

HILTI

OneStep rock anchor

Bedienungsanleitung

de

Operating instructions

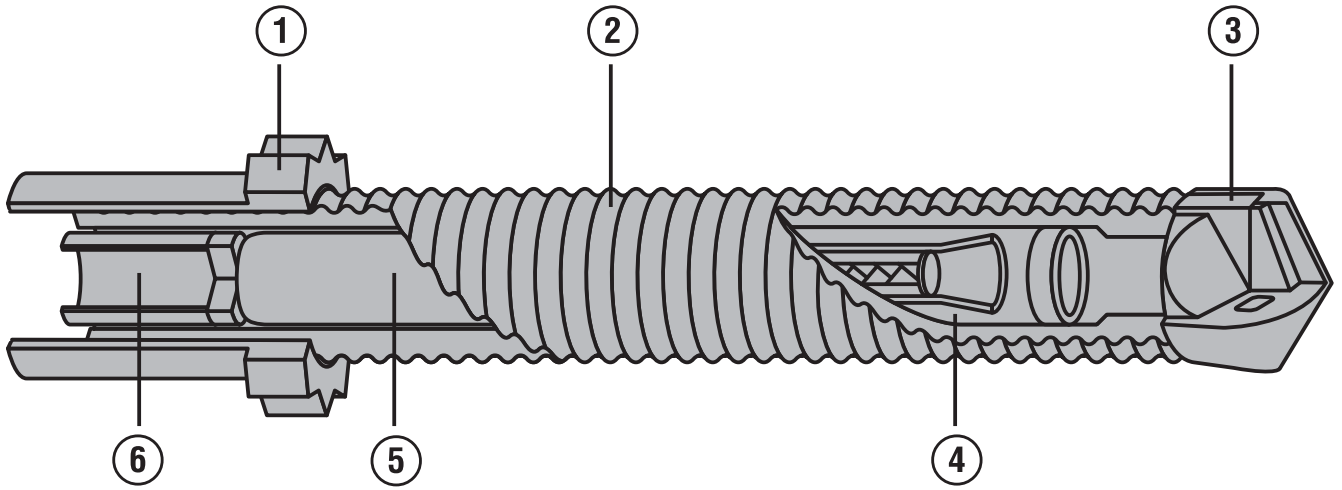
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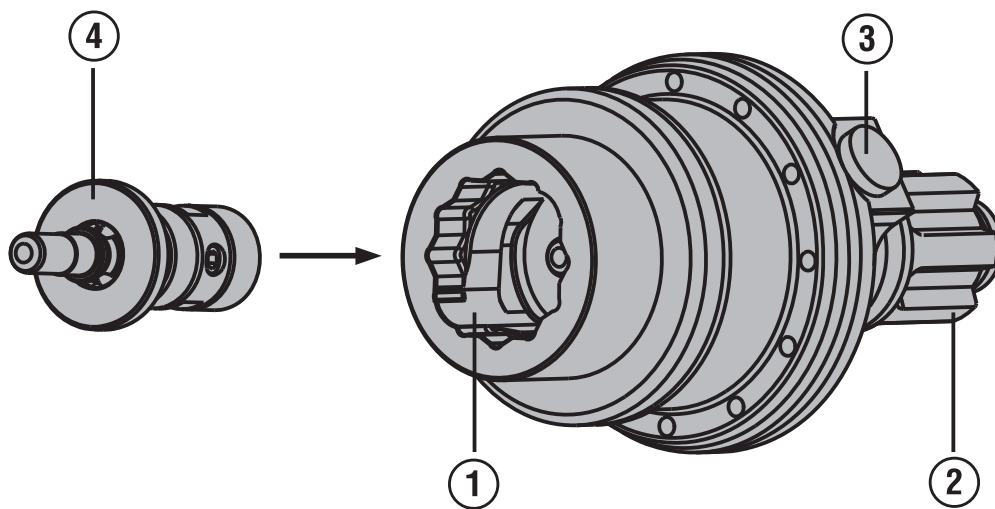
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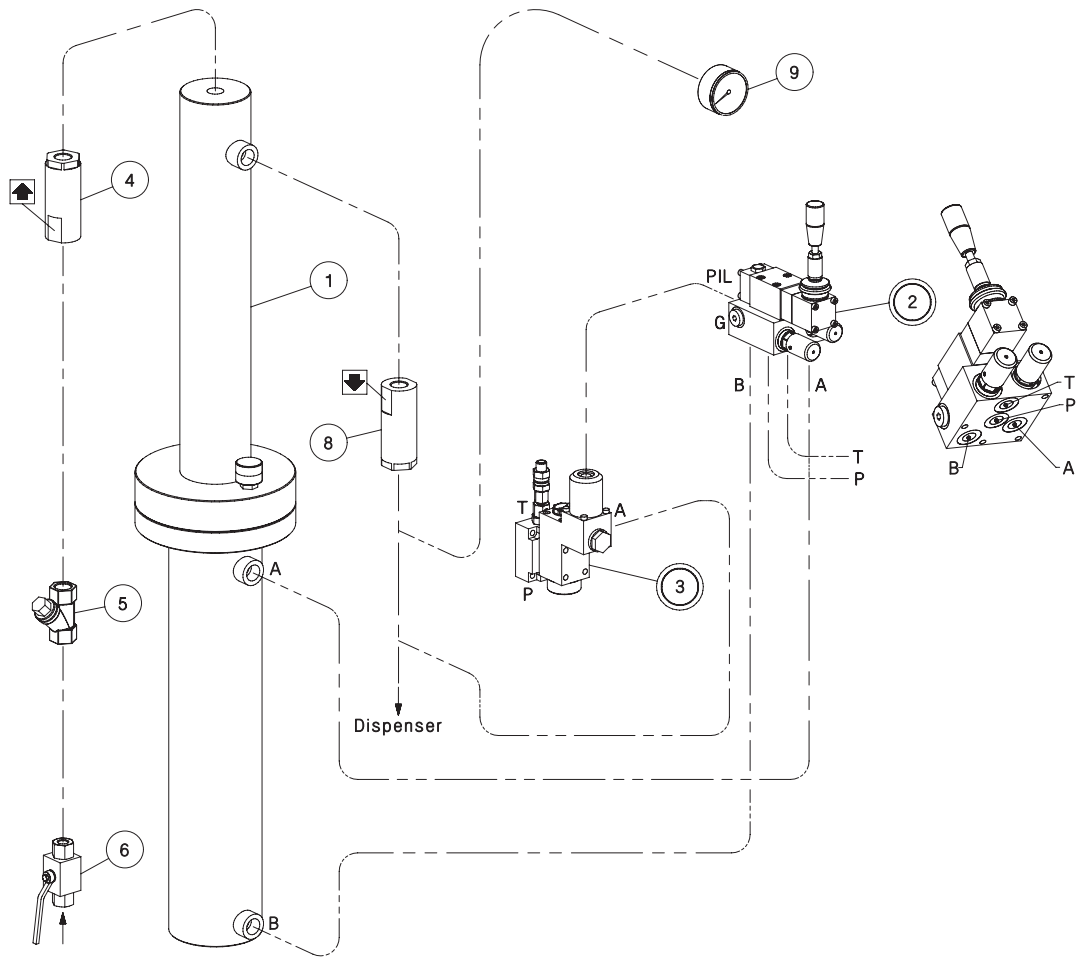
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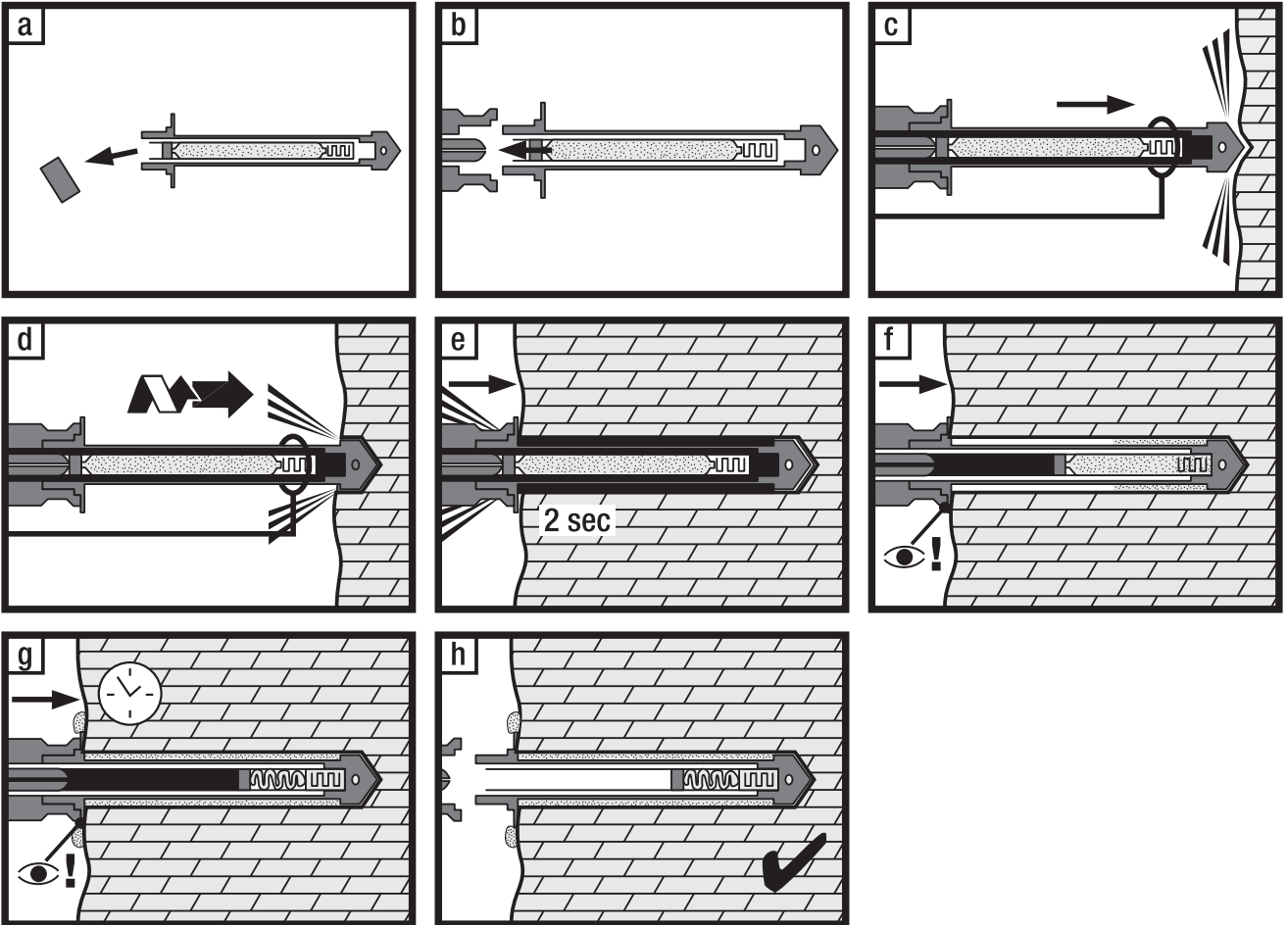
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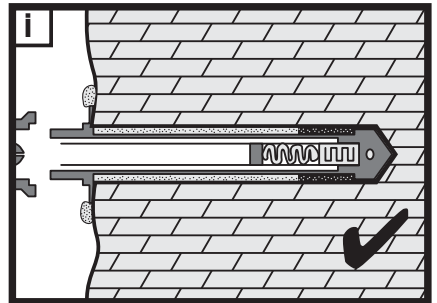
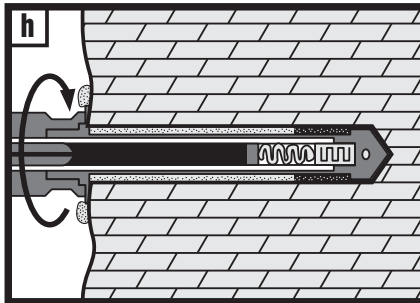
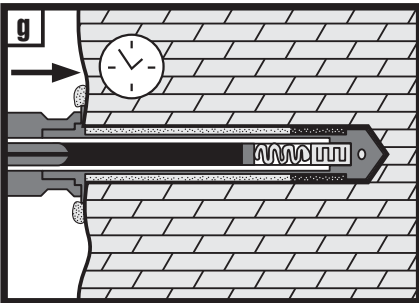
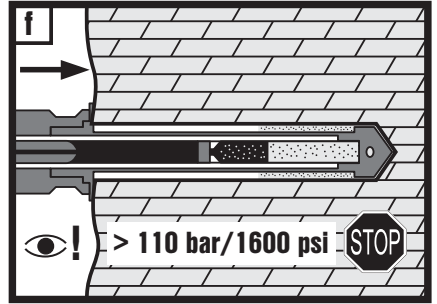
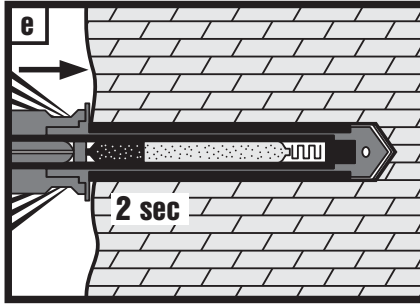
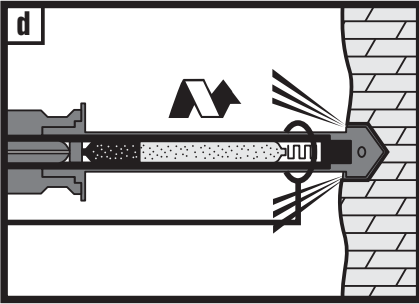
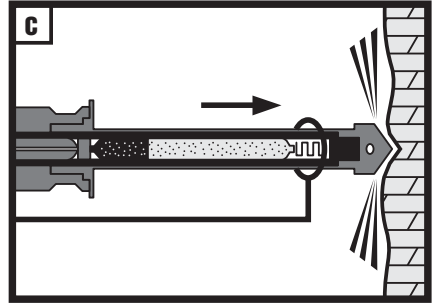
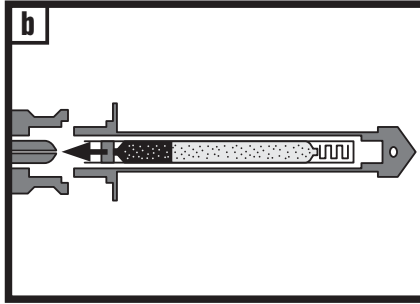
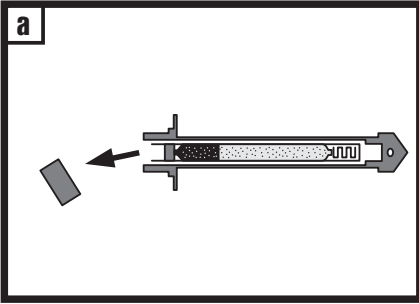


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4





HOS rock anchor system

It is essential that the operating instructions are read before initiation of the system.

Always keep these operating instructions with the OneStep system.

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1. General Information

1.1 Safety notices and their meaning

-CAUTION-

This word draws attention to a potentially dangerous situation that could lead to minor personal injury or damage to the equipment or other property.

-NOTE-

This word draws attention to instructions and other useful information.

1.2 Pictograms

Warning signs



General warning



Warning: avoid hand injuries



Warning! Falling objects

Obligation signs



Wear eye protection



Wear a hard hat



Wear ear protection



Wear protective gloves



Wear safety boots

Approvals for the HOS rock anchor



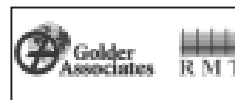
MSHA



DMT



Bezirksregierung Arnsberg



RMT

1.3 Other information

In these operating instructions, the designation “the system” always refers to the HOS rock anchor system.

1 These numbers refer to the corresponding illustrations. The illustrations can be found on the fold-out cover-pages. Keep these pages open while studying the operating instructions.

(#1) These numbers refer to the corresponding valves shown in the flow diagram on illustration **3** on the cover-page.

2. Description

2.1 Components

The Hilti OneStep rock anchor system consists of 3 main components which are necessary for drilling the anchor and injecting the mortar contained within the anchor:

1. Rock anchor (HOS) 1

- 12-pointed nut (Single piece nut with standard anchor, two piece nut with pretension anchor)
- Anchor-tube (HOS-W: steel; HOS-C: fiber)
- Drill-head
- Flushing-water channel
- Mortar
- Centre ring

2. Dispenser 2

(illustration Type B; the described parts are also available in dispenser of Type A)

- 12-pointed chuck
- Connection end (hydraulic-motor); according to appendix 8 different designs are available
- Water connection (dispensing water)
- Inner component

3. Intensifier circuit 3

- Cylinder
- Control Valve
- Pressure Relief Valve
- Non Return Valve 5 bar
- Dirt trap (filter)
- Ball cock
- Non Return Valve 20 bar
- Manometer 0–250 bar

2.2 Use of the product as directed

-CAUTION-

In addition to the safety rules listed in the individual sections of these operating instructions, the following points must be strictly observed at all times.

The system is designed for drilling with the Hilti rock anchor HOS and for injecting the contained mortar.

When assembling and using the dispensing unit the national standards are to be followed, the minimum requirements are as defined in DIN EN ISO 4413.

It is permissible to use in environments where there is a risk of explosion. The appliance complies with the provisions and requirements of 94/9/EC (ATEX) for: **Group I** category M2 → Mining and explosive atmospheres (firedamp)



Changes or modifications to the system are not permissible. To avoid the risk of injury, use only genuine Hilti accessories and ancillary equipment. Observe the information printed in the operating instructions concerning operation, care and maintenance.

The system and its ancillary equipment may present hazards when used incorrectly by untrained personnel or not as directed.

3. Technical Data and required media

Technical specification of the rock anchor HOS-W

| | |
|--|--|
| Tubular shaft diameter | 38.5 mm (1½ inch) |
| Lengths | 120–250 cm (47¼ – 98⅓ inch) (see appendix 1) |
| Ultimate load | ≥ 320 kN |
| Yield strength | ≥ 270 kN |
| Elongation at break | ≥ 10 % |
| Chemical mortar | 2-component polyester mortar |
| Drilling method | Clockwise rotating, wet |
| Pretensioning method (only for HOS-W type) | Anticlockwise rotating |
| Drill head | Roof-shaped cutting edge |
| Diameter at cutting edge | 40.5 mm |

Technical specification of the rock anchor HOS-C

| | |
|------------------------|--|
| Tubular shaft diameter | 38.0 mm (1½ inch) |
| Lengths | 120–250 cm (47¼ – 98⅓ inch) (see appendix 1) |
| Ultimate load | ≥ 200 kN |
| Shear load | ≥ 50 kN |
| Nut pull-off | ≥ 100 kN |

| | |
|--------------------------|------------------------------|
| Chemical mortar | 2-component polyester mortar |
| Drilling head | Roof-shaped cutting edge |
| Diameter at cutting edge | 40.5 mm |

Dispenser

| | | | |
|----------------------------------|--|---------------------|--|
| Connection ends | Different types of connection ends available → appendix 8 | | |
| Weight | depending on type and length | → appendix 8 | |
| Length | depending on type and length | → appendix 8 | |
| Speed of rotation | max. 1000 r.p.m. | | |
| Torque transfer | max. 800 Nm | | |
| Contact pressure during drilling | max. 20 kN (HOS-W) ; max. 10 kN (HOS-C) | | |

Cylinder

| | |
|-------------------|---|
| Weight | 42 kg (93 lb) |
| Length | 1022 mm (40 ¹ / ₄ inch) |
| Max. water volume | 1.38 l (0,36 US-gal) |
| Pressure ratio | 1:1.65 |

Hoses

| | Nominal pressure | | Nominal Diameter | |
|-------------|------------------|--------|------------------|------|
| | bar | PSI | mm | inch |
| Oil hoses | ≥ 350 | ≥ 5075 | 6 | 1/4" |
| Water hoses | ≥ 350 | ≥ 5075 | 6 | 1/4" |

Required media

| | Pressure | | Flow-rate | |
|-----------------------|----------|-----------|-----------|------------|
| | bar | PSI | l/min | US-gal/min |
| Oil | 80–200 | 1160–2900 | 8–20 | 2.1–5.3 |
| Flushing-water * / ** | 15–25 | 218–362 | 30–50 | 7.9–13.2 |
| Dispensing-water * | 15–25 | 218–362 | > 5 | > 1.3 |

* Filtered water (200 µm); water temperature < 40°C/104°F

** Flushing-water pressure measured at the drill-motor

Valves (#1) – (#9)

Use only genuine Hilti spare parts as given in **3** and in appendix 7.

Regulator HOS (Pressure Compensator), Appendix 7/3

Maximum pressure: 350 bar / 5075 PSI
 Maximum flow-rate: 240 l/min / 63 US-gal/min
 Differential pressure: 14 bar / 200 PSI

Right of technical changes reserved

-NOTE-

The valves used in the oil hydraulic circuit are designed for use with liquids of the following specification

Hydraulic parameters

| | |
|---------------------------------|--|
| Pressurized liquid | Mineral oil, other liquids upon request |
| Maximum allowable contamination | ISO 4406:1999, Class 20/18/14 (recommended filter size 10...16 ≥ 75) See data sheet 1.0-50/2 |
| Viscosity range | 12mm ² /s – 320 mm ² /s |
| Liquid temperature | –20 to +70°C |

4. Safety rules – general

4.1 Proper arrangement and organization of the workplace

- Wear non-slip boots and always work from a secure stance.
- Wear Personal Protective Equipment (PPE) while working.
- Do not wear loose clothing, loose long hair and jewellery, which could become caught up in moving parts.
- Avoid unfavourable body positions.
- Ensure that the workplace is well lit.
- Ensure that the workplace is well ventilated.
- Objects which could cause injury should be removed from the working area.
- Keep other persons outside the area affected while you are working.
- Take care of your tools. You will work more efficiently and more safely if tools are clean and sharp.

4.2 Handling and using the appliance with due care and attention



-CAUTION-

- The hoses are pressurized. Check the hoses at the beginning of every shift and ensure that all hoses are well positioned to avoid damage as a result of surrounding influences.
- Don't touch or hold rotating parts.
- The system is heavy. There is a risk of pinching parts of the body. Wear a hard hat, protective gloves and safety boots.
- The system emits noise. Excessive noise may damage the hearing. Wear ear protection.
- Drilling may cause hazardous splintering of the material. Splintering material may injure parts of the body and the eyes. Wear eye protection and a hard hat.
- Operate the system only as directed and only when it is in faultless condition.
- Never leave the system unsupervised.

- Use only the genuine Hilti accessories or spare parts listed in the operating instructions. The use of other equipment may present a risk of injury.
- Do not overload the system. The system operates more efficiently and more safely within its given performance range.
- Follow the instructions concerning care and maintenance.

4.3 Requirements to be met by users

- Specified maximum operating pressure:
 - max. power fluid pressure in feed-line to the Hilti system: 200 bar / 2900 PSI
- **-Note-**
 - In case the machine power fluid pressure is higher than 200 bar / 2900 PSI, a pressure reducing valve must be added in front of the Hilti system.
 - max. flushing water pressure: 25 bar / 362 PSI
- Minimum power-fluid pressure during standby of the Hilti system: 10 bar / 145 PSI to ensure the complete reset of the cylinder.
- The system is intended for professional use.
- The system may only be installed, operated, serviced and repaired by authorized and trained personnel. These personnel must be informed of any special hazards that may be encountered.
- Always concentrate on the job you are doing. Proceed carefully and do not use the system if your full attention is not on the job.
- Always follow country specific regulations, processes and safety standards

4.4 Personal protective equipment

- The user and persons in the immediate vicinity must wear suitable eye protection, a hard hat, ear protection, protective gloves and safety boots when the system is in use (in accordance with the safety regulations of the mine).



5. Installation

It is essential that safety rules printed in these operating instructions are read and observed.



Ensure the system parameters match the technical requirements of the OneStep-system.

-NOTE-

It is recommended to use the preassembled dispensing unit (see chapter 5.1.3 and Appendices 7/1 and 7/2). If the components are installed separately on the machine, when assembling and using the dispensing unit the

national standards are to be followed, the minimum requirements are as defined in DIN EN ISO 4413.

The length of the hoses has to be fitted to the required working radius. All possible movements have to be covered to avoid tearing off the hoses.

All equipment must be clean, undamaged and fully functional when installed.

-Caution-

By the connection of the dispensing unit and the injection adapter, the national standards are to be followed, the minimum requirements are as defined in DIN EN ISO 4413.

The Pressure-Reducing Valve (PR) in the Control Valve (#2) is pre-adjusted to 80 bar / 1160 PSI. Do not change this setting.

5.1 Preparation for use

5.1.1 Fitting the intensifier circuit

1. Mount the cylinder (#1) in a well-protected, easily accessible and visible location (where possible with the water reservoir higher than the oil reservoir).
2. It is proposed to clamp the Cylinder (#1) mechanically at a device as it is shown exemplary in appendix 5. You may use the open holes with M 16 inside thread in the flange. The existing screws mustn't be unscrewed.
3. Do not weld the Cylinder (#1) or the flange of the Cylinder.
4. Do not drill additional holes in the Cylinder (#1) or the flange of the Cylinder
5. Mount the Control Valve (#2) in a well-protected and easily accessible location where the operator can operate it easily and ergonomically.
6. Connect Cylinder (#1) and Control Valve (#2) at ports "A" (oil-side of Cylinder, next to the flange) and "B" (oil-side of Cylinder, outside) with a hydraulic hose.
7. Mount the Manometer (#9), that shows the pressure in the dispensing-water-line, in a well-protected and well visible location.
8. Mount the remaining components of the OneStep hydraulic system in a well protected, easily accessible and visible location.
9. Connect all components as shown in appendix 7.
10. Connect the dispensing-water-supply line with the Ball Cock (#6).
11. Connect at the Control Valve (#2)
 - the oil feed line from the motor with port "P"
 - the oil return line to the tank with port "T"
12. Use the ports for control lines at the Control Valve (#2) according to the existing pump-type (see also appendix 7):

-NOTE-

The flow diagrams shown in appendix 7 are to be known as schematic diagrams. The implementation of the Intensifier Unit and if necessary of an additional Pressure Compensator into the hydraulic complete system has to be defined on the basis of the really existing flow diagram of the machine.

- Variable pump with load sensing (appendix 7.1)
Connect the LS-port with the pump control in a way that ensures the generation of the required dispensing-pressure in the OneStep-system anytime after operating the dispensing-lever.
- Variable pump without load sensing (appendix 7.2)
Close the LS-port. Ensure that the required dispensing-pressure can be generated in the OneStep-system anytime after operating the dispensing-lever.
- Constant pump (appendix 7.3)
Pilot a Pressure Compensator over PIL-port in a way that ensures the interruption of the pressure-less cir-

ulation and the generation of the required dispensing-pressure in the OneStep-system anytime after operating the dispensing lever.

13. Ensure all fittings are tight.
14. Ensure oil and water is available anytime with adequate pressure and flow-rate (see chapter 3).
15. Bleed the hydraulic-oil circuit in accordance with the manufacturers guidelines.

5.1.2 Fitting the dispenser

1. Check the seals at the connection end of the dispenser (if worn, change seals according to existing connection end as shown in appendix 8).
2. Grease the connection end.
3. Fit the dispenser, connection end first, into the drilling motor.
4. Secure the dispenser in the drill-motor with the mounting-accessories intended for the existent drill-motor.
5. Connect the dispensing-water hose to the dispenser.
6. Secure the housing to prevent rotation as shown in appendix 4 (Caution: No rigid connection to the motor or motor carriage).
7. Dispenser Type B: Use stainless cylinder-head bolts M8 with adequate length to fix the Anti-twist device. Ensure that all screws of the dispenser are set and mounted with the specified torque (see appendix 8) after mounting the anti twist device.

5.1.3 Fitting the Mobile Intensifier Unit (MIU)

Connect the in appendix 7/1 and appendix 7/2 named Mobile Intensifier Unit (MIU) as described in chapter 5.1.1 and 5.1.2 (oil-feed line, oil-return line, dispensing-water-supply line to the cylinder, dispensing-water line to dispenser, if necessary control-line).

5.1.4 HOS Feed Control (optional)

Description

The HOS Feed Control is an option to support the HOS drilling process. It controls the feed rate of the drill rig as a function of flushing water pressure. Therefore, the feed rate is automatically kept at an optimum without the need for the operator to adjust it. The HOS Feed Control System is particularly suitable for drilling strata with cohesive layers. Hydraulic circuit and part list is located in appendix 9. The standard system can be used with flushing water pressures up to $p = 22$ bars / 320 PSI.

Installation

During assembly and operation of the HOS Feed Control System all local regulations on hydraulic systems are to be considered. The DIN EN ISO 4413 is always to be taken into account as a minimum requirement.

- Switch off the machine and block the flushing water line.
- Release the pressure on all hydraulic and water lines.
- Find a suitable position for the feed control valve close to the HOS anchor. Ask for support from your Hilti Technical Support.
- Assemble the HOS Feed Control System in accordance to hydraulic circuit and part list in appendix 9.

Adjustment

The HOS Feed Control system has to be adjusted to the local flushing water conditions. This guarantees a drilling performance at its best.

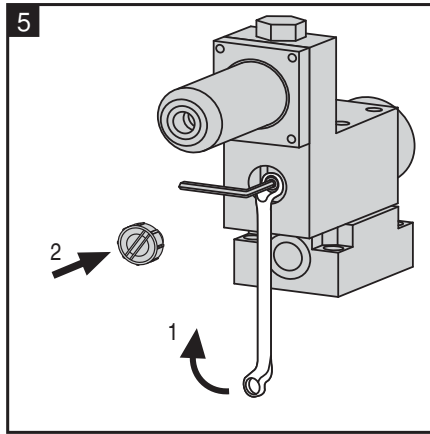
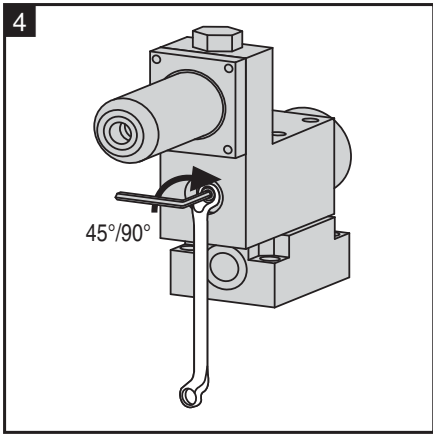
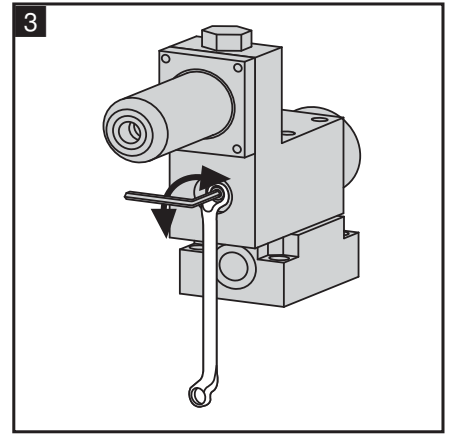
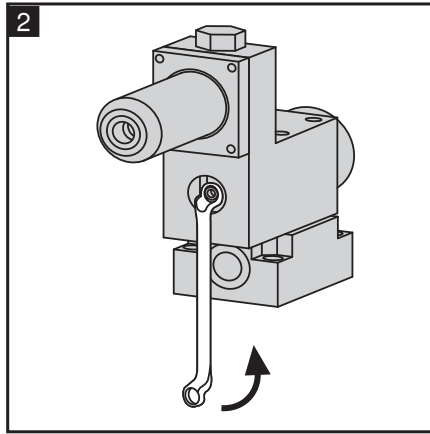
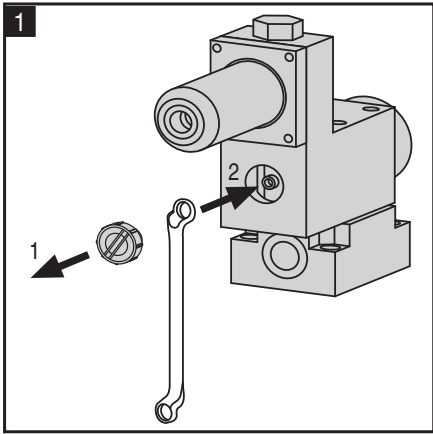
- Block the ball valve in the flushing water line (the valve actuation now has maximum static pressure).
- Remove protective cap from valve [1.1].
- Release locking screw of valve [1.2 + 2].
- Switch on flushing water supply.
- Vent system air at valve actuation (water cylinder).
- Adjust the drill rig feed rate as follows:

Step 1: Switch on feed.

Step 2: In case the drill rig moves, reduced feed by turning valve adjustment screw clockwise until carriage just stops [3].

Step 3: In case the drill rig does not move, increase feed by turning valve adjustment screw anti clockwise until drill rig just moves [3]. With a maximum flushing water pressure between 20 and 22 bars / 290 and 320 PSI you may skip step 4. The adjustment is already done here.

Step 4: With a maximum flushing water pressure below 20 bars / 290 PSI and water pressure fluctuations of $\Delta p < 2$ bars / 29 PSI turn adjustment screw [4] clockwise 45°. With water pressure fluctuations of $\Delta p > 2$ bars / 29 PSI turn adjustment screw [4] clockwise 90°. Tighten locking screw of valve carefully [5.1]. Replace protective cap [5.2]. Open ball valve in flushing water line.

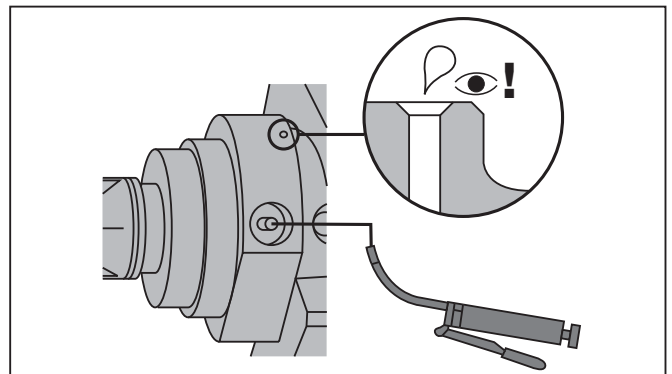


6. Before Use

6.1 Before each usage

6.1.1 General overview

- Inner component **2**: Check the contact surface of the sealing plate for signs of wear (good seal with the rock anchor). Change sealing plate, if it is worn or broken (see chapter 8.2). Ensure the inner component is properly fixed in the dispenser.
- Check 12-pointed chuck for signs of excessive wear.
- Ensure oil and water is available with adequate pressure and flow-rate (see chapter 3).
- Only dispenser type A: grease the dispenser.



6.1.2 Setting the system

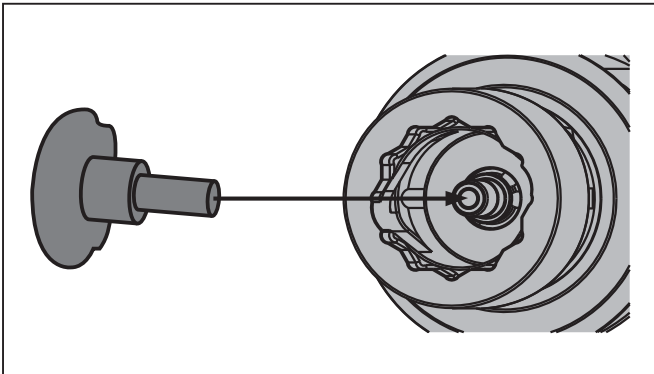
-Caution-

Water can exit the dispenser at pressure. **Keep out of the way.**

1. Ensure all hoses and valves are mounted properly and connected correctly and all fittings are tight.
2. Bleed the system (waterside)
 - Operate dispensing-lever at the control valve (#2) until dispensing water is completely drained.
 - Observe the escaping water at the dispenser during dispense:
 - If the water flow is smooth and continuous, no air will be in the system → o.k.
 - If a mixture of water and air escapes, air will be in the system
 - wait until cylinder has been completely recharged with water
 - operate dispensing-lever again
 - repeat this procedure until all air has been released (smooth and continuous water flow)
3. Set the speed of injection to the defined time
 - Operate the dispensing-lever at the control valve (#2)
 - Measure the time until the whole dispensing-water (~1.3 l) has been completely drained
 - 15 sec → o.k.
 - if dispensing time differs from 15 sec, adjust dispensing time by calibrating the Flow-Control-Valve (FC) at control valve (#2).

6.1.3 Checking for leakage and gauge functionality

- Close the injection water outlet on the dispenser with an M8 screw (e.g. starknob according to appendix 6).



- Set the system under pressure by operating the dispensing-lever at the control valve (#2) and hold the lever in the operating position.
- Ensure all fittings and hoses do not leak.
- Observe the Manometer that shows the water-pressure in the dispensing-water line 3 (#9) for proper function after leakage test. When operating the injection lever at the control valve (#2) the pressure must increase immediately to ~110 bar / 1600 PSI. This pressure will remain constantly, if all valves and seals work properly.
- Return the dispensing-lever to the basic position. Loosen the screw at the inner component of the dispenser carefully.
- Start to remove the screw slowly. Ensure the pressure is completely released before removing the screw.

6.1.4 Checking HOS Feed Control (if used)

The HOS Feed Control Valve should be adjusted to the flushing water pressure as needed, but at least once per day. If there are problems see the troubleshooting chapter 9.3.

6.2 Periodical checks

If the system is in constant use, these checks should be carried as frequently as mine conditions require, but at least once per week. If the system has been idle for a long period of time they should be made before the next usage.

6.2.1 Dirt trap (filter) (#5)

- Check the mesh
 - Clean the mesh, if silted/blocked.
 - Change the dirt trap (filter), if worn.

6.2.1 Assembly

- Ensure the anti-twist device is secure.
- Ensure the dispenser is securely connected with the drill motor.

7. Operation

It is essential that the safety rules printed in these operating instructions are read and observed. Ensure the expiry date of the anchor you want to set is not exceeded.

-NOTE-

Use only anchors that are in a proper condition (anchor tube, drill bit and 12-pointed nut) as delivered by Hilti. Ensure the anchors didn't become damaged during storage or transportation in the mine.

7.1 Operation HOS-W ISL and HOS-C 4 (pictures a–e)

7.1.1 Drilling HOS-W ISL and HOS-C

1. Remove the protective cap from the 12-pointed nut of the rock anchor.
2. Ensure flushing-water holes at dispenser and anchor (at 12-pointed-nut and drill bit) are open. Clean holes, if necessary.
3. Insert the 12-pointed-nut of the rock anchor into the 12-pointed chuck of the dispenser, until the seal at the nut-bottom gets in contact with the sealing plate of the inner component.
4. Use the anchor guide (or similar equipment) on the drilling carriage to stabilize the rock anchor whilst drilling.
5. Ensure the anchor rotates freely in the anchor guide.

6. Drilling direction: clockwise
7. Use an extension (see appendix 2) in case of uneven strata to ensure the anchor can be drilled to its complete depth.
8. Brace the drilling carriage to the strata. Bring the drill bit of the rock anchor in contact with the rock and press it to the strata (from now on do not remove the thrust until the complete setting procedure has been finished).

-NOTE-

9. Do not use excessive drill thrust that bends/breaks the anchor.
10. Start flushing water.
11. Start drilling.
12. Where required remove the anchor guide in accordance with manufacturer's guidelines and local work and safety procedures.
13. Drill anchor to its complete depth.
14. In order to prevent strong friction stop drilling and applying thrust immediately once anchor reaches its complete depth.
15. Continue flushing for approx. 2 seconds after drilling has been finished.

7.1.2 Dispensing HOS-W ISL and HOS-C 4 (pictures f-h)

1. Ensure the rock anchor is still properly engaged in the dispenser chuck.
2. Ensure the anchor is firmly pushed against the strata.
3. Operate the injection lever at the Control Valve (#2) to start dispensing.
4. Keep the lever pulled until the mortar escapes from the drilled hole. If no mortar escapes, end the injection operation when maximum injection pressure ~110 bar / 1600 PSI is shown at the Manometer in the dispensing-water line (#9).

-CAUTION-

Do not dispense any further anchors if the pressure greater than 110 bar / 1600 PSI is shown on the Manometer in the water circuit (#9). Check the functioning of the control valve (#2), and if required change the pressure reducing valve (PR) in the control valve (#2).

5. Maintain thrust until the mortar has set. The length of the waiting time depends on the surrounding temperature and the flushing-water temperature, but lasts at least 15 sec.
6. Retract the drilling motor to its original position.

-NOTE-

Observe also the safety precautions listed in the MSDS material safety data sheet (see also training documents).

7.2 Operation Pretension HOS

7.2.1 Drilling (Pretension HOS) 5 (pictures a-e)

1. Remove the protective cap from the 12-pointed nut of the rock anchor.
2. Ensure flushing-water holes at dispenser and anchor (at 12-pointed-nut and drill bit) are open. Clean holes, if necessary.
3. Insert the 12-pointed-nut of the rock anchor into the 12-pointed chuck of the dispenser, until the seal at

the nut-bottom gets in contact with the sealing plate of the inner component.

4. Use the anchor guide (or similar equipment) on the drilling carriage to stabilize the rock anchor whilst drilling.
5. Ensure the anchor rotates freely in the anchor guide.
6. Drilling direction: clockwise
7. Use an extension (see appendix 2) in case of uneven strata to ensure the anchor can be drilled to its complete depth.
8. Brace the drill rig to the strata. Bring the drill bit of the rock anchor in contact with the rock and press it to the strata (from now on do not remove the thrust until the complete setting procedure has been finished).

-NOTE-

9. Do not use excessive drill thrust that bends/breaks the anchor.
10. Start flushing water.
11. Start drilling.
12. Where required remove the anchor guide in accordance with manufacturer's guidelines and local work and safety procedures.
13. Drill anchor to its complete depth.
14. In order to prevent strong friction stop drilling and applying thrust immediately once anchor reaches its complete depth.
15. Continue flushing for approx. 2 seconds after drilling has been finished.

7.2.2 Dispensing and tensioning (Pretension HOS) 5 (pictures f-i)

1. Ensure the rock anchor is still properly engaged in the dispenser chuck.
2. Ensure the anchor is firmly pushed against the strata.
3. Operate the injection lever at the Control Valve (#2) to start dispensing.
4. Operate the injection lever until the maximum pressure of ~110 bar / 1600 psi is shown on the Manometer in the water circuit (#9).
5. Maintain thrust until the fast resin is has set. The length of the waiting time depends on the surrounding temperature and the flushing-water temperature. Wait 3 to 10 seconds before tensioning the rock anchor.
6. Rotate the drill motor anti-clockwise to tension the anchor.

-NOTE-

For consistent pretension in the rock anchor, check the torque level of the drill motor regularly.

7.3 Consequences of improper setting

-NOTE-

If one of the following cases occurs during injection or setting of the mortar the full load capacity of the anchor cannot be ensured:

- Power failure (dispensing incomplete)
- Drill-rig thrust removed (potential move of the anchor in the underground and hence potential damage of chemical bond)
- Rotation of the anchor (potential damage of chemical bond)
- Interruption of dispensing (dispensing incomplete)

-CAUTION-

If the anchor is not properly installed or damaged in any way:

- Ensure the anchor can not cause any damage or harm. If required, remove and dispose the anchor.
- If required set a new anchor

8. Maintenance

-NOTE-

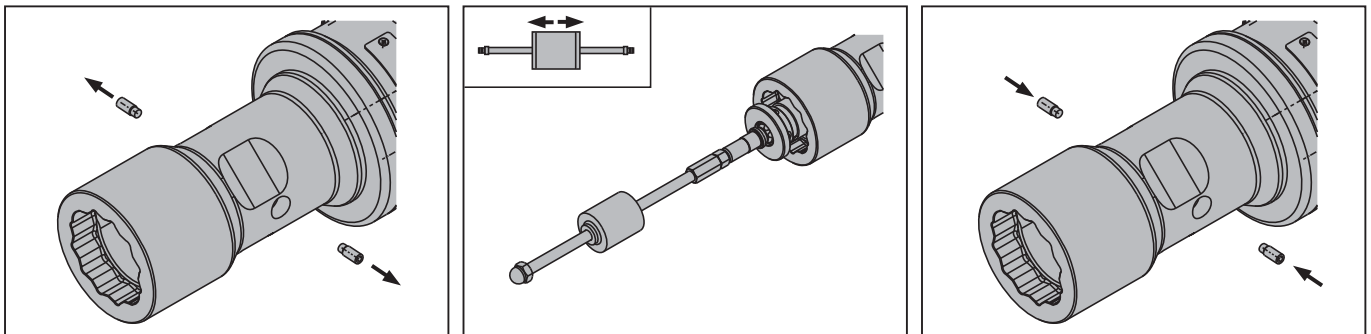
The following described activities are to be done in case of need.

The required spare parts and repair tools are listed in appendix 6 and concerning to the type of dispenser in appendix 8.

en

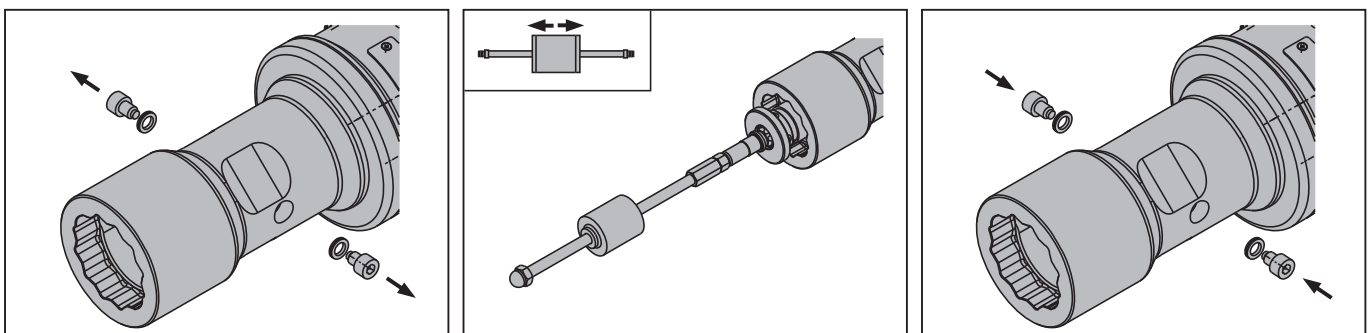
8.1 Replacement of the inner component

8.1.1 Dispenser Type A



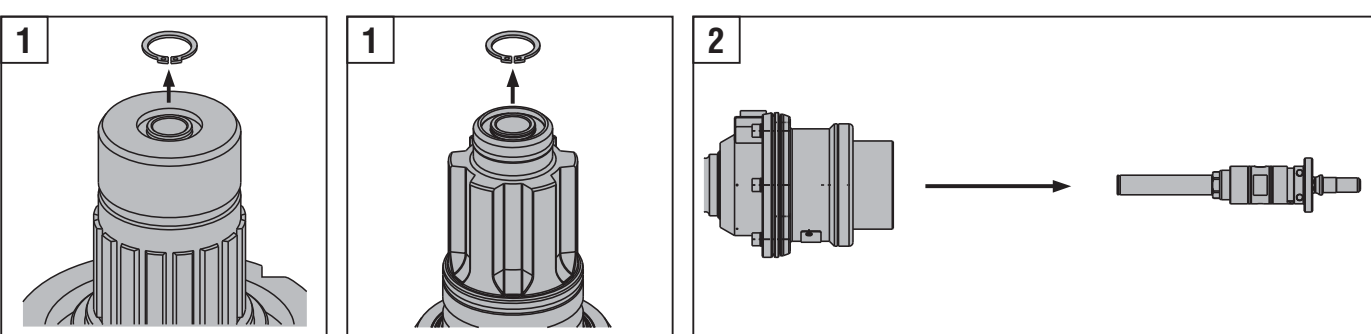
- Release the threaded pins with an Allen key (4 mm).
- Screw the extractor into the inner component.
- Pull out the inner component.
- Insert and position a new, lightly greased inner component.
- Secure the inner component with new threaded pins (secure screws with Nord-Lock® washers).

8.1.2 Dispenser Type B (short inner component)



- Release the cylinder cap screws and retaining-washers with an Allen key (6 mm)
- Screw the extractor into the inner component.
- Pull out the inner component.
- Insert and position a new, lightly greased inner component.
- Secure the inner component with new cap screws and Nord-Lock® washers.

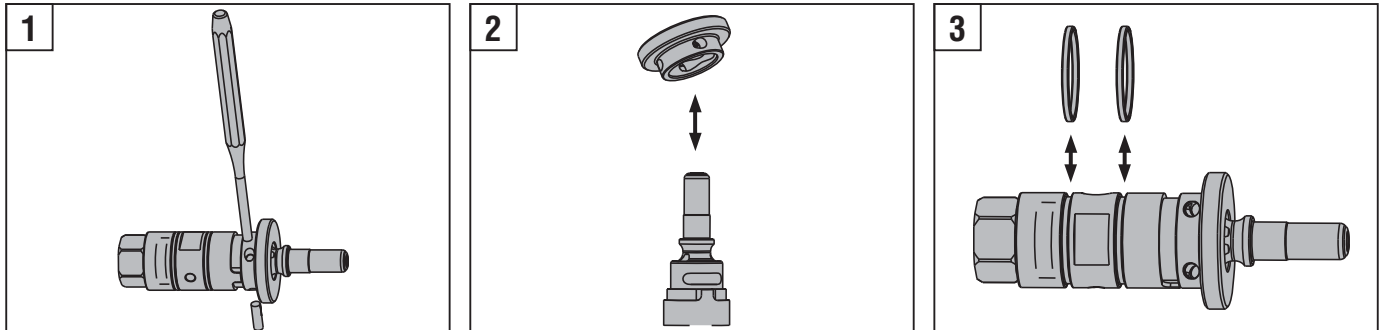
8.1.3 Dispenser Type B (long inner component)



- Screw the extractor into the inner component.
- Release the circlip (fig 1)
- Pull out the inner component (fig 2)
- Insert and position a new, lightly greased inner component.
- Secure the inner component with a circlip.

8.2 Maintenance of the inner component

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- Use a hammer and pin punch to drive out both slotted pins (fig 1).
- Remove worn sealing plate / fit new sealing plate (fig 2).
- Drive in slotted pins to secure sealing plate.
- Fit new O-rings (fig 3).
- Ensure the flushing-water holes are open.
- Check the non-return valves for smoothness of operation. Do this by pressing the base of the housing of the non-return valve with a pin or rod.

8.3 Replacement of the seals at the connection end

The seals at the drilling-motor interface differ between the various types of connection ends. The different work steps, seal-types and tools are shown in appendix 8 according to the existing type of dispenser.

9. Troubleshooting

9.1 Troubleshooting HOS rock anchor (all types) und dispensing system

Problem: No dispensing / bolt encapsulation incomplete

→ Manometer in dispensing-water-line (#9):

no / insufficient pressure increase after 15 sec

- Anchor not pressed to the strata?
- Leakage in the system / dispenser? → check according to chapter 6.1.3
- System-inlet pressure < 80 bar / 1160 PSI after operating the dispensing lever (#2)?
- No / insufficient dispensing water supply?
- Non-Return Valve 5 bar (#4) doesn't close?
- Air in system? → bleed system according to chapter 6.1.2
- Control Valve (#2) defect (no flow through)?
- Dispensing-time too long (>> 15 sec)? → check according to chapter 6.1.2
- Seals in Cylinder (oil-side) worn?
- Centre-ring at anchor broken?

→ Manometer in dispensing-water-line (#9):

Pressure increase to ~110 bar / 1600 PSI

At the end of dispensing process → mortar completely dispensed

- Broken ground / excavations in the underground?

Immediately after lever operation → blockage in system

- Flushing holes at drill bit blocked?
- Dispensing-water holes at inner component blocked?
- Hoses blocked/squeezed?
- Valve blocked?

Suddenly during dispensing (dispensing time shorter than usual)
→ dispensing process interrupted

- Mortar cured too quickly?
→ storage-, flushing water- or underground-temperature too high?
- Annular gap clogged?
- Hoses blocked/squeezed?

Problem: Water continually leaking from pressure relief valve (#3)

- Non return valve 20 bar (#8) blocked/broken?
- Supply water pressure to the cylinder too high?
→ Reduce water pressure or correct the opening resistance of the non return valve (to be discussed with Hilti technician)

Problem: No flushing water during drilling

Flushing water holes at inner component clogged?

→ Remove inner component (see chapter 8) and clean holes

Flushing water holes at drill bit clogged?

→ Clean holes at drill bit

Problem: Escaping flushing water between 12-pointed-nut und 12-pointed-chuck

Rock-anchor not properly engaged in the chuck?

→ Insert anchor completely into the chuck

Sealing plate at inner component worn/broken?

→ Change sealing plate (see chapter 8.2)

Missing seal at nut-bottom?

→ Insert seal or change nut

Problem: Escaping flushing water between motor and dispenser

Seals at the connection end of the dispenser worn?

→ Change seals according to appendix 8

9.2 Trouble shooting pretension HOS

Problem: During drilling the nut runs out of the dispenser

Is the direction of rotation correct?

→ Correct rotation direction controls

Problem: During tensioning the nut doesn't run out of the dispenser

Is the direction of rotation correct?

→ Correct rotation direction controls

Problem: Anchor doesn't rotate during drilling

Pretension nut run forwards on the anchor?

→ Screw the nut back in position

9.3 Trouble shooting Option HOS Feed Control System

With installation and operation of the HOS Feed Control System the local regulations are to be taken into account. The guideline DIN EN ISO 4413 is always to be considered as a minimum requirement.

Problem: Clogging of bolt = no function of HOS Feed Control Systems

Air in valve actuation (water line)

→ Vent air at actuation and repeat valve adjustment according chapter 5.1.4

No or not sufficient flushing water to bolt

→ Ref. chapter 9.1 Trouble shooting HOS bolt

Valve adjustment screw out of adjustment

→ Repeat valve adjustment according chapter 5.1.4

Water leakage out of protective cap

→ Replacement of FC valve

Problem: Carriage feed too slow

Pressure of flushing water above selected control pressure range

→ Repeat valve adjustment according chapter 5.1.4

Problem with hydraulic power supply

→ Check hydraulic power supply by qualified staff

Valve damaged

→ Replacement of FC valve

Problem: No carriage feed

Pressure of flushing water above selected control pressure range

→ Repeat valve adjustment according chapter 5.1.4

Hydraulic hoses or system components not properly connected

→ Check hydraulic system by qualified staff

Efficient power supply or problem with hydraulic power supply

→ Check hydraulic system by qualified staff

Valve damaged

→ Replacement of FC valve

Problem: No retraction of carriage

Check valve inside FC valve blocked

→ Replacement of FC valve

→ Repeat valve adjustment according chapter 5.1.4

10. Storage and transportation

See the actual Material Safety Data Sheet concerning storage and transportation.

11. Accessories, spare parts & repair tools

- | | | | |
|--|-----------------------------|----------------|--------------|
| • Coupling nut | → appendix 2 | • Feed Control | → appendix 9 |
| • Extensions | → appendix 2 | | |
| • Drill- and setting-adapters | → appendix 3 | | |
| • Spare parts hydraulic circuit | → appendix 7 | | |
| • Spare parts & repair tools dispenser | → appendix 6 and appendix 8 | | |

12. Disposal

See the actual Material Safety Data Sheet concerning disposal.

-CAUTION-

Improper disposal of the equipment may have serious consequences: The burning of plastic components generates toxic fumes which may present a health hazard.



Most of the materials from which Hilti tools or appliances are manufactured can be recycled. The materials must be correctly separated before they can be recycled. In many countries, Hilti has already made arrangements for taking back old tools and appliances for recycling. Ask Hilti customer service or your Hilti representative for further information.

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13. Manufacturer's warranty – tools

Hilti warrants that the tool supplied is free of defects in material and workmanship. This warranty is valid so long as the tool is operated and handled correctly, cleaned and serviced properly and in accordance with the Hilti Operating Instructions, and the technical system is maintained. This means that only original Hilti consumables, components and spare parts may be used in the tool.

This warranty provides the free-of-charge repair or replacement of defective parts only over the entire lifespan of the tool. Parts requiring repair or replacement as a result of normal wear and tear are not covered by this warranty.

Additional claims are excluded, unless stringent national rules prohibit such exclusion. In particular, Hilti is

not obligated for direct, indirect, incidental or consequential damages, losses or expenses in connection with, or by reason of, the use of, or inability to use the tool for any purpose. Implied warranties of merchantability or fitness for a particular purpose are specifically excluded.

For repair or replacement, send tool or related parts immediately upon discovery of the defect to the address of the local Hilti marketing organization provided.

This constitutes Hilti's entire obligation with regard to warranty and supersedes all prior or contemporaneous comments and oral or written agreements concerning warranties.

14. Declaration of conformity (original)

| | |
|-----------------|-------------------------|
| Designation: | Dispenser |
| Type: | HOS I-T xx / HOS I-N xx |
| Year of design: | 2003–2009 |

We declare, on our sole responsibility, that the in appendix 8 named dispenser comply with the following directives and standards: 94/9/EC, 2006/42/EC, EN 12100-1, EN 12100-2, EN 13463-1.

| | |
|-----------------|--|
| Designation: | Dispensing Unit HOS assy / Dispensing Unit HOS JIC assy |
| Type: | HOS MIU ... 01 / HOS MIU JIC ... 01 |
| Year of design: | 2007 |

We declare, on our sole responsibility, that the in appendix 7/1 and 7/2 named preassembled Dispensing Units MIU comply with the following directives and standards: DIN EN ISO 4413, DIN 12100-1, DIN 12100-2, 2006/42/EC.

**Hilti Corporation, Feldkircherstrasse 100,
FL-9494 Schaan**

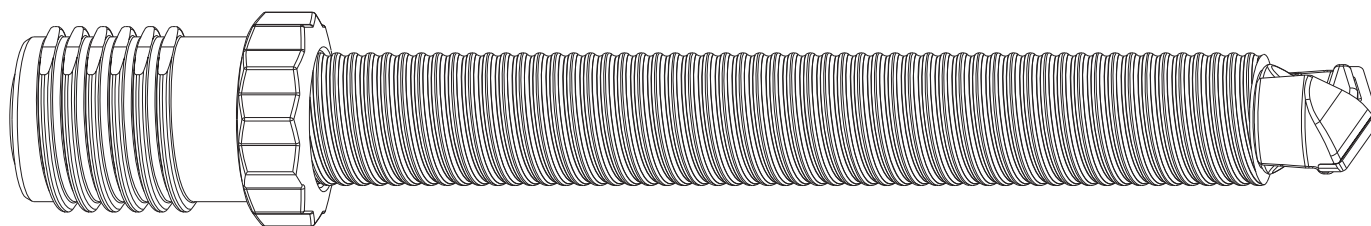
Handwritten signature of Helmut Haas.

Helmut Haas
Head of Quality Management Natural Resources
Energy & Industry
03/2013

Handwritten signature of Lars Taenzer.

Lars Taenzer
Head of Natural Resources
Energy & Industry
03/2013

Technical documentation filed at:
Hilti Entwicklungsgesellschaft mbH
Zulassung Elektrowerkzeuge
Hiltistrasse 6
86916 Kaufering
Deutschland

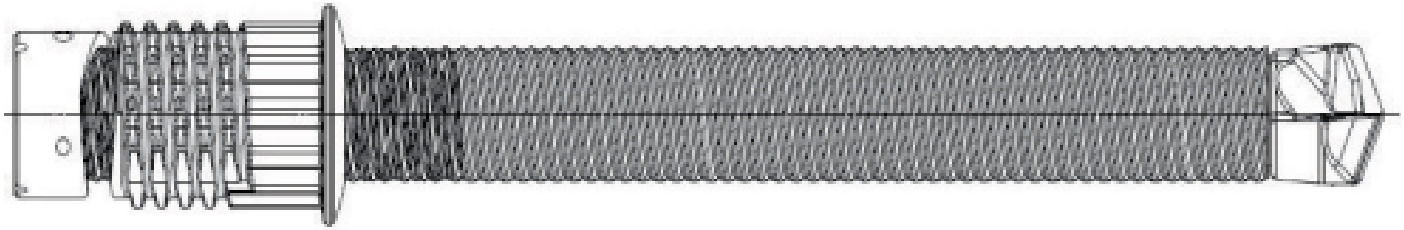
Appendix 1/1**Rock anchor (HOS-W 320)****for dispenser N****Anhang 1/1****Felsanker (HOS-W 320)****für Dispenser N****1/1**

| Name (steel-drill bit) Bezeichnung (Stahl-Bohrspitze) | Total length Gesamtlänge [mm] | [inch] | Color code in nut Farbcode in Mutter | Item number Artikelnummer |
|--|-------------------------------------|--------|---|------------------------------|
| HOS-W 120 /320 N3 30 | 1245 | 49" | no color / farbl. | 211876 |
| HOS-W 150 /320 N3 30 | 1545 | 61" | red / rot | 211877 |
| HOS-W 180 /320 N3 30 | 1845 | 72,6" | blue / blau | 211878 |
| HOS-W 210 /320 N3 30 | 2145 | 84,5" | orange / orange | 211879 |
| HOS-W 250 /320 N3 30 | 2565 | 101" | white / weiss | 211880 |

| Name (carbide-drill bit) Bezeichnung (Hartmetall-Bohrspitze) | Total length Gesamtlänge [mm] | [inch] | Color code in nut Farbcode in Mutter | Item number Artikelnummer |
|---|-------------------------------------|--------|---|------------------------------|
| HOS-W 120 /320 N4 30 | 1245 | 49" | no color / farbl. | 211875 |
| HOS-W 150 /320 N4 30 | 1545 | 61" | red / rot | 236496 |
| HOS-W 180 /320 N4 30 | 1845 | 72,6" | blue / blau | 236497 |
| HOS-W 210 /320 N4 30 | 2145 | 84,5" | orange / orange | 236498 |
| HOS-W 250 /320 N4 30 | 2565 | 101" | white / weiss | 283042 |

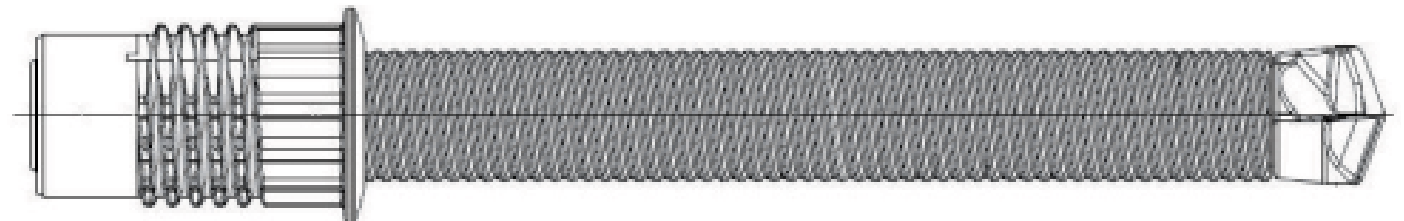
| Name (steel-drill bit) Bezeichnung (Stahl-Bohrspitze) | Total length Gesamtlänge [mm] | [inch] | Color code in nut Farbcode in Mutter | Item number Artikelnummer |
|--|-------------------------------------|--------|---|------------------------------|
| HOS-W 120 /320 N3 15 | 1245 | 49" | no color / farbl. | 437901 |
| HOS-W 150 /320 N3 15 | 1545 | 61" | red / rot | 437902 |
| HOS-W 180 /320 N3 15 | 1845 | 72,6" | blue / blau | 437904 |
| HOS-W 210 /320 N3 15 | 2145 | 84,5" | orange / orange | 437905 |
| HOS-W 250 /320 N3 15 | 2565 | 101" | white / weiss | 437906 |

| Name (carbide-drill bit) Bezeichnung (Hartmetall-Bohrspitze) | Total length Gesamtlänge [mm] | [inch] | | Item number Artikelnummer |
|---|-------------------------------------|--------|-------------------|------------------------------|
| HOS-W 120 /320 N4 15 | 1245 | 49" | no color / farbl. | 437908 |
| HOS-W 150 /320 N4 15 | 1545 | 61" | red / rot | 437910 |
| HOS-W 180 /320 N4 15 | 1845 | 72,6" | blue / blau | 437911 |
| HOS-W 210 /320 N4 15 | 2145 | 84,5" | orange / orange | 437912 |
| HOS-W 250 /320 N4 15 | 2565 | 101" | white / weiss | 437913 |

Appendix 1/1**Rock anchor (HOS-W 320)****for dispenser T****Anhang 1/1****Felsanker (HOS-W 320)****für Dispenser T****1/1**

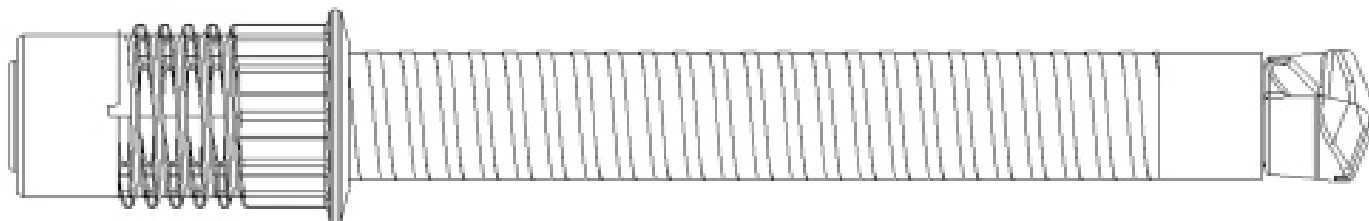
| Name (steel-drill bit) Bezeichnung (Stahl-Bohrspitze) | Total length Gesamtlänge [mm] | [inch] | Color code in nut Farbcode in Mutter | Item number Artikelnummer |
|--|-------------------------------------|--------|---|------------------------------|
| HOS-W 120 /320 T3 15 | 1245 | 49" | no color / farbl. | 421186 |
| HOS-W 150 /320 T3 15 | 1545 | 61" | red / rot | 421187 |
| HOS-W 180 /320 T3 15 | 1845 | 72,6" | blue / blau | 421188 |
| HOS-W 210 /320 T3 15 | 2145 | 84,5" | orange / orange | 421189 |
| HOS-W 250 /320 T3 15 | 2565 | 101" | white / weiss | 421190 |

| Name (carbide-drill bit) Bezeichnung (Hartmetall-Bohrspitze) | Total length Gesamtlänge [mm] | [inch] | Color code in nut Farbcode in Mutter | Item number Artikelnummer |
|---|-------------------------------------|--------|---|------------------------------|
| HOS-W 120 /320 T4 15 | 1245 | 49" | no color / farbl. | 421191 |
| HOS-W 150 /320 T4 15 | 1545 | 61" | red / rot | 421192 |
| HOS-W 180 /320 T4 15 | 1845 | 72,6" | blue / blau | 421193 |
| HOS-W 210 /320 T4 15 | 2145 | 84,5" | orange / orange | 421194 |
| HOS-W 250 /320 T4 15 | 2565 | 101" | white / weiss | 421195 |



| Name (steel-drill bit) Bezeichnung (Stahl-Bohrspitze) | Total length Gesamtlänge [mm] | [inch] | Color code in nut Farbcode in Mutter | Item number Artikelnummer |
|--|-------------------------------------|--------|---|------------------------------|
| HOS-W 120 /320 N3 15 | 1245 | 49" | no color / farbl. | 437901 |
| HOS-W 150 /320 N3 15 | 1545 | 61" | red / rot | 437902 |
| HOS-W 180 /320 N3 15 | 1845 | 72,6" | blue / blau | 437904 |
| HOS-W 210 /320 N3 15 | 2145 | 84,5" | orange / orange | 437905 |
| HOS-W 250 /320 N3 15 | 2565 | 101" | white / weiss | 438906 |

| Name (carbide-drill bit) Bezeichnung (Hartmetall-Bohrspitze) | Total length Gesamtlänge [mm] | [inch] | Color code in nut Farbcode in Mutter | Item number Artikelnummer |
|---|-------------------------------------|--------|---|------------------------------|
| HOS-W 120 /320 N4 15 | 1245 | 49" | no color / farbl. | 437908 |
| HOS-W 150 /320 N4 15 | 1545 | 61" | red / rot | 437910 |
| HOS-W 180 /320 N4 15 | 1845 | 72,6" | blue / blau | 437911 |
| HOS-W 210 /320 N4 15 | 2145 | 84,5" | orange / orange | 437912 |
| HOS-W 250 /320 N4 15 | 2565 | 101" | white / weiss | 437913 |

Appendix 1/2
Rock anchor (HOS-C 200)
for dispenser T
Anhang 1/2
Felsanker (HOS-C 200)
für Dispenser T

1/2

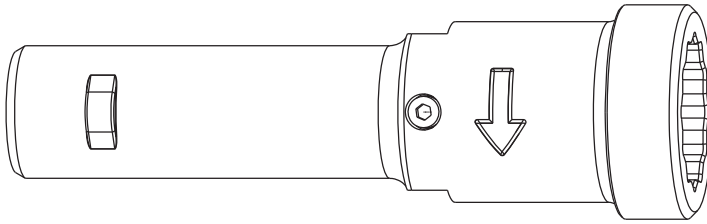
| Name (steel-drill bit) Bezeichnung (Stahl-Bohrspitze) | Total length Gesamtlänge [mm] | [inch] | Color code in nut Farbcode in Mutter | Item number Artikelnummer |
|--|-------------------------------------|--------|---|------------------------------|
| HOS-C 120/200 N3 15 | 1245 | 49" | blue / blau | 2060279 |
| HOS-C 150/200 N3 15 | 1545 | 61" | orange / orange | 2060310 |
| HOS-C 180/200 N3 15 | 1845 | 72.6" | red / rot | 2060311 |
| HOS-C 210/200 N3 15 | 2145 | 84.5" | green / grün | 2060312 |
| HOS-C 250/200 N3 15 | 2565 | 101" | yellow / gelb | 2060313 |

| Name (carbide-drill bit) Bezeichnung (Stahl-Bohrspitze) | Total length Gesamtlänge [mm] | [inch] | Color code in nut Farbcode in Mutter | Item number Artikelnummer |
|--|-------------------------------------|--------|---|------------------------------|
| HOS-C 120/200 N3 15 ASC | 1245 | 49" | blue / blau | 2060314 |
| HOS-C 150/200 N3 15 ASC | 1545 | 61" | orange / orange | 2060315 |
| HOS-C 180/200 N3 15 ASC | 1845 | 72.6" | red / rot | 2060316 |
| HOS-C 210/200 N3 15 ASC | 2145 | 84.5" | green / grün | 2060317 |
| HOS-C 250/200 N3 15 ASC | 2565 | 101" | yellow / gelb | 2060318 |

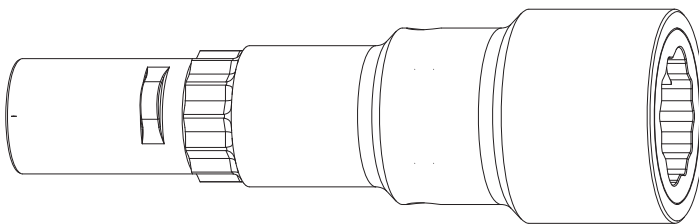
| Name (steel-drill bit) Bezeichnung (Stahl-Bohrspitze) | Total length Gesamtlänge [mm] | [inch] | Color code in nut Farbcode in Mutter | Item number Artikelnummer |
|--|-------------------------------------|--------|---|------------------------------|
| HOS-C 120/200 N4 15 | 1245 | 49" | blue / blau | 2060082 |
| HOS-C 150/200 N4 15 | 1545 | 61" | orange / orange | 2060083 |
| HOS-C 180/200 N4 15 | 1845 | 72.6" | red / rot | 2060084 |
| HOS-C 210/200 N4 15 | 2145 | 84.5" | green / grün | 2060085 |
| HOS-C 250/200 N4 15* | 2565 | 101" | yellow / gelb | 2060086 |
| HOS-C 250/200 N4 30 STD | 2565 | 101" | yellow / gelb | 2060322 |

* Exception: for dispenser N
Ausnahme: für Dispenser N

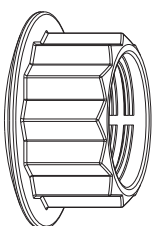
| Name (carbide-drill bit) Bezeichnung (Stahl-Bohrspitze) | Total length Gesamtlänge [mm] | [inch] | Color code in nut Farbcode in Mutter | Item number Artikelnummer |
|--|-------------------------------------|--------|---|------------------------------|
| HOS-C 120/200 N4 15 ASC | 1245 | 49" | blue / blau | 2060087 |
| HOS-C 150/200 N4 15 ASC | 1545 | 61" | orange / orange | 2060088 |
| HOS-C 180/200 N4 15 ASC | 1845 | 72.6" | red / rot | 2060089 |
| HOS-C 210/200 N4 15 ASC | 2145 | 84.5" | green / grün | 2060320 |
| HOS-C 250/200 N4 15 ASC | 2565 | 101" | yellow / gelb | 2060321 |

Appendix 2**Extension****for dispenser N****Anhang 2****Verlängerung****für Dispenser N****2**

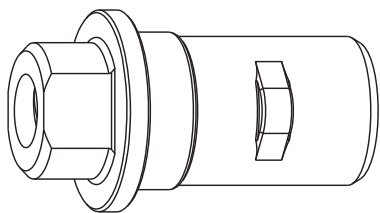
| Available tube lengths (without shaft) Verfügbare Rohrlängen (ohne Einsteckende) [mm] | [inch] | Item number Artikelnummer |
|---|--------|------------------------------|
| 200 | 7,8 | 248318 |
| 300 | 11,8 | 287588 |
| 600 | 23,6 | 287589 |

Appendix 2**Extension****for dispenser T****Anhang 2****Verlängerung****für Dispenser T**

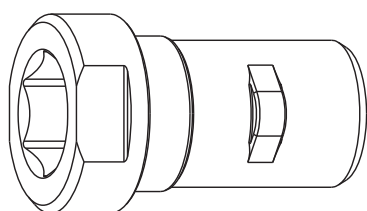
| Available tube lengths (without shaft) Verfügbare Rohrlängen (ohne Einsteckende) [mm] | [inch] | Item number Artikelnummer |
|---|--------|------------------------------|
| 200 | 7,8 | 428618 |
| 300 | 11,8 | 428619 |
| 600 | 23,6 | 428620 |

Appendix 2**Coupling nut HOS-W 320****for all nut types****Anhang 2****Überwurfmutter HOS-W 320****für alle Mutter Typen**

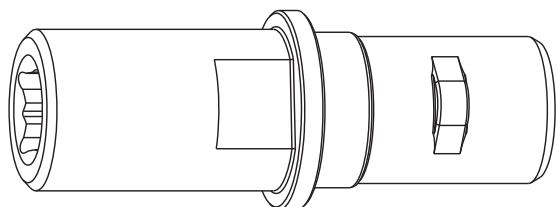
| | Item number Artikelnummer |
|--|------------------------------|
| | 284132 |

Appendix 3**Drill- and setting-adapters****for dispenser N****Anhang 3****Bohr- und Setzadapter****für Dispenser N****3**

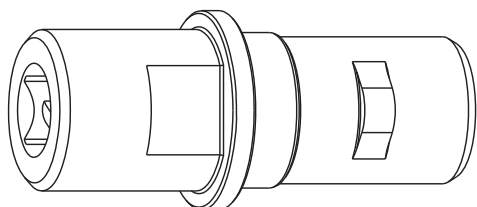
| | |
|-----------------------------|------------------------------|
| | Item number Artikelnummer |
| Drill-adapter B 25 rht assy | 274648 |
| Bohr-Adapter B 25 re-kpl | |



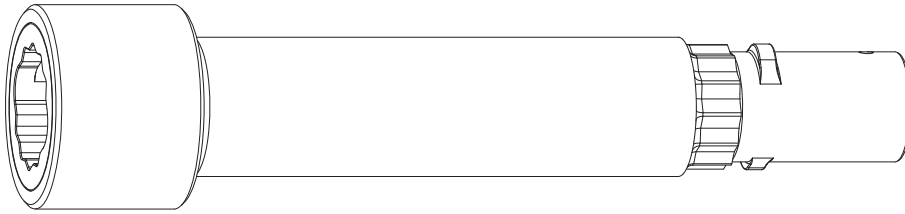
| | |
|----------------------------|------------------------------|
| | Item number Artikelnummer |
| Setting-adapter SW 41 assy | 274649 |
| Setz-Adapter SW 41 kpl | |



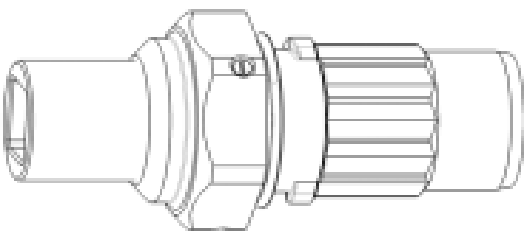
| | |
|--|------------------------------|
| | Item number Artikelnummer |
| Drill- and setting-adapter 1 1/8" assy | 365875 |
| Bohr- und Setz-Adapter 1 1/8" kpl | |



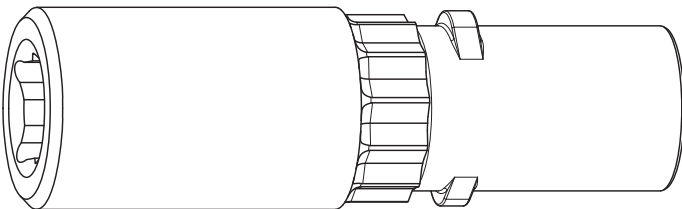
| | |
|---|------------------------------|
| | Item number Artikelnummer |
| Drill- and setting-adapter Hydro-AUS assy | 274650 |
| Bohr- und Setz-Adapter Hydro-AUS kpl | |

Appendix 3**Drill- and setting-adapters****for dispenser T****Anhang 3****Bohr- und Setzadapter****für Dispenser T****3**

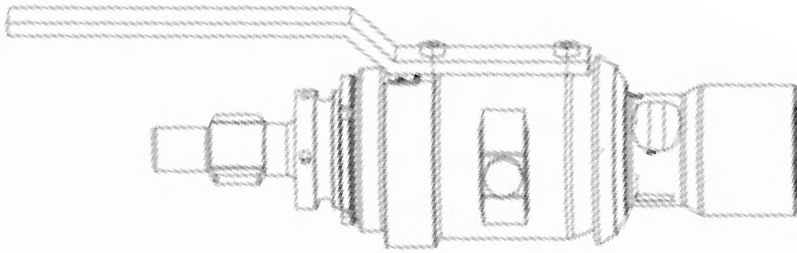
| | |
|----------------------------------|------------------------------|
| | Item number Artikelnummer |
| Socket wrench Steckschüssel T | 428539 |



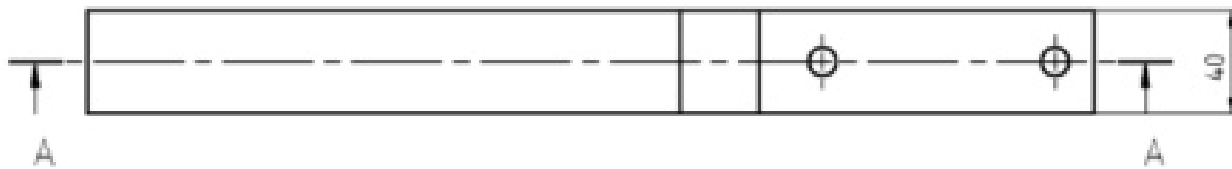
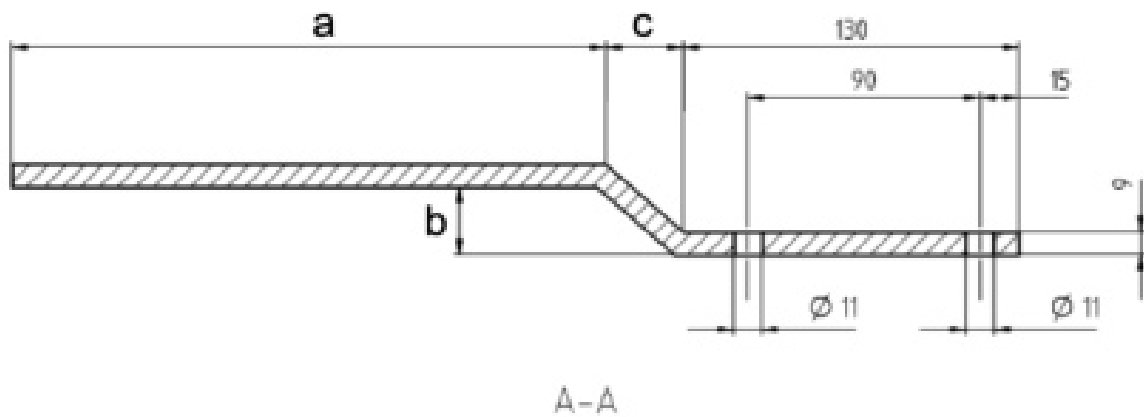
| | |
|------------------------------|------------------------------|
| | Item number Artikelnummer |
| Adapter T 25 Adapter T 25 | 2053605 |



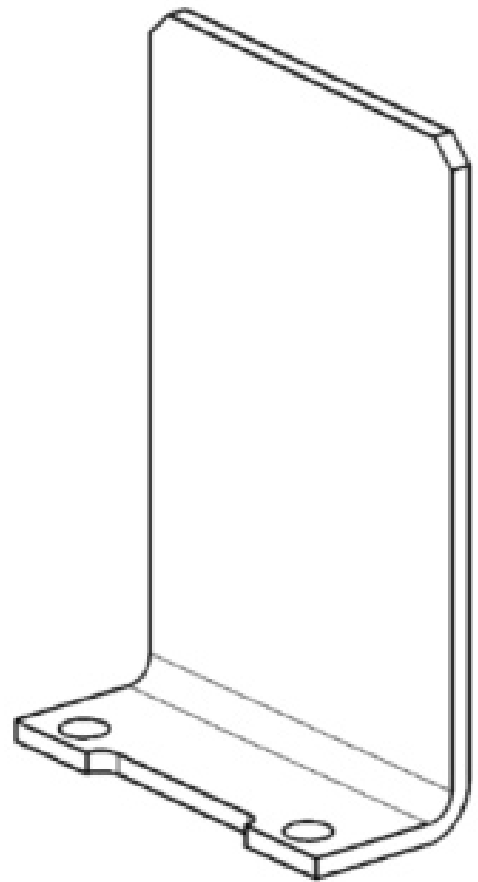
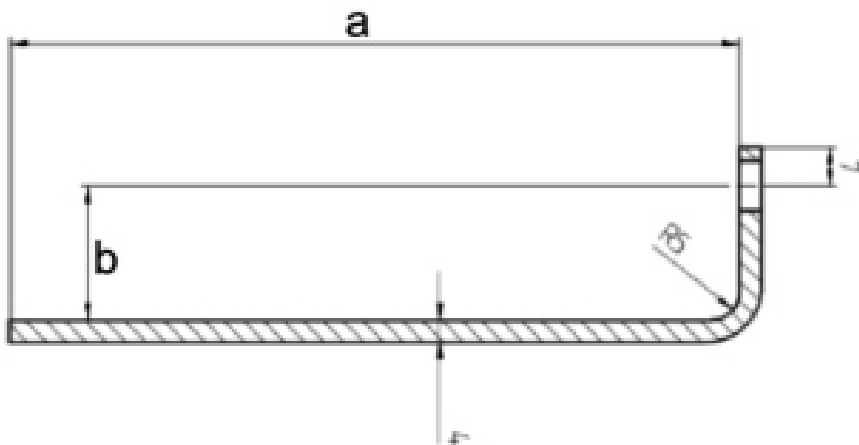
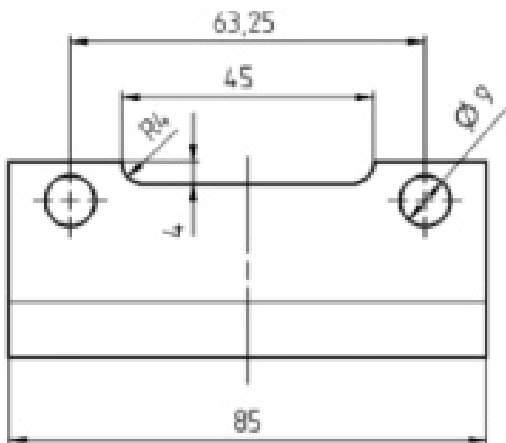
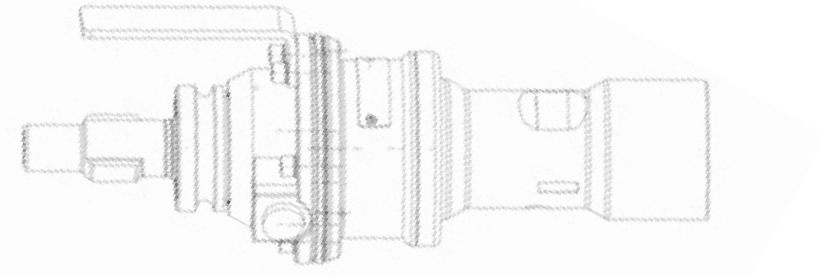
| | |
|--------------------------------------|------------------------------|
| | Item number Artikelnummer |
| Adapter T 1 1/8" Adapter T 1 1/8" | 428541 |



4/1



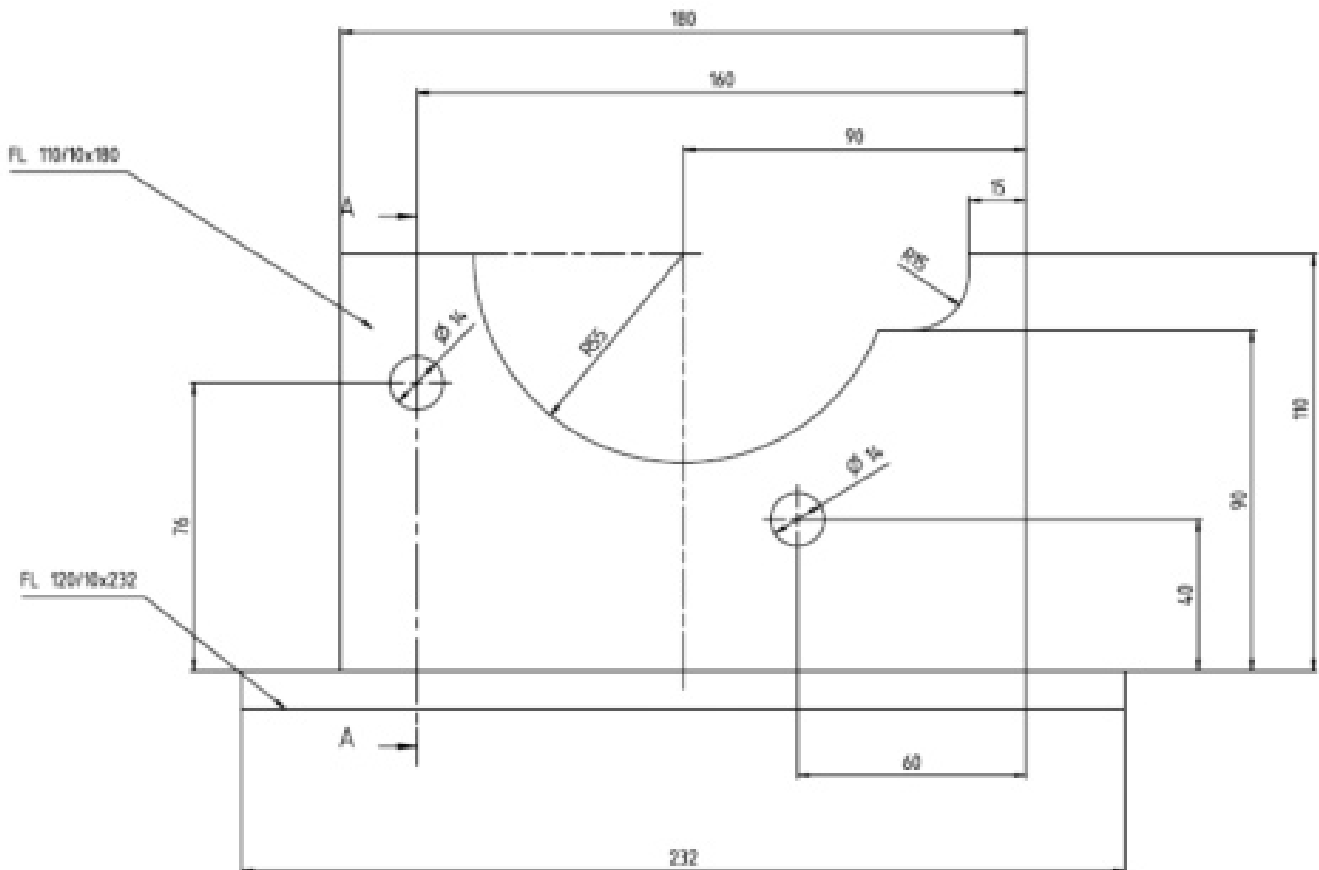
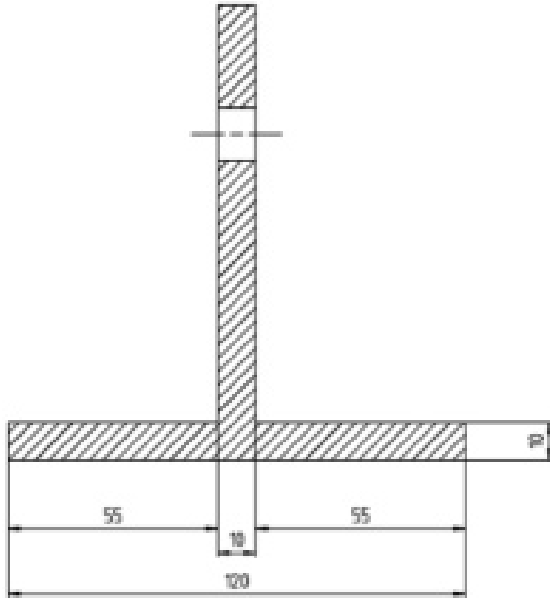
Adapt dimensions **a**, **b**, **c** to motor-geometry
 Masse **a**, **b**, **c** der Geometrie des Motors anpassen



Adapt dimensions **a**, **b** to motor-geometry
 Masse **a**, **b** der Geometrie des Motors anpassen

Schnitt A-A

5



Information

The spare part- and tool-box is intended to store the most important spare parts and tools together. Spare parts for the hydraulic system, plus special tools, seals and wear parts needed for the maintenance of the dispensers are shown in the corresponding appendices. The tools named on this page are generally needed for maintaining the hydraulic system and the dispensers.

Hinweis

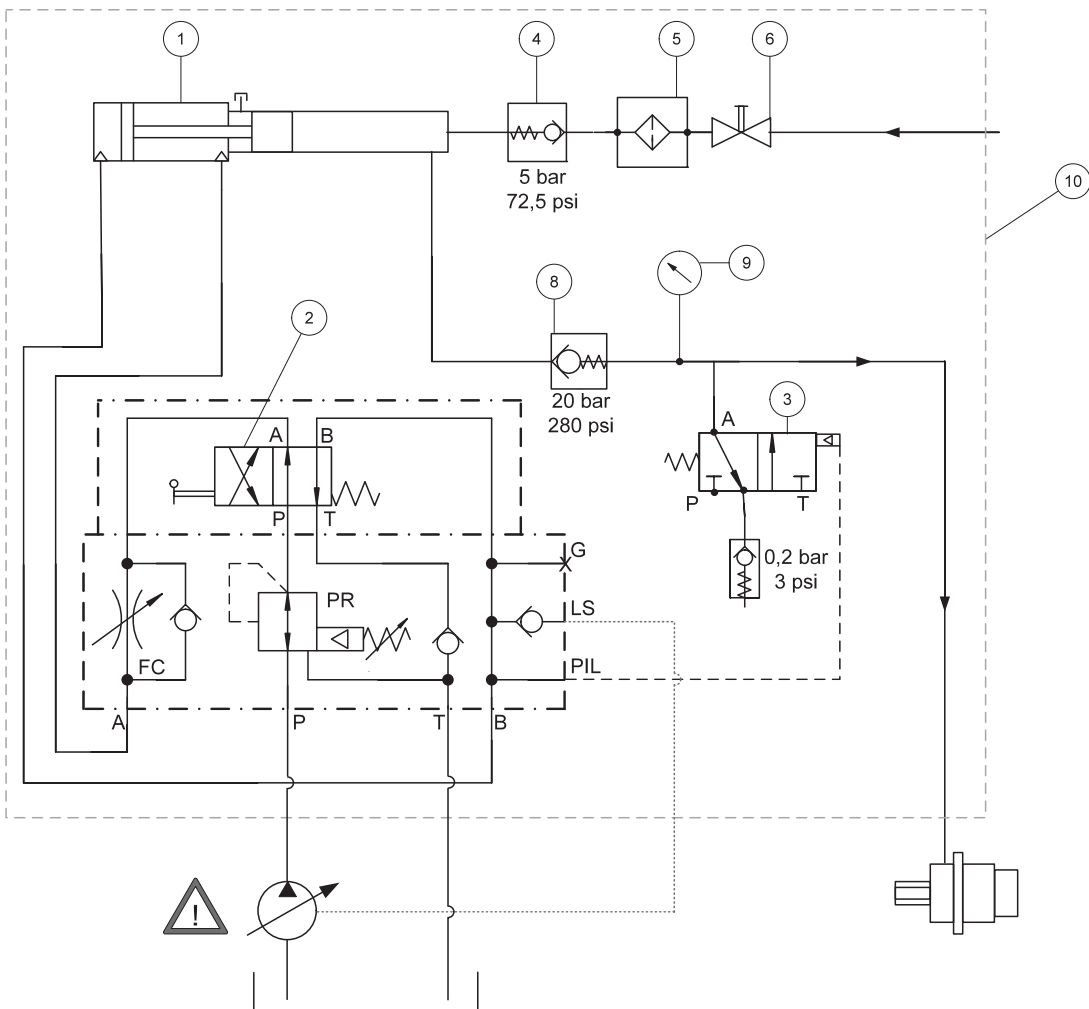
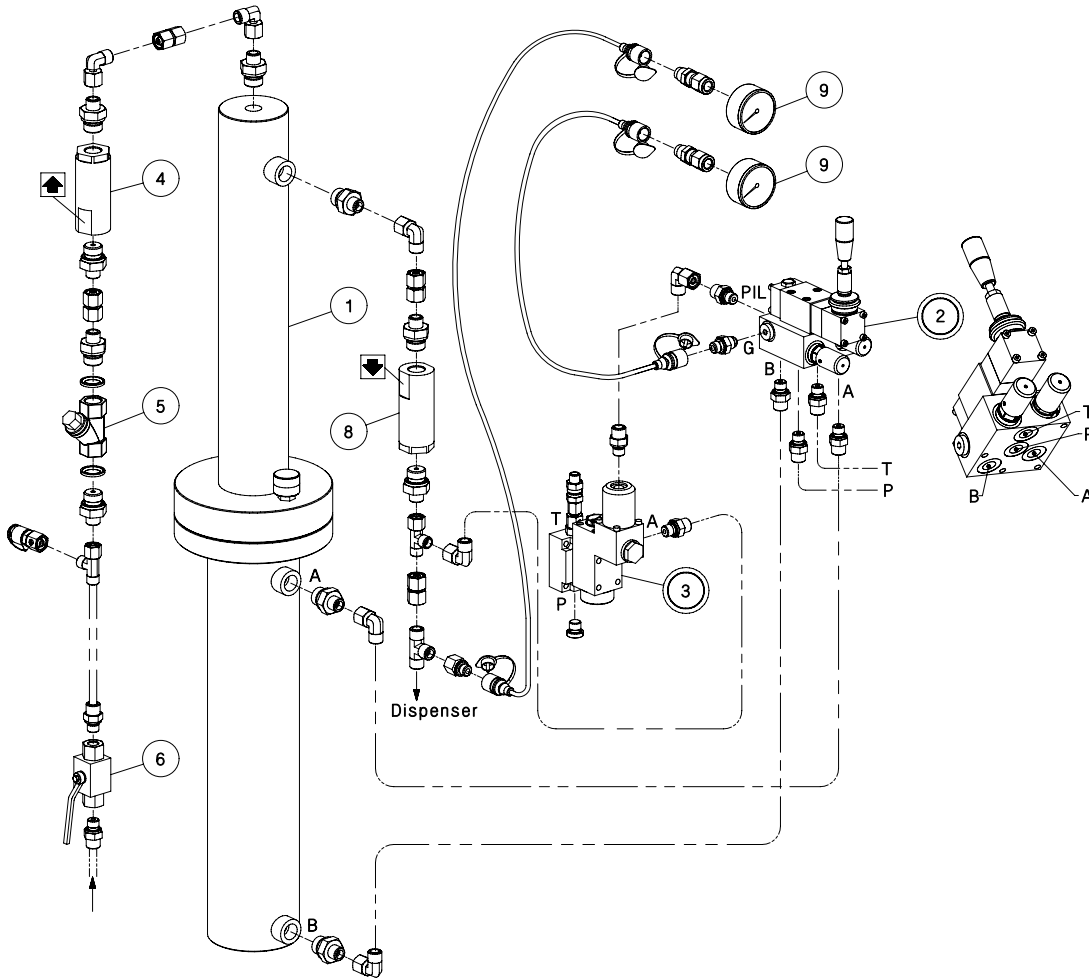
Der Ersatzteil- und Werkzeugkoffer ist dazu gedacht, die wichtigsten Ersatzteile und Werkzeuge gesammelt aufzubewahren. Ersatzteile für das hydraulische System, sowie spezielle Werkzeuge, Dichtungen und Verschleiss-teile die für die Wartung der Dispenser benötigt werden sind in den entsprechenden Anhangseiten aufgeführt. Die auf dieser Seite angegebenen Werkzeuge sind generell für die Wartung des Systems und der Dispenser erforderlich.

| Article | Artikel | Item number Artikelnummer |
|----------------------------|-----------------------------|------------------------------|
| Spare part box HOS (empty) | Ersatzteilkoffer HOS (leer) | 241291 |
| Allen wrench PB 4 mm | Inbusschlüssel PB 4 mm | 209436 |
| Allen wrench PB 2 mm | Inbusschlüssel PB 2 mm | 404019 |
| Screw driver PB 135 (3) | Schraubendreher PB 135 (3) | 404021 |
| Flat wrench 10*13 | Gabelschlüssel 10*13 | 404020 |
| Star knob 40/M8 | Sterngriff 40/M8 | 209435 |
| LOCTITE 243 | LOCTITE 243 | 3994 |
| Pin punc | Splinttreiber | 209437 |
| Extractor RSH | Abzieher RSH | 17744 |
| Operating Instruction HOS | Bedienungsanleitung HOS | 304802 |

Appendix 7/1**Variable pump – load sensing****Anhang 7/1****Verstellpumpe – load sensing**

| Pos | Description | Hilti Part No. |
|------|-----------------------------------|----------------|
| 1 | Cylinder HOS I-N 1,3 l | 274199 |
| 2 | Dispensing unit HOS hydraulic | 365879 |
| 3 | Pressure Relief Valve HOS | 365885 |
| 4 | Non Return Valve HOS I-N 5 bar | 274198 |
| 5 | Dirt trap HOS 1/2" | 365886 |
| 6 | Ball cock HOS 1/4" | 365887 |
| 7.1 | Hydraulic fitting-KIT HOS | 365888 |
| 7.2 | Hydraulic fitting-KIT HOS JIC | 365890 |
| 8 | Non Return Valve HOS I-N 20 bar | 274197 |
| 9 | Manometer 0 – 250 | 409905 |
| 10.1 | MIU - preassembled – DIN fittings | 365884 |
| 10.2 | MIU - preassembled – JIC fittings | 365889 |

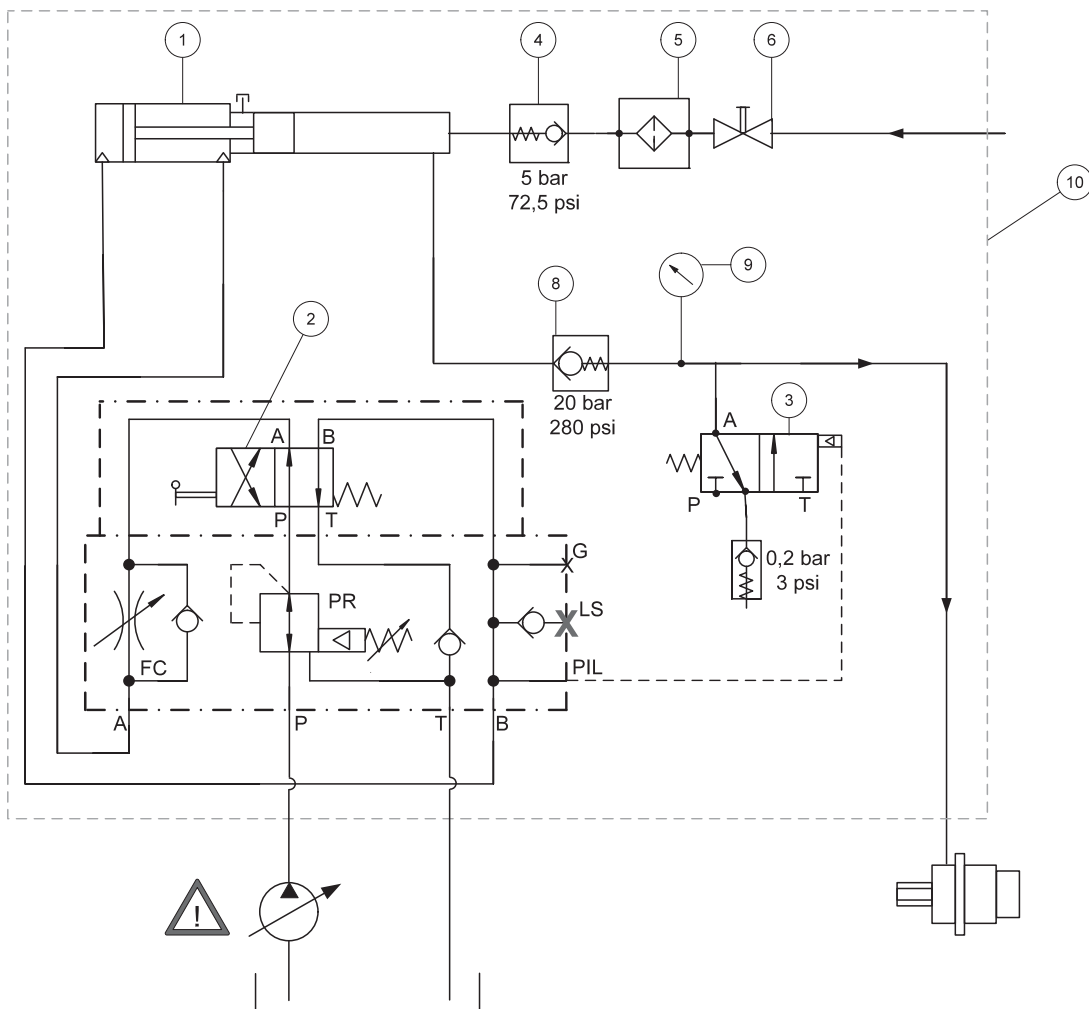
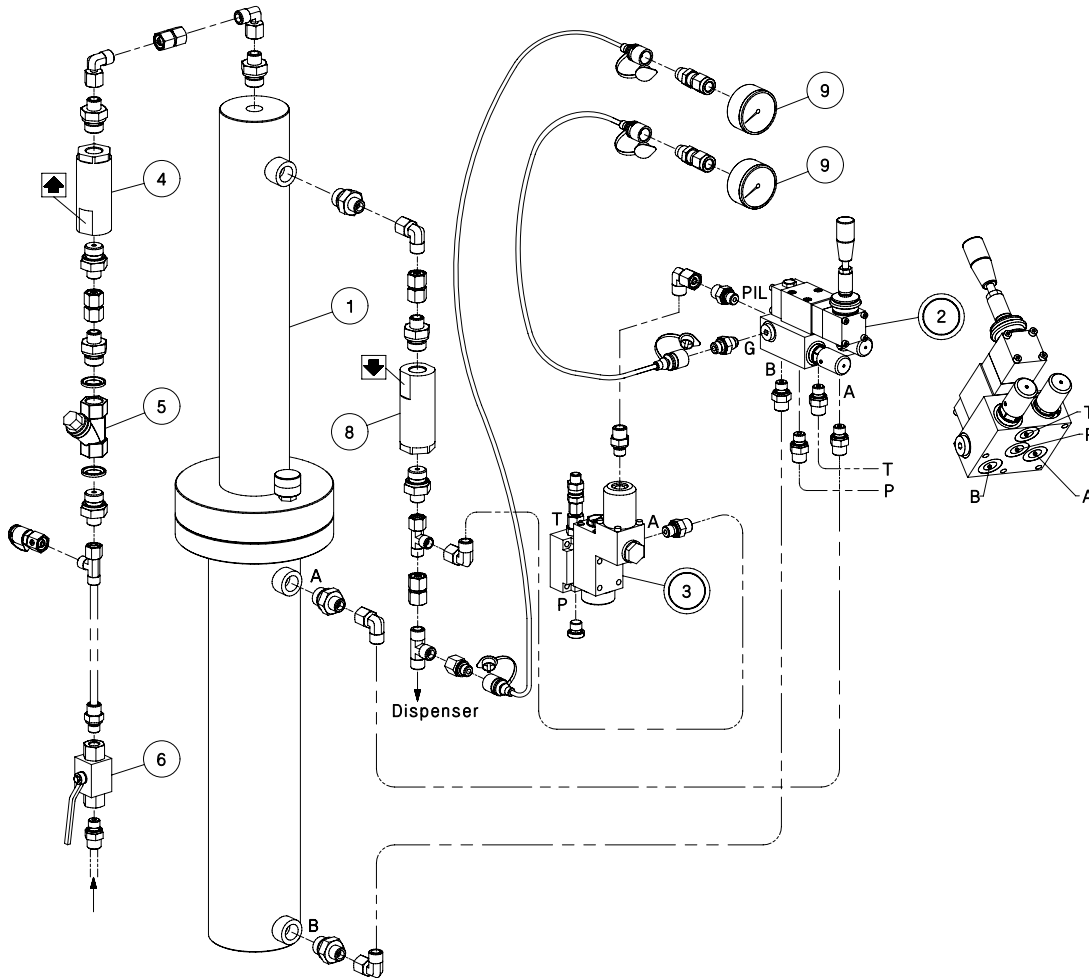
| Pos | Beschreibung | Hilti Art. Nr. |
|------|---------------------------------------|----------------|
| 1 | Zylinder HOS I-N 1,3 l | 274199 |
| 2 | Auspresseinheit HOS hydraulisch | 365879 |
| 3 | Druckentlastungsventil HOS | 365885 |
| 4 | Rückschlagventil HOS I-N 5 bar | 274198 |
| 5 | Schmutzfänger HOS 1/2" | 365886 |
| 6 | Kugelhahn HOS 1/4" | 365887 |
| 7.1 | Hydraulikverschraubungsset HOS | 365888 |
| 7.2 | Hydraulikverschraubungsset HOS JIC | 365890 |
| 8 | Rückschlagventil HOS I-N 20 bar | 274197 |
| 9 | Manometer 0 – 250 | 409905 |
| 10.1 | MIU - vormontiert – DIN Verschraubung | 365884 |
| 10.2 | MIU - vormontiert – JIC Verschraubung | 365889 |



Appendix 7/2**Variable pump – non load sensing****Anhang 7/2****Verstellpumpe – non load sensing**

| Pos | Description | Hilti Part No. |
|------|-----------------------------------|----------------|
| 1 | Cylinder HOS I-N 1,3 l | 274199 |
| 2 | Dispensing unit HOS hydraulic | 365879 |
| 3 | Pressure Relief Valve HOS | 365885 |
| 4 | Non Return Valve HOS I-N 5 bar | 274198 |
| 5 | Dirt trap HOS 1/2" | 365886 |
| 6 | Ball cock HOS 1/4" | 365887 |
| 7.1 | Hydraulic fitting-KIT HOS | 365888 |
| 7.2 | Hydraulic fitting-KIT HOS JIC | 365890 |
| 8 | Non Return Valve HOS I-N 20 bar | 274197 |
| 9 | Manometer 0 – 250 | 409905 |
| 10.1 | MIU - preassembled – DIN fittings | 365884 |
| 10.2 | MIU - preassembled – JIC fittings | 365889 |

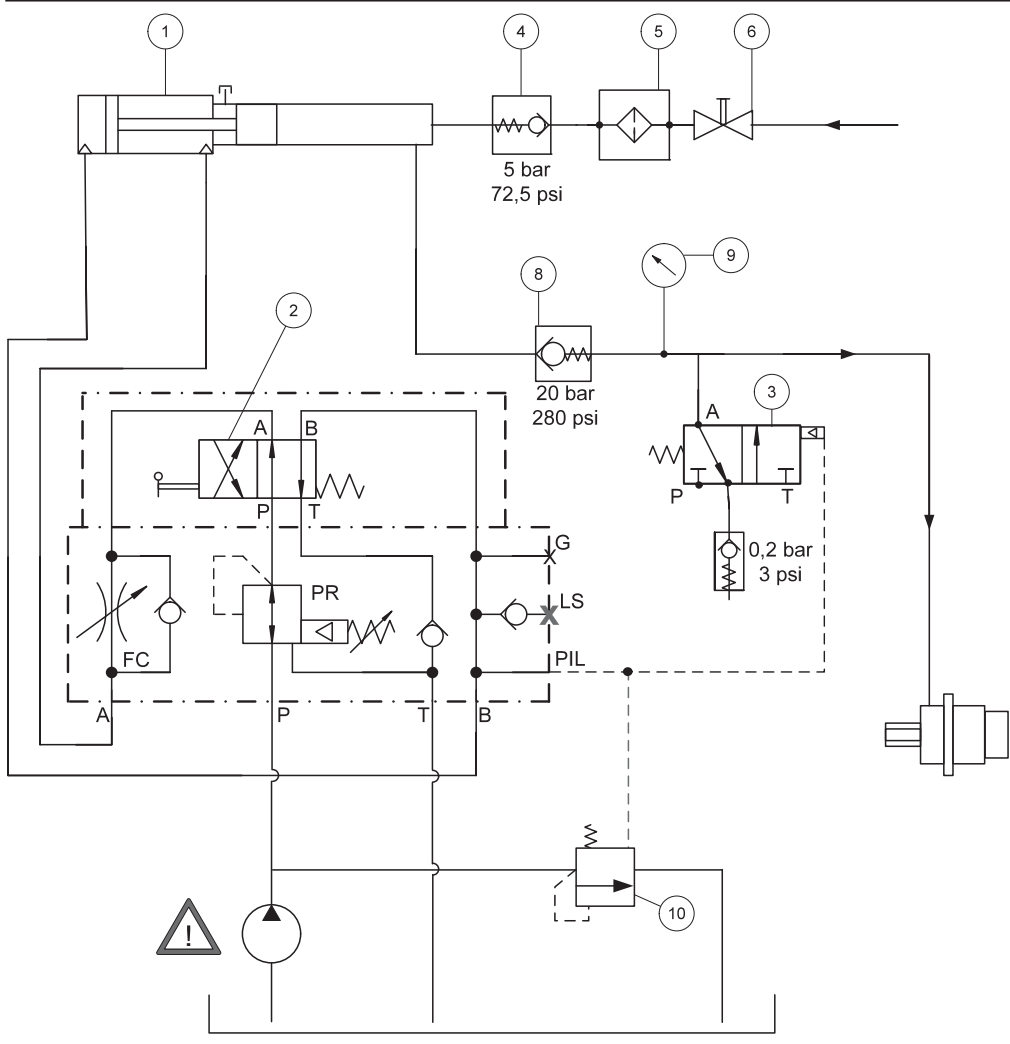
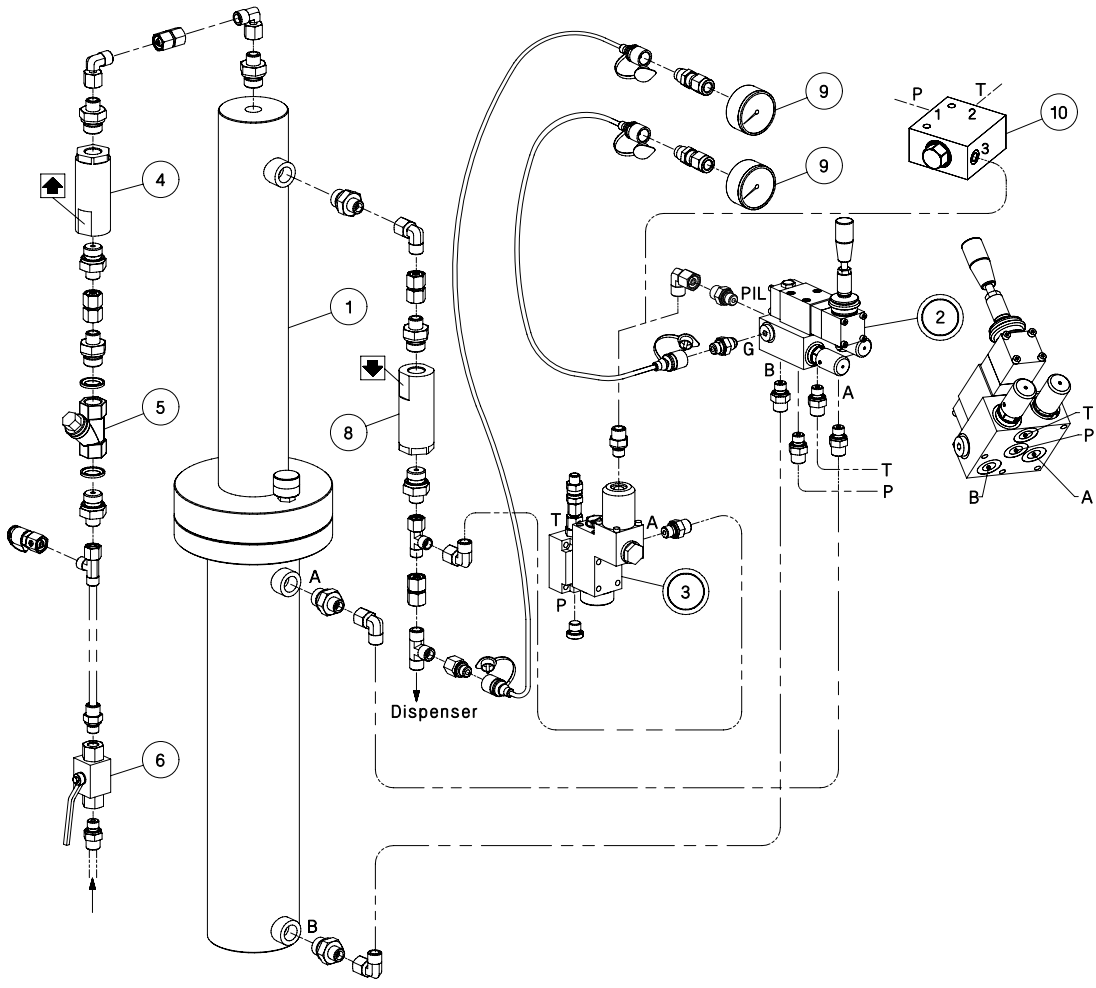
| Pos | Beschreibung | Hilti Art. Nr. |
|------|---------------------------------------|----------------|
| 1 | Zylinder HOS I-N 1,3 l | 274199 |
| 2 | Auspresseinheit HOS hydraulisch | 365879 |
| 3 | Druckentlastungsventil HOS | 365885 |
| 4 | Rückschlagventil HOS I-N 5 bar | 274198 |
| 5 | Schmutzfänger HOS 1/2" | 365886 |
| 6 | Kugelhahn HOS 1/4" | 365887 |
| 7.1 | Hydraulikverschraubungsset HOS | 365888 |
| 7.2 | Hydraulikverschraubungsset HOS JIC | 365890 |
| 8 | Rückschlagventil HOS I-N 20 bar | 274197 |
| 9 | Manometer 0 – 250 | 409905 |
| 10.1 | MIU - vormontiert – DIN Verschraubung | 365884 |
| 10.2 | MIU - vormontiert – JIC Verschraubung | 365889 |



Appendix 7/3**Constant pump****Anhang 7/3****Konstantpumpe**

| Pos | Description | Hilti Part No. |
|-----|---------------------------------|----------------|
| 1 | Cylinder HOS I-N 1,3 l | 274199 |
| 2 | Dispensing unit HOS hydraulic | 365879 |
| 3 | Pressure Relief Valve HOS | 365885 |
| 4 | Non Return Valve HOS I-N 5 bar | 274198 |
| 5 | Dirt trap HOS 1/2" | 365886 |
| 6 | Ball cock HOS 1/4" | 365887 |
| 7.1 | Hydraulic fitting-KIT HOS | 365888 |
| 7.2 | Hydraulic fitting-KIT HOS JIC | 365890 |
| 8 | Non Return Valve HOS I-N 20 bar | 274197 |
| 9 | Manometer 0 – 250 | 409905 |
| 10 | Regulator HOS | 407674 |

| Pos | Beschreibung | Hilti Art. Nr. |
|-----|------------------------------------|----------------|
| 1 | Zylinder HOS I-N 1,3 l | 274199 |
| 2 | Auspresseinheit HOS hydraulisch | 365879 |
| 3 | Druckentlastungsventil HOS | 365885 |
| 4 | Rückschlagventil HOS I-N 5 bar | 274198 |
| 5 | Schmutzfänger HOS 1/2" | 365886 |
| 6 | Kugelhahn HOS 1/4" | 365887 |
| 7.1 | Hydraulikverschraubungsset HOS | 365888 |
| 7.2 | Hydraulikverschraubungsset HOS JIC | 365890 |
| 8 | Rückschlagventil HOS I-N 20 bar | 274197 |
| 9 | Manometer 0 – 250 | 409905 |
| 10 | Druckregler HOS | 407674 |

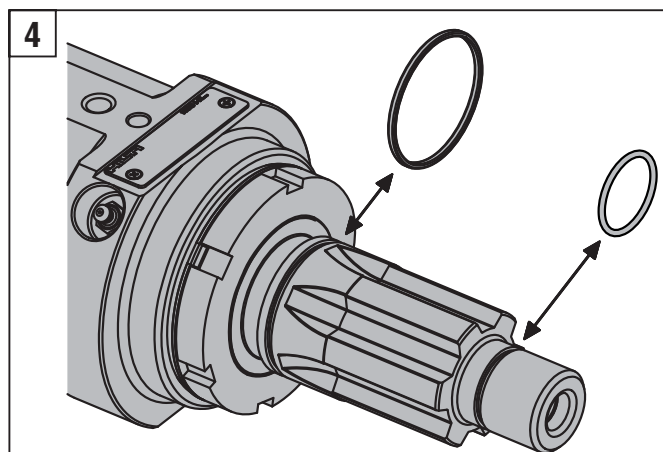
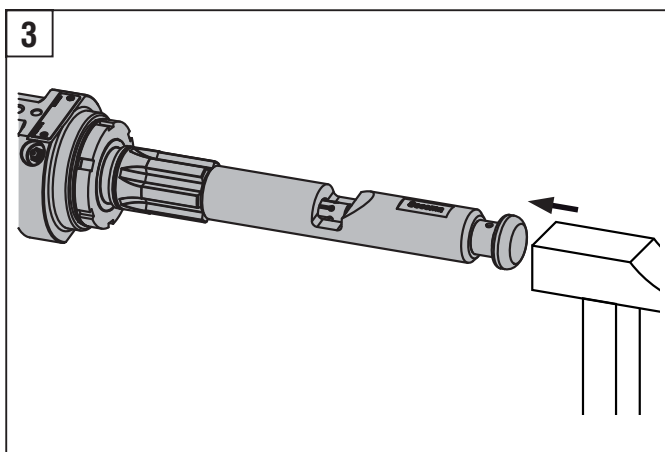
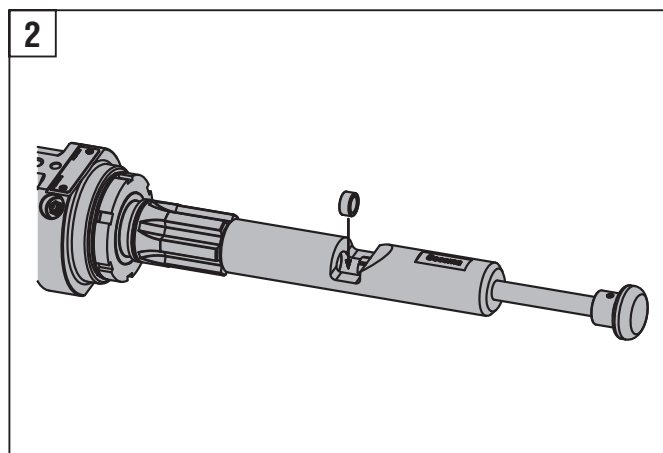
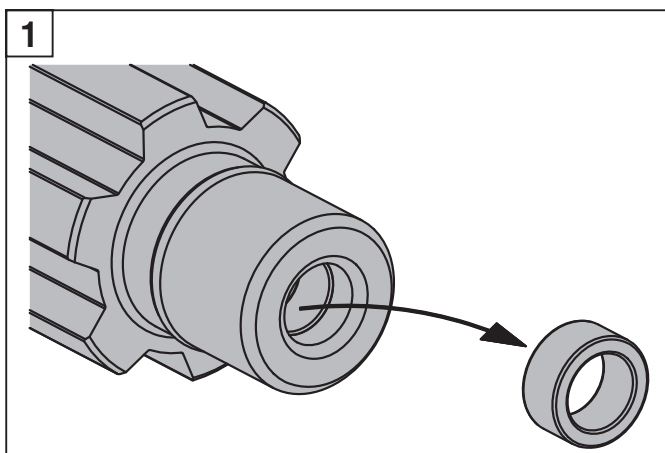


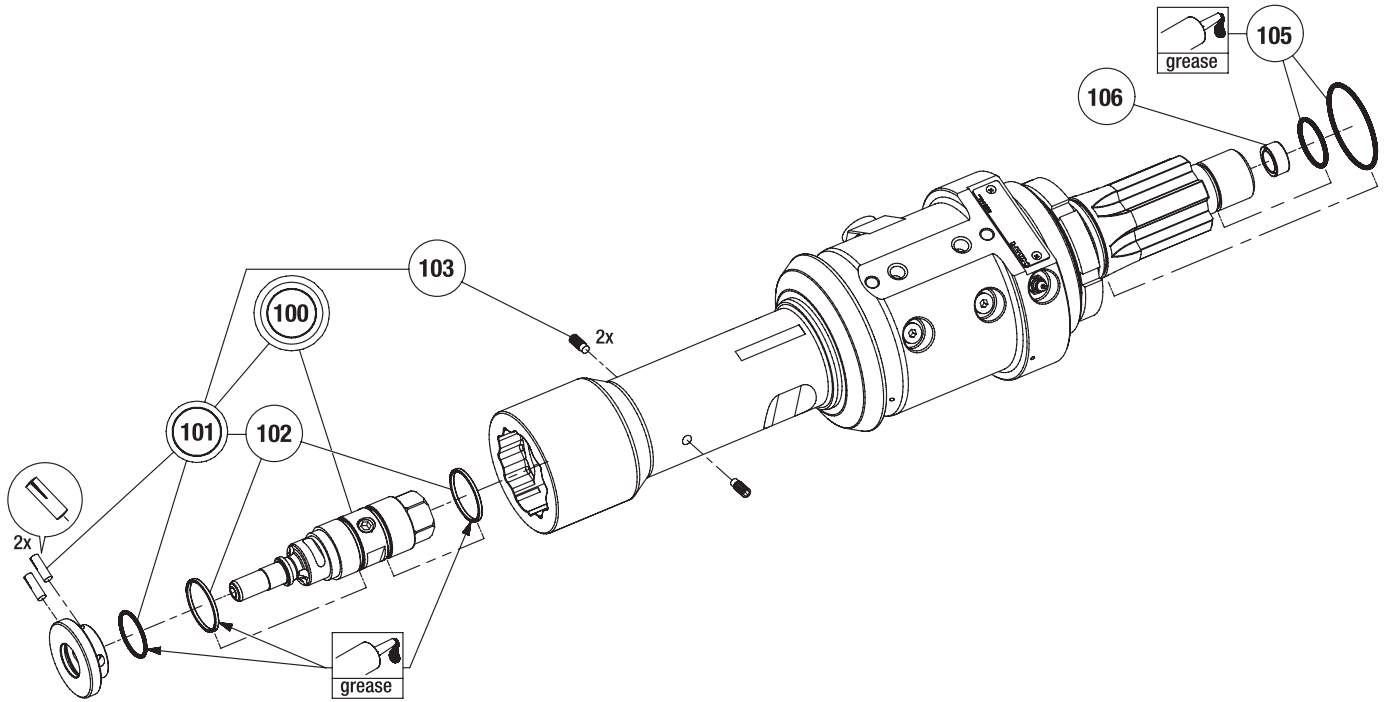
Maintenance of the shaft

- Remove the dispenser from the drill motor
- Remove the lip seal (blue) shown in figure 1
- Reinsert a new lip seal (#106) with the impact cam → fig 2, 3
- Remove the worn O-rings / fit new O-rings (#105) → fig 4
- Grease the connection end slightly before reassembly

Wartung des Einsteckendes

- Dispenser aus dem Motor entfernen
- Entfernen der in Abbildung 1 dargestellten Nutring-Dichtung (blau)
- Einbau eines neuen Nutrings (#106) mit Hilfe des Eintreibwerkzeugs → Abb. 2, 3
- Austausch verschlissener O-Ringe gegen neue O-Ringe (#105) → Abb. 4
- Einsteckende des Dispensers vor dem Wiedereinbau leicht fetten

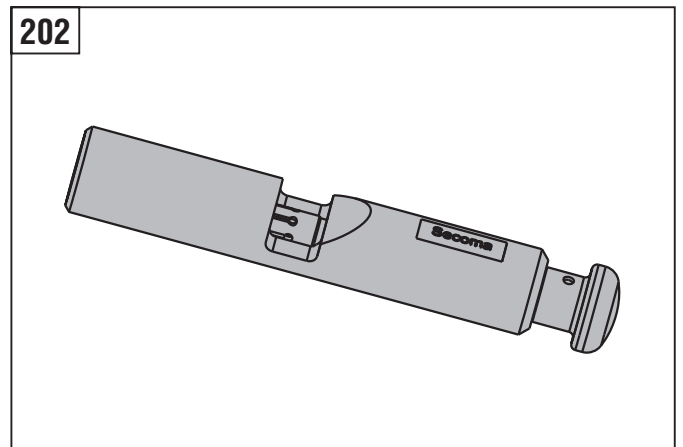
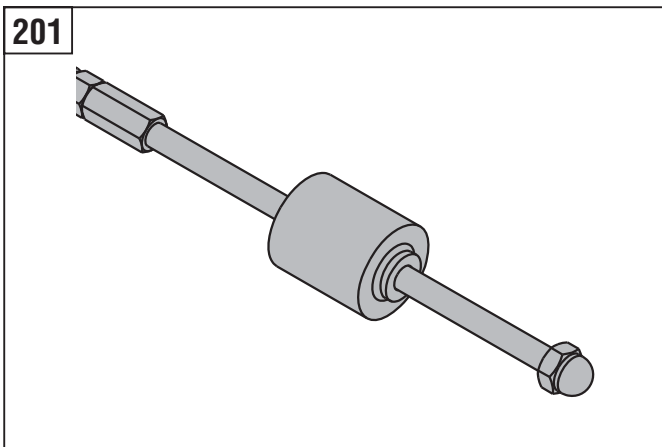




| Name Bezeichnung | Length without shaft Länge ohne Einsteckende | | Weight Gewicht | | Item number Artikelnummer |
|----------------------|---|----------------------------------|-------------------|------|------------------------------|
| | [mm] | [inch] | [kg] | [lb] | |
| Dispenser HOS I-N S5 | 424 | 16 ¹¹ / ₁₆ | 21,6 | 47,6 | 274282 |

| # | Spare parts | Ersatzteile | Item number Artikelnummer |
|-----|----------------------------------|-----------------------|------------------------------|
| 100 | Inner component HOS I-N sht assy | Innenteil HOS I-N kpl | 274440 |
| 101 | Stop HOS I-N assy | Anschlag HOS I-N kpl | 274194 |
| 102 | O-ring HOS-I-N | O-Ring HOS-I-N | 274442 |
| 103 | Threaded pin M8×16 A2 | Gewindestift M8×16 A2 | 274454 |
| 105 | O-ring-set | O-Ring-Satz | 274196 |
| 106 | Seal HOS I-N | Dichtung HOS I-N kpl | 274193 |

| # | Tools | Werkzeuge | Item number Artikelnummer |
|-----|------------------------|-------------------------|------------------------------|
| 201 | Extractor assy | Abzieher kpl | 17719 |
| 202 | Impact cam Secoma assy | Schlagkörper Secoma kpl | 274891 |

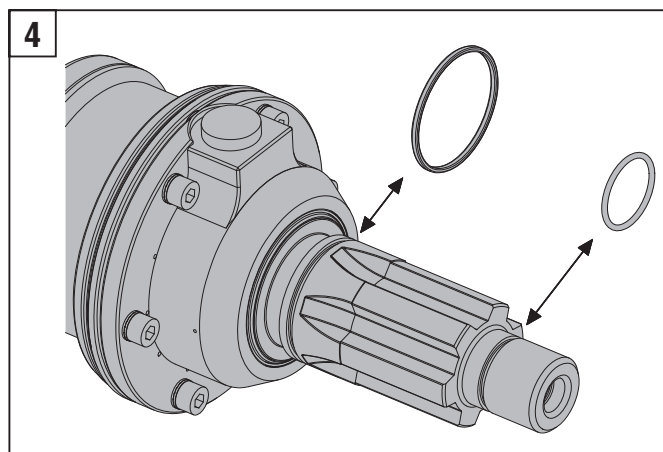
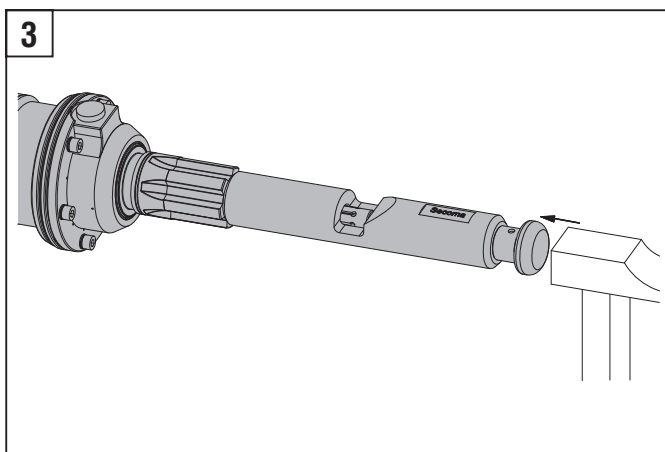
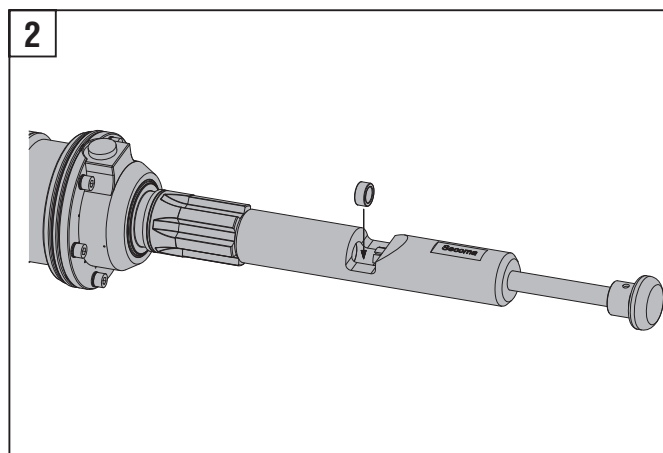
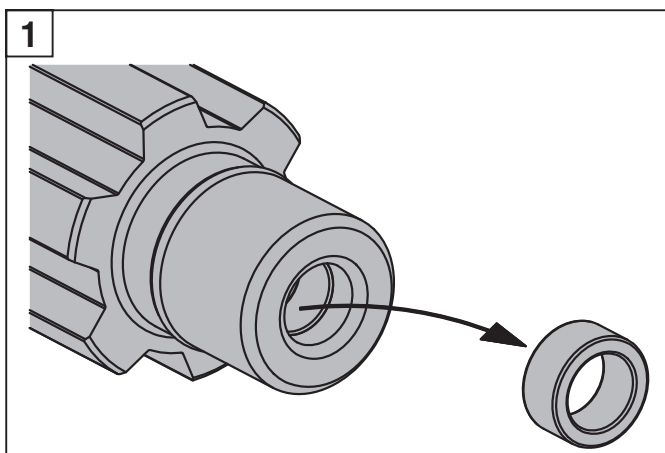


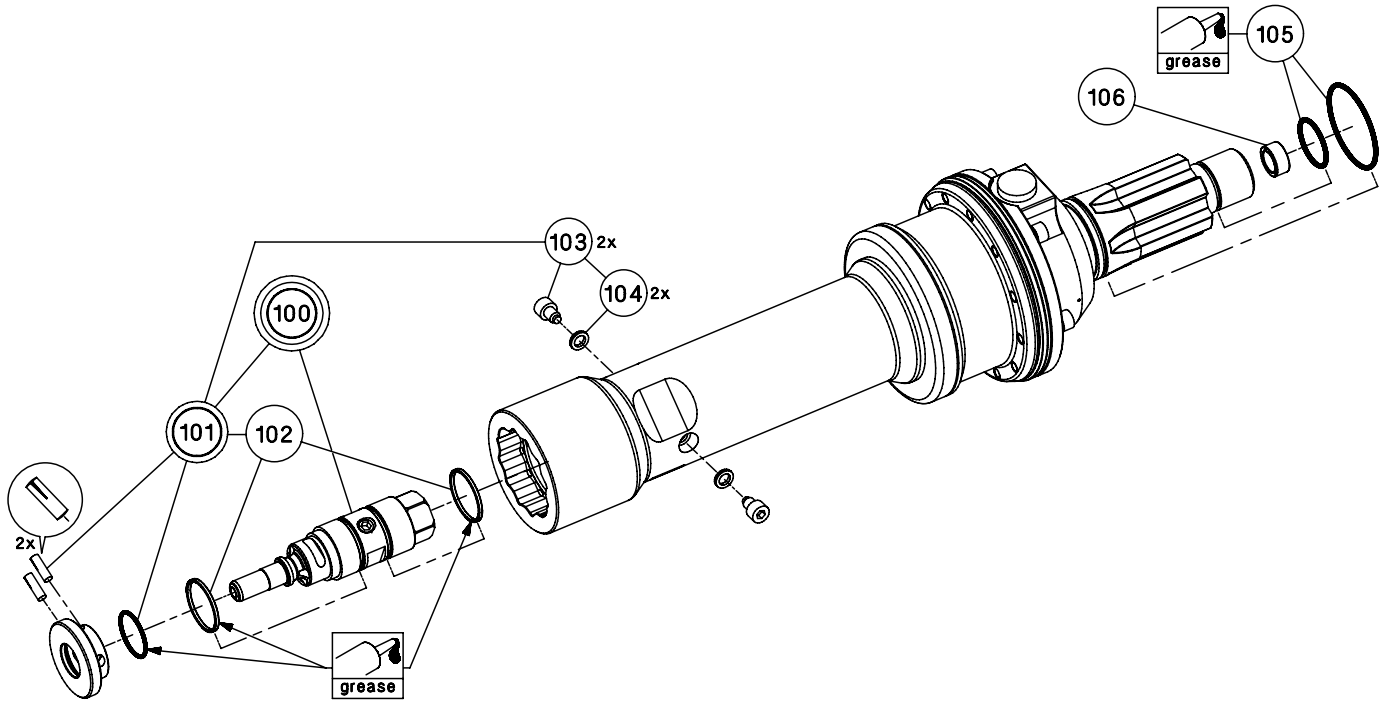
Maintenance of the shaft

- Remove the dispenser from the drill motor
- Remove the lip seal (blue) shown in figure 1
- Reinsert a new lip seal (#106) with the impact cam → fig 2, 3
- Remove the worn O-rings / fit new O-rings (#105) → fig 4
- Grease the connection end slightly before reassembly

Wartung des Einsteckendes

- Dispenser aus dem Motor entfernen
- Entfernen der in Abbildung 1 dargestellten Nutring-Dichtung (blau)
- Einbau eines neuen Nutrings (#106) mit Hilfe des Eintreibwerkzeugs → Abb. 2, 3
- Austausch verschlissener O-Ringe gegen neue O-Ringe (#105) → Abb. 4
- Einsteckende des Dispensers vor dem Wiedereinbau leicht fetten

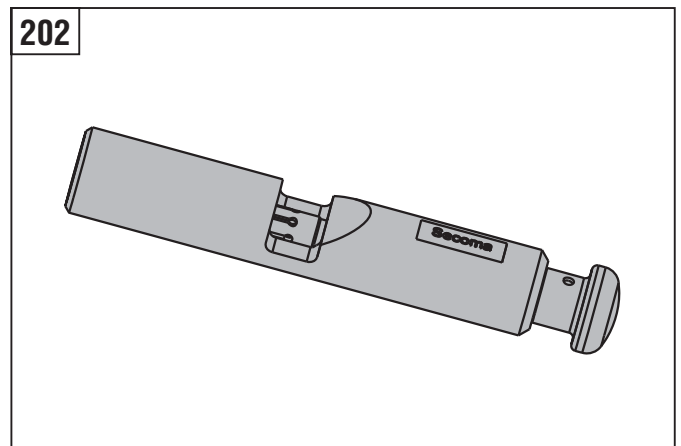
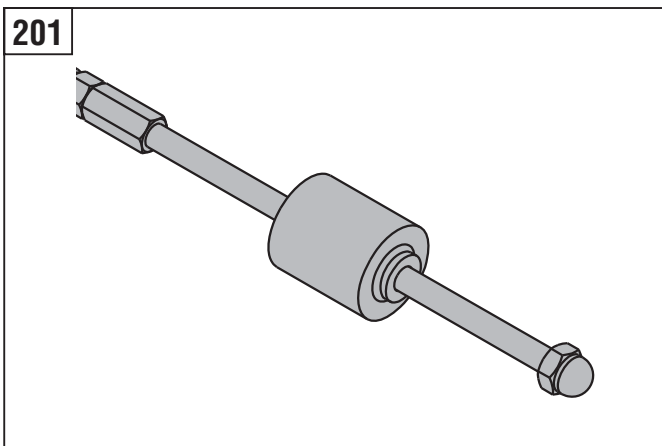




| Name Bezeichnung | Length without shaft Länge ohne Einsteckende | | Weight Gewicht | | Item number Artikelnummer |
|---------------------|---|----------------------------------|-------------------|------|------------------------------|
| | [mm] | [inch] | [kg] | [lb] | |
| HOS I-N S564 B | 424 | 16 ¹¹ / ₁₆ | 19,1 | 42,1 | 433408 |

| # | Spare parts | Ersatzteile | Item number Artikelnummer |
|-----|----------------------------------|------------------------|------------------------------|
| 100 | Inner component HOS I-N sht assy | Innenteil HOS I-N kpl | 274440 |
| 101 | Stop Kit | Anschlag Set | 287592 |
| 102 | O-Ring HOS-I-N | O-Ring HOS-I-N | 274442 |
| 103 | Hex skd hd cap screw | Zyl-Schr m I-6kt | 287597 |
| 104 | Retaining washer NL 8 | Sicherungsscheibe NL 8 | 238578 |
| 105 | O-ring-set | O-Ring-Satz | 274196 |
| 106 | Seal HOS I-N | Dichtung HOS I-N kpl | 274193 |

| # | Tools | Werkzeuge | Item number Artikelnummer |
|-----|------------------------|-------------------------|------------------------------|
| 201 | Extractor assy | Abzieher kpl | 17719 |
| 202 | Impact cam Secoma assy | Schlagkörper Secoma kpl | 274891 |



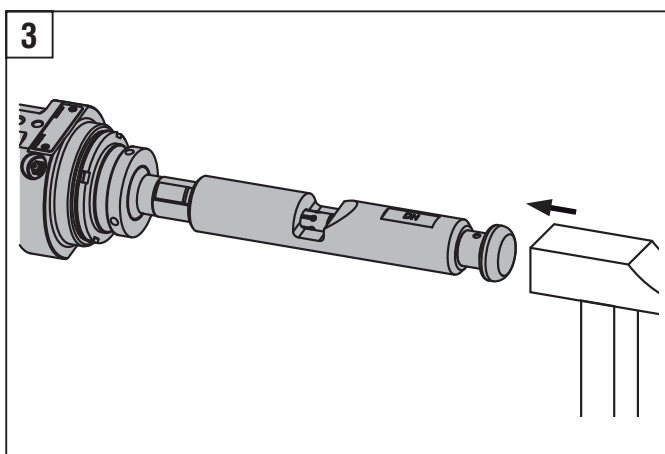
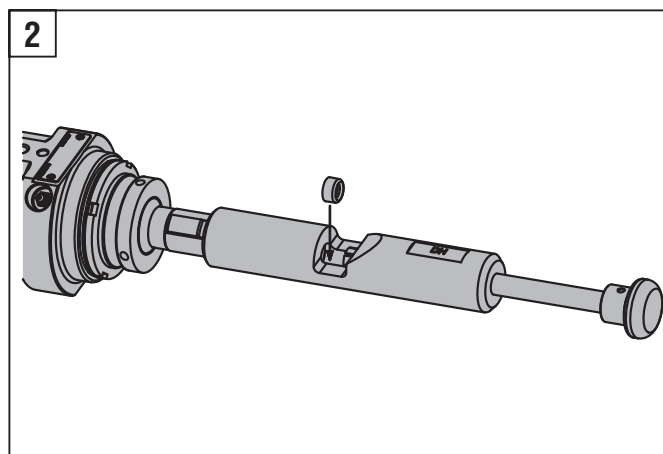
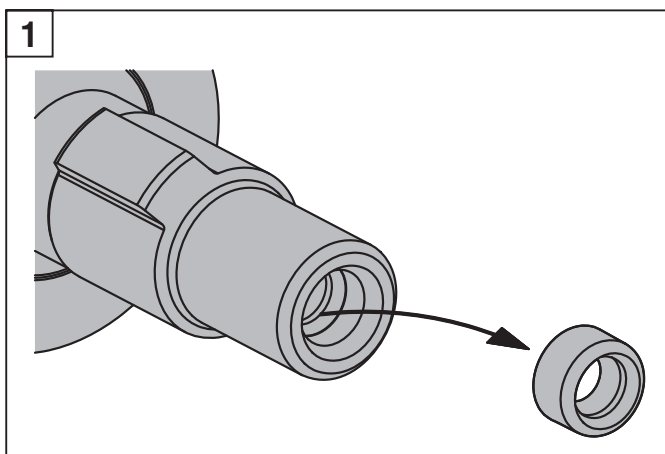
Maintenance of the shaft

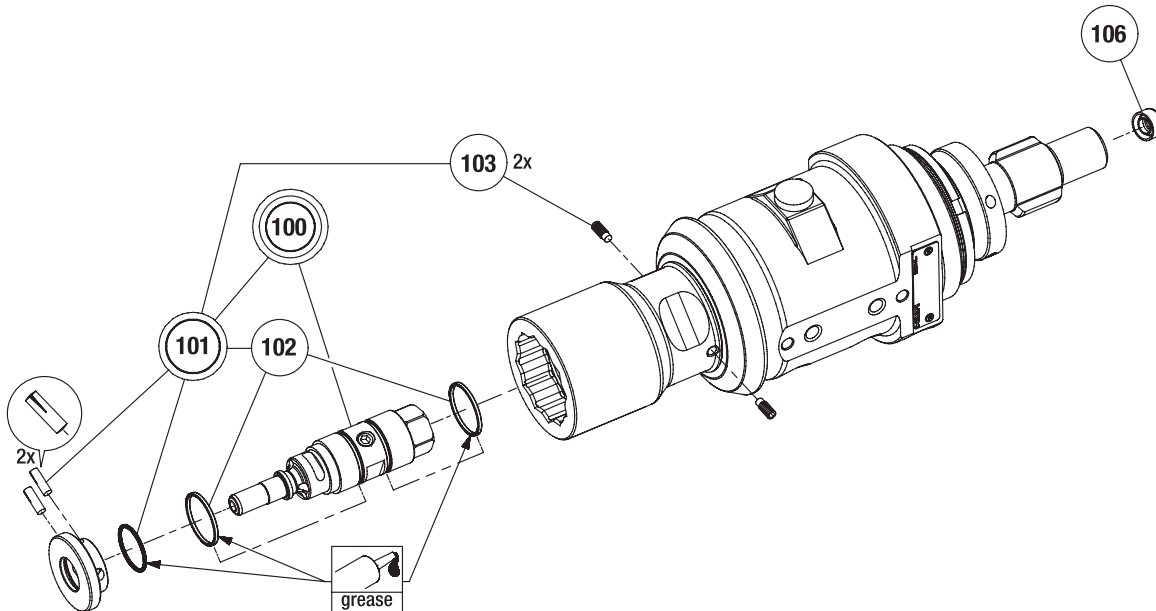
- Remove the dispenser from the drill motor
- Remove the lip seal (blue) shown in figure 1
- Reinsert a new lip seal (#106) with the impact cam → fig 2, 3
- Grease the connection end slightly before reassembly

8/3

Wartung des Einsteckendes

- Dispenser aus dem Motor entfernen
- Entfernen der in Abbildung 1 dargestellten Nutring-Dichtung (blau)
- Einbau eines neuen Nutrings (#106) mit Hilfe des Eintreibwerkzeugs → Abb. 2, 3
- Einsteckende des Dispensers vor dem Wiedereinbau leicht fetten

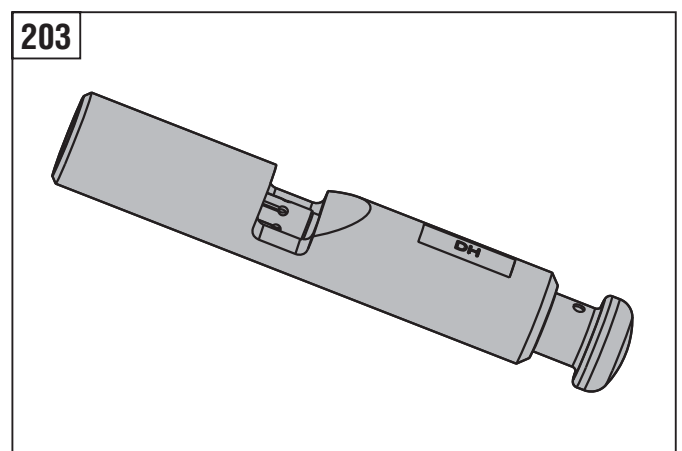
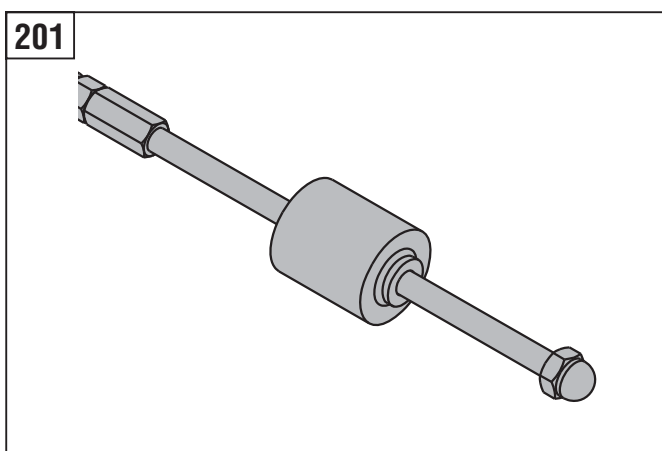




| Name Bezeichnung | Length without shaft Länge ohne Einsteckende | | Weight Gewicht | | Item number Artikelnummer |
|----------------------|---|---------------------------------|-------------------|------|------------------------------|
| | [mm] | [inch] | [kg] | [lb] | |
| Dispenser HOS I-N D3 | 336 | 13 ⁷ / ₃₂ | 18,4 | 40,6 | 274283 |

| # | Spare parts | Ersatzteile | Item number Artikelnummer |
|-----|----------------------------------|-----------------------|------------------------------|
| 100 | Inner component HOS I-N sht Assy | Innenteil HOS I-N kpl | 274440 |
| 101 | Stop HOS I-N Assy | Anschlag HOS I-N kpl | 274194 |
| 102 | O-ring HOS-I-N | O-Ring HOS-I-N | 274442 |
| 103 | Threaded pin M8x16 A2 | Gewindestift M8x16 A2 | 274454 |
| 106 | Seal HOS I-N | Dichtung HOS I-N kpl | 274101 |

| # | Tools | Werkzeuge | Item number Artikelnummer |
|-----|--------------------|---------------------|------------------------------|
| 201 | Extractor Assy | Abzieher kpl | 17719 |
| 203 | Impact cam DH Assy | Schlagkörper DH kpl | 274883 |



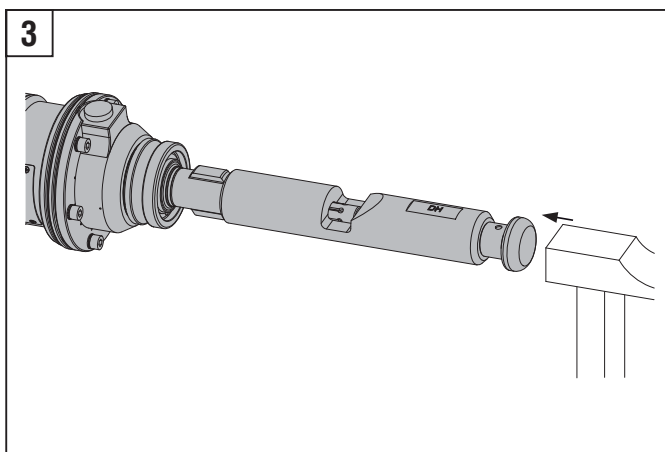
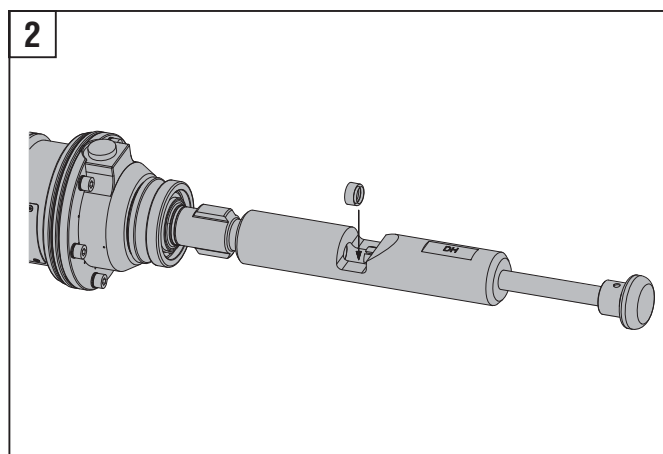
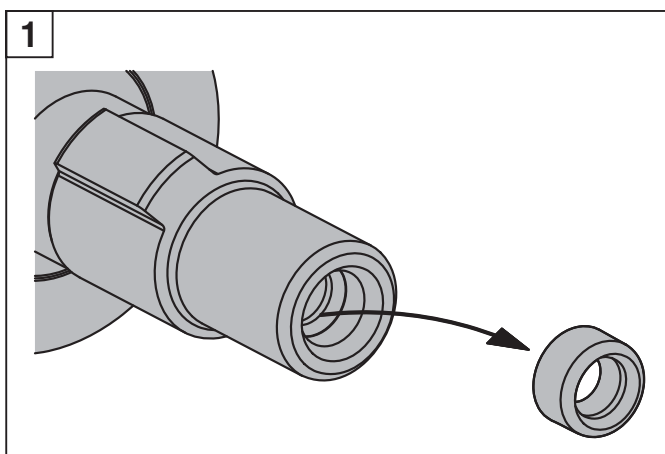
Maintenance of the shaft

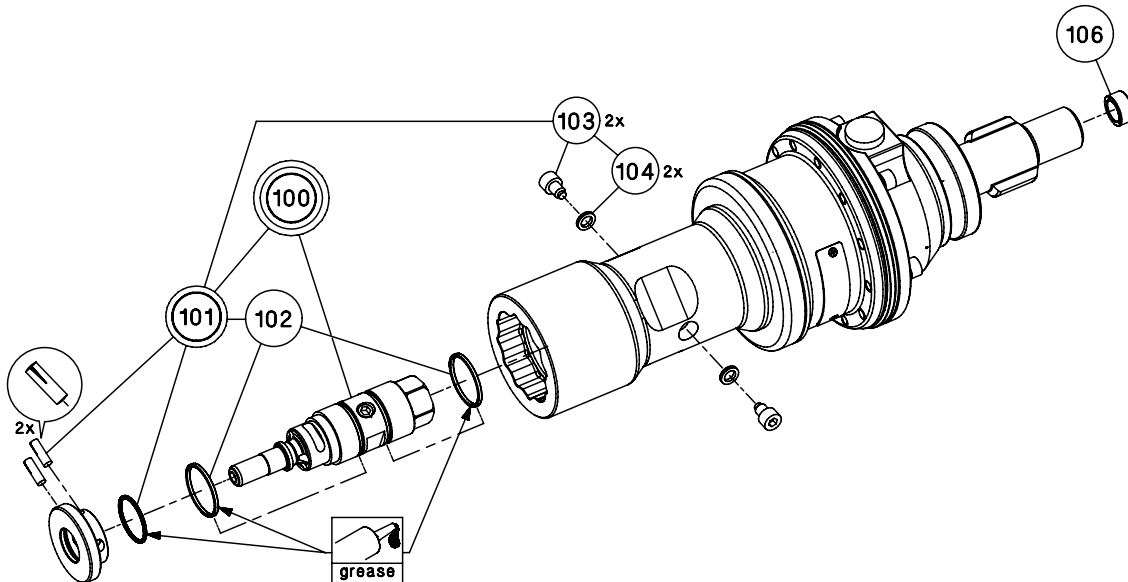
- Remove the dispenser from the drill motor
- Remove the lip seal (blue) shown in figure 1
- Reinsert a new lip seal (#106) with the impact cam → fig 2, 3
- Grease the connection end slightly before reassembly

8/4

Wartung des Einsteckendes

- Dispenser aus dem Motor entfernen
- Entfernen der in Abbildung 1 dargestellten Nutring-Dichtung (blau)
- Einbau eines neuen Nutrings (#106) mit Hilfe des Eintreibwerkzeugs → Abb. 2, 3
- Einsteckende des Dispensers vor dem Wiedereinbau leicht fetten

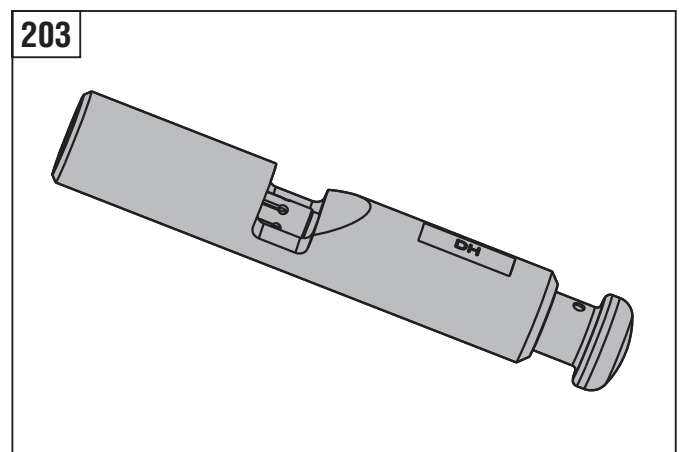
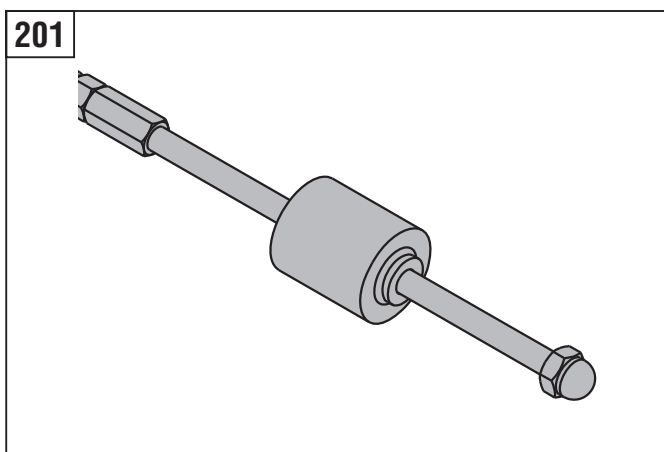




| Name Bezeichnung | Length without shaft Länge ohne Einsteckende | | Weight Gewicht | | Item number Artikelnummer |
|---------------------|---|---------------------------------|-------------------|------|------------------------------|
| | [mm] | [inch] | [kg] | [lb] | |
| HOS I-N D3 B | 336 | 16 ⁷ / ₃₂ | 15,3 | 33,7 | 287571 |

| # | Spare parts | Ersatzteile | Item number Artikelnummer |
|-----|----------------------------------|------------------------|------------------------------|
| 100 | Inner component HOS I-N sht assy | Innenteil HOS I-N kpl | 274440 |
| 101 | Stop Kit | Anschlag Set | 287592 |
| 102 | O-Ring HOS-I-N | O-Ring HOS-I-N | 274442 |
| 103 | Hex skd hd cap screw | Zyl-Schr m I-6kt | 287597 |
| 104 | Retaining washer NL 8 | Sicherungsscheibe NL 8 | 238578 |
| 106 | Seal HOS I-N | Dichtung HOS I-N kpl | 274101 |

| # | Tools | Werkzeuge | Item number Artikelnummer |
|-----|--------------------|---------------------|------------------------------|
| 201 | Extractor assy | Abzieher kpl | 17719 |
| 203 | Impact cam DH assy | Schlagkörper DH kpl | 274883 |



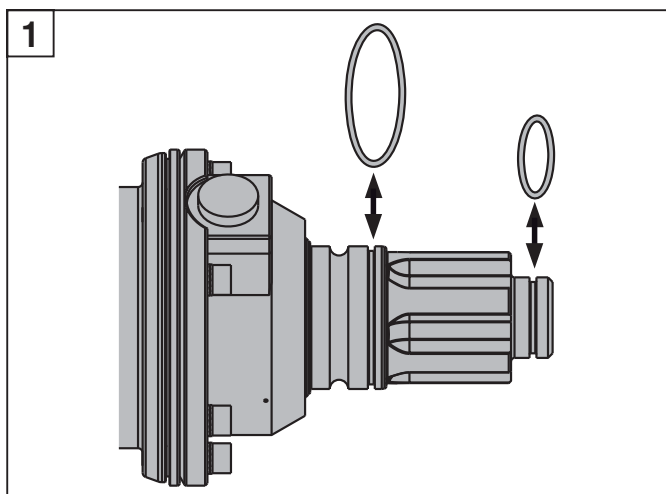
Maintenance of the shaft

- Remove the dispenser from the drill motor
- Remove the worn O-rings / fit new O-rings (#105)
- Grease the connection end slightly before reassembly

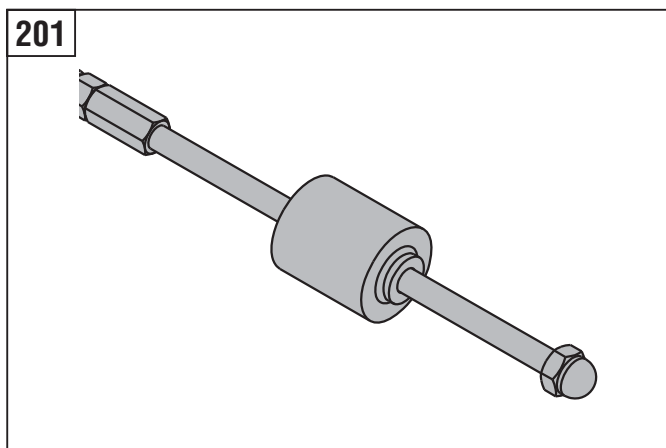
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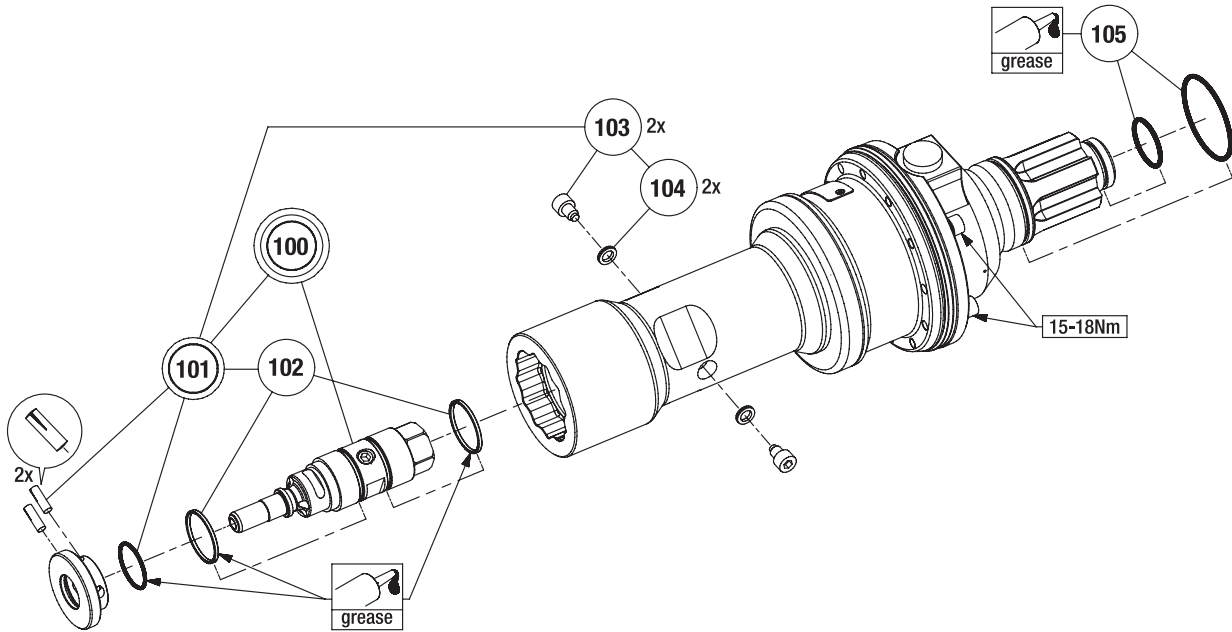
Wartung des Einsteckendes

- Dispenser aus dem Motor entfernen
- Austausch verschlissener O-Ringe gegen neue O-Ringe (#105)
- Einsteckende des Dispensers vor dem Wiedereinbau leicht fetten



| # | Tools | Werkzeuge | Item number Artikelnummer |
|-----|----------------|--------------|------------------------------|
| 201 | Extractor assy | Abzieher kpl | 17719 |





| Name Bezeichnung | Length without shaft Länge ohne Einsteckende | | Weight Gewicht | | Item number Artikelnummer |
|----------------------|---|----------------------------------|-------------------|------|------------------------------|
| | [mm] | [inch] | [kg] | [lb] | |
| Dispenser HOS I-N A5 | 286 | 11 ¹⁷ / ₆₄ | 14,7 | 32,5 | 362227 |
| Dispenser HOS I-N A2 | 336 | 13 ⁷ / ₃₂ | 16,4 | 36,2 | 287569 |
| Dispenser HOS I-N A3 | 386 | 15 ¹³ / ₆₄ | 18,0 | 39,7 | 287570 |

| # | Spare parts | Ersatzteile | Item number Artikelnummer |
|-----|----------------------------------|------------------------|------------------------------|
| 100 | Inner component HOS I-N sht Assy | Innenteil HOS I-N kpl | 274440 |
| 101 | Stop Kit | Anschlag Set | 287592 |
| 102 | O-Ring HOS-I-N | O-Ring HOS-I-N | 274442 |
| 103 | Hex skt hd cap screw | Zyl-Schr m I-6kt | 287597 |
| 104 | Retaining washer NL 8 | Sicherungsscheibe NL 8 | 238578 |
| 105 | O-ring Hydro Kit | O-Ring Hydro Set | 238577 |

| Name Bezeichnung | Length without shaft Länge ohne Einsteckende | | Weight Gewicht | | Item number Artikelnummer |
|-------------------------|---|----------------------------------|-------------------|------|------------------------------|
| | [mm] | [inch] | [kg] | [lb] | |
| Dispenser HOS I-T A 391 | 286 | 11 ¹⁷ / ₆₄ | 14,7 | 32,5 | 428536 |
| Dispenser HOS I-T A 441 | 336 | 13 ⁷ / ₃₂ | 16,4 | 36,2 | 428537 |
| Dispenser HOS I-T A 491 | 386 | 15 ¹³ / ₆₄ | 18,0 | 39,7 | 428538 |

| # | Spare parts | Ersatzteile | Item number Artikelnummer |
|-----|-----------------------------------|--------------------------|------------------------------|
| 100 | Inner component HOS I-TR sht Assy | Innenteil HOS I-TR kpl | 435830 |
| 101 | Stop Kit HOS I-T | Anschlag Set HOS I-T set | 435832 |
| 102 | O-Ring HOS-I-N | O-Ring HOS-I-N | 274442 |
| 103 | Hex skt hd cap screw | Zyl-Schr m I-6kt | 287597 |
| 104 | Retaining washer NL 8 | Sicherungsscheibe NL 8 | 238578 |
| 105 | O-ring Hydro Kit | O-Ring Hydro Set | 238577 |

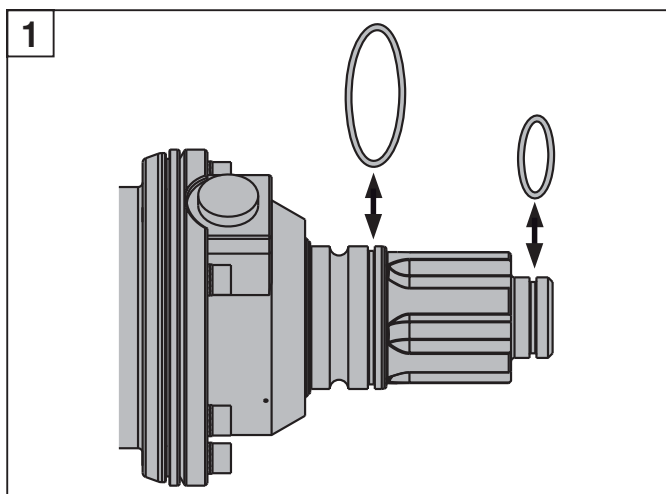
Maintenance of the shaft

- Remove the dispenser from the drill motor
- Remove the worn O-rings / fit new O-rings (#105)
- Grease the connection end slightly before reassembly

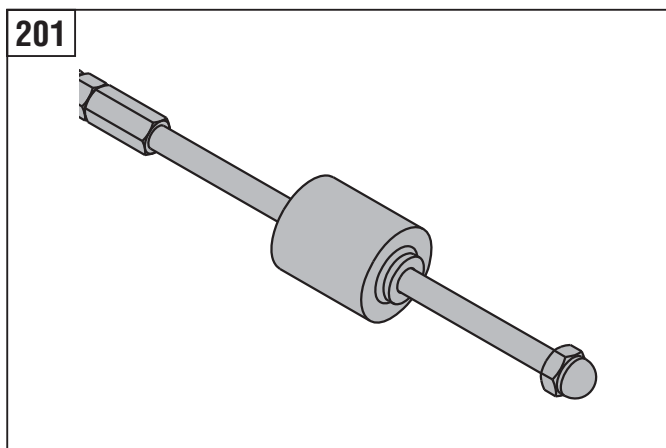
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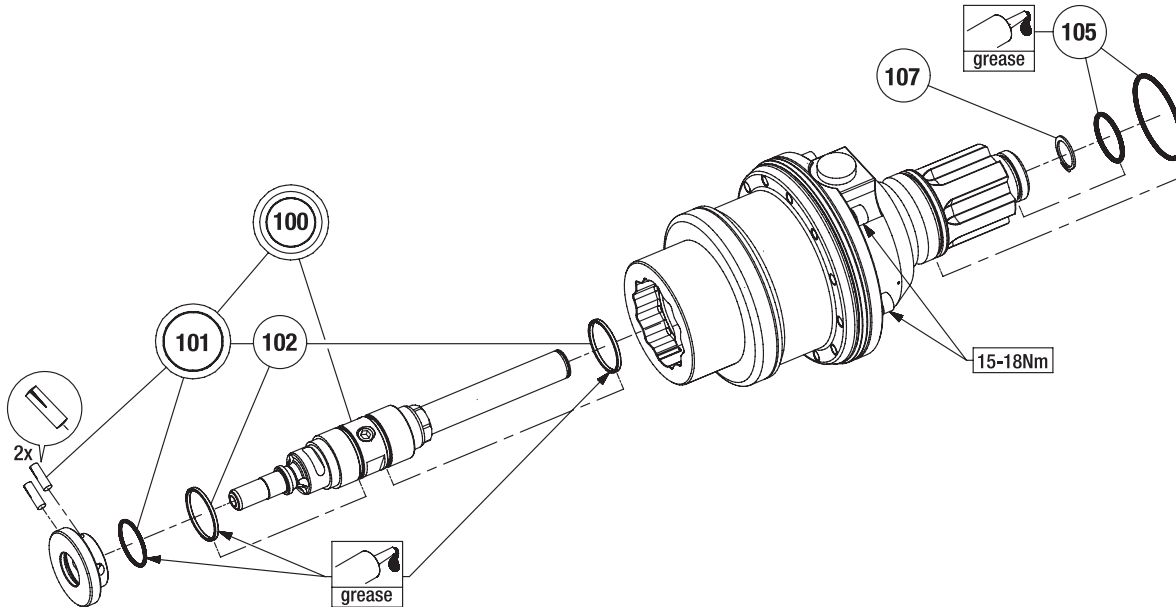
Wartung des Einsteckendes

- Dispenser aus dem Motor entfernen
- Austausch verschlissener O-Ringe gegen neue O-Ringe (#105)
- Einsteckende des Dispensers vor dem Wiedereinbau leicht fetten



| # | Tools | Werkzeuge | Item number Artikelnummer |
|-----|----------------|--------------|------------------------------|
| 201 | Extractor assy | Abzieher kpl | 17719 |





| Name Bezeichnung | Length without shaft Länge ohne Einsteckende | | Weight Gewicht | | Item number Artikelnummer |
|----------------------|---|---------------------------------|-------------------|------|------------------------------|
| | [mm] | [inch] | [kg] | [lb] | |
| Dispenser HOS I-N A1 | 176 | 6 ¹⁵ / ₁₆ | 11,1 | 24,4 | 287572 |

| # | Spare parts | Ersatzteile | Item number Artikelnummer |
|-----|--------------------------------|-----------------------------|------------------------------|
| 100 | Inner component Hydro 160 assy | Innenteil Hydro 160 kpl | 238521 |
| 101 | Stop Hydro 160 kit | Anschlag Hydro 160 Set | 238582 |
| 102 | O-ring HOS-I-N | O-Ring HOS-I-N | 274442 |
| 105 | O-ring Hydro Kit | O-Ring Hydro Set | 238577 |
| 107 | circlip A20 stnls | Sicherungsring A20 rostfrei | 238576 |

| Name Bezeichnung | Length without shaft Länge ohne Einsteckende | | Weight Gewicht | | Item number Artikelnummer |
|-------------------------|---|---------------------------------|-------------------|------|------------------------------|
| | [mm] | [inch] | [kg] | [lb] | |
| Dispenser HOS I-T A 281 | 176 | 6 ¹⁵ / ₁₆ | 11,1 | 24,4 | 428535 |

| # | Spare parts | Ersatzteile | Item number Artikelnummer |
|-----|-----------------------------------|-----------------------------|------------------------------|
| 100 | Inner component Hydro 160-TR assy | Innenteil Hydro 160-TR kpl | 435836 |
| 101 | Stop Kit Hydro 160-T kit | Anschlag Hydro 160-T Set | 435838 |
| 102 | O-ring HOS-I-N | O-Ring HOS-I-N | 274442 |
| 105 | O-ring Hydro Kit | O-Ring Hydro Set | 238577 |
| 107 | circlip A20 stnls | Sicherungsring A20 rostfrei | 238576 |

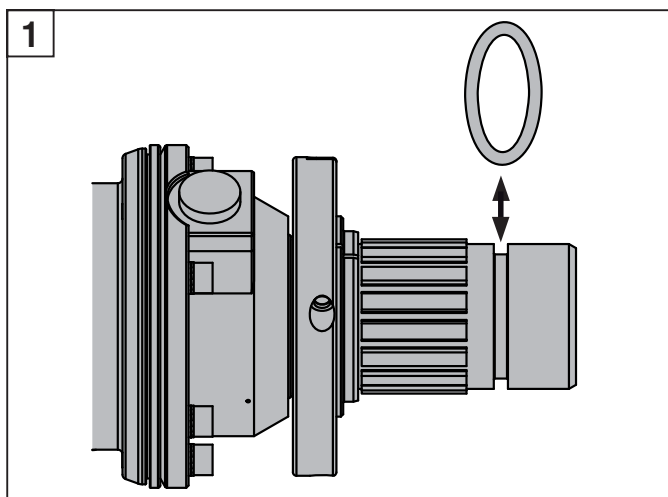
Maintenance of the shaft

- Remove the dispenser from the drill motor
- Remove the worn O-rings / fit new O-rings (#105)
- Grease the connection end slightly before reassembly

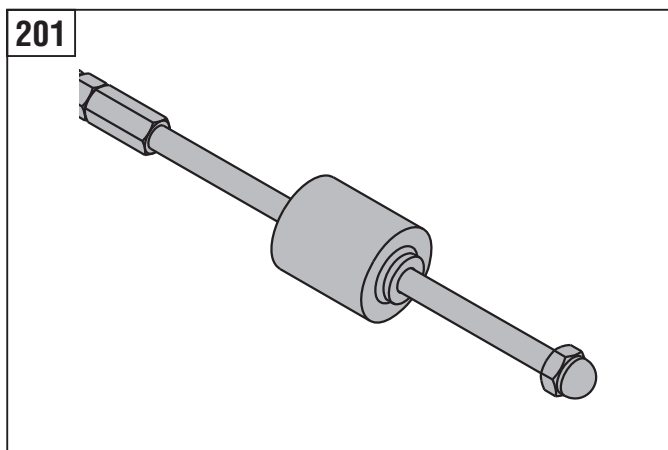
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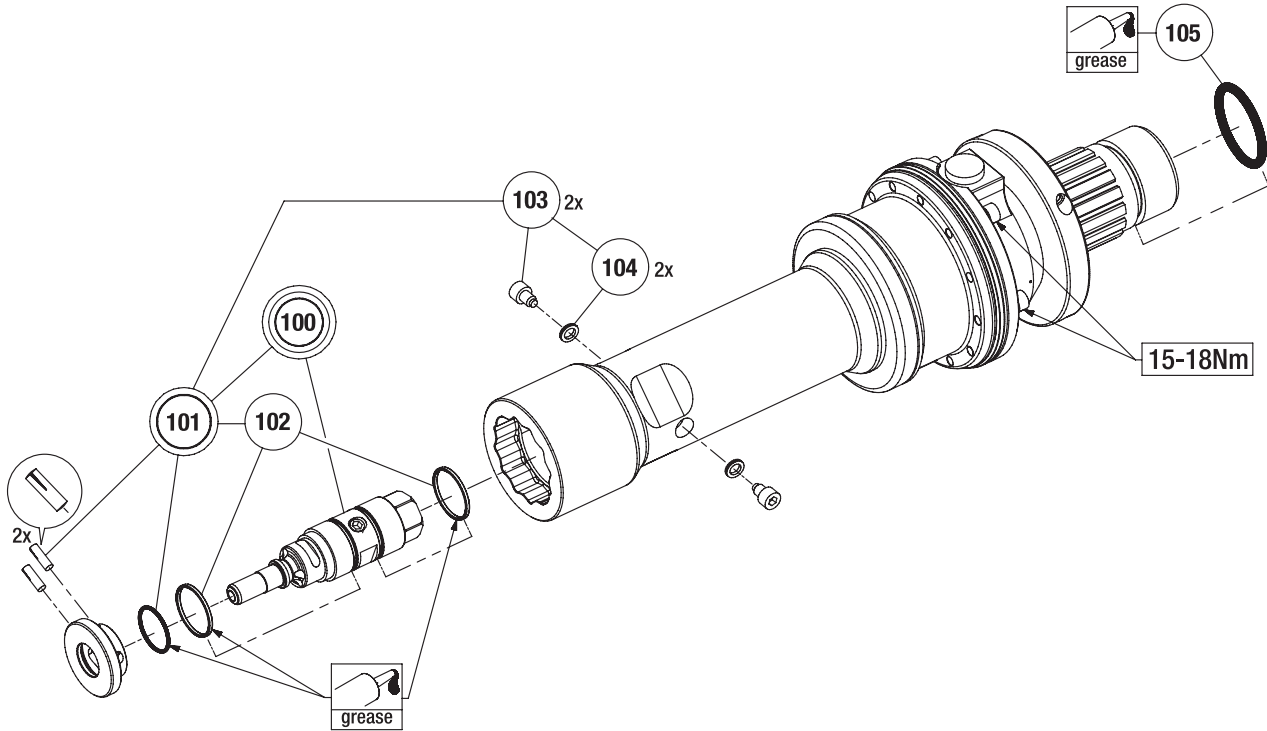
Wartung des Einsteckendes

- Dispenser aus dem Motor entfernen
- Austausch verschlissener O-Ringe gegen neue O-Ringe (#105)
- Einsteckende des Dispensers vor dem Wiedereinbau leicht fetten



| # | Tools | Werkzeuge | Item number Artikelnummer |
|-----|----------------|--------------|------------------------------|
| 201 | Extractor assy | Abzieher kpl | 17719 |





| Name Bezeichnung | Length without shaft Länge ohne Einsteckende | | Weight Gewicht | | Item number Artikelnummer |
|--------------------------|---|--------|-------------------|------|------------------------------|
| | [mm] | [inch] | [kg] | [lb] | |
| Dispenser HOS I-N V 526B | 406 | 16 | 21,3 | 46,9 | 406208 |

| # | Spare parts | Ersatzteile | Item number Artikelnummer |
|-----|----------------------------------|------------------------|------------------------------|
| 100 | Inner component HOS I-N sht assy | Innenteil HOS I-N kpl | 274440 |
| 101 | Stop kit | Anschlagset | 287592 |
| 102 | O-ring HOS-I-N | O-Ring HOS-I-N | 274442 |
| 103 | Hex skt hd cap screw | Zyl-Schr m I-6kt | 287597 |
| 104 | Retaining washer NL 8 | Sicherungsscheibe NL 8 | 238578 |
| 105 | O-ring 50,17 * 5,33 | O-Ring 50,17 * 5,33 | 295149 |

| Name Bezeichnung | Length without shaft Länge ohne Einsteckende | | Weight Gewicht | | Item number Artikelnummer |
|--------------------------|---|--------|-------------------|------|------------------------------|
| | [mm] | [inch] | [kg] | [lb] | |
| Dispenser HOS I-T V 526B | 406 | 16 | 21,3 | 46,9 | 437819 |

| # | Spare parts | Ersatzteile | Item number Artikelnummer |
|-----|-----------------------------------|-------------------------|------------------------------|
| 100 | Inner component HOS I-TR sht assy | Innenteil HOS I-TR kpl | 435830 |
| 101 | Stop kit | Anschlagset HOS I-T Set | 435832 |
| 102 | O-ring HOS-I-N | O-Ring HOS-I-N | 274442 |
| 103 | Hex skt hd cap screw | Zyl-Schr m I-6kt | 287597 |
| 104 | Retaining washer NL 8 | Sicherungsscheibe NL 8 | 238578 |
| 105 | O-ring 50,17 * 5,33 | O-Ring 50,17 * 5,33 | 295149 |

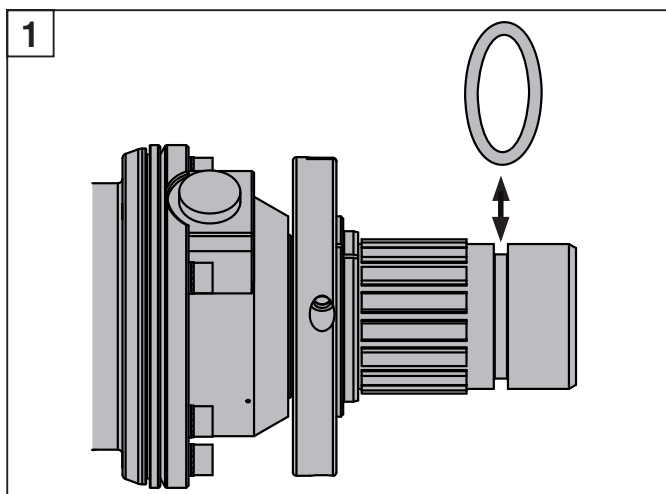
Maintenance of the shaft

- Remove the dispenser from the drill motor
- Remove the worn O-rings / fit new O-rings (#105)
- Grease the connection end slightly before reassembly

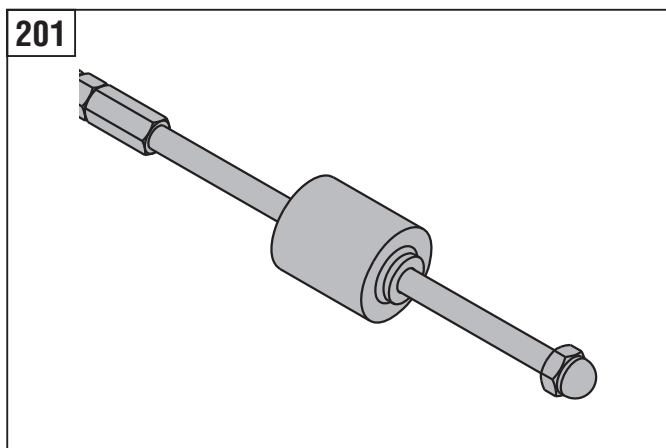
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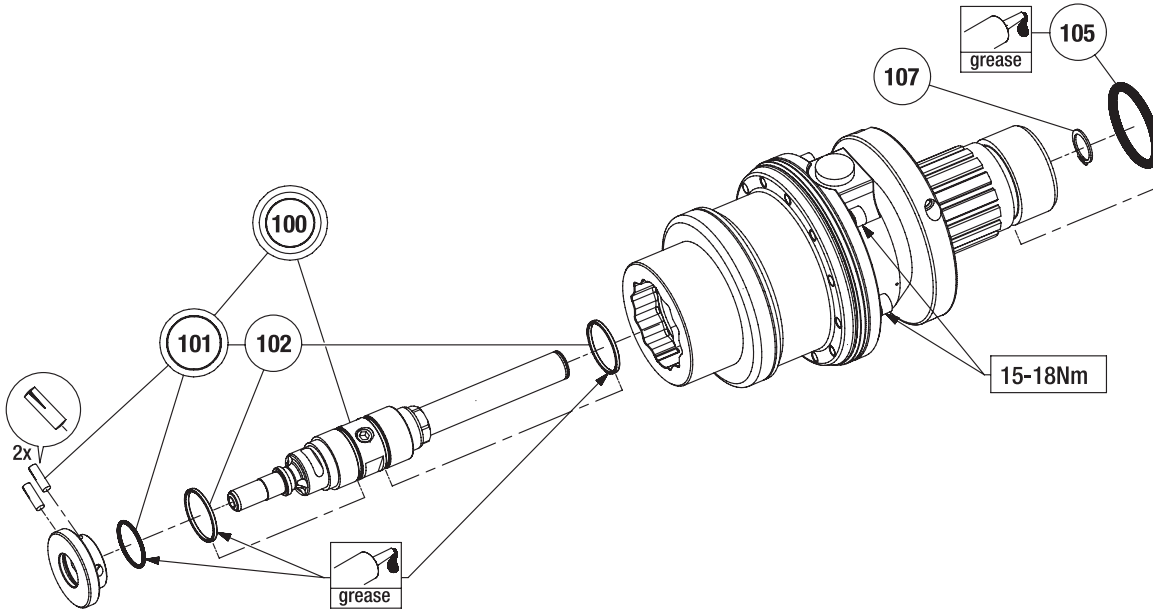
Wartung des Einsteckendes

- Dispenser aus dem Motor entfernen
- Austausch verschlissener O-Ringe gegen neue O-Ringe (#105)
- Einsteckende des Dispensers vor dem Wiedereinbau leicht fetten



| # | Tools | Werkzeuge | Item number Artikelnummer |
|-----|----------------|--------------|------------------------------|
| 201 | Extractor assy | Abzieher kpl | 17719 |





| Name Bezeichnung | Length without shaft Länge ohne Einsteckende [mm] | [inch] | Weight Gewicht [kg] | [lb] | Item number Artikelnummer |
|----------------------|---|---------------------------------|---------------------------|------|------------------------------|
| Dispenser HOS I-N V1 | 176 | 6 ¹⁵ / ₁₆ | 13,5 | 29,7 | 365877 |

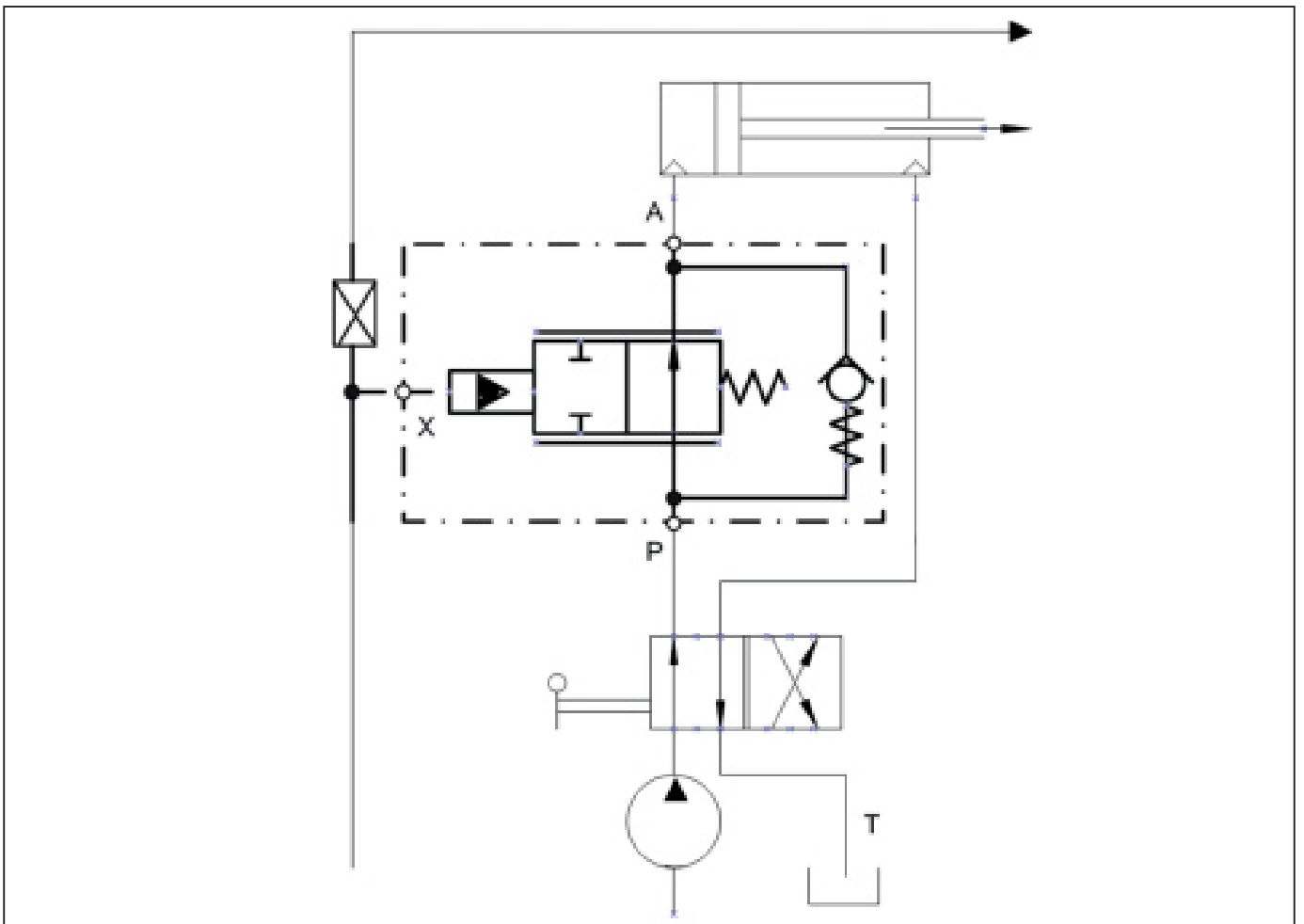
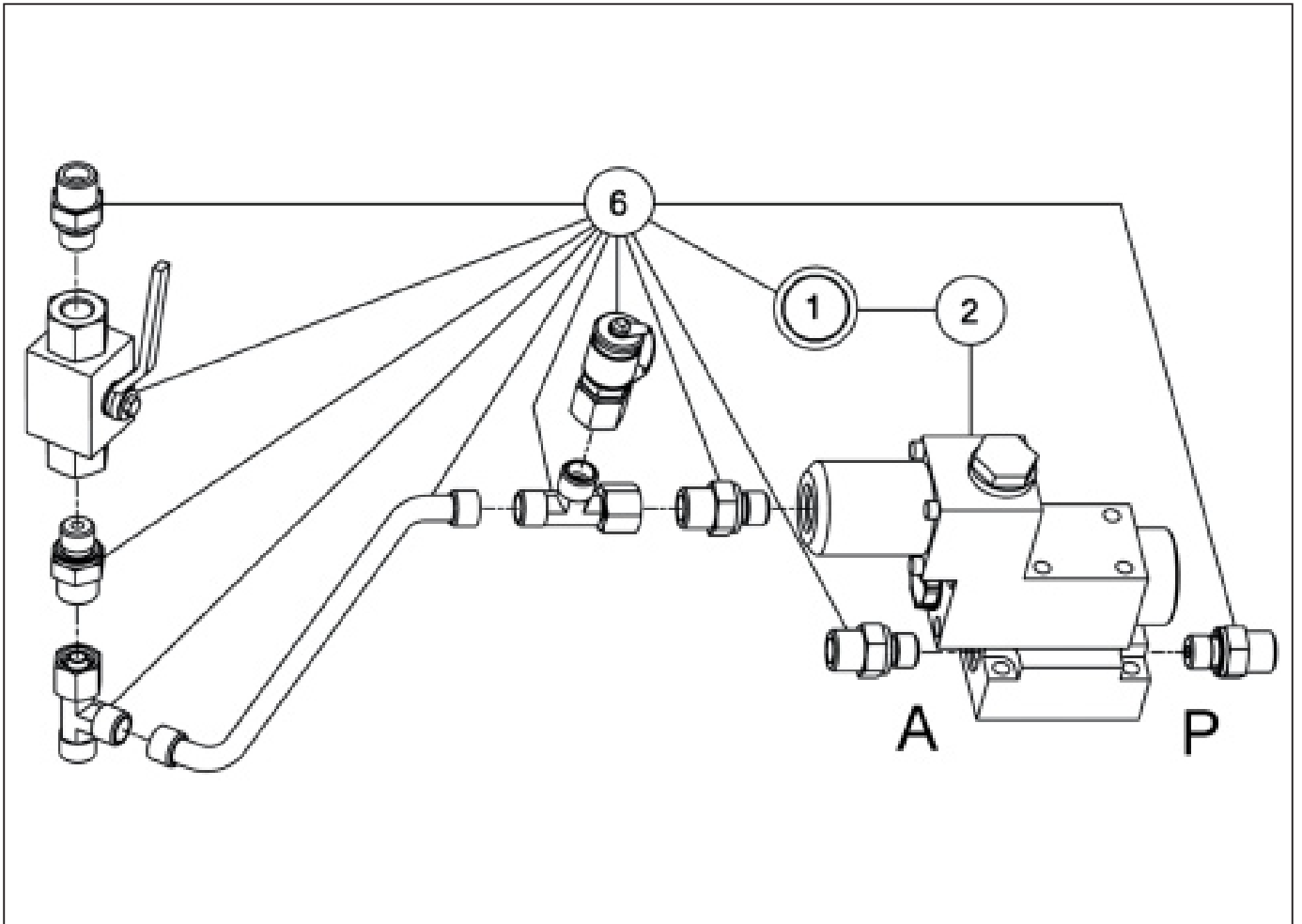
| # | Spare parts | Ersatzteile | Item number Artikelnummer |
|-----|--------------------------------|-----------------------------|------------------------------|
| 100 | Inner component HOS DeVall 176 | Innenteil HOS deVall 176 | 356293 |
| 101 | Stop Hydro 160 kit | Anschlag Hydro 160 Set | 238582 |
| 102 | O-ring HOS-I-N | O-Ring HOS-I-N | 274442 |
| 105 | O-ring 50,17 * 5,33 | O-Ring 50,17 * 5,33 | 295149 |
| 107 | Circlip A 20 stnls. | Sicherungsring A20 rostfrei | 238576 |

| Name Bezeichnung | Length without shaft Länge ohne Einsteckende [mm] | [inch] | Weight Gewicht [kg] | [lb] | Item number Artikelnummer |
|-------------------------|---|---------------------------------|---------------------------|------|------------------------------|
| Dispenser HOS I-T V296B | 176 | 6 ¹⁵ / ₁₆ | 13,5 | 29,7 | 437820 |

| # | Spare parts | Ersatzteile | Item number Artikelnummer |
|-----|-----------------------------------|-----------------------------|------------------------------|
| 100 | Inner component HOS DeVall 176-TR | Innenteil HOS deVall 176-TR | 435840 |
| 101 | Stop Hydro 160-T kit | Anschlag Hydro 160-T Set | 435838 |
| 102 | O-ring HOS-I-N | O-Ring HOS-I-N | 274442 |
| 105 | O-ring 50,17 * 5,33 | O-Ring 50,17 * 5,33 | 295149 |
| 107 | Circlip A 20 stnls. | Sicherungsring A20 rostfrei | 238576 |

Appendix 9**Feed Control****Anhang 9****Feed Control****9**

| Pos | Description | Beschreibung | Hilti Part. No Hilti Teile Nr |
|-----|---------------------------|----------------------------|----------------------------------|
| 1.1 | HOS FC Unit JC | HOS FC Einheit JC | 423049 |
| 1.2 | HOS FC Unit BSPP | HOS FC Einheit BSPP | 423055 |
| 1.3 | HOS FC Unit DN | HOS FC Einheit DN | 423057 |
| 2 | HOS FC Valve Assembly | HOS FC Ventil Zusammenbau | 423050 |
| 6.1 | HOS FC Hose Assembly JIC | HOS FC Verschlauchung JIC | 423054 |
| 6.2 | HOS FC Hose Assembly BSPP | HOS FC Verschlauchung BSPP | 423056 |
| 6.3 | HOS FC Hose Assembly DIN | HOS FC Verschlauchung DIN | 423058 |





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