HORN TECALEMIT

Operating manual

Meter
FMOGe

Item-No.: 027175201, 027175301, 027175401, 027175501,
027175601, 027175701, 027175801, 027175901

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.

Copyright

Service Hotline **+49 1805 900 301**
Reparatur Service **+49 1805 900 302**
(0,14 €/Min: on the German landline network, Mobile telephone max. 0,42 €/Min.)

service@tecalemit.de

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1. Safety instructions

This device has been constructed per the current state of technology and in accordance with the recognized technical safety regulations. Regardless, risks to the user or third parties and/or damages to the device or other material assets could result from its use. The instructions in this operation manual, especially the safety instructions and the sections marked with warning signs, must thus be complied with.

Warning signs and symbols

The following symbols are used for especially important information in the operation manual.

Special information regarding the efficient use of the device.

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

Information and/or dos and don’ts for personal accident prevention or comprehensive material damages.

Appropriate use

! This device may only be used when functioning free of technical problems and must used according to its designated use, with full knowledge of the safety and hazard risks and in consideration of the instruction manual! Malfunctions which could affect safety must be remedied immediately.

The device and its components are to be used exclusively with the fluids listed and the use designated. Any other use or use extending beyond is deemed as undesignated. The manufacture is not liable for damages thus resulting; the operator shall bear the risk alone.

Organisational measures

! The operation manual must always be kept accessible at the place of use! Every person who is involved with the assembly, commissioning, maintenance and operation of the device must have read and understood the complete operation manual. The type label on the device and the warning signs on the device must be heeded and kept in a fully legible condition.

Qualified personnel

! The personnel for the operation, maintenance and assembly must have the corresponding qualifications for this work. The operator must precisely regulate the spheres of responsibility, authority and monitoring of the personnel. If the personnel do not possess the necessary knowledge, they must be trained and instructed. In addition, the operator must ensure that the contents of the operation manual have been fully understood by the personnel.

Water protection

The device is designed to handle substances hazardous to water. The valid regulations for the place of use (e.g. water resources act, ordinance for systems with substances hazardous to water) are to be complied with.

Compressed air

⚠ Only persons with special knowledge and experience with pneumatic systems may carry out work on pneumatic parts and equipment. Prior to any inspection, maintenance or repair work, ensure that the equipment is not under pressure. All lines, hoses and screw joints should regularly be checked for leaks and external damage. Any damage must be rectified immediately.

Hydraulics

⚠ Only personnel with special knowledge and experience with hydraulics may work on the hydraulic parts and equipment. All wires, hoses and screws must be checked regularly for leaks and externally detectable damages and these must be remedied immediately.

Squirting oil can cause injuries and fires.

Note the safety guidelines valid for the product when dealing with oils, greases and other chemical substances!

Maintenance and repairs

⚠ In accordance with the legal regulations, only companies specialized can be hired for work with systems for substances hazardous to water. Do not make any modification, additions or conversions to the system which could affect its safety with the approval of the manufacturer. Replacement parts must correspond to the technical requirements of the manufacturer. This is always ensured when original parts are used.

Electrical energy

⚠ Work on the electrical equipment may only be conducted by a trained electrical technician or by trained personnel under the supervision of an electrical technician as per the electrical engineering regulations. Machines and system components which are to undergo inspection, maintenance and repair work must be rendered current-less. First check that these components are voltage-free, then ground and short circuit them, as well as insulate neighboring voltage-carrying components.

2. Technical description

2.1 Description

The FMOGe is a flow meter for flowing liquids based on the measuring principle of an oval wheel meter. It can be used as a fixed meter or as a manual flow meter. The pulse generator allows it to be used in a fluid management system.

⚠ **The FMOGe must not be operated with combustible and explosive liquids from hazard classes AI, AII and B. Liquids of hazard class A III must not be used, if they are heated above their flash point. The operation of the remote oil equipment in explosive areas is not permitted. This would constitute a risk of explosion!**

The FMOGe oval wheel meter consists of a measuring chamber with an oval pair of wheels and a cover containing the evaluation electronics as well as display and keyboard. The oval wheels are each equipped with a magnet pair which in the case of volume flow transfers the meter pulses to staggered reed switches on the evaluation electronics.

2.2 Product versions

Item no.	Model
027175401	Meter inlet, bottom
027175501	Meter inlet; top
027175601	Meter inlet, left
027175701	Meter inlet, right
027175201	Meter with pulse output, inlet, bottom
027175301	Meter with pulse output, inlet, top
027175801	Meter with pulse output, inlet, left
027175901	Meter with pulse output, inlet, right

2.3 Technical data

Housing	aluminium
Viscosity range	20–2000 mPa s
Smallest volumetric flow Q min	1 l /min (HDZ 0,5 l /min)
Largest volumetric flow Q max	10 l / min
Max. operating pressure P max	10 bar
Threaded connection	G ½“ internal
Measuring accuracy	+/- 0,5%
Dimensions	90x90*x60 (wxhxd) * flow direction
Weight	approx. 0,5 kg
Permitted operating temperature	-10°C to +50°C
Permissible storage temperature	-20°C to +70°C
Protection class	IP 65
Battery	Lithium battery

2.4 Elements of the FMOG

2.4.1 Display

LC display with five digit amount display, 16 mm high characters as well as display of the measuring unit Litre (optional US-Gal, UK-Gal) and display at low battery capacity. The smallest numeral step of the measured value is 0,01 litres, the smallest numeral step of the non-resettable totalizer is 1 litre.

2.4.2 Keyboard

Foil keyboard with two keys: „Total“ and „Reset“.

2.4.3 Battery

Lithium battery (type CR ½ AA, 3,6V, 1200 mAh) with a minimum service life of approx. 10 years given a flow amount of 1.000.000 litres during this time.

The battery can be exchanged when casing is opened. Totals and calibration values are saved during the exchange.

☛ **As the calibration marks have to be damaged when changing the battery, the battery is to be changed as a precautionary measure when calibration is performed.**

2.4.4 Measured value recording

Recording of the double pulse signal of the sensing chamber.

Error redundant saving and selection of measuring unit and calibration factor.

2.4.5 Double pulse exit (optional)

In the option „double pulse exit“, the counter is equipped with a dual-channel double pulse exit with 2 x 100 pulses / measuring unit. The pulses are phase-deferred by 90° ± 60°. The counter can be operated with an external voltage source of 5 VDC–24 VDC. Data of the pulse exits: open collector, U_{CEmax} =30V, I_{cmax} =50 mA

Pin assignment:

Connection	Colour
V_{dc} (5 VDC – 24 VDC)	Yellow
Pulse exit A	Green
Pulse exit B	White
Gnd (Mass)	Brown

3. Operating manual

3.1 Delivery state

At delivery, the counter is set at works to the measuring unit „litre“ and the calibration factor „1.000“. The calibration factor of pre-inspected counters have already been justified at works, otherwise this can also be done subsequently. The counter is ready to measure dispensations without any further interventions.

3.2 Basic state, volume measuring

In the basic state the LC display shows the measured volume since the last reset. The display shows two pre-decimal and three decimal places, the smallest digit step is 0,005 litres. In the lower line, the measuring unit „litre“(optional US-Gal, UK-Gal) is displayed. During the measurement, the keys are locked.

A flashing display indicates that more than two incorrect pulses (phase errors) have occurred since the last reset. The keys are blocked when metering takes place.

3.3 „Reset“ key

After pressing the key „Reset“ the programme state is displayed as long as the key remains pressed. After releasing the key, all segments are tested successively, and the resetting of the volume counter is executed. Should pulse signals incur at the same time (volume flow), the display test is interrupted and the counter changes back to the basic state.

3.4 Totalizer key – „Total“

After pressing the key „Total“, the totalizer state is displayed as long as the key remains pressed. The display is in rounded litres. Should pulse signals incur at the same time (volume flow), the display of the totalizer is interrupted, and the counter changes back to the basic state.

3.5 Display of the calibration factor – keys „Total“ + „Reset“

When the “Reset” key is pressed in addition to the pressed “Total” key (totaliser status display), the set calibrating factor is displayed for as long as the two keys are pressed. The calibrating factor can be between 0.950 and 1.500.

In addition, the rotational direction is displayed by the letters ‘l’ (left) or ‘r’ (right) in the foremost display segment

Should pulse signals proceed (volumetric flow) during the display, then the calibrating factor display is interrupted and changed to the basic state.

4. Error Control

4.1 Flashing volume display in basic state

A flashing volume display indicates that more than two incorrect pulses (phase errors) have occurred since the last reset. The incorrect pulses and the flashing can be reset by pressing the “Reset” button.

If this fault occurs repeatedly it may be assumed that there is either air in the hydraulic system or that pressure surges and hence back pulses are briefly occurring. These can be suppressed by the use of a suitable back flow preventer.

4.2 Battery symbol display in the basic state

The built-in 3.6 V lithium battery, type CR ½ AA, is designed for a minimum operating life of approx. 10 years given a 1,000,000 litre flow rate during this period. The appearance of the battery symbol in the basic state indicates that the battery capacity is exhausted and that the battery must be replaced within the next 6 months. The times may be reduced given extreme operating conditions such as a high flow rate or very low temperatures!

The battery can be replaced without tools once the housing is opened. Cumulative and calibration values are not affected by replacement.

☛ **In the event of the W & M seal being damaged, the responsible body (weights and measures office) must be informed and the meter must be re-calibrated if necessary.**

4.3 Display of five lines „-----“

Should the counter stop functioning and the display only show five horizontal lines, then an error has occurred in the evaluation electronic, and the counter has to be exchanged.

5. Programming the meter

5.1 General

The measuring unit (litre, US-Gal, UK-Gal) and the calibration factor (0.950 – 1.050) can be set and saved.

5.2 Switching to the programming mode

In order to access programming mode, the cover with the evaluation electronics is to be disconnected from the measuring chamber; the evaluation electronics is to remain installed in the cover. For this, the W & M seal on calibrated meters must be removed. Then the pushbutton on the back of the evaluation electronics must be pressed once. Then all segments rapidly flash (approx. 3 Hz) on the LC display.

5.3 Adjusting the measurement unit and rotational direction

The set rotational direction and the measurement unit appear on the display when the “Reset” button is pressed. Renewed pressing of the “Reset” button results in the rotational direction switching between ‘l’ for left and ‘r’ for right and the measurement unit switching between “Litre”, “US-Gal” and “UK-Gal”. The set rotational direction and measurement unit are taken over by pressing the “Total” button. Notice: Any change to the measurement unit causes the volume indicator and totaliser to be reset.

Pressing the programming button without previously pressing the “Total” button terminates programming mode without adopting the displayed rotational direction and measurement unit.

5.4 Setting the calibrating factor

After pressing the “Total” key, the calibrating factor set appears in the display. After repeatedly pressing the “Total” button the calibration factor is cumulatively counted in steps of 0.001, in order to jump back to the smallest possible value 0.950 after the highest possible value of 1.050 etc.

Press the “Reset” key and the set calibrating factor is taken on.

Pressing the programming button without previously pressing the “Reset” button terminates programming mode without adopting the displayed calibration factor.

Before a new calibrating factor can be established, a delivery must be made into a satisfactorily accurate vessel or undertaken by means of a reference meter. The new calibrating factor is calculated as follows:

$$\text{Factor}_{\text{new}} = \text{Factor}_{\text{old}} \times \frac{\text{Volume}_{\text{dispensed}}}{\text{Volume}_{\text{displayed}}}$$

Example: A 2 litre calibration cylinder is filled; the meter only indicates 1.985 litres. The existing calibrating factor is 1.004.

The new calibrating factor is calculated to:

$$1{,}004 \times \frac{2{,}000}{1{,}985} = 1{,}012 \text{ (rounded)}$$

5.5 Resetting all settings (first initialization)

If the “Reset” button is also pressed while the “Total” button is pressed (setting of calibrating factor), all values of the meter are deleted and a first time initialization is carried out.

Following values are initialized:

Measuring unit:	Litres
Calibration factor:	1.000
Dispensing amount:	0, 00 litres
Totalizer:	0 litres

5.6 Ending the programming mode

To end the programming mode, press the „mode“ key once again after setting the calibration factor. The counter switches back into the basic state. If no key has been pressed for longer than five minutes while in programming mode, then the counter will switch back to the basic state automatically.

6. Disposal

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

The equipment is to be disposed of properly when taken permanently out of service:

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

☛ **The water legal regulations are to be followed.**

6.1 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

7. Declaration of conformity

HORN TECALEMIT

Konformitätserklärung
Declaration of Conformity

Hiermit erklären wir, dass die Bauart
We herewith declare that the construction type

Typ: *Type:*	**FMOGe** ***FMOGe***
Bezeichnung: *Designation:*	**Durchflussmesser** ***Flow meter***
Artikel-Nr.: *Item No.:*	**914930002, 914930004, 914930006,** **914930008, 914930200, 914930202,** **914930229, 914930230, 914930302,**

in der von uns gelieferten Ausführung folgenden einschlägigen Bestimmungen entspricht:
in the form as delivered by us complies with the following applicable regulations:

- EMV-Richtlinie 2004/108/EG
  Electromagnetic compatibility 2004/108/EC

EG-Dokumentationsbevollmächtigter: Jörg Mohr
EC official agent for documentation:

Horn GmbH & Co. KG
Munketoft 42
24937 Flensburg

21.01.2011
Datum
Date

.....
i.V. Dipl.-Ing. Jörg Mohr
Entwicklungsleiter / *Engineering Manager*

HORN GmbH & Co. KG
Munketoft 42
D-24937 Flensburg
Germany

T +49 461 8696-0
F +49 461 8696-66
info@tecalemit.de
www.tecalemit.de

Geschäftsführer:
Jürgen Abromeit
Torsten H. Kutschinski

Commerzbank AG
BLZ 215 400 60
Konto-Nr. 2476000

SWIFT COBADEFFXXX
IBAN DE33215400600247600000
Amtsgericht Flensburg HRA 4264
USt-IdNr. DE813038919

8. Notice

HORN GmbH & Co. KG
Munketoft 42
24937 Flensburg
Germany

T +49 461-8696-0
F +49 461-8696-66

www.tecalemit.de
info@tecalemit.de