edibon

Engineering and Technical
Teaching Equipment

PROCESS DIAGRAM AND UNIT ELEMENTS ALLOCATION
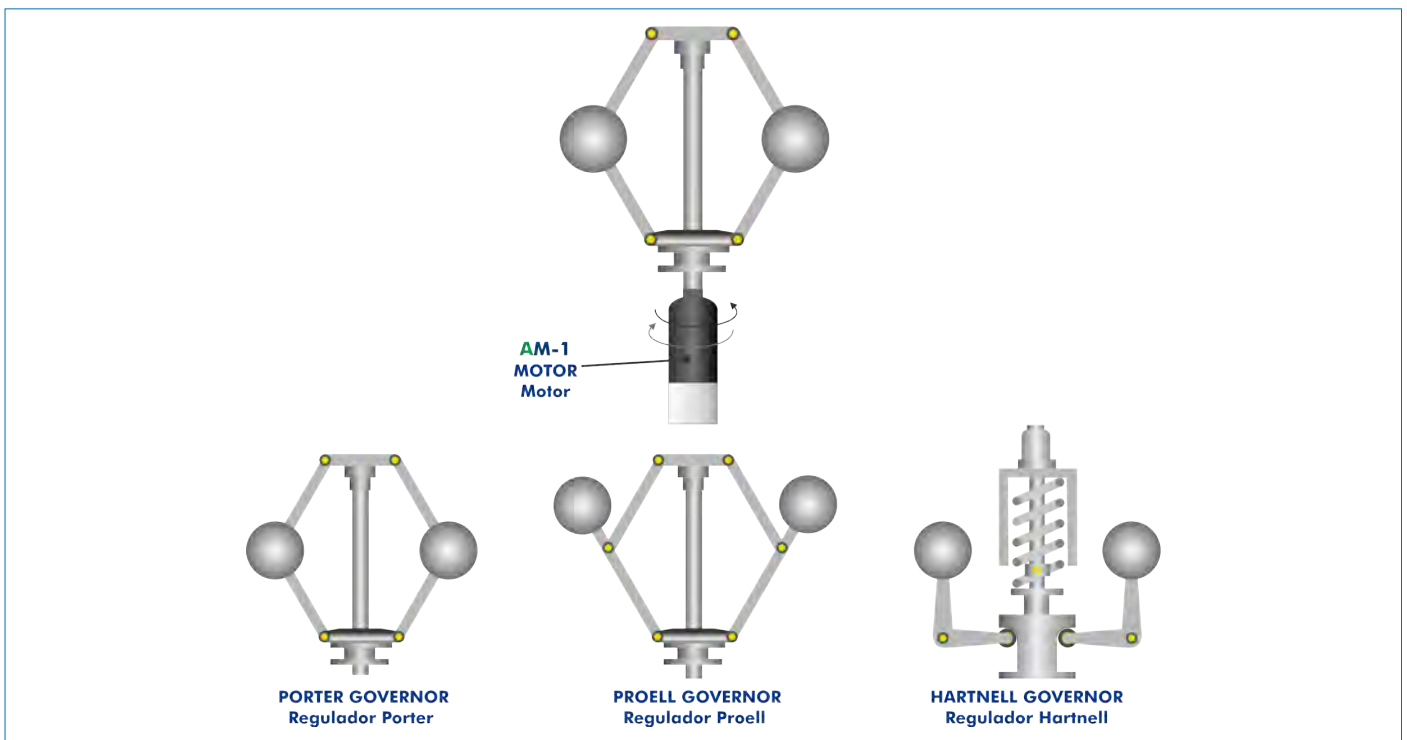
**AM-1
MOTOR**
Motor

PORTER GOVERNOR
Regulador Porter

PROELL GOVERNOR
Regulador Proell

HARTNELL GOVERNOR
Regulador Hartnell

INTRODUCTION

The centrifugal governor is a mechanism that adopts a position, dependent on the speed of rotation of a shaft, which will control the higher or lower motor action on the system load.

As a result of centrifugal force, a rotating mass tends to move away from the axis of rotation, but at the same time it opposes mechanisms (spring system or gravity force through an articulated system). The deviation will be proportional to the number of revolutions. There are different types of regulators depending on the type of mechanism: weights and springs.

The Centrifugal Governor Unit, "CGU", has been designed to study the operation of different centrifugal governors.

GENERAL DESCRIPTION

The Centrifugal Governor Unit, "CGU", has been designed to study the operating mode of different centrifugal governors, including three interchangeable governors: Porter governor, Hartnell governor and Proell governor.

Interchangeable governors rotate using a variable speed motor. The centrifugal masses of each governor move away from the pivot axis and the governors compensate for this deviation. The Porter and Proell governors include different centrifugal masses to perform studies with different rotating masses and different mass or force of the sleeve.

The preload of the spring can also be regulated in the Hartnell governor.

A transparent protective cover provides protection against rotating parts and enables different experiments to be observed. The opening of this cover automatically stops the electrical motor.

SPECIFICATIONS

Bench-top unit.

Anodized aluminium frame and painted steel panels.

Main metallic elements of stainless steel.

Diagram on the front panel with distribution of the elements similar to the real one.

Variable speed motor:

    Speed range: 0 - 600 rpm.

Proell regulator:

    Mass of the sleeve: 3 x 100 g.

    Centrifugal masses: 2 x 400 g and 2 x 150 g.

Hartnell regulator:

    Centrifugal mass: 2 x 400 g.

    Two compression springs with initial tension of the adjustable spring.

Porter regulator:

    Mass of the sleeve: 3 x 100 g.

    Centrifugal masses: 2 x 400 g and 2 x 150 g.

Transparent protective cover, made of PMMA, provides protection against rotating parts and enables different experiments to be observed. This cover includes a safety switch which allows to automatically stop the electric motor if the cover is opened.

Electronic console:

    Metallic box.

    Main switch.

    Motor switch.

    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, Security, Maintenance and Practices manual.

EXERCISES AND PRACTICAL POSSIBILITIES

1.- Study of the operating mode of a Porter type centrifugal governor.

2.- Study of the operating mode of a Proell type centrifugal governor.

3.- Study of the operating mode of a Hartnell type centrifugal governor.

4.- Adjustment of different types of centrifugal governors.

5.- Construction of characteristic curves of different centrifugal governors.

6.- Study of the effect of changing the centrifugal mass.

7.- Study of the effect of changing the preload of the spring.

8.- Study of the effect of changing the mass or force of the central sleeve.

9.- Comparison of the sensitivity, stability and stress of different types of centrifugal governors.

REQUIRED SERVICES

- Electrical supply: single-phase 200 VAC – 240 VAC/50 Hz or 110 VAC – 127 VAC/60 Hz.

DIMENSIONS AND WEIGHTS

CGU:

Unit:

- Dimensions: 600 x 600 x 540 mm approx.
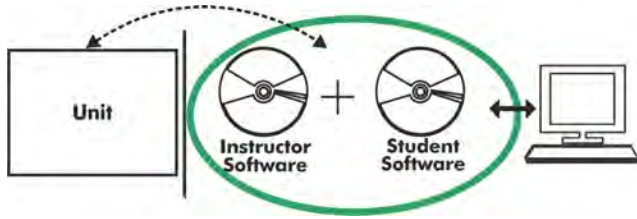
(23.62 x 23.62 x 21.26 inches approx.)

- Weight: 20 Kg approx.

(44 pounds approx.)

Electronic console:

- Dimensions: 300 x 190 x 130 mm approx.

(11.81 x 7.48 x 5.12 inches approx.)

- Weight: 3 Kg approx.

(6.6 pounds approx.)

CGU/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.
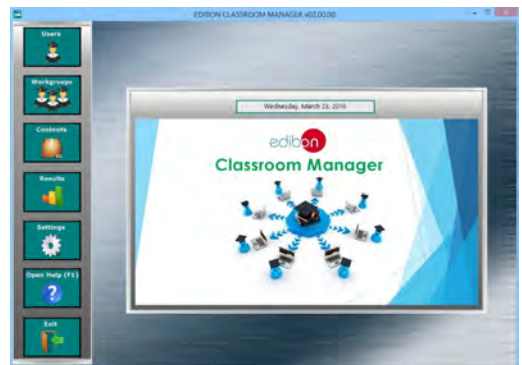
Instructor Software

### - 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
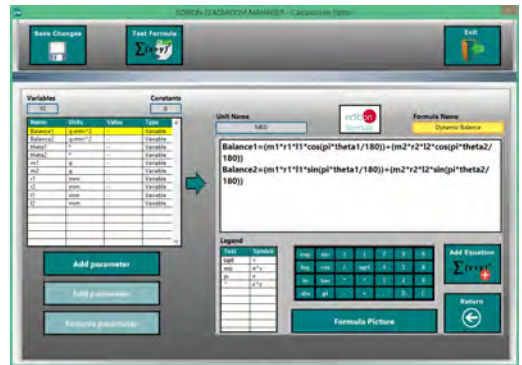
ECAL. EDIBON Calculations Program Package - Formula Editor Screen
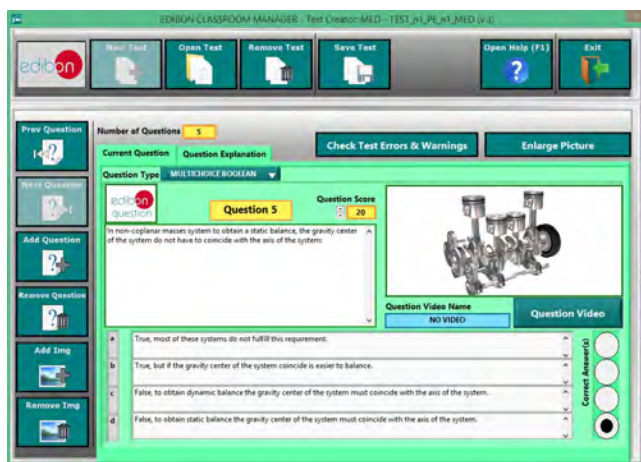
ETTE. EDIBON Training Test & Exam Program Package - Main Screen with Numeric Result Question

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

- 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.**

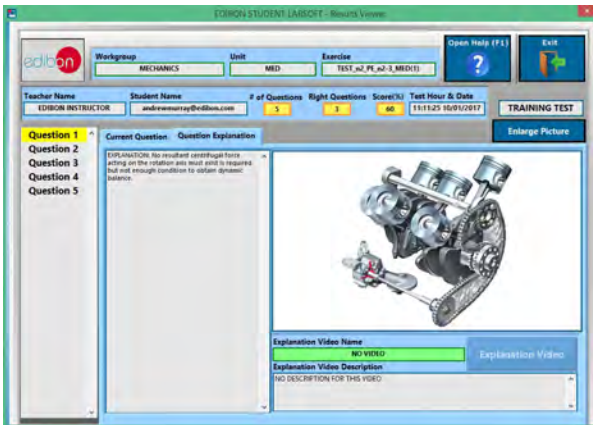For more information see **ICAI** catalogue. Click on the following link:

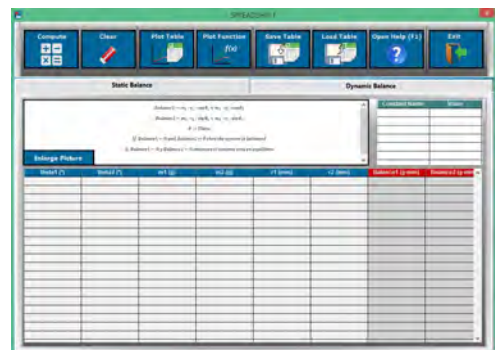www.edibon.com/en/files/expansion/ICAI/catalog

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.

edibon
INTERNATIONAL

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REPRESENTATIVE: