Temperature Measurement Training Unit

TEMT

Electronic console

PROCESS DIAGRAM AND UNIT ELEMENTS ALLOCATION
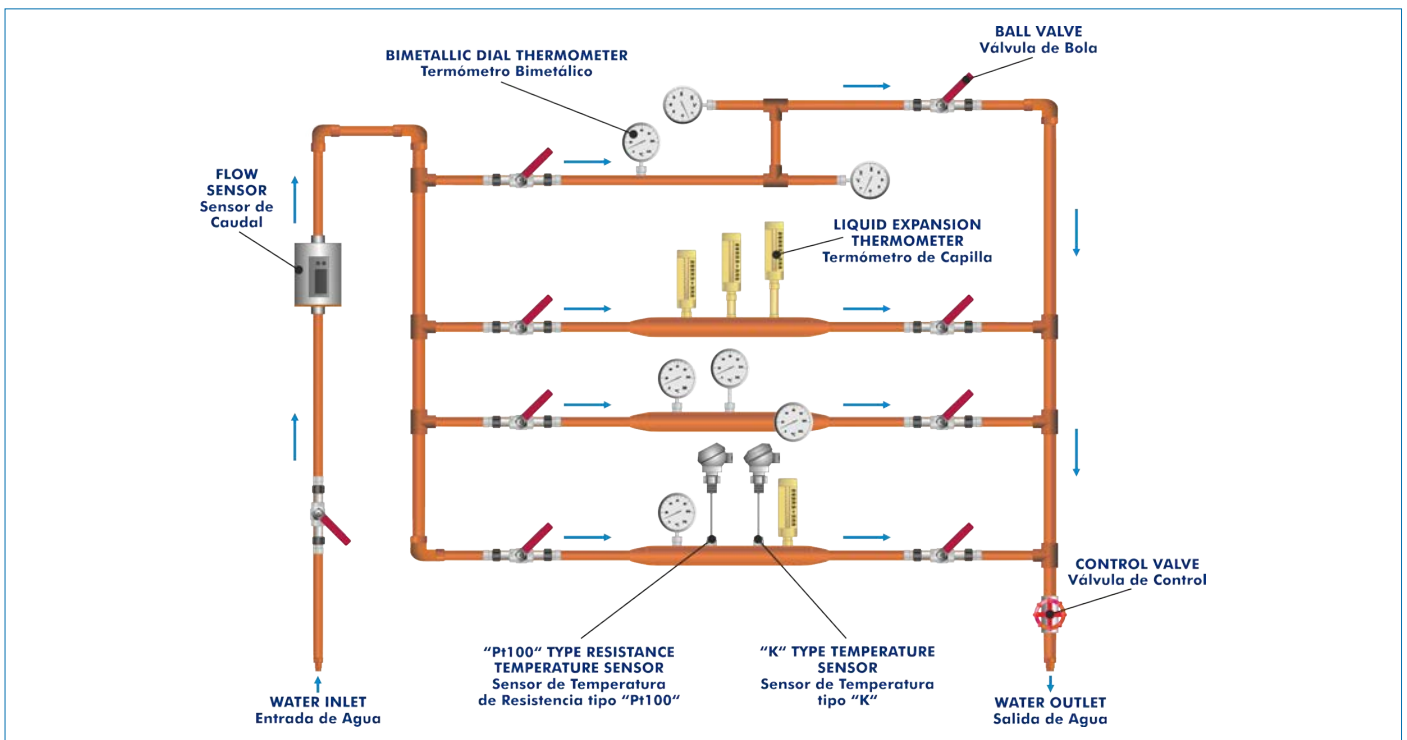
BALL VALVE
Válvula de Bola

BIMETALLIC DIAL THERMOMETER
Termómetro Bimetálico

FLOW
SENSOR
Sensor de
Caudal

LIQUID EXPANSION
THERMOMETER
Termómetro de Capilla

"Pt100" TYPE RESISTANCE
TEMPERATURE SENSOR
Sensor de Temperatura
de Resistencia tipo "Pt100"

"K" TYPE TEMPERATURE
SENSOR
Sensor de Temperatura
tipo "K"

CONTROL VALVE
Válvula de Control

WATER INLET
Entrada de Agua

WATER OUTLET
Salida de Agua

INTRODUCTION

Several methods have been developed for measuring temperature. Most of them rely on measuring some physical property of a working material that varies with temperature.

For example, bimetallic dial thermometers use a bimetallic strip wrapped into a coil that converts a temperature change into mechanical displacement, liquid expansion thermometers measure the temperature by expansion of a liquid under the effect of heat, and resistance temperature sensors measure the temperature by correlating the resistance of the resistance temperature detector (RTD) element with temperature.

The Temperature Measurement Training Unit, "TEMT", allows to investigate several temperature measurement techniques, in the range from 0 – 60 °C.

GENERAL DESCRIPTION

The Temperature Measurement Training Unit, "TEMT", allows to compare the response of several devices to measure the temperature for different flows and different installation position of these devices.

The unit includes four different measuring sections. Each section has different types of thermometers installed in different positions: bimetallic dial and liquid expansion thermometers indicate the measurement directly; "Pt100" type resistance temperature sensor and "K" type temperature sensor are displayed digitally with an electronic console (in a separate metallic box).

The measuring sections can be individually selected using the ball valves situated at the inlet and outlet sections.

A flow sensor situated on the water inlet measures the flow rate in the measuring sections.

Water connections made using quick-release couplings.

SPECIFICATIONS

Anodized aluminum frame and panels made of painted steel.

The unit includes wheels to facilitate its mobility.

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

The unit includes:

    Four types of thermometers:

        Bimetallic dial thermometers, range: 0 – 60 °C.

        Liquid expansion thermometers, range: 0 – 60 °C.

        "Pt100" type resistance temperature sensor, range: 0 – 250 °C.

        "K" type temperature sensor, range: 0 – 1200 °C.

    Four measuring sections:

        Material: Cooper.

        Section no.1: It includes three bimetallic dial thermometers situated at different positions.

        Section no.2: It includes three liquid expansion thermometers situated at different heights.

        Section no.3: It includes three bimetallic dial thermometers situated at different heights.

        Section no.4: It includes one bimetallic dial thermometer, one liquid expansion thermometer, one "Pt100" type resistance temperature sensor and one "K" type temperature sensor situated at same height.

    A flow sensor, with display, situated on the water inlet to measure the flow rate in the measuring sections, range: 0.2 – 50 l/min.

    Nine ball valves:

        Ball valve situated in the water inlet line.

        Eight ball valves situated in the measuring sections inlet and outlet lines to select individually the different sections.

    Control valve situated in the water outlet line to regulate the water flow rate in the measuring sections.

    Water connections made using quick-release couplings.

    Electronic console (in a separate metallic box):

        Temperature sensor connections.

        Selector for temperature sensors.

        Digital display for the temperature sensors.

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.

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EXERCISES AND PRACTICAL POSSIBILITIES

1.- Identification and familiarization with several devices of temperature measurement.

2.- Study of the function of bimetallic dial thermometers and liquid expansion thermometers.

3.- Study of the function of "Pt100" type resistance temperature sensors and "K" type temperature sensors.

4.- Study of the type of construction of bimetallic dial thermometers and liquid expansion thermometers.

5.- Study of the type of construction "Pt100" type resistance temperature sensors and "K" type temperature sensors.

6.- Study of the applications of bimetallic dial thermometers and liquid expansion thermometers.

7.- Study of the applications of "Pt100" type resistance temperature sensors and "K" type temperature sensors.

8.- Determination of the precision, sensitivity and error of measurement for different thermometers.

9.- Study of the influence of installation position, for the different thermometers, in the response and error of measurement.

REQUIRED SERVICES

- Electrical supply: single-phase, 220 V/50 Hz or 110 V/60 Hz.
- Water connections.
- Hot water supply: max. temperature: 60 °C, max. flow: 50 l/min.

DIMENSIONS AND WEIGHTS

TEMT:
  Unit:
    -Dimensions: 1700 x 550 x 1700 mm approx.
                 (66.93 x 21.65 x 66.93 inches approx.)
    -Weight :   70 Kg approx.
                 (154 pounds approx.)
  Electronic console:
    -Dimensions: 300 x 190 x 130 mm approx.
                 (11.81 x 7.48 x 5.11 inches approx.)
    -Weight: 3 Kg approx.
                 (6.6 pounds approx.)

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TEMT/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.
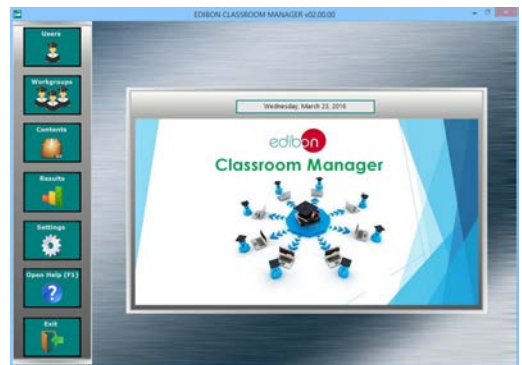
Instructor Software

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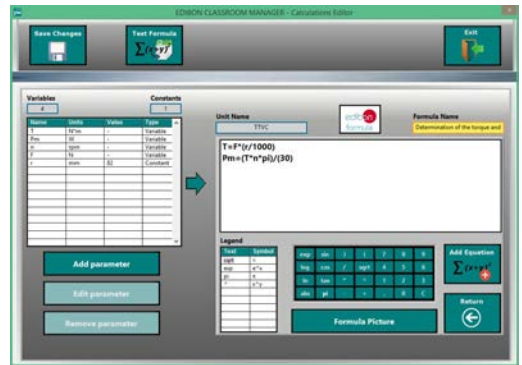
ECAL. EDIBON Calculations Program Package - Formula Editor
Screen
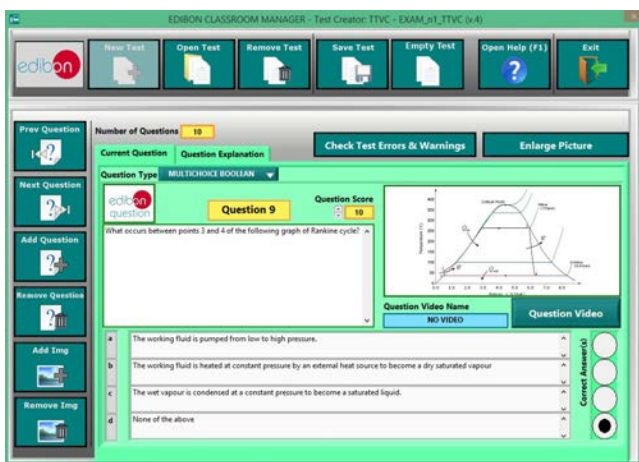
ETTE. EDIBON Training Test & Exam Program Package - Main Screen with
Numeric Result Question

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.

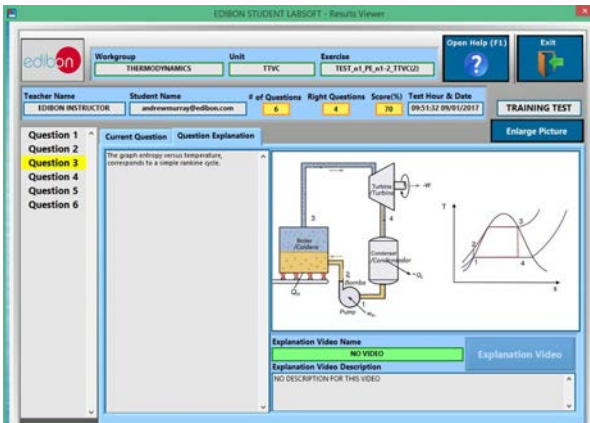For more information see ICAI catalogue. Click on the following link:
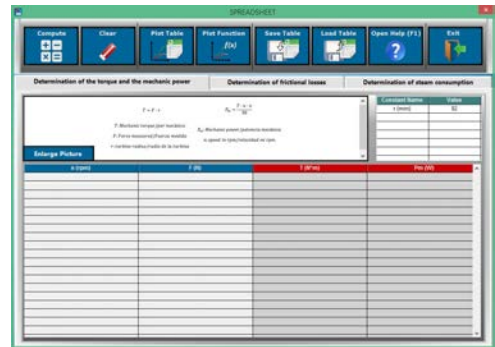www.edibon.com/en/files/expansion/ICAI/catalog

ESL-SOF. EDIBON Student LabSoft (Student Software)
Application Main Screen
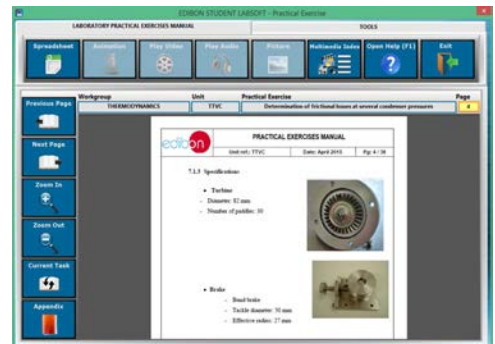
EPE. EDIBON Practical Exercise Program Package Main Screen

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.

INTERNATIONAL

REPRESENTATIVE: