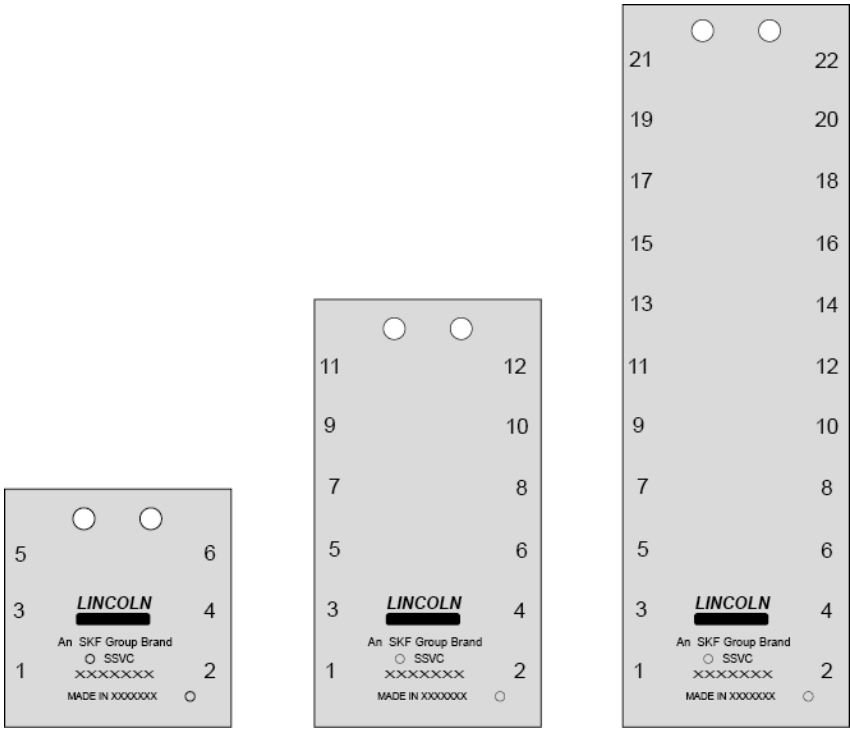


SSVC Stainless Steel Version

Lubricant metering device for progressive systems



Date:	23.01.2025
Document no.:	951-171-065-EN
Version:	04
 Read this manual before installing or commissioning the product and keep it at hand for later reference!	

Masthead

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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.

NOTE

The metering devices described in these instructions are components in accordance with § 35 of the Guide to Application of the Machinery Directive. They are therefore excluded from the scope of the Machinery Directive.

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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 Intended use

Supply of lubricant to lubrication points.

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.

1.2 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 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.

Specialist in electrics

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

1.3 General behavior when handling the product

Putting the product into operation or operating it 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. All operating instructions, safety instructions, and in-house instructions relevant to the particular activity must be followed. Uncertainty seriously endangers safety. Responsibilities for different activities must be clearly defined and observed. In addition to these instructions, the statutory regulations for accident prevention and environmental protection must be observed.

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. Guards and safety devices must not be removed, modified, nor disabled during operation and must be checked for proper function and completeness at regular intervals.

Unauthorized modifications and changes can have an unpredictable effect on safety and operation. Unauthorized modifications and changes are therefore prohibited.

Tasks in the context of repair or maintenance work may be carried out only with the spare parts and accessories offered by SKF for the respective product.

Any unclear points regarding proper condition or correct assembly/operation must be clarified. Operation is prohibited until issues have been clarified.

The painting of any plastic components, visual monitoring devices or seals is prohibited. Completely mask or remove parts before painting.

Electrical devices must be kept in proper condition. This must be ensured by periodic inspections in accordance with the relevant applicable standards and technical rules. The type, frequency, and scope of the inspections must be determined in accordance with the risk assessment to be carried out by the operator. Work on electrical components may be performed only by qualified electricians. Connect the electrical power only in accordance with the valid terminal diagram and in observance of the relevant regulations and the local electrical supply conditions. The operator must implement appropriate measures to protect vulnerable electrical devices from the effects of lightning during use. The electrical device is not furnished with a grounding system for the dissipation of the respective electric charge and does not have the voltage strength necessary to withstand the effects of lightning.

1.4 Transport, assembly, maintenance, malfunction, repair, shutdown, disposal

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. Other units must not be damaged or impaired in their function by the installation work.

Avoid chafe points when installing. 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.

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.

Shutdown in an emergency is to be performed by measures specified by the operator, e.g. by pressing the emergency stop switch of the higher-level machine or by cutting off the power supply.

In the case of electrical products, the following must also be observed:

- Work on electrical components may be performed only in a voltage-free state and using tools suitable for electrical work.
- Do not touch cables or electrical components with wet or damp hands.
- Fuses must not be bridged. Always replace defective fuses with fuses of the same type.
- Ensure proper connection of the protective conductor for products with protection class I. Observe the specified enclosure rating.

1.5 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.

1.6 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 C3 versions in areas with aggressive, corrosive substances (e.g., high salt load).
- 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 securing against excessively high pressures, in the case of pressurized products.
- Use outside of the technical data and limits specified in this manual.

1.7 Referenced documents

In addition to this manual, the following documents must be observed by the respective target group:

- Company instructions and approval rules

If applicable:

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

1.8 Note on Pressure Equipment Directive

Due to its performance characteristics, the product does not reach the limit values defined in Article 4, Paragraph 1, Subparagraph (a) (ii) and is excluded from the scope of Pressure Equipment Directive 2014/68/EU in accordance with Article 1, Paragraph 2 Subparagraph (f).

1.9 Residual risks

Table 1

Residual risks									
Residual risk	Possible in life cycle ¹⁾						Prevention/ remedy		
Personal injury, material damage due to falling of raised parts.	A	B	C		G	H	K	Keep unauthorized persons away. No people may remain under suspended loads. Lift parts with adequate lifting devices.	
Personal injury, material damage due to tilting or falling of the product because of non-observance of the stated tightening torques.		B	C		G			Observe the specified tightening torques. Fix the product to components with adequate load-bearing capacities only. If no tightening torques are stated, apply tightening torques according to the screw size characteristics for 8.8 screws.	
Personal injury, damage to material due to spilled or leaked lubricant.		B	C	D	F	G	H	K	Be careful when connecting or disconnecting lubricant feed lines. Always use suitable hydraulic screw connections and lubrication lines for the stated pressures. Do not mount lubrication lines to moving parts or friction points. If this cannot be avoided, use spring coils respectively protective conduits.
Tearing or damaging of lubrication lines when installed on moving machine parts.			C	D					If possible, do not install on moving parts. If this cannot be avoided, use flexible lubrication lines.
Lubricant spraying out due to faulty component fitting or lubrication line connection.			C	D	F	G			Use suitable hydraulic screw connections and lubrication lines for the stated pressures. Check these prior to commissioning for correct connection and damage.
Injury of persons because of loosening of the impressed balls when using metering devices with black galvanized surface (C3 version) in a strongly corrosive environment.				D	E	F	G	H	Only metering devices in C5 design (stainless steel) are allowed to be used in highly corrosive environments.

¹⁾ Life phases: A = transport, B = installation, C = initial start-up, D = operation, E = cleaning, F = maintenance, G = fault, repair, H = shutdown, K = disposal

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 General information

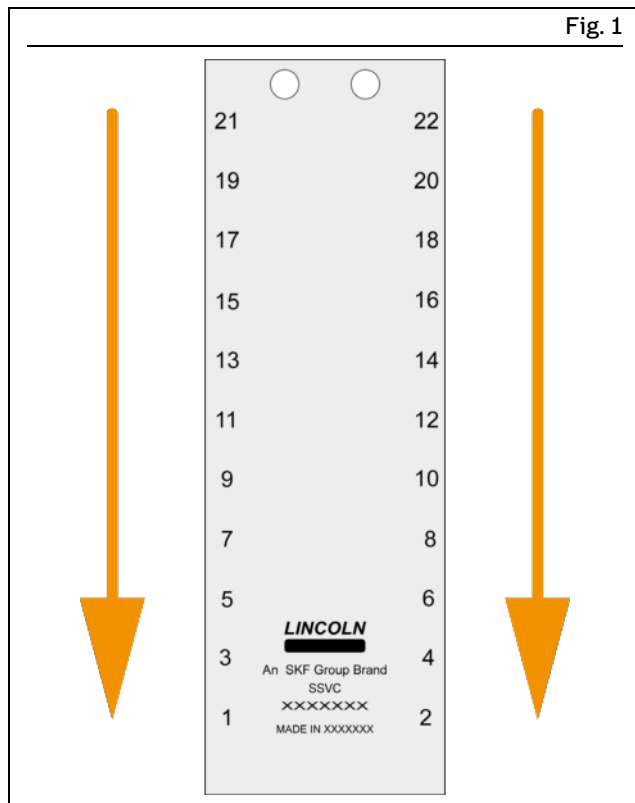
The described metering devices are piston metering devices which serve to supply lubricant to lubrication points in progressive lubrication systems. Lubricant is dispensed as long as lubricant is fed to the metering device under pressure by the lubrication pump.

The pressurized lubricant moves the pistons in the metering device subsequently from their initial position into their final position, whereby the lubricant in front of the piston is displaced to the connected lubrication point/secondary metering device.

A piston will move only when the previous piston has reached its end position. Whenever all pistons have moved from their initial position into their final position and back into their initial position again, a lubrication circuit has been completed and all connected lubrication points/secondary metering devices have been provided with lubricant.

The metering order of each piston is shown adjacently and can start or stop at any point (by switching the lubrication pump on or off).

If larger lubricant quantities are required for the individual lubrication points/ secondary metering devices, the output volumes can be adjusted accordingly by cross-porting outlets.



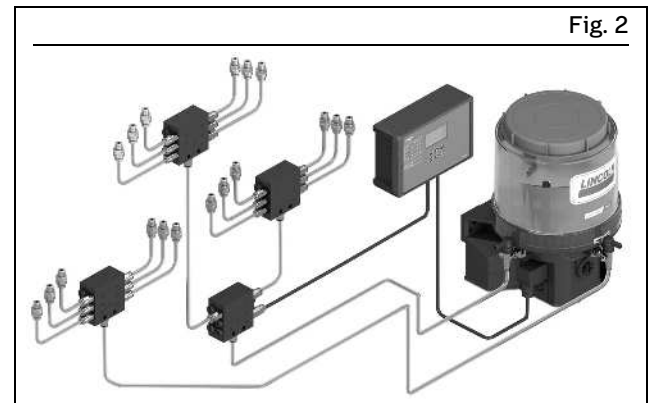
Metering order

3.2 Fields of application

SSVC metering devices can be used for almost all types of applications within a progressive lubrication system.

Typical fields of application:

- Construction machinery
- Utility road vehicles
- Agricultural machines
- Tooling machine
- Wind turbine generators
- Compactors
- Food and beverage filling systems
- Packaging machines



Example of a progressive lubrication system with SSVC metering device

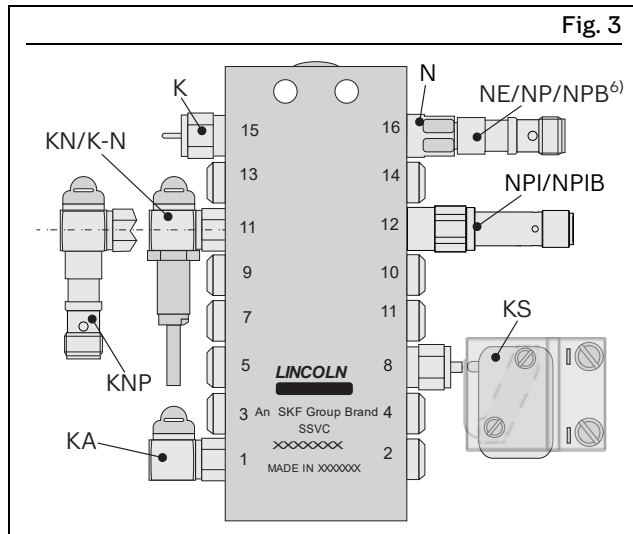
3.3 Function monitoring options

The described metering devices offer the following function monitoring respectively controlling options.

Table 2

Function monitoring options	
Code ²⁾	Description
K	visual monitoring via indicator pin
KN	electric monitoring via indicator pin and proximity switch
KNP	electric monitoring via indicator pin and piston detector
K-N	electric monitoring via indicator pin and piston detector
KA	electric monitoring via indicator pin and proximity switch provided by the customer
KS	electric monitoring via indicator pin and limit switch
N/NP	electric monitoring via piston detector (magnetic)
NPB	electric monitoring via bipolar piston detector (magnetic)
NPI	electric monitoring via piston detector (inductive)
NPIB	electric monitoring via bipolar piston detector (inductive)
NE	electric monitoring via proximity switch (bayonet plug)

²⁾ The respective designation depends on the type of connection of the piston detector (see Technical Data of the piston detector)



Function monitoring options (schematic representation)

⁶⁾ The respective designation depends on the type of connection of the piston detector (see Technical Data of piston detector)

3.3.1 Visual monitoring with indicator pin

The metering devices can be equipped with an indicator pin for visual monitoring of the metering piston's movement.

NOTE

An electrical function monitoring requires an adequate processing of the signal by a lubrication pump with control PCB or by an external control unit.

3.3.2 Electrical monitoring / controlling via proximity switch / limit switch

The proximity switch detects the movement of the indicator pin. Proximity switches are used in combination with lubrication pumps with control PCB or in combination with an external control unit to monitor and, if necessary, terminate the lubrication time.

3.3.3 Electrical monitoring/controlling via piston detector

The piston detector detects the movement of the metering piston. Piston detectors are used in combination with lubrication pumps with control PCB or in combination with an external control unit to monitor and, if necessary, terminate the lubrication time.

3.3.4 System-related monitoring

The individual components of a progressive lubrication system equipped with SSVC metering devices are functionally connected to each other. This means, in case of a blockade in the progressive lubrication system, the pistons of the metering devices cannot move any more. As soon as a piston blocks, pressure in the progressive lubrication system will rise until lubricant will leak from the pressure control valve of the lubrication pump or in case of progressive lubrication systems with pressure control the lubrication pump will be switched off.

3.4 Functional principle

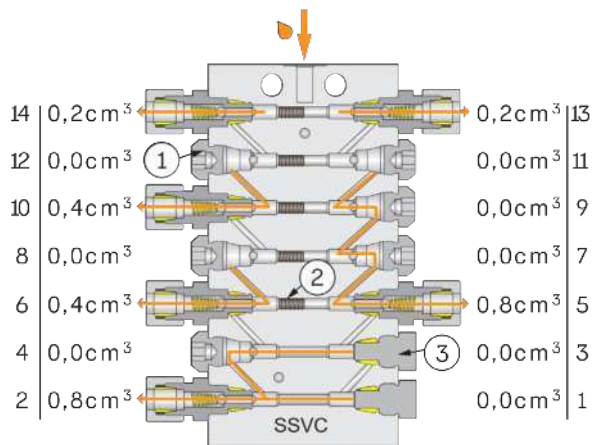
SSVC metering devices meter a nominal lubricant volume of 0.2 cm^3 per stroke and outlet. SSVC metering devices offer the following lubricant metering possibilities:

- **All outlets open:** 0.2 cm^3 per outlet
- **Standard cap screws:** Single unneeded outlets can be closed by means of the standard cap screws (1). The lubricant volume is increased at the next lower open outlet by the lubricant volume of the upper closed outlets.
- **Cross-porting:** By removing the corresponding coated set screw (2) the connection between the two related outlets (in the example between outlet 4 and outlet 3) is opened. By closing an outlet with a cross-porting cap screw (3) the output on the opposite side can be increased by the lubricant volumes of the closed outlets.
- **Combination of cross-porting and standard cap screws:** By combining cross-porting cap screws (3) and standard cap screws (1), the lubricant volume on the opposite side can be further increased also at lower outlets. For large metering volumes all outlets can be cross-ported to one outlet.

NOTE

Repeated use of the coated set screws (2) results in internal leakages thus impacting the metering accuracy and the pressurization negatively. Therefore, the coated set screws should be replaced by new coated set screws after the fourth application at the latest. (See spare parts)

Fig. 4



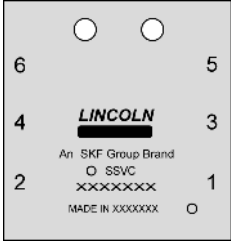
Functional principle

4 Technical data

4.1 General technical data

Table 3

General technical data

Maximum operating pressure	bar	350	
Minimum operating pressure	bar	20	
Max. differential pressure between 2 outlets ⁷⁾	bar	100	
Number of outlets		6-22	
Installation position		any	
Inlet thread		G1/8	
Outlet thread		M10 x 1	
Connectable lubrication lines	mm	Ø 4 Ø 6	
Metering volume per stroke and outlet ³⁾	cm ³	0.2	
Possible material versions		Stainless steel 1.4305 (V2A)	
Function monitoring options ⁴⁾		K KA KN KNP K-N N NP NPB NPI NPIB NE KS	
Suitable lubrication grease consistencies		Lubrication greases up to and including NLGI 2	
Suitable lubrication oil viscosities		Lubrication oils of at least 40 mm ² /s at ambient temperature	
Ambient temperature range without electrical component ⁵⁾	°C	-40 to +120	
Ambient temperature range with electrical component ⁵⁾	°C	see Technical data of the respective electrical component	

³⁾ When using function monitoring devices K, KA, KN, KNP, K-N and KS, the metering volume on those outlets provided with lubricant by a piston via indicator pin is reduced by about 35 %.

⁴⁾ Also see chapter Function monitoring options.

⁵⁾ The stated ambient temperature range assumes the transportability of the lubricant applied and the use of fittings and lubrication lines suitable for the respective existing ambient temperature range.

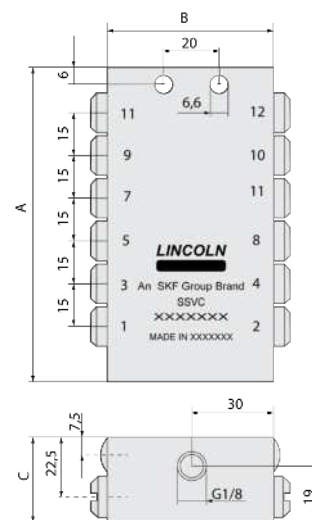
⁷⁾ The maximum differential pressure must not be exceeded and can be reduced by selecting the right length and diameter of the line.

4.2 Construction sizes, dimensions and weights

Table 4

Construction sizes, dimensions and weights

Outlets	A Height (mm)	B Width (mm)	C Depth (mm)	Weight (kg)
6	60	60	30	0.8
8	75	60	30	1.0
10	90	60	30	1.2
12	105	60	30	1.4
14	120	60	30	1.6
16	135	60	30	1.8
18	150	60	30	2.0
20	165	60	30	2.2
22	180	60	30	2.4



4.3 Tightening torques

Table 5

Tightening torques

Position [Nm] Overview

Piston level:

K	1	18-2
KA	1+2	10 ± 1.0
KN/KNP/K-N	1+2+3	7 ± 1.0
N	Adapter to metering device	15 ± 1.0
NP/NE/NPB	Piston detector (magnetic) to adapter (N)	7 ± 0.5
NPI/NPIB	Piston detector (inductive)	15 ± 0.5
P		18-2

Outlet level:

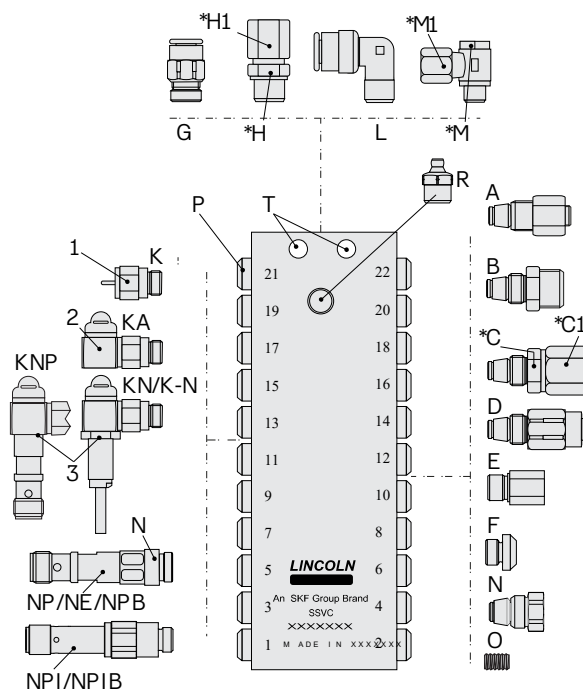
A ⁹⁾		15 ± 0.5
B/C/D/E/N		11 ± 0.5
C1		10 ± 0.5
F		15 ± 1.5
O		2 ± 0.2

Inlet level:

G/L		10 ± 1.0
H		17 ± 1.7
M		15 ± 1.0
H1/M1	for plastic tube	10 ± 1.5
H1/M1	for steel tube	11 ± 1.0

Fastening screws:

T	M 6 x (8.8) dry	10 ± 1.0
	M 6 x (8.8) oiled ⁸⁾	7.5 ± 0.8



Secure all lubrication fittings and all tapered and cylindrical screws without sealing edges with a medium-strength screw lock (e.g. Loctite 274).

⁸⁾ In case of an oiled assembly reduce the stated tightening torques by 20%.

⁹⁾ Mount fitting A with an assembly paste suitable for stainless steel (e.g. EO-Niromont).

4.4 Technical data of the universal piston detector

Table 6

Part number 234-13163-9			
Parameters	Unit/Values		
Ambient temperature	[°C]	-40 to 85	Dimensional drawing
Type of installation		Flush mounted in the adapter	
Switching status display	LED	yellow (lit during damping)	
Electrical connection		M12x1 connector, gold-plated contacts	Electrical connection 2-wire DC PNP/NPN
Rated switching distance	[mm]	2.2 Delivered condition	
Secured switching distance (Sr)	[mm]	2.2 ±10%	
Hysteresis	[% of Sr]	≤ 25, adjusted	3-wire DC PNP
Switch point/reproducibility	[% of Sr]	±10 %	
Admissible operating pressure	[bar]	like the one of the metering device	
Operating voltage	[V]	10-36 DC, supply class 2 according to cULus	NP
Current consumption	[mA]	< 5	
Reverse polarity protection		YES	
Output function		Normally open contact (NO)	NP
Voltage drop	[V]	3.5	
Minimum load current	[mA]	5	
Residual current	[mA]	< 0.8	NP
Current rating	[mA]	100	
Short-circuit proof Overload proof		YES YES	
Switching frequency	[Hz]	10, for damping area of Ø 4 mm up to 7 Hz	NP
Tightening torques	[Nm]	See indications on tightening torques of the metering devices	
Degree of protection	[IP]	65/68/69K with properly screwed cable socket	
Housing		Sensor face: 1.4404, housing = 1.4016, plug = PEI	

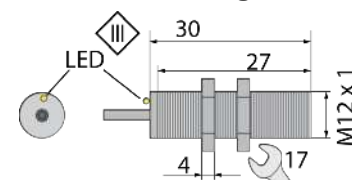
4.5 Technical data proximity switch DC version

Table 7

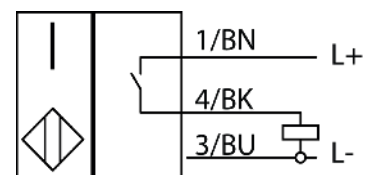
Part number 234-10812-8

Parameters	Unit/Values	
Ambient temperature	[°C]	-25 to 70
Type of installation		flush
Switching status display	LED	yellow (lit during damping)
Type of connection Cable diameter		2000 mm PVC cable 3.2 mm
Cable version Core cross-section	[mm ²]	PBT 3 x 0.14
Rated switching distance	[mm]	2.0
Secured switching distance	[mm]	0-1.62
Reduction factor A_l r_{Cu} R_{V2A}	[mm]	0.3 0.2 0.7
Hysteresis	[% of S_r]	typ. 10 %
Admissible operating pressure	[bar]	like SSVC metering device
Operating voltage U_B	[V]	10-30 DC
Operating current	[mA]	0 / 200
Reverse polarity protection		YES
Output function		Normally open contact PNP
Voltage drop	[V]	≤ 3
No-load current	[mA]	≤ 15
Short-circuit resistant		Clocking
Switching frequency	[Hz]	0-800
Degree of protection	[IP]	67
Housing		Nickel-plated brass, active area = PBT
Tightening torques	[Nm]	See indications on tightening torques of the metering devices

Dimensional drawing



Electrical connection



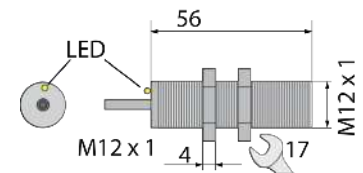
4.6 Technical data proximity switch AC/DC version

Table 8

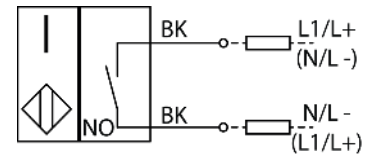
Part number 234-13180-3

Parameters	Unit/Values	
Ambient temperature	[°C]	-25 to 80
Type of installation		flush
Switching status display	LED	yellow (lit during damping)
Type of connection Cable diameter		2000 mm PUR cable
Cable version Core cross-section [mm ²]		2 x 0.25
Rated switching distance	[mm]	2
Reproducibility	[mm]	0.04
Response time/Settling time	[ms]	0.4
Readiness delay	[ms]	100
Admissible operating pressure	[bar]	like SSVC metering device
Operating voltage U _B	[V]	20 - 320 DC
including residual ripple	[mA]	20 - 265 AC
Reverse polarity protection		YES
Output function		Normally open contact NO
Current consumption	[mA]	1.5 (AC) 1.0 (DC)
Current rating	[mA]	200
Short-circuit resistant		NO
Switching frequency	[Hz]	25 (AC) 1200 (DC)
Degree of protection	[IP]	67
Housing		Nickel-plated brass
Tightening torques	[Nm]	See indications on tightening torques of the metering devices

Dimensional drawing

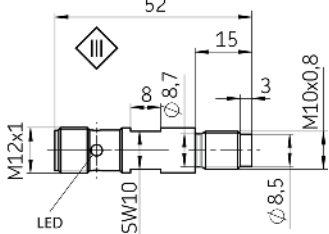
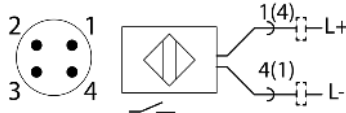
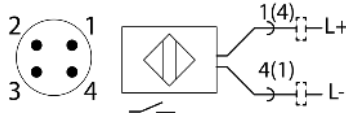
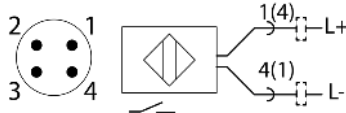
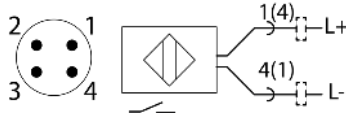
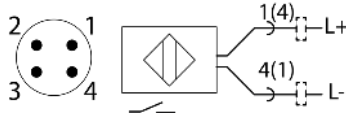
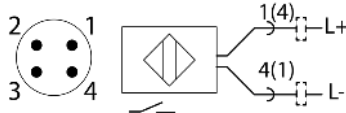


Electrical connection



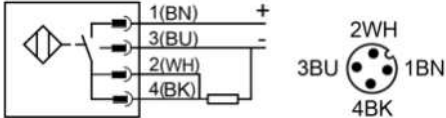
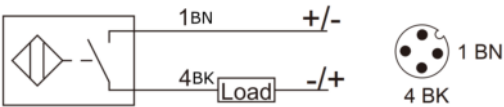
4.7 Technical data of the bipolar piston detector

Table 9

Part number 234-11454-1			
Parameters	Unit/Values		
Ambient temperature	[°C]	-40 to 85	Dimensional drawing 
Type of installation		Flush mounted in the adapter	
Switching status display	LED	yellow (lit during damping)	
Electrical connection		M12x1 connector, gold-plated contacts	Electrical connection 2-wire DC PNP/NPN 
Voltage drop	[V]	4.5	
Minimum load current	[mA]	5	
Rated operating distance (Sr)	[mm]	2.2 ±10%	Electrical connection 2-wire DC PNP/NPN 
Switch point Reproducibility	[mm]	±10 %	
Hysteresis	[% of Sr]	< 10 %	
Admissible operating pressure	[bar]	like the one of the metering device	Electrical connection 2-wire DC PNP/NPN 
Operating voltage U _B	[V]	10 - 36 DC (supply class 2 according to cULus)	
Immunity to magnetic fields	[mT]	-0.5 to +0.5	
Reverse polarity protection		reversible	Electrical connection 2-wire DC PNP/NPN 
Output function		Normally open contact NO	
Residual current	[mA]	< 0.8	
Current rating	[mA]	100	Electrical connection 2-wire DC PNP/NPN 
Short-circuit proof/ Overload proof		YES	
Switching frequency	[Hz]	10; for damping area of Ø 4 mm up to 7 Hz	
Degree of protection	[IP]	65; 67; 69K with properly screwed cable socket	Electrical connection 2-wire DC PNP/NPN 
Materials		Active face: stainless steel (1.4404); housing: stainless steel (1.4016), plug: PEI	
Tightening torques	[Nm]	See indications on tightening torques of the metering devices	

4.8 Technical data Inductive piston detector

Tabelle 10

Inductive piston detector			
Item number 3-wire:	Item number 2-wire (bipolar)	Field of application / lubricant metering device:	
2340-00000093	2340-00000157	VPK / PSG1	
2340-00000094	2340-00000158	VPB	
2340-00000095	2340-00000156	SSV / SSVD / SSVC / SSV-E / SSVD-E / SLC	
		VSG* / VSL* / VSKH* / VSKV* (*NP/NPI)	
2340-00000096	--	VP / PSG2	
General data		Electrical data	
Operating principle	Inductive proximity switch	Electrical design	3-wire, DC PNP 2-wire, DC NO
Max. permissible pressure	400 bar	Switching function	NO contact
Temperature range	-40 °C to +80 °C	Operating voltage U _B	10-36 V DC
Mounting type	flush mountable	Protection class	SELV / PELV 
Housing material	V4A (1.4571)316Ti	Rated insulation voltage	<= 0,5 kV
Temperature drift	± 10 %	Voltage drop / max. load	<= 2,5 V
Deflector surface	Ceramic	Current-carrying capacity	<= 200 mA
Circuit state display	LED yellow	No-load current	<= 15 mA
Enclosure rating	IP67 (only with corresponding socket)	Minimum load current	<= 1 mA
Connection type	M12x1 a-coded 4-pin.	Residual current	<= 0,1 mA
Switching frequency	max. 200 Hz	Residual ripple	<=10 % U _B
Nominal sensing distance S _n	2 mm	Switching hysteresis	3 %....15 %
Secured sensing distance	>= 0.81 x S _n	Short-circuit protection	pulsed
Correction factors	St37=1, V2A approx. 0.7 Al approx. 0.3	Reverse polarity protected	Yes
Magnetic field compatibility	-50 mT to 50 mT	Overload-proof	Yes
Electrical connection (Wire color in accordance with IEC 60757)			
			
3-wire, DC PNP		2-wire, DC NO (bipolar)	
Directives and tests			
Standard	IEC 60947-5-2	ESD	IEC 61000-4-2, 4 kV CD / 8 kV AD
Vibration resistance	IEC 60068-2-6, 55 Hz (1 mm)	Burst	IEC 61000-4-4, 2 kV
Shock resistance	IEC 60068-2-27, 30 g (11 ms)	Surge	EN 61000-4-5, 0,5 kV (line to line, Ri: 2 Ohm)
HF (radiated)	IEC 61000-4-3, 10 V/m	HF (conducted)	IEC 61000-4-6, 10 V
KBA	ECE R10 V.5, E1	cULus ¹⁾ E326357	UL 60947-1:2019; UL 60947-5-2:2022
Radio interference - limit values and measurement methods		EN 55011, Klasse B	
Road vehicles – electrical interference by narrow. blasted el- ektromag. energy		ISO 11452-2, 100 V/m	
Road vehicles – electr., Wired and coupled interference		ISO 7637-2 Pulse, 1 / 2a / 2b / 3a / 3b / 4 / 5a / 5b	

¹⁾ Not applicable to 2340-00000157 and 2340-00000158

4.9 Technical data limit switch

Table 11

Part number 236-13281-2			
Parameters	Unit/Values		
Ambient temperature	[°C]	-25 to 85	
Type of installation		laterally to the mounting bores	
Switching status display		none	
Switch actuating force	[N]	3.9	
Switch detaching force	[N]	1.1	
Rated contact current	[A]	5 A at 250 AC	
Contact arrangement	NO contact / NC contact type SP		
Contact material	Silver		
Mechanical durability	10 ⁶ actuations		
Type of actuator	Stainless steel plunger with elastomer bellows		
Housing material	Nylon, fibre glass reinforced		
Protective cap (bellows)	Silicone/rubber		
Connection cable	firmly wired in the housing, 3-core silicone/rubber 2000 mm long		

Dimensional drawing

Electrical connection

4.10 Type identification code

Specifications regarding customer-specific cross-porting as well as dummy screw fittings ex works are not included in the type identification code.

[illegible]

⁸⁾ If none of these options is selected, the specifications in the type identification code are omitted (without placeholders).

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.



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 Storage conditions for products filled with lubricant

For products filled with lubricant, the permitted storage temperature range is:

minimum	+ 5 °C	[+41 °F]
maximum	+ 35 °C	[+95 °F]

If the storage temperature range is not maintained, the following steps for replacing the lubricant may not lead to the desired result under certain circumstances.

5.5.1 Storage period up to 6 months

Filled products can be used without implementing additional measures.

5.5.2 Storage period between 6 and 18 months

Pump:

- Connect the pump to a power source
- Switch on the pump and run it until lubricant comes out of every outlet without air bubbles
- Disconnect the pump from the power source
- Remove and dispose of the lubricant that came out

Lines:

- Remove pre-installed lines
- Ensure that both ends of the line are open
- Fill the lines completely with fresh lubricant

Metering devices:

NOTE

Due to the large number of different metering devices, no universally valid statement can be made regarding the removal of the old lubricant and correct bleeding after filling with new lubricant. The instructions can be found in the technical documentation of the specific metering device used.

5.5.3 Storage period more than 18 months

To prevent faults, the manufacturer should be consulted before start-up. The basic procedure for removal of the old lubrication filling corresponds to that for storage periods between 6 and 18 months.

6 Assembly

Observe the safety instructions and the technical data in this manual. Additionally, during assembly pay attention to the following:

- Only qualified and authorized technical personnel may install the products described in this manual.
- Adhere to safety distances and legal prescriptions on assembly and prevention of accidents.
- Possibly existing visual monitoring devices, e.g. pressure gauges, MIN/MAX markings, oil inspection glasses must be clearly visible.
- Protect the product against humidity, dust and vibrations.
- Install the product in an easily accessible position. This facilitates other installations, control and maintenance work.

6.1 Prerequisites for the correct functioning of the metering devices

The following points must be observed during installation to ensure correct functioning and a trouble-free operation:

- the metering devices must be configured and mounted correctly
- all lubrication lines must be routed and mounted to the metering device correctly
- each open outlet on the metering device must be secured by a suitable check valve
- use adequate lubricant without contaminations only
- there must not be present any blockage in the progressive lubrication system or in the lubrication points
- adhere to the stated tightening torques
- in case of attached electrical components also observe the relevant IP types of protection
- a correct electrical function monitoring requires an adequate processing of the signal by a lubrication pump with control PCB or by an external control unit
- the minimum operating pressure must be reached
- the maximum differential pressure must not be exceeded.

6.2 Place of installation

Install the metering device at a suitable place following the lubrication plan. Install the product protected against humidity and vibration and easily accessible to ensure all other installations can be carried out without any problem. Mount the metering device together with the indicator pin in such way that the indicator pin is easily visible.

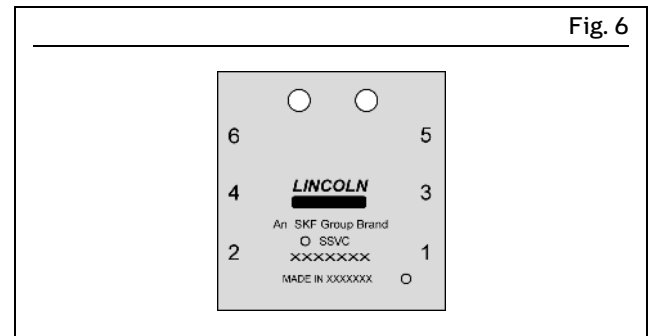
6.3 Fixation of the metering device at the place of installation

It is recommended to provide a free space of about 80 mm around the metering device for inspection and connection purposes. The described metering devices are fixed to 2 mounting bores.

For measures see table Size, dimensions and weights.

Proceeding:

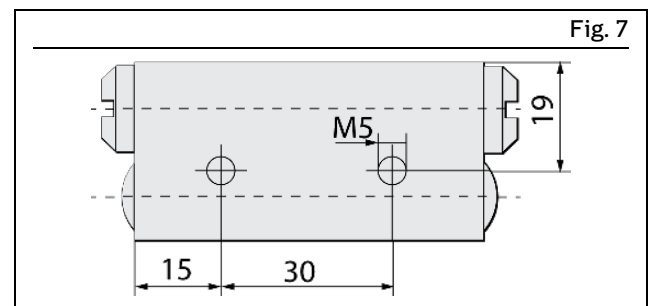
1. Position the metering device to be mounted at the place of installation.
2. Transfer the drill pattern and then make the corresponding bores.
3. Tightening torques, see table 5.
4. For metering devices with electronic function monitoring, this must also be connected.



Fastening bores of the metering device

6.4 Optional mounting bracket

For metering devices as of construction size 14, there exists the possibility to additionally fix them on their bottom side by means of a fixing bracket. For this purpose the metering devices have two threaded bores on the bottom side. Fixation is done by means of two screws M5x8 and the corresponding washers. Tightening torque corresponding to screw size.



Additional fixation points as of construction size 14

6.5 Configuring the SSVC metering device

NOTE

Non preconfigured metering devices:

On delivery, all connecting ducts between the individual outlet pairs are closed by coated set screws (Fig. 8/2). To be able to use the cross-porting function, first of all, the coated set screws must be removed from the outlet pairs intended for cross-porting.

Preconfigured metering devices:

The corresponding marking of which outlet pairs are still closed with set screws can be found on the customer drawing belonging to the metering device.

Should it be necessary to increase the lubricant volume of 0.2 cm^3 per stroke and outlet for certain outlets, this is achieved by internal cross-porting of single outlets.

NOTICE

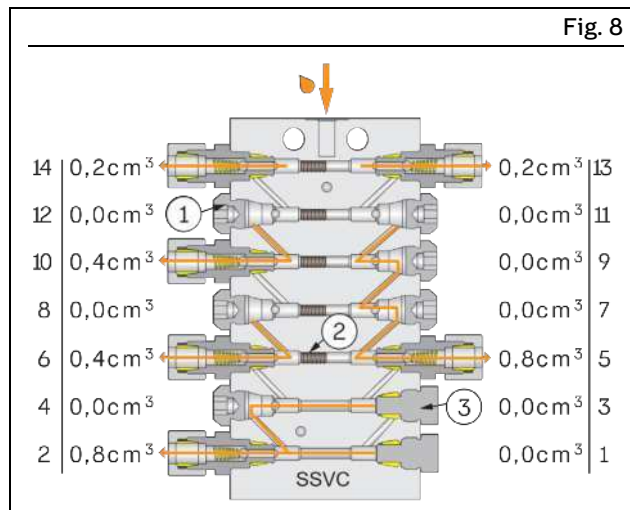
Risk of damage to the superior machine due to poor lubrication

For metering devices with indicator pin (monitoring K, KA, KN, KNP and K-N) the metering volume reduces following the specifications in the Technical data.

6.5.1 Changing the metering volume internally

Changing the metering volume internally is done as shown in below illustration by:

- Standard cap screws
- two-piece cross-porting cap screws and removing the set screw.



Example - Configurations of an SSVC metering device

If necessary, all outlets can be cross-ported to outlet 1 or 2.

NOTE

Figure 8 shows an example of cross-poring lubricant volumes from top to bottom (in the direction of the outlets with lower numbering). However, it is also possible to cross-port lubricant volumes from bottom to top (in the direction of the outlets with higher numbering).

6.5.2 Removing the set screws for cross-porting

NOTE

Repeated use of the coated set screws (2) results in internal leakages thus impacting the metering accuracy and the pressurization negatively. Therefore, the coated threaded screws should be replaced (see spare parts).

To remove the set screws, proceed as follows:

NOTICE

Damage to the metering device and possible leakage

Hereby, the sealing surfaces at the outlet of the metering device must not be damaged. Do not use sharp tools. If possible, lever the plastic protective cap sideways out of the outlets.

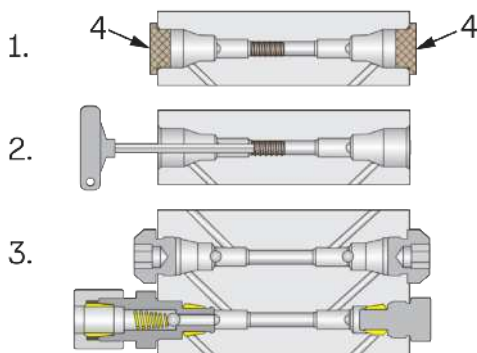
1. Carefully remove the plastic protective caps (4) from all outlets with suitable tools.
2. Remove the set screws (2) on the even-numbered side of the metering device on the outlet pairs intended for cross-porting by means of an Allen key (2 mm) counter-clockwise (CCW). The set screws can be saved for further use.
3. Configure the outlets of the SSVC metering device with standard cap screws (1) or with the two-piece cross-porting cap screws (3) and the intended outlet fittings (see Technical data) according to the specifications in the lubrication plan.

NOTICE

Damage to the metering device

The closure screws (slotted screws) on the piston level must not be removed to change the output volume.

Fig. 9



Work steps for configuring an SSVC

7 First start-up

The start-up is effected in the frame of the initial start-up of the fully and correctly mounted progressive lubrication system.

8 Operation

SKF products operate automatically to the greatest possible extent.

Basically, activities during standard operation are limited to:

Regular functional checks as well as external cleaning in case of contamination.

9 Maintenance

9.1 Maintenance

Regular and appropriate maintenance is a prerequisite to detect and clear faults in time. The specific time lines have to be determined, verified at regular intervals and adapted, if necessary, by the operator based on the operating conditions. If needed, copy the table for regular maintenance activities

Table 12

Maintenance check list		
Activity to be done	YES	NO
All components, such as e.g. lubrication lines and adapters, have been correctly installed	☐	☐
No visible damage, contamination and corrosion	☐	☐
Any dismantled protection and monitoring equipment has been reassembled and checked for correct function	☐	☐
No unusual noises, vibrations, accumulation of moisture, or odours present	☐	☐
No unwanted escape of lubricant (leakages) from connections	☐	☐
Bearings and friction points are provided with the planned amount of lubricant	☐	☐

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 Interior cleaning

The interior normally does not need to be cleaned. The interior of the product must be cleaned if incorrect or contaminated lubricant accidentally enters the product. Please contact our Service department.

10.3 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 13

Fault table

Fault	Possible cause	Remedy
Poor or excessive lubrication of all lube points	• Wrong setting of lubrication time or pause time on the lubrication pump • Wrong output setting on the metering device	Check and, if necessary, correct lubrication and pause times Check the output settings for compliance with the specifications. If needed, correct the output settings
Poor lubrication of individual lubrication points	• Wrong output setting on the metering device • No check valve mounted to the metering device outlet • Main metering device clogged	Check and, if necessary, mount check valve or replace defective check valve. Check the output settings for compliance with the specifications. If needed, correct the output settings. Loosen the lubrication lines from the main metering device to the secondary metering devices one after the other. If after loosening a lubrication line there leaks lubricant from the outlet of the main metering device, then the problem is located in the corresponding lubrication circuit of the secondary metering device. Clean and, if necessary, replace the secondary metering device. Loosen the lubrication lines from the secondary metering device to the lubrication points one after the other. If after loosening a lubrication line there leaks lubricant from the outlet of the secondary metering device, then the problem is located in the corresponding lubrication point or lubrication line of the secondary metering device.
Poor lubrication of all lubrication points	• Main metering device clogged	Loosen the lubrication line to the main metering device. If after loosening the lubrication line there is no lubricant output from the line, then the problem is located either in the lubrication line to the main metering device or in the lubrication pump. Loosen the lubrication lines from the main metering device to the secondary metering devices one after the other. If after loosening the lubrication lines there is no lubricant output from the main metering device, then the problem is located either in the main metering device or in its feed line. Clean and, if necessary, replace the main metering device.

12 Repairs

⚠ WARNING



Risk of injury

At a minimum, the following safety measures must be taken before any repairs:



- Unauthorized persons must be kept away
- Mark and secure the work area
- Depressurize the product
- Isolate the product, and lock and tag it out
- Check to ensure live voltage is no longer present
- Ground and short-circuit the product
- Cover any adjacent live parts.

NOTICE

Damage to the superior machine due to poor lubrication caused by a malfunction of the pressure control valve

The pressure control valve must be replaced with a new pressure control valve after the third triggering at the latest. Otherwise, the pressure control valve opens due to the changed triggering behaviour well before the maximum permissible operating pressure is reached, which can lead to malfunctions.

To remedy a blockade proceed as described in chapter Troubleshooting. After remedying the fault, check the progressive lubrication system with regard to safety and function.

12.1 Remedying a blockade

NOTICE

Risk of damage to the superior machine due to poor lubrication

Make sure to eliminate any blockades. If possible, switch off the superior machine or use a grease gun to provide lubrication points with sufficient lubricant.

Blockades can be detected as follows:

At the lubrication pump:

- Without lubricant return
 - Lubricant leaking from the pressure control valve
- With lubricant return
 - Red indicator pin visible at the lubricant return
- Lubrication pump with control unit
 - Fault indication/ fault signal

At the monitored main metering device:

- The indicator pin at the metering device does not move within the usual time.
- The proximity switch does not switch within the usual time (yellow LED does not turn off or on).

At the superior control unit:

- Fault indication/fault signal in case of function-monitored progressive lubrication systems.

NOTE

Lubricant leaking from the pressure control valve or extending of the red indicator pin will happen only, if the maximum admissible operating pressure is exceeded. If there are leakages in the centralized lubrication system, e.g. Due to damaged lubrication lines, the pressure control valve will not open and the fault will not be indicated.

13 Shutdown, disposal

13.1 Temporary shutdown

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

13.2 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.

13.3 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.

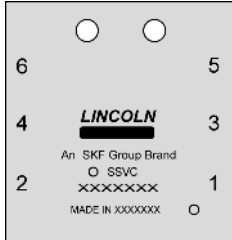
14 Spare parts

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

14.1 SSVC metering device

Table 14

Standard version, stainless steel 1.4305 (V2A)

Designation	Qty.	Part number	Fig.
SSVC 6 Stainless steel 1.4305 (V2A)	1	619-78154-1	
SSVC 8 Stainless steel 1.4305 (V2A)	1	619-78155-1	
SSVC 10 Stainless steel 1.4305 (V2A)	1	619-78156-1	
SSVC 12 Stainless steel 1.4305 (V2A)	1	619-78157-1	
SSVC 14 Stainless steel 1.4305 (V2A)	1	619-78158-1	
SSVC 16 Stainless steel 1.4305 (V2A)	1	619-78159-1	
SSVC 18 Stainless steel 1.4305 (V2A)	1	619-78160-1	
SSVC 20 Stainless steel 1.4305 (V2A)	1	619-78161-1	
SSVC 22 Stainless steel 1.4305 (V2A)	1	619-78162-1	

14.2 Screw fittings for the outlet side

Table 15

Closure screws

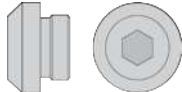
Designation	Qty.	Part number	Fig.
Cap screw with sealing edge M10x1 (1.457.1)	1	303-19346-2	

Table 16

Cross-porting cap screw

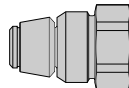
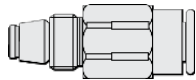
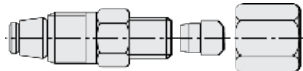
Designation	Qty.	Part number	Fig.
Plug, closure-hex 2611-M10x1-S..DG	1	2260-00000087	

Table 17

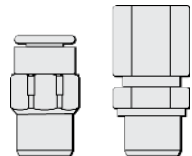
Outlet fittings

Designation	Qty.	Part number	Fig.
Push-in type fitting RV-6-M10x1-S01 Multi Pressure (tube Ø 6 mm)	1	226-14091-4	
Screw-in fitting (tube Ø 6 mm) (1.4571)	1	504-31705-1	

14.3 Screw fittings for the inlet side

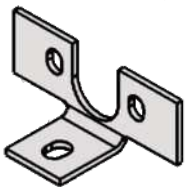
Table 18

Inlet fittings

Designation	Qty.	Part number	Fig.
Push-in type fitting GEKM 6510-6-1/8-S01	1	226-10622-8	
Fitting GE 6 LLR 1/8 K	1	223-12270-7	
Fitting GE 8 LLR 1/8 K	1	223-12270-9	

14.4 Mounting brackets

Table 19

Designation	Qty.	Part number	Fig.
Mounting bracket for SSVc metering devices as of construction size 14 VA	1	419-23723-1	
Delivery without fastening material			

14.5 Set screw

Table 20

Designation	Qty.	Part number	Fig.
Set screw M4 x 8 SI with coating	1	2040-00000005	

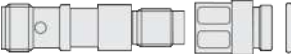
14.6 Universal piston detector

Table 21

Designation	Qty.	Part number	Fig.
Universal piston detector with adapter and O-ring	1	519-85224-1	
Universal piston detector with adapter and O-ring and 3 m cable (2-core)	1	664-85282-7	
Universal piston detector with adapter and O-ring and 5 m cable (2-core)	1	664-85282-8	
Universal piston detector with adapter and O-ring and 7 m cable with bayonet plug (4/2-core)	1	664-85242-5	
Other kits on request			

14.7 Bipolar universal piston detector, kit

Table 22

Designation	Qty.	Part number	Fig.
Bipolar piston detector, kit with adapter, O-ring and service instructions	1	5190-00000006	

14.8 Inductive piston detector, kit

Tabelle 23

Designation	Qty.	Part number	Fig.
Inductive piston detector 3-core, with O-ring	1	5190-00000008	
Bipolar inductive piston detector 2-core, with O-ring	1	5190-00000017	

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