

DOCUMENTATION

Grab type:

MMGL 8000-3-S

Com.-no.:

AB00008697

Serial-no.:

1300 / 1301 / 1302 / 1303

EC Declaration of Conformity in accordance with Machinery Directive 2006/42/EC, Annex II 1.A

The manufacturer / distributor: **Salzgitter Maschinenbau AG**
Windmühlenbergstraße 20-22
38259 Salzgitter

hereby declares that the following product

product name: **PEINER Motor Orange-Peel Grab**
series / type: **MMGL 8000-3-S**
serial number: **1300**

Description:

A grab essentially consisting of the shells, the cross member, the hydraulic system and the lifting cylinders

complies with all relevant provisions of the above Directive and other applied directives (listed below) – including their amendments valid at the time of declaration. In case of any modification of the machine that has not been agreed with us, this declaration becomes invalid.

The following harmonised standards were applied:

- | | |
|---------------------|---|
| EN ISO 12100-1:2003 | Safety of machinery - Basic concepts, general principles for design Part 1: Basic terminology, methodology (ISO 12100-1:2003) |
| EN ISO 12100-2:2003 | Safety of machinery - Basic concepts, general principles for design Part 2: Technical principles (ISO 12100-2:2003) |
| EN ISO 13849-1:2008 | Safety of machinery - Safety-related parts of control systems - Part 1: General principles for design (ISO 13849-1:2006) |
| EN ISO 14121-1:2007 | Safety of machinery - Risk assessment – Part 1: Principles (ISO 14121-1:2007) |
| EN 60204-1:2006 | Safety of machinery - Electrical equipment of machines – Part 1: General requirements (IEC 60204-1:2005 (modified)) |
| EN 61000-6-1:2007 | Electromagnetic compatibility (EMC) – Part 6-1: Generic standards - Immunity for residential, commercial and light-industrial environments (IEC 61000-6-1:2005) |

The following national or international standards (or parts/clauses thereof) and specifications were applied:

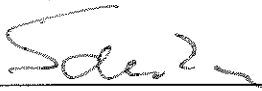
BGR 500 Operation of work equipment BGV D6 Cranes

Name and address of the person authorised to compile the technical documentation:

Salzgitter Maschinenbau AG
Windmühlenbergstraße 20-22
38259 Salzgitter

Place: Salzgitter

Date: **29. März 2012**



Karin Schulze
Substitution Engineering Manager - Grabs

EC Declaration of Conformity in accordance with Machinery Directive 2006/42/EC, Annex II 1.A

The manufacturer / distributor: **Salzgitter Maschinenbau AG**
Windmühlenbergstraße 20-22
38259 Salzgitter

hereby declares that the following product

product name: **PEINER Motor Orange-Peel Grab**
series / type: **MMGL 8000-3-S**
serial number: **1301**

Description:

A grab essentially consisting of the shells, the cross member, the hydraulic system and the lifting cylinders

complies with all relevant provisions of the above Directive and other applied directives (listed below) – including their amendments valid at the time of declaration. In case of any modification of the machine that has not been agreed with us, this declaration becomes invalid.

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38259 Salzgitter

Place: Salzgitter

Date: **29. März 2012**



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Substitution Engineering Manager - Grabs

EC Declaration of Conformity in accordance with Machinery Directive 2006/42/EC, Annex II 1.A

The manufacturer / distributor: **Salzgitter Maschinenbau AG**
Windmühlenbergstraße 20-22
38259 Salzgitter

hereby declares that the following product

product name: **PEINER Motor Orange-Peel Grab**
series / type: **MMGL 8000-3-S**
serial number: **1302**

Description:

A grab essentially consisting of the shells, the cross member, the hydraulic system and the lifting cylinders

complies with all relevant provisions of the above Directive and other applied directives (listed below) – including their amendments valid at the time of declaration. In case of any modification of the machine that has not been agreed with us, this declaration becomes invalid.

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Name and address of the person authorised to compile the technical documentation:

Salzgitter Maschinenbau AG
Windmühlenbergstraße 20-22
38259 Salzgitter

Place: Salzgitter

Date: **29. März 2012**



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Substitution Engineering Manager - Grabs

EC Declaration of Conformity in accordance with Machinery Directive 2006/42/EC, Annex II 1.A

The manufacturer / distributor: **Salzgitter Maschinenbau AG**
Windmühlenbergstraße 20-22
38259 Salzgitter

hereby declares that the following product

product name: **PEINER Motor Orange-Peel Grab**
series / type: **MMGL 8000-3-S**
serial number: **1303**

Description:

A grab essentially consisting of the shells, the cross member, the hydraulic system and the lifting cylinders

complies with all relevant provisions of the above Directive and other applied directives (listed below) – including their amendments valid at the time of declaration. In case of any modification of the machine that has not been agreed with us, this declaration becomes invalid.

The following harmonised standards were applied:

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Windmühlenbergstraße 20-22
38259 Salzgitter

Place: Salzgitter

Date: **29. März 2012**



Karin Schulze
Substitution Engineering Manager - Grabs

Certificate

Qualification of the manufacturer for welding of steel structures complying with DIN 18800-7: 2008-11

Class E

This is to certify that the company **Salzgitter Maschinenbau AG**

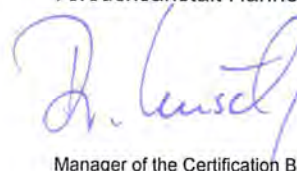
in the plant **38259 Salzgitter, Windmühlenbergstr. 20 - 22**

has the required personnel and equipment to carry out welding works for manufacturing supporting steel structures in the following fields of application:

Standards/Regulations	DIN 18800-7 DIN 15018 DIN 4131
Welding Processes (Reference no. acc. to DIN EN ISO 4063)	111 manual arc welding 121 submerged arc welding 135 metal active gas welding 136 metal active gas welding with flux-cored wire electrode
Parent Metals	S235, S275, S355, S460 according to the currently valid list of building parts and to the adaptation rules of the German steel design code Stainless steels as per homologation certificate Z-30.3-6 DIBt S690Q as per homologation certificate Z-30.1.1 DIBt
Extensions/Restrictions	-
Responsible welding coordinator (Surname, Name, Date of birth, Qualification)	Herbert Engeler, born 22.04.1955 Welding Engineer
Substitute (Surname, Name, Date of birth, Qualification)	-
Remarks	Further substitutes of the welding coordinator: Joachim Kuhn, born 25.03.1962, Welding-Expert Torsten Gödecke, born 27.08.1965, Welding-Expert Ali Örs, born 02.03.1964, Welding-Expert
Period of validity	from 03.12.2009 to 02.12.2012
Number of certificate	2009 700 0696/E
Issued on	16.12.2009 Baumbach/SU
General requirements see reverse	



Schweißtechnische Lehr- und
Versuchsanstalt Hannover



Manager of the Certification Body
(Name/Signature)

C o n t e n t s

	Page No.	Class No.
Data sheet		
1.0 Safety		
1.1 About this Document	2-1	A 04.1400-1 E
1.2 Audience	2-1	A 04.1400-1 E
1.3 Intended Use	2-1	A 04.1400-1 E
1.4 Fundamental Safety Notes	2-2	A 04.1400-2 E
1.4.1 Warning Notes	2-2	A 04.1400-2 E
1.4.2 Safety Symbols	2-2	A 04.1400-2 E
1.4.3 Organizational Measures	2-3	A 04.1400-3 E
1.4.4 Personnel Selection and Qualification	2-4	A 04.1400-4 E
1.4.5 Measures to be Performed by the Operating Company	2-4	A 04.1400-4 E
1.4.6 Measures to be Performed by the Operator	2-5	A 04.1400-5 E
1.4.7 Measures for the Maintenance, Servicing and Repair	2-5	A 04.1400/5-6 E
1.4.8 Safety Notes for the Electrical System	2-6	A 04.1400/6-7 E
1.4.9 Safety Notes for the Hydraulic System	2-7	A 04.1400-7 E
1.4.10 Handling of Oil, Grease and Other Chemical Substances	2-7	A 04.1400-7 E
2.0 Description and Survey of Features		
2.1 Base unit: Constructional and Functional Description		
2.1.1 Constructional Description	3-1	A 03.1527 E
2.1.2 Functional Description	4/1-5	A 03.1581/1-5 E
2.2 Hydraulic diagram – 2303.6505	5/1-2	A 04.1615/1-2 E
2.4 Parts list	7-1	A 03.1698 E
3.0 Operating instructions		
3.1 Details for safe use	8/1-2	A 03.1711/1-2 E
3.2 Putting into operation		
3.2.1 Initial start-up	8/3-6	A 03.1711/3-7 E
3.2.2 Daily start-up	8/7-8	A 03.1711/8-14 E
3.3 Information for operation	9-1	A 03.1701 E
3.4 Shut-down	9-2	A 03.1712-1 E
3.5 Reoperation	9-2	A 03.1712-1 E

Original operating instructions

C o n t e n t s

	Page No.	Class No.
3.6 Transportation	9-2	A 03.1712/1-2 E
4.0 Maintenance and repair		
4.1 Maintenance	10-1	A 03.1817-1 E
4.1.1 Hydraulic fluid change	10-1	A 03.1817/2-5 E
4.1.2 Lubrication instructions	10-1	A 03.1817/6-7 E
4.1.4 Oil filter	10-1	A 03.1817-7 E
4.1.5 Motor	10-1	A 03.1817-7 E
4.2 Required checks	10-2	A 03.1878-1 E
4.2.1 Inspection of chains and individual chain links	10-2	A 03.1878/2-3 E
4.2.2 Inspection of shackles	10-2	A 03.1878-3 E
4.2.3 Check of bushes for wear	10-2	A 03.1878-4 E
4.2.4 Check of hydraulic hose lines	10-2	A 03.1878/5-6 E
4.2.5 Check oil level	10-2	A 03.1878-7 E
4.2.6 Check and adjust pressure	10-2	A 03.1878/8-17 E
4.3 Repair		
4.3.1 Important instructions for repairs	10-3	A 03.1904/1-2 E
4.3.2 Disassembly	10-3	A 03.1904-3 E
4.3.3 Repair works	10-4	A 03.1957 E
4.3.4 Assembly	10-5	A 03.2000 E
4.3.5 Control block	10-6	A 01.0925/1-2 E
4.4 Table of recommended hydraulic oil	11/1-2	A 05.1807/1-2 E
4.5 Lubricant recommendation	11/3-6	A 05.1807/3-6 E
5.0 Failure - Symptoms - Sources of failures		
5.1 Grab not functioning	12/1-2	A 01.0958-1 E
5.2 Grab malfunctioning	12/1-2	A 01.0958-2 E
5.3 Failure of hydraulic system	12/1-2	A 01.0958-2 E
6.0 Spare parts list and electric equipment		

Original operating instructions

 Salzgitter Maschinenbau AG
 Windmühlenbergstraße 20-22
 38259 Salzgitter / Germany

 Phone:
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 E-mail:
peiner@smag.de
 Internet:
www.smag.de
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 Board of management:
 Sebastian H. Brandes (Chairman),
 Jürgen Bialek,
 Chairman of the Supervisory Board:
 Ulrich Decker

 Domicile of company: Salzgitter Bad
 Registration court:
 Amtsgericht Braunschweig
 Registration number:
 HRB 201 389

Order no.: AB00008697
Product: MMGL 8000-3
Material no.: 1000062713 Operating instructions: A 03.0131
Serial no.: 1300 / 1301 / 1302 / 1303
Year of construction: 2012
Deadweight: 8690 kg
Required crane lifting capacity: 32.690 kg

Filling volume / admissible lifting capacity

Filling volume [m³]	Piled density [t/m³]	adm. lifting capacity / SWL [t]
8,0	3,0	24,0

Bulk material: scrap

Theoretical working times (free in space / without picking up bulk material)

	50 Hz	60 Hz
Opening of grab	11 sec.	9 sec.
Closing of grab	19 sec.	16 sec.

Electric Data

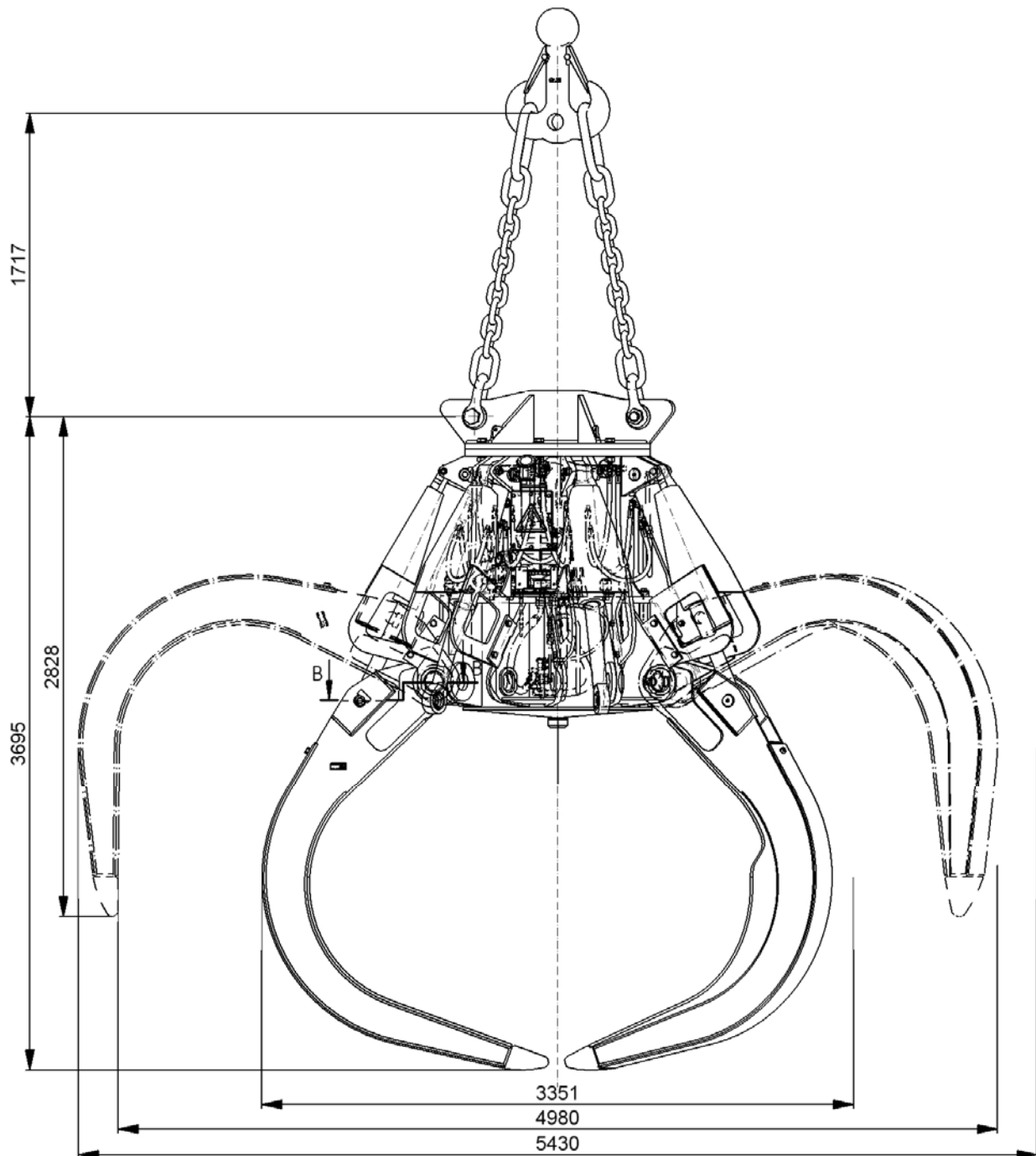
Mode of operation:	S6 / S3	System of protection:	IP 65
Motor type: (8111628)	225S-4	Insulation class:	H
Intermittent service:	40 % duty cycle	max. duty classification:	120/h
Motor power:	35 / 54 kW	Circuit diagram no.:	1000062714
Voltage:	380 / 440 V	Plug-in connector:	Leidel D58
Frequency:	50 / 60 Hz	Control voltage:	230 V AC
Current:	threephase		
Rated current:	68,5 / 88 A ± 10 %		

Hydraulic Data

max. service pressure	Opening of grab [± 10 bar]	Closing of grab [± 10 bar]
Measuring point MA		
Measuring point MB		
Measuring point MP		
Measuring point MP1		230
Measuring point MP2	120	
Measuring point MLS		

Pump type:	V30D-095
Control block:	NG30N-LS
Cylinder size:	120/80x500 stroke
Filled oil quality:	HLP 46
Oil tank capacity:	440 l
Filter type:	E 453-278
Filter mesh:	β _{16(c)} = 200 Exapor
Admissible service temperature:	- 5 °C up to + 85 °C

Dimensions



1.0 Safety

1.1 About this Document

This operating manual is part of the machine and describes the safe and correct use in all operational phases.

We reserve the right to make changes to our products in the interest of further development.

- ▶ Adhere to the operating instructions when using this machine.
- ▶ Always keep the service manual close to the machine.
- ▶ Retain this service manual for further use.
- ▶ Hand over the service manual to any further proprietor or user of the machine.

1.2 Audience

The audience of this operating manual is the technical personnel.

The machine must only be used, maintained and/or repaired by technically skilled personnel that is used to carry out such work.

1.3 Intended use

The grab has been designed for industrial applications.

The grab has exclusively been designed to handle bulk material in compliance with the performance parameters specified in the Technical Data.

Assembly and connection of the grab must be in compliance with these instructions and with the specifications on the nameplate. All specifications must urgently be adhered to.

Intended use includes adherence to the operating instructions of this grab and to the inspection and maintenance instructions.

The manufacturer does not accept any responsibility for any resulting damage caused by improper use. The operating company alone carries the risk here.

An improper use is, for example:

- Any loading that exceeds the permitted capacity (see SWL indicated on the grab)
- Horizontal movement of non-freely hanging loads
- Adding to the load once it has already been raised
- Causing the load to oscillate
- Lifting or dragging loads diagonally from the location
- Demolition work and tearing off loads
- Riding on the load or on the grab
- Use of the grab by unskilled personnel
- Operation of the grab at a higher working pressure than allowed.
- Exceeding of the admissible on-time (see Technical Data)
- Use of the grab in explosive atmosphere

1.4 Fundamental Safety Notes

1.4.1 Warning Notes

Warning notes in this operating manual indicate particular dangers and mention measures for the avoidance of the danger.

There are four levels of warning notes:

Signal word	Meaning
DANGER	Immediate potential danger Death or severe injury occurs
WARNING	Possible potential danger Death or severe injury can occur
CAUTION (personal injury)	Possible potential danger Minor injury can occur
CAUTION (damage to property)	Possible potential danger Damage to property can occur

Warning notes have the following form:



DANGER

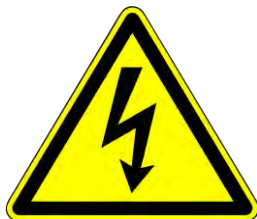
Type and source of the danger

Possible consequences, explanation of the danger.

⊘ Do **not** do ...

► Perform these measures.

1.4.2 Safety Symbols



Warning of electrical dangers

1.4.3 Organizational Measures

Always keep the service manual at the place of operation of the grab!

In addition to the operating manual, observe generally valid legal and other binding regulations for accident prevention and for environmental protection! Such obligations can also concern, for example, the handling of dangerous materials or the provision/wearing of personal protective equipment or traffic safety regulations.

The grab has been built in accordance with the state of the art and is reliable if used as specified. However, dangers might emanate from this machine if it is operated improperly by uninstructed or disregarding personal or used for any other purpose than it is intended for. (see 1.3 Intended use, page no. 1-1). The manufacturer will not be liable for any other use in excess of the intended use nor for any damages resulting therefrom. The user alone will bear such risk.

The grab must only be operated in perfect technical condition.

During operation of the grab keep sufficient safe distance to the load and to the grab! Don't stay under the grab or the load!

The personnel who is assigned to work on the grab must have read the operating instructions, in particular the chapter „Safety“ before starting to work. This applies particularly to personnel who only works on the grab occasionally, e. g. for setup or maintenance.

Adhere to all warnings and safety instructions applied to the grab and make sure they are always completely legible!

For safety-relevant malfunctions or changes to the operational state, stop the grab immediately and report the fault to the responsible office/person!

Augment the operating manual with instructions, including supervisory and reporting obligations, to cater for special operational situations, for example, with regard to the work organization, work procedures and the delegated personnel.

Only sling any slinging gear (slinging ropes or chains) to the devices provided for this purpose (e. g. at the shackles).

Check that the carrying capacity of the lifting tackle is adequate for the task before starting hoisting!

Do not make any changes, additions or modifications to the machine that could impair the safety without approval of the vendor! This is also the case for the installation and the calibration of safety equipment and valves. The machine must not be subjected to welding work without prior consent and specifications of the manufacturer.

Spare parts must conform to the technical specifications stipulated by the manufacturer. This is always the case when genuine spare parts are used.

Genuine spare parts are specially designed for the particular machine. Parts and special equipment not supplied by the manufacturer have not been approved. The installation and/or the use of such products can impair the safety. The manufacturer does not accept any liability for damage caused by the use of non-genuine parts or any special equipment.

1.4.4 Personnel Selection and Qualification

Any person who is responsible for assembly/disassembly, putting into operation, operation, maintenance and repair of the grab must have read, understood and adhere to the complete service manual, in particular the chapter „Safety“.

Only authorised, trained and instructed personnel is allowed to run, to maintain and to repair the grab. Such personnel must have been given special instruction in the possible dangers. The personnel must be allowed to reject any safety-endangering instructions from third-parties.

The responsibilities of the personnel for the installation/dismantling, commissioning, operation, maintenance, servicing and repair must be clearly defined and observed!

Make sure that only personnel assigned to run the grab will do so!

Only specialist electricians or instructed personnel under direction and supervision of a specialist electrician are allowed to work on the electric systems of the grab and they must do this in compliance with the electrotechnical regulations.

Work on the hydraulic equipment may be performed only by personnel with special hydraulics knowledge and experience!

The personnel being trained, instructed or participating in a general training may work on the grab only under the continuous supervision of an experienced person!

1.4.5 Measures to be Performed by the Operating Company

The owner must take appropriate maintenance and inspection measures to make sure the grab is always run in a perfect technical condition.

The owner must evidently manage and define the responsibilities for assembly / installation, operation, maintenance and repair.

The owner shall be obliged to make sure that any work on the grab is carried out by well-trained and instructed personnel only who

- is aware of the basic instructions about working safety and prevention of accidents and has been instructed to run the grab;
- has read and understood the safety instructions and warnings in this service manual.

The owner shall be obliged to verify regularly if the personnel works safety-consciously.

The owner shall be obliged to make sure that this service manual is always easily accessible.

1.4.6 Measures to be Performed by the Operator

The regulations applicable to the place of operation must be adhered to. The operation of the grab is in any case subject to the local safety regulations and instructions for the prevention of accidents.

Before putting the grab into operation make sure that nobody might be endangered by operation of the grab! Grab components might automatically restart when the grab is restarted!

The crane operator must at all times be able to see the working area and the load! Ensure adequate lighting in conditions of poor sight and darkness.

Do not stand or work under suspended loads!

Avoid any safety-compromising working!

Examine the grab at least once per shift to make sure it is exempt from damages or defects! Notify the responsible post/person of any occurred abnormality (including abnormal operating behaviour)! Immediately shut down and secure the grab if necessary! Remedy any failure immediately!

1.4.7 Measures for the Maintenance, Servicing and Repair

Observe the adjustment, maintenance and inspection tasks and schedules, including details concerning the replacement of parts and equipment prescribed in the operating manual! These tasks may only be performed by specialized personnel.

Inform the operations personnel before commencing maintenance and servicing work! Designate a supervisory person.

The shutdown instructions according to the operating instructions must be adhered to during any work referring to assembly/disassembly, putting into operation, operation, maintenance and repair.

Carry out repair work on the hydraulic and electric system in a clean and dust-free environment.

If necessary, secure the work area!

Before carrying out any maintenance or repair work completely shut down the grab and protect it against any unauthorized restart:

- Unplug the plug connection if possible.

Remove protective equipment only after the machine has been shut down!

Carefully fasten and secure spare parts and modules being replaced to the lifting gear so that they do not endanger anyone. Use only suitable and technically perfect lifting gear and load carrying equipment with adequate carrying capacity!

Do not stand or work under suspended loads!

If necessary, use security-conform ladders and work platforms for installation and servicing work! Do not use machine parts as steps! Wear fall-prevention gear for work performed at height.

Because contact with hot parts and the discharge of oil during maintenance and servicing work cannot be excluded, always wear protective glasses and protective gloves.

Clean electric components in voltage-free state only. Unplug electric plug-in connector for this purpose. This regulation also applies to non-touch cleaning (air-blasting).

Do not bypass pressure-operated switches, pressure-operated valves, safety valves and other sensors.

The pressure-operated switches, pressure-operated valves, safety valves and other sensors may only be adjusted with the written approval of the manufacturer.

Safety valves may only be replaced with the same valves.

Replace immediately any damaged hydraulic hoses, pipes, cables and valves.

Replace hydraulic hoses at indicated or reasonable intervals, even if no safety-relevant defects can be detected (see check of hydraulic hose lines, page 10-2).

Observe the prescribed tightening torques and check regularly.

For maintenance and repair work, always tighten loosened screwed joints as specified in the guidelines.

Before cleaning the grab with water or by means of a vapour stream (high-pressure cleaner) or with other detergents cover or obturate all openings in which no water/vapour/detergent may penetrate for safety or functional reasons. Electromotors, switch cabinets, stop switches, ball bearings, gears and chains are especially vulnerable.

Regularly check all electrical cables and hydraulic oil lines for damage and abrasion. Also inspect hydraulic oil lines for leaks.

Before resuming operation after completing maintenance or repair work, check whether all safety equipment has been reattached to the machine and is operational! Check all functions of the grab and the working pressure!

1.4.8 Safety Notes for the Electrical System

In accordance with the electro-technical regulations, work on electrical systems may only be performed by an electrician or by instructed persons under the guidance and supervision of an electrician.

Only use original fuses with specified amperage (see spare parts list)! Shutdown the grab immediately should any malfunctions occur in the electrical power supply!

When prescribed, machine and system components for which inspection, maintenance or repair work is to be performed, must be disconnected from the power supply. First check that the disconnected parts are in fact free of power, then ground and short-circuit, and insulate any neighboring parts still under power!

Check the electric equipment of the grab regularly. Any defect, such as loose connections or damaged cables, must be eliminated immediately.

If work needs to be performed on live parts, a second person must be present who must always has visual or wireless contact and, in the case of an emergency, can active the emergency-off switch or disconnect the master switch from the power supply. Secure

the work area with a red-white safety chain and a warning notice. Use only insulated tools!

After the associated electrical installation or repair, test the installed protective measures (e.g., earthing resistance).

1.4.9 Safety Notes for the Hydraulic System

Work on the hydraulic system may be performed only by persons with special knowledge and experience in hydraulics. The personnel must be able to read and completely understand the hydraulic diagram, in particular the correlations of the integrated safety systems.

Wear your personal protective equipment, e. g. gloves, protective clothes, protective goggles or helmet with visor when working on the hydraulic system.

Avoid any oil leakages when working on the hydraulic units. Leaking oil must be collected in appropriate receptacles and disposed of in compliance with the corresponding regulations.

The hydraulic system is under high pressure! Do not detach or tighten any screw fittings of the hydraulic lines (hydraulic couplings) as long as the system is under pressure! Immediately eliminate any leakages.

Prevent the components from moving accidentally!

Utmost cleanliness must be observed for all work performed on the hydraulics! The external vicinity must be cleaned before removing the connections. Close all openings with protective caps so that no dirt can enter.

Regularly inspect all lines, hoses and connections for leaks and externally visible damage! Repair any damage without delay! Tighten untight screw fittings in pressure-free state only. Escaping oil can cause injuries, fire and environmental contamination.

Before starting the repair work on system sections and pressure lines of the hydraulics system to be opened, remove pressure in accordance with the construction and function description! When present: remove pressure from system sections using the manometer connections (MA1, etc., in the hydraulics diagram).

Route and install the hydraulic lines correctly! Do not interchange the connections! The fittings, length and quality of the hose lines must be appropriate for the requirements.

Unapproved modifications and changes to the hydraulic system are prohibited.

1.4.10 Handling of Oil, Grease and Other Chemical Substances

Observe the appropriate product safety and environmental regulations for the handling of oil, grease and other chemical substances!

Take care with the handling of hot fuels and agents (such as hydraulic oil), there is danger of burning and scalding!

2.0 Description and Survey of Features

2.1 Basic unit: Constructional and Functional Description

2.1.1 Constructional Description

The structure of the PEINER Motor Orange-Peel Grab is as follows:

The shells which serve to pick up the bulk material are linked to the traverse by means of pins. The shell points are made of wear-resistant material.

The hydraulic unit is mounted as a complete assembly vertically into the traverse, which thus also serves as a protection. The lower part of the traverse is designed to serve as oil tank as well. The hydraulic unit consists of the motor, hydraulic pump and control unit. The complete hydraulic unit can be removed from the grab by unscrewing the fastening screws. The low position of the hydraulic unit guarantees a reduced overall height of the grab and a favourable position of the center of gravity.

The attachment points for the lifting cylinders are located on the traverse and on the shells. The shells are opened or closed by retracting or extending the piston rods. The piston rods are surface-treated and corrosion-resistant. The control unit is connected with the lifting cylinders by means of hydraulic hoses. The lifting cylinders are protected against damages.

The suspension is achieved through load hooks on a load shackle or via chains.

Power is supplied to the motor via a plug-in connector. To avoid damage, a tension relief is used to prevent any tension on the plug-in connector.

All subassemblies and parts are made of high-quality materials and can be easily replaced.

2.1.2 Functional description

(see page-no. 5-1, hydraulic diagram)

Selectable Reversing operation (S3) and Continuous duty (S6)

Variable delivery pump (Power regulator plus Load-Sensing regulator)

Control block NG 30-E

General:

Operating mode S3, also called reversing operation, means that the opening and closing movement of the grab is effected by the right or left turn of the electric motor and thus also the pump.

Operating mode S6 means that for both "open grab" and "close grab" a 2-way built-in valve is connected, while the electric motor of the grab must be turned on. In this operating mode, the electric motor, and thus also the hydraulic pump, turn only in one direction.

If, with drive motor rotating, no valve is connected, i. e. the grab shells do not close nor open, the hydraulic pump only sucks as much oil as is required to maintain the lubrication and the operational safety of the pump. This operating working order of the pump is hereinafter described under the term „zero-lift regulation“.

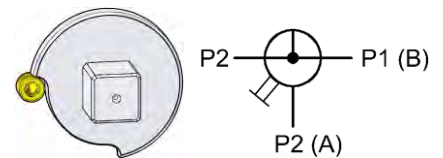
The built-in axial piston pump is output-regulated and has a load-sensing regulator. The Load-Sensing-regulator, for short LS-regulator, only functions as a „min./max.-regulator“, i. e. via the LS-regulator the pump recognizes that,

1. a consumer has been connected and the pump must switch to max. output,
2. a consumer has been disconnected and the pump has to return to „zero-lift regulation“,
3. a system pressure pre-set at the pressure relief valve (DV1 or DV2) has been reached and that the pump has to return towards „zero-lift regulation“ in order to suck only as much oil as is required to maintain the system pressure and is required for levelling of the gab leakage of the pumps and system.

The power regulator of the pump is adapted to the maximum drive motor power, i. e. depending on the drive power, the output of the pump is continuously adjusted to the output of the drive motor in case a determined operating pressure is exceeded and continues to increase.

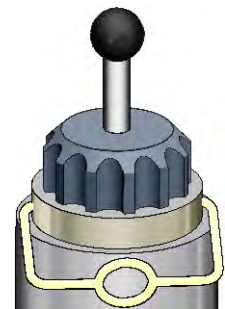
Operating mode S6

In the operating mode S6, the three-way stop cock must be connected in the switching position, as shown on the figure (see also section "Z" on the hydraulic diagram).



Switching position **S6**

The locking device of the manual control is not active



Locking device for **S6**

Functional description "grab opening" (Operating mode S6):

The pilot control valve (WV2) of the 2-way valve (WV4) is actuated by means of the solenoid valve (Y2). The spring side of the valve (WV4) is thereby relieved on its rear side, i.e. oil can escape from there into the oil tank. As soon as the pilot control valve reaches the switch position, the pump changes over from the „zero-lift regulation“ to suck the maximum flow volume. The present pump pressure opens the main valve (WV2) and the oil flows through the pressure line (P) via the opened main valve (WV2), the internal block connection (P2), the non-return valve (R2), the control block connection (B) and a hose line to the piston side (KS) of the lifting cylinder.

At the same time, the non-return valve SV1 is opened via the control line (St1) and the non-return valve (SV2) is closed via the control line (St2).

When the piston rods of the lifting cylinder are retracted, the oil exiting from the piston sides KS flows back through the pipe A. This oil pouring back from the piston sides KS can now flow via SV1, tank line T and filter F back to the tank.

If the system pressure „open grab“ pre-set at the pressure relief valve (DV2) is reached, the pressure relief valve (DV2) is opened and oil is led via connection (T) and the return filter into the tank.

The nozzle (D2) is dimensioned in such a way that less oil can follow from the pressure line P than escapes via the pressure relief valve. The resulting pressure difference in line (LS) is transmitted in form of a signal to the „LS-regulator“. The pump switches back and only sucks as much oil as is required to maintain the system pressure. (see „General“).

Now the solenoid valve (Y2) can be disconnected and the line (LS) can be relieved from

pressure via the pilot control valve of the bidirectional valve (WV2) and the connection (T) towards the tank. The pump switches to „zero-lift regulation“.

As an additional system protection (e. g. if the pump regulation unit fails), there is a pressure relief valve (DV3) in the pressure line (P), which is permanently set to 28 - 30°Mpa { 280 – 300 bar}.

Functional description “close grab” (Operating mode S6):

The closing procedure is initiated by switching the magnet (Y1) (| | – position) of the bidirectional valve (WV1). The spring side of the valve (WV3) is thereby relieved on its rear side, i.e. oil can escape from there into the oil tank.

The pump pressure opens the main valve (WV3) and the oil flows through the non-return valve (R1) to the piston side (KSS) of the lifting cylinder.

When retracting the piston rods, the oil getting out of the piston side (KS) of the lifting cylinders is lead to the tank via a hose line, the control block connection (B), the opened non-return valve (SV2), the connection (T) and the return filter (F).

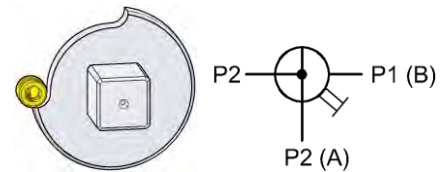
The maximum pressure is defined by the pressure switch (DV1). When reaching the maximum pressure (adjustment at DV1) the flow rate of the pump is re-regulated. (see „General“, item 3).

If the bidirectional valves are switches off (WV1, WV2), the check valves (R1, R2) and the non-return valves (SV1, SV2) prevent an automatic opening respectively closing of the grab.

ATTENTION ! The pump's sense of rotation is to the right, while looking at the pump's drive shaft!

Operating mode S3

In the operating mode S3, the three-way stop cock must be connected in the switching position, as shown on the figure (see also section "Z" on the hydraulic diagram).



Switching position **S3**

The locking device of the manual control holds the 4/2-way valves WV1 and WV2 constantly in the switching position, i.e. the valve main stages WV3 and WV4 are constantly open.



Locking device for **S3**

Functional description „grab opening“ (Operating mode S3):

If "open grab" is turned on, the pump sucks in the oil through the suction valve (R3) and oil flows through the main valve (WV4), the non-return valve (R2), to the piston side (KS) of the lifting cylinder.

At the same time, the non-return valve SV1 is opened via the control line (St1) and the non-return valve (SV2) is closed via the control line (St2).

When the piston rods of the lifting cylinder are retracted, the oil exiting from the piston sides KS flows back through the pipe A. This oil pouring back from the piston sides KS can now flow via SV1, tank line T and filter F back to the tank.

If the system pressure „open grab“ pre-set at the pressure relief valve (DV2) is reached, the pressure relief valve (DV2) is opened and oil is led via connection (T) and the return filter into the tank.

The nozzle (D2) is dimensioned in such a way that less oil can follow from the pressure line P than escapes via the pressure relief valve. The resulting pressure difference in line (LS) is transmitted in form of a signal to the „LS-regulator“. The pump switches back and only sucks as much oil as is required to maintain the system pressure. (see „General“).

Functional description “close grab” (Operating mode S3):

If "close grab" is turned on, the pump sucks in the oil through the suction valve (R4) and the oil flows through the main valve (WV3), the non-return valve (R1) to the piston rod side (KSS) of the lifting cylinder.

When retracting the piston rods, the oil getting out of the piston side (KS) of the lifting cylinders is lead to the tank via a hose line, the control block connection (B), the opened non-return valve (SV2), the connection (T) and the return filter (F).

The maximum pressure is defined by the pressure switch (DV1). When reaching the maximum pressure (adjustment at DV1) the flow rate of the pump is re-regulated. (see „General“, item 3).

If the pump is switched off, the non-return valves (R1, R2) and stop valves (SV1, SV2) prevent the grab from opening and closing automatically.

Manometer connections:

The system pressures can be checked at the provided measuring points (for pressures please refer to the machinery data card).

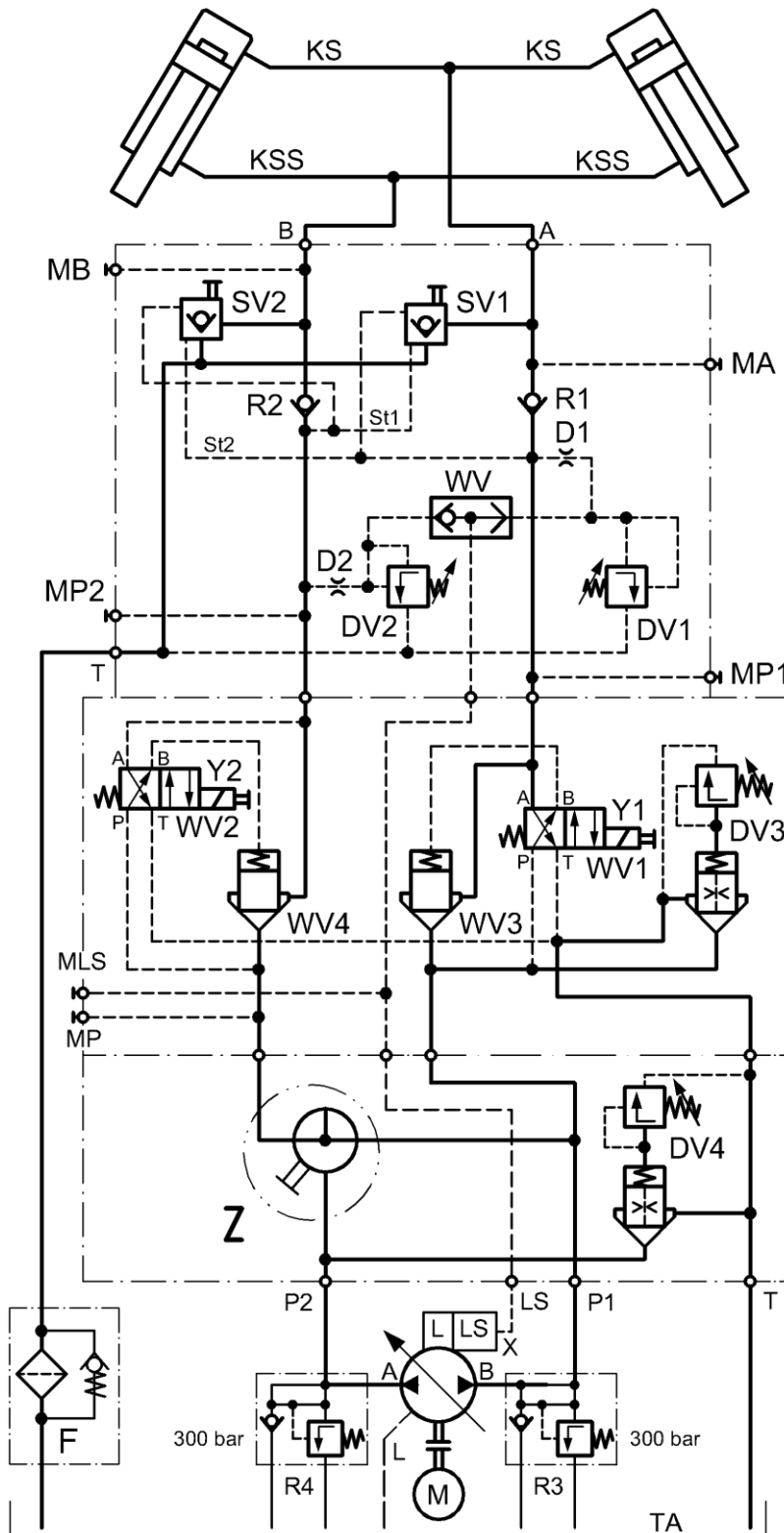
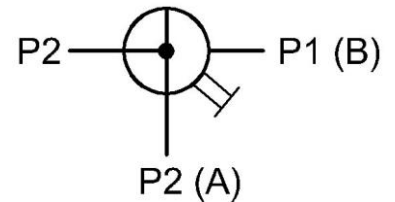
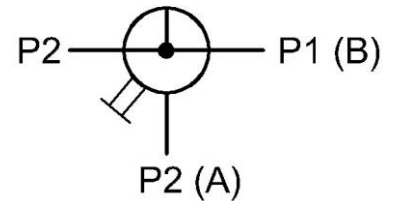
Closing: MP1, MA

Opening: MP2, MB

Pump pressure: MP, MP1, MP2

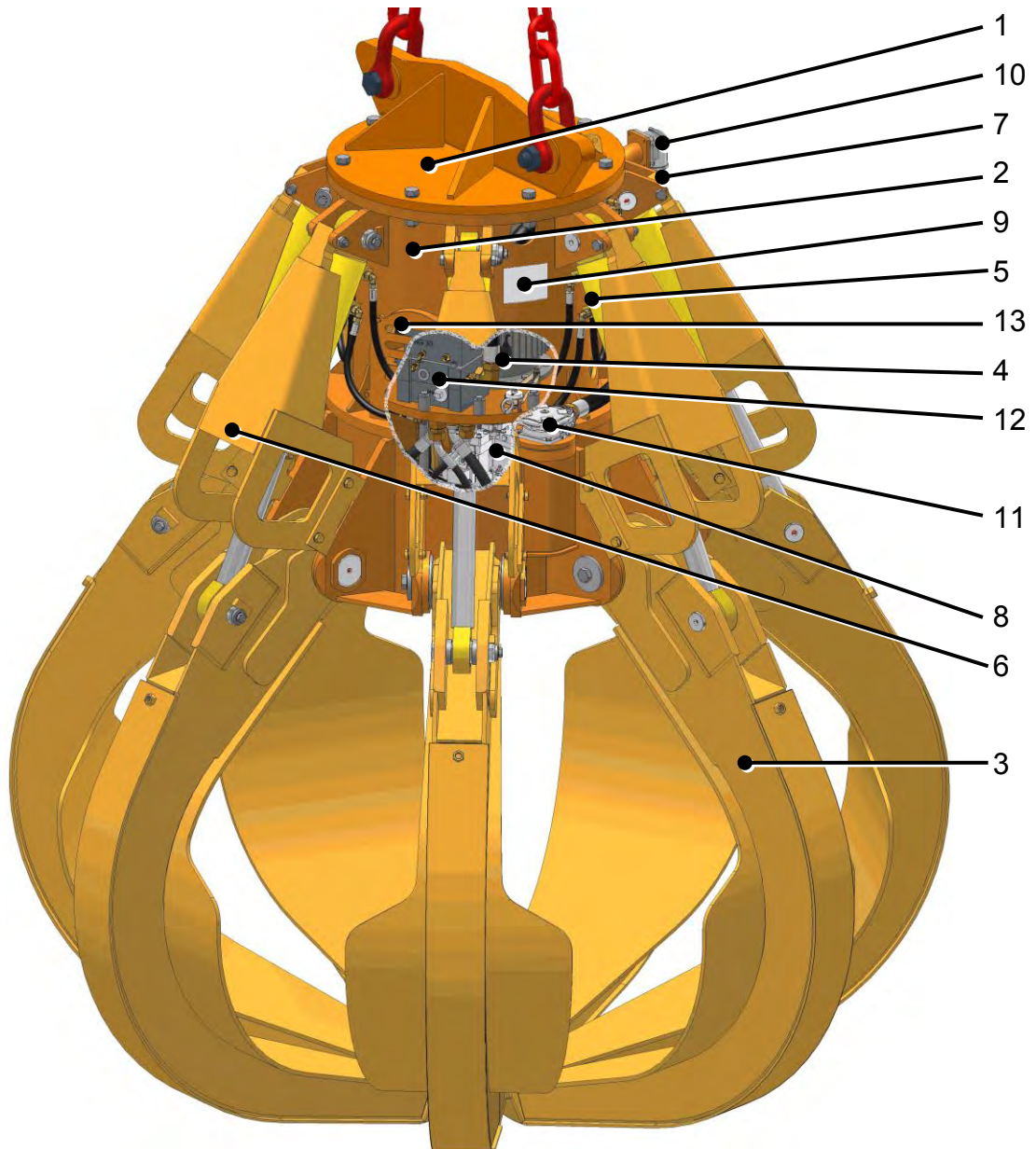
LS-pressure: MLS

2.2 Hydraulic diagram 2303.6505
Selectable Reserving operation (S3) or Continuous duty (S6);
Variable delivery pump; Control block NG 30-N (standard design)

**Legend:**Section **Z**Switching position: operating mode **S3**Switching position: operating mode **S6**

- A = pipe (closing)
- B = pipe (opening)
- D1, D2 = nozzle
- DV1, DV2 = pressure relief valve
- DV3 = security valve
- DV4 = security valve
- F = filter
- KS = piston side

2.4 Parts list


Legend:

1 cover

2 traverse

3 shell

4 hydraulic unit

5 lifting cylinder

6 cylinder protection

7 plug-in connector

8 pump

9 identification plate (nameplate)

10 male part

11 filter

12 control block

13 cover

3.0 Operating instructions

Read carefully the instructions before the start-up and keep them for future use in a careful and easily accessible manner.

3.1 Details for safe use

- ▶ Follow the regulations in the relevant accident prevention specifications for "Load suspension devices".
- ▶ Always adhere to the service manual.
- ▶ The grab may only be commissioned, serviced or operated by trained personnel.
- ▶ When putting the grab into operation or when operating the grab make sure that no person stands in or under the grab and that nobody is endangered by the grab in operation.
- ▶ If the direct communication option between the commissioning body and crane operator is not available, the operating company should provide appropriate equipment (such as mobile radios) and / or agree with the crane operator about the planned work and signals for communication.
- ▶ Persons have to keep a sufficient safety distance to the grab.
- ▶ It is not permitted to move the load over people.
When necessary, the crane operator must give warning signs. If the crane operator becomes aware of the presence of people who could be endangered by the crane, the operator must immediately shut down the crane and not start moving the crane again until the people are no longer found in the area of danger.
- ▶ It is forbidden to transport people on the load or the grab!
- ▶ Only operate the grab in its original condition or in a condition released by the manufacturer.
- ▶ Before putting the grab into operation, the crane driver must make sure that no inflammable material (e. g. waste) is near the electric cables.
- ▶ Make sure that all safety devices are in place and in good working condition.
- ▶ Make sure that during operation of the grab all hoses, lines, pipes and fittings are in good order and tight.
- ▶ The grab has exclusively been designed to handle bulk material in compliance with the performance parameters specified in the Technical Data.
- ▶ Don't exceed the lifting capacity of the crane!
- ▶ Never exceed the load capacity of the grab and the lifting accessories (e. g. ropes, chains, shackles, etc.)!
- ▶ Never use a damaged sling gear or a sling gear where the identification mark is no longer present!

-
- ▶ Chains are not allowed to be twisted or knotted.
 - ▶ The crane operator must particularly observe the load or the empty run of the load-carrying equipment during all crane movements. If this is not possible, the crane operator is only allowed to operate the crane when following a signalperson's signals.
 - ▶ It is forbidden to tear off stuck loads.
 - ▶ It is forbidden to use the grab to transversely pull loads or to move railway waggons or other vehicles.
 - ▶ Avoid any damages to the grab by preventing it from heavily striking against other bodies.
 - ▶ Avoid any jerky starting, lifting, stopping or lowering of the grab.
 - ▶ The grab must never dash down on the bulk material at high speed.
 - ▶ When picking up a load, make sure that the grab is operated in „Closing“ mode until the picked up load perfectly hangs in the scoops when the grab is lifted.
 - ▶ When handling bulk material which impedes the perfect closing of the grab, we recommend to lift the grab slightly during the closing procedure. In order to reach the maximum filling capacity, the grab should be set down horizontally.
 - ▶ Immediately inform the responsible supervising person of any grab failure or any lifting accessory failure as well as of any watched circumstance that might give rise to expectations of a failure (e. g. noises, elevated temperatures, unusual behaviour of the grab, etc.).
 - ▶ Only operate the grab, the hydraulic fluid and the lubricants within the admissible temperature range (see Technical Data or Recommended Oil).
 - ▶ In order to avoid unnecessary heating of the hydraulic oil, the opening procedure must be switched off immediately after the operating condition "grab opened" or „grab closed“ is reached.
 - ▶ In case of any failures stop the grab operation immediately and prevent it from being restarted. Failures must immediately be remedied!
 - ▶ In order to prevent accidents when climbing up the grab, the personnel for operation and maintenance must take adequate precautionary measures in accordance with the regulations for the prevention of accidents in order to be protected against falling down and other dangers!
 - ▶ Dismantle protective equipment when and only when the grab is at standstill.

3.2 Putting into operation

3.2.1 Initial start-up

**DANGER**

Danger to life from the moving grab due to communication problems with the crane operator!

- Make sure that the communication with the crane operator can be carried out without problems. The signals for communication and the planned work must be agreed with the crane operator!

**DANGER**

Danger of life due to electric shock!

Installation, maintenance and repair of electrical equipment, especially plug-in connectors, may only be carried out by **authorised and qualified electrical** personnel.

- Make sure that voltage and frequency correspond to the data indicated on the nameplate.
- Make sure that the power supply cable is not damaged.

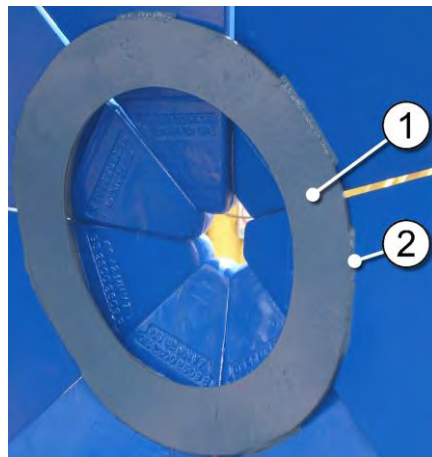


Figure 3.2.1a

Legend:

Design version: Transport fixation, inside

- 1 transport fixation
- 2 weld seam

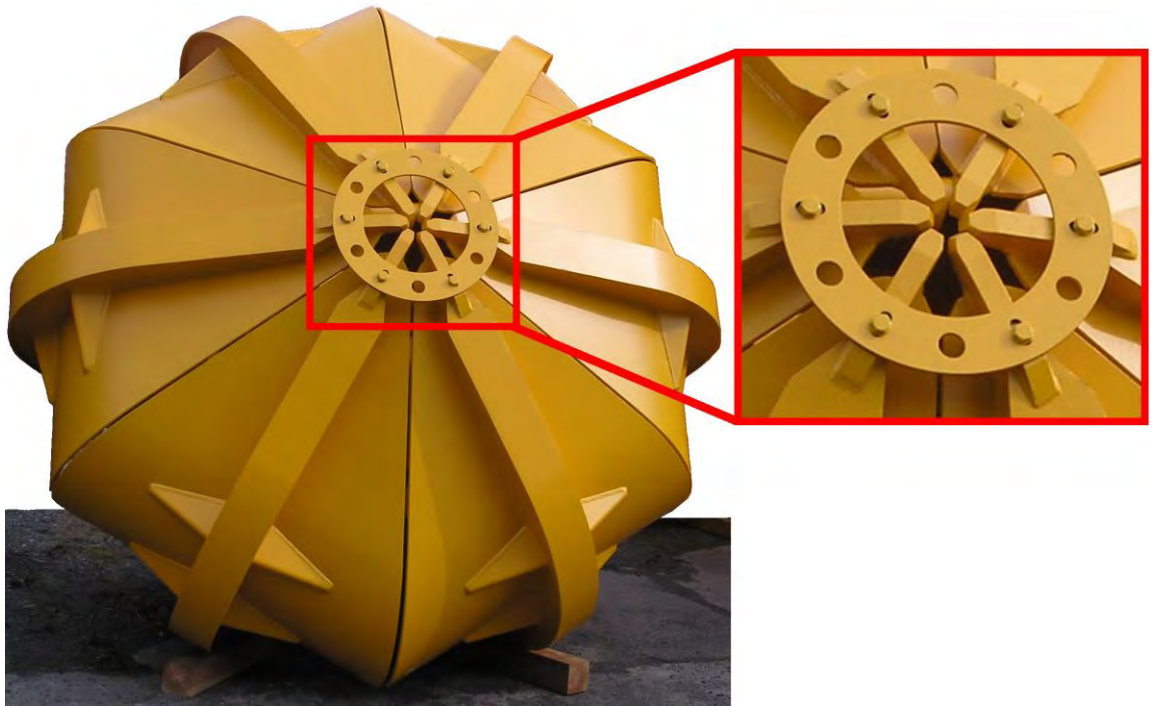


Figure 3.2.1b Design version: Transport fixation, outside

1. The power supply to the grab must be switched off on the crane!
2. Check which operating mode is used to control the grab with the technical personnel responsible for the crane system. In the operating mode S6 Continuous duty, the opening and closing is controlled by valves, while in the S3 Reversing operation, it is controlled by the phasing of the power supply of the grab motor and, therefore, by the rotation direction of the grab motor. For ship cranes the S3 mode is usually used, while for harbour cranes the S6 mode is often used.
3. Secure the grab against tipping.
4. Set the operating mode on the grab – see Section 3.2.2 Start-up.
5. Check the grab for damage.
6. Check hydraulic hoses, bolted joints, control block and lifting cylinder for leakage.
7. Check that the power output, voltage and frequency on the nameplate of the grab correspond to the available power supply for the grab.
- 8.
9. Remove the transport fixations (see Fig. 3.2.1a and Fig. 3.2.1b) of the shells, if existing.

**DANGER****Danger to life from electric shock due to ripped-out power supply cable!**

If the power supply cable exerts tension on the plug-in connector or cable gland, it can be ripped out. This may lead to death from electric shock or to serious injuries from the swinging cable.

- ▶ Make sure that the power supply cable does not exert any tension on the plug-in connector or cable gland on the grab!
- ▶ Make sure that all persons are clear of the danger zone!

The power supply cable can be prevented from being ripped out, for example, by a tension relief or a cable grip.

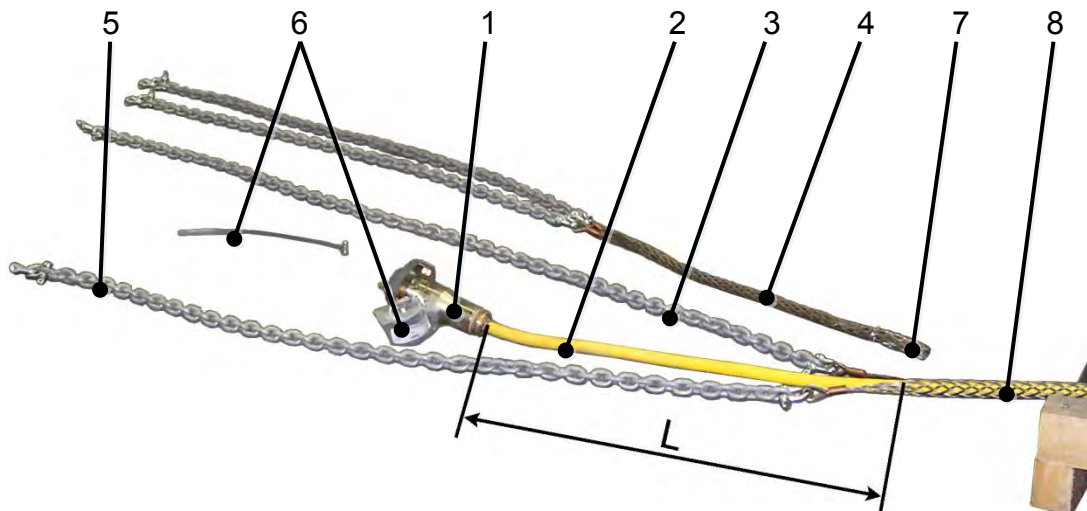


Figure 3.2.1c cable tension relief

Legend:

- | | |
|-----------------------------------|-------------------------|
| 1 plug-in connector | 5 short chain |
| 2 power supply cable | 6 cable tie |
| 3 long chain | 7 end of cable grip |
| 4 cable-pulling-grip (snake grip) | 8 premounted cable grip |

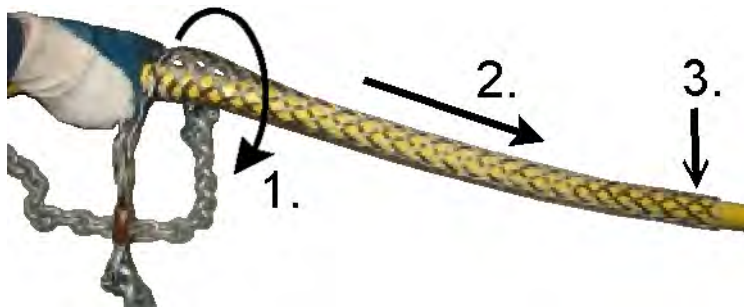


Figure 3.2.1d



Figure 3.2.1e

10. Fix the tension relief (see Fig. 3.2.1c to Fig. 3.2.1e)

- Pull the cable grip [4] onto the cable until the length L equals the length of the long chain [3]. This also applies to a pre-assembled tension relief.

- Secure the end of the cable grip [7] against slipping with a cable tie (see Fig. 3.2.1e).
 - If necessary, get an electrician to connect the plug-in connector or cable according to the current wiring diagram and the safety regulations.
11. Check whether the lifting capacity of the lifting appliance (e.g. crane) and the carrying device, which connects the lifting appliance with the grab, is sufficient to carry the weight of the grab and the handled bulk material.
 12. Fix the tension relief in such a way that the power supply cable does not exert any tension on the plug-in connector (see Fig. 3.2.1f). If the tension relief is not available, fix the power supply cable in such a way that it does not exert any tension on the plug-in connector.
 13. Connect the suspension with the carrying device. Pay attention to the lifting capacity of the lifting appliance. When connecting with a crane hook, the suspension link on the load hook must be able to move freely and rest in the hook base (see Fig. 3.2.1g)

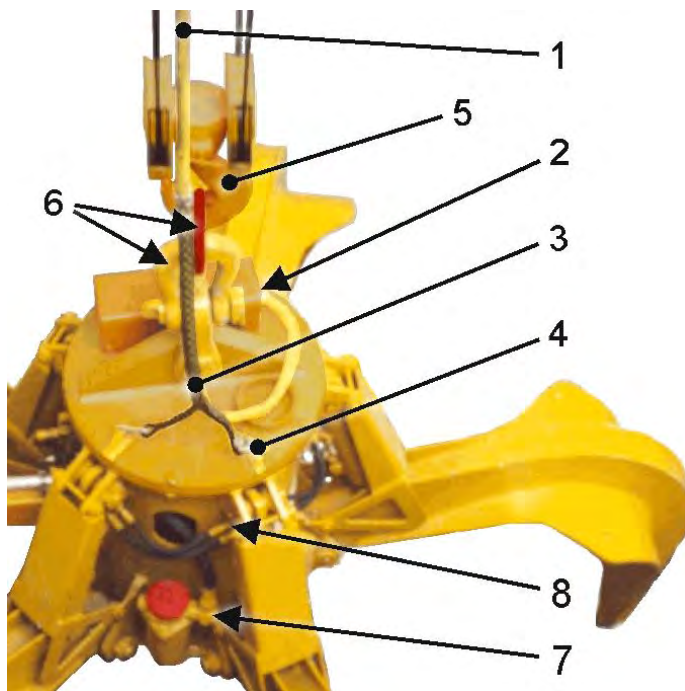


Figure 3.2.1f

Legend:

- 1 power supply cable
- 2 plug-in connector
- 3 cable tension relief
- 4 fixation of the tension relief
- 5 carrying device (in this case: crane hook)
- 6 suspension (design version)
- 7 bolted joint (fitting) at the filter
- 8 bolted joint (fitting) at the lifting cylinder

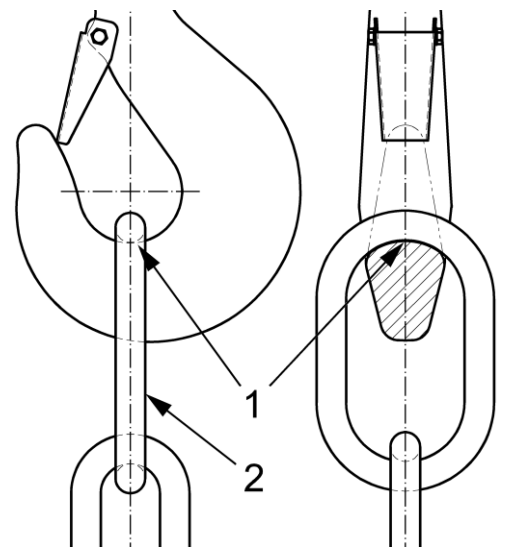


Figure 3.2.1g

Legend:

Design version:

Suspension on the crane hook

- 1 hook base
- 2 suspension link

14. Check the oil level (see 4.2.1); if necessary, top up the hydraulic oil to the prescribed

level. (See sheet No. 11-1 for recommended oils)

15. **Before the first start-up, the correct assembly and the safe functioning of the grab must be checked by a qualified person ① (specialist) (see also Section 4.2 "Checks to be carried out").**
16. Connect the grab with the plug-in connector. In the event of incorrect rotation direction, reconnect the plug-in connector (swap the two outer wires). If the plug-in connector is not mounted, connect it according to the wiring diagram.
17. Carry out the procedure steps of the daily start-up in Section 3.2.2.
18. Test run the grab; when testing the grab with bulk goods, pay attention to Section 3.3 "Instructions for the operation".
19. Check hydraulic hoses, fittings and hydraulic parts (such as lifting cylinder, control block) for visible damage and leakage.
20. After approx. 50 hours of operation, replace the oil filter element (see sheet No. 10-1) and check that screws, nuts and bolts are secured; see the spare parts list for tightening torques.

3.2.2 Daily start-up

The following work has to be performed at the daily start-up and at the start-up after changing the crane system.

- ▶ Check which operating mode is used to control the grab with the technical personnel responsible for the crane system. In the operating mode **S6 Continuous duty**, the opening and closing is controlled by valves, while in the **S3 Reversing operation**, it is controlled by the phasing of the power supply of the grab motor and, therefore, by the rotation direction of the grab motor. For **ship cranes** the **S3** mode is usually used.
- ▶ Check for which operating mode the grab is set. Change the setting, if necessary:

For **S3**, turn the three-way stop cock to the right and lock both manual controls; see Fig. 3.2.2a

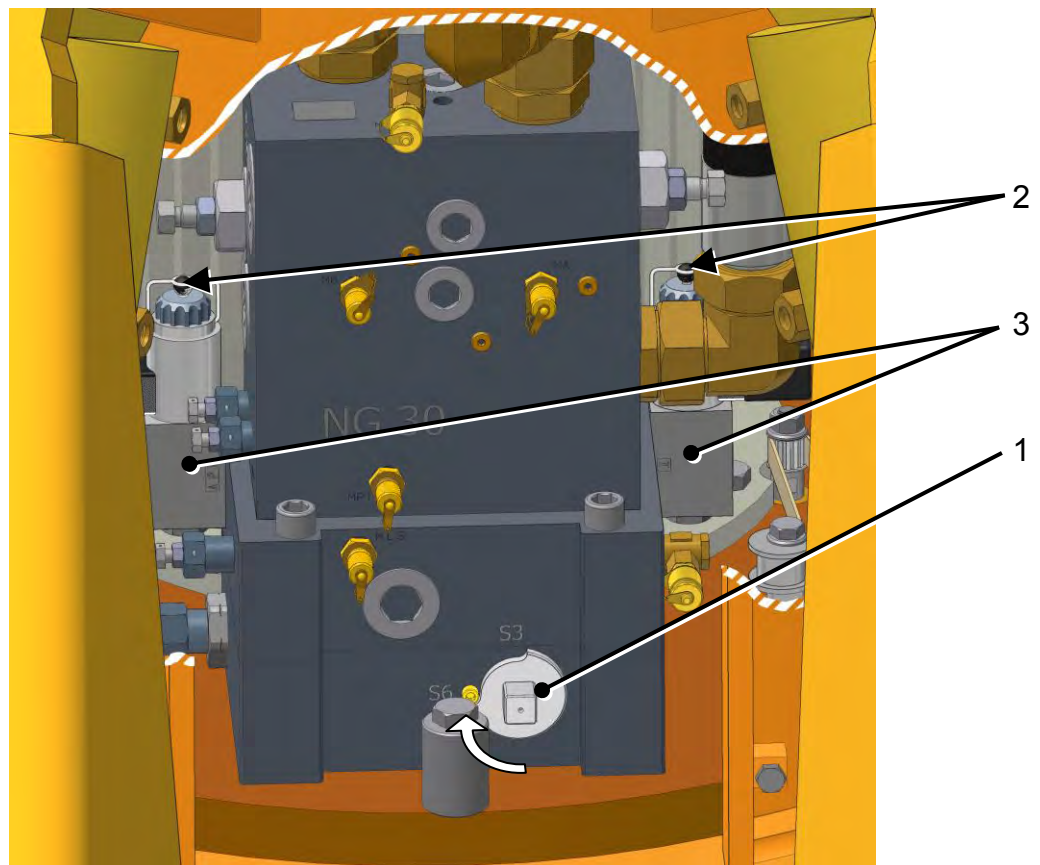


Figure 3.2.2a Grab is set for **S3 Reversing operation**

Legend:

1 three-way stop cock  19

3 4/2- directional valve

2 locking device of manual control

For **S6**, turn the three-way stop cock to the left and unlock both manual controls;
 see Fig. 3.2.2b

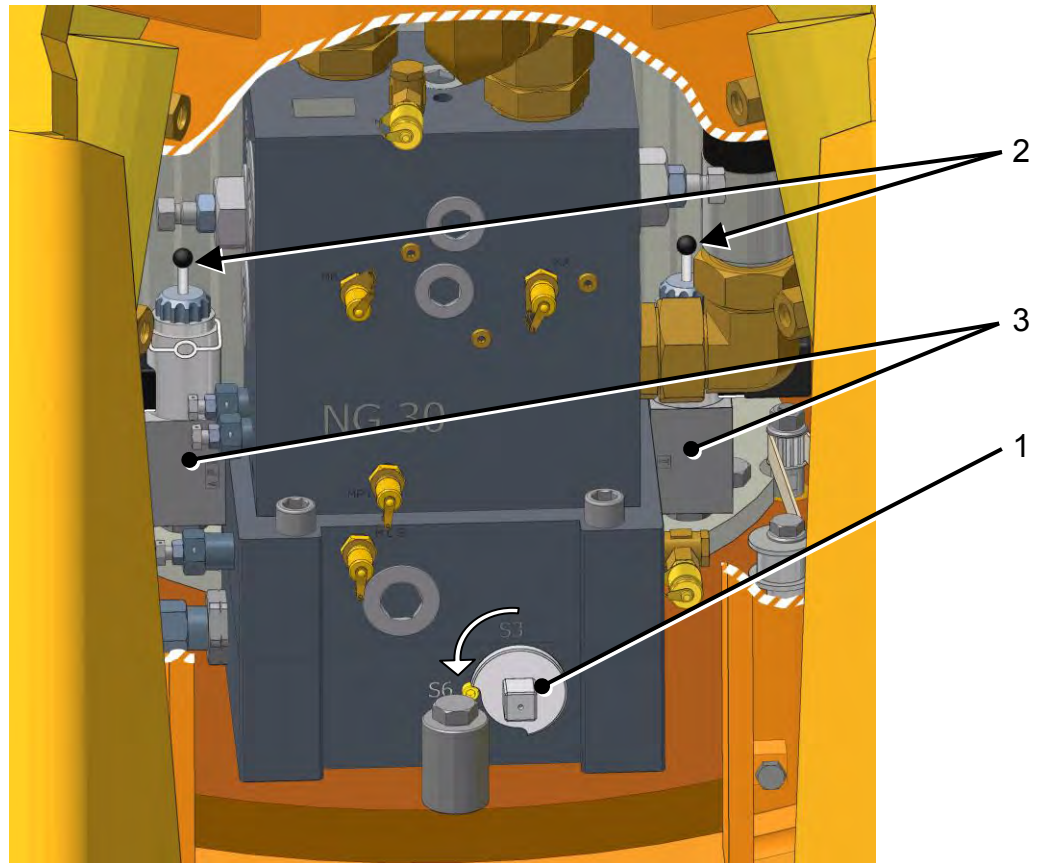


Figure 3.2.2b Grab is set for **S6 Continuous duty**

Legend:

- | | | | | | |
|---|-------------------------|---|----|---|------------------------|
| 1 | three-way stop cock |  | 19 | 3 | 4/2- directional valve |
| 2 | manual control unlocked | | | | |

► Visual inspection for safe operating condition

- ☐ Check the grab for loos or missing parts.
- ☐ Check the grab, and especially the suspension of the grab, for visible damage and cracks.
- ☐ Check hydraulic hoses, fittings and hydraulic parts (such as lifting cylinder, control block) for visible damage and leakage.

**CAUTION****Risk of injury from pressurised hot air!**

The air in the oil tank is under pressure and hot.

- Wear gloves when unscrewing the oil dipstick.

- ☐ Check the oil level with the grab closed, according to Section 4.2.1. If necessary, top up hydraulic oil to the required level (for oil recommendation, see sheet No. 11-1).

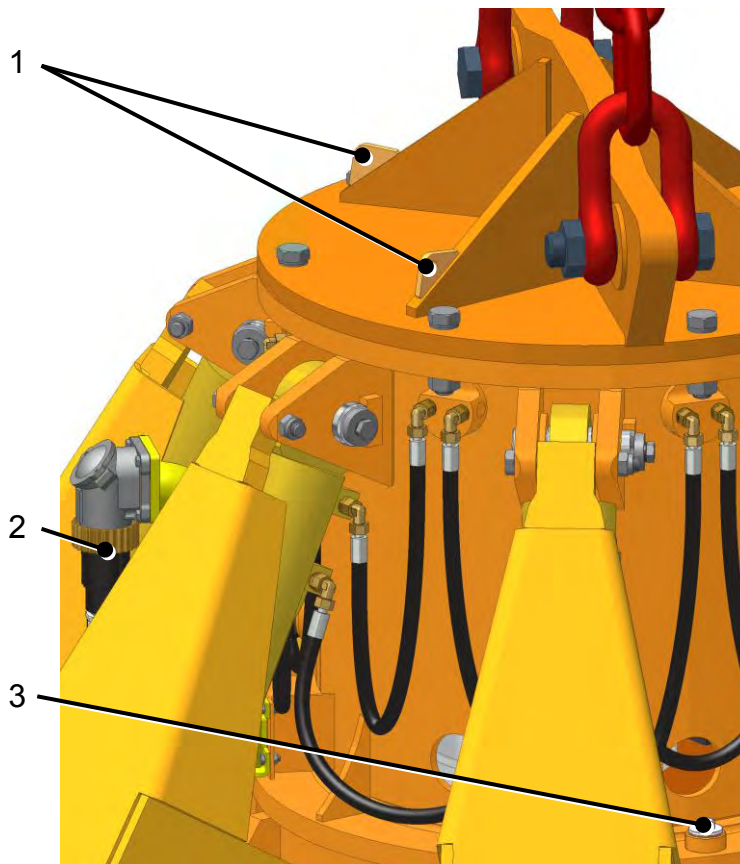
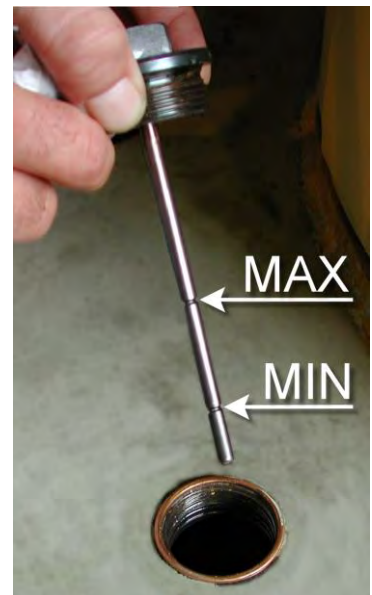


Figure 3.2.2c

Figure 3.2.2d
oil dipstick

Legend:

1 fastening point for tension relief

3 oil dipstick

2 plug-in connector

- ☐ Check the Pin locking devices (see Figure 3.2.2c)

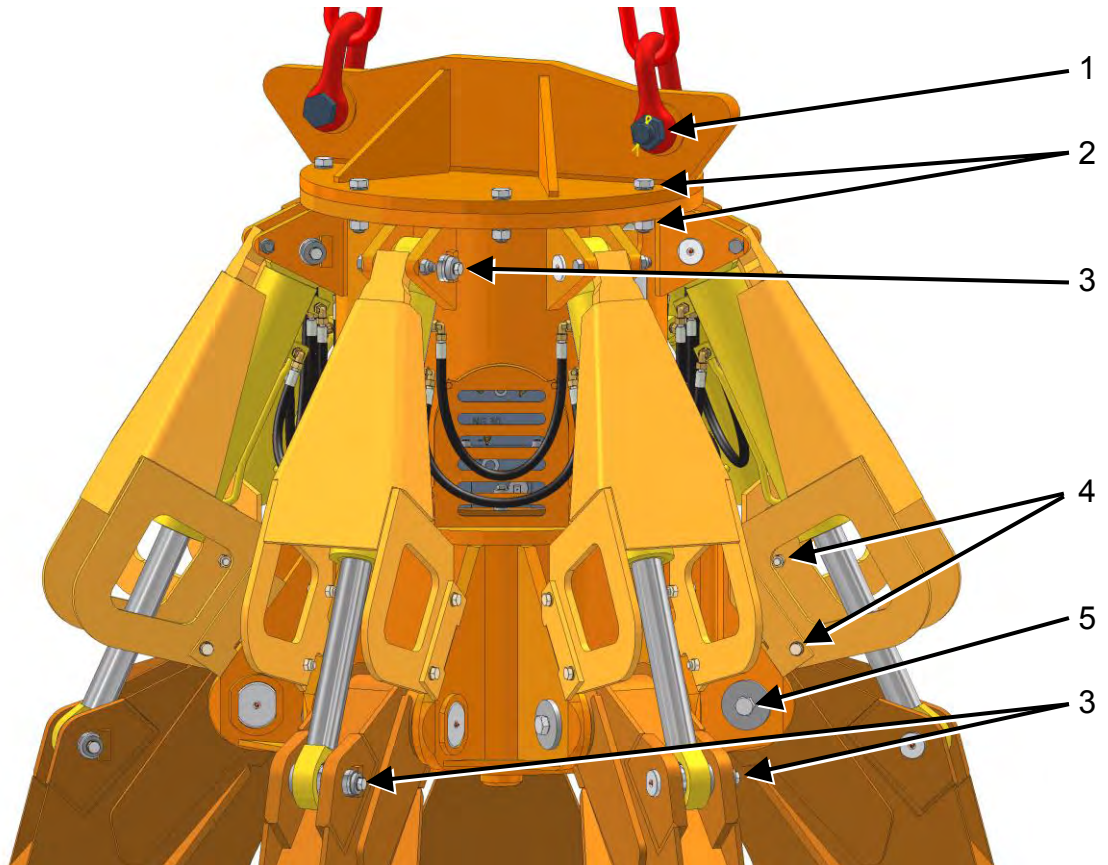


Figure 3.2.2c Pin locking devices on the grab

Legend:

- | | |
|--|---|
| 1 shackle secured with nut and split pin | 4 per protection 4 screws secured with a nut |
| 2 screws on the cover secured with a nut | 5 1 pins per shell, each secured with one screw |
| 3 2 pins per lifting cylinder, each secured with one screw | |

- ☐ Check the power supply cable for visible damage.
- ☐ Check the plug-in connector for firmness. The strain relief must be located in such a manner that the power supply cable does not exert any kind of traction on the plug-in connector.
- Supply the lubricating points with grease in accordance with 4.1.2 Lubricating instructions.

Output adjustment of the hydraulic pump

The maximum available output is determined by the characteristics of the power supply. The settings are marked according to the technical data sheet on the toothed flat belt to the right of the control block. After loosening the counter nut, the output can be adjusted by using an open-jawed or ring spanner (19) (turning clockwise from MIN to MAX).

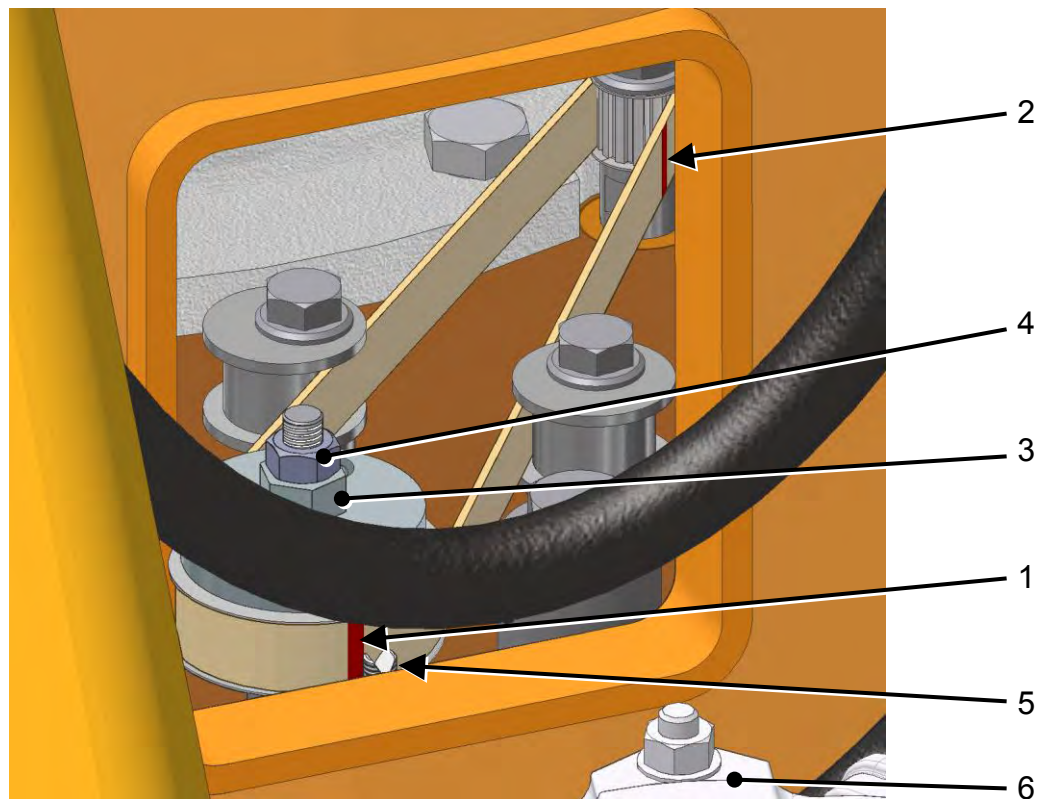


Figure 3.2.2d Output adjustment

Legend:

- | | |
|------------------------------------|---------------|
| 1 marking: output P1 ($P1 < P2$) | 4 counter nut |
| 2 marking: output P2 | 5 dipstick |
| 3 cover of toothed lock washer 19 | 6 filter |

1. Switch off the grab.
2. Determine what power supply is available.
3. Loosen the counter nut [4] (Fig. 3.2.1d).
4. Turn the cover of the toothed lock washer [3] counter-clockwise $\curvearrowright$ until it stops (minimum power input).
5. Turn back clockwise $\curvearrowleft$ to the desired marking. The first marking (P1) is the smaller power, the second (P2) is the higher power. The values can be found in the technical data sheet.
6. After the adjustment, tighten the counter nut [4] again.

7. Check the adjusted value, for example, with a clamp-on ammeter, while the grab closes in the bulk material or SV2 is throttled.

ATTENTION Adjust the stop valves SV2 and SV1 only when the grab is **switched off**.



If a stop valve is adjusted with the pump running, this may lead to damage in the control block!

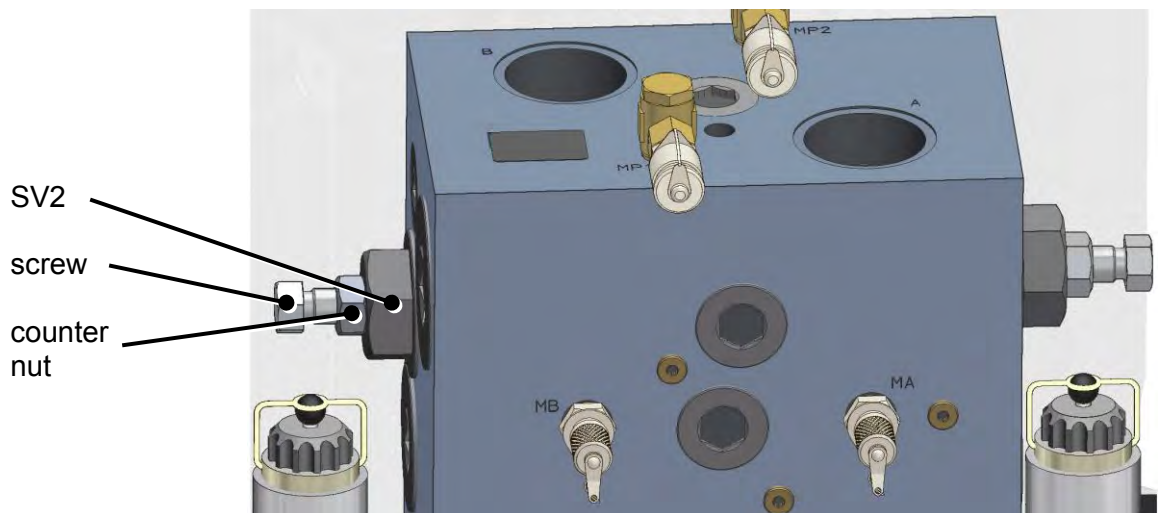


Figure 3.2.2e stop valve SV2

To throttle SV2:

- loosen the counter nut
- turn the screw in until it stops
- turn out again by $\frac{1}{8}$ turn
- tighten the counter nut.

To reset SV2:

- loosen the counter nut
- turn the screw out until it stops
- tighten the counter nut.

ATTENTION: If the temperature of the hydraulic fluid is below the start temperature, the motor of the grab must not be started. The hydraulic fluid is in such case so viscous that it may cause damage to the pump and other hydraulic parts.

- If the temperature of the hydraulic fluid is below the starting temperature (see sheet No. 8-7, Table 3.2.1 Oil temperatures), the hydraulic fluid must be pre-heated to the start-up temperature (check the availability of heating in the grab in 2.4 "Parts designation diagram: wiring diagram). If the heating is not available:

Depending on the available options:

- Heat up the hydraulic fluid with an external heating device designed for heating hydraulic fluids
 - Move the grab to a warm place
 - Use a hydraulic fluid with a lower starting temperature
 - Replace the hydraulic fluid by a pre-heated hydraulic fluid.
- If the temperature of the hydraulic fluid is between the starting temperature and the start-up temperature (see sheet No. 8-7, Table 3.2.2 Oil temperatures), pre-heat the hydraulic fluid to the start-up temperature, or
 - Switch on the function "Open the grab" for one minute to allow the pump to pump the oil through the pressure relief valve into the tank.
 - Then pause for two minutes.
 - Repeat this procedure until the oil is warmed up to the temperature that is necessary to put the system into operation.

Table: 3.2.2 Oil temperature

Hydraulic fluid	Start up temperature	Temperature that is necessary to put the system into operation	Max. upper working temperature
Shell Tellus Arctic 32	-30 °C	-20 °C	+70 °C
NATO-code: H 540	-25 °C	-15 °C	+85 °C
HVLP 32 acc. to DIN 51524/3 HV	-15 °C	-5 °C	+70 °C
HLP 46 acc. to DIN51524/2	-5 °C	+5 °C	+80 °C
HLP 68 acc. to DIN51524/2	+5 °C	+12 °C	+85 °C
HVLP 68 acc. to DIN51524/3 HV	+0 °C	+10 °C	+90 °C



OPERATING INSTRUCTIONS MOTOR GRABS

Class-no.

A 03.1701 E

Page-no.

9-1

3.3 Information for operation

When handling bulk materials which impede the perfect closing of the grab, it would be advisable to raise the grab slightly during the closing procedure. In order to reach the maximum filling capacity, the grab should be set down horizontally. The grab must never dash down on the bulk material at high speed. Heavy impacts should be avoided, in order to prevent damages.

3.4 Shut-down

The grab is to be placed in opened condition so that the piston rods are retracted. This is of particular importance when the unit is out of operation for extended periods. The plug-in connector is to be provided with protection caps.

In addition, for longer periods out of service, the grab should be exercised every three months to prevent corrosion and gumming of the hydraulic fluid in the control elements.

3.5 Reoperation

- Observe all points mentioned under 3.2.
- Inspect for damages.

3.6 Transportation

**DANGER**

Danger to life from falling cargo!

⊘ **Do not** stand or work under suspended loads!

- ▶ Do not exceed the maximum lifting capacity of the crane and slinging means.
- ▶ The machine should be transported only by experienced and authorised personnel. Follow safety instructions!

- Grabs must be transported only in the fully opened or fully closed state.

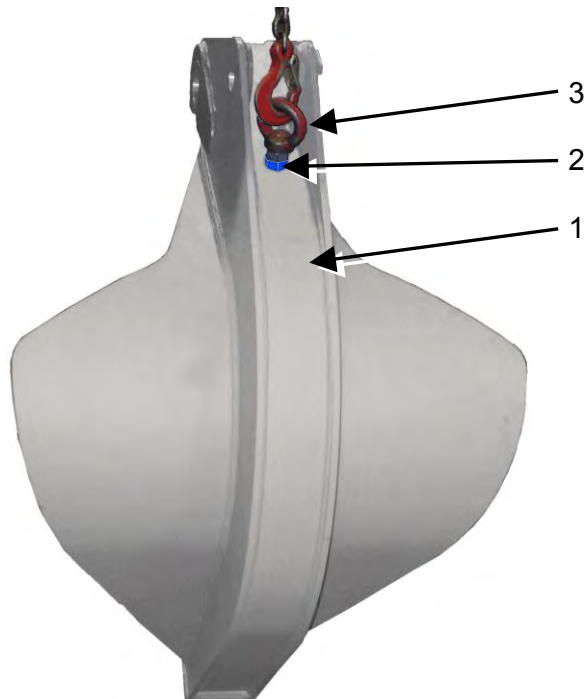
**DANGER**

Danger to life from falling cargo!

⊘ **Do not** use the nuts on the shells for the transportation of the grab!

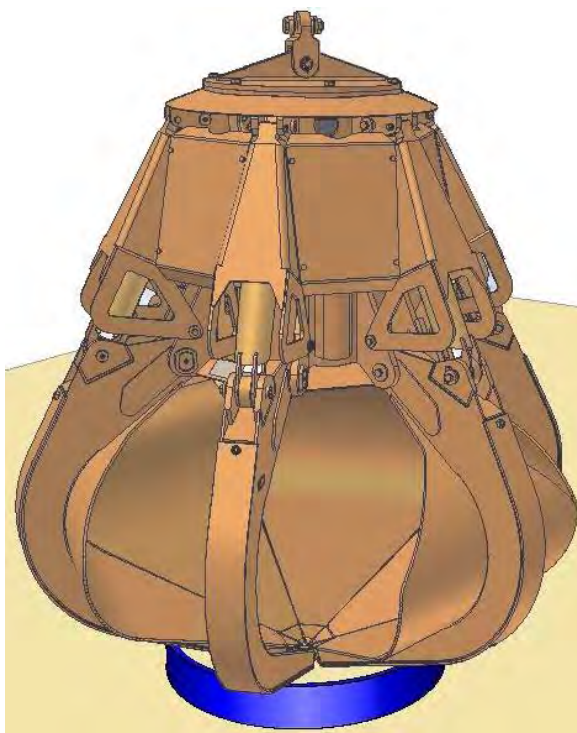
- ▶ Use the nut on the shell (see Fig. 3.6.1) only for the transportation of a single shell.

- Transportation in the fully opened state: pay attention to the transport dimensions
- Transportation in the fully closed state, for vertical storage:
 - use a device (see Fig. 3.6.2) or strut for vertical storage
- Transportation in the fully closed state, for horizontal storage:
 - avoid damage when putting down the grab
 - ensure a stable position
 - check the tightness of the hydraulic system after the first day and first week

**Legend:**

- 1 Shell
- 2 Welded nut
- 3 Eye screw with lock nut

Figure 3.6.1 Transportation of a shell

Figure 3.6.2 A grab vertically stored
on a ring

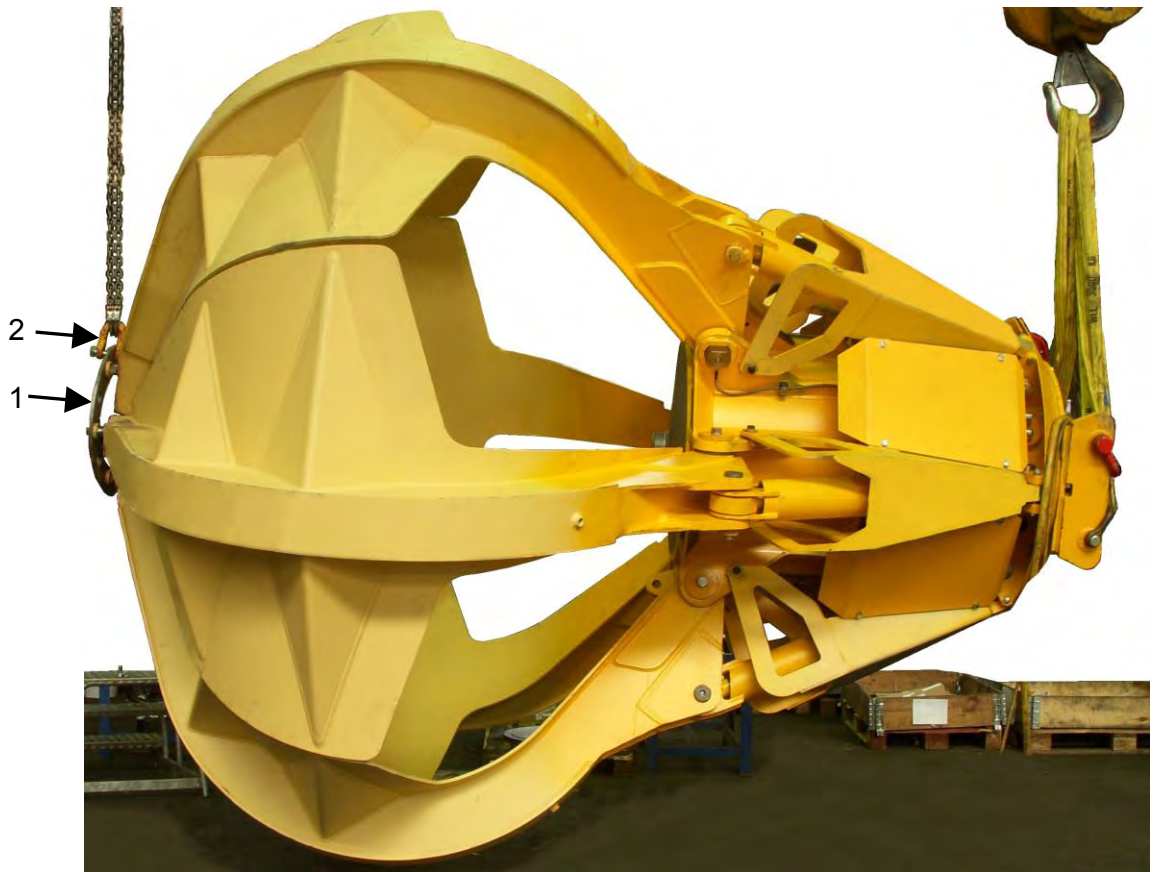


Figure 3.6.3 Transport

Legend:

1 Transport fixation

2 shackle

4.0 Maintenance and repair

4.1 Maintenance

Insufficient and improper maintenance might result in operating troubles and thus high repair costs and downtimes. This is why regular maintenance is imperative.



WARNING

Risk of injury due to maintenance work that has been carried out improperly!

Improper working might cause considerable personal and material damages.

- ▶ Maintenance and repair of the grab must only be carried out by authorized, well-trained and instructed specialized personnel. This personnel must be specifically instructed in the imminent dangers. the personnel must be allowed to reject any instructions of third parties that might breach the safety instructions.
- ▶ The operating staff must be informed about any maintenance work carried out before starting the maintenance work.
- ▶ Responsibilities of the staff for assembly / disassembly, putting into operation, operation, maintenance and repair must be clearly defined and adhered to!
- ▶ Make sure that only such personnel works on the grab who is assigned to do so!
- ▶ Before starting the maintenance work disconnect the power supply of the grab and protect it against accidental restart. To do this, it is also possible to unplug the electric plug-in connector.
- ▶ The product-specific safety instructions must be complied with when handling oils and greases.



DANGER

Only qualified technical personnel may carry out any work on the hydraulic system and the electrical system in accordance with the valid circuit diagrams.

Personnel must be instructed regarding the possible hazards and the protective measures that need to be taken.



DANGER

Danger to life from hydraulic oil discharge at high pressure

- ▶ Ensure that parts of the hydraulic system on which you are working have been relieved of pressure. Tighten untight hydraulic couplings in unpressurized condition only.
- ▶ Rectify any leakage immediately.

4.1.1 Hydraulic fluid change

The first change of hydraulic fluid is to be carried out after about 500 service hours. Further oil changes every 1000 service hours - after one year at the latest.

Extraordinary operating conditions may cause excessive contamination or ageing of hydraulic fluid. In such cases, we recommend to have the hydraulic fluid analysed in the laboratory of the hydraulic fluid manufacturer before the next hydraulic fluid change is due.

- Oil brands, see table: oil recommendation (Page-no. 11-1)

In order to protect the hydraulic components, the oil must be in accordance with purity level 20/18/15 according to ISO 4406 at least (approximately corresponding to class 9 according to NAS 1638).

The purity class of new hydraulic fluid is usually lower and, therefore, new hydraulic fluid must be filtered. This can be done using a special filling / filtration unit or a drum pump with built-in filter (with 16 µm non-woven fabric) that will filter the hydraulic fluid to reach the required purity class.



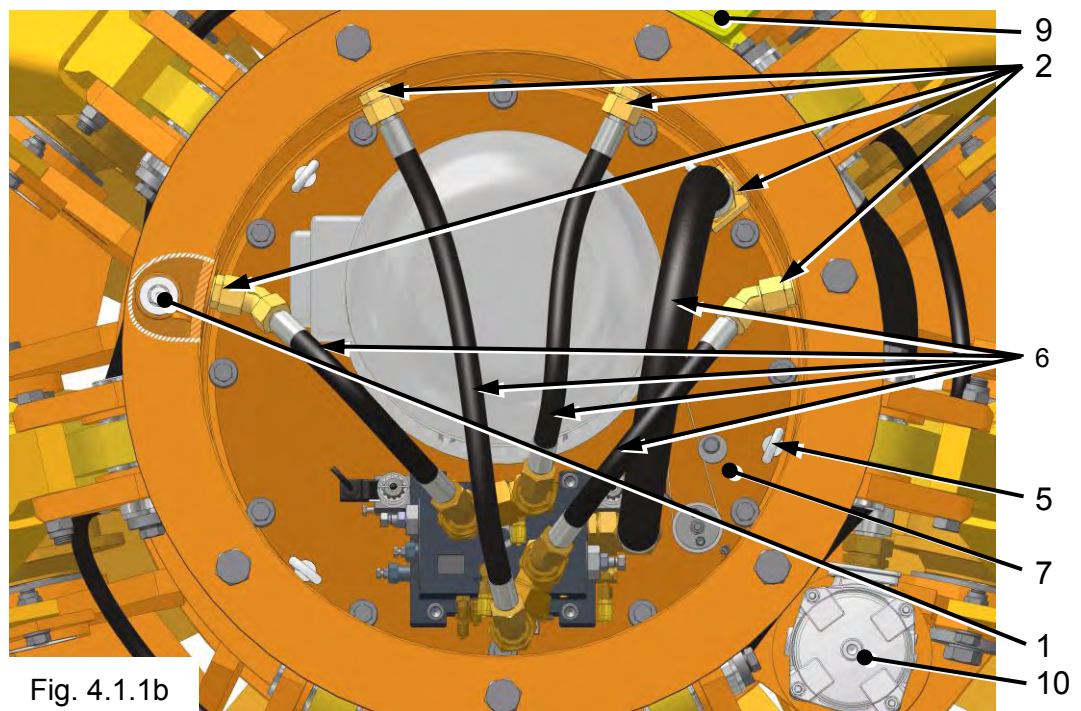
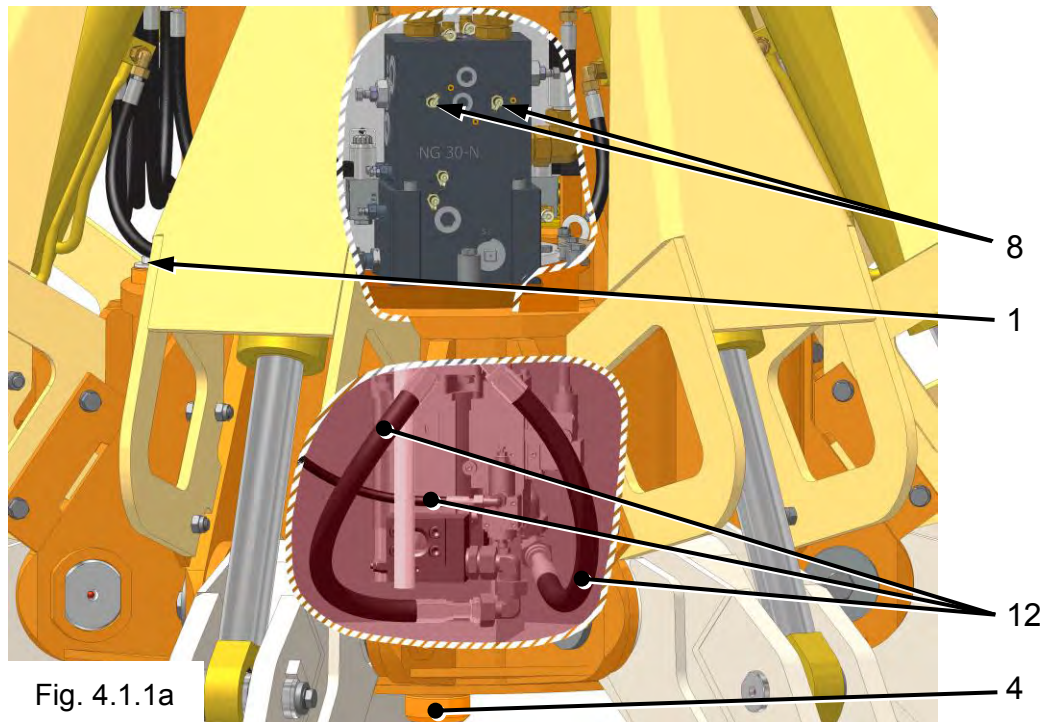
Risk of burns from hot surfaces!

High temperatures of over 80°C (176° F) may occur on the surfaces of the tank, lifting cylinder, hose lines, control block and other parts that come into contact with hydraulic fluid.

CAUTION

Before starting any work, allow the grab to cool until the control block is lukewarm (below 30°C (86° F)). Where appropriate, the work should be carried out after long periods of non-operation in the morning hours and in the shade.

- Proceeding: (see the figure 4.1.1a and 4.1.1b)
 1. Agree on the following procedure with the crane operator.
 2. Cold hydraulic fluid flows out slowly and, therefore, if the hydraulic fluid is cold, open and close the grab repeatedly until the control block becomes lukewarm (approx. 30°C {86° F}).
 3. Put down the grab in the opened state on a horizontal, flat surface.
 4. Switch off the grab on the crane and secure it against restart.
 5. Disconnect the plug-in connector of the power supplier from the grab and protect it against dirt.
 6. Allow the grab to cool. (Based on experience, the control block has the highest temperature and should be cooled to below 30°C {86° F} (lukewarm state).
 7. Dismantle the cable strain relief from the cover of the grab, if present.
 8. Dismantle the cover of the grab and keep it away from dirt.

**Legend:**

- | | |
|-----------------------|---------------------------------------|
| 1 oil dipstick | 7 tank cover |
| 2 hydraulic couplings | 8 pressure gauge connection, (MA, MB) |
| 3 screw plug | 9 terminal box |
| 4 oil drain plug | 10 return filter |
| 5 eye screw | 11 hydraulic coupling |
| 6 hosepipes | 12 hosepipe |

ATTENTION

Do not use high-pressure cleaners to clean the area around and above the tank cover [7] and around the return filter [10] and the oil dipstick [1]!

A high-pressure cleaner may only be used for cleaning the grab shells and guard plates by trained personnel. In that case, do not direct the jet under the guard plates and into the traverse!

9. Depressurise the hydraulic system:
 - a. Put one end of a measuring hose (approx. 2 to 4 m long) into an oil collection container (capacity approx. 10 l).
 - b. Connect the other end consecutively to both measuring points [9] (see Fig. 4.1.1a).
 - c. Drain the hydraulic fluid until it stops flowing.
10. Clean the areas around the return filter [10] and the oil dipstick [1] with an industrial vacuum cleaner and, if necessary, with cold solvent and compressed air. When cleaning with compressed air, always wear safety goggles and follow the safety instructions!
11. Clean the area around and above the tank cover [7] with industrial vacuum cleaner.
12. Unscrew the oil dipstick [1] to allow the pressurised air to escape from the tank (wear safety goggles!).
13. Place an appropriate collection container under the oil drain plug [4]; check the quantity of hydraulic fluid in the machine chart.
14. Quickly remove and clean the oil drain plug [4].
15. Clean the tank
 - a. Depressurize the hoses [6] (see the figure 4.1.1b). For this purpose connect a measuring hose to the test point (MA) in such a way as to ensure that the oil flows into a basin at the other end of the measuring hose. Repeat this procedure at test point (MB).
 - b. Unscrew hoses [6] (see the figure 4.1.1b) from the hydraulic couplings [2].
 - c. Disconnect the cables from the electric motor, magnetic coils and, if present, level switches, the thermostat and pressure switches in the terminal box [9]. Stow the cables on the tank cover in such a way that they cannot be damaged when lifting the hydraulic unit with the tank cover.
 - d. Unscrew the tank cover [7] from the traverse.
 - e. Lift the hydraulic unit out of the traverse, including the tank cover on eye screws [5].
 - f. Clean the tank by means of a plain plastic scraper. Don't use cleaning wool, cloths or cleaning paper since they might leave fibers. Clean the tank by rinsing it by means of a suitable detergent, e. g. benzene.

Note: If metal particles are found in the tank, this might be a sign of pump wear.
 - g. Check the threaded holes of the tank cap mounting. Clean and/or recut thread if necessary.

16. Check the O-ring gasket of the tank cover for damage and dirt. If necessary, clean or replace the O-ring gasket.
17. Clean the area under the tank cover at the hydraulic unit. Spray the components with cold solvent and thoroughly clean with compressed air in compliance with the safety instructions.
18. Check the three hydraulic hoses [12] between the pump and the tank cover for damage and expiry of the service life (see Fig. 4.1.1a).
19. Mount the hydraulic unit. (For tightening torques, see Spare Parts List).

ATTENTION! Pay attention to utmost cleanliness during assembly of the hydraulic unit and hoses.

20. Reconnect the cables of the electric motor, magnetic coils and, if present, level switches, the thermostat and pressure switches.
21. Replace the oil filter element.
22. Screw in the oil drain plug [4].
23. To fill hydraulic fluid, use a filling unit with integrated filtration or a drum pump with built-in filter (with 16 µm non-woven fabric).
 - Fill hydraulic fluid to the middle of the upper oil level glass - see Fig. 4.1.1a.
 - The level of hydraulic fluid must be visible in the upper oil level glass.
 - Hydraulic fluid must be above the middle of the lower oil level glass.

ATTENTION! Close the tank airtight with the oil dipstick [1] only when the piston rods are extended (grab closed).

24. Check the oil level (see 4.2.1)
25. Screw on the cover of the grab and install the cable strain relief.
26. Make sure that the grab is switched off on the crane. Install the plug-in connector.
27. Leave the danger zone around the grab (the minimum distance is three times the diameter of the opened grab).
28. Lift and close the grab with the crane.
29. Put down the grab vertically (for example, in a ring).
30. Switch off the grab on the crane.
31. With the grab closed, seal the oil tank airtight with the oil dipstick [1]; (see Fig. 4.1.1a). (The gasket and sealing surfaces must be clean and undamaged.)
32. Open and close the grab approx. 20 times without reaching the end positions.
33. Put down the grab in the opened state and switch it off on the crane.
34. Check the tightness of hydraulic couplings through the openings in the traverse and check the level of hydraulic fluid.
35. After the grab has been in operation for one hour, check again the tightness of hydraulic couplings.
36. Check pressures – see Section 4.2.5

4.1.2 Lubricating instructions

To ensure proper operation of the grab, the lubrication points (marked in red) must be regularly supplied with lubricant (for lubricant recommendation, see Sheet No. 11-3).

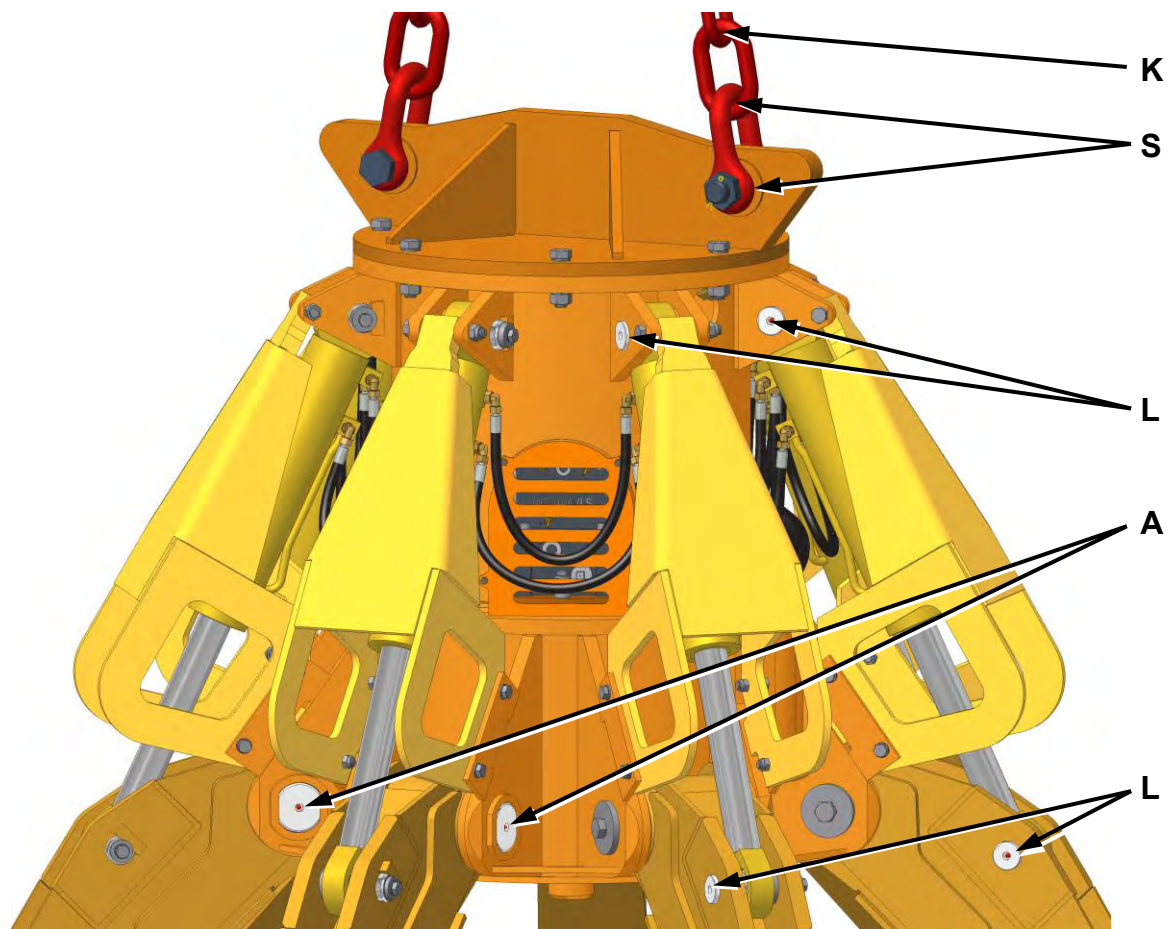


Fig. 4.1.2

Legend:

lubrication point **A** (shell)

lubrication point **L** (cylinder pins)

lubrication point **K** (chains)

lubrication point **S** (shackle)

- ▶ Grease lubricating points **A** and **L** weekly, with lithium-saponified grease, KP 2 K or K 2 K according to DIN 51502.
- ▶ Grease lubrication points **K** and **S** every six months, with grease used for lubrication of wire ropes or tothing.

Note: Regular lubrication of the chain, suspension links and shackles can ensure a significantly longer permissible service life compared to unlubricated parts. It is recommended to lubricate all chain links and shackles before the initial start-up. During lubrication, make sure that you lubricate the contact surfaces

to prevent premature wear. Suitable lubricants are those used for lubrication of wire ropes or toothing (see Chapter 4.4)

4.1.3 Oil filter



WARNING

Beware! Danger of burning!

High temperatures of over 80°C can occur on the surface of the filter.

- ▶ The filter must be allowed to cool before the start of the maintenance work.

Filter elements must be replaced:

- after the first 50 hours of operation,
- after repairs where dirt could get into the hydraulic fluid, e.g. when hydraulic hose lines were unscrewed,
- after each oil change

Filter elements of this grade **cannot** be cleaned (disposable elements); they must be replaced by new ones.

4.1.4 Motor



WARNING

Beware! Danger of burning!

High temperatures of over 80°C can occur on the surface of the electric motor.

- ▶ The motor must be allowed to cool before the start of the maintenance work.

Maintenance intervals: every 15,000 operating hours, after 3 years at the latest

- ▶ Before the start of the maintenance work, the power supply of the slewing unit must be disconnected and secured against restart.
- ▶ Clean the bearings and fill them to the half with grease, according to Chapter 4.5 "Lubricant recommendation".

4.2 Required checks

The type, scope and periods of the regular checks should be set by the contractor (operating company) in such a way as to enable early detection of defects. The type of use and the load as well as the expertise of the inspector and the regulations at the operation site must all be taken into account.

The parts of the grab must be checked by a qualified person ① (specialist) at least once a year.

If defects affecting safety are detected, the grab must not be used any further!

In addition, the grab must be checked by a qualified person ① (specialist) after damages or other incidents that may affect safety and lifting capacity and after repair work.

- ① By "qualified person" in this context is meant a person who, through his/her professional training, relevant professional experience and recent additional professional activities, has acquired the necessary expertise to inspect the respective parts (equipment). He/she must be familiar with the applicable regulations and generally recognised rules of technology to such an extent that he/she can assess the safe working condition of the parts. The qualified person must regularly check and expertly assess parts of appropriate design and purpose and be able to determine the type, scope, depth and periods of checks for them.

Regular checks, unless described separately, are as follows:

- Check hydraulic bolted joints (fittings) and hydraulic parts (such as lifting cylinder, control block) for visible damage and leakage.
- Check screw and pin connections.
- Check bearings for wear.
- Check that plug-in connectors fit correctly. The relief tension must be fixed in such a way that the power supply cable does not exert any tension on the plug-in connector.
- Monitor oil temperature.
- Check filters for contamination.

For daily checks see Section 3.2.2 "Daily start-up".

4.2.1 Inspection of chains and individual chain links

The chains and individual chain links or suspension links (see Fig. Data Sheet - Dimensions) must be inspected by a qualified person ① at intervals of not more than 12 months. Shorter intervals are required under unfavourable conditions of use such as increased wear or intensified corrosion. In addition to visual inspections, a magnetic testing for absence of cracks must be performed at intervals of maximum three years. The inspections have to be documented in accordance with the regulations of the country where the chain is used.

Prior to the inspection, the chain links must be thoroughly cleaned to ensure that they are free from oil, dirt and rust. The cleaning method may not corrode the base material and may not cover cracks or surface defects.

The chains or suspension links must be replaced:

- a) If a chain link is deformed or broken and if it has deposits that cannot be removed.
- b) If chain links were straightened, welded, bent, burned or otherwise changed.
- c) If a chain link has dents, cracks, grooves, cuts, corrosion pits or deformations. Minor dents can be repaired by a qualified person ①, provided that the remaining material thickness in that place is more than 90% of the original diameter and no abrupt change in cross section is noticeable. Do not weld chain links!
- d) If, as a result of plastic deformation, the outside length of a chain link has increased by more than 3% of the outside nominal dimension.
- e) If wear or excessive corrosion is present anywhere on a chain link. The wear of up to 90 % of the original diameter (d_n) is permissible, calculated as the average value of two measurements of the diameters d_1 and d_2 performed at 90° to each other (see Fig. 4.2.4).
- f) If, as a result of wear, the inside length has increased by at least $\Delta L=8\%$ ($\Delta L = L_1 - L_0$) for suspension links
by at least $\Delta L=5\%$ for a chain link
by at least $\Delta L=2\%$ for a chain with 11 pitches (links)
- g) In the event of discolouration caused by heat or damage due to chemical influences

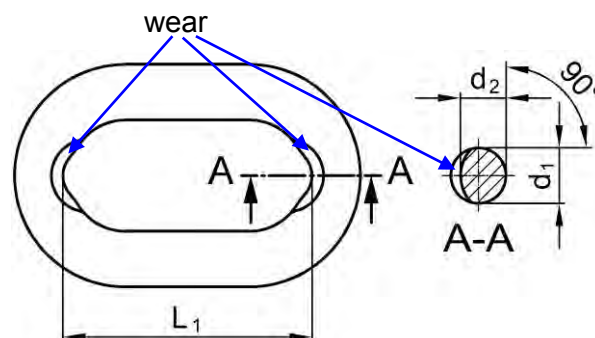


Figure 4.2.1

Chains to be replaced if:

$$\frac{d_1 + d_2}{2} \leq 0,9 d_n$$

The repairs may only be carried out by the manufacturer or, for minor dents (see Point c)), by a specialist ②.

- ② Specialists are persons who, by virtue of their professional training and experience, have sufficient knowledge and skills to carry out repair work in the field of lifting equipment and who are acquainted with relevant national work safety regulations, accident prevention regulations, rules for safety and health at work, guidelines and generally recognised technical standards as well as the present operating instructions to the extent that they are able to establish and assess the safe working condition of lifting equipment, shackles and chains.

Note: Regular lubrication of the chain, suspension links and shackles can ensure a significantly longer permissible service life compared to unlubricated parts. It is recommended to lubricate all chain links and shackles before the initial start-up. During lubrication, make sure that you lubricate the contact surfaces to prevent premature wear. Suitable lubricants are those used for lubrication of wire ropes or tothing (see Chapter 4.5)

4.2.2 Inspection of shackles

- ▶ The intervals at which the shackles must be examined more closely, shall be determined by a competent person. The inspection intervals shall be selected in such a way that damages can be detected in good time and shall not exceed 6 months.
- ▶ The inspection of shackles must be performed by a competent person ①.

The shackle must be replaced:

- a) *If the nominal size is decreased by more than 5% due to wear in any place.*
- b) In the case of permanent deformation of the pin or frame.
- c) In the case of heat treatment or welding marks.
- d) If another pin is mounted in the shackle in place of the original pin.
- e) If not all markings are visible anymore.
- f) If there are any dents, cracks, grooves, cuts, corrosion pits or crushed sections in the pin or frame; *(Minor dents can be straightened by a competent person if the remaining material thickness in this place is more than 95% of the original diameter and no abrupt change in cross section is observed)*
- g) If the pin is screwed in incorrectly (when assembled correctly, the pin collar and nut rest flat on the shackle eyes and the nut is secured by a splint) the assembly must be changed or the shackle replaced.



4.2.3 Check of bushes for wear

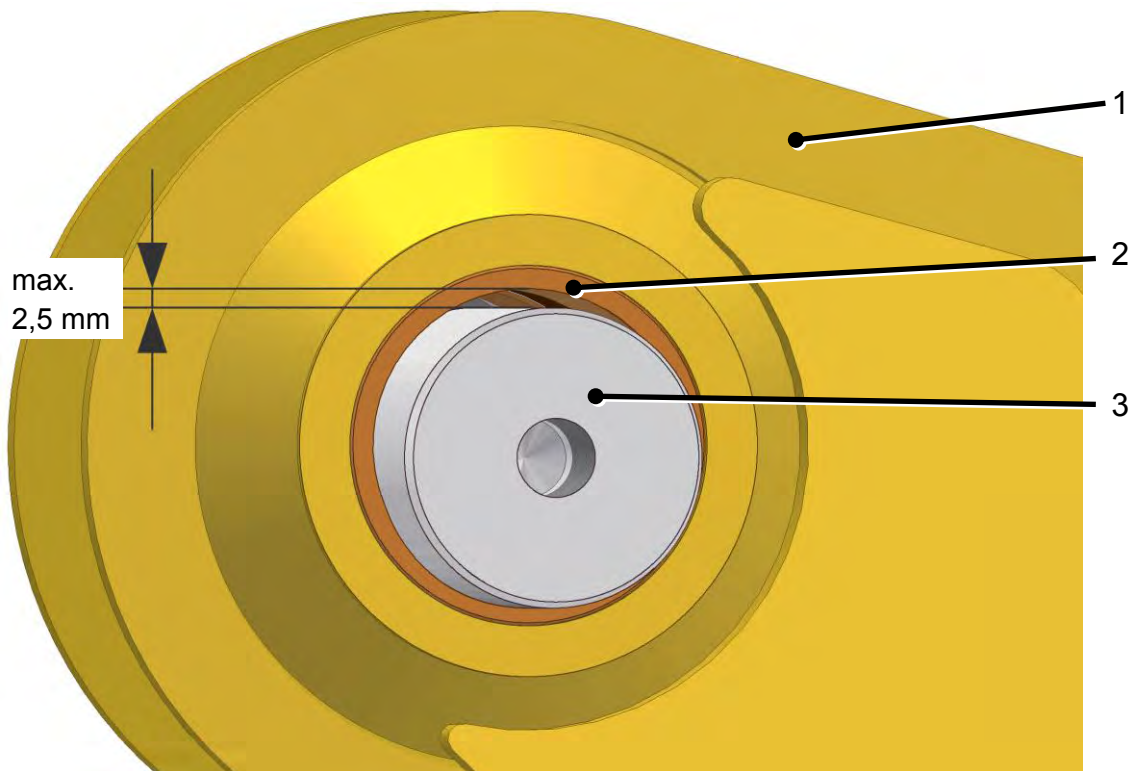


Figure 4.2.3 The distance is shown exaggerated

Legend:

1 shell

3 pin (shell pivot axle)

2 bush

The distance in between the bush and the pin of the shell must be inspected by a qualified person at intervals of not more than 6 months.

The distance in between must be **not** more than 2,5 mm.

4.2.4 Check of hydraulic hose lines


DANGER

The highly pressurized hydraulic fluid (oil) may get into the human body by injection and **lead** to very severe **intoxication**, **embolism** and within a very short time, **to death**.



Pressurized hydraulic fluids may escape almost invisibly from tiny holes; penetrate the skin and even protective gloves and the skin. If this happens, seek medical attention immediately!



- ⊙ Never put your fingers into a stream of escaping oil.
- ⊙ Never touch pressurized hose lines with a part of your body.
- ▶ Check carefully and thoroughly for visible damage and leaks.
- ▶ Always use cardboard or paperboard when checking hydraulic components for leaks. Never use your hands when looking for leaks!


DANGER
Danger to life from hydraulic oil discharge at high pressure

Work on the hydraulic system may only be carried out by qualified personnel according to the existing wiring diagrams.

The personnel must be instructed on the hazards arising and the protective measures to be taken.

- ▶ Make sure that the parts of the hydraulic system being worked on are depressurised. Loose screw connections may only be tightened in depressurised state.
- ▶ The grab must be fully opened or fully closed. If this is not possible, secure the grab shells against movement that may be caused by the retraction or extension of the lifting cylinder. **Risk of injury!**
- ▶ Depressurise the hydraulic system via the pressure gauge connectors **MA** and **MB** and, additionally, via **MP1** and **MP2** (see Fig. 4.2.5). For this purpose, put one end of a pressure gauge hose into a container to receive the outflowing hydraulic fluid. (For splash protection, use, for example, a 10-litre bucket). Connect the other end to the pressure gauge hose connectors until the pressure is released.

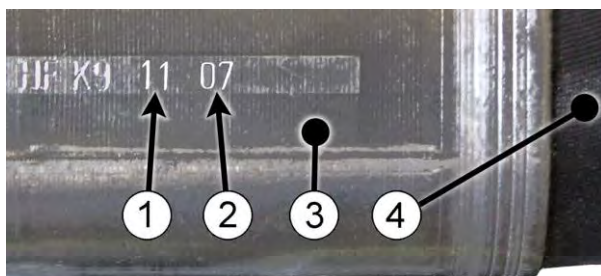
The hydraulic hose lines may only be laid by qualified ① persons assigned by the contractor (operating company).

The hydraulic hose lines must be checked as required, but at least once a year, in case of multishift operation every six months. The intervals between the checks must be selected so as to allow early detection of deviations from the safe working condition. After any maintenance and repair work the hydraulic hose lines must be checked to make sure they are assembled properly and in an operational safety state.

The hose lines must be replaced if one of the following criteria has been detected:

- Damages of the external layer event to the wire braid reenforcement (e. g. chafe marks, cuts, cracks)
- Brittleness of the external layer (formation of cracks in the hose material)
- Deformations that do not correspond to the natural form of the hose or of the hose line, in unpressurized as well as in pressurized condition or when bended, e. g. separation of layers, bubbling
- Leakages
- Damage or deformation of the hose fitting (prejudiced sealing function)
- Detaching of the hose out of the fitting
- Corrosion of hose fitting impairing the function and rigidity
- Specified period of storage and/or use of the hose or of the hose line is exceeded.
 - ▶ Hydraulic hoses must not be stored longer than 2 years.
 - ▶ Hydraulic hoses must not be used longer than 6 years (including maximum storage period of 2 years).
- ▶ Any defect must be eliminated immediately.
- ▶ Make sure that the hydraulic hoses are admitted for the required pressures.
- ▶ Only use hose lines according to the spare parts list to replace defective hose lines.
- ▶ Make sure that the replacement lines are clean; close them with dust covers until they are fitted.

The hydraulic hose lines are marked on the hose fittings with the date of manufacture (year and month) (see Fig. 4.2.3)


Legend:

- 1 Year
- 2 Month
- 3 Hose fitting
- 4 Hydraulic hose

Figure 4.2.4 Hose line

(A marking on the hydraulic hoses indicates the date of their manufacture (quarter and year). For example, the mark 2 Q 12 means that the hose was manufactured in the second quarter of 2012).

4.2.5 Check oil level

**CAUTION**
Risk of burns from hot surfaces!

High temperatures of over 80°C (176° F) may occur on the surfaces of the oil tank, lifting cylinder, control block and other parts that come into contact with hydraulic fluid.

- ⊗ Do not touch the oil tank when checking the oil level!
- ▶ Wear gloves when unscrewing the oil dipstick!

- ▶ Measure the oil level in the opened state, i.e. with retracted piston rods.
- ▶ The grab must be levelled horizontally.
- ▶ The maximum or minimum oil level can be read on the oil dipstick.
- Too much hydraulic fluid causes an inadmissibly high overpressure in the tank.
- Too little hydraulic fluid causes an overheating of the hydraulic system and might lead to pump damages.
- For topping up oil, refer to Section 4.1.1 "Oil change".
- ▶ Close the grab shells.
- ▶ With the grab shells closed, close the tank airtight with the oil dipstick.

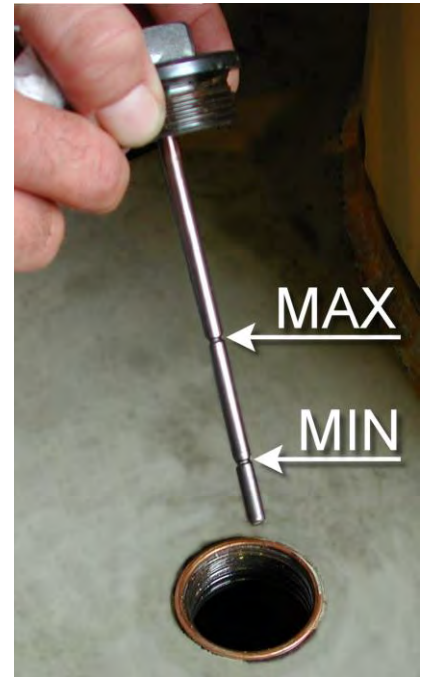


Figure 4.2.4 oil dipstick

4.2.6 Check and adjust pressure

**DANGER**
Danger to life from hydraulic oil discharge at high pressure

- ▶ Use a pressure gauge with a measurement range of 0 – 400 bar (0 – 5800 psi) and
- ▶ a measuring hose with a permissible pressure of 400 bar {5800 psi} and a length of 4 to 5 m {158 to 200 in}.

**WARNING**
Danger from the suddenly moving grab!

- ▶ The grab must be in a stable position before the measurement.
- ▶ Make sure that the grab is not moved by the crane.

**CAUTION**
Risk of burns from hot surfaces!

High temperatures of over 80°C {176° F} may occur on the surfaces of the tank, lifting cylinder, hose lines, control block and other parts that come into contact with hydraulic fluid.

Before starting any work, allow the grab to cool until the control block is lukewarm (below 30°C {86° F}). Where appropriate, the work should be carried out after long periods of non-operation in the morning hours and in the shade.

ATTENTION! If the hydraulic fluid is not warm enough for operation (see data in the machine chart in the appendix), the hydraulic fluid must be warmed in advance by a test run. In cold conditions, the set operating pressures deviate from the factory settings.

Check pressure

The pressure can be checked at the control block (see Figure 4.2.6a):

- Measuring point MA: closing pressure (cylinder)
- Measuring point MB: opening pressure (cylinder)

ATTENTION!

Due to physical rules, the pressure measured here is approx. 30 to 40 bar higher than the pressure actually produced by the pump. Furthermore, there can be deviations in the pressure measurements, which can be measured

- a) during operation with material (bulk goods) and
 - b) during operation without material (bulk goods)
- in spite of the same pressure adjustment.

- **Measuring point MP1:** The pressure produced by the pump, limited by the pressure relief valve DV1 for "closing". The pressure measured at this point can be approx. 30 bar lower than at measuring point MA.
- **Measuring point MP2:** The pressure produced by the pump, limited by the pressure relief valve DV1 for "opening". The pressure measured at this point can be approx. 30 to 40 bar lower than at measuring point MB.
- **Measuring point MP:** The pressure for „opening“ and „closing“, produced by the pump. $MP \sim MP1$ respectively $MP \sim MP2$. In connection with a load sensing variable delivery pump, the stand-by pressure is approx. 35 bar, in the operating mode S6 when opening or closing is not activated.
- **Measuring point MLS:** Pressure in the load-sensing signal line to the load-sensing regulator of the pump (only for variable delivery pumps with load-sensing regulator).

The following is applicable:

Electric motor is switched on; operating mode S6; opening or closing is not activated:

- $MLS = 0 \text{ bar}$

Electric motor is switched on

- during the movement of the shells (cylinder): $MLS = MP$
- at the end of the movement, i. e. adjusted pressure at DV1 respectively DV2 reaches $MLS = MP - 20 \text{ to } 30 \text{ bar}$

After having switched off the consumer (valve):

- $MLS = 0 \text{ bar}$

Pressure measurement

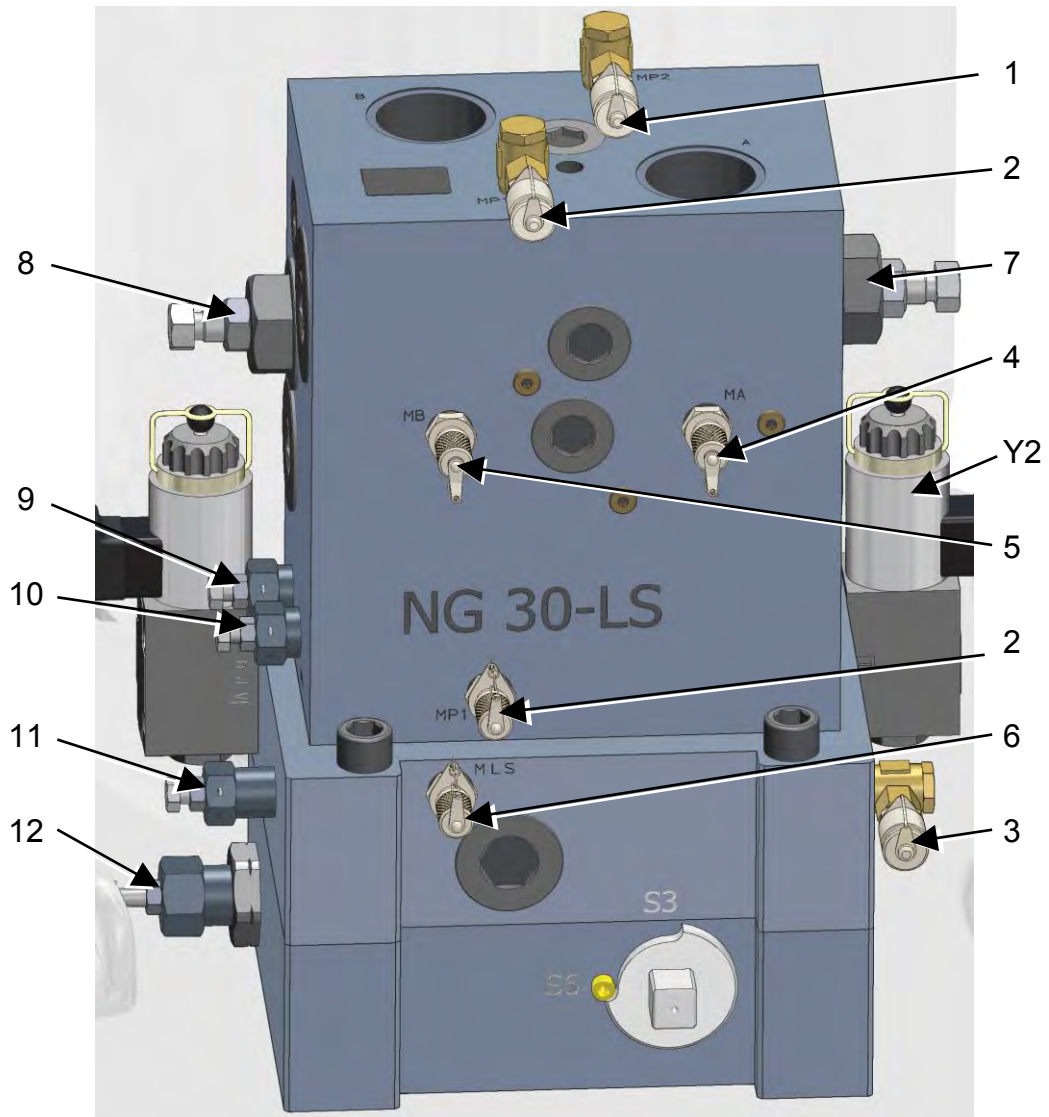


Figure 4.2.6a control block

Measuring points:

- | | | | | | |
|---|-----|-----------------------------|----|-----|------------------------------------|
| 1 | MP2 | pump pressure - opening | 7 | SV1 | stop valve with lift stop |
| 2 | MP1 | pump pressure - closing | 8 | SV2 | stop valve with lift stop |
| 3 | MP | pump pressure | 9 | DV2 | pressure relief valve grab opening |
| 4 | MA | cylinder pressure - closing | 10 | DV1 | pressure relief valve grab closing |
| 5 | MB | cylinder pressure - opening | 11 | DV3 | pressure relief valve |
| 6 | MLS | load-sensing control | 12 | DV4 | pressure relief valve |

Pressure measurement

1. Park the opened grab in a stable position; if the grab cannot be opened, put it in a stable position in a parking device.
2. Switch off the power supply and secure it against restart.
3. Dismantle the cover in front of the control block (see [13], Section 2.4 Parts list).
4. Clean the control block from dust and dirt in the area of measuring points.
5. Unscrew the protective caps of the measuring points.
6. First, connect the pressure gauge to the measuring hose.
7. Then connect the other end of the measuring hose to the measuring point.
8. Keep the pressure gauge in a clearly visible place and outside of the danger zone (pivoting range of the grab).
9. Lift the grab until the operating path under the shells is free.
10. Switch on the power supply of the grab.
11. Open and close the grab and check the operating pressure on the pressure gauge.
12. Open the grab and park it in a stable position.
13. Switch off the power supply of the grab.

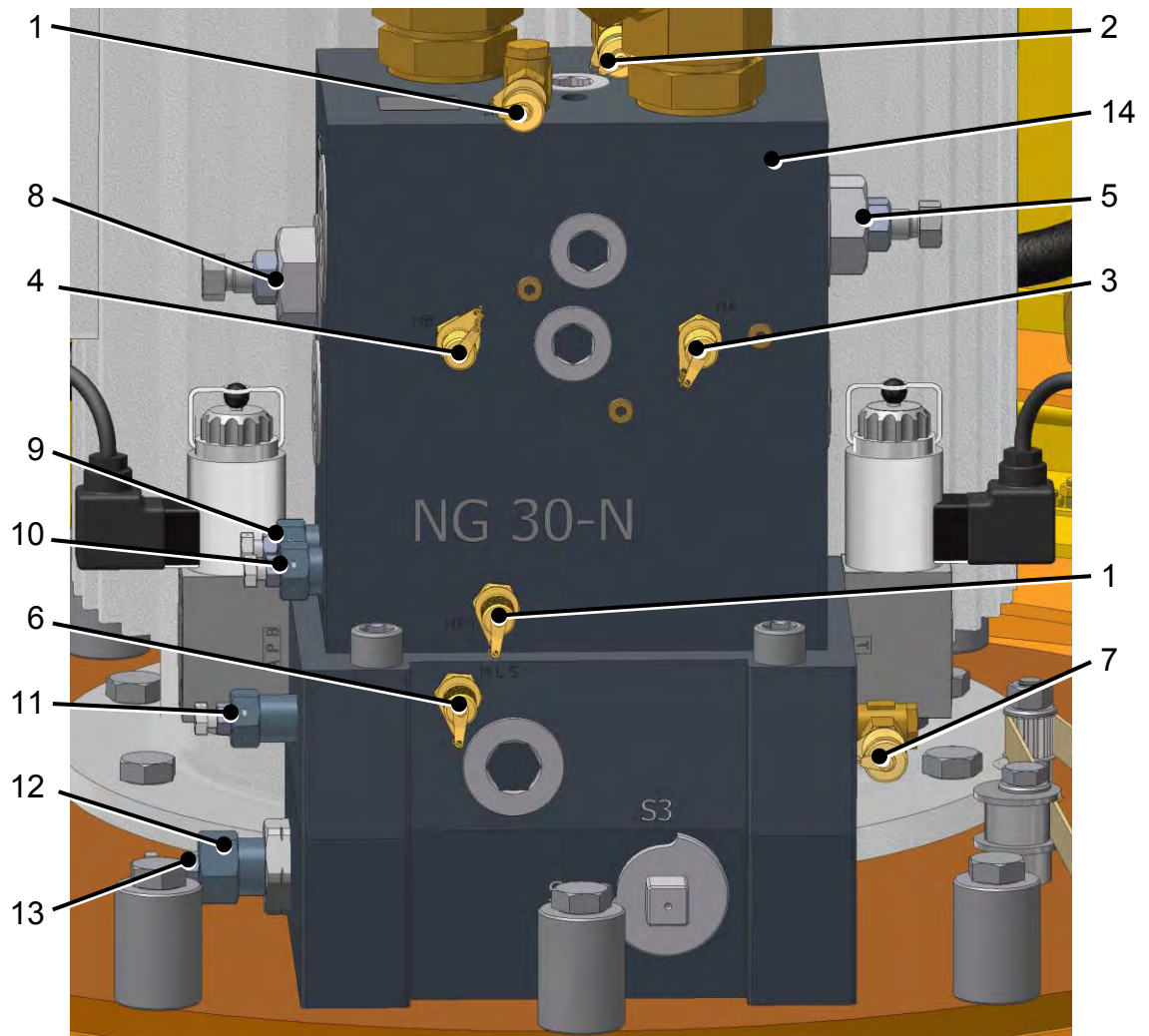


Figure 4.2.6b Control block

Legend:

- | | |
|-------------------------------------|---|
| 1 MP1 = gauge port closing pressure | 9 DV2 = pressure relief valve opening pressure |
| 2 MP2 = gauge port opening pressure | 10 DV1 = pressure relief valve closing pressure |
| 3 MA = gauge port (closing) | 11 DV3 = pressure relief valve |
| 4 MB = gauge port (opening) | 12 DV4 = pressure relief valve |
| 5 SV1 = stop valve | 13 counter nut DV4 |
| 6 MLS = gauge port (load-sensing) | 14 control block |
| 7 MP = gauge port pump pressure | |
| 8 SV2 = stop valve | |

Safety valves DV3, DV4

The entire hydraulic unit is protected by the safety valves DV3 and DV4. They must always be set approx. 30–50 bar higher than the system pressure valves (DV1, DV2). They are factory set to 280 bar and should never be adjusted.

Pressure adjustment:

Closing pressure: Pressure relief valve DV1

Opening pressure: Pressure relief valve DV2

Operating mode S6: only DV3

Operating mode S3: DV4 (protection function: OPENING the grab)
 DV3 (protection function: CLOSING the grab)

ATTENTION! The pressure relief valves DV3 and DV4 are set by the manufacturer. Changes of the settings may lead to malfunctions of the grab or damage. Changes of the settings may only be carried out by qualified personnel.

ATTENTION! Adjustment when the system is warm from operating

Pressure adjustment is done at the control block (see Figure 4.2.6b)

The recommended adjustment values are to be seen in the machine card.

Other values must only be set after having consulted the manufacturer.

Procedure

To be performed preferably only in the operating mode S3.

Setting DV4: only in the operating mode S3

1. Park the opened grab in a stable position; if the grab cannot be opened, put it in a stable position in a parking device.
2. Switch off the power supply and secure it against restart.
3. Clean the control block from dust and dirt in the area of measuring points (see Fig. 4.2.6b). To set **S3**, if not set yet, turn the three-way stop cock to the right and lock both manual controls; see Fig. 3.2.2a
4. Unscrew the protective caps of the measuring point(s).
5. First, connect the pressure gauge (**pressure range 0 – 400 bar**) to the measuring hose.
6. Then connect the other end of the measuring hose to the measuring point **MP** or **MP2**.
7. Keep the pressure gauge in a clearly visible place and outside of the danger zone (pivoting range of the grab).
8. Lift the grab until the operating path under the shells is free.
9. Switch on the power supply of the grab.
10. Open the grab completely and measure the pressure in the opened state. If the

pressure deviates from 280 bar by more than ± 5 bar, the pressure at DV4 must be adjusted!

11. Briefly engage the function "close grab" to get the pressure at MP to 0 bar and to allow to adjust DV4.
12. Open the grab and park it in a stable position.
13. Switch off the power supply of the grab.
14. Turn the adjustment screw DV2 until tight (the pressure is then set to maximum).
15. Loosen the counter nut of DV4 (see [13], Fig. 4.2.5b).
16. Loosen the adjustment screw **DV4** until it is no longer loaded by the spring and is easier to turn (do not unscrew completely).
17. Turn the adjustment screw **DV4** by hand clockwise until spring resistance can be felt. Then turn further (by approx. 3 turns).
18. Open the grab and check the pressure on the pressure gauge.
19. If the setting of 280 bar is not reached, briefly engage again the function "close grab" to allow to adjust DV4.
20. Turn the adjustment screw DV4 clockwise (with the number of turns depending on the previous pressure measurement).
21. Open the grab and check the pressure on the pressure gauge. Repeat the process step by step until the setting of 280 bar is reached.
22. Tighten the counter nut of DV4.
23. Set DV2 to the pressure indicated for the measuring point MP2 in the technical data sheet.

Setting DV2:

1. Park the opened grab in a stable position; if the grab cannot be opened, put it in a stable position in a parking device.
2. Switch off the power supply and secure it against restart.
3. Connect the measuring hose with a pressure gauge (**pressure range 0 – 400 bar**) to the measuring point **MP2**.
4. Keep the pressure gauge in a clearly visible place and outside of the danger zone (pivoting range of the grab).
5. Loosen the adjustment screw **DV2** until it is no longer loaded by the spring and is easier to turn (do not unscrew completely).
6. Turn the adjustment screw **DV2** by hand clockwise until spring resistance can be felt. Then turn further (by approx. 3 turns).
7. Lift the grab until the operating path under the shells is free.
8. Switch on the power supply of the grab.
9. Open the grab completely and measure the pressure in the opened state. If the pressure deviates by more than ± 10 bar from the pressure indicated for the measuring point MP2 in the technical data sheet, the pressure at **DV2** must be

adjusted!

10. Briefly engage the function "close grab" to get the pressure at MP2 to 0 bar and to allow to adjust DV2.
11. Open the grab and park it in a stable position.
12. Switch off the power supply of the grab.
13. Turn the adjustment screw DV2 clockwise (with the number of turns depending on the previous pressure measurement).
14. Open the grab and measure the pressure in the opened state. Repeat the process step by step until the value indicated for the measuring point MP2 in the technical data sheet is reached.
15. Tighten the counter nut of DV2.

Setting DV3: in operating modes S3 and S6

1. Park the opened grab in a stable position; if the grab cannot be opened, put it in a stable position in a parking device.
2. Switch off the power supply and secure it against restart.
3. Clean the control block from dust and dirt in the area of measuring points (see Fig. 4.2.5b).
4. Unscrew the protective caps of the measuring points.
5. First, connect the pressure gauge (**pressure range 0 – 400 bar**) to the measuring hose.
6. Then connect the other end of the measuring hose to the measuring point **MP1**.
7. Keep the pressure gauge in a clearly visible place and outside of the danger zone (pivoting range of the grab).
8. Lift the grab until the operating path under the shells is free.
9. Switch on the power supply of the grab.
10. Open the grab completely and measure the pressure in the opened state. If the pressure deviates from 280 bar by more than ± 5 bar, the pressure at DV3 must be adjusted!
11. Briefly engage the function "close grab" to get the pressure at MP1 to 0 bar and to allow to adjust DV3.
12. Open the grab and park it in a stable position.
13. Switch off the power supply of the grab.
14. Turn the adjustment screw DV1 until tight (the pressure is then set to maximum).
15. Loosen the counter nut of DV3.
16. Loosen the adjustment screw **DV3** until it is no longer loaded by the spring and is easier to turn (do not unscrew completely).
17. Turn the adjustment screw **DV3** by hand clockwise until spring resistance can be

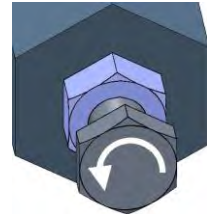
felt. Then turn further (by approx. 3 turns).

18. Open the grab and check the pressure on the pressure gauge.
19. If the setting of 280 bar is not reached, briefly engage again the function "close grab" to allow to adjust DV3.
20. Turn the adjustment screw DV3 clockwise (with the number of turns depending on the previous pressure measurement).
21. Open the grab and check the pressure on the pressure gauge. Repeat the process step by step until the setting of 280 bar is reached.
22. Tighten the counter nut of DV3.
23. Set DV1 to the pressure indicated for the measuring point MP2 in the technical data sheet.

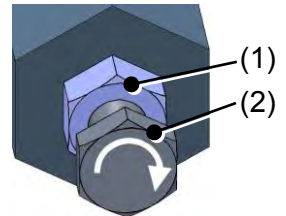
Setting DV1:

1. Park the opened grab in a stable position; if the grab cannot be opened, put it in a stable position in a parking device.
2. Switch off the power supply and secure it against restart.
3. Connect the measuring hose with a pressure gauge (**pressure range 0 – 400 bar**) to the measuring point **MP1**.
4. Keep the pressure gauge in a clearly visible place and outside of the danger zone (pivoting range of the grab).
5. Loosen the adjustment screw **DV1** until it is no longer loaded by the spring and is easier to turn (do not unscrew completely).
6. Turn the adjustment screw **DV1** by hand clockwise until spring resistance can be felt. Then turn further (by approx. 3 turns).
7. Lift the grab until the operating path under the shells is free.
8. Switch on the power supply of the grab.
9. Open the grab completely and measure the pressure in the opened state. If the pressure deviates by more than ± 10 bar from the pressure indicated for the measuring point MP2 in the technical data sheet, the pressure at **DV1** must be adjusted!
10. Briefly engage the function "close grab" to get the pressure at MP1 to 0 bar and to allow to adjust DV1.
11. Open the grab and park it in a stable position.
12. Switch off the power supply of the grab.
13. Turn the adjustment screw DV1 clockwise (with the number of turns depending on the previous pressure measurement).
14. Open the grab and measure the pressure in the opened state. Repeat the process step by step until the value indicated for the measuring point MP1 in the technical data sheet is reached.
15. Tighten the counter nut of DV1.

- Lower pressure = Loosen the counter nut at the pressure relief valve and turn the adjusting screw to the left (anti-clockwise). Then check the pressure and secure the adjusting screw with the counter nut.



- Raise pressure = Loosen the counter nut at the pressure relief valve and turn the adjusting screw to the right (clockwise). Then check the pressure and secure the adjusting screw with the counter nut.



(1) counter nut

(2) adjusting screw

ATTENTION! Prior to adjusting the pressure, the respective pressure relief valve should be released, i. e. if for example the closing pressure is to be changed, the grab shall be operated into "opening" direction for a short while before you turn the adjusting screw of DV1. If the respective pressure relief valve is not released, adjustment cannot be done at all or only with a lot of force, which might lead to damages of the valve components.

4.3 Repairs

4.3.1 Important instructions for repairs

For major repairs please consult the after-sales service of Salzgitter Maschinenbau AG.



WARNING

Risk of injury in case of insufficient qualification!

Improper working might cause considerable personal and material damages.

- ▶ Maintenance and repair of the grab must only be carried out by authorized, well-trained and instructed specialized personnel. This personnel must be specifically instructed in the imminent dangers. the personnel must be allowed to reject any instructions of third parties that might breach the safety instructions.
- ▶ Only specialist electricians or instructed personnel under direction and supervision of a specialist electrician are allowed to work on the electric systems of the grab in compliance with the electrotechnical regulations.
- ▶ Only personnel who has special knowledge of and experience in hydraulic systems is allowed to work on hydraulic systems!
- ▶ Responsibilities of the staff for assembly/disassembly, putting into operation, operation, maintenance and repair must be clearly defined and adhered to!
- ▶ Make sure that only such personnel works on the grab who is assigned to do so!
- ▶ Disconnect power supply to the grab and protect it against accidental restart before starting repair work. To do this, it is also possible to unplug the electric plug-in connector.

Wear the following personal when carrying out any maintenance or repair work:

- Protective helmet
- Protective goggles
- Protective clothes
- Protective gloves
- Safety shoes with toe caps and puncture-resistant base

The following points must always be observed when making repairs:

Disconnect the grab from the power supply. After every disassembly or repair, it is necessary to check the maximum pressure against that given on the name plate or the machine card. Suitably calibrated manometers are to be used.

As a basic principle, supply all the lubricating points with grease in accordance with 4.5 "Lubricant recommendation" before any restart (for lubricating instructions see 4.1.2).

Only start the grab after repairs or modifications if

- the reliable operating state is restored,
- the work is definitely declared completed by authorized qualified personnel
- nobody is within the area of danger.

Before restarting the grab adhere to the instructions specified in chapter „3.2 Putting into operation“.

**DANGER****Danger to life from hydraulic oil discharge at high pressure**

Work on the hydraulic system may only be carried out by qualified personnel according to the existing wiring diagrams.

The personnel must be instructed on the hazards arising and the protective measures to be taken.

- ▶ Make sure that the parts of the hydraulic system being worked on are depressurised:
- ▶ The grab must be fully opened or fully closed. If this is not possible, secure the grab shells against movement that may be caused by the retraction or extension of the lifting cylinder. **Risk of injury!**
- ▶ Depressurise the hydraulic system via the pressure gauge connectors **MA** and **MB** and, additionally, via **MP1** and **MP2** (see Fig. 4.3.1). For this purpose, put one end of a pressure gauge hose into a container to receive the outflowing hydraulic fluid. (For splash protection, use, for example, a 10-litre bucket). Connect the other end to the pressure gauge hose connectors until the pressure is released.

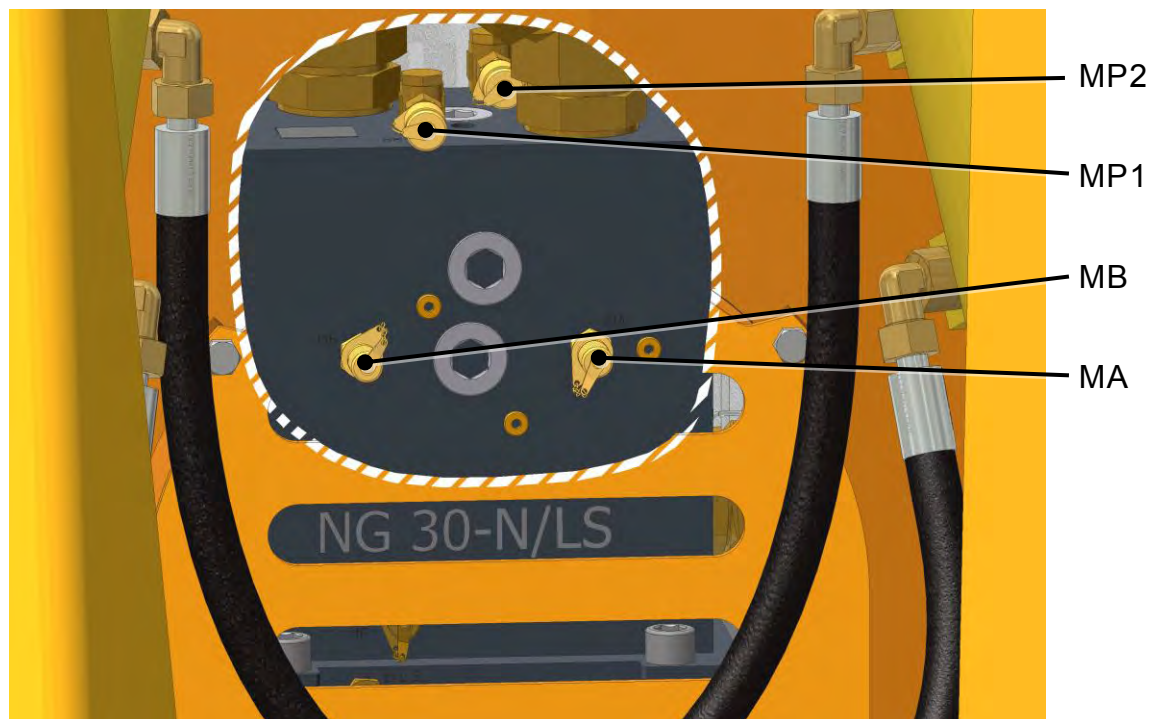


Figure 4.3.1 Measuring points on the control block

4.3.2 Disassembly

Perform steps 1 to 9 described in Section **"4.1.1 Hydraulic fluid change"**.

1. Shells

Set down the opened grab. Support the traverse on stands, so that the pins are relieved of strain. Disassembly in the order specified below:

- 1.) Lifting cylinder pins at the shell
- 2.) Remove shell pins

2. Hydraulic unit

Disassemble the hydraulic unit as described in Section **"4.1.1 Hydraulic fluid change"**.

3. Pump

Disassembly order as described in par. 2, above. Set down the hydraulic unit with the motor downwards. Disconnect pipe lines / hoses. Unscrew the pump mounting bolts and remove the pump.

4. Control block

Remove cover and disconnect hoses at control block. Loosen mounting bolts and lift out control block.

5. Motor

Disassembly order as described in par. 2, above. Set down the hydraulic unit, motor upwards, on stands. Remove mounting bolts. Attach lift rope to lifting eyes and lift out the motor.

6. Lifting cylinders

Set down the opened grab. Remove hoses to the lifting cylinders and collect draining oil. Dismount lifting cylinder bolts and unscrew lifting cylinder. (Depending on the weight, a hemp rope can be used for lifting.)

4.3.3 Repair works

1. Replace the bearing bushes of the scoops

Dismount as described under 4.3.2. Replace the worn bushes by new ones and stick in by means of a suitable adhesive, e. g. Loctite Type 638.

2. Replace the pins

When replacing the bearing bushes, check the contact surface of the pins. Replace the pins, too, if the contact surface is very worn.

3. Replace the lift cylinder seals (rod seal, piston seal, o-rings)

Remove the cylinder guide nut. Pull out the piston rod from the cylinder tube. Dismount piston from the piston rod. Remove the guide nut from the piston rod and replace the seals.

4. Pump

You should not repair the pump yourself. We propose that you have the defected pump repaired by the SMAG.

5. Control block

a) Replace the pressure relief valve
(see sheet-no. 10-6)

b) Replace the stop valve
(see sheet-no. 10-6)

Remove both covers and replace the whole stop valve assembly. Replace all parts completely, so as to ensure perfect operation.

4.3.4 Assembly

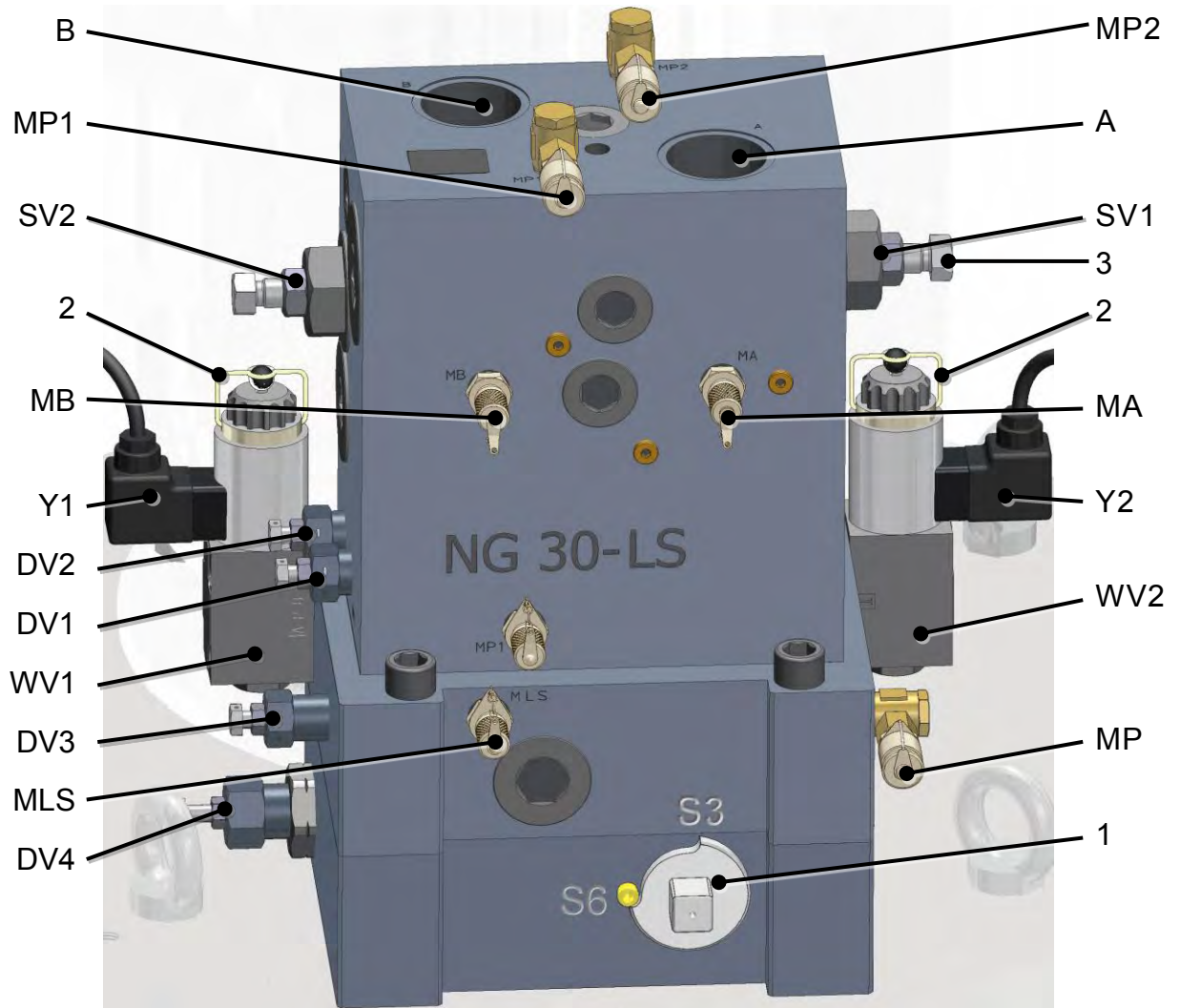
Carry out the assembly in reverse order of the disassembly. Take care that the parts provided with packings are not damaged during the assembly.

Do not use grease containing MoS₂ (molybdenum disulphide additives) for spherical plain bearings but only pressure-proof lithium-saponified greases to DIN 51825-K2k)

After the assembly, ensure that the service pressures comply with those indicated on the data sheet.

ATTENTION! For major repair works, call the after-sales service technician!

4.3.5 Control block NG 30 S3 / S6



Benennung:

1 three-way stop cock 19

A = connection – grab closing

B = connection – grab opening

DV1 = pressure relief valve “closing”

DV2 = pressure relief valve “opening”

DV3 = pressure relief valve

DV4 = pressure relief valve

MA = gauge port cylinder pressure
“closing”

MB = gauge port cylinder pressure
“opening”

2 locking device of manual control

3 adjusting screw for lift stop SV1

MLS = gauge port MLS

MP = pump pressure

MP1 = pump pressure „closing”

MP2 = pump pressure
“opening”

SV2 = stop valve with lift stop

WV1, WV2 = 4/2- directional valve

Y1, Y2 = trip coil

With the adjustment screw for the lift stop, the oil that flows back to the control block during opening the grab is throttled which prevents the scoops from moving too fast (rattling effect). The oil flow should only be throttled as much (clockwise adjustment of the screw), as is necessary to avoid rattling (vibration of the scoops). (Heating of the hydraulic oil because of too much throttling).

4.4 Table: Oil recommendation - Hydraulic fluids

For normal operation, a hydraulic fluid of ISO-viscosity VG 46 shall be used. For summer or winter operation, a hydraulic fluid of ISO-viscosity VG 68 or VG 32 is to be used according to the ambient temperature.

The following oil grades are appropriate and released by SMAG:

	← Winter →		← Summer →
ISO viscosity	VG 32	VG 46	VG 68
Standard	HVLP 32 acc. to DIN 51524/3 HV	HLP 46 acc. to DIN51524/2	HLP 68 acc. to DIN51524/2
Start up temperature *)	-15°C	-5°C	+5°C
Temperature that is necessary to put the system into operation	-5°C	+5°C	+12°C
Max. upper working temperature	+70°C	+80°C	+85°C
Ambient temperature	< -5°C to -20°C	-5°C to +30°C	> +30°C
ADDINOL	ADDINOL Hydrauliköl HVLP 32	ADDINOL Hydrauliköl HLP 46	ADDINOL Hydrauliköl HLP 68
ARAL	Vitam HF 32	Vitam GF 46	Vitam GF 68
AVIA	AVIA FLUID HVI 32	AVIA FLUID RSL46	AVIA FLUID RSL68
BP	ENERGOL SHF-HV 32	ENERGOL HLP-HM 46	ENERGOL HLP-HM 68
CASTROL	HYSPIN AWH M 32	HYSPIN AWS 46	HYSPIN AWS 68
Chevron	CALTEX RANDO HDZ 32	CALTEX RANDO HD 46	CALTEX RANDO HD 68
ExxonMobil (ESSO)	UNIVIS N 32	Mobil DTE 25	Mobil DTE 26
FUCHS	RENOLIN MR 32 MC	RENOLIN MR 15	RENOLIN MR 20
FUCHS LUBRITECH	RENOLIN B 32 HVI	RENOLIN B15VG46	RENOLIN B20VG68
Q8 Kuwait Petroleum Corporation	Q8 Händel 32	Q8 Haydn 46	Q8 Haydn 68
SHELL	Tellus Oel T 32	Tellus Oel 46	Tellus Oel 68
Chevron TEXACO	TEXACO RANDO HDZ 32	TEXANDO RANDO HD 46	TEXANDO RANDO HD 68
TOTAL	Equivis ZS 32	Azolla ZS 46	Azolla ZS 68

*) Temperature from which the hydraulic pump may be started in order to preheat the oil by means of the pressure relief valve up to the temperature that is necessary to put the system into operation.

Do not use other hydraulic fluids without SMAG's prior release.

Use zinc-containing hydraulic fluids.

Mixing of different hydraulic fluids is not allowed without prior consultation of the corresponding manufacturer and without prior release.

Do not use biodegradable hydraulic oil without SMAG's prior release. It is generally not allowed to mix mineral and biodegradable hydraulic oil!

In order to protect the hydraulic components, the oil must be in accordance with purity level 20/18/15 according to ISO 4406 at least (approximately corresponding to class 9 according to NAS 1638).

Since the purity level of new oil is generally lower, the new oil must be filtered. To do this either refill oil via the filter or use special filling devices that filter the oil to reach the required purity class.

A hydraulic oil of type HVLP according to DIN 51524-3 NATO code: H 540 should be used for operation at -50°C to +40°C. In case of temperatures below -25°C, the hydraulic oil must be pre-heated.

	Winter
Standard	HVLP acc. to DIN 51524/3 HV NATO-code: H 540
Start up temperature *)	-25°C
Temperature that is necessary to put the system into operation	-15°C
Max. upper working temperature	+85°C
Ambient temperature	< - 50°C bis +40°C
ARAL	Vitam H 540
AVIA	AVILUB HYDRAULIKFL H 540
Agrip	PRECIS SYSTEM MULTIFLUID
SHELL	Hydraulikflüssigkeit H-540
H&R ChemPharm GmbH	SRS Wiolan H-540

*) Temperature from which the hydraulic pump may be started in order to preheat the oil by means of the pressure relief valve up to the temperature that is necessary to put the system into operation.

4.5 Lubricant recommendation

For greases used by the manufacturer please refer to data sheet!

Insulation class und size of the electric motor: see machine data sheet

Note: Do not mix synthetic lubricants with mineral lubricants!
 Mix synthetic lubricants with another synthetic lubricant only after consultation with the lubricant manufacturer.

If you change over to a grease based on another soap type or another thickening agent, the grease that had been used so far should be completely removed if possible. After changeover the regreasing periods should be reduced in order to ensure the old grease is removed as quickly as possible. If greases are mixed, this will impair the lubricating properties and thus reduce the service life of the parts.

	Lubricant for the bearings in the electric motor with insulation class: H and size: 56 to 400	Lubricant for the bearings in the electric motor Low-temperature range
	synthetic lubricant	synthetic lubricant
BREMER & LEGUIL GMBH	Rivolta S.K.D. 4002 -50°C to +210°C *)	
Castrol	Firetemp XT 2 - 25°C to + 180°C	
Fuchs	RENOLIT PU 8-061/2 -20°C to +180°C	RENOLIT HLT 1
FUCHS LUBRITECH	URETHYN E/M 2 - 20°C to + 180°C	URETHYN LT 60 - 50°C to + 140°C
KLÜBER LUBRICATION	PETAMO GY 193 approx. - 20°C to + 180°C	ISOFLEX TOPAS NB 52 - 50°C to + 120°C
Shell	Gadus S3 T100/2 - 20°C to + 160°C	Gadus S2 V100/2 - 30°C to + 130°C

*) operating temperature range

	Lubricant for the bearings in the electric motor with insulation class: F and size: 56 to 112 mineral lubricant lithium 12- hydroxystearate grease	Lubricant for the bearings in the electric motor with insulation class: F and size: 132 to 400 mineral lubricant barium complex grease
AVIA	LITHOPLEX 3 EP - 20°C bis + 150°C	
BREMER & LEGUIL GMBH	Rivolta S.K.D. 4002 -50°C bis +210°C *)	Rivolta S.K.D. 4002 -50°C bis +210°C *)
BP	Energrease LS 3 - 25°C bis + 130°C	
Fuchs	RENOLIT GP3 -30°C bis +120°C	RENOLIT DURAPLEX EP 2 -30°C bis +160°C
FUCHS LUBRITECH	STABYL L 120 - 20°C bis + 130°C	STABYL L 120 - 20°C bis + 130°C
KLÜBER LUBRICATION		Staburags NBU 8 EP - 20°C bis + 140°C
Shell	Alvania RL3 - 25°C bis + 130°C	

*) operating temperature range

	Grease for sliding and rolling bearings DIN 51502 K 2 K mineral lubricant lithium thickener	Grease for sliding and rolling bearings Low-temperature range DIN 51502 KPHC2N-50 synthetic lubricant organic thickener
AGIP	Agip GR MU 2 -30°C to +120°C *)	Agip Longtime Grease 2 - 35°C to + 135°C
ARAL	Aralub HLP 2 -20°C to +120°C	Aralub SKL 2 - 50°C to + 130°C
AVIA	AVIALITH 2 -30°C to +120°C	AVIA SYNTOGREASE PE-T -60 to +140°C
BP	Energrease LS 2 -25°C to +130°C	Energrease SY 2202 - 40°C to + 170°C
BREMER & LEGUIL GMBH	Rivolta S.K.D. 3602 -20°C to +140°C	
Castrol	Spheerol EPL 2 -20°C to +140°C Longtime PD 2 -35°C to +140°C	Optitemp LG 2 -50°C to +120°C
FUCHS EUROPE SCHMIER-STOFFE GMBH	RENOLIT GP 2 -30°C to +120°C	RENOLIT HLT 2 - 40°C to + 140°C
FUCHS LUBRITECH	Lagermeister BF 2 -20°C to +130°C	URETHYN LT 60 - 50°C to + 140°C
KLÜBER LUBRICATION	Klüberplex BEM 41-132 -40°C to +150°C	ISOFLEX TOPAS NB 52 - 50°C to + 120°C
Mobil Oil	Mobilux EP 2 -20°C to +120°C	Mobilith SHC 100 (KPHC2N-40) - 40°C to + 150°C
Shell	Alvania RL2 -30°C to +130°C	AeroShell Grease 33 -70 to + 120°C
Total	Multis 2 -25°C to +120°C	Multis XLT 2 -60°C to +130°C

*) operating temperature range

For greases used by the manufacturer please refer to data sheet!

	Grease for tothing DIN 51502 KP2 K (KPF2 N) mineral lubricant calcium thickener	Grease for tothing Low-temperature range DIN 51502 KE 1 N -50 synthetic lubricant organic thickener
AGIP	AUTOL TOP 2000 -30 to +120°C *)	
AVIA	AVIACAL 2 LD -30 to +120°C	
BREMER & LEGUIL GMBH		CERITOL PK 1 -60°C to +140°C
BP	Energrease Mp-MG 2 -30°C to +175°C	
Fuchs	RENOLIT CA-LZ -30°C to +120°C	
FUCHS LUBRITECH	LAGERMEISTER 3000 PLUS -30 to +120°C	URETHYN LT 60 - 50°C to + 140°C
KLÜBER LUBRICATION	Klüberplex AG 11-462 - 40°C to + 180°C	ISOFLEX TOPAS NB 52 - 50°C to + 120°C ISOFLEX TOPAS NCA 51 - 60°C bis + 140°C
Möllenberg & Sonntag	Zählit VZ - 20°C to + 90°C	
Shell	Retinax HD2 -20°C to +130°C	AeroShell Grease 7 - 73°C to + 135°C

*) operating temperature range

For greases used by the manufacturer please refer to data sheet!

5.0 Failure - Symptoms - Sources of failures

For the indicated sources of failures it is assumed that the operating mode on the control block has been set correctly (see Section 3.2.2 Start-up) and that the set operating mode corresponds to the mode available on the crane (see Section 3.2.1 Initial start-up)

- Failure	- Symptoms	- Diagnosis / Sources of failures
5.1 Grab does not open and close	- motor not running, motor does not receive current - current available - motor is running	- fuses - contactors - electric cables - connection terminals - cable reel - plug-in connector - motor is defect - coupling defect - pressure line pump / control block is defect - pressure relief valve DBV of the pump is defect - pump is not exhausted (vented) - pump is defect - DV1; DV2 is defect - pilot control valve for WV1; WV2 is defect - no oil in the tank In the S6 operating mode: - magnets Y1, Y2 do not work - wrong rotational direction of the electric motor

- Failure	- Symptoms	- Sources of failures
5.2 Grab does not render enough out-put	- opening / closing times increased considerably	- pump is worn - pump regulator does not work - leakage in the pressure line pump/control block - cylinder sealing (piston) is leaky - locking valves in the control block are leaky (SV1; SV2; R1; R2) - soiled pressure relief valve or loss of spring pressure. Readjustment required (see sheet no. 10-6). - oil level in tank too low
5.3 Failure of hydraulic system	- grab rattles on opening (heavy vibration of the scoops) - oil temperature is too high (after some hours of work, the grab does not function)	- wrong adjustment of the lift stop of SV1 - leakage in the control block (locking valves SV1; SV2; R1; R2) - leakage in the pressure line pump / control block - pressure adjustment on DBV of the pump is too low - pump does not switch to variable

Werks-Nr. / Serial-no.:
1300 / 1301 / 1302 / 1303
Erzeugnis / Product:
MMGL 8000-3-S
Sach-Nr. / Subject no.:
S 1000062713

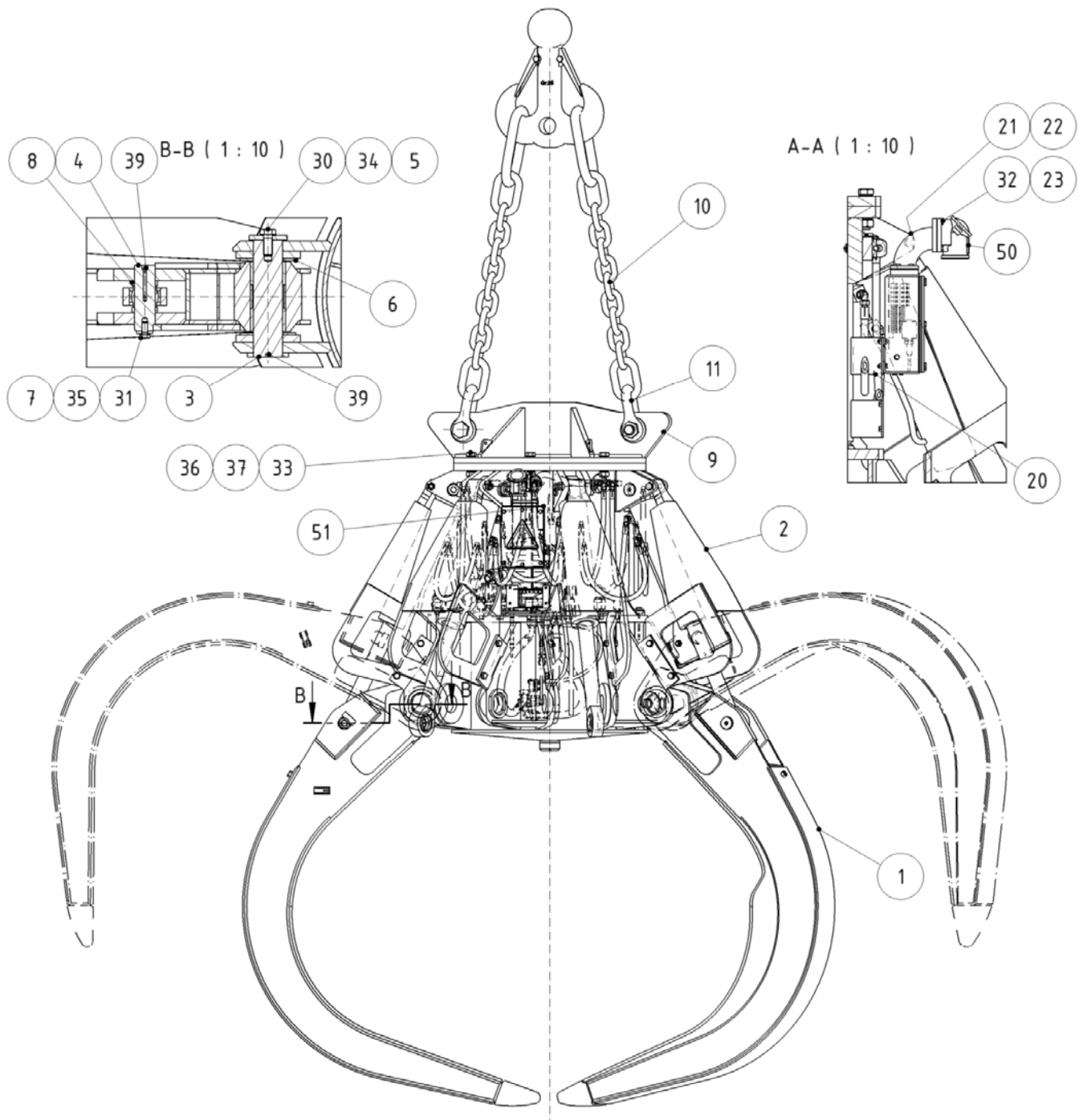
Benennung	Description	Bestell-Nr. / Order-no.	Gruppe-Nr. / Group-no.
Zusammenstellung	compilation	1000062713	1.0
Schale, halboffen	shell, half open	1000062367	2.0
Grundgerät	basic unit	1000062734	3.0
Anschlusskasten, kpl.	connection box, cpl.	0023144105	4.6
Hubzylinder	lifting cylinder	0023036457	7.1
Zylinderschutz	cylinder protection	0023039196	8.0
Hydraulikanlage	hydraulic system	0023141140	9.0
Hydraulikaggregat	hydraulic unit	0023036456	10.0
Rücklauffilter	return filter	0000020696	11.0
Pumpe	pump	0000022955	12.0
Steuerblock	control block	1000063253	13.0

Bei Ersatzteilbestellung ist außer der Bestellnummer das Erzeugnis, die Werks-Nr. und Kommissions-Nr. anzugeben.

For spare part orders, the product, serial-no. and commission-no. must be given in addition to the requisition-no.

Motor-Mehrschalengreifer
Motor Orange-Peel Grab
MMGL-3
MMGL-3
B 1000062713

 Gruppe-Nr.
 Group-no.

1.0




Ersatzteilliste Spare parts list

Motor-Mehrschalengreifer MMGL 8000-3-S
Motor Orange-Peel Grab MMGL 8000-3-S

Bestell-Nr. **1000062713**
 Order-no.
 Gruppe-Nr. **1.0**
 Group-no.

Pos. Item	Bestell - Nr. Order - no.	Menge Quantity	Benennung Description
01	0023141888	7	Schale, halboffen (s. Gruppe-Nr. 2.0) shell, half open (see group-no. 2.0)
02	1000062734	1	Grundgerät (s. Gruppe-Nr. 3.0) basic unit (see group-no. 3.0)
03	0023141515	7	Bolzen 100x385/400 pin
04	0023141523	7	Bolzen Ø 70x223 pin
05	0027604256	7	Scheibe disc
06	0027604768	14	Scheibe disc
07	0027604276	7	Scheibe disc
08	0023141272	14	Distanzhülse 82,5/71x18 spacer sleeve
09	0023142102	1	Deckel cover
10	0023143335	2	Ringkette ring chain
11	0000022987	2	Schäkel G-2150 2" shackle
20	1000062811	1	Klemmenkasten terminal box
21	0023144377	1	Rohrbogen tube bend

Motor-Mehrschalengreifer MMGL 8000-3-S
Motor Orange-Peel Grab MMGL 8000-3-S

 Bestell-Nr. **1000062713**
 Order-no.
 Gruppe-Nr. **1.0**
 Group-no.

Pos. Item	Bestell - Nr. Order - no.	Menge Quantity	Benennung Description
22	0023144356	1	Dichtung gasket
23	0023002616	1	Dichtung gasket
30	0065173600	7	6kt.-Shr. M 30x70 / 8.8A3P / DIN EN ISO 4017 hexagon screw
31	0065165309	7	6kt.-Shr. M 20x40 / 8.8A3P / DIN EN ISO 4017 hexagon screw
32	0065153410	12	6kt.-Shr. M 10x25 / 8.8A3P / DIN EN ISO 4017 hexagon screw
33	0065046110	7	6kt.-Shr. M 30x130 / 10.9 / DIN EN ISO 4014 hexagon screw
34	0063949963	7	Schnorr-Sicherungsscheibe S 30 locking washer
35	0063949920	7	Schnorr-Sicherungsscheibe S 20 locking washer
36	0066829606	7	6kt.-Mu M 30 / 8A3P / DIN EN ISO 4032 hexagon nut
37	0000025583	14	Nord-Lock Sicherungsscheibe NL 30 locking washer
38			
39	0069520310	14	Schmiernippel AM 10x1 / 5.8Zn / DIN 71412 lubricating nipple



Ersatzteilliste Spare parts list

Motor-Mehrschalengreifer MMGL 8000-3-S
Motor Orange-Peel Grab MMGL 8000-3-S

Bestell-Nr. **1000062713**
 Order-no.
 Gruppe-Nr. **1.0**
 Group-no.

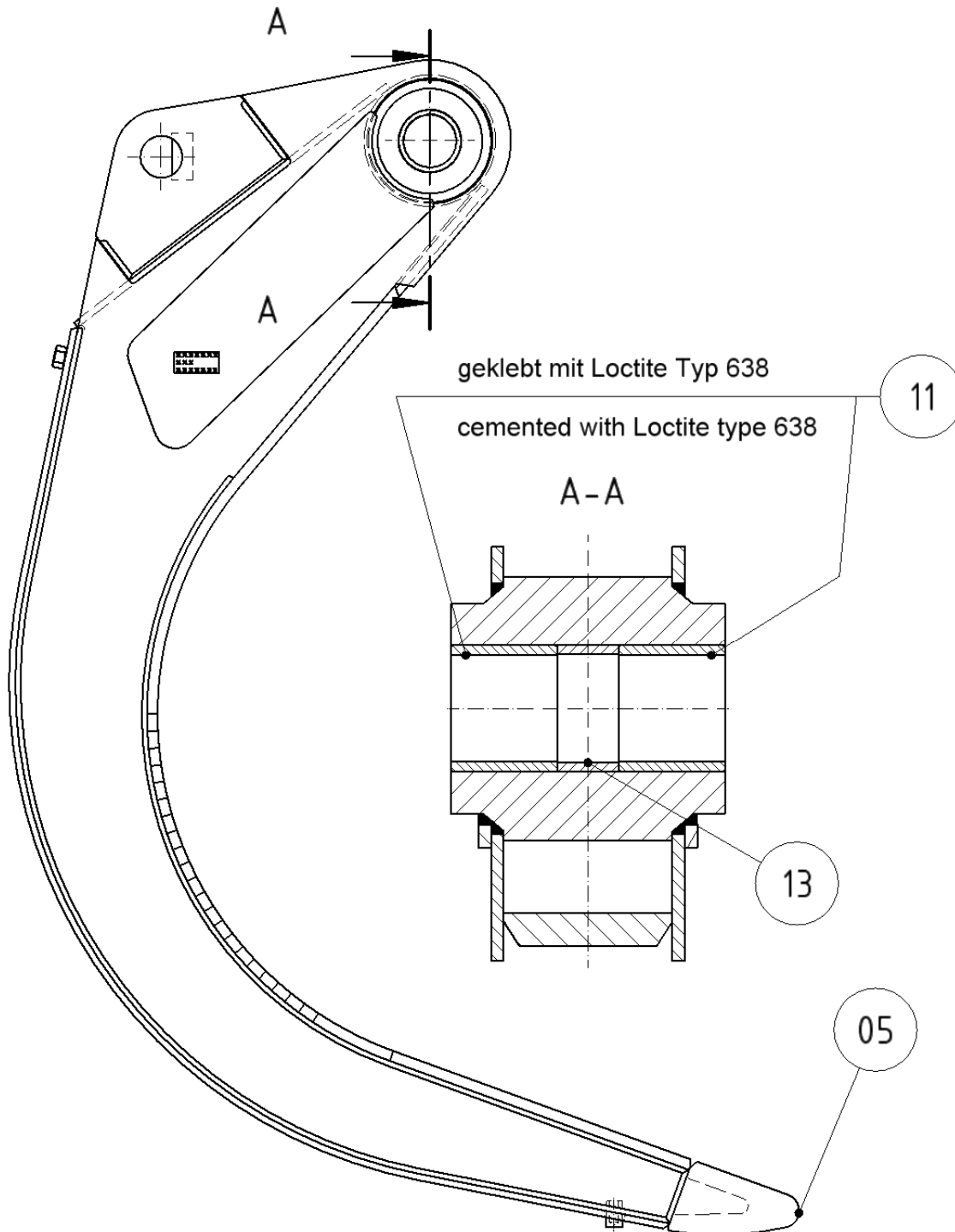
Pos. Item	Bestell - Nr. Order - no.	Menge Quantity	Benennung Description
50	1000062714	1	Elektrische Installation (s. Geräteausrüstung Elektrik) electrical installation (see electric equipment)
51	0000040887	2	Magnetspule 205 V DC trip coil

Schale, halboffen
shell, half open

B 1000062367

Gruppe-Nr.
Group-no.

2.0





Ersatzteilliste Spare parts list

Schale, halboffen
shell, half open

Bestell-Nr. **1000062367**
Order-no.
Gruppe-Nr. **2.0**
Group-no.

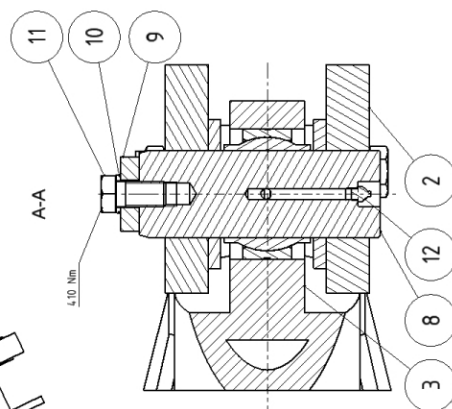
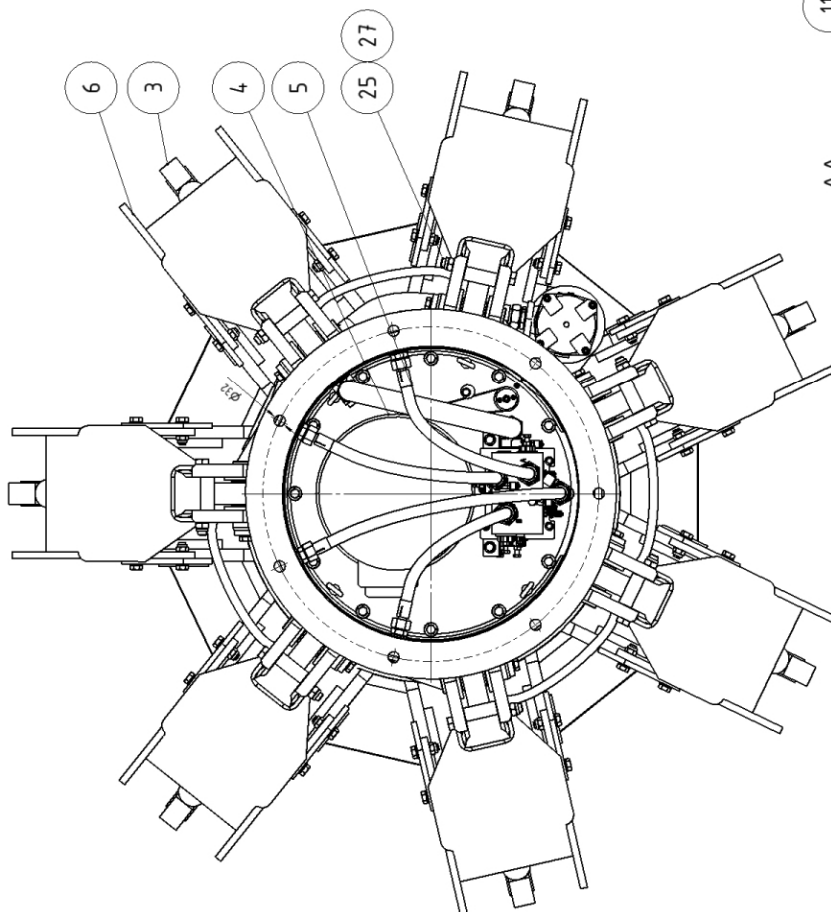
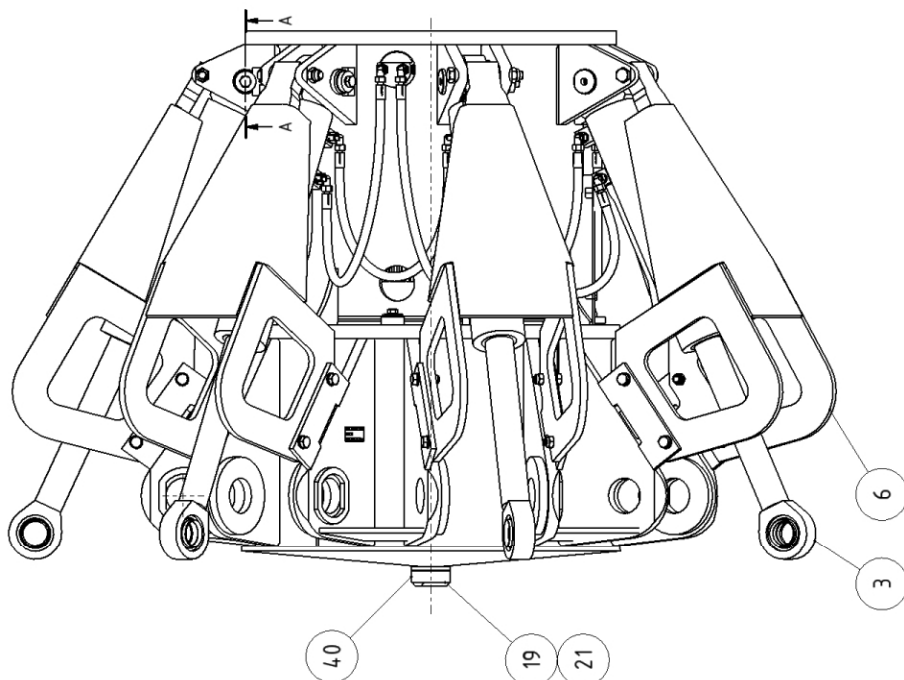
Pos. Item	Bestell - Nr. Order - no.	Menge Quantity	Benennung Description
01			
05	0023002509	1	Schalenspitze shell tip
11	0023003034	2	Buchse 100,5/120x101 bush
13	0023037011	1	Distanzhülse spacer sleeve

Grundgerät
basic unit

B 1000062734

Gruppe-Nr.
Group-no.

3.0



Grundgerät
basic unit

 Bestell-Nr. **1000062734**
 Order-no.
 Gruppe-Nr. **3.0**
 Group-no.

Pos. Item	Bestell - Nr. Order - no.	Menge Quantity	Benennung Description
01			
02	0023141892	1	Traverse (1000063829 – Umbau Traverse mit Öffnung für Leistungsgeger) traverse (1000063829 – modification traverse with hole for power regulator)
03	0023036457	7	Hubzylinder 120/80x500 (s. Gruppe-Nr. 7.1) lifting cylinder (see group-no. 7.1)
04	0023036465	1	Hydraulikaggregat (s. Gruppe-Nr. 10.0) hydraulic unit (see group-no. 10.0)
05	0023141140	1	Hydraulikanlage S3 (s. Gruppe-Nr. 9.0) hydraulic system (see group-no. 9.0)
06	0023039196	7	Zylinderschutz (s. Gruppe-Nr. 8.0) cylinder protection (see group-no. 8.0)
07			
08	0023141516	7	Bolzen 70x195 pin
09	0027604257	7	Scheibe disc
10	0000025869	7	Nord-Lock Sicherungsscheibe NL 20 locking washer
11	0065165309	7	6kt.-Shr. M 20x40 / 8.8A3P / DIN EN ISO 4017 hexagon screw
12	0069520310	7	Schmiernippel AM 10x1 / 5.8Zn / DIN 71412 lubricating nipple
19	0074577212	1	Dichtring A 27x32x2 / Cu / DIN 7603 sealing ring



Ersatzteilliste Spare parts list

Grundgerät basic unit

Bestell-Nr. **1000062734**
Order-no.
Gruppe-Nr. **3.0**
Group-no.

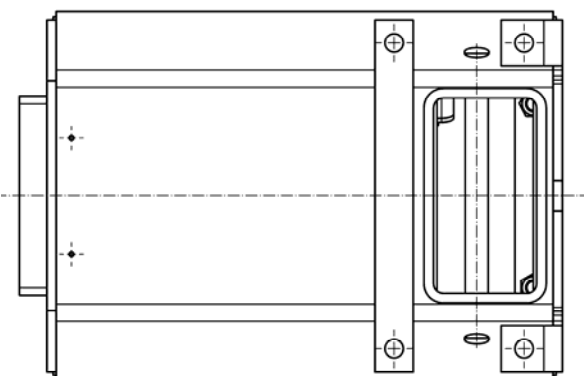
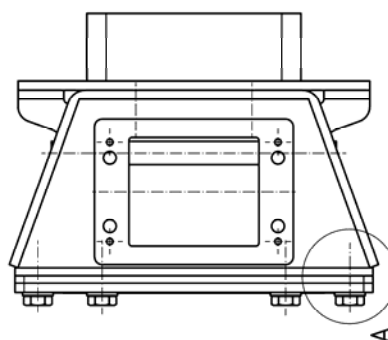
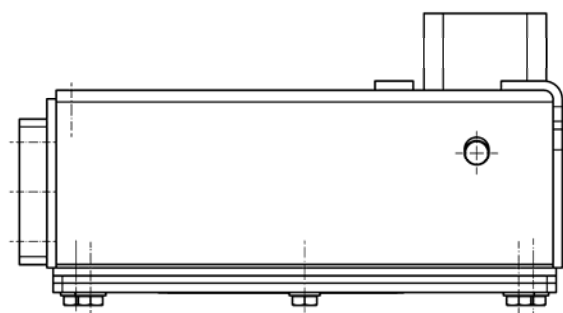
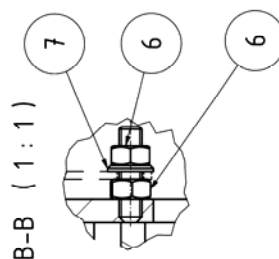
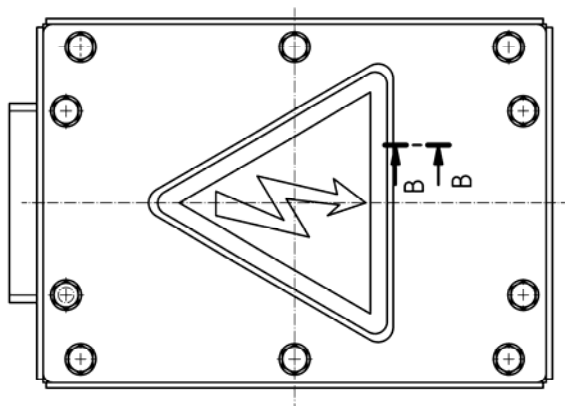
Pos. Item	Bestell - Nr. Order - no.	Menge Quantity	Benennung Description
20			
21	0008022741	1	Verschluss-Shr. R $\frac{3}{4}$ screw plug
25	0000018261	7	6kt.-Shr. M 24x200 / 8.8A3P / DIN EN ISO 4014 hexagon screw
26			
27	0066770908	7	Sicherungs-Mu M 24 / 8A3P / DIN EN ISO 7042 locking nut
40	0023000741	1	Schutzkappe protection cap

Anschlusskasten, kpl.
connection box, cpl.

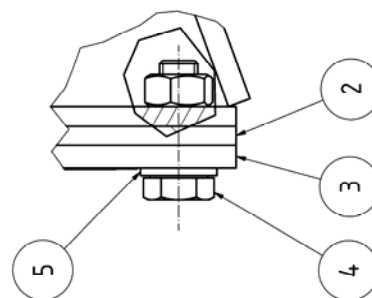
B 0023144105

Gruppe-Nr.
Group-no.

4.6



A (1:1)



Anschlusskasten, kpl.
connection box, cpl.

 Bestell-Nr. **0023144105**
 Order-no.
 Gruppe-Nr. **4.6**
 Group-no.

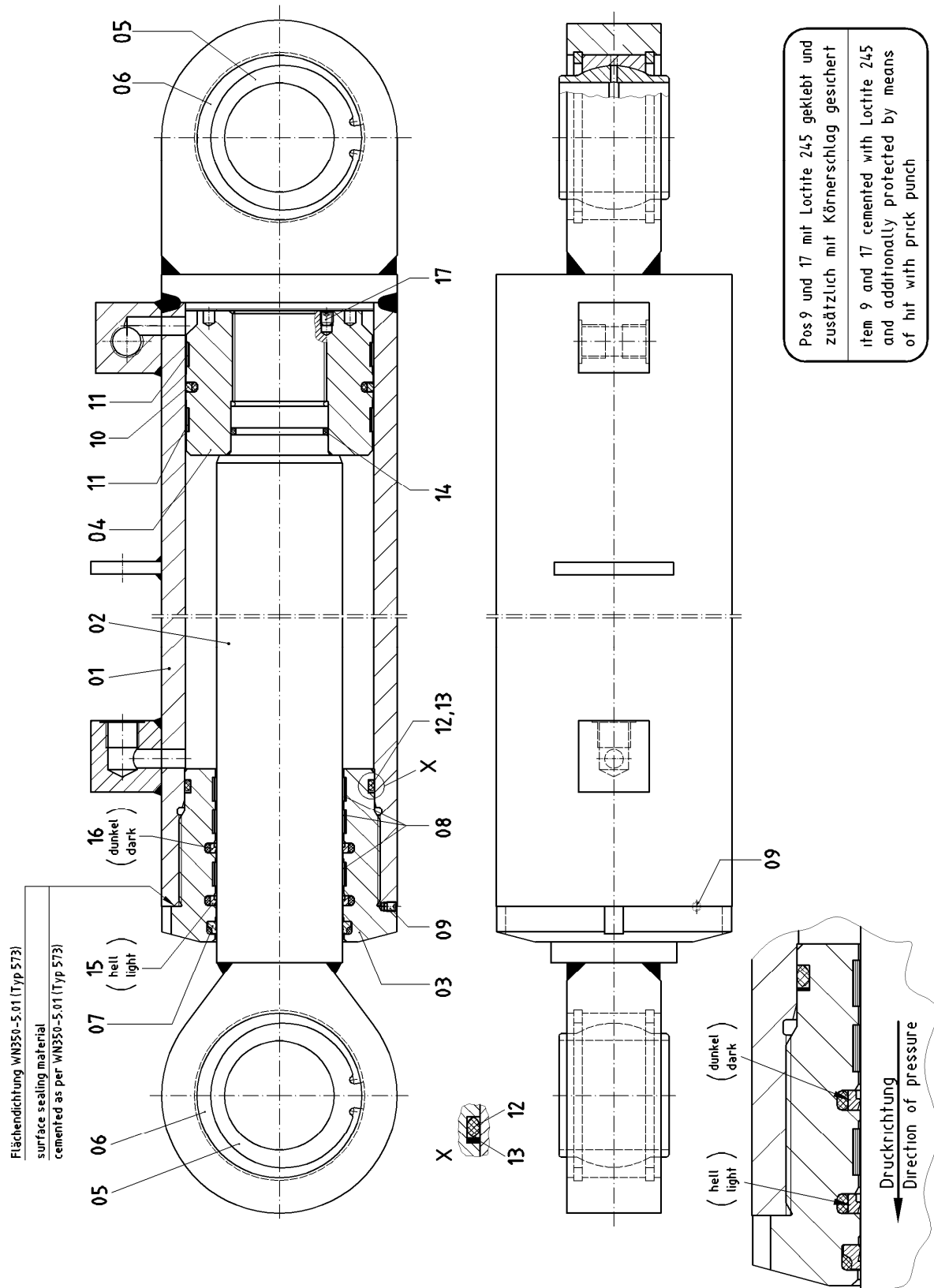
Pos. Item	Bestell - Nr. Order - no.	Menge Quantity	Benennung Description
01			
02	0023144110	1	Dichtung gasket
03	0023144111	1	Frontdeckel front cover
04	0065153601	8	6kt.-Shr. M 10x30 / A2-70 / DIN EN ISO 4017 hexagon screw
05	0063872406	8	Scheibe 10 / 200HV-A2 / DIN EN ISO 7090 disc
06	0066828003	8	6kt.-Mu M 6 / 8A2P / DIN EN ISO 4032 hexagon nut
07	0000027921	4	Scheibe 6 / 140HV-A3P / DIN EN ISO 7090 disc
12	0069343634	1	Schelle SP218 PPD PAS disc
13	0065147203	2	6kt.-Shr. M 6x20 / 8.8A2P / DIN EN ISO 4017 hexagon screw
14	0066828003	2	6kt.-Mu M 6 / 8A2P / DIN EN ISO 4032 hexagon nut

Hubzylinder
lifting cylinder

B 0023039185

Gruppe-Nr.
Group-no.

7.1



Hubzylinder 120/80x500
lifting cylinder

 Bestell-Nr. **0023036457**
 Order-no.
 Gruppe-Nr. **7.1**
 Group-no.

Pos. Item	Bestell - Nr. Order - no.	Menge Quantity	Benennung Description
01	0023036458	1	Zylinderrohr cylinder tube
02	0023036459	1	Kolbenstange piston rod
03	0023036460	1	Führungsmutter guide nut
04	0023036461	1	Kolben piston
05	0000021732	2	Gelenklager GE 70 LO rocker bearing
06	0063910500	4	Sicherungsring 105x4 / F-St / DIN 472 circlip
07	0000020581	1	Abstreifer WE5200800-Z51N scraper
08	0000020582	3	Stangenführungsring GR7300800-C380 rod guide ring
09	0000016064	1	Gewindestift M 6x8 / 45H / DIN EN ISO 4026 stud bolt
10	0000028511	1	Glydring PGP301200-Z66N sliding ring
11	0000021727	2	Kolbenführungsring GP7301200-C380 piston guide ring
12	0000021728	1	O-Ring 110,49x5,33 / 70NBR/769 o-ring
13	0000021729	1	Stützring BP090A348 back-up ring
14	0008014527	1	O-Ring 54x4 / 70 Shore o-ring



Ersatzteilliste Spare parts list

Hubzylinder 120/80x500 lifting cylinder

Bestell-Nr. **0023036457**
Order-no.
Gruppe-Nr. **7.1**
Group-no.

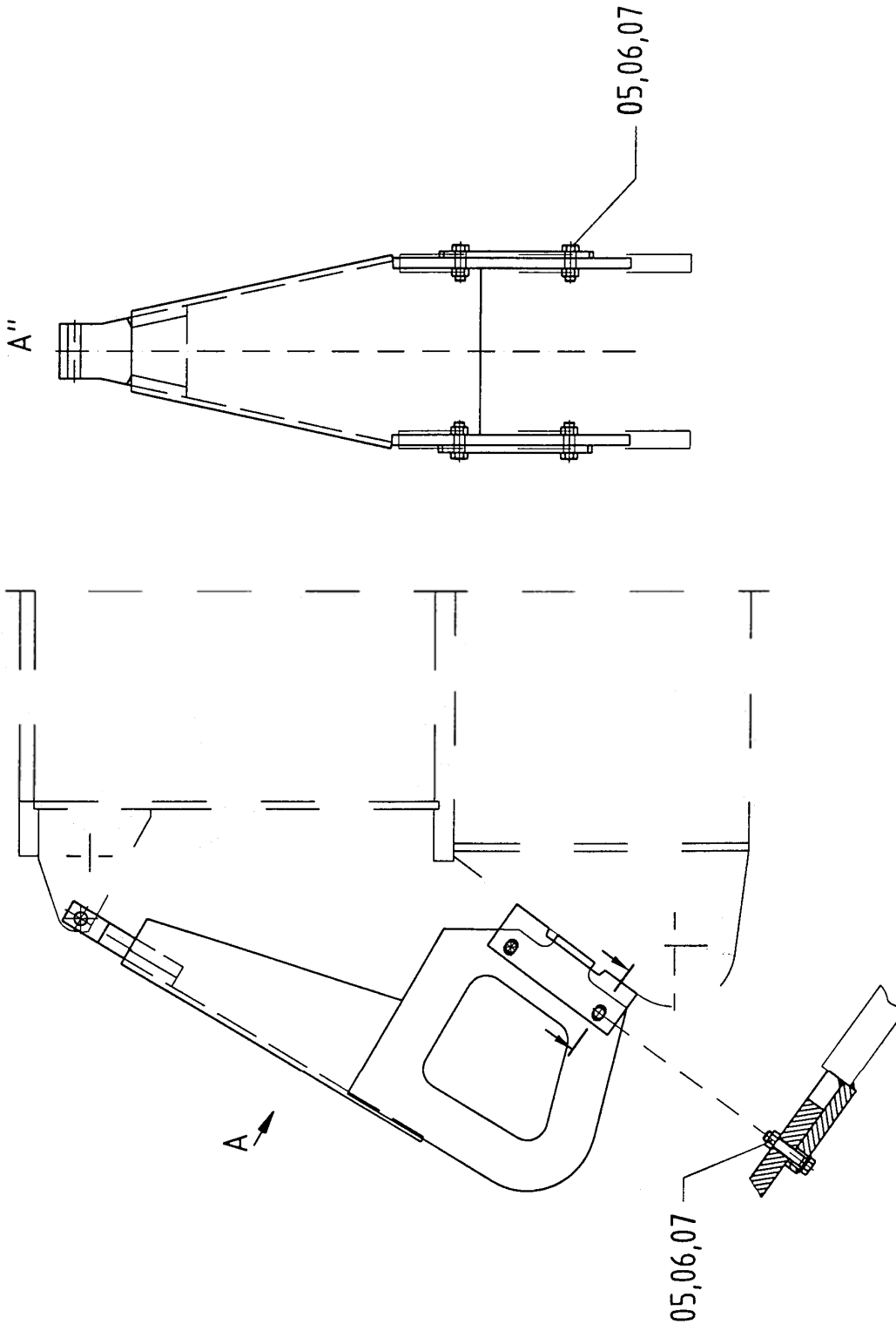
Pos. Item	Bestell - Nr. Order - no.	Menge Quantity	Benennung Description
15	0000021730	1	Stepsealring, hell RS1300800-Z51N step seal ring, light
16	0000021731	1	Stepsealring, dunkel RS1300800-T46N step seal ring, dark
17	0000015678	1	Gewindestift M 8x10 / 45H / DIN EN ISO4029 stud bolt
	00E3036457	1	Dichtsatz, kpl. best. aus Pos. 07, 08, 10 – 16 packing set, cpl. consisting of item 07, 08, 10 – 16

Zylinderschutz
cylinder protection

B 0023034094

Gruppe-Nr.
Group-no.

8.0



Zylinderschutz
cylinder protectionBestell-Nr. **0023039196**
Order-no.
Gruppe-Nr. **8.0**
Group-no.

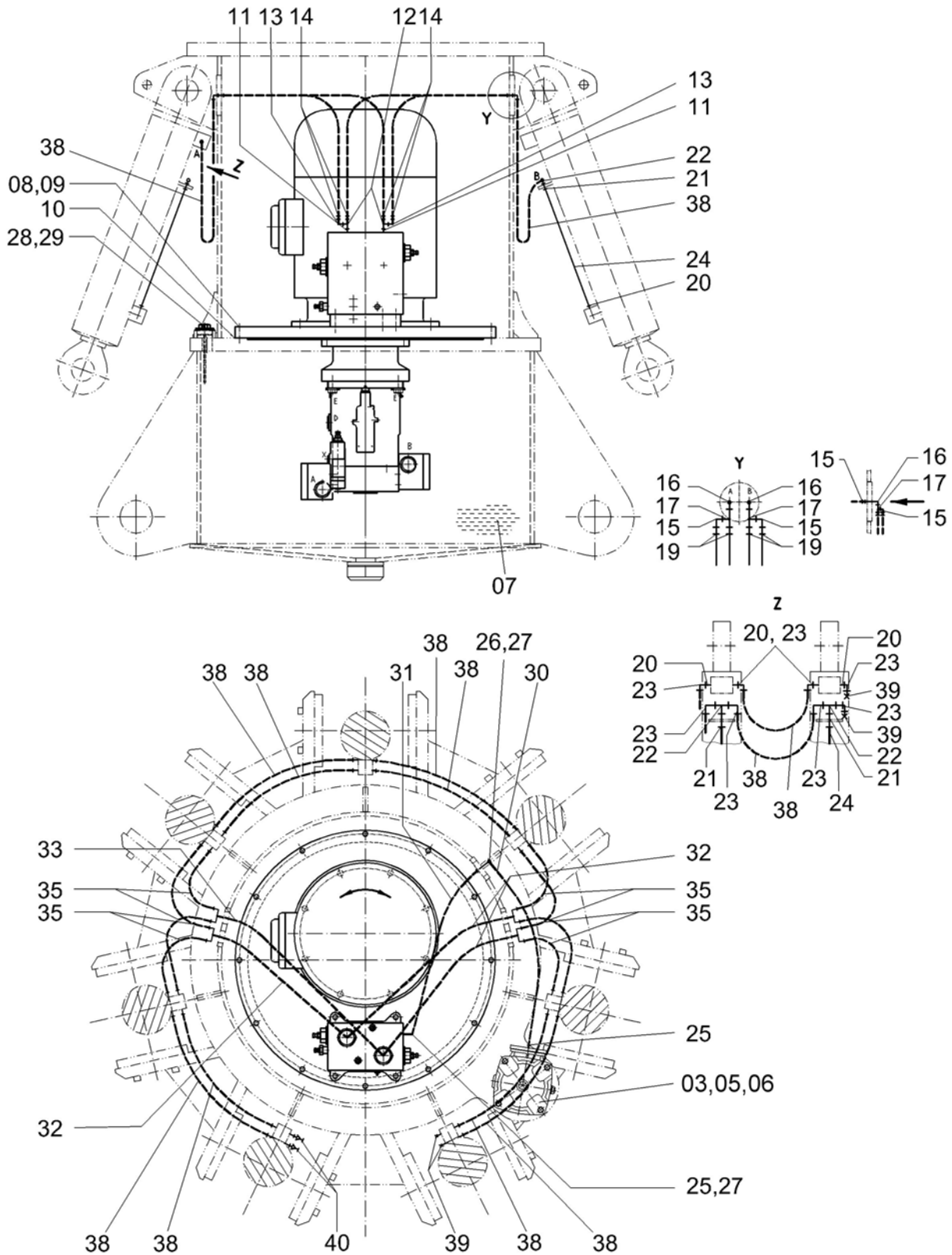
Pos. Item	Bestell - Nr. Order - no.	Menge Quantity	Benennung Description
01			
05	0065165709	4	6kt.-Shr. M 20x60 / 8.8A3P / DIN EN ISO 4017 hexagon screw
06	0066770910	4	Sicherungs-Mu M 20 / 8A3P / DIN EN ISO 7042 circlip nut
07	0063712716	4	Scheibe 20 / DIN EN 14399-6 disc

Hydraulikanlage hydraulic system

B 0023141140

Gruppe-Nr.
Group-no.

9.0



Hydraulikanlage
hydraulic system

 Bestell-Nr. **0023141140**
 Order-no.
 Gruppe-Nr. **9.0**
 Group-no.

Pos. Item	Bestell - Nr. Order - no.	Menge Quantity	Benennung Description
01			
02			
03	0000020696	1	Rücklauffilter E 453-278 (s. Gruppe-Nr. 11.0) return filter (see group-no. 11.0)
04			
05	0065153607	4	6kt.-Shr. M 10x30 / 8.8A3P / DIN EN ISO 4017 hexagon screw
06	0063872402	4	Scheibe 10 / 200HV-A3P / DIN EN ISO 7090 disc
07		440 l	Hydrauliköl HLP 46 (s. Ölempfehlung) hydraulic oil (look to oil recommendation)
08	0065720216	12	6kt.-Shr. M 16x60 / 10.9 / DIN 14399-4 hexagon screw
09	0063808314	12	Scheibe 17 / TZn / DIN EN 14399-6 disc
10	0008014806	1	O-Ring 730x8 / 70 Shore o-ring
11	0000022878	2	Verschraubung GE 38-PSR-ED bolted joint
12	0069106519	2	Verschraubung ELSD 38-S bolted joint
13	0069106719	2	Verschraubung EWSD 38-S bolted joint
14	0069105010	4	Verschraubung BO-REDVD 38/25-S bolted joint

Hydraulikanlage
hydraulic system

 Bestell-Nr. **0023141140**
 Order-no.
 Gruppe-Nr. **9.0**
 Group-no.

Pos. Item	Bestell - Nr. Order - no.	Menge Quantity	Benennung Description
15	0069106717	8	Verschraubung EWSD 25-S bolted joint
16	0069367900	4	Verschraubung WSV 25-PS bolted joint
17	0069106517	4	Verschraubung ELSD 25-S bolted joint
18			
19	0069104976	8	Verschraubung BO-REDVD 25/16-S bolted joint
20	0005580465	21	Verschraubung GE 16-PSR-ED/A3C bolted joint
21	0069103865	7	Verschraubung BO-GSV 16-S bolted joint
22	0069107204	7	Verschraubung ETSD 16-S bolted joint
23	0069106715	28	Verschraubung EWSD 16-S bolted joint
24		7	Ro. 16x2 – 500 mm / 1,0255-NBK/C / DIN EN 10305-4 pipe
25	0000010533	2	Verschraubung GE 42-PLR-ED bolted joint
26	0000013758	1	Verschraubung WSV 42-PL bolted joint
27	0069106709	2	Verschraubung EWSD 42-L bolted joint
28	0023034507	1	Ölmesstab oil dipstick

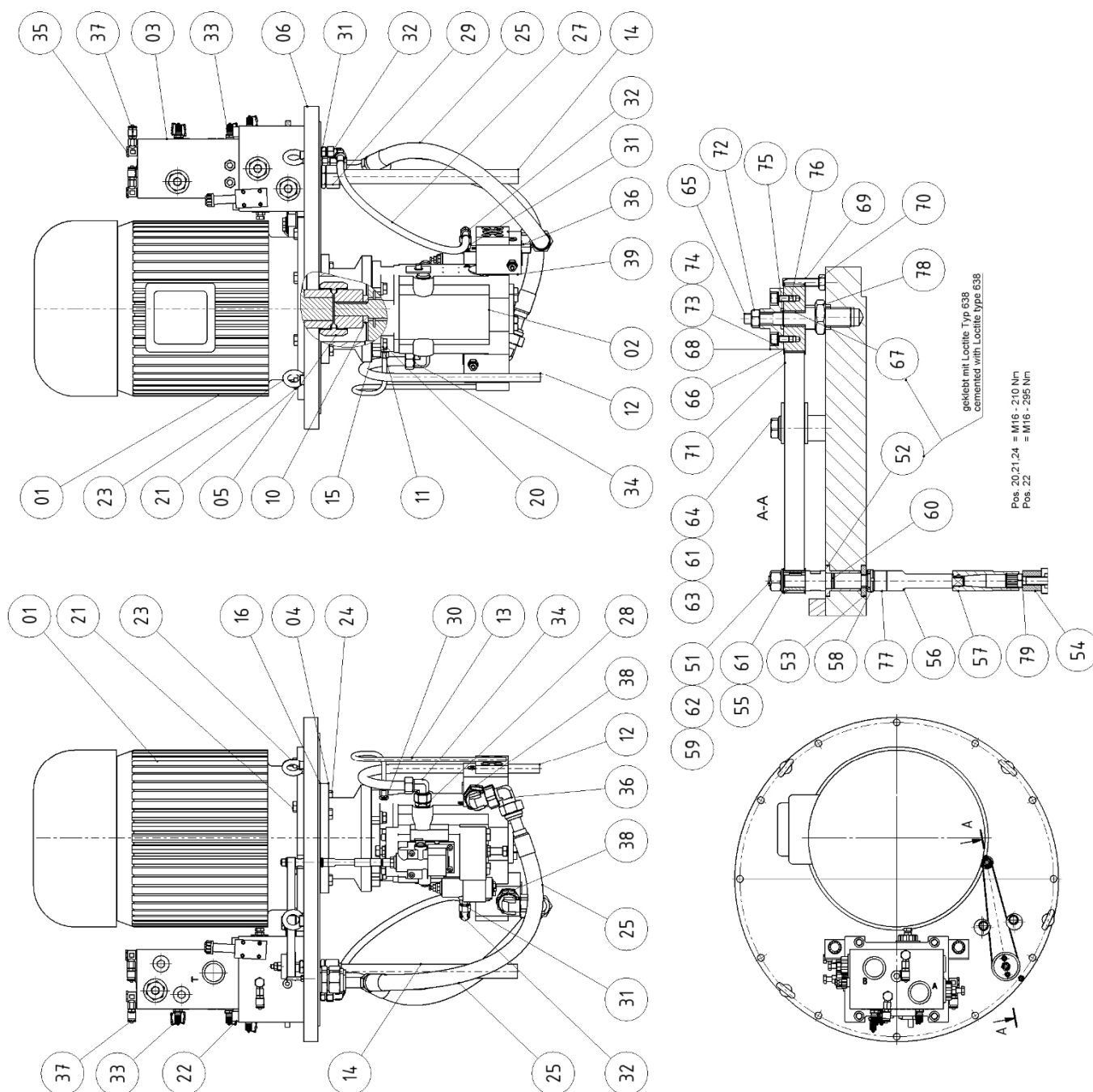
Hydraulikanlage
hydraulic system

 Bestell-Nr. **0023141140**
 Order-no.
 Gruppe-Nr. **9.0**
 Group-no.

Pos. Item	Bestell - Nr. Order - no.	Menge Quantity	Benennung Description
29	0074579800	1	Dichtring A 48x55x2 / Cu / DIN 7603 sealing ring
30	0027993062	1	Schlauchltg. DN 40x650 hose
31	0027993043	1	Schlauchltg. DN 40x950 hose
32	0027990128	3	Schlauchltg. DN 20x650 hose
33	0027993052	1	Schlauchltg. DN 20x750 hose
34			
35	0027992388	8	Schlauchltg. DN 12x650 hose
38	0027991875	8	Schlauchltg. DN 12x800 hose
39	0069369471	2	Verschlußbutzen BUZ 16-S locking slug
40	0069372537	2	Minimeß-Stutzen connecting piece

Hydraulikaggregat
hydraulic unit
B 0023036456

 Gruppe-Nr.
 Group-no.

10.0


Hydraulikaggregat
hydraulic unit

 Bestell-Nr. **0023036456**
 Order-no.
 Gruppe-Nr. **10.0**
 Group-no.

Pos. Item	Bestell - Nr. Order - no.	Menge Quantity	Benennung Description
01	0008111628	1	E-Motor 225S-4 (s. Maschinenkarte) electric motor (see machine card)
02	0000022955	1	Pumpe V30D-095-BKN-LLS-2 (s. Gruppe-Nr. 12.0) pump (see group-no. 12.0)
03	1000063253	1	Steuerblock AV6466-0-2-OS (s. Gruppe-Nr. 13.0) control block (see group-no. 13.0)
04	0023034408	1	Zwischenflansch intermediate flange
05	0023007877	1	Kupplung M 65 coupling
06	0023036504	1	Behälterdeckel container cover
10	0023034416	1	Scheibe disc
11	0023034732	4	Scheibe disc
12	0060000032	1	Rohr 22x2x650 pipe
13		1	Rohr 8x1,5x580 pipe
14		1	Rohr 35x2x650 pipe
15	0023034417	1	Dichtung gasket
16	0023004922	1	Dichtung gasket

Hydraulikaggregat
hydraulic unit

 Bestell-Nr. **0023036456**
 Order-no.
 Gruppe-Nr. **10.0**
 Group-no.

Pos. Item	Bestell - Nr. Order - no.	Menge Quantity	Benennung Description
20	0065161603	4	6kt.-Shr. M 16x45 / 8.8A3P / DIN EN ISO 4017 hexagon screw
21	0065161403	8	6kt.-Shr. M 16x35 / 8.8A3P / DIN EN ISO 4017 hexagon screw
22	1000062869	4	Zyl.-Shr. M 16x180 / 10.9 / DIN EN ISO 4762 cap screw, socket head
23	0000014742	4	Ring-Shr. M 12 / C15A3P / DIN 580 eye screw
24	0065161503	4	6kt.-Shr. M 16x40 / 8.8A3P / DIN EN ISO 4017 hexagon screw
25	0027993621	2	Schlauchltg. DN 25x840 hose
26			
27	0027993717	1	Schlauchltg. DN 10x650 hose
28	0069103138	1	Verschraubung BO-GEV 22-LR bolted joint
29	0069103142	1	Verschraubung BO-GEV 352-LR bolted joint
30	0069103148	1	Verschraubung BO-GEV 8-SR bolted joint
31	0000024220	2	Verschraubung GE 12-PS/R $\frac{1}{4}$ -ED bolted joint
32	0069106713	2	Verschraubung EWSD 12-S bolted joint

Hydraulikaggregat
hydraulic unit

 Bestell-Nr. **0023036456**
 Order-no.
 Gruppe-Nr. **10.0**
 Group-no.

Pos. Item	Bestell - Nr. Order - no.	Menge Quantity	Benennung Description
33	0069372501	4	Schraubkupplung Minimes screw coupling
34	0069106700	1	Verschraubung EWSD 22-L bolted joint
35	0000020108	3	Verschraubung 15/3-07/S6R bolted joint
36	0069106718	4	Verschraubung EWSD 30-S bolted joint
37	0069372565	3	Minimes-Stutzen connection piece
38	0000023033	4	Verschraubung GE 30-PSR-ED/A3C bolted joint
39	0000025836	2	Nachsaugventil mit DBV check valve with pressure relief valve
51	0023036550	1	Führungsbolzen guide pin
52	0023036553	1	Buchse bush
53	0023036554	1	Scheibe disc
54	0023036552	1	Buchse bush
55	0023036551	1	Zahnscheibe – klein toothed washer – small
56	0000022962	1	Verlängerung extension

Hydraulikaggregat
hydraulic unit

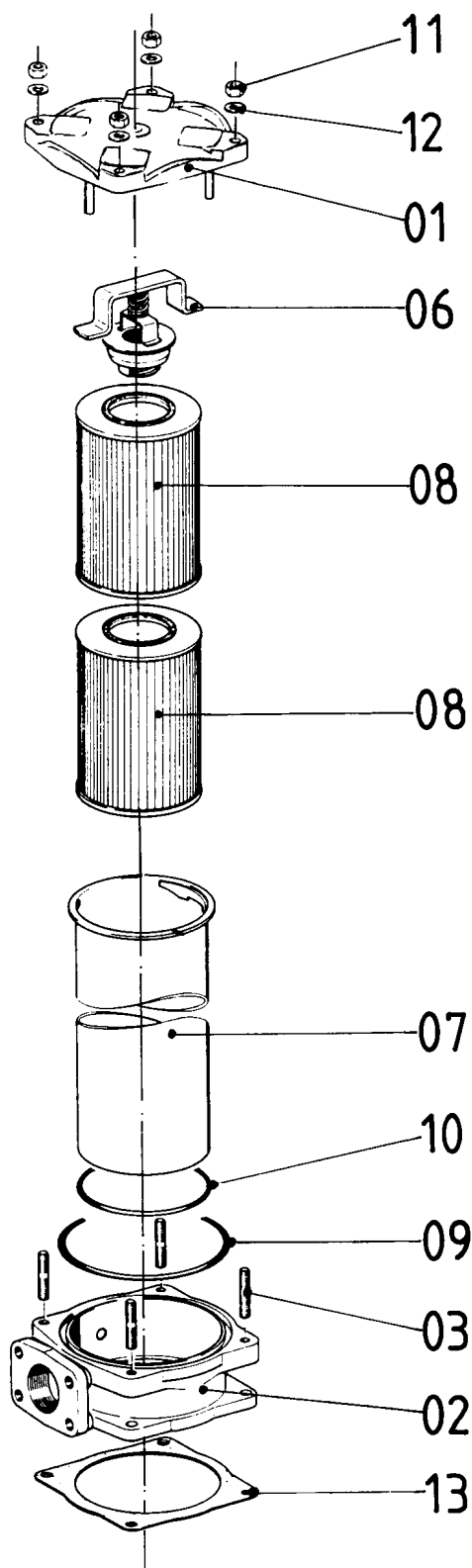
 Bestell-Nr. **0023036456**
 Order-no.
 Gruppe-Nr. **10.0**
 Group-no.

Pos. Item	Bestell - Nr. Order - no.	Menge Quantity	Benennung Description
57	0000022964	1	Steckschlüsselsatz set of socket spanners
58	0000022963	2	Nut-Mu KM 1 / St / DIN 981 grooved nut
59	1000063894	1	Passfeder A 4x4x12 / DIN 6885 fitting key
60	0074721111	1	O-Ring 11x2 / 88NBR/156 O-ring
61	0063872803	3	Scheibe 12 / 200HV-A3P / DIN EN ISO 7090 washer
62	0066828803	1	6kt.-Mu M 12 / 8A3P / DIN EN ISO 4032 hexagon nut
63	0023036563	2	Exenterbolzen eccentric pin
64	0065028101	2	6tk.-Shr. M 12x70 / 8.8A3P / DIN EN ISO 4014 hexagon screw
65	0023036564	1	Aufnahmebolzen holding pin
66	0023036561	1	Zahnscheibe – gross toothed washer – large
67	0023036605	1	Buchse bush
68	0023036565	1	Deckel cover
69	0023036606	1	Peilstab dip stick
70	0066828403	1	6kt.-Mu M 8 / 8A2P / DIN EN ISO 4032 hexagon nut

Hydraulikaggregat
hydraulic unit

 Bestell-Nr. **0023036456**
 Order-no.
 Gruppe-Nr. **10.0**
 Group-no.

Pos. Item	Bestell - Nr. Order - no.	Menge Quantity	Benennung Description
71	1000063851	1	Zahnflachriemen toothed flat belt
72	0066828608	1	6kt.-Mu M 10 / 8A3P / DIN EN ISO 4032 hexagon nut
73	0065984009	2	Zyl.-Shr. M 6x12 / 8.8A2P / DIN EN ISO 4762 cap screw, socket head
74	0063871503	2	Scheibe 6 / 200HV-A3P / DIN EN ISO 7090 washer
75	0063901201	1	Sicherungsring 12x1 / F-St / DIN 471 circlip
76	0000010073	2	Gewindeeinsatz M 6x9 / S2 / DIN 8140 threaded insert
77	0023036728	1	Buchse bush
78	0066829239	1	6kt.-Mu M 20 / 04 / DIN EN ISO 4035 hexagon nut
79	0065151070	1	6kt.-Shr. M 8x70 / 8.8A3P / DIN EN ISO 4017 hexagon screw

Rücklauffilter E 453-278 R1½
return filter**B 0000020696**Gruppe-Nr.
Group-no.**11.0**

Rücklauffilter E 453-278 R1½" 20 µm
return filter

 Bestell-Nr. **0000020696**
 Order-no.
 Gruppe-Nr. **11.0**
 Group-no.

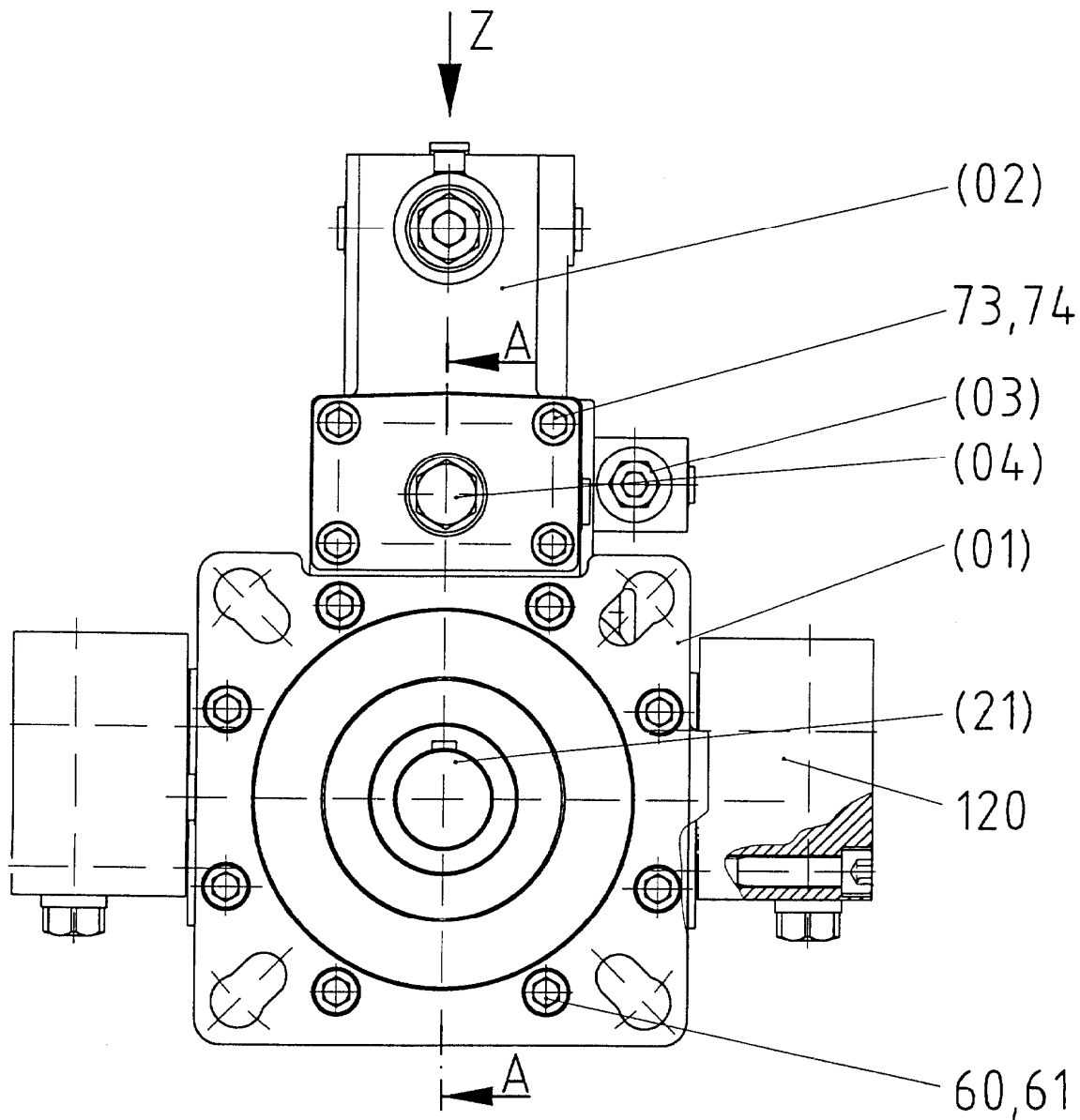
Pos. Item	Bestell - Nr. Order - no.	Menge Quantity	Benennung Description
01	0000026473	1	Deckel, kpl. cover, cpl.
02	0000026477	1	Kopfteil head part
03	0000030868	4	Stiftschraube M 10x30 / 8.8 / DIN 835 stud
04			
05			
06	0000030234	1	Ventil, kpl. / E 642.1510 valve, cpl.
07	0000040239	1	Rohr, kpl. pipe, cpl.
08	0000020719	2	Exapor-Filterelement (mit Dichtungen) Exapor - filter element (with gaskets)
09	0000022881	1	O-Ring 151,76x5,33 o-ring
10	0000022882	1	O-Ring 125x6 o-ring
11	0066828803	4	6kt.-Mu M 10 / 8.8A2P / DIN EN ISO 4032 hexagon nut
12	0063859210	4	Federscheibe B 10 / F-St / DIN 137 serrated lock washer
13	0000026732	1	Flachdichtung gasket

Pumpe V30D-095-BKN-L-LS-2, mit Nachsaugventil
pump, with check valve

B 0000024018

Gruppe-Nr.
 Group-no.

12.0

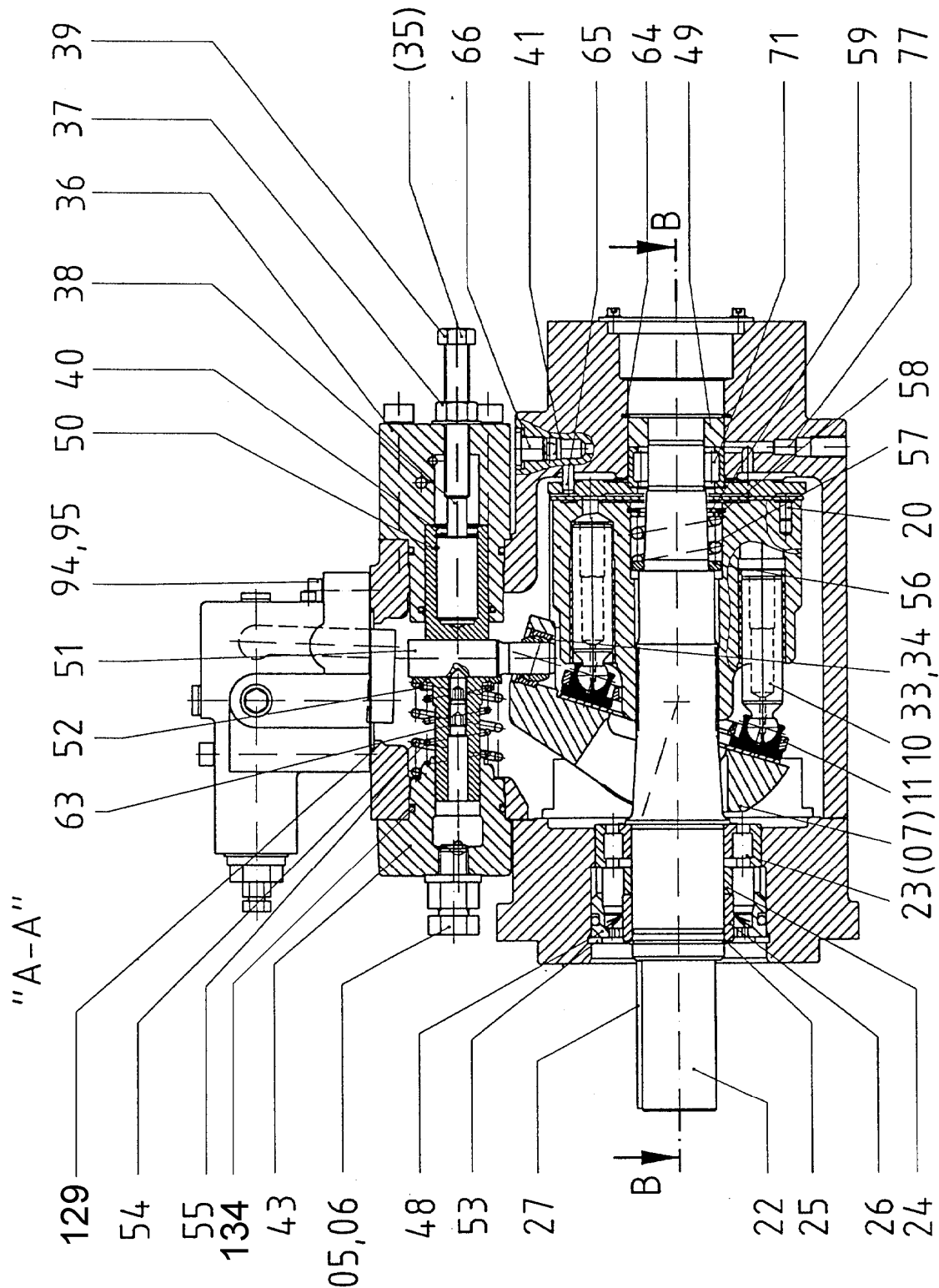


Pumpe V30D-095-BKN-L-LS-2, mit Nachsaugventil
pump, with check valve

B 0000024018

Gruppe-Nr.
 Group-no.

12.0

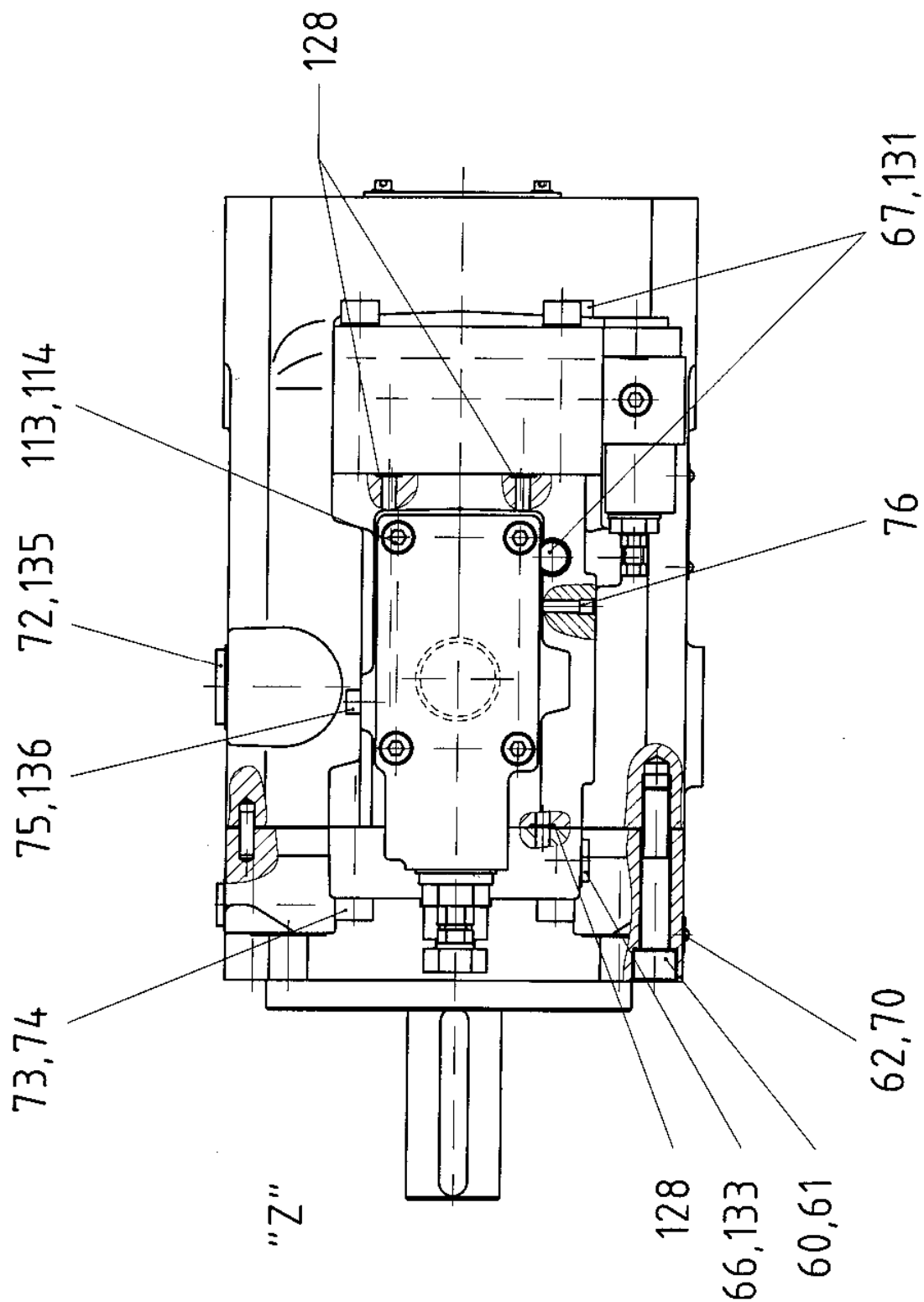


Pumpe V30D-095-BKN-L-LS-2, mit Nachsaugventil
pump, with check valve

B 0000024018

Gruppe-Nr.
 Group-no.

12.0

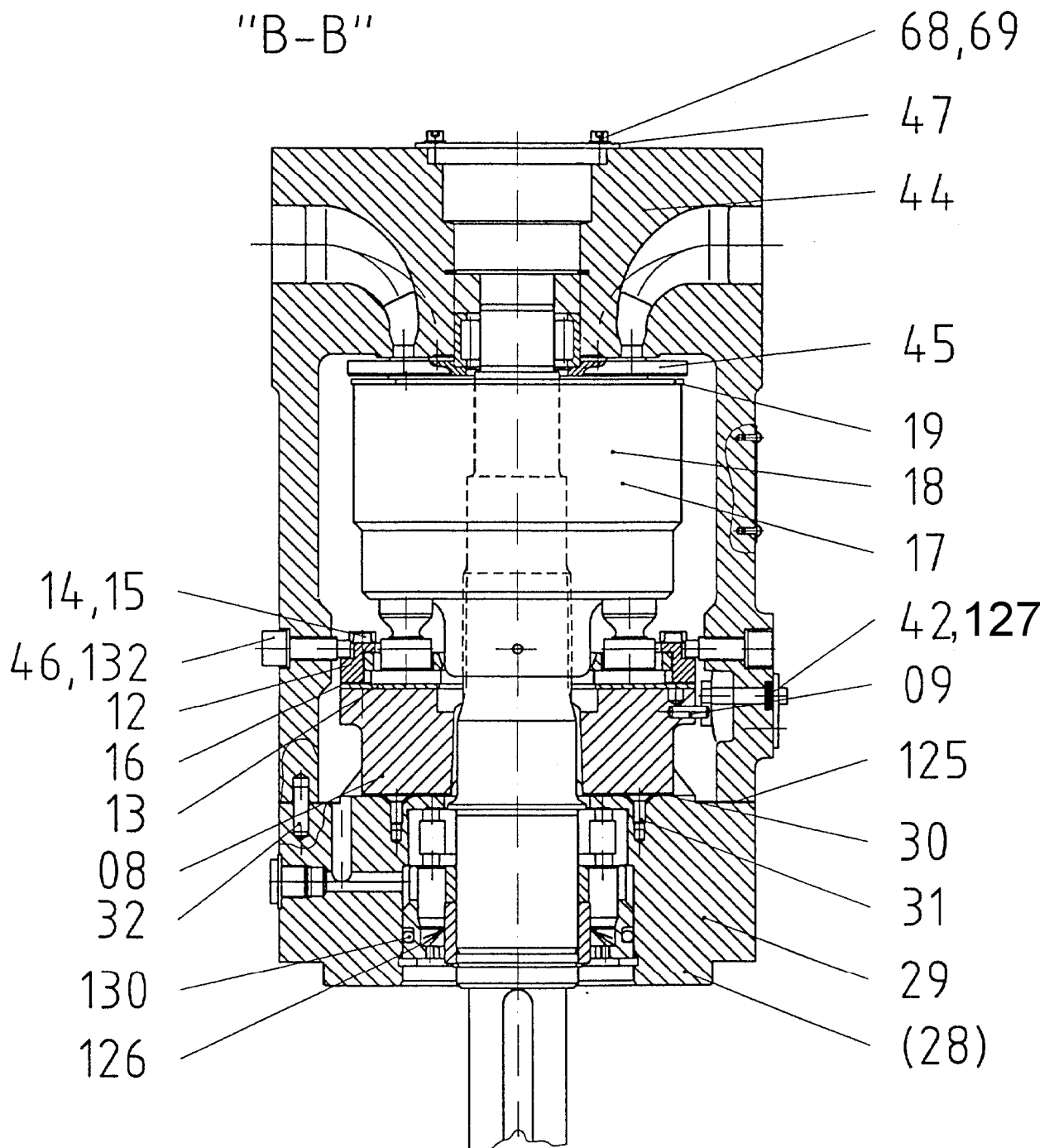


Pumpe V30D-095-BKN-L-LS-2, mit Nachsaugventil
pump, with check valve

B 0000024018

Gruppe-Nr.
 Group-no.

12.0

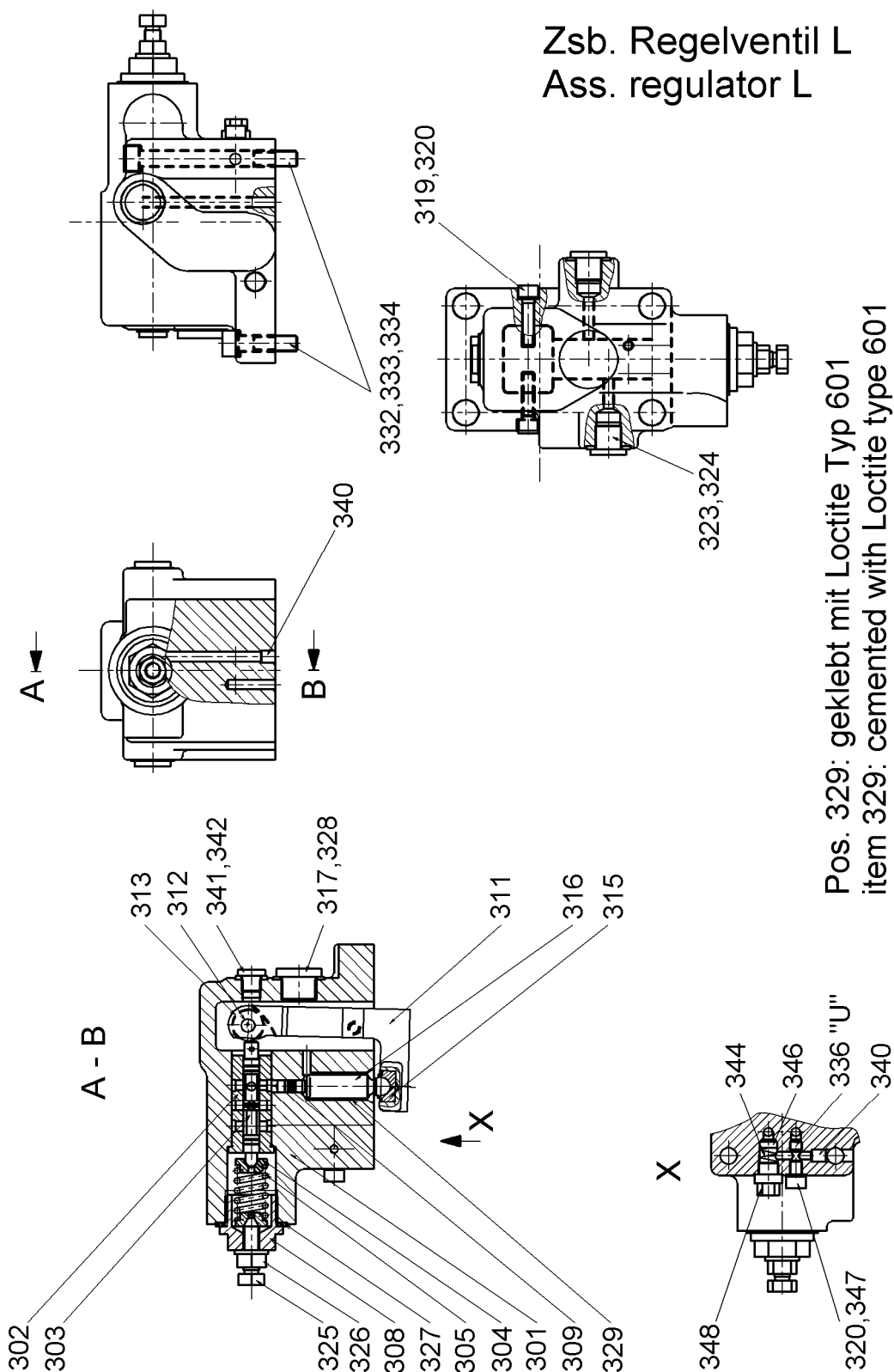


Pumpe V30D-095-BKN-L-LS-2, mit Nachsaugventil
pump, with check valve

B 0000024018

Gruppe-Nr.
 Group-no.

12.0

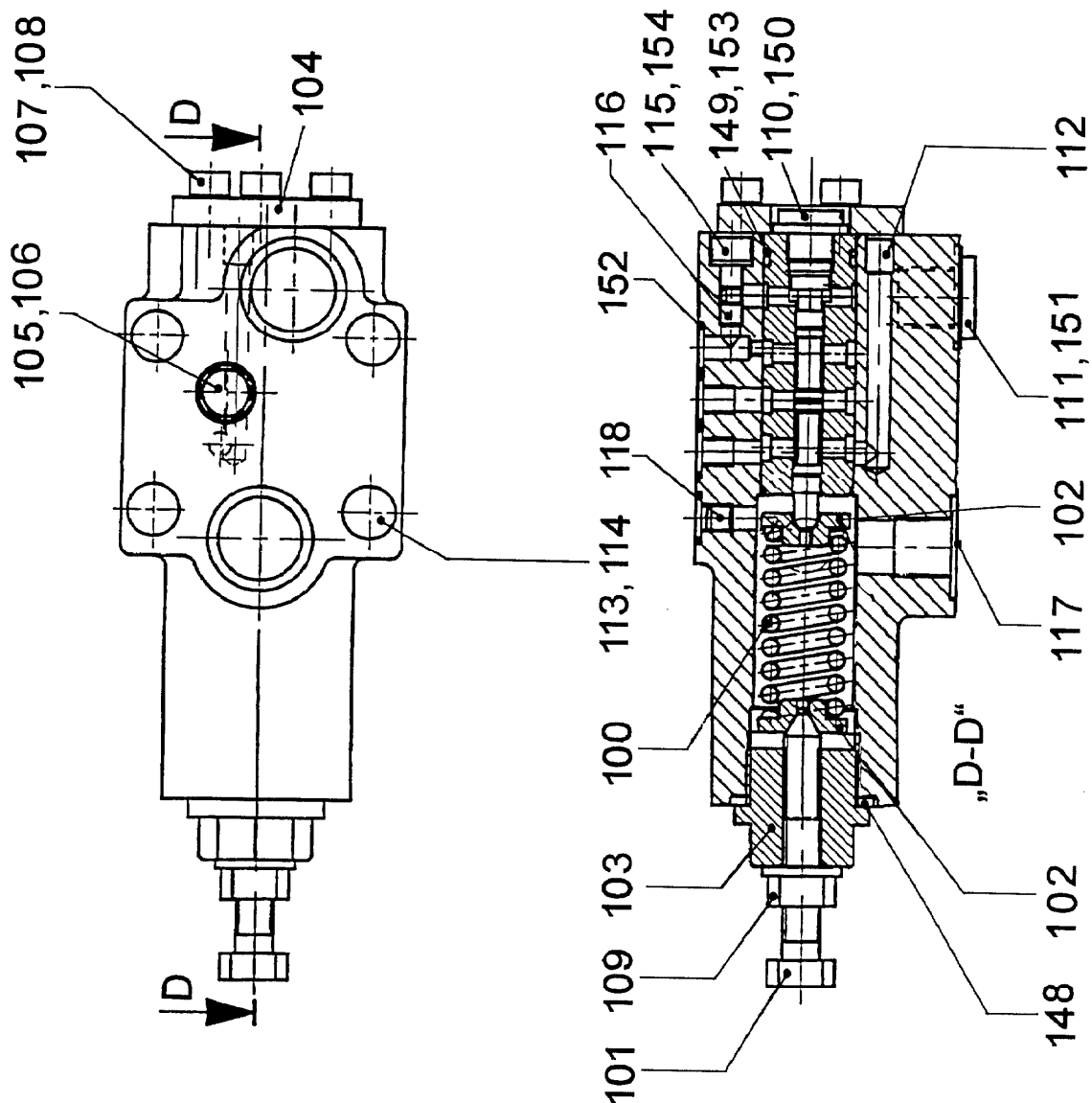


Pumpe V30D-095-BKN-L-LS-2, mit Nachsaugventil
pump, with check valve

B 0000024018

Gruppe-Nr.
Group-no.

12.0

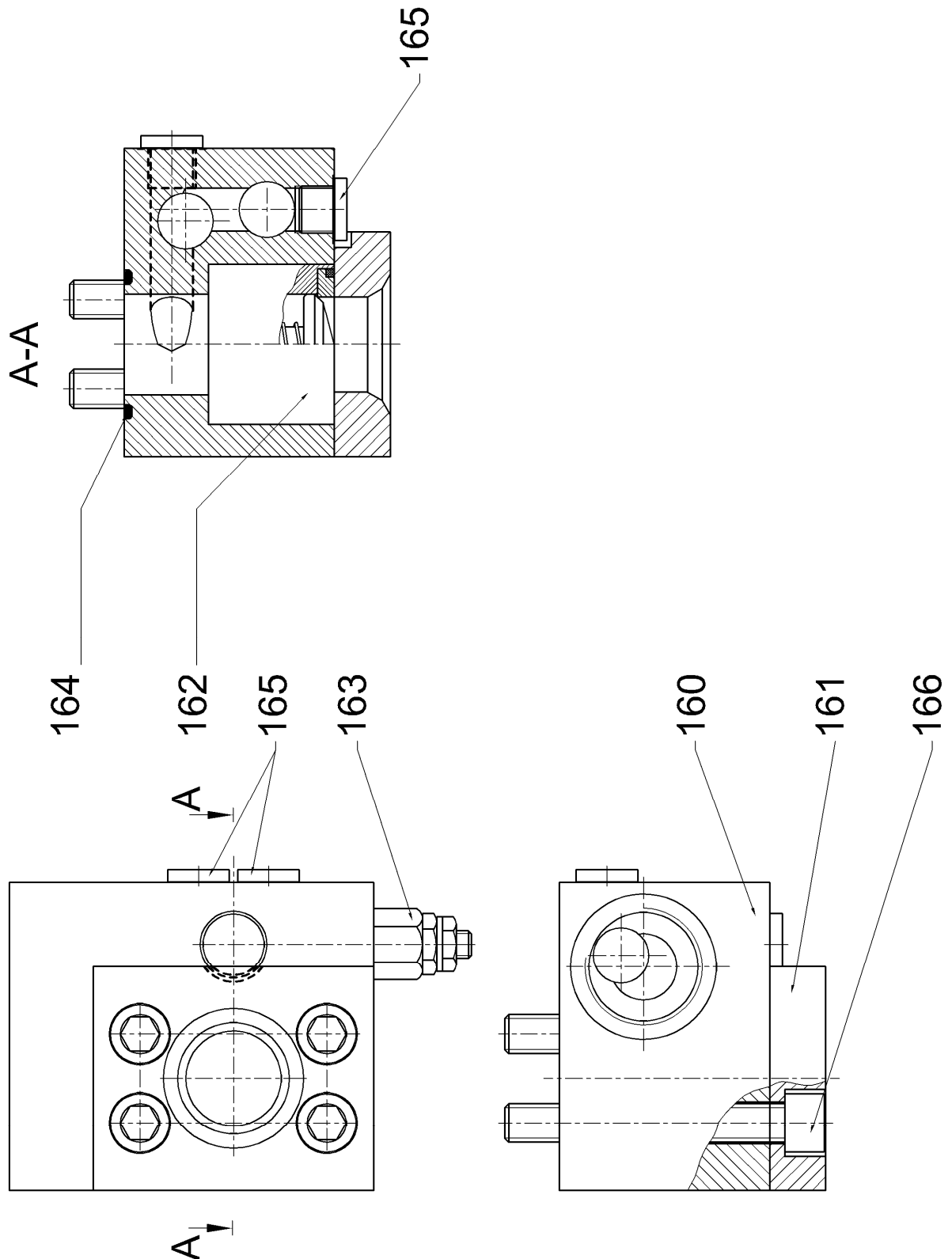


Pumpe V30D-095-BKN-L-LS-2, mit Nachsaugventil
pump, with check valve

B 0000024018

Gruppe-Nr.
 Group-no.

12.0



Pumpe V30D-95-BKN-L-LS-2, 45 kW, 50 Hz
pump

 Bestell-Nr. **0000022955**
 Order-no.
 Gruppe-Nr. **12.0**
 Group-no.

Pos. Item	Bestell - Nr. Order - no.	Menge Quantity	Benennung Description
01		1	Grundpumpe V30D-095 (ohne Dichtsatz) 7926605.00 basic pump V30D-095 (without packing set) (best. aus Pos. 04 - 77 / consisting of item 04 - 77)
02		1	Zsb. Regelventil L, kpl. (ohne Dichtsatz) 7929810.00 Ass. regulator L, cpl. (without packing set) (best. aus Pos. 301 – 348/consisting of item 301 – 348)
03		1	Vorsteuerventil LS, kpl. (ohne Dichtsatz) 7927275.00 regulator LS, cpl. (without packing set) (best. aus Pos. 100 - 118 / consist. of item 100 - 118)
04		1	Hubbegrenzung (min.), kpl. 7926268.00 lift stop (min.), cpl. (best. aus Pos. 05 + 06 / consisting of item 05 + 06)
05		1	Hubbegrenzungsschraube 7926269.00 stroke limiting screw
06		1	Seal-Lock-Mutter M 16 7992441.00 Seal-Lock nut
07		1	Verstellkopf, kpl. 7926239.00 adjusting head, cpl. (best. aus Pos. 09 - 15 / consisting of item 09 - 15)
08		1	Wiege / Mitnehmer 7927042.00 cam plate / driver
09		1	Connex-Spannstift SG 5x16 7992564.00 Connex dowel pin
10		9	Kolben, kpl. 7925234.00 piston, cpl.
11		1	Rückholplatte 7925235.00 return plate
12		2	Spannsegment 7926211.00 clamping segment
13		1	Gleitscheibe 7925725.00 sliding disc

Pumpe V30D-95-BKN-L-LS-2, 45 kW, 50 Hz
pump

 Bestell-Nr. **0000022955**
 Order-no.
 Gruppe-Nr. **12.0**
 Group-no.

Pos. Item	Bestell - Nr. Order - no.	Menge Quantity	Benennung Description	
14		4	Sicherungsblech 6,4 / DIN 463 locking plate	7992455.00
15	0065016701	4	6kt.-Shr. M 6x30 / 8.8A2P / EN 24014 hexagon screw	7990531.00
16		2	Laminum-Ausgleichsscheibe Laminum - compensating washer	7925237.00
17		1	Kolbentrommel, kpl. piston drum, cpl. (best. aus Pos. 18 - 20 / consisting of item 18 - 20)	7926323.00
18		1	Kolbentrommel mit Buchse piston drum with bush	7926320.00
19		1	Gleitscheibe sliding disc	7926210.00
20		3	Führungsstift guide pin	7992609.00
21		1	Paßfederwelle, kpl. feather key shaft, cpl. (best. aus Pos. 22 - 26 / consisting of item 22 - 26)	7926561.00
22		1	Paßfederwelle feather key shaft	7926544.00
23		1	Zylinderrollenlager NUP 2210 ECP tapered roller bearing	7992793.00
24		1	Distanzhülse spacer sleeve	7926698.00
25		1	Sprengring SW 50 snap ring	7992714.00
26		1	Innenring IR 50x60x25 EGS inner ring	7992406.00
27	0027608792	1	Paßfeder A 12x8x80 / DIN 6885 fitting key	7992567.00

Pumpe V30D-95-BKN-L-LS-2, 45 kW, 50 Hz
pump

 Bestell-Nr. **0000022955**
 Order-no.
 Gruppe-Nr. **12.0**
 Group-no.

Pos. Item	Bestell - Nr. Order - no.	Menge Quantity	Benennung Description	
28		1	Wiegenlager ISO, kpl. cam plate bearing, cpl. (best. aus Pos. 29 - 32 / consisting of item 29 - 32)	7927103.00
29		1	Wiegenlager ISO cam plate bearing	7927033.00
30		2	Lagerschale VBK bearing shell	7926247.00
31		2	Senk-Shr. M 5x12 / 8.8 / DIN 7991 countersunk screw	7990924.00
32	0000014752	2	Zyl.-Stift 8m6x20 / St-HRC60 / EN 28734 cylindrical pin	7992808.00
33		1	Radial-Gelenklager GE 17 ES radial rocker bearing	7991929.00
34		1	Sprengring SB 30 snap ring	7990813.00
35		1	Hubbegrenzung (max.), kpl. lift stop (max.), cpl. (best. aus Pos. 36 - 40 / consisting of item 36 - 40)	7927509.00
36		1	Gehäuse (max. Hubbegr.) housing (max. lift stop)	7927438.00
37		1	Seal-Lock-Mutter M 16 Seal-Lock nut	7992441.00
38		1	Distanzstück spacer part	7925263.00
39		1	6kt.-Shr. M 16x100 / 8.8 / EN 24014 hexagon screw	7992878.00
40		1	Sicherungsring 22x1 / F-St / DIN 472 circlip	7991661.00
41		2	Ventil, kpl. valve, cpl.	7926715.00

Pumpe V30D-95-BKN-L-LS-2, 45 kW, 50 Hz
pump

 Bestell-Nr. **0000022955**
 Order-no.
 Gruppe-Nr. **12.0**
 Group-no.

Pos. Item	Bestell - Nr. Order - no.	Menge Quantity	Benennung Description	
42		1	Zeigerwelle, kpl. indicator shaft, cpl.	7926714.00
43		1	Deckel cover	7926213.00
44		1	Gehäuse (B/2-1) f. L housing	7926602.00
45		1	Steuerscheibe B control washer	7926603.00
46		1	Zapfenschraube shank screw	7926266.00
47		1	Deckel cover	7925377.00
48		1	Deckel (Wiegenlager) cover (cam plate bearing)	7927044.00
49		1	Ring ring	7927175.00
50		1	Stellkolben adjusting piston	7926205.00
51		1	Führungsbolzen L, kpl. guide pin, cpl.	7926424.00
52		1	Federteller spring disc	7926212.00
53		1	Sicherungsring 95x3 / DIN 472 circlip	7992875.00
54		1	Druckfeder pressure spring	7926208.00
55		1	Druckfeder pressure spring	7926207.00

Pumpe V30D-95-BKN-L-LS-2, 45 kW, 50 Hz
pump

 Bestell-Nr. **0000022955**
 Order-no.
 Gruppe-Nr. **12.0**
 Group-no.

Pos. Item	Bestell - Nr. Order - no.	Menge Quantity	Benennung Description	
56		1	Scheibe disc	7926242.00
57		1	Druckfeder pressure spring	7925228.00
58		1	Stützring SS 40x50x2,5 back-up ring	7990023.00
59		1	Sicherungsring 50x2 / DIN 472 circlip	7991366.00
60	0065986370	8	Zyl.-Shr. M 12x70 / 10.9 / DIN 912 cap screw, socket head	7990687.00
61		8	Sicherungsscheibe S 12 locking washer	7990036.00
62		6	Kerbnagel 2,6x6 / DIN 1476 grooved drive stud	7991946.00
63		2	Gewindestift M 10x16 / DIN 914 stud bolt	7990226.00
64		1	Sicherungsring 52x2 / DIN 472 circlip	7992597.00
65		1	Spiral-Spannstift 6x24 / DIN 7343 spiral pin	7991848.00
66		3	Verschluß-Shr. G 1/4" / DIN 908 screw plug	7991703.00
67		3	Zyl.-Shr. M 8x10 / 10.9 / DIN 912 cap screw, socket head	7992842.00
68		4	Zyl.-Shr. M 10x16 / 10.9 / DIN 912 cap screw, socket head	7991987.00
69		4	Sicherungsscheibe S 10 locking washer	7990027.00

Pumpe V30D-95-BKN-L-LS-2, 45 kW, 50 Hz
pump

 Bestell-Nr. **0000022955**
 Order-no.
 Gruppe-Nr. **12.0**
 Group-no.

Pos. Item	Bestell - Nr. Order - no.	Menge Quantity	Benennung Description	
70		1	Drehrichtungsschild plate for sense of rotation	7992754.00
71		1	Zylinderrollenlager F 201 380 tapered roller bearing	7992575.00
72		1	Verschl.-Shr. G 3/4A / DIN 908 screw plug	7992051.00
73	0000013735	4	Zyl.-Shr. M 10x45 / 10.9 / DIN 912 cap screw, socket head	7990780.00
74		4	Sicherungsscheibe S 10 locking washer	7990027.00
75		1	Zyl.-Shr. M 6x8 / 10.9 / DIN 912 cap screw, socket head	7992565.00
76		1	Dichtstopfen MB 800-060 sealing plug	7991727.00
77		1	Dichtstopfen MB 800-080 sealing plug	7991726.00
100		1	Druckfeder L-Regler pressure spring L-regulator	7921129.00
101		1	Einstellschr. LS, P,Q-Regler adjusting screw LS,P,Q-regulator	7927267.00
102		2	Federteller div. Regler spring plate div. regul.	7927268.00
103		1	Verschl.-Shr. div. Regler. screw plug div. regul.	7925659.00
104		1	Deckel N, Regler cover N, regul.	7922449.00

Pumpe V30D-95-BKN-L-LS-2, 45 kW, 50 Hz
pump

 Bestell-Nr. **0000022955**
 Order-no.
 Gruppe-Nr. **12.0**
 Group-no.

Pos. Item	Bestell - Nr. Order - no.	Menge Quantity	Benennung Description	
105		1	Drosselnadel (div. Regler) throttle pin (div. regul.)	7923782.00
106		1	Seal-Lock-Mutter M 6 Seal-Lock nut	7992174.00
107		3	Zyl.-Shr. M 5x12 / 10.9 / DIN 912 cap screw, socket head	7991336.00
108		3	Sicherungsscheibe S 5 locking washer	7990208.00
109		1	Seal-Lock-Mutter M 8 Seal-Lock nut	7992035.00
110		1	Verschl.-Shr. screw plug	7927815.00
111	0000014106	1	Verschl.-Shr. G ¼A / A1 / DIN 908 screw plug	7991703.00
112		1	Dichtstopfen MB 800-060 sealing plug	7991727.00
113	0065984823	4	Zyl.-Shr. M 6x60 / 10.9A2P / DIN 912 screw plug	7990257.00
114		4	Sicherungsscheibe S 6 locking washer	7990048.00
115		1	Zyl.-Shr. M 5x6 / 10.9 / DIN 912 cap screw, socket head	7992872.00
116		1	Drossel 1,0 (M5x5 / DIN 913) throttle	7992893.00
117		1	Schutzstopfen TL-4-119 protection plug	7990013.00
118		1	Gewindestift M 6x6 / DIN 913 stud bolt	7992496.00



Ersatzteilliste Spare parts list

Pumpe V30D-95-BKN-L-LS-2, 45 kW, 50 Hz pump

Bestell-Nr. **0000022955**
Order-no.
Gruppe-Nr. **12.0**
Group-no.

Pos. Item	Bestell - Nr. Order - no.	Menge Quantity	Benennung Description	
119				
120	0000025836	2	Nachsaugventil mit DBV, kpl. check valve with pressure relief valve, cpl.	
125	0000041061	1	Flachdichtung gasket	7926248.00
126	0000063966	1	Simmerring 60-80-7-7,5 radial packing ring	7992401.00
127	0000030967	1	O-Ring 4,47x1,78 o-ring	7992463.00
128	0000030968	4	O-Ring 7,65x1,78 o-ring	7990025.00
129	0000030969	1	O-Ring 66,34x2,62 o-ring	7992501.00
130	0000030970	1	O-Ring 85,09x5,33 o-ring	7992712.00
131	0074638013	3	USIT-Ring U 8,7x13x1 sealing ring	7992052.00
132	1000052978	2	USIT-Ring U 10,35x16x2 sealing ring	
133	0000040894	4	USIT-Ring U 13,7x22x1,5 sealing ring	7992439.00
134	0000030971	1	O-Ring 44,05x3,53 o-ring	7992595.00
135	0000021610	3	USIT-Ring U 27,2x36x2 sealing ring	7992469.00

Pumpe V30D-95-BKN-L-LS-2, 45 kW, 50 Hz
pump

 Bestell-Nr. **0000022955**
 Order-no.
 Gruppe-Nr. **12.0**
 Group-no.

Pos. Item	Bestell - Nr. Order - no.	Menge Quantity	Benennung Description	
136	0008070510	1	USIT-Ring U 6,7x10x1 sealing ring	7991398.00
144	0074638013	3	USIT-Ring U 8,7x13x1 sealing ring	7992052.00
148	0008019761	1	USIT-Ring U 24,7x32x2 sealing ring	7991538.00
149	0000030973	1	O-Ring 17,17x1,78 o-ring	7991475.00
150	1000052978	1	USIT-Ring U 10,35x16x2 sealing ring	7991705.00
151	0000040894	1	USIT-Ring U 13,7x22x1,5 sealing ring	7992439.00
152	0000030968	4	O-Ring 7,65x1,78 o-ring	7990025.00
153		1	Stützring S 11 109-017 back-up ring	7991991.00
154	0074638009	1	USIT-Ring U 5,7x9x1 sealing ring	7991963.00
	0000021910	1	Dichtsatz für Grundpumpe, kpl. packing set for basic pump, cpl. (best. aus Pos. 125 - 136 / cons. of item 125 - 136)	7926641.00
	0000021900	1	Dichtsatz für Regelventil L, kpl. packing set for control valve L, cpl. (best. aus Pos. / cons. of item 320,324,327,328,342)	

Pumpe V30D-95-BKN-L-LS-2, 45 kW, 50 Hz
pump

 Bestell-Nr. **0000022955**
 Order-no.
 Gruppe-Nr. **12.0**
 Group-no.

Pos. Item	Bestell - Nr. Order - no.	Menge Quantity	Benennung Description	
	0000022117	1	Dichtsatz für Vorsteuerventil LS, kpl. packing set for pilot valve LS, cpl. (best. aus Pos. 148 - 154 / cons. of item 148 - 154)	7927280.00
160		1	Saug/Druck-Block 2 V30D-095 suction/pressure block	7929314.00
161		1	Ventildeckel 2 V30D-095 valve cover	7929316.00
162		1	Rückschlagventil RKC-50-K nonreturn valve	7993171.00
163		1	Druckventil 1LR100F35S pressure valve	7993172.00
164	0074429111	1	O-Ring (47,22x3,53)225-8309 o-ring	7990398.00
165	0005586574	3	Verschluß-Shr. VSTI R3/8-WD screw plug	7993174.00
166	0000027866	8	Zyl.-Shr. M 14x100 / 10.9 / DIN 912 cap screw, socket head	
301		1	Gehäuse housing	7929808.00
302		1	Ventilbuchse valve bush	7927235.00
303		1	Ventilkolben valve piston	7924721.00
304		2	Federteller spring plate	7924757.00

Pumpe V30D-95-BKN-L-LS-2, 45 kW, 50 Hz
pump

 Bestell-Nr. **0000022955**
 Order-no.
 Gruppe-Nr. **12.0**
 Group-no.

Pos. Item	Bestell - Nr. Order - no.	Menge Quantity	Benennung Description	
305		1	Druckfeder pressure spring	7924754.00
308		1	Verschluß-Shr. R $\frac{3}{4}$ " screw plug	7927224.00
309		1	Kolben piston	7921673.00
310				
311		1	Winkelhebel angle lever	7926762.00
312		1	Welle shaft	7921596.00
313		1	INA-Stützrolle RSTO 5TN supporting roller	7991924.00
314				
315		1	Gleitschuh sliding block	7921018.00
316		1	Kolben piston	7927676.00
317		1	Verschluß-Shr. M 18x1,5 / DIN 908 screw plug	7990157.00
318				
319		2	Zyl.-Shr. M 6x25 / DIN 912 cap screw, socket head	7990047.00

Pumpe V30D-95-BKN-L-LS-2, 45 kW, 50 Hz
pump

 Bestell-Nr. **0000022955**
 Order-no.
 Gruppe-Nr. **12.0**
 Group-no.

Pos. Item	Bestell - Nr. Order - no.	Menge Quantity	Benennung Description	
320		3	USIT-Ring 6,07x10x1 sealing ring	7991398.00
323		2	Verschluß-Shr. R $\frac{1}{4}$ / DIN 908 screw plug	7991703.00
324		2	USIT-Ring 13,7x22x1,5 sealing ring	7992439.00
325		1	Einstellschraube M 8 adjusting screw	7927671.00
326		1	Seal-Lock-Mutter M 8 Seal-Lock nut	7992035.00
327		1	USIT-Ring 27,2x36x2 sealing ring	7992469.00
328		1	USIT-Ring 18,7x26x1,5 sealing ring	7991488.00
329		2	Buchse bush	7991875.00
332		2	Zyl.-Shr. M 8x80 / DIN 912 cap screw, socket head	7990267.00
333		4	Sicherungscheibe S 8 locking washer	7990008.00
334		2	Zyl.-Shr. M 8x30 / DIN 912 cap screw, socket head	7990002.00
335				

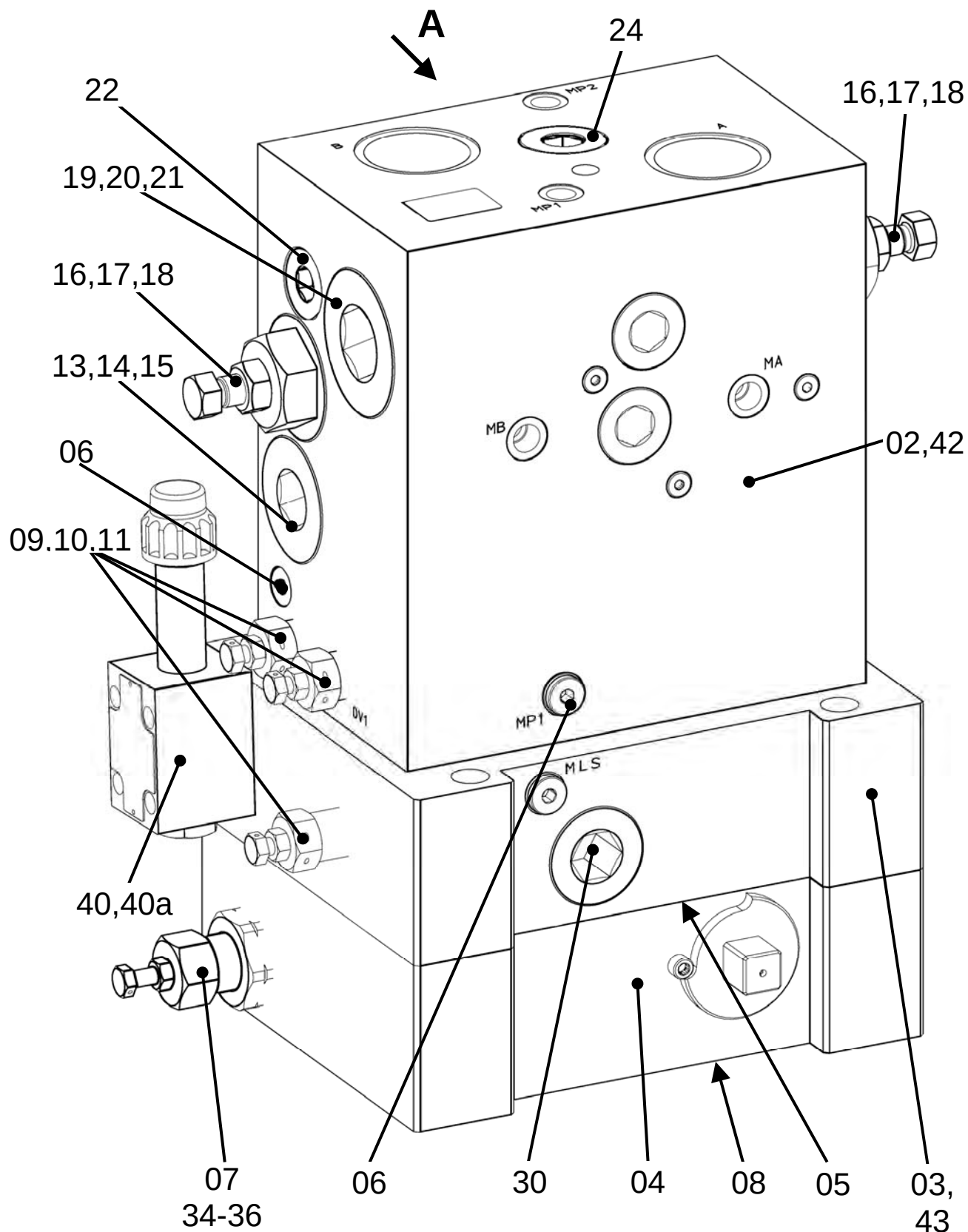
Pumpe V30D-95-BKN-L-LS-2, 45 kW, 50 Hz
pump

 Bestell-Nr. **0000022955**
 Order-no.
 Gruppe-Nr. **12.0**
 Group-no.

Pos. Item	Bestell - Nr. Order - no.	Menge Quantity	Benennung Description	
336 „U“		1	Drossel (M 6x6 bei Bedarf) throttle (if necessary)	7992603.00
340		2	Dichtstopfen MB800-060 plug	7991727.00
341		1	Verschluß-Shr. R1/8" /DIN 908 screw plug	7992075.00
342		1	USIT-Ring 10,35x16x2 sealing ring	7991705.00
343				
344		1	Druckfeder pressure spring	7926317.00
345				
346		1	Sieb 9x6x3 sieve	7993269.00
347		1	Zyl.-Shr. M 6x25 / DIN 912 cap screw, socket head	7992565.00
348		1	Verschluß-Shr. M 10x1 screw plug	7927815.00
	0000020824	1	Reparatursatz, bestehend aus Pos. 10,17,23,71 repair set, consisting of item 10,17,23,71	
	0000027721	1	Verschleißteilsatz, bestehend aus Pos. 13,14,19,26,30,31,45, set of wearing parts, consisting of item 13,14,19,26,30,31,45	

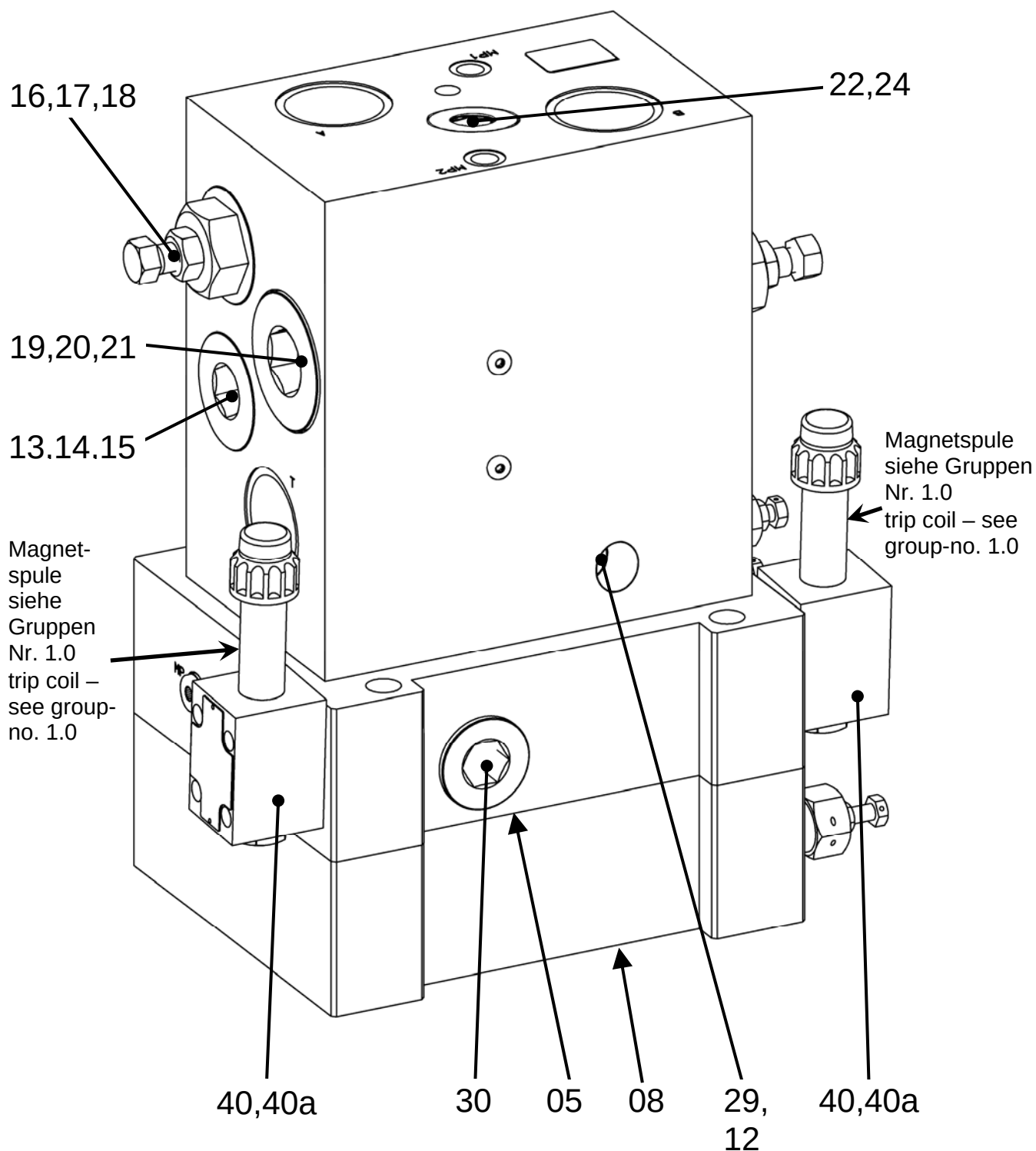
Steuerblock AV 6466-0-2/OS NG30-N
control block
B 1000063253

 Gruppe-Nr.
 Group-no.

13.0


Steuerblock AV 6466-0-2/OS NG30-N
control block
B 1000063253

 Gruppe-Nr.
 Group-no.

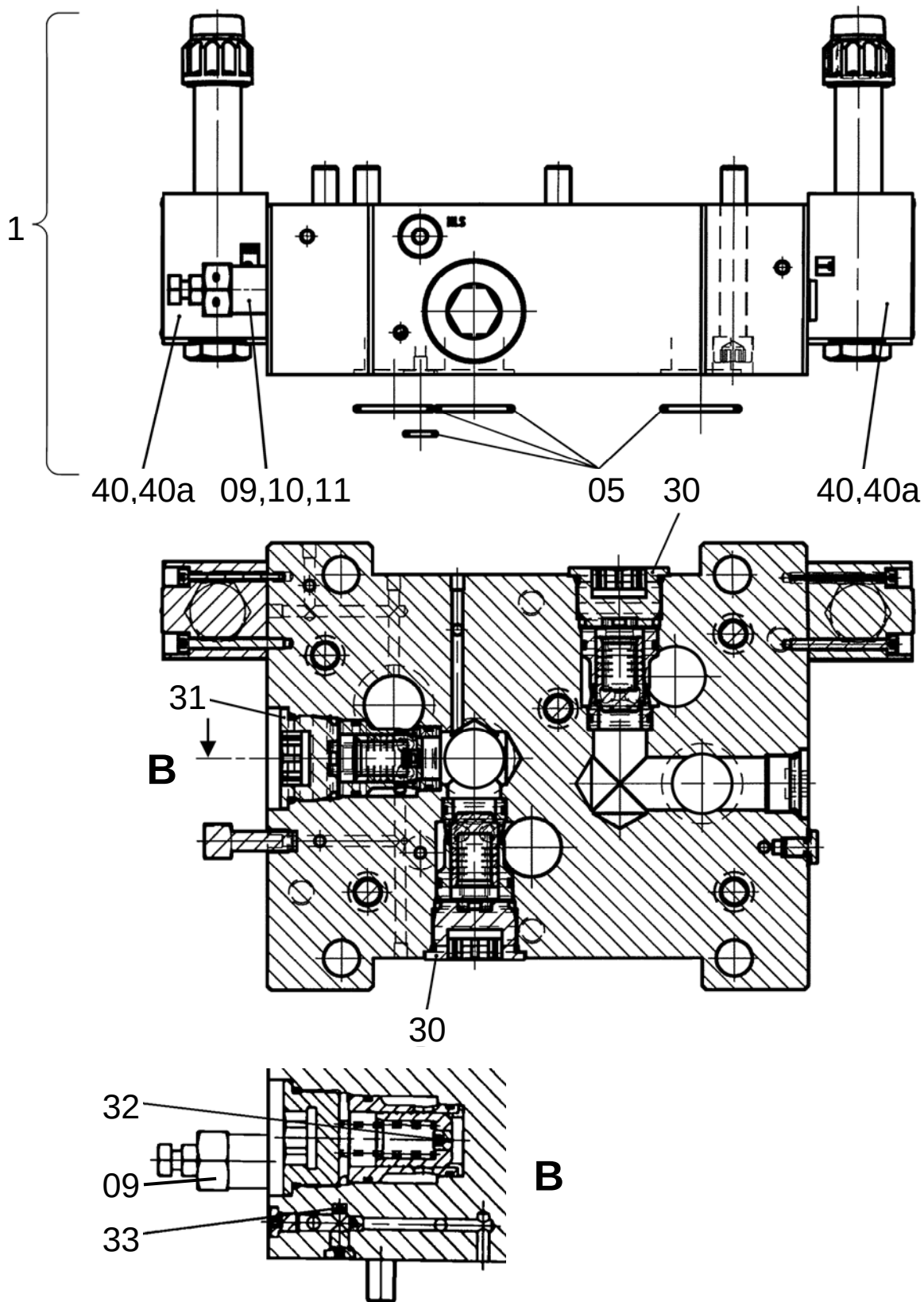
13.0
“A“


Steuerblock AV 6466-0-2/OS NG30-N
control block

B 1000063253

Gruppe-Nr.
Group-no.

13.0



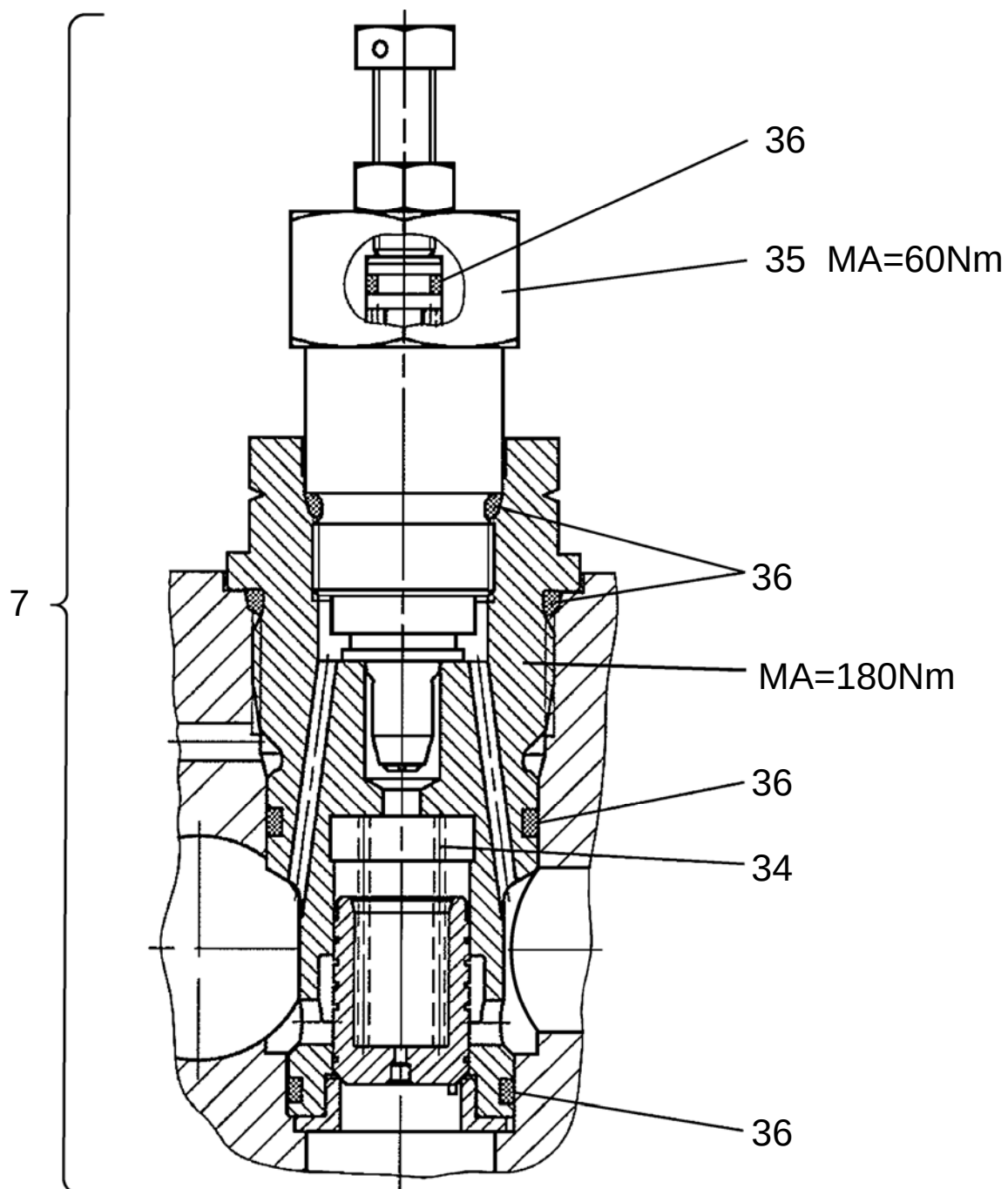
Steuerblock AV 6466-0-2/OS NG30-N
control block

B 1000063253

Gruppe-Nr.
Group-no.

13.0

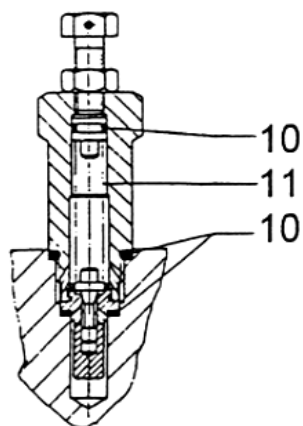
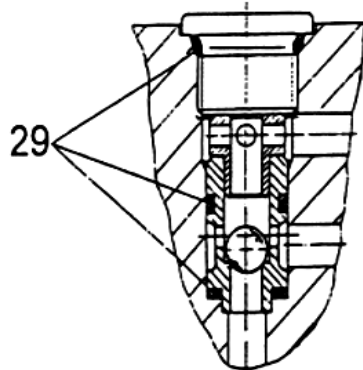
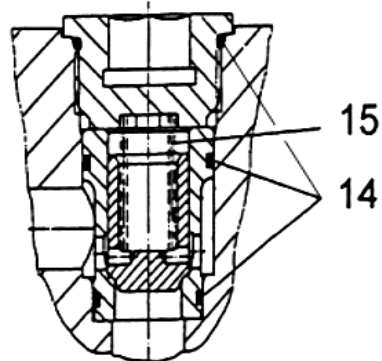
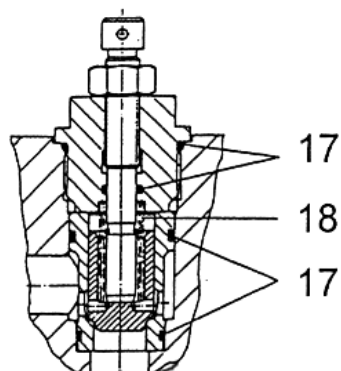
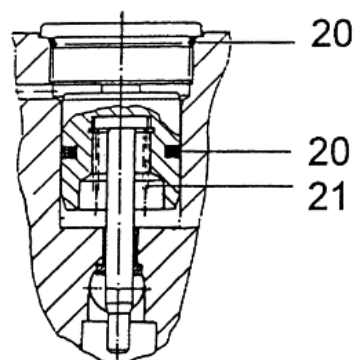
Pos. 07
item 07

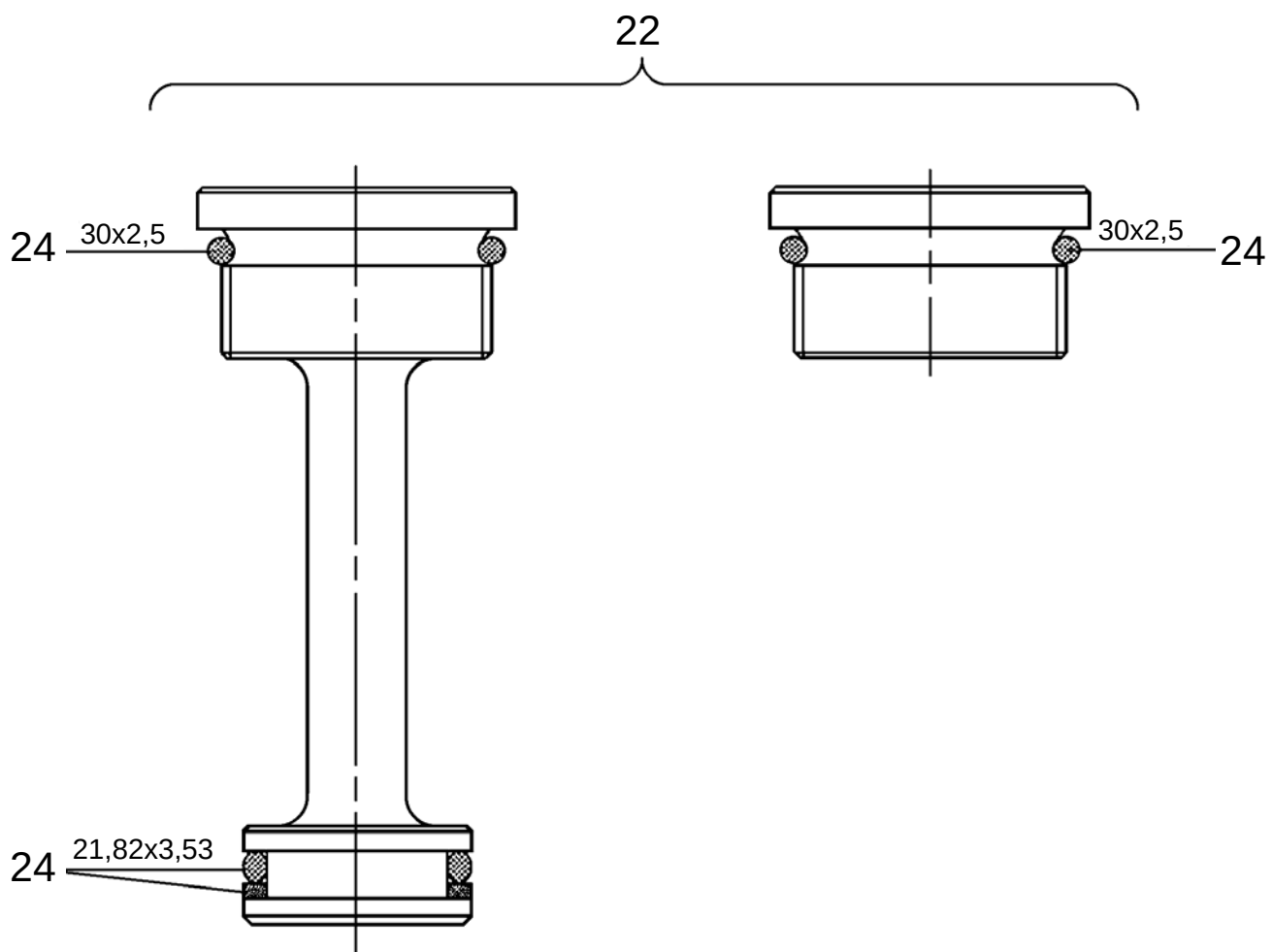


Steuerblock AV 6466-0-2/OS NG30-N
control block
B 1000063253

 Gruppe-Nr.
 Group-no.

13.0

 Pos. 09
 item 09

 Pos. 12
 item 12

 Pos. 13
 item 13

 Pos. 16
 item 16

 Pos. 19
 item 19


Steuerblock AV 6466-0-2/OS NG30-N
control block**B 1000063253**Gruppe-Nr.
Group-no.**13.0****Pos. 22**
item 22

Steuerblock AV 6466-0-2-OS, DN 30-N
control block

 Bestell-Nr. **1000063253**
 Order-no.
 Gruppe-Nr. **13.0**
 Group-no.

Pos. Item	Bestell - Nr. Order - no.	Menge Quantity	Benennung Description	
01				
02		1	Grundblock, kpl. basic block, cpl.	OF-1407
03		1	Steuerplatte, kpl. control plate, cpl.	OF-203
04		1	Anschlussplatte connecting plate	OF-2036-4
05		1	Dichtungssatz für Flanschebene packing set for flange plane	OF-2036
06		2	Düse Ø 1,5 nozzle	OF-810-1.3
07		1	Druckbegrenzungsventil pressure relief valve	OF-1592
08				
09	0008061695	3	Vorsteuerventil DV1 / DV2 / DV3 pilot valve	OF-337-2.1
10	0008061139	3	Dichtungssatz für Pos. 09 packing set for item 09	OF-337-2.2
11	0008061135	3	Druckfeder für Pos. 09 pressure spring for item 09	OF-337-2.3
12	0000020479	1	Wechselventil, kpl. shuttle valve, cpl.	OF-603-1
13	0008061478	2	Rückschlagventil nonreturn valve	OF-337-5.1
14	0008061142	2	Dichtungssatz für Pos. 13 packing set for item 13	OF-337-5.2
15	0008061186	2	Druckfeder für Pos. 13 pressure spring for item 13	OF-337-5.3

Steuerblock AV 6466-0-2-OS, DN 30-N
control block

 Bestell-Nr. **1000063253**
 Order-no.
 Gruppe-Nr. **13.0**
 Group-no.

Pos. Item	Bestell - Nr. Order - no.	Menge Quantity	Benennung Description	
16	0008061479	2	Logikpatrone mit Hubbegrenzung nonreturn valve with lift stop	OF-337-6.1
17	0008061143	2	Dichtungssatz für Pos. 16 packing set for item 16	OF-337-6.2
18	0008061134	2	Druckfeder für Pos. 16 pressure spring for item 16	OF-337-6.3
19	0008061623	2	Vorsteuerung pilot control	OF-337-7.1
20	0008061144	2	Dichtungssatz für Pos. 19 packing set for item 19	OF-337-7.2
21	0008061188	2	Druckfeder für Pos. 19 pressure spring for item 19	OF-337-7.3
22		1	Stopfensatz plug set	OF-1244
23		1	Dichtungssatz für Flanschfläche packing set for flange plane	OF-1407-21
24		1	Dichtungssatz für Pos. 22 packing set for item 22	OF-1244
29	0000021486	1	Dichtungssatz, kpl. für Pos. 12 packing set, cpl. for item 12	OF-603-2
30	0000025395	2	Einbaupatrone, kpl. built-in valve, cpl.	OF-811-3
31	0000027605	1	Einbaupatrone, kpl. built-in valve, cpl.	OF-1246
32		1	Düse Ø 1,0 nozzle	OF-833-10

Steuerblock AV 6466-0-2-OS, DN 30-N
control block

 Bestell-Nr. **1000063253**
 Order-no.
 Gruppe-Nr. **13.0**
 Group-no.

Pos. Item	Bestell - Nr. Order - no.	Menge Quantity	Benennung Description	
33		1	Düse Ø 1,2 nozzle	OF-834-12
34		1	Druckfeder für Pos. 07 pressure spring for item 07	OF-594-4
35		1	Druckbegrenzungsventil pressure relief valve	OF-594-5
36		1	Dichtungssatz, kpl. für Pos. 07 packing set, cpl. for item 07	OF-594-2
40	1000050697	2	4/2-Wegeventil (Magnetspule – siehe Gr.-Nr. 1.0) 4/2-way valve (trip coil – see group-no. 1.0)	
40a	0000027131	4	Zyl-Shr. M 5x45 / 10.9 / DIN EN ISO 4762 cap screw, socket head	
41				
42		1	Dichtungssatz, kpl. für Pos. 02 packing set, cpl. for item 02	OF-1243-12
43		1	Dichtungssatz, kpl. für Pos. 03 packing set, cpl. for item 03	OF-2039-8
44	0000023621	1	Dichtungssatz, kpl. packing set, cpl.	OF-2036-8
	0000025397	2	Dichtungssatz, kpl. für Pos. 30 packing set, cpl. for item 30	OF-811-6
	0000025397	1	Dichtungssatz, kpl. für Pos. 31 packing set, cpl. for item 31	OF-811-6

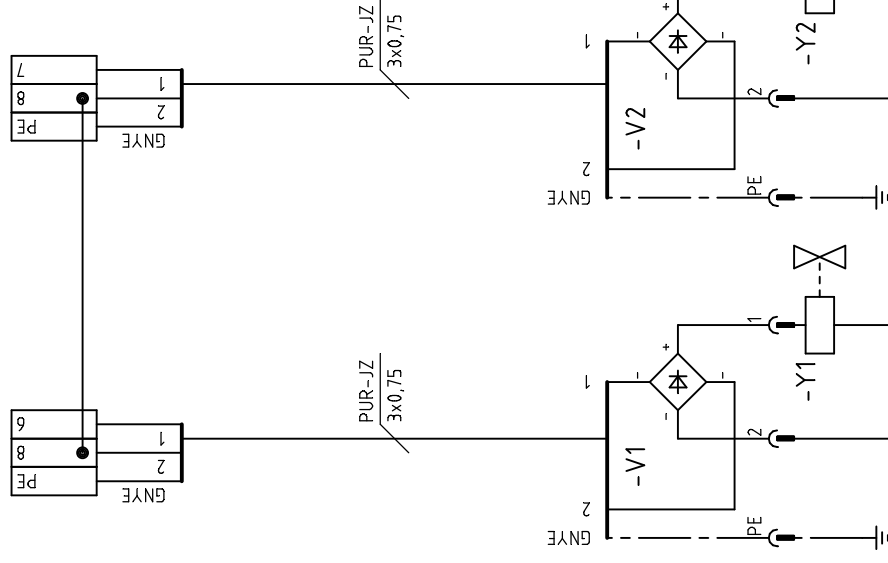
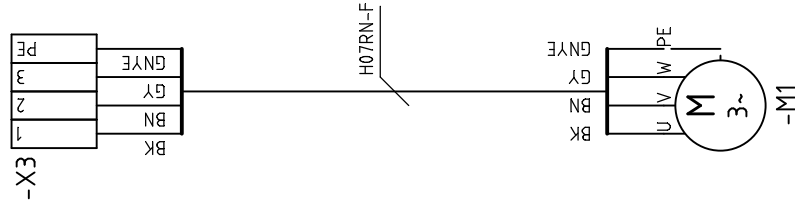
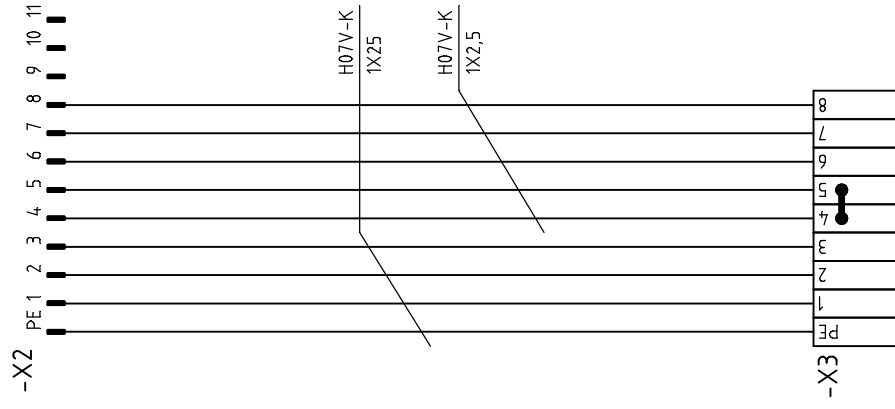
Werks-Nr. / Serial-no.:
1300 / 1301 / 1302 / 1303
Erzeugnis / Product:
MMGL 8000-3-S
Sach-Nr. / Subject no.:
S 1000062713
Geräteausrüstung Elektrik
electric equipment
Schaltplan
wiring diagram
1000062714/1-2 E

Benennung	Description	Bestell-Nr. / Order-no.	Gruppe-Nr. / Group-no.
Zugentlastung	tension relief	0023003000	15.0
Verlängerung	extension	1000062715	15.1
Kabelteil, Stifte	male part, pins	0023079931	16.0
Elektrische Installation	electrical installation	1000062714	40.0

Bei Ersatzteilbestellung ist außer der Bestellnummer das Erzeugnis, die Werks-Nr. und Kommissions-Nr. anzugeben.

For spare part orders, the product, serial-no. and commission-no. must be given in addition to the requisition-no.

1	2	3	4	5	6	7	8
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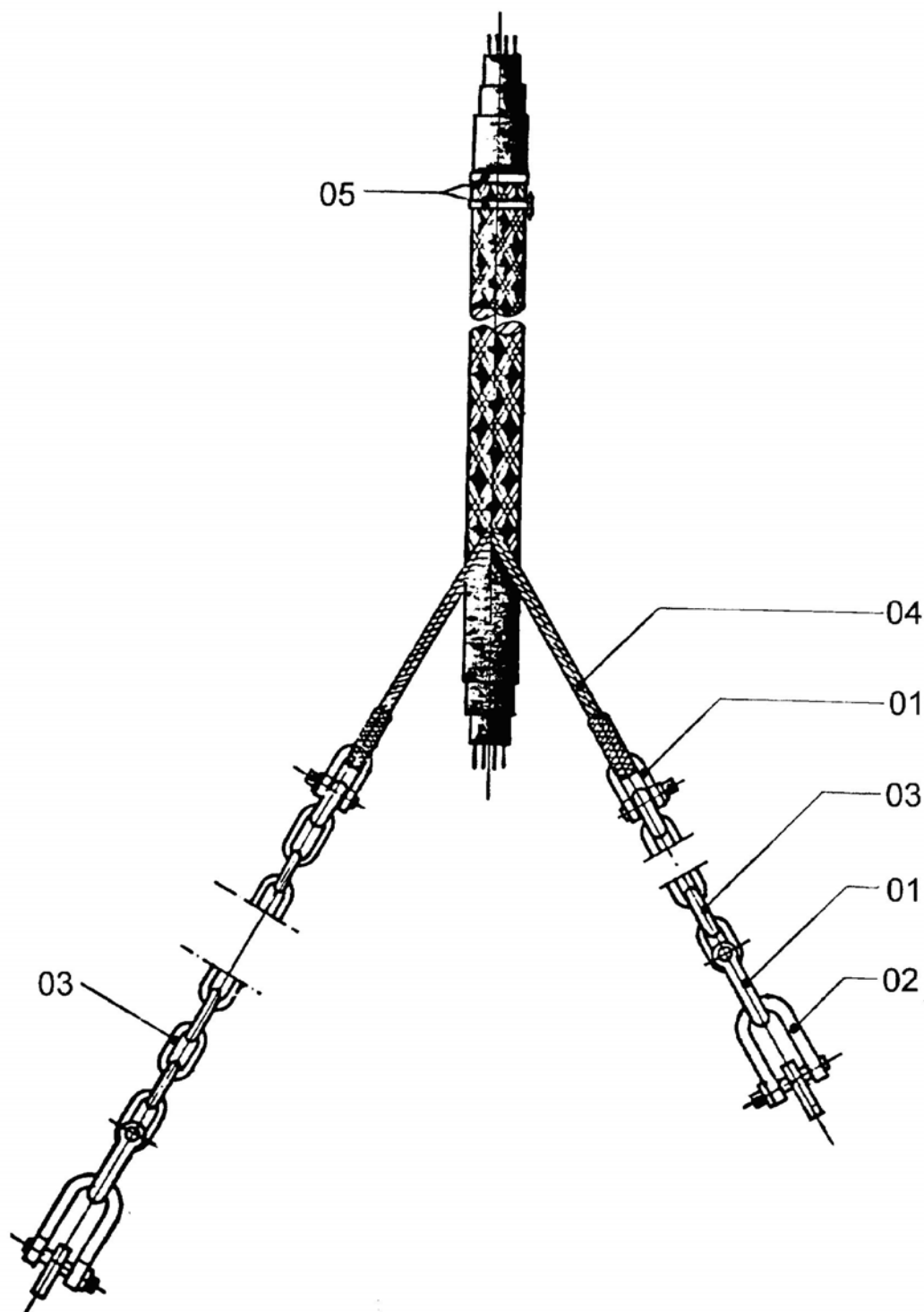
c		Datum	12.12.2011	 Peiner Greifer	 OSMAG Salzgitter Maschinenbau	WIRING DIAGRAM MOTOR-GRAB	ONLY FOR INFORMATION		== +			
b		Bearb.	Longwitz									
a	Änderung	Datum	Name				Gepr.	Abt.			VG-K	Ersatz durch:
										E	1000062714	Bl. 2 Fbl. -

Zugentlastung
tension relief

B 0023003000

Gruppe-Nr.
Group-no.

15.0



Zugentlastung
tension reliefBestell-Nr. **0023003000**
Order-no.
Gruppe-Nr. **15.0**
Group-no.

Pos. Item	Bestell - Nr. Order - no.	Menge Quantity	Benennung Description
01	0002304905	4	Schäkel A 0,25 / StTZn / DIN 82101 shackle
02	0002304743	2	Schäkel A 0,4 / StTZn / DIN 82101 shackle
03	1000054215	2	Kette 3-6x18,5 – 1000 mm chain
04	0008012058	1	Kabelziehstrumpf RP 225/1000 N cable grip
05	0001296886	1	Schlauchbinder WSN 9 – 470 mm hose clamp

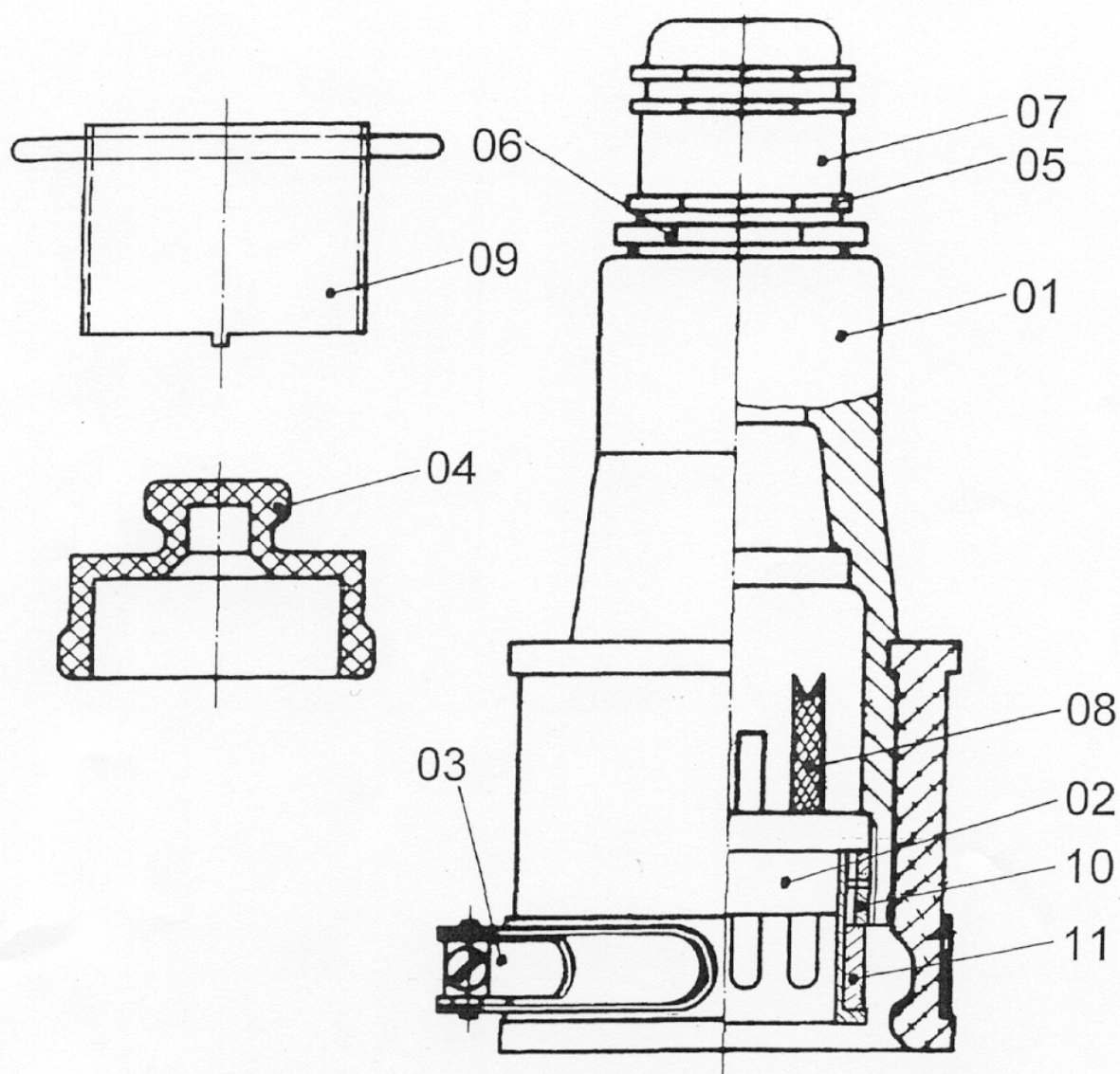
Verlängerung 36x2,5 BO D58
extension

 Bestell-Nr. **1000062715**
 Order-no.
 Gruppe-Nr. **15.1**
 Group-no.

Pos. Item	Bestell - Nr. Order - no.	Menge Quantity	Benennung Description
01	0023079931	1	Kabelteil BO 37x27A, Stifte (s. Gruppe-Nr. 16.0) male part (see group-no. 16.0)
02	0000027591	1	Kabelteil D58, 3+PEX125A+8X25A S0118 female part
03	0000022933	1	Leitung (N)SHTÖÜ(SMK)-J 36x2,5 mm ² – 6 m electric cable
04	0023003000	1	Zugentlastung (s. Gruppe-Nr. 15.0) tension relief (see group-no. 15.0)

Kabelteil Bo
plug connection, cable part
B 0023079931

 Gruppe-Nr.
 Group-no.

16.0


Kabelteil BO, 37pol., 27A, D26-36, Stifte
male part, pins

 Bestell-Nr. **0023079931**
 Order-no.
 Gruppe-Nr. **16.0**
 Group-no.

Pos. Item	Bestell - Nr. Order - no.	Menge Quantity	Benennung Description
01	0006171739	1	Stecker 0 E 3 09 021-554 00 plug
02	0000017323	1	Stifteinsatz 309 803 150 037 151, 37polig male insert
03	0006171833	1	Klemmring 309 021 018 200 00 clamping ring
04	0006171832	1	Verschlusskappe 309 097 002 924 locking cap
05	0006194799	1	Verschraubung – Zugentlastung PG 36 tension relief for gland
06	0091044000	1	Reduktion H PG42 - PG36 / Ms / DIN 46320 reduction
07	0006194764	1	Verschraubung – Zugentlastung PG 42 tension relief for gland
08	0000023644	37	Schrumpfschlauch CPX50 5x25 socket
09	0006165984	1	Schlüssel 309 098 000 719 mounting key
10	0006171802	2	Gewinding 802-0107 threaded ring
11	0006171801	1	Zwischenring 802-0105 intermediate ring

Elektrische Installation
electrical installation

 Bestell-Nr. **1000062714**
 Order-no.
 Gruppe-Nr. **40.0**
 Group-no.

Pos. Item	Bestell - Nr. Order - no.	Menge Quantity	Benennung Description
01	0000019172	1	Montageplatte 9823007000 F CP300 53/A42 mounting plate
02	0006222179	1	Tragschiene 1201280 mounting rail
03	0000019854	3	Kemme UK 35 / 3008012 terminal
04	0000041006	1	Schutzleiterklemme USLKG 35 / 0444019 protective conductor terminal
05	0000019853	6	Klemme UK 5 N / 3004362 terminal
06	0060000552	1	Deckel D-UK 4/10 / 3003020 cover
07	0060000551	2	Schutzleiterklemme USLKG 5 / 0441504 protective conductor terminal
08	0000030133	2	Gerätesteckdose mit Gleichrichter und 2 m Leitung socket with rectifier and 2 m electric cable
09	0090017600	1	Leitung H07V-K 1X25 – 1,5 m electric cable
10	0090017608	1	Leitung H07V-K 1G25 – 0,5 m electric cable
11	0090017100	1	Leitung H07V-K 1X2,5 – 2,5 m electric cable
12	0000027590	1	Geräteteil D58 3+PEX125A+8X25A S0117, kpl. male part, cpl.