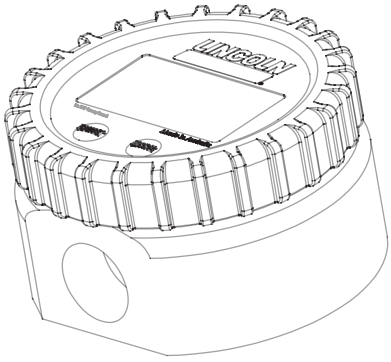
LINCOLN

Installation and maintenance guide

Positive displacement flowmeter

Models 814 and 817



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⚠ DANGER

Read manual prior to installation or use of this product. Keep manual nearby for future reference. Failure to follow instructions and safety precautions can result in death or serious injury.

SKF

Contents

Safety

Read and carefully observe these installation instructions before installing/operating/troubleshooting the assembly. The assembly must be installed, maintained and repaired exclusively by persons familiar with the instructions.

Install the assembly only after safety instructions and this guide have been read and are completely understood.

Adequate personal protection must be used to prevent splashing of material on the skin or in the eyes.

Extreme caution should be used when operating this equipment as material leaks from loose or ruptured components can inject fluid through the skin and into the body. If any fluid appears to penetrate the skin, seek attention from a doctor immediately.

Do not treat injury as a simple cut. Tell attending doctor exactly what type of fluid was injected.

Any other use not in accordance with instructions will result in loss of claim for warranty or liability.

- Do not misuse, over-pressurize, modify parts, use incompatible chemicals, fluids, or use worn and/or damaged parts.
- Do not exceed the stated maximum working pressure of the pump or of the lowest rated component in your system.
- Always read and follow the fluid manufacturer's recommendations regarding fluid compatibility, and the use of protective clothing and equipment.
- Failure to comply may result in personal injury and/or damage to equipment.

Explanation of signal words for safety

⚠

This is the safety alert symbol. It is used to alert you to potential physical injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

⚠ SAFETY INSTRUCTIONS

Safety instruction signs indicate specific safety-related instructions or procedures.

⚠ DANGER

Indicates a hazardous situation which, if not avoided, will result in death or serious injury.

⚠ WARNING

Indicates a hazardous situation which, if not avoided will result in death or serious injury.

⚠ CAUTION

Indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.

Please read this information carefully before installing the flow meter.

Read and retain this instruction manual to assist you in the operation and maintenance of this product.

If you have any problems with the meter, refer to the maintenance and troubleshooting sections of this manual (→ **page 9**).

This manual contains connection and operating instructions for meters with liquid crystal displays (LCD).

If you need further assistance, please contact your local Lincoln representative or distributor for advice.

Exceptional repeatability and high accuracy over a wide range of fluid viscosities and flow rates are features of the oval rotor design.

Notice

Before use, confirm fluid to be used is compatible with meter. Refer to industry fluid compatibility charts or consult your local representative for advice.

Introduction

General information

Please read and retain this instruction manual to assist you in the operation and maintenance of this quality product.

This manual assists you in operating and maintaining your new flow meter. The information contained will help you ensure many years of dependable performance and trouble free operation.

Please take a few moments to read through this manual before installing and operating your new flow meter. If you require further assistance please contact your local Lincoln distributor or authorized Lincoln service center.

Review of the parts list and nomenclature is recommended before starting disassembly or operation.

Model 814 and model 817 use similar displays, however they do have different meter bodies. Model 814 has a 1/2 in. NPT fitting and model 817 has a 3/4 in. NPT fitting.

Model 814 product specifications

Accuracy [1)]	± 0.5% of reading
Type	Oval gear
Flow rate	0.26 to 8 U.S. gal./min. *(1 to 30 l/min.)*
Maximum pressure	1,000 psi *(69 bar)*
Reset batch total	99999.9
Non-reset batch total	999999
Maximum viscosity	SAE 140
Maximum temperature	131 °F *(55 °C)*
Minimum temperature	7 °F *(–14 °C)*
Inlet size	1/2 in. NPT
Outlet	1/2 in. NPT
Compatible fluids	Engine oil, diesel oil, automatic transmission fluid, ethylene glycol based anti-freeze/anti-boil mixture (maximum ***50%*** water)

[1)] When tested with lubrication oil at 77 °F *(25 °C)*. Allowances should be made for changes to these parameters.

Model 817 product specifications

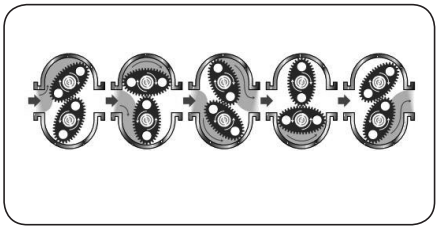
Accuracy [1)]	+/– 0.5% of reading
Type	Oval gear
Flow rate	0.8 to 21.1 U.S.gallons/minute *(3 to 79 liter/minute)*
Maximum pressure	1,500 psi *(103 bar)*
Reset batch total	99999.9
Non-reset batch total	999999
Maximum viscosity	SAE 140
Maximum temperature	131 °F *(55 °C)*
Minimum temperature	7 °F *(–14 °C)*
Inlet size	3/4 in. NPT
Outlet	3/4 in. NPT
Compatible fluids	Engine oil, diesel oil, automatic transmission fluid, ethylene glycol based anti-freeze/anti-boil mixture (maximum ***50%*** water)

[1)] When tested with lubrication oil at 77 °F *(25 °C)*. Allowances should be made for changes to these parameters.

Operating principle

Operational overview

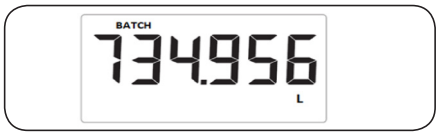
When fluid passes through the meter the rotors turn, as shown below. The magnets which are located in the rotors will pass across the PCB sensors, which generates a signal, that is sent to the relevant LCD, or receiver as a pulse output.



1 During normal operation the six figure LCD display will appear as shown in the example below.

2 Pressing the blue 'mode' button will enable the operator to toggle between the following two display options.

- Batch
- Total



3 The batch total can be reset by pressing the red 'reset' button.

> **Notice**
> This function resets the batch only. The total displayed is unable to be reset.

4 A sleep mode has been incorporated in the meter to prolong battery life. The unit will activate sleep mode after 30 secs without use.

Programming instructions

Accessing programming menu

To enter in the programming menu, press the reset button for five seconds.

Once in the programming menu the operator will be able to access (and adjust) three programming selections.

1 Setting decimal place
2 Display units of measurement
3 Calibration mode

Setting the decimal place

1 The unit will display the mode and the number of decimal places currently set. For example dEC .22.

> **Note**
> Any changes made during programming phase will automatically be saved when unit is returned to operation mode.

2 Pressing the blue mode button will cycle through options available

- dEC .1 = 1 Decimal place
- dEC .22 = 2 Decimal places
- dEC .333 = 3 Decimal places.

3 To move to the next section (unit) press the red reset button.

Setting the units for both batch and total

1 The LCD will now display unit. (→ **operational overview**).

2 Pressing the blue mode button will cycle through the options of units that can be displayed for batch.

- L
- GAL
- Qt
- Pt
- Oz
- dL.

3 Next press the red reset button to move onto setting the total units. The available unit options are as shown above.

4 Once the required units have been selected move to the next section (calibration) by pressing the red reset button.

Calibration

The calibration mode enables, in case the operator suspects the accuracy of the meter is in question, the operator to dispense a known volume of fluid through the meter (test volume).

This test volume is compared to the volume measured by the meter (measured volume). The meter will perform an auto calibration if applicable. The unit will display calibrate in the lower left hand corner, and a number on the main display.

The following options can be scrolled through by pressing the blue mode button.

- 2
- 4
- 8
- 20
- 100
- 250

This number represents the test volume to be dispensed through the meter during calibration.

5 On selecting the test volume press the blue mode button for three seconds. The meter will display purge and calibrate will also start to flash.

6 Purge the system of air by running fluid through the system.

7 Once purged of air the calibration process can be started by pressing the blue mode button. The unit will display run and the test volume. For example, RUN 100.

8 Run the test volume through the meter until stipulated volume has been reached For example, 100.

9 Once this volume has been reached press the blue mode button to stop the test. The unit will now compare the measured volume to the test volume and perform an 'auto calibration' if the difference between the two volumes are within ± 8% of each other.
Note: If the difference between the two volumes is greater than ± 8% of each other, the unit will display one of the following messages.

- Error low
- Error high

If these messages are displayed please contact your Lincoln agent for advice.

Returning to operation mode

At any stage the unit can be returned to the operation mode by pressing the red reset button for approximately three seconds.

Disassembly

Ensure that the fluid supply to the meter is disconnected, and the line pressure is released before disassembly, with the exception for repair or maintenance to the LCD or PCB where it is not necessity to isolate the meter from flow. Refer to the exploded parts diagram on subsequent pages for item numbers.

1 Pull off protective boot (**1**) and unscrew the four retaining screws (**2**).
2 Remove the electronic module (**3**).
3 Check for evidence of moisture in the electronic housing. If there is evidence of this, check the condition of the o-ring (**4**).
4 To access the rotor assembly, remove the eight meter cap screws (**9**).
5 Remove the rotors (**6**) and inspect the condition of each. Also investigate if there is the presence of any foreign material in the meter body, that may inhibit the rotors performance.

Notice

Meter face orientation can be changed by removing the rubber boot and four screws.

Rotate the face and reinstall the four screws and rubber boot.

Assembly

Notice

Please note, the design of the rotor and shaft assembly ensures that the rotors can only be re-installed with the correct orientation. For example, with the magnets being in close proximity to the electronic module. When replacing the rotors the top face of the rotors should be flush with the sealing face of the meter body. If they sit higher than the sealing face remove, turn over and replace.

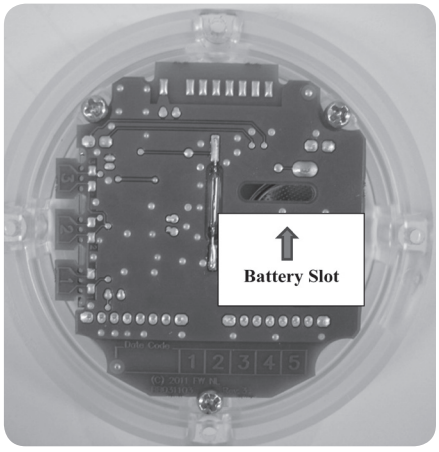
1 Replace the rotors (**6**) onto the shafts at 90 degrees to each other (as per diagram below) and check their operation by turning either of the rotors. If the rotors are not 'in mesh' correctly or do not move freely, remove one of the rotors and replace correctly at 90 degrees to the other rotor.
2 Check the rotors (**6**) rotate freely.
3 Replace the o-ring (**7**) into the groove of the meter cap (**8**).
4 Replace the meter cap onto meter body (**5**). Tighten meter cap screws (**9**) in a diagonal sequence, for example 1, 5, 3, 7, 4, 8, 6, 2.
5 Place the o-ring (**4**) into the electronic module (**3**) and mount the electronic module onto to the meter body.
6 Replace and tighten the retaining screws (**2**) in diagonal sequence.
7 Align and push the protective boot (**1**) onto the electronic module (**3**).
8 Before returning to service test the meter by turning the rotors with your finger, or applying a very low air pressure (no more than a good breath) to the meter.

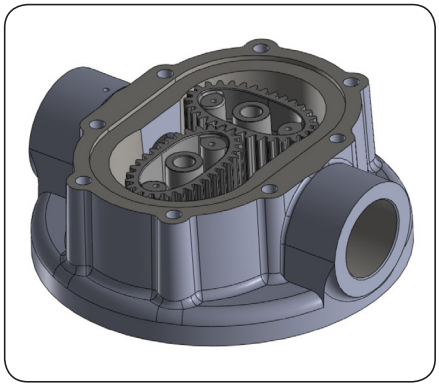
Changing the battery

A low battery warning will be displayed on the LCD screen when there is 5% power left.

The warning will remain active until the battery is replaced.

1 Refer to the disassembly procedure and follow step 1 to isolate the electronic module.
2 See photograph below.
3 Remove the PCB from clear plastic housing by unscrewing the three retaining screws.
4 The battery can now be removed by placing a screw driver into the slot (slot indicated by arrow) on the PCB and easing the battery free from its compartment.
5 Replace with a new CR2450 lithium battery.





Meter dimensions

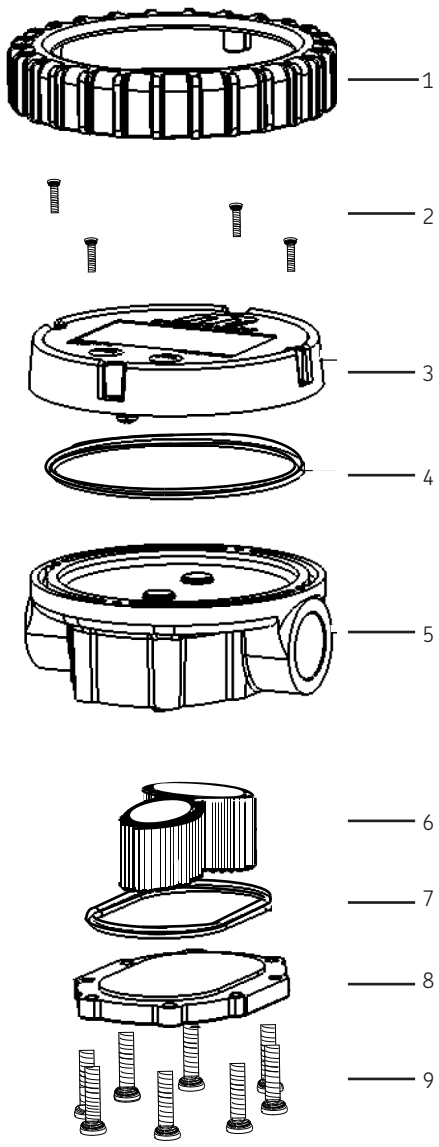
Fig. 1

Model 814

Fig. 2

Model 817

Illustrated parts breakdown



Parts list

Item	Part description	Wetted parts
1	Protective boot	–
2	Electronic module retaining screws	–
3	Electronic module	–
4	O-ring	–
5	Meter body	CA313 aluminum
6	Rotor set	Acetal (delrin)
7	O-ring	Nitrile butadiene rubber
8	Meter cap	CA313 aluminum
9	Meter cap screws	–

814 Spare parts kit

Item no.	Part description	Part number
A	Electronics kit	277870 items 1-4
B	Meter kit	277869 items 5-9

817 Spare parts kit

Item no.	Part description	Part number
A	Electronics kit	277873 items 1-4
B	Meter kit	277872 items 5-9

Troubleshooting

Problem	Cause	Remedy
Fluid will not flow through meter	Foriegn matter blocking rotors Damaged rotors Meter connections over tightened Fluid is too viscous	• Dismantle meter, clean rotors • Replacement rotor assembly required • Readjust connections • Refer to specifications for maximum viscosity (**page 4**)
Reduced flow through meter	Partially blocked Fluid is too viscous	• Check and clean meter • See specifications for maximum viscosity
Meter reading inaccurate	Fluid flow rate is too high or too low Air in fluid Excess wear	• See specifications for minimum and maximum flow rates (**page 4**) • Bleed air from system • Check meter body and rotors (**→ reassembly**, **page 6**)
Meter reading half or double the amount of actual fluid	Hard reset required[1)]	Remove battery and re-install. Press and momentarily hold the reset and mode buttons.
Meter not giving a pulse signal	Faulty hall effect sensor Faulty reed switch Magnets failed	• Replace PCB board • Replace PCB board • Replacement rotor assembly required
LCD register not working	Battery is drained Faulty liquid crystal display	• Replace battery • Replace PCB module

[1)] Performing a hard reset will reset both totals back to zero.

Lincoln industrial standard warranty

Standard limited warranty

Lincoln warrants the equipment manufactured and supplied by Lincoln to be free from defects in material and workmanship for a period of one (1) year following the date of purchase, excluding there from any special, extended, or limited warranty published by Lincoln. If equipment is determined to be defective during this warranty period, it will be repaired or replaced, within Lincoln's sole discretion, without charge.

This warranty is conditioned upon the determination of a Lincoln authorized representative that the equipment is defective. To obtain repair or replacement, you must ship the equipment, transportation charges prepaid, with proof of purchase to a Lincoln Authorized Warranty and Service Center within the warranty period.

This warranty is extended to the original retail purchaser only. This warranty does not apply to equipment damaged from accident, overload, abuse, misuse, negligence, faulty installation or abrasive or corrosive material, equipment that has been altered, or equipment repaired by anyone not authorized by Lincoln. This warranty applies only to equipment installed, operated and maintained in strict accordance with the written specifications and recommendations provided by Lincoln or its authorized field personnel.

This warranty is exclusive and is in lieu of any other warranties, express or implied, including, but not limited to, the warranty of merchantability or warranty of fitness for a particular purpose. Warranty on items sold by Lincoln, but not manufactured by Lincoln are subject to the warranty consideration, if any, of their manufacturer (such as hoses, hydraulic and electric motors, electrical controllers, etc.) Assistance in making such warranty claims can be offered as required.

In no event shall Lincoln be liable for incidental or consequential damages. Lincoln's liability for any claim for loss or damages arising out of the sale, resale or use of any Lincoln equipment shall in no event exceed the purchase price. Some jurisdictions do not allow the exclusion or limitation of incidental or consequential damages, therefore the above limitation or exclusion may not apply to you.

This warranty gives you specific legal rights. You may also have other rights that vary by jurisdiction.

Customers not located in the Western Hemisphere or East Asia: Please contact Lincoln GmbH and Co. Kg, Walldorf, Germany, for your warranty rights.

Special limited warranties

Special limited 2 year warranty sl-v series, single injectors-85772, 85782, and replacement injectors-85771, 85781.

Lincoln warrants the SL-V Injector series to be free from defects in material and workmanship for two (2) years following the date of purchase. If an injector model (single or replacement) is determined to be defective by Lincoln, in its sole discretion, during this warranty period, it will be repaired or replaced, at Lincoln's discretion, without charge.

Special limited 5 year warranty series 20, 25, 40 bare pumps, pmv bare pumps, heavy duty and 94000 series bare reels.

Lincoln warrants series 20, 25, 40 bare pumps, PMV bare pumps, Heavy Duty (82206), Mini Bench (81133, 81323), and all 94000 LFR series (single arm and dual arm) bare reels to be free from defects in material and workmanship for five (5) years following the date of purchase. If equipment is determined by Lincoln, in its sole discretion, to be defective during the first year of the warranty period, it will be repaired or replaced at Lincoln's discretion, without charge. In years two (2) and three (3), the warranty on this equipment is limited to repair with Lincoln paying parts and labor only. In years four (4) and five (5), the warranty on this equipment is limited to repair with Lincoln paying for parts only.

Special limited 5 year warranty-limited oil meters, limited fluid control valves, aod (air-operated diaphragm) pumps.

Lincoln warrants the 712 series control valves, 912 series lube meters, electronic lube meters (980. 981, 982 series), our universal inline digital meters (812/813 series), and our AOD pump offering to be free from defects in material and workmanship for five (5) years following the date of purchase. If either is determined to be defective by Lincoln, in its sole discretion, during the warranty period, they will be repaired or replaced, at Lincoln's discretion, without charge.

Special DEF (diesel exhaust fluid) limited warranty

DEF products are warranted to be free from defects in material and workmanship for a period of one (1) year following the date of purchase. The following exceptions to the standard warranty period are in effect:

- **85700-30/85700-50 DEF hose reels (bare reel only),**
  277251/277252 AC DEF pumps, and 277256 and 277257 DEF meters are warranted for two (2) years from date of purchase.

- **85623 DEF AOD (air operated diaphragm) pumps**
  are covered under the standard five (5) year AOD pump warranty.

If either is determined to be defective by Lincoln, in its sole discretion, during the warranty period, they will be repaired or replaced, at Lincoln's discretion, without charge.

Lincoln Industrial contact information

To find Lincoln Industrial's nearest service center in the United States, call customer service at 314-679-4200. For international callers dial 01-314-679-4200. You may also use our website lincolnindustrial.com.

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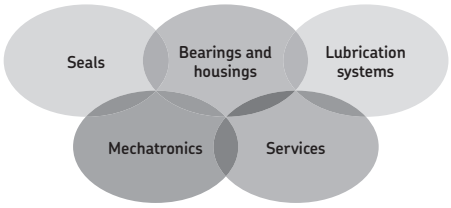

The Power of Knowledge Engineering
Combining products, people, and application-specific knowledge, SKF delivers innovative solutions to equipment manufacturers and production facilities in every major industry worldwide. Having expertise in multiple competence areas supports SKF Life Cycle Management, a proven approach to improving equipment reliability, optimizing operational and energy efficiency and reducing total cost of ownership.

These competence areas include bearings and units, seals, lubrication systems, mechatronics, and a wide range of services, from 3-D computer modelling to cloud-based condition monitoring and asset management services.

SKF's global footprint provides SKF customers with uniform quality standards and worldwide product availability. Our local presence provides direct access to the experience, knowledge and ingenuity of SKF people.

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