edibon

Engineering and Technical Teaching Equipment

Hydronic Balancing Training Unit

THBT

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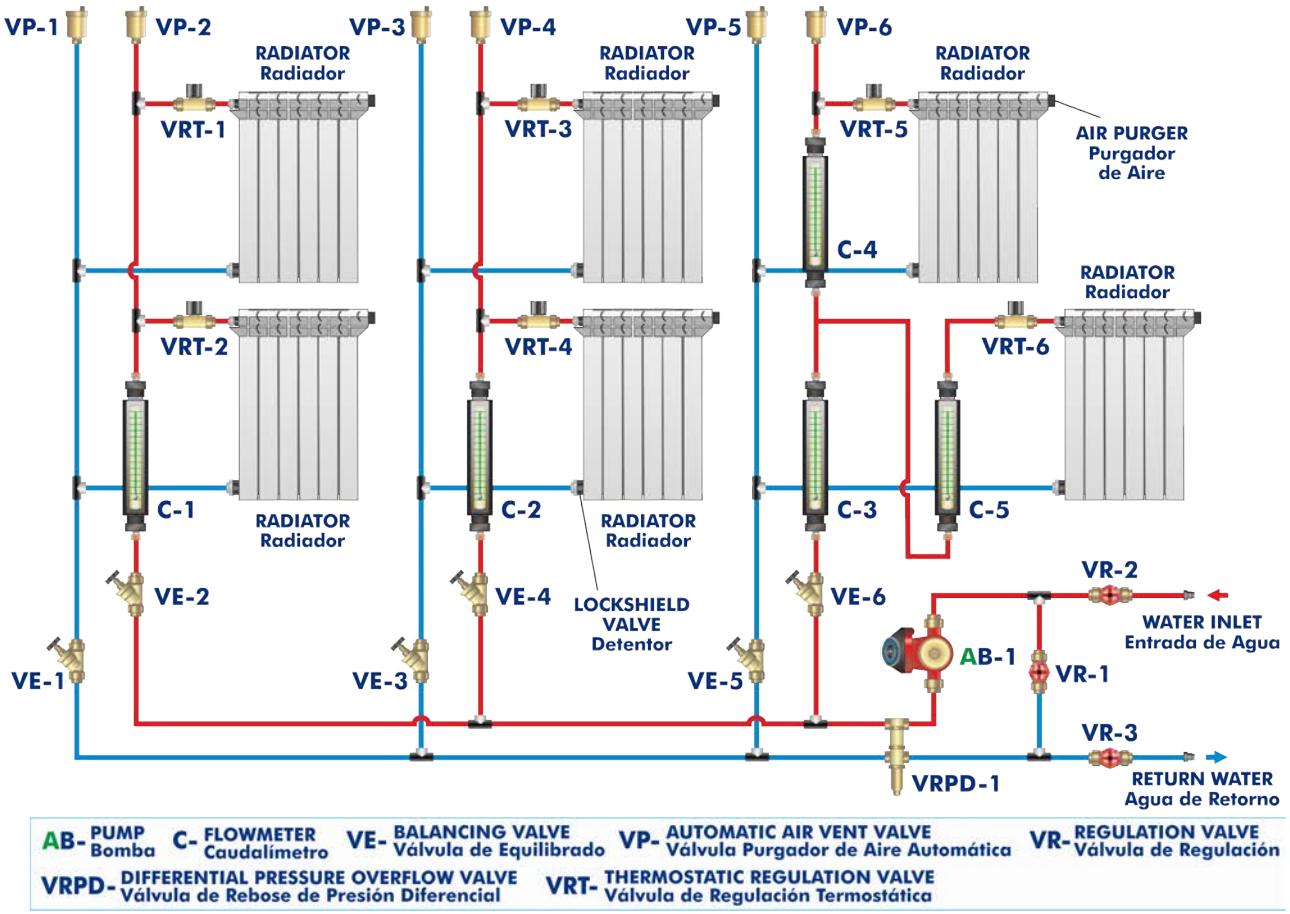
PRODUCTS
90.- THERMODYNAMICS & THERMOTECHNICS



INTRODUCTION

Heating refers to the method or system used to supply heat to a person or a space with the aim of keeping or raising its temperature.

Applied to buildings, heating covers the group of devices and accessories installed to reach and keep thermal comfort conditions during cold seasons, so it is part of air-conditioning systems.

The hydronic balancing of a DHW system allows for keeping the water temperature constant in every point of consumption. In an unbalanced distribution network, water losses temperature between intervals of use, apart from oscillating depending on the degree of demand. In both cases, the service is inadequate, causing waste of water and energy: water frequently runs till it is hot and, even so, its temperature fluctuates. Trying to solve it by increasing the flow and temperature implies greater heat losses, not correcting the temperature disparity between the points of consumption.

GENERAL DESCRIPTION

The Hydronic Balancing Training Unit, "THBT", has been designed to study the amount of water that guarantees enough provision of hot water to all the radiators in a system. The hydronic balancing is performed with lockshield valves, which block the circulation of a fluid in one direction and allow it to circulate in the opposite direction.

The unit has several heating circuits that consist of radiators, balancing valves, differential pressure overflow valve, automatic air vents and a circulating pump. The circuits are made with commercial components and each circuit can be shut off individually. When the circuit is filled, it is independent of the water mains or feed flow and return flow pipe connections, although it can also be used together with a heating circuit.

Each radiator has a thermostatic valve, a bleed valve and an adjustable lockshield valve.

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.

Commercially available components are used.

Heating system:

- Circulating hydraulic pump:
  - Maximum flow rate: 60 l/min.
  - Maximum head: 4 m.
- Six radiators. Each radiator includes:
  - Preset thermostatic valve to control the temperature of the radiators.
  - Bleed valve to purge air from the system.
  - Adjustable lockshield valve.
- Four automatic air vent.
- Six hydronic balancing valves.
- Differential pressure overflow valve.
- Expansion vessel.
- Boiler safety group according to DIN 4751.
- Five rotameters distributed along the system:
  - Four of them with a range of 50 – 650 l/h.
  - One of them with a range of 30 – 350 l/h.
- Surface thermometer to measure the temperature at the inlet and outlet of the radiators, range: -50 – 30 °C.
- Water connections with quick-release fitting.

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

EXERCISES AND PRACTICAL POSSIBILITIES

1.- Study of a hydronic balancing system of a heating system.
2.- Study and understanding of a hydronic balancing valve.
3.- Study and understanding of a thermostatic valve.
4.- Study of a differential pressure bleed valve.

REQUIRED SERVICES

- Hot and cold water supply.
- Drain.

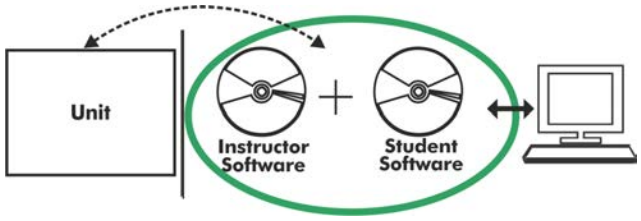
DIMENSIONS AND WEIGHTS

THBT:

-Dimensions: 2300 x 800 x 1800 mm approx.
(90.55 x 31.49 x 70.86 inches approx.)

-Weight: 200 Kg approx.
(440.92 pounds approx.)

THBT/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).

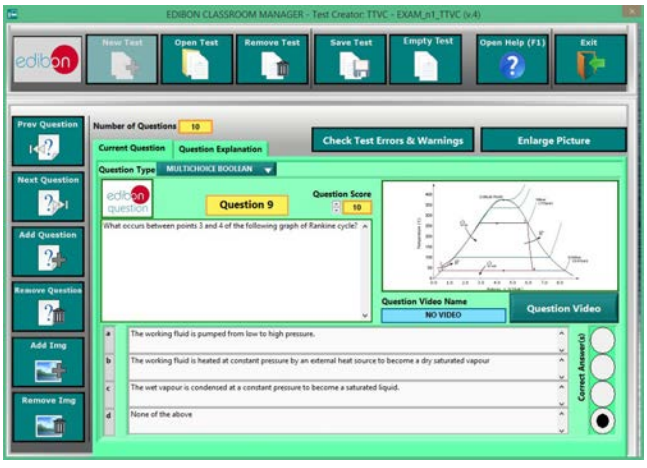
ECM-SOF is the application that allows the Instructor to register students, manage and assign tasks for workgroups, create own content to carry out Practical Exercises, choose one of the evaluation methods to check the Student knowledge and monitor the progression related to the planned tasks for individual 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

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.

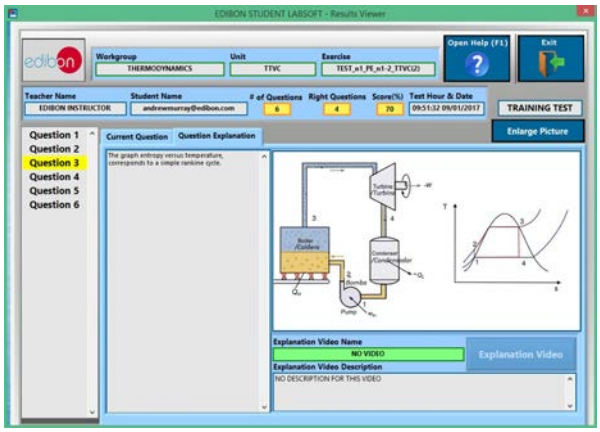
Innovative features:

- **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.**

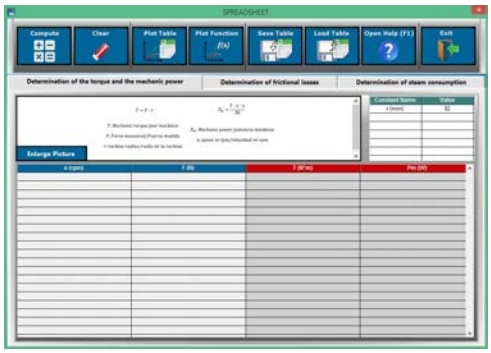
ESL-SOF. EDIBON Student LabSoft (Student Software) Application Main Screen

EPE. EDIBON Practical Exercise Program Package Main Screen

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



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: