



Adjustable Unloader Valve O&M Manual



**Unloader Valve
Part #60-020-361**

ADVANCED PRESSURE SYSTEMS

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ADJUSTABLE UNLOADER VALVE

SAFETY AWARENESS

All operators of water blasting equipment must be thoroughly trained in the use of this type of equipment. All personnel must be fully conversant with: “**RECOMMENDED PRACTICES FOR THE USE OF MANUALLY OPERATED HIGH PRESSURE WATER JETTING EQUIPMENT**” published by the **Water Jet Technology Association**. Copies may be obtained free of charge by contacting **Advanced Pressure Systems L.P. (877) 290-4277**.

Before operating any high pressure water blasting equipment, make a thorough check of the condition of all components of the system that will be subject to high pressure. Pay particular attention to the condition of all hoses and make sure that all components are rated for operation at the pressure that is to be used.

Scope

This Manual covers the Installation, Operation and Maintenance of the Manually Adjustable Unloader Valve Models Rated for 15,000 psi MAWP and 20,000 psi MAWP. These valves are designed to be used in conjunction with Dry Shut-off guns and control valves.

The 15,000 psi Model is Part # 60-010-350 has a maximum flow rate of 50 gpm (189 lpm)

The 20,000 psi Model is Part # 60-020-361 has a maximum flow rate of 30 gpm (114 lpm)



Description

These valves are essentially user adjustable pressure relief valves. The relief pressure is set by increasing or decreasing the force on the relief valve by adjusting the spring tension. (See Operating Instructions for detailed explanation)

WARNING!

Do NOT use your hand or fingers to check around fittings while unit is at operating pressure as this may cause severe bodily injury if a high pressure jet is encountered.

- Visually check for leaks at high pressure joints.
- Stand away from the area and visually check all high pressure areas.
- Stop and repair regulator if any leaks are found.
- Start unit at low pressure and slowly increase operating pressure until desired blast pressure is reached. Inspect all joints for leaks.

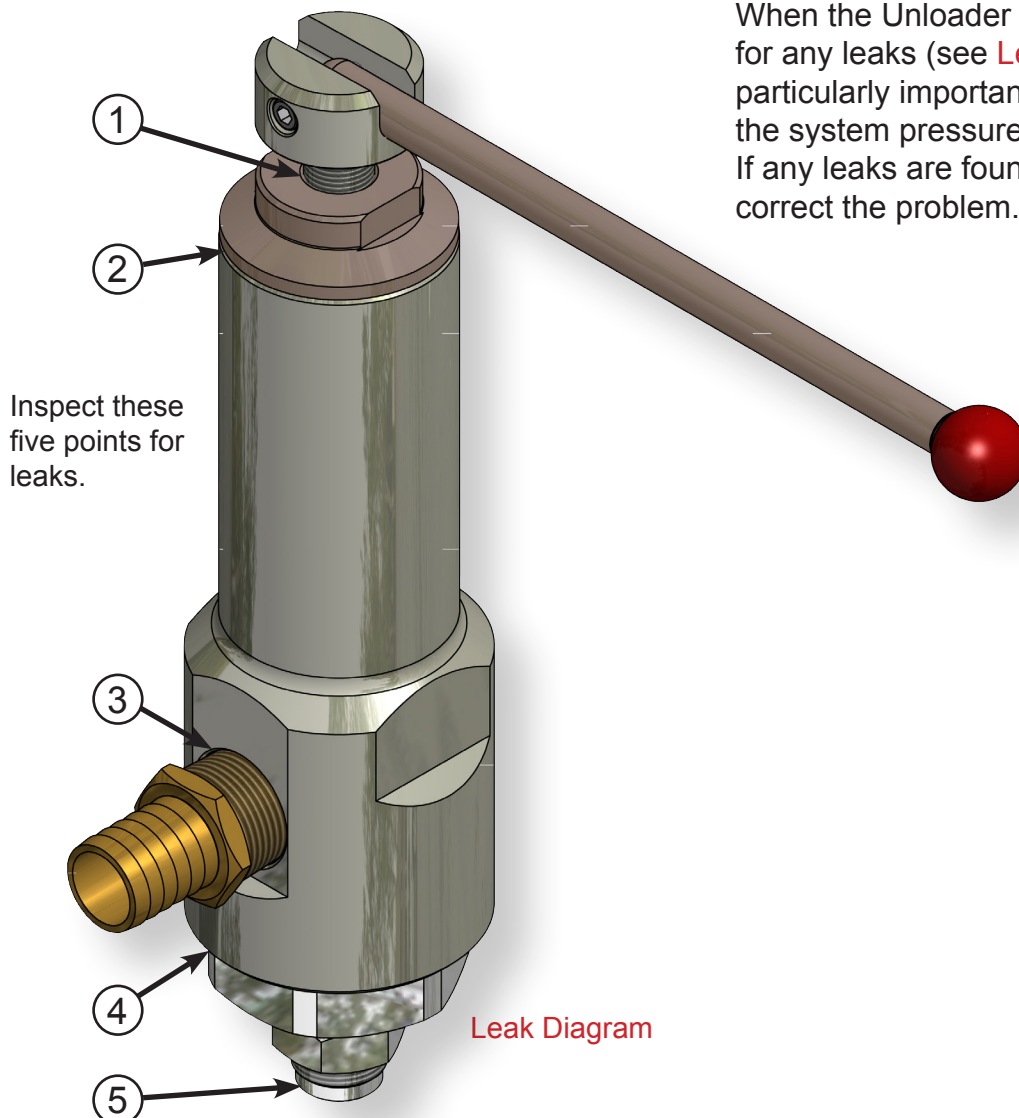
Operation

1. Ensure that the Unloader Valve is in the open or unloaded condition by turning the lever handle in an anti-clockwise direction.
2. Following all operating instructions from the manufacturer, start the water blasting unit and engage the drive to the pump.
3. Set all guns or foot control valves to blasting condition. (i.e. pull the trigger on a hand gun or depress the pedal on a foot valve)
4. While observing a pressure gauge, increase the system pressure by turning the lever handle in a clockwise direction. Continue adjusting the lever handle until the required blasting pressure is reached.
5. As soon as the blasting pressure is reached, cycle all guns and control valves to make sure that the system is working correctly. Do not operate at pressures in excess of that for which the valve is rated.

When all blasting operations are completed, release the system pressure by turning the lever handle in an anti-clockwise direction until the pressure is reduced to zero.

Maintenance

When the Unloader Valve is in use, check for any leaks (see [Leak Diagram](#)). This is particularly important at start up and while the system pressure is being increased. If any leaks are found, stop the pump and correct the problem.



Installation

These valves are typically mounted on the pump fluid end (see Diagram 1) and are adjusted using the lever style handle to control the system pressure generated by the pump. Excess pressure causes the valve to open and the unused flow is recirculated at low pressure back to the holding tank or to a drain.

Diagram 1

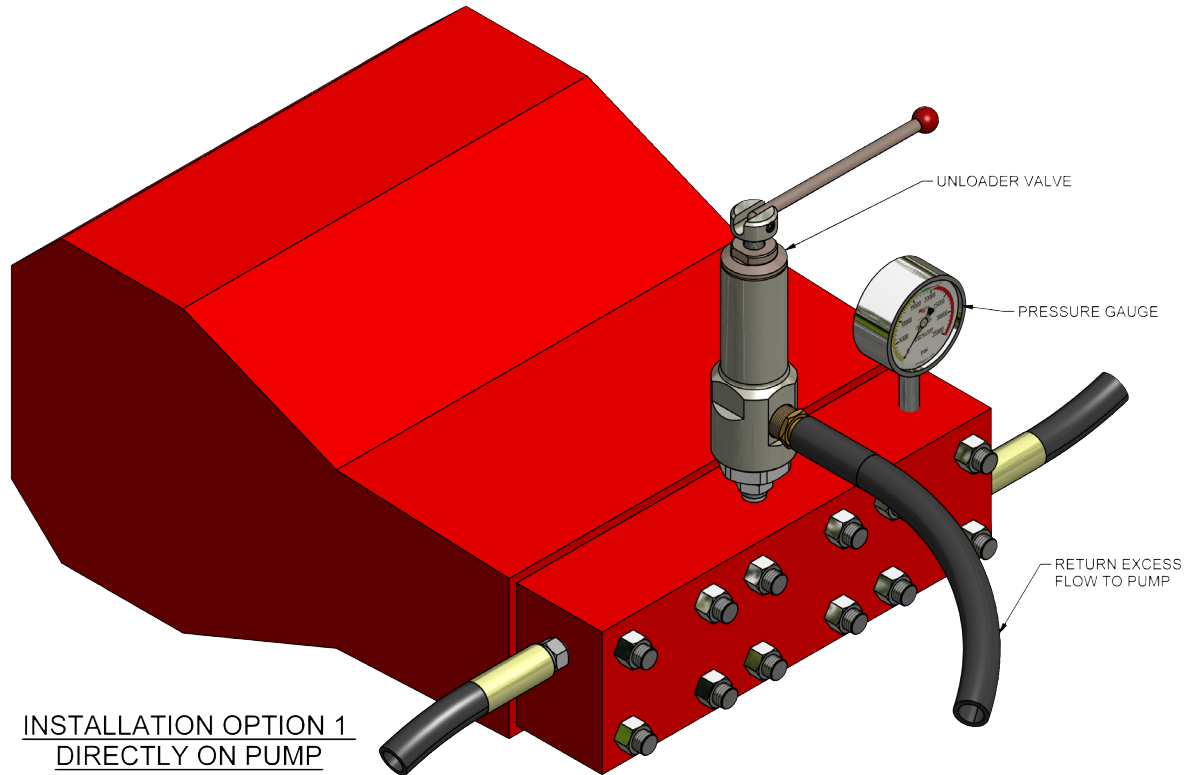
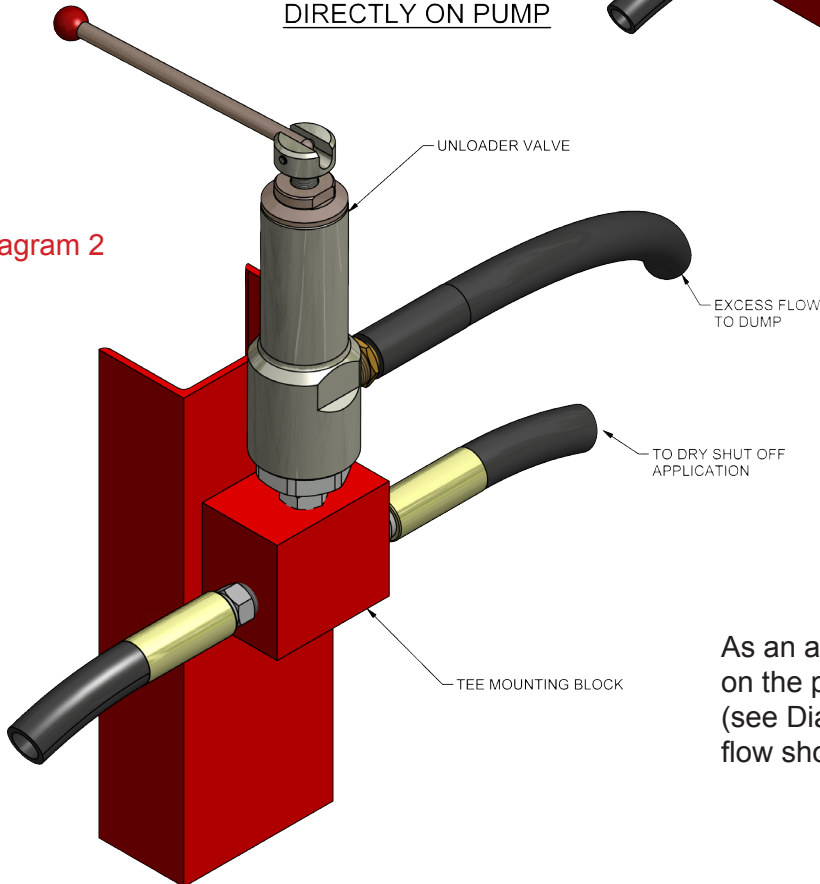


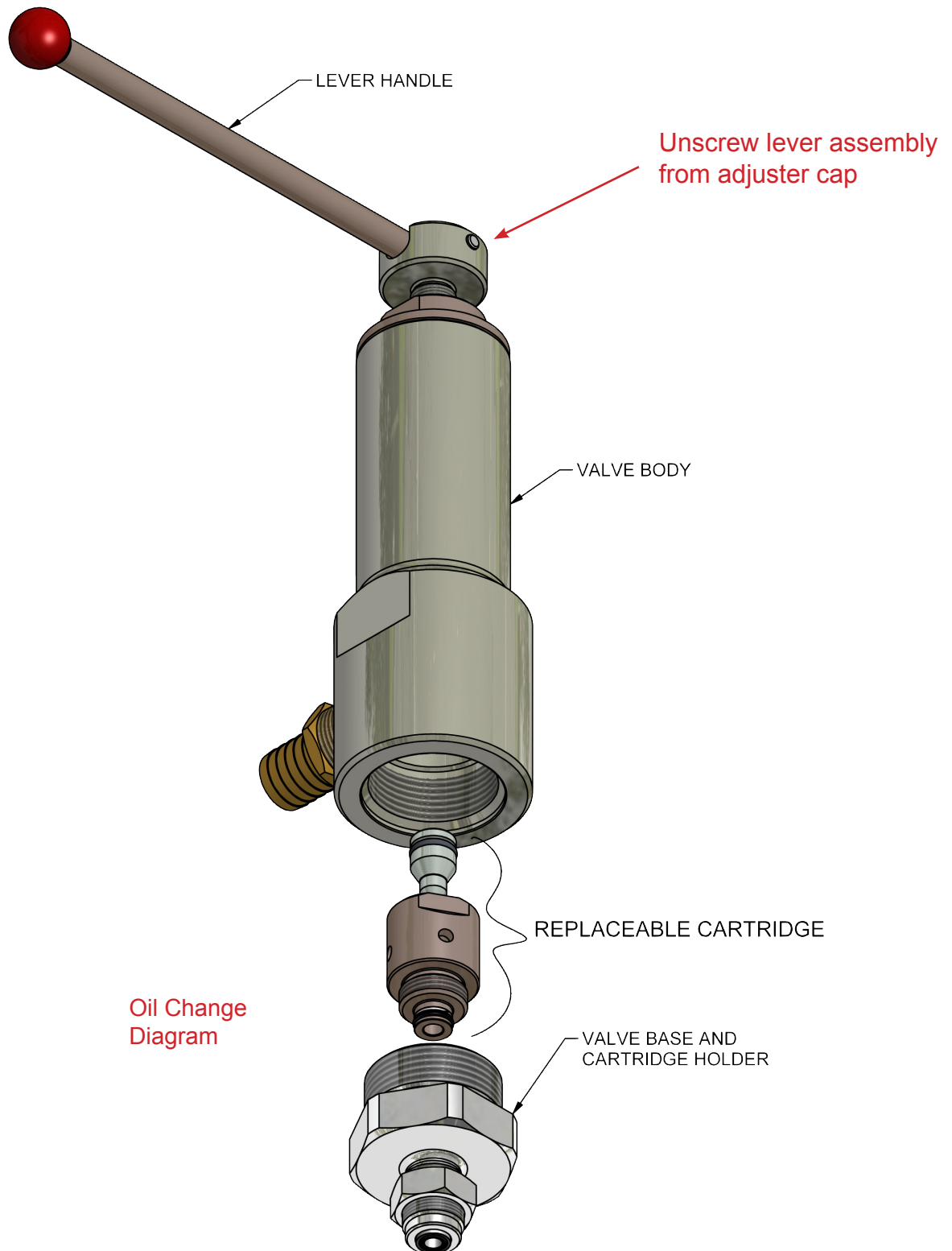
Diagram 2



As an alternative to mounting the Unloader Valve on the pump, it may be located remotely on a tee (see Diagram 2) and in this arrangement the relief flow should be directed to a convenient drain.

Oil Change

1. Unscrew high pressure base and cartridge from regulator body.
2. Remove adjuster cap and lever assembly from body by unscrewing counter-clockwise (see [Oil Change Diagram](#)).



Initial Disassembly

3. With a clean tray or tub to catch debris, turn body upside down and push out spring plunger and springs (See Diagram 5). There should be 20 disc springs in addition to the plunger that are moved. Clean all components in solvent and blow dry.



Spring Plunger & Spring Removal

4. Inspect plunger, seals, and body for wear and damage (See Figure 6). Replace seals if cuts, wear, or other damage is found.

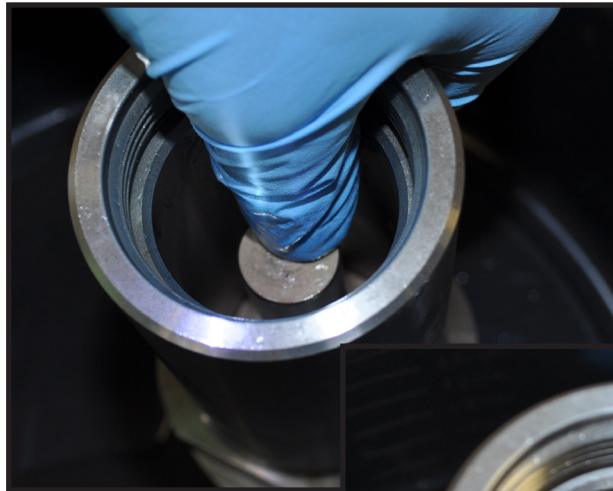


Plunger & Seals Inspection

5. Insert spring plunger into body as shown until plunger seals contact body (See Figure 7). Turn body upside down while supporting spring plunger.

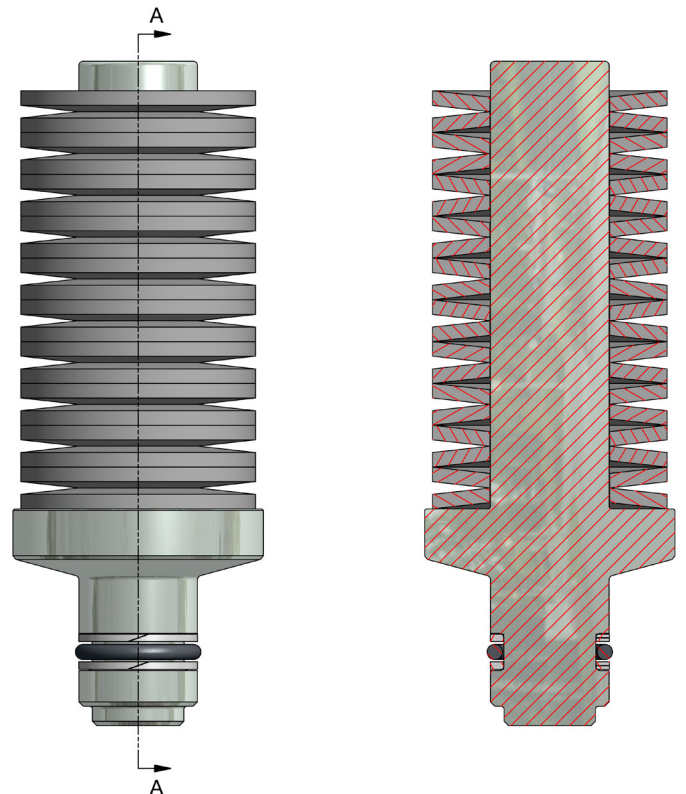
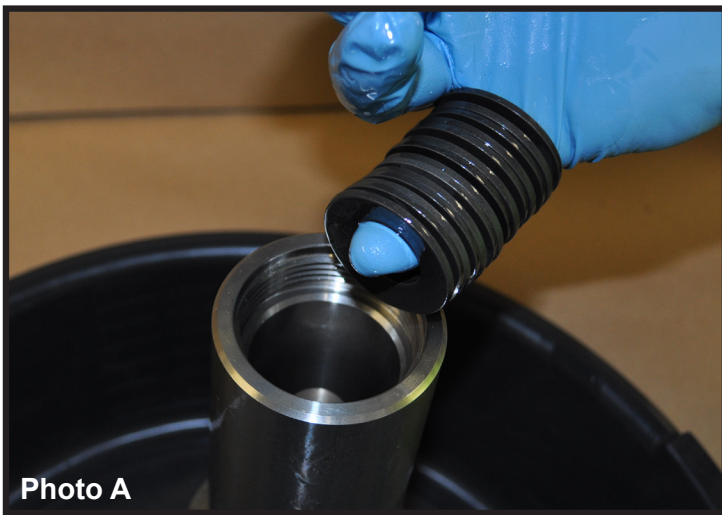
Spring Plunger Installation

6. Insert Plunger without allowing the o-ring seals to seat. (This will allow play up and down)



Stacking Disc Springs

7. Begin stacking the disc springs in an alternating fashion as shown with the spring OD contacting the flange and cap surfaces (See photo A).



NOTE:

**Overall length for the assembly should be 2.720" +/- .030".
Replace the springs if the dimensions fall outside this range.**

Fill With Oil

8. Over a clean tube or pan, fill cavity with IOW-40 oil until the last spring is just totally covered (See Photo B). Do not overfill as this will cause problems with the regulating accuracy and may result in over pressurization. (Oil level should remain steady when the top spring is totally covered.)



Photo B

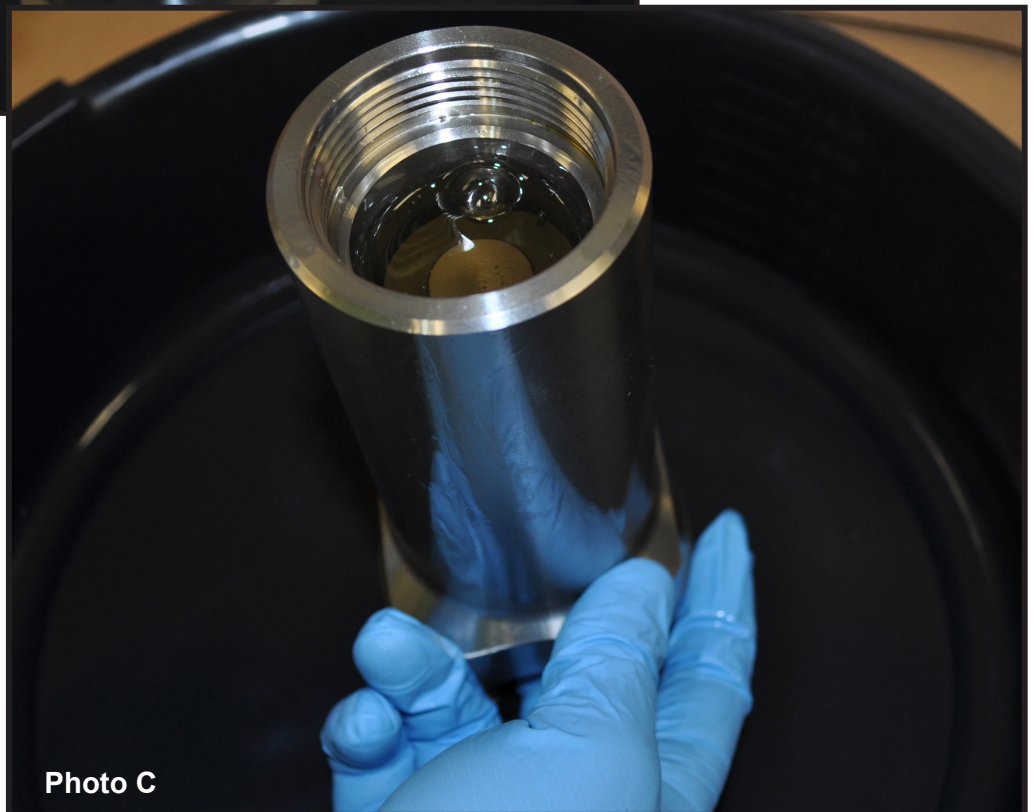


Photo C

9. Take finger through discharge port, lifting up on plunger to evacuate air (Fill as needed) Notice bubbles will stop. (See photo C)

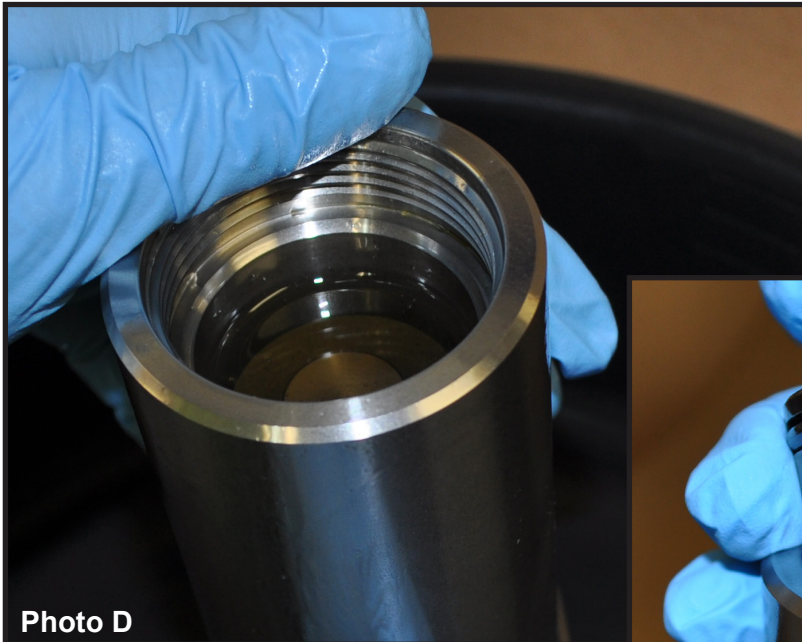


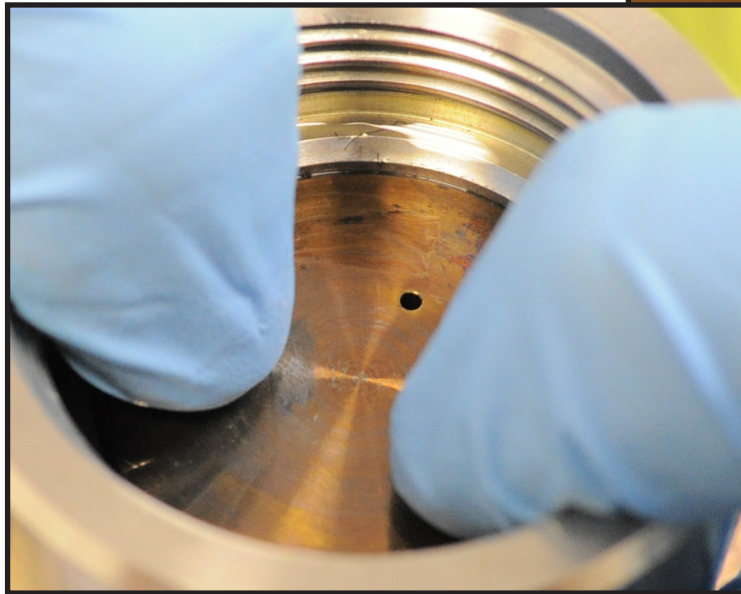
Photo D

10. Purge remaining air out by compressing valve. (See photo D)

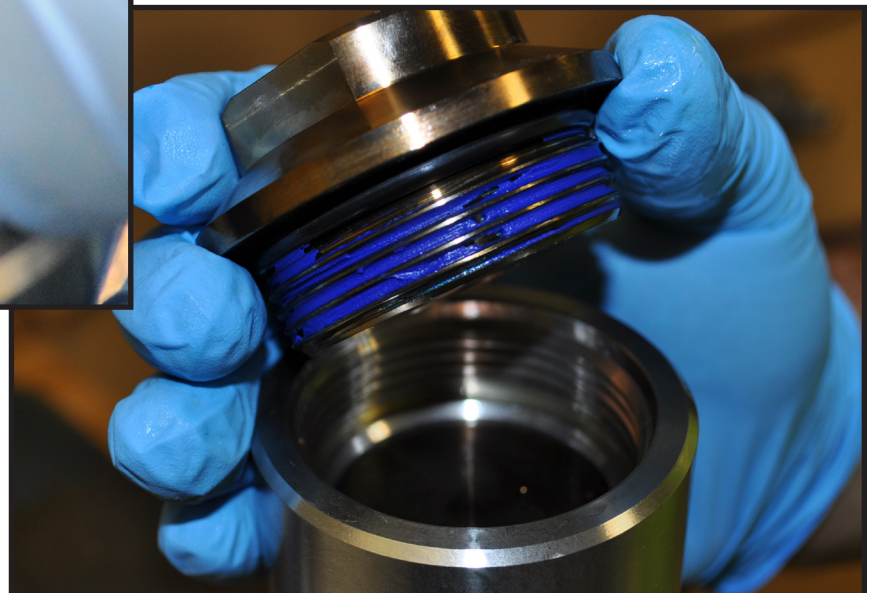
11. Install spring pusher with O-ring.



12. Push compression cap downwards until cap seats in to bore. (Any excess oil will evacuate from weep hole.)



13. Install spring adjuster cap. (Without threaded handle installed.)



14. Thread adjuster handle in adjuster cap unit is now ready for operation

Troubleshooting

Symptom	Probable Cause	Corrective Action
Regulator does not reach operating pressure.	Valve seat cartridge worn out	Replace cartridge
	Spring discs worn or damaged	Replace springs
Regulator makes chattering or "screaming" noises	Oil level too low	Check oil level and refill as needed
	Cartridge damaged	Replace cartridge
Regulating pressure inconsistent	Valve seat cartridge damaged	Replace cartridge
	Spring plunger binding	Replace spring plunger
	Bypass hose too small or too long	Replace hose with 1" minimum I.D. and proper length
Oil leaking from regulator	O-ring seals damaged	Replace O-rings where necessary

Valve Cartridge Replacement

If operating pressure cannot be attained, replace cartridge as follows:

1. Turn the adjustment lever counterclockwise to the low pressure position.
2. Unscrew high pressure base from body as shown.

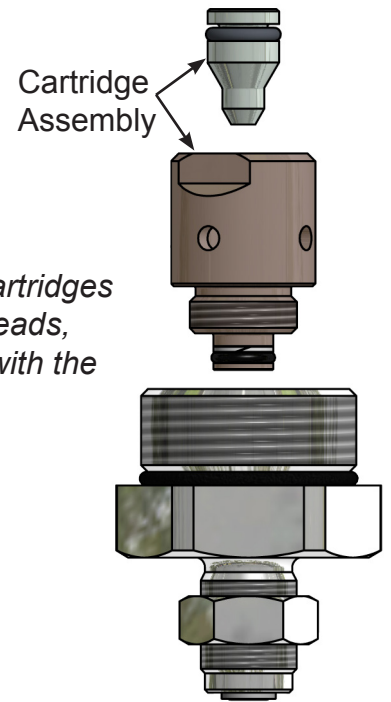


3. Remove valve cartridge from high pressure base. Inspect base for any erosion or other high pressure water damage.

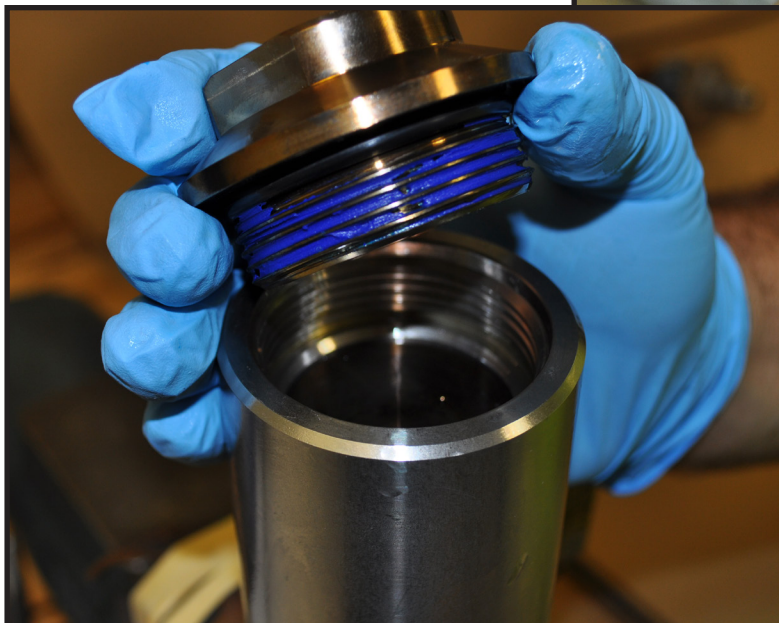


NOTE:

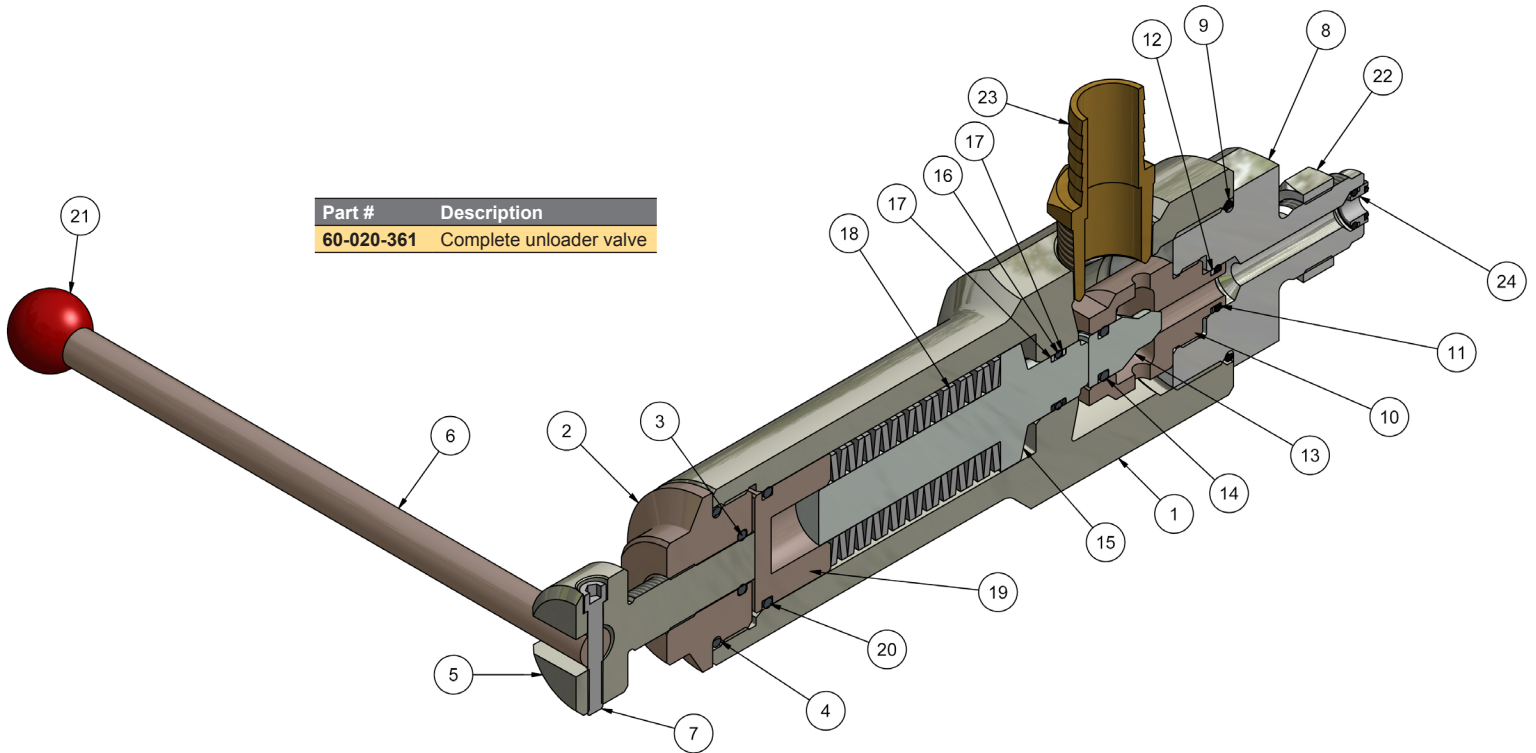
Different pressure range cartridges have different diameter threads, and will not fit into a base with the incorrect pressure rating.



4. Install new valve cartridge.



5. Assemble high pressure base into body and tighten securely. The unit is now ready for operation.



Part #	Description
60-020-361	Complete unloader valve

ITEM	QTY	PART #	DESCRIPTION
1	1	60-020-350	Unloader Valve - Body
2	1	60-020-355	Unloader Valve - Spring Adjuster Cap
3	1	30-001-209	O-Ring 2-209 Dur.90
4	1	30-001-224	O-Ring 2-224 Dur.90
5	1	60-020-357	Unloader Valve Spring Adjuster Screw
6	1	60-020-358	Unloader Valve - Adjuster Handle
7	1	10-001-150	SHCS 1/4-20 x 1-1/2" long SS
8	1	60-020-351	Unloader Valve - 20K Seat Adapter
9	1	30-002-226	O-Ring 2-226 Dir.70
10	1	60-020-353	Unloader Valve - Seat
11	1	30-001-111	O-Ring 2-0111 dur.90
12	1	30-017-111	Backup Ring (Delrin)
13	1	60-020-354	Unloader Valve - Valve
14	1	30-001-206	O-Ring 2-206 Dur.90
15	1	60-020-352	Unloader Valve - Piston
16	1	30-001-114	O-Ring 2-114 Dur.90
17	2	30-007-114	Backup Ring (Teflon)
18	20	60-020-359	Bellville Disc Springs
19	1	60-020-356	Unloader Valve - Spring Compression Cap
20	1	30-001-221	O-Ring 2-221 Dur.90
21	1	60-020-362	Knob for Handle
22	1	60-020-363	Lock Nut
23	1	60-020-360	1"NPTM x 1" Barb
24	1	65-120-011	Seal Assy., J/S Type 20K Face

YOU ARE RESPONSIBLE FOR SAFETY!

Advanced Pressure Systems publishes guides for the safe use of Water Blasting Equipment.

Please READ them!

We also strongly advise that all personnel are fully conversant with:
"Recommended Practices for the Use of Manually Operated High Pressure Water Jetting Equipment"
published by the Water Jet Technology Association.



These may be obtained free of charge by contacting:
ADVANCED PRESSURE SYSTEMS, L.P. (877) 290-4277

Conditions of Sale & Warranty

General - These terms and conditions and warranty provisions are applicable to all products contained in this catalog, and may not be varied, except in writing by a partner of APS Pressure Systems L.P.

Terms of Sale –

- 1) All sales are FOB manufacturers plant, Houston, Texas, and are priced and must be paid for in US dollars.
- 2) The purchaser agrees to hold APS Pressure Systems (DBA: Advanced Pressure Systems) harmless for any and all claims arising from the misuse or misapplication of any product manufactured or supplied by Advanced Pressure Systems.
- 3) Products returned for credit will be subject to 15% restocking charge. Only standard products will be accepted for restocking. All sales of non-standard items are final.
- 4) Payment may be made by credit cards issued by VISA or MASTERCARD. Payment by credit cards issued by AMERICAN EXPRESS will be subject to 3% service charge.

Warranty - The following classes of products carry the warranty indicated. Any component included in an assembled product which is subject to wear is not warranted. Products which have been subject to abuse including misapplication, corrosion, excessive pressure, over-tightening and galling of screw threads will not be accepted for replacement under warranty. Products not manufactured by Advanced Pressure Systems will carry the warranty by of the respective manufacturer

Hose - Not warranted. Coupling may be warranted by manufacturer.

Rigid Lances - Ninety days from date of shipment.

Plungers and Pump Packing - Not warranted.

Control Guns, Flow Divider Valves, Flow Control Valves - Ninety days from date of shipment.

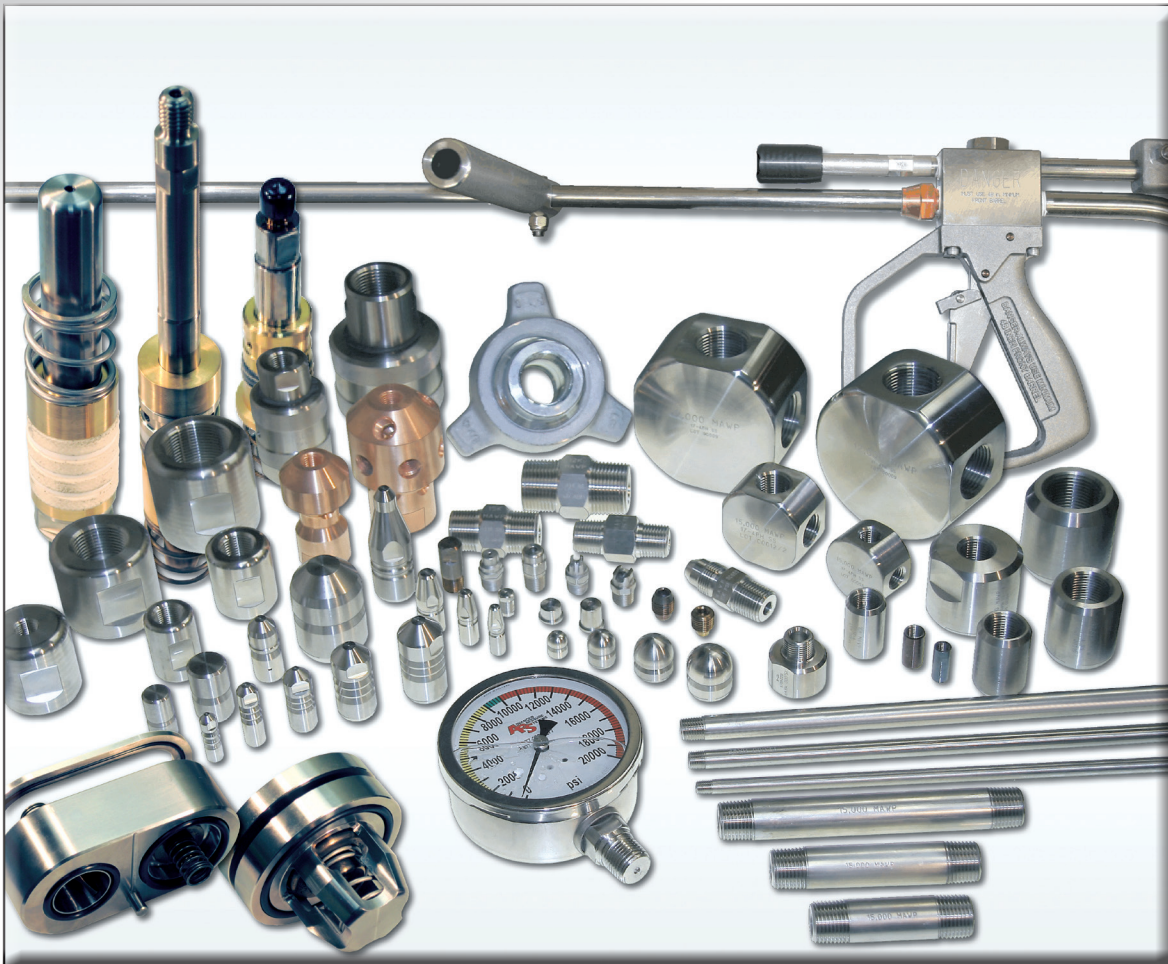
Relief Valves - 180 days from date of shipment.

Nozzles and nozzle inserts / orifices - Not warranted

Fittings, Connectors and Couplings - 180 days from date of shipment.

Shipping Costs - Orders may be shipped prepaid by any regularly available means, and the cost will be paid by the customer. Other shipping costs including but not limited to: insurance for the full retail value of the products, packaging, crating and any other handling costs will be billed to the customer. If the customer collects the products from the Houston plant there will not be any shipping charges.

Payment - All invoices are due net 30 days from date of shipment. Any invoices which are more than 30 days past due will result in the account of the customer concerned to be placed on hold.



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