



## 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.

The Borg-Warner Automatic Transmission, "MBW", includes a torque converter and a three-speed automatic system that will allow the student to carry out experiments with different transmission ratios simulating clutches and band brakes. In addition, a freewheel allows the visualization of the engine brake effect.

## GENERAL DESCRIPTION

The main distinguishing element of automatic transmissions is its group of epicyclic gearing.

The gear assembly of the "MBW" unit consists of:

- Two sun gears, one to transfer forward gear ratios and one reverse gear.

- Two sets of planet gears: long and short planet gears.

- Ring gear.

It is a gearing system in which power is transmitted to the assembly through the central sun gears. For forward gear ratios power will be introduced through the forward sun gear and for the reverse gear through the reverse sun gear. In both cases, the final motion is transferred to the output shaft through the ring gear.

The Borg-Warner Automatic Transmission, "MBW", has a torque converter and a three-speed automatic system. The transmission consists of three forward gear ratios and one reverse gear. They can be selected and their gear ratio studied through the coupling of the appropriate mechanical actuator in the different discs available to brake the elements of the planetary gearing, simulating brake bands and clutches.

Two graduated discs are included, one at the inlet and the other at the outlet, to measure angular displacement, allowing to observe the gear ratios of the assembly and to compare them with the values calculated theoretically.

Other special feature of the unit is that it has a freewheel mechanism that blocks the rotation of a shaft in one direction, allowing rotation in the opposite direction, and it allows to visualize the braking effect.

## SPECIFICATIONS

Bench-top unit with adjustable legs.

Anodized aluminum frame and panels made of painted steel.

The "MBW" unit mainly consists of:

- Epicyclic gear set is composed of:

  - Two sun gears, one to transfer forward gear ratios and one reverse gear.

  - Two set of planet gears: long and short planet gears.

- Ring gear.

- Two graduated discs, with angular indicator, placed in the input and output shaft.

- Two input discs to simulate the clutch of gears.

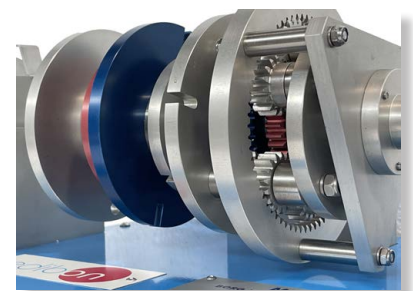
- Some mechanic actuators or pins that simulate the pilot valves used to brake the different components of the planetary gear.

The shafts of the unit is made of stainless steel. The discs and the gears are made of aluminum to facilitate the practice's carrying out.

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

Required elements (Not included):

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



MBW detail

## EXERCISES AND PRACTICAL POSSIBILITIES

- 1.- Demonstration of the operation of an epicyclic gearing system.
- 2.- To check the gear ratio:
  - First gear.
  - Imposed first gear.
  - Second gear.
  - Reverse gear.
  - Third gear and neutral.
- 3.- To simulate breakdowns:
  - Forward gear clutch breakdown.
  - Reverse gear clutch breakdown.
  - Brakes breakdown.
- 4.- To check the relation between the input motor torque and the output motor torque.
- 5.- To check the relation between the input motor torque and the output motor torque having the transmission brake activated.

## REQUIRED ELEMENTS (Not included)

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

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

MBW:

- Dimensions: 450 x 320 x 300 mm approx.  
(17.72 x 12.60 x 11.81 inches approx).
- Weight: 15 Kg approx.  
(33 pounds approx).

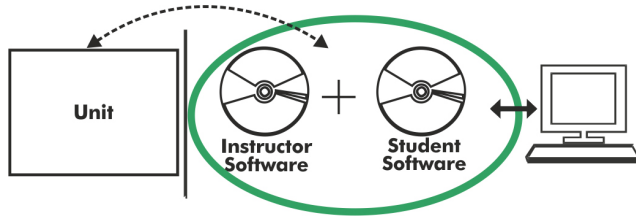
## SIMILAR UNITS AVAILABLE

- MBW. Borg-Warner Automatic Transmission.

Offered in this catalog:

- MTE1. Epicyclic Gear Unit (1 element).
- MTE2. Epicyclic Gear Unit (2 elements).
- MTE3. Epicyclic Gear Unit (3 elements).

Offered in other catalog:

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

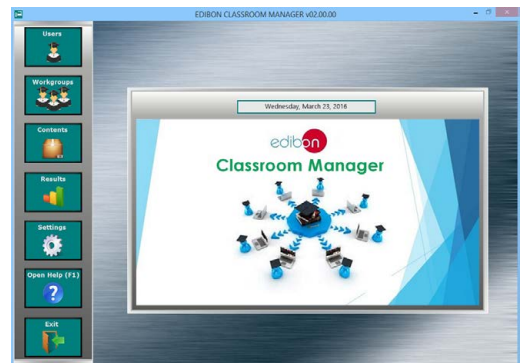
With no physical connection between unit and computer, this complete software package consists of an Instructor Software (EDIBON Classroom Manager -ECM-SOF) totally integrated with the Student Software (EDIBON Student Labsoft -ESL-SOF). Both are interconnected so that the teacher knows at any moment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

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

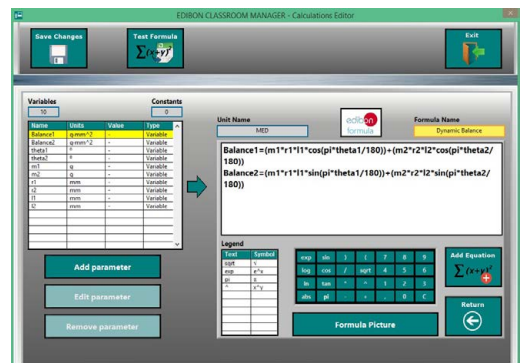
ECM-SOF is the application that allows the Instructor to register students, manage and assign tasks for workgroups, create own content to carry out Practical Exercises, choose one of the evaluation methods to check the Student knowledge and monitor the progression related to the planned tasks for individual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

Innovative features:

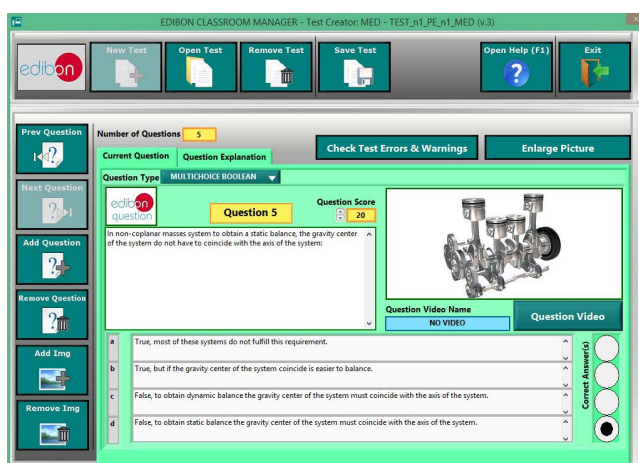
- User Data Base Management.
- Administration and assignment of Workgroup, Task and Training sessions.
- Creation and Integration of Practical Exercises and Multimedia Resources.
- Custom Design of Evaluation Methods.
- Creation and assignment of Formulas & Equations.
- Equation System Solver Engine.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

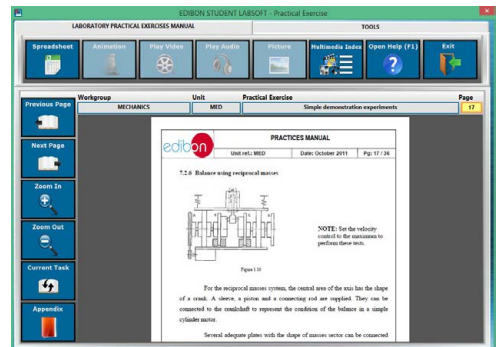
- Student Log-In & Self-Registration.
- Existing Tasks checking & Monitoring.
- Default contents & scheduled tasks available to be used from the first session.
- Practical Exercises accomplishment by following the Manual provided by EDIBON.
- Evaluation Methods to prove your knowledge and progression.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

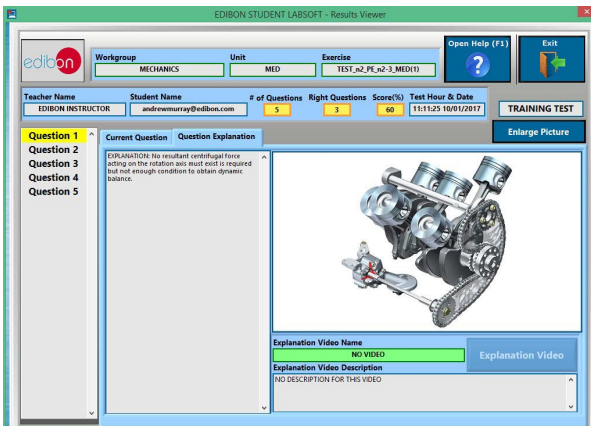
[www.edibon.com/en/interactive-computer-aided-instruction-software](http://www.edibon.com/en/interactive-computer-aided-instruction-software)



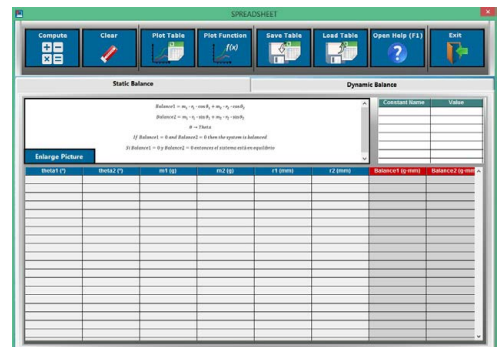
ESL-SOF. EDIBON Student LabSoft (Student Software)  
Application Main Screen



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:

