


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

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 ART. 2497 – BIS C.C. DIREZIONE E COORDINAMENTO BENETTI srl R.I. TRIB. DI RE 01480690351
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VB 10 - Unloader Valve (discharging)

Technical manual: E 212

Pressure regulating unloader valve with discharge control pressure with very low readings.
 At gun-lance closure, the water flow is bypassed at reduced pressure

DN 10


- **60.1100.00** VB 10 G3/8 FF
- **60.1100.50** VB 10 3/8NPT FF
- **60.1150.00** VB 10/2 G3/8 FF

- Sturdy steel and brass construction.
- Bypass control brought into effect by very low pressure readings. Therefore delivery line at reduced pressure at gun closure.
- Quick start at gun opening assures gradual pressure reset, essential for use on endothermic engines.
- Specially designed check valve prevents jamming and vibrations even in presence of sand and scale.
- Safety valve built in the delivery side.
- Working typology protected by registered patent.

Technical specifications

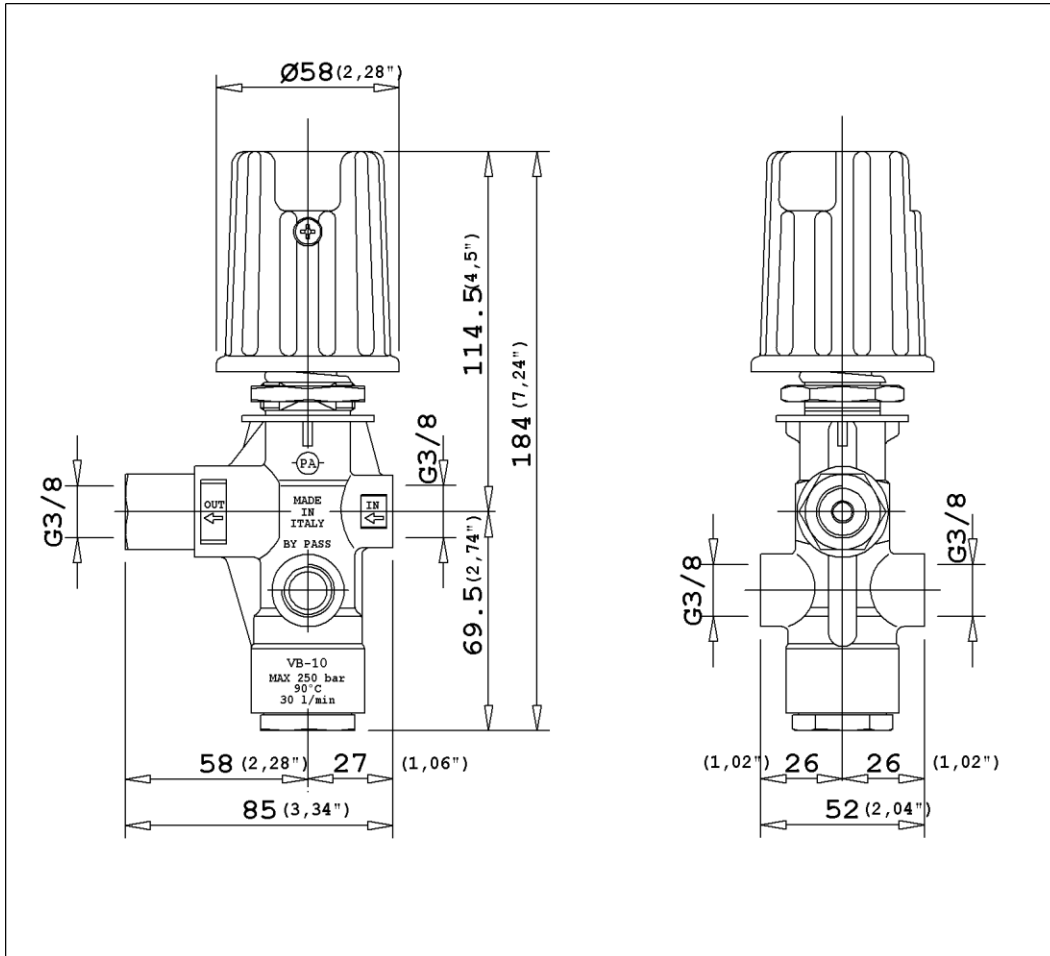
Max. flow rate: 30 l/min. Max temperature: 90°C (1)

| Part number | Rated pressure bar - MPa | Permissible pressure bar - MPa | Minimum adjustable pressure bar - MPa | Pressure remainder at circuit closure | | (2) Pressure drop to reset bypass bar | | | Inlet outlet bypass | Weight g |
|-------------|-----------------------------|-----------------------------------|--|---------------------------------------|-------------------------|---------------------------------------|-------------|-------------|---------------------|-------------|
| | | | | > 150 bar > (15 MPa) | a 220 bar a (22 MPa) | 100 (10) | 150 (15) | 200 (20) | | |
| 60.1100.00 | 220 - 22 | 250 - 25 | 22 – 2.2 | 45 (4.5) | 55 (5.5) | 15 (1.5) | 20 (2) | 30 (3) | G3/8 F | 1100 |
| 60.1100.50 | 220 - 22 | 250 - 25 | 22 – 2.2 | 45 (4.5) | 55 (5.5) | 15 (1.5) | 20 (2) | 30 (3) | 3/8 NPT F | 1100 |
| 60.1150.00 | 220 - 22 | 250 - 25 | 22 – 2.2 | 45 (4.5) | 55 (5.5) | 15 (1.5) | 20 (2) | 30 (3) | G3/8 F | 1200 |

(1) The valve has been designed for a continuous use at a water temperature of 60°C. It can resist for short periods at a maximum temperature of 90°C.

(2) This is the pressure reduction necessary in comparison to the set up, in order that the valve brings back pressure in the circuit.

| | |
|---|---------------|
| Instruction manual, maintenance, installation, spare parts. | n. 12.9212.00 |
| For a correct utilization, follow the directions of this manual | |
| Re-print them on the Use and Maintenance booklet of the machine. | |

DIMENSIONAL DRAWING**INSTRUCTIONS****SELECTION**

This product is to be utilized with clean fresh water, even slightly additivated with normal detergents. For use involving different or corrosive liquids, contact the PA Technical department. Appropriate filtration should be installed when using unclean liquids. Choose the valve in line with the data of nominal running (system rated pressure, max flow and max temperature). In any case, the pressure of the machine should not exceed the permissible pressure rate imprinted on the valve.

INSTALLATION

This accessory, on a system that produces hot water, must be fitted in **front of the heat generator**. This product is bound to be incorporated on a finished machine. On a system that generates hot water, anticipate the fitting of accessories that limit the accidental increase of fluid temperature.

Always install a safety valve that protects the pressurized inlet channel.

Choose a correct nozzle size, which allows a regular discharge on bypass, at least 5% of the total flow of the system in order to achieve a constant pressure value and avoid troublesome pressure spikes at closure. If the nozzle wears out, the pressure drops.

On installation of a new nozzle, re-adjust the system to the original pressure setting.

OPERATIONS

The valve regulates the the max pressure of the system through a piston, which acts on a ball correctly positioned, that closes the bypass opening. A check valve cuts out the delivery section, the pressure of which controls the drive of the piston.

Each regulation should be made when the system is operational and the nozzle open.

ATTENTION: In order not to overstep the max pressure, the nut (pos 30) must be fastened and never removed otherwise a mechanical safety feature would lack that limits the max pressure avoiding serious damage to persons and machine. For the min pressure position the locknut (pos 33) on the nut (pos 34) blocking it with a dowel (pos 32). Mark the position with a drop of paint in order to prevent possible slackening and tampering.

The balanced conformation of the valve allows a renewed pressure at very low readings giving a longer function in bypass and a progressive restart, without unpleasant pressure spikes, useful with endothermic engines.

DISCHARGE SYSTEM AND WATER ADDUCTION

The bypass line should be returned into a tank with deflectors. By using a direct pump recycle, with elevated pressure intake, it is necessary to install a pressure reducer in order to have an even flow supply and to protect the circuit intake.

When the system is opened and closed frequently, it is recommended to install a thermal protector valve (VT3 or VT6) in order to eliminat excessive temperature build-up

PROBLEMS AND SOLUTIONS

| PROBLEMS | PROBABLE CAUSES | SOLUTIONS |
|--|---|---|
| Frequent unloader recycles | Damaged seat or cone Leaking connections Restricted bypass | Replace Check and renew Clean or adapt |
| Unloader does not reach pressure | Unloader not properly sized Piston O rings worn out Material matter between seat and shutter Worn out nozzle | Change spring or type of valve Replace Clean the seat Replace |
| Pressure peaks | There is not a min of 5% of total flow in bypass Excessive flow in bypass Spring totally compressed | Reset Change type of valve or adjust passages Loosen knob and change nozzle |
| Unloader does not bypass at low pressure | Jammed check valve Check valve O ring worn out Material matter on check valve | Clean or replace Replace Clean |

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.

Make sure that you are given **the Original Conformity Declaration** for the accessory chosen. The present manual is valid for all unloader valves named **VB 10**.

MAINTENANCE

Maintenance has to be carried out by **Specialized Technicians**.

STANDARD: every 400 working hours (circa 10,000 cycles), check and lubricate the seals with water resistant grease.

SPECIAL: every 800 working hours (circa 20,000 cycles), control the wear of the seals and internal parts and if necessary, replace with original PA parts taking care during installation and to lubricate with water resistant grease.

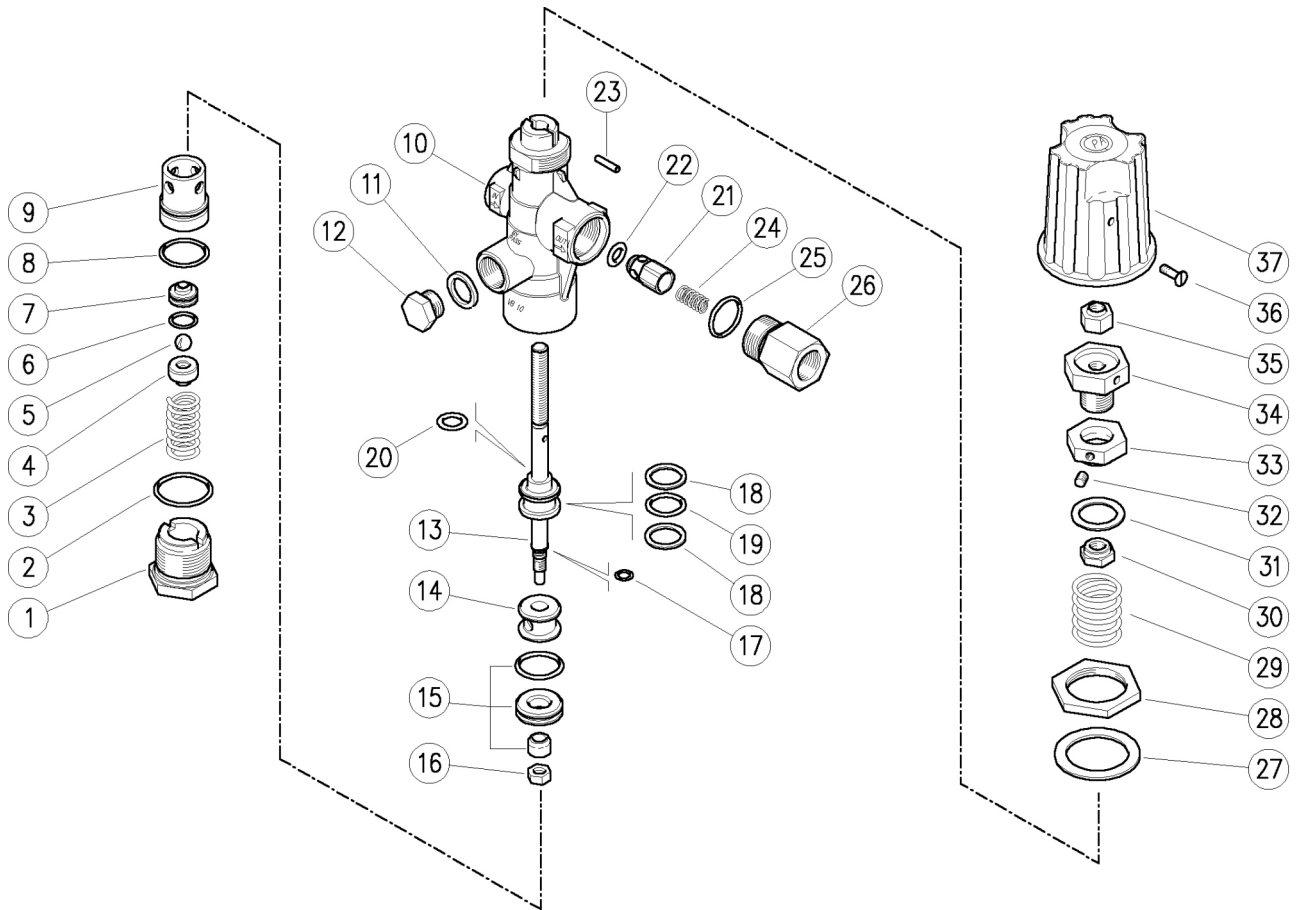
ATTENTION: reassemble the valve in the correct manner paying special attention to the **Nut (pos 31)** which must always be in place.

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

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

60.1100.00 VB10 unload. 3/8F Bsp+knob

60.1100.50 VB10 unload. 3/8F Npt +knob



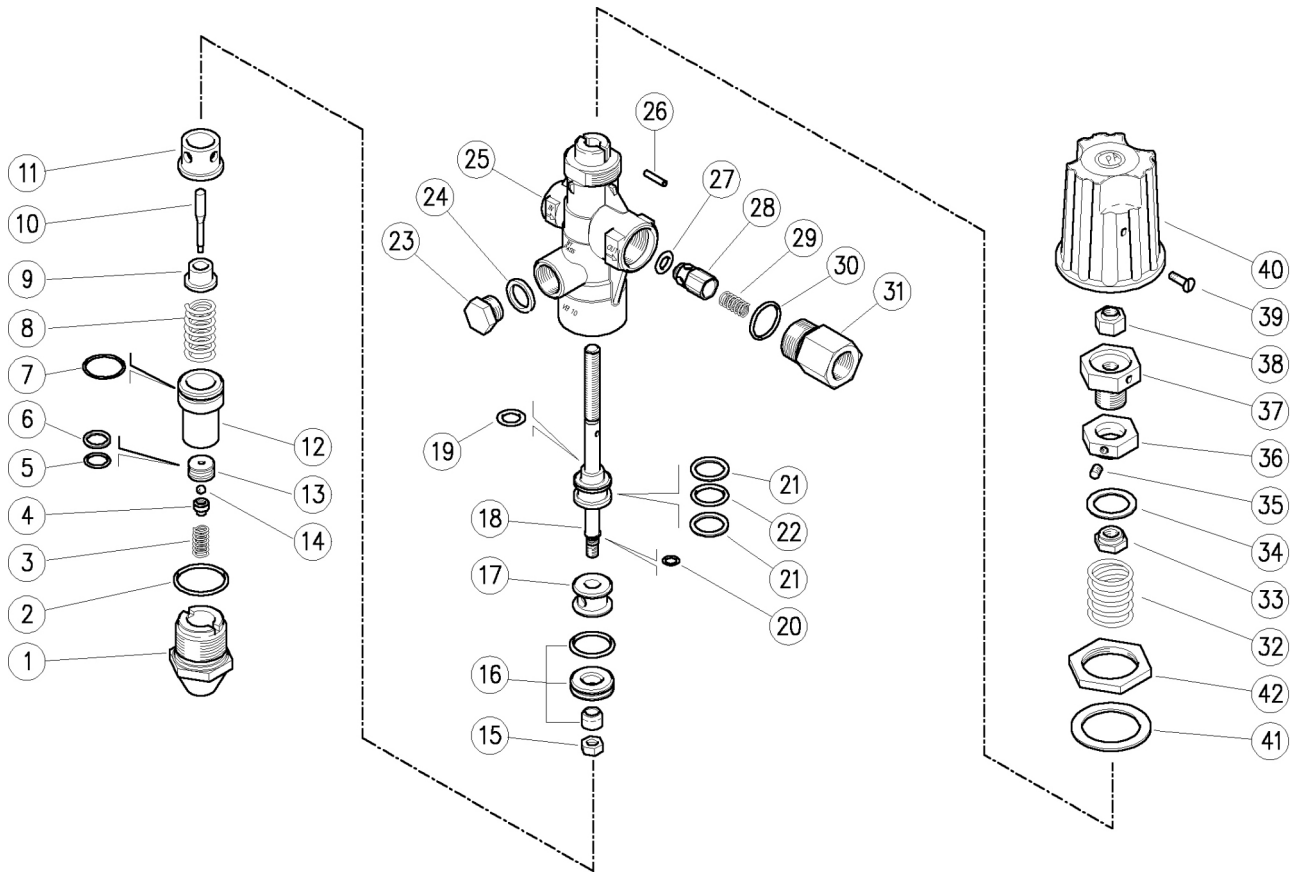
| Pos. | P/N | Description | Q.ty | K1 | K2 | K3 | K4 | |
|------|-------------|--------------------------------------|------|----|----|----|----|----|
| 1 | 60.1101.31R | Lower plug, M27x1,5 brass | 1 | | | | | 3 |
| 2 | 10.3074.01R | O-ring, 1,78x25,12 mm Ni 85 | 1 | • | | | | 10 |
| 3 | 60.1102.51R | Spring, 2,5x12,6x26 mm Sst. | 1 | | | | | 10 |
| 4 | 60.1112.31R | Ball holding piston, brass | 1 | | | | | 3 |
| 5 | 14.7421.50R | Ball, 1/4" Sst. | 1 | • | | | | 10 |
| 6 | 10.3059.01R | O-ring, 1,78x11,11 mm Ni 85 | 1 | • | | | | 10 |
| 7 | 60.1103.51R | Seat, 5x14x7 mm Sst. | 1 | • | | | | 10 |
| 8 | 10.3072.01R | O-ring, 1,78x20,35 mm Ni 85 | 1 | • | | | | 10 |
| 9 | 60.1107.31R | Spacer ring, 9x24x29 mm brass | 1 | | | | | 3 |
| 10 | 60.1108.35R | Housing -VB10, 3/8 FFF Bsp brass (1) | 1 | | | | | 3 |
| 10 | 60.1120.35R | Housing -VB10, 3/8 Npt FFF brass (2) | 1 | | | | | 3 |
| 11 | 14.4042.00R | Washer, 16,7x22x1,5 mm alu. (1) | 1 | | | | | 25 |
| 12 | 60.0028.31R | Plug,brass 3/8 Bsp,hex.19 (1) | 1 | | | | | 25 |
| 12 | 60.0025.31R | Grub screw, brass 3/8M Npt (2) | 1 | | | | | 10 |
| 13 | 60.1106.23R | Piston -VB10 | 1 | • | | | | 3 |
| 14 | 60.1105.31R | Spacer ring, 8,5x20,8x14,5mm brs. | 1 | | | | | 3 |
| 15 | 60.1116.24 | Seat, 10mm+O-ring, 1,78mm+shutt. | 1 | • | | | | 1 |
| 16 | 11.4540.00R | Hex. nut, M6, Sst. | 1 | | | | | 10 |
| 17 | 10.3001.01R | O-ring, 1x4 mm Ni 85 | 1 | • | | | | 10 |
| 18 | 10.4056.00R | Back-up ring, opn. 15,5x19,9x2 mm | 2 | • | | | | 10 |

| Pos. | P/N | Description | Q.ty | K1 | K2 | K3 | K4 | |
|------|-------------|-------------------------------------|------|----|----|----|----|----|
| 19 | 10.3180.00R | O-ring, 2,62x15,08 mm | 1 | • | | | | 10 |
| 20 | 10.3170.08R | O-ring, 2,62x7,6 mm Ni 85 | 1 | • | | | | 10 |
| 21 | 60.0052.99R | Shutter pin, brass+o-ring 3x6 mm | 1 | | | | | 10 |
| 22 | 10.3213.00R | O-ring, 3x6 mm | 1 | • | | | | 10 |
| 23 | 15.1021.00R | Roll pin, 3x14 mm Sst. | 1 | | | | | 10 |
| 24 | 60.0053.51R | Spring, 0,7x9x20 mm Sst. | 1 | | | | | 10 |
| 25 | 10.3070.02R | O-ring, 1,78x18,77 mm Ni 85 | 1 | • | | | | 10 |
| 26 | 60.0058.31R | Delivery coupl., 3/8F Bsp brass (1) | 1 | | | | | 5 |
| 26 | 60.0059.31R | Delivery coupl., 3/8F Npt brass (2) | 1 | | | | | 10 |
| 27 | 14.3582.00R | Washer, 30,5x42x2 mm | 1 | | | | | 10 |
| 28 | 60.2254.31R | Ring nut, M30 brass | 1 | | | | | 10 |
| 29 | 60.2203.61R | Spring, 4,2x27,4x31 mm z.pl. | 1 | | | | | 10 |
| 30 | 60.2207.31R | Ring nut, M8 brass | 1 | | | | | 10 |
| 31 | 60.2208.84R | Washer, 19x26x1,5 mm PA black | 1 | | | | | 10 |
| 32 | 16.2105.00R | Set screw, DIN913 M5x6 mm | 1 | | | | | 10 |
| 33 | 60.2252.31R | Ring nut, M16x1 brass | 1 | | | | | 10 |
| 34 | 60.2253.31R | Regulating pin, brass | 1 | | | | | 10 |
| 35 | 11.4589.10R | Hex. locknut, M8 | 1 | | | | | 10 |
| 36 | 16.1838.00R | Screw, DIN7985 M4x10 mm z.pl. | 1 | | | | | 10 |
| 37 | 60.2251.84R | Valve regulating knob, PA black | 1 | | | | | 5 |

| Kit | P/N | Description | |
|-----|------------|----------------------------|---|
| K1 | 60.1115.24 | Spares kit -VB10, 15x1pcs. | 1 |

(1) 60.1100.00 (2) 60.1100.50

60.1150.00 VB10 unload. 3/8F Bsp +sst.pist.



| Pos. | P/N | Description | Q.ty | K1 | K2 | K3 | K4 | |
|------|-------------|-----------------------------------|------|----|----|----|----|----|
| 1 | 60.1156.31R | Lower plug, M27x1,5 brass | 1 | | | | | 3 |
| 2 | 10.3074.01R | O-ring, 1,78x25,12 mm Ni 85 | 1 | • | | | | 10 |
| 3 | 60.8006.51R | Spring, 1x7,2x14 mm Sst. | 1 | | | | | 3 |
| 4 | 60.8014.51R | Ball holding piston, Sst. | 1 | | | | | 5 |
| 5 | 10.3058.02R | O-ring, 1,78x10,82 mm Ni 85 | 1 | • | | | | 10 |
| 6 | 10.4090.00R | Back-up ring, 11,2x14x1,5 mm | 1 | • | | | | 10 |
| 7 | 10.3072.01R | O-ring, 1,78x20,35 mm Ni 85 | 1 | • | | | | 10 |
| 8 | 60.1102.51R | Spring, 2,5x12,6x26 mm Sst. | 1 | | | | | 10 |
| 9 | 60.1154.31R | Spacer ring, 5,2x15x8,5 mm brass | 1 | | | | | 5 |
| 10 | 60.1157.51R | Pin, Sst. | 1 | | | | | 5 |
| 11 | 60.1155.31R | Spacer ring, 11,5x24x19 mm brass | 1 | | | | | 5 |
| 12 | 60.1153.31R | Seat holder, 24 mm brass | 1 | | | | | 5 |
| 13 | 60.8015.51R | Seat, 3x14x7,5 mm Sst. | 1 | • | | | | 5 |
| 14 | 14.7418.71R | Ball, 5/32" | 1 | • | | | | 5 |
| 15 | 11.4540.00R | Hex. nut, M6, Sst. | 1 | | | | | 10 |
| 16 | 60.1116.24 | Seat, 10mm+O-ring, 1,78mm+shutt. | 1 | • | | | | 1 |
| 17 | 60.1105.31R | Spacer ring, 8,5x20,8x14,5mm brs. | 1 | | | | | 3 |
| 18 | 60.1151.23R | Piston -VB10/2 | 1 | | | | | 3 |
| 19 | 10.3170.08R | O-ring, 2,62x7,6 mm Ni 85 | 1 | • | | | | 10 |
| 20 | 10.3001.01R | O-ring, 1x4 mm Ni 85 | 1 | • | | | | 10 |
| 21 | 10.4056.00R | Back-up ring, opn. 15,5x19,9x2 mm | 2 | • | | | | 10 |

| Pos. | P/N | Description | Q.ty | K1 | K2 | K3 | K4 | |
|------|-------------|----------------------------------|------|----|----|----|----|----|
| 22 | 10.3180.00R | O-ring, 2,62x15,08 mm | 1 | • | | | | 10 |
| 23 | 60.0028.31R | Plug,brass 3/8 Bsp,hex.19 | 1 | | | | | 25 |
| 24 | 14.4042.00R | Washer, 16,7x22x1,5 mm alu. | 1 | | | | | 25 |
| 25 | 60.1108.35R | Housing -VB10, 3/8 FFF Bsp brass | 1 | | | | | 3 |
| 26 | 15.1021.00R | Roll pin, 3x14 mm Sst. | 1 | | | | | 10 |
| 27 | 10.3213.00R | O-ring, 3x6 mm | 1 | • | | | | 10 |
| 28 | 60.0052.99R | Shutter pin, brass+o-ring 3x6 mm | 1 | | | | | 10 |
| 29 | 60.0053.51R | Spring, 0,7x9x20 mm Sst. | 1 | | | | | 10 |
| 30 | 10.3070.02R | O-ring, 1,78x18,77 mm Ni 85 | 1 | • | | | | 10 |
| 31 | 60.0058.31R | Delivery coupl., 3/8F Bsp brass | 1 | | | | | 5 |
| 32 | 60.2203.61R | Spring, 4,2x27,4x31 mm z.pl. | 1 | | | | | 10 |
| 33 | 60.2207.31R | Ring nut, M8 brass | 1 | | | | | 10 |
| 34 | 60.2208.84R | Washer, 19x26x1,5 mm PA black | 1 | | | | | 10 |
| 35 | 16.2105.00R | Set screw, DIN913 M5x6 mm | 1 | | | | | 10 |
| 36 | 60.2252.31R | Ring nut, M16x1 brass | 1 | | | | | 10 |
| 37 | 60.2253.31R | Regulating pin, brass | 1 | | | | | 10 |
| 38 | 11.4589.10R | Hex. locknut, M8 | 1 | | | | | 10 |
| 39 | 16.1838.00R | Screw, DIN7985 M4x10 mm z.pl. | 1 | | | | | 10 |
| 40 | 60.2251.84R | Valve regulating knob, PA black | 1 | | | | | 5 |
| 41 | 14.3582.00R | Washer, 30,5x42x2 mm | 1 | | | | | 10 |
| 42 | 60.2254.31R | Ring nut, M30 brass | 1 | | | | | 10 |

| Kit | P/N | Description | |
|-----|------------|------------------------------|---|
| K1 | 60.1158.24 | Spares kit -VB10/2, 13x1pcs. | 1 |