GENERAL PUMP *A member of the Interpump Group*

ZKHM

Regulating Unloader

FEATURES

- Ideal for use in systems which incorporate a gasoline engine.
- Eliminates back pressure in system when pulling a manual start engine.
- Brass and stainless steel construction.
- Adjustable pressure control knob
- Accommodates multiple discharge lines

Note: For proper operation of the ZKHM Unloader, it must be mounted as shown in the upright position.

SPECIFICATIONS

Part Numbers:		**ZKHMS** (Complete Valve)
		ZKHM (Valve Less Spring)
		ZKHM1 (Valve Less Adjusting Knob)
Max Volume		10.8 GPM
Max Discharge Pressure		0 - 3000 PSI
Max Temperature		185º F
Port Sizes:	Inlet	3/8"-19 BSP-F
	Outlet	1/4"-19 BSP-F
	Outlet	3/8"-19 BSP-M
	Bypass (2)	3/8"-19 BSP-F
Dimensions		2.75" x 3.75" x 6.5"
Weight		2.5 lbs

General Pump recommends using a pressure reducing device in conjunction with this unloader valve when installed on a positive displacement pump. General Pump is not liable and assumes no responsibility when used in a customer's high pressure system.

UNLOADERS

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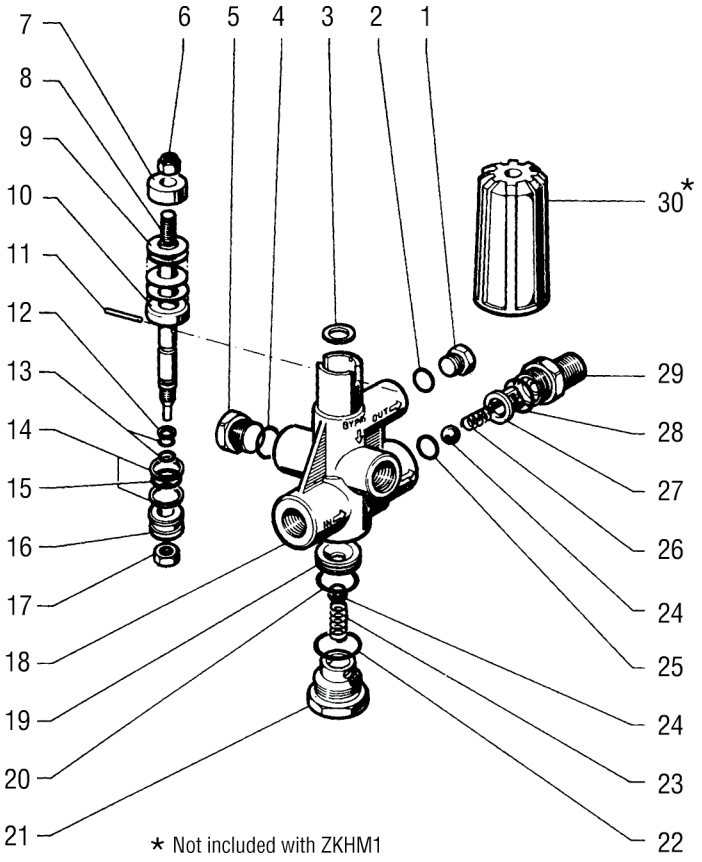
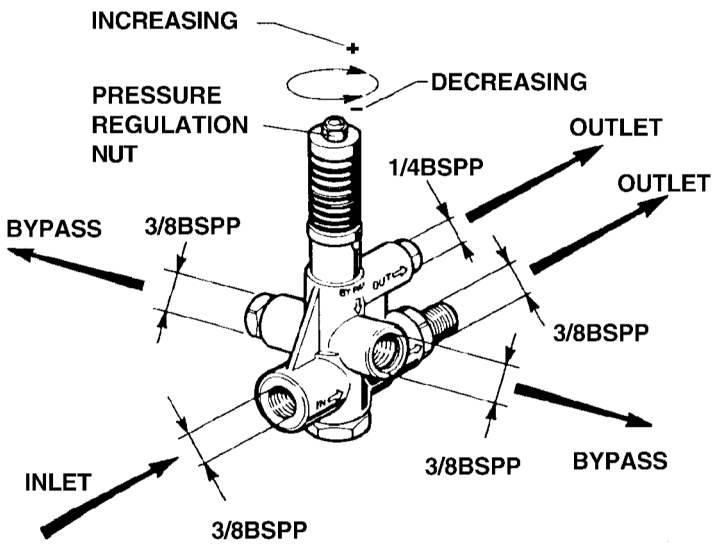
PARTS LIST

No.	Part No	Description	QTY.
1	98204100	Cap	1
2*	90358500	O-Ring	1
3	96710200	Washer	1
4*	90383300	O-Ring	1
5	98210000	Cap	1
6	92220800	Nut	1
7	36311364	Spring Guide	1
8	36310766	Piston Guide	1
9*	94849500	Washer	20
10	36310976	Spring Plate	1
11	97614300	Pin	1
12*	90502500	Anti-extrusion Ring	1
13*	90357500	O-Ring	2
14*	90508000	Anti-extrusion Ring	2
15*	90383100	O-Ring	1
16	36311266	Piston	1
17	92222000	Nut	1
18	36320101	Body	1
19*	36310266	Valve Seat	1
20*	90359400	O-Ring	1
21	36310370	Cap	1
22*	90384700	O-Ring	1
23*	94737400	Spring	1
24*	97483800	Ball	2
25*	90382200	O-Ring	1
26*	94735500	Spring	1
27*	36310451	Valve Guide	1
28*	90384300	O-Ring	1
29	36310570	Nipple	1
30	36311002	Knob	1
*	K72	Repair Kit	



Note: For proper operation of the HM Unloader, it must be mounted in the vertical position. The optional spring (item #23) must be used if the unloader is mounted in any position other than vertical.



GENERAL PUMP

ZKHM

Regulating Unloader

THIS DOCUMENT PROVIDES THE INSTRUCTIONS FOR THE INSTALLATION, USE AND MAINTENANCE OF THE VALVE, THEREFORE IT IS AN INTEGRAL PART OF THE VALVE ITSELF AND MUST BE READ CAREFULLY BEFORE ANY USE AND KEPT WITH CARE.
STRICTLY COMPLY WITH THE INSTRUCTIONS CONTAINED IN THIS DOCUMENT IN VIEW OF A SAFE AND EFFECTIVE USE OF THE VALVE.
FAILURE TO COMPLY WITH THESE INSTRUCTIONS MIGHT CAUSE EARLY FAULTS AND RESULT IN SITUATIONS OF DANGER, IN ADDITION TO VOIDING ANY WARRANTY.

1- GENERAL INFORMATION

1.1- The **ZKHM automatic pressure regulator** is a manually-adjustable, pressure-operated device which, according to its setting, limits the pump/system pressure by conveying the excess of water to the by-pass. Moreover, when the outlet flow is blocked, this device totally releases the flow – and keeps under pressure the portion of the system following the valve, while it sets the pressure to zero in the portion of the system preceding the valve.
1.2- Since the ZKHM valve is used in connection with a high pressure water pump/system, which shall be called hereafter only “system”, installation and use must be suited to the type of system used and comply with the safety Regulations in the Country where the valve is used.
1.3- Before using the valve, make sure that the system the valve is used with is certified to comply with the relevant Directives and/or Regulations.
1.4- Before installing and using the valve for the first time, we suggest you check that it is undamaged and make sure that the rated features correspond to the required ones. If this is not the case, do not use the valve and contact General Pump’s Customer for information.
1.5- In order to install the valve correctly, follow the instructions for the water inlet, outlet and by-pass connections, as stated in this instruction manual and/or on the valve itself.

2- PACKAGE

2.1- Packages must be handled in compliance with the instructions stated on the packages themselves and/or provided by the manufacturer.
2.2- In case the valve is not used immediately, it must be stored in its integral package and placed in areas which are not exposed to the weather and protected from excessive humidity and from direct sunlight. It is advisable to place wooden pallets or other types of pallets between the package and the floor, in order to prevent the direct contact with the ground.
2.3- The package components must be disposed of in compliance with the relevant laws in force.

3- INSTRUCTIONS FOR ADJUSTMENT

3.1- In order to obtain a correct adjustment and consequently a proper functioning of the valve, always make sure that, when working at the maximum pressure, the valve by-pass keeps releasing a quantity of water equal to 5% of the total flow-rate. In case the flow-rate at the by-pass is close to zero or exceeds 15% of the maximum flow-rate, this could cause faults, early wear and result in situations of danger.
The positions mentioned in the following instructions refer to those shown in the exploded view.
3.2- Connect the valve to the water system and follow these steps:
3.2.1- Unloose the adjustment knob pos. 30 in order to completely release the spring.
3.2.2- Open the gun or the water control device and start the system. Make sure that the air contained in it is fully ejected.
3.2.3- Keeping the gun or the water control device open, increase the pressure by screwing down the knob pos.30. Alternate the adjusting operations with a few openings and closings of the gun or of the control device. When the desired pressure has been reached, open and close the gun/control device a few times again in order to stabilize the various components (seals, spring etc.)
3.2.4- In order to obtain working pressures different from the set pressure, screw or unscrew the knob pos. 30.
3.2.5- The HM valve is equipped with caps pos. 1 and pos. 5. These shall be removed in case the valve is used in systems having more than one working lines.

In case of doubts, do not hesitate to contact the General Pump’s Customer Service Department.
IMPORTANT: During use, never exceed the maximum values of pressure, flow-rate and temperature as stated in this document and/or indicated on the valve.

Regulating Unloader

4- WARNINGS

4.1- The installation and the pressure setting must be made by qualified staff only, who must have the required skills to handle high pressure systems and be informed of the operating and safety instructions contained in this document.
4.2- The installer must provide the ultimate consumer with the proper instructions for the correct use of the system the valve is used in connection with.
4.3- Use soft and filtered water only. In case of salt water and/or of water containing solid particles of a size exceeding 360µm, the internal components of the valve will be subject to quick wear; furthermore, this might compromise the correct functioning of the valve. Addition agents can be used in the water, provided that they are delicate, biodegradable and always complying with the Regulations in force in the Country where the valve is used.
4.4- Use guns or other control devices ensuring a perfect seal when closed. Leakages may compromise the correct functioning of the valve.

4.5- In the systems for hot water production, the temperature of the liquid that comes into contact with the valve must always be lower than the value stated in this instruction manual and/or indicated on the valve itself**. Avoid the formation of steam or overheated water.**

IMPORTANT: When the temperature of the liquid is close to the maximum value, the outside temperature of the valve body is only slightly inferior. Therefore, take care in case of contact with the hot surfaces.

4.6- After use and/or before performing any operation on the system or on the valve, release the pressure by opening the gun or the control device for a few seconds. The jet created by the residual pressure must be directed downwards in order to avoid damages or dangers.
4.7- For safety reasons, it is advisable to equip the high pressure feeding line of the system also with a relief or safety valve duly adjusted.
4.8- To connect the valve to the system it is preferable to use flexible hoses fitted in a way that they do not form 90° elbows, throttlings or siphons which could include harmful air bubbles. The inside diameters of the hoses and fittings must be equal to the correspondent inside diameters of the inlet, by-pass and outlet threads of the valve. Moreover, it is necessary to correctly choose the type of hose depending on the rated pressure and flow-rate; the hoses must be used within their operation limits as stated by the manufacturer and indicated on the hoses themselves.
4.9- Tighten the fittings used on the G3/8” threads of the valve (torque wrench setting 45Nm ±5%). In order to ensure the seal, fit a metal washer with a rubber ring between the fittings, or use a proper sealant on the thread.
4.10- Always connect the valve by-pass fitting to a hose, in order to avoid the excessive noise caused by the water outflow through the by-pass without hose.
4.11- Before operating the system, it is advisable to start it for a preliminary test run in order to check that the system is properly installed.
4.12- **WARNING:** If the valve is used at low temperature involving the risk of freezing, make sure that it is not frozen inside and/or it is not blocked before using it.

5- MAINTENANCE

5.1- Maintenance and repair must be carried out by qualified and authorized staff only. Before any operation, make sure that the valve and the system are shut down and made unusable.
5.2- A correct maintenance helps extend the working life and grants a better performance of the valve.
5.3- From time to time, it is necessary to check that the valve is clean outside, and that there is no sign of leakage and/or malfunctioning. If necessary, replace the involved parts. In case of doubts, contact General Pump’s Customer Service Department.
5.4- Replace the valve parts with original spare parts only.

IMPORTANT: After maintenance, make sure that the valve is re-assembled correctly and that the initial conditions are restored. Comply with the torque wrench setting values and adjust the pressure again as described above.

5.5- The valve is entirely made of non-toxic and safe materials; however, in case of disposal, we suggest taking it to an authorized disposal center or contact General Pump's Customer Service Department.

The valve shall not be tampered with for any reason and/or used for any purpose other than the use it has been designed for. In case of tampering, the manufacturer disclaims all responsibility as to the valve functioning and safety.

6- WARRANTY CONDITIONS

6.1- The period and conditions of warranty are specified in the purchase contract.

6.2- Warranty is voided in case the valve is used for improper purposes, used at higher performances than the rated ones, repaired with non-original spare parts or if it turns out to be damaged due to the non-compliance with the operating instructions or to unauthorized tampering.

WARNING: High Pressure Systems require a primary pressure regulating device (i.e. regulator, unloader) and a secondary pressure relief device (i.e. pop-off valve, relief valve). Failure to install such relief devices properly could result in personal injury or damage to pump or property. GP does not assume any liability or responsibility for the operation of the user's high pressure system.

WARNING: This product can expose you to chemicals including lead, which is know to the state of California to cause cancer and birth defects or other reproductive harm. For more information, go to www.P65Warnings.ca.gov

GENERAL PUMP 1174 Northland Drive • Mendota Heights, MN 55120
Phone: 651.686.2199 • Fax: 800.535.1745 • e-mail: sales@gpcompanies.com • www.generalpump.com

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