
IRAN SAKHT

Presidency Of Islamic Republic of Iran
Vice Presidency of Science, Technology and Knowledge-Based Economy

IRAN SAKHT

13 The 13th Exhibition
Of Equipment, Laboratory Materials and Advanced Test

# IRANLABEXPO

**13-16 December 2025**

Tehran International Exhibition Centre
No 31 (Milad) , No 40 , 44 (Persian Gulf)

## IRANLABEXPO

is a specialized exhibition where Iranian knowledge-based companies showcase their domestically manufactured products in the fields of laboratory equipment, chemicals, and advanced testing and measurement instruments. Over 12 successful editions, more than 20,000 product models produced by around 1,000 companies in various fields have been exhibited and sold.All products showcased at the exhibition are registered and approved by the Technical Evaluation and Supervision Unit of the event, ensuring continuous monitoring of product quality and performance. Universities and research centers across Iran are among the main purchasers, and their ongoing participation reflects both the success of the exhibition's operational framework and the high quality of the products.

In recent years, industrial testing and inspection equipment have also been added to the exhibition's scope. Many industrial companies now rely on these products to conduct their quality control and assurance processes.

This exhibition provides an exceptional opportunity for international companies, universities, and research institutions to engage directly with Iranian manufacturers and establish mutually beneficial business partnerships. It is also an excellent platform for distributors, traders, and tender participants seeking new connections in the Iranian high-tech manufacturing sector.

The 13th edition of the exhibition will be held from December 13th to 16th, 2025 (22–25 Azar 1404) at the Tehran International Permanent Fairground.

## Exhibition Sections:

- Biomedical Engineering and Biotechnology
- Calibration Service Providers
- Educational Equipment
- Civil Engineering and Construction
- Chemical Engineering and Metallurgy
- Strategic Technologies, Machinery, and Equipment
- Electrical, Electronics, Software, and Simulation
- Oil, Gas, and Petrochemical
- Basic Physics
- Laboratory Materials and Consumables
- General Laboratory Equipment
- Agriculture and Environmental Sciences
- Industrial Testing and Measurement Equipment

www.iranlabexpo.ir +98 21 8353 3555

# AN INTRODUCTION TO IRAN

Iran is the eighteenth largest country in the world with an area of 1,648,000 $km^2$. Its area roughly equals that of the United Kingdom, France, Spain, and Germany combined or slightly less than the state of Alaska. Greater Iran is home to one of the richest artistic traditions in world history and encompasses many disciplines, including architecture, painting, weaving, pottery, calligraphy, metalworking, and stone masonry. The Culture of Iran is a mixture of ancient pre-Islamic culture and Islamic culture.

Tehran as the capital of Iran is the largest city in the Middle East. Archaeological investigations and excavations in Tehran demonstrate that this area was home to civilizations as far back as 6,000 years BC.

Iran's economy is a mixture of central planning, state ownership of oil and other large enterprises, village agriculture, and small-scale private trading and service ventures. Iran ranks second in the world in natural gas reserves and also second in oil reserves.

## Industry of IRAN

Iran is a country in the Middle East that is strategically located on the Strait of Hormuz and the Persian Gulf. Both of these areas are important pathways for the shipment of crude oil. Iran has a mixed

transitional economy that is dominated by gas and oil production industries. Iran has 10% of the world's oil reserves. Iran has a high development potential and is a member of the Next Eleven countries (N-11).

## Main Industries of Iran

The economy of Iran is dominated by oil and gas production which makes up the largest revenue source for the government. Other major industries include petrochemicals, fertilizers, caustic soda, car manufacturing, pharmaceuticals, telecom, energy, construction materials, textiles, cement, metal fabrication, and food processing.

## Main Exports of Iran

The main exports were petroleum at 80% of the total exports. Other exports include petrochemicals, chemicals, automobiles, fruits, nuts, and carpets.

## Export Partners of Iran

Iran's major export partners include China importing 30. 1 % of all Iranian exports, India 16.7%, Turkey 9.5%, and Japan 6.8%

## EXHIBITION

The shows of national Laboratory Equipment & Chemical Exhibitions were organized by the vice-presidency for science and technology of the I.R. Iran presidency from 2013, to support domestic laboratory equipment and chemicals manufacturing, and encourage universities and research centers to purchase national productions.

This is a great chance for all international companies, universities, and research centers to negotiate with the manufacturers directly to reach a mutual business agreement. The exhibition is also a unique opportunity for international distributors, traders, tenders, and everybody who is interested in and involved with this business to interact with Iranian companies and establish new connections.

# Laboratory Equipment

- Nanotechnology Lab
- Materials Science Lab
- Physics Lab
- Electrical Engineering Lab
- Medicine & Biology lab
- Mechanical Engineering Lab
- Civil Engineering Lab
- Chemical Engineering Lab
- Chemistry Lab

2022

# CONTENT

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# NANOTECHNOLOGY LAB

# Nanotechnology Lab

1. Desk Sputter Coater
2. Desk Carbon Coater
3. Magnetron Desk Sputter Coater
4. Pulsed Laser Deposition (PLD)
5. Plasma Nano Colloid Maker (PNC)
6. Spin Coater
7. Atomic Force Microscope (AFM)
8. Atmospheric Cold Plasma Jet
9. Lab Scale Electro-Spinning Unit
10. Measure Thickness of  Thin Layer
11. Vibrating Sample Magnetometer
12. Scanning Probe Microscope (SPM)
13. Benchtop Nanosynthesizer

## No.1

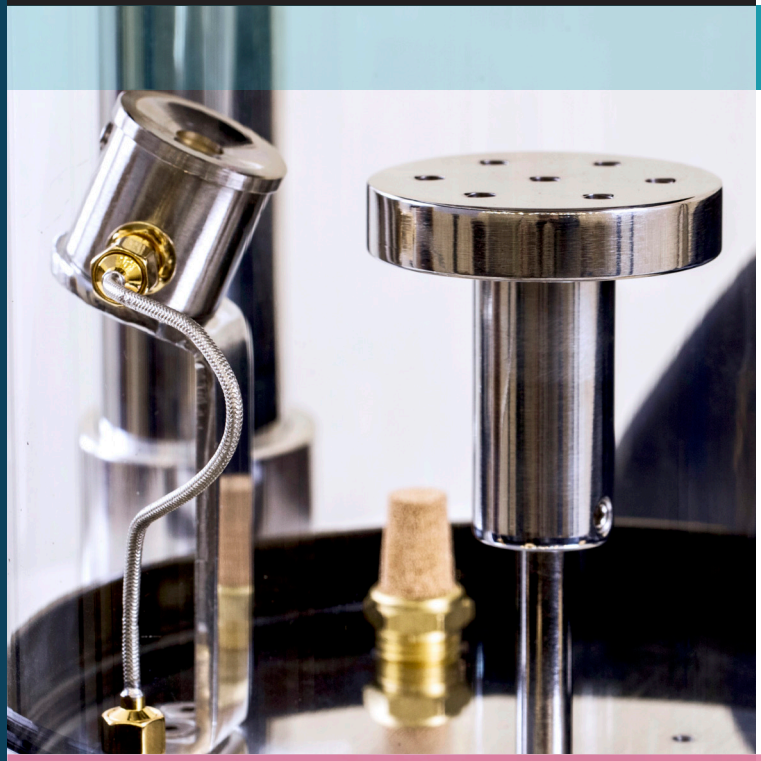
# Desk Sputter Coater


## Definition

The Desk SEM Coater model DSR1 is a compact coating system able to coat carbon film and noble metals such as gold (Au), palladium (Pd), platinum (Pt) and gold/palladium (Au/Pd) on non-conductive or poorly conductive specimens.


## Applications

- The Desk Sputter Coater model DSR1 is a Scanning Electron Microscope (SEM) sample preparation system equipped with a rotary pump to achieve vacuum less than 50 millitorr which is a suitable vacuum range for noble metals sputter coating and carbon fiber evaporation coating.
- Desk magnetron sputter coater (DSR1) is equipped with plasma cleaner mode to improve quality of the deposited thin film by DC magnetron sputtering or carbon coating process.
- Ion collisions with sample surface cause removing contaminations from sample through the ion sputtering process.



## Technical Specifications

- Dimension: L:37 W:50 H:45 cm
- Net Weight: 42 Kg
- Gross Weight: 60 kg
- Power supply: 80 Watt DC switching power
- Two-stage, direct drive 4$m^3$/h, rotary vane pump, and an oil mist filter
- 170 mm OD x 140 mm Pyrex cylinder chamber
- 2 inches magnetron cathode.
- Ultimate Vacuum: Less than 50 millitorrs
- Planetary sample rotation
- Automatic venting valve
- Utilities: 220 V-50 Hz- 10 A
- Package: Hard case

## Features

- Easy to operate
- Intuitive touch screen to control the coating process and rapid data input
- User-friendly software for both full-automatic and semi-automatic control
- Easy loading and unloading of specimens
- Repeatable film thickness depositions
- Precisely reproducible coatings
- High-resolution fine coating (order of 2nm Gold grain)
- Low voltage sputtering
- No cooling system is required
- Carbon coating in both flash and pulse mode
- Dual carbon fiber to thicker layer deposition

## No.2

# Desk Carbon Coater


## Definition

Desk Carbon Coater is a compact carbon fiber coating system suitable for sample preparation for use in the scanning electron microscope (SEM), the Transmission electron microscope (TEM) and the X-Ray analysis (EDX).

## Applications

This device is available in two formats:

DCR

- DCR is a rotary-pumped carbon coater that is suitable for SEM sample preparation, EDS/WDS and thin film applications.

DCT

- DCT is a turbo-pumped carbon coater that is ideal for FE-SEM, EDS/WDS, TEM, EBSD and thin film applications.
- This high vacuum coater offers high quality uniform carbon films with fine grain sizes which are suitable for specimens that require high resolution and high quality characterization.

## Technical Specifications

- High vacuum turbo pump 70 l/s. (For DCT format)
- Diaphragm backing pumps. (For DCT format)
- Two-stage, direct drive 4m3/h, rotary vane pump. (For DCR format)
- Full range vacuum gauge. (For DCT format)
- 170 mm OD x 140 mm Pyrex cylinder chamber.
- 0-100 A switching Pulsed DC power supply.
- Ultimate Vacuum: Less than 2 x 10-5 torr. (For DCT format)
- Ultimate Vacuum: Less than 50 milli torr. (For DCR format)
- Dimensions: 450 x 500 x 370 mm (H x W x D)
- Utilities: 220V-50Hz- 10A.
- Intuitive touch screen with colored display unit.
- Sample holder with planetary rotation.
- Electronic shutter.
- Automatically controlled coating- independent of pressure.
- Precision metering valve for fine control of vacuum pressure.
- Real time plots of coating parameters.
- Simple transfer of coating data plots via USB port to PC.
- Shipping Weight: 46 Kg

## Features

- Quartz crystal monitoring system used for real time thickness measurement (1nm precision).
- Pulsed or flash carbon fiber coating modes. Intuitive touch screen to control and monitor the coating process with a capability of rapid data input.
- User friendly software that can be updated via network.
- Able to record and plot coating parameters graphs.
- Easy-to-change specimen stages (rotation stage as standard)
- Two-year warranty.
- CE conformity

## No.3

# Magnetron Desk Sputter Coater


## Definition

The DST2-T is a dual-target, turbo molecular-pumped, multi vacuum coater system, combines thermal evaporator and sputter coater in one single compact desktop system. It is suitable for deposition of a wide range of materials. The system can easily switch between evaporation and sputtering conditions.

## Applications

- Metal, Semiconductor and Dielectric Films
- Nano & Microelectronic
- Solar cell applications
- Co-Sputtering processes
- Glad sputtering
- Optical components coating
- Thin film sensors
- Magnetic thin film devices
- Computer memory applications
- Fine grain structural deposition for SEM & FE-SEM sample preparation

## Technical Specifications

- High vacuum turbo pump 300 l/s.
- Diaphragm backing pump.
- Ultimate Vacuum: Less than 2x10-6 torr.
- Independent sputtering control rate for each cathode to produce fine grain structures.
- Automatic control of deposition power independent of pressure.
- Automatic control of the cathode's temperatures to protect the life time of the magnets.
- Precision Mass Flow meter (MFC) for fine control of vacuum and pressure.
- Records and plots of coating parameters graphs.
- Transfers curves and deposition process data by a USB port to PC
- 0-1000 mA DC power supply. 0-100 A high current power supply.
- 300 W RF power supply with matching box.
- Utilities: 220V- 50HZ- 16A
- Box Dimensions: 50 cm H x 60 cm W x 47 cm D
- Shipping Weight:100kg (pump, rack and box)


## Features

- Sputtering and Thermal evaporation process in a compact system.
- High vacuum coating suitable for oxidizing and non-oxidizing metals.
- Equipped with DC and RF power supplies suitable for metals, semiconductors and dielectrics.
- Two water cooled angled, magnetron cathodes suitable for producing alloy films and. multilayer deposition. One thermal source installation.
- Two quartz crystal monitoring system for real time thickness measurement (1 nm precision).
- Manual or automatic Timed and Thickness deposition.
- Intuitive touch screen to control coating process and rapid data input.
- 500 °C substrate heater.
- 300 V DC substrate bias voltages.
- Unlimited deposition time without breaking vacuum.

## No.4

# Pulsed Laser Deposition (PLD)

## Definition

PLD – T is a high vacuum thin film deposition system enables to deposit different materials by both Pulsed Laser Deposition and thermal evaporation technique. It can deposit complex materials and crystalline structures onto substrates with very little setup involved.

## Applications

- Pulsed Laser Deposition technique preserves the stoichiometry could deposit materials such composites.

- technique leads to efficient, none-thermal thermal ablation and this method it stoichiometry of the target materials. By applying this such as nitrides, oxides, super lattices, lattices, polymers,

## Technical Specifications

- High vacuum turbo pump 300
- 300 l/s. Diaphragm backing pump.
- Full range vacuum measuring gauge.
- 2.5 KW High current power supply.
- Precision Mass Flow meter (MFC).
- Able to record and plot coating parameters graphs.
- Transfers the curves and deposition process data by USB port to PC.
- Box Dimensions: 50 cm H x 60 cm W x 47 cm D.
- Shipping weight: 48 kg

## Features

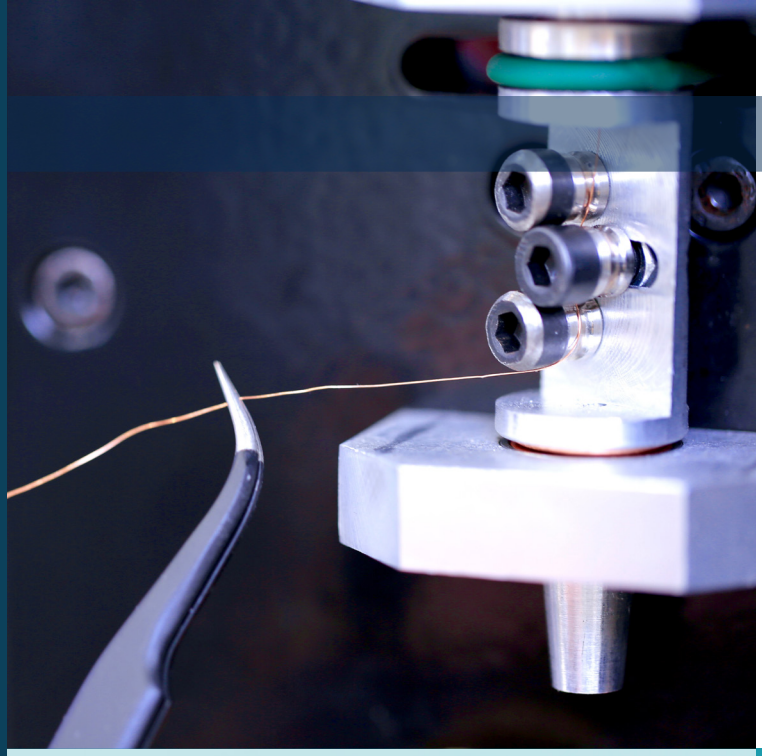
- Target manipulator with adjustable
- adjustable rotation speed.
- 3 thermal sources and special
- special feed-through.
- system for real time thickness measurement
- Intuitive touch screen to control
- User friendly software that
- control the coating process and rapid data input.
- Equipped with rotary sample
- Equipped with electronic shutter.
- shutter.
- 500 °C substrate heater.

## No.5

# Plasma Nano Colloid Maker (PNC)


## Definition

In this method, by applying extra high electric voltage and current, a properly chosen wire is converted into nano particles via liquid wire explosion process. Accordingly, any type of thin conductive wire can be transformed into nano particles.



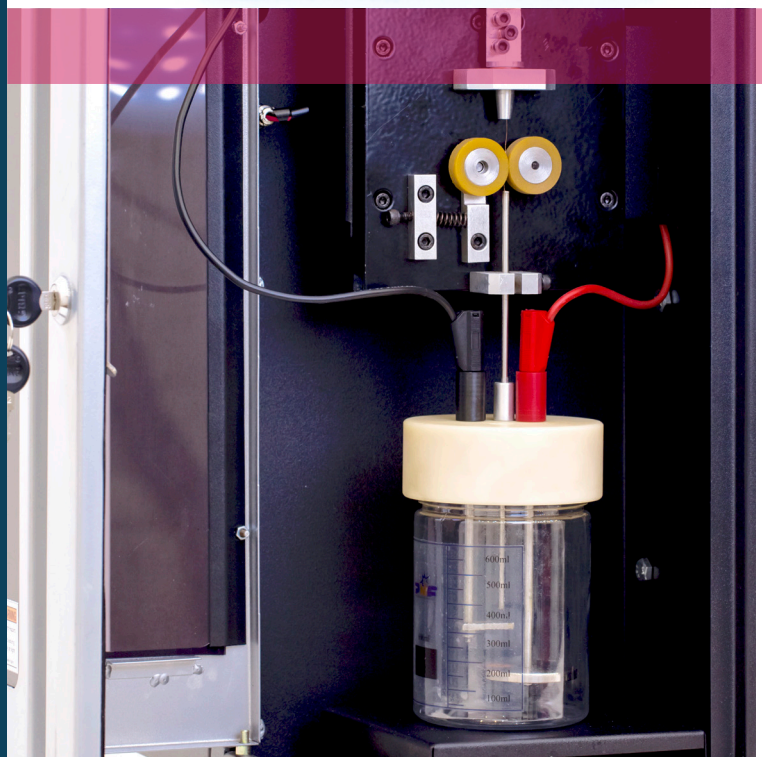
## Applications

Synthesis of nano metal particles (pure or oxidized) applied in:

- Waste water treatment
- Cancer therapy
- Cosmetic additives
- Conductive coatings
- Lubricant additives


## Technical Specifications

- Dimension: L:70 W:50 H:80
- Output voltage: 300-500 V DC
- Shot period intervals: 3-5 sec
- Wire max diameter: 0.20 mm
- Exploding wire length: 2 cm
- Package: Wooden box

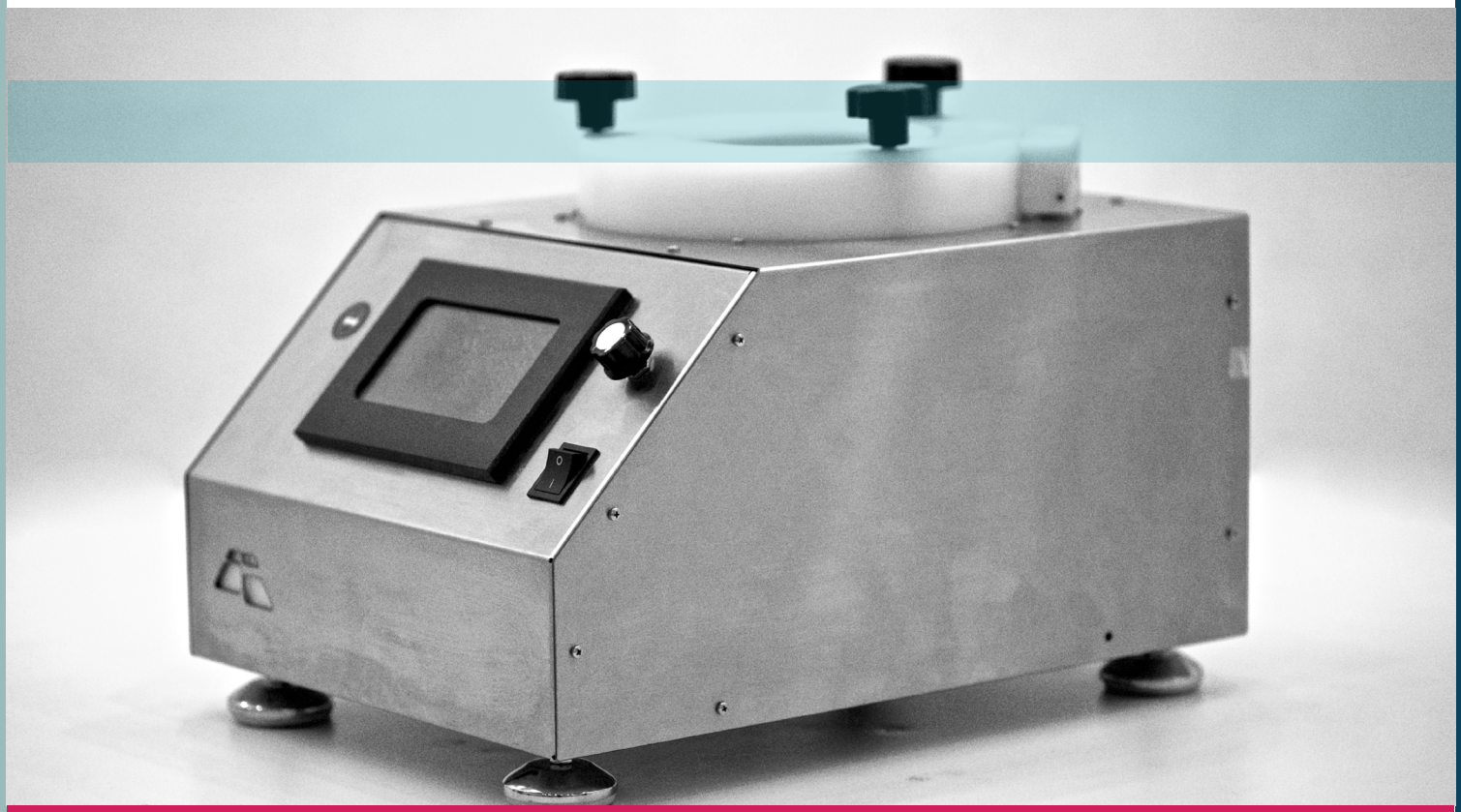


## Features

- Various nano-colloids with wide range of metals in liquid media
- Environmentally friendly
- High productivity
- Fine and homogenous particles

## No.6

# Spin Coater



## Definition

Spin coating is one of the most common techniques for applying thin films to substrates. It is used in a wide variety of industries and technology sectors. The advantage of spin coating is its ability to quickly and easily produce very uniform films, ranging from a few nanometres to a few microns in thickness.


## Applications

- Uniform thin film deposition on flat substrates
- Microfabrication of oxide layers
- Photolithography
- MEMS production
- Coating Polymer materials in micro and Nano scale

## Technical Specifications

- Dimension: L:50 W:60 H:50 cm
- Voltage: 220 V (AC)
- Wafer holder with high precision
- Vacuum pump capacity: 32 L/min
- Vacuum input: 400-630 mmHg
- Drain output: Silicon rubber tube
- Dimension: 30×50×30h cm
- Net Weight:  20 kg
- Gross Weight: 35 kg
- Power: 400 w
- Package: Wooden box


## Features

- 7-inch full color touch screen
- Programming capability
- Input data in table
- Saving most- used programs
- Graph display
- Vacuum chuck changeability
- Main shaft easy clean
- Speed range up to 12000 RPM
- Acceleration range up to 3000 RPM/S
- 304 stainless steel body
- High density PE bowl material
- Inert gas injection
- Compatible with automatic dispense system
- Sample: silicon, glass, quarts

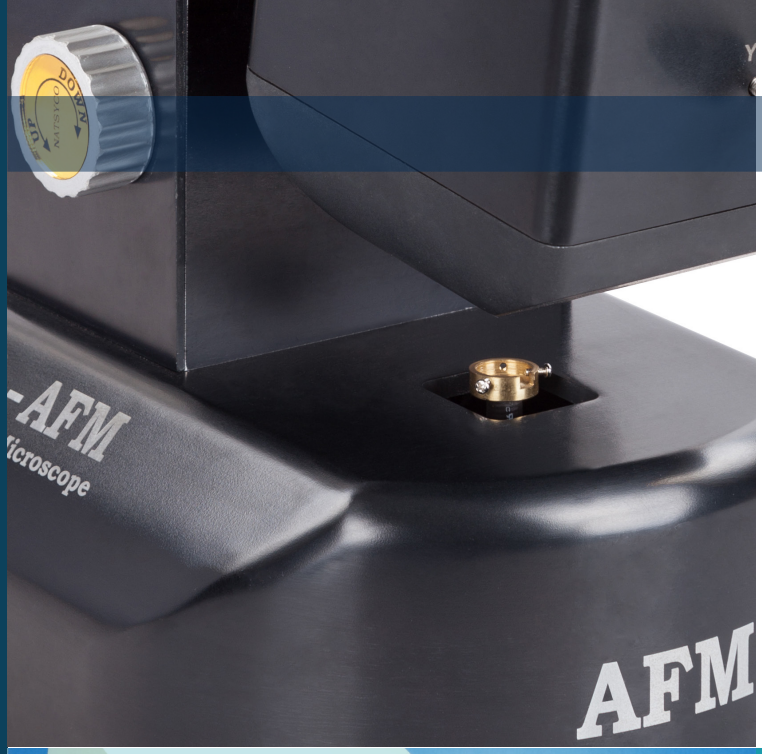
No.7

# Atomic Force Microscope (AFM)


## Definition

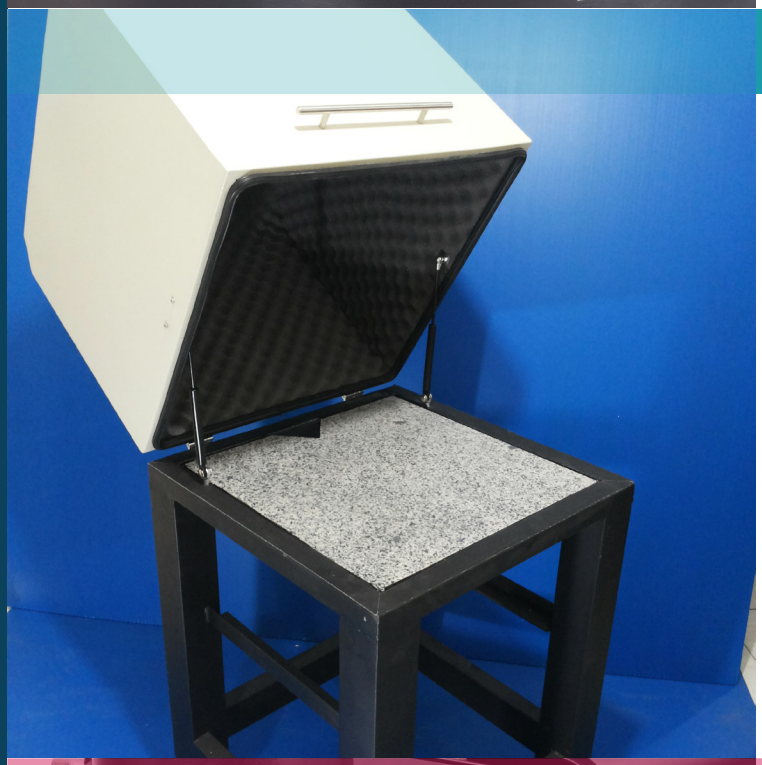
Atomic Force Microscopy is essential for process development and control applications in advanced technology industries including data storage, semiconductor, advanced material, polymer and photonics.

Atomic force microscopes (AFM) are extremely high-resolution scanning probe microscopes, with demonstrated resolution of fractions of a nanometer, more than 1000 times better than the optical diffraction limit.




## Applications

- Data storage devices (data storage media inspection)
- Micro and nanostructures (gratings, self-organizing systems)
- Materials science
- Polymers
- Bio-Medical applications
- Semiconductors
- Thin films Image



## Technical Specifications

- Dimension: 1/5×1 $m^2$, 0/6×0/6 $m^2$
- Net Weight: 40 kg
- Gross Weight: 50 kg
- Power: 45W
- Range of scanning X, Y: 30 µm
- Range of scanning Z: 5 µm
- Lateral resolution: 0.13 nm
- Vertical resolution: 0.05 nm
- Scanning schema: Movable sample under stationary probe
- Scanner type: Piezo ceramic
- Maximum sample size: 10 mm
- XY Micro positioning stage for each step: 1 µm
- Embedded video system: visualization on a PC connector via USB port from top 16 bit
- Scanner DAC/ADC resolution
- Package: Hard case


## Features

- NAMA Analysis software
- Anti-vibration Table
- Sample: semiconductor, advanced material, polymer and photonics

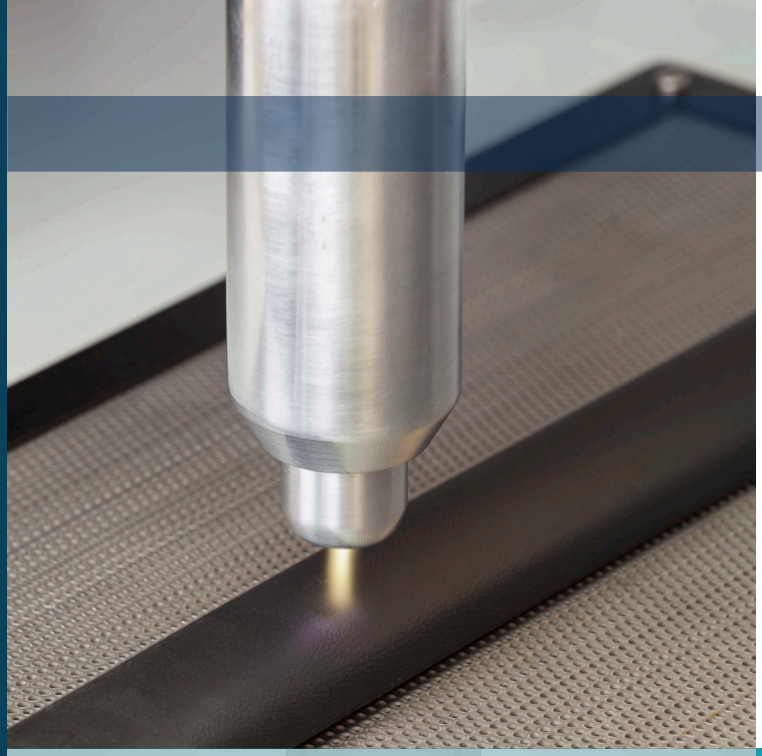
## No.8

# Atmospheric Cold Plasma Jet

## Definition

ACPJ16-A is an efficient system for generating atmospheric cold plasma in air that has the ability of treating the metallic and non-metallic surfaces in industrial scale.

Treating the complex surfaces, adjustment of the treatment power is the features of this system to achieve good adhesion results in various applications.



## Applications

- Automotive industry: Surface cleaning, increase adhesion of elastomers, better sealing of head light, Improving dyeability of bumpers, polymer and non-polymer surfaces.
- Packaging Industry: Improvement of package and bottles printability, etc.
- Printing industry: Improvement of surfaces printability and dyeability.
- Life appliances: Improvement of printability and dyeability of toys, decorations.
- Textiles: Increase the hydrophilicity of fibers.

## Technical Specifications

- Dimension: L:60 W:30 H:50 cm
- Net Weight: 40kg
- Gross Weight: 60 kg
- Power requirement: 50Hz, 220V AC,1 phase
- Output Voltage: 6-10 kV
- Frequency: 20 kHz
- Power: 600-1000 W
- For material: metal and nonmetal
- Processing gas: Air
- Nozzle: Model FG
- Nozzle dimention: L:5.2 W:4 L:15 cm
- Nozzle weight: 400 gr
- Treatment size: 8mm

## Features

- Surface treatment in low-temperature
- Fast surface treatment
- Working at atmospheric pressure
- Capability of installation on the production line
- Working in industrial scale
- Treatment of three-dimensional objects
- Treatment of metal and non-metal materials
- Adjustable speed and treatment rate
- User-friendly
- Electronical safety
- Working with air as the processing gas

## No.9

# Lab Scale Electro-Spinning Unit


## Definition

Electroris is a lab-scale electrospinning machine to prepare polymeric/carbon/ceramic nanofibers with a diameter range of 50 nm to a few microns. The machine mainly consists of metallic body, syringe pump, spinneret system, collector system and high voltage power supply.


## Applications

- Filtration
- Textile manufacturing
- Medical
- Pharmaceutical manufacturing
- Composites


## Technical Specifications

- Dimension: L:90 W:95 H:100 cm
- Net Weight: 110 kg
- Gross Weight: 150 kg
- Power: 200-240 V AC, 50/60Hz, single-phase, 6A
- Metallic body
- 3 doors in 3 sides
- Exhaust Fan at the back
- Operating with on/off timer
- Turn off HV while lock of proper earth
- Safety switches in 3 doors.
- Turn off HV when needed (for example: Injection completed)
- Package: Wooden box

## Features

- Advanced safety features
- Reliable performance
- Modular design
- Bright display and easy-to-use interface
- Non-volatile memory
- Easy use and maintenance
- Dual syringe pump model is available
- A big four-line 20-character LCD display along with 20 membrane keys makes this a most attractive but powerful, easy-to-use system. Operational key for each line of LCD causes easy access to sub-systems of Electroris.

No.10

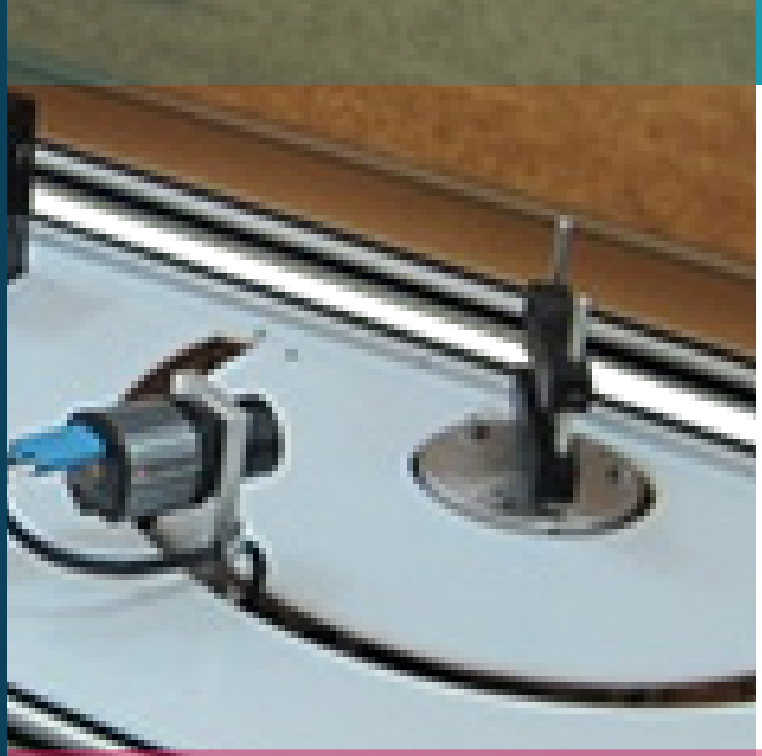
# Measure Thickness of Thin Layer

## Definition

FDP-D1 of Electron Vacum Technologies Co. Is a thickness measurement device for nanometer layers that uses the principles of optical diffractometry of phase step for measurement. This device is capable of measuring thickness of metallic nanometer layers by a precision that has never been been achieved before by other techniques suitable for metallic thickness measurement like interferometry. This device has the capability to measure thin layers above 2 nanometers with the aim of Fresnel diffraction.

## Applications

- Thickness measurement in multi-layers
- Optical filters
- military industries
- coating
- Microelectronics
- Sample: Testing of micro and nanometer, metallic and non-metallic layers



## Technical Specifications

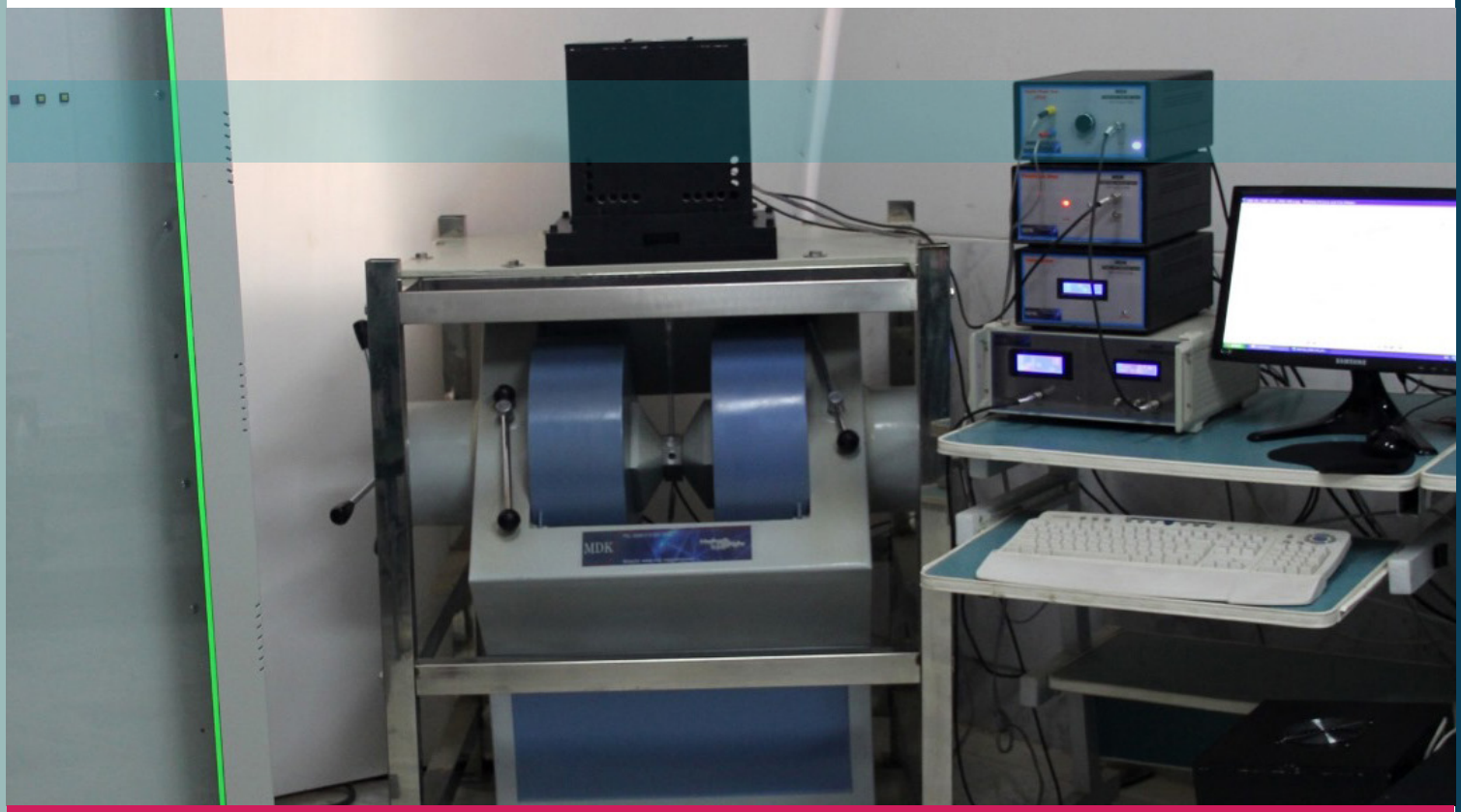
- Dimension: L:80 W:37 H:45 cm
- Net Weight: 25kg
- Gross Weight: 28kg
- Power: 4 to 74 mW laser power
- Package: Carton box

## Features

- Insensitivity to mechanical oscillations
- No need for calibration
- Ease of use
- Independent of parameter entry

No.11

# Vibrating Sample Magnetometer



## Definition

Vibrating Sample Magnetometers (VSMs) are the easiest to use vibrating sample magnetometers with the widest range of options available. Whether you are measuring magnetic moment and coercivity of thin films or studying the magnetic properties of liquids, powders, or bulk samples.

## Applications

- Measuring magnetic moment and coercivity of Thin films
- Studying the magnetic properties
- Liquids
- Powders
- Bulk samples

## Technical Specifications

- Input power: 220ac/35A
- Magnet pole cap face diameter: 60 mm (2.36 in)
- Room temperature: 20 kOe (2.0T)
- With oven: 18 kOe (1.8 T)
- Noise floor (emu RMS): Room temperature
  0.1 TC; 0.1 s/pt 1e-4 emu
  0.1 TC; 1 s/pt 5e-4 emu
  1 TC; 10 s/pt 7.5e-4 emu
- With oven (300 to 800 K): $1e^{-3}$ emu

**Dynamic range**

- Time constants (TC): 0.1 to 1s
- Moment stability2: %1
- Reproducibility: %1
- Moment accuracy: %1
- Sample mass: 1g
- Field accuracy: %1 full range

## Features

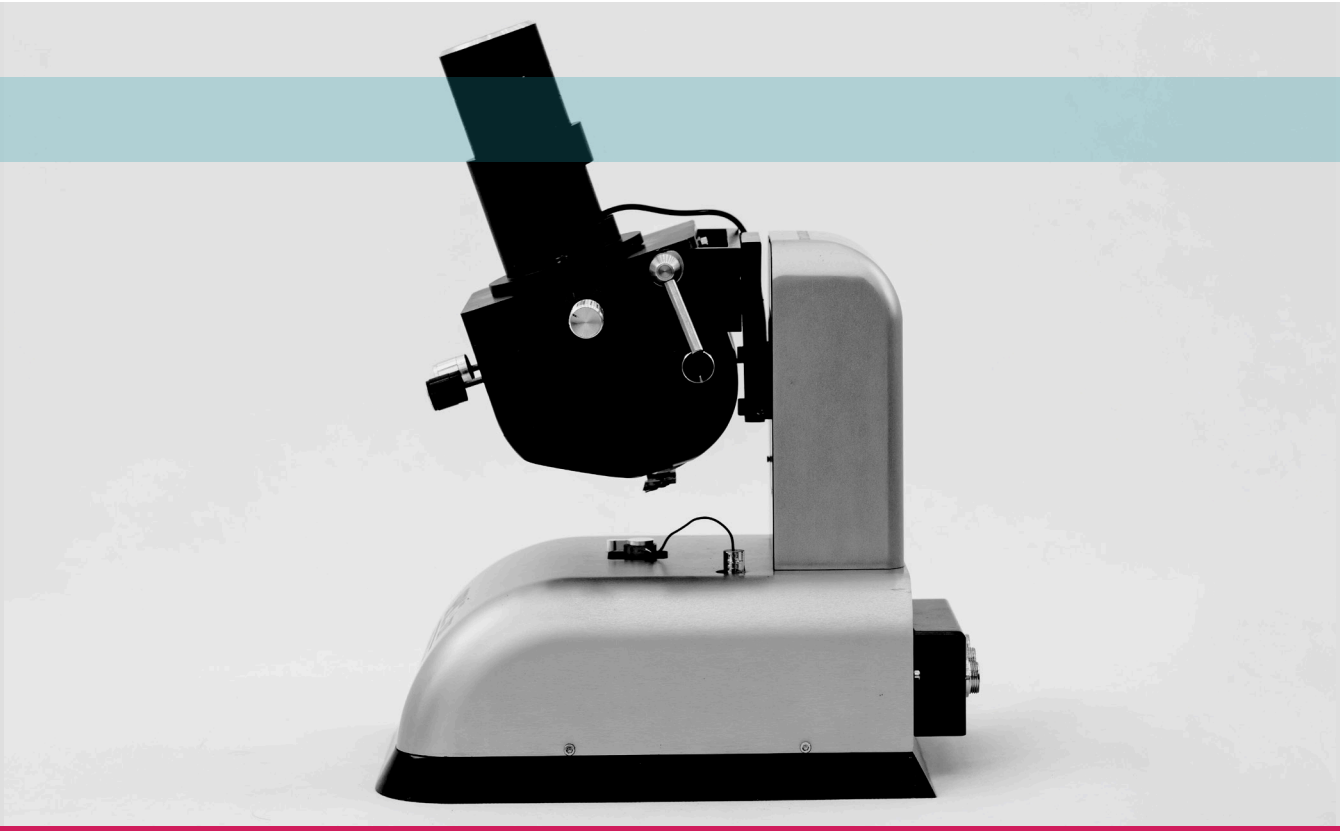
- Computer with MDK software
- Net Weight:  900 Kg
- Gross Weight: 1100 Kg

**Electromagnet**

- Pole diameter: 150 mm
- Pole cap face diameter:  60 mm
- Cooling water requirements: 5 kW

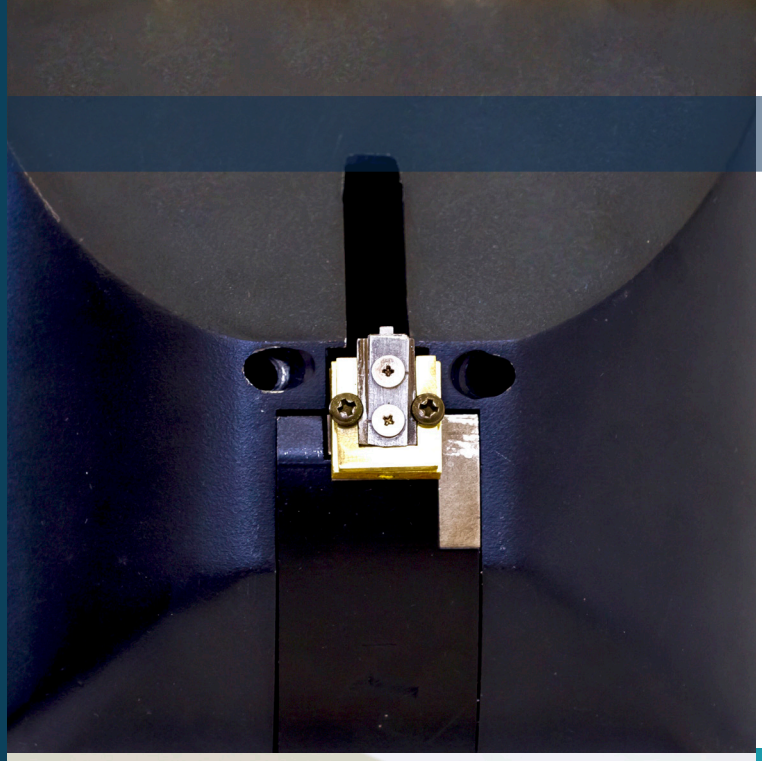
## No.12

# Scanning Probe Microscope (SPM)



## Definition

Featuring an innovational ergonomic design and improved electronics, this Scientific Microscope delivers atomic-scale resolution at a remarkably affordable price, making it an ideal choice for education as well as research. NAMA-SPM offers educators an exceptional opportunity for their students to learn many powerful SPM/AFM-STM techniques.

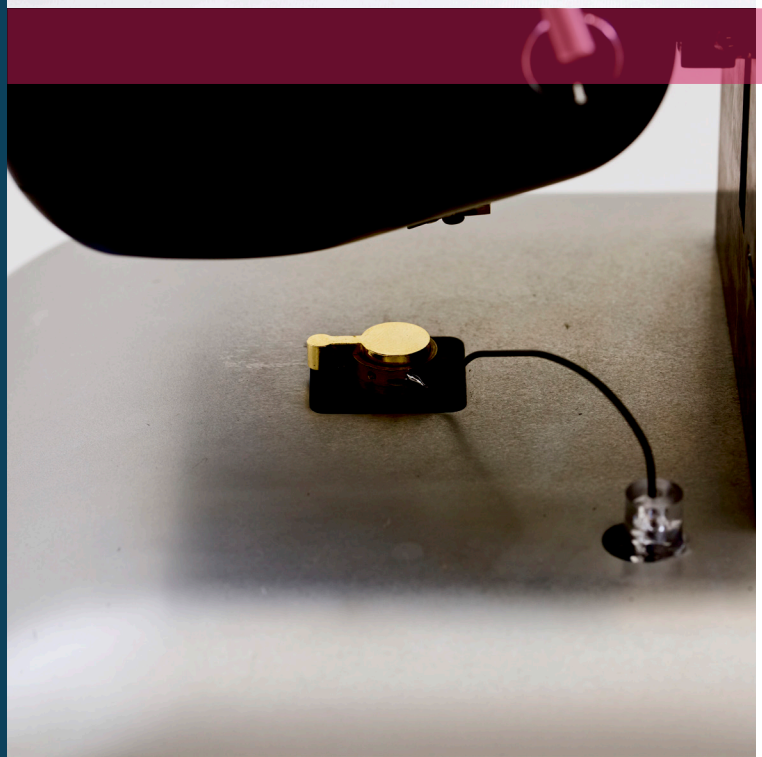


## Applications

- Data storage devices (data storage media inspection)
- Micro and nanostructures (gratings, self-organizing systems)
- Materials science
- Polymers
- Bio-Medical applications
- Semiconductors
- Thin films Image


## Technical Specifications

- Dimension: Device L:97 W:62 H:60,
  Table L:60 W:63 H:135 cm
- Net Weight: 40kg
- Gross Weight: 50kg
- Power: 45W
- Range of scanning X,Y: 30 μm
- Range of scanning Z: 5 μm
- Lateral resolution: 0.13 nm
- Vertical resolution: 0.05 nm
- Scanning scheme: Moveable
- Scanner type: piezo ceramic
- Maximum sample size: 20 mm
- XY Micro positioning stage: 2.5 m
- Embedded video system: visualization on a PC connector via USB port from top and side.
- Scanner DAC/ADC resolution: 16 bit
- Package: Hard case



## Features

- NAMA Analyzer software
- Anti-vibration Table
- Computer, Electronic
- All Samples

## No.13

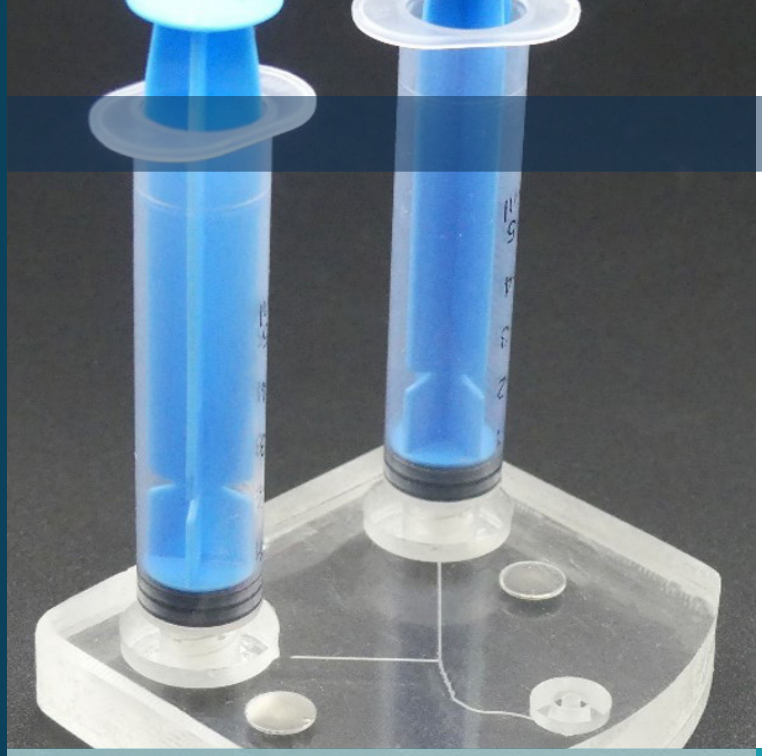
# Benchtop Nanosynthesizer


## Definition

The INSIGHT® benchtop is to produce various types of lipid- and polymeric-based nanocarriers at laboratory scale. It employs a microfluidic chip to properly manage the mixing of two formulation streams for high tunability of size and PDI of particles.

In comparison to conventional methods that rely on the shrinking of multilayered vesicles.

This system is used to produce nanodrug carriers, nano vaccines, and cosmetic products.



## Applications

- The use of size reduction techniques is eliminated. This technology produces medicinal nanocarriers in a single step without the need for time- and cost-intensive post-processing procedures like sonication and extrusion to reduce the size of nanoparticles.
- High-volume production of nanocarriers with maintaining high size homogeneity and encapsulation efficiency. This technique provides a straightforward approach for the production of nanocarriers using low volumes of reagents and materials, with high capacity to regulate the size of the nanoparticles with high encapsulation efficiency through adjusting the flow rates.


## Technical Specifications

- Electrical specifications: 100-240 VAC, 4A
- Environmental specifications:
  Temperature: 20-40 °C
- Humidity: 0-40%
- Pressure: 70-106 kPa
- Dimensions: 26 cm3×34×50
- Weight: 15 kg
- Syringe volume: 3, 5, 10 and 20 ml
- Temperature: 20-40 °C
- Humidity: 0-40%
- Pressure: 70-106 kPa


## Features

- The microfluidic technique is a substitute technology that is highly favored since it does not share the limitations of the earlier conventional techniques. The company's breakthroughs include technologies for chip design and production. By carefully mixing the employed solutions, the constructed microfluidic chip enables the production of pharmaceutical nanocarriers in a single step without the need for post-processing that provides high level of consistency.


# MATERIALS SCIENCE LAB


# Materials Science Lab

1. IZOD Impact Tester (For Polymers)
2. Brunauer Emmett Teller (BET)
3. Differential Scanning Calorimetry (DSC)
4. Universal Tensile and compression test
5. Hot Creep Testing Machine
6. Bend & Re-bend Testing Machine
7. Relaxation
8. Digital Universal Hardness Tester
9. Planetary Ball Mill
10. Measurement of Bending Strength
11. Selective laser melting (SLM)
12. Turbomixer
13. Electric Furnace
14. Impact Testing

No.1

# IZOD CHARPY IMPACT TESTER


## Definition

The Izod impact strength test is an ASTM standard method of determining the impact resistance of materials. A notched sample is generally used to determine impact energy and notch sensitivity.


## Applications

- to measure the quality of products manufactured in polymer plants
- to study a material's toughness
- determining the impact resistance of materials

## Technical Specifications

- Equipment dimension: 47×32×92h
- Packing dimension: 57× 42×102h
- Net Weight: 50 kg
- Gross Weight: 60kg
- Packing: Wooden
- Power: 200w

## Features

- Certified by Calibration Certified Companies of Iran National Standard
- Ability to edit software installed on the touch-screen at the request of a respected buyer
- With one-year warranty and ten years after-sales service
- Includes instruction manual on device usage and training CD

## No.2

# Brunauer Emmett Teller (BET)


## Definition

NanoSORD is one of the most widely used apparatus used for characterization of nanomaterials such as metals, metal oxides and metal sulfides and in general nano-structured and porous materials. This equipment measures BET specific surface area, active surface area, metal dispersion and adsorption, desorption and reduction of nanomaterials.


## Applications

- B.E.T. Surface Area in range 1000±1 $m^2$/gr
- Temperature Programmed Analysis (TPR-TPD-TPO)
- Chemisorption Analysis (Pulse Titration)

## Technical Specifications

- Dimension:L:80 W:45 H:65 cm
- Net Weight: 80 Kg
- Gross Weight: 100 Kg
- Power: 1800 W
- Package: Wooden box
- Compatible with $H_2$ , $O_2$ , CO, $CO_2$, $NH_3$ , $N_2$, Ar and He gases
- Injection Loop (500 µL) for Pulse Titration
- Bypass for Degassing Pretreatment
- Variable Furnace Heating Rate


## Features

- Micro Volume Thermal Conductivity Detector with Nickel-Iron Filaments
- Flow control with 2 precise mass flow controllers
- Data Acquisition Interface & Software
- High Temperature Furnace with PID controller (up to 1100˚C)
- Sample: Powder

No.3

# Differential Scanning Calorimetry (DSC)


## Definition

Differential scanning calorimetry (DSC) is used for examination of all physical processes taking place during heating and cooling of a pharmaceutical compound. Determination of the thermal behavior is a required part of physical characterization of a pharmaceutical compound.


## Applications

- Polymers
- Organics & Inorganics materials
- Metals /alloys
- Foods & Cosmetic materials
- Ceramics/Glass/Building
- Chemical industries
- Pharmaceutical Research
- Metal industry
- Research/Development, Academia
- Development and Quality Assurance


## Technical Specifications

- Dimension: 40×40×30h cm
- Net Weight: 15 kg
- Gross Weight: 25 kg
- Power: 2 kW
- Sample: various type
- Temperature range: Rt.600 °C
- Atmospheres: Inert, Static
- Gas: One inlet for Ar or $N_2$
- MFC range: 0 to 200 ml/min.
- MFC resolution: 1ml/min.
- Scanning rate: 0.01 up to 30 °C/min.
- Temperature accuracy: 0.01 °C
- Time constant: 3sec.
- Measuring range: ±150mW
- Resolution: 0.1mW
- Power requirements: 220 v, 50 Hz
- Package: Carton box

## Features

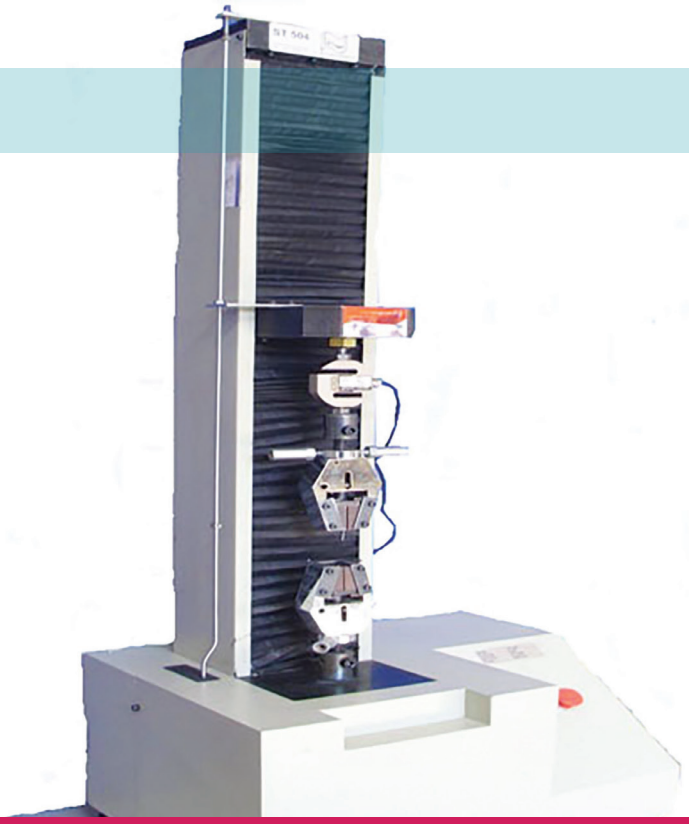

- Robust and easy to use
- High signal resolution
- Flat stable baseline
- Integrated mass flow controller for precise gas control
- A compact heat flux plate differential scanning calorimeter to measure energy changes associated with transitions, reactions and decompositions in material

Software:

- Data acquisition
- Data analysis
- MFC software
- Temperature controller software

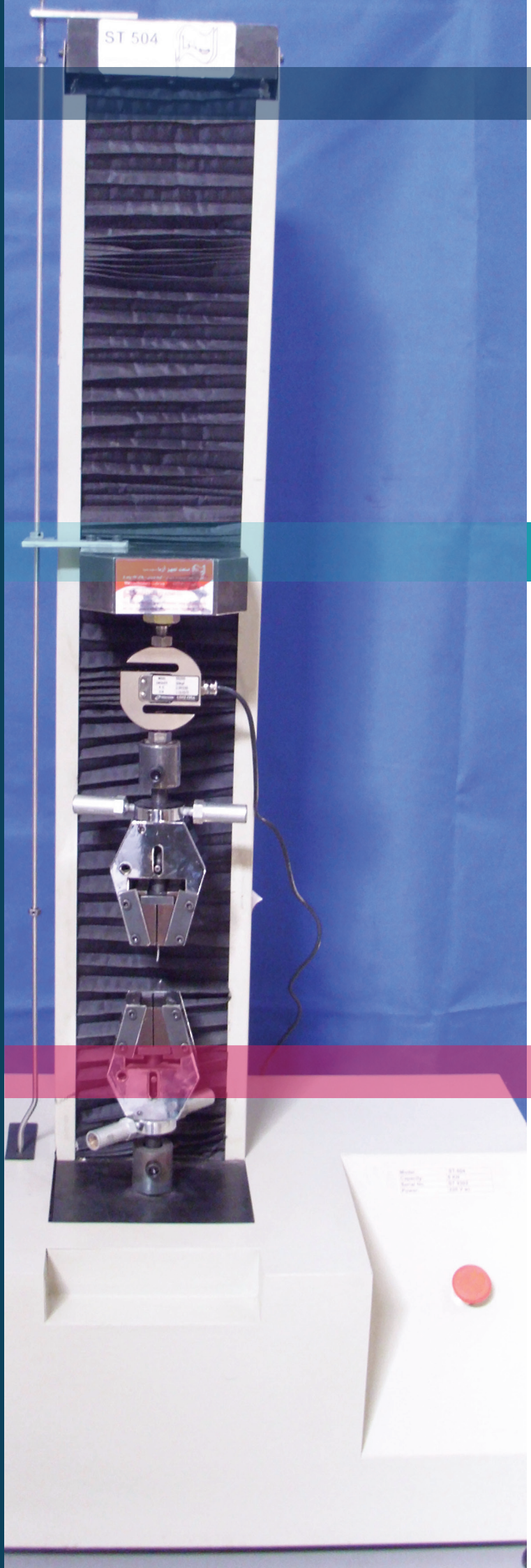
## No.4

# Universal Tensile and compression test



## Definition

Universal Tensile and compression test with a capacity of 3 ,1.2 and 5 kN, also known as a universal tester, materials testing machine or materials test frame, is used to test the tensile strength and compressive strength of materials. An earlier name for a tensile testing machine is a tensometer.




## Applications

- Test on flat and round samples in accordance with all global standards such as ASTM, ISO, DIN ,.
- Perform a 3-point bend and compression test
- Quality control of polymer products
- Textile product testing
- Quality testing and control of wire and wire coating
- Quality control of simple polymer pipes (small size) and multi-layer water transfer

## Technical Specifications

- Equipment dimension: 620×460×1400h
- Packing dimension:720×560×1500
- Net Weight: 120kg
- Gross Weight: 165kg
- Packing: Wooden
- Power: 400W
- Software specifications:
- Simultaneous viewing - 4 curves on one page (with user definition)
- Simultaneous drawing of curves (5 samples per page)
- Different default defined formats

## Features

- Server-Electric System Performance Using Ball Screw (Single Column)
- Ability to perform Tensile, Compression, Cyclic, Bending, Peeling, Tear, Creep and Relaxation according to ASTM and DIN international standards. , EN, ISO, JIS
- Test chamber as a single chamber
- Equipped with precise displacement sensor to measure cross-head displacement of the device
- Ability to install the furnace and perform hot testing up to 80 degrees Celsius (if the relevant appendices are prepared)
- Ability to use different fixtures and specialized jaws (tensile, compression, bending, adhesion, etc.)
- The use of two-way loadcell to increase the accuracy of the test is generally from reputable European and Asian brands.

## No.5

# Hot Creep Testing Machine


## Definition

The load stabilization control function in SCT-30 is electromechanical and provides accurate control over temperature and force parameters. The loading mechanism is performed by accurate weights or dead weight by means of a rigid lever and knife edge support applying a weight load ten times ratio to the sample (with %0.5 accuracy ranging from 1000N to 30KN according to ISO 7500).

# Applications


- Research and manufacturing centers of power plants equipment and gas turbines.
- Research activities on metal behavior in high temperatures.
- Quality control and function verification of super alloys (Inconel, Monel …).
- Production of hot working steel.
- Material testing of high temperature equipment (boilers, furnaces ...).

# Technical Specifications

- Weight: Approx. 400 kg
- Dimension: W:160 x D:80 x H:270 (cm x cm x cm)
- Power: 220VAC Single Phase, 16Amp
- Capacity: 30 KN
- Loading Type: Dead Weight with 10/1 lever and Knife Edge Supports
- Accuracy 0.5% of applied load from 1000N ~ 30KN (ISO 7500 Standard)
- Self Align Grips with interchangeable Adaptors
- Two Standard Adaptors for Specimen with M8 Thread (Super Alloy Metal)
- Automatic level of lever during the test
- Dead Wight: 100Kgf (to 10KN loading)

# Features

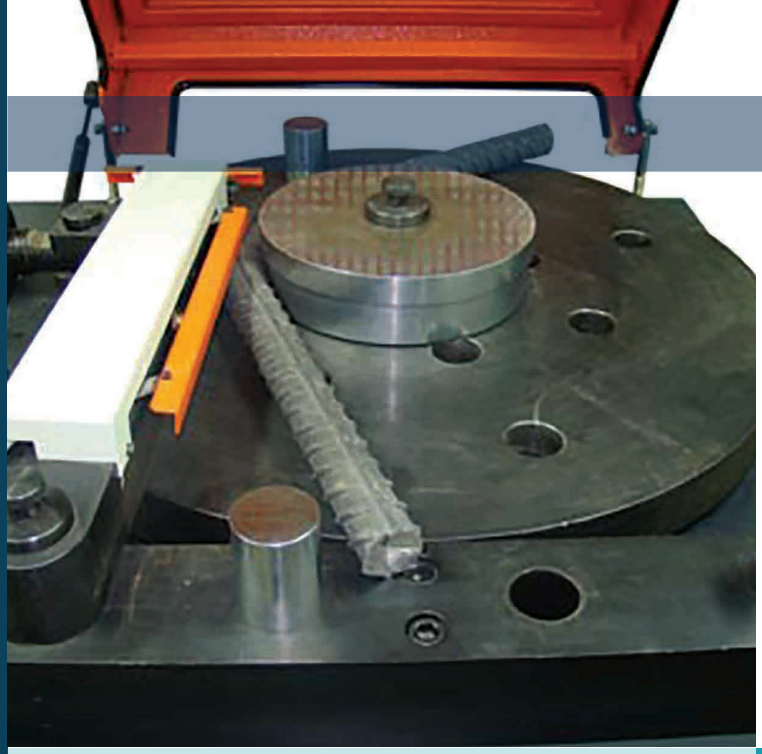
- Meet to ASTM E139 standard
- Applying Force via dead weight with control method of constant force.
- Stress rupture test performance and constant stress control method (requires special accessories)
- High temperature furnace (max 1150˚C) capable of carrying out continuous test in 1000˚C.
- 3 Thermal zone furnace: Heater, Sensor and Digital Temperature controller with PID control for each zone.
- Separate digital display for displacement and time, independent from PC for testing even without PC.

## No.6

# Bend & Re-bend Testing Machine


## Definition

Flexure test is used for determination of quality of metals or welds against plastic deformation. Sample is rotated on a sheet and is bent around an plunge with standard radius (according to sample diameter and related standard) and then rotation is stopped after contact with micro switch and re bend is started up to specific angle up to automatic stop.



## Applications

Flexure test of reinforcements and steel strips to test bend resistance performance of reinforced rolling steel bars

## Technical Specifications

- Capacity: 200 kN
- According to ASTM-A615 and ISIR 3132 standards
- Suitable for reinforcement (8 to 32 mm in diameter) and steel strips (5 to 30 mm in width)
- Exchangeable supports with various radiuses (10 to 200 mm) (standard stages)
- Interchangeable of Support Radius from (Ø10 ~ Ø200) (Standard Steps)
- Jog Switches for Adjusting Specimen Proper Position (CW & CCW)
- Pre-adjustable Bend & Rebend Angle (0º ~ 180º& 180º ~ 0º)

## Features


- Jog key for precise sample placement (clockwise and counter clockwise)
- Prevention of support and arm crash using microswitch
- Programmable for samples with various flexure angle
- Electrical current isolation (torque)
- Robust and tight clamping
- Flexure primitive angle set
- Safety guard

## No.7

# Relaxation


## Definition

During relaxation test according to standard a specific stress (usually 70-80% of ultimate strength) is applied to the specimen and after loading, the specimen strain is controlled and the relaxed force (for stabilizing the specimen in the initial strain) in a specific time duration is then obtained. The test results are of paramount importance in bridges and structures designing. SRT-400M makes it possible to test relaxation up to 40 tonf load.

# Applications


- PC wires test and control
- PC strands Quality Control
- Coated and uncoated wires

# Technical Specifications

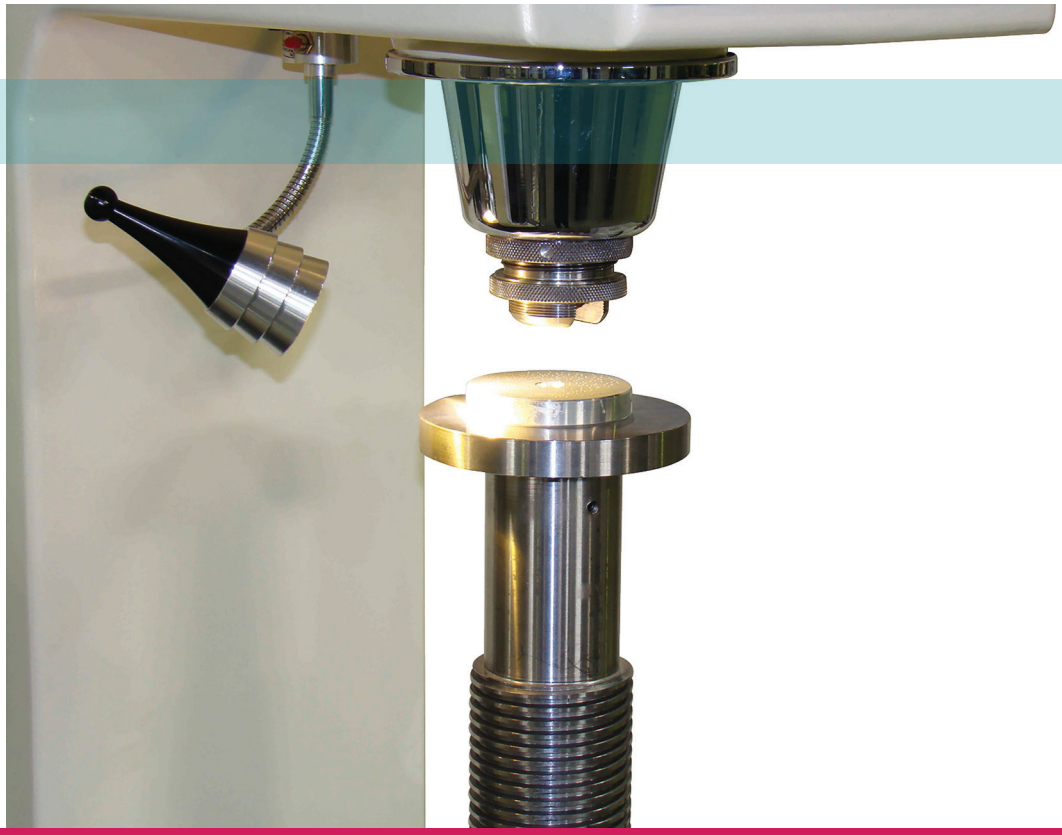
- The distance between the columns: 600mm
- Dimension: 2800×400×1800h (mm)
- Weight: Approx. 700Kg
- Digital extensometer with 1 µm resolution.
- High rigidity frame.
- High repeatability.

# Features

- Meeting ASTM A416, ASTM A421, ASTM E328, ISO/FDIS 15630-3 2001(E) standards
- Lever mechanism for dead weight application with knife edge support.
- Automatic and controlled applied strain on the specimen according to standard.
- Micro switch limiting at specimen fracture at the end of the test.
- Motor and gear box system for automatic applying load at the beginning of test.

## No.8

# Digital Universal Hardness Tester



## Definition

SUH-200 hardness tester machine is capable of testing metals hardness in Rockwell (direct measurement), Vickers and Brinell (indirect measurement). in Rockwell direct method the indenter penetration depth is directly measured by the machine and hardness displayed. In indirect method the indenter mean diameter or diagonal of impression should be measured by auxiliary equipment and hardness calculated.


## Applications

- Research on abrasion and machining
- Metal alloys quality control
- Research on applied force on surface and metals surface resistance
- Quality control of metallic products like bars, profiles, pipes, plates…
- Hardness control after heat treatment, coating and welding processes.


## Technical Specifications

- Max Load: 200 kgf
- Load Measurement: Accuracy as a percentage of reading 0.5%
- Applied load (50 grf max error)
- Displacement Measurement: 0.01 µm resolution
- Hardness Measurement: ±1 HRC accuracy with 0.01 HRC resolution
- Anvil Stroke: 300mm
- Depth for Specimen: Max 200 mm
- Power Supply: 220VAC, 3 Amp
- Dimensions (W×D×H): 26×60× 92
- Weight: 110kg


## Features

- Meeting standards ASTM E18 (ROCKWELL HARDNESS), ASTM E10 (BRINELL HARDNESS), ASTM E92 (VICKERS HARDNESS)
- Highly accurate servo mechanical operation mechanism with precise load cell.
- HMI touch screen display
- Capable of selection and testing variousmethods that consist of Rockwell (15 method) and Superficial Rockwell (15 methods) direct method, Vickers (8 methods) and Brinell (24 methods) Indirect method.
- 200 kgf Load capacity
- High test results recording (40000 tests).

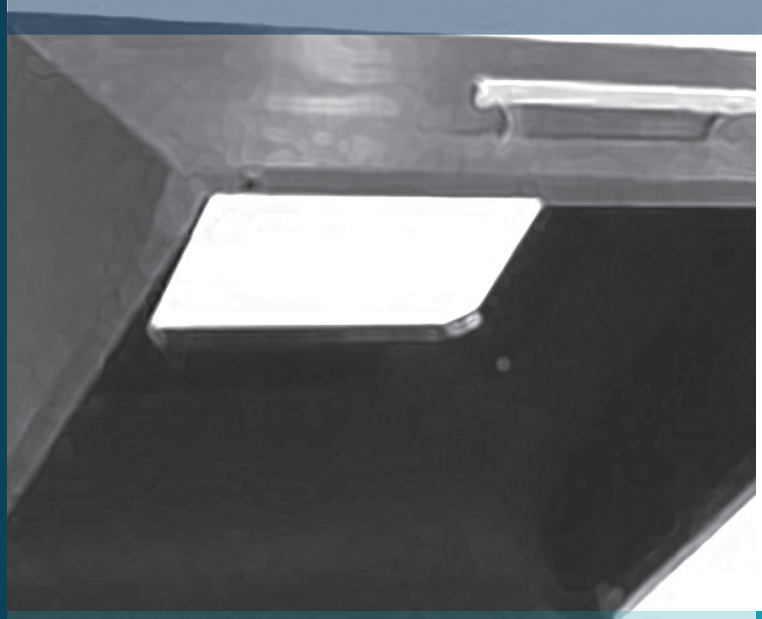
## No.9

# Planetary Ball Mill


## Definition

The energy of the mill in the planetary mill is %50 more than ordinary mills. This reduces the milling time by about 60 percent compared to a conventional mill. The rotation outside the center of the chamber, as well as the difference in the rotation speed of the chamber and the disc, causes the interaction between friction and impact inside the chamber to produce more dynamic energy. This machine is used for pulverizing materials, stirring, homogenizing, colloidal grinding and mechanical alloying.

## Applications



- pulverizing
- mixing
- homogenizing
- colloidal milling
- mechanical alloying

## Technical Specifications

- Equipment dimension: 135×65× 85 cm
- Net Weight: 140 kg
- Input power: 220 V AC
- Power: Disk motor power: 1.5 hp
- Engine capacity: 0.25 hp
- Packing: Wooden
- Disc rotation speed: 0-300 Rpm
- Chamber rotation speed: 0-600 Rpm
- Powder grain size after grinding: <1 µm

## Features

- It has four compartments for grinding materials
- It has a separate motor for the disc and each chamber that allows you to adjust the different rotation ratios of the disc to the chamber.
- Ability to automatically reverse to rotate to prevent particle agglomeration
- Ability to adjust mill time, work cycle, stop time between cycles and rotation direction
- Possibility to use chambers with different materials according to the material and type of materials tested up to a capacity of 500 cc
- It has a device cooling fan

No.10

# Measurement of Bending Strength

## Definition

This device is designed to measure the flexural strength of a sample according to ISO4-10545, ASTM C 649-84, DIN51030 and EN 520. This device is used for cooked samples.

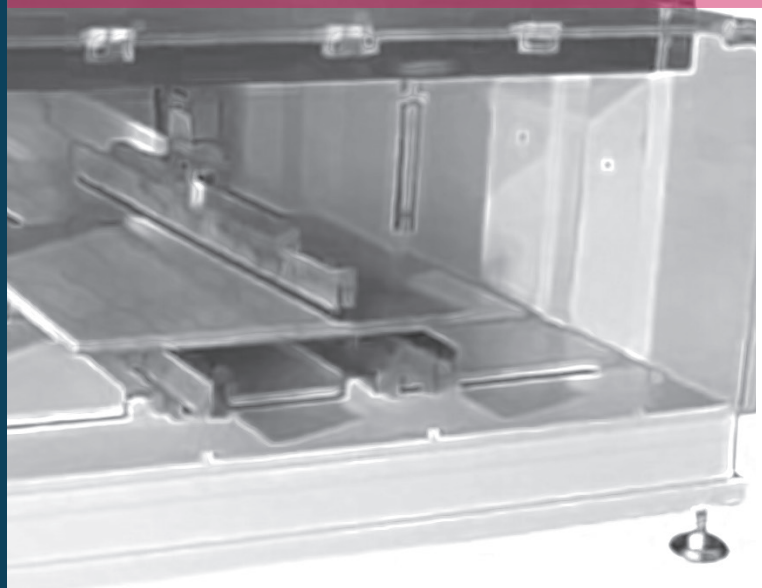
## Applications

- Used to measure bending strength and fracture modulus of various ceramic samples based on three-point bending strength measurement
- Suitable for flexural strength of standard samples of ceramic tiles, sanitary ware, porcelain, engineering ceramics and other ceramic parts
- Calculate the fracture strength and bending modulus automatically and display it on the device display
- Muharram to software to record and store test results with the ability to store 100 test

## Technical Specifications

- Equipment dimension: 60×80×85 cm
- Net Weight: 240 kg
- Packing:  Wooden
- Power: 375 watt
- Load cell with the ability to adjust the load speed
- Maximum power applied capacity 1000 Kgf
- The maximum distance between the two jaws is 600 mm
- The length of each jaw is 60 cm
- The accuracy of the device is 10 grams
- Power required single-phase 220V device

## Features



- Load cell with the ability to adjust the load speed
- Results in the device's memory
- It has the ability to calibrate

No.11

# Selective laser melting (SLM)


## Definition

The Noura M120 is a verastile system, operating based on selective laser melting (SLM) technology. It is used for production of customized-metal parts as well as low volume series of intricate components. This machine is a member of the M100 family with new face and smaller dimensions while keeping the technical specifications.


## Applications

Production of implants and prostheses with personalized designs (Patient Specific Implants), manufacture of complex industrial parts used in aerospace, oil, gas and petrochemical, aerospace, military and component manufacturing industries.

## Technical Specifications

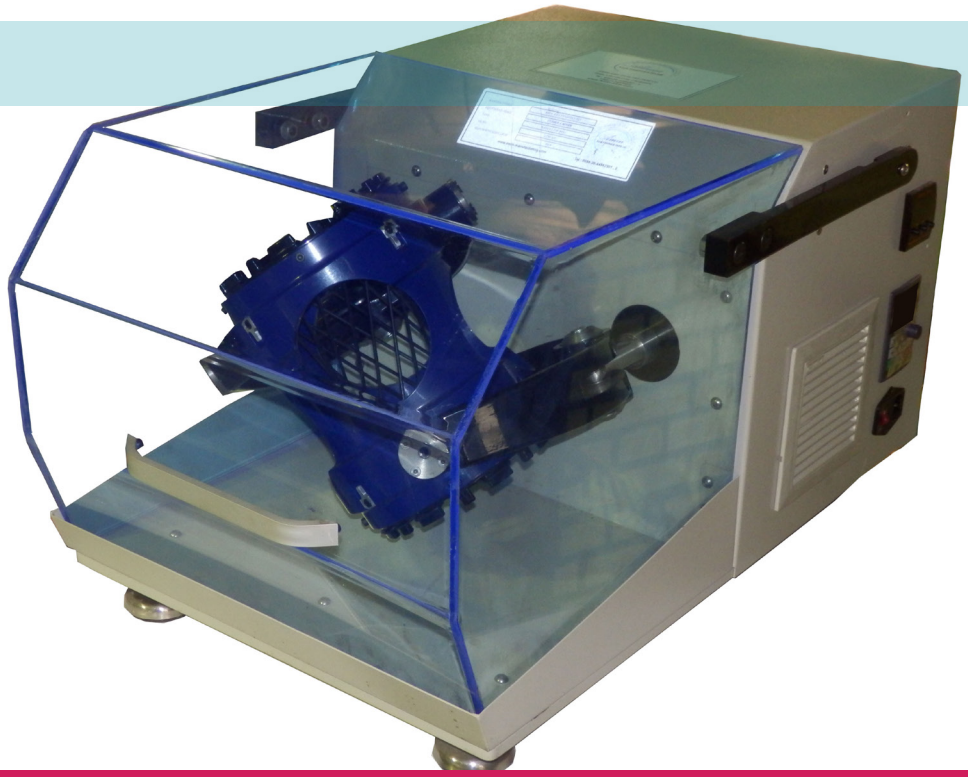
- Building volume: 125 mm x 150 mm
- Layer thickness: 20-80 µm
- Laser system: Fiber laser 300/500 W (CW)
- Optic system: T-theta-lens; High-speed scanner
- Scanning speed: Up to 7.0 m/s
- Focus diameter: Approx. 80 µm
- Production speed: Up to 20 cm3/h
- Power supply: 32 A; 200-220 V
- Power consumption: Max. 7 kW
- Inert gas: Nitrogen or Argon
- Operating temperature: 15- 25 °C
- Weight: 700 Kg
- System dimension: 850 x 1000 x 2000 mm


## Features

- Displaying the position of the building platform and the volume of powder in the machine.
- The ability of monitor and control the powder surface remotely, while manufacturing.
- Instant recording of the conditions inside the building chamber.
- The ability to stop the manufactoring process and resume that at other times.
- The ability to determine the scaning sequences.

## No.12

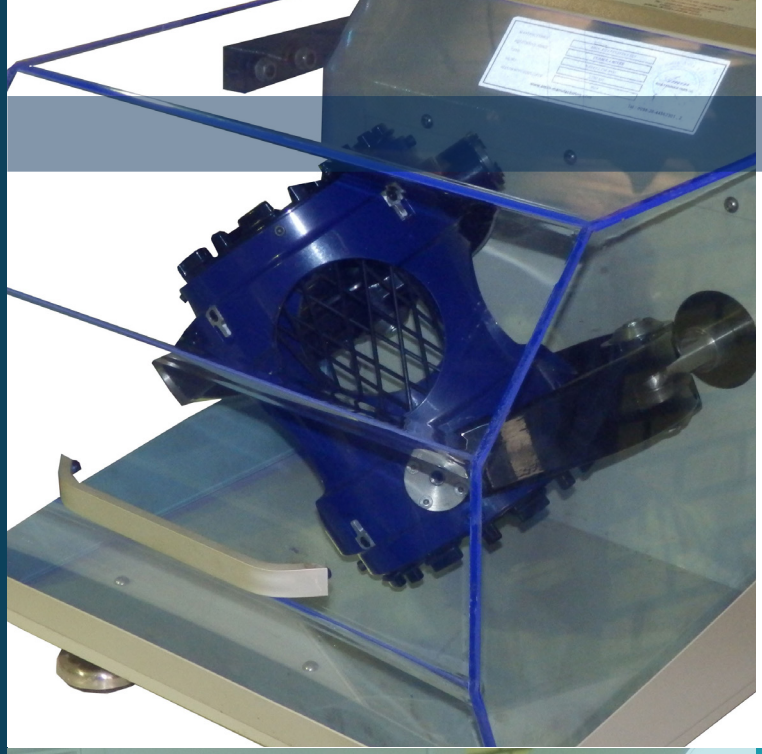
# Turbomixer



## Definition

Turbo Mixer is used for Mixing and Homogenization of dry and wet Powders with different size and densities.

The Vessel is Rotates as Orbital Shape and Cause Optimum Mixing in 3D Direction in Minimum Time with the Best Result.



## Applications

- Mixing of Powders in Dry and Wet Situation
- Mixing of Powders with different size and densities

## Technical Specifications

- 1 Capacity: Max 2 Liter
- Speed: 0-100 Cycle/Min Adjustable
- Electromotor: 0.18 KW
- Power: 220 VAC , 50 Hz , 5 Amp
- Dimension (CM): L:67  W:48  H:37
- Weight(kg): 70 kg

## Features

- Laboratory scale (maximum capacity 2 liters)
- Ability to manufacture on an industrial scale (maximum capacity of 220 liters)

- Characteristics of the sample: all materials, including mineral, pharmaceutical, herbal, synthetic, etc., in dry and wet form, solutions and a mixture of powders of different materials, such as a mixture of metal oxides

## No.13

# Electric Furnace


## Definition

An electric furnace or a laboratory furnace is a device that has a fully insulated chamber with firebricks, firebrick cement, firebrick cotton and strong elements around or on the roof of the device. The laboratory electric furnace is used for heating with very high temperatures or burning and getting the ash of chemical substance.

## Applications

This device is used in conducting experiments and research and taking fast cooking. In these furnaces, the elements are embedded in the floor and walls, and for this reason, a uniform temperature chamber is created.

## Technical Specifications

- Pid controlling system including 20 programs, each capable of 20 steps (manufactured in SANAT-CERAM co.)
- Including 8 different positions for placing trays (adjustable in terms of the space between the trays)
- Using stainless steel for internal walls and trays
- Including air circulation fan for having a proper air convection inside
- Including thermocouple with metallic sheath - type K(Ni-Cr)
- The ceiling is equipped with a damper in order to release the vapors produced by water or gas
- Temperature accuracy is 1°C
- Two-shell body colored by electrostatic powder dye
- The ceiling is equipped with LED lamps in order to have a better observation of products while working
- Having a glass door in order to observe the products inside the oven

## Features


- Electric Kiln for Firing Homemade Ceramic Products
- Industrial Electric Kiln for Firing Ceramics
- Gas Kiln for Firing Homemade Ceramic Products
- Raku Gas Kiln
- Electric Fused Glass Kiln
- Laboratory Dryer
- Different working temperature (1100°C, 1250°C and 1500°C)
- Different capacity (3, 6, 10, 11, 20, 32, 45, 80, 300, 500, 1000 Liter)

## No.14

# Impact Testing

## Definition

According to the standard, a pendulum with specified energy (mass,height & geometry) is released to strike the specimen and causes to break it. After breaking, pendulum rises a certain height where is indicated in Joules on Machine Panel. SIT300-E Impact Testing Machine has LCD Digital read out and Manual Device to release pendulum. Machine operation is very easy. The operator can test and read impact energy simply.

Pendulum is designed based on minimum distance between Pendulum Center of Percussion and Strike Line.

This dynamic property eliminates all lateral forces during strike time in bearings and transfer all amount of pendulum energy to the specimen.

## Applications

- Pendulum Impact Test Series are used
- for metals to determine impact resistance of Standard
- Specimens.
- Materials under Instant Load (Impact Test) may behave very
- different in comparison of Quasi - Static Load (Tensile Test).
- Also, temperature affect in Brittle Failure so much.
- Impact Test is a good criterion to determine and classify
- Metals failure behavior.


## Technical Specifications

- Standard: ASTM E23, ISO 148, EN-10045-2
- Method: Charpy
- Read out: LCD Dot Matrix Display with RS -232 Data Out Put
- Pendulum Release Device: Manual
- Pendulum Release Angle: 150o
- Anvil (On Request): 40mm (For Anvils Distance)
- Standard Pendulum Energy: 300 J
- Strike Velocity: 5.2 ±10% m/sec
- Striking (Edge) Radius: r8 mm (ASTM) , r2 mm (ISO,EN)
- Dimensions: 1850 x 750 x 950 mm (Width x Depth x Height)
- Weight (Approx). : 650 kg (With Safety Guard)
- Power: 3Phase 380 ±20VAC , 50-60 Hz ,500 watt
- Operation Temperature: Ambient 10-3°C, 10-90% Humidity, Non Condensing

## Features

- Capacity: 300J
- Standard: ASTM E23, ISO 148, EN-10045-2
- Digital Readout with LCD Display
- Charpy Method
- Automatic Lifting & Brake Mechanism
- Automatic Calculation of Exact Pendulum Energy & Energy/Area
- Determination of Release & Rise Angles of Pendulum, Strike Velocity,
- Pendulum Center of Percussion, Friction Loss
- Storage of 10 latest tests
- Mechanical Releasing Handle
- RS-232 data output
- Safety Guard

# PHYSICS LAB

# Physics Lab

1. Advanced Solid and Semiconductor Laser Kit
2. Conductivity Meter
3. Portable Radiation Monitor
4. Personal Dosimeter
5. Alpha- Beta Spectroscopy System
6. Contact Angle Goniometer & Tensiometer
7. Spectrophotometer (UV-VIS-NIR)
8. HRC-Spectrometer
9. Oven
10. Diode laser collection
11. Nitrogen condenser
12. X-ray source

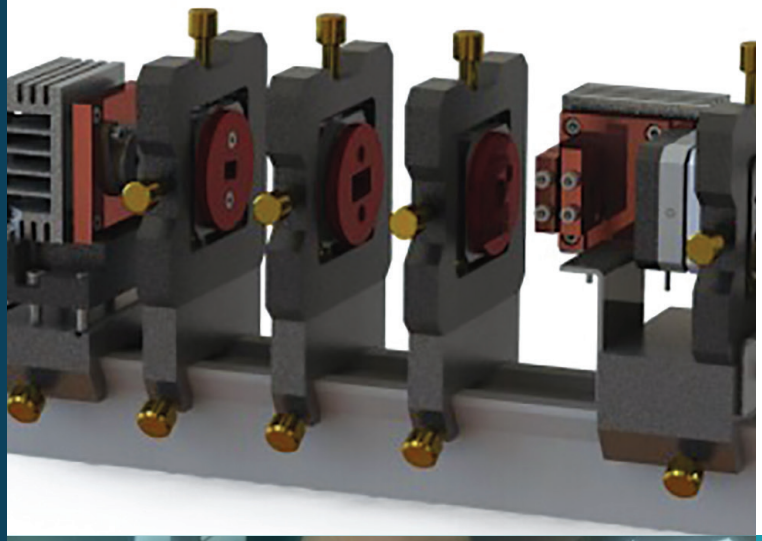
## No.1

# Advanced Solid and Semiconductor Laser Kit

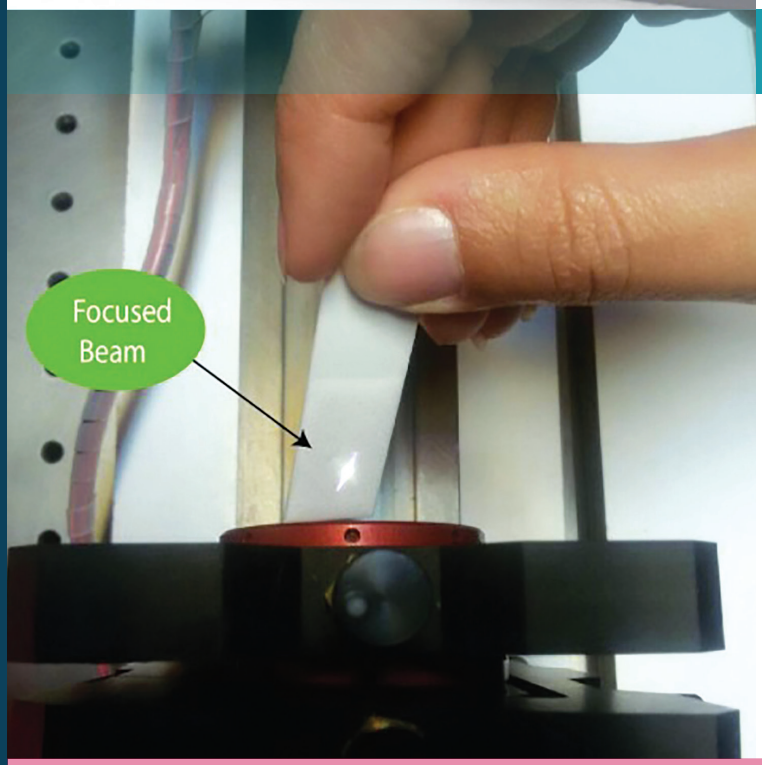

## Definition

Advanced Solid includes 4 types of widely used lasers with basic wavelengths for educational and research.

## Applications



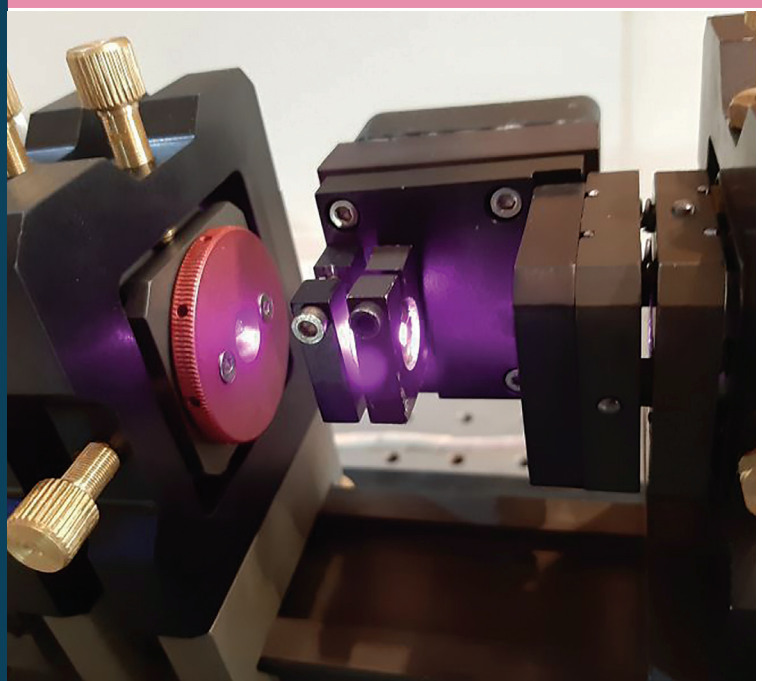
- As university researches, having the most used 3 wavelengths.
- For laboratories of laser and optics related academic fields.
- Presentation laser principle courses for laser operators.
- For medical researches.
- Laser calibration training for students and people working in this field.




## Technical Specifications

- Equipment dimension: 41×20×16 $cm^3$
- Packing dimension: 90×80×20 $cm^3$
- Net Weight: 25Kg
- Gross Weight: 31Kg
- Packing: Hard-Case
- Power: mW to 5W
- Sample: Chemical solutions, bio and medical samples.

## Features



- Power supply or laser driver with power cable
- Laser protection glasses with excellent OD
- Special hard- case for easy and safe laser kit transportations
- Environmental pollution protection cover
- IR card for detecting laser beams in the near-infrared spectral range

## No.2

# Conductivity Meter


## Definition

Electrical Conductivity (EC), relate to the ability of a ionic solution to pass an electric current. In solutions the current is carried by cations and anions whereas in metals it is carried by electrons. How well a solution conducts electricity depends on a number of factors • Concentration • Mobility of ions • Valence of ions • Temperature In aqueous solutions the level of ionic strength varies from the low conductivity of ultra pure water to the high conductivity of concentrated chemical samples.


## Applications

Measuring and controlling:

- The percentage of bases and acids in Cleaning In Place systems (CIP)
- The conductivity of solutions in every level of purification process
- The conductivity of acids, minerals, ammonia, organic solutions, salty solutions etc
- The amount of conductivity of many chemical solutions derived from oil, slurry, Hydrogen peroxide, hydrofluoric acids etc
- The concentration of vinegar and salt water in pickles and dairy industry
- The salinity of sea water at each steps of the desalination process

## Technical Specifications

- Conductivity range: 0-1000 ms/cm
- accuracy: ±0.5% full scale
- Temperature compensation: continues
- Electrods material: AISI 316L/Gerafit/Platinum
- Enclosure material: Anodized aluminium
- Head wetted material: PTFE
- Max sample temperature: 130°C
- Power supply: 220 V AC
- Protection: IP54
- Internal sensors: board voltages and temperature
- Serial output: one modbus RTU RS485


## Features

- Abrupt measurement and high accuracy
- Including RS485 port with Modbus protocol to communicate with a computer up to a 1000m far
- Creating alarm in bad working conditions or error in communication, decreasing voltage etc.
- Isolated against electrical noise and mechanical vibrations
- Applicable to measure the conductivity of a wide range of solutions
- In three models with digital display, with graphic touch screen display and without display
- Can be installed on tanks and different pipe sizes

## No.3

# Portable Radiation Monitor


## Definition

The PRM2415A from CFP is a highly sensitive radiation sensor designed for the embedded systems market. Capable of detecting Gamma and Beta radiation, it has a simple pulsed output that can be used with any interface.

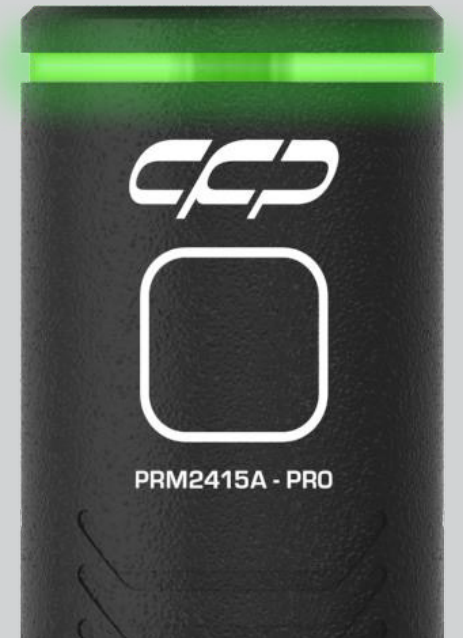
## Applications


- Lantern Mantles
- Nuclear medicine and industry
- Customs and border control
- Emergency rescue service
- Medical and health physics
- Radioecology and Radiology
- Individual radiation and protection
- Civil protection, security and police
- Medical procedures (X-Rays, CT scans, etc.)
- X-Ray crystallography and X-Ray fluorescence spectroscopy, electronic microscopy

## Technical Specifications

- Energy range: 60keV-3MeV
- Dose range: 0.1-10000μSv/h
- Accuracy: +/- 10% (Cs-137)
- Power: 0.1W
- Protection class: IP40

## Features




- Detects all Gamma & X-Ray radiation. Measurement Count:(0.01cpm~300Kcpm). Dose Range: (0.1uSv/h~10mSv/h (@Cs137))
- Compact design with Low weight
- Cost effective Semiconductor Sensor
- 2 versions STD type (120keV-3MeV) and PRO type (60keV-3MeV) gamma energy
- Light and Sound alarm (PRO version only)
- Detect the presence of a source of radiation During air
- travel or during medical procedures (X-Rays, CT scans, etc.)

## No.4

# Personal Dosimeter


## Definition

The PD2319 from Control Farayand Pasargad (CFP) is a highly sensitive radiation dosimeter designed for various environmental conditions based on Geiger-Mueller (GM) detector. The PD2319 has three versions.

This personal dosimeter in type 1, capable of detecting gamma & x-rays radiation, in type 2 detecting beta, gamma radiation source and type 3 of PD2319 has the ability to detect alpha, beta and gamma simultaneously.

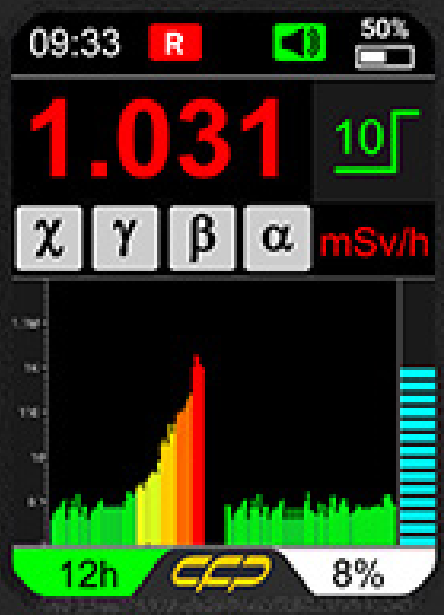
## Applications


- Security control
- Nuclear medicine (x-rays, CT scans, etc.)
- Research activities in radioecology and radiology
- Nuclear industry
- Roentgenology and radiotherapy
- Individual radiation and protection
- Accelerator sites
- Measure background radiation Dose monitoring of population
- Counts/interval vs. distance and shielding studies
- Half-life determination (counts/interval vs. time)

## Technical Specifications

- Energy range (Gamma) 0.2 –3MeV
- Energy range (Beta): 100- 3500keV 100- 3500keV
- Energy range (Alpha): 3.5- 5.5MeV
- Measurement range (Gamma): 1- 10Sv/h
- Measurement range (Beta): 1µSv/h- 0.1Sv/h @90Sr
- Measurement range (Alpha): 1µSv/h - 10mSv/h @241Am
- Accuracy: +/- 20%
- Continuous run time: In normal conditions ≥12 h
- In economy mode ≥24 h
- Beta, Gamma, and X- ray detector: 2 type GM

## Features




- Designed for field use to measure all types of ionizing
- radiation and collection of the x-ray, gamma, beta and alpha emitting sources in three types
- Geiger-Mueller (GM) detector
- CsI(Tl) Scintillator detector
- Extreme sensitivity to alpha, beta, gamma & x-rays
- High sensitivity and uniform response
- Background radiation measurement
- Compact design with low weight
- Highly integratable
- Dosimeter-to-PC communication

No.5

# Alpha- Beta Spectroscopy System


## Definition

ABS2218-3” is a portable alpha-beta activity measurement system offering both simultaneous and separate measurement of alpha and beta activities in the sample.


## Applications

- Environmental, Food, Agricultural and industrial products monitoring
- Radionuclide laboratories
- Nuclear facilities
- Environmental monitoring

## Technical Specifications

Performance

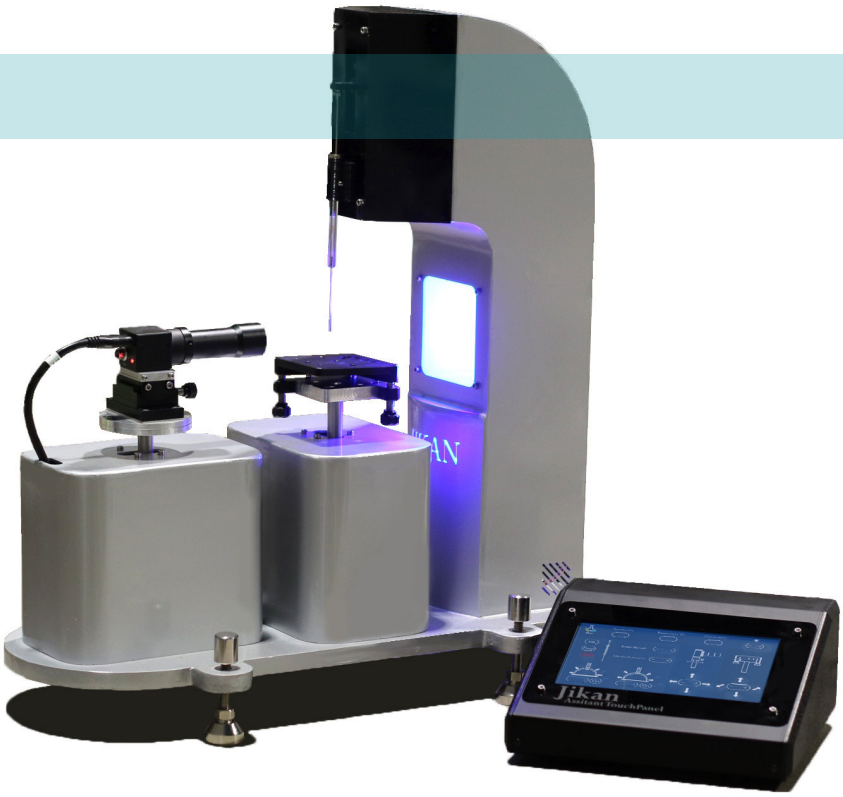
- False beta to true alpha 1:4600 (In true alpha window)
- False alpha to true beta 1:3700 (in true beta window)
- Background Measurement (Background is measured with the light shield placed in front of the detector)
- Alpha: <0.025CPS
- Beta: <1.2CPS
- Detector: Active Surface Area 35cm2
- Alpha detector: ZnS(Ag), Thickness: 24µm with 250µm carrier
- Beta detector: PVT, 0.25mm
- PMT: 14-pin 10-stage PMTs


## Features

- Lightweight field deployable Alpha/Beta spectrometer
- Planchet with up to 79mm diameter and 4.6mm height
- Closed measuring chamber with scintillation detector
- 2 Bank spectrum presentation (2x2048 channels)
- Supports all data extraction and reanalysis data
- Simple operation with touch sensitive display
- Simultaneous and separate measurement
- Time gained by multiple measurement

No.6

# Contact Angle Goniometer & Tensiometer

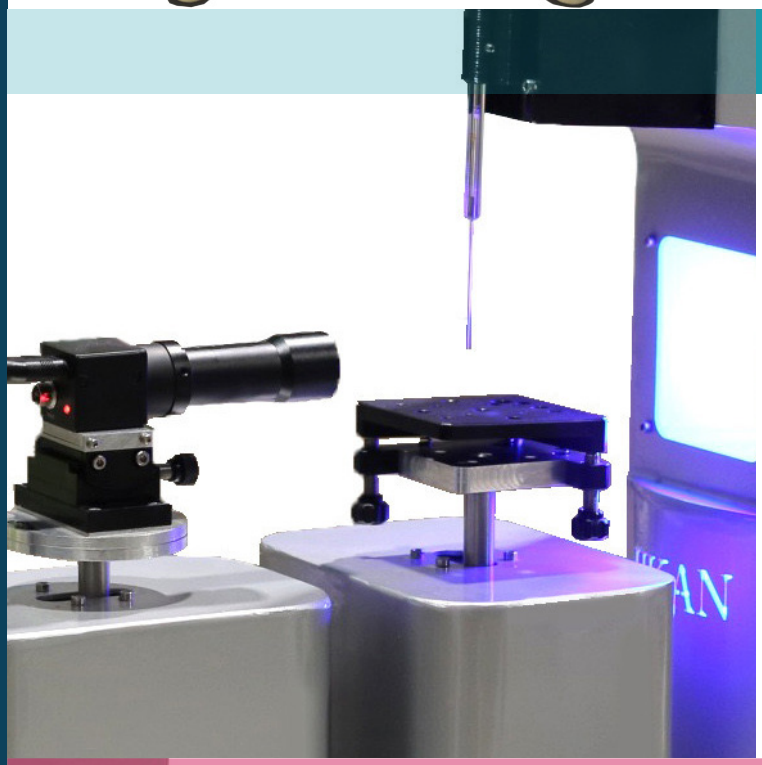



## Definition

Jikan CAG-20 Premium Edition is an automatic device that measures static and dynamic contact angles (advancing, receding, roll-off and hysteresis), surface and interfacial tensions, as well as surface free energy.


## Applications

- Measuring static contact angle, dynamic contact angles, surface tension and surface free energy
- Exclusive software for contact angle and surface tension measurements with 2 years of software update license and support



## Technical Specifications

- Measuring Range | Inaccuracy: 0°- 180° | ±0.1°

Camera System:

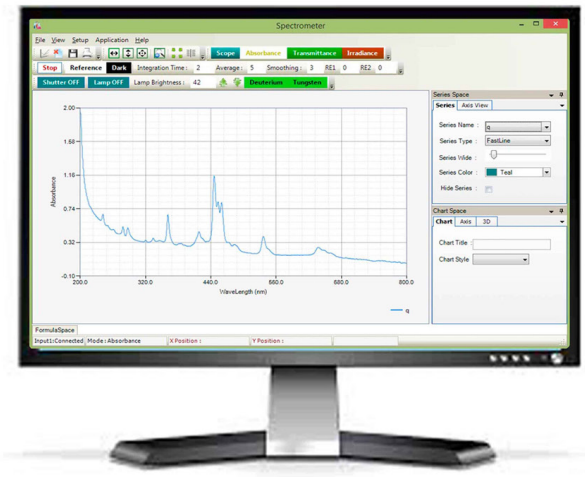
- Progressive CMOS Sensor | Global Shutter
- Up to 150fps Optical Frame Rate
- 1024 ×1280 Pixels | Pixel Size: 5.0 µm × 5.0 µm
- USB 3.0 | Video Sequences
- Optics: ±1 mm Working Distance Tolerance
- Camera Back To Front Tilt: ±10°
- Lighting System: 450 nm Wavelength | No Heat LED
- Jikan Assistant Software: Contact Angle, Surface Tension & Surface Free Energy Measurement Module Included


## Features

- Uses SPPF (Sub-Pixel Polynomial Function) and ADSA (Axisymmetric Drop Shape Analysis) methods for high-accuracy contact angle measurement.
- Calculating contact point motion rate while measuring dynamic contact angles.
- Simple access to camera and environmental data such as temperature and humidity by touch screen display.
- Automatic dispensing system for the desired volume rates.
- Measuring the surface tension and interfacial tension using pendant drop method.
- Calculating Drop Volume as well as Bond (Bo) and Worthington (Wo) numbers during surface tension and interfacial tension measurement.
- Measuring the surface free energy using the OWRK, Wu and Equation of State algorithms.

## No.7

# Spectrophotometer (UV-VIS-NIR)



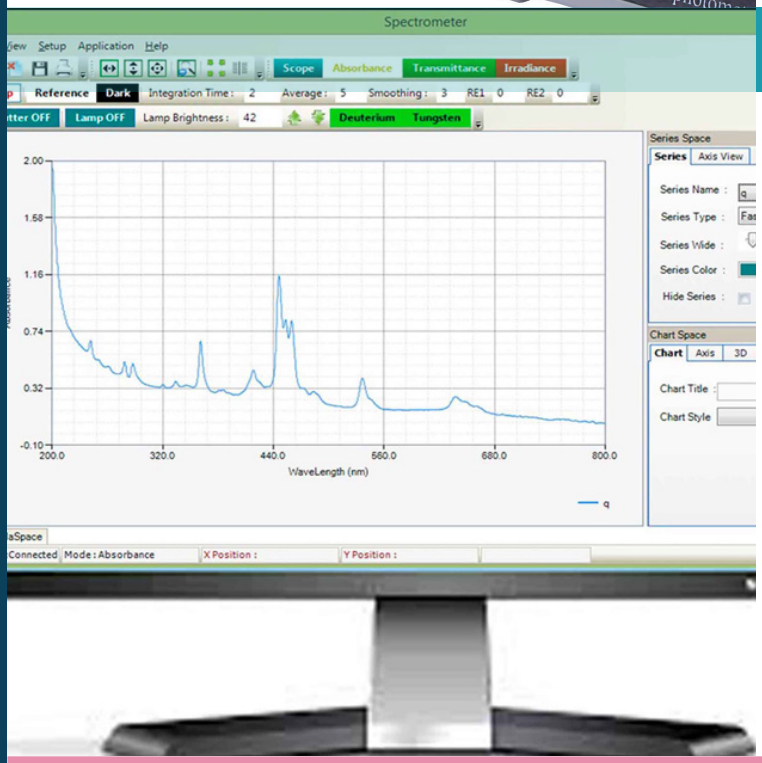


## Definition

«BloorSpec Photo» with a capacity of 2 to 16 cells provides simultaneous spectrometry in the ultraviolet, visible, and infrared regions. The industrial and software design of this device is at the world›s advanced level and complies with today›s world standards. Measuring the intensity, absorbing, passing, and controlling the intensity of the radiation source and detection sensitivity is one of the important and practical advantages of this device.

# Applications

With this device, you will be able to perform a wide range of analyzes in the waste water, oil and gas and petrochemical industries, food industries, pharmaceutical sciences, medical sciences, bio-technology, etc.




# Technical Specifications

- Light source: Deuterium Tungsten- Halogen
- Wavelenght range: 190-1100 nm
- Wavelenght resolution: 0.01-1 nm
- Scan time: 100 µs-1000 ms
- Photometric accuracy: ±0.004 Abs (0.5 Abs)
- Photometric Repeatability: Less than ±0.001 Abs at 0.5 Abs

# Features

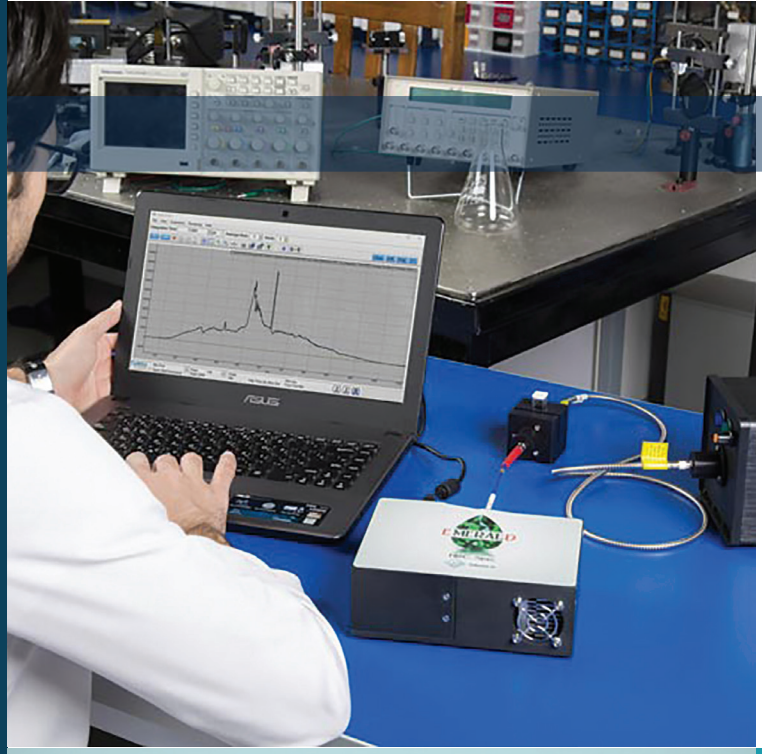
- Wide wavelength range: 185-1200 nm
- Touch screen (Digital LED display)
- Automatic 8 cell changer for acceleration and accuracy in the analysis process
- Customization feature
- User friendly software
- Upgradable software
- Fully automatic and fast calibration
- Reading full wavelengths range simultaneously
- Defining at least 20 different users and different passwords

## No.8

# HRC-Spectrometer


## Definition

TIDA spectrometer is a small-footprint, high-resolution spectrometer. TIDA draws power from the both power supply and also host PC, eliminating the need for an external power supply. TIDA is perfect for applications where fast reactions need to be monitored and high resolution is necessary.



## Applications

- Materials Engineering
- Pharmaceutic
- Color Analysis & colorimeter
- Nanotechnology
- Food & Beverage Quality Control

## Technical Specifications

- Dimensions: (L x W x H): 171 x 135 x 65 mm
- Weight: 0.79 kg
- Cooling Up to −20 °C
- Range: 190 – 1150 nm
- Wavelength range: 190 – 1150 nm
- Integration time: 1 microsecond – 65 seconds to 60 Min
- Signal-to-noise ratio: 500:1 (at full signal)
- Grating: 300
- Power consumption: 200 mA at +5 VDC

## Features


- High sensivity
- User-friendly software
- Cooled detector to reduce background signal
- High strength for use in industry
- Accurate calibration
- Controlling with Tansu software

## No.9

# Oven

## Definition

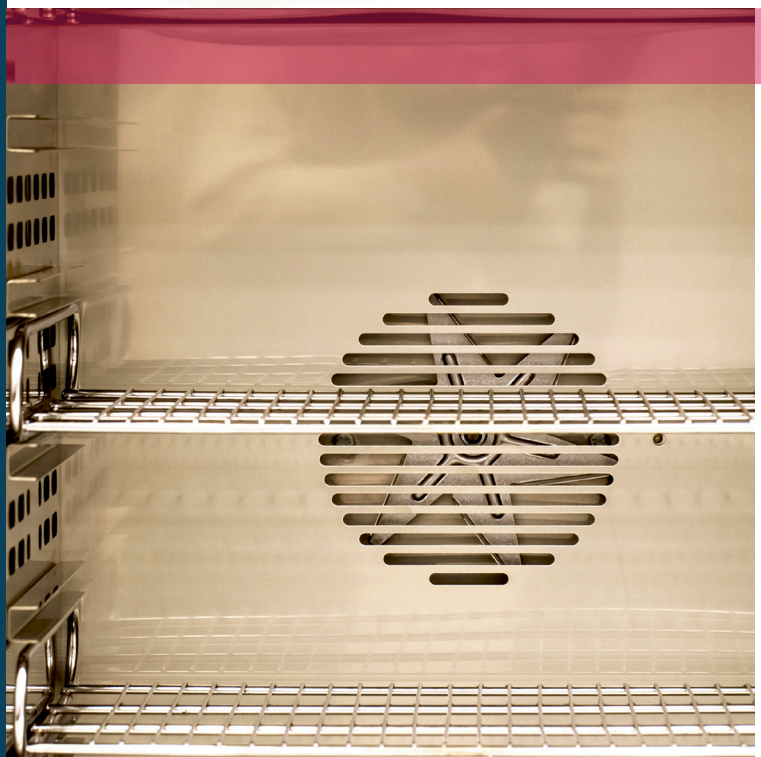
Laboratory ovens are used for high-forced volume thermal convection applications. These ovens generally provide uniform temperatures throughout their chambers.

## Applications

- High-forced volume thermal convection
- Die-bonding curing
- Polyimide baking
- Annealing of materials


## Technical Specifications

- Temperature range: 30-300
- Heating up time to 300: 60 minutes
- Uniformity at 250: ±2.5
- Voltage: 220 V AC
- Power: 1320 W

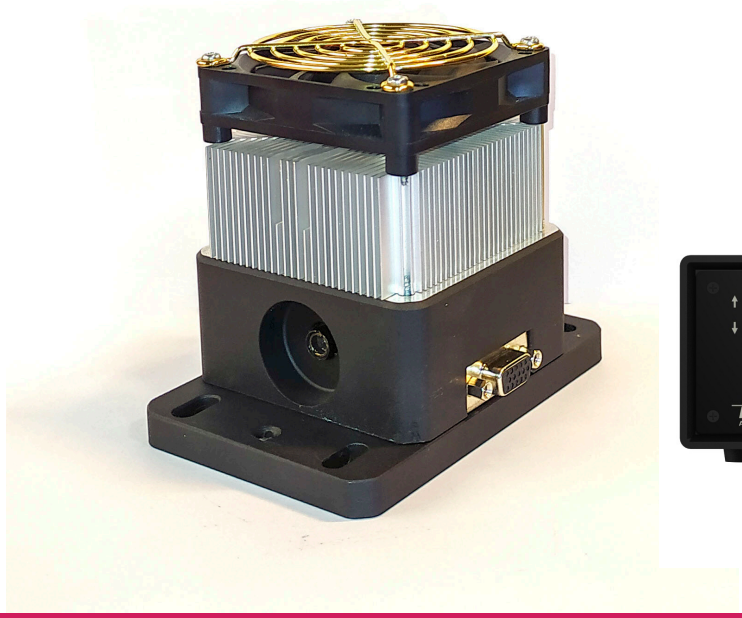


## Features

- Round corners of inner chamber
- Wide temperature range
- Stainless steel inner chamber and heater element
- Circulating fan system with air channel
- Equipped with error alarm

No.10

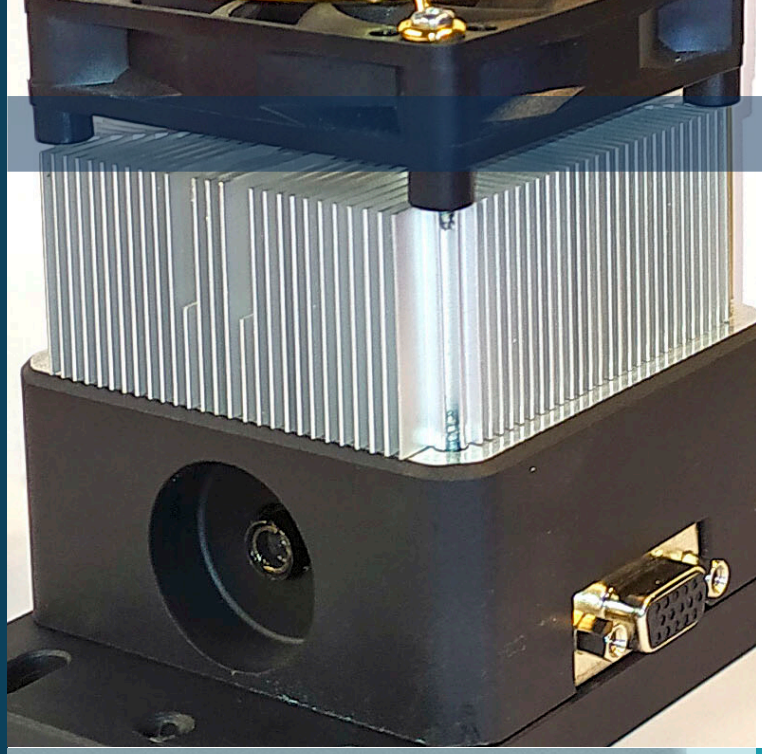
# Diode laser collection




## Definition

The LDB-204-LDB diode laser starter and stabilizer set provides all the environmental conditions required for the laser to operate with high stability and allows the user to adjust the current and temperature.

With the help of this device, stabilization of high-power diode lasers, instantaneous power control, application of analog and digital modulation, and all the capabilities of a coherent light source are available.



## Applications

- Setting up a wide range of diode lasers in the ultraviolet to infrared range
- The possibility of controlling and stabilizing the laser power with high precision
- The possibility of setting up in two continuous and semi-continuous modes
- Setting up the laser in various temperature conditions.


## Technical Specifications

- Maximum output current: 1.1 A
- Maximum output voltage: 6 V
- Laser diode output: 15 Pin D-Type
- Ripple: mA ≤ 2
- Input power: 6A- 12V
- Cooling capacity: ~5W
- Weight: Kg ≤ 1.5
- Working temperature: 0- 20 °C
- Dimensions: 18 X 16.5 X 7 $cm^3$


## Features

- Launching a wide range of diode lasers in the ultraviolet to infrared range
- The possibility of controlling and stabilizing the laser power with high precision
- The possibility of starting in two continuous and semi-continuous modes
- Optimized thermal conductivity
- High speed laser stabilization
- Ease and accuracy of operation
- The possibility of using it independently or as a source of pumping energy in other lasers
- The possibility of starting the laser in various temperature conditions
- Voltage, current and temperature display

## No.11

# Nitrogen condenser

## Definition

With the ability to produce ultra-cold temperatures (Cryogenics), up to 200- degrees Celsius, this device can condense all gases whose condensing temperature is higher than this temperature. (The condensation temperature of gases is the temperature at which they change from gas to liquid.)

## Applications

This product is used for all research and laboratory centers that need liquid nitrogen or cryogenics, such as:

- Research laboratories
- Animal sperm reproduction and storage centers
- Medical laboratories to store special biological samples
- Stem cell storage centers
- Physics laboratories for superconductivity, optics

## Technical Specifications

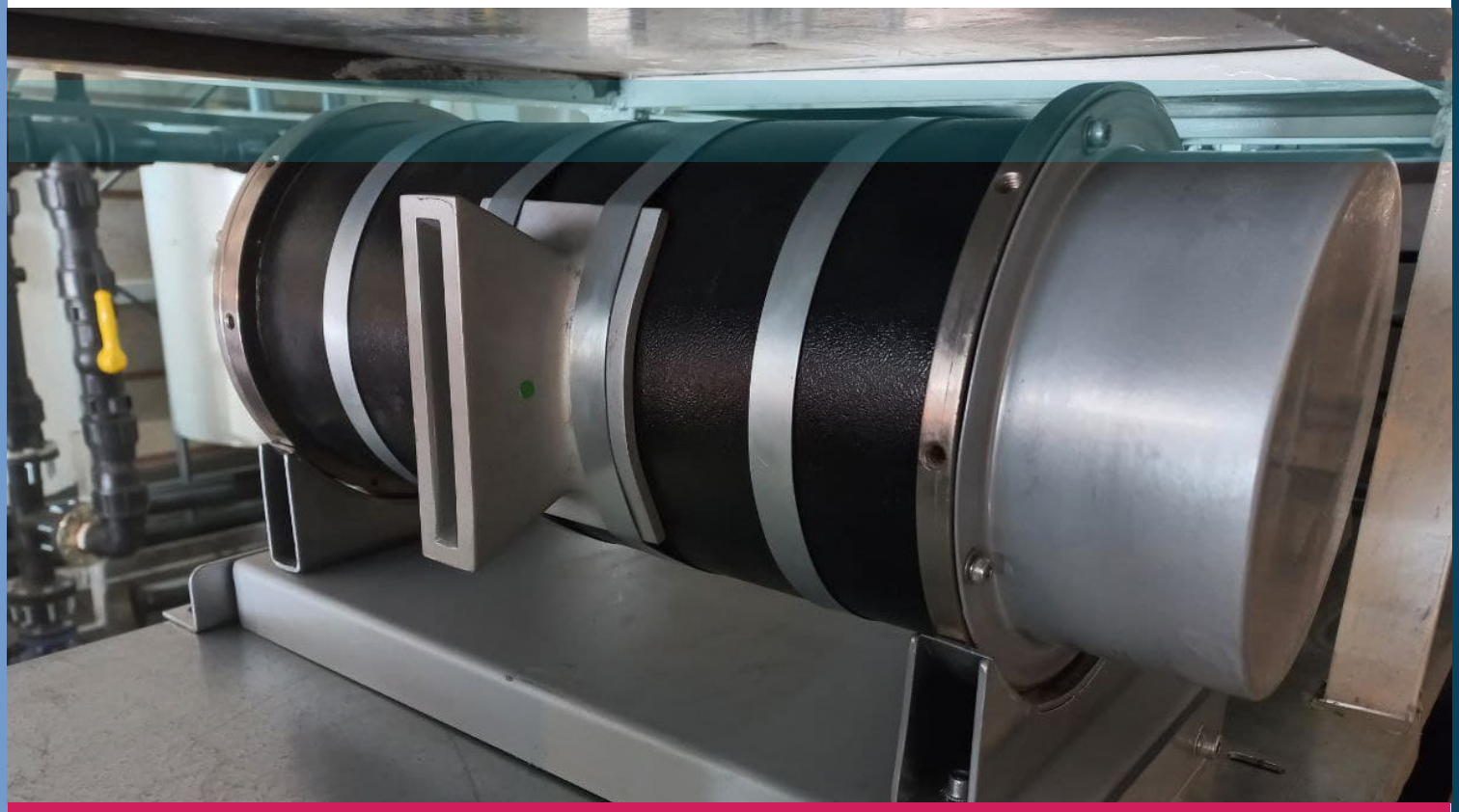
- Cooling type: GM closed cycle
- Cycle working gas: Helium
- Cryogenic liquid: none
- Power supply: three phase/380V/50Hz
- Power consumption: 4 kW
- Dimensions (L×W×H): 600×800×600
- Nitrogen gas purity: 97%
- Maximum output pressure: 2 bar

## Features

- The condensing capacity of the device is equal to 25 liters of liquid nitrogen (LN2) per day for nitrogen gas with a condensing temperature of -196 degrees Celsius and 50 liters per day for argon gas with a condensing temperature of -186 degrees Celsius.

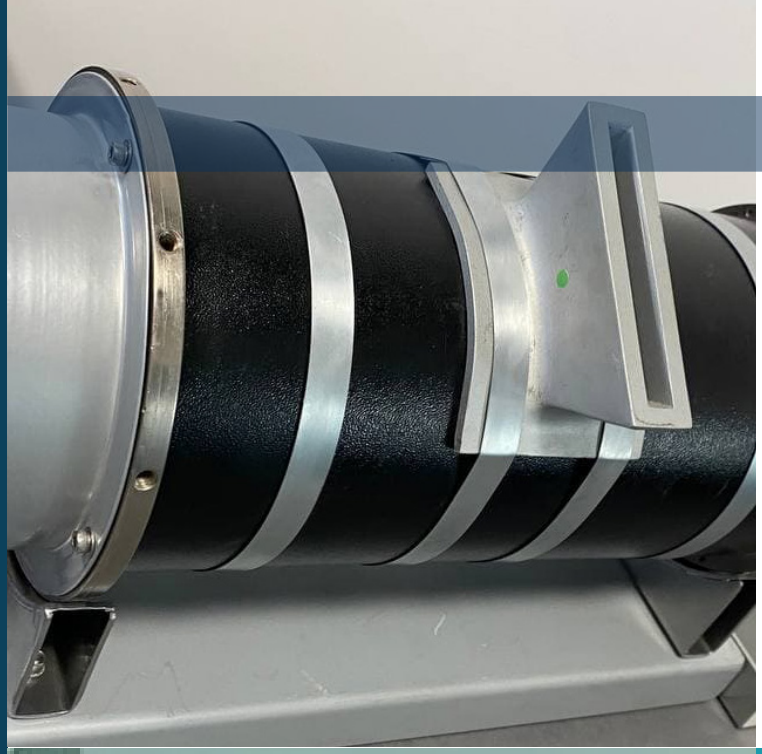
## No.12

# X-ray source



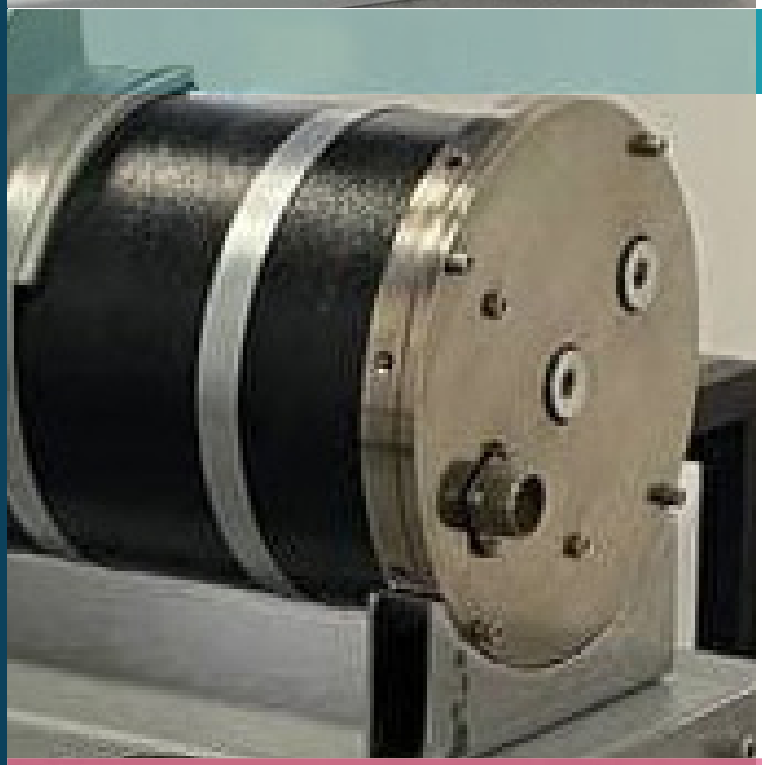
## Definition

RAXON100HPO is an industrial X-ray source for producing a beam of high intensity X-rays with small focal spot and high stability which ensures uniform beam intensities and dose rate throughout its fan/cone-shaped beam. Stable voltage and electrical power applied to X-ray tube guarantees stable dose exposure and highquality images in digital radiography applications.



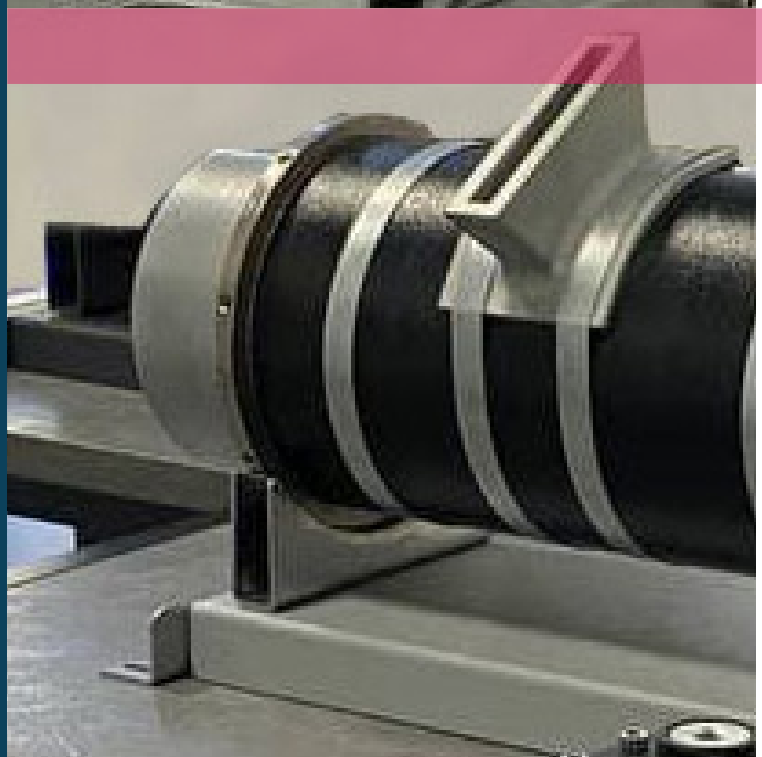
## Applications

Industrial Radiography
- X-ray Imaging
- X-ray Irradiation
- Non-Destructive Testing
- Food Inspection
- Security Inspection
- Densitometry and Thickness Measurement



## Technical Specifications

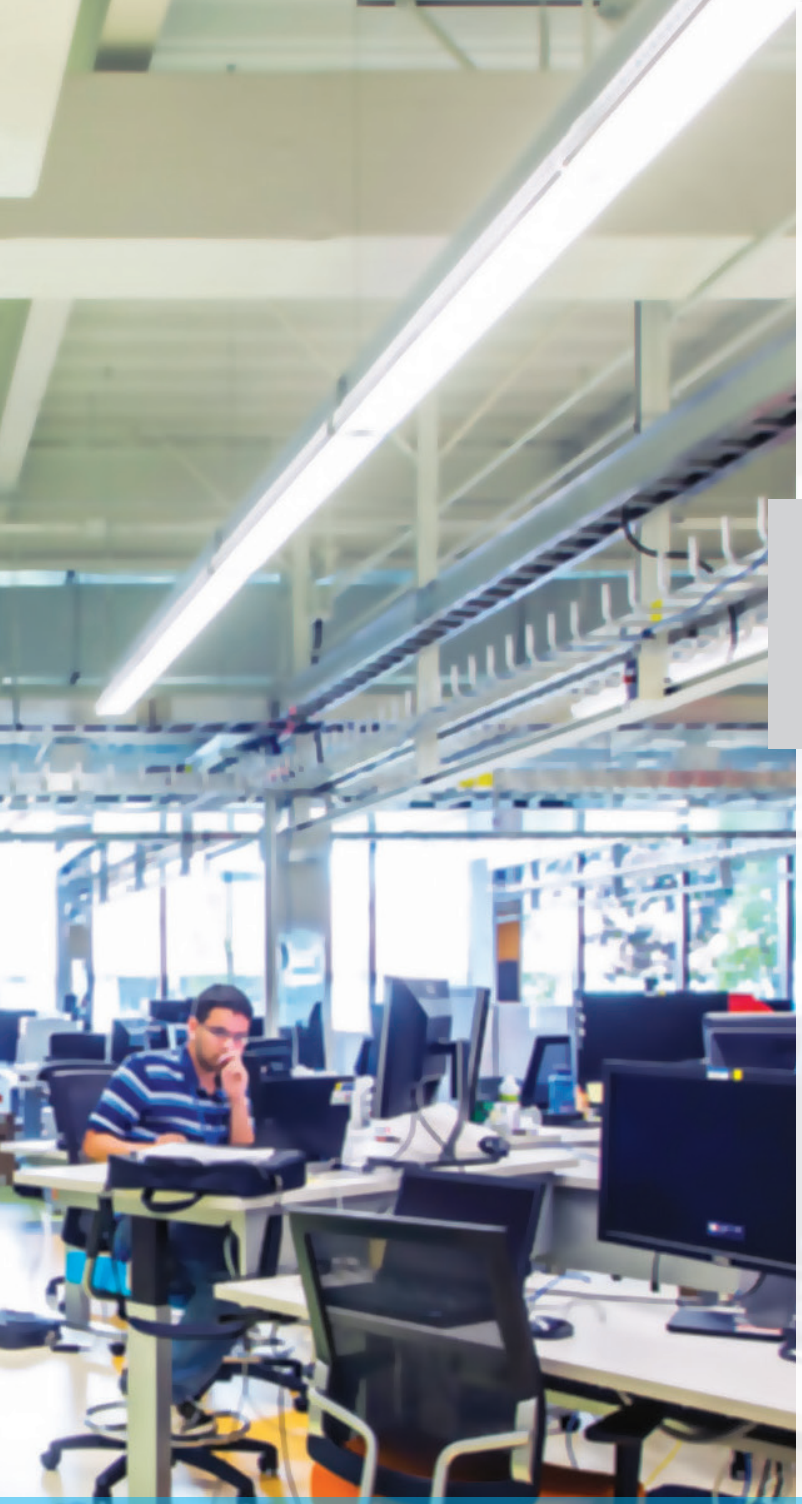
- Tube Type: Stationary anode, Glass tube, Tungsten target, Be filter
- Focal Spot: 0.5mm (IEC 336)
- Beam Filter: 2mm thick 6061 Al, ±0.01
- Beam Geometry: Symmetrical fan up to 50° x 30°, cone up to 40°
- Input Voltage: 220±10% Vac, 50/60Hz, 3A maximum
- X-ray Tube Voltage: Nominal X-ray tube voltage is adjustable between 60kV to 110kV with 5kV step
- X-ray Tube Current: 0.1-4mA over specified tube voltage range
- X-ray Tube Power: 400W, continuous mode
- Voltage Regulation: Line: ±0.1% for a ±10% input line change of nominal input line voltage



## Features

- RS
- 232/USB Connection cable
- Ethernet connection cable
- User Manual
- Software
- Fan Beam External Collimator (Cone Beam optional)

# ELECTRICAL ENGINEERING LAB



# Electrical Engineering Lab

1. Industrial Electronic Training Set
2. Solar Simulator
3. High Voltage Power Supply
4. The radiofrequency (RF) generator
5. Elecric Machines
6. Photodiode Power Meters
7. Desktop Lithography

## No.1

# Industrial Electronic Training Set

## Definition

Industrial Electronic Trainer is a self-contained training equipment allowing students to learn experiments through a power supply unit and replaceable modules.

## Applications

- Investigating of designing and wiring of control circuit
- Investigating of designing and wiring of power circuit
- Investigating of self-protection equipment and electro motors
- Contactor, relay, fuses and bi-metal

## Technical Specifications

1. Industrial Electronic Training Set
   - Dimensions (L×W×H) mm: 1200 x 800 x 1600
   - Dc electrical supply
   - 3 phases electrical motor

2.PLC Training Set:
   - Dimensions (L×W×H) mm: 1600 x 1250 x 1000
   - 3phases motor

3. Digital & Analog Communication Trainer:
   - AD9680 14-bit dual channel ADC
   - SFDR at 1 GSPS = 85 dBFS at 340 MHz, 80 dBFS at 1 GHz
   - SNR at 1 GSPS = 65.3 dBFS at 340 MHz, 60.5 dBFS at 1 GHz
   - ENOB = 10.8 bits at 10MHz

## Features

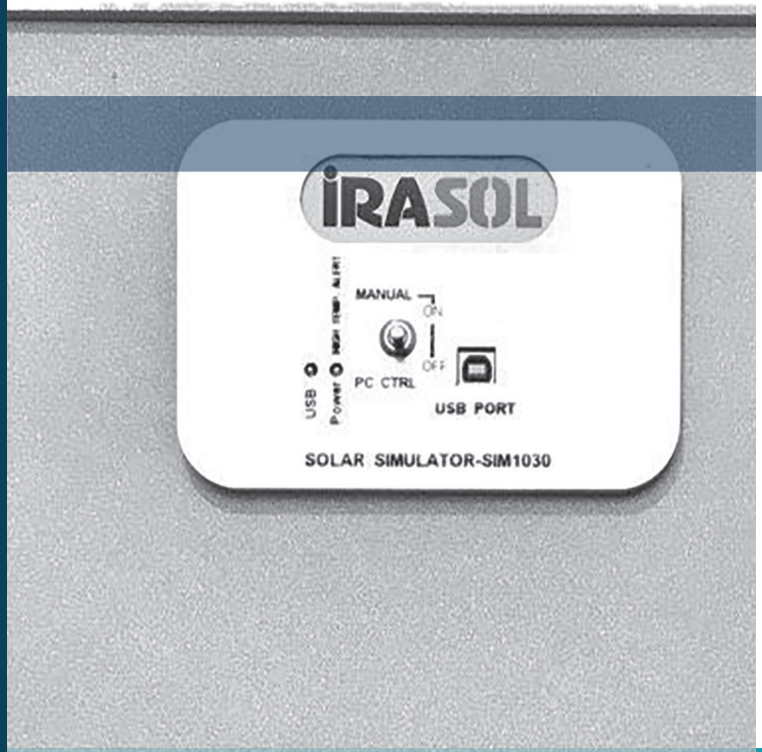
4. Power Systems Lab:
   - Monitoring and control capability
   - Synchronous generator simulator
   - Linear electric charges including resistors, inductors and capacitors
   - Series compensator capacitor
   - Parallel compensator capacitor
   - Franz Phenomenon Compensator Reactor
   - Voltage, current and power meters
   - multimeter
   - Three-phase transformer iron
   - Voltage and current scale one to one thousand and power scale one to one million

## No.2

# Solar Simulator


## Definition

SIM1030- is a high performance solar simulator with 16 cm x 16 cm uniform area, suitable for measurement of small cells as well as module size cells. The light source is a full-LED long-life lamp, composed of multiple LEDs with different wavelengths, covering the spectral range of 380 nm – 1000 nm.




## Applications

- The LED solar simulator is based on a lamp comprising multiple LEDs with different wavelengths, forming together a spectrum similar to AM1.5 solar light. The advantage of LED solar simulators is the high stability of LEDs compared to Xe arc lamps, as well as the possibility to tune the spectrum, change intensity or use single wavelength light.
- In SIM-1030 the design of the LED lamp allows high spectral matching, as well as excellent uniformity and temporal stability of light. A highly optimized electronics guarantees stable and maintenance-free operation of the device.

## Technical Specifications

- Light source: Multiple LED source
- Wavelength range: 380-1000 nm
- Non-uniformity of irradiance: < 2% (Class A)
- Spectral match: < 5% (Class A+)
- Temporal instability: < 0.5% (Class A)
- Calibration cell: Calibrated silicon cell
- Direction of illumination: Top, down or side
- Main box size (l × w × h): 40 cm × 40 cm × 50 cm
- Sample box features: mechanical jack cooling fan
- Sample box size (l × w × h): 40 cm × 40 cm × 25 cm
- PC connection: USB 2.0
- Operation modes: Manual/ PC control
- Lamp intensity adjustment: 0.1 Sun- 1.0 Sun
- Spectrum Filters: Virtual filters: >900 nm and >850 nm
- Temperature sensor: On LED heat sink
- Thermal Protection: Heat sink temperature
- Input power: 100-240 VAC, 50-60 Hz, 500 W
- Weight: 20 Kg


## Features

- Full-LED long-life light source
- AAA class solar simulator
- 1 Sun- 1.0 Sun variable light intensity
- Spectral range 380 nm- 1000 nm
- Manual as well as PC control modes
- Top, down or side illumination
- 16 cm x 16 cm uniform illumination area
- Suited for solar cells as well as photo-electrochemical cells
- Single wavelength illumination for spectral tests

## No.3

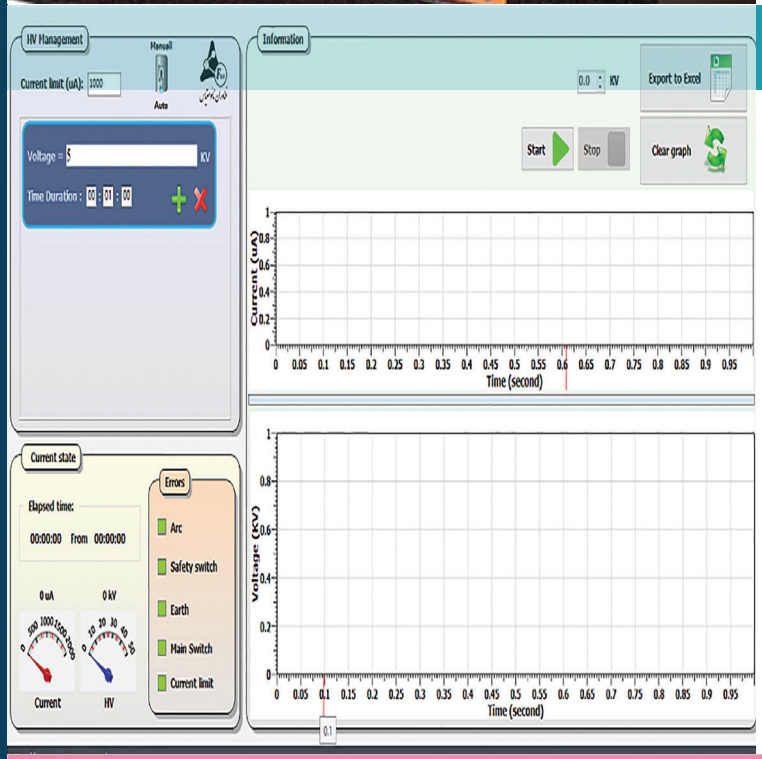
# High Voltage Power Supply


## Definition

High voltage power supplies (HVPSs), manufactured by Fanavaran Nano-Meghyas Co. Ltd. (FNM Co.) offer small and lightweight packages, making them suitable for demanding laboratory and OEM applications such as capacitor testing, free-electron laser, ion implantation, physical vapor deposition, capillary electrophoresis, electrospinning, ion-beam assisted deposition, and ion sources.


## Applications

- Electrospinning
- Capillary electrophoresis
- Capacitor testing
- CRT display testing
- Free-electron lasers
- Photomultipliers
- Ion sources
- Biasing
- Dielectric Testing
- Piezoelectric Drivers
- Electrostatic Chucks
- Sealing Applications
- Inkjet Printers
- Photo Detectors




## Technical Specifications

- Weight: 5 kg (35 and 50 kV) and 7 kg (more than 50kV; Optional)
- Output: Continuous, stable adjustment, from 0 to the desirable voltage by panel-mounted 10-turn potentiometer (OC and OV series) or by a digital volume (DRC Series).
- Dimensions
  OC and OV: 34×38×12 cm, D-RC: 34×43×12 cm
- Input: 100-240 V AC, single-phase
- Power: 35 Watt
- Working Temperature:-5 to +45 °C
- Voltage Monitoring: Accuracy: 0.1 kV
- Current Monitoring (OC and DRC series): Accuracy: 1 µA
- Arc detector: in DRC series
- Polarity: Available either positive or negative
- Warranty: 1 year for manufacturing defects

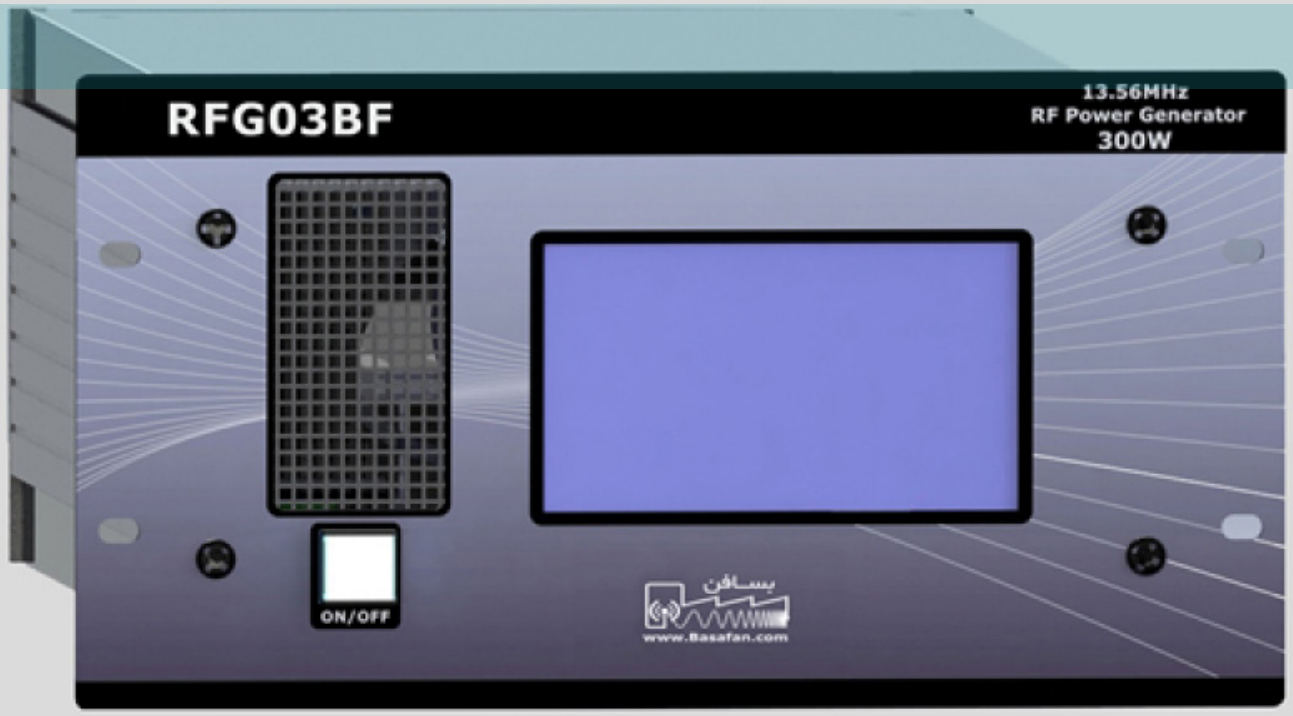

## Features

High Frequency Switch-Mode Circuit Design: HVPS design topologies are based upon switch mode power conversion technology, while operating at high frequencies. The “switcher” is the design of choice for many industrial and medical applications because of its desirable combination of high efficiency, small size, and low weight as well as increased safety for high voltages supplies.

Arc Sensing Circuitry (Optional): Proprietary arc sensing circuitry will suppress arcing conditions that can occur regularly in high voltage applications and provide maximum safety and protection for both the power supply and user.

## No.4

# The radiofrequency (RF) generator




## Definition

The radiofrequency (RF) generators manufactured by Basafan are reliable devices for industrial and laboratory deposition, plasma generation, and even dielectric heating and melting. This device is also one of the most important components of semiconductor manufacturing systems, used for producing integrated circuits (ICs) and chips present in modern computers and electronic equipment.

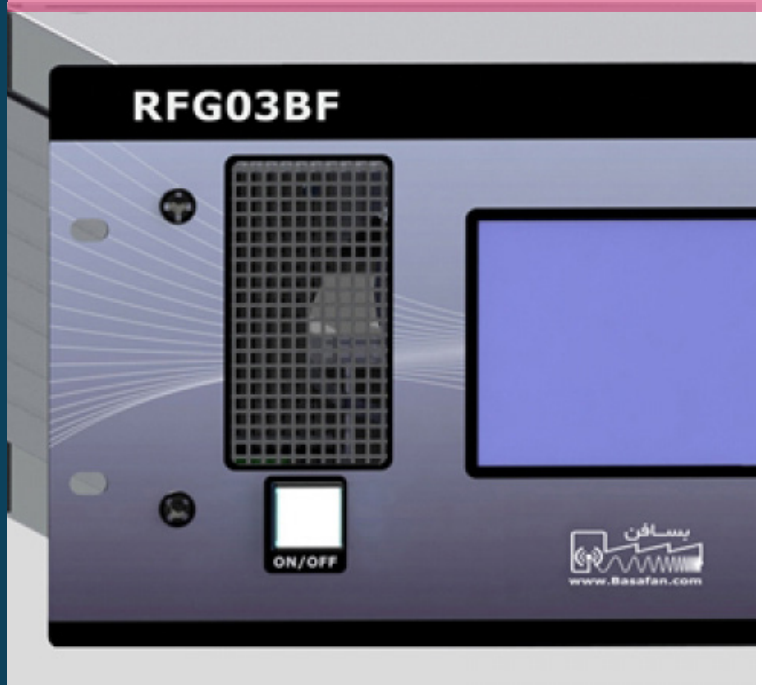
## Applications

- Semiconductor production
- Physical and chemical plasma deposition
- Plasma etching
- Various plasma processing techniques
- Heating and melting discarded dielectrics

## Technical Specifications


- Power supply 220 V (200-240 V), 50 Hz (50-60 Hz)
- Output frequency 13.56 MHz
- Protection Various types (protection against reflected power, overtemperature, overcurrent, and overvoltage), especially reflected power limiter
- Display Graphic display with touch screen or digital display
- Remote control Digital RS485
- Working temperature 10-40°C
- Cooling Air conditioned
- Output impedance 50Ω(resistive)
- Dimensions (cm) Depends on device output
- Weight Depends on device output
- Output connector N – 7/16
- Box material aluminum

## Features




- Reflected power limiter
- Air-cooling (DC to RF conversion efficiency larger than 70%)
- Graphical control, display and adjustment system with a touch screen
- Various protection types (against reflected power, overtemperature, overcurrent, and overvoltage), capable of automatically limiting the transmitted power
- 0-5 V input voltage for remotely controlling the generator output power; more than 90% efficiency for larger than 300 W models

## No.5

# Elecric Machines

## Definition

Presented unit is a fully equipped training system with all necessary components and aids to conduct a comprehensive training course in the fundamentals of pneumatic, electro-pneumatic, hydraulic and Electrohydraulics controls. The system comprises standard industrial components and Performance of various hydraulic and pneumatic equipment can be investigated.


## Applications

- Investigating of one way and two ways cylinder performance and control
- Investigating of different directional control valves
- Acquainting with several hydraulic and pneumatic devices

## Technical Specifications

Electrohydraulics:

- Accumulator
- Flow and pressure control valve
- One way and two ways cylinder
- Reservoir oil tank
- Pressure gauges

Electro-Pneumatics:

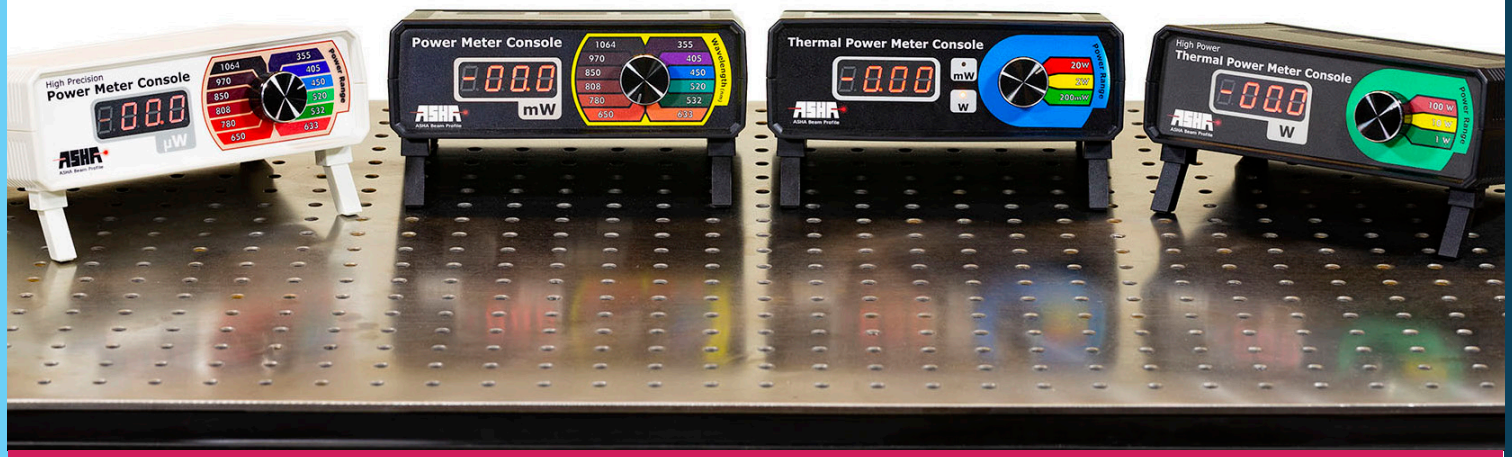
- Pneumatic motor
- Shuttle valve
- Pneumatic jacks
- High speed reaction discharge valve
- Butterfly valve

## Features

- The chassis of the board and table is specially designed for testing pneumatic and hydrolytic circuits with an electrostatic corrosion and rust resistant coating.

## No.6

# Photodiode Power Meters




## Definition

The semiconductor power meter sensor is designed and manufactured to measure the optical power of light sources accurately. These power meters measure the absorbed photons by a calibrated semiconductor sensor. To ensure accurate measurements, the calibration data is stored in the sensor and is downloaded automatically to the connected power meter console.

## Applications

Many scientific, industrial, medical and commercial laser applications have been developed since the invention of the laser.

## Technical Specifications


- Detector Type: Si Photodiode
- Wavelength Range: 350 nm ~ 1100 nm
- Power Range: 0.01 mW ~ 100 mW
- Active Area: 10 mm × 10 mm
- Aperture Size: 9 mm × 9 mm
- Resolution: 0.01 %
- Dimensions: 32 mm × 73 mm × 3 mm
- Weight: < 200 gr
- Measuring Error: ± 5 %
- Filter Type: Surface Absorber

## Features


- Compact design for measurements in confined spaces
- Wavelength Range from 350 nm to 1100 nm
- Automatic software update
- Operated and powered with a PC via the USB
- Power range of 60 dB
- Built-in rechargeable battery for more than 8 hours of continuous measuring

## No.7

# Desktop Lithography

## Definition

The system enables researchers to create micrometer patterns (MFS=2µm) on different substrates in micro and nanotechnology application such as: devices, MEMS and micro-fluidic. The equipment supports a variety of standard lithography processes, such as proximity and contact exposure mode.

## Applications

- Ability to copy existing layout or pattern with different size: 0.5-4 inch in diameter.
- Lithography process in manufacture of electronic devices and sensors with standard methods
- Contact and proximity techniques
- Exposure process under UV rays

## Technical Specifications

- Dimension: L: 50 W: 45 H: 50 cm
- Net Weight: 40kg
- Gross Weight: 55kg
- Power: 150 W
- Sample size (inch): 1-2-3-4 inch
- Mask size (inch): 1-2-3-4
- Minimum Feature size: 2µm
- Maximum Mask size: 90×90 mm
- Vacuum chunk for samples: 1-2-4 inch
- Mask holding mechanism: Manual
- Sample loading mechanism: Manual
- Lithography process: Semi-auto
- Exposure System
  - Wavelength: 365–380nm
  - Power: UV-100
  - Beam size: 5 inch

## Features

- The system contains uniform lighting system with UV100 source and 365nm wavelength.
- Unique optical mask and sample loading mechanism with different sizes: 1, 3, 4 inches in diameter.
- Negative (down to 100 µm) and Positive tone resists are supported.
- High resolution with feature size down to 2 µm.
- Intensity control of the light

# MEDICINE & BIOLOGY LAB

# Medicine & Biology lab

1. Tubular Centrifuge
2. Blood bank Centrifuge
3.Blood Bank refrigerator
4. Deep freezer
5. Cell Culture Incubator
6. Spray Dryer
7. Ultra Centrifuge
8. Laboratory Incubator
9. Rotary Evaporator
10. 3D Body Scanners
11. Fluorescence Molecular Imaging System
12. Gamma Probe
13. Urea Breath Test (UBT)
14. SPECT
15. Freeze Dryer
16. surgical navigation system
17. 3D BioPrinters
18. Electromyograph
19. Electroencephalograph
20. Gradient thermocycler
21. Braille PDA

## No.1

# Tubular Centrifuge

## Definition

The Tubular Centrifuge is used primarily for the continuous separation of liquids from liquids or of very fine particles from liquids, although in some cases it is employed as a batch-type centrifuge.

## Applications

- Continuous separation of bacteria,
- Continuous separation of yeasts,
- Continuous separation of cells, fungi and proteins
- Continuous separation of suspensions and continuous emulsions

## Technical Specifications

- Equipment dimension:160 × 75 × 75 cm
- Net Weight: 480 kg
- Gross Weight: 530 kg
- Packing: Wooden box
- Power: 4 Kw, 10 A, 3 phase (With the ability to convert to 32 amp. Single phase)

## Features

- PLC monitor and control system that displays and displays all the required items such as: speed, separation acceleration, time, feed inlet and outlet temperature, current consumption of the electric motor, level and vibration level of the device.
- Vibration sensor that ensures the accuracy and health of the device, product and user.
- Direct motor coupling technology that drastically reduces the vibration and sound of the device and allows access to high speed without sound and vibration.
- A table for assembling and disassembling the rotor and a special robot for removing and placing the rotor without the need for hand contact and bearing the heavy weight of the rotor.

## No.2

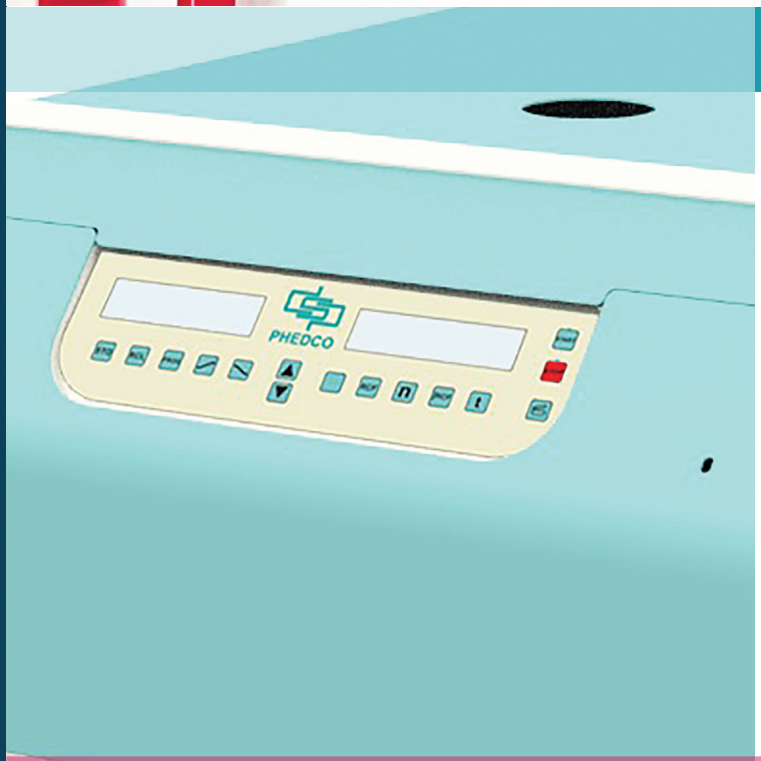
# Blood bank Centrifuge

## Definition

Blood bank Centrifuge This Blood Bank Refrigerated Centrifuge is designed for separating blood and blood components from whole blood like platelet, plasma, RBC and Cryoprecipitate.

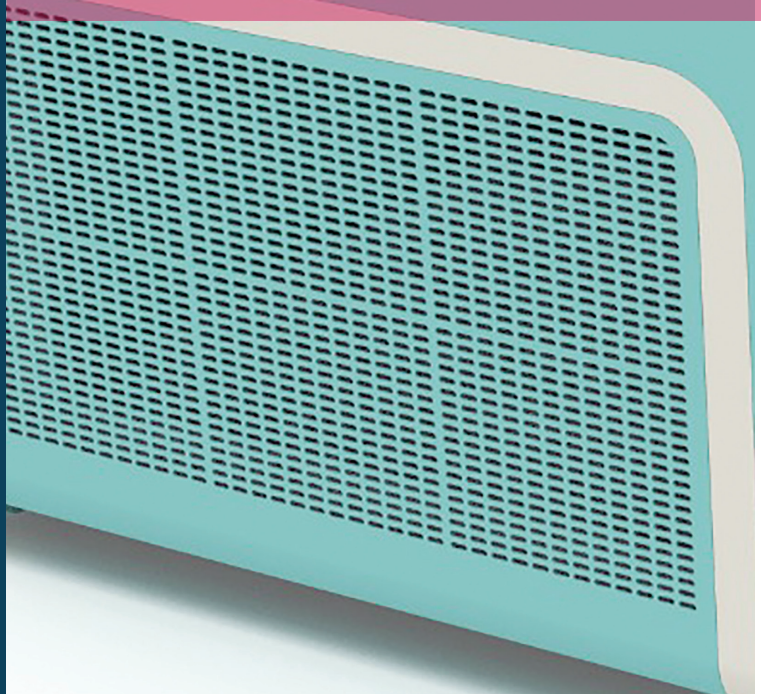
## Applications

- Separation under blood plasma control in blood transfusion bags.
- Continuous temperature-controlled separation up to 12 liters per step for centrifugable detachable materials (mainly in the pharmaceutical, biotechnology and chemical industries)
- Pharmaceutical companies, in order to batch separate and control the temperature of cells, bacteria, yeasts, fungi, active pharmaceuticals and proteins, etc.
- Blood transfusion organization, for the separation of plasma temperature control from blood cells in the blood bags.




## Technical Specifications

- Equipment dimension: 102 (L) × 98(W) × 83(H) cm
- Packing dimension: 132 (L) × 128(W) × 113(H) cm
- Net Weight: about 400 kg.
- Gross Weight: 450 kg.
- Packing: Wooden box.
- Power: 8 kw



## Features

- Refrigerator, for temperature control during separation of blood and biological materials and temperature sensitive materials.
- It has a barcode reader, for accurate, fast and reliable tracking of samples.
- It has 10 stored control programs and the ability to define and access operators. Has a control and monitor system for viewing and controlling items of speed, temperature, time, separation acceleration, etc.
- It has a six-branch swing-out rotor to use a variety of bags for blood bags up to 2-liter bottle caps (12 liters in total)

## No.3

# Blood Bank refrigerator

## Definition

The blood bank refrigerator is one of the essential general equipment of the immunology and hematology department and provides safe and convenient storage of whole blood, blood components (eg, blood cells, plasma) and reagents. The refrigerator and freezer of the blood bank maintain the freshness and integrity of blood and blood components.


## Applications

- It is used in hospital and blood transfusion laboratories .

## Technical Specifications

- Temperature tolerance: ±1°C
- Recorder and controller accuracy: 0.1°C
- Internal chamber: stainless steel 314
- External body: Galvanized steel with electrostatic coating
- Polyurethane insulation
- Double glass door, self closing hinge and European lock
- European digital controller with two sensors for displaying and controlling the cabinet temperature
- Volume: 480 L
- Power input: 440VA

## Features

- Evaporator with zilabeg fan
- SECOP compressor
- 4 shelves with 16 baskets for storing blood bags
- Door microswitch with alarm system
- Option: SMS center can be installed on it for sending alarm message and temperature
- Anti moisture fluorescent light
- Forced air circulation

## No.4

# Deep freezer


## Definition

It uses two separate refrigeration cycles. If one cycle stops working, the other cycle maintains temperature within normal range.


## Applications

- It is used in genetics , biotechnology , biology research centers , medical , agricultural , food , pharmaceutical laboratories and related factories .

## Technical Specifications

- Temperature range:-50C - -80C
- Tube evaporator in the shelves made by Danesh Pajoohesh Fajr Company
- European compressor : 4 pcs
- Two stage refrigeration systems with heat exchanger made by Danesh Pajoohesh Fajrcompany
- Temperature tolerance: ±2°C
- Recorder and controller accuracy : 0.1°C
- Internal chamber : Stainless steel 314
- External body : Galvanized steel with electrostatic coating
- Polyurethane insulation thickness : 150 mm
- Volume : 415 L
- Power input :3100VA

## Features

- Outstanding Refrigeration System
- High-Precision Temperature Control
- Security & Alarm System
- Mappings
- Medical Refrigerator Security Solution

## No.5

# Cell Culture Incubator


## Definition

An incubator is a device used to grow and maintain microbiological cultures or cell cultures. The incubator maintains optimal temperature, humidity and other conditions such as the CO2 and oxygen content of the atmosphere inside.


## Applications

- In pharmaceutical companies for growing cells

## Technical Specifications

- L: 95.5, W:90, H:232.5
- Heating element: 1000W, 250W
- Forced air circulation
- SECOP compressor
- Temperature tolerance: ±0.5°C
- Recorder and controller accuracy: 0.1°C
- Internal chamber: Stainless steel 314
- Volume: 1050
- Power input: 1300VA

## Features

- External body is made by galvanized steel with electrostatic coating
- Polyurethane insulation
- Double glass door self-closing
- Door lock with key
- Anti-moisture fluorescent light
- Door micro switch with alarm system
- European CO2 controller

## No.6

# Spray Dryer


## Definition

Spray dryer Equipment in which the material to be dried is sprayed as a fine mist into a hot-air chamber and falls to the bottom as dry powder. The period of heating is very brief and so nutritional and functional damage are avoided. Dried powder consists of hollow particles of low density; widely applied to many foods (e.g. milk) and pharmaceuticals.


## Applications

- process to prepare and/or to dry polymeric nanoparticles formulations intended for drug administration
- Spray drying of nanosuspension
- Reproducible powder production at lab scale

## Technical Specifications

- Dimension: W:59 D:43 H:93 cm
- Net Weight: 46 KG
- Gross Weight: 56 kg
- Power: Max.2500 w
- Package: Carton and wooden box
- Dryer Accessory: 50 Liter Oil Free Air Compressor

## Features

- Glass parts made of borosilicate 3.3
- Evaporating capacity:1000 ml (water like)
- Integrated automation for adjusting operational parameters
- Pharmaceutical particle engineering
- Micron scale processing
- Particle Size:1-50 µm
- Nozzle tip diameter: 0.7 mm standard
- Sample: max viscosity 300 cps,

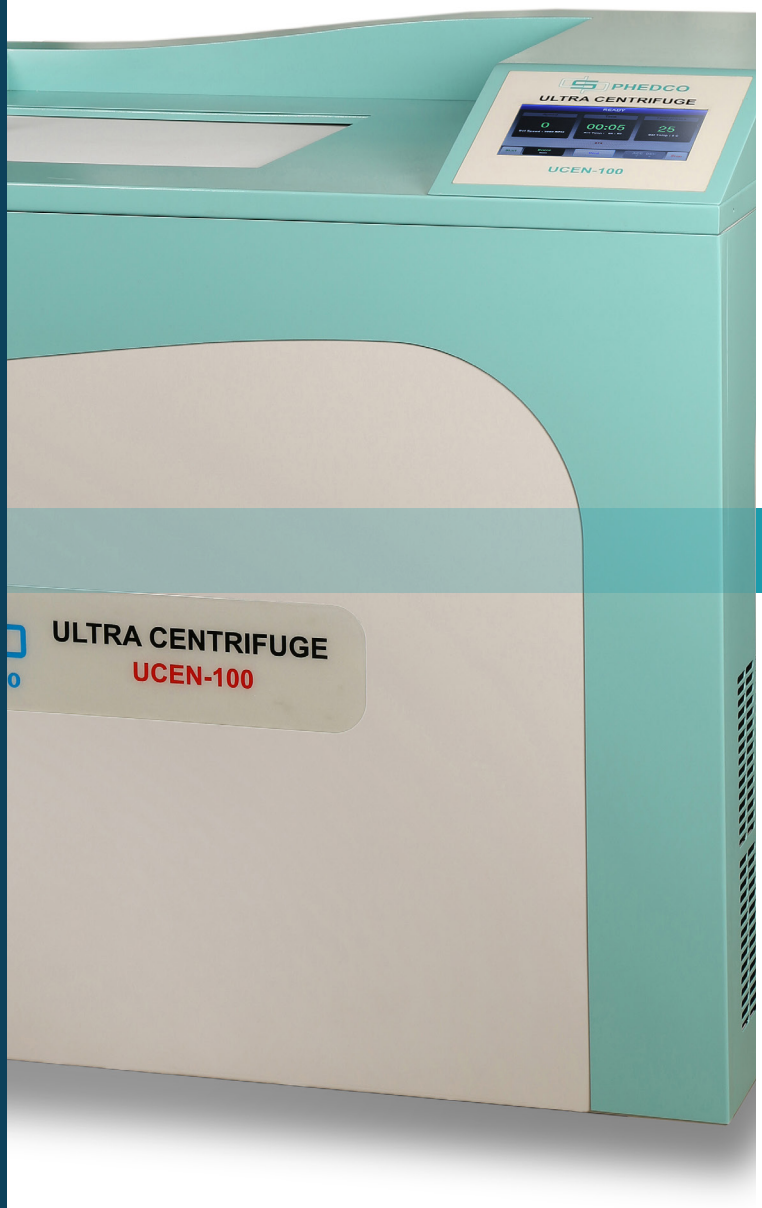
## No.7

# Ultra Centrifuge


## Definition

Ultra Centrifuge is one of various Centrifuges, designed for high rotational speed. As a result of rapid rotation, a centrifugal force (separation force) thousands of times greater than earthly gravitational force is introduced into the samples. This centrifugal force can be used to separate two-component materials with close density, and is applicable in production of (human or animal) vaccines, biotechnology purposes or specialized laboratories of the other industries. In this type of machines, rotor rotation performed in vacuum, so they are equipped to vacuum system.

# Applications




- Ultracentrifuges are used for separation on a research scale and in the fields of biology and biochemistry, such as the separation of small particles of the size of viruses, proteins, RNAs and DNAs.

# Technical Specifications

- Max. speed: 40000 rpm
- Max. acceleration: 175000 x g
- Max. capacity: 6 x 250 ml
- Speed indication accuracy: 1 rpm
- Tepmerature range: 0°C to +30°C
- Powe supply: 220V, 60 Hz, single phase, 4.0 kW
- Dimensions (WxDxH): 800x1100x1120 mm
- Weight: 440 kg

# Features

- high rotational speed to the rotor in vacuum
- Cooling System in the range of 0°C to 25°C
- Control and Monitoring System
- Vacuum System to diminish the rotor-air friction
- Aluminum or titanium rotor

## No.8

# Laboratory Incubator

## Definition

Shaking incubator is designed and produced by the utilization of modern technology. Orbital motion without the slightest noise and vibration, loading capacity of up to 10 kilograms and unrivaled 0.1°C accuracy have made this device one of the most unexceptionable in market. Broad and diverse features of this device have allowed its utilization in different laboratories, Such as medical, industrial, pharmaceutical and research laboratories

## Applications

- Medical, industrial, pharmaceutical, food and research laboratories

## Technical Specifications

- Device height and width: 44, 47 cm
- Temperature recovery after 30 seconds of opening the door at a temperature of 40°C: 10 min
- Time to reach 90% of SP from ambient temperature to 40°C: 5 min
- Isothermal at 5 points of the chamber at 25°C: 0.5 (variation) (±K)
- Temperature fluctuation at 25°C: 0.1 (fluctuation) (±K)
- Movement Type: Orbital
- Movement diameter: 24 mm
- speed range: 50-220 RPM
- Power: 1000 W
- Frequency: 50 Hz
- Voltage: 220 V (AC)

## Features

- Specially designed to prevent pouring liquids on electronic parts
- Class 3.1 independent temperature safety device (DIN12880) (TWW).
- Class 1 independent temperature safety device (DIN12880) (TWB).
- Loading capacity of up to 10 kilograms.

## No.9

# Rotary Evaporator

## Definition

The rotary evaporator is one of the valuable laboratory tools for efficient and gentle removal of solvent from the sample by evaporation.

## Applications

- Separation of organic solvents from medicinal, herbal and food compounds

## Technical Specifications

- Dimensions: length 109, height 250, depth 60 cm
- Net weight of the device: 120 kg
- Weight of the device with packaging: 56 kg
- Heated bath with the ability to work in the ambient temperature range up to 150 degrees Celsius
- Additional equipment: according to the type of chiller process and vacuum pump, Cold Trap
- The ability to adjust the speed from 2 to 120 rpm

## Features

- Using FFKM polymer resistant to a wide range of organic solvents in the sealing sector
- It has a 20-liter glass feed tank and a 10-liter collection tank
- It has primary and secondary vertical glass condenser along with condenser interface and intermediate tube

## No.10

# 3D Body Scanners


## Definition

Postural analysis system (PT-Posture Analyzer) is used to evaluate and analyze the abnormalities of human skeletal system. Using photogrammetric technology, the postural analysis device evaluates the anomalies of the spine and skeleton of the human body, the asymmetries in the human body and the deviations of the axis of the human body. PT-Posture Analyzer includes a digital camera, calibration banner, markers and software as a simple user interface.

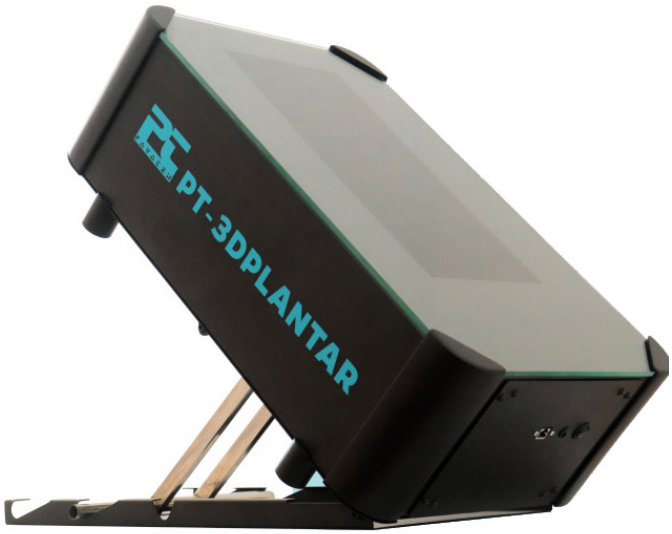
## Applications


- Create profile for client
- Compare the test result during the treatment
- Examine the patient's recovery process
- Calibrate automatically
- Present 1 degree and 1 millimeter accuracy
- Indicate abnormality of the skeletal system

## Technical Specifications


- Optimal distance: 3.8 meters
- Accuracy: 1°, 1mm
- Device dimensions: 18cm×13.5cm×130cm
- calibration screen dimensions: 100cm×210cm
- Power supply: 12v dc
- Connectivity: USB B-type
- Weight: 8 kg
- OS: Windows x64 10/11

## Features




- 3D Body Scanner, 3D Foot Scanner, Posture Analysis

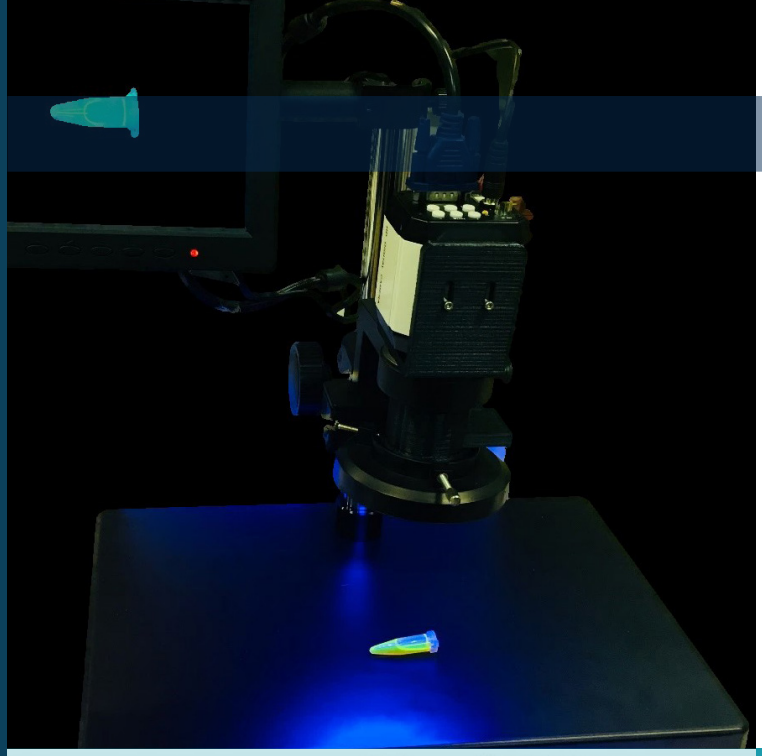
No.11

# Fluorescence Molecular Imaging System (Planar)

## Definition

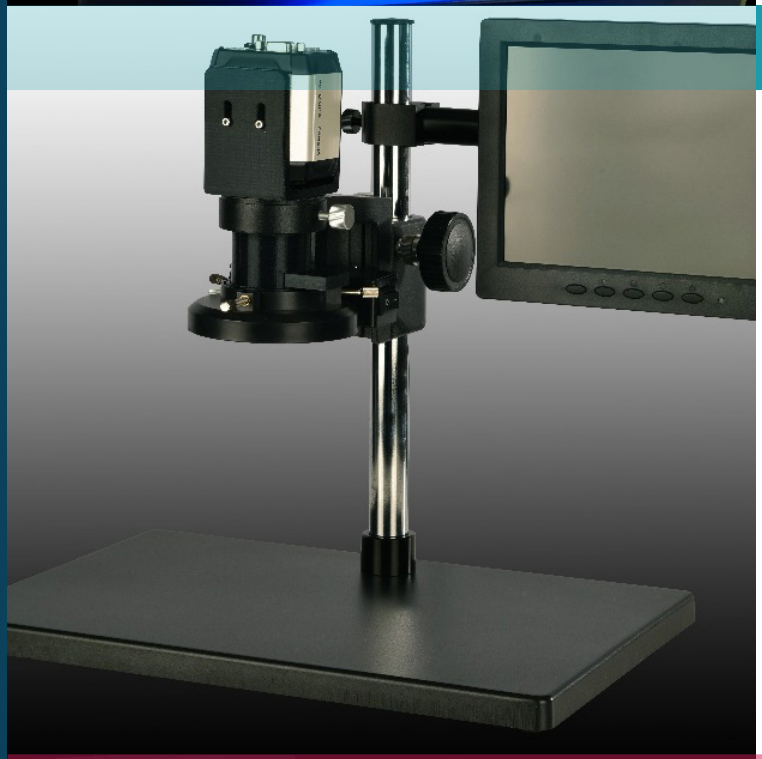
Fluorescence imaging is the visualization of fluorescent dyes or proteins as labels for molecular processes or structures. It enables a wide range of experimental observations including the location and dynamics of gene expression, protein expression and molecular interactions in cells and tissues.

The specimen is illuminated with light of a specific wavelength (or wavelengths) which is absorbed by the fluorophores, causing them to emit light of longer wavelengths. The illumination light is separated from the much weaker emitted fluorescence through the use of a spectral emission filter.



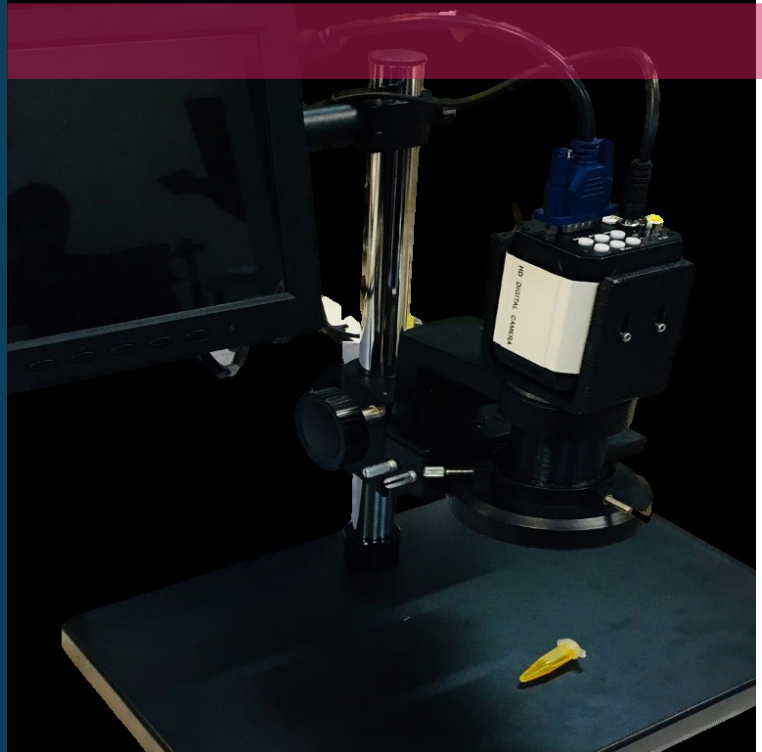
## Applications

- Stimulate and view fluorescent materials such as fluorine and GFP
- Show excitation and emission of quantum dots
- Investigating the effect of quantum dot density on light emission intensity



## Technical Specifications

- Dimension: L:38 W:25 H:40 cm
- Net Weight: 4 kg
- Gross Weight: 6 kg
- Power: 12 W
- Camera:  HD DIGITAL
- Filter: THORLABS FB550-40
- Filter type: Band pass
- Filter wavelength center: 550 nm
- Wavelength bandwidth:  40 nm
- Package: Wooden box



## Features

- A light source in a 460 nm area with a bandwidth of 30 nm to stimulate the sample
- Outbound intermediate filters are provided for the device, depending on the order, from one to five
- Filters passing through the range: 500, 550, 600, 650, and 700 nm

## No.12

# Gamma Probe


## Definition

A gamma probe is a handheld device used for intraoperative use following interstitial injection of a radionuclide, to locate regional lymph nodes by their radioactivity. It is used primarily for sentinel lymph node mapping and parathyroid surgery


## Applications

- Detection and localization of sentinel nodes in cancer surgery
- Gamma radiation detection


## Technical Specifications

- Equipment dimension: 22 × 25 × 22 $cm^3$
- Packing dimension: 40 × 50 × 60 $cm^3$
- Net Weight: 3Kg
- Gross Weight: 10kg
- Packing: Carton, Metal box
- Power: 40 w

Probe specifications:

- Three types of Probes: Large Tip, Small Tip, Endoscopic
- Length: 21 cm
- Tip Diameter: 16 mm (Large), 11 mm (Small), 10 mm (Endoscopic)
- Stainless Steel Body , Tungsten Collimator Crystal: CsI(Tl)

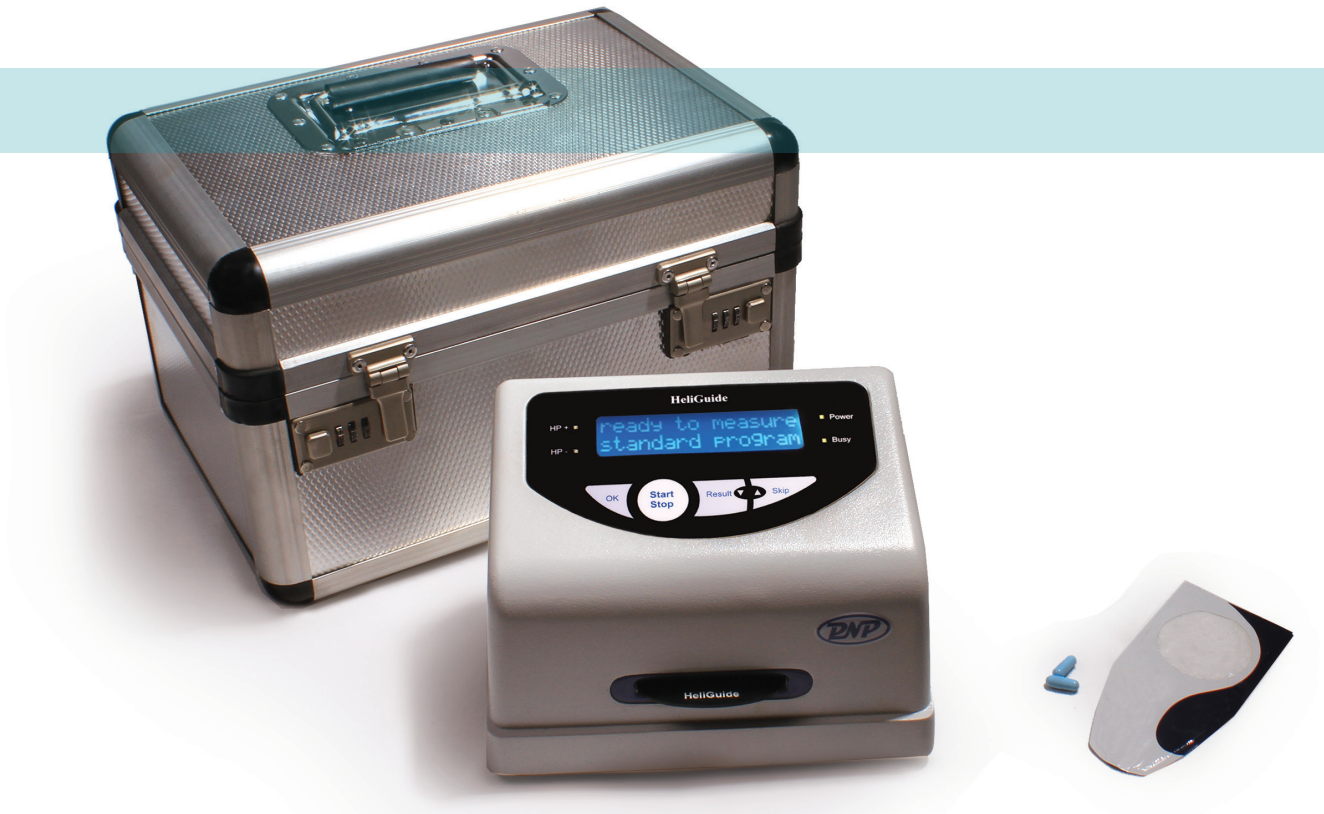

## Features

NEMA-NU3 standard test results:

- Sensitivity: ~2K cps/MBq @ 3 cm
- Shielding Efficiency: 99.6 % for Tc-99m
- Energy Resolution: <11% FWHM for Tc-99m
- Angular Resolution: 30˚, 45˚, 95˚ (optional)
- Local Resolution: <40 mm FWHM at 5 cm distance (For Large Probe)

## No.13

# Urea Breath Test (UBT)




## Definition

Urea Breath Test (UBT) is recommended by European Helicobacter pylori experts as the first choice and the most reliable non-invasive test for diagnosing an active infection as well as for follow-up of eradication of infection.


## Applications

- Helicobacter pylori infection detection
- To find active cases of pylori infections
- Monitoring the efficacy of the treatment


## Technical Specifications

- Equipment dimension: 45×25×25 $cm^3$
- Packing dimension: 15.5×15×21 $cm^3$
- Net Weight: 4kg
- Gross Weight: 10kg
- Packing: 2w Carton


## Features

Detector Specifications:

- Geiger-Muller beta counter
- Consist of two pancake detector for 4π detection angle.
- 10 centimeters stile shielding for background emission.

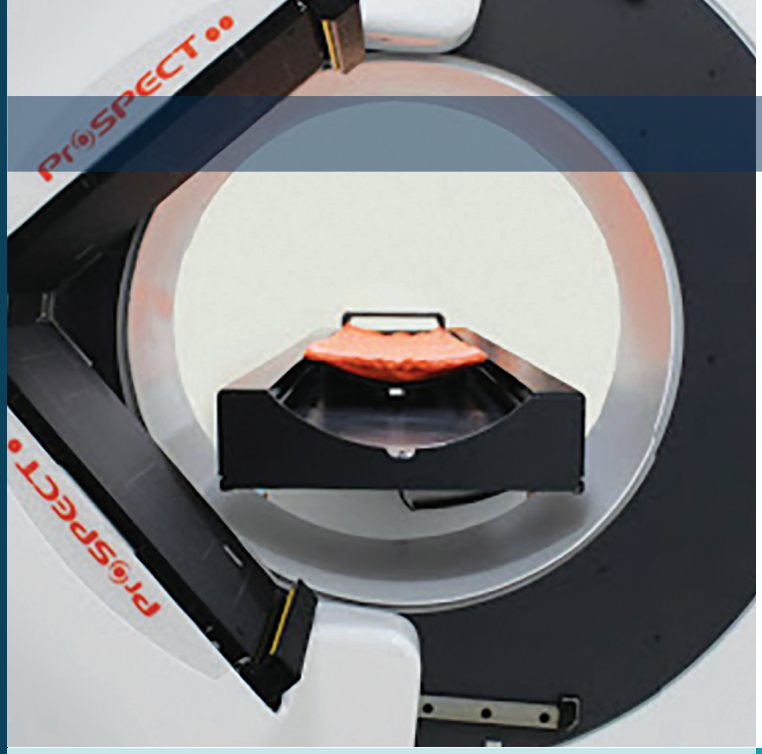
## No.14

# SPECT

## Definition

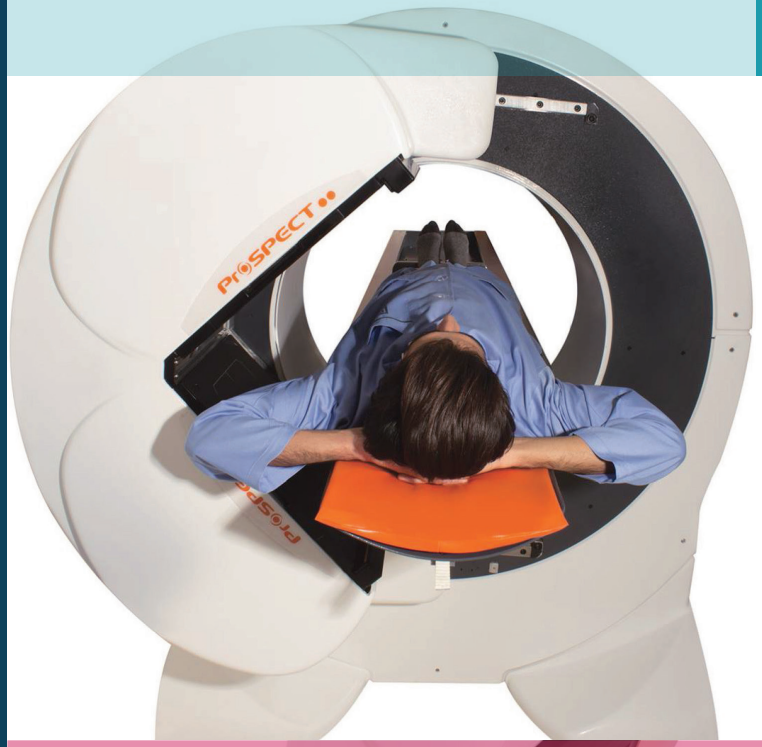
Cardiac imaging has become an integrated part in the diagnostic and prognostic work-up of patients with cardiovasular disease. We designed and developed a dedicated cardiac SPECT system for cardiac imaging called ProSPECT.

The ProSPECT scanner designed with comfort patients in mind. The scanner provides both supine and prone imaging with small footprint. The system increases comfort patients especially patients with claustrophobia disorder because the head of patients comes out of the bore of gantry during scanning process. This dedicated cardiac imaging system introduces an optimized FOV to minimize inappropriate activity uptake of other organs.




## Applications

- Functional imaging to assesss the heart disease
- Developing different radiopharmaceuticals for cardiac imaging
- Analysis of different radiopharmaceuticals for cardiac imaging




## Technical Specifications

Intrinsic spatial resolution
- FWHM in UFOV: ≤ 3.5 mm
- FWTM in UFOV: ≤ 7.4 mm

Intrinsic spatial linearity
- Absolute in UFOV: ≤ 0.8 mm
- Differential in UFOV: ≤ 0.2 mm

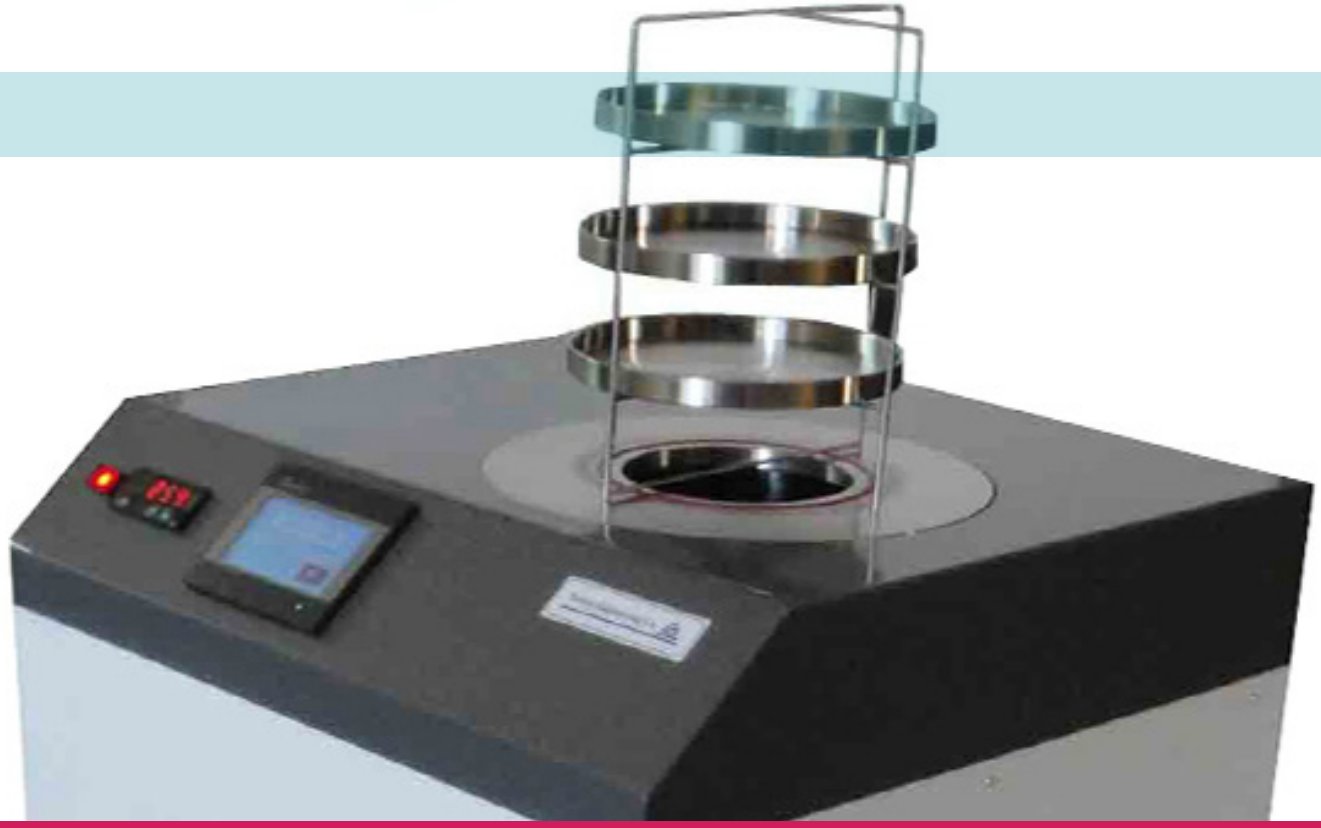
Gantry Physical Specifications
- Length: 365 cm
- Width: 140 cm
- Height: 160 cm
- Weight (with Detectors and Collimators): 900 kg

## Features


- Light weight LEHR collimator
- Supine and prone imaging
- Low attenuation patient bed
- Portable acquisition console
- Equipped with icon-driven hand controller
- Dedicated acquisition software

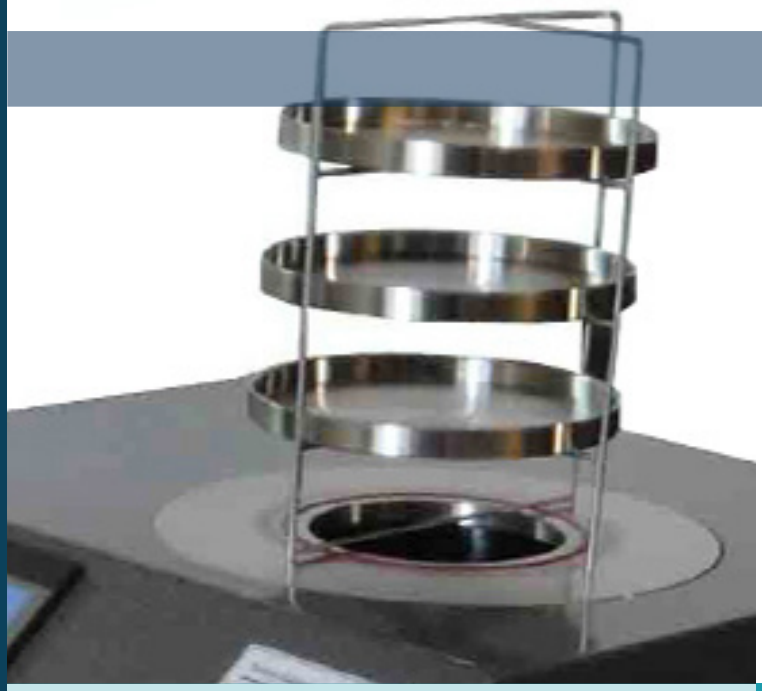
## No.15

# Freeze Dryer



## Definition

The Freeze Dryer is suitable for freeze drying test of laboratory biomedical samples.
It is widely used in medicine, biological products, chemical and food industries. On the heat-sensitive substances such as antibiotics, vaccines, blood products, hormones and other biological tissue enzymes, freeze-drying technology is applied.



## Applications

- Pharmaceuticals
- Vaccines
- Antibiotics
- Blood fractions
- Biological specimens
- Inorganic materials
- Metallic and ceramic powders
- Chemical
- Nano-powders
- Food
- Agriculture
- Medical

## Technical Specifications

- Dimension: L:60 W:57 H:78 cm
- Net Weight: 55 kg
- Gross Weight: 70 kg
- Power: 3 kW
- Distance between trays: 7 cm
- Condenser final temperature: Below- 55 °C
- Condenser capacity: 6 kg
- Vacuum pump type: 12 $M^3$/hr two stage, direct drive rotary, vane vacuum pump
- Vacuum manifold: For 4 flasks
- Vacuum controller: Controllable up-to, 0.001 mbar with PLC
- Vacuum gauge: Pirani type
- Display type: Five inch HMI
- Refrigerator cooling system: Air cooled
- Air inlet: Vacuum solenoid valve
- Package: Wooden box

## Features

- High performance
- Convenience and comfort
- Economical
- Efficient insulation
- Space-saving console design
- Vacuum & temperature gauges
- CFC free refrigeration system
- Digital display of vacuum & temperature
- All stainless steel 316L condenser and parts
- Very low condenser temperature
- Drying chamber material: Stainless steel 316L
- Cooling chamber material: Stainless steel 316L

Accessories: • Four balloons connector
• 20 ampoules connector

## No.16

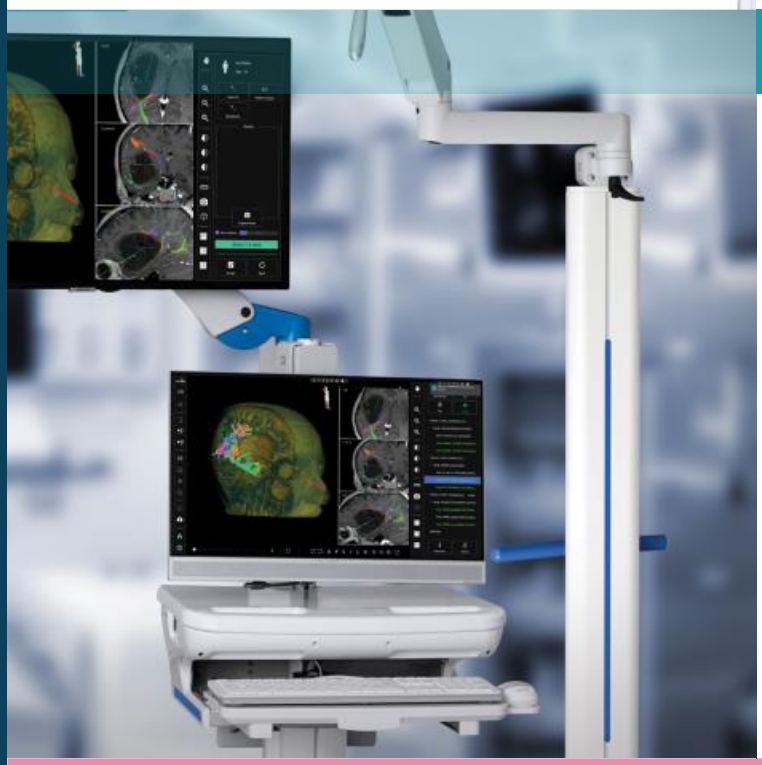
# surgical navigation system

## Definition

OV4 is a comprehensive and high performance surgical navigation system for Neurosurgery and ENT, Spine and Maxillofacial surgeries. Using advanced technology and high precision IR camera it offers surgeons more accurate and reliable navigation during surgery.


## Applications

- Brain applications
- Spinal applications
- Ear/Nose/Throat applications



## Technical Specifications

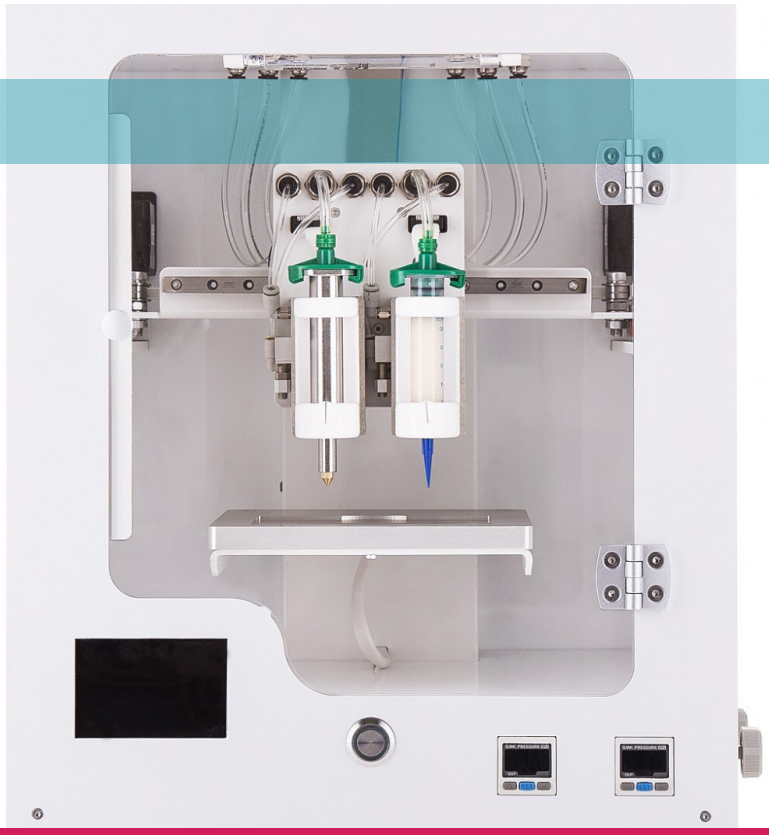
- A large field of IR tracking (3000 1470 1856 mm) o High volumetric accuracy to 0.12 mm RMS with low noise o Two-part trolley design with maneuverable articulated arms o A 32-inch high-definition monitor for the surgeon
- A variety of tools for a wide range of surgeries o Smart frameless biopsy module
- Ability to import fMRI and DTI images that analyzed by the third-party applications
- Weight-balanced height adjustment of the main trolley

## Features

- Perfect design with small footprint and high maneuverability
- Easy positioning of the large display dedicated to surgeon
- Virtual key and foot switch to activate predefined system tasks
- UPS support to continue working in the case of power failure

## No.17

# 3D BioPrinters



## Definition

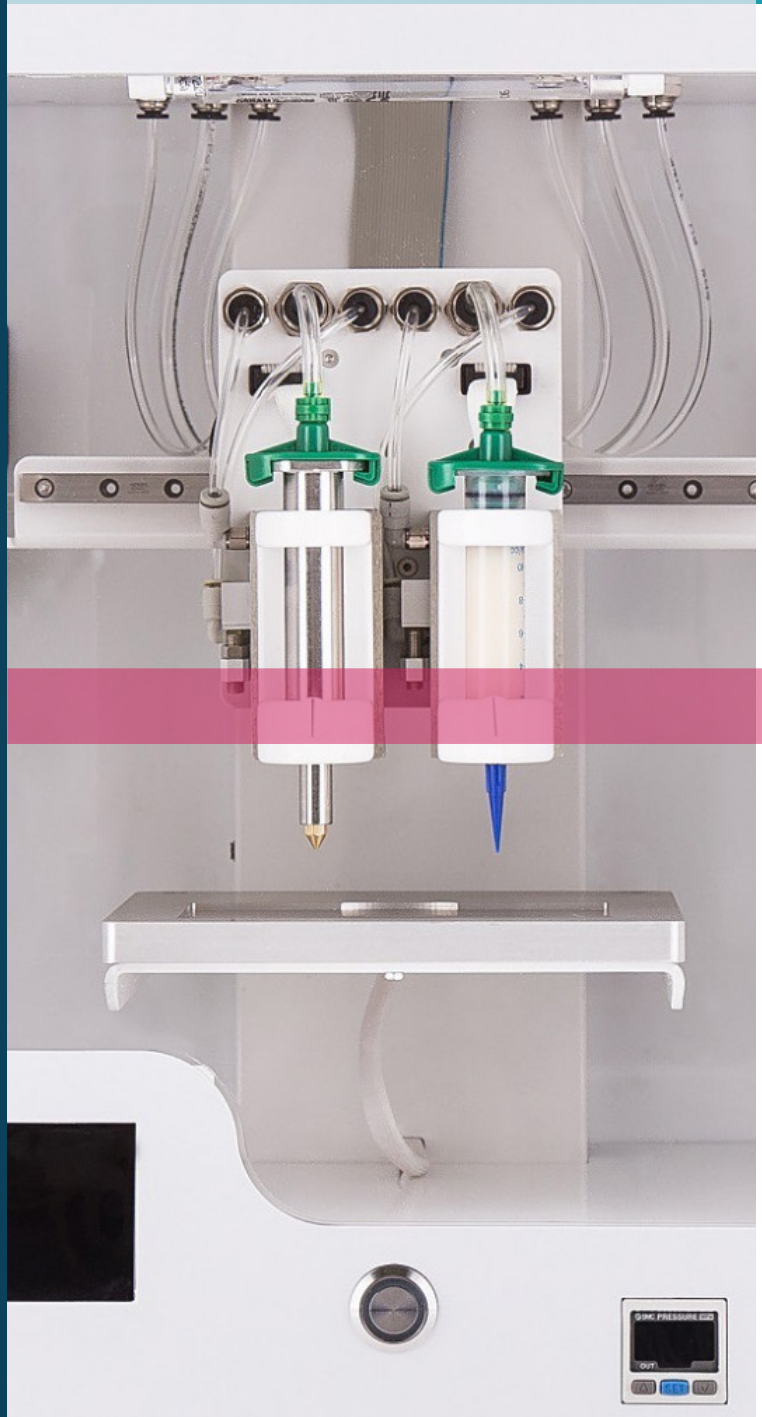
3DPL-N2 Plus is a hi-tech, professional bioprinter. It is equipped with two extruders that are capable of printing a variety of biomaterials and hydrogels. N2 Plus meets all you needs from a state-of-the-art bioprinter, creating a wide range of artificial tissue and scaffolds for research and even tissue replacement.


## Applications

- Bioprinters use a combination of biomaterials, in which living cells are embedded, to create 3-dimentional structures of cell-embedded gels/liquids and scaffolds. These structures are pre-programmed for the printer and are printed layer by layer.

## Technical Specifications

- Dimensions: 34 x 36 x 48 cm (w,l,h)
- Weight: 20 kg
- Power Requirement: 110V-220V
- Connectivity: USB
- Construction: Plexi Glass, Powder Coated Aluminum Frame
- Number of Extruders: 2 heating heads
- Max Temp of printhead/printbed: 175ºC
- Printing Technology: Pneumatic extrusion based
- Precision: 5 microns
- Photocuring: 365 nm and 405 nm



## Features

- Dual Extruder System
- Open System
- Modular Head
- Pneumatic Driven
- Heating Control
- Cooling Fan
- Photocuring
- Live Imaging
- Chamber Sterilization
- Benchtop-Friendly

## No.18

# Electromyograph

## Definition

NegarAndishgan Ltd. EMG/NCV/EP 5000Q Manufacturing is a full featured diagnostic EMG system with a low noise high performance amplifier and state-of-the-art software features. This system can be configured for 2 channels (configuring for 4 channels is optional).

## Applications

- Needle EMG
- Sensory NCV
- Motor NCV
- F Wave
- H reflex
- RNS (Repetitive Nerve Stimulation)
- Blink Reflex
- Visual Evoked Potential
- Auditory Evoked Potential
- Somatosensory Evoked Potential

## Technical Specifications

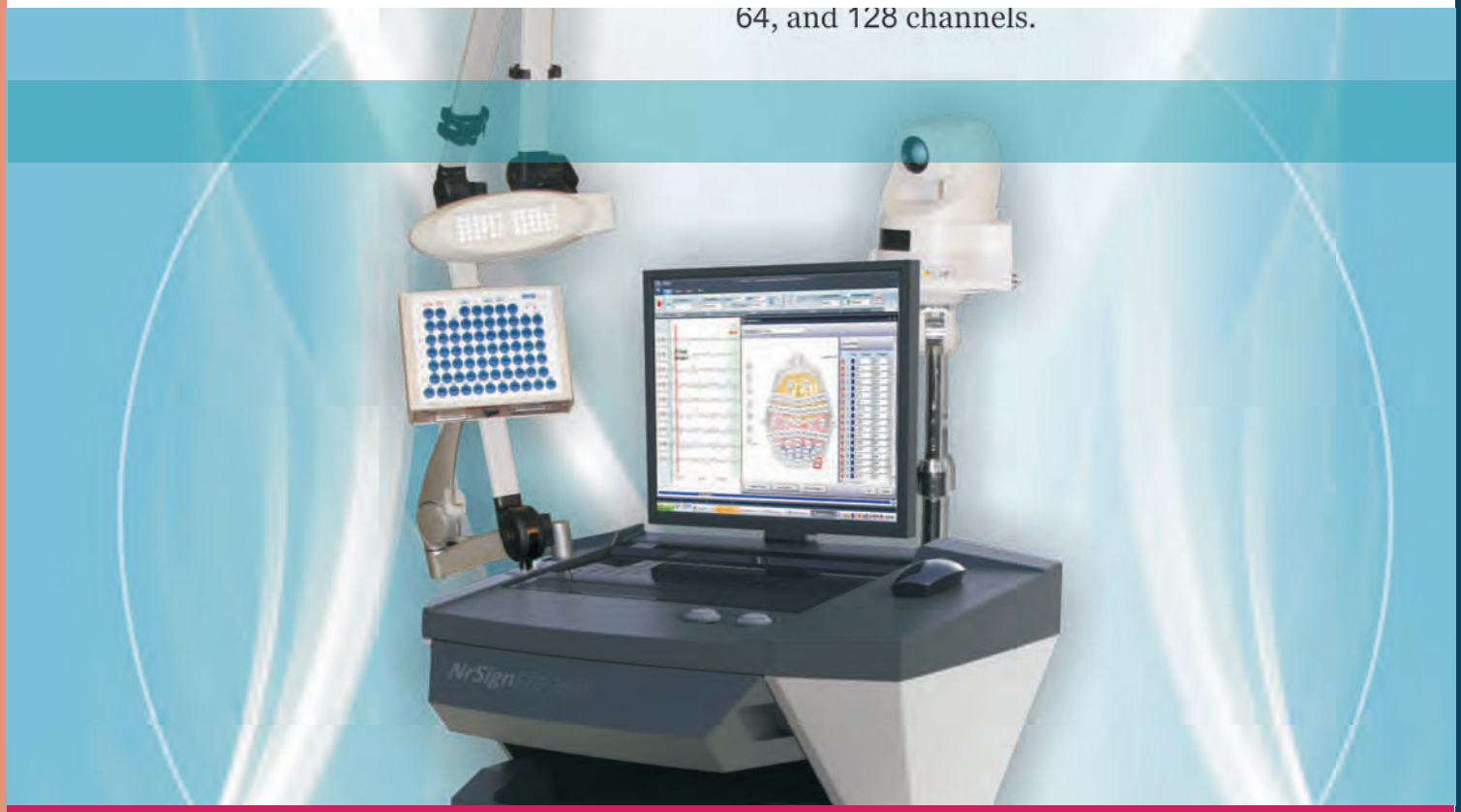
- Accuracy: Time measurement error: less than 5%; Amplitude measurement error: less than 5%
- 2, 4 Channel EMG and EMG/EP Systems
- Input Impedance: >1000M OHM, < 30pF; CMRR >100dB; Noise < 5µV r.m.s
- Low Cut (-6dB/octave) 0.1, 1, 3, 10,, 30,100, 200, 300, 400, 500, 1000, 2000Hz
- High Cut (-12dB/Octave) 40, 50, 60, 80, 100, 200, 300,400, 500 Hz; 1, 2, 3, 10, 20 KHz
- Display Customer option; Display Sensitivity 0.2µV to 30mV/div
- Power Requirements: Input 100-220 volts 50Hz/60HZ

## Features

- Portable EMG system with light weigh and easy to port
- 2 channel low noise amplifire
- Designed to achieve the high flexibility
- Easy to setup and state af the art software development.
- Generating customize report in word, PDF or video

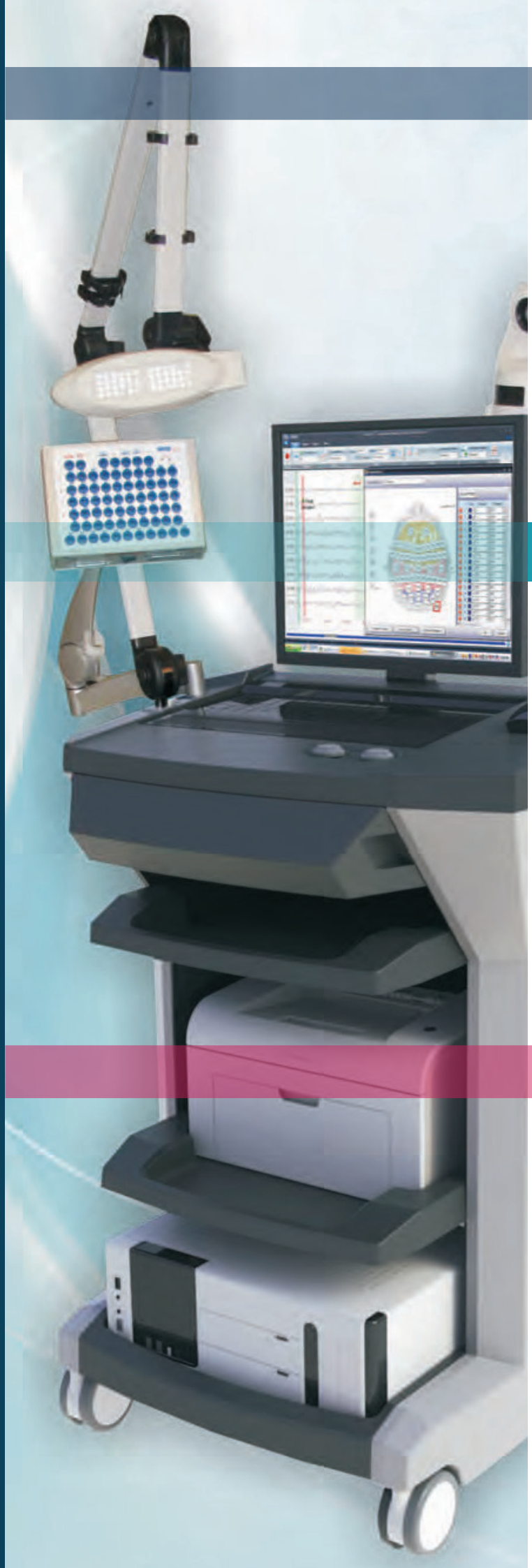
## No.19

# Electroencephalograph




## Definition

EEG 5000Q has all you need for a long term video EEG monitoring solution. It aimed for monitoring and recording brain electrical activities in long term mode to help professionals in diagnosing neural diseases. It is a strong, high quality, and user friendly EEG system for working in the hospitals and epilepsy centers. It has all you need to monitor and analyze brain activity in long term mode with strong amplifier, easy to use and flexible configuration on 64 ,32 ,24 and 128 channels.



## Applications

- Seizures (fits) or memory problems
- Epilepsy
- Dementia
- Head injury and concussion
- Brain tumors
- Encephalitis (brain inflammation)
- Sleep disorders, such as sleep apnoea.

## Technical Specifications

- Power supply: 110-220 V ~ ,50/60 Hz, 0.5A via isolated power supply; Isolation: 4500 V
- Amplifier: Number of channels: 32-128 CH EEG, 2 CH Surface EMG, and 1 CH ECG; Sensitivity: 1-300uv/mm; Input impedance: > 1000 MΩ; CMRR: > 110 dB; Low pass filter: > 0.1 Hz; High pass filter: < 1 kHz; Notch Filter: Optional 50/60 Hz
- Push Button event: Reliable finger touch switch
- Software: Operating system: Microsoft Windows XP-7 (32,and 64 bits); Application software: EEG
- Computer PC: At least CPU: Intel Core 2 Quad-Q8200@ 2.33 GHz; RAM: 4G, HDD: 1TB, VGA: 1024 ME.

## Features

- low weight and portable head box up to 128 channels with its cables
- Interface box
- Photic stimulator and its cable
- Isolation transformer
- PC (with Microsoft Windows XP/ Vista/ Seven Professional operating system and EEG application software)
- Optional notch filter to omit 50 Hz or 60 Hz
- Impedance checking
- Strong review software (Reanalysis facilities, event navigator, event marker, easy annotation and signal selection, summarizing all events on marking bar for long and short time)

## No.20

# Gradient thermocycler


## Definition

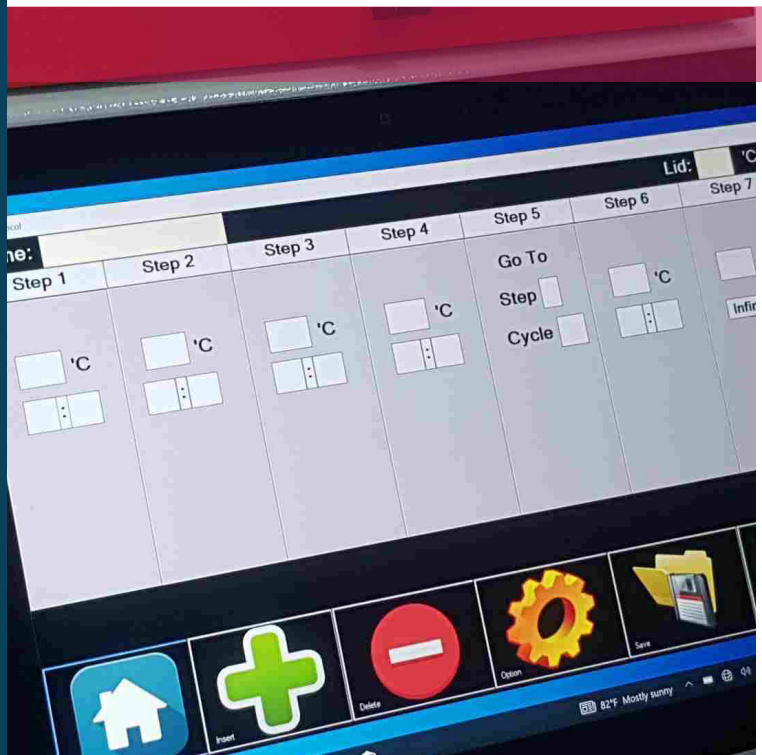
Thermocyclers are tools used to amplify DNA and RNA samples by polymerase chain reaction. The thermocycler raises and lowers the temperature of samples in a holding block in discrete, pre-programmed steps, allowing for denaturation and renaturation of samples with different reagents. Amplified genetic material can be used in many downstream applications such as cloning, sequencing, expression analysis and genotyping.

## Applications

- Direct detection of microorganisms in patient samples
- Identification of microorganisms grown in culture medium
- Detection of antimicrobial resistance
- Examining the relationship of dependence on the strain of a desired pathogenic agent
- Genetic fingerprint
- Mutation detection
- Cloning genes

## Technical Specifications

- Sample capacity: 0.2ml×48
- Temperature uniformity:
- Temperature control : 0.2c accuracy: 0.1c
- Temperature rise rate: 2.5c
- Temperature drop rate: 1.5c
- Gradient temperature range: 15-95
- Gradient temperature difference: 1-10c
- Temperature control range: 4-99c
- Door temperature: 70-110c
- Operating system: windows 10
- Memory:  64GB 2GRAM
- Display: 10inch tach
- Communication interface: USB
- Ppower supply:220VAC 250W
- Weight:10kg




## Features

- Using the Windows 10 operating system
- Using 8 accurate temperature sensors
- The ability to replace the block
- Ability to update the software through the Internet

## No.21

# Braille PDA

## Definition

Barjastehnegar Hooshmand Hamrah (SBj) is a portable device designed to be used in the classroom, at home or at work and is the only Iranian PDA (Personal Digital Assistant) with Farsi and English braille and audio output that offers better and full after sale services.

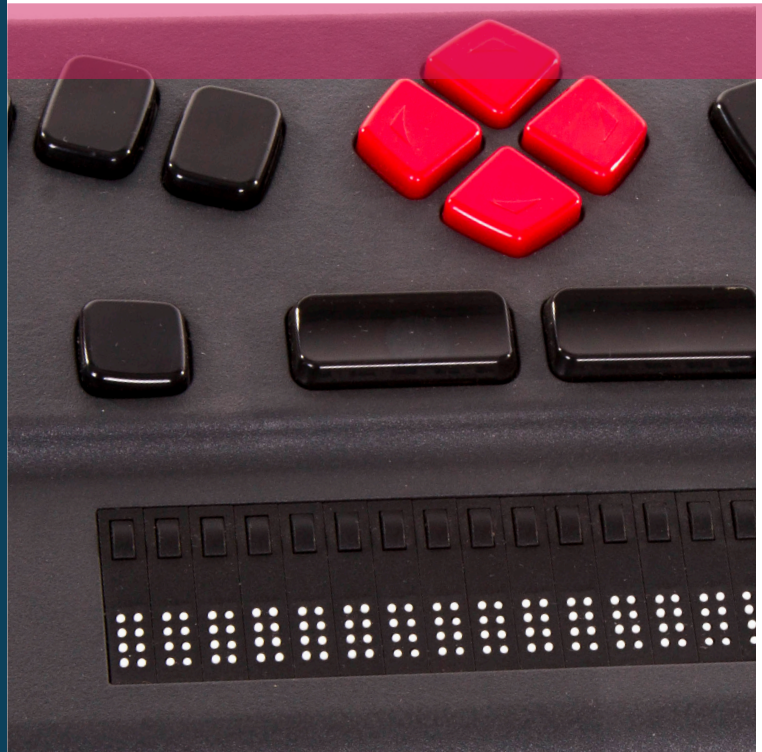
## Applications

- It is a portable device with the ability to operate independently, and with Braille and audio outputs, it is the best rehabilitation aid for the blind, and with its hardware and software facilities, it fulfills the study and writing needs of the blind user.

## Technical Specifications

- 20 cells, each with 8 anti-allergic plastic pins
- 20 CR keys
- 6800 mah Rechargeable Battery
- WIFI and Bluetooth interfaces
- 16GB free internal storage
- HDMI port for monitor and TV
- 3 USB ports (for Keyboard and flash drive)

## Features



- Word processor (English & Farsi)
- Supported file reader Doc, Docx, txt, pn, klk, brf (English & Farsi)
- Dictionary (English-English, English-Farsi, Farsi-English, Farsi-Farsi)
- Phonebook
- Audio Player
- Calculator


# MECHANICAL ENGINEERING LAB


# Mechanical Engineering Lab

1. HP Single Pump
2. Vibration measurement system
3. Process Control
4. Thermodynamic
5. Heat Transfer
6. Vibration, Dynamics and Machine Dynamics
7. Fluid Mechanics

## No.1

# HP Single Pump


## Definition

Pumps consist of a general base unit which includes, Servo Motor, Gear Box and HMI based controlling unit. These pumps are designed for applications requiring accurate pulse less flow and pressure control for delivery of fluids, solvents, solutions. This pump consists of a single injection unit with maximum barrel volume of 500 cc. Besides, it is possible to inject the fluids at constant flow and constant pressure mode.


## Applications

- This product is used to inject various liquids into high pressure systems. In addition, since this product has the ability to inject in three modes: constant pressure, constant flow, and continuously. This product can be used in various industries such as oil industry, chemical industry and supercritical fluid, chemical analysis (GC), construction and other such things to inject fluids into various systems.

## Technical Specifications

- Maximum injection pressure: 700 bar
- Accuracy: 0.25 % full scale
- Cylinder volume: 500 cc
- Minimum flow rate: 0.01 cc/min
- Maximum flow rate: 20 cc/min
- Flow rate resolution: 2×10-5
- Wetted parts: Stainless steel 316

## Features

- Pressure transmitter
- Pressure transmitter
- Constant pressure mode
- Constant flow rate mode
- Touch panel

## No.2

# vibration measurement system


## Definition

Due to the special position of Monitoring Canton (CM) as one of the main subcategories of preventive maintenance, the Vibro Rack24-1000 analyzer has been considered as one of the company's most popular products and has been welcomed by its customers.


## Applications

- Condition monitoring system installed parallel to other 3rd party vibration protection systems
- Protection & Condition monitoring system
- Laboratory Vibration Analyzer

## Technical Specifications

- The VibroRack1000 is available in a 19-inch 2unit Size. VibroRack1000 dimensions defined through following items:
- Length: 48 cm  Width: 9 cm  Depth: 27 cm
- Power supply is available in AC version.
- Current output of sensors (4~20mA) is available on the each channel which can be used for connecting to PLC or DCS systems.
- There is an Ethernet port which provides TCP/IP protocol. Via this port, VibroRack1000 can be connected to diagnosis software installed on for example panel PC.

## Features

- Online Vibration Analyzer with Industrial Capability in 24 Channel and Lower Channels to 9 Channels
- Equipped with CMS software for analyzing and troubleshooting vibrating spectra, sound analysis, single-sheet and two-page balances, modal testing
- Frequency bandwidth up to 40 kHz with a resolution of 16 bits, according to the number of channels used

## No.3

# Process Control

## Definition

Automatic process control in continuous production processes is a combination of control engineering and chemical engineering disciplines that uses industrial control systems to achieve a production level of consistency, economy and safety which could not be achieved purely by human manual control. It is implemented widely in industries such as oil refining, pulp and paper manufacturing, chemical processing and power generating plants.

## Applications

- Effect of PID coefficient on device and unit performance
- Control of level, flow rate, pressure, temperature
- Checking system response online
- Trainer for control engineering experiments (Pressure control)
- Investigating stirred tanks in series and their response due to different entry
- Obtaining liquid concentration response under step function and pulse entry
- Study the response of the system to different inlet
- Determination of the response to a/an impulse, unit step, unit lag inputs

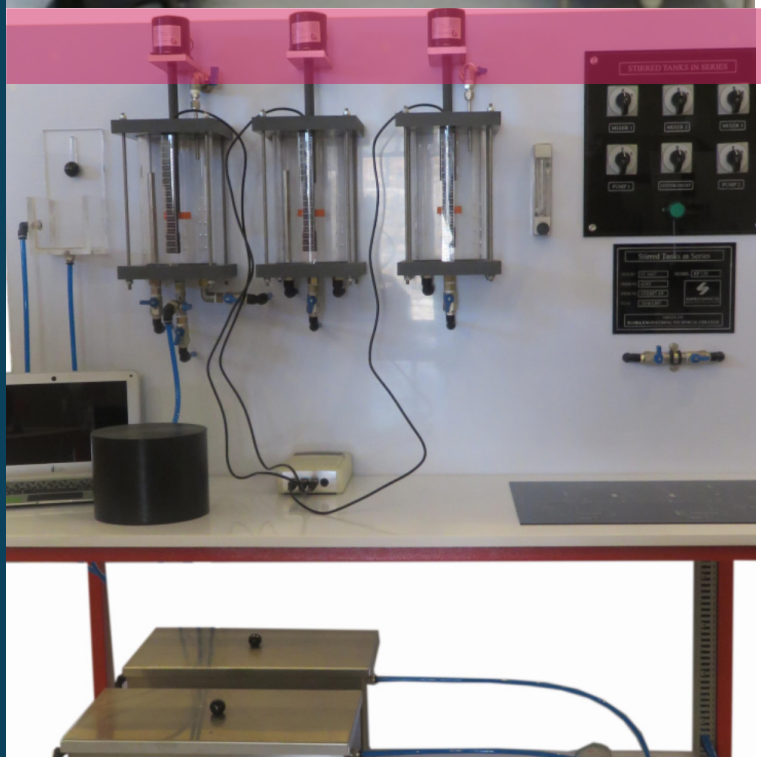
## Technical Specifications

Control of Four Variables (Temperature, Pressure, Level and Flow):

- Centrifugal pump
- Transparent tank equipped with ruler
- Pressure gauge
- Reservoir tank with sight glass

Flow and Level Control Demonstration Unit:

- Centrifugal pump
- Rotameter
- Feed reservoir
- Transparent plexiglass



## Features

Pressure Control Demonstration Unit:

- Centrifugal pump
- Inverter
- Feed tank
- Pressure vessel made of Stainless Steel

Stirred Tanks in Series:

- Three identical stirred tank reactors connected in series
- Liquid concentration sensors (EC meter)
- Stirrers
- Pumps and tanks

## No.4

# Thermodynamic

## Definition

Thermodynamics describes the general theory of energy and substance conversion. The fundamentals of Thermodynamics deal with the behavior of systems during temperature changes.

## Applications

- Studying the operation of a single cylinder
- four-stroke petrol engine
- The effect of different parameters (speed, temperature, moisture) on the system
- Acquaintance with the principles of sterling cycle
- Plotting steam pressure curve
- Determining the output power

## Technical Specifications

Four Stroke Single Cylinder Petrol Engine:

- Four stroke single cylinder engine
- Heat exchanger with cooling coil
- Water rotameter
- Electrical and control panels and precision instruments

Air Conditioning System:

- An air blower
- Air heaters placed before and after the evaporator
- The moisture absorption (evaporator), refrigerant(R-134 gas)
- Stainless Steel Tank for Steam Generating

## Features

Steam Engine:

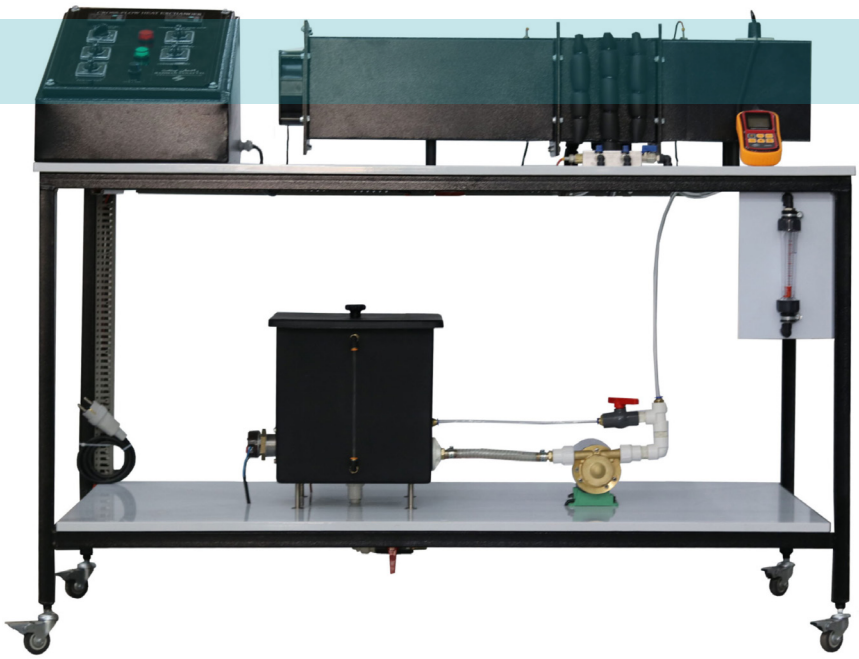
- Stainless steel pressurized tank
- Stainless steel double walled tank
- Pressure switch
- Torque indicator including load cell and force display

Sterling Engine:

- Expansion (high temperature) cylinder
- The motion displacer piston cylinder
- Thermocouple type-K
- A fly wheel

## No.5

# Heat Transfer



## Definition

Heat transfer is a discipline of thermal engineering that concerns the generation, use, conversion, and exchange of thermal energy (heat) between physical systems. Heat transfer is classified into various mechanisms, such as thermal conduction, thermal convection, thermal radiation, and transfer of energy by phase changes.

## Applications

- Investigating of cross flow heat exchanger performance
- Comparing result for triangle and square pattern of radiators
- Comparing various types of heat exchangers performance
- Comparing co-current and counter-current flow
- Acquainting with shell and tube heat exchanger and its performance
- Investigation of thermal radiation
- Investigating Kirchhoff law for radiation

## Technical Specifications

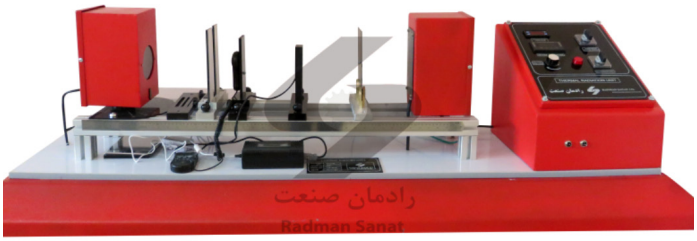
Cross Flow Heat Exchanger:

- Axial fan
- Air duct
- Temperature sensors
- Pump

Heat Transfer Bench:

- Stainless Steel shell and tube heat exchanger
- Stainless Steel Double pipe heat exchanger
- Plate heat exchanger
- Centrifugal pump

## Features




Thermal Radiation Unit:

- Radiation source with adjustable power
- Light emitter with adjustable power and angle
- Luxmeter
- Thermopile for measuring radiant power

Shell & Tube Heat Exchanger:

- Shell and tube converter including stainless steel tubes
- Centrifugal pump
- Hot reservoir with heating element
- Temperature measuring sensors

## No.6

# Vibration, Dynamics and Machine Dynamics


## Definition

Vibration is the process occurring when a physical quantity periodically changes depending on time. This is associated with a conversion of energy from one form to another. In the case of mechanical vibrations, periodic potential energy is converted into kinetic energy and vice versa.

In engineering, a mechanism is a device that transforms input forces and movement into a desired set of output forces and movement. Mechanisms generally consist of moving components that can include gears, belt, cam and followers, linkage, friction devices, etc.

## Applications

- Investigating mechanical governor systems and their fundamental work
- Investigating kinetic and kinematic governor systems
- Visualization of the Coriolis force effect
- Investigating rotational speed effect on Coriolis force
- Fundamentals of mechanical vibration theory; free, damped and forced vibrations
- Investigating damped free vibration of a mechanical system


## Technical Specifications

Centrifugal governor:
- Porter and Proell governor
- Capability of changing rotational speed of each governor
- Including digital displayers of rotational speed of each governor
- Capability of denoting value of displacement in each governor

Coriolis force:
- Capability of rotational speed adjustment continuously
- Capability of indicating Coriolis force in a rotational system
- Capability of observing radial deviance of water as a function of speed and rotation direction
- Electro motor with adjustable speed

## Features


Mass-spring-Damper Vibration System:
- Investigating linear vibrations of single degree of freedom vibration system
- Including viscous damper
- Displacement measurement system
- Different weights for loading

Free and Forced Vibration:
- Movable imbalance exciter with adjustable DC motor
- Viscous damper
- Specified Spring
- Free and fixed beam

## No.7

# Fluid Mechanics

## Definition

Fluid mechanics plays a fundamental and key role in engineering education. Lectures and laboratory exercises on fluid mechanics are part of the standard curriculum for a wide range of engineering disciplines, such as mechanical and plant engineering, energy and process engineering, environmental engineering, shipbuilding, civil engineering, agriculture, food technology etc.

## Applications

- Perfect analyzing of liquid flow in open channel
- Measuring and comparing applied force to target plane with different shapes
- Obtaining flow rate by using orifice plate, venturi meter, and rotameter
- Two Stainless steel centrifugal pumps
- Study the effect of pumps in series and parallel states

## Technical Specifications

Experimental Flume:

- Experimental flume with experimental section, inlet and outlet element and closed water circuit
- Adjustable inclination of the experimental section
- Side walls of the experimental section are made of tempered glass or pelexiglass for excellent observation of the experiments
- Flow-optimised inlet element for low turbulence entry into the experimental section

Measurement of Water Jet Forces:

- Transparent tank made of plexiglass
- Flat and conical target surface
- Vertical nozzle for producing water jet
- Mechanism for measuring applied force

## Features

Series and Parallel Configuration of Pumps:

- Study pressure, flow in series and parallel state
- Determine efficiency of pumps in different state
- Plot performance diagram of pump

Methods of flow measurement:

- Transparent venturimeter
- Orifice meter
- Rotameter
- Piezometric vessels for measuring of head loss

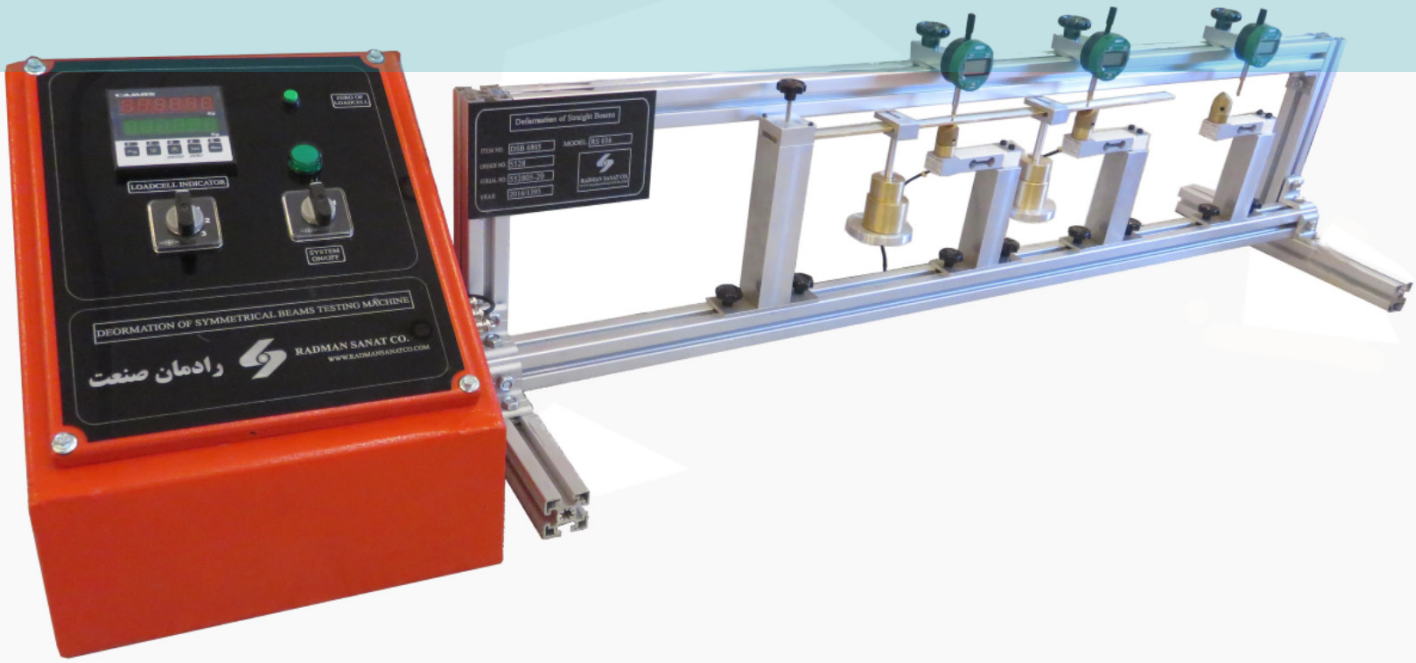

# CIVIL ENGINEERING LAB

# Civil Engineering Lab

1. Strength of Materials
2.Point-Load Strength Test
3.Los Angeles Abrasion Machine
4.Servotronic Compression Machine with LVDT
5.Automatic Static Triaxial

## No.1

# Strength of Materials




## Definition

Strength of materials deals with the effect of forces on deformable bodies. In addition, material-dependent parameters should be considered as well. An introduction to the strength of materials is, therefore, given by the concept of stress and strain and by Hooke's law, which is applied to tension, pressure, torsion and bending problems.

## Applications

- Calculating the modulus of elasticity using beam curvature
- Researching the three-moment equation
- Determining the deflection of straight beams under different support conditions
- Determining the critical load of columns in different end support conditions
- Studying the elastic deformation due to the buckling and to analyze the Euler formula, both practically and theoretically, and comparing the results
- Calculating the PCR (critical load) for a column with different supports

## Technical Specifications

Symmetric Beams:

- Loading using weight and weight hanger
- Brass weights: 3×100 gr, 3×200 gr, 3×500 gr
- A 50 kg load cell for measuring the applied forces on the supports
- Digital indicator to display the applied forces on the supports
- 3 Dial Gauge to measure and observe the variation in length
- Different types of supports (simple and fixed) to perform various experiments
- Sample parts made of aluminum, brass and carbon steel

## Features

Buckling Behavior of Bars:

- Dial Gauge to measure and observe the increase in length
- Load cell for measuring force
- Digital monitor to show the amount of load
- Two fixed and movable end supports, rotary knob (to apply the compressive load)
- Cylinder and piston (designed for loading)
- Sample pieces made from brass and steel
- Electrical panel

## No.2

# Point-Load Strength Test


## Definition

Having an index to display rock resistance is very useful. This index should be determined easily and inexpensively. Nowadays, this index is determined by using a point load test. In this test, the sample is loaded between two steel cones and the stone breaks through stretching cracks along the loading axis.

## Applications


- It is used to estimate the uniaxial compressive strength.
- To determine compressive strength of rock specimens.
- It is used as an index test for strength classification of rock materials.

## Technical Specifications

- Capacity:5 Ton
- Maximum sample diameter: 100 mm
- Approximate weight: 32 Kg
- Dimensions: 35×27×57 $cm^3$

## Features

- Load Reading: 400-bars power sensor which is display on digital monitor

## No3

# Los Angeles Abrasion Machine

## Definition

A qualitative advantage of aggregates is their resistance to abrasion. For example, when aggregates are used in concrete and the concrete is placed under abrasion, such as traffic jams it is essential to determine the abrasion resistance of the passing car floors.

## Applications

The most common of these tests is resistance to abrasion and impact, is Los Angeles Abrasion Test. In this test, put a certain amount of aggregates in a steel cylinder and after a certain number of turning the cylinders determined the percentage of abrasion of aggregates.

## Technical Specifications

- Overall Dimensions: 110×100×110 $cm^3$ (L×W×H)
- Approximate Weight: 300 Kg
- Power Supply: 220 V, 50 Hz, 1 ph
- Speed:31 rpm
- Internal diameter: 711 mm
- Accessories: a) 12 steel balls b) Tray to drain the sample after the abrasion

## Features

This cylinder around its axis horizontally mounted on the chassis of the machines which is rotated with the help of the driving force of the gearbox and the belt, the number of these rounds count with the help of a digital counter which has the ability to automatically turn off in the number of definition rounds.

## No.4

# Servotronic Compression Machine with LVDT


## Definition

The technical specification of this device is same as Fully Automatic-Servotronic Compression Machine. The only difference is this device has LVDT sensor to calculate of deformation rate of under load sample.


## Applications

- Determining the compressive strength of concrete samples and drawing stress and strain curves

## Technical Specifications

- Power Supply: 1.1kW, 220V, 50Hz
- Capacity: 1200kN
- Accuracy: 1kN
- Distance Between Plates: 320mm
- Stroke limit: 40mm
- Selectable Measuring force: kgf, N, lb
- Digital Indicator: 7” Touchscreen/LCD- TFT
- Communication Port Serial: Communication/ Port- RS232
- Calibration: Possible with internal Software

## Features

- Transmitter pressure 600bar
- Uniform loading speed preset and controllable through the display based on kg/sec
- Memory capacity up to 200 tests

## No.5

# Automatic Static Triaxial

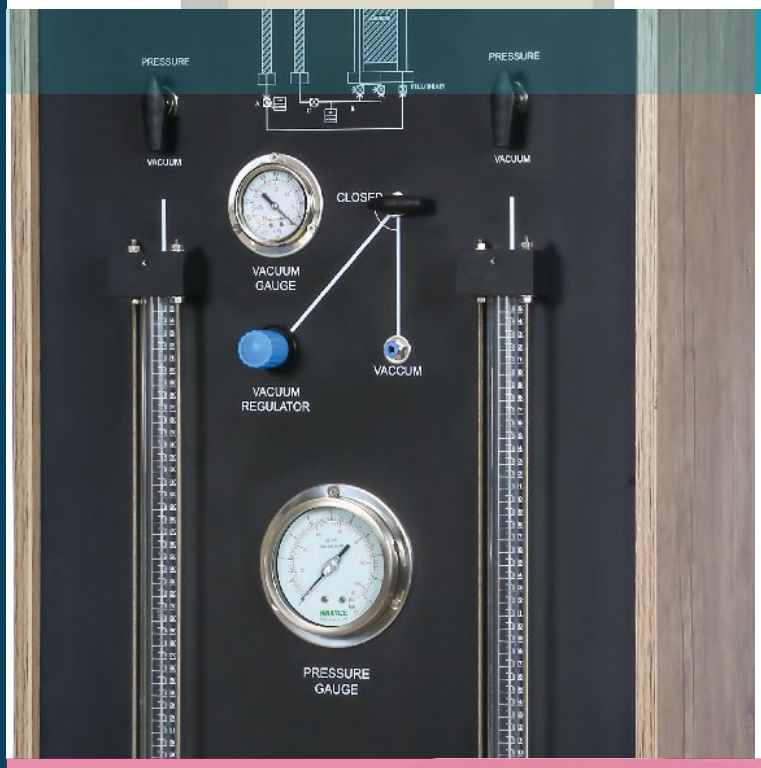


## Definition

Automatic Static Triaxial is a highly advanced apparatus that it can controls force, displacement and pressure automatically based on your command. This Device is used for measuring different soils shear strength parameters within the expected range.

## Applications

- The main purpose of the static triaxial tests is to a priori identify the maximum stress level that can be applied in the cyclic tests, and to assess the strength and stiffness increase produced during the cyclic loading process. These Tests are one of the most widely performed tests in a geotechnical laboratory. The advantages of the test over other test methods used to determine shear strength are that specimen drainage can be controlled and pore pressure can be measured automatically.




## Technical Specifications

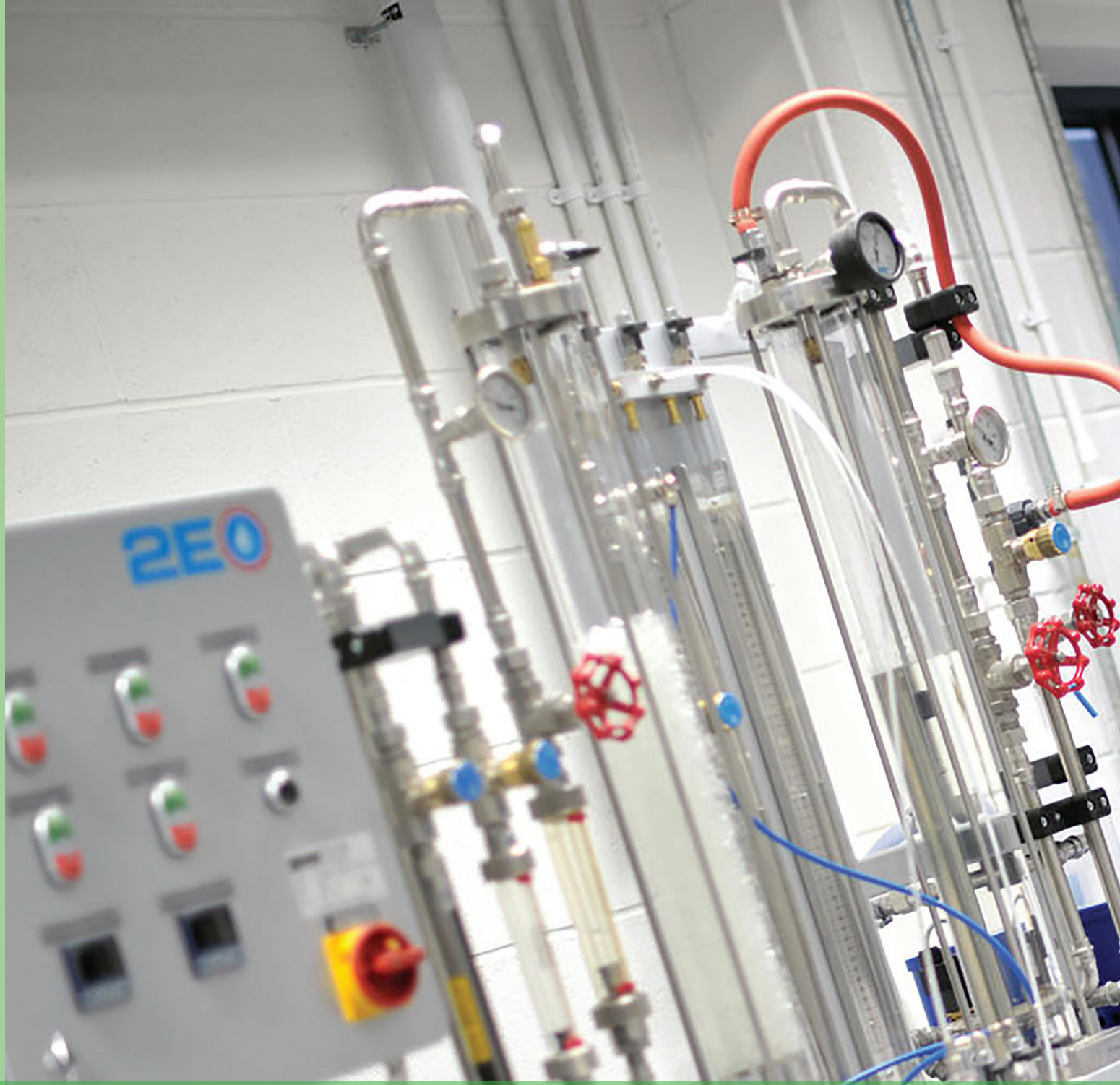
- Load Frame Capacity: 20 kN
- Max. Load: 5 kN
- Displacement Range: 50 mm
- Sample Diameter: 50 & 70 mm
- Control Types: Monotonic Stress/Strain Control
- Data Logging Frequency: Up to 100 Points per Sec.
- Data Transfer: 10 to 100 Mb/s
- No. of Acquisition Channel: 16 Channel 16/24- bit

## Features





- Automatic Static Triaxial (with servo-pneumatic valve) can perform any static-base stress path on the soil sample. This apparatus has been equipped with stress, strain, and cell pressure controllers that can be a great device for measuring soil's different parameters. Also, it can record 100 data in only one second which means you can have an exact output for measuring strength parameters. The measurement precision is mentioned in the above table. It can be ordered with Bender Element and Unsaturated soil system separately.



# CHEMICAL ENGINEERING LAB

# Chemical Engineering LAB

1. Mass Flow Controller
2. Autoclave
3. Chemical Reactor
4. Supercritical Carbon Dioxide Multi-Purpose Apparatus
5. Core Flooding
6. HP-HT Pendant Drop Interfacial Tension Measurement Apparatus
7. Helium Porosimeter
8. Core Acidizing
9. Pycnometer

## No.1

# Mass Flow Controller


## Definition

MFC units are used to regulate and control the flow of gases. IRASOL devices employ state-of-the-art technologies to determine the rate of gas flow based on the differential pressure as a result of gas fluid.

## Applications

• In general, the mass flow controller is a device that can be used to fully control the desired gas flow.


## Technical Specifications

- Inlet Pressure Range: 2-7 Bar
- Differential Pressure Range: 2-3 Bar
- Resolution: 0.1% full scale
- Repeatability: ±0.2% Set point
- Accuracy: ±1.5% Full scale
- Response Time < 2 s
- Operating Temperature: 0- 45 °C
- Valve Type Normally closed
- Measuring range
- Warning Alarm Low input pressure
- Power: 12 VDC, 2 A
- Electrical Connection DC Jack
- Dimension (L×H×W): 12 cm × 13.8 cm × 3.0 cm
- Weight: 1.2 Kg (1.4 Kg for MFC-1000B)

## Features

- Model: MFC-50B, MFC-100B, MFC-200B, MFC-500B, MFC-1000B, MFC-3000B, MFC-5000B
- Monitor and control keys on the device
- Device control by computer
- Device controlling software
- No need to a separate control unit
- High accuracy of measurement
- Measurement for different gases

## No.2

# Autoclave


## Definition

An autoclave is a pressure chamber used to sterilize equipment and supplies by subjecting them to high pressure saturated steam at 121 °C for around 20–15 minutes depending on the size of the load and the contents.


## Applications

- Equipment and supplies sterilizing
- Rubber vulcanization
- Hydrothermal synthesis
- Crystal growth

## Technical Specifications

- Power: 2000 W
- Allowable working pressure: 1.2 ± 0.1 bar
- Max temperature: 121.5 ±
- Voltage: 220 V

## Features

- Fiberglass outer body
- Digital screen for time, temperature and warnings
- Stainless or phosphor bronze tubes and fittings and acid resistant steel

## No.3

# Chemical Reactor


## Definition

Jacketed glass&steel reactors are designed for synthetic reaction of different types of materials in a controlled temperature.


## Applications

- dissolution of solids
- Multiple chemical reactions liquid/liquid, liquid/solid
- batch distillation
- extraction and polymerization
- Reflux

## Technical Specifications


- Glass reactor Capacity: 4 L, 6 L, 30L
- Vessel Type: Double Wall (Jacket) including Zero Dead Space Drain Stopcock
- Glass Reactors made from Europe Raw Material
- Smooth start and change of stirring speed while operation
- Operating Temperature : -20 °C to +200 °C ( ΔT: 100 °C)
- Operating pressure: atmospheric
- Operating Speed: 50- 450 rpm

## Features

- PTFE Anchor Propeller Stirrer Shaft (default)
- Wide range of glassware including condensers, dropping funnels etc

## No.4

# Supercritical Carbon Dioxide Multi-Purpose Apparatus

## Definition

Apex technologies co., designed and manufactured a supercritical fluid extraction equipment for different purposes including extraction of essential oils, removal of contaminations from soil (cleaning purposes), and regeneration of spent catalysts and fabrication of sub-micron and nano size pharmaceuticals or any soluble substance in $SCCO_2$. Supercritical fluid is any substance at a temperature and pressure above its critical point.

## Applications

- Applicable to investigate the effectiveness of supercritical carbon dioxide on deactivation of
- spent catalyst or removing any polar or non-polar contaminations
- Applicable in drug delivery, drug engineering, etc. by micronizing the solid particles using
- rapid expansion of supercritical solution

## Technical Specifications

- Transfer vessel for co-solvent injection × 1 (volume of transfer vessels: 100 cc made of stainless steel 316)
- HP-HT metering valve to control the output flow ×1 (Hoke)
- Tuneable spraying distance system × 1 (variable from 1 cm to 15 cm)
- Applicable to extract essential oils from herbs and seeds and etc.
- Oil-free air driven reciprocating Haskel/Maximator pump × 1
- Maximum working temperature of extraction vessel: 70°C
- Main process valves: BuTech / Autoclave / HIP
- Maximum working pressure of extraction vessel: 300 bar
- Minimum temperature of refrigeration system:-20°C
- Minimum carbon dioxide discharge pressure: 750 psi

## Features

- Touch panel equipped with a software for expansion algorithm
- Extraction vessel is equipped with two sight glasses enable the operator to monitor the contents of the vessel

## No.5

# Core Flooding

## Definition

Apex technologies Co., designed suitable Displacement Tests equipment called core flooding equipment to understand the oil trapping mechanisms and effective mechanism in oil recovery. In details, there are various possible techniques for Enhanced Oil Recovery (EOR) and Improved Oil Recovery (IOR) of depleted reservoir.

## Applications

This device is used to simulate reservoir conditions up to 10,000 psi and 150 degrees Celsius, depending on the model, using this device, you can simulate natural, secondary and tertiary extraction processes. In addition, this device can be used to check the process of over-harvesting by injecting gas-chemical substances, microbial substances, etc. Other applications of this device can be used to perform forced drinking steps to determine the Amot coefficient. Also, this device can be used to saturate rocks with water, oil, or any other material, and then obtain the change of wettability and the recovery factor of rock and oil.

## Technical Specifications

- Online software to log the pressure, displaced volume, injection rate, online
- permeability and temperature of the system
- Pressure transmitters: 2
- Core diameter: 1.5”
- Core length:1” to 4”
- Connections and valves: BuTech/Autoclave/HIP
- Pressure transmitter accuracy: 0.01 % full scale
- Heating mechanism: slim elements
- Max. working temperature: 150°C

## Features

- Hand pump equipped with a pressure gauge to control confining pressure
- General equipment to simulate the secondary, tertiary oil recovery
- processes including smart water injection, microbial EOR, …
- The lowest dead volume among its kind

No.6

# HP-HT Pendant Drop Interfacial Tension Measurement Apparatus

## Definition

Apex technologies Co., designed and manufactured a new generation, compact and easily portable high pressure high temperature pendant drop interracial tension equipment rated for maximum pressure and temperature of 10000 psi and 150 °C basically made of stainless steel 316 L.

## Applications

This device can be used to measure interfacial tension in liquid-liquid, gas-liquid systems, industries that produce detergents, detergents, glazes, paints, polymers, and all systems where the surface phenomenon is important. In addition, in the ift-pdsa-01 and ift-pdsa-02 models, it is also possible to check the contact angle, which can expand the use of this device in the oil and gas industry, material engineering and metallurgy, etc.

## Technical Specifications

- Pressure transmitter accuracy: 0.2 % full scale
- IFT range of measurement: 0.7-72 dyn/cm
- Manual XYZ camera positioner × 1
- Max. working temperature: 120 °C
- Max. working pressure: 600 bar
- Temperature resolution: 0.1 °C
- Wetted material: S.S.316 L
- Main cell volume: 20 cc
- Pressure transmitter × 1
- Cold back light×1
- Basler CCD camera: 2 MP

## Features

- Temperature controllable accumulator (Necessary for injection of live crude oil)
- Automatic injection of bulk and drop phases using two HP single pumps
- Online professional special software including pendant drop method for measurement of IFT

## No.7

# Helium Porosimeter

## Definition

Bench top-automatic helium gas expansion porosimeter especially designed for 1.5” cores in diameter with length of up to 3.5” is designed and constructed to measure the porosity in the rage up to 50 %. It can also have designed and constructed for whole core matrix cup upon to the request of the client. Utilizes a highly accurate 10-0 bar transducer. Exclusive use of computer controlled valves allows automated control of the measurement process.


## Applications

This device can be used to calculate the porosity of rock samples and various solid samples. Also, this device is used to calculate the Grain Density of stones, which is considered a very important parameter.

## Technical Specifications

- Core holder
- Core diameter: 1.5”
- Core length: 3.5”
- Maximum injection pressure: 10 bar
- Pressure transmitter
- Pressure transmitter accuracy: 0.1% full scale
- Porosity range: 0.2-50 %

## Features

- Standard billets for calibration
- Standard check plugs with known porosity
- Automatic valves for automatic controlling of the system
- Special software for calibration, automatic initial and final pressure recording, calculation of porosity, pore volume, grain density and bulk volume

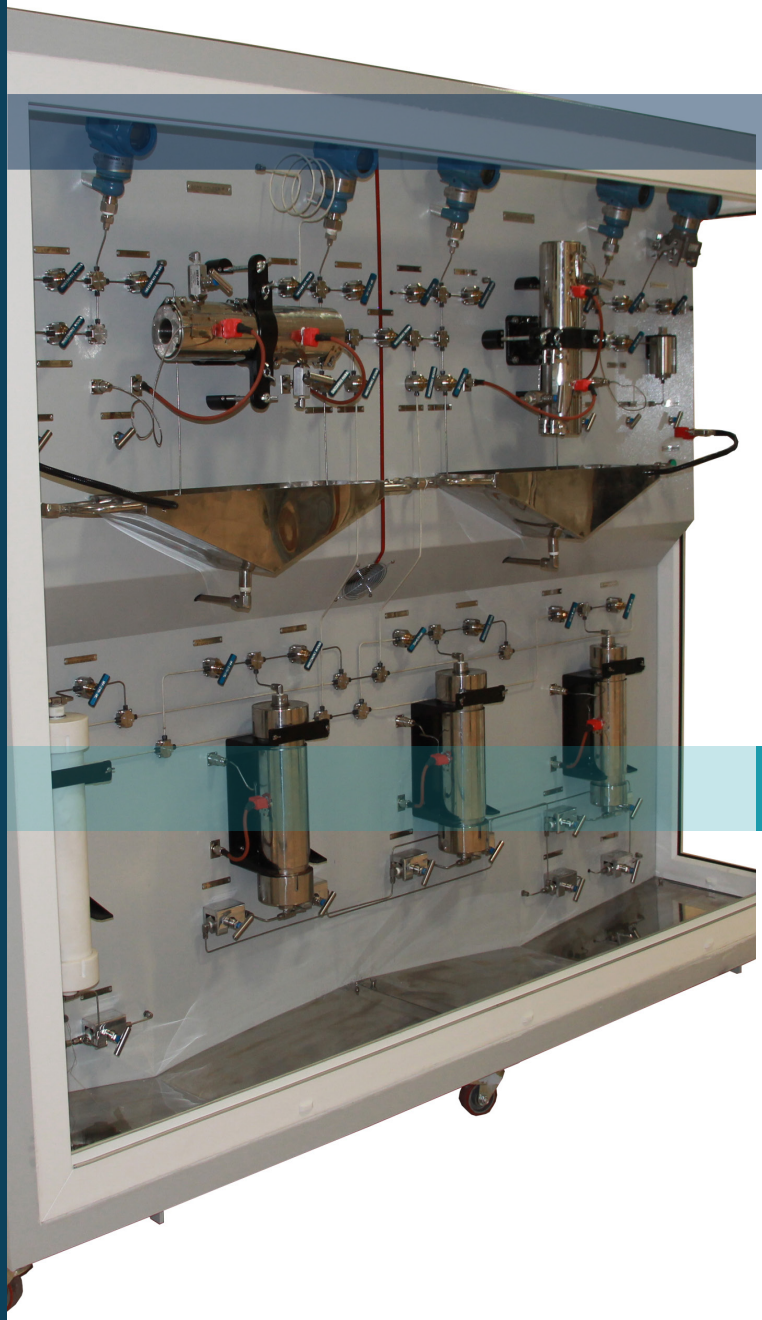
## No.8

# Core Acidizing


## Definition

The core acidizing system is designed in a way that it is possible to inject an acid solution into a rock sample at reservoir conditions to modify the natural permibility of rock by dissolving some minerals present in the rock.

Since the wetted material is hastelloy, it is possible to not only investigate the efficiency of different HCl-HF formulations to attack plugging minerals but also to study the effects of flow rate and temperature on core samples permeability.



## Applications

This device can be used to investigate the effect of the acidification process with acids such as HF, HCl, other acids and even a combination of these acids on the change in the permeability of reservoir rocks.

## Technical Specifications

- Maximum core length: 6”
- Maximum working pressure: 600 bar
- Maximum confining pressure: 600 bar
- Pressure transmitter×4
- Pressure transmitter accuracy: 0.1 % full scale
- Differential pressure transmitter×2
- Differential pressure transmitter accuracy: 0.1 % full scale
- Gas back pressure regulator×2: 600bar (Hastelloy C-276)
- Maximum working temperature: 100 °C
- Fluid accumulator×2: 750 cc (Hastelloy C-276)
- Fluid accumulator: 750 cc (Stainless steel 316)
- Low pressure accumulator equipped with low pressure safety valve for easy charging of the high pressure acid accumulator: 1000 cc (PTFE)


## Features

- Asymmetric design to perform two parallel acid injections into different cores
- Equipped with manual rocking system for core holder rotation at 90, 180, 270 and 360 degrees
- Vertical, horizontal and reverse injection of fluid
- Wetted parts: Hastelloy C-276 and stainless steel 316
- Computer system: Equipped with software for automatic data acquisition and monitoring system

## No.9

# Pycnometer


## Definition

To measure true volume and density of the powders and irregularly shaped solids, gas pycnometer is a fast and accurate one, which uses inert pure gases ($N_2$ or He) for measurements. The number of technological fields and industries that depend on density determination of powders and irregularly shaped porous solids is extensive including ceramic, mineralogy, geology, metallurgy, pharmaceuticals, catalysts, iron concentrates, cement, pigments and building materials.


## Applications

- To measure true density of powders such as steel concentrates, nano particles
- To measure porosity of porous materials
- To measure specific volumes of materials such as catalysts

## Technical Specifications

- Equipment dimension: 18×17×13.5 $in^3$
- Packing dimension: 25×23×17 $in^3$
- Net Weight: 15 kg
- Gross Weight: 20 kg
- Packing: Carton, Wooden
- Sample: the sample needs to be weighted first. It should be prepared depending on the sample type (heated up, dried or …).
- Sponge materials can not be analyzed using gas pycnometer.
- Non-effective porosities can not be measured using gas pycnometer.

## Features

- Fast (less than 10 min) and accurate (±0.02 g/cc) analysis
- Without reaction with the sample
- Repeatability and reliability
- Fully automatic calibration and measurement
- Multi volume sample cell (80-130 cc)
- This instrument has two types of manual and automatic.
- Data transfer to computer

# CHEMISTRY LAB


# Chemistry Lab

1. Laboratory Desktop Centrifuge
2. Fuel Cell Test System
3. Raman Microscope
4. Ultrasonic Homogenizer
5. Ion Mobility Spectrometry (IMS)
6. Potentiostat-Galvanostat
7. Multi-Channel Battery Test System
8. Refractometer
9. High Performance Liquid Chromatography (HPLC)
10. Water Analyzer
11. Magnetic Heater Stirrer
12. Gas chromatography
13. GloveBox

## No.1

# Laboratory Desktop Centrifuge


## Definition

Centrifuge is one of the most widely used laboratory devices, which is used to separate blood, serum, separate emulsions and suspensions, prepare protein-free filters, and other things.


## Applications

- Separation of blood plasma and clearing of urine in medical and research diagnostic laboratories
- Separation of cells yeasts and fungi from the culture medium
- separation of components of emulsions and suspensions and separation of anything

## Technical Specifications


- Equipment dimension: 26×46×37 cm
- Packing dimension: 40×60×40
- Packing: Carton
- Power: 300 Watt

## Features

- Four-branch swing-out rotor with a maximum speed of 4,000 rpm with four 6-house buckets (24 in total) for 15 ml. round test tubes.
- Bucket 2 house for 15 ml. Falcon test tubes, total 8 branches. (Option)
- Bucket 1 house for 50 ml. Falcon test tubes, total 4 branches. (Option)
- Bucket 1 house for 50 & 100 ml. round test tubes, total 4 branches. (Option)

No.2

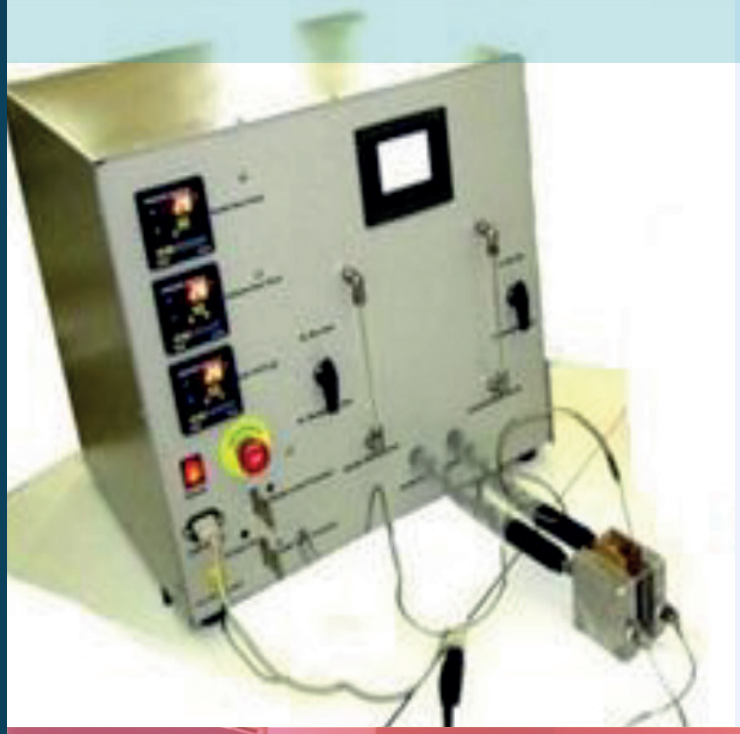
# Fuel Cell Test System


## Definition

Fuel Cell Test System is a powerful device to evaluate the performance and durability of fuel cell and its components under different operation conditions including temperature, pressure, anode and cathode relative humidity and reactant flows.

## Applications

- Performance and durability study of different types of fuel cells and their constituents including anode and cathode nanocatalysts, catalyst layer microstructure, gas diffusion layer, electrodes, membrane electrode assembly, bipolar plates and membranes under real operation conditions.



## Technical Specifications

- Maximum Load Current 12/ 80 A
- Maximum Load Power: 125 W
- Maximum Whole Cell Voltage: 20 V
- Voltage Accuracy: ±3 mV ±3% of reading, 1% Full Scale
- Reactant Gas Control System: All stainless steel
- construction (humidifiers, flow path, valves and MFC) with stainless steel fittings
- Mass Flow Control: Anode 2 SLPM and Cathode 5 SLPM
- Dual rate software controlled mass flow controllers
- Automatic N2 purge
- Back pressure Control: Standard: Manual control, 0-30 PSIG
- Temperature Controllers: cell, anode humidifier, cathode humidifier
- Dimensions: 53 (L) $cm^3$
- Weight: 25 kg


## Features

- Temperature Controllers
- stainless steel Gas Control System
- Dual rate software controlled mass flow controllers

## No.3

# Raman Microscope

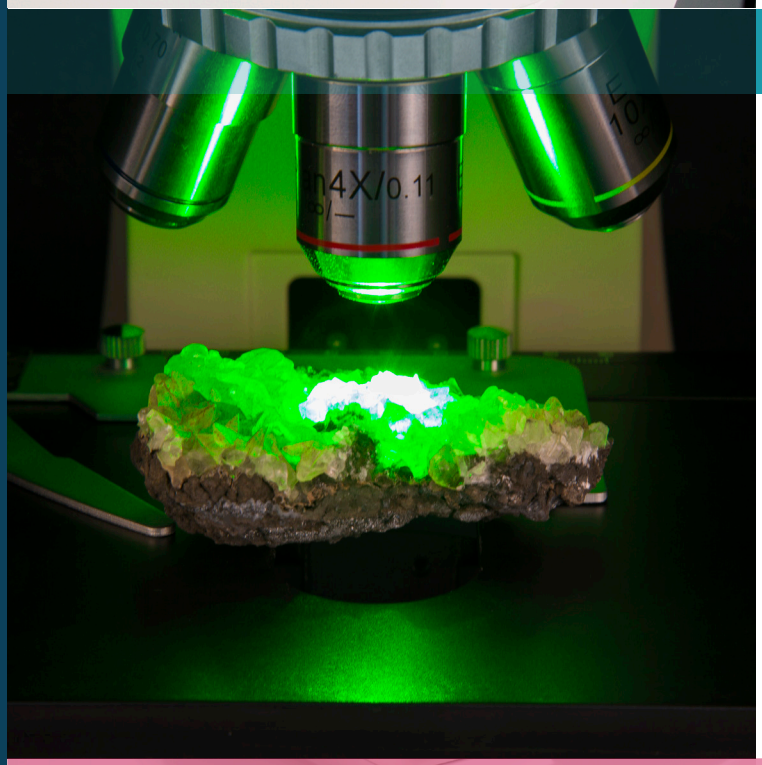

## Definition

Raman microscope is used for molecular analysis of chemicals with different phases with very high spectral and spatial resolution.

## Applications

Application for molecular identification and analysis of materials in various scientific fields such as:

- Chemistry
- Biomaterials
- Materials
- Ceramics




## Technical Specifications

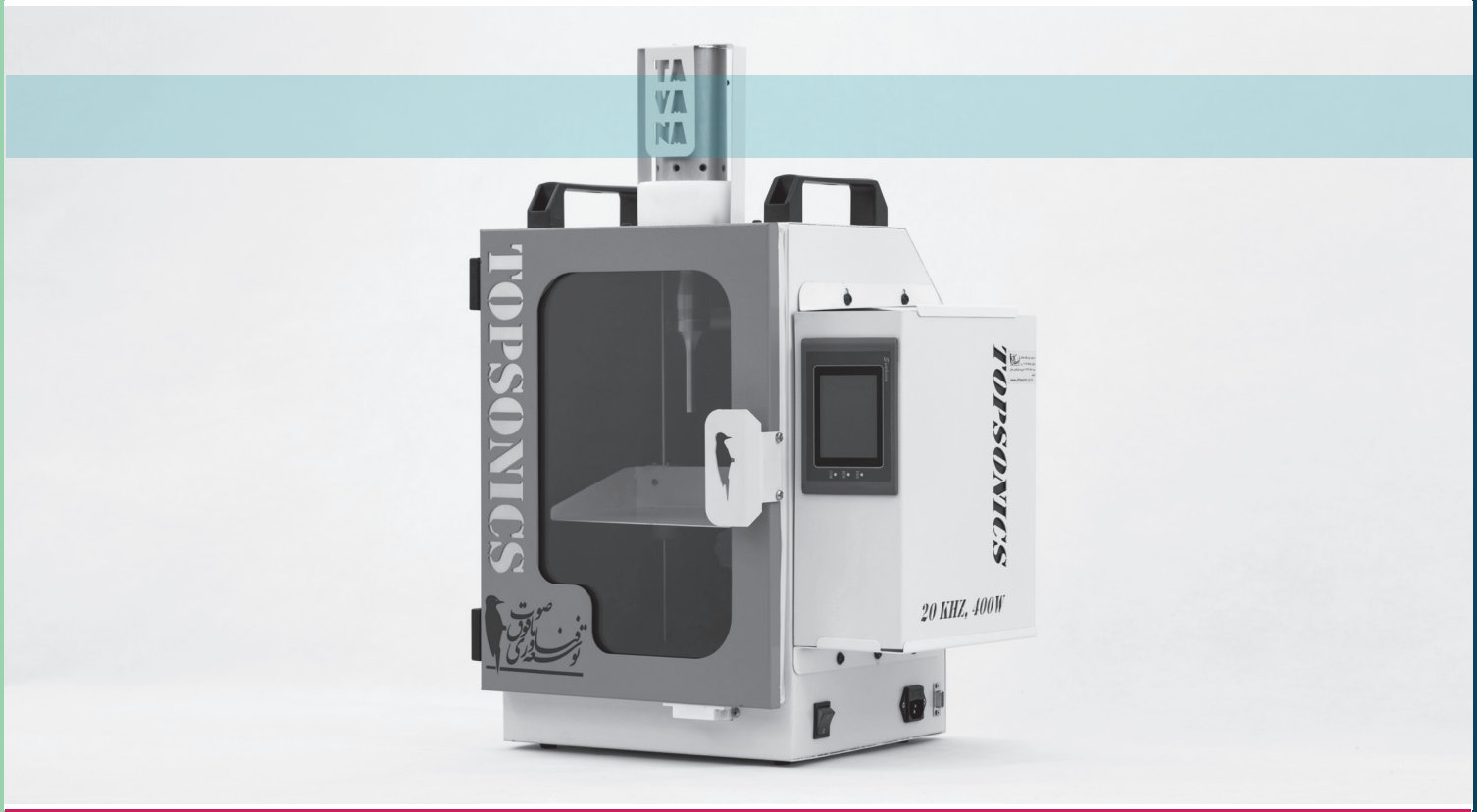
- Dimension: L:57.5 W:45 H:59.5 cm
- Net Weight: 25 Kg
- Gross Weight: 45 Kg
- Power: 100 W
- Package: Hard Case

## Features


- High Spectral and spatial resolution for accurate measurements
- Arbitrary spectral range of Raman
- Use of high sensitive and performance detectors
- The ability to cool the detector to reduce noise
- Using The powerful software “Tunsu” to receive and analyze information
- Functional, user-friendly and flexible
- Has national and international standards
- Sample: Types of chemical samples with different phases that contain molecular compounds

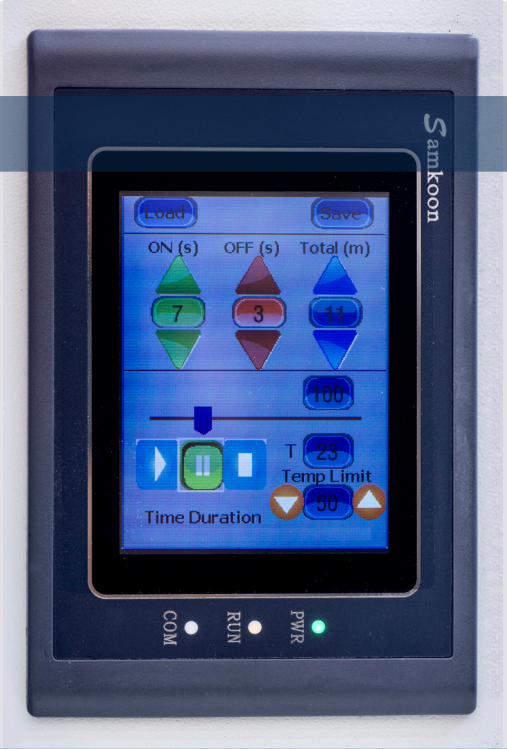
## No.4

# Ultrasonic Homogenizer




## Definition

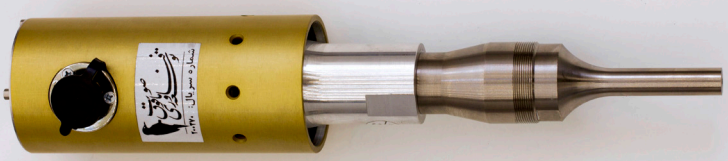
The ultrasonic power supply (generator) converts 60/50 Hz voltage to high frequency electrical energy. This alternating voltage is applied to disc-shaped ceramic piezoelectric crystals within the converter, causing them to expand and contract with each change of polarity. These longitudinal vibrations are amplified by the probe (horn) and transmitted into the liquid as ultrasonic waves consisting of alternate expansions and compressions.




## Applications

- Nano material (synthesis and processing)
- Dispersion
- Emulsification
- Waste water refinement
- Depolymerization & Polymerization
- Oil refinement & Desulfurization
- Nano-composite coating
- Cell lysing
- Tissue Homogenizing

## Technical Specifications



- Dimension: L:30 W:32 H:48 cm
- Net Weight: 20 Kg
- Gross Weight: 22 Kg
- Frequency: 20 ± 1 kHz
- Working Time: Up to 30 min
- Working mode: Pulse
- Pulse On: 0-20 s
- Pulse Off: 2-10 s
- Horn Diameter: 12 mm
- Transducer: 500 W – 20 kHz
- Horn Type: Ti-6Al-4V
- Power: 100-200-400-1200-2000
- Package: Carton box

## Features


- Soundproof case
- Set of ultrasonic convertor and horns
- Temperature  sensor

## No.5

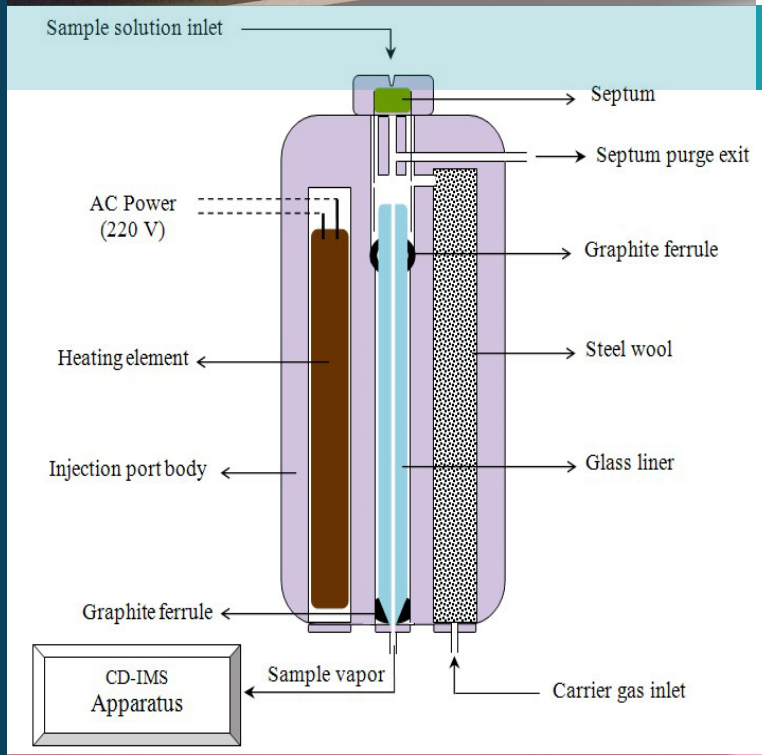
# Ion Mobility Spectrometry (IMS)


## Definition

Ion mobility spectrometer model CD1500- as a powerful analytical apparatus can be used for trace detection of various chemical compounds in both positive and negative modes, simultaneously. This instrument can be easily used as the detection system after various extraction techniques such as SPE, SMPE, and LPME, helping us to apply for different research in academic and industrial laboratories.

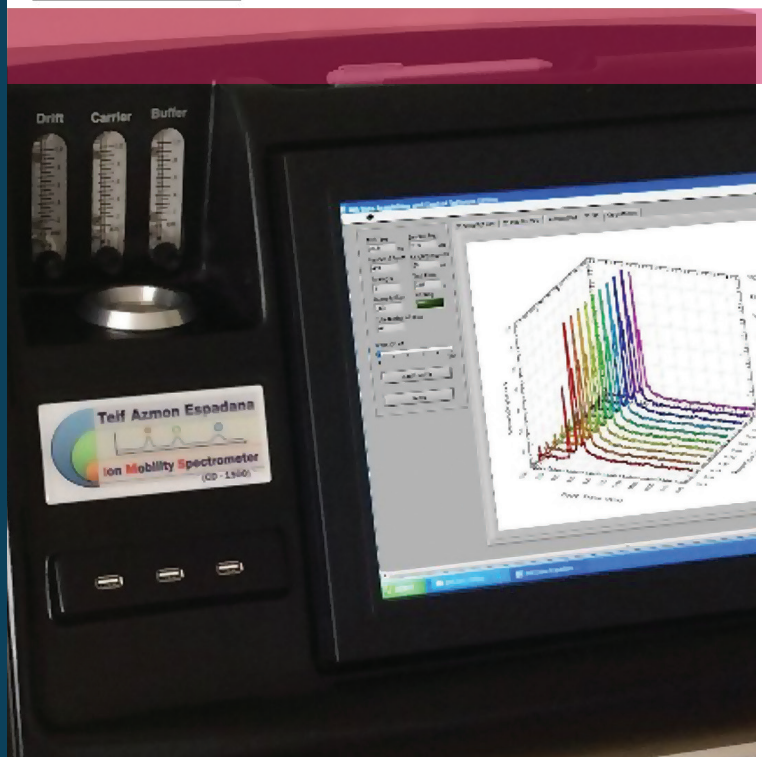

## Applications

- Analysis of chemical gases ($NO_x$, $SO_x$, $O_2$, CO, $CO_2$ and halogens) and pesticides (insecticides, fungicides, ...) and various chemical contaminant
- Analysis of explosives (TNT, DNT, RDX, HMX, NG)
- Analysis of clinical and illicit drugs (Antibiotics, morphine, codeine, methamphetamine, heroin)




## Technical Specifications

- Dimension: 50×60×60 cm
- Net Weight: 30 Kg
- Gross Weight: 40 Kg
- Power: 220 V, 900 W
- Operating temperature range: 25 to 220 °C.
- Working condition: 0 to 45 °C, less than 80 % humidity.
- Warm-up time: 60 minutes
- Package: Carton box

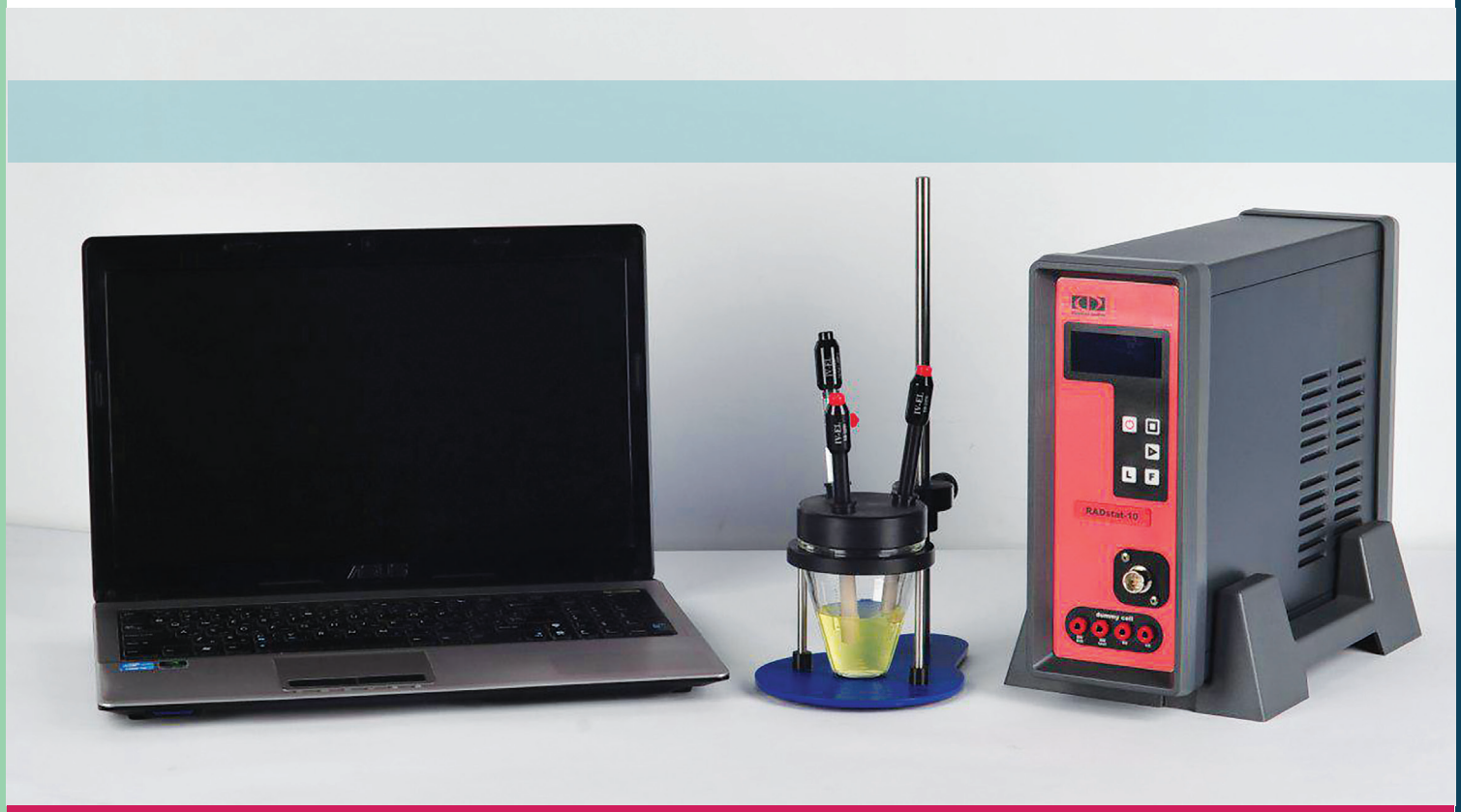



## Features

- Corona discharge ionization source with a novel design
- Unique and specially developed proprietary software
- Negative detection without interferences of $NO_x$
- Novel designed injection port for accurate injection
- Panel Touch Monitor (for IMS (CD-1500))
- Analysis in negative and positive modes
- Very fast analysis (< 5 sec) with high sensitivity (~ pg)
- Sample: Solid, Liquid, Gas

## No.6

# Potentiostat-Galvanostat




## Definition

Explain identification and application brieflyThe Radstat 10 is an innovative affordable high performance potentiostat-galvanostat-impedance analyzer which enables electrochemical studies and research for low price but still at maximum rate of precision.


## Applications

- Linear Sweep Voltammetry
- Cyclic Voltammetry
- ChronoAmperometry
- Amperometric Detection
- Multistep Potentiometry


## Technical Specifications

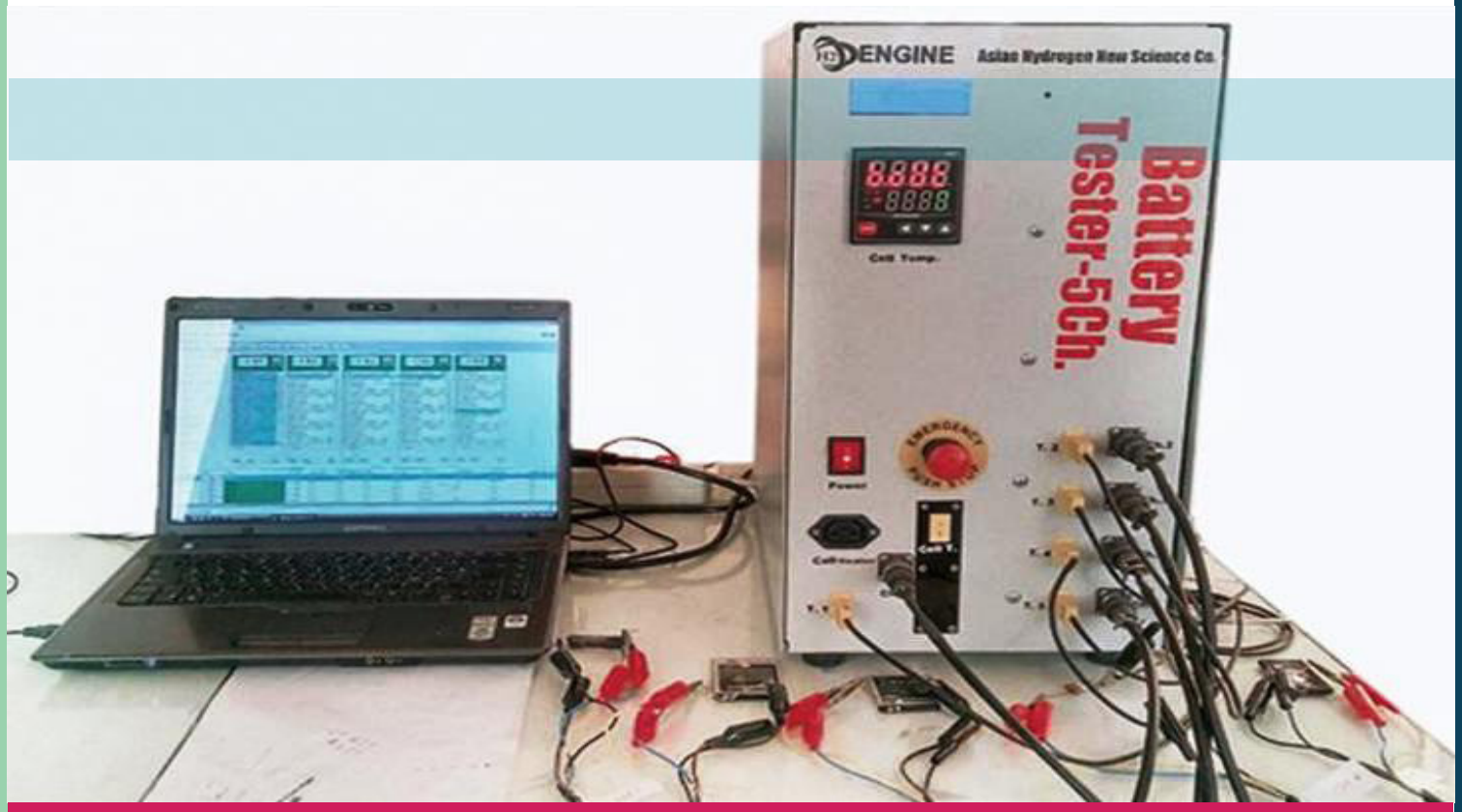
- compliance voltage: ± 8.0 V
- dc-potential range: ± 5.000 V
- dc-potential resolution: 0.15 mV
- applied potential accuracy: ≤ 0.2 %
- frequency range: 100 µHz to 50 kHz
- ac- amplitude range: 1 mV to 0.3 V (rms)

## Features

- Radstat 10 automatically sets the optimal current range
- Frequency scan
- Potential scan
- Multiple Pulse Amperometric Detection MPAD

No.7

# Multi-Channel Battery Test System




## Definition

Battery Test System is an advanced device to perform all of the charge and discharge test parameters under different modes; (constant voltage, constant current, constant power and constant resistance). Life cycle and the performance of different types of batteries , Super capacitors small fuel cells and electrolyzer can be evaluat by this system.


## Applications

- Different types of rechargeable and nonrechargable batteries.
- Capacitor & Super capacitors
- Different alchohols fuel cells, microbial fuel cells.
- Electrolyzers

## Technical Specifications

- Number of channels: 5 channels
- Maximum voltage: 5V
- Maximum Current: 1A
- Current levels : 1, 10 , 100, 1000 mA
- Current accuracy: 0.01 Full Scale
- Voltage accuracy: 1 mV
- Dimensions: 45 (L)× 27 $cm^3$
- Weight: 8 kg

## Features

- Test modes: constant current, constant voltage,
- constant power, constant resistance
- Analysis software: user-friendly, flexible
- Control software: user-friendly, powerful
- Battery temperature control system
- Suitable for battery, fuel cell and electrolyser

## No.8

# Refractometer


## Definition

Laboratory refractometer or brixmeter (BenchTop Refractometer), with the brand name «Prismatic», (made in Iran) with the latest technology and the use of the highest quality parts in order to measure and display the concentration of transparent and opaque solutions in research laboratories and quality control units of factories It is industrially designed.

## Applications

- Laboratories and research centers have many uses. Below are some cases in which a refractometer (brix meter) is used to measure the concentration and refractive index of solutions.

1- Measuring the specific gravity of urine from 1000 to 1080

2- Measurement of urine protein from 0 to 12 mg

- Chemistry: measuring the concentration of some acids and inorganic minerals, ammonia, alcohol, industrial oils, organic products and solvents, salt solutions, some adhesives, paints, etc.
- Petrochemical: measuring the concentration of paraffin and waxes, many chemical products derived from oil, slurries, hydrogen peroxide, hydrofluoric acids, etc.

## Technical Specifications

- refracrive index range: 1.32500-1.43000/1.54000
- Brix Range: 0-50/100 %Brix
- Brix mesurement accuracy: 0.05/0.07 %Brix
- Max sample temperature: 180 °C
- Optical sensor: CCD 3648 Pixel
- Prism Material: sapphire
- Board voltage and temperature: 19 to 29V, DC/ -5 to 60 °C


## Features

- The ability to automatically adjust the temperature of the sample in the standard temperature (ATC_Peltier)
- Fast measurement and short response time with the ability to adjust the damping coefficient from one to one hundred cycles
- Warning notification in inappropriate working conditions such as communication error, wire cut, temperature increase, voltage decrease, etc.
- Being isolated against electrical noise, mechanical vibrations, dust and moisture with IP67 degree of protection.
- It has a head made of AISI 316L stainless and acid-proof steel
- It has a sapphire prism with very high corrosion and heat resistance

No.9

# High Performance Liquid Chromatography (HPLC)


## Definition

high-pressure liquid chromatography, is a technique in analytical chemistry used to separate, identify, and quantify each component in a mixture. It relies on pumps to pass a pressurized liquid solvent containing the sample mixture through a column filled with a solid adsorbent material. Each component in the sample interacts slightly differently with the adsorbent material, causing different flow rates for the different components and leading to the separation of the components as they flow out of the column.

## Applications

- Qualitative and quantitative determination of materials in different combinations

## Technical Specifications

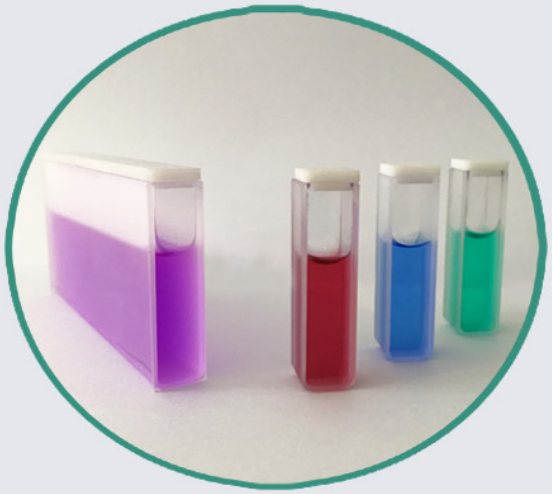
- Wetted Materials: Stainless Steel / PEEK, PVDF, Ceramics,
- Ruby
- Flow Rate: Micro: 0.001- 4.000 ml/min
- Analytical: 0.001- 10.000 ml/min
- Semi-Preparative: 0.001- 40.000 ml/min
- Flow Accuracy: ± 1.0 % @ 1.000 ml / min
- Flow Precision: ± 0.1 % RSD @ 1.000 ml/min
- Gradient Mixing: Dynamic; 516- 923 µl adjustable mixing
- volume
- Pressure Range: 0 – 40 MPa (0 – 6000 PSI)
- Pressure Pulsation: typical < 0.1 MPa or < 1.0 %
- Dimensions: 310 x 165 x 478 mm (W x H x D)
- Weight: 7.0 kg
- Power Supply: 100 – 250 ~V, 47 – 63 Hz, 20 W


## Features

- UV-Visible and photodiode detectors of PDA
- Isocratic and 4-solvent gradient pumps
- Sample automatic injection systems
- Vacuum degassers inside the pump
- Fraction collector
- Analytical and Semi preparative

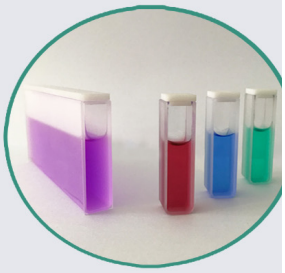
## No.10

# Water Analyzer

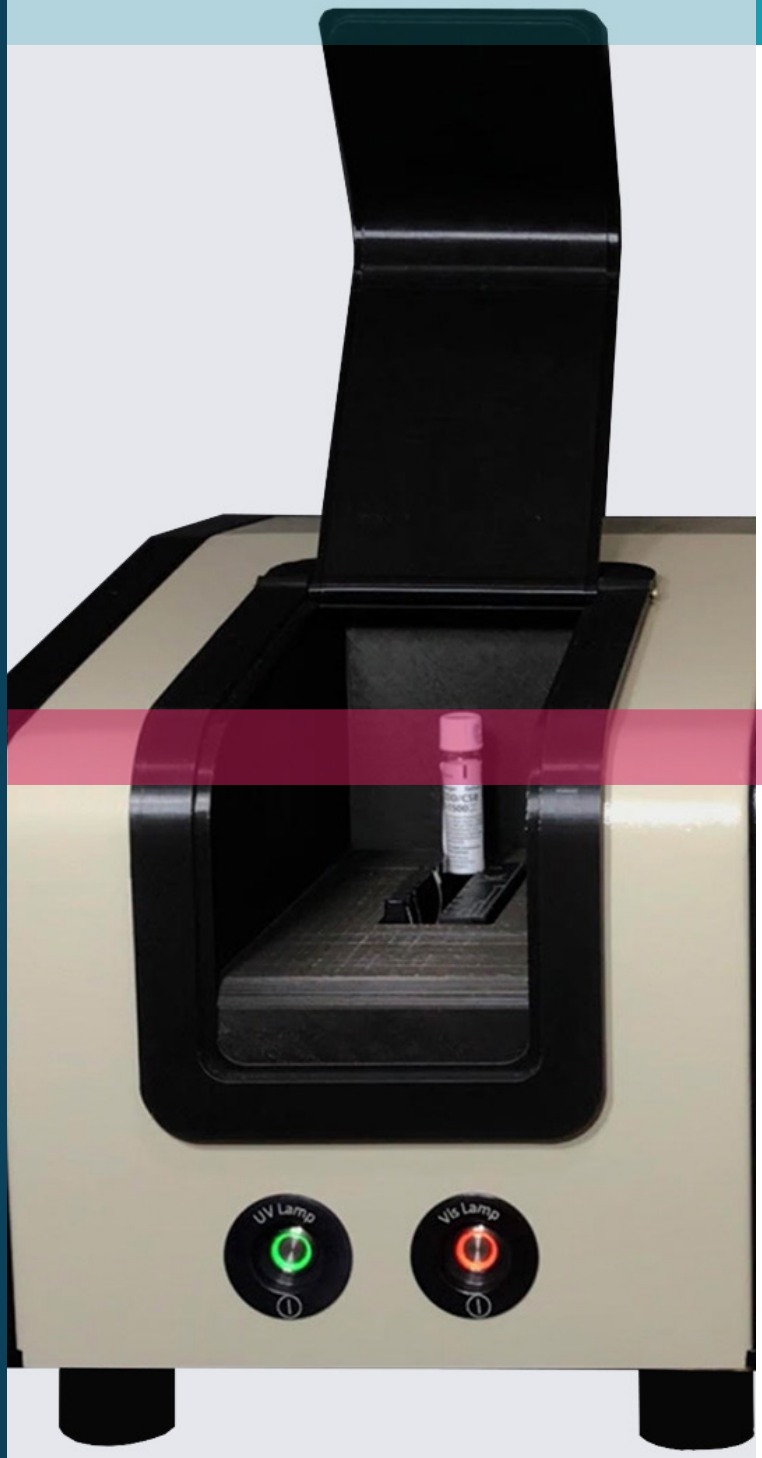
## Definition

Measuring parameters: Sodium (Na), Potassium (K), Calcium (Ca), Magnesium (Mg), total hardness, total alkalinity, Iron (Fe), Chlorine (Cl), Sulphate ($SO_4$), Nitrate ($NO_3$), Nitrite ($NO_2$), Phosphate ($PO_4$), Fluoride (F), Salt (NaCl), Heavy metals (Hg, Cd, Pb, As, ..), COD, TOC and E.coli bacteria and more.

## Applications

Drinking water quality measurements, Waste water quality measurements, Agriculture, enviromental science and engineering, Industrial water quality measuremens, Oil industry, Power stations, Food safety and quality, UV-Vis spectroscopy, general R&D and quality control Labs.




## Technical Specifications

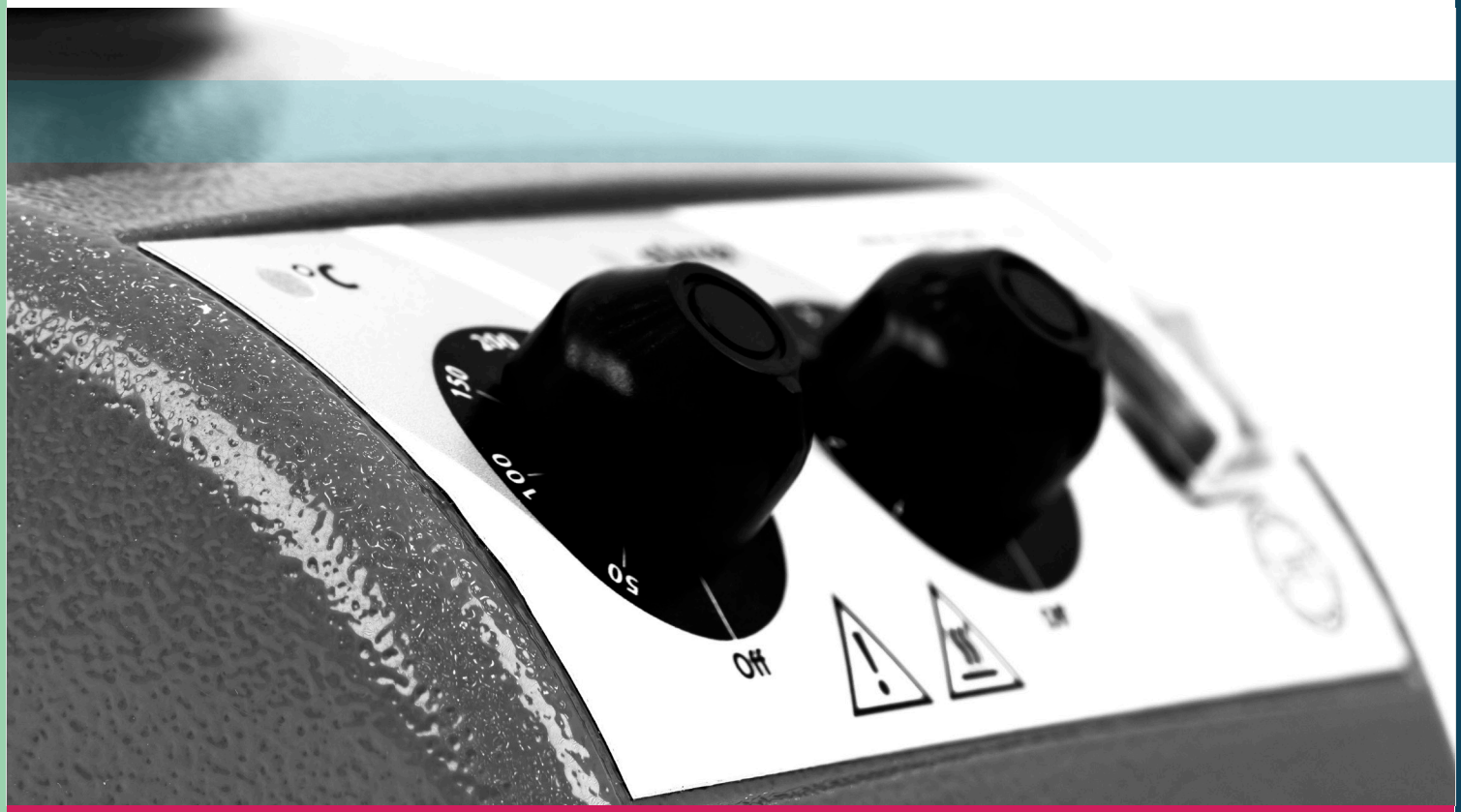
- Detection mode: Absorbance
- Wavelength range: 190 nm- 900 nm, selectable in 1 nm increments
- Light source: Tungsten halogen and deuterium
- Detector: Linear CCD SONY 2048
- Minimum sample size: 1 ml
- Wavelength accuracy: 0.1 nm
- OD accuracy: 0.002 OD
- Spectral bandwidth: 1 nm
- Dynamic range: 0- 4 OD
- Resolution: ± 0.01 OD
- wavelength repeatability: ±0.2 nm
- Power: 100- 240 Volts AC. 50/60 Hz.
- Software compatibility: Windows
- Dimensions: 48 cm x 38 cm x 28 cm
- Weight: 25 kg

## Features

- Full spectrum measurement in 190-900 nm wavelength range (1 nm increment) and OD measurement at any wavelength within the ul-traviolet-visible wavelength range
- Kinetics measurement and graph display
- Concentration measurement, display calibration curve (standard curve) and regression number
- Storing unlimited data and recording of the full spectrum data every millisecond

No.11

# Magnetic Stirrer Heater




## Definition

Hot plate stirrer is perfectly suitable for smooth to intense mixing and heating of low-viscosity fluids.

## Applications

- Accurate analysis of the chemical substances pH value
- Monitoring chemical reactions
- Safety and health control in food industries


## Technical Specifications

- Temperature range: 50-300 °C
- Maximum mixing power: 30 W
- Maximum capacity: 1.5 L
- Stirring speed range: 50-1800 rpm
- Hot plate maximum power: 700 W
- Maximum environment humidity: 60%

## Features

- Optimal and uniform temperature distribution
- Separate control over temperature and rotation speed
- Resistance to the most of common laboratory chemicals

## No.12

# Gas chromatography

## Definition

The GC2552- is the one of best choice of gas chromatography that provides superior performance for all chromatography analyses application. The major advantage for high quality analyses are the use of advanced electronic pneumatic control (EPC) that is optimized for its intended use for the specific inlet and detectors, high performance GC oven and enhanced electronic micro controller based control system.

## Applications

- Chemical laboratories
- Petrol and Petrochemical
- Environment protection
- Pharmacology
- Scientific research

## Technical Specifications

- Oven Temperature Ambient ~ 400 °C
- Inj – Det Temperature Ambient ~ 400 °C
- Injector Capillary- Packed
- Capillary mode Split- Splitless
- Injection mode Manual- Online
- Multiple Injection Online by 10 port valve
- Detector FID – TCD
- FID Detector High speed
- FID Dynamic range 10 e7
- FID detection limit 3×10 e-12 g/s
- TCD Detector High speed
- TCD filament 4 filament
- Gas control EPC
- Power 220 V AC – 2.5 KW
- Dimension 54 X 45 $cm^3$
- Weight 30 Kg

## Features

- FID detector
- Capillary injector
- Capillary inlet pressure by EPC
- Oven temperature programming via software
- PID temperature control

## No.13

# GloveBox

## Definition

Glowbox creates a closed space with controlled conditions and provides the possibility of performing sensitive experiments or making compounds that require an inert and controllable environment.

## Applications

Providing an environment with humidity and oxygen below 1ppm to make devices sensitive to humidity and oxygen

## Technical Specifications

- Device dimensions: length: 200 cm, height from the ground: 195 cm, depth: 75 cm
- Dimensions of the main compartment: length: 110 cm, height: 80 cm, bottom depth: 70 cm, top depth: 48 cm
- 304 stainless steel body with a thickness of 2 mm.

Front wall:

- 10 mil strength glass
- With the dimensions of the viewing window: 110 cm by 84 cm
- Niches: two niches with a length of 60 cm and a depth of 20 cm
- Differential pressure sensor with an accuracy of 1 pascal from 0 to 4000 pascals
- Large vacuum chamber pressure sensor -1000 mbar to +1000 mbar
- Small vacuum chamber pressure sensor -1000 mbar to +1000 mbar

## Features

- Pressure control through electronic system and differential pressure sensors
- Ability to communicate with the device through the Internet
- Device control through touch screen
- Multiple software routines defined for different working conditions of the device
- Very low leakage rate
- Various gas inlet ports and electrical ports
- Oxygen, humidity, organic vapor, pressure and differential pressure sensors installed on the device

# List of devices

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