

(12) PATENT APPLICATION PUBLICATION

(21) Application No.202321087180 A

(19) INDIA

(22) Date of filing of Application :20/12/2023

(43) Publication Date : 19/01/2024

(54) Title of the invention : SMART HYDRAULIC PUMP WITH VARIABLE DISPLACEMENT FOR ENERGY-EFFICIENT FLUID POWER

(51) International classification :G06Q0010060000, H04W0004800000, F15B0013080000, H04W0040100000, H04W0004380000
(86) International Application No :NA
Filing Date :NA
(87) International Publication No : NA
(61) Patent of Addition to Application Number :NA
Filing Date :NA
(62) Divisional to Application Number :NA
Filing Date :NA

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(57) Abstract :

The proposed invention introduces the Smart Hydraulic Pump with Variable Displacement for Energy-Efficient Fluid Power, a groundbreaking advancement in fluid power engineering. This innovative system comprises a hydraulic pump unit, intelligent control systems, and sensors, allowing it to dynamically adjust its displacement in real-time based on the hydraulic system's demand. This adaptive approach optimizes energy efficiency, reducing waste and operational costs. Furthermore, the system offers extended component life and reduced maintenance requirements. With connectivity features, it can communicate with other components and control systems for predictive maintenance and remote monitoring. This invention holds significant promise for various industries, including manufacturing, construction, agriculture, and transportation, where hydraulic systems are vital. It aligns with sustainability goals by minimizing energy consumption and environmental impact, making it a transformative development in fluid power engineering.

No. of Pages : 21 No. of Claims : 10