



# Indian Institute of Technology Madras

I.I.T.P.O., MADRAS-600 036

DEPARTMENT OF CIVIL ENGINEERING

## Form for Inviting Quotations

Ref.No.CIE/SMAT/2016/Multi Parameter/SPL

Date: 15/11/2016

SPEED POST

To  
List enclosed

Dear Sirs,

DUE DATE: 30/11/2016

1. Quotations are invited in duplicate for the various items shown below / overleaf / Enclosed list.
2. **The Quotations duly sealed and superscribed on the envelope with the reference No. and due date, should be addressed to the undersigned so as to reach him on or before the due date stipulated above.**
3. The Quotations should be valid for sixty days from the due date and the period of delivery required should also be clearly indicated.
4. If the item is under DGS&D Rate contract No. and the price must be mentioned. It may also please be indicated whether the supply can be made direct to us at the Rate contract price (Please note that we are not Direct Demanding Officers). If so please send copy of the RC.
5. Relevant literature pertaining to the items quoted with full specifications (and drawing, if any) should be sent along with the Quotations, wherever applicable. Samples if called for, should be submitted free of charges, and collected back at the supplier's expenses.
6. Local Firms : Quotations should be for free delivery to this Institute. If Quotations for Ex-Godown delivery charges should be indicated separately.
7. Firms Outside Madras : Quotations should be for F.O.R. Madras. 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.
8. 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 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.
9. Goods should be supplied carriage paid and insured.
10. Goods shall not be supplied without an official supply order.
11. Payment : Every attempt will be made to make payment within 30 days from the date of receipt of bill / acceptance of goods, whichever is later

Yours faithfully

  
HEAD OF THE DEPARTMENT

Details as per enclosed list.

## Specifications of Multi-parameter Online Analyzer and Controller

The online multi-parameter controller must have the following specifications.

- Encompass features of the latest Multi-parameter Controller systems with the capability of handling atleast 4 sensors in a single controller configuration and provision for more as and when required.
- Capacity to operate as a controller (having programmability feature) or a terminal (that can display read-only data).
- Improved reading precision through special backlit graphic display.
- Easy User Intuitive operating keys: including keys for functions such as: Measurement, calibration, set/system settings, additional keys for: confirmation/switching menu O.K. (OK), Escape (ESC) etc.
- Internal integrated data logger with minimum data memory of up to 500,000 data sets
- Capacity to power all the sensors and terminals or accessories attached to it and also to provide protection against lightening and possible electromagnetic interference.
- Automatic reboot in case of power failure.
- Low power consumption of less than 5W.
- Automatic detection and initialisation of sensors connected to the system.
- Easy substitution / replacement of sensors without any additional configuration requirement.
- Provision for a separate 'Service mode' option for cleaning/calibration/ maintenance activities
- Facilitate data download via USB interface with fast data exchange.
- Fully programmable system with multiple levels of access control through Electronic-Key for data security and protection against non-authorized access.
- In-controller storage facility for sensor configurations and calibrations.
- Provision for in built log book to record data.
- Cost free updation of supporting software / firmware by the supplier as and when they become available.
- Reliable and fast information transmission regarding the function and status of system preferably through a simple LED system showing potential malfunctions in the system.
- Data Output to Control System: The System should have the capability to transmit the required 4-20 mA Analog Outputs and Modbus (RS 485) as a minimum.
- Provision to output Profibus, RS 232, LAN, GPRS, GSM compatible signals and addition of respective modules in future as and when required.
- Compatibility with both AC (100-240 AC) and DC12/24V power supply.
- Ambient Conditions Operating temperature: -4 °C ... +55 °C
- Storage temperature: -10 °C ... +65 °C
- Housing Material – Non corrosive e.g. Acrylonitrile-Styrene-Acryloester polymer or better
- Protection Rating IP 66 / equivalent to NEMA 4X
- Electromagnetic Compatibility: EN 61326, Class B; FCC Class A, EMC for indispensable operation

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- Integrated Lightning Protection: According to EN 61326 enhanced overvoltage protection for the entire system, implemented in each component
- Manufacturer warranty of minimum 3 years from the date of supply.

### Specifications of Sensors:-

#### pH Sensor: -

- Integrated temperature measurement and compensation.
- Sensor-check function for detection of glass breakage in electrode.
- Galvanically separated input.
- Automatic storage of calibration history in the sensor.
- Facility for sensor calibration in laboratory or field conditions.
- Low maintenance electrodes with infrequent or no electrolyte replacement.
- Intermittent automatic cleaning technology preferably ultrasonic cleaning.
- Manufacturer warranty of minimum 2 years from the date of supply.

#### Technical Specifications:

- Measuring Range: pH – 0.00- 14.00
- Signal Output –Digital
- Sensor Check function
- Power Consumption: less than 0.5 Watt
- Integrated temperature Sensor
- Temp Compensation: -5 to +50 Deg C
- Max Pressure for Sensor: 10 Bar
- Max Pressure for Sensor Cable: 10 Bar
- Integrated transient voltage protection.
- Sensor body: Titanium or Sea Water Version
- protection type : IP 68 for both Sensor and Cable
- Sensor cable with a length of atleast 5 meter and resistant to action of acids and other corrosive media in sample.

#### ORP sensor

- Measuring principle - electro-chemical
- Measuring range:  $\pm 2000$  mV
- Temperature measurement - Integrated NTC, -5 to +60 °C
- Operating temperature - 0 to +60 °C
- Permissible overpressure - 6 to 10 bar (depending on the electrode)
- Manufacturer warranty of minimum 2 years from the date of supply.
- Sensor cable with a length of atleast 7 m and resistant to action of acids and other corrosive media in sample.

#### DO sensor

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- Digital calibration free optical D.O. sensor (universal use).
- Factory calibrated system composed of sensor and membrane cap.
- Measuring ranges for O<sub>2</sub> concentration - 0 to 20.00 mg/l
- Measuring ranges for O<sub>2</sub> saturation – 0 to 200.0 %
- Resolution for O<sub>2</sub> concentration - 0.01 mg/l
- Resolution for O<sub>2</sub> saturation - 0.1 %.
- Response time, t<sub>90</sub>: <150 s, t<sub>95</sub>: <200 s
- Temperature measurement - Integrated NTC with a range of -5 to +50 °C
- Operating temperature : -5 to +50 °C
- Pressure resistance - 10 bar overpressure

**ADDITIONAL REQUIREMENTS (SHOULD BE PART OF THE INSTRUMENT/QUOTE)**

**(1) Data acquisition** - A Laptop computer with the following specifications

- o i5 processor
- o 15"-16" display screen
- o 2 GB RAM
- o 500 GB memory
- o 64 bit processor

**(2) Buffer solutions**

- Buffer solutions of pH 4 and 7 for pH sensor calibration.
- Buffer solution for ORP sensor calibration with pH value of 7 and U<sub>H</sub> of 427 mV.

**(3) Adapter cables**

- Adapter cables for pH, ORP and DO sensors with a minimum length of 5m.
- A suitable cable of 5 meter to connect the controller and the laptop

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