

INTRODUCTION

Most vehicles have gearboxes, which mainly consist on coupling gears of different size that are meshed when the driver needs it.

The main objective of a gearbox is the use of the torque to obtain the maximum advantage of the energy supplied, either as torque or as angular velocity.

The sliding type gearbox, although used in heavy commercial vehicles, is rarely used in modern vehicles. Nevertheless, its basic design and operation are important, since it represents the fundamental sketch from which most modern gearboxes have been developed.

The Gearbox, "MCC", consists on simple shafts and gears mechanism to get three gear ratios and reverse. It includes pulleys adjusted to the inlet and outlet shafts of the mechanism to generate the momentums that allow to determine the efforts generated. All the shafts rest on bearings so that they can reduce losses due to friction.

GENERAL DESCRIPTION

The Gearbox unit, "MCC", has been designed to represent the typical position of a simple gearbox with three gears ratio and reverse. Basically, the gearbox consists of several gears of different size that can be meshed as required. Those gears are visible in order to help the students to understand the different principles involved, as well as the operation of a gearbox.

Gears are arranged and fixed on different shafts (input shaft, output shaft, fixed shaft and reverse) that are mounted on ball bearings which, together with the displacement mechanisms, guarantee a smooth shifting and reduce losses due to friction.

Pulleys with protractors are coupled to the input and output shafts so the student can determine and verify torque and speed ratio.

SPECIFICATIONS

Unit mounted on a frame made of aluminum profiles and panel made of painted steel.

The gears and shafts are made of stainless steel.

The number of gears and the teeth of the gears is:

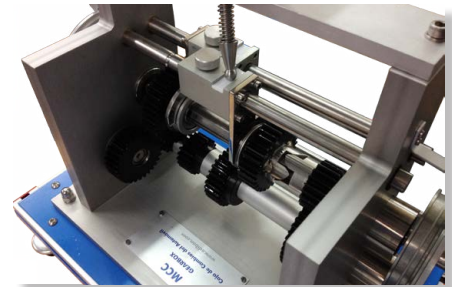
- Two gears with 20 teeth each.
- Three gears with 30 teeth each.
- Two gears with 40 teeth each.
- Gear with 16 teeth.

The unit includes two pulleys, which are made of aluminum.

The shafts of the unit are mounted on ball bearings. Thus, inertia will be low and losses due to friction will decrease, allowing an easier execution of the practical exercises.

To perform the practical exercises the unit can be either placed on a table or hung from a wall, allowing a more comfortable performance of the practical exercises with the weights or masses.

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



MCC detail

Required elements (Not included):

- SET B. Brass Hook and Mass Set 2 kg. (2 units)

Additional recommended elements (Not included):

- MCCA. Short Coupling.
- MCCB. Universal Jointed Coupling.

EXERCISES AND PRACTICAL POSSIBILITIES

- 1.- Study of mechanism that represents a gearbox.
- 2.- Measurement of the angular displacement at the input and output of the gearbox and comparison with the theoretical values.
- 3.- Determination of the minimum effort required at the input shaft to lift a series of loads.
- 4.- Calculation of the efficiency for different ratios depending on the input torque.
- 5.- Plot of characteristic curves.
- 6.- Determination of the torque and speed ratio for different gears.

REQUIRED ELEMENTS (Not included)

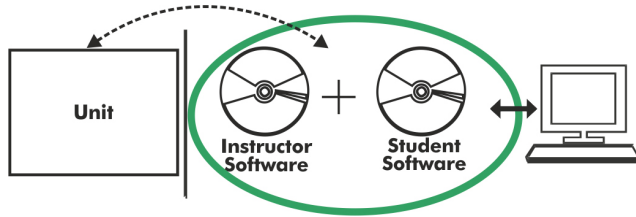
- SET B. Brass Hook and Mass Set 2 kg. (2 units).
- Each "B type" set included:
 - 6 weights of 200 g. (0.44 pounds)
 - 6 weights of 100 g. (0.22 pounds)
 - 2 weights of 50 g. (0.11 pounds)
 - 2 weights of 20 g. (0.044 pounds)
 - 2 weights of 10 g. (0.022 pounds)
 - 1 support hook of 100 g. (0.22 pounds)

DIMENSIONS AND WEIGHTS

- MCC:
- Dimensions: 580 x 350 x 500 mm approx.
(22.83 x 13.78 x 19.68 inches approx.).
 - Weight: 17 Kg approx.
(37.47 pounds approx.).

ADDITIONAL RECOMMENDED ELEMENTS (Not included)

- MCCA. Short Coupling.
- MCCB. Universal Jointed Coupling.

MCC/ICAI. Interactive Computer Aided Instruction Software:

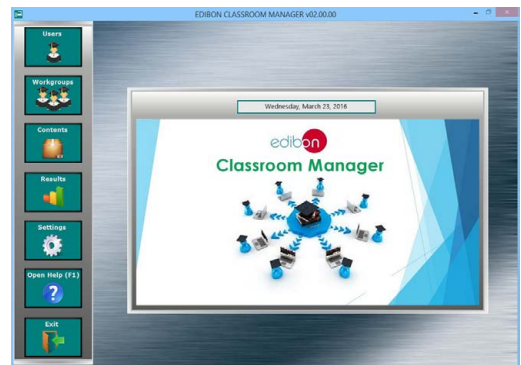
With no physical connection between unit and computer, this complete software package consists of an Instructor Software (EDIBON Classroom Manager -ECM-SOF) totally integrated with the Student Software (EDIBON Student Labsoft -ESL-SOF). Both are interconnected so that the teacher knows at any moment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

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

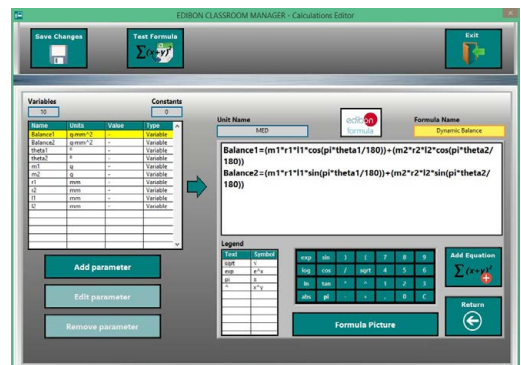
ECM-SOF is the application that allows the Instructor to register students, manage and assign tasks for workgroups, create own content to carry out Practical Exercises, choose one of the evaluation methods to check the Student knowledge and monitor the progression related to the planned tasks for individual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

Innovative features:

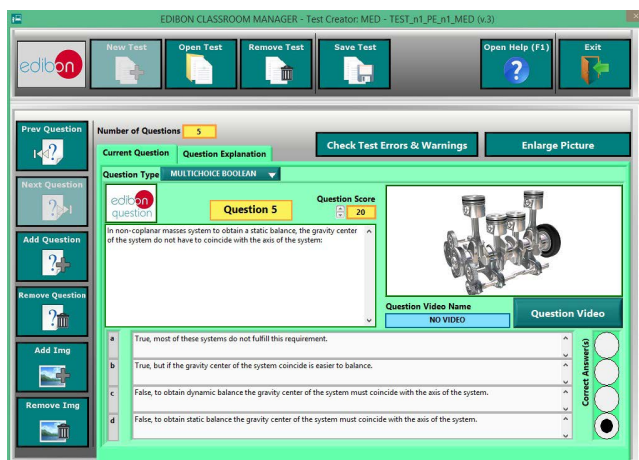
- User Data Base Management.
- Administration and assignment of Workgroup, Task and Training sessions.
- Creation and Integration of Practical Exercises and Multimedia Resources.
- Custom Design of Evaluation Methods.
- Creation and assignment of Formulas & Equations.
- Equation System Solver Engine.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

Optional
Student Software

- **ESL-SOF. EDIBON Student Labsoft (Student Software).**

ESL-SOF is the application addressed to the Students that helps them to understand theoretical concepts by means of practical exercises and to prove their knowledge and progression by performing tests and calculations in addition to Multimedia Resources. Default planned tasks and an Open workgroup are provided by EDIBON to allow the students start working from the first session. Reports and statistics are available to know their progression at any time, as well as explanations for every exercise to reinforce the theoretically acquired technical knowledge.

Innovative features:

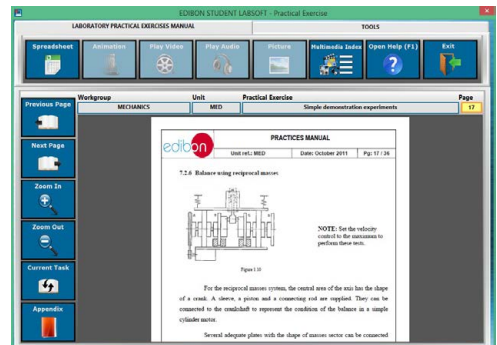
- **Student Log-In & Self-Registration.**
- **Existing Tasks checking & Monitoring.**
- **Default contents & scheduled tasks available to be used from the first session.**
- **Practical Exercises accomplishment by following the Manual provided by EDIBON.**
- **Evaluation Methods to prove your knowledge and progression.**
- **Test self-correction.**
- **Calculations computing and plotting.**
- **Equation System Solver Engine.**
- **User Monitoring Learning & Printable Reports.**
- **Multimedia-Supported auxiliary resources.**

For more information see ICAI catalogue. Click on the following link:

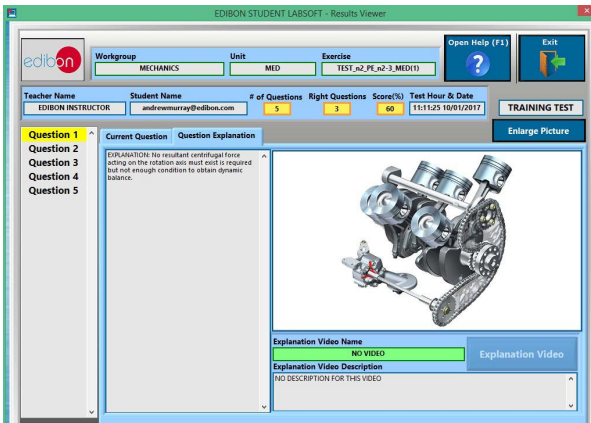
www.edibon.com/en/interactive-computer-aided-instruction-software



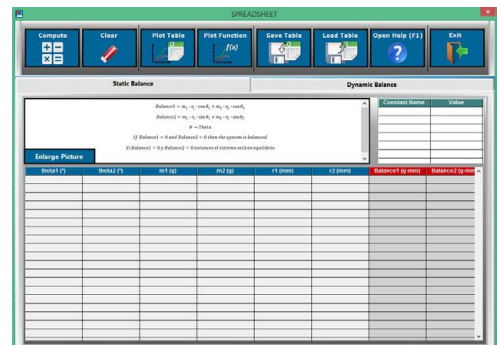
ESL-SOF. EDIBON Student LabSoft (Student Software)
Application Main Screen



EPE. EDIBON Practical Exercise Program Package Main Screen



ERS. EDIBON Results & Statistics Program Package - Question Explanation



ECAL. EDIBON Calculations Program Package Main Screen

* Specifications subject to change without previous notice, due to the convenience of improvement of the product.



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REPRESENTATIVE:

