

TM18**Geared System**

Studies gear systems, from basic principles to gear system design



- Comprehensive range of experiments – from basic principles to introducing gear system design
- Studies simple and compound gear trains
- Transparent cover allows students to see the gear train working
- Completely self-contained, robust, bench-mounted product - no ancillaries needed
- Fully investigates each gear system, including finding the dynamic mechanical efficiency and mass moment of inertia
- Includes a dynamometer and comprehensive control and instrumentation unit.
- Interlocked safety guards protect students from moving parts
- Quick and convenient changeover of gear systems

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- An ISO 9001 certified company

TM18

Geared System

Description

A robust, bench-mounting product that allows students to do a comprehensive range of experiments on geared systems in safety. Students study different simple and compound gear trains. They can fully examine each system, including the dynamic mechanical efficiency and comparison of theoretical and experimentally determined mass moments of inertia.

The main part is a gear unit on a rigid base plate. A variable speed, trunnion-mounted motor drives the gears. A friction brake unit loads the gears and measures power and torque. A separate control and instrumentation unit displays the important measurements and includes a variable speed drive to control the motor speed.

The gear unit includes three shafts supporting the gears. The first and third shaft each have a single sliding gear, while the middle shaft has two differently sized fixed gears. A simple alignment mechanism allows students to quickly and conveniently change the gear ratios using the sliding gears. The shafts all run on maintenance-free ball races with low friction shields. The surfaces of the gears have a special coating that reduces wear. Sensors on the gear unit connect to the control and instrumentation unit.

The gear unit, motor and brake unit locate in machined slots in the base plate. Couplings allow quick and easy connection and alignment to the motor.

For efficiency tests, students use the motor to drive the gear system. An electronic load cell measures input power and torque. The brake unit measures the output power and torque.

To find inertias, students accelerate the system with falling masses and a heavy steel drum. The drum attaches to the centre shaft of the gear unit. A sensor connects to the instrumentation unit that calculates acceleration.

The apparatus includes interlocks and guards to prevent students touching any moving parts.

Standard Features

- Supplied with comprehensive user guide
- Two-year warranty
- Manufactured in accordance with the latest European Union directives

Experiments

- Mechanical efficiency of a geared system
- The effect of speed on the mechanical losses and efficiency of a simple geared system
- Simple and compound gear trains
- Inertia of a drum
- Inertia of a shaft with friction
- Combined inertias of a geared system

Essential Services

Electrical supply:
Single-phase, 230 V/110 V 50/60 Hz

Bench space needed:

- Solid, level bench top between 700 mm and 1000 mm high.
- Approximately 950 mm x 550 mm for the main unit
- Approximately 650 mm x 400 mm for the Control and Instrumentation Unit

Operating Conditions

Operating environment:
Laboratory environment

Storage temperature range:
-25°C to +55°C (when packed for transport)

Operating temperature range:
+5°C to +40°C

Operating relative humidity range:
80% at temperatures < 31°C decreasing linearly to 50% at 40°C

Sound Levels

This equipment emits sound levels of approximately 90 dB(A) at the operator's ear level.

You must wear ear protection when you work near to the equipment.

Specifications

Nett dimensions:
Base plate and gear unit: 900 mm x 500 mm x 400 mm
Control and instrumentation unit: 600 mm x 400 mm x 300 mm.

Nett weight of both parts:
67 kg

Packed dimensions and weight:
0.78 m³ and 125 kg

Shaft 1:
One sliding gear of 40 teeth and pitch circle diameter 80 mm

Shaft 2:
Two fixed gears, one of 30 teeth and pitch circle diameter 60 mm, one of 60 teeth and pitch circle diameter 120 mm

Shaft 3:
One sliding gear of 60 teeth and pitch circle diameter 120 mm

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