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Title	Fabrication, Assembly, Testing, Supply, Installation and Commissioning of 12 inch 4 port torus shaped switch
Sub-title	Scope of Supply & work and Technical Specifications

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Distribution list	Interested Bidders
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ITER-India, IPR	ITER-India, IPR	ITER-India, IPR

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Amendment Record				
Version No.	Date dd/mm/yyyy	Section affected	Description of Changes	Made by

1. Introduction


ITER-India is seeking a bidder for manufacturing, assembly and integration of 12 inch 4 port torus shaped switch. Switch is a components of Transmission Line. Switch is a mechanical component which contains coaxial cylinder/conductor with rotating inner conductor by servo/ stepper electric motor with controller units. Switch is cooled by circulating air in annular space (between inner and outer cylinder) at 3 bar gauge pressure (approximately). The arrangements of components are shown in below figure:



2. Scope of Work

Vendor scope of work includes:

- a) Preparation and submission of manufacturing (shop floor) drawings for ITER-India approval. Preparation of a document explaining the sequence of welding and casting and its submission for ITER India approval.
- b) Procurement of material required for all the assemblies and submission of test certificate to ITER-India for approval.
- c) After ITER-India approval of above mentioned requirements, fabrication/ manufacturing of following assemblies shall be started:

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Sr. No	Assembly Details	Quantity
1	12 inch 4 ports Torus shaped switch (Drawing no : II/ICH/12 INCH/DPDT/00)	1


- d) All the fastener and heli-coil inserts required for assembly are under the supplier scope and material of fastener & Heli-coil insert should be SS 304.
- e) Inspection & testing of individual components at supplier site in presence of ITER-India representative. The fabricated components shall confirm to the technical specifications, drawings and standards as per tender document. *The die after casting shall be the property of ITER India and it should be delivered to ITER India.*
- f) Assembly of entire system to confirm the mechanical integrity.
- g) Integration & testing of entire system, with servo motor and control unit at the supplier site in presence of ITER-India representative (s). Servo motor, control unit and finger contact will be provided by ITER-India during FAT.
- h) Submission of pre-dispatch inspection report to ITER-India for dispatch clearance certificate.
- i) Delivery of items to ITER-India lab, ITER-India site with adequate packing to avoid damage during transportation.
- j) Un-packing, Assembly, Installation & Testing at ITER-India site.
- k) Preparation of final acceptance test report and submission to ITER-India for approval.
- l) Providing warranty as per section 1.16.1 of Part-A(III).

3. Material Procurement

The system is fabricated from the following grades of materials:

- Copper – grade ETP (99.9%Cu) ASTM C11000
- SS 304
- Aluminum alloy 6061-T6 grade ASTM B308
- Forged Brass 60-40 commercial grade ASTM B111
- Teflon rod PTFE ASTM D1710-8,11B/ Teflon plate PTFE ASTM D3294-03, 11A
- ULTEM 2300 ASTM D 638 ASTM D 790 & D 792 ASTM D 1525
- Mild Steel ASTM A 36
- LM6 alloy ASTM B 209 / ASTM 413

It is highly recommended that bidder need to check the requirements from the attached engineering drawings for completeness.

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4. Precaution during Fabrication and Assembly

- No modification in the drawing or design is permitted except in case where it is necessary to facilitate manufacturing without changing the function, accuracy and strength of the component. Bidder shall provide prior justification and drawings to the ITER-India representatives for approval before implementing on it.
- All sharp edges should be avoided and rounded off as per supplied drawings.
- Surface irregularities, scratches, dents and tool marks are not acceptable on the surfaces.
- Holes should be drilled with essential matching of various parts, wherever applicable.
- The inner surface of outer conductor and outer surface of inner conductor should be machined up to $\nabla\nabla\nabla$ wherever mentioned in the drawings, otherwise $\nabla\nabla$ finishes if not mentioned in the drawings.
- Necessary machining shall be done to get the required straightness, roundedness, perpendicularity and concentricity (as applicable).
- Brazing rods shall have less than 60% silver contents
- In case fabrication of components depends upon external agencies, it will be the responsibility of the vendor to get the things made in guarantee the manufacturing tolerances required for this assembly.

5. Coating/ Plating


- Silver plating as mentioned in Annexure I and submit certificate of plating thickness & contents of plating (in %) to ITER-India.
- Powder coating shall be provided on as mentioned in Annexure I.

6. Inspection & Testing

General guidelines for Inspection / Tests are written below for preparation of procedure:

I. Quality checks:

- (a) The material used in the system will be checked for its required properties to confirm on the material grade, based on the test certificate submitted by the vendor.
- (b) All the individual components shall be inspected for its dimensional accuracy, brazing/welding, assembly performance and surface finish requirements as per the drawings and specifications.
- (c) Necessary radiography tests report are required to be submitted to ITER-India of the outer conductor which is manufactured by casting to know the internal defects.

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(d) Supplier shall arrange all gauges and measurement tools for measurements and inspection at their site.

II. Factory Acceptance Tests/Pre-dispatch Inspection:

- (a) Pre-dispatch inspection and testing (including stage wise inspection) of complete system at manufacturer's / fabricator's place shall be carried out in presence of ITER-INDIA representative (s) for material, performance, check for mechanical integrity, dimensional requirements, positioning accuracy, functional requirements, and assembly requirements .
- (b) The inner conductor assembly movement with motor and controllers shall be tested conforming the requirements, at supplier site, for at least 25 times for 90° to and fro.
- (c) Pneumatic test shall be performed for pressurization @ 4 bar gauge pressure for 15 minutes.


III. Site Acceptance Test

Following site acceptance test will be carried out at ITER-India lab, ITER-INDIA site:

1. Once all the components /sub-assemblies are delivered to ITER-India lab, the supplier shall assemble switch to check for position accuracy and functional requirements.
2. The inner conductor assembly movement with motor and controllers shall be tested conforming the requirements, for at least 10 times for 90° to and fro.
3. Pneumatic test shall be performed for pressurization @ 4 bar gauge pressure for 15 minutes. Any leaks, if detected by soap bubble method, shall be rectified and re-tested in the same manner.

7. General Requirements:


1. All the machined surfaces should be 2 -delta finish otherwise mentioned.
2. All the threads should be in metric system or otherwise as mentioned in Drawings.
3. Suitable fasteners for assembly should be made of SS 304.
4. The tolerances mentioned in the drawing should be followed. In case tolerances are not mentioned please follow the ISO 2768.

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8. Technical Compliance:

The bidder should fill the below table and return back along with the offers;

Sr. Nos.	ITER-India Specifications	Bidder Specifications	Complied? Yes / No	Remarks
1	Preparation and submission of manufacturing (shop floor) drawings for ITER-India approval. Preparation of a document explaining the sequence of welding and its submission for ITER India approval.			
2	Procurements of material required for all assemblies.			
3	Submission of material test certificate to ITER India for approval.			
4	Fabrication of 12 inch 4 ports torus type switch, quantity – 1 Nos. as per Drawing no: II/ICH/12 INCH/DPDT/00			
5	All the SS 304 fastener & heli-coil insert are under vendors scope			
6	Powder coating shall be done on MS stand as mentioned in drawings			
7	Inspections and testing of individual components at vendors site as per section 6			
8	Assembly of entire system to confirm the mechanical integrity			
9	Integration & testing of entire system with control unit at the vendors site in presence of ITER India representative(s)			
10	Static pneumatic test at pressure 4 bar (Gauge pressure).			
11	Submission of pre-dispatch inspection report to ITER-India for dispatch clearance certificate			

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12	Delivery of items to ITER India Lab site with adequate packing to avoid damage during transportation.			
13	Un-packing, Assembly, Installation and testing at ITER India site			
14	Preparation of final acceptance test report and submission to ITER India for acceptance.			
15	Providing one year warranty from the date of final acceptance.			

Annexure-I

Engineering drawings