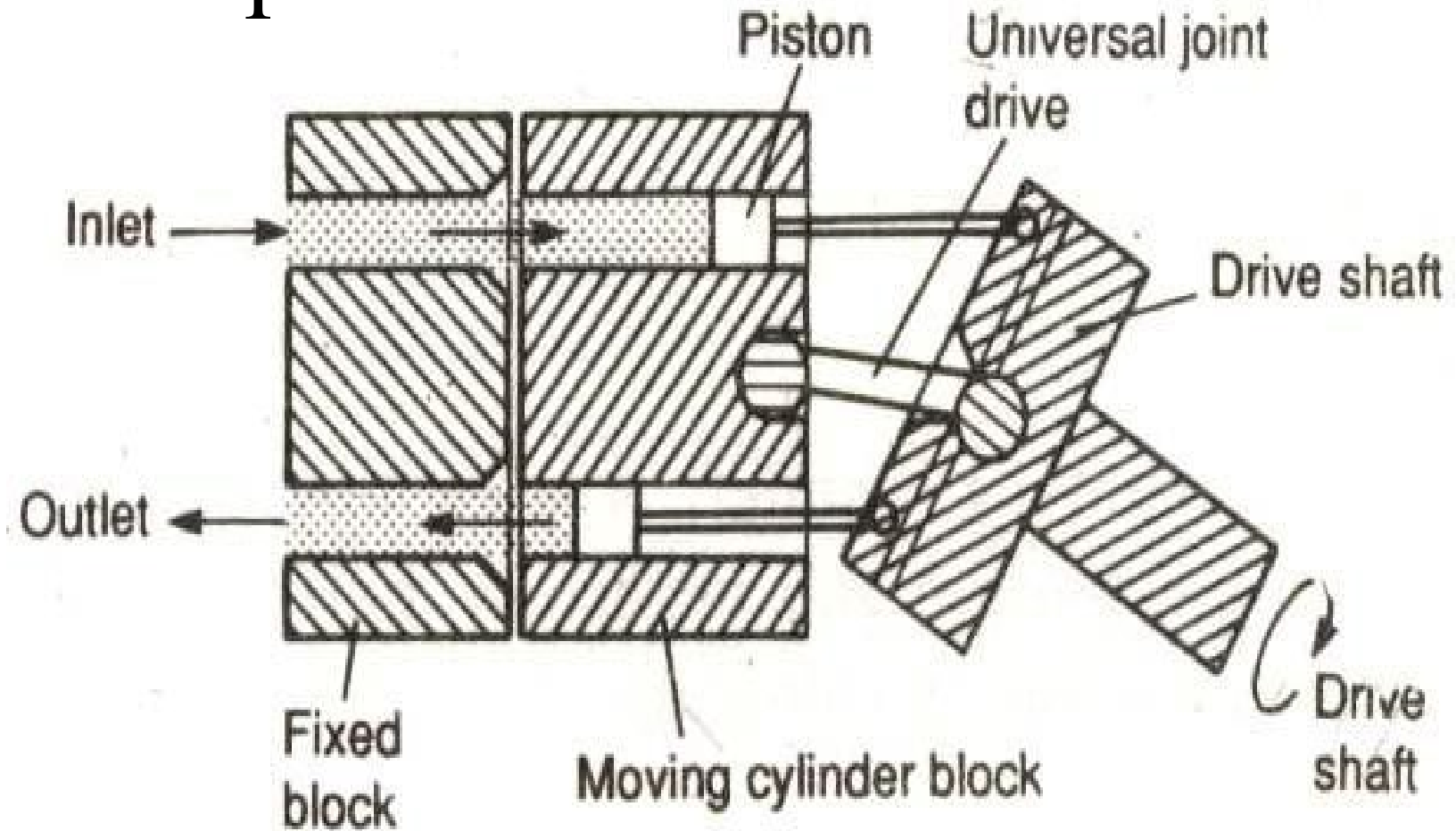




# PISTON PUMPS

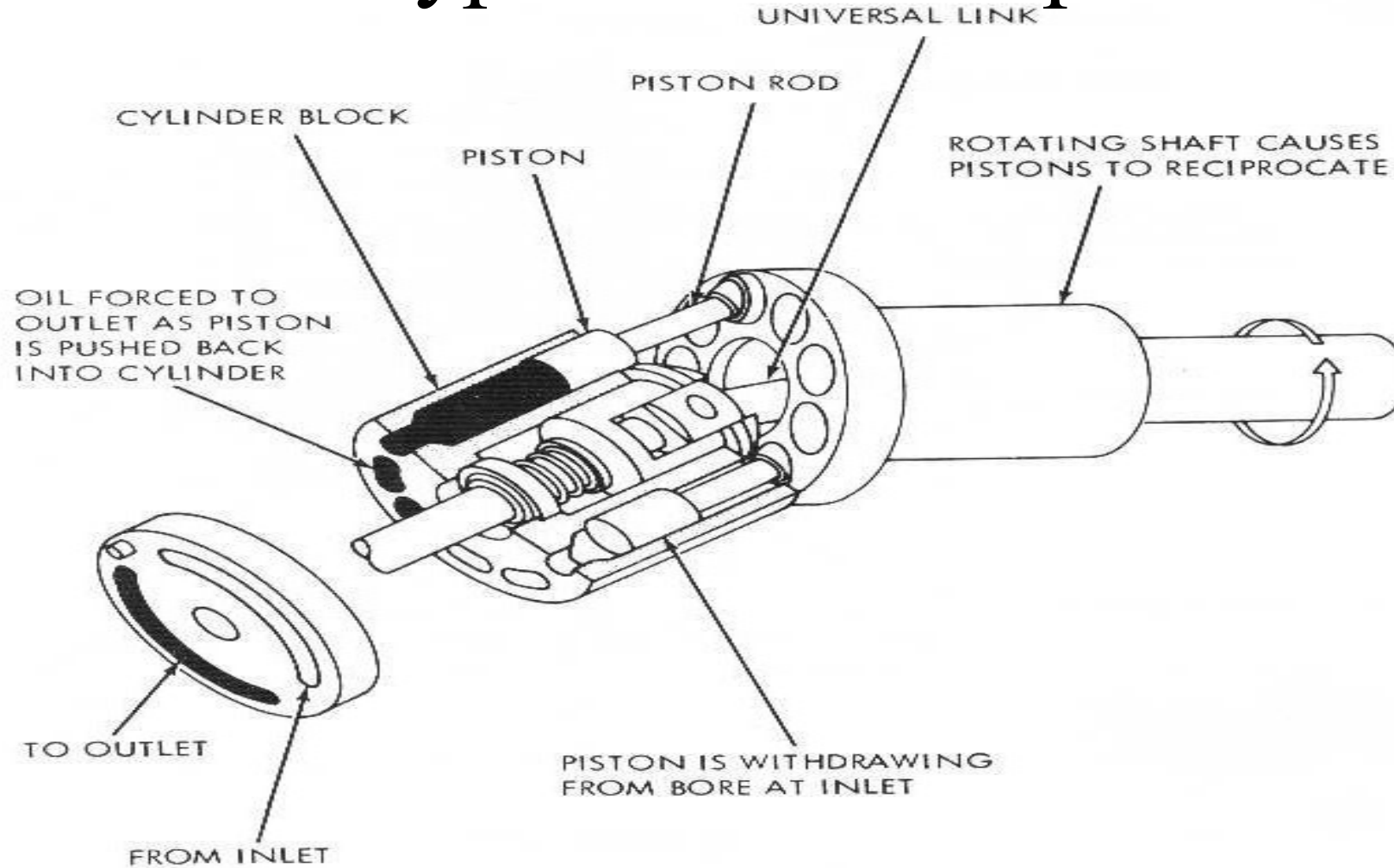


## Axial Piston Pump



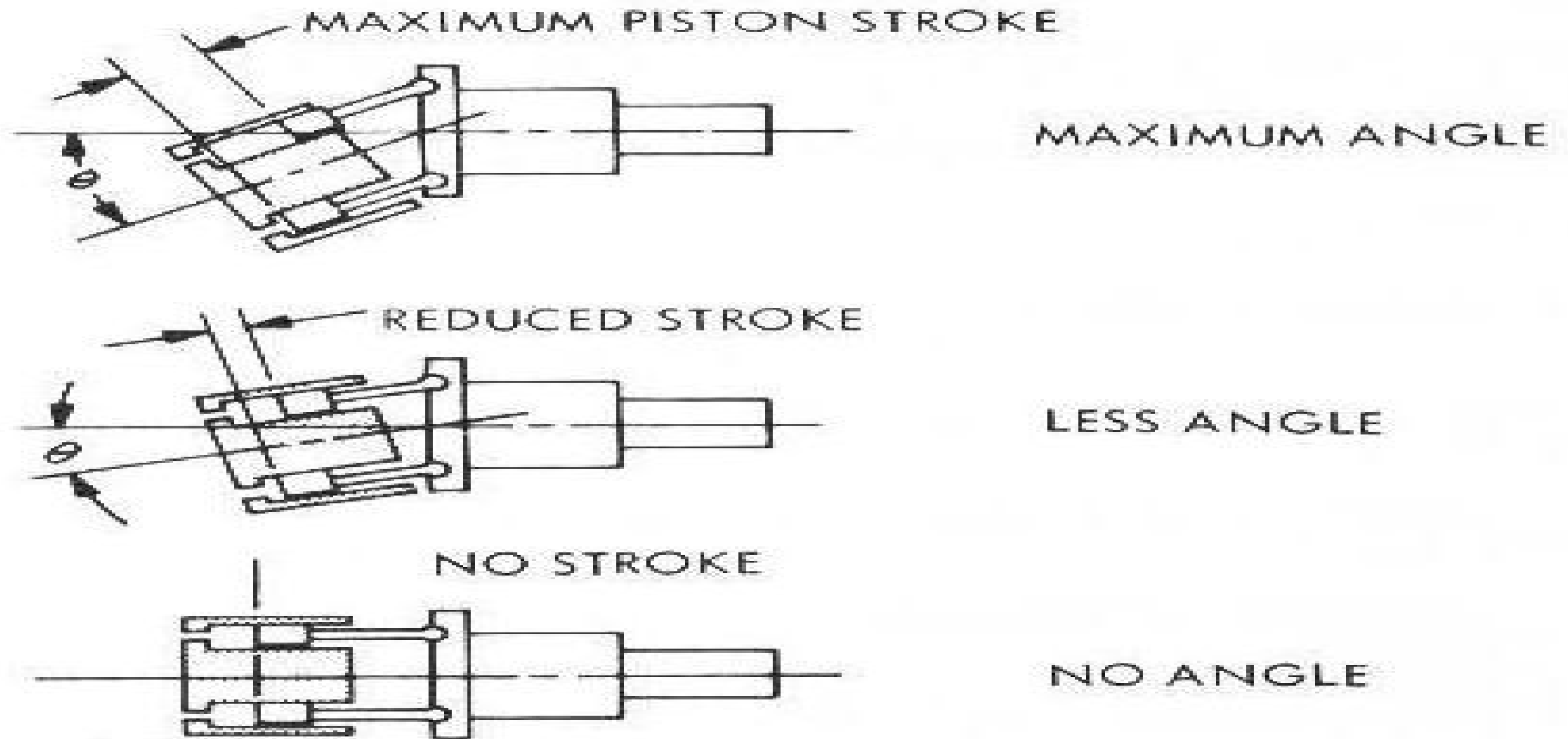


# Bent Axis Type Piston Pump



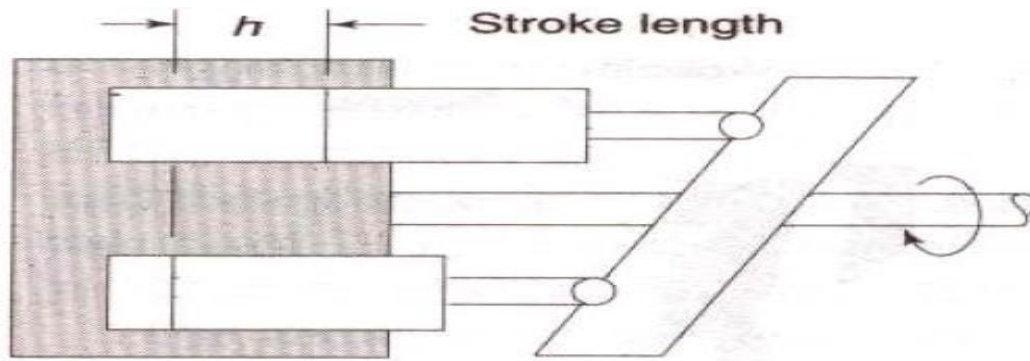


# Bent Axis Type Piston Pump

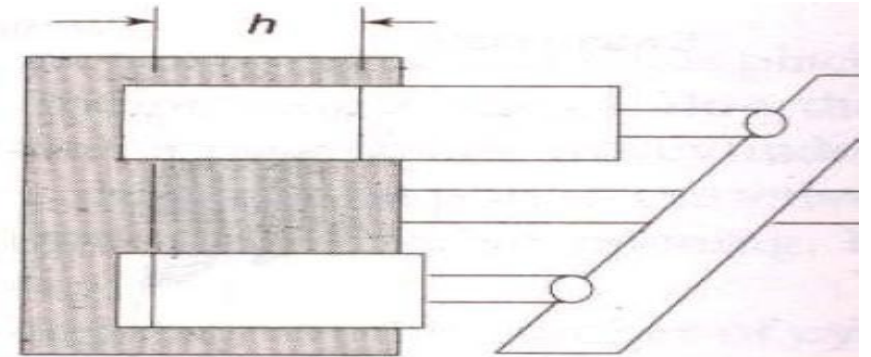




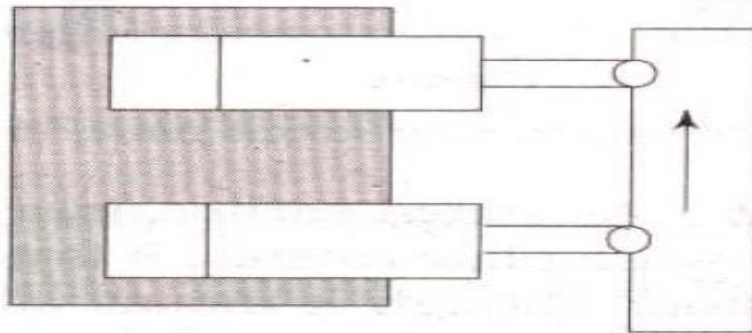
# Swash Plate Type Piston Pump



(a) Maximum swash plate angle  $\theta_{max}$



(b) Decreased swash plate



(c) Zero swash plate angle (no displacement)



- Swash plate rotates with drive shaft while the cylinder block is kept fixed
- Swash plate in such pumps are called as wobble plate
- Shoe plate is prevented from rotation
- Swash plate rotating on surface of the shoe plate produces to & fro motion of piston
- The angle of the swash plate is controlled by the displacement piston.
- The swash plate is at its maximum angle which corresponds to maximum displacement and maximum flow.

### **Advantages of Piston Pumps**

- high pressure, high speed, large power-driven pump
- Efficiency, volumetric efficiency is 95% of the total efficiency of about 90%
- Long life

### **Dis- Advantages**

The mechanical parts are prone to wear, so the maintenance costs can be high.



# Summary

- **GEAR PUMPS**

- ✓ Least expensive
- ✓ Lowest level of performance
- ✓ Efficiency is rapidly reduced by wear
- ✓ High maintenance cost
- ✓ Simple in design
- ✓ Widely used in fluid power industry

- **VANE PUMPS**

- ✓ Efficiency & cost fall between Gear and Piston pumps
- ✓ Have good efficiencies
- ✓ Last for longer time
- ✓ Leakage losses across the faces of rotor & between the bronze wear plates and pressure ring



# Summary

- **PISTON PUMPS**

- Most expensive
- Provides highest level of overall performance
- Can be driven at high speeds (up to 5000 rpm)
- Produces non pulsating flow
- Operates at the highest pressure levels
- Highest efficiency
- Longer pump life
- Normally can not be repaired in the field because of their complex design