

**P.A. – S.p.A. – EQUIPAGGIAMENTI TECNICI DEL LAVAGGIO**

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## Unloader type pressure regulating valve for recycled waters Technical manual: **MPA.0020.EN**

Unloader type pressure regulating valve. When the gun is closed, the water flow is discharged into the bypass, lowering the pressure of the circuit upstream of the valve.

### DN 10



- **60.0000.00** 3/8" BSP F White spring
  - **60.0000.05** 3/8" NPT F White spring
  - **60.0000.60** 3/8" BSP F Blue spring
  - **60.0000.63** 3/8" BSP F Blue spring – Shutter pin, Sst.
  - **60.0000.65** 3/8" NPT F Blue spring
  - **60.0007.00** 3/8" BSP F White spring with knob
  - **60.0007.05** 3/8" NPT F White spring with knob
  - **60.0007.60** 3/8" BSP F Blue spring with knob
  - **60.0007.63** 3/8" BSP F Blue spring with knob
  - **60.0007.65** 3/8" NPT F Blue spring with knob
- Optimized internal passages that guarantee reduced pressure loss.
  - Antirotation device of the piston positioned inside the valve and obtained by an hexagonal sector of the piston itself.
  - O-rings of the fittings positioned upstream to the thread: no risk of fittings ejected in case of overpressure.
  - Double bypass connection.

### TECHNICAL FEATURES

#### Construction Material

Brass Body, inner parts in stainless steel

#### Rated Temperature (1)

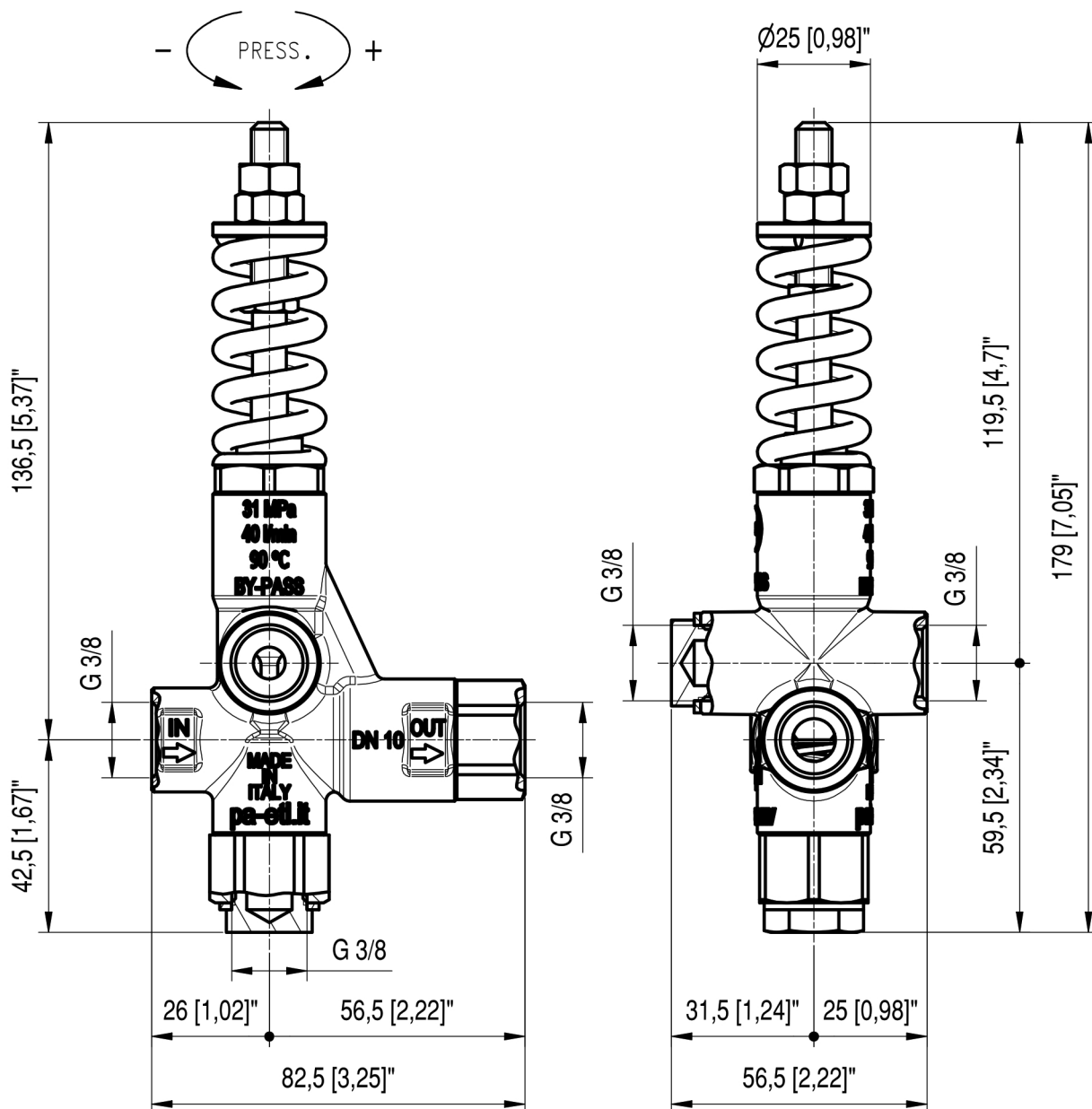
90°C (195°F)

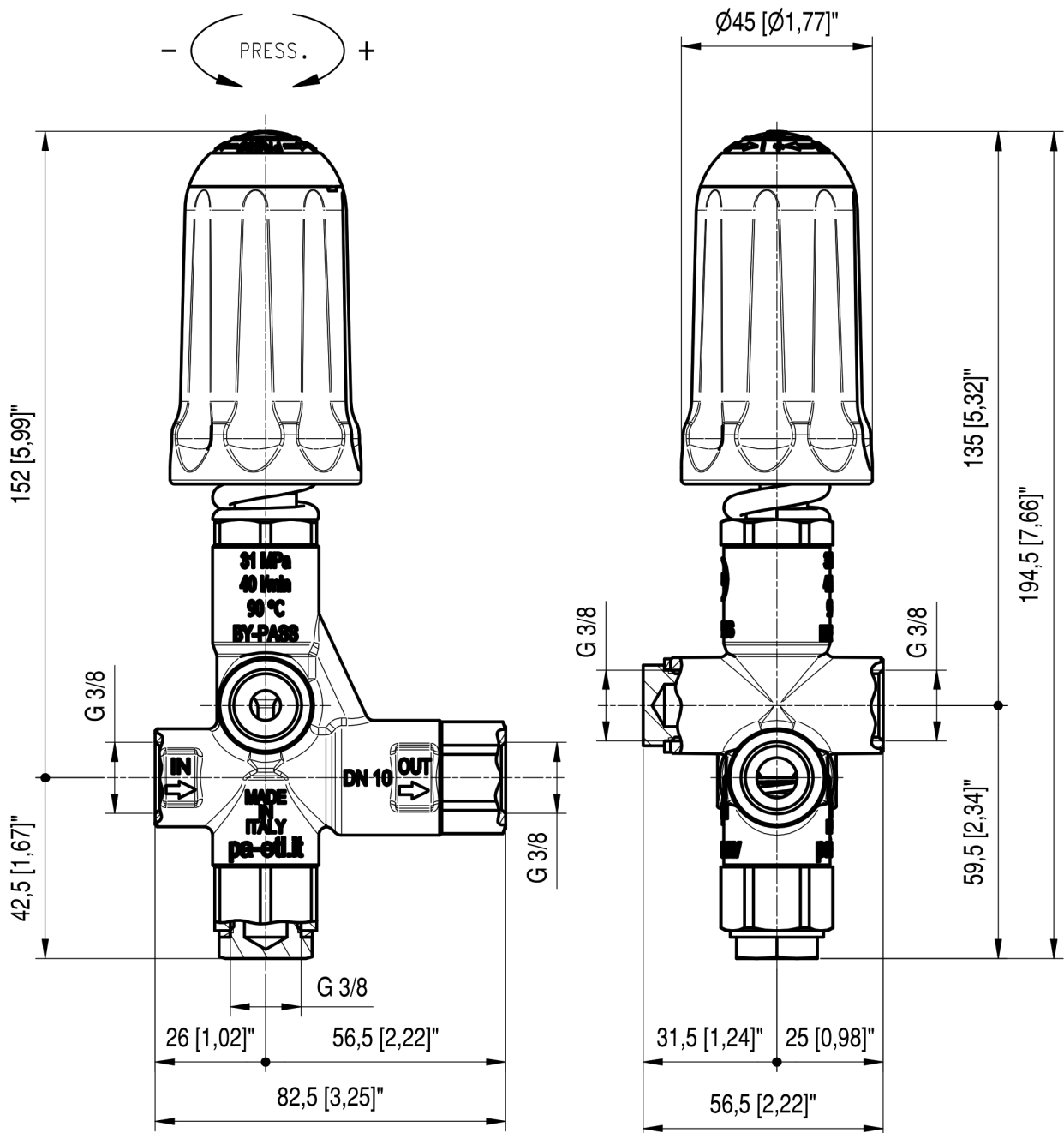
PART NUMBER	RATED PRESSURE		PERMISSIBLE PRESSURE		MINIMUM ADJUSTABLE PRESSURE		% PRESSURE DECREASE FOR VALVE RESET (2)	MAXIMUM FLOW (3)		WEIGHT		INLET OUTLET BYPASS
	bar	psi	bar	psi	bar	psi		l/min	USGpm	g	oz.	
<b>60.0000.00</b>	160	2300	180	2600	16	230	30	40	10.5	711	25.08	G 3/8" F
<b>60.0000.05</b>	160	2300	180	2600	16	230	30	40	10.5	712	25.11	3/8" NPT F
<b>60.0000.60</b>	280	4050	310	4500	28	400	30	40	10.5	744	26.24	G 3/8" F
<b>60.0000.63</b>	280	4050	310	4500	28	400	30	40	10.5	744	26.24	G 3/8" F
<b>60.0000.65</b>	280	4050	310	4500	28	400	30	40	10.5	744	26.24	3/8" NPT F
<b>60.0007.00</b>	160	2300	180	2600	16	230	30	40	10.5	780	27.51	G 3/8" F
<b>60.0007.05</b>	160	2300	180	2600	16	230	30	40	10.5	780	27.51	3/8" NPT F
<b>60.0007.60</b>	280	4050	310	4500	28	400	30	40	10.5	780	27.51	G 3/8" F
<b>60.0007.63</b>	280	4050	310	4500	28	400	30	40	10.5	777	27.40	G 3/8" M
<b>60.0007.65</b>	280	4050	310	4500	28	400	30	40	10.5	780	31.18	3/8" NPT F

- 1) The valve has been designed for a continuous use with water at a temperature of **60°C (140°F)**. It can work for short periods with water at the maximum temperature of **90°C (195°F)**.
- 2) When the valve is in bypass mode, this is the decrease of pressure that has to occur in the circuit downstream of the valve, in order that the valve can restore the working pressure in the system. The indicated figure is expressed as a percentage of the pressure setting (working pressure).

At gun closure, a pressure increase occurs in the circuit downstream of the valve. This pressure increase is used to activate the valve and discharge all the flow in bypass. The value of the pressure increase cannot be calculated. It depends on the correct setting of the valve (see PRESSURE ADJUSTMENT/SETTING) and on the layout of the system: flow rate, working pressure, length and characteristic of the tubes, closing time of the gun.

## DIMENSIONAL DRAWING





## INSTRUCTIONS

### DESCRIPTION

The valve has an inlet ports with Bsp 3/8" F thread (3/8"NPT F)  
 The valve has an outlet port with Bsp 3/8" F thread (3/8"NPT F) .  
 The valve has also two bypass ports with Bsp 3/8" F thread (3/8"NPT F).  
 The valve is available in two different versions: with and without the plastic adjustment Knob.

### SELECTION

This product is intended to be incorporated on a finished machine. This product is to be utilized with clean fresh water, or with a slight addition of standard detergents. For use involving different or corrosive liquids, contact the PA Technical department. Appropriate filtration should be installed when using impure liquids. Choose the valve in line with the working data of the machine where to be installed (permissible pressure, maximum flow rate and rated temperature of the system). In any case, the pressure of the machine must not exceed the permissible pressure imprinted on the valve.

### OPERATION

The valve regulates the pressure of the system by altering the flow discharged by the bypass. The adjustment is carried out by changing, by means of a piston, the position of a ball that partially shuts the bypass opening. At gun closure, a check valve closes and isolates the part of the circuit downstream of the valve: the pressure increase that remains trapped is used to activate the complete opening of bypass. All the flow supplied by the pump is therefore discharged at low pressure through the bypass and the pump works at low pressure.

**INSTALLATION**

This item is to be installed on a finished machine. On a system that produces hot water, this accessory must be fitted upstream of the heat generator. On a system that generates hot water, On a system that produces hot water, it is advisable to fit in accessories that limit the accidental increase of fluid temperature.

**Always install a relief valve.**

It is recommended to use a nozzle with a size that, at gun opened, allows to discharge from the valve bypass at least 5% of the flow supplied by the pump in order to obtain a constant pressure value, and an easy adjustment and to avoid troublesome pressure spikes at gun closure.

If the nozzle wears out, the working pressure decreases. To reset the pressure back to work level, it is necessary to replace the worn out nozzle. When a new nozzle is fitted, re-setting of the system to its original working pressure is necessary.

**DISCHARGE SYSTEM AND WATER ADDUCTION**

The bypass discharge can be sent back to the pump intake or returned into a tank; in such case it is advisable that the tank be fitted with deflectors to reduce eventual turbulence and air bubbles generated by the emission of the bypass flow which could be harmful for the pump.

**PRESSURE ADJUSTMENT/CALIBRATION**

The desired working pressure must be adjusted with the system running and the gun opened. Adjust the pressure by screwing or unscrewing the adjustment screw/knob. The operation is easier if the correct nozzle has been chosen (see paragraph "installation"). When screwing the screw/knob a consequent pressure increase must be matched. If, before reaching the desired pressure, there is no pressure increase when screwing the screw/knob, do not insist but check the correct ratio nozzle/flow rate – pressure and, if necessary, fit a nozzle with an inferior size. In the knob version, it is possible to set up the minimum working pressure with the provided locknut (pos.16).

**ATTENTION: The nut in position 22 (position 10 in the knob version) is a mechanical security device that limits the maximum pressure; it must absolutely not be removed.**

**TROUBLESHOOTING:**

ISSUE	PROBABLE CAUSE	SOLUTION
Frequent valve recycles	Damaged check valve O-ring Leaking connections Restricted bypass or too small diameter of the bypass hose	Replace Check or renew Clean or adapt passage diameter
Valve does not reach pressure	Piston O-rings worn out Material between seat and shutter Seat worn out Nozzle worn out Incorrect choice of nozzle	Replace Clean the seat Replace Replace Fit nozzle with lower size
High pressure spikes at gun closure	There is not a min of 5% of total flow discharged in bypass Excessive flow in bypass Adjustment with spring totally compressed	Reset correctly  Change type of valve or adjust passages Loosen adjustment screw/knob and eventually fit nozzle with lower size
Valve does not discharge at low pressure at gun closure	Jammed check valve Material matter on check valve	Clean or replace Clean
Lack of electric signal	Control piston broken	Adjust nut and ball holder

## **MAINTENANCE**

**STANDARD:** every 400 working hours, control and lubricate the seals with water resistant grease.

**SPECIAL:** every 800 working hours, control the wear of the seals and internal parts and if necessary, replace with original PA parts taking care, during installation, to lubricate with water resistant grease.

Maintenance has to be carried out by Specialized Technicians.

**The Manufacturer is not to be considered responsible for damage as a result from incorrect fitting and maintenance.**

## **REGULATIONS:**

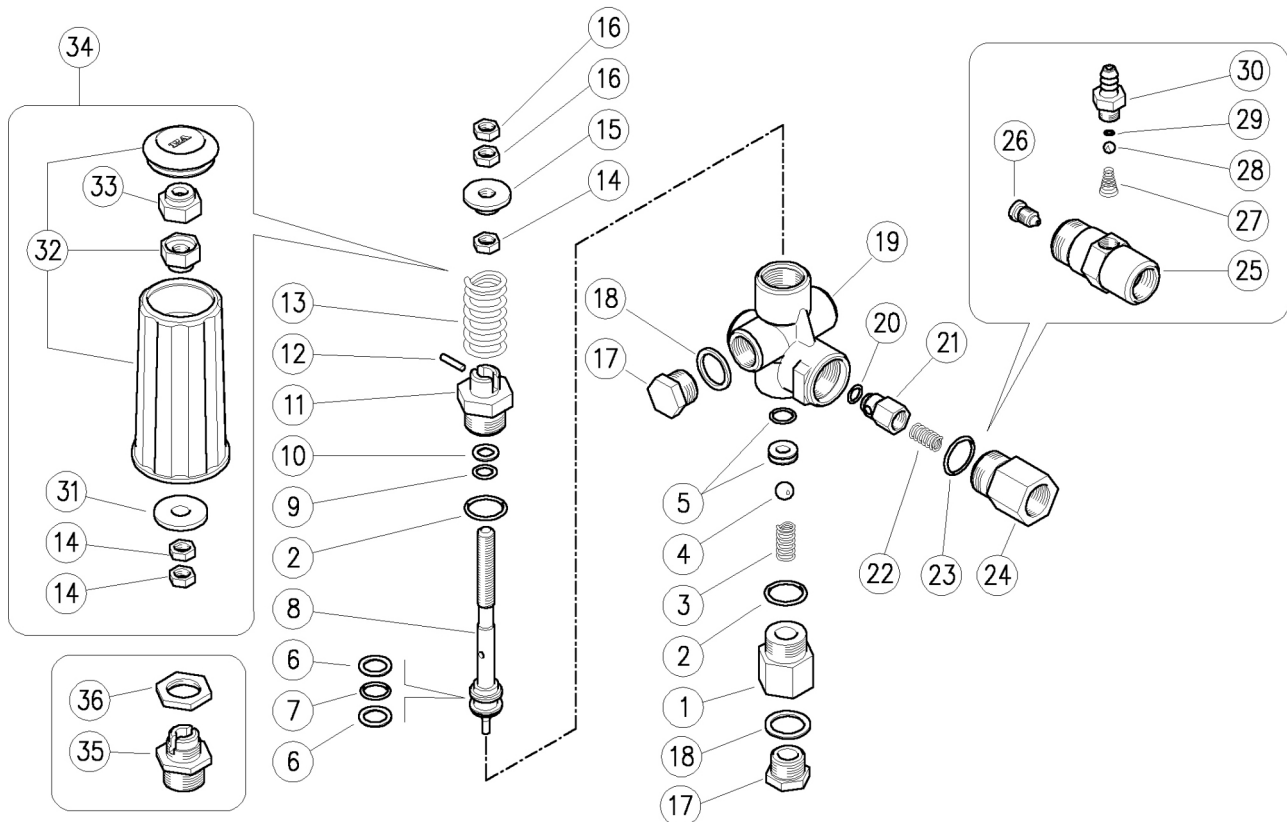
See Norm Manual.

For a correct utilization, follow the directions described in this manual and re-print them on the Use and Maintenance manual of the machine. If needed, ask for the original Conformity Declaration for the chosen accessory. The present manual is valid for all unloader valves named **PULSAR RV**.

Technical data, descriptions and illustrations are indicative and liable to modification without notice.

60.0000.00 Pulsar Rv- unload. 3/8F Bsp-18MPa  
 60.0006.00 Pulsar Rv unld.3/8F Bsp+m/sw-18MPa+knob  
 60.0006.60 Pulsar Rv unld.3/8F Bsp+m/sw-31MPa+knob

60.0006.62 Pulsar3 unload.3/8F Bsp-250bar+kn.+p.ftg  
 60.0006.65 Puls.Rv un/d. 3/8F Npt-31MPa+kno+Pr16  
 60.0073.21 Pulsar3 250 Unl.+fix.inj.3/8Bsp M 2,1mm



Pos.	P/N	Description	Q.ty	K1	K2	K3	K4
1	60.0024.31R	Suction coupl., 3/8F Bsp brass	1				10
1	60.0030.31R	Suction coupl., 3/8F Npt brass (1)	1				10
2	10.3068.00R	O-ring, 1,78x17,17 mm	2	•	•		10
3	60.0015.51R	Spring, 1,4x10x16 mm Sst.	1				10
4	14.7443.10R	Ball, 11/32" Sst.	1	•	•		10
5	30.0031.20R	Seat, 7 mm +O-ring	1	•	•		10
6	10.4021.00R	Back-up ring, opn. 11,5x15,9x1,2 mm	2	•	•		10
7	10.3175.00R	O-ring, 2,62x10,77 mm	1	•	•		10
8	60.0061.23R	Valve piston, Sst.	1				5
9	10.3170.00R	O-ring, 2,62x7,6 mm	1	•	•		10
10	10.4020.00R	Back-up ring, 8x12,6x1,2 mm	1	•	•		10
11	60.0064.31R	Piston holder, brass	1				5
12	15.1021.00R	Roll pin, 3x14 mm Sst.	1				10
13	60.0012.61R	Spring, 5x25x50 mm white (2)	1				5
13	60.0033.61R	Spring, 5,7x26x53 mm blue	1				5
14	11.4573.31R	Hex. nut, M8, brass (2)	1				10
14	11.4573.31R	Hex. nut, M8, brass (3)	2				10
15	60.0011.31R	Spring holder ring, brass	1				10
16	11.4574.00R	Hex. nut, M8	2				10
17	60.0028.31R	Plug, brass 3/8 Bsp, hex. 19	2				25
17	60.0025.31R	Grub screw, brass 3/8M Npt (1)	2				10

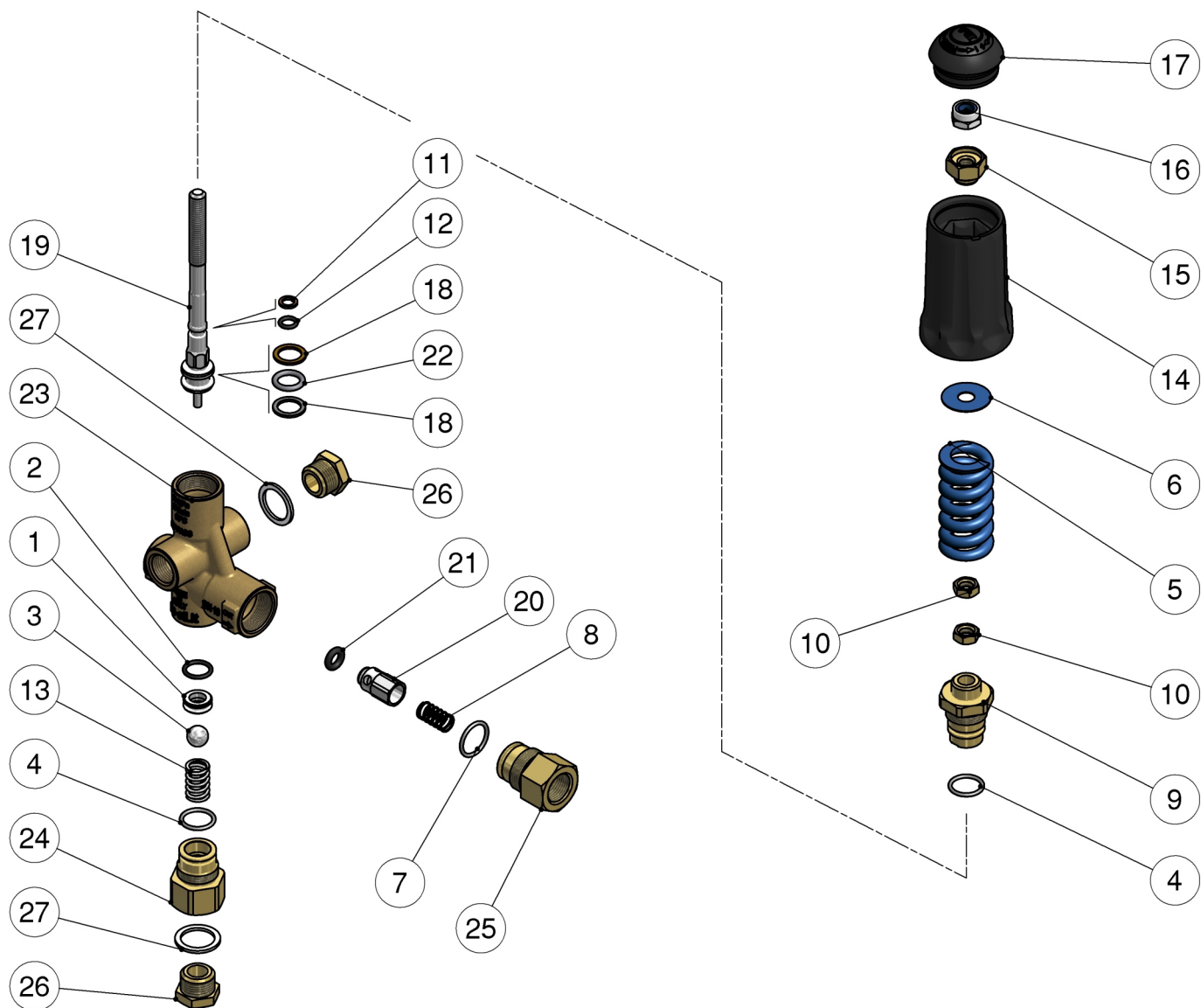
Kit	P/N	Description	Q.ty
K1	60.0005.24	Spares kit -Pulsar3, 10x5pcs.	1
K2	60.0056.24	Spares kit -Pulsar3, 10x1pcs.	1

Pos.	P/N	Description	Q.ty	K1	K2	K3	K4
18	14.4042.00R	Washer, 16,7x22x1,5 mm alu.	2				25
19	60.0051.35	Housing -Pulsar3, 3/8Bsp FFF brass	1				1
20	10.3213.00R	O-ring, 3x6 mm	1	•	•		10
21	60.0052.99R	Shutter pin, brass+o-ring 3x6 mm	1				10
22	60.0053.51R	Spring, 0,7x9x20 mm Sst.	1				10
23	10.3070.02R	O-ring, 1,78x18,77 mm Ni 85	1	•	•		10
24	60.0058.31R	Delivery coupl., 3/8F Bsp brass	1				5
24	60.0059.31R	Delivery coupl., 3/8F Npt brass (1)	1				10
25	21.0261.31R	Inject.hou.M22x1,5M-3/8M Bsp (4)	1				3
26	21.0213.51R	Nozzle, M8x1 - 2,1 mm Sst.	1				10
27	21.0160.51R	Tapered spring, Sst. -inject.	1				10
28	14.7420.01R	Ball, 7/32" Sst. Aisi 316	1				10
29	10.3049.00R	O-ring, 1,78x5,28 mm Vi 70	1				10
30	21.0003.31R	Hose barb, 8 - M12x1 mm brass	1				10
31	14.3720.40R	Washer, 9,2x24x0,5 mm (3)	1				10
32	60.0004.24	Knob + Plug -Pulsar3 (3)	1				5
33	11.4589.10R	Hex. locknut, M8	1				10
34	60.0014.24	Knob Kit -Pulsar3, 6x1pcs. (3)	1				1
35	60.0185.31R	Piston hold.+panel fitting, 3/8M Bsp brs (5)	1				3
36	29.0171.31R	Nut, brass, 3/8F Bsp (5)	1				50

(1) 60.0006.65 (2) 60.0000.00 (3) 60.0006.00 (4) 60.0073.21 (5) 60.0006.62

60.0007.00 Puls. RV unld.3/8F Bsp+knob 18MPa  
 60.0007.05 Puls. Rv unld.3/8F Npt+knob-18MPa  
 60.0007.60 Puls. RV unld.3/8F Bsp+knob 31MPa

60.0007.63 Pulsar Rv unload. 3/8FM Bsp-31MPa+knob  
 60.0007.65 Puls. RV unld.3/8F Npt+knob 31MPa  
 60.0007.86 Puls.Rv-valv.3/8Npt+easy starter+knob



Pos.	P/N	Description	Q.ty	K1	K2	K3	K4
1	60.0259.20R	Seat, 8mm + O-ring, 1,78mm	1	•			10
2	10.3059.01R	O-ring, 1,78x11,11 mm Ni 85	1				10
3	14.7461.00R	Ball, 13/32" Sst.	1	•			10
4	10.3064.01R	O-ring, 1,78x14 mm Ni 85	2	•			10
5	60.0033.61R	Spring, 5,7x26x53 mm blue	1				5
5	60.0012.61R	Spring, 5x25x50 mm white (1)	1				5
6	14.3720.40R	Washer, 9,2x24x0,5 mm	1				10
7	10.3066.01R	O-ring, 1,78x15,6 mm Ni 85	1	•			10
8	60.0053.51R	Spring, 0,7x9x20 mm Sst.	1				10
9	60.0146.31R	Piston holder, brass	1				5
10	11.4573.31R	Hex. nut, M8, brass	2				10
11	10.4006.01R	Back-up ring, opn. 6,2x9x1,2 mm	1	•			10
12	10.3051.01R	O-ring, 1,78x6,07 mm	1	•			10
13	60.0410.51R	Spring, 1,6x11,5x20 mm Sst.	1				5
14	60.0148.24	Knob + Plug -PulsarRv	1				5
16	11.4589.10R	Hex. locknut, M8	1				10

Kit	P/N	Description	Q.ty
K1	60.0009.24	Spares kit -Pulsar Rv, 9(11)x1pcs.	1

(1) 60.0007.00 (2) 60.0007.05 (3) 60.0007.65 (4) 60.0007.86 (5) 60.0007.63

Pos.	P/N	Description	Q.ty	K1	K2	K3	K4
18	10.4021.00R	Back-up ring, opn. 11,5x15,9x1,2 mm	2	•			10
19	60.0034.51R	Puls.RV ex. piston, Sst.(2 bk )	1				5
20	60.0052.99R	Shutter pin, brass+o-ring 3x6 mm	1				10
21	10.3213.00R	O-ring, 3x6 mm	1	•			10
22	10.3175.00R	O-ring, 2,62x10,77 mm	1	•			10
23	60.0141.35R	Housing -Pulsar Rv 3/8 Bsp F brass	1				1
23	60.0136.35R	Housing -Pulsar Rv 3/8 Npt F brass (2,3,4)	1				3
24	60.0142.31R	Suction coupl., 3/8F Bsp brass	1				10
24	60.0137.31R	Suction coupl., 3/8F Npt brass (2,3)	1				10
24	60.0121.31R	Ball grub screw, brass (4)	1				5
25	60.1811.31R	Shutter coupl., 3/8F Bsp brass	1				5
25	60.1817.31R	3/8Npt F nipple (2,3,4)	1				3
25	60.0138.31R	Outlet nipple 3/8 Bsp M brass (5)	1				3
26	60.0028.31R	Plug,brass 3/8 Bsp,hex.19	2				25
26	60.0025.31R	Grub screw, brass 3/8M Npt (2,3,4)	2				10
27	14.4042.00R	Washer, 16,7x22x1,5 mm alu.	2				25