ME-202

MACHING DRAWING
PROJECT REPORT

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1.TITLE:

SOLID WORKS MODEL OF A OIL PISTON PUMP.

2.OBJECTIVE:

To enhance our experience in using solid works expand our understanding in various mechanical engineering by applying it to various project scenarios.

3.INTRODUCTION:

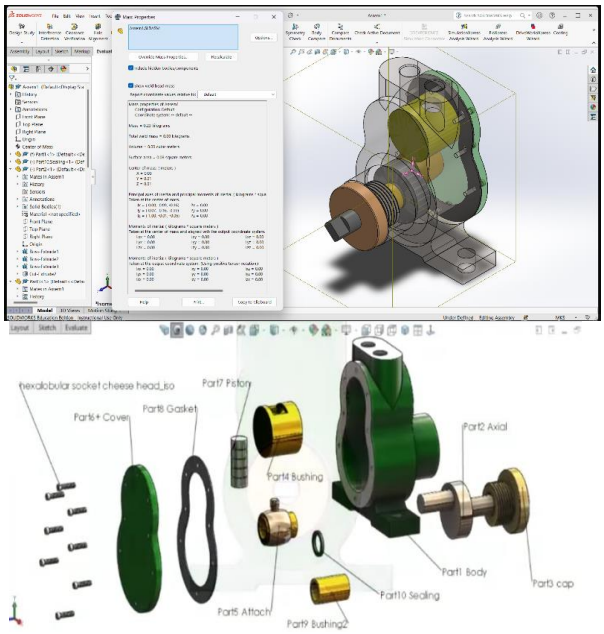
The oil/piston pump is a mechanical device that transfers fluids, predominantly hydraulic oil, using the reciprocating motion of pistons within a cylinder. This pump operates on positive displacement principles, ensuring a controlled and consistent fluid flow. As the pistons move back and forth, they alternately draw in and expel fluid, allowing for precise control of flow rates and pressures. Widely applied in industries like manufacturing and automotive, oil/piston pumps play a crucial role in hydraulic systems, facilitating the efficient transfer of fluid for various industrial processes.

4.DESCRIPTION OF THE PROJECT:

A MODEL OF SCALED VERSION OF OIL/PISTON PUMP, MADE USING SOLID WORKS.

Model Overview,

TOTAL NO OF PARTS: 10TOTAL NO OF MOVING PARTS: 6NO OF ASSEMBLIES AND DRAWINGS: 1 & 1



All dimensions are in mm/g/s/ISO - Based on true dimensioning.

5. WORKING PRINCIPLES:

The oil/piston pump operates on the principle of positive displacement, using reciprocating pistons to transfer energy from the motor to fluid. As the pistons move back and forth within the cylinder, they create alternating suction and discharge phases. During suction, fluid is drawn into the cylinder, and during discharge, it is expelled. This precise cyclic motion ensures a consistent and controlled flow of fluid, making oil/piston pumps effective for transferring energy from the motor to hydraulic systems.

6. REAL-LIFE APPLICATIONS:

Oil/piston pumps are widely used in automotive power steering systems, manufacturing machinery (hydraulic presses, injection molding machines), construction equipment (excavators, cranes), and agriculture (tractors, harvesting equipment) for efficient hydraulic force transmission and precise fluid control.

7. MATERIAL CHOICES:

COMPONENT	MATERIAL	REASON
Cylinder Body	**Stainless Steel, Cast Iron, Aluminum Alloys**	**Durability, corrosion resistance, and strength to withstand high pressure/wear**
Piston	**Hardened Steel, Aluminum Alloys, Ceramic**	**High wear resistance for constant movement and sealing integrity**
Seals and O-Rings	**Polyurethane, Rubber, Teflon**	**Tight seal, fluid leakage prevention, resilience, chemical resistance**

Rod	**High-Strength Steel, Alloys**	**Transmit force from piston to external components, high-strength for durability**
Gland	**Cast Iron, Steel**	**Withstand pressure, maintain seal integrity, prevent fluid leakage**
Head or Cap	**Stainless Steel, Cast Iron**	**Enclose cylinder, provide support, maintain structural integrity**
Bearings	**Bronze, Brass, Polymer-Based Materials**	**Reduce friction, ensure smooth operation, low friction, wear resistance**
Wear Rings	**Bronze, Self-Lubricating Alloys**	**Protect cylinder/piston from abrasion, self-lubricating, wear resistance**

10. CONCLUSION:

This project helped me get better at using SolidWorks and understand how piston pumps work and the crucial role of materials in designing. I can now turn drawings into 3D models more easily. Looking ahead, I'm excited to develop these skills for more interesting engineering projects.

11. REFERENCES:

https://youtu.be/qgDTMfny4rM?si=5PkXZGtOUj45OVK3;https://openai.com/