Testing and Recalibration

Testing and Recalibration of the MAS2600
Testing

Caution! Please observe that testing and recalibration of transmitters mounted in hazardous areas shall be carried out by Ex qualified personnel.

Before dispatch, the MAS2600 transmitter is calibrated in accordance with the requirements specified in the order.
The transducer and the amplifier are calibrated together and must, therefore, always be used together.
A programmable measuring range transmitter will in conditions of no pressure (empty tank) give an output signal of 4 mA, and in conditions of maximum pressure an output signal of 20 mA.
The transmitter should be tested by applying to the transducer a known pressure from a calibrator and reading the equivalent millamp signal on a millamp meter.
The above-mentioned applies to the gauge transmitter only. For absolute transmitters the output signal will be higher than 4 mA, because it is calibrated for 4 mA at 0.8 bar abs. The output signal will typically be 5-7.5 mA in atmospheric pressure, depending on the transducer range and the actual atmospheric pressure. Maximum output signal 20 mA, will be at the transducers absolute range.
Recalibrating Gauge Transmitter using Pressure on the Transducer

**Caution!** Please observe that testing and recalibration of transmitters mounted in hazardous areas shall be carried out by Ex qualified personnel.

When recalibrating the MAS2600 Gauge Transmitter a pressure calibrator with a range of -1 to 3.5 bar should be used. It should have an accuracy of 0.05% FS or better, as well as a 4½ digit milliamp meter.

1. Set the calibrator to pressure mode.
2. Connect the pressure calibrator to the transducer via MAS2600 Test Cup, type G022S100 (DPI610 and DPI603) or type G022S103 (DPI802P CAL KIT).
3. Check that the range select switch on the amplifier is correctly set.
4. In conditions of no pressure (atmospheric pressure) the output signal should be adjusted to 4.00 mA on the zero potentiometer.
5. Increase the pressure to maximum and adjust the output signal to 20.00 mA on the span potentiometer.
6. Remove the pressure and check the zero point
7. Check the linearity at 0-25-50-75 and 100% of the measuring range.
8. If necessary, repeat the steps 4 to 7.
Recalibrating Gauge Transmitter using Vacuum (for gauge transmitters only)

**Caution!** Please observe that testing and recalibration of transmitters mounted in hazardous areas shall be carried out by Ex qualified personnel.

An internally mounted transducer can also be recalibrated by using vacuum.

1. Check that the tank is empty.
2. Check that the range select switch on the amplifier is correctly set.
3. Set the calibrator to vacuum mode.
4. Connect the hose from the calibrator to the breather tube from the transducer cable.
5. In conditions of no pressure the output signal should be adjusted to 4.00 mA on the zero potentiometer.
6. Increase the vacuum equal to the maximum height of the fluid (water gauge) and adjust the output signal to 20.00 mA on the span potentiometer.
7. Remove the vacuum and check the zero point.
8. Check the linearity at 0-25-50-75 and 100% of the measuring range.
9. If necessary, repeat the steps 5 to 8.

**Note!** If the calibrated maximum water gauge is greater than the maximum water gauge that can be generated by the vacuum calibrator, the proportional mA output signal equal to the maximum vacuum signal should be calculated.

**Example:**

If the full-scale of the transmitter is 15 mH₂O, and the maximum capacity of the vacuum calibrator is 7.5 mH₂O, the mA output signal at 7.5 mH₂O is calculated as:

15 mH₂O = 20 mA and 0 mH₂O = 4 mA
7.5 mH₂O = 4 + ((20 - 4) * 7.5) / 15 = 12 mA

The span potentiometer is adjusted so that the output signal shows 12 mA at 7.5 mH₂O.
Recalibrating the Absolute Transmitter using Pressure on the Transducer

**Caution!** Please observe that testing and recalibration of transmitters mounted in hazardous areas shall be carried out by Ex qualified personnel.

When recalibrating the MAS2600 Absolute Transmitter a pressure calibrator with a range of -1 to 3.5 bar should be used. It should have an accuracy of 0.05% FS or better, as well as a 4½ digit milliampmeter. If a calibrator without reference transmitter is used, the atmospheric pressure must be known to calculate the correction.

*Atmospheric pressure* and *Transducer range* to be entered into the formulas as mbar.

1. The calibrator with the output selector switch set to pressure mode is connected to the MAS2600 transmitter via MAS2600 Test Cup, type G022S100 (DPI610 and DPI603) or type G022S103 (DPI802P CAL KIT).

2. Check the transducer range. The transducer range is indicated on the amplifier inside the box.

3. Calculate output signal in conditions of no pressure (atmospheric pressure), using below formula. The output signal should be adjusted to the calculated value on the zero potentiometer.

\[
\text{mA at Atmospheric pressure} = 4 + \left(16 \times \frac{(\text{Atm. press} - 800)}{\text{(Trd. range - 800)}}\right)
\]

4. Calculate the pressure for maximum output signal, using the following formula.

\[
\text{mbarg at 20 mA} = \text{Trd. range} - \text{Atm. press}
\]

Increase the pressure to calculated pressure and adjust the output signal to 20.00 mA on the span potentiometer.

5. Remove the pressure and check the zero point.

6. Check the linearity at 0-25-50-75 and 100% of the measuring range.

Output signal at different pressures \(P\) can be calculated, using the following formula.

\[
\text{mA at } P \text{ mbarg} = 4 + \left(16 \times \frac{(\text{Atm. press} - 800 + P)}{\text{(Trd. range - 800)}}\right)
\]

7. If necessary, repeat the steps 3 to 6.

**Example:**

If the range of the transducer is 3.5 bar abs and the atmospheric pressure is 1005 mbar.

Calculated output at atmospheric pressure:

\[
\text{mA at Atm.press} = 4 + \left(16 \times \frac{(1005 - 800)}{3500 - 800}\right) = 5.215 \text{ mA}
\]

Calculated applied pressure for maximum output:

\[
\text{mbarg at 20 mA} = 3500 - 1005 = 2495 \text{ mbarg}
\]

Calculated pressure at 50% of the transducer range:

\[
\text{mA at } P \text{ mbarg} = 4 + \left(16 \times \frac{(1005 - 800 + 1750)}{3500 - 800}\right) = 15.585 \text{ mA}
\]