en

Translation of the original instructions

FLOW METER MDO2

0697-601 MDO2 - 10/2023

Please read this manual before starting up!

To be retained for future reference.

Table of Contents

1. Concerning this manual

This manual
- is part of this product
- is valid for all mentioned series
- describes the safe and proper use in all operating stages

1.1 Terms

User: Single person or organisation who is using the products e.g. customer, user, assistant
Children: Young persons up to and including the age of 14 years.

1.2 Target groups

Target group	Task
User	▶ Retain these operating instructions at the product's place of use for future reference. ▶ Demand the staff to read and observe these instructions and the additional valid documents, in particular the safety information and warnings. ▶ Observe additional regulations and instructions concerning the plant.
Qualified personnel, installer	▶ Read, observe and follow these instructions and the additional valid documents, in particular the safety information and warnings.

Tab. 1: Target groups and their tasks

1.3 Associated applicable documents

None

1.4 Warnings and symbols

Warning	Level of risk	Consequences in case of non-compliance
DANGER	direct danger	death or serious injury
WARNING	possible direct danger	death or serious injury
CAUTION	possible dangerous situation	Light physical injury
NOTICE	possible dangerous situation	damage of property

Tab. 3: Warnings and consequences in case of non-compliance

Symbol	Meaning
⚠	Safety information ► Comply with all measures that are marked with a safety sign to prevent injuries or death.
i	Information / Recommendation
►	What to do
→	Cross reference
✓	Requirement

Tab. 4: Symbols and meaning

1.5 Latest state

Please find the latest state of this operating instruction under www.lutz-pumpen.de.

1.6 Copyright

2. Safety

The manufacturer will not be held responsible for any damages resulting from non-compliance of the overall documentation, in particular for damages in case of non-compliance of the operating instructions.

2.1 General safety information

Observe following regulations before accomplishing all activities.

Product safety

The flow meter is constructed in conformity with the state of the art and approved safety-related standards. Danger however can occur during use for life and health of the user or third parties or damage of the flow meter and other material assets. Therefore:

- Operate the flow meter only in a technically sound state, for its proper use, and conscious of safety and hazards taking into account these instructions.
- Ensure that these instructions and all associated applicable documents are complete, legible, and stored in a place that personnel can access at all times.
- Refrain from any manner of working that endangers personnel or uninvolved third parties.
- In the case of a safety-relevant malfunction, stop the flow meter immediately and enlist a responsible person to rectify the malfunction.
- In addition to the overall documentation, observe the statutory or other safety and accident prevention regulations, as well as the valid standards and guidelines of the respective operating country.

Modifications

Unless the manufacturer has provided its consent in writing, the manufacturer is not liable for interventions performed by the user (modifications) on the product, such as conversion, alteration, new design, etc. Modifications not agreed with the manufacturer may have the following effects, among others:

- Functional impairments on the appliance or plant
- Damage to the appliance and other property damage
- Environmental damage
- Personal injuries right through to death

Duties of the operator

Safety-conscious working

- Operate the flow meter only in a technically sound state, for its proper use, and conscious of safety and hazards taking into account these instructions.
- Ensure observance and monitoring of:
  - Proper use
  - Statutory or other safety and accident prevention regulations
  - Safety provisions in handling hazardous substances
  - Valid standards and guidelines in the respective country of operation
- Provide protective equipment.

Personnel qualification

- Ensure that personnel tasked with work on the flow meter have read and understood these instructions and all associated applicable documents, particularly safety, maintenance and servicing information, before they start work.
- Clarify responsibilities, competencies and monitoring of the personnel.
- Ensure that all work is carried out by technical qualified personnel only:
  - Assembly, repair, maintenance
  - Work on the electricals
- Personnel to be trained must only work on the flow meter under the supervision of technical personnel.

Statutory warranty

- During the guarantee period, obtain the manufacturer's permission for modifications, maintenance work or alterations.
- Use only original parts.

Duties of the personnel

- Observe the notices on the flow meter and maintain them in a legible state.
- Use protective equipment where necessary.
- Only perform work on the flow meter during downtime.
- Ensure that the flow meter is disconnected before you carry out assembly and maintenance work.
- After completing all the work on the flow meter, remount the safety devices in accordance with specifications.

2.2 Proper use

The MDO 2 flow meter is used for measuring liquid volumes of mineral and vegetable oils where gauging metering is not required. The flow meter is suitable for stationary use as well as for mobile filling process.

⚠ DANGER

Fire and explosion hazard due to pumped liquid!
Risk of burns. Blast wave: Flying parts can kill you.
The flow meter is not explosion proof. It is not allowed to put the flow meter into operation inside of hazardous location and with explosion hazard, oxidizing, highly or easily flammable liquids. When handling flammable liquids, temperature of liquid may not exceed the flashpoint.

⚠ DANGER

Exceeding the temperature range and the operating pressure causes damage to the flow meter. Splashing liquid or flying parts can cause injury.
The ranges indicated in the technical data for temperature of liquid and operating pressure have to be observed.

2.2.1 Technical data

Material	**Cover**	PA
Material (in contact with the medium)	**Measuring chamber**	Aluminium
	Oval gears	LCP
Volume flow range		3 – 80 l/min
Nominal pressure		4 bar
Measuring accuracy (calibrated) *		± 0.5%
Nominal width		G 3/4
Protection class		IP 67
Battery		Lithium, type CR123A, 3 V, replaceable
Temperature range		-10 – 80°C**
Dimensions approx. (ø x h)		100 x 98 mm
Weight approx.:		1.4 kg

* Viskosity > 20 mPas

** When handling flammable liquids, temperature of liquid may not exceed the flashpoint.

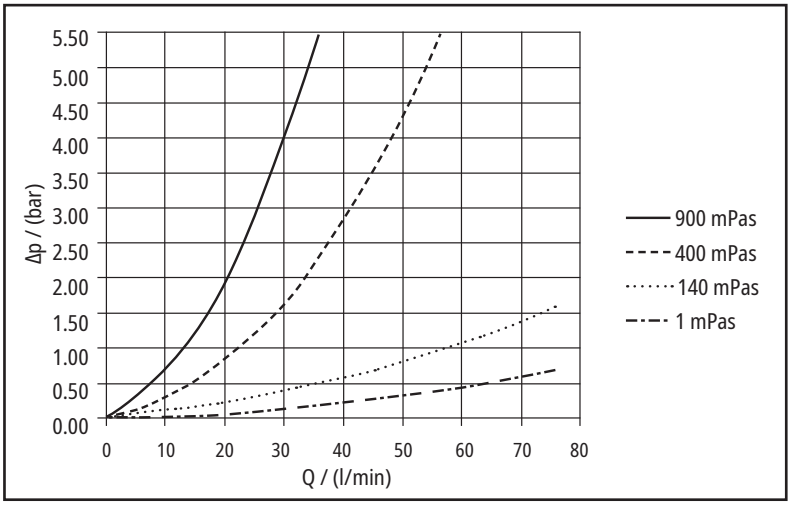

Diagram 1 – Pressure drop characteristic curve MDO2

2.2.2 Liability

If the product and supplied accessories are used for other purposes than the intended purpose, it is the responsibility of the user to check the suitability and admissibility. Product use not confirmed in writing by the manufacturer absolves the manufacturer of any liability.
The manufacturer is not liable for consequences of incorrect treatment, use, maintenance, servicing and operation of the appliance, as well as normal wear and tear. The same applies if faults arise from intervention or configurations on the part of the user not confirmed by the manufacturer.

2.2.3 Prevention of obvious misapplication (examples)

⚠ WARNING

Equipment misuse can cause the meter to rupture or malfunction and cause serious injury.

- Do not pump flammable liquids.
- Do not operate the flow meter in explosion hazard area.
- Do not leave the equipment unattendedly while dispensing.
- Check equipment daily. Repair or replace worn or damaged parts immediately.
- Use only extensions and nozzles that are designed for use with this equipment.
- Use only fluids and solvents that are compatible with the equipment. Read all fluid and solvent manufacturer's warnings.
- Seal all fluid connections before operating this equipment
- Do not stop or deflect leaks with hands, body, gloves or rags.
- Do not dispense liquid towards any person or any part of the body.
- Do not place hands or fingers over the end of or into the dispense valve.

3. Unpack and inspect flow meter

Upon receipt of the product, perform the following unpacking and inspection procedures:

Attention: If the packaging is damaged, unpack the flow meter in the presence of the forwarding agent.

► Carefully open the shipping package and follow any instructions marked on the exterior. Remove all packing material and carefully lift the flow meter from the package.
► Retain the package and all packing material for possible use in reshipment or storage.
► Visually inspect the product and applicable accessories for any physical damage such as scratches, loose or broken parts, or any other sign of damage that may have occurred during shipment.

Attention: Once a damage is detected, request an inspection by the carrier within 48 hours after delivery and file a claim with the carrier.

4. Before the first installation

► Please flush the flow meter with fresh water or the medium to measure before the first installation.

5. Installation

► Do not place the unit on an unstable surface that may allow it to fall.

► Never place the unit near a heater.

6. Installation of the flow meter

NOTICE

Read the following information and have a thorough understanding before proceeding with the meter installation. Only qualified personnel should perform meter installation.

► Install a filter (mesh size 0,25 mm) as close to the inlet side of the meter as possible. These prevent dirt and other fluid contaminants from impending meter performance. Strainers require periodic cleaning, as clogged strainers also impede meter performance.

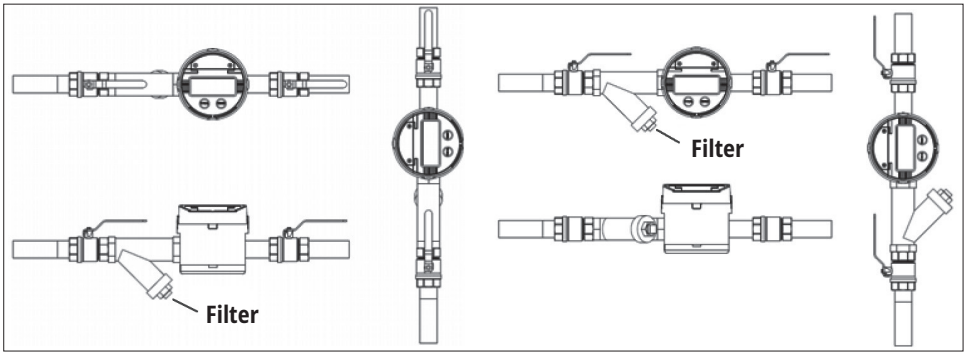

Fig. 1: Installation of the flow meter

► Turn off any associated pumps to reduce line pressure and slowly fill the line and meter with fluid before restarting pumps. Thus the possibility of a meter damage caused by errant air pressures in the line and meter is reduced.

► Make sure that all pipes have the same pressure as the pump.

► Make sure that all pipe threads are equipped with thread sealants.

► Install meters horizontally (→ Fig. 1).

► Check the system for leaks and remove them before liquid flows.

7. Register function

The register display consists of two rows of seven-segment digits, status, unit of measures, flow rate and battery indicators. Operating function settings and programming are provided using the TOTAL and RESET buttons.

Fig. 2: Register display and buttons

7.1 Normal operation

To enter normal operation mode - when the screen is dark after exiting programming mode, or upon initial use, press either the **TOTAL** or **RESET** button once.

7.2 Status

Status indicators are RESET and TOTAL.

7.3 Totalizers

The top row of indicators is the batch totalizer. This totalizer displays the cumulative volume of flow through the meter with six digits. The batch totalizer totalizes in selected units of measure.
To reset the batch totalizer, after 2 seconds of no flow, press and release the RESET button.
The bottom row of indicators display the resettable totalizer with five digits or the five least significant digits of the non-resettable totalizer. RESET and TOTAL is indicated when the resettable total is displayed in the five-digit lower row. Only TOTAL is indicated when the non-resettable total is displayed.
To toggle between the non-resettable totalizer and the resettable totalizer, press and release the TOTAL button.
To reset the resettable totalizer, press and hold the TOTAL button and then press and release the RESET button.

To display 11-digit non-resettable totalizer, while the non-resettable total is displayed, press and hold the TOTAL button for seconds. The top row displays the 6 most significant digits; the bottom row displays the 5 further digits.

Note: The non-resettable totalizer normally displays the 5 least-significant digits.

7.4 Flow rate

Flow rate per minute is displayed in conjunction with the unit of measure. All flow rates are calculated in volume unit per minute.

7.5 Battery

The „LBat“ indicator will indicate when the battery is approaching end of life. When the indicator is illuminated, the 2/3AA, 3.0 VDC lithium battery is drained to 10% of its total capacity and should be changed. Normal battery life is five years.
Note: A 2/3AA, 3.6 VDC battery may also be used as a replacement.

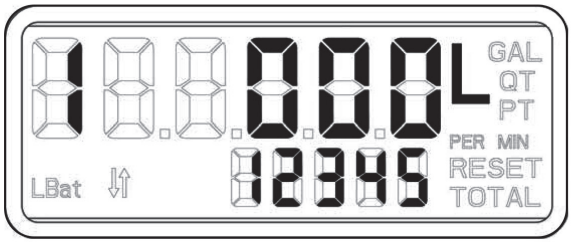

Fig. 3: Low battery indicator

7.6 Checksum

To display the firmware checksum, press and hold the RESET button for three seconds. To return to normal display, release the RESET button.

7.7 Display scale factor

At the same time, press and hold the TOTAL and RESET buttons for two seconds to display the scale factor. The programmed scale factor is displayed. To return to the normal display, release both buttons.

8. Register programming

In programming mode only, pressing and releasing the TOTAL button advances to the next parameter on the current screen. Pressing and releasing the RESET button changes the current flashing selection to another selection (such as “L” to “GAL”).

To enter the programming mode, press the TOTAL button three times and then press the RESET button three times (the time lag between pressing both buttons - three times the TOTAL button and three times the RESET button - must be within two seconds).

8.1 Unit of measure

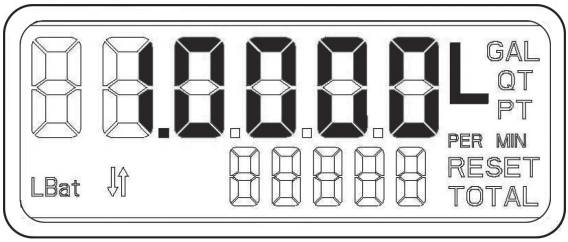

Fig. 4: Unit of measure & scale factor programming

1. Press and release the RESET button to change the unit of measure (L, GAL, QT, PT).
2. Press and release the TOTAL button to select the desired unit of measure (the selected unit of measure will flash).
3. When the appropriate unit of measure is selected, press the TOTAL button to advance to the scale factor programming.

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8.2 Scale factor

The register collects input pulses from the oval gear meter and then determines the appropriate display output using the scale factor. The scale factor varies depending upon the viscosity of the liquid being measured, therefore calibrating the meter and register in the appropriate liquid will affect the scale factor. The scale factor is displayed as 5 digits (on the top row) next to the unit of measure. The scale factor consists of one integer digit and 4 decimal digits (→ Fig.4).

1. Press the TOTAL button to select a digit (selected digits flash). After cycling through all 5 digits of the scale factor, the register will return to the unit of measure selection.
2. Press RESET to change the selected digit. The scale factor must fall between the values of 0.5000 and 2.0000. The factory preset is set at 1.0000.
3. When finished adjusting the unit of measure and scale factor, press and hold the TOTAL button for one second to advance to the pulse rate section.

Note: You will not advance to the next screen if the entered value is outside the range.

8.3 Changing the meter pulse rate

The meter pulse rate (screen is indicated by the "I" on the top row, on the left side) is the number of pulses per unit of measure as detected by the register. The pulse rate varies according to the meter. The bottom row consists of the 5-digit integer value of the meter pulse rate, whereas the top row consists of the 2-digit decimal value of the meter pulse rate.

The meter pulse rate is entered in pulses per liter if the selected unit of measure is liters. The meter pulse rate is entered in pulses per gallon if the selected unit of measure is gallons.

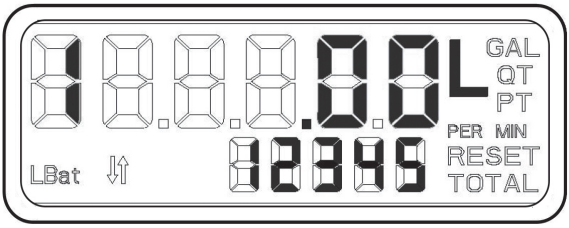

Fig. 5: Meter pulse rate

1. Press the TOTAL button to select a digit (selected digits flash). Press RESET to change the selected digit. The pulse rate can be any value between 00000.01 and 99999.99 on the top row; integer values are displayed on the bottom row. Example: 10.45 would display .45 on the top row and 10 would be displayed on the bottom row.
2. When finished adjusting the pulse rate, press and hold the TOTAL button for one second to advance to the "register orientation".

Note: You will not advance to the next screen if the entered value is outside the range.

8.4 Register orientation

Depending on the orientation (perpendicular or horizontal on the meter); this setting may need to be changed.

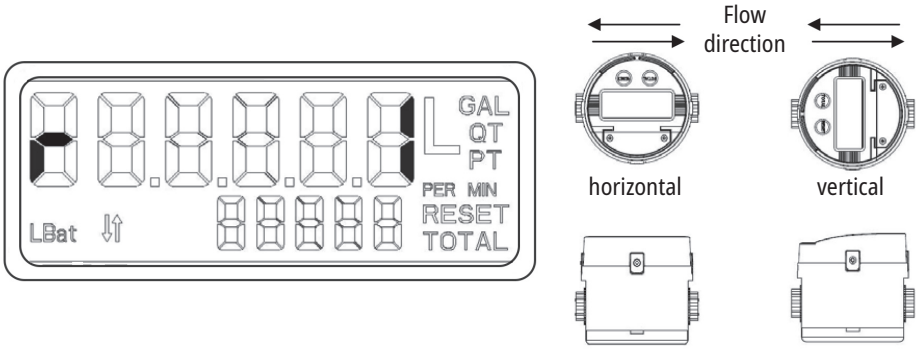

Fig. 6: Register orientation

1. Press the RESET button to toggle between available options ("I", for a horizontal orientation (in flow direction) and "P" for a perpendicular-to-flow orientation).
2. When finished adjusting the register orientation, press and hold the TOTAL button for one second to advance to the "Display Modus" section.

8.5 Changing the display mode

The display mode screen (indicated by a "d" on the top row, on the left side) determines the information displayed on the top line of the register during normal operation. The display mode may be either the totalizer screen or the flow rate screen.

"C" indicates the totalizer screen and "F" indicates the flow rate screen. The totalizer screen is depicted below:

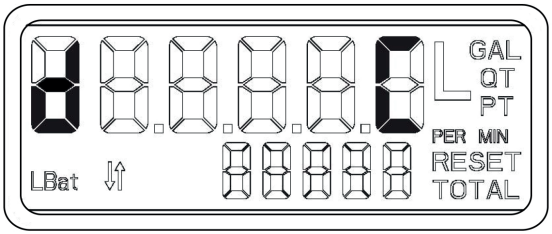

Fig. 7: Display Mode

1. While a letter is flashing on the display, press the RESET button to select either totalizer or flow rate.
2. Upon completion of this setting, the programming is complete.

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8.6 Exiting programming mode

On any screen: Press TOTAL and RESET button and hold both buttons. The screen will revert back to the programmed scale factor and then flash. Following the three flashes, the register display will be dark.

Note: Pressing the TOTAL or RESET button will turn the display back on.

9. Cleaning

Switch off the unit before cleaning. Clean using a damp cloth. Do not use detergents.

10. Repairs

Repairs should only be made by the manufacturer or authorized Lutz dealers. Only use Lutz spare parts.

11. Disposal

Batteries and battery packs are containing dangerous substances for the environment and the human health.

Do not dispose batteries and battery packs into the domestic waste, into fire or into water.
Batteries and rechargeable batteries must be collected and recycled.
Within the EC countries you are legally bound to return batteries and battery packs after use to the sale shop or a public collecting point. Taking back of batteries and rechargeable batteries is free of charge.
Dispose the flow meter according to the locally applicable regulations.

Translation of the original declaration of conformity

We herewith declare under the sole responsibility that the following product complies with the EU Directives listed.

Manufacturer:	Lutz Pumpen GmbH Erlenstraße 5-7 D-97877 Wertheim

Product:	**Flow meter**

Type:	**MDO2**

Relevant European Directives:	EMC:	2014/30/EU
	PED[1)]:	2014/68/EU
	RoHS:	2011/65/EU, 2015/863/EU

[1)] Is classified according to 2014/68/EU, article 4, point 3. There is no CE marking on it.

Wertheim, 05.09.2019

Heinz Lutz, CEO

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