



TX1128148-UN: Hydrostatic Pump (neutral position)

LEGEND:

- 1 - Electric Displacement Control (EDC) (2 used)
- 2 - Swash Plate Feedback Pin (2 used)
- 3 - Slipper (18 used)
- 4 - Rear Shaft Bearing
- 5 - Rear Shaft
- 6 - Swash Plate Bearing (2 used)
- 7 - Servo Piston (2 used)
- 8 - Swash Plate (2 used)
- 9 - Piston (18 used)
- 10 - Cylinder Block (2 used)
- 11 - Center Shaft Bearing (2 used)
- 12 - Valve Plate (2 used)
- 13 - Shaft Coupling
- 14 - Front Shaft Bearing
- 15 - Shaft Seal
- 16 - Front Shaft

Design

Two tandem-mounted, variable-displacement, axial piston pumps convert input torque to hydraulic power. Tandem design powers two independent drive trains for dual-path propel applications. Two-piece input shaft transmits rotational force to cylinder block. A splined shaft coupling (13) connects front and rear shafts (16 and 5). Shafts are supported by front, center, and rear shaft bearings (14, 11, and 4). Splines connect each shaft to a cylinder block (10). Shaft seal (15) prevents leakage where shaft exits pump housing.

Spinning cylinder blocks (10) each contain nine reciprocating pistons (9). Each piston has a brass slipper (3) connected at one end by a ball joint. Block spring, ball guide, and slipper retainer hold slippers to swash plate (8). Reciprocating movement of pistons occurs as slippers slide against inclined swash plate during rotation.

One half of each cylinder block is connected to left forward hydrostatic motor port (131) or right reverse hydrostatic motor port (134) and other half to left reverse hydrostatic motor port (132) or right forward hydrostatic

motor port (133), through valve plates (12). Front and rear sections have independent porting in center section. As each piston cycles in and out of its bore, oil is drawn from one port and displaced to the other, thereby providing hydraulic power to system. A small amount of oil is allowed to flow from cylinder block/valve plate and slipper/swash plate interfaces for lubrication and cooling. Case drain ports return oil through the return manifold and then to hydraulic oil reservoir. An external charge pump (not shown) provides clean, cool oil to make up this lubricating flow and to maintain minimum loop pressure.

Angle of each swash plate controls the volume and direction of oil displaced into system. Servo pistons (7) control angle of swash plates. Each hydrostatic pump solenoid valve, by varying pressure at servo pistons, controls each piston's position. An electric signal to pump solenoid transmits command from operator to pump. Mechanical feedback of swash plate position to control through swash plate feedback pins (2) allows for very precise displacement control and increases overall system stability.

Basic Closed-Loop

Hydraulic lines connect main ports of pump to main ports of motor. Oil flows in either direction from pump to motor and back. Either hydraulic line can be under high pressure. In pumping mode position, swash plate determines which line is high pressure as well as direction of oil flow.

Case Drain

Hydrostatic pump and motor require case drain lines to remove hot oil from system. Hydrostatic pump and motor drain from topmost port to ensure cases remain full of oil. Case drain oil flows from hydrostatic pump and motor through return manifold to hydraulic oil reservoir.