

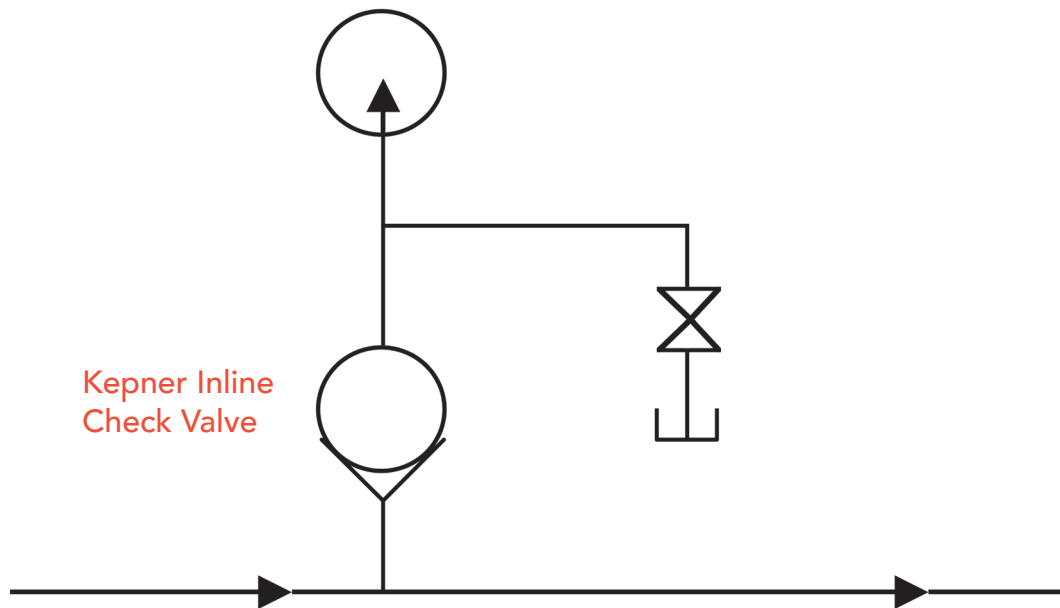


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Measuring Surge Pressure Using An Inline Check Valve

Hydraulic equipment and circuitry develop pressure surges or shock in operation due to a rapid deceleration of the hydraulic fluid in any part of the system. The fluid deceleration may be caused by a valve closing or by a ram bottoming. Severity of shock depends on the degree of deceleration and is greatest when using fast acting on-off valves, such as solenoid operated spool valves, or when a fast moving ram is bottomed out, such as occurs at the end of stroke on the die ram of a die casting machine.

It is often desirable, and sometimes even necessary, to know the magnitude of the surge. Surge and shock can be measured with an oscillograph using a high response pressure sensor, but the associated expense and inconvenience often rules this out. An ordinary pressure gauge in a surging line is of no value as the gauge will not respond to rapid fluctuations in pressure and the needle cannot be accurately read in its excursion up and down, even on long surges.



The simple circuit shown above is an integrator for use in cases of repetitive shock or single surges of duration within the response rate of the gauge. On each successive pressure rise an increment of fluid is trapped in the gauge line until the gauge line pressure balances the surge pressure. When the gauge reading stabilizes, the reading will be very close to the peak surge pressure.

This idea is not new and has been presented in hydraulic writings. This system, however, is accurate and usable only if a zero leakage check valve is used. The zero leakage characteristics of the Kep-o-seal® valves together with their ruggedness make them the logical choice for this application.

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