09/06/2026
VPPCV21SPD375

Pressure sustaining and relief valve type E2116-00

Choice of the valve

The pressure sustaining/relief valve E2116-00 is controlled by a normally closed diaphragm actuated, two way, spring loaded, adjustable pressure discharging control valve (rep 1), set to maintain a minimum and constant pressure at valve inlet.

When upstream pressure increases to the sustaining/relief set point, the control pilot (rep1) throttles towards open, increasing flow through the pilot circuit; pressure is decreased in the main valve control chamber, inducing the main valve to modulate towards open an appropriate amount, relieving excess upstream pressure through the main valve to its outlet. The opening speed can be adjusted by independent flow regulator "OPENING SPEED = OS" located in lockable central control "TUP - 93" rep7).

As the upstream pressure decreases to the sustaining/relief set point, the control pilot (rep1) throttles towards closed, restricting the flow through the pilot circuit. Pressure is increased in the main valve control chamber, inducing the main valve to modulate towards closed an appropriate amount, maintaining the desired upstream pressure. The closing speed can be adjusted by the independent flow regulator "CLOSING SPEED = CS" located in the lockable central control "TUP-93".

If upstream pressure is dropping below the sustaining/relief set point and is remaining below the set point, the main valve is closing drop-tight.

DN (mm)	PN	A (mm)	B (mm)	C (mm)	D (mm)	E (mm)	Mass (kg)	References
50	10 16 25	230	148	246	165	85	20.00	RCA50DCCHB
65	10 16	290	148	246	185	95	23.00	RCA65DCBHB
65	25	290	148	246	185	95	28.00	200959
80	10 16 25	310	148	246	200	100	25.00	RCA80DCBHB

Last Update 08/06/2026
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DN (mm)	PN	A (mm)	B (mm)	C (mm)	D (mm)	E (mm)	Mass (kg)	References
100	10 16	350	206	272	220	110	34.00	RCB10DCCHB
100	25	350	206	272	220	110	36.00	RCB10DCDHB
125	10 16	400	267	330	250	125	51.00	RCB12DCCHB
125	25	400	267	330	250	125	51.00	RCB12DCDHB
150	10 16	480	267	330	285	145	62.00	RCB15DCCHB
150	25	480	267	330	285	145	68.00	RCB15DCDHB
200	10	600	356	402	340	170	110.00	RCB20DCBHB
200	25	600	356	402	340	170	110.00	RCB20DCDHB
250	10	730	445	569	400	200	191.00	RCB25DCBHB
250	16	730	445	569	400	200	191.00	RCB25DCAHB
300	10	850	597	649	455	230	320.00	RCB30DCBHB
300	16	850	597	649	455	230	320.00	RCB30DCAHB
300	25	850	597	649	455	230	430.00	200983
400	10	1100	750	786	565	285	603.00	RCB40DCBHB
400	16	1100	750	786	565	285	618.00	200987
500	10	1250	842	840	670	335	935.00	RCB50DCBHB
600	10	1450	905	956	780	390	1280.00	RCB60DCBHB
600	16	1450	905	956	780	390	1280.00	RCB60DCAHB
600	25	1450	905	956	780	390	1280.00	RCB60DCDHB
700	10	1650	1110	1080	910	460	2148.00	RCB70DCBHB
700	16	1650	1110	1080	910	460	2148.00	RCB70DCAHB

Standard version with adjustment range 1,4-14 bar

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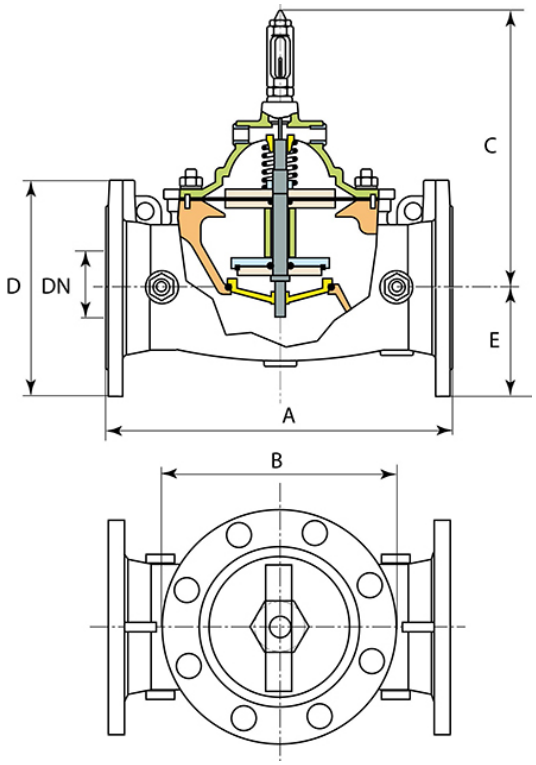

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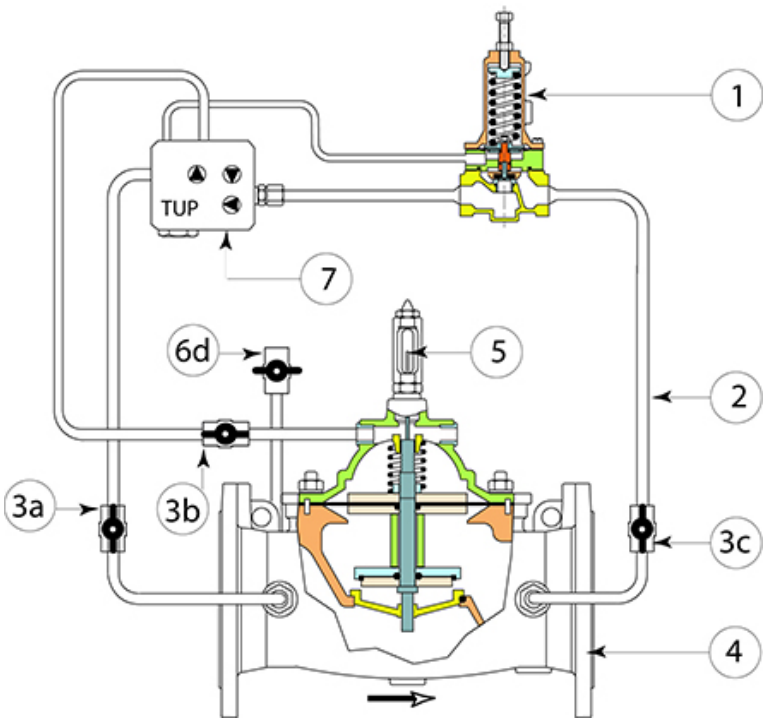
Hydraulic scheme



Item	Description	Material
1	Pressure sustaining \ relief pilot	
2	Tube	AISI 304
3a 3b 3c	Ball valve	Brass Ni-plated
4	Main valve	
5	Position indicator with manual venting cock.	
6d	Gauge holder ball valve (manometer)	Brass Ni-plated
7	Centralized control unit	

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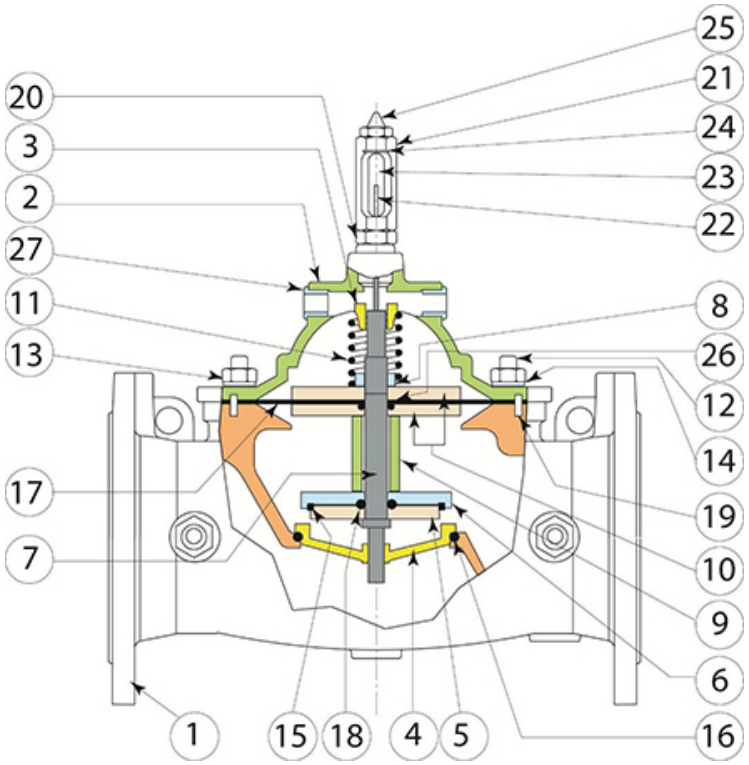
Material and coating



Item	Quantity	Description	Material
01	01	Body	FGS 400-15 (coating BFE epoxy 250µm mini)
02	01	Cover	FGS 400-15 (coating BFE epoxy 250µm mini)
03	01	Cover bearing	Bronze
04	01	Seat	AISI 316
05	01	Quad-ring retainer plate	AISI 316
06	01	Quad-ring retainer size 50-200	AISI 316
07	01	Stem	AISI 303
08	02	Stem nuts	AISI 303
09	01	Spacer	AISI 303
10	02	Diaphragm washers epoxy coated	Steel
11	01	Spring	AISI 302
12	*	Stud	AISI 303
13	*	Nut	AISI 303

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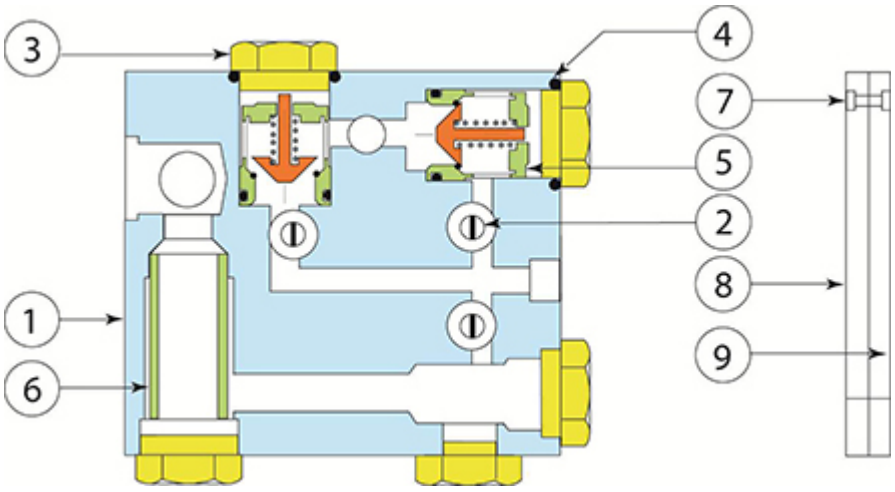
Item	Quantity	Description	Material
14	*	Washer	AISI 303
15	01	Quad-ring	NBR (KTW-WRC)
16	01	Seat O-ring	Viton
17	01	Diaphragm	NBR nylon reinforced (KTW-WRC)
18	01	O-ring	NBR
19	02	Centring taper pin	AISI 303
20	01	Base position indicator	Brass Ni-plated
21	01	Position indicator housing	Brass Ni-plated
22	01	Position indicator stem	AISI 303
23	01	Position indicator	Glass
24	02	O-ring	NBR
25	01	Brass Ni-plated	Brass Ni-plated
26	01	O-ring	NBR
27	01	Reduction	AISI 304

Central Control Unit TUP 93



Item	Quantity	Description	Material (type)
01	01	Body	AISI 303
02	03	Cock	AISI 303
03	03	Plug	AISI 303

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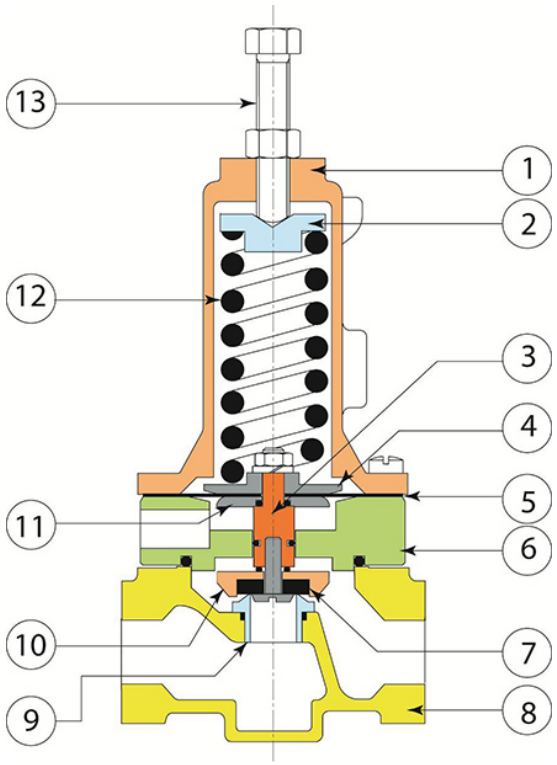
Item	Quantity	Description	Material (type)
04	03	O-ring	NBR
05	02	Non return valve (WRC)	
06	01	Screen	AISI 316
07	01	Rivet	Brass
08	01	Bottom label	Polycarbonate makrolon
09	01	Top label	Polycarbonate makrolon

Pilot PV 20 c



Item	Description	Material
1	Pilot cover	Bronze
2	Top spring guide	Bronze
3	Obturator / stem	Brass
4	Top diaphragm washer	Brass Ni-plated
5	Diaphragm	NBR nylon reinforced

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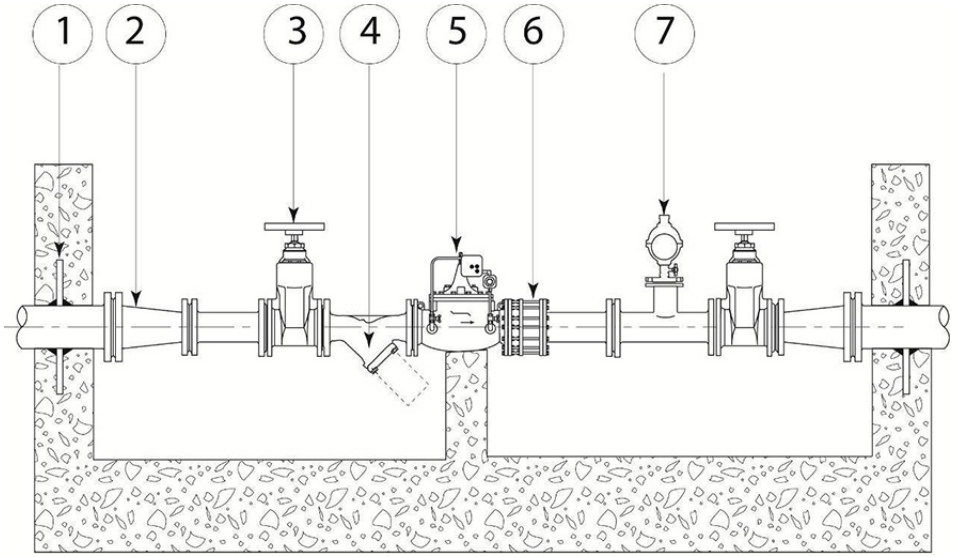
Item	Description	Material
6	Spacer	Brass Ni-plated
7	Seat gasket	NBR
8	Body	Bronze
9	Seat	AISI 316
10	Seat retainer	Brass
11	Bottom diaphragm washer	Brass Ni-plated
12	Spring	AISI 302
13	Setting screw	AISI 303

Mounting scheme (I)



Item	Quantity	Description
01	2	Attachment flange
02	2	Flanged taper
03	3	Isolating valve
04	1	Strainer with drain cock
05	1	Automatic control valve E2001
06	1	Dismantling joint
07	1	Air release / vacuum breaker valve

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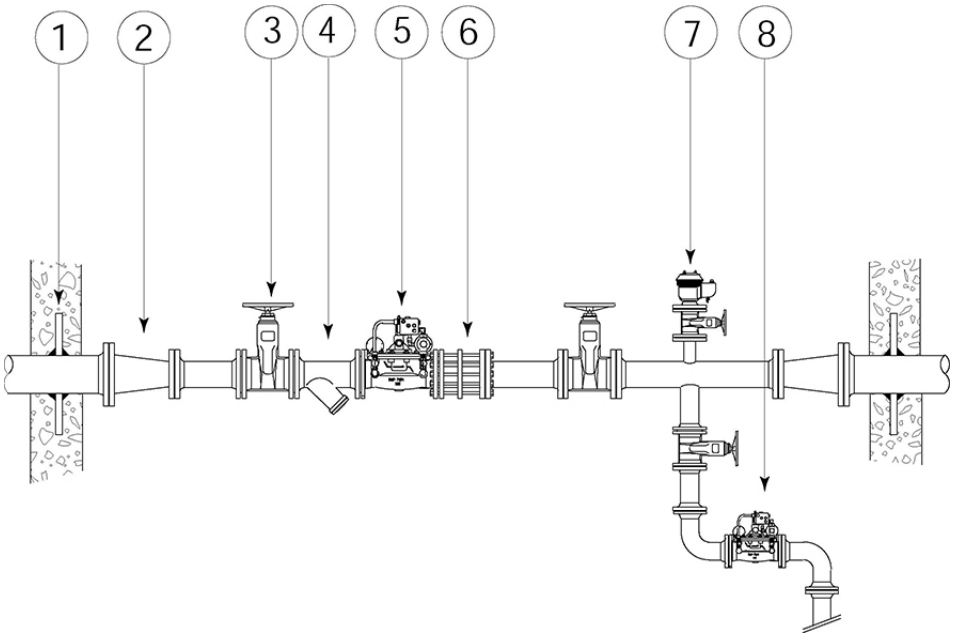
Mounting scheme (II)



Item	Quantity	Description
01	2	Attachment flange
02	2	Flanged taper
03	3	Isolating valve
04	1	Strainer with drain cock
05	1	Automatic control valve E2001
06	1	Dismantling joint
07	1	Air release / vacuum breaker valve
08	1	Security valve

Installation

Packing and storage

The valves are packed in special cardboard boxes. Outside the carton are clearly pointed out:

- The arrow indicating the position of the valve
- The name of the customer
- The code of the valve
- The number of order confirmation

The valve is protected by two hardening foam cushions, carefully coated by a thermal plate.

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This kind of packing if properly stored avoids all the damages originated from transport, unloading, and handling before installation. Avoid storing it under the rain for more than 24 hours!

Open the upper side of the carton and remove the upper cushion. Do not lift the valve by utilizing the pilot, the pilot circuit, or the position indicator.
For any kind of handling we recommend to utilize proper eyebolts.

Installation

The mounting scheme of the valve is shown on the drawing.

If the valve is working as pressure sustaining device in a transport line, it may be recommended to install a by-pass around it, which will allow to put it out of service during some hours for maintenance purpose, without generating problem for the exploitation of the system.

The choice of the proper "by-pass" alternative must be taken considering the following points:

1. Can the main transport/feeding line be put out of service during some hours (corresponding to the requested time for maintaining the MAIN VALVE), without generating problem for the exploitation of the system? In particular, it must be considered that an empty system may require several hours to be vented properly.
2. Pressure relief: Has the downstream or upstream zone of the system to be protected against any risk of pressure surge (quick closing of heavy demands, closing time) ?

Should installation require the main valve stem to be horizontal (cover pointed sideways), manufacturer should be consulted concerning valves of DN200 mm and larger.

Note: All sizes on request are available with an additional venting cover device (venting cock installed at the top of the cover) to permit a simple escaping of air during the first commissioning.

- Before control valve assembly, make sure that pipeline it is free from foreign matters or any other obstacle. (note: pipeline must be cleaned, possibly, before assembly. For an ideal pipeline cleaning we suggest a 1.5 m/sec speed during several hours!).
- In presence of foreign matters into the fluid it is indispensable to adopt a strainer on valve upstream side.
- Keep free around the valve space enough for operations as maintenance and calibration.
- Set up the valve according to main valve cast arrow indicating flow sense.
- Install the valve so that the FLOW ARROW marked on the valve body matches flow through the line: UPSTREAM → DOWNSTREAM

Start up of an automatic control valve requires that proper procedures be followed. Time must be allowed for the valve to react to adjustments and the system to stabilize. The objective of the following procedure is to bring the valve into service in a controlled manner.

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Commissioning

Close upstream and downstream (if existing) isolation valve.

Open all ball cocks (3 a and b) of the pilot circuit. Failure to open these ones will prevent the valve from functioning properly. Ball valve 3 C must be closed.

TUP - 93 (rep 7) pre-setting:

- a- Reaction speed [RS] is already setting = 3
- b- Opening speed [OS] is already setting = 6
- c- Closing speed [CS] is already setting = 2

Calibrate setting screws "OPENING" and "CLOSING" according to the practical service conditions (see below). If not included in the order, install one pressure gauge by utilising the gauge holder ball valve (6 d).

Initial set up:

- On pressure sustaining/relief control (rep 1), loose the counter-nut and turn the setting screw clockwise (IN), until the screw is practically compressing the spring at its maximum. This is simulating the highest setting value of the spring range, from which the commissioner will have to gradually decrease the pressure, up to the prescribed one.
- Check the setting of the TUP - 93, as indicated above.
- Open upstream isolation valve SLOWLY of one / two turns maximum, in order to allow a controlled filling of the regulating valve, which is going to close [in any case, if the maximum set value of control (1) is higher than the upstream pressure of the system].
- Vent air of main valve cover through the safety venting cock mounted on the valve position indicator (5).
- Check the upstream pressure gauge, which should show a pressure value corresponding to the system pressure. To open partially the inlet and outlet isolating valve, and completely the ball valve 3c. Then to turn progressively by ½ turn the regulating screw of control (1) anti-clockwise (OUT), to decrease the set maximum pressure. Wait some seconds (5 - 10 s) after each (1/2 turn) correction, allowing to the pilot circuit to react.

Sustaining valve:

As soon as the flow starts in the pilot circuit (WHISTLE of water), observe the upstream gauge and unscrew further and very slowly the regulating screw of control (1). The main valve (rep 4) opens, releasing the inlet pressure to its outlet; wait until the main valve is stable and read the set pressure.

Unscrew further the regulating screw of control (rep 1), until the inlet pressure is reaching the prescribed value.

SUSTAINING VALVE Fine tune the pressure sustaining pilot (1) to the set point: SCREW CLOCKWISE (IN) → increase inlet pressure - SCREW ANTI-CLOCK (OUT) →decrease inlet pressure

Relief valve

As soon as the flow starts in the pilot circuit (WHISTLE of water), screw clockwise (IN) the regulating screw of the control (rep 1), in order to set the pressure relief value at higher value than the one of the system [system pressure + prescribed overpressure, which can be computed by using the data given here above].

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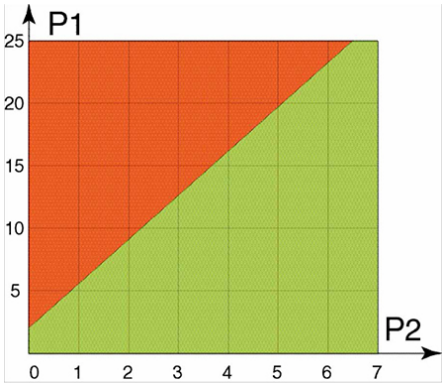
Example: Pressure relief valve mounted on a pumping transport line (pump in service) / control (1) has a standard range of 1.4 - 14 bar:

a) dynamic pressure P1 of the system starts to open the pilot (1)
b) overpressure chosen = 1 bar, requesting to screw clockwise the regulating screw of pilot (1) of half-turn -----> relief pressure value is now set to [P1 + 1 bar]

- When the desired setting is reached, open completely, but slowly, the upstream isolation valve.
- Then lock the counter-nut of pilot (1) and the plastic cap.
- **"TUP - 93" adjusting closing speed**: the closing speed adjustment reduces the flow entering in the main valve (4) control chamber. Do not reduce this value below 1 to assure a correct closing of the valve.

"TUP - 93" adjusting opening speed: the opening speed adjustment reduces the flow in exit from the main valve (4) control chamber. If the opening speed of the valve is too fast [pre-setting of the flow regulator (OS) at value = 6] decrease the adjustment of the regulator progressively towards 3. In the opposite case to increase the value but without going below value 1 to assure a correct opening of the valve.

Limit conditions



Cavitation diagram: it's the admissible differential pressure normally used in the regulating valve

P1 = Maximum inlet pressure of the valve
P2 = Minimum outlet pressure before danger of cavitation occurs

Green area: no danger of cavitation (and therefore no significant wear on the valve)

Red area: notable danger of cavitation (with accelerate wear and damage of the valve)

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Maintenance

Recommended spare parts:

- 1 pilot PV20C
- Set of joints for PV20C
- Set of joint for E2001

The quality of the material used in the manufacture of our valves should produce no wear of the internal components.

However we are recommending:

After 6 months of service:

- Control and clean eventually the TUP - 93 screen

Note: an obstructed screen due progressively the valve out of order.

After 12/18 months of service :

- Control and clean the TUP - 93screen.
- Take the main valve apart, by removing first the complete pilot circuit.
- Unscrew the stud nuts and remove the cover and internal diaphragm assembly.
- Check for any eventual damage of the QUAD-RING and the diaphragm.
- Clean thoroughly the internal part of the valve, grease slightly the stem at both guided locations (water grease, non-toxic!!).
- Assemble the main valve and the pilot circuit.
- Put the valve back into service.

This control should then allow to determine the cycle of the requested maintenance, since it is taking into consideration the true service conditions of the valve.

For any further information contact our Customer Service, indicating all data as per plastic label on main valve body. Give full detailed information's about working conditions, the type of problem, and report the adjusting values (OS-CS-RS).

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