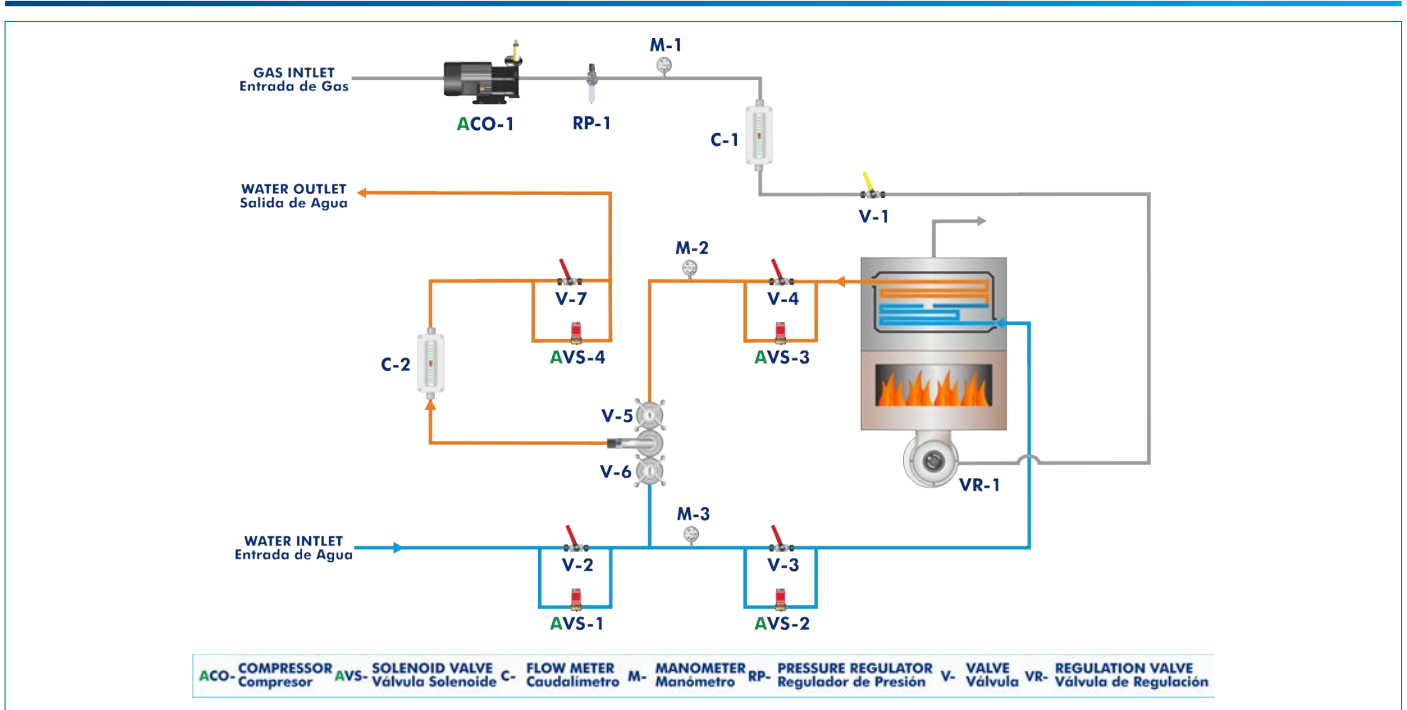




PROCESS DIAGRAM AND UNIT ELEMENTS ALLOCATION



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

Nowadays, there is a heating device in every home to heat service water. There are different devices used for this purpose: heaters with electrical heating element, diesel boilers, instantaneous gas heaters, etc.

The instantaneous gas heater is a common apparatus in many houses due to its affordable cost and simple assembly and maintenance. Besides, their dimensions can be quite compact to provide small hot water services.

The Instantaneous Gas Heater Trainer, "IGHT", allows the user to study the operation, installation and assembly of this type of device, as well as to simulate faults to analyze and repair them.

GENERAL DESCRIPTION

The Instantaneous Gas Heater Trainer, "IGHT", designed by EDIBON, is a training unit with wheels to facilitate its mobility that represents a gas heater training system.

The unit operates with air, simulating the operation of the heater, so it can be safely used in classrooms and laboratories.

The unit is self-contained since the air required for its operation is supplied by a diaphragm pump.

The main element of the unit is an instantaneous gas heater driven by a diaphragm pump that provides service air at the pressure required by the heater to work. A pressure regulator controls the service pressure in the heater and a set of LED diodes simulate the flame generated in the heater. Furthermore, the heater does not have casing or heat exchanger to allow an easier understanding of the concepts under study.

The unit simulates, through a PLC, typical and real faults produced in this type of devices. Besides, the unit includes a set of solenoid valves to simulate faults in the piping that supply the heater. The PLC coupled to the unit simulates up to possible 14 faults randomly in three different working modes and has a selection touchscreen. On the other hand, the unit is installed on a totally accessible panel provided with wheels for better mobility.

Besides, this unit simulates all the safety measures required: pilot light flame, probe to avoid the blowing back of the combustion gases, flame detection by thermocouple, pressure switch, temperature limiting thermostat, etc.

SPECIFICATIONS

Anodized aluminum frame and panels made of painted steel.

Main metallic elements made of stainless steel.

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

Gas heater circuit:

Diaphragm pump: 100 l/min - 0.04 mpa.

Heater. Power: 20 Kw.

Pressure regulator: 10 - 400 mbar.

Venturi type nozzles.

Water flowmeter. Range: 0 - 10 l/min.

Air flowmeter. Range: 0 - 100 l/min.

Air manometer: 0 - 0.5 bar.

Water manometer. Range: 0 - 6 bar.

Thermostat.

PLC controller with touchscreen:

Box made of steel.

Power supply: 110 - 240 Vac.

ON/OFF main switch.

Power supply connector.

Protection fuse: 5 A.

RS232 cable for communication with computer.

Panasonic FP-XC30R PLC unit. Main characteristics:

Ultra-high processing speed of 0.32 μ s per instruction.

Great programming capacity of 16 Ksteps.

Memory for independent comments.

Maximum of 300 I/O (Inputs/Outputs) points.

Touchscreen:

Display: STN monochrome LCD. Resolution: 128 (W) x 64 (H) points. Display colors: 2. LCD duration: an average of 50000 hours.

Backlight: 3 colors LED (green, red, orange). Different sources. Types of characters: alphanumeric characters. Graphs: straight lines, continuous straight lines, squares, circles, ovals, arches, elliptic arches, etc. Number of screens: 160 approx. Part of the functions: messages, lamps, switches, data, bar graphs, keyboard. Contrast control.

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.



IGHT detail

EXERCISES AND PRACTICAL POSSIBILITIES

- 1.- Identification of the main components of an instantaneous gas heater: heat exchanger, burners, casing, etc.
- 2.- Study of the operation of an instantaneous gas heater.
- 3.- Study of the ignition method and protocol.
- 4.- Study of possible faults generated in this type of devices.
- Additional practical possibilities:
- 5.- Study of the pressure regulation method with Venturi nozzles for the adjustment of gas burners.
- 6.- Study of the volumetric method for the adjustment of gas burners.
- 7.- Study of the minimum distance for the installation of an instantaneous gas burner.
- 8.- Study of the compatibility with other heating systems.

REQUIRED SERVICES

- Electrical supply: single-phase, 220 V/50 Hz or 110 V/60 Hz.
- Two batteries: 1.5 V.
- Water supply: 6 - 10 l/min.

DIMENSIONS AND WEIGHTS

- IGHT:
- Dimensions: 1400 x 800 x 1800 mm approx.
(55.11 x 31.49 x 70.86 inches approx.)
 - Weight: 80 Kg approx.
(176 pounds approx.)

IGHT/ICAI. Interactive Computer Aided Instruction Software System:



With no physical connection between unit and computer (PC), 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.

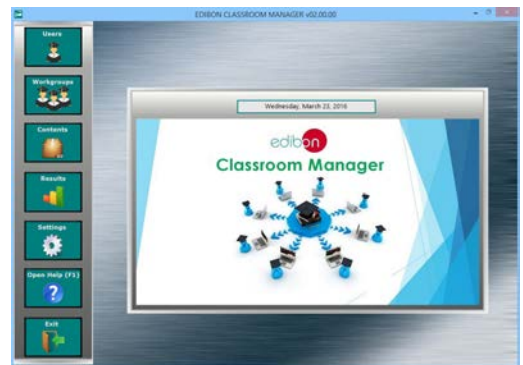
Instructor Software

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

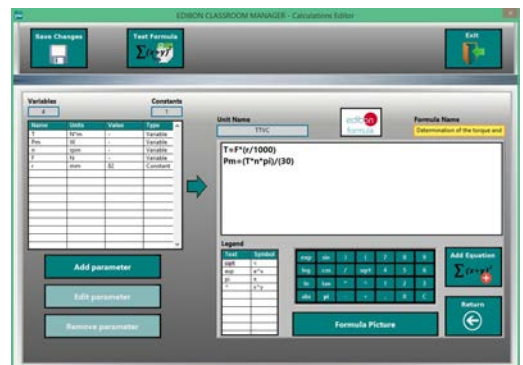
ECM-SOF is the application that allows the Instructor to register students, manage and assign tasks for workgroups, create own content to carry out Practical Exercises, choose one of the evaluation methods to check the Student knowledge and monitor the progression related to the planned tasks for individual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

Innovative features:

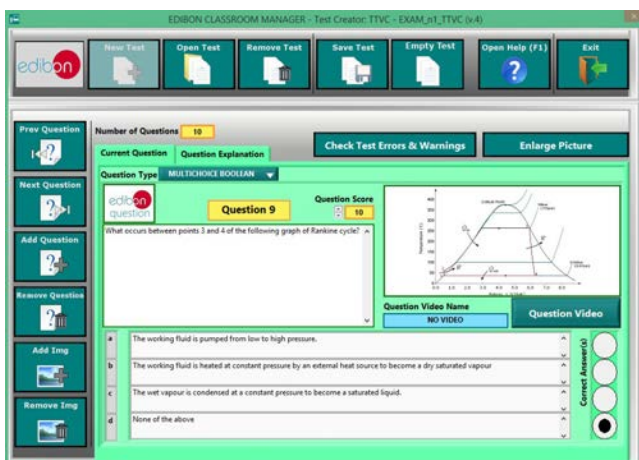
- User Data Base Management.
- Administration and assignment of Workgroup, Task and Training sessions.
- Creation and Integration of Practical Exercises and Multimedia Resources.
- Custom Design of Evaluation Methods.
- Creation and assignment of Formulas & Equations.
- Equation System Solver Engine.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

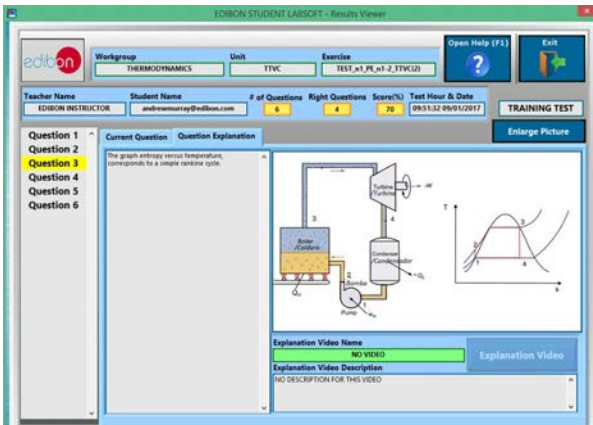
www.edibon.com/en/files/expansion/ICAI/catalog



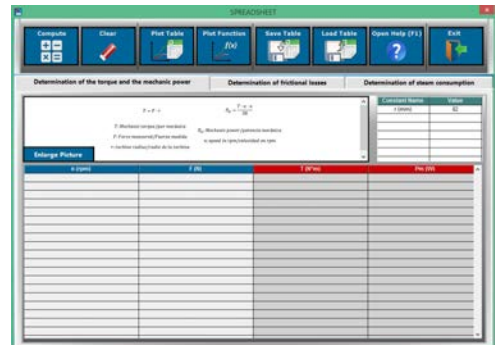
ESL-SOF. EDIBON Student LabSoft (Student Software)
Application Main Screen



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.



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REPRESENTATIVE:

