



Government of India  
Bhabha Atomic Research Centre  
Electromagnet Applications and Instrumentation Division  
Electromagnetic Applications Section



Ref : EmA&ID/RRS/2019/163669

Date: ~~28~~<sup>27</sup> Aug, 2019

Sub: Development, fabrication, Assembly and testing of LVDT signal monitoring boards as per the specification sheet-TSP/RRS/2019/05

Dear Sir/Madam,

1. Quotations are invited for the *execution of subject work*.
2. Taxes and Excise Duties shall be quoted separately. Form AF / H whichever is applicable shall be provided, if required.
3. The suppliers are shall submit the cost for Design, fabrication, assembly and testing. All necessary tools, instruments have to be arranged by the supplier.
4. The quotation must reach the undersigned on or before **20<sup>th</sup> September, 2019** and must be sent in a sealed envelope super-scribed with the **reference number & the due date** given above.
5. The quotations must reach us on or before the aforesaid date by India post (by speed post or ordinary post) only.
6. The address on the envelop should read:  
**The Head,**  
**Electromagnetic Applications Section,**  
**Electromagnet Applications and Instrumentation Division**  
**RCnD Bldg., North Site,**  
**B.A.R.C, Trombay,**  
**Mumbai - 400 085.**  
**(Attn: Shri. R R Singh)**  
**Email: jdsingh@barc.gov.in**
7. The bidder is expected to deliver the finished components after the approval by our engineer within 05 months from the date of receipt of firm work order.
8. All the raw materials used shall have the manufacturer's QC/QA certificates for ensuring the authenticity of the components. Further details are mentioned in the enclosed specification sheet.
9. The finished components with the test certificates as mentioned in the enclosures shall be delivered by the manufacturer after the award of the contract at Electromagnet Application and Instrumentation Division(EmA&ID), BARC, Trombay, Mumbai - 400 085.
10. The undersigned reserves the right to accept / reject any or all quotations without assigning any reason.
11. Delivery, packing & forwarding charges, if any, must be clearly mentioned in the offer.
12. Drawings / Sketches (if any) must be returned along with the offer
13. Quotation must indicate the GST No. / PAN No. of the vendor & validity of offer. Minimum validity of 60 days is preferred.
14. The quotation has to be duly signed by *authorized person with company seal. Unsigned offers shall be treated as invalid.*

Encl.: TSP/RRS/2019/05

(Kumud Singh)

**Scientific Officer(F), B.A.R.C**

For & on Behalf of the President of India  
(The Purchaser)

Specification sheet No.	Revision	Date
TSP/RRS/2019/05	Rev.1	27 <sup>th</sup> August, 2019

*Development, Fabrication, Assembly and Testing of LVDT signal monitoring boards card*

**1.0 SCOPE OF THE TENDER:**

Supplier has to design, fabricate and deliver LVDT signal monitoring Board ( PCB ) for eddy current application.

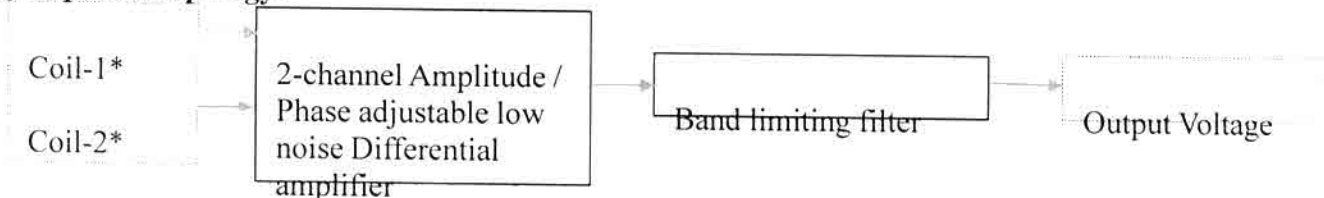
1.1) Supplier shall design the electronic circuit and submit the same to the purchaser for verification and validation purpose.

1.2) Purchaser representative shall submit the approval of design topology, PCB layout and bill of materials to the contractor within 1 week of receipt of the same vide email/fax.

1.3) Supplier shall fabricate the PCB on receipt of approval and test the system with standard function generator.

**2.0 TECHNICAL SPECIFICATION:**

**2.1) Expected topology:**



2.1.1) The LVDT coils are not in scope of supplier, but supplier shall emulate the same signal by means of standard 2-channel function generator, that can be synchronised.

**2.2) Specification of LVDT Signal Monitoring Board**

S. No.	Specifications	Value
Two-channel Amplitude/Phase adjustable Low noise differential amplifier card		
1	No of channel	2
2	Min and Max Input signal on channel	0 to 10V
3	Type of signal	AC signal only
4	Frequency of operation	200 to 250 Hz
5	Output rms noise 200 to 250Hz	< 5µV
6	Output Voltage	$V_{out} = (V_{ch1} \times (K \angle \Delta) - V_{ch2}) \times G$ G is the differential gain, user settable from 10, 100, 500 K ∠ Δ is the compensating vector
7	Range of Compensating Vector 'K ∠ Δ'	Gain, K: user adjustable from 0.75 to 1.25, in continuous step Phase, ' ∠ ': User adjustable from 1° to 10° in continuous step, only in lagging mode
8	Recommended operational amplifiers	Ultra-low noise op-amp such as OPA 27E or equivalent
9	Input Connector	6 pin circular connector (along with mating part)
10	Power supply	Lead Acid powered; Vcc : ±12 V, DC-DC converters to be avoided, linear regulators may be used
11	Capacitors recommended	Only Polypropylene for low drift

*Handwritten signature and date: 27/8/2019 (Janvin Heera)*