



**INDIAN INSTITUTE OF TECHNOLOGY KANPUR**  
DEPARTMENT OF MECHANICAL ENGINEERING  
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Enquiry no.: ME/ERL/2013-14/October/01

Enquiry date: October 26<sup>th</sup>, 2013

**Extended Last Date: November 15<sup>th</sup>, 2013**

**Enquiry for Digital Mass Flow Controllers for Methane and Hydrogen**  
**Fuels for Engine Applications**

Sealed quotations are invited for the purchase of digital mass flow controllers for Methane and Hydrogen fuels for engine applications. The detailed specifications are the following:

**1. Mass Flow Controller for HYDROGEN:**

- ◆ Flow Range: 0-1000 SLM of HYDROGEN.
- ◆ Material of Construction: ALUMINUM
- ◆ Accuracy range:  $\leq \pm 3\%$  of FS
- ◆ Operating Temperature: 0°C to 50°C.
- ◆ Maximum Inlet Pressure: 32 bars.
- ◆ Inlet-Outlet Fittings: ¼" Male NPT.
- ◆ Repeatability:  $\pm 0.25\%$ .
- ◆ Sealing Material of Fluid contact: Viton/ PTFE
- ◆ Application Position: Horizontal
- ◆ Power Supply: 220V, 50Hz AC
- ◆ Leak: As low as possible (must be specified)
- ◆ Valve: Normally closed
- ◆ Resolution: 0.1% of F.S
- ◆ Warm Up Time: < 2min

Company must do calibration at STP (25°C and 1 atm) for HYDROGEN, but must provide calibration factor for use in other conditions of temperature and inlet pressure and relation for calculation of corresponding mass flow rate at other temperature and pressure.

**2. Mass Flow Controller for CNG**

- ◆ Flow Range: 0-1000 SLM of CNG
- ◆ Material of Construction: ALUMINUM.
- ◆ Accuracy range:  $\leq \pm 3\%$ .
- ◆ Operating Temperature: 0°C to 50°C.

◆ Maximum Inlet Pressure:	32bar
◆ Inlet-Outlet Fittings:	¼” Male NPT.
◆ Repeatability:	±0.25%.
◆ Sealing Material of Fluid contact:	Viton/ PTFE
◆ Application Position:	Horizontal
◆ Power Supply unit:	220V, 50Hz AC
◆ Leak:	As low as possible (must be specified)
◆ Valve:	Normally closed
◆ Resolution:	0.1% of F.S.
◆ Warm-up Time:	< 2min

Company must do calibration at STP (25°C and 1 atm) for CNG but must provide calibration factor for use in other conditions of temperature and inlet pressure and relation for calculation of corresponding mass flow rate at other temperature and pressure.

### **3. Module for Hydrogen-CNG mixture ratio control:-**

Supplier should provide module or controller, which can set the ratio between Hydrogen-CNG MFC's to form there (Hydrogen in CNG by mass) mixture at 5%, 10%, 15%, 20%, 25%, 30%, 35%, 40%, 45% and 50%.

### **Terms & Conditions:**

- (i) Provide “Authorization certificate” from the manufacturer, if representing an international supplier.
- (ii) Prices should include delivery and installation at IITK.
- (iii) Validity of quotation should be at least for 90 days
- (iv) Delivery period should be less than 30 days after the PO.
- (iv) Warranty should be for one year (preferably longer).

Kindly send your best offer (Techno-Commercial offer in a single document) so as to reach us on or before November 15<sup>th</sup>, 2013 (**Extended date**) to the following address:

Prof. Avinash Kumar Agarwal  
 Department of Mechanical Engineering,  
 IIT Kanpur, Kanpur – 208016, India

In case of any queries/ clarifications related to this tender, you may contact Mr. Tadveer Singh Hora (+919559795588).