

GLOBAL SERVICE BULLETIN

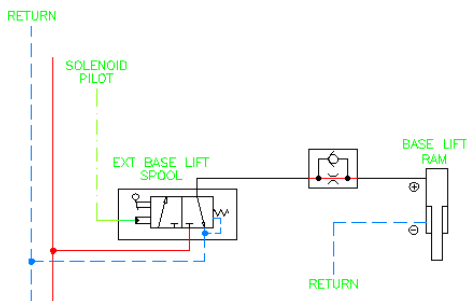
REVIEW OF JOY BASE LIFT CIRCUIT DESIGN

INTRODUCTION:

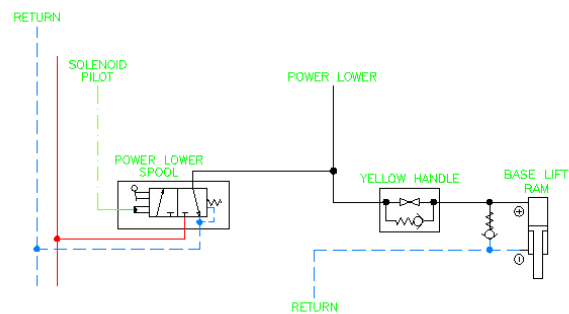
As a result of a fatal accident at the Century Mine in Ohio (USA) on August 8, 2011 involving a base lift jack, Joy has received a number of inquiries concerning whether or not our design is adequate. **In this regard, it must first be noted that the base lift jack involved in the August 8, 2011, accident was not a JOY product.** In addition, as a reputable supplier of equipment and systems to the mining industry, Joy Mining Machinery wants to assure our customers that we routinely review and evaluate our products for safety compliance and performance. Therefore, the purpose of this Service Bulletin is to inform users of JOY equipment that such a review has been conducted on the JOY powered roof support hydraulic base lift circuits to verify that the circuit does not have any potential issues with respect to pressure intensification as a result of design or functionality.

DISCUSSION:

The review checked the base lift circuit configuration for supports previously supplied on JOY Roof Supports. The base lift function is controlled via a dedicated spool valve as depicted in circuit A below, or is operated in conjunction with the leg's lower function as depicted in circuit B. When the base lift function is inactive, any pressure generated from an external input load has a path to return through the spool valve.



Circuit A



Circuit B

Circuits that do not have a dedicated spool may have an additional isolation valve in the base lift circuit (circuit B). Since this isolation valve can shut off the fluid path to the base lift ram, an integral parallel check valve is included in the circuit to ensure that fluid has a path back to return, hence eliminating the potential for intensification of the cylinder in both circuit configurations during normal operating functions.

Return circuits are protected by the 600 psi relief valves supplied for the ring main hosing; however, should a return hose be blocked or severely restricted, pressure intensification is possible. The condition of the circuit hosing between the base lift cylinder and the roof support control valve should be examined regularly and replaced if damaged or blocked.

If, in error, the leg extend function (leg set) is operated simultaneously with the base lift extend, a degree of intensification could potentially occur in the base lift circuit between the base lift ram and restrictor. This intensification is limited to the characteristic of the restrictor in the base lift circuit and by design is within the nominal safety factors of the associated hydraulic equipment.

Base Lift Ram Design:

The Base lift ram with the forged cylinder design was tested in 1996, test report number HY0475N. Pressure testing included:

- 30,000 Pressure pulse cycles, between 700 psi and 6,960 psi to the extended side of the ram.
- Double overload pressure tests for both ram extension and retraction.

The design of the base lift ram is such that, if the thrust bar is pushed closed, the base lift pad contacts the cylinder gland. When the ram is closed, any load acting on the base lift pad is transmitted through the gland and into the body of the ram. As such, any high externally applied load acting on the base lift piston rod does not react on the bottom of the cylinder bore.

The information detailed above regarding the base lift ram design and testing relates to Joy's base lift ram. As noted in the introduction, the base lift jack involved in the August 8, 2011, accident was not a Joy product. Joy is not familiar with the specifications and testing performed on third party products and therefore cannot give any assurances as to the design or workmanship of products manufactured or rebuilt by third parties.

RECOMMENDED ACTIONS:

Joy strongly recommends that customers:

- Use JOY parts on the applicable machinery – while mine operators are, of course, free to choose their own suppliers, Joy can give no assurances as to the design or workmanship of other companies' products.
- Routinely check the circuit hoses for blockages and restrictions.
- Do not modify hydraulic circuits supplied by Joy on JOY Roof Supports.
- Have only trained and competent personnel service the equipment.

Please contact your Joy representative with any questions concerning this information.

END