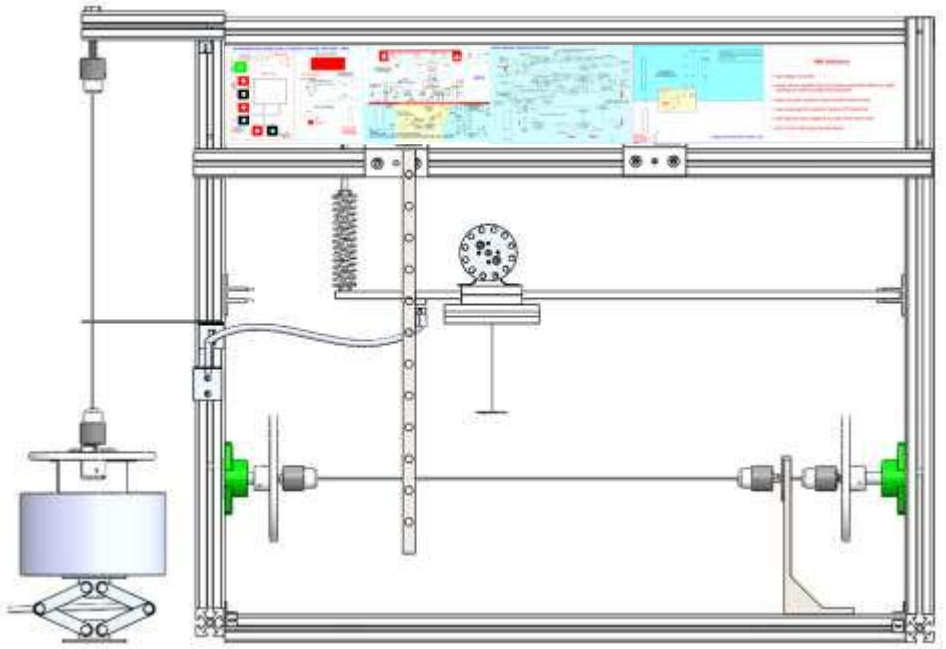
# UNIVERSAL VIBRATION TRAINER (MODEL: TMS-UVT)

Trinity



## SALIENT FEATURES

- Facilitates vibration study in mechanical lab for Torsional, lateral, forced, damped/undamped vibrations for spring mass system, Beam, single & Double Rotor system, simple, compound, bifilar, Kater's pendulums etc,
- Uses hall sensor to detect amplitude, frequency of vibration & connect to PC for paperless DAQ.
- Aluminum profile Sturdy (5x4) Modular Flat Panel system, carrying various components housed in plastic enclosures (panels) with colorful screwless overlays showing circuit schematic & its connection tag numbers for easy understanding and connection.
- Set of Instructor Guide & Student Workbook

## Technical Specifications

### ◆ Instrumentation Power supply cum Multichannel DPM panel (EMT 8)

- DC Multi Output power supply.
- Supplies DC power to neighboring signal conditioning circuit panels like EMT9, CIP1, CIP2, MIT12, CE7 etc. through 20 pin FRC cable.
- Provides 1 Ph. AC supply through 3 MCB's, 4A each to power up other panels in the rack.
- Optionally Multichannel 4 position DPM for Speed, Torque etc.
- Green SBS5 socket is provided for extend earth.
- Variable DC 0-12V / 3A to vary speed of DC vibrator motor with imbalanced rotor wheel.

### ◆ Sensor signal conditioning panel (EMT9/CE2/TAP).

- Supports signal conditioning for speed measurement with Instrumentation Amplifier with F to V converter to generate 0-2.5Vdc (FS).

### ◆ Sound Sensing Transducers Panel (MIT4)

- Support AC amplifier, precision rectifier for vibration amplitude measurement.
- Support F to V converter for vibration frequency measurement.
- Provides signal conditioning circuit using hall sensor for vibration amplitude / frequency measurement.

### ◆ Computer interface Panel (CIP/PCT1)

- Connects to PC (Win7/8/10) USB port through USB to IO Module & type to mini B cable.
- 4 ADC channels I/P: 0 to 2.5V FS with 1no input simulation pot. 1
- DAC channel O/P 2.5V FS.
- V to I function block: I/P 0 to 2.5V & O/P 0-20 or 4-20mA(100 ohm load) switch settable.
- I to V function block : I/P 4 to 20mA& O/P 0 - 2.5V
- USB IO module to interface 25 pin D connector on CIA panel to USB PC port enclosed in 25 Pin D shell using Type Ato mini B cable.

### ◆ PC (WIN7/8/10) based Virtual Work Bench Software (PC with USB port not in scope of supply) For details refer VWB option under TMS-VLAB.

- Supplied on installable CD works under WIN7/8/10.
- Variety of software tools/controllers like Fuzzy, PID etc. provided.
- **Graph Plotting :** Provided with X & Y cursor for measurement, under process monitoring mode can draw XT graphs for vibration frequency & amplitude measurements & XY graph to detect resonance

## Mechanical specifications :

| Parameters | Specifications |
|---|---|
| Exciter Unit | Mounted on rectangular beam vibrator consisting of 12V PMDC motor with imbalanced disc to generate vibration with weight attachment facility. Speed measurement using photo reflective sensor & slotted wheel. |
| Plastic oil drum | Diameter 230mm & height 100mm for oil, Screw jack to adjust height of mounted drum. |
| Flywheel/ Rotor | Mounted on pedestal bearing 20Ø with outside dia 200mm, thickness 12mm & weight 3.6Kg = 3 nos. |
| MS wire / Rod | 3 mm dia with lengths 820mm, 710mm, 500mm, 1 each = 3 nos. |
| Drill chuck | Size 13mm x13 mm = 5nos. |
| Rectangular beam | Size 1050x25x12 mm & 890x25x12, 1 each = 2nos. |
| Damper cylinder | Stroke length 120mm & dia 20mm. |
| Simple pendulum | Nylon plumb Bob of size 40x20 mm tied to nylon thread 0.7Ø x 700mm. |
| Compound pendulum | Rectangular MS bar of size 700x20x8 mm |
| Katers pendulum | Round MS bar of dia 10mm & length 700mm |
| Bifilar pendulum | Rectangular MS bar of size 500x40x5mm |
| Helical spring | Helical spring of Dia 42 mm, thickness 2 mm, Length 125 mm |
| List of experiments | **Study of vibration**<br>1) Study of undamped forced vibration of equivalent spring mass system (one end held beam).<br>2) Study of damped forced vibration of equivalent spring mass system (with damper).<br>3) Study of undamped forced vibration of equivalent spring mass system (with weight).<br>4) Study of undamped forced lateral vibration of the beam (both end held).<br>5) Study of damped forced lateral vibration of the beam (with damper).<br>6) Study of Torsional oscillations of single rotor shaft system.<br>7) Study of Torsional oscillations of two rotor system.<br>8) Study of Torsional oscillations & determine damping coefficient (without oil).<br>9) Study of Torsional oscillations & determine damping coefficient (with oil).<br>10) To verify Dunkerley's rule.<br>11) Study of longitudinal vibration of helical spring & to determine the frequency & time period of oscillation .<br><br>**Study of pendulum**<br>12) Study of simple pendulum & determination of g (Gravitational constant)<br>13) Study of compound pendulum & determination of acceleration due to gravity (g) & radius ogyration.<br>14) Study of Kater's pendulum & determination of acceleration due to gravity (g).<br>15) Study of bifilar pendulum & determination of radius of gyration & moment of inertia.<br>16) Study of torsional pendulum to determine moment of inertia & rigidity modulus of material. |