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# High-low and mighty

## A PUMP SYSTEM THAT MAXIMISES FLOW WHILE MINIMISING POWER CONSUMPTION WORKS SO EFFICIENTLY THAT WORKING TIME CAN BE REDUCED – ALL WITHOUT SACRIFICING RELIABILITY

MAIN IMAGE: **Marzocchi Pompe Hi-Low pumps**

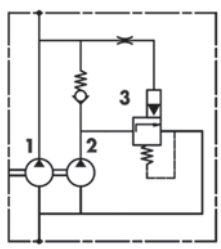
Over the past 50 years, Marzocchi Pompe has expanded and increased its product range of gear pumps to reach its current position as one of the most important Italian manufacturers of external gear pumps and motors. To satisfy the requirements of the mobile and industrial market, it has now added to its product line a range of pumps with integrated valves, relief, check valves, priority valves and Hi-Low systems.

### Hi-Low systems

The Hi-Low system is a special type of pump with integrated valves specially designed for applications such as compactors, log splitters, and clamping and crimping machines. This pump is ideal for applications which require an actuator with rapid advance and/or return under low loads, alternating by slow motion with heavy loads. It also enables better sizing and low operating costs for the electric motors or IC engines to which they are coupled, because they reduce the peak power demanded by the hydraulic system. For example, the use of small electric motors enables work in environments where there is limited power available, such as domestic applications.

The Hi-Low pump is a double pump with a large-displacement rear section that works only at low pressures (from 30-80 bar). This rear section is used to deliver high flow, resulting in a high speed at the actuator. The front section, with small displacement, is the only one that works at high pressure (200-250 bar). Under these conditions, all available power is used to generate maximum force at the actuator with limited speed. When operating at low pressure, both pumps work together to provide maximum flow until the unloading valve located on the rear pump cover is closed. Above this set pressure, flow from the rear section is recirculated separately from the primary circuit, so the front section has all the power available to reach its maximum pressure, although power consumption remains acceptable due to its small displacement. Under these conditions, the flow is recirculated back through the built-in unloading valve, absorbing negligible power.

The use of Hi-Low pumps also reduces working time, as the passive phases can increase the velocity of actuators. Pumps of this type have been completely designed by Marzocchi Pompe to obtain high mechanical and volumetric efficiency. The inner ducts and the unloading valve components have been designed with the aid of CFD simulation techniques to reduce power losses during internal recirculation. Close study of Hi-Low valve components enabled the reduction in size without sacrificing reliability.




LEFT: **Hydraulic circuit**
**1. First stage high pressure**
**2. Second stage low pressure**
**3. Unloading valve**

FAR LEFT: **Noise test of wood log splitters in the R&D department of Marzocchi Pompe**

### Thorough testing

Marzocchi Pompe's R&D department is equipped with experimental test benches to record mechanical, hydraulic, acoustic and vibration performances, and durability test benches capable of simulating the toughest working conditions. The range of Marzocchi Pompe Hi-Low pumps spans groups 1P, 1 and 2 in a range of configurations and can satisfy a wide variety of applications that require oil flow up to 70 l/min. Marzocchi production ranges from 0.19 to 200.3cc/rev and it is divided into eight groups according to the gear size (0.25, 0.5, 1P, 1, 2, 3, 3.5, 4).

A range of flange, shaft and coupling configurations is also available, including cast-iron versions in groups 1, 2 and 3. Maximum operating pressure ranges, on average, from 230 bar in the aluminium models to 280 bar for the cast-iron versions. All products can also be supplied with Viton seals, and special versions are available for conditions between -40° to +120°C. The monodirectional and bidirectional motors are divided into three groups (1, 2, 3) covering a range of displacements from 2.8 to 87cc/rev. The maximum working pressures for the motors are similar to those allowed for the pumps and they can deliver torque up to 250Nm and power up to 60kW. The production of high-quality components is assured by extensive experience in the field and continuous development of design, testing and research for specific materials and sophisticated production techniques. **iVT**

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