

Level Plus[®]

Magnetostrictive Liquid Level Transmitters
with Temposonics[®] Technology

LP-Series SE Replacement
Installation Manual

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2. Tools

- Computer
- MTS LP Dashboard Setup Software
- Phillips Head Screwdriver
- Common Head Screwdriver
- 12 or 24 Vdc linear regulated power supply
- Snap ring pliers or needlenose pliers
- Channel-lock pliers
- Analog
 - HART® to USB Converter (MTS Part #380068 or equivalent)
 - 250 Ohm Resistor
- Digital
 - RS485 to USB Converter (MTS Part #380114 or equivalent)

3. Procedure

1. Disconnect power from level transmitter and make sure it is safe to work on level transmitter.
2. The following picture illustrate the single cavity aluminum housing. The same procedure can be adapted for any of the other MTS housings with minimal difficulty. Remove the cover of the housing.



Fig. 1: Housing without cover

3. Pull out display. The display is connected with a cable. The display can hang from the housing by the cable or it can be removed and secured.



Fig. 2: Display removed

4. Remove the two Phillips head screw as shown below.



Fig. 3: Screw removal

5. Remove the top board from the board stack. The top board will remain with the housing as the white ground wire is connected to the ground lug.



Fig. 4: Top board removed

6. Pull the remaining board(s) up from plastic retainer. Do not pull all the way out as the sensing element and temperature cables are still connected. Digital level transmitters will have a total of two boards in addition to the display whereas analog level transmitters will have a total of three boards in addition to the display.



Fig. 5: All boards removed

7. Disconnect sensing element and temperature cables from the board. The white ribbon temperature cable will only be present if the level transmitter was ordered with the temperature option.



Fig. 6: Sensing element Disconnected

8. Remove the black plastic retainer by removing the two larger Phillips head screws.



Fig. 7: Retainer removed

9. Remove the housing from the flexible hose or the rigid pipe. The top of the pipe has a sensor cartridge that can be used for loosening. Depending on the housing you will need to determine a place to grip the housing. Make sure not to damage the housing. A large screwdriver can be used for leverage. Be careful not to damage the top board or cables for the sensing element or temperature cable.



Fig. 8: Housing removal

10. The rigid pipe and flexible hose should now be separate from the housing.



Fig. 9: Pipe with sensing element

11. Use the Snap Ring or Needle Nose pliers to remove the c-clip.



Fig. 10: Sensor cartridge view

12. Pull up on the retainer to remove it from the top of the pipe. The Explosion Proof / Flameproof approved units will have a metal pressure barrier at the top of the pipe. Do not scratch or drop the pressure barrier. If it is mechanically damaged it will need to be replaced. This is not included with the sensing element. See the image below. Remove sensing element from pipe or hose.



Fig. 11: Explosion proof cartridge

13. The Intrinsically Safe approved units will have a plastic retainer at the top of the pipe. The plastic retainer can be removed. A replacement is included with the sensing element. Connect display to middle board (analog) or bottom board (digital).



Fig. 12: Intrinsically safe cartridge

14. The new sensing element will be a flexible sensing element unless the order length is less than 48" (1220 mm) or model CHAMBERED. The flexible sensing element will ship on a spool as shown below. Remove the tag that shows the Gradient and save this. The sensing element can go direct from the spool into the pipe or hose. Be careful to not force the sensing element or it can be damaged. If the sensing element does not go in smoothly then make sure the flexible hose or pipe are straight and not damaged. Make sure the flexible hose is tight. It is suggested to twist the sensing element if it encounters resistance and not push on the element.



Fig. 13: Sensing element spool

15. For Explosion Proof / Flameproof units install the plastic spacer over the head of the sensing element. The plastic space is keyed so make sure it slides on correctly. Connect the sensing element and temperature cable to the bottom of the pressure barrier. The temperature cable needs to have the gold pins to the outside of the pipe. Install assembly into pipe or hose. Install c-clip with yellow paint facing up so it is visible. The c-clip is required as part of the approval to hold the pressure barrier in place.
16. For Intrinsically Safe units install the plastic plug and c-clip.
17. Thread cable into bottom of housing. Tighten housing to pipe or hose.
18. Insert black plastic retainer and secure with screws.
19. Connect sensing element and temperature cable to electronic boards. Temperature cable should have gold pins facing down towards board.
20. Install boards in retainer and secure with screws.
21. Close housing.
22. The following steps can be done from the control room or any safe area. Install LP Dashboard from USB supplied with level transmitter or download from www.mtssensors.com.
23. Connect level transmitter, power supply, computer, converter, and resistor (analog only) as shown in Fig. 14 for analog and Fig. 15 for digital.

24. Open LP Dashboard and connect to level transmitter. Select the correct Protocol from the drop-down menu. Select the correct COM Port. Do note that only active COM Ports will be shown so make sure the converter is plugged into the computer before opening the LP Dashboard. Select the correct Device Address. Default address is 0 for HART®, 0 for SIL, 247 for Modbus, 192 for DDA, and 192 for USTD.

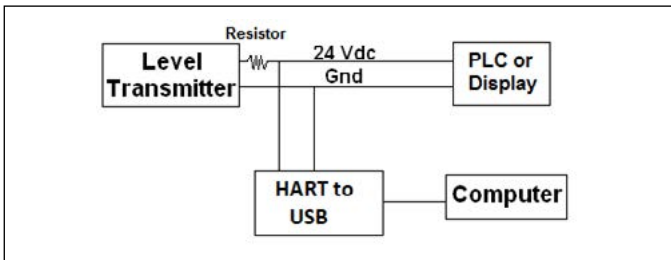


Fig. 16: Connection diagram for HART® outputs

Fig. 14: LP dashboard - connect screen

25. Click on the three white bars in the top left and select Signal Settings. Input the Gradient from the white tag into the Gradient field on the LP Dashboard. Click Write.

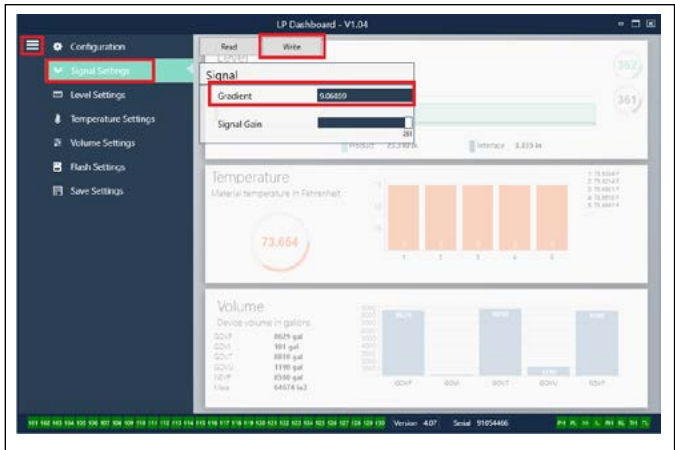
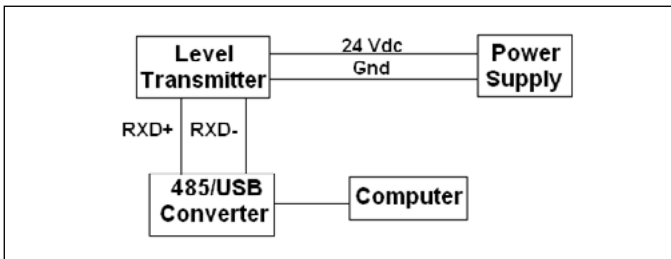


Fig. 17: LP dashboard - signal settings

Fig. 15: LP dashboard - connect screen

- Click on the three white bars in the top left and select Save Settings. Click Read Settings from Gauge. All of the boxes will turn red. Wait for them to change two white signaling that the parameters have been updated.

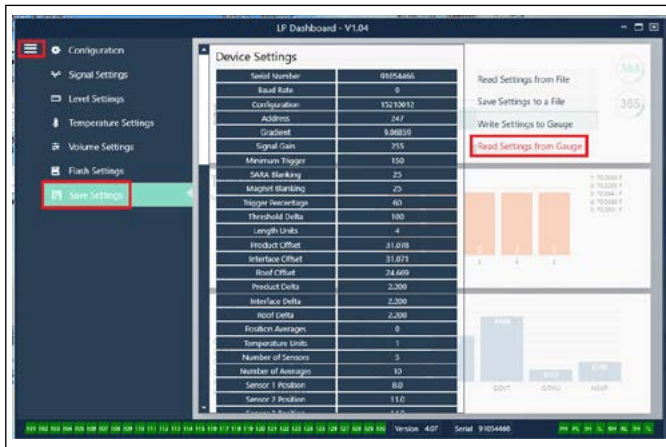


Fig. 18: LP dashboard - save settings - read from gauge

- Save a backup file of the settings for the level transmitter by clicking Save Settings to a File. Label the file with customer name, site, and tank number. The board set will come with the factory programming based off of the serial number but this will not include any changes made by the end user after receipt.

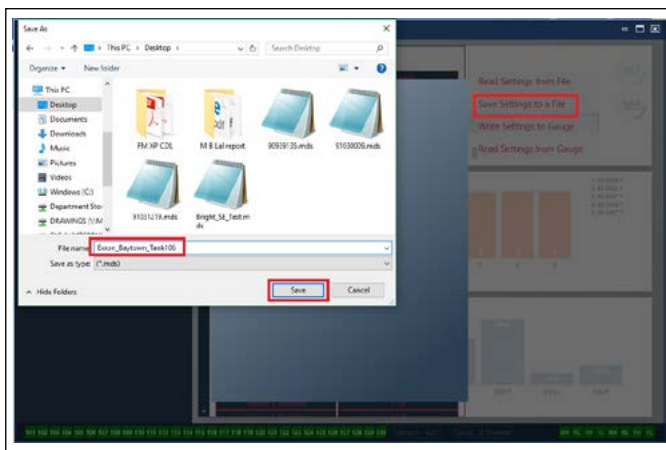


Fig. 19: LP dashboard - save settings - file save

- Disconnect from level transmitter and place back in service. Verify the level transmitter is now working correctly.



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