

CASAPPA

Saving energy without compromise

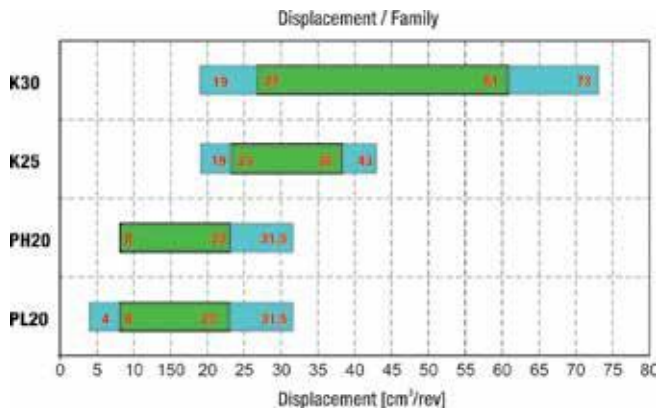
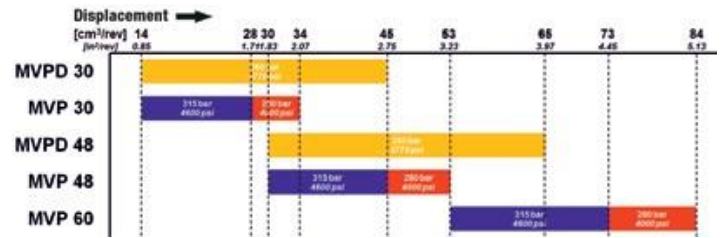
For earth-moving equipment, too, reducing pollution and saving energy has become essential. The need for a greener world is vital for future generations. Casappa designs and builds electro-hydraulic components that can be part of the innovation project aimed at cutting consumption and drastically reducing harmful emissions into the environment while safeguarding vehicle performance.

Due to the increasing attention towards atmospheric pollutants, the new regulations related to exhaust emissions are becoming more and more pressing.

Similar to developments in the automotive industry, non-road regulations now require significant reductions of NOx + HC and PM.

In 2019-2020 the next stage of emissions regulations will go into effect (Stage V), which, compared to Stage I, clearly indicates the importance of improvement measures.





Power density oriented solutions from Casappa

In this article we compare the values and the respective percentage reductions of NO_x + HC (nitrogen oxides and unburnt hydrocarbons) and PM (particulate matter), which are all atmospheric pollutants. Stage V regulations will stipulate values of 0.59 and 0.015 g/kWh, respectively; Stage I values, on the other hand, were 10.5 and 0.7 g/kWh, respectively. This equates to a reduction of 94.38% and 97.86%, respectively.

To reach these targets, combustion engine manufacturers have implemented highly innovative technologies, such as: High pressure common rail system; (C) EGR (Cooled exhaust gas recirculation); DPF (diesel particulate filter); SCR (selective catalytic reduction); DOC (diesel oxidation catalyst); and POC (particulate oxidation catalyst).

New technological conditions

In short, our quality of life also depends on the clean air that we breathe. Reducing emissions has become imperative, but is needed without compromising vehicle performance.

So what technological solutions can we adopt? How do we do it? One solution is the introduction of latest generation electro-hydraulic components on earth-moving machinery, such as concrete mixers, cranes, tractors, trucks, and drills, just to name a few types of vehicles. Not only do these components contribute to improve the performance and efficiency of a vehicle, but they are designed to ensure

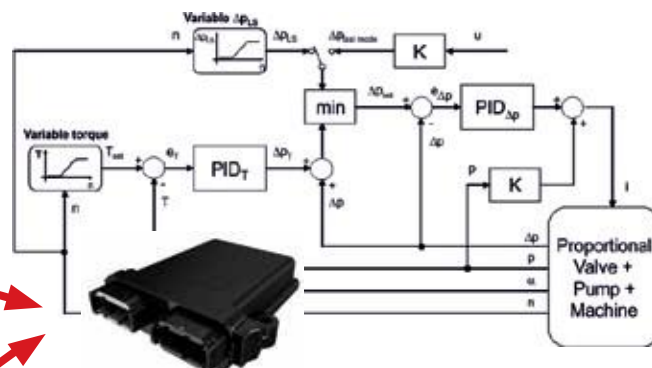
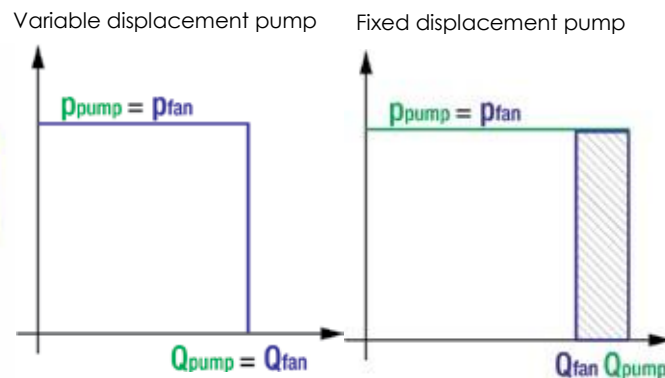
application sustainability and environmental protection.

The introduction of these technologies has led to a change in some of the fundamental characteristics of the equipment. For example, new diesel engines generate more heat; therefore, managing the temperature of the fluids becomes a more delicate operation. Moreover, the necessary additional emission subsystems cause some unique space claim challenges.

Being directly linked to fuel consumption, the trend of CO₂ emissions reduction highlights the importance of solutions that increasingly focus on fuel economy.



Fan drive solutions
for energy savings



Interaction between the information received
by the circuit and the Casappa system (MVP
pump and CED control unit).

Within this framework, machinery manufacturers are required to develop solutions that are environmentally friendly and efficient (reduced power consumption), with high-performance and high operator comfort.

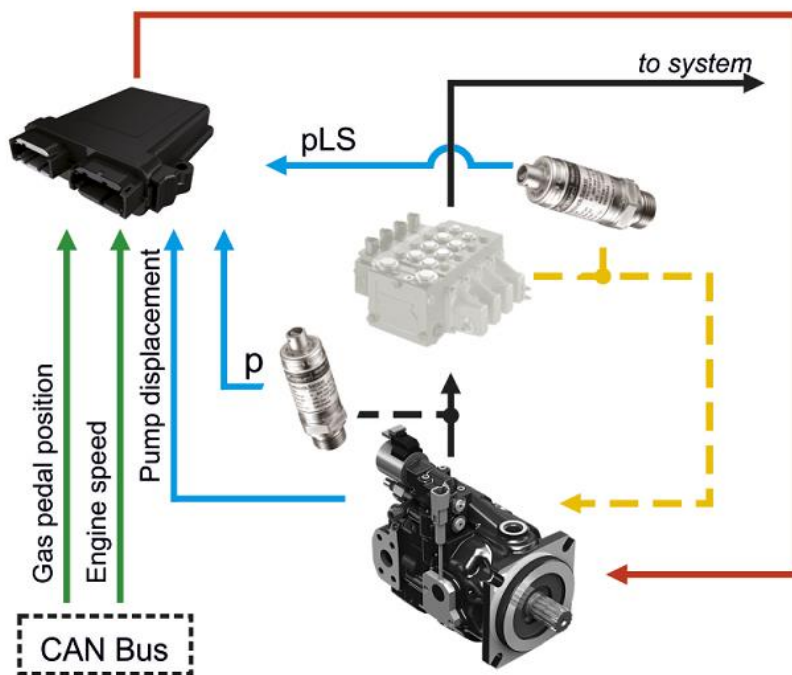
Hydraulic systems can support these changes thanks to their ability to handle considerable power using components of reduced size and weight compared to other technologies, thus guaranteeing high efficiency with the possibility to optimize hydraulic circuits using various available technologies.

Modern technological solutions and these new standards propel manufacturers toward a major re-design in engineering: from intelligent hydraulic pumps and motors to control by means of control units and sensors for accurate data management.

Fan drive systems are a good example, where considerable energy savings can be achieved depending on the solution implemented, for example: fixed displacement pump and motor with relief valve with fixed setting or with electro-proportional control; or solutions with variable displacement pump with electro-proportional controls. Using dedicated control units, multiple fan motors can be managed in parallel, providing the flexibility to govern multiple heat exchangers independently, avoiding under/over-cooling.

Casappa Smart Power System

‘Zero energy waste’ is the motto that accompanies the technological changes mentioned above: from the hydraulic point of view, the highest performing solution is the use of electronically controlled variable displacement piston pumps.



Casappa's Smart Power System

This ensures the necessary flow rate based on the sensors' feedback, offering great flexibility on the types of control without foregoing compactness. In parallel with attention to fuel consumption, there is still the need to obtain high performance. In line with these concepts, Casappa has combined the different control solutions developed to create the 'Casappa Smart Power System', which provides several benefits: anti-stall control, EVLS (Electronic load sensing control), torque e-control, working e-modes, recovery function, power boost, and auto-idle.

This solution is the result of collaborations with telehandler and mini-excavator manufacturers in which the objective was to guarantee the user a simple control system for switching to the desired working mode, obtaining considerable energy savings (eco mode) and having the possibility for greater torque available when necessary (power mode).