

Supply, Installation, Testing and Commissioning of Data Acquisition System for Digital Inputs and Analog Voltage Inputs and Digital Outputs at a facility in IPRC.

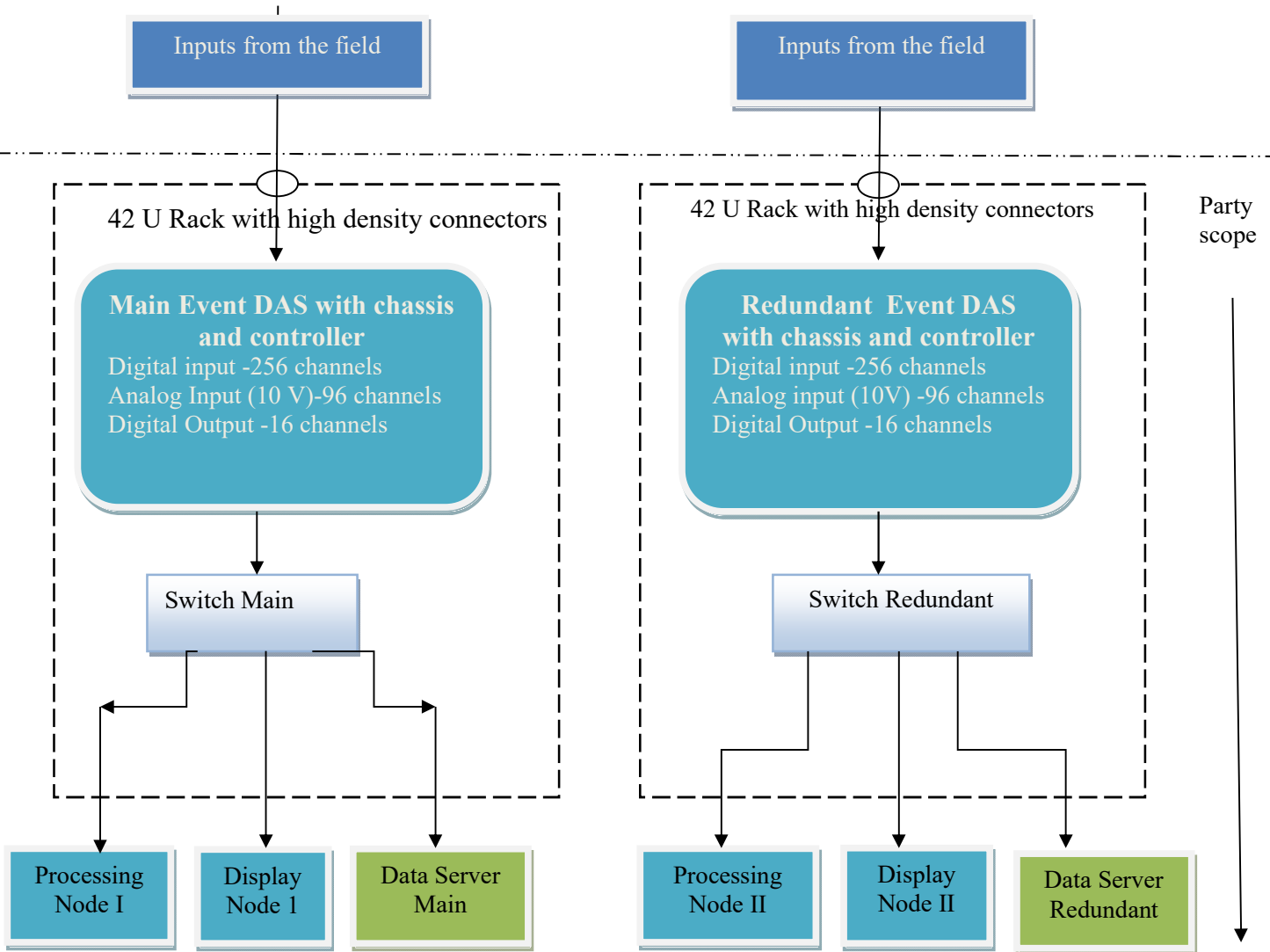
Digital Inputs – 512. (2 x 256 Channel Capacity)
Analog Voltage Inputs (10 V) -192 (2 x 96 Channel Capacity)
Digital Output 32 channels (2 x 16 Channel Capacity)

Scope of Work:

The vendor shall be responsible for the **Supply, Installation, and Testing & Commissioning of Data Acquisition System for Digital Inputs and Digital outputs and Analog Voltage Inputs at a facility along with wired racks (as per the requirements)**. The following table elucidates the details of the measurement systems along with the number of channels in the subsystem:

Sl No	Measurement System	Number of Channels
1	Supply, Installation, and Testing & Commissioning of Data Acquisition for the Digital Inputs The 512 channel capacity shall be in two individual systems, (256 nos main and 256 nos redundant)	512
2	Supply, Installation, and Testing & Commissioning of Data Acquisition for the measurement of ± 10 Voltage levels. The 192 channel capacity shall be in two individual systems, (96 nos main and 96 nos redundant.)	192
3.	Supply, Installation, and Testing & Commissioning of digital outputs channels. The 32 channel capacity shall be in two individual systems , (16 nos main and 16 nos redundant.)	32
All the digital inputs and outputs and Voltage measurement system shall be configurable via proven software. The entire DAS system shall be from a single OEM. The order will not be split and the system shall be integrated as one unit.		

Probable Configuration Of the Analog and digital Event DAS



I. **Specification for Digital Inputs Cards**

The Entire system (Digital Inputs) shall be designed for 512 Digital inputs. (256 in the main event DAS and 256 in the redundant event DAS).

SI No	Specification	Description
1.	No of channels per DI card	≥ 32 isolated Digital inputs channels.
2.	Input Type	24 V – DC
3.	Over Voltage Protection	35 V dc
4.	Sampling Rate	1000 samples / second
5.	Isolation Voltage	≥ 60 V
6.	Input Low Level	< 2 V
7.	Input High Level	> 3 V
8.	Input High current – per channel	< 10 mA
9.	Connectors	To be provided as per the no of input channels.
10.	Quantity	256 in the main event DAS and 256 in the redundant event DAS.

II. Specification for Voltage measurement

The Entire system (Analog Voltage Inputs) shall be designed for 192 Analog Voltage measurements for monitoring the power supply voltage measurements . (96 in the main event DAS and 96 in the redundant event DAS.)

Specification for the 10 V Cards

<i>SI No</i>	<i>Specification</i>	<i>Description</i>
1	Type of input and configuration	Voltage
2	Input Configuration	2 wire - Differential
3	Input Range	± 10 V DC
4	Input impedance	≥ 1 M Ω
5	Input Protection	$\geq \pm 30$ VDC between I/P + and I/P- (for 10 V cards)
6	Gain Stability	≤ 70 ppm / $^{\circ}$ C
7	CMRR	≥ 75 dB DC to 50 Hz
8	Common Mode Voltage	$\geq \pm 30$ V DC (Between Input + and Input -)
9	Filter	2 pole , low pass filter : 10 Hz./Digital filters.
10	ADC	SAR /Sigma Delta.
11	Resolution	16 bits or above.
12	Connectors	To be provided as per the no of input channels.
13	Cross talk	> 80 dB @ 1 kHz
14	Error due to digitizer	$\leq 0.05\%$ FSO
15	Sampling Rate	10 samples to 2000 samples / second - configurable.
16	Quantity	96 Nos in Main and 96 Nos and Redt

III. Specification for the Digital Output – 2 x 16 channel capacity

SI No	Specification	Description
1	No of channels per DO card	8/16 channel capacity
2	Compatibility	Solid State relay
3.	Max Sink current	0.5 A
4	Maximum switching voltage	24V
5	Maximum Update Rate	< 5 millisecond.
5	Power Supply	9-48 V DC
6	Isolation Voltage	≥60 V peak
7	Input Low Level	≤5 V
8	Input High Level	≥16V
9	Quantity	16 Nos in Main and 16 Nos and Redt system

IV. Specification for Controller

SI No	Specification	Description
Chassis		
1	Chassis	Rack mountable / stackable
2	Power supply	230 V AC ±10%, 50 Hz/24V DC
3	LED Indication/ Alarms	Power ON, additional if any
Digitizer		
4	Resolution	16 bit (Minimum)
5	Sampling rate	10Samples / second to 2000 Samples / second – Configurable
Digital Bus		
6	Bus type	PXI/ PXI Express/ LXI/ Proprietary bus with synchronization clock.
7	Port Speed	100/ 1000 MBPS
Environmental Conditions		
8	Operating Temperature	15 °C to 50 °C
9	Storage Temperature	15 °C to 60 °C
10	EMI/ EMC compliances	Required
11	Humidity	95 % non-Condensing

V. *Server with OS – 2 Nos*

<i>SL No</i>	<i>Parameter</i>	<i>Specification</i>
1	CPU	Intel Xeon gold processor. (2 processor sockets) Processor speed 3 GHz or more.
2	OS	PRELOADED WINDOWS SERVER- 2022 64 bit version or latest , Red hat linux or compatible for the application software.
3	Memory	Min :12 DDR4 DIMMS 64 GB RAM.
4	PCI slots	6 PCIe 3.00
5	HDD	1TB SSDs for OS in Raid 1 32 TB OR more in raid 6. 3.5” or 2.5“ Hot swap SATA/SAS 6Gb/s Server class HDD
6	RAID Controllers	PERC S130(SW RAID) / PERC H 330/ PERC H330/PERC H730/ PERC H730P/ PERC H740P or latest The OS shall be installed with RAID 1. The data shall be stored in RAID 6 mode.
7	Networking features	TCP/IP (IPv4/IPV6) VLAN 802.1Q Port trunking DHCP Client CIFS/SMB, AFP/Netatalk3.2, NFS FTP, SFTP(admin),Telnet, Windows Server or higher & Linux server support
8	Interface requirement	4 x RJ45 10/100/1000Mbps (GbE) Ethernet ports 2x USB 3.0 2x USB 2.0 1x SATA
9	Backup management features	Facility to backup and restore system configuration Instant, scheduled backup management Real time backup of server& clients Support to third party backup software. Support to data backup using USB/eSATA storage devices
10	Expandability	Support to connect external USB hard disk drives. Read /write on FAT 32, NTFS, ext2/ext3/ext4 or HFS +formatted drives
11	Operation system support	Red Hat Linux, Windows OS (Server 2016/2019 or later.Novel SUSE Linux enterprise server. Vmware V sphere ESXi
12	Power supply	Input 100-240v AC, 50-60 Hz with redundancy
13	FAN	1x quiet cooling fan or more.
14	Form Factor	Tower
15	Cache	16/18/12/22 MB
16	Accessories	27 inch monitor (2 nos) Wireless keyboard and mouse. (2 nos) Indian power chord CD / Manuals LAN Cable and all other items required as part of installation
17	Operating temperature	0 – 50°C

VI. Processing System 2 Nos and Display Systems 2 Nos with Operating System

SL No	Parameter	Specification
1	Processing node PC	i-7 with 13th generation or latest processor or equivalent
2	RAM	16 GB RAM
3	HDD	2TB HDD
4	Standard features	DVDRW, network interfaces, USB keyboard, mouse and other standard features
5	Display	LED display of size 27" or better with standard configuration
6	OS	Windows 10/ OS compatible with your proprietary software.

VII. Specification of Multipin connector

- Type of connector : Heavy duty connector with rectangular hood for rack mounting
- No of contact in connector : atleast, 72 or more
- Rated voltage :250V
- Rated current :10A
- Insert Insulation resistance :>10GΩ
- Insert Insulating Material : Glass fibre reinforced PC
- Contact resistance : <5mΩ
- Contact material : copper alloy
- Contact Surface : Gold coated 0.8 μm gold on 2 μm nickel
- Connection type : crimp type
- Crimp cable connection : from 26 AWG wire to 14 AWG stranded wire
- Connector standard: DIN EN61984 or equivalent
- Hood and Cable entry: Male insert in hood, side way in the hood with M32 entry and thread
- Hood IP protection: IP65
- Base : Bulk head housing with female pin inserts
- Base mounting : screw type
- Detailed drawings are to be provided with quote, suitable crimping tool and remover tool also required.

Sl.No	Type	Quantity(Nos)
1	Connector	As required for the Commissioning of the DAS.

VIII. Specification of 42 U Single Rack

Size	Dimensions	Qty
Single Rack	Height : 42 U Width : 600 mm Depth : 800 mm	As required for the Commissioning of the DAS.

1. The Rack shall conform to DIN41494(Standard of the Rack dimension)
2. Frame: Aluminium extruded profiles
3. Vertical 45 W x 70 D x 1000H (in mm) (minimum)
4. Horizontal 4 Nos. on Top & 4 Nos. Bottom-Total 8Nos(minimum)
5. Front & Rear – 510W x 1060H x 25D(in mm) (minimum)
6. Side – 25 W x 1060 H x 660 D (in mm) (minimum)
7. Shall Conform to the specification of 7604 & 7588 IS-1285-1975
8. Aluminium / Steel extruded frame along with side, top and bottom panels in steel.
9. Bottom panel with gland plate for cable entry.
10. Lockable front door made of toughened tinted glass of 4mm Thick, Steel frame of 18 Gauge CRCA sheet. CRCA of “IS 513 Gr D” Standard.
11. Side panels with slam latches vented top cover made of 18 Gauge CRCA Sheet Louvered.
12. 19” Mount for equipment mounting channels made of 14 Gauge CRCA sheet and to comply the specifications in IS513-CRCA. Fully adjustable 19”equipment mounting angles.
13. Cross support to be made up of 14Gauge CRCA sheet comply the specification in IS-513-CRCA.
14. Base frame to be made up of 13 Gauge CRCA sheet and to comply the specifications in IS-513-CRCA.
15. Maximum Load rating of 1500 kg.
16. Panels and doors to be powder coated with Light grey EPOXY/Antiflame
17. property -550 C spcified in RAL 7035 Lgrey OR RAL 9005 (Black)
18. Frame to be made of Aluminium extrusions powder coated Specified in RAL
19. 7037 Grey OR RAL 9005 (Black).
20. Equipment support angles to be made of 14 Gauge CRCA sheet as specified in IS-513-CRCA.
21. Earthing continuity kit to be provided.
22. AC Mains channel (Horizontal mounting) to be provided.
23. Rear Steel door to be provided with a lock facility made of 18 Gauge CRCA sheet and to comply the specifications of IS-513-CRCA.
24. Front and rear holed profiles for mounting equipment supports to be provided.
25. 100 mm Height Base frame 600 * 800 mm to be provided.
26. The Single rack (42 U), 19 “ shall have standard accessories such as
27. Door,glass,(front) 600w, 42u, door vented(rear) , door steel, hex-prf 600w, 42u, fan housing unit, fan 230vac/ 24 v , earth continuity kit, base frm,600mmw x 800mmd,

blinking panel 19", 1u, m.s (4nos) , blanking panel 19", 8u, m.s (4 nos) , equipment mounting shelf 575mm depth, pdu with 12 sockets each of 5 amp, led light at front.

28. Accessories per rack as per the standard list.
29. The base plinth which includes the supply of 4 levellingfeet, assembly parts etc .
30. Rail Systems
31. All the rails required for interior installation
32. Base configuration Rail
33. Mounting Flanges
34. Support Strips
35. System support rails
36. C rails
37. Cable clamp rail
38. Side panel Lockable
39. Side panels shall be perforated
40. Fan mounting plate
41. Base mount
42. Gland plates
43. Air Baffle plates (Optional)
44. 1U filler plate : 4 Nos
45. 2U filler plates: 4 Nos
46. 3U filler plate : 4 Nos
47. 4U filler plates: 2 Nos

IX. ***Specification Network Switches (2 nos)***

1. The switch shall be a layer 2 or above managed switch.
2. No of copper ports : 24 ports or more.
3. Copper port speed: 1Gbps
4. Fiber ports : 2 nos of 10G SFP+ port with modules
5. Basic protocol supported: IPv4/6 , RIP v1/v2, OSPF v2/3, 802.1Q VLAN .
6. Management Protocol supported : HHTP/HTTPS/SSlv3, Telnet, SSH V1/v2, local serial port, SNMPv1/2/3, Rmonv1/2, LLDP, NTP ETC.
7. The processor shall be of ARM v7 800 MHz or higher.
8. Memory supported : DRAM 512 MB, Flash memory 256 MB.
9. Forwarding bandwidth :
 - ✓ FE: >6 Gbps
 - ✓ 1G: >24 Gbps
 - ✓ 10G: >60 Gbps
10. Switching bandwidth:
 - ✓ FE: >12 Gbps
 - ✓ 1G: >50 Gbps
 - ✓ 10G: >= 128 Gbps
11. Operating Temperature : 0 to 50 degree C ,

X. System Requirements :

The Data Acquisition system should be designed and implemented with the following features:-

1. Data Acquisition System Chassis shall accommodate all the types of Functional Input Modules (Digital Inputs ,Voltage Acquisition and Digital Outputs).
2. Provision for card wise variable sampling rate.
3. DAS should amplify, acquire and log the test data at correct sampling rate with Time Synchronization.
4. Synchronization scheme between multiple chassis and systems shall be provided.
5. On-line monitoring of parameters such as statuses and Voltage monitoring shall be possible.
6. Processing of acquired data in such a way that the data is presented sequentially. Sample data is attached.
7. Digitized data to be stored in Local controller in the chassis hard disk and in the Data server.
8. All hardware used shall be modular and expandable. Diagnostic indication features such as fault LEDs, health LEDs, status LEDs to be provided (Optional).
9. According to the functional requirements, if additional accessories like Chassis/ Controllers/ Software are required, the same is to be supplied.
10. Easy and flexible capability for future expansion with either the Digital Input or Output cards or Voltage Cards shall be possible.
11. Complete data acquisition, storage, processing, data print out format and analysis software package shall be supplied along with the item. Templates are annexed for reference .
12. The system configuration and capacity should be able to acquire and store required channels at the required sampling rate for a continuous duration of at least 12 hours, with multiple files for processing.
13. Data shall be transmitted in real time to other acquisition system / Control system for integrated display purpose in that system.
14. Data format for OPC interface to be provided.
15. The source code for UDP data transmission to interface with other data acquisition systems / control system is to be provided.

XI. *Software Requirements :*

Configuration Settings

1. The acquisition software shall be capable of scanning the selected user required channels at user required sampling rate.
2. Channel legend, description, gain, and filter settings, type of voltage input / output ranges, shall be selectable.
3. Logging of set configuration in notepad or in spread sheet format or in built formats.
4. All configuration setting changes shall be done through system, controller. Provision shall be available for remote control from control room.

Acquisition Software:

1. The acquisition software for acquisition of the field process parameters and should continuously store the acquired data.
2. Acquisition shall start on receipt of a TTL level trigger signal or from keyboard from function keys.
3. The acquisition software shall be capable of being operated with acquisition ON/OFF and file writing ON/OFF.
4. The acquisition software shall be remotely operated from Control room in remote node.
5. Acquired data to be transmitted to server through TCP – IP for storage and display. Data shall be stored in controller hard disk and in server (Multiple file creation based on size and manual selection).
6. The software shall be capable of accepting input channel wise legends, description , units , and first and fourth order calibration data constants for Engineering Units (EU) Conversion.
7. Linux / Windows operating system environment
8. Configuration shall be stored in the controller and even after rebooting the entire system , the set –up shall be available.

Server Software:

1. Server software to be installed for storage of received data from data acquisition system.
2. Engineering unit conversion for numeric display and trend graph display.
3. Data transmission through TCP-IP/multicast UDP packets for display.
4. Provision for simulation of the display / Trend graph for parameters.

Online Display:

1. The online display shall be provided to all the client nodes.
2. The online display may be of graphical and numeric form.
3. The graphical display shall start with trigger signal or based on time from an Ethernet based countdown clock.

4. The graphical display shall have different scales for each parameter and shall have four parameters per screen.
5. The graphical change over to different screen shall be by timing reference or by keyboard control.
6. The numeric and graphical display shall have the option of for the colour change when threshold limits are reached.
7. Graphical display with predicted graph at background (Lower and upper boundary values shall be accepted as input from excel file format).

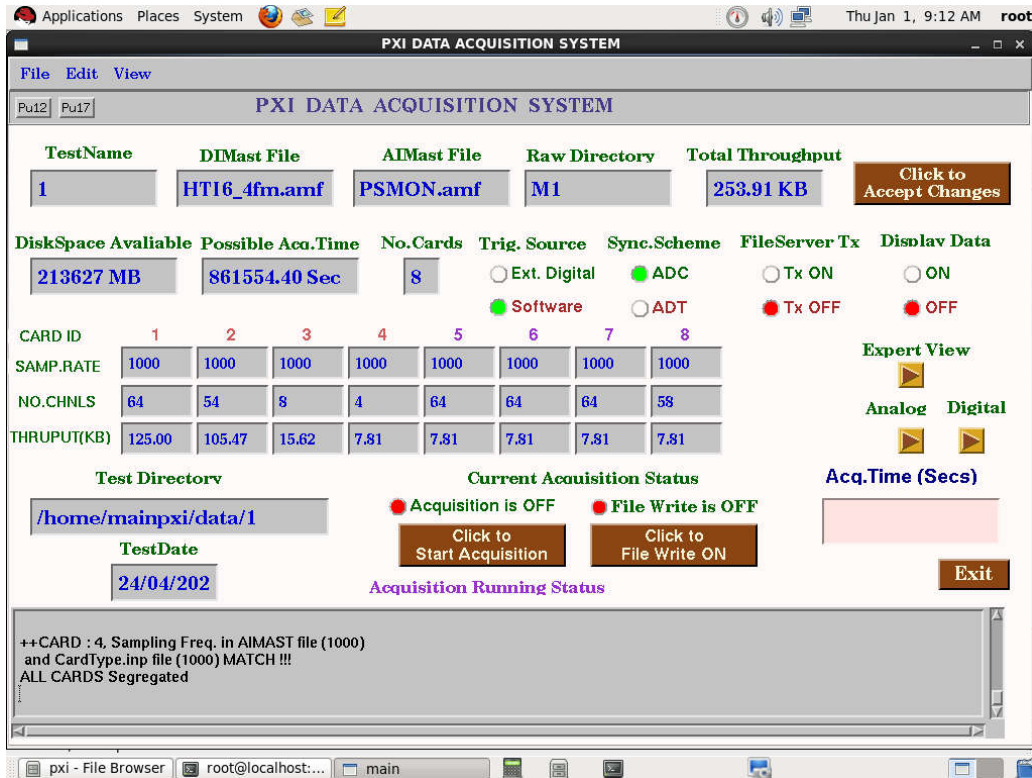
Off-line processing:

1. Offline processing of selected channels in EU or voltage with selectable averaging, printing intervals and time offset correction. The file shall have optional header and stored in DAT format.
2. Each plot and data files with optional headers & footers.
3. Data shall be stored in server for data archival and analysis.

General Terms:

1. Installation, commissioning and demonstration of the system along with software applications at IPRC, Mahendragiri shall be by the supplier.
2. All software packages for acquisition, online display, offline analysis shall be provided.
3. Necessary interface and DLL shall be provide for installation.
4. Training program on the entire DAS software operation shall be provided to our operators at our site during installation and commissioning.
5. Necessary interface cables (LAN / 2 core / Low noise) to be supplied along with the system.
6. All accessories required for system installation and commissioning shall be supplied.
7. All documents, data sheets, catalog; software packages shall be in English.
8. Accessories: Mating connectors- BNC connectors for the Voltage DAS, and relevant connectors and pins as required for the Digital Input / output modules shall be provided.

Sample Data Acquisition Software



Sample Data

ISRO PROPULSION COMPLEX
MAHENDRAGIRI

TEST NAME : HS-03
 TEST DATE : 06-04-2023 HS-03 HOT TEST DATA
 253

Time	Legend	status	
-361.020000	Gim_ema_act_ON_ICM		ON
-355.430000	Gim_ema_act_ON_ICM		OFF
-146.810000	VHPP_CLOSE	ON	
-146.810000	VSPP_CLOSE	ON	
-119.910000	PLC_Athori	ON	
-119.910000	PXI_MSync_Auto		ON
-119.910000	DeweSync_Auto	ON	
-119.910000	PXI_FSSync_Auto		ON
-119.910000	Video_Sync_Auto		ON
-119.910000	PVP101_ManCMD	OFF	
-119.910000	PVP102_ManCMD	OFF	
-119.910000	PVP107_ManCMD	OFF	
-119.910000	PVP108_ManCMD	OFF	
-119.910000	PVP201_ManCMD	OFF	
-119.910000	PVP202_ManCMD	OFF	
-119.910000	PVP207_ManCMD	OFF	
-119.910000	PVP208_ManCMD	OFF	
-119.910000	PVP904_ManCMD	OFF	
-119.910000	PVP905_ManCMD	OFF	
-119.910000	PVP101_AutoCMD		ON
-119.910000	PVP102_AutoCMD		ON
-119.910000	PVP107_AutoCMD		ON
-119.910000	PVP108_AutoCMD		ON
-119.910000	PVP201_AutoCMD		ON
-119.910000	PVP202_AutoCMD		ON
-119.910000	PVP207_AutoCMD		ON
-119.910000	PVP208_AutoCMD		ON

General Requirements:

1. Detailed drawings, product catalogues, data sheets from the principal, shall be submitted along with the offer. The drawing shall include: Internal cabinet wiring drawing, Inter cabinet wiring drawing, Software functional drawings. The Vendor shall furnish all the manuals necessary to test, operate, maintain and troubleshoot the system.
2. The test reports and calibration reports of all the data acquisition modules , chassis, and data acquisition systems shall be submitted along with the tender.
3. All the updates / upgrades/ hardware upgrades/ software patches / shall be provided free of cost at the time of installation, testing and commissioning.
4. For the data acquisition system, the size of the memory shall be sufficient for storage of the program, instruction required by the control schemes. Offer shall indicate the amount of memory occupied by the actual program, and 90 % spare memory space, shall be provided at the time of handover of the system to the Department. It shall be possible to log all measured parameters.
5. Output contacts shall be potential free / dry contacts.
6. Any kind of accessories for the commissioning shall be supplied.
7. The system shall have modular construction and shall be expandable in the future for any additional measurement modules, which are to be synchronized with the existing system without any clock latency. (expandable upto 512 measurements)
8. The system shall have a warranty of 2 year, during the warranty period, any defective/ faulty item / unit shall be replaced free of cost.
9. Under any circumstances, the principal shall be responsible to resolve any problematic issues related to required / specified performance of hardware and /or software.
10. Transient/ Static / EMI / RFI protection: The system shall be internally protected against system errors and hardware damage resulting from Electrical Transients on power / signal wiring. The system should be able to prevent noise errors due to Electromagnetic Interference (EMI) or Radio frequency interference (RFI), including nearby radios, electrical storms, solenoids, relays. Corresponding technical compliance certificates shall be provided with tender.
11. **Non Comprehensive AMC** : The vendor shall quote separately for the Non comprehensive AMC for a period of 3 years after the expiry of warranty period with minimum 3 visits per annum (Quarterly). The supplier shall depute 2 engineers / supervisors to ensure the healthiness of the system / to attend to any faults in the system/ software / hardware / module etc. The supplier shall attend to any fault/Breakdown in the system during the AMC period within 24 hours and the system shall be made operational within the time. No deviation in rates is permissible at a later stage. The AMC cost quoted will be considered in the cost comparison of this tender. Department reserves the right to place a Separate Order for the AMC and the rates quoted in this order are binding on the vendor.
12. **Spare** : The vendor shall quote separately for the spares of the DI cards (1 channel/ 1card), Voltage Cards 10 V(1 Channel/1 card) , DO card (1 Channel / 1 card) and Controller and chassis (1 no each) . The rates quoted under the spares shall be binding for the 3 years (post warranty) irrespective of the quantity ordered in the future. The spare cost of any other component shall also be mentioned separately. The spare cost quoted will not be considered in the cost comparison of this tender.
13. **Operational Support shall be extended for a 1year from the date of commissioning.**

Note : Any of the cost elements shall not be included in the technical offer. The price elements should not be disclosed in the technical offer and if disclosed the quote shall be invalid.

XII. GENERAL INSTALLATION, TESTING & COMMISSIONING REQUIREMENTS

1. The vendor shall depute a team of experienced Engineers / Technicians, and other staff for the purpose of installation, pre-commissioning, and commissioning of the system at site.
2. The vendor shall depute an Engineer/Technician, at site, for system support and maintenance, for a period of 1year,after the system delivered, commissioned and made operational.
3. All internal and inter cabinet wiring shall be ferruled with permanent markers bearing identifications that can be cross referenced with appropriate documentation. Colored ferrules shall be used with proper coding philosophy, as per facility requirement.
4. All erection hardware and consumables like nuts, bolts, primers, paints, cable glands, grommets etc shall be supplied by the vendor for proper installation.
5. All the components shall be checked for proper functioning.
6. The following site acceptance tests shall be carried out:
 - ✓ Hardware verification as per the bill of material.
 - ✓ Visual and mechanical check up for proper workmanship, ferruling, identification etc.
 - ✓ Demonstration of all system diagnostics.
7. The grounding scheme shall be followed as per extant IS standards, and the necessary parameters like Earth Resistance, Neutral to Earth Voltage etc, to be demonstrated at the time of Installation, Testing and commissioning for the entire system.
8. The training imparted by the vendor shall include Training on different hardware components, software, maintenance training on the individual instrument being supplied, training on the operation of the entire system as per functional requirement.
9. Site acceptance tests shall be carried out by vendor, as per the facility requirement, after the delivery.

Rack

1. All the wiring and installation shall be done by the vendor under the supervision of department engineers with proper approvals.
2. Each cabinet shall be of maximum 2100 mm height, 600 mm width and 800mm depth. Construction shall be modular preferably to accommodate 19” standard electrical racks. All racks shall be of same height. Maximum swing out for pivoted card racks doors and drawers shall be limited to 600 mm.
3. All cabinets, panels & racks shall be designed to avoid congestion for ease of maintenance. Additionally the rack / cabinets shall be designed as per following guidelines.
4. All spare cores shall be terminated on the rack. No cable / core shall be left un-terminated in the rack / cabinet.
5. No terminals or terminal strips shall be located on the side panel of the rack / cabinet.

6. Vendor shall supply and install all interconnecting cables which shall include but not limited to the following :
 - Cabling between racks, PLC, DAAS etc.
 - Power supply cabling to all system components from Power distribution cabinets
 - Earthing cables of IS ground, Signal ground, cabinet body ground, system consoles, and peripherals inside control room.
 - Vendor shall support networking of the system in the existing network, as per facility requirement
 - Interconnections shall preferably be done preferably with the help of pre-fabricated cables with plug-in connectors at both ends.
7. Following tests shall be performed by the vendor and report shall be forwarded to the Department
 - Quality control tests shall be carried out to assure quality of all components and modules in accordance with vendor's quality control and assurance procedures.
 - Vendor shall forward the details of these procedures for Department's review.
 - System pretest which shall be physical check of all subsystem components, modules and racks.
 - System Power-up test which shall functionally check the systems hardware and software including diagnostic software at sub-system level by stimulating the input.
 - All cabinets / racks / enclosures shall be labeled in front and rear for easy identification. All cabinet, console, rack, terminal etc labels shall be engraved plastic laminate (white background with black lettering) fixed with self tapping screws.
8. The following engineering drawings shall be prepared by vendor and submitted for approval to the department :
 - Rack drawings
 - I/O Assignment details
 - Internal Cabinet wiring drawings
 - Inter-cabinet wiring drawings
 - Peripheral connection wiring drawings
 - Software functional diagrams
9. Loop wiring diagrams, containing full information of each loop (one drawing per loop) including field termination, cables numbering, rack number, device address code, power supply connections
10. After placement of purchase order, vendor shall submit certified drawings and specification sheet for each instrument and its accessories which shall include the following, as a minimum :
 - Configuration diagram
 - Detailed dimensional drawings of internal components
 - Power consumption in volt-amperes
 - GA (General Arrangement) drawings
 - Rack layout including physical I/O module locations.
 - Input / Output (I/O) assignments
 - Wiring drawings for system cabinet & racks.

- Bidder shall be fully responsible for proper engineering, integration, installation, performance and operation of all equipments including I/O and racks and bought out items supplied by them as per the requirement.
11. Heavy duty multi pin Connectors: 108 pin high density Connector spec to be attached. To be wired and rack end and the also suitable mating connectors are to be supplied by the party.

Pre Qualification Criteria

Pre Requisites. (Pre - Qualification Criteria)

1. Only manufacturer / Authorized distributor / authorized system integrator shall quote for the tender.
2. Distribution / system integrator shall enclose authorization reference letter from original equipment manufacturer (OEM).
3. The vendors shall enclose detailed technical specification clearly indicating the model number, part number of the items quoted. The vendor shall also enclose printed catalogues for all the items along with the tender.
4. Technical compliance statement for all indent specification shall be provided with actual specification from the catalogue. The vendors are advised not to quote vaguely in the technical compliance statement.
5. If any specification is not clearly specified or available in manufacturer datasheet, then Manufacturer test report from factory / approved labs shall be enclosed.
6. The product quoted shall be standard catalogued items and should be in the market.
7. The party shall provide detailed reference of installation of same type of systems with Purchase order / documentary proof.
8. The parties shall comply with all the above mentioned points failing which the offer will be rejected.
9. A single supplier/ manufacturer/ authorized distributor / authorized system integrator shall supply the system within the stipulated time. The order will not be split for the different Data acquisition systems.
10. Proven Track Record (PTR) requirements : The vendor shall have presence in India for a period of minimum 7 years as Analog and Digital Event Data Acquisition system supplier with expert manpower for support and shall have supplied a similar type to a Govt Sector / PSU Unit with critical application. The offered system shall have proven track record of successful operation for minimum 1 year, and end user certificate shall be provided from the user. Vendor shall provide the supporting documents for the same along with the Technical Offer. The quoted item shall be standard and field proven system.
11. Make in India Content Declaration to be provided.
12. The vendor shall have supplied atleast 100 channel Data Acquisition System (Analog Voltage Channels / Digital Input /Output Cards). The Vendor shall provide the supporting documents for the same along with the Technical Offer.
13. The vendor shall provide the details of Purchase Order for the offered models of Analog and digital Data Acquisition System supplied to Government Bodies / PSUs in the last 7 years. With one of the following criteria
 1. Single order value of 80 lakhs /
 2. Two orders of value of each 60 lakhs /
 3. Three orders of value of each 40 lakhs /

Bill of Material

<i>Sl No</i>	<i>Measurement System</i>	<i>Number of Channels</i>
1.	<i>Supply, Installation, and Testing & Commissioning of Digital Input channels</i>	<i>512 (2 x 256)</i>
2.	<i>Supply, Installation, and Testing & Commissioning of $\pm 10 V$ Voltage Input Channels</i>	<i>192 (2*96)</i>
3.	<i>Supply, Installation, and Testing & Commissioning Digital Output channels</i>	<i>32(2*16)</i>
4.	<i>Supply, Installation, and Testing & Commissioning of all the above mentioned systems in racks and necessary heavy duty connectors</i>	<i>As required for the above mentioned systems.</i>
5.	<i>Connectors</i>	<i>As required for the above mentioned systems for all the channels (4 sets as spare apart from the requirement for realizing the system)</i>
6.	<i>Data Acquisition system , software , peripherals</i>	<i>As required for the above mentioned systems.</i>
7.	<i>Server and Accessories</i>	<i>2 servers + 2 display nodes + 2 processing nodes.</i>
8.	<i>All the accessories , interconnectors, ferrules, cables ,), nuts, bolts, din rails (if any) and all the items required for making the system operational including spares.</i>	<i>As required for the above mentioned systems.</i>
9.	<i>AMC quote to be provided.</i>	<i>Pl refer detailed specification mentioned above.</i>
10.	<i>Spare Cost to be provided.</i>	<i>Pl refer detailed specification mentioned above.</i>

11. *Note : Department reserves the right to finalize the bill of material as per site conditions. As far as possible , detailed cost split up of items (DI cards , DO Cards, Voltage cards , chassis, controller , AMC , rack , server, display nodes, switches , connectors ,software and the spare cost shall be explicitly mentioned in the price bid .*
(No price shall be mentioned in the Technical Offer)
The tender is a two part tender and mention of price in the Technical offer will deem the offer invalid.
Vendors are advised to quote technical and commercial terms separately.

Delivery Schedule

Sl No	Schedule	Acceptance
1	Placement of Order (T1)	
2	Detailed engineering drawings (T2) - (to be provided within 8 weeks from T1)	
3.	Supply Installation , Testing and commissioning of all the items including connectors racks, connectors and all the Data Acquisition system and making the system complete operational of to be provided within 24 weeks from T2 (T3)	
4.	Operational Support (1 year from the end of T3)	