SCHAEFFLER



Hydraulic Nuts HYDNUT..-E, HYDNUT..-E-INCH, HYDNUT..-HEAVY

User manual

Foreword

New designation	The new hydraulic nuts HYDNUTE(-INCH) can be identified from the -E in the designation. The E stands for Enhanced and refers to many improvements to the hydraulic nuts. However, improvements have also been made to the HYDNUTHEAVY series.
Measuring the drive-up distance	At first sight, it is not possible to identify the new piston form for hydraulic nuts HYDNUTE(-INCH), but it is precisely this charac- teristic that gives a major advantage: the drive-up distance can be measured simply using a conventional dial gauge. This is fitted in the hole for the dial gauge and is located by hand using a knurled clamping screw made from plastic. The tip of the measuring pin lies flat on the new collar of the piston, which means that the stroke can be measured precisely.
Marking	The marking is also a new feature. Each hydraulic nut is marked with the maximum permissible pressure and the thread present. This facilitates reliable operation and damage-free mounting.
Mounting and dismounting	Mounting and dismounting of a HYDNUTE(-INCH) is aided by the hand lever now supplied. This is inserted in a handling hole and, as a result, the hydraulic nut can be easily screwed and unscrewed. If maintenance or repair of a HYDNUTE(-INCH) becomes necessary at any time, the dismounting screws made from burnished steel and complete with brass stud give considerable benefit in dismounting. The annular piston can thus be unscrewed uniformly from the press ring. The maximum stroke is indicated by a red O-ring, thus reliably preventing excessive outward movement of the piston and all
	the resulting consequences. Simple visual inspection is sufficient during use.
Current version	A current version of this user manual can be found at http://medien.schaeffler.com using the search term BA04.

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Hydraulic nuts HYDNUT

About the user manual	This user manual is part of the product and contains important information.
Symbols	The warning and hazard symbols are defined in accordance with ANSI Z535.6-2011.
WARNING	In case of non-compliance, death or serious injury may occur. \triangleleft
	In case of non-compliance, minor or moderate injury may occur. <
NOTICE	In case of non-compliance, damage or malfunctions in the product or the adjacent construction may occur. ◀
Availability	This user manual is supplied with each hydraulic nut and can also be ordered retrospectively. An electronic version (.pdf) is available in the Mediathek on the Schaeffler page of the Internet.
WARNING	Serious injuries may occur due to the escape under high pressure of hydraulic oil in the absence of important information for the user since the user manual is incomplete, illegible or absent.
	As the safety coordinator, you must ensure that this user manual is always complete and legible and that any persons using hydraulic nuts have the user manual available.
Legal guidelines	The information in this manual corresponded to the most recent status at the close of editing. The illustrations and descriptions cannot be used as grounds for any claims relating to devices that have already been delivered. Schaeffler Technologies AG & Co. KG accepts no liability for any damage or malfunctions if the device or accessories have been modified or used in an inappropriate manner.
Original user manual	The original user manual is taken to be a user manual in the German language. A user manual in another language is to be taken as a translation of the original user manual.

General safety guidelines	This section describes how the hydraulic nut may be used, who may use the hydraulic nut and what must be observed in general during its use.
Usage for the intended purpose	In the case of hydraulic nuts, usage for the intended purpose comprises the mounting and dismounting of rolling bearings as well as the mounting and loosening of press fits such as ships' propellers and rubber blades, shaft couplings and gears.
Usage not for the intended purpose	The hydraulic nut must not be used to lift loads. Unilateral loading is not possible, instead load must be applied uniformly over the circumference of the annular piston.
Qualified personnel	 The hydraulic nut must only be used by suitably qualified personnel. A person defined as qualified personnel: has all the necessary knowledge has been trained in working on rolling bearings and hydraulic tools is aware of all the hazards and safety guidelines is authorised to use a hydraulic nut by the safety co-ordinator has fully read and understood this user manual
Hazards	If a hydraulic nut is damaged, hydraulic oil may be sprayed out under high pressure. For this reason, only an undamaged hydraulic nut may be used and repairs to the hydraulic nut are therefore prohibited.
Protective equipment	Personal protective equipment is intended to protect personnel against health hazards. This comprises safety goggles, safety shoes and gloves and must be used for personal safety.

Hydraulic nuts HYDNUT

Safety regulations	The following safety specifications must be observed when working with the hydraulic nut. Further guidelines on hazards and specific operating procedures can be found, for example, in the descriptions of the operation of hydraulic nuts, see page 41. Safety specifications for the pressure generation device can be found in the user manual of the pressure generation device.
Transport	If the ambient conditions during transport differ to a large extent from the ambient conditions specified for its operation, usage of the hydraulic nut must be stopped immediately.
	The hydraulic nut must always be stored and operated under the ambient conditions described. Before storage, preservative must be applied to the hydraulic nut in order to give protection against corrosion.
	Unsuitable ambient conditions can endanger the health of the operating personnel.
	The hydraulic nut must not be operated at a pressure greater than the maximum permissible operating pressure.
	These ambient conditions are as follows:
	no aggressive chemicals in the environment temperature from +5 °C to +40 °C
Maintenance	The hydraulic nut must undergo regular maintenance, see page 60. Only original replacement parts may be used.
Conversion	The hydraulic nut must not be converted.

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Scope of delivery

Hydraulic nuts HYDNUT..-E(-INCH) The scope of delivery comprises the hydraulic nut, accessories and user manual, see *table* and *Figure 1*.

Component	Designation	Quantity
Hydraulic nut	HYDNUT	1
Clamping screw	-	3
Screw plug ($G^{1/4}$)	HYDNUT.PLUG	2
Dismounting screw ¹⁾	-	3 5
Valve nipple ($G^{1/4}$)	PUMP1000.VALVE-NIPPLE	1
Hand lever ²⁾	HYDNUT-HANDHEBEL-D10	1
	HYDNUT-HANDHEBEL-D12	1
	HYDNUT-HANDHEBEL-D16	1
Seal set (replacement outer seal, replacement inner seal and red O-ring)	HYDNUTSEAL	1
User manual	-	1

¹⁾ Allocation, see *tables*, page 16.

²⁾ Allocation, see *tables*, page 15.



 Hydraulic nut
 Clamping screws
 Screw plug
 Dismounting screws
 Hand lever
 Valve nipple
 Replacement seals for outer side, inner side and red O-ring
 User manual

> Figure 1 Scope of delivery HYDNUT..-E(-INCH)

Accessories	Hydraulic nuts are supplied with the appropriate replacement seals. Other accessories are available, see page 68.
Further information	 The scope of delivery does not include the following documents: TPI 195, Pressure Generation Devices TPI 196, Hydraulic Nut HYDNUT MH 1, Mounting of Rolling Bearings WL 80110, Reduction in Radial Internal Clearance in Mounting of Spherical Roller Bearings with Tapered Bore
Damage during transit	Any damage during transit must be reported as a complaint to the carrier.
Defects	Any defects must be reported promptly to Schaeffler Technologies AG & Co. KG.

Description All hydraulic nuts are of a similar design. They have a metric, trapezoidal or inch size thread on the inner cylindrical surface of the press ring. Accessories are necessary for operation.

A hydraulic nut comprises a press ring, in which a movable annular piston is located. Between these two components is a pressure chamber filled with hydraulic oil. This is sealed by means of two seals, *Figure 2*.



Press ring
 Annular piston
 Sealing ring, PVC
 Red O-ring

Figure 2 Hydraulic nut HYDNUT..-E(-INCH)

Press ring The single piece press ring made from steel supports the movable annular piston.

- Annular piston The single piece annular piston is made from steel. The annular piston has two slots for sealing rings and one flat slot for the red O-ring.
 - Sealing rings Two sealing rings made from soft PVC are inserted in corresponding slots in the annular piston and seal off the pressure chamber between the annular piston and the press ring. This prevents escape of the hydraulic oil from the pressure chamber.
 - **Red O-ring** The red O-ring is made from PVC and indicates that the annular piston may only be moved out as far as this position.

Press ring The single piece steel press ring supports the movable annular piston and has a thread on the inner cylindrical surface, *Figure 3*.

(1) Thread on inner cylindrical surface (2) Threaded hole for folding clevis (3) Folding clevis ④ Handling hole (5) Threaded hole for dismounting screw (6) Dismounting screw (7) Threaded hole G1/4 (8) Screw plug, W 6 (9) Hole for dial gauge, diameter 8 mm (10) Threaded hole for clamping screw (1) Clamping screw, M4

Figure 3 Press ring HYDNUT..-E(-INCH)

Thread on inner cylindrical surface

In order to allow mounting on the thread of a shaft, withdrawal sleeve or adapter sleeve, the inner cylindrical surface has a metric fine pitch thread, a trapezoidal thread or an inch size thread.



Threaded holeA suitable folding clevis can be screwed into this threaded holefor folding clevisin the outer cylindrical surface.

The threaded hole is available from HYDNUT270-E or 280-E-INCH.

HYDNUTE	Designation		
	from	to	
	HYDNUT270-E	HYDNUT395-E	M8
	HYDNUT400-E	HYDNUT900-E	M12
	HYDNUT930-E	HYDNUT1180-E	M16

HYDNUT..-E-INCH

Designation		
from	to	
HYDNUT280-E-INCH	HYDNUT380-E-INCH	M8
HYDNUT400-E-INCH	HYDNUT900-E-INCH	M12
HYDNUT950-E-INCH	-	M16

Folding clevis If there is a threaded hole for a folding clevis, then a folding clevis of sufficient load carrying capacity (not included in the scope of delivery) can be used to transport the complete hydraulic nut.

Alternatively, a round sling or steel rope of sufficient load carrying capacity can be used for transport. The steel rope may only be wrapped around the outer cylindrical surface of the press ring.

Handling holes Depending on the size, there are two, four or six pairs of handling holes. In each case, two holes are always arranged opposite each other, with one hole in the end face and the other in the outer cylindrical surface. If the hand lever is inserted in the handling hole, the press ring can be rotated more easily.

HYDNUTE	Designation			Diameter
	from	to		mm
	HYDNUT50-E	HYDNUT200-E	2×2	10
	HYDNUT205-E	HYDNUT395-E	4×2	12
	HYDNUT400-E	HYDNUT1180-E	6×2	16

HYDNUT..-E-INCH

Designation		Quantity	Diameter	
	from	to		mm
	HYDNUT50-E-INCH	HYDNUT200-E-INCH	2×2	10
	HYDNUT220-E-INCH	HYDNUT380-E-INCH	4×2	12
	HYDNUT400-E-INCH	HYDNUT950-E-INCH	6×2	16

A hand lever made from steel is included in the scope of delivery.

NOTICE

Damage to the handling holes and thus irreparable damage to the press ring due to the use of an unsuitable hand lever.

Only use hand levers that are of precisely the stated diameter and up to the maximum stated length. \blacktriangleleft

Hand lever	Designation		Length	Diameter
	from	to	mm	mm
	HYDNUT50-E	HYDNUT200-E	150	10
	HYDNUT205-E	HYDNUT395-E	250	12
	HYDNUT400-E	HYDNUT1180-E	300	16

Designation I		Length	Diameter
from	to	mm	mm
HYDNUT50-E-INCH	HYDNUT200-E-INCH	150	10
HYDNUT220-E-INCH	HYDNUT380-E-INCH	250	12
HYDNUT400-E-INCH	HYDNUT950-E-INCH	300	16

Threaded holes	The press ring has three or five threaded holes for dismounting
for dismounting screws	screws. If all dismounting screws are uniformly tightened,
	the annular piston is pressed out of the press ring, see page 61.

Dismounting screws At the time of delivery, dismounting screws made of burnished steel with brass stud similar to ISO 4028 are screwed into the dismounting holes and are used for dismounting of the annular piston.

HYDNUT..-E Designation Thread Quantity from to HYDNUT50-E HYDNUT200-E 3 M5 3 HYDNUT205-E HYDNUT395-E Μ6 5 HYDNUT400-E HYDNUT560-E Μ8 HYDNUT570-E HYDNUT900-E 5 M10 5 HYDNUT930-E HYDNUT1180-E M12

HYDNUT..-E-INCH Designation from to HYDNUT50-E-INCH HYDNUT200-E-II HYDNUT220-E-INCH HYDNUT380-E-II

from	to		
HYDNUT50-E-INCH	HYDNUT200-E-INCH	3	M5
HYDNUT220-E-INCH	HYDNUT380-E-INCH	3	M6
HYDNUT400-E-INCH	HYDNUT560-E-INCH	5	M8
HYDNUT600-E-INCH	HYDNUT900-E-INCH	5	M10
HYDNUT950-E-INCH	-	5	M12

Threaded holes G¹/₄ The press ring has two oil ducts. Each oil duct runs to the outside and ends in a threaded hole G¹/₄. The radial threaded hole is in the outer cylindrical surface, the axial threaded hole is on the end face of the press ring. The two threaded holes are offset by 180°.

At the time of delivery, a valve nipple is screwed into the radial threaded hole $G^{1/4}$. At the time of delivery, a screw plug is screwed into the axial threaded hole $G^{1/4}$.

During operation, the valve nipple can be screwed into the radial or axial threaded hole $G^{1/4}$. This depends on which threaded hole $G^{1/4}$ is more accessible. The other threaded hole $G^{1/4}$ must be closed off with the screw plug.

Quantity

Thread

Screw plug	At the time of delivery, a threaded hole $G^{1/4}$. A second delivery.	screw plug is screwed into cond screw plug is include	o the axia ed in the s	ll scope
Hole for dial gauge	The hole through the press ring is used to locate a dial gauge and has a diameter of 8 mm.			ge and
Threaded hole for clamping screw	At an angle of 90° to the hole for the dial gauge is a threaded hole for locating a clamping screw.			d hole
Clamping screw	The clamping screw made from plastic is knurled and can be tigh ened or loosened without the use of a tool. It locates the clampin shank of the mounted dial gauge. The material of the screw was selected such that the clamping shank is not damaged by the scree		e tight- amping was ne screw.	
HYDNUTE	Designation		Length	Thread
	from	to	mm	
	HYDNUT50-E	HYDNUT260-E	6	M4
	HYDNUT270-E	HYDNUT510-E	10	M4
	HYDNUT520-E	HYDNUT1180-E	16	M4
HYDNUTE-INCH	Designation		Length	Thread

СН	Designation		Length	Thread
	from	to	mm	
	HYDNUT50-E-INCH	HYDNUT260-E-INCH	6	M4
	HYDNUT280-E-INCH	HYDNUT500-E-INCH	10	M4
	HYDNUT530-E-INCH	HYDNUT950-E-INCH	16	M4

Annular piston The single piece annular piston is made from steel. The annular piston has two slots for sealing rings and one flat slot for the red O-ring. At or above a stipulated size, there are three threaded holes in the annular piston, *Figure 4*.



Slot for sealing ring
 Slot for red O-ring
 Threaded hole for eye bolt

Figure 4 Annular piston Slots for sealing rings Slot for red O-ring Threaded holes for eye bolts

A flat slot supports the red O-ring made from PVC.

In the case of hydraulic nuts HYDNUT400-E(-INCH) or larger, there are three threaded holes in the annular piston. At the pitch circle, the holes have a spacing of 120° to each other. If eye bolts are screwed into these threaded holes, the annular piston can be transported by means of a lifting device, see page 62.

HYDNUT..-E

Designation		Thread
from	to	
HYDNUT400-E	HYDNUT930-E	3×M6
HYDNUT950-E	HYDNUT1180-E	3×M8

HYDNUT..-E-INCH

Н	Designation		Thread
	from	to	
	HYDNUT400-E-INCH	HYDNUT900-E-INCH	3×M6
	HYDNUT950-E-INCH	-	3×M8

Other components In addition to the hydraulic nut, a hydraulic hose and a pressure generation device filled with hydraulic oil are required for operation, *Figure 5*.



Hydraulic nut
 Hydraulic hose
 Pressure generation device
 Hydraulic oil

Figure 5 Equipment

Hydraulic hose	The following specifications are only a selection. Ensure that all guidelines from the manufacturer are observed.
	The hydraulic hose:
	must fulfil all legal requirements valid at the point of use
	must be checked before each use
	must not be damaged
	must be approved for the operating pressure
	must be suitable for the hydraulic oil used
	must not exceed the maximum permissible operating period
	Further information on the hydraulic hose used is given in the documentation for the hydraulic hose.
Pressure generation device	The points stated below are only a selection. Ensure that all guidelines from the manufacturer of the pressure generation device are observed.
	The pressure generation device:
	must fulfil all legal requirements valid at the point of use
	must be checked before each use
	must not be damaged
	may only be operated at a pressure that is lower than the maximum permissible pressure of the hydraulic nut
	must have a sufficiently large tank, see page 40
	Further information on the pressure generation device used is given in the documentation for the pressure generation device.
Hydraulic oil	The hydraulic oil used must correspond to a particular viscosity class, see page 68.

Function The sealing rings in the annular piston create an outwardly sealed pressure chamber between the press ring and annular piston. A pressure generation device filled with hydraulic oil is connected to this pressure chamber via a hydraulic hose.

In the pressure generation device, hydraulic oil is placed under high pressure and flows into the pressure chamber. The annular piston undergoes movement, *Figure 6*.



 Pressure generation device

 Hydraulic line
 Hydraulic nut, threaded hole G¹/4
 Valve nipple G¹/4
 Pressure chamber
 Screw plug
 Direction of movement of annular piston

> *Figure 6* Functional principle

Mounting In the mounting of rolling bearings, the end face of the annular piston presses on the end face of the bearing inner ring, withdrawal sleeve or mounting plate, *Figure 7*.

Mounting on and dismounting from an adapter sleeve can be carried out using the oil pressure method. In this method, an additional pressure generation device is used to press hydraulic oil between the fit surfaces of the sleeve and bearing inner ring as well as between the sleeve and shaft.



 Mounting on shaft
 Mounting on adapter sleeve, oil pressure method
 Mounting on withdrawal sleeve
 Mounting on withdrawal sleeve, oil pressure method

> Figure 7 Mounting method

Dismounting If the rolling bearing is mounted on an adapter sleeve or withdrawal sleeve, the bearing can be dismounted from the sleeve using the hydraulic nut, *Figure 8*.

If mounting is carried out directly on the shaft, the hydraulic nut cannot be used for dismounting. However, the hydraulic nut can remain mounted on the shaft in dismounting and intercepts the bearing when it abruptly becomes loose in dismounting.



 Dismounting with withdrawal sleeve
 Dismounting with adapter sleeve

Figure 8 Dismounting method

Commissioning

oning Commissioning comprises the following steps:

- checking the hydraulic nut
- lifting the hydraulic nut out of the transport container and transporting the hydraulic nut
- preparation for mounting
- mounting the hydraulic nut
- applying the mounting ring, optional
- applying the intermediate ring, optional
- selecting and mounting the dial gauge
- selecting the pressure generation device

Checking the hydraulic nut

Before use, it is advisable to check whether the hydraulic nut is suitable for the thread present. The press ring has the diameter and thread information engraved on the surface, *Figure 9*.



① Diameter and thread information

Figure 9 Checking the hydraulic nut

> Check also whether the thread is damaged. A hydraulic nut with a damaged thread must not be used, since it can damage the thread on the shaft.

Lifting the hydraulic nut out of the transport container and transporting the hydraulic nut

WARNING

A hydraulic nut can be delivered lying flat either in a rigid box or a wooden crate. Smaller hydraulic nuts can be lifted out of the box and carried due to their low mass. Larger and thus heavier hydraulic nuts must be lifted using a suitable lifting tool. Lifting must always be carried out by the press ring, the threads of the annular piston are not suitable for transport of the complete hydraulic nut.

WARNING If a hydraulic nut with threaded holes in the annular piston is lifted by the annular piston and transported horizontally, the press ring may become loose and fall. A falling press ring can cause serious injury.

Always transport hydraulic nuts vertically.⊲

A CAUTION If a small hydraulic nut is carried horizontally with the annular piston facing down, the annular piston may become loose and fall. A falling annular piston can cause injury to legs and feet.

Hydraulic nuts should always be transported with the annular piston facing up or vertically. \triangleleft

WARNING If the annular piston is moved out further than the red O-ring, it may become loose during transport. The falling annular piston can cause injury.

Before transport, press in the annular piston until the red O-ring is no longer visible. \triangleleft

An unsuitable lifting tool can fail. A falling hydraulic nut can cause injury.

Use a suitable lifting tool that can safely support the mass of the hydraulic nut. Ensure that nobody is underneath the hydraulic nut at any time during transport. Secure the hazard area. ⊲



Serious injury caused by a falling hydraulic nut due to failure of an unsuitable clevis.

Only use a folding clevis that is suitable for all lifting positions (angles), *Figure 10.* \triangleleft

 Hydraulic nut, lying flat
 Hydraulic nut, lifted half way
 Hydraulic nut, suspended

Figure 10 Lifting positions

- Screw in the folding clevis (if there is a threaded hole for the clevis in the outer cylindrical surface of the press ring).
- ► Hang a hook in the folding clevis or thread in a carrying sling.
- Fit the securing belt.
- Slowly lift the hydraulic nut until it hangs vertical, *Figure 11*.



Wooden crate
 Hydraulic nut
 Valve nipple
 Folding clevis
 Hook
 Securing belt

Figure 11 Delivered condition

► Transport the hydraulic nut without shocks or vibration.

Preparation for mounting The valve nipple is checked as follows:

• Check optically whether the thread of the valve nipple is damaged. If the thread is damaged, use a new valve nipple, Figure 12.



Before mounting a hydraulic nut with thread, the shaft or sleeve must be secured so that it cannot rotate. In addition, the threads of the shaft or sleeve must be checked, *Figure 14*.



Damage to the mating thread during screw mounting if a thread is damaged.

Check the thread of the shaft or sleeve. Repair any damaged thread if possible. A hydraulic nut must not be screwed onto a damaged thread. ⊲



Damage to the thread through scoring if a lubricant is not used.

Apply lubricant to the thread of the hydraulic nut, for example using ARCANOL-MOUNTING-PASTE. \triangleleft



Damaged thread
 Undamaged thread
 Lubricant

Figure 14 Preparation Mounting the hydraulic nut

In mounting, the method used depends on the mass of the hydraulic nut.

Mounting a light hydraulic nut

A light hydraulic nut can be mounted manually, *Figure 15*:

- Rotate the hydraulic nut until the start of the thread on the hydraulic nut and the start of the thread on the shaft journal or sleeve coincide.
- Align the hydraulic nut exactly parallel and concentrically to the shaft.

WARNING

Injuries due to a hydraulic nut becoming loose from the shaft and falling because too few thread turns were engaged.

At least half the thread width must be engaged.⊲

NOTICE

If the thread of the shaft journal or sleeve is subjected during mounting to the mass of the hydraulic nut, scoring may occur in the thread.

Lift the hydraulic nut slightly and prevent the thread from being subjected to load by the whole mass of the hydraulic nut.⊲

- Screw the hydraulic nut into place (right hand thread) until the end face of the annular piston is in contact with the end face of the bearing inner ring.
- ► Loosen the hydraulic nut as necessary until the axial or radial threaded hole G¹/₄ is in the upper position.
- ▶ If necessary, apply a mounting ring, see page 36.
- \triangleright The hydraulic nut is mounted and can be bled.



 Shaft
 Hydraulic nut
 Rotary motion
 Half thread width of press ring
 Radial threaded hole G¹/₄, upper position
 Annular piston, end face
 Inner ring, end face

Figure 15 Mounting

Mounting a heavy hydraulic nut

A heavy hydraulic nut cannot be mounted manually. A mounting aid should be used on which the hydraulic nut is supported with the facility for rotation and axial displacement.

WARNING

If the hydraulic nut tilts or falls from the mounting aid, this can cause serious crushing of body parts.

Use an auxiliary device for screw mounting that has sufficient load carrying capacity and tilting rigidity. During mounting, secure the hydraulic nut against tilting and falling.

► Align the mounting aid at 90° and concentrically to the axis, *Figure 16*.



Figure 16 Aligning the mounting aid

Serious crushing in setting down of the hydraulic nut.

When setting down the hydraulic nut, ensure that no body parts are located in the gap between the hydraulic nut and shaft or adjacent construction. \triangleleft

Set down the hydraulic nut carefully on the mounting aid using a crane, *Figure 17*.



Shaft
 Hydraulic nut
 Gap

Figure 17 Setting down the hydraulic nut

Remove the securing belt.

Adjustment of the mounting aid requires precise action.

NOTICE

If the thread of the shaft or sleeve is subjected during mounting to the entire mass of the hydraulic nut, scoring may occur in the thread.

Adjust the height of the mounting aid so that the thread of the shaft or sleeve is not subjected to load by the entire mass of the hydraulic nut. \triangleleft

- ► Adjust the height of the mounting aid.
- Align the hydraulic nut exactly parallel and concentrically to the shaft.
- Remove the hook or carrying sling.
- Remove the folding clevis (if present).
- Rotate the hydraulic nut until the start of the thread on the hydraulic nut and the start of the thread on the shaft journal or sleeve coincide, *Figure 18*.



 Mounting aid
 Hydraulic nut, start of thread
 Shaft, start of thread

> Figure 18 Start position

When displacing the hydraulic nut, there is an increased risk of injury, especially to the hands.

WARNING

Serious crushing in displacement of the hydraulic nut.

When displacing the hydraulic nut, ensure that no body parts are located in the gap between the hydraulic nut and shaft or adjacent construction. \triangleleft

▶ Move the hydraulic nut in the direction of the shaft until the start of the thread on the hydraulic nut and the start of the thread on the shaft journal or sleeve are in contact, *Figure 19*.



Shaft
 Hydraulic nut
 Gap

Figure 19 Displacing the hydraulic nut

Repeat the following steps as often as necessary until the end face of the annular piston is in contact with the end face of the part to be pressed into place, *Figure 20*:

- ▶ Insert the hand lever into the lower handling hole.
- Rotate the hydraulic nut until the next handling hole is in the lower position.
- ▶ Move the hand lever into the lower handling hole.

WARNING

Injuries due to a hydraulic nut becoming loose from the shaft and falling because too few thread turns were engaged.

At least half the thread width must be engaged. ⊲



 Shaft
 Hydraulic nut
 Mounting aid
 Rotary motion
 Hand lever
 Half thread width of press ring
 Annular piston, end face
 Inner ring, end face

> *Figure 20* Mounting
The following step must only be carried out once:

- ► Loosen the hydraulic nut as necessary until the axial or radial threaded hole G^{1/4} is in the upper position, *Figure 21*.
- ▶ If necessary, apply a mounting ring, see page 36.
- \triangleright The hydraulic nut is mounted and can be bled.



(1) Radial threaded hole $G^{1/4}$

Figure 21 Loosening the hydraulic nut slightly 000B0558

Applying a mounting ring A mounting ring is necessary if the hydraulic nut cannot be screwed far enough onto the shaft journal or sleeve.

NOTICE

If there is too little interference, the hydraulic nut may become damaged. The pressure of the hydraulic oil can deform the hydraulic nut at the location where the thread of the hydraulic nut is not screwed into place.

If there is an interference of less than 80%, a mounting ring must be used.

- Measure the interference.
- ▶ Produce the mounting ring. For the diameter tolerance to be observed, please contact us in advance.
- ▶ Apply the mounting ring, *Figure 22*.



(1) Hydraulic nut, width = 100% (2) Interference (3) Mounting ring

> Figure 22 Mounting ring

Applying an intermediate ring

Depending on the nature of the rolling bearing, it may be necessary to apply an intermediate ring.

NOTICE

Without an intermediate ring, the hydraulic nut and bearing may be damaged.

If a rolling bearing is mounted which has a projecting cage or if its outer ring can be axially displaced or tilted too much, an intermediate ring must be applied. \triangleleft

- Measure the necessary width.
- Produce the intermediate ring. For the tolerance to be observed, please contact us in advance.
- ► Apply the intermediate ring, *Figure 23*.



Cage projection
 Maximum tilting
 Intermediate ring

Figure 23 Intermediate ring

Selecting and mounting the dial gauge

A dial gauge can be used for precise measurement of the drive-up distance in the mounting of rolling bearings with a tapered bore. This is clamped in the locating hole in the press ring and measures the drive-up distance of the annular piston.

The dial gauge used is selected depending on the dimensions of the hydraulic nut used.

No tools are required for mounting of the dial gauge.

Selecting the dial gauge

Both a digital and an analogue dial gauge are offered. Each dial gauge is delivered with extensions, *Figure 24*. The extensions are available separately, see page 68.



Digital dial gauge
 Analogue dial gauge
 Extension 30 mm
 Extension 50 mm

Figure 24 Dial gauges and extensions

For some hydraulic nuts, it is necessary to use an extension, see *table*.

Extensions

Designation		Extension
from	to	mm
HYDNUT50-E(-INCH)	HYDNUT440-E(-INCH)	-
HYDNUT450-E	-	
HYDNUT460-E(-INCH)	HYDNUT750-E(-INCH)	30
HYDNUT760-E	HYDNUT780-E	50
HYDNUT800-E(-INCH)	HYDNUT950-E(-INCH)	
HYDNUT1000-E	HYDNUT1180-E	

Mounting the dial gauge

A digital or analogue dial gauge from Schaeffler or a conventional dial gauge can be used. A conventional dial gauge is shown in the following illustration. The mounting procedure is not determined by the design of the dial gauge, *Figure 25*.

After mounting, the measuring pin must be able to move by at least the drive-up distance. This is dependent on the bearing and can be found, for example, in TPI 196.

- ► Loosen the plastic clamping screw.
- Insert the dial into the locating hole for the dial gauge until the tip of the measuring pin is in contact with the annular piston.
- Slide the dial gauge in by at least the requisite drive-up distance.
- ► Lightly tighten the clamping screw.



 Clamping screw
 Locating hole for dial gauge
 Dial gauge
 Measuring pin
 Drive-up distance

Figure 25 Mounting the dial gauge

Selecting the pressure generation device

A suitable pressure generation device must have certain characteristics, see page 20. It must have a sufficiently large tank containing at least the requisite oil quantity, since it is not possible to refill with hydraulic oil during operation.

Oil quantity For the maximum drive-up distance, a certain oil quantity is required, see *table*.

HYDNUT..-E, HYDNUT..-E-INCH

Hydraulic nut		Oil quantity ¹⁾
from	to	l
HYDNUT50-E(-INCH)	HYDNUT340-E(-INCH)	0,5
HYDNUT350-E	-	0,5
HYDNUT355-E	-	1
HYDNUT360-E(-INCH)	HYDNUT480-E(-INCH)	1
HYDNUT490-E	-	2
HYDNUT500-E(-INCH)	HYDNUT630-E(-INCH)	2
HYDNUT650-E	HYDNUT655-E	2
HYDNUT670-E(-INCH)	HYDNUT750-E(-INCH)	3
HYDNUT760-E	-	3
HYDNUT780-E	-	4
HYDNUT800-E(-INCH)	HYDNUT900-E(-INCH)	4
HYDNUT930-E	-	5
HYDNUT950-E(-INCH)	-	5
HYDNUT1000-E	-	5
HYDNUT1060-E	HYDNUT1080-E	6
HYDNUT1120-E	-	8
HYDNUT1180-E	-	9

 Assuming usage of a hydraulic hose with a length of 1 m and an inside diameter of 4 mm.

Operation	After bleeding, the pressure is built up in order to mount or dismount the component. The oil pressure method can be used for easier mounting and dismounting.
Drive-up distance	In the mounting of rolling bearings with a tapered bore, the internal clearance is reduced if the inner ring is driven up onto the shaft or sleeve and is thus expanded. The length of the drive-up distance determines the degree to which the internal clearance is reduced.
NOTICE	If the internal clearance is set incorrectly, this will reduce the life of the rolling bearing or the rolling bearing will be damaged. Please observe the specifications of the rolling bearing manufacturer. ⊲
Hydraulic oil	The hydraulic oil used in operation must be clean and of the specified viscosity class, see page 68.
WARNING	Severe burns due to ignition of hydraulic oil. Avoid sources of ignition, including in particular cutting, welding and soldering work, in the vicinity of escaping hydraulic oil.⊲
WARNING	Hydraulic oil can cause irritation to skin and respiratory organs. Avoid skin contact if possible. Wear gloves. Protect uncovered skin by means of oil-based skin cream. Do not inhale vapours or fumes. ⊲
NOTICE	Contaminated hydraulic oil can damage seals. Damaged seals must be replaced promptly. Only use clean hydraulic oil.⊲

Maximum pressure Th

The maximum permissible pressure must be observed throughout operation.



Serious injuries due to the spraying of hydraulic oil under high pressure and damage to the hydraulic nut if the maximum permissible pressure is exceeded.

Measure the operating pressure continuously. The operating pressure must never exceed the maximum permissible pressure, *Figure 26*. \triangleleft



1 Maximum pressure information

Figure 26 Maximum permissible pressure, engraved

> Technical data such as dimensions and the permissible pressure for hydraulic nuts can be found in a Technical Product Information. This is available as a PDF file on the Internet under the address https://www.schaeffler.de, menu item Mediathek.

Further information TPI 196, Hydraulic Nut HYDNUT

Mounting the hydraulic hose

hose Mounting of the hydraulic hose connects the pressure generation device and hydraulic nut with each other.

The following accessories are required:

- hose fasteners
- tool for mounting hose fasteners, see instructions for hose fasteners
- Allen key W 6 for fitting and removing the screw plug
- tool for fitting and removing the valve nipple

AWARNING Serious injuries due to the spraying out of hydraulic oil as a result of an unsuitable, damaged or old hydraulic hose.

Only mount a hydraulic hose that is approved for use with the pressure generation device. The hydraulic hose must be free from damage. Observe the storage life date of the hydraulic hose.

NOTICE Damage to the pressure generation device and seals in the hydraulic nut due to contaminants.

Remove any contaminants from the pressure generation device, hydraulic hose and hydraulic nut. All work must be carried out under extreme cleanliness. ⊲

Mounting the hydraulic hose:

WARNING

Serious injuries due to the spraying of hydraulic oil under high pressure due to the loosening of a screw connection.

Observe the maximum tightening torque for the threaded hole $G^{1/4}$ (oil connector) in the hydraulic nut, see page 68. Observe the maximum tightening torque for the oil connector on the pressure generation device.

- Screw the value nipple (CEJN series 116) into the axial or radial threaded hole G¹/4, Figure 27.
- Screw the screw plug into the other threaded hole $G^{1/4}$.
- Slide the collar of the hydraulic hose onto the valve nipple.



 Hydraulic nut, threaded hole G^{1/}4
 Valve nipple
 Hydraulic hose

> *Figure 27* Connector

- Slide the collar of the hydraulic hose onto the valve nipple of the pressure generation device, *Figure 28*, page 45.
- ► Apply the hose fasteners.

WARNING

Serious injuries due to detached hose whipping back and forth. Mount hose fasteners in order to prevent whipping by the hydraulic hose. ⊲

WARNING

Serious injuries due to hydraulic oil spraying out of torn hydraulic hose under high pressure because the hydraulic hose was laid with an excessively small bending radius.

Lay the hydraulic hose with the specified bending radius to the pressure generation device. Observe the instructions for the hydraulic hose. \triangleleft



 Hose fastener on hydraulic nut
 Hose fastener on pressure generation device

Figure 28 Connecting the pressure generation device

- **Bleeding** Bleeding is necessary since compressed air will endanger the safety of the user. The hydraulic oil escaping during bleeding must be collected and disposed of correctly in accordance with the regional regulations.
 - Check whether the oil volume in the pressure generation device is adequate to bleed the pressure generation device, hydraulic hose and hydraulic nut. Furthermore, the oil volume must be sufficient for the drive-up distance of the annular piston. Where necessary, hydraulic oil must be refilled before bleeding. Refilling during operation is not permissible.

WARNING

Blinding or injury to eyes due to spraying out of hydraulic oil under high pressure.

Ensure that the plug-in coupling is securely connected and the hose fasteners are fitted. Always wear safety goggles. ⊲

- Ensure that the screw plug is at the top, *Figure 29*, page 47.
- ► Apply the device for collection of hydraulic oil.
- Remove the screw plug from the upper threaded hole $G^{1/4}$.
- ► Start the pressure generation device.
- ▶ Wait until the hydraulic oil escapes without air bubbles.
- ► Stop the pressure generation device.
- Screw the screw plug back into the upper threaded hole G^{1/4} and observe the tightening torque, see page 68.
- ▶ Remove the collector device.
- Dispose of the collected hydraulic oil correctly or send for recycling.



 Screw plug, threaded hole G^{1/}4 at top
 Collector device
 Pressure generation device
 Manometer

> *Figure 29* Bleeding

Pressing the component into place

Pressing into place can be carried out either with or without the oil pressure method. The oil pressure method is explained in the Mounting Handbook MH 1.

Oil pressure method In order to reduce the pressing force, the oil pressure method can be used. In the oil pressure method, an additional pressure generation device is used to press hydraulic oil between the fit surfaces of the component and shaft or sleeve, *Figure 30*.



 Additional pressure generation device, connection
 Rolling bearing inner ring
 Shaft
 Fit surface

> *Figure 30* Oil pressure method

> > Red O-ring

ng The maximum drive-up distance of the press ring is indicated by a red O-ring. The press ring can only be pressed out while the red O-ring is visible, *Figure 31*.



 Annular piston
 Press ring
 Red O-ring
 Drive-up distance, maximum

> Figure 31 Red O-ring

Pressure build-up As a result of pressure build-up, the component is pressed off the hydraulic nut.

When using the oil pressure method, pressure is first built up using the additional pressure generation device and then maintained during the whole mounting procedure.

WARNING

Serious injuries due to spraying out of hydraulic oil under high pressure.

The reasons for this may be as follows:

missing screw plug, defective seal, overshoot of maximum operating pressure, excessive pressing out of the press ring.

Screw in the screw plug in the radial threaded hole $G^{1/4}$.

Measure the operating pressure continuously. The operating pressure must never exceed the maximum permissible pressure, *Figure 32*.

Operate the hydraulic nut only while the red O-ring is visible, see page 48. \triangleleft



 $\textcircled{1} Maximum \ pressure \ information$

Figure 32 Maximum permissible pressure

WARNING

Serious injuries due to bursting or loosening of hydraulic nut in case of component failure.

Stand to one side, not directly behind the hydraulic nut.◀

Build up pressure in the hydraulic nut. Press the requisite volume into the hydraulic nut until the requisite drive-up distance is reached.

Pressure decrease in oil pressure method

The following steps are only carried out if the oil pressure method is used:

- ▶ Switch the pressure generation device for the oil pressure method to unpressurised.
- ▶ Wait 5 min.
- ▶ Measure the radial or axial internal clearance.
- ▶ Wait 30 min so that the oil can escape.

Pressure decrease The following steps are always carried out:

- in hydraulic nut > Switch the pressure generation device for the hydraulic nut to unpressurised.
 - ▶ Measure the radial or axial internal clearance.

Pressing back the piston HYDNUT50-E to HYDNUT190-E

Once mounting or dismounting of smaller hydraulic nuts is complete, switch the pressure generation device to unpressurised and press the annular piston completely into the press ring by rotation until it stops. The hydraulic oil will run back into the pressure generation device.

ACAUTION

Risk of slippage and contamination of the environment with hydraulic oil if oil is prevented from returning to the tank of the pressure generation device.

Ensure the return of oil to the tank of the pressure generation device. \triangleleft

WARNING

Serious injuries due to spraying out of hydraulic oil under high pressure if the pressure generation device is not switched to unpressurised and a hydraulic hose is detached.

A hydraulic hose may only be detached after switching the system to unpressurised. \triangleleft

- Switch the system to unpressurised, see the user manual of the pressure generation device.
- Screw the hydraulic nut on further until the annular piston is completely pressed back, *Figure 33*.
- ▷ The hydraulic oil is pressed back into the pressure generation device.



 Rotary motion
 Hydraulic hose
 Pressure generation device, pressure-free

Figure 33 Pressing back the annular piston

- ► Loosen the hose fastener.
- ▶ Remove the hydraulic hose.
- \triangleright The hydraulic nut can now be removed and transported away.

Pressing back the annular piston HYDNUT200-E to HYDNUT1180-E

Checking the stroke

In the case of larger hydraulic nuts, the hydraulic nut is transported after completion of mounting or dismounting to a suitable location, at which the annular piston is pressed back completely into the press ring using suitable tools until it stops.

If the annular piston has been pressed out further than the red O-ring, the hydraulic nut must not be transported. In this case, the annular piston must be pressed back while the hydraulic nut is still on the shaft.

- ► Check optically how far the annular piston has been extended, *Figure 34*.
- If the annular piston has been extended too far, omit the following sections and go directly to page 57.



Red O-ring
 Extended too far
 Maximum permissible extension

Figure 34 Checking the stroke Removing the hydraulic hose



Before transporting the hydraulic nut, the hydraulic hose is removed. The pressure generation device and hydraulic hose are connected again before the annular piston is pressed back.

Serious injuries due to spraying out of hydraulic oil under high pressure if the pressure generation device is not switched to unpressurised and a hydraulic hose is detached.

A hydraulic hose may only be detached after switching the system to unpressurised. \triangleleft

- Switch the system to unpressurised, see the user manual of the pressure generation device.
- Undo the hose fastener on the hydraulic nut, then remove the hose.

from the shaft



Detaching the hydraulic nut The hydraulic nut is first detached from the shaft and then transported.

> Risk of crushing due to a falling hydraulic nut because this was loosened too guickly.

When unscrewing the last thread turn, rotate the hydraulic nut very slowly. \triangleleft

Repeat the following operations as often as necessary until the hydraulic nut is no longer screwed onto the shaft, *Figure 35*:

- ► As necessary, position the mounting aid at the end of the shaft.
- ▶ Insert the hand lever into the lower handling hole.
- ▶ Rotate the hydraulic nut until the next handling hole is in the lower position.
- ▷ The hydraulic nut is now on the smooth end of the shaft or mounting aid.

The following operation must only be carried out once:

▶ Rotate the hydraulic nut until the threaded hole for the folding clevis is in the upper position.



(1) Shaft (2) Mounting aid (3) Rotary motion (4) Radial threaded hole $G^{1/4}$. upper position

Figure 35 Unscrewing the hydraulic nut

Transporting the hydraulic nut

The hydraulic nut is prepared for transport as follows, *Figure 36*:

- Screw in the folding clevis (if there is a threaded hole for the folding clevis in the outer cylindrical surface of the press ring).
- ▶ Hang a hook in the folding clevis or thread in a carrying sling.
- ▶ Fit the securing belt.
- ▷ The hydraulic nut can now be transported.



Folding clevis
 Hook
 Securing belt

Figure 36 Preparation for transport

- ► Transport the hydraulic nut without shocks or vibration, *Figure 37*.

Hydraulic nut
 Folding clevis
 Securing belt

Figure 37 Transport 000B047D

Pressing back the annular piston

Once the hydraulic nut with the annular piston facing up has been deposited on wooden beams of sufficient load carrying capacity, the annular piston can be pressed back.

ACAUTION

Risk of slippage and contamination of the environment with hydraulic oil if oil is prevented from returning to the tank of the pressure generation device.

Ensure the return of oil to the tank of the pressure generation device. \triangleleft

- Connect the hose and the unpressurised pressure generation device again.
- Press in the annular piston by means of screw clamps until it stops, *Figure 38*.
- ▷ The hydraulic oil is pressed back into the pressure generation device.



Screw clamp
 Rotary motion

Figure 38 Pressing back the annular piston

▶ Remove the hydraulic hose.

▷ The hydraulic nut can now be transported away.

Pressing back the annular piston at the mounting location

The annular piston can only be pressed out while the red O-ring is visible. If the annular piston has been pressed out too far, the hydraulic nut must not be transported. The annular piston must then be pressed back on site.

In the case of larger hydraulic nuts, the friction can be so great that the annular piston cannot be pressed back through rotation by hand. In this case, suitable tools such as screw clamps can be used.

- ► Loosen the hydraulic nut until there is sufficient space for suitable tools such as screw clamps, *Figure 39*.
- Connect the unpressurised pressure generation device and ensure that hydraulic oil can flow back into the pressure generation device.
- Press the annular piston back until the red O-ring is no longer visible.
- ▷ Once the annular piston has been pressed back far enough that the red O-ring is no longer visible, the hydraulic nut can be transported.



Screw clamp
 Hydraulic hose
 Pressure generation device

Figure 39 Pressing back the annular piston

Decommissioning If the hydraulic nut will not be used for an extended period, it should be decommissioned:

- Press the annular piston in completely.
- Screw in the screw plug and valve nipple.
- Clean the hydraulic nut using cold cleaner or paraffin oil.
- Oil the surface of the hydraulic nut, for example using ARCANOL-ANTICORROSIONOIL-400G.



Disease of the respiratory organs through inhalation of vapours of the cleaning agent used.

Observe the safety and environmental guidelines of the cleaning agent manufacturer. ⊲

Storage All parts should be stored under the specified conditions, see page 6.



The press ring of the hydraulic nut may become deformed due to its own weight if it is stored standing up. As a result of storage standing up, the hydraulic nut may thus become unusable.

Store the hydraulic nut lying flat with the annular piston facing up in the delivery packaging, *Figure 40*. \triangleleft



Hydraulic nut
 Box or wooden transport crate

Figure 40 Decommissioning

Alternatively, a hydraulic nut can be stored lying on wooden ledges and covered.

Troubleshooting Malfunctions become apparent in operation of the hydraulic nut. Once the malfunction has been eliminated, the hydraulic nut is normally ready for use again.

Troubleshooting Hydraulic nut	Malfunction	Possible cause	Remedy
	Hydraulic oil escaping in the area of the seal	Seals damaged	Replace seals, see page 60
	Hydraulic oil is contaminated		
	Annular piston jammed	Annular piston tilted	Do not use force. Collect the escaping hydraulic oil. Loosen the screw plug, then press the annular piston back into the press ring.

If the defect cannot be eliminated, please contact Schaeffler Customer Service.

Troubleshooting Pressure generation device

Malfunction	Possible cause	Remedy
Annular piston moves out abruptly	Air in system	Bleed oil circuit
Pressure does not increase	Escape valve is open	Close escape valve
Other malfunction	-	See the user manual of the pressure generation device

If the defect cannot be eliminated, please contact the manufacturer of the pressure generation device.

Maintenance	The hydraulic nut must be checked before every use.		
NOTICE	Damage to the hydraulic nut in the case of defective maintenance. If seals are damaged, contamination can reach the pressure chamber of the hydraulic nut. If oil is lost, replace the seals immediately.⊲		
Maintenance plan	The maintenance items are see <i>tables</i> .	stated in the maintenance plan,	
Before every use	Subassembly	Activity	
	Hydraulic nut	Visual inspection – check for wear and damage	
After every use	Subassembly	Activity	
	Press ring and annular piston	Clean using cold cleaner or paraffin oil Apply oil (rust protection)	
Every 2 years		A A	
Every 2 years	Subassembly	Activity	
Every 2 years	Subassembly Seal	Activity Replacement	
Every 2 years As necessary	Subassembly Seal Subassembly	Activity Replacement Activity	
Every 2 years As necessary	Subassembly Seal Subassembly Seal	Activity Replacement Activity Replace if oil is lost	
Every 2 years As necessary Ordering the seal	Subassembly Seal Subassembly Seal Order suitable replacement The ordering number of the	Activity Replacement Activity Replace if oil is lost seals before replacement is carried out. seal set is listed in a table, page 68.	
Every 2 years As necessary Ordering the seal Replacing the seal	Subassembly Seal Subassembly Seal Order suitable replacement The ordering number of the Before replacing the seals, of seals are available.	Activity Replacement Activity Replace if oil is lost seals before replacement is carried out. seal set is listed in a table, page 68. check whether suitable replacement	
Every 2 years As necessary Ordering the seal Replacing the seal	Subassembly Seal Subassembly Seal Order suitable replacement The ordering number of the Before replacing the seals, of seals are available. The replacement of seals co	Activity Replacement Activity Replace if oil is lost seals before replacement is carried out. seal set is listed in a table, page 68. check whether suitable replacement mprises the following steps:	
Every 2 years As necessary Ordering the seal Replacing the seal	Subassembly Seal Subassembly Seal Order suitable replacement The ordering number of the Before replacing the seals, of seals are available. The replacement of seals co dismount the annular pis	Activity Replacement Activity Replace if oil is lost seals before replacement is carried out. seal set is listed in a table, page 68. check whether suitable replacement mprises the following steps: ton	
Every 2 years As necessary Ordering the seal Replacing the seal	Subassembly Seal Subassembly Seal Order suitable replacement The ordering number of the Before replacing the seals, of seals are available. The replacement of seals co dismount the annular pis dismount the seals	Activity Replacement Activity Replace if oil is lost seals before replacement is carried out. seal set is listed in a table, page 68. check whether suitable replacement mprises the following steps: ton	
Every 2 years As necessary Ordering the seal Replacing the seal	Subassembly Seal Subassembly Seal Order suitable replacement The ordering number of the Before replacing the seals, of seals are available. The replacement of seals co dismount the annular pis dismount the seals clean the components	Activity Replacement Activity Replace if oil is lost seals before replacement is carried out. seal set is listed in a table, page 68. check whether suitable replacement mprises the following steps: ton	
Every 2 years As necessary Ordering the seal Replacing the seal	Subassembly Seal Subassembly Seal Order suitable replacement The ordering number of the Before replacing the seals, of seals are available. The replacement of seals co dismount the annular pis dismount the seals clean the components mount the seals	Activity Replacement Activity Replace if oil is lost seals before replacement is carried out. seal set is listed in a table, page 68. check whether suitable replacement mprises the following steps: ton	

Dismounting the annular piston

During dismounting, ensure that the annular piston is not positioned obliquely.

- Provide support of sufficient load carrying capacity and tilting rigidity.
- Deposit the hydraulic nut on the prepared support with the annular piston facing up, *Figure 41*.
- ▶ Remove the screw plug and valve nipple.
- Screw in the dismounting screws consecutively until these are in contact with the annular piston.
- Screw in each dismounting screw in turn by one revolution until the red O-ring is visible.
- ▶ If the annular piston is positioned obliquely, strike the raised point lightly using a plastic hammer.



Support
 Screw plug
 Valve nipple
 Press ring
 Dismounting screw
 Red 0-ring

Figure 41 Pressing out the annular piston

- **Note** Starting from HYDNUT400, eye bolts can be screwed into the annular piston and a crane can be used to lift and transport the dismounted annular piston.
 - Remove the annular piston, *Figure 42*.



Annular piston
 Eye bolt

Figure 42 Removing the annular piston **Dismounting the seals**

When removing the seals, ensure that the seal slots remain undamaged. For dismounting, use a soft tool made from wood or plastic.

• Lever the seals out of the seal slots, *Figure 43*.



Seal
 Seal slot
 Wooden or plastic tool

Figure 43 Dismounting the seals

Cleaning the components As cleaning agents, cold cleaners and paraffin oil have proved effective.

> ▶ Clean the press ring and annular piston. Carry out particularly thorough cleaning of the seal slots, piston surface and piston guide face, Figure 44.



(1) Press ring (2) Annular piston 3 Seal slots ④ Piston surface (5) Piston guide face

Figure 44 Cleaning the components

Mounting the seals

During mounting, ensure that the seals remain undamaged.▶ Oil both seal slots using hydraulic oil, *Figure 45*.



Seal slot
 Hydraulic oil

Figure 45 Oiling the seal slots

▶ Insert new seals in the annular piston, *Figure 46*.



Seal
 Piston guide face

Figure 46 Mounting the seals Oil the piston guide face using hydraulic oil, *Figure 47*.



Piston guide faces
 Hydraulic oil

Figure 47 Oiling the piston guide faces Mounting the annular piston

During mounting, ensure that the annular piston is fitted straight, *Figure 48*.



Figure 48 Mounting

- ▶ Position the annular piston above the press ring.
- ▶ Oil the sealing rings using hydraulic oil.
- Carefully lower the annular piston until this is lying on the press ring.
- Press the annular piston into the press ring uniformly using three screw clamps until both seals have disappeared in the press ring, *Figure 49*.



Annular piston
 Screw clamp
 Seal

Figure 49 Mounting the annular piston

- ▶ Remove the screw clamps.
- Strike the annular piston lightly using a plastic hammer at a spacing of 120°, until the annular piston is completely in contact with the press ring.

Disposal	A hydraulic nut can be returned to Schaeffler for disposal.
	Risk of injury due to skin contact with hydraulic oil. Wear gloves when dismantling the hydraulic nut. ◀
	After dismounting, the press ring and annular piston can be disposed of together with other steel parts. The seals are made from plastic (PVC). Hydraulic oil must be collected and disposed of correctly or recycled. Aids such as oil-soaked cleaning cloths must be disposed of correctly.
Regulations	Disposal must be carried out in accordance with locally applicable regulations.

Technical data, accessories and replacement parts

The technical data give information that is valid for each hydraulic nut. Accessories and replacement parts are available, see *tables*.

Technical data	Designation	Maximum tightening torque ¹⁾ Nm	Hydraul viscosit mm²/s	ic oil, y class
			from	to
	HYDNUTE(-INCH)	45	46	68

 $^{1)}$ The maximum tightening torque is valid for threaded holes $\rm G^{1/4}$ in the press ring.

Accessories	Designation	Description	Mass
			kg
	HYDNUT.GAUGE-ANALOG	Dial gauge, analogue	0,7
	HYDNUT.GAUGE-DIGITAL	Dial gauge, digital	0,7
	HYDNUT.GAUGE-EXTENSION-SET	Extensions, set	0,04
	ARCANOL-MOUNTINGPASTE-70G	Mounting paste	0,1
	ARCANOL-MOUNTINGPASTE-250G	Mounting paste	0,3
Replacement parts	It is advisable to have a screw plug ment part. Experience has shown be found when it is needed. Since a specified period, the replacement in advance of the maintenance da	g available on site as a rep that this part cannot alway the seals are replaced afte nt seals should be ordered te.	lace- s er well
Note	Only use Schaeffler original replac	cement parts.	

Screw plug	Designation	Ordering number
	HYDNUT.PLUG	038487659-0000-10

uts and seals	Hydraulic r	Seal (set)	
HYDNUIE	HYDNUT	Ordering number	HYDNUT
	50-E	092186300-0000-10	50.SEAL
	55-E	089705254-0000-10	55.SEAL
	60-E	092186521-0000-10	60.SEAL
	65-E	092186505-0000-10	65.SEAL
	70-E	092186483-0000-10	70.SEAL
	75-E	086435205-0000-10	75.SEAL
	80-E	092186440-0000-10	80.SEAL
	85-E	092186416-0000-10	85.SEAL
	90-E	089903218-0000-10	90.SEAL
	95-E	092186394-0000-10	95.SEAL
	100 E	080705207 0000 10	100 CEAL

Hydraulic n (n

HYDNUT	Ordering number	HYDNUT	Ordering number
50-E	092186300-0000-10	50.SEAL	038858193-0000-02
55-E	089705254-0000-10	55.SEAL	022473726-0000-02
60-E	092186521-0000-10	60.SEAL	038858231-0000-02
65-E	092186505-0000-10	65.SEAL	038858240-0000-02
70-E	092186483-0000-10	70.SEAL	038858266-0000-02
75-E	086435205-0000-10	75.SEAL	038858282-0000-02
80-E	092186440-0000-10	80.SEAL	038858304-0000-02
85-E	092186416-0000-10	85.SEAL	019270208-0000-02
90-E	089903218-0000-10	90.SEAL	054408270-0000-10
95-E	092186394-0000-10	95.SEAL	038858320-0000-02
100-E	089705297-0000-10	100.SEAL	038857880-0000-02
105-E	092192475-0000-10	105.SEAL	039620190-0000-02
110-E	092192343-0000-10	110.SEAL	038857898-0000-02
115-E	092192220-0000-10	115.SEAL	038857901-0000-10
120-E	089961072-0000-10	120.SEAL	038857910-0000-02
125-E	092192181-0000-10	125.SEAL	039620204-0000-02
130-E	092192092-0000-10	130.SEAL	038857936-0000-02
135-E	092191932-0000-10	135.SEAL	039620212-0000-10
140-E	089961137-0000-10	140.SEAL	038857944-0000-02
145-E	092191894-0000-10	145.SEAL	038857952-0000-02
150-E	089705319-0000-10	150.SEAL	038857960-0000-02
155-E	092191843-0000-10	155.SEAL	039620220-0000-02
160-E	089961170-0000-10	160.SEAL	038857979-0000-10
165-E	092191797-0000-10	165.SEAL	019268548-0000-02
170-E	089961234-0000-10	170.SEAL	038857987-0000-02
180-E	089907507-0000-10	180.SEAL	038857995-0000-10
190-E	092191509-0000-10	190.SEAL	038858002-0000-02
200-E	089961340-0000-10	200.SEAL	038858010-0000-02

Hydraulic nuts and seals HYDNUT..-E (trapezoidal thread)

Hydraulic nut		Seal (set)	
HYDNUT	Ordering number	HYDNUT	Ordering number
205-E	092194370-0000-10	205.SEAL	076209652-0000-10
210-E	092194362-0000-10	210.SEAL	039708772-0000-02
215-E	092194346-0000-10	215.SEAL	039620247-0000-02
220-E	089705335-0000-10	220.SEAL	038858029-0000-02
225-E	092193935-0000-10	225.SEAL	019268734-0000-02
230-Е	086435361-0000-10	230.SEAL	039620255-0000-02
235-E	092205712-0000-10	235.SEAL	038858045-0000-02
240-E	089907710-0000-10	240.SEAL	038858053-0000-02
250-E	092205704-0000-10	250.SEAL	038858061-0000-02
260-E	089961390-0000-10	260.SEAL	038858070-0000-02
270-Е	092205690-0000-10	270.SEAL	038858088-0000-02
275-E	092205682-0000-10	275.SEAL	069728852-0000-10
280-E	089961420-0000-10	280.SEAL	038858096-0000-02
290-Е	092205674-0000-10	290.SEAL	038858100-0000-02
295-E	092205666-0000-10	295.SEAL	092672523-0000-10
300-E	089705351-0000-10	300.SEAL	038858118-0000-10
310-E	092205658-0000-10	310.SEAL	039620263-0000-10
315-E	092205640-0000-10	315.SEAL	092672558-0000-10
320-E	092205631-0000-10	320.SEAL	038858126-0000-10
330-E	092205623-0000-10	330.SEAL	039620271-0000-10
335-E	092205615-0000-10	335.SEAL	092672663-0000-10
340-E	092205836-0000-10	340.SEAL	038858134-0000-10
345-E	092205828-0000-10	345.SEAL	039620280-0000-10
350-E	092205810-0000-10	350.SEAL	038858142-0000-10
355-E	092205801-0000-10	355.SEAL	092679870-0000-10
360-E	089907817-0000-10	360.SEAL	039049396-0000-10
365-E	092205798-0000-10	365.SEAL	038384671-0000-10
370-E	092205780-0000-10	370.SEAL	089975880-0000-10
375-E	092205771-0000-10	375.SEAL	092679919-0000-10
380-E	089961471-0000-10	380.SEAL	038858150-0000-10
385-E	092205755-0000-10	385.SEAL	088096777-0000-10
395-E	092205720-0000-10	395.SEAL	039620301-0000-10
400-E	089961536-0000-10	400.SEAL	038858169-0000-10
410-E	092217427-0000-10	410.SEAL	038456435-0000-10
415-E	092217419-0000-10	415.SEAL	092680097-0000-10
420-E	089907850-0000-10	420.SEAL	038858177-0000-10
430-E	092217400-0000-10	430.SEAL	087022486-0000-10
435-E	092217389-0000-10	435.SEAL	092680178-0000-10
			continued V
Hydraulic	nut	Seal (set)	
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HYDNUT	Ordering number	HYDNUT	Ordering number
440-E	092217362-0000-10	440.SEAL	039620310-0000-10
450-E	092217354-0000-10	450.SEAL	039620328-0000-10
460-E	089705483-0000-10	460.SEAL	039620336-0000-10
470-E	092217338-0000-10	470.SEAL	038456443-0000-10
480-E	089961676-0000-10	480.SEAL	038858185-0000-10
490-E	092217273-0000-10	490.SEAL	092680232-0000-10
500-E	089961846-0000-10	500.SEAL	038858207-0000-10
510-E	092217265-0000-10	510.SEAL	085295078-0000-10
520-E	092217133-0000-10	520.SEAL	064017621-0000-10
530-E	089961919-0000-10	530.SEAL	039716538-0000-10
540-E	092217109-0000-10	540.SEAL	068895453-0000-10
550-E	092217095-0000-10	550.SEAL	038858215-0000-10
560-E	089705513-0000-10	560.SEAL	038858223-0000-10
570-E	092217079-0000-10	570.SEAL	092680267-0000-10
580-E	092222323-0000-10	580.SEAL	054408598-0000-10
590-E	092222315-0000-10	590.SEAL	054759030-0000-02
600-E	092222307-0000-10	600.SEAL	039620344-0000-10
610-E	092222293-0000-10	610.SEAL	092681530-0000-10
625-E	092222285-0000-10	625.SEAL	058657916-0000-10
630-E	092222277-0000-10	630.SEAL	039620352-0000-10
650-E	089907892-0000-10	650.SEAL	054408385-0000-10
655-E	092222145-0000-10	655.SEAL	092681565-0000-10
670-E	092222137-0000-10	670.SEAL	038858258-0000-10
680-E	092222129-0000-10	680.SEAL	092681581-0000-10
690-E	092222110-0000-10	690.SEAL	092681603-0000-10
695-E	092230075-0000-10	695.SEAL	092681760-0000-10
710-E	089865979-0000-10	710.SEAL	038858274-0000-10
720-E	092232965-0000-10	720.SEAL	092681778-0000-10
740-E	092232930-0000-10	740.SEAL	092681794-0000-10
750-E	092232922-0000-10	750.SEAL	038858290-0000-10
760-E	092232914-0000-10	760.SEAL	092681816-0000-10
780-E	092232892-0000-10	780.SEAL	072469170-0000-10
800-E	092232876-0000-10	800.SEAL	038858312-0000-10
830-E	092232868-0000-10	830.SEAL	039698211-0000-10
850-E	089705521-0000-10	850.SEAL	065253205-0000-10
880-E	092237746-0000-10	880.SEAL	092680283-0000-10
900-E	092237738-0000-10	900.SEAL	038456451-0000-10
930-E	092237720-0000-10	930.SEAL	058964088-0000-10
950-E	089907930-0000-10	950.SEAL	080688780-0000-10
			continued AV

Hydraulic nuts and seals HYDNUT..-E (trapezoidal thread)

Hydraulic nuts HYDNUT..-E, HYDNUT..-E-INCH

Hydraulic nuts and seals HYDNUT..-E (trapezoidal thread)

Hydraulic nut		Seal (set)	
HYDNUT	Ordering number	HYDNUT	Ordering number
1000-E	092237703-0000-10	1000.SEAL	060584734-0000-10
1060-E	092237690-0000-10	1060.SEAL	092680356-0000-10
1080-E	092237681-0000-10	1080.SEAL	092681840-0000-10
1120-E	089705556-0000-10	1120.SEAL	092661769-0000-10
1180-E	089866118-0000-10	1180.SEAL	087022613-0000-10
			continued 🔺

Hydraulic nuts and seals HYDNUT..-E-INCH

Hydraulic nut		Seal (set)	
HYDNUT	Ordering number	HYDNUT	Ordering number
50-E-INCH	093932677-0000-10	50.SEAL	038858193-0000-02
55-E-INCH	093934165-0000-10	55.SEAL	022473726-0000-02
60-E-INCH	093934998-0000-10	60.SEAL	038858231-0000-02
65-E-INCH	093935633-0000-10	65.SEAL	038858240-0000-02
70-E-INCH	093936907-0000-10	70.SEAL	038858266-0000-02
75-E-INCH	093937199-0000-10	75.SEAL	038858282-0000-02
80-E-INCH	093997965-0000-10	80.SEAL	038858304-0000-02
85-E-INCH	094000638-0000-10	85.SEAL	019270208-0000-02
90-E-INCH	092427022-0000-10	90.SEAL	054408270-0000-10
95-E-INCH	092524397-0000-10	95.SEAL	038858320-0000-02
100-E-INCH	092400760-0000-10	100.SEAL	038857880-0000-02
105-E-INCH	092418341-0000-10	105.SEAL	039620190-0000-02
110-E-INCH	092525296-0000-10	110.SEAL	038857898-0000-02
120-E-INCH	092441297-0000-10	120.SEAL	038857910-0000-02
130-E-INCH	092525520-0000-10	130.SEAL	038857936-0000-02
140-E-INCH	092526284-0000-10	140.SEAL	038857944-0000-02
150-E-INCH	092412360-0000-10	150.SEAL	038857960-0000-02
160-E-INCH	092527809-0000-10	160.SEAL	038857979-0000-10
170-E-INCH	092531466-0000-10	170.SEAL	038857987-0000-02
180-E-INCH	092431364-0000-10	180.SEAL	038857995-0000-10
190-E-INCH	092531768-0000-10	190.SEAL	038858002-0000-02
200-E-INCH	092423779-0000-10	200.SEAL	038858010-0000-02
220-E-INCH	092377785-0000-10	220.SEAL	038858029-0000-02
240-E-INCH	092532489-0000-10	240.SEAL	038858053-0000-02
260-E-INCH	092425488-0000-10	260.SEAL	038858070-0000-02
280-E-INCH	092426166-0000-10	280.SEAL	038858096-0000-02
			continued 🔻

Hydraulic nut		Seal (set)	
HYDNUT	Ordering number	HYDNUT	Ordering number
300-E-INCH	092416403-0000-10	300.SEAL	038858118-0000-10
320-E-INCH	092534759-0000-10	320.SEAL	038858126-0000-10
340-E-INCH	092407021-0000-10	340.SEAL	038858134-0000-10
360-E-INCH	092536808-0000-10	360.SEAL	039049396-0000-10
380-E-INCH	092426662-0000-10	380.SEAL	038858150-0000-10
400-E-INCH	092417043-0000-10	400.SEAL	038858169-0000-10
420-E-INCH	092538800-0000-10	420.SEAL	038858177-0000-10
440-E-INCH	092543200-0000-10	440.SEAL	039620310-0000-10
460-E-INCH	092402844-0000-10	460.SEAL	039620336-0000-10
480-E-INCH	092546323-0000-10	480.SEAL	038858185-0000-10
500-E-INCH	092549640-0000-10	500.SEAL	038858207-0000-10
530-E-INCH	092413102-0000-10	530.SEAL	039716538-0000-10
560-E-INCH	093759932-0000-10	560.SEAL	038858223-0000-10
600-E-INCH	093757824-0000-10	600.SEAL	039620344-0000-10
630-E-INCH	093762178-0000-10	630.SEAL	039620352-0000-10
670-E-INCH	093453531-0000-10	670.SEAL	038858258-0000-10
710-E-INCH	093763662-0000-10	710.SEAL	038858274-0000-10
750-E-INCH	093765215-0000-10	750.SEAL	038858290-0000-10
800-E-INCH	093765754-0000-10	800.SEAL	038858312-0000-10
850-E-INCH	093768710-0000-10	850.SEAL	065253205-0000-10
900-E-INCH	093769091-0000-10	900.SEAL	038456451-0000-10
950-E-INCH	093741693-0000-10	950.SEAL	080688780-0000-10
			continued 🔺

Hydraulic nuts and seals HYDNUT..-E-INCH

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Scope of delivery

Hydraulic nuts HYDNUT..-HEAVY

The scope of delivery comprises the hydraulic nut, accessories and
user manual, see <i>table</i> and <i>Figure 1</i> .

Component	Designation	Quantity
Hydraulic nut	HYDNUT	1
Screw plug $(G^{1/4})$	HYDNUT.PLUG	2
Valve nipple (G ^{1/} ₄)	PUMP1000.VALVE-NIPPLE	1
Seal set (replacement outer seal, replacement inner seal and red O-ring)	HYDNUTHEAVY.SEAL	1
User manual	-	1



 Hydraulic nut
 Screw plug
 Valve nipple
 Replacement seals for outer side, inner side and red O-ring
 User manual

> *Figure 1* Scope of delivery HYDNUT..-HEAVY

Accessories	Hydraulic nuts are supplied with the appropriate replacement seals.
Further information	The scope of delivery does not include the following documents: TPI 195, Pressure Generation Devices TPI 196, Hydraulic Nut HYDNUT MH 1, Mounting of Rolling Bearings
Damage during transit	Any damage during transit must be reported as a complaint to the carrier.
Defects	Any defects must be reported promptly to Schaeffler Technologies AG & Co. KG.

Description A hydraulic nut comprises a press ring, in which a movable annular piston is located. Between these two components is a pressure chamber filled with hydraulic oil. This is sealed by means of two seals, *Figure 2*. Accessories are necessary for operation.



Press ring The single piece press ring made from steel supports the movable annular piston and has three threaded holes: one for the folding clevis and two at the end of the oil ducts, *Figure 3*.



Threaded hole for folding clevis
 Folding clevis
 Threaded hole G^{1/4}
 Screw plug, W 6

Figure 3 Press ring HYDNUT..-HEAVY

for folding clevis

Threaded hole A suitable folding clevis can be screwed into this threaded hole in the outer cylindrical surface.

HYDNUT..-HEAVY

AVT	Designation		Thread
	from	to	
	HYDNUT100-HEAVY	HYDNUT325-HEAVY	M8
	HYDNUT350-HEAVY	HYDNUT600-HEAVY	M12
	HYDNUT625-HEAVY	HYDNUT900-HEAVY	M16

Folding clevis If there is a threaded hole for a folding clevis, then a folding clevis of sufficient load carrying capacity (not included in the scope of delivery) can be used to transport the complete hydraulic nut. Alternatively, a round sling or steel rope of sufficient load carrying capacity can be used for transport. The steel rope may only be

Threaded holes G1/4 The press ring has two oil ducts. Each oil duct runs to the outside and ends in a threaded hole $G^{1/4}$. The two radial threaded holes in the outer cylindrical surface are offset by 180°.

At the time of delivery, a valve nipple is screwed into one radial threaded hole $G^{1/4}$. The second threaded hole $G^{1/4}$ is provided with a screw plug.

wrapped around the outer cylindrical surface of the press ring.

At the time of delivery, a screw plug is screwed into one of Screw plug the two radial threaded holes $G^{1/4}$. A second screw plug is included in the scope of delivery.

Annular piston The single piece annular piston is made from steel. The annular piston has two slots for sealing rings, one flat slot for the red O-ring and three threaded holes, *Figure 4*.



(1) Slot for sealing ring (2) Slot for red O-ring (3) Threaded hole for eye bolt

HYDNUTHEAVY	Decignation	Thursd
Threaded holes for eye bolts	The annular piston has three threaded holes. At the pitch circle, the holes have a spacing of 120° to each other. If eye bolts are screwed into these threaded holes, the annular piston can be raised or transported by means of a lifting device, see page 125.	
Slot for red O-ring	A flat slot supports the red O-ring made from PVC.	
Slots for sealing rings	Two slots support the sealing rings made from soft PVC.	
Annular piston		

Designation	Thread	
from	to	
HYDNUT100-HEAVY	HYDNUT525-HEAVY	3×M8
HYDNUT550-HEAVY	HYDNUT900-HEAVY	3×M10

Other components In addition to the hydraulic nut, fasteners (nut or washer), a hydraulic hose and a pressure generation device filled with hydraulic oil are required for operation, *Figure 5*.



Hydraulic nut
 Nut
 Washer
 Screws
 Hydraulic hose
 Hydraulic oil
 Pressure generation device

Figure 5 Equipment

Fasteners

If the end of the shaft is threaded, the hydraulic nut can be secured with a nut. If the end of the shaft is not threaded, a washer is used, which is attached to the end face of the shaft.

Hydraulic hose	The following specifications are only a selection. Ensure that all guidelines from the manufacturer are observed.	
	The hydraulic hose:	
	must fulfil all legal requirements valid at the point of use	
	must be checked before each use	
	must not be damaged	
	must be approved for the operating pressure	
	must be suitable for the hydraulic oil used	
	must not exceed the maximum permissible operating period	
	Further information on the hydraulic hose used is given in the documentation for the hydraulic hose.	
Pressure generation device	The points stated below are only a selection. Ensure that all guidelines from the manufacturer of the pressure generation device are observed.	
	The pressure generation device:	
	must fulfil all legal requirements valid at the point of use	
	must be checked before each use	
	must not be damaged	
	may only be operated at a pressure that is lower than the maximum permissible pressure of the hydraulic nut	
	must have a sufficiently large tank, see page 103	
	Further information on the pressure generation device used is given in the documentation for the pressure generation device.	
Hydraulic oil	The hydraulic oil used must correspond to a particular viscosity class, see page 132.	

Function The sealing rings in the annular piston create an outwardly sealed pressure chamber between the press ring and annular piston. A pressure generation device filled with hydraulic oil is connected to this pressure chamber via a hydraulic hose.

In the pressure generation device, hydraulic oil is placed under high pressure and flows into the pressure chamber. The annular piston undergoes movement, *Figure 6*.



 Pressure generation device

 Hydraulic line
 Hydraulic nut, threaded hole G¹/4
 Valve nipple G¹/4
 Pressure chamber
 Screw plug
 Direction of movement of annular piston

> *Figure 6* Functional principle





Mounting the ship's propeller
 Mounting the rudder blade

Figure 7 Mounting

Further press fits, such as shaft couplings and gears, can also be mounted.

Commissioning Commissioning comprises the following steps:

- checking the hydraulic nut
- lifting the hydraulic nut out of the transport container and transporting the hydraulic nut
- preparation for mounting
- mounting the hydraulic nut
- selecting the pressure generation device

Checking the hydraulic nut

Before use, it is advisable to check whether the diameter of the hydraulic nut is suitable for the shaft present. The press ring has the diameter engraved on the surface, Figure 8.



(1) Diameter information

Figure 8 Checking the hydraulic nut Lifting the hydraulic nut out of the transport container and transporting the hydraulic nut A hydraulic nut can be delivered lying flat either in a rigid box or a wooden crate. Smaller hydraulic nuts can be lifted out of the box and carried due to their low mass. Larger and thus heavier hydraulic nuts must be lifted using a suitable lifting tool. Lifting must always be carried out by the press ring, the threads of the annular piston are not suitable for transport of the complete hydraulic nut.

WARNING	If a hydraulic nut is lifted by the annular piston and transported horizontally, the press ring may become loose and fall. A falling press ring can cause serious injury. Always transport hydraulic nuts vertically. ◀
	If a small hydraulic nut is carried horizontally with the annular piston facing down, the annular piston may become loose and fall. A falling annular piston can cause injury to legs and feet. Hydraulic nuts should always be transported with the annular piston facing up or vertically.
WARNING	If the annular piston is moved out further than the red O-ring, it may become loose during transport. The falling annular piston can cause injury. Before transport, press in the annular piston until the red O-ring is no longer visible. ⊲
WARNING	An unsuitable lifting tool can fail. A falling hydraulic nut can cause injury. Use a suitable lifting tool that can safely support the mass of

the hydraulic nut. Ensure that nobody is underneath the hydraulic nut at any time during transport. Secure the hazard area. ⊲



Serious injury caused by a falling hydraulic nut due to failure of an unsuitable clevis.

Only use a folding clevis that is suitable for all lifting positions (angles), *Figure 9*. ⊲

(a) Hydraulic nut, lying flat
 (b) Hydraulic nut, lifted half way
 (a) Hydraulic nut, suspended
 Figure 9
 Lifting positions

- Screw in the folding clevis (if there is a threaded hole for the clevis in the outer cylindrical surface of the press ring).
- ▶ Hang a hook in the folding clevis or thread in a carrying sling.
- ▶ Fit the securing belt.
- Slowly lift the hydraulic nut until it hangs vertical, *Figure 10*.



Wooden crate
 Hydraulic nut
 Valve nipple
 Folding clevis
 Hook
 Securing belt

Figure 10 Delivered condition

► Transport the hydraulic nut without shocks or vibration.

Preparation for mounting The valve nipple is checked as follows:

• Check optically whether the thread of the valve nipple is damaged. If the thread is damaged, use a new valve nipple, Figure 11.



Mounting the hydraulic nut

In mounting, the method used depends on the mass of the hydraulic nut.

Light hydraulic nut, fixing nut or washer

ut, A light hydraulic nut can be mounted manually and located **er** with a fixing nut or washer, for example, *Figure 13*:

- Slide the hydraulic nut on the shaft until the press ring is in contact with the component to be mounted.
- ▶ If necessary, turn the hydraulic nut until one threaded hole G^{1/4} is in the upper position.
- Screw the fixing nut into place on the thread of the shaft or attach the washer to the end face of the shaft.



 \triangleright The hydraulic nut is mounted and can be bled.

 Shaft
 Thread
 Hydraulic nut
 Radial threaded hole G^{1/}4, upper position
 Fixing nut
 Washer
 Screws

> *Figure 13* Mounting

Light hydraulic nut, stepped fixing nut

A light hydraulic nut can be mounted manually and located using a stepped fixing nut, for example, *Figure 14*:

- Slide the hydraulic nut onto the stepped fixing nut until the end face of the annular piston is in contact with the collar of the nut.
- Screw the stepped fixing nut into place until the press ring is in contact with the component to be mounted.
- ▶ If necessary, turn the hydraulic nut until one threaded hole G^{1/4} is in the upper position.
- \triangleright The hydraulic nut is mounted and can be bled.



 Hydraulic nut
 Stepped fixing nut
 Shaft
 Thread
 Radial threaded hole G^{1/}4, upper position

> Figure 14 Mounting

Heavy hydraulic nut, fixing nut or washer

t, A heavy hydraulic nut cannot be mounted manually. A mounting aid
 er should be used on which the hydraulic nut is supported with
 the facility for axial displacement.

WARNING

If the hydraulic nut tilts or falls from the mounting aid, this can cause serious crushing of body parts.

Use an auxiliary device that has sufficient load carrying capacity and tilting rigidity to assist with the sliding operation. During mounting, secure the hydraulic nut against tilting and falling. \triangleleft

► Align the mounting aid at 90° and concentrically to the axis, *Figure 15*.



Figure 15 Aligning the mounting aid

Serious crushing in setting down of the hydraulic nut.

When setting down the hydraulic nut, ensure that no body parts are located in the gap between the hydraulic nut and shaft or adjacent construction. ⊲

Set down the hydraulic nut carefully on the mounting aid using a crane, *Figure 16*.



Shaft
 Hydraulic nut
 Gap

Figure 16 Setting down the hydraulic nut

Remove the securing belt.

When displacing the hydraulic nut, there is an increased risk of injury, especially to the hands.

WARNING

Serious crushing in displacement of the hydraulic nut.

When displacing the hydraulic nut, ensure that no body parts are located in the gap between the hydraulic nut and shaft or adjacent construction.

Push the hydraulic nut onto the shaft until the press ring is in contact with the component to be mounted, *Figure 17*.



Shaft
 Hydraulic nut
 Gap

Figure 17 Displacing the hydraulic nut

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One threaded hole $G^{1/4}$ must be located at the top, with no gap permissible between the hydraulic nut and the fixing nut or washer: Turn the hydraulic nut until one threaded hole $G^{1/4}$ is in the upper

position, *Figure 18*.



(1) Threaded hole $G^{1/4}$

Figure 18 Threaded hole at the top

The hydraulic nut is attached to the shaft using either a fixing nut or a washer, *Figure 19*, page 96.

WARNING

Injuries due to a washer becoming loose from the shaft and falling because too few screws were used.

Determine the load and use an appropriate number of screws.◀

- Use suitable lifting and transport tools to transport the fixing nut or washer to the assembly area.
- ► Rotate the fixing nut until this is in contact with the hydraulic nut or screw mount the washer on to the end face of the shaft.
- ▶ Remove the hook.
- ▶ Remove the folding clevis.
- \triangleright The hydraulic nut is mounted and can be bled.



Heavy hydraulic nut, stepped fixing nut A heavy hydraulic nut cannot be mounted manually. A mounting aid should be used on which the hydraulic nut is supported with the facility for axial displacement.

WARNING

If the hydraulic nut tilts or falls from the mounting aid, this can cause serious crushing of body parts.

Use an auxiliary device that has sufficient load carrying capacity and tilting rigidity. During mounting, secure the hydraulic nut against tilting and falling. ⊲

▶ Align the mounting aid at 90° and concentrically to the axis, *Figure 20*.



Figure 20 Aligning the mounting aid

WARNING

Serious crushing in setting down of the hydraulic nut.

When setting down the hydraulic nut, ensure that no body parts are located in the gap between the hydraulic nut and shaft or adjacent construction. \triangleleft

Set down the fixing nut, onto the shoulder of which the hydraulic nut is pushed, carefully on the mounting aid using a crane, Figure 21.



Shaft
 Hydraulic nut
 Gap

Figure 21 Setting down the hydraulic nut

▶ Remove the securing belt.

HYDNUT..-HEAVY

Adjustment of the mounting aid requires precise action.

- ► Adjust the height of the mounting aid.
- ► Align the fixing nut, with the hydraulic nut pushed into position, exactly parallel and concentrically to the shaft, *Figure 22*.



Mounting aid
 Hydraulic nut
 Shaft

Figure 22 Start position

When displacing the hydraulic nut, there is an increased risk of injury, especially to the hands.

WARNING

Serious crushing in displacement of the hydraulic nut.

When displacing the hydraulic nut, ensure that no body parts are located in the gap between the hydraulic nut and shaft or adjacent construction. \triangleleft

Displace the fixing nut, with the hydraulic nut pushed into position, until the press ring is in contact with the component to be mounted, *Figure 23*.



Shaft
 Hydraulic nut
 Gap

Figure 23 Displacing the hydraulic nut

00166E1B

During this mounting step, it is very important that the hydraulic nut is positioned exactly concentrically to the shaft. The stepped fixing nut should only be tightened to the point that the hydraulic nut can still be turned:

▶ Rotate the stepped fixing nut on the thread of the shaft until the flange slightly abuts the hydraulic nut, *Figure 24*.



Shaft
 Hydraulic nut
 Stepped fixing nut
 Flange

Figure 24 Mounting the collar nut

In order to be able to turn the hydraulic nut, the collar nut should not be overtightened:

- ► Turn the hydraulic nut until one threaded hole G^{1/4} is in the upper position, *Figure 25*.
- Remove the hook.
- ▶ Remove the folding clevis.
- \triangleright The hydraulic nut is mounted and can be bled.



Hook
 Folding clevis
 Threaded hole G^{1/}4

Figure 25 Turning the hydraulic nut, threaded hole at the top 00166E2A

Selecting the pressure generation device	A suitable pressure generation device must have certain character- istics, see page 83. It must have a sufficiently large tank containing at least the requisite oil quantity, since it is not possible to refill with hydraulic oil during operation.
Oil quantity	For the maximum drive-up distance, a certain oil quantity is required, see <i>table</i> .

HYDNUT..-HEAVY

Hydraulic nut		Oil quantity ¹⁾
from	up to	l
HYDNUT100-HEAVY	HYDNUT250-HEAVY	0,5
HYDNUT275-HEAVY	HYDNUT350-HEAVY	1
HYDNUT375-HEAVY	HYDNUT450-HEAVY	2
HYDNUT475-HEAVY	HYDNUT500-HEAVY	3
HYDNUT525-HEAVY	HYDNUT575-HEAVY	4
HYDNUT600-HEAVY	-	5
HYDNUT625-HEAVY	-	6
HYDNUT650-HEAVY	HYDNUT675-HEAVY	7
HYDNUT700-HEAVY	-	8
HYDNUT750-HEAVY	-	10
HYDNUT800-HEAVY	-	12
HYDNUT850-HEAVY	-	15
HYDNUT900-HEAVY	-	17

 Assuming usage of a hydraulic hose with a length of 1 m and an inside diameter of 4 mm.

Operation	After bleeding, the pressure is built up in order to mount the component.
Hydraulic oil	The hydraulic oil used in operation must be clean and of the specified viscosity class, see page 132.
WARNING	Severe burns due to ignition of hydraulic oil. Avoid sources of ignition, including in particular cutting, welding and soldering work, in the vicinity of escaping hydraulic oil.⊲
WARNING	Hydraulic oil can cause irritation to skin and respiratory organs. Avoid skin contact if possible. Wear gloves. Protect uncovered skin by means of oil-based skin cream. Do not inhale vapours or fumes. ◀
NOTICE	Contaminated hydraulic oil can damage seals. Damaged seals must be replaced promptly.
	Only use clean hydraulic oil. <

Maximum pressure

The maximum permissible pressure must be observed throughout operation.



Serious injuries due to the spraying out of hydraulic oil under high pressure and damage to the hydraulic nut if the maximum permissible pressure is exceeded.

Measure the operating pressure continuously. The operating pressure must never exceed the maximum permissible pressure, Figure 26. \triangleleft



(1) Maximum pressure information

Figure 26 Maximum permissible pressure, engraved

> Technical data such as dimensions and the permissible pressure for hydraulic nuts can be found in a Technical Product Information. This is available as a PDF file on the Internet under the address https://www.schaeffler.de, menu item Mediathek.

Further information TPI 196, Hydraulic Nut HYDNUT

Mounting the hydraulic hose

e Mounting of the hydraulic hose connects the pressure generation device and hydraulic nut with each other.

The following accessories are required:

- hose fasteners
- tool for mounting hose fasteners, see instructions for hose fasteners
- Allen key W 6 for fitting and removing the screw plug



Serious injuries due to the spraying out of hydraulic oil as a result of an unsuitable, damaged or old hydraulic hose.

Only mount a hydraulic hose that is approved for use with the pressure generation device. The hydraulic hose must be free from damage. Observe the storage life date of the hydraulic hose.⊲



Damage to the pressure generation device and seals in the hydraulic nut due to contaminants.

Remove any contaminants from the pressure generation device, hydraulic hose and hydraulic nut. All work must be carried out under extreme cleanliness. ⊲
Mounting the hydraulic hose:

▶ Rotate the hydraulic nut until the valve nipple is at the bottom.

WARNING

Serious injuries due to the spraying out of hydraulic oil under high pressure due to the loosening of a screw connection.

Observe the maximum tightening torque for the oil connector on the pressure generation device. \triangleleft

► Slide the collar of the hydraulic hose onto the valve nipple, *Figure 27*.



 Hydraulic nut, lower threaded hole G^{1/}4
 Valve nipple
 Hydraulic hose

> *Figure 27* Connector

- ► Slide the collar of the hydraulic hose onto the valve nipple of the pressure generation device, *Figure 28*.
- ► Apply the hose fasteners.

WARNING

Serious injuries due to detached hose whipping back and forth. Mount hose fasteners in order to prevent whipping by the hydraulic hose. ◀

WARNING

Serious injuries due to hydraulic oil spraying out of torn hydraulic hose under high pressure because the hydraulic hose was laid with an excessively small bending radius.

Lay the hydraulic hose with the specified bending radius to the pressure generation device. Observe the instructions for the hydraulic hose. \triangleleft



 Hose fastener on hydraulic nut
 Hose fastener on pressure generation device

Figure 28 Connecting the pressure generation device

- **Bleeding** Bleeding is necessary since compressed air will endanger the safety of the user. The hydraulic oil escaping during bleeding must be collected and disposed of correctly in accordance with the regional regulations.
 - Check whether the oil volume in the pressure generation device is adequate to bleed the pressure generation device, hydraulic hose and hydraulic nut. Furthermore, the oil volume must be sufficient for the drive-up distance of the annular piston. Where necessary, hydraulic oil must be refilled before bleeding. Refilling during operation is not permissible.

AWARNING

Blinding or injury to eyes due to spraying out of hydraulic oil under high pressure.

Ensure that the plug-in coupling is securely connected and the hose fasteners are fitted. Always wear safety goggles. ⊲

- Ensure that the screw plug is at the top, *Figure 29*, page 110.
- ► Apply the device for collection of hydraulic oil.
- Remove the screw plug from the upper threaded hole $G^{1/4}$.
- Start the pressure generation device.
- ▶ Wait until the hydraulic oil escapes without air bubbles.
- ► Stop the pressure generation device.
- ► Screw the screw plug back into the upper threaded hole G^{1/4} and observe the tightening torque, see page 132.
- ▶ Remove the collector device.
- Dispose of the collected hydraulic oil correctly or send for recycling.



 Screw plug, threaded hole G^{1/}₄ at top
 Collector device
 Pressure generation device
 Manometer

> *Figure 29* Bleeding

Pressing the component into place

Pressing into place can be carried out either with or without the oil pressure method. The oil pressure method is explained in the Mounting Handbook MH 1.

Oil pressure method In order to reduce the pressing force, the oil pressure method can be used. In the oil pressure method, an additional pressure generation device is used to press hydraulic oil between the fit surfaces, *Figure 30*.



 Additional pressure generation device, connection
 Component to be pressed into place
 Shaft
 Fit surface

> *Figure 30* Oil pressure method

Red O-ring The maximum drive-up distance of the press ring is indicated by a red O-ring. The press ring can only be pressed out while the red O-ring is visible, *Figure 31*.



(1) Annular piston (4) Drive-up distance, maximum

Pressure build-up As a result of pressure build-up, the component is pressed off the hydraulic nut.

When using the oil pressure method, pressure is first built up using the additional pressure generation device and then maintained during the whole mounting procedure.

WARNING

Serious injuries due to spraying out of hydraulic oil under high pressure.

The reasons for this may be as follows:

missing screw plug, defective seal, overshoot of maximum operating pressure, excessive pressing out of the press ring.

Screw in the screw plug in the upper threaded hole $G^{1/4}$.

Measure the operating pressure continuously. The operating pressure must never exceed the maximum permissible pressure, *Figure 32*.

Operate the hydraulic nut only while the red O-ring is visible, see page 48. \triangleleft



1 Maximum pressure information

Figure 32 Maximum permissible pressure

WARNING

Serious injuries due to bursting or loosening of hydraulic nut in case of component failure.

Stand to one side, not directly behind the hydraulic nut. ⊲

Build up pressure in the hydraulic nut. Press the requisite volume into the hydraulic nut until the requisite drive-up distance is reached.

Pressure decrease The following steps are only carried out if the oil pressure method is in oil pressure method used: Switch the pressure generation device for the oil pressure method to unpressurised. ▶ Wait 5 min. Measure the radial or axial internal clearance. ▶ Wait 30 min so that the oil can escape. Pressure decrease Once the component is pressed into place: in hydraulic nut Switch the pressure generation device for the hydraulic nut to unpressurised. Checking the stroke If the annular piston has been pressed out further than the red O-ring, the hydraulic nut must not be transported. In this case, the annular piston must be pressed back while the hydraulic nut is still on the shaft. ▶ Check optically how far the annular piston has been extended, Figure 33.



Red O-ring
 Extended too far
 Maximum permissible extension

Figure 33 Checking the stroke

Pressing back the annular piston at the mounting location

If the annular piston has been pressed out too far, it must be pressed back in on site.

- ▶ Loosen the hydraulic nut until there is sufficient space for suitable tools such as screw clamps, *Figure 34*.
- Connect the unpressurised pressure generation device and ensure that hydraulic oil can flow back into the pressure generation device.
- Press the annular piston back until the red O-ring is no longer visible.
- ▷ Once the annular piston has been pressed back far enough that the red O-ring is no longer visible, the hydraulic nut can be transported.



Screw clamp
 Hydraulic hose
 Pressure generation device

Figure 34 Pressing back the annular piston

Removing the hydraulic hose Before transporting the hydraulic nut, the hydraulic hose is removed. The pressure generation device and hydraulic hose are connected again before the annular piston is pressed back.



Serious injuries due to spraying out of hydraulic oil under high pressure if the pressure generation device is not switched to unpressurised and a hydraulic hose is detached.

A hydraulic hose may only be detached after switching the system to unpressurised. \triangleleft

- Switch the system to unpressurised, see the user manual of the pressure generation device.
- Undo the hose fastener on the hydraulic nut, then remove the hose.

Detaching the hydraulic nut from the shaft

The hydraulic nut is first detached from the shaft and then transported.

Before loosening the fastener, the hydraulic nut is secured, *Figure 35*, page 117:

- Loosen the fastener to the point that the hydraulic nut can be rotated.
- Rotate the hydraulic nut until the threaded hole for the folding clevis is at the top.
- Screw in the folding clevis.
- ► Hang a hook in the folding clevis or thread in a carrying sling.
- \triangleright The fastener can now be removed.



Nut
 Washer
 Collar nut
 Folding clevis
 Hook
 Carrying sling

Figure 35 Securing the hydraulic nut



Risk of crushing due to a falling fastener (nut, washer or collar nut) because this was not secured.

Secure fastener against falling.⊲

Before the hydraulic nut can be removed, the fastener must be removed, *Figure 36*:

- ▶ When fastening with a stepped collar nut, lift the nut slightly with a dismounting aid or by the folding clevis.
- Remove the fastener.
- ▶ Where necessary, protect the thread with sheet metal.
- ▷ The hydraulic nut can now be removed.



Shaft
 Washer
 Nut
 Stepped collar nut
 Sheet metal

Figure 36 Removing the fastener The hydraulic nut can be transported immediately after removal from the shaft, *Figure 37*:

- Screw a folding clevis into the threaded hole for the clevis in the outer cylindrical surface of the press ring.
- ▶ Hang a hook in the folding clevis or thread in a carrying sling.
- ► Fit the securing belt.
- ▶ Remove the hydraulic nut from the shaft.
- \triangleright The hydraulic nut can now be transported.



Folding clevis
 Hook
 Securing belt

Figure 37 Removing the hydraulic nut from the shaft

Transporting the hydraulic nut

▶ Transport the hydraulic nut without shocks or vibration, Figure 38.



Pressing back the annular piston

Once the hydraulic nut with the annular piston facing up has been deposited on wooden beams of sufficient load carrying capacity, the annular piston can be pressed back.

ACAUTION

Risk of slippage and contamination of the environment with hydraulic oil if oil is prevented from returning to the tank of the pressure generation device.

Ensure the return of oil to the tank of the pressure generation device. \triangleleft

- Connect the hydraulic hose and the unpressurised pressure generation device again.
- Press in the annular piston by means of screw clamps until it stops, *Figure 39*.
- \triangleright The hydraulic oil is pressed back into the pressure generation device.



Screw clamp
 Rotary motion

Figure 39 Pressing back the annular piston

- ▶ Remove the hydraulic hose.
- \triangleright The hydraulic nut can now be transported away.

Decommissioning If the hydraulic nut will not be used for an extended period, it should be decommissioned:

- Press the annular piston in completely.
- Screw in the screw plug and valve nipple.
- Clean the hydraulic nut using cold cleaner or paraffin oil.
- Oil the surface of the hydraulic nut, for example using ARCANOL-ANTICORROSIONOIL-400G.



Disease of the respiratory organs through inhalation of vapours of the cleaning agent used.

Observe the safety and environmental guidelines of the cleaning agent manufacturer. ⊲

Storage All parts should be stored under the specified conditions, see page 6.



The press ring of the hydraulic nut may become deformed due to its own weight if it is stored standing up. As a result of storage standing up, the hydraulic nut may thus become unusable.

Store the hydraulic nut lying flat with the annular piston facing up in the delivery packaging, *Figure 40*. \triangleleft



Hydraulic nut
 Box or wooden transport crate

Figure 40 Decommissioning

Alternatively, a hydraulic nut can be stored lying on wooden ledges and covered.

Troubleshooting Malfunctions become apparent in operation of the hydraulic nut. Once the malfunction has been eliminated, the hydraulic nut is normally ready for use again.

Troubleshooting Hydraulic nut	Malfunction	Possible cause	Remedy
	Hydraulic oil escaping in the area of the seal	Seals damaged	Replace seals, see page 124
	Hydraulic oil is contaminated		
	Annular piston jammed	Annular piston tilted	Do not use force. Collect the escaping hydraulic oil. Loosen the screw plug, then press the annular piston back into the press ring.

If the defect cannot be eliminated, please contact Schaeffler Customer Service.

Troubleshooting Pressure generation device

Malfunction	Possible cause	Remedy
Annular piston moves out abruptly	Air in system	Bleed oil circuit
Pressure does not increase	Escape valve is open	Close escape valve
Other malfunction	-	See the user manual of the pressure generation device

If the defect cannot be eliminated, please contact the manufacturer of the pressure generation device.

Maintenance	The hydraulic nut must be checked before every use.	
NOTICE	Damage to the hydraulic nut in the case of defective maintenance. If seals are damaged, contamination can reach the pressure chamber of the hydraulic nut. If oil is lost, replace the seals immediately.⊲	
Maintenance plan	The maintenance items are stated in the maintenance plan, see <i>tables</i> .	
Before every use	Subassembly	Activity
	Hydraulic nut	Visual inspection – check for wear and damage
After every use	Subassembly	Activity
	Press ring and annular piston	Clean using cold cleaner or paraffin oil Apply oil (rust protection)
Every 2 years	Cubaaaamblu	A shinite .
Every 2 years	Subassembly	Activity
Every 2 years	Subassembly Seal	Activity Replacement
Every 2 years As necessary	Subassembly Seal Subassembly	Activity Replacement Activity
Every 2 years As necessary	Subassembly Seal Subassembly Seal	Activity Replacement Activity Replace if oil is lost
Every 2 years As necessary Ordering the seal	Subassembly Seal Subassembly Seal Order suitable replacement The ordering number of the	Activity Replacement Activity Replace if oil is lost seals before replacement is carried out. seal set is listed in a table, page 133.
Every 2 years As necessary Ordering the seal Replacing the seal	Subassembly Seal Subassembly Seal Order suitable replacement The ordering number of the Before replacing the seals, of seals are available.	Activity Replacement Activity Replace if oil is lost seals before replacement is carried out. seal set is listed in a table, page 133. check whether suitable replacement
Every 2 years As necessary Ordering the seal Replacing the seal	Subassembly Seal Subassembly Seal Order suitable replacement The ordering number of the Before replacing the seals, of seals are available. The replacement of seals co dismount the annular pis dismount the seals	Activity Replacement Activity Replace if oil is lost seals before replacement is carried out. seal set is listed in a table, page 133. check whether suitable replacement mprises the following steps: ton
Every 2 years As necessary Ordering the seal Replacing the seal	Subassembly Seal Subassembly Seal Order suitable replacement The ordering number of the Before replacing the seals, of seals are available. The replacement of seals co dismount the annular pis dismount the seals clean the components	Activity Replacement Activity Replace if oil is lost seals before replacement is carried out. seal set is listed in a table, page 133. check whether suitable replacement mprises the following steps: ton
Every 2 years As necessary Ordering the seal Replacing the seal	Subassembly Seal Subassembly Seal Order suitable replacement The ordering number of the Before replacing the seals, of seals are available. The replacement of seals co dismount the annular pis dismount the seals clean the components mount the seals	Activity Replacement Activity Replace if oil is lost seals before replacement is carried out. seal set is listed in a table, page 133. check whether suitable replacement mprises the following steps: ton

Dismounting the annular piston

During dismounting, ensure that the annular piston is not positioned obliquely.

- Provide support of sufficient load carrying capacity and tilting rigidity.
- Deposit the hydraulic nut on the prepared support with the annular piston facing up, *Figure 41*.
- Remove the screw plug and valve nipple.
- Screw the eye bolts into the annular piston.
- ▶ Lift the hydraulic nut by the annular piston by a few centimetres.
- Wait until the press ring separates from the annular piston under its own weight.
- As soon as the press ring is in contact with the support, lift again by a few centimetres and repeat the process until the annular piston has become completely detached.
- ▶ Remove the annular piston.



Support
 Screw plug
 Valve nipple
 Annular piston
 Eye bolt
 Press ring
 Plastic hammer

Figure 41 Knocking out the annular piston

Dismounting the seals

When removing the seals, ensure that the seal slots remain undamaged. For dismounting, use a soft tool made from wood or plastic.

- ► Lever the seals out of the seal slots, *Figure 42*.

Seal
 Seal slot
 Wooden or plastic tool

Figure 42 Dismounting the seals

Cleaning the components As cleaning agents, cold cleaners and paraffin oil have proved effective.

> ▶ Clean the press ring and annular piston. Carry out particularly thorough cleaning of the seal slots, piston surface and piston guide face, *Figure 43*.



① Press ring (2) Annular piston (3) Seal slots (4) Piston surface (5) Piston guide face

Figure 43 Cleaning the components

Mounting the seals

During mounting, ensure that the seals remain undamaged.▶ Oil both seal slots using hydraulic oil, *Figure 44*.



Seal slot
 Hydraulic oil

Figure 44 Oiling the seal slots

▶ Insert new seals in the annular piston, *Figure 45*.



Seal
 Piston guide face

Figure 45 Mounting the seals ▶ Oil the piston guide face using hydraulic oil, *Figure 46*.



Piston guide faces
 Hydraulic oil

Figure 46 Oiling the piston guide faces Mounting the annular piston





Figure 47 Mounting

- ▶ Position the annular piston above the press ring.
- ▶ Oil the sealing rings using hydraulic oil.
- Carefully lower the annular piston until this is lying on the press ring.
- Press the annular piston into the press ring uniformly using three screw clamps until both seals have disappeared in the press ring, *Figure 48*.



Annular piston
 Screw clamp
 Seal

Figure 48 Mounting the annular piston

- ▶ Remove the screw clamps.
- Strike the annular piston lightly using a plastic hammer at a spacing of 120°, until the annular piston is completely in contact with the press ring.

Disposal	A hydraulic nut can be returned to Schaeffler for disposal.
	Risk of injury due to skin contact with hydraulic oil. Wear gloves when dismantling the hydraulic nut. ◀
	After dismounting, the press ring and annular piston can be disposed of together with other steel parts. The seals are made from plastic (PVC). Hydraulic oil must be collected and disposed of correctly or recycled. Aids such as oil-soaked cleaning cloths must be disposed of correctly.
Regulations	Disposal must be carried out in accordance with locally applicable regulations.

Technical data and The technical data give information that is valid for each hydraulic replacement parts nut. Replacement parts are available, see tables.

Technical data	Designation	Maximum tightening torque ¹⁾	Hydraulic viscosity c	oil, lass
		NIII	from	to
	HYDNUTHEAVY	45	46	68
	 The maximum tightening torque press ring. 	e is valid for threaded	holes G ^{1/} 4	in the
Replacement parts	It is advisable to have a screw ment part. Experience has shu be found when it is needed. S a specified period, the replace in advance of the maintenance	screw plug available on site as a replace- as shown that this part cannot always ded. Since the seals are replaced after eplacement seals should be ordered well enance date.		
1	Only use Schaeffler original re	placement parts.		
Screw plug	Designation	Ordering number		
	HYDNUT.PLUG	038487659-0000-1	0	

Hydraulic nut		Seal (set)		
HYDNUT	Ordering number	HYDNUT	Ordering number	
100-HEAVY	087022893-0000-10	100-HEAVY.SEAL	093204000-0000-10	
125-HEAVY	039083403-0000-02	125-HEAVY.SEAL	054409772-0000-02	
150-HEAVY	087023067-0000-10	150-HEAVY.SEAL	069290482-0000-10	
175-HEAVY	038456427-0000-02	175-HEAVY.SEAL	093204051-0000-10	
200-HEAVY	054758947-0000-10	200-HEAVY.SEAL	039620239-0000-02	
225-HEAVY	061190012-0000-10	225-HEAVY.SEAL	038858037-0000-02	
250-HEAVY	039620182-0000-10	250-HEAVY.SEAL	054409713-0000-02	
275-HEAVY	093097921-0000-10	275-HEAVY.SEAL	059279273-0000-10	
300-HEAVY	061569933-0000-10	300-HEAVY.SEAL	061178675-0000-10	
325-HEAVY	054409489-0000-10	325-HEAVY.SEAL	064188442-0000-10	
350-HEAVY	093244614-0000-10	350-HEAVY.SEAL	093204299-0000-10	
375-HEAVY	055315348-0000-10	375-HEAVY.SEAL	039620298-0000-10	
400-HEAVY	088547701-0000-10	400-HEAVY.SEAL	093204329-0000-10	
425-HEAVY	093250630-0000-10	425-HEAVY.SEAL	064189007-0000-10	
450-HEAVY	062207180-0000-10	450-HEAVY.SEAL	087414414-0000-10	
475-HEAVY	069844852-0000-10	475-HEAVY.SEAL	064189449-0000-10	
500-HEAVY	093253460-0000-10	500-HEAVY.SEAL	094107475-0000-10	
525-HEAVY	093253931-0000-10	525-HEAVY.SEAL	094107483-0000-10	
550-HEAVY	093265514-0000-10	550-HEAVY.SEAL	094107491-0000-10	
575-HEAVY	054551315-0000-10	575-HEAVY.SEAL	039079520-0000-10	
600-HEAVY	093265859-0000-10	600-HEAVY.SEAL	094107505-0000-10	
625-HEAVY	093266022-0000-10	625-HEAVY.SEAL	094107513-0000-10	
650-HEAVY	093266170-0000-10	650-HEAVY.SEAL	079987702-0000-10	
675-HEAVY	093266235-0000-10	675-HEAVY.SEAL	053955064-0000-10	
700-HEAVY	093266383-0000-10	700-HEAVY.SEAL	094107521-0000-10	
750-HEAVY	093266421-0000-10	750-HEAVY.SEAL	094107530-0000-10	
800-HEAVY	093266570-0000-10	800-HEAVY.SEAL	094107548-0000-10	
850-HEAVY	093266642-0000-10	850-HEAVY.SEAL	094107556-0000-10	
900-HEAVY	092764592-0000-10	900-HEAVY.SEAL	039062775-0000-10	

Hydraulic nuts and seals HYDNUT..-HEAVY

Hydraulic nuts HYDNUT

Appendix This appendix contains the Declaration of Conformity for hydraulic nuts.

EC Declaration of Conformity EC Declaration of Conformity for hydraulic nuts HYDNUT..-E, *Figure 1.*

23	SCHAEFFLER
FC D	eclaration of Conformity
IN acco	stdance with machinery Directive 200042723
The manufacturer:	Schaeffler Technologies AG & Co. KG
	Georg-Schäfer-Straße 30
	D-97421 Schweinfurt
hereby declares that the pro- and safety requirements of for terms of its design and type circulation. This declaration of product without the agreement	Suct described below is in conformity with the applicable health slowing EC Directives: Machinery Directive 2006/42/EG in and in the execution the manufacturer has brought into shall cease to be valid if any modification is made to the nt of the manufacturer.
The sole responsibility for the the manufacturer.	issuing of this declaration of conformity is within the charge of
Product description:	Hydraulic nut
Product name:	HYDNUT
Туре:	50 to 1180
Applicable harmonized stand	ards:
EN-ISO 12100:2010:	Safety of Machinery - General principles for design: Risk Assessment & Risk Reduction
EN-ISO 4413:2010:	Hydraulic fluid power - General rules and safety requirements for systems and their components
Name and address of the au	thorized person for the technical documentation:
	Schaeffler Technologies AG & Co. KG
	Georg-Schäfer-Straße 30
11/1 1	D-97421 Schweinfurt
What	
Pater Schuster	
Department Manager Mecha	atronic
Place Date:	
Schweinfurt, 14.05.2019	
This declaration certifies conformity with	the stated directives but does not represent a guarantee of characteristics. The safety

Figure 1 EC Declaration of Conformity

Schaeffler Technologies AG & Co. KG

Georg-Schäfer-Straße 30 97421 Schweinfurt Germany www.schaeffler.de/en/services

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