GUIDANT

Smith Meter®
Ultra™ Series C Liquid Ultrasonic Flowmeters & MPU™ Series C Ultrasonic Flowmeters
SoM Replacement Manual

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Important

All information and technical specifications in this document have been carefully checked and compiled by the author; however, we cannot completely exclude the possibility of errors. Guidant is always grateful to be informed of any error.

Technical Support

Field Service Response Center
24/7 Technical Support/Schedule a Technician: +1 844.203.4014

System installation supervision, startup, and commissioning services are available.

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Customer Service

1602 Wagner Avenue
Erie, PA 16510 USA
+1 814.898.5000

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1 Introduction

This manual provides instructions for replacing the system on module (SoM) using the SoM Upgrade Kit, located on the Ultrasonic Meter Control Board (UMCB) of the following meters:

- Ultra Series C Liquid Ultrasonic Flowmeter
- MPU Series C Ultrasonic Gas Flowmeter

> This procedure assumes the appropriate Ethernet or fiber-optic communications cabling are accessible in a safe area for connection between a PC and the sealed UMCB enclosure that is mounted in the hazardous area.

1.1 Weights and Measures Requirements

Guidant's Ultra and MPU series of ultrasonic meters are used in a global market. Requirements regarding weights and measures may vary depending on the region of installation and type of installation. In the majority of cases in which the meter is controlled by a weights and measures certificate, the software version is defined and controlled.

In the case of a controlled measurement application, users are required to verify that the Guidant Ultrasonic meter is configured and operated in a manner consistent with the controlling certificate and local codes, and that proper notification (permit for use) or registration has been filed with the local authority or jurisdiction. This requirement also pertains to software updates of the meter.

Weights and measures authorities rely on either physical sealing or electronic sealing with password protection to secure metrological parameters for use in legal trade applications. For instructions on setting a passwords for metrological parameters and information about physically sealing the electronic enclosure and specific meter components, refer to the Ultra Series C Liquid Ultrasonic Flowmeters Installation, Operation, and Maintenance Manual (MNLS005) or MPU Series C Installation, Operation, and Maintenance Manual (MNKS025).

1.2 Product Description

The SoM Upgrade Kit enables you to upgrade your SoM to run Ultrasonic Software versions 2.0 and above. Ultrasonic Software version 2.0 improves critical processes,

such as Ultrasonic Software updates, to be faster and more reliable.

Multiple SoM upgrade kits are available, depending on the version of your UMCB:

- P8000019905 SoM 2.0 upgrade kit for use in UMCB version 4.0 and UMCB-W version 3 and above
- P8000019988 SoM 2.0 upgrade kit for use in UMCB version 3.0 and UMCB-W version 2 and below
- P8000020133 SoM 2.0 upgrade kit (special Modbus) for use in UMCB version 3.0 and UMCB-W version 2 and below

  P8000020134 SoM 2.0 upgrade kit (special Modbus) for use in UMCB version 4.0 and UMCB-W version 3 and above

The process of replacing the SoM is the same for all upgrade kits.

1.2.1 SoM Upgrade Kit Contents

All SoM upgrade kits include the following items:

- A new SoM programmed for Ultrasonic Software 2.0
- SoM-specific serial number label for placement on UMCB assembly
- An anti-static wrist strap
- Tweezers
- A PH1 Phillips head (cross-head) screwdriver
- UMCB shield SoM upgrade label
- Two SoM mounting screws (spares)
- Two SoM Spacers (spares)

1.3 Receipt of Equipment

When you receive your SoM Replacement Kit, you should check the exterior packing case for any shipping damage.

> If the packing case is damaged, contact the shipping carrier immediately regarding their liability.

Carefully remove the control board module from the exterior packaging and inspect it for damaged or missing parts. For a list of parts included in the SoM Replacement Kit, see Section 1.2.1: SoM Upgrade Kit Contents. The SoM module is packaged in an antistatic, sealed, zipper storage bag; it should not be opened or the SoM should not be handled without using the antistatic wrist strap.

Prior to installation, the unit should be stored in its original packaging and protected from adverse weather conditions and abuse.

> If the control board module is damaged or parts are missing, a written report must be submitted to:
>
> Guidant
> c/o Inside Sales Department, Measurement Solutions
> PO Box 10428
> Erie, PA 16514

1.4 Storage Instructions

To ensure your replacement SoM is not damaged by moisture or water before being installed, it must be properly stored in a cool, dry, protected location and remain in its resealable zipper antistatic bag.

1.5 Warnings and Precautions

Before you begin the process to replace the SoM, please read all of the following warnings and cautions to reduce the risk of injury, equipment damage, or malfunction.

1.5.1 Hazardous Locations

The Ultrasonic Meter Control (UMC) assembly is approved for use in an explosive environment or hazardous location. This manual only provides information pertaining to the installation of the SoM replacement.

To maintain equipment safety, it is required to keep the front cover of the enclosure bolted tightly while power is applied when operating in a hazardous location. The closing and sealing of the enclosure is the key to maintaining explosion protection. It is imperative that servicing be performed by a qualified individual who is familiar with associated risks involved with the operation and maintenance of electrical equipment in hazardous (classified) locations. This individual must have knowledge of local and national electrical codes, in addition to ordinances concerned with hazardous location

safety requirements. It is recommended (and may be required in some jurisdictions) that the final installation be verified and inspected by the authority having jurisdiction before placing the equipment back into service. Electrical installations in hazardous areas have features specifically designed to make them suitable for use in such locations and it is the operator's responsibility to maintain the integrity of those special features.

> **Warning:** The electronics inside the explosion-proof enclosure are not suitable for exposure in a hazardous area while power is applied. Proper precautions must be taken before opening the enclosure when the meter and its electronics are installed in a hazardous area. The area must be verified that hazardous gases or vapors are not present, and all power to the equipment has been removed.

1.5.2 Electrostatic Discharge Precautions

The UMCB printed circuit board assembly is susceptible to damage by static discharge. To minimize the risk of damage, the following precautions should be followed:

- Before touching a circuit board with hands or tools, personnel and tools should be grounded using a wrist strap.
- Avoid touching components or traces on the circuit boards and handle by the edges or mounting holes.
- Circuit boards should be kept in static control packaging, such as static shielding bags, when not installed.
- Provisions should be made to protect against electrostatic discharge (ESD) in work spaces when handling circuit boards.

2 Replacing the SoM

Use the following process to replace a SoM using a SoM Replacement Kit.

> **Caution:** Before working with the UMCB, ensure that the system is made safe for work, removing energy sources, and tagging out, as required.

2.1 Required Tools

The tools needed to replace the SoM include:

- An anti-static wrist strap (included in the SoM Replacement Kit)
- Tweezers (included in the SoM Replacement Kit
- 5 millimeter (mm) hexagon key wrench
- 2.5 mm slotted (flat blade) screwdriver
- 6.5 mm slotted screwdriver
- PH1 Phillips head screwdriver (included in the SoM Replacement Kit)
- Personal computer (PC) with a web browser (Google Chrome is recommended)
- Ethernet connection
- Guidant Plotter Tool for Series C Ultrasonic Flow Meters version usmplot-0.5.7-BETA or newer (contact your Guidant service representative to get a copy of this software)

> **Note:** The external Ethernet connection should be available in an area where it is safe to use a laptop computer. If this is not available, the UMCB board must be removed the from the enclosure and taken to a safe area where it can be powered on and connected to a PC. This procedure is based on performing the upgrade at the meter's location; if the board needs to be removed to be taken to a safe area, you should modify the steps below accordingly.

2.2 Backing Up Existing SoM Database

Before replacing the SOM in the UMCB, you should back up the database to preserve and verify the parameters so they can be restored to the new SOM after completing the installation.

> You will need a PC with a web browser (Google Chrome is recommended) and the Guidant Log Plotter Tool.

Complete following steps to back up the database:

1. Connect to the meter using a web browser and download the parameters to a USC file; this file will be used to configure the new SoM to the meter.
2. Using the Guidant Log Plotter Tool, open the USC file and determine whether any parameters are missing. Missing parameters are highlighted in red; the status bar indicates the number of missing parameters. If parameters are missing, download the USC file again and re-verify.

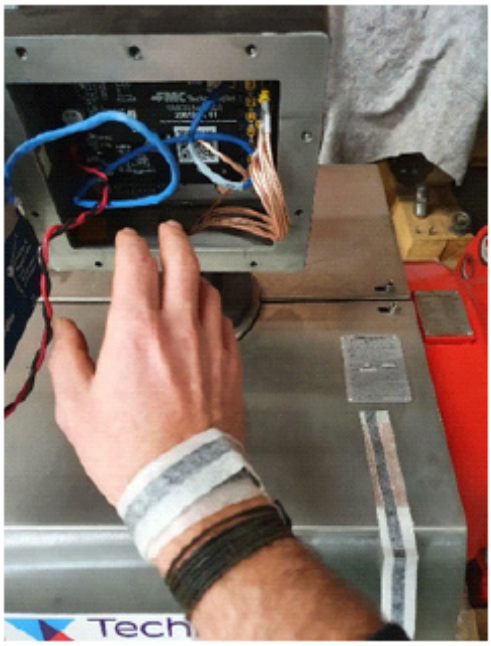
> When uploading this parameter file to the new SOM, the meter tag name will not transfer. You must program this using a web browser after uploading the parameters.

2.3 Removing the UMCB

Complete the following steps to remove the UMBC from the meter's electronics enclosure:

1. Verify that all power to the explosion proof enclosure is removed.
2. Remove the 10 M8 1.25 x 25 mm socket-head cap screw cover bolts with a 5 mm hexagon key wrench and open the electronics enclosure.
3. Following the instructions on the anti-static wrist strap's packaging, ground the strap by attaching one end of the anti-static strap to your wrist and attaching the other end of the strap to a suitable grounding point in the area close to the enclosure.

Figure 1: Grounded Anti-Static Wrist Strap



4. Using a 2.5 mm slotted screwdriver, loosen the two captive screws from the UMCB's power supply connector CN1 and unplug the connector. This step can be done for the remaining field wiring connectors if you need to remove cable connections to allow removal of the UMCB board from the enclosure housing.
5. If equipped, loosen the two captive screws for the touch screen's connectors using a 2.5 mm slotted screwdriver.

> It is important to remember or make a note of the position of all cable connectors removed from the UMCB board assembly so you can replace them in the proper location after the SoM replacement procedure.

6. Remove any additional cables connected to the UMCB, such as any Ethernet or fiber-optic communications cables.

> Do not disconnect the transducer cables.

Figure 2: UMCB

7. While supporting the UMCB with one hand, remove the four mounting screws using the 6.5 mm slotted screwdriver.
8. Remove the UMCB from its enclosure (without disconnecting the transducer cables) and gently rotate it to set it down on the cover of the meter.

2.4 Exchanging the SoM

Complete the following steps to exchange the SoM:

> When removing the SoM, do not touch the gold-plated contacts.

1. Ensure the UMCB is placed with the bottom of the board facing up and supported on the flat, top surface of the meter cover.
2. Using a PH1 Phillips head screwdriver, remove the two screws that secure the SoM to the UMCB.
3. The SoM also is secured with a spring latch connector. Carefully push both sides of the connector's clips outward at the same time to release the SoM from the UMCB.

> The SoM can inadvertently pop out of the connector when removing it.

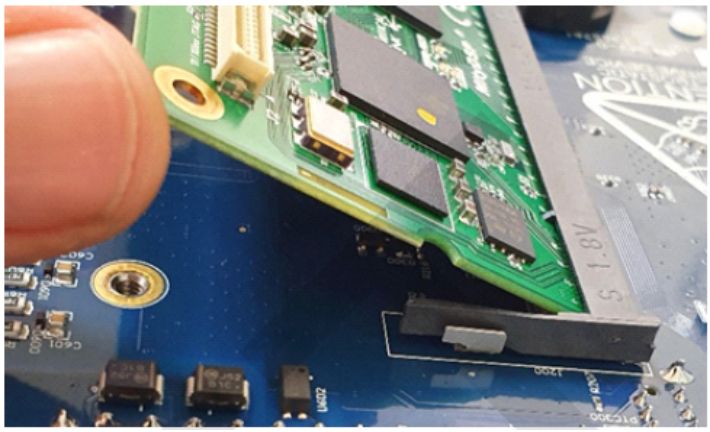
Figure 3: Removing the Old SoM

4. Remove the SoM from the connector, ensuring that you only touch the edges of the module.
5. Remove the two spacers between the SoM and the UMCB.

> Failing to remove these spacers may result in damage to the circuit boards when installing the new SoM.

6. Slide the new SoM into the module connector at a slight angle. The SoM is correctly placed when its connection to the board is completely in the socket.

Figure 4: Inserting the New SoM



7. Gently press the SoM down until the two clips snap into place. Ensure that you do not force the SoM into place.
8. After the SoM is seated, re-position the spacers using tweezers. The spacers must be placed between the boards and aligned with the screw holes.
9. Using a PH1 Phillips head screwdriver, re-insert the two screws that secure the SoM to the PCB. Be sure not to over-torque the screws.
10. Verify the position of the spaces to ensure they are properly aligned with the pads; improper alignment can damage the PCB or SoM traces.

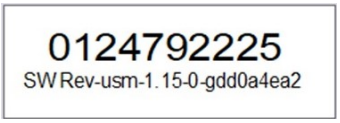
2.5 Replacing Labels

Two new labels, a serial number label and a firmware revision label, are packaged with the programmed SoM to be used when it is permanently attached to the UMCB board assembly. The serial number for the SoM will be read from the Meter Info page in the web browser.

2.5.1 Serial Number Label

The serial number is on the first line and the software version and check sum are on the second line. For example,

Figure 5: Firmware Revision and CRC Label



This label should be placed over the old label located on the fiber-optic converter.

2.5.2 Firmware Version Label

The firmware version label with a QR code should be placed over the old QR code label located on the UMCB shield.

Figure 6: Firmware Version Label

2.6 Re-Assembling the UMBC

After replacing the SoM, complete the following steps to re-assemble the UMBC:

1. Verify that the power is turned off.
2. Gently rotate the PCB and place it into the enclosure.
3. While supporting the UMCB with one hand, attach the four mounting screws using a 6.5 mm slotted screwdriver.
4. Connect the Ethernet cable.
5. Re-attach any additional cables connectors that were previously removed.
6. Using a 2.5 mm slotted screwdriver, tighten the two captive screws to attach the UMCB's power supply connectors.

> Ensure that all connectors are re-attached in their original position and the captive screws are tightened.

7. Using a 2.5 mm slotted screwdriver, tighten the two captive screws to attach the touch screen's connectors (if equipped).
8. Using a 5 mm hexagon key wrench, close the electronics enclosure and secure it with the 10 M8 1.25 x 25 mm socket-head cap screw cover bolts.

2.7 Restoring the Database

Restoring the database requires an external Ethernet connection available in an area that is safe to use a laptop computer. If this is not available, the UMCB board must be removed the from enclosure and taken to a safe area where it can be powered on and connected to a PC.

Complete the following steps to restore the backed-up database:

1. Power up the UMCB. Be sure to follow the precautions noted in section 1.5.1: Hazardous Locations.
2. Connect to the meter using a web browser (Google Chrome is recommended) and upload the parameter file from the previously created USC file.

> When uploading this parameter file to the new SOM, the meter tag name will not transfer; you will need to program this a the web browser after uploading the parameters.

3 Related Publications

- Ultra Series C Liquid Ultrasonic Flowmeters Installation, Operation, and Maintenance Manual (MNLS005)
- MPU Series C Installation, Operation, and Maintenance Manual (MNKS025)

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USA Operation
1602 Wagner Avenue
Erie, Pennsylvania 16510 USA
P:+1 814.898.5000

Germany Operation
Smith Meter GmbH
Regentstrasse 1
25474 Ellerbek, Germany
P:+49 4101 304.0

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