Almost Everything You Need to Know About Trouble Shooting

When a hydraulic circuit quits working the problem must be quickly diagnosed and fixed. The responsibility for doing the work usually falls on the area mechanic. Often the mechanic is not well versed in trouble-shooting techniques and only has a minimal understanding of fluid power symbols. This text will attempt to address these areas with information on methods of logical trouble-shooting and how to read the symbols used in fluid power.

Step 1	Look Over Machine And Hydraulic Components For Obvious Faults Low Oil, Bad Wiring, Damaged P arts, Etc.
Step 2	Question Maintenance Persons About **Any Work** On The Machine Prior To Start Of Problem
Step 3	Question Operator On What Happened When Problem Started
Step 4	Try To Cycle Machine To See If Fault Is Related To Flow, Pressure Or Movement
Step 5	Study Circuit Schematic And Note Any And All Valves That Could Cause The Problem
Step 6	If The Problem Appears To Be An Adjustment Make Changes And Cycle Again, **If Not**:
Step 7	Lower Or Mechanically Contain Suspended Loads Lockout And Tagout Electrical Circuit Bleed Off All Trapped Pressurized Fluid
Step 8	Check Out The Most Obvious Component, Then The Next Most Obvious Component For Correct Part Number, Damage, Setting, Etc. Until Finding An Obvious Problem Or Depleting All The Obvious Components
Step 9	Adjust, Repair, Replace All Parts That Are Not Operating As Designed
Step 10	Restart Machine To See If Problem Is Resolved

Chart 1 General Troubleshooting Procedure

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Information and Logical Steps to Find Design

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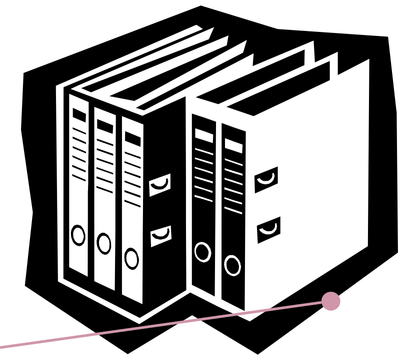
INTRODUCES



Trouble Shooting Industrial Hydraulics

A Generic Training Book for Maintenance Mechanics and Technicians that Work on Fluid Power Systems

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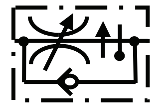
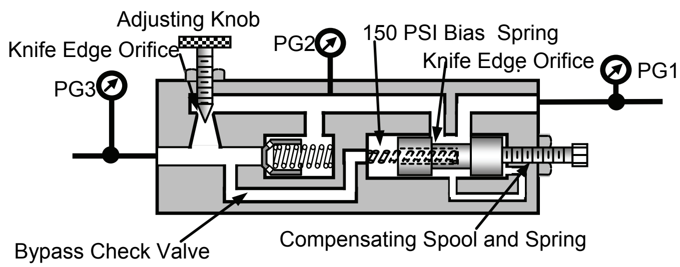
Information From the Table of Contents

Pressure Compensated Flow Control Valve Cutaway



Symbol



Explanation of Function

UNI-DIRECTIONAL PRESSURE COMPENSATED FLOW CONTROL

Fig. 11B shows a generic cutaway of a pressure compensated unidirectional flow control that accurately controls flow even when input or output pressures change. This type flow control is 2-4 times more expensive than the non-compensated type but is worth the money when accurate flow is required.

Flow entering the **Inlet Controlled Flow** port passes through the **Compensator Spool And Spring** chamber and on to the adjustable orifice. Back pressure at the orifice builds at the right end of the compensator spool and forces it against the spring. The compensator spring takes approximately 75-150 PSI to compress it so the compensator spool moves over enough to restrict flow so pressure on gauge **PG2** reads 150 PSI. When pressure at **PG2** reads zero PSI then pressure drop across the orifice is 150 PSI. No matter how much input pressure changes the **Compensator Spool And Spring** maintains the 150 PSI drop across the orifice and flow stays constant.

If pressure increases at the outlet, gauge **PG3**, it adds to spring pressure at the compensator spool and causes pressure at **PG2** to increase by the amount of back pressure plus the 150 PSI compensator spring. If outlet pressure climbs to 400 PSI then pressure at **PG2** would increase to 550 PSI keeping pressure drop across the orifice at 150 PSI.

When pressure at the inlet or outlet fluctuates the **Compensator Spool And Spring** adjusts flow to the control orifice to maintain a constant pressure drop across it. When pressure drop remains constant flow also remains constant. The schematic symbol indicates pressure compensation by the perpendicular arrow on the inlet to the orifice.

When this type valve is used at low flows it sometimes becomes unstable when it first receives flow. The **Compensator Spool And Spring** jumps shut too fast and too far causing a pressure drop which then allows it to open too far and too fast. It take a few seconds for the valve to settle in to a constant flow and could cause problems. To overcome this fault a **Spool Over Speed Adjustment (No Jump)** screw is added to adjust spool starting position close to the minimum flow setting so it does not have as far to move at first flow. If the valve is fitted with a **Spool Over Speed Adjustment (No Jump)** it needs to be changed especially when speeding up the actuator.

To compensate for viscosity changes primarily due temperature changes a **Knife Edged Orifice** replaces the standard needle and orifice. This sharp edged restriction causes less change from different viscosity's and keeps an actuator operating at the same speed from star up to operating temperature. Temperature compensation is shown on the schematic symbol as a temperature bulb perpendicular to the inlet line to the orifice.

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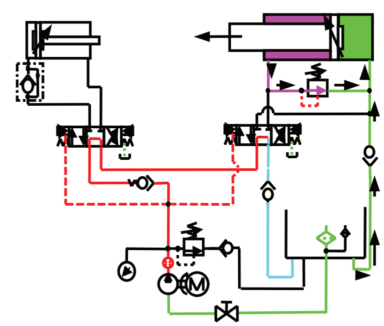

Information and Logical Steps to Find Design Problems or Problems Causing Components in the Shortest Time

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