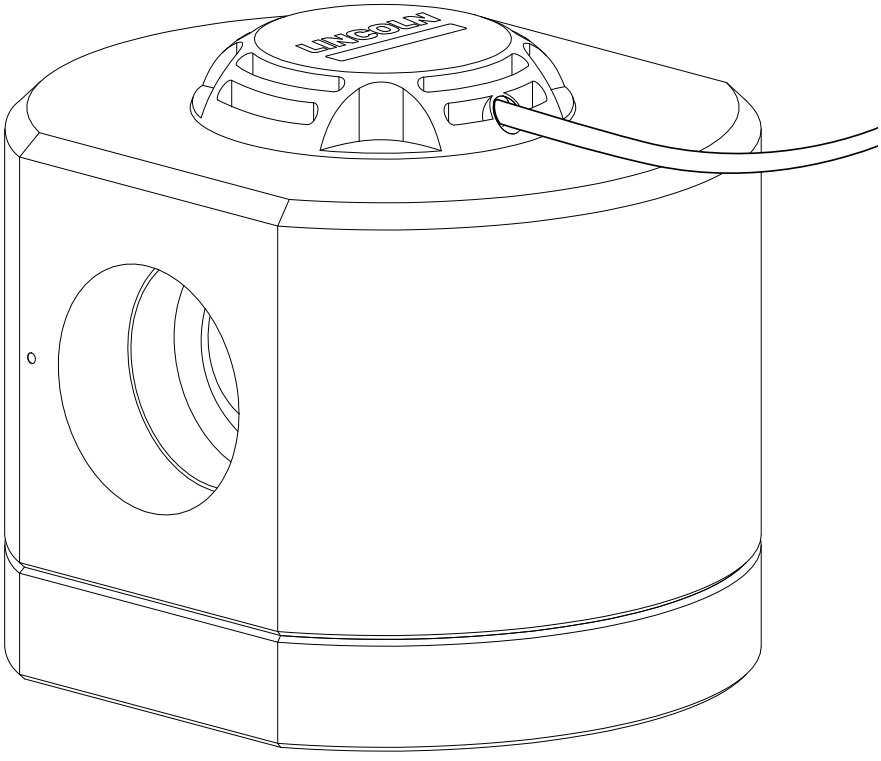
LINCOLN

Installation and maintenance guide

1 in., 1.5 in., and 2 in. electronic high flow meter

Models 279147, 279149 and 279150



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Read manual prior to installation or use of this product. Keep manual nearby for future reference.

SKF

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General information

Manual information

This manual provides important information on how to work with the device safely and efficiently.

The manual is part of the device, must always be kept in the device's direct proximity and should be available for the personnel at any time. All personnel working with the device must read and understand this manual before starting any work. Strict compliance with all specified safety notes and instructions is a basic requirement for safety at work.

Moreover, the accident prevention guidelines and general safety regulations applicable at the place of use of the device must also be complied with.

For better representation of circumstances, the illustrations used are not necessarily to scale and may vary from the actual design of the device.

Explanation of symbols

Warnings

Warnings are identified by symbols. These warnings are introduced by signal words, which express the severity of a danger.

Adhere to these warnings and act cautiously in order to avoid accidents, personal injuries and damage to property.

Limitation of liability

All information and notes in this manual were compiled under due consideration of valid standards and regulations, the present status of technology and our years of knowledge and experience.

The manufacturer can not be made liable for damage resulting from:

- disregarding this manual
- unintended use
- employment of untrained personnel
- unauthorized conversions
- technical modifications
- manipulation or removal of the screws on the device
- use of unapproved spare parts

In case of customised actuator, the actual product delivered may be different from what is described in the manual. In this case, ask SKF for any additional instructions or safety precautions relevant to the actuators.

We reserve the right to make technical modifications to the actuator to improve usability.

⚠ DANGER

Safety hazard caused by wrong spare parts!

Wrong or faulty spare parts can adversely affect safety and cause damage, malfunctions or total failure.

Therefore:

- Use only genuine spare parts from the manufacturer.

Warranty terms

The applicable and effective warranty terms are included at the end of this document.

Customer service

Lincoln customer service is always available to provide technical information and answer questions.

Safety

This chapter provides an overview of important safety precautions and information necessary for safe and trouble-free installation, operation and maintenance.

Disregarding this manual and safety precautions specified therein may result in considerable danger.

Intended use

The device has been designed and built exclusively for its intended purpose as described in these instructions.

Any injury, damage or loss caused by violation of these instructions will be the responsibility of the customer.

⚠ DANGER

Risk from misuse!

Any utilization of this device beyond its intended purpose may lead to potentially hazardous situations.

Therefore:

- Strictly adhere to all information in this manual.
- Do not allow this device to be subjected to weather conditions, strong UV rays, corrosive or explosive air media as well as other aggressive media.
- Do not modify, retool or change the structural design or individual components.
- Never use the device outside of the technical application and operational limits.

Responsibility of the owner and processor

The device is designed for personal use and is also used in commercial applications by owner or processors.

The processor is the contracting partner of the re seller or the manufacturer. The processor installs the device in a complete system (application).

The owner or processor of the system is therefore subject to requirements of the occupational health and safety act.

In addition to the safety instructions in this manual, the safety, accident prevention guidelines and environmental protection regulations applicable to the site of the system's installation must:

- Inform themselves of applicable industrial safety regulations and determine additional hazards that arise due to the specific working conditions prevailing at the site where the device is installed using risk assessment. The risk assessment must be implemented in the form of work instructions for device operation.
- Confirm that the work instructions created for the system including the device satisfy current legal requirements and must alter the instructions if they don't.
- Clearly regulate and specify the responsibilities for installation, operation, maintenance, and cleaning.

- Ensure that all employees who deal with the device have read and understood this manual.
- Provide personnel with the required protective equipment.

In addition, owner must train personnel at regular intervals and inform personnel of the hazards.

In addition, owner or processors is responsible to ensure that the device is in adequate working condition. They must do the following:

- Ensure that the maintenance intervals described in these instructions are complied with.
- Have all safety devices inspected regularly for function and completeness.

Personnel requirements

⚠ DANGER

Risk from misuse!
Do not improperly install, operate or maintain this equipment.

Failure to comply may result in death or serious injury.

Qualifications

The following qualifications are specified for different areas of activity listed in the manual.

- **An instructed person (operator)**
  has been instructed by the customer in an orientation session on the assigned tasks and possible dangers in case of improper behaviour.

- **Qualified personnel**
  based on their professional training and experience as well as knowledge of the applicable standards and regulations is able to perform assigned work activities and to detect and avoid possible dangers on their own.

- **A professional electrician**
  based on their professional training and experience as well as knowledge of the applicable standards and regulations is able to perform work on electrical systems and to detect and avoid possible dangers on their own.

  The professional electrician has been trained for the special location where they work and knows the relevant standards and regulations.

Only persons who are expected to perform their tasks reliably are permitted as personnel. Persons whose reaction capability is impaired, e.g. through drugs, alcohol or medication, are not permitted.

Specific dangers

The following section lists the residual risks that have been determined by the risk assessment.

- **Heed the safety instructions listed here, and the warnings in subsequent chapters of this manual, to reduce health hazards and to avoid dangerous situations.**

Changes and modifications on the device

To avoid hazardous situations and to ensure optimal performance, the only changes or modifications that should be made to the device are changes made by Lincoln kit changes. All changes should be made in accordance with the instructions accompanied by the Lincoln kit.

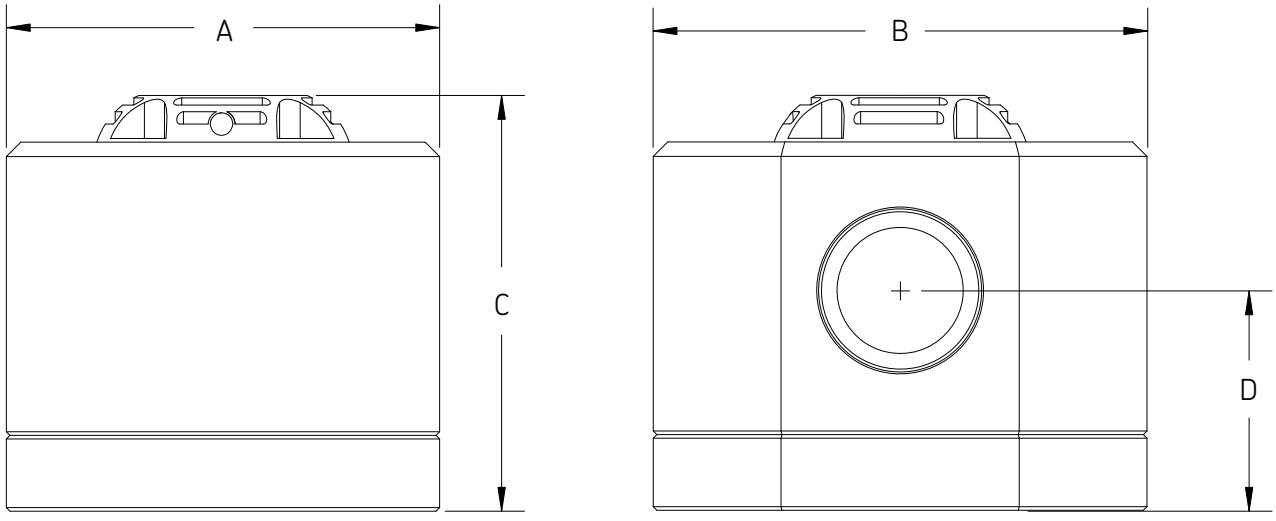
Technical and dimensional data

Table 1

Flowmeter specifications	**Model**		
	279147 - 1.0 in. *(25,4 mm)*	279149 - 1.5 in. *(38,1 mm)*	279150 - 2.0 in. *(50,8 mm)*
Temperature range	–40 to 176 °F *(–40 to 80 °C)*	–40 to 176 °F *(–40 to 80 °C)*	–40 to 176 °F *(–40 to 80 °C)*
Maximum operating pressure	2,000 psi *(13 790 bar)*	1,200 psi *(8 274 bar)*	1,000 psi *(6895 bar)*
Maximum viscosity	1,000 Cps	1,000 Cps	1,000 Cps
Flow range below 5cP	2.6 to 26 gal./min. *(10 to 100 l/min)*	4 to 62 gal./min. *(15 to 235 l/min)*	4 to 130 gal./min. *(15 to 500 l/Min)*
Flow range 5 to 1,000cP	1.6 to 32 gal./min. *(6 to 120 l/min)*	2.6 to 66 gal./min. *(10 to 250 l/min)*	4 to 130 gal./min. *(15 to 500 l/Min)*
Nominal pulses per gallon[1)]	136.27 pulses/gal. *(36 pulses/l)*	54.89 pulses/gal. *(14,5 pulses/l)*	25.29 pulses/gal *(6,68 pulses/l)*
Wetted parts: aluminum, FKM (Viton), PPS and 316SS			
Reed switch (mechanical sensor)			
Maximum current	500mA	500mA	500 mA
Maximum voltage	30 V DC	30 V DC	30 V DC
Maximum power	10 W	10 W	10 W
Hall effect sensor (electronic sensor)			
Maximum current (supply)	7.5mA	7.5mA	7.5mA
Maximum current (output)	25mA	25mA	25mA
Operating voltage	4.5V to 24V DC	4.5V to 24V DC	4.5V to 24V DC
Transistor type	Open collector NPN	Open collector NPN	Open collector NPN

1) Refer to flowmeter data for specific pulses per gallon/liter for each meter. Refer to **fig. 4, pg. 7** for data location.

Fig. 2



Model dimensions

Model	Part no.	Dimensions A	B	C	D
1.0 in *(2,54 cm)* High flow pulse meter	279147	3.94 in. *(10,0 cm)*	4.41 in. *(11,2 cm)*	3.62 in. *(9,2 cm)*	1.77 in. *(4,5 cm)*
1.5 in *(3,81 cm)* High flow pulse meter	279149	4.72 in. *(12,0 cm)*	5.39 in. *(13,7 cm)*	4.72 in. *(12,0 cm)*	2.40 in. *(6,1 cm)*
2.0 in *(5,08 cm)* High flow pulse meter	279150	5.51 in. *(14,0 cm)*	6.42 in. *(16,3 cm)*	5.55 in. *(14,1 cm)*	2.83 in. *(7,2 cm)*

Structure and function

Brief description

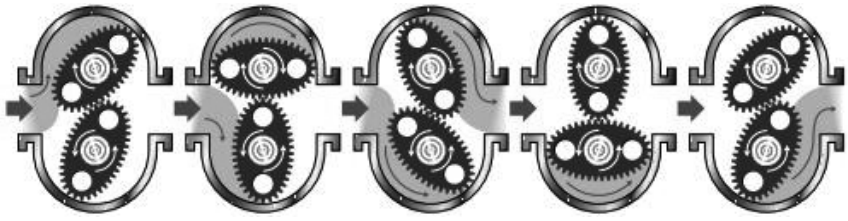
When fluid passes through the meter the rotors turn, as shown in **fig. 2**.

The magnets which are located in the rotors will pass across the pulser circuit board Reed switches. A signal is generated by the Reed Switches which is then sent by the Pulse Circuit Board (PCB) to the relevant LC display or receiving instrument.

This high flow meter from Lincoln is a positive displacement oval gear flow meter that is optimised for fuel and oil measurement applications such as:

- Service and fueling trucks
- Fuel depots
- Portable fuelling systems
- Biodiesel blending and production
- Lubricant blending and dispensing
- Hydraulic fluid dispensing
- Boiler and generator fuel consumption
- and other clean fluids compatible with aluminum, FKM (viton), PPS and 316SS.

Fig. 2



Notice
For pump applications, ensure pipe work has the appropriate working pressure rating to match pressure output of pump. See Meter Specifications section for further details.

Installation

Installation guidelines

- Use thread sealant on all pipe threads.
- Do not overtighten meter connections.
- Test the system for leaks.

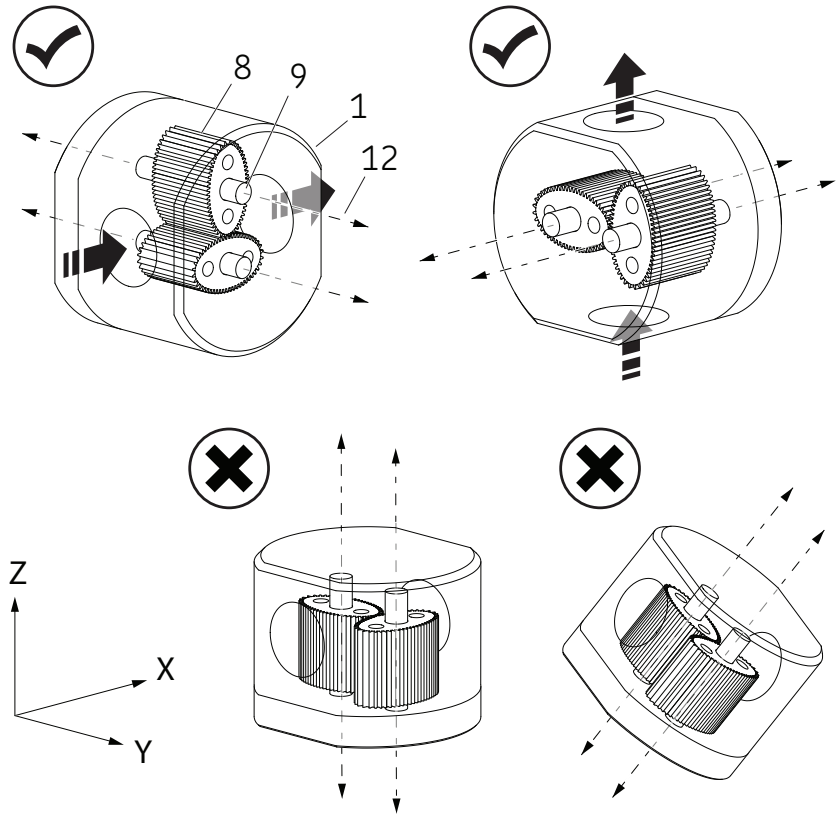
Notice
To prevent damage caused by air purge, slowly fill meter with fluid after initial installation.

To reduce pressure build up turn off pump at end of each day.

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

Notice
Meter is bi-directional and can be installed in different orientations, as long as axis **(12)** of rotor shafts **(9)** are level (in which case the top of the meter body is perpendicular to the ground, represented by the X, Y plane shown in **fig. 3**).

Fig. 3



Pulser installation

The pulser is fitted with a common "bayonet" style fastener.

1 Insert the bottom end of the pulser **(4)** into the top of the meter body **(1)** (→ **fig. 4**).
2 Tighten pulser **(4)** clockwise until it comes to a complete stop.
3 For a basic wiring diagram of pulser electrical connections, refer to **fig. 5, pg. 8**.

Notice
Flowmeter data is etched in pulser cavity **(16)**. Twist off pulser **(4)** to view (→ **fig. 4**).

Notice
Ensure that fluid supply to meter is disconnected, and line pressure is released before disassembly, with the exception for repair or maintenance to pulser **(4)** where there is no need to isolate meter from flow (→ **fig. 4**).

Fig. 4

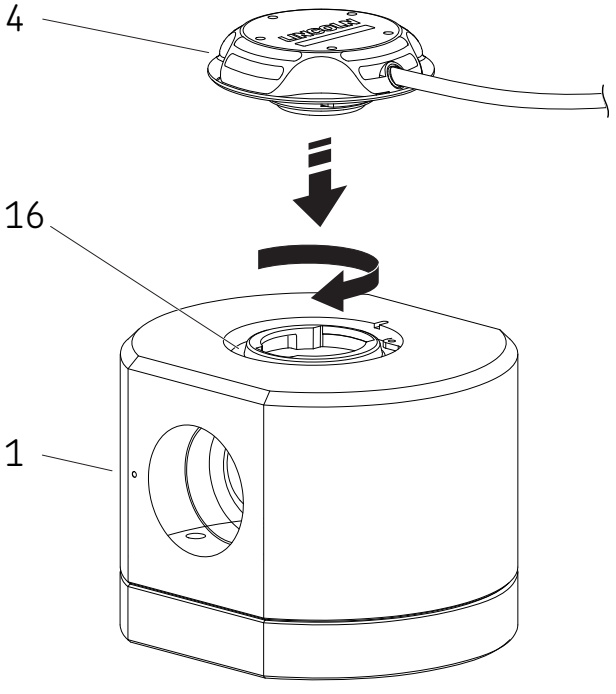
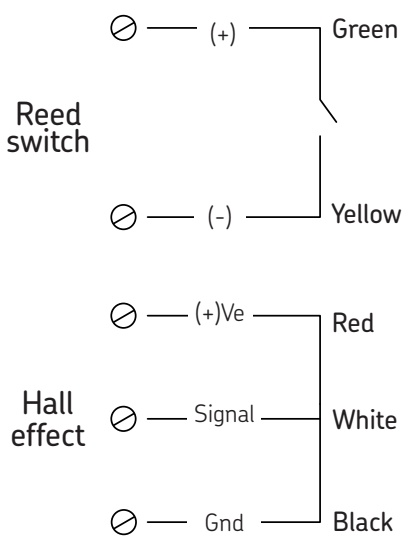


Fig. 5

Pulser Wiring



Maintenance

Disassembly

1 Loosen the cap head screws **(11)** that hold down the meter cap **(10)**, remove the screws, washers and lift off the cap (→ **fig. IPB, page 9**).
2 Remove the o-ring **(5)** from the o-ring groove in the meter cap **(10)**.
3 Remove rotors **(8)**.

Reassembly

1 Before reassembling, check the condition of the rotors **(8)** and replace if necessary.
2 Locate the "active" rotor **(8)**, which is the rotor inset with magnets (→ **fig. 6**).
3 Install active rotor **(8)** on rotor shaft **(9)**, directing the magnets of the rotor towards the pulser while aligning the dimple **(14)** on the active rotor with the dimple **(15)** on the meter body **(1)**.
4 Install the second "passive" rotor on rotor shaft **(9)** at 90 degrees to the active rotor.
5 Check that the rotors **(8)** move freely by turning either rotor.
6 Check o-ring **(5)** for damage and replace if necessary (→ **fig. IPB, pg. 9**).
7 Insert the o-ring **(5)** into groove in the meter cap **(10)**.
8 Install meter cap **(10),** making sure that the locating pin in meter body **(1)** lines up with the hole in the meter cap **(10)**.
9 Install cap head screws **(11)** and tighten in a diagonal sequence 1, 3, 2, 4, etc.

Notice
Test the meter by turning the rotors **(8)** with a finger or by applying very low air pressure (no more than a good breath) to one end of the meter, before returning the meter to the line.

Fig. 6

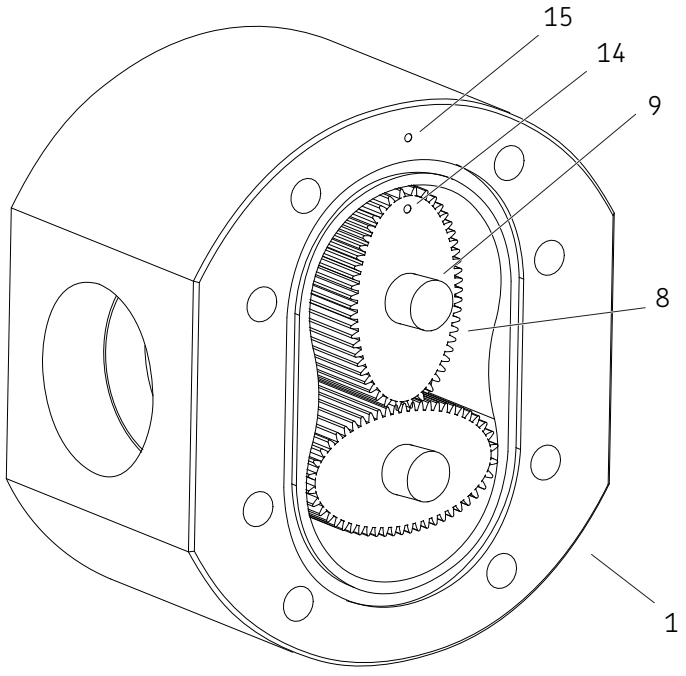
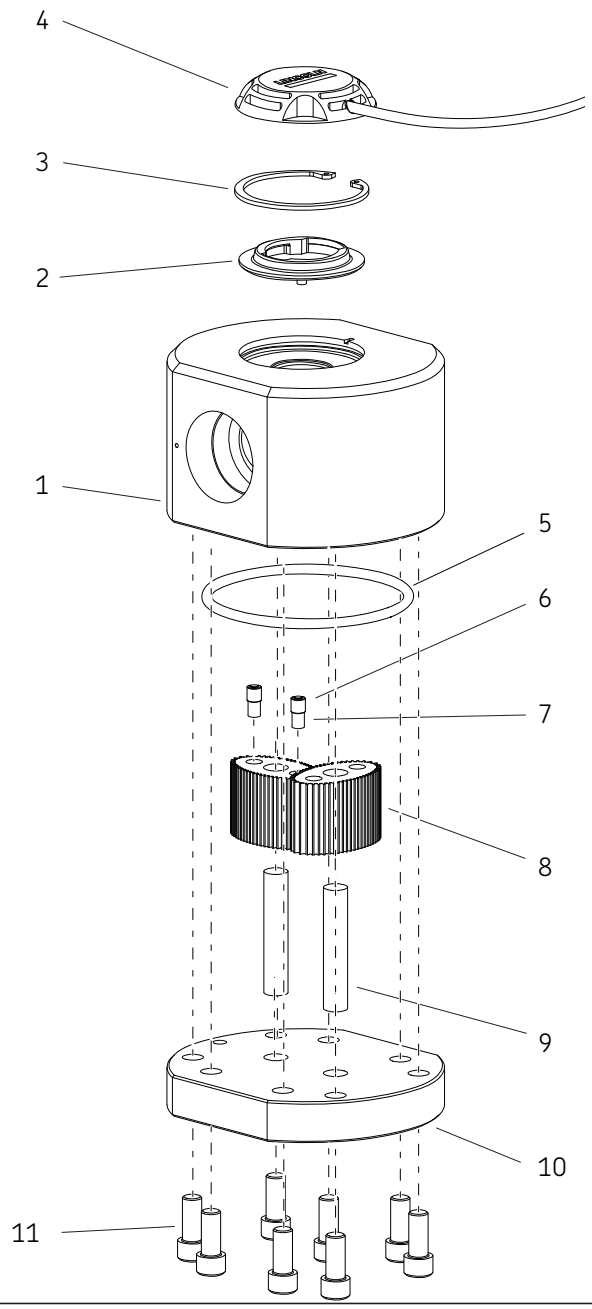


Fig. IPB



Flowmeter parts

Item no.	Part description	Quantity
1	Meter body	1
2	Cam	1
3	Circlip	1
4	Pulser PCB	1
5	Meter cap o-ring	1
6	Magnets	2
7	Magnet housing	2
8	Rotor	2
9	Rotor shaft	2
10	Meter cap	1
11	Meter cap bolts	8

Service kits

	Part no.		
Item	279147 - 1.0 in. *(25,4 mm)*	279149 - 1.5 in. *(38,1 mm)*	279150 - 2.0 in. *(50,8 mm)*
Pulser kit-includes pulser PCB (1)	279151	279151	279151
Seal kit-includes o-ring (1) and bolts (8)	279153	279163	279168
Rotor kit-includes (2) rotors with magnets (2), o-ring (1) and bolts (8).	279154	279164	279169

Troubleshooting

Condition	Possible cause	Corrective action
Fluid will not flow through meter	Foreign matter blocking rotors	Dismantle meter, clean rotors
	Damaged rotors	Replace rotors
	Meter connections over tightened	Re-adjust connections
	Fluid is too viscous	See specifications for maximum viscosity
Reduced flow through meter	Fluid is too viscous	See specifications for maximum viscosity
Meter reading inaccurate	Fluid flow rate is too high or too low	See specifications for minimum and maximum flow rates
	Air in fluid	Bleed air from system
	Excess wear caused by incorrect installation	Check meter body and rotors. Replace as required
Meter not giving a pulse signal	Faulty hall effect sensor	Replace pulser PCB board
	Faulty reed switch	Replace pulser PCB board
	Magnets failed	Replace rotors

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 numbers, you may also use our website

Customer Service	314-679-4200
Website	lincolnindustrial.com

The Power of Knowledge Engineering

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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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