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Engineering and Technical Teaching Equipment

Assembly and Maintenance of Pumps

AMP

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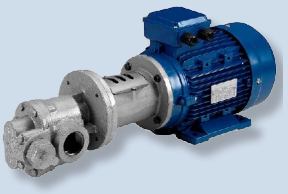
↳PRODUCTS
↳7.- MECHANICS AND 8.- FLUID MECHANICS

AMGP



AMLCP

AMPP

AMCP

AMMCP

AMSP

AMDP

INTRODUCTION

A hydraulic pump is a machine that transforms its driving energy, usually mechanical energy, into energy of the incompressible fluid it moves. The incompressible fluid may be liquid or a mixture of liquids and solids, such as pre-setting concrete or paper pulp, among others. By increasing the energy of the fluid, its pressure, speed, or height are increased, all them being interrelated according to the Bernoulli principle. In general, a pump is used to increase the pressure of a liquid by adding energy to the hydraulic system, in order to move the fluid from a lower pressure zone to a higher pressure zone.

Maintenance and repair works are performed throughout the life cycle of all types of pumps, since in many cases there are no spare parts available, or these are not designed to be replaced.

The different sets for the assembly and maintenance of pumps allow to assemble and disassemble, maintain and repair the main types of pumps that are usually used, as well as to the learn of all its components and their operation.

LRQA CERTIFIED ISO 9001
Certificate of Approval of the Quality Management System

CE
European Union Certificate
(total safety)

UL CSA
UL and CSA Regulations
(All our products are manufactured according to current UL and CSA regulations)

LRQA CERTIFIED ISO 14001
Certificate of Approval of the Environmental Management System

WQC worlddidac
Worlddidac Association Certificate of Membership

The different sets for the assembly and maintenance of pumps have all the parts in a case for an easy transport, facilitating the clear identification of all the components and allowing the systematic assembly and disassembly, maintenance and repair of the main types of pump that are usually used.

In addition, each set includes a tightness set for checking purposes, as well as a toolbox with compartments including everything needed to work with each set: open end wrenches, screwdrivers, non-ferrous hammers, spare gaskets, bearing puller, etc.

It serves to work both alone and in small groups, where the student will know all the components and their operation, as well as the structure and the pump operation. Each set is provided with the corresponding assembly diagrams, two-dimensional drawings, identification of the field of application, PFD and P&ID diagrams, operational data, technical designation, materials, exploded diagrams and operating manuals.

AMCP. Assembly and Maintenance of a Centrifugal Pump Unit:

The centrifugal pumps belong to the group of rotodynamic pumps, where the fluid is boosted thanks to the acceleration acquired when passing through the operating impeller. This acceleration, which starts from the center of the impeller and goes to the outside, is transformed into pressure at the end of the impeller, while negative pressures are generated at the suction side of the fluid. In most cases, this type of devices are installed in parallel in the industry, this way maintenance and repair tasks can be performed frequently without stopping the process. The most important applications of this type of pumps include driving different liquids into industrial processes applications, water purification, food sector, distillation and filtration processes, etc.

AMMCP. Assembly and Maintenance of a Multistage Centrifugal Pump Unit:

The multistage centrifugal pumps belong to the group of rotodynamic pumps, where the water is driven by centrifugal forces caused by the rotational movement of the impeller. Multi-stage centrifugal pumps can increase its lifting height, depending on the number of stages. The most important applications of this type of pumps include the industry, water supply and shipbuilding. They are also used to transport liquids containing suspended solids, but not very viscous.

AMSP. Assembly and Maintenance of a Screw Pump Unit:

The screw pumps belong to the group of positive displacement pumps, which use an eccentric helical screw (rotor) that moves inside a sleeve (stator), making the liquid flow between the screw and the sleeve. The most important applications of this type of pumps include chemical industry, paper industry, timber industry, ceramics and construction, food; they are also used for pumping wastewater at low altitudes. They also serve to transport viscous fluids with high solid content, which do not need to be stirred or which create foams if are agitated.

AMSP detail

AMDP. Assembly and Maintenance of a Diaphragm Pump Unit:

Membrane pumps or diaphragm pumps belong to the group of positive displacement pumps, where the pressure increase is obtained by pushing elastic walls, known as, membranes or diaphragms, which change the volume of the chamber. Retention valves, usually made with an elastomer material, make sure that the movement of the fluid takes place from the area of lower pressure to that of greater pressure. Diaphragm pumps are often used as dosing pumps because they have a stroke control system. Due to the corrosion resistance of these pumps and because of the fact that they don't need to be primed to work, this type of pumps is widely used in the industry, especially the chemical industry, to drive virtually any liquid, and in many industries involving acids, petroleum derivatives, solvents, paints, varnishes, inks, sewage sludge, reactants.

AMPP. Assembly and Maintenance of a Piston Pump Unit:

The piston pumps belong to the group of positive displacement pumps, where there are one or several fixed cavities whose volume can be changed due to the effect of a piston. The movement of the fluid is discontinuous and the charge and discharge processes are performed by valves which open and close alternately. The most important applications of this type of pumps include the transport of drinkable or industrial water in buildings, gardening, in the industry, in agriculture and in ships.

AMPP detail

AMLCP. Assembly and Maintenance of an In-Line Centrifugal Pump Unit:

The centrifugal in-line pumps belong to the rotodynamic pump group; these pumps are the most used currently to pump liquids in general. In-line pumps are installed in straight pipes, and the main difference with a standard pump is that the suction and discharge fittings are on the same shaft. The most important applications of this type of pumps include heating installations, water supply and irrigation and sprinkler systems.

AMGP: Assembly and Maintenance of a Gear Pump Unit:

The gear pumps belong to the group of positive displacement, rotary piston pumps, which produce flow by transporting the fluid between the teeth of two coupled gears. One of them is driven by the shaft of the pump (driving shaft), which turns the other one. The gear pump operates by the displacement principle - a pinion is driven and rotates the other one in the opposite direction. The filled teeth transport the liquid along the housing wall into the drive chamber. In the intake chamber, the meshing pinions transport the liquid out of the teeth and prevent the liquid from flowing back. The most important application of this type of pumps includes oleodynamic systems, since they can work with both low and high viscosity fluids. This type of pumps is only suitable for transporting fluids with no solid particles.

SPECIFICATIONS

Each set includes:

- Case for easy transport.
- Tightness test set:
  - Manual pump.
  - Pressure gauge.
  - Flange connections.
- Set of assembly and disassembly tools required for each of the units.

AMCP.
Assembly and Maintenance of a Centrifugal Pump Unit

Maximum power: 3000 W.
Maximum flow: 30 m^3/h.
Maximum No. of revolutions: 2900 min^{-1}.
Maximum lifting height: 29.5 m.
Suction / discharge diameter: DN50 / DN32 mm.
Pump housing and impeller: Cast iron.
Shaft: AISI 304 Steel.

AMMCP.
Assembly and Maintenance of a Multistage Centrifugal Pump Unit

Maximum power: 4000 W.
Maximum flow: 24 m^3/h.
Maximum No. of revolutions: 2900 min^{-1}.
Maximum lifting height: 50.5 m.
Suction / discharge diameter: DN50 / DN50 mm.
Pump head: Cast.
Shaft: AISI 304 Steel.

AMSP.
Assembly and Maintenance of a Screw Pump Unit

Maximum power: 500 W.
Maximum flow: 0.8 m^3/h.
Maximum No. of revolutions: 532 min^{-1}.
Design pressure: 12 bar.
Cover / shaft diameter: 45 / 40 mm.
Pump material: Cast iron.
Shaft material: Steel AISI 316.

AMDP.
Assembly and Maintenance of a Diaphragm Pump Unit

Maximum power: 180 W.
Flow: 5.5 l/h.
Number of impulses: 58 imp/min.
Design pressure: 10 bar.
Membrane diameter: DN64 mm.
Head / valve / valve box material: Stainless steel SS 316.
Piston: PTFE.

AMPP.
Assembly and Maintenance of a Piston Pump Unit

Maximum power: 180 W.
Maximum flow: 1000 l/h.
Number of impulses: 116 imp/min.
Design pressure: 5 bar.
Piston diameter: DN89 mm.
Pump Head: Stainless steel SS 316.
Piston: Stainless steel SS 316.
Valves and box valves material: Stainless steel SS 316.

AMLCP.
Assembly and Maintenance of an In-Line Centrifugal Pump Unit

Maximum power: 1500 W.
Maximum flow: 12.5 m^3/h.
No. of revolutions: 2900 m^{-1}.
Maximum lifting height: 21 m.
Suction / discharge diameter: DN32 / DN32 mm.
Head and case: Cast.

AMGP.
Assembly and Maintenance of a Gear Pump Unit

Maximum power: 2,2 kW.
Maximum flow: 5400 l/h.
Engine No. of revolutions: 1450 min^{-1}.
Maximum pressure: 6 bar.
Case and lid Gears: GG – 25 cast.
Shaft diameter: DN22 mm.
Gears: Treated steel.
Shaft: Cementation steel.

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.- Analysis and study of the operation and structure of the main types of pumps by identifying the components of the structure:
   - Centrifugal Pump.
   - Centrifugal Multistage Pump.
   - Screw Pump.
   - Diaphragm Pump.
   - Dosing Piston Pump.
   - Centrifugal In-line Pump.
   - Gear Pump.

2.- Set assembly and disassembly study and exercises.

3.- Study of tightness by means of the cable gland principle.

4.- Analysis of frequent breakdowns.

5.- Analysis and establishment of work planning, primarily maintenance and repair of damages and anomalies.

6.- Study and performance of replacement exercises of different components.

7.- Reading comprehension of technical drawings and instruction manuals.

DIMENSIONS AND WEIGHTS

AMCP:

- Dimensions of the pump: 380 x 290 x 200 mm approx. (14.96 x 11.41 x 7.87 inches approx.)
- Weight: 28 Kg approx. (61 pounds approx.)
- Dimensions of the case: 793 x 322 x 385 mm approx. (31.22 x 12.67 x 15.15 inches approx.)

AMMCP:

- Dimensions of the pump: 200 x 690 x 300 mm approx. (7.87 x 27.16 x 11.81 inches approx.)
- Weight: 42 Kg approx. (92 pounds approx.)
- Dimensions of the case: 793 x 322 x 385 mm approx. (31.22 x 12.67 x 15.15 inches approx.)

AMSP:

- Dimensions of the pump: 780 x 250 x 252 mm approx. (30.70 x 9.84 x 9.92 inches approx.)
- Weight: 20 Kg approx. (44 pounds approx.)
- Dimensions of the case: 793 x 322 x 385 mm approx. (31.22 x 12.67 x 15.15 inches approx.)

AMDP:

- Dimensions of the pump: 360 x 285 x 230 mm approx. (14.17 x 11.22 x 9.05 inches approx.)
- Weight: 20 Kg approx. (44 pounds approx.)
- Dimensions of the case: 570 x 280 x 210 mm approx. (22.44 x 11.02 x 8.26 inches approx.)

AMPP:

- Dimensions of the pump: 410 x 453 x 230 mm approx. (16.14 x 17.83 x 9.05 inches approx.)
- Weight: 35 Kg approx. (77 pounds approx.)
- Dimensions of the case: 793 x 322 x 385 mm approx. (31.22 x 12.67 x 15.15 inches approx.)

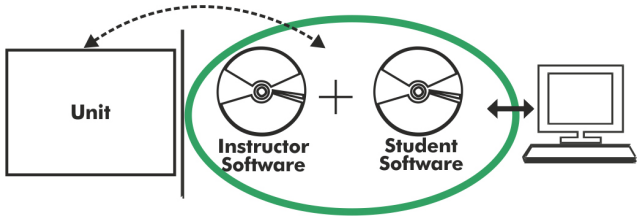
AMLCP:

- Dimensions of the pump: 511 x 340 x 120 mm approx. (20.11 x 13.38 x 4.72 inches approx.)
- Weight: 50 Kg approx. (110 pounds approx.)
- Dimensions of the case: 793 x 322 x 385 mm approx. (31.22 x 12.67 x 15.15 inches approx.)

AMGP:

- Dimensions of the pump: 324 x 260 x 160 mm approx. (12.75 x 10.23 x 6.29 inches approx.)
- Weight: 37 Kg approx. (81 pounds approx.)
- Dimensions of the case: 440 x 240 x 200 mm approx. (17.32 x 9.44 x 7.87 inches approx.)

AMP/ICAI. Interactive Computer Aided Instruction Software:



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.

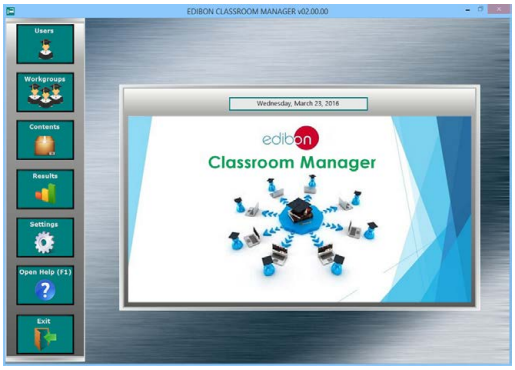
Instructor Software

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

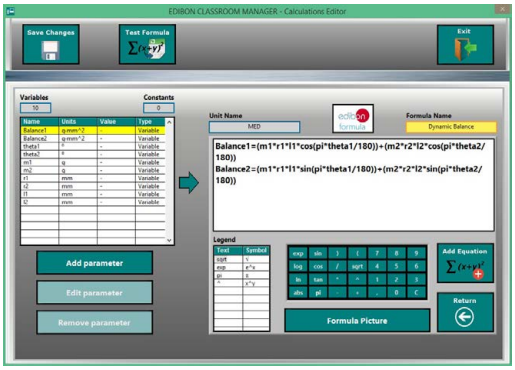
ECM-SOF is the application that allows the Instructor to register students, manage and assign tasks for workgroups, create own content to carry out Practical Exercises, choose one of the evaluation methods to check the Student knowledge and monitor the progression related to the planned tasks for individual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

Innovative features:

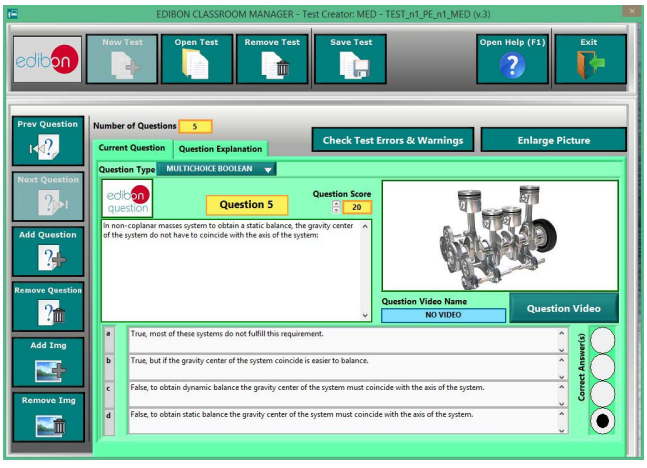
- **User Data Base Management.**
- **Administration and assignment of Workgroup, Task and Training sessions.**
- **Creation and Integration of Practical Exercises and Multimedia Resources.**
- **Custom Design of Evaluation Methods.**
- **Creation and assignment of Formulas & Equations.**
- **Equation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



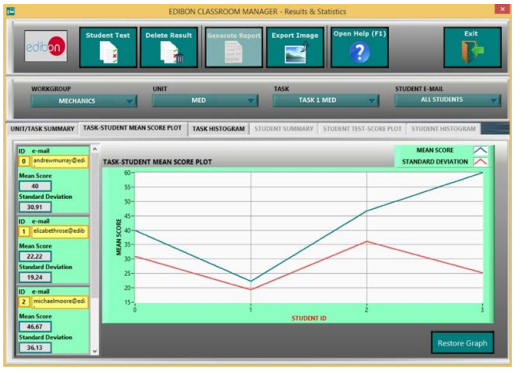
ECM-SOF. EDIBON Classroom Manager (Instructor Software) Application Main Screen



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).

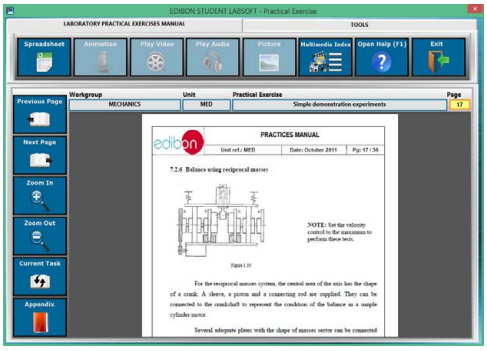
ESL-SOF is the application addressed to the Students that helps them to understand theoretical concepts by means of practical exercises and to prove their knowledge and progression by performing tests and calculations in addition to Multimedia Resources. Default planned tasks and an Open workgroup are 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:

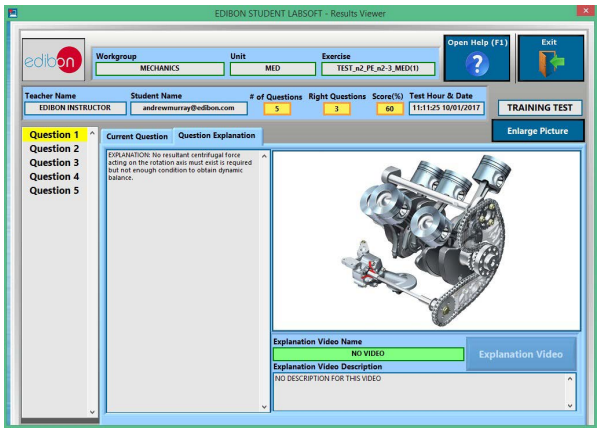
- **Student Log-In & Self-Registration.**
- **Existing Tasks checking & Monitoring.**
- **Default contents & scheduled tasks available to be used from the first session.**
- **Practical Exercises accomplishment by following the Manual provided by EDIBON.**
- **Evaluation Methods to prove your knowledge and progression.**
- **Test self-correction.**
- **Calculations computing and plotting.**
- **Equation System Solver Engine.**
- **User Monitoring Learning & Printable Reports.**
- **Multimedia-Supported auxiliary resources.**

For more information see **ICAI** catalogue. Click on the following link:
www.edibon.com/en/interactive-computer-aided-instruction-software

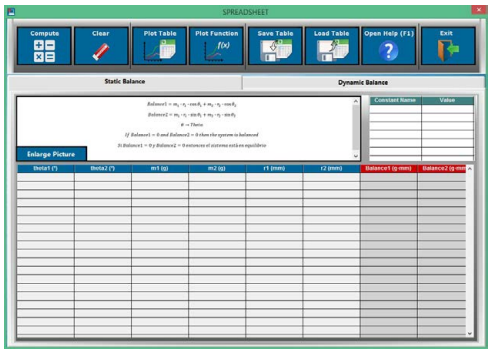
ESL-SOF. EDIBON Student LabSoft (Student Software) Application Main Screen



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:

Edition: ED01/23
Date: August/2023