



## INTRODUCTION

The clutch is a system that allows both transmitting and interrupting the transmission of a mechanical energy to its final action on a voluntary basis. In a car, for example, it allows the driver to control the torque transmission from the engine to the wheels.

It is an element related to the rotation movement: transmit or absorb mechanical energy of rotation. At the time of the clutch, two masses that are spinning at different speeds are attempted to reach the same speed. Relative slip occurs, there is friction with heat generation and temperature increase.

There are multiple criteria to classify the different types of clutches that exist, but they can all be grouped into three large groups. Hydraulic, electromagnetic and friction clutches.

The friction clutch is composed of two clearly differentiated parts, the clutch disc and the pressure plate, a system with which one element is pressed against the other and with which, therefore, torque transmission is controlled by springs or by diaphragm.

The friction clutch is the one currently used in motor vehicles.



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

## GENERAL DESCRIPTION

The Plate Clutch, "MEM", allows to demonstrate the influence of the friction surface and the applied pressure of the springs on the transmitted torque for a friction clutch. To this end, several clutch discs with different diameters and coefficients of friction and springs, with marked tightening nuts, will be used to increase the pressure in the system.

The "MEM" unit consists of a disc with friction material attached and one or two discs, depending on the study that is to be carried out, that when rubbing with the friction disc it produces a friction force.

These discs are arranged on a stainless steel shaft, so that, the friction disc rotates thanks to a series of weights that have to be hung to produce a torque, whereas said will be stopped by the pressure discs that produce the friction force, since these are joint to the shaft and the structure.

To apply pressure on the system, three springs, with marked tightening nuts are used. All nuts are marked to be able to perform the same force with all, and thus increase pressure throughout the system uniformly. This system transmits the force to the pressure discs that transmit it to the rest of the equipment.

Several friction discs with different diameters and different friction materials are available in order to be able to study both the variation as a function of the size and as a function of the coefficient of friction.

The study can be done with one or two pressure discs.

## SPECIFICATIONS

Bench-top unit with adjustable legs.

Anodized aluminum frame and panels in painted steel.

The MEM unit mainly consists of:

Stainless steel shaft on which the clutch discs rotate to produce torque.

Aluminum clutch discs with three different diameters to which the friction discs are attached:

Two clutch discs of  $D_{ext} = 200$  mm.

Clutch disc of  $D_{ext} = 150$  mm.

Clutch disc of  $D_{ext} = 100$  mm.

Interchangeable friction discs of different materials attached to the clutch discs:

Two friction discs of  $D_{ext} = 200$  mm and  $D_{int} = 160$  mm.;  $\mu = 0.38$  and  $\mu = 0.62$ .

Friction disc of  $D_{ext} = 150$  mm and  $D_{int} = 110$  mm.;  $\mu = 0.45$ .

Friction disc of  $D_{ext} = 100$  mm and  $D_{int} = 70$  mm.;  $\mu = 0.45$ .

Two anodized aluminum pressure discs for the production of friction of  $D_{ext} = 200$  mm and  $D_{int} = 16$  mm.

Three springs which allow the increase of pressure in the system.

Three marked tightening nuts to regulate the pressure rise of the system uniformly.

Teflon ring, to perform the study with a single friction surface.

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

Required elements (No included):

- SET B. Brass Hook and Mass Set 2 kg.



MEM detail

## EXERCISES AND PRACTICAL POSSIBILITIES

- 1.- Study of the function of a plate clutch.
- 2.- Analysis of the relationship between the contact force and the friction moment.
- 3.- Determination of the coefficient of friction.
- 4.- Study of the influence of the materials used in the friction moment.
- 5.- Study of the influence of the radius of the friction surface at the friction moment.
- 6.- Investigation of the relationship between pressure applied to friction surfaces, radius of friction surfaces and torque.
- 7.- Comparison of torque based on the number of friction surfaces used.
- 8.- Demonstration that the minimum torque to maintain rotation is proportional to the axial load and the diameter of the friction surface.

## REQUIRED ELEMENTS (Not included)

- SET B. Brass Hook and Mass Set 2 kg.

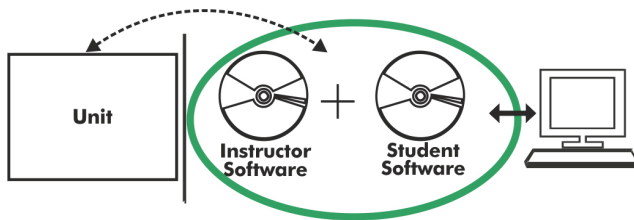
Each SET B included:

- 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

MEM:

- Dimensions: 600 x 700 x 1000 mm approx.  
(23.62 x 27.55 x 39.36 inches approx.)
- Weight: 15 Kg approx.  
(33 pounds approx.)

**MEM/ICAI. Interactive Computer Aided Instruction Software:**

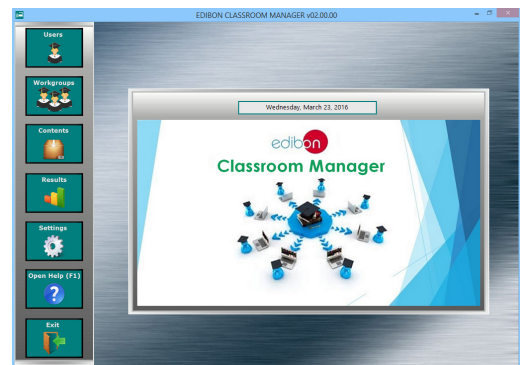
With no physical connection between unit and computer, this complete software package consists of an Instructor Software (EDIBON Classroom Manager -ECM-SOF) totally integrated with the Student Software (EDIBON Student Labsoft -ESL-SOF). Both are interconnected so that the teacher knows at any moment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

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

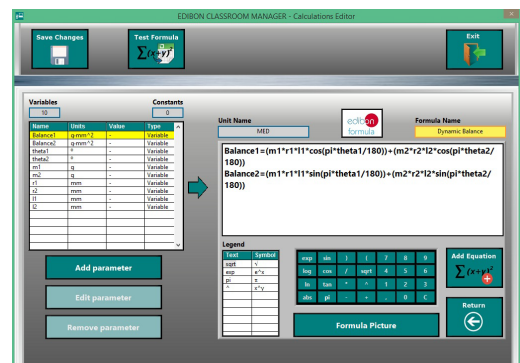
ECM-SOF is the application that allows the Instructor to register students, manage and assign tasks for workgroups, create own content to carry out Practical Exercises, choose one of the evaluation methods to check the Student knowledge and monitor the progression related to the planned tasks for individual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

Innovative features:

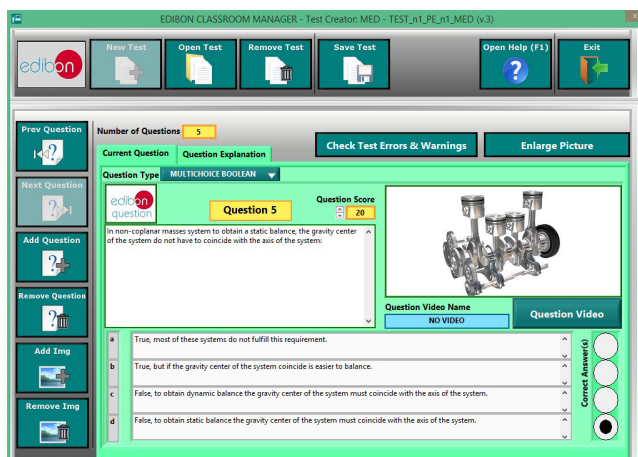
- User Data Base Management.
- Administration and assignment of Workgroup, Task and Training sessions.
- Creation and Integration of Practical Exercises and Multimedia Resources.
- Custom Design of Evaluation Methods.
- Creation and assignment of Formulas & Equations.
- Equation System Solver Engine.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



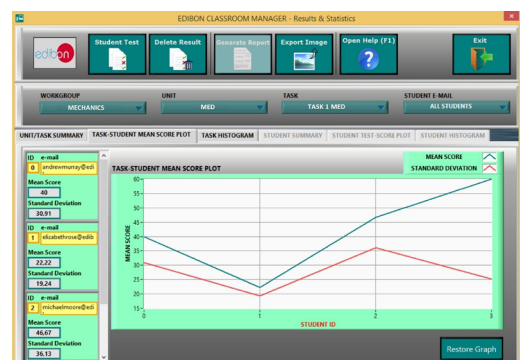
ECM-SOF. EDIBON Classroom Manager (Instructor Software) Application Main Screen



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

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

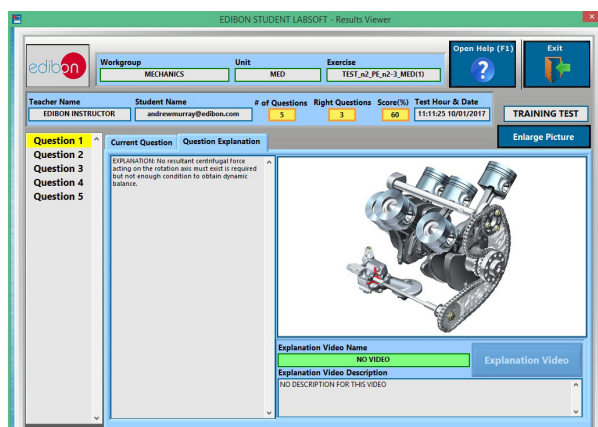
ESL-SOF is the application addressed to the Students that helps them to understand theoretical concepts by means of practical exercises and to prove their knowledge and progression by performing tests and calculations in addition to Multimedia Resources. Default planned tasks and an Open workgroup are 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:

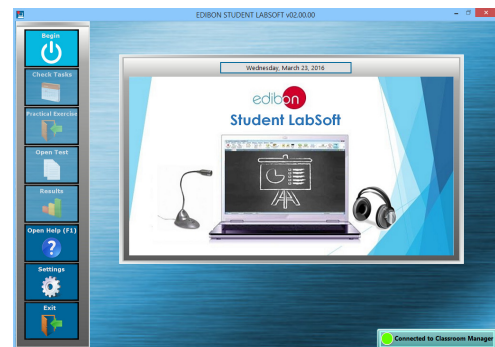
- Student Log-In & Self-Registration.
- Existing Tasks checking & Monitoring.
- Default contents & scheduled tasks available to be used from the first session.
- Practical Exercises accomplishment by following the Manual provided by EDIBON.
- Evaluation Methods to prove your knowledge and progression.
- 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:

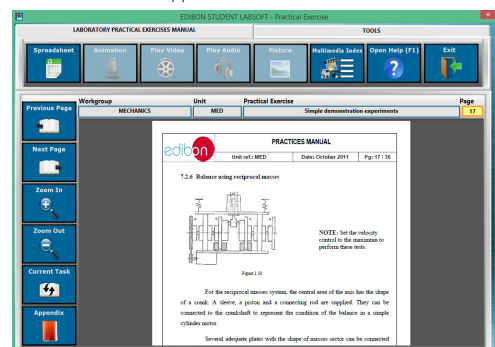
[www.edibon.com/en/files/expansion/ICAI/catalog](http://www.edibon.com/en/files/expansion/ICAI/catalog)



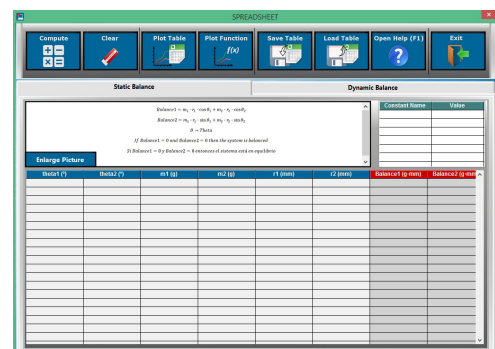
ERS, EDIBON Results &amp; Statistics Program Package - Question Explanation



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



EPE. EDIBON Practical Exercise Program Package Main Screen



ECAL, EDIBON Calculations Program Package Main Screen

### **BDAS. Basic Data Acquisition System and Sensors:**

For being used with mechanical modules.

BDAS is designed to monitor the measurements of each mechanical module from a computer.

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



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REPRESENTATIVE: