



# Electrical Vehicle Testing & Measurement Workbench

Nvis 7089EVM



Note Shown image is just for illustration original may differ

Transport is a fundamental requirement of modern life, but the traditional combustion engine is quickly becoming outdated. Petrol or diesel vehicles are highly polluting and are being quickly replaced by fully electric vehicles. Fully electric vehicles (EV) have zero tailpipe emissions and are much better for the environment.

Electrical Vehicle emerges very quickly nowadays due to such benefits. With the increasing adoption of electric vehicles in the landscape, this number is only expected to increase further.

**Nvis 7089EVM “Electrical Vehicle Testing & Measurement Workbench”** offers an excellent approach to learn complete fundamental aspects of Electrical Vehicle with a new updated technology and measurement devices.

It provides flexibility for the students to carry out experiments over machines adopt in Electrical Vehicles using a large selection of Industry standard inbuilt components. It enables user to put their theory knowledge into practice with ease. There is an additional facility to make wireless connection on workstation with computer and to monitor real time electrical parameters using computer interfacing software.

The design of the workbench ensures to get the highest quality practical experience to user. An integrated workbench consisting of instrument panel and working table should suitable for students to learn and perform testing of Electric Vehicle Components. Instruments should internally electrically connect and should be fitted/on Bench in the panel such that only front panel and necessary interfaces are easily accessible to use. Structure of workbench should be made up of approx. 1.5 mm thick MS pipe with top made up of good quality 19 mm thick plywood and covered with 1.8 mm off white color mica.



# Electrical Vehicle Testing & Measurement Workbench

Nvis 7089EVM

## Structure and design of Workbench follow the below specifications:

The basic structure is made of 38mm x 38mm x 1.5 mm Stainless Steel pipes for sturdiness.

The overall dimensions of Workbench is not less than W = 1200 mm; D = 900 mm; H = 1500 mm.

MS drawers 03 numbers W = 275 mm; D = 375 mm; H = 100 mm and thickness 1.2mm with handle & separate lock on each Drawer s provided.

## Features

- Built-in drives to operate PMSM, BLDC, PMDC & Induction Motor.
- Standard BS-10 terminals, patch cords for safety purpose
- High Quality Digital Tachometer for RPM Measurement which is also interfaced with DAQ (Data Acquisition System)
- Motors provided with standard mechanical loading arrangement facility
- Motors with “aluminum” casted brake-drum/pulley with heat suppression facility
- Rust free powder coat mechanical structure
- Machines with class “B” insulation
- Designed by considering all the safety measures

## Technical Specifications

Operating Voltage : Three phase, 415V  $\pm$ 10%, 50Hz

### Control Circuits

#### Three Phase Induction Motor Drive

Make : Siemens  
Topology : V/F  
Input Voltage : Three phase, 415V  $\pm$ 10%, 50Hz  
Power Rating : 1HP  
Output Frequency Range : 0-599Hz  
Protection Class : IP20

#### BLDC Drive

Voltage Rating : 24V  
Current Rating : 10Amp.  
Function : Speed reversal & braking

#### PMDrive

Fixed DC Output Voltage : 220V $\pm$ 10%, 2A  
Variable Output DC Voltage : 0-220V $\pm$ 10%, 12A  
Function : Separately & self excited mode

#### PMSM Drive

Output Voltage : 0-70VAC  
Frequency : 0–160Hz  
Graphical LCD : (128 X 64pixels)



# Electrical Vehicle Testing & Measurement Workbench

Nvis 7089EVM

## Electrical Vehicle Machines

### Three Phase Induction Motor

|                     |   |                   |
|---------------------|---|-------------------|
| Type                | : | Squirrel cage     |
| Rating              | : | 1HP               |
| Voltage Rating      | : | Three phase       |
| Speed               | : | 1440 RPM $\pm$ 5% |
| Insulation          | : | Class B           |
| Loading arrangement | : | Mechanical        |
| Brake Drum/Pulley   | : | Aluminum casted   |

### BLDC Motor

|                     |   |                                    |
|---------------------|---|------------------------------------|
| Mains Supply        | : | Single phase, 230V $\pm$ 10%, 50Hz |
| Machine Type        | : | BLDC                               |
| Rating              | : | 200W                               |
| Voltage Rating      | : | 24V                                |
| Current             | : | 8 A                                |
| Speed               | : | 2500 rpm $\pm$ 10%                 |
| Loading arrangement | : | Mechanical                         |
| Brake Drum/Pulley   | : | Aluminum casted                    |

### PMDC Motor

|                     |   |                   |
|---------------------|---|-------------------|
| Rating              | : | 1HP               |
| Voltage rating      | : | 220V $\pm$ 10     |
| Speed               | : | 1500 RPM $\pm$ 5% |
| Insulation          | : | Class B           |
| Loading arrangement | : | Mechanical        |
| Brake Drum/Pulley   | : | Aluminum casted   |

### PMSM Motor

|                     |   |                   |
|---------------------|---|-------------------|
| Rating              | : | 1HP               |
| Speed               | : | 1440 RPM $\pm$ 5% |
| Insulation          | : | Class F           |
| Loading arrangement | : | Mechanical        |
| Brake Drum/Pulley   | : | Aluminum casted   |

## Electrical Measuring Instruments

### AC Ammeter (2 Nos.)

|       |   |         |
|-------|---|---------|
| Type  | : | Digital |
| Range | : | 10A     |

### AC Voltmeter (2 Nos.)

|       |   |         |
|-------|---|---------|
| Type  | : | Digital |
| Range | : | 450Vrms |

### DC Ammeter (2 nos.)

|       |   |         |
|-------|---|---------|
| Type  | : | Digital |
| Range | : | 20A     |

### DC Voltmeter (2 nos.)

|       |   |         |
|-------|---|---------|
| Type  | : | Digital |
| Range | : | 300V    |



# Electrical Vehicle Testing & Measurement Workbench

Nvis 7089EVM

## Test and Measuring Instruments

Electrical Data Acquisition System includes three inputs each for Voltage and Current, two inputs each for DC voltage and DC current to measure an entire three phase parameters and DC parameters such as AC and DC voltage, AC and DC current, active power, reactive power, apparent power, power factor, frequency, etc. along with over load protection indicators and buzzer at the same time.

All these parameters will be displayed on the PC Software screen provided with the product. Nvis electrical data acquisition system is compatible for three phase/three wire and three phase/four wire configurations. User can also plot a real time graph between any of these parameters on computer through the facility of wireless connectivity.

## Technical Specifications

|                         |   |        |
|-------------------------|---|--------|
| Communication Frequency | : | 2.4GHz |
| RF Power                | : | 1mwatt |
| Range                   | : | 10Mtr. |
| Antenna                 | : | 2 nos. |

## Measurement Ranges

|                  |   |  |
|------------------|---|--|
| AC Voltage Range | : | 25-450Vrms, accuracy $\pm 5\%$                         |
| AC Current Range | : | 0.20-10Amp, accuracy $\pm 5\%$                         |
| DC Voltage Range | : | 25-300Vrms, accuracy $\pm 5\%$                         |
| DC Current Range | : | 0.20-15Amp, accuracy $\pm 5\%$                         |
| Frequency        | : | 45-55Hz, accuracy $\pm 5\text{Hz}$                     |
| Active Power     | : | 50-3000Watts, accuracy $\pm 5\%$                       |
| Reactive Power   | : | 50-3000Watts, accuracy $\pm 5\%$                       |
| Apparent Power   | : | 50-3000Watts, accuracy $\pm 5\%$                       |
| Power Factor     | : | 0.30 to 0.99 both lead and lag, accuracy $\pm 5^\circ$ |
| Electrical Speed | : | Up to 2500 RPM $\pm 5\%$                               |
| Torque           | : | 0 - 25 N-m $\pm 5\%$                                   |
| Auxiliary Supply | : | 230V AC $\pm 10\%$ , 50Hz                              |



### Battery Tester

- Multiple test functions
  - 4-terminal test, the test can't be influenced by impedance of test leads.
  - Contact inspection, to inspect the contact of test leads in testing
  - Deviation deduction (rel) and reference operation, eliminate the influence of base to test result.
- Feature of battery tester
  - Basic impedance accuracy: 0.1%
  - Basic voltage accuracy: 0.1%
  - Min. resolution of impedance: 1uΩ
  - Min. resolution of voltage: 100uV
  - Max. test speed 50 times/s
  - 1kHz AC constant current source test
- R, V, L, Z,  $\theta$  test
- 24 bit color 4.3 inch LCD display
- LCD resolution 480×272
- Direct and  $\theta$  % display
- V, I test signal level monitor function
- Graphic scanning and analysis
- 10 bin compare, High limit, low limit, pass and alarm function
- Statistics, like CpK, Cp.etc
- 100 groups of file for storage and load
- Information in screen stored in U disk.
- Automatic update through USB HOST
- Chinese-English operation system selectable
- Foot switch trigger function
- Handler interface
- RS232、 USB HOST, USB Device, GPIB, (optional), for communication with PC and remote control



### Multifunction Safety Compliance Analyzer

#### Features

- 7-inch capacitive touch screen, 800×480 resolution Linux operating system
- Seven-in-one comprehensive test system with the following functions:
  1. AC withstand voltage test
  2. DC withstand voltage test
  3. Insulation resistance test
  4. Ground bond test
  5. Continuity test
  6. Leakage current test
  7. Electrical performance test
- 500VA power AC withstand voltage design
- Maximum voltage 5kV for Insulation resistance test
- Leakage current supports a variety of human body impedance simulation resistance (MD)
- 500VA high-power AC power output (only TH9130, TH9131 this function is optional)
- Open/short circuit detection OSC
- ARC detection function
- Crash voltage test function
- Single screen display test mode, time, voltage, current, resistance value, test steps
- List display function: Simultaneously display the test results of multi-step settings and sequential execution
- Storage: 100 files, 50 steps/file