

INTRODUCTION

The most important elements of an automatic transmission are one or several planetary gears (or epicyclic gears), clutch packs, band brakes and pilot valves.

Epicyclic gears perform several functions:

- Coupling between input and output shafts.
- At low velocities, it generates high torque at the output shaft.
- At high velocities, it reduces the torque at the output shaft.
- Rotation direction inversion between the input and output shafts.

GENERAL DESCRIPTION

The Epicyclic Gear Unit (1 element), "MTE1", includes a set of epicyclic gears that allows the student to study different reduction ratios (direct drive and overdrive), as well as torque conversion.

A simple epicyclic gears set consists of:

- Sun gear that rotates together with the input shaft.
- Planet gears whose carrier can rotate.
- Ring gear that rotates together with the output shaft.

One of the three elements will provide motion to the system, it will be called driving element. Other element will be kept static, by braking it, and the third element will act as driven element.



ISO 9001: Quality Management (for Design, Manufacturing, Commercialization and After-sales service)



European Union Certificate (total safety)



Certificates ISO 14001 and ECO-Management and Audit Scheme (environmental management)



"Worlddidac Quality Charter" and Platinum Member of Worlddidac

SPECIFICATIONS

Bench-top unit with adjustable legs.

Anodized aluminum frame and panels made of painted steel.

The "MTE1" unit mainly consists of:

The epicyclic gears set, formed by:

- Sun gear ($Z=21$).
- Planet gears set ($Z=21$).
- Ring ($Z=63$).

Two graduated discs located at the input and output shafts.

The shafts of the unit are made in stainless steel. The discs and gears are made in aluminum to facilitate the experiments.

The pinions are made of aluminum and are mounted on ball bearings to reduce of losses due to friction, making the practical exercises execution easy.

In order to carry out some practices with "MTE1" unit, two "B type" set of weights is required. (See "Required Accessories" section)

Manuals: This unit is supplied with the following manuals: Required services, Assembly and Installation, Starting-up, Security, Maintenance and Practices manual.



MTE1 detail

EXERCISES AND PRACTICAL POSSIBILITIES

- 1.- To demonstrate the operation of an epicyclic gears system.
- 2.- To determine and verify the speed and torque ratio between the input and output shafts.
- 3.- To study the mechanical advantage and efficiency of an epicyclic system.
- 4.- To determine the angular displacement at the input and output and to compare with the ratio calculated.
- 5.- To determine the minimum effort required at the input to raise a load at the output.
- 6.- Selection of gears:
 - Overdrive.
 - Direct drive.
- 7.- Power transmission: checking the relation between input torque and output torque.

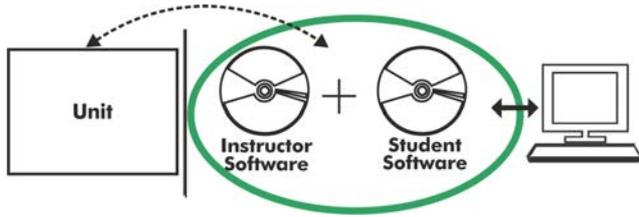
REQUIRED ACCESSORIES (Not included)

- 2 "B type" set of weights. Each "B type" set included:
 - 6 weights of 200 g. (0.44 pounds)
 - 6 weights of 100 g. (0.22 pounds)
 - 2 weights of 50 g. (0.11 pounds)
 - 2 weights of 20 g. (0.044 pounds)
 - 2 weights of 10 g. (0.022 pounds)
 - 1 support hook of 100 g. (0.22 pounds)

DIMENSIONS AND WEIGHTS

- MTE1:
- Dimensions: 300 x 300 x 300 mm approx.
(11.81 x 11.81 x 11.81 inches approx.)
 - Weight: 10 Kg approx.
(22 pounds approx.)

MTE1/ICAI. Interactive Computer Aided Instruction Software System:



With no physical connection between unit and computer, this complete software package consists of an Instructor Software (EDIBON Classroom Manager -ECM-SOF) totally integrated with the Student Software (EDIBON Student Labsoft -ESL-SOF). Both are interconnected so that the teacher knows at any moment what is the theoretical and practical knowledge of the students.

Instructor Software

- ECM-SOF. EDIBON Classroom Manager (Instructor Software).

ECM-SOF is the application that allows the Instructor to register students, manage and assign tasks for workgroups, create own content to carry out Practical Exercises, choose one of the evaluation methods to check the Student knowledge and monitor the progression related to the planned tasks for individual students, workgroups, units, etc... so the teacher can know in real time the level of understanding of any student in the classroom.

Innovative features:

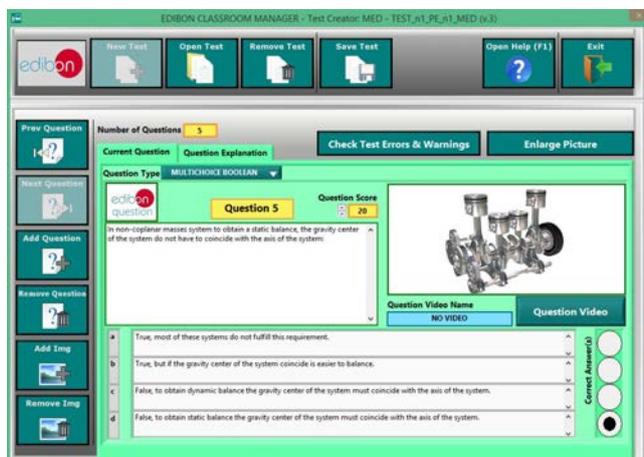
- User Data Base Management.
- Administration and assignment of Workgroup, Task and Training sessions.
- Creation and Integration of Practical Exercises and Multimedia Resources.
- Custom Design of Evaluation Methods.
- Creation and assignment of Formulas & Equations.
- Equation System Solver Engine.
- Updatable Contents.
- Report generation, User Progression Monitoring and Statistics.



ECM-SOF. EDIBON Classroom Manager (Instructor Software) Application Main Screen



ECAL. EDIBON Calculations Program Package - Formula Editor Screen



ETTE. EDIBON Training Test & Exam Program Package - Main Screen with Numeric Result Question



ERS. EDIBON Results & Statistics Program Package - Student Scores Histogram

