

EDDY CURRENT DYNAMOMETER (I.S.O. Certified)

A. Technical Specifications:-

Objective	To perform 'Engine performance test' of high speed low torque engines as per Automotive engine test according to IS: 10000 & 12036:1995
<p>Water Cooled Eddy Current Dynamometer with fully digitally automatic controller with separate Gravimetric fuel flow meter for petrol and diesel engine</p> <p>Data Acquisition systems with latest Configuration PC Peripherals along with Printer and supporting Software.</p>	<p>One number of dynamometer of following specifications:</p> <ul style="list-style-type: none">- Power range :<ul style="list-style-type: none">Min : 0.1 kW at 300 rpmMax : 4.0 kW at 5800 to 15000 rpmTorque range :<ul style="list-style-type: none">Min : 0.5 Nm@ 100 rpmMax : 6.5 Nm @ 5800 rpmSpeed (Max) : 15000 rpm <p>Type : Eddy Current dynamometer with full digital automatic controller as per the Accuracy and control modes given below:</p> <p>a) Measurement Resolution & Accuracy:</p> <ul style="list-style-type: none">- Speed Accuracy : +/-1 rpm, Resolution : 1 rpm- Torque of Dynamometer Accuracy : +/-0.03Nm Resolution: 0.01 Nm- Rotor inertia: 0.00090 kg.m² <p>b) Mode of operation (Selectable, bump less transfer between modes:-</p> <ul style="list-style-type: none">- N/Alpha : Speed/Throttle- T/Alpha : Torque/Throttle- N/T :Speed/Torque- T/N : Torque/Speed- External :External <p>c) Direction of rotation – Bidirectional</p> <p>d) Calibration arm with weight for static calibration by dynamometer</p> <p>e) Water filter with magnetic plug at inlet of Dynamometer</p> <p>f) Safety protection for Dynamometer</p> <p>g) This electronics controller offers 3 modes of operation</p> <ul style="list-style-type: none">- Constant current mode (I)- Constant speed mode (N)- Constant torque mode (T)

Maximum Torque	6.5 Nm
Maximum Speed	15000 rpm
Minimum power absorption	0.1 KW
B. Standard Mechanical Accessories	<p>a) Engine Mounting CI bed with screw</p> <p>b) Propeller shaft/Coupling: Set of double Universal joint propeller shafts or other suitable coupling for testing engines in the range of 0.1 KW to 4.0 KW Operating speed range 300 to 15000 rpm</p> <p>c) Shaft Guards, 1 No. each</p> <p>d) Dynamometer calibration Kit for statistic and dynamic calibration in "Nm"</p>
C. Digital control system with response time less than 200 mili seconds	<p>-Standard 19 Rack system should be provided for digital display of following parameter within close limit of accuracy:</p> <p>-Power, Torque, engine rpm, Temperatures 16 Channel, Thermocouple-5 Channel, Atmosphere Pressure, Engine oil pressure, relative humidity, exhaust gas pressure, air intake pressure, cooling Fan Speed, penal hour meter.</p>

D. Parameter, Accuracy, Resolution and Measuring Range:

Name of parameters	Measuring range	Resolution	Accuracy
Power (kW)	0.1-4.0 KW	0.001kW	±0.015 kW
Torque (Nm)	0.5-6.5 Nm	0.01 Nm	±0.03 Nm
Speed (rpm)	0-15000 rpm	1 rpm	±1 rpm
Temperature (deg C)16-Channel	0-250 deg C	0.1 deg C	±1 deg C
Thermocouple (Cr-Al) 5-Chanel	0-1200 deg C	0.1 deg C	±1 deg C
Air intake Pressure (Depression)	0-200 mm of Hg	1 mm	0.5%
Exhaust gas pressure	0-760 mm of Hg	1 mm	0.5%
Atmospheric pressure	730-1000mm of Hg	1mm	0.5%
Relative humidity	4-96%	1%	±0.5%

E. Sensors And Transducers with spares:

Universal Strain gauge load cell	Capacity: 5kg – 2 Nos. (" PSI" protection)
Temperature sensor	RTD (Pt-100, length-6cm, Probe dia-6mm, 10 Nos).
Thermocouple (K type)	Cr-Al ,Probe length-6cm, dia-6mm, 5 Nos.
Exhaust Gas Pressure transmitter	4-20 mA-4 Nos.
Intake Air Pressure Transmitter	4-20 mA-4 Nos.
Relative humidity transmitter	4-20 mA-4 Nos.
Magnetic Pickup	Permanent magnet type-4 Nos.
Extendibility (with 10 meter cable)	To control panel of each sensor and transducers.

F. Other essential equipments:	
1.Gravimetric fuel consumption meter (For Petrol and Diesel engine)	<p>a) Provision for 6 ranges of measurement such as 10 gms,15gms,20gms, 25gms,50 gms and 100gms .</p> <p>b) Controller 19" standard rack type. Selection of weight through keypad.</p> <p>c) Auto weight selection through PC based system.</p> <p>d) Accuracy better than ± 1.0 g over the entire weighing range from 0 to 100g of selected weight in lower range.</p> <p>e) Calibration check facility.</p>
2. Engine mounting stand.	Engine mounting stand (X-Y-Z adjustment) for mounting engines upto 0.1 to 4 kW capacity
Safeties	<p>The following safeties and facilities should be incorporated as standard:</p> <p>High dynamometer body temperature trip with LED indication (HI-T)</p> <p>Low water inlet pressure trip with LED indication (LO-P)</p> <p>High excitation current trip with LED indication. (HI-C)</p> <p>High dynamometer over speed safety with LED indication (HI-C)</p> <p>Adjustable current clamp facility.</p> <p>Fault reset facility. (push button)</p> <p>One set of potential free change over contacts which operates when dynamometer fault conditions occurs.</p>
Digital speed indication for the dynamometer, consisting of the following:	Digital speed indicator with 5 digit LED display, range 0-16,000 rpm, Accuracy : ± 1 RPM
	Electromagnetic contact less speed sensor.
	Connecting cable between speed sensor and digital instrument with plugs (10 mtrs.).
Digital load indication for the dynamometer, consisting of the following:	Digital load indicator with 4 digit 7 segment, 0.5" height LED/LCD display, Accuracy : ± 0.03 Nm
	Zero control potentiometer
	Calibration control potentiometer
	Damping control potentiometer
	Strain gauge load cell
	Connecting cable between the load cell and the digital load indicator with 2 plugs. (10 mtrs.)
Engine Throttle Actuator	<p>Should be suitable for cable drive as well as solid link drive.</p> <p>Two station operation.</p> <p>Torque output : 15 Nm</p> <p>Response Time :400 msec</p> <p>Driving power : ± 24 V, 2.3 Amp</p> <p>Position : ± 0-100%</p> <p>Accuracy : ± 0.2%</p> <p>Sensor type feedback potentiometer.</p> <p>Throttle actuator will have stroke adjustment from 25 mm to 90 mm.</p>

Other features	<p>a) Material used for energizing coils is super enameled copper wire with H class insulation giving enhanced life. The coils are potted into canisters held the casing body halves. The special compound used has excellent thermal potting.</p> <p>b) The water connection is by means of 'O' ring sealed articulated/supported pipes(benefiting low friction),leading to flanges suitable for connection to the customer water supply line. This insures that water connection and supply pressure variation have lesser effect on the torque measurement accuracy. A differential / pressure switch is to be provided to detect the flow rate and ensures that the warning signal is given if water flow drops below the desired level. Also provided are the loss plate temperature sensor to monitor the last plate condition.</p>
-----------------------	---