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Enquiry no.: ME/ERL/2013-14/May/04

Enquiry date: May 8<sup>th</sup>, 2013

Last Date: June 2<sup>nd</sup>, 2013

**Enquiry for High Speed Combustion Data Acquisition**  
**System for Engine Test Cell as well as in-vehicle**  
**application, Piezoelectric In-cylinder Pressure**  
**Transducer, Charge Amplifier and Miniature Current**  
**Clamps**

The following items are required for engine test cell/ in-vehicle application at ERL.

1. High Speed Combustion data acquisition system, including all necessary software and accessories (1 Nos)
2. Glow Plug Based Piezoelectric In-cylinder Pressure Transducers (2 Nos)
3. Charge Amplifier (1 nos)
4. Miniature Current Clamps and accessories (2 Nos)

The detailed minimum specifications are given below:

**1. High Speed Combustion Data Acquisition System for Engine Test Cell as well as in-vehicle application**

(a) High Speed Combustion Data Acquisition System for Engine Test Cell as well as in-vehicle applications for Measurement and evaluation of combustion parameters in test vehicles as well as engine test cells with relevant Software

- Analog Channels                    8 channels (BNC)
- Modular architecture            number of analog inputs expandable
- Input voltage range              -10- +10 V
- ADC resolution                    Minimum 16-bit
- ADC sampling rate                1.25 MHz (MS/s) per channel
- Bandwidth                         100 kHz
- Low-pass filter                    5/10/20/25/30/35/40 kHz
- 8 digital inputs.                 The number of measuring channels for injection and ignition timing should be 8 digital inputs.
- Current Clamp                    2 Input Supported
- CAN Interfaces                    1 Number with Max. transmission rate 1 Mbit/s max.
- USB compatibility                Local connection of mass storage device like USB drive for prolonged data acquisition in MDF4 format
- INCA compatible                 Interface for INCA 7.0 with trigger functionality
- System should be used as a monitoring device for both in-vehicle and test stand applications
- Capability to measure statistical knocking characteristics
- An "Alternative Volume Function" to support engines with a variable compression ratio
- With on-board Digital 2-channel charge amplifier- module, with drift-compensation for mounting, With sensor identification.
  - Frequency Range                0-200kHz
  - Measuring range                100-10,000 PC
  - Drift Compensation             100-20,000 per min
- Optical Crank angle encoder, set consisting of Encoder hardware, Electronics, LVDS cable 10 m for engine test cell            (One No.)
  - Crank angle signal (deg)                    720x0.5
  - Speed range                                0-15000 rpm
  - Resolution with electronics/software            The system must be capable to obtain resolution of 0.1 ° CA
- Crank Angle Adapter for conditioning crank angle signals from a magnetic or Hall type encoder, for processing of data for in-vehicle analysis.

## **2. Glow Plug Based Piezoelectric In-cylinder Pressure Transducer**

(a) Glow Plug Based Piezoelectric In-cylinder Pressure Transducers, M5x0.5, for combustion engines, Cable length  $L = 2$  m

- Measuring range                      0 - 250 Bar
- Linearity                                 $\leq \pm 0.5\%$  of FS
- Sensitivity                              Minimum -17 pC/Bar
- Thermal Shock Error ( $\Delta P$ )  $\leq \pm 0.5$  bar

(b) Connecting Cable, Single Wire, High Insulation for Sensor, BNC neg. BNC pos. BNC pos. Length 10 m Deg. of protection: IP40 - IP40 Cable PVC,  $\phi 3.2$  mm

(c) Glow plug adapter suitable for Tata Dicor 2.2 L Glow Plug and another one for Mahindra Scorpio Diesel CRDI engine

(d) Mounting Key, hex size 4 mm, outer diameter 5.6 mm, not slotted

## **3. Laboratory Charge Amplifier for Piezoelectric Pressure Transducer**

- Desktop, 230 V, BNC, Dual Mode,
- RS-232C compatible
- Measuring Range:                       $\pm 2 \dots 2\,200\,000$  pC
- Measuring Range Piezotron:         $\pm 2 \dots 20\,000$  mV
- Meas. Signal Connection:            BNC neg.-Housing:
- Desktop Version with Support Bracket- Interface:
- RS-232C Voltage: Adjusted to 230 VAC- With Voltage Input (Piezotron)

## **4. Miniaturized current clamp for Fuel Injectors**

(a) Power supply module

(b) Amplifier module

(c) Miniaturized current probe

- Current Clamp                      Miniature , clamp size should be less than 40mmx40mmx10mm in size
- Measurement range                  +30 Amp
- Output Voltage signal                +10V
- Sensitivity                              10 mV/A or 100 mV/A

(d) Power supply cable

**Terms & Conditions:**

- (i) Provide “Authorization certificate” from the manufacturer, in case the quotation is submitted by an Indian Agent.
- (ii) Prices should be FOB/ CIF upto Delhi.
- (iii) Validity of quotation should be at least for 90 days.
- (iv) Warranty: Three Years from the date of Installation and Commissioning.

*Kindly send your best offer (Technical and Commercial offers separately) so as to reach us on or before June 2<sup>nd</sup>, 2013 to the following address:*

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In case of any queries/ clarifications related to this tender, you may contact Mr. Dhananjay Srivastava (+91 9935355990).