ESOLS
Engineering Education Equipment

Epicyclic Gear Apparatus (SMT-MM-97)

The ESOLS Epicyclic Gear Train Apparatus (Multi-stage) is designed to study and analyse the motion and performance of multi-stage epicyclic gear systems. It consists of three interconnected gear trains, each featuring a sun gear, three planet gears, a planet carrier, and an internal ring gear, all sharing a common axis. Protractors are mounted on the input, output, and intermediate shafts to enable precise measurement of torque and angular velocity ratios. The first stage reduces speed through the planet gears, the second reverses the motion, and the third delivers the output via the carrier while the ring gear remains fixed. This setup allows students to experimentally determine gear ratios, velocity relationships, and efficiencies, and to plot efficiency curves, providing a clear understanding of planetary gear mechanisms used in advanced mechanical systems.

TECHNICAL SPECIFICATIONS

Specifications:

- Self-Contained
- Three epicyclic gears
- Wall mounted
- Protractors at input, middle and output shafts for precise measurement
- Adjustable gear ratios
- Locking pins to stop rotation while hanging weights
- Weights and hangers included

Technical Data:

- Sun Gear Teeth: 30
- Planet Gear Teeth: 60
- Ring Gear Teeth: 150
- Module: 1.5
- Dimensions and mass:
  - 500 x 200 x 150mm
  - 4kg (Approx.)

Experiments:

- Calculate and experimentally observe the angular velocity ratios of gear trains
- Experimentally obtain the gear ratios, efficiencies and velocity ratios can be calculated
- Calculate the efficiencies of gear trains and draw efficiency curve

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