

## COUNTERBALANCE VALVE

**Note: This counterbalance valve is NOT serviceable, and must be returned to the factory for any service.**

Read and carefully follow these instructions before installation and use of this valve. Most problems with new equipment are caused by improper operation and installation.

### SAFETY PRECAUTIONS



#### WARNING

- All WARNING statements must be carefully observed to help prevent personal injury.
- As with all hydraulic valves, this valve is designed to lift, lower, and control the load. However, cribbing or blocking the load **MUST BE** used to provide adequate protection and safety.
- The operational nature of a counterbalance valve is to use the rod end pilot pressure to sense and control the load. Because of this, a portion of this pressure is added to the load pressure at the base end of the ram. *Example:* Load pressure at base of ram = 10,000 PSI  
Ram base to rod ratio = 2 to 1  
Loaded pilot pressure (lowering) = 2,000 PSI  
**Ram base pressure (lowering) = 10,000 PSI load + (2,000 PSI pilot / 2 ratio) = 11,000 PSI**
- In counterbalance systems, avoid dead ending the hydraulic cylinder as this could cause lurching when the load begins to be lowered.
- Install the counterbalance valve as close as possible to the cylinder to minimize the potential for component failure between the cylinder and the counterbalance valve.

#### Hydraulic Hose

- Before operating this tool, tighten all hose connections using the proper tools. Do not overtighten the connections. Connections need only be tightened securely and leak-free. Overtightening may cause premature thread failure or high pressure fittings to split at pressures lower than their rated capacities.
- Should a hydraulic hose ever burst, rupture, or need to be disconnected, immediately shut off the pump. Never attempt to grasp a leaking hose under pressure with your hands. The force of the escaping hydraulic fluid could cause serious injury.
- Do not subject the hose to potential hazard such as fire, extreme heat or cold, sharp surfaces, or heavy impact. Do not allow the hose to kink, twist, curl or bend so tightly that the oil flow within the hose is blocked or reduced. Periodically inspect the hose for signs of wear because any of these conditions can damage the hose and may result in personal injury.
- Do not use the hose to move attached equipment. Stress may damage the hose and cause personal injury.
- Hose material and coupler seals must be compatible with the hydraulic fluid used. Hoses also must not come in contact with corrosive materials such as creosote-impregnated objects and some paints. Consult the manufacturer before painting a hose. Never paint the couplers. Hose deterioration due to corrosive materials may result in personal injury.

Note: Shaded areas reflect last revision(s) made to this form.

Sheet No. 1 of 2

Rev. 2 Date: 9 June 1997

## SAFETY PRECAUTIONS (CONTINUED)

### Pump

- Do not exceed the PSI hydraulic pressure rating noted on the pump nameplate or tamper with the internal high pressure relief valve. Creating pressure beyond rated capacities may result in personal injury.
- Before replenishing the oil level, retract the system to prevent overfilling the pump reservoir. An overfill may cause personal injury due to excess reservoir pressure created when cylinders are retracted.

### Cylinder

- Do not exceed rated capacities of the cylinders. Excess pressure may result in personal injury.

## OPERATION

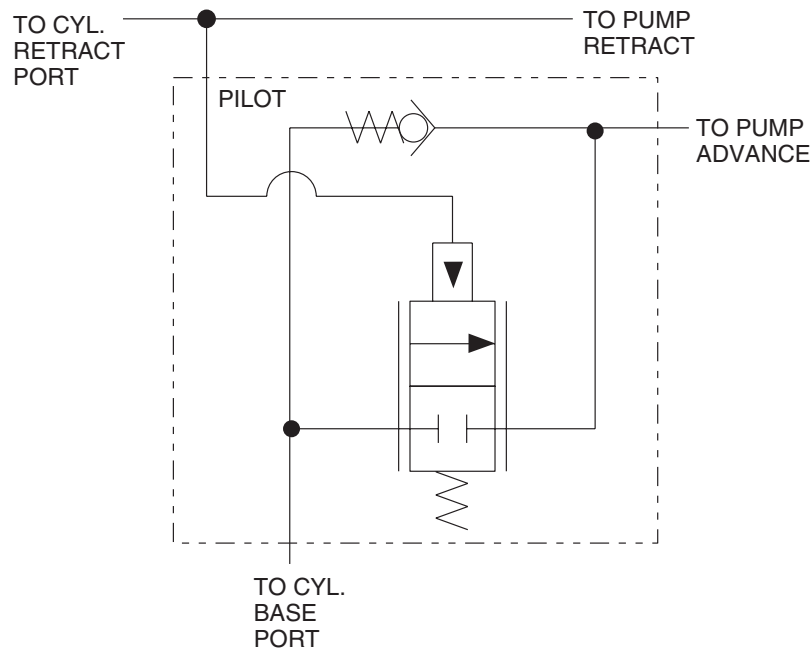
The new 9720 & 9721 counterbalance valves incorporate the holding associated with a Pilot Operated Check Valve and the control of a Pilot Operated Control Valve. The load will stop moving the moment the supply pump is stopped or the control valve is shifted to neutral. What all this means to you, the user, is that when using the 9720 & 9721 valves in a system the following features are in place:

1. **When *lifting* a load with a double-acting cylinder and a 9720 or 9721 valve in the system** - The return oil is checked at the 9720 or 9721 valve by an internal pilot operated check valve. If a hose(s) from the pump to the 9720 or 9721 valve is broken, the load will remain positively supported by this internal pilot operated check valve. For those who would like to permanently connect the 9720 or 9721 valve to their double-acting cylinder, it is reasonable to hard plumb the valve to the cylinder, and to secure the valve body to the cylinder. This makes a very compact, neat installation and insures that the individual cylinder is always protected from a run-away load.
2. **When *lowering* a load with a 9720 or 9721 valve in the system** - The operator will simply shift the pump-mounted, 4-way valve to the retract position. This begins the supply of oil under pressure to the top port/pilot line to the cylinder. When pressure in the 9720 or 9721 pilot line reaches approximately 2000 PSI the pilot valve begins to open. Oil flows through the pilot operated flow control past the open pilot operated check back to the pump reservoir.

**NOTE: Pilot pressure could reach 4,000 PSI in light load applications at higher flow rates.**

## CONNECTING THE 9720 & 9721 VALVE IN A SYSTEM

- Connect the RETRACT port from your pump-mounted valve and tee into port marked PILOT.
- The port marked PILOT should tee into the top (or retract) port of the cylinder.
- Connect the port marked CYL. BASE to the bottom (or advance) port of the cylinder.
- Connect the PUMP ADVANCE port from your pump-mounted valve to the port marked PUMP ADVANCE.



**HYDRAULIC SCHEMATIC**

Before operating the system under load, bleed the system of all air as follows:

**IMPORTANT: Failure to completely bleed air from the system will result in erratic control during the load lowering sequence.**

- Elevate the pump at least one foot above the highest port on the cylinder.
- With the pump elevated, extend the cylinder fully and build to maximum pressure, then retract the cylinder fully and build to 2000 PSI. Repeat this extend/retract cycle several times.
- Observe the cylinder piston as it extends and retracts. When it appears to operate smoothly throughout the cycle, with no hesitation or jerking, the system is ready for use.