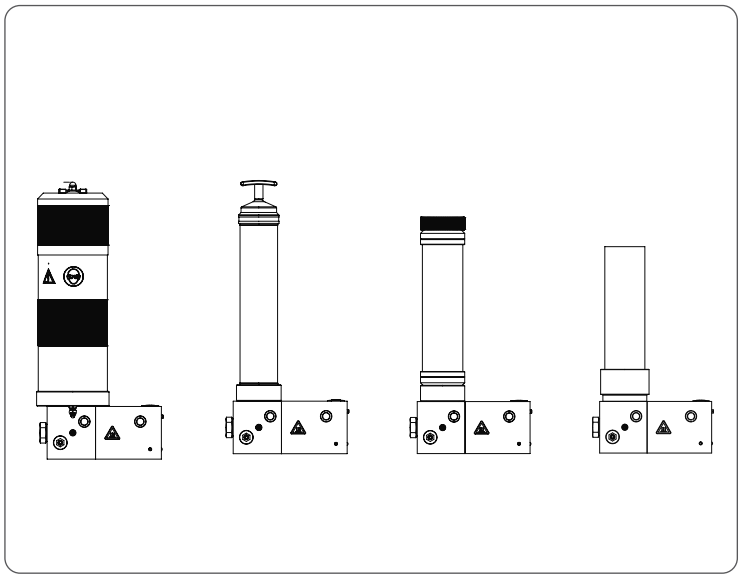
Hydraulically driven lubrication pump HTL 201

Installation instructions
following machinery directive
2006/42/EC

EN



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Version 05

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

The manufacturer, SKF Lubrication Systems Germany GmbH, Heinrich-Hertz-Str. 2-8, DE - 69190 Walldorf, hereby declares under its sole responsibility conformity of the partly completed machinery with the essential health and safety requirements of the Machinery Directive 2006/42/EC, Annex I, marked in the Annex to the Declaration of Incorporation as applicable and fulfilled at the time of placing on the market.
The special technical documentation described in Annex VII, Part B of this Directive has been compiled. We undertake to transmit the special technical documents in electronic form to individual national authorities in response to reasoned requests. The manufacturer is the authorized representative for the technical documentation.

Designation:	Hydraulically driven lubrication pump for the feeding of lubricants
Type:	HTL 201
Item number:	642-* | 6420-*

The following Directives and standards were applied in the applicable areas:

Standards

EN ISO 12100:2010

EN 809:1998+A1:2009/AC:2010

The partially completed machinery must not be put into service until the machinery into which it is to be installed has been declared in conformity with the provisions of Machinery Directive 2006/42/EC and all other applicable Directives.

Walldorf, 10/23/2023

Jürgen Kreutzkämper
Manager R&D Germany
SKF Lubrication Business Unit

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

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

The manufacturer, SKF Lubrication Systems Germany GmbH, Heinrich-Hertz-Str. 2-8, DE-69190 Walldorf, hereby declares under its sole responsibility conformity of the partly completed machinery with the essential health and safety requirements pursuant to the Supply of Machinery (Safety) Regulations 2008 No. 1597, Annex I, which are marked as applicable in the Annex of the EC Declaration of Incorporation and which are fulfilled at the time of placement on the market.
The special technical documentation described in Annex VII, Part B has been compiled. We undertake to transmit the technical documentation in electronic form in response to a reasoned request by the national authorities. The authorized representative for the compilation of the technical documentation is SKF (U.K.) Limited, 2 Canada Close, Banbury, Oxfordshire, OX16 2RT, GBR.

Designation:	Hydraulically driven lubrication pump for the feeding of lubricants
Type:	HTL 201
Item number:	642-* | 6420-*

The following Regulations and standards were applied in the applicable areas:

Standards

EN ISO 12100:2010

EN 809:1998+A1:2009/AC:2010

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 United Kingdom statutes pursuant to the Supply of Machinery (Safety) Regulations 2008 No. 1597, Annex I and all other applicable directives.

Walldorf, 10/23/2023

Jürgen Kreutzkämper
Manager R&D Germany
SKF Lubrication Business Unit

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

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.

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	YES
Regarding 1.1.3 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.			
1.1.5	Design of machinery to facilitate its handling	YES	YES
1.1.6	Ergonomics	YES	YES
Regarding 1.1.6 Not completely fulfilled: The operator must ensure that the pump is integrated into the higher-level machine in such a way that the pump can be operated and filled ergonomically.			
1.2	Control systems	YES	YES
1.2.1	Safety and reliability of control systems	YES	YES
1.2.3	Starting	YES	YES
1.2.6	Failure of the power supply	YES	YES
1.3	Protection against mechanical hazards	YES	YES
1.3.1	Risk of loss of stability	YES	YES
1.3.2	Risk of break-up during operation	YES	YES
Regarding 1.3.2 Not completely fulfilled: The operator must protect the lubrication system against excessive pressure. For this purpose, a pressure limiting valve with max. 120 or 270 bar opening pressure (as applicable) must be provided on the pump element.			
1.3.4	Risks due to surfaces, edges or angles	YES	YES
1.3.7	Risks related to moving parts	YES	YES
1.3.9	Risks of uncontrolled movements	YES	YES
1.5	Risks due to other hazards	YES	YES
1.5.1	Electricity supply	YES	YES
1.5.6	Fire	YES	YES
Regarding 1.5.6 Not completely fulfilled: For pumps without control, the operator must take suitable measures to ensure that the cyclic duration factor (see Technical Data) is adhered to. Otherwise, the heat of the motor could become unacceptably high.			

No.:	Essential health and safety requirement	Applicable:	Fulfilled:
1.5.8	Noise	YES	YES
1.5.11	External radiation	YES	YES
1.5.13	Emissions of hazardous materials and substances	YES	YES
1.5.15	Risk of slipping, tripping, or falling	YES	YES
1.6	Servicing	YES	YES
1.6.1	Machinery maintenance	YES	YES
1.6.2	Access to operating positions and servicing points	YES	YES
Regarding 1.6.2 Not completely fulfilled: The operator must ensure that the pump is integrated into the higher-level machine in such a way that the pump can be operated without danger.			
1.6.4	Operator interventions	YES	YES
1.7	Information	YES	YES
1.7.1	Information and warnings on the machinery	YES	YES
1.7.1.1	Information and information devices	YES	YES
1.7.2	Warning of residual risks	YES	YES
1.7.3	Marking of machinery	YES	YES
1.7.4	Operating instructions/assembly instructions	YES	YES
1.7.4.1	General principles for the drafting of operating instructions/assembly instructions	YES	YES
1.7.4.2	Contents of the operating instructions/assembly instructions	YES	YES
1.7.4.3	Sales literature	YES	YES

Manufacturer
SKF Lubrication Systems Germany GmbH
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Training
SKF conducts detailed training in order to enable the maximum safety and efficiency. SKF recommends taking advantage of this training. For information, contact the relevant SKF service address.

Authorized party placing the product on the market locally

United Kingdom
SKF (U.K.) Limited,
2 Canada Close, Banbury, Oxfordshire,
0X16 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 do not contain any information on the warranty. This can be found in our General Terms and Conditions.

Disclaimer of liability
The manufacturer shall not be held liable for damage resulting from:

- Improper usage, assembly, operation, configuration, maintenance, repair, or accidents
- Use of unsuitable lubricants
- Improper reaction to malfunctions.
- Unauthorized modifications to the product.
- Intentional or gross negligence
- Use of non-original SKF spare parts
- Faulty planning or design of the centralized lubrication system

The maximum liability for loss or damage resulting from the use of our products is limited to the purchase price. Liability for indirect damage of any kind is excluded.

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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		Dangerous electrical voltage		Risk of falling		Hot surfaces
	Unintentional intake		Crushing hazard		Pressure injection		Suspended load
	Electrostatically sensitive components		Risk of explosion		Explosion-protected component		
	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)		Disconnect product from mains		General obligation		
	Keep unauthorized persons away		Protective earth		Safety extra-low voltage (SELV)		Safe galvanic isolation (SELV)
	CE marking		Disposal, recycling		Disposal of waste electrical and electronic equipment		

	Warning level	Consequence	Probability
	DANGER	Death, serious injury	imminent
	WARNING	Death, serious injury	possible
	CAUTION	Minor injury	possible
	NOTICE	Property damage	possible

Symbol	Meaning
●	Chronological guidelines
○	Lists
☞	Refers to other facts, causes, or consequences

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
etc.	et cetera	l	litre	hp	horse power
e.g.	for example	dB (A)	sound pressure level	kp	kilopound
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	diametre	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	≈	about	Mass	1 kg = 2.205 lbs
DC	direct current	=	equal to		1 ml = 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	≤	less than	Pressure	1 bar = 14.5 psi
no	normally open contact	mm^2	square millimetre	Temperature	°C = (°F-32) x 5/9
OR	logical OR	rpm^{-1}	revolutions per minute	Output	1 kW = 1.34109 hp
&	logical AND			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

- 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.
- Unauthorized persons must be kept away.
- 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 emergency devices must not be removed, modified or affected otherwise in their function and are 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.
- Wear personal protective equipment.
- Never use parts of the centralized lubrication system or of the machine as standing or climbing aids.

1.3 Intended use

Supply of lubricants or chisel pastes 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 adequate pressure 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) respectively GHS with acute oral, dermal, inhalative toxicity, and of substances or substance mixtures marked with GHS01-GHS06 and GHS08 hazard pictograms.
- to supply, transport or store fluids of group 1 classified as hazardous fluids as defined in the Pressure Equipment Directive (2014/68/EU) Articele 13 (1) a).
- to feed, forward, or store gases, liquefied gases, dissolved gases, vapours, or fluids whose vapour pressure exceeds normal atmospheric pressure of 1013 mbar [14.69 psi] by more than 0.5 bar [7.25 psi] at the maximum permissible operating temperature.
- in an explosion protection zone
- outside the technical data and limits specified in these instructions.

1.5 Painting

The pump is delivered in unpainted condition and can be operated without painting.

1.5.1 Painting of plastic parts

Painting of plastic parts and seals, if any, is prohibited.

Remove or completely tape parts concerned before painting the superior machine.

Reference on Pressure Equipment Directive 2014/68/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 pump housing, the pump element or to the reservoir vent

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 (MSDS) of the lubricant and the hydraulic oil used.

Where appropriate:

- Project planning documents
- Any documents of other components required to set up the centralized lubrication system

1.10 Markings on the product HTL201 with 1.5 l steel reservoir

Marks the bore from which a small amount of grease leaks in case of maximum filling of the 1.5 l steel reservoir

Warning of hot surfaces

Wear appropriate eye protection when filling the 1.5 l steel reservoir

1.11 Note on UKCA marking

The UKCA marking confirms the conformity of the product with the applicable regulations of the United Kingdom.

1.12 Notes related to the type identification plate

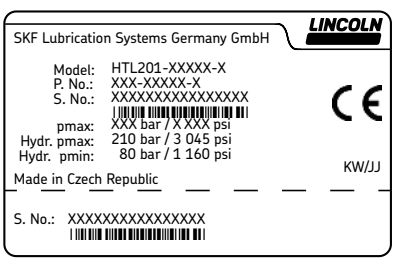
The type identification plate states important characteristics such as type designation, order number, and regulatory characteristics.

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. _____

S. No. _____



1.13 Persons authorized to operate the pump

1.13.1 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.

1.13.2 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.

1.14 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

1.15 Emergency stopping

In case of an emergency stop the pump station by:

- Switching off the superior machine or system in which the pump station has been integrated.
- Actuating the emergency stop switch of the superior machine.

1.16 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.

1.17 Provision of personal protective equipment

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

1.18 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.
- Prior to performing work, the product and the machine, into which the product will be integrated, must be depressurized and secured against unauthorized activation.
- 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.
- Dry or cover wet, slippery surfaces accordingly.
- Cover hot or cold surfaces accordingly.
- Work on possible supplementary electrical components must be carried out by electrical specialists only. Observe any waiting periods for discharging, if necessary. Carry out works on electrical components using voltage insulated tools only.
- Undertake drilling at non-critical, non-load bearing parts only. Use any available boreholes. Do not damage lines and cables when drilling.
- Observe possible abrasion points. Protect the parts accordingly.
- All components used must be designed for:
  - maximum operating pressure
  - maximum / minimum ambient temperature
  - the lubricant to be supplied
  - the operating / ambient conditions at the place of usage.
- 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 should 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.

1.19 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

1.20 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.
- Work on possible supplementary electrical components must be carried out by electrical specialists only.
- Mark damp areas accordingly.

1.21 General residual risks

Residual risk	Possible in life cycle									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 only to components with sufficient load capacity. If no tightening torques are stated, apply tightening torques according to the screw size characteristics for 8.8 screws.
Personal injury due to contact with possibly hot pump surfaces				D		F	G			Keep unauthorized persons away. When working on the pump wear suitable thermally insulating protective gloves
Personal injury/ damage to material due to spilled or leaked lubricant		B	C	D		F	G	H		Follow usual safety procedures when handling mineral oil products. Wear suitable face protection and gloves. 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.

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 used specifically for certain application purposes. In order to fulfil their tasks, lubricants must fulfil various requirements to varying extents.

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 (SDS) and hazard designations on the packaging, if any, 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 Reservoir/cartridge
The reservoir with a follower piston resting on the lubricant stores the lubricant. For types of reservoirs and cartridges see: Pages 27-29.

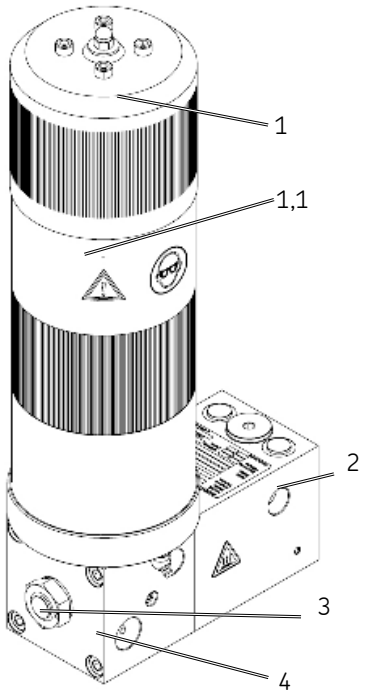
1.1 Reservoir venting device
The reservoir vent (1.1) is positioned on the 1.5 l steel reservoir. It provides air for the reservoir while the pump is operating and consuming lubricant and vents the reservoir when it is filled with lubricant.

2 Pump housing
The pump housing includes the pump element and the hydraulic drive and supply devices.

3. Pump element
The pump element meters and dispenses the lubricant into the supply line,

4. Emergency lubrication fitting
The emergency lubrication fitting serves to provide the connected lubrication lines with lubricant, e.g. in case of a defect of the hydraulic system of the superior machine.

Overview Fig. 1



5 Vent screw
Serves to vent the lubricant. To do so, after filling the reservoir the vent screw (5) must be loosened there leaks a small amount of lubricant. Then firmly tighten the vent screw again.

6 Filler fitting (for 1.5 l steel reservoir only)
The filler fitting serves to fill the reservoir via a transfer pump.

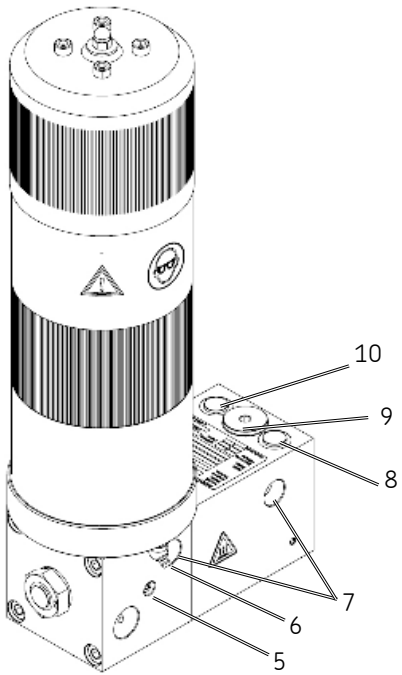
7 Mounting bores
The pump is fastened to the two mounting bores (7).

8 Pressure connection P
The pressure connection serves to connect the supply line of the hydraulic system of the superior system.

9 Throttle (hidden)
The throttle is protected by a cover screw. The throttle (9) serves to adjust the pump output.

10 Return-line connection T
The return-line connection serves to connect the return line to the hydraulic system of the superior machine.

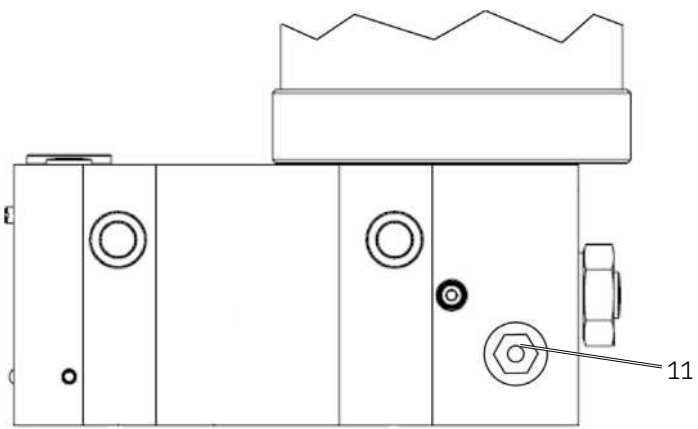
Overview Fig. 2



11 Pressure control valve

The pressure control valve (11) protects the pump and the lubrication system components against too high pressure. There are available pumps with a 120 bar respectively 270 bar pressure control valve.

Overview Fig. 3



4. Technical data

4.1 Mechanics

Operating temperature range of the pump		-25 °C to +75 °C		

The indicated operating temperature range of the pump presupposes the suitability of the lubricant used for the actually existing operating temperature. Using a lubricant not suitable for the actual operating temperature may, in case of low temperatures, result in a blockade of the pump due to a too high lubricant viscosity.

	Cartridges	Press reservoir	1.5 l steel reservoir	Oil reservoir
Lubricants		Lubricating greases up to NLGI 2		Oil as of 40 mm²/s
Operating pressure [1) 2)]		120 bar (max. 270 bar)		
Operating pressure of the hydraulic carrier system		80 bar min. / 210 bar max.		
Required viscosity of the hydraulic oil at operating temperature		≥ 20 – 1 000 mm²/s		
Pressure connection P		G 1/4		
Return-line connection T		G 1/4		
Lubrication line		G 1/4		
Nominal volume	310/380/500 ml	500 ml	1.5 l	400 ml
Filling	Cartridge	Cartridge/ grease container	Filler fitting	Screw cap
Number of pump elements (outlets)	1	1	1	1
sound pressure level	< 70 dB (A)	< 70 dB (A)	< 70 dB (A)	< 70 dB (A)
Weight of the empty pump	approx. 3.3 kg	approx. 4.2 kg	approx. 7.2 kg	approx. 4.2 kg
Installation position		vertical, i. e. reservoir on top, optional with cartridge		

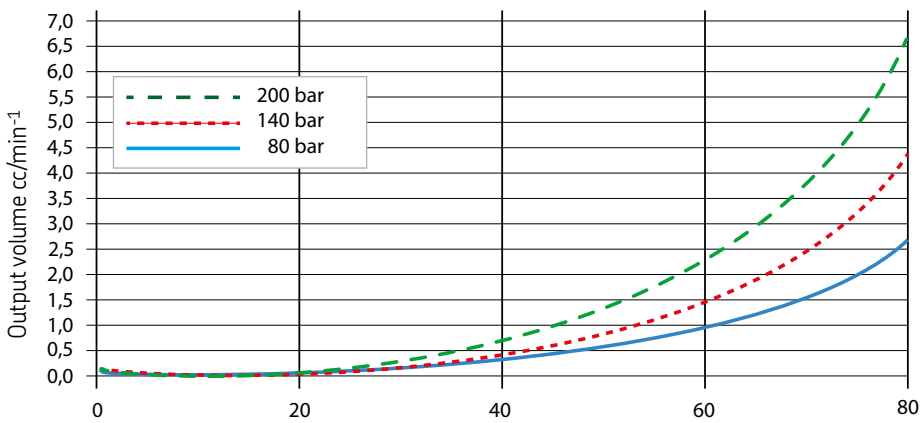
[1)] When pumping chisel paste always use the 120 bar pressure control valve
[2)] HTL 01 K7 also available with 270 bar pressure control valve

4.2 Nominal output volumes

Pump element	C7 or K7
Nominal output per stroke	0.22 cm^3

This information applies for greases of NLGI class 2 at 40 °C and 100 bar counterpressure and the hydraulic operating pressure indicated in the diagram. Output volumes can be increased or reduced by turning the throttle into the plus or minus direction.
Adjusting of the output volume, see chapter 6.4

4.2.1 Output diagram



The pump is factory-set to maximum output (throttle notch position 80).

At maximum output and 200 bar operating pressure refilling may become necessary already after about 1 hour of continuous operation (1.5 l steel reservoir after about 3 hours).

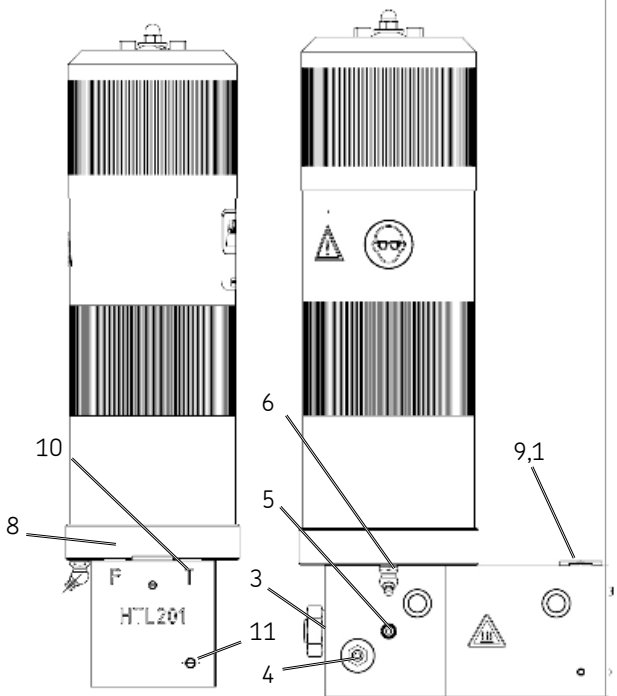
Overview Fig. 4

4.3 Tightening torques

Observe the specified torques.

No.	Component	Tightening torque
3	Pump element with integrated check valve	25 Nm ± 2.0 Nm
4	Emergency lubrication nipple	14 Nm ± 1.0 Nm
5	Vent screw	3 Nm ± 0.1 Nm
6	Filler nipple	14 Nm ± 1.0 Nm
8	Screw union P (hydraulic system)	20 Nm ± 2.0 Nm
9.1	Plug screw throttle	10 Nm ± 1.0 Nm
10	Screw union T (hydraulic system)	20 Nm ± 2.0 Nm
11	Pressure limiting valve (concealed)	8 Nm + 1.0 Nm
12	Fastening screws M5, adapter for lubricant reservoir XF 0.4l	10 Nm ± 1.0 Nm
13	Fastening screws M8, for lubricant reservoir XF 1.5	16 Nm ± 1.0 Nm

If no torques are specified, use those specified for screws of strength class 8.8



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)

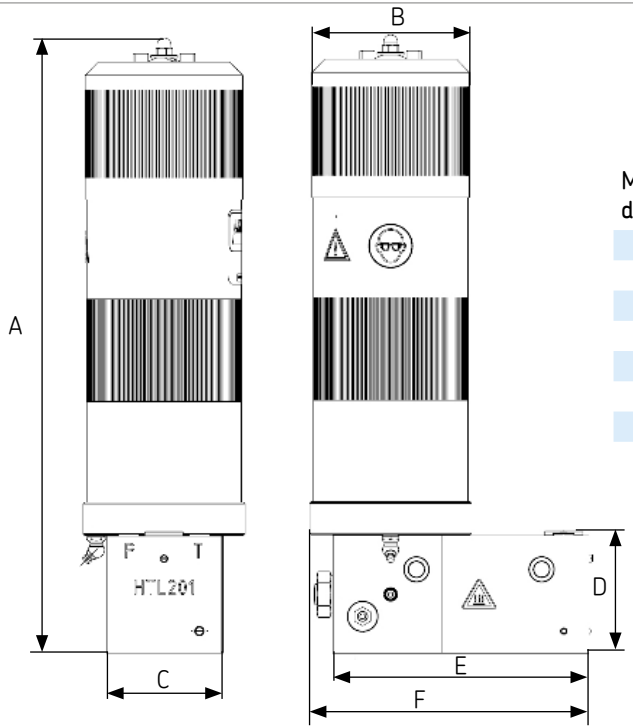
Before application inspect the products with regard to possible damages occurred during their storage. This particularly applies for parts made out of plastic and rubber (embrittlement) as well as for components primed with lubricant (ageing).

5.4 Mechanical connection

5.4.1 Minimum assembly dimensions

Ensure sufficient space for maintenance work or for a possible disassembly of the product by leaving a free space of at least 100 mm into each direction in addition to the stated dimensions, see page 28.

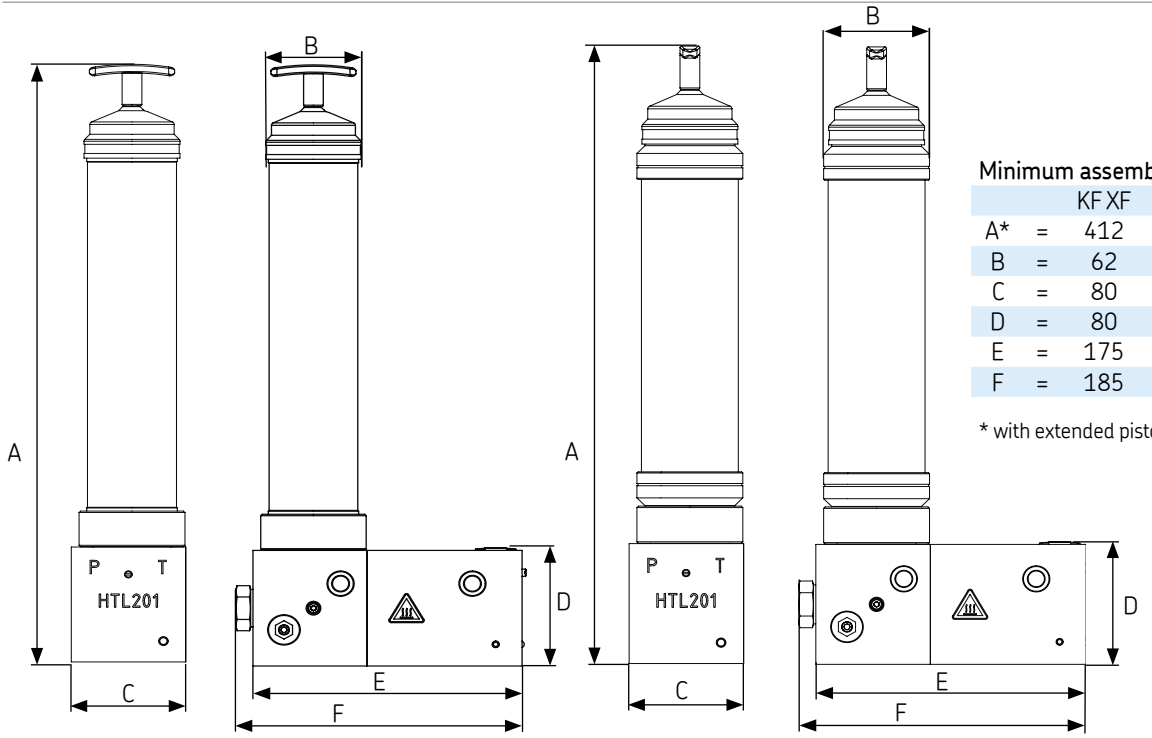
Minimum assembly dimensions 1.5 l steel reservoir Fig. 5



Minimum assembly dimensions

		Steel 1.5 l	
A	=	440	mm
B	=	110	mm
C	=	80	mm
D	=	80	mm
E	=	175	mm
F	=	185	mm

Minimum assembly dimensions KF XF and ST FX reservoirs Fig. 6

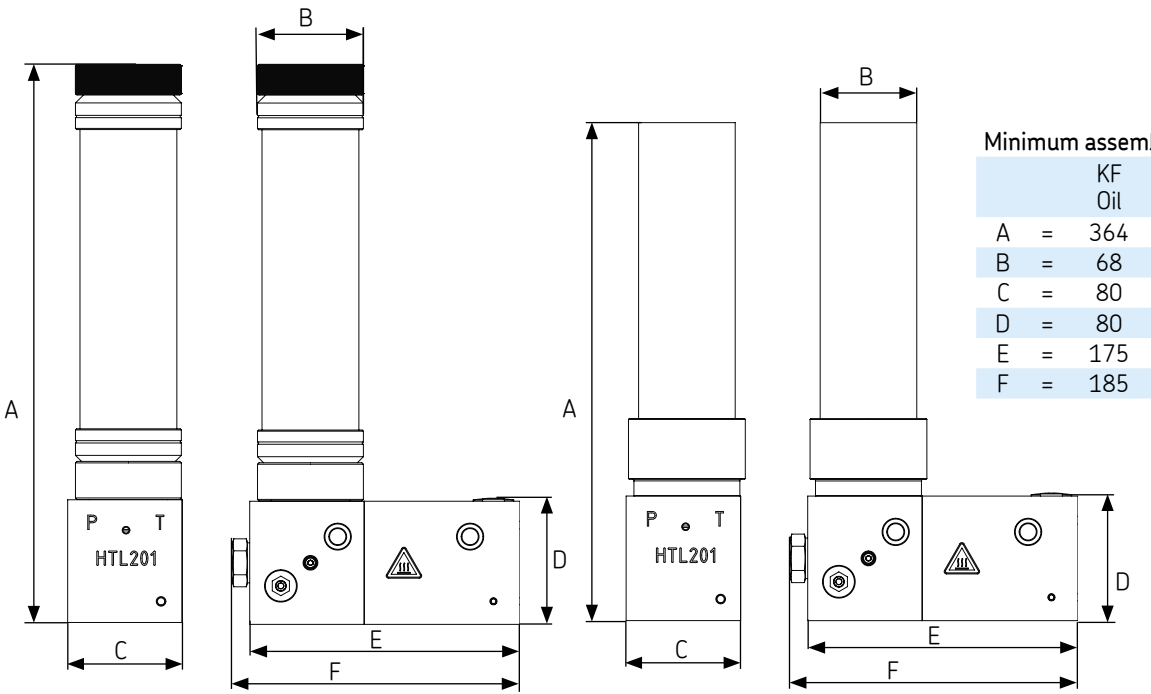


Minimum assembly dimensions

		KF XF	ST XF	
A*	=	412	416	mm
B	=	62	62	mm
C	=	80	80	mm
D	=	80	80	mm
E	=	175	175	mm
F	=	185	185	mm

* with extended piston rod

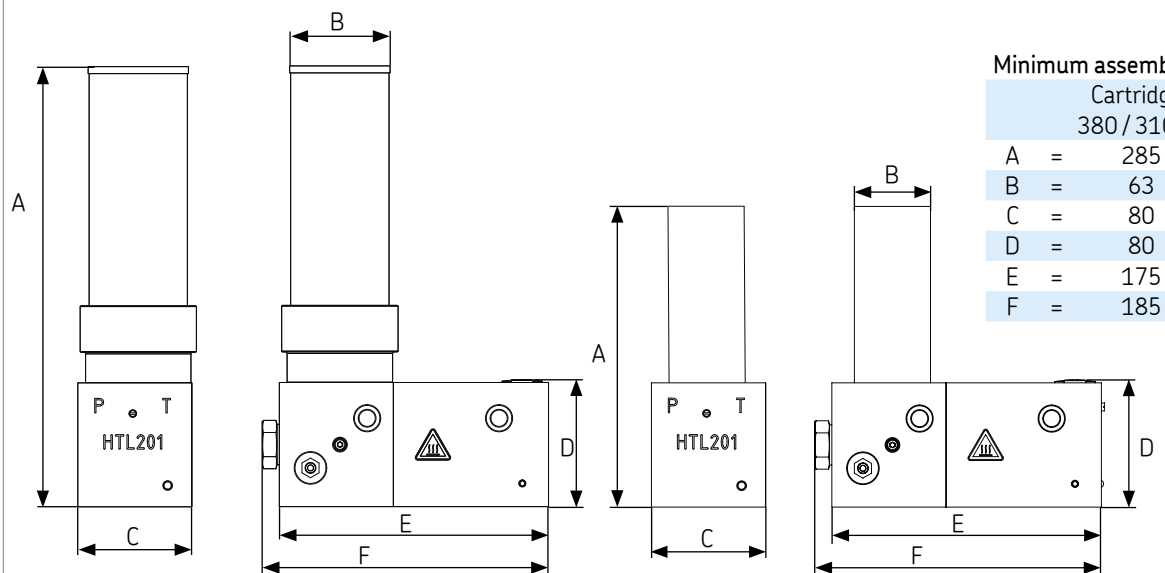
Minimum installation dimensions KF oil reservoir and 500 ml cartridge Fig. 7



Minimum assembly dimensions

		KF Oil	Cartridge 500 ml	
A	=	364	320	mm
B	=	68	62	mm
C	=	80	80	mm
D	=	80	80	mm
E	=	175	175	mm
F	=	185	185	mm

Minimum installation dimensions 380, 310 and 150 ml cartridges Fig. 8



Minimum assembly dimensions

		Cartridges 380 / 310 ml	
A	=	285	mm
B	=	63	mm
C	=	80	mm
D	=	80	mm
E	=	175	mm
F	=	185	mm

6. Installation

6.1 General information

Only qualified technical personnel may install, operate, maintain, and repair the products described in these Instructions.

During assembly and particularly during any drilling work always 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.
- Installation bores for fastening have to be provided according to the indications made in the corresponding chapter of the variant described.

6.1.1 Installation bores

The product is fastened on the 2 mounting bores (7). For correct installation the pump housing (2) has to be underlaid with a suitable distance piece (12) made of steel exceeding the diameter of the lubricant reservoir (1).

The free space for the pressure control valve (11), predetermined by the two distance holders of the pump housing, must be maintained.

For underlaying no elastic materials, e.g. rubber or plastic, may be used.

Fastening is done by means of:

2 x screw M10 (screw strength class 8.8)

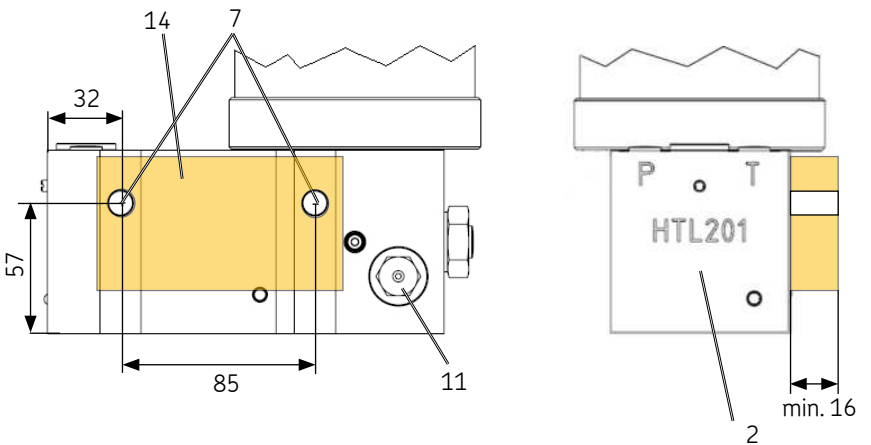
2 x hex nut M10

2 x washer 10

The screws lengths depend on the actual installation situation.

Tightening torque: see technical literature for 8.8 screws.

Installation bores Fig. 9



6.2 Hydraulic lines

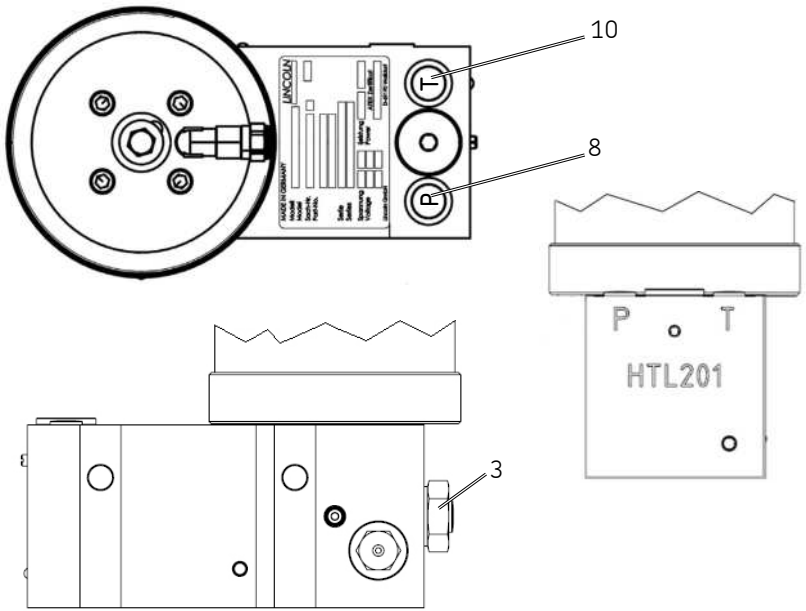
Use suitable hydraulic fittings and lines to connect the pump with the pressure connection P (8) and the return-line connection T (10) to the hydraulic circuit of the superior machine / the carrier system.

Do not mix up pressure connection P (8) and return-line connection T (10). Connection measures, see chapter 4.1.

6.3 Supply lines

Connect the HTL201 pump to the pump element (3) with suitable fitting and lubrication line and provide a connection to the lubrication point.

Connecting hydraulic lines Fig. 10



6.4 Adjusting the output volume

During pump operation the output volume must never be changed. The pump is factory-set to maximum output.

- Switch off the hydraulic system of the superior machine or carrier system.
- Determine the required lubricant volume and notch position of the throttle (by means of the output diagram).
- Remove closure screw (9.1).
- To adjust the output volume, turn the throttle (9) by the corresponding number of notch positions forward or backward.

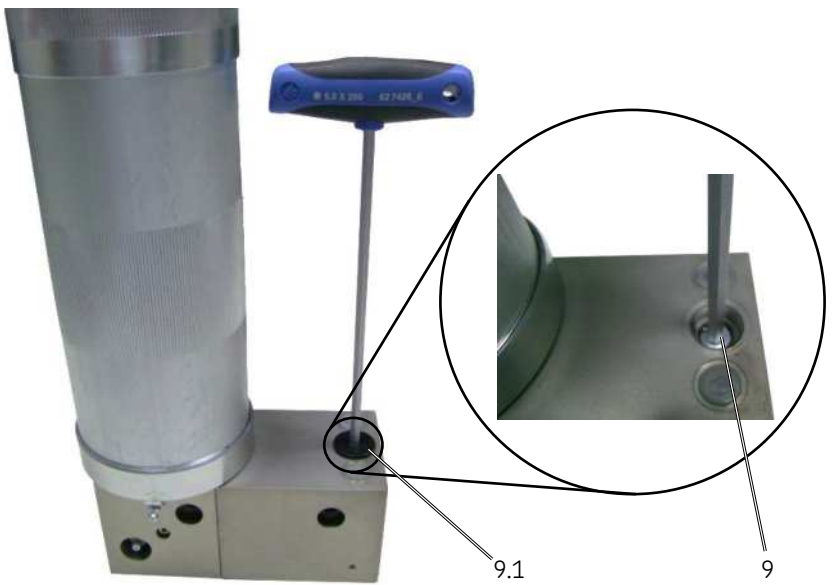
↻ = Reduction of the output.

↺= Increase of the output.

- Reinstall closure screw (9.1).

Tightening torque = 10 Nm ± 1.0 Nm

Adjusting of the output volume Fig. 11



6.5 Filling with lubricant

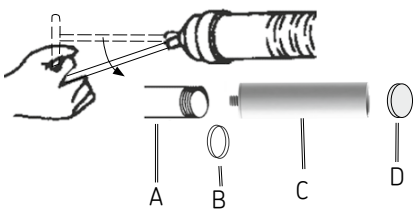
6.5.1 Operation with lubricant cartridge (310 ml) without press reservoir

- Remove empty cartridge.
- Cut off the tip of the threaded collar of the new cartridge.
- Push the follower piston into the cartridge using light pressure until grease will leak from the open threaded collar.
- Position cartridge into the bore of the HTL housing using light pressure and tighten by hand.
- Remove air inclusions, if any (see chapter 6.11 Venting of the pump).

6.5.2 Operation with lubricant cartridge (400 ml) with press reservoir

- Unscrew the grease reservoir assy. from the HTL adapter.
- Use the handle to pull the drive rod together with the follower piston backward to that extent that the groove in the drive rod engages in the notch of the reservoir closure cap.
- Use the handle to carefully unlock the drive rod and let it return into the press reservoir; thereby the empty cartridge will be ejected.
- For initial filling with a 400 ml lubricant cartridge adapt the filling variant (Fig. 13).
- Remove plastic cover (Fig. 12; a) from grease cartridge (C) and push the cartridge with this side into the press reservoir (A).
- Remove the tear-off lid (D) from the grease cartridge and then screw the grease reservoir assy. to the HTL adapter.

Engage the drive rod Fig. 12



- Disengage the drive rod from the reservoir closure cap.
- Remove air inclusions, if any (see chapter 6.11 Venting of the pump).

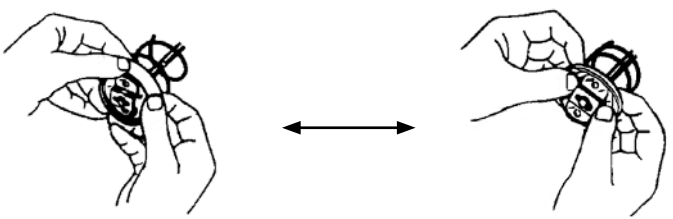
6.5.3 Adjust the filling variant:

- Unscrew the reservoir (grease gun) from the housing of the HTL201.
- Check the follower piston collar and adjust it, if necessary:
- Unscrew the reservoir closure cap.
- Use the handle to pull the drive rod together with the follower piston out of the press reservoir.
- Turn the inside of the follower piston collar out (Fig. 13).
- Reinstallation of the follower piston.
- Screw the closure cap to the press reservoir.

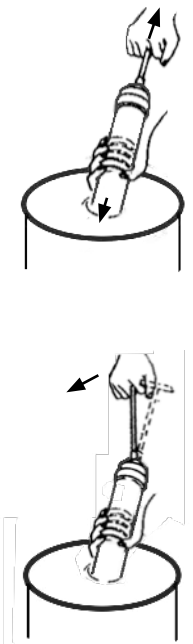
6.6 Operation with bulk grease filling in the press reservoir

- For initial filling with bulk grease adapt the filling variant (Fig. 14).
- Unscrew the grease reservoir assy. from the HTL adapter.
- Immerse the open end of the press reservoir in the grease container. Slowly pull the handle backwards while at the same time following the lowering filling level in the grease reservoir. Doing so prevents air from being sucked into the press reservoir during the filling procedure (Fig. 14).
- Use the handle to slowly pull the drive rod together with the follower piston backward to that extent that the groove in the drive rod becomes visible and laterally engages in the notch of the reservoir closure cap (Fig. 14).
- Fasten the filled press reservoir again.
- Disengage the drive rod from the reservoir closure cap via the handle.
- Remove air inclusions, if any (see chapter 6.11 Venting of the pump).

Adjusting of the follower piston collar Fig. 13



Fill in lubricant Fig. 14



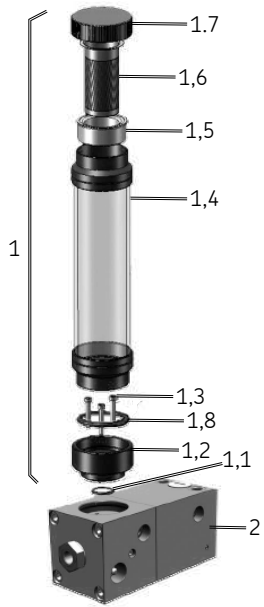
6.7 Reservoir for oil

- Before the initial equipment or replacement of a reservoir for oi (1) or with a press reservoir the cartridge housing must be provided with an adapter (1.2 to 1.4 and 1.9).

6.7.1 Filling

- Unscrew the screw cap (1.7) from the reservoir (1.5).
- Fill lubrication oil in via the strainer (1.7).
- After filling close the reservoir (1.5) again with the screw cap (1.8).

Reservoir for oil assembled Fig. 15



Item.	Component
1	Oil reservoir assy.
1.2	O-ring
1.3	Adapter
1.4	M5x 25 hexagonal socket head screws
1.5	Reservoir
1.6	Strainer insert
1.7	Strainer
1.8	Screw cap
1.9	Seal (for press reservoir only)
2	Pump housing

Fig. 15

	1.2	1,3	1,4	1,5	1,6	1,7	1,8	1,9	Part number
Oil reservoir	x	x	x	x	x	x	x		542-33134-1
Adapter for presses	x	x	x				x	x	542-33133-1

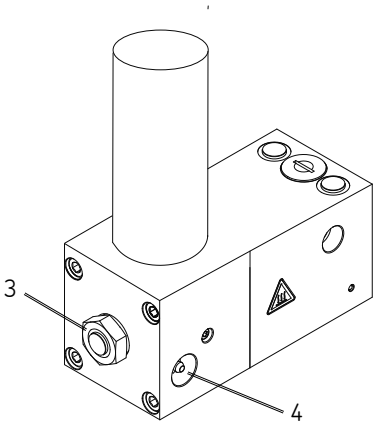
6.8 Initial placement of a cartridge

- Lightly grease the O-ring included in the adapter.
- Cut off the tip of the threaded collar of a new cartridge.
- Insert cartridge into bore by pushing it slightly and then hand-tighten it to the housing.
- Vent the pump (see chapter 6.11)
- Switch on the carrier device to let the pump run until lubricant leaks from the pump element (3).

The pump conveys the lubricant very slowly. In can take some time until lubricant leaks from the outlets without air.

- Connect the lubrication line to the pump element (3).
- Manual lubrication can be effected by means of a hand lever grease gun via the emergency lubrication fitting (4).

Initial placement of a cartridge Fig. 16



6.9 Mounting the adapter for Lube-Shuttle system cartridges

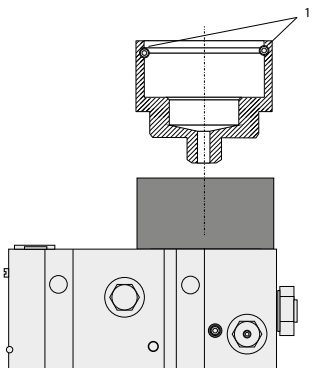
To mount the adapter for the Lube-Shuttle system cartridges, proceed as follows.

- Check the adapter for Lube-Shuttle system cartridges for contamination and damage.
- If necessary, completely remove all parts located in the upper pump housing such as reservoir, adapter for the oil reservoir, O-rings, etc.
- Clean the assembly area, if need be. No contamination must get inside the pump housing.
- Screw the adapter for Lube-Shuttle system cartridges into the pump housing. Screw the adapter in so far that its end face rests evenly on the pump housing.
- Insert O-ring(1)

Tightening torque = 20 Nm + 2.0 Nm

Screwing the adapter for Lube-Shuttle system cartridges Fig. 17

Adapter for Lube-Shuttle system cartridges mounted Fig. 18



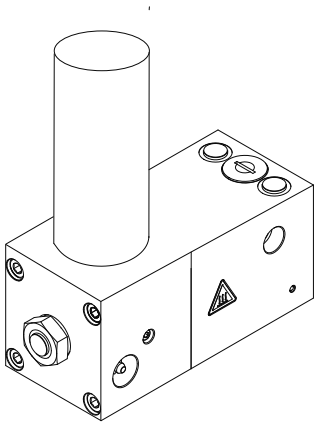
6.10 Replacing the cartridge

- Switch off the carrier device.
- Remove the old cartridge unscrewing it anticlockwise.
- Cut off the tip of the threaded collar of a new cartridge.
- Lightly press the follower piston until grease leaks from the cartridge.
- Insert cartridge into bore by pushing it slightly and then hand-tighten it to the housing.
- The pump is ready for operation again.

If after 2 to 3 minutes the pump still does not supply lubricant, the system must be vented (see chapter 6.12)

.

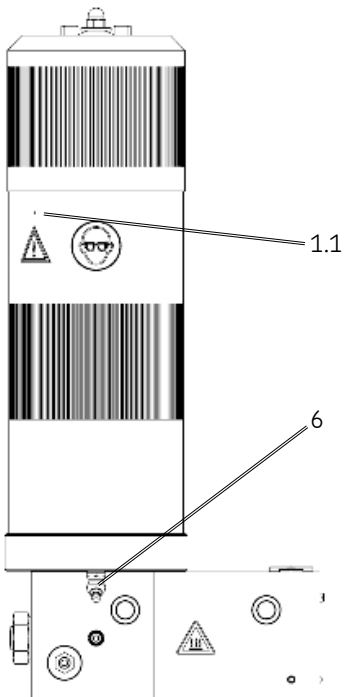
Change of cartridge, Fig. 19



6.11 Filling the 1.5 l steel reservoir with lubricant

- Place the transfer pump with a proper matching part onto the filler fitting (6).
- Switch the transfer pump on and fill the reservoir until lubricant leaks from the bore (1.1) (maximum filling of reservoir).
- Switch off and remove the transfer pump.
- Remove leaked lubricant.

Filling the 1.5 l steel reservoir with lubricant Fig. 20



6.12 Venting of the pump

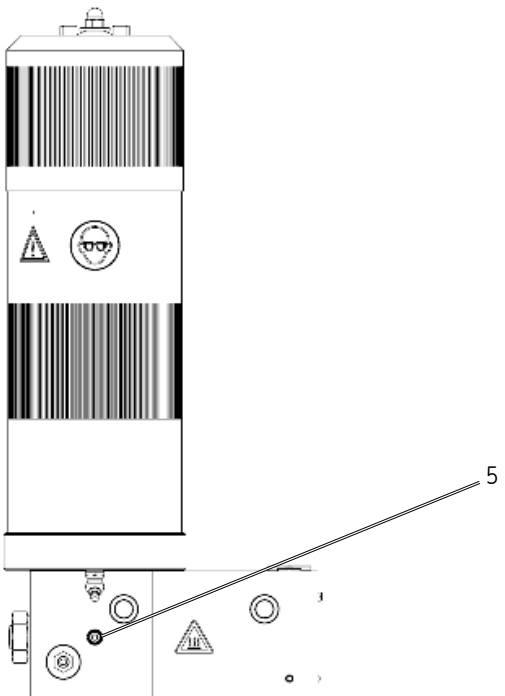
Vent the pump after each filling of the reservoir. By doing so a possible functional failure of the pump due to air inclusions can be avoided.

During the reservoir filling procedure the vent screw must not be open. Otherwise the lubricant would leak directly from the vent screw.

- Loosen vent screw (5) until a small amount of lubricant leaks from it. Then firmly tighten the vent screw again.

Tightening torque = 3 Nm ± 0.1 Nm

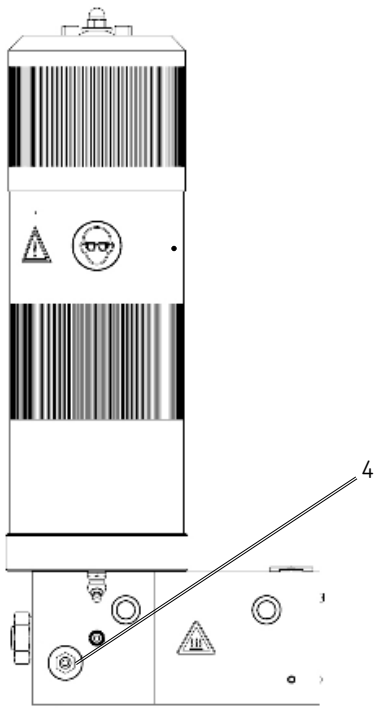
Venting of the pump Fig. 21



6.13 Emergency lubrication

- Place the transfer pump with a proper matching part onto the emergency lubrication fitting (4).
- Switch the transfer pump on and carry out an emergency lubrication until the connected lubrication points are provided with a sufficient amount of lubricant.
- Switch the transfer pump off and remove it from the emergency lubrication fitting (4) of the pump.

Emergency lubrication via emergency lubrication fitting Fig. 22



6.14 Lubrication line connection

CAUTION

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

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

All components of the centralized lubrication system must be laid out for:

- the maximum arising operating pressure
- the operating 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.
- The main lubrication line should be laid preferably rising with a possibility to vent it at its highest point. Lubrication lines shall generally be laid in such way that there can never be created air pockets at any point.
- Mount the lubricant metering devices at the end of the main lubrication line in such way that the outlets of the lubricant metering devices show upwards.
- If lubricant metering devices have to be mounted below the main lubrication line, then this should not be done at the end of the main lubrication line.
- The lubricant flow should not be impeded by the installation of sharp elbows, angle valves, gaskets protruding to the inside, or cross-section changes (big to small). Provide unavoidable changes of the cross sections in the lubrication lines with as smooth transitions as possible.

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 connection carried out correctly	☐	☐
Hydraulic 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	☐	☐
Reservoir/ cartridge completely filled with lubricant. The refilling interval was determined correctly by means of the throttle position and the operating pressure of the carrier system (see output diagram) and is known to the responsible person.	☐	☐
The pump was vented correctly via the vent screws	☐	☐
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	☐	☐
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	☐	☐
Bearings and friction points are provided with the planned amount of lubricant	☐	☐

8. Operation

SKF products operate automatically to the greatest possible extent.

Basically, activities during standard operation are limited to:

- Filling with lubricant (see 6.5)
- Venting after filling with lubricant (see 6.12)
- Cleaning/replacing the oil strainer (see 10.1)

9. Cleaning

WARNING

Electric shock

Use steam-jet cleaners or high-pressure cleaners only in accordance with the IP protection class of the superior machine. Otherwise electrical components may be damaged.

Carry out cleaning works only on depressurized products that have been disconnected from the power supply. Do not touch cables or electrical components with wet or damp hands.

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 2.3).

Thoroughly remove residues of cleaning agents from the product and rinse off with clear water. Thus the formation of lye stone is avoided.

9.2 Exterior cleaning

- Mark and secure wet areas.
- Keep unauthorized persons away.
- Thorough cleaning of all outer surfaces with a damp cloth.

Make sure to keep the reservoir closed during the cleaning procedure.

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 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.

Maintenance check list

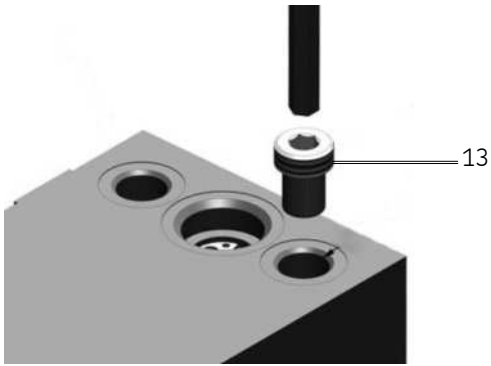
Activity to be done	YES	NO
Mechanical connection carried out correctly	☐	☐
Hydraulic connections carried out correctly	☐	☐
All components, such as lubrication lines and metering devices, have been correctly installed	☐	☐
No visible damage, contamination and corrosion	☐	☐
Any dismantled protection and monitoring equipment has been reassembled and checked for correct function	☐	☐
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	☐	☐
Lubricant is supplied free from bubbles	☐	☐
Bearings and friction points are provided with the planned amount of lubricant	☐	☐

10.1 Clean or replace oil strainer

The oil strainer must be cleaned or replaced every 1,000 operating hours.

- Switch off the hydraulic system of the superior machine
- Remove fitting of hydraulic connection P
- Remove the oil strainer (13) and clean respectively replace it
- Screw oil strainer (13) in again and reinstall the fitting of the hydraulic connection P
- Switch off the hydraulic system of the superior machine again

Clean or replace oil strainer Fig. 23



11. Troubleshooting

Fault table 2

Fault	Possible cause	Remedy
Pump does not supply any lubricant	○ Hydraulic system of carrier device is switched off ○ Pressure in the hydraulic system is too low (< 80 bar) ○ Lubricant reservoir is empty ○ Pressure line P and return line T swapped during installation ○ Air pockets in the suction area ○ Hydraulic oil temperature is too low (too high viscosity). (This fault typically happens only when starting the work)	○ Switch the hydraulic system on ○ Check the hydraulic system ○ Check and correct, if necessary ○ Correct the connection of the pump Vent the HTL201 ○ Let the superior machine, into which the pump is integrated, run for some minutes until the hydraulic oil will have heated up.
Pump supplies too little/ too much lubricant	○ Throttle wrongly adjusted Too little pressure in the hydraulic system	○ Adjust throttle correctly (see chapter 6.4) Check the hydraulic system
Lubricant leaks from the lubricant reservoir or from the adapters	○ Defective sealing ring of the lubricant reservoir and/or of the adapter	○ Replace lubricant reservoir assy. and/or adapter
Hydraulic oil leaking from pressure line P or return line T	○ Fittings tightened incorrectly	○ Check fittings and retighten, if needed

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.

12. Repairs

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
- De-pressurize the product

12.1 Replacing the pressure control valve

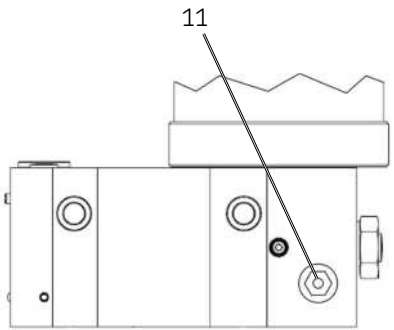
To reach the pressure control valve, depending on the side of attachment of the pump, it may be necessary to disassemble the pump first.

- Unscrew defective pressure control valve (11) at its hexagon out of the pump housing.
- Then screw a new pressure control valve (11) into the pump housing.

Tightening torque = 8 Nm + 1.0 Nm

- If necessary, reassemble the pump (see chapter 6 Assembly).

Replace pressure control valve Fig. 24



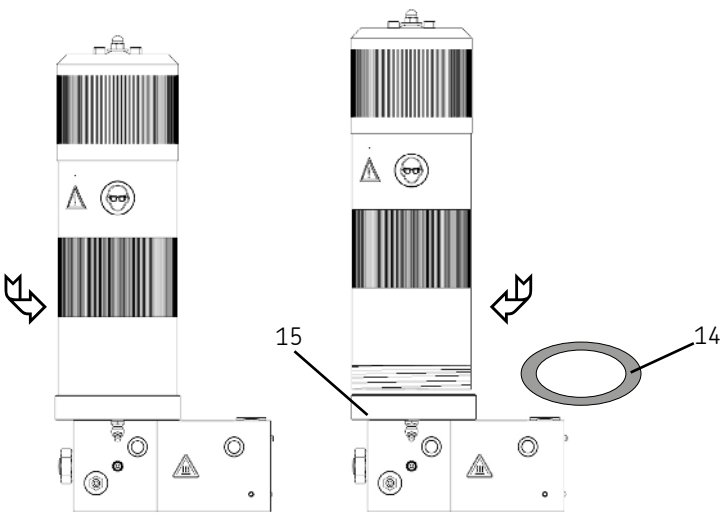
12.2 Replace the 1.5 l steel reservoir

Reservoir should be empty when replacing it. When removing the reservoir, the lubricant inside will leak.

To replace the reservoir proceed as follows:

- A strap wrench may be required to loosen the steel reservoirs. Bind any leaking lubricant and dispose of in an environmentally friendly way.
- Remove and dispose of reservoir in an environmentally sound manner.
- Check flat packing (14) in the connecting adapter (15) for damages and replace by a new flat packing in case of damage.
- Position new reservoir onto the connection thread and tighten clockwise, e.g. by means of a strap wrench.
- Refill reservoir with suitable lubricant.

Replace reservoir Fig. 25



13. Shutdown and disposal

13.1 Temporary shutdown

Temporarily shut the system down by:

- Switching off the superior machine

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

14.1 Pump HTL201

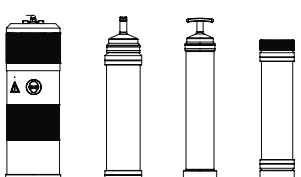
Designation	Qty.	Part number
HTL201 with pump element C7 and 120 bar pressure control valve	1	642-41184-1
HTL201 with pump element K7 and 120 bar pressure control valve	1	642-41184-2
HTL201 with pump element K7 and 270 bar pressure control valve	1	642-41184-4

Fig. 26

14.2 Retrofit kits 0.4 l / spare part for HTL 201-1.5 XF

Designation	Qty.	Part number
Lubricant reservoir 0.4 l KF XF, complete	1	542-33430-1
Lubricant reservoir 0.4 l, steel, XF, complete	1	542-33472-1
Lubricant reservoir 0.4 l, oil, KF, complete	1	542-33134-1
* Spare part for HTL 201-1.5 XF (lubricant reservoir 1.5l, steel, complete)	1	542-60216-1

Fig. 27



14.3 Cartridges

Designation	Qty.	Part number
Cartridge with chisel paste, 310 ml	12	642-37636-2
Cartridge with Renolit LX2, 290 ml	12	6420-00000005

Fig. 28

14.4 Adapter kits

Designation	Qty.	Part number
Adapter kit for 380 ml cartridge	1	542-33136-1
Adapter kit for 500 ml cartridge	1	542-33135-1
Adapter kit for press reservoir	1	542-33133-1
Kit of seals for 380 ml cartridge	1	542-34079-1
Adapter kit for Lube-Shuttle system cartridges (no figure)	1	542-60532-1

Fig. 29

14.5 Pressure control valve

Designation	Qty.	Part number
270 bar pressure control valve	1	235-14343-2
120 bar pressure control valve	1	235-14343-5

Fig. 30

14.6 Oil strainer

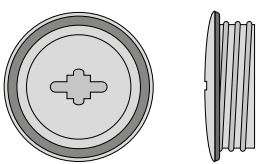
Designation	Qty.	Part number
Oil strainer screw G $^1/_4$ x 17, 100 µm	1	447-72394-1

Fig. 31

14.7 Closure screws

Designation	Qty.	Part number
Closure screw M20 x 1.5 for throttle	1	203-10710-1

Fig. 32



14.8 Filler fitting for 1.5 l steel reservoir

Designation	Qty.	Part number
Filler fitting 1/8“	1	251-14109-6

Fig. 33

14.9 Emergency lubrication fitting

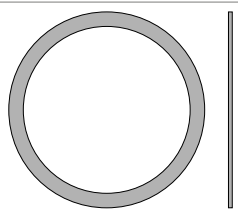
Designation	Qty.	Part number
Emergency lubrication fitting	1	251-14073-9

Fig. 34

14.10 Flat packing for 1.5 l steel reservoir

Designation	Qty.	Part number
Flat packing 103 x 88 x 3	1	306-17831-3

Fig. 35



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