

MANUAL

Status: January 2011

DrallEx Swivel

MANUAL Drallex-Swivel

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1. Load pick up devices in usage with hoists

As usage with hoists is in general defines as usage with cranes and load pick up devices are load-carrying equipment, lifting accessories, and suspensions.

Load-carrying equipments are e. g. swivel, c-hooks, clamps, grips, and pincers. These are devices which can be attached with the suspension of the hoist for the load pick up.

Lifting accessories are e. g. ceaseless ropes, hooked chains, hooked ropes, trusses, crane chains, ring-ended slings. These devices build the connection between suspension and the load or hoist and load-carrying equipment.

Suspensions are crane hooks as well as hard coded swivel, grips, tie bars, pincers, which are attached to hard coded devices for pick up of load-carrying equipment and lifting accessories.

Load-carrying equipment can only be used if inspected by specialists and asserted defects are remedied. Load-carrying equipment has to be inspected by specialists at an interval of max. 1 year. Steel chains used as lifting accessory have additionally to be crack tested at intervals of max. 3 years. Furthermore, load pick up devices have to be inspected by specialist after special events or defects.

All inspections are in general visual or functional inspections regarding status of components, devices, completion and effectivity of safety components (see BRG 500 chapter 2.8/3.15). Inspection reports are to be made according to BGR 500 chapter 2.8/3.15.5.

1.1 Machinery directive 2006/42/EG

- **Article 2 Definitions**

d) A "Load-carrying equipment" is not belonging to the hoist component or piece of equipment, that allowed picking up the load and mounted between the machinery and the load or the load itself or which is intended to be a integral part of the loader and is placed on the market separately. Load-carrying equipments are also lifting accessories and their components.

- Appendix I, chapter 4.1.2.5 Load-carrying equipment: The basic safety and health protection requirements are applied and observed.
- Appendix VII part B The special technical documents prepared under the machinery directive 2006/42/EG.

2. DRALLEX-swivel in general

DRALLEX-swivels by **Süther & Schön GmbH (S+S)** are very versatile. Every kind of usage has special technical requirements, different environmental conditions and different specifications. When swivels are orders, the user is responsible that he has selected the correct product, since only he has knowledge of the field of usage and the environmental conditions. S+S will of course support the selection of products when asked. Please contact S+S if you have questions regarding DRALLEX-swivel.

2.1 Load (SWL: Safe Working Load; WWL: Working Load Limit)

The load of every single DRALLEX-swivel is determined by our engineering expertise and shall never be exceeded, no matter how strong the combined wire ropes, synthetic ropes, chains or other accessories are. S+S does not take responsibility in case the load is exceeded.

Load does refer only to the case in which the load is put evenly in axial direction and along the centre axis. Load does in no case refer to jolt loads which exceed the static load several times.

Furthermore, loads refer to load pick-ups at the tip of the hook or sideways and not axial working loads as bending or twisting.

Such loads are a misuse and are therefore not included in the manufacturer's guarantee. The load refers only to newly manufactured products as supplied from factory. Age, service, environmental conditions and general usage can reduce the load.

2.2 Applied load (see BGR 500 chapter 2.8/3.5)

Load pick up devices are not to be loaded above their capacity. When attaching in choker hitch lifting accessories are to be loaded with max. 80% of their capacity.

At the lifting of loads also the capacity of the hoists and the net weight of the load pick up devices are to be considered (see BGR 500 chapter 2.8/3.4). Since suspensions are part of hoists, their net weight is usually considered already at determining of the allowed load of the hoists.

2.3 Test load

The test load is the one load which is put onto the product before a physical change occurs. At the same time it is the highest load possible which it put during a test load inspection. The test load shall never be seen as the allowed load, since the load is never to be allowed to be exceeded during usage. Test loads: acc. to test load table acc. to DIN 82003 appendix 2.

2.4 Breaking load

The breaking load is a theoretical value at which the product loses its function ability or cannot bear its load any longer.

2.5 Safety factor

The safety factor is a theoretical and provisional capacity and is usually calculated by the quotient of breaking load and load. The safety factor is usually expressed as ratio, for swivel 1:4.

2.6 Yield point

The yield point is the point between test load and breaking load on which a continuing deformation occurs. Bear in mind that these deformations are not necessarily visible.

2.7 Jolt load

The jolt load is a dynamical increase of the load factor which can occur by sudden stress on the rope, load alternation, twisting or by any impact onto a load or the device holding the load. Example: a load stands on the edge of a platform and is held by a slack rope; the load is then pushed over the edge and falls into the rope; the rope will tighten at once and the swivel is put under a strong jolt load.

2.8 Test load inspection

By customers' demand a test load inspection is run through. The test load is put under controlled laboratory conditions onto the vertical tension.

2.9 Safety snares

All DRALLEX-swivel with load hook (type 123) are equipped by factory with safety snares. The only function of a safety snare is to keep in a situation without load slings, rings and other lifting accessories with the hook opening. Safety snares are not to be considered as equipment to correct wrong handling. Therefore it is to be considered that safety snares never bear a load. Safety snares have to be controlled for their efficiency by routine. Certain usages of load hooks can afford different designs of safety snares. See also BRG 500 chapter 2.8/3.6 to secure the load against falling. Please contact S+S for further questions regarding safety snares.

3. Usage and testing of DRALLEX-swivel

3.1 Selection of DRALLEX-swivel

All data, used as basis in manuals for DRALLEX-swivel, are related to new products in unused condition. If you select a DRALLEX-swivel, you have to consider which loads will be put onto the product. It is necessary to consider possible jolt loads when selecting a product.

Conditions as extreme cold or heat, humidity or pollution have to be considered since these conditions have impact on longevity, performance and load.

3.2 Usage in water

Standard DRALLEX-Swivels are never to be used in water. Contact S+S if you need a product especially designed for usage in fresh or salt water.

3.3 Not allowed loads

Use DRALLEX-swivel only for those usages they are designed for. Passenger transportation on any load or on any suspension is forbidden.

3.4 Durability of DRALLEX-swivel

Outer impacts have influence on the durability of DRALLEX-swivel. There is not exact determined durability for DRALLEX-swivel. Even after a short working period the conditions can afford to remove the product from usage.

Should there be unanswered questions during inspection of DRALLEX-swivel regarding planned usage or necessity of repair, the product has immediately to be removed from further usage.

3.5 Storage of swivel (Storage of lifting accessories and load carrying equipment BGR 500 chapter 2.8/3.12)

- (1) Lifting accessories and load carrying equipment have to be stored in such a manner that they cannot overturn, fall down or divert.
- (2) Lifting accessories and load carrying equipment have to be secured against climatic conditions and aggressive materials, as long as the safety could be influenced by these.

3.6 Claims on swivel

It is the responsibility of the user to maintain the product, to inspect it and to test it. Claims (see BGR 500 chapter 2.8/3.13)

- (1) Employees who use load carrying equipment have to look out for visual defects during usage.
- (2) The employer has to take care that load carrying equipment with defect, which could influence the safety, are removed from further usage.

3.7 Repair (see BGR 500 chapter 2.8/3.14)

The employer has to take care that repair of load carrying equipment is only done by persons who have the necessary knowledge and qualification.

3.8 Welding DRALLEX-swivel

Do not carry out welding on DRALLEX-swivel. Inform S+S should changes or repairs are necessary. **It is recommended to contact S+S for questions regarding repair and maintenance.**

3.9 Inspection of swivel(see BGR 500 chapter 2.8/3.15)

- (1) **Inspection before first use(see BGR 500 chapter 2.8/3.15.1)**

All DRALLEX-swivel are mechanical components and are subject to a certain abrasion. Worn out parts have not the same load capacity as new parts. Employer, buyer and user of DRALLEX-swivel have responsibility for inspection, maintenance and further usage.
- (2) **Periodical inspection(see BGR 500 chapter 2.8/3.15.2)**

Consider that visual inspection is not necessarily sufficient to receive impression of the current situation of the product. Furthermore, further inspections like x-ray, ultrasound or surface crack testing can be necessary.
- (3) **Special inspection(see BGR 500 chapter 2.8/3.15.3)**

The employer has to take care that load carrying equipment are inspected after defect or special occurrences which could influence the load capacity as well as after repair.

(4) **Scope of inspection(see BGR 500 chapter 2.8/3.15.4)**

The inspection is essentially a visual and functional test. It has to extend to check of the condition of the components and equipments, on the proper assembly and of completeness and effectiveness of safety devices.

(5) **Test record(see BGR 500 chapter 2.8/3.15.4)**

The employer has to take care that the tests of suspensions and special tests of steel chains are recording.

(6) **Abrasion, withdrawal from service and control before usage(see BGR 500 chapter 2.8/3.15.4 and BGI 556 (previous ZH1/103a))**

Independent from the annual necessary testing of lifting accessories by qualified personnel the hanger-on has to visually inspect rope. Chain, swivel or hoist before each use and assure himself that his "tool" is undefected. By impact of violence from outside or overload since the last periodical inspection lifting accessories can be in such a way defected that their further usage could lead to breakage of rope or chain and to crash of the load.

(7) **Remarks for nuts, hexagon screws, pins and springs**

All nuts, hexagon screws, pins, rivets and springs have to be checked for their proper location periodically. The chosen interval between inspections depends on the specific working conditions. Working assignments with high vibration, high load changes and continuing turns require shorter inspection- and maintenance intervals. All safety pins are secured against grainage by factory; should these start to loosen, drive these in again and grain carefully again.

4 Maintenance and inspection

4.1 General information

In the following a minimum of maintenance for DRALLEX-swivel under normal usage is proposed. Special product usages, the environment and the grade of usage can lead to the necessity of a more intense maintenance and inspection as proposed by S+S. Furthermore, national, government safety organizational or safety-technical prescriptions have to be considered when the maintenance and inspection plan for your S+S product is determined. See VBG 9a Load pick up devices with hoists.

Always consider to ask S+S if you need support for the setting up and carrying out of your maintenance and inspection plan.

Should a DRALLEX-swivel is wearing off and/or becomes unusable the try to repair is to the risk of the party who does so. See BGR 500 chapter 2.8

S+S accepts any DRALLEX-swivel for inspection, repair or replacement if mutual agreements are made.

4.2 Prescription for lubrication

Recommended properties of multipurpose lubricators

These are typical lubricators for most applications with taper roller thrust bearings and taper thrust bearings. Applications with higher rotation speeds, at extraordinary temperatures, under certain environmental conditions and under high loads need special consideration.

Type of soap	Lithium 12-Stearat or similar
Texture	NLGI no.2
Basic oil	Mineral oil raffinate, viscosity class ISO VG 100 – 300
Additive	Corrosion- and oxidizing inhabitants
Viscosity of basic oil	100 cSt – 320 cSt (at 40 °C)
Viscosity index	min. 80
Pour point	max. – 10 °C

5 Proposal for a maintenance and inspection plan

The minimum requirements are part of the maintenance and inspection plan and are made for the normal use of DRALLEX-swivel. Only you are can and must create your maintenance and inspection plan in such a manner that it meets the requirements for your specific usage conditions. Contact S+S for further questions.

Maintenance and inspection plan

Inspection interval	Item	Was is to be inspected	Applicable actions
acc. to application	Safety snare of load hook	Missing of the snare, location out of centre, bend, broken spring, missing of not working spring	A defective hook safety has to be replaced immediately
daily or acc. to application	Hook, long eye, fork or straps	Accessories as hooks, eyelets and fitting parts on ropes, chains and hoists that are to be withdrawn <ul style="list-style-type: none"> - Mechanical damages by pinches, notches, cracks - Deformations by bending, twisting or pressing See BGR500 chapter 2.8 and BGI 556 (formerly ZH 1/103 a) item 23. Abrasion, withdrawal from service and control before usage	Hints for overload. Swivel to be removed from usage and replaced. Any suspicion of cracks, breakages and another defects need a further inspection and, if necessary, replacement of defective parts. The prescriptions of governmental safety organization for inspections (x-ray, ultrasound, surface crack testing and other qualified methods) are to be kept (see 3 i) Hook = Y-measuring point (acc. to DIN 15401) appendix 1 sheet 11 Long eye, forks or straps = deformations appendix 2 sheet 12
→ 14 days continuous operation → 30 days undisturbed operation	Swivel	Clearance or a gap of more than 1.5 mm (1/16") in axial direction Uneven run Long eye or fork-bearing, bend pins Abrasion at diameter of long/round eyes Appendix 1 sheet 11 see BGI 556 (formerly ZH 1/103 a)	Swivel immediately to be removed from service Defective roller thrust bearings changed Signs for overload, remove swivel immediately from service and change defective parts.

6 Return of DRALLEX-swivel

Swivels are only allowed to be return for credit if a written allowance has been given. Freight charges are to be paid by the sender. For unused DRALLEX-swivel, we charge 20% of sales price for re-storage and re-conditioning.

7 Defects and guarantee

S+S guarantees original purchasers that if a swivel is determined to be defective during guaranteed period and normal usage to repair, refund or replace the swivel according to own measures.

Guarantees are restraint as follows:

- The purchaser has to pay for transport expenses if swivel are returned to S+S
- The guarantee does not apply for a swivel involved in an accident, which was neglectful cared for, was changed, was not used in accordance with the prescriptions, was overloaded or has not been maintained according to the recommended maintenance and inspection plans
- The guarantee does not apply for DRALLEX-swivel whose restrictions and inspections with governmental safety organizations were not met
- S+S is not responsible for freight cost, transportation cost, time delays, physical defects, damages of capital and mediate and immediate damages caused by the product or its repair
- Every claim from this guarantee has to be made within one year after supply of product
- Furthermore, our General Terms & Conditions are valid

8 Extractions from legal texts, prescriptions, regulations from the preventions of industrial accidents, BG-principles and standards

Legal texts, prescriptions

- machine directive 2006/42/EG
- equipment and product safety act (GSPG)
- Employment protection act
- Machine safety prescription
- Ordinance on Industrial Safety and Health
- Directive concerning the personal protective equipment

Remark

Remarks for those who need further information find under **www.bgbau-medien.de** the website of the governmental safety organization

Regulations for the prevention of industrial accidents

- BGV A1
- BGV D6
- BGV D8
- BGR 500 chapter 2.8

- Regulations and information from governmental safety organization

- BGR A1,
- BGR 150
- BGR 151
- BGR 152
- BGR 189
- BGR 191
- BGR 193
- BGR 194
- BGR 195
- BGR 198
- BGR 500
- BGI 622
- BGI 873

DIN standards

- DIN EN 1677, parts 1 and 2
- DIN 7540
- DIN 7541
- DIN 15 106
- DIN 15 003
- DIN 15 400
- DIN 15 401-1
- DIN 15 401-2
- DIN 15 402-1
- DIN 15 402-2
- DIN 15 404 T1
- DIN 15 405 part 1
- DIN 15 428
- DIN 82 003
- DIN 82 017
- DIN 15 003
- DIN 5691

Appendix 1

Singular hook DIN 15401

Definition of measuring section Y (according to DIN 15401)

Measuring section Y	
Singular hook No.	Y
1	70
1.6	80
2.5	90
4	105
5	115
6	130
8	145
10	160
12	180
16	200

<p>Remark: For singular hooks up to including No. 5 the measuring section Y is made by grainage in hook horn and onto the horn shaft.</p>	<p>The drawing shows a side view of a hook with a measuring section Y indicated by a double-headed arrow. Section A-B is marked with dashed lines. A detail view below shows the hook tip with a diameter of $\phi 6$ and a radius of r_2. The text 'Kennzeichnung der Meßstrecke Y' points to the measuring section, and 'Schnitt A - B' labels the section line.</p>
<p>Singular hooks of all forms starting with No. 6 include a pressed cylindrical pin made of non-rusting steel only in the hook horn.</p>	

Hooks are ready for withdrawal when:

- Hooks are opened more than 10%. **10% may be not much, yet dangerous!**
- Opened or abraded crane hooks. Beginning cracks, especially within shaft, neck, thread or opening.
- Abrasion of hook opening of more than 5%.
- Deformation of hook opening.

Appendix 2

DK 621.86.061 : 621.861/.866 : 629.12 DEUTSCHE NORMEN	Februar 1972
Ladegeschirr Zubehör und Beschlagteile Technische Lieferbedingungen	

6. Prüfung

Genormte Teile müssen in allen Einzelheiten den jeweiligen Maßnormen entsprechen.

6.1. Prüfung für den Schiffbau

6.1.1. Prüfvorschriften

Alle Teile, die im Schiffbau verwendet werden, müssen nach den Vorschriften der zuständigen Überwachungsstelle ¹⁾ geprüft werden (siehe z. B. die „Grundsätze für die Ausführung und Prüfung von Ladegeschirren“ des Germanischen Lloyd, Abschnitt „Prüfung des Ladegeschirrs“). Hierzu gehören Werkstoffprüfungen und Belastungsprüfungen für Bauteile, die Zugbeanspruchungen unterliegen.

6.1.2. Prüfkraft für Ladegeschirr-Einzelteile

Die angegebenen Prüfkraftwerte gelten nur für Zugglieder wie Schäkel, Ladehaken und -wirbel, Ketten und Ringe, Seilhülsen, Spannschrauben und Kreuzkloben.

Nenngröße ⁵⁾	Prüfkraft kN	Nenngröße ⁵⁾	Prüfkraft kN
0,16	3,2	12	250
0,25	5	16	320
0,4	8	20	400
0,6	12,5	25	500
1	20	32	600
1,6	32	40	700
2	40	50	850
2,5	50	63	1000
3	63	80	1200
4	80	100	1450
5	100	125	1700
6	125	160	2150
8	160	200	2700
10	200	250	3300

6.2. Prüfung für andere Anwendungsbereiche

Für die Prüfung sind, soweit vorhanden, die einschlägigen Vorschriften zu beachten. Bei Bestellung muß gegebenenfalls auf die jeweiligen Vorschriften hingewiesen werden.

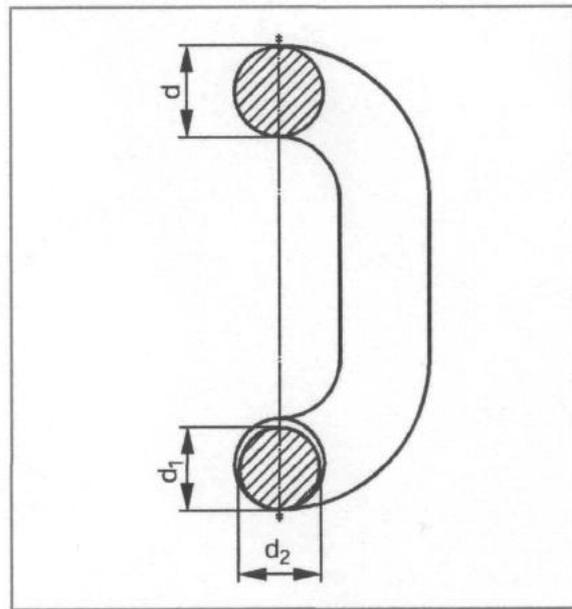
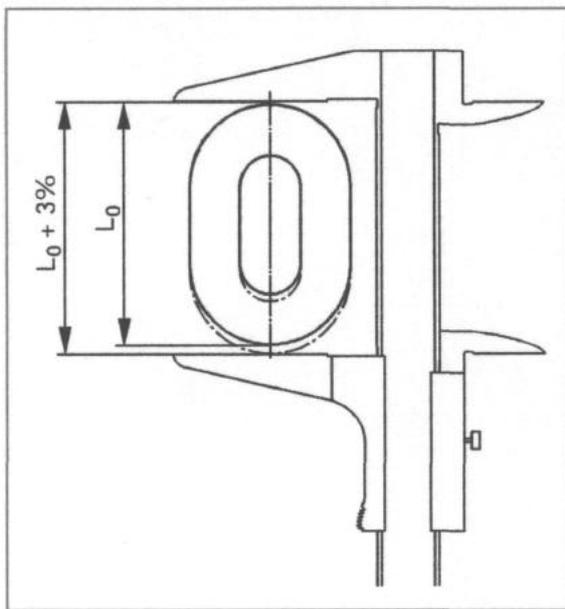
Appendix 3

BGI 556 /formerly ZH 1/103 a) hanger-on

Item 23 Abrasion, withdrawal and control before usage

Chains and straps, long eyes, transfer links used with DRALLEX-swivel are to be withdrawn when:

- Mechanical damages by pinches, notches, cracks
- Deformations by bending, twisting or pressing
- Elongation by overload: connected parts are elongated with 5% and more
- Abrasion: decrease of the diameter at any position of more than 10%



DRALLEX-swivel are to be withdrawn if connected parts are elongated by 3%. This complies with an inner elongation of 5%.

DRALLEX-swivel are to be withdrawn if the middle diameter d_m is at any position reduced by 10% or more.

Pins in forks or fork-head-hooks are equally determined. They have to be replaced latest after 3 years.

Appendix 4

Disassembly and assembly of DRALLEX-swivel → see attached picture sequence

1. Disassembly of outer locking devices

Outer locking devices (2) namely pins with interior threads prevents that top and socket loosen.

- abrasion of grainage at pin locating holes
- screw with head (hexagon or round head) inserted into securing pin and securing pin to be pulled out of the bearing
- remove top and socket

2. Disassembly of inner securing

The interior locking (1) namely pin with interior thread prevents that the movable part and the attached nut can disconnect

- remove grease until nut is visible
- remove grain points by drilling
- remove safety pin as mentioned under 1
- disassemble nut and movable part from the socket

3. Cleaning of parts

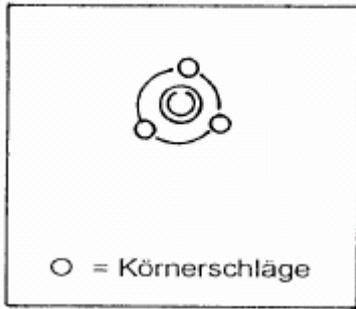
4. Inspection and maintenance

- test grease fitting and ducts for permeance
- test taper roller bearings for performance and damages
- test jointing between socket and movable part
- replace damaged parts
- Attention: fill excavations only to 50% with grease

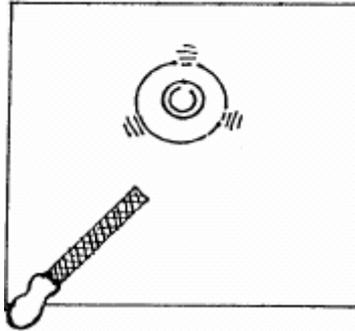
5. Assembly in converse order

- test performance of movable part before grainage of interior locking
- use elastic sealant (recommended: Hylomar) between socket and top
- fit in outer locking and secure against twisting with 3 grain points

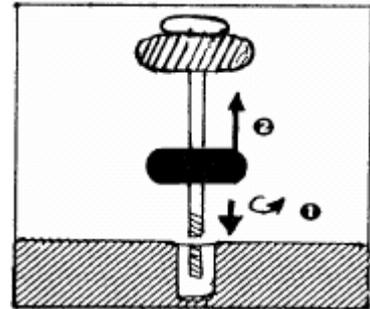
Picture Sequence for appendix 4: Disassembly of DRALLEX-swivel



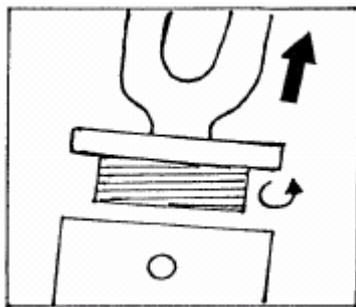
Outer lockings on swivel socket



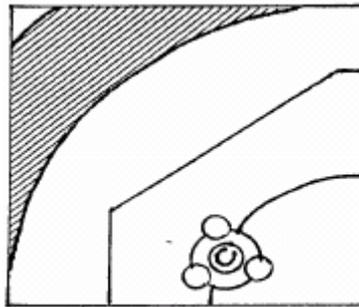
Abrasion of grains



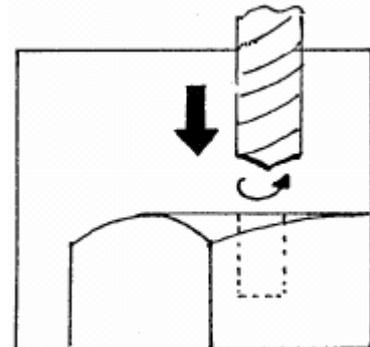
Put screw or threaded pin into locking (1)
Move loose handle against head and pull locking out (2)



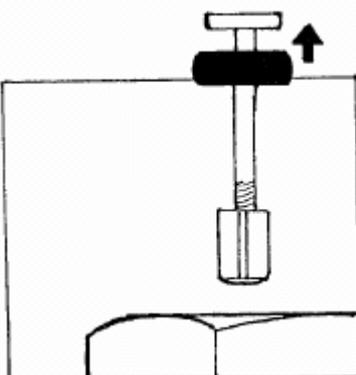
Remove top



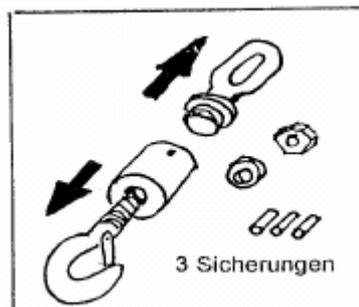
Expose interior locking



Remove grains with drill



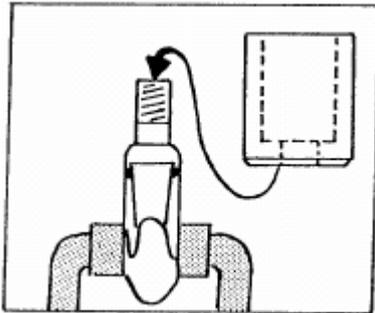
Pull locking out



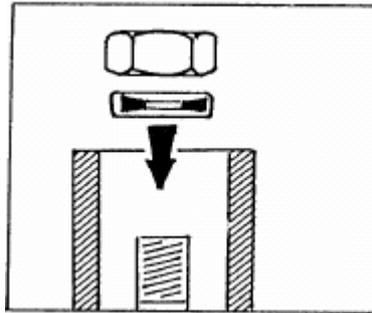
Disassembly and cleaning of parts
3 Sicherungen



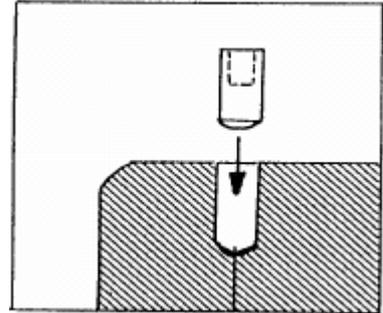
Picture sequence for appendix 4: Assembly of DRALLEX-swivel



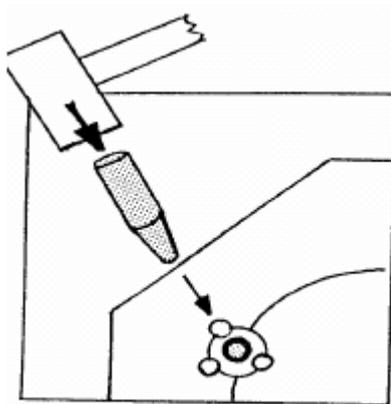
Assemble socket and movable part



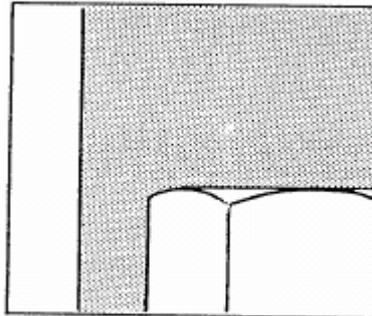
Insert taper roller thrust bearings, assemble nut



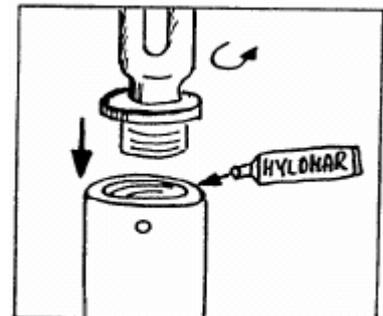
Insert locking pin into bearing between nut and movable part



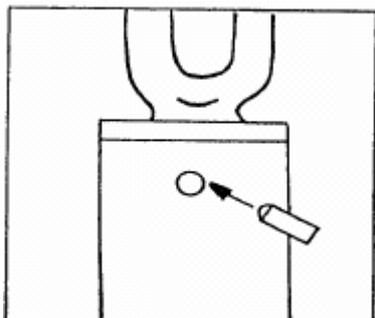
Grain pin



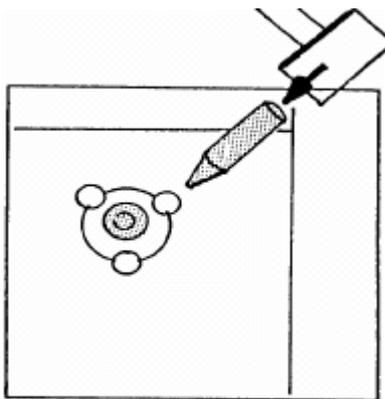
Fill interior of socket with grease



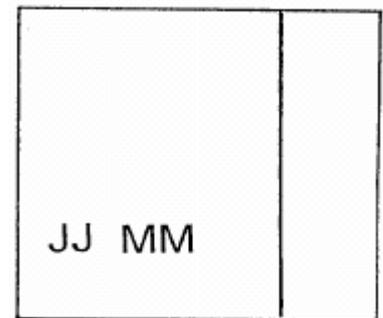
Assemble top and seal top (Hylomar)



Insert locking pin



Secure locking pin with 3 grains



Insert inspection date into socket