

RELIEF VALVE

APPLICATION

The primary function of a relief valve is to provide an adjustable control, which will limit the maximum pressure in the hydraulic system.

Another function of the relief valve is a procedure referred to as "venting". When a relief valve is vented, the hydraulic balance within the valve is changed in such a manner that oil from the pump will flow through the valve and return to the oil reservoir at very low pressure.

Venting is accomplished through suitable valving connected between the venting port (designated by "V" on the valve cap) and the oil reservoir. When the vent port is opened to the oil reservoir, the system pressure will drop. When the vent port is closed, hydraulic balance within the valve is re-established so that the valve will be restored to its normal operating condition and pressure can rise to the maximum setting of the valve.

A remote control valve can be used with the relief valve, which will provide for remote control of pressure adjustment. The remote control valve is connected to port "V" in the cap of the relief valve with 3/8" OD High Pressure Tubing.

INSTALLATION

A relief valve should always be installed adjacent to the pump pressure outlet port. It may also be necessary to install relief valves in other sections of the system when such need is indicated by the circuit design. Install only those valves which meet the requirements of pressure and volume.

This valve is furnished in two body styles. (1) Threaded Body Style. (2) Subplate Mounted Style. See Valve Print Page.

The Threaded Body Style is used for "in-the-line" installations since it can act as a tee in the line. One pressure port is used as an inlet and the other pressure port becomes the outlet. This valve may also be used for "off-the-line" installations by connecting one pressure port. The "tank" port on the valve is always connected to the oil reservoir.

The Subplate Mounting Style relief valve consists of a relief valve body designed to mount on a subplate. The subplate is drilled and tapped to provide oil passages to the valve body and to furnish a means of connecting the hydraulic lines to the valve. This arrangement will permit the removal of the valve body without disturbing the hydraulic lines.

The pressure port must always be teed off the line when installed in the hydraulic circuit. The tank port must always be connected to the oil reservoir.

The discharge from the tank port of the relief valve should enter the oil reservoir below operating oil level and be directed away from the pump intake lines. The return line from the tank port of the relief valve should be piped directly to the oil reservoir with as few bends as possible to minimize back pressure on the tank port.

The cap on the Threaded Body relief valve may be installed in one of two positions, 90° apart. This provides for convenient accessibility to the adjustment screw. (If cap position is changed, it is important that one of the two small pressure ports in the valve body lines up with a mating hole in the cap. (See Valve Printing Page). The cap on the Subplate Style valve cannot be rotated. It must be installed in the position shown on Valve Print Page.

Check model number stamped on the valve cap. The model number, adjustable pressure range and maximum working pressure for this valve is tabulated on Valve Print Page. Do not install a relief valve in the hydraulic system where the pressures are not compatible with the specifications for a particular valve model. All valve models listed in GFP Catalog are rated at 50 GPM.

A gauge connection port is provided on the side of the Threaded Body Style relief valve. This outlet may also be used for an auxiliary high pressure pilot line when such is indicated by circuit design.

A tee should be provided on the side of the Threaded Body Style relief valve. This outlet may also be used for an auxiliary high pressure pilot line when such in indicated by circuit design.

A tee should be provided in the pressure line for gauge installation when the Subplate Style relief valve is used. Do not remove the plug from port "D".

CAUTION: Make certain that system hydraulic pressure is at zero before removing plug to install pressure gauge. This precaution should be observed whenever the valve is serviced.

PRESSURE ADJUSTEMENT

The pressure adjustment control is located on the cap of the relief valve. To adjust pressure, first loosen knurled lock nut. Turn adjusting screw clockwise to increase pressure or counter-clockwise to decrease pressure. Turn adjusting screw slowly since there is a lag in pressure change until hydraulic balance is established within the valve. After pressure has been set, tighten lock nut securely.

CAUTION: THE ADJUSTING SCRE KNOW IS EQUIPPED WITH A SMALL ALLEN SCREW. THIS SCREW IS SET AT THE FACTORY TO LIMIT MAXIMUM PRESSURE TO THE RATING OF THE VALVE. DO NOT ADJUST OR REMOVE THE ALLEN SCREW.

If the relief valve is used as a component in a unit as shipped from the factory, the Allen Screw in the adjusting screw know will be set to limit the maximum pressure permissible in the hydraulic circuit.

Should foreign material lodge on the seat of the control valve or plunger, it may be possible to flush the offending material from the valve seat. To do this, first release the knurled lock nut and turn adjusting screw counter-clockwise until it feels free of spring load. Then start the pump and allow oil to circulate through the valve and back to the oil reservoir. Re-set the adjusting screw for the proper pressure and tighten lock collar.

Aeration of the oil in the reservoir can cause faulty valve operation. Aeration an be caused by improper return of oil to the reservoir. Locate return lines to direct flow of oil away from pump intake line and below operating oil lever.

Air leaks in the pump suction line will cause faulty pump operation, which , in turn, will effect the operation of the relief valve. This condition will result in noisy operation and fluttering of the pressure. Replace faulty fittings, couplings or pipe.

If the foregoing procedures do not remedy the trouble, the valve must be disassembled. Refer to Valve Print Page.

1. Remove control head seat. (Code 7)
2. Take out four cap screws (Code 1) and remove valve cap (Code 3).
3. Remove all parts of pressure adjustment. (Codes 12 - 17)
4. Remove all parts from valve body (Codes 9, 10, 19-21). If valve body is not readily accessible for inspection or requires washing, it should be removed from the circuit.
5. Wash all parts thoroughly with a good solvent.
6. Inspect valve seats for nicks, foreign matter or erosion.
7. Inspect internal parts and small oil passages for any possible obstructions.
8. Differential piston must move freely in plunger (Code 20). The plunger should also move freely in the valve body. If these parts do not move properly, check for nicks, scratches or foreign material.
9. Inspect O-Ring for damage.
10. Normally a continuous ring will be evident on the poppet and the valve body seat where the oil seal is made between this two parts. If, however, indentations are found in either of the mating parts of this area, replacement of the affected parts should be made. This also applies to the control valve seat and the control valve cone (Code 7 and 12).
11. Replace damaged or excessive worn parts. Do not attempt to repair valve body seat. Return to factory.

Refer to Valve Print Page when assembling the valve. Wipe parts clean with the hand or use an air stream. (Do not use a cloth since it will leave a deposit of lint, which can have an adverse effect on the valve characteristics). Blow out all oil passages with compressed air. Handle parts carefully to avoid scratches or burns on mating parts which might make assembly difficult or even impossible.

Control head seat (Code 7) is fitted into the cap with a very close tolerance. It may require considerable force to assemble. Before assembly, apply a lubricant such as "Lubriplate" to the OD of this part. Tighten control head seat securely against cap. Cap screws (Code 1) should be tightened with approximately 70 ft. lbs. of torque.

CAUTION: After assembly, the pressure settling must be checked with a reliable pressure gauge. It may be necessary to re-set the Allen Screw in the adjustment screw knob so that maximum working pressure, adjust Allen Screw until it bears against lock collar. Re-seal Allen Screw to prevent tampering by unauthorized personnel.

USE THE CORRECT VALVE PRINT PAGE AND BIL LOF MATERIAL FOR YOUR VALVE.

**RELIEF VALVE
SERVICE AND MAINTENANCE
TROUBLE SHOOTING CHART**

TROUBLE	PROBABLE CAUSE	REMEDY
VALVE WILL NOT BUILD PRESSURE	1. Dirt or foreign material in valve.	Flush valve as instructed or disassemble and clean.
	2. Valve Cap position relative to body is incorrect.	Re-position cap according to instructions.
	3. Poppet (Code 20) stuck in valve body.	Remove poppet and inspect for foreign material or nicks.
	4. Differential Piston (Code 19) stuck in poppet.	Remove differential piston and inspect for foreign material or nicks.
	5. Small holes in valve cap are plugged.	Clean out with fine wire or air stream.
VALVE BUILDS LOW PRESSURE ONLY OR IS NOT REPSONSIVE TO PRESSURE ADJUSTMENT	1. Poppet (Code 20) stuck in valve body.	Remove poppet and inspect for foreign material or nicks.
	2. Differential Piston (Code 19) stuck in poppet.	Remove differential piston and inspect for foreign material or nicks.
	3. Valve Seat (Code 7) and Cone (Code 12) are eroded.	Replace seat and/or cone. See "Caution" note before re-setting pressure.
	4. Small holes in valve cap are plugged.	Clean out with fine wire or air stream.
	5. Clearance between valve seat (Code 7) and valve cap is excessive.	Replace seat and/or valve cap is necessary. See "Caution" note.
	6. O-Ring (Code 10) is damaged.	Replace O-Ring.
VALVE FAILS TO BUILD MAXIMUM PRESSURE AFTER PROLONGED USAGE	1. Spring (Code 13) has taken a set.	Replace spring.
	2. Valve Seat (Code 7) and Cone (Code 12) are eroded.	Replace damaged parts. See "Caution" note before resetting pressure.
PRESSURE SETTING IS VERY ERRATIC	1. Differential Piston (Code 19) does not move freely in poppet.	Remove and clean. Make sure no nicks exist and that piston work freely in poppet.
	2. Valve Seat (Code 7) and Cone (Code 12) are eroded.	Replace damaged parts. See "Caution" note before resetting pressure.

CAUTION: WHENEVER ANY OF THE FOLLOWING PARTS ARE REPLACED IT MAY BE NECESSARY TO RE-SET MAXIMUM PRSSURE STOP.

1. Adjusting Screw	Code 5	Reference: See Valve Print Page Listed below for parts breakdown listing.	
2. Lock Nut	Code 4		
3. Cap	Code 16		
4. Guide	Code 15	GFP #	Model #
5. Spring	Code 13	092133	VR323103
6. Cone	Code 12	092137	VR332103
7. Valve Cap	Code 3	092138	VR333103
8. Valve Seat	Code 7	092132	VR323105
		092141	VR323150

IS 1105101-2004

Granite Fluid Power

PO BOX 215 * Granite Falls, MN 56241 * Phone (320)564-9009 * Fax (320)564-9029 * www.gfpmf.com