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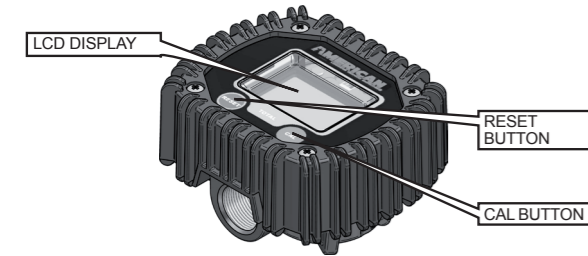
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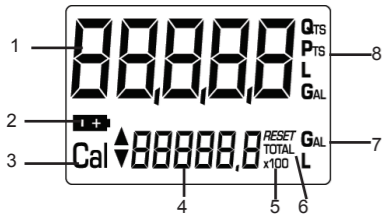
### A. AMERICAN LUBRICATION TIM-615: GENERAL OVERVIEW

TIM-615 is an electronic digital oval-gear meter, designed for precise measuring of oil and other liquids that are compatible with the materials found in the meter. The TIM-615 features a non-volatile memory for storing calibration and dispensing data in the event of a complete power loss. The meter is unique in that the electronic section is completely isolated from the fluid section. This means that the electronics can be easily field replaced while the meter is still installed in-line using a replacement electronics "head".



### 1) LCD Display

The "LCD" of the TIM-615 features two numerical registers and various symbols that are displayed only when required.



- 1) Batch register indicates volume dispensed
- 2) Battery charge Indicator
- 3) Calibration Mode
- 4) Total register; display can show (2) different totals, one which is resettable and one that is non-resettable.
- 5) Total multiplication factor (x10 or x100)
- 6) Total type (TOTAL / RESET TOTAL)
- 7) Total unit of measurement (Gal=Gallons, L=Liters)
- 8) Batch unit of measurement (Qts=Quarts, Pts=Pints, L=Liters, Gal=Gallons)

### 2) User Buttons

The TIM-615 meter features two buttons (RESET and CAL) which individually perform two main functions and when pressed at the same time together perform secondary functions. The functions are:

- a) For the RESET button, resetting the batch register and the resettable totalizer.
- b) For the CAL button, entering meter calibration mode.
- c) Pressing RESET and CAL together enters the configuration mode where the desired unit of measurement can be set.

### 3) Fluid Chamber

The measurement chamber is located in the lower part of the meter. It features a 1/2" NPT(F) inlet and outlet. The cover on the bottom provides access to the chamber for contaminant cleaning. Inside the chamber are two oval gears that generate electrical pulses which are counted by the microprocessor. By applying a calibration factor, the microprocessor translates the pulses into units of measurement, displayed on the batch and total registers of the LCD. All TIM-615's are factory set with a calibration factor (FACTORY K FACTOR) equal to 1,000.

### 4) Batteries

The TIM-615 is powered by two standard AAA 1.5V Alkaline batteries. The batteries can be found under the face of the meter by removing the four top screws and the protective cover.

## B. INSTALLATION

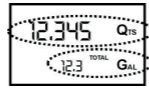
The TIM-615 features two 1/2" NPT(F) ports. It has been designed to be installed in any position, in a fixed in-line installation or as part of a control handle. The meter does not have specific direction of flow and either port can be used as inlet or an outlet. Make sure the threaded connections do not interfere with the inside of the measurement chamber. This can cause the gears to be damaged and/or seize. A filter with adequate filtering capacity should always be placed at the inlet of the meter or somewhere in the product line onto which the TIM-615 is mounted. If solid particles enter the measurement chamber, the gears could be damaged and/or seize.

## C. DAILY USE

Below are the two normal display modes. One display page shows the batch and resettable total registers (temporary display mode). The other page shows the batch and non-resettable total register (standby display mode). Changeover between these two pages is automatic and tied to phases and times that are factory set and cannot be changed by the user.



Temporary Display Mode



Standby Display Mode

**NOTE: 6 digits are available for TOTALS, plus two icons x 10 / x100. The increment sequence follows: 0.0 → 99999.9 → 999999 → 100000 x 10 → 999999 x 10 → 100000 x 100 → 999999 x 100**

\*The batch register is in the top of the display and indicates the quantity dispensed since the last time the RESET button was pressed

\*The resettable total register (Reset TOTAL), positioned in the lower part of the display, indicates the quantity dispensed since the last time the resettable total was reset. The resettable total cannot be reset until the batch register has been reset. The unit of measurement of the two total registers can be the same as the batch register or a different unit of measure depending on the factory or user programming choice.

\*The non-resettable total register (TOTAL) can never be reset by the user. It continues to rise for the entire operating life of the TIM-615.

\*The register of the two totals (Reset TOTAL and TOTAL) share the same line of the display. The TIM-615 is programmed to show each of these totals at different times.

\*The non-resettable (TOTAL) page is shown in standby screen mode

\*The resettable total (Reset TOTAL) page is shown in the temporary screen mode:

- a) For a few seconds after the RESET button is pressed.
- b) During the entire dispensing stage and for five seconds after dispensing. Once this short time has expired the TIM-615 switches to standby mode and the lower register switches back to the non-resettable total (TOTAL).

### 1) Resetting the Batch Register

The batch register can be reset by pressing the RESET button only when the meter is in standby mode. Press the RESET button to reset the batch register. After pressing the RESET button, the LCD screen will display all the characters on the screen, and then the screen will momentarily go blank. The screen will then display the resettable total for 5 seconds, after which the display will return to the standby mode screen.

### 2) Resetting the Resettable Total (Reset TOTAL)

- a) Wait for the display to enter standby mode
- b) Press the RESET button quickly. This will reset the batch register.
- c) After pressing the RESET button, the LCD screen will display all the characters on the screen, and then the screen will momentarily go blank. The screen will then display the resettable total for 5 seconds. Hold down the Reset button for at least one second.

- d) The LCD screen will again display all the characters on the screen, and then the screen will momentarily go blank. The screen will then display the resettable total (which now should read 0.0) for 5 seconds

## D. CALIBRATION

### 1. Definitions

- a) Calibration factor or "K Factor" - this is the multiplication factor applied by the system to the electrical pulses received, to transform these into measured fluid units.
- b) Factory K Factor: Factory-set default factor. It is equal to 1,000.

**The Factory K Factor is based on the following operating conditions:**

Fluid: 10W30 motor oil  
 Temperature: 68° F.  
 Flow rate: 1.3 - 6.6 gallons/min.

- c) User K Factor: Customized calibration factor, meaning the K Factor obtained from calibrating the meter.

## 2. Reasons to Calibrate

The TIM-615 is supplied with a factory calibration that ensures precise measuring in most operating conditions. Meter accuracy might be compromised when dispensing fluids like low-viscosity automatic transmission fluid or high-viscosity gear oils. The meters' accuracy also might be compromised when operating at flow rates that are close to the minimum or maximum.

When the meter's accuracy is less than ideal, user calibration can be performed to better suit the actual conditions in which the TIM-615 is required to operate.

## 3. Calibration Procedure

Two procedures are available for changing the Calibration Factor:

- a) Dispensing Calibration, performed by means of a dispensing operation.
- b) Direct Calibration, performed by directly changing the calibration factor inside the meter.

The calibration phases can be entered (by keeping the CAL button pressed for a few seconds) to:

- a) Display the current user calibration factor
- b) Return to factory calibration (Factory K Factor) after a previous calibration by the user
- c) Change the calibration factor using one of the two previously indicated procedures.

During calibration, the batch and total dispensed quantities indicated on the display screen take on different meanings according to the calibration procedure phase. In calibration mode, the TIM-615 cannot be used for normal dispensing operations. During the calibration process, the totals are not increased.

**NOTE: The TIM-615 features a non-volatile memory for storing calibration and dispensing data. There is no need to re-calibrate the meter in the event of power loss.**

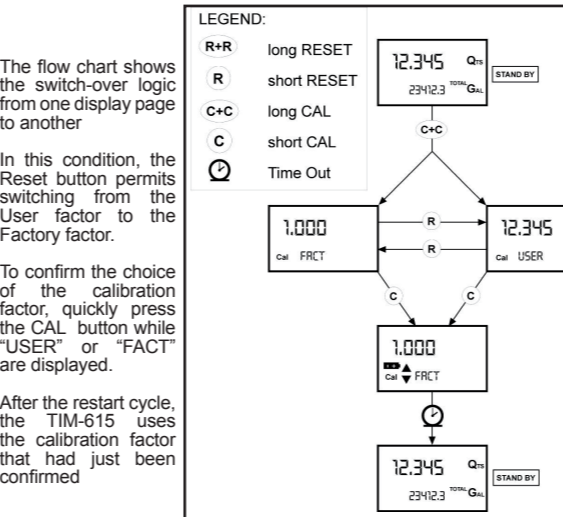
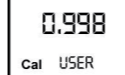
### 4. Displaying the K Factor & Restoring the Factory K Factor

By pressing the CAL button while the meter is in standby mode, one of two display pages will appear showing the current calibration factor.

The following display page will appear if calibration has been performed or the meter has been restored to factory calibration. The word "FACT" (abbreviation for "factory") indicates that the factory calibration factor is being used.



This display page will appear if a calibration has been made by the user. It shows the current used calibration factor (in the example 0.998) and the word "USER" (indicating that the user calibration factor is being used)



The flow chart shows the switch-over logic from one display page to another

In this condition, the Reset button permits switching from the User factor to the Factory factor.

To confirm the choice of the calibration factor, quickly press the CAL button while "USER" or "FACT" are displayed.

After the restart cycle, the TIM-615 uses the calibration factor that had just been confirmed

**NOTE: When the Factory Factor is chosen, the old user factor is deleted from the memory**

## 5. In-Field Calibration

This procedure requires the fluid to be dispensed into a certified graduated container. For best accuracy, perform this procedure when the meter is installed in the system it is going to be used on.

**NOTE: Important steps for accurate meter calibration:**

- 1) Completely eliminate all of the air from the system before calibrating.
- 2) Use a certified graduated container with a minimum capacity of 5 Qts. Do not use metal or plastic oil containers typically found in automotive shops. These are typically not accurate enough.

## 5. In-Field Calibration (continued)

**NOTE: Important steps for accurate meter calibration: (continued)**

- 3) Try to keep the flow rate constant when filling the container. Do not trickle the flow to reach the desired level (the correct method during the final stage is to make short top-offs at the normal operating flow rate).

- 4) When oil is dispensed into a container, air gets trapped inside the oil, making the level in the container appear higher than it really is. After dispensing, wait a few minutes to make sure all air bubbles are eliminated from the fluid inside the calibration container.

ACTION	DISPLAY
1 Make sure the meter is in standby mode. If you are unsure, press the REST button and wait 10 seconds.	12.345 Qts TOTAL GAL
2 Hold down the CAL button until the display reads "CAL". The TIM-615 enters calibration mode, shows <<CAL>> and displays the calibration factor in use. The words "FACT" and "USER" indicate which of the two factors (factory or user) is currently in use.	1.000 Qts Cal FRCT GAL
3 Hold down the RESET button until the display reads "FIELD". The TIM-615 shows "CAL" and the batch register set to zero. The TIM-615 is ready to perform in-field dispensing calibration.	0.000 Qts Cal FIELD
4 Dispensing into a calibrated container. Without pressing any buttons, start dispensing into the graduated container. Dispensing can be stopped and started again at will. Continue dispensing until the level of the fluid in the sample container has reached the graduated area. Make sure dispensing is correctly finished before performing the next step.	9.800 Qts Cal FIELD Batch Display Actual Value 9.86
5 Press the RESET button, and quickly release. This tells the meter that the dispensing is finished. To finish calibrating the meter, the value on the meter's batch display (example 9.800) must be adjusted to equal the actual amount in the calibrated container. In the bottom left part of the display an arrow appears (pointing upwards or downwards), that shows the direction (increase or decrease) that the value on the batch display will be changed when performing step 7.	9.800 Qts Cal FIELD
6 Changing the Arrows direction in the display Quickly pressing the RESET button changes the arrows direction in the display. This operation can be repeated to alternate the direction of the arrow.	9.800 Qts Cal FIELD
7 Adjusting the Batch Display Value (The indicated value changes in the direction indicated by the arrow) 1) The amount on the display changes one unit each time the CAL button is pressed quickly. 2) The amount on the display changes continuously if the CAL button is kept pressed. The speed of change increases the longer the button is held. If you accidentally program the wrong value, repeat the operation starting from step number 6	9.860 Qts Cal FIELD
8 Saving the New Calibration Factor Before performing this operation, double-check to make sure the display value on the meter is the same value that is in the calibrated container. Press the RESET button for at least one second. The TIM-615 calculates the new USER K FACTOR. This calculation could require a few seconds to compute. At the end of the calculation, the new USER K FACTOR is shown for a few seconds.	Cal END 1.015 Qts Cal END
9 Finishing The meter will re-start and enter into the standby mode. The meter is now programmed with the new calibration factor and is ready to use. Note: The calibrated USER K FACTOR is now the factor used in the TIM-615. This will be the factor the meter will use even after battery failure and battery replacement.	0.000 Qts Cal 12345 TOTAL GAL

# PRO SERIES DIGITAL OVAL GEAR METER



## TIM-615

This meter is built exclusively for American Lubrication Equipment Corporation incorporating numerous design ideas provided by their design team.

Bulletin M0169 EN rev.1

PRO SERIES METER

## Features

Fluid Isolated from the Electronics

Field-Replaceable Electronic Head

Reliable Oval Gear Design

New AAA Battery Lasts Longer

6 Bolt Construction

Programmable to Pts, Qts, Lts & Gals

Molded-in Shock Guard

Baltimore, Md. Los Angeles, Ca.

888-252-9300

americanlube.com

Bulletin M0169 EN rev.1

PRO SERIES METER

## D. CALIBRATION (continued)

### 6. Direct Calibration of the K Factor

This procedure is useful if the meter is over-dispensing or under-dispensing fluid by a known percentage. Using this method, the correction of the USER K FACTOR must be calculated by the operator using the following formula:

$$\text{New Cal. Factor} = \text{Old Cal Factor} * \left( \frac{100 - E\%}{100} \right)$$

#### Example:

Error percentage found (E%) - 0.3 %  
 CURRENT calibration factor 1.000  
 New USER K FACTOR =  $1.000 * [(100 - (-0.3))/100]$   
 =  $1.000 * [(100 + 0.9)/100]$   
 = 1.003

If the TIM-615 is under-dispensing (negative error), the new calibration factor must be higher than the old one as shown in the example. The opposite applies if the TIM-615 is over-dispensing (positive error).

ACTION	DISPLAY CONFIGURATION
1 Make sure the meter is in standby mode. If you are unsure, press the REST button and wait 10 seconds.	12.345 Qts 1234.5 TOTAL GAL
2 Hold down the CAL button until the display reads "CAL". The TIM-615 enters calibration mode, shows <<CAL>> and displays the calibration factor in use. The words "FACT" and "USER" indicate which of the two factors (factory or user) is currently in use.	1.000 Cal FACT (USER)
3 Hold down the RESET button until the display reads "FIELD". The TIM-615 shows "CAL" and the batch register set to zero. The TIM-615 is ready to perform in-field dispensing calibration.	12.345 Qts Cal FIELD
4 Hold down the RESET button until the display reads "DIRECT". In the bottom left part of the display an arrow appears (pointing upwards or downwards), that shows the direction (increase or decrease) that the value on the batch display will be changed when performing step 6.	1.000 Qts Cal ▲ DIRECT
5 Changing the Arrows direction in the display Quickly pressing the RESET button changes the arrows direction in the display. This operation can be repeated to alternate the direction of the arrow.	1.000 Cal ▼ DIRECT
6 Adjusting the Batch Display Value (The batch display value changes in the direction indicated by the arrow) 1) The amount on the display changes one unit each time the CAL button is pressed quickly. 2) The amount on the display changes continuously if the CAL button is kept pressed. The speed of change increases the longer the button is held. If you accidentally program the wrong value, repeat the operation starting from step number 5.	1.003 Qts Cal ▲ DIRECT
7 Saving the New Calibration Factor Before performing this operation, double-check to make sure the display value on the meter is equal to the value you obtained using the calibration formula. Press the RESET button for at least one second. The TIM-615 calculates the new USER K FACTOR. This calculation could require a few seconds to compute. At the end of the calculation, the new USER K FACTOR is shown for a few seconds.	----- Qts Cal ▲ DIRECT 1.003 Qts Cal END
8 Finishing The meter will re-start and enter into the standby mode. The meter is now programmed with the new calibration factor and is ready to use. Note: The calibrated USER K FACTOR is now the factor used in the TIM-615. This will be the factor the meter will use even after battery failure and battery replacement.	0.000 Qts 1345.6 TOTAL GAL

## E. UNIT OF MEASURE SETUP

The user can select the batch measurement unit. The choices are: Quarts (Qts), Pints (Pts), Liters (Lit), and Gallons (Gal). The total register unit of measurement is automatically determined based on what is chosen for the batch measurement unit (see chart below).

Combination no.	Unit of Measurement Partial Register	Unit of Measurement Totals Register
1	Liters (L)	Liters (L)
2	Gallons (Gal)	Gallons (Gal)
3	Quarts (Qts)	Gallons (Gal)
4	Pints (Pts)	Gallons (Gal)

## E. UNIT OF MEASURE SETUP (continued)

To choose between the 4 available combinations:

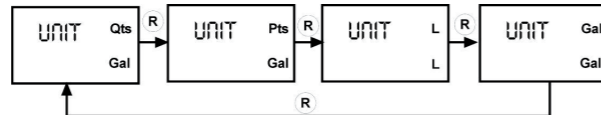
1) Wait for the TIM-615 to go to Standby.

12.345 Qts  
1234567.8 Gal

2) Press and hold the CAL and RESET buttons together. Keep these pressed until the word "UNIT" appears on the screen. You will also see the current units of measure (in this example Qts & Gal).

UNIT Qts  
Gal

3) Each quick press of the RESET button changes the units of measure. The chart below shows the order of scrolling.



4) Press the CAL key for a few seconds and the new unit of measurement will be stored. The meter will re-start and enter into the standby mode. The meter is now programmed with the new unit(s) of measure and is ready to use.

12.345 Qts  
1234567.8 Gal

**NOTE:** The Reset Total and Total will be automatically converted to the new unit of measurement. No new calibration is required when changing the unit of measurement.

## F. METER MAINTENANCE

The TIM-615 was designed to require minimal maintenance. The only maintenance required is battery replacement and cleaning the measuring chamber.

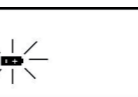
### 1) Battery Replacement

The TIM-615 is supplied with two SIZE AAA, 1.5 Volt Alkaline batteries. The meter features two low-battery alarm warnings:

a) When the battery charge falls below the first level, the fixed battery symbol appears on the LCD. In this condition, the meter continues to operate correctly, but the fixed battery icon will flash and the user that it is time to change the batteries.

12.345 Qts  
23412.3 GAL

b) If you continue to use the meter without changing the batteries the second battery alarm level will eventually be reached, preventing meter operation. In this condition the battery icon will flash and will be the only item visible on the LCD. You must change the batteries once the meter has reached this mode. All dispensing data from this point forward will not be displayed or stored in the meter.



**NOTE:** Refer to your local regulations before disposing the old batteries.

c) To change the batteries, refer to the spare parts list in the next column while completing the following steps:

- 1) Press reset to update all the totals.
- 2) Remove the 4 screws on the cover (item 5).
- 3) Remove the cover (item 8).
- 4) Replace the two dead batteries (item 9).
- 5) Put the cover on and re-tighten the 4 cover screws, making sure that it has been positioned correctly.
- 6) The meter will switch on automatically and enter into the standby mode. It is now ready to resume normal operation.

d) After changing the batteries, the meter will display the same reset total, the same non-resettable total and the same batch total as it did before the batteries were changed. The meter will also use the same calibration factor as it did before the power outage/battery replacement.

## 2) Cleaning

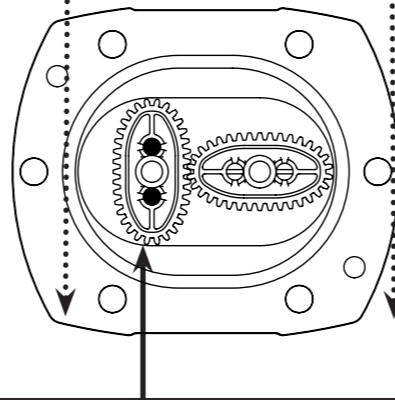
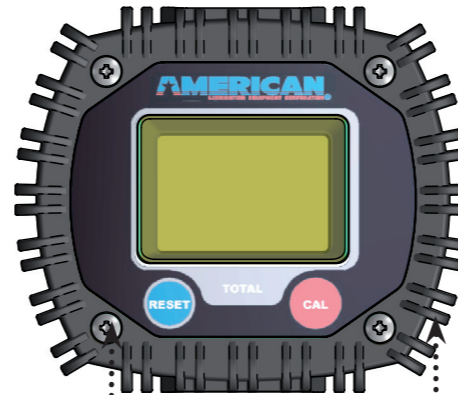
The measuring chamber of the TIM-615 can be cleaned without removing the unit from the dispensing nozzle or the line on which it is installed.

**NOTE:** Always make sure the liquid has been drained from the meter before cleaning.

To clean debris from the measuring chamber, refer to the spare parts list on the right while completing the following steps:

- 1) Loosen the six retention screws (item 7) on the body (item 1).
- 2) Remove the cover (item 2) and the seal (item 10)
- 3) Remove the two oval gears (item 13).
- 4) Clean where 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.
- 5) To reassemble the unit, carry out these steps in the reverse order. Please pay close attention to the note below before re-assembling the meter!

**NOTE:** Only one of the two gears has magnets. These gears must be inserted into the body of the meter, and placed perpendicular to each other. To position the gears correctly, refer to the diagram below, making sure that the position of the gear with respect to the magnets is observed. If the gears are not installed correctly, the meter will not work. Check that the gears are rotating freely before closing the cover.

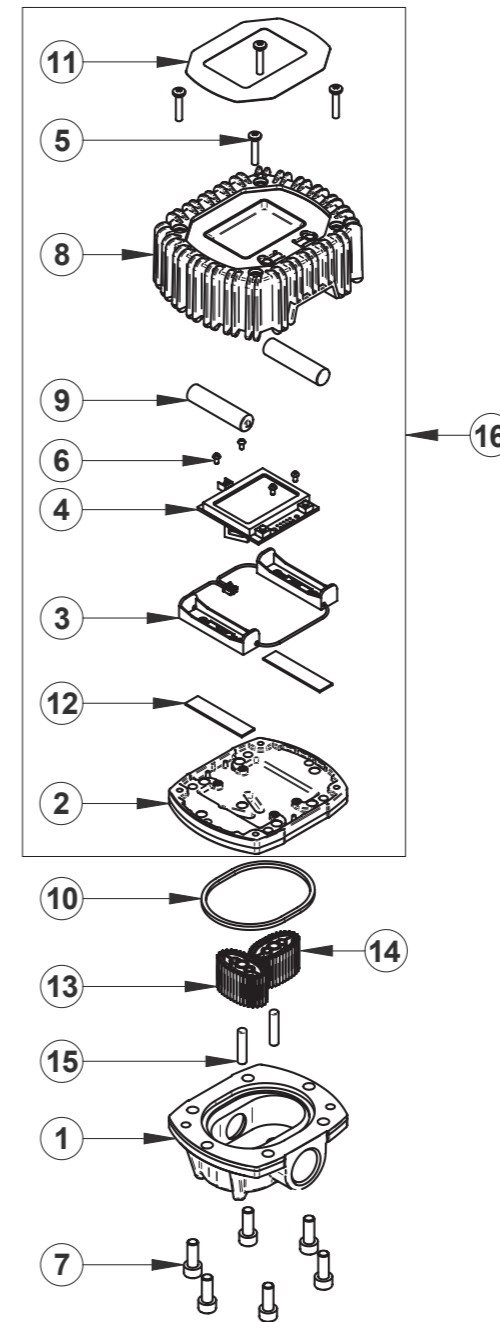


**NOTE:** The gear with the magnet (TIM-615-13) must be placed so that it is on the left side of the meter when assembled

## G. TROUBLESHOOTING GUIDE

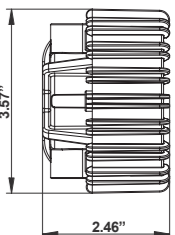
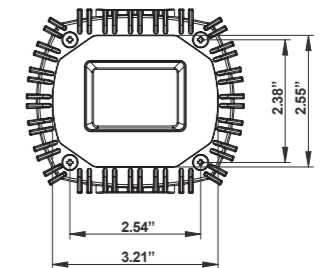
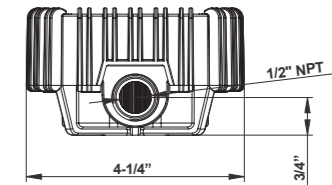
Problem	Possible cause	Remedial Action
Dull LCD	Low Battery	Replace the batteries (see section F.)
Inaccurate Dispensing	Wrong K FACTOR	Re-calibrate (see section D.)
Reduced or Zero Flow Rate	Gears blocked	Clean the measurement chamber (see section F.)
The meter does not count, but the flow rate is correct	Incorrect installation of gears after cleaning	Repeat the reassembly procedure (see section F.)
	Possible circuit board problem	Contact your local American Lubrication Equipment dealer

## H. PARTS BREAKDOWN & SPECIFICATIONS



Item	Part Number	Description	Qty
1	TIM-615-1	Fluid Chamber Body	1
2	TIM-615-2	Isolation Plate	1
3	TIM-615-3	Battery Support Tray	1
4	TIM-615-4	Circuit Board	1
5	TIM-615-5	Cover Screw	4
6	TIM-615-6	Circuit Board Screw	4
7	TIM-615-7	Fluid Body Screw	6
8	TIM-615-8	Protective Cover	1
9	TIM-615-9	AAA Battery	2
10	TIM-615-10	Gasket	1
11	TIM-615-11	Cover label	1
12	TIM-615-12	Adhesive Strip	2
13	TIM-615-13	Magnetic Gear	1
14	TIM-615-14	Non-Magnetic Gear	1
15	TIM-615-15	Gear Post	2
16	TIM-615-HEAD	Replacement Meter Head includes items 2, 3, 4, 5, 6, 8, 9, 11 & 12	1

## H. PARTS BREAKDOWN & SPECIFICATIONS (continued)



Measurement system		Oval Gear
Resolution	(nominal)	0.005 (Quarts/Pulse)
Flow Rate	(Range)	1-26 (Quarts/Minute)
Operating pressure	(Max)	1000 (PSI)
Bursting pressure	(Min)	2000 (PSI)
Storage temperature	(Range)	-5 to 158 (°F)
Storage humidity	(Max)	95 (% RH)
Operating temperature	(Max)	140 (°F)
Flow resistance	(at 16 quarts/min with SAE 10W motor oil at 68°F)	19 (PSI)
Viscosity	(Range)	5-5000 (mPas)
Precision	(1 and 26 quarts/min)	±1 of value indicated after calibration (%)
Repeatability	(Typical)	±0.3 (%)
Screen	Liquid crystals LCD Featuring: - 5-figure partial - 6-figure Reset Total plus x10 / x100 - 6-figure non reset Total plus x10 / x100	
Power supply	(2) 1.5 V alkaline batteries size AAA	
Battery life	14,000 - 100,000 hours	
Weight	.83 lbs. (including batteries)	

