Technical Note
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Universal Auto Trim Procedure

The Universal Auto Trim function is used by the Rosemount Transmitter to calibrate itself with non-Rosemount sensors. This procedure provides detailed instructions for performing the Universal Auto Trim function. The procedure is valid for the Rosemount 8712D, 8712E, and 8732E HART® and FOUNDATION™ fieldbus Magnetic Flowmeter Transmitters. It is important to note that the Rosemount universal capabilities should only be used with remote mount sensors in non-hazardous classified areas. Refer to the Rosemount Product Manuals for the 8712D, 8712E or 8732E for more details regarding certain steps.

Verify Sensor Health

If the health of the sensor is in doubt, the following steps can be taken to ensure the sensor's internal circuits are in good working condition and will function properly with the Rosemount transmitter.

1. Disconnect power to the existing sensor or transmitter.
2. Disconnect remote wiring at the sensor junction box.
3. Check condition of the current sensor by checking resistance and inductance of coil circuit. Check resistance with a Digital Multimeter. Check inductance with an LCR Meter.

Coil circuit resistance should be between 2.25 and 500 Ω.
Coil circuit inductance should be between 11 mH and 1500 mH.

4. Check to ensure that resistance from coil circuit to ground is an open circuit (MΩ range or less than 1 nS). Check resistance with a Digital Multimeter. Do not use the Rosemount transmitter if there is a low resistance between coil circuit and ground. This can cause long term stability issues and potentially damage the Rosemount transmitter if it is connected with one of these sensors. Contact your local Rosemount representative for detailed information on how to handle this situation.
5. Check resistance of electrode 1 and electrode 2 to ground to make sure there isn't a short between the electrode and ground. If the sensor is full, check electrode resistance with an LCR meter. Set the LCR meter to the 120 Hz frequency setting. Resistance should be very roughly 1000 Ω or larger if the sensor is full. More importantly, the resistance readings for electrode 1 and electrode 2 should be stable and within a few hundred Ω of each other. If the sensor is empty, check electrode resistance with a Digital Multimeter. Resistance should read Open if the sensor is empty.

Pre-Configure the Rosemount Transmitter

Perform a basic configuration of the Rosemount transmitter to get it set up for the application.

1. Be sure to disconnect power to the existing transmitter.
2. Remove the old transmitter.
3. Power up the Rosemount transmitter with no sensor attached. Enter the line size, engineering units, and range values (4-20 mA points). If using pulse output, configure the pulse output.
4. Disconnect power to the Rosemount transmitter.

Make Wiring Connections between Sensor and Rosemount Transmitter

Note that this Universal functionality is only valid for remote mount transmitters.

1. Discard old wiring and use new wiring per Rosemount specifications. Contact your local Rosemount representative before reusing existing wiring.

Signal Cable – 20 AWG, Belden 8762 or Alpha 2411 equivalent
Coil Drive Cable – 14 AWG, Belden 8720 or Alpha 2442 equivalent

2. Make wiring connections at the Rosemount transmitter.
3. Determine on the sensor which set of terminals is for the coil circuit and which set is for the electrodes or signal circuit. Refer to the Appendix D in the 8712D manual (00809-0100-4661), Appendix E from the 8712E Manual (00809-0100-4664) or Appendix E in the 8732E manual (00809-0100-4662) for wiring diagrams with non-Rosemount sensors.
4. Match the terminals on the Rosemount transmitter to the corresponding sensor terminal.

TABLE 1. Generic Wiring Chart for Universal Installations

Rosemount Transmitter Terminal	Sensor Terminal
1	Coil Positive
2	Coil Negative
⏚	Coil Shield/Ground
17	Electrode Shield/Ground
18	Electrode Positive
19	Electrode Negative

5. It is most important during wiring to make sure the coil circuit is connected to the coil drive terminals and the electrode circuit is connected to the signal terminals. If positive and negative are switched, it is not a major concern at this point. If the terminals for the coil circuit and electrodes circuit can't be determined, measure the resistance values as detailed in the Verify Sensor Health section.

Performing the Universal Auto Trim

The Universal Auto Trim function is used to calibrate the Rosemount transmitter with the sensor. A known steady flow rate is required to perform the Universal Auto Trim.

1. Reconnect power to the Rosemount transmitter. Check for any alarms on the transmitter. Note that the transmitter will probably not be reading the correct flow rate at this time, and may be exceeding the configured flow range.
2. Check the flow rate on transmitter. Ensure it is in the correct direction. If the transmitter is indicating reverse flow, switch the wires on terminals 18 and 19 at the transmitter. This should correct the reverse flow condition.
3. Ensure the transmitter has a default calibration number of 1000005010000000.

8712D/E LOI: Press the "TUBE CAL NO." key on the LOI.
8712D/E with 375 Field Communicator: Use fast key sequence 1,3,6.
8732E LOI: Use the menu path Basic Setup, Cal Number.
8732E with 375 Field Communicator: Use fast key sequence 1,3,6.

4. Locate and run the Universal Auto Trim function on the transmitter. Enter the current process flow rate. Use a setpoint, valve setting, historical data, or upstream or downstream flowmeter to determine this value. The more accurate the entered flow rate, the more accurate the transmitter will perform.

8712D/E LOI: Press the "AUX. FUNCTION" key on LOI to find Universal Auto-Trim and then follow the instructions on the display.
8712D/E with 375 Field Communicator: Use fast key sequence 1,2,5,5.
8732E LOI: Use the menu path Diagnostics, Trims, Universal Trim and then follow the instructions on the display.
8732E with 375 Field Communicator: Use fast key sequence 1,2,5,5.

5. When the Universal Auto Trim is complete, check the flow rate of the transmitter. Ensure it is close to the expected value from the previous step.
6. Record the 16-digit Rosemount Calibration Number that was generated by the Universal Auto Trim. This is the unique calibration number for the non-Rosemount sensor.

8712D/E LOI: Press the "TUBE CAL NO." key on the LOI.
8712D/E with 375 Field Communicator: Use fast key sequence 1,3,6.
8732E LOI: Use the menu path Basic Setup, Cal Number.
8732E with 375 Field Communicator: Use fast key sequence 1,3,6.

7. If fine tuning of the current flow rate reading is required, change the first five digits in calibration number. There is an implied decimal point between the third and fourth digits. See Figure 1: Rosemount Universal Calibration Number Breakdown below for details. For example, if the flow rate is 3% higher than expected, and the existing first five digits of the calibration number are 09945 (99.45% gain), add 3% to the existing digits so it reads 10243 (102.43% gain).

FIGURE 1. Rosemount Universal Calibration Number Breakdown

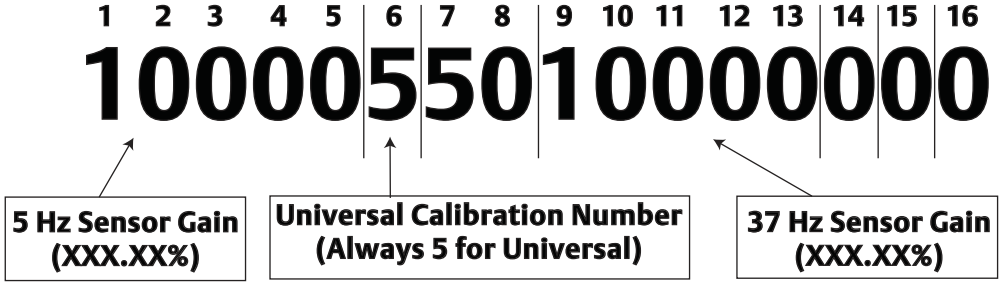

TABLE 2. Sensor gain adjustment examples

Example	Flow Reading	Actual Flow Rate	% Deviation	Current Gain Value	Required Adjustment	New Gain Value
Readfing High	103 GPM	100 GPM	+3.00%	09945	+2.98	10243
Reading Low	95 m3/hr	100 m3/hr	-5.00%	10172	-5.09	09663

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