

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

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 C.F. e P. IVA 01035950359 – Cap. Soc. i.v. € 750.000,00 – Codice Identificativo C.E.E. IT 01035950359  
 ART. 2497 – BIS C.C. DIREZIONE E COORDINAMENTO BENETTI srl R.I. TRIB. DI RE 01480690351  
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## VB 280-VB350 - Unloader Valve (discharging)

Technical manual: **E 237**

Pressure regulating unloader valve.

At gun shut off, the water flow is bypassed at reduced pressure.

DN 10



- **60.1600.00** VB 280 G 3/8 MF
- **60.1700.00** VB 350 G 3/8 MF

- Assembly equipped with a high pressure proof compensation.
- Compact dimensions.
- Sturdy steel and brass construction.
- Adjustable locknut to control max pressure.
- Possibility to fit a venturi injector, on delivery, for chemicals.
- Nylon knob
- By-pass G1/2 F.
- Easy maintenance.

### Technical specifications

Max. flow rate: 40 l/min. Max temperature: 90°C (1)

| Part Number | Rated pressure | Permissible pressure | Minimum adjustable pressure | (2) Trapped pressure at circuit closure | (3) Pressure drop to reset bypass | Inlet Outlet bypass | Weight |
|-------------|----------------|----------------------|-----------------------------|---|-----------------------------------|---------------------|--------|
|             | bar - MPa      | bar - MPa            | bar - MPa                   | %                                       | %                                 |                     | g      |
| 60.1600.00  | 280 - 28       | 310 - 31             | 28 - 2.8                    | 12                                      | 44                                | G3/8 MF             | 850    |
| 60.1700.00  | 350 - 35       | 390 - 39             | 35 - 3.5                    | 12                                      | 44                                | G3/8 MF             | 880    |

(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 maximum pressure increase implemented in the circuit for the intervention of the valve and to bring all the fluid in bypass (percentage figures of the pressure set up)

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

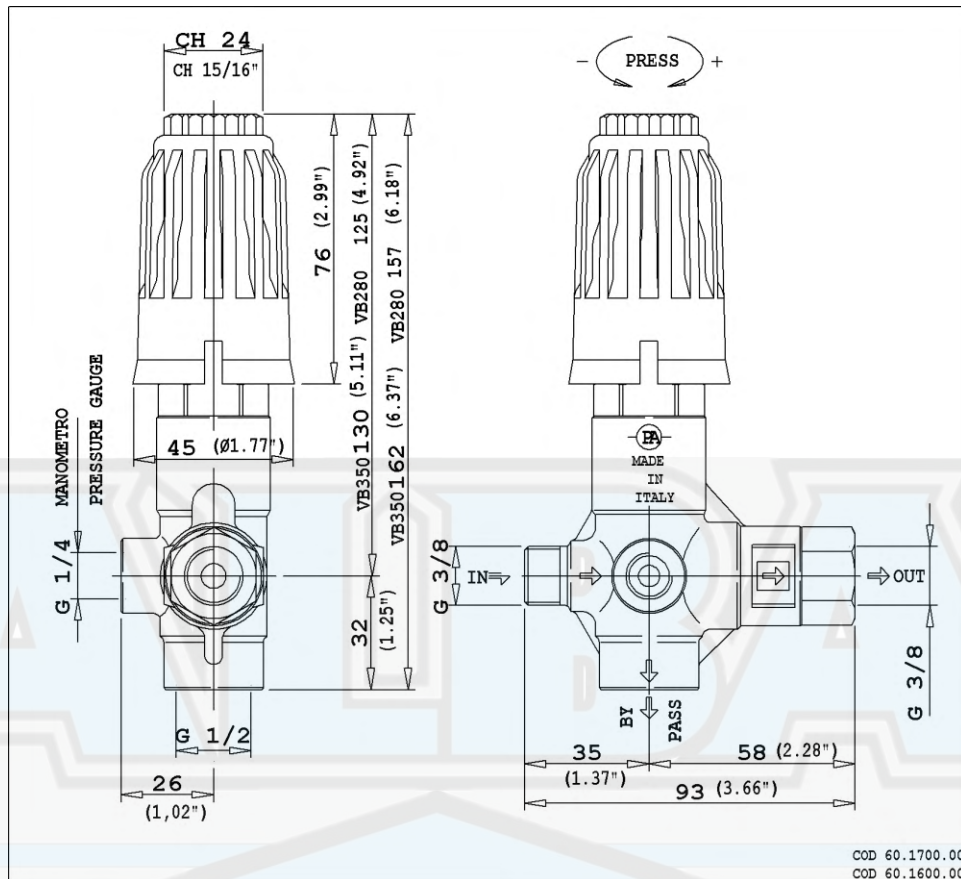
**Instruction manual, maintenance, installation, spare parts.**

For a correct utilization, follow the directions of this manual

**Re-print them on the Use and Maintenance booklet of the machine.**

n. 12.9237.00

## 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 outlet 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 that, normally positioned, 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: The nut (pos.15) must never be removed mainly because, it is a mechanical safety feature that limits the max pressure and avoids serious damage to persons and machine.**

### DISCHARGE SYSTEM AND WATER ADDUCTION

The bypass line should be returned into a tank with deflectors. 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 eliminate excessive temperature build.

## PROBLEM HANDLING: CAUSES AND SOLUTIONS

| PROBLEMS   | PROBABLE CAUSES   | SOLUTIONS   |
|--|---|---|
| Frequent unloader recycles                           | Damaged check valve O-Ring<br>Leaking connections<br>Restricted bypass  | Replace<br>Check and renew<br>Clean or adapt  |
| Unloader does not reach pressure                     | Unloader not properly sized<br>Piston O rings worn out<br>Material matter between seat and shutter<br>Worn out nozzle | Change spring or type of valve<br>Replace<br>Clean the seat<br>Replace  |
| Pressure peaks                                       | Less than 5% of total flow in bypass<br>Excessive flow in bypass<br>Spring totally compressed                         | Reset<br>Change type of valve or adjust passages<br>Loosen knob and change nozzle   |
| Unloader does not bypass at low pressure             | Jammed check valve<br>Check valve O ring worn out<br>Material matter on check valve                                   | Clean or replace<br>Replace<br>Clean  |
| Unloader causes oscillations to the hydraulic system | Bypass system unfit<br><br>Bypass tube not properly sized<br>Bypass obstructed or throttled                           | Stick to the installation scheme represented at the bottom of this page, with bypass directed into the pump<br>Enlarge diameter<br>Clean or reset |

## REGULATIONS : see provisional 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 Declaration of Conformity** for the accessory chosen. The present manual is valid for all unloader valves type **VB 280** and **VB 350**.

## MAINTENANCE

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

**STANDARD:** every 400 working hours (circa 10,000 cycles), control 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 19) 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**

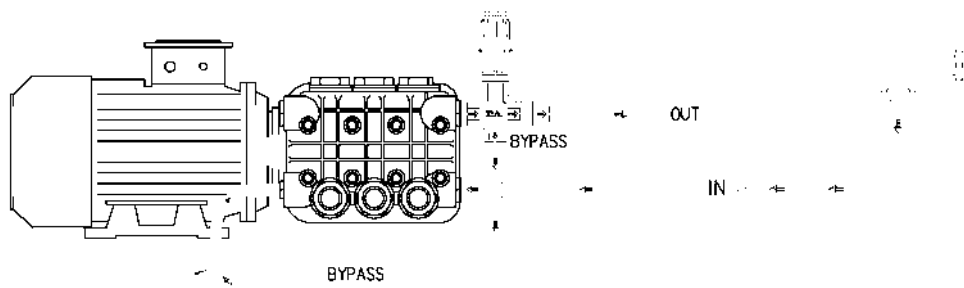


Fig 1

TUBO BASSA PRESSIONE MAX 20 bar (290 PSI) LUNGHEZZA MIN.= 700mm (2.3 ft) Di= 1/2"

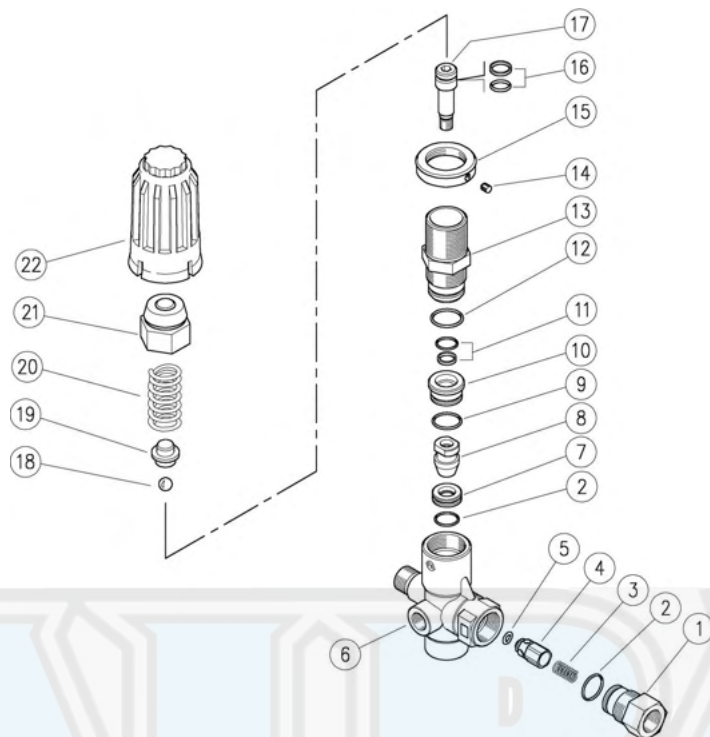
TUBE DE BASSE PRESSION MAX 20 BAR (290 psi) LONGUEUR MIN.=700 mm (2.3 ft) Di= 1/2"

LOW PRESSURE HOSE MAX 20 BAR (290 PSI) MIN. LENGTH=700 mm (2.3 ft) Di= 1/2"

60.1600.00 VB280 unload. 3/8MF Bsp byp:1/2F+knob

60.1700.00 VB350 unload. 3/8MF Bsp byp:1/2F+knob

60.1700.50 VB350 unload. 3/8MF Npt byp:1/2F+knob



| Pos. | P/N         | Description                                | Q.ty | K1 | K2 | K3 | K4 |    |
|------|-------------|--|------|----|----|----|----|----|
| 1    | 60.1811.31R | Shutter coupl., 3/8F Bsp brass             | 1    |    |    |    |    | 5  |
| 1    | 60.1817.31R | 3/8Npt F nipple (1)                        | 1    |    |    |    |    | 3  |
| 2    | 10.3066.01R | O-ring, 1,78x15,6 mm Ni 85                 | 2    | •  |    |    |    | 10 |
| 3    | 60.0053.51R | Spring, 0,7x9x20 mm Sst.                   | 1    |    |    |    |    | 10 |
| 4    | 60.9052.93R | Shutter pin, Sst.+or 3x6 mm N90            | 1    |    |    |    |    | 10 |
| 5    | 10.3213.08R | O-ring, 3x6 mm Ni 90                       | 1    | •  |    |    |    | 10 |
| 6    | 60.1725.35R | Hous.-V280-350/4,3/8M c/snk+1/4F Bsp brs   | 1    |    |    |    |    | 3  |
| 6    | 60.1717.35R | Hous.-V280-350/4,3/8M Npt +1/4FNpt brs (1) | 1    |    |    |    |    | 3  |
| 7    | 60.1809.51R | Seat, 11,6x19x6 mm Sst.                    | 1    | •  |    |    |    | 5  |
| 8    | 60.1808.51R | Shutter pin, M8 Sst.                       | 1    | •  |    |    |    | 3  |
| 9    | 10.3068.01R | O-ring, 1,78x17,17 mm Ni 85                | 1    | •  |    |    |    | 10 |
| 10   | 60.1810.31R | Spacer ring, 10,3x23,4x12,5 mm brass       | 1    |    |    |    |    | 5  |
| 11   | 60.0979.24  | Stem seal, 10x14,9x2,2 mm+O-ring           | 1    | •  |    |    |    | 5  |
| 12   | 10.3072.01R | O-ring, 1,78x20,35 mm Ni 85                | 1    | •  |    |    |    | 10 |

| Pos. | P/N         | Description                         | Q.ty | K1 | K2 | K3 | K4 |    |
|------|-------------|-------------------------------------|------|----|----|----|----|----|
| 13   | 60.0973.31R | Piston holder, brass (2)            | 1    |    |    |    |    | 3  |
| 13   | 60.1805.31R | Piston holder, brass (3,1)          | 1    |    |    |    |    | 3  |
| 14   | 16.2100.00R | Set screw, DIN914 M4x4 mm           | 1    |    |    |    |    | 10 |
| 15   | 60.1728.31R | Ring nut, M27x1 brass               | 1    |    |    |    |    | 10 |
| 16   | 60.0978.24  | Piston seal, 9x14x2,2 mm+O-ring     | 1    | •  |    |    |    | 5  |
| 17   | 60.1806.51R | Piston, M8 Sst.                     | 1    |    |    |    |    | 3  |
| 18   | 14.7443.10R | Ball, 11/32" Sst.                   | 1    | •  |    |    |    | 10 |
| 19   | 60.1813.31R | Spring rest pin, brass              | 1    |    |    |    |    | 5  |
| 20   | 60.0975.61R | Spring, 4,2x19,7x42 mm z.pl. (2)    | 1    |    |    |    |    | 10 |
| 20   | 60.1812.61R | Spring, 4,5x15,8x47mm (3,1)         | 1    |    |    |    |    | 3  |
| 21   | 60.1727.31R | Valve regulating knob, brass        | 1    |    |    |    |    | 5  |
| 22   | 60.1726.84R | Valve regulating knob, PA black (2) | 1    |    |    |    |    | 10 |
| 22   | 60.1729.84R | Valve regulating knob, PA red (3,1) | 1    |    |    |    |    | 10 |

| Kit | P/N        | Description                      |   |
|-----|------------|----------------------------------|---|
| K1  | 60.1615.24 | Spares kit -VB280-350/4 11x1pcs. | 1 |

(1) 60.1700.50 (2) 60.1600.00 (3) 60.1700.00