

ContiMaster
Hydraulically driven barrel pump

Assembly instructions
following machinery directive 2006/42/EC

EN



951-171-035-EN
Version 02
2017/10/27



EC Declaration of incorporation following machinery directive 2006/42/EC, annex II, part 1 B

The manufacturer, SKF Lubrication Systems Germany GmbH, Walldorf Facilities, Heinrich-Hertz-Straße 2-8, D - 69190 Walldorf, hereby declares that the partly completed machinery

Designation: Hydraulically driven barrel pump to supply lubricants
Type: ContiMaster
Part number: 509-60333-1-L
Year of construction: See type identification plate

complies with the following basic safety and health requirements of the EC machinery directive 2006/42/EC at the time when first being launched in the market.

1.1.2 · 1.1.3 · 1.3.2 · 1.3.4 · 1.3.7 · 1.3.8.2 · 1.5.3 · 1.5.6 · 1.5.8 · 1.6.1 · 1.7.1 · 1.7.2 · 1.7.3

The special technical documents were prepared following Annex VII part B of this directive. Upon justifiable request, these special technical documents can be forwarded electronically to the respective national authorities. The person empowered to assemble the technical documentation on behalf of the manufacturer is the head of standardization, See manufacturer's address.

Standard	Edition
DIN EN ISO 12100	2011
DIN EN ISO 809	2012

The partly completed machinery must not be put into service until the final machinery into which it is to be incorporated has been declared in conformity with the provisions of machinery directive 2006/42/EC and any other applicable directives.

Walldorf, October 27, 2017

Jürgen Kreutzkämper
Manager R&D Germany
SKF Lubrication Business Unit



Stefan Schürmann
Manager R&D Hockenheim/Walldorf
SKF Lubrication Business Unit



Legal disclosure

Manufacturer

SKF Lubrication Systems Germany GmbH

Manufacturer's facilities

Head Office

Walldorf Facilities

Heinrich-Hertz-Str. 2-8

69190 Walldorf

Germany

Phone +49 (0) 6227 33-0

Fax: +49 (0) 6227 33-259

Berlin Facilities

Motzener Straße 35/37

12277 Berlin

Germany

Phone +49 (0)30 72002-0

Fax +49 (0)30 72002-111

www.skf.com/lubrication

Hockenheim Facilities

2. Industriestraße 4

68766 Hockenheim

Germany

Phone +49 (0)62 05 27-0

Fax +49 (0)62 05 27-101

E-mail: Lubrication-germany@skf.com

www.skf.com/lubrication

Training courses

In order to provide a maximum of safety and economic viability, SKF carries out detailed training courses. It is recommended that the training courses are attended. For more information please contact the respective SKF Service address.

Copyright

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Warranty

The instructions do not contain any information on the warranty. This can be found in our general terms and conditions.

Disclaimer

The manufacturer shall not be held responsible for damages caused by:

- Non appropriate use
faulty assembly, operation, setting, maintenance, repair or accidents
- Use of inappropriate lubricants
- Improper or late response to malfunctions
- Unauthorized modifications of the product
- Intent or negligence
- Use of non-original SKF spare parts

Liability for loss or damage resulting from the use of our products is limited to the maximum purchase price. Liability for consequential damages of whatever kind is excluded.

Table of contents

EC Declaration of incorporation following machinery directive 2006/42/EC, annex II, part 1 B	2
Legal disclosure	3
Explanation of symbols, signs and abbreviations	6

1. Safety instructions	8
1.1 General safety instructions	8
1.2 General behaviour when handling the product	8
1.3 Intended use	9
1.4 Foreseeable misuse	9
1.5 Reference on Pressure Equipment Directive 2014/68/EU	10
1.6 Modifications of the product	10
1.7 Prohibition of certain activities	10
1.8 Inspections prior to delivery	10
1.9 Other applicable documents	10
1.10 Markings on the product	11
1.11 Notes related to the type identification plate	11
1.12 Persons authorized to operate the pump	12
1.12.1 Operator	12
1.12.2 Specialist in mechanics	12
1.12.3 Specialist in electrics	12
1.13 Briefing of external technicians	12
1.14 Provision of personal protective equipment	12
1.15 Operation	12
1.16 Emergency stopping	12
1.17 Transport, installation, maintenance, malfunctions, repair, shutdown, disposal	13
1.18 Initial commissioning / daily start-up	14
1.19 Cleaning	14
1.20 Residual risks	15

2. Lubricants	16
2.1 General information	16
2.2 Selection of lubricants	16
2.3 Material compatibility	16
2.4 Temperature characteristics	16
2.5 Ageing of lubricants	17
3. Overview, functional description	18
4. Technical data	20
4.1 Mechanics	20
5. Delivery, returns, and storage	22
5.1 Delivery	22
5.2 Returns	22
5.3 Storage	22
6. Installation	23
6.1 General information	23
6.2 Place of installation	23
6.3 Minimum assembly dimensions	24
6.4 Adjusting the volumetric flow rate	25
6.5 Adjusting the hydraulic inlet pressure	26

7.	Initial start-up	27	13.	Shutdown and disposal.....	46
7.1	Inspections prior to initial start-up	27	13.1	Temporary shutdown	46
7.2	Inspections during initial start-up	27	13.2	Final shutdown and disassembly	46
8.	Operation	28	13.3	Disposal	46
9.	Cleaning.....	29	14.	Spare parts.....	47
9.1	Cleaning agents	29			
9.2	Exterior cleaning.....	29			
9.3	Interior cleaning.....	29			
10.	Maintenance	30			
11.	Troubleshooting	31			
12.	Repairs.....	32			
12.1	Safety instructions	32			
12.2	Tools and accessories	33			
12.3	Replacement of coupling/ Replacement of the coupling nut.....	34			
12.3.1	Disassembly	34			
12.3.2	Installation	36			
12.4	Replacement of the angled casings	38			
12.5	Replacement of the pump tube	39			
12.6	Replacement of pressure-reducing valve and flow control valve..	42			
12.7	Replacement of the oscillating cylinder	43			

Explanation of symbols, signs and abbreviations

The following abbreviations may be used within these instructions. Symbols within safety notes mark the kind and source of the hazard.

	General warning		Suspended load		Risk of falling		Hot surfaces
	Unintentional intake		Crushing hazard		Pressure injection		Cold surfaces
	Wear personal protective equipment (goggles)		Wear personal protective equipment (face shield)		Wear personal protective equipment (gloves)		Wear personal protective equipment (protective clothes)
	Wear personal protective equipment (safety shoes)		General obligation				
	Keep unauthorized persons away.						
	CE marking		Disposal, recycling				

	Warning level	Consequence	Probability	Symbol	Meaning
	DANGER	Death, serious injury	imminent	●	Chronological guidelines
	WARNING	Death, serious injury	possible	○	Lists
	CAUTION	Minor injury	possible		Refers to other facts, causes, or consequences
	NOTICE	Property damage	possible		

Abbreviations and conversion factors

re.	regarding	°C	degrees Celsius	°F	degrees Fahrenheit
approx.	approximately	K	Kelvin	Oz.	Ounce
i.e.	that is	N	Newton	fl. oz.	fluid ounce
etc.	et cetera	h	hour	in.	inch
poss.	possibly	s	second	psi	pounds per square inch
if appl.	if applicable	d	day	sq.in.	square inch
a.a.r.	as a rule	Nm	Newtonmeter	cu. in.	Cubic inch
incl.	including	ml	millilitre	mph	miles per hour
min.	minimum	ml/d	millilitre per day	rpm	revolutions per minute
max.	maximum	cc	cubic centimetre	gal.	gallon
min.	minute	mm	millimetre	lb.	pound
		l	litre	hp	horse power
e.g.	for example	dB (A)	Sound pressure level	kp	kilopond
kW	kilowatt	>	greater than	fpsec	feet per second
U	Voltage	<	less than	Conversion factors	
R	Resistance	±	plus/minus	Length	1 mm = 0.03937 in.
I	Current	Ø	Diameter	Area	1 cm ² = 0.155 sq.in
V	Volt	kg	Kilogram	Volume	1 ml = 0.0352 fl.oz.
W	watt	rh	relative humidity		1 l = 2.11416 pints (US)
AC	alternating current	≈	approximately	Mass	1 kg = 2.205 lbs
DC	direct current	=	equal to		1 g = 0.03527 oz.
A	ampere	%	per cent	Density	1 kg/cc = 8.3454 lb./gal(US)
Ah	Ampere hour	‰	per mille		1 kg/cc = 0.03613 lb./cu.in.
Hz	Frequency [Hertz]	≥	greater than	Force	1 N = 0.10197 kp
nc	normally closed contact	≤	less than	Pressure	1 bar = 14.5 psi
no	normally open contact	mm ²	square millimetre	Temperature	°C = (°F-32) x 5/9
N/A	Not released	rpm	revolutions per minute	Output	1 kW = 1.34109 hp
				Acceleration	1 m/s ² = 3.28084 ft./s ²
				Speed	1 m/s = 3.28084 fpsec.
					1 m/s = 2.23694 mph

1. Safety instructions

1.1 General safety instructions

- The owner must ensure that safety information has been read by any persons entrusted with works on the product or by those persons who supervise or instruct the before-mentioned group of persons. In addition, the owner must also ensure that the relevant personnel are fully familiar with and have understood the contents of the Instructions. It is prohibited to commission or operate the product prior to reading the Instructions.
- These Instructions must be kept for further use.
- The described products were manufactured according to the state of the art. Risks may, however, arise from a usage not according to the intended purpose and may result in harm to persons or damage to material assets.
- Any malfunctions which may affect safety must be remedied immediately. In addition to these Instructions, general statutory regulations for accident prevention and environmental protection must be observed.

1.2 General behaviour when handling the product

- Keep unauthorized persons away.
- Wear personal protective equipment always.
- All relevant persons must be informed of the activity prior to starting any work. Observe the precautionary operational measures and work instructions.
- The product may be used only in awareness of the potential dangers, in proper technical condition, and according to the information in these instructions.
- Familiarize yourself with the functions and operation of the product. The specified assembly and operating steps and their sequences must be observed.
- Any unclear points regarding proper condition or correct assembly/operation must be clarified. Operation is prohibited until issues have been clarified.
- Precautionary operational measures and instructions for the respective work must be observed.
- Responsibilities for different activities must be clearly defined and 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 be checked for correct function.
- Never use parts of the centralized lubrication system or of the machine as standing or climbing aids.

- Remedy occurring faults in the frame of responsibilities. Immediately inform your superior in the case of faults beyond your competence.

1.3 Intended use

Supply of lubricants within a centralized lubrication system following the specifications, technical data and limits stated in these Instructions:

Usage is allowed exclusively for professional users in the frame of commercial and economic activities.

1.4 Foreseeable misuse

Any usage differing from the one stated in these Instructions is strictly prohibited, particularly a usage:

- outside the indicated temperature range
- with non-specified means of operation
- without pressure-reducing valve and flow-control valve
- in areas with aggressive or corrosive materials (e.g. high ozone pollution)
- in areas with harmful radiation (e. g. ionising radiation)
- to supply, transport, or store hazardous substances and mixtures in accordance with annex I part 2-5 of the CLP regulation (EG 1272/2008) and marked with GHS01 - GHS06 and GHS08 hazard pictograms.
- to feed, forward, or store gases, liquefied gases, dissolved gases, vapours, or fluids whose vapour pressure exceeds normal atmospheric pressure (1013 mbar) by more than 0.5 bar at the maximum permissible operating temperature.
- in an explosion protection zone

1.5 Reference on Pressure Equipment Directive 014/68/EU

Because of its performance data the product does not achieve the limit values defined in Article 4 (1) (a) (i) and is therefore excluded from the scope of application of Pressure Equipment Directive 2014/68/EU following Article 4 (3).

1.6 Modifications of the product

Unauthorized conversions or modifications may result in unforeseeable impacts on safety. Therefore, any unauthorized conversions or modifications are expressly prohibited.

1.7 Prohibition of certain activities

Due to potential sources of faults that may not be visible or due to legal regulations the following activities may be carried out by manufacturer specialists or authorized persons only:

- Repairs or changes to the drive exceeding replacement in case of defects

1.8 Inspections prior to delivery

The following inspections were carried out prior to delivery:

- Safety and functional tests

1.9 Other applicable documents

In addition to these instructions, the following documents must be observed by the respective target group:

- Operational instructions and approval rules
- Safety data sheet of the lubricant used

Where appropriate:

- Project planning documents
- Additional information on special versions of the pump. You will find these in the special system documentation.
- Any documents of other components required to set up the centralized lubrication system

1.10 Markings on the product



Warning of unintentional intake

CAUTION

**PUMP PRIMING PLUG
NOT FOR RELIEVING
SYSTEM PRESSURE**

Vorsicht

Der Befüllanschluss
der Pumpe darf
nicht zur Druckent-
lastung benutzt
werden.

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 or GHS), where appropriate.

1.11 Notes related to the type identification plate

The type identification plate states important characteristics such as type designation, order number, and regulatory characteristics.

To ensure that the loss of data due to an illegible type identification plate is avoided, the characteristics should be entered in the Instructions.

Model: _____

P. No. _____

Ident. No. _____

Series _____

Supplier No. _____

(KW/JJJJ) _____

Calendar week/year of construction

LIEBHERR

Contimaster Grease pump

P-No.: 1234567890

Ident.-No.: 1234567890

KW/JJJJ

Series: 1234567890

Supplier-No.: 99154

1.12 Persons authorized to operate the pump

1.12.1 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.

1.12.2 Specialist in mechanics

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

1.12.3 Specialist in electrics

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

1.13 Briefing of external technicians

Prior to commencing the activities, external technicians must be informed by the operator of the company safety provisions, the applicable accident prevention regulations to be maintained, and the functions of the superordinate machine and its protective devices.

1.14 Provision of personal protective equipment

The operator must provide suitable personal protective equipment for the respective location of operation and the purpose of operation.

1.15 Operation

The following must be observed during commissioning and operation.

- Any information within this manual and the information within the referenced documents.
- All laws and regulations to be complied with by the user.

1.16 Emergency stopping

In case of an emergency stop the pump station by:

- Interrupting the hydraulic supply of the pump
- Where appropriate, by other measures to be determined by the operator.

1.17 Transport, installation, maintenance, malfunctions, repair, shutdown, disposal

- All relevant persons must be informed of the activity prior to starting any work. Observe the precautionary operational measures and work instructions.
- Carry out transport using suitable transport and hoisting equipment on suitable ways only.
- Maintenance and repair work can be subject to restrictions at low or high temperatures (e.g. changed flow properties of the lubricant). Therefore, where possible, try to carry out maintenance and repair work at room temperature.
- Ensure through suitable measures that movable or detached parts are immobilized during the work and that no limbs can be caught in between by inadvertent movements.
- Assemble the product only outside of the operating range of moving parts, at an adequate distance from sources of heat or cold. Other units of the machine or vehicle must not be damaged or impaired in their function by the installation.
- Observe possible abrasion points. Protect the parts accordingly.

- All components used must be designed according to the maximum operating pressure and the maximum respectively minimum operating temperature.
- No parts of the centralized lubrication system may be subjected to torsion, shear, or bending.
- Check all parts prior to their usage for contamination and clean, if necessary.
- Lubricant lines must be primed with lubricant prior to installation. This makes the subsequent ventilation of the system easier.
- Observe the specified tightening torques. When tightening, use a calibrated torque wrench.
- When working with heavy parts use suitable lifting tools.
- Avoid mixing up or wrong assembly of dismantled parts. Mark these parts accordingly.

1.18 Initial commissioning / daily start-up

Ensure that:

- All safety devices are completely available and functional
- All connections are correctly connected
- All parts are correctly installed
- All warning labels on the product are present completely, highly visible and undamaged
- Illegible or missing warning labels are to be replaced without delay

1.19 Cleaning

- Risk of fire and explosion when using inflammable cleaning agents. Only use non-flammable cleaning agents suitable for the purpose.
- Do not use aggressive cleaning agents.
- Thoroughly remove residues of cleaning agents from the product.
- Steam jet and high pressure cleaners must not be used for direct cleaning of gaskets and flexible parts of the product.
- Mark damp areas accordingly.

1.20 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 filling the reservoir and 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.
Burns / frostbite when having skin contact with the pump surface in case of pump operating temperatures > 60 °C or < -20 °C			C	D		F	G	If possible, do not operate pump in these temperature ranges. If this should not be possible: Label pump with corresponding warning label following ISO 7010 or DIN 4844-2 or take adequate measures to prevent touching. Let the pump cool down or heat up before maintenance or repair.
Life cycles: 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 used specifically for certain application purposes. In order to fulfil their tasks, lubricants must fulfil various requirements.

The most important requirements for lubricants are:

- Reduction of abrasion and wear
- Corrosion protection
- Noise minimisation
- protection against contamination or penetration of foreign objects
- Cooling (primarily with oils)
- longevity (physical/ chemical stability)
- economic and ecological aspects

2.2 Selection of lubricants

SKF considers lubricants to be an element of system design. A suitable lubricant is selected already when designing the machine and forms the basis for the planning of a centralized lubrication system.

The selection is made by the manufacturer or operator of the machine, preferably together with the lubricant supplier based on the requirement profile defined.

Should you have little or no experience with the selection of lubricants for centralized lubrication systems, please contact SKF.

If required we will be glad to support customers to select suitable components for feeding the selected lubricant and to plan and design their centralized lubrication system.

You will avoid possible downtimes through damage to your machine or system or damage to the centralized lubrication system.

2.3 Material compatibility

Lubricants must generally be compatible with the following materials:

- steel, grey iron, brass, copper, aluminium
- NBR, FPM, ABS, PA, PU

2.4 Temperature characteristics

The lubricant used must be suitable for the specific operating temperature of the product. The viscosity required for proper operation of the product must be adhered to and must not be exceeded in case of low temperatures nor fall below specification in case of high temperatures. Specified viscosities, see chapter Technical data.

2.5 Ageing of lubricants

After a prolonged downtime of the machine, the lubricant must be inspected prior to re-commissioning as to whether it is still suitable for use due to chemical or physical ageing. We recommend that you undertake this inspection already after a machine downtime of 1 week.

If doubts arise as to a further suitability of the lubricant, please replace it prior to re-commissioning and, if necessary, undertake initial lubrication by hand.

It is possible for lubricants to be tested in the company's laboratory for their suitability for being pumped in centralized lubrication systems (e.g. "bleeding").

Please contact SKF if you have further questions regarding lubricants.

You may request an overview of the lubricants tested by SKF.



Only lubricants specified for the product (see chapter Technical data) may be used. Unsuitable lubricants may lead to a failure of the product.



Do not mix lubricants. This may have unforeseeable effects on the usability and therefore on the function of the centralized lubrication system.



When handling lubricants the relevant safety data sheets and hazard designations, if any, on the packaging have to be observed.



Due to the multitude of possible additives, individual lubricants, which according to the manufacturer's data sheets fulfil the necessary specification, may not, in fact, be suitable for use in centralized lubrication systems (e.g. incompatibility between synthetic lubricants and materials). In order to avoid this, always use lubricants tested by SKF.

3. Overview, functional description

1 Oscillating cylinder

The oscillating cylinder is connected to the hydraulic system and drives the pump.

2 Flow control valve

The flow control valve serves to adjust the volume flow rate of the hydraulic oil flowing into the pump.

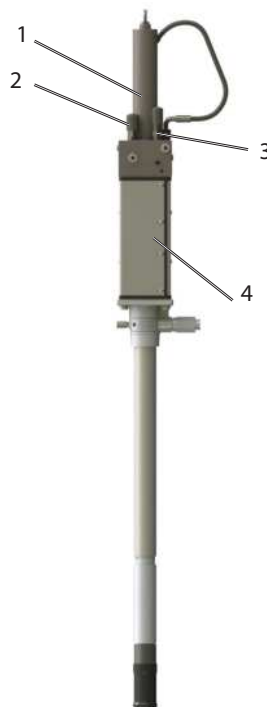
3 Pressure-reducing valve

The pressure-reducing valve serves to adjust the maximum pressure of the hydraulic oil flowing into the pump.

4 Casing

Covers the flexible part between the oscillating cylinder and the pump tube. The casing consists of two parts, each of which has an inspection window for function control purposes.

Overview, functional description Fig. 1



5 Pump tube

The lifting strokes of the oscillating cylinder are carried out by the pump tube as a supply motion.

6 Suction port

Serves to take in the lubricant.

During operation the suction port is in the material to be supplied.

7 Vent valve

Serves to remove air inclusions in the pump tube.

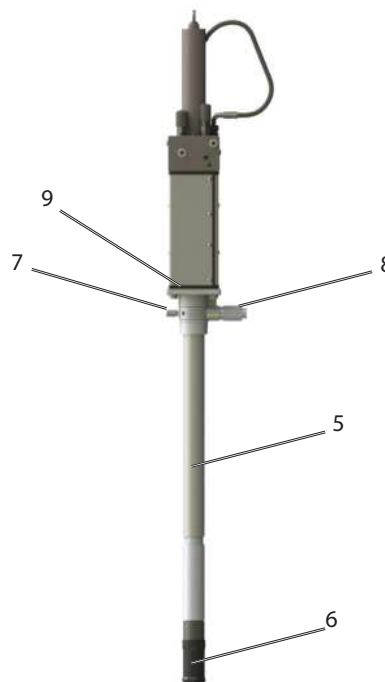
8 Connection fitting for supply material

Serves to connect the supply line.

9 Base plate

Serves to install the pump tube with the oscillating cylinder.

Overview, functional description Fig. 2



4. Technical data

4.1 Mechanics

Admissible operating temperature range of the pump

-40 °C to +80 °C



The specified operating temperature range of the pump presupposes the suitability of the lubricant or hydraulic oil used for the respective actually existing operating temperature. Using an unsuitable lubricant or hydraulic oil may result in malfunctions and even in a downtime of the lubrication system. Failure caused by the lubricant or the hydraulic oil may occur temporarily, e.g., if the application temperature stated for the lubricant or hydraulic oil for lubrication systems is exceeded or is not reached.

Lubricants	Lubricating greases of NLGI II
Admissible operating temperature range of hydraulic oil	+55 °C to +80 °C
Operating pressure of hydraulic oil	21 bar min. / 103 bar max. (factory setting 55 bar)
Ratio	10:1 (theoretically); 6,55:1 (practically)
Back pressure	320 bar max.
Installation position	Vertical ¹⁾ i.e. Oscillating cylinder on top
Consumption of hydraulic oil per double stroke	308 cc
Hydraulic connection inlet	G 3/8
Hydraulic connection outlet	G 3/8
Lubricant outlet	3/4" - 14 NPTF inner thread
Number of double strokes	12 min./ 16 max. per minute
Sound pressure level	< 85 dB (A)
Weight of the empty pump	approx. 25 kg
Nominal supply volume per double stroke	About 30 cc

The stated nominal outputs per double stroke refer to NLGI II lubricating greases at an operating temperature of + 20 °C. Deviating operating conditions result in a change of the actual output volume per time unit. If an adjustment should become necessary, for logical reasons it is made by adapting the operating pressure and the volume flow at the pressure control valve or the flow control valve.

ContiMaster pump tube				
Part number	Length ¹	Output ²	Material to be pumped ³	Version ⁴
509-60245-1-L	864	30	G	a
Legend				
1	=	Length in mm		
2	=	Output in cc (per double stroke)		
3	=	Material that can be pumped G = grease (special material only upon prior release by the pump manufacturer)		
4	=	Version a = shovel piston with plunger-in-bushing style piston b = shovel piston with packed pistons c = ball style valve (short form) / e = flat check valve		

5. Delivery, returns, and storage

5.1 Delivery

After receipt of the shipment, check the shipment for damage and completeness according to the shipping documents. Immediately report any transport damages to the forwarding agent.

Keep the packaging material until any discrepancies are resolved. During in-house transport ensure safe handling.

5.2 Returns

Clean all parts and pack them properly (i.e. following the regulations of the recipient country) before returning them.

Protect the product against mechanical influences such as impacts. There are no restrictions for land, sea or air transport.

Mark returns on the packaging as follows.



5.3 Storage

SKF products are subject to the following storage conditions:

- dry, dust- and vibration-free in closed premises
- no corrosive, aggressive materials at the place of storage (e. g. UV rays, ozone)
- protected against pests and animals (insects, rodents, etc.)

- possibly in the original product packaging
- shielded from nearby sources of heat and coldness
- in case of high temperature fluctuations or high humidity take adequate measures (e. g. heater) to prevent the formation of condensation water.
- the admissible storage temperature range corresponds to that of the operating temperature (see Technical data of the pump)



Before application inspect the products with regard to possible damages occurred during their storage. This particularly applies for parts made out of plastic and rubber (embrittlement).

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:

- Other units must not be damaged by the assembly.
- 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 coldness.
- Adhere to safety distances and legal prescriptions on assembly and prevention of accidents.
- Monitoring devices, if any, must be clearly visible.
- Observe prescriptions in the Technical data (chapter 4) regarding the installation position.



In case of new systems depending on the overall system and the local ambient conditions there may be required further installation steps. You will find them in the instructions of the overall system provided by the manufacturer or in the operator's amendments.

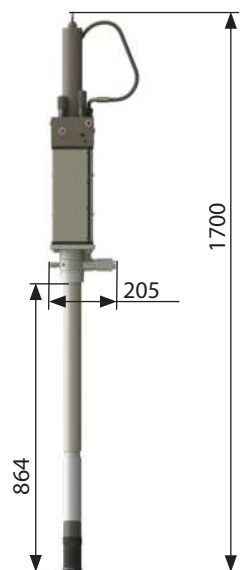
6.2 Place of installation

Protect the product against humidity, dust and vibrations and install it in an easily accessible position to facilitate other installation and maintenance works.

6.3 Minimum assembly dimensions

Ensure sufficient space for maintenance work or for attachment of further components by leaving a free space of at least 100 mm into each direction in addition to the stated dimensions.

Minimum assembly dimensions Fig. 3



6.4 Adjusting the volumetric flow rate



The number of double strokes per minute is set via the volumetric flow rate. The volumetric flow rate should be adjusted during the operation of the pump; this facilitates a direct control of the lifting speed. Observe the minimum and maximum admissible number of double strokes (see Technical data).

Required tools:

- Fork wrench AF 17
- Allen key, size 5

To set the output volume proceed as follows:

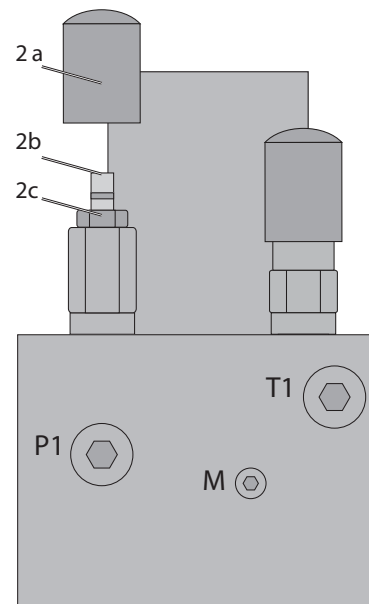
- Remove the protective cap (2a).
- Loosen counter nut (2c) with fork wrench AF 17.
- Adjust the volumetric flow rate/ lifting speed by turning the spindle (2b) by means of an Allen key.

↻ = Increase volumetric flow rate/ lifting speed

↺ = Reduce volumetric flow rate/ lifting speed

After the adjustment re-tighten counter nut (2b) and put protective cap (2a) in place again.

Adjusting the volumetric flow rate Fig. 4



6.5 Adjusting the hydraulic inlet pressure



The inlet pressure should be adjusted during pump operation. Observe the minimum and maximum admissible inlet pressure (see Technical data).

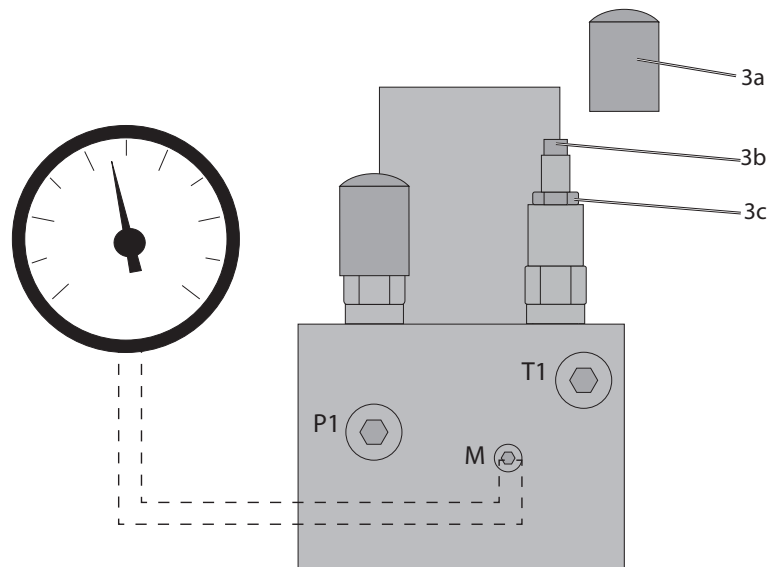
Required tools:

- Fork wrench AF 19
- Allen key, size 8

To set the output volume proceed as follows:

- Remove the protective cap (3 a).
- Loosen counter nut (3c) with fork wrench AF 17.
- Adjust the inlet pressure by turning the spindle (3b) by means of the Allen key.
- ⤿ = Increase the inlet pressure
- ⤿ = Reduce the inlet pressure
- After the adjustment re-tighten the counter nut (3b) and put the protective cap (3a) in place again.

Adjusting the hydraulic inlet pressure Fig. 5



7. Initial 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.

Start-up check list

7.1 Inspections prior to initial start-up

YES NO

Mechanical and hydraulic connections carried out correctly

☐ ☐

Operating pressure and required volumetric flow rate adjusted correctly

☐ ☐

All components, e. g. lubrication lines, have been filled with the right grease and have been installed correctly

☐ ☐

No visible damage, contamination and corrosion

☐ ☐

Any dismantled protection and monitoring equipment has been reassembled and checked for correct function

☐ ☐

All warning labels on the product are available and in proper condition

☐ ☐

The lubricant used corresponds to the admitted specification of the pump and the intended use

☐ ☐

7.2 Inspections during initial start-up

No unusual noises, vibrations, accumulation of moisture, or odours present

☐ ☐

No unwanted escape of lubricant from connections (leakages).

☐ ☐

Lubricant is supplied free from bubbles

☐ ☐

The maximum respectively minimum admissible number of double strokes per minute is adhered to

☐ ☐

The maximum respectively minimum admissible inlet pressure is adhered to

☐ ☐

8. Operation

SKF products operate automatically to the greatest possible extent.

Basically, activities during standard operation are limited to a timely refilling of lubricant.

9. Cleaning



CAUTION

Personal injury

Steam jet and high pressure cleaners must not be used for direct cleaning of gaskets and flexible parts of the product.

Performance of cleaning, required personal protective equipment, cleaning agents and devices following the valid operational regulations of the operator.

9.1 Cleaning agents

Cleaning agents compatible with the material may be used only (materials, see chapter 2.3).



Thoroughly remove residues of cleaning agents from the product and rinse off with clear water.

9.2 Exterior cleaning

- Keep unauthorized persons away.
- Thorough cleaning of all outer surfaces with a damp cloth.



No cleaning agents must get inside the pump tube.

9.3 Interior cleaning

Normally, interior cleaning is not required.

Should incorrect or contaminated lubricant have been filled, inside cleaning of the product will be required.

To do so, contact the SKF Customer Service.

10. Maintenance

Regular and appropriate maintenance is a prerequisite to detect and clear faults in time.

The specific timelines 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. All activities address to maintenance specialists with special knowledge of hydraulics.

Maintenance check list

Activity to be done	YES	NO
Mechanical and hydraulic connections carried out correctly	☐	☐
Operating pressure and volumetric flow rate adjusted correctly	☐	☐
No visible damage, contamination and corrosion	☐	☐
Any dismantled protection and monitoring equipment has been reassembled and checked for correct function	☐	☐
All warning labels on the product are available and in proper condition	☐	☐
No unusual noises, vibrations, accumulation of moisture, or odours present	☐	☐
No unwanted escape of lubricant from connections (leakages).	☐	☐
Lubricant is supplied free from bubbles	☐	☐
The maximum respectively minimum admissible number of double strokes per minute is adhered to	☐	☐
The maximum respectively minimum admissible inlet pressure is adhered to	☐	☐

11. Troubleshooting

Fault table 1

Fault	Possible cause	Remedy
Pump does not run	No adequate hydraulic oil supply	Check and, if necessary, adapt adjustment of the flow control valve respectively the pressure control valve. Check whether one of the indicated faults is present and remedy it in the frame of responsibilities. Faults outside of your own responsibility have to be reported to your superior to initiate further measures. If the fault cannot be determined and remedied, please contact our Customer Service.
Pump runs but supplies no or only little lubricant	Defective check valve in the pump tube Clogged suction bores in the pump tube Air pockets in the lubricant Too high lubricant consistency (at low temperatures) Too low lubricant consistency (at high temperatures)	Check whether one of the indicated faults is present and remedy it in the frame of responsibilities. Faults outside of your own responsibility have to be reported to your superior to initiate further measures. If the fault cannot be determined and remedied, please contact our Customer Service.
Pump runs too fast	Hydraulic volumetric flow rate is too high	Adapt adjustment of the volume flow control valve.

12. Repairs

12.1 Safety instructions

	 WARNING
	Risk of injury Before carrying out any repair work, take at least the following safety measures: ○ Keep unauthorized persons away. ○ Mark and secure work area. ○ Depressurize the pump. This applies for the hydraulic connections as well as for the lubrication line connection ○ Cover wet or slippery parts ○ Disconnect live neighbouring units from the power supply and secure them against unauthorized connection.

- Clean the pump. The hydraulic connections, the pressure control valve and the volume control valve as well as any other mounting places or assembly parts must be free from contamination.
- Drive the oscillating cylinder into its top position.
- Depressurize the pump and secure it against being switched on again.
- Remove the two hydraulic connections from the oscillating cylinder. Then protect the loosened hydraulic connections against being contaminated. Bind any leaking hydraulic oil and dispose of in an ecologically sound manner.

Notes regarding a replacement of the coupling and the coupling nut assay:

- Before replacing the coupling respectively the coupling nut, check the piston rod with regard to damages (e.g. scoring). If the piston rod is damaged, a replacement should not be carried out on site, as damage to the gaskets of the coupling nut cannot be excluded. Please contact our Service in such case.
- After replacement there may occur a short-term leakage on the gaskets of the coupling nut. The leakage reduces in the course of the pump operation as the gaskets will better fit to the piston rod after some time. Minor light leakage of the gaskets even after the run-in period is normal and does not represent any fault or defect of the pump.
- The mounting sleeve is intended for single use and must be checked for damages prior to using it.

12.2 Tools and accessories

The following tools and equipment are necessary to carry out the works described in the following.



Spare parts, see corresponding chapter in these instructions

Tools

- Fork wrench
AF (metric) 19, 22, 24, 32, 36, 41, 55,
AF (inch) 2 1/4", 19/32", 7/8"
- Lifting device for oscillating cylinder

Other assembly tools

(are supplied together with the spare parts)

- Mounting sleeve for protection of the kit of gaskets of the coupling nut (single use)
- Mounting bushing for assembly of the coupling nut
- Fixing insert for fixing the piston rod in the pump tube

Accessories

- Loctite 274 or equivalent
- Renolit IPR2 or equivalent
- Hygienic tissues/ binding agents to absorb hydraulic oil/ grease.



If no tightening torques are stated for the respective work, apply tightening torques according to the screw size characteristics for 8.8 screws.

12.3 Replacement of coupling/ Replacement of the coupling nut

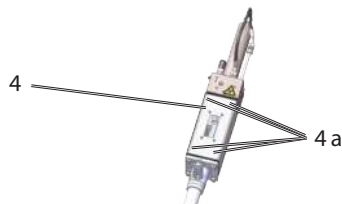
12.3.1 Disassembly



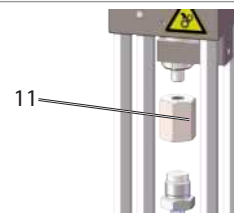
The replacement described can be carried out only, if previously the pump was removed from the barrel/ container.

- Remove the two angled casings (4) and keep them together with the screws (4a) for further use.
- Turn screw M30x1,5 (10) with fork wrench AF 32 out of coupling (11). To do so fix coupling (11) with open-ring wrench AF 36.
- Turn coupling (11) with fork wrench AF 36 out of oscillating cylinder (1).
- Remove the four nuts (1a) of the distance rods of the oscillating cylinder (1) from the base plate by means of fork wrench AF 19 and eliminate them.

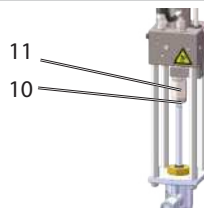
Remove casing Fig. 6



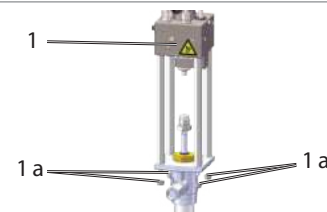
Remove coupling Fig. 8



Loosen screw M30x1,5 Fig. 7



Loosen the nuts of the distance rods Fig. 9

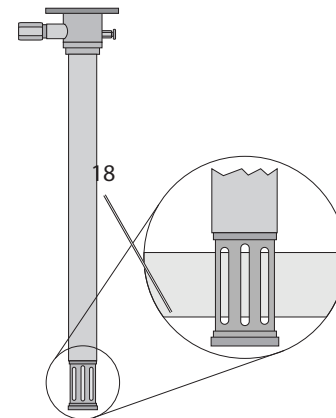


- Use suitable lifting device to lift oscillating cylinder (1) on the eyebolt (1b) and remove it from the pump.
- Pull the piston rod (14) upwards by hand so that the fixing insert (18) can be mounted.
- Fix the piston rod in the pump tube by means of the fixing insert (18) as shown. Otherwise during the replacement of the coupling nut the piston rod might glide into the pump tube.
- Use fork wrench AF 19/32" to loosen and remove the connecting screw (12) from the piston rod. When doing so fix piston rod (14) with fork wrench AF 7/8" against torsion.
- Remove screw M 30x1,5 (10) from the piston rod.
- Remove coupling nut (13) by means of fork wrench AF 2 1/4".

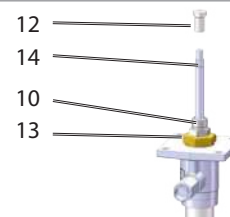
Remove oscillating cylinder Fig. 10



Fix the piston rod Fig. 11



Remove connecting screw Fig. 12



12.3.2 Installation



Clean the place of installation with clean cloth.

- Position the mounting sleeve (15) on the piston rod (14).
- Grease the piston rod (14) and the mounting sleeve with suitable anti-friction agent (e.g. Renolit IPR2).
- Grease the kit of gaskets (14) with suitable anti-friction agent (e.g. Renolit IPR2).
- Slide the coupling nut (13) onto the mounting sleeve/ piston rod.
- Place the mounting bushing (17) onto the mounting sleeve (15) and hammer the coupling nut by means of a plastic hammer with light blows downward onto the piston rod.
- Remove the mounting sleeve (15).
- Remove the fixing insert from the pump tube.



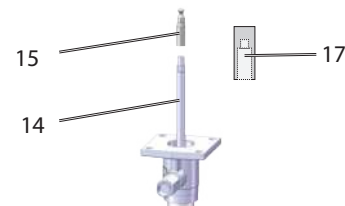
The coupling nut must be pushed downward into the screw-in position without using a hammer or violence. Prevent damage of the coupling nut

- Slowly push the piston rod down by hand together with the preassembled coupling nut (13) until the coupling nut (13) reaches the screw-in position.
- Tighten coupling nut (13) with fork wrench AF 55.

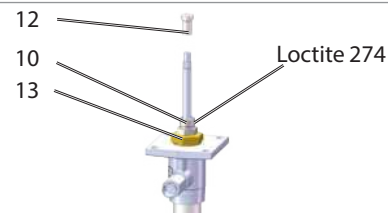
Tightening torque $140 \text{ Nm} \pm 5 \text{ Nm}$

- Grease the o-ring (16) with suitable lubricant (e.g. Renolit IPR2) and mount it into the groove of screw M30x1,5 (10).
- Slide screw M 30x1,5 (10) onto the piston rod.
- Coat thread of screw M30 x1,5 (10) with Loctite 274.

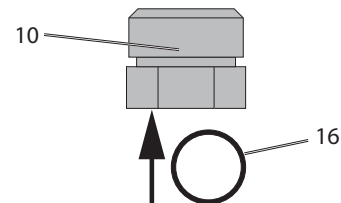
Mounting sleeve Fig. 13



Mount parts Fig. 14



Mount O-rings Fig. 15



- Use fork wrench AF 19/32" to mount the connecting screw (12) to the piston rod. When doing so fix piston rod with fork wrench AF 7/8" against torsion.

Tightening torque $95 \text{ Nm} \pm 5 \text{ Nm}$



Mind correct direction of installation of the oscillating cylinder (position of the hydraulic connections).

- Lift the oscillating cylinder (1) over the pump again and use fork wrench AF 19 to mount it to the base plate with the four nuts (1a).

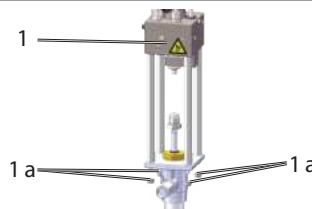
Tightening torque $40 \text{ Nm} \pm 4.0 \text{ Nm}$



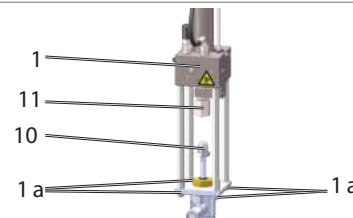
The flexible hydraulic tube fitting must align with the block of the oscillating cylinder. If necessary, correct the position accordingly. Make sure to avoid torsion.

- Use fork wrench AF 36 to screw new coupling (11) onto the piston rod of the oscillating cylinder. When doing so fix oscillating cylinder by means of fork wrench AF 42 against torsion.

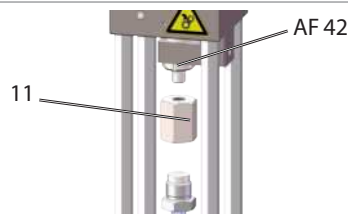
Mount oscillating cylinder Fig. 16



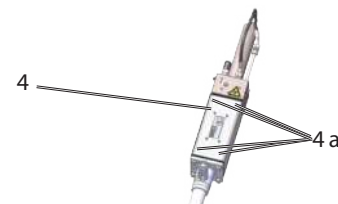
Mount parts Fig. 18



Mount coupling Fig. 17



Reinstall casing Fig. 19



Turn screw M30x1,5 (10) with fork wrench AF 36 into coupling (11). When doing so fix coupling (11) with a second fork wrench AF 36 against torsion.

- Reinstall the two angled casings (4) by means of the screws (4a).

The pump is ready again for installation at the place of use.

12.4 Replacement of the angled casings



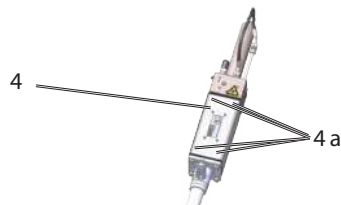
Prior to performing work, depressurize the pump and secure it against unauthorized switch-on.

- Loosen the two angled casings (4) on the screws (4a) and remove them.
- Install new angled casings by means of the screws (4a) included in the scope of delivery.

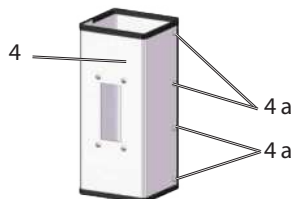


Provide new angled casings with all necessary safety notes and warning labels for safe operation of the pump in a suitable place.

Remove casings Fig. 20



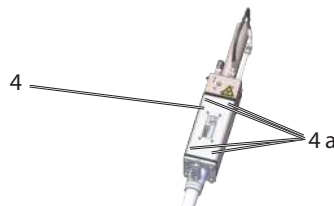
New casings Fig. 21



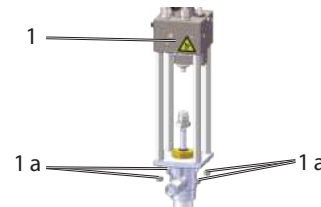
12.5 Replacement of the pump tube

- Remove the two angled casings (4) and keep them together with the screws (4a) for further use.
- Turn screw M30x1,5 (10) with fork wrench AF 32 out of coupling (11). To do so fix coupling (11) with fork wrench AF 36.
- Turn coupling (11) with fork wrench AF 36 out of oscillating cylinder (1).
- Remove the four nuts (1a) of the distance rods of the oscillating cylinder (1) from the base plate and eliminate them.
- Use suitable lifting device to lift oscillating cylinder (1) on the eyebolt (1b) and remove it from the pump.

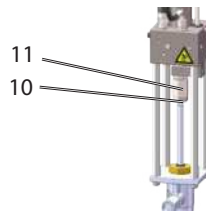
Remove casing Fig. 22



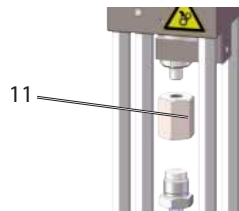
Loosen the nuts of the distance rods Fig. 25



Loosen screw M30x1,5 Fig. 23



Remove coupling Fig. 24



Remove oscillating cylinder Fig. 26



- Use fork wrench AF 19/32" to loosen and remove the connecting screw (12) from the piston rod. When doing so fix piston rod with fork wrench AF 7/8".
- Remove old pump tube.

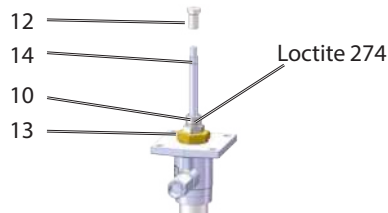


Fix the piston rod. Otherwise the piston rod might glide into the pump tube.

- Remove the closure cap (6a) from the new pump tube (5).
- Use fork wrench AF 19/32" to screw connecting screw (12) onto the piston rod of the new pump tube. When doing so, use fork wrench AF 7/8" to fix piston rod.

Tightening torque 95 Nm $\pm$ 5 Nm

Remove connecting screw Fig. 27



Remove oscillating cylinder Fig. 28



Pump tube Fig. 29



- Lift the oscillating cylinder (1) over the pump again and use fork wrench AF 19 to mount it to the base plate of the new pump tube with the four nuts (1a).

Tightening torque $40 \text{ Nm} \pm 4.0 \text{ Nm}$

- Coat thread of screw M30 x1,5 (10) with Loctite 274.

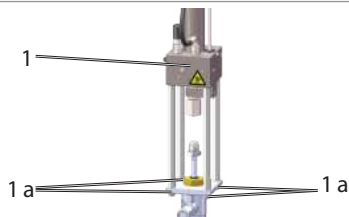


The flexible hydraulic tube fitting must align with the block of the oscillating cylinder. If necessary, correct the position accordingly. Make sure to avoid torsion.

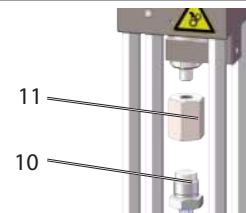
- Use fork wrench AF 36 to screw new coupling (11) onto the piston rod of the oscillating cylinder. When doing so fix oscillating cylinder by means of fork wrench AF 42 against torsion.
- Reinstall the two angled casings (4) by means of the screws (4a).

The pump is ready again for installation at the place of use.

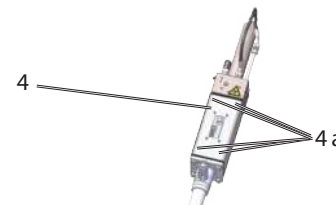
Mount parts Fig. 30



Mount coupling Fig. 31



Reinstall casings Fig. 32



12.6 Replacement of pressure-reducing valve and flow control valve

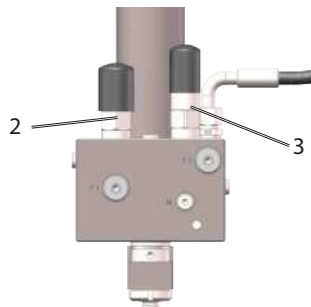
- Turn flow control valve (2) with fork wrench AF 29 out of oscillating cylinder.
- Turn pressure-reducing valve (3) with fork wrench AF 26 out of oscillating cylinder.
- Turn new flow control valve (2) with fork wrench AF 29 into the oscillating cylinder.

Tightening torque $15 \text{ Nm} \pm 1.5 \text{ Nm}$

- Turn new pressure-reducing valve (3) with fork wrench AF 26 into the oscillating cylinder.

Tightening torque $15 \text{ Nm} \pm 1.5 \text{ Nm}$

Pressure-reducing and flow control valve in the oscillating cylinder Fig. 33

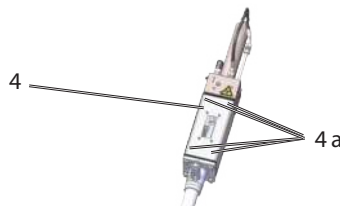


12.7 Replacement of the oscillating cylinder

- Remove the two angled casings (4) and keep them together with the screws (4a) for further use.
- Turn screw M30x1,5 (10) with fork wrench AF 32 out of coupling (11). To do so fix coupling (11) with fork wrench AF 36.
- Turn coupling (11) with fork wrench AF 36 out of oscillating cylinder (1).
- Remove the four nuts (1a) of the distance rods of the oscillating cylinder (1) from the base plate and keep them for further use.
- Use suitable lifting device to lift oscillating cylinder (1) on the eyebolt (1b) and remove it from the pump.
- Use fork wrench AF 19 to turn the 4 distance rods out of the oscillating cylinder, coat them with Loctite 274 and turn them into the new oscillating cylinder.

Tightening torque 40 Nm $\pm$ 4.0 Nm

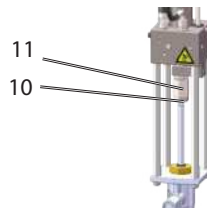
Remove casings Fig. 34



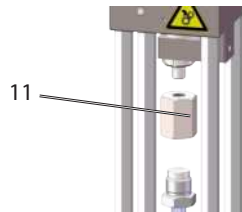
Loosen the nuts of the distance rods Fig. 37



Loosen screw M30x1,5 Fig. 35



Remove coupling Fig. 36



Remove oscillating cylinder Fig. 38





Fix the piston rod. Otherwise the piston rod might glide into the pump tube.

- Use fork wrench AF 19/32" to screw connecting screw (12) onto the piston rod of the new pump tube. When doing so, use fork wrench AF 7/8" to fix piston rod.

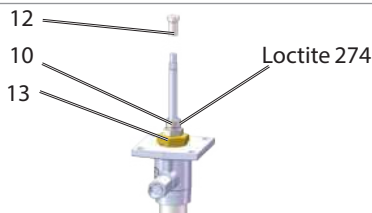
Tightening torque $95 \text{ Nm} \pm 5 \text{ Nm}$

- Lift the oscillating cylinder (1) over the pump again and use fork wrench AF 19 to mount it to the base plate of the pump tube with the four nuts (1a).

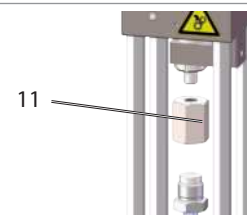
Tightening torque $40 \text{ Nm} \pm 4.0 \text{ Nm}$

- Use fork wrench AF 36 to screw new coupling (11) onto the piston rod of the oscillating cylinder. When doing so fix oscillating cylinder by means of fork wrench AF 42 against torsion.

Mount parts Fig. 39



Mount coupling Fig. 41

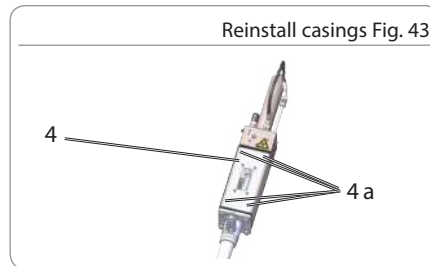
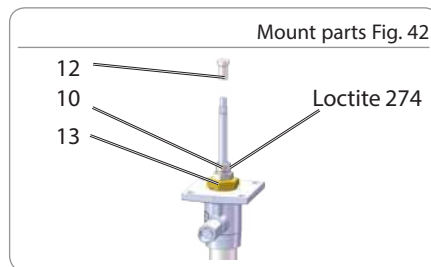


Mount oscillating cylinder Fig. 40



- Turn screw M30x1,5 (10) with fork wrench AF 36 into coupling (11). When doing so fix coupling (11) with a second fork wrench AF 36 against torsion.
- Use fork wrench AF 22 to verify firm seat of connection lines on oscillating cylinder and retighten, if necessary.
- Reinstall the two angled casings (4) by means of the screws (4a).

The pump is ready again for installation at the place of use.



13. Shutdown and disposal

13.1 Temporary shutdown

Temporarily shut the system down by:

- Switching off the hydraulic supply system

13.2 Final shutdown and disassembly

The final shutdown and disassembly of the product must be professionally planned and carried out by the operator in compliance with all regulations to be observed.

13.3 Disposal

Countries within the European Union

Disposal should be avoided or minimized wherever possible. Disposal of products contaminated with lubricant must be effected via a licensed waste disposal contractor in accordance with environmental requirements and waste disposal regulations as well as local authority requirements.



The specific classification of the waste is in the waste producer's responsibility, as the European Waste Catalogue provides different waste disposal codes for the same type of waste but of different origin.

Parts made of plastic or metal
can be disposed of with the
commercial waste.

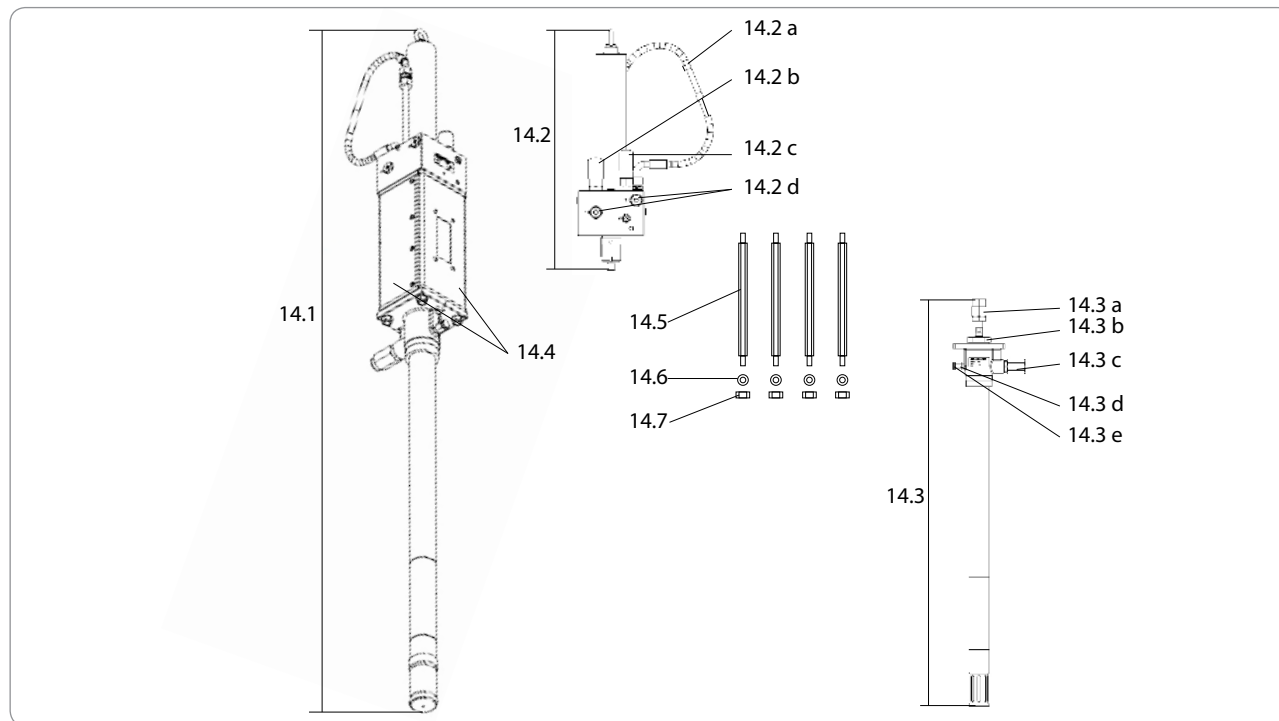


Countries outside the European Union

The disposal has to be done according to the valid national regulations and laws of the country where the product is used.

14. Spare parts

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



No.	Designation	Qty.	Part number
14.1	ContiMaster pump assy.	1	509-60333-1-L
14.2	Oscillating cylinder assy.	1	509-60332-1
14.2 a	Hose DN 10x600 DKLO45/DEKLO90 V. 180 GR	1	235-13183-3
14.2b	Flow control valve	1	235-13179-3
14.2c	Pressure-reducing valve	1	235-13179-2
14.2d	Hexagon socket closure plug VSTI G 3/8-ED (VA)	4	223-13702-3
14.3	Pump tube assy. (replacing pump tube 84999-L)	1	509-60245-1-L
14.3 a	Coupling kit assy.	1	509-60353-1
14.3b	Coupling nut assy. Incl. mounting aid and service instructions	1	536-85189-2
14.3c	Outlet stud kit assy.	1	536-85189-3
14.3d	Adapter 1/4-18NPTF Ax1/2-20 UNF-28 Z	1	016381
14.3e	Screw 1/2-20 UNF-2A Z	1	016382
14.4	Angled casing (two-piece) assy.	1	509-60049-1
14.5	Distance rods	4	409-24709-1
14.6	Hexagon nut M12 A3C with clamping part	4	207-12516-6
14.7	Lock washer VS A3C	4	211-14195-5

A full-page view of a blank sheet of graph paper. The grid consists of thin, light gray horizontal and vertical lines forming small squares across the entire page. There are no margins, text, or other markings on the paper.

SKF Lubrication Systems Germany GmbH
Walldorf Facilities
Heinrich-Hertz-Str. 2-8
DE - 69190 Walldorf
Phone: +49 (0) 6227 33-0
Fax: +49 (0) 6227 33-259
E-mail: Lubrication-germany@skf.com
www.skf.com/lubrication

951-171-035-EN
Version 02
2017/10/27

