

# Electronic Oil Meter

## OM 20



**Congratulations on purchase of this World Class Electronic Oil Meter!**

- Electronic digital meter featuring an oval-gear measurement system.
- Designed for easy and precise measuring of oils and other liquids compatible with the component materials.
- Features a non-volatile memory for storing the dispensing data, even in the event of a complete power break for long periods.
- Robust Aluminum Die Cast construction with a protective Rubber Shroud



## SPECIFICATIONS

<b>Meter Type</b>	Digital
<b>Mechanism</b>	Oval Gear
<b>Inlet / Outlet Position</b>	In-Line
<b>Inlet / Outlet</b>	1/2" BSP (F) or 1/2" NPT (F)
<b>Flow Rate</b>	1 to 30 LPM (0.3 to 8 GPM)
<b>Accuracy</b>	+/- 0.50%
<b>Repeatability</b>	+/- 0.30%
<b>Max. Working Pressure</b>	1000 PSI (70 BAR)
<b>Burst Pressure</b>	2000 PSI (140 BAR)
<b>Pressure Loss</b>	10 PSI (0.7 BAR)
<b>Working Temperature range</b>	-10°C to 60°C (14°F to 140°F)
<b>Max. Resettable Batch Total</b>	99,999 units
<b>Max. Non Resettable Totalizer</b>	9,99,999 units
<b>Least Count / Resolution</b>	0.001 units
<b>Filter/ Screen Included</b>	No
<b>Max. Viscosity of Media</b>	5000 cSt
<b>Option to Recalibrate by User</b>	Yes

Number Of positions in which display can be rotated	0
Protective Shroud on Meter	Yes
Weights & Measures Approved	No
Calibration Certificate Included	No
Water Resistance	IP55

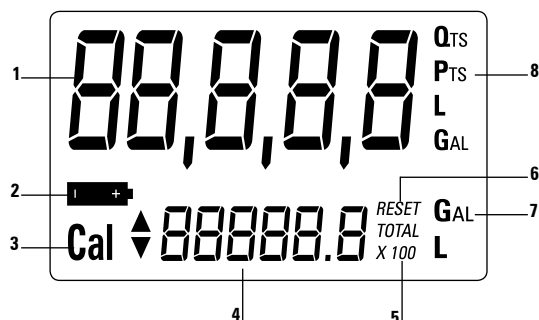
## KNOW ABOUT YOUR FLOWMETER

### Table of Contents

- A. Major Components
- B. Measurement Units Configuration
- C. Normal Dispensing Mode
- D. Resetting The Batch Total
- E. Resetting The Reset Total
- F. Calibration
- G. Calibration Procedures –
  - In-Field Calibration Sequence,
  - Direct Calibration Sequence

### A. MAJOR COMPONENTS

**LCD DISPLAY** - Includes three numerical Totals and other keys as given below:



1. **Resettable Batch Total (5 figures with moving comma)-** indicates volume dispensed after RESET button was last pressed.
2. Indication of battery charge.
3. Indication of calibration mode.
4. **Batch Totalizer (6 figures with moving comma in multiple of 10 or 100)** - indicates two types of Total:
  - Non-Resettable General Total (TOTAL)
  - Resettable total (Reset TOTAL)
5. Indication of total multiplication factor ( x10 or x100 ).
6. Indication of type of total, (TOTAL / Reset TOTAL).
7. Indication of unit of measurement of Totalizer:
  - L=Litres
  - Gal=Gallons
8. Indication of unit of measurement of Resettable Batch Total:
  - Qts=Quarts
  - Pts=Pints
  - L=Litres
  - Gal=Gallons

**User Buttons** - The meter features two buttons (RESET and CAL) which individually perform two main functions and together, other secondary functions.

- **RESET key** - is used to reset the Batch Total and Reset Total
- **CAL key** - is used to enter calibration mode
- **Combination of RESET + CAL keys** - is used to change the unit of measurement

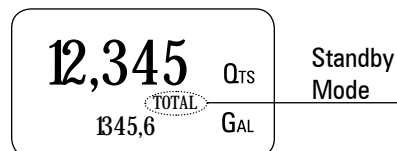
**Measurement Chamber** - It has a threaded inlet and outlet. It contains two oval gears which turn when media passes through them with sufficient pressure. This action generates electrical pulses which are processed by a microprocessor and the result is displayed on the registers of the LCD.

**Battery Housing** - The meter is powered by two standard type 1.5 V batteries (size 1N). The battery housing is closed by a threaded watertight cap that can be easily removed for quick battery change.



### WHAT IS STANDBY ?

When the media is not flowing through the meter, the display shows only the word TOTAL on the batch register. This mode is called STAND BY and majority of adjustments are carried out in this mode.



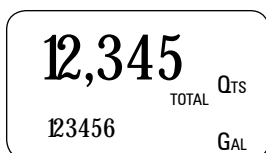
## B. MEASUREMENT UNITS CONFIGURATION

The METER comes with a menu through which the user can select the main measurement unit, Quarts (Qts), Pints (Pts), Litres (Lit), Gallons (Gal); The combination of the unit of measurement is predefined according to the following table:

Reference No	Unit of Measurement Batch Total	Unit of Measurement Total Register
1	Litres (L)	Litres (L)
2	Gallon (Gal)	Gallon (Gal)
3	Quarts (Qts)	Gallon (Gal)
4	Pints (Pts)	Gallon (Gal)

### SEQUENCE OF SETTING THE UNIT OF MEASUREMENT

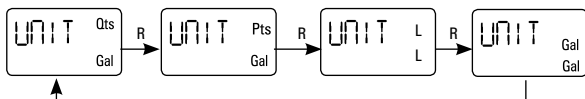
1. Wait for the METER to go to Standby



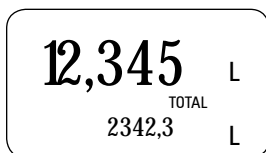
2. Press the CAL and RESET keys together. Keep these pressed until the word "UNIT" appears on the screen together with the unit of measurement set at that time ( in this example Quarts / Gallon )



3. Press RESET key to scroll among the four combinations of units of measurement as shown :

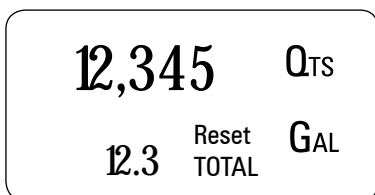


4. By pressing the CAL key at length, the new settings will be stored, the METER will pass through the start cycle and will then be ready to dispense in the set units.  
No new calibration is required after changing the Unit of Measurement.

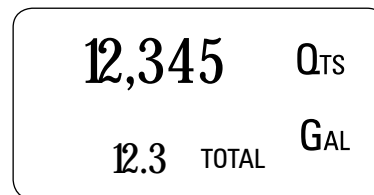


## C. NORMAL DISPENSING MODE

While the media is flowing through the meter, Batch Total and Reset Total are displayed at the same time.



A few seconds after dispensing has ended, on the lower register, the display switches from Reset Total to General Total: the word RESET above the word TOTAL disappears, and the Reset Total is replaced by the General Total.



This situation , where only "TOTAL" is displayed, is called **STANDBY mode**. It remains stable until the user operates the meter again.

## D. RESETTING THE BATCH TOTAL

1. While in standby (i.e when the display shows TOTAL), press the RESET button.
2. During reset, the display screen first of all shows all the lit-up digits and then all the switched off digits.
3. At the end of the process, a display page is first of all shown with the reset batch and the Reset TOTAL.
4. After a few moments, the Reset TOTAL is replaced by TOTAL.

## E. RESETTING THE RESET TOTAL

The Reset Total can be reset by pressing the RESET key at length while the display screen shows Reset TOTAL. The steps to be taken are:

1. Wait until the display shows Total only (standby mode)
2. Press the RESET key quickly.
3. The meter starts to reset the Batch Total.
4. While the display page showing the Reset Total is displayed, press the Reset key again for at least 1 second.
5. The display screen again shows all the segments of the display followed by all the switched-off segments and finally shows the display page where the new Reset Total is shown.

## F. CALIBRATION

In standby mode, press the CAL key at length to see the current calibration factor.

- **Factory K Factor: Factory-set default factor.**  
It is equal to 1 (indicated as 1,000).
- **User K Factor: Customized calibration factor,**  
meaning modified by calibration.

The meter has been calibrated at the factory under the following operating conditions:

Fluid motor oil type	:	10W40
Temperature	:	20°C (68°F)
Flow rate	:	5-25 litres/min

Calibration is needed to make the meter suitable for actual conditions.

## IMPORTANT

The METER features a non-volatile memory that keeps the data concerning calibration and total dispensed quantity stored for an indefinite time, even in the case of a long power break.

## G. CALIBRATION PROCEDURES

1. In-Field Calibration, performed by means of a dispensing operation
2. Direct Calibration, performed by directly calculating the calibration factor.  
By pressing CAL key while the meter is in Standby, the display page appears showing the current calibration factor used.

Two cases can occur:

### CASE 1

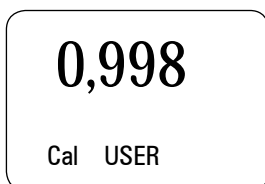
If no calibration has ever been performed, or the factory setting has been restored after previous calibrations, the following display page will appear:



The word "Fact" abbreviation for "factory" shows that the factory calibration factor is being used.

### CASE 2

If, on the other hand, calibrations have been made by the user, the display page will appear showing the currently used calibration factor (in our example 0,998).



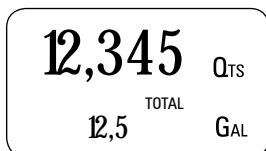
The word "user" indicates that a calibration factor, set by the user is being used.

To confirm the choice of calibration factor, quickly press CAL while "User" or "Fact" are displayed.

After the restart cycle, the meter uses the calibration factor that has just been confirmed.

## IN-FIELD CALIBRATION SEQUENCE

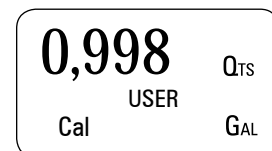
1. Wait until the METER comes in Standby (Display shows TOTAL).



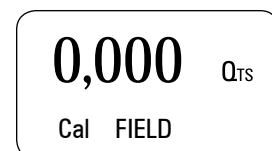
2. Press CAL key for more than 2 seconds. The METER enters calibration mode and shows "CAL". The words "FACT" and "USER" indicate which factor (factory or user) is currently in use.



OR

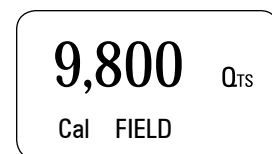


3. Press RESET key for more than 2 seconds. The METER shows "CAL" and the Batch Total at zero. The meter is ready to perform in-field calibration.

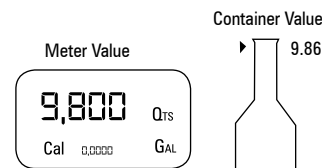


4. **DISPENSING INTO SAMPLE CONTAINER**

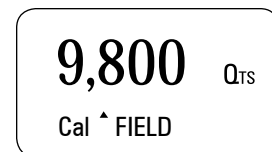
Without pressing any key, start dispensing into the sample container.



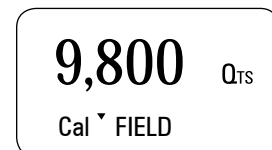
While dispensing, do not try to reach a particular reading of the container. Instead make short top-ups in the final stage of dispensing.



5. Press RESET key once. The METER detects that the calibration dispensing is finished. To calibrate the METER, the value indicated by the Batch total (example 9.800) must be forced to the Container value marked on the graduated sample container. An arrow (up/down) appears which indicates the direction in which the value can be changed via steps 6 & 7.



6. Press RESET key once. The arrow changes direction. The operation can be repeated to alternate the direction of the arrow.



7. Press RESET key for more than 2 seconds .  
The meter value changes in the direction indicated by the arrow

- One unit for every short press of CAL key.
- Continually if the CAL key is kept pressed.

9,860 Q<sub>TS</sub>  
Cal ^ FIELD

8. Press RESET key for more than 2 seconds .

The METER is informed that the calibration procedure is finished.

The meter calculates the new USER K FACTOR factor for a few seconds.

----- Q<sub>TS</sub>  
Cal END

9. The new USER K FACTOR is shown for a few seconds, after which the restart cycle is repeated.

1015 Q<sub>TS</sub>  
Cal END

10. The METER comes back to standby mode.

0,000 Q<sub>TS</sub>  
TOTAL  
12,5 GAL

## DIRECT CALIBRATION SEQUENCE

If normal METER operation shows a mean percentage error E, (obtainable on the basis of several performed dispensing operations), this can be corrected by applying a correction to the **current calibration factor** as shown below :-

$$\text{New cal. Factor} = \text{Old Cal Factor} \times \left\{ \frac{100 - E}{100} \right\}$$

### Example:

$$\begin{aligned} \text{Error percentage found } E\% &= -0.3\% \\ \text{CURRENT calibration factor} &= 1.000 \\ \text{New USER K FACTOR} &= 1.000 * [(100 - (-0.3))/100] \\ &= 1.000 * [(100 + 0.3)/100] \\ &= 1.003 \end{aligned}$$

1. Wait until the METER comes in Standby (Display shows TOTAL).

12,345 Q<sub>TS</sub>  
TOTAL  
12.5 GAL

2. Press CAL key for more than 2 seconds.  
The METER enters calibration mode and shows "CAL". The words "Fact" and "USER" indicate which factor (factory or user) is currently in use.

1000 Q<sub>TS</sub>  
Cal FACT  
USER GAL

3. Press RESET key for more than 2 seconds.  
The METER shows "CAL" and the Batch total at zero. The user can perform in-field calibration now.

0,000 Q<sub>TS</sub>  
Cal FIELD

4. Press RESET key for more than 2 seconds.  
"Direct" appears together with the Current calibration factor. In the bottom left part of the display, an arrow appears (upwards or downwards) defining the direction (increase or decrease) of the reading.

1000 Q<sub>TS</sub>  
Cal ^ DIRECT

5. By pressing RESET key the user can change the direction of the arrow.

1000 Q<sub>TS</sub>  
Cal v DIRECT

6. By pressing CAL key, the Meter value changes in the direction indicated by the arrow,  
  - one unit for every short press of CAL key .
  - continually if the CAL key is kept pressed. The speed increase rises by keeping the key pressed.

1003 Q<sub>TS</sub>  
Cal ^ DIRECT

7. Press RESET key for more than 2 seconds.  
The METER detects that the desired reading has been set and the calibration procedure is finished.

----- Q<sub>TS</sub>  
Cal ^ DIRECT

8. At the end of the calculation, the new USER K FACTOR is shown for a few seconds.

1003 Q<sub>TS</sub>  
Cal END

9. The restart cycle is repeated to finally achieve standby mode.

0,000 Q<sub>TS</sub>  
TOTAL  
12.5 GAL

## MAINTENANCE

The meter has been designed to require a minimum amount of maintenance.

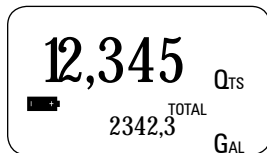
The only maintenance jobs required are:

- **Battery change** - Necessary when the batteries have run down
- **Cleaning the measurement chamber** - Due to the presence of solid particles following bad filtering.

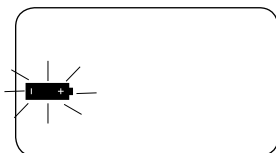
### CHANGING THE BATTERY

The METER features two low-battery alarm levels

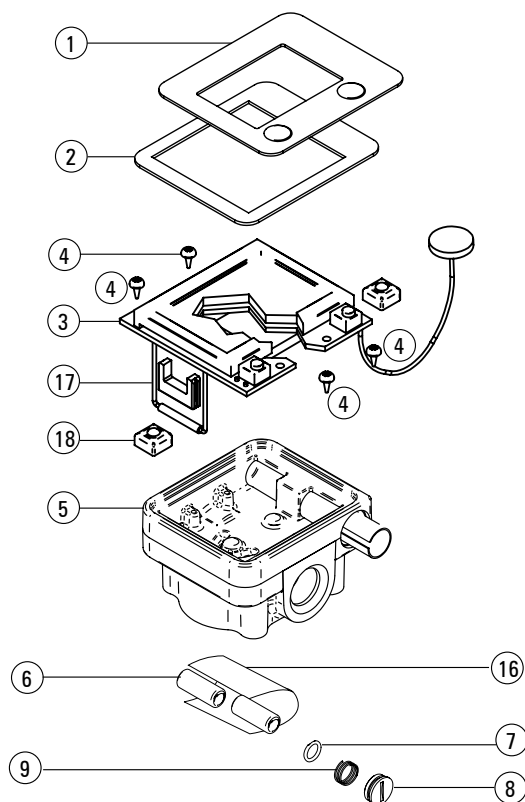
1. When the battery charge falls below the first level on the LCD, the fixed battery symbol appears. In this condition, the METER continues to operate correctly, but the fixed icon warns the user that it is time to change the batteries.



2. If first alarm is ignored without changing the batteries, the second battery alarm will prevent operation. In this condition the battery icon starts to flash and is the only one to remain visible on the LCD.



### EXPLODED VIEW



### BATTERY REPLACEMENT PROCEDURE :

- Press RESET to update all the totals.
- Unscrew the battery plug (8).
- Remove the old batteries.
- Place the new batteries in the same position as the old ones, making sure the positive pole is positioned as indicated on the cover .
- Re-tighten the battery plug, making sure the conical spring (9) & O-ring (7) is correctly positioned.
- The METER will switch on automatically and normal operation can be resumed. The old calibration will stay same as before..

### CLEANING OF THE MEASUREMENT CHAMBER

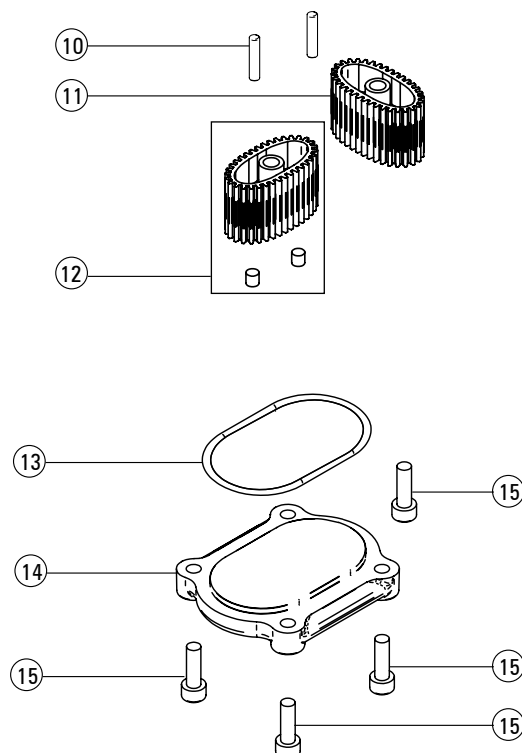
The measurement chamber can be cleaned without removing the meter from the lines.



**Always make sure the liquid has been drained from the meter and the line pressure is released before cleaning. To clean the chamber, proceed as follows.**

**(Refer to the parts indicated in the exploded view):**

- Loosen and remove the four cover retention screws (15).
- Remove the cover (14) and the seal (13).
- Remove the oval gears (11) & (12).
- Clean wherever necessary. For this operation, use a brush or pointed object such as a small screwdriver.
- Be careful not to damage the body or the gears.



## COMPONENT LIST

REFERENCE NUMBER	DESCRIPTION	QUANTITY
1	Meter Label	1
2	Plastic Face	1
3	Electronic Board	1
4	Screw	4
5	Meter Housing	1
6	Battery 1.5V N size	2
7	O-Ring	1
8	Battery Plug	1
9	Conical Spring	1
10	Oval Gear Pivot	2
11	Oval Gear	1
12	Oval Gear with Magnet	1
13	Seal	1
14	Cover	1
15	Screw	4
16	Battery Protection	1
17	Spacer for Bulbs	1
18	Spacer for Key	2

## CAUTION

To reassemble the meter, take care of the following step :

Fit the second gear (without magnets) with axis greater than 90° compared to the first gear, and with the holes visible from the cover side. Make sure the gears are turning freely before closing the cover.



### RECOMMENDED USE

Oils with viscosity upto 5000 cSt, Diesel, Biodiesel

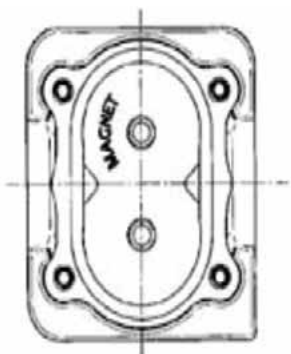
### DO NOT USE WITH

Water based media, Gasoline etc.

### WETTED COMPONENTS

Aluminium, Stainless Steel, Nitrile Rubber & POM

Only one of the two gears features magnets. This must be fitted in the position marked "MAGNET" (see drawing). Once the gear has been fitted, the magnets must be visible before closing the cover.



## TROUBLESHOOTING


PROBLEM	CAUSE	SOLUTION
<b>LCD: Indication is dull</b>	Battery Low	Replace battery (See Maintenance - Changing the battery)
<b>Not enough measurement precision</b>	Wrong K FACTOR	Adjust the calibration factor (See Calibration Procedures)
	The meter works out of flow rate nominal range	Re-enter at flow rate nominal range
<b>Reduced or Zero flow rate</b>	Gears blocked	Clean the measurment chamber (Refer Maintenance)
<b>Indication Error 1 flashing</b>	The data in the electronic board memory have been damaged	Not repairable
<b>Indication Error 2 temporary</b>	Temporary error during data reading (possible at battery change)	The board will restart automatically to restore correct working
<b>The meter does not count, but the flow rate is correct</b>	Incorrect installation of gears after cleaning	Refit the gears correctly as shown in Maintenance-cleaning of the measurment chamber
	Possible electronic board problems	Contact your Dealer



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