

Success Story: Digga (Australia)

Market Served
Construction Equipment

The I-Drive gets its unique capabilities from the combination of four Eaton 6000 Series hydraulic motors with a SICV-based manifold to create a 'bullet-proof' design that is virtually immune to the kind of operator errors that can damage power heads less robust than the I-Drive.

Digga's Award-Winning I-Drive Depends On Eaton Motors And Valves

Location:

Australia

Segment:

Earthmoving Attachments

Challenge:

Design a "bullet-proof" drilling power head for excavators which requires only two hydraulic lines, and no case drain.

Solution:

The Digga I-Drive is designed around multiple 6000 Series disc valve motors resulting in a very compact unit with a built-in margin of safety that is 300 percent more productive than competitive systems.

Results:

The Digga I-Drive was recognized with an Australian Design Award as one of the year's "best examples of Australian Design and Innovation, and the high quality of design expertise available to manufacturers in Australia and Internationally."

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Background

A power head is attached to the boom of an excavator to perform tasks including foundation drilling, screw anchoring, and core barreling. Existing designs require multiple hose connections and case drains that make them difficult to attach and set-up in the field. They also depend on the operator to modulate the excavator's hydraulic output to keep it within the typical 250 lpm capacity common in these units.

Challenges

Digga set out to design a compact, high-capacity power head that was significantly more tolerant of operator errors, while providing substantially enhanced productivity. Digga engineers also had to devise a way to control the rapid decompression of oil that is characteristic of the screw anchoring process.

Solution

Digga worked closely with Eaton's Hydraulics Group and experts at Eaton's Jinning, China, plant to "tweak" the 6000 Series motors selected to power the I-Drive. Each I-Drive uses multiple 6000 Series disc valve motors rather than the more traditional radial piston type.

The compact, geroler-based 6000 Series motors use rolls to seal the space between the rotating "star" and stationary gear ring. This makes them inherently more efficient than gerotor designs, because of both better sealing and the bearing effect of the rollers.

A rotary disc is used to direct fluid into the void between the star and ring, causing the star to rotate and giving the motor its name. This design accommodates high flow rates and high pressures while providing excellent



The Award-Winning Digga I-Drive power head uses four Eaton 6000 Series motors and an Eaton SICV-based manifold. The compact I-Drive is more than 300-percent more productive than competitive systems.

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starting and low-speed torque characteristics.

Digga also designed a sophisticated manifold using Eaton screw-in cartridge valves (SICV), and a unique flow-reversal bypass valve, dubbed a "swoosh" valve by Digga engineers to control screw anchoring decompression.

The SICV-based manifold controls the flow to the four motors which allows the operator to selectively engage and disengage them to provide variable speed and torque capabilities. The largest, 1,000 lpm, I-Drive has three available operating modes, high speed/low torque, mid-speed/mid torque, and low speed/high torque. Smaller units rated at 375, 500, and 750 lpm are also available in either single/dual or three-speed configurations.

Results

Digga designed the I-Drive to survive in the rugged environment of a construction site. It requires no complex hose, valve, or filtration arrangements, no third hydraulic line, and no case drain. In service, the design has been virtually "bullet-proof" and immune to operator errors that can damage less robust power heads.

The I-Drive can utilize the full hydraulic flow capabilities of an excavator producing 1000

lpm to deliver a maximum torque of 300,000 Nm. That's actually more hydraulic power than most excavators can provide, so the I-Drive has a built-in margin of safety while delivering up to 300 percent greater productivity than currently available systems.

Digga plans to offer an extended warranty on the I-Drive and certain other products. They credit Eaton's global footprint and reputation for quality products and comprehensive support as a major advantage for Digga wherever it competes.

The Digga I-Drive was recognized with an "Australian Design Award" in 2009. The Australian Design Awards is a division of Standards Australia whose mission is to present to the Australian public and the world the best examples of Australian Design and Innovation, and the high quality of design expertise available to manufacturers in Australia and Internationally."

The secret to the I-Drive's capabilities is the combination of four Eaton 6000 Series hydraulic motors, and the SICV-based manifold.



Attached to the boom of an excavator, the I-Drive is used for tasks including core barreling, screw anchoring, and foundation drilling. The compact I-Drive allows these operations to be performed in confined areas and close to existing structures.

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