

Level Plus®

Liquid-Level Sensors



M-Series
Model MG
Digital Output

Transmitter Electronics Replacement Guide

551104 A



M-Series Model MG
digital transmitter

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Guide overview

This guide contains software setup and digital component replacement procedures for the MTS M-Series Model MG digital transmitter (gauge). Software setup screens shown in this guide are Modbus examples. If you are installing DDA setup software, your setup screens will be similar.

Software and hardware requirements

MTS Part Numbers:

- 625051 - M-Series PC Setup Modbus Software CD and RS-485 to RS-232 Adapter
- 625052 - M-Series Digital PC Setup Modbus Software CD
- 380075 - RS-485 to RS-232 Adapter
- 625053 - M-Series Digital PC Setup (DDA)

Technical support and shipping information

The M-Series transmitter design is modular in nature. The electronics can be replaced in the field without on-site support of the MTS Service Department.

Ordering information and software updates:

You can get the latest ordering information and software updates by using the World Wide Web. Go to www.mtssensors.com.

Technical support

Phone: 800-633-7609
E-mail: levelplus@mts.com

Shipping address

MTS Systems Corporation
Sensors Division
3001 Sheldon Drive
Cary, North Carolina 27513

Notices used in this guide

Notes

These notices provide important tips, guidance, or advice.

Caution

These notices indicate situations that can be potentially hazardous to you. A Caution notice is placed just before a description of a potentially hazardous procedure, step, or situation.

Attention

These notices indicate possible damage to devices or data. An Attention notice is placed before the instruction or situation in which damage could occur.

Always follow applicable local and national electrical codes and observe polarity when making electrical connections. Do not remove cover or make electrical connections to the M-Series transmitter with power turned on. Make sure that no wire strands are loose or sticking out of the terminal block connection which could short and cause a problem.

Related publications

The following publications are available in Adobe Acrobat Portable Document Format (PDF) at <http://www.mtssensors.com>.

- 550731 - Installation sheet, M-Series Electronics Module
- 550784 - Product Specification, Level Plus M-Series Digital
- 550537 - Product Specification, Level Plus M-Series Floats and Accessories

All specifications are subject to change. Contact MTS for specifications that are critical to your application. Go to www.mtssensors.com for the latest support documentation.

Before you begin

Before replacing your digital transmitter electronics, make sure that it is programmed with the transmitter data restore file you created after initial installation and calibration of your transmitter.

Note:

Each transmitter requires its own restore file.

- To install the transmitter setup software, go to the section titled “*Software installation and configuration; Modbus and DDA*”.
- To create a restore file, go to the section titled “*Create the transmitter data restore file*”.
- If your transmitter electronics PCB is already programmed and you have a data restore file, go to the section titled “*Replacing your transmitter electronics PCB*”.

Software installation and configuration; Modbus and DDA

Obtain the setup software that shipped with your transmitter or go to www.mtssensors.com and download the latest Modbus or DDA setup software from the MTS software Vault. You will be asked to register for a login and password to enter the Vault portal. From the Vault, do the following:

For Modbus configuration, download *Modbus_*.zip*

For DDA configuration, download *DDA_*.zip*

Perform the following steps to extract and install the setup software:

1. Locate and double-click the appropriate *protocol_*.zip* file. Extract the program folder into C:\ProgramFiles\ and double-click the *.exe file to install the program.
2. **Create shortcut and Enable factory mode:** Go to C:\ProgramFiles\MTS Sensors\ and right click the program configuration folder. Drag the folder to your desktop.
3. Right click the Configuration folder shortcut icon, select “*Properties*”. The shortcut properties dialog box opens (*Figure 1*).

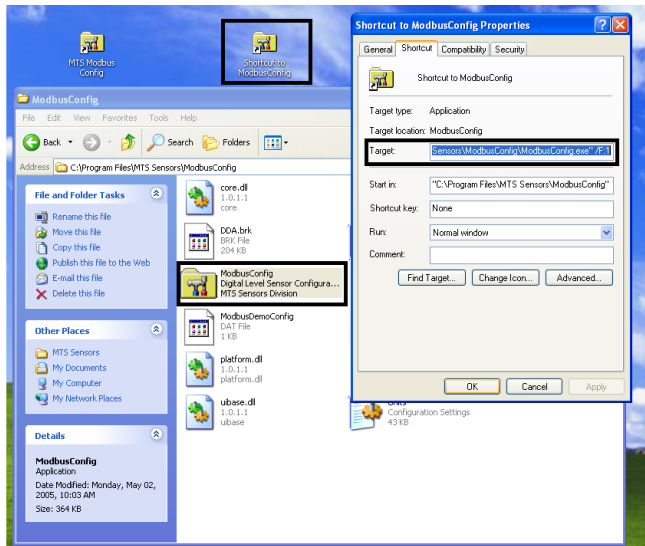


Figure 1. Shortcut creation and Target entry

In the “*Target*” entry box at the end of the path string, type *Spacebar/F:1*. The string should resemble one of the following:

“C:\ProgramFiles\MTSSensors\ModbusConfig\ModbusConfig.exe”/F:1

“C:\ProgramFiles\MTSSensors\DDAConfig\DDAConfig.exe”/F:1

4. Continue with “*Create the transmitter data restore file*”.

Create the transmitter data restore file

Note:

Each transmitter requires its own restore file. Your transmitter must be installed properly and calibrated before you create the data restore file.

Perform the following steps to create a transmitter data restore file:

1. Click the program file icon to launch the configuration setup software. The setup “*Configuration*” window opens (*Figure 2*).

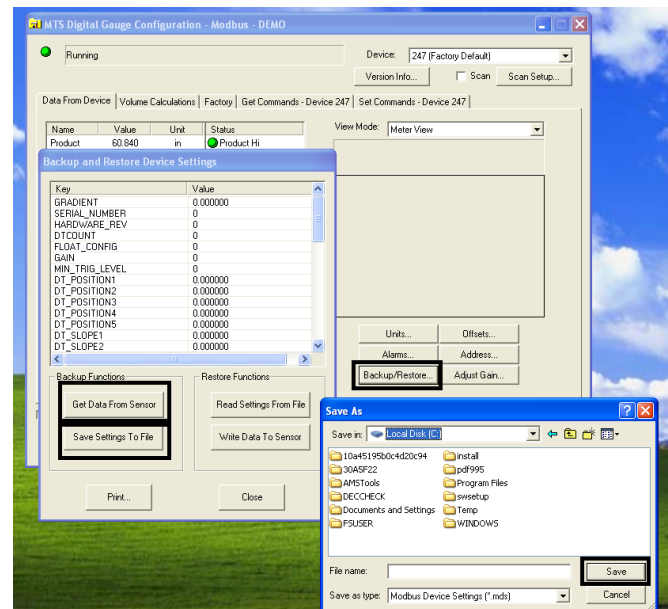


Figure 2. Shortcut creation and Target entry

2. Connect the transmitter. If the transmitter is connected properly, you will see five new tab selections at the top of the window. perform the following:

- a. Click the “*Data from Device*” tab, a new window opens.
- b. Click the “*Backup/Restore*” button. a new window opens.
- c. Click the “*Get Data from Sensor*” button, then select the “*Save settings to file*” button.
- d. Type in a filename such as *ModbusRestore* or *DDARestore* and path that you can easily locate. then, click “*Save*”

Transmitter electronics replacement procedure

Complete the following steps to remove and replace your transmitter electronics board after you have successfully created a data restore file.

Caution:

Ensure that all power is disconnected and that all lockout procedure(s) are followed prior to opening the transmitter instrument housing.

Removing the transmitter electronics boards

1. Remove any dirt, debris, or liquid from the top of the instrument enclosure.
2. Remove the instrument housing cover.
3. Remove wired connector (replacement included if needed) from PC board terminal block (Figure 3).

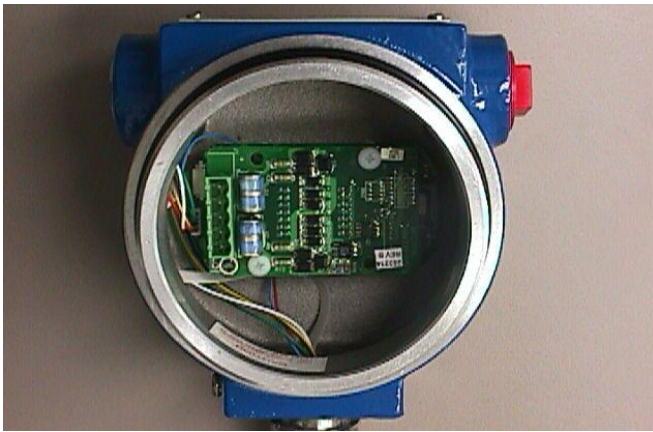


Figure 3. Transmitter electronics top board with connector removed

4. Remove the existing transmitter electronics by unscrewing the four retaining screws and removing the (top) board. Note the orientation of boards housing before removal to aid in installation of replacement boards (Figure 4).

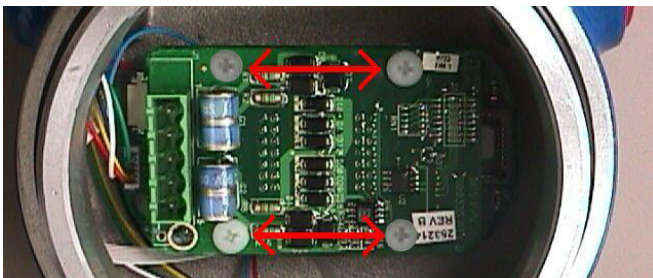


Figure 4. Top electronics board retaining screw locations

5. Unscrew four standoffs and remove bottom board (Figure 5).

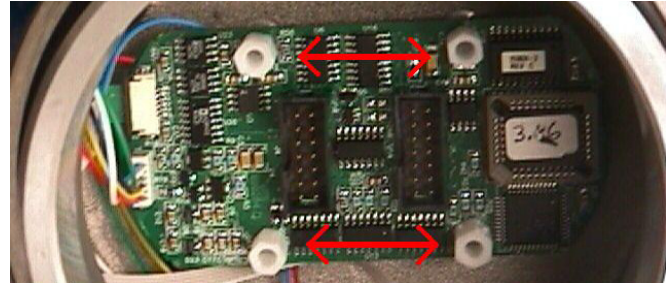


Figure 5. Bottom electronics board standoffs locations

6. Disconnect the white sensing element (SE) 6-pin connector from the bottom board (pull straight out) and remove the white DT ribbon cable connector with a small green connector card if present (slide wing outward and pull connector out parallel to the PCB sideways) (Figure 6).

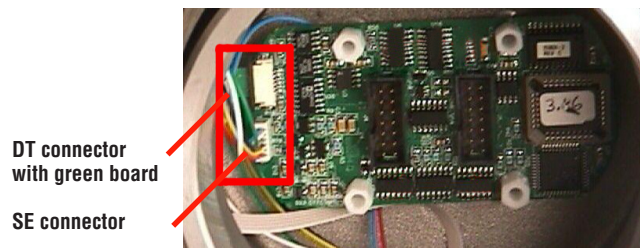


Figure 6. SE and DT connector locations

Replacing the transmitter electronics boards

Use the same procedure and adhere to the same cautions noted in the board removal process when reinstalling boards. Install the boards in the following order:

1. Reconnect the sensing element (SE) connector and DT connector (when available). Before you reconnect the DT to the board, verify that the gold DT connector pins are facing down. Push wing back in lock the DT cable.
2. Install the new base board (round edges) with four standoffs (replacement standoffs included).
3. Install top board and secure with four screws (replacement screws are included with kit). Verify that the orientation of the boards are such that the connectors are all located on the same side as in (Figure 4).
4. Plug the wired connector into the PC board terminal block.
5. Reattach the transmitter instrument housing cover.

Attention:

If PC boards are in the housing, be sure you disconnect the SE and DT cables first. When removing the pipe from the housing, damage to the DT cable SE connections may occur if proper care is not taken (Figure 7).

1. Remove the SE and DT cable connections first, See Removing the transmitter electronics boards.
2. Slowly unscrew the pipe from the housing. Be aware of possible damage to the DT and SE connectors when performing this step (Figure 7).



Figure 7. SE and DT connector locations

Attention:

Damage to the SE and DT can occur when removing the plastic base cartridge and heat shrink tubing from the SE (Figure 8).

3. Using e-clip or needle nose pliers, remove the retaining clip from the inside of the pipe (Figure 8).

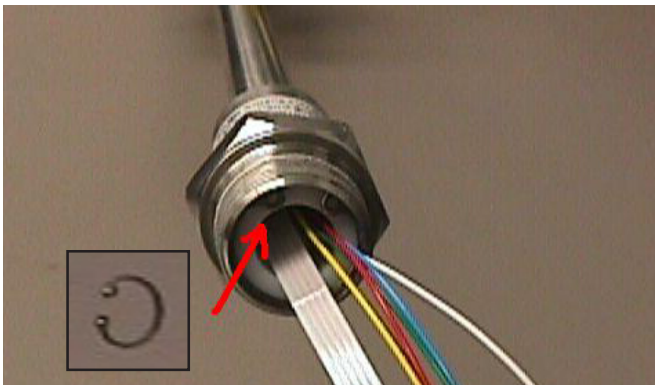


Figure 8. Removing the retaining clip from inside of the pipe assembly

Attention:

To avoid component damage, removing the SE with needle nose pliers is required. Please note that the SE can not be bent in less than a 2 foot radius (Figure 9).

4. Using needle nose pliers, gently pull the SE cable assembly out of the pipe. Remove the white base cartridge from the SE. To avoid damaging the SE, do not bend the SE in less than a 2 ft. radius (Figure 9).

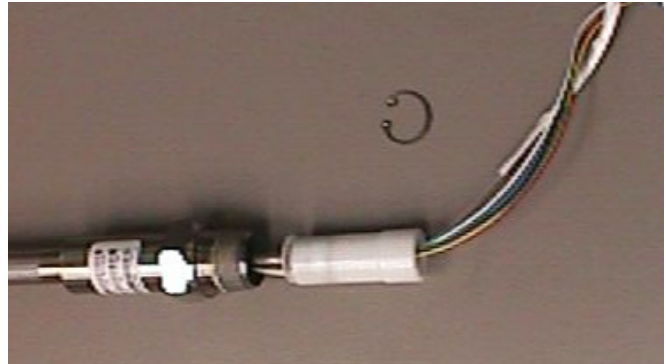


Figure 9. Removing the SE cable assembly

- Locate and open the *Gradient Off tag* which is attached to the new SE. Record the gradient information and place it in a safe place. The Gradient value will be entered into the configuration software Factory tab window after installation (Step 5 in next section).
 - Remove the black rubber plug from the end of the new SE.
5. Install the SE. There are two methods you can use to install the SE:
 - Roll the SE off the spool and directly into the pipe.
 - Uncoil the SE and gently feed it into the pipe by hand. Light pressure and twisting may be required to install the SE into the pipe. If the SE is bent or kinked, functionality and or breakage will occur which will render the SE unrepairable.
 6. Secure the SE with the retaining clip you removed in step 2 and reconnect the pipe to the instrument housing. Continue with “Replacing the transmitter electronics boards”.

Installing current parameters

Setting new gradient value and board parameters

Your new boards must be programmed before use. Follow the steps below to program your new boards:

1. Launch your setup software and connect to the transmitter. Click the “Data from Device” tab, then click the “Backup/Restore” button. The “Backup and Restore Device Settings” window opens (Figure 10).

5. Click “Read”.
6. Click the “Volume” tab. The Volume tab window opens. Click “Strap table”.
7. Click “Read from Table”. Then, click “Write data to sensor”.
8. You will be prompted for a password. The password is “becareful”.

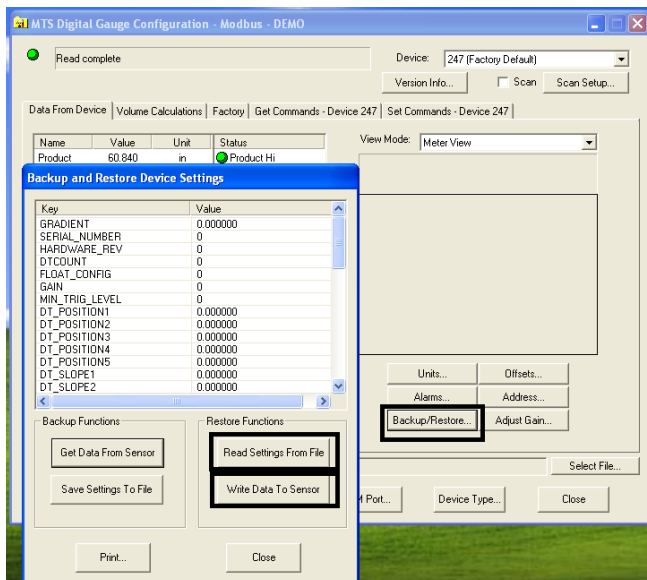


Figure 10. Data from Device window; Backup and restore settings.

2. Click the “Read Settings from file” button. Then, select your previously saved data restore file.
3. Click the “Write Data to Sensor” button, Click “Yes”, Click “OK” and “Close”.
4. Click the “Factory” tab. The Factory Tab window opens. Type the Gradient value you recorded from the Gradient Off Tag (Figure 11).

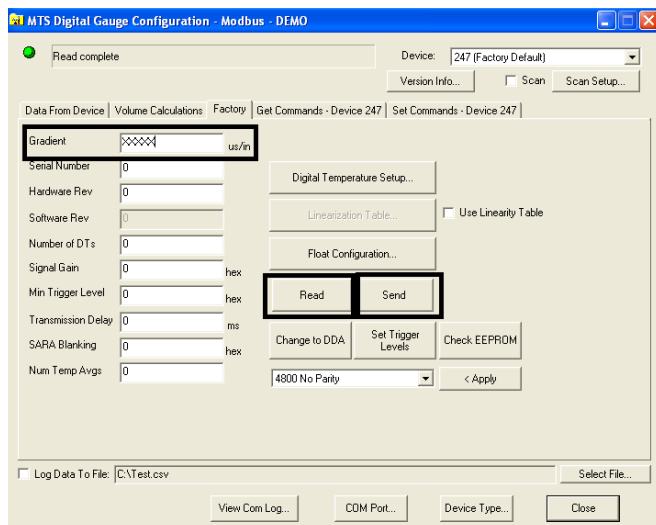


Figure 11. Factory window; Entering the new gradient value and reading new settings



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

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