

# Level Plus<sup>®</sup>

Liquid-Level Sensors  
With Temposonics<sup>®</sup> Technology



M-Series Model MG with Digital Output  
Unsigned Integer - High and Low Word Registers

551094 A

## Technical Tip

M-Series Model MG  
Digital Transmitters



### Technical Tip Overview

This Technical Tip explains how to use **High Word** and **Low Word** registers when interfacing a Model MG Modbus transmitter to a PLC.

### Reviewing model MG transmitter measurement

To review a measurement out of the Model MG transmitter when interfacing with Modbus, the end user needs to request both the 'High Word' and 'Low Word' registers. Each word is a 16 bit integer. The 'High Word' should be shifted 16 bits to the left and added to the 'Low Word' as shown below.

|                     |                                  |
|---------------------|----------------------------------|
| 'High Word'         | 1111000011110000                 |
| 'Low Word'          | 1100110011001100                 |
| Shifted 'High Word' | 11110000111100000000000000000000 |
| 'Low Word'          | 1100110011001100                 |
| Value               | 11110000111100001100110011001100 |

The result of shifting the 'High Word' and adding it to the 'Low Word' is a 32 bit signed integer. The most significant bit of the 'High Word' carries the signed bit throughout the process.

Customers identified a problem when interfacing a Model MG Modbus transmitter to a PLC using the Modbus software. The transmitter will have the correct level and volume calculations but the PLC will have a different value. The error came from the PLC assuming both the 'High Word' and 'Low Word' were either signed or unsigned. The confusion between a signed and unsigned integer does not always disturb the measurement. This seemingly random occurrence frustrated many end users as the error only occurs at certain measurement.

Whenever interfacing with the Model MG transmitter with Modbus, pull both the 'High Word' and 'Low Word', shift the 'High Word', add the 'Low Word', and use the sum as a 32 bit signed integer. Refer to the M-Series Digital Operation and Installation Manual, part no. 550791 for detailed information about Modbus registers.

If you require additional assistance, contact MTS Applications Engineering Department at (919) 677-0100.

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All Temposonics sensors are covered by US patent number 5,545,984. Additional patents are pending.

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