



SNS COLLEGE OF TECHNOLOGY

(An Autonomous Institution)

COIMBATORE-35.

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DEPARTMENT OF AUTOMOBILE ENGINEERING

**COURSE NAME : 23AUT101 – ELEMENTS OF
AUTOMOTIVE SYSTEM**

I YEAR /II SEMESTER

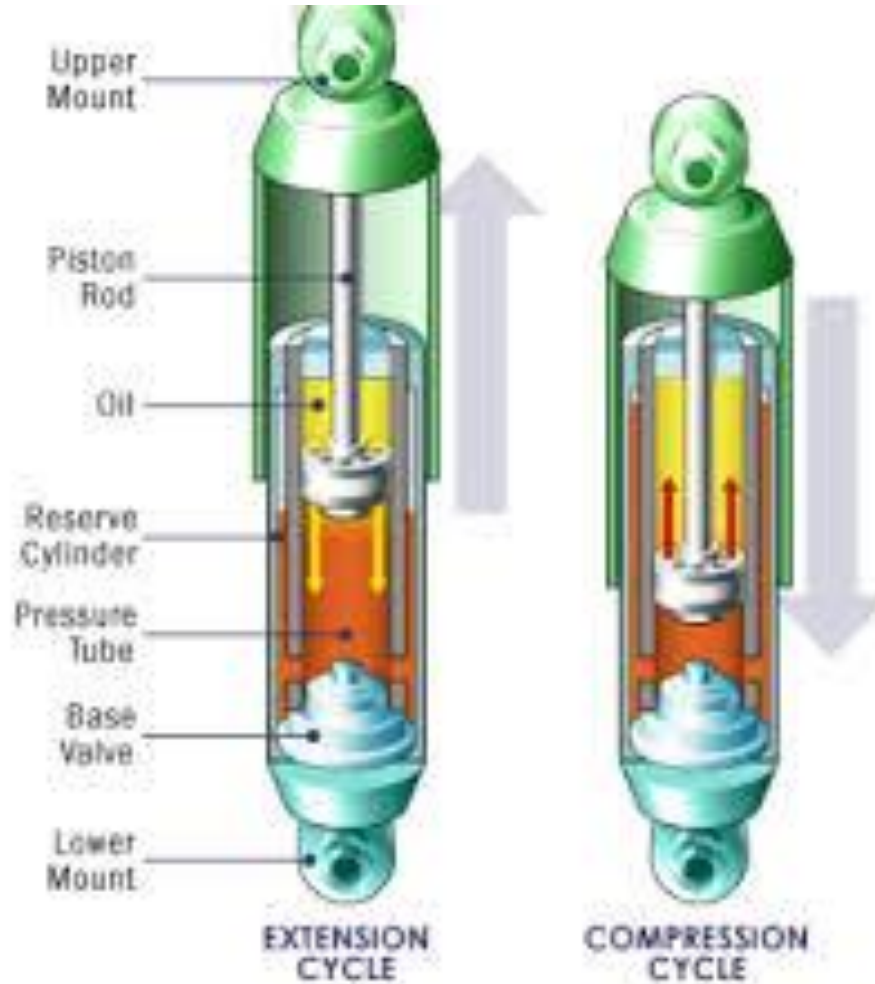
Unit 4 – Telescopic & Hydraulic Shock Absorber



Telescopic Shock Absorber



- Telescopic shock absorbers, also known simply as telescopic dampers, are the most common type of shock absorbers used in modern vehicles. They are designed to absorb and dampen the impact and oscillations from road irregularities, ensuring a smooth and stable ride. Telescopic shock absorbers are characterized by their ability to extend and compress, much like a telescope, to adapt to varying road conditions and suspension movements.





- The telescopic shock absorber operates based on the principles of hydraulic damping. When the vehicle encounters a bump or dip, the suspension system moves, causing the piston rod to move up and down within the cylinder.
- The movement of the piston forces the hydraulic fluid through small orifices in the piston, creating resistance. This resistance converts kinetic energy into thermal energy, dissipating it and thereby reducing the oscillations of the vehicle's suspension.

Types of Telescopic Shock Absorbers

- **Single-Acting Shock Absorbers**
- **Double-Acting Shock Absorbers**

1. Single-Acting Shock Absorbers

Single-acting shock absorbers provide damping during only one direction of the piston's movement (usually during compression).



2. Double-Acting Shock Absorbers

Double-acting shock absorbers provide damping during both compression and extension of the piston rod. This type is more common in modern vehicles due to its superior performance in controlling suspension oscillations.

Advantages

- **Simplicity:** Straightforward design and easy to manufacture.
- **Cost-Effective:** Relatively low production cost.
- **Reliability:** Proven technology with widespread use and reliability.
- **Maintenance:** Generally requires low maintenance.



Disadvantages

- **Heat Dissipation:** May not dissipate heat as efficiently as more advanced shock absorber designs.
- **Performance:** May not provide as smooth or responsive ride as more sophisticated systems like monotube or gas-charged shock absorbers.

Applications

Telescopic shock absorbers are widely used across various types of vehicles, including:

- Passenger cars
- SUVs
- Light trucks
- Motorcycles
- Commercial vehicles



Hydraulic Shock Absorber



A hydraulic shock absorber is a device used in the suspension system of vehicles to dampen the vibrations and shocks from the road. It operates based on hydraulic principles, using fluid to absorb and dissipate kinetic energy, providing a smoother and more controlled ride.

Working Principle

Hydraulic shock absorbers work by converting the kinetic energy from the suspension movement into heat, which is then dissipated through hydraulic fluid.



Hydraulic Shock Absorber



Compression and Extension: When a vehicle encounters a bump, the piston inside the shock absorber moves within a cylinder filled with hydraulic fluid.

Fluid Flow: As the piston moves, the hydraulic fluid is forced through small orifices or valves in the piston. The resistance to fluid flow creates a damping effect.

Heat Dissipation: The energy from the suspension movement is converted into heat within the hydraulic fluid, which is then dissipated through the body of the shock absorber.



Components



Cylinder: Contains the hydraulic fluid and the piston assembly.

Piston: Moves within the cylinder, forcing fluid through valves or orifices.

Piston Rod: Connected to the piston, it extends out of the shock absorber and attaches to the vehicle.

Valve System: Regulates the flow of hydraulic fluid, providing the necessary damping force.

Reservoir: In some designs, an additional reservoir is used to store excess hydraulic fluid.