



### Product Overview

The **Eddy Current Dynamometer** is a precision engine testing and power absorption system designed for evaluating the performance of internal combustion engines, electric drives, and other prime movers. Utilizing **eddy current braking technology**, it provides accurate and repeatable measurement of **torque, speed, and power** over a wide operating range.

The system incorporates a **high-accuracy strain gauge load cell** for torque measurement and a **closed-loop electronic control system** for precise loading. A rugged, low-inertia rotor and efficient water-cooled construction ensure stable operation under continuous testing conditions. The TME 500 is suitable for **research laboratories, engine development centers, automotive industries, technical universities, engineering colleges, and industrial training institutes**.

### Working Principle

The TME 500 operates on the **eddy current braking principle**. When the field coils are energized, a magnetic field is generated. As the toothed rotor rotates within this magnetic field, eddy currents are induced in the cooling plates. These eddy currents create an opposing magnetic field that produces braking torque proportional to the excitation current.

The generated braking torque is transmitted through the trunnion-mounted housing to a **high-precision strain gauge load cell**, allowing accurate torque measurement. The absorbed power is controlled electronically by varying the excitation current supplied to the field coils, enabling smooth and precise engine loading.

### Technical Specifications

Parameter	Specification
<b>Type</b>	Water-Cooled Eddy Current
<b>Maximum Power</b>	500 BHP
<b>Maximum Torque</b>	2000 Nm

Note: Specifications are subject to change, Photos shown above are Indicative, Actual Product can Vary.



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Parameter	Specification
Maximum Speed	4500 RPM
Minimum Cooling Water Flow	250 LPM
Minimum Water Supply Pressure	3 kg/cm <sup>2</sup>
Maximum Inlet Water Temperature	35°C
Maximum Excitation Current	125 A
Maximum Supply Voltage	250 VAC
Energising Coil Voltage	5 VDC
Operating Temperature	10°C to 55°C
Relative Humidity	Up to 90% (Non-Condensing)
Overall Length	800 mm
Overall Width	680 mm
Overall Height	965 mm
Approximate Weight	1400 kg
Water Connection	1½" BSP Inlet & Outlet

**Construction Features**

The TME 500 is manufactured using heavy-duty industrial components to ensure long service life and high operational reliability.

**Mechanical Construction**

- Heavy-duty steel body
- Dynamically balanced low-inertia rotor
- High-strength shaft assembly
- Heavy-duty trunnion bearing support
- Compact space-saving construction
- Vibration-free operation
- Smooth rotor running characteristics

**Cooling System**

- Water-cooled power absorption system
- Electroless nickel-plated cooling passages
- Corrosion-resistant cooling plates
- Flexible inlet and outlet water hoses
- Dry-run protection through water flow switch
- Optimized cooling path for continuous duty operation

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## Torque Measurement

- Precision strain gauge load cell
- High measurement accuracy
- Excellent repeatability
- Stable torque sensing over full operating range
- Long-term calibration stability

## Control System

The incorporates an advanced closed-loop control system for precise engine loading.

## Standard Control Functions

- Closed-loop torque control
- Manual loading operation
- Automatic loading operation
- Variable excitation current control
- Accurate RPM measurement
- Real-time torque feedback
- Stable loading under varying operating conditions

The power absorbed by the is regulated electronically by varying the excitation current supplied to the field coils.

## Standard Features

- High-accuracy strain gauge load cell
- Water-cooled eddy current braking system
- Closed-loop torque control
- Bi-directional operation
- Low inertia rotor
- Smooth vibration-free operation
- Rugged industrial construction
- Compact design
- Long service life
- Electroless nickel-plated water passages
- Dry-running protection
- High reliability under continuous operation
- Fast response to load changes
- Low maintenance requirements
- Suitable for continuous engine testing

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### Safety Features

- Water flow monitoring
- Dry-run protection
- Over-speed protection
- Over-torque protection
- Heavy-duty mechanical construction
- Stable mounting arrangement
- Electrically insulated field coils
- Safe operation under continuous loading

### Optional Accessories

This can be supplied with the following optional accessories:

- Control Unit (DCU)
- PC-based LabVIEW® Data Acquisition Software
- Universal Engine Test Bed
- Universal Propeller Shaft
- Fuel Measurement System
- Calibration Equipment (SI/Imperial)
- Engine Starting Arrangement
- Rotor Locking Device
- Stainless Steel Magnetic Filter
- Safety Guard
- Temperature Sensors & Indicators
- RPM Indicator
- Torque Indicator
- Scanner & High-Speed Data Logger

### Data Acquisition System

IIT is compatible with a **computer-based Data Acquisition & Control System** providing real-time monitoring and recording of engine parameters.

Typical software functions include:

- Torque Measurement
- Speed Measurement
- Brake Power Calculation
- Power Curves
- Torque Curves
- Fuel Consumption Measurement

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- Combustion Analysis
- Heat Balance Sheet
- Morse Test
- Efficiency Calculations
- Data Logging
- CSV Report Generation
- Real-Time Graphical Display

## Applications

This is suitable for:

- IC Engine Performance Testing
- Diesel Engine Testing
- Petrol Engine Testing
- Electric Motor Testing
- Research & Development Laboratories
- Automotive Testing Facilities
- Engine Manufacturing Industries
- Technical Universities
- Engineering Colleges
- Polytechnics
- Industrial Training Institutes
- Prime Mover Performance Evaluation
- OEM Product Development
- Quality Control Laboratories

## Advantages

- High power absorption capability up to **500 BHP**
- Accurate torque measurement using strain gauge technology
- Stable closed-loop electronic loading
- Water-cooled design for continuous operation
- Compact footprint with rugged construction
- Low maintenance requirements
- Excellent measurement repeatability
- Fast response to changing engine loads
- Long operational life
- Suitable for both educational and industrial applications
- Easy integration with computerized engine test systems

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- Reliable operation under demanding laboratory and industrial environments

**Typical Scope of Supply**

- Eddy Current
- Precision Strain Gauge Load Cell
- Water-Cooled Power Absorber
- RPM Sensor Assembly
- Excitation Coil Assembly
- Standard Control Unit
- Flexible Water Connection Hoses
- Mounting Hardware
- Operation & Maintenance Manual
- Calibration Certificate

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