

Your Company Name / Logo	PRESSURE TRANSMITTER CALIBRATION SOP	Doc no: SOP INST 001	Rev: 0
Department: Instrumentation	Standard operating procedure	Date:	Page: see footer

1. Purpose

To verify and, where necessary, adjust the accuracy of pressure transmitters so that their output stays within the specified tolerance.

2. Scope

Gauge and absolute pressure transmitters with 4 to 20 mA output, with or without HART, calibrated in the field or in the instrument workshop.

3. References

- Manufacturer instruction manual of the transmitter
- Instrument data sheet and loop drawing
- Site calibration and isolation procedures
- ISO 9001 clause 7.1.5 (monitoring and measuring resources)

4. Responsibilities

- Instrument technician: carries out the work and records results.
- Instrument engineer or supervisor: reviews and approves the records.
- Operations: grants the permit, isolates the process and returns the equipment to service.

5. Safety precautions

- Work only under a valid permit to work and follow the site isolation (lockout tagout) procedure.
- Wear the PPE required for the area: safety helmet, glasses, gloves and safety shoes as a minimum.
- In hazardous areas use certified or intrinsically safe test equipment, or obtain a gas free certificate and hot work permit.
- Inform the control room before starting, and before returning the instrument to service.
- Isolate, depressurise and vent the transmitter before disconnecting; toxic or hot process fluids need draining to a safe place.
- Never exceed the transmitter overpressure limit when applying test pressure.

6. Tools and equipment

- Pressure calibrator or hand pump with reference gauge, at least 4 times more accurate than the transmitter
- mA meter or documenting process calibrator (loop power if required)
- HART communicator or configuration software
- 250 Ω resistor for HART communication on the bench
- Test hoses and fittings rated for the test pressure
- Calibration report form

7. Prerequisites

- Permit approved and the loop put in manual or bypassed by operations.
- Reference standard within its calibration validity.
- Data sheet values available: LRV, URV, unit, tolerance.

8. Procedure

8.1 Isolation

- 8.1.1 Ask operations to put the control loop in manual or bypass any trip using the approved bypass procedure.

- 8.1.2 Close the root or manifold block valve, open the vent or drain valve and confirm that the pressure is zero.
- 8.1.3 Connect the pressure source to the test port or manifold, and the mA meter in series with the loop (or use the test terminals).

8.2 As found test

- 8.2.1 Record the transmitter configuration (range, damping, units) with the HART communicator.
- 8.2.2 Apply pressure at 0, 25, 50, 75 and 100 % of span, approaching each point from below, and record the output in mA.
- 8.2.3 Continue downscale at 75, 50, 25 and 0 %, approaching each point from above.
- 8.2.4 Calculate the error in % of span at each point. If all errors are within tolerance, no adjustment is needed.

8.3 Adjustment

- 8.3.1 If any point is out of tolerance, perform a sensor trim (lower and upper) with the HART communicator using the reference pressures.
- 8.3.2 If the mA output itself is wrong, perform a 4 mA and 20 mA output (D/A) trim against the mA meter.
- 8.3.3 Do not change the range unless authorised; ranging is a configuration change, not a calibration.

8.4 As left test

- 8.4.1 Repeat the 5 point upscale and downscale test and record the as left readings.
- 8.4.2 Confirm that all points are within tolerance.

8.5 Return to service

- 8.5.1 Remove the test equipment, close the vent and drain valves and reinstate the plugs.
- 8.5.2 Open the block valve slowly and check for leaks.
- 8.5.3 Confirm with the control room that the reading is correct and normal for the process, then hand back the loop and close the permit.

9. Acceptance criteria

- As left error at every point within the specified tolerance (typically ± 0.25 % of span unless stated otherwise).
- No leaks at the process connections after return to service.
- Reading in the DCS matches the expected process value.

10. Records

- Pressure transmitter calibration report (free template: instrumentationblog.in/downloads/templates/pressure-transmitter-calibration-report/)
- Calibration master list (update the next due date) (free template: instrumentationblog.in/downloads/templates/calibration-master-list/)

11. Approval

	Prepared by	Reviewed by	Approved by
Name			
Signature			
Date			

This procedure is a generic template. Adapt it to your site permit system, the manufacturer instructions and your quality system before use.