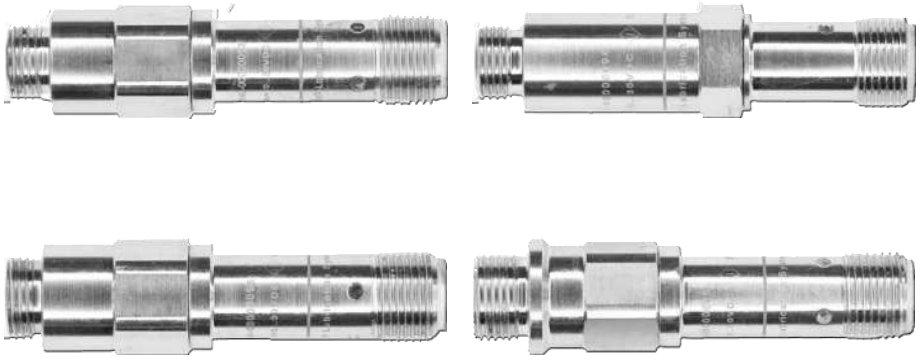
Inductive piston detector

for metering devices PSG1, PSG2, SLC, SSV, SSVC, SSVD, SSV-E, SSVD-E, VP, VPB, VPK, VSG (NP / NPI), VSL (NP / NPI)



Created on:	**10-05-2022**
Document no.:	**951-181-029-EN**
Version:	**03**

Read these instructions before installation or start-up of the product and keep them readily available for later consultation.

EU Declaration of Conformity in accordance with Directive 2014/30/EU, Annex IV

The manufacturer hereby declares under its sole responsibility conformity of the product described below with all relevant harmonization legislation of the European Union at the time of placing on the market.

Designation: Inductive piston detector
Type: Electromagnetic sensor
Item numbers: 2340-00000093, 2340-00000094, 2340-00000095, 2340-00000096
Year of manufacture: See circumferential laser engraving on the product

Furthermore, the following directives and standards were applied in the respective applicable areas:
2014/30/EU: Electromagnetic Compatibility
2011/65/EU: RoHS II
EN 60947-5-2:2007/A1:2012

EN IEC 63000:2018	EN 61000-4-4:2012	EN 61000-4-6:2014	EN IEC 61000-4-3:2020
EN 60068-2-6:2008	EN 60068-2-27:2010	EN 61000-4-2:2009	

Walldorf, 16.03.2021

Jürgen Kreutzkämper
Manager, R&D
Germany

Stefan Schürmann
Manager, PD
Germany South

Manufacturer: SKF Lubrication Systems Germany GmbH, Heinrich-Hertz-Str. 2-8, 69190 Walldorf, Germany

UK Declaration of Conformity pursuant to the Electromagnetic Compatibility Regulations 2016 No. 1091, Annex IV

The manufacturer hereby declares under its sole responsibility conformity of the product described below with all relevant harmonization legislation of the United Kingdom at the time of placing on the market.

Designation: Inductive piston detector
Type: Electromagnetic sensor
Item numbers: 2340-00000093, 2340-00000094, 2340-00000095, 2340-00000096
Year of manufacture: See circumferential laser engraving on the product

Furthermore, the following regulations and standards were applied in the respective applicable areas:
Electromagnetic Compatibility Ordinance 2016 No. 1091
The Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations 2012 No. 3032
EN 60947-5-2:2007/A1:2012

EN IEC 63000:2018	EN 61000-4-4:2012	EN 61000-4-6:2014	EN IEC 61000-4-3:2020
EN 60068-2-6:2008	EN 60068-2-27:2010	EN 61000-4-2:2009	

Walldorf, 16.03.2021

Jürgen Kreutzkämper
Manager, R&D
Germany

Stefan Schürmann
Manager, PD
Germany South

Manufacturer: SKF Lubrication Systems Germany GmbH, Heinrich-Hertz-Str. 2-8, 69190 Walldorf, Germany

Masthead

Manufacturer
SKF Lubrication Systems Germany GmbH
Email: Lubrication-germany@skf.com
www.skf.com/lubrication

Berlin Plant
Motzener Strasse 35/37
12277 Berlin
Germany
Tel. +49 (0)30 72002-0
Fax +49 (0)30 72002-111

Walldorf Plant
Heinrich-Hertz-Strasse 2-8
69190 Walldorf, Germany
Germany
Tel.: +49 (0) 6227 33-0
Fax: +49 (0) 6227 33-259

Authorized local distributors
- Great Britain -
SKF (U.K.) Limited,
2 Canada Close, Banbury, Oxfordshire,
OX16 2RT, GBR.

- North America -
SKF Lubrication Business Unit
Lincoln Industrial
5148 North Hanley Road, St. Louis,
MO. 63134 USA

- South America -
SKF Argentina Pte. Roca 4145,
CP 2001 Rosario, Santa Fe

Warranty
The instructions contain no statements regarding the warranty or liability for defects. That information can be found in our General Terms of Payment and Delivery.

Training
We conduct detailed training in order to enable maximum safety and efficiency. We recommend taking advantage of this training. For further information, contact your authorized SKF dealer or the manufacturer.

Table of contents

Safety alerts, visual presentation, and layout

While reading these instructions, you will encounter various symbols, illustrations, and text layouts intended to help you navigate and understand the instructions. Their meaning is explained below.

Safety alerts:
Activities that present specific hazards (to life and limb or possible damage to property) are indicated by safety alerts. Always be sure to follow the instructions given in the safety alerts.

⚠ DANGER

These safety alerts indicate an imminent danger. Ignoring them will result in death or serious injury

⚠ WARNING

These safety alerts indicate potentially imminent danger. Ignoring them could result in death or serious injury

⚠ CAUTION

These safety alerts indicate potentially imminent danger. Ignoring them could result in minor injury

NOTICE

These safety alerts indicate a potentially harmful situation. Ignoring them could result in damage to property or malfunctions

Illustrations:
The illustrations used depict a specific product. For other products, they may have the function of a diagram only. This does not alter the basic workings and operation of the product.

Text layout:

- First-order bulleted lists: Items on a bulleted list start with a solid black dot and an indent.
  - Second-order bulleted lists: If there is a further listing of subitems, the second-order bulleted list is used.

1 Legend: A legend explains the numbered contents of an illustration, presented as a numbered list. Items in a legend start with a number (with no dot) and an indent.
  - Second-order legend: In some cases, the numbered contents of an image represent more than just one object. A second-order legend is then used.

1. Instruction steps: These indicate a chronological sequence of instruction steps. The numbers of the steps are in bold and are followed by a period. If a new activity follows, the numbering starts again at "1."
   - Second-order instruction steps: In some cases, it is necessary to divide up a step into a few substeps. A sequence of second-order instruction steps is then used.

1. Safety instructions

1.1 General safety instructions

NOTICE

To mount or replace the piston detector, the respective documentation for the lubricant metering device (lifecycle manual, assembly instructions) in which the piston detector is to be used should be consulted for supplementary information. The safety instructions in that documentation must be observed in full.

- Putting the products into operation or operating them without having read the instructions is prohibited. The operator must ensure that the instructions are read and understood by all persons tasked with working on the product or who supervise or instruct such persons. Retain the instructions for further use.
- The product may only be used in awareness of the potential dangers, in proper technical condition, and according to the information in this manual.
- Any faults that could affect safety must be remedied according to responsibility. The supervisor must be notified immediately in case of malfunctions outside one's individual scope of responsibility.
- Unauthorized modifications and changes can have an unpredictable effect on safety and operation. Unauthorized modifications and changes are therefore prohibited. Only original SKF spare parts and SKF accessories may be used.
- Any unclear points regarding proper condition or correct assembly/operation must be clarified. Operation is prohibited until issues have been clarified.
- The components used must be suitable for the intended use and the applicable operating conditions, e.g. max. operating pressure and ambient temperature range, and must not be subjected to torsion, shear, or bending.

1.2 General behaviour when handling the product

- Familiarize yourself with the functions and operation of the product. The specified assembly and operating steps and their sequences must be observed.
- Keep unauthorized persons away.
- Wear personal protective equipment always.
- Precautionary operational measures and instructions for the respective work must be observed.
- In addition to these Instructions, general statutory regulations for accident prevention and environmental protection must be observed.
- Precautionary operational measures and instructions for the respective work must be observed. Uncertainty seriously endangers safety.
- Safety-related protective and safety equipment must not be removed, modified or affected otherwise in its function and is to be checked at regular intervals for completeness and function.
- If protective and safety equipment has to be dismantled, it must be reassembled immediately after finishing the work, and then checked for correct function.
- Remedy occurring faults in the frame of responsibilities. Immediately inform your superior in the case of faults beyond your competence.
- Never use parts of the centralized lubrication system or of the machine as standing or climbing aids.

1.3 Intended use

Contactless recording of objects.
Spare parts should only be used to replace faulty components of identical construction.
Use is only permitted within the scope of commercial or economic activity by professional users, in compliance with the specifications, technical data, and limits specified in this manual.

1.4 Persons authorized to use the product

Operator
A person who is qualified by training, knowledge and experience to carry out the functions and activities related to normal operation. This includes avoiding possible hazards that may arise during operation.

Specialist in electrics
Person with appropriate professional education, knowledge and experience to detect and avoid the hazards that may arise from electricity.

Specialist in mechanics
Person with appropriate professional education, knowledge and experience to detect and avoid the hazards that may arise during transport, installation, start-up, operation, maintenance, repair and disassembly.

1.5 Foreseeable misuse

Any usage of the product other than as specified in this manual is strictly prohibited. Particularly prohibited are:

- Use of non-specified consumables, contaminated lubricants, or lubricants with air inclusions.
- Use of plastic parts in areas with high exposure to ozone, UV light, or ionizing radiation.
- Use to supply, convey, or store hazardous substances and mixtures as defined in the CLP Regulation (EC 1272/2008) or GHS with acute oral, dermal, or inhalation toxicity or substances and mixtures that are marked with hazard pictograms GHS01-GHS06 and GHS08.
- Use to supply, convey, or store Group 1 fluids classified as hazards as defined in the Pressure Equipment Directive (2014/68/EU) Article 13 (1) a).
- Use to supply, convey, or store gases, liquefied gases, dissolved gases, vapors, or fluids whose vapor pressure exceeds normal atmospheric pressure (1013 mbar) by more than 0.5 bar at their maximum permissible operating temperature.
- Use in an explosion protection zone.
- Use without proper safeguards against excessively high pressures, in the case of pressurized products.

- Use outside of the technical data and limits specified in this manual.

1.6 Referenced documents

In addition to this manual, the following documents must be observed by the respective target group:
- Company instructions and approval rules
- The documentation for the corresponding lubricant metering device (lifecycle manual, assembly instructions) in which the piston detector is used

If applicable:
- Safety data sheet of the lubricant used
- Project planning documents
- Supplementary information regarding special designs. This you will find in the special system documentation.
- Instructions for other components for setting up the centralized lubrication system.

1.7 Prohibition of certain activities

- Modifications to the product which exceed proper installation or replacement in the event of defect.

1.8 Painting plastic components and seals

The painting of any plastic components and seals of the products described is prohibited. Completely mask or remove plastic components before painting the main machine.

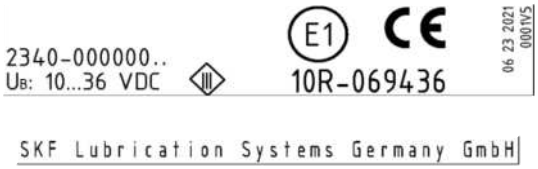
1.9 Safety markings on the product

No safety markings on the product

> NOTE
> In accordance with the results of the workstation risk assessment, additional labels (e.g., warnings, safety signs, prohibition signs, or labels in accordance with CLP/GHS) are to be attached by the operator if necessary.

1.10 Note on the type plate

The type plate provides important data such as the type designation, order number, and sometimes regulatory characteristics. To avoid loss of this data in case the type plate becomes illegible, it should be entered in the manual.



Lasered around the circumference of the product

1.11 Notes on CE marking

CE marking is effected following the requirements of the applied directives requiring a CE marking:
- 2014/30/EU Electromagnetic Compatibility
- 2011/65/EU Directive on the restriction of the use of certain hazardous substances in electrical and electronic equipment (RoHS II)

1.12 Note on UKCA marking

The UKCA conformity marking confirms the product's conformity with the applicable legal provisions of Great Britain.
- Electromagnetic Compatibility Ordinance 2016 No. 1091
- The Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations 2012 No. 3032

1.13 Note on ECE mark

The ECE test mark (E1) confirms that an ECE type approval (components requiring approval on motor vehicles) has been granted for a product which bears this mark on its type plate.

1.14 Note on EAC marking

The EAC conformity marking confirms the product's conformity with the applicable legal provisions of the Eurasian customs union.

1.15 Note on China RoHS mark

The China RoHS mark confirms that there is no danger to persons or the environment from the regulated substances contained within for the intended period of use (year number shown in the circle).

1.16 Emergency shutdown

This is done by a course of action to be defined by the operator.

1.17 Assembly, maintenance, fault, repair

Prior to the start of this work, all relevant persons must be notified of it. At a minimum, the following safety measures must be taken before any work is done:
- Unauthorized persons must be kept away
- Mark and secure the work area
- Cover adjacent live parts
- Dry any wet, slippery surfaces or cover them appropriately
- Cover hot or cold surfaces appropriately

Where applicable:
- Depressurize
- Isolate, lock and tag out
- Check to ensure live voltage is no longer present
- Ground and short-circuit

The product should be protected as much as possible from humidity, dust, and vibration, and should be installed so that it is easily accessible. Ensure an adequate distance from sources of heat or cold. Any visual monitoring devices present, such as pressure gauges, min./max. markings, or oil level gauges must be clearly visible. Observe the mounting position requirements.

Drill required holes only on non-critical, non-load-bearing parts of the operator's infrastructure. Use existing holes where

possible. Avoid chafe points. Immobilize any moving or detached parts during the work. Adhere to the specified torques.

If guards or safety devices need to be removed, they must be reinstalled immediately following conclusion of work and then checked for proper function.

Check new parts for compliance with the intended use before using them.

Avoid mixing up or incorrectly assembling disassembled parts. Label parts. Clean any dirty parts.

1.18 First start-up, daily start-up

Ensure that:

- All safety devices are fully present and functional
- All connections are properly connected
- All parts are correctly installed
- All warning labels on the product are fully present, visible, and undamaged
- Illegible or missing warning labels are immediately replaced

1.19 Residual risks

Table 1

Residual risks

Residual risk	Possible in lifecycle	Avoidance / Remedy
Personal injury / property damage due to falling of hoisted parts	A B C G H K	• Unauthorized persons must be kept away. • Personnel are not permitted to stand under hoisted parts. • Lift parts using suitable lifting gear.
Personal injury / property damage due to detaching or falling product due to non-compliance with specified torques	B C G	• Adhere to the specified torques. • Mount the product only on components provided for that purpose.
Personal injury / property damage due to electric shock resulting from connection cable damage	B C D E F G H	• Inspect connection cables for damage prior to initial use and then at regular intervals. • Do not install the cable on moving parts or wearing spots. • If this cannot be avoided, use anti-kink coils and/or conduits.
Personal injury / property damage due to spilled, leaked lubricant	B C D F G H K	• Be careful when filling the lubricant reservoir and when connecting or disconnecting the lubricant lines. • Use only hydraulic screw unions and lubrication lines suitable for the specified pressure. • Do not install lubrication lines on moving parts or wearing spots. • If this cannot be avoided, use flexible hose lines or anti-kink coils and/or conduits.

Lifecycles: A = Transport, B = Assembly, C = First start-up, D = Operation, E = Cleaning, F = Maintenance, G = Malfunction, repair, H = Shutdown, K = Disposal

NOTE

In addition, the safety instructions and residual risks contained in the documentation for the corresponding lubricant metering device (lifecycle manual, assembly instructions) in which the piston detector is used are to be complied with and observed in full.

2. Lubricants

2.1 General information

Lubricants are selected specifically for the relevant application. The manufacturer or operator of the machine should ideally make the selection in consultation with the supplier of the lubricant. If you have no or little experience in selecting lubricants for lubrication systems, please contact us. We would be happy to assist you in selecting suitable lubricants and components to build a lubrication system optimized for your particular application. Consider the following points when selecting/using lubricants. This will spare you potential downtime and damage to the machine or lubrication system.

2.2 Material compatibility

The lubricants must generally be compatible with the following materials:

- Plastics: ABS, CR, FPM, NBR, NR, PA, PET, PMMA, POM, PP, PS, PTFE, PU, PUR
- Metals: steel, gray cast iron, brass, copper, aluminum

2.3 Temperature properties

The lubricant used must be suitable for the specific ambient temperature of the product. The viscosity approved for proper functioning must neither be exceeded at low temperatures nor fall too low at high temperatures. For the approved viscosity, see the "Technical data" chapter.

2.4 Aging of lubricants

Based on past experience with the lubricant used, checks should be conducted at regular intervals defined by the operator, to determine whether the lubricant needs to be replaced due to aging processes (oil separation). In case of doubt regarding the continued suitability of the lubricant, it must be replaced before the system is started up again. If you do not yet have any experience with the lubricant used, we recommend conducting a check after just one week.

2.5 Avoidance of faults and hazards

To avoid faults and hazards, please observe the following:

- When handling lubricants, observe the relevant safety data sheet (SDS) and any hazard labeling on the packaging.
- Due to the large number of additives, some lubricants that meet the pumpability requirements specified in the manual are not suitable for use in centralized lubrication systems.
- Whenever possible, always use SKF lubrication greases. They are ideal for use in lubrication systems.
- Do not mix lubricants. This can have unpredictable effects on the properties and usability of the lubricant.
- Use lubricants containing solid lubricants only after technical consultation with SKF.
- The lubricant's ignition temperature has to be at least 50 kelvin above the maximum surface temperature of the components.

2.6 Solid lubricants

Solid lubricants may only be used after prior consultation with SKF. When solid lubricants are used in lubrication systems, the following rules generally apply:

Graphite:

- Maximum graphite content 8%
- Maximum grain size 25 µm (preferably in lamellar form)

MoS2:

- Maximum MoS2 content 5%
- Maximum grain size 15 µm

Copper:

- Lubricants containing copper are known to lead to coatings forming on pistons, bore holes, and mating surfaces. This can result in blockages in the centralized lubrication system.

Calcium carbonate:

- Lubricants containing calcium carbonate are known to lead to very heavy wear on pistons, bore holes, and mating surfaces.

Calcium hydroxide:

- Lubricants containing calcium hydroxide are known to harden considerably over time, which can lead to failure of the centralized lubrication system.

PTFE, zinc, and aluminum:

- For these solid lubricants, it is not yet possible to define any limit values for use in lubrication systems on the basis of existing knowledge and practical experience.

3. Overview, functional description

3.1 Field of application

The piston detector is used for monitoring the function of lubricant metering devices. The monitoring of the centralized lubrication system and possibly the termination of a lubrication interval can thus take place in connection with an external control unit or lubrication pump with control circuit board.

Depending on the type of metering device, different designs exist for the piston detector which are tailored specially to the respective metering device type and piston stroke. These are distinguished from one another by their dimensions/clearance dimensions and by their respective connection threads.

3.2 How it works

The piston detector is a pressure-resistant inductive proximity switch which is screwed in at the position of the piston plug screw in the piston bore of the lubricant metering device and which detects its piston movement without either contact or wear being involved.

Its switching function is designed as an NO contact. As long as the piston detector is acted upon by the piston, it will switch its plus (+) on the output (2/4), while at the same time a yellow LED lights up to indicate the circuit state.

NOTE

Function monitoring by means of an inductive piston detector is contingent on adequate processing of the signal by an external control unit or by a lubrication pump with control circuit board.

3.3 Control units and pumps

The inductive piston detector is compatible with the following control units and pumps:

Table 2

Control units	Pumps
• LMC 2	• P253
• LMC 301	• CLP (with IMS)
• IG502-2-E+912 / +914 (external)	
• PLC (with PNP signal processing)	

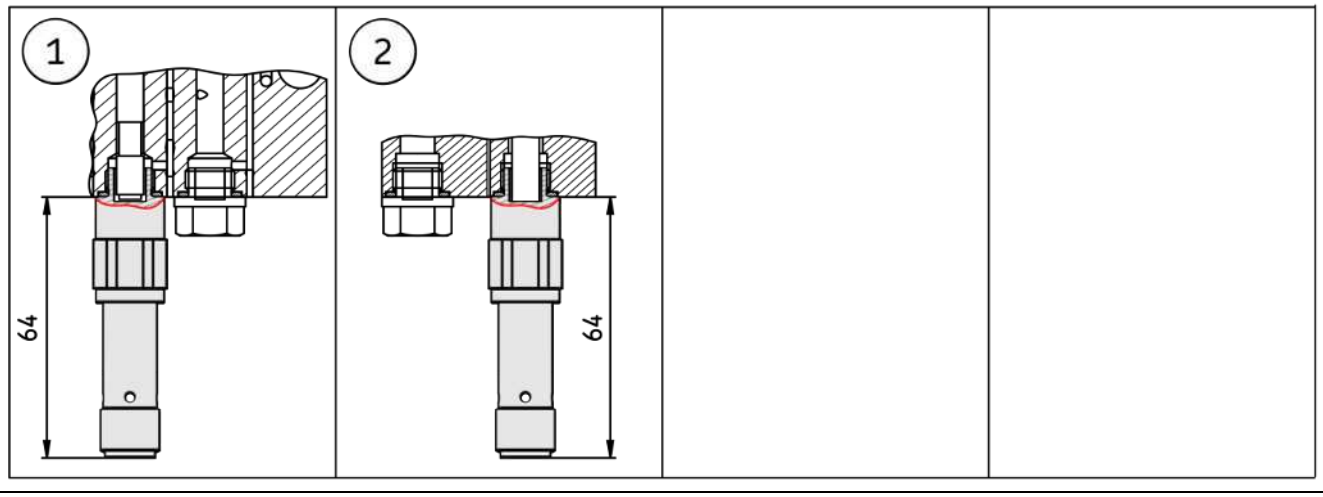
3.4 Overview of the compatible lubricant metering devices with mounting dimension

NOTE

Different part numbers for repeat orders. When reordering for the purpose of replacing or retrofitting the piston detector, the part number of the respective retrofit kit must be used (see chapter Spare parts).

3.4.1 Metering device VPK / PSG1 – Piston detector 2340-00000093

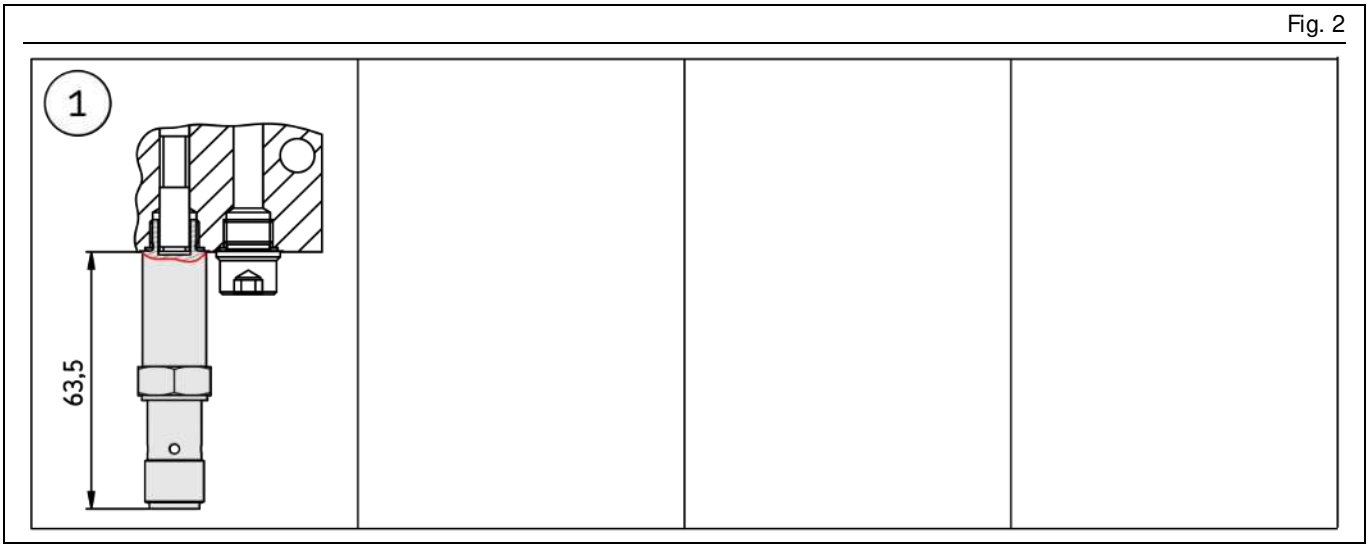
Fig. 1



1 VPK
2 PSG1
Mounting dimension 64 mm

3.4.2 Metering device VPB – Piston detector 2340-00000094

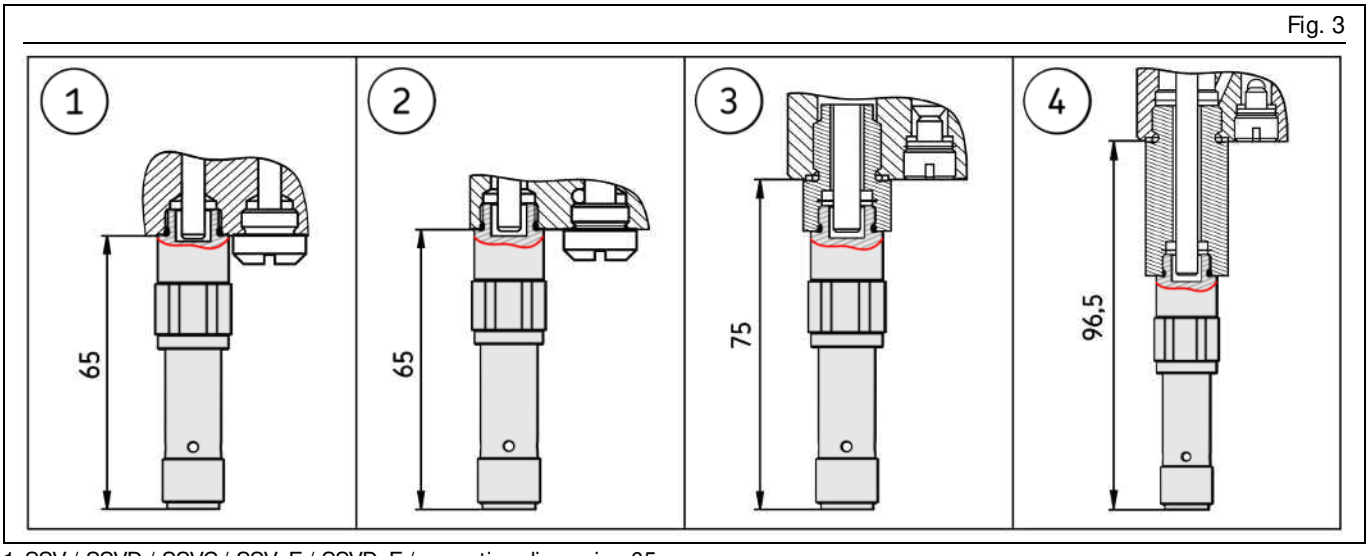
Fig. 2



1 VPB
Mounting dimension 63.5 mm

3.4.3 Metering device SSV / SSVD / SSVC / SSV-E / SSVD-E / SLC / VSG (NP / NPI) / VSL (NP / NPI) – Piston detector 2340-00000095

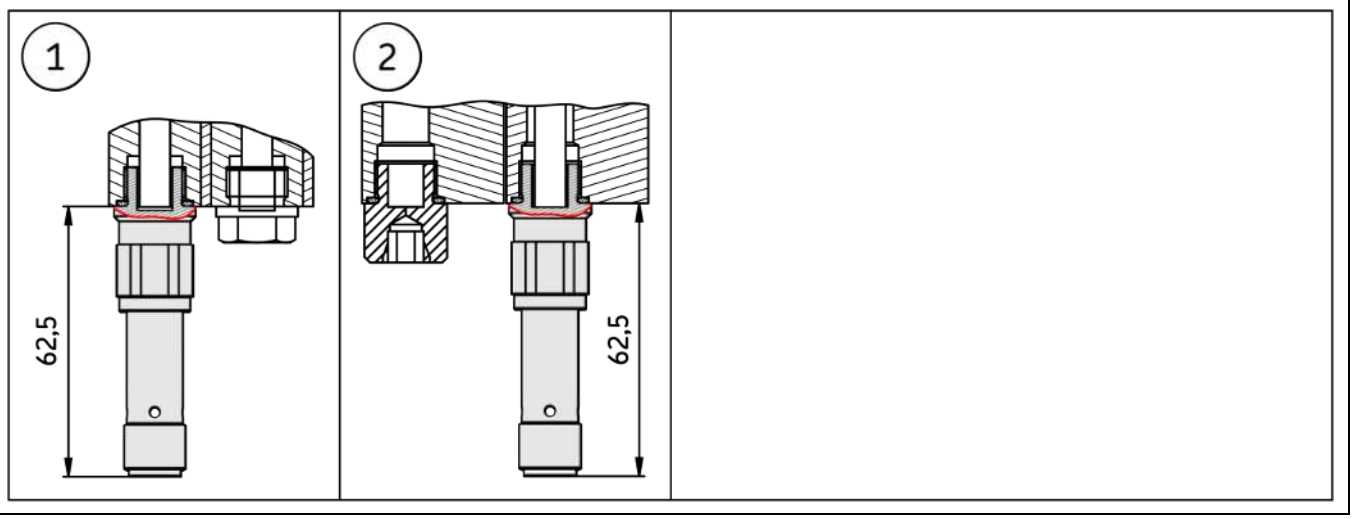
Fig. 3



1 SSV / SSVD / SSVC / SSV-E / SSVD-E / mounting dimension 65 mm
2 SLC / mounting dimension 65 mm
3 VSG (NPI) / mounting dimension 75 mm
4 VSL (NPI) / mounting dimension 96.5 mm

3.4.4 Metering device VP / PSG2 – Piston detector 2340-00000096

Fig. 4



1 VP
2 PSG2
Mounting dimension 62.5 mm

NOTE
For all further dimensions, see Chapter 4.2.1 to 4.2.4 .

4. Technical data

4.1 General technical data

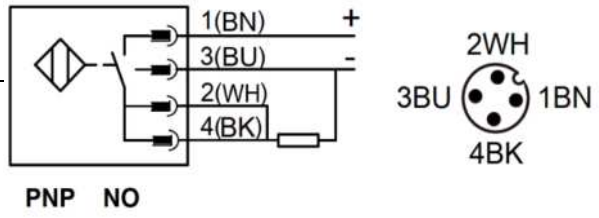
Table 3

Inductive piston detector

Item number	Field of application / lubricant metering device:
2340-00000093	VPK / PSG1
2340-00000094	VPB
2340-00000095	SSV / SSVD / SSVC / SSV-E / SSVD-E / SLC / VSG (NP / NPI) / VSL (NP / NPI)
2340-00000096	VP / PSG2

General data		Electrical data	
Operating principle	Inductive proximity switch	Electrical design	3-wire, DC PNP
Max. permissible pressure	400 bar	Switching function	NO contact
Temperature range	-40 °C to +80 °C	Operating voltage U_B	10-36 V DC
Temperature drift	± 10 %	Protection class	SELV / PELV ⧫
Medium	Lubrication oils, lubrication greases up to NLGI grade 2	Rated insulation voltage	<= 0.5 kV
		Voltage drop / max. load	<= 2.5 V
Housing material	V4A (1.4571)316Ti	Current-carrying capacity	<= 200 mA
Deflector surface	Ceramic	No-load current	<= 15 mA
Magnetic field compatibility	-50 mT to 50 mT	Minimum load current	<= 1 mA
Enclosure rating	IP67 (only with corresponding socket)	Residual current	<= 0.1 mA
Mounting type	flush mountable	Residual ripple	<=10%UB
Connection type	M12x1 a-coded 4-pin.	Switching hysteresis	3%...15%
Switching frequency	max. 200 Hz	Short-circuit protection	pulsed
Nominal sensing distance Sn	2 mm	Reverse polarity protected	Yes
Secured sensing distance	>= 0.81 x Sn	Overload-proof	Yes
Correction factors	St37=1, V2A approx. 0.7 Al approx. 0.3		
Circuit state display	LED yellow		

Electrical connection / Wire color in accordance with IEC 60757



Certifications

ECE / E1	10R-069436

Directives and tests

Standard	IEC 60947-5-2
Vibration resistance according to EN 60068-2-6 Fc	55 Hz (1 mm)
Impact resistance according to EN 60068-2-27 Ea	30 g (11 ms)
Immunity against the discharge of static electricity in accordance with EN 61000-4-2 ESD	4 kV CD / 8 kV AD
Immunity against high-frequency electromagnetic fields in accordance with EN 61000-4-3 HF radiated	10 V/m
Immunity against rapid transient electrical disturbances EN 61000-4-4 Burst	2 kV
Immunity against conducted disturbances in accordance with EN 61000-4-6 HF grid-bound	10 V

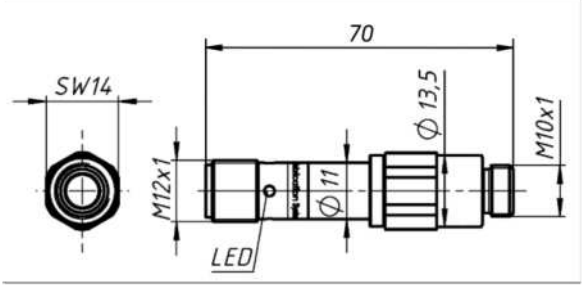
4.2 Dimensioned drawings

4.2.1 Inductive piston detector 2340-00000093

Table 4

Field of application of lubricant metering device VPK / PSG1

Dimensioned drawing



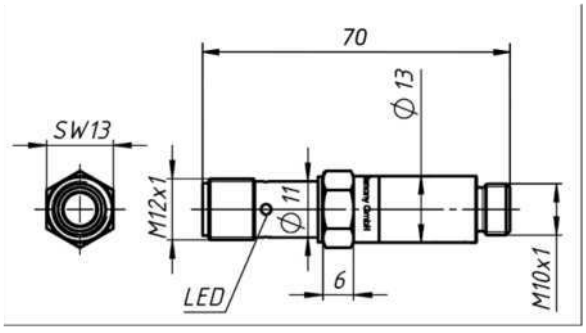
Tightening torque 15 ± 0.5 Nm
Nominal sensing distance Sn = 2 mm

4.2.2 Inductive piston detector 2340-00000094

Table 5

Field of application of lubricant metering device VPB

Dimensioned drawing



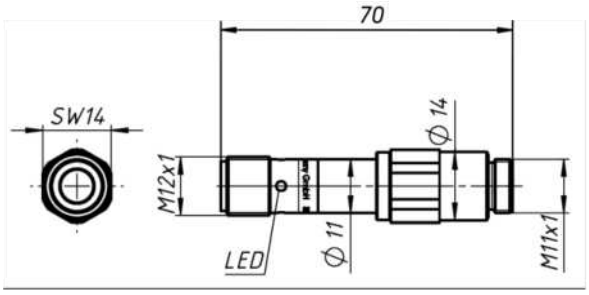
Tightening torque 13 +1 Nm
Nominal sensing distance Sn = 2 mm

4.2.3 Inductive piston detector 2340-00000095

Table 6

Field of application of lubricant metering device SSV / SSVD / SSVC / SSV-E / SSVD-E / SLC / VSG / VSL (Type NPI)

Dimensioned drawing



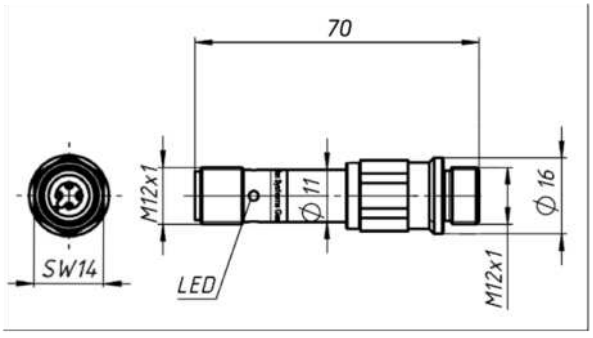
Tightening torque 15 ± 0.5 Nm
Nominal sensing distance Sn = 2 mm

4.2.4 Inductive piston detector 2340-00000096

Table 7

Field of application of lubricant metering device VP / PSG2

Dimensioned drawing



Tightening torque 20 ± 0.5 Nm
Nominal sensing distance Sn = 2 mm

4.3 Electrical connection

⚠ WARNING

Risk of injury

At a minimum, the following safety measures are to be implemented when the electrical connection components are connected or when modifications are made to them:

- Unauthorized persons must be kept away
- Mark and secure the work area

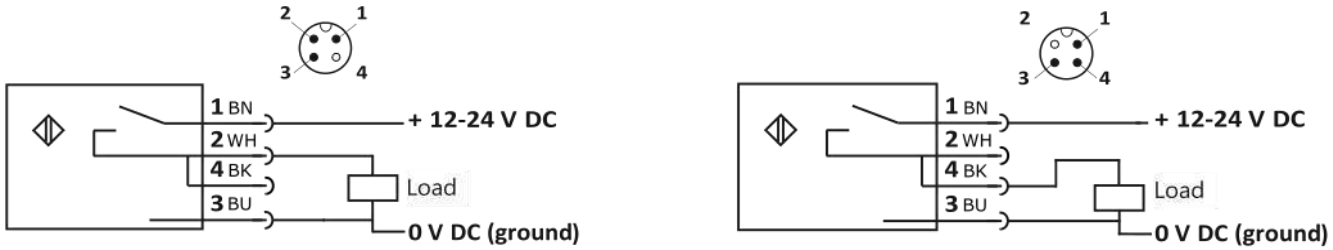
- Unlock the product and prevent it from being restarted

- Depressurizing the product

- Check to ensure live voltage is no longer present
- Ground and short-circuit the product
- Cover any live parts in the surrounding area

4.3.1 Connection options / connector pin assignment

Fig. 5

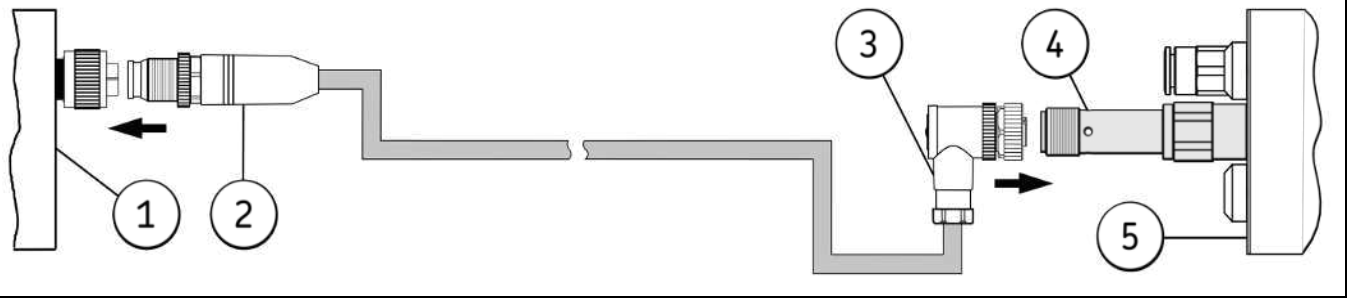


Wire colors in accordance with IEC 60757

1 BN = Brown
2 WH = White
3 BU = Blue
4 BK= Black

4.3.2 Example of a connection between an inductive piston detector with M12-plug and socket

Fig. 6



Legend

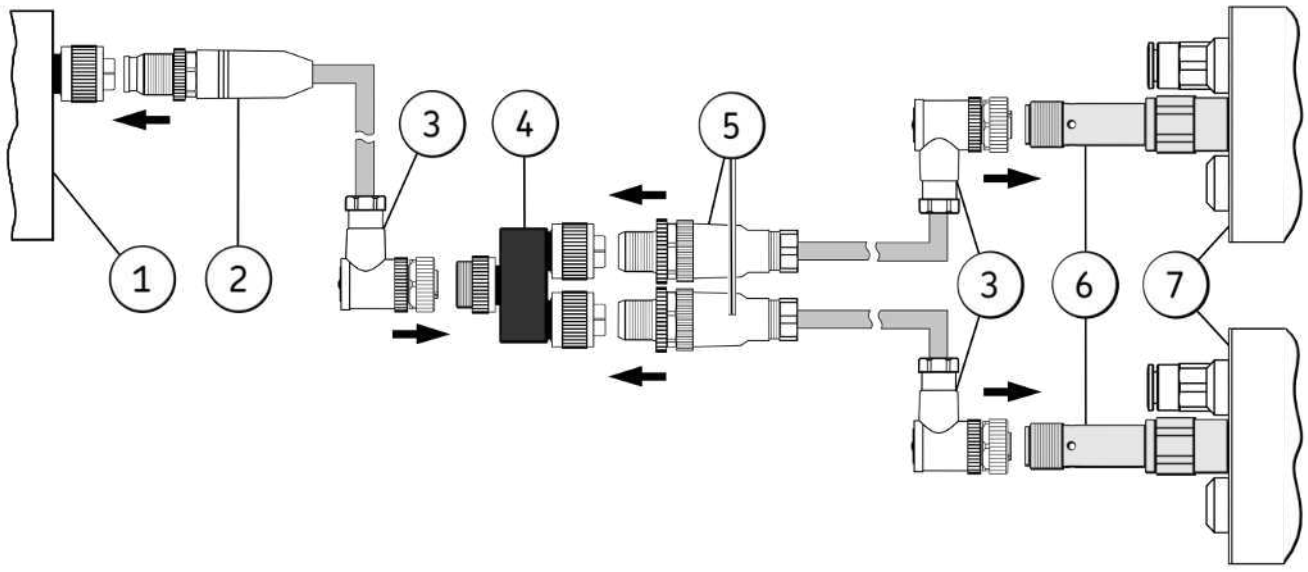
1 M12-Connection of an external control unit or centralized lubrication pump with control circuit board
2 M12-Coupler plug, straight
3 M12-Elbow-Coupling socket
4 Inductive piston detector
5 Lubricant metering device

NOTE

The plug and coupling sockets shown in the Fig. may differ in appearance, for connection material, see "Accessories" chapter.

4.3.3 Example of a connection between two inductive piston detectors with M12-plug and socket

Fig. 7



Legend
1 M12-Connection of an external control unit or centralized lubrication pump with control circuit board
2 M12-Coupler plug, straight
3 M12-Elbow-Coupling socket
4 M12-Tee connector (Pin 4 and Pin 2 separate)
5 M12-Coupler plug, straight
6 Inductive piston detector
7 Lubricant metering device

NOTE
The plug and coupling sockets shown in the Fig. may differ in appearance, for connection material, see "Accessories" chapter.

5. Delivery, returns, storage

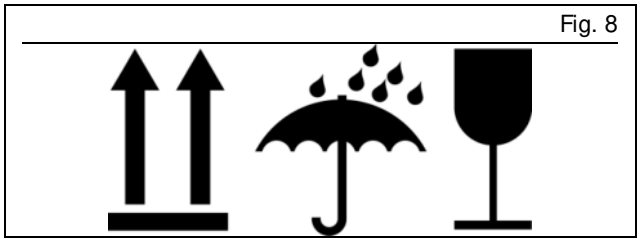
5.1 Delivery

After receipt of the shipment, it must be inspected for any shipping damage and for completeness according to the shipping documents. Immediately inform the transport carrier of any shipping damage. The packaging material must be preserved until any discrepancies are resolved.

5.2 Return shipment

Before return shipment, all contaminated parts must be cleaned. If this is not possible or practical, e.g. if it would impede fault detection in the case of complaints, the medium used must always be specified. In the case of products contaminated with hazardous substances as defined by GHS or CLP regulations, the safety data sheet (SDS) must be sent with the product and the packaging must be labelled in accordance with GHS/CLP. There are no restrictions for land, air, or sea transport. The choice of packaging should be based on the specific product and the stresses to be expected during transport (e.g., necessary anti-corrosion measures in the case of shipment by sea). In the case of wooden packaging, the applicable import regulations and the IPPC standards must be observed. Required certificates must be included in the shipping documents. The following information, as a minimum, must be marked on the packaging of return shipments.

Fig. 8



Marking of return shipments

5.3 Storage

The following conditions apply to storage:

- Dry, low-dust, vibration-free, in closed rooms
- No corrosive, aggressive substances at the storage location (e.g., UV rays, ozone)
- Protected against animals (insects, rodents)
- If possible, keep in the original product packaging
- Protected from nearby sources of heat or cold
- In the case of large temperature fluctuations or high humidity, take appropriate measures (e.g., heating) to prevent the condensation of water
- Before usage, check products for damage that may have occurred during storage. This applies in particular to parts made of plastic (due to embrittlement).

5.4 Storage temperature range

For parts not filled with lubricant, the permitted storage temperature is the same as the permitted ambient temperature range (see "Technical data").

5.5 Declaration of decontamination

If the product came in contact with harmful substances, make sure to thoroughly clean the product before returning it to us. Due to statutory provisions and for the safety of our employees and operation facilities we further need a fully completed and signed "Declaration of decontamination".

6. Assembly

⚠ WARNING

Risk of injury

At a minimum, the following safety measures must be taken prior to installation or repair:

- Unauthorized persons must be kept away
- Mark and secure the work area

- Depressurizing the lubricant metering device

- Unlock the product and prevent it from being restarted

- Check to ensure live voltage is no longer present
- Ground and short-circuit the product
- Cover any live parts in the surrounding area

⚠ CAUTION

Slipping hazard

Centralized lubrication systems must always be free of leaks. Leaking lubricant is hazardous. It creates a risk of slipping and injury. Beware of any lubricant leaking out during assembly, operation, maintenance, or repair of centralized lubrication systems. Leaks must be sealed off without delay.

6.1 General information

Only qualified technical personnel may install the products specified in the instructions.

The product should be protected as much as possible from humidity, and vibration, and should be installed so that it is easily accessible.

During assembly, always pay attention to the following:

- Check the piston detector for possible transport damage
- The IP enclosure rating must be observed
- The lubricant metering device in which the piston detector is to be used must be compatible with it (see Chapter 3.4)
- Dimensions and connection dimensions can be found in the Technical Data chapter; the altered installation dimensions of the lubricant metering device caused by the use of a piston detector must be taken into account here
- The piston detector can be attached to either the left or right side of the lubricant metering device. It is attached to the right side at the factory. A conversion to left-side attachment by the customer can be found in the respective documentation of the lubricant metering device that is used
- It should not be attached to the first or last module / piston (lubricant metering device PSG1 / PSG2)
- No active forces may occur on the piston detector
- Other units must not be damaged by assembly work
- The product must not be installed within range of moving parts
- The product must be installed at a sufficiently large distance from sources of heat or cold
- Maintain safety clearances and comply with statutory regulations for assembly and accident prevention.
- Carefully clean fittings and tubing prior to beginning installation
- It must be ensured that fittings, connections, and connection elements are leak-free
- Ensure cleanliness; components must be installed without contamination
- Do not use any cleaning wipes containing lint.

6.2 Installation or replacement of the inductive piston detector

See Fig. 9

NOTE

Applies to lubricant metering devices VP, VPB, VPK, PSG1, PSG2:

- The factory-set installation of the piston detector takes place on the lubricant metering device. Installation or conversion of the piston detector to the left side by the customer requires the respective metering device piston to be rotated by 180°; the assembly instructions for the lubricant metering device used must be taken into account without fail for this purpose!

Applies to lubricant metering devices PSG1, PSG2:

- The piston detector should not be installed at the first or last module of the lubricant metering device.

Applies to lubricant metering devices VSG, VSL:

- The metering device must be designed to support a piston detector (Type NP / NPI).

1. Deactivate the lubrication system and depressurize the metering device(1).
2. Ensure wherever possible that no contamination caused by escaping lubricant can take place, e.g. through utilization of a suitable collection receptacle.
3. Mount the packing ring (2), lightly greased, on the connection thread of the new piston detector (3) and then set it down close to hand on a clean storage surface.

The following steps apply only to the replacement of a piston detector that is already present:

See Fig. 10and Fig. 11(distinctive feature of lubricant metering devices VSG and VSL)

- Disconnect the connection cable (1) and the adapter cable (2) (if present) of the piston detector (3).
- Remove the shielding sleeve (4) (if present).
- Disconnect and unscrew the piston detector (3) together with the adapter (5) (if present) on the lubricant metering device (6), taking care to ensure while doing so that any packing ring (7) which may be present does not get left behind in the lubricant metering device.
- Now continue with item 5.

4. At a selected piston bore on the right side of the lubricant metering device, loosen and unscrew the plug screw (4)taking care to ensure while doing so that any packing ring which may be present does not get left behind in the lubricant metering device.
5. Place a new piston detector (3) at the thread of the previously opened piston bore and screw it in by hand, afterwards tightening it with the following torque:

- 2340-00000093 (SW 14) = 15 ± 0.5 Nm
- 2340-00000094 (SW 13) = 13 + 1 Nm
- 2340-00000095 (SW 14) = 15 ± 0.5 Nm
- 2340-00000096 (SW 14) = 20 ± 0.5 Nm

NOTICE

Damage / malfunction

Avoid uncontrolled tightening of the piston detector! This can lead to damage or malfunctions, do not fail to maintain the prescribed tightening torque.

6. Remove the protective cap (5) on the piston detector (3) and connect the electrical connection cable (6) to the piston detector.

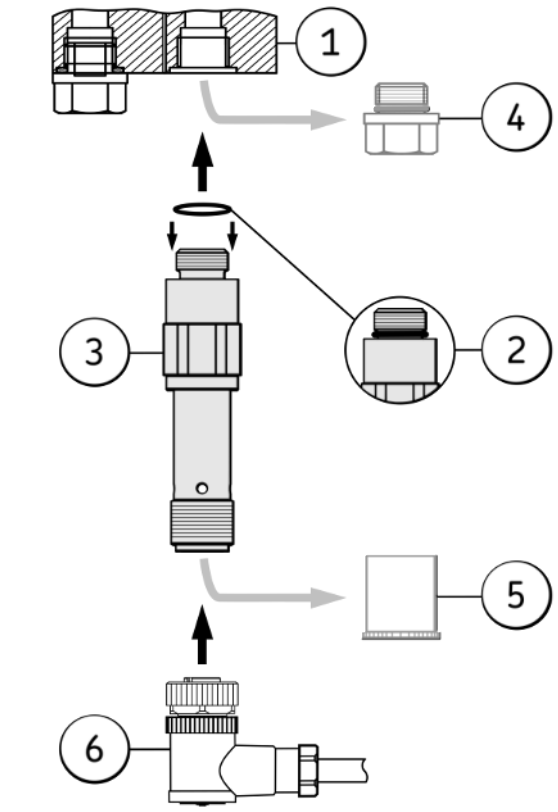
NOTICE

Damage / malfunction

Observe electrical connection options in accordance with Chapter 4.3 !

7. Remove any contamination from the working area and the lubricant metering device, removing the collection receptacle with escaped lubricant and dispose of its contents properly.
8. Function check in accordance with Chapter 7.1 .

Fig. 9

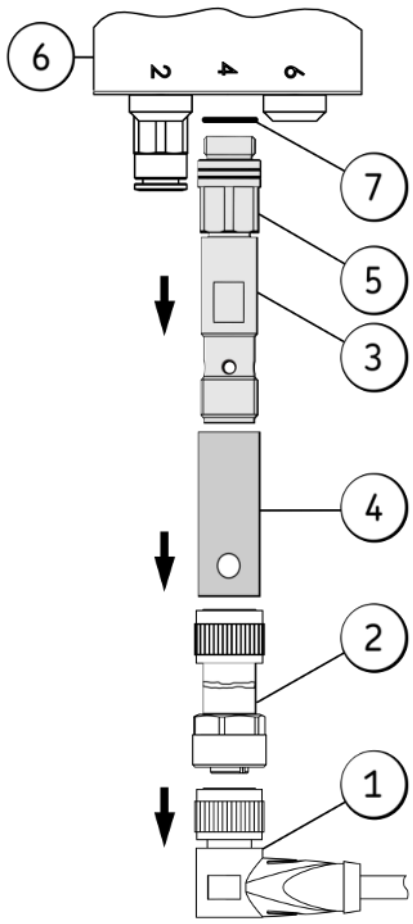


Installation of inductive piston detector

NOTE

The Fig. shows installation on a PSG1 - lubricant metering device; the appearance of the components may differ from the depiction here, depending on the lubricant metering device used (see Chapter 3.4)

Fig. 10

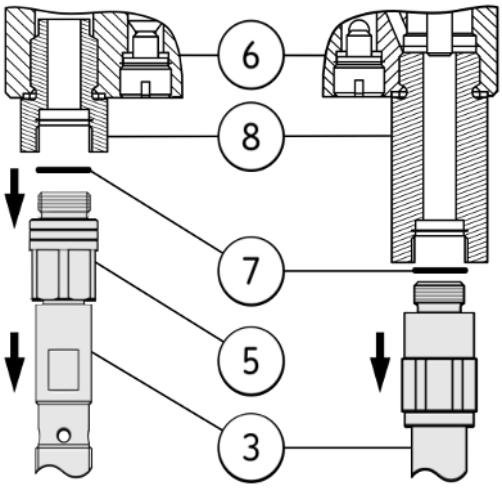


Dismantling the piston detector

NOTE

The Fig. shows the dismantling of an existing piston detector 234-13163-9 with adapter, shielding sleeve and adapter cable at an SSV-lubricant metering device; the appearance and arrangement of the components may differ from the depiction here, depending on the lubricant metering device and piston detector used.

Fig. 11



Dismantling the piston detector with lubricant metering devices VSG / VSL

NOTICE

Damage / malfunction

Applies to lubricant metering devices VSG and VSL

The Fig. shows as an example the dismantling of a piston detector 234-13163-9 with adapter 419-74455-1 at a VSG-metering device (left) and of a piston detector 2340-00000095 at a VSL-metering device (right). When dismantling, take care to ensure that the adapter(8) provided for supporting the piston detector on the metering device does not become detached or screwed out, while also checking as needed the correctness of the torque of 30 Nm.

7. First start-up

7.1 Checking the signal

1. Check the connections of all of the components of the centralized lubrication system for correctness and then activate these afterwards.
2. Execute several metering device strokes.
3. Check the signal capture of the metering device stroke on the piston detector on the basis of the signal change.

NOTE

For the subsequent metering device strokes, the signal from the piston detector must be received at the control or at the control circuit board of the centralized lubrication pump.

4. Check the dispensing of the correct lubricant volume at the connected lubrication points.

8. Operation

SKF products operate automatically to the greatest possible extent.
Basically, activities during standard operation are limited to:

- Regular function checks
- Regular checks for contamination or damage

9. Maintenance and repair

9.1 Maintenance

Careful and regular maintenance is required in order to detect and remedy possible faults in time. The specific intervals must always be determined by the operator according to the operating conditions and regularly reviewed and adapted where necessary. If necessary, copy the table for regular maintenance activities.

Checklist Maintenance Table 8

Activity to be performed	YES	NO
Electrical connection established correctly	☐	☐
Mechanical connection established correctly	☐	☐
The performance characteristics for the aforementioned connections match the specifications in "Technical data"	☐	☐
All components such as lubrication liness and metering devices are correctly installed	☐	☐
Product is protected by a suitable pressure relief valve	☐	☐
No apparent damage, contamination, or corrosion	☐	☐
Any dismantled protective and monitoring equipment is fully reinstalled and functional	☐	☐
Warning labels which may be present on the product are present and in proper condition	☐	☐
No unusual noises, vibrations, moisture accumulation, odors present	☐	☐
No undesired discharge of lubricant (leakages) at connections	☐	☐
Lubricant is fed without bubbles	☐	☐
The bearings and friction points requiring lubrication receive the planned lubricant volume	☐	☐

9.2 Repair

The device contains no parts which can be repaired by the user.
In the event of a defect in the piston detector, it must be replaced with a new piston detector.

10. Cleaning

10.1 Basics

Cleaning should be carried out in accordance with the operator's own company rules, and cleaning agents and devices and the personal protective equipment to be used should likewise be selected in accordance with those rules. Only cleaning agents compatible with the materials may be used for cleaning. Completely remove any cleaning agent residue left on the product and rinse with clear water. Unauthorized persons must be kept away. Use signage to indicate wet areas.

10.2 Exterior cleaning

Do not allow any cleaning fluid to enter the interior of the product during cleaning.

⚠ WARNING

Risk of fatal electric shock

Cleaning work may only be performed on products that have been de- energized first. When cleaning electrical components, be mindful of the IP enclosure rating.

⚠ WARNING

Serious injury from contact with or inhalation of hazardous substances

Wear personal protective equipment. Observe the safety data sheet (SDS) of the hazardous substance. Avoid contaminating other objects or the environment during cleaning.

11. Faults, causes, and remedies

Table 9

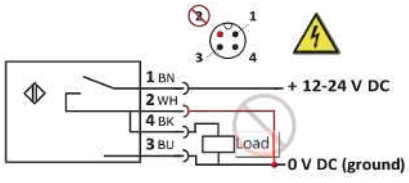
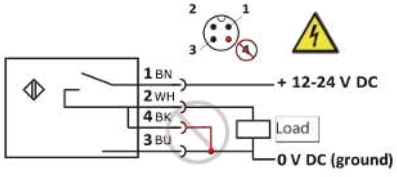
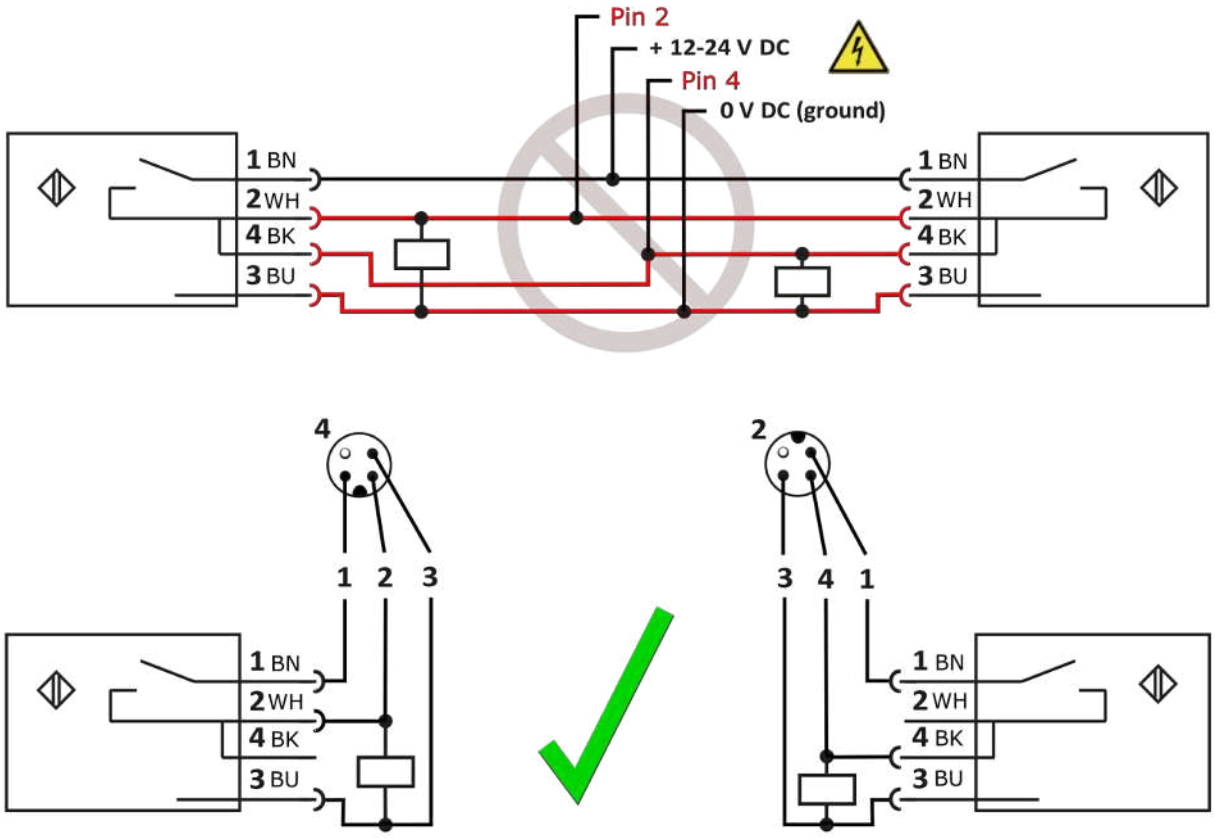
Fault	Possible cause	Remedy
Metering devices signal missing	• Mechanical blockage of the lubricant metering device	• Eliminate the blockage, check the lubricant metering device
	• Socket not connected or connected incorrectly	• Check plug contacts, socket mounted correctly
	• Signal line is broken	• Check signal line
	• Piston detector is not installed correctly	• Check the thread engagement of the piston detector, retightening it if necessary; observe tightening torque and nominal sensing distance
	• Piston detector overtightened	• Detach piston detector, run a signal check, observe tightening torque and nominal sensing distance, replace the piston detector in the event of damage
	• Wrong piston detector used	• Use only the piston detector permitted for the respective metering device
	• Piston detector installed on the left, but the installation position of the respective metering device piston not adapted (only with VP/VPB/VPK/PSG1/PSG2)	• Change the installation position of the metering device piston in accordance with the assembly instructions for the type of metering device used
Short circuit	 • A contact between Pin 2 (WH/white) and Pin 3 (BU/blue = ground) will cause a short circuit (the LED of the piston detector lights up only weakly when actuated)  • A contact between Pin 4 (BK/black) and Pin 3 (BU/blue = ground) will cause a short circuit (the LED of the piston detector lights up only weakly when actuated)	• Connect piston detector in accordance with Chapter 4.3
Incorrect signal output	• The connection of a second piston detector via a nonisolated Y-metering device cable can lead to reciprocal impairments	• Connect the signal lines of the piston detectors via a suitable T-plug (see Chapter 4.3.3). SKF recommends using a separate 3-core signal cable for every piston detector connection (see Fig. 12)

Fig. 12



Connection of two piston detectors

NOTE

Should a malfunction continue to be present after the possible fault causes have been worked through, then the entire lubricant metering device should be sent in to an SKF- Service/dealer for inspection, together with the piston detector.

12. Shutdown, disposal

12.1 Temporary shutdown

Temporary shutdowns should be done by a course of action to be defined by the operator.

12.2 Permanent shutdown, disassembly

Permanent shutdown and disassembly of the product must be planned properly by the operator and conducted in compliance with all applicable laws and regulations.

12.3 Disposal

The waste producer/operator must dispose of the various types of waste in accordance with the applicable laws and regulations of the country in question.

12.3.1 Countries within the European Union

Waste should be avoided or minimized to the extent possible. The disposal of products contaminated with lubricant must be performed by a recognized waste disposal company in compliance with environmental protection requirements and waste disposal regulations as well as the requirements of local authorities.

NOTE

The waste producer/operator is responsible for its specific classification, as the European Waste Catalog provides for different disposal keys for waste that is the same but of different origin.

Dispose of or recycle electrical components in accordance with WEEE Directive 2012/19/EU.

Plastic or metallic parts can be disposed of as industrial waste.

12.3.2 Countries outside the European Union

The waste producer/operator must perform the disposal in accordance with the applicable laws and regulations of the country.

13. Spare parts

Spare parts may be used exclusively for replacement of identical defective parts. Modifications with spare parts on existing products are not allowed.

13.1 Spare parts

Table 10

Retrofit kit / spare part

Designation	Pcs.	Item number
Retrofit kit VPK / PSG1 (Comprised of piston detector 2340-00000093 and O-ring 10.00 x 1.5)	1	5781-00000002
Retrofit kit VPB (Comprised of piston detector 2340-00000094 and O-ring WVN 501- 10.00 x 1.00)	1	5781-00000003
Retrofit kit SSV / SSVD / SSVC / SSV-E / SSVD-E / SLC / VSG (NP / NPI) / VSL (NP / NPI) (Comprised of piston detector 2340-00000095 and O-ring 70 NBR 10.00 x 1.00)	1	5190-00000008
Retrofit kit VP / PSG2 (Comprised of piston detector 2340-00000096 and O-ring WVN 532- 12 x 1.5)	1	5781-00000001

13.2 Accessories

Table 11

Connection accessories

Designation	Use / pump / control	Pcs.	Item number
Cable 3 m with M12 socket A-coded / connector B-coded / 5-pin	P253, eLube (e.g. CLP) with IMS	1	2370-00000086
Cable 5 m with M12 socket A-coded / connector B-coded / 5-pin	P253, eLube (e.g. CLP) with IMS	1	2370-00000167
Cable 0.3 m with M12 socket and connector / 3-pin	P253, eLube (e.g. CLP) with IMS, PLC (with PNP signal processing)	1	2370-00000052
Cable 2 m with M12 socket and bayonet / 4-pin	P253	1	6640-00000059
Cable 3 m with M12 socket and bayonet / 4-pin	P253	1	6640-00000061
Cable 7 m with M12 socket and bayonet / 4-pin	P253	1	6640-00000062
Cable 10 m with M12 socket and bayonet / 4-pin	P253	1	6640-00000058
Cable 30 m with M12 socket and bayonet / 4-pin	P253	1	6640-00000060
Cable 3 m with M12 socket and open end / 4-pin	PLC (with PNP signal processing)	1	2370-00000114
Cable 5 m with M12 socket and open end / 4-pin	PLC (with PNP signal processing)	1	237-13429-6
Cable 10 m with M12 socket and open end / 5-pin	PLC (with PNP signal processing)	1	237-11273-4
Elbow-Coupling socket 90° M12 A-coded	Optional	1	236-10022-6
Elbow-Plug 90° M12 B-coded / 5-pin	Optional	1	236-11003-8
Elbow-Plug 90° M12 A-coded / 5-pin	Optional	1	236-11003-7
T plug (Pin 4 and Pin 2 separate)	For the connection of two piston detectors (see also Chapter 4.3.3 Fig. 7 / 4)	1	179-990-700

14. Appendix

14.1 China RoHS Table

Table 12

部件名称 (Part Name)	有毒害物质或元素 (Hazardous substances)					
	铅	汞	镉	六价铬	多溴联苯	多溴二苯醚
	Lead (Pb)	Mercury (Hg)	Cadmium (Cd)	Hexavalent Chromium (Cr(VI))	Polybrominated biphenyls (PBB)	Polybrominated diphenyl ethers (PBDE)
用钢和黄铜加工的零件 (Components made of machining steel and brass)	X	0	0	0	0	0

本表格依据SJ/T11364的规定编制 (This table is prepared in accordance with the provisions of SJ/T 11364.)

0：	表示该有毒有害物质在该部件所有均质材料中的含量均在GB/T 26572 规定的限量要求以下。 (Indicates that said hazardous substance contained in all of the homogeneous materials for this part is below the limit requirement of GB/T 26572.)
X：	表示该有毒有害物质至少在该部件的某一均质材料中的含量超出GB/T 26572标准规定的限量要求。 (Indicates that said hazardous substance contained in at least one of the homogeneous materials used for this part is above the limit requirement of GB/T 26572.)

skf.com/lubrication

PUB 951-181-029-EN 10-05-2022