

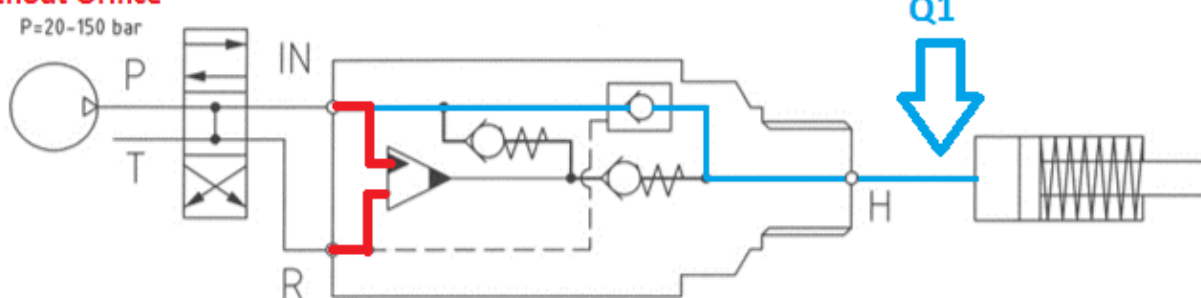
Integrated Orifice in miniBOOSTER

This document outlines the benefit of using an orifice in the miniBOOSTER Hydraulic Intensifier in the R port, and the effect on performance and lifetime.

Installing an orifice in the return side of the intensifier will limit (reduce) the total flow rate from the R port of the intensifier and maximise the intensified flow in the H port (see figures below).

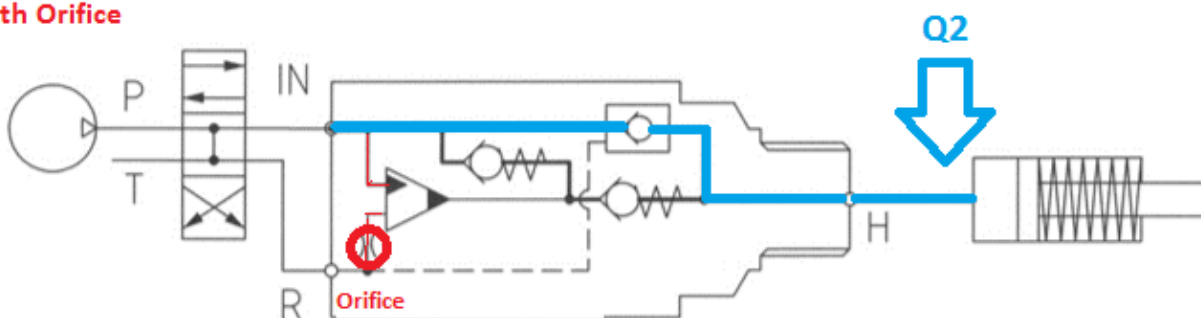
The advantages of using an orifice are, controlling the return flow, and reducing the oscillating frequency of the intensifier, avoiding the possibility of high frequency and thereby increasing reliability and lifetime. The performance levels of the orifice from miniBOOSTER provide high reliability and low maintenance costs even under the most challenging operational conditions. The ultra-compact size, low weight and durable materials of the miniBOOSTER allow flexible configuration in almost any environment onshore, offshore or subsea..

Without Orifice



$$Q2 > Q1$$

With Orifice



Summary of testing

miniBOOSTER engineering has proven through testing that our intensifier with orifice is the best solution for your applications. The test matrix parameters - type of miniBOOSTERS, Pressure In, Flow rate, Frequency, Orifice Diameter, I factors, and Piston Speed - were combined in different variations. The outcome of the test was that miniBOOSTER with orifice in R port achieved the highest score on both evaluated parameters (performance and reliability). This means that, with orifice, one can expect the highest outlet flow to the system from designed intensifiers, resulting in best performance among all tested orifice with miniBOOSTER, and life-time improvement.

Currently, miniBOOSTER is able to provide the HC4, HC6, HC6D, HC1W, HC2W, HC6DW and HC7W intensifiers with an orifice. The intensifiers HC6D2, HC6D2W, HC9D2 and HC9D2W are available with orifice on request.

The plots below illustrate the test comparisons between miniBOOSTER with and without an orifice. Figure 1 shows the flow measurements with the intensifier HC6D-2.5-A-1 without an orifice. At the beginning of the cycle, the total inlet flow is approx 65 l/min, while the intensified flow (H) is only 30 l/min. The intensifier frequency is close to 8 Hz (oscillations per second). The set point was reached in approximately 23 seconds.

In figure 2, the intensifier was tested with a 1.4 mm diameter orifice in the return side with the same test set-up and operating conditions. The results show a slightly lower inlet flow, closer to 52 l/min and a higher H flow about 42 l/min. At the same time, the oscillating frequency has been reduced to about 2 Hz. Finally, the cycle time was reduced below 19 seconds.

