



VIT[®]

Vellore Institute of Technology
(Deemed to be University under section 3 of UGC Act, 1956)
CHENNAI

RESEARCH AND CONSULTANCY FACILITIES AT

**ELECTRIC VEHICLES INCUBATION,
TESTING AND RESEARCH
CENTRE (eVIT-RC)**

VELLORE INSTITUTE OF TECHNOLOGY CHENNAI

Battery Cycler



Specifications:

- 20 kW capacity,
- 80V maximum and 300 A capacity
- Individual cells measurement
- Individual temperature measurements

FEATURES

- Can measure up to 80 V and 300 A
- 16 channels simultaneous data acquisition
- Individual cell voltage (16 channels and temperature measurement (8 channels))
- Programmable charging and discharging patterns

MEASURING CAPABILITIES

Batteries

Fuel Cells

Electrolyzers

Battery Management
System

Multiple Stack
Testing

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Pouch Cell Fabrication Facility



FABRICATION CAPABILITIES

Pouch Cells

Specifications:

- Pouch cell die cutter
- Hot roll press machine

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Environmental Chamber



Specifications:

- -20 to 120 C

FEATURES

Can be used to

- Individual cells and battery packs
- Super-conductors
- Electrolyzers, Fuel Cells

MEASURING CAPABILITIES

Batteries

Fuel Cells

Electrolyzers

Battery Management
System

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Glove Box (two port)



Make: Korea Kiyon (KK-011AS)

Equipment:

- Size: 1,200 (W) X 760 (D) X 890 (H) mm
- Material: SUS304
- Windows: Polycarbonate
- Glove: Butyl Rubber
- Leak Test: 0.05 vol%/hr as per ISO 10648-2

Antechamber:

- Size: 390 X 600 mm
- Vacuum: 1×10^{-3} Torr
- Tray: 220 X 580 mm

Purifier System:

- Purity Level: Less than 1 ppm O₂ and H₂O
- Purifier Regeneration: Auto Regeneration programmed on PLC
- Vacuum Pump: 180 lpm

Solvent Trap:

- Inside support stand of glove box
- Removal of organic solvents (DCM, Pentane, THF etc.)

Gas Chromatograph



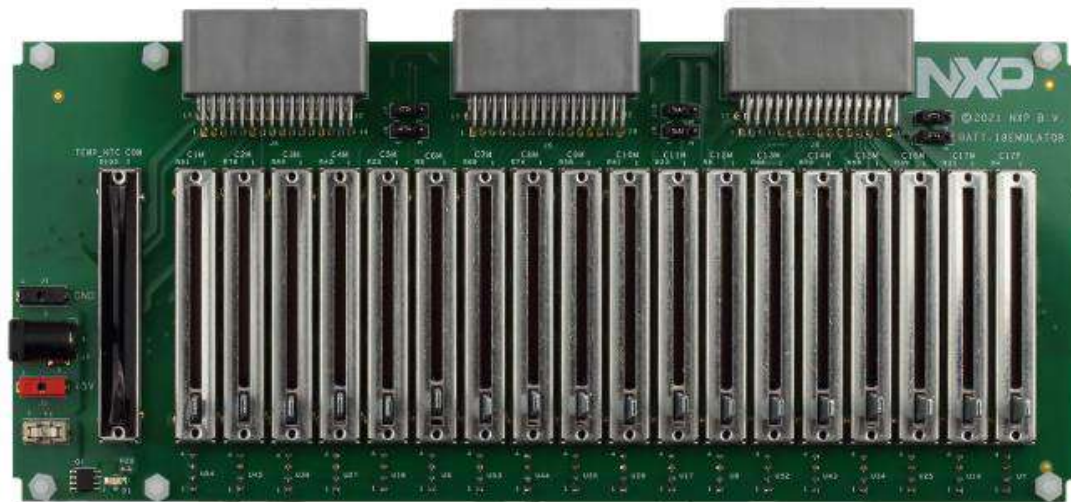
Column Temperature: Ambient + 10°C to 400°C

Carrier Gas Control: Digital control via electronic flow controllers (AFC) for both capillary and packed columns.

Injection Units: Split/splitless, single packed, dual packed, and direct injection options.

Detectors: FID, TCD, ECD, FPD, and FTD are supported.

18 Cell Battery Pack Emulator



Power Input:

5 V, 5 A with DC plug type P1J (2.1 × 5.5 × 11 mm),
tuning fork type, center positive

Cell Voltage Output:

Adjustable individual cell voltage (1.25 V to 3.3 V)

Temperature Sensor Emulator:

Adjustable (0 V to 4.9 V)

User Components:

LED power indicator

Can emulate batteries
accurately

Fuel Cell Test Bench

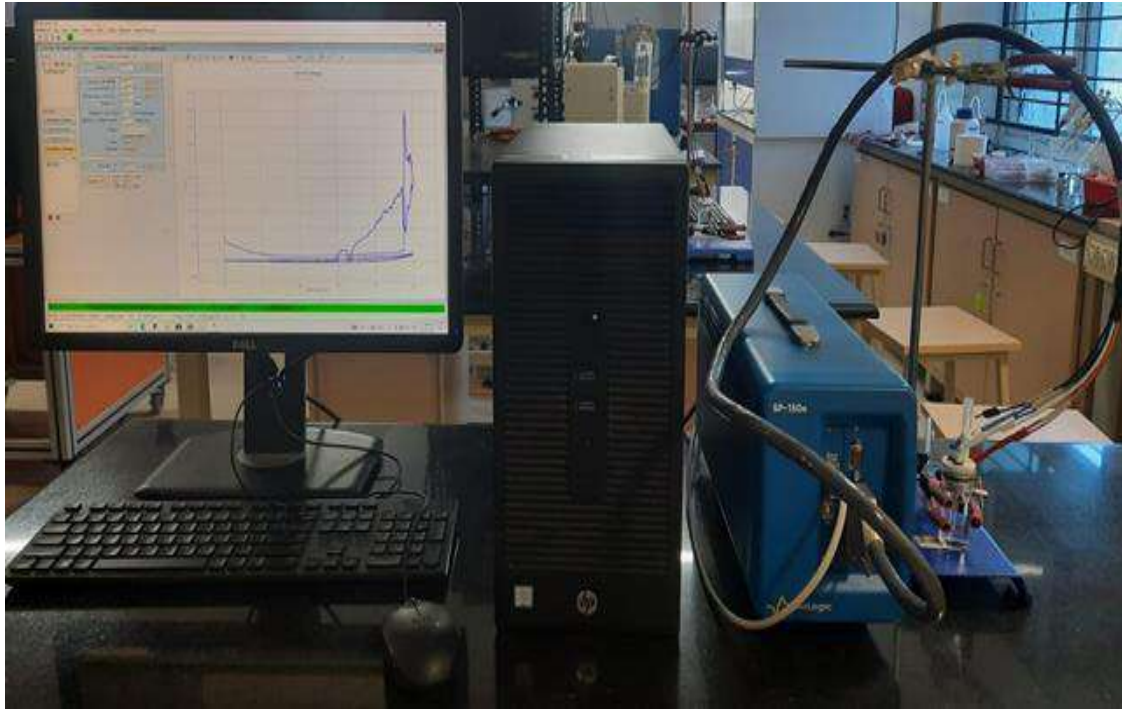


Specifications:

- Till 5 kW unit testing
- In build humidifier
- Partially Automated
- PLC controlled BoP

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Electrochemical Workstation: 1 Channel



Specifications:

- 01 Channel and Electrochemical Impedance Spectra enabled (1 MHz to 10 μ Hz)
- ± 10 V capability with ± 10 μ A to ± 1 A current range with accuracy < 0.1 %

FEATURES

All electrochemical-related studies such as cyclic Voltammetry, Linear sweep voltammetry, Chronoamperometry, Galvanostatic charge-discharge, Tafel slopes, Corrosion studies, battery cycling, impedance studies and many more can be done.

MEASURING CAPABILITIES

Corrosion and
Electroplating studies

Fuel Cells

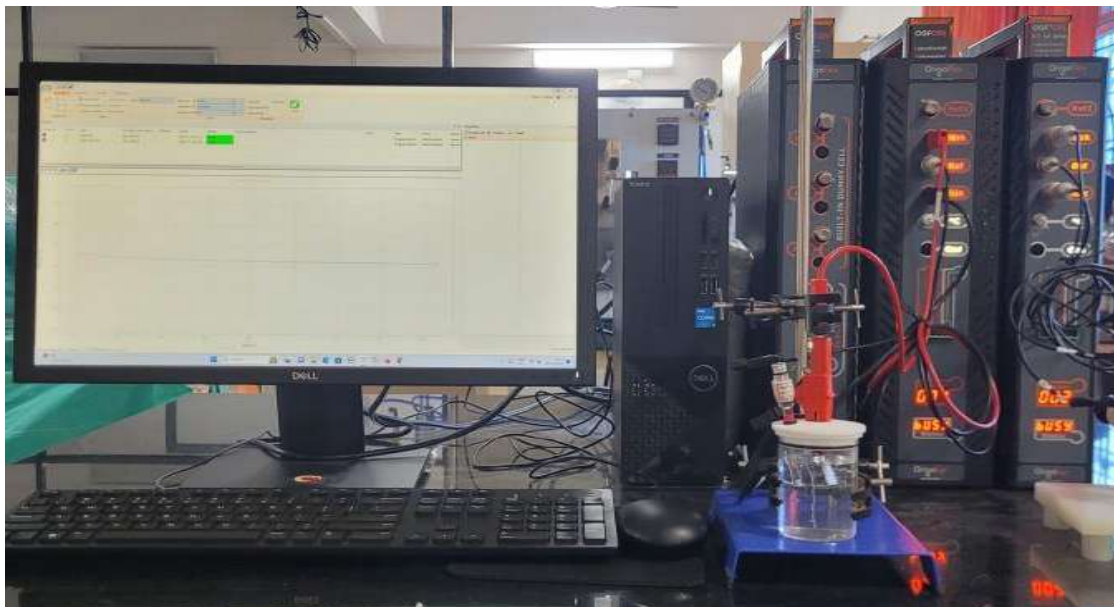
Super capacitors

Electrocatalysis

Li-ion and Metal-air
Batteries

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Electrochemical Work Station: 3 Channel



Specifications:

- 5 A and 15 V capacity
- Included 26 technics which includes , CV, LSV, Chrono-Potentiometer, amperometry, etc.,
- Impedance upto 6 MHz measurements
- 3 channels

FEATURES

- 3 Channels and Electrochemical Impedance Spectra enabled (5 MHz)
- ± 20 V capability with 5 Amps
- Electro catalytic studies such as Cyclic voltammetry, Linear sweep voltammeter, charge discharge studies, etc.,

MEASURING CAPABILITIES

Corrosion and
Electroplating studies

Fuel Cells

Super Capacitors

Sodium Ion Batteries

Metal Air Batteries

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Xenon (Xe) UV-Vis Light Source



Specifications:

- Lamp power 300 W
- Ozone free Xenon short arc lamp
- 50 mm illumination diameter with temporal light instability $\pm 2\%$

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FEATURES

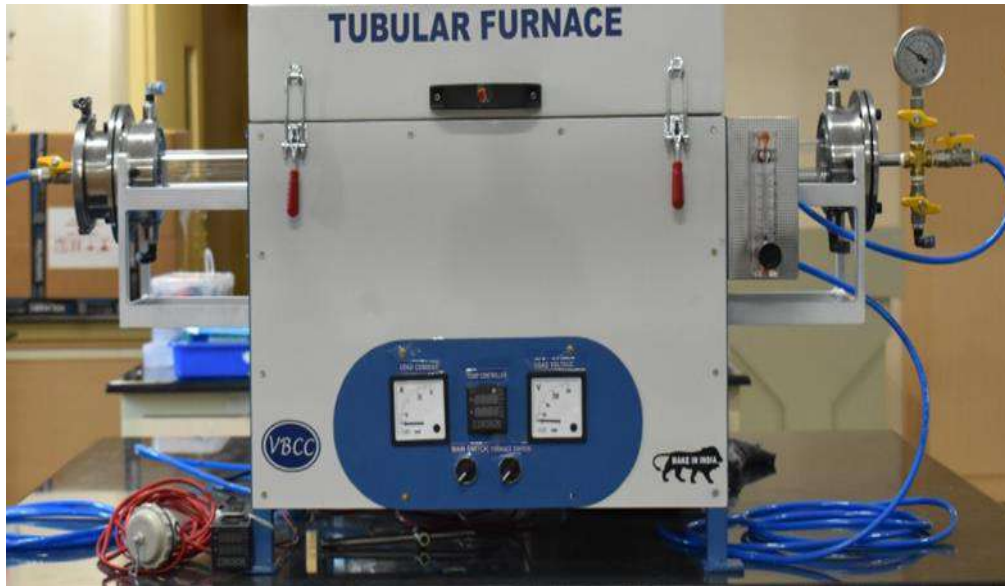
- Key to study solar cells, photo-electrochemical devices and photocatalytic energy conversion
- Closely matches the solar spectrum

MEASURING CAPABILITIES

Solar Cells

Photochemical and
Photoelectrochemical devices

Tubular Furnace



Specifications:

- Heating up to 1200 °C measurements
- 1 °C/ min to any heating rate is possible
- Passing any gas to maintain inert atmosphere is possible
- It can able to maintain vacuum and used to do CVD

FEATURES

- Used to synthesis the electrode materials below 200 nm
- Calcination temperature up to 1200 °C

MEASURING CAPABILITIES

Fault diagnosis in Batteries

Degradation Mechanism in Fuel Cells and Flow Cells

Rotating Ring Disk Electrode (RRDE)



Specifications:

- It can measure all mass transport phenomena
- It can able to perform Rotation Disc Electrode (RDE) and Rotating Ring Disc Electrode measurements

FEATURES

- Mass transport phenomenon in energy devices
- Range 1 to 4000 RPM

MEASURING CAPABILITIES

Mass transport phenomena for batteries and all electrochemical system

Degradation Mechanism in Fuel Cells and Flow Cells

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Hot Air Vacuum Oven



FEATURES

- Temperature range up to 300°C with the digital temperature and time controller and the vacuum pump controller.
- Vacuum range up to 760 mm of Hg

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Rotary Vacuum Evaporator



FEATURES

- Temperature range up to 100°C
- Digital temperature controller, Manual rotation controller and height adjuster
- Vacuum range up to 760 mm of Hg

Power Train Test Setup

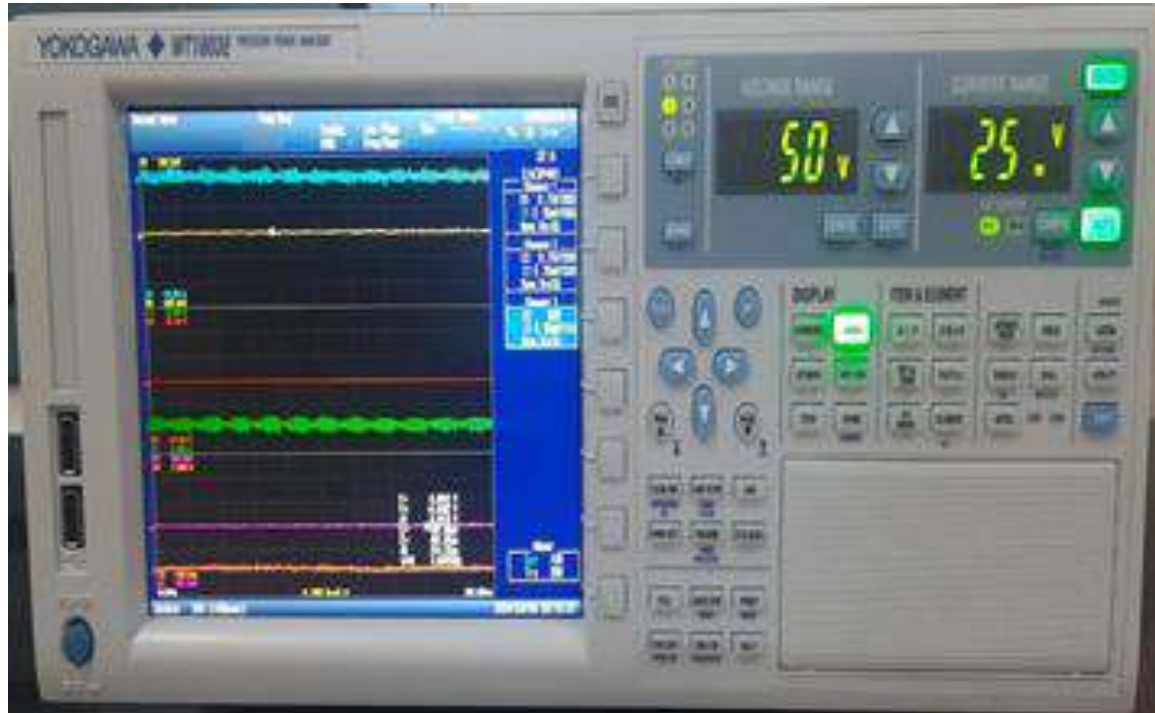


Features:

- Motor test facility:
- 5 N-m, 30,000 RPM
- Applicable for light electric vehicle motors

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High Performance Power Analyzer



FEATURES

- Power accuracy of 0.05% of reading plus 0.05% of range
- Capable of harmonics analysis up to the 500th order of a 50/60 Hz fundamental frequency
- Up to 6 input channels at 2 MS/s (16 bits)
- High resolution 8.4 inch XGA display
- Voltage range 1.5 V to 1000V (for CF3) and 0.75 V to 500 V (for CF6)
- Current range 1 A to 50 A (for 50 A input and CF3) and 500 mA to 25 A (for 50 A input and CF6)
- Current range 10 mA to 5 A (for 5 A input and CF3) and 5 mA to 2.5 A (for 5 A input and CF6)

Portable Scope Corder



FEATURES

- FFT Type: LS, RS, PS, PSD (Time windows: Hanning, Hamming, FlatTop, and Rectangle)
- Harmonic analysis (Harmonic RMS value, percentage of content, phase angle, distortion factor (IEC or CSA) and total RMS value)
- Maximum number of simultaneous analysis 8 channels
- Fundamental wave 50 Hz, 60 Hz or auto setting
- FFT points 2048
- Window width 10 periods (for 50 Hz), 12 periods (for 60 Hz) or 8 periods (auto)
- Power analysis can be selected from 1P2W (single-phase, two-wire), 1P3W (single-phase, three-wire) or 3P3W (three-phase, three-wire)

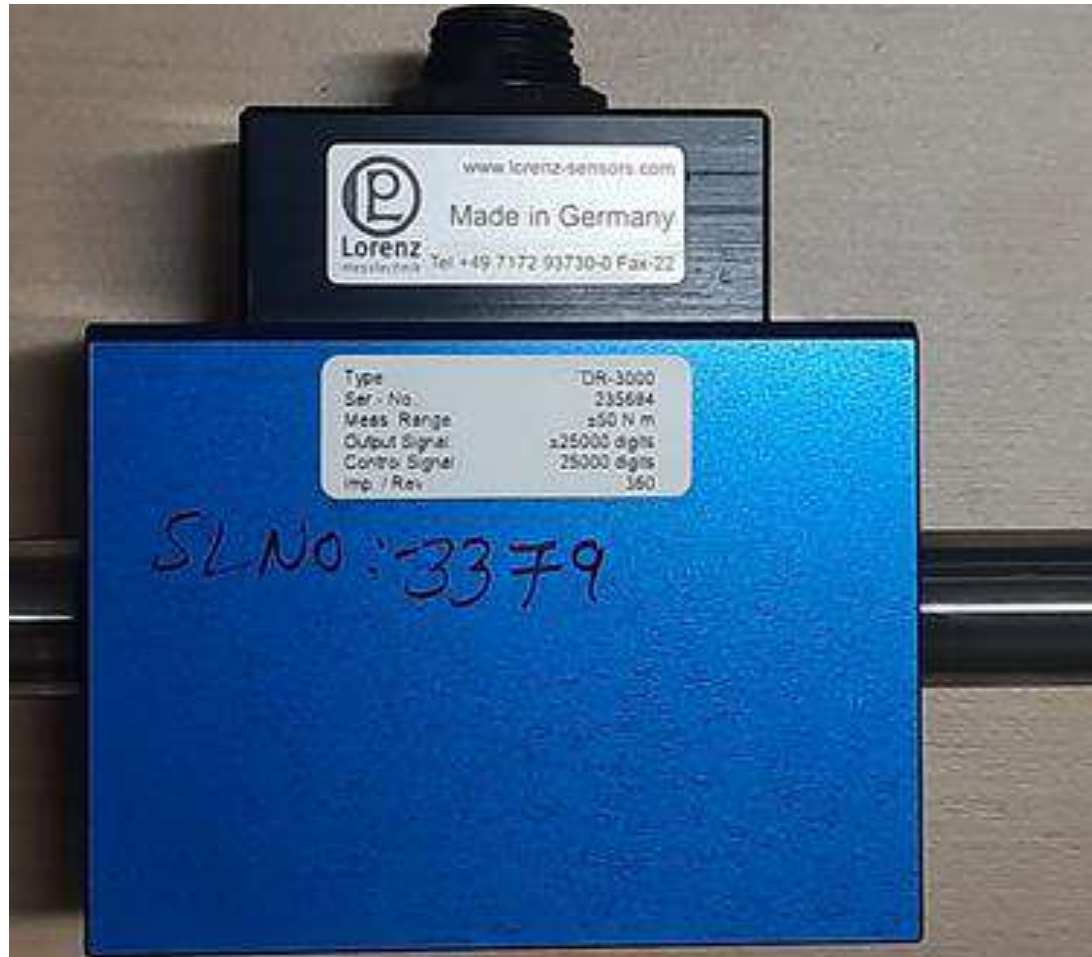
Torque Sensor 5 N-m



FEATURES

- Rotating torque sensor with non-contact transmission
- Type DR-3000, Article No. 111233, Weight 0.5 kg
- Rated torque 5 N-m, Speed 30000 rpm
- Spring rate 770 N-m/rad, Axial force 900 N, Lateral force 16.5 N
- Configuration and Evaluation Software DR-USB-VS, High accuracy, Integrated speed/angle measurement
- Up to 2500 measurements/s per measuring channel
- Very short axial length
- Accuracy class 0.1% of rated torque

Torque Sensor 50 N-m



FEATURES

- Rotating torque sensor with non-contact transmission
- Type DR-3000, Article No. 111114, Weight 1.6 kg
- Rated torque 50 N-m, Speed 20000 rpm
- Spring rate 9600 N-m/rad, Axial force 5000 N, Lateral force 142 N
- Configuration and Evaluation Software DR-USB-VS, High accuracy, Integrated speed/angle measurement
- Up to 2500 measurements/s per measuring channel
- Very short axial length
- Accuracy class 0.1% of rated torque

Computational Design and Visualization Laboratory



SOFTWARES

- ANSYS FLUENT, ANSYS RMxpert and MAXWELL, ANSYS MOTOR CAD
- COMSOL FOR BATTERY CELL AND FUEL CELL DESIGN, SOLIDWORKS, CYCLE TEMPO, TRNSYS
- MATLAB, Z-VIEW IMPEDANCE, CRYSTAL MAKER

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Experts & Expertise



Dr. M. Sreekanth
Thermal Management, Thermal
Power



Dr. Febin Daya
Wireless Charging, AI



Dr. Venugopal T
Thermal Management, H₂
Generation



Dr. Florence
Battery Management System, Robotics



Dr. Ganesan Pandian
Battery Chemistry, Electrolyzers



Dr. Sujoy Sarkar
Battery Chemistry, Electrolyzers



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