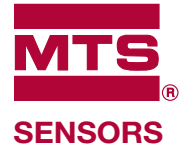


# Liquid-Level Sensors

with Temposonics®  
Magnetostrictive Technology



Calibrating M-Series Transmitters using  
MTS Field Setup Software - Analog Output

550880 A

## Technical Tip #24

M-Series Transmitter



### M-Series transmitter overview

The Liquid Level M-Series transmitter is multi-functional with two 4-20 mA loops that utilize Highway Addressable Remote Transducer (HART) communications. It provides up to two analog outputs of level, interface, or temperature. An optional electronics module displays simultaneous readouts of level, interface, or temperature.

The optional electronics module is designed with three push buttons for local setup of level parameters. Outputs can be monitored using 4-20 mA signal output, when you use a RS-232 to HART Hand-Held Converter with an optional integral display or MTS PC-compatible M-Series Field Setup software.

### Required equipment

You will require the following equipment to calibrate M-Series Transmitters:

- Linear power supply
- Multi-meter
- Computer with the M-Series Field Setup software installed
- HART to RS-232 converter

### Required software

MTS M-Series Field Setup software

For software updates go to [www.mtssensors.com/software.htm](http://www.mtssensors.com/software.htm)

### Calibrating M-Series transmitters

The procedure in this Technical Tip will guide you through the necessary steps to calibrate M-Series Transmitters with MTS Field Setup software.

All specifications are subject to change. Please contact MTS for specifications that are critical to your needs.

## Before you begin

Before you begin, do the following:

1. Obtain a *Linear Power Supply, Multi-meter, PC* and a *HART RS-232 Converter*.
2. Complete the following steps to install the latest *M-Series Field Setup Software* package otherwise, go to "Calibration and setup parameters":
  - a. Insert the CD into the proper drive.
  - b. Browse to to CD-ROM drive and run setup.exe.
  - c. Follow the instructions on screen to install the program.

## Setup and calibration parameters

### Setup parameters

1. Connect the amp meter, power supply and transmitter. Set the proper scale on the meter. Ensure a 250 ohm resistor is installed in the line to enable uninterrupted communication.
2. Connect the HART adapter/converter to the RS-232 COM port on the back of the PC.
3. Attach the HART converter to the HART connection pins located on top of the M-Series Electronic module (puck) or across the resistor.
4. Apply power to the M-Series Transmitter and PC.

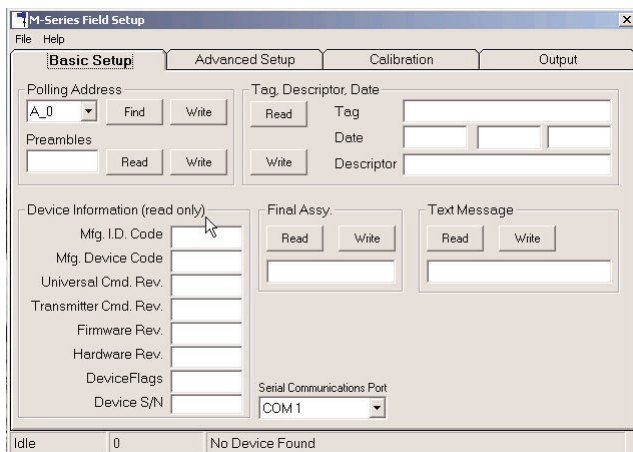
Complete the following steps to calibrate the M-Series transmitter using MTS Field Setup software:

1. From your desktop double-click the *M-Series Field Setup* icon to start the software.



2. Setup will automatically search and receive configuration data from the transmitter. The M-Series Field Setup window displays as shown in *Figure 1*, "M-Series Field Setup software - Basic Setup window", click the **Basic Setup** tab to review the data. If there is no data, assign a different serial communications port and click the **Find** button in the top left corner to rerun the search program.

**Figure 1**  
M-Series Field Setup software - Basic Setup window



3. Click the **Advanced Setup** tab. The M-Series Field Setup window "M-Series Field Setup software-Advanced setup" window displays, (see *Figure 2* on page 3). Confirm that the *Gradient, Length, and Head Adder* have been received from the level transmitter. If the information does not display, click the **Read** button at the bottom of the window and manually enter the missing data. The sensor information fields are defined as follows:

#### Sensor information:

**Gradient:** Is slightly different for each transmitter. It can be found on sensor element head.

**Units:** Determines the units of measure for *Length* and *Head Adder*. This is used when writing new values of Order Length and Head Adder to the transmitter. Click the **Output Tab** to change units of measure for all data.

**Length:** Is equal to the order length of the transmitter being used.

**Head Adder:** Is the distance between the sensing element and the order length. Each model has a slightly different adder as follows: Gauge Style (Length in Inches):

NEMA 4X housing, standard rigid pipe (4.3 to 4.5)

Explosion-proof housing with rigid pipe (5.6 to 5.7)

NEMA 4X housing with flex pipe < 10 feet (14.0 to 14.5)

Explosion-proof housing with flex pipe < 10 feet (14.0 to 14.5)

#### Instrument parameters:

**Display Units:** Type of level data displayed on the optional LCD display; Units, mA and Percent.

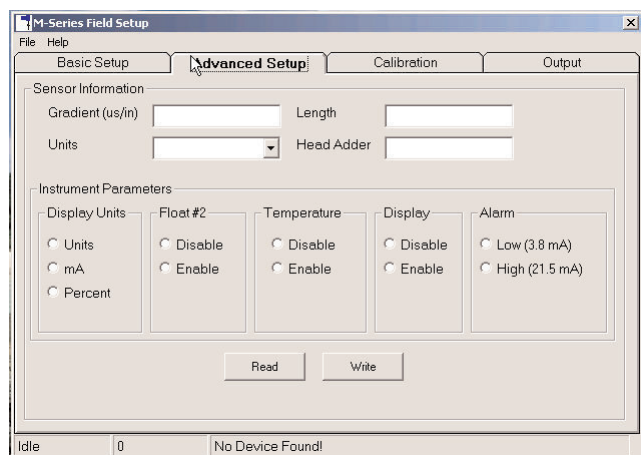
**Float #2:** optional float #2; Enable/Disable .

**Temperature:** optional temperature data; Enable and Disable.

**Display:** optional LCD display; Enable and Disable.

**Alarm:** Output current value defined as Low (3.8 mA) or High (21.5 mA), if the float(s) or temperature sensor should fail.

**Figure 2**  
M-Series Field Setup software - Advanced Setup window



4. Click the **Calibration** tab. The M-Series Field Setup window as shown in *Figure 3* on page 3 "M-Series Field Setup software - Calibration Setup window", displays.

If the data is not present, press the **Read** button. You will need to adjust both Zero and Span values. You will press the **Write** button to adjust the *Zero (LRV)* value, *Span (URV)* value and *Units* value from the appropriate channel.

## Setup and calibration parameters (continued)

The Calibration window fields are defined as follows:

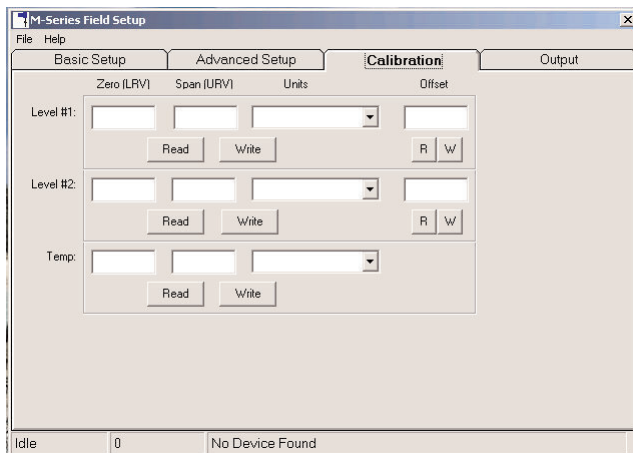
The Calibration window contains the *Zero (LRV)* and *Span (URV)* set points for all three variables. To change a value, type in the new value and press the **Write** button to save your change. To confirm the value change, press the **Read** button.

The Units field shows the units of measure for the *Zero (LRV)* and *Span (URV)*. To change the units of measure for Zero (LRV) and Span (URV), press the arrow and select from the pull-down menu. Press the **Write** button to confirm any changes to the settings. Press the **Read** button to confirm that the transmitter has accepted the new value.

The Offset field is used for making adjustments to the optional LCD display only, not the current output.

**Example:** If the float is at the 4-mA point, but the display reads +.25 inches. Enter in -.25 inches in the block and press the **W** key to save, now the display will read 0.00 inches even though the current has remained at 4 mA.

**Figure 3**  
M-Series Field Setup software - Calibration window



- Click the **Output** tab. In the M-Series Field Setup window as shown in Figure 4 "M-Series Field Setup software - Output window" displays.

The Output window fields are defined as follows:

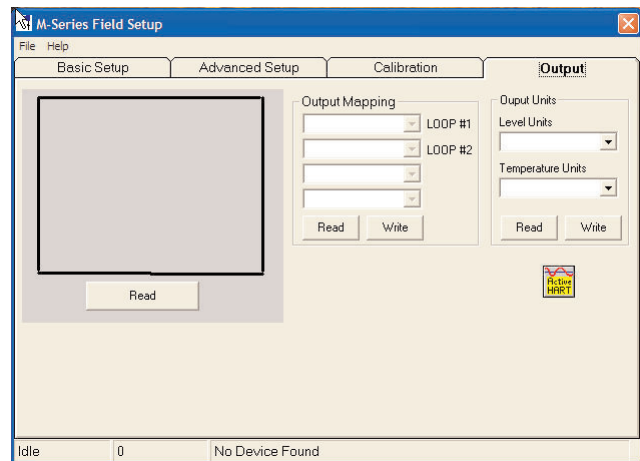
**Output Mapping:** Using the pull-down menus, select settings for *Level*, *Interface* or *Temperature* as needed for Loops #1 and #2.

**Output Units:** Use the pull down menus to select units of measure for *Level* and *Temperature*.

**Note:** When changing units, make your selections from the *Output* window **BEFORE** changing units on the *Advanced Settings* or *Calibration* windows.

**Read:** When pressing the Read button, a single read command is sent to the gauge. The gauge responds and displays operational data.

**Figure 4**  
M-Series Field Setup software - Output window



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