Department of Chemical Engineering invites quotations for “Custom made miniaturized conductivity sensors, transmitters, isolators and current-to-voltage converter modules” with the following specifications.

1) **Miniaturized Conductivity Sensors (Qty: 10)**
   - Miniaturized conductivity sensors capable of measuring time variation of conductivity in the range of 0 to 20 mS/cm in a liquid.
   - Conductivity sensor parts and signal cables should be water-resistant and leak proof.
   - Conductivity sensors should have dimensions of: diameter 6 mm or less, length 40 mm or less.
   - Conductivity sensors should be fast enough to measure small conductivity fluctuations with a frequency of 1000 Hz.
   - **Specifications**
     
     **I. Performance**
     
     | Parameter                      | Specification                  |
     |--------------------------------|--------------------------------|
     | Conductivity range            | 0 to 20 mS/cm                  |
     | Accuracy                      | ≤ ±1% of full scale            |
     | Response time                 | 1 ms                           |
     | Temperature range (probe can be placed in) | 0 to 100°C               |
     | Cell constant                 | 1.0 cm⁻¹                       |

   **II. Mechanical**

     | Description       | Glass body                     |
     | Plate Material    | Platinum                       |
     | Dimensions        | 6 mm OD and 40 mm length       |
     | Cell type         | 2 platinum pole                |

   *(Note: Quote price per sensor)*

2) **Conductivity transmitters with isolators (Qty: 10 each)**
   - Conductivity transmitters with isolators will be required to supply required excitation current/voltage to miniaturized conductivity probes described above.
   - **Specifications**
     
     **Conductivity transmitter**

     **Inputs**

     | Input            | 220 VAC, 50Hz          |
     | Conductivity range | 0 to 20 mS/cm         |
     | Temperature range   | -20 to 60°C           |

     **Outputs**

     | Output          | 4-20 mA               |
     | Accuracy        | ±0.5% of full scale or higher |
     | Response time   | 1 ms                  |

     **Isolator**

     | Isolation | 2000 V |
     | Input     | 4-20 mA |
     | Output    | 4-20 mA |
Input ripple: less than 0.1 %
Output ripple: less than 0.1 %
Basic accuracy: 0.05 %
Linearity: 0.01 %
Load range: 0-750 ohm
Temperature range: 0 to 50°C
Thermal drift: 0.02%/°C

(Note: Quote prices per unit of transmitters and isolators)

3) Signal Converter – Current to Voltage (Qty: 10)

Input: 4 – 20mA
Output: 0 – 10 VDC
Supply Voltage: 12 – 24 VDC.
Power Consumption: > 1W
Isolation Voltage: 1500 Volts
Temperature Drift: 0.01 Deg C.
Accuracy: 0.1 % FSO
Response Time: 50 micro seconds
Mounting: Din Rail Type
Enclosure: ABS
Ambient Temperature: 0 – 60 Deg C.

Note: Quote price per converter module

4) Enclosure cabinet for transmitter, isolator and converter modules

A good quality professional enclosure cabinet (powder coated) is required with appropriate input/output ports for connections, controllers/switches to enclose the aforementioned transmitters, isolators and converter modules and power supply units to power to all the transmitters, isolators and converters. Appropriate AC power supply adapter should be provided.

Required accessories for the aforementioned miniaturized conductivity probes, transmitters, isolators and current-to-voltage converter modules

- Connector at back-end of probe to extend the length of probe using SS tube (with electrical wire inside) (15 Qty)
  Miniaturized connectors to be used to connect conductivity probes (OD 6mm) to a SS tube (3 mm OD) (that will carry water resistant and leak proof insulated electrical wires without any conductivity loss) with appropriate BNC connectors (high quality) at the end. The combined diameter of the electrical wires should not exceed the ID of the SS tube (2 mm). The total length of the probe including the 40 mm glass sensor, connector and SS tube should be 50 cm.

- Electrical cables for conductivity sensors (15 Qty)
  Water resistant and low-noise signal cables will be required to provide the required voltage/current from the conductivity transmitter units to conductivity probes and to provide the conductivity probe output to the conductivity transmitters with appropriate connectors (high quality) at the end. One end of this cable should have a connector compatible with the conductivity transmitter units and the other end should have 10-32 coaxial female BNC connectors. The length of the cable should be 2 m.
• Electrical cables for current-to-voltage converter modules (15 Qty)
  (a) Low-noise signal cables will be required to provide the current from the conductivity transmitter units to current-to-voltage converter modules with appropriate connectors and length.
  (b) Low-noise signal cables will be required to provide the voltage from the current-to-voltage converter modules to existing NI data acquisition system with appropriate connectors and length of 1 m.

Scope of work: Vendor will be responsible for fabrication of appropriate connectors to fix (leak proof) the miniaturized conductivity sensors on SS tubes as described above, making all the electrical connections, integrating the probes with the transmitters, isolators and converter modules. Further, the vendor shall be responsible for the installation and demonstration of conductivity sensors and transmitters, isolators and converter modules.

Warranty: 1 year comprehensive onsite warranty (inclusive of parts and labor costs) for the conductivity sensors, 3 year comprehensive on-site warranty (inclusive of parts and labor costs) for the transmitters, isolators and converter modules and 3 year comprehensive on-site technical support (inclusive of parts and labor costs).

Delivery schedule: 3 weeks (including procurements, installation and on-site testing)

Terms and conditions
• The technical and commercial bids must be submitted in separate sealed envelopes subscribed with “Technical Bid” or “Commercial Bid” as appropriate. Both the technical and the commercial bids should be enclosed in an envelope subscribed “Quotation for custom made miniaturized conductivity sensors, transmitters, isolators and current-to-voltage converter modules” and should be submitted to the undersigned.
• Quotations should be in Indian rupees and should include all the terms and conditions i.e. all applicable taxes, freight, insurance, installation and other miscellaneous chargers.
• 100% payment will be made after installation and demonstration of conductivity sensors and transmitters, isolators and converter modules.
• Quotations must be valid for at least three months from the date of NIQ.
• A special discount/rebate wherever admissible keeping in view that supplies are being made for educational purpose in respect of public institution of national importance may please be indicated.
• The institute reserves right to accept or reject any or all quotations without stating the reasons thereof.

The quotations should reach undersigned latest by **5.00 pm on 24th May 2013**.

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