

Government of India
Bhabha Atomic Research Centre
Accelerator Control Division

Ref: ACnD/ACSS/17/519

Date: 27.07.2017

-----TO WHOM SO EVER IT MAY CONCERN-----
Sub: Minor Fabrication job for "Fabrication. Component procurement and assembly of Arc sensing system conforming to technical specification no ACnD/ACSS/RK/TS06 dated 21/07/2017"

Dear Sir/Madam,

1. Quotations are invited for " Fabrication. Component procurement and assembly of Arc sensing system " conforming to technical specification no. ACnD/ACSS/RK/TS06 dated 21/07/2017.
 2. Bidder shall quote for purchase of raw materials, fabrication, assembly, integration, testing and supply of all items and its accessories.
 3. Taxes and Excise Duties shall be quoted separately. Form AF / H whichever is applicable shall be provided, if required.
 4. The quotation must reach The Head, Accelerator Control Division by 16/08/2017 (12:00 PM) and must be sent in a sealed envelope super scribed with the reference number & the due date given above only through India Ordinary Post/Speed Post.
 5. The address on the envelop should read: The Head,
Accelerator Control Division,
1-328S, First floor, Modlab-D
block, BARC, Trombay,
Mumbai - 400 085.
(Kind Attn: Shri R T Keshwani, SO/F, ACnD)
 6. The bidder shall complete the job within 24 weeks from the date of firm work order issued to the bidder. The finished components shall be delivered by the bidder at Accelerator Control Division, BARC, Trombay, Mumbai - 400 085.
 7. Head, Accelerator Control Division reserves the rights to accept / reject any or all quotations without assigning any reason.
 8. Delivery charges if any must be clearly mentioned in the offer. Quotation must also indicate the validity of offer. Quotation must also indicate the VAT no and PAN no of the party.
 9. Drawings / Sketches must be returned along with the offer.
 10. The quotation has to be signed by authorized person with company seal.
 11. Payment will be made by cheque only after satisfactory completion of work on production of bill, delivery challan and advance stamped receipt. It may be noted that IT @ 2% shall be deducted from your bills.
 12. In case of technical clarifications, the suppliers may kindly contact Shri R. T. Keshwani, SO/F, ACnD (Ext No: 022-25593806)
- Encl.: Technical Specification Sheet no: - ACnD/ACSS/RK/TS06 dated 21/07/2017.

R. Keshwani

S. Marhade.
Head EMAS, ACnD

Technical Specification for minor fabrication enquiry

Specification no.	Revision no.	Date of Issue	No of pages
ACnD/ACSS/RTK/TS06	0	21/07/17	06

Fabrication. Component procurement and assembly of Arc sensing system

1.0. Scope of work:

It is required to fabricate, assemble and supply PMT based arc sensing system as per Technical Specifications detailed in annexure II. The job is to be executed as detailed below.

The supplier shall procure all components as per specifications enclosed. The system shall be assembled with the required components as per drawing and inputs provided in this document. Wiring is to be done as per the information in annexure II. The indenting authority shall provide all the necessary details required for the job.

2.0. Mode of execution:

- a) Supplier shall procure each component with specifications mentioned in this document.
- b) Supplier shall assemble components as per drawing/s provided in this document.
- c) The supplier can suggest any changes in drawings to improve overall outcome of assembly process.
- d) Procurement shall be done as per the bill of material.
- e) The components shall be assembled and soldered as per schematic/s provided.
- f) Fabrication costs, component cost and assembly charges of job are to be mentioned separately in the quote.
- g) All the items fabricated shall have onsite warranty for a period of one year from the date of final acceptance against all manufacturing defects.
- h) If required the purchaser along with experts will visit the supplier and evaluate the capability of the engineers employed by the supplier. Supplier must give details of jobs undertaken of similar complexity in the past three years for any organization.
- i) The supplier must give the details of the infrastructure suitable for this job. In case the firm does not have these tools and equipment's but intend to bring them on rent or outsource part of work during the execution of the job then it should be clearly mentioned in the technical quotation.

3.0 Deliverables:

The following items shall be supplied to ACnD, BARC after satisfactory inspection by indenting authority. The packaging, transportation and safe delivery shall be in scope of supplier.

Sr No	Description	Qty
1	PMT along with housing, connector assembly and cable assembly (along calibration chart of PMT)	10 Nos
2	PMT power supplies	05 Nos
3	PMT (along calibration chart of PMT)	02 Nos

4.0 Documentation Requirements:

4.1 Before commencing manufacturing, supplier shall furnish the following for purchaser's approval:

4.1.1 The fabrication drawing shall be submitted for approval either in soft/ hard copy form.

4.2 The supplier shall submit a quality assurance (QA) plan to the buyer for acceptance. The plan shall ensure that each item offered for acceptance conforms to the requirements herein.

5.0 Requirements of supplier qualification:

5.1 Human resources: The supplier must give the details of human resources including Engineers, Draftsman, assembly mechanic, quality control inspector, etc.

5.2 Infrastructure: The supplier must give the details of infrastructure suitable for this job such as electronic testing equipment, etc. Assembly room and other tools & tackles, Inspection facilities etc.

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

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

5.5 Supplier shall have necessary electronic hardware test set up at their facility to carry out the above fabrication and testing.

5.6 Supplier must have previous experience of carrying out fabrication, component mounting and assembly job of similar complexity.

6.0 Requirement of price and delivery schedule:

6.1 The supplier shall give a lump-sum price with delivery schedule

7.0 Confidentiality clause:

7.1 No party shall disclose any information to any third party concerning the matters under this Contract generally. In particular, any information identified as "Proprietary" in nature by disclosing party shall be kept strictly confidential by the receiving party and shall not be disclosed to any third party without the prior written consent of the original disclosing party. This clause shall apply to sub-contractors, consultants, advisors or the employees engaged by a party with equal force.

4.2 . "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 any contractor / sub-contractor, consultant, advisor or the employees of the contractor will invite penal consequences under the aforesaid legislation.

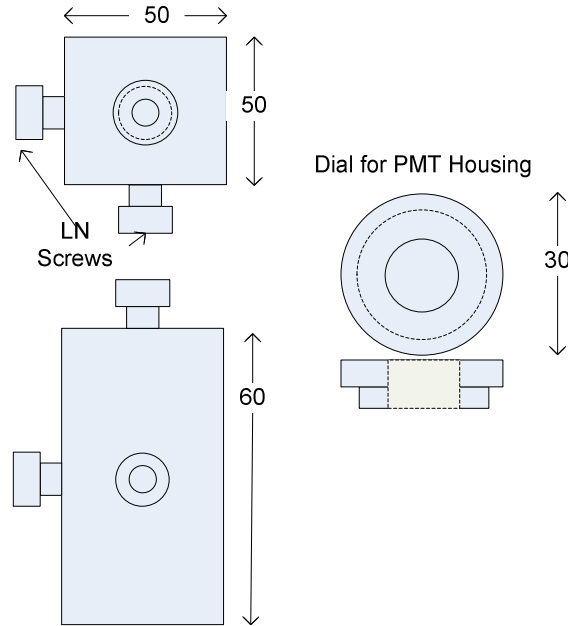
4.3 Prohibition against the use of BARC's name without permission for publicity purpose. The contractor or sub-contractors, consultants, advisors or the employees engaged by a party shall not use BARC's name for publicity purpose through any public media like: press, radio, TV or Internet without any prior approval of BARC (wide circular ref.: 2/Misc- 9/Lgl/2001/92 date 30/04/2001

Annexure II

Technical specifications for fabrication, component procurement and assembly of Arc sensing system

Arc sensing system basically has PMT (Photo-multiplier tube) as sensor. This sensor needs to be housed in aluminium housing fabricated compatible with structure on which it has to be installed. Sensor needs control supply and power supply voltage. These supplies are routed through suitable cable and connector assembly. These supplies are to be provided from stable power supply.

1.1: Housing of PMT: Housing material is aluminium. It has dial for mounting it on target structure.



The dimensions of housing are 60mm height and 50mm by 50mm square cross section.

1.2: Technical specifications of PMT: Typical specifications of PMT are:

Spectral response range: 230-700 nm
Input Voltage: 4.5 to 5.5V
Control Voltage: 1.1V (max)
Cathode luminous sensitivity: 105 $\mu\text{A}/\text{lm}$
Cathode Radiant Sensitivity: 10mA/W
Rise time: 0.57 ns
Dark Current: 1 nA

1.3: Technical specifications of power supply for PMT: It is intended to use multi channel DC Power Supply Power supply shall have isolated, independent, and adjustable outputs in one instrument

- Output a total of 195W of power with two 30V@3A outputs and one 5V@3A output
- Set voltage outputs with 0.06% basic accuracy and current outputs with 0.2% basic accuracy
- Output DC power with less than 5mVp-p noise
- Display voltage and current measurements continuously from all three outputs
- Double output levels by connecting the two 30V channels in series or parallel
- Store frequently used configurations in any of 30 setup memory locations
- Turn off any output after a predetermined test time with each channel's output timer
- Control the supply from a PC with an optional USB adapter

DC OUTPUT RATING	Voltage	Current
Channel 1	0-30 V	0-3 A
Channel 2	0-30 V	0-3 A
Channel 3	0-5 V	0-3 A

MAXIMUM POWER: 195W

LOAD REGULATION: Voltage: $\leq 0.02\% + 4\text{mV}$ & Current: $\leq 0.2\% + 3\text{mA}$

LINE REGULATION: Voltage: $\leq 0.02\% + 4\text{mV}$ & Current: $\leq 0.2\% + 3\text{mA}$

RIPPLE AND NOISE (20Hz-20MHz): Voltage: $\leq 1\text{mVrms}/\leq 5\text{mVp-p}$ & Current: $\leq 6\text{mArms}$

SETTING RESOLUTION: Voltage: 10mV & Current: 1mA

SETTING ACCURACY: Voltage: $\leq 0.06\% + 20\text{mV}$ & Current: $\leq 0.2\% + 10\text{mA}$

READBAC RESOLUTION: Voltage: 10mV & Current: 1mA

READBAC ACCURACY: Voltage: $\leq 0.06\% + 20\text{mV}$ & Current: $\leq 0.2\% + 10\text{mA}$

ISOLATION VOLTAGE, OUTPUT TO CHASSIS: Any output can be isolated up to 240V (DC + peak AC with AC limited to a maximum of 3Vpk-pk and a maximum of 60Hz) relative to the earth ground terminal.

ISOLATION VOLTAGE, OUTPUT TO OUTPUT: Any output can be isolated up to 240V (DC + peak AC with AC limited to a maximum of 3Vpk-pk and a maximum of 60Hz) relative to any other output terminal.

TRACKING AND COMBINATION MODES: Tracking Mode: Maintains the ratio on the two 30V output channels that is present when the control is activated.

1.4: Cable for routing power supply:

Type: Twisted Pair Conductor Multi-Pair , Foil

Number of Conductors 4 (2 Pair Twisted)

Wire Gauge 26 AWG

Conductor Strand 19/38

Conductor Material Copper, Tinned

Jacket (Insulation) Material Polyphenylene Ether, Modified (mPPE)

Jacket (Insulation) Diameter 0.150" (3.81mm)

Shield Type Foil

Length 100.0'

Jacket Color Slate

Ratings UL Style 21460

Features Drain Wire, Rip Cord

Voltage 300V

Operating Temperature $-40^{\circ}\text{C} \sim 80^{\circ}\text{C}$

Jacket (Insulation) Thickness 0.015" (0.38mm)

Conductor Insulation Polyphenylene Ether, Modified (mPPE)

Shield Material Aluminum

Shield Coverage 100%

1.5 Cable connectors: The cable joint from Cable in 1.4 with wires of PMT shall be through connector assembly encompassing following parts:

1.5 a: Four Position Circular Connector Plug:

Connector Type: Plug, Female Sockets

Number of Positions: 4

Shell Size-Insert: 14S-2

Mounting Type: Free Hanging (In-Line)

Termination: Solder Cup

Fastening Type: Threaded

Orientation: N (Normal)

Ingress Protection: None
 Shell Material, Finish: Aluminum, Olive Drab Cadmium Plated
 Contact Finish: Silver
 Features: None
 Voltage – Rated: 200VAC, 250VDC
 Current Rating: 13A
 Contact Finish Thickness: NA
 Operating Temperature: -55°C ~ 125°C

1.5 b: Backshells and Cable Clamp specs:

Olive Connector Cable Clamp: 3/4-20 , 14S
 Suitable for: Circular Connectors
 Type :Cable Clamp
 Cable Opening: 0.438" (11.10mm)
 Shell Size – Insert:14S
 Thread Size:3/4-20
 Cable Exit:180°
 Material:Zinc Die Cast
 Plating: Chromate
 Color: Olive
 Features:Bushing, Clamp Screws

1.5c: Four Position Circular Connector Receptacle:

Connector Type: Receptacle, Male Pins
 Number of Positions: 4
 Shell Size – Insert: 14S-2
 Mounting Type: Free Hanging (In-Line)
 Termination: Solder Cup
 Fastening Type: Threaded
 Orientation : N (Normal)
 Shell Material, Finish: Aluminum, Olive Drab Cadmium Plated
 Contact Finish: Silver
 Voltage – Rated: 200VAC, 250VDC
 Current Rating: 13A

Operating Temperature -55°C ~ 125°C

1.5d: Dust Cap (Cover):

Accessory Type: Cap (Cover)
 For Use With/Related Products: Plug mentioned in 1.5a
 Shell Size – Insert: 14, 14S
 Material : Metal
 Features: along with Metal Chain
 Color: Olive

1.6: Connection of PMT with connector and cable: A 15 metre cable would be terminated on plug. PMT power supply wires would be terminated on socket as per table below:

Socket pin no	Signal	Plug pin no	Remark
1	+5V	1	All wires in all pins to be soldered along with heat shrink sleeve.
2	GND	2	Shield of cable shall be terminated on GND pin
3	+0.8 (Control volatage)	3	
4	GND	4	

1.7 Quantity requirements as per deliverable list:

Sr No	Item	Qty
1	PMT housing as drawing in section 1.1	10 Nos
2	PMT with specifications in section 1.2	12 Nos
3	PMT power supplies as per specifications in section 1.3	05 Nos
4	Cable as per specifications in section 1.4	150 metre
5	Four Position Circular Connector Plug as per specifications in section 1.5a	10 Nos
6	Backshells and Cable Clamp specs as per specifications in section 1.5b	20 Nos
7	Four Position Circular Connector Receptacle as per specifications in section 1.5c	10 Nos
8	Dust Cap (Cover) as per specifications in section 1.5d	10 Nos