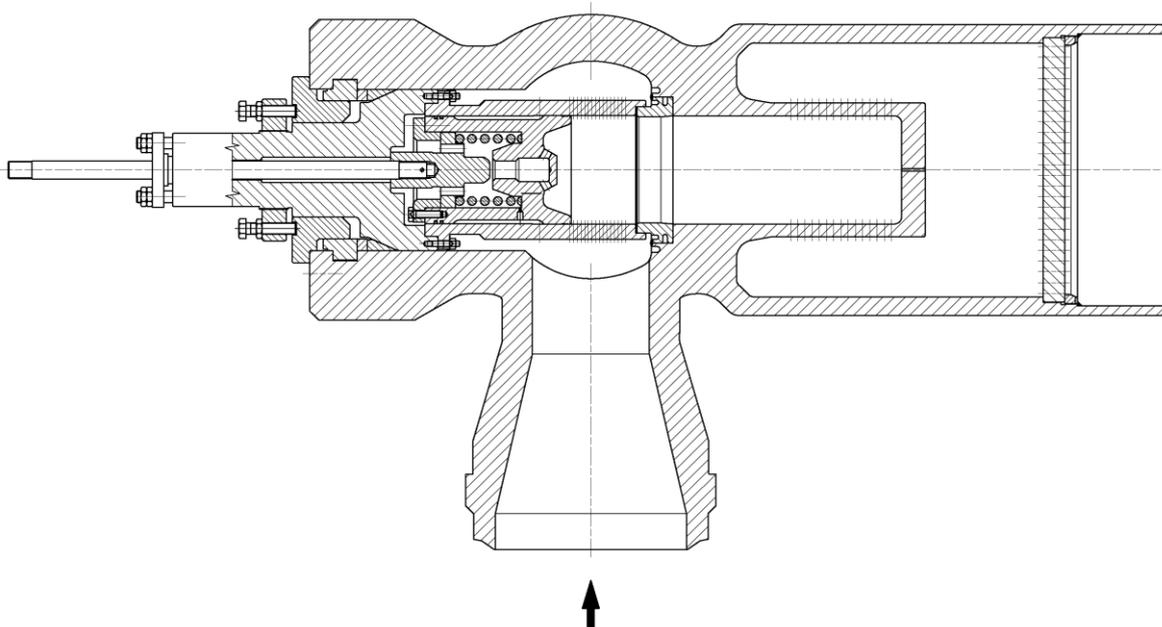
| ITEM | PART NAME | Basic Class / Temperature range | | |
|------|-----------------------|------------------------------------|-------------------|------------------|
| | | A (-29 / +427 °C) | D (-29 / +566 °C) | V (-29 / +593°C) |
| 1 | BODY | SA 105 / SA 350 LF2 ⁽¹⁾ | SA182 F22 Cl.3 | SA 182 F91 |
| 2 | BONNET | | | |
| 3 | STUD | SA 193 B7 | SA 479 XM-19 | |
| 4 | NUT | SA 194 Gr.4 | SA 194 Gr.8 | |
| 5 | PLUG | SA 182 F6NM Nitrided | | |
| 6 | SEAT | A182 F6NM Seat joint stellite | | |
| 8 | GASKET | AISI 321+GRAPHITE | | |
| 9 | CAGE | A 351 CA6NM Nitrided | | |
| 12 | PIN | A 479 316 | | |
| 13 | SEAL RING | A 479 316 | | |
| 14 | GASKET | AISI 321+GRAPHITE | | |
| 15 | ADAPTER | SA 105 / SA 350 LF2 | SA182 F22 Cl.3 | SA 182 F91 |
| 16 | FLANGE | SA182 F22 Cl.3 | | |
| 17 | RETAINING RING | A 182 F91 Nitrided | | |
| 19 | RING NUT | A 182 F6NM Nitrided | | |
| 20 | SPACER | A 182 F91 | | |
| 21 | GASKET | AISI 321+GRAPHITE | | |
| 25 | PLATE | A 479 304 | | |
| 26 | SCREW | A2-70 EN ISO 3506 | | |
| 27 | PACKING | SEE PACKING SUB-CLASS | | |
| 28 | SCREW | A2-70 EN ISO 3506 | | |
| 29 | STOP WASHER | A 479 304 ANNEALED | | |
| 30 | FLANGE | A182 F6NM HARDENED 240-300 HB | | |
| 32 | SPRING | INCONEL X-750 T.T.T. | | |
| 34 | STOP WASHER | A 479 304 ANNEALED | | |
| 35 | STUD | SEE NOTE (3) | | |
| 36 | NUT | SA 194 Gr.8 | | |
| 38 | SCREW | A2-70 EN ISO 3506 | | |
| 39 | NUT | SA 194 Gr.8 | | |
| 49 | SEAL | A182 F6NM HARDENED 240-300 HB | | |
| 70 | STEM + PILOT ASSEMBLY | A 276 XM19 + A 182 F6NM Nitrided | | |

| ITEM | PART NAME | MATERIAL |
|------|-------------------|-------------------|
| 17 | PACKING FLANGE | AISI 316 |
| 23 | STUD | AISI 304 |
| 24 | NUT | AISI 304 |
| 252 | PACKING FOLLOWER | AISI 316 |
| 255 | PACKING RING | Flexible Graphite |
| 257 | END RING | AISI 316 |
| 274 | INTERMEDIATE RING | Pure Graphite |

⁽¹⁾ only for flanged body-bonnet connection

C_v TABLES

| Port | | Valve stroke mm | Max valve C _v with silencer - gpm | | | | | |
|------|-------|--------------------|--|----------|----------|--------------------------------|----------|----------|
| in. | mm | | Linear Characteristic | | | Modified Linear Characteristic | | |
| | | | 1 stage | 2 stages | 3 stages | 1 stage | 2 stages | 3 stages |
| 2" | 65.5 | 45 | 100 | 100 | 105 | 84 | 85 | 88 |
| 3" | 83.5 | 60 | 180 | 170 | 185 | 155 | 145 | 155 |
| 4" | 95.5 | 60 | 215 | 200 | 210 | 180 | 170 | 180 |
| 5" | 112.5 | 76 | 320 | 280 | 305 | 275 | 245 | 265 |
| 6" | 126.5 | 100 | 470 | 380 | 420 | 405 | 345 | 370 |
| 7" | 146.5 | 100 | 555 | 455 | 485 | 465 | 400 | 420 |
| 8" | 161.5 | 120 | 730 | 570 | 605 | 620 | 515 | 540 |
| 9" | 186.5 | 120 | 875 | 695 | 715 | 730 | 615 | 630 |
| 10" | 216.5 | 150 | 1 250 | 940 | 950 | 1 050 | 850 | 855 |
| 12" | 244.5 | 150 | 1 450 | 1 100 | 1 100 | 1 200 | 995 | 985 |
| 13" | 266.5 | 200 | 2 050 | 1 450 | 1 400 | 1 750 | 1 350 | 1 300 |
| 14" | 294.5 | 200 | 2 350 | 1 700 | 1 600 | 1 950 | 1 550 | 1 450 |
| 15" | 324.5 | 250 | 3 150 | 2 150 | 2 000 | 2 700 | 1 950 | 1 850 |
| 16" | 344.5 | 250 | 3 350 | 2 300 | 2 150 | 2 900 | 2 150 | 2 000 |
| 17" | 364.5 | 300 | 4 150 | 2 700 | 2 450 | 3 600 | 2 500 | 2 300 |



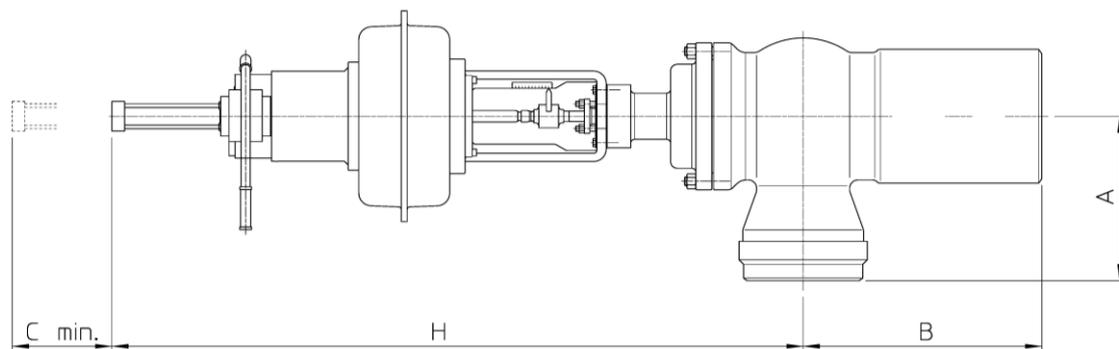
Parcol 1-4475 High Temperature High Pressure control valves.

HAS style silencer:

- increase downstream silencer efficiency
- minimize outlet generated noise levels
- allows to reduce valve outlet diameters.

HIGH TEMPERATURE HIGH PRESSURE CONTROL VALVES 1-4470 SERIES

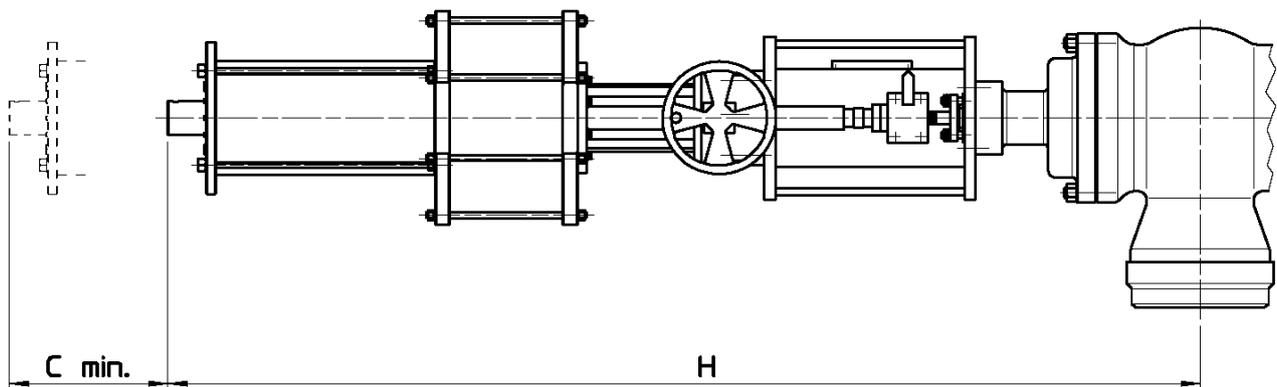
DIMENSIONS



| Port in. | Inlet connection in. | ANSI 150÷600 | | | | ANSI 900÷1500 | | | | ANSI 2500 | | | |
|-------------|-------------------------|--------------|------|-----|------|---------------|------|-----|------|-----------|------|-----|------|
| | | A | B | C | H | A | B | C | H | A | B | C | H |
| 2" | 3" | 210 | 420 | 250 | 1070 | 220 | 440 | 250 | 1080 | 230 | 460 | 250 | 1110 |
| | 4" | 220 | | | | 230 | | | | 240 | | | |
| 3" | 3" | 240 | | | | 260 | | | | 260 | - | - | - |
| | 4" | 270 | 450 | 250 | 1080 | 290 | 470 | 250 | 1090 | 320 | 490 | 250 | 1120 |
| | 6" | 270 | | | | 290 | | | | 320 | | | |
| 4" | 6" | 280 | | | | 300 | | | | 320 | | | |
| | 8" | 300 | 570 | 250 | 1130 | 380 | 590 | 450 | 1930 | 390 | 610 | 450 | 1970 |
| | 10" | 400 | | | | 480 | | | | 480 | | | |
| 5" | 6" | 310 | | | | 320 | | | | 360 | | | |
| | 8" | 370 | 620 | 250 | 1140 | 380 | 640 | 450 | 1945 | 390 | 655 | 450 | 1980 |
| | 10" | 470 | | | | 480 | | | | 480 | | | |
| 6" | 6" | 320 | | | | 330 | | | | 380 | | | |
| | 8" | 360 | 665 | 450 | 2055 | 380 | 685 | 450 | 2055 | 400 | 695 | 450 | 2085 |
| | 10" | 460 | | | | 480 | | | | 470 | | | |
| | 12" | - | - | - | - | - | - | - | - | 550 | | | |
| 7" | 8" | 350 | | | | 370 | | | | 420 | | | |
| | 10" | 430 | 720 | 450 | 2060 | 430 | 735 | 450 | 2075 | 470 | 755 | 450 | 2100 |
| | 12" | 520 | | | | 520 | | | | 550 | | | |
| 8" | 8" | 350 | | | | 400 | | | | 450 | | | |
| | 10" | 410 | 780 | 450 | 2085 | 430 | 890 | 450 | 2115 | 450 | 810 | 450 | 2145 |
| | 12" | 520 | | | | 500 | | | | 520 | | | |
| | 14" | - | - | - | - | - | - | - | - | 580 | | | |
| 9" | 10" | 400 | | | | 450 | | | | 500 | | | |
| | 12" | 470 | 850 | 450 | 2105 | 480 | 855 | 450 | 2120 | 520 | 890 | 450 | 2160 |
| | 14" | 520 | | | | 540 | | | | 580 | | | |
| 10" | 10" | 430 | | | | 500 | | | | 550 | | | |
| | 12" | 460 | 940 | 500 | 2505 | 500 | 940 | 500 | 2570 | 550 | 1000 | 500 | 2615 |
| | 14" | 500 | | | | 530 | | | | 560 | | | |
| | 16" | - | - | - | - | 610 | | | | 650 | | | |
| 12" | 12" | 480 | | | | 520 | | | | 600 | | | |
| | 14" | 500 | 1010 | 500 | 2510 | 530 | 1015 | 500 | 2580 | 600 | 1060 | 500 | 2630 |
| | 16" | 560 | | | | 580 | | | | 600 | | | |
| | 18" | - | - | - | - | - | - | - | - | 700 | | | |
| 13" | 14" | 500 | | | | 600 | | | | 650 | | | |
| | 16" | 550 | 1070 | 500 | 2605 | 600 | 1090 | 500 | 2700 | 650 | 1140 | 500 | 2770 |
| | 18" | 610 | | | | 680 | | | | 750 | | | |
| | 20" | - | - | - | - | - | - | - | - | 850 | | | |
| 14" | 14" | 520 | | | | 600 | | | | 700 | | | |
| | 16" | 550 | 1150 | 500 | 2615 | 600 | 1180 | 500 | 2705 | 700 | 1240 | 500 | 2800 |
| | 18" | 610 | | | | 640 | | | | 800 | | | |
| | 20" | 690 | | | | 720 | | | | 900 | | | |
| 15" | 18" | 600 | | | | 730 | | | | 750 | | | |
| | 20" | 650 | 1240 | 350 | 3505 | 750 | 1340 | 350 | 3610 | 850 | 1360 | 350 | 3700 |
| | 22" | 700 | | | | 850 | | | | 950 | | | |
| 16" | 18" | 650 | | | | 730 | | | | 780 | | | |
| | 20" | 700 | 1300 | 350 | 3515 | 750 | 1430 | 350 | 3650 | 800 | 1450 | 350 | 3570 |
| | 22" | 750 | | | | 850 | | | | 900 | | | |
| | 24" | 800 | | | | 950 | | | | 1000 | | | |
| 17" | 20" | 700 | | | | 850 | | | | 850 | | | |
| | 22" | 750 | 1380 | 400 | 3535 | 900 | 1520 | 400 | 3700 | 900 | 1540 | 400 | 3800 |
| | 24" | 800 | | | | 1000 | | | | 1000 | | | |
| | 26" | 850 | | | | 1100 | | | | 1100 | | | |

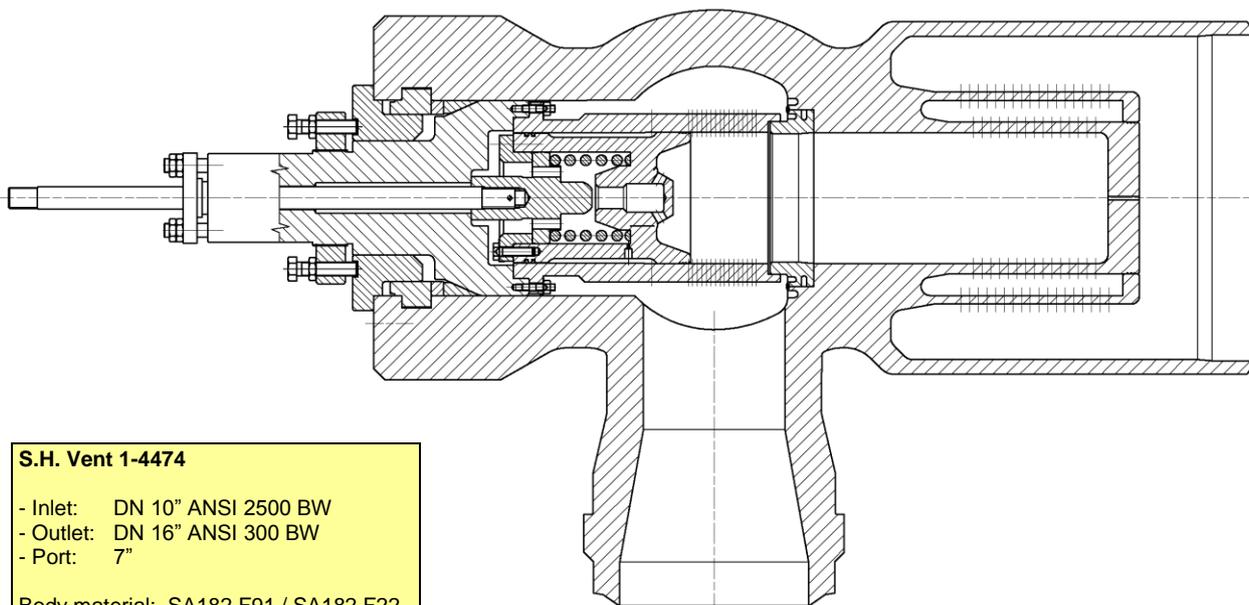


Parcol single effect diaphragm **pneumatic actuator 1-X-252 D63** equipped with hydraulic manual operator, with speed regulating additional function.

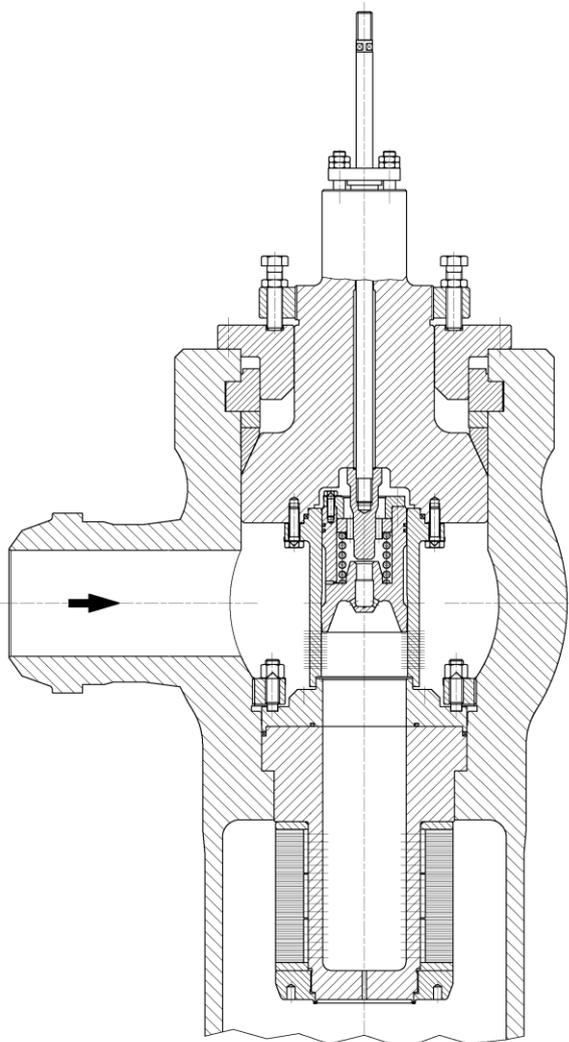


DOUBLE EFFECT SPRING RETURN PNEUMATIC CYLINDER ACTUATOR (PORT 15" AND OVER)

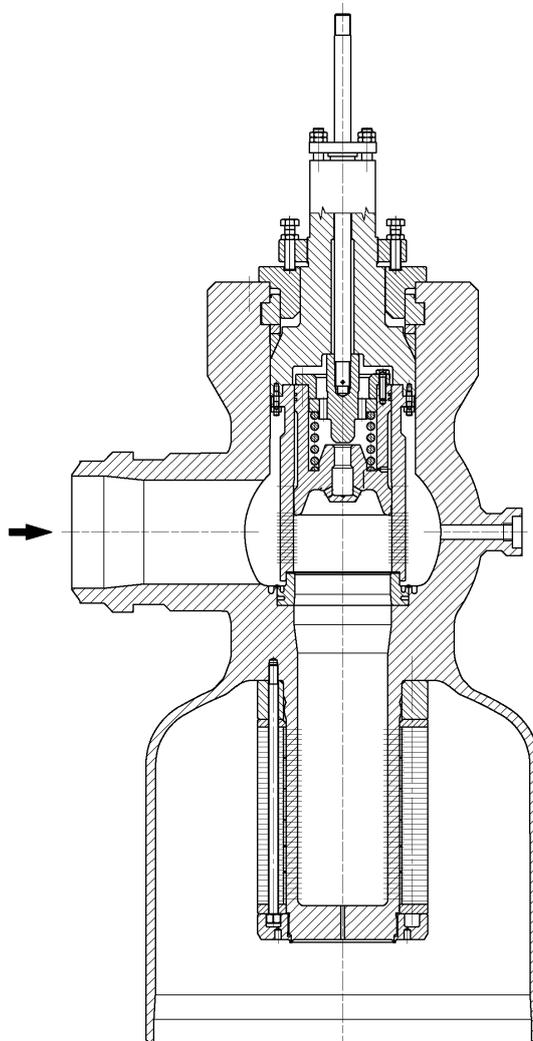
HIGH TEMPERATURE HIGH PRESSURE CONTROL VALVES 1-4470 SERIES



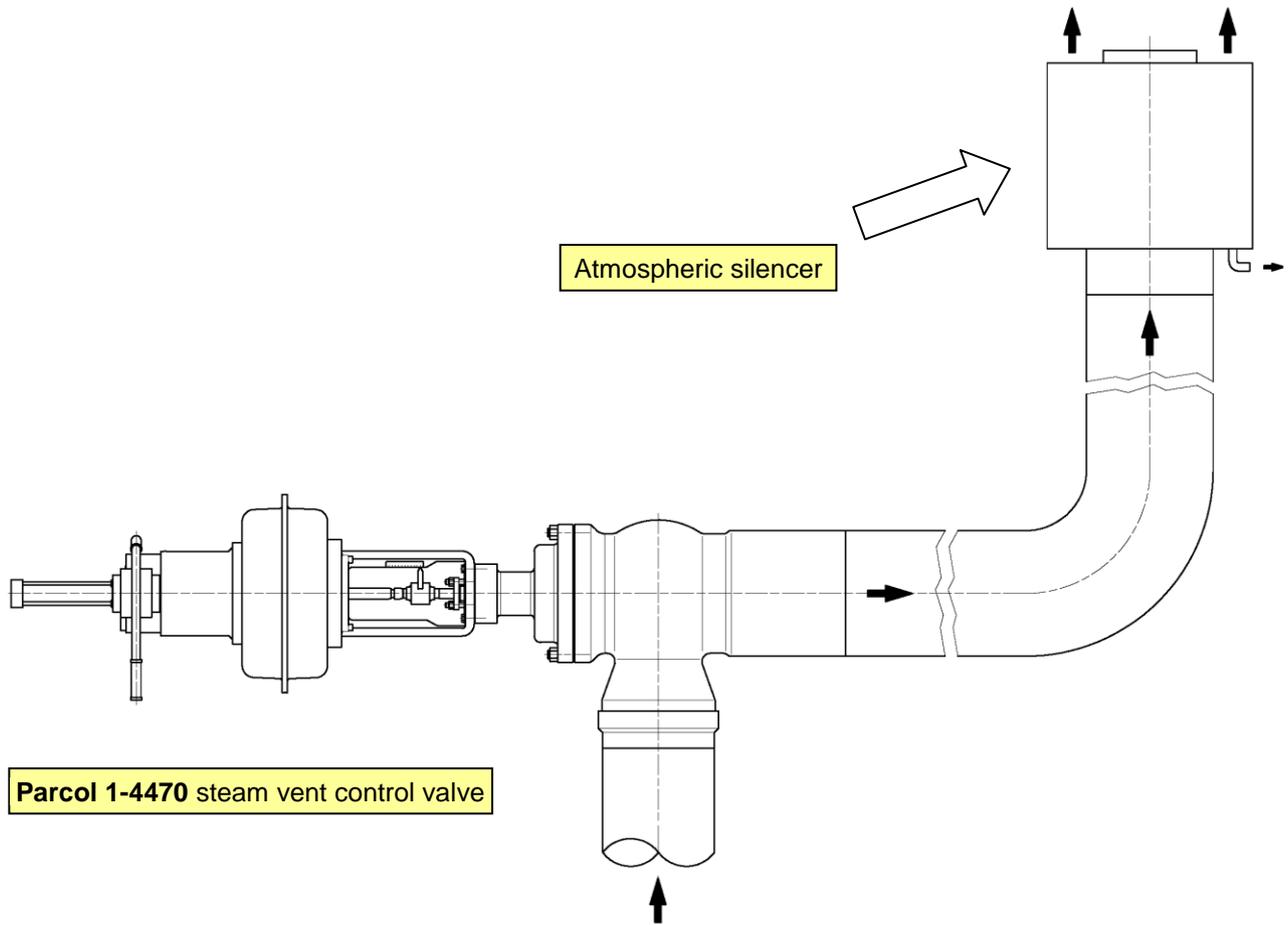
S.H. Vent 1-4474
 - Inlet: DN 10" ANSI 2500 BW
 - Outlet: DN 16" ANSI 300 BW
 - Port: 7"
 Body material: SA182 F91 / SA182 F22



Parcol 1-4476QL High Temperature High Pressure valve with quick change seat and Limiphon silencer, suitable for high differential pressure services when very low noise levels are required.



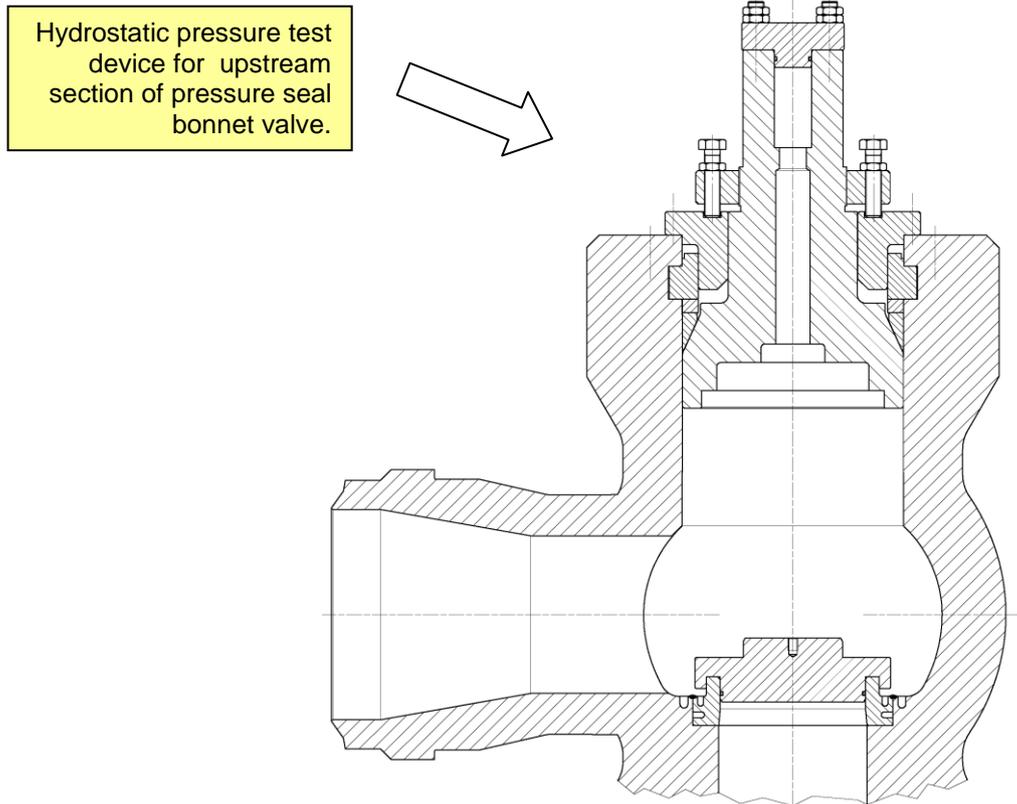
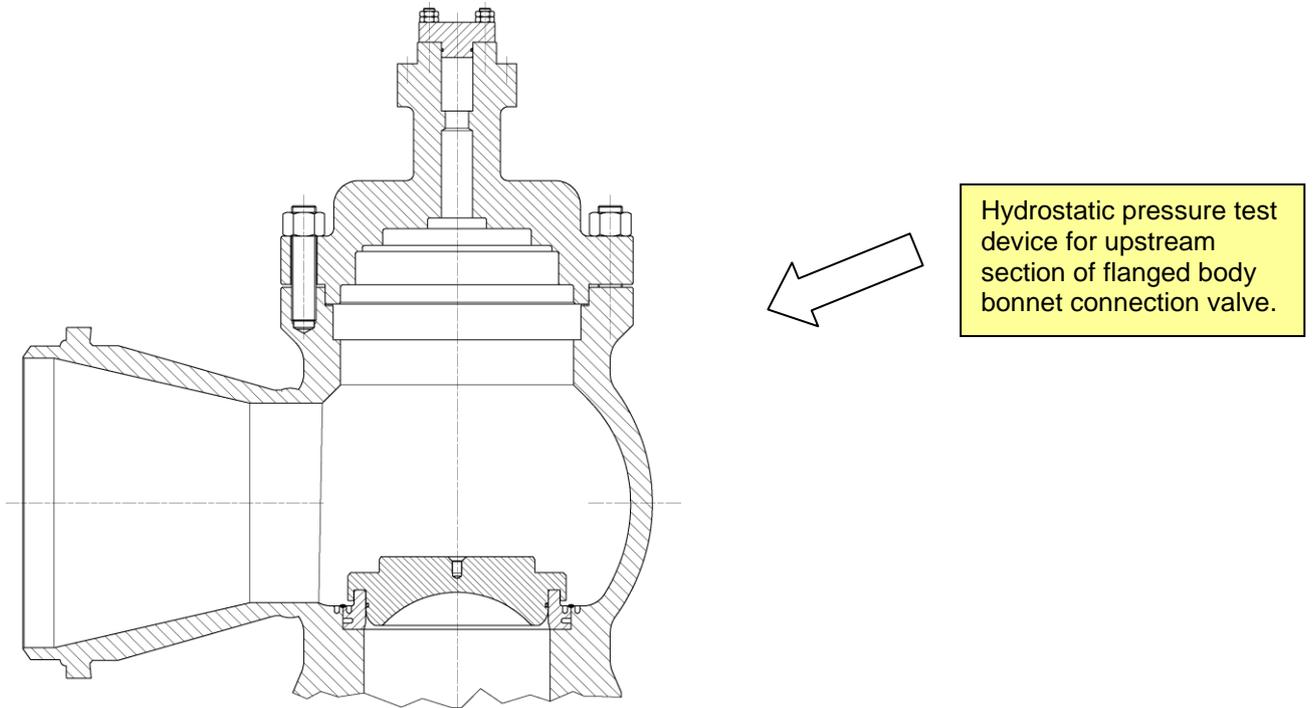
S.H. Vent 1-4476
 - Inlet: DN 8" ANSI 2500 BW
 - Outlet: DN 24" ANSI 300 BW
 - Port: 7"
 Body material: SA182 F91

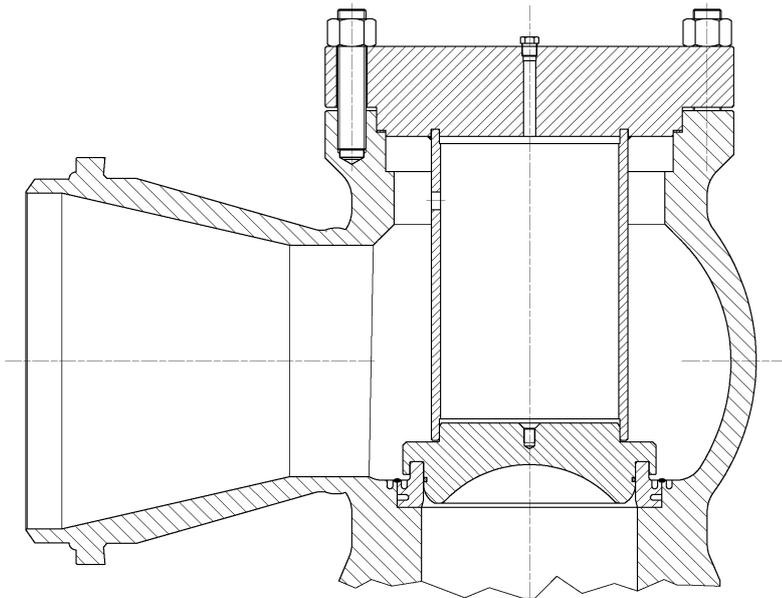


Parcol 3-9811 Limiphon resistor with lateral discharge

HYDROSTATIC PRESSURE TEST DEVICES

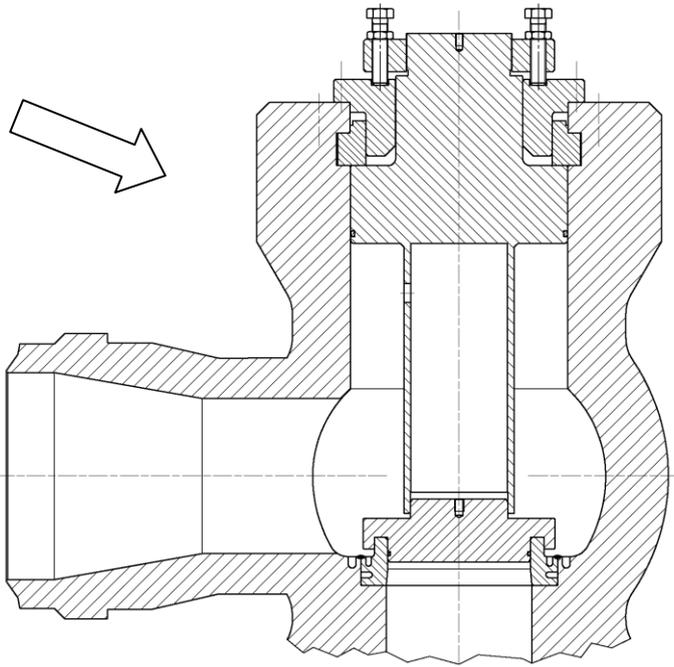
For valves with different upstream-downstream design conditions, upstream section can be hydrostatically tested up to 250 bar without any special device by closing valve plug.
For higher test pressures or when downstream section must be tested separately from upstream section, pressure test devices can be supplied.





Hydrostatic pressure test device for upstream and downstream sections of flanged body-bonnet connection valve (optional).

Hydrostatic pressure test device for upstream and downstream sections of pressure seal bonnet connection valve (optional).

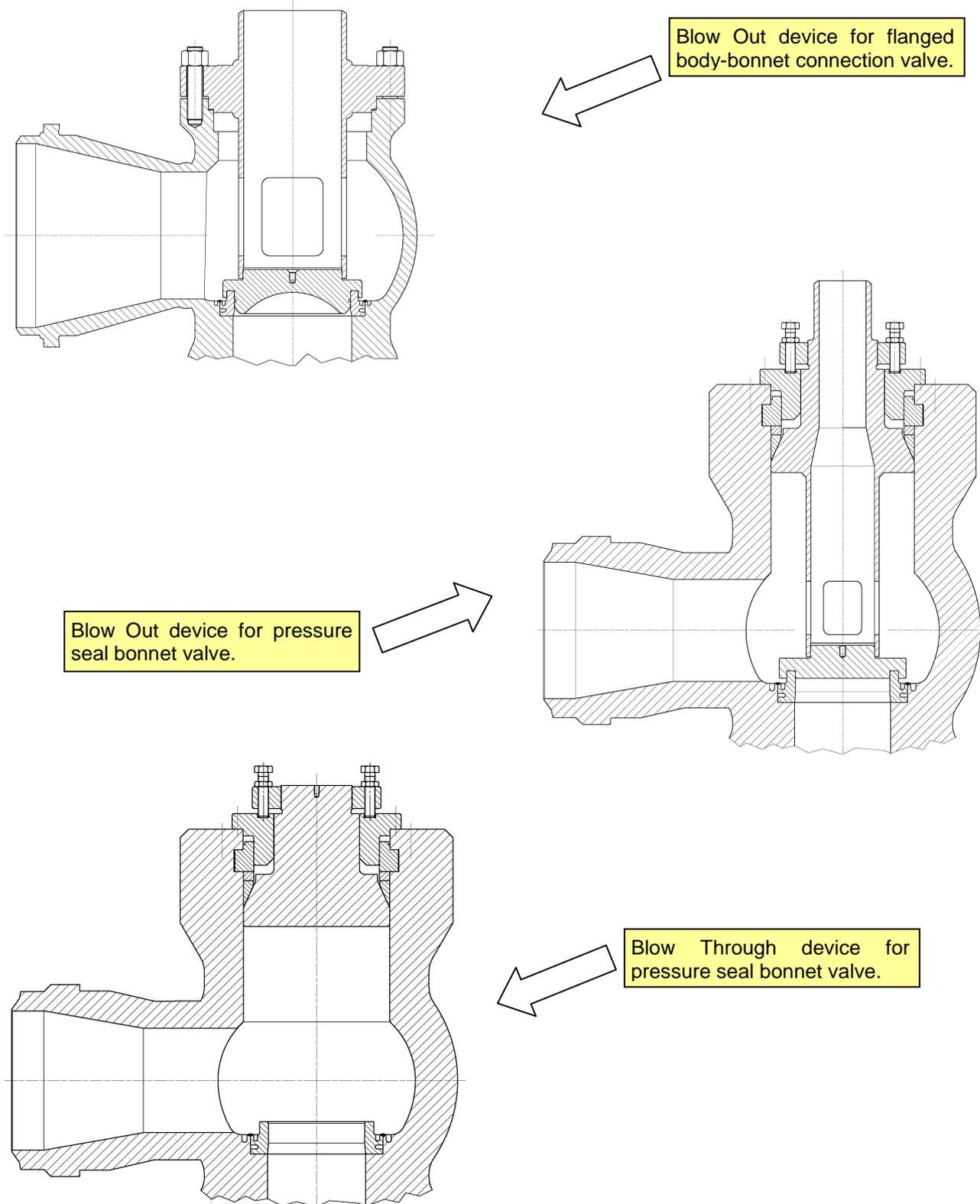


BLOWING DEVICES

Valve seat of 1-4470 is self-protected by the micro-drilled cage, however line cleaning before valve operation is strongly recommended to avoid trim clogging and internal parts damage.

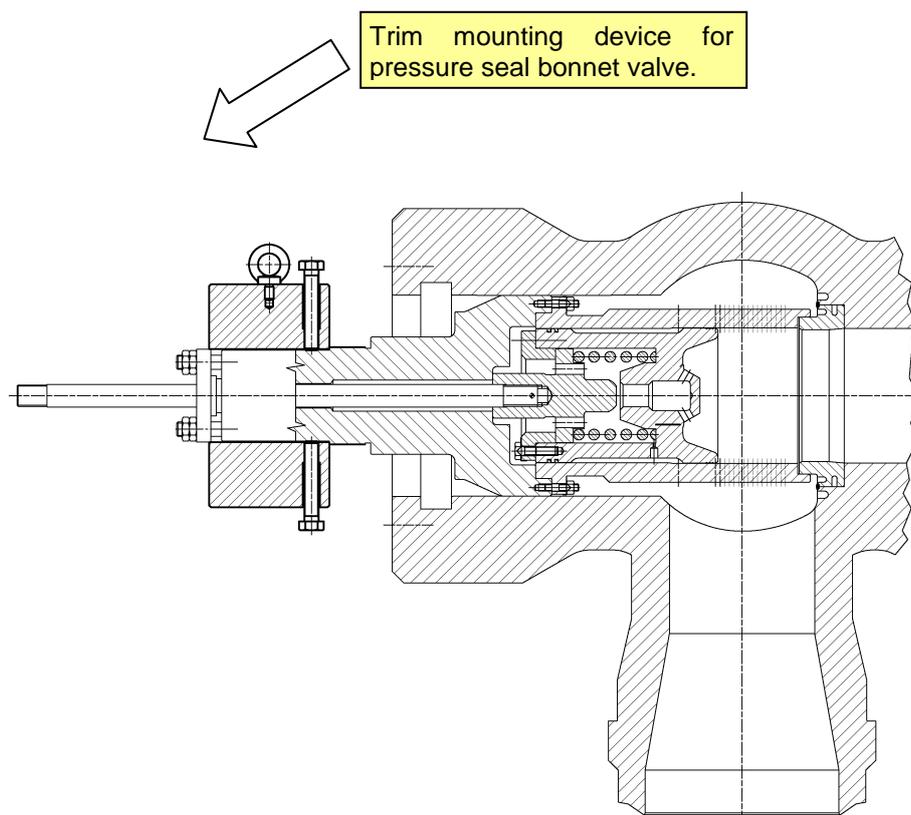
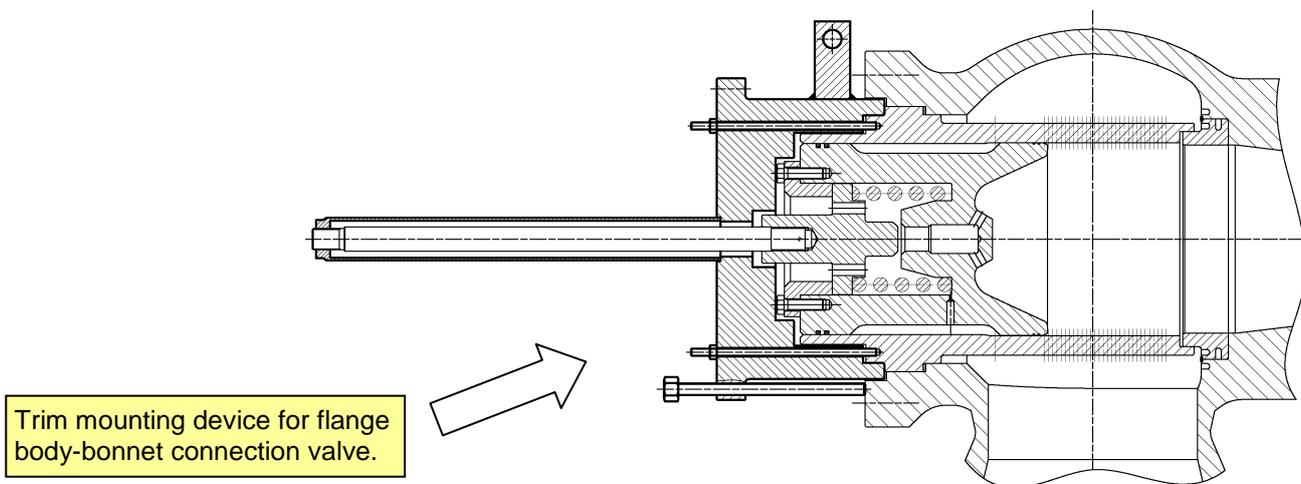
Blowing devices, typically with “blow out” function, can be supplied on request to perform line cleaning before put valves in service.

Blow through devices are usually supplied only when quick change seat and silencer are provided.



SPECIAL MAINTENANCE TOOLS

1-4470 are often installed with horizontal actuator axis. For such an installation special tools can be supplied, on request, to simplify disassembly and re-assembly operations.





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