

# Keep your motor running

## HIGH OVERPRESSURE AND STRONG FRICTION CAN CAUSE LEAKAGE FROM GEAR MOTORS BUT A SPECIAL SEAL SYSTEM IS AN EFFECTIVE BARRIER EVEN IN LARGE HYDRAULIC MOTORS



ABOVE: Ghedini auger drive units

RIGHT: Ghedini bush cutter

BELOW: Ghedini vibrating plates



In response to customer demand, construction and agricultural machinery manufacturers produce a wide range of tools and accessories for machines equipped with hydraulic systems. These accessories are essential for the more flexible and productive use of excavators, mini excavators, skid-steer loaders, wheeled loaders, backhoe loaders and cranes.

An example of this is provided by Ghedini ing Fabio, an Italian company founded in 1984 and specialising in the production of hydraulic equipment for cranes and earthmoving machinery. The quality of its products is recognised in Italy and abroad, where its auger drive units – with a wide range of auger bits and extensions suitable for every kind of soil and its bush cutters – are well known. Some of its other products include submersible pumps, weed-cutting buckets and vibrating plates.

The use of hydraulic motors in these applications has many advantages. Mounting versatility is one of them – as the location of the pump is not tied to the PTO or the engine driveshaft, it can be mounted in a variety of locations to suit the application requirements. Performance can also be customised, because it is dependent on the supply of hydraulic oil to the motor rather than intrinsically tied to the engine speed. A hydraulically driven pump can produce higher pressures than PTO or belt-driven pumps, and they can also hold constant pressure at varying engine speeds on closed-centre hydraulic systems.

Maintenance is easier too, because there are no belts to align or break on a hydraulically driven pump. Separate pump and hydraulic motor shafts simplify repair and replacement. Two main pump bearings support shaft loads.

This equipment exploits the hydraulic circuit of the machine to which the components are connected. Consequently all hydraulic components should be very



reliable in all conditions of operation and should also be able to withstand mishandling by the operator.

Responding to customer demand, Marzocchi Pompe has expanded its range of gear motors by mounting a special system of radial sealing at the shaft. This can bear enormous internal overpressures with no damage. At the moment they are available in families 2 and 3, covering a range of displacements between 4.5-87cm<sup>3</sup>/rev (2.75-53.1in<sup>3</sup>/rev).

These products can also be supplied with anti-cavitation valves, for maximum pressure with internal or external drainage.

This radial sealing is particularly useful in single-direction hydraulic motors when the technician or operator expects that, under specific circumstances, high overpressures will be generated at the motor output. In bi-directional motors, the area adjacent to the seal ring of the driveshaft is maintained at atmospheric pressure by the drainage circuit. In single-direction motors, this area is directly connected to the output, therefore a potential overpressure directly impacts on the seal ring, causing the lip to turn over, or the ring to be expelled from its seat with a consequent leakage of fluid.

The motors can be supplied with an internal drainage circuit. In this case, the hydraulic motor always drains inside with a lower pressure. The combination of this product with a high-performance sealing ring substantially increases its reliability.

### Defining the limits

Validation tests have been conducted in Marzocchi's R&D laboratories to verify the limits of the sealing system. These revealed that the system is able to work on a continuous basis at a constant pressure of 30 bar (430psi) with no spilling of fluid and no wear of the ring and the shaft. Tests performed at higher pressures also demonstrated the possibility of its functioning for short periods of time (ie several minutes) with overpressures up to 140 bar (2,030psi). In case of pressure peaks, for example, caused by errors of manoeuvring or an incorrect timing of the valves of the hydraulic circuit, or in static conditions, with the shaft still, this sealing system can bear overpressures higher than 210 bar (3,050psi) without any loss of fluid or deformation of the components.

The robustness and reliability of this product make it particularly suitable for

applications that work as an auxiliary tool of other machines that do not exactly know the circuit characteristics.

The use of these radial seals in single-direction motors enables these parts to be safely employed in heavy-duty applications, effectively protecting the sealing system on the shaft and preventing any fluid leakage. The production of high-quality components is assured through a long-lasting experience with these types of products and the continuous development of design and testing, research into specific materials and sophisticated production techniques.

### Child of the 60s

Marzocchi Pompe was established in 1961 on the outskirts of Bologna, Italy. As a specialist in the field of hydraulic pumps and motors, it has increased its product range to reach its present position as one of the most important Italian external gear pumps and motor manufacturers.

Due to the trust and the respect garnered over a long period of time, the company is considered a highly reliable partner on the market, able to provide customers with specific know-how, high-quality products and excellent service for all hydraulic applications.

The current Marzocchi production ranges from 0.19-200.3cm<sup>3</sup>/rev (0.0104-12.223in<sup>3</sup>/rev) and is divided into eight groups according to the gear size (0.25, 0.5, 1P, 1, 2, 3, 3.5, 4). Within each group, the different displacements are obtained by changing the gear's width. A wide range of flange, shaft and coupling configurations is also available.

These components can also be manufactured according to the customer's requirements. Cast iron versions can be found in groups 1, 2 and 3. The maximum operating pressure depends on pump displacement and type: it ranges, on average, from 230 bar (3,300psi) in the

aluminium models to 280 bar (4,100psi) for the cast iron versions.

All products can also be supplied with Viton seals, and special versions are available for temperatures between -40 to +120°C (-40 to +248°F). The mono-directional and bi-directional motors are divided into three families (1,2,3) covering a range of displacements between 2.8-87cm<sup>3</sup>/rev (0.17/53.1in<sup>3</sup>/rev). The maximum working pressures for the motors are similar to those established for the pumps and they can deliver torques up to 250Nm and power up to 60kW. **IVT**

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ABOVE: Marzocchi GHM3-50-EX gear motor

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