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<th>Sl. No.</th>
<th>Technical Specifications for dual phase digital Lock-In amplifier</th>
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<td>1.</td>
<td>The lock-in amplifier must have A/D Converter of 16 bits or better.</td>
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| 2.    | **Input Signal channel:**  
          i) Both Single-ended and Differential voltage inputs must be possible.  
          ii) Current input with $10^8$ V/A must be possible.  
          iii) Input impedance for voltage input should be 10MΩ, both AC and DC coupling should be possible.  
          iv) Differential input must not have noise more than 7nV/$\sqrt{\text{Hz}}$ at 1kHz  
          v) High Dynamic Reserve of 100 dB or better (without any prefilters) must be possible. |
| 3.    | The lock in must have a Reference Channel  
          i) Reference Phase Resolution must be 0.005º or better.  
          ii) Harmonic detection of up to 5$^{th}$ Harmonic must be possible. |
| 4.    | Output time constant should have a range of 10 µs to 10 ks. |
| 5.    | The lock-in amplifier must have an internal sinusoidal signal generator with  
          i) a Frequency range of at least 1mHz to 100 kHz with resolution of 100 µHz.  
          ii) amplitude in the range of 5 mVrms to 5 Vrms with a resolution of 2mV or better should be possible.  
          iii) output impedance should be 50 Ω.  
          iv) sine wave output should be able to be phase-locked to an external reference. |
| 6.    | **Inputs and Outputs**  
          i) sampling rate should be 256 k samples/s or better.  
          ii) Both amplitude and phase (X,Y, R, θ) data must be supplied.  
          iii) Minimum of three auxiliary A/D inputs with at least 1 mV resolution and ±10V full scale must be available for user defined measurements.  
          iv) Minimum of three auxiliary D/A outputs with at least 1 mV resolution and ±10V full scale must be available for user defined measurements.  
          v) Output data should be provided in ASCII format. |
| 7. | **Displays:**  
  i) Dual Display (amplitude and phase) must be possible.  
  ii) Numeric readout as well as bar graph should be possible. |
|---|---|
| 8. | **Computer Interfacing:**  
  i) GPIB as well RS232 must be possible.  
  ii) A minimum of 1.5 meter long GPIB cable must be supplied.  
  iii) A USB-GPIB adaptor must be supplied. |
| 9. | **Maintenance support:**  
  i) On-site warranty of 5 years from the date of purchase should be provided.  
  ii) In addition, an AMC support for 1 year after warranty should also be provided for which bidder should mention its AMC charge per year separately. (The AMC charge will not be counted towards financial evaluation). |
| 10. | **Optional**  
  **A low-noise voltage pre amplifier with following specifications:**  
  i) Input with AC or DC coupled, both differential as well as single ended must be possible  
  ii) Input noise better than 5nV/√Hz at 1 kHz or better must be demonstrated.  
  iii) CMRR: 100 dB from DC to 1 kHz or better should be possible.  
  iv) Gain: 1 – 30000 or more. Gain should be selectable.  
  v) Maximum output of 10 V<sub>pp</sub> for 50 Ω should be possible.  
  vi) Both low-pass and high-pass filter options must be available.  
  vii) On-site warranty of 3 years from the date of purchase should be provided. |