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A1VO axial piston variable pump

Compact size – high efficiency

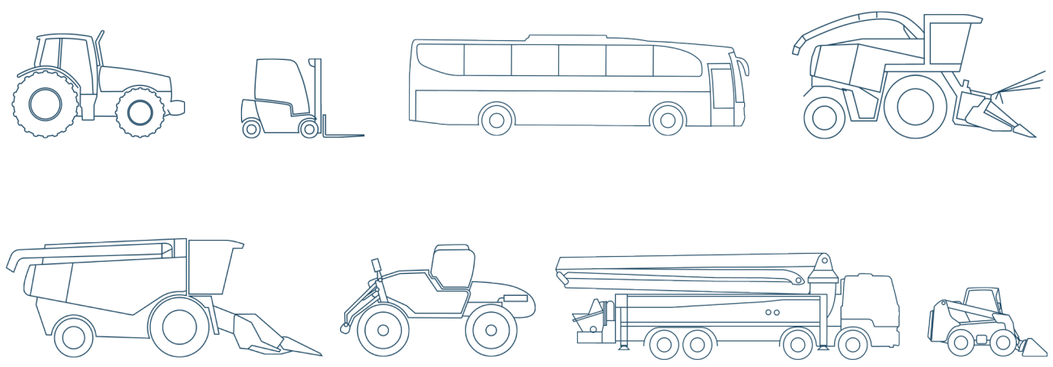
The A1VO axial piston variable pump comes in three sizes: 18, 28 and 35 cm^3. It is available with different control options for use in load-sensing applications as well as auxiliary functions such as fan drive systems.

Lower exhaust emissions and better fuel economy are right at the heart of all requirement lists for both manufacturers and owners of mobile equipment. Hydraulic systems with demand-controlled power generation based on variable pumps have made significant strides in efficiency. In the past, variable pumps were only applied to machines in the upper power ranges, while applications in the lower power ranges had to make do with energy-intensive open-center systems using fixed pumps because of cost reasons. With the introduction of the A1VO axial piston variable pump, Bosch Rexroth closes the price gap to gear pumps of similar compact size.

CUSTOMER BENEFITS

- Significant fuel savings compared with fixed displacement system
- Optimized efficiency: Same power with less fuel consumption
- Compact design with controller and connections integrated into port plate
- Increased life expectancy
- High flexibility: Pumps can be combined using interchangeable through-drive adapter
- Maximum flow of 105 l/min thanks to high self-suction speeds

APPLICATIONS



FUNCTION AND BENEFITS

Compact, flexible and reliable design

Manufacturers can easily switch to the Rexroth A1VO variable pump as its performance data and compact dimensions are similar to that of a fixed displacement gear pump. The efficiency rate of the A1VO is nearly 90 percent and its service life is comparable with the widely applied Rexroth A10VO and A10VNO pumps for the higher power ranges. A universal through-drive, with an easily inter-changeable adapter, makes it simple to combine the A1VO with other pumps. The compact design of the A1VO is achieved by using a seven piston rotary group and by integrating all ports and the controller into the port plate. This further increases the leak tightness, as there are no high-pressure connections to the housing.

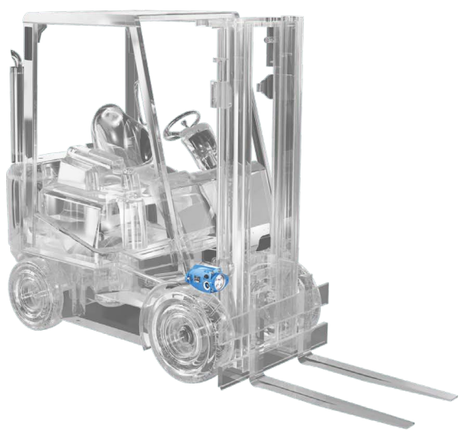
Controls for multiple applications

The range of available control types offers the choice between DR control, load-sensing control, and ED control. This makes the A1VO an economically attractive alternative for many hydraulic systems that have been equipped with fixed pumps until now – whether it be the implement hydraulics in smaller machines or auxiliary functions in larger applications such as the fan drive or the steering unit.

A1VO axial piston variable pump
Compact size – high efficiency

TECHNICAL DATA

Axial piston variable pump A1VO series 10	
Sizes:	18 cm^3 to 35 cm^3
Normal pressure:	250 bar
Maximum pressure:	280 bar
Speed:	3300 rpm to 3000 rpm
Flange:	SAE-A, SAE-B
Data sheet:	RE 92650
Hydraulic ports:	Available with metric or inch threads
Through-drives:	Universal through-drive makes it simple to change the through-drive type without changing the part number
Control types:	DR control Load-Sensing control ED control



Example of an A1VO in a four tons forklift truck

Example of an A1VO in a 90 hp/66 kW tractor

Savings through LS-implement hydraulics

Load-sensing technology for the implement hydraulics is a key to greater energy efficiency. Consequently, the A1VO has already been successfully applied in small tractors. In comprehensive simulations using OEM engine map data of a commercially available 90-hp-diesel (66 kW), engineers from Bosch Rexroth have calculated consumption savings of between 10 and nearly 16 percent per operating hour. The variable pump achieves the greatest savings in diesel fuel consumption in partial-load operation such as holding the plow during transportation or working with the front loader. Projected onto the usual tractor life expectancy of 6,000 hours and assuming a typical load cycle distribution, overall savings of around 10,000 liters of diesel fuel can be expected. Similar calculations have been made for a typical forklift application. Based on the Transport&Opslag-cycle, a de-facto standard load-profile for forklift trucks, the expected fuel savings amount to 0.7 liters per hour. This translates into approximately 7,000 liters of fuel savings during the 10,000 hours of typical machine life of a forklift truck.

Savings through variable fan drives

New diesel engines that comply with the ever stricter emissions regulations require a more complex temperature management. Often, these requirements exceed the technical limitations of non-variable systems. The Rexroth A1VO provides a cost-effective opportunity for switching to a variable fan drive system that supplies exactly the amount of cooling required.
When comparing a variable A1VO fan drive with a conventional belt drive, the savings potential becomes evident. Based on the typical fan drive duty-cycle in a combine harvester, as provided by a major manufacturer, the calculations show a fuel saving of 3.9 liters per hour which results in over 29,000 liters during the average life time of 7,500 hours.

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