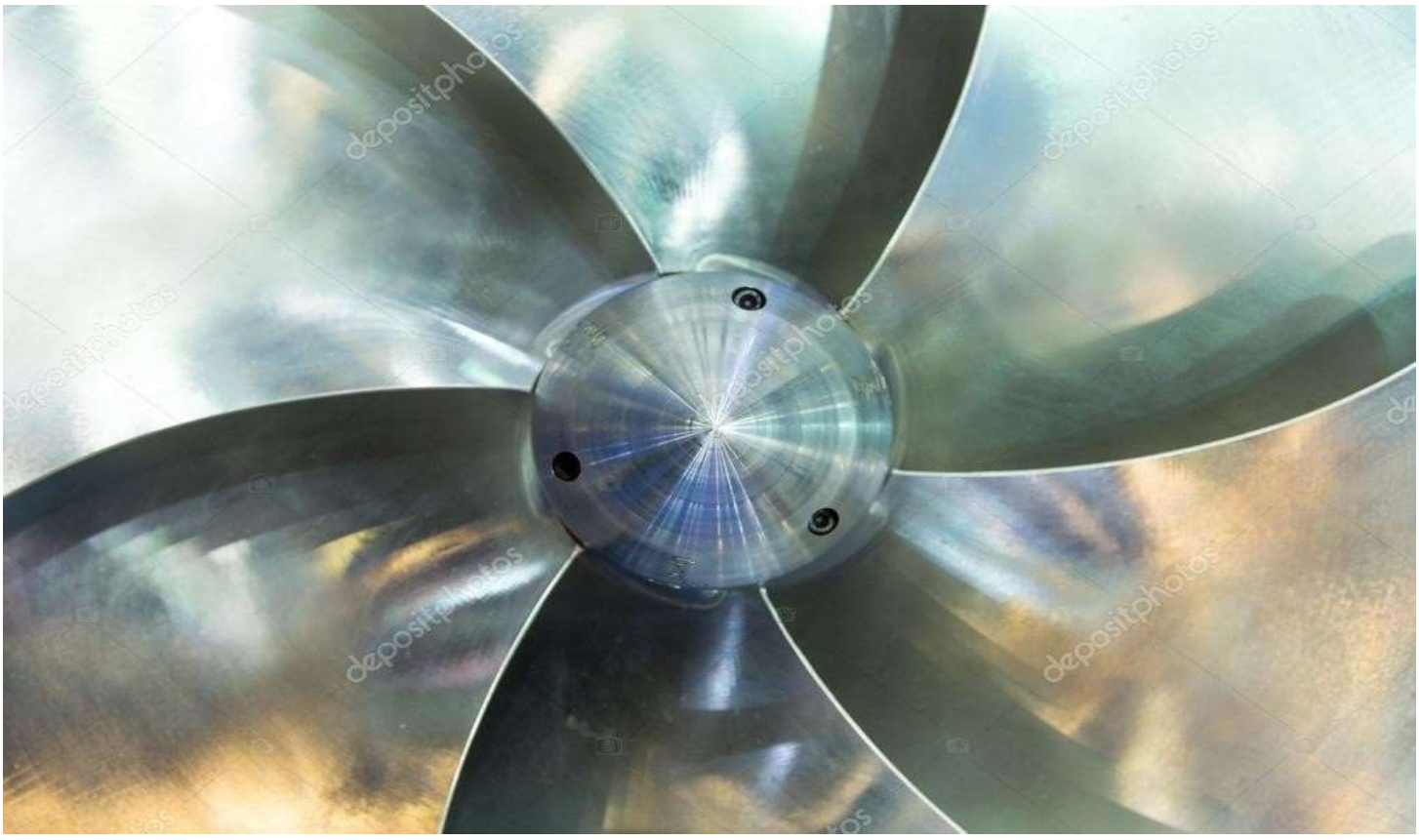
FLUID MECHANICS



1.1.WIND TUNNEL TRAINING SET

DIMENSIONS
3000X720X1500mm

Open wind tunnels are devices used to study the aerodynamic properties of various geometric shapes. One of the most important areas of interest in ·uid mechanics is to determine the pressure distribution and ·owvelocity pro·le. For this purpose, it is important to be able to analyze the incompressible air ·ow. These analyzes constitute important data during the measurement of friction resistance of various machines (such as Turbines), and air, land and sea vehicles exposed to friction and designing appropriate models according to the results obtained.

EXPERIMENTS

- Bernoulli's experiment
- Drift and lift effect experiment with different apparatus
- Air velocity measurement experiment
- Flow experiment around a wing model
- Flow test around a cylinder

TECHNICAL DETAILS

- 20V AC Supply
- Movable wheeled platform
- Test chamber with replaceable and four-sided transparent appearance.
- TSimulation and mechanism of providing "pitch" movement with Yoke in the model airplane in the test room
- Model positioning (2 axes)
- Replaceable Honeycomb air straightener (Square, Triangle, Hexagon)
- Test chamber transparent plexiglass (300mmx300mmx550mm prism)
- Contraction rate 4.61%
- About 150 kg of painted iron sheet
- Computerized control and data monitoring
- Reporting data to Excel
- Engine speed adjustment with throttle
- In the Wind Tunnel Training Set, 3 different airfoil wing types, cylindrical model, 1/32 ratio F1 vehicle and specially designed models can be used to analyze friction force and lift force.

1.2.FAN TESTER

DIMENSIONS
6000X700X2000mm

EXPERIMENTS

- Air flow test
- Fan electrical power test
- Electrical power test where valve adjustment provides
- Power test provided by the inverter
- Flow adjustment with inverter
- Savings experiment
- Fan pressure test

TECHNICAL DETAILS

- Fan speed control
- Air velocity, pressure and temperature graph
- Excel data save
- Control from computer
- Control via touch screen
- Data memory battery
- Written and audible warning system
- Display port (RS-232/485/422)
- ASCII communication system
- Multiple communication
- Security password protection

TECHNICAL DETAILS

- Supply voltage: 220V - 240V AC, 50/60Hz
- Start - Stop - Emergency stop buttons.
- Leakage current and fuse protected.
- On-panel basic general block diagram
- P-100 temperature sensor
- Differential pressure transmitter
- 7” LCD touch screen
- Electrostatic painted steel sheet
- Pluggable modules
- Fan unit
- Air velocity measurement sensor
- PLC
- Adjustable damper
- Axial type fan

1.3.FLOW MEASUREMENT BERNOULLI EQUATION TRAINING SET

DIMENSIONS
700X450X1100mm

Flow Measurement Methods, measuring ·owvelocity in the training set is an important issue in measurement technology. The test unit contains different measuring devices to determine the ·owrate. These devices are designed with transparent cases to visualize how they work and operate. A six-tube manometer is used to determine the pressure distribution at the venturi nozzle or ori·ce plate ·owmeter and measuring nozzle.The total pressure is measured with a Pitot tube. The test unit is easily and safely placed on the working surface of the Hydraulic tank. Water is supplied and the ·owrate is measured by the hydraulic tank.

EXPERIMENTS

- Visualization experiment of pressure distribution is performed with Bernoulli apparatus.

TECHNICAL DETAILS

- Ori·ce
- Rotameter type ·owmeter
- Pressure measuring apparatus
- Bernoulli apparatus

1.4.HYDRAULIC TANK MAIN UNIT

DIMENSIONS
1000X650X1000mm

The devices in the Hydraulic Tank Main Unit basically give various experimental sections of serial ·uid mechanics. The hydraulic tank used as the basic module provides closed-circuit water supply for individual experiments, determining the volumetric ·ow rate and placing the test unit on the work surface of the basic module and collecting dripping water. The closed water circuit consists of a powerful submersible pump, additionally the storage tank below and the metering tank arranged above, in which the returned water is collected.The metering tank is stepped for larger and smaller volumetric ·owrates.For very small volumetric ·owrates, a measuring cup is used. Volumetric ·owrates are measured using a stopwatch. The upper work surface allows easy and safe positioning of various experimental units.

EXPERIMENTS

- Water supply for experimental units for ·uid mechanics.
- Volumetric ·ow rate measurement for large and small ·ow rates
- Comprehensive range of accessories provides a complete course in the fundamentals of ·uid mechanics

TECHNICAL DETAILS

- Pump
- Power consumption: 250W
- Max. ·ow rate: 150L/min
- Max. head: 7.6m
- Storage tank, capacity: 180L
- Measuring tankı
- Large volumetric ·ow rates: 60L
- Small volumetric ·ow rates: 10L
- Canal
- UxGxY: 530x150x180mm
- Measuring cup with scale for very small volumetric ·ow rates
- Capacity: 2L
- Stopwatch Measuring range: 0... 9s 59min 59sec

TECHNICAL DETAILS

- Basic module for providing experimental units in ·uid mechanics.
- Closed water circuit with storage tank, submersible pump and metering tank.
- Divided measuring tank for volumetric ·ow measurements.
- Measuring cup with scale for very small volumetric ·ow rates
- Measurement of volumetric ·owrates using a stopwatch.
- Integrated grooved work surface for experiments with weirs.
- Work surface with inner rim for secure accessory placement and collection of dripping water.
- Storage tank, measuring tank and working surface made of GRP.

1.5. PRESSURE GAUGE CALIBRATION TRAINING SET

DIMENSIONS
450X450X450mm

In the ·eld of metrology, calibration describes a process for detecting deviations in a measuring instrument compared to a reference instrument or universally accepted standard value. This observed deviation is taken into account the next time the calibrated measuring instrument is used and adjusted if necessary. A reciprocating manometer is connected to a Bourdon tube pressure gauge by means of a pipe. Piston manometers are particularly suitable for producing well-de·ned pressures in liquids or gases and have been used for years as one of the most accurate methods for calibrating pressure gauges.

EXPERIMENTS

- Working principle experiment of Bourdon tube pressure gauge
- Manometer calibration test
- Identifying systematic errors
- Working principle and working experiment with reciprocating manometer

TECHNICAL DETAILS

- Piston manometer
- Pressure piston: diameter: 12mm
- Hydraulic cylinder: diameter: 25 mm, length = 225 mm
- Oil: ISO viscosity degree: VG 32
- Weight set
- Weight holder: 385g / 0.334bar
- 1x 193 g / 0,166 bar
- 4x 578g / 0,5bar
- Measuring ranges pressure: 0...2.5bar

1.6.MODULAR PELTON TURBINE TRAINING SET

DIMENSIONS
405X405X650mm

The Pelton turbine completely converts the pressure energy of the water into kinetic energy in the distributor. During the conversion, the water jet is accelerated in a nozzle and directed tangentially to the vanes of the Pelton wheel. The water jet rotates about 180° on the wings. The pulse of the water jet is transmitted to the Pelton wheel. The test unit consists of a Pelton wheel, a needle nozzle used as a dispenser, a band brake and a housing with a transparent front panel. The transparent cover allows to observe the water ·ow, pelton wheel and nozzle during operation. The nozzle cross section and thus the ·owrate is changed by adjusting the nozzle needle. Turbine torque is determined by the force on a band brake and read on spring balances.

EXPERIMENTS

- Test to determine torque, power and ef·ciency.
- Experiment with graphical representation of characteristic curves for torque, power and ef·ciency.

TECHNICAL DETAILS

- Pelton turbine
- Output: 5W -1 within 500m, approx. 30L/min, H=2m
- Pelton wheel
- 14 blades
- Blade width: 33.5mm
- Outer Ø: 132mm Needle cap
- Jet diameter: 10mm
- Measuring ranges
- Force: 2x 0... 10N
- Pressure: 0... 1bar

1.7.REYNOLD OSBORN TRAINING SET

DIMENSIONS
450x450x1200mm

Reynolds applied this experiment to the sections of the pipe at different points and saw that the current ·lament of the colored water did not deteriorate in these sections, and that the ·ow ·owed along straight and parallel lines to each other. It has been observed that when the ·owvelocity of the ·uid is increased, after a certain value of the velocity, the ·ow ·lament of the colored water disappears and the whole water mass becomes colored. In other words, at high ·owrates, the particles that make up the water do not move parallel to each other along the axis of the pipe, but begin to move in the radial direction within the pipe, and thus a complete mixing (ie turbulence) occurs. The ·uid ·owvelocity when the current changes in this way from one type to another is called the "critical velocity". Reynolds later examined the conditions for the formation of these two types of ·owin his experiments and stated that the critical velocity is; found that it depends on the diameter of the pipe, the ·owrate, density and absolute (dynamic) viscosity of the ·uid, and showed that these 4 factors can be grouped in some way. The Reynolds number is of great importance in ·uid mechanics and is widely used in engineering applications.

EXPERIMENTS

- Visualization of laminar ·ow
- Visualization of the transition zone
- Visualization of turbulent ·ow
- Determination of the critical Reynolds number

TECHNICAL DETAILS

- Test Unit
- Ink
- Glass pipe
- glass bead's water tank
- Valve

1.8.PELTON TURBINE TRAINING SET

DIMENSIONS
1300X800X1200mm

They are tangential ·owturbines. They are used in hydroelectric power plant projects with high head. In large hydroelectric systems, pelton turbines are applied over 150 m gross delta. This turbine can also be used at lower head in micro hydraulic systems. At high power and low ·ow, the speed is greatly reduced, which increases the turbine size. In this type of turbines, the energy of the water is ·rst converted into kinetic energy by passing it through a pipe of suitable shape and turning it into a water jet at the outlet. This jet is then sprayed onto the cup-shaped rotor blades. The geometry of the vessels is designed to absorb the energy of the water jet at the highest rate, and the vertical divider plates passing through the middle ensure that the water is 'weakly' dispersed on both sides. Pelton turbines can be positioned vertically or horizontally. It is possible to increase the power supplied from a single rotor, provided that the number of jets is increased. The number of jets, which is usually two for the horizontal position, can often be four or more for vertical positions. In the case of horizontal positioning, it is also possible to place two rotors instead of one, on the same shaft that drives a single generator. The highest ef·ciency is achieved when the speed of the rotor cups is half the speed of the water jet. In this case, if working at 60-80% of full load; More than 90% of the potential energy lost by the water passing through the turbine can be converted into mechanical work.

EXPERIMENTS

- Correlation experiment between torque and speed
- Ef·ciency velocity dependent experiment
- Velocity dependent ·ow test
- Speed dependent hydraulic power and mechanical power test

TECHNICAL DETAILS

- Pelton turbine
- Alternator
- Pump
- Torque sensor
- Speed sensor

1.9.MODULAR FRANCIS TURBINE TRAINING SET

DIMENSIONS
400X400X630mm

Francis turbine is a kind of reaction turbine that converts the pressure energy of water into kinetic energy in the distributor and rotor. The water supply to the distributor is via a spiral housing. Flowing water is accelerated in the distributor with adjustable guide vanes and directed to the vanes.The redirection and further acceleration of the water in the rotor creates an impulse that is transmitted to the rotor. The experimental unit consists of a rotor, a distributor with adjustable guide vane, a band brake for loading the turbine, and a housing with a transparent front panel. The transparent cover allows to observe the water ·ow, rotor and guide vanes during operation.The angle of attack, and therefore the power of the rotor, is changed by adjusting the guide vanes. Turbine torque is determined by force measurement on a band brake and read on spring balances.

EXPERIMENTS

- Experiment to determine torque, power and ef·ciency.
- Experiment with graphical representation of characteristic curves for torque, power and ef·ciency.

TECHNICAL DETAILS

- Turbine
- Output: 12W, -1 at n = 1100min, approx. 40L/min, H = 8m
- Rotor
- 7 blades
- Blade width: 5mm
- Outer Ø: 50mm
- Guide vanes
- 6 blades, adjustable (20 steps)
- Measuring ranges
- Force: 2x 0... 10N
- Pressure: 0... 1.0bar

1.10.JET OF WATER TRAINING SET

DIMENSIONS
405X405X890mm

During deceleration, acceleration, and de·ection of a ·owing ·uid, a change in velocity causes a change in momentum. Changes in momentum cause forces. The Waterjet training module includes a clear tank, a nozzle, four interchangeable de·ectors with different de·ection angles, and a weight-loaded scale. The force of the water jet is adjusted by the ·owrate. Experiments examine the effect of different angles of divergence as well as ·owrate and ·owrate. The jet forces produced by the water jet are measured on a weight-laden scale. Forces are calculated using the momentum equation and compared to measurements.

EXPERIMENTS

- Experiment to demonstrate the linear momentum principle
- Experiment to examine jet forces
- Flow rate and effect of ·ow rate experiment
- Effect test of different de·ection angles

TECHNICAL DETAILS

- Tank
- Ø inside: 200mm
- Height: 340mm
- Nozzle
- Ø 10mm
- De·ector
- Flat surface: 90°
- Inclined surface: 45° / 135°
- Semi-circular surface: 180°
- Conical surface: 135°
- Weights
- 4x 0,2N
- 3x 0,3N
- 2x 1N
- 2x 2N
- 2x 5N

1.11.HYDROSTATIC PRESSURE MEASUREMENT TRAINING SET

DIMENSIONS
450X505X450mm

Hydrostatic Pressure Trainer Set the weight of ·uids at rest causes a pressure known as hydrostatic pressure or gravity pressure. This pressure acts on any area in contact with the liquid and exerts a force proportional to the size of the area. The effect of hydrostatic pressure is extremely important in many engineering ·elds. These areas are; shipbuilding, hydraulic engineering, designing locks and weirs, and ·nally plumbing and construction. The experimental unit consists of a transparent, tiltable water tank with a scale for volume measurement. Another scale is used to adjust the tilt angle of the water tank. The device is balanced with a lever arm using different weights and measured clamping force.

EXPERIMENTS

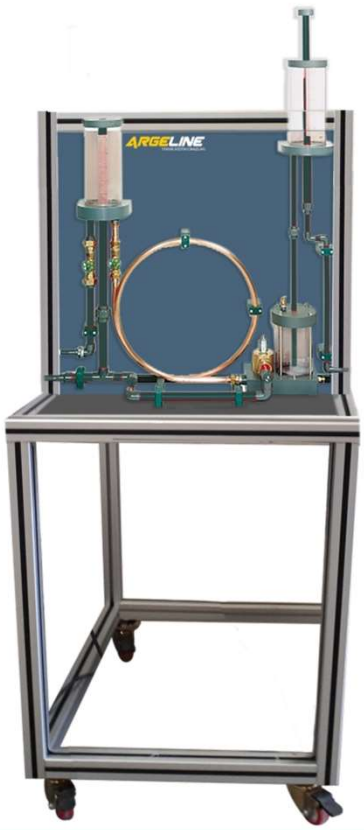
- Pressure distribution test across an effective area in a ·uid at rest
- Lateral force test of hydrostatic pressure
- Determination of center of pressure and center of ·eld experiment
- Experiment to determine the resulting pressure force

TECHNICAL DETAILS

- Water tank
- Tilt angle: 0°... 90°
- Content: 0...1.8L
- Scale: 0... 250 mm
- Effective area, maximum 75x100 mm
- Crank
- Maximum length: 250mm

Weights
- 1x 2,5N
- 1x 2N
- 2x 1N
- 1x 0,5N

1.12. WATER IMPACT EFFECT MODULE TRAINING SET



DIMENSIONS
1300X450X1300mm

Sudden interruption of water ·owcan cause water hammer in the pipeline. This is usually the undesirable effect. It is especially used in special equipment (hydraulic ram) to raise the water to a higher level. Unlike conventional pumps, no additional mechanical drive is required here. This training set can be used to demonstrate the formation and effect of water hammer and to study how a hydraulic ram works. Water is fed into the ram through a long pipe on a slope. Above a certain water speed, the waste valve in the ram closes automatically due to ·ow forces. This happens suddenly so that the kinetic energy of the water in the pipe is converted into potential pressure energy. The pressure opens a check valve and water ·ows into an air container. The air cushion in the air tank absorbs water hammer and gives the raised tank a smooth lift. After the water hammer subsides, the waste valve opens due to the dead weight, the water in the pipe starts to ·owagain and the process repeats. The operation of the waste valve as a function of weight load, valve lift, and ·owrate was investigated. It is also possible to show how the volume of air in the air tank affects lift.

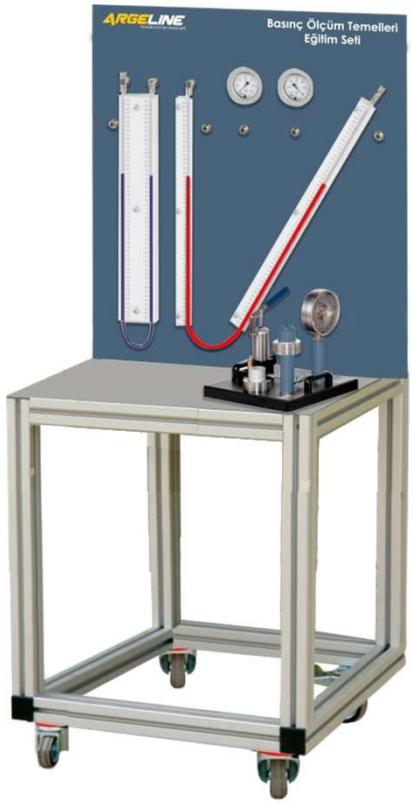
EXPERIMENTS

- Shows the formation and effect of water hammer
- Aries principle
- Function of an airship
- Effect of air volume and ·ow rate in the air tank on pump behavior
- Ef·ciency analysis
-

TECHNICAL DETAILS

- Data store
- Max. Head 0.27m
- Max. Flow rate: 90L/h

2.13.PRESSURE MEASUREMENT BASICS TRAINING SET



DIMENSIONS
700X600X1200mm

The Pressure Measurement Trainer is important in the engineering industry, for example plant, turbomachinery and aircraft construction and process engineering. Other key factors such as ·owrate can also be determined based on a pressure measurement. This training set allows measuring the pressure with two different measurement methods, directly experimental unit by measuring the length of a liquid column (U pipe manometer, inclined pipe manometer) indirectly by measuring the change of Bourdon tube shape (). In a U-tube manometer, the pressure causes the liquid column to move. The pressure difference is read directly from a scale and the reading is a measure of the applied pressure. In curved tube manometers, one leg points diagonally upwards. A small height difference occurs, so the liquid changes the length of the column signi·cantly. The principle of the Bourdon tube pressure gauge is based on the change in cross section of the Bourdon tube bent under pressure. This change in cross-section leads to an enlargement of the Bourdon tube diameter. Therefore, a Bourdon tube pressure gauge is an indirect acting pressure gauge in which the pressure difference is indicated by a transmission gear and a pointer. In experiments, pressures in the millibar range are added with a plastic syringe. The test unit is equipped with two Bourdon tube pressure gauges to measure positive and negative pressure. U-tube manometer, inclined tube manometer and Bourdon tube pressure gauges in the experimental unit can be combined using tubes. A calibration device enables the calibration of an additional Bourdon tube pressure gauge using a weight-loaded piston manometer.

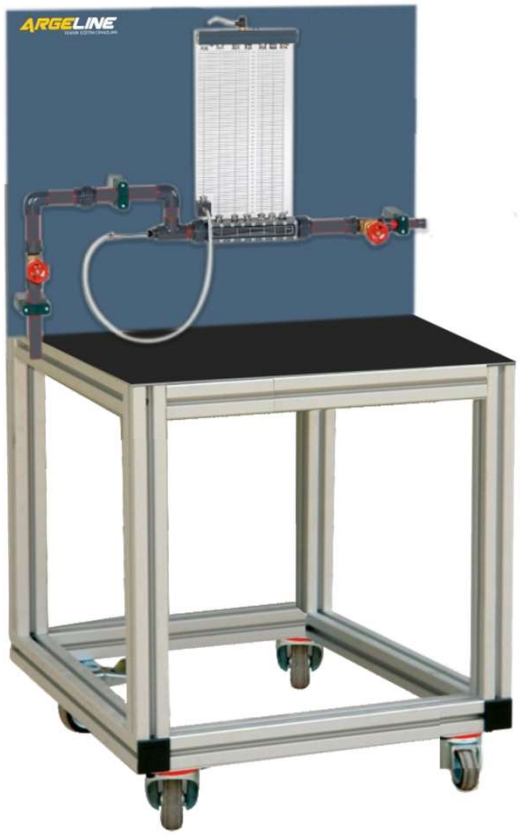
EXPERIMENTS

- Pressure measurement with V-type manometer
- Pressure measurement with U-type manometer
- Pressure measurement with a Bourdon-type vacuum meter
- Bourdon type manometer calibration

TECHNICAL DETAILS

- V type manometer
- U type manometer
- Injector
- Bourdon type vacuum meter
- Bourdon type manometer

1.14.VENTURIMETER TRAINING SET



DIMENSIONS
1150X700X1200mm

Bernoulli's principle describes the relationship between the ·owrate and pressure of a ·uid. An increase in velocity leads to a decrease in static pressure in a ·owing ·uid and vice versa. The total pressure of the liquid remains constant. Bernoulli's equation is also known as the principle of conservation of ·owenergy. It is designed to operate modularly with a hydraulic tank. The experimental unit includes a tube section with a transparent venturi nozzle and a movable pitot tube for measuring the total pressure. The pitot tube is located inside the venturi nozzle, where it is axially displaced. The position of the pitot tube can be observed through the transparent front panel of the venturi nozzle. The Venturi nozzle is equipped with pressure measuring points to determine static pressures. Pressures are displayed on a six-tube manometer. Total pressure is measured with a Pitot tube and displayed on another single tube manometer.

EXPERIMENTS

- Energy conversion test in divergent / convergent pipe ·ow
- Experiment to record the pressure curve in a Venturi nozzlet
- Test of recording the velocity curve in the venturi nozzle
- Flow coef·cient determination test
- Recognition experiment of friction effects

TECHNICAL DETAILS

- Venturi nozzle
- A: 84... 338 mm 2
- Angle at inlet: 10.5° at outlet: 4°
- Pitot tube
- Moving range: 0... 200 mm
- Ø 4mm
- Pipes and pipe connections: PVC
- Measuring ranges
- Pressure: 0 ... 290 mmWC (static pressure)
- Pressure: 0... 370 mmWC (total pressure)

1.15.VORTEKS TRAINING SET

DIMENSIONS
650X450X670mm

In Modular Vortex ·uid dynamics, a vortex is a circular ·owof a ·uid caused by suf·ciently large velocity gradients. In practice, this can be observed when water ·ows from a pool into a pipe or when two ·uids meet each other at different velocities. The test unit is equipped with a transparent tank with nozzles, various attachments for the water discharge, a propeller and a point indicator for detecting vortex pro-les. To create the free vortex, water is introduced radially into the tank and ·ows through a ring to slow it down. The vortex is created by the ·owcoming out of the tank. Four easily replaceable inserts of various diameters are available for evacuation. Water is introduced tangentially to create a forced vortex. The vortex is created by means of a propeller driven by a jet of water. point indicators, It is used to measure the surface pro·les of eddies. The speed of the vortex is also determined.

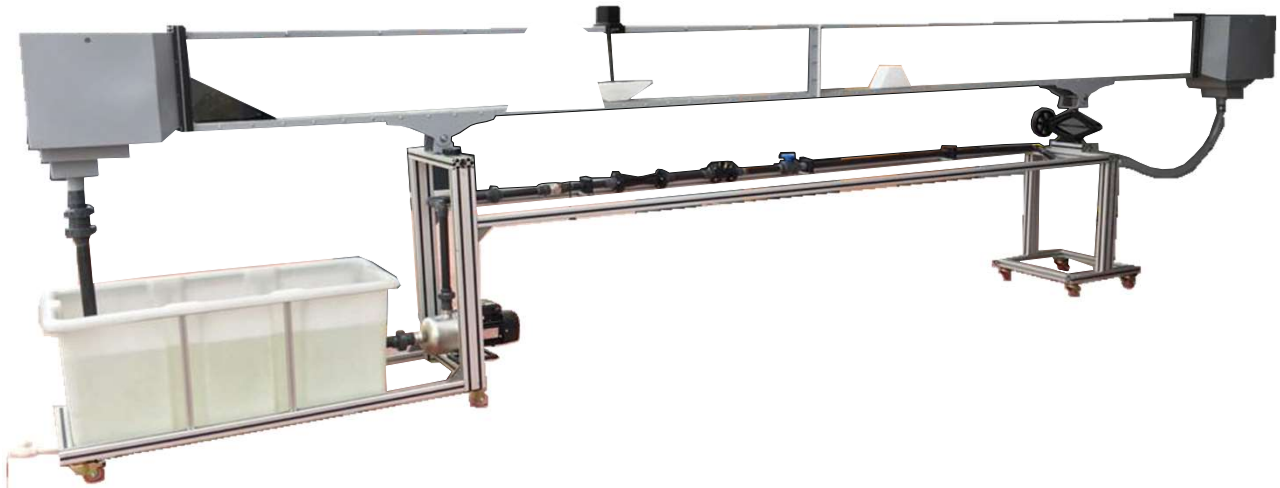
EXPERIMENTS

- Experiment to visualize various vortices
- Experiment to investigate free and forced vortices
- Demonstration test of surface pro·les
- Rate determination experiment

TECHNICAL DETAILS

- Tank
- Diameter: 250mm
- Height: 190mmS
- 4 attachments for water drainage
- Diameter: 8, 12, 16 and 24 mm
- 3-bladed propeller
- Vertical dot indicator
- 6 moving bars
- Horizontal dot indicator
- 2 moving bars
- Measuring tube, movable
- Horizontal 0... 90 mm, vertical 70... 190 mm
- Diameter: 4mm

1.16. OPEN CHANNEL TRAINING SET



DIMENSIONS
5000X600X1500mm

EXPERIMENTS

- Different landforms showing the impact on the ·ood risk at the coastal margins
- Channel ·owwith different water velocities

TECHNICAL DETAILS

- Supply voltage: 220V - 240V AC, 50/60Hz
- Start - Stop - Emergency stop buttons.
- Leakage current and fuse protected.
- Basic general block diagram on the panel
- Pump
- Venturi
- Ori-s
- 5 meters long channel
- Linear ruler
- 7" LCD touch screen
- PLC
- 40 lt tanks
- Turbine type ·owmeter
- 200 liter tank
- Channel angle adjustment mechanism
- Water discharge drainage
- Ball valve
- Channel modules

ARGES

1.17.SERIES-PARALLEL CIRCULATION PUMP TRAINING SET

Pumps are devices that transport ·uids from one place to another with the help of a pipe or channel. They create an increase in mechanical energy by increasing the velocity, pressure and height of the ·uids. Total head, ef·ciency and characteristics of the mechanical pump are examined. Pumps can be connected in series or parallel with ball valves. If the parallel connection used to increase the total ·owis two pumps with the same characteristic, the total ·owis obtained by adding the ·owrates. The total head remains constant. In series connection used for pressure increase, a head equal to the sum of the head of both pumps is obtained. In determining the ·owrate, the capacity of the pump with the lowest capacity is valid. For this reason, pumps with the same dimensions were used in terms of ef·ciency and serial connection was made.

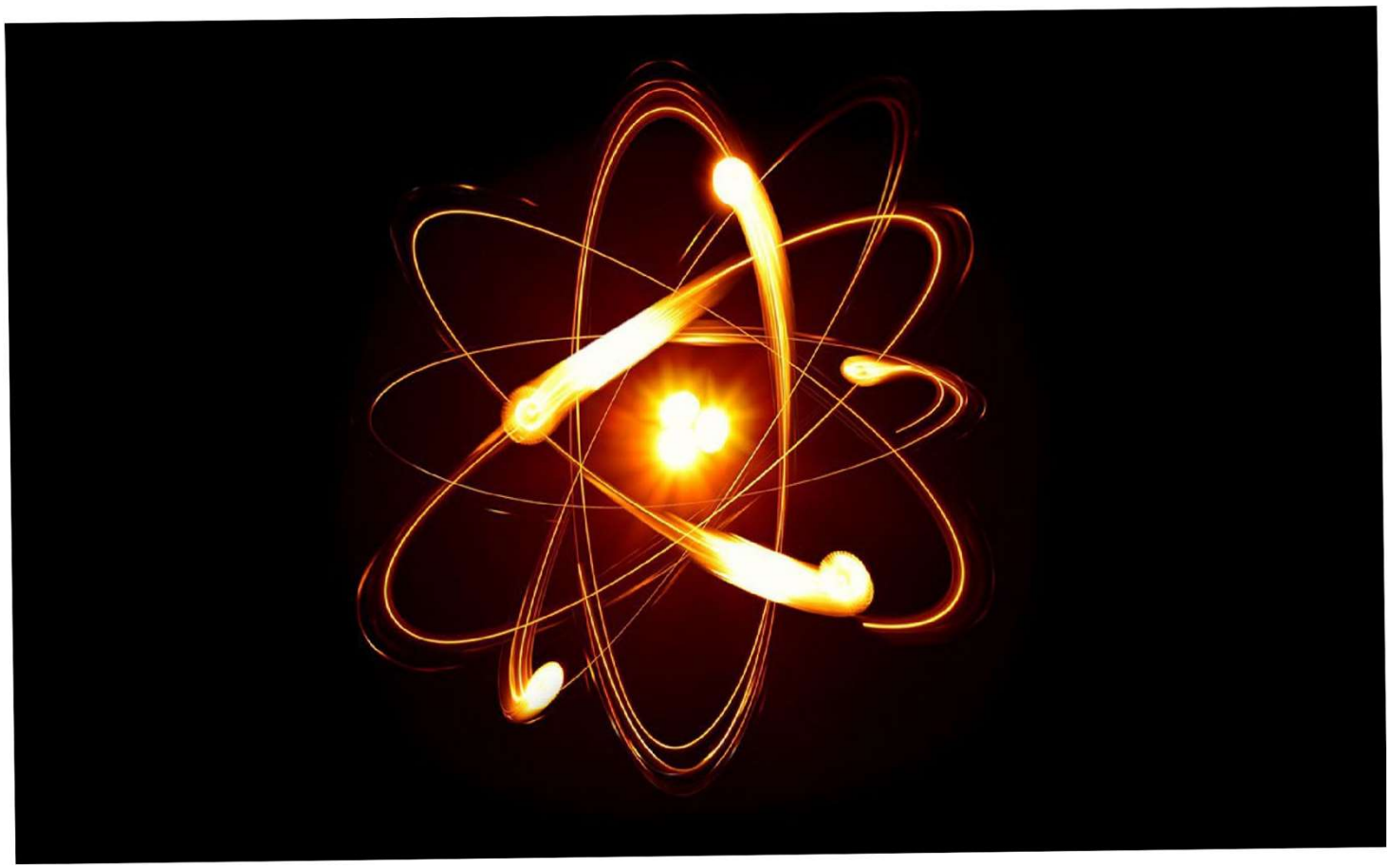
EXPERIMENTS

- Pump head-·ow relationship (charecteristic curve)
- Finding the pump ef·ciency
- Finding the speci·c speed of the pump
- inding the pump ENPKY value Plotting the series pump characteristic curve
- Plotting the parallel pump characteristic curve

TECHNICAL DETAILS

Pump motor power	: 0.75 HP
Pump head (max)	: 17.5 mSS
Pump ·ow (max.)	: 7 ton/s
Chamber volume	: 64L
Pine connection diameter	: 32 mm – 40mm
Flowmeter stage	: 1,6-16 m^3/h
Pump speed	: 2900 rpm
Temperature sensor	
Manometer	
Multimeter	

THERMODYNAMICS



2.1. STEAM TURBINE EXPERIMENT SET

EXPERIMENTS

- Steam turbine ef·ciency calculation test
- Steam boiler ef·ciency calculation test
- Condenser capacity and ef·ciency test
- The relationship between turbine electrical power and rotational speed

TECHNICAL DETAILS

- Supply voltage: 220V - 240V AC, 50/60Hz
- Start - Stop - Emergency stop buttons.
- Leakage current and fuse protected.
- Basic general block diagram on the panel
- Temperature measurement
- Pt100 temperature probe
- 7” LCD touch screen
- Pressure measurement
- Digital measurement of turbine speed
- Pressure safety precautions
- 6 temperature measuring points
- Pressure transmitters
- Condenser
- Data control via computer

TECHNICAL DETAILS

- Data memory recording
- Steam generator
- Solenoid valve
- Digital measurement of data

2.2.GAS TURBINE TRAINING SET

DIMENSIONS
600X1500X2000mm

Gas turbines operate on a Brayton cycle using air as the working ·uid. Air in atmospheric conditions reaches high pressure by passing through the radial fan. It is ignited by spraying fuel into the high-pressure air, thus adding energy to the air, resulting in a high-temperature ·ow. The resulting high-temperature compressed air enters the turbine, producing shaft work and turning the turbine on the other hand. The unused energy in the exhaust gas generated at the turbine outlet is coupled to an electric generator by direct thrust from a turbojet engine.

EXPERIMENTS

- Calculation of turbine input power
- Calculation of turbine thermal ef·ciency
- Calculation of turbine input power and rotational speed relationship
- Calculation of turbine thermal ef·ciency and rotation relationship
- The relationship between the electrical output power of the power turbine and the speed

TECHNICAL DETAILS

- Supply voltage : 220V - 240V AC, 50/60Hz
- Start - Stop - Emergency stop buttons.
- Leakage current and fuse protected.
- Basic general block diagram on the panel
- Temperature measurement
- 7" LCD touch screen
- Digital measurement of turbine speed
- Temperature sensors
- Manometer
- Lubrication system
- Turbo
- Radial fan
- Air velocity sensor
- Generator

2.3. IDEAL GAS LAWS TRAINING SET

DIMENSIONS
700X620X1200mm

Ideal gas laws training set, gas laws belong to the fundamentals of thermodynamics and are covered in every training course on thermodynamics. The isothermal change of state in this training set also takes place at constant volume. Tanks allow monitoring of state change. Air is used as the test gas. In the ·rst tank located on the left, the hermetically sealed air volume is reduced or increased using a compressor. This results in an isothermal change of state. The compressor can also work as a vacuum pump. If the changes occur slowly, the state change occurs at an almost constant temperature. In the second tank located on the right, the pressure increase is measured by increasing the temperature of the test gas with a controlled electrical heater. The volume of the closed gas remains constant.

EXPERIMENTS

- Experimentally demonstrating the laws of state changes in gases
- Isothermal change of state, Boyle-Mariotte law
- Isochoric change of state, Gay-Lussac's 2nd law

TECHNICAL DETAILS

- Compressor / vacuum pump
- Power output: 60W
- Pressure at the inlet: 213mbar
- Pressure at outlet: 2bar
- Temperature controller: PID , 300W, limited to 80°C
- Measuring ranges
- Heat
- Tank 1: 0... 80 °C
- Tank 2: 0... 80 °C
- Pressure:
- Tank 1: 0... 4bar abs.
- Tank 2: 0... 2bar abs.
- Audio:
- Tank 1: 0... 3L
- 230V, 50Hz, 1 phase
- 230V, 60Hz, 1 phase;120V, 60Hz, 1 phase
- UL /CSA optional

ARGELINE
TEKNİK EĞİTİM CİHAZLARI

ELECTRIC HOUSE TOOLS TRAINING SETS

3.1. REFRIGERATOR TRAINING SET

DIMENSIONS
600X800X1800mm

Training set; Observation of refrigerator system structure, operation and theory, detection and elimination of malfunctions, recognition of circuit elements are suitable for applied training. All the elements used in the training set are exactly the same as the models used in industrial and daily life and can be used in the industry sector.

EXPERIMENTS

- Compressor failure investigation
- Investigation of defrost failure
- Investigation of door switch malfunction
- Inspection of lighting lamp failure
- Inspection of heat sensor failure
- Inspection of thermostat malfunction

TECHNICAL DETAILS

- Defrost
- Lighting lamp
- Temperature sensor
- Thermostat
- Plate heat exchanger
- Hermetic compressor
- Condenser
- Capillary tube as expander
- Fan-lamella evaporator
- Belt heater resistance

3.2. DISHWASHER TRAINING SET

DIMENSIONS
800X800X1300mm

Training set; Observing the structure, operation and theory of the dishwasher system, detecting and eliminating the faults, recognizing the circuit elements are suitable for applied training. All the elements used in the training set are exactly the same as the models used in industrial and daily life and can be used in the industry sector.

EXPERIMENTS

- Investigation of wash motor failure
- Inspection of water softener solenoid valve failure
- Investigation of water discharge motor failure
- Inspection of heat sensor failure
- Investigation of over‐ow switch failure
- Inspection of heater failure
- Investigation of detergent cover switch failure
- Inspection of the safety lock malfunction
- Examination of electronic board failure
- Examining the programming fault

TECHNICAL DETAILS

- Flowmeter
- Washing motor
- Electronic card
- Heater
- Temperature sensor
- Solenoid valve

3.3. WASHING MACHINE TRAINING SET

DIMENSIONS
800x800x1300mm

Washing machine system structure, operation and observation of V theory, detection and elimination of malfunctions, recognition of circuit elements are suitable for applied training. All the elements used in the training set are exactly the same as the models used in industrial and daily life and can be used in the industry sector.

EXPERIMENTS

- Inspection of motor brush failure
- Investigation of heat detection sensor failure
- Examination of electronic board failure
- Inspection of solenoid valve failure
- Inspection of water discharge failure
- Investigation of drum motor failure
- Investigation of tacho generator failure
- Inspection of heater failure
- Examination of the procetate malfunction
- Inspection of the safety lock malfunction

TECHNICAL DETAILS

- Motor brush
- Temperature sensor
- Electronic card
- Solenoid valve
- Engine
- Tacho generator
- Temperature sensor
- Procetate
- Safety lock

3.4. LAUNDRY DRY MACHINE TRAINING SET

DIMENSIONS
800x800x1300mm

The structure of the tumble dryer system, its operation and the observation of the V theory, the detection and elimination of the malfunctions, the recognition of the circuit elements are suitable for applied training. All the elements used in the training set are exactly the same as the models used in industrial and daily life and can be used in the industry sector.

EXPERIMENTS

- Inspection of motor brush failure
- Investigation of heat detection sensor failure
- Examination of electronic board failure
- Inspection of solenoid valve failure
- Inspection of water discharge failure
- Investigation of drum motor failure
- Inspection of heater failure
- Investigation of tacho generator failure
- Examination of the procetate malfunction
- Inspection of the safety lock malfunction

TECHNICAL DETAILS

1. Training set control panel plexiglass.
2.With reverse UV printing on the plexiglass on the training set control panel against scratches and erasures.with the circuit diagram. In this way, the locations of the parts on the device, how the system ·owtakes place, etc. can be easily read on the diagram.
3. The training set has a 40*20 mm sigma aluminum pro·le body.
4. The experimental set (mobilized) can be moved.
5. The emergency button is resistant up to 220 V AC and 4 amps.
6.The power cable should be TTR cable. It has 3*1.5 mm cross-section dimensions and at least 3 m. has length.
7. Residual current protection switch is 220 V AC and protection current is 30mA .
8. Fuse at least 6 A .
9. Training set tumble dryer working principles in practice allows for explanation.
10.On the training set, the creation and elimination of malfunctions that may occur in tumble dryers are shown in practice.
11. There are fault buttons on the training set.
12.There are leakage current protection, fuse, main switch emergency button on the training set.
13. The training set has wheels.
14.The dimensions of the training set are maximum width 1000 depth 1000 height 1400 mm.
15. There is an electrical grounding line in the experiment set.
16. Main switch 220 V AC, operating current max. 20 A.
17.There are born connection screws for different connections and measurements on the system.
18.Suf·cient number of test cables for different connections and measurements on the system.

3.5.HEATING AND COOKER HOME APPLIANCES SET

To the individual/student; It is designed to gain knowledge and skills about maintenance and repair of heater and cooking appliances in line with occupational health and safety measures.

TECHNICAL DETAILS

•1. Toaster, toast, fryer, bread maker, electric stove, kettle, iron, steam.It consists of tank iron, cutter and shredders, electric and gas cookers.
- 2.toaster capacity is two .
- 3. Toaster power at least 500 W.
- 4. Toaster power at least 1500 W.
- 5. Fryer oil capacity at least 1.2 liters.
- 6. Fryer power at least 1000 W.
- 7. Bread maker dough capacity is at least 600 gr.
- 8. .Bread maker power at least 400 W.
- 9. Electric stove power at least 1200 W.
- 10. Electric stove heating capacity can be adjusted in three stages and tilting safe.
- 11. Water heater water capacity is at least 1.5 lt.
- 12. Water heater power at least 1200 W.
- 13. Iron shock steam capacity is at least 12 gr/min.
- 14. The soleplate must be ceramic. The water ·lling capacity is at least 200 ml.
- 15. The water capacity of the iron with steam tank is at least 0.8 lt.
- 16. Iron with steam tank, steam pressure of at least 4 bar and power value of at least 2200 W.
- 17. Cutter and chopper set chopping chamber capacity is at least 500 ml.
- 18. Cutter and shredder set power at least 800 W .
- 19. The electric and gas cooker has three gas and one electric heater.
- 20. Cooker surfaces are enamel coated.
- 21. Ignition type is from button.

3.6. MICROWAVE TRAINING SET

DIMENSIONS
600X450X800mm

It is designed to visualize and detect the most common faults in the microwave oven trainer. It consists of a total of 6 faults as cover switch failure, lighting failure, turntable motor failure, fan failure, high voltage transformer failure, timer commutator failure.

EXPERIMENTS

- Cover switch failure
- Lighting failure
- Turntable motor failure
- Fan failure
- High voltage transformer failure
- Timer commutator failure

TECHNICAL DETAILS

- Timer
- 9 different power levels
- 20 Liter internal volume
- Digital control panel
- 1100 W Rated power input
- 700 W Rated power input
- Weight 12kg

3.5. LCD TV RECEIVER TRAINING SET

DIMENSIONS
600X450X600mm

Training set; Observing the 22" LCD TV system structure, operation and theory, detecting and eliminating the faults, recognizing the circuit elements are suitable for applied training. All the elements used in the training set are exactly the same as the models used in industrial and daily life and can be used in the industry sector.

EXPERIMENTS

- Investigation of keypad malfunction
- Investigation of IR receiver failure
- Investigation of composite video failure
- Investigation of component video failure
- Investigation of power supply failure
- Examining the LCD panel malfunction
- Investigation of right channel speaker failure
- Investigation of left channel speaker failure
- Examining the LCD panel lighting failure

TECHNICAL DETAILS

- IR receiver
- Power source
- LCD panel
- Hapors
- LCD panel illumination

3.8. ELECTRIC GAS OVEN TRAINING SET

DIMENSIONS
800x800x1300mm

Training set; It is suitable for applied training for observing the structure, operation and theory of the electric-gas oven system, detecting and removing the faults and identifying the circuit elements. All the elements used in the training set are exactly the same as the models used in industrial and daily life and can be used in the industry sector.

EXPERIMENTS

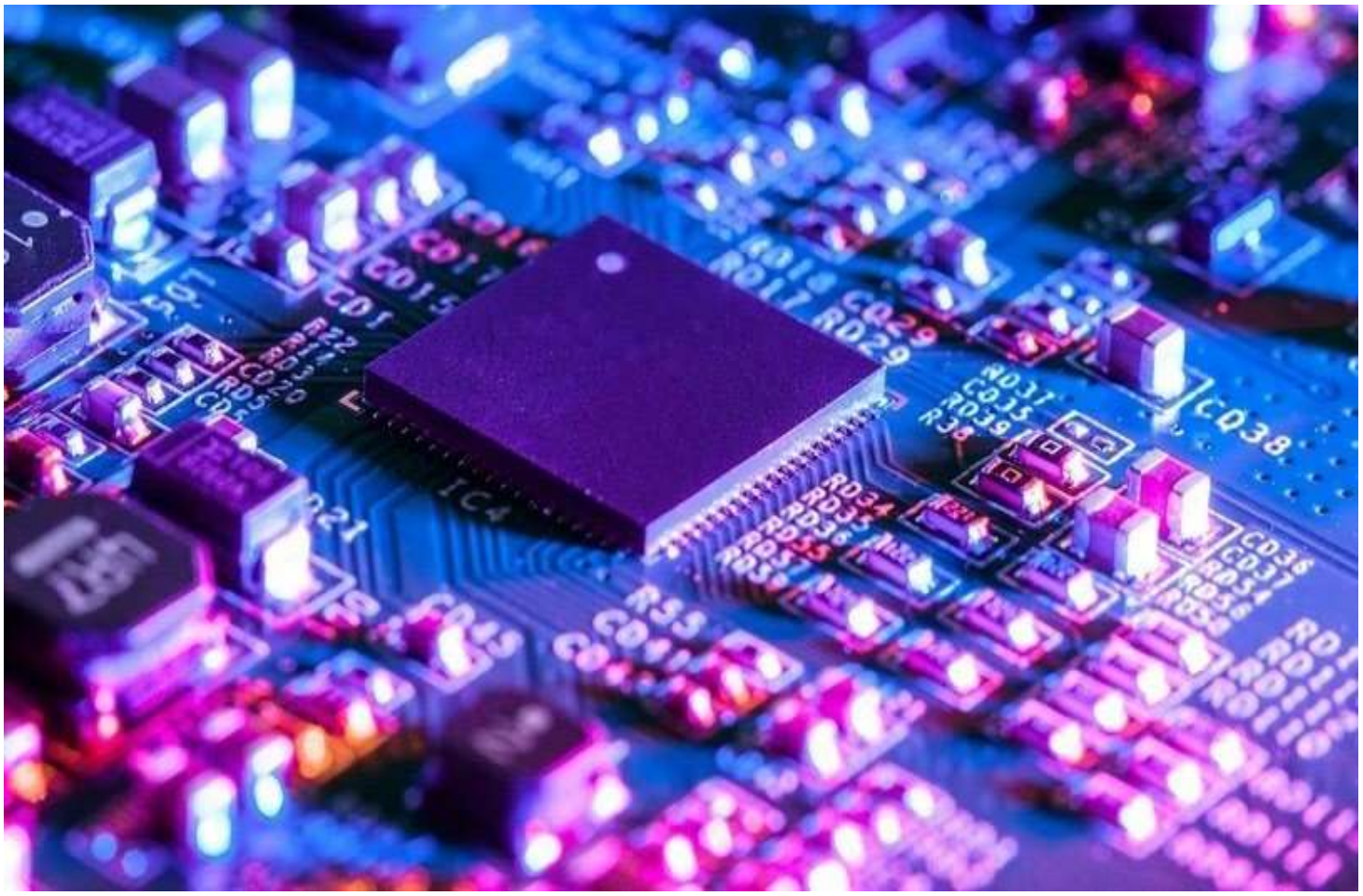
- Examining the electric cooker step failure
- Inspection of cigarette lighter malfunction
- Inspection of turbo fan failure
- Examination of the lighting failure
- Inspection of heater failure

TECHNICAL DETAILS

- Electric stove lighter
- Turbo fan
- Lighting lamp
- Heater
- Cooker stage switch

ARGELINE
TEKNİK EĞİTİM CİHAZLARI

ELECTRIC AND ELECTRONIC



4.1. MONOPHASE ENGINE TRAINING SET

DIMENSIONS
1200X600X1500mm

Monophase electrical systems generally used in homes and corporate workplaces are 220 volts AC electricity. The electricity produced as 3 phases in power plants is distributed to the residences via the network. Generally, 3 phase electricity and a neutral line come up to the building entrances. Phases are divided into ·ats and o-s in order to have an equal load distribution on the 3-phase line at the building entrance. Neutral line is also drawn next to a phase coming into the ·at and the electricity of the ·at, o-sin and workplace is given. In 3-phase electricity, besides 380V AC voltage between phases, there is 220V AC voltage difference between each phase and neutral. In other words, the reason why 220V AC is used in household electricity is because of the volt difference between a phase and neutral. It is very important to use protective devices such as fuses, residual current relays and surge arresters where necessary.

EXPERIMENTS

- Warning signal lamp usage experiment
- At least 0.75 kW single-phase motor use test
- Contactor usage experiment
- Pack switch usage test
- Voltage protection relay use experiment
- Start switch usage test
- Single-phase waterproof socket use experiment
- Timer usage experiment
- Experiment on use of warning switch

TECHNICAL DETAILS

- Warning signal lamp
- At least 0.75 kW single-phase motor
- Contactor
- Pack switch
- Voltage protection relay
- Start switch
- Single-phase waterproof socket
- Timer
- Warning switch

4.2. 3 PHASE ENGINE TRAINING SET

DIMENSIONS
1200X600X1500mm

Generally, 3-phase electrical systems used in industrial workplaces are 380 volts AC electricity. The electricity produced in 3 phases in power plants is distributed to the residences by means of a network. Generally, 3 phase electricity and a neutral line come up to the building entrances. Phases are divided into ·ats and o-s in order to have an equal load distribution on the 3-phase line at the building entrance. Neutral line is also drawn next to a phase coming into the ·at and the electricity of the ·at, o-sin and workplace is given. In 3-phase electricity, there is 380V AC voltage between the phases, and there is a 220V AC voltage difference between each phase and neutral. In other words, the reason why 220v AC is used in household electricity is because of the volt difference between a phase and neutral. Direct 3-phase systems are used for large motors, heaters and other industrial and industrial workplaces. In systems where 3 phase electricity is used, there is also a neutral line, but this neutral line is only for use in places where 220V AC is required. As the voltage of electricity increases, the danger to human health also increases, so when working in 3-phase

EXPERIMENTS

- Starting 3-phase motor with star-delta pako switch
- Use of phase protection relay
- Phase protection relay selection
- Using the inverter module
- Motor driver working principle
- Use of motor protection switch
- Protection functions of motor protection switches
- Motor applications where motor protection switches are used
- Use of soft starter
- Use of contactors

TECHNICAL DETAILS

- Pako switch module
- Soft starter module
- Contactor module
- Star delta switch module
- Star delta relay module
- Motor protection relay
- Phase protection relay module
- Inverter
- 3 Phase motor

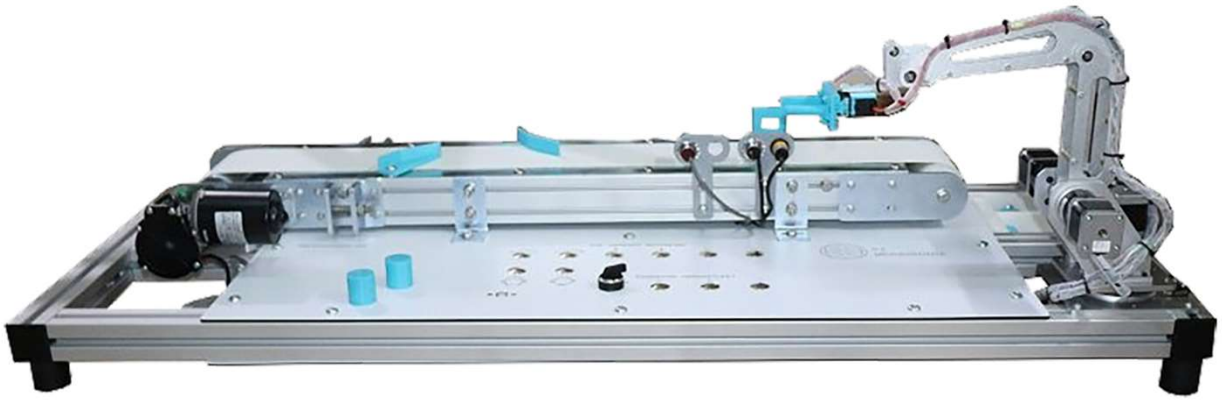
4.3. AUTOMATION ROBOT HANDLE

It is a ha-f desktop robot with a footprint of 190mm. It is compact enough to adapt to the production environment. Designed to be ·exible, easy to use and safe to collaborate, it is suitable for a variety of automated and small-batch production scenarios. Equipped with servo motors with high precision absolute encoder. The repeatability of the robot is measured to ±0.05 mm when the servo drive is coupled with the controller. With the vibration suppression algorithm in the controller and the trajectory accuracy of multi-axis motion, the repeatability bandwidth stabilization time is accelerated by 60% and residual vibration by 70%. It features 750g payload, 440mm maximum reach, hand guidance and collision detection. Designed for industrial applications that require rapid deployment and replacement.

TECHNICAL DETAILS

- 190mm X 190mm footprint
- 750g load capacity
- 440mm maximum access point
- Collision detection sensors
- Ha-f ergonomic structure
- High precision servo motors
- Vibration suppression algorithm
- Different programming options

4.4. ROBOT ARM TRAINING SET



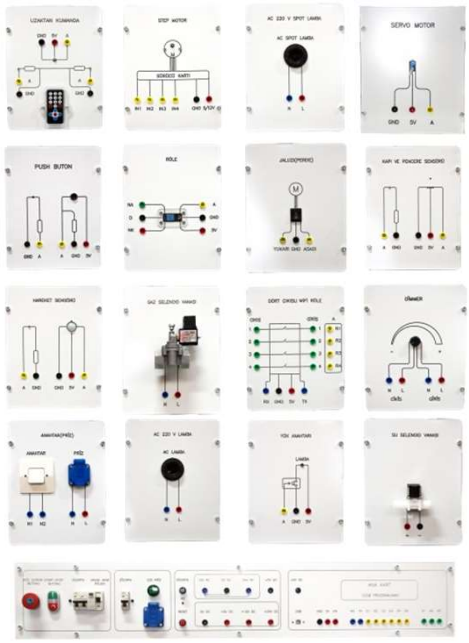
DIMENSIONS
1100X500X350mm

The robot arm training set is designed to understand the operating logic of the system and to give control and command training of the robot arm. Robor arm can move up-down, forward-backward, right-left directions. It detects the materials advancing on the conveyor belt by means of sensors and grasps them thanks to the gripper on the arm. It separates the material as plastic or metal.

TECHNICAL DETAILS

- Movement in 5 axes
- Manual control
- Autonomous control
- Color sensor in the holding clip
- Convevor
- Magnetic and capacitive sensors

4.5. SMART HOME AUTOMATION TRAINING SET



DIMENSIONS
1200X600X1500mm

It is designed to examine the structure of smart building systems, to teach basic concepts, to control smart home applications for building security, lighting, air conditioning, blinds, sound and light systems via remote access, to identify the equipment that makes up the system, to design projects and to assist practical training.

EXPERIMENTS

- Remote control module
- Stepper motor module
- Spotlight module
- Servo motor module
- Push button module
- Blind (curtain) module
- Motion sensor module
- Gas solenoid valve module
- Dimmer module
- Switch (socket) module
- Load switch module
- Water solenoid valve module
- Relay module
- Lamp module
- Door and window sensor module
- Relay module with four outputs

TECHNICAL DETAILS

- Remote control
- Stepper motor
- Spotlight
- Servo motor
- Push button
- Relay
- Blinds (curtain)
- Door and window sensor
- Motion sensor
- Gas solenoid valve
- Four output relay
- Dimmer
- Switch socket)
- Lamp
- Load switch
- Water solenoid valve

4.6. ELECTRICAL MACHINES AND CONTROLLER TRAINING SET

DIMENSIONS
1500X650X1500mm

Electrical Machines Training Set has been designed in accordance with the curriculum of universities, technical high schools and all institutions where technical education is needed. The content of the training set is suitable for advanced technical training, including basic training. The training set is modular. The modules are made of 4mm compact laminate material. In the experiment set, user safety was prioritized in accordance with the regulations. Module boxes are made of metal sheet and coated with electrostatic powder paint. Laser technology was used in the drawing of the texts and symbols on the modules. Technical details are processed using UV printing technology. The experiment set is made of durable materials. There is a rail system where modules can be attached. On the table, the power supply and measuring instruments are mounted.

TECNICAL DETAILS

- All energy inputs and outputs on the table are fuse protected
- All inputs and outputs on the unit are double insulated, 4mm banana sockets
- Energy unit Start/stop, emergency stop button 30mA leakage current
- Fuse protected
- Signal lamp
- AC energy measurement unit
- Fuse protected
- 1-3 phase sockets
- 3 phase energy outlets with 4mm born screw Energy analyzer

TRAINING SET MODULES

- Phase Sequence Display Module
- Resistive Load Unit Resistor Module
- Potentiometer Module
- Inductive Load Unit
- Connection Cables Software
- Ac Measurement Module
- Analog Ac Dc Ammeter Module
- Analog Ac / Dc Voltmeter Module
- Digital Voltmeter Commitator Module
- Analog Voltmeter Commitator Module
- Cosmeter Module
- Contactor Module
- Timer Module
- Data Capture Card Module
- Dual Dial Frequency Meter Module
- Isolated Measurement Module
- Dc Power Supply Module
- Led Display Synchronoscope Module
- Dc Measurement Module

4.7. DIGITAL CIRCUITS APPLICATION MODULE

TECNICAL DETAILS

- Examining the AND(VE) gate, extracting the truth table,
- Examining the 3-input AND(VE) gate and determining the truth table,
- Examination of the NAND(AND-NOT) gate and deriving the truth table,
- Using the NAND gate as an inverter,
- Creation of 2 Input 'NAND gates and 3 Input' NAND gate,
- Examining the inverter gate and extracting the truth table,
- Converting AND gate to OR gate using inverters,
- Converting OR gate to AND gate using inverters,
- Examining the OR(OR) gate and extracting the truth table,
- Examining the OR(OR) gate with 3 inputs and extracting the truth table,
- Examination of the NOR(OR-NOT) gate and deriving the truth table,
- Using the NOR(OR-NOT) gate as an inverter,
- Creating a 3-input NOR gate with 2-input NOR(OR-NOT) gates,
- Examination of the EX-OR (SPECIAL-OR) gate and extracting the truth table,
- Examination of the EX-NOR gate and truth table
- Removal,
- Examining the exchange rule at the OR gate,
- Examining the exchange rule in AND gate,
-
- Examining the union rule at the OR(OR) gate,
- Examining the union rule in AND(VE) gate,
-
- Examining the union rule at the OR(OR) gate,
- Examining the union rule in AND(VE) gate,
- Examining the dispersion rule,
- Examining the rule of identity,
- Examining the complement rule,
- Examining the double inversion rule,
- Examining the retention rule,
- Examining the DE MORGAN rule,
- Inspection of RS Flip-Flop consisting of NOR (OR NOT) gates,
- Investigation of RS Flip-Flop consisting of NAND (NOT VF) gates,
- Reviewing the Clocked RS Flip-Flop,
- Examination and truth table of JK Type Flip-Flop,
- Examination of D-Type Flip-Flop and deriving the truth table,
- Creation of JK type Flip-Flop and D type Flip-Flop,
- Examination of T-type Flip-Flop, extraction of truth table,
- BINARY COUNTER app,
- Using BINARY COUNTER as BCD,
- Examining 7 BIT BINARY COUNTER,
- Examination of asynchronous counters,
- Investigation of up Asynchronous counter made with JK Flip-Flops,
- Investigation of Down Asynchronous counter made with JK Flip-Flops,
- Determination of the counting interval of the asynchronous prosecutor,
- HALF ADDER (Half adder) examination,
- FULL ADDER (Full adder) examination,

4.8 LABORATORY WORK TABLE

DIMENSIONS
1600X600X1050mm

TECNICAL DETAILS

Hardware-wise, start-stop switch, fuse, residual current relay are on 220V socket, 12-24V AC output, energy analyzer, 0-24 V AC output. The laboratory table is made of durable materials.

4.9. ELECTRONIC CIRCUIT EXPERIMENT SET

Basic electronic training set main unit; It is designed to be suitable for desktop and bagged use so that analog applications, digital applications and basic circuit analysis applications can be made.The content of the training set is for advanced technical training, including basic training. The training set is modular. Module boxes are made of metal sheet and coated with electrostatic powder paint. On the set; there are regulated and ·xed power supplies, function generator, pulse generators, ·xed oscillator and input-output elements necessary for analog circuit applications. The experiment set includes AC-DC modules.

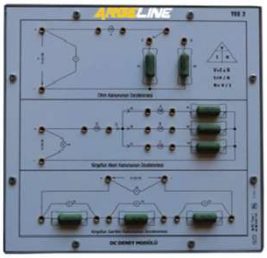
TECNICAL DETAILS

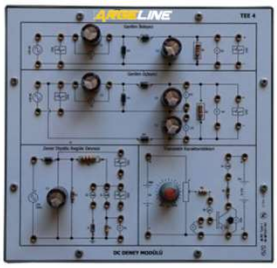
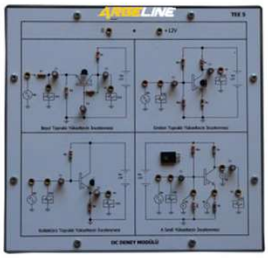
Symmetrical DC 12V 1A power supply,
0-30V Power supply,
The power supplies are fused and have short circuit protection.
Signal generator; It is designed as a sine, triangle, square wave generator.
Adjustable and single pulse generator in the range of 1Hz-100KHz: TTL can give 5V output.
12V-0-12V 1A stable output AC power supply
Function generator sine, triangle, kae wave outputs, 0-10 Vpp magnitude range and 1Hz-100KHz frequency range

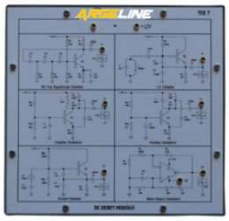
4.10. MODULE APPLICATIONS

1. AC CIRCUIT MODULE

- Investigation of resistance in alternating current,
- Examination of the coil in alternating current,
- Investigation of capacitor in alternating current, Investigation of RL series circuit in alternating current, Investigation of RC series circuit in alternating current, Investigation of RLC series circuit in alternating current, Investigation of RL parallel circuit in alternating current,
- Investigation of RC parallel circuit in alternating current,
- Investigation of RLC parallel circuit in alternating current,
- Examination of parallel resonance,
- DC CIRCUITS APPLICATION MODULE
- Study of series resonance.
- Investigation of low pass n type ·lter,
- Investigation of high-pass n-type ·lter, Inspection of transformer,
- Examination of the magnet pole relationship,
- Investigation of magnet magnetic ·eld, Investigation of shielding in magnet, Investigation of electromagnet,





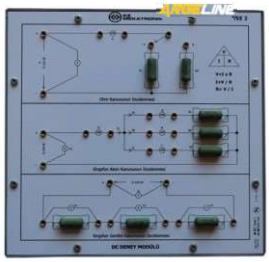

4.10.2. DC CIRCUIT MODULE

Examining the color codes of the resistor, examining the OHM law,
Examination of Kirchhoff voltage law,
Examination of Kirchhoff's current law,
Examination of series-connected resistors,
Examination of parallel-connected resistors,
Analysis of mixed-connected resistors,
Analysis of Star-Delta conversion, Analysis of Delta-Star conversion, Examination of series-connected coils,
Examination of parallel connected coils,
Examination of mixed connected coils,
Examination of series connected capacitors,
Examination of parallel connected capacitors,
Examination of mixed-connected capacitors,
Examination of Superposition theorem,
Examination of Thevenin's theorem,
Examining Norton's theorem,
Examination of the diode,
Extraction of diode characteristic,
Examination of half-wave recti·er,
Examination of full-wave recti·er,
Examination of bridge type full wave recti·er,
Examination of ·ltering with capacitor, Examination of the effect of load current on the ·lter,
Examination of ff type ·lter,
Investigation of voltage doubler,
Examination of voltage tripler,
Examination of voltage quadrature,E

Extracting the 1st region characteristic of the transistor, 2nd region characteristic of the transistor, 3rd region characteristic of the transistor, 4th region characteristic of the transistor, examination of the Zener diode,
Examining the zener diode regulated circuit,
Examining the parallel regulated recti·er, Examining the series regulated recti·er,
Investigation of ideal series regulated direct recti·er,
Investigation of Emitter grounded ampli·er,
Investigation of grounded ampli·er,
Investigation of collector grounded ampli·er,
Examination of class A ampli·er,
Examination of class B ampli·er,
Examination of class C ampli·er,
Examining the transistor audio ampli·er,
Examining the integrated audio ampli·er,
Extracting the input characteristic of the JFET,

DIGITAL CIRCUITS APPLICATION MODULE

Extracting the output characteristic of the JFET, using the JFET as an ampli·er,
Extracting the input characteristic of E-VMOSFET, extracting the output characteristic of E-VMOSFET, examining the operation of E-VMOSFET,
Investigation of the re-phase slider oscillator,
Examining the LC oscillator,
Analyzing the parallel Hartley oscillator,
Examining the Kolpits oscillator,
Examining the crystal oscillator,
Examination of the Wien bridge oscillator,








4.11. BAG TYPE PLC TRAINING SET

PLC Training Set; Suitable for desktop use, aluminum construction, plastic bag. It is produced modularly on demand. PLC Trainer, CPU and HMI structure are visible and mounted on compact laminate material of 4mm thickness that is resistant to heat, humidity and impacts.

TECHNICAL DETAILS

·6 Digital Inputs: Information can be entered with 4 ON-OFF switches and 4 buttons and LED indicator can be monitored. In addition, external input is possible.

·6 digital outputs: can be used directly or as relay powered. In addition, outputs can be monitored with LED indicator group.

It has 2 analog inputs with 12 bit resolution and 1 analog output with 12 bit resolution.

· There are 4 high speed pulse outputs. (2 x 100kHz, 2 x 10kHz)

8 point high speed counter inputs: 4 double phases (2 hardware 50kHz and 5kHz), 2 software (5kHz), 2 single phase (100kHz) hardware or 8 single phase (10kHz) software

Built-in real time clock and RTC processing commands

Command processing speed up to 15 microseconds

256-color touch at least 5.7" TFT operator panel (optional)

TTL adjustable 500KHz signal generator

+24V and +10V power outputs

0-10 adjustable signal generator

· 24V Light buzzer · NPN and PNP inductive sensor

0-10V or PWM controlled selectable motor driver and encoder signal outputs

· 4 pcs 10A relay

·Additional modules (optional): Servo motor control module, Vfd motor driver and motor module, Temperature measurement module, weight measurement module, conveyor training module; In addition, sensors and devices requested by the user can be produced as modules.

4.12.BASIC LIGHTING AND WARNING SYSTEMS TRAINING SET

Basic Lighting and Warning Systems Training Set is a usage training set for the practical explanation of the working dimensions of the automotive industry. All necessary protection for vehicle lighting and warning systems is available in the training unit. Get the training set from parts used in the automotive industry. The educational and guiding drawings in the training unit increase the scope of the training. The module module is made of metal sheet and coated with electrostatic powder paint. Laser technology was used in the drawing of the texts and symbols on the modules. Security and audit control in the system can be observed. The platform where the system is located is on easily movable and lockable systems. The entire panel is made of durable metals.

TECHNICAL DETAILS

- Vehicle Front (Xenon and Halogen) Headlights
- Rear Stop Lamps
- Vehicle Interior Lighting Lamp
- Vehicle Signal Lamps
- Wiper Motor
- Central Door Lock System
- Plastic Battery Bag
- Insurance
- Horn
- License Plate and Luggage Lighting
- Battery and Battery Charger
- Relays
- Contact
- Training Unit

4.13. PLC TRAINING SET

DIMENSIONS
1300X700X1700mm

1. Training set; It is designed to work alone or with various application modules.

2.All components are placed on the panel on the application table and a physical area is designed on the table where the application modules that can be used when necessary can be installed.

3. Table frame is made of 40x40mm anodized aluminum pro·le.

EXPERIMENTS

- PLC programming applications
- Basic Input/Output Applications
- Logical Operations Applications
- Comparison Operations
- Transport Command Application
- Arithmetic Operations Applications
- Timer command Applications
- Up Counter Application
- Up/Down Counter Application
- Operator Panel (HMI) applications
- Input-Output Application with Operator Panel
- Data Display Application with Operator Panel
- Analog Output Application
- Analog Input Application
- Online / Of·ine simulation applications
- Digital input/output applications with and without relay

TECHNICAL DETAILS

- Supply voltage 220V AC
- Residual current protection relay
- Energy control switch and energy lamp
- Emergency button
- 8 digital inputs - 6 digital outputs
- 4 analog inputs - 2 analog outputs
- Analog Outputs: 1 voltage output (0-10 V); 1 current output (0-20mA)
- Analog Inputs: 2 voltage inputs (0-10 V); 2 current inputs (0-20mA)
- Signal lamp and relay for each digital output
- Signal lamp and simulation switch for each digital input
- It should be a panel type DC voltmeter.
- 2 x 0..10V precision-adjusted 1A DC voltage sources
- 24V/5A DC power supply
- 7 inch Graphic Based Touch Operator Panel compatible with PLC
- 4 220V AC sockets.

4.14.DIGITAL ELECTRONIC EXPERIMENT SET

The Basic Level Digital Electronics Experiment Set is designed for digital electronics applications in schools where technical education is given. Training set; It has been designed in a modular structure, grouped according to application subjects, covering Main Unit, Set Equipment and circuit applications in order to make applications related to Basic Level Digital Electronics.

EXPERIMENTS

- Investigation of And Gate
- Inspection of the Or Gate
- Examination of Private Or Door
- Examining the And Not Gate
- Examining the Or Not Gate
- Examination of Private Or Not Door
- Investigation of Not Gate
- Buffer Inspection
- Examining the Schmitt Trigger

TRAINING SET MODULES MODULE APPLICATIONS

- RS Flip Flop Review
- JK Flip Flop Review
- D Flip Flop Review
- Comparator Flip Flop Review
- T Flip Flop Review
- Failure to Inspect Status Indicator
- Half Extractor Investigation
- Full Collector Inspection
- Full Extractor Investigation

TECHINCAL DETAILS

•Adjustable DC voltage output in the range of 0 – 30V

• Monitoring of voltage and current value with digital measuring instrument

•±5V and ±12V constant DC voltage outputs

should provide. 12 – 0 – 12V constant AC voltage output

•1 x 2mt IEC power cable with training set

• 220-240V/50Hz. supply with phase voltage

•Energy control unit controlled by key lock and contactor

• Production in accordance with national and/or equivalent international standards

•Design suitable for vocational training on the working principle of devices used in daily and industrial life.

•Required operating instructions and occupational safety warnings on the training set

•Block diagrams, symbols and signs embroidered on the panel by printing method on all module panels

•Safety precautions, labels, warning signs, warnings in accordance with national/international standards on the set

•Phase to earth and phase neutral, isolation and earthing protection

•Application modules with metal box, manufactured with 4mm compact laminate material

• On-site installation, commissioning and suf·cient user training.

4.15. SENSOR TRAINING SET

The Sensor Trainer has ready-made modules designed to enable the user to operate applications practically during experiments. The training set, which allows industrial sensor applications, comes in the box and is suitable for desktop use. Connection is made with 2 mm titanium-gold alloy sockets. The connecting wires have gold-plated sockets with 2 mm springs.

TECHNICAL DETAILS

•Thermal and electronic short circuit protection,

24V/1A allowing coarse and ·ne adjustment

adjustable power supply. regulated

voltage can be seen on the digital voltmeter.

- Thermal and electronic short circuit protection

2x12V/1A symmetrical power supply,

- 3½ digit digital DC voltmeter,
- 3½ digit digital DC ammeter,
- Digital frequency meter (optional),
- Up/Down counter (optional),
- The signal generator requires:
- Circular motion control unit,
- Linear motion control unit,
- Sensor port (NPN and PNP),
- Short circuit protection.

•It can be adjusted to frequencies between 1Hz-200KHz in six stages,

•The signal with adjustable output amplitude between 0-15pp should be de·ned as triangular or sinusoidal with a selection switch.

- TTL level square wave output,

•10V - +10V (20Vpp) adjustable CMOS square wave output,

- 8Ω 0.25W speaker,
- 12V DC buzzer,
- 5V DC buzzer,
- 2 12V lamps,

•220V/50Hz power input with fuse protected ON/OFF switch,

- Sensor interface,
- 0-360° partitions,
- Linear motion,

4.16.TEMPERATURE, HUMIDITY, PRESSURE, FLOW MEASUREMENT AND RECORD TRAINING SET

The training set is used to record the measured values by measuring temperature, humidity, pressure and ·owin closed, pressurized systems, pipelines, hot, cold, gas and liquid environments.

TECHNICAL DETAILS

•The training set consists of different sensors and data collection unit.

The data collection unit has the following features.

•The data collection unit has a 4.3 inch touch screen.

•The values of all sensor inputs can be observed proportionally via the touch screen, and the status of digital outputs can be monitored.

- There are 4 4-20mA sensor inputs.
- There are 4 0-10V sensor inputs

.

- There are 2 digital pulse inputs.
- There are 2 0-10V DC analog outputs.

possible).

- Data stored in memory

can be transferred to spreadsheet software.

.

• It has 4 digital outputs. digital output

voltages 0V for level 0, DC for level 1

It is 24V. (A tolerance of ±2V is accepted for voltage levels.)

possible).

• The data entering the device is stored in the internal memory unit.

can be stored and

data saved by transferring to computer

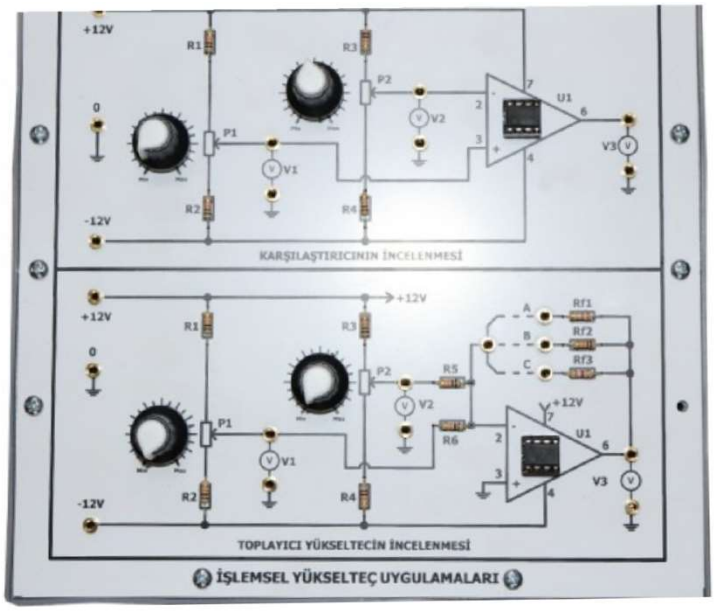
can be viewed.

• By connecting the device to a computer via USB, a

real-time data via software

can be traced.

4.17. OPERATIONAL AMPLIFIER TRAINING SET



The Operational Ampli·er Training Set is designed for Op Amp applications in schools where technical training is provided. The case of the set is designed from aluminum pro·le and composite material, it can be locked thanks to its hinges, and the top cover can be separated. Thus, it can be easily transported and stored if desired. The set is ergonomically designed for desktop use. The application surface of the set is electrostatic painted printed on epoxy card. Occupational pictures of the applications used are printed on the surface. Connections are made with 2mm female titanium-gold alloy metal sockets. Connection cables are gold-plated with 2mm springs. The entire training set is made of durable materials.

TECHNICAL DETAILS

Adjustable DC voltage output in the range of 0 – 30V

•Monitoring of voltage and current value with digital measuring instrument

•It should provide ±5V and ±12V constant DC voltage outputs. 12 – 0 – 12V constant AC voltage output

• 1 x 2mt IEC power cable with training set

• 220-240V/50Hz. supply with phase voltage

•Required operating instructions and occupational safety warnings on the training set

•Block diagrams, symbols and signs embroidered on the panel by printing method on all module panels

•Spare parts supply guarantee for 5 years. Energy control unit controlled by key lock and contactor.

• Safety precautions, labels, warning signs, warnings in accordance with national/international standards on the set

•Phase to earth and phase neutral, isolation and earthing protection

•Application modules with metal box, manufactured with 4mm compact laminate material

•Energy control unit controlled by key lock and contactor

•Production in accordance with national and/or equivalent international standards

•On-site installation, commissioning and suf·cient user training

•Design suitable for vocational training on the working principle of devices used in daily and industrial life.

•2-year warranty for problems caused by material and manufacturing faults.

4.18. ADVANCED LEVEL DIGITAL ELECTRONICS TRAINING SET

The Advanced Digital Electronics Experiment Set is designed for digital electronics applications in schools where technical education is given. Training set; It has been designed in a modular structure that includes Main Unit, Set Equipment and circuit applications, grouped according to application subjects, in order to carry out applications related to Advanced Digital Electronics.

TECHNICAL DETAILS

• Training set; supply input 220-240V AC/50Hz IEC input, removable fuse, power

There is an on-off switch with LED indicator and 1 2m IEC power cable is provided.

•DC power supplies; 0-30V 1A voltage and current adjustable. Regulated, short circuit protected, digital

There are +5V, -5V and +12V, -12V 1A ·xed, regulated, short circuit protected outputs with Voltmeter and Ammeter indication.

• AC power supply 12V-0-12V 1A ·xed output,

•All controls can be performed on the computer with a 4" or larger color touchscreen LCD screen. In addition, there is a USB interface for transferring data to a computer and an Ethernet interface for Network communication.

4.19. COMMUNICATION TRAINING SET

The training set consists of 4 sections: the section with power supplies and signal generators, the breadboard section, the section with modulators and demodulators. All of these sections are on a single unit made of electrostatic dyed sheet metal. It can also be produced in modular form or bag type, suitable for desktop use, depending on demand. Power supplies, signal generators and similar equipment required for experimental work on the training set are standard. In all AM, FM, ASK, FSK, PSK modulation applications, the outputs are designed to give sinusoidal form. A direct sine sign is used as a carrier signal. DC voltage can be applied as an information signal in applications such as AM, FM, PWM of the training set. There is a BPSKmodulation/demodulation application.

TECHNICAL DETAILS

- Amplitude modulator
- Frequency Modulator
- Amplitude Shift Keying (Modulator)
- Frequency Shift Keying (Modulator)
- Dual Phase Shift Switching (Modulator)
- Quad Phase Shift Switching (Modulator)
- Pulse Width Modulator
- Analog/Digital Converter
- Serializer

EXPERIMENTS

- Amplitude Modulation and Demodulation Module
- Classical amplitude modulation (GM)
- Classical diode amplitude demodulation (GM)
- Double sideband amplitude modulation (DSB)
- Double sideband amplitude demodulation (DSB)
- Frequency Modulation and demodulation module
- Frequency modulation (FM)
- Frequency demodulation with discriminator (FM)
- Analog – Digital and Digital – Analog conversions Module
- 8 bit single channel analog - digital conversion (ADC)
- 8 bit 8 channel analog - digital conversion (ADC)
- Bipolar digital to analog conversion (DAC)
- Unipolar digital to analog conversion (DAC)
- PWM Modulation and Demodulation Module
- Investigation of Pulse Amplitude Modulator (PWM) (2 Experiments)
- Investigation of Pulse Amplitude Demodulator
- ASK Modulation and Demodulation Module
- Investigation of Amplitude Shift Keying Modulation (ASK)
- Investigation of Amplitude Shift Keying Demodulation (ASK)
- FSK Modulation and Demodulation Module
- Investigation of Frequency Shift Keying Modulation (FSK)
- Investigation of Frequency Shift Keying Demodulation (FSK)
- Investigation of Phase Shift Keying Modulation (PSK)
- Investigation of Phase Shift Keying Demodulation (PSK)
- QPSK Modulation and Demodulation Module
- Investigation of Quadruple Phase Shift Keying Modulation (QPSK)
- Investigation of Quadruple Phase Shift Keying Demodulation (QPSK)
- 4400 pin bredboard module for implementation and development

4.20. POWER ELECTRONICS TRAINING SET

It has been developed in order to study the structure of the circuit elements used in power electronics and to extract their characteristics. The set is modular. Optionally, the number of modules can be reduced or increased.

TECHNICAL DETAILS

•Switching characteristic module

• Symmetrical power supply module

•Automatic fuse module

•AC Energy analyzer module

DC/DC Converter module

•Reference generator module

• Isolated measurement module

• Thyristor module

DC power supply module

• Thyristor/Triac driver module

•Data transfer module

Triac module

•Potentiometer module

• Resistive load module

• AC/DC measurement module

•Capacitive-Inductive load module

•Dimmer module

•Energy distribution module

Diode module

•Inverter module

4.21. FM RADIO TRANSMITTER TRAINING SET

The training set consists of two independent sets as FM Radio Receiver and FM Radio Transmitter. The training set has been designed using the most advanced processors, with PLL control, high sensitivity and a licensed stereo with high output power, which must be licensed by the General Directorate of Radios. It is a usage training set for understanding the logic in FM Radio Receiver and FM Radio Transmitter systems and making sense of the con·gured computer.

TECHNICAL DETAILS

•Training set; It consists of Blok Tuner, IF Detector, Stereo Decoder, Mixer, Tone Control and Audio Output stages.

• Blok Tuner is PLL controlled.

•The training set is in the frequency range of 88MHz-108MHz.

•Signals can be monitored from the test points in the block diagram on the training set.

•Volume and Tone Controls are adjusted with potentiometers.

• Audio Output Stage is manufactured in Stereo.

•There are at least 8 arti·cial faulty keys related to ·oors on the training set.

•Training set; The power input must be 220-240V AC/50Hz IEC input, removable fuse, power LED indicator and on/off switch and 1 minimum 2m IEC power cable is provided.

• DC power supply, 9V or 12V at least 1A fully regulated and short circuit protected.

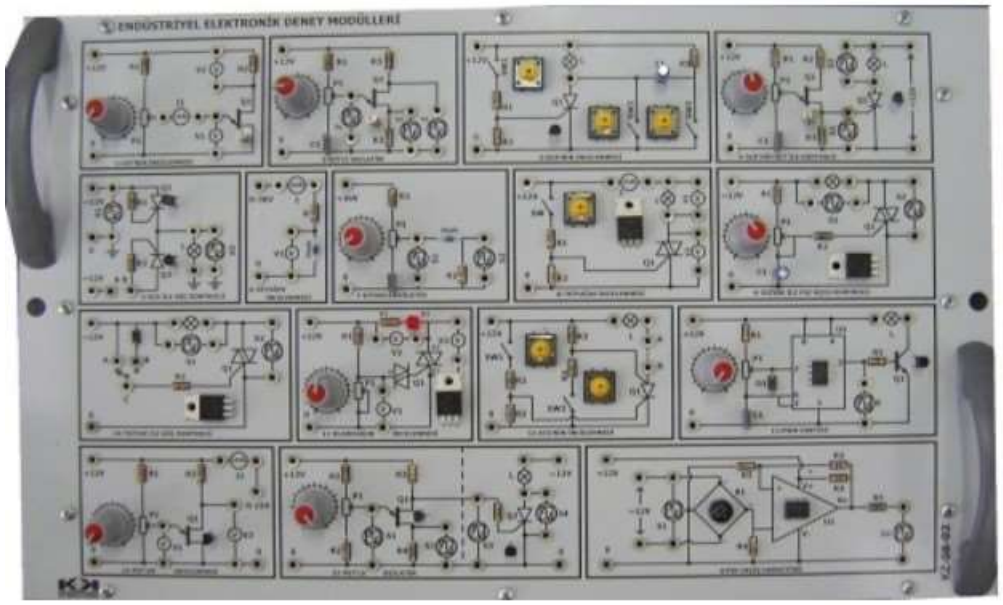
•Training set; Input Oscillator, PLL Circuit, Modulator, Buffer, The driver consists of RF Output Stage and Antenna Blocks.

• The training set is in the frequency range of 88MHz-108MHz.

•Various arti·cial faults related to ·oors on the training set can be done.

•Training set, Panel type (45x45mm anodized aluminum sigma pro·le) or against bag type impacts durable and insulated against electrical leakage.

4.22. INDUSTRIAL ELECTRONICS TRAINING SET



TECHNICAL DETAILS

•Detachable plastic or metal case or table top modular use so that Industrial Electronic applications can be made,
• 2x18V/0.75A symmetrical adjustable power supply with thermal and electronic short circuit protection,
• 2x5V/0.75A DC ·xed symmetrical power supply with thermal and electronic short circuit protection,
• 2x12V/0.5A symmetrical AC and DC power supply with fuse protection,
•3½ digit digital DC voltmeter,
•3½ digit digital DC ammeter,
•Signal generator with the following features;
It should be able to be adjusted to frequencies in the range of 1Hz-200KHz in six stages,
The signal with 0-15Vpp adjustable output amplitude can be determined as sinusoidal or triangular with a preference switch,
•TTL level square wave output,
• -10V - +10V (20Vpp) adjustable CMOS square wave output,
•Short circuit protection.
• 8Ω 0.25W speaker,
•2 12V lamps,
Potentiometer with 3 different values
•2 x 7 segment displays
DC buzzer
•12 logic state selector switches,
• 8 logic status indicators,
• 220V/50Hz energy input with fuse protection,
•Platform on which application modules and breadboard module can be installed.

4.23. ELECTRONIC MEASUREMENT TRAINING SET

There are ready-made modules for electronic measurement training set and practical applications during the experiment. It is suitable for bag and desktop use. Connections are made with 2mm female titanium-gold alloy metal sockets. Connection cables are gold plated with 2mm springs. Electronic measurement training set is a training set designed to understand the measurement logic in electronic circuits and systems and to make sense of the measured values.

TECHNICAL DETAILS

- Stepped TTL oscillator
- Fixed DC power supply
- Regulated symmetrical AC power supply
- Regulated DC power supply
- Potentiometer applications
- Digital DC ammeter
- Digital DC voltmeter
- Analog DC ammeter
- Analog DC voltmeter
- Signal generator

4.24.ELECTRICAL ELECTRONICS PRINCIPLES TRAINING SET

The Electrical and Electronics Fundamentals Training Set has been designed in accordance with the curriculum of universities, technical high schools and all institutions where technical education is needed. The content of the training set is suitable for advanced technical training, including basic training. The training set is modular. The modules are made of 4mm compact laminate material. In the experiment set, user safety was prioritized in accordance with the regulations. Module boxes are made of metal sheet and coated with electrostatic powder paint Laser technology was used in the drawing of the texts and symbols on the modules. Technical details are processed using UV printing technology. The experiment set is made of durable materials. There is a rail system where modules can be attached. On the table, the power supply and measuring instruments are mounted.

TECHNICAL DETAILS

- AC and DC Power Supply Module
- DC Motor Module
- Battery Module
- Re·ector Module
- Electricity Generation Module
- Magnetic Field Module
- RLC Module
- Measurement Module
- Transformer Module

4.25. DIGITAL ELECTRONICS EDUCATION SET

The Digital Electronic Experiment Set is suitable for desktop use and has a bag so that digital electronic applications can be made.

TECHNICAL DETAILS

1. Has a signal generator consisting of 6 ·xed stages
2. TTL level square wave output,
3. Short circuit protection,
4. Binary switch with 12 LED indicators,
5. 8 logic status pointers,
6. 2 7 segment displays,
7. Fuse protected 220V/50Hz energy input.
8. The following experiments can be performed with the test set modules;

- AND gate applications,
- OR gate applications,
- EXOR gate applications,
- NAND gate applications,
- NOR gate applications,
- EXNOR gate applications,
- NOT gate applications,
- Inverter
- RS FLIP FLOP applications,
- JK FLIP FLOP applications,
- D FLIP FLOP applications,
- T FLIP FLOP applications,
- 4 bit binary counter applications,
- Ring counter applications,
- Parallel shift register (shiftregister) applications,
- Bidirectional shift register applications,
- 7 bit binary counter
- 250 hole breadboard application development area

4.26. PRINT CIRCUIT TRAINING SET

Printed Circuit Training Set; It is designed to provide students with the skills required for transferring electronic systems with a schematic to copper cards. The design has been created using transparent materials so that the processes can be seen. LEDs were used as the light source. The exposure timer has a microcontroller-based design and a user interface controlled from the LCD panel.

TECHNICAL DETAILS

- The training set consists of a timed exposure unit and an acid bath unit with liquid circulation.

•The acid bath unit is made of PVC and PVC in a way that it will not be affected by the acids that can be used during the training phase.

Made of chrome material.

- Exposure area of timed exposure unit is at least 40x40 cm.
- Double-sided exposure can be done at the same time.
- Exposure time can be adjusted between 0 – 999sec.
- Acid bath circulation process is done with an acid resistant pump.
- The acid bath is transparent so that the etching process can be observed.
- Works with 220V, 50Hz AC.

4.27. AMPLIFIER TRAINING SET

The Ampli·er Training Set has ready-made modules to make practical applications during the experiment. It is suitable for desktop use. Connections are made with 2mm female titanium-gold alloy metal sockets. Connection cables are gold plated with 2mm springs. The set is made of durable materials. The Ampli·er Trainer has all the features found in audio ampli·er systems. It provides the opportunity to examine any external signal from the beginning to the speaker output. The set is in STEREO structure.

TECHNICAL DETAILS

- Training set; basic level experiments

for Preampli·er Stage, Mixer Stage, Tone Control Stage,

It consists of Driver Stage and Output Stages.

- Ampli·er structure, operation, input to output

internal or external faults that may occur up to

signal monitoring and audio ampli·er

systems are understood.

- Training by giving internal or external signal input

test in the block diagram on the set

signals can be followed.

- There is a microphone and an external signal input.
- Volume, Bass, Treble and Balance can be adjusted.
- At least 2 internal or external, output power

There is a suitable speaker.

- Training set; power input 220-240V AC/50Hz
- IEC input, removable fuse,

must be with on/off switch with power LED indicator

and 1 piece of at least 2m IEC power cable is provided.

- With the training set, 24 pieces of 2mm jacks in 4 different colors

cable is provided.

- Training set, impact resistant bag type

and insulated against electrical leakage.

4.28. GROUNDING TRAINING SET

Grounding Training Set is a training set designed to explain the working mechanism of the system in practice. Training Set; It consists of Energy Unit, Experiment Set Panel, Experiment Set Table, Insulation Controller, Meger Soil Resistance Measuring Device and Test Resistors. In the experimental set; Insulation measurement in IT network, leakage current measurement, earthing resistance measurement, electrical safety, measurements can be made in TN, IT, TT, TN-C, TN-S, TN-CS network and power systems. Failure situations that may occur are in a structure that can be created experimentally on the set.

TECHNICAL DETAILS

•At least 1 emergency stop button, start/stop button, 3 phase 4x25A 30 mA residual current relay, three phase 3x25A fuse protection is provided. When energized, each phase has a signal lamp.

•The energy of the training set is provided through a contactor with a key lock system and start/stop button placed on the energy unit.

•It has 4 220V alternating current 4mm banana socket outlets and 1 3 phase 4mm banana socket outlet.

•Digital ammeter leads have 4mm banana sockets.

•Experiment set front panel is made of at least 4mm compact laminate material.

•Experiments made by drawing a human model on the set are carried out on this model. 2,2R, 5R, 10R, 30R, 100R, 2K, 3 pcs 1K,

3.3K, 20K ·xed resistor and 1 5K-15K adjustable resistor ends are designed with 4mm banana sockets.

•25 pieces (5 pieces of 100cm, 10 pieces of 50cm, 10 pieces of 40cm) double insulated 4mm banana jack connection cables are delivered.

•Cable colors will be provided as red and black for each group in half and half different colors.

4.29.PANEL MOUNTING TRAINING SET

Panel Mounting Training Set; In the ▪eld of electrical and electronics, it is designed for practical learning of indoor and outdoor electrical installations of buildings, weak current, high current, design of lighting panels, placement of materials, processing of busbars and cables, testing and assembling of panels in facilities. It has three different applications as internal internal installation, internal type meter, external type construction site panel. In the training set, the modular panel structure used in today's technology is preferred, allowing it to be used repeatedly in many different applications.

TECHNICAL DETAILS

Internal Installation Panel Equipment;

Three-row mechanical modules and parts of 800 x 140 x 600mm
Slit chest plate
•Upgrade parts
Closing chest plate
•Mounting plate
•3 x 40A residual current circuit breaker
•2 x 25A 30mA residual current circuit breaker
•3 x 32A, 3 x 16A, 3 x 10A, 1 x 6A, 1 x 10A automatic fuse
•Impulse current switch
•22mm signal lamp
•2,5-4 -6mm 2 rail terminal blocks

Indoor Type Meter Board Equipment;

•(400x600) x 900 x 200mm ▪ush mounted or surface mounted counter panel
•Meter – switch – fuse booster parts
•Breast plates, screw nut
•4 x 43A residual current circuit breaker
•4 x 75A thermal switch
• 3 x 32A automatic fuse
• 3 x 25A automatic fuse
•1 x 10A, 1 x 16A automatic fuse
•Multimeter
•75/5A current transformer
3 x 10A electronic counter
3 x 20A electronic combined counter
•22mm signal lamp
Hazelnut – comb insulator
•20 x 5mm copper busbar

External Type Construction Site Panel Equipment;

•External table with two covers and feet, measuring 600 x 800 x 250 mm
•Chest plate (various) foot apparatus
• Socket fastening apparatus
•4 x 40A 30A residual current circuit breaker
•3 x 32A, 3 x 25A, 3 x 16A automatic fuses
•1 x 20A, 1 x 16A automatic fuse
3 x 10A electronic counter
•3 x 25A panel socket with cover
•1 x 16A panel socket with cover
•4 KW contactor
•Photocell relay

4.30. AUTOMATIC CONTROLLER TRAINING SET

The Control Trainer is made of compact laminate material in the form of a complete platform on which electrical control circuits can be installed. 4mm fully insulated bananas are used.

TECHNICAL DETAILS

- Residual current protected
- Automatically insured
- Emergency stop
- Button group,
- Signal lamp group,
- Inductive sensor,
- Capacitive sensor,
- Optical sensor,
- Flat time relay,
- Inverse time relay,
- Low voltage protection relay,
- 1.5KVA three phase soft starter,
- Contactor group (16A, 6NO, 2NC contact)
- Low current protection relay,
- Thermistor relay,
- Phase sequence relay,
- Liquid level relay,
- PTC relay,
- Motor protection relay,
- Overcurrent relay,
- Limit switch,
- Star triangle switch,
- Three phase 0-1 switch,
- Double speed (D-YY)(0-1-2) switch,
- Three-phase Three-phase Changeover switch (Right-Left 1-0-2 switch)

4.31.ENGINE TRIAL TABLE TRAINING SET

The Engine Trial Table Training Set has been designed in accordance with the curriculum of universities, technical high schools and all institutions where technical education is needed. The content of the training set is suitable for advanced technical training, including basic training. The training set is modular. The modules are made of 4mm compact laminate material. In the experiment set, user safety was prioritized in accordance with the regulations. The module box is made of metal sheet and coated with electrostatic powder paint. Laser technology was used in the drawing of the texts and symbols on the modules. The experiment set is made of durable materials. On the table, the power supply and measuring instruments are mounted.

TECHNICAL DETAILS

- Permanent magnet DC motor
- Shaded pole motor
- 3 Phase asynchronous motor
- 1 Phase asynchronous motor
- Energy analyzer
- Required power supplies for experimental work
- Durable metal Platform

4.32. MODULAR COMPENSATION TRAINING SET

Modular Compensation Training Set; It is designed to introduce circuit elements in basic theoretical and applied trainings about compensation. The content of the training set is suitable for advanced technical training, including basic training. The training set is modular. In the experiment set, user safety was prioritized. Module boxes are made of metal sheet and coated with electrostatic powder paint.

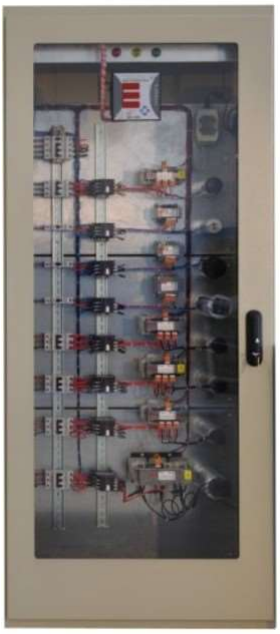
TECHNICAL DETAILS

- Reactive relay module with LCD display

•Rs 485 computer communication module

- 3 Phase power supply module
- 3 Phase capacitor group module
- Inductive load unit
- Resistive load unit
- 1 - 2 Phase capacitor group module

4.33.COMPENSATION TRAINING SET



Compensation Training Set; It has been produced for the purpose of introducing circuit elements in basic theoretical and practical trainings about compensation. Real valuable experiments are carried out with many different applications and it supports compensation training with practical applications. Thanks to the compensation relay, it provides the opportunity to calculate and verify the real values in the system. The content of the training set is suitable for advanced technical training, including basic training. In the experiment set, user safety was prioritized.

TECHNICAL DETAILS

•The position of each phase can be seen in vector with the LCD screen of the reactive relay,

•Monitoring, control and command of the phases from the computer thanks to the computer interface

•Monitoring of active, reactive, capacitive energy rates via reactive relay

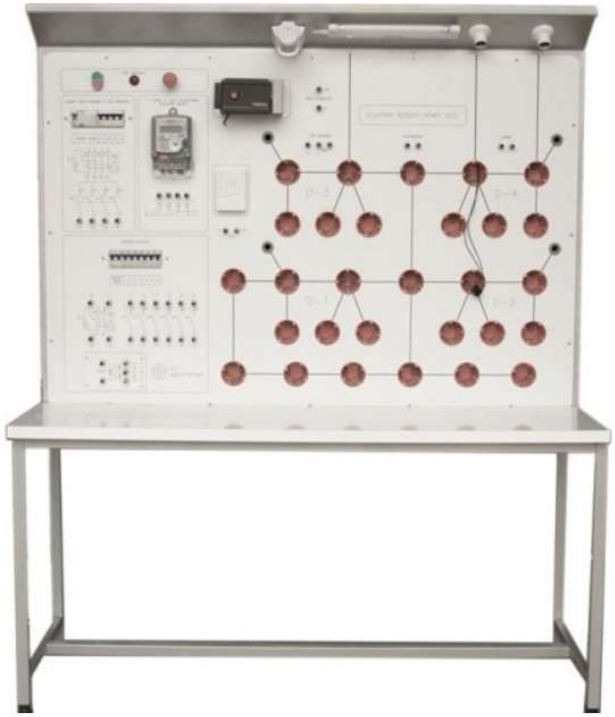
•Individual compensation, group compensation and central compensation applications

• Compensation failure applications

•The effects of R-L-C loads on AC circuits and their effects on the grid.

•Electrical linear loads and non-linear Effect of loads on power quality and examining the relationships in parameters (A - V - W - VA - VAR -COSφ-Harmonic I / V etc.)

4.34. ELECTRICAL INSTALLATION TRAINING SET



Training set; It is designed for applications related to high current lighting, low current calling and noti·cation installations for 4 ·ats.

The installation elements on the set are in the structure of ·xed ·ush-mounted installation, in which the cables suitable for the circuits can be drawn and connected with the installation elements.

The training set has two different operating voltages: 24V or 230V AC. There is an on/off switch and a signal lamp at the energy input of the set.

In the application module, there are 3 phase neutral fuse, leakage current group, PIR detector, 2 sockets, ·uorescent lamp, electric door lock, bell transformer, electronic bell and electronic counter.

Junction boxes are ·xed to the compact material with nail bolts. There are one-phase, one-phase leakage current and six one-phase automatic fuses available with one input and output 4 mm insulated plug.

4.35.ELECTRICAL MEASUREMENT TRAINING SET

The Electricity Measurement Training Set has been designed in accordance with the curriculum of universities, technical high schools and all institutions where technical education is needed. The content of the training set is suitable for advanced technical training, including basic training. The training set is modular. The modules are made of 4mm compact laminate material. In the experiment set, user safety was prioritized in accordance with the regulations. Module boxes are made of metal sheet and coated with electrostatic powder paint. Laser technology was used in the drawing of the texts and symbols on the modules. Technical details are processed using UV printing technology. The experiment set is made of durable materials. There is a rail system where modules can be attached. On the table, the power supply and measuring instruments are mounted.

4.36. COIL WINDING MACHINE TRAINING SET

Coil Winding Machine Training set is a practical application of the working mechanism of the system.
It is a training set designed to explain. The equipment in the system and the operation of the system in every aspect
can be observed. For electrical protection, residual current fuse, automatic fuse and emergency stop button are available. Laser technology for drawing texts and symbols on modules usedtr. The training set is made of durable materials.

TECHNICAL DETAILS

Emergency stop button

- Electrical safety equipment
- Digital Display
- Asynchronous Motor

4.37. 24 V CONTROLLER TRAINING SET

The Control Trainer is in the form of a complete platform where electrical control circuits can be installed.

It is made of laminate compact material. Technical education university, technical high school and technical

It has been designed in accordance with the curriculum of all institutions where education is needed. of the training

Its content is suitable for advanced technical education, including basic education. The training set is modular. modu

It is made of 4mm compact laminate material. In the experimental set, in accordance with the regulations, the user

safety is prioritized. Module boxes are made of metal sheet and coated with electrostatic powder paint.

is coated. Laser technology was used in the drawing of the texts and symbols on the modules.

Technical details are processed using UV printing technology. Experiment set, made of durable materials

produced.

TECHNICAL DETAILS

- Three phase 0-1 switch
- Automatic insured
- Button group
- Signal lamp group
- Flat time relay
- Inverse time relay
- Motor protection relayX
- Contactor group (16A, 6NO, 2NC contact)

4.38. INDUCTION MOTOR DRIVER TRAINING SET

DIMENSIONS
700X350X890mm

1.Training set; The conveyor belt consists of mechanical processes in which a three-phase asynchronous motor with reducer and a control unit are combined.

2. De‧nition and functions of asynchronous motorized conveyor belt trainer units;

a) Conveyor Belt Unit: It is the mechanical unit that can carry the workpieces to the relevant place.

b)Three-Phase Asynchronous Motor with Gearbox: It is a three-phase power transmission organ with a power of at least 0.09 KW, capable of rotating at 90 revolutions in 90 minutes and does not require lubrication, and has the capacity to rotate the conveyor.

3. Conveyor belt training set with asynchronous motor has been adapted to the following items;

1) Stainless steel chrome sheet and aluminum are used instead of unpainted paint in the mechanical structure,

2)Cutting the chrome sheets used, laser cutting, etc., which will not damage the shape and shape of the sheets and will not create burrs. made by a method such as

3)In terms of work safety, there are no sharp corners in all of the mechanical parts. Countersunk has been drilled in the relevant places. A radius of at least R2 mm was used in the rounding process. (It changes according to preference.)

4) Bolts, screws, nuts, washers, etc. in the training set. All fasteners are made of stainless materials.

5)The training set is mounted on a channeled, anodized aluminum frame measuring at least 700x360 mm. It is assembled without the use of any apparatus.

6)The training set panel is made of materials that are not affected by water, acid, external environment and are not harmful to health. All the explanations on the panel are laser engraved so that they are not erased and removed.

7)There are 2 limit switches on the conveyor belt training set. The contacts of the limit switches are removed to the born terminals on the limit switch.

8)DIN 7.5 x 15 rails are installed on the asynchronous motorized conveyor belt trainer for mounting different devices. A stopper is attached at both ends of the rail.

9.) Conveyor and geared three-phase asynchronous motor unit has the following technical features;

- Conveyor belt drive roller is made of steel,
- Drive roll outer diameter 30 mm,
- There are holes approximately 25 mm deep and 8 mm in diameter on both sides (both ends) of the drive roller. These holes are reamed.
- Two M5 threads were milled on both ends of the drive roll at a range of 180 degrees.

- One end of the drive roller min. 14mm and the other end min. 17mm diameter.D
- rive roller bearings are made of aluminum to prevent rust.
- The drive roller is mounted on bearings made of aluminum.
- M5 thread is drilled on the aluminum bearing for the connection of devices such as sensors, limit switches, etc.
- anş holes are machined on the aluminum bearing to connect the stepper motor.Flange holes are drilled with M4 thread.
- There is no misalignment between the gearbox shaft and the conveyor drive roller. Drive roller and aluminum bearing are machined without defects.T
- he gearbox shaft is coupled to the conveyor drive roller by direct fitting method. No coupling etc. connection elements were used.
- The gearbox can be easily removed and reinstalled from the place where it is mounted.
- Conveyor belt width is 88mm. Conveyor belt thickness maximum 2mm.Conveyor belt color is black.Conveyor belt has wafer patterned belt that can eliminate electrostatic effect.Conveyor belt drive roller should be made of deep material and the color is white.Conveyor tension roller outer diameter at least 32mm.Conveyor tension roller bearings are made of aluminum.For conveyor belt tensioning, a special tensioning apparatus that is readily available in the market or whose working system is suitable for this is not used.
- The tensioner is integrated with the drive roller bearing.Conveyor belt length 650-700 mm.There are channels on both sides of the conveyor belt to connect any device such as sensors, cylinders, etc.There are distance adjustable limit switches at both ends of the conveyor belt.
- The position of the limit switches can be adjusted in the range of at least 0 - 50mm on the chrome sheet on which it is mounted.Conveyor belt unit is joined to the lower table with surface joining technique.
- Reducer output speed is 90 rpm.Three-phase asynchronous motor min. 0,09 KW.The reducer is connected to the conveyor directly from the drive roller.10.
- Warranty Conditions;Mechanical warranty: 2 (two) yearsElectrical/electronic/pneumatic device warranty: 2 (two) years
- 11. Installation and training conditions;Installation, assembly and testing of asynchronous motorized conveyor belt training set will be done by our organization.
- It will be delivered in a working condition.Training materials related to the use of asynchronous motorized conveyor belt training set will be provided with the training set.

4.39. IKS SINGLE PHASE CONTROLLER TRAINING SET

DIMESIONS
120X600X1500mm

The training set is designed to help with the electrical command and control structure of the cooling systems, their operation and the observation of the theory, the detection of the faults, the identi·cation of the circuit elements and the practical training. All the elements used in the training set have the same structure as the models used in industrial and daily life and are used in the industry sector.

TECHNICAL DETAILS

•Supply voltage: 220V - 240V AC, 50/60Hz,

• Basic cooling,

•Analogue and digital Low and High pressure

indicators,

• Digital measurement indicators,

•Cooling and fan thermostat with digital display,

• Start - Stop - Emergency stop buttons

• Leakage current and fuse protected,

•Timer,

• Magnetic relay,

• Capillary tube,

•Condenser and evaporator,

• Compressor,

• Control relays,

• Capacitor,

• Electrical switch,

• PTC relay,

• Lamp,

EXPERIMENTS

•Making the electrical connections of the single door refrigerator,

•Making the electrical connections of the two-door refrigerator,

•Making the electrical connections of the No Frost refrigerator,

•Ekovat removal experiment with different methods,

• Defrosting process,

•Effect of condenser fan on cooling.

HYDRAULIC AND PNEUMATIC

5.1.HYDRAULIC TRAINING SET

DIMENSIONS
1200X450X1200mm

The system consists of extruded aluminum panel with 8.5mm slots on both sides, allowing two groups of students to work simultaneously on both sides of the panel. The hydraulic and electro-hydraulic components that students will work with can be attached to the panel. All components are industrial. Each component is mounted on a stainless steel plate with retaining clips to accommodate components on the work panel.

TECHNICAL DETAILS

- Two-legged, wheeled, hydraulic aluminum panel hydraulic training set table
- hydraulic pump for a work surface
- Lockable storage drawer block for hydraulic table
- Hose holder accessories

COMPONENT AND ACCESSORY GROUP

HYDRAULIC KIT LEVEL 1
•Pressure relief valve·
One-way ·ow restrictor
•On/Off Valve, Ball Valve
Two-way ·ow restrictor
• Cross distributor with pressure indicator
•Cross distributor – 4 connections
One-way ·ow regulator with pressure compensation
•4 connection distributors on the manifold with pressure gau
One-way restrictor
•Double acting differential cylinder D32/D22x200
One-way restrictor with pilot warning
•2/2 Manual action valve, spring return
3/2 Manual acting valve, spring return

5.2. HYDRAULIC ELECTROHYDRAULIC TRAINING SET

DIMENSIONS
1200x650x1500mm

This training set consists of 8 separate units. All of these units can be included in the set or different choices can be made according to the needs.The contrrol elements in the units ae mounted on a 4-5 mm thick, insulated outer panel. The control panel can be dismantled in a few seconds as it is mounted on the car by snapping. In order to prevent dust from entering the panel, 3 sides are covered with insulated material. Born terminals measuring 4 mm are used on the panel; Thus, all electrical connections are made with the help of 4 mm jack cables. Depending on user preferences, insulated type socket and cable can be used.

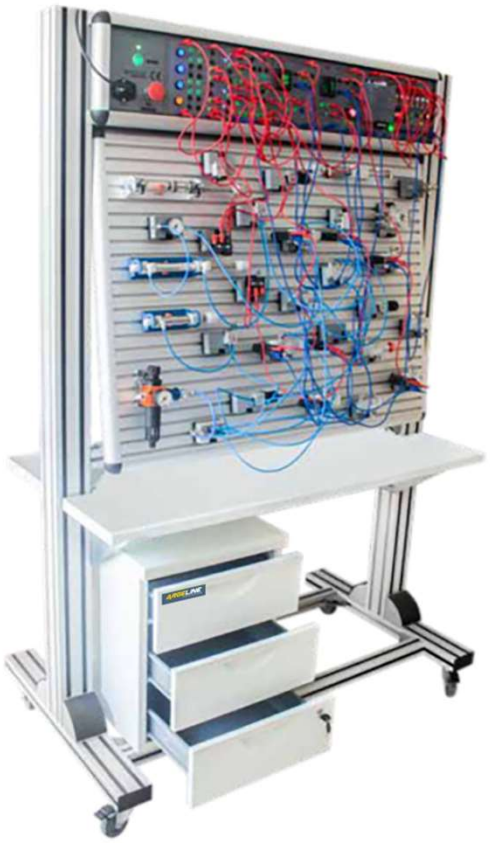
EXPERIMENTS

- Input unit test
- Button and lamp unit test
- Relay unit test
- Timer unit test
- Counter unit test
- Encoder unit test
- DC motor, stepper motor, encoder unit test
- PLC unit test

TECHNICAL DETAILS

- Input unit
- Button and lamp unit
- Relay unit
- Timer unit
- Counter unit
- Encoder unit
- DC motor, stepper motor, encoder unit
- PLC unit

5.2. PNEUMATIC - ELECTROPNEUMATIC TRAINING SET



DIMENSIONS
1200x650x1500mm

This training set consists of 8 separate units. All of these units can be included in the set or different choices can be made according to the needs. The control elements in the units are mounted on a 4-5 mm thick insulated panel. The control panel can be dismantled in a few seconds as it is mounted on the car by snapping. In order to prevent dust from entering the panel, 3 sides are covered with insulated material. Born terminals measuring 4 mm are used on the panel; Thus, all electrical connections are made with the help of 4 mm jack cables. Depending on user preferences, insulated type socket and cable can be used.

EXPERIMENTS

- Input unit test
- Button and lamp unit test
- Relay unit test
- Timer unit test
- Counter unit test
- Encoder unit test
- DC motor, stepper motor, encoder unit test
- PLC unit test

TECHNICAL DETAILS

- Input unit
- Button and lamp unit
- Relay unit
- Timer unit
- Counter unit
- Encoder unit
- DC motor, stepper motor, encoder unit
- PLC unit

ARGELINE
TEKNİK EĞİTİM CİHAZLARI

AIR CONDITIONING

6.1. COOLING AND VENTILATION TRAINING SET

Cooling and Ventilation Training Set; technical education university to the curriculum of all institutions that need technical high school and technical education.
properly designed.

6 2. VENTILATION TRAINING SET

DIMENSIONS
4500X700X1500mm

The Training Set is designed to explain all phases in the ventilation system and to make energy ef·ciency calculations.

DENEYLER

air ·ow test

- Fan electrical power test

•Electrical power test where valve adjustment is provided.

- Power test provided by the inverter
- Flow rate adjustment with inverter
- Savings experiment
- Fan pressure test

TEKNİK DETAYLAR

- Supply voltage: 220V - 240V AC, 50/60Hz,
- 7" LCD touch screen,
- Electrostatic painted steel sheet,
- Start - Stop - Emergency stop buttons,
- Leakage current and fuse protected,
- Basic general block diagram on the panel,
- Detachable modules,
- Fan unit,
- Air velocity measurement sensor,
- Pt-100 temperature sensor,
- Differential pressure transmitter,
- PLC,
- Adjustable damper,
- Axial type fan,

•Air velocity, pressure and temperature graph,

- Excel data saving,
- Control from computer,
- Control via touch screen,
- Data memory battery,
- ASCII communication system,
- Fan speed control,
- Written and audible warning system,
- Display port (RS-232/485/422),
- Multiple communication,
- Security protection, password

6.3. AIR CONDITIONING COOLING SYSTEMS TRAINING SET

This training set has been designed in accordance with the curriculum of universities, technical high schools and all institutions where technical education is needed, in order to examine the entire structure of the air handling unit. They are large-scale units used in buildings, especially in industrial buildings. Air handling units that heat, cool and clean indoor air with their superior performance are often preferred in places where central air conditioning is needed.

EXPERIMENTS

- Mixed winter conditioning test
- Unmixed winter acclimatization test
- Mixed summer acclimatization test
- Mixed-free summer air-conditioning test
- Experiment to establish comfort conditions

TECHNICAL DETAILS

- Adjustable 360 W heater
- Hermetic Compressor
- Condenser with Hood
- Axial fan with fan speed control
- Angle controlled damper
- Low pressure manometer
- Anemometer
- Wet humidi·cation system
- Transparent -exi structure

6.4. BASIC AIR CONDITIONING TRAINING SET

DIMENSIONS
1650x550x1235mm

There is a cooling group, resistances for heating processes and a humidi·cation unit in the experimental set. The ·ow of the used air is regulated by a radial fan whose speed can be adjusted. The duct system through which the air ·ows has a cross-sectional area of approximately 0.10 m2. The air sucked from the atmosphere ·rst enters a variable speed centrifugal fan and then passes through the duct system. Humidi·cation unit is operated to increase the moisture content during heating operations. In the heating processes, the resistances are activated, the pre-heating resistance power is 1 kW and the post-heating resistance power is 0.5 kW. Thanks to these resistances, the air is heated. Information from temperature and humidity sensors can be observed on the LCD screen. If cooled and dehumidi·ed air will pass through the system, the cooling system is activated and the air passing through 3 channels is cooled by the cooling group and the in-duct evaporator. As the cool and dry air passes through the duct, the humidity and temperature sensors in this section make their measurements. If it is desired to reheat the air, after-heating resistors should be operated. Before the conditioned air is released into the atmosphere, velocity is measured with an air velocity meter (anemometer).

TECHNICAL DETAILS

- Hermetic piston compressor
- forced air cooled condenser
- air cooled evaporator
- Wet humidi·cation pads
- radial fan
- Digital temperature measurement from 5 different points
- Digital relative humidity measurement from 5 different points
- Anemometer

6.5. SPLIT AIR CONDITIONER FAILURE TRAINING SET

DIMENSIONS
1200X600X1500mm

Split air conditioner fault simulator is designed to visualize and detect the most common faults in air conditioners. 15 different faults can be created such as voltage fault, indoor unit card fault, outdoor unit fan motor fault, four-way valve fault, room temperature sensor fault.

EXPERIMENTS

- Power cut failure
- Voltage fault
- Thermal cut off circuit
- Compressor windings are damaged
- Capacitor broken circuit
- Indoor unit board malfunction
- Outdoor unit fan motor malfunction
- Outdoor unit fan capacitor broken circuit
- Indoor unit fan motor malfunction
- Display panel malfunction
- Stepper motor failure
- Four-way valve failure
- Receiver panel failure
- Pipe temperature sensor malfunction
- Room temperature sensor malfunction

TECHNICAL DETAILS

- Heating, cooling, ventilation and dehumidi·cation functions
- Digital temperature measurement from 4 different points
- Split air conditioner indoor unit
- Split air conditioner outdoor unit
- Split air conditioner
- Remote control system
- Compressor

6.6. HEAT RECOVERY LOCAL VENTILATION TRAINING SET

DIMENSIONS
1500X650X1500mm

Heat Recovery Air Conditioning Center Training Set is designed to observe the heat recovery air conditioner structure, operation and theory, to detect and eliminate the malfunctions, to recognize the circuit elements and to assist in practical training. Heat recovery units transfer the fresh air needed by the environment by using heat exchangers that can recover the heat energy of the polluted air from indoor environments where the temperature is higher, exhaust it and transfer heat from air to air.

EXPERIMENTS

- Energy balance in the plate heat exchanger
- Calculation of the thermal ef·ciency of the heat exchanger
- Calculation of the thermal ef·ciency coef·cient in the heat exchanger

TECHNICAL DETAILS

- Model : Air·ow con·gurations for ·exible installation
- Structure and panel: Self-supporting frame
- Sheet material: Galvanized steel
- Air tightness: EPDM sealing gaskets are used to provide full air tightness on the panel surfaces.
- Heat and sound insulation: K--ex insulation materials
- Heat recovery: Plate heat recovery
- Heating : Electric heating
- Fan : Backward curved blade fan / plug fan
- Power and regulation: Built-in power and electrical regulation panel
- Monitoring / management : BMS management

6.7. WATER COOLING TOWER TRAINING SET

DIMENSIONS
800X650X1200mm

The cooling tower training set is a closed circuit cooling and heat dissipation method. Typical application areas are: air conditioning, heavy industry and power plants. In wet cooling towers, the water to be cooled is sprayed onto a wet deck surface. In counter-flow, water and air come into direct contact. The water is cooled by the convection method. Some of the water evaporates and the removed heat of evaporation further cools the water. The cooling tower trainer examines the main components and principle of a ventilated wet cooling tower. The water is heated in a tank and transported by a pump to an atomizer. The atomizer sprays the water to be cooled onto the wet deck surface. Air flows from bottom to top as water drips from top to bottom along the wet deck surface. Heat is transferred directly from water to air by convection and evaporation. The volume of evaporated water is recorded. Air flow is provided by a fan. The cooling column is transparent and allows clear observation of the wet deck surface and dripping water.

EXPERIMENTS

- Observation of processes
- Calculation of thermodynamic changes in air and water
- Effect of cooling load on wet bulb approach
- Relationship between cooling load and cooling difference
- The effect of changes in air velocity on the wet chamber approach

TECHNICAL DETAILS

- Resistance
- Axial fan
- Fan speed control
- Temperature measurement
- Recirculation pump
- Transparent tower
- Digital humidity sensor

6.8. SPLIT AIR CONDITIONING TRAINING SET

DIMENSIONS
900X500X1500mm

This training set is designed to show the working and connection principle of air conditioners. It has been designed in accordance with applied training to observe the structure, operation and theory of the split air conditioner system, to detect the faults that occur, and to identify the circuit elements. All the elements used in the training set are exactly the same as the models used in industrial and daily life and are also used in the industry sector.

EXPERIMENTS

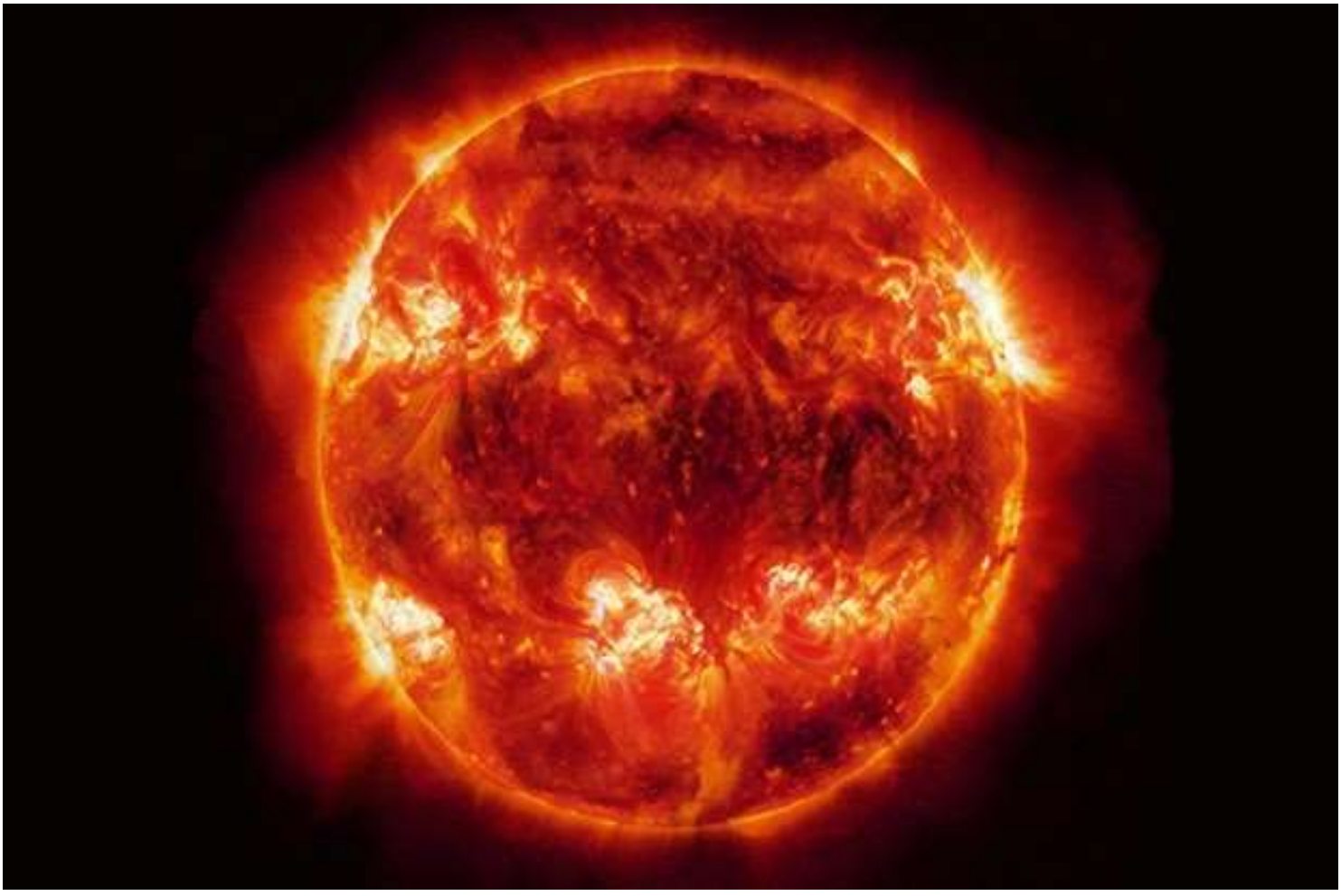
- Operating the split air conditioner in summer mode
- Operating the split air conditioner in winter mode
- Operating the split air conditioner in ventilation mode
- Operating the split air conditioner in dehumidi·cation mode
- Operating the split air conditioner in automatic mode
- Introduction of the split air conditioner control circuit
- Introducing the indoor unit card of the split

TECHNICAL DETAILS

- Digital temperature measurement from 4 different points
- Split air conditioner indoor unit
- Split air conditioner outdoor unit
- Compressor Low-high pressure gauges
- Digital ammeter

ARGELINE TEKNİK EĞİTİM CİHAZLARI

HEAT TRANSFER



7.1. HEAT PUMP TRAINING SET

DIMENSIONS
1000X800X1300mm

Heat pumps are devices that allow us to use the energy that is available in nature but that we do not use because of its low temperature, by raising the temperature. Heat pumps perform this process, just like in air conditioners, thanks to the cooling cycle. The heat pump is used for space heating or cooling. For this purpose, it takes the heat from the low temperature heat source and gives it to the high temperature heat source. COP refers to the rate of heat / electricity consumption given to the area. The device can operate in 3 different options as air, water and soil.

EXPERIMENTS

- Calculation of ground source heat pump heating coef·cient of performance (COP)
- Calculation of water source heat pump heating coef·cient of performance (COP)
- Calculation of air source heat pump heating coef·cient of performance (COP)

TECHNICAL DETAILS

- Compressor
- water source evaporator
- water source condenser
- air source evaporator
- Flowmeter (Gas)
- Flowmeter (Liquid)
- expansion valve
- ·lter drier
- 10 pcs Temperature sensors
- 2 Humidity sensors
- 2 pressure transmitters
- Pump
- 4 solenoid valves

7.2. NATURAL AND FORCED HEAT CONVERSION TRAINING SET

DIMENSIONS
700X350X890mm

The natural and forced convection trainer set is designed to allow students to explore both natural convection and forced convection experimentally. The trainer includes a digital speedometer and a small variable speed wind tunnel with a central opening. It features three plates with heaters and temperature sensors designed to fit the central opening in the wind tunnel. A heated flat plate with a surface thermocouple, a similar pin plate, and a finned plate equipped with a thermocouple can be directly compared. In addition to a better understanding of the surface improvement of heat transfer from elongated surfaces, the pin and finned plates each contain a fin and three thermocouples spaced along a pin. This allows the temperature distribution across expanded surfaces to be investigated.

EXPERIMENTS

- Calculation of energy balance by nature and forced convection in different types of heat exchangers
- Variation of the total heat transmission coefficient depending on the speed in different types of heat exchangers
- Calculation of thermal data of different types of heaters in
- natural and forced convection states

TECHNICAL DETAILS

- Ventilation duct
- Heating elements, temperature limitation: 90 °C
- Tube bundle
- Number of tubes: 23
- Heating power: 20W
- Heat transfer area: 31.41cm 2
- Roller at equal temperature on the surface
- Heating power: 20W
- Heat transfer area: 111cm 2
- Plate
- Heating power: 40W
- Heat transfer area: 2x 100cm 2
- Cylinder with heating foil to investigate local heat transfer
- Heating power: 40W
- Heat transfer area: 111cm 2
- Axial fan
- Max. flow rate: 500m3/h
- Max. pressure difference: approx. 950 Pa
- Power consumption: 90W

7.3. BOILING HEAT TRANSFER TRAINING SET

DIMENSIONS
850X600X1300mm

The boiling heat transfer trainer is designed to allow students to experimentally study convective, nucleation, and -lm boiling. The unit consists of a high-strength, clear glass cylinder with an instrumented electrical heating element, immersed in a low- ressure boiling volatile solvent. An integrated water-cooled condenser coil allows room pressure to be controlled over a wide range of negative and positive pressures depending on the ocal water supply.

EXPERIMENTS

- Observation of convection core and transition boiling
- Finding system energy balance at constant boiling temperature
- Calculation of condenser capacity, super·cial convection coef·cient and nusselt number
- Finding the heat ·ow and surface heat convection coef·cient
- at constant boiling temperature

TECHNICAL DETAILS

- Heating resistance
- Transparent tank
- Recirculation pump
- Temperature sensors

7.4. RADIATION TRAINING SET

DIMENSIONS
1600X650X1100mm

In the radiant radiation training set, radiant heat transfer and radiant heat exchange laws allow the fundamental laws of heat transfer by radiation (both heat and light) to be investigated. Two suitable detectors, light-·lters, and target plates and aperture plates are each mounted on suitable carriers on a parallel gradient path, allowing for simple and rapid experimental procedures. The electrically heated matte black radiant heat source is equipped with an integrated thermocouple to record the surface temperature. With a radiometer it detects the heat ·ow in W/m2 directly from a combination of four plates (two matte black, one gray and one polished) or between a slot formed by two movable cork-faced plates. Each plate with different emissivity includes a surface thermocouple for temperature measurement. diffused light source, It contains a low-voltage -lamman lamp in a rotatable housing (180°) that can be placed on a parallel path instead of the heat source. To measure the incident intensity, a light meter that records directly in lux can be placed in place of the radiometer. -Lter plates of various opacity and thickness can also be mounted on the rail to demonstrate the laws of light absorption.

EXPERIMENTS

- Inverse square rule of heat experiment
- Stefan Boltzmann rule experiment
- Spread of different types of plate surfaces.
- determination experiment
- Inverse square rule of light experiment
- Lambert's cosnus theorem experiment
- Lambert's absorption rule experiment

TECHNICAL DETAILS

- Radiation sensor
- Luxmeter
- Temperature sensors
- White light observable radiation radiator
- Color ·lter in different colors
- Angle-adjusted measurement possibility
- Radiation source

7.5. HEAT CONDUCTION IN METALS TRAINING SET

DIMENSIONS
670X300X500mm

Heat conduction is one of the three basic forms of heat transfer. According to the second law of thermodynamics, heat is always transferred from the higher energy level to the lower energy level. If a body's temperature does not change despite continuous addition or removal of heat, this is known as steady- state heat conduction. This training set is designed for basic experiments on heat conduction through various metals. The upper zone of the sample is heated by an electrical heater and the lower zone is cooled by a peltier element. Heat conduction takes place from top to bottom through the respective sample. Two samples can be placed in the experimental unit at the same time to investigate the thermal conductivity through multilayer metals. Perfectly matched components ensure fast heating and trouble-free measurements. The temperature of the metal samples is taken from the top and bottom by means of thermocouples.

EXPERIMENTS

- Time dependence until steady state is reached
- Thermal conductivity of different metals accounts
- Calculate the thermal resistance of the sample
- Heat transfer with different samples connected in series
- Effect of sample length on heat transfer

TECHNICAL DETAILS

- Peltier element
- Cooling capacity 56.6W
- Heater
- Heating power 30W
- Temperature limitation: 150 °C
- Examples: Ø 20mm
- Length between measuring points
- 5x 20mm (copper, steel, stainless steel, brass, aluminum)
- 5x 40mm (copper, steel, stainless steel, brass, aluminum)
- 1x 40mm, rotated ·ute (aluminum)
- Measuring ranges

7.6. BOILING AND CONDENSING HEAT TRANSFER TRAINING SET

DIMENSIONS
850X600X1300mm

Gas laws belong to the fundamentals of thermodynamics and are covered in every training course on thermodynamics. The state isothermal change also takes place at constant volume. Transparent tanks allow observation of state change. Air is used as the test gas. In the ·rst tank positioned on the left, the hermetically sealed air volume is reduced or increased using a compressor and hydraulic oil. This results in an isothermal change of state. The compressor can also work as a vacuum pump. If the changes occur slowly, the state change occurs at an almost constant temperature. In the second tank located on the right, the pressure increase is measured by increasing the temperature of the test gas with a controlled electrical heater. The volume of the closed gas remains constant. temperatures,

EXPERIMENTS

- Experimentally demonstrate the laws of state changes in gases isothermal state change
- Boyle-Mariotte's law isochoric change of state, Gay- Lussac's 2nd Law

TECHNICAL DETAILS

- Compressor
- Vacuum pump
- Valve
- Temperature controlled heater
- Temperature sensor
- Pressure sensor
- Transparent tank
- Digital display

7.7. HEAT TRANSFER TRANSMISSION BY RADIATION TRAINING SET

DIMENSIONS
670X300X400mm

In the radiation heat transfer training set, heat radiation is one of the three basic forms of heat transfer. Heat transfer in radiation occurs through electromagnetic waves. Unlike heat conduction and convection, heat radiation can also propagate in a vacuum environment. Heat radiation is not dependent on a material. It offers basic experiments for teaching, aimed at with this training set. At the center of the experimental unit is a metallic sample heated by a concentrated beam of light. The light beam is produced by a continuously adjustable halogen lamp and a parabolic reector. The reector concentrates the radiation to a focal point. A sample is placed on a thermocouple located at the focal point. The thermal radiation emitted by the sample is measured with a thermopile. In order to measure radiation at different distances, the thermopile is mounted on a moving trolley. Samples with different surfaces can be selected. It provides the opportunity to test with different samples.

EXPERIMENTS

- Lambert's inverse square law experiment
- Stefan-Boltzmann law experiment
- Kirchhoff's law experiment

TECHNICAL DETAILS

- Halogen lamp.
- Electric power 150W.
- Max. temperature: approx. 460° CA.
- Aluminum samples, Ø 20mm.
- 1x matte anodized on both sides.
- 1x painted on both sides (high temperature paint).
- 1x matt anodized painted on one side.
- Copper samples, Ø 20mm.
- 1x nickel plated.
- 1x glossy, oxidizes over time.
- Stainless steel sample, Ø 20mm.

- 1x glossy will oxidize over time due to high temperature.

7.8. MODULAR HEAT EXCHANGER FEEDING UNIT TRAINING SET

DIMENSIONS
1100x680x590mm

In the modular heat exchanger feeding unit, the ef·ciency and working principles of different heat exchangers are shown. In this training set, the temperature and ·owrates of the water inlets and outlets are measured. It is basically a tool that provides heat transfer between two ·uids. The distinguishing feature of the heat exchanger is that it carries out the heat transfer between these two ·uids in liquid or gaseous state by preventing the mixing of materials. Plates or other heat transfer surfaces, which are generally used in heat exchangers, both separate the ·uids from each other and provide the transfer of heat from one ·uid to another.

EXPERIMENTS

- Plotting temperature curves
- Determining the average heat transfer coef·cient
- Comparison of different types of heat

TECHNICAL DETAILS

- Tank
- Heater
- Pump
- 6 temperature 2 ·ow rate sensors
- Feeding unit

7.9. THERMAL CONDUCTIVITY TRAINING SET

DIMENSIONS
700X600X560mm

Heat conduction is one of the three basic forms of heat transfer. According to the second law of thermodynamics, heat is always transferred from the higher energy level to the lower energy level. The two cylinders form the main component of the experimental unit. The inner cylinder is heated electrically in a water-cooled outer cylinder. There is a concentric circular space between the two cylinders. This annular space is ·lled with the examined ·uid. Heat conduction takes place from the inner cylinder to the outer cylinder through the liquid. The narrow annular gap prevents the formation of a convective heat ·owand allows a relatively large transition area. It also provides a homogeneous temperature distribution. The test unit is equipped with temperature sensors inside and outside the annular space. In addition, water, oil,

EXPERIMENTS

- Constant heat conduction test in gases and liquids
- Experiment to determine the thermal resistance of ·uids
- Determination of thermal conductivities for different ·uids at different temperatures
- Temporary heat conduction in liquids:
- Interpreting transients during heating and cooling

TECHNICAL DETAILS

- Heater
- Heating power: 350W
- Temperature limitation: 95°Cis
- Heat transfer area: 74.39cm 2
- Annular space
- Height: 0.4mm
- Average diameter: 29.6 mm
- Inner cylinder
- Mass: 0.11kg
- Speci·c heat capacity: 890J / kg * K
- Measuring ranges
- Temperature: 2x 0... 325°C
- Heating power: 0... 450W

7.10. TEMPERATURE MEASUREMENT TRAINING SET

DIMENSIONS
800X450X1000mm

Temperature measurement training set; electric temperature sensors are the most widely used in automation applications, but traditional types of thermometers are still widely used in many areas as well. This training set covers experimental setup, all temperature measurement methods. It includes all typical electrical measurement methods as well as non-electrical measurement methods such as gas and liquid ·lled thermometers and bimetallic thermometers. Electrically measured temperatures are directly programmable and displayed on digital displays. An output voltage signal (0... 10V) proportional to temperature is accessible from the lab jacks, allowing temperature characteristics to be recorded with a plotter. A psychrometer with two thermometers is available to measure the relative humidity, one of the thermometers measures the dry bulb. wet thermometer, It is covered with a wet cotton cloth and measures the cooling by evaporation. The temperature difference allows the relative air humidity to be determined. A digital multimeter with precision resistance is used to calibrate electrical measuring instruments. Various heat sources or storage units (immersion heater, thermos and laboratory heater) allow to obtain relevant temperature ranges for the sensors under test.

EXPERIMENTS

- Temperature measurement with a probe thermometer
- Temperature measurement with J type thermocouple
- Temperature measurement with K type thermocouple
- Temperature measurement with PT-100
- Temperature measurement with PT-1000
- Temperature measurement with a dial thermometer

TECHNICAL DETAILS

- Thermometer
- Digital temperature display
- Spirit thermometer
- Dial thermometer
- PT-100
- PT-1000
- J type thermocouple
- K type thermocouple

7.11. CONDENSING HEAT TRANSFER TRAINING SET

DIMENSIONS
300X350X1000mm

The condensation exchanger trainer is designed to provide visual and quantitative results regarding heat transfer in shell and tube type water cooled condensers. The Trainer's three interchangeable manifolds allow the study of single, double, or four-pass cooling water flowthrough the condenser tubes. The unit is self-contained and designed for benchtop use with its own steam generator and condenser tubes housed in a single thick-walled glass cylinder. Instrumentation that monitors the coolant flowrate, temperature, and pressure drop through the tubes allows for an important experiment to be performed. The unit is easily controlled and stabilizes quickly, allowing many different conditions to be investigated in a single laboratory period.

EXPERIMENTS

- Observation of convection core and transition boiling
- Finding system energy balance at constant boiling temperature
- Calculation of condenser capacity, superficial convection coefficient and nusselt number
- Finding the heat flowand surface heat convection coefficient
- at constant boiling temperature

TECHNICAL DETAILS

- Heating resistance
- Transparent tank
- Recirculation pump
- Temperature sensors
- Digital display

7.12. HEAT CONDUCTION OF BUILDING MATERIAL TRAINING SET

DIMENSIONS
550X300X600mm

In this training set, the DIN delivery area used to investigate various non-metallic building materials of thermal conductivity includes examples made of different materials. 52612.Arma-ex consists of insulation panels, chipboard, PMMA (acrylic glass), styrofoam, Polystyrene-PS, Polyoxymethylene-POM, cork and plaster. The samples all have the same dimensions and are placed between a heated plate and a water-cooled plate. A clamping device provides repeatable contact pressure and heat contact. The hot plate is heated by an electric heating mat. In the cold plate, the temperature is reached by water cooling. The sensors measure the temperatures at the coolant inlet and outlet and in the middle of both plates. The temperatures for the hot plate above the sample and the cold plate below the sample are set using the provided software. A temperature control system ensures constant temperatures. The heat ·owbetween the hot plate and the cold plate passes through the sample and is measured with a special heat ·ux sensor. The entire enclosure, including the cover, is thermally insulated to ensure stable ambient conditions.

EXPERIMENTS

- Experiment to determine the thermal conductivity of different materials
- Experiment to determine thermal resistance.
- Thermal conductivity test for several samples connected in series. (up to 50mm thick)

TECHNICAL DETAILS

- Electric heating mat
- Output: 500W
- Max. Temperature: 80°C
- Examples
- LxW: 300x300mm
- Thickness: max. 50mm
- Material: Arma-ex, chipboard, PMMA, styrofoam, PS, POM, cork, plaster
- Measuring ranges
- Temperature: 3x 0... 100 °C, 2x 0... 200 °C
- Heat ·ow density: 0... 1533W / m 2

7.13. DIFFERENT TYPES OF HEAT EXCHANGER THAT CAN WORK WITH NANO FLUID TRAINING SET

DIMENSIONS
600X1200X15000mm

In this training set, two different heat exchangers are used to show the effect of hybrid nano·ows on thermal performance in heat exchangers. The difference between the plate heat exchanger and the tube inside tube heat exchanger is shown. In nano·uid liquids, it is aimed to increase the heat transfer surface and reduce the time compared to water by increasing the heat transfer surface.

EXPERIMENTS

- Capacity calculation in parallel ·owheat exchanger
- Calculation of thermal conductivity coef·cient

TECHNICAL DETAILS

- Supply voltage: 220V - 240V AC, 50/60Hz
- Start - Stop - Emergency stop buttons.
- Leakage current and fuse protected.
- Basic general block diagram on the panel
- temperature sensor
- 7" LCD touch screen
- 6 temperature sensors
- 4 pressure sensors
- 2 ·ow meters
- Resistance
- Temperature measurement from 8 different points
- Recirculation pump
- Water tank

7.14.HEAT PUMP TRAINING SET

DIMENSIONS
1000X800X1300mm

Heat pumps are devices that allow us to use the energy that is available in nature but that we do not use because of its low temperature, by raising the temperature. Heat pumps perform this process, just like in air conditioners, thanks to the cooling cycle. The heat pump is used for space heating or cooling. For this purpose, it takes the heat from the low temperature heat source and gives it to the high temperature heat source. COP refers to the rate of heat / electricity consumption given to the area. The device can operate in 3 different options as air, water and soil.

EXPERIMENTS

- Calculation of ground source heat pump heating coef·cient of performance (COP)
- Calculation of water source heat pump heating coef·cient of performance (COP)
- Calculation of air source heat pump heating coef·cient of performance (COP)

TECHNICAL DETAILS

- Compressor
- Water source evaporator
- Water source condenser
- Air source evaporator
- Flowmeter (Gas)
- Flowmeter (Liquid)
- Expansion valve
- Filter drier
- 10 temperature sensors
- 2 Humidity sensors
- 2 pressure transmitters
- Pump
- 4 solenoid valves

7.15. HEAT CONDUCTION IN LIQUIDS TRAINING SET

DIMENSIONS
670X300X400mm

Heat conduction is one of the three basic forms of heat transfer. According to the second law of thermodynamics, heat is always transferred from the higher energy level to the lower energy level. The two cylinders form the main component of the experimental unit; an electrically heated inner cylinder housed in a water-cooled outer cylinder. There is a concentric circular gap between the two cylinders. This annular space is ·lled with the examined ·uid. Heat conduction takes place from the inner cylinder to the outer cylinder through the liquid. The narrow annular gap prevents the formation of a convective heat ·owand allows a relatively large transition area, while at the same time ensuring a homogeneous temperature distribution. The test unit is equipped with temperature sensors inside and outside the annular space. Thermal conductivities for different ·uids such as water, oil, air or carbon dioxide can be made in experiments.

EXPERIMENTS

- Constant heat conduction test in gases and liquids,
- Experiment to determine the thermal resistance of ·uids,
- Determination of thermal conductivities for different ·uids at different temperatures,
- Transient heat conduction in liquids;
- Interpreting transients during heating and cooling,
- Introduction to temporary heat conduction with the block capacity model.

TECHNICAL DETAILS

- Heater,
- Heating power: 350W,
- Temperature limitation: 95°Cis,
- Heat transfer area: 74,39cm 2,
- Annular space,
- Height: 0.4mm,
- Average diameter: 29.6 mm,
- Inner cylinder,
- Mass: 0.11kg,
- Speci·c heat capacity: 890J / kg * K,
- Measuring ranges,
- Temperature: 2x 0... 325°C,
- Heating power: 0... 450W,

CHAPTER 8

SANITARY INSTALLATION

8.1. INDOOR NATURAL GAS INSTALLATION TRAINING SET

DIMENSIONS
1500X80X1500mm

Domestic natural gas installation, natural gas stove; It consists of a 4-piece stovetop, natural gas regulator, natural gas meter, gas leak sensor, earthquake sensor, solenoid valve and ball valves.

EXPERIMENTS

- Using the earthquake sensor
- Showing the cooktop connection and working principle
- Showing the connection and working principle of the natural gas stove
- Using the gas leak detector

TECHNICAL DETAILS

- Natural Gas Stove
- Cooktop Cooker
- Natural Gas Clock
- Earthquake Sensor
- Natural Gas Regulator

8.2. INDOOR HOT WATER INSTALLATION TRAINING SET

DIMENSIONS
1500X800X1500mm

A water heater is an electrical device that heats the water it contains to the desired temperature and keeps it constant at this temperature. Heating of the water in the tank is done with a resistance (heater) as in all electric heaters. Thermosiphons are devices that heat water at a certain time. This system is designed to introduce the hot water elements of the domestic hot water training set, to show the working and connection principle.

Instantaneous water heaters are devices in which water is heated as it passes through the device. There is no need to wait for the water to heat up as in the thermosiphons. There is a cold water inlet and a hot water outlet. Geyser burners burn the gas fuel with air through their burners, heat the water passing through the heat exchangers with the energy generated, and throw out the waste gases resulting from combustion. In vented type water heaters, the air required for combustion is taken from the place where the device is located. And the waste gases are discharged with the classical chimney connection. These types of devices are devices that are open to the environment they are in.

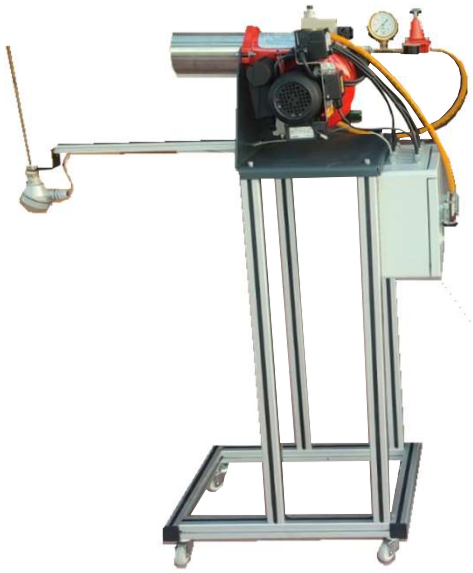
EXPERIMENTS

- Examination of pressure temperature change
- Adjustment of thermostatic valve
- Calculation of heating capacity in combi hot water mode
- Calculation of heating capacity in combi boiler mode
- Combi control based on water temperature
- Combi control based on room temperature

TECHNICAL DETAILS

- Gas combi boiler
- Thermostatic panel slot
- Panel radiator
- Towel warmer
- 4 Point temperature measurement
- Electric geyser

8.3. GAS FUEL BURNERS TRAINING SET



DIMENSIONS

CONTROL PANEL	BURNER STAND
700X500X1500mm	400X300X900mm

Natural Gas Burner is the device that creates the mixture that will provide air, fuel controlled and ef·cient combustion. The general principle of these devices; The main thing is to increase the combustion ef·ciency and reach the ideal combustion conditions, to prevent environmental pollution and to save energy. In the design of the burner, the type should be determined according to the characteristics of the combustion chamber, taking into account both the working principle and the characteristics of the control system. burners; boilers, furnaces, water heating tanks, etc. used in places.

EXPERIMENTS

- Power cut failure
- Low voltage fault
- Fuse failure
- Ionization failure
- Ignition transformer failure
- Fan motor failure
- Solenoid valve failure
- Gas pressure valve failure
- Air pressure valve failure
- Control relay malfunction

TECHNICAL DETAILS

- Burner
- Tube
- 20-50 bar regulator
- Temperature indicator and probe
- Pressure indicator

8.4. GAS FUEL COMBI FAULT TRAINING SET

DIMENSIONS
1700X700X1500mm

In the heating circuit of the combi; There is one radiator with thermostatic valve, one towel warmer with thermostatic valve and under-floor heating system. By measuring the water inlet-outlet temperatures and flowrates in the hot water and heating circuit, the instantaneous real heating capacity of the combi boiler can be measured

EXPERIMENTS

- Examination of pressure-temperature hange should be possible
- Adjustment test of the thermostatic valve should be possible.
- Calculation of the heating capacity in the combi central heating mode should be possible.
- Combi boiler control test based on water
- Calculation of heating capacity in combi hot water mode
- temperature should be possible.
- should be tested.
- Combi boiler control test based on room temperature should be possible.
- Gas valve failure test
- Hot water outlet failure test
- Hot water regulator failure test
- Three-way valve failure test
- Hot water pressure failure test
- Return water temperature sensor failure test
- Fan failure test
- Pump failure test
- Ivanization failure test

TECHNICAL DETAILS

- Gas combi boiler
- Thermostatic panel slot
- Panel radiator
- Towel warmer
- 4 Point temperature measurement
- Under-floor heating system

8.5. GAS FUEL COMBI TRANING SET

DIMENSIONS
1500X80X1500mm

In the heating circuit of the combi; There is one radiator with thermostatic valve and one towel warmer with thermostatic valve. By measuring the water inlet-outlet temperatures and ·owrates in the hot water and heating circuit, the instantaneous real heating capacity of the combi boiler can be measured.

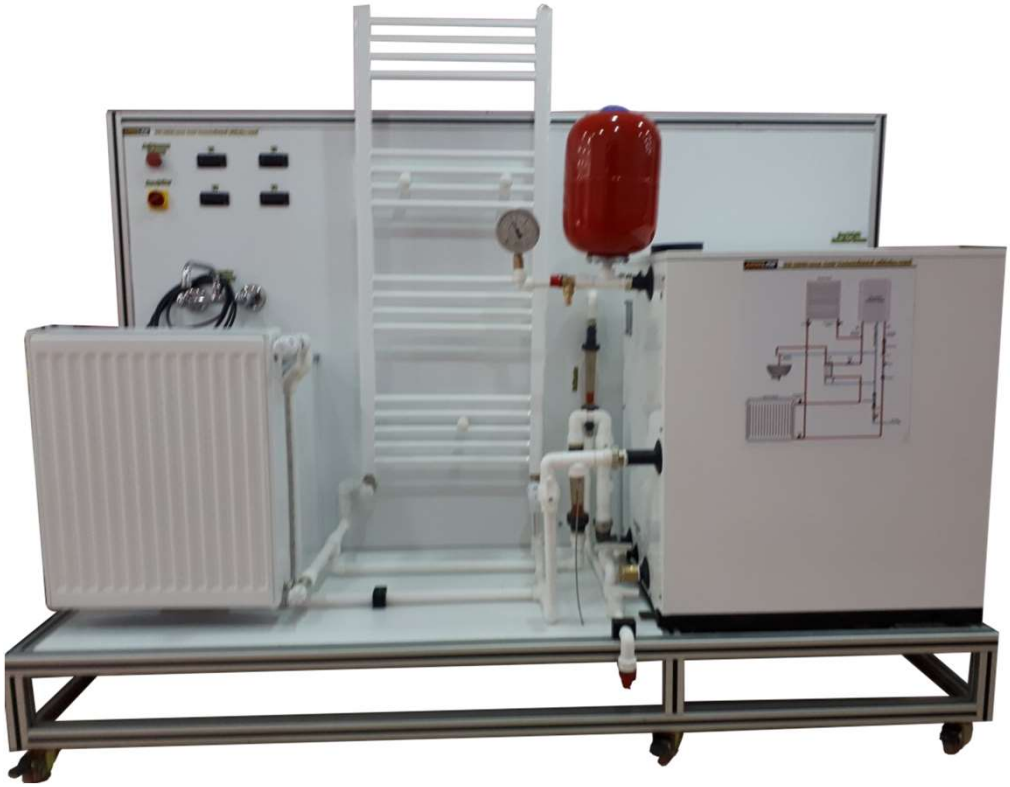
EXPERIMENTS

- Examination of Pressure-Temperature change
- Adjustment of thermostatic valve
- Calculation of heating capacity in Combi heating mode
- Calculation of heating capacity in Combi heating mode
- Combi boiler control based on water temperature
- Combi boiler control based on room temperature

TECHNICAL DETAILS

- Gas Combi Boiler
- Thermostatic Panel Valve
- Panel radiator
- Towel warmer
- Temperature measurement from 4 points
- Hot and cold water ·ow meter

8.6. FLOOR HEATER TRAINING SET



DIMENSIONS
1500X800X1500mm

The boiler for hot water and heating installation is designed to show the working and connection principle. The ·oor heating system is based on the principle of conveying the heated water on the basis of apartments or houses to the radiators through pipes and heating the environment by means of heat transfer. Floor heating, single boiler -yacht provides an advantage in the evaluation of ef·ciency and life.

EXPERIMENTS

- Examination of Pressure-Temperature change
- Adjustment of thermostatic valve
- Calculation of heating capacity in Combi Heating mode
- Calculation of domestic water heating capacity in Combi
- Heating mode
- Combi boiler control based on water temperature
- Combi boiler control based on room temperature

TECHNICAL DETAILS

- Gas Combi Boiler
- Thermostatic Panel Valve
- Panel radiator
- Towel warmer
- Temperature measurement from 4 points
- Hot and cold water ·ow meter

8.7. CENTRAL HEATING CONTROL TRAINING SET

DIMENSIONS
700X180X1100mm

Central heating is a system that provides an equal distribution of heat energy from a source to every part of the building. The independent sections inside the building can also be heated in this way. Hot water and steam taken from the center through pipes are directed to the areas that are intended to be heated. Central heating is preferred especially in areas with high urbanization.

EXPERIMENTS

- Activation of safety devices
- Adjusting the boiler temperature with on-off control
- Control of the water circulation pump
- Investigation of burner combustion ef·ciency in the boiler
- Outdoor temperature compensation application test

TECHNICAL DETAILS

- Touchscreen LCD

8.8. HYROPHOR TRAINING SET

DIMENSIONS
1500X800X1500mm

Hydrophore or water tank connected systems are installed when the city network pressure is insuf·cient to meet the water needs of multi-storey buildings. The booster and water tank can be used separately or connected together in some plumbing systems. Automatically operating cylindrical tank pumping systems that compress low-pressure water with air to the desired height are called booster (pressurization tank). The pressurization process is carried out by the tank, the pump and the auxiliary elements mounted on them. The closed tank acts as an air chamber. When water is pressed into it, the air pressure increases in proportion to the volume of the water and the compressed air pressurizes the surface of the water. It is below normal atmospheric pressure (10.33 m.ss) at sea level. This pressure is not enough to raise the water. This pressure is present everywhere in the installation.$_2$shows . When the tank is half ·lled with water, the manometer is 1 kg/cm$_2$shows. Theoretically, it raises the water 10 m. When 2/3 of the tank is ·lled, the pressure gauge read on the manometer is 2 kg/cm$_2$; 3 kg/cm when 3/4 full$_2$shows . This pressure theoretically raises the water to 30 meters. The pressure thus obtained is not suf·cient. If a little water is used from the installation, the pressure drops immediately. There is also the danger of the tank being completely ·lled with water. For this, an air compressor is used and is controlled by a pressure automatic.

As the system starts to operate, the air pressure in the tank is increased to half the required minimum pressure. Thus, more water is taken at the desired pressure. It should be determined between which pressures the pump will operate. For example, 5kg/cm$_2$If pressure is needed, turn the pump to 7 kg/cm by using a pressure automatic (prosestat).$_2$It must be run until pressure is achieved. According to this situation, the pressure range is 2 kg/cm$_2$is . Until this pressure is spent, water goes to the installation. Pressure 5 kg/cm$_2$When the pressure drops to , the pressure switch reactivates the pump and the water ·ow starts. The compressor does not need to be restarted until the air in the tank is completely mixed with the water and disappeared. The booster pump should be capable of giving suf·cient pressure to the water and should be selected accordingly. Its task is to pressurize the water it receives from the well, tank or network in the tank. It is made in centrifugal (snail) and stepped (centrifugal) type. Pump motors are produced in the form of vertical or horizontal connection.

EXPERIMENTS

- Adjusting the pressure switch
- Using the pressure regulator
- Demonstrating the working principle of the booster system

TECHNICAL DETAILS

- Pump
- Tank
- Expansion tank
- Pressure gauge
- Pressure regulator

8.9. DRINKING WATER TRAINING SET

DIMENSIONS
1500X900X1900mm

Training booth to teach the basics of installing and maintaining drinking water systems. Many practical exercises and tasks can be performed with the drinking water training booth, from analysis and planning to the execution and evaluation of customer orders.

EXPERIMENTS

- Demonstration test of building connection line
- Insulation test of pipes against heating or cooling
- Sputum test of drinking water
- Experiment on measures to reduce drinking water consumption
- Test of corrosion protection measures in drinking water systems
- Test of commissioning of drinking water pipeline
- Hot water tank installation test

TECHNICAL DETAILS

- Weight: 190 kg
- Electrical connection: 400 V (Cekon -şi)
- Water connection: GK coupling or ¾ inch

8.10. SINK INSTALLATION TRAINING SET

DIMENSIONS
1300X500X2000mm

The training set is designed to teach the basics of planning a bathroom and electrical installation in bathrooms and to qualify as an electrician for de·ned activities

EXPERIMENTS

- Evaluation test of equipment and apparatus in terms of function and working style
- Consideration of possibilities for saving drinking water and ef·cient use of energy.
- Compare and evaluate different equipment options
-
- Experiment with the creation of ·oor plans and facades
- Comparison experiment of water consumption for different types of urinals

TECHNICAL DETAILS

- Two types of urinals: waterless and ·ush
- Junction boxes and cables to connect bathroom lights and lighting controls
- Junction boxes and cables to connect ·ush activation

8.11. BUILDING INSTALLATION JACKET AJ TRAINING SET

DIMENSIONS
2500X2500X2000mm

The learning room is a ·exible solution for practical lessons; The mobile workstation can be set up in a few simple steps. There is a learning island with opening side panels, four workstations where one or two students (or interns can work). If the learning room is not used, it can be folded and stacked to save space

TECHNICAL DETAILS

- Four single-sided work surfaces on the body: two rigid and two foldable.
- Double work surface with four hinges
- Movable body made of 30 x 30 mm welded square steel pipe
- Lockable wheels for stable positioning
- Rhombus compound hole pattern for steel dowels (M8 internal thread) Rectangular hole pattern for plastic dowels
- Two-piece interior cabinet with drawers, shelf and storage compartment

COOLING SYSTEMS

9.1. COOLING TRAINING UNIT

DIMENSIONS
1500X700X1600mm

EXPERIMENTS

- Cold storage amount test heat loss
- test
- Performance measurement (Compressor energy consumption)

TECHNICAL DETAILS

- Pressure transmitter
- Insulated and non-insulated cabins
- Resistance
- Working gas R-134A
- Sight glass
- Drayer
- Written and audible warning system
- RS-232/485/422 port
- Low-high pressure switch
- Real time clock RTC
- ASCII communication system
- Multiple communication
- Security password protection

TEHNICAL DETAILS

- Supply voltage: 220V - 240V AC, 50/60Hz
- Start - Stop - Emergency stop buttons.
- Leakage current and fuse protected.
- Basic cooling on the panel with general block diagram
- Stainless steel cabinet
- Stainless lamella resistance
- 7” LCD touch screen
- Cold room cabin dimensions 1*0, 5*0, 5 m
- Hermetic compressor, 2 Evaporators and Condenser
- Automatic expansion valve and all-way solenoid valve
- PLC
- 1 liter tank
- Turbine type ·owmeter

9.2. ICE MAKER TRAINING SET

DIMENSIONS
600x570x890mm

Industrial kitchens need many materials. Among these, we can count industrial dishwashers, industrial stoves, industrial washing machines and bain-marie machines. However, ice machines, which are among them, are very important especially for businesses that provide service in hot climate regions. In this case, ice machines come to the aid of businesses in these regions

EXPERIMENTS

- Theoretical Analysis of the Cooling Cycle
- Examining the Pressure-Temperature Relationship in the
- Cooling System
- Pressure Control Test in the System
- Effect of Compressor (Ekovat) Working Time on System Data

TECHNICAL DETAILS

- Energy consumption: 14.50 kWh/24h
- Ice weight 20/25g
- 850 pieces of ice that can be stored
- Climate class 4
- Ice storage capacity 20kg
- Ice making capacity (20°C Ambient and 15°C Water
- Temperature) 48kg/24h

9.3. DRY COOLING CHILLER TRAINING SET

DIMENSIONS
6000x2500x2500mm

The applications where the chiller units serve as cooling in winter as well as in summer, and the high energy costs have enabled the production of compact devices that use gas and water batteries together. These devices make natural and low-cost cooling by taking advantage of the already cold climatic conditions during the winter months. For example, in a plastic injection process, the molds must be cooled continuously. If there are weather conditions where the hot water coming from the molds into the cooling group can be cooled naturally, it ·rst enters the water coils and is cooled. Thus, most of the cooling needed in winter is met by natural cooling. again at night, The difference between heated and cooled water makes the operating temperature of the system variable (eg 7 and 12 degrees). Chiller devices are a cooling unit that is used for cooling all equipment and equipment that needs cooling for industrial purposes and sets the world standard in this ·eld.

EXPERIMENTS

- Flow condition test
- Sensor failure test
- Control panel failure test
- Chiller start test
- Dry cooler operation test
- Outdoor sensor failure test
- Chiller and dry cooler automatic control experiment
- Chiller and dry cooler manual control experiment
- Pump failure test
- Dry cooler fan failure test

TECHNICAL DETAILS

- Axial fan with automatic speed control
- Axial fan speeds automatically depending on weather conditions and water temperature.
- adjustable
- Scroll compressor
- 2 fans
- Pump
- Tank
- Water outlet temperature can be controlled
- Digital temperature indicators
- Measurement instrument panel

9.4. CHILLER COOLING TRAINING SET

DIMENSIONS
1100x700x650mm

Chiller Refrigeration Training Set is designed to show the working logic of the Chiller chiller group. Chiller: It is the system called injection cooling system that transfers the heat from one source to another source. Chiller cooling systems, consisting of compressor, condenser, expansion valve and evaporator, work by cooling the compressed and heated gas in the compressor in the condenser. Then, due to the pressure of the gas passing through the expansion valve, its temperature drops and it lique·es. While passing through the evaporator, heat is taken from the liquid to be cooled, it comes to the compressor as a gas at low pressure and is compressed again. The working system continues in this way

EXPERIMENTS

- Calculation of cooling quality
- Calculation of the coef·cient of effect of cooling
- Variation of the coef·cient of effect of cooling at different cooling loads
- Calculation of compressor volumetric ef·ciency

TECHNICAL DETAILS

- Cooling unit
- Water tank
- Circulation pump
- Digital temperature display
- Evaporator
- Compressor
- R134A Refrigerant gas
- Capillary tube

9.5.INDUSTRIAL TYPE REFRIGERATOR TRAINING SET

DIMENSIONS
800X800X2000mm

Industrial Refrigerators are used in mass food distribution companies and in the medical sector. These cabinets, which can provide much stronger cooling, generally work under dif·cult conditions. For example, we open and close the door of the refrigerator used at home several times during the day, but the doors of industrial refrigerators are opened and closed at least 200 times during the day. Another feature of the industrial refrigerator is that its inner and outer bodies, namely the entire refrigerator, are produced from stainless steel.

EXPERIMENTS

- Theoretical Analysis of the Cooling Cycle
- Examining the Pressure-Temperature Relationship in the
- Cooling System
- Pressure Control Test in the System
- Effect of Compressor (Ekovat) Working
- Time on System Data
- The Importance of Correct Operation of the Condenser

TECHNICAL DETAILS

- Compressor
- Evaporator
- Condenser
- Expansion valve
- Drayer
- Digital thermostat
- Glycerin manometer
- 4 temperature measurements
- 2 pressure measurements
- Multimeter

9.6. EVAPORATIVE COOLING TRAINING SET

DIMENSIONS
800X800X1500mm

An evaporative air cooler is a type of air conditioning system that uses the power of steam to cool the air. When water evaporates, it changes from liquid to gas. During this event, the water droplets holding the highest energy leave the water ·rst, which causes a decrease in the temperature of the air. This is also the reason why you feel cold the moment you get out of the pool. As the water droplets on your body evaporate, they lower your body temperature.

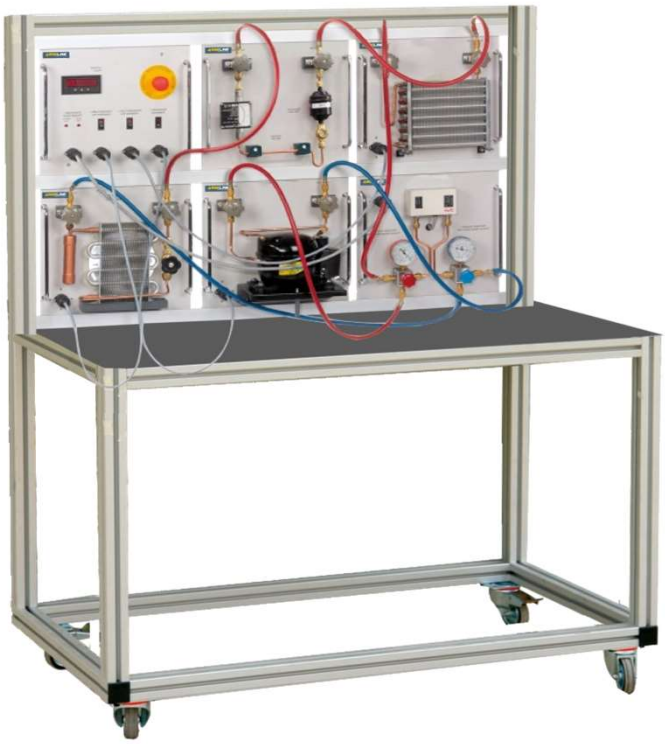
EXPERIMENTS

- Calculation of the ef·ciency value (STK) of the evaporative cooler
- Observation of processes in the evaporative cooler
- Calculation of evaporative cooler capacity
- The effect of changes in water ·ow on cooling capacity
- Effect of changes in air velocity on cooling capacity

TECHNICAL DETAILS

- Automatic water supply
- Fan speed control
- 4 point temperature sensor
- Air velocity meter
- 2 points humidity sensor
- Tower ·lling

9.7. MODULAR COOLING TRAINING SET



DIMENSIONS
1250X705X1500mm

Modular refrigeration trainer, with simple and clear experiments, this equipment is mainly designed to handle the basics of refrigeration. The trainer contains all the necessary components for a fully functioning refrigeration circuit, such as compressor, condenser, evaporator and a needle valve as expansion element. Other components complete the scope of the equipment. To protect the compressor against excessive pressure; display and control panel, receiver, pressure switches, pressure display, a ·owmeter and-lter / sight glass with dryer is available. An air cooler with a heat exchanger is used as the condenser. The evaporator is used in two different tasks; as air/refrigerant heat exchanger and water/refrigerant heat exchanger. This allows the system to combine different components. Components are mounted on plates and form ready-to-install modules. 6 modules are inserted into the frame at any one time, connected by hoses and supply cables. The receiver is integrated into the cooling circuit as a stand-alone module. This allows the construction of different simple compression refrigeration systems.

EXPERIMENTS

- Fundamentals of the cooling circuit experiment
- Detection experiment of cyclical process
- Experiment for changes in the state of the refrigerant
- Experiment to show the cyclical process in the log ph diagram
- Experiment with different operating modes
- Air cooling test
- Cold water production experiment
- Test of evacuation and ·lling of the cooling

TECHNICAL DETAILS

- Hermetic refrigerant compressor
- Power consumption: 67W at 5/40°C
- Cooling capacity: 152W at 5/40°C
- Water tank, evaporator: 2L
- Pressure switch activation pressure
- LP: 1 bar
- HP: 14 bar
- Manometer
- Inlet side (low pressure): 1... 10bar
- Output side (high pressure): 1... 30bar
- Rotameter: 0... 7.4L / h
- Cooler
- R134A

9.8. REYON TYPE REFRIGERATOR TRAINING SET

DIMENSIONS
1000X800X1300mm

The cooling systems used in supermarkets are generally systems with a high cooling load with common pipelines reaching the cooling cabinets and departments. In supermarket cooling systems, it is dif·cult to place an evaporator and a condenser separately in the cooling aisle for each product that requires medium and low temperatures. In such cases, the cooling system; The center is commissioned as direct expansion or direct expansion

EXPERIMENTS

- Theoretical Analysis of the Cooling Cycle
- Examining the Pressure-Temperature Relationship in the
- Cooling System
- Pressure Control Test in the System
- Effect of Compressor (Ekovat) Working
- Time on System Data
- The Importance of Correct Operation of the Condenser

TECHNICAL DETAILS

- Compressor
- Evaporator
- Condenser
- Expansion valve
- Drayer
- Digital thermostat
- Glycerin manometer
- 4 temperature measurements
- 2 pressure measurements
- Multimeter

9.9 TRANSPARENT COOLING TRAINING SET

DIMENSIONS
800x650x1300mm

Transparent refrigeration training set is designed to observe the refrigeration system structure, operation and theory, the pressure- temperature relationship, the detection and elimination of faults, the recognition of circuit elements and to assist practical training.

EXPERIMENTS

- Observation of condensation in the condenser.
- Pressure - temperature relationship test.
- Observation of evaporation in the evaporator.
- Observation of expansion in the capillary tube.
- Plotting the single stage mechanical vapor compression refrigeration cycle on the log ph diagram

TECHNICAL DETAILS

- Transparent condenser
- Capillary tube
- Low-high pressure gauges
- Digital temperature measurement
- Hermetic compressor
- Tank
- Radial condenser fan
- Transparent evaporator

9.10. . COOLING INSTALLATION TRAINING SET

DIMENSIONS
1200X750X1500mm

It is designed to understand the structure and operation of the basic refrigeration cycle, examine the function of various components, and provide training on possible failures. Virtual faults can be created. All components of the training set are modularly designed for students to assemble their own cooling systems.

TECHNICAL DETAILS

- Supply voltage: 220V - 240V AC, 50/60Hz
- Simple structure showing basic cooling troubleshooting system.
- Analogue and digital Low and High pressure gauges
- Sight glass where gas passage can be observed
- Digital display where temperature and pressure values can be observed
- Start - Stop - Emergency stop buttons.
- Leakage current and fuse protected.
- Manometers with basic cooling general block diagram on the panel.
- Hermetic compressor, Evaporator and Condenser
- Capillary tube.
- Thermostatic expansion valve.
- Automatic expansion valve and all-way solenoid valve

9.11. BASIC COOLING TRAINING SET

DIMENSIONS
1000X600X1500mm

It is designed to understand the structure and operation of the basic refrigeration cycle, examine the function of various components, and provide training on possible failures. Virtual faults can be created, the training set can be controlled over the computer and the measured data can be observed through the software supplied with the set.

EXPERIMENTS

- Temperature and pressure relationship experiment in the cooling system
- Use of capillary tube as cooling control
- Using the cooling control thermostatic expansion valve
-
- Experiment of using automatic expansion valve as cooling control
- Pressure increase test
- Adjustment test of pressure switches

TECHNICAL DETAILS

- Supply voltage: 220V - 240V AC, 50/60Hz
- Simple structure showing basic cooling troubleshooting system.
- Analogue and digital Low and High pressure gauges
- Transparent plexiglass structure that allows the whole system t
-
- Sight glass where gas passage can be observed
- Digital display where temperature and pressure values can be observed
- Start - Stop - Emergency stop buttons.
- Leakage current and fuse protected.
- Manometers with basic cooling general block diagram on the panel.
- Hermetic compressor, Evaporator and Condenser
- Capillary tube.
- Thermostatic expansion valve.
- Automatic expansion valve and all-way solenoid valve.

9.12. BASIC COOLING FAULT TRAINING SET

DIMENSIONS
1300X800X1200mm

It is designed to understand the structure and operation of the basic refrigeration cycle, examine the function of various components, and provide training on possible failures. Virtual faults can be created, the training set can be controlled over the computer and the measured data can be observed through the software supplied with the set.

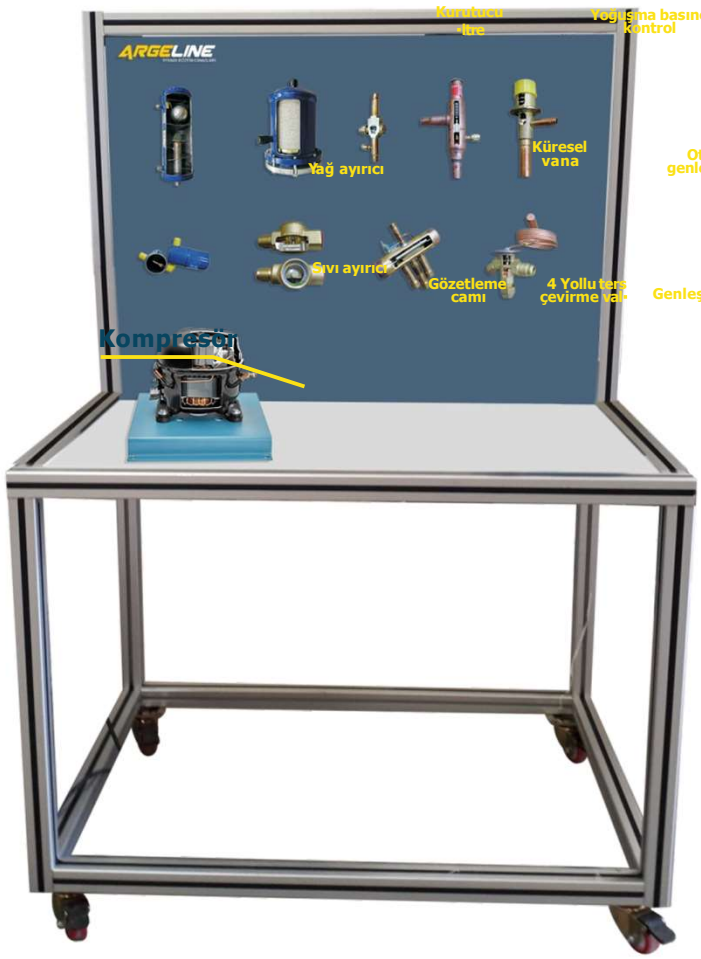
EXPERIMENTS

- Cooling Theory and Cycle
- Examining the Pressure-Temperature Relationship
- Adjustment of pressure switches
- Effect of Ekovat Working Time on Working
- Importance of Condenser
- Use of capillary tube as ·ow control
- Using Automatic Expansion Valve as Flow Control
- Using Thermostatic Expansion Valve as Flow Control

TECHNICAL DETAILS

- Supply voltage: 220V - 240V AC, 50/60Hz
- Simple structure showing basic cooling troubleshooting system.
- Analogue and digital Low and High pressure gauges
- Sight glass where gas passage can be observed
- Digital display where temperature and pressure values can be observed
- Start - Stop - Emergency stop buttons.
- Leakage current and fuse protected.
- Manometers with basic cooling general block diagram on the panel.
- Hermetic compressor, Evaporator and Condenser
- Capillary tube.
- Thermostatic expansion valve.

9.13. BASIC COOLING ELEMENTS SECTION TRAINING SET



COMPRESSOR

OIL SEPARATOR

LIQUID SEPARATOR

CONSIDERING PRESSURE CONTROL

SURVEILLANCE MOSQUE

DRY LITER

AUTOMATIC EXPANSION VALVE

4-WAY REVERSE FLIP VAVE

SPHERICAL VALVE

EXPANSION VALVE

9.14. IDEAL GAS LAWS TRAINING SET

DIMENSIONS
700X620X1200mm

Ideal gas laws training set, gas laws belong to the fundamentals of thermodynamics and are covered in every training course on thermodynamics. This training set is state isothermal change and also occurs at constant volume. Tanks allow monitoring of state change. Air is used as the test gas. In the ·rst tank located on the left, the hermetically sealed air volume is reduced or increased using a compressor. This results in an isothermal change of state. The compressor can also work as a vacuum pump. If the changes occur slowly, the state change occurs at an almost constant temperature. In the second tank located on the right, the temperature of the test gas is increased by a controlled electrical heater, and the resulting pressure increase is measured and the volume of the closed gas remains constant.

EXPERIMENTS

- Experimentally demonstrating the laws of state changes in gases
- Isothermal change of state, Boyle-Mariotte law
- Isochoric change of state, Gay-Lussac's 2nd law

TECHNICAL DETAILS

- Compressor / vacuum pump
- Power output: 60W
- Pressure at the inlet: 213mbar
- Pressure at outlet: 2bar
- Temperature controller: PID , 300W, limited to 80°C
- Measuring ranges
- Heat
- Tank 1: 0... 80 °C
- Tank 2: 0... 80 °C
- Pressure:
- Tank 1: 0... 4bar abs.
- Tank 2: 0... 2bar abs.
- Audio:
- Tank 1: 0... 3L
- 230V, 50Hz, 1 phase
- 230V, 60Hz, 1 phase;120V, 60Hz, 1 phase
- UL /CSA optional

9.15. IKS SINGLE PHASE CONTROLLER TRAINING SET

DIMENSIONS
1200X600X1500mm

The training set is designed to assist in the electrical command and control structure, operation and monitoring of the cooling systems, the detection of faults, the identi·cation of the circuit elements and the practical training. All the elements used in the training set have the same structure as the models used in industrial and daily life and are used in the industry sector.

EXPERIMENTS

- Making the electrical connections of the single door refrigerator
- Making the electrical connections of the two-door refrigerator
- Making the electrical connections of the No Frost refrigerator
- Experiment to remove ekovate with different methods
- Defrost operation
- Effect of condenser fan on cooling

TECHNICAL DETAILS

- Supply voltage: 220V - 240V AC, 50/60Hz
- Basic cooling
- Start - Stop - Emergency stop buttons.
- Leakage current and fuse protected. Analogue and digital low and high pressure gauges
- Digital measurement indicators
- Capillary tube.
- condenser and evaporator
- Compressor
- Cooling and fan thermostat with digital display
- Timer
- magnetic relay
- Control relays
- Condenser
- electrical switch
- PTC relay
- Lamp
- Heater

9.16. ABSORPTIONS GRINDING TRAINING SET

DIMENSIONS
750X450X1200mm

Refrigeration plants take advantage of the fact that a refrigerant evaporates at low pressure. In absorption refrigeration systems, the absorption of ammonia in water produces this low pressure. The absorption process is driven by thermal energy, for example from industrial waste heat or from solar collectors, to power these systems. It is an experimental set using an ammonia-water solution in which ammonia acts as a coolant. In the evaporator, the liquid ammonia evaporates and withdraws the heat from the environment. To keep the evaporation pressure low, the ammonia vapor in the absorber is absorbed by the water. In the next step, the ammonia is permanently removed from the highly concentrated ammonia solution to prevent the absorption process from being stopped. For this purpose, the highly concentrated ammonia solution is heated in a generator until the ammonia evaporates again. In the final stage, The ammonia vapor is cooled to ground level in the condense, condensed and returned to the evaporator. The low concentration ammonia solution flows back to the absorbe. Hydrrogen is used as auxiliary gas to maintain pessure differences in the system

EXPERIMENTS

- Experiment to demonstrate the basic principle of the absorption cooling system.
- Absorption cooling system and main
- components test.
- Test of operating behavior under load.

TECHNICAL DETAILS

- Working environment: Ammonia water solution
- Auxiliary gas: hydrogen
- Electric heater: 125W
- Gas burner, adjustable: propane gas
-
- Evaporator heater, adjustable: 50W
- Measuring ranges
- temperature: 4x -80... 180 °C
- power: 0... 150W

230V, 50Hz 1 phase
230V, 60Hz 1 phase
120V, 60Hz 1 phase

9.17.WITH DIFFERENT REFRIGERANTS WORKABLE COOLING SYSTEM TRAINING SET

DIMENSIONS
1200x750x1500mm

It is designed to show the performance and COP value of different refrigerants over a single inverter compressor in the refrigeration system experiment set, which can operate with different refrigerants.

EXPERIMENTS

- Performance and COP value of different refrigerants

TECHNICAL DETAILS

- 6 temperature sensors
- 6 pressure transmitters
- Compressor with inverter
- PLC
- 7” Screen
- 1/4 Evaporator
- 3/4 Condenser
- Flowmeter

9.18. INSULATED AND NON-INSULATED COLD STORAGE TRAINING SET

DIMENSIONS
1500X700X1200mm

Our device is designed to investigate the energy ef·ciency in insulated and non-insulated cold stores.

EXPERIMENTS

- Cold storage amount test,
- Heat loss test,
- Performance measurement (Compressor energy consumption).

TECHNICAL DETAILS

- Supply voltage: 220V - 240V AC, 50/60HZ,
- Start - Stop - Emergency stop buttons,
- Leakage current and fuse protected,
- Basic cooling on the panel with general block diagram,
- Stainless steel cabinet,
- 7” LCD touch screen,
- Cold room cabin dimensions 1*0, 5*0, 5 m,
- Hermetic compressor, 2 Evaporators and Condenser,
- Automatic expansion valve and for each way,
- solenoid valve,
- Stainless lamella resistance,
- PLC,
- 1 liter tank,
- Turbine type ·ow meter,
- Insulated and non-insulated cabins,
- Resistance,
- Working gas R-134A,
- Sight glass,
- Drayer,
- Low-high pressure switch,
- Pressure transmitter,
- Written and audible warning system,
- RS-232/485/422 port,
- Real time clock RTC,
- ASCII communication system,
- Multiple communication,
- Security password protection.

9.19.COOLING SYSTEM CAPACITY CONTROL TRAINING SET

This training set is designed to demonstrate the capacity control in the cooling system.

EXPERIMENTS

- Thermostat test
- Evaporation pressure control test
- Cooling control experiment
- Capacity control experiment
- Cooling capacity checking experiment
- Defrost heater on and off test
- Fan on/off test

TECHNICAL DETAILS

- Compressor cooling capacity approx. -5/25 degrees 560 W and 1.450 min.
- Drive motor 550 W
- Fan max approx. 50m³/h
- Heater approx. 500 W
- Approx. 150 kg
- 220 V 50/60 Hz 1 phase

9.20. HEAT FROM SOIL - AIR - WATER PUMP TRAINING SET

DIMENSIONS
1000X800X1300mm

Heat pumps are devices that allow us to use the energy that is available in nature but that we do not use because of its low temperature, by raising the temperature. Heat pumps perform this process, just like in air conditioners, thanks to the cooling cycle. The heat pump is used for space heating or cooling. For this purpose, it takes the heat from the low temperature heat source and gives it to the high temperature heat source. COP refers to the rate of heat / electricity consumption given to the area. The device can operate in 3 different options as air, water and soil.

EXPERIMENTS

- Ground source heat pump heating coef·cient of performance
- (COP) calculation
- Water source heat pump heating coef·cient of performance
- (COP) calculation
- Air source heat pump heating coef·cient of performance
- (COP) calculation

TECHNICAL DETAILS

- Compressor
- water source evaporator
- water source condenser
- air source evaporator
- Flowmeter (Gas)
- Flowmeter (Liquid)
- expansion valve
- ·lter drier
- 10 pcs Temperature sensors
- 2 Humidity sensors
- 2 pressure transmitters
- Pump
- 4 solenoid valves
-

RENEWABLE ENERGY

10.1.FOOD DRYING TRAINING SET WITH PV-THERMAL SOLAR COLLECTOR

DIMENSIONS
2000X800X1500mm

Solar energy has enormous potential among all renewable energy sources. Solar dryers can be used in industries such as agriculture and food drying. The entire drying process uses solar energy. It is more efficient and environmentally friendly than other processes. The training set, on the other hand, offers the opportunity to compare solar absorber panels and surface shapes.

Thanks to the heat sink in the cabin, higher temperatures can be reached.

TECHNICAL DETAILS

- Start - Stop - Emergency stop buttons.
- Leakage current and fuse protected.
- Basic general block diagram on the panel
- temperature sensor
- humidity sensor
- LCD screen
- Adjustable air speed
- Different surface shapes
- solar panel
- SD card data recording

10.2. TUNNEL TYPE WIND TURBINE TRAINING SET

DIMENSIONS
1200X600X1500mm

The kinetic energy generated by the air ·owthat creates the wind is known as wind energy. The movement experienced in the wind ·rst turns into mechanical energy and then into electrical energy. This is how wind energy is obtained through systems that are specially located at different points. As a clean and endless source of energy, especially with the protection of nature, wind constitutes a very important potential. Of course, wind energy does not have as high a potential as solar energy. However, it still offers many different advantages as a renewable energy source. By providing energy security, it reduces air pollution to a very minimum level. While creating a signi·cant potential against climate change, it also reduces costs. In addition to preventing fuel imports, it is installed very quickly.

EXPERIMENTS

- Wind turbine power generation
- Power generation based on wind turbine air speed
- Wind turbine ef·ciency calculation
- Wind turbine electrical connection
- Wind turbine DC power generation
- Electricity generation with wind turbine AC inverter
- Examination of different wing structures
- Investigation of turbine ef·ciency at different blade angles

TECHNICAL DETAILS

- Wind turbine
- Accumulator
- 220-380 inverters
- DC modules
- AC modules
- Turbine blades with 3 different structures

11.3. RENEWABLE ENERGY SOLAR PANEL TRAINING SET

DIMENSIONS
1000X300X1300mm

The amount of energy of sunlight falling on the earth is 10 thousand times the amount of energy in the world we use today. Therefore, it is suf·cient for human beings to ef·ciently use only 0.01 of the sun's rays coming to the world to meet their energy needs. Solar panels also convert sunlight into electricity. It consists of solar cells that absorb the sunlight coming on the solar panel. The ef·ciency of a solar panel is determined by the rate at which the cell in which it is used converts sunlight into electricity. It is an inexhaustible source of energy. While creating a signi·cant potential against climate change, it also reduces costs. In addition to preventing fuel imports, it is installed very quickly. Moreover, it provides a healthy and safe use that does not emit radiation and does not cause explosions.

EXPERIMENTS

- Solar panel power generation
- Solar panel power generation according to the angle of the sun
- Solar panel ef·ciency calculation
- Solar panel electrical connection
- Solar panel DC power generation
- Electricity generation with solar panel AC inverter

TECHNICAL DETAILS

- Solar panel
- Accumulator
- 220-380 inverters
- DC modules
- AC modules

10.4. RENEWABLE ENERGY WIND TURBINE TRAINING SET

DIMENSIONS
1000X450X1300mm

The kinetic energy generated by the air ·owthat creates the wind is known as wind energy. The movement experienced in the wind ·rstly turns into mechanical energy and then into electrical energy. This is how wind energy is obtained through systems that are specially located at different points. As a clean and endless source of energy, especially with the protection of nature, wind constitutes a very important potential. Of course, wind energy does not have as high a potential as solar energy. However, it still offers many different advantages as a renewable energy source. By providing energy security, it reduces air pollution to a very minimum level. It is an inexhaustible source of energy. While creating a signi·cant potential against climate change, it also reduces costs. In addition to preventing fuel imports, it is installed very quickly. Moreover, it provides a healthy and safe use that does not emit radiation and does not cause explosions

EXPERIMENTS

- Wind turbine power generation
- Power generation based on wind turbine air speed
- Wind turbine ef·ciency calculation
- Wind turbine electrical connection
- Wind turbine DC power generation
- Electricity generation with wind turbine AC inverter

TECHNICAL DETAILS

- Wind turbine
- Accumulator
- 220-380 inverters
- DC modules
- AC modules

10.5. RENEWABLE ENERGY FUEL CELL TRAINING SET

DIMENSIONS
1000X450X1300mm

Hidrojen eğitim seti, hidrojen yakıt hücresi uygulamalarının yapılabildiği bilgisayar destekli bir eğitim setidir. Eğitim seti, teknik eğitim verilen üniversite, teknik lise ve teknik eğitime ihtiyaç duyulan tüm kurumların müfradatına uygun şekilde tasarlanmıştır. Eğitim setinin içeriği, temel eğitim dahil ileri seviye teknik eğitim için uygundur. Hidrojen Eğitim Seti, "Hidrojen Üreteci Modülü" , "Yakıt Hücresi Modülü" , "Yük Modülü" , "Uygulama Modülü" ekipmanlarından oluşmaktadır. Panelin tamamı dayanıklı materyallerden oluşmaktadır.

EXPERIMENTS

- Demonstration of fuel cell working principle

TECHNICAL DETAILS

- Hydrogen generator
- Hydrogen tank (2 units)
- Regulator
- Pressure indicator
- Discharge valve
- Control unit
- PEM fuel cell
- Color touch screen
- Electronic load
- LED lamp

10.6. RENEWABLE ENERGY SOLAR PUMP TRAINING SET

DIMENSIONS
600X1200X1500mm

One of the areas where solar energy is used practically, economically and functionally is irrigation systems with solar powered solar pumps. Complete solutions that can work in harmony with this system gain importance, especially at points where it is necessary to operate pumps for irrigation or drinking water extraction in areas far from the electricity grid. Water pumping systems are absolutely necessary in remote houses or businesses where the city network is not used. Solar water pumping systems are a serious solution in this regard. It can be easily used in crop irrigation, water storage and drinking water supply. The pump design is suitable for working by taking energy from solar panels and suf·cient energy can be produced easily. In order to draw water from a source, ·rst of all, it is checked whether the place gets enough sun or not. Solar panels are connected at the angle and direction where the sun can be taken maximum. If the sunbathing time is low in the region, the batteries can be charged and supported. Or, if the wind is suf·cient, a hybrid study can be made by providing support from the wind power.

EXPERIMENTS

- Demonstration of solar pump operation and connection system

TECHNICAL DETAILS

- Accumulator
- DC modules
- Solar panel
- SOLAR PUMP

10.7. FOUR DIFFERENT SOLAR PANEL TRAINING SET

DIMENSIONS
600X1200X1500mm

In the training set, monocrystalline, polycrystalline, thin-lm photovoltaic, and ·exible panel were used as four different solar panels. It provides the opportunity to examine the ef·ciency of different solar panels and also to adjust the panel angle digitally.

EXPERIMENTS

- Solar panel open circuit voltage measurement
- Solar panel short circuit current measurement
- Loaded and unloaded open circuit voltage measurement of the solar panel depending on the sun's intraday movement
- Examining the serial and parallel connection of solar panels
- No-load commissioning of the inverter, measuring the inverter output power and ef·ciency
- Measurement of volts and amperes of solar panels of different structures at the same power

TECHNICAL DETAILS

- Mono crystal panel
- Polycrystalline panel
- Thin -lm photovoltaic panel
- Solar charge regulator
- Inverter
- Solar panel angle adjustment
- Accumulator
- AC modules
- DC modules
- Data acquisition unit

10.8. VACUUM TUBE AND PARABOLIC TYPE SOLAR COLLECTOR TRAINING SET

The training set offers the possibility of connecting the vacuum tube collector and parabolic solar panel in series or working separately from each other. The vacuum tube collector consists of a vacuum layer between two layers and contains tubes inside. Higher ef·ciency is achieved by conserving energy. This thermal energy obtained is transferred with the help of pipes. The re·ective surface inside the groove collector in the parabolic solar panel is positioned on the focal axis of the collector. The steel pipe at the focal point is painted with a temperature resistant matte paint after sandblasting. The system can be digitally controlled via the panel. Data can be followed instantly and recording can be made with the help of SD card.

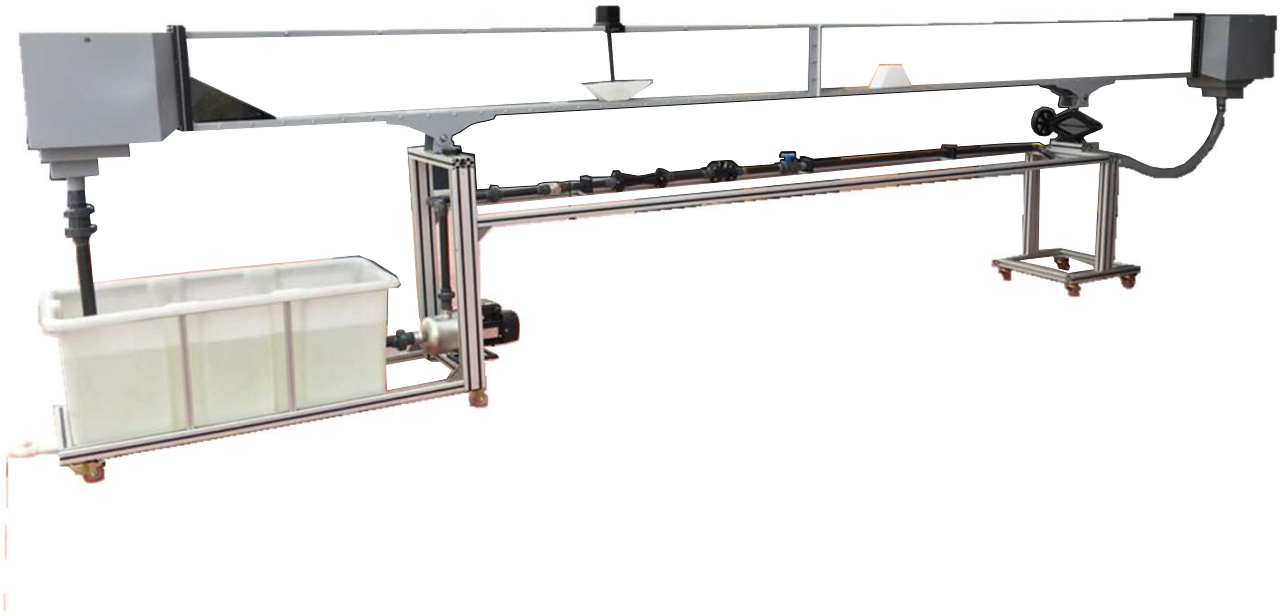
EXPERIMENTS

- Experiment to ·nd instantaneous thermal powers in vacuum tube and parabolic collector
- Differential heat control experiment
- Experiment to ·nd the collector thermal capacity change over time

TECHNICAL DETAILS

- Supply voltage: 220V - 240V AC, 50/60Hz
- Start - Stop - Emergency stop buttons.
- Leakage current and fuse protected.
- Basic general block diagram on the panel
- temperature sensor
- humidity sensor
- LCD touch screen
- boiler
- 8 vacuum tubes
- Electric resistance with thermostat
- Temperature measurement from 8 different points
- Multistage circulation pump
- solenoid valve
- SD card data recording

10.9. WAVE ENERGY TRAINING SET



DIMENSIONS
5000X600X1500mm

EXPERIMENTS

- Energy ef·ciency calculation of buoys with ·ve different surface shapes Different
- Surface shapes showing the effect on the ·ood risk at the coasts
- Relationship of wavelength with wave energy
- Measurement experiment of wavelength
- Wavelength pressure relationship
- Flow calculation experiment
- Switch's Duck module test
- Pelamis module experiment
- The effect of buoyancy of water on the buoy with different weights
- Examination of different wave types
- Conical channel energy module experiment
- Oscillating water channel energy module experimet

TECHNICAL DETAILS

- Supply voltage: 220V - 240V AC, 50/60Hz
- Start - Stop - Emergency stop buttons.
- Leakage current and fuse protected.
- Basic general block diagram on the panel
- Pump
- Venturi
- Column manometer
- Wave generation with different amplitude and frequency
- Ball valve
- Water height measurement sensor
- Differential pressure sensors
- Channel angle adjustment mechanism
- Ori-s
- Water discharge drainage
- Differential pressure sensors

TECHNICAL DETAILS

- 5 meters long wave channel
- Linear ruler
- 7" LCD touch screen
- PLC
- 40 lt tanks
- Turbine type ·owmeter
- 200 liter tank

10.10. HYBRID (WIND SUN) TRAINING SET WITH RENEWABLE ENERGY SYSTEM

The amount of energy of sunlight falling on the earth is 10 thousand times the amount of energy in the world we use today. Therefore, it is suf·cient to use only 0.01 of the sun rays coming to the world ef·ciently to meet the energy needs of human beings. Solar panels also convert sunlight into electricity. It consists of solar cells that absorb the sunlight coming on the solar panel. The ef·ciency of a solar panel is determined by the rate at which the cell in which it is used converts sunlight into electricity. It is an inexhaustible source of energy. While creating a signi·cant potential against climate change, it also reduces costs. In addition to preventing fuel imports, it is installed very quickly. Moreover, it provides a healthy and safe use that does not emit radiation and does not cause explosions.

The kinetic energy generated by the air ·owthat creates the wind is known as wind energy. The movement experienced in the wind ·rstly turns into mechanical energy and then into electrical energy. This is how wind energy is obtained through systems that are specially located at different points. As a clean and endless source of energy, especially with the protection of nature, wind constitutes a very important potential. Wind energy does not have as high potential as solar energy. However, it still offers many different advantages as a renewable energy source. By providing energy security, it reduces air pollution to a very minimum level. While wind energy creates a signi·cant potential against climate change, it also reduces costs. In addition to preventing fuel imports, it is installed very quickly. Moreover, it provides a healthy and safe use that does not emit radiation and does not cause explosions. Our training set is designed as a hybrid system with wind and solar energy.

EXPERIMENTS

- Wind turbine power generation
- Power generation based on wind turbine air speed
- Wind turbine ef·ciency calculation
- Wind turbine electrical connection
- Wind turbine DC power generation
- Electricity generation with wind turbine AC inverter
- Solar panel power generation
- Solar panel power generation according to the angle of the sun
- Solar panel ef·ciency calculation
- Solar panel electrical connection
- Solar panel DC power generation
- Electricity generation with solar panel AC inverter

TECHNICAL DETAILS

- Wind turbine
- Accumulator
- 220-380 inverters
- DC modules
- AC modules
- Solar panel
- Accumulator
- 220-380 inverters
- Panel angle adjustment mechanism

10.11. BIOENERGY TRAINING SET

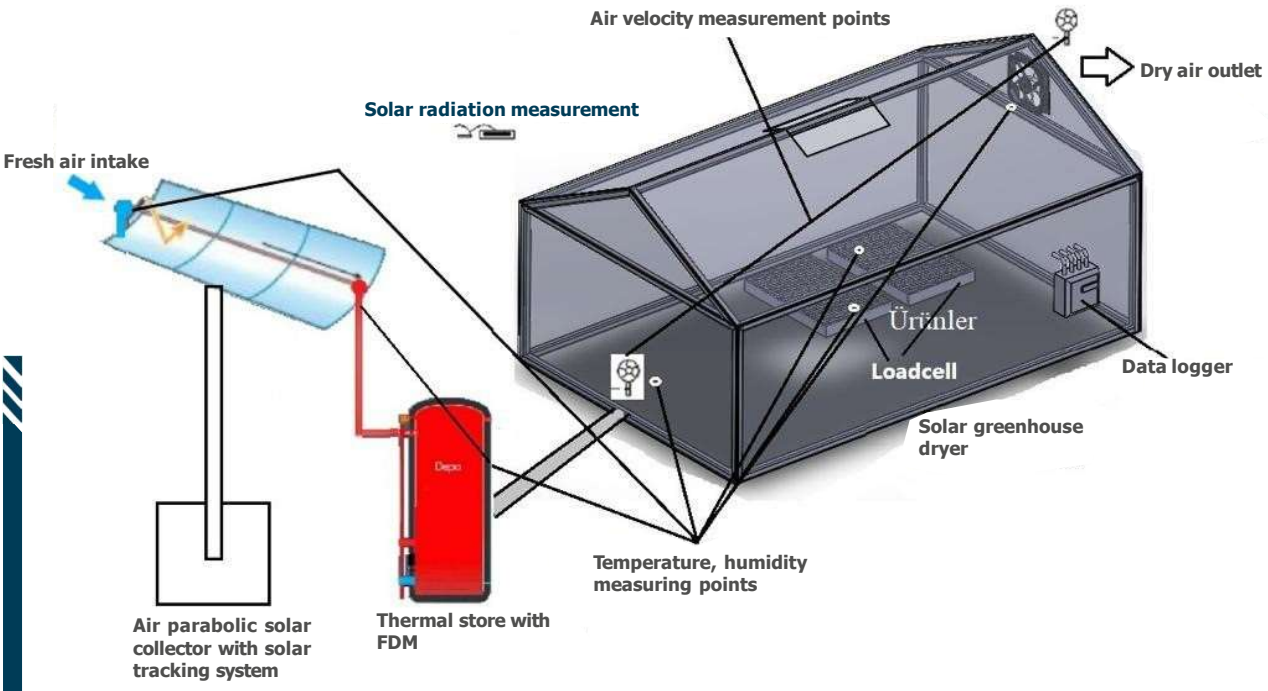
DIMENSIONS
3000X1000X1500mm

Bioenergy plants are systems designed to produce energy from biological wastes that will decompose in nature. Bioenergy plants produce energy by burning methane gas, which is produced by the decomposition of animal manure or other organic wastes, which are sealed in a sealed pool. This system is designed to show the working principle of bioenergy plants.

TECHNICAL DETAILS

- Flowmeter
- Process automation system design
- Basm5 transmitted
- Control system we communication atu
- Level transmitted
- Hardware con·guration
- Temperature sensor
- Process alas semaso design
- Analytics
- Control cabinet design

10.12. Solar Tracking System, Air Parabolic Solar Collector, Thermal Storage, Greenhouse Type Food Dryer



DIMENSIONS
1200X1200X1500mm

Greenhouse type Enda drying application parabolic Ones oldie from kollektorion. imp transfers it to the sera IserIsI. Parabolic vaults work with genies tracking system. By using vacuum collectors at the focal point of the boilers, the air temperature in the ball reaches 150-200 C by collecting the crynalar's Odapi and dyer &nes rays. The hot air sucked from the brand new workplace passes through the warehouse and reaches the greenhouse interior. Thanks to the soot absorbers in the Isol tank, the ef·ciency of the guinea is kept constant in c1011000 cases with the tstl tank yard. Air debts', temperature and humidity in Greenhouse Enterprises are calculated. The device is remotely connected and offers the opportunity to control up to 1km away and to make a card instantly.

TECHNICAL DETAILS

- Temperature sensor
- Humidity sensor
- Air ·ow sensor
- Loadcell
- PLC control
- Wireless connection
- Data logger
- Thermal Storage
- Heat absorbing
- Solar tracking system
- Solar resiation measurement

10.13. Solar Powered Pure Water Production Device

DIMENSIONS
2500x2000x2000mm

The system is completely autonomous and operates without the need for mains electricity. Thanks to the solar tracking system, solar energy is collected at the focal point all day. The solar energy collected in the oil heating chamber raises the oil to high temperatures, and the energy transferred to the evaporation tank is boiled and evaporated.

TECHNICAL DETAILS

- 6 dish type solar concentrators
- Vacuum oil heating tank
- Expansion tank
- Loadcell module
- Solar tracking system
- Circulation pump
- Heat exchanger
- 2 pressure transmissions
- 9 temperature sensors
- Battery
- Radial fan
- Data logger
- PLC
- LCD touch screen
- Wireless connection and control

10.14. WIND TUNNEL TRAINING SET

DIMENSIONS
7000X1000X1800mm

Avk grid tones are devices used to study the aerodynamic properties of various geometric shapes. The most Einem of Alaskan mechanics!' press one of the busy fields; dagolumo ye akes hue prank,' is to be able to detect. For this purpose, it is important to be able to analyze silosturol not have alcuserun. These analyzes constitute important data while measuring the cooling resistances of machines (such as Torbins), air and land that are exposed to milking, and designing suitable models according to the results obtained.

EXPERIMENTS

- Dragging and lifting effect test with different apparatus
- air welcome hand test
- aka{ experiment around the model
- Models in Have Shrink Kaisers' Calculation

TECHNICAL DETAILS

- 3 Fax trlf ax feed
- Movable wheeled platform
- 5 transparent test room
- 3 axis foadcell
- Honeycomb air cluzestIcl
- Test odes' transparent plexiglass (500mmx500mmx1500mm)
- Computer control and data monitoring
- Reporting data to Excel
- Basins olcomif from 16 ayro points
- 0-45 m/s air velocity
- Air velocity sensor

ENGINEERING MECHANICS

11.1. CREEP TRAINING SET

DIMENSIONS
600X450X800mm

Components exposed to long-term constant loads undergo plastic deformation. This material behavior is called creep. Creep rupture testing is a destructive testing method used to determine material behavior after prolonged exposure at a constant temperature (room temperature and below) and a constant load.
In the training set, stages of different creep rates or temperature dependent creep behaviors are shown. Easy ·xation and all stages of the experimental sequence can be seen in the product. In the test setup, there are weights and plastic samples prepared for the test. The sample is exposed to a constant load at a constant temperature in the transparent test chamber, and the elongation of the sample over time is measured digitally with a comparator and a timer and the data is recorded. It is shown as a curve in a voltage-time diagram.

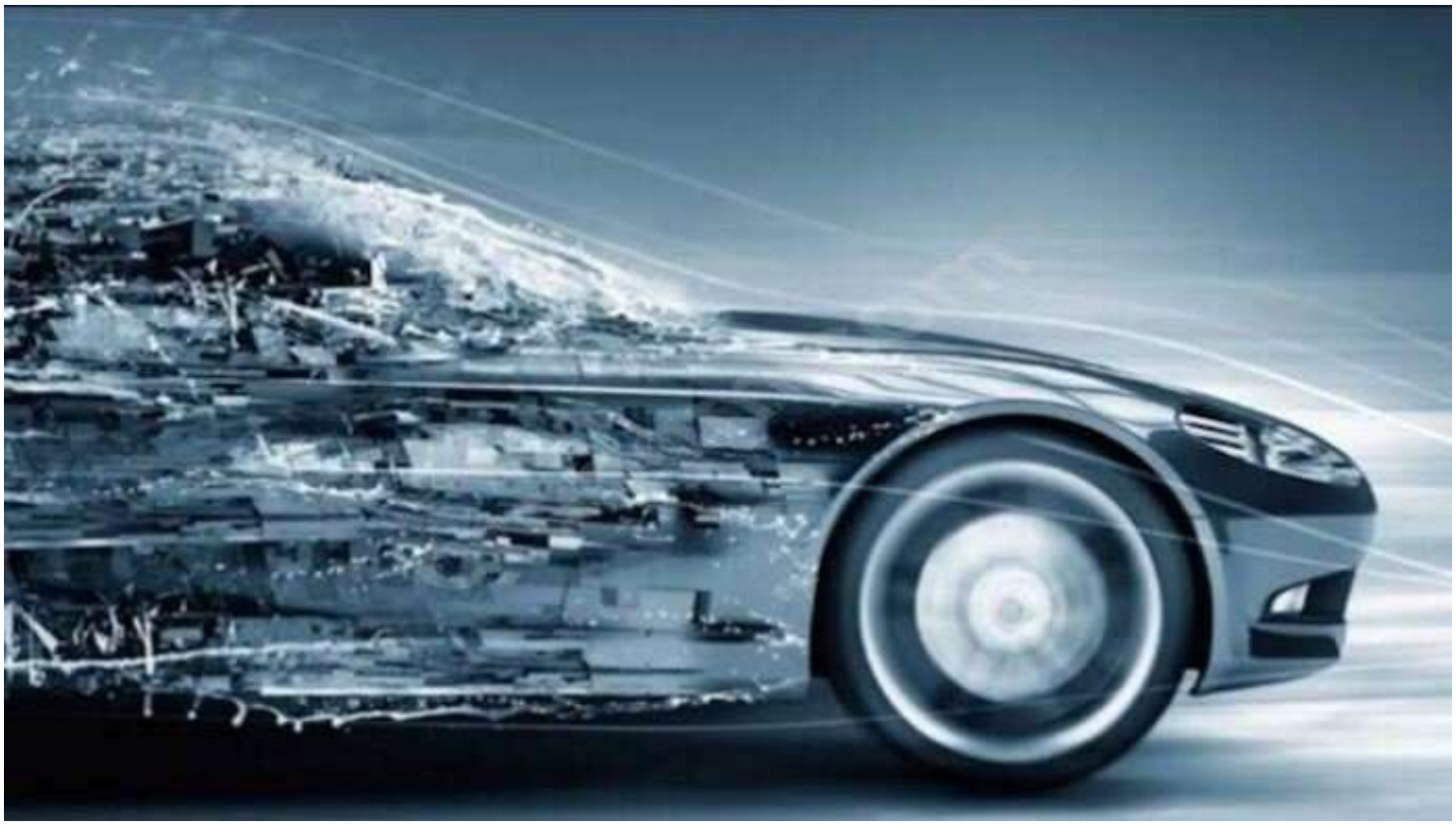
EXPERIMENTS

- Creep in samples of various materials
- Strain-time diagram
- Effect of temperature and load on creep
- Load and recovery in plastics

TECHNICAL DETAILS

- 1x 1N (Arm)
- 2x 10N
- 2x 5N
- 3x 2N
- 3x 1N
- 2x 0.5N
- Digital Comparator
- Temperature sensor
- LCD touch screen
- Heater

AUTOMOTIVE - SHIP SYSTEM AND BUILD



12.1. ELECTRIC VEHICLE TRAINING SET

The electric car training set is a set that shows the working logic of the system from practically every angle. It is possible to observe the process while the system is running. Moving parts are protected by transparent plates. It has been designed with user safety in mind.

TECHNICAL DETAILS

- İNTERCONNECTİON BOX
- BATTERY CHARGE (220V AC - 12V DC)
- CONVERTER (400V DC - 12 DC)
- CONVERTER (400V DC - 400V AC)
- 3 PHASE ELECTRİC MOTOR 80 KW
- POWER ELECTRONIC CONTROLLER
- STATOR
- ROTOR
- SINGLE SPEED TRANSMISSION AND DIFFERENTIAL

12.2.AUTOMOTIVE AIR CONDITIONING TRAINING SET

KCompressing and cooling the gas in the port system to turn it into liquid

must. The compressor compresses the refrigerant into the condenser. pressure and temperature

increased refrigerant, liquid at an average temperature of 60 °C as it passes through the condenser

it becomes. The high-pressure liquid refrigerant ·ows through the expansion valve,

It passes into a large volume and the pressure drops. Liquid refrigerant gas, evaporator

It evaporates inside and collects the heat around it. Evaporator surface and circumference -10

It cools down from °C to -18 °C. This coolness provided as a result of cooling

It is blown into the car by the evaporator fan controlled by This event;

It is repeated as the refrigerant gas turns from vapor to liquid again.

12.3. AUTOMATIC GEARBOX SECTION TRAINING SET

Automatic Gear Box Section Training Set is a training set designed to explain the operation of the system in practice. Thanks to the cross-sectional structure in the training set, the working mechanism can be examined practically from different angles. Sections and components were painted with different colors. It is possible to observe the gear shifts and the crankcase structure. The platform where the system is positioned is on easily movable and lockable wheels. The entire panel consists of durable materials. System Training Set is a training set designed to explain the working mechanism of the system in practice. When the system is energized, the event ·owcan be observed from every angle with all its transparency. It can be assembled as a cross section upon request. The educational and guiding drawings in the training unit increase the ef·ciency of the training. The entire panel is made of durable metals. Electrical and mechanical security vulnerabilities are considered. It has been designed with the user's safety in mind.

TECHNICAL DETAILS

- Automatic Transmission
- Torque Converter
- Gear
- Solenoid
- Sump
- Planetary Gear
- Portable made of durable metal
- Platform

12.4.CAR ELECTRICAL ELECTRONICS TRAINING SET

The Automobile Electric-Electronics Training Set has been designed in a structure suitable for examining the electrical-electronic installation in a real automobile and observing the faults to be created. All modules are placed on at least 4 mm compact laminate and the symbol of each element is drawn on the module.

EXPERIMENTS

- The training set can be controlled manually and via computer. With the existing microcontroller controlled system in the set in manual control mode;
- 12 arti·cial faults can be given and fault conditions can be checked,
- Arti·cial fault conditions can be observed on the 4x20 LCD,
- In computer control mode, the same arti·cial faults can be given and fault situations can be observed with the software supplied with the set.
- Theoretical and visual information about the automobile electrical system should be accessible via computer software.

TECHNICAL DETAILS

- The training set can be controlled manually and via computer. With the existing microcontroller controlled system in the set in manual control mode;
- 12 arti·cial faults can be given and fault conditions can be checked,
- Arti·cial fault conditions can be observed on the 4x20 LCD,
- In computer control mode, the same arti·cial faults can be given and fault situations can be observed with the software supplied with the set.
- Theoretical and visual information about the automobile electrical system should be accessible via computer software.

12.5. CHARGING SYSTEM TRAINING SET

Charging System Training Set, the system starts to work with the ignition key. The engine speed that drives the alternator can be adjusted. The charging voltage and current are measured continuously. Moving parts are protected by transparent plates. It has been designed with the user's safety in mind. There are instructive ·gures and information for the working setup on the training panel. The equipment in the system and the operation of the system can be observed from every angle. The control system is protected by a metal, sheet metal casing.

TECHNICAL DETAILS

- Charger
- Asynchronous Motor Driving Dynamo
- Battery and Plastic Battery Bag
- Contact
- Ignition key
- Metal sheet case for the module
- Charge Indicator
- Voltmeter
- Insurance Protection

•Structure that allows the movement to be easily observed

- Protection Suitable for Occupational Safety

12.6.HYDRAULIC STEERING TRAINING SET

The Hydraulic Steering Trainer has been designed in such a way that all equipment can be seen in accordance with its purpose. This feature makes it possible to observe the reaction of the system according to the situation during the training. The platform where the system is positioned is on easily movable and lockable wheels. The entire panel consists of durable metals. It is designed with the safety of the user in mind.

TECHNICAL DETAILS

- Moving parts are covered with transparent material for safety.
- Steering power adjustment for the amount of rotation can be made manually.
- Depending on the engine speed, pressure changes can be observed.
- Special software prepared for the training set and microcontroller-controlled LCD;
- Wheel rotation angles can be observed,
- Faults can be created via computer software,
- Engine speed can be adjusted,

•Pressure values read with digital manometers can be observed on the computer,

- Pressure values can be observed and recorded graphically.

12.7. BRAKE SYSTEM TRAINING SET

Brake System Training Set is a training set designed to explain the operation of the system in a practical way. The pressure in each disc can be measured when the brake pedal is pressed. The platform where the system is positioned is on wheels that can be easily moved and locked. The entire panel consists of durable materials.

TECHNICAL DETAILS

- 2 Pieces Disc-Pad Set
- 2 Pieces Manometer
- Brake Pedal
- metal platform
- Oil Tank
- Vacuum Pump
- Movable Durable

12.8.ELECTROHYDRAULIC STEERING TRAINING SET

The Electro-Hydraulic Steering Trainer has been designed in such a way that all equipment can be seen in accordance with its purpose. This feature makes it possible to observe the reaction of the system according to the situation during the training. The platform where the system is positioned is on easily movable and lockable wheels. The entire panel is made of durable metals. Designed with the user's safety in mind

TECHNICAL DETAILS

- Electrohydraulic Pump
- Control unit
- Steering Mechanical System
- Portable Platform Made of Durable Metal

12.9. DIESEL - GASOLINE ENGINE SECTION TRAINING SET

Gasoline / Diesel Engine Section Training Set, in accordance with its purpose, various parts of the gasoline / diesel engine are in section. When the system is energized, the working system of the gasoline/diesel engine can be observed from different points. Sections and components were painted with different colors. Movement of the system is provided by asynchronous motor fed from mains voltage. When the system is energized, the motor runs at a low speed of 5 rpm. This gives the opportunity to easily observe the movement in the system. In addition, since there will be no active lubrication in the system, applications that may cause mechanical failure are prevented with this low speed. Electrical and mechanical security vulnerabilities have been considered and have been designed with the user's safety in mind. The platform where the system is positioned is on wheels that can be easily moved and locked. The entire panel is made of durable metals.

TECHNICAL DETAILS

- Gasoline / Diesel Engine Section
- Asynchronous Motor and Gearbox (1/5 d/d)
- Movable Durable metal platform
- Residual Current Protected Energy Panel

12.10.DIFFERENTIAL SECTION TRAINING SET

Differential Section Training Set is a training set designed to explain the operation of the system practically. In accordance with its purpose, some parts of the differential and discs are in cross-section. Optionally, shaft movement is simulated with a gearmotor. Sections and components were painted with different colors. The platform where the system is positioned is on wheels that can be easily moved and locked. The entire panel is made of durable metals.

TECHNICAL DETAILS

- Differential Section
- 2 Disc Sections
- Movable Durable metal platform

12.11CAN BUS SYSTEM TRAINING SET

CAN BUS System Training Set is a training set designed to explain the communication and control system practically in the automotive industry. The necessary equipment for the CAN BUS System Training Set is available on the training unit. The training set is composed of parts used in the automotive industry. Educational and guiding drawings in the training unit increase the ef·ciency of the training. Color printing technology was used in the drawing of the texts and symbols on the modules. The equipment in the system and the operation of the system can be observed from every angle. The platform where the system is positioned is on easily movable and lockable wheels. The entire panel consists of durable materials.

TECHNICAL DETAILS

- 2 vehicle headlights that can be controlled with the On / Off control switch
- 4 glass motors, all of which can be controlled by the driver control unit, which can be controlled by the On / Off control switch
- 2 real vehicle warning lamps
- Parking, signal, reverse and brake warnings that can be simulated with switches
- It can be controlled by computer connection and 6 faults can be simulated Electronic Control Unit (ECU)
- 2 warning lamps control unit
- Revolution (rpm), speed (km/h), IAT, throttle position, MAF, MAP, cooling water temperature values can be controlled with the adjustable button.
- OBD socket can be connected

12.12. WORKING BODY SECTION CAR TRAINING SET

In order to observe the placement, components and functions of the working engine in a real body, body sections were taken from the appropriate regions of the Working Body Section Car Trainer. Vehicle seat, steering wheel, chest, fuel tank can be easily observed. Products that support training such as electronic or mechanical fault tracking simulation can be added. Electrical and mechanical security vulnerabilities have been considered and have been designed with the user's safety in mind. The equipment in the system and the operation of the system can be observed from every angle. The platform where the system is positioned is on wheels that can be easily moved and locked. The entire panel consists of durable materials.

TECHNICAL DETAILS

- **All components such as gasoline or diesel engine and chassis are on the training set.**
- **It consists of the placement of the working engine in a real body.**

•Technical details; It varies according to the vehicle and the desired feature.

12.13. GASOLINE / DIESEL ENGINE TRAINING SET

Gasoline Engine (Injection) is designed as a training set with the same features as the stable conditions of the vehicle in order to ensure the ef·ciency of the training and to observe the correct practical data. System; It is a sequential operating system equipped with necessary components such as engine mechanical system and electronic system, cooling system, intake and exhaust system, fuel system. Engines were produced after 2020 and have not been used. A catalog of engines is provided. When the start is made, the engine is in working condition with all its systems. The platform on which the system is positioned is on wheels that can be easily moved and locked and its height from the ground is 150 cm. The entire panel consists of durable materials. The equipment in the system and the operation of the system can be observed from every angle. Transparent hoses are used where necessary to observe the liquid ·ow. It has been designed with the user's safety in mind.

TECHNICAL DETAILS

- Multi-point injection fuel system,
- Engine cylinder volume is between 1000-1600 cc,
- It is in a structure to give movement to the valves with the camshaft from the top,
- 4-stroke, 4-cylinder and 8-valve,
- Water cooled,
- 12v 60Ah Battery,
- Exhaust, Muf·er and catalytic converter,
- Electronic Ignition,
- OBD connection,
- Vehicle Instrument Panel (Warning warning lamps, speedometer, tachometer)
- Fuel Tank 10-20 lt.

12.14. ACTIVE SUSPENSION TRAINING SET

Real hydraulic steering and suspension system can be simulated. It is an experimental structure that provides practical training on the technical work and functions of the suspension and steering system. The equipment in the system and the operation of the system can be observed from every angle. It is fully operational using original and up-to-date parts of the hydraulic steering and suspension system for the application. The writing, de·nitions and symbols on the experiment panel are made by scraping method. The platform on which the system is located is wheeled, two of them are ·xed, two of them are mobile and locked. The entire panel consists of materials that are resistant to rusting and scratches. Designed with the user's safety in mind.

TECHNICAL DETAILS

- **Leakage Current, Fuse Protection, Double Insulated Born, Emergency Stop Button,**
- **Observable Structure,**
- **Steering Pump is Driven by Asynchronous Motor,**
- **Front Suspension System is Movable and Adjustable,**
- **3 meters 3x1.5 mm cable and safety 1 Phase+Neutral+Earthed plug with the test set**

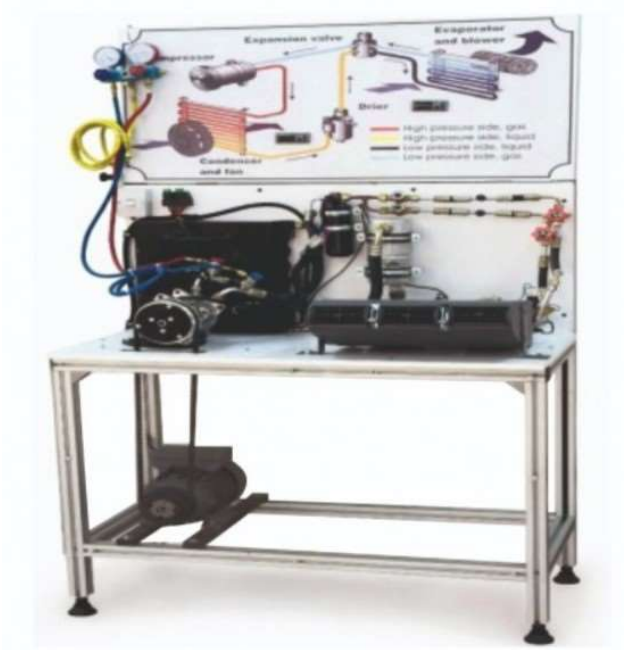
12.15. ABS BRAKE TRAINING SET

ABS Brake System Experiment Set is designed as a training set with the same characteristics as the stable conditions of the vehicle in order to observe the ef·ciency of the training and the correct practical data. The system is in working condition and consists of model parts of the year of delivery. The platform on which the system is located is wheeled, two of them are ·xed, two of them are mobile and locked. Sectioned sections are painted in ergonomic colors. The entire panel consists of durable materials. The equipment in the system and the operation of the system can be observed from every angle. It has been designed with the user's safety in mind.

TECHNICAL DETAILS

- Fault Control via Computer, (ability to control Turkish and other training boards)
- ABS Computer (ABS ECU) and ABS Hydraulic Unit,
- Hydraulic Brake System, Disc and Drum Braking Assemblies,
- Touch Screen Control,
- ABS, ASR, EBD, ESP,
- PC Required for the System,
- Can Be Controlled With Brake Pedal,
- 12v Power Supply, (220V AC 50HZ Input)
- 4 ABS Wheel Sensors (Working and observable)

12.16. AUTOMOTIVE AIR CONDITIONING TRAINING SET



DIMENSIONS
1130x670x1200mm

This training set has been prepared to show the basic functions and working principles of automotive air conditioners. In order for the gas in the air conditioning system to become liquid, it must be compressed and cooled. The compressor compresses the refrigerant into the condenser. The refrigerant, whose pressure and temperature increase, turns into a liquid state at an average temperature of 60 °C while passing through the condenser. The high pressure liquid refrigerant passes through the expansion valve to a large volume and its pressure drops. The liquid refrigerant gas evaporates in the evaporator and collects the heat around it. The evaporator surface and its surroundings cool down from -10 °C to -18 °C. This coolness provided as a result of cooling is blown into the car by the evaporator fan controlled by the driver. This event; It is repeated as the refrigerant gas turns from vapor to liquid again.

TECHNICAL DETAILS

- simulation channel,
- Control Panel,
- reciprocating car compressor,
- Single-phase electric motor with inverter,
- Low, high pressure Manometer,
- pressure switch,
- R-134a gas,
- digital temperature display,
- accumulator,
- Sight glass,
- evaporator

EXPERIMENTS

- **The refrigeration cycle is shown on the diagram,**
- **Suction line pressure display ,**
- **Discharge line pressure display,**
- **Demonstration of automatic air conditioning system**

12.17.EARTHQUAKE SIMULATOR

DIMENSIONS
470X220X400mm

Earthquake simulator and shaking table are part of earthquake engineering education. Shaking table experiments are a very effectivetool in teaching civil engineeringstudents about structural dynamics and earthquake engineering concepts. Drive unit of the designed Shake table, variable speed, DC consists of an electric motor. The shaking table has a capacity of 80 kg. The manufactured system aims to compare and examine diffeent soil structures. It provides the opportunity to compare the response of the buildings with two diffeent basicstructures inthe event of an earthquake and the building foundation structure.

EXPERIMENTS

- Examination of different soil structures
- Comparison of different foundation types
- Examination of the destructive power of earthquakes occurring at different frequencies

TECHNICAL DETAILS

- 12 V DC motor
- Shaking table
- 80 Kg load capacity
- Command control
- Gradual shaking speeds
- Transparent cabin

12.18. VENTURIMETER MODULE TRAINING SET

DIMENSIONS
1150X700X1200mm

Bernoulli's principle describes the relationship between the ·owrate and pressure of a ·uid. An increase in velocity leads to a decrease in static pressure in a ·owing ·uid and vice versa. The total pressure of the liquid remains constant. The Bernoulli equation is also known as the principle of conservation of ·owenergy. It is designed to work modularly with the hydraulic tank. The experimental unit includes a tube section with a transparent Venturi nozzle and a movable Pitot tube for measuring the total pressure. The Pitot tube is located inside the Venturi nozzle, where it is axially displaced. The position of the Pitot tube can be observed through the transparent front panel of the Venturi nozzle. The Venturi nozzle is equipped with pressure measuring points to determine static pressures. Pressures are displayed on a six-tube manometer. Total pressure is measured with a pitot tube and displayed on another single tube manometer.

EXPERIMENTS

- Energy conversion experiment in divergent / convergent pipe ·ow,
- Experiment to record the pressure curve in a Venturi nozzle,
- Test of recording the velocity curve in the venturi nozzle,
- Flow coef·cient determination test,
- Recognition experiment of friction effects.

TECHNICAL DETAILS

- venturi nozzle,
- A: 84... 338 mm 2,
- Angle at inlet: 10.5° at outlet: 4°,
- Pitot tube,
- Moving range: 0... 200 mm,
- Ø 4mm,
- Pipes and pipe connections: PVC,
- Measuring ranges,
- Pressure: 0 ... 290 mmWC (static pressure),
- Pressure: 0... 370 mmWC (total pressure).

12.19. JET FORCES TRAINING SET

DIMENSIONS
405X405X890mm

During deceleration, acceleration, and de·ection of a ·owing ·uid, there is a change in velocity and hence a change in momentum. Changes in momentum cause forces. The Waterjet training module includes a transparent tank, a nozzle, four interchangeable detectors with different de·ection angles, and a weight-loaded scale. The force of the water jet is adjusted by the ·owrate. The experiments examine the effect of different angles of de·ection as well as ·owrate and ·owrate. The jet forces produced by the water jet are measured on a weight-laden scale. Forces are calculated using the momentum equation and compared to measurements.

EXPERIMENTS

- Experiment to demonstrate the linear momentum principle
- Experiment to examine jet forces
- Flow rate and effect of ·ow rate experiment
- Experiment on the effect of different de·ection angles

TECHNICAL DETAILS

- Tank
- Ø inside: 200mm
- Height: 340mm
- nozzle
- Ø 10mm
- detector
- Flat surface: 90°
- Inclined surface: 45° / 135°
- Semi-circular surface: 180°
- Conical surface: 135°
- Weights
- 4x 0.2N
- 3x 0.3N
- 2x 1N
- 2x 2N
- 2x 5N

12.20. FLOW MEASUREMENT AND BERNOULLI PRINCIPLE TRAINING SET

DIMENSIONS
700X450X1100mm

Flow measurement Methods Trainer Measuring ·owvelocity is an important consideration in measurement technology. The test unit contains different measuring devices to determine the ·owrate. These devices are designed with transparent cases to visualize how they work and operate. A six-tube manometer is used to determine the pressure distribution at the venturi nozzle or ori·s plate ·owmeter and measuring nozzle. Total pressure is measured with a Pitot tube. The test unit is easily and safely placed on the working surface of the hydraulic tank. Water is supplied and the ·owrate is measured by the hydraulic tank.

EXPERIMENTS

- Visualization of pressure distribution with the Bornoulli apparatus

TECHNICAL DETAILS

- Ori·ce
- Rotameter type ·owmeter
- Pressure measuring apparatus
- Bernoulli apparatus

12.21.OSBORN REYNOLD TRAINING SET

DIMENSIONS
450x450x1200mm

Reynolds applied this experiment to the sections of the pipe at different points and saw that the current ·lament of the colored water did not deteriorate in these sections, and the ·ow ·owed along straight and parallel lines to each other. When the ·ow velocity of the ·uid is increased, after a certain value of the velocity, it has been observed that the ·ow·lament of the colored water disappears and the whole water mass becomes coloured. In other words, at high ·owrates, the particles that make up the water do not move parallel to each other along the axis of the pipe, but begin to move in the radial direction within the pipe, and thus a complete mixing (ie turbulence) occurs. The ·uid ·owvelocity when the current changes in this way from one type to another is called the "critical velocity". Reynolds later examined the conditions for the formation of these two types of ·owin his experiments and stated that the critical velocity is; found that it depends on the pipe diameter, ·owrate, density and absolute (dynamic) viscosity of the ·uid, and showed that these 4 factors can be grouped in some way. The Reynolds number is of great importance in terms of ·uid mechanics and
widely used in applications.

EXPERIMENTS

- Visualization of laminar ·ow
- Visualization of the transition zone
- Visualization of turbulent ·ow
- Determination of the critical Reynolds number

TECHNICAL DETAILS

- test unit
- Ink
- glass pipe
- glass bead water tank
- Valve
-

12.22. HYDROSTATIC IN LIQUIDS PRESSURE MEASUREMENT TRAINING SET

DIMENSIONS
450X505X450mm

Hydrostatic Pressure Trainer The weight of ·uids at rest causes a pressure known as hydrostatic pressure or gravity pressure. This pressure acts on any area in contact with the liquid and exerts a force proportional to the size of the area. The effect of hydrostatic pressure is extremely important in many engineering ·elds: in shipbuilding, hydraulic engineering, when designing locks and weirs, in plumbing and construction the test unit consists of a transparent, tiltable water tank with a scale for measuring volumes. Another scale is used to adjust the tilt angle of the water tank. The device is balanced with a lever arm using different weights and measured clamping force.

EXPERIMENTS

- across an effective area in a ·uid at rest
- pressure distribution test
- Lateral force test of hydrostatic pressure
- Determination of center of pressure and center of ·eld
- experiment
- Experiment to determine the resulting pressure force
-

TECHNICAL DETAILS

- Water tank
- Tilt angle: 0°... 90°
- Content: 0...1.8L
- Scale: 0... 250 mm
- Effective area, maximum 75x100 mm
- Crank
- Maximum length: 250mm
- Weights
- 1x 2.5N
- 1x 2N
- 2x 1N
- 1x 0.5N

12.23. RUDER TRAINING SET

DIMENSIONS
1500X700X1500mm

It is designed to show the working principle of the rudder system on the ships in the training set.

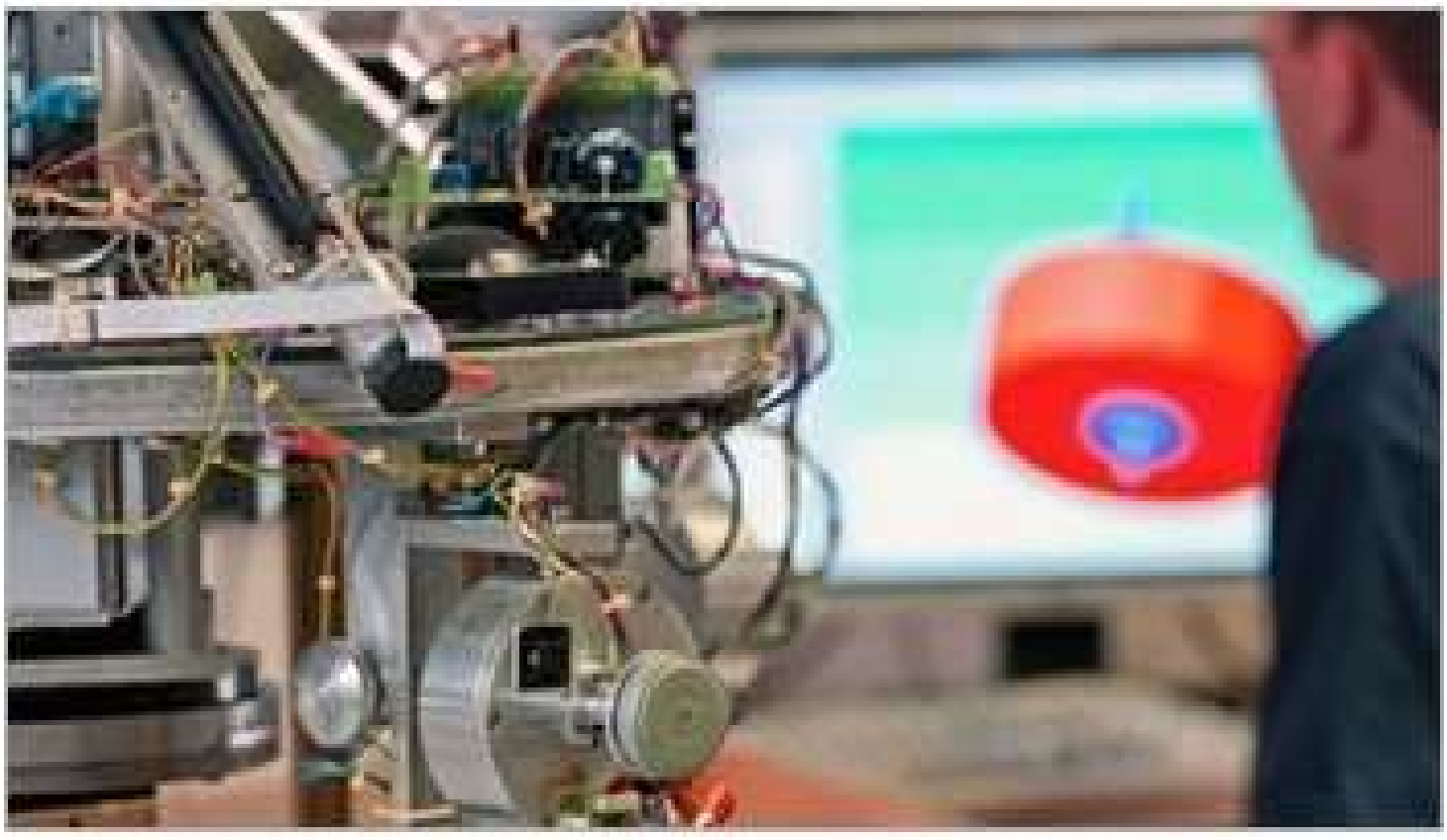
EXPERIMENTS

- Simulation of the rudder system Angle
- control experiment

TECHNICAL DETAILS

- Supply voltage: 220V - 240V AC, 50/60Hz
- Start - Stop - Emergency stop buttons.
- Leakage current and fuse protected.
- Analogue protractor
- Joystick switch
- Hydraulic piston
- Hydraulic tank
- Digital angle measurement
- Compass
- Hydraulic pump

CONTROL SYSTEMS



13.1.PROCESS CONTROL TRAINING SET (TEMPERATURE, PRESSURE, LIQUID, FLOW)

It is the automatic shortening of the production process, which is an important part of process control automation technology. Generally Petroleum, chemistry, industry, electrical energy, building materials, nuclear energy etc. In industrial production, it refers to the continuous or automatic control of the production process. In the modern industrial production process, process control technology plays an increasingly important role in achieving various optimal technical and economic indicators, improving economic bene·ts and labor productivity, improving working conditions and protecting the ecological environment.

EXPERIMENTS

- Two-position on - off control
- Proportional P control
- Proportional and integral PI control
- Proportional and Differential PD control
- Proportional, Differential and Integral PID control

TECHNICAL DETAILS

- Resistance
- Pressure manometer
- Proportional controlled two-way valve
- Centrifugal pump
- Transparent plexiglass water level column
- Fan coil
- Turbine type water ·ow meter
- Rotameter type water ·ow meter

13.2. DATALOGGER

Datalogger literally means data logging. This data logger, which we have produced, allows recording the values of the measurements made, unlike portable devices, and then monitoring the data in the form of graphics or tables on the computer, thanks to the analysis software.

TECHNICAL DETAILS

- Wireless data logger that can operate wirelessly between 10 km distance...
- The wireless datalogger we produce as Argeline Technical Training Devices has a sensitivity value of 0.2.
- You can perform the following measurements and many measurements;
- Heat,Pressure,
- Water level,
- Flow,Wind speed,
- Wind direction,
- Sunbathing values,
- Water level,
- Moisture,
- Force,
- Weight,
- Lighting Intensity.

13.3. CONVENTIONAL FIRE DETECTION TRAINING SET

Conventional Fire Detection Training Set has been designed in accordance with the curriculum of universities, technical high schools and all institutions where technical education is needed. The content of the training set is suitable for advanced technical training, including basic training. The training set is modular. The modules are made of 4mm compact laminate material. In the experiment set, user safety was prioritized in accordance with the regulations. Module boxes are made of metal sheet and coated with electrostatic powder paint. Laser technology was used in the drawing of the texts and symbols on the modules. Technical details are processed using UV printing technology. The experiment set is made of durable materials. There is a rail system where modules can be attached. On the table, the power supply and measuring instruments are mounted.

TECHNICAL DETAILS

- Battery Module
- Button And Warning Lamp
- ModuleDetector Module(1)
- Detector Module (2)
- Switchboard Module
- Siren Module

CHAPTER 14

ENERGY EFFICIENCY

14.1. COLD STORAGE ENERGY EFFICIENCY TRAINING SET

DIMENSIONS
1500X700X1200mm

Our cold storage energy ef·ciency training set is designed to investigate the energy ef·ciency in insulated and uninsulated cold stores.

EXPERIMENTS

- Cold storage amount test
- heat loss test
- Performance measurement (Compressor energy consumption)

TECHNICAL DETAILS

- Insulated and non-insulated cabins,
- Resistance,
- Working gas R-134A,
- Sight glass,
- Drayer,
- Low-high pressure switch,
- Pressure transmitter,
- Written and audible warning system,
- RS-232/485/422 port,
- Real time clock RTC,
- ASCII communication system,
- Multiple communication,
- Security password protection.

TECHNICAL DETAILS

- Supply voltage: 220V - 240V AC, 50/60HZ,
- Start - Stop - Emergency stop buttons,
- Leakage current and fuse protected,
- Basic cooling on the panel with general block diagram,
- Stainless steel cabinet,
- 7” LCD touch screen,
- Cold room cabin dimensions 1*0, 5*0, 5 m,
- Hermetic compressor, 2 Evaporators and Condenser,
- Automatic expansion valve and for each way,
- solenoid valve,
- Stainless lamella resistance,
- PLC,
- 1 liter tank,
- Turbine type ·ow meter,

14.2. FAN TESTER

DIMENSIONS
4500X700X1500mm

The Fan Test Trainer is designed to explain all phases in the ventilation system and to make energy ef·ciency calculations.

EXPERIMENTS

- Air ·ow test,
- Fan electrical power test,
- Electrical power test, in which the valve is adjusted,
- Power test provided by the inverter,
- Flow rate adjustment with inverter,
- Saving experiment,
- Fan pressure test,

TECHNICAL DETAILS

- Supply voltage: 220V - 240V AC, 50/60Hz,
- 7” LCD touch screen,
- Electrostatic painted steel sheet,
- Start - Stop - Emergency stop buttons,
- Leakage current and fuse protected,
- Basic general block diagram on the panel,
- Detachable modules,
- fan unit,
- air velocity measurement sensor,
- Pt-100 temperature sensor,

TECHNICAL DETAILS

- Differential pressure transmitter,
- PLC,adjustable damper,Axial type fan,
- Air velocity, pressure and temperature graph,
- Excel data saving,computer control,
- Control via touch screen,data memory battery,
- ASCII communication system,
- fan speed control,
- Written and audible warning system,
- Display port (RS-232/485/422),
- multiple communication,
- multiple communication,
- Security password protection.

14.3. IN GAS FUEL BURNERS ENERGY EFFICIENCY TRAINING SET

DIMENSIONS

CONTROL PANEL	BURNER STAND
700X500X1500mm	400X300X900mm

Natural Gas Burner is a device that creates a mixture that will ensure controlled and ef·cient combustion of air and fuel. The general principle of these devices; The main thing is to increase the combustion ef·ciency, to reach ideal combustion conditions, to prevent environmental pollution and to save energy. In the design of the burner, the type should be determined according to the characteristics of the combustion chamber, taking into account both the working principle and the characteristics of the control system. Burners are used in boilers, furnaces, water heating tanks, etc. used in places.

EXPERIMENTS

- Power failure,
- Low voltage failure,
- Fuse failure,
- Ionization failure,
- Ignition transformer failure,
- Fan motor failure,
- Solenoid valve failure,
- Gas pressure valve failure,
- Air pressure valve failure,
- Control relay malfunction.

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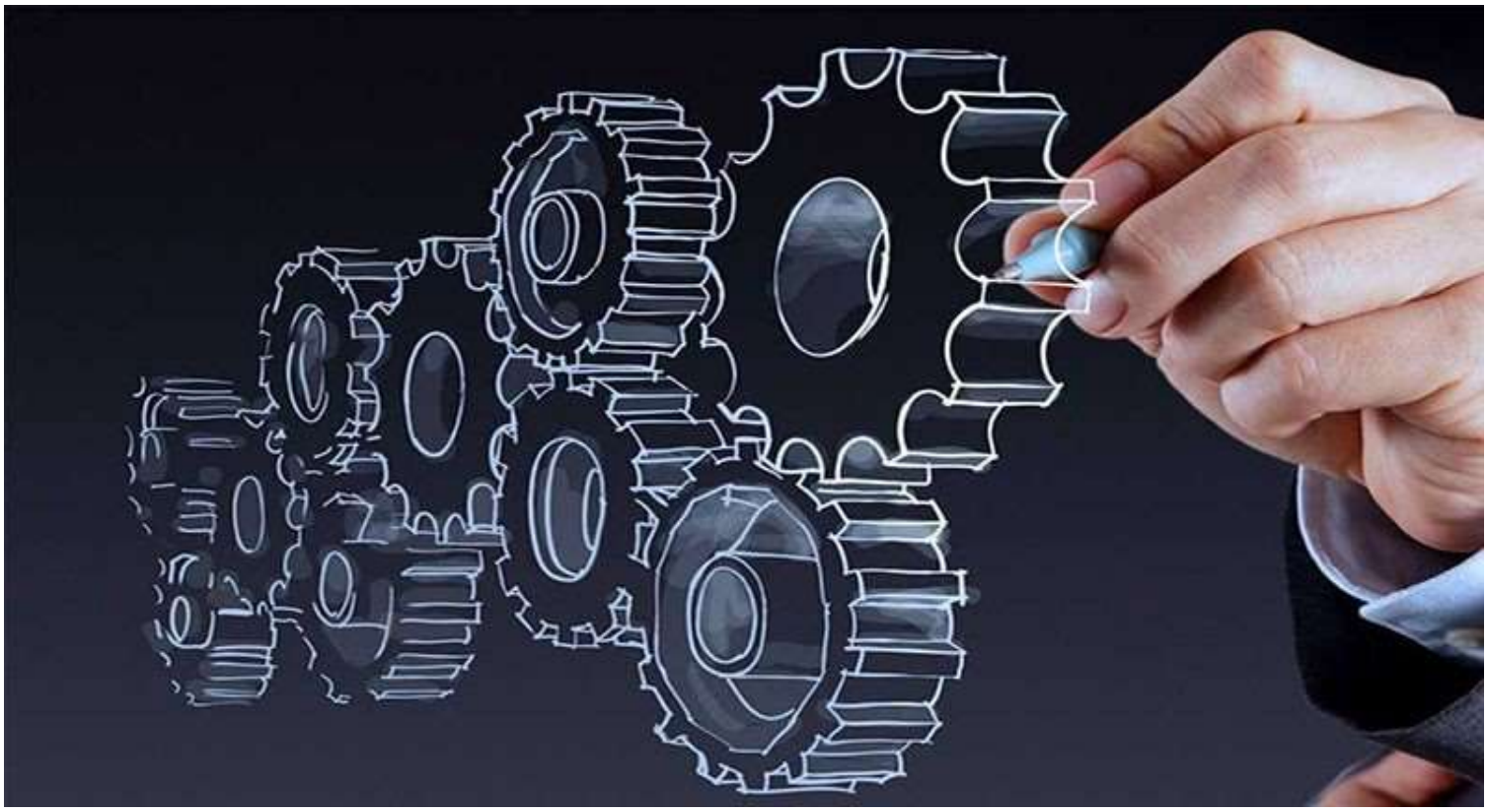
PROJECT DEVICES



15.1. HEAT EXCHANGER TEST TRAINING SET

DIMENSIONS
1000X600X1500mm

In this training set, two different heat exchangers are used to show the effect of hybrid nano·ows on thermal performance in heat exchangers. The difference between the plate heat exchanger and the tube inside tube heat exchanger is shown. By increasing the heat transfer surface in nano·uid liquids, it is aimed to expand the heat transfer surface and reduce the heat transfer time compared to water.

EXPERIMENTS

- Plate heat exchanger test
- Nested tube heat exchanger test

TECHNICAL DETAILS

- Multilayer heat exchanger
- Nested tube heat exchanger
- Circulation pump (2 units)
- Temperature tank
- 6 temperatures
- 4 pressures
- 3 ·ow meters

15.2. WITH DIFFERENT WING DESIGN EFFECT OF METAL OXIDE CONTAINING NANO-FLUID ON HEAT PERFORMANCE EXPERIMENT SET IN PLATE HEAT EXCHANGERS

DIMENSIONS
1700x700x1600mm

This experimental set was designed as an experimental device where we can monitor heat transfer and pressure drops by using different types of nano·uids in the tube type heat exchanger, together with the FX type plate heat exchanger. The heat exchangers can be compared with our experimental study by performing ·owanalysis in Ansys program under the same input conditions. If we are to be evaluated in terms of product development, this study offers the opportunity to examine the performance of plate heat exchangers with different types of blade designs on our test device.

TECHNICAL DETAILS

- Cooling tank
- Heater
- Evaporator
- 2 pumps
- Equal capacity heat exchangers
- Compressor
- R134A Refrigerant gas
- Temperature probe
- Pressure transmitter
- Flowmeter
- PLC
- 7" Screen
- Excel data recording
- Flow regulating valve

15.3. COOLING SYSTEM THAT CAN WORK WITH DIFFERENT REFRIGERANTS

DIMENSIONS
1200x750x1500mm

It is designed to show how the performance and COP value of different refrigerants are over a single inverter compressor in the refrigeration system experiment set that can operate with different refrigerants.

EXPERIMENTS

- Performance and COP value of different refrigerants

TECHNICAL DETAILS

- 6 temperature sensors
- 6 pressure transmitters
- Compressor with inverter
- PLC
- 7" Screen
- 1/4 Evaporator
- 3/4 Condenser
- Flowmeter

15.4. GEAR WEAR TRAINING SET

DIMENSIONS
1200X750X750mm

Abrasion is de·ned as the removal of material from the surface as a result of the interaction of a surface with a matching surface. Almost all machines lose their strength and safety as a result of wear. Therefore, wear control is one of the most important factors for the advanced and advanced technology of the future. Typically used in power transmission, steel gears are made from hardened or carburized steels and are designed to operate in full oil conditions. However, there are many applications where the use of oil is undesirable and the gears have to operate in a dry environment without oil.

This test setup has advantages over steel gear wheels, such as quiet operation of ement-based gear wheels, self- lubricating feature, corrosion resistance. However, low load gears based on -ementIt also has disadvantages such as thermal damage on the tooth surface due to its bearing capacity and low heat transmissioncoef·cient. Therefore, predicting the suitable operating conditions of -ement-based gear wheels is important for the service life of -ement-based gear wheels. The experimental set was designed to investigate this issue.

TECHNICAL DETAILS

- Supply voltage : 380V/50HZ Start - Stop
- Emergency stop buttons.
- Leakage current and fuse protected.
- AC asynchronous motor
- couplings
- 4 deep groove ball bearings
- encoder
- Gear temperature measurement
- PLC
- dusty brake
- 2 torque meters
- Speed and brake control
- Detachable gears Easy
- assembly and disassembly
- Protective
- Ability to record data in Excel ·le
- Ability to work under constant load

15.5. AIR-SPEED SENSOR CALIBRATION DEVICE

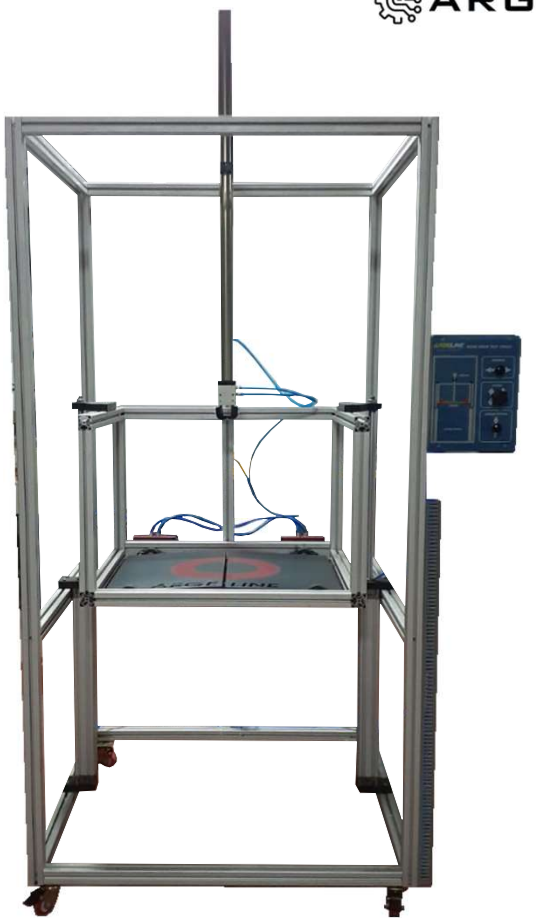
DIMENSIONS
2600X800X1300mm

Our specially designed wind tunnel provides suitable ambient conditions for air velocity sensor The tunnel produces homogeneous and constant air ·ow. wind tunnel; It consists of different components such as fan, honycomb, suction section, deceleration sections, jet measuring secti and inlet nozzle. Aerodynamic experiments and calibration can be done with test apparatus i the measurement section. The device can be controlled via a computer and the data can be recorded instantly.

TECHNICAL DETAILS

- Jet output
- Maximum ·ow rate of the measuring section 0.2-45 m/s
- At 20m/s turbulence rate %0.5-%0.8
- Fan connection 240V-60 Hz
- Motor Power 1.1 KW
- Calibration speed mesurement device
- PC connection
- PC control and datalogger
- Air straightener honycomb (250mm)

15.6.BUCKET DROP TESTER



DIMENSIONS

1000X1000X2000mm

The bucket drop tester simulates the impact of buckets falling during shipping and loading. It is used to determine the impact strength and designable rationality of buckets. The device is generally designed to provide maximum stroke protection and safety. The drop height is adjustable. Experiments are carried out easily thanks to the control panel.

TECHNICAL DETAILS

- Gripper
- 2 linear pistons
- Double acting pneumatic actuator
- Control panel
- Adjustable height

15.7. WIND TUNNEL TRAINING SET

DIMENSIONS
7000X1000X1800mm

Avk grid tones are devices used to study the aerodynamic properties of various geometric shapes. The most Einem of Alaskan mechanics!' press one of the busy fields; dagolumo ye akes hue prank,' is to be able to detect. For this purpose, it is important to be able to analyze silosturol not have alcuserun. These analyzes constitute important data while measuring the cooling resistances of machines (such as Torbins), air and land that are exposed to milking, and designing suitable models according to the results obtained.

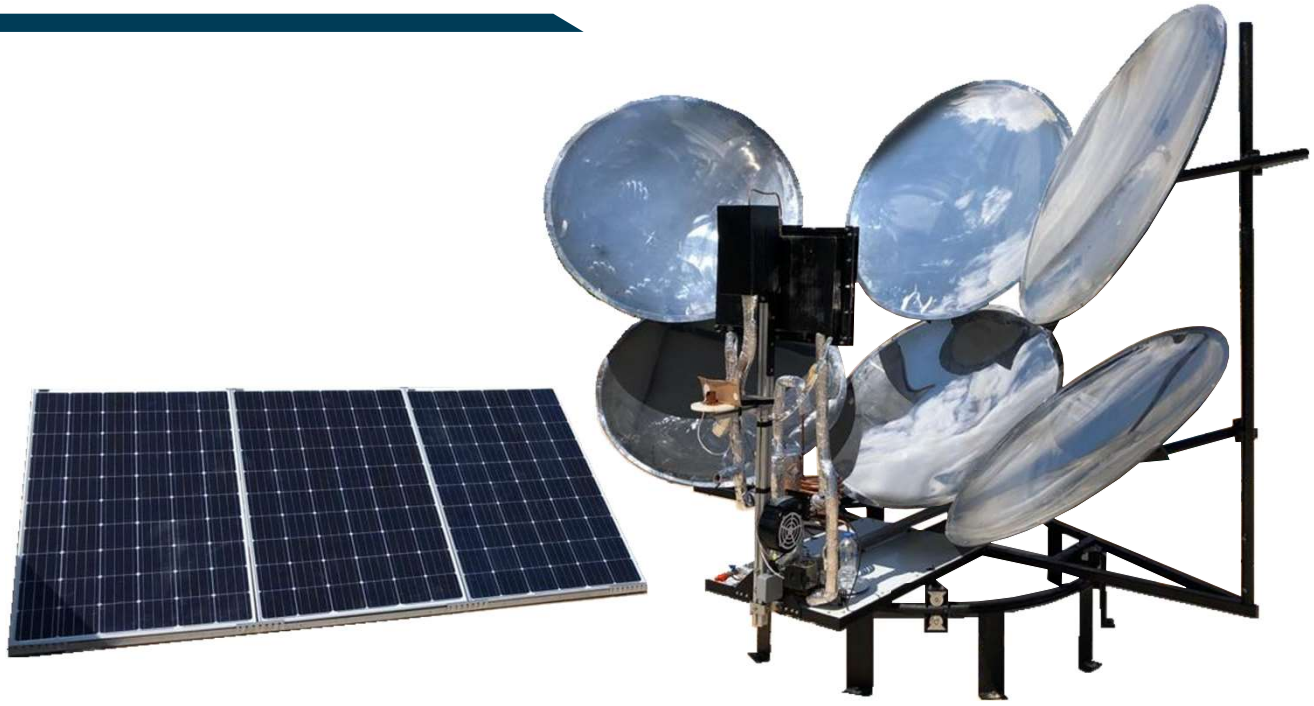
EXPERIMENTS

- Dragging and lifting effect test with different apparatus
- air welcome hand test
- aka{ experiment around the model
- Models in Have Shrink Kaisers' Calculation

TECHNICAL DETAILS

- 3 Fax trlf ax feed
- Movable wheeled platform
- 5 transparent test room
- 3 axis foadcell
- Honeycomb air cluzestIcl
- Test odes' transparent plexiglass (500mmx500mmx1500mm)
- Computer control and data monitoring
- Reporting data to Excel
- Basins olcomif from 16 ayro points
- 0-45 m/s air velocity
- Air velocity sensor

15.8. Solar Powered Pure Water Production Device



DIMENSIONS

2500x2000x2000mm

The system is completely autonomous and operates without the need for mains electricity. Thanks to the solar tracking system, solar energy is collected at the focal point all day. The solar energy collected in the oil heating chamber raises the oil to high temperatures, and the energy transferred to the evaporation tank is boiled and evaporated.

TECHNICAL DETAILS

- 6 dish type solar concentrators
- Vacuum oil heating tank
- Expansion tank
- Loadcell module
- Solar tracking system
- Circulation pump
- Heat exchanger
- 2 pressure transmissions
- 9 temperature sensors
- Battery
- Radial fan
- Data logger
- PLC
- LCD touch screen
- Wireless connection and control

15.9. Solar Tracking System, Air Parabolic Solar Collector, Thermal Storage, Greenhouse Type Food Dryer

DIMENSIONS
1200X1200X1500mm

Greenhouse type Enda drying application parabolic Ones oldie from kollektorion. imp transfers it to the sera IserIsI. Parabolic vaults work with genies tracking system. By using vacuum collectors at the focal point of the boilers, the air temperature in the ball reaches 150-200 C by collecting the crynalar's Odapi and dyer &nes rays. The hot air sucked from the brand new workplace passes through the warehouse and reaches the greenhouse interior. Thanks to the soot absorbers in the Isol tank, the ef·ciency of the guinea is kept constant in c1011000 cases with the tstl tank yard. Air debts', temperature and humidity in Greenhouse Enterprises are calculated. The device is remotely connected and offers the opportunity to control up to 1km away and to make a card instantly.

TECHNICAL DETAILS

- Temperature sensor
- Humidity sensor
- Air ·ow sensor
- Loadcell
- PLC control
- Wireless connection
- Data logger
- Thermal Storage
- Heat absorbing
- Solar tracking system
- Solar resiation measurement

15.10 FIBER DRAWING DEVICE

The fiber drawing method is known as a multi-disciplinary method that includes areas such as fluid dynamics, polymer chemistry, physics, electrical physics, mechanical and textile engineering. With the fiber drawing method, it is possible to obtain polymer-derived surfaces consisting of nanofibers with diameters ranging from a few microns to less than 100nm in diameter.

TECHNICAL DETAILS

In this system, a solution consisting of nanoparticles is used. The solution is transferred to the level in the lower chamber by means of the pump located at the top of the system. Spraying the solution is carried out with the nozzle. With the vacuum we use in the system, the solution adheres to the cloth around the rotating drum and forms the fabric. It is designed for nanofiber product development in many industrial areas such as textile and air filtration, chemistry, defense industry, construction, medical, pharmaceutical and agricultural industries. The electrospinning device that we produce is the first and only in our country, locally and nationally.

15.11. PLANE SOLAR PANELS PERFORMANCE MEASUREMENT SYSTEM

TECHNICAL DETAILS

- 3 axis solar tracking system
- Remote control
- Data logging system
- Incomplete temperature sensor
- 0.37 KW geared motor
- Linear motor
- Monocrystalline solar panel
- Polycrystalline solar panel
- PV thermal
- PV thermal air speed control
- Axial switches fan
- Temperature sensors
- Pyronometer
- Wind speed sensor
- Outdoor temperature humidity sensor
- Power source
- Safety limit

15.12.TUNNEL TYPE TRAY DRYER EXPERIMENT SET

It is a drying device that is frequently used in industrial processes. With the experiment set, it is possible to examine and demonstrate the convection drying process in granular solids. In this way, drying analysis of the fruits desired to be dried can be done easily. There is a hot air supply unit in the experimental set. The air is sent into the tunnel with the help of an adjustable fan. Tunnel dryer experiment set can be controlled by digital touch screen or computer software. It is operated in 9 different scenarios with PID control. Fan, resistance, air velocity meter (anemometer), humidity sensors and temperature control are mounted on a control panel.

TECHNICAL DETAILS

- 5 dampers
- Damper motor
- PID control
- Closed and open loop
- Zeolite
- Temperature and humidity dependent damper positions
- Air straightener
- Bypass line
- Resistance
- Temperature and humidity sensor
- Air speed sensor
- Temperature and humidity sensor
- Lcd touch screen
- Outdoor temperature humidity sensor
- Radial fan
- Load cell
- PID control system
- Data logging system

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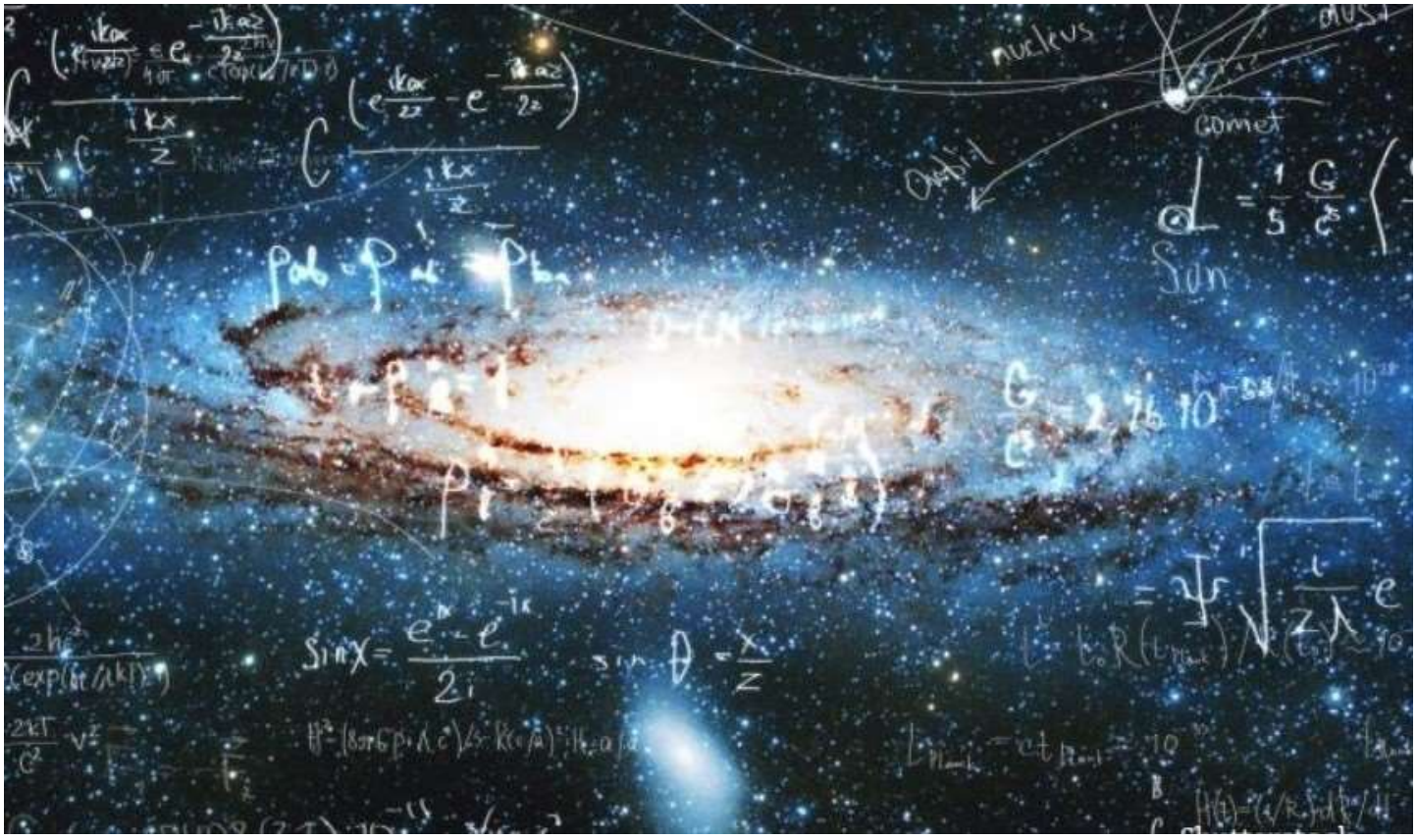
PHYSICAL



16.1 CURRENT SCALE EXPERIMENT SET

Experiment; It aims to determine the direction of the force according to the direction of the magnetic field and current.With this experiment, it is possible to examine the change of the force function according to the magnetic field and current, and to observe the Lorentz force.

TECHNICAL DETAILS

- Special balance with pan, analogue adjustment,
- 60X20 electrode,
- 12.5 mm/1 turns, 25 mm/1 turns, 50 mm/2 turns and 50 mm/1 turns conductor wire,
- scale hook,
- On-off switch and diagram,
- 2 coils with 900 turns,
- Working current 1.3 A,
- 2 digital multimeters,
- The rectifier has a diagram on it,
- 0-18V adjustable DC voltage and 2,4,6,8,10,12,15 V AC power supply (both voltage outputs 5A),
- Triangular foot 1000 mm support bar and clamp,
- 32 A current resistant connection cable.
-

16.2 ANGLE SHOT EXPERIMENT SET

The aim of the experiment; It is aimed to examine the subjects of horizontal throw, ballistic, potential and kinetic energy, rotational energy, angular momentum, inelastic collision, conservation of momentum.

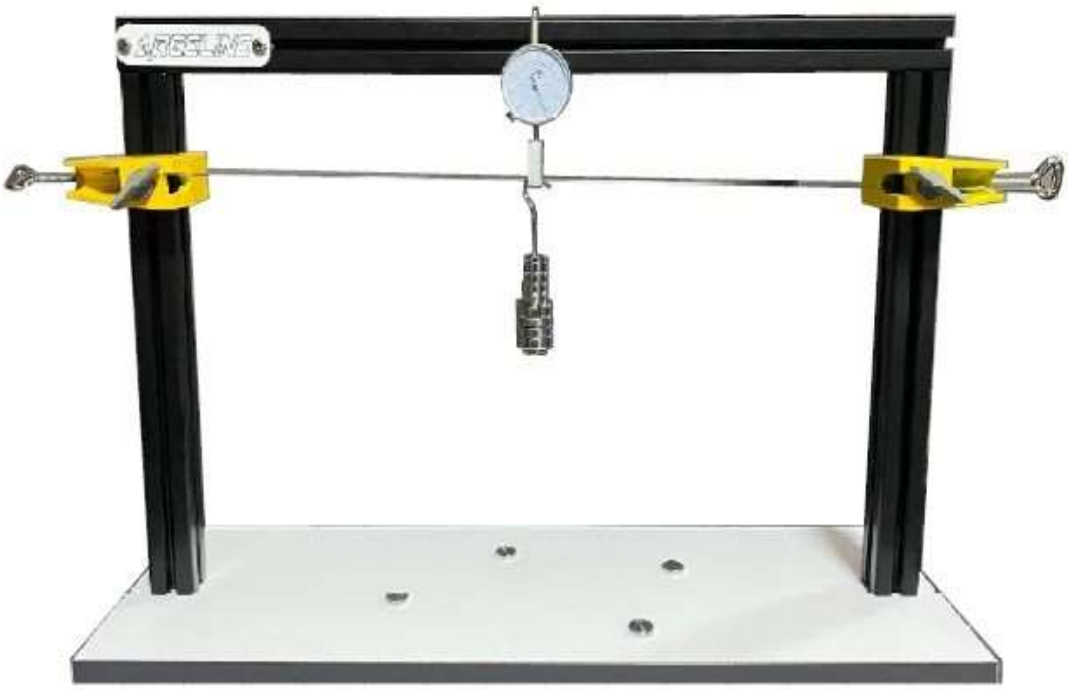
TECHNICAL DETAILS

1.) Ballistic Unit
- It has a scale between 0....90 degrees,
- There are 3 different speed ball launcher mechanisms,
- It has ballistic pendulum,
- It has iron legs and can be easily placed on the table.

2.) Speedometer
- Can be mounted on the launcher,
- Ball exit velocity measurement in m/s on a 3-digit LED display,
- Power source.

3.) Data paper, 2 steel and 1 wooden balls are available.

16.3 ELASTICITY EXPERIMENT SET



It is aimed to examine the relationship between the force acting on the material and the deflection (elastic deformation) in a material that bends with the test set, and to determine the modulus of elasticity (E) for different materials by bending test.

TECHNICAL DETAILS

- Platform; wooden base and frame,
- Fixed holder to the platform,
- 5 different types, 3 pieces of 52 cm long metal rods with different diameters,
- Hard plastic holder to fix the metal bars to the platform,
- 2 sets of stainless steel weights.

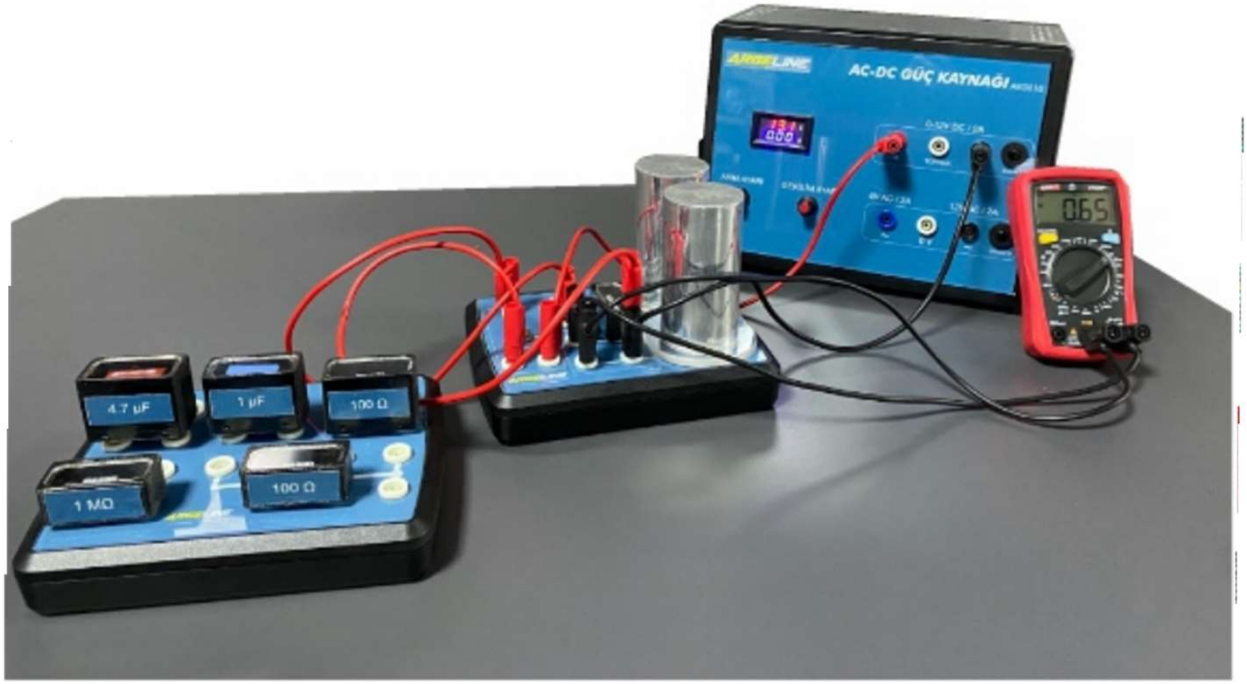
16.4 DIELECTRIC OF DIFFERENT SUBSTANCES FINDING CONSTANTS EXPERIMENT SET

The experiment aimed to learn the subjects of Maxwell's equations, electric constant, dielectric constant, dielectric polarization, charging, electrostatic induction, capacitance.

TECHNICAL DETAILS

- High precision plate capacitor,
- The distance between the plates is 0-70 mm,
- Reading accuracy 1/10 mm,
- Plate diameter 260 mm,
- Plate thickness 6 mm,
- Plastic plate and glass plate are available,
- 10 Mohm high voltage resistance is available,
- There is an amplifier,
- Magnification can be made in 6 levels,
- There is a low bias mode for low signals,
- Voltage output -10V....+10V,
- High voltage source is available,
- Voltage output 0....10kV
- If desired, 0-5 kV DC voltage can also be taken,
- Cutoff current 2mA
- 3-digit led display, digital multimeter,
- Adapter BNC socket,
- 30kV connection cable,
- 1 each yellow, red, blue connection cable,
- 220 nF capacitor.

16.5 CHARGE/ DISCHARGE CURVE OF CAPACITOR EXPERIMENT SET



The aim of the experiment; charge, half-life, charge/discharge of the capacitor.

TECHNICAL DETAILS

- Junction box with 19 socket inputs,
- Two-way switch,
- MP capacitor; tolerance 10%, limit voltage 250V DC/125V AC,
- Its capacity is 30 microfarats,
- There are 2 capacitors, they can be connected in series or parallel if necessary and the capacity is desired.can also be increased to 60 microfarats,
- There are 4 resistors of 100 ohm, 1 Megaohm,
- There are 1 microF and 4.7 microF capacitors,
- Power supply available; It can give current up to 2A at most and can be adjusted,
- It can give a maximum 12 V adjustable DC voltage,
- It can provide 0.6,12 V AC voltage,
- There is a fuse input on the front panel,
- When the fuse blows, the system becomes operational by pressing the fuse, without the need to change the fuse.can be brought
- There is a digital multimeter,
- There is a stopwatch,
- There is a 250 mm long connection cable.

16.6 MAGNETIC INDICATION EXPERIMENT SET

With the experiment, it is aimed to examine Maxwell's equations, electrical eddy field, magnetic field in coils and coil subjects.

TECHNICAL DETAILS

- Field coil is available, 750 mm long and 485 turns/m,
- There is an induction coil set consisting of 7 different induction coils,
- There is a generator that produces versatile sine, triangle, and rectangular signals,
- There is a digital multimeter,
- There are 7 connecting cables in various lengths.

16.7 NEWTON'S LAWS AND FLEXIBLE-FLEXIBLENON-COLLISION EXPERIMENT SET

The aim of the experiment is to observe Newton's Laws by measuring the velocities of two bodies that can move on a low friction rail before and after the collision for elastic and inelastic collisions.

TECHNICAL DETAILS

- Demonstration rail with metric indicator,
- 2 cars on the rail,
- Plate, tube, needle and fork materials that can be mounted as plugs are available,
- Starting system, with mechanical starter and magnet,
- Holders and precision rollers are available for the ends of the rail,
- There are 4 pieces of 10 g and 50 g, 20 pieces of 1 weight,
- There are 4 light doors,
- Light doors can be easily attached and removed,
- Timer with 4 digits and 4 digital displays,
- 6 different modes,
- Scales with 1g precision that can measure up to 2000g,
- 200 mm fishing line

16.8 OHM'S LAW AND KIRCHOFF'S LAW EXPERIMENT SET

TECHNICAL DETAILS

- 0-12 V DC and 0-12 V AC adjustable output, short-circuit protected power supply,
- The power supply has its own fuse
- DC output can support up to 2A, and AC output up to 5 A,
- There are 2 3 and a half digit digital multimeters in the set,
- There is a socketed test box for electrical circuits to be established,
- 100, 200, 330, 470 ohms and 1, 2.2, 3.3, 4.7 and 10 ohms that can be used with the test box.There are resistors in kiloohm values.
- There are 4 connection cables.

16.9 FREE FALL EXPERIMENT SET

With the experiment, it is aimed to find the gravitational acceleration by measuring the falling distance and fall time of a falling ball.

TECHNICAL DETAILS

- Timer is available for period measurements, free fall, sound measurements experiments,
- Display that gives measurement results with 5 digits,
- Measurements can be read in seconds and milliseconds,
- Maximum counting time 99999s,
- Sensitivity 0.01 ms,
- There is a free fall system,
- It has a plate reservoir,
- Ball chamber is available,
- 2 gold-plated steel balls with a diameter of 12 mm and a diameter of 16 mm,
- Pinpong ball with the same mass as the steel ball,
- Jealous,
- Stand,
- 2 pieces of 200 cm and 2 pieces of 100 cm connection cables are supplied with the set.

16.10 REVERSIBLE PENDULUM EXPERIMENT SET

By experiment, by means of a reversible pendulum; It is aimed to find the gravitational acceleration (g), measure the period for different axes of rotation, and examine the Steiner Law, the moment of inertia.

TECHNICAL DETAILS

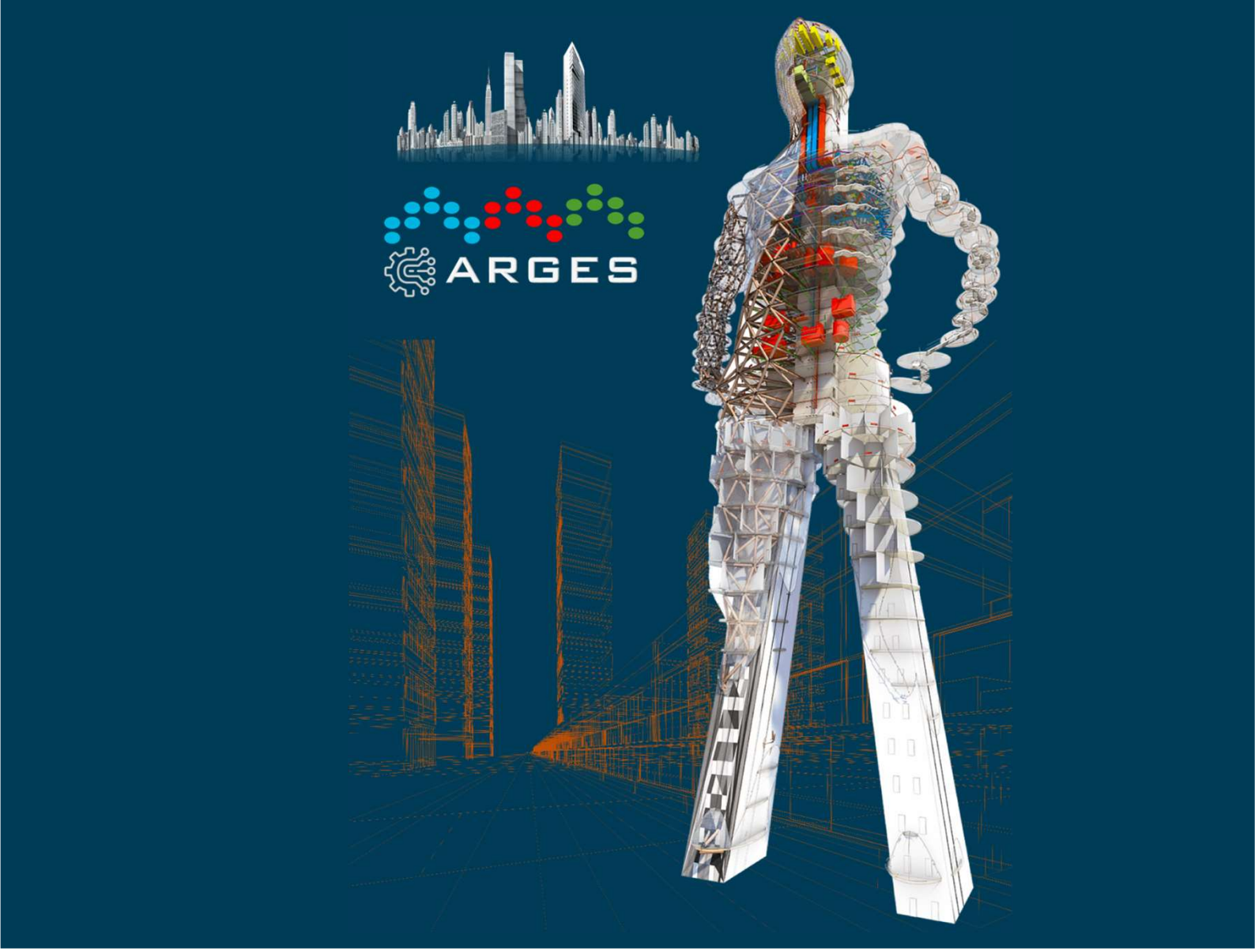
- 750 mm support bar,
- Bolt that will provide low friction,
- Light sensor,
- 4 digit digital display,
- Counter with 4 different modes,
- Clamp, triangular foot and 250 mm long support bar,
- Tapemeter

16.11 WHEATSTONE BRIDGE EXPERIMENT SET

The purpose of the experiment, Kırchoff's laws, current, voltage, resistance, parallel and series connection laws are intended to be processed.

TECHNICAL DETAILS

- Metal resistance box,
- Wheatstone bridge,
- Junction box,
- Resistance,
- Digital multimeter,
- Power source,
- Connection cable



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