



Operating manual

Meter

FMT 3

Item-No.: 253591006

Translation of the
original operating manual

Important

The operating manual is always to be read before commissioning the equipment. No warranty claim will be granted for faults and damage to the equipment arising from insufficient knowledge of the operating manual.

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1 Safety instructions

The device is a state of the art piece of equipment and has been constructed according to recognised safety specifications. It is nevertheless possible that use of the device will present hazards to the operator or to third parties, or may damage the device or other property. It is therefore essential to act in accordance with these safety instructions, and in particular with those sections identified as warnings.

Warning notices and symbols

In the operating manual, the following signs are used for highlighting important information.



Special information for economical use of the equipment.



Special information or "dos and don'ts" for damage prevention.



Information or "dos and don'ts" for the prevention of damage to persons or equipment.

Appropriate use



The device may only be used if it is in perfect condition, and then only for its intended purpose, in compliance with all safety regulations, with an awareness of the potential risks, and according to the operating manual. Any faults that may impair the safety must be rectified immediately.



The device and its components are only to be used for handling the liquids listed and the purpose described. Using the machine for any other purpose would constitute inappropriate use. The manufacturer is not responsible for any loss arising as a result of this, the risk for this is borne only by the operating company.

Organisational measures



This operating manual should always be kept readily available at the site of operation! Each person concerned with the assembly, commissioning, maintenance and operation of the equipment must have read and understood the entire operating manual. It is essential that the type plate and the warning notices attached to the device are observed, and are maintained in a fully readable condition.

Qualified personnel



The operating, maintenance and assembly personnel must be appropriately qualified for their work. The areas of responsibility, competences and supervision of the personnel must be precisely regulated by the operating company. If the personnel do not have the required knowledge, they must be trained and instructed. The operating company must also ensure that the contents of the operating manual are properly understood by the personnel.

Waters protection



The device has been designed to handle water hazardous substances. The regulations on the operating place (e.g. Water Resources Act WHG, = ordinance on installations for handling of substances hazardous to water VAWS) must be adhered to.

Hydraulics



Only persons with special knowledge and experience with hydraulic systems may carry out work on hydraulic parts and equipment. All lines, hoses and screw joints should regularly be checked for leaks and visible external damage. Any damage must be rectified immediately. Any oil spurting out can cause injuries and fire.

The relevant safety regulations for the product must be followed when handling oils, greases or other chemical substances!

Maintenance and Service



According to the regulations of the water resources law only authorized services may work on devices for flammable and/or water endangering substances. During such works, appropriate tools are to be used (avoid sparking). Before any kind of work on the device, all fuel lines are to be completely emptied and aerated.

Do not make any changes. Modifications or additions to the device which may affect the safety cannot be carried out without consent of the manufacturer. Exclusively genuine spare parts made by the manufacturer may be used.

Electric power



Work on the electrical equipment may only be carried out by a qualified electrician or by trained persons under the guidance and supervision of a qualified electrician according to electro-technical guidelines. Machine or system components, on which inspection, maintenance or repair work is to be carried out must be de-energised. Product description

2 Technical description

2.1 Description

The FMT 3 is a flow meter for flowing liquids based on the measuring principle of a turbine wheel meter. It can be used as a fixed meter or as a manual flow meter.



The FMT 3 is not to be operated with flammable and potentially explosive liquids with a flash point < 55 °C. Liquids with a flash point above 55°C may not be used with the unit if they are heated beyond their flash point.

The FMT 3 turbine meter consists of a measurement tube with a turbine and an electronic housing which contains the evaluation electronics, display, and keypad. The turbine is equipped with a magnet which transfers the measurement pulses to a reed switch on the evaluation electronics when a medium flows through it.

The FMT 3 has a non-resettable total volume memory and 8 resettable partial volume memory slots which allow e.g. the fuel consumption of individual vehicles to be monitored.

2.2 Product variants

| Art. no. | Type | Material* |
|-----------------|-----------------------------------|----------------------------|
| 253591000 | FMT 3 add-on kit for Hornet 40 | POM, Stainless Steel, PEEK |
| 253591001 | FMT 3 add-on kit for Hornet 50/80 | POM, Stainless Steel, PEEK |
| 253591006 | FMT 3, vertically rotatable | POM, Stainless Steel, PEEK |
| 253591020 | FMT 3 add-on kit for Hornet W85 H | POM, Stainless Steel, PEEK |

*Material of measurement chamber, measurement chamber lid, and of turbine

2.3 Technical data

| | | | |
|---------------------------|----------------|------------------------------|--------------------|
| Volume flow range | 5 - 120 l/min | Nominal width | 1" external thread |
| Viscosity range | 0.8 - 40 mPa s | Protection category | IP 65 |
| Operating pressure (max.) | 10 bar | Burst pressure (min.) | 20 bar |
| Accuracy, uncalibrated* | ± 2% | Dimensions approx. | 85x 123 x 52 mm |
| Accuracy, calibrated* | ± 1% | Weight approx. | 0.24 kg |
| Repeat accuracy | ± 0.5 % | Operating temperature range: | -10 °C - +50 °C |
| Battery | 2 x AAA 1.5V | Storage temperature range: | -20 °C - +70 °C |

* Test assembly: Medium: water/diesel, settling section of 0.2 m before and after meter

2.4 Display

LCD display with

- Four-digit volume display with digits measuring 17 mm in height for current dispensation
- Seven-digit display with digits measuring 6 mm in height for totalizers
- Display in liter units (optional: GAL, PTS, QTS) and flow rate (l/min)
- Low battery alert on display.

The minimum digital step of the measured value is 0.01 liters and that of the non-resettable totalizers 1 liter

2.5 Keypad

Front membrane with three keys: "Reset", "Mode", and "Light".

2.6 Battery

Two 1.5 V batteries (AAA) with a minimum service life of approx. 5 years for a flow quantity of 1,000,000 liters during this period without use of the illumination. If the illumination is used, the service life decreases with frequency of use.

The battery can be replaced after opening the housing (see chapter 6.2). Volume and calibration values remain stored in the device after a battery change.

3 Assembly instructions

3.1 Installation in pipes

The FMT 3 possesses G1" external threads on both sides which allow it to be installed in any pipe. When doing so, please ensure that the meter is not under mechanical stress due to tension/pressure or bending. To avoid this, an elastic equalizing element is to be used, and the lines are to be supported in a suitable manner. In order to prevent damage, the tightening torque at the G1" external threads are not to exceed 30 Nm.

The flow direction can be chosen freely.

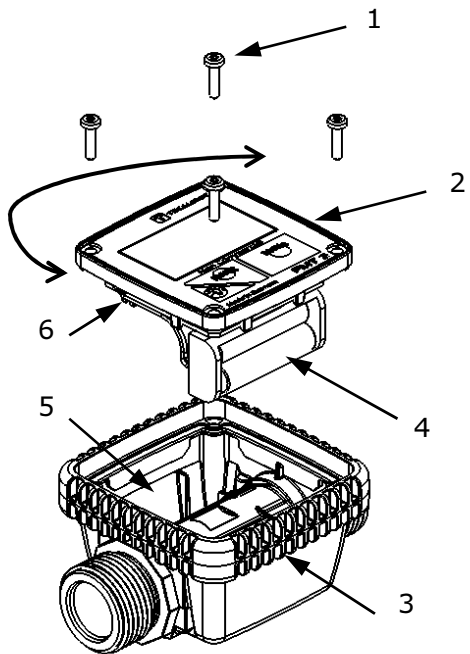
We recommend the use of front-side flat seals or O-rings at the ends of the screw threads for sealing purposes.

After being screwed into the pipe, the electronic housing can be rotated freely around the measurement tube. This allows the display to be brought into a position that is comfortable for the user.

The pressure surges that occur in the pipe are not to exceed the nominal pressure.

3.2 Rotating the display

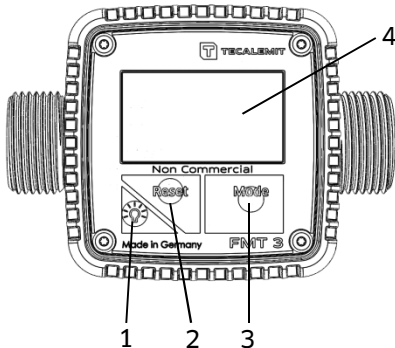
The display of the FMT 3 [1] can be mounted both vertically as well as horizontally in order to allow the meter to be read off comfortably. To turn the display, the four screws [2] on the top side are loosened and the display is pulled upwards. The display can now be replaced in any desired orientation. The rubber shock protector [3] is not to be rotated along with the display. The battery housing [4] may need to be placed on the other side [5] of the meter housing to prevent the battery housing and battery connector [6] from colliding. The battery cable needs to be laid such that it is not pinched between the reed switch and the housing.



4 Operating the FMT 3

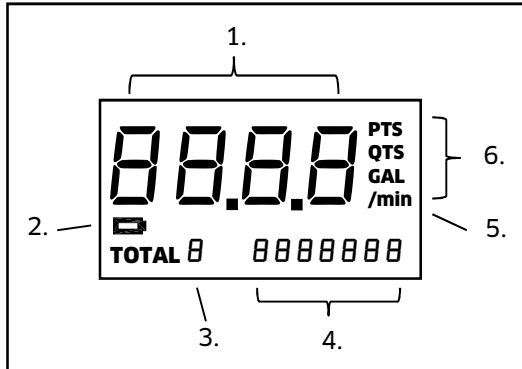
The FMT 3 is operated using three keys: "Reset" (2), "Mode" (3), and "Light" (1). Information is shown on the LCD display (4) with a permanently visible display.

Upon delivery, the meter is factory-configured with the unit "liters" and the calibration factor "1.000". The accuracy of the display can be increased through calibration, and the unit of measurement can also be changed (see chapter 5). After installation, the meter is ready to measure dispensations without requiring further configuration.



4.1 Description of display

The display is divided into various areas



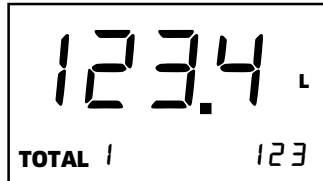
1. Four-digit partial volume display with floating point, values range from 0.00 to 9999
2. Battery symbol
3. Indicates partial volume totalizer (TOTAL 1 - TOTAL 8) or total volume totalizer (TOTAL)
4. Seven-digit totalizer display, values range from 0 to 9999999
5. Volume flow display
6. Volume unit display

4.2 Dispensation mode

For daily use, the FMT 3 is set to **Dispensation mode**.

4.2.1 Dispensation active

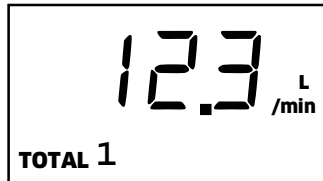
During a dispensation, both the partial volume display as well as the selected totalizer will be continually updated. The total volume totalizer will always be updated in the background even if it is not shown on the display.



The following key combinations are possible during dispensation:

"Light" key: The display illumination is turned on for 15 seconds.

"Mode" key: The current flow rate is shown in the partial volume display for as long as the "Mode" key is held down.



4.2.2 No active dispensation

The partial volume for the last dispensation as well as the current value for the selected totalizer are shown on the display. The following key combinations are possible:

"Light" key:

The display illumination is turned on for 15 seconds.

"Reset" key:

Pressing this key for a short time resets the partial volume display.

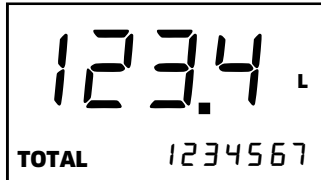


Holding it down for a longer time resets the active partial volume totalizer. The total volume totalizer cannot be reset.



"Mode" key:

Pressing this key for a short time toggles between partial volume totalizers (TOTAL 1 - TOTAL 8) and the total volume totalizer (TOTAL) shown.



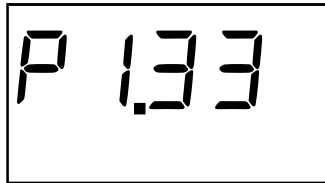
Holding down the "Mode" key for a longer time until the program version is shown (e.g. "P1.33") switches the device to **Programming mode** (see chapter 5).

5 Programming the meter

The device allows the unit of measurement (liters, US gallons, US quarts, US pints, imperial gallons, imperial quarts, imperial pints) to be selected, the basic selection of the medium characteristic curve (watery media, thin mineral oils) to be performed, as well as a calibration to be performed to optimize measurement accuracy.

5.1 Switching to programming mode

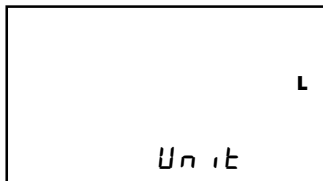
Hold down the "Mode" key until the program version is shown (e.g. "P1.33" to switch to **Programming mode**.



Once the key is released, a display test is carried out. Subsequently, multiple settings can be configured in succession, beginning with the **selection of the unit of measurement for volume**. In programming mode, the display will blink. If no key is pressed for more than 60 seconds, the device will cancel programming mode and return to **dispensation mode**.

5.2 Setting the unit of measurement

The configured unit of measurement is shown and can be changed if necessary. If the unit is changed, the partial volume shown as well as all totalizers will automatically be converted.



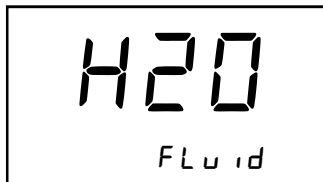
"Reset" key: Toggles between the units liters (L), US gallons (US GAL), US quarts (US QTS), US pints (US PTS), imperial gallons (IMP GAL), imperial quarts (IMP QTS) and imperial pints (IMP PTS).



"Mode" key: Confirms the volume unit shown and switches to **Fluid selection**.

5.3 Setting the medium conveyed

The FMT 3 meter is configured with two optimized characteristic curves for watery media such as water or AdBlue, as well as for thin mineral oils such as diesel or fuel oil at 20 °C. One of these two characteristic curves can be chosen.



"Reset" key: Switches between the characteristic curves for watery media (H2O) and for thin mineral oils (dSL).



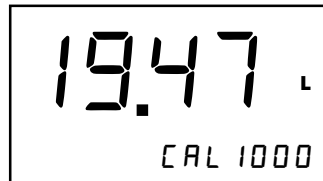
"Mode" key: Confirms the fluid shown and switches to **Calibration**.

5.4 Setting the calibration factor

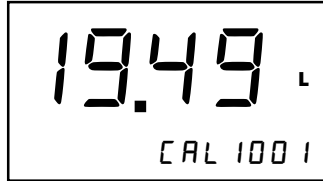
5.4.1 Calibration

The selected characteristic curve of the FMT 3 can be subjected to an additional calibration to compensate for special operating conditions, such as unusual media temperatures or borderline flow values.

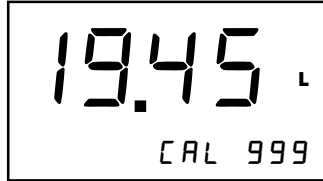
Shown on the partial volume display are the measured quantity for the last dispensation, as well as the calibration factor in the lower line (factory default 1000, configurable values 500-1500).



"Reset" key: Increases calibration factor by 1; increases the dispensation value shown by 1/1000. Hold the key to increase the setting speed.



"Light" key: Decreases calibration factor by 1; decreases the dispensation value shown by 1/1000. Hold the key to increase the setting speed.

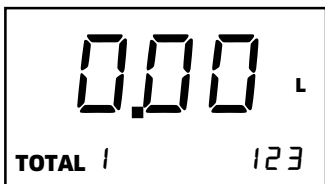


"Mode" key: Confirms the calibration factor shown and switches back to **Dispensation mode**.

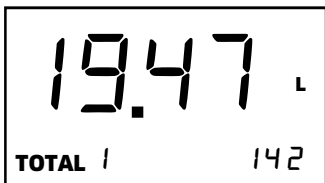
5.4.2 Calibration with measuring vessel

One easy way to perform a calibration is by performing a comparison using a sufficiently large and precise measuring vessel. Proceed as follows:

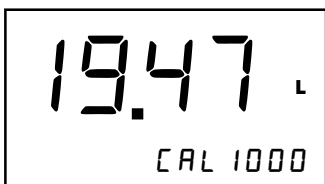
1. Meter is in dispensation mode, partial volume counter has been deleted



2. The dispensation is carried out at a flow speed that is as constant as possible until the measuring vessel is filled to the defined volume.



3. Switch to programming mode, sub-menu "Calibration" (skip Volume unit and Fluid menus with the "Mode" key).



4. Adjust the calibration factor until the quantity displayed corresponds to the quantity dispensed into the measuring vessel.



5. Save the new calibration factor and return to **Dispensation mode**.



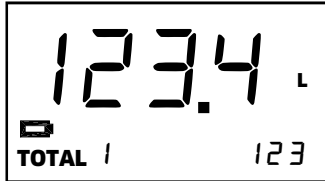
6 Maintenance

6.1 Cleaning the meter

In the case of dirt or stains on the exterior of the device, clean it carefully using a damp cloth and mild cleaning agent. Do not use any aggressive (e.g. abrasive, chlorine-containing) cleaning agents or solvents. The screen of the display may turn milky upon contact with solvents.

6.2 Changing the battery

When the battery symbol appears on the display, it is recommended that the batteries of the FMT 3 be changed as soon as possible. It will be possible to continue using the meter, but the display illumination will not work.

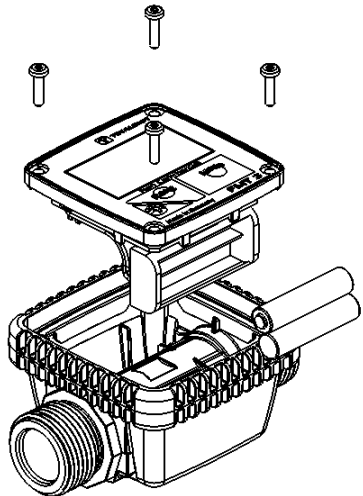


If all that appears on the display is a blinking battery symbol, it will be necessary to change the batteries before the meter can be used again.



All displayed and saved values are retained during a battery change.

To change the battery, remove the front cover by loosening the four screws on the top and pulling the cover upwards. Now remove the battery housing from the device housing and replace the batteries with normal store-bought batteries (1.5 V, type AAA). The device is then closed back up in reverse order. When doing so, ensure that the rubber shock protector is in the correct orientation. The battery cable needs to be laid such that it is not pinched between the reed switch and the housing.



7 Error messages- What do I do when...

...the battery symbol appears on the display?

Change the batteries. (see chapter 6.2)

...nothing appears on the display?

Ensure that the batteries have been placed in the correct orientation and the battery cable has been connected to the control circuit board.

Check if the batteries have sufficient charge. Replace batteries if necessary (see chapter 6.2).

...the value on the display does not change, or only moves very slowly?

Free the turbine in the measurement tube of foreign objects.

...the display shows too much or too little?

Check that the permissible flow rate and media specifications are complied with.

Calibrate the meter (see chapter 5.4).

...the illumination no longer works?

Change the batteries. (see chapter 6.2)

8 Disposal

The device is to be emptied completely and the liquids properly disposed of in case it is taken out of service.

In case the device is put out of service permanently then it has to be disposed of properly:



- Return old metal for recycling.
- Return plastic parts for recycling.
- Return electronic waste for recycling.



The water legal regulations are to be followed.

8.1 Return of batteries

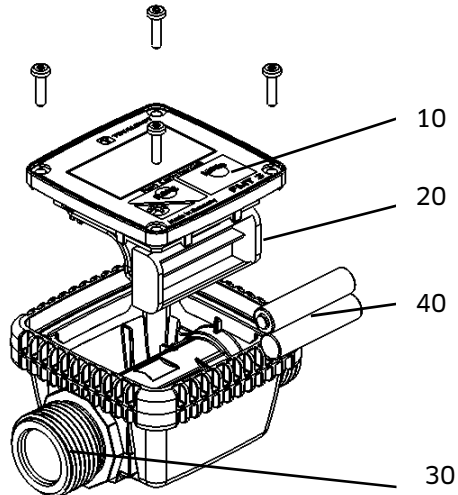
Batteries must not be disposed of with the domestic waste. Batteries can be returned free of charge via a suitable collecting point or to the dispatch stores. Consumers are legally obliged to return used batteries.

Batteries that contain harmful substances are marked with a crossed out dustbin (see above) and the chemical symbol (Cd, Hg or Pb) of the heavy metal that is decisive for the classification as containing harmful substances:

1. "Cd" stands for cadmium.
2. "Pb" stands for lead.
3. "Hg" stands for mercury.

9 Spare parts

| Item | Art. no. | Description |
|------|-----------|--|
| 10 | 817050001 | Cover incl. electronics |
| 20 | 517050011 | Battery housing |
| 30 | 817050002 | Measurement chamber (without electronic housing) |
| 40 | 450600750 | Battery, 1.5V, type AAA (2x required) |



10 Declaration of Conformity

Konformitätserklärung *Declaration of Conformity - Déclaration de conformité*

Hiermit erklären wir, dass die Bauart
We herewith declare that the construction type - Nous déclarons par la présente que le modèle

| | |
|---|---|
| Typ: - Type: | FMT 3 |
| Bezeichnung: <i>Designation: - Désignation :</i> | Durchflussmesser Flow meter - Débitmètre |
| Artikel-Nr.: <i>Item No.: - N° d'article :</i> | 917050001 |

in der von uns gelieferten Ausführung folgenden einschlägigen Bestimmungen entspricht:
*in the form as delivered by us complies with the following applicable regulations:
dans la version que nous livrons, est conforme aux directives en vigueur suivantes :*

- EMV-Richtlinie 2014/30/EG
Electromagnetic compatibility 2014/30/EC; Directive CEM 2004/108/CE
(EN 55011 (2009) + A1 (2010); EN 61000-4-2 (2009);
EN 61000-4-3 (2006) +A1 (2008) +A2 (2010); EN 61326-1 (2013))

| | |
|--|--|
| EG-Dokumentationsbevollmächtigter: <i>EC official agent for documentation: Personne autorisée à constituer le dossier technique CE:</i> | Jörg Mohr Horn GmbH & Co. KG Munketoft 42 D-24937 Flensburg |
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|------------------------------------|--|
| 28.04.2016 Datum <i>Date</i> |  i.V. Dipl.-Ing. Jörg Mohr Entwicklungsleiter / <i>Engineering Manager</i> |
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