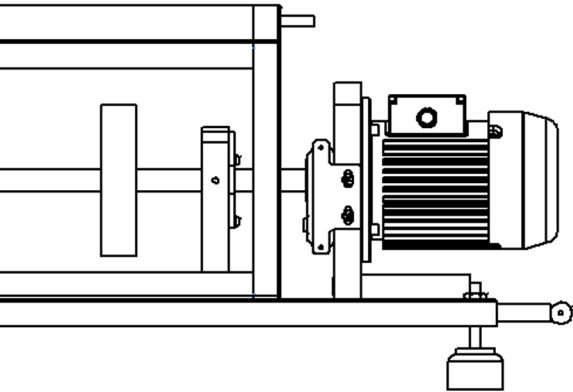


TMFSS MICRO S E R I E S

Compact And Portable Machinery Fault Signature Simulator For Learning Machine Fault Diagnosis

MACHINERY FAULT SIGNATURE SIMULATORS

Faults such as unbalanced rotors, misaligned shafts, cracked bearing races, looseness in foundations, etc. are common in the industry. TMFSS is a useful tool for simulating the fault signatures of components of industrial machinery. These test benches provide a platform for the users to simulate the above faults in a test environment for learning / sensor prototype testing & qualification / developing algorithms for predictive or preventive maintenance/research on signature feature extraction & signal processing techniques etc.



TMFSS MICRO

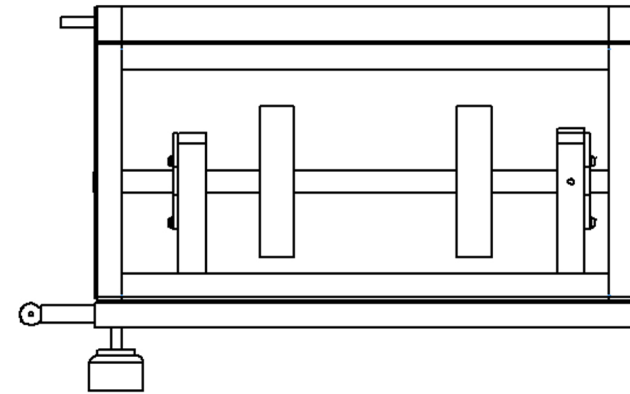
The Micro-Series is a portable and compact version of the TMFSS, designed to simulate five machinery faults and one critical speed. This model is commonly used for training and demonstration purposes. Its lightweight and portable design make it ideal for on-site demonstrations.

ABOUT TIERA

TIERA is a company working in the domains of vibration testing, training, Test and measurement System development & sales. The company has been manufacturing the simulators for 5+ years, delivering cost-effective test benches without compromising the quality. It is backed by a team of experts in Vibration testing, Mechanical & Electronics domain product development, and Software development. We have developed customized test benches for customers in the past, for research organizations like Vikram Sarabhai Space Centre, Trivandrum & Academic Research Institutions like the National Institute of Technology Silchar, Assam, etc. based on their requirements.

LIST OF EXPERIMENTS

- Static and dynamic unbalance simulation and subsequent waveform, frequency analysis and order spectrum analysis with Phase measurements.
- Study of unbalance of the multi-rotor system and overhanging rotors.
- Single plane and dual plane balancing techniques.
- Order spectrum, order tracking, and orbit plots.
- Misalignment studies using frequency spectrum, order spectrum and phase analysis.
- Run up and coast down test with waterfall plots.
- Bump testing.
- Bearing condition monitoring using demodulation and enveloping.
- Foundational Looseness.



SPECIFICATIONS

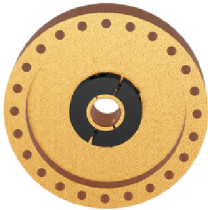
Electrical

Motor & Drive	0.1 HP DC motor (24V) with PWM based SCR Control for speed control with control Panel
Max RPM	Maximum speed of 7000RPM
Power Supply	230 V AC, Single Phase 50 Hz

Mechanical

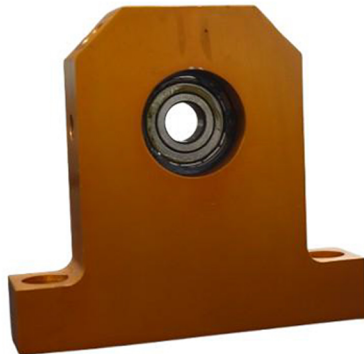
Shaft Diameter	12 mm diameter turned, ground and polished shaft.
Bearing	Deep groove bearings are used. Two bearing blocks (aluminum alloy) with drilled holes for varying the rotor span.
Base & Foundation	140X 25.4X 550 (B X T X L), powder coated aluminum-alloy base plate. Mounting holes fitted with Heli coil inserts for repeated mounting/detaching. Alternate holes are provided for adjusting the effective distance between bearing mounts. Proper damping pads are provided for isolation. Stiffening is provided to avoid resonances.
Rotors	Two Anodized Aluminum discs 100 mm X 32mm (Dia X T) with evenly spaced holes at the sides for adding weights for simulating and correcting unbalance.
Mounts for Sensors	Mounting pads for magnetic base at bearing housing and motor housing. Slotted plates for placing tachometer and proximity probes
Safety Features	Acrylic cover & Emergency Stop button for extra safety.

TMFS Simulator: A Sneak Peek



ROTOR DISC

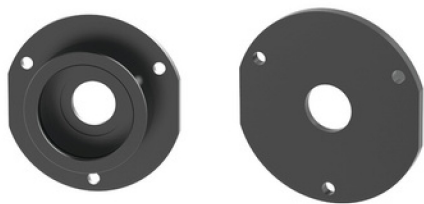
- Learn the effects of rotor unbalance on vibration spectra.
- Learn static, dynamic, and overhanging unbalance conditions.
- Learn Single and Dual plane balancing.



BEARING ADAPTER

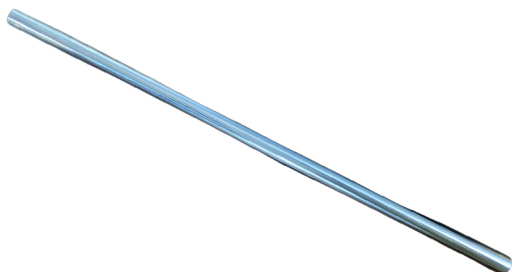
- Learn fault signature from different stages of bearing faults.
- Calibrated fault of slight or hair line fault, Medium and Severe ranges of Faults can be studied to find the effects on vibrations
- Learn Signal Processing techniques for Bearing Fault detection like envelope, Cepstrum analysis etc

TMFS Simulator: A Sneak Peek



SLEEVE BEARINGS

- Learn to detect looseness in sleeve bearings and to perform orbit analysis using eddy current probes



BENT SHAFT

- Learn the signature vibration from bent shaft system.
- Learn to distinguish between bent shaft, misalignment and unbalance using spectrum and phase measurements.

TMFS Simulator: A Sneak Peek

Add-ons

Details	Code
IEPE Data Acquisition System	
2 IEPE Channels , Simultaneous , Max 48 Kilo Samples/s	Phono vibe-D
4 IEPE Channels , Simultaneous , Max 64 Kilo Samples/s	Phono vibe-Q
8 IEPE Channels , Simultaneous , Max 64 Kilo Samples/s	Phono vibe-O
Software Options	
TVIB Sound & Vibration Analysis Modules	
Time & FFT Spectrum Analyzer with Postprocessor	TSAP 201
Basic Vibration meter	TVM202
Advanced Vibration meter	TVM203
Sound level meter	TSLM 204
FRF Test	TIST 205
Waveform Generator	TWGM 206
Order Analysis Basic	TOA 207
Order Analysis Advanced	TOA 208
Balancing Basic	TB 209
Balancing Advanced	TB 210
Human Vibration meter	THVM 211
Orbit Analysis	TO 212
Sensors	
Proximity Probe Kit: Eddy current probe, Driver and Cable 5 meter, Mounting Accessories	ECP 100
Accelerometer kit: IEPE Accelerometer, Cable 3 meter, Mounting Accessories	VA 101
Microphone kit: IEPE Microphone, Cable 3 meter, Holder	AA 102
Bearing Load cells	BL 103
Static Load Measurement Unit	LM 104
Modal Analysis Kit	
Impact Hammer, Impedance Head, Electrodynamic Shaker, Amplifier, Signal Generator, Software	MA 300
Training	
Vibration Analysis based on ISO 18436 CAT I, CAT II	CVA 300
Experimental Modal Analysis: A Practical Approach	CEMA 301
TOLean VIBE Simulator Software	TOL 302

CUSTOMERS

Honeywell

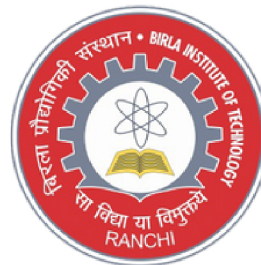
SCHAEFFLER

CYIENT

LAB³



CHENNAI
INSTITUTE OF TECHNOLOGY
(Autonomous)



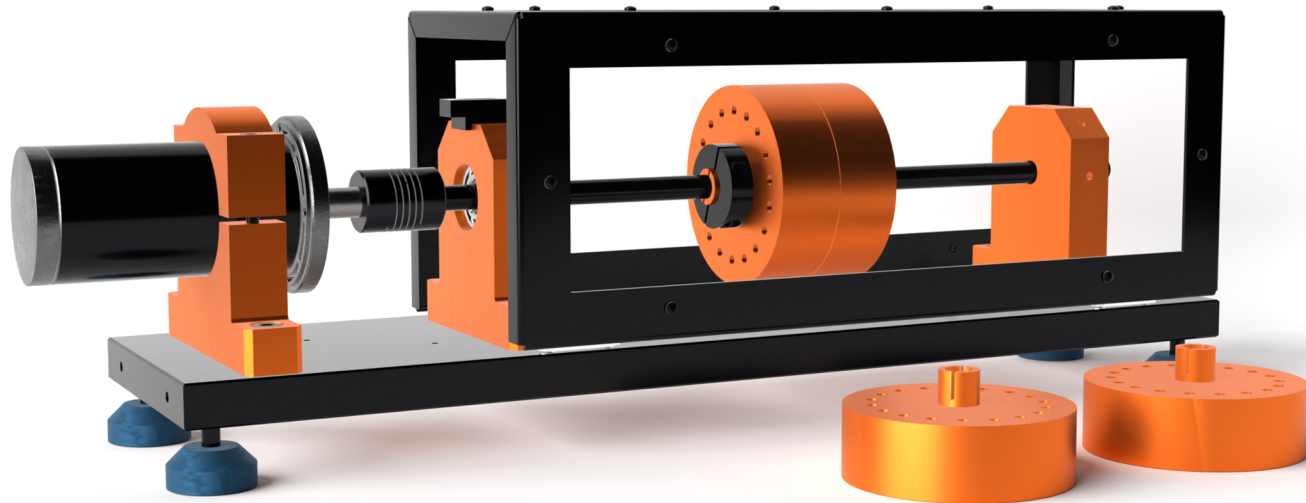
ADVANTECH

CIMCON
Software



SOMAIYA
VIDYAVIHAR UNIVERSITY

VIBROSINE
Helping You Understand the Sign of Your Sine



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