

Government of India
Bhabha Atomic Research Centre
Electromagnetic Application & Instrumentation Division

Ref :BARC/EmA&ID/KS/2019/161838

Date : 26.08.2019

Sub : Minor fabrication job of “Fabrication and upgradation of three axis scanner for magnetic field inspection ”

Dear Sirs,

1. Quotations are invited for the minor fabrication job of “Fabrication and upgradation of three axis scanner for magnetic field inspection” as per the technical specifications TSP/DCMM/2019/01.
2. Bidder shall quote for the machining and fabrication along with raw materials. Taxes, shall be quoted separately.
3. The quotation must reach Head, EmA&ID by due date **12.09.2019** and must be sent in a sealed envelope **super scribed with the reference number & the due date given above**. The quotation shall be sent only by speed post or Registered Dak. Quotations received by courier will not be accepted for opening.
4. The address on the envelop should read:
**Head,
Electromagnetic Applications & Instrumentation
Division,
RCnD Complex
BARC, Trombay,
Mumbai - 400 085
(Kind Attn: Smt Kumud Singh)**
5. Any modification required during the fabrication process shall be made after approval from our engineer.
6. The bidder shall complete the same within 3 months from the date of firm work order issued to the bidder.
7. Head, EmA&ID reserves the rights to accept / reject any or all quotations without assigning any reason.
8. Delivery charges if any must be clearly mentioned in the offer.
9. Quotation must also indicate the validity of offer.
10. Quotation should be submitted on printed format along with PAN,IGST/CGST. Computer generated format and without PAN, IGST/CGST, the quotations will be rejected.

Encl.:

01) Technical specification : TSP/DCMM/2019/01

Kumud Singh ,SO/F, EmA&ID
(On and behalf of
President of India)

GOVERNMENT OF INDIA

CONTROL INSTRUMENTATION DIVISION
BHABHA ATOMIC RESEARCH CENTRE
TROMBAY-400085



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BHABHA ATOMIC RESEARCH CENTRE

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Specification no.	Revision	Date of Issue	Total pages
TSP/DCMM/2019/01	0	02/08/2019	6 including cover page

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TSP/DCMM/2019/01	0	02/08/2019

1.0 Scope:

The Quotations are invited for “Fabrication and upgradation of three axis scanner for magnetic field inspection” as per the following technical specification.

- Para 2 gives Statement of purpose.
- Para 3 scope of supply and deliverables.
- Para 4 gives technical requirements of the coil winding. Supplier has to offer their product equivalent to this specification along with complete product sheet for technical evaluation.
- Para 5 gives acceptance criteria and test and inspection plan.
- Para 6 gives Clauses for performance of contract. Supplier shall confirm the acceptance of the same.
- Para 7 list down the reference drawings and documents.
- Para 8 gives general instructions.

2.0 Statement of Purpose

This specification lists the properties of the linear & rotary stages required for a hall probe scanning bench to be used in the Magnet Measurement Facility. The bench will be used primarily to measure field integrals for dipole magnet and other long insertion magnets. A schematic of the measurement bench is shown in Figure 1. It consists of one r- θ table mounted on a platform made up of aluminium profiles. The r- θ table carries a long probe holding structure and the measurement probe is firmly fixed on it. The r- θ stages places the probe at the correct position in the magnet aperture, and the z stage translates the probe from -500mm to +500mm from center of the magnet (magnet center position taken as 0). The probe reads magnetic field at each position and integral field calculation is derived from these measurements.

3.0 Scope of Supply and Deliverables

3.1) Deliverables

The supply shall include the following:

Sr. No	Item	Quantity
1.	Three axis scanner as per specification and drawing	1 No.
2.	Vibration isolated Job mounting structure	1 No.
3.	Operating manual and inspection reports	1 Set

3.2) Suppliers Responsibility:

- ✓ Preparation of manufacturing drawings on the basis of engineering drawings given by the purchaser. Approval shall be taken from the purchaser on the prepared manufacturing drawings before the start of fabrication.
- ✓ Purchase of raw material and produce test certificates for approval from purchaser.
- ✓ Manufacturing of three axis scanner as per technical specifications given below.
- ✓ Testing and demonstration of three axis scanner.
- ✓ Programming of the motor controller for automization of the scanning.
- ✓ Packing of the scanner assembly and shipment to the purchaser’s site.

- ✓ Installation of the three axis scanner at purchaser's site.

4.0 Details of Free Issue Material

Following free issue material will be provided to the supplier against the submission of insurance policy for an amount mentioned below:

Sr. No	Item	Size	Quantity	Cost
1.	Three – axis horizontal scanning bench : Ser no. BARC/DCMM/01	3000mm long, 600mm height, 500mm wide	1 No.s	Rs 13,00,000/-

The supplier shall draw the insurance for the aforesaid material as per the following details:
Name of beneficiary: President of India acting through Head Electromagnetic Applications & Instrumentation Division, BARC, Trombay-400085

5.0 Vendor qualification criteria

5.1 Human resources

The supplier must give the details of human resources including Engineers, Draftsman, Electrical, Welder, assembly mechanic, quality control inspector, machinist etc.

5.2 Infrastructure:

The supplier must give the details of infrastructure suitable for this job such as Manufacturing Machines, programming tools, alignment inspection, Assembly room and other tools & tackles, Inspection facilities etc.

5.3 Past experience:

The supplier must give their past three year turnover and job executed by them with reference, volume of work and completion schedule, present commitments and anticipated commitments inside and outside India.

5.4 Sub contract:

Supplier should list the jobs, which they want to sub-contract. They should also produce the list of sub-contractors and their infrastructures and facilities.

6.0 Technical requirements

Major technical specifications have been listed as given below:

Sr. No	Parameter	Description
1.	Job Details	a) Hollow square shaped magnet with clear aperture 150mm x 150 mm (see the figure and the drawing in Annexure A) b) Outer dimensions: 400mm x 300 mm (Height) x 400mm c) Bend, if any over total length: Not applicable d) Job material: Magnetic steel e) Weight: 200 kgs
2.	Scanning	a) Purpose: Magnetic field inspection b) Type of scanning required : r-θ-z ; Type of scanning currently available in existing machine : x-y-z (50mm-50mm-1000mm range) c) Scanning probe: Gauss meter probe

3.	Control	a) Type of control - PC control /HMI/Data logging b) Local Pendant Control required : yes c) Controls and display required: ➤ Zero position setting (Isolation table surface) ➤ Display: probe position w.r.t zero position ➤ Synchronization with an external RS 232 interface (data to be recorded and displayed at each position). ➤ Data acquisitions from RS232 interface. ➤ Automatic position setting.					
4.	Manipulator	AXIS	STROKE LENGTH	Resolution	Repeatability	Motorized/Manual	Encoder F/B YES/NO
		Z	1000mm	500 μm	50 μm	motorized	yes
		r	150 mm	100 μm	20 μm	motorized	yes
		θ	360 deg	1 deg	0.5 deg	motorized	yes
Speed of the measurement is not very critical; vibrations shall be avoided during probe positioning by operating the linear stage motors at low speeds.							
5.	Probe holder type	Clamping arrangement shall be made on probe holding structure to clamp the probe in firm position.					

- The x-, y- and rotating stages shall have a homing switch and limit switches.
- Supplier has to develop controllers for stepping motors.
- The hall probe scanning bench will be computer controlled, and the vendor shall include all interface modules necessary for the computer control. The computer hardware shall also be supplied by supplier.

7.0 Acceptance criteria

Acceptance tests to be performed					
Sr.No	Type of test	Applicable Standard/Document Test Procedure	Scope		
1.	Visual Inspection	Three axis scanners shall be free from any visual defects, loose nut bolts and wiring. Probe clamping arrangement shall be firm and job holding table and probe holding table shall be mechanically coupled for alignment.	Purchaser will perform pre dispatch inspection at supplier's premises.		
2.	Dimensional inspection	Supplier shall carry out inspection and demonstrate following dimension requirements of the linear stage travel using machined blocks/graduated scales kept at various axial positions :			
		AXIS	STROKE LENGTH	Resolution	Repeatability
		Z	1000mm	500 μm	50 μm
			Supplier shall perform this test and submit the test report. Purchaser reserves the right to be		

		<table border="1"> <tr> <td>r</td> <td>150 mm</td> <td>100 μm</td> <td>20 μm</td> </tr> <tr> <td>θ</td> <td>360 deg</td> <td>1 deg</td> <td>0.5 deg</td> </tr> </table>	r	150 mm	100 μm	20 μm	θ	360 deg	1 deg	0.5 deg	present during the inspection tests.
r	150 mm	100 μm	20 μm								
θ	360 deg	1 deg	0.5 deg								
		<p>Alignment of the job w.r.t probe shall be demonstrated and probe positioning accuracy shall be within 50 Microns. Levelling shall be done with help of inclinometer (10 micron accuracy)</p>									
3.	Programme demonstration	Supplier shall demonstrate the programming of the controller unit for operation and synchronization with RS232 input.		Demonstration shall be carried out in presence of purchaser's representative. Any changes or feedback shall be incorporated if required.							
4.	Installation	Installation shall be done by suppliers' representative at purchaser's site.									

8.0 PERFORMANCE OF THE CONTRACT

8.1 Fabrication and Delivery Schedule

The bidder shall complete the job within 6 months starting from the date of firm purchase order is issued to bidder.

Award of contract	week 0
Manufacturing drawings and manufacturing file	week 4
Approval of drawings	week 8
Fabrication of three axis scanner	week 18
Testing and demonstration	week 20
Installation at purchaser's site	week 24

8.2 To be supplied before starting the manufacture of three axis scanner

The contractor shall first deliver the MF. A review meeting will be scheduled within two weeks after its receipt. This document shall be approved by purchaser, although the review and the approval process shall not relieve the contractor from his full responsibility to produce the magnets according to the requirements set out in this technical specification.

The detailed design and production information in the Manufacturing file shall be submitted to purchaser for written approval as foreseen in the Fabrication and Delivery Schedule.

Once the MF is fully approved, the execution of the contract can proceed with the procurement of material, the samples and the preliminary tests detailed in the ITP (inspection & test plan).

8.3 Quality Control Records

The QCR shall contain:

The material certificates, in particular aluminium profiles, x y stages;
Inspection and test plan documents shall be sent to purchaser for approval before successive stages of the production can be undertaken, or for provisional acceptance before authorization for shipment can be granted. The baseline format of the QCR shall be specified in the MF. If any format is changed during the production through mutual agreement between purchaser and the contractor, the relative templates in the MF shall be updated as well.

9.0 DRAWINGS AND REFERENCE DOCUMENTS

The specification drawings enclosed with this technical specification is an integral part of this document. Any conflicts noted by the contractor shall be immediately brought to the attention of BARC and clarified before proceeding with the work. All engineering drawings shall be produced by the contractor.

10.0 GENERAL DESCRIPTION:

- ✓ Supplier shall quote with material; except for free issue material is involved in this tender.
- ✓ Overall cost will be compared and include packaging, forwarding and safe delivery to BARC at RCZ stores.
- ✓ Suppliers shall give complete details of their product, facilities, winding machine details, list of users and compliance certificates form users for technical evaluation. Quotations submitted with incomplete details are viable for rejection.
- ✓ Vendors with test facilities for qualification of winding resistance, Insulation test, Inter-turn insulation, temperature qualification, and basic metrology equipment's for dimensional checks will be given preference. In case vendor plans of sub-contracting the job, same shall be clearly brought out in quotations. The sub-contracting can only be carried out only after prior permission of the purchaser. In all circumstances the responsibility of completion of job up to the satisfaction of the purchaser lies with the supplier. Vendors shall list down the details of qualification checks performed on the fabricated parts by self or in collaboration with other laboratories.