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Variable Flow Gear Pump

An inexpensive, electronically controlled variable flow external gear pump modifies only one component to increase energy efficiency and performance in various hydraulic applications.

Fixed displacement in external gear pumps are limited to having only one set flow rate. Most solutions to augment external gear pumps involve making drastic modifications to the pump's design. The more complicated designs involve moving the gears, which are the most loaded parts of the pump. Including more parts, introduces new sets of challenges that are not required to develop a more efficient pump. Large-scale applications are more difficult to perform with the more complicated designs. There is need for a simpler design to resolve the fixed displacement limitations of external gear pumps.

Researchers at Purdue University have developed an electronically controlled variable flow external gear pump. Using a variable timing principle, electronic displacement control is realized in this novel pump design. Only one component of the gear pump is modified. This makes the design inexpensive and easier to implement while retaining all the advantages of a traditional gear pump. The actuation forces are low, needing lower energy for regulation. This variable displacement pump will help hydraulic system designers/engineers of fluid power systems who want to increase energy efficiency and performance while avoiding throttling losses and lowering energy waste and/or fuel consumption without resorting to system oversizing. This technology could be used in various hydraulic applications such as in engines and conveyor systems.

Advantages:

-Inexpensive

-Retains advantages of traditional gear pump

-Energy efficient

-Ease of implementation

Technology ID

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Category

Energy & Power Systems/Power Generation

Robotics & Automation/Automation & Control

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Potential Applications:

-Various hydraulic applications

-Engines

-Conveyor systems

TRL: 5

Intellectual Property:

Provisional-Patent, 2017-06-02, United States | Utility Patent, 2018-05-30, United States

Keywords: Electronically controlled variable flow external gear pump, variable timing principle, electronic displacement control, variable displacement pump, external gear pump, energy efficient hydraulic system, fluid power systems, flow control, throttling losses, gear pump