

WORK CONTRACT FOR THE INSTRUMENTATION ACTIVITIES RELATED TO THE GROUP AIIS/AISE

3. TCEM DIVISION

3.A. WORK DESCRIPTION:

- Part - A: Works to be executed by Technician
- Part – B: Works to be executed by Technical Assistant
- Part – C: Works to be executed by Scientific Assistant

1. CALIBRATION OF SENSORS: 7000 nos.

Part-B works: a, b, c, d, e, f

Part-C works: g, h, i, j

a. Calibration of Differential pressure transducers:

- Visual inspection (Inspection of conical seat area and thread portion, GO and NO-GO)
- Initial Health checks (Measurement of continuity resistance, input/output terminals, isolation resistance and ambient output verification.)
- Calibration of pressure sensors with line pressure(Proofing of sensors, verification of full scale output, calibration of sensors in five ascending and descending steps and logging in data acquisition system)
- Final health check
- Chart preparation and verification
- Data uploading

b. Calibration of differential pressure transmitters:

- Visual inspection (Inspection of conical seat area and thread portion, GO and NO-GO)
- Initial Health checks (Measurement of continuity resistance, input/output terminals, isolation resistance and ambient output verification.)
- Calibration of pressure sensors with line pressure(Proofing of sensors, verification of full scale output, calibration of sensors in five ascending and descending steps and logging in data acquisition system)
- Final health check
- Chart preparation and verification
- Data uploading

c. Calibration of Vacuum transducer:

- Visual inspection (Inspection of conical seat area and thread portion, GO and NO-GO)
- Initial Health checks (Measurement of continuity resistance, input/output terminals, isolation resistance, and zero absolute and ambient output verification.)
- Calibration of pressure sensors(Proofing of sensors, verification of full scale output, calibration of sensors in five ascending and descending steps and logging in data acquisition system)
- Final health check
- Chart preparation and verification
- Data uploading

d. Calibration of Vacuum transmitters:

- Verify whether the transmitter is suitable for vacuum calibration.
- Current trimming in lower/higher measurement ranges
- Proofing of transmitters (3 cycles)
- Calibration of transmitters with line pressure in five ascending and descending steps and logging in data acquisition system
- Chart preparation and verification
- Data uploading

e. Calibration of pressure gauges:

The calibration set up is similar to that of calibrating absolute pressure transducers.

- Proofing of pressure gauge (3 cycles)
- calibration of gauge in five ascending and descending steps and logging in data acquisition system
- Cleaning of ports /chamber
- Chart preparation and verification
- Data uploading

f. Calibration of pressure Switches:

The calibration set up is similar to that of calibrating absolute pressure transducers.

- Sensor connected to the pressure calibrator.
- Increase pressure step by step upto required range and verify there is NC/NO conduction.
- Chart preparation and verification
- Data uploading

g. Calibration of RTD probes:

- Visual inspection (Inspection of thread portion, GO and NO-GO)
- Initial Health checks (Measurement of continuity resistance, isolation resistance, Element resistance)
- Calibration of RTD probes (Temperature is applied in equal ascending steps up to full scale and outputs are logged through Data acquisition software)
- Final health check
- Chart preparation and verification
- Data uploading

h. Calibration of Thermo Couple probes:

- Visual inspection (Inspection of thread portion, GO and NO-GO)
- Initial Health checks (Measurement of continuity resistance, isolation resistance, Element resistance)
- Calibration of RTD probes (Temperature is applied in equal ascending steps up to full scale and outputs are logged through Data acquisition software)
- Final health check
- Chart preparation and verification
- Data uploading

i. Calibration of Vibration sensors:

- Sensors are to be mounted in the vibration Shaker.
- Vary the vibration level `g' from minimum to maximum level of the shaker.

- Set the vibration at one fixed level, acquire both the reference transducer output, and test transducer output.
- Sensitivity and linearity of the sensor are found out using acquired calibration data.
- Chart preparation and verification.
- Data uploading

j. Calibration of LVDT:

- The sensor was mounted on a LVDT calibrator setup and the sensor output is connected to the DMM.
- Output is measured at equal ascending steps up to full scale and logged through Data acquisition software.
- Chart preparation and verification
- Data uploading.

2. FUNCTION TESTING OF SENSORS : 6250 Nos.

Part-B works: a

Part-C works: b & c

a. Pasting RTD / TC and HLP Probes:

Temperature (RTD probe):

- Measurement of continuity resistance, isolation resistance, Element resistance at SRC.
- Before vibration Output resistance measured at 0 °C and LN₂ temperature.
- After vibration Output resistance measured at 0 °C and LN₂ temperature.

Temperature (TC probe):

- Measurement of continuity resistance, isolation resistance, Element resistance at SRC.
- Before vibration Output resistance measured at 0 °C and 100 °C temperature.
- After vibration Output resistance measured at 0 °C and 100 °C temperature.

Surface Temperature (Pasting RTD):

- Measurement of continuity resistance, isolation resistance, ambient resistance at SRC.
- Output resistance measured at 0 °C and LN₂ temperature.

Surface Temperature (Pasting TC):

- Measurement of ambient resistance at SRC.
- Output mV measured at 0 °C and 100 °C temperature

b. Vibration transducer:

- Measure the output (mV) at 61.4 Hz, 100 Hz and 159.2 Hz using 1g calibrator

c. Charge to voltage converter:

- Capacitance and gain checking using 1g calibrator with vibration sensors

3. HEALTH CHECKING OF TRANSDUCERS : 5750Nos.

Part-B works: a & b

Part-C works: c

a. Temperature sensors:

AS SOON AS THE RTD/TC PROBES ARE RECEIVED FOR HEALTH CHECK, THE FOLLOWING JOBS HAVE TO BE DONE

- Capacitance and gain checking using 1g calibrator with vibration sensors.
- Note the serial number.
- Inspect the thread by Go – No go thread gauge and log the observation.
- Measure the insulation resistance at 50 V and log the values.
- Measure the Continuity resistance and log the values.
- Pack and store.

b. Speed sensors:

AS SOON AS THE SPEED SENSORS ARE RECEIVED FOR HEALTH CHECK, THE FOLLOWING JOBS HAVE TO BE DONE

- Note the model number.
- Note the serial number.
- Clean the speed sensor using Isopropyl Alcohol.
- Measure the insulation resistance at 50 V and log the values.
- Measure the Continuity resistance and log the values.
- Measure the inductance and log the values.
- Pack and store.

c. Vibration stud:

AS SOON AS THE VIBRATION STUDS ARE RECEIVED FOR HEALTH CHECK, THE FOLLOWING JOBS HAVE TO BE DONE

- Note the model number.
- Note the serial number.
- Measure the Insulation resistance at 50 V and log the values.
- Pack and store.

4. FLIGHT ACCEPTANCE TEST OF TRANSDUCERS: 5800Nos.

Part-B works: a

Part-C works: b

Environmental Test

Flight acceptance tests have to be carried out on selected transducers in the following sequence.

- a. Thermal cycling tests.
- b. Vibration tests.

a. Thermal cycling Tests:

After temperature cycling, do the Functional checks

- Measure the input resistance and output resistance and record.
- Measure the insulation resistance and record.
- Measure the zero offset using vacuum pumping system and record.
- Measure the ambient output and record.

b. Vibration Tests:

Functional checks. Repeat the functional tests.

5. CURVE FITTING OF DATA : 4250Nos

Part-B works:

On many occasions, data obtained from in-house or external calibrations will have to be fitted to first and fourth order curves and the calibration charts have to be generated. The curve-fitting program can be used for this purpose.

6. PREPARATION OF LOG BOOKS : 3000Nos.

Part-B works:

- a) Collect all the data sheets from the appropriate files
 - 1. Manufacturer cal chart
 - 2. Acceptance test report. (Pre environmental cal chart, Thermal and vibration test results, post environmental cal chart)
 - 3. Last calibration chart.
- b) Prepare a comparison chart in the PC as annexure-I (sample enclosed) and take the printout. The chart consists of last calibration values against the specifications.
- c) Prepare the front page as annexure-II (sample enclosed) and take the printout. (Refer the given measurement plan for the required details of program, range, parameter, model no. etc.)
- d) Arrange all the above reports in a logbook folder and write the program, parameter, serial number of the transducer on top of the folder using marker pen.
- e) Submit the logbook to the concerned officer for clearance.
- f) Make a duplicate copy after clearance.

Note: 1) Individual log books have to be prepared for each transducer.

2) An average, prepare 12 log books in a day.

7. TRANSDUCER DATABASE MANAGEMENT: 9000Nos.

Part-B & Part-C works

The following entries have to be made in the transducer database management system so as to track the movement of transducers.

- Sensors Inward
- Sensors Issue& return
- Defective inward
- Stock verification and management
- Datasheets and text file uploading.

8. PREPARATION OF TECHNICAL DOCUMENTATION: 800Nos.

Part-A works:

9. TROUBLE SHOOTING AND REPAIR OF ELECTRONIC INSTRUMENTS : 2000Nos.

Part-A works:

10. FUNCTIONAL CHECKING OF SIGNAL CONDITIONERS(PRESSURE, TEMPERATURE & FLOW : 500Nos.

Part-A works:

11. LOAD TESTING OF POWER SUPPLIES AND UPS : 2300Nos.

Part-A works:

3.B. WORK CONTENT:

Sl. no.	Work content with identification name	Quantity	UoM
1.	3-Activities-1.a to 1.j	7000	nos
2.	3-Activities-2.a to 2.c	6250	nos
3.	3-Activities-3.a to 3.c	5750	nos
4.	3-Activities-4.a & 4.b	5800	nos
5.	3-Activities-5	4250	nos
6.	3-Activities-6.a to 6.f	3000	nos
7.	3-Activities-7	9000	nos
8.	3-Activities-8	800	nos
9.	3-Activities-9	2000	nos
10.	3-Activities-10	500	nos
11.	3-Activities-11	2300	nos

3.C. CONTRACT CONDITIONS - TECHNICAL:

1. Based on our past experience, the average number of Personnel required to carry out the **3.B. Work Content are 3 Diploma holders, 1 Science Degree holder and 2 ITI holders (1 Junior Technician & 1 Senior Technician) for 2 years.** However, depending on the work load, the Contractor may require to deploy more people as and when required.
2. The persons should have educational qualifications as min. **Diploma in Electronics & Communication or Electrical & Electronics branches of Engg. and Bachelor degree in Physics & ITI in Electronics/Electrical trade.**
3. The **3.B. Work content** table in the Tender contains **11 rows** of items starting as '**3-Activity(ies)- XX**'.