ANNEXURE-1

A 40 channel data logger with the ability to log/record analogue signals, measure parameters such as temperature, voltage, pressure signals at sampling rate of at least 500ms for all 40 channels.

The logger should be able to accept different type of signals per channel. The logger should have the capability to view the recorded signals in engineered values such as pressure in bar or kpa as desired. This feature should be user definable per channel.

It should also have capability to interface with a PC, an application software for real time monitoring of the signal and for offline analysis.

The logger should be expandable up to 100 channels or more in future.

| **Technical Feature** | **BHEL Specifications** | **Vendor compliance** |
|---|---|---|
| Number of Analogue Input Channels | 40 analogue input channels, expandable up to 100 channels or more | |
| Multifunctional analogue Input capability | The logger should be capable of measuring combined measurements from voltage, temperature, pressure signal etc | |
| Analogue voltage | Programmable per channel<br>20 mV to 50-100 V DC or better for various ranges | |
| Withstand Voltage between channels | 600 Vp-p or better<br>1500 – 2300 V AC RMS - Min. 1 minute<br>50 Mega Ohms @500 V DC | |
| Input Type | M3 screw terminal | |
| Temperature | The logger should be capable of accepting inputs from sensors such as:<br>Thermocouples of any type (K, J, E, T, R, S, B, N, W )<br>TDS - PT100/PT1000 (3-wire) | |
| DC Current | 4 to 20ma using shunt resistor | |
| Measurement Accuracy | Voltage: ± 0.1% of full scale<br>Thermocouple K Type: ± (0.05% of reading + 1.0°C)<br>RTD(PT100): ± 1.0°C or better | |
| Sampling Interval | The logger should be capable of maximum of 10ms sampling rate. The sample rate should be programmable as 10, 20, 50, 100, 125, 200, 250, 500ms, 1, 2, 5, 10, 20, 30s, 1, 2, 5, 10, 20, 30min, 1h; External triggering.<br><br>When all 40 channels are in use the logger should be capable of sampling at 500ms rate or better. | |

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|---|---|---|
| Calculation Function | Addition, Subtraction, Multiplication, and Division for analogue input between channels<br>Two calculations from Average, Peak, Maximum, Minimum, RMS | |
| Memory | The logger should have a built in 2-4 GB or more flash memory with an external removable card slot. | |
| File Format | The logger should be capable of recording data in binary and CSV format | |
| Data Display formats | Data Display formats:<br>1. Waveform<br>2. Digital<br>3. Chart or graphs | |
| Recording / Capturing Time | Minimum Recording / capturing time of at-least 45 days at 500ms sampling rate for 20 channels atleast | |
| Alarm Output Function | 4 alarm outputs | |
| Engineering Unit Function | The logger should have the capability to specified engineering unit. For example, the output signal from pressure sensor in mV should be displayed back in kPa or bar. | |
| USB Interface or LAN interface | The USB or LAN interface should enable users transfer data from logger to the PC | |
| Interface to PC | Ethernet (10BASE-T/100BASE-TX) and/or USB2.0 (High speed), | |
| Networking Features | Web & FTP server function: The user should be able control or monitor the logger via a network on web browser. | |
| | Should be able to control or monitor the loggers | |
| | FTP client: The logger should be capable of taking backup on the FTP client | |
| Power Source | AC power supply : 100 to 240 V AC, 50/60 Hz or DC power supply with 24 V | |
| Ambient conditions of Operation | 0 to 45°C, 5 to 85 % RH (non-condensed) | |

| Application Software Specification | BHEL Specification | Vendor Complaince |
|---|---|---|
| Operating System | Windows 8.1, 8, 7, Vista (32/64-bit edition), 10 | |
| Functions | Control the logger, Real-time data capture, Replay data, and Data format conversion | |
| User setting conditions | Input condition, Capturing condition, Trigger/Alarm condition, Report, etc. | |
| Data Capturing capability | Saves captured data in real time (in binary or CSV format) | |
| Display capability | Y-T waveform, Digital values, Report, X-Y graph (specified period of data, data reply only), Two displays for the current and past data, and Statistical calculation | |
| File conversion | Converting data format to CSV from binary, merge multiple data files in the time axis or as an additional channel | |
| Alarming Functions | The software should support alarm functions | |
| Statistical Function | Maximum, Minimum, and Average during data capturing | |

## General Specifications

| Sl No | BHEL Specifications | Vendor Complaince |
|---|---|---|
| 1 | Quote should include all the required spares like connecting cables, CF or SD card etc | |
| 2 | Vendor should provide data sheet in support of the compliance or deviations to BHEL specifications and reference of same to be indicated | |
| 3 | Supply certificate of conformance along with calibration certificate for the raw signals with traceability. | |
| 4 | Equipment to be supplied to BHEL Corp R&D, Hyderabad. | |
| 5 | Supplier should demonstrate functionality along with necessary training if any at BHEL R&D at free of cost | |