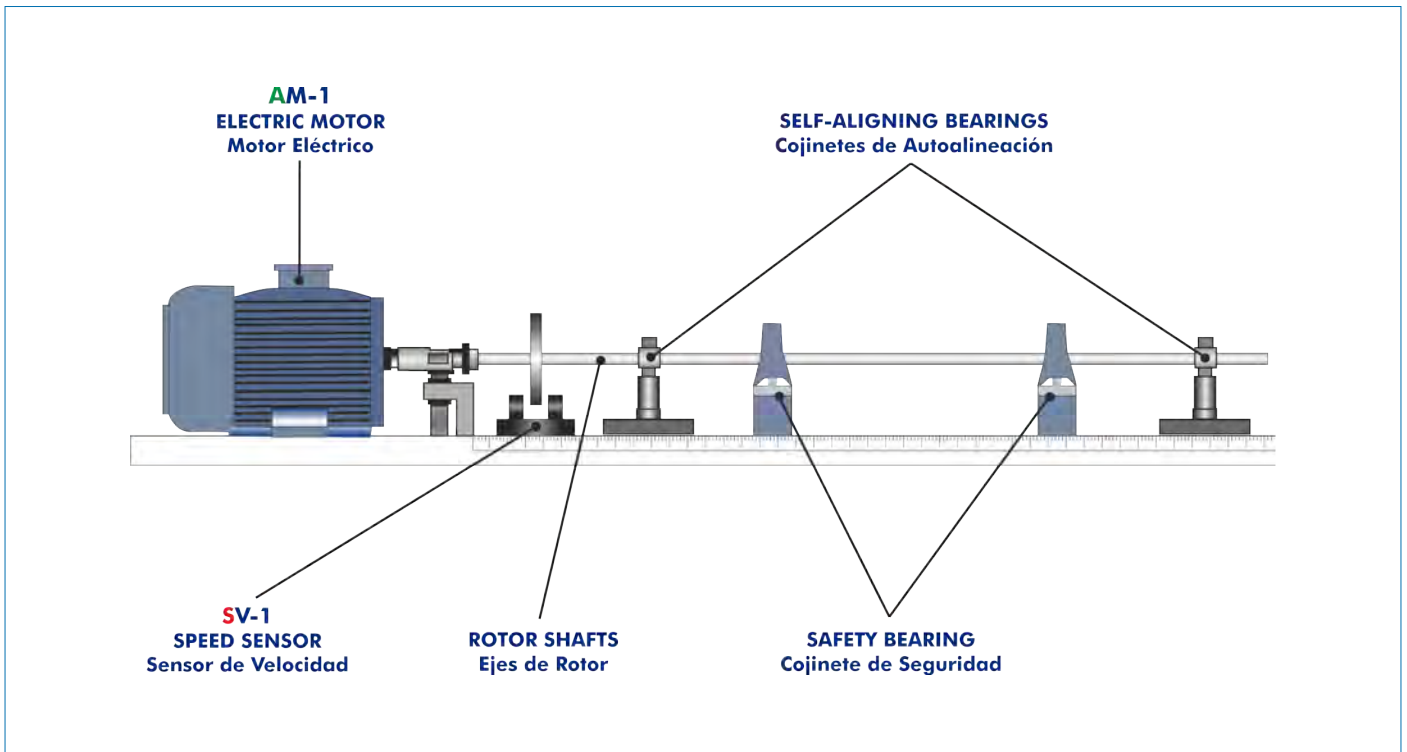




Electronic console

PROCESS DIAGRAM AND UNIT ELEMENTS ALLOCATION



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)



Certificate and Worlddidac Member

INTRODUCTION

The Whirling of Shafts Unit "MEER" is a unit manufactured by EDIBON to demonstrate and determine different modes of oscillation and resonance of shafts with continuous distribution of mass under different conditions.

The components of a machine behave in a different way depending on whether they are static or in motion, although they move to low speed. A solid shaft able to support one hundred times its weight plus the weight of the components mounted on it might bend and vibrate to certain rotation speeds. These speeds are known as "critical speed". If that critical speed is maintained for a specific period of time, the amplitude will be enough to cause deformation and failure in the shaft. Nevertheless, if revolutions are quickly increased, leaving that critical section behind, the shaft becomes stable and rotates correctly again till the next critical speed.

Thanks to this unit the speeds to which a shaft may or may not operate are determined.

GENERAL DESCRIPTION

The operation of the Whirling of Shafts Unit "MEER" unit starts when the potentiometer of the console is activated.

This potentiometer delivers electric power to the motor, which starts to rotate at a specific frequency. As the power delivered increases, the motor will rotate quicker. This speed is obtained from the reading of the velocity sensor.

The rotation of the motor is transferred by an elastic coupling to a fixed support with a mandrel. The rotation is transferred from that support to the fixed shaft.

Several supports are located along the shafts under study to establish different configurations with fixed or articulated supports. These restrictions imposed on the shafts will determine the way in which they oscillate.

SPECIFICATIONS

Bench top unit with adjustable legs.

Anodized aluminum frame and panels made of painted steel.

Main metal elements made of stainless steel.

Diagram in the front panel with distribution of the elements similar to the real unit.

Three-phase motor controlled by a variable – frequency drive to make the test shaft rotate to different frequencies:

Power: 0.5 kW.

Speed: 0 – 10000 r.p.m.

Three rotor shafts of different diameters:

Made of stainless steel.

Diameters: 3 mm, 6 mm, 7 mm.

Length: 950 mm.

Rotor disc with clamping mandrel to load the shaft in a concentrated point:

Made of stainless steel.

Diameter: 100 mm.

Weight: 1.2 kg.

Two supports with clamping mandrels. They allow the determination of the fixed supports for the shaft.

Two supports with self-aligning bearings. They allow the determination of the articulated supports for the shaft.

Different open-end wrenches and Allen keys are supplied with the unit to change and fix the different testing shafts and supports.

The unit includes all the safety measures required for a safe operation:

Safety supports with nylon bearings that prevent the shafts from oscillating with uncontrolled amplitude.

Support with clamping mandrel to prevent inadequate oscillations and damages in the unit.

Transparent protection cover to allow the visualization of the unit.

Limit actuator to prevent the operation of the unit without the protection cover.

Electronic console:

Metal box.

Motor connector.

Motor speed controller.

Digital display for the motor speed.

Cables and accessories, for normal operation.

Manuals: This unit is supplied with the following manuals: Required Services, Assembly and Installation, Starting-up, Safety, Maintenance & Practices Manuals.

EXERCISES AND PRACTICAL POSSIBILITIES

- 1.- Visualization of different modes of oscillation in a shaft.
- 2.- Influence of the rotating speed of the shaft. Critical speed and operation speed.
- 3.- Speed of the modes of vibration of a rotor shaft in function of different distances between supports.
- 4.- Speed of the modes of vibration of a rotor shaft in function of different diameters of the shaft.
- 5.- Speed of the modes of vibration of a rotor shaft in function of different conditions in the ends.
- 6.- Study of a Laval rotor: critical speed and auto-centering.
- 7.- Critical speed of the shaft with concentrated load in function of the position of the mass.
- Other practical possibilities:
- 8.- Demonstration of basic whirling.

REQUIRED SERVICES

- Electrical supply: single phase, 220V/50Hz, 110V/60Hz.

Note: This unit can create vibrations, so you must use it on a strong, good-quality laboratory bench.

OPTIONAL ACCESSORIES

- MEER-S1. Vibration sensors with clamping set:
Includes: 2 sensors with cable and 2 sensors clamps.
It allows the measurement of the displacement of the rotor shaft.

DIMENSIONS AND WEIGHTS

MEER:

Unit:

-Dimensions: 1 600 x 500 x 600 mm. approx.
(62.99 x 19.68 x 23.62 inches approx.)

-Weight : 60 kg. approx.
(132.2 pounds approx.)

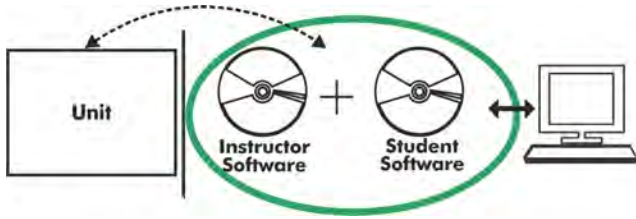
Electronic console:

-Dimensions: 310 x 220 x 145 mm. approx.
(12.20 x 8.66 x 5.70 inches approx.)

-Weight : 2 kg. approx.
(4.4 pounds approx.)

Optional

MEER/ICAI. Interactive Computer Aided Instruction Software System:



Without a physical connection between unit and computer (PC), this complete software package consists of an Instructor Software (EDIBON Classroom Manager -ECM) totally integrated with the Student Software (EDIBON Student Labsoft -ESL). Both are interconnected so that the teacher knows at any moment what is the theoretical and practical knowledge of the students.

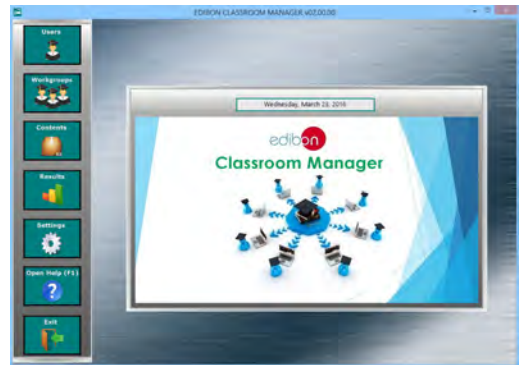
Instructor Software

-ECM. EDIBON Classroom Manager (Instructor Software).

ECM 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:

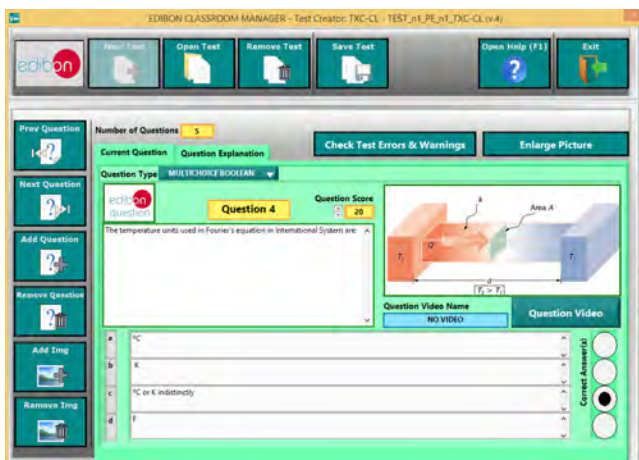
- User Data Base Management.
- Administration and assignment of Workgroups, Tasks and Training sessions.
- Creation and Integration of Practical Exercises and Multimedia Resources.
- Custom Design of Evaluation Methods.
- Creation and assignment of Formulas & Equations.
- Equation System Solver Engine.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



ECM. 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. EDIBON Student Labsoft (Student Software).

ESL 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.

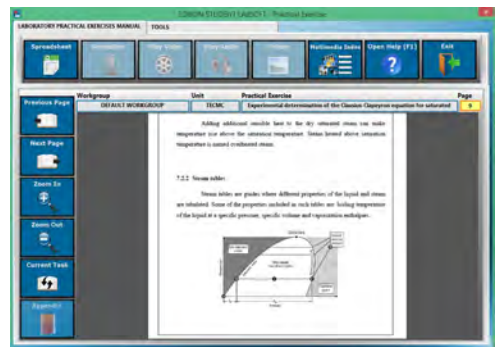
Innovative features:

- 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.**

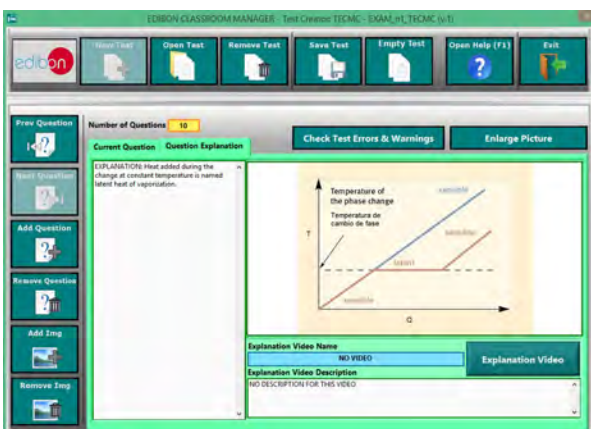
For more information see **ICAI** catalogue. Click on the following link:
www.edibon.com/products/catalogues/en/ICAI.pdf



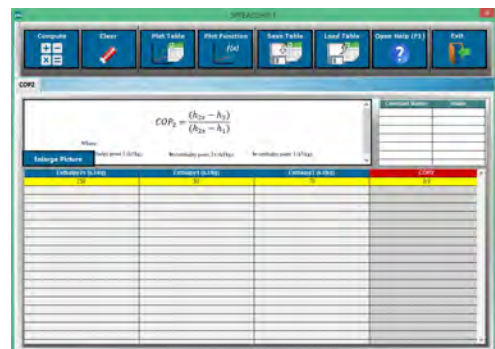
ESL. EDIBON Student LabSoft (Student Software) Application Main Screen



EPE. EDIBON Practical Exercise Program Package Main Screen



ERS. EDIBON Results & Statistics Program Package-Question Explanation



ECAL. EDIBON Calculations Program Package Main Screen

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 (PC).

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



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