



RRMD, BARC
Trombay
Mumbai - 400 085
Telefax : 022 - 25595311

**Government of India
Bhabha Atomic Research Centre
Research Reactor Maintenance Division
Electrical Maintenance Section**

Tender Notice No: RRMD/TN/32/2018 ,

Dated: 09-07-2018

Sub: Supply & Installation Test bench with Instruments as per Technical specifications.

Sealed tenders are invited for and on behalf of the President of India by the Head, RRMD, BARC, Trombay, Mumbai-400085 for the Supply & Installation Test bench with Instruments as per Technical specifications **from vendors those having adequate expertise to execute project as per the following terms and conditions.**

1.0 Description of the work:

- 1.1 Supply and installation of **Test bench** with Instruments as per Technical specifications. The proposal including supply of all materials that may be required for complete execution of the job.
- 1.2 Prior approval of all drawings are required.
- 1.3 Pre-dispatch inspection of material shall be done at supplier site.

2.0 Terms and conditions:

- 2.1 The offer should be valid for consideration for 30 days from due date of the offer.
- 2.2 Contractor should complete the whole job within 6 months after receipt of work order.
- 2.3 On complete execution of the work to our satisfaction, payment would be released on submission of bills in triplicate along with an advance stamped receipt.
- 2.4 The vendor should also clearly reply in his tender to "whether the contractor / vendor has any relative working in BARC or the contractor himself is an ex-employee of BARC or the contractor has any ex- employee of DAE on his payroll".
- 2.5 Since the job has to be carried out at our site Dhruva, BARC, the employees deputed at site by the contractor should have a valid police verification certificate.
- 2.6 Contractor should mention their valid PAN No. and GST No. in the quotation, failing which the offer shall be rejected.

3.0 Instructions to tenderers:

- 3.1 Tenderers should submit documents in support of their technical capabilities.
- 3.2 Price quoted shall be filled up in the same format given in the Schedule-B with GST if any and no other charges will be payable.
- 3.3 Tender shall be submitted in the sealed cover in the vendor's standard company format quoting our Tender no. on the envelope and addressed to 'Head, RRMD, BARC, Trombay, Mumbai-400085 and shall be sent through speed post only to the RRMD office, Dhruva'. The offers should be received at RG office, Dhruva on or before 20 July 2018.
- 3.4 Tenders shall be opened on the same day at 1530 Hrs. in RG office, Dhruva, Trombay, and BARC. For any clarification, Shri Nishant Mishra may be contacted in this regard on phone no. 022-25596225/4310.
- 3.5 The acceptance of the tenders will rest with Head, RRMD who does not bind himself to accept the lowest offer, and reserves to him the authority to reject any or all the tenders received without assigning any reason.
- 3.6 Quotation received after the due date and time shall be summarily rejected.

Thanking you,

Yours faithfully,

S/d

Associate Director, Reactor Group
(For and on behalf of the President of India)

Enclosures: Schedule A & Schedule B

Schedule –A

Tender Notice No: RRMD/TN/ 32 /2018,

Dated: 09-07-2018.

Name of Work: **Supply & Installation of Test bench** with Instruments as per Technical specifications.

Sl. No.	Description	Qty	Unit	Rate
1.	Water	As required	Litre	Free
2.	Electricity	As required	KWH	Free
3.	SMRT 36 Relay test Unit	01	Nos.	Free
4.	Chartless Recorder	01	Nos.	Free

Schedule – B

Tender Notice No: RRMD/TN/32/2018 ,

Dated: 09-07-2018.

Name of Work: **Supply & Installation of Test bench** with Instruments as per Technical specifications.

Sl. No.	Description of items	Unit	Qty (a)	Rate (Rs.)			Amount
				Supply (b)	Installation (c)	Total (d=b+c)	Total (Rs.) (e=axd)
1	Supply & Installation Test bench with Instruments as per Technical specifications.	No.	1				
GST							
Grand Total(Rs.)							
(Rupees _____ only)							

Signature of the contractor with seal

Note: The prices shall be quoted in numerals and words as well inclusive all taxes. All pages of this form shall be signed with seal.

Technical Specifications

Sr. No.	Item Description	Qty.	Units	Specifications	Recommended Manufacturer	Recommended Model/Part No.
1.	Test Bench	1	Nos.	ANNEXURE-1	Pyrotech	Fabricated in AL Extruded frame (Alcosy 30)
2.	Bench top Digital Multimeter	1	Nos.	ANNEXURE-2	Fluke	8846A
3.	Time Interval meter	2	Nos.	ANNEXURE-3	PEA	L105S
4.	Timers- ON/OFF Delay and Sequence time	4	Nos.	ANNEXURE-4	Omron	H5CX-A-N
5.	Impulse Counter	4	Nos.	ANNEXURE-5	Selec	XC22B-4-AR-M1-230
6.	DC power supply	1	Nos.	ANNEXURE-6	Aplab	H0330
7.	DC dual power supply	1	Nos.	ANNEXURE-7	Aplab	LD3205
8.	3-Phase AC Power supply	1	Nos.	ANNEXURE-8	Automatic Electric	8D-3PM120
9.	3-Phase Transformer	1	Nos.	ANNEXURE-9	Automatic Electric	Double Wound Transformer
10.	Annunciator Panel	1	Nos.	ANNEXURE-10	Minilec	MBAS 08
11.	Indication panel	1	Nos.	ANNEXURE-11	Minilec	-----
12.	Digital DC Panel mounted Ammeter (2A/20A)	2	Nos.	ANNEXURE-12	Selec	-----
13.	Digital DC Panel mounted Voltmeter (0-500 VDC)	2	Nos.	ANNEXURE-13	Reputed Make	-----
14.	Multi function 3 ph digital meter	2	Nos.	ANNEXURE-14	Schneider	ION 6200
15.	Barcode printer & Reader cordless	2	Nos.	ANNEXURE-15	Reputed Make	-----
16.	8 Slots Backplane	1	Nos.	ANNEXURE-16	M340 / Schneider	BMXXBP0800
17.	Miniature Relay sockets	6	Nos.	ANNEXURE-17	Reputed Make	-----
18.	Casing of EM Relay	4	Nos.	ANNEXURE-18	Alstom/Areva	-----
19.	Soldering station & De-soldering station	1	Nos.	ANNEXURE-19	Weller	-----

ANNEXURE-1

TEST BENCH

Sr. No.	Parameters	Specification
1.	Test bench	
2.	Size	Approx. 4500 (W) x 1800 (H) x 1100 (D) mm Single Unit (three section in curved shape) as per attached drawing.
3.	General	<p>Test bench should be a free standing structure in Al-cosy 30 Construction System (3 sections each width 1500mm) to facilitate movement and handling ease at site. All instruments will be mounted on the front facia and cabling and termination will be done from back side. Doors are to be provided for access from the back side. The panel is to be designed and fabricated in accordance with the guidelines from the Engineer-in-Charge any changes or modifications to be approved by him from time to time.</p> <p>Relevant drawings to be submitted in hard copy in triplicate for approvals before start of fabrication. The work surface should be provided with anti-static matt.</p>
4.	Material	<p>As per relevant standards mentioned.</p> <p>The Test bench shall be having free standing structure in Al-cosy 30 Construction System with adjustable legs to level the surface of the Test bench</p>
5.	Support structure:	It shall be made of 3 mm CRCA sheet steel. It should be fixed to the Test bench structure and have cut-outs to accommodate the equipments and instruments. The overall dimensions of the work bench should be as per the dimensions given in the drawing. The successful bidder is advised to visit the site discuss & measure the dimensions for preparing layout and fabrication drawings. The fabrication drawing should be submitted for approval of the purchaser before starting the fabrication.
6.	Front facia	The work bench front facia should be fabricated from a single CRCA sheet and there should not be any weld joint on the front facia.
7.	Colour shade	Final paint shade of RAL 9002. The paint shade of the side end covers shall be RAL 5012. Final shade selected is to be approved by the purchaser
8.	Earthing bus bars	Two separate plated copper bars (Panel electrical earthing and Signal reference) with appropriate length. It should also include sufficient number of M4 tapings for termination of earthing cables and

		signal references of instruments.
9.	Top & side	It shall be covered with a 2.03 mm (14 SWG) thick CRCA steel sheet.
10.	Bottom	A Plate of 2.03 mm (14 SWG) thickness should cover the bottom.
11.	Back	Back of the control console should be provided with hinged doors of plate thickness 2.03 mm (14 SWG).
12.	Lifting bolts	Lifting arrangement should be provided to take care of the load of console in safe version.
13.	Cable entry	Provision shall be made at the bottom plate with rubber grommets.
14.	Cable support	Provision shall be made to support the cables internally.
15.	Instrument Mounting	Internal Instrument mounting/support should be flexible to adjust the same. It can be reviewed during execution.
16.	Console Wiring	Wiring inside the test bench should be in a plastic duct/channel. All wires shall be of PTFE. Details of free issue components is given in schedule A and discussed in detail to the successful bidder for preparation of schematic drawings and wiring diagrams. The supplier shall obtain approval of this drawing before beginning of the work.

ANNEXURE-2

Bench top digital meter

Sr. No	Parameters	Specification
1.	Display	VFD Dot Matrix
2.	Resolution	6.5 Digits
3.	V DC	
	Ranges	100 mV to 1000 V
	Max. Resolution:	100 nV
	Accuracy	0.0024 + 0.0005 (% measurement + % of Range)
4.	V AC	
	Ranges	100 mV to 1000 V
	Max. Resolution	100 nV
5.	Accuracy	0.06 + 0.03 (% measurement + % of Range)
6.	Frequency	3 Hz to 300 KHz
7.	Resistance	
	2x4 Wire	Yes
	Ranges	10 Ω to 1 G Ω
	Max. Resolution	10 $\mu\Omega$
	Accuracy	0.010 + 0.001 (% measurement + % of Range)
8.	A DC	
	Ranges	100 μ A to 10 A
	Max. Resolution	100 pA
	Accuracy	0.050 + 0.005 (% measurement+% of range)
9.	A AC	
	Ranges	100 mA to 10 A
	Resolution	100 pA
	Accuracy	0.10 + 0.04 (% measurement + % of range)
	Frequency	3 Hz to 10 kHz
10.	Freq/Period	
	Ranges	3 Hz to 1 MHz
	Accuracy	0.01 %
11.	Continuity/ Diode Test	Yes
12.	Capacitance	
	Ranges	1 nF to 0.1 F
	Max Resolution	1 pf
	Accuracy	1 %
13.	Temperature	
	Type	Platinum RTD
	Ranges	-200 $^{\circ}$ C to +600 $^{\circ}$
	Max. Resolution	0.01 $^{\circ}$
	Accuracy	0.06 $^{\circ}$

14.	Advanced Functions	
	Statistics/Histogram	Yes
	Trend plot	Yes
	Limit Test	Yes
15.	Input Output	
	USB Memory	USB memory drive port
	Real Time Clock	Yes
	Interfaces	RS 232, IEE-488.2, Ethernet, USB (with Optional adaptor)
	Programming	SCPI (IEEE-488.2), Agilent 34401A

ANNEXURE-3

TIME INTERVAL METER

Sr. No.	Parameters	Specification
1.	Type	L 105S, PEA MAKE 5 Digit time interval meter
2.	supply voltage:	230 VAC +/- 10%
3.	Time base Accuracy:	+/- 0.1% with crystal
4.	Accuracy:	+/- 1 COUNT
5.	Input Start	Potential free N/O contact, N/C contact, 2-50VDC, 50-250VDC SYM type.
6.	Stop	Potential free N/O contact, N/C contact, 2-50VDC, 50-250VDC SYM type.
7.	Resolution: 1ms 10ms 100ms	1ms to 99.999S 10ms to 999.99S 100ms to 9999.9S
8.	Dimention:	82mm X 240mm X 230mm (H-W-D)

ANNEXURE-4

TIMER: ON/OFF DELAY AND SEQUENCE TIME

Sr. No.	Parameters	Specification
1.	Type	ON/OFF DELAY AND SEQUENCE TIME
2.	Classification	Standard Type
3.	Power supply voltage *1	100-240 VAC, 50/60 Hz, 12 to 24 VDC/24 VAC 50/60 Hz
4.	Ratings Operating voltage fluctuation range	85% to 110% of rated supply voltage (90% to 110% at 12 to 24 VDC)
5.	Power Consumption	Approx. 6.2 VA at 100 to 240 VAC, Approx. 5.1 VA/2.4 W at 24 VAC/12 to 24 VDC *2
6.	Mounting method	Flush mounting

7.	External connections	Screw terminals
8.	Degree of protection	IEC IP66, UL508 Type 4X (indoors) for panel surface only and when Y92S-29 Waterproof Packing is used
9.	Digits	4 digits
10.	Time ranges	0.001 s to 9.999 s, 0.01 s to 99.99 s, 0.1 s to 999.9 s, 1 s to 9999 s, 1 s to 99 min 59 s, 0.1 m to 999.9 min, 1 m to 9999 min, 1 m to 99 h 59 min, 1 h to 999.9 h, 1 h to 9999 h
11.	Timer mode	Elapsed time (Up), remaining time (Down) (selectable)
12.	Input signals	Signal, Reset, Gate
13.	Inputs	No-voltage Input:
14.	Input method	
15.	ON impedance:	1 k Ω max. (Leakage current: 12 mA when 0 Ω) ON residual voltage: 3 V max. OFF impedance: 100 k Ω min.
16.	Voltage Input:	High (logic) level: 4.5 to 30 VDC Low (logic) level: 0 to 2 VDC (Input resistance: approx. 4.7 k Ω) No-voltage input/voltage input (switchable)
17.	Signal, reset, gate	Minimum input signal width: 1 or 20 ms (selectable, same for all input)
18.	Reset system	Power reset (depending on output mode), external reset, manual reset, automatic reset (depending on output mode)
19.	Power reset	Minimum power-opening time: 0.5 s (except for A-3, b-1, F, ton-1, and toff-1 mode)
20.	Reset voltage	10% max. of rated supply voltage
21.	Sensor waiting time	250 ms max. (Control output is turned OFF and no input is accepted during sensor waiting time.)
22.	Output modes	A: Signal ON Delay I, A-1: Signal ON Delay II, A-2: Power ON Delay I, A-3: Power ON Delay II, b: Repeat Cycle 1, b-1: Repeat Cycle 2, d: Signal OFF Delay, E: Interval, F: Cumulative, Z: ON/OFF-duty-adjustable flicker, S: Stopwatch, toff: Flicker OFF Start 1, ton: Flicker ON Start 1, toff-1:

		Flicker OFF Start 2, ton-1: Flicker ON Start 2
23.	One-shot output	0.01 to 99.99 s
24.	Output	time
25.	Control output	Models with Contact Outputs 5 A at 250 VAC/30 VDC, resistive load Minimum applied load: 10 mA at 5 VDC (failure level: P, reference value) AgSnIn Transistor output: NPN open collector, 100 mA at 30 VDC max., Residual voltage: 1.5 VDC max. (Approx. 1 V), Leakage current: 0.1 mA max
26.	Display method *3	7-segment, negative transmissive LCD Present value: 12-mm-high, between red, green, and orange) Set value: 6-mm-high characters, green
27.	Memory backup	EEPROM (overwrites: 100,000 times min.) that can store
28.	Operating temperature Range	-10 to 55°C (-10 to 50°C if counters are mounted side by side) (with no icing or condensation)
29.	Storage temperature range	-25 to 70°C (with no icing or condensation)
30.	Operating humidity Range	25% to 85%
31.	Attachments	Waterproof packing, flush mounting adapter, label for DIP switch settings

ANNEXURE-5

IMPULSE COUNTER

Sr. No.	Parameters	Specification
1.	DISPLAY Type	7 segment LED; Height: 0.5". Digits : 4.
2.	SUPPLY VOLTAGE	230 / 110 VAC (factory set) 50 or 60Hz.
3.	SETTING	By Push wheel switches
4.	SET POINT	Single set point
5.	RANGE	0 to 9999 counts
6.	OPERATING MODES	a) On delay. b) Interval. c) Auto reset. After completion of a batch, the counter resets automatically after a given duration. (User settable from 0.1 to 5 sec)

7.	COUNTING DIRECTION	Up.
8.	MEMORY RETENTION	30 days memory (M1 type).
9.	INPUTS	a) 3-30 VDC From Proximity Switch, Encoder, Solid State Device, b) Mechanical Switch, Potential Free Contact.
10.	INPUT SPEED RESET	High Speed : 2kHz. Slow Speed : 30 Hz. a) On front panel. b) Via terminals at the rear. c) Auto reset (optional).
11.	OUTPUT SENSOR	2 C/O relay rated at 5 A@ 230 VAC. 12 DC(±10%), 30 mA. SUPPLY (Short Circuit Protected)
12.	TEMPERATURE	Operating: 0 to 50 C.
13.	HUMIDITY	95% RH

ANNEXURE-6

DC POWER SUPPLY

Sr. No.	Parameters	Specification
1.	Make	Aplab, Model : H0330
2.	Output Voltage	12-300 VDC
3.	Current	3A
4.	Metering	3 Digit DPM.
5.	Meter Accuracy	±3 counts.
6.	Ripple & Noise	0.04% rms.
7.	Mode Indication	LED indication for constant voltage / constant current operating mode.

ANNEXURE-7

DC DUAL POWER SUPPLY

Sr. No.	Parameters	Specification
1.	Make	Aplab, Model : LD3205
2.	Output Voltage	0-32V-0-32V
3.	Current	0-5A
4.	Metering	3 Digit DPM.
5.	Meter Accuracy	±3 counts.
6.	Ripple & Noise	0.04% rms.
7.	Mode Indication	LED indication for constant voltage / constant current operating mode.

ANNEXURE-8

AC POWER SUPPLY

Sr. No.	Parameters	Specification
1.	Three Phase AC Power supply	3-Phase AC Power supply 0-460 volt, 8 Amp. Motorise. 120 sec/ full revolution, 8D-3PM120 open/enclosed type.

ANNEXURE-9

THREE PHASE TRANSFORMER

Sr. No.	Parameters	Specification
1.	Three Phase Transformer	3-Phase 415/12 , 3000 VA enclosed type Double wound transformer of Reputed make.

ANNEXURE-10

ANNUNCIATOR PANEL

Sr. No.	Parameters	Specification
1.	Make	Minilec
2.	Model	MBAS 08
3.	Dimension	96 X 96 X76 mm (LWH)
4.	Window	6, small 37X17 mm
5.	Material	16/18G. CRCA sheet Steel
6.	Features	NO/NC Grouping ,RS232/RS485 output
7.	Input signal	Potential free contact
8.	Output	1 No + 1 NC for hooter
9.	Inbuilt push button	4 (test, reset, accept, mute)
10.	Communication	RS232/RS485

ANNEXURE-11

INDICATION PANEL

Sr. No.	Parameters	Specification
	Make	Minilec, Microfacia
1.	Size	144 (L) x 72 (W) x 80 (D)
2.	Window / colour	8, colour red, amber, green, white, blue
3.	Aux Supply	12/24/110 V AC/DC
4.	Input	Potential free contacts or Potential contact

ANNEXURE-12

DIGITAL DC AMMETER

Sr. No.	Parameters	Specification
1.	Digital DC Ammeter	1A , 30 VDC : 1 Nos. 5A , 60VDC : 1 Nos. of any reputed make.
2.	Communication	RS 485 serial channel connection industry standard Mod bus RTU protocol

ANNEXURE-13

DIGITAL DC VOLTMETER

Sr. No.	Parameters	Specification
1.	Digital DC Voltmeter Panel mounted	0-300VDC : 1 Nos 0-60 VDC : 1Nos of any reputed make.
2.	Communication	RS 485 serial channel connection industry standard Mod bus RTU protocol

ANNEXURE-14

MULTI FUNCTION 3 PHASE DIGITAL METER

Sr. No.	Parameters	Specification
1.	Sensing	True RMS, 1 sec update time 4 Quadrant Measurement Power & Energy
2.	Accuracy	Class 1.0 as per IEC 62052-1 1 and IEC 62053-21 Class 0.5S (optional) as per IEC 62052-1 1, 62053-22 and ANSIC12.20 Class 0.2S (optional) as per IEC 62052-11 and IEC 62053-22
3.	Aux Supply	44 to 300 Vac/dc
4.	Input voltage	4 Voltage inputs (V1, V2, V3, VN) 110 or 415 Vac LL nominal(Range 80 to 600 Vac LL)
5.	Input current (Energy Measurement)	Current inputs (A1, A2, A3) 5 A Class 1.0 0.5: 5 mA (Starting) to 6 A* 5 A Class 0.5S 0.2S: 5 mA (Starting) to 6 A 1 A Class 0.5S 0.2S: 1 mA (Starting) to 1.2 A
6.	Overload	5 A meter : 10 A max continuous 2 A max continuous
7.	Burden	0.2 VA max for each phase input voltage and current, 3 VA max on Aux Supply
8.	Frequency	45 to 65 Hz
9.	Resolution	RMS 4 digit, INTG 8 digit
10.	Communication	RS 485 serial channel connection Industry standard Modbus RTU protocol
11.	Isolation	2 kVac isolation for one min between all isolated circuits including communication port
12.	Parameter	V V1 V2 V3 V12 V23 V A A1 A2 A3 PF PF1 PF2 PF3 A Phase Angle A°1 A°2 A°3, VAR VAR1 VAR2 VAR3

ANNEXURE-15

BARCODE PRINTER & READER

Sr. No.	Parameters	Specification
	Barcode printer	Reputed Make(industrial Grade)
	Reader- cordless	

ANNEXURE-16

BACKPLANE OF PLC

Sr. No.	Parameters	Specification
	Backplane	Modicon M340 automation platform 8 slots

ANNEXURE-17

MINIATURE RELAYS SOCKETS

Sr. No.	Parameters	Specification					
		ParamountP14 Sigma 76 R4	LY4N DC24/ Relpol R4	OEN 67 DP	OEN 67 DP	OEN 31 1R/2R	OEN 31 1R/2R
1.	Relay Type						
2.	Contact Type	4 Change over	4 Change over	4 Change over	6 Change over	2 Change over	3 Change over
3.	Contact rating	10A ,24 VDC, 10A,110 VAC (Rest load)	6A ,24VDC, 6A,250 VAC (Rest load)	3A ,24 VDC, 3A / 250 VAC (Rest load)	3A,24 VDC, 3A,250 VAC (Rest load)	10A,24 VDC, 10A,230 VAC (Rest load)	10A,24 VDC, 10A,230 VAC (Rest load)

ANNEXURE-18

CASING OF EM RELAY

Sr. No.	Details of Relay Casing	Specification
1.	CDG 11	ALSTOM/AREVA Make Size : 233 X 170 X 170 mm (H-W-D), 1-D, 10 terminal
2.	VAA 53	ALSTOM/AREVA Make Make Size : 233 X 170 X 170 mm (H-W-D), 1-D, 20 terminal
3.	CCUM 31	ALSTOM/AREVA Make Make Size : 362 X 170 X 170 mm (H-W-D), 1 ½ D, 10 terminal
4.	CDG31	ALSTOM/AREVA Make Make Size : 524 X 170 X 170 mm (H-W-D), 3D Vertical, 20 terminal

ANNEXURE-19

Soldering station & De-soldering station

Sr. No.	Parameter	Specification
1.	Soldering station Make	Weller
2.	Temperature Range	50°C - 450°C
3.	Temperature Accuracy	± 2% of final value (±9°C)
4.	Leakage Resistance	< 2 (Tip to Ground) Ω
5.	Leakage Voltage	< 2 mV (Tip to Ground)
6.	Digital Display	Set & Actual temperatures
7.	Input Supply	230VAC, 50Hz
8.	Desoldering station Make	Weller

Approximated Drawing

