LINCOLN®

Oil control guns

Model 916EF and 916ER

Version	01
Date of issue	June 2012
Form number	404428
Section	F22
Page	43A

⚠ 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

Table of contents

Saftey

Explanation of signal words for safety precautions

⚠ CAUTION

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

⚠ WARNING

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

⚠ DANGER

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

Please read this information carefully before using the oil control gun.

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 trouble shooting sections of this manual (→ **page 7**).

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.

This oil control gun has incorporated the oval rotor principal into its design. This has proven to be a reliable and highly accurate method of measuring flow.

Exceptional repeatability and high accuracy over a wide range of fluid viscosities and flow rates are features of the oval rotor design. With a low pressure drop and high pressure rating oval rotor oil control guns are suitable for both gravity and pump (in line) applications.

Important information

⚠ DANGER

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

Introduction

Thank you for purchasing a Lincoln oil dispensing gun complete with either a flexible or rigid extension. The Lincoln oil dispensing guns have been designed for use with engine oil, gear oil, automatic transmission fluid, anti-freeze/anti-boil and compatible fluids.

Lincoln also manufactures a complete range of ratio oil pumps and retractable oil hose reels, greasing equipment and accessories to fulfil all your fluid handling and greasing needs requirements.

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

General information

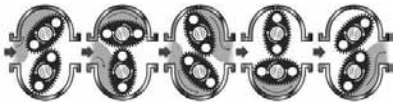
This manual assists you in operating and maintaining your new oil control gun. The information contained will help you ensure many years of dependable performance and trouble free operation.

Please take a few moments to read through this manual before installing and operating your new oil control gun. If you experience problems with this product, refer to the troubleshooting sections of this manual (→ **page 13**). If you require further assistance please contact your local Lincoln distributor or authorized Lincoln service center.

Operating principle

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.

A signal is generated which is then sent by the PCB to the relevant LCD, or receiving instrument as a pulse output.



Operational overview

1 During normal operation the six figure LCD display will appear as per the example diagram 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.
Please note: 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

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

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. E.g. ' dEC .22"

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 & total

1 The LCD will now display 'unit'. (→ **operational overview** on **this page**).

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 availible 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 the 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.

1 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.

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

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

4 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'. E.g. RUN 100

5 Run the test volume through the meter until stipulated volume has been reached (e.g. 100).

6 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 secs.

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**) next remove the electronic module (**3**).

2 Check for evidence of moisture into the electronic housing. If there is evidence of this, check the condition of the o-ring (**4**).

3 To access the rotor assembly, remove the eight meter cap screws (**9**).

4 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.

Reassembly

1 Please note, the design of the rotor and shaft assembly ensures that the rotors can only be re-installed with the correct orientation. (i.e. 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.

2 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.

3 Check the rotors (**6**) rotate freely.

4 Replace the o-ring (**7**) into the groove of the meter cap (**8**).

5 Replace the meter cap onto meter body (**5**). Tighten meter cap screws (**9**) in a diagonal sequence i.e. 1, 5, 3, 7, 4, 8, 6, 2.

6 Place the o-ring (**4**) into the electronic module (**3**) and mount the electronic module onto to the meter body.

7 Replace and tighten the retaining screws (**2**) in diagonal sequence.

8 Align and push on the protective boot (**1**) onto the electronic module (**3**).

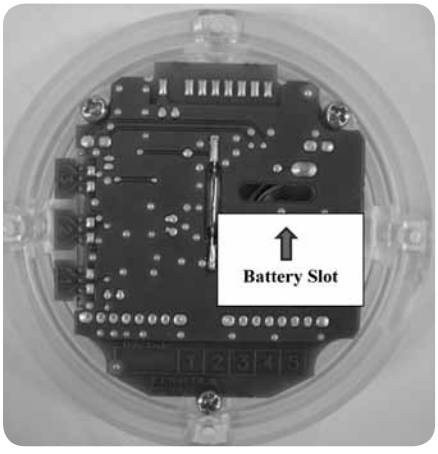
9 Before returning to service test the meter by turning the rotors with your finger, or applying a very low air pressure (no more than a good breath) to the meter.

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 (→ **page 5**). Follow step 1 to isolate the electronic module.
2 See photograph below.
Remove the PCB from clear plastic housing by unscrewing the three retaining screws.
3 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.
4 Replace with a new CR2450 Lithium battery.



Product Specifcations

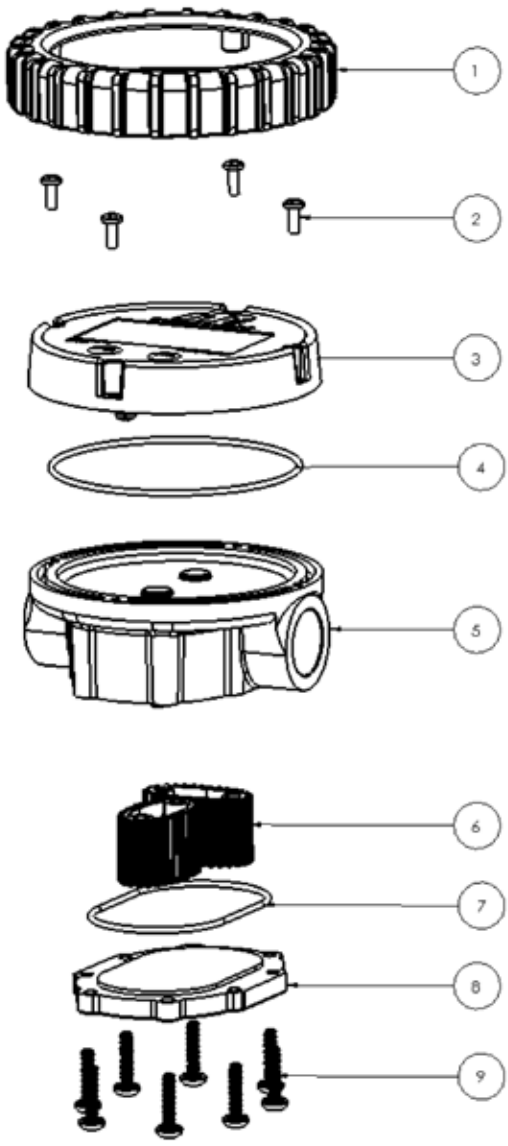
Accuracy*	+/– 0.5% of reading
Type	Oval gear
Flow rate	0.26 to 12 gallons/minute *(1 to 45 liter/minute)*
Maximum pressure	1000 psi *(69 bar or 6900 kPA)*
Resettable 'batch' total	99999.9
Nonresettable 'total"	999999
Maximum viscosity	SAE 140
Maximum temperture	131 °F *(55 °C)*
Minimum temperature	7 °F *(–14 °C)*

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

Meter troubleshooting guide

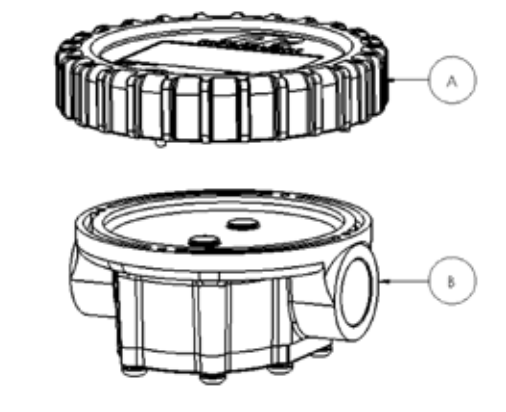
Problem	Cause	Remedy
Fluid will not flow through meter.	**1** Foriegn matter blocking rotors. **2** Damaged rotors. **3** Meter connections over tightened. **4** Fluid is too viscous.	• Dismantle meter, clean rotors. • Replacement rotor assembly required. • Readjust connections. • Refer to specifications for maximum viscosity (**page 6**).
Reduced flow through meter.	**1** Partially blocked. **2** Fluid is too viscous.	• Check and clean meter. • See specifications for maximum viscosity.
Meter reading inaccurate.	**1** Fluid flow rate is too high or too low. **2** Air in fluid. **3** Excess wear.	• See specifications for minimum and maximum flow rates (**page 6**). • Bleed air from system. • Check meter body and rotors (**→ reassembly**, **page 5**).
Meter not giving a pulse signal.	**1** Faulty hall effect sensor. **2** Faulty reed switch. **3** Magnets failed.	• Replace PCB board. • Replace PCB board. • Replacement rotor assembly required.
LCD register not working.	**1** Battery is drained. **2** Faulty liquid crystal display.	• Replace battery. • Replace PCB module.

Exploded diagram and spare parts



Exploded diagram list

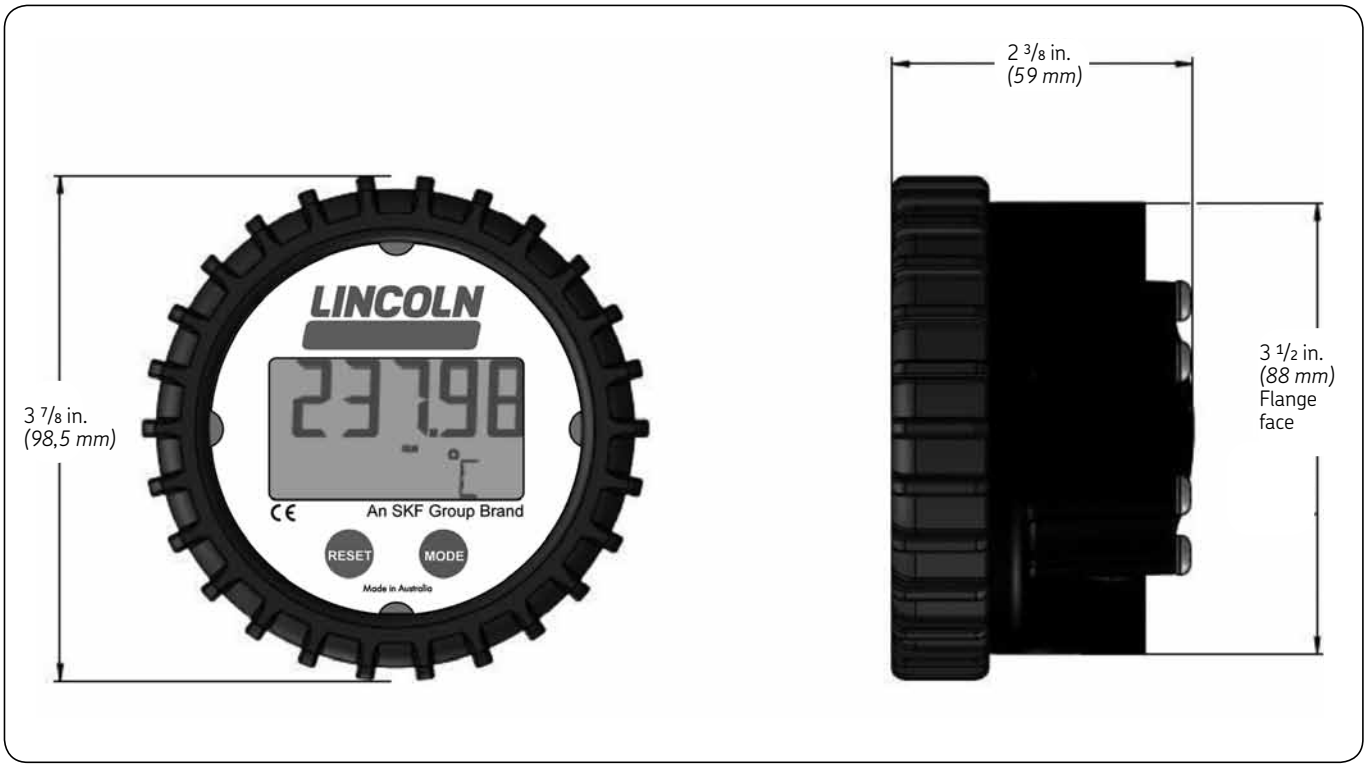
Item	Part description	Wetted parts
1	Protective boot	–
2	Electronic module retaining screws	–
3	Electronic module	–
4	O-ring	–
5	Meter body	CA313 aluminum
6	Rotor set	Acetal (delrin)
7	O-ring	Nitrile butadiene rubber
8	Meter cap	CA313 aluminum
9	Meter cap screws	–



Spare parts kit

Item no.	Part description	Part number
A	Electronics kit	278179
B	Meter kit	278280

Meter dimension



Assembly and disassembly

Assembly

Use Teflon tape (or suitable thread sealant) when connecting the oil control gun to an oil hose.

Outlet nozzle operation

When fluid flows through the gun the outlet nozzle will automatically open. When the fluid flow stops the semi-automatic nozzle can be shut by pulling the outer sleeve back towards the handle.

Handle operation

To latch the handle, squeeze the lever, push the button and then release lever.

To release the latch in manual mode simply squeeze and release lever.

⚠ CAUTION

Before carrying out any maintenance disconnect the air supply to the pump and release the fluid pressure in the system by pressing the lever on the control gun.

Inspect your oil control gun daily for any signs of damage. Replace any damaged parts or components as required.

Control handle disassembly

Use a clean bench to carry out maintenance.

1 Remove the oil hose from the control gun inlet swivel (**12**).
2 Unscrew and remove swivel (**12**), washer (**10**) and o-ring (**11**) from the control gun inlet. (Clean or replace the swivel strainer and o-ring if required).

⚠ CAUTION

The swivel is under spring tension.

3 Remove valve spring (**15**), seal/valve body assembly (**14**) and plunger (**13**).
4 Remove the screw (**18**), then remove the trigger guard (**19**).

Lever and valve removal

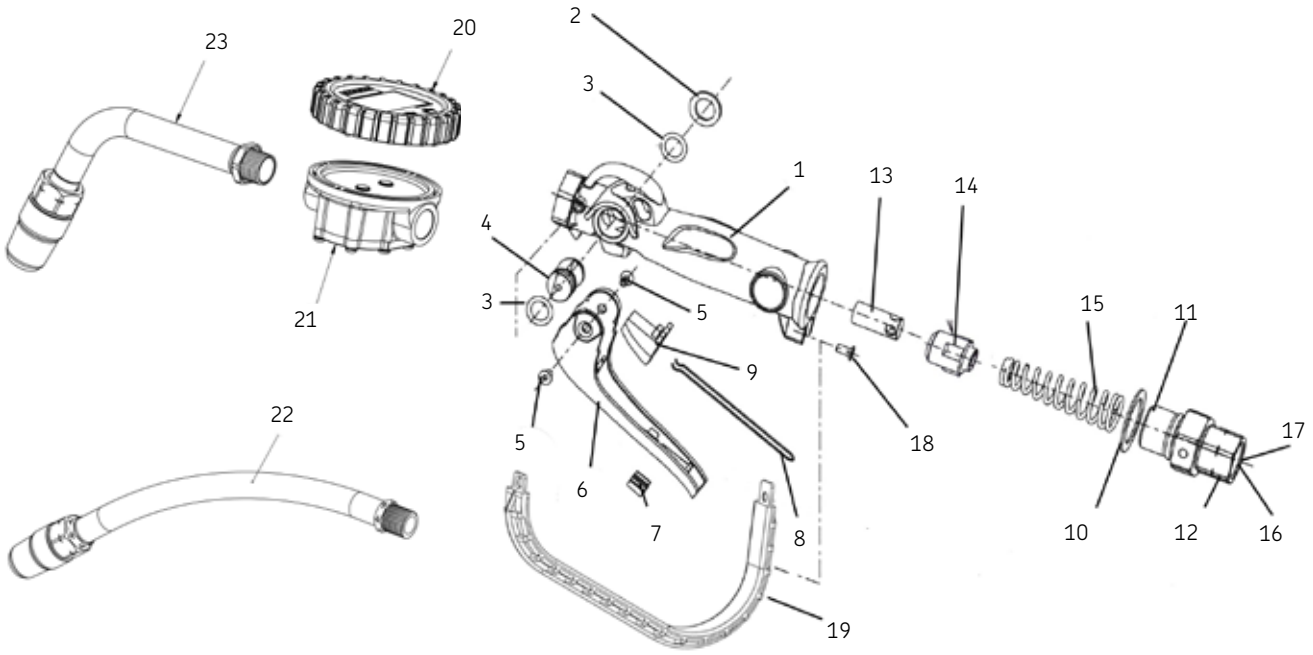
1 Using a 3/4 in. *(2,5mm)* allen key, remove the two handle screw (**5**).
2 Remove lever (**6**) ease downwards.
3 Remove the washer (**2**), o-ring (**3**), then push the valve cam (**4**) from the gun body (**1**), and remove o-ring (**3**).
Note: If the plunger has not been removed the cam will not release from the body.

Control handle reassembly

1 Clean and inspect all parts. Replace any suspect, worn or damaged components.
Note: Lightly lubricate the valve cam before assembly.
2 Place o-ring (**3**) onto valve cam (**4**).
Note: The cut out section in the middle of the valve cam (**4**) must face the inlet swivel (**12**).
3 Replace the valve cam (**4**) into the body (**1**). Note the orientation shown on the assembly drawing. Fit the second o-ring (**3**) and washer (**2**).
4 Slide lever assembly (**6**) into position and replace the two hex head screws (**5**). (Use Loctite or similar sealant).
5 Replace plunger (**13**).
Note: The end hole in the plunger must face the gun outlet.
6 Replace the seal/valve body assembly (**14**), and spring (**15**) and replace into the gun body (**1**).
Note: Install the spring, small end first.
7 Re-fit the trigger guard (**19**) and replace screw (**18**).
8 Replace washer (**10**), o-ring (**11**) on to the swivel assembly (**12**), and screw firmly into place (use Loctite or similar sealant).
Note: After assembly ensure the handle latch is operating correctly.

Fig. 1

Parts diagram



Spare parts list

Item	Part number	Description
1–9	278177	Handle assembly
1[1)]		Body
2[1)]		Washer
3[1)]		O-ring
4[1)]		Camshaft
5[1)]		Screw
6		Handle assembly
7[2)]		Lever plug
8[2)]		Button spring
9[2)]		Lever button
10–12	278178	3/4 in. NPT swivel outlet
10[1)]		Washer
11[1)]		O-ring
12		Swivel assembly
13–17	278210	Valve kit
13		Plunger cage
14		Valve body
15[1)]		Spring
16[1)]		Strainer
17[1)]		O-ring
18–19	278281	Trigger guard kit
18		Screw
19		Trigger guard
20	278179	LDC electronics module
21	278280	Meter
22	276281	High flow flex extention
23	276283	High flow rigid extention

[1)] Included in 278278 overhaul kit.
[2)] Included in 278279 lever button kit.

Troubleshooting

Condition	Cause	Remedy
No fluid passing through the gun.	Blocked strainer.	Clean or replace strainer.
Constant oil leak from the nozzle.	Damaged plunger seal.	Replace plunger seal (check for damage).
Internittent drip from nozzle.	Dirt in the nozzle.	Remove the nozzle and flow out any dirt particles, replace if necesssary.
Oil leak from the lever assembly area.	Damaged o-rings (**3**).	Replace damaged o-rings.
Low flow rate.	Blocked strainer (**16**).	Replace strainer.
Oil leaking form the swivel inlet.	Damaged o-ring or swivel.	Replace damaged o-ring or swivel.

Product specifications

Flow range	0.26 to 12 gallons/minute *(1 to 45 liters/minute)*
Maximum pressure	1500 psi *(103 bar)*
Swivel inlet	3/4 in. NPT
Outlet	1/2 in. NPT
Weight	1.76 lbs. *(0,8 kg)*
Wetted parts	Aluminum, mild steel, nitrile rubber
Fluid compatibility	Engine oil, diesel oil, automatic transmission fluid, anti-freeze/anti-boil (maximum viscosity SAE 140)
Accuracy	+/– 0.5% of reading
Maximum temperture	131 °F *(55 °C)*
Minimum temperature	7 °F *(–14 °C)*

This page left intentionally blank.

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:

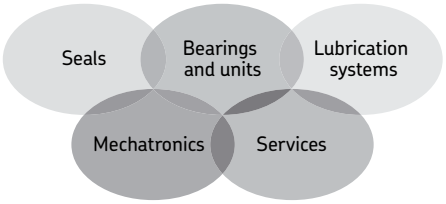
- **85700-30/85700-50 DEF hose reels (bare reel only),**
  277251/277252 AC DEF pumps, and 277256 and 277257 DEF meters are warranted for two (2) years from date of purchase.

- **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 call one of the following number;
customer service 314-679-4200
or you may also use our website
lincolnindustrial.com



The Power of Knowledge Engineering

Drawing on five areas of competence and application-specific expertise amassed over more than 100 years, SKF brings innovative solutions to OEMs and production facilities in every major industry worldwide. These five competence areas include bearings and units, seals, lubrication systems, mechatronics (combining mechanics and electronics into intelligent systems), and a wide range of services, from 3-D computer modelling to advanced condition monitoring and reliability and asset management systems. A global presence provides SKF customers uniform quality standards and worldwide product availability.

SKF **PUB LS/I1 00000 XX.XX** · Month 2012 · **Form 404428**

This publication supersedes publication 0000.

Printed in USA on environmentally friendly paper.

LINCOLN®

SKF