



तेजपुर विश्वविद्यालय / TEZPUR UNIVERSITY  
(केंद्रीय विश्वविद्यालय / A Central University)  
कुल सचिव का कार्यालय / OFFICE OF THE REGISTRAR  
तेजपुर-784028 :: असम / TEZPUR-784028 :: ASSAM

**NOTICE INVITING QUOTATION (NIQ)**

**ET-NIQ-4418...DT-21/12/2019**

Online Tenders in 02 Bid System (Technical and Financial) are invited from reputed manufacturers/authorized dealers/vendors for supply, installation & commissioning etc. of the following items required for the AICTE Research Project of Dr. P.P.Dutta, Department of Mechanical Engineering, Tezpur University.

Please read the NIQ document carefully before participating. It shall be deemed that submission of bid by the bidder has been done after their careful study and examination of the NIQ terms with full understanding to its implications. Any lack of information shall not in any way relieve the bidder of its responsibility to fulfill its obligations under the Bid.

The University will reject a proposal for award if it determines that the bidder recommended for award has engaged in corrupt or fraudulent practices in competing for, or in executing, the Purchase Order. Fraudulent Practice means a misrepresentation of facts in order to influence a procurement process and includes collusive practice among bidders (prior to or after Bid submission) designed to establish Bid prices at artificial non-competitive levels and to deprive Tezpur University of the benefits of free and fair competition. Corrupt Practice means offering, giving, receiving or soliciting of anything of value, pressurizing to influence the action of a public official in the process of this purchase execution.

For any queries/doubt please contact the Stores & Purchase Section (e-mail: snp@tezu.ernet.in).

**Items:**

Sl. No	Item	Approx Quantity	Approximate Unit Value in ₹
1	Automatic weather station technical specification of the sensors	01	2.0 lac
2	Data logger with thermocouples (Data Acquisition and Switching)	01	1.50 lac
3	Thirty-two Channels Data logger	01	1.0 lac
4	Cloud Digital data logger (Hygrometer)	01	1.0 lac
5	Digital data logger Hygrometer	01	1.0 lac
6	Pyranometer (All season heated)	01	1.0 lac
7	Orifice Meter (Gas Flow Meter)	01	0.75 lac
8	Rotameter	01	0.60 lac
9	Vortex Flow meter transmitter/Rotameter	01	0.75 lac
10	Pitot Tube with transmitter	01	0.70 lac
11	Micro-manometer / Multifunction meter	01	0.70 lac

**(Detail Technical Specification/Compliance Sheet and BoQ are attached/uploaded separately)**

**General Information about the NIQ**

Last date and time for submission of Bids: 20.01.2020 (2.00 PM)

Date and Time of opening of Bids: 22.01.2020 (4.00 PM)

Place of Opening of Bids: Tezpur University

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**GENERAL TERMS & CONDITIONS:**

1. No separate tender paper will be issued from the office; one should only download the specifications from the CPP Portal of Govt. of India or the Tezpur University website ([www.tezu.ernet.in](http://www.tezu.ernet.in)).
2. **GST: As per GoI Notification dated 14.11.2017 GST % for Public Funded Research Institution or a University has been reduced to 5% for certain goods and services. Hence, reduced rate of GST shall be paid if applicable on the tendered items. Exemption Certificate will be provided on request.**
3. **Rates:** Rates quoted should be on **FOR Tezpur University, Napam, Tezpur, Door Delivery Basis**, for indigenous items and **CIP Tezpur University, Napam, Tezpur or Delivered Duty Paid**, for imported item. Failure to comply with this term may lead to rejection of the quotation.
4. **Quotations should be accompanied by** i) An **EMD (in the form of Demand Draft/Banker Cheque) @ 2% on the given approximate/estimated value of the quoted item(s) to be rounded off to nearest Ten (10) drawn in favor of Registrar, Tezpur University, payable at Tezpur. No request for consideration of earlier deposited EMD will be considered.** ii) A non-refundable application (quotation/tender) fee of **₹. 1000.00 (Rupees One Thousand) only must be paid only by Demand Draft/Banker Cheque drawn in favour of Registrar, Tezpur University payable at Tezpur.** iii) **The original copies of the EMD & Tender Fee should be deposited/submitted/reach the office of the undersigned before opening of the Bids in an envelope superscribed as "Tender Fee and EMD for ET-NIQ-.....DT-....." addressed to the Assistant Registrar-GA, Tezpur University. Failure to do so may result in rejection of the bid.**
5. **Exemption: To Bidders who are MSME/NSIC registered may claim exemption from payment of EMD only subject to submission of valid documents in support of their claim. Payment of tender fee is a must and is not exempted. However, the University will make provisions for the tender documents free of cost in its website as well as in CPPP Portal.**
6. The rates should be exclusive of taxes and applicable tax % should be clearly indicated.
7. **Validity of Quotation:** Quoted rates must be valid for at least **180 days** from the last date of submission of quotation.
8. Applicable levies, surcharge and discounts should be clearly indicated item wise.
9. The rates should be quoted along with supporting documents of specifications and technical features and list of users, wherever applicable.
10. The system must be installed at the laboratory wherever applicable, and after installation a basic training must also be provided by the supplier or their Indian counterpart without any additional costs.
11. **Literature a must:** All the quotations must be supported by technical leaflet/literature and the specifications mentioned in the quotation must be reflected/ supported by such technical leaflet/ literature. The model and specifications quoted should **invariably be highlighted** in the leaflet/literature for easy reference.
12. **Technical Evaluation:** The bidder should provide the standard technical literature on the subject offered with dealership certificate of the offered product(s). The offers which do not meet the NIQ required technical specifications will be summarily rejected, from any further consideration. The bidder has to provide the details Bill of Materials (BOM). Technical bids

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- will be evaluated and ranked by the award ACCEPT & REJECT. The price bids of ACCEPTED vendors would then be considered by the concerned Purchase Committee of the institute.
13. **After Sales Service Guidelines:** In case of imported goods, bidders should clearly state the detailed address, contact number and email ids of 'after sales service centre' preferably in Tezpur/Guwahati, India or any place in Assam without which their offers shall be liable for rejection. Service against any complaint must be provided within 24 hours.
  14. **Dealership Certificate:** Dealers or Agents quoting on behalf of Manufacturer must upload valid dealership certificate.
  15. **Quality Certificates:** Valid certificate to prove that the products are genuine and of International standard, as mentioned below, must be uploaded: (a) Manufacturer's certificate; (b) ISO/ISI certificate.
  16. **Performance Bank Guarantee:** If PO value is above Rs.5 Lakhs, the successful bidder, to whom the PO is placed, shall furnish an unconditional Performance Bank Guarantee from a scheduled Bank of India, for 10% of the Purchase Order value, alongwith the Bill/Invoice. The format for PBG if required; will be provided on request. In case of foreign purchase, the local Agent shall submit the PBG. Where the PBG is to be necessarily given by a foreign bank it shall be endorsed by its counterpart in India. Validity of the PBG, which shall be effective from the date mentioned therein, shall be *warranty period + 2 months before and 3 months after the warranty period.*
    - a. **By submitting the PBG, the vendor is understood to have guaranteed that,**
      - i. The Purchase Order (PO) shall be executed as per terms and conditions mentioned therein.
      - ii. The vendor shall at his/their own cost rectify/replace the defects, if any, during the guarantee period.
      - iii. The guarantee is to the extent of 10% of the order value.
    - b. **Condition for invoking PBG:** In case of failure to comply with the guarantees above, Tezpur University, Napam, Tezpur may terminate the contract / purchase order in whole or in part and forfeit the PBG. In addition, Tezpur University, Napam, Tezpur, at its discretion, procure upon such terms and in such manner as it deems appropriate, goods similar to the undelivered items/products and the defaulting supplier/vendor shall be liable to compensate Tezpur University, Napam, Tezpur for any extra expenditure involved."
  17. **Genuine Pricing:** Vendor is to ensure that quoted price is not more than the price offered to any other customer in India to whom this particular item has been sold, particularly to Universities/IITs/Institutes and other Government Organization.
  18. **Payment:** 100% payment after successful delivery, installation and commissioning and acceptance by the user. ***Please note that as per University's norm advance payment is not allowed for indigenous purchase.***
  19. **PENALTY FOR DELAYED DELIVERY:** The date of delivery should be strictly adhered to. In the event of delayed delivery, installation & commissioning, the vendor shall be liable for a penalty deduction as per prevailing rule.
  20. Demonstration may be sought from the vendors for authentication of quoted specification.
  21. The University is exempted from paying Custom and Excise duty.
  22. Warranty/Guarantee period should be specifically mentioned in the quotation.
  23. No Advance payment will be made. However, for foreign supplies, advance payment will be

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- made either by LoC. In such cases 10% Performance Bank Guarantee should be submitted before opening of the LoC.
24. Items of Foreign origin should have Insurance up to installation on site.
  25. The University reserves the right to accept or reject any or all the quotations without assigning any reason.
  26. Irresponsive/incomplete quote will be rejected.
  27. **Award:** The Final Award will be given to the vendor, selected by the Purchase Committee on the lowest quote basis.
  28. **Conditional tenders not acceptable:** All the terms and conditions mentioned herein must be strictly adhered to by all the vendors. Conditional tenders shall not be accepted on any ground and shall be rejected straightway. Printed conditions mentioned in the tender bids submitted by vendors will not be binding on Tezpur University.
  29. **Enquiry during the course of evaluation not allowed:** No enquiry shall be made by the bidder(s) during the course of evaluation of the tender till final decision is conveyed to the successful bidder(s). However, the Purchase Committee or its authorized representative (Tezpur University) can make any enquiry/seek clarification from the bidders. In such a situation, the agency shall extend full co-operation. The bidders may also be asked to arrange demonstration of the offered items, in a short period notice, as such the bidders have to be ready for the same.
  30. **Force Majeure:**

If the performance of the obligation of either party is rendered commercially impossible by any of the events hereafter mentioned that party shall be under no obligation to perform the agreement under order after giving notice of 15 days from the date of such an event in writing to the other party, and the events referred to are as follows:

    - I) any law, statute or ordinance, order action or regulations of the Government of India,
    - II) Any kind of natural disaster, and
    - III) Strikes acts of the Public enemy, war, insurrections, riots, lockouts, sabotage.

**Termination for default:** Default is said to have occurred

    - a. If the equipment or any of its component is found having poor workmanship, faulty designs, poor performance and bad quality of materials used.
    - b. If the supplier fails to deliver any or all of the services within the time period(s) specified in the purchase order or any extension thereof granted by Tezpur University.
    - c. If the supplier fails to perform any other obligation(s) under the contract.
    - d. Under the above circumstances Tezpur University may terminate the contract / purchase order in whole or in part and forfeit the EMD/PBG as applicable. In addition to above, Tezpur University may at its discretion also take the following actions: Tezpur University may procure, upon such terms and in such manner, as it deems appropriate, goods similar to the undelivered items/products and the defaulting supplier shall be liable to compensate Tezpur University for any extra expenditure involved towards goods and services obtained. Besides, the Vice-Chancellor, Tezpur University, reserves the right to impose any other form of penalty as deemed fit including blacklisting of the vendor.
  31. **Selection criteria:**
    - i. **Evaluation Criteria:**

To ensure that each bidder has the necessary qualifications and resources to fulfil its obligations under the contract, the following criteria shall be evaluated. The Eligibility,

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Financial, Experience & Support criteria should be passed before the technical criteria. Technical criteria will be evaluated and ranked by the award of ACCEPT and/or REJECT. Only the ACCEPTED vendors will be considered for price bid. In case a joint venture makes a bid, any one of the members of the joint venture need to be qualified for each of the criteria mentioned below.

**ii. Eligibility Criteria:**

- a. All technical specifications of the quoted product(s) should be verifiable through the official website of the OEM and the data sheet available on the web site on the day of the Purchase Committee Meeting of the tender will be considered as final and no further clarification will be cited in this regard. The URL links to the respective documentation should be provided.
- b. Tender specific MAF (Manufacturing Authorization Form) is to be submitted by all interested Vendors, Dealership certificate/ authorization certificate from OEM if the bidder is a dealer.
- c. The bidder or the OEM should not be blacklisted by Tezpur University or any other Educational /R&D/ PSU/ Govt organizations. A certificate or undertaking to this effect must be submitted.

**Note: The bidders should provide sufficient documentary evidence to support the eligibility criteria.**

**iii. Support Criteria:**

The Bidder must have experience of supply and maintenance facilities and must have qualified support staff and resident engineers that can provide maintenance support for the hardware and software items concerned and all the items quoted must be covered by these facilities. List of spare items should be mentioned in the quotation. Similarly, all partnerships for maintenance shown as part of the above qualifying criteria must be in existence before the publication of this tender. Documentary proof of this must be provided. The purchaser reserves the right to reject a bid as non- responsive if not satisfied with the level of support as detailed above.

**iv. Manufacturer's Authorization Certificate:**

The OEM should authorize the bidder to participate in the quote. Original copy of the MAF specific to the NIQ has to be submitted along with the tender.

**v. Technical Criteria**

The bidder should provide the standard technical literature on the subject offered with dealership certificate of the offered product(s). The offers which do not meet the NIQ required technical specifications will be summarily rejected, from any further consideration. The bidder has to provide the details Bill of Materials (BOM). Technical bids will be evaluated and ranked by the award Accepted & Rejected. The price bids of Accepted vendors would then be considered by the concerned Purchase Committee of the institute.

**32. ADDITIONAL TERMS FOR IMPORTED GOODS:**

Following additional terms will be applicable in case of foreign supply:

- a) **Rates:** Rates quoted should be on **DELIVERED DUTY PAID basis**, with break-ups as per details given in the BOQ,
- b) **Exchange rate:** Rate of foreign exchange shall be the rate prevailing on the date of Purchase Committee Meeting.

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- c) While transshipment will be allowed, **part shipment will not be allowed.**
- d) **Payment:** By an irrevocable Letter of Credit at CIF/CIP Kolkata value negotiable through any overseas branch of State Bank of India with unrestricted provision. 90% of payment will be released on receipt of the shipping document and balance 10% after receipt of consignment. LoC will be established on receipt of Order acknowledgment, Proforma Invoice and Performance Bank Guarantee (PBG).
- e) **Agency Commission:** The percentage of ex-works value to be paid to Indian agent in equivalent Indian currency as agency commission as applicable if any will have to be clearly stated in the quotation.
- f) **Country of Origin:** While Country of Origin will have to be stated in the Original Invoice for payment through LoC.
- g) **LoC Amendment:** LoC amendment charges due to mistake on the part of the supplier, if any, will have to be borne by the supplier.
- h) Any query related to Technical Specifications, Instruction to Bidders and Terms & Conditions must be made before 7 working days of last date of submission of bids to Stores & Purchase Section, Tezpur University.
33. Applications for release of EMD should be submitted to the Registrar/ Joint Registrar-GA/Assistant Registrar-GA, Tezpur University.
34. Apart from the above terms and conditions the University has the right to include any other terms and conditions as and when felt necessary.

**INSTRUCTIONS TO BIDDERS FOR ONLINE BID SUBMISSION**

Instructions to the Bidders to submit the bids online through the Central Public Procurement Portal for e Procurement at <http://eprocure.gov.in/eprocure/app>

1. Possession of valid Digital Signature Certificate (DSC) and enrollment/registration of the agencies/bidders on the e-Procurement/e-tender portal is a prerequisite for e-tendering.
2. Bidder should do the enrollment in the e-Procurement site using the "Online Bidder Enrollment" option available on the home page. Portal enrollment is generally free of charge. During enrollment/registration, the bidders should provide the correct/true information including valid email id. All the correspondence shall be made directly with the agency/bidder through email id provided.
3. Bidder need to login to the site through their user ID/ password chosen during enrollment/registration.
4. Then the Digital Signature Certificate (Class II or Class III Certificates with signing key usage) issued by SIFY/TCS/nCode/eMudra or any Certifying Authority recognized by CCA India on eToken/SmartCard, should be registered.
5. The DSC that is registered only should be used by the bidder and should ensure safety of the same.
6. Agency/Bidder may go through the tenders published on the site and download the required tender documents/schedules for the tenders he/she is interested.
7. After downloading / getting the tender document/schedules, the Bidder should go through them carefully and then submit the documents as asked, otherwise bid will be rejected.
8. If there are any clarifications, this may be obtained online through the tender site, or through the contact details. Bidder should take into account the corrigendum published before submitting the bids online.
9. Bidder then logs in to the site through the secured log in by giving the user id/ password chosen during enrolment/registration and then by giving the password of e-Token/Smartcard to access DSC.
10. Bidder selects the tender which he/she is interested in by using the search option & then moves it to the 'my tenders' folder.
11. From my tender folder, he selects the tender to view all the details indicated.

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12. It is construed that the bidder has read all the terms and conditions before submitting their offer. Bidder should go through the tender schedules carefully and upload the documents as asked; otherwise, the bid will be rejected.
13. Bidder, in advance, should get ready the bid documents to be submitted as indicated in the tender documents/schedule and generally, they can be in PDF/xls/rar/jpg/dwf formats. If there is more than one document, they can be clubbed together and can be provided in the requested format. Bidders Bid documents may be scanned with 100 dpi with black and white option. It is advisable that each document to be uploaded through online for the tenders should be less than 2 MB. If any document is more than 2MB, it can be reduced through rar and the same can be uploaded, if permitted. However, if the file size is less than 1 MB the transaction uploading time will be very fast.
14. If there are any clarifications, this may be obtained through the site. Bidder should take into account the corrigendum published from time to time before submitting the online bids.
15. The Bidders can update well in advance, the documents such as certificates, annual report details etc., under My Space option and these can be selected as per tender requirements and then send along with bid documents during bid submission. This will facilitate the bid submission process faster by reducing upload time of bids.
16. Bidder should submit the Tender Fee/EMD as specified in the tender. The original should be posted/couriered/given in person to the Tender Inviting Authority, within the bid submission due date & time for the tender or as indicated in the tender. Scanned copy of the instrument should be uploaded as part of the offer.
17. While submitting the bids online, the bidder reads the terms & conditions and accepts the same to proceed further to submit the bid packets.
18. The bidder has to select the payment option as offline to pay the Tender Fee/EMD as applicable and enter details of the instruments.
19. The details of the DD/ any other accepted instrument, physically sent, should tally with the details available in the scanned copy and the data entered during bid submission time. Otherwise submitted bid will not be acceptable or liable for rejection.
20. The bidder has to digitally sign and upload the required bid documents one by one as indicated. Bidders to note that the very act of using DSC for downloading the bids and uploading their offers shall be deemed to be a confirmation they have read all sections and pages of the bid document including General conditions of contract without any exception and have understood the entire document and are clear about the requirements of the tender requirements.
21. The bidder has to upload the relevant files required as indicated in the cover content. In case of any irrelevant files, the bid will be rejected.
22. If the price bid format is provided in a spread sheet file like BoQ\_xxxx.xls, the rates offered should be entered in the allotted space only and uploaded after filling the relevant columns. The Price-bid BOQ template must not be modified/replaced by the bidder; else the bid submitted is liable to be rejected for this tender.
23. The bidders are requested to submit the bids through online e-tendering system to the Tender Inviting Authority (TIA) well before the bid submission end date & time (as per Server System Clock). The TIA will not be held responsible for any sort of delay or the difficulties faced during the submission of bid online by the bidders at the eleventh hour.
24. After the bid submission (i.e. after Clicking "Freeze Bid Submission" in the portal), the acknowledgement number, given by the system should be printed by the bidder and kept as a record of evidence for online submission of bid for the particular tender and will also act as an entry pass to participate in the bid opening date.
25. The time settings fixed in the server side & displayed at the top of the tender site, will be valid for all actions of requesting, bid submission, bid opening etc., in the e-tender system. The bidders should follow this time during bid submission.
26. All the data being entered by the bidders would be encrypted using PKI encryption techniques to ensure the secrecy of the data. The data entered will not viewable by unauthorized persons during bid submission & not be viewable by any one until the time of bid opening.
27. Any bid document that is uploaded to the server is subjected to symmetric encryption using a system generated symmetric key. Further this key is subjected to asymmetric encryption using buyers/bid openers'

Yours truly  
24/12/19



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public keys. Overall, the uploaded tender documents become readable only after the tender opening by the authorized bid openers.

28. The confidentiality of the bids is maintained since the secured Socket Layer 128-bit encryption technology is used. Data storage encryption of sensitive fields is done.
29. The bidder should logout of the tendering system using the normal logout option available at the top right-hand corner and not by selecting the (X) exit option in the browser.
30. For any queries regarding e-tendering process, the bidders are requested to contact as provided in the tender document. Parallely for any further queries, the bidders are asked to contact over phone: 180030702232 or send a mail over to [cppp-nic@nic.in](mailto:cppp-nic@nic.in).

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21/12/19

Assistant Registrar (GA)  
Tezpur University



**Technical Specifications cum Compliance Report**  
**(To be submitted on Company's/Firm's Letterhead Signed and Sealed)**

**List of equipment with Technical Specifications**

1. Automatic weather station technical specification of the sensors				Complied (Yes/No)	Remarks if any,
Sl.No	Parameters	Features	Specifications		
1.	Air Temperature	Range	-10 °C to +60 °C		
		Accuracy	±0.2 °C or better (with radiation shield)		
		Resolution	±0.1 °C		
		Response Time	10 sec or better		
		Accuracy	±0.2 °C or better (with radiation shield)		
2.	Wind Speed	Range	0 to 60 m/s or better		
		Sustainability	Up to 75 m/sec		
		Accuracy	±0.5 m/s or better		
		Resolution	0.1 m/s		
		Threshold	0.5 m/s or less		
		Response time	10 sec. or better		
3.	Wind Direction	Range	0-360°		
		Accuracy	±5° or better		
		Resolution	1°		
		Threshold	0.5 m/s or better		
		Response Time	10 sec or better		
4.	Pressure Sensor	Range (With single sensor)	600 to 1100 hPa		
		Accuracy	±0.2 hPa or better		
		Resolution	0.1 hPa		
		Response time	10 sec or better		
		Operating Temperatures	-40 to + 60°C		
5.	Evaporation Sensor	Range	30 to 300mm		
		Accuracy	±1% or better		
		Resolution	1 mm		
		Response	30 sec or better		
		Operating temperature	-10 °C to 60 °C		
6.	Relative Humidity Sensor	Range	0 to 100% RH		
		Accuracy	±3% or better		
		Resolution	1%		
		Response Time	10 sec. or better		
		Settling Time Max	Max 500 ms		
		Temperature Dependence	max ±0.05% RH/°C		
7.	Rainfall sensor	Range	0 to 1023 mm/h		
		Accuracy	±5% or better		
		Resolution	0.5 mm		
8.	Global Radiation Sensor	Range	0 to 1500 W/m <sup>2</sup>		
		Accuracy	±5% or better		
		Resolution	5 W/m <sup>2</sup>		
9.	Warranty	Period	3 year onsite		

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*24/12/19*

## Annexure 2

### Data Acquisition and telemetry:

- a) The system shall automatically collect the observations from attached sensors, process the same and store them into its memory as per the pre programmed procedure.
- b) The system shall also send the values of meteorological parameters (user selectable) to a remote display unit or a webserver accessible via the internet.
- c) The number of analog/digital/ SDI channels in the data logger must be compatible to the sensors being supplied. Atleast four additional analog and digital channels each, extra RS-232, RS-485 and SDI -12 channels must be available to interface other types of sensors. The type and the number of extra channels provided in the data logger must be specified.
- d) The sensor's signal conditioning unit should be an integral part of the system.
- e) The system shall have provision to easily include and change the following information as mandatory requirements:
  - i) Unique station identification code
  - ii) Time of observation
  - iii) Sensor identification.
- f) The system shall have an integrated microprocessor based data acquisition and storage system having adequate hardware configuration and software support to serve as an interface between sensors and the communication link to perform tasks of data logging, AWS health monitoring and telemetry.
- g) Providing necessary electrical power to the sensors and conversion of electrical output signals from the sensors into engineering values based on calibration equations stored in the memory. Full compatibility with all types of sensors provided in the packages shall be mandatory.
- h) Storage of observed data along with time for all the parameters in the memory. Memory capacity to retain at least one year's data is required. Data shall be available even if the power supply to the system has failed (RAM Backup battery) for one year.
- i) The stored data shall be retrievable via serial port to a PC/laptop and a PCMCIA card or any other compact and commercially available solid state memory device. Additionally, a serial port should make the latest data accessible for alternate telemetry devices.
- j) The system should be stand-alone and all programming functions/set-ups to be carried out through system keypad and display independent of a PC/Laptop.
- k) The system should be capable of continuous updating of the values of sensed weather parameters and post processing the instantaneous values into average values over a specified period of time for transmission to the AWS earth station.
- l) Management of AWS transmitter to optimize the battery consumption.
- m) The system shall provide a complete health status of the battery, transmitter and other components.
- n) The health data shall be stored as a log record and shall be capable of being retrieved and displayed when required.
- o) The system shall have in-built sensor simulation system options to conduct tests on the system for field installation, two-point calibration/re-calibration and maintenance of the sensors.
- p) The system shall have a weather-proof housing.
- q) The system shall have self-diagnostic facility and be capable of displaying Station ID/Sensor ID codes and messages on the display panel for general identification of the fault. Facility to monitor these codes and other health status through an external lap top/PC.
- r) The system shall be provided with a keypad option and at least 16 character display in the front panel. Setup shall be organised in a tree of menus and sub-menus. Protection of setup parameters and data through password should be supported by the system. In addition, the AWS shall support the manual entry of data through keypad and its display.

### Analog to digital converter:

Resolution :16 bit or better

Conversion Accuracy:  $\pm 1$  LSB

Stability Long-term: 1 ppm/year or better

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Stability (Temperature): 3 ppm or better from -40°C to 55°C

Other features:

Operating Temperature range: -10°C to + 55°C

Internal Memory: 1 MB RAM minimum

Battery Backup (internal:) Lithium Battery, storage: 2 years

Real-Time Clock: GPS synchronised

Watchdog Timer: System Reset upon microprocessor failure

Sample Intervals: 1 sec. to 24 hr. in 1 second increments (user selectable)

Visual display: 16 Character or more, alphanumeric LED/LCD to operate in temp. range -10°C to +55°C

Power consumption: Average over an hour shall be less than 0.5 A at 12VDC including that of sensors, GPS and transmitter. With compatible **Window based software** for interfacing.

Power Supply:

Battery: Single 12V DC chargeable maintenance-free battery 65 AH capacity with charger/inverter

Charge controller: Internal or External

Solar panel: Rated capacity 30W, Open circuit voltage: 21V, Short circuit current 2.4 A coupled to the battery charger/inverter.

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2. Data logger with thermocouples (Data Acquisition and Switching)		Complied (Yes/No)	Remarks if any,
Number of slots / wire channels	3 slots / up to 60, 2 wired channel / minimum 20 channels actuator / switch mainframe		
Switching	High quality switching with Internal 6 ½ DMM for precision measurements		
Computer interface	LAN / USB		
Analog measurement	Temperature, humidity, current, resistance, frequency		
Digital I/O	Up to 48 bits		
Analog O/P	-10 V to +10 V, 20 mA		
Multiplexing	Max 120 1-wire, 60 2-wire		
Matrix	Max 96 cross points		
General purpose	Max 60 switches		
RF multiplexing	Max 24 channel, 2 GHz		
Sensors	10 J type thermocouples, 10 RTDs, 10, Thermistors		
Power source	220 VAC, 50Hz or with AC/DC rectifier		
Software	With compatible interfacing software		
Warranty	3 years onsite/ 2 years		

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<b>3. Thirty Two Channels Data logger</b>		<b>Complied (Yes/No)</b>	<b>Remarks if any,</b>
Number of input channels /port for analog signals	32		
Voltage	0 to 5VDC		
Current	0-20 mA, 4-20 mA		
Thermocouple range	0-1200°C J type, 0-1372°C for K type		
Differential and single ended	0-1300 °C N type, 0-1768 °C R /S type, -50 to 400 °C T type		
Pt 100 / 1000 2/3 wires	-200 to 300 °C		
Alarm output	2 RS range of relay for high and low		
A/D resolution	12 successive approximation 0.1% FSD of range		
Clock resolution	1 second		
Data scaling	Required		
Data statistics	From data acquisition PC software		
Internal memory	Minimum 512/1024 kB		
Display	32 CH 7 inches multicolour TFT display with LED backlit, resolution 320x240 pixels with push button keypad		
Internal battery storage /life	3 V lithium / upto 5 years		
External power	230 VAC single phase, 50 Hz / or with AC/DC rectifier		
Sensor power output	Required appropriate electrical signal for data logger		
Networking / WiFi	LAN/WiFi		
USB port	USB 2.0		
Serial communication port	RS232 (minimum two ports)		
Interfacing software	Dedicated data acquisition software		
PC/Laptop	Compatible branded PC / laptop must be provided for data analysis		
Sensors (standard)	8, J type thermocouples, 8, K type thermocouples, 8, R type thermocouples and 8, S type thermocouples with calibration with connection lead.		

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<b>4. Cloud Digital data logger (Hygrometer)</b>		<b>Complied (Yes/No)</b>	<b>Remarks if any,</b>
Minimum processor	32 bit ARM or better		
Minimum memory	32/64 MB, 300000 records total		
Power supply	SMPS type EMI/RFI filter with spike suppressor		
In put voltage	90 to 270 VAC, 50 Hz or with AC/DC rectifier		
Protection	EMI/RFI filter with spike suppressor		
USB port	Pen drive and key board		
COM port	Cellular modem interface		
Power consumption	10 VA		
Environment	Operating temperature 0 to 50 °C		
Humidity	95%		
Register per device	20		
Connectivity	USB key board, user defined time interval for data logging and provision for manual data collection and up load		
Number of channel /analog devices to be connected	8/16		
Sensors	8, compatible humidity sensors, 8, compatible J, type thermocouples		
Interfacing software	Complete computer interfacing software for cloud data logger.		
Warranty	3 years onsite / 2 years		

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5. Digital data logger Hygrometer	Complied (Yes/No)	Remarks if any,
<p><b>Technical Highlights:</b>            No. of Channel : 32 external            Connectable probes : Minimum 16/32 x NTC temperature probes; 16/32 x humidity probes            Measuring rate : 1 s to 24 h; 2 s to 24 h (online measurement)            Interface : Mini USB, SD card slot            Memory : 2,000,000 measuring values  <b>Temperature - NTC</b>            Measuring range : -20 to +70 °C            Accuracy : ±0.2 °C (-20 to +70 °C) ±1 Digit                              ±0.4 °C (Remaining Range) ±1 Digit            Resolution : 0.1 °C  <b>Humidity - Capacitive</b>            Measuring range : 0 to 100 %RH            Resolution : 0.1 %RH            Interface : Compatible software            Sensors : 8 compatible humidity sensors, 8 compatible thermistors            Power : 220 VAC, 50Hz or with AC/DC rectifier            Warranty : 3 years on site / 2 years</p>		

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6. Pyranometer (All season heated)	Complied (Yes/No)	Remarks if any,
Power Supply :12 V DC for heater with a current draw of 15.4 mA Heater :780 Ω, 15.4 mA & 185mW at 12 V DC Sensitivity :0.2 mV per W m Calibration Factor :5W m per mV Calibration Uncertainty : ± 5 % Calibrated Output Range : 0 to 400 mV Measurement Repeatability : <1 % Non-stability (Long-term Drift) : <2 % per year Non-linearity : <1 % (up to 2000 W/ m <sup>2</sup> ) Measurement Range : 0 to 1750 W/m <sup>2</sup> (full sunlight ≈1000 W/m <sup>2</sup> ) Response Time : <1 ms Field of View : 180 ° Spectral Range : 360 to 1120 nm Sensitivity : 0.2 mV/W/m <sup>2</sup> Calibration Factor : 5 W/m <sup>2</sup> /mV Directional (Cosine) Response : ± 5 % at 75° zenith angle Temperature Response : 0.04 ± 0.04 % per C Operating Temperature Range : -40° to +70°C Data logger : (With appropriate data logger for continuous monitoring of solar radiation) Power source : 9/12 V DC/ 220 VAC, 50 Hz (DC/AC rectifier/inverter must be provided with 65A battery and compatible solar panel) Warranty : 03 years on site / 2 years		

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<b>7. Orifice Meter (Gas Flow Meter)</b>		<b>Complied (Yes/No)</b>	<b>Remarks if any,</b>
Gas to be measured	Compressed air, LPG, Biogas, CNG, and Producer Gas entered through closed pipe.		
Size	2 inches diameter		
Type of flow element	Differential pressure flow element		
Materials of flow meter	High grade non corrosive stainless steel (SS316)		
End connection	Slip on Raised Face (SORF)		
Materials of flange	Stainless steel		
Flange rating	Class 150		
DPT	With digital display		
Data logger	Minimum 4900 reading and extendable to 9800		
Communication port	RS485 and RS232		
Communication protocol	MODBUS, RTU		
Design standard	BS1042/ISO5167		
Accuracy	±2.5%		
Turn down ratio	10:1		
Density compensation	Online monitoring and compensation of density		
Gas temperature	Up to 80 °C		
Power supply	220 VAC, 50Hz or with AC/DC rectifier		
Interface software	Standard Window based software for PC interfacing		
Calibration	Standard calibration certificate for parameters to be measured		
Warranty	On site 03 years/ 2 years		

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8. Rotameter		Complied (Yes/No)	Remarks if any,
Meter size	40 mm		
Tube size	12 mm		
Discharge	500 -5000 Litre per hour/ 18-180 SCFM		
Fluid measurement	Air, gas and liquid		
Accuracy	± 2% full scale deflection		
Repeatability	0.5%		
Range	10:1		
Scale	180 degree angular		
Pressure range	0- 50 bar		
Temperature	-50 -150 °C		
Connection	Flanged		
Enclosure	IP 65		
Tube material	316SS, 316LSS, 304SS, Hastelloy 'C', Titanium		
Float	316SS, 316LSS, 304SS, Hastelloy 'C', Titanium		
Indicator box	ABS, Cast Al., SS		
End Fittings	316SS, 316LSS, 304SS, Hastelloy 'C', Titanium		
Calibration	Standard calibration certificate for parameters to be measured		
Warranty	On site 03 years / 2 years		

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9. Vortex Flow meter transmitter/Rotameter		Complied (Yes/No)	Remarks if any,
Measuring medium	Gas , liquid and vapour		
Temperature	-40 to 280 °C		
Pressure	1.0 to 10 MPa		
Diameter	50 mm		
Discharge	5 to 56 m <sup>3</sup> /h (liquid), 35-450 m <sup>3</sup> /h (gas), 28-450 m <sup>3</sup> /h (steam)		
Ratio of measurement range	1:20, 1:30, 1:40		
Error	± 0.5%		
Power Supply	3.6 V / 12 VDC / 220 VAC, 50Hz		
Material	1Cr18Ni9Ti		
Reynolds number	> 4000		
Ambient temperature	-40 to 55 °C		
Output signal	RS485/RS232		
Power source	220 VAC, 50Hz or with AC/DC rectifier		
Interfacing	Standard Window based software for PC interfacing		
Warranty	On site 03 years / 2 years		

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10. Pitot Tube with transmitter		Complied (Yes/No)	Remarks if any,
Flow range with flow sensor	5 to 56 m <sup>3</sup> /h (liquid), 35-450 m <sup>3</sup> /h (gas), 28-450 m <sup>3</sup> /h (steam)		
Pressure	0 to 16 MPa		
Tube diameter	1 inch		
Ambient temperature	-40 to 55 °C		
Controller/ transducer	30° to +90°		
Accuracy of Flow	±(1.5%+0.3% full scale)		
Pressure	0.5% F.S.		
Temperature	0.5°C		
Default pressure	1000 hPa (a), T=20°C		
Medium	Wet and dry air, non-corrosive gases, steam		
Medium temperature	-40 to 230 °C		
Power Supply	12 VDAC/ 220 VAC (Standard DC voltage rectifier will be required if the unit is operated with 12/24 VDC)		
Sensor materials	Stainless steel 1.4404 (SUS 316L)		
Output signal	SDI (SUTO specific), 4 to 20 mA and Pulse (optional), Modbus RTU (optional)		
Warranty	On site 03 years / 2 years		

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<b>11. Micro-manometer / Multifunction meter</b>		<b>Complied (Yes/No)</b>	<b>Remarks if any,</b>
Pressure sensor	Piezoresistive		
Measuring range	0 to 2000 hPa		
Overload	1,200 in H <sub>2</sub> O (3000 hPa)		
Static pressure	800 in H <sub>2</sub> O (2000 hPa)		
Uncertainty	±0.05% full scale		
Resolution	±0.004 in H <sub>2</sub> O (±0.01 hPa (0.0 to 1000.0 hPa) ±0.04 in H <sub>2</sub> O (±0.1 hPa (1000.0 to 2000.0 hPa)		
Computer interface	RS232 with computer interfacing cable		
Compatible software	Comsoft3 Software or equivalent		
Probes	Immersion-penetration probe (-330 to 1112°F) / Air and gas probe with fixed cable one each, Current/voltage cable (±1 V, ±10 V, ±20 mA) with fixed cable one each, Absolute pressure probe interface 0–800 in H <sub>2</sub> O (0-2000 hPa) one each, Probes requiring cables – standard 5inch cable, Pitot tube 20 inch long stainless steel (500 mm), Silicone Hose, Connecting hose set, 9V rechargeable battery, 220VAC input battery charger for 9 V battery with Transport case.		
Power source	220 VAC, 50Hz or with AC/DC rectifier		
Probe socket	Minimum additional two user defined sockets		
Warranty	2 years on site		
Total (Rupees eleven lakh only)			

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