

Technical Specifications of Contact-based ground truth equipment : respiration measurement device-1, skin temperature measurement device -1, Pulse Oximeter -1, ECG -1, cardiac output -1

Bidder Eligibility Criteria-I

Sl. No	Bidder Eligibility Criteria-I	Complied / Not Complied	Reference Page No.	Remarks, If any
1	The bidder/OEM should have supplied at least similar items to IITs, NITs, IISERs, CSIR Labs or other Govt. organizations in the last 5 years, PO copies or installation certificates along with contact details of end user need to be submitted as the proof of supply. IIT Madras reserves its right to verify the claims submitted by the bidder and the feedback from the previous customers will be part of technical evaluation.			

Technical Specifications II

Quantity – respiration measurement device-1, skin temperature measurement device -1, Pulse Oximeter -1, ECG -1, cardiac output -1

Description of respiration measurement device: Respiration measurement device are devices worn around the waist to measure respiration rates and volumes. They use sensors to detect changes in abdominal and thoracic movement during breathing. They are used in medical clinics, research institutions, and athletic training facilities to monitor breathing patterns and diagnose respiratory issues. They are commonly used in sleep studies and with breathing and pulmonary function measurement devices. These are designed for comfort and accurate measurements, made from durable materials, and featuring adjustable straps and secure closures.

Detailed specifications:

Specification	Parameters	Complied/Not Complied	Ref.Page.No
Output	1-D Waveform proportional to respiration		
Output format	Analog (0-5V) and/or digital (16 bit)		
Data transfer	Real-time		
Analog front end	Inbuilt/standalone analog front end preferably with selectable filter cutoff and gain		
Data acquisition	In built/standalone data acquisition system with minimum 16 bit ADC and user selectable sampling rate 1 ksps – 10 ksps (minimum range)		
Software compatibility	National Instruments LabVIEW™		

Description of skin temperature measurement device: A skin temperature measurement device is a device used for measuring the temperature of a person's skin. It typically includes a skin temperature probe, a data acquisition device, software for data analysis and management. The skin temperature probe is designed to be small, flexible, and non-invasive, allowing for comfortable and accurate temperature measurements. The data acquisition device can transfer large amounts of data to a computer real time via a wired or wireless connection.

Detailed specifications:

Specification	Parameters	Complied/Not Complied	Ref.Page.No
Temperature range	20-50°C minimum		
Temperature accuracy	Preferably factory calibrated to 0.1°C accuracy		
Output	1-D Waveform proportional to temperature		
Output format	Analog (0-5V) and/or digital (16 bit)		
Data transfer	Real-time		
Analog front end	Inbuilt/standalone analog front end preferably with selectable filter cutoff and gain		
Data acquisition	In built/standalone data acquisition system with minimum 16 bit ADC and user selectable sampling rate 1 ksps – 10 ksps (minimum range)		
Software compatibility	National Instruments LabVIEW™		

Description of Pulse oximeter: A pulse oximeter is a medical device used to measure the oxygen saturation levels (SpO2) of a person's blood in a non-invasive manner. It typically consists of a small sensor that attaches to a person's fingertip and a display unit that shows the oxygen saturation reading.

Detailed specifications:

Specification	Parameters	Complied/Not Complied	Ref.Page.No
Sensor type	Finger clip- adult		
Output	1-D PPG Waveform, SpO2 value, pulse rate		
Oxygen Saturation range (SpO2) minimum	70% to 100%		
Pulse Rate (PR) minimum	40 to 180 bpm		
Accuracy	(SpO2): ±2% or better ±3 bpm or better		
Output format for PPG waveform	analog (0-5V) and/or digital (16 bit)		
Data transfer	Real-time		
Analog front end	Inbuilt/standalone analog front end preferably with selectable filter cutoff and gain		
Data acquisition	In built/standalone data acquisition system with minimum 16 bit ADC and user selectable sampling rate 1 ksps – 10 ksps (minimum range)		
Software compatibility	National Instruments LabVIEW™		

Description of ECG: ECG measures the electrical activity of a person using skin contact electrodes. A 3-lead ECG can be obtained with electrodes placed on the limbs. The ECG is essential in obtaining the heart rate, heart rate variability with high accuracy. The ECG signals generally undergo analog signal conditioning and are sampled by a data acquisition device, and transferred to a computer.

Detailed specifications:

Specification	Parameters	Complied/Not Complied	Ref.Page.No
Output	3-lead ECG waveform		
Number of leads	3 leads minimum,		
Output format for ECG waveform	analog (0-5V) and/or digital (16 bit)		
Data transfer	Real-time		
Analog front end	Inbuilt/standalone analog front end preferably with selectable filter cutoff and gain		
Data acquisition	In built/standalone data acquisition system with minimum 16 bit ADC and user selectable sampling rate 500 sps – 10 ksps (minimum range)		
Software compatibility	National Instruments LabVIEW™		

Description of Cardiac output device: In the process of developing an indigenous image-free ultrasound technology for comprehensive vascular function assessment, novel technologies for the non-invasive assessment of cardiac functions are being developed. Cardiac function markers and methodologies are being explored. Measuring such a host of parameters during interventions such as treadmill exercise, cold-pressor test, tilt table test, etc, demands systems and sensors that can communicate and record data from human subjects with ease.

Detailed specifications:

Specification	Parameters	Complied/Not Complied	Ref.Page.No
Impedance (Z)	50 mV (100 ohm)		
Derivative Impedance (dZ)	5 mV/s		
Operational Frequency	Around 100 kHz sine wave		
Current level	Around 2 mA (rms)		
Bandwidth	Z : DC – 100 Hz dZ : DC – 100 Hz		

(Note: It is mandatory for the bidders to provide the compliance statement in tabular column format along with catalogue page number (comply/not comply) for the Above points with document proof as required. Failing which bidders will be technically disqualified)