



**NATIONAL CENTER FOR COMBUSTION RESEARCH  
AND DEVELOPMENT (NCCRD)  
INDIAN INSTITUTE OF TECHNOLOGY MADRAS  
CHENNAI – 600036, INDIA**

**Ref. No. ICS/11-12/013/DSTX/TSUN**

**Date: 28 Sep. 2015**

**Due date: 19 Oct. 2015**

**Item name: EDDY CURRENT DYNAMOMETER**

1. Quotations are invited in duplicate for the items shown overleaf (in Annexure I). The quotations duly sealed and superscribed on the envelope with reference no. and due date, should be addressed to the undersigned so as to reach on or before the due date mentioned above.
2. The quotations should be valid for sixty days from the due date and the period of delivery required should also be clearly indicated.
3. The total cost of the equipment in terms of CIP Chennai should be clearly mentioned.
4. Terms of warranty and guarantee should be explicitly mentioned.
5. Packing and delivery charges, customs and clearance duty should be clearly stated.
6. Goods shall not be supplied without an official supply order.
7. Local firms : Quotations should be for free delivery to this institute. If quotations for ex-godown delivery charges should be indicated separately.
8. Firms outside Chennai: Quotations should be for F.O.R. Chennai. If F.O.R. consignor station, freight charges by passenger train / lorry transport must be indicated. If ex-godown, packing, forwarding and freight charges must be indicated.
9. The rate of sales / general taxes and the percentage of such other taxes legally leviable and intended to be claimed should be distinctly shown along with the price quoted. Where this is not done, no claim for sales / general taxes will be admitted at any stage and on any ground whatsoever. The taxes leviable should take into consideration that we are entitled to have Concessional Sales Tax (CST) applicable to non-government educational institutions run with no profit motive for which a concession sales tax certificate will be issued at the time of final settlement of the bill.
10. Payment : Specify the mode of payment and if advanced payment has to be made. Every attempt will be made to make payment within 30 days from the date of receipt of bill / acceptance of goods, whichever is later.
11. IIT Madras is exempt from payment of excise duty and is eligible for concessional rate of customs duty. Necessary certificate will be issued on demand.
12. IIT Madras has the right to accept the whole or any part of the tender or portion of the quantity offered or reject it in full without assigning any reason.
13. In case of any technical queries/clarifications, please contact Prof. A. Ramesh, Dept. of Mechanical Engineering, IIT Madras, Chennai, E-mail: [aramesh@iitm.ac.in](mailto:aramesh@iitm.ac.in); Phone: 9444462154.
14. The sealed quotation may be sent to  
**Prof. S. R. Chakravarthy**  
**NCCRD Office**  
**No. 201, Rarefied Gas Dynamics Lab (Behind Aerospace Engineering Dept.)**  
**Chennai – 600036**  
**(P) +91-44-22575025**



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**Annexure I**

Ref. No. ICS/11-12/013/DSTX/TSUN

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**TECHNICAL SPECIFICATIONS OF EDDY CURRENT DYNAMOMETER FOR  
TESTING OF SI AND CI ENGINE FOR COMBUSTION AND EMISSION RESEARCH**

**Pre-Qualification Requirements:**

- The vendor must have supplied at least 10 systems of similar model of base equipment which includes the sensors and all relevant electronics and indication system in reputed automotive research and development laboratories of government funded institutions or research and development divisions of leading automobile industries worldwide during the past 1 year. The vendor should provide the details of organizations where such systems have been supplied.
- The vendor should be the manufacturer of the system supplied. If the manufacturer is a company outside India then the vendor should be the sole subsidiary of the manufacturer in India and due proof of the same has to be enclosed with the quotation. No agents/representatives will be accepted.
- The vendor should have their Service Centre in India and trained personnel for after-sales service. Vendor has to submit the complete details of the service set up.
- The vendor should clearly indicate the terms of warranty along with their quote.

**Scope of Supply:**

- a) Eddy current dynamometer capable of testing *petrol engines* with maximum power in the range of 7kW @ 4000 rpm to 100kW @ 6500 rpm and maximum torque in the range of 40Nm @ 1200 rpm to 140 Nm @ 5000 rpm and *Diesel engines* with maximum power in the range of 5kW @ 1500 rpm to 100kW @ 4000 rpm and maximum torque in the range of 40 Nm @ 1500 rpm to 300 Nm @ 1800 rpm.
- b) Along with the dynamometer a digital controller which can allow it to work in both directions
- c) Base plate, coupling shaft along with necessary couplings and shaft guard.



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<b>Specification</b>	<b>Requirement</b>
<b>Dynamometer</b>	
Rated Power	Scope of supply (a)
Maximum Permissible Speed	10000 rpm
Maximum Permissible Torque	400 Nm
Mass moment of inertia	$\leq 0.3 \text{ kgm}^2$
Water Cooled	Yes
Rotational Direction	Clockwise and Counter-Clockwise
Torque Measurement Accuracy	$\leq \pm 0.5\% \text{ F.S. Torque}$
RPM Control Accuracy	$\leq \pm 3 \text{ rpm}$
Rotor Type	Drum type
Torque Measurement	Load cell principle
<b>Drive Shaft</b>	
Quantity	One shaft suitable for coupling with engines as specified in scope of supply (a).
<b>Shaft Guard</b>	
Feature	Guard should have removable cover and quick release mechanism
Safety	Safety contact switch has to be provided which prevents test run starting with open shaft guard.
<b>Cabinet</b>	
Type	19" rack
Safety	Necessary safety features complying to relevant standards to be provided
<b>Dyno Controller</b>	
PID controller update rate	Minimum 500 Hz
Control Modes	Idle control Dyno Speed/Throttle Position Dyno Torque/Throttle Position Dyno speed/Engine Torque Dyno Torque/Engine Speed Dyno speed/any variable



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	Dyno Torque/any variable
Safety Protection	Over Torque, Over speed, Over current, Over Temperature, Water supply
Password Protection	Calibration and Tuning parameters to be available to the user with password protection

**Electrical Connections:**

Standard electrical connections/connectors will be provided for the dynamometer and controller by IIT Madras. The vendor will be responsible for connections to the dynamometer from this standard electrical connector which will be at a maximum distance of 8 m.

**Documentation:**

Vendor should provide required instruction manuals for operating and maintenance of the system in English language. This will include the descriptions and drawings required for operation and control of the equipment supplied. The user manual must also include procedure for calibration and PID tuning of the system.

**Time Schedule:**

The system should be supplied, installed and commissioned within 4 months after acceptance of technically clear Purchase Order.

**Warranty:**

The vendor should provide a warranty for at least 24 months from the date of commissioning of the setup.

**After Sales Support:**

The vendor should have well trained engineers for after sales support in India to service the installation at IIT Madras. Software upgrades should be provided as and when available free of cost.

**For any technical clarifications, please contact:**

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