

## Optimization of Manufacturing Processes by Reducing the Costs of Tools and Equipment on Hydraulically Operated High-Pressure Technological Lines

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**Abstract.** Most technological manufacturing lines include hydraulically operated stationary tools, devices and equipment. During a manufacturing cycle, there are phases, usually short, in which part of the hydraulic cylinders of the drive systems concerned, with small gauges and displacement speeds, have to generate / maintain high clamping or pressing forces, which implies functioning at high working pressures. The solution for such cylinders is to use modular hydraulic pumping units comprising: oil tank; low-pressure electric pump; hydraulic directional valve for starting, stopping and changing the direction of movement of the cylinder; electric pump pressure control valve; pressure filter; return filter; oscillating hydraulic pressure intensifier (minibooster mounted directly on the cylinder). Such pumping modules, which consume low pressure (in the primary side of the minibooster) to generate high pressures (in the secondary side of the minibooster), are cost-effective when it comes to the purchase of components, in-stalling them, the space required for installation, and their maintenance, too. The classic applications of using them are for achieving and maintaining high pressure values, either in volumes of closed spaces (endurance tests for pipes and tanks), or at the active stroke end of hydraulic cylinders (hydraulic presses).

The authors demonstrate, on an experimental laboratory bench, the following:

- The range of applications of such pumping modules can be extended in a third direction, namely for actuation of hydraulic cylinders with low gauge / speeds and constant high load (high working pressure) over the entire stroke;
- Uniformity of movement of these cylinders with load over the entire stroke that are fed and operated by such pumping modules is weakly affected by the pulsating operating mode of the hydraulic pressure intensifier.

**Keywords:** low pressure; pumping module; oscillating hydraulic pressure intensifier; high pressure; hydraulic cylinder

*The full paper is published in MATEC Web of Conferences, Volume 368 (2022):*

DOI: <https://doi.org/10.1051/mateconf/202236801008>

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