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TENDER FORM

प्लाज्मा अनुसंधान संस्थान

(भारत सरकार के परमाणु ऊर्जा विभाग का सहायता प्राप्त संस्थान)

इंदीरा ब्रिज के पास, भाट, गांधीनगर - 382428, भारत

दूरभाष: 079-23962020/23962021, फ़ैक्स: 079-23962277

निमंत्रण निविदा और निविदाकारों को निर्देश करने के लिए

Invitation to Tender and Instructions to Tenderers

The Purchase Officer, Institute for Plasma Research invites, online tenders IN **TWO PART (INR QUOTE ONLY)** for supply of stores as detailed in the Purchaser's Tender documents. The conditions of contract and instructions to tenderers which will govern the contract pursuant to tender are given below.

If you are in a position to quote for the supply in accordance with the requirements stated in the attached Tender Form please submit your quotation **online. The quote should be in INR only.**

Tender submitted by **fax/cable/telegram or any mode other than online will NOT be considered at all** and all such tenders will be rejected without any notice to the tenderer.

Yours faithfully,

Purchase Officer-II

For and on behalf of Director, IPR
Institute for Plasma Research

Encl: as above.

INSTRUCTIONS FOR ONLINE SUBMISSION

- 1) It is mandatory for all the applicants to have **class-III digital signature certificate** from any of the licensed Certifying Applicant to participate in e-tendering.
- 2) In order to participate in online e-tendering process, it is mandatory for the applicants to have **user ID & password** to get access to the website www.tenderwizard.com/DAE. The applicants have to get registered their firm / company with the service provider, M/s ITI Limited for user ID & password. The registration shall be done by paying an annual registration fees to M/s ITI Limited and completing other formalities as mentioned in the website, www.tenderwizard.com/DAE. Validity of online registration is for one year from the date of its issuance and may be renewed by paying the applicable amount. For assistance/clarifications please contact Mr. Sunil K Patel at mobile 09624981992, e-mail: twhelpdesk426@gmail.com or nodalofficer.et@ipr.res.in or All India Help line No: 91-80-40482000/[18004255048](tel:18004255048), e-mail: daehelpdesk@tenderwizard.co.in.
- 3) The applicants, who have already obtained such valid user ID and password from M/s ITI Limited, for any other tender of DAE, need not obtain fresh user ID and password for the purpose of participation in the present tender.
- 4) The services for e-tendering in IPR/DAE is provided by M/s ITI Ltd., Tender wizard Help Desk Centre, # 24, 1st Floor, Sudha Complex, Near Havanoor Circle, 3rd Stage, 4th Block, Basaveshwaranagar, Bangalore - 560079, Ph:91-80-40482000/[18004255048](tel:18004255048), Telefax: 91-80-40482114, Email: daehelpdesk@tenderwizard.co.in.
- 5) The quotations shall be submitted online in the prescribed format before the date and time as mentioned in tender document. No other mode of submission is acceptable.
- 6) On successful e-payment of tender processing fees, the applicants can download the tender documents (including Excel sheets, if any) from the e-tendering portal.
- 7) Submission of the offer document after the due date and time shall not be permitted. Time being displayed on e-Tendering portal shall be final and binding on the applicant.
- 8) Applicants are advised to submit their documents well before the due date. IPR shall not be responsible for any delay in submission of documents for any reason including server and technical problems.
- 9) **Applicants are advised to fill all the mandatory fields (coloured cells) of the excel files of the Tender. If applicant keeps any mandatory cell blank, System will not allow to close/save the file.**
- 10) In case of any problem with the submission of the offer documents, the applicant may have the assistance of helpdesk or use the help manual given on the said website or mobile and e-mail mentioned elsewhere.

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| <p>प्लाज़्मा अनुसंधान संस्थान इंदीरा ब्रिज के पास, भाट, गांधीनगर - 382428 गुजरात राज्य दूरभाष: 079 23962020, 23962021 फैक्स: 079 23962277</p> | <p>INSTITUTE FOR PLASMA RESEARCH NEAR INDIRA BRIDGE, BHAT, GANDHINAGAR 382 428 GUJARAT STATE Phone: 079 23962020, 23962021 Fax: 079 23962277</p> |
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निविदा सूचना TENDER NOTICE NO: IPR/TN/PUR/TPT/ET/19-20/13

दिनांकित DATED 5-7-2019

निम्नलिखित के लिए प्रतिष्ठित और योग्य पार्टियों से ई-निविदा विधि के माध्यम से दो भाग में ऑनलाइन निविदा आमंत्रित की जाती है।

Online tender is invited in **TWO PART** through e-tendering mode from reputed and eligible parties for the following.

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| मद का विवरण Item Description | Supply and installation of PXI and PLC Control System with software services for ICRH System integration and functionality testing as per the specifications mentioned in the tender documents |
| निविदा प्रक्रिया शुल्क Tender Processing Fee | Tender Processing Fee of Rs.4,720.00 should be paid through electronic mode to M/s ITI Limited. |
| बयाना राशि जमा EMD | Rs.1,66,000.00 (Copy of Demand Draft to be uploaded with the quotation, Original DD should be sent to IPR on or before the specified closing date and time) |
| निविदा दस्तावेज वेबसाइट पर देखने और डाउनलोड करने के लिए उपलब्ध है Tender document available for view and downloading on website | 09.00 hrs. on 6-7-2019 to 12.55 hrs. on 14-8-2019 |
| निविदा दस्तावेज के संबंध में स्पष्टीकरण Clarifications regarding Tender document | 09.00 hrs. on 6-7-2019 to 16.00 hrs. on 1-8-2019 |
| निविदा ऑनलाइन जमा करने की अंतिम तिथि Closing of online submission of tenders | 14-8-2019 at 13.00 hrs. |
| भाग-I के ऑनलाइन खोलने का समय और तिथि (तकनीकी बोली) Time and Date of online Opening of PART-I (Technical Bid) | 14-8-2019 at 14.30 hrs. |
| भाग-II के ऑनलाइन खोलने का समय और तिथि (मूल्य बोली) Time and Date of online Opening of PART-II (Price Bid) | Will be declared later on |

आवेदक निविदा दस्तावेज के बारे में वेबसाइट www.tenderwizard.com/DAE पर 1-8-2019 (16:00 बजे) तक अपने प्रश्नों को अपलोड करके स्पष्टीकरण (बोली-पूर्व) मांग सकते हैं। स्पष्टीकरण उसी वेब पोर्टल www.tenderwizard.com/DAE पर 5-8-2019 (17:30 बजे) तक अपलोड किए जाएंगे।

The applicant can seek clarifications (pre-bid) regarding the tender document up to 1-8-2019 (16:00 Hrs) by uploading their queries on website www.tenderwizard.com/DAE . The clarifications will be uploaded on the same web portal www.tenderwizard.com/DAE by 5-8-2019 (17:30 Hrs).

विस्तृत निविदा सूचना, योग्यता मानदंड और निविदा दस्तावेज के साथ वेबसाइट www.tenderwizard.com/DAE पर निःशुल्क देखने और डाउनलोड करने के लिए उपलब्ध है। ई-निविदा प्रक्रिया में भाग लेने के लिए, उपर्युक्त ई-निविदा पोर्टल पर रजिस्टर करना अनिवार्य है और डिजिटल हस्ताक्षर प्रमाणपत्र (श्रेणी-III) होना आवश्यक है। बोलीदाता नए रजिस्ट्रेशन/टेन्डरिंग में सहायता के लिए पऊवि हेल्पडेस्क से daehelpdesk@tenderwizard.co.in पर संपर्क कर सकते हैं, फोन नंबर: (80)-40482000/ 9624981992/18004255048

Detailed tender notice along with Eligibility criteria and Tender Document is available on website www.tenderwizard.com/DAE for free view and downloading. For participating in the e-tendering process, it is mandatory to get registered on the above e-tender portal and required to have Digital Signature Certificate (Class -III). For new registration/ tendering help, bidders may contact DAE Helpdesk at daehelpdesk@tenderwizard.co.in Phone No: (80)-40482000/ 9624981992/ 18004255048

इस निविदा सूचना की एक प्रति संस्थान की वेबसाइट www.ipr.res.in//purchasetenders.html पर भी उपलब्ध है। अधिक जानकारी के लिए, कृपया संपर्क करें: 079 23962020/2021, फ़ैक्स: 079 23962277।

A copy of this tender notice is also available on the Institute's website www.ipr.res.in//purchasetenders.html. For further information, please contact: 079 23962020/2021, Fax: 079 23962277.

TWO-PART TENDER SECTION – A

Invitation to Tender and Tendering Conditions

1.0 INVITATION TO TENDER

1.1 Institute for Plasma Research (IPR) invites online tenders for supply of Plant, Machinery, Equipment/Components to the specifications detailed in Section "C" to this tender document. The conditions of contract/purchase order which will govern the contract pursuant to the tender are as contained in Section "B" of this tender document. If you are in a position to quote for supply in accordance with the technical specifications indicated in Section "C" to this tender document and as per the conditions stipulated in this Section and Section B, please upload your offer in a manner and method specified below.

2.0 MANNER AND METHOD FOR SUBMISSION OF TENDERS

2.1 All tenderers in response to this invitation shall be submitted through online mode only. Tender submitted by **fax/cable/telegram or any mode other than online will NOT be considered at all** and all such tenders will be rejected without any notice to the tenderer.

2.1.1 **Part-I (Techno-commercial):** This part of the tender shall include/contain documents related to eligibility criteria, all technical details, technical specifications, drawings and also the commercial terms and conditions of contract for the supplies to be made and the services to be rendered **EXCLUDING ANY PRICE DETAILS THEREOF.**

Proof for fulfillment of eligibility criteria mentioned in Annexure-A should be uploaded along with the tender. If the tender is submitted without valid documents, we shall not consider your offer. Tenders received without proof of eligibility criteria will be rejected. The offers which meets the eligibility criteria will only be considered for evaluation.

2.1.2 **Part-II (Price):** This part should contain only the prices of the stores offered for the services to be rendered. Part-II (Price) should be furnished in accordance with the format provided by the Purchaser at Section "D" of this tender document

2.1.3 If tenderer includes prices of any nature in Part-I (Techno-commercial) of the tender such offers are liable for rejection without any notice to the tenderers.

3.0 EARNEST MONEY DEPOSIT (EMD)

3.1 The Tenderer shall submit, as part of its bid, interest free Earnest Money Deposit (EMD) for an amount as specified in the Tender Notice. In the case of foreign bidders, the EMD shall be submitted either by the principal or by the Indian agent and in the case of indigenous bidders;

the EMD shall be submitted by the manufacturer or their specifically authorized dealer/bidder. EMD shall be submitted by way of Demand Draft from **SBI/nationalized banks or any one of the scheduled banks mentioned in the bracket (Axis Bank, HDFC Bank, ICICI Bank and IDBI Bank)** issued in favour of "**Institute for Plasma Research**" and payable at **Ahmedabad**. **Tender received without EMD will be rejected at the discretion of IPR.**

(Copy of Demand Draft to be uploaded with the quotation, Original DD should be sent to IPR on or before the specified closing date and time)

- 3.2 The EMD of unsuccessful Tenderer will be discharged/returned after finalizing award of the Contract/placement of Purchase order.
- 3.3 The successful Tenderers EMD shall be discharged upon the Bidder submitting the Security Deposit as specified in the contract/purchase order, without any interest.
- 3.4 **Exemption from payment of EMD:** The firms registered with DGS&D, NSIC, DPS or Micro & Small Enterprises (MSEs) which are actual producers/manufacturers of tendered items are exempted from payment of EMD provided valid registration certificate is uploaded along with the offer. In the case of foreign bidders, payment of EMD is exempted if they submit their bid directly or through their Indian agent in **foreign currency** against the tender document bought by them, so that the order can be placed directly on their Principals.
- 3.5 **The EMD may be forfeited:**
 - 3.5.1 If a Tenderer withdraws or amends or modifies or impairs or derogates its bid during the period of bid validity specified by the Bidder on the Bid Form; or
 - 3.5.2 In case of a successful tenderer, if the tenderer fails to furnish order acceptance within 15 days of the order or fails to submit the Security Deposit within 21 days from the date of contract/order.

4.0 LATE/DELAYED TENDERS

- 4.1 Uploading of the offer document after the due date and time shall not be permitted. Time being displayed on e-Tendering portal shall be final and binding on the applicant.

5.0 OPENING OF TENDERS

- 5.1 Unless otherwise pre-opened or postponed with advance intimation to the tenderers, tender will be opened in two stages on the date and time indicated on e-Tendering portal.
- 5.2 Part-I (Techno-commercial) of the tender will be opened at the first stage on the due date and time indicated for opening on the e-Tendering portal while the Part-II (Price) will be opened at the second stage after completion of the evaluation of the Techno-Commercial Part (Part-I) of the tender.
- 5.3 While all the tenderers who uploaded tenders within the due date and time will be permitted to participate in the opening of Part-I (Techno-Commercial) of the tender on the due date and time indicated on e-Tendering portal, opening of the Part-II (Price) of the tender can be attended to only by such of those tenderers whose Part-I (Techno-Commercial) of the tenders are found to be technical suitable/

acceptable to the Purchaser and to whom intimation thereof is given by the Purchaser by Email/letter or through e-Tendering portal.

- 5.4 The tenderers whose Techno-commercial part (Part-I) are found suitable/acceptable to the Purchaser, will be given seven days advance intimation by the Purchaser to enable such tenderers to depute their representative to participate in the opening of the Part-II (Price) of the tender. The technically unqualified tenderers will neither be given any intimation about the date and time of opening of Part-II (Price) of the tender nor will they be permitted to participate in the opening of the same. **Part-II (Price) of the technically disqualified tenderers will not be opened.**

6.0 AUTHORITY LETTER

- 6.1 The tenderers who wish to participate in the opening of the tenders may depute their representatives to IPR on the respective due date and time as indicated in the tender notice with an authority letter addressed to the Purchase Officer which should be produced to the officers who are opening the tenders, on demand to prove the bonafides of the representative who participates in the opening of the tender. In case the representative of the tenderer fails to produce such an authority letter on behalf of the tenderer, he will be debarred from participating in the opening of the tenders.

- 6.2 The tenderers representative, who reaches the venue of the tender opening late, i.e. after the starting time specified for opening of the tenders, may not be allowed to take part in the tender opening. It should be noted that only one representative of each tenderer will be permitted to participate in the tender opening.

7.0 EVALUATION OF TENDER

- 7.1 Evaluation of tender shall be based on all inclusive landed cost.

8.0 PURCHASER'S RIGHTS TO REJECT QUOTATION

- 8.1 The Purchaser reserves the right to reject any quotation without assigning any reason thereof.

9.0 TECHNICAL CLARIFICATIONS

- 9.1 After opening of Part-I (Techno-commercial) of the tender, if it becomes necessary for IPR to seek clarifications from the tenderers, the same will be sought for from the tenderers.

10.0 DATE FOR OPENING OF PART-II (PRICE):

After completion of technical evaluation, Part-II (Price) of only technically qualified tenderers shall be opened. The date and time of opening of Part-II (Price) shall be intimated only to the technically qualified tenderers. Whose Part-I offers have been found suitable will only be permitted to participate in the opening of the Part-II (Price) of the tender.

11.0 HOLIDAYS

If the date (s) specified for receipt and opening of the tenders is/are declared as holidays abruptly by the competent authority due to any administrative reasons, then the date(s) for opening of tenders will get postponed automatically to the next working day. As for instance, if the due date for receipt of tender and its opening falls on 3rd of a particular month and if the 3rd day of the month is declared as a holiday, then the

opening date of tender will stand automatically postponed to 4th day of the month at the same time. However, due date for submission of tender online will remain same as mentioned in the tender notice.

12.0 VALIDITY OF OFFERS

Offers shall be kept valid for acceptance for a period of 120 (One hundred twenty) days from the date of opening of Part-II (Price) of the tender. Offers with shorter validity period will be liable for rejection.

13.0 CATALOGUES/TECHNICAL LITERATURE

Vendor shall upload all necessary catalogues/drawings technical literature data as are considered essential for full and correct evaluation of the offers shall invariably accompany the Part-I (Techno-Commercial) of the tender. The quotations are liable to be ignored if this condition is not complied with.

14.0 TERMS AND CONDITIONS OF THE CONTRACT

It must be clearly understood that any contract concluded pursuant to this invitation to tender shall be governed by the General Conditions of the Contract as contained in Section "B" of this tender document. Tenderers must therefore, take special care to go through these general conditions of contract and in exceptional cases if any deviations are proposed, these must be clearly indicated in the Part-I of the tender as a separate annexure instead of merely enclosing their printed conditions of Sale. Tenders made subject to counter conditions or far too many deviations from the general conditions of contract, i.e. Section "B" of this tender document are liable to be ignored. It should also be realised that failure to bring out deviations from the General Conditions of Contract contained in Section "B" of this tender document will imply that the tenderer is willing to execute the contract as per the Purchaser's terms and conditions of contract.

15.0 TENDERING CONDITIONS FOR BIDS

- 15.1 The prices quoted must be FIRM and preference will be given to such tenders. In exceptional cases (e.g. items involving substantial use of raw materials susceptible to sharp fluctuations in prices) if prices quoted subject to variation it shall be on the basis of a standard 'Price Variation Formula'. The basis for calculation shall be very clearly stated. The responsibility for furnishing the documentary evidence for price variation lies with the vendor. Here again preference will be given to the tenders with a specific ceiling on escalation.
- 15.2 Prices quoted by the tenderer should include all charges involved for direct and safe-delivery of the stores to the consignee/place of delivery indicated in the tender document. If a tenderer so desires, separate lump sum charges for safe-delivery of the stores to the consignee/purchaser's site, could be furnished. However, the purchaser reserves the right to call for break-up. The purchaser will neither undertake responsibility for transit insurance nor pay for it separately.
- 15.3 In respect of tenders on Ex-works basis, in case the tenderer has not mentioned in the offer packing, forwarding and transportation charges for safe delivery up to Purchaser's site, 2% of the price quoted towards packing (in respect of both local and outstation firms), 1% of the basic price quoted towards safe delivery charges in respect of local tenderer and 3% of the basic price quoted towards safe delivery charges in

respect of outstation firm will be added for comparison of offers on safe door delivery at Purchaser's site.

- 15.4 The stores shall neither be despatched under 'owner's risk' nor consigned to 'self', but only to the consignee's name and address indicated in the Purchase order. Non-adherence to this condition shall make the contractor liable to bear all consequential penalties/expenses such as demurrage, wharf age, etc. which the Purchaser may incur.
- 15.5 The consignee will, as soon as possible, but not later than 45 days from the date of arrival of stores at destination notify the contractor of any loss or damage to the stores that may have occurred during transit to enable the contractor to repair/rectify the defects/damages or replace the goods as is appropriate, free of all charges. In case it is desired by the contractor for returning of the material to them all expenses towards transportation etc. will be borne by the supplier and also will furnish bank guarantee towards the cost of material.
- 15.6 In case an Indian supplier/Agent furnishes an offer for supply of outrightly imported stores, the price of such stores shall be quoted in Indian Rupees for delivery to the consignee's premises exclusive of import duties and on firm price basis.
- 15.6 **Conditional Discount:** In case the tenderer offers any conditional discount with regard to acceptance of their offer within a specific payment terms, delivery, quantity etc. the purchaser will not take into consideration such conditional discount while evaluating their offer.

16.0 SPARES AND ACCESSORIES

- 16.1 Tenders for plant/machinery/equipment/component shall also indicate prices for essential accessories, optional accessories and spares necessary for satisfactory operation of the plant/machinery/equipment.
 - 16.1.1 for a period of two years and
 - 16.1.2 for a period of five years
- 16.2 Prices for accessories and spares shall be itemized. Tenders where only lumpsum prices are indicated are liable to be ignored. Particular care must be taken to list out each item of spare and quantity recommended and also the individual price for these items. These details should be included only in Part-II (Price) of the tender. However, a list of spares and accessories without Price should be included in Part-I (Techno-Commercial) of the tender.

17.0 QUANTITY

The purchaser reserves the right to accept tenders for any quantity of his choice and the tenderer shall be bound to accept a contract for any quantity. The Purchaser also reserves the right to accept or reject lowest or any tender in full or in part without assigning any reasons.

18.0 STATUTORY LEVIES SUCH AS CUSTOMS DUTY, GOODS AND SERVICE TAX

18.1 CUSTOMS DUTY

- 18.1.1 The Purchaser is entitled for assessment of customs duty at the concessional rate as per Customs Notification No. 51/96-Custom dated 23.7.1996 issued by the Department of Revenue, Ministry of Finance, as amended from time to time, in respect of purchases made for the Research Institutions under the Department of Atomic Energy and the Purchaser will obtain the requisite

- certificate from the appropriate authority.
- 18.1.2 In case an Indian vendor/agent submits an offer for supply of outrightly imported stores in Indian Rupees, they should quote price for free and safe delivery of stores at destination.
- 18.1.3 Wherever, against a requirement, both indigenous as well as imported offers are received, the offers for imported stores will be evaluated on the basis of the total landed cost after loading the custom duty and other levies as may be applicable from time to time for taking purchase decision.
- 18.1.4 High Seas sale will not be considered.

18.2 **FLUCTUATION IN THE CUSTOMS DUTY**

- 18.2.1 Unless otherwise specifically agreed to in terms of the Contract, the purchaser shall not be liable for any claim on account of fresh imposition and /or increase in Customs Duty on raw materials and/or components used directly in the manufacture of the contracted stores, taking place during the pendency of the contract.

- 18.3 **Offers from Indian Agents on behalf of foreign suppliers:** In case the tender is submitted by an Indian supplier/Indian agent on behalf of their foreign supplier/ principals, following documents should be submitted with the tender, failing which, their offer is liable to be ignored.

- 18.3.1 Photocopy of the Agency Agreement between the Principals and the Indian Agent showing the percentage or the quantum of agency commission payable and a Letter of Authority from the Principals authorizing the Indian Agents to submit the tender on their behalf.
- 18.3.2 The type and nature of after sales services to be rendered by the Indian Agent.
- 18.3.3 Both Indian Agent and Principal/OEM cannot bid simultaneously for the same item/product in the same tender.
- 18.3.4 The Indian Agents are allowed to quote on behalf of only one foreign Principal/ Supplier against this tender.
- 18.3.5 Copy of Registration Certificate with DGS&D or DPS.

18.4 **GOODS AND SERVICE TAX**

- 18.4.1 GOODS AND SERVICE TAX where legally leviable as per relevant HSN code will be admitted and reimbursed at the rate applicable during original delivery date.
- 18.4.2 GOODS AND SERVICE TAX intended to be claimed should be distinctly shown separately along with the price quoted. Where this is not done, no claim for GOODS AND SERVICE TAX will be admitted at any later stage and on any ground whatsoever.
- 18.4.3 The Purchaser is entitled for assessment of GST at the Concessional rate as per Notifications issued by the Government, as amended from time to time, in respect of purchases made for the Research and Development applications under the Department of Atomic Energy and other R&D units.
- 18.4.4 **GST for R&D Unit:** Goods and Service Tax (GST) wherever applicable will be paid extra at actual during the delivery period stipulated in the Purchase order. In terms of notifications issued by the Central Government and State Governments, R&D units of Department of Atomic Energy are entitled for IGST @ 5% or CGST @ 2.5% and SGST @ 2.5% as applicable for stores covered under the Purchase Order.

- 18.4.5 **GST for Services:** As applicable. Specify the SAC codes wherever services are involved.
- 18.4.6 It would be the responsibility of the contractor to ensure that relevant certificate is obtained from the Purchaser before effecting the delivery of goods ordered failing which the excess tax paid by the contractor shall not be reimbursed by the Purchaser.
- 18.4.7 When GOODS AND SERVICE TAX is claimed as extra by the vendor in general and on packing charges in particular, the following certificates should be submitted by the vendor to the Paying Authority on the bills itself.
- 18.4.8 Certified that the goods and packing charges on which GOODS AND SERVICE TAX has been charged have not been exempted under the Central Sales Tax or the State Sales Tax Act or the rules made there-under and the amount charged on account of GST on these goods and packing charges are not more than what is payable under the provision of relevant Act or the rules there-under.
- 18.4.9 Certified further that we have actually paid GOODS AND SERVICE TAX and are being assessed to GST on packing charges and also that where there are statutory exemption under the Relevant Act/Law of the State Government concerned, we have availed ourselves of it and certified non-availability of such a provision for GST on packing charges wherever claimed.
- 18.4.10 Certified further in respect of amount claimed into the bill no claim is pending for refund/or admissible. Certified that in the event of our getting refund in whole or in part of the element of GOODS AND SERVICE TAX on packing charges claimed from Government, we shall pass on the benefit to the Purchaser by remitting to Government the amount equivalent to the amount of refund obtained by us.
- 18.4.11 Further certified that we abide by the all the provisions of Acts of Governemnt and rules made thereunder especially regarding anti-profiteering provisions.
- 18.4.12 Certified further that we (our Branch or agent) _____

 (address) are registered as dealers in the State of _____
 under Local Regn. No. _____ and in the State of _____
 under Central Regn. No. _____ for the
 purpose of State/Central Tax.
 (Stamp & Signature of the Vendor)
- 18.4.13 The vendor shall solely be responsible for declaration of Goods and Service Tax made in his invoice and shall indemnify the purchaser from any claim or its liability from concerned authorities at any stage.
- 18.4.14 Certificate with each bill to the effect that no refund has been obtained in respect of the reimbursement of GST made to vendor during three months immediately preceding the date of the claim covered by the relevant bill.
- 18.4.15 AN UNDERTAKING to the effect that in case any refund of GST is granted to the vendor by concerned authorities in respect of stores supplied under the contract, they shall pass on the credit to the purchaser immediately alongwith a certificate from their Director/Manager/Proprietor/ Accountant to the effect that the credit so passed on relates to the GST originally paid for the stores

supplied under the contract. In case of their failure to do so within 10 days of the issue of the refund orders to them by the Authorities, the purchaser would be empowered to deduct a sum equivalent to the amount refunded by the authorities without any further reference to the vendor, from any of their outstanding bills against this or any other pending Government Contracts and that no dispute on this account would be raised by the vendor.

18.4.16 Statutory Deductions, as applicable shall be made from the supplier's bill.

18.5 **DEDUCTION OF TAX AT SOURCE (TDS)**

As per Government of India rules, it is mandatory that income tax shall be deducted at source at applicable rates as per relevant act, rules and notifications issued by the government from time to time.

18.5.1 **In case of Indigenous Vendors** (Indian Suppliers who provide indigenous products and services, Indian subsidiaries with permanent establishment in India who supply imported goods and services and paid in Indian currency only): Tax deducted at source will be applicable under Section 194-C for carrying out any work (including supply of labour for carrying out any work) in pursuance of contract as per Income Tax Act 1961. In case of technical or professional services, TDS will be applicable as per under Section 194-J of Income Tax Act 1961.

18.5.2 **In case of Foreign Vendors** (Foreign Suppliers who provide goods from abroad paid in foreign currency and providing technical services by Indian subsidiary paid in Indian currency): The TDS is applicable where services are rendered in India directly or through their Indian counter part against foreign Purchase order / Contract as per the provision of under Section 195 of Income Tax act of India. Wherever DTAA (Double Taxation Avoidance Agreement) agreement exists between India and the supplier country the provisions of the agreement shall be applicable. For getting benefit of DTAA (Double Taxation Avoidance Agreement), the following documents must be submitted, otherwise full TDS will be deducted.

- a) No Permanent Establishment in India certificate
- b) Tax Residency Certificate (TRC) issued by Tax authorities of their country
- c) Form 10F if TRC does not contain required details
- d) PAN (Permanent Account Number) details issued by Indian Income Tax Authority

Important Note:

- a) Where bifurcation is inappropriate and unacceptable for supply of material and providing services the purchase order / contract will be treated as **Composite Contract** and TDS will be deducted on whole contract / purchase order value as per applicable rate.
- b) TDS or any other leviable taxes or duties, if applicable, shall be deducted recovered from the Supplier's bill and necessary certificate will be issued to the supplier.

- c) Details on relevant sections of Income Tax Act and DTAA treaties can be obtained from [https://www.incometaxindia.gov.in/ Pages/acts/income-tax-act.aspx](https://www.incometaxindia.gov.in/Pages/acts/income-tax-act.aspx).

19.0 FLUCTUATION IN STATUTORY LEVIES

Unless otherwise specifically agreed to in terms of the Contract, the purchaser shall not be liable for any claim on account of fresh imposition and/or increase in statutory levies on raw materials and/or components used directly in the manufacture of the contracted stores, taking place during the pendency of the contract. However, any reduction in statutory levies on these raw materials and/or components must be passed on to the Purchaser.

20.0 SAMPLES/PROTOTYPES

If any called for shall be submitted free of all charges by the Tenderer and the Purchaser shall not be responsible for any loss or damage thereof for any reason whatsoever. In the event of non-acceptance of the tender, the tenderer will have to make arrangements to remove/collect the sample/prototypes at his own expenses.

21.0 QUANTITIES

Quantities indicated are approximate only and one or more of the items of the stores tendered, or a portion of any one or more of the items of such stores may be accepted and the tenderer notwithstanding that his Tender has not been accepted in whole shall be bound to supply contracted quantity to the Purchaser.

22.0 SUBMISSION OF DRAWINGS

The tenderer shall furnish all drawings pertaining to the plant/machinery/ equipment/component to the Purchaser along with the tender for correct understanding and appreciation of the tender in quadruplicate. Besides, tenderers should also furnish general arrangement, schematic and such other drawings prescribed by the Purchaser within 4 weeks from the date of receipt of a Purchase Order for approval. Such drawings should be furnished along with Part-I (Techno-Commercial) of the tender. Tenderer's drawing will form part of the purchase order/contract only after these are approved by the Purchaser.

23.0 INSTALLATION AND COMMISSIONING

- 23.1 Wherever, the purchaser's invitation to tender calls for installation and commissioning or supervision of installation and commissioning of the instrument/equipment by the tenderer, the tenderer must clearly and separately quote the prices for the supply of the stores and the charges and the terms for installation and commissioning or supervision of installation and commissioning, as the case may be. The charges towards installation and commissioning should not be included in the price of the stores.
- 23.2 In respect of contracts involving installation and commissioning by vendors including overseas vendors where identifiable charges for the same has been quoted by the vendor, he shall bear the Income-tax liability as per the rates prevailing at the time of undertaking the job in accordance with the Income-tax Act in force in India.

23.3 Wherever, the scope of the contract includes installation and commissioning, it shall be the sole responsibility of the contractor to undertake the installation and commissioning as and when called for, by the Purchaser.

24.0 **INSPECTION**

24.1 The Contractor shall be responsible for and perform all inspection and testing required in accordance with the contract/purchase order and specifications included therewith.

24.2 The Purchaser may at his option depute his representative for inspection of the stores to be supplied under the contract or authorize and nominate a Quality Surveillance Agency of his choice for the purpose hereinafter called, in either case, the inspection.

24.3 The supplier shall give notice of readiness for inspection to the Purchaser so that the Inspector can be present at the requisite time. In such an event delivery shall not be effected until an authorization or shipping release is obtained from the Purchaser.

24.4 The contractor shall allow reasonable facility and free access to his work/factory and records to the inspector for the purpose of inspection or for ascertaining the progress of delivery under the contract.

25.0 **FACTORY REGISTRATION/SHOP & ESTABLISHMENT CERTIFICATE**

The tenderers shall upload the copy of the Factory Registration/License or Shop & Establishment Certificate as applicable, along with the tender, failing which the tenders are liable for rejection.

26.0 **PRODUCTS WITH ISI MARK**

26.1 Products with ISI mark will be preferred.

26.2 In respect of following categories of item, Purchaser will consider offers for products with ISI mark only:

- Fire Extinguisher
- Building Material
- PVC Pipes & fittings
- Agricultural Implements & sprayers
- Medical instruments such as syringes, needles, BP apparatus etc.

27.0 **SHOP/FACTORY EVALUATION, QUALITY SURVEILLANCE /INSPECTION AND SUBMISSION OF PROGRESS REPORTS**

27.1 The Purchaser or his technical authorities may at his option and prior to evaluation of the tender depute his Inspector or any quality surveillance Agency of his choice to the factory/workshop of the tenderer to assess and establish the manufacturing capability etc. of the tenderer. Similarly, the Purchaser may also depute his inspector/Quality Surveillance agency of his choice for inspection of the plant/machinery/equipment/component during the various stages of manufacture in such an event the tenderer/contractor shall:-

27.1.1 Allow reasonable facility and free access to his factory/work/ records to the Inspector for the purpose of inspection or for ascertaining the progress of manufacture and delivery.

27.1.2 Provide the drawings, toolings, gauges, instruments etc. required for carrying out the inspection work.

- 27.1.3 Produce an inspection plan to the Purchaser's satisfaction notifying him when check points on the plan are imminent.
- 27.1.4 Not supply or deliver the plant/machinery/equipment/ component unless and until a Shipping Release or an authorisation for despatch is obtained in a format provided by the Purchaser. Failure to comply with this instruction will not only result in withholding of the payment to the contractor/supplier, but also hold the tenderer/contractor liable for payment of compensation to the Purchaser due to delay in clearance of the Equipment/plant/machinery/ component from the carriers.

28.0 INSTRUCTION MANUAL

In respect of plant/ machinery/ equipment/ instrument/ apparatus, where instruction/ operation manual is normally necessary to enable the user to put the plant/machinery/equipment/instrument/ apparatus to proper use, the Contractor shall furnish such an instruction/operation manual specific to the stores being supplied along with the plant/machinery/equipment/instrument/apparatus. The Contractor shall clearly specify in the offer about his readiness to supply instruction/operation manual

29.0 PACKING

- 29.1 Tenderers shall note that packing for shipment shall be in accordance with the instructions outlined in this tender document, each package shall be limited to the size and weights that are permissible under the existing Air and Sea limitations. Even when no packing specification is included in the invitation to tender, it will be Supplier's responsibility to provide appropriate packing depending upon the nature of the supply and the transportation and handling hazards.
- 29.2 The equipment shall be so packed and protected as not to suffer deterioration, damage or breakage during shipment and storage in a tropical climate.
- 29.3 Each package shall be properly labeled to indicate the type and quantity of material it contains, the purchase order number, its dimensions and weight and any other necessary data to identify the equipment and relate it to contract.

30.0 DEVIATIONS TO PURCHASER'S SPECIFICATIONS AND CONDITIONS OF CONTRACT

- 30.1 If any deviation or substitution from the technical specifications contained in Section "C" to this tender document is involved, such details should be clearly indicated in Part-I (Techno-Commercial) and should be added as an annexure to Part-I (Techno-commercial) of the tender as otherwise it shall be an admission on the part of the tenderer that he will supply the equipment as specified by the Purchaser. Similarly, deviations to the Purchaser's General Conditions of Contract/Special Conditions of Contract contained in Section "B" of this tender document shall be indicated by the tenderer in another annexure to Part-I (Techno-commercial) of the tenderer.

30.2 Part-II (Price) should be furnished in accordance with the format provided by the Purchaser at Section “D” of this tender document.

31.0 DELIVERY

Tenderer should note that no tender will be considered by the Purchaser unless the Tenderer can meet the delivery schedule specified by the Purchaser. All equipments/machinery/plant/ component covered by this tender document should be supplied on or before _____ or _____ month from the date of approval of drawings or ____ month from the date of receipt of free issue materials. The prices quoted by the tenderer should include all charges involved for direct and safe delivery of the items by Road to the project site of the Purchaser. If a tenderer so desires/separate lumpsum charges for transportation and safe delivery to Purchaser’s site could be furnished. Purchaser will neither undertake responsibility for transit insurance nor pay for it separately. No other, delivery term will be accepted by the Purchaser.

32.0 ACCEPTANCE OF TENDERS

32.1 The purchaser shall be under no obligation to accept the lowest or any other tender and shall be entitled to accept or reject any tender in part or full without assigning any reasons whatsoever.

32.2 Acceptance of tenders by the Purchaser will be sent by fax, E-mail, letter etc. within the validity date of the tender and such a fax, letter etc. would then be followed by a formal purchase order/contract. The tenderer whose offer is accepted will proceed with the execution of the contract on the basis of such advance acceptance of tenders without waiting for a formal purchase order/contract, and will be responsible to seek and obtain whatever clarifications that are necessary from the Purchaser to proceed with the manufacture without waiting for a formal purchase order/contract and delivery period will be reckoned from the date of the Letter of Intent.

33.0 SETTLEMENT OF COMMERCIAL TERMS AND CONDITIONS OF CONTRACT

In case the commercial terms and conditions of sale/contract stipulated in Part-I (Techno-commercial) of the tender submitted by the tenderer are at variance with the Purchaser’s General Conditions of all Contracts/Special Conditions of Contract stipulated in Section “B” of this tender document, the Purchase Officer will settle the commercial terms and conditions of contract with the tenderers chosen for award of the contract by holding discussions with them OR by sending Fax/Letter/E-mail etc. In case the concerned tenderer to whom an intimation thereof is given does not respond/fail to respond to communication sent by the Purchaser within the date specified, his tender is liable for rejection at the discretion of Director, IPR and no complaints whatsoever will be entertained from the tenderer for rejection of this tender. The tenderers should not discuss with the technical authorities/user department any of the commercial terms and conditions of contract and any agreement/understanding reached between the tenderer and the technical authorities will not be valid and binding.

34.0 **COMPLIANCE WITH THE SECURITY REQUIREMENTS OF THE PURCHASER**

The Contractor shall strictly comply with the Security Rules and Regulations of the Purchaser in force and shall complete the required formalities including verification from Police and any other authority and obtain necessary prior permission for entry into the Purchasers premises, wherever authorized by the Purchaser.

35.0 **PAST PERFORMANCE**

In case the past performance of the tenderer is not found to be satisfactory with regard to quality, delivery, warranty obligation and non-fulfillment of terms and conditions of the contract, their offer is liable to be rejected by the purchaser.

36.0 **CAPACITY & FINANCIAL STANDING**

In case it is found that the tenderer does not possess the requisite infrastructure, capacity, capability and their financial standing is not satisfactory, such tender is liable to be rejected by the Purchaser.

37.0 **CONFIDENTIALITY**

Drawings, specifications, prototypes, samples or any other correspondence/details/information provided by the Purchaser relating to the tender or the contract shall be kept confidential by the contractor, and should not be disclosed or passed on to any other person/firm without the prior written consent of the purchaser. This clause shall apply to the sub-contractors, consultants, advisers or the employees engaged by the Contractor.

38.0 **RESTRICTED INFORMATION CATEGORIES UNDER SECTION 18 OF THE ATOMIC ENERGY ACT, 1962 AND OFFICIAL SECRETS UNDER SECTION 5 OF THE OFFICIAL SECRETS ACT, 1923**

Any contravention of the above mentioned provisions by the contractor, sub-contractor, consultant, adviser or the employees of the contractor will invite penal consequences under the aforesaid legislation.

39.0 **PROHIBITION AGAINST USE OF THE NAME OF ANY INSTITUTION OF DEPARTMENT OF ATOMIC ENERGY WITHOUT PERMISSION FOR PUBLICITY PURPOSES**

The Contractor or sub-contractor, consultant, adviser or the employees engaged by the contractor shall not use the name of any Institution of Department of Atomic Energy for any publicity purpose through any public media like Press, Radio, TV or Internet without the prior written approval of the Purchaser.

40.0 **FREE ISSUE MATERIAL** *(This clause shall apply only to contracts for supply of fabricated equipment with purchaser's Free Issue Materials (FIM)).*

40.1 Wherever contracts envisage supply of Free Issue Material (FIM) by the Purchaser to the contractor, such Free Issue Material shall be safeguarded by an insurance policy to be provided by the Contractor at his own cost for the full value of such materials and the insurance policy shall cover, the following risks specifically and shall be valid for six months beyond the contractual delivery date.

- **Risk to be covered:** Any loss or damage to the Purchaser's material due to fire, theft, riot, burglary, strike, civil commotion, terrorist act, natural calamities etc. and any loss or damage arising out of any other causes such as other materials falling on purchaser's materials.
- **Insured by:** (Name of the Contractor)
- **Beneficiary:** Institute for Plasma Research, Near Indira Bridge, Bhat, Gandhinagar-382428.
- **Amount for which insurance policy to be furnished:** The amount will be indicated in the respective contract.

Free Issue Material (FIM) will be issued to the Contractor only after receipt of the Insurance Policy from the Contractor. The contractor shall arrange collection of the FIM from the Purchaser's premises and safe transportation of the same to his premises at his risk and cost.

Notwithstanding the insurance cover taken out by the Contractor as above, the contractor shall indemnify the purchaser and keep the Purchaser indemnified to the extent of the value of free issue materials to be issued till such time the entire contract is executed and proper account for the FIM is rendered and the left over/surplus and scrap items are returned to the Purchaser. The contractor shall not utilize the Purchaser's free issue materials for any job other than the one contracted out in this case and also not indulge in any act, commission or negligence which will cause/result in any loss/damage to the Purchaser and in which case, the Contractor shall be liable to the Purchaser to pay compensation to the full extent of damage/loss. The Contractor shall be responsible for the safety of the free issue materials after these are received by them and all through the period during which the materials remain in their possession/control/ custody. The free issue materials on receipt at the Contractor's works shall be inspected by them for ensuring safe and correct receipt of the material. The Contractor shall report the discrepancies, if any, to the Purchaser within 5 days from the date of receipt of the material. The Contractor shall take all necessary precautions against any loss, deterioration, damage or destruction of the FIM from whatever cause arising whilst the said materials remain in their possession/custody or control. The FIM shall be inspected periodically at regular intervals by the Purchaser for ensuring safe preservation and storage. The contractor shall also not mix up the FIM with any other goods and shall render true and proper account of the materials actually used and return balance remaining unused material on hand and scrap along with final product and if it is not possible within a period of one month from the date of delivery of the final product covered by this purchase order. The Contractor shall also indemnify the Purchaser to compensate the difference in cost between the actual cost of the FIM lost/damaged and the claim settled to the Purchaser by the insurance company. The decision of the Director, Institute for Plasma Research, as to whether the Contractor has caused any loss, destruction, damage or deterioration of the FIM while in his possession, custody or control from

whatever cause arising and also on the quantum of damage suffered by the government, shall be final and binding upon the Contractor.

41.0 EXPORT LICENCE/EXPORT PERMISSION

41.1 It is entirely the responsibility of the vendors who are quoting for materials of foreign origin to ensure obtaining export permission/licence/authorisation as required from the respective Government before arranging shipment. This Department would not accept post supply inspection by any agency/authority of any foreign country. It is, therefore, necessary that the vendors offering materials from foreign countries shall have thorough knowledge of export contract regulations in vogue in those countries.

41.2 The vendors shall indemnify the purchaser against any consequences in respect of any end-use declaration they/their overseas Principals may furnish to the government/government agencies of the country of origin of the materials, while seeking export permission/licence. Post supply inspection, contrary to the terms and conditions of purchaser's contract shall be deemed to be null and void.

42.0 END USE CERTIFICATE

42.1 Whenever an End-use Certificate is desired by the vendor, the same shall be clearly mentioned in the quotation and the purchaser shall provide an Enduser Certificate as per the format given below. The Purchaser will not provide any other document/declaration in this regard.

END USER STATEMENT:

"We hereby certify that the item/s i.e. _____, being procured from M/s _____ against our Purchase Order No. _____ dated _____ will be used for _____. We also certify that the item/s will not be used in designing, developing, fabricating or testing of any chemical, biological, nuclear, or weapons of mass destruction or activities related to it. It is further certified that we will not re-export the Item/s prior to obtaining permission from the concerned authorities as may be required".

43.0 COUNTRY OF ORIGIN

43.1 Wherever the tenders are for imported stores, the Country of Origin of the stores must be clearly specified in the quotation.

44.0 LIABILITY

44.1 Vendors shall be liable for any damage to the purchaser or any third party out of any patent or latent defect in the goods supplied by him or sub-standard services rendered by him.

45.0 RIGHT TO REJECT QUOTATION

45.1 The Purchaser reserves the right to reject any quotation, which is not in conformity with the above instructions.

45.2 The Purchaser also reserve the right to reject any quotation without assigning any reason whatsoever.

46.0 **PRICE / PURCHASE PREFERENCE**

Purchase/Price preference to industries will be given as per the policy of the Government of India in force at the time of evaluation provided their offer is in compliance with the conditions of the policy.

47.0 **PERMANENT ACCOUNT NUMBER (PAN)**

47.1 Vendors are required to upload a true copy of the PAN Card/Letter issued by the Income-tax Department, failing which the tenders are liable to be rejected.

48.0 MSE bidders should declare their UAM (Udyog Aadhar Memorandum) number on CPPP portal to avail benefits as per Public Procurement Policy for MSE's order 2012.

49.0 The bidder shall not be under a declaration of ineligibility for corrupt or fraudulent practices or blacklisted with any of the Government Agencies.

Any additional conditions attached to this Invitation to Tender shall also form part of the contract conditions.

SECTION 'B'

**GENERAL CONDITIONS OF
CONTRACT**

**INSTITUTE FOR PLASMA RESESARCH
PURCHASE SECTION**

**GENERAL CONDITIONS OF ALL
CONTRACT**

&

**SPECIAL CONDITIONS OF CONTRACT
GOVERNING SUPPLIES OF
PLANT AND MACNHINERY**

GENERAL CONDITIONS OF CONTRACT

1. DEFINITIONS

- 1.1 The term 'PURCHASER' means the Institute for Plasma Research or its successors or assigns.
- 1.2 The term 'PARTICULARS' means the following:
 - 1.2.1 Specification
 - 1.2.2 Drawing
 - 1.2.3 Sealed pattern denoting a pattern sealed and signed by the Inspector
 - 1.2.4 Proprietary make denoting the produce of an individual firm
 - 1.2.5 Any other details governing the construction manufacture and/or supply as existing for the contract.
- 1.3 The term 'CONTRACTOR' or 'SUPPLIER' means, firm or company with whom or with which the order for the supply of stores is placed and shall be deemed to include the Contractors/Successors (approved by the Purchaser), representatives, heirs, executors and administrators unless excluded by the contract.
- 1.4 The term 'CONTRACT' or 'PURCHASE ORDER' means and comprises of a Letter or Email or ink signed or digitally signed document conveying acceptance of Contractor's offer and invitation to tender, tender containing offer, advance acceptance of offer, general and special conditions of contract specified in the acceptance of offer and any subsequent amendments/alterations thereto made on the basis of mutual agreement.
- 1.5 The term 'STORES' or 'MATERIAL' means, the goods specified in the contract/purchase order which the contractor has agreed to supply under the contract.
- 1.6 The term 'SUB-CONTRACTOR' or 'SUB-SUPPLIER' means any contractor or supplier engaged by the contractor or the supplier with the prior approval of the Purchaser in relation to the contract/purchase order.
- 1.7 The term 'INSPECTOR' or 'QUALITY SURVEYOR' means any person nominated and deputed by the purchaser or their appointed Consultants or Quality Surveillance Agency or any other person from time to time authorized by the Purchaser to act as his representative for the purpose of inspection of stores under the contract/purchase order.

2. AUTHORITY OF PERSON SIGNING THE CONTRACT ON BEHALF OF THE CONTRACTOR

The person signing the contract or the purchase order or any other document in respect of the contract or purchase order on behalf of the contractor shall be deemed to warrant that he has the authority to bind the contractor.

3. SUBLETTING OF CONTRACT OR BILLS OR ANY BENEFIT ACCRUING THEREFROM

- 3.1 The Contractor shall not sublet, transfer or assign the Contract or any part thereof or bills or any other benefits, accruing therefrom or under the contract without the prior written consent of the Purchaser (All Sub-contractors are required to be appraised and approved by the Purchaser before placement of orders by the Contractor/Supplier). However, such consent shall not be unreasonably withheld by the Purchaser, if such stores are not normally manufactured by the Contractor, such assignment or subletting shall not relieve the Contractor from any contractual obligation or responsibility under the Contract.
- 3.2 Any breach of this condition shall entitle the Purchaser to cancel the Contract or any part thereof and to purchase from other sources at the risk and cost of the Contractor and shall recover from the Contractor damages arising from such cancellations.
- 3.3 In case the Contractor sublets, transfers or assigns any part of the Contract with the prior written consent of the Purchaser, all payments to the Sub-Contractor shall be the responsibility of the Contractor and any requests from such sub-Contractor shall not be entertained by the Purchaser.

4. SECURITY DEPOSIT

- 4.1 On acceptance of tender, the Contractor shall at the option of the Purchaser and within the period specified by him, submit a Bank Guarantee from SBI or any one of the nationalized banks or reputed private banks, viz. AXIS Bank, ICICI Bank, IDBI Bank and HDFC Bank towards Security Deposit not exceeding 10% (ten percent) of the tendered value of the contract/purchase order valid till at least 2 months beyond the acceptance date of the material, as the Purchaser shall specify.
- 4.2 If the Contractor is called upon by the Purchaser to submit Security Deposit and the contractor fails to provide the same within the period specified such failure shall constitute a breach of the Contract and the Purchaser shall be entitled to make other arrangements for the repurchase of the stores contracted for at the risk and expenses of the Contractor in terms of clause 9.2.4 hereof and/or recover from the Contractor damages arising from such cancellation. No claim shall lie against the purchaser either in respect of interest if any due on Security Deposit or depreciation in value.
- 4.3 Offers wherein contractors declined to submit Security Deposit are liable to be rejected.

5. DRAWINGS & SPECIFICATIONS

- 5.1 The drawings and specifications are intended to be complementary and to provide for an comprise everything necessary for the completion of supply. Any material shown on the drawing even if not particularly described in specifications or vice versa is to be supplied by the Contractor as if it were both shown and specified.

- 5.2 Should any discrepancy be noted in the drawings and/or specifications and should any interpretation of the same be required, the matter shall be referred to the Purchaser for clarification which shall be binding upon the contractor. Otherwise, the contractor shall assume responsibility for the interpretation of the drawings and specifications including interpretation by his sub-contractors.
- 5.3 Should any difference or dispute arise with regard to the true intent and meaning of drawings or specification or should any portion of the same be obscure or capable of more than one interpretation, the same shall be decided by the Purchaser whose decision shall be final.
- 5.4 All lettering on the drawings is to be considered as part of the specification and contract. In all cases figured dimensions are to be followed rather than those indicated by scale. Large scale drawings will take precedence over small scale drawings.
- 5.5 The contractor's drawings shall, when approved by the Purchaser, be deemed to be included in the list of drawings which form part of the contract. The Contractor shall not proceed with fabrication until all drawings associated therewith have been duly approved by the Purchaser.
- 5.6 The Contractor shall be responsible for and shall pay for any alterations of the stores and shall indemnify the Purchaser for any consequential expenditure incurred by the Purchaser due to any discrepancies, errors, omissions in the drawings or other particulars supplied by him whether such drawings or specifications have been approved by the Purchaser or not, provided that such discrepancies, errors or omissions be not due to inaccurate information or specifications furnished to the contractor on behalf of the Purchaser.
- 5.7 **General Warranty**
- 5.7.1 The stores supplied by the contractor under the contract shall be of best quality and workmanship. The contractor shall supply the stores in accordance with the contract specifications unless any deviation has been expressly specified in the contract and any amendments agreed thereto.
- 5.7.2 The contractor's offer to supply stores in accordance with the tender specifications shall be deemed to be in admission on his part that he has fully acquainted himself with the details thereof and no claim shall lie against the Purchaser on the ground that the contractor did not examine or acquaint himself fully with the tender specifications.
- 5.8 **Contractor's Liability for Defective Stores**
- 5.8.1 For a period of twelve months after the stores have been accepted by Purchaser the Contractor shall be responsible for any defects that may be discovered therein notwithstanding that such defects could have been discovered at the time of inspection or any defects therein are found to have developed under proper use, arising from faulty materials, design or workmanship and the Contractor shall remedy all such defects as aforesaid at his own cost provided he is called upon within a period of 14 months from the date of acceptance thereof to do

so, by the Purchaser who shall state in writing in what respect the goods are faulty and further if in the opinion of the Purchaser the defects are of such a nature that it is necessary to replace or renew any defective stores, such replacement or renewal shall be made by the Contractor without any extra costs to the Purchaser, provided notice informing the Contractor of the defect is given by the Purchaser within the said period of 14 months. The decision of the Purchaser notwithstanding any prior approval or acceptance of the Inspector as to whether or not the stores delivered are defective or any defect has developed within the said period of twelve months or as to whether the nature of defects renewal or replacement shall be final conclusive and binding on the Contractor.

6. ALTERATIONS

- 6.1 The Purchaser may, from time to time, make changes in the drawings specifications and issue additional instructions without altering the purchase order in any manner provided that no changes shall have been ordered which materially alter the character and scope of the supply under the contract.
- 6.2 It shall be lawful for the parties to the contract to alter by mutual consent at any time and from time to time the drawings and specifications and as from the dates specified by him stores to be supplied shall be in accordance with such altered drawings and specifications provided that if any such alterations involve increase or decrease in the cost of or in the period required for production, a revision of the contract price and/or the period prescribed for delivery shall be made by mutual agreement in respect of the stores to which the alteration applies. In all other respects, the contract shall remain unaltered.

7. SAMPLES

- 7.1 Samples submitted for any reason shall be supplied without charge and freight paid without any obligation of the Purchaser as regards safe custody or safe-return thereof. All samples submitted must be clearly labelled with the Contractor's name and address and tender number. If the Contractor submits the sample with his tender the same shall not govern the standard of supply except when it has been specifically stated in the Purchase Order that it is accepted instead of any sealed pattern. Should certified samples be lent to the Contractor by the Purchaser, the Contractor is responsible for the return in perfect order of all certified samples with the labels intact.

8. PACKING

- 8.1 The contractor shall be held responsible for the stores being sufficiently and properly packed for transport by rail, road, sea or air so as to ensure their being free from any loss or damages on arrival at their destination. The packing and marking of packages shall be done by and at the expenses of the Contractor. Each package shall contain a Packing

Note quoting Purchase Order number and date and showing its contents in detail.

- 8.2 Unless otherwise provided in the contract all containers (including packing cases, boxes, tins, drums and wrappings) in which the stores are supplied by the contractor shall be considered as property of the Purchaser and their cost as having been included in the contract price.

9. DELIVERY:

9.1 TIME FOR AND DATE OF DELIVERY, THE ESSENCE OF THE CONTRACT:

The time for and the date of delivery of the stores stipulated in the purchase order/contract shall be deemed to be of the essence of the contract and delivery must be completed not later than the date/dates stipulated.

9.2 EXTENSION OF DELIVERY SCHEDULE

- 9.2.1 If any delay in delivery shall have arisen from any cause such as strike, Lock-outs, fire, accidents, riot or the like which the purchaser may admit as reasonable ground for grant of extension of delivery schedule, the purchaser will allow such additional period for the purpose as he may consider necessary taking the circumstances into consideration.
- 9.2.2 If the contractor fails to deliver the stores or any instalment or part thereof within the period fixed for such delivery or such additional period allowed by the purchaser in accordance with foregoing paragraphs or any time before the expiry of such period repudiates the contract, the Purchaser may without prejudice to the rights of the purchaser.
- 9.2.3 Recover from the contractor as Liquidated Damages and not by way of penalty as detailed under clause No.222 given herein below for any stores which the contractor has failed to deliver within the period fixed for delivery in the contract or such additional period as mentioned in paragraph 9.2.1. during which the delivery of such stores, may be in arrears where delivery thereof is accepted after expiry of the aforesaid period. (For the purpose of computing the damages for delayed supplies under the clause, the cost of the entire plant/machinery/equipment/instrument will be taken into consideration if the plant/machinery/equipment/instrument cannot be put to the intended use for want of delayed portion of supply).
- 9.2.4 Purchase or authorise the purchase elsewhere without notice to the contractor, on account and at the risk of the contractor of the stores not so delivered or others of a similar description (where stores exactly complying with the contract specification are not in the opinion of the Purchaser, which opinion shall be final, readily procurable) without cancelling the contract in respect of the portion instrument not yet due of delivery, OR
- 9.2.5 Cancel the contract or portion thereof and if so desired purchase or authorise purchase of the stores not so delivered or others of a similar description (where stores exactly complying with the contract specification are not in the opinion of the Purchaser, which opinion shall be final, readily procurable) at the risk and cost of the contractor, if the contractor had defaulted in the performance of the original contract, the purchaser shall have the right to ignore his offer in response to risk purchase enquiry even though the lowest.

- 9.2.6 Where action is taken under sub-clause 9.2.4 or sub-clause 9.2.5 above the contractor shall be liable for any loss which the purchaser may sustain on that account provided that the repurchase, or if there is an agreement to repurchase then such agreement, is made within a reasonable period from the date of such failure, depending upon the nature / merit of the purchase and in case of repudiation of the contract before the expiry of the aforesaid period of delivery, shall not be entitled to any gain on such purchase and the manner and method of such purchase shall be in the entire discretion of the Purchaser. It shall not be necessary for the purchaser to serve a notice of such purchase on the contractor.

10. INSPECTION

- 10.1 The contractor shall be responsible for and perform all inspection and testing required in accordance with the contract/purchase order and specifications included herewith.
- 10.2 The Purchaser may at his option depute his representative for Inspection of the stores to be supplied under the contract or authorize and nominate a Quality Surveillance Agency of his choice for the purpose hereinafter called, in either case, the inspection.
- 10.3 The contractor shall give notice of readiness for inspection to the Inspector (deputed under clause 10.2 above) so that the Inspector can be present at the requisite time. In such an event delivery shall not be effected until an authorization or shipping release is obtained from the Purchaser's Inspector.
- 10.4 The contractor shall allow reasonable facility and free access to his work/factory and records to the inspector for the purpose of inspection or for ascertaining the progress of delivery under the contract.

11. RECTIFICATION AND REPLACEMENT OF DEFECTIVE STORES

- 11.1 If the inspector find that the contractor has executed any unsound or imperfect work, the inspector shall notify such defects to the contractor and the contractor on receiving the details of such defects or deficiency, shall at his own expenses, within seven days or otherwise within such time as may be mutually agreed upon as reasonably necessary, proceed to alter, reconstruct or remanufacture the stores to the requisite standard and specifications as called for by the tender specification.

12. INSPECTION AND REJECTION

- 12.1 **Inspection and Rejection:** The stores shall be tendered by the Contractor for inspection at such places as may be specified by the Inspector, at the Contractor's own risk, expenses and costs and shall lie at such places of inspection at the risk of the Contractor and the stores will be subject to inspection and test as may be considered necessary by the inspector and his decision as regards rejection of goods shall be final and binding on the Contractor. If any goods are rejected as aforesaid, then without prejudice to the foregoing provision, the Purchaser shall be at liberty to
- 12.1.1 Allow the Contractor to re submit without prejudice to the Purchaser's right to claim and recover Liquidated damages as provided in clause 9.2.3 hereof, stores in replacement of those rejected within a time specified by the Purchaser (which time shall be essence of the contract), the contractor bearing the

- cost of freight for such replacement without being entitled to any extra payment, or
- 12.1.2 Buy the quantity of stores rejected or others of a similar nature elsewhere at the risk and cost of the Contractor in accordance with the provisions contained in second paragraph of clause 9.2.4 thereof without effecting the Contractor's liability as regards the supply of any further consignments due under the Contract, or
- 12.1.3 Terminate the Contract and recover from the Contractor the loss Purchaser thereby incurred
- 12.2 **Removal of rejection:** Any stores submitted for inspection and rejected by the Inspector must be removed by the Contractor within fourteen days from the date of receipt of intimation of rejection, provided that in the case of dangerous infected or perishable stores, the Inspector (whose decision shall be final) shall notify the Contractor to remove such stores within 48 hours of receipt of intimation of rejection and it shall be the duty of the Contractor to remove them accordingly. Such rejected stores shall lie at the Contractor's risk from the time of such rejection and if not removed within the aforementioned time, the Purchaser shall have the right either to return the rejected stores to the Contractor at the Contractor's risk by such mode of transport as Purchaser may select or to dispose off or segregate such stores as he thinks fit at the Contractor's risk and on his accounts and to appropriate such portion of the proceeds as may be necessary to cover any loss or expenses incurred by the Purchaser in connection with the said sale. Freight to destination of stores rejected after examination at destination shall be recoverable from the Contractor at the Tariff Rate.
- 12.3 **Test Certificate and Guarantees:** Test Certificate Guarantees, if required by the Inspector shall be obtained and furnished by the Contractor free of costs.

13. RECOVERY OF SUMS DUE

- 13.1 Whenever any claim for payment of, whether liquidated or not, moneys arises out of or under this contract against the Contractor the Purchaser shall be entitled to recover sum by appropriating, in part or whole, by encashing the Bank Guarantee submitted towards Security deposit by the Contractor, if a Security Deposit is taken against the Contract. In the event of the security being insufficient or no Security Deposit has been taken from the Contractor then the balance or the total sum or which at any time hereafter may become due to the Contractor under this or any other contract with the Purchaser, should this sum be not sufficient to cover the full amount recoverable, the Contractor shall pay to the Purchaser on demand the remaining balance due. Similarly, if the Purchaser has or makes any claim, 'whether liquidated or not against the Contractor under any other contract with the Purchaser the payment of all moneys payable under the contract to the contractor including the security deposit shall be withheld till such claims of the Purchaser are finally adjudicated upon and paid by the Contractor.
- 13.2 All demurrage, wharfage and allied expenses incurred by the Purchaser, if any, due to delayed clearance of Stores in view of non receipt, incomplete or delayed receipt of documents by the Purchaser, shall be recovered from the payment due to the Contractor.

14. BAR/PERT CHART

- 14.1 The contractor at the discretion of the Purchaser shall submit the BAR/PERT chart indicating various activities from the date of purchase order to handing over of the stores.

15. PERFORMANCE BANK GUARANTEE

- 15.1 In the event of acceptance of the offer in respect of plant, machinery, equipment, instrument, etc. the tenderer will be required to submit a performance bank guarantee for 10% of the total value of the stores inclusive of all statutory levies and other charges admitted in the contract, from SBI/any nationalized bank or private sector banks, namely, ICICI Bank, IDBI Bank, HDFC Bank and AXIS Bank, on a non-judicial stamp paper of appropriate value valid till 2 months beyond the expiry date of warranty period as per the Purchaser's format towards satisfactory performance of the plant, machinery, equipment, instrument, etc. during the warranty period. In case of bids in currency other than INR performance bank guarantee shall be furnished from any bank of international repute.
- 15.2 In case of non-submission of performance bank guarantee by the Contractor, an amount equivalent to 10% of the total value of the stores and other charges admitted in the contract will be retained by the purchaser till the expiry of the warranty period of the stores.
- 15.3 Offers of the tenders who are not agreeable to furnish performance bank guarantee or retaining of an equivalent amount by the purchaser as per clause No.15.1 and 15.2 above, are likely to be rejected.

16. PERMIT AND LICENCES

- 16.1 The contractor shall secure and pay all licenses and permit at his end which he may be required to comply with all laws ordinances and regulations of the public authorities in connection with the performance of his obligations under the contract. The contractor shall be responsible for all damages and shall indemnify and save the purchaser harmless from against all claims for damages and liability which may arise out of the failure of the contractors to secure and pay for any such licenses and permits or to comply fully which any and all applicable laws ordinances and regulations.

17. PATENTS & PATENT RIGHTS INDEMNIFICATION

- 17.1 The Contractor shall indemnify and keep indemnified the Purchaser from and against any and all claims, actions, costs, charges and expenses arising from or for infringement of patent rights, copy right or other protected rights, of any design plans, diagrams, drawings in respect of the stores supplied by the contractors or any of the manufacturing methods or process adopted by contractor for the stores supplied under the contract.
- 17.2 In the event of any claim being made or action being taken against the purchaser in respect of the matter referred to clause 17.1 above, the contractor shall promptly be notified thereof and he shall at his own expense, conduct all negotiations for the settlement of the same and any litigation that may arise therefrom.
- 17.3 In the event of any designs, drawing, plans or diagrams or any manufacturing methods or process furnished by the contractor constituting infringement of patent or any other protected rights and use thereof is restrained, the contractor shall procure for Purchaser, at

no cost to the latter, the rights to continue using the same or to the extent it is possible to replace the same so as to avoid such infringement and subject to approval by the Purchaser or modify them so that they become non-infringing, but such modifications shall otherwise be to the entire satisfaction of the Purchaser.

17.4 The provision of the clause remains effective and binding upon the Contractor even after the completion, expiration or termination of the contract.

18. LAW GOVERNING THE CONTRACT

18.1 This Contract shall be governed by the laws of India for the time being in force. The marking of all stores supplied must comply with the requirements of India Acts relating to Merchandise Marks and all the rules made under such Acts.

19. JURISDICTION

19.1 The Courts within the local limits (i.e. Gandhinagar) of whose jurisdiction the place from which the purchase order is issued is situation only shall, subject to Arbitration Clause, have jurisdiction to deal with and decide any matter out of this Purchase Order/Contract.

20. SETTLEMENT OF DISPUTES

20.1 The Purchaser and the Contractor shall make every effort to resolve amicably by direct informal negotiation any disagreement or dispute arising between them under or in connection with the Contract.

20.2 If the parties have failed to resolve their dispute or difference by such mutual consultation, then either the Purchaser or the Supplier may give notice to the other party of its intention to commence arbitration, as hereinafter provided, as to the matter in dispute, and no arbitration in respect of this matter may be commenced unless such notice is given. Any dispute or difference in respect of which a notice of intention to commence arbitration has been given in accordance with this Clause shall be finally settled by arbitration. Arbitration may be commenced prior to or after delivery of the Goods under the Contract.

21. ARBITRATION

21.1.1 In the event of any dispute or difference arising out or of in connection with any of the terms and conditions of the Purchase Order/Contract, the matter shall be referred to the Director, IPR for settlement. In case the parties to the Purchase Order are not in a position to settle the dispute mutually, the matter shall be referred to a Sole Arbitrator to be appointed in accordance with the Arbitration & Reconciliation Act, 1996 & Arbitration and Conciliation (Amendment) Act, 2015 as amended time to time.

22. LIQUIDATED DAMAGES

22.1 As per Standard Terms & conditions, the Purchaser reserves the right to levy the Liquidated Damages, for delay in supply beyond the contractual delivery date at the rate of half percent (0.5 percent) of the total Contract price (Basic price) for each calendar week of delay. The total liquidated damages shall not exceed five percent (5%) of the contract price (Basic price). Stores/Goods will be deemed to have been delivered only when all its component parts are also delivered. If certain

components are not delivered in time, the Stores/Goods will be considered as delayed until such time as the missing parts are delivered.

- 22.2 Where the Contract entered into is a composite one with supply cum erection and installation/commissioning activities and the completion of erection and installation/commissioning is delayed irrespective of the fact that whether supply of material has been made within the original delivery period, the contract is to be considered as a whole and Liquidated Damages will be recovered on the total contract value.

23. EXERCISING THE RIGHTS AND POWERS OF THE PURCHASER

- 23.1 All the rights, discretions and powers of the Purchase under the contract shall be exercisable by and all notices on behalf of the Purchaser shall be given by the Purchase Officer and any reference to the opinion of the Purchaser in the terms and conditions contained in these General Conditions of all Contracts shall mean and be construed as reference to the opinion of any of the persons mentioned in this clause.

24. TRAINING

- 24.1 The successful tenderer shall, if required by the Purchaser, provide facilities for the practical training of Purchaser's engineering or technical personnel for their active association on the manufacturing process throughout the manufacturing period of the Contract/stores, number of such personnel to be mutually agreed upon. If demanded by the Purchaser, such training shall be conducted at Purchaser's site by the Contractor free of charge. The duration of training shall be mutually decided upon by the Purchaser and the Contractor.

25. RISK PURCHASE

- 25.1 In the event supplier fails to fulfill the contractual obligations as per the terms and conditions of the Contract, the Purchaser has an option of completing the Contract at the risk and expenses of the Contractor. While initiating risk purchase at the risk and expenses of the supplier, the Purchaser must satisfy himself that the supplier has failed to deliver and he has been given all the opportunities as per the Contract to execute the Contract and also adequate and proper notice. Wherever risk purchase is resorted to, the supplier is liable to pay the additional amount spent by the government, if any as compared to contracted amount. All the factors including the method of recovering such amount should also be considered while taking a decision to invoke the risk purchase.

26. LIEN IN RESPECT OF CLAIMS IN OTHER CONTRACTS

- 26.1 Any sum of money due and payable to the Contractor under any contract may be withheld or retained by way of lien by the purchaser or any other person or persons contracting through the Director, IPR against any claim of the Purchaser or such other person or persons in respect of payment of a sum of money arising out of or under any other contract made by the contractor with the Purchaser or with other such person or persons.
- 26.2 It is an agreed term of the contract that the sum of money so withheld or retained under this clause by the Purchaser will be kept withheld or retained as such by purchaser till this claim arising out of in the same

contract or any other contract is either mutually settled or determined by the arbitrator, and that the contractor shall have no claim for interest or damages whatsoever on this account or on any other ground in respect of any sum of money withheld or retained under this clause and duly notified as such to the contractor.

SPECIAL CONDITIONS OF CONTRACT GOVERNING SUPPLIES OF PLANT AND MACHINERY

In addition to the General Conditions of Contract hereinbefore set out the following special conditions shall apply to contracts for the supply of Plant and Machinery and manufactured equipment. These Special Conditions where they differ from the General Conditions shall over-ride the later.

27. DEFINITION OF PLANT

27.1 The word "PLANT" wherever, appears in these "Special Conditions of Contract governing supplies of Plants and Machinery" shall mean all machinery, plants, equipment or parts thereof or what the Contractor agrees to supply under contract as specified in the Purchase Order.

28. MISTAKES IN DRAWING

28.1 The Contractor shall be responsible for and shall pay for an alterations of the works due to any discrepancies, errors or omissions in the drawings or other particulars supplied by him whether such drawings or particulars have been approved by the Purchaser or not.

29. RESPONSIBILITY FOR COMPLETENESS

29.1 All fittings or accessories which may not be specifically mentioned in the specification but for which are usual or necessary, are to be provided by the Contractor without extra charge and the plant must be complete in all respects.

30. REJECTION OF DEFECTIVE PLANT

30.1 If the completed plant or any portion thereof before it is finally accepted is found to be defective or fails to fulfill the requirements of the contract, the Purchaser shall give the Contractor notice setting forth with the details of such defects or failure and the contractor shall forthwith rectify the defective plant or alter the same to make comply with the requirement of the contract. Should the contractors fail to do so within a reasonable time the Purchaser may reject and replace at the cost of the Contractor, the whole or any portion of the Plant as the case may be, which is defective or fails to fulfill the requirement of the contract. Such replacement shall be carried out by the Purchaser within a reasonable time and at reasonable price and where reasonably possible to the same specifications and under competitive conditions. The Contractor shall be liable to pay to the Purchaser the extra cost, if any, of such replacement delivered and or erected as provided for in the contract such extra cost being the difference between the price paid by the Purchaser under the provisions above mentioned for such replacement and the contract price for them. Contractor shall refund to Purchaser any sum paid by the Purchaser to the Contractor in respect of such defective plant.

31. INSPECTION AND FINAL TESTS

31.1 All tests necessary to ensure that the plant complies with the particulars and guarantees shall be carried out at such place or places as may be determined by the inspector. Should, however, it be necessary for the final tests as to performance or guarantees to be held over until the Plant is erected at site they shall be carried out within

one month of completion of erection.

32. TRANSPORT AND RESPONSIBILITY FOR BREAKAGES EN-ROUTE

- 32.1 Unless otherwise specified the Purchaser will take delivery of the plant from the place named in the purchase order but the contractor will be responsible for any damage which may be caused to the Plant during transit to the site of erection thereof.

33. ERECTION AND COMMISSIONING

- 33.1 In all cases where contracts provide for supervision of erection and commissioning or for test at the Purchaser's premises the Purchaser except where otherwise specified, shall provide free of charge, such labour, materials, fuels, stores, apparatus and instruments as may be required from time to time and as may reasonably be demanded by the contractor to carryout efficiently such supervision of erection and commissioning and for the requisite test. In case of contracts requiring electricity for the completion of erection, commissioning and testing at site, such electricity shall be supplied free to the contractor.
- 33.2 Action by the Purchaser under the clause shall not relieve the contractor of his warranty obligations under the contract.

34. WARRANTY

- 34.1 The contractor warrants that stores to be supplied under the contract shall be free from all defects and faults in materials, workmanship and manufacture and shall be of the highest grade and consistent with the established and generally accepted standards for stores of the types under the contract in full conformity with the specifications, drawings or samples, if any and shall if operable, operate properly. This warranty shall expire (except in respect of complaints notified to the contractor prior to such date) twelve months after the date of receipt of the last lot of stores under the contract at the ultimate destination stipulated in the contract.
- 34.2 For a period of twelve calendar months after the plant/machinery/equipment/instruments has been put into operation (or a suitable mutually agreed longer period to be reckoned from the date of last major shipment depending upon the nature of the plant/machinery/equipment/instrument) the Contractor shall be responsible for any defects that may develop under conditions provided for the contract and under proper use, arising from the faulty materials, design or workmanship in the plant or from faulty erection of the plant by the Contractor, but otherwise and shall rectify such defects at his own cost when called upon to do so by the Purchaser who shall state in writing such defects.
- 34.3 If it becomes necessary for the Contractor to replace or renew any defective portions of the plant for purpose of rectification under this clause, the provisions of this clause shall apply to the portions of the plant so replaced or renewed under the expiration of six months from the date of such replacement or renewal or until the end of the above mentioned period of twelve months whichever may be the later. If any defects not rectified within reasonable time, the purchaser may proceed to get the work done at contractor's risk and expenses but without prejudice to any other rights which the Purchaser may have against the Contractor in respect of such defects as provided in clause 9.2.4 or 9.2.5.

- 34.4 All inspections adjustments, replacements or renewals carried out Contractor during the warranty period shall be subject to the same conditions as in the contract.
- 34.5 Contractor shall, spare parts of equipment before going out of production, give adequate advance notice to the purchaser so that the latter may order requirement of spares in one lot if so desires.
- 34.6 The contractor shall further guarantee that if spare parts go out of production, will make available blue prints, drawings of spare parts and specifications of material at no cost to the Purchaser, if and when required in connection with the equipment to enable Purchaser to fabricate or procure spare parts from other sources.
- 34.7 The provision of this clause shall remain effective and binding upon the Contractor even after the completion or expiration of the contract and till the plant/machinery/equipment supplied under the contract is in use by the Purchaser.

35. MODE OF PAYMENT

- 35.1 Unless otherwise agreed to in writing between the Purchaser and the Contractor, payment for the delivery of the material will be made as follows.
- Within 30 days from the date of final acceptance and on receipt of Performance Bank guarantee for 10% of the contract value amount from SBI/nationalized banks or any one of the scheduled banks mentioned in the bracket (Axis Bank, HDFC Bank, ICICI Bank and IDBI Bank) valid through out the guarantee period mentioned in the contract/purchase order.**
- 35.1.1 In case any of the vendors seek advance or progressive payment prior to delivery of the material, such requests can be considered only in exceptional cases of large value items, in which case the vendor will be required to furnish a bank guarantee for an equivalent amount of the advance/progressive payment sought for, valid till the execution of the contract. The bank guarantee shall be got executed as per the Purchaser's format from the State Bank of India (SBI)/nationalized banks or any one of the scheduled banks mentioned in the bracket (Axis Bank, HDFC Bank, ICICI Bank and IDBI Bank).
- 35.1.2 Besides, the offers of the vendors seeking advance/progressive payment will be evaluated by loading 12% interest charges per annum on the amount of advance desired up to the delivery period quoted.
- 35.1.3 In case any of the vendors seek pro-rata payment for the stores to be supplied they should clearly mention in their offer the maximum number of installments of supply. However, such installment delivery and pro-rata payment will be considered only in respect of contract involving large value and sizeable quantity of the item and the maximum number of installments shall be normally restricted to four. Acceptance or otherwise of this condition is reserved by the purchaser.
- 35.1.4 **Bank Charges:** All bank charges to be borne by the Contractor/Supplier.
- 35.1.5 No correspondence will be entertained within 30 days from the date of receipt of material and bills, whichever is later.
- 35.1.6 **Interest for delay in supply beyond the contractual delivery date:** Wherever advance payments are sought for by the contractor and

admitted in the contract, against Bank Guarantee for equivalent amount, in the event of any delay in supply beyond the contractual delivery date for reasons attributable to the contractor, interest charges @ 12% shall be levied for the period beyond the contractual delivery date, on the amount of balance advance payment to be adjusted.

36. DELAY IN ERECTION

36.1 Wherever erection of a plant or machinery is the responsibility of the Contractor as a term of the contract and in case the Contractor fails to carry out the erection as and when called upon as to do within the period specified by the Purchaser, the Purchaser shall have right to get the erection done through any source of his choice. In such an event, the contractor shall be liable to bear any additional expenditure that the Purchaser may incur towards erection. The Contractor shall, however, not be entitled to any gain due to such an action by the Purchaser.

SECTION 'C'

**TECHNICAL SPECIFICATIONS
OF
STORES AND DRAWINGS**

Please refer tender document

SECTION 'D'

FORMAT FOR SUBMISSION OF PART-II (PRICE)

Please refer tender document

TENDER FORM
INSTITUTE FOR PLASMA RESEARCH
(An Aided Institute of
Department of Atomic Energy, Government of India)
Near Indira Bridge; Bhat; Gandhinagar-382428; India

Following terms are replaced in our Form for Tender No.IPR/TN/PUR/TPT/ET/19-20/13 dated 5/7/2019.

- 1) Sr.No.3.1 (Section-A) under heading “Earnest Money Deposit (EMD)” of Form No.IPR-LP-ET-02.V5 (Terms and Conditions) is replaced with the following:
The Tenderer shall submit, as part of its bid, interest free Earnest Money Deposit (EMD) for an amount as specified in the Tender Notice. EMD shall be submitted by way of Demand Draft from **SBI/nationalized banks or any one of the scheduled banks mentioned in the bracket (Axis Bank, HDFC Bank, ICICI Bank and IDBI Bank)** issued in favour of **"Institute for Plasma Research"** and payable at **Ahmedabad. Tender received without EMD will be rejected at the discretion of IPR.**

(Copy of Demand Draft to be uploaded with the quotation, Original DD should be sent to IPR on or before the specified closing date and time)

- 2) Sr.No.3.4 (Section-A) under heading “Earnest Money Deposit (EMD)” of Form No.IPR-LP-ET-02.V5 (Terms and Conditions) is replaced with the following:
Exemption from payment of EMD: The firms registered with DGS&D, NSIC, DPS or Micro & Small Enterprises (MSEs) which are actual producers/manufacturers of tendered items are exempted from payment of EMD provided valid registration certificate is uploaded along with the offer.

- 3) Sr.No.18 (Section-A) under heading “Statutory Levies such as Customs Duty, Goods and Service Tax” of Form No.IPR-LP-ET-02.V5 (Terms and Conditions) is replaced with the following:
Clause Nos.18.1, 18.2, 18.3, 18.5.2 and its sub-clauses deleted from Form No: IPR-LP-ET-02.V5.

- 4) Sr.No.31 (Section-A) under heading “Delivery” of Form No.IPR-LP-ET-02.V5 (Terms and Conditions) is replaced with the following:

Delivery: All equipments/machinery/plant/component covered by this tender document should be supplied within 3 months from the date of Purchase order & the integration, interfacing and commissioning testing should be completed within 3 months from the date of delivery of material at IPR site. The prices quoted by the tenderer should include all charges involved for direct and safe delivery of the items by Road to the project site of the Purchaser. If a tenderer so desires/separate lumpsum charges for transportation and safe delivery to Purchaser’s site could be furnished. Purchaser will neither undertake responsibility for transit insurance nor pay for it separately. No other, delivery term will be accepted by the Purchaser

- 5) Sr. No. 35 (Section-B) under heading Mode of Payment of “General Conditions of Contract” of Form No.IPR-LP-ET-02.V5 (Terms and Conditions) is replaced with the following:

Payment: Unless otherwise agreed to in writing between the Purchaser and the Contractor, payment for the delivery of the tendered items, will be made as follows.

- a) 80% of supply portion + 100% of all other charges (i.e. Item Sr.No.1 to 18 and 20 of Price Bid) will be paid after receipt of material at IPR site and its verification by IPR representative and on receipt of invoice in triplicate.
- b) Balance 20% of supply portion (i.e. Item Sr.No.1 to 18 and 20 of Price Bid) along with 100% of integration & commissioning charges (i.e. Item Sr.No.19 of Price Bid) will be paid within 30 days from the date of acceptance and on receipt of Performance Bank Guarantee for 10% of the order value from SBI/nationalized banks or any one of the scheduled banks mentioned in the bracket (Axis Bank, HDFC Bank, ICICI Bank and IDBI Bank) valid throughout the warranty period and on receipt of final invoice.

Following terms is **added to** our Form No. IPR-LP-ET-02.V5 for Tender No. No.IPR/TN/ PUR/TPT/18-19/xx dated 25/9/2018.

- a) **TDS as per CGST Act:** As per the provisions mentioned under Section No. 51 of the CGST Act 2017, TDS @ 2% (IGST 2% or CGST 1% and SGST 1%) will be deducted while making payment to the suppliers where total value of the purchase order/contracts/work orders exceeds Rs.2.5 Lakhs. Necessary TDS Certificate will be issued to the supplier after TDS deduction.

IMPORTANT NOTE:

[1] QUOTATIONS ARE INVITED IN INDIAN CURRENCY ONLY

[2] QUOTATIONS RECEIVED OTHER THAN “INR” QUOTE SHALL SUMMARILY BE REJECTED.

INSTITUTE FOR PLASMA RESEARCH

Technical Specifications
SECTION 'C'

**SUPPLY OF PXI AND PLC CONTROL
SYSTEM WITH SOFTWARE SERVICES
(ICRH SYSTEM APPLICATION
INTEGRATION AND
FUNCTIONALITY TESTING)**

1. Introduction:

High Power ICRH (Ion Cyclotron Resonance Heating) Division at IPR has to commission the 1.5MW amplifier for experiment in the SST-1 Machine on the new control system using PXI and PLC Hardware. For that IPR is tendering to procure the compatible hardware (for control, monitoring, interlock, and protection system) and software services. Existing and Running control system has been developed on the **Schneider PLC** for slow control signals and **National Instrument (NI), supplied PXI system** for fast control, protection and monitoring the system). Existing application code and software have been successfully integrated and performance has been optimized for the existing hardware.

IPR will provide existing running code (Software) to vendor for deployment of System application program on the new procured hardwares. For PXI system running code is develop on the Lab-view application software - 2012 and for PLC system ,running code is develop on the Ladder Logic control Programming. Vendor has to recompile the software and have to deploy / Test / Run and integrate the application and show the existing running functionality on the new hardware.

2. Scope of work:

Single supplier for all parts of hardware and software is mandatory for PXI and PLC System. Partial quotation would not acceptable.

2.1 Supply of the PXI System Modules

| Sr No | Module Type | New Procurement (Advance and Compatible modules) with quantity | Existing Modules running on the System (National Instrument-NI) |
|-------|--|---|---|
| 1 | Instrument Chassis | PXIe 1084 -1Nos | PXIe 1045 -1 Nos |
| 2 | Embedded Controller | PXIe 8840-1Nos | PXIe 8108-1Nos |
| 3 | Multifunction Data Acquisition Module | PXIe 6355-2Nos | PXIe 6255-1Nos |
| 4 | Simultaneous Analog Input Module | PXIe 6368-2Nos | PXIe 6133-4Nos |
| 5 | High Speed Control & Interlock Module | PXIe 7856R-3Nos | PXIe 7841R-2Nos |
| 6 | Software License(Lab view real time) | Compatible with IPR campus Labview license Available (presently it is -Labview2016) | Labview-2012 |
| 7 | Software deployment & application Integration testing with Full running system | | Existing running code IPR will provide to vendor for deployment |

2.2 Supply of the PLC Modules

| Sr No | Module Type | New Procurement (Advance and Compatible modules) with quantity | Existing Modules running on the System (Schneider make) |
|-------|---------------------------------|--|---|
| 1 | Logic Processor and Controller | BMEP582020 - 1Nos | P57 2634M-1Nos |
| 2 | Power Supply module | BMXCPS3500-1Nos | PSY 5500M-1Nos |
| 3 | Digital Input Module | BMXDDI3202K- 2Nos | TSX DEY 16FK -2Nos |
| 3 | Digital Output Module | BMXDDO3202K -2Nos | TSX DSY 32T2K-2Nos |
| 4 | Analog Input Module | BMXAMI0810-2Nos | TSX AEY 420 -2Nos |
| 5 | Analog output Module | BMXAMO0410-4Nos | TSX ASY 800 -4Nos |
| 6 | 12 slot Ethernet backplane with | 1 Nos | |

| | | | |
|----|--|--------------------|---|
| | accessories | | |
| 7 | PLC software License | 1 Nos | |
| 9 | Programming configuration cables | As per requirement | |
| 10 | Other Accessories (if any) | As per requirement | |
| 11 | Software deployment and application Integration testing with Full running system | | Existing running code IPR will provide to vendor for deployment |

2.3 Software development Service (Recompilation of software) and Integration system testing

| S.N | Major Tasks and Objective | Remarks |
|-----|--|--|
| 1. | Unity Pro XL Single License PLC Software License | PLC Software License for Schneider PLC |
| 2 | Recompilation of Lab-view application software on the supplied hardware for PXI System | Existing running code IPR will provide to vendor for deployment |
| 3. | Application Integration testing with dummy /Actual Signals for the full system to demonstrate Acquisition /monitoring /Control/ Interlock facilities on PXI System | Existing feature have to test (on new hardware and recompiled software by the Vendor) with coordination of IPR staff |
| 4 | Recompilation of Ladder Logic control Programming as per the new supplied hardware for PLC System | Existing running code IPR will provide to vendor for deployment |
| 5 | Application Integration testing with dummy /actual signals for the full running system from the PLC System | Existing feature have to test (on new hardware and recompiled software by the Vendor)with coordination of IPR staff |
| 6 | PLC and PXI system Integration and interfacing testing and demonstration of the complete running system | Hardware and software protocol communication as per the existing system |

3. Technical Specification

3.1 Hardware Specification of the PXIe modules

| Sr. No | Parameters | Model No. PXIe 1084 | Quantity -1 Nos |
|--------|--------------------------|--|-----------------|
| 1. | AC power supply | 230V +/- 10%, 50Hz | |
| 2. | Input current rating | 12-6 A | |
| 3. | Bus Type | 16 hybrid slots, 1 PXI Express system timing slot | |
| 4. | Number of Slots | 18 minimum (One slot for Embedded controller + 17 slots for I/O cards) | |
| 5. | Slot types | Accepts 3U PXI, PXI Express, CompactPCI, and CompactPCI Express modules | |
| 6. | Bandwidth | 4 GB/s per PXIe slot dedicated bandwidth | |
| 7. | Dimensions | Installable in 19 inch rack | |
| 8. | Form Factor | 3U | |
| 9. | Cooling | Forced air cooling with inbuilt fan/fans | |
| 10. | Operating temperature | 0 to 55 °C | |
| 11. | Standards and Compliance | The product should meet the international safety standard related to electrical equipment and EMI/EMC standard. CE Compliance is required. | |
| 12. | Reference Clock I/O | 100 MHz System Reference Clock, External 10 MHz Reference Out through BNC on rear of chassis | |

| | | |
|-----|-----------------|--|
| 13. | Synchronization | It should be possible to synchronize modules in all slots through back plane without any additional hardware |
| 14. | Accessories: | 1. Rack Mount kit 2. Power cord 3. Filler Panel |

| Sr. No | Parameters | Model PXIe-8840 Quad Core, Windows 10 64-bit | Quantity -1 Nos |
|--------|--|---|-----------------|
| 1. | Bus type | PXI Express (PXIe) | |
| 2. | Processor | Intel® Core™ i7 5700EQ (2.6 GHz quad-core processor) | |
| 3. | Operating system and Drivers | Controller should have Lab view Real Time Operating System. | |
| 4. | Hard Drive | 240 GB SSD | |
| 5. | RAM | 8 GB standard | |
| 6. | Ethernet interface | Two 10/100/1000 BaseT ports | |
| 7. | Serial port | RS 232 | |
| 8. | Display port | Available | |
| 9. | High Speed USB(2.0) Port | 4 Nos. | |
| 10. | High Speed USB(3.0) | 2 Nos. | |
| 11. | GPIB Port | GPIB (IEEE 488 Controller) Port | |
| 12. | PXI Express Trigger Bus Input / Output | PXI Express | |

| Sr. No | Parameters | Model NI PXIe 6355 | Quantity -2 Nos |
|-----------|---------------------------------------|--|-----------------|
| 1. | Analog Input: | | |
| 1.1 | Number of Input channels | 40 differential or 80 single-ended | |
| 1.2 | Bus Type | PXI Express | |
| 1.3 | ADC Resolution | 16 bits | |
| 1.4 | Sampling rate | 1.25 MS/s for one channel 1 MS/s aggregate for multiple channels | |
| 1.5 | Input Impedance | $\geq 10 \text{ G}\Omega$ in parallel with input capacitance $\leq 100 \text{ pF}$ | |
| 1.6 | Input coupling | DC | |
| 1.7 | Input Voltage range | $\pm 0.1 \text{ V}, \pm 0.2 \text{ V}, \pm 0.5 \text{ V}, \pm 1 \text{ V}, \pm 2 \text{ V}, \pm 5 \text{ V}, \pm 10 \text{ V}$ | |
| 1.8 | Over voltage Protection | $\pm 25 \text{ V}$ | |
| 1.9 | Input FIFO size | 4095 Samples | |
| 1.10 | Data transfers | DMA (scatter-gather), programmed I/O | |
| 1.11 | CMRR (DC to 60 Hz) | 100 dB or better | |
| 1.12 | Settling time ($\pm 1 \text{ LSB}$) | 1.5 μSec | |
| 2. | Analog Output: | | |
| 2.1 | Number of Output channels | 4 | |
| 2.2 | DAC Resolution | 16-bits | |
| 2.3 | Output Range | $\pm 10 \text{ V}, \pm 5 \text{ V},$ | |
| 2.4 | Maximum Update Rate | 2.86 MS/s in single channel 2 MS/s in Two Channels | |
| 2.5 | Timing accuracy | 50 ppm of sample rate | |
| 2.6 | Timing resolution | 10 ns | |
| 2.7 | Output Coupling | DC | |
| 2.8 | Output FIFO size | 8,191 samples | |
| 2.9 | Data transfers | DMA, Programmed IO | |
| 2.10 | Output Impedance | 0.2 Ω | |
| 3. | Digital I/O: | | |
| 3.1 | Number of Channels | 24 | |
| 3.2 | Channel compatibility | 5 V TTL DIO lines | |

| | | |
|----------|---|--|
| 3.3 | Timing | Hardware & Software |
| 4 | Counters/Timers: | |
| 4.1 | Number of Counters/Timers | 4 |
| 4.2 | Base clock | 100 MHz |
| 4.3 | Resolution | 32 bits |
| 4.4 | Counter Measurements | Edge counting, pulse, semi-period, period, two-edge separation |
| 5. | Driver should be compatible with operating System | Windows 7, Real-Time Operating System |
| 6. | Accessories: | Shielded connection box for connection of acquisition signals to DAQ Modules Shielded cables for connection of modules to Connection box. |

| Sr. No | Parameters | Model PXIe 6368 | Quantity -2 Nos |
|--------|---|--|-----------------|
| 1. | Number of Analog Input channels | 16 nos. Differential Channels | |
| 2 | Number of Analog output channels | 4nos. | |
| 3. | Number of DIO channels | 48nos. | |
| 4. | Number of Counter/Timer | 4 nos., 32 bits | |
| 5. | Bus Type | PXI Hybrid Compatible | |
| 6. | ADC Resolution | 16 bits | |
| 7. | Sampling rate | 2 MS/s/ch | |
| 8. | Input Impedance | >100 GΩ in parallel with 100 pF | |
| 9. | Input coupling | DC | |
| 10. | Input Voltage range | ±1 V, ±2 V, ±5 V, ±10 V | |
| 11. | Over voltage Protection | ±35 V | |
| 12. | Input FIFO size | 8182 samples | |
| 13. | Data transfers | DMA, Programmed IO | |
| 14 | CMRR (DC to 60 Hz) | 80dB | |
| 15 | Settling time (± 1 LSB) | 2 μSec | |
| 16 | Driver should be compatible with the Operating system | Windows 7, Real Time Operating System | |
| 17 | Accessories | Shielded connection box for connection of acquisition signals to DAQ Modules Shielded cables for connection of modules to Connection box. | |

| Sr. No | Parameters | Model PXIe 7856R | Quantity -3Nos |
|-----------|--------------------------------------|--|----------------|
| 1. | FPGA Type | Kintex-7 160T FPGA | |
| 2. | Number of Flip-Flops | 202,800 | |
| 3. | Embedded Block RAM | 11,700 kbits | |
| 4. | Timebase | 40 MHz, 80 MHz, 120 MHz, 160 MHz, or 200 MHz | |
| 5. | Analog Inputs: | | |
| 5.1 | Number of Input channels | 8 | |
| 5.2 | Input configurations | Software selectable as RSE, NRSE, Differential | |
| 5.3 | ADC Resolution | 16 bits | |
| 5.4 | Sampling rate | 1 MS/s per channel | |
| 5.5 | Input coupling | DC | |
| 5.6 | Input Voltage range | ±1 V, ±2 V, ±5 V, ±10 V | |
| 5.7 | Over voltage Protection | ±42 V | |
| 5.8 | On-Board Memory size | | |
| 5.9 | CMRR (DC to 60 Hz) | -100 dB | |
| 5.10 | Settling time to ± 2 LSB | 2 μSec | |
| 5.11 | Driver should be compatible with the | Windows 10, Real Time, FPGA | |

| | | |
|-----------|---------------------------|--|
| | Operating system | |
| 6. | Analog Output: | |
| 6.1 | Number of Output channels | 8 |
| 6.2 | DAC Resolution | 16 bits |
| 6.3 | Output Range | ± 10 V |
| 6.4 | Update Time | 1 μ s |
| 6.5 | Update Rate | 1 MS/s |
| 6.6 | Output Coupling | DC |
| 6.7 | Protection | Short circuit to ground |
| 7. | Digital I/O: | |
| 7.1 | Number of Channels | 48 |
| 7.2 | Channel compatibility | LVTTL, LVCMOS |
| 8. | Accessories: | Shielded connection box for connection of acquisition signals to DAQ Modules Shielded cables for connection of modules to Connection box. |

3.2 Hardware Specification of the PLC modules (Schneider make)

| S.No | Model Processor (BM5P582020) | Quantity -1Nos |
|--|--|----------------|
| Processor should support: Analog I/O | Maximum number of analog I/O channels | 512 Nos. |
| Processor should support: Digital I/O | Maximum number of discrete I/O channels: | 2048 Nos. |
| Memories without PCMCIA Card | <ul style="list-style-type: none"> Integrated RAM 10 kB system memory Integrated RAM 8 MB program Integrated RAM 768 kB data | |
| Memories with PCMCIA Card | Not required for M580 processor as it has internal 8 MB RAM which is also better than PCMCIA card memory | |
| Data Storage | 4 GB data storage | |
| Execution Time for one instruction without PCMCIA card (Max. Execution time) | <ul style="list-style-type: none"> Boolean: 0.1 μs, 65% Boolean + 35% fixed arithmetic (Kinstr/ms): 0.13 μs Floating point : 2.75 μs | |
| Execution Time for one instruction with PCMCIA card (Max. Execution time) | Not applicable as per new tech PLC processors. Not required also. | |
| Integrated Connections | <ul style="list-style-type: none"> USB type mini B 1 Ethernet TCP/IP service port 2 Ethernet TCP/IP device network | |
| Min. no. of connections | Communication module processor capacity <ul style="list-style-type: none"> 2 Ethernet communication module 8 AS-Interface module | |

| Digital Input Module (Model :BMXDDI3202K) | Quantity -2Nos |
|--|-------------------------------------|
| Number of Inputs | 32, Isolated |
| Type of Input | Current sink (logic positive) |
| Connection | FCN/HE10 40 PIN connector on module |
| Response time | 4 ms |

| Digital Output Module (Model:BMXDDO3202K) | | Quantity -2Nos |
|--|---------------------|-----------------------|
| Number of Channel | 32, Positive logic | |
| Output Nominal Values | Voltage:- 24VDC | |
| Permissible Current | <= 3.2 A per module | |
| Response Time | 1.2 ms | |
| Dissipated Power | <= 3.6 W | |

| Analog Input Module (Model :BMXAMI0810) | | Quantity -2Nos |
|--|---|-----------------------|
| Number of Channel | 8 in single module (Voltage or current, Selectable) | |
| Voltage Range | 0...10v, 0 ...5v, 1...5v, +/- 10 V, +/- 5 V | |
| Current Range | 0 to 20mA / 4 to 20 mA / +/- 20 mA | |
| Resolution | 16 bit | |
| Connection | 1 connector 28 ways | |

| Analog output Module Model:BMXAMO0410 | | Quantity -4Nos |
|--|--|-----------------------|
| Number of Channel | 16 in 4 different module, Each module having 4 isolated channel. (voltage or current selectable) | |
| Voltage Range | +/- 10V | |
| Current Range | 0 to 20mA / 4 to 20 mA | |
| Resolution | 15 bits + sign | |
| Connection | 1 connector 20 ways | |
| Isolation | 1400 V DC between channels and ground 1400 V DC between channels and bus 750 V DC between channels | |

| Power Supply Model :BMXCPS3500 | | Quantity -1Nos |
|---------------------------------------|--|-----------------------|
| Input | 85...264 V, 47...63 Hz, 1-Ph | |
| Output | <ul style="list-style-type: none"> • 0.9 A, 24 V DC sensor power supply • 1.3 A, 24 V DC I/O module power supply and processor • 4.5 A, 3.3 V DC I/O module logic power supply | |
| Line / LOAD Regulation | < 0.1 % | |
| Protection | <ul style="list-style-type: none"> • Internal fuse not accessible primary circuit • Overload protection secondary circuit • Overvoltage protection secondary circuit • Short-circuit protection secondary circuit | |
| Indication | <ul style="list-style-type: none"> • 1 LED green rack voltage OK • 1 LED green sensor voltage | |
| Isolation | <ul style="list-style-type: none"> • 1500 V primary/ground • 1500 V primary/secondary I/O module logic power supply • 1500 V primary/secondary I/O module power supply and processor • 2300 V primary/secondary sensor power supply • 500 V 24 V sensor output/ground | |

3.3 Software Specification [Vendor has to demonstrate the new compiled and deployed software on the their supplied hardware for full running system]

IPR will provide existing running software and application program for PXI (NI) and PLC (Schneider) system. Vendor has to deploy on the new supplied hardware.

3.3.1 Software Compatibility of DAQ modules

| Sr. No | Parameters | IPR's Specifications |
|--------|-------------------------------------|--|
| 1. | Operating system | Windows 10 or higher and Real time Operating system for NI system. |
| 2. | Programming Language for NI System | LabVIEW 2016 or higher (existing Labview codes developed on 2012) |
| 3. | Programming Language for PLC System | Ladder Programming |

3.3.2 Functionality of the software (For details, please refer Annexure-1).

| Sr. No | Parameters | IPR's Specifications |
|--------|--|--|
| 1. | Monitoring format of on line and post shot analysis. | Software should have separate page for all RF amplifier stages, calibration of each power supplies, Post Shot analysis, RF shot detail. Shot page should have all possible mode of operation as above mentioned in software. Configuration and calibration page should have calibration table of all power supplies and sensors. Any modification in calibration table should automatically upgrade the online monitoring and post shot analysis of respective signal. Single signal or multiple signals in single screen option should have to provide. (Minor additional functionality in existing code) |
| 2. | Generation of local and central shot number | Shot number should be automatically increment in both the internal and external trigger mode with either remote or local selection before applying shot. (Minor additional functionality in existing code) |
| 3. | Data-analysis feature | Normal data-analysis feature like zooming, comparison with previous shot data for same signal etc should be provided with comparisons. It should also show Min/Max/Average for on-time pulse duration. Single Signal or multiple signals in single screen option should have to provide. |
| 4. | Data Storage | Data should be saved in raw format as well as in calibrated values shot wise. |
| 5. | Report Generation | Data should be saved in such a manner that it can be retrieved without any complexity and can make presentation and report generation easily in MS Word and MS Excel. |

3.3.3 Supplier scope of work and derivable (For details, please refer Annexure-2)

| Sr. No | Parameters | IPR's Specifications |
|--------|--|---|
| 1. | Single supplier for all parts and hardware | single supplier for all parts of hardware and software is mandatory for PXI and PLC |

| | | |
|----|---|--|
| 2. | Application software development and demonstration and validation of system | Existing running source code for PLC and PXI system would be provided by IPR; thereafter Vendor will be responsible for installation, integration and configuration of the software in new supplied hardware. Vendor has to demonstrate test-validation and verification for the above system. |
| 3. | Original software and application documentation | Delivery of original source code, programming flow chart with necessary comment is mandatory. |
| 4. | Software minor correction | Minor correction in software, if any, should be carried out by the vendor free of cost as per operational requirements (if it seems) during the warranty period. |

3.3.4 On Line data Acquisition and control (For details, please refer [Annexure-3](#))

| Sr. No | Parameters | IPR's Specifications |
|--------|------------------------------|---|
| 1. | Monitoring | On line monitoring of provided signals (Digital and Analog). |
| 2. | Control | System control using software and hardwired signal, additional FPGA based fast control should be required. (Minor additional functionality in existing code) |
| 3. | Operation mode | Internal and external mode with and without acquisition option. |
| 4. | RF-ICRH pulse operation mode | Hardware and software support for the single pulse operation, multi-pulse operation, multi pulse variable duty cycle, multi pulse variable amplitude operation. |

3.3.5 Acquisition and Post shot Analysis (For details, please refer [Annexure-4](#))

| Sr. No | Parameters | IPR's Specifications |
|--------|-------------------------------------|--|
| 1. | Storing Data | Store the raw Data (if selected for acquisition during experiment) |
| 2. | 1ms acquisition rate | 1ms for analysis and on line display. |
| 3. | 1us acquisition rate | 1us acquisition rate in the pre and post fault event occurring data.[total data of 200msec with 100msec pres and 100msec post fault] |
| 4. | Time stamping in acquired data | Time stamping of all slow and fast acquisition data. |
| 5. | Calibration mapping | Mapping the raw data to show Calibrated values of the system. |
| 6. | Graph plot of each acquired channel | Graph plot of each acquired channel using best curve fit for the calibrated value) method with accuracy. |

3.3.6. Interface

| Sr. No | Parameters | IPR's Specifications |
|--------|-------------------------------------|--|
| 1. | Interface to Signal generator | Software has to interface the signal generator to set the operational parameter remotely. Signal generators have Ethernet and GPIB port. |
| 2. | Interface for serial communication: | Software has to interface the device having serial communication. Like Vacuum reading, stepper motor controller etc. |
| 3. | PLC interfacing: | Software may have to interface with the PLC using software and hardware both. |

| | | |
|---|-------------------------------------|--|
| 4 | Interface for remote operation(CCS) | Interface for remote operation(CCS) using message passing mechanism with specified rules (provided by IPR) |
|---|-------------------------------------|--|

3.3.7. Warranty

| Sr. No | Parameters | IPR's Specifications |
|--------|-----------------|--|
| 1. | Warranty period | Warranty period (of supplied hardware and software material) would be one year from the date of acceptance of fully developed software running on the supplied hardware. |

4. Instruction for the vendors

Vendor who is quoting for all three parts of indent (PXI Hardware, PLC Hardware, Software deployment and Testing) as mentioned in the section 2.1, 2.2, 2.3 would be considered for the Technical and commercial evaluation. Part quotation would not be accepted.

Warranty period (of supplied hardware and software material) would be one year from the date of acceptance of fully developed software running on the supplied hardware.

4.1. Instruction for PXI bid

Vendor has to supply the item as mentioned in the section 3.1(PXI Modules). Vendor can have the access of the existing application code for their review, understanding, running and troubleshooting with the hardware inside the IPR Premises.

- Vendor has to quote for all the items as per the specifications mentioned.
- Vendor has to deploy /compile and run the software on supplied hardware. Software code is already developed and running successfully at IPR premises on the following hardware mentioned in the table below-

| Sr No | Module Type | Number of existing Modules |
|-------|--|----------------------------|
| 1 | Instrument Chassis PXIe 1045 | 1 |
| 2 | Embedded Controller PXIe 8108 | 1 |
| 3 | Multifunction Data Acquisition Module PXIe 6255 | 1 |
| 4 | Simultaneous Analog Input Module- PXIe 6133 | 4 |
| 5 | High Speed Control & Interlock Module - PXIe 7841R | 2 |

Number of channels used in each type of modules (Existing System):

PXIe 6255: (Analog Input -40, Analog Output-2, Digital Input-1, Digital Output-3)

PXIe 6133: (Analog Input -27)

PXIe 7841R: (Analog Input -8, Analog Output-12, Digital Input-31, Digital Output-19)

- Vendor has to **quote separately** for each type of modules with the single unit price, software and other accessories.
- Vendor has to see the full compatibility of their offered modules with Processor, Chassis, and application software (which has to deploy on the supplied hardware).
- Send quotation with all other technical details & features of CPU & modules, if you have (Reply of IPRs Technical specification is must).

- Rails, termination panel for the modules have to be supplied. Termination panels are module type specific. Any other essential accessories can be quoted separately.
- Vendor has to install the PXI modules at IPR and show the application code running functionality.

4.2. Instruction for PLC bid

- Vendor has to supply the item as mentioned in the section 3.2(PLC Modules).
- Vendor has to quote for the **Schneider** make PLC only.
- Vendor has to deploy / compile and /run the software on supplied hardware. PLC Software code is already developed and running successfully at IPR Premises on the following hardware mentioned in the table-.

| Sr No | Module Type | Number of Modules used | Number of channels used |
|-------|---|------------------------|-------------------------|
| 1 | Logic Processor and Controller - P57 2634M | 1 | |
| 2 | Power Supply module- PSY 5500M | 1 | |
| 3 | Digital Input Module- TSX DEY 16FK | 2 | 50 |
| 3 | Digital Output Module- TSX DSY 32T2K | 2 | 24 |
| 4 | Analog Input Module - TSX AEY 420 | 2 | 8 |
| 5 | Analog output Module - TSX ASY 800 | 4 | 9 |
| 6 | 12 slot Ethernet backplane with accessories | 1 | |

- Vendor has to **quote separately** for each type of modules with the single unit price, Software and other accessories.
- Vendor has to see the full compatibility of their offered modules (AIO and DIO) with CPU.
- Vendor has to estimate the dimension of Backplane (Rail-R16).
- Send quotation with all other technical details & features of CPU & modules, if you have (Reply of IPRs Technical specification is must).
- A Programming tools which supports the Statement List (STL), Ladder Diagram (LAD) and Functional Block Diagram (FBD) has to be supplied with appropriate license to program PLC modules.
- Rails, termination panel for the modules have to be supplied. Termination panels are module type specific. Any other essential accessories can be quoted separately.
- Vendor has to install the PLC modules at IPR and show the functionality of each module by writing test application.
- User manual (in English) has to be supplied for each type of PLC modules, Programming Tool.
- Introductory training for the PLC programming, Installation, configuration and maintenance.
- Software for PLC Programming should be installed at the IPR.

4.3. Instruction for Software bid

- Vendor has to develop and demonstrate the software functionality as per the specification mentioned in the section 3.3

5. Acceptance Test:

Vendor has to demonstrate the development, integration, Interfacing and commissioning testing on the supplied hardware (and reconfigured application software). Testing would be done preferably on actual system placed in Lab (IPRs responsibility and scope). In case full system is not placed, then testing would be performed with dummy signals. Vendor has to demonstrate all the software functionality mentioned in the section 3.3 on the running system.

- a. Simultaneous sampling of all PXI channels (32 Nos) which are used for fast acquisition at 1 MS/sec/ch or more (64MB) with internal and external clock for duration 1000second. The application software should acquire continuous and lossless data, transfer to buffer, plot and write the data to file. Software selectable sampling rate up to maximum sampling rate. Demonstrate the resolution of 16 bit.
- b. For medium acquisition, the no. of channels and duration of acquisition is defined (in existing running application) and will be provided to vendor at the time of development.
- c. Demonstrate features for interrupt handling, priority handling, inter process communication in single or among multiple cores in LabVIEW real time operating system.

6.1 Deliverables for the PXI System

- Installation & testing of software with IPR hardware should be carried out by the vendor to establish operation of software with real data from the system.
- Original source code and running software should be given.
- Flow chart of the developed program should be given.
- Introductory training for the PXI programming, Installation, configuration and maintenance.
- Proper documentation with comments for the source code should be given.
- Minor modifications in software, if any, should be carried out by the vendor free of cost as per operational requirements till the warranty period.

6.2 Deliverables for the PLC System

- Installation & testing of software with IPR hardware should be carried out by the vendor to establish operation of software with real data from the system.
- PLC sequence control system will be checked using the recompiled and deployed code (functionality testing have to demonstrate) for following functionality.
- Introductory training for the PLC programming, Installation, configuration and maintenance.
- Original source code and running software should be given.
- Proper documentation with comments for the source code should be given.
- Minor modifications in software, if any, should be carried out by the vendor free of cost as per operational requirements till the warranty period.

6.3 Deliverables for the PXI and PLC Software:

| A | Software Development/Recompilation Modules for PXI System |
|----------|---|
| 1 | Configuration Module |
| 2 | Online monitoring module |
| 3 | Online Analysis and visualization module |
| 4 | Online data acquisition module |
| 5 | User administration Module |
| 6 | PLC communication Module |
| 7 | High Speed Data Acquisition module |
| 8 | Visualization & monitoring modules |
| 9 | Offline Analysis module building |
| 10 | RT Data acquisition File storage |
| 11 | Module for Data transfer to Windows |
| 12 | Interlock system code implementation on FPGA |
| 13 | Control loop implementation on FPGA |
| | |
| | |
| B | PLC Software Programming |
| | |
| C | Panel Verification, Installation & Commissioning of the System |
| 1 | Data Acquisition Panel I/O Verification & PLC Panel |
| 2 | RT deployment and testing |
| 3 | Communication with PLC System |
| 4 | High Speed Data Acquisition Testing (RT System) & bug Fixing |
| 5 | Control loop & Interlocks testing |
| 6 | System Integration |
| | |

Annexure-1

As architecture of the software has been already designed and it has to be extended as per the new or addition requirement of RF transmission and diagnostics associated with new application. Some alteration or modification can be taken place with the existing software design. The original software code which is designed in LabVIEW and PLC ladder code will be provided to vender for redesign and deploy with available new instrumentation and software.

Real time data acquisition, control and Interlock system:

Vender has to develop the system which will fulfill the following requirement:

FAST INTERLOCK System:

Vendor has to develop fast interlock system using **PXIe 7856R (Alternative of existing 7841R)** board, which will insure reliable operation and will be independent of processor and act as hard wired system having response time of less than 2micro second. It should have fault count facility so that we can reapply RF repetitively if fault is not exceeding the pre-defined value. Detailed Design will be described in design report. Status of all I/O of Interlock system should be logged at 1us sampling frequency and should be provided in graphical form for

offline analysis. Auto Fault simulation signal will be provided to check ILK functionality before generating System Ready signal.

Real time control system:

- **Amplitude control loop: [As per the existing source code]**

The Regulation system provide stable power level over a wide range of load change (VSWR) and at the same time protect the tube by reducing the RF power instead of switching it off (Limiting Mode of the amplifier). To optimize the operation and for safety of the tubes- two parameter are regulated. They are-

- The output power is regulated for the requested power level by comparing the measured feedback signal with the reference level (Derived from reference signal & provided by Plant Control System) and taking VSWR condition into account.
- The Anode Voltage is regulated (VA LOOP) to keep dissipated power minimum and efficiency maximum.

Amplitude control loop will be developed using NI PXIe 7856R FPGA board which have 8 analog i/p and 4 analog o/p channel. The loop timing for amplitude control loop is of maximum 200 milli-second.

- **Phase control loop: [As per the existing source code]**

To maintain a predefined phase between the Synthesizer output and Final transmitter output Phase control loop is incorporated which acts as phase locking system with offset facility. As combiner may require phasing between two inputs and that can be achieved by this control loop.

Phase control loop will be developed using **PXIe 7856R** board which have 8 analog i/p and 4 analog o/p channel. The loop timing for Phase control loop is of maximum 10 micro second.

Real time data acquisition system:

Data acquisition is divided in 3 Subgroups based on data acquisition:

Fast acquisition: Some of analog I/O channel related to ILK signal directly or indirectly should be acquired with 1 micro sec sampling frequency. It is event based data acquisition and triggered with RF off signal. Pre-defined pre trigger and post trigger data should be acquired for around 100 msec.

Medium acquisition: All the parameters are acquired with 1ms-5ms sampling frequency continuously without missing any data.

Slow acquisition: All the cooling parameters are acquired at 1ms sampling frequency and for that separate data logger will be supplied. It has facility to define three level alarm signals and generate 3-TTL signal for different group of signal for further interlocking of the system

On line monitoring facility: Some of the channels (Pre selectable) should be monitored on-line after calibration at actual unit. The refreshing time of display will be finalized during development.

Off line visualization facility: All the acquired data should be displayed in graphical form as well as available in different format so that it should be transported to other s/w for further analysis. Other general feature of GUI (Zoom, Comparison, Data point display, Out of range indication, conformity for setting value etc) should be incorporated.

Data Management: Should able to acquire data of RF pulse duration. In local memory and then should be transferred to secondary memory.

Annexure-2

Test Acceptance procedure:

Preliminary acceptance test procedure is defined here.

1. PLC sequence control system will be checked

- a. Functionality of Individual board
- b. Checking of I/O channels with dummy signals
- c. Functionality of sequence control loop will be checked with dummy signal
- d. Each power supply and other subsystem will be integrated with PLC.
- e. Integrated performance evaluation with simulated fault

2. Interlock testing

- a. With simulated fault and annunciation of fault
- b. Automatic Interlock testing prior to RF Pulse
- c. Fault counter testing
- d. Reapplication of RF

3. Control Loop Testing

- a. Phase loop testing for Phase locked condition and phase shift of source
- b. Amplitude control loop for simulated signal
- c. Tuning of Control parameter
- d. Checking of Amplitude control loop for stability and loop timing
- e. Testing it with very low power level and gradually increase the power level
- f. Testing of Amplitude control loop with Actual system
- g. Anode variation with simulated limiting condition

4. Real time acquisition, Analysis module and Display module testing

- a. RT acquisition for no data missing will be tested
- b. On-line display for all parameter at different screen should be checked
- c. All the general functionality like Zooming, Overlapping of multiple channels with different axial value and other functionality will be tested.

5. Storage capability testing: It should be able to store the data of continuous 16hr with specified acquisition pattern

6. Position control testing and integration with actual system.

7. Actual integrated testing with RF system will be carried out by the vendor subject to available system from ITER-India. In case of non-availability of the any RF system from IPR, the system will be tested with simulated condition and acceptance letter

will be issued. Vendor has agreed to depute technical persons during actual integration for one month period without any additional cost.

Annexure-3

1. Fast controller application for control and fast acquisition

PXI system shall be able to control phase and amplitude of RF power within 20-200 μ Sec.

Phase control loop is single loop controller. Phase reference is generated from Plant control system. In current system, the phase reference will be internally generated as Plant Control System is not available. The loop maintains a fix offset between Synthesizer output and final RF output. This is required as combiner requires phasing between two outputs.

Amplitude loop control is a multi-loop controller. The system will be designed to give stable power output over large load changes at the same time it should protect tube by reducing power instead of switching off power. The primary control loop will take action based on error between amplitude set point and feedback. The secondary control loop is Anode Voltage loop. Two parameters directly linked to VA loop are Anode power dissipation and Screen grid current. We need to maintain both this variable within limit while achieving set point.

PXI system shall be able to implement fast interlocking system with fault management. System has hardwired interlocks which need to act upon within 10 μ Sec. For safety of system as fault handling system has to be designed based on fault counter mechanism. The Fault counter will continuously calculate number of fault occurred in a fixed interval window.

If the number of faults within an interval then RF power shall be switched off. PXI system shall be able to acquire and log data at different speed. The system is connected to different types of signal coming from RF Power source and its auxiliaries. The system parameter needs to be monitored while in operation. The critical parameters are acquired at different rates of 1mSec and 1 μ Sec. Critical parameters are acquired at fast rate during fault condition. System needs to acquire pre and post triggered data with user selectable interval. The system also has slow speed scanner module which acquire data at very slow speed and communicate with PXI system on RS-485 ModBus.

TEST DATA STORAGE

Test data will be stored in binary file after each shot performed. Each day, new folder will be generated with date named. The shot files generated will be stored in particular folder of dates and named as date and time. Also software has facility to filter out unused stored data. Logbook on each button event as well as shot parameter along with RF power measurement to be stored in database for future use.

Software Overview

The software is designed to provide GUI to user for configure test setup, conduct test and generate test report. The DAQ & Control System for RF Source software is standalone application software that will be divided in following modules

• User Administration

This module is basically Login screen in which only users will be allowed to use software. This module puts restriction on entry of other personals and does not allow moving further inside of the software. The master administrator is authorized to handle all the user accounts. He can add, edit or delete user accounts.

• Shot parameters entry & interlock activation

This module is responsible for test or shot parameters' entry and interlocks selections. As per user enters the parameters and required interlocks, all the settable parameters will be fed and selected interlocks will be activated for test shots.

• Test & Acquisition

This module takes care of starting test, handling parameters and data acquisition during test progress. This module performs as per user had entered parameters and interlock choices.

• Test Analysis

This module makes user to analyze test on live basis while performing shots as well as offline mode after test completion.

• Plotting

This module helps to plot accurate graph of acquired data at very high speed.

• Report Generation

This module helps much to user for the post analysis of each test. This is the bunch of data which makes use to understand test situations for the user to determine success of the test.

Core software

- LabVIEW 2016, Drivers and LabVIEW toolkits are base platform of the application software
- MS-Excel is base platform for report generation
- MS-Access provides Database platform to store application data (if required). The data is on open platform and can be accessed through ODBC link.

Software architecture

The software is divided into two major parts 1> Host application and 2> real time data acquisition and control module.

The host application is take cares of graphical user interface and test sequence execution. The real time data acquisition and control module acquires and controls I/O channels deterministically. The determinism provided by real time data acquisition and control module enable us to sample I/O channels at equal time slices providing better controls.

2. System Overview

The DAQ & Control System for ICH & CD Source software is working with the system diagram as shown in figure 1 (System Block Diagram).

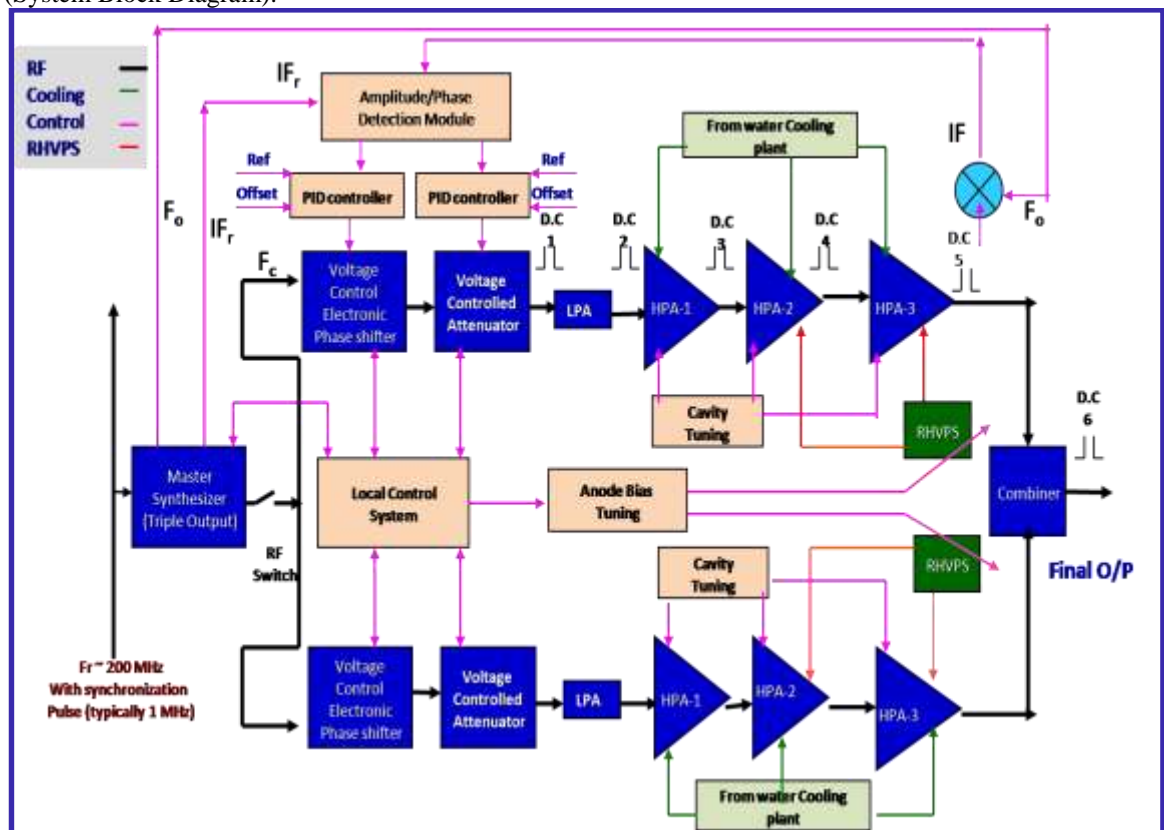


Figure 1 - System Block diagram

3. Overall Block diagram

- The real time data acquisition (RTC) and PLC hardware are system's access point to field instruments.
- It acquires data from field instruments, processes and controls field instruments.
- The real time data acquisition hardware in turn communicates with host work station on Ethernet.
- Workstation carries host application software which provides graphical user interface to user. Proposed hardware architecture is shown in figure 2.

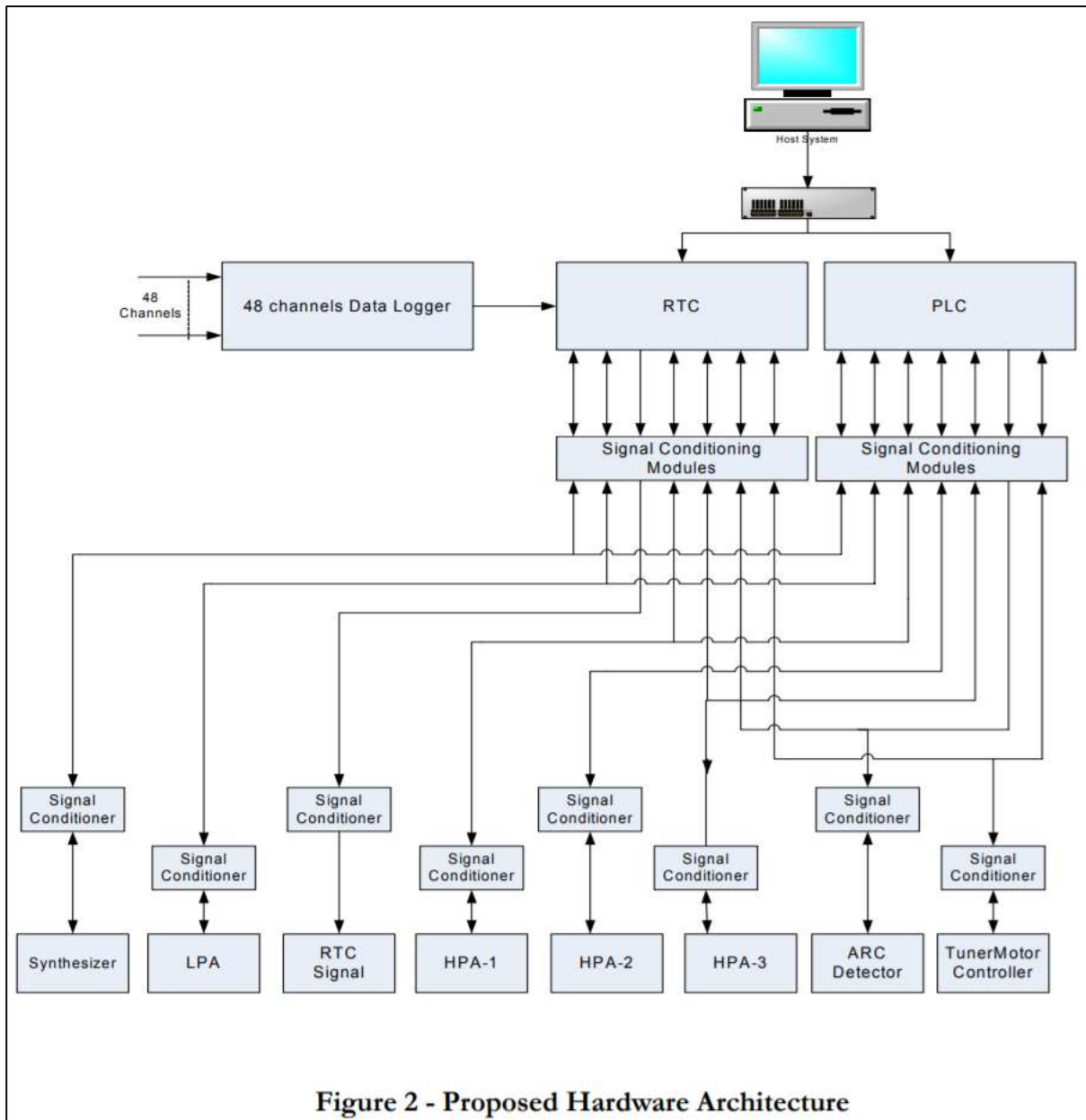


Figure 2 - Proposed Hardware Architecture

4. Host application

- The software consists of user interface, with tabbed format for convenient use.
- At this stage of design, software with different tabs is made, which may fulfil the user interface requirements.
- These tabs are representing system block, indications and result oriented pages. Sample screens are shown and described below.

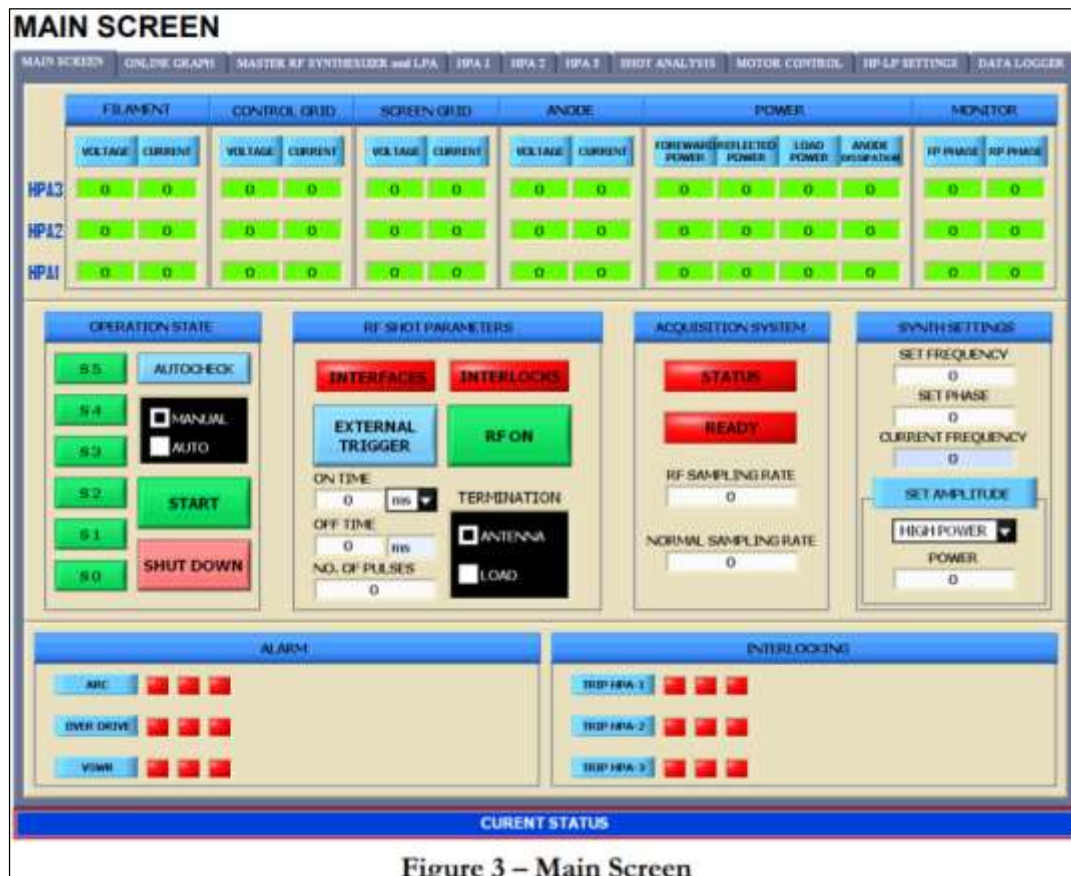
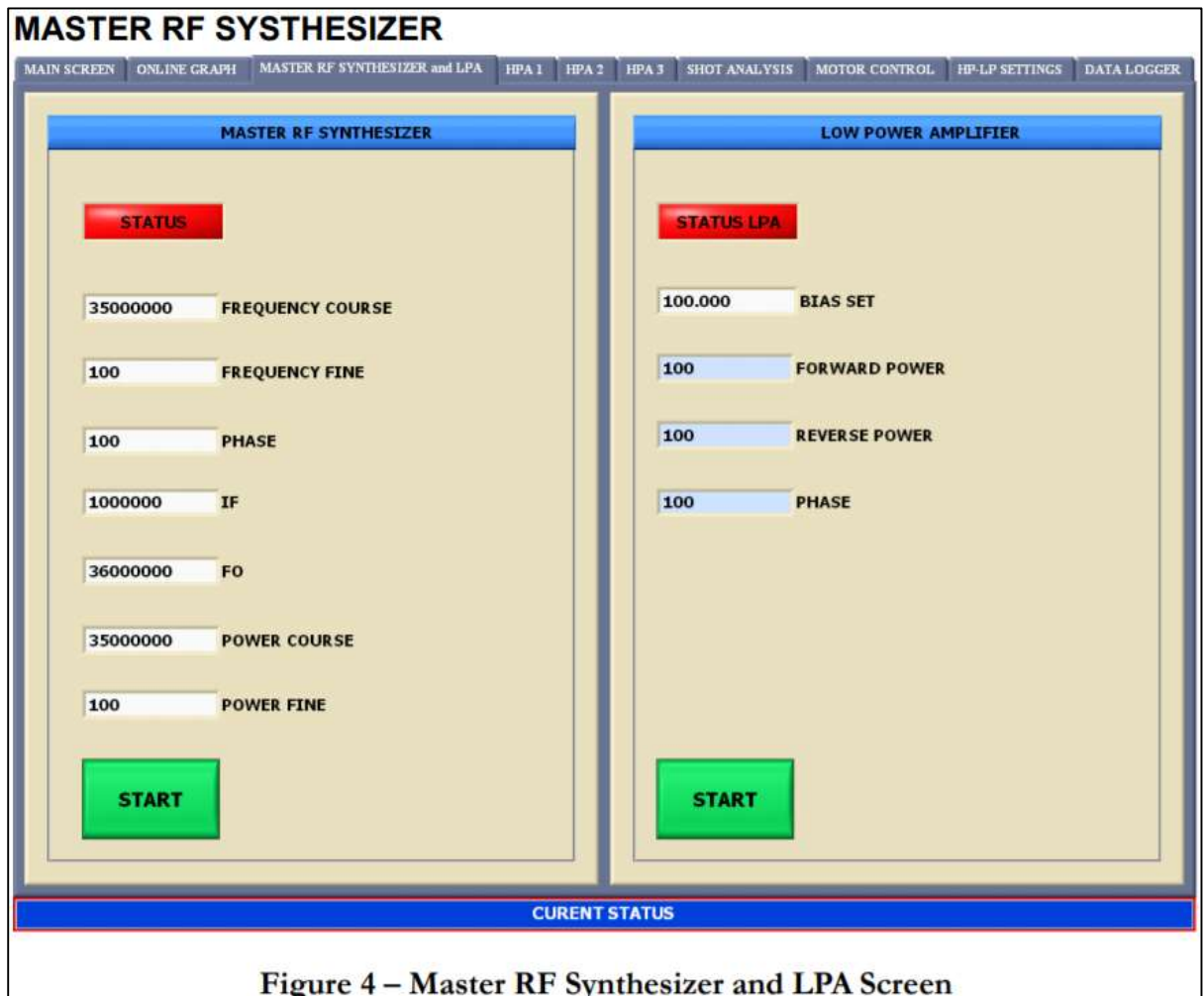


Figure 3 – Main Screen

- **Figure 3** is the main screen, where the user can start the process or stop the process.
- The user will check and set all the parameters from other tabs to function the system properly.
- After setting all the parameters, the user moves on the main screen. Here, user needs to set the sampling frequency for normal time data acquisition and shot time or ON time data acquisition in millisecond range.
- As displayed on main screen, almost all the indications are included required to monitor the health of the system and control the system operation.
- The user can check all the working systems that it is properly working or not by using GREEN or RED indications.
- The final step of RF switch ON is provided for setting PULSE ON period, PULSE OFF period (in milliseconds or seconds) and number of pulses.

- All the system status, voltage and current data are continuously acquired from the system and are displayed on the MAIN page for convenience of the user to start the RF shot.
- **Current status updating** i.e. RF waiting for external trigger, Shot is continued, Shot successfully completed, premature terminated etc. will be visible below each screen bottom.



- As shown in **figure 4** (Master RF Synthesizer and LPA Screen), it consist of Frequency fine & course setting, phase, power fine & course settings and its start stop button and also display the status of Synthesizer Stage.
- **LPA:** LPA screen consist of controls of set bias voltage, forward power, reverse power & phase settings. It has having start stop & its status of LPA Stage.

HPA-1 SCREEN



Figure 5 – HPA-1 Screen

- As shown in **figure 5**, the HPA-1 page consists of various indicators and controls regarding the same.
- All the four supply terminals are provided with appropriate indications and controls. The terminals, named as Filament, CG, SG and Anode, are displayed with their individual status, set-points, start/ stop and immediate OFF.
- The TTL controls are START/STOP and IMMEDIATE OFF, while analog controls are CURRENT SET and VOLTAGE SET for this particular HPA-1 stage of the system.
- The TTL indications are STATUS, TRIP and READY, while analog indications are VOLTAGE, CURRENT, FORWARD POWER, REVERSE POWER and PHASE.

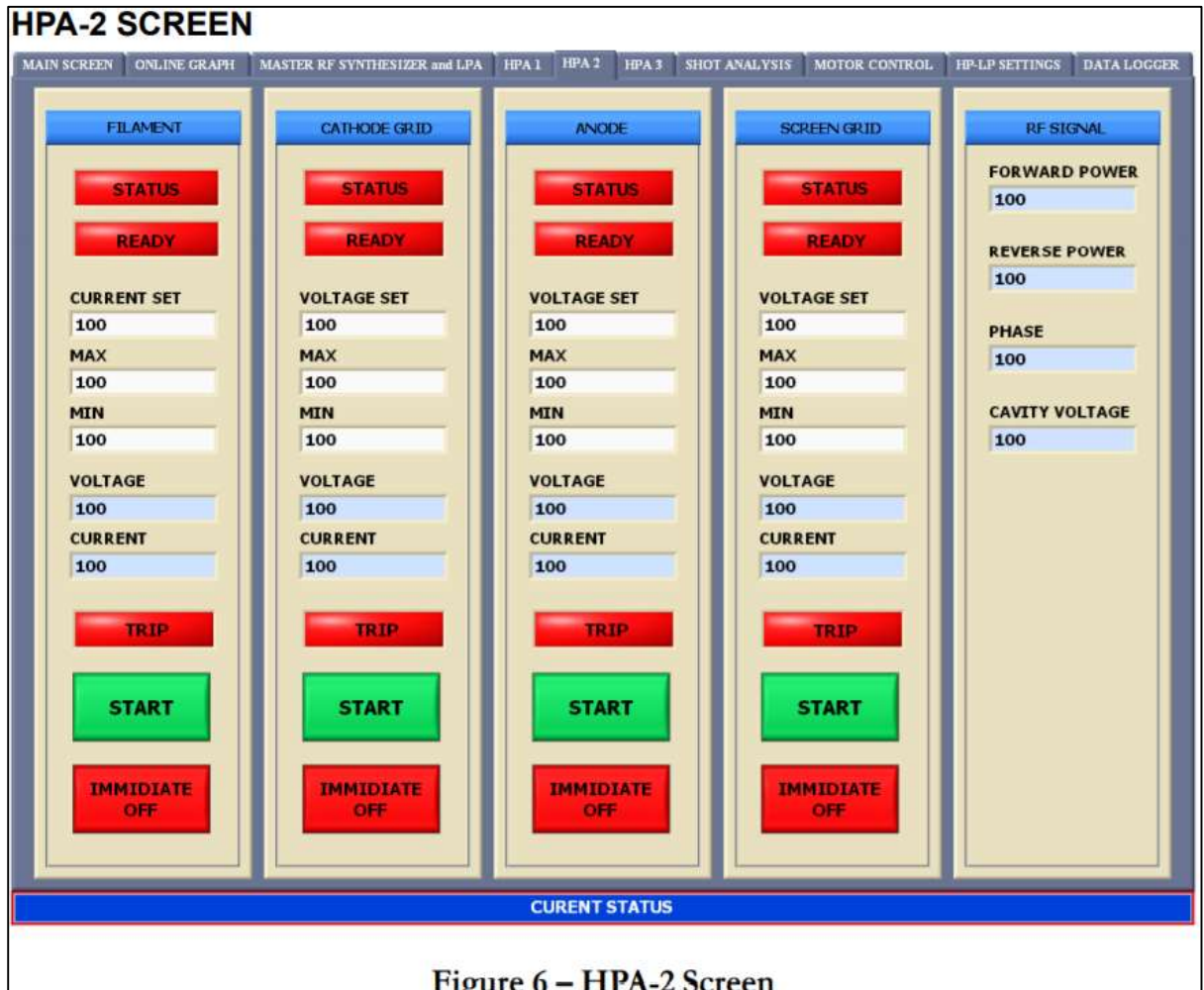


Figure 6 – HPA-2 Screen

- As shown in **figure 6**, the HPA-2 is having almost same screen and functioning as HPA-1. All the controls and indicators are provided for the user conveniences.
- The status of various supply terminals and RF status of HPA-2 are acquired and displayed, as well as controllable parameters can be controlled.
- The TTL controls are START/STOP and IMMEDIATE OFF, while analog controls are CURRENT SET and VOLTAGE SET for this particular HPA-1 stage of the system.
- The TTL indications are STATUS, TRIP and READY, while analog indications are VOLTAGE, CURRENT, FORWARD POWER, REVERSE POWER, CAVITY VOLTAGE and PHASE.
- The most complex among all the HPAs is HPA-3, which is the most important part of the system, requires more controls and precise indications which is shown in **figure 7**.
- All the controls and indicators are provided for the user conveniences.
- The status of various supply terminals and RF status of HPA-3 are acquired and displayed, as well as controllable parameters can be controlled.

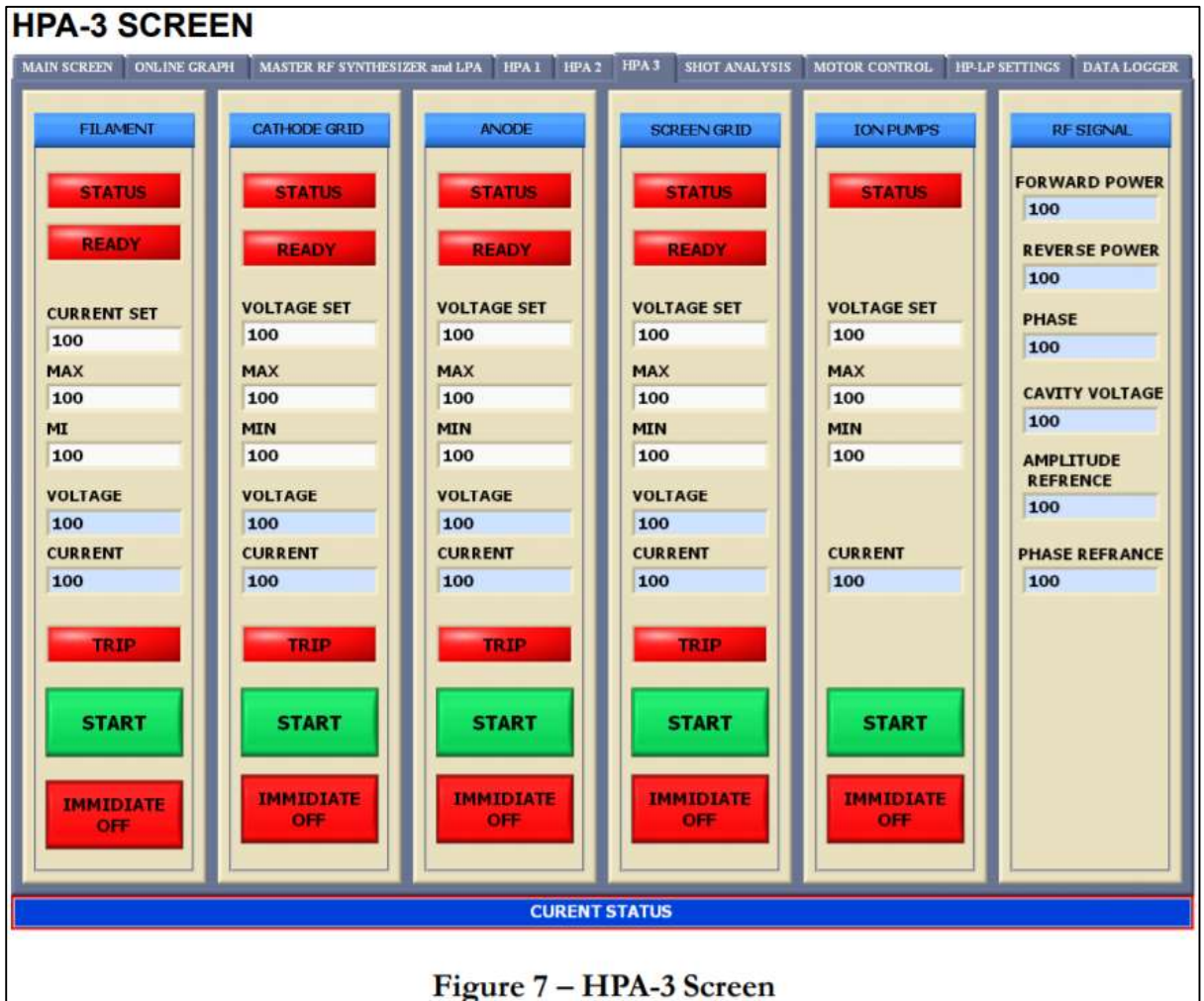


Figure 7 – HPA-3 Screen

- The color of background of amplitude parameter selection indicates the color of the line for the same. There is facility in the graph for zooming, scrolling, as well as comparing.

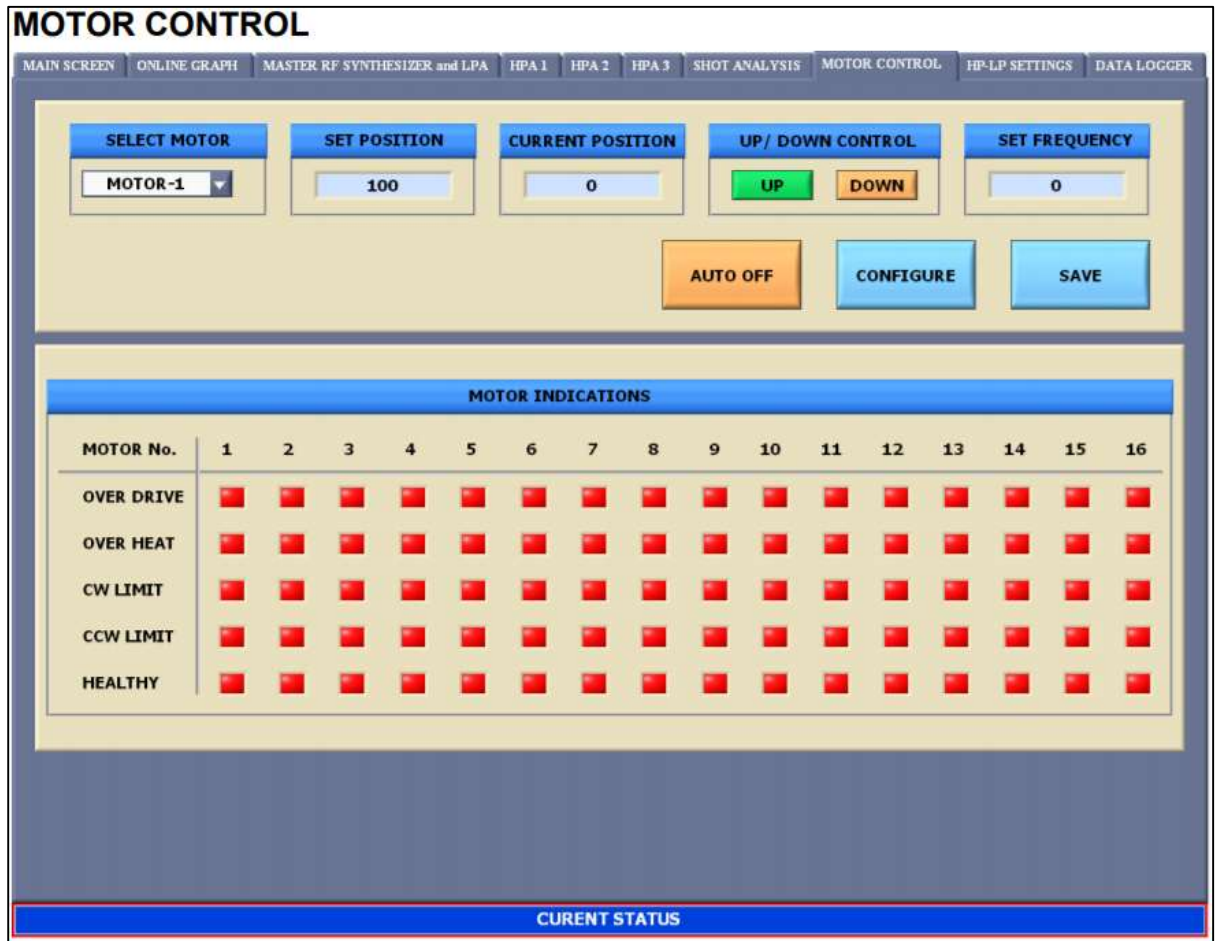


Figure 8 - Motor control screen

- **Figure 8** shown motor control screen. This screen shows current position of all motors, set positions, auto ON/ OFF button and UP/ DOWN controls.
- User can make motors on manual control by pressing AUTO OFF button and again can make auto by pressing same button.
- In manual mode, user can set motor position precisely by pressing UP/ DOWN buttons which moves motor one step by pressing once. If administrator needs to modify default set position of motor, he can make click on CONFIGURE button.
- This will pop- up a window, which includes frequency bands and appropriate motor positions.
- User can also view various motor indications like, over drive, over heat, CW or CCW limit and over all healthiness of motor. Figure 9 shows HP-LP setting.



Figure 9 – HP – LP Setting Screen

MOTOR POSITION SETTINGS

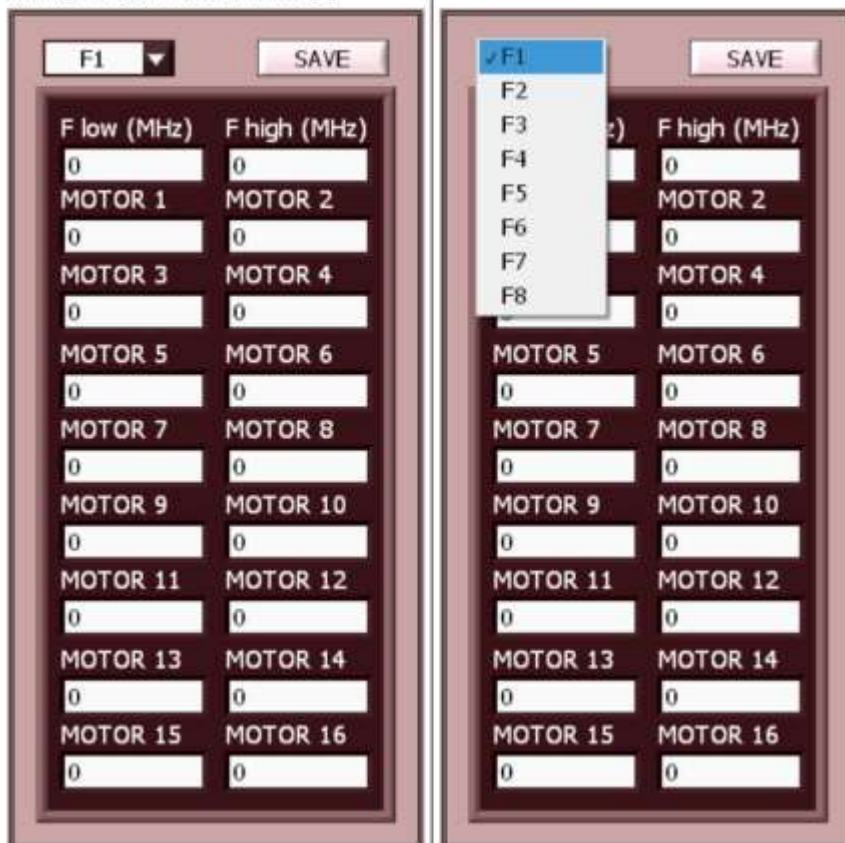


Figure 10 – Motor Position Setting Screen

- **Figure 10** shows motor position setting window. This screen is to set motor position for different frequency bands.
- User has choice of eight different frequency bands and appropriate motor positions.
- User has to take care of not overlapping the frequency bands as it will create problem while setting positions in the screen.

OMN based software addition (Minor modifications in below sections)

- There should be 8 AI signals would be scanned at least the rate of 1kHz and have to generate pulses for CW/CCW movement for movement of VVC motors based on some equations given by IPR.
- Additional 10 DO signals have to be generated based on button click events. Vacuum reading based on voltage signals have to be shown with graph plotting.
- More 8 DI signals have to be monitored with red/green color status.
- For CCS communication one DI and DO signals must be allocated and software communication between CCS and out system must be integrated as per design criteria.
- **Figure 11** shows OMN and digital control screen for same motors. Same way figure 12 shows the diagnostic screen with vacuum reading.

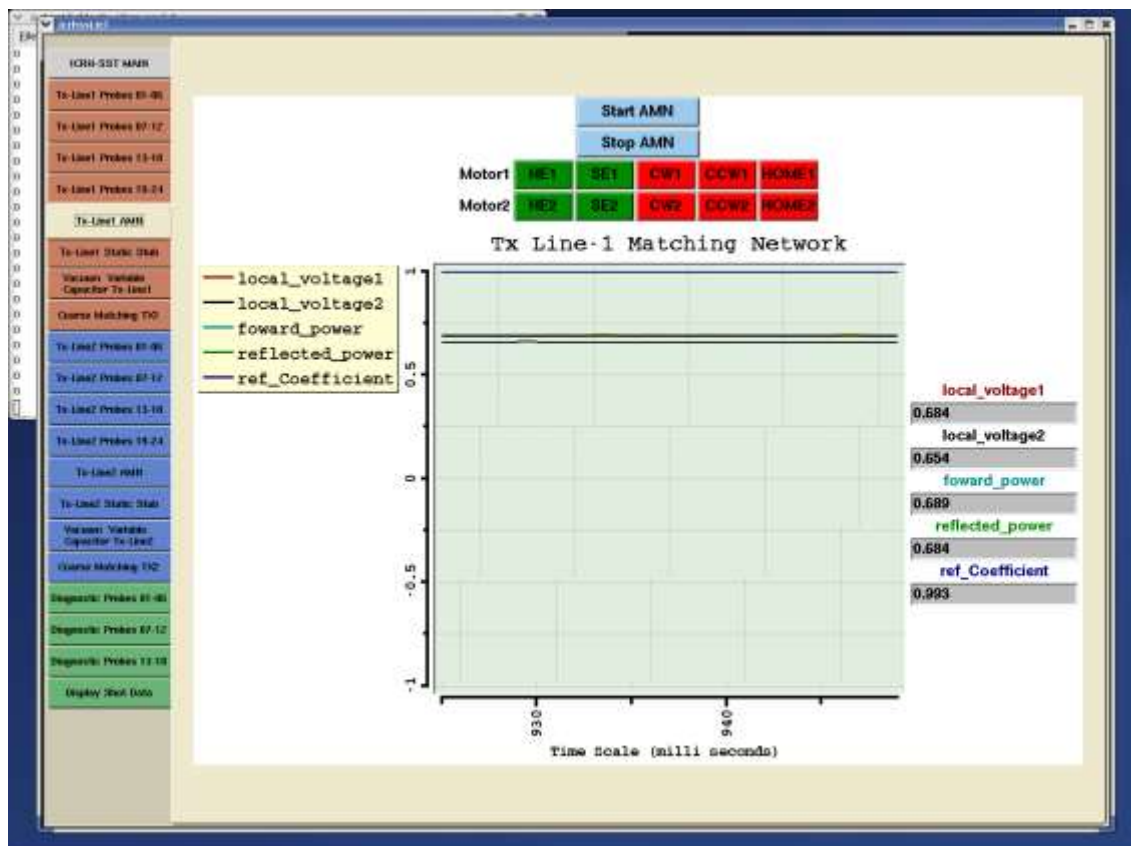


Figure 11 – OMN with Digital control Screen

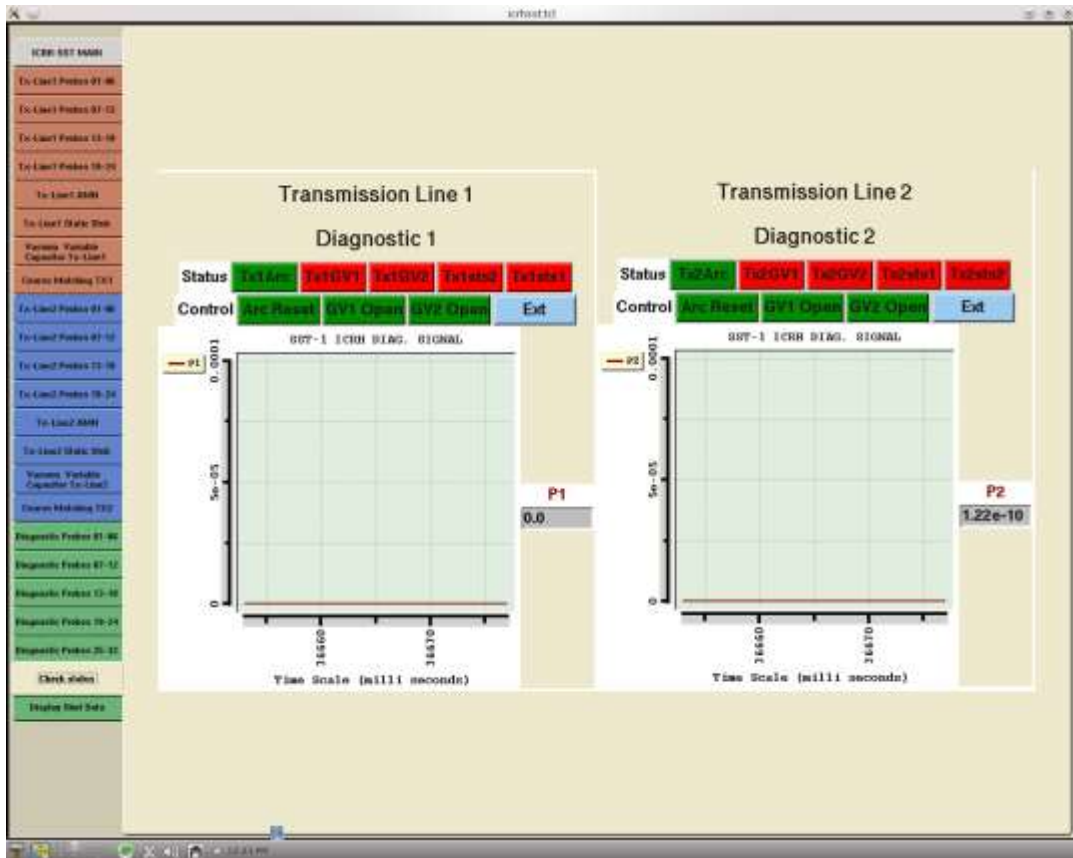


Figure 12 – Vacuum reading with diagnostic Screen

| Antenna Edge diagnostics: | Probes | RF Diagnostics: | Interface Diagnostics: |
|--|-----------------|--|---|
| Electron Density (ne) | Langmuir probe | Antenna current : Rogowski coil | Interface Pressure : ionization gauges |
| Electron Temperature (Te) | Magnetic loop | VSWR: VSWR probe section | Interface Arc : Arc detectors |
| Electric Field (E _θ &E _φ) | Electric dipole | Forward & reflected power: Directional coupler | Interface cooling & interlock: flow meters & switch |
| | | Antenna tiles temperature: thermocouple | Interface temperature: calorimetric |

Table 1. Different diagnostics connected with Antenna and interface.

- **Figure 13** shows CCS communication for remote operation to interface ICRH system with CCS for software and hardware interface this kind of facilities should be added with specified protocol and rules for Tokamak operation.
- Logbook for each shot operation should be stored in data base which can be plotted offline when it requires by offline plotting facility. Logbook is shown in figure 14 screen.

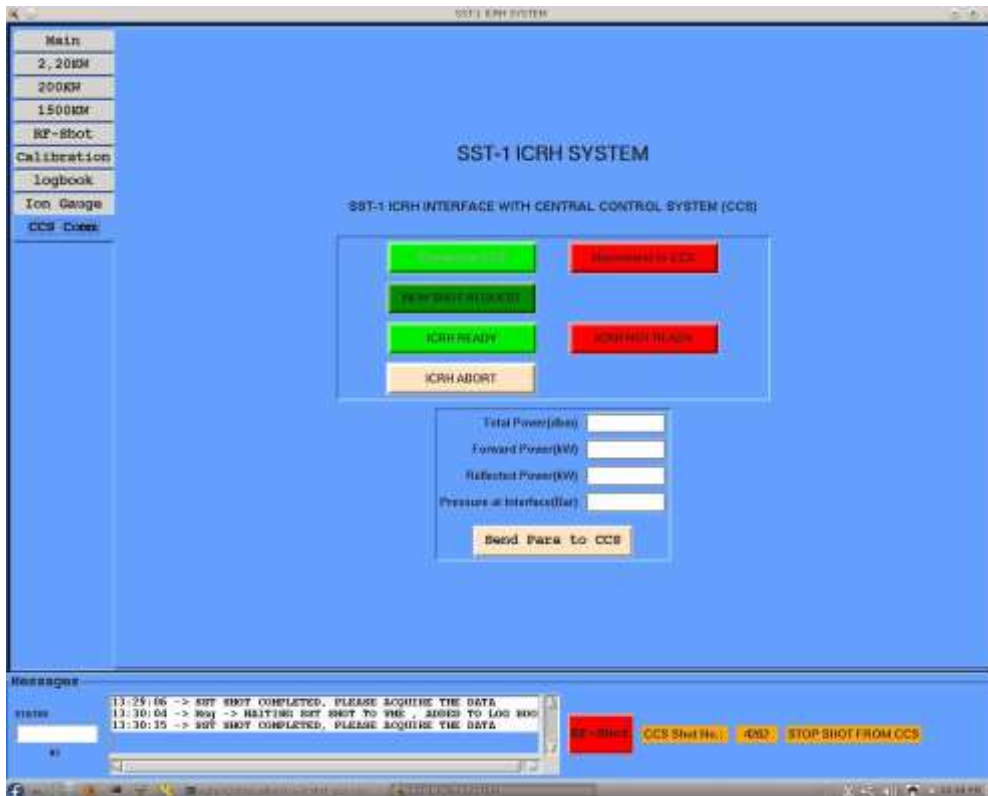


Figure 13 – CCS interface for Remote operation

| Shot ID | ICRH SHOT | HDG# ID | ALIQUA ID | ST |
|---------|------------------------------------|---------|-----------|----|
| 17 | ICRH_21_Sep_2013_10_46_30_1780-000 | 1780 | | |
| 18 | ICRH_21_Sep_2013_10_47_09_1781-000 | 1781 | | |
| 19 | ICRH_21_Sep_2013_10_47_34_1782-000 | 1782 | | |
| 20 | ICRH_21_Sep_2013_10_47_59_1783-000 | 1783 | | |
| 21 | ICRH_21_Sep_2013_10_48_18_1784-000 | 1784 | | |
| 22 | ICRH_21_Sep_2013_10_48_41_1785-000 | 1785 | | |
| 23 | ICRH_21_Sep_2013_10_50_04_1786-000 | 1786 | | |
| 24 | ICRH_21_Sep_2013_10_50_37_1787-000 | 1787 | | |
| 25 | ICRH_21_Sep_2013_10_51_02_1788-000 | 1788 | | |
| 26 | ICRH_21_Sep_2013_10_51_42_1789-000 | 1789 | | |
| 27 | ICRH_21_Sep_2013_10_51_58_1790-000 | 1790 | | |
| 28 | ICRH_21_Sep_2013_10_52_18_1791-000 | 1791 | | |
| 29 | ICRH_21_Sep_2013_10_53_41_1792-000 | 1792 | | |
| 30 | ICRH_21_Sep_2013_10_54_57_1793-000 | 1793 | | |
| 31 | ICRH_21_Sep_2013_10_55_14_1794-000 | 1794 | | |
| 32 | ICRH_21_Sep_2013_10_55_38_1795-000 | 1795 | | |
| 33 | ICRH_21_Sep_2013_10_56_18_1796-000 | 1796 | | |
| 34 | ICRH_21_Sep_2013_10_57_10_1797-000 | 1797 | | |
| 35 | ICRH_21_Sep_2013_10_57_37_1798-000 | 1798 | | |
| 36 | ICRH_21_Sep_2013_11_23_28_1799-000 | 1799 | | |
| 37 | ICRH_21_Sep_2013_11_27_01_1800-000 | 1800 | | |
| 38 | ICRH_21_Sep_2013_12_18_03_1801-000 | 1801 | | |
| 39 | ICRH_21_Sep_2013_12_40_04_1802-000 | 1802 | | |
| 40 | ICRH_21_Sep_2013_12_42_31_1803-000 | 1803 | | |

Messages

13:25:06 -> RF SHOT COMPLETED. PLEASE ACQUIRE THE DATA
 13:30:04 -> RF -> WAITING FOR SHOT TO END. PRESS TO LOG HDG
 13:30:35 -> RF SHOT COMPLETED. PLEASE ACQUIRE THE DATA

RF-Shot CCS Shot No. HDG STOP SHOT FROM CCS

Figure 14 – Logbook for shot details

Annexure-4**1. Real time data acquisition and control module**

- RT control system is PXI based high speed control system. The Operating system of the PXI controller will be NI Lab View Real Time.
- For deterministic and fast control we are using NI-7856R FPGA based DAQ card. The card has 1M Gate equivalent FPGA chip onboard, which is utilized to burn control loop and interlocks.
- This means that process control loop and interlock control system is working independent to Controller execution cycle. For High data acquisition, we are using NI PXI6368 card.
- This card has capacity to acquire 16 analog channels at 2Ms/sec/ch, which is sufficient to fulfill our current requirement of acquiring critical data at 1Ms/s/ch and higher in future if possible. NI PXI-6368 (existing one is PXI-6133) can able to acquire data of specified time using PXI (bus) back plane & Processor board speed. This card is mainly useful for data acquisition rather control.
- FPGA based software will be developed for individual 7856R boards separately. The IO channels will be associate such a way the all corresponding channel of one control loop will be part of same board.
- Then FPGA software will be subdivided in two loops, fast interlock loop running at 10MHz and system parameter control loop running at 200 kHz. Within control loop each control loop algorithm will be written separately.
- **Figure-1** shows controls for setting HPA 1, HPA 2 and HPA 3 parameter amplitudes for Filament current, Anode voltage, Cathode Grid current and Screen Grid current for High Power (HP) and Low Power (LP) individually.
- Administrator can save set-points for auto mode. Variable will be of 32- bit floating point, supporting 3- decimals after decimal point and can be varied as per needs.
- Offline plotting of signals should have facility to compare signals with min, max and average calculation.
- There should be a search facility based on date, shot number, signal name and forward power signal value.
- As shown in **figure-2**, screen is made for online analysis of selected parameters (maximum 8).
- The user can select parameters from list. The selected parameters will be shown on graph as per its settings for amplitudes. User can zoom, scroll, and compare different Y- scales (with common timestamp).
- All the graphs are visually different colored as per selected in amplitude parameter selection list background. User is also given facility to view Alarm and interlocking status.

ONLINE GRAPH



Figure 1 – Online graph Screen

SHOT ANALYSIS

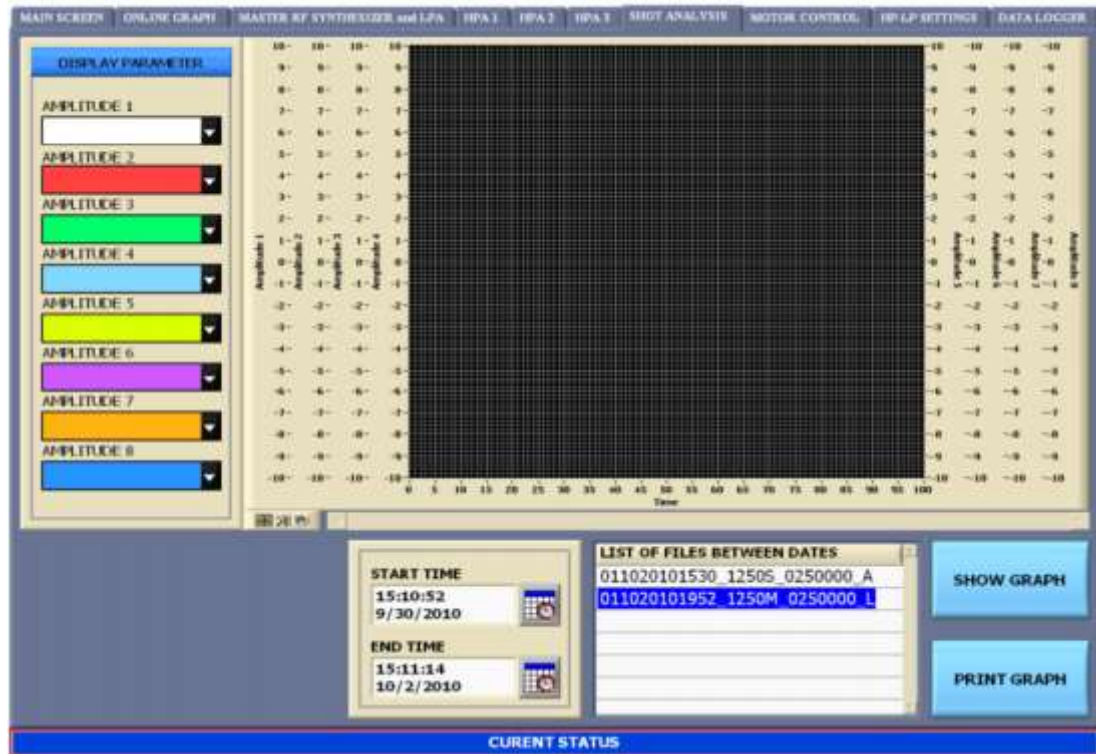


Figure 2 – Shot analysis Screen

CALIBRATION

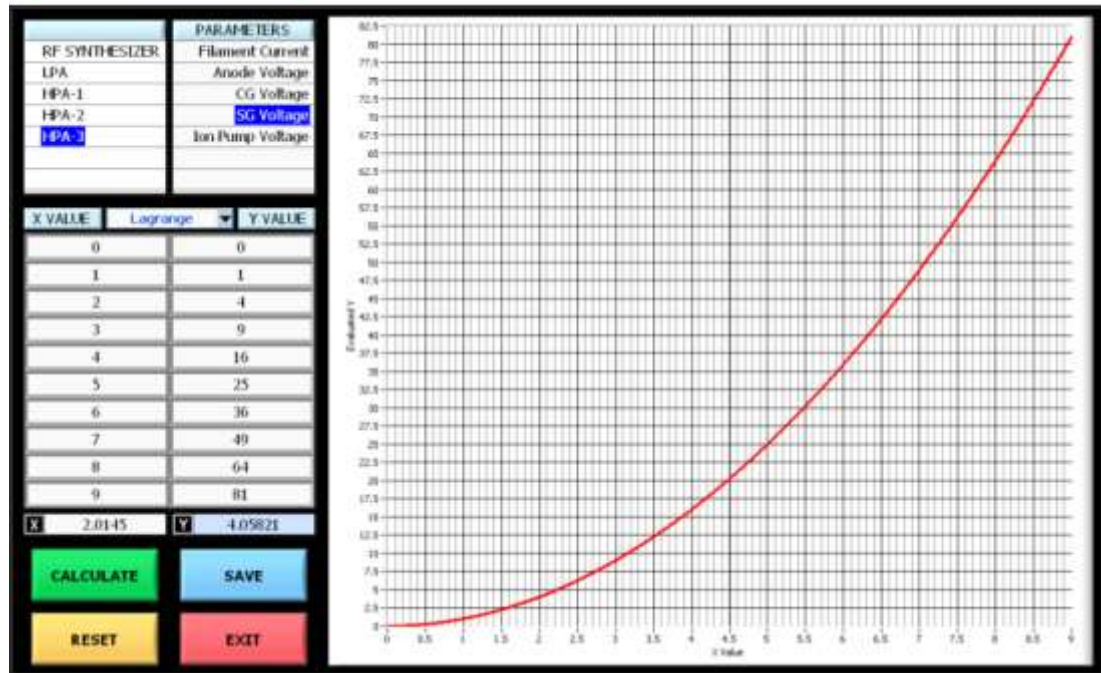


Figure 3 – Calibration Screen

- As shown in **figure 3**, user is given facility for calibration of device. User can select device from the first left list box, then select parameter from second list box which is to be calibrated.
- The calibration data is the fed to below two list boxes for value relationship. Right side chart shows interpolated graph of listed data.
- By pressing RESET button, all values will be reset to default values. SAVE button saves calibration data to the database.
- CALCULATE button will make necessary calculations for interpolation.

Institute for Plasma Research
(An Autonomous Institute of Dept. of Atomic Energy)
Bhat, Gandhinagar

TERMS & CONDITIONS

| ITEM DESCRIPTION | Supply and installation of PXI and PLC Control System with software services for ICRH System integration and functionality testing as per the specifications mentioned in the tender documents | |
|------------------|--|---|
| Sl. No. | PARTICULARS | REMARKS |
| I | Name of the Supplier | |
| II | IPR Enquity NO & Date | IPR/TPT/TN/PUR/ET/19-20/13 DATED 5/7/2019 |
| III | Vendor Offer No & Date | |
| IV | Postal address | |
| V | Contact with STD code | |
| VI | Fax with STD code | |
| VII | Name of Contact person | |
| VIII | Mobile No. | |
| IX | e-mail ID | |
| X | Currency of offer/quotation | |
| | SCANNED COPY OF THE BELOW MENTIONED DOCUMENTS NEED TO UPLOAD AT www.tenderwizard.com/DAE AT THE TIME OF PARTICIPATION OF TENDER WITHIN THE PERIOD OF SUBMISSION. | "YES" OR "NO" |
| 1 | Certificates: | |
| | i) Registration Certificate if Any, with DGS&D/NSIC/MSME | |
| | ii) PAN (Permanent Account Number) Registration | |
| | iii) Certificates of Registration for Sales Tax/ VAT/ WCT or Service Tax | |
| | iv) Authorization certificate/ Agency Agreement from Manufacturer (if not manufacturer) | |
| | Commercial Terms for Quoted items (Please Provide Commercial terms and conditions in the below form) | |
| 2 | Price Shall be firm and fixed through out the currency of contract, in the event of placement of purchase order. | |
| 3 | Please select the CURRENCY OF OFFER / QUOTATION first | |
| 4 | Have you offered Packing and forwarding charges in the price bid (if applicable)? | |
| 5 | Goods and Services Tax: Have you specified HSN / SAC Code for Goods and Services Tax in Price Bid? | |
| 6 | Have you offered Freight charges in the price bid? | |
| 7 | Have you offered Insurance charges in the price bid? | |
| 8 | Delivery period (as per Sr. No.31 of Section-A of Form No. IPR_LP_ET_02.V5 (Terms and Conditions) attached with the tender/enquiry). (Also refer document named "Deferred_terms_IPR_LP_ET_02.V5" for amended delivery terms) | |
| 9 | Have you offered Installation and commissioning charges? | |
| 10 | Liquidated Damages:- as per Sr. No. 22 of Section B of Form No IPR-LP-ET-02.V5 (Terms and Conditions) attached with the tender/enquiry | |
| 11 | Terms of Payment:- as per Sr. No.35 of Section B of Form No. IPR_LP_ET_02.V5 (Terms and Conditions) attached with the tender/enquiry. (Also refer document named Deferred_terms_IPR_LP_ET_02.V5" for amended payment terms) | |
| 12 | Guaranty / Warranty:-as per Sr. No. 34 of Section B of Form No. IPR_LP_ET_02.V5 (Terms and Conditions) attached with the tender/enquiry | |
| 13 | Validity of offer/quotation:- 120 days from the date of opening of tender | |
| | QUESTIONNAIRE TO BE FILLED BY BIDDER IN AND SENT ALONG WITH OFFER DULY SIGNED | |
| 14 | In the event of a purchase order/contract vendor has to provide Security Deposit in the form of Bank Guarantee for 10% of contract/ order value from SBI/nationalized banks or any one of the scheduled banks mentioned in the bracket (Axis Bank, HDFC Bank, ICICI Bank and IDBI Bank) valid till final acceptance of the supplied goods at IPR, wherever applicable shall be submitted . | |
| 15 | In the event of a purchase order/contract Performance Bank Gurantee for 10% of the contract/order value from SBI/nationalized banks or any one of the scheduled banks mentioned in the bracket (Axis Bank, HDFC Bank, ICICI Bank and IDBI Bank) valid throughout the guarantee period, wherever applicable shall be submitted. | |

| | | |
|----|--|--|
| 16 | I/We hereby offer to supply the stores detailed in the schedule hereto at the price given in the said schedule and agree to hold this offer open till expiry of quotation. I/We shall be bound to supply the stores hereby offered upon issue of purchase order communicating the acceptance thereof on or before the expiry of the last mentioned date. You will be at liberty to accept any one or more of the items of stores tendered for or portion of any or more of the items of such stores and I/We notwithstanding that the offer in the tender has not been accepted in whole shall be bound to supply to you- such item or items and such portion or portions of one or more of the items as may be specified in the said Purchase Order communicating the acceptance. | |
| 17 | I/we have understood the General Conditions of all Contracts and special conditions of contract governing supplies of plant and machinery in the Form No.IPR_LP_ET_02.V5, included in the General Conditions of all Contracts and special conditions of contract governing of plant and machinery applicable to contracts placed by the Institute for Plasma Research and the instructions to Tenderer annexed to the invitation to tender Form and have thoroughly examined the specification / drawing and / or pattern quoted or referred to in the Schedule hereto and am/are fully aware of the nature of the stores required any my/our offer is to supply stores strictly in accordance with subject tender to the terms and conditions stipulated in your above Form No. IPR_LP_ET_02.V5 and also contained in the Purchase Order Communicating acceptance of this Tender. | |
| 18 | Whether All Documents Related to tender Viewed? | |
| 19 | Vendor should upload the complete technical details (Tehncial specifications with product data sheet | |
| 20 | In case of two part tender whether unpriced quotation has been uploaded (Failing which offer will not be considered for technical evaluation) | |
| 21 | Free Issue Material: Successful tenderer will have to arrange insurance showing beneficiary as "Institute for Plasma Research" at their risk and cost towards adequate security for the materials/property provided/issued by the Purchaser as Free Issue Material for the due execution of the contract, wherever applicable. | |

Institute for Plasma Research
(An Autonomous Institute of Dept. of Atomic Energy)
Bhat, Gandhinagar

Eligibility Criteria (Annexure-A)

| | | | |
|------------------|--|--|---|
| ITEM DESCRIPTION | Supply and installation of PXI and PLC Control System with software services for ICRH System integration and functionality testing as per the specifications mentioned in the tender documents | | |
| SI. No. | PARTICULARS | REMARKS | |
| I | Name of the Vendor | | |
| II | IPR Enquity NO & Date | IPR/TN/PUR/TPT/ET/19-20/13 DATED 5/7/2019 | |
| III | Vendor Offer No & Date | | |
| Sr. No. | Criteria | Documents required to upload | Status of Documents (Uploaded/ Not-Uploaded in e-Tender Portal) |
| 1 | Bidder must be an OEM (original equipment manufacturer) or AUTHORIZED representative/Dealer/Distributor of the OEM | In case the bidder is an OEM, provide company profile for OEM products. In case the bidder is an authorized representative/dealer/distributor of OEM, he should provide copy of valid agreement/dealership/distributorship certificate of OEM | |
| 2 | Bidder must be ISO 9001:2008 certified | Bidder should submit copy of valid ISO 9001:2008 certificate | |
| 3 | Bidder should have developed, installed and commissioned PLC/PXI control system in the field of data acquisition, control and instrumentation systems in the past | Bidder should submit the copies of detailed purchase orders with completion/installation certificate. | |

Note:

| |
|--|
| The response to tender without submission of proof of above points will summarily be rejected without further communication |
| The bidder shall not be under a declaration of ineligibility for corrupt or fraudulent practices or blacklisted with any of the Government agencies |
| Original documents shall be produced for verifications, if required. |

PRICE SCHEDULE (SECTION-D)

IPR Enquiry NO & Date : **IPR/TN/PUR/TPT/ET/19-20/13 DATED 5/7/2019**

From

NAME OF THE CONTRACTOR :

Offer no & date:

| Sl.No | Item Description | Tendered Quantity | Unit of Measurement (UOM) | Rate in INR | | | | Packing and Forwarding Charges Per Unit (In percentage) | | Freight Charges Per Unit (In percentage) | | Insurance per unit (In percentage) | | Remarks |
|-------|--|-------------------|---------------------------|---------------|-----------------|----------------------|--------------------------------|---|--------|--|--------|------------------------------------|--------|---------|
| | | | | HSN Code (*1) | Basic Unit Rate | Discount (in amount) | Basic Unit rate after discount | (in %) Only | Amount | (in %) Only | Amount | (in %) Only | Amount | |
| 1 | Instrument Chassis -PXIe 1084 | 1 | No. | | | | 0.00 | | 0.00 | | 0.00 | | 0.00 | |
| 2 | Embedded Controller -PXIe 8840 | 1 | No. | | | | 0.00 | | 0.00 | | 0.00 | | 0.00 | |
| 3 | Multifunction Data Acquisition Module- PXIe 6355 | 2 | Nos. | | | | 0.00 | | 0.00 | | 0.00 | | 0.00 | |
| 4 | Simultaneous Analog Input Module- PXIe 6368 | 2 | Nos. | | | | 0.00 | | 0.00 | | 0.00 | | 0.00 | |
| 5 | High Speed Control & Interlock Module - PXIe 7856R | 3 | Nos. | | | | 0.00 | | 0.00 | | 0.00 | | 0.00 | |
| 6 | Shield I/O Connector block (SCB) (For all Modules) - Provide list of items separately with technical bid | 1 | Set | | | | 0.00 | | 0.00 | | 0.00 | | 0.00 | |
| 7 | Shielded cable for SCB (For all Modules) - Provide list of items separately with technical bid | 1 | Set | | | | 0.00 | | 0.00 | | 0.00 | | 0.00 | |
| 8 | Other miscellaneous / essential accessories related with PXI system (Provide list of items separately with technical bid) | 1 | Lot | | | | 0.00 | | 0.00 | | 0.00 | | 0.00 | |
| 9 | Logic Processor and Controller - BMEP582020 | 1 | No. | | | | 0.00 | | 0.00 | | 0.00 | | 0.00 | |
| 10 | Power Supply module- BMXCPS3500 | 1 | No. | | | | 0.00 | | 0.00 | | 0.00 | | 0.00 | |
| 11 | Digital Input Module- BMXDDI3202K | 2 | Nos. | | | | 0.00 | | 0.00 | | 0.00 | | 0.00 | |
| 12 | Digital Output Module -BMXDDO3202K | 2 | Nos. | | | | 0.00 | | 0.00 | | 0.00 | | 0.00 | |
| 13 | Analog Input Module - BMXAMI0810 | 2 | Nos. | | | | 0.00 | | 0.00 | | 0.00 | | 0.00 | |
| 14 | Analog output Module - BMXAMO0410 | 4 | Nos. | | | | 0.00 | | 0.00 | | 0.00 | | 0.00 | |
| 15 | 12 slot Ethernet backplane with accessories | 1 | Set | | | | 0.00 | | 0.00 | | 0.00 | | 0.00 | |
| 16 | PLC software License | 1 | No. | | | | 0.00 | | 0.00 | | 0.00 | | 0.00 | |
| 17 | Programming configuration cables (As per requirement) - Provide list of items separately with technical bid | 1 | Set | | | | 0.00 | | 0.00 | | 0.00 | | 0.00 | |
| 18 | Other Accessories (if any) related with PLC system (As per requirement) - Provide list of items separately with technical bid | 1 | Set | | | | 0.00 | | 0.00 | | 0.00 | | 0.00 | |
| 19 | Charges to demonstrate the development, integration, interfacing and commissioning testing on the supplied hardware (and reconfigured applicaion software) | 1 | Job | | | | 0.00 | | 0.00 | | 0.00 | | 0.00 | |

| | | | | | | | | | | | | | |
|----|---|---|-----|--|--|--|------|--|------|--|------|--|------|
| 20 | Other miscellaneous / essential accessories related with software services and system testing (Provide list of items separately with technical bid) | 1 | Lot | | | | 0.00 | | 0.00 | | 0.00 | | 0.00 |
| 21 | Other items (if any) | | | | | | | | 0.00 | | | | |
| a | Optional Item/ Accessories | | | | | | 0.00 | | 0.00 | | 0.00 | | 0.00 |
| b | Optional Item/ Accessories | | | | | | 0.00 | | 0.00 | | 0.00 | | 0.00 |
| c | Optional Item/ Accessories | | | | | | 0.00 | | 0.00 | | 0.00 | | 0.00 |
| d | Optional Item/ Accessories | | | | | | 0.00 | | 0.00 | | 0.00 | | 0.00 |
| e | Optional Item/ Accessories | | | | | | 0.00 | | 0.00 | | 0.00 | | 0.00 |

Place of delivery **IPR Gandhinagar**

NOTES:

- (a) If freight is not shown separately it will be treated as "FREE DELIVERY" (applicable for INR Quote)
- (b) Detailed specifications and scope of work are as per Attached Annexure
- (c) If the rate cells are left blank, it will be treated as "0" (ZERO)
- (e) Kindly enable the Macros if you receive the "Security Warning" message. (Click on options in "Security Warning" and select "Enable this content")

- IMPORTANT NOTES:**
- 1) Custom Duty Exemption certificate will not be issued to any bidder under any circumstances.
 - 2) Prices in this bid format alone are acceptable
 - 3) GST (IGST, CGST, SGST or any form) should not be included in the basic cost (Unit Rate Column) for either goods or services
 - 4) Evaluated total cost on the basis of bid prices will be calculated by Purchaser after bid opening
 - (*1) HSN/SAC Code: For indigenous goods/services, to be filled by the bidder

- 1) QUOTATIONS ARE INVITED IN INDIAN CURRENCY ONLY.
- 2) QUOTATIONS RECEIVED OTHER THAN "INR" QUOTE SHALL SUMMARILY BE REJECTED.

(This need to be printed in Tenderer's letter head)

To
The Purchase Officer
Institute for Plasma Research
Near Indira Bridge
Bhat
Gandhinagar-382428 (INDIA)

Ref: Tender Notice No.IPR/TN/PUR/TPT/ET/19-20/13 dated 5/7/2019

Dear Sir,

I/We have gone through the tendering conditions pertaining to the Two Part Tender and General Conditions of Contracts and Special Conditions of Contracts contained in Section "B" of Form No: IPR-LP-ET-02.V5. I/We hereby agree to supply the stores conforming to the tender specifications and also agree to abide by your General Conditions of all Contracts and Special Conditions of Contract contained in Section "B" of the Tender document.

- You will be at liberty to accept any one or more of the items of stores offered by us and I/We shall be bound to supply you the stores as may be specified in the Purchase Order/Contract.
- I/We hereby agree to keep the price valid for your acceptance for a period of 120 days from the date of opening of Tender (Part-I) of the tender.
- Deviations to technical specifications of the tender documents are detailed in Annexure-A of the tender form while deviations proposed to the General/Special Conditions of Contract are detailed in Annexure "B" to this tender.
- I/We are also uploaded all the leaflets/catalogue, etc. pertaining to the stores offered.

Yours faithfully
Stamp and Signature of the Tenderer