Pump Mounting and Drive Arrangements
Six Methods

- Auxiliary engine
- Power take-off
- Front-mount
- Midship transfer
- Rear-mount
- Hydrostatic
Auxiliary Engine Driven Pumps

- Portable
- Skid-mount
- Permanent mounting
- Airport rescue and fire fighting (ARFF) vehicles
- Wildland fire apparatus
- Mobile water supply apparatus
- Trailer-mounted fire pumps
- Portable fire pumps
Auxiliary Engine Driven Pumps

- **Advantages**
  - Pump speed independent of vehicle speed
  - Pump and roll capability
  - Pump can be carried to a source of water

- **Disadvantages**
  - Limited pressure and capacity
  - Additional engine to maintain
  - Extra supply of fuel, or
  - Two types of fuel
Power Take-off Pumps

- Gear assembly mounted on the side of the transmission
- Flywheel mounted
Power Take-off Pumps

- **Advantages**
  - Pump and roll capabilities
  - Pumps for different applications

- **Disadvantages**
  - Pump size limited unless flywheel mounted
Front-mount Pumps

- Power is supplied through a coupling and/or clutch arrangement attached to crankshaft
- Generally mounted between the frame rails and in front of grill
Front-mount Pumps

**Advantages**
- Simplified linkage and controls
- Pump is independent of drive wheels
- Can pump while moving

**Disadvantages**
- Size of pump is limited
- While moving, pump discharge depends on engine speed
- Components are susceptible to freezing
Midship Pumps

- Also known as split-shaft pumps
- Most common application in fire service
  - Power source is main engine in the vehicle
  - Power is transmitted from the engine through the vehicle transmission to the pump gearbox
  - When the pump is engaged, power is redirected from the rear axle to fire pump
Pump Engagement

- Pump engagement is done either electrically, manually, air actuated or vacuum operated

- Gear selection – manufacturer's recommendations

- Manually engage/disengage pump
Midship Pumps

- Advantages
  - Full engine power is available
  - Pump size is unlimited

- Disadvantages
  - Power to rear wheels is disconnected
  - Complex mechanical operation
  - Need a backup system to engage pump
Rear-mount Pumps

- Pump located in rear of apparatus
  - Powered by either
    - Power take-off
    - Split-shaft transmission
Rear-mount Pumps

- **Advantages**
  - Provides a more even weight distribution on chassis
  - Allows for more compartment space

- **Disadvantage**
  - Operator exposed to oncoming traffic
Hydrostatic Driven Pumps

- Primarily used on interface engines
- Powered from hydraulic pump driven directly off the chassis’ crankshaft
- Four components in hydraulic system
  - Hydrostatic pump
  - Hydrostatic motor
  - Hydraulic reservoir
  - Pump control
Hydrostatic Pump

- Mounted behind front bumper and in front of radiator
- Driven by a drive shaft attached to the crankshaft of the apparatus engine
Hydrostatic Pump

Reservoir
Hydrostatic Motor

- Mounted forward of the fire pump between chassis frame rails
- Provides the power necessary to turn the pump shaft of the fire pump
Hydraulic Reservoir

- Mounted adjacent to hydrostatic pump
Pump Control

- Activates the hydraulic system and sets the desired pressure/flow during pumping operations
- Can be done during stationary and mobile pumping operations
Pump Control
Operation

- **Stationary pumping**
  - Activate high idle switch
  - Rotate pump control knob to desired pump pressure

- **Mobile pumping**
  - Rotate pump control valve to desired pump pressure
    - No more than 100 psi
Hydrostatic Driven Pumps

- **Advantages**
  - Pump-and-roll capabilities
  - One of the simplest pump systems to operate

- **Disadvantages**
  - Limited to pump size
  - Very noisy