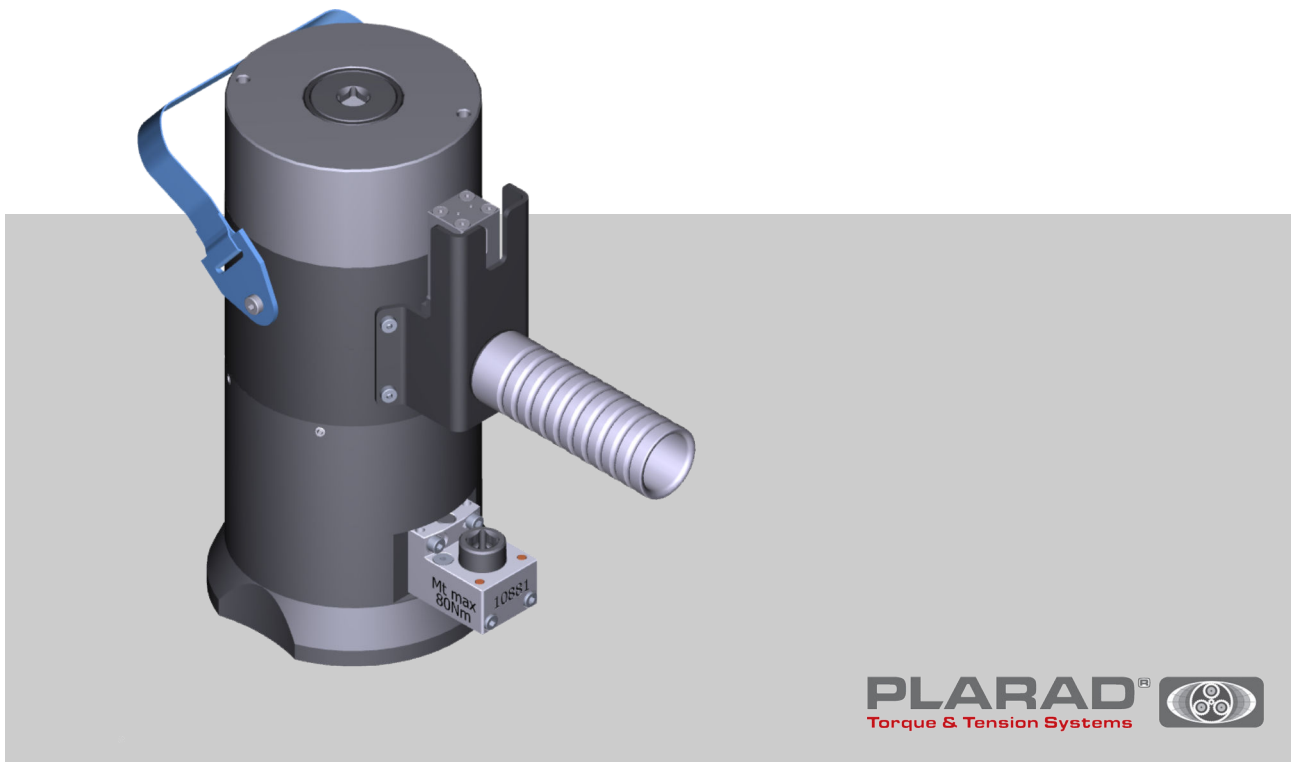


Operating instructions

Hydraulic tensioner

PSE, PSEF, PSD, PST, PSQ



PLARAD[®] 
Torque & Tension Systems

**Read the manual carefully before use!
Keep for future use.**

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Translation of the original operating instructions

pA# 69825, 2, en_GB



Information about this manual



This manual enables safe and efficient handling of the hydraulic tensioner (also referred to in the following as “tensioner”).

The manual is a component of the hydraulic tensioner and must be kept in its immediate vicinity so that the user can access it at any time.

The user must have read and understood this manual prior to commencing any tasks. A basic prerequisite for ensuring that work is performed safely is compliance with all safety instructions and guidelines in this manual. In addition, the local accident prevention regulations and general safety provisions for the hydraulic tensioner’s area of application apply.

Illustrations in this manual serve to provide a basic understanding and may differ from the actual design.

Versions

This manual applies to the following versions of the hydraulic tensioner:

- PSE hydraulic tensioner, single-stage
- PSEF hydraulic tensioner, single-stage
- PSD hydraulic tensioner, dual-stage
- PSD hydraulic tensioner, triple-stage
- PSQ hydraulic tensioner, quad-stage

Other applicable documents

The following documents must be observed in addition to this manual:

- Rating plate
- EU declaration of conformity
- Pressure-force diagram
Consideration of maximum tensile force permitted for fastening operation and operating pressure
- Hydraulic power pack operating instructions
- Certificates (option)
- Technical data sheet

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- Follow-up order** Further copies of this manual can be ordered subject to an additional fee.
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1 Unpacking

Delivery



Fig. 1: Example, transport case

The hydraulic tensioner and remaining items of delivery are packed for transport in packaging that has been specially chosen according to the transport route and delivery location. Smaller deliveries are packed in a plastic or metal box.

Larger deliveries are packed in wooden boxes and delivered on a pallet.

Checking the delivery



Check the delivery for transport damage and ensure it is complete immediately upon receipt. If it is incomplete or if there are defects, note the extent of the damage on the transport documents and lodge a complaint immediately.

Scope of delivery

The scope of delivery includes:

- Hydraulic tensioner
- Lubricant
- Allen key
- Document folder
 - Operating instructions
 - Pressure-force diagram
 - EU declaration of conformity

Options:

- Any accessory ordered
- Test reports



*Technical data sheet is available online at:
<https://www.plarad.de/download-center.html>*

Handling packaging material

The individual packages are packed according to the expected transport conditions. Only environmentally friendly materials are used for the packaging.

The packaging should provide protection against transport damage, corrosion and other damage. For this reason, do not destroy the packaging and do not remove it until shortly before use.

Dispose of packaging material in accordance with the applicable statutory provisions and local regulations.



ENVIRONMENT!

Danger to the environment due to incorrect disposal!

Packaging materials are valuable raw materials and, in many cases, can be further utilised or appropriately reconditioned and recycled. Incorrect disposal of packaging materials can be hazardous to the environment.

- Reuse pallets.
- Dispose of packaging materials in an environmentally sound manner.
- Observe the locally applicable disposal regulations. If necessary, engage the services of a specialist company with regard to disposal.

Transport by hand

1. ➤ Remove any hoses that are connected.
2. ➤ Seal all couplings and nipples with sealing caps before transport.
3. ➤ Make sure that all attached parts (handle, bracing, tools) are fastened securely and cannot drop.

4. ➤



WARNING!

Danger of injury from high weight!

Carry small tools by their handle.

For larger versions, use suitable transport aids. Attach to lifting gear properly.



Transport after operation



WARNING!

Danger of burns from hot surfaces or hydraulic oil!

In high ambient temperature and after prolonged operation, the hydraulic tensioner can reach surface temperatures of up to 80°C. The hydraulic oil gets hot when pressurised. Contact with hot surfaces and hot hydraulic oil could result in severe burns.

- Let the hydraulic tensioner cool down prior to transport.
- Seal all openings.
- Wear personal protective equipment.

Storage

- Disconnect the hydraulics from the hydraulic power pack when storing. Disconnect the hydraulic hoses.
- Comply with ambient conditions ↪ *Chapter 13 'Technical data' on page 66.*
- Seal all openings (couplings, nipples).

2 Getting to know the hydraulic tensioner

2.1 Illustration of hydraulic tensioner

Example illustration PSE

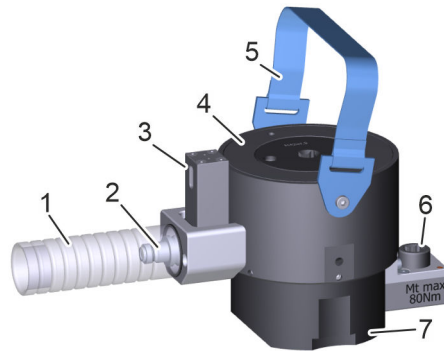


Fig. 2: Illustration of PSE

- | | | | |
|---|---|---|--|
| 1 | Screw-on handle | 5 | Carry handle |
| 2 | Pressure connection | 6 | Gear drive with square socket, maximum torque engraved |
| 3 | Cycle meter | 7 | Bracing surface |
| 4 | Hydraulic tensioner, single- or multi-stage | | |

Hydraulic tensioner versions

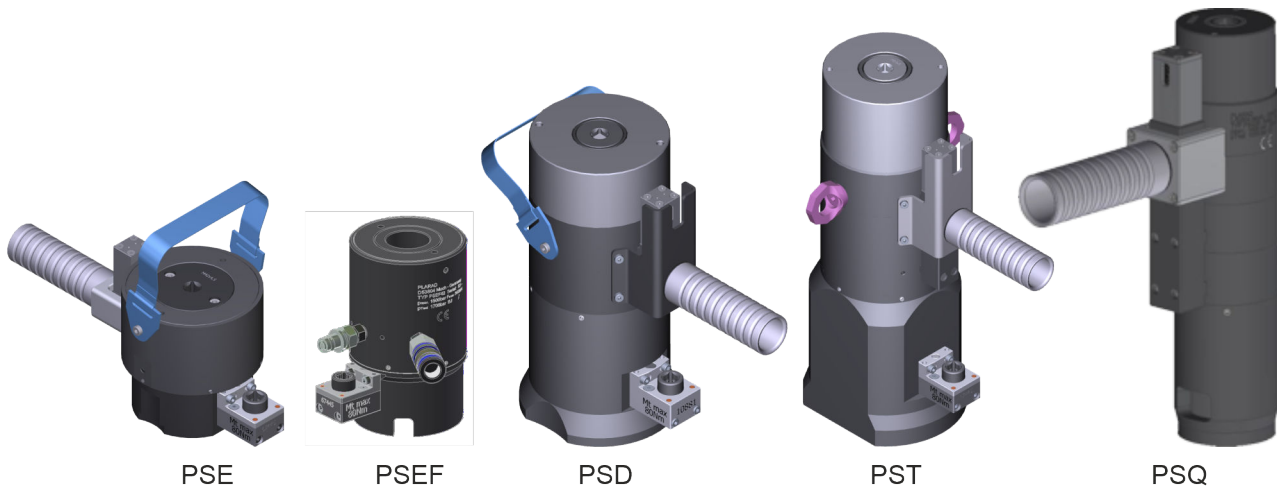


Fig. 3: Single- and multi-stage hydraulic tensioners

- | | | | |
|------|--------------|-----|--------------|
| PSE | single-stage | PST | triple-stage |
| PSEF | single-stage | PSQ | quad-stage |
| PSD | dual-stage | | |

The various versions differ from each other in that the multi-stage hydraulic tensioners have multiple pistons acting successively.

PSEF

The PSEF hydraulic tensioner works in conjunction with a customer's clamping nut.

PSD as example setup

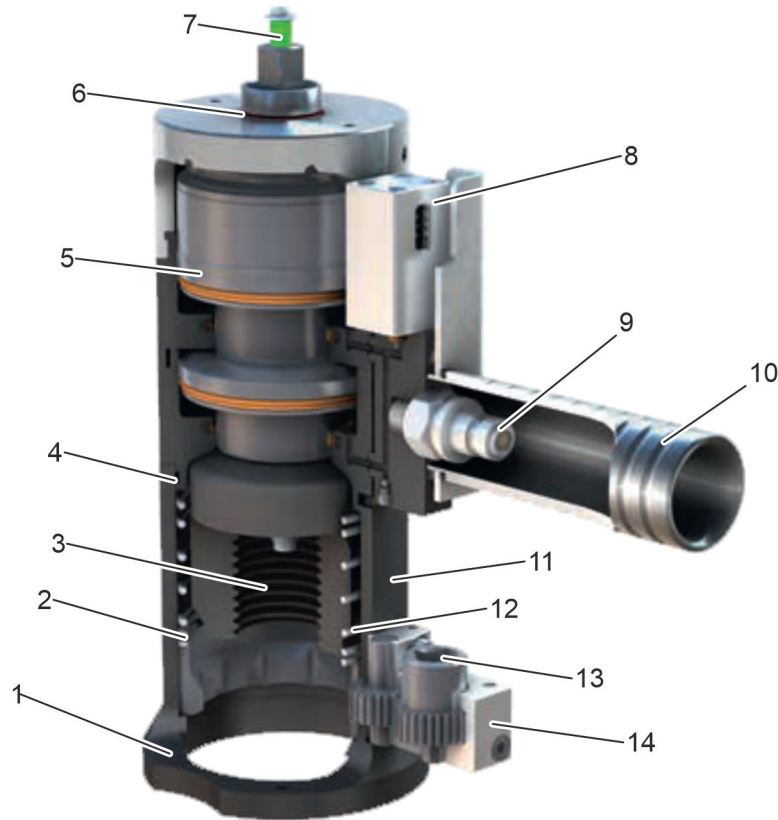


Fig. 4: PSD setup

- | | | | |
|---|--|----|-------------------------------------|
| 1 | Bracing surface | 8 | Cycle meter |
| 2 | Rotary bushing | 9 | Pressure connection |
| 3 | Tension bolt | 10 | Handle |
| 4 | Mechanical stroke limiter | 11 | Swivelling bracing surface |
| 5 | Automatic piston return | 12 | Rotary bushing spring |
| 6 | Safety marking (red) for maximum stroke | 13 | Square socket on screwing gears |
| 7 | Safety indicator (green) for bolt thread engagement (optional) | 14 | Gear drive, maximum torque engraved |

2.2 Hydraulic tensioner nomenclature

Name	Meaning
PSD 30-471	
PSD	Dual-stage PLARAD [®] hydraulic tensioner <ul style="list-style-type: none"> ■ E – single-stage ■ D – dual-stage ■ T – triple-stage ■ Q – quad-stage
30	M30 – bolt size/width across flats
471	471 – maximum preload [kN]

2.3 Brief description

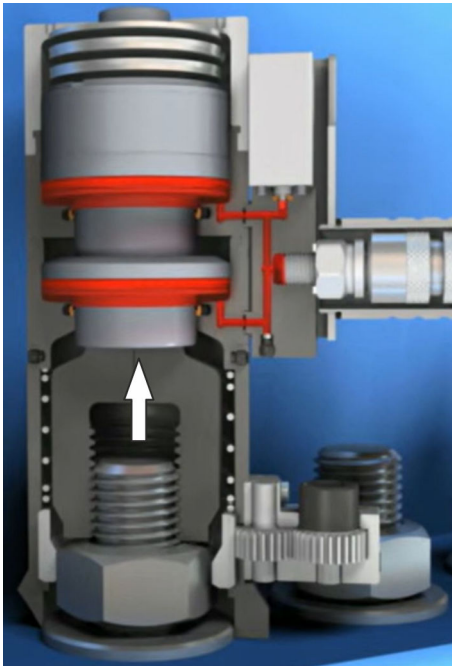


Fig. 5: Preloading

The hydraulic tensioner is a hand-held tool for preloading bolted connections.

Bolted connections can be preloaded without applying torsion loads in the bolt. The preload can be set precisely.

The hydraulic tensioner is powered by a hydraulic power pack. The hydraulic power pack generates hydraulic pressure. This pressure is shown on a pressure gauge or digital pressure indicator and can be adjusted by means of a pressure reducing valve. A hydraulic hose supplies the hydraulic tensioner with hydraulic oil.

The hydraulic tensioner is screwed vertically onto the bolted connection.

The hydraulic tensioner consists of a cylinder casing with one or more pistons inside. The pistons use hydraulic pressure to pull the bolt. The hydraulic tensioner is braced against a resting surface during this process.

A gear drive is available to screw on the nut using a ratchet wrench or torque wrench.

The cycle meter indicates the number of tensioning cycles performed so far. This helps observe the maintenance intervals.

The hydraulics unit can be swivelled through 360° on the bracing column. This way, you can adjust the hydraulic tensioner to match the fastening operation optimally.

Maximum stroke is achieved when the red stroke limiter marking on the stroke pin is visible. When the red marking is visible, the mechanical stroke limiter has been reached. Preloading needs to be checked.

2.4 Rating plate

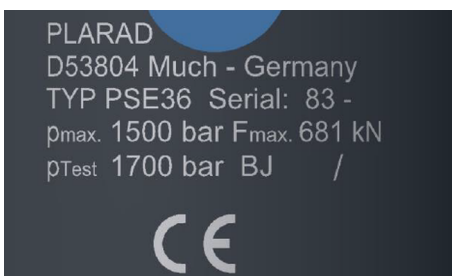


Fig. 6: Hydraulic tensioner rating plate

The following data is inscribed on the rating plate:

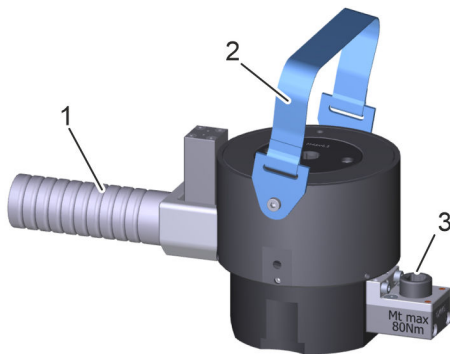
- Name of the manufacturer including location
- Type designation
- Article/serial number
- Maximum operating pressure
- Maximum tensile force
- Test pressure
- Year of construction
- CE mark

2.5 Controls



The hydraulic tensioner is controlled additionally through the hydraulic power pack's remote control unit.

Controls



- 1 Screw-on handle
- 2 Carry handle
- 3 Gear drive

Fig. 7: Controls

Carry handle

Small hydraulic tensioners feature a carry handle (Fig. 7/2) for easy transport.

Large hydraulic tensioners may feature lifting eyes.

Screw-on handle

The hydraulic tensioner can be gripped securely and carried by the handle (Fig. 7/1). The handle needs to be removed to connect the hydraulic hose.

Gear drive

The gear drive (Fig. 7/3) is used to screw on the nut. To do so, insert the tool's square drive into the gear drive's square socket.

2.6 Display elements

Cycle meter (optional)



Fig. 8: Cycle meter

The cycle meter indicates the number of tensioning cycles performed so far. This helps observe the maintenance intervals.

The maximum cycle number is engraved in the cycle meter's housing. When the maximum number of cycles has been reached, the tension bolt must be replaced ↪ *Chapter 10 'Performing maintenance' on page 59.*

Stroke limiter

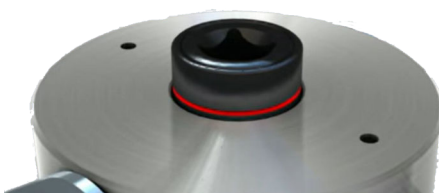


Fig. 9: Stroke limiter

Maximum stroke is achieved when the red stroke limiter marking on the stroke pin is visible.

Thread engagement indicator (optional)

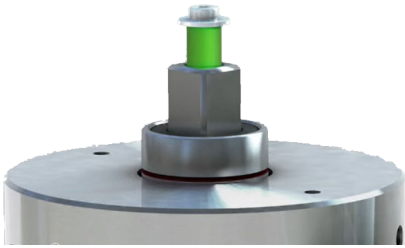


Fig. 10: Thread engagement indicator

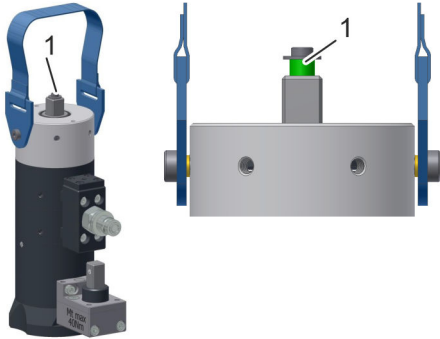
The bolt you are tightening has to be screwed into the hydraulic tensioner's tension bolt to a length of at least $1 \times D$ (D: thread diameter). The green marking on the thread engagement indicator becomes visible when the minimum thread engagement (thread coverage) has been reached.

The thread engagement indicator is available for order as an optional accessory.

Installation of thread engagement indicator (optional) ↪ *Chapter 5 'Installing the thread engagement indicator (optional)' on page 35.*

2.7 Accessories

The following accessories are available for ordering together with the hydraulic tensioner and may be included in the delivery:



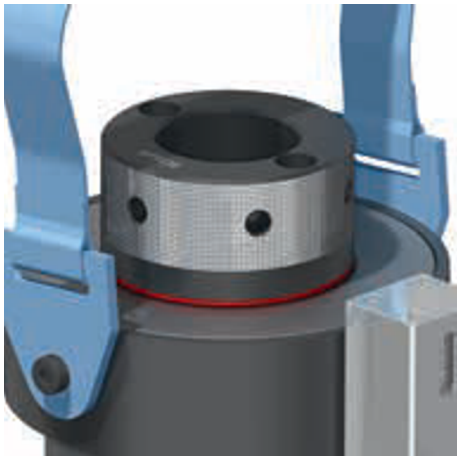
- Thread engagement indicator (1)
Indicates thread engagement



- Spacer rings and washers to adjust for the fastening operation



- Swivelling hydraulic hose port for greater ease of handling



- Knurled top for protruding bolts

Special accessories

Contact PLARAD[®] service.

3 Before you begin

This section provides an overview of all important safety aspects for protecting personnel and for ensuring safe and fault-free operation. Further task-specific safety instructions can be found in the sections of the individual chapters.

3.1 Symbols in this manual

Safety instructions

Safety instructions are indicated by symbols in this manual. The safety instructions are initiated by signal words that indicate the degree of the danger.



DANGER!

This combination of symbol and signal word indicates an imminently dangerous situation which, if not avoided, will result in death or serious injury.



WARNING!

This combination of symbol and signal word indicates a potentially dangerous situation which, if not avoided, could result in death or serious injury.



CAUTION!

This combination of symbol and signal word indicates a potentially dangerous situation which, if not avoided, could result in slight or minor injuries.



NOTICE!

This combination of symbol and signal word indicates a potentially dangerous situation which, if not avoided, could result in damage to property.




ENVIRONMENT!

This combination of symbol and signal word indicates potential dangers to the environment.

Safety instructions in specific instructions

Safety instructions may refer to specific, individual instructions. Such safety instructions are integrated into the instruction so that they do not interrupt the flow of reading when carrying out the task. The signal words described above are used.

Example:

1.  Loosen the screw.

2. 



CAUTION!
Risk of pinching by cover!

Close the cover carefully.

3.  Tighten the screw.





Tips and recommendations



This symbol highlights useful tips and recommendations as well as information designed to ensure efficient and smooth operation.

Other markings

The following markings are used in this manual in order to highlight instructions, outcomes, lists, references and other elements:

Marking	Explanation
	Step by step instructions
	Outcomes of steps
	References to sections of this manual and to other applicable documents
	Lists without a fixed order

3.2 Symbols on the hydraulic tensioner

Overview

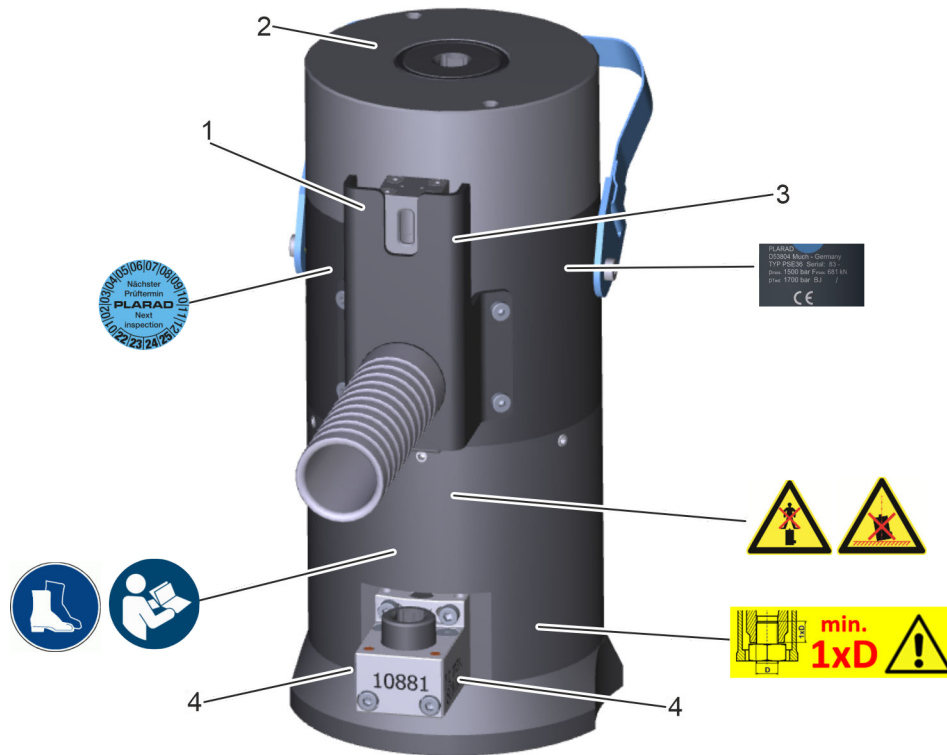


Fig. 11: Symbols on the hydraulic tensioner

- 1 Serial number
- 2 Thread size and pitch
- 3 Maximum permitted cycles before tension bolt needs to be replaced
- 4 Maximum torque
- 'Follow the manual' on page 20
- 'Safety shoes' on page 20

- 'Test badges' on page 20
- 'Direction of draw' on page 20
- 'Bracing' on page 20
- Chapter 2.4 'Rating plate' on page 12
- 'Thread coverage' on page 21

Illegible signage



WARNING!

Danger in the event of illegible signage!

Over time, signs and stickers can become dirty or be rendered unrecognisable by other means, such that hazards cannot be recognised and necessary operating instructions cannot be followed. This creates a danger of injury.

- Keep all safety notices, warnings and operating instructions in a clearly legible state at all times.
- Replace damaged signs and stickers immediately.

You will find the following symbols and information notices on the hydraulic tensioner:

Follow the manual



Read the operating instructions before use.

Safety shoes



Safety shoes protect the feet from crushing, falling parts and from slipping on slippery ground.

Test badges



The test badges state the dates of the respective tests.

Date of the next PLARAD[®] service



Date of the last DGUV-V3 test



For tools with certificate:

Date of last tensile force test

Direction of draw



Keep clear of hydraulic tensioner's direction of draw.

Bracing



The bolt axis must lie perpendicular to the bracing surface.

Thread coverage



The thread coverage (minimum thread engagement) must equal at least the bolt's diameter.

3.3 Intended use

The hydraulic tensioner is a hand-held tool and may only be used for preloading and loosening bolted connections within the defined specifications (↪ *Chapter 13 'Technical data' on page 66*).

The hydraulic tensioner is powered hydraulically.

The hydraulic tensioner may only be used for commercial purposes and only in conjunction with PLARAD® hydraulic power packs.

The hydraulic power pack may only be used in atmospheres that are not potentially explosive.

Intended use includes compliance with all of the stipulations in this manual.



WARNING!

Danger of injury from unadjusted tensile force!

The operating pressure associated with the tensile force is calculated based on the hydraulic tensioner's piston surface. If the hydraulic tensioner's maximum tensile forces exceed the tensile forces permitted for the respective fastening operation, there is a danger of injury and damage.

- Determine the particulars of the fastening operation and adjust the tensile force by setting the correct pressure.

3.4 Misuse

Any use beyond the intended use as well as any other use is considered misuse.



WARNING!

Danger in the event of misuse!

Misuse of the hydraulic tensioner can lead to dangerous situations.

- Never subject the hydraulic tensioner, bolts or accessories to loads exceeding the permitted tensile force.
- Do not use the hydraulic tensioner if you cannot brace it on a surface perpendicular to the bolt axis.
- Always observe the minimum thread coverage of $1 \times D$ (D: bolt's diameter) between the bolt you are preloading and the tension bolt.
- Observe the oil specifications at all times.
- Never operate outside the permissible environmental conditions.
- Never exceed the maximum operating pressure.
- Never operate if there are signs of leaking.

3.5 Residual risks

The following section outlines the residual risks potentially posed by the hydraulic tensioner even when it is used as intended.

To reduce the risks of personal injury and property damage and to avoid dangerous situations, observe the safety instructions listed here and the safety instructions in the other sections of this manual.

3.5.1 Danger due to hydraulics

Pressurised hydraulic fluid



WARNING!

Pressurised hydraulic components could result in life-threatening injuries!

Inadvertent opening or defects could result in the discharge of hydraulic fluid under high pressure.

Hydraulically powered drives could move unexpectedly.

Contact with hot hydraulic oil could result in severe burns.

- Prior to commencing all work, check the hydraulic power pack, connections, hoses and tools for visible damage and leaks. Have all identified defects remedied immediately.
- Prior to commencing work on the hydraulic system, first switch it off, then depressurise it and let it cool down. Fully relieve all accumulators of pressure. Check to ensure a depressurised state.
- Do not change pressure settings such that they exceed the maximum values.
- Comply with the maintenance intervals.
- Always ensure that hydraulic hoses are properly connected and locked. Quick-release couplings must be engaged. Bolted connections must be fully secured.

Exceeding the maximum pressure



WARNING!

Danger of bursting due to excessive hydraulic pressure!

If the hydraulic pressure exceeds the maximum permissible pressure for connections, hoses, tools or components of the hydraulic power pack, these could burst. Airborne parts and hydraulic fluid discharged under high pressure could cause serious injuries.

- Ensure that all components are designed for the maximum applied hydraulic pressure and that none of the components are damaged.
- Check for defects, damage and leaks. Have all identified defects remedied immediately.
- Comply with the maintenance intervals.

Hydraulic oil



WARNING!

Damage to health and secondary illnesses due to contact with hydraulic oil!

Contact with hydraulic oil could cause allergic reactions, skin and eye irritation, nausea and other secondary illnesses.

- Wear personal protective equipment for all work with hydraulic oil.
- Do not eat, drink or smoke in areas in which work involving hydraulic oil is performed.
- Upon completion of the work, clean or dispose of clothing and personal protective equipment contaminated with hydraulic oil in the proper manner.
- Note the safety data sheet for the hydraulic oil in use.

Oil specifications



NOTICE!

Property damage from non-compliance with the oil specifications!

Incorrect hydraulic oils and the use of contaminated hydraulic oils can result in damage. Hydraulic oil overflowing as a result of excessive oil level can result in pollution.

- Only connect purged hydraulic hoses.
- Ensure that the hydraulic hoses and hydraulic power pack are filled with identical hydraulic oil and that the hydraulic oil meets the oil specifications ↪ *'Oil specifications' on page 67.*
- Comply with the maintenance intervals.
- Top up using only new and clean hydraulic oil ↪ *'Oil specifications' on page 67.*

3.5.2 Mechanical dangers

Moving components and rotational movements



WARNING!

Danger of injury from moving components!

Moving components can cause serious injuries. There is a danger of being pulled in during rotational movements.

- During operation, do not reach into moving components or handle moving components.
- Do not switch on the hydraulic tensioner while carrying it.
- Wear tight fitting work clothing with seams that will tear readily.
- Wear safety goggles.
- Protect long hair from being pulled in by rotating parts using a protective cap (hair net).

Incorrect bracing and overloading



WARNING!

Danger of injury from incorrect bracing, overloading, breakage!

Incorrect bracing or overloading of the hydraulic tensioner or individual components can result in serious injuries.

- Do not use the hydraulic tensioner if the particulars of the fastening operation are not entirely clear.
- Note the pressure-force diagram.
- Check the bracing surface and swivelling bracing column for signs of damage before use. Do not use the hydraulic tensioner if it is damaged.
- Brace correctly ↪ *Chapter 8 'Bracing' on page 43.*
- Do not use the hydraulic tensioner in continuous operation.
- Use only PLARAD® original parts.

Crushing



WARNING!

Danger of crushing when bracing and due to high weight!

During operation, very strong forces act on the hydraulic tensioner, bracing column, bracing surface and bolts. There is a danger of crushing between the resting surface and bracing surface during tightening and loosening. The high weight of the hydraulic tensioner can cause crushing if it falls down.

- Handle the hydraulic tensioner with care and as intended.
- Give due consideration to the weight during transport and during all work.
- Have work performed only by persons who are physically capable of using the hydraulic tensioner safely despite its high weight.
- Do not reach between the resting surface and bracing surface.
- Keep clear of hydraulic tensioner's direction of draw.
- Secure the hydraulic tensioner against falling when working at height.
- Wear safety shoes.
- Also wear an industrial safety helmet for overhead work.

Dirt and scattered objects



CAUTION!

Danger of injury from falling over dirt and scattered objects!

People may slip on or stumble over dirt and scattered objects. Falling may cause injuries.

- Always keep the work area clean.
- If objects are no longer needed, remove them from the work area and especially if such objects are at ground level.
- Mark unavoidable stumbling points with hazard tape.
- Keep handles and gripping surfaces of the hydraulic tensioner dry, clean and free of lubricants. Clean them immediately if they are dirty.

3.5.3 Noise and ergonomics

Noise



WARNING!

Danger of injury from noise!

The noise level of 70 dB(A) (3 dB(A) measurement uncertainty) occurring in the work area can cause hearing damage.

- Always wear hearing protection when working.
- Remain in the danger zone only for as long as your presence is required.

Hot surfaces



WARNING!

Danger of injury from hot surfaces!

Component surfaces may become very hot during operation. Surface temperatures of up to 80°C could develop. Contact between the skin and hot surfaces will result in severe burns to the skin.

- Always wear heat-resistant protective work clothing and safety gloves when working in the vicinity of hot surfaces.

Inadequate ergonomics



CAUTION!

Injuries to the musculoskeletal system from the high weight of the hydraulic tensioner!

Lifting and carrying heavy loads can cause permanent damage to the musculoskeletal system.

- Ensure stable footing and sufficient room for movement.
- Keep your back as straight as possible. Do not lift with your upper body hunched over, bent forward, or with your back arched.
- Lift the hydraulic tensioner as close to your body as possible.
- Only carry small hydraulic tensioners.
- Avoid lopsided lifting. Avoid twisting your spine. Do not carry one-handed.
- Never move the hydraulic tensioner abruptly.
- Use suitable aids and lifting gear.

Inattention



WARNING!

Danger of injury due to distraction, inattention or irresponsible use!

Distraction, inattention or irresponsible use can result in losing control of the hydraulic tensioner and thus cause serious injuries.

- Always keep the work area well-lit.
- Keep children and unauthorised persons away.
- Work purposefully and in a responsible manner. Do not allow yourself to be distracted.
- Do not work if you are tired or under the influence of drugs, alcohol or medicine.
- Do not be lulled into a false sense of security. Do not disregard the safety information and instructions in this manual, even if the hydraulic tensioner seems familiar to you after frequent use.
- When the hydraulic tensioner is not in use, always store it securely in the transport case out of reach of children and other unauthorised persons.
- Wear the prescribed personal protective equipment.

3.6 Safety devices

Faulty safety devices



WARNING!

Danger of death due to inoperative safety devices!

If safety devices or safety functions are inoperative or disabled, there is a danger of serious injuries.

- Prior to commencing work, check that all safety devices are operative and correctly installed.
- Never disable or bypass safety devices or safety functions.

The hydraulic tensioner is equipped with the following safety devices and safety functions:

Stroke limiter

Maximum stroke is achieved when the red stroke limiter marking on the stroke pin is visible.

Thread engagement indicator (optional)

The green marking on the thread engagement indicator becomes visible when the minimum thread engagement has been reached.

Mechanical stroke limiter

The end stop limits piston extension even at maximum load.

Spring-assisted rotary bushing

The spring makes the rotary bushing flexible in axial direction. This helps to prevent assembly damage when positioning the hydraulic tensioner.

Handle

The hydraulic hose port is protected from damage. The detachable handle offers optimal grip when transporting or using the hydraulic tensioner.

3.7 Operator's obligations

The hydraulic tensioner is used in the commercial sector. The operator of the hydraulic tensioner is therefore subject to the statutory obligations pertaining to occupational safety.

In addition to the safety instructions in this manual, the applicable safety, occupational safety and environmental protection regulations for the hydraulic tensioner's area of application must be adhered to.

The following specifically applies in this regard:

- Operators must familiarise themselves with the applicable occupational safety regulations and, as part of a risk assessment, determine additional dangers that arise as a result of the specific operating conditions at the hydraulic tensioner's operating site. The findings of this risk assessment must be used to draft safety instructions for operating the hydraulic tensioner.
- During the entire time the hydraulic tensioner is in use, the operator must check whether the safety instructions they have compiled reflect current regulations and, if necessary, the operator must change the instructions accordingly.
- The operator must clearly define and regulate responsibilities for all work on and with the hydraulic tensioner. The authority and responsibilities of personnel regarding operation, set-up, maintenance and repair must be clearly defined.
- The operator must reliably check the use of the hydraulic tensioner and ensure that only commissioned and instructed personnel work with the hydraulic tensioner. Personnel being trained or instructed and personnel undertaking vocational training must always be supervised by an experienced person when working with or on the hydraulic tensioner.
- The operator must ensure that the hydraulic tensioner is not opened and that no work is performed on the electrical equipment by unauthorised persons.

Work on electrical equipment may only be performed by an electrician or by trained persons under the guidance and supervision of an electrician. Adhere to electrotechnical regulations for safety reasons.

The operator is further responsible for ensuring that the hydraulic tensioner is in technically flawless condition at all times. The following applies for this reason:

- The operator must ensure adherence to the maintenance intervals described in this manual.
- The operator must have the functionality and integrity of all safety devices checked on a regular basis.

3.8 Who is permitted to use the hydraulic tensioner?


WARNING!
Danger of injury if personnel are insufficiently qualified!

If unqualified personnel perform work on or with the hydraulic tensioner or if such persons are present in the danger zone while work is being performed, dangers arise that could cause serious injuries and considerable damage.

- Have all tasks performed by suitable qualified personnel without exception.
- Keep unqualified personnel away from the danger zones and work areas.

User

Users of the hydraulic tensioner have the requisite knowledge and the requisite training for handling hydraulics. Furthermore, during training by the operator, users have been trained in relation to the tasks assigned to them and the potential dangers associated with improper conduct.

Users are trained in how to use the personal protective equipment, are familiar with the most important specifications, situations and information relating to working with hydraulic tensioner and are capable of using the hydraulic tensioner safely. This includes connecting hydraulic hoses.

The user must be older than the legally permissible minimum age.

Users may only perform tasks that exceed operation under normal operating conditions if this is specified in this manual and the operator has expressly entrusted the users with the performance of such tasks.

The user knows who their supervisor is, can contact their supervisor if they have questions or in an emergency, and is able to communicate with their supervisor.

The user is familiar with all residual risks and is trained in the practical handling of the hydraulic tensioner.

Qualified hydraulic tensioner personnel

Qualified hydraulic tensioner personnel are trained for the specific task area in which they work and are familiar with the relevant standards and regulations.

Due to their professional training and experience, qualified personnel are able to perform work with the hydraulic tensioner, recognise and avoid potential dangers independently and indicate them to users.

Specific capabilities of qualified hydraulic tensioner personnel include:

- Operate the hydraulic tensioner safely.
- Use all functions of a hydraulic power pack.

- Uphold safety, occupational safety and health protection when using the hydraulic power pack and hydraulic tensioner and convey this to users.
- Determine the condition and suitability of hydraulic hoses for the respective application.
- Identify damage and arrange for repairs or get in touch with the manufacturer.
- Instruct users in the proper manner.

Operator

The operator is the person who operates the hydraulic tensioner for commercial or economic purposes themselves, or makes it available for a third party to use, and who bears legal responsibility for the product vis-à-vis protection of personnel and third parties during operation.

🔗 *Chapter 3.7 'Operator's obligations' on page 29*

PLARAD[®] service

Certain work may only be performed by PLARAD[®] service or by personnel authorised by Maschinenfabrik Wagner GmbH & Co. KG. Other personnel are not authorised to perform this work. Contact PLARAD[®] service or authorised PLARAD[®] partners regarding performance of the work that is due.

Contact: www.plarad.de

🔗 *Chapter 10.3 'Having service tasks performed by the manufacturer' on page 62*

Unauthorised persons



WARNING!

Danger of death for unauthorised persons due to dangers in the danger zone and work area!

Unauthorised persons, who do not meet the requirements described in this manual, are not aware of the dangers in the danger zone. There is therefore a danger of serious injuries or even death for unauthorised persons.

- Keep unauthorised persons away from the danger zone and work area.
- If in doubt, address the respective persons and instruct them to leave the danger zone and work area.
- Suspend work while there are unauthorised persons loitering in the work and danger zone.

3.9 Personal protective equipment

Safety gloves



Safety gloves are used to protect the hands from friction, abrasions, punctures or deeper injuries and from contact with hot surfaces.

Safety shoes



Safety shoes protect the feet from crushing, falling parts and from slipping on slippery ground.

Hearing protection



Hearing protection is used to protect against hearing damage caused by noise.

Safety goggles



Safety goggles are used to protect the eyes from airborne parts and liquid jets.

Protective work clothing



Protective work clothing is tight fitting work clothing with a low tearing resistance, with tight sleeves and without any protruding parts.

Protective cap



The protective cap (hairnet) is used to protect the hair from being pulled in by rotating and moving parts, such as bolts.
The wearing of a protective cap is mandatory if your hair is longer than the circumference of the moving shaft.

Industrial safety helmet



Industrial safety helmets are used to protect the head from falling objects, suspended and swinging objects and from bumping into stationary objects.

An industrial safety helmet must be worn for overhead work.

3.10 Environmental protection



ENVIRONMENT!

Danger of pollution from incorrect handling of environmentally hazardous substances!

If environmentally hazardous substances are handled incorrectly, especially if such substances are disposed of incorrectly, this could cause significant damage to the environment.

- Always adhere to the instructions given below in relation to the handling of environmentally hazardous substances and the disposal thereof.
- If environmentally hazardous substances accidentally enter the environment, adopt suitable measures immediately. If in doubt, notify the competent local authority of the damage and inquire about suitable measures to be taken.

The following environmentally hazardous substances are used:

Lubricants

Lubricants, such as greases and oils, contain toxic substances. Such substances must not enter the environment.

If lubricants do escape, arrange for them to be disposed of by a specialist disposal company.

Observe the manufacturer's safety data sheet.

Hydraulic oil

Hydraulic oil can contain harmful and environmentally hazardous substances. It must not enter the environment (soil, water), sewage system or household waste. Dispose of hydraulic oil and waste containing hydraulic oil separately via an approved disposal company.

Observe the manufacturer's safety data sheet.

4 Determining the particulars of the fastening operation

Information about bolted connections

The hydraulic tensioner's tensile force, and thus the associated hydraulic power pack pressure, must be set for each fastening operation individually and checked directly during the fastening operation.

The operating pressure associated with the tensile force is calculated based on the hydraulic tensioner's piston surface. If the hydraulic tensioner's maximum tensile forces exceed the tensile forces permitted for the respective fastening operation, there is a danger of injury and damage.

Personnel: ■ Operator

The hydraulic tensioner can only be used safely and properly if the particulars of the fastening operation are known.

1. ► Determine the particulars of the fastening operation. To do so:
Determine a suitable bracing surface and select a hydraulic tensioner suitable to the bolted connection.
2. ► Determine the tensile force and hydraulic pressure settings required for the fastening operation.
3. ► Make further accessories available according to the situation.

5 Installing the thread engagement indicator (optional)

Scope of delivery

The optional thread engagement indicator accessory comes including the following:

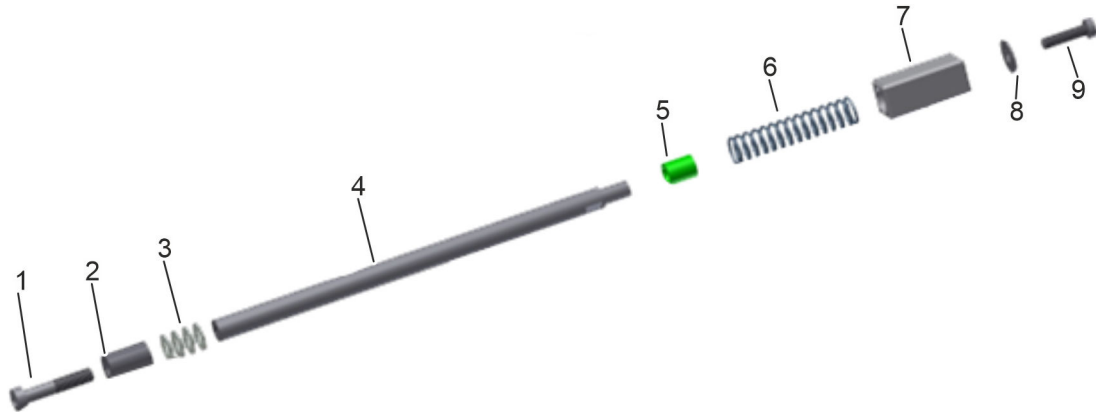


Fig. 12: Components

- | | | | |
|---|------------------|---|--------------------|
| 1 | M5 cylinder bolt | 6 | Compression spring |
| 2 | Spacer ring | 7 | Square socket |
| 3 | 5.3 mm washers | 8 | 4.2 mm washer |
| 4 | Measuring rod | 9 | M4 cylinder bolt |
| 5 | Plastic bushing | | |

Installing

- | | |
|-----------------------|---|
| Personnel: | ■ Qualified hydraulic tensioner personnel |
| Protective equipment: | ■ Protective work clothing |
| | ■ Safety goggles |
| | ■ Safety gloves |
| | ■ Safety shoes |
| Tool: | ■ Open-end spanner a/f6 |
| | ■ Allen key size 3 and 4 |

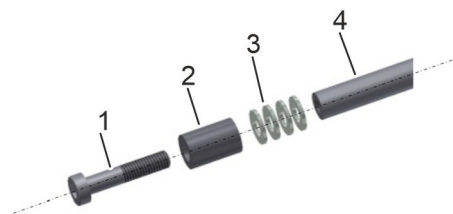


Fig. 13: Measuring rod

- 1.** → Screw the 5.3 mm washers (Fig. 13/3) and spacer ring (Fig. 13/2) using the M5 bolt (size 4) (Fig. 13/1) onto the measuring rod (Fig. 13/4). Torque 8 Nm. Counter the measuring rod with the size 6 open-end spanner while doing so.

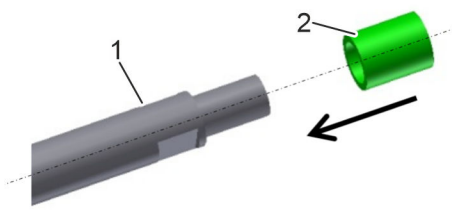


Fig. 14: Plastic bushing

2. → Slide the plastic bushing (Fig. 14/2) onto the measuring rod (Fig. 14/1).



Fig. 15: Compression spring

3. → Slide on the compression spring (Fig. 15/1).

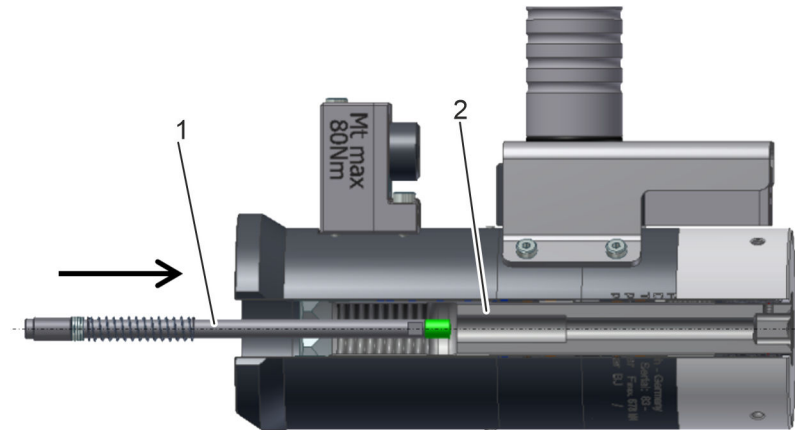


Fig. 16: Tension bolt

4. → Insert the assembled measuring rod (Fig. 16/1) into the tension bolt (Fig. 16/2).

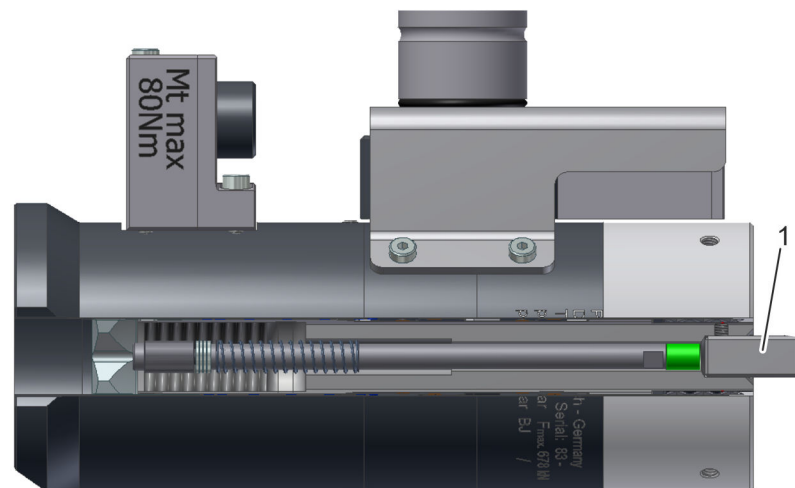


Fig. 17: Square socket

5. → Insert the square socket (Fig. 17/1).

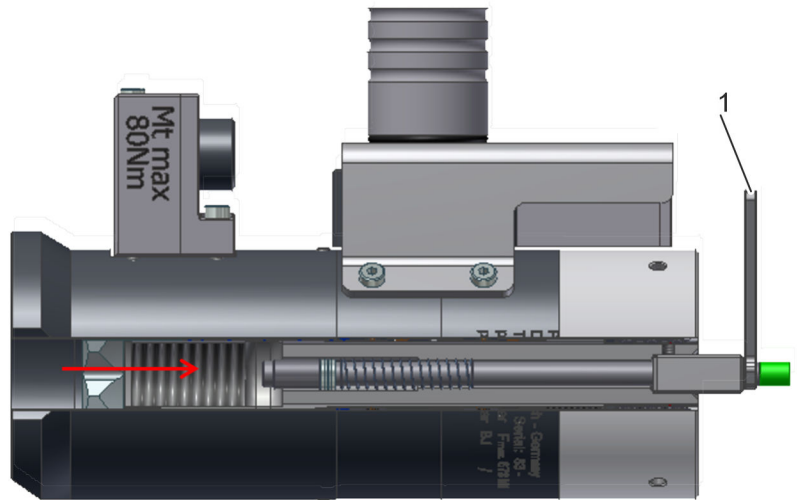


Fig. 18: Pushing through the measuring rod

6. → Push through the measuring rod until you can slot the size 6 open-end spanner (Fig. 18/1) onto the measuring rod's spanner flats.
7. → Screw the M4 cylinder bolt (size 3) (Fig. 19/3) and 4.3 mm washer (Fig. 19/2) onto the measuring rod (Fig. 19/1). Torque 5 Nm.

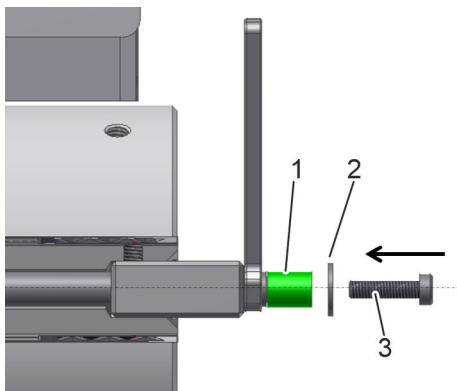


Fig. 19: Cylinder bolt



⇒ The thread engagement indicator has been installed.

6 Preparing the hydraulic tensioner

Unsecured or overloaded components



WARNING!

Danger of injury from unsecured or overloaded components!

Unsecured components or components subjected to loads exceeding the intended use could result in uncontrolled hydraulic tensioner behaviour, outward ejection of components or breakage and thereby cause serious injuries.

- Carefully determine all the particulars of the fastening operation.
- Ensure that all components are used within the scope of their intended use.
Never exceed load limits (e.g. maximum pressures or tensile forces).
- Do not use the hydraulic tensioner if the bracing column or bracing surface are damaged.

Personnel: ■ Qualified hydraulic tensioner personnel

Protective equipment: ■ Protective work clothing

■ Safety shoes

Prior to being used for tightening or loosening, the particulars of the fastening operation must be known and the hydraulic tensioner must be prepared.

Determining the particulars of the fastening operation

1. ▶ Ensure that the particulars of the fastening operation have been determined & *Chapter 4 'Determining the particulars of the fastening operation' on page 34* and that all parameters are available.

Checking the bracing surface

2. ▶ Make sure that the bracing surface and bracing column are undamaged. Do not use the hydraulic tensioner if anything is damaged.

Cleaning

3. ▶ Clean the resting surface and bolted connection.

7 Supplying with energy

Pressurised hydraulic fluid



WARNING!

Danger of injury from pressurised hydraulic fluid jets!

Faulty or improperly connected hydraulic hoses can cause hydraulic fluid to eject under high pressure, causing critical injuries.

Contact with hot hydraulic oil could result in severe burns.

- Prior to commencing all work, check the hydraulic power pack, connections, hoses and tools for visible damage and leaks. Have all identified defects remedied immediately.
- Do not change pressure settings such that they exceed the maximum values.
- Only use hydraulic hoses approved for the maximum permitted operating pressure.
- Comply with the maintenance intervals.
- Always ensure that hydraulic hoses are properly connected and locked. Quick-release couplings must be engaged. Bolted connections must be fully secured.

Hydraulic power pack

Energy is supplied from a hydraulic power pack. Observe the specifications ↗ 'Hydraulic power pack' on page 66.

Connecting hydraulic hoses

- Personnel: ■ User
- Protective equipment: ■ Protective work clothing
■ Safety goggles
■ Safety gloves
■ Safety shoes

1. ➤ Ensure that the hydraulic power pack meets the relevant specifications ↗ 'Hydraulic power pack' on page 39.
2. ➤ Ensure that the hydraulic power pack is ready for use ↗ hydraulic power pack operating instructions. When doing so, make sure that the oil specifications are being observed, that the hydraulic hoses have been purged and that there is a sufficient quantity of oil in the hydraulic power pack's surge tank.
3. ➤ Ensure that the hydraulic hoses have not exceeded the maximum period of use.

Period of use



Hose check:

- The maximum period of use must not be exceeded.
Comply with the exchange interval. Use for a maximum of 5 years.
- The maximum pressure must not be reached.
- Use filled hydraulic hoses only.
- Oil specifications must match.
- Couplings and nipples must be compatible and be undamaged.
- There is no visible damage.

Detaching the handle

4. ➤ To access the hydraulic hose port (Fig. 20/1), unscrew and take off the handle (Fig. 20/2).

Connection

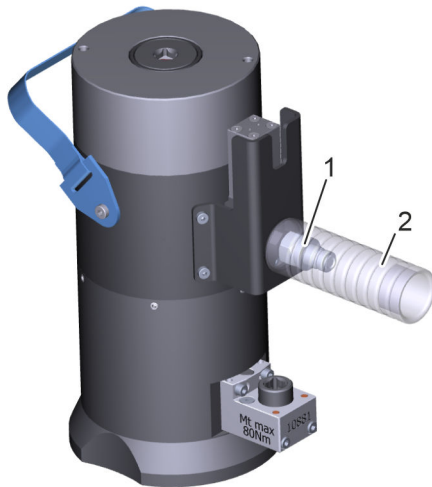


Fig. 20: Detaching the handle

Sequence to observe

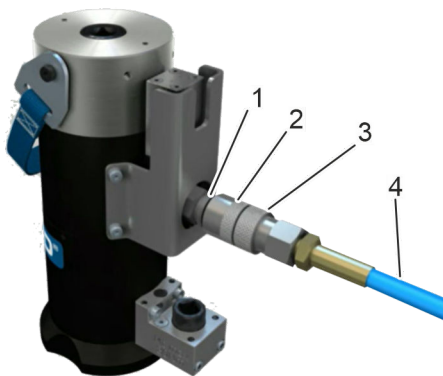


Fig. 21: Connecting the hydraulic hose

- 1 Hydraulic hose port
- 2 Quick-release coupling
- 3 Locking thread
- 4 Hydraulic hose

Check the lock.

5. →



The hydraulic tensioner may feature a variety of coupling systems.

Ensure that the coupling/nipple combination is suitable and free of damage.

6. →

Ensure that the maximum permissible pressures of all components are sufficient.

7. →

Ensure that the hydraulic hose is fully filled with suitable hydraulic oil ☞ 'Oil specifications' on page 67.

8. →

Ensure that coupling and nipples are unsoiled. Remove any soiling.

9. →

Guide the hydraulic hose through the handle.

10. →



Connect hydraulic hoses only in a depressurised state!

Connect the hydraulic hose to the hydraulic power pack.

When connecting the hydraulic tensioner, connect the ports in the order specified below:

1. - Hydraulic power pack pressure port
2. - Hydraulic tensioner pressure port

11. →

Connect the hydraulic hose (Fig. 21/4) to the hydraulic hose port (Fig. 21/1). Make sure that the quick-release coupling (Fig. 21/2) engages.

12. →

Tighten the locking thread (Fig. 21/3). Check the lock.



Older couplings have counter-threads. Tighten to lock.

New couplings have a bayonet closure. Let it fully engage.

Purging

Setting the operating pressure

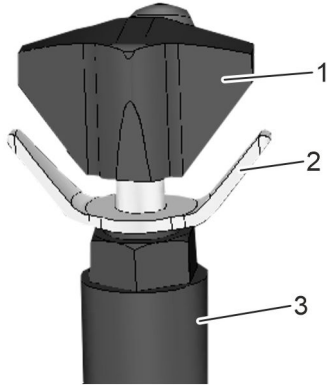


Fig. 22: Pressure adjustment valve

- 1 Knob
- 2 Adjustment lock
- 3 Pressure adjustment valve

13. ▶ Screw on the handle (Fig. 20/2).

14. ▶ Purge ↻ hydraulic power pack operating instructions.

15. ▶ Set the operating pressure ↻ hydraulic power pack operating instructions, ↻ pressure-force diagram.

8 Bracing

Bracing column/bracing surface/ resting surface

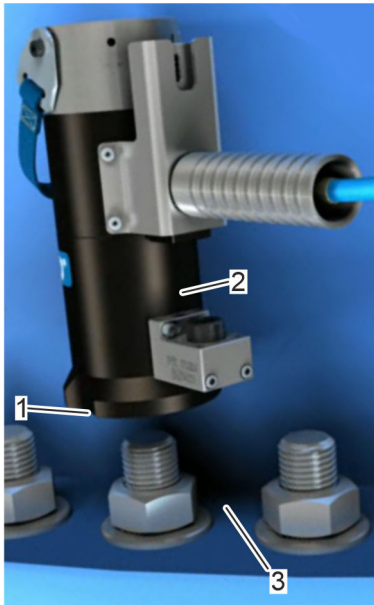


Fig. 23: Bracing

Danger of crushing

- 1 Bracing surface
- 2 Bracing column
- 3 Resting surface

Tensile forces can only be generated if the reaction forces are absorbed. To do so, brace the bracing column (Fig. 23/2) by setting the bracing surface (Fig. 23/1) against a clean resting surface (Fig. 23/3) that is perpendicular to the bolt axis. Make sure that the bracing surface is free of damage.

For fastening operations for which the standard hydraulic tensioner is unsuitable, contact PLARAD® service.



WARNING!

Danger of crushing when bracing!

During operation, very strong forces act on the hydraulic tensioner, bracing column, bracing surface, resting surface and bolts. Body parts might get caught between bracing surface and resting surface. This could result in serious injuries.

- Never reach between the bracing surface and bracing point.
- Keep clear of the bolt's direction of draw.
- Keep hands and other body parts clear of the mating surface.

Incorrect bracing and overloading



WARNING!




Danger of injury from incorrect bracing, overloading, breakage!

If the hydraulic tensioner is not sufficiently braced, it can slip out of place and be ejected. Incorrect bracing or overloading of the bolts or other components can result in serious injuries and damage the hydraulic tensioner.

- Do not use the hydraulic tensioner if the particulars of the fastening operation are not entirely clear.
- Note the pressure-force diagram.
- Do not use the hydraulic tensioner if you cannot brace it on a surface perpendicular to the bolt axis.
- Check the bracing column and bracing surface for signs of damage before use. Do not use the hydraulic tensioner if it is damaged.
- Brace the hydraulic tensioner properly.
- Use only PLARAD[®] original spare parts.

Bracing

Ideal bracing situations

1.  Clean the resting surface.
2.  Make sure that resting surface and bracing surface are parallel.
3.  Make sure that the resting surface is perpendicular to the bolt axis.

Inadmissible bracing situations

4. 



NOTICE!

Danger of fracture from point loads!

Make sure that no forces are applied to any surfaces obliquely.

Always brace using the entire bracing surface.

Never pinch the hydraulic hose.

Never brace on a single point of an oblique surface.

9 Preloading and loosening

Residual risks during operation



WARNING!

Danger of injury from improper use!

During operation, very strong forces act on the hydraulic tensioner, bracing column, bracing surface, resting surface and bolts. Body parts might get caught between bracing surface and bracing column. Components may become overloaded. Hydraulic oil may escape under high pressure. This could result in serious injuries.

- Keep all body parts clear of the resting surface and bracing surface.
- Secure all detachable components.
- Position the tool with care.
- Only use hydraulic hoses that are approved for the operating pressure and are free of damage.
- Never overload components.
- Note the pressure-force diagram. Set the pressure properly.
- Before use, check the hydraulic tensioner, bracing column, bracing surface, resting surface, bolts and all other components for signs of damage. Do not use damaged components.
- Brace correctly ↪ *Chapter 8 'Bracing' on page 43.*
- Only use PLARAD® accessories.
- If you have questions, contact PLARAD® service.

Hot surface



WARNING!

Danger of burns from hot surfaces!

In high ambient temperature, the hydraulic tensioner can reach surface temperatures of up to 80°C.

- Wear personal protective equipment.
- Allow the hydraulic tensioner to cool down before performing any work on it.

Working as a team



WARNING!

Danger of injury from poor coordination!

When two people use the hydraulic tensioner and remote control as a team, poor coordination can cause injuries.

- Work alone wherever possible. Have only a single person position and brace the hydraulic tensioner and start the hydraulic power pack by remote control.
- If working alone is not possible, ensure good communication at all times.
- If coordination becomes difficult, immediately cease all work.

9.1 Preloading



WARNING!

Danger of injury from component fracture!

Components or the bolted connection may tear while working. The hydraulic tensioner may eject at force from the bolting point.

- Stay clear of the hydraulic tensioner's longitudinal axis.
- Load hydraulic tensioner, attached parts and bolts only up to the permitted maximum torque and tensile force.
- Also wear an industrial safety helmet for overhead work.

- Personnel: ■ User
- Protective equipment: ■ Protective work clothing
■ Safety goggles
■ Safety gloves
■ Safety shoes
■ Industrial safety helmet

Prerequisites

- The hydraulic power pack is operational and the remote control is within reach.
 - ↳ Hydraulic power pack operating instructions
- The hydraulic tensioner is ready for use.
 - ↳ Chapter 6 'Preparing the hydraulic tensioner' on page 38

- The hydraulic hoses have been connected.
↳ Chapter 7 'Supplying with energy' on page 39
- It is possible to brace the hydraulic tensioner properly.
↳ Chapter 8 'Bracing' on page 43

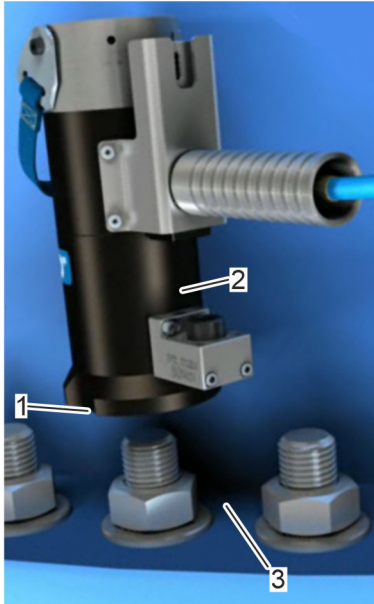


Fig. 24: Bracing

- 1 Bracing surface
- 2 Bracing column
- 3 Resting surface

1. → Clean the resting surface (Fig. 24/3) and bolt.
2. → Position the hydraulic tensioner. Make sure that the resting surface (Fig. 24/3) is perpendicular to the bolt axis.

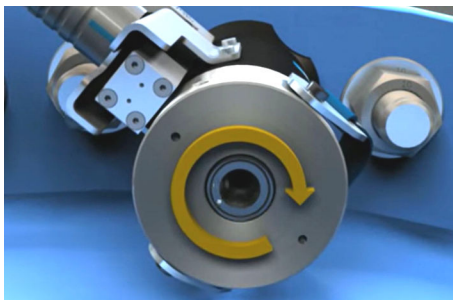




Fig. 25: Screwing on

3. →  Use a suitable tool to screw the tension bolt onto the bolt you are preloading (Fig. 25). Thread coverage must equal at least the bolt's diameter.
 - ⇒  If you have installed the optional thread engagement indicator, the green marking will become visible when the minimum thread engagement is reached.
4. → Make sure that the resting surface is level, clean and perpendicular to the hydraulic tensioner's bolting axis.

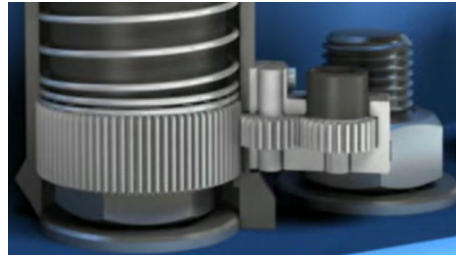


Fig. 26: Nut engaged



5. ▶ Check that the rotary bushing's hex socket engages flush with the nut.
 - ⇒ If the hex socket is not engaging flush with the nut, the rotary bushing will be pushed upwards (Fig. 27).



Fig. 27: Nut not engaged



6. ▶ Use the gear drive to rotate the rotary bushing.
 - ⇒ The spring force will move the rotary bushing into the correct position.

Setting the pressure

7. ▶ Check the pressure-force diagram to find the pressure for the required preload.
8. ▶ Switch on the hydraulic power pack.
9. ▶ Set the pressure.

Preloading

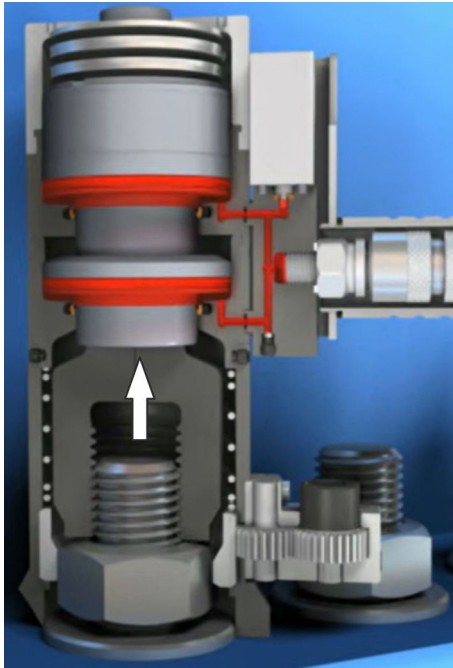


Fig. 28: Preloading

Screwing on the nut

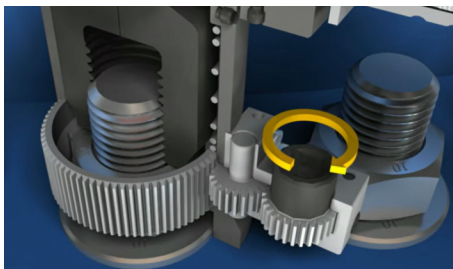


Fig. 29: Screwing on the nut

10. ➤



WARNING!

Danger of injury from component fracture!

Make sure that there is no one in the hydraulic tensioner's or hydraulic power pack's danger zone.

Stay clear of the hydraulic tensioner's longitudinal axis.

11. ➤

Switch on the hydraulic power pack using the remote control ⚡ hydraulic power pack operating instructions.

Pressurise the hydraulic tensioner.

⇒ The tension bolt pulls the bolt in axial direction, stretching it (Fig. 28).

The nut can be turned on the bolt by the value of this stretching.

12. ➤

Use a tool in the gear drive to screw on the nut until it engages completely. Observe the engraved maximum torque.

13. ▶ Discharge pressure from hydraulic tensioner.



On systems with and without automatic piston return, the hydraulic hose needs to remain connected so that the oil in the cylinder can be forced back into the tank.



WARNING!

Danger of injury from pressurised components!

Do not switch off the hydraulic power pack immediately after completing the preloading procedure. The system may still be under pressure after switching off.

Piston return

- On systems with automatic piston return, the piston returns to its home position when the pressure is switched off.
- Systems without automatic piston return
Screw on the tension socket to screw the piston back into its home position.

⇒ The tension bolt is returned to the home position.

Settling phenomena

14. ▶ To compensate for settling caused by compressing the surfaces' top layer, perform preloading at least twice.

15. ▶ Unscrew and take off the hydraulic tensioner.

⇒ Preloading is complete.

9.2 Preloading with the PSEF

Unique characteristics of the PSEF

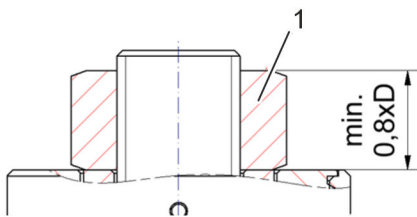


Fig. 30: Customer's clamping nut

The PSEF hydraulic tensioner works in conjunction with a customer's clamping nut (Fig. 30/1).

Thread coverage by the engaged clamping nut (Fig. 30/1) on the bolt for preloading must equal at least $0.8 \times D$ (D: thread diameter).

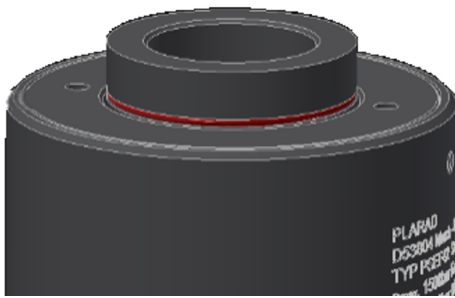


Fig. 31: PSEF stroke limiter

To prevent the maximum stroke travel from being exceeded, a red marking (Fig. 31) indicates the end of stroke travel.



WARNING!

Danger of injury from component fracture!

Components or the bolted connection may tear while working. The hydraulic tensioner may eject at force from the bolting point.

- Stay clear of the hydraulic tensioner's longitudinal axis.
- Load hydraulic tensioner, attached parts and bolts only up to the permitted maximum torque and tensile force.
- Also wear an industrial safety helmet for overhead work.

- Personnel: ■ User
- Protective equipment: ■ Protective work clothing
 ■ Safety goggles
 ■ Safety gloves
 ■ Safety shoes
 ■ Industrial safety helmet

Prerequisites

- The hydraulic power pack is operational and the remote control is within reach.
 - ☞ Hydraulic power pack operating instructions
- The hydraulic tensioner is ready for use.
 - ☞ Chapter 6 'Preparing the hydraulic tensioner' on page 38
- The hydraulic hoses have been connected.
 - ☞ Chapter 7 'Supplying with energy' on page 39
- It is possible to brace the hydraulic tensioner properly.
 - ☞ Chapter 8 'Bracing' on page 43

Customer's clamping nut

1. ➔ Screw on customer's clamping nut (Fig. 30/1).

Thread coverage by the engaged clamping nut (Fig. 30/1) on the bolt for preloading must equal at least $0.8 \times D$ (D: thread diameter).

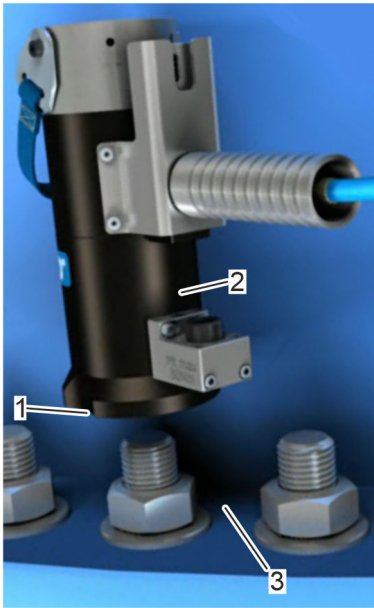


Fig. 32: Bracing

- 1 Bracing surface
- 2 Bracing column
- 3 Resting surface

- 2. ➤ Clean the resting surface (Fig. 24/3) and bolt.

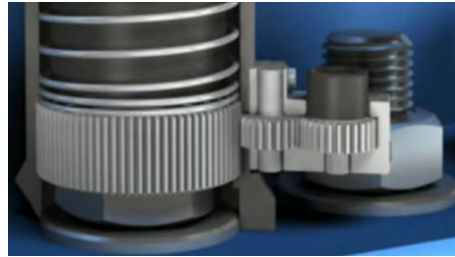
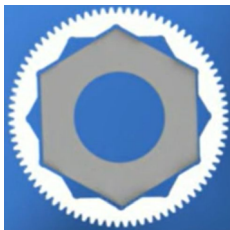


Fig. 33: Nut engaged



- 3. ➤ Check that the rotary bushing's hex socket engages flush with the nut.

⇒ If the hex socket is not engaging flush with the nut, the rotary bushing will be pushed upwards (Fig. 27).



Fig. 34: Nut not engaged



- 4. ➤ Use the gear drive to rotate the rotary bushing.

⇒ The spring force move the rotary bushing into the correct position.

Setting the pressure

- 5. ➤ Check the pressure-force diagram to find the pressure for the required preload.
- 6. ➤ Switch on the hydraulic power pack.

Preloading

7. ➤ Set the pressure.

8. ➤



WARNING!

Danger of injury from component fracture!

Make sure that there is no one in the hydraulic tensioner's or hydraulic power pack's danger zone.

Stay clear of the hydraulic tensioner's longitudinal axis.

9. ➤ Switch on the hydraulic power pack using the remote control ⚡ hydraulic power pack operating instructions.

Pressurise the hydraulic tensioner.

⇒ The tension bolt pulls the bolt in axial direction, stretching it.

The nut can be turned on the bolt by the value of this stretching.

Screwing on the nut

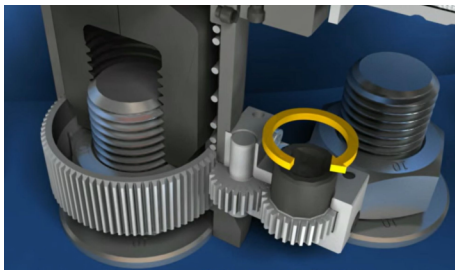


Fig. 35: Screwing on the nut

10. ➤ ⤴ Use a tool in the gear drive to screw on the nut until it engages completely. Observe the engraved maximum torque.

11. ➤ Discharge pressure from hydraulic tensioner.



On systems with and without automatic piston return, the hydraulic hose needs to remain connected so that the oil in the cylinder can be forced back into the tank.



WARNING!

Danger of injury from pressurised components!

Do not switch off the hydraulic power pack immediately after completing the preloading procedure. The system may still be under pressure after switching off.

Piston return

- On systems with automatic piston return, the piston returns to its home position when the pressure is switched off.
- Systems without automatic piston return
Screw on the tension socket to screw the piston back into its home position.

⇒ The tension bolt is returned to the home position.

Settling phenomena

12. ➤ To compensate for settling caused by compressing the surfaces' top layer, perform preloading at least twice.

13. ➤ Unscrew and take off customer's clamping nut.

- 14.** ▶ Take off the hydraulic tensioner.
⇒ Preloading is complete.

9.3 Loosening



WARNING!

Danger of injury from component fracture!

Components or the bolted connection may tear while working. The hydraulic tensioner may eject at force from the bolting point.

- Stay clear of the hydraulic tensioner's longitudinal axis.
- Load hydraulic tensioner, attached parts and bolts only up to the permitted maximum torque and tensile force.
- Also wear an industrial safety helmet for overhead work.

- Personnel: ■ User
- Protective equipment: ■ Protective work clothing
■ Safety goggles
■ Safety gloves
■ Safety shoes
■ Industrial safety helmet

Prerequisites

- The hydraulic power pack is operational and the remote control is within reach.
 - ↳ Hydraulic power pack operating instructions
- The hydraulic tensioner is ready for use.
 - ↳ *Chapter 6 'Preparing the hydraulic tensioner' on page 38*

- The hydraulic hoses have been connected.
↳ Chapter 7 'Supplying with energy' on page 39
- It is possible to brace the hydraulic tensioner properly.
↳ Chapter 8 'Bracing' on page 43

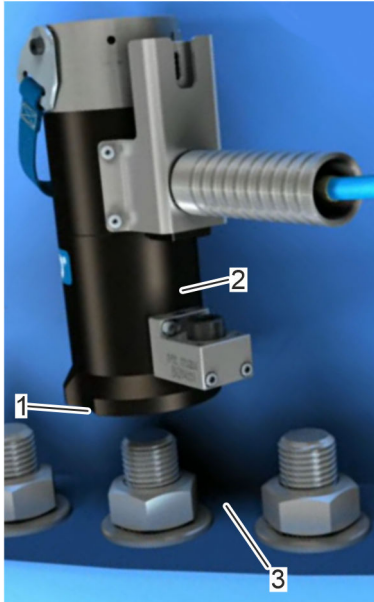


Fig. 36: Bracing

- 1 Bracing surface
- 2 Bracing column
- 3 Resting surface

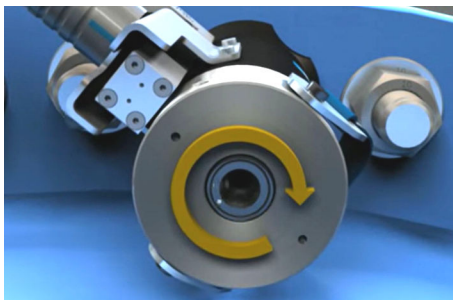




Fig. 37: Screwing on

1. → Clean the resting surface (Fig. 36/3) and bolt.
2. → Position the hydraulic tensioner. Make sure that the resting surface (Fig. 36/3) is perpendicular to the bolt axis.

3. →  Use a suitable tool to screw the tension bolt onto the bolt you are preloading. Thread coverage must equal at least the bolt's diameter.

Maintain a gap between the resting surface and bracing surface of 1 to 2 mm.

- ⇒  If you have installed the optional thread engagement indicator, the green marking will become visible when the minimum thread engagement is reached.

4. → Make sure that the resting surface is level, clean and perpendicular to the hydraulic tensioner's bolting axis.

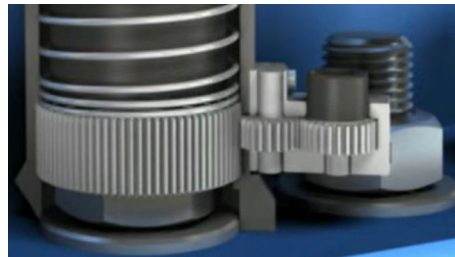
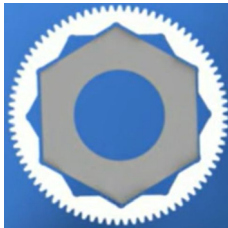


Fig. 38: Nut engaged



5. ▶ Check that the rotary bushing's hex socket engages flush with the nut.
 - ⇒ If the hex socket is not engaging flush with the nut, the rotary bushing will be pushed upwards (Fig. 39).



Fig. 39: Nut not engaged



6. ▶ Use the gear drive to rotate the rotary bushing.
 - ⇒ The spring force move the rotary bushing into the correct position.

Setting the pressure

7. ▶ Check the pressure-force diagram to find the pressure for the required loosening force.
8. ▶ Switch on the hydraulic power pack.
9. ▶ Set the pressure.

Loosening

10. ▶



WARNING!
Danger of injury from component fracture!

Make sure that there is no one in the hydraulic tensioner's or hydraulic power pack's danger zone.

Stay clear of the hydraulic tensioner's longitudinal axis.

- 11.** ➤ Switch on the hydraulic power pack using the remote control
↳ hydraulic power pack operating instructions.

Pressurise the hydraulic tensioner.

- ⇒ The tension bolt pulls the bolt in axial direction, stretching it.

You can loosen the nut.

Loosening the nut

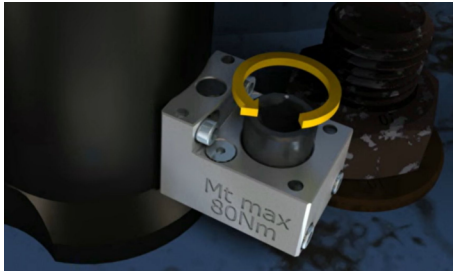


Fig. 40: Loosening the nut

- 12.** ➤ ⤴ Use a tool in the gear drive to loosen the nut by the stretching length.

When doing so, take care not to screw the nut all the way up to the tension bolt or onto the tension socket.

- 13.** ➤ Discharge pressure from hydraulic tensioner.



On systems with and without automatic piston return, the hydraulic hose needs to remain connected so that the oil in the cylinder can be forced back into the tank.



WARNING!

Danger of injury from pressurised components!

Do not switch off the hydraulic power pack immediately after completing the preloading procedure. The system may still be under pressure after switching off.

Piston return

- On systems with automatic piston return, the piston returns to its home position when the pressure is switched off.
- Systems without automatic piston return
Screw on the tension socket to screw the piston back into its home position.

- ⇒ The tension bolt is returned to the home position.

- 14.** ➤ If you can no longer move the hydraulic tensioner after loosening the nut, the original elongation of the bolt was greater than the distance between bracing column and resting surface during the loosening process. Preload the bolt again.

Then repeat the loosening procedure with a greater distance between bracing surface and resting surface.

- 15.** ➤ When the bolt has been loosened, unscrew and take off the hydraulic tensioner.

- ⇒ Loosening has been completed.

9.4 After use

- Personnel: ■ User
- Protective equipment: ■ Protective work clothing
■ Safety goggles
■ Safety gloves
■ Safety shoes

1. ▶ Switch off the hydraulic power pack ↻ hydraulic power pack operating instructions.

2. ▶ Disconnect the hydraulic hoses and seal all openings with caps.

3. ▶



ENVIRONMENT!

Danger of pollution from hydraulic oil!

Clean the hydraulic tensioner, work area, attached parts and hoses.

Mop up spilled hydraulic oil and lubricants properly and dispose of them responsibly together with the cleaning aids.

10 Performing maintenance

10.1 Maintenance schedule

Improperly performed maintenance tasks



WARNING!

Danger of injury from improperly performed maintenance tasks!

Improper maintenance can cause serious injuries and significant property damage.

- Ensure sufficient assembly space prior to commencing the tasks.
- Ensure that the assembly site is clean and tidy. Loosely stacked or randomly scattered components and tools may cause accidents.
- Have all repairs performed by the manufacturer.
- Use only PLARAD® original parts.
- Observe the oil specifications.

Faultless operation

The following sections describe the maintenance tasks that are required in order to ensure optimum and faultless operation.

If routine checks reveal increased wear, shorten the requisite maintenance intervals according to the actual signs of wear. If you have questions about maintenance tasks and intervals, contact PLARAD® service.

Interval	Maintenance task	Personnel
Before and after every use	<ul style="list-style-type: none"> ■ Clean. ■ Remove any flash rusting. ■ Check surfaces, warning symbols and pictograms for damage. ■ Check hydraulic hose connections, hose couplings and nipples for damage. ■ Check the bracing surface for damage and correct operation. ■ Check the handle and carry handle/lifting eyes for damage and firm attachment. ■ Check the hydraulic tensioner, hoses and hose connections for leaks. ■ Check all moving parts for correct operation. <p>🔗 Chapter 10.2 ‘Maintenance by the user’ on page 61</p>	User
	Check the hydraulic tensioner, rotary bushing and gearing for damage and correct operation.	Qualified hydraulic tensioner personnel

Interval	Maintenance task	Personnel
Every 3 months <ul style="list-style-type: none"> ■ In the event of extreme operating conditions (e.g. dust, dirt) ■ In the event of high frequency of use, multi-shift operation ■ In the event of constant work at higher output levels 	<ul style="list-style-type: none"> ■ Check the hydraulic tensioner for correct operation and damage and replace any damaged components. ■ Grease all joints and running surfaces. ■ Check the seals for damage and replace them if damaged. ■ Check the slide bearings for damage and replace them if damaged. ■ Connecting the hydraulic tensioner. ■ Check the accessories for damage and replace them if damaged. ■ Exchange damaged markings. <p>🔗 <i>Chapter 10.3 'Having service tasks performed by the manufacturer' on page 62</i></p>	PLARAD® service
Every 6 months <ul style="list-style-type: none"> ■ In the event of standard operating conditions ■ In the event of average frequency of use ■ In the event of work at medium output levels 		
Every 12 months <ul style="list-style-type: none"> ■ In the event of low frequency of use ■ If work is conducted at low output levels only 		
Every 4 years	Replace seal.	PLARAD® service
After reaching permitted number of cycles	Replace tension bolt.	PLARAD® service

Accessories, spare parts and wear parts

Spare parts must meet the technical requirements specified by PLARAD®. This is always ensured by original spare parts. A warranty can only be provided for original spare parts supplied by PLARAD®.

The installation or use of other spare parts can, under certain circumstances, adversely alter the specified design properties and, consequently, impair active or passive safety.

Any liability and warranty for damage resulting from the use of parts other than the original spare parts and accessory parts is excluded.

Have at least the following information about the hydraulic tensioner to hand to enable quick and easy processing:

- Client
- Hydraulic tensioner's serial number
- Desired spare part
- Desired quantity
- Desired mode of shipping

🔗 *'PLARAD® service' on page 4*

10.2 Maintenance by the user

Personnel: ■ User

Perform the following maintenance steps before and after every use:

Cleaning

1. 



NOTICE!
Damage from improper cleaning!

Clean the hydraulic tensioner with a soft cloth. Never use strong cleaning agents, water, brushes, sharp-edged tools or high-pressure cleaners.



WARNING!
Fire hazard!

When using isopropyl alcohol, do not clean the hydraulic tensioner near ignition sources. Do not smoke. Let it evaporate.

Surfaces and markings

2. 

Check surfaces and markings for damage. Arrange for repairs if there is damage or illegible markings.

Hydraulic hoses

3. 

Check the hydraulic hoses and connections for damage and leaks. Replace damaged hydraulic hoses; have damaged connections replaced by PLARAD[®] service.

Never replace them yourself.

Hydraulic tensioner

4. 



WARNING!
Danger of injury from faulty hydraulic tensioner!

Have the faulty hydraulic tensioner repaired or get the faulty parts replaced. Contact PLARAD[®] service.

Transport case

5. 

Store the clean, undamaged hydraulic tensioner in its transport case until its next use.

10.3 Having service tasks performed by the manufacturer


Service intervals

The service intervals are dependent on the conditions of use and the operating site.

Service interval	Conditions
Every 3 months	<ul style="list-style-type: none"> ■ In the event of extreme operating conditions (e.g. dust, dirt) ■ In the event of high frequency of use, multi-shift operation ■ In the event of constant work at higher output levels ■ In the event of soft fastening operations
Every 6 months	<ul style="list-style-type: none"> ■ In the event of standard operating conditions ■ In the event of average frequency of use ■ In the event of work at medium output levels
Every 12 months	<ul style="list-style-type: none"> ■ In the event of low frequency of use ■ In the event of work at lower output levels

Contacting service

→



WARNING!
Danger of injury from improperly performed service tasks!

Contact PLARAD® service in good time regarding the following service tasks.

Do not perform service tasks yourself.

Service tasks

Personnel: ■ PLARAD® service

Component	Service task
Accessories	Check for damage; exchange.
	Exchange damaged markings.
Hydraulic tensioner	Exchange damaged markings.
	Check for damage, replace damaged components.
	Recalibrate. Determine characteristics.
	Create pressure-force diagram/factory certificate.
	Lubricate and check joints, seals, slide bearings; replace if damaged.
	Replace seal after 4 years.
	Replace tension bolt.

11 Troubleshooting

11.1 Identifying faults

Malfunctions and faults can become noticeable in different ways:

Fault description	Cause	Remedy	Personnel
Operating pressure not reached, visible leaks	Component faulty	Contact ↗ <i>'PLARAD[®] service'</i> on page 4.	PLARAD [®] service
	Seal faulty	Contact ↗ <i>'PLARAD[®] service'</i> on page 4.	PLARAD [®] service
	Stroke limiter triggered	Screw on a nut and start a new pre-loading procedure ↗ <i>Chapter 9.1 'Pre-loading'</i> on page 46.	User
Rotary bushing does not spring back	Bracing column is heavily soiled	Dismantle and clean the hydraulic tensioner.	Qualified hydraulic tensioner personnel
Gearing cannot be turned	Bracing column is heavily soiled	Dismantle and clean the hydraulic tensioner.	Qualified hydraulic tensioner personnel
	Gearing damaged by excessive torque	Contact ↗ <i>'PLARAD[®] service'</i> on page 4.	PLARAD [®] service
Piston does not return all the way	Hydraulic hose disconnected too early. Hydraulic power pack switched off too early. Hydraulic power pack still pressurised.	Connect hydraulic hose. Switch on hydraulic power pack. Flip lever to relieve pressure. ↗ Hydraulic power pack operating instructions	User
	Springs faulty	Contact ↗ <i>'PLARAD[®] service'</i> on page 4.	PLARAD [®] service
Hydraulic hose cannot be connected	System is under pressure	Relieve pressure. ↗ Hydraulic power pack operating instructions	User
Hydraulic tensioner stuck in place after loosening	Bolt still under tension	Retighten bolt again, screw on nut and depressurise hydraulic tensioner. Screw back the tension bolt slightly to increase the gap between the bracing surface and resting surface. Repeat loosening. ↗ <i>Chapter 9 'Preloading and loosening'</i> on page 45	User

11.2 Performing troubleshooting

Improperly performed troubleshooting



WARNING!

Danger of injury from improperly performed troubleshooting!

Improper troubleshooting can cause serious injuries and significant property damage.

- With regard to maintenance tasks, only allow “Clean hydraulic tensioner” and “Check for damage” to be performed by the user.
- Have all repairs performed by the manufacturer.
- Use only PLARAD[®] original parts.


Device damage

- ➔ Contact  ‘PLARAD[®] service’ on page 4 if there is any damage to the hydraulic tensioner.

Power supply

1. ➔ Check hydraulic hoses, couplings and nipples and have them replaced if damaged.
2. ➔ Check the hydraulic power pack pressure.

Dismantling and cleaning

For cleaning purposes, only qualified personnel who have undergone specific training are permitted to dismantle the hydraulic tensioner. Contact  ‘PLARAD[®] service’ on page 4.

Returning to service after remedying the error



WARNING!

Danger of injury from faulty hydraulic tensioner!

An improperly repaired hydraulic tensioner can cause serious injuries.

- Never return a defective hydraulic tensioner to service.

12 Disposing of the hydraulic tensioner

The hydraulic tensioner must be disposed of in an environmentally sound manner at the end of its service life.

Disassembly



WARNING!

Danger of injury from stored residual energy!

Damaged components can cause injuries through undissipated residual energy.

1. ➤ Disconnect the hydraulic tensioner from the power supply.
2. ➤ Remove attached parts.
 - ⇒ Reuse these components if necessary.
3. ➤ Do not dismantle the hydraulic tensioner any further.

Disposal

Insofar as no take-back or disposal agreement has been put in place, dispose of the hydraulic tensioner in accordance with local regulations. Use authorised collection points.



ENVIRONMENT!

Danger of pollution from incorrect disposal!

Incorrect disposal can be hazardous to the environment.

- Dispose of hydraulic oil and objects contaminated with hydraulic oil responsibly. They must not enter the environment.
- If in doubt, obtain information about environmentally sound disposal from the local municipal authority or from specialist disposal companies.

13 Technical data

Technical data sheet



Technical data sheet is available online at:
<https://www.plarad.de/download-center.html>

Dimensions and weight

Dimensions and weight depend on the version. See the technical data sheet for specific values. Weight specifications ↗ rating plate.

Performance values

Specification	Value and unit
Pressure, maximum	1,500 bar ↗ Rating plate
Tensile force, maximum	↗ Rating plate
Width across flats	↗ Technical data sheet
Gear drive torque, maximum	Engraved on gear drive

Environment

Data	Value	Unit
Temperature range	-20 – 70	°C
Relative humidity, maximum	Non-condensing	

Emissions

Emission levels as per EN 60745

Data	Value	Unit
Emission sound pressure level	< 70	dB(A)
Measurement uncertainty of emission sound pressure level	3	dB(A)

Hydraulic power pack

The hydraulic power pack chosen as a power supply must meet the following performance data.

Data	Value	Unit
Pressure, maximum	1500	bar
Oil temperature, maximum	90	°C
Hydraulic oil	Shell Tellus S2 VX 15	

Oil specifications

Data	Value
Hydraulic oil	Shell Tellus S2 VX 15
Lubricant	Castrol Tribol GR 3020/1000

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Appendix

A Castrol – Tribol GR 3020/1000-0 PD

Section 1. Identification

Product name Tribol GR 3020/1000-00 PD
SDS # 468588
Code 468588-DE03

Relevant identified uses of the substance or mixture and uses advised against

Product use Grease for industrial applications
 For specific application advice see appropriate Technical Data Sheet or consult our company representative.

Supplier BP Lubricants USA Inc.
 1500 Valley Road
 Wayne, NJ 07470
 Telephone: +1-888-CASTROL

EMERGENCY HEALTH INFORMATION: +1-800-447-8735

EMERGENCY SPILL INFORMATION: +1-800-424-9300 (CHEMTREC USA)
 +1-703-527-3887 (CHEMTREC outside the US)

Section 2. Hazards identification

OSHA/HCS status This material is not considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).

Classification of the substance or mixture Not classified.

GHS label elements

Signal word No signal word.
Hazard statements No known significant effects or critical hazards.
Precautionary statements
Prevention Not applicable.
Response Not applicable.
Storage Not applicable.
Disposal Not applicable.
Hazards not otherwise classified None known.

Section 3. Composition/information on ingredients

Substance/mixture Mixture
 Highly refined mineral oil and additives. Thickening agent.

Ingredient name	CAS number	%
Distillates (petroleum), hydrotreated heavy naphthenic	64742-52-5	≥75 - ≤90
Benzenesulfonic acid, di-C10-18-alkyl derivatives, calcium salts	93820-57-6	≤3
Molybdenum, bis(dibutylcarbamodithioato)di-μ-oxodioxodi-, sulfurized	68412-26-0	≤3

Any concentration shown as a range is to protect confidentiality or is due to batch variation.

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health and hence require reporting in this section.

Product name Tribol GR 3020/1000-00 PD **Product code** 468588-DE03 **Page:** 1/8
Version 4 **Date of issue** 01/04/2022. **Format** CCSA **Language** ENGLISH

Section 3. Composition/information on ingredients

Occupational exposure limits, if available, are listed in Section 8.

Section 4. First aid measures

Description of necessary first aid measures

Eye contact	In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Eyelids should be held away from the eyeball to ensure thorough rinsing. Check for and remove any contact lenses. Get medical attention.
Skin contact	Wash skin thoroughly with soap and water or use recognized skin cleanser. Remove contaminated clothing and shoes. Wash clothing before reuse. Clean shoes thoroughly before reuse. Get medical attention if symptoms occur.
Inhalation	If inhaled, remove to fresh air. In case of inhalation of decomposition products in a fire, symptoms may be delayed. The exposed person may need to be kept under medical surveillance for 48 hours. Get medical attention if symptoms occur.
Ingestion	Do not induce vomiting unless directed to do so by medical personnel. Get medical attention if symptoms occur.
Protection of first-aiders	No action shall be taken involving any personal risk or without suitable training.

Most important symptoms/effects, acute and delayed

See Section 11 for more detailed information on health effects and symptoms.

Indication of immediate medical attention and special treatment needed, if necessary

Notes to physician	<p>Treatment should in general be symptomatic and directed to relieving any effects. In case of inhalation of decomposition products in a fire, symptoms may be delayed. The exposed person may need to be kept under medical surveillance for 48 hours.</p> <p>Note: High Pressure Applications Injections through the skin resulting from contact with the product at high pressure constitute a major medical emergency. Injuries may not appear serious at first but within a few hours tissue becomes swollen, discolored and extremely painful with extensive subcutaneous necrosis. Surgical exploration should be undertaken without delay. Thorough and extensive debridement of the wound and underlying tissue is necessary to minimize tissue loss and prevent or limit permanent damage. Note that high pressure may force the product considerable distances along tissue planes.</p>
Specific treatments	No specific treatment.

Section 5. Fire-fighting measures

Extinguishing media

Suitable extinguishing media	In case of fire, use water fog, alcohol resistant foam, dry chemical or carbon dioxide extinguisher or spray.
Unsuitable extinguishing media	Do not use water jet.

Specific hazards arising from the chemical No specific fire or explosion hazard.

Hazardous combustion products	<p>☑ Combustion products may include the following: metal oxide/oxides carbon oxides (CO, CO₂) (carbon monoxide, carbon dioxide) sulfur oxides (SO, SO₂ etc.) nitrogen oxides (NO, NO₂ etc.)</p>
--------------------------------------	---

Special protective actions for fire-fighters No action shall be taken involving any personal risk or without suitable training. Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire.

Special protective equipment for fire-fighters Fire-fighters should wear positive pressure self-contained breathing apparatus (SCBA) and full turnout gear.

Product name Tribol GR 3020/1000-00 PD

Product code 468588-DE03

Page: 2/8

Version 4 **Date of issue** 01/04/2022.

Format CCSA

Language ENGLISH

Section 6. Accidental release measures

Personal precautions, protective equipment and emergency procedures

For non-emergency personnel

No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Put on appropriate personal protective equipment. Floors may be slippery; use care to avoid falling.

For emergency responders

If specialized clothing is required to deal with the spillage, take note of any information in Section 8 on suitable and unsuitable materials. See also the information in "For non-emergency personnel".

Environmental precautions

Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).

Methods and materials for containment and cleaning up

Small spill

Move containers from spill area. Vacuum or sweep up material and place in a designated, labeled waste container. Dispose of via a licensed waste disposal contractor.

Large spill

Move containers from spill area. Approach release from upwind. Prevent entry into sewers, water courses, basements or confined areas. Vacuum or sweep up material and place in a designated, labeled waste container. Avoid creating dusty conditions and prevent wind dispersal. If emergency personnel are unavailable, contain spilled material. Suction or scoop the spill into appropriate disposal or recycling vessels, then cover spill area with oil absorbent. Dispose of via a licensed waste disposal contractor.

Section 7. Handling and storage

Precautions for safe handling

Protective measures

Put on appropriate personal protective equipment (see Section 8).

Advice on general occupational hygiene

Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Wash thoroughly after handling. Remove contaminated clothing and protective equipment before entering eating areas. See also Section 8 for additional information on hygiene measures.

Conditions for safe storage, including any incompatibilities

Store in accordance with local regulations. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10) and food and drink. Keep away from heat and direct sunlight. Keep container tightly closed and sealed until ready for use. Store and use only in equipment/containers designed for use with this product. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Use appropriate containment to avoid environmental contamination.

Section 8. Exposure controls/personal protection

Control parameters

Occupational exposure limits

<u>Ingredient name</u>	<u>Exposure limits</u>
Distillates (petroleum), hydrotreated heavy naphthenic	ACGIH TLV (United States). TWA: 5 mg/m ³ 8 hours. Issued/Revised: 11/2009 Form: Inhalable fraction OSHA PEL (United States). TWA: 5 mg/m ³ 8 hours. Issued/Revised: 6/1993
Benzenesulfonic acid, di-C10-18-alkyl derivatives, calcium salts	None.
Molybdenum, bis(dibutylcarbomodithioato)di-μ-oxodioxodi-, sulfurized	ACGIH TLV (United States). TWA: 10 mg/m ³ , (as Mo) 8 hours. Issued/Revised: 2/2001 Form: Inhalable fraction TWA: 3 mg/m ³ , (as Mo) 8 hours. Issued/Revised: 2/2001 Form: Respirable fraction OSHA PEL (United States).

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TWA: 15 mg/m³, (as Mo) 8 hours. Issued/
Revised: 6/1993 Form: Total dust

While specific OELs for certain components may be shown in this section, other components may be present in any mist, vapor or dust produced. Therefore, the specific OELs may not be applicable to the product as a whole and are provided for guidance only.

Appropriate engineering controls

All activities involving chemicals should be assessed for their risks to health, to ensure exposures are adequately controlled. Personal protective equipment should only be considered after other forms of control measures (e.g. engineering controls) have been suitably evaluated. Personal protective equipment should conform to appropriate standards, be suitable for use, be kept in good condition and properly maintained. Your supplier of personal protective equipment should be consulted for advice on selection and appropriate standards. For further information contact your national organisation for standards.

Provide exhaust ventilation or other engineering controls to keep the relevant airborne concentrations below their respective occupational exposure limits.

The final choice of protective equipment will depend upon a risk assessment. It is important to ensure that all items of personal protective equipment are compatible.

Environmental exposure controls

Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

Individual protection measures

Hygiene measures

Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period.

Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.

Eye/face protection

Safety glasses with side shields.

Skin protection

Hand protection

Wear protective gloves if prolonged or repeated contact is likely. Wear chemical resistant gloves. Recommended: Nitrile gloves. The correct choice of protective gloves depends upon the chemicals being handled, the conditions of work and use, and the condition of the gloves (even the best chemically resistant glove will break down after repeated chemical exposures). Most gloves provide only a short time of protection before they must be discarded and replaced. Because specific work environments and material handling practices vary, safety procedures should be developed for each intended application. Gloves should therefore be chosen in consultation with the supplier/manufacturer and with a full assessment of the working conditions.

Body protection

Use of protective clothing is good industrial practice.

Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Cotton or polyester/cotton overalls will only provide protection against light superficial contamination that will not soak through to the skin. Overalls should be laundered on a regular basis. When the risk of skin exposure is high (e.g. when cleaning up spillages or if there is a risk of splashing) then chemical resistant aprons and/or impervious chemical suits and boots will be required.

Other skin protection

Appropriate footwear and any additional skin protection measures should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Respiratory protection

In case of insufficient ventilation, wear suitable respiratory equipment.

For protection against metal working fluids, respiratory protection that is classified as "resistant to oil" (class R) or oil proof (class P) should be selected where appropriate. Depending on the level of airborne contaminants, an air-purifying, half-mask respirator (with HEPA filter) including disposable (P- or R-series) (for oil mists less than 50mg/m³), or any powered, air-purifying respirator equipped with hood or helmet and HEPA filter (for oil mists less than 125 mg/m³).

Where organic vapours are a potential hazard during metalworking operations, a combination particulate and organic vapour filter may be necessary.

The correct choice of respiratory protection depends upon the chemicals being handled,

Section 8. Exposure controls/personal protection

the conditions of work and use, and the condition of the respiratory equipment. Safety procedures should be developed for each intended application. Respiratory protection equipment should therefore be chosen in consultation with the supplier/manufacturer and with a full assessment of the working conditions.

Section 9. Physical and chemical properties

The conditions of measurement of all properties are at standard temperature and pressure unless otherwise indicated.

Appearance

Physical state	Grease
Color	Yellow.
Odor	Not available.
Odor threshold	Not available.
pH	Not applicable.
Melting point/freezing point	Not available.
Boiling point, initial boiling point, and boiling range	Not available.
Flash point	Closed cup: 226°C (438.8°F) [Estimated. Based on Lubricants - Base Oils]
Evaporation rate	Not available.
Flammability	Not applicable. Based on - Physical state
Lower and upper explosion limit/flammability limit	Not applicable.
Vapor pressure	Not available.
Relative vapor density	Not applicable.
Density	<1000 kg/m ³ (<1 g/cm ³) at 20°C
Solubility	insoluble in water.
Partition coefficient: n-octanol/water	Not applicable.
Auto-ignition temperature	Not applicable.
Decomposition temperature	Not available.
Viscosity	Not available.
Particle characteristics	
Median particle size	Not available.

Section 10. Stability and reactivity

Reactivity	No specific test data available for this product. Refer to Conditions to avoid and Incompatible materials for additional information.
Chemical stability	The product is stable.
Possibility of hazardous reactions	Under normal conditions of storage and use, hazardous reactions will not occur. Under normal conditions of storage and use, hazardous polymerization will not occur.
Conditions to avoid	Avoid all possible sources of ignition (spark or flame).
Incompatible materials	Reactive or incompatible with the following materials: oxidizing materials.
Hazardous decomposition products	Under normal conditions of storage and use, hazardous decomposition products should not be produced.

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Section 11. Toxicological information

Information on toxicological effects

Information on the likely routes of exposure Routes of entry anticipated: Dermal, Inhalation.

Potential acute health effects

Eye contact	No known significant effects or critical hazards.
Skin contact	No known significant effects or critical hazards.
Inhalation	Exposure to decomposition products may cause a health hazard. Serious effects may be delayed following exposure.
Ingestion	No known significant effects or critical hazards.

Symptoms related to the physical, chemical and toxicological characteristics

Eye contact	No specific data.
Skin contact	Adverse symptoms may include the following: irritation dryness cracking
Inhalation	No specific data.
Ingestion	No specific data.

Delayed and immediate effects and also chronic effects from short and long term exposure

Short term exposure

Potential immediate effects	Not available.
Potential delayed effects	Not available.

Long term exposure

Potential immediate effects	Not available.
Potential delayed effects	Not available.

Potential chronic health effects

General	No known significant effects or critical hazards.
Carcinogenicity	No known significant effects or critical hazards.
Mutagenicity	No known significant effects or critical hazards.
Teratogenicity	No known significant effects or critical hazards.
Developmental effects	No known significant effects or critical hazards.
Fertility effects	No known significant effects or critical hazards.

Numerical measures of toxicity

Acute toxicity estimates

Not available.

Section 12. Ecological information

Toxicity

No testing has been performed by the manufacturer.

Persistence and degradability

Not expected to be rapidly degradable.

Bioaccumulative potential

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Section 12. Ecological information

Not available.

Mobility in soil

Soil/water partition coefficient (K_{oc}) Not available.

Mobility Grease. insoluble in water.

Other adverse effects No known significant effects or critical hazards.

Section 13. Disposal considerations

Disposal methods

The generation of waste should be avoided or minimized wherever possible. Significant quantities of waste product residues should not be disposed of via the foul sewer but processed in a suitable effluent treatment plant. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible. This material and its container must be disposed of in a safe way. Empty containers or liners may retain some product residues. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

Section 14. Transport information

	DOT Classification	TDG Classification	IMDG	IATA
UN number	Not regulated.	Not regulated.	Not regulated.	Not regulated.
UN proper shipping name	-	-	-	-
Transport hazard class(es)	-	-	-	-
Packing group	-	-	-	-
Environmental hazards	No.	No.	No.	No.
Additional information	-	-	-	-

Special precautions for user Not available.

Transport in bulk according to IMO instruments Not available.

Section 15. Regulatory information

U.S. Federal regulations

United States inventory (TSCA 8b) All components are active or exempted.

Other regulations

Australia inventory (AIC) All components are listed or exempted.

Canada inventory At least one component is not listed in DSL but all such components are listed in NDSL.

China inventory (IECSC) All components are listed or exempted.

Japan inventory (CSCL) At least one component is not listed.

Korea inventory (KECI) All components are listed or exempted.

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Section 15. Regulatory information

Philippines inventory (PICCS)	At least one component is not listed.
Taiwan Chemical Substances Inventory (TCSI)	All components are listed or exempted.
REACH Status	The company, as identified in Section 1, sells this product in the EU in compliance with the current requirements of REACH.

Section 16. Other information

History

Date of issue/Date of revision 01/04/2022.

Date of previous issue 06/23/2021.

Prepared by Product Stewardship

Key to abbreviations

ACGIH = American Conference of Industrial Hygienists
ATE = Acute Toxicity Estimate
BCF = Bioconcentration Factor
CAS Number = Chemical Abstracts Service Registry Number
GHS = Globally Harmonized System of Classification and Labelling of Chemicals
IATA = International Air Transport Association
IBC = Intermediate Bulk Container
IMDG = International Maritime Dangerous Goods
LogPow = logarithm of the octanol/water partition coefficient
MARPOL = International Convention for the Prevention of Pollution From Ships, 1973 as modified by the Protocol of 1978. ("Marpol" = marine pollution)
OEL = Occupational Exposure Limit
SDS = Safety Data Sheet
STEL = Short term exposure limit
TWA = Time weighted average
UN = United Nations
UN Number = United Nations Number, a four digit number assigned by the United Nations Committee of Experts on the Transport of Dangerous Goods.
Varies = may contain one or more of the following 64741-88-4, 64741-89-5, 64741-95-3, 64741-96-4, 64742-01-4, 64742-44-5, 64742-45-6, 64742-52-5, 64742-53-6, 64742-54-7, 64742-55-8, 64742-56-9, 64742-57-0, 64742-58-1, 64742-62-7, 64742-63-8, 64742-65-0, 64742-70-7, 72623-85-9, 72623-86-0, 72623-87-1

 Indicates information that has changed from previously issued version.

Notice to reader

All reasonably practicable steps have been taken to ensure this data sheet and the health, safety and environmental information contained in it is accurate as of the date specified below. No warranty or representation, express or implied is made as to the accuracy or completeness of the data and information in this data sheet.

The data and advice given apply when the product is sold for the stated application or applications. You should not use the product other than for the stated application or applications without seeking advice from BP Group.

It is the user's obligation to evaluate and use this product safely and to comply with all applicable laws and regulations. The BP Group shall not be responsible for any damage or injury resulting from use, other than the stated product use of the material, from any failure to adhere to recommendations, or from any hazards inherent in the nature of the material. Purchasers of the product for supply to a third party for use at work, have a duty to take all necessary steps to ensure that any person handling or using the product is provided with the information in this sheet. Employers have a duty to tell employees and others who may be affected of any hazards described in this sheet and of any precautions that should be taken. You can contact the BP Group to ensure that this document is the most current available. Alteration of this document is strictly prohibited.

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