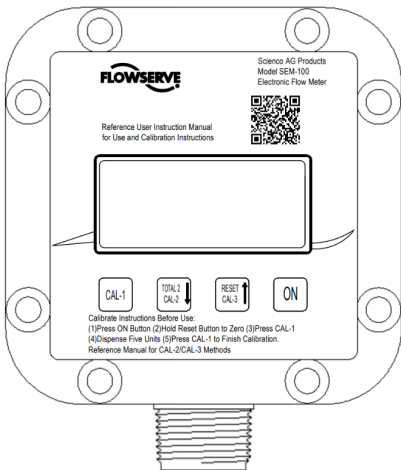




# SEM-100SS Electronic Flow Meter

PUIOM000649-00 (ENGLISH, REV 07-2022)



Calibrate Instructions Before Use:


- (1) Press ON Button
  - (2) Hold Reset Button to Zero
  - (3) Press CAL-1
  - (4) Dispense Five Units
  - (5) Press CAL-1 to Finish Calibration.
- Reference Manual for CAL-2/CAL-3 Methods

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# 1. Introduction and safety


## 1.1 General

 ***These instructions must always be kept close to the product's operating location or directly with the product.***

Flowserve products are designed, developed and manufactured with state-of-the-art technologies in modern facilities. The unit is produced with great care and commitment to continuous quality control, utilizing sophisticated quality techniques and safety requirements.

Flowserve is committed to continuous quality improvement and being at service for any further information about the product in its installation and operation or about its support products, repair and diagnostic services.

These instructions are intended to facilitate familiarization with the product and its permitted use. Operating the product in compliance with these instructions is important to help ensure reliability in service and avoid risks. The instructions may not take into account local regulations; ensure such regulations are observed by all, including those installing the product. Always coordinate repair activity with operations personnel, and follow all plant safety requirements and applicable safety and health laws and regulations.

 ***These instructions must be read prior to installing, operating, using and maintaining the equipment in any region worldwide. The equipment must not be put into service until all the conditions relating to safety noted in the instructions have been met.***

## SEM-100SS User Instructions

### 1.2 Disclaimer

***Information in these User Instructions is believed to be reliable. In spite of all the efforts of Flowserve to provide sound and all necessary information, the content of this manual may appear insufficient and is not guaranteed by Flowserve as to its completeness or accuracy.***

Flowserve manufactures products to exacting International Quality Management System Standards as certified and audited by external Quality Assurance organizations. Genuine parts and accessories have been designed, tested and incorporated into the products to help ensure their continued product quality and performance in use. As Flowserve cannot test parts and accessories sourced from other vendors, the incorrect incorporation of such parts and accessories may adversely affect the performance and safety features of the products. The failure to properly select, install or use authorized Flowserve parts and accessories is considered to be misuse. Damage or failure caused by misuse is not covered by the Flowserve warranty. In addition, any modification of Flowserve products or removal of original components may impair the safety of these products in their use.


### 1.3 Copyright

All rights reserved. No part of these instructions may be reproduced, stored in a retrieval system, or transmitted in any form or by any means without prior permission of Flowserve.

## SEM-100SS User Instructions


### 1.4 Duty conditions

This product has been selected to meet the specifications of your purchase order. The acknowledgement of these conditions has been sent separately to the Purchaser. A copy should be kept with these instructions.

 ***The product must not be operated beyond the parameters specified for the application. If there is any doubt as to the suitability of the product for the application intended, contact Flowserve for advice, quoting the serial number.***

### 1.5 Safety

**1.5.1 Summary of safety markings:** These User Instructions contain specific safety markings where non-observance of an instruction would cause hazards. The specific safety markings are:

 ***This symbol indicates safety instructions where non-compliance would affect personal safety and could result in loss of life.***

**1.5.2 Personnel qualification and training:** All personnel involved in the operation, installation, inspection and maintenance of the unit must be qualified to carry out the work involved. If the personnel in question do not already possess the necessary knowledge and skill, appropriate training and instruction must be provided. If required, the operator may commission the manufacturer/supplier to provide applicable training.

Always coordinate repair activity with operations and health and safety personnel, and follow all plant safety requirements and applicable safety and health laws and regulations.

 ***PUMP IS NOT TO BE USED IN POTENTIALLY EXPLOSIVE ATMOSPHERES.***

# 2. Transport and storage

## 2.1 Consignment receipt and unpacking

Immediately after receipt of the equipment, it must be verified for contents and inspected for damages in transportation. Any shortage and/or damage must be reported immediately to distributor/Flowserve Scienco and must be received within 10 days of receipt of the equipment. Later claims cannot be accepted.

Check any boxes or wrappings for any accessories or spare parts that may be packed separately with the equipment.

Each product has a unique serial number. Check that this number corresponds with that advised, and always quote this number in correspondence as well as when ordering spare parts or further accessories.

## 2.2 Storage

Normal packaging is designed to protect the pump and parts during shipment and storing.

## 2.3 Recycling at end of product life

At the end of the service life of the product, the relevant materials and parts should be recycled or disposed of using an environmentally acceptable method and in accordance with local regulations.



**Make sure that hazardous substances are disposed of safely and that the correct personal protective equipment is used. The safety specifications must be in accordance with the current local regulations at all times.**

# 3. Description

## 3.1 Configurations

The SEM-100SS electronic flow meter employs positive displacement nutating disk technology to meter liquids of various viscosities with great accuracy and nominal pressure loss. Stainless steel and plastic construction make the SEM-100SS an extremely versatile meter, suitable for use with many chemicals and petroleum products.

The SEM-100SS flow meter features a large LCD display, an anti-glare screen with back light, large positive touch buttons, and simple one-touch operation, making the meters easy to read and easy to use in both high light and low light settings.

The SEM-100SS flow meter is a positive displacement, nutating disk, fluid metering unit. As fluid flows through the unit, it causes the nutating disk to move which in turn causes the rotation of a hermetically sealed magnet disk. The meter electronic assembly counts the number of revolutions of the magnet and mathematically determines, based on the calibration number, the quantity of liquid that has passed through the meter. The self-contained electronic assembly features a large Liquid Crystal Display (LCD), and simple four-button operation.

## SEM-100SS User Instructions

### 3.2 Operating parameters

- Flows from 7.5 lpm to 110 lpm (2 gpm to 30 gpm)
- Temperatures up to 85°C (185°F)
- Pressures up to 6.9 bar (100 psi)

### 3.3 Available equipment and accessories

The SEM-100 and SEM-100FT electronic flow meters are available individually or in packages with the CT6 chemical transfer pump in multiple configurations, each with varying equipment and accessories, including:

- Standard and special hoses
- Recirculation piping
- Various fittings and adapter
- Brackets
- Dispensing nozzles
- Dip-tubes



## SEM-100SS User Instructions

### 3.4 Materials of construction

The SEM-100SS electronic flow meters are resistant to corrosion from typical ag-chem and light industrial chemicals. Wetted materials include:

- |                            |       |   |
|----------------------------|-------|---|
| • Fluid Housing/Form Cover | ----- | 316 Stainless Steel                             |
| • Meter Chamber            | ----- | Polypropylene Sulfide (PPS),<br>Stainless Steel |
| • O-rings                  | ----- | Viton   |
| • Electronic Housing       | ----- | Nylon   |
| • Screws                   | ----- | Stainless Steel                                 |

**Note:** Ensure chemical compatibility between liquid metered and the meter's wetted parts before using

**Note:** Meter should not be used to transfer flammable petroleum products. DO NOT use with fluids that have a flashpoint lower than 37°C (100°F).

**Refer to the Scienco Product Reference Manual FPD-1607 to learn more about the available configurations.**

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# 4. Installation and operation


## 4.1 Unpacking the meter


Unpack the meter, and ensure that meter configuration and materials of construction are correct for your application.

## 4.2 Installation

Flow can be metered in either direction through the SEM-100SS flow meter.

Thread the meter inlet into the female discharge port of the pump or line. Using an elbow or coupling, screw the discharge hose onto the other port of the meter. Use thread sealant tape or pipe dope to seal thread connections as necessary.

 ***DO NOT over tighten threaded connections. Breakage can occur resulting in fluid exposure and leakage.***

 ***DO NOT mount meter in a load bearing manner. Excessive loads can cause breakage, resulting in fluid exposure and leakage.***

## SEM-100SS User Instructions

### 4.3 Calibration and operation



Wakes up display in Current Total mode. Unit will automatically shut off after 40 seconds with no input.



Resets Current Total to zero. Also used to activate back light, enter CAL-3 mode and as the "UP ARROW" during calibrations.



Press and hold to display "TOTAL-2". Also used to enter CAL-2 mode, and as the "DOWN ARROW" during calibrations.



Push to enter into the three calibration modes, starting with CAL-1.

#### 4.3.1 Calibration

The SEM-100SS Flow Meter has three calibration options, CAL-1, CAL-2, and CAL-3. The flow meter can be calibrated in any unit desired (i.e. gallons, liters, pounds, acres, pints, etc.). CAL-1 requires pumping 5 units of fluid. CAL-2 requires pumping a known quantity of any units; this quantity is then entered into the electronics. CAL-3 allows calibration without pumping fluid by manually changing the calibration constant.

Before performing meter calibration, turn on the pump and purge the system of all air. For best results, calibrate at normal dispensing conditions, i.e. flow rate and pressure.

## SEM-100SS User Instructions

### CAL-1 Calibration:

1. Press **“ON”** button to wake up meter.
2. Press and hold the **“Reset”** button to zero (“.00”) the Current Total screen
3. Press **“CAL-1”** to enter calibration sequence.
4. Pump process liquid into a calibrated container that holds five units (gallons, liters, etc.)

**Note:** The display will blink as fluid is being pumped.

5. Press **“CAL-1”** to complete the calibration process.

**Note:** The display will return to the Current Total screen and read the previous total.

### CAL-2 Calibration:

1. Press **“ON”** button to wake up meter.
2. Press and hold the **“Reset”** button to zero (“.00”) the Current Total screen.
3. Press **“CAL-1”** to enter calibration sequence.
4. Press **“CAL-2”** to enter the CAL-2 calibration mode.
5. Dispense desired amount.

**Note:** For greatest accuracy pump a minimum of 9.5 liters (2.5 gallons). The minimum amount required is 1.9 liters (0.5 gallons).

6. Press **“CAL-1”**.

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7. Press **“UP”** and **“DOWN”** arrow keys to enter the amount of fluid that was pumped in the desired units.

**Note:** The display will return to the Current Total screen and read the previous total.

**Note:** “Err” will be displayed if too few or too many counts have been received during the calibration. A volume between 0.5 to 20 units must be recorded for a valid calibration. If “Err” is displayed, no calibration change has taken place.

### CAL-3 Calibration:

1. Press **“CAL-1”** to enter calibration mode.
2. Press **“CAL-3”**. The current CAL-3 number will show.
3. Press the **“UP”** and **“DOWN”** arrow keys to adjust to a known CAL-3 number.
4. Press **“CAL-1”** to enter the new number and complete the calibration process.

**Note:** Use of the CAL-3 function will override any previous calibrations.

**Note:** A typical “CAL-3” number for water is 600. Recording the “CAL-3” numbers for specific fluids after calibration, and resetting the meter to those numbers when the fluid is pumped again is a convenient method to quickly and accurately calibrate the meter.

## SEM-100SS User Instructions

### 4.3.2 Operation

**TO METER FLUID:** With the pump and meter properly installed, the meter will wake up automatically and begin to display the Current Total as fluid is pumped.

**TO DISPLAY CURRENT TOTAL:** Press **“ON”** button.

**TO RESET CURRENT TOTAL TO ZERO:** Press and hold **“RESET”** button for 3 seconds while the Current Total is displayed. Current Total will be reset to “.00”.

**TO DISPLAY TOTAL-2:** While the Current Total is displayed, press and hold **“TOTAL-2”** button. Total units pumped will be displayed as long as **“TOTAL-2”** is pressed.


**Note:** TOTAL-2 cannot be reset to zero.

**TO DISPLAY FLOW RATE:** With meter on, press and hold the **“ON”** button for 2 seconds. The display will read **“FX.X”**, with the numbers indicating flow rate in units of volume per minute. To return to the Current Total screen, press and hold the **“ON”** button for 2 seconds again.

**TO TURN ON BACKLIGHT:** With meter on, press the **“ON”** button, then press the **“RESET / CAL-3”** button. The backlight will turn on. To turn off the backlight press the **“ON”** button, then press the **“RESET / CAL-3”** button again. The backlight will also turn off automatically after 10 seconds with no input.


**SHUT DOWN:** The meter will automatically turn off after 40 seconds with no input.

# 5. Maintenance

 It is the final operator's responsibility to ensure that all maintenance steps are carried out by authorized and qualified personnel who have adequately familiarized themselves with the subject matter by studying this manual in detail.

## 5.1 Battery removal and replacement

If the LCD display becomes dim, the battery should be replaced. The meter electronics can be removed without exposure to fluid inside the meter.

 **Open valve to relieve system pressure and do not pressurize the system during this procedure.**

### 5.1.1 Battery removal

To replace battery, remove the 8 screws (DD6P-43A) that hold the electronic assembly to the meter assembly. Remove the electronic assembly. Remove and dispose of used batteries.

### 5.1.2 Battery replacement


Install the new AAA Batteries into the battery holder. Note the polarity markings on the batteries. The positive end of one battery should face the red wire and the negative end of the other battery should face the black wire. Press the **“ON”** button to check power supply.

Inspect gasket (S10-06SS) for damage. If the gasket (S10-06SS) is damaged, replace with new. (See section 6: Parts List and Parts Diagram)

## SEM-100SS User Instructions

Place the gasket and electronic assembly onto the meter assembly. Reinstall the 8 screws (DD6P-46A) to secure the electronic assembly to the meter assembly. Tighten the screws to 32-36 inch-pounds in a star pattern to avoid any leakage.

### 5.2 Meter Chamber Removal

 **Exposure to chemicals can cause bodily harm. Before disassembling, thoroughly flush the meter with water. Always wear appropriate gloves, eye protection and any other necessary PPE while working with chemicals.**

 **Ensure that the meter is not under pressure before continuing.**

Remove the 8 screws (DD6P-46A) to remove electronic assembly (S10-11B COMPLETE). Remove the 4 screws (SFM10000-19) that secure the meter plate (SFM10000-14A) to the fluid housing (SFM10000-13A). Remove the meter plate and O-ring (SFM10000-18). The meter chamber can now be removed for cleaning or replacement.

### 5.3 Meter assembly procedure

Ensure that the bottom O-ring (SFM10000-17) is in place. Insert the meter chamber into the fluid housing (SFM10000-13A). Place O-ring (SFM10000-18) around the bottom of the meter plate (SFM10000-14A) and place on top of the fluid housing (SFM10000-13A). Secure with 4 short screws (SFM10000-19) torqued to 32-36 inch-pounds. After inspecting for damage, install the gasket (S10-06SS) and the electronic assembly (S10-11B COMPLETE) using the 8 long screws (DD6P-46A) torqued to 32-36 inch-pounds.



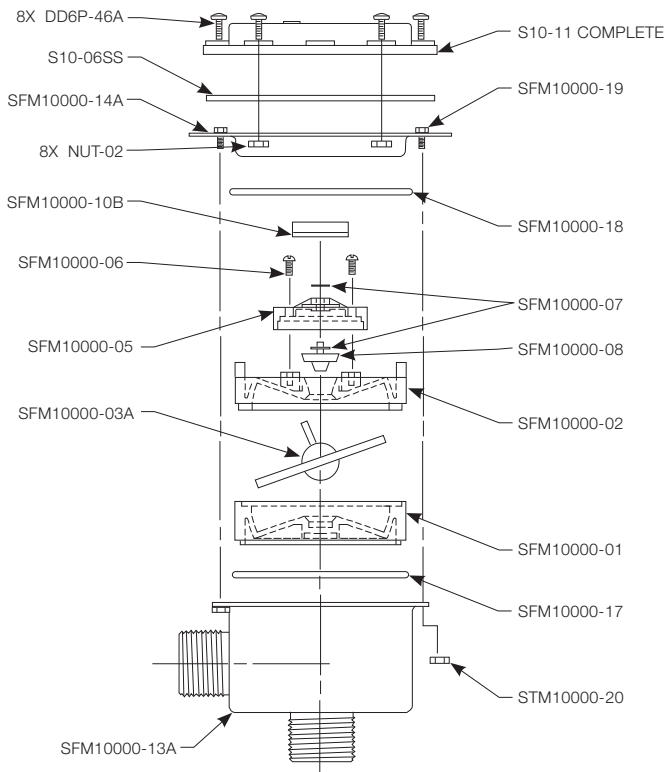
## SEM-100SS User Instructions

# 6. Parts List and Parts Diagram

SEM-100SS Parts List		
Qty.	Part No.	Description
8	DD6P-46A	SS Phillips Head Screw, 10-24 X .75"
1	S10-11B COMPLETE	Electronic Assembly
1	S10-06SS	Meter Gasket
8	SFM10000-19	SS Screw, Short
1	SFM10000-14A	Meter Plate
8	NUT-02	10-24 Lock Nut
1	SFM10000-10B	Magnet Holder
1	SFM10000-18	Viton O-Ring
2	SFM10000-06	Screws
1	SFM10000-05	Mounting Bracket
1	SFM10000-07	Washer
1	SFM10000-08	Drive Dog Assembly
1	SFM10000-02	Top Wobble Housing
1	SFM10000-03A	Wobble Plate Assembly
8	SFM10000-20	Nut
1	SFM10000-14A	Meter Plate
1	SFM10000-13A	SEM-100SS 316SS Fluid Housing

**Note:** All parts are common to the SEM-100 and SEM-100FT except for the fluid housing

## SEM-100SS User Instructions



## 7. Troubleshooting guide

**Problem:** Meter reads high or low.

**Solution:** Check for the following:

- Ensure lines are full and there is no trapped air in the system before calibrating.
- Pump may be sucking air due to low fluid level or bad pump inlet connection.
- Calibrating at one flow rate and operating at a different rate. Calibrating with a different fluid than what is being pumped.

**Problem:** Meter flashes “ERR” at the end of calibration.

**Solution:** Check for the following:

- Meter electronics are not sensing the rotation of the magnet. During calibration, if the CAL-1 or CAL-2 text does not blink while fluid is being pumped, rotation is not being sensed. Disassemble meter and clean out or replace the meter chamber (SEM-10 KIT)
- Volume dispensed during calibration is too small or too large. The meter must be calibrated with 9.5 liters – 265 liters (2.5 gallons – 70 gallons)

## SEM-100SS User Instructions

**Problem:** No liquid will pass through the meter or the meter will not register flow.

**Solution:** Foreign material is in the metering cartridge and is obstructing flow or preventing the nutating disk from moving freely. Remove the meter cartridge and clean.

**Problem:** The meter will not power on, or the display is dim.

**Solution:** Replace the batteries.

## SEM-100SS User Instructions

# Product warranty

Flowserve Corporation (the Company) warrants the following Scienco Equipment for the periods below:

- Scienco CT6 Diaphragm Pump warranty period shall be if it appears within sixty (60) months from the initial Equipment startup or sixty-six (66) months after shipment, whichever occurs first.
- Scienco Meters, Systems, and Accessories warranty period shall be if it appears within twelve (12) months from the initial Equipment startup or until eighteen (18) months after shipment, whichever occurs first.

Warranty of Equipment shall be free from defects in materials and workmanship within the periods outlined above, that the Equipment or any part thereof does not conform to this warranty, and Buyer so notifies the Company in writing within a reasonable time after discovery shall there upon promptly correct such nonconformity by repair or replacement EXW Flowserve's factory.

The Company's sole obligation and Buyer's sole remedy under this warranty is repair or replacement at the Company's election. The Company shall not be responsible for any on-site costs, including removal and reinstallation of any warranted Equipment. All Equipment repaired or replaced will be re-warranted only for the remainder of the original warranty period. THE EXPRESS WARRANTY SET FORTH HEREIN IS THE EXCLUSIVE WARRANTY OF THE COMPANY, AND NO OTHER WARRANTY, EITHER EXPRESSED OR IMPLIED, INCLUDING WARRANTY OF MERCHANTABILITY OR FITNESS FOR PURPOSE, SHALL APPLY.

Flowserve is not responsible for repairs or alterations made by others without manual written agreement between the Company and Buyer. The Company does not warrant the Equipment or any repair/replacement part against the effects of erosion, corrosion, or normal wear and tear due to operation or the environment. The warranty and remedies set forth herein are conditioned upon proper storage, installation, use and maintenance of the Equipment in all material respects, and in accordance with the Company's written recommendations.

The remedies set forth herein are exclusive, and the total liability of the Company with respect to this Equipment, or any breach thereof, whether based on contract, warranty, tort (including negligence), indemnity, strict liability or otherwise, shall not exceed the order price of the specific Equipment which gives rise to the claim. In all cases where Buyer claims damages allegedly arising out of defective or nonconforming Equipment or Services, Buyer's exclusive remedies and the Company's sole liability shall be those specifically provided for under the Warranty.

IN NO EVENT, WHETHER ARISING BEFORE OR AFTER COMPLETION OF ITS OBLIGATIONS UNDER THE CONTRACT, SHALL SELLER BE LIABLE FOR SPECIAL, INDIRECT, CONSEQUENTIAL, INCIDENTAL OR PUNITIVE DAMAGES OF ANY KIND (INCLUDING BUT NOT LIMITED TO LOSS OF USE, REVENUE OR PROFITS, INVENTORY OR CHARGES, OVERHEAD, COST OF CAPITAL, OR CLAIMS OF CUSTOMERS) INCURRED BY THE BUYER OR ANY THIRD PARTY.

### Technical Service & Support

3900 Cook Blvd.  
Chesapeake, VA 23323-1628 USA  
Telephone: 800-343-7867 (343-PUMP)  
Fax: 757-673-3528  
Website: [www.flowserve.com](http://www.flowserve.com)  
Email: [csb@flowserve.com](mailto:csb@flowserve.com)



#### **Flowserve Corporation**

5215 North O'Connor Blvd.  
Suite 700  
Irving, Texas 75039-5421 USA  
Telephone: +1-937-890-5839

#### **Flowserve Scienco**

3900 Cook Blvd.  
Chesapeake, VA 23323-1628 USA  
Telephone: +800-343-7867 (343-PUMP)  
Fax: +757-673-3528  
Website: [www.flowserve.com](http://www.flowserve.com)  
Email: [csb@flowserve.com](mailto:csb@flowserve.com)

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Flowserve Corporation has established industry leadership in the design and manufacture of its products. When properly selected, this Flowserve product is designed to perform its intended function safely during its useful life. However, the purchaser or user of Flowserve products should be aware that Flowserve products might be used in numerous applications under a wide variety of industrial service conditions. Although Flowserve can provide general guidelines, it cannot provide specific data and warnings for all possible applications. The purchaser/user must therefore assume the ultimate responsibility for the proper sizing and selection, installation, operation, and maintenance of Flowserve products. The purchaser/user should read and understand the Installation Instructions included with the product, and train its employees and contractors in the safe use of Flowserve products in connection with the specific application.

While the information and specifications contained in this literature are believed to be accurate, they are supplied for informative purposes only and should not be considered certified or as a guarantee of satisfactory results by reliance thereon. Nothing contained herein is to be construed as a warranty or guarantee, express or implied, regarding any matter with respect to this product. Because Flowserve is continually improving and upgrading its product design, the specifications, dimensions and information contained herein are subject to change without notice. Should any question arise concerning these provisions, the purchaser/user should contact Flowserve Corporation at any one of its worldwide operations or offices.

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