CALIBRATION PROCEDURE – ROSEMOUNT-TYPE PRESSURE TRANSMITTER USING DRUCK HAND PUMP, MULTIMETER, AND 24 VDC SUPPLY

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1. PURPOSE

This procedure describes the method for calibrating a Rosemount-type 4–20 mA pressure transmitter equipped with mechanical ZERO and SPAN adjustment potentiometers. The goal is to ensure the transmitter output corresponds to the defined Lower Range Value (LRV) and Upper Range Value (URV).

2. EQUIPMENT REQUIRED

- Rosemount-type pressure transmitter with ZERO and SPAN pots
- Druck pneumatic or hydraulic hand pump
- Reference pressure gauge or digital pressure calibrator
- 24 VDC power supply
- Digital multimeter (DC mA measurement)
- Pressure fittings and tubing
- Small flat-blade screwdriver
- Manufacturer’s datasheet or nameplate

3. SAFETY REQUIREMENTS

- Ensure the transmitter is isolated from the process and depressurised.
- Confirm all pressure ports are vented before applying pressure.
- Do not exceed the transmitter’s maximum working pressure.
- Verify correct polarity and voltage before energising the loop.
- Use only pressure-rated fittings and tubing.

4. PRE-CALIBRATION PREPARATION

- Identify the transmitter model, range, LRV, and URV from the nameplate.
- Allow the transmitter to warm up for 5–10 minutes after applying power.
- Ensure the Druck pump and reference gauge are leak-free.
- Confirm the transmitter is at true zero pressure (vented or equalised).

5. ELECTRICAL SETUP

- Set the multimeter to DC mA mode.
- Wire the loop in series:

  Power supply (+) to transmitter (+)

  Transmitter (–) to multimeter (+)

  Multimeter (–) to power supply (–)
- Verify the loop is complete and the transmitter is energised.

6. PNEUMATIC SETUP

Gauge or Absolute Transmitter:

Connect the Druck pump to the pressure port.

Ensure any vent/reference port is open to atmosphere.

Differential Transmitter:

Connect the Druck pump to the high-pressure side.

Leave the low-pressure side vented unless otherwise required.

Plug any unused ports.

7. CALIBRATION OVERVIEW

- ZERO adjustment sets the output at LRV (4.00 mA).

- SPAN adjustment sets the output at URV (20.00 mA).- Adjustments interact; expect to repeat zero/span steps.

8. CALIBRATION PROCEDURE

8.1 SET ZERO (4.00 mA AT LRV)

- Vent the Druck pump so the transmitter is at LRV.
- Confirm the reference gauge reads the correct LRV pressure.
- Observe the multimeter reading.
- Adjust the ZERO potentiometer:

  Clockwise = increase output

  Anticlockwise = decrease output
- Set output to 4.00 mA ± 0.02 mA.
- Allow the reading to stabilise.

8.2 SET SPAN (20.00 mA AT URV)

- Apply pressure with the Druck pump up to URV.
- Approach the target pressure slowly.
- Observe the multimeter reading.
- Adjust the SPAN potentiometer:

  Clockwise = increase output

  Anticlockwise = decrease output
- Set output to 20.00 mA ± 0.02 mA.
- Allow the reading to stabilise.

8.3 RE-CHECK ZERO

- Vent the Druck pump back to LRV.
- Confirm the reference gauge is at LRV.

- Verify the output is still 4.00 mA.
- If not, adjust ZERO slightly.

8.4 ITERATE ZERO AND SPAN

- Re-apply URV pressure and verify 20.00 mA.
- Return to LRV and verify 4.00 mA.
- Repeat until both points are stable and within tolerance.

9. LINEARITY CHECK (OPTIONAL)

- Apply 50% of span (e.g., 5.00 bar for a 0–10 bar transmitter).
- Expected output = 12.00 mA.
- Compare actual vs expected.
- Optionally check 25% and 75% points.
- If midpoints are significantly off, the transmitter may require factory calibration or may be faulty.

10. COMPLETION

- Return pressure to zero and confirm final 4.00 mA reading.
- De-energise the loop and disconnect all equipment.
- Refit all covers including ZERO/SPAN access cover.
- Record:
  - Transmitter tag
  - Model and serial number
  - LRV and URV
  - As-found and as-left readings
  - Date and technician name
  - Remarks or issues

11. EXAMPLE CALIBRATION TABLE

POINT	APPLIED PRESSURE	EXPECTED mA	ACTUAL mA	ERROR	RESULT
0%	0.00 bar	4.00	_____	_____	_____
25%	2.50 bar	8.00	_____	_____	_____
50%	5.00 bar	12.00	_____	_____	_____
75%	7.50 bar	16.00	_____	_____	_____
100%	10.00 bar	20.00	_____	_____	_____

END OF PROCEDURE
