SKF 40 PGA Pump

Date:	**13.9.2024**
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Version:	**01**

Read this manual before installing or commissioning the product and keep it at hand for later reference!

Original EC Declaration of Incorporation in accordance with Directive 2006/42/EC, Appendix II Part 1 B

The manufacturer hereby declares at its sole responsibility that the partly completed machinery conforms to the essential health and safety requirements of the Machinery Directive 2006/42/EC, Annex I, marked in the Annex to the EC Declaration of Incorporation as applicable and fulfilled at the time of placing on the market.
The special technical documents were prepared following Annex VII part B. Upon justifiable request, these special technical documents can be forwarded electronically to the respective national authorities. The authorized company for the compilation of the technical documentation is Oy SKF Ab Finland.

Designation: Pneumatic lubrication pump for vehicle lubrication systems
Type 40PGAS-2L-12V-PS
40PGAS-2L-24V-PS
40PGAA-4L-24V-PS
40PGAA-10L-24V-PS

Furthermore, the following directives and standards were applied in the respective applicable areas:
2011/65/EU: ROHS II including the addition (EU) 2015/863
Machinery Directive 2006/42/EC: EN ISO 12100-1/A1, EN ISO 12100-2/A1
Pneumatic fluid power: EN ISO 4414:2011-4

The partly completed machinery must not be put into service until it has been established that the machinery into which it is to be incorporated is in compliance with the provisions of the Machinery Directive 2006/42/EC and all other applicable Directives.

Muurame, 5.10.2021
Juha Kärkkäinen
Design Office Manager
SKF Lubrication Management
Oy SKF Ab Finland Teollisuustie 6, 40951 Muurame FINLAND

Original UK Declaration of incorporation according to the Supply of Machinery (Safety) Regulations 2008 No. 1597 Annex II

The manufacturer hereby declares under sole responsibility that the partly completed machinery complies with the essential health and safety requirements of UK legislation Supply of Machinery (Safety) Regulations 2008 No. 1597Annex I, marked in the Annex to the EC Declaration of Incorporation as applicable and fulfilled at the time of placing on the market.
The special technical documents were prepared following Annex VII part B. Upon justifiable request, these special technical documents can be forwarded electronically to the respective national authorities. The authorized company for the compilation of the technical documentation is SKF (U.K.) Limited, 2 Canada Close, Banbury, Oxfordshire, OX16 2RT, GBR.

Designation: Pneumatic lubrication pump for vehicle lubrication systems
Type 40PGAS-2L-12V-PS
40PGAS-2L-24V-PS
40PGAA-4L-24V-PS
40PGAA-10L-24V-PS

Furthermore, the following directives and standards were applied in the respective applicable areas:
- The Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations 2012 No. 3032

EN ISO 12100-1/A1 EN ISO 12100-2/A1 EN ISO 4414:2011-4

The partly completed machinery must not be put into service until it has been established that the machinery into which it is to be incorporated is in compliance with the provisions of UK legislation Supply of Machinery (Safety) Regulations 2008 No. 1597 and all other applicable Directives.

Muurame, 5.10.2021
Juha Kärkkäinen
Design Office Manager
SKF Lubrication Management
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Appendix to Declaration of Incorporation in accordance with 2006/42/EC, Annex II, No. 1 B
Description of the essential health and safety requirements according to 2006/42/EC, Annex I, which have been applied and fulfilled. Any essential health and safety requirements not listed here are not relevant to this product

Table 1

Appendix to Declaration of Incorporation
Valid for: 40PGA lubrication pumps

No.:	Essential health and safety requirement	Applicable:	Fulfilled:
1.1.1	Definitions	Yes	Yes
1.1.2	Principles of safety integration	Yes	Yes
1.1.3	Materials and products	Yes	Partially[1)]
1.3	Protection against mechanical hazards	Yes	Yes
1.3.2	Risk of break-up during operation	Yes	Yes
1.3.4	Risks due to surfaces, edges or angles	Yes	Yes
1.5	Risks due to other hazards	Yes	Yes
1.5.4	Errors of fitting	Yes	Yes
1.6	Maintenance		
1.6.1	Machinery maintenance	Yes	Yes
1.6.3	Isolation of energy sources	Yes	Yes
1.7	Information	Yes	Yes
1.7.1	Information and warnings on the machinery	Yes	Yes
1.7.2	Warning of residual risks	Yes	Yes
1.7.3	Marking of machinery	Yes	Yes
1.7.4	Instructions	Yes	Yes

1) Not completely fulfilled: Hazards due to the lubricant used must be assessed by the operator on the basis of the Safety Data Sheet (SDS) and, if necessary, protective measures must be taken.

Masthead

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Authorized local distributors
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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 sub steps. A sequence of second-order instruction steps is then used.

1. Safety instructions

1.1 General safety instructions

- 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 electrical safety instructions

- 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.
- 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 moist 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.
- 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.

1.3 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.

1.4 Intended use

Supply of lubricants.
The product is intended solely for installation in another machine.
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.

1.5 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.

1.6 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 Prohibition of certain activities

- Replacement of or modifications to the pistons of the pump elements
- Repairs or modifications to the drive

1.9 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.

1.10 Safety markings on the product

NOTE

Further to the findings of the workplace risk evaluation the operating company has to attach additional markings (e. g. warnings, signs giving orders, prohibition signs or labelling as specified by CLP / GHS), where appropriate.

1.11 Notes 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.

Fig. 1

1.12 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).

1.13 Notes on CE marking

CE marking is effected following the requirements of the applied directives requiring a CE marking:

- 2011/65/EU Directive on the restriction of the use of certain hazardous substances in electrical and electronic equipment (RoHS II)

1.14 Notes related to the UKCA marking

The UKCA conformity marking confirms the product's conformity with the applicable legal provisions of Great Britain.

1.15 Note on EAC marking

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

1.16 Note on China RoHS mark

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

1.17 Emergency shutdown

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

1.18 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.

1.19 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

1.20 Residual risks

Table 2

Residual risks

Residual risk	Possible in life cycle	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.
Fire hazard or damage to the pump due to an operation with defective electrical components, e.g. Connection cables and plugs.	B C D E F G H	Check the electrical components with regard to damages before the first usage and then at regular intervals. Do not mount cable to moving parts or friction points. If this cannot be avoided, use spring coils respectively protective conduits.
Damage to the pump due to non-observance of the admissible relative duty cycle.	C D	Operate the pump within the admissible relative duty cycle only.
Damage to the pump due to an installation at the place of use without the mounting brackets and washers provided for this purpose.	B C D G	Mount pump only with the mounting brackets and washers provided for this purpose.

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 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 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 Celsius 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, design & operation

3.1 General description

3.1.1 SKF 40PGA pump

The pumping unit is designed for pumping lubricant into central lubrication system. SKF-40PGA is a pneumatic central lubrication system pump developed for use in vehicles. The main purpose of the pump is to feed lubricant into a centralised lubrication system.

3.1.2 Single-line SKF MonoFlex Lubrication system

SKF MonoFlex is a single-line centralised lubrication system in which lubricant is pumped through piping to dosers. Dosers feed a prescribed amount of lubricant to lubrication points. The system's operation is controlled and monitored by a control unit. The control unit controls the system based on a preset starting interval setting and monitors the pressurisation of the system and the amount of lubricant dosed. If the system's pressure does not reach its preset value during the maximum pressurisation time or the amount of lubricant falls to the set lower limit, the control unit will generate an alarm.

⚠ CAUTION

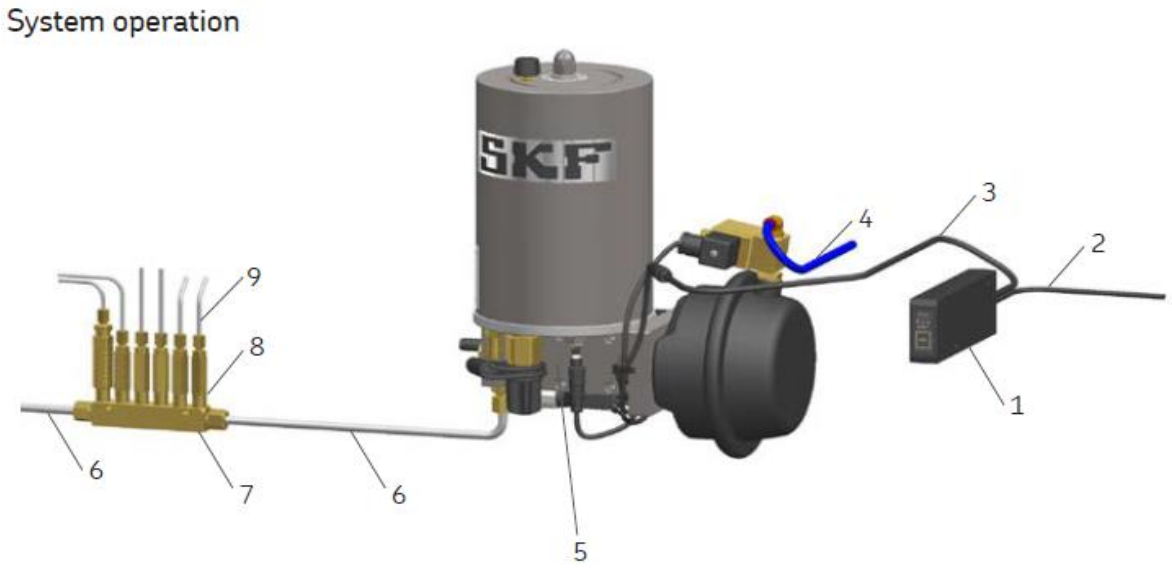
Please read and follow the general and safety instructions included in this manual.
Failure to follow these instructions may result in serious injury or damage to the lubrication system or the lubricated equipment.

3.2 System operation

SKF products operate largely automatically. The activities required during normal operation are limited primarily to checking the pump for damage and proper functioning.

The system's operation is controlled by a control centre, such as the ST-102 (1), which activates the pump at predetermined intervals. At the start of a lubrication cycle, a control impulse from the control centre opens a solenoid valve, allowing pressurised air to flow into the pump (5), increasing the pressure in the piping. When the pressure in the header piping (6) increases, pressure-forced piston dosers (8) inject a predetermined dose of lubricant through the lubrication tube or hose (9) to the lubrication point. At the end of the pressurisation stage, the control centre reverts the pump to its rest position, and both the pump and the doser are filled with lubricant for the next stroke. The control centre receives power through a 24 V DC power supply cable (2). There is also a control cable (3) between the control centre and the pump.

Fig. 2

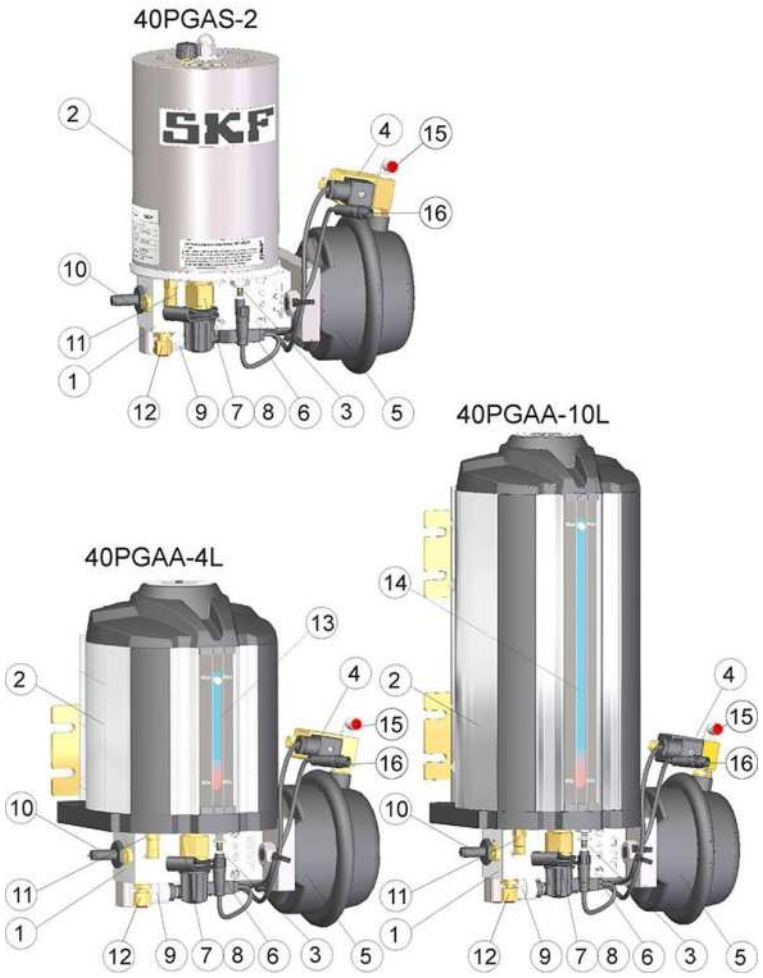


System operation

1. Control centre, e.g. ST-102 or ST-102P
2. 24 V DC power cable
3. Control cable
4. Pressurised air supply hose
5. Pump unit 40PGA
6. Header tube or hose
7. Mounting rail
8. B doser
9. Lubrication tube or hose

3.3 Main components

Fig. 3



Main pumping unit components (Figure 3):
1. Body
2. Lubricant reservoir

The body assembly includes:
3. Low level switch
4. Solenoid valve
5. Pneumatic actuator
6. M12 branch cable
7. Filling connector
8. Filling filter
9. Pressure switch
10. Discharge valve
11. Overfill relief valve
12. Lubricant outlet
13. Visual level indicator – 4 l reservoir
14. Visual level indicator – 10 l reservoir
15. Pneumatic inlet connector
16. M12 electrical connection

3.4 Connections

Outputs
• Lubricant outlet, Ø 8 mm
(Figure 3, item 12), thread: G 1/4"

Inputs
• Pressurised air inlet connector (Figure 3, item 15), 1 pc, Ø 8 mm
nylon tube, barbed insert fitting

Electrical connections
• Electrical connection, M12 (Figure 3, item 16)

3.5 Pneumatic connection

NOTICE

Compressed air
Do not exceed the maximum admissible air pressure and air volume. Before making the connection, ensure that the air valve of the filter regulator lubricator is closed.

NOTICE

Connect the compressed air in such way that no forces are transferred to the product (tension-free connection).

3.6 Electrical connections

⚠ WARNING

Electrical shock
Please remember to unplug the products before any work on electrical components.

NOTICE

When making connections, make sure there is no tension on the wires.

Fig. 4

M12 connection

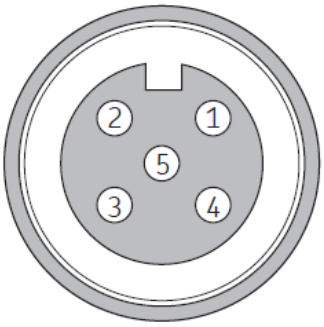


Table 3

M12 connection

M12 pin	Cable wire colours	Description	
1	Brown	Low limit	12V / 24V DC
2	White	Valve control	12V / 24V DC
3	Blue	Pressure switch	12V / 24V DC
4	Black	Protective Earth and Neutral	0V DC
5		Not connected	

4. Technical data

4.1 Technical specification

Table 4

General technical data	
Ambient temperature	-30°C - +70°C
Maximum air pressure	10 bar
Normal operating pressure	4-8 bar
Pressure ratio	16:1
Maximum lubricant pressure	150 bar
Pump capacity	40 cc per stroke
Reservoir volume	2, 4, 10 liter
Body material	
2 l lubricant reservoir	Steel
4 l and 10 l lubricant reservoir	Aluminium
Approved lubricants	NLGI 000-NLGI 1
Degrees of protection	IP65

Electrical data	
Rated voltage	12 VDC 24 VDC
Max. power consumption	8 W

4.2 Type identification code

Table 5

Type indentification code

40PGA-A-B-C-D	Abbreviation	Description
A:	40PGA	The SKF 40 PGAS pump
B:	S	Stainless steel reservoir
	A	Aluminium reservoir
C:	2	Lubricant reservoir volume 2 l
	4	Lubricant reservoir volume 4 l
	10	Lubricant reservoir volume 10 l
D:	12	Power input: 12 V
	24	Power input: 24 V
E:	PS	Integrated pressure switch

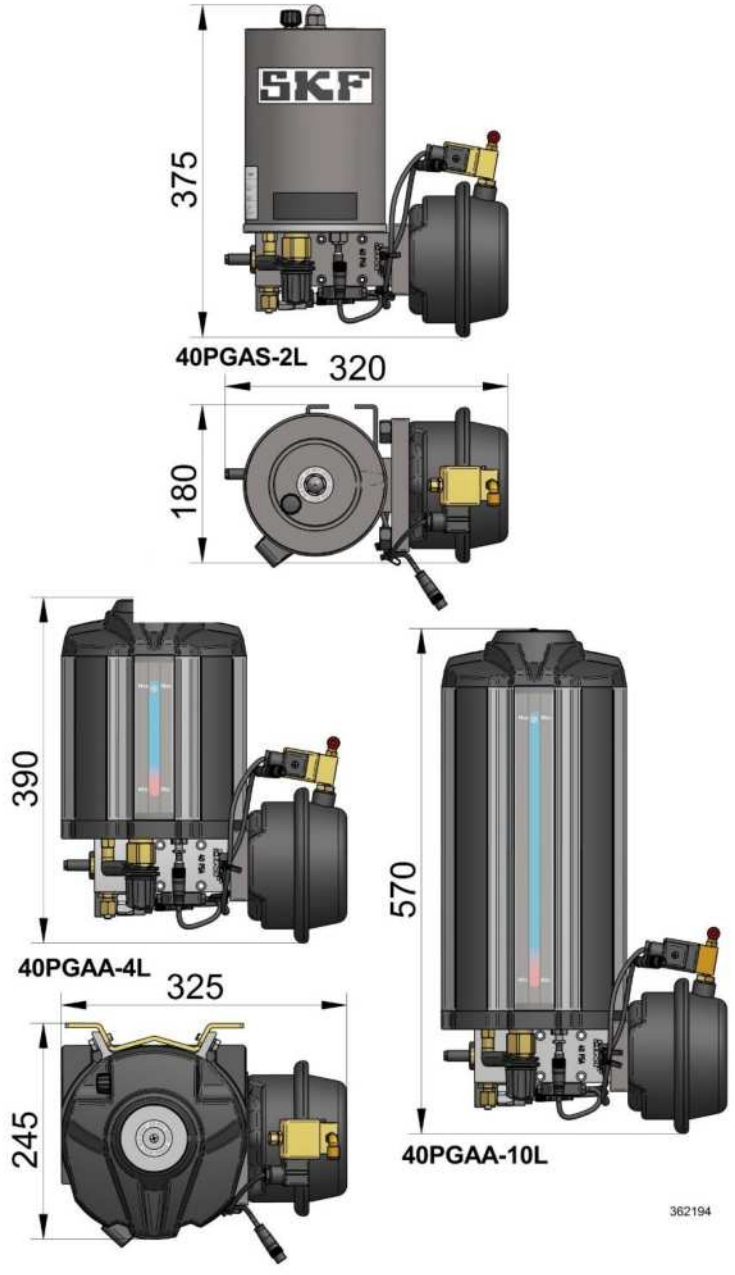
4.2.1 Dimensions and weight

Table 6

Dimensions and weight

Pump	Width	Height	Depth	Weight
40PGAS-2L	320	375	180	9.6 kg
40PGAA-4L	325	390	245	14.3 kg
40PGAA-10L	325	570	245	17.3 kg

Fig. 5



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. 6

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 its power source.
- Switch on the pump and run it until about 4 ccm of lubricant comes out of every outlet.
- Disconnect the pump from its power source.
- Remove and dispose of the lubricant that came out.

Metering devices:
- Remove all connecting lines and, if necessary, plug screws.
- Connect the pump containing fresh lubricant suitable for the intended purpose to the metering device manifold in such a way that the metering device manifold connection on the opposite side is open.
- Run the pump until fresh lubricant is discharged at the metering device manifold.
- Remove the discharged lubricant.
- Reinstall the plug screws and connecting lines.

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

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. Installation

6.1 General information

Only qualified technical personnel may install the products described in these Instructions.

During assembly, pay attention to the following:

- Be careful not to damage other devices during installation.
- The product must not be installed within the range of moving parts.
- The product must be installed at an adequate distance from sources of heat and cold.
- Observe the product's IP protection class when selecting the installation position.
- Make sure that all of the pump’s visual indicators, such as the MIN/MAX reservoir markings and the low level sensor indicator, are fully visible.
- Observe the prescriptions concerning the installation position in chapter 5: Technical data.

6.2 Installation position

Protect the product against humidity, dust and vibrations and install it in an easily accessible position to ensure all other installation work can be carried out without any problem.

6.3 Minimum assembly dimensions

Make sure there is sufficient space for product maintenance and possible disassembly by adding a clearance of at least 50 mm to each of the stated dimensions.

6.4 Mounting

Fasten the pumps 40PGAS with four M6 screws, 40PGAA-4L with four M8 screws and 40PGAA-10L with eight M8 screws. The minimum allowable property class for the fastening screws is 8.8.

Fig. 7

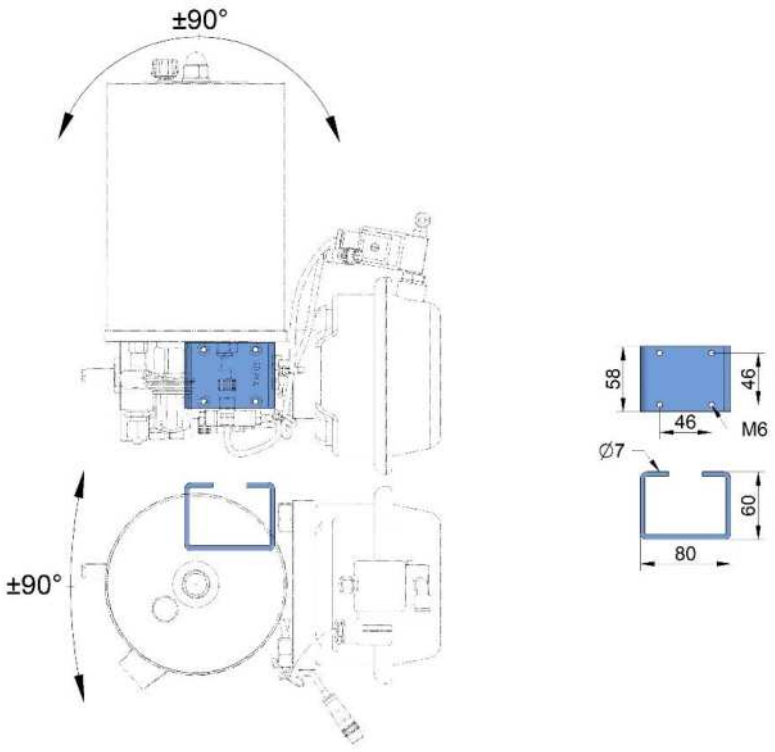
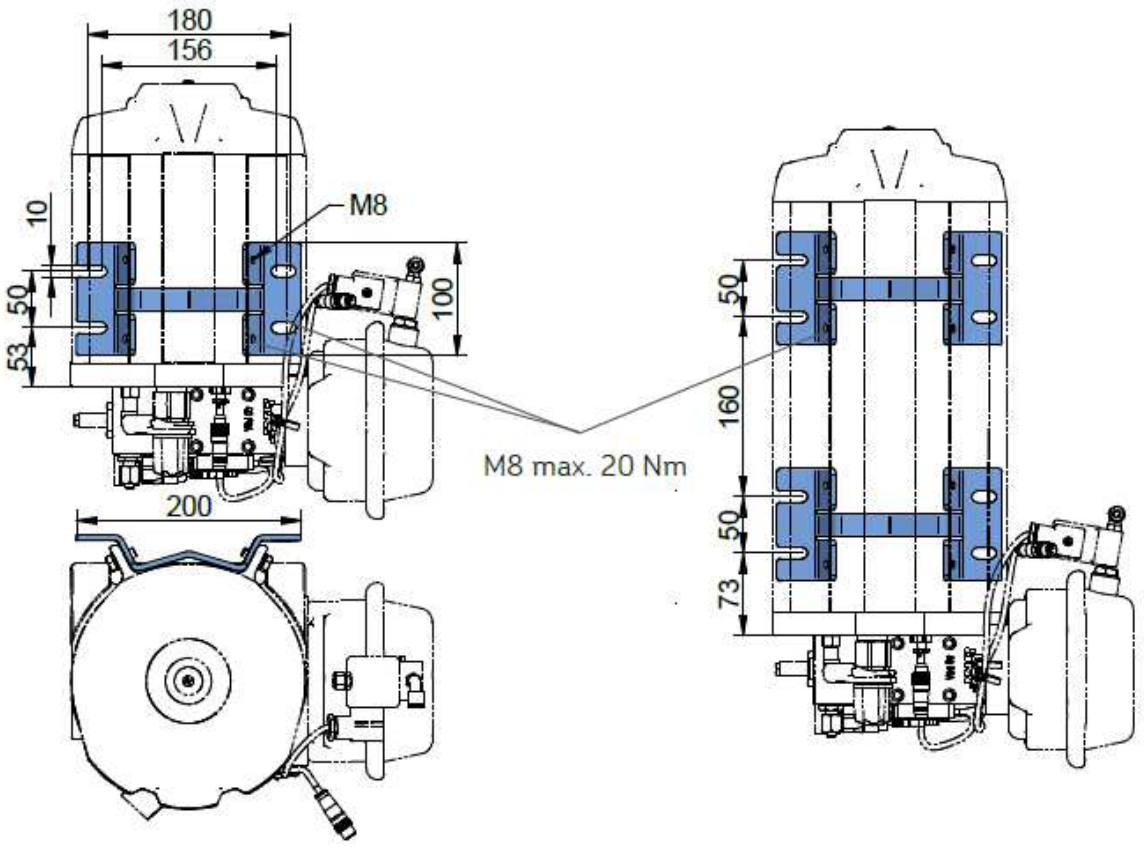


Fig. 8

Installation details and tightening torques for 40PGAA



6.5 Lubrication line connection

⚠ CAUTION

Risk of falling
Exercise care when dealing with lubricants. Bind and remove spilled or leaked lubricants immediately.

NOTICE

Connect lubrication lines in such a way that no forces are transferred to the product (tension free connection).

All components of the centralised lubrication system must be able to withstand:
- maximum pressure during pressurization
- the system's design temperature range
- the output volume and the lubricant to be supplied

Observe the following installation instructions for safe and smooth operation:
- Use clean components and primed lubrication lines only.
- Lubrication lines shall generally be laid in such a way that no air pockets can be formed at any point.
- Avoid installing sharp elbows, angle valves, gaskets protruding to the inside or any structures which increase or decrease the cross-section of the line, as these may impede lubricant flow. If changing the cross-section of a lubrication line cannot be avoided, make the transition as smooth as possible.

7. First start-up

In order to warrant safety and function, a person assigned by the operator must carry out the following inspections. Immediately eliminate detected deficiencies. Deficiencies may be remedied by an authorized and qualified specialist only.

Checklist Start-up Table 7

7.1 Inspections prior to initial start-up

	YES	NO
Electrical connection carried out correctly	☐	☐
Mechanical connection carried out correctly	☐	☐
Pneumatic connection carried out correctly	☐	☐
The performance data of the previously indicated connections correspond to the specifications stated in the Technical data	☐	☐
All components, such as lubrication lines and metering devices, have been correctly installed	☐	☐
No visible damage, contamination and corrosion	☐	☐
Any dismantled protection and monitoring equipment have been reassembled and checked for correct function	☐	☐
All safety-relevant markings on the product are available and in proper condition	☐	☐

7.2 Inspections during initial start-up

No unusual noises, vibrations, accumulation of moisture, or odors present	☐	☐
No unwanted escape of lubricant (leakages) from connections	☐	☐
Lubricant is supplied free from bubbles	☐	☐
Bearings and friction points are provided with the planned amount of lubricant	☐	☐

8. Operation

8.1 Filling the lubricant reservoir

NOTICE

Filter of the filling connector has to be cleaned regularly and replaced if necessary. Cleaning and replacing has to be performed when the reservoir is empty.

NOTICE

To avoid air bubbles in the reservoir, pump gently when filling the reservoir.

NOTICE

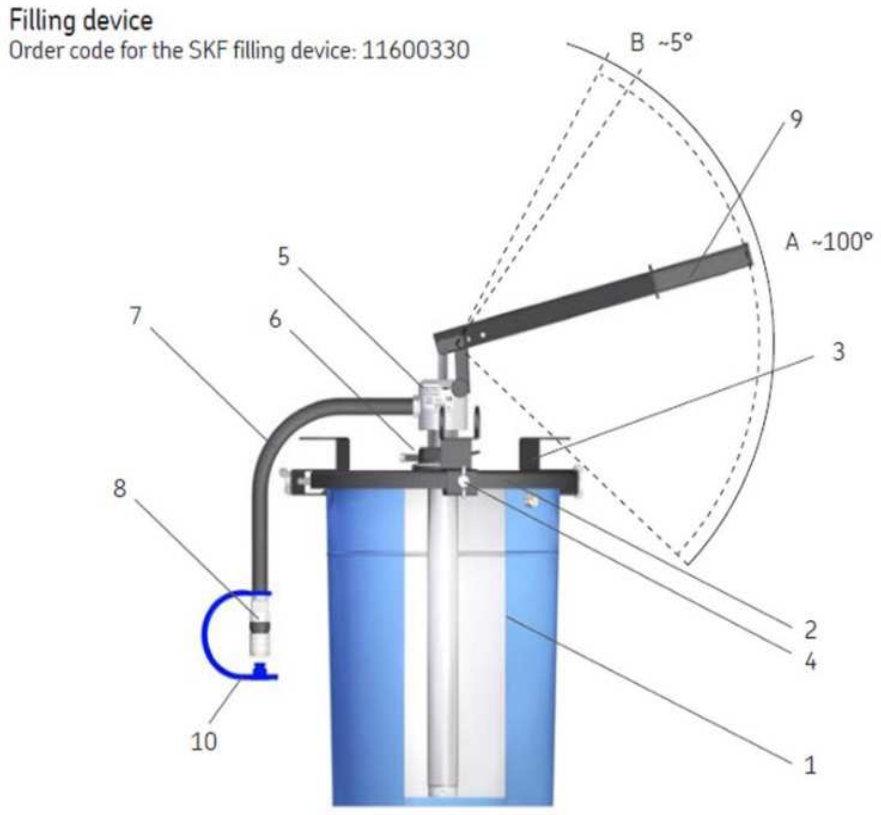
Do not fill the reservoir of the 40PGA pump using a pneumatic filling device due to high output and pressure.

⚠ CAUTION

Risk of falling
Exercise care when dealing with lubricants. Bind and remove spilled or leaked lubricants immediately.

8.2 Using a refilling device

Fig. 9

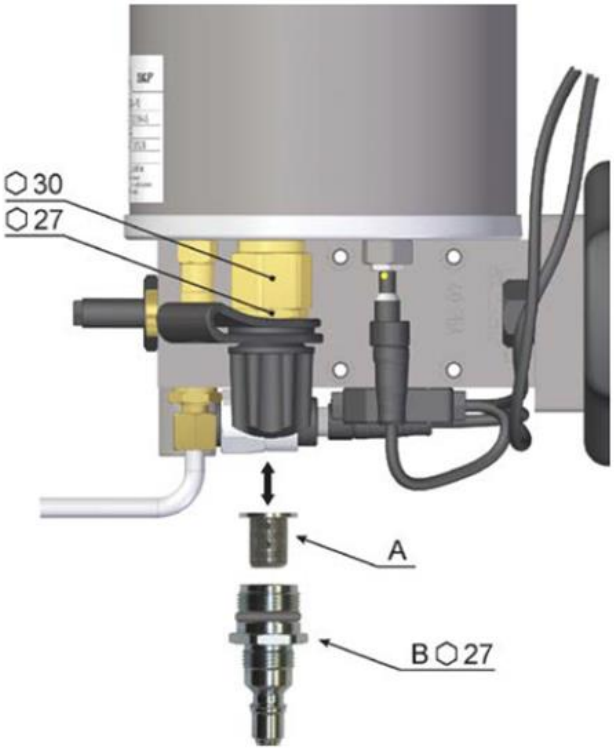


1. Make sure that the area surrounding of the pumping unit is clean. Impurities in the system prevent trouble-free operation and cause damage at the lubrication point.
2. Remove the lubricant barrel's (1) original lid.
3. Place the lid (2) on top of the lubricant barrel. Using fasteners (3) and wing screws (4), fasten the lid onto the lubricant barrel.
4. Pass the pump (5) through the suction port at the centre of the lid (6).
5. Connect the lubricant hose (7) to the pump.
6. Fill the lubricant hose by pumping by hand.
7. Connect the quick connector (8) to the lubricant hose.
8. Connect the quick connector to the pumping unit filling connector.
9. Fill the lubricant reservoir of the pumping unit by pumping slowly by hand (A).
10. To prevent overfilling, the pumping unit is equipped with a safety valve.
11. Turn the pump handle (9) to an upright position (B), allowing the pressure to discharge to the lubricant barrel.
12. Disconnect the quick connector from the pumping unit filling connector.
13. Fasten the protective cap onto the pumping unit filling connector.
14. Fasten the protective cap (10) onto the filling device quick connector.
15. Coil the hose onto the three fasteners (3).
16. If there are problems when filling the reservoir, it is likely that impurities in the grease have clogged the filter (A) connected to the filling nipple. Remove the filter by unscrewing the filling connector from the body as shown in figure 10 and clean or replace the filter. It is recommended that the filter be cleaned or replaced twice a year.

Barrel pump
• Suitable for pumping NLGI-000...NLGI-1
greases
• Output: approximately 25 cm3 per stroke
• Suitable for 18 kg barrels

Fig. 10

Filling connector



The figure shows the filling inlet screwed off the body (AV 30 and AV27), filter (A) and filling inlet (B).

8.3 Bleeding the 40PGA pump unit of air

If there are air bubbles in the pump, the lubricant pressure in the header will not reach sufficient levels.

To bleed the pump of air:

1. Disconnect the header tube from the pump outlet.
2. Start the pump.
3. Keep restarting the pump until no air bubbles come out of the pump.
4. Reconnect the header tube to the pump outlet.

8.4 Priming the header piping and bleeding it of air

To prime the header piping and then bleed it of air:

1. Remove the mounting rail stopper plugs.
2. Run the pump until no air bubbles come out of the stopper plug openings.
3. Reinstall the stopper plugs starting from the plugs closest to the pump.
4. Make sure the lubricant reservoir does not run dry in the process. Once bleeding is complete, refill the reservoir if necessary.

8.5 Lubrication tubes and hoses

Before installation, prime all lubrication tubes or hoses using a grease gun. If required, also apply grease to the lubrication point.

8.6 Cleanliness

Absolute cleanliness must be observed when installing, adjusting or servicing the system. If you suspect that the header piping or lubrication tubes or hoses have been contaminated, remove all stopper plugs or connectors and pump lubricant through the system until all impurities have been purged from the header piping.

9. Maintenance and repair

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.

Checklist Maintenance Table 8

Activity to be done	YES	NO
Electrical connection carried out correctly	☐	☐
Mechanical connection carried out correctly	☐	☐
Pneumatic connections carried out correctly	☐	☐
The performance data of the previously indicated connections correspond to the specifications stated in the Technical data	☐	☐
All components, such as lubrication lines and metering devices, have been correctly installed	☐	☐
No visible damage, contamination and corrosion	☐	☐
Any dismantled protection and monitoring equipment has been reassembled and checked for correct function	☐	☐
Any warning labels on the product are present and in proper condition	☐	☐
No unusual noises, vibrations, accumulation of moisture, or odors present	☐	☐
No unwanted escape of lubricant (leakages) from connections	☐	☐
Lubricant is supplied free from bubbles	☐	☐
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.

10.4 Cleaning the filter of the filling connection

Impurities in the lubricant may cause the pump unit or dosers to malfunction or damage lubrication points. The pump unit is equipped with a filter (Figure 10 item A) to prevent impurities from entering the system. The filter must be cleaned twice a year. A good indication of a clogged filling filter is that filling takes longer than usual.

After cleaning the filter, fill the filter housing with grease and place the filter back in its place. Lubricant pipes or hoses from dosers to lubrication points run unshielded in areas and are exposed to damage. Check daily that the pipes or hoses are intact and lubricant
reaches all lubrication points. When the system has been operational for some weeks, you should check again all lubrication points.
If required, the lubrication interval can be increased or decreased from the ST102 control centre. This adjustment should be conducted after several weeks or months, finally finding the exact lubricant volume for all operating conditions.

11. Faults, causes, and remedies

11.1 Troubleshooting

⚠ CAUTION

Before troubleshooting the following malfunctions, disconnect the control cable from the pump and depressurise the system. Any residual pressure in the system when opening or disconnecting components may cause components or lubricant to cause injury to people or damage to the environment.

Table 9

Fault table

Description of malfunction	Cause of malfunction	Remedy
The pump does not start.	Pressurised air has been cut off.	Open the pressurised air inlet.
	Insufficient air pressure.	Check that the pressure is 6–8 bar. Check the pressure air supply hoses for Leaks.
	The supply voltage is not on.	Check that the supply voltage has been switched on in the control centre.
The pump starts but pressure Does not increase.	Insufficient air pressure.	Check that the air pressure is approximately 6–8 bar.
	There is air in the pump's piping.	Bleed the system of air.
	Lubricant reservoir is empty.	Add lubricant.
	There is air in the lubricant reservoir or lubricant.	Empty the reservoir, refill with new grease.
	Lubricant viscosity is too high (in cold conditions).	Check lubricant viscosity, replace if necessary (NLGI-000...NLGI-1).
	Filling the pump with a manual filling device fails (pumping is too heavy).	Check and clean the filling inlet filter.
	N.A.	Contact your Oy SKF Ab representative.

11.2 Functional component testing

11.2.1 Pumping unit 40PGA

Remove the plug or connector closest to the pump from the header tube and press the extra lubrication button. The pump should complete a working stroke and inject a lubricant dose corresponding to its displacement (40 cm³) through the opened connection.

11.2.2 Solenoid valve 40PGA

Check that the control centre receives power. Press the “Extra lubrication” button and check whether pressurised air is discharged at the end of the predetermined pressurization cycle through the solenoid valve’s discharge opening. If pressure is not discharged, the solenoid valve is defective. The system can also be used manually by turning the valve’s manual activation screw with a screwdriver half a turn clockwise and, after pressurisation, back to its original position.

11.2.3 Alarm system – pressure switch

The pressure alarm switch monitors pressure changes in the header piping. If the pressure does not increase and decrease, the control centre generates an alarm. Remove the plug next to the discharge valve (Figure 3 item 10). Press the Extra lubrication button. Wait until the pressurization time is complete. The indicator for line 1 should start flashing. Close the opened plug, press the extra lubrication button and check that the indicator for line 1 stops flashing.

11.2.4 Alarm system – reservoir low level switch

Press the Extra lubrication button and check that the P indicator and the low level switch indicator remain unlit.

11.3 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

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.

13. Spare parts and accessories

⚠ CAUTION

Repair or maintenance work may be carried out only with the spare parts and accessories offered by SKF for the respective product. Spare parts may be used exclusively for replacement of identical defective parts. Modifications with spare parts on existing products are not allowed.

13.1 Order codes

Table 10

Order codes

Designation	Order code
40PGAS-2L-12V-PS	11390444
40PGAS-2L-24V-PS	11390445
40PGAA-4L-24V-PS	11390431
40PGAA-10L-24V-PS	11390441
ST-102 V 2.0 CONTROL CENTRE	11500610
ST-102P-PS CONTROL CENTRE	11500608
INSTALLATION BRACKET	11400020
FASTENING KIT	11390562

Fig. 11

Installation bracket and Fastening kit

*) Fastening kit includes:
Allen screw M6x60, 4 pcs
Hex screw M6x20, 4 pcs
Nut M6, 4 pcs

13.2 Spare parts

Fig. 12

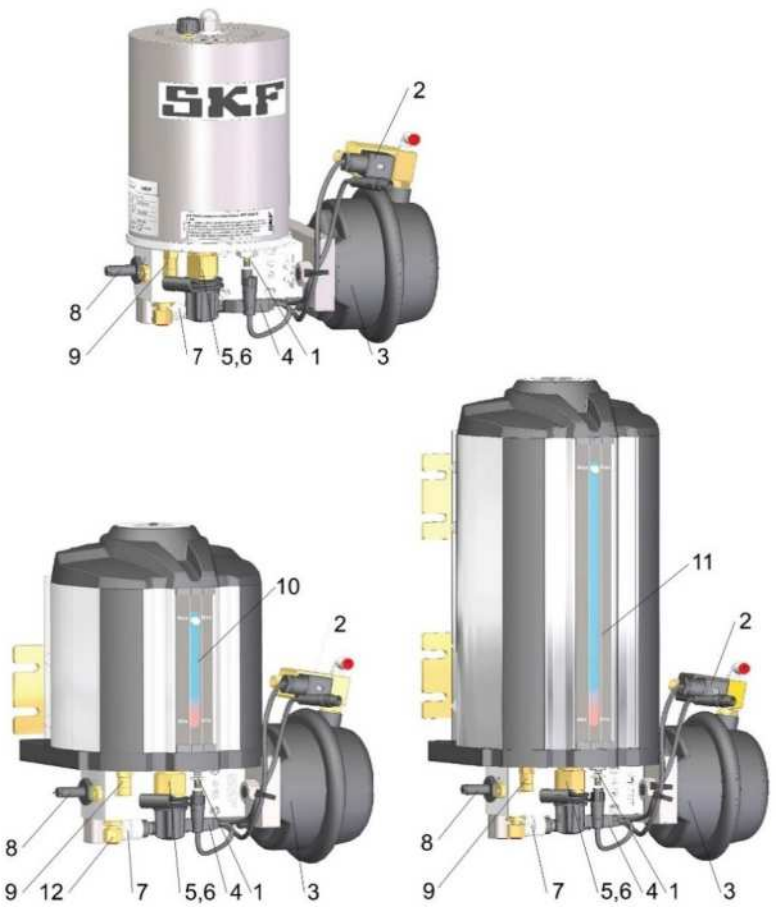


Table 11

Spare parts

Item	Description	Order code
1	Low level switch	10543528
2	Solenoid valve 24 V Solenoid valve 12 V	11601420 11601421
3	Pneumatic actuator	11770250
4	M12 branch cable	11500194
5	Filling connector	11770460
6	Filling filter	11770415
7	Pressure switch	11601477
8	Discharge valve	11390730
9	Overfill relief valve	11770490
10	Visual Level indicator – 4 l reservoir	11771545
11	Visual Level indicator – 10 l reservoir	11771548

13.3 Accessories

Fig. 13

Table 12

SKF 40 PGA accessories

Item	Description	Order code
15	ST-102 V 2.0 CONTROL CENTRE	11500610
16	ST-102P-PS CONTROL CENTRE	11500608
17	SKF-40PGAS-PS-ST102 INSTALLATION KIT	11500192

14. Appendix

14.1 China RoHS Table

Table 13

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.)