User manual for

MDV Wheel Hub Fixation

Keep for future reference.
Edition V1.1 / as of 09-2022

For your notes:

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1. General

1.1 Purpose of the user manual

This "User Manual MDV Wheel Hub Fixation" describes the design and function, mounting, dismounting, maintenance and cleaning as well as transport and storage of the MDV version of the wheel hub fixation.
The described wheel hub fixation is for fixing the test vehicle by using of adapters, bearings, rods and anchors onto a roll dynamometer.

The wheel hub fixation was developed and manufactured by S. Bleyer GmbH.

1.2 Target group

This "User Manual MDV Wheel Hub Fixation" is intended for operators of dynamometers for automobiles with adequate technical knowledge.

1.3 Version

The footer on each page contains the current version and the date of printing of this document "User Manual MDV Wheel Hub Fixation".

You can download the latest version of this user manual at any time from www.s-bleyer-gmbh.de.

1.4 Safekeeping

Make sure that you keep the user manual safely!

1.5 Copyright

The content of this edition has been carefully checked for accuracy. Nevertheless, errors cannot be completely excluded.

Subject to change without prior notification.

Layout and texts: S. Bleyer GmbH. All photos and drawings are the property of S. Bleyer GmbH. Photos and drawings need not represent the current production status as long as the illustrated function is the same.

Printed on 100% recycled paper.

1.6 Language of the user manual

The original version of this user manual has been written in the EU official language of the manufacturer (German).
Translations into other languages are translations of the original version.
The legal stipulations of the Machinery Directive are applicable.

1.7 Address of manufacturer

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1.8 Explanation of the symbols

Levels of danger are identified according to ISO 3864 or ANSI Z535.4

 **Danger**	The triangular warning symbol with the signal word "Danger" stands for an *imminent danger* that will definitely lead to *serious injuries* or *death*.
 **Warning**	The triangular warning symbol with the signal word "Warning" stands for a *possibly dangerous situation* that can lead to *serious injuries* or *death*.
 **Caution**	The triangular warning symbol with the signal word "Caution" stands for a *potentially hazardous situation,* that could lead to *minor injuries.* *bodily injury*. The triangular warning symbol with the signal word "Caution" also stands for a *hazardous situation* in which the product or an object in the vicinity can be damaged *(material damage).*
 **Notice**	The round warning symbol with the signal word "Notice" stands for a *potentially hazardous situation* in which the product or an object in the vicinity could be damaged *(material damage).*
 **Note**	The hand with the signal word "Note" gives advice and hints for use.

2. Description

2.1 General view

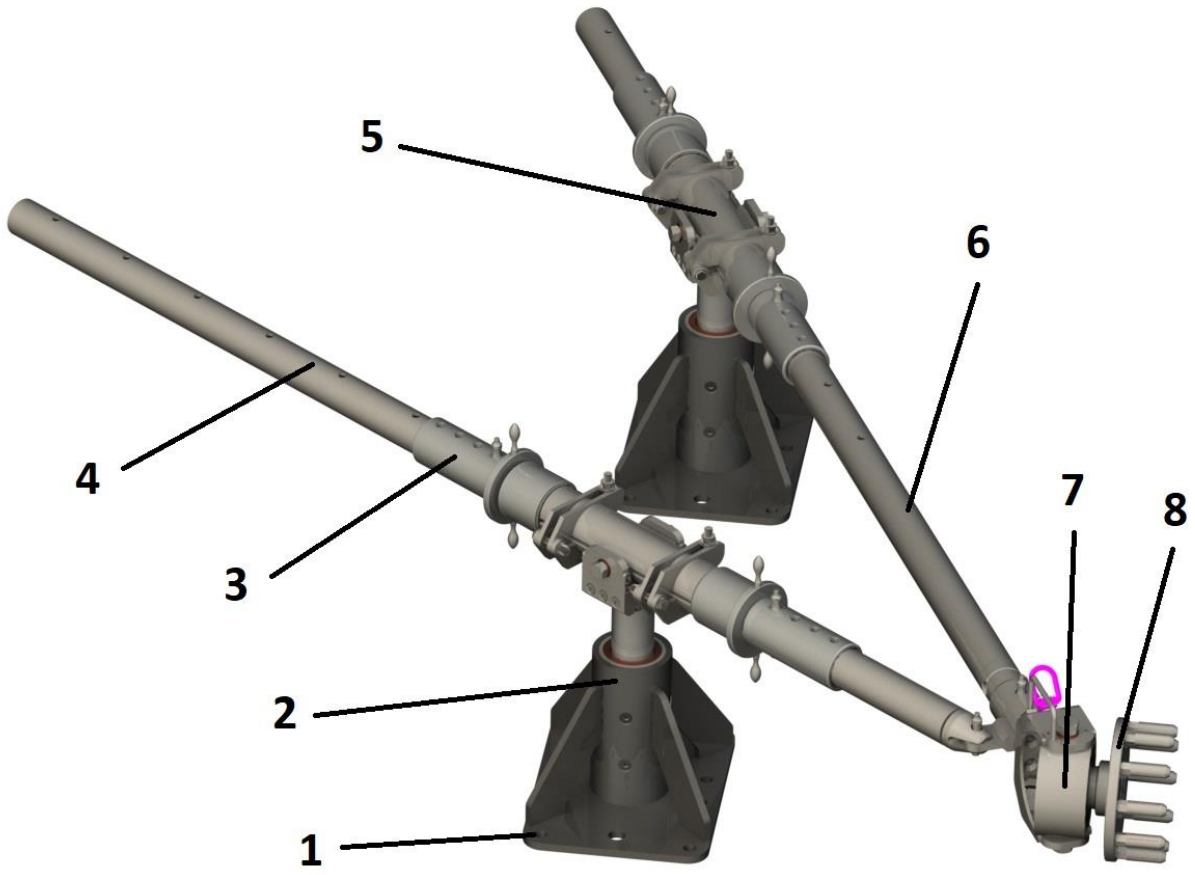


Figure 1: Complete fixation triangle

[1] Hole for hammerhead screw to T-rail
[2] Sliding anchor (MD-SA20)
[3] Rod locking (MD-STAR20)
[4] Diagonal wheel hub rod (MD-DRST20)
[5] Clamping collet
[6] Wheel hub rod (MD-RST20)
[7] Fixation bearing (MD-FL20)
[8] Wheel rim adapter (MD-FA20)

2.2 Intended use

The task of the MDV wheel hub fixation is the fixation of heavy passenger cars and commercial vehicles of various types fast, safe and without any tension on roller dynamometers via the wheel hub.

Currently, the following types of vehicles can be fixated:
- Cars over 3.5t up to max. 7.5t permissible total weight
- Commercial vehicles up to 7.5t permissible total weight

Currently possible areas of use:
- Single roller or double roller test benches
- Each rotating axle must be fixed with the wheel hub fixation

Intended use:
Only use the MDV wheel hub fixation to secure vehicles on a roller dynamometer in accordance with the intended use and the Technical Data.

Intended use also includes:
- note and comply with the user manual
- follow maintenance instructions

 **Danger**	**Danger to life and risk of material damage around the vehicle!** Death, serious injuries or material damage due to improper use of the wheel hub fixation! Follow all instructions for mounting and dismounting, maintenance and cleaning precisely, as well as all safety instructions!

2.2.1 Limits for tractive load for MDV wheel hub fixations

 **Danger**	**Limits for tractive load:** **Range up to max. 40,000N tractive load per fixed axis:** Corresponds to maximum 4t permissible axle weight.

2.2.2 Danger Zone

The following areas are part of the danger zone:

- Area of 1m distance around the fixed vehicle
- Vicinity of the fixation triangles
- In front of and behind the vehicle

 **Danger**	**Danger to life within the danger zone during test operation!** People caught by the vehicle and thereby killed or seriously injured if the vehicle breaks away due to improper fixation or broken thread adapters! Legs cut off or broken from deforming rods or rods breaking away. Remain outside the danger zone during test operation!

2.2.3 Identification markings

The individual components are marked by engraving as follows:

Component	Marking	Location of engraving
Sliding anchor	MD-SA20 / No.	
Wheel hub rod	MD-RST20 / No.	
Diagonal wheel hub rod	MD-DRST20 / No.	
Fixation bearing	MD-FL20 / No.	
Rim adapter unit	MD-FA20 / LK / No.	
Adapter ring	MD-FA20 / Type	
Thread adapter	MD-GA20 / Type / Thread	Main body
Rod locking	MD-STAR20 / No.	

2.3 Configuration

2.3.1 Scope of Delivery

Per rotating axle, the following components are included within the scope of delivery:

- 2 wheel hub rods (MD-RST20)
- 2 diagonal wheel hub rods (MD-DRST20)
- 4 sliding anchors (MD-SA20)
- 2 rim adapter units (MD-FA20) with thread adapters (MD-GA20) and adapter ring in version according to agreement (more versions upon request),
- 2 fixation bearings (MD-FL20)
- 8 rod locking (MD-STAR20)

3. Safety instructions

Danger

Danger of life due to inadequate securing of the vehicle!

Vehicle could break away, killing or injuring persons and causing material damage if the wheel hub fixation is mounted incorrectly or inadequately.

- ➔ Secure at least one axle with a wheel hub fixation!
- ➔ Secure vehicle with hand brake during mounting/dismounting.
- ➔ Always mount wheel hub fixation completely and correctly.
- ➔ **Alternative fixation configurations are possible and may even make sense (e.g. in the case of only one power-transmitting axle on all-wheel rollers) must, however, be agreed in advance with the manufacturer or implemented at own risk.**
- ➔ **Always mount vehicle fixation completely.**

Danger

Danger to life due to inadequate protective measures on rotating parts!

Hands, arms or feet get crushed or severed if they come into contact with rotating parts (wheels, roller).

- ➔ Always install covers and/or use other structural measures (e.g. hoods) to ensure the safety of personnel.
- ➔ During operation it is forbidden to stay in the danger zone (1m around the vehicle)!

Danger

Danger to life due to component parts flying off!

Component parts can fly off, injure people and cause material damage if bolted connections become loose during test operation.

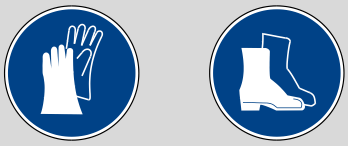
- ➔ Always tighten all bolted connections with the required tightening torque!
- ➔ In the case of endurance tests check all bolted connections at least every 12 hours and re-tighten them if necessary. Any deviating arrangements in individual cases must always be agreed upon in advance with the manufacturer.

Danger

Danger of life and material damage due to overstraining!

Vehicle breaks loose, killing or injuring people and causing material damage if a component of the vehicle fixation is unable to withstand the stress and breaks.

Always ensure that the vehicle fixation is used exclusively within permissible values.

Danger	**Danger to life due to incompletely mounted wheel hub fixation!** Vehicle breaks loose, killing or injuring people and causing material damage if the vehicle fixation is not fully mounted. ➔ Always mount vehicle fixation completely.
Danger	**Danger of life and material damage through faulty or incorrect components of the wheel hub fixation!** Vehicle breaks loose, killing or injuring people and causing material damage if components of the wheel hub fixation are faulty or used incorrectly. ➔ Make sure that the version of the wheel hub fixation is matched to the vehicle to be tested. ➔ Only use thread adapters and rim adapters that are compatible with the vehicle wheel rims! ➔ Check fixation rods and anchors: Must not be deformed or damaged, must be free of grease and dirt. ➔ Before every test run, visually check all screws that are marked with screw marking lacquer. ➔ Perform maintenance of the components according to chapter "Maintenance and cleaning" before every test run.
Warning	**Injuries due to inadequate personal protective equipment!** Hands and feet can get crushed by heavy components of wheel hub fixation or at anchor joints. ➔ Wear personal protective equipment appropriate to the activity (e.g. gloves, safety shoes)! 
Caution	**Material damage caused by untrained personnel!** The wheel hub fixation, the body of the vehicle, the test bench or the equipment of the test cell will be damaged if an accident occurs due to untrained personnel. ➔ Selection, mounting, dismounting, maintenance and cleaning, transportation and storage of the wheel hub fixation requires expert knowledge and must be performed only by trained personnel.

Note	Only use connecting elements (screws, nuts, latch clamps, locking levers, etc.) that are approved by the manufacturer.

4. Design and function

4.1 Basics

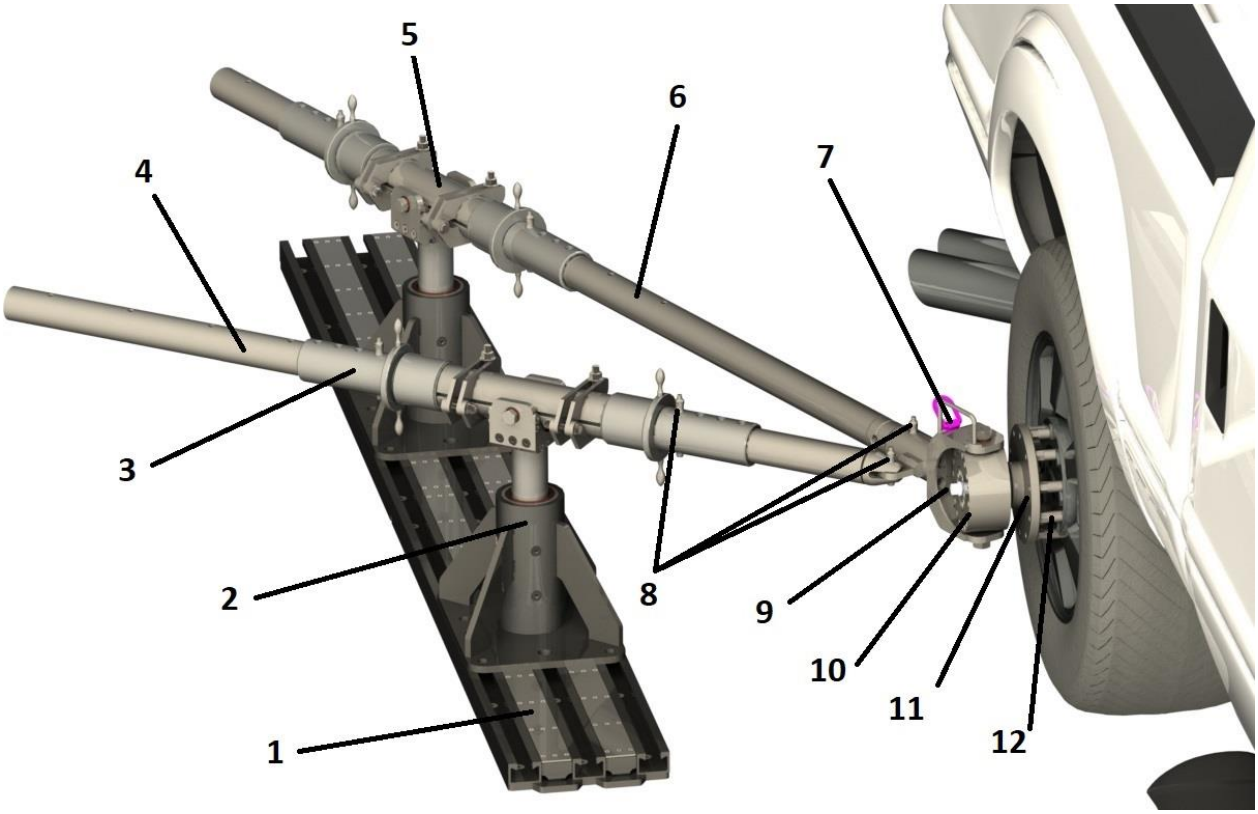


Figure 2: Wheel hub fixation mounted to a wheel

[1] T-rail
[2] Sliding anchor (MD-SA20)
[3] Rod locking (MD-STAR20)
[4] Diagonal wheel hub rod (MD-DRST20)
[5] Clamping collet
[6] Wheel hub rod (MD-RST20)
[7] Handling aids
[8] Ball lock pin
[9] Connecting screw locating bearing (MD-RS20)
[10] Fixation bearing (MD-FL20)
[11] Wheel rim adapter unit (MD-FA20)
[12] Thread adapter (MD-GA20)

With the wheel hub fixation, the vehicle is fastened to the roll dynamometer quickly and safely and without any pre-tension.

To fix the vehicle, each rotating wheel is restrained via a rim adapter unit [11] and fixation bearings [10] with two fixation rods. These rods are held by sliding anchors [2] by being clamped in the rubber-coated clamping collets [5].
The power transmission is only permissible with correctly mounted rod locking [3].
The fixation bearing [10] together with the two fixation rods (wheel hub bar [6] and diagonal wheel hub bar [4]) form the fixation triangle.

4.2 Fixation rods

4.2.1 Wheel hub rod

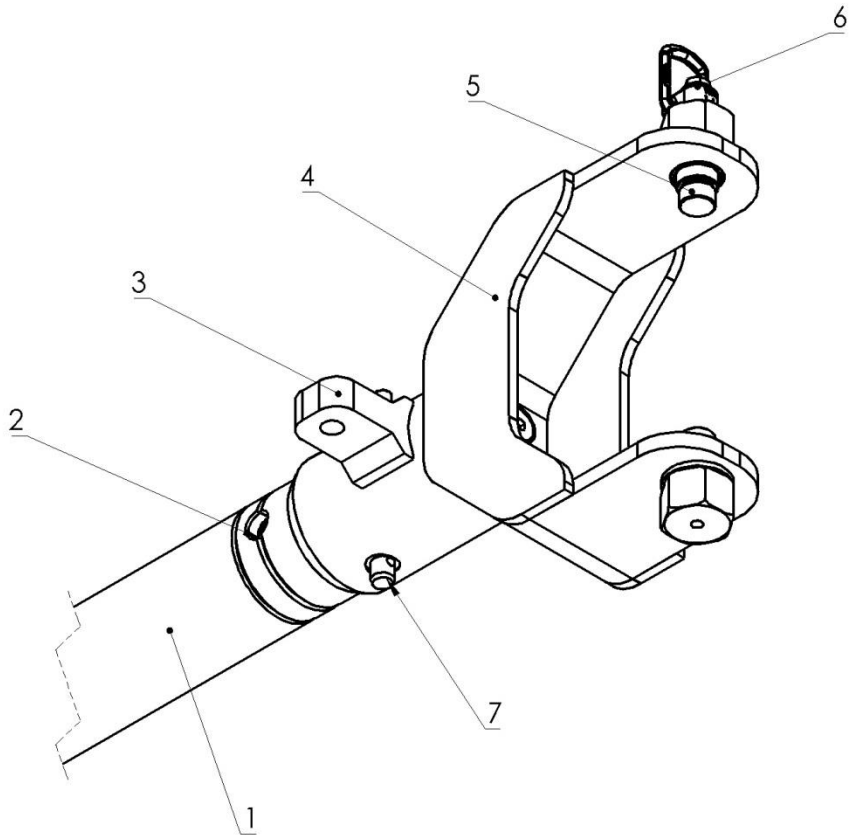


Figure 3: Wheel hub rod

[1] Wheel hub rod
[2] Coupling for detachable forkhead
[3] Docking unit for diagonal wheel hub rod
[4] Fork head
[5] Connecting screw
[6] Attachment eye to facilitate assembly
[7] Ball lock pin

The connecting screws are used to restrain the fixation bearing inserted in the fork head.

Note	**The tightening torque of the connecting screws is 250Nm**

4.2.2 Diagonal wheel hub rod

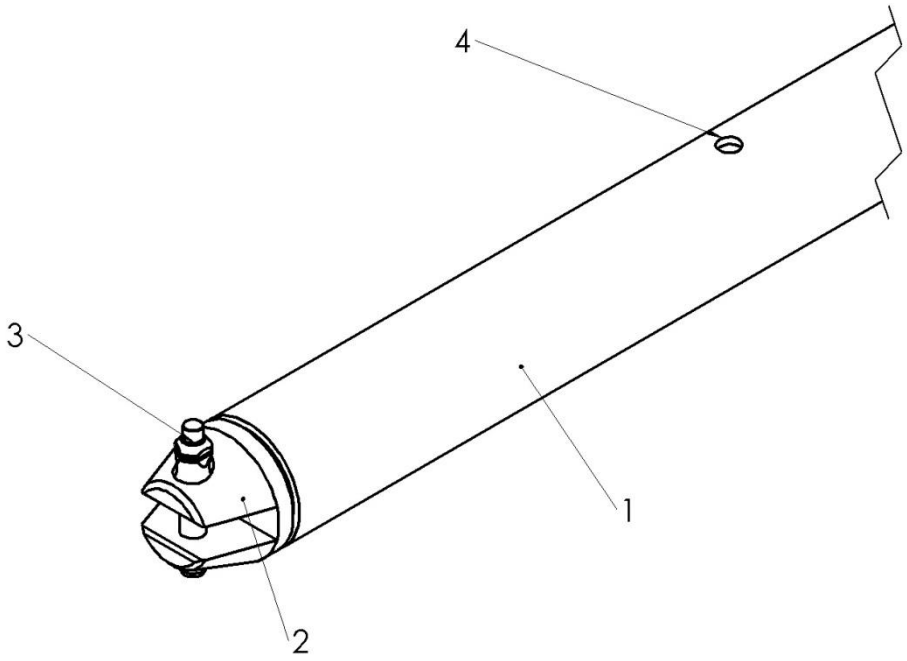


Figure 4: Diagonal wheel hub rod

[1] Diagonal wheel hub rod
[2] Fork head
[3] Ball lock pin
[4] Hole for ball lock pin of rod locking

4.3 Sliding anchor height adjustable

The sliding anchor is screwed to the floor with T-bolts in T-rails.

Note	**Tightening torque for the T-bolts:** • M20 ➔ 120Nm

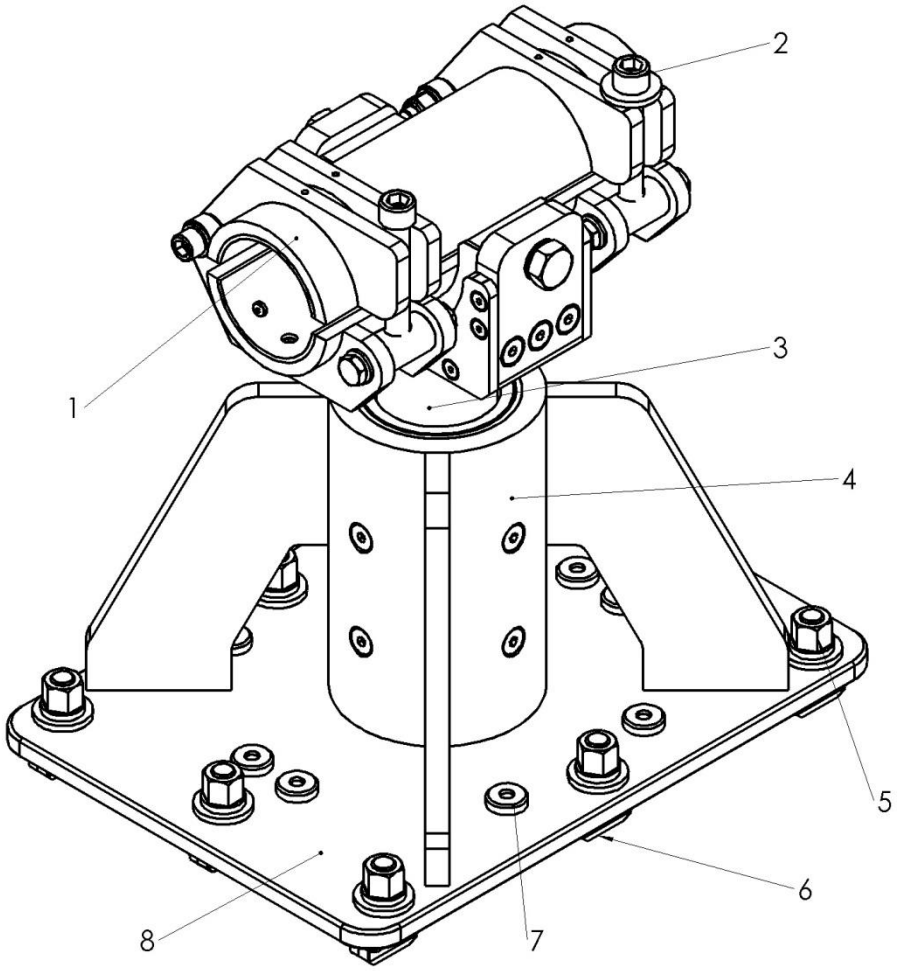


Figure 5: Sliding anchor

[1] Clamping collet with rubber coating
[2] Locking screw
[3] Sliding column (height adjustment)
[4] Guide sleeve
[5] High nut M20 and washer
[6] T-bolt M20×80 for fixation in rail
[7] Ball pressure roller (optional equipment)
[8] Base plate

4.4 Rod locking

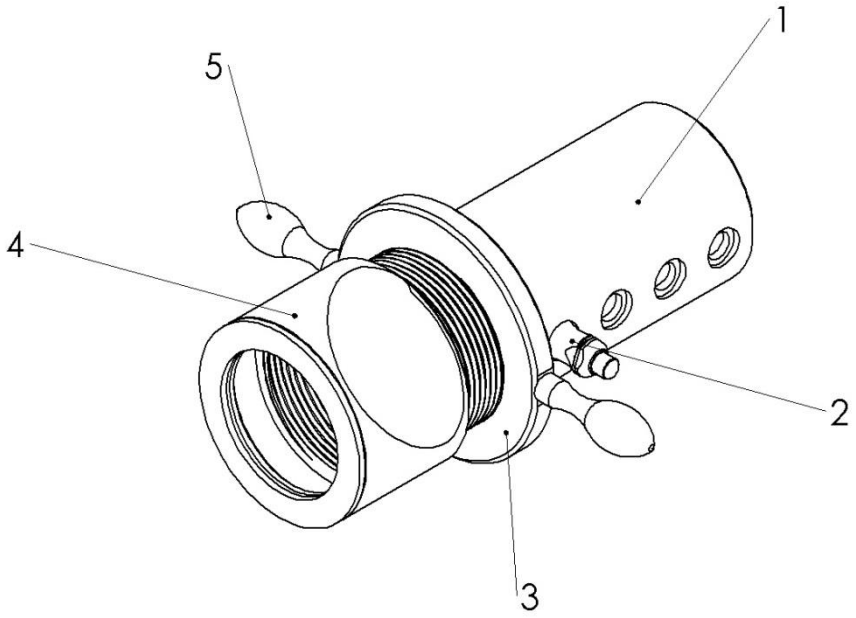


Figure 6: Rod locking

[1] Base body with holes for ball lock pins
[2] Ball lock pin
[3] Lock nut
[4] Union nut with rubber coating
[5] Ball handle

4.5 Fixation bearing

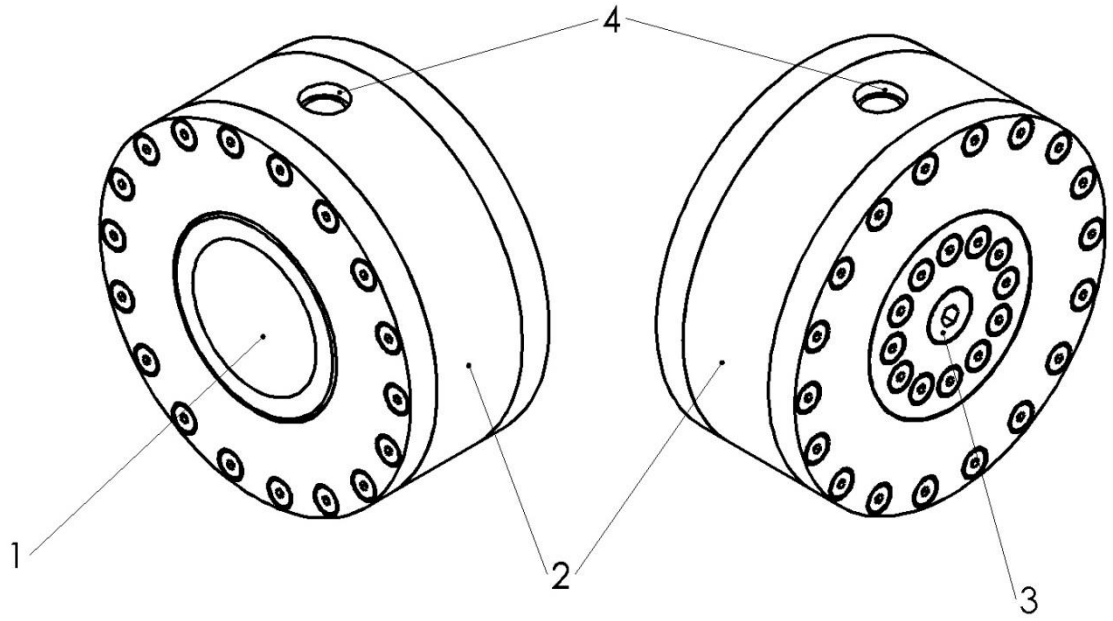


Figure 7: Fixation bearing

[1] Connection of adapter cone
[2] Fixation bearing
Rear view (left)
Front view (right)
[3] Connecting screw for fixation bearing (MD-RS20)
[4] Seat for connecting screw

The fixation bearing is attached to the fork head of the wheel hub rod with two connecting screws. It is then placed on the adapter cone of the rim adapter unit and fixed with the DIN7991 M24×60 screw.

4.6 Rim adapter unit

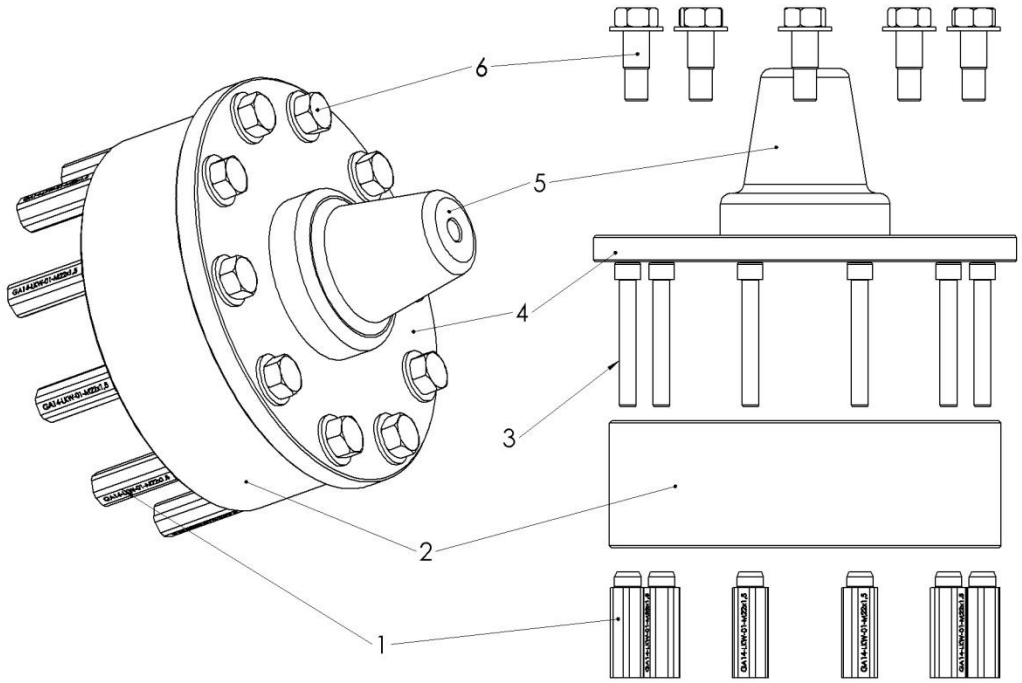


Figure 8: Mounted removable rim adapter unit

[1] Thread adapter
[2] Adapter ring with vehicle hole circle
[3] DIN912 M16 (Length as required)
[4] Base plate with vehicle hole circle
[5] Adapter cone for Fixation bearing
[6] Connecting screw with washer

Base plate [4] and adapter cone [5] form a pre-assembled unit.
Adapter ring [2] and M16 bolt [3] only need to be replaced if the vehicle hole circle or rim offset is changed.
Type of thread adapter [1] depends on vehicle type.
The components are normally all pre-assembled on the vehicle.

4.6.1 Versions

Rim adapter units can be made in different designs depending on the version of the test vehicle.

The following parameters can be selected:

- Bolt circle
- Wheel rim offset
- Thread type and dimension

Other rim adapter units can be manufactured and supplied upon request.

4.6.2 Thread adapter

The thread adapters ensure the correct and secure connection of the wheel hub fixation on the rim. Thread adapters can (and must) be manufactured in different versions depending on the wheel rims of the test vehicle.

The following parameters can be selected:

- Shaft length
- Thread diameter and length, internal and external thread
- Head shape (flat, with washer, ball or conical collar)
- Wrench size

Note	There are multiple thread adapters to suit different types of vehicles and rims, bolts, and nuts. These differ in parameters mentioned above. The standard shank length of the thread adapter is 85mm. Additional lengths and versions of thread adapters are provided upon request to suit the wheel rim shape of the respective test vehicle. **It is important that the head shape and thread of the thread adapter correspond to the head shape and thread of the original wheel bolt/ nut. The clean reproduction and replication of this geometry is an essential prerequisite for clean running of the adaptation on the rim and thus for safe test operation!**

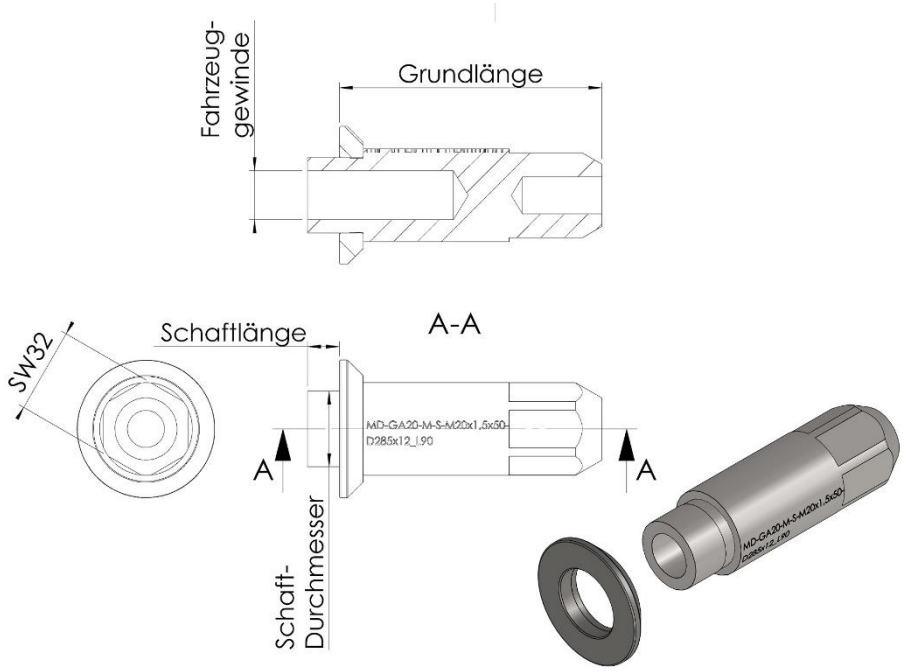


Figure 9: Thread adapter

4.6.3 Adapter ring

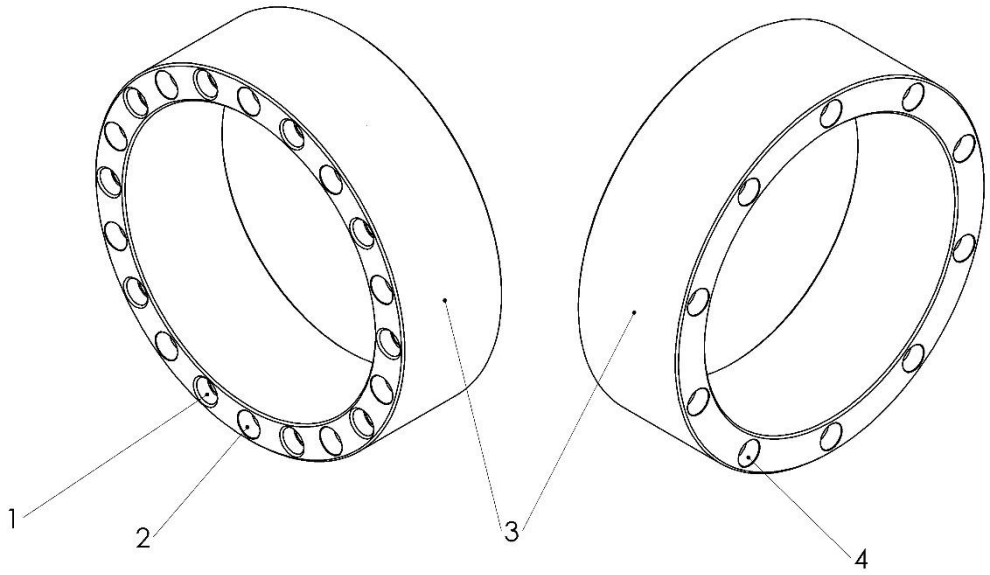


Figure 10: Adapter ring

[1] Threaded base hole to accommodate the connecting screws for base plate

[2] Counterbore for DIN912 M16 cylinder head bolt

[3] Adapter ring
Fixation bearing side (left)
Wheel hub side (right)

[4] Fitting hole for thread adapter shaft

Dimensioning, bore type and number depends on the vehicle

4.6.4 Rim adapter – base plate

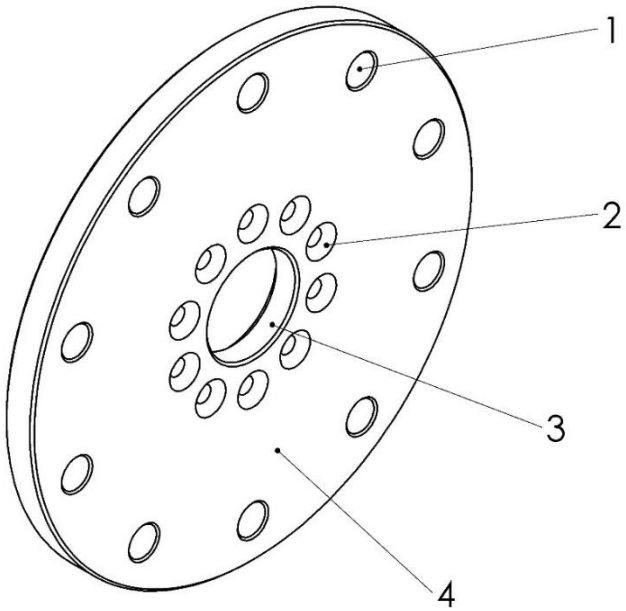


Figure 11: Rim adapter – base plate

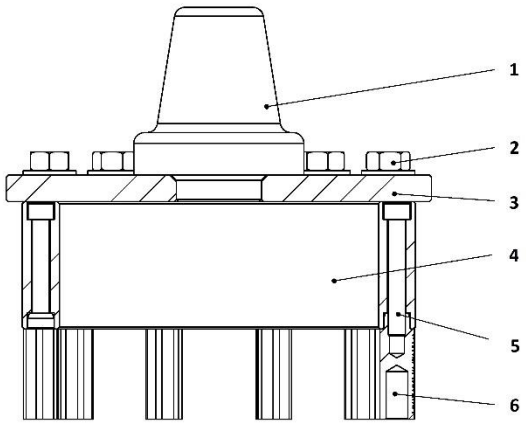
[1] Bore hole for connecting screw

[2] Countersinks for adapter cone connection

[3] Guide for adapter cone

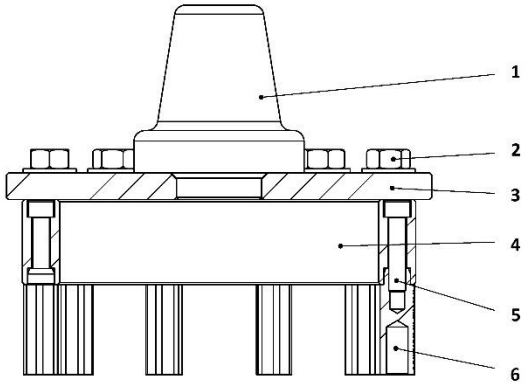
[4] Vehicle side

4.6.5 Rim adapter units Assembly options



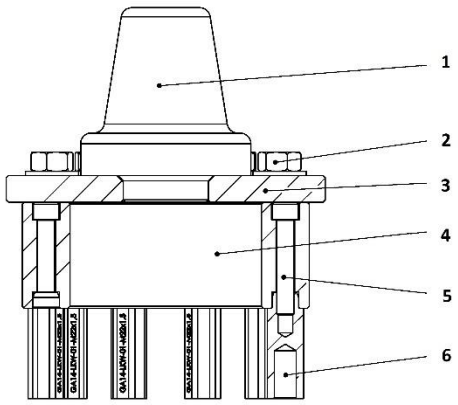
Rim adapter unit LK335-10-hole for large offset of the rim

1. 1× adapter cone (10× DIN7991 M12×40)
2. 10× connecting screw
3. 1× base plate for LK335-10-hole
4. 1× adapter ring for LK335-10-hole 120mm height
5. 10× screw DIN912 M16x120
6. 10× thread adapter (any)



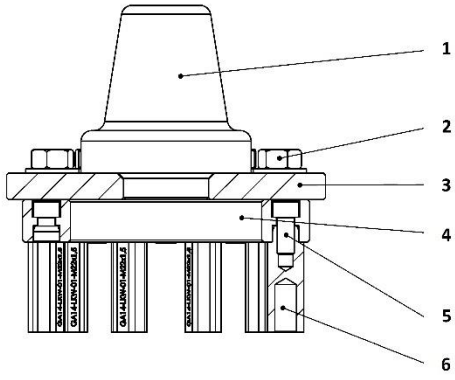
Rim adapter unit LK335-10-hole for small offset of the rim

1. 1× adapter cone (10× DIN7991 M12×40)
2. 10× connecting screw
3. 1× base plate for LK335-10-hole
4. 1× adapter ring for LK335-10-hole 80mm height
5. 10× screw DIN912 M16×80
6. 10× thread adapter (any)



Rim adapter unit LK225-10-hole for large offset of the rim

1. 1× adapter cone (10× DIN7991 M12×40)
2. 10× connecting screw
3. 1× base plate for LK225-10-hole
4. 1× adapter ring for LK225-10-hole 100mm height
5. 10× screw DIN912 M16x100
6. 10× thread adapter (any)



Rim adapter unit LK225-10-hole for large offset of the rim

1. 1× adapter cone (10× DIN7991 M12×40)
2. 10× connecting screw
3. 1× base plate for LK225-10-hole
4. 1× adapter ring for LK225-10-hole 40mm height
5. 10× screw DIN912 M16x40
6. 10× thread adapter (any)

Figure 12: Rim adapter units Assembly options

5. Mounting of the wheel hub fixation

The wheel hub fixation is mounted on all wheels that are operated/rotated by the vehicle or by the test bench.

 **Note**	Before mounting the wheel hub fixation, position the vehicle on the test bench and align it (e.g. with centering device and jogging mode). In doing so, observe the applicable procedural and safety regulations!

 Warning	**Risk of injury due to unsecured vehicle during mounting!** In case of single rollers, the vehicle could roll off the crest of the roll, injuring people and causing material damage if it is not secured against slipping or rolling away during mounting. Before mounting the wheel hub fixation, secure the vehicle against slipping or rolling away (handbrake, centering device).
 **Danger**	**Danger of life and material damage through faulty or incorrect components of the wheel hub fixation!** Vehicle breaks loose, killing or injuring people and causing material damage if components of the wheel hub fixation are faulty or used incorrectly. ➔ Make sure that the version of the wheel hub fixation is matched to the vehicle to be tested (speed, weight, tractive forces). ➔ Only use thread adapters and rim adapters that are compatible with the vehicle type! ➔ Check fixation rods and anchors: must not be deformed or damaged, must be dry, free of dirt and grease. ➔ Check rubber coating of clamping collet (KR): Must be tight and show no damage (cracks, notches). ➔ Before every test run, visually check all screws that are marked with screwmarking lacquer. ➔ Inspection/maintenance of the components according to chapter 7: Maintenance and cleaning before each test run.

 **Warning**	**Risk of injury due to unsecured vehicle during mounting!** In case of single rollers, the vehicle could roll off the crest of the roll, injuring people and causing material damage if the vehicle is not secured against slipping or rolling away during mounting. ➔ Before mounting the wheel hub fixation, secure the vehicle against slipping or rolling away (handbrake, centering device).

 **Caution**	**Injuries due to falling components!** The vehicle wheel detaches completely from its mounting and the vehicle tilts, injuring people and causing material damage if all original wheel bolts are removed at once. ➔ Replace the original wheel bolts only 1-by-1 with the thread adapters! ➔ Never remove all wheel bolts at once!

 **Caution**	**Material damage due to incorrect thread adapters!** Incorrect thread adapters (shaft length, thread diameter, thread length, head shape) may break. This can lead to subsequent damage of the wheel hub fixation and the vehicle. Check existing wheel rim adapter unit for proper connection. If this is not the case, replace the rim adapter unit or component parts.
 **Danger**	**Material damage due to a wider vehicle!** Mounted rim adapter sets with adapter cones protrude from the wheels. As a result, the vehicle is wider. Move vehicle with mounted wheel rim adapters with great caution and care.

The wheel hub fixation secures the wheels in their preset positions during the test operation. Exceptions to this are the axle height and the toe. This influences the dynamic behaviour of the chassis and can lead to unusual structural vibrations as well as increased tire abrasion during the test operation. Therefore align the vehicle as precisely as possible on the test bench before attaching the wheel hub fixation.

5.1 Fitting the wheel rim adapter unit

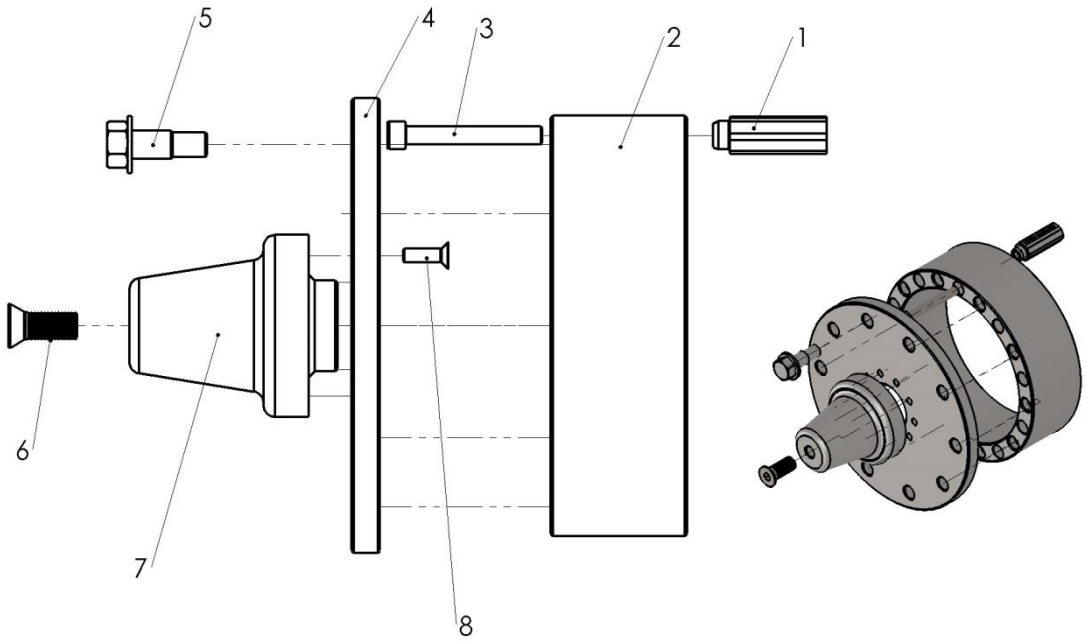


Figure 13: Rim adapter unit

[1] Thread adapter
[2] Adapter ring with hole circle
[3] DIN912 M16 Screw
[4] Base plate with hole circle
[5] Connecting screw w. washer
[6] DIN7991 M24×60
[7] Adapter cone
[8] DIN7991 M12×40

Note	The hole circle of the wheel rim adapter unit must correspond to the hole circle of the rim of the test vehicle (number of holes, hole circle diameter). Ensure proper connection.
Note	Ensure that each wheel bolt is replaced sequentially with a thread adapter and tightened with the original tightening torque for the vehicle!

1. Replace original wheel bolts with thread adapters [1].
   Never remove all wheel bolts completely!
2. Push adapter ring [2] onto the thread adapters. If necessary, use adapter ring mounting aid (see chapter 9 Spare parts and accessories).
   Fit the DIN912 M16 screws [3] and remove mounting aid.
3. Mount base plate [4] with pre-mounted adapter cone [7]. If necessary, use rim adapter mounting aid (see chapter 9 Spare parts and accessories).
   Mount connecting screws with washer [5] and remove mounting aid.
4. Base plate [4] and adapter cone [7] with DIN7991 M12×40 screw [8] is normally pre-assembled once.

Note

Tightening torques:

Thread adapter	[1]:	According to specification of wheel bolt, is determined by the manufacturer
DIN912 M16 Screw	[3]:	140 Nm
Connecting screw	[5]:	250Nm
DIN7991 M24×60	[6]:	300Nm
DIN7991 M12×40	[8]:	75Nm

Note

Important: after mounting the thread adapter and rim adapter unit, the radial and axial run-out of the adapter unit must be checked. Some radial run-out is normal due to tire influence and does not affect strength and testing.

Wobbling of the rim adapter unit is not permissible and must be avoided. If, after mounting of the rim adapter unit, a longitudinal or transverse impact of the adapter disc of >0.5mm is detected on the outside, the cause of this unacceptable impact must be determined and eliminated.

We will be glad to help you with the analysis of such a problem

→ **Please contact us in this case!**

5.1.1 Fitting the wheel rim adapter unit to the wheel

Danger	**Danger to life due to loose screws during endurance tests!** People may be injured and material damage may occur if bolted connections at the wheel hub fixation loosen during endurance tests. This occurs through increased loads that deviate from normal driving operation. The safe and proper performance of the test operation is thereby impaired. ➔ **In the case of endurance tests, check the tightness of bolted connections at least every 12 hours: thread adapters and connecting screws.**

Caution	**Material damage due to a wider vehicle!** Mounted rim adapter units with adapter cones protrude from the wheels. As a result, the vehicle is wider. ➔ Move vehicle with mounted wheel rim adapter units with great caution and care.

The wheel rim must meet the technical standards regarding alignment and concentricity. The wheel rim adapter unit is mounted on every wheel to be secured, in the following steps:

1. On the first wheel (arbitrarily selected), remove one wheel bolt/nut and replace it with an appropriate thread adapter.

Note	**The thread adapter must correspond to the thread and head shape of the wheel bolt removed!**

2. Tighten thread adapters with correct tightening torque (as original wheel bolt or dependent on the thread dimension)

3. Replace all of the other wheel bolts on the first wheel, step by step with thread adapters.

4. Insert the connecting screws [3] with washers [2] through the wheel rim adapter into the thread adapters [1], (see Figure 13) and tighten with 250Nm.

Repeat these mounting steps on all wheels to be secured.

Note	**Ensure that each wheel bolt is replaced sequentially with a thread adapter and tightened with the original tightening torque for the vehicle!**

5.1.2 Dismantle rim adapter unit or change to other bolt circle

Normally, the components of the rim adapter unit are firmly screwed together. When testing the same vehicle types, the same rims with the same bolt circle dimensions are present. It is not necessary to change the rim adapter unit in this case.

To test vehicles with different rims, the rim adapter unit must be adjusted.

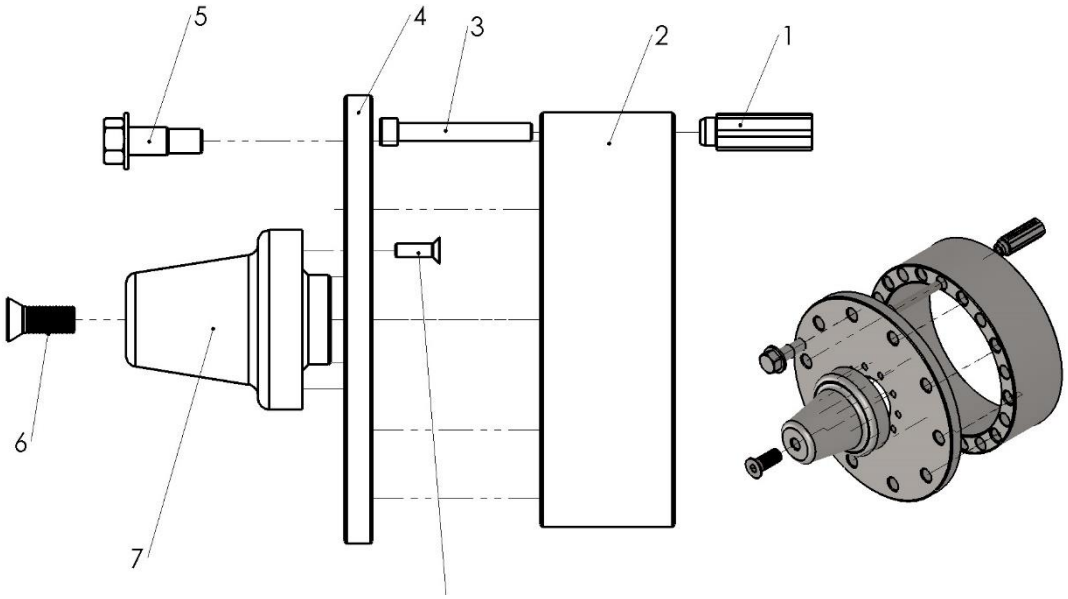


Figure 14: Rim adapter unit

Note	Additional versions of thread adapters and rim adapter units are provided upon request to suit the wheel rim shape of the respective test vehicle.

To change the rim adapter unit for a rim adapter unit with a different bolt circle, the following steps are necessary (cf. Figure 13)

1. Remove all connecting screws [5]. The mounting cone [7], with base plate [4] is thus detached from the adapter ring [2].
   Before all connecting screws are removed, a fall down should be prevented by using the mounting aids (see chapter 9 Spare parts and accessories.

2. Loosen DIN912 M16 [3]. The adapter ring [2] is still seated on the thread adapters [1]. The use of a soft-head hammer may be necessary for removal. Here, too, the use of the mounting aids can prevent a falling down.

3. Remove thread adapter [1] and again make sure not to loosen all connections at once.

4. To change the adapter plate [2], to another bolt circle, the DIN7991 M12x40 screws [8] are loosened and the mounting cone [7] can be used for another base plate.

5. Reassemble the rim adapter unit as described in chapter 5.1.

Danger

Risk of injury due to the rim adapter unit falling down
People may be injured and material damage may occur if during disassembly it is not taken into account that the loosened parts are heavy and may fall down.

➔ To avoid such accidents, the supplied mounting aids are also to be used for disassembly.

5.2 Connecting the fixation bearing with the wheel hub rod

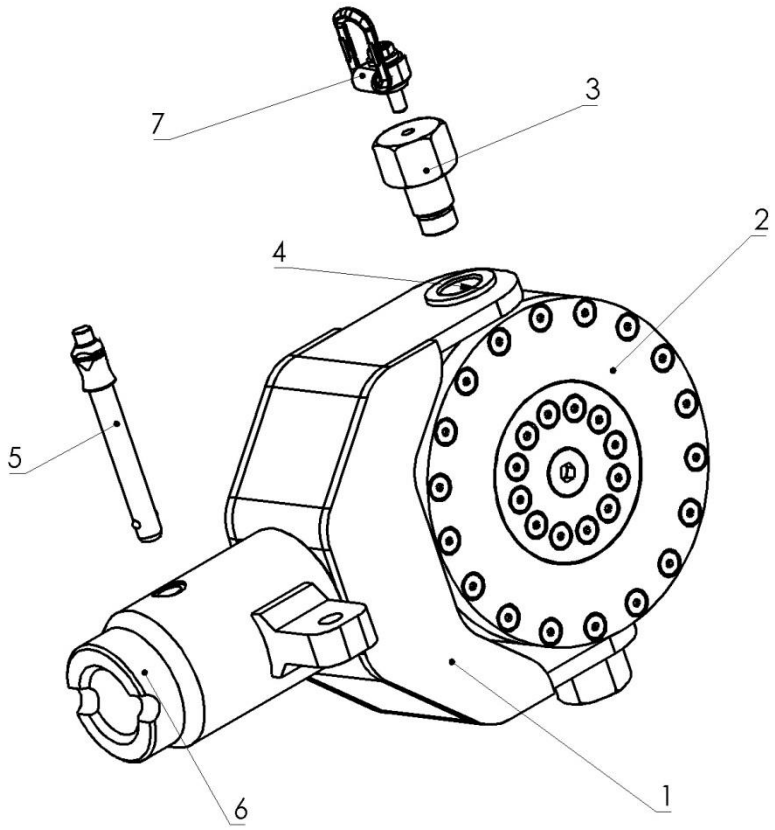


Figure 15: Fixation bearing and wheel hub rod end

[1] Wheel hub rod end
[2] Fixation bearing
[3] Connecting screw
[4] Sliding bearing
[5] Ball lock pin
[6] Rod connection socket
[7] Attachment eye

1. If the wheel hub rod end is already connected to the fixation bearing: check the secure connection of the connecting screws **(250 Nm)**.

2. Place the fixation bearing and the wheel hub rod end in one another on a stable and clean surface and position them.

3. Screw in both connection screws [3] and tighten with 600Nm.
   The bearing should still turn easily now.

4. The attachment eye is intended for further mounting by means of a suitable lifting device. According to the manufacturer, the screw of the attachment eye is tightened to 100Nm.

Danger	**Danger of injuries!** Fingers can be crushed because once mounted, the fixation bearing in the fork head can rotate freely. ➔ Do not reach into the fork head in order to avoid danger of crushing.

5.3 Moving the vehicle on the test bench and preparation

When the vehicle is driven to the test bench, pay attention to the following.

Danger

Material damage due to a wider vehicle!

Mounted rim adapter units with adapter cones protrude from the wheels.
As a result, the vehicle is wider.

➔ Move vehicle with mounted rim adapter unit with great caution and care.

Note

Before mounting the MDV wheel hub fixation, position the vehicle on the test bench and align it.

In doing so, observe the applicable procedural and safety regulations.

Apply the handbrake to secure the test vehicle against rolling away during the mounting of the wheel hub fixation.

5.3.1 Rolling in/aligning the test vehicle

1. In the case of double rollers, the vehicle is driven into the roller set with the driven axle.
   If a lifting device is present, lower it and switch the test bench to setup mode.

2. With single rollers, the vehicle is aligned on the apex and one wheel is already locked in place with the fixation.

3. Release any applied hand brake.

4. Align the test vehicle on the roller. This is done by "rolling in".
   The vehicle or roller is driven briefly and with little load.
   → The vehicle will now align itself on the roller and
   may sheer off in the process.

Danger

Injuries due to unintentional movements of the unsecured vehicle!

The vehicle can break away from the roller or roller set if not rolled in carefully.

The vehicle will move to the side during roll-in and maycatch people.

➔ Do not stay close to the vehiclewhile it is being set up.

5.4 Fixing the first wheel

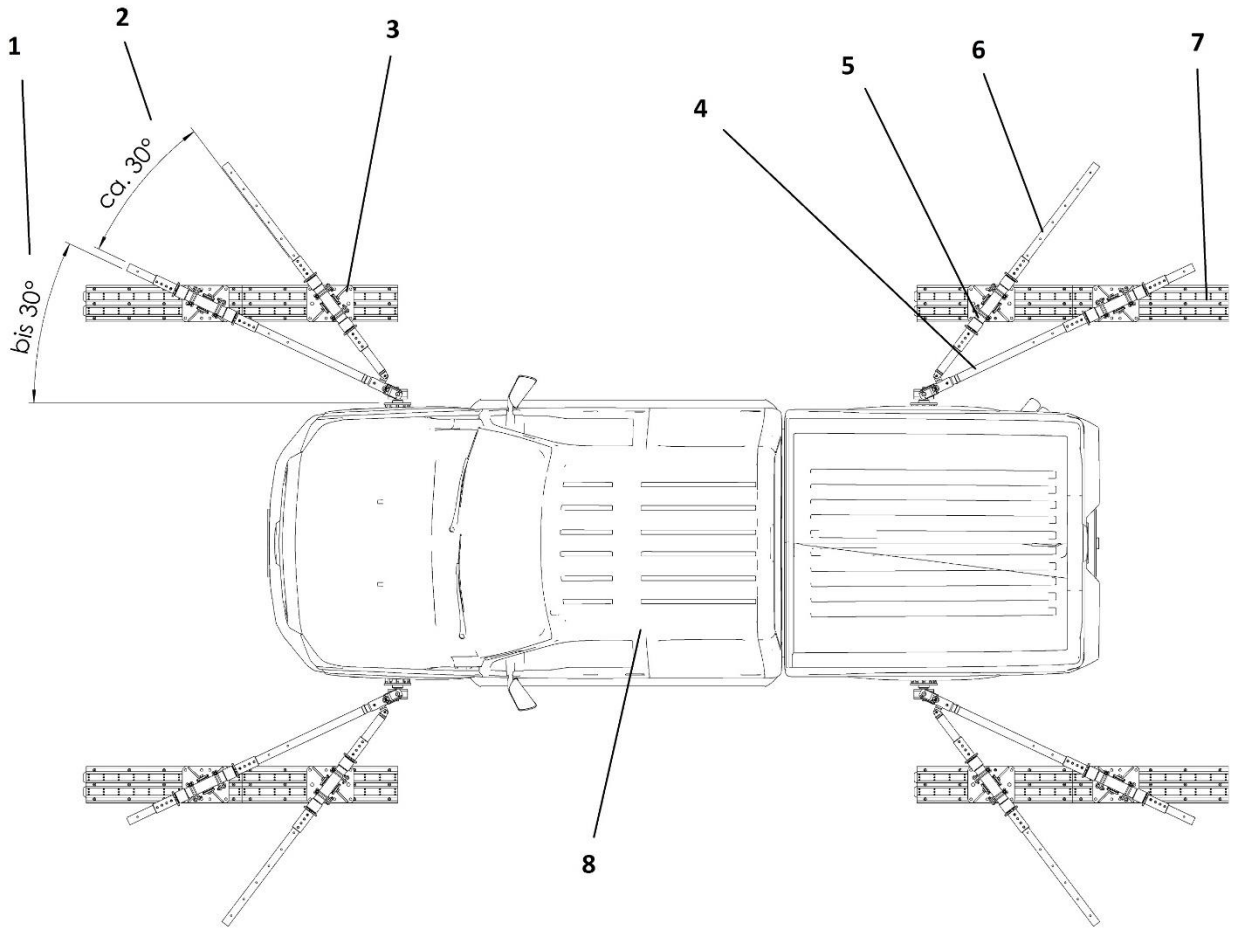


Figure 16: Fixation scheme

[1] Angle small or as parallel as possible to the longitudinal axis of the vehicle
[2] Angle approx. 30°
[3] Sliding anchor on T-rail
[4] Wheel hub rod
[5] Rod locking
[6] Diagonal wheel hub rod
[7] T-rails
[8] Test vehicle on test bench

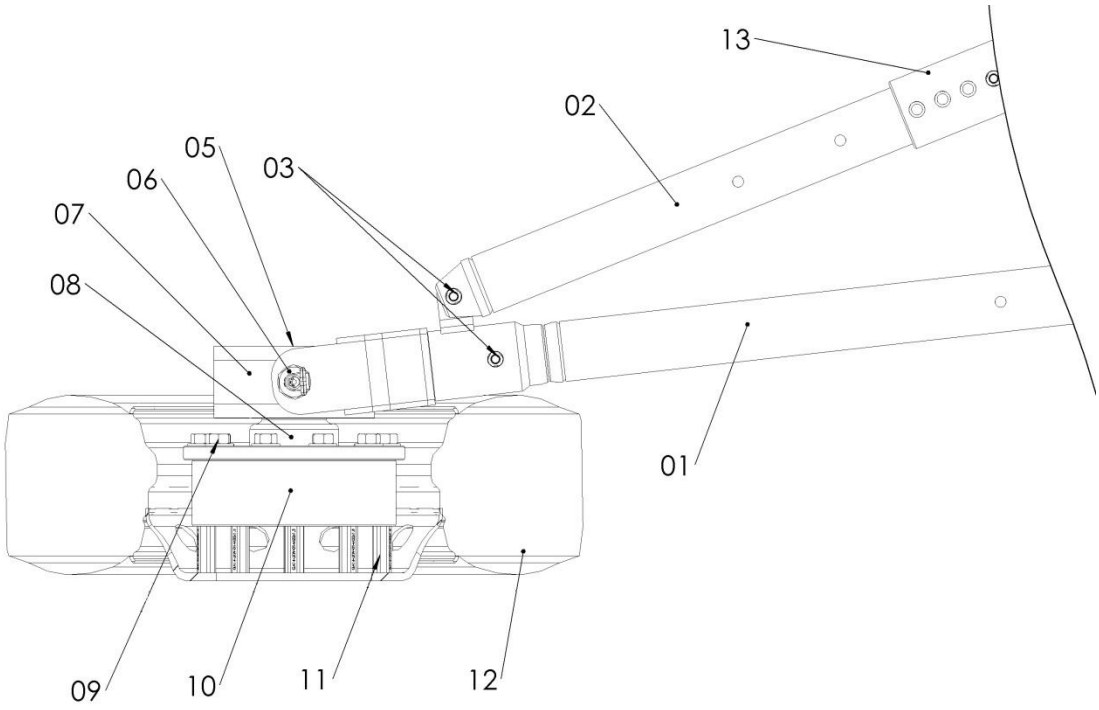


Figure 17: Finished, assembled wheel hub fixation, plan view

[01] Wheel hub rod with fork head
[02] Diagonal wheel hub rod
[03] Ball lock pin
[04] Fork head
[05] Connecting screw for fixation bearing
[06] Connecting screw
[07] Fixation bearing
[08] Adapter cone
[09] Connecting screw
[10] If necessary: Adapter ring
[11] Thread adapter
[12] Wheel rim with tire
[13] Rod locking

Extremes can be mapped using the permissible angle. The rods should always be aligned as horizontally as possible.

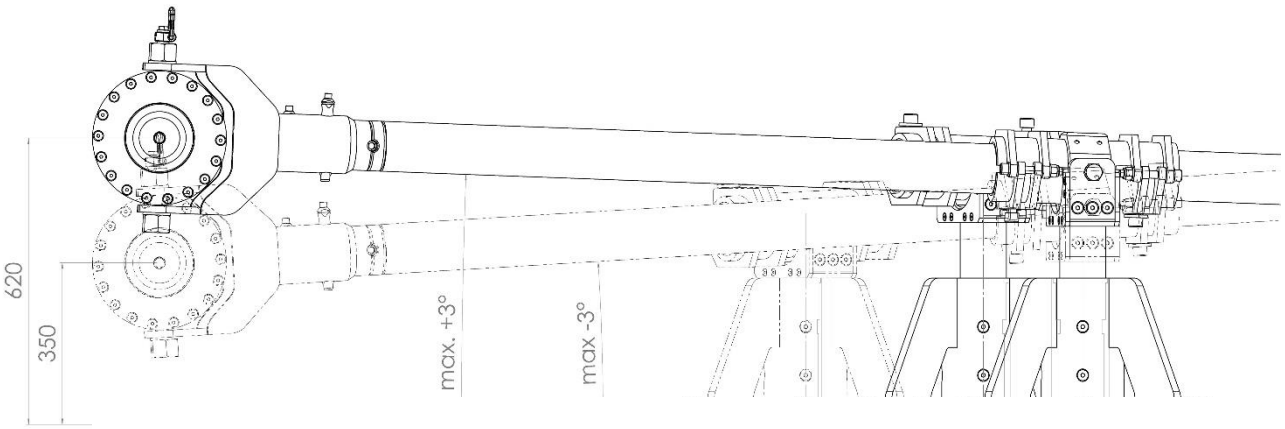


Figure 18:Adaptation to different hub heights

5.4.1 Positioning the first anchor (for wheel hub rod)

Danger	**Danger of injuries at pivoted and rotating joints!** Fingers could be crushed. ➔ Never reach into the pivoted joint or the joint of the clamping collets at the anchors!

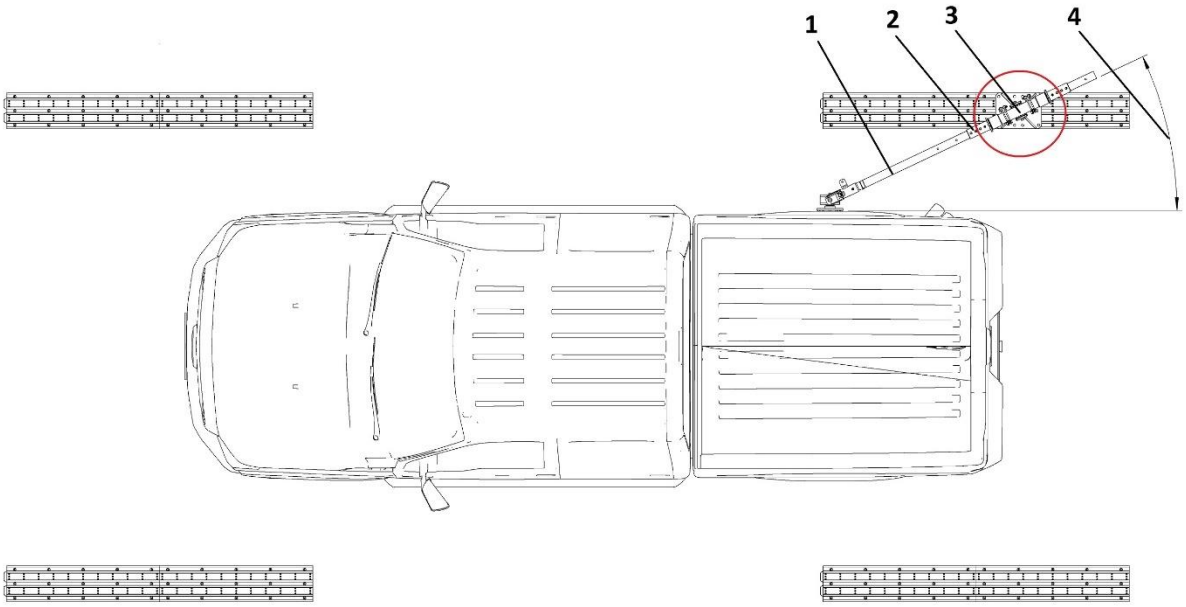


Figure 19: Position for first anchor and wheel hub rod

[1] Wheel hub rod with fixation bearing
[2] First rod locking
[3] Position for first sliding anchor
[4] Angle as parallel as possible to vehicle longitudinal axis up to max. 30°

Note	Conditions for the **position of first anchor** (circle in Figure 19) • The wheel hub rod runs as parallel as possible to longitudinal vehicle axis (max. 30°) • Distance between anchor and wheel: between 1m and 2m. There must be space for the rod locking on both sides of the clamping collet

Note	Condition for **suitable setting of anchor height:** • Maximum allowed inclination of the fixation rod: 3° (5cm height difference within 1m horizontal distance between anchor and vehicle). • Alignment of the anchors to each other and the rod angles is easiest with horizontal rods. Aids may be required to align to the hub height.

5.4.2 Connecting the wheel hub rod and the fixation bearing with the adapter cone

Danger	**Danger of injuries at fixation bearing and at fork head!** Fingers could be crushed because the fixation bearing is free to rotate in the fork head! ➔ Do not reach into the fork head.

Danger	**Risk of injury due to slipping of the fixation bearing!** Feet could be injured due to a non-tightened fixation bearing slipping off. ➔ Use the intended load suspension point with a suitable lifting device and secure the components.

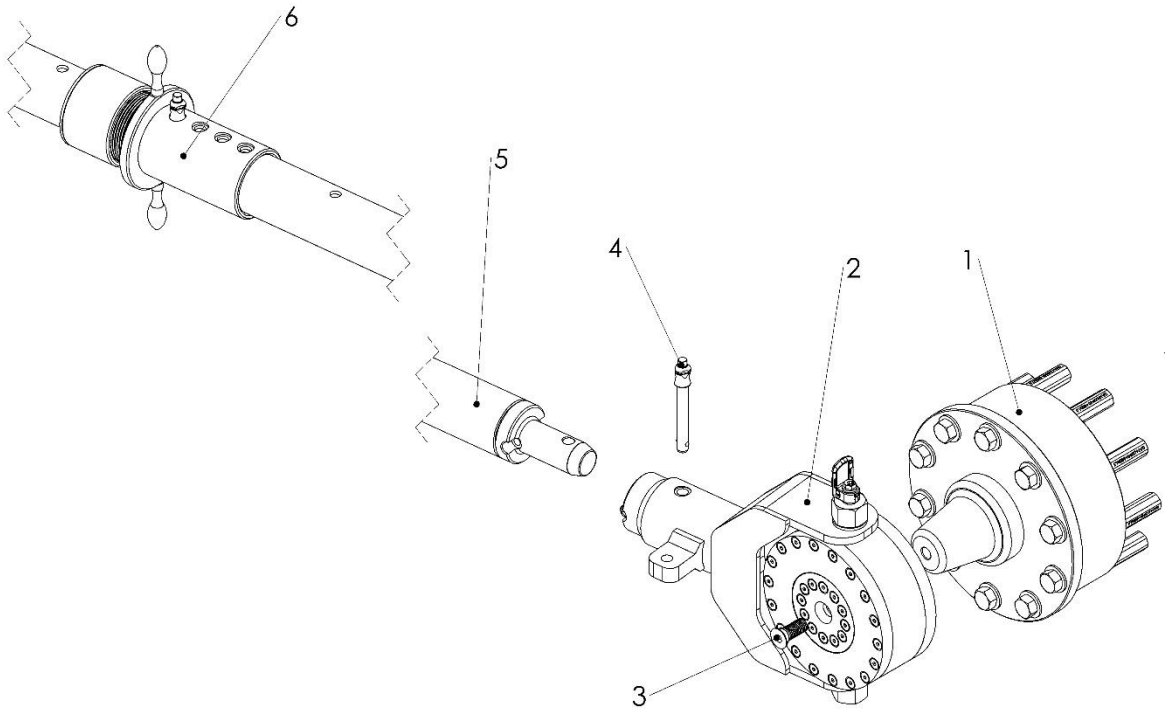


Figure 20: Connecting the wheel hub rod and the fixation bearing with the adapter cone

[1] Pre-assembled rim adapter unit with adapter cone
[2] Wheel hub rod end with pre-mounted fixation bearing
[3] Connecting screw for fixation bearing
[4] Ball lock pin for connecting wheel hub rod with head
[5] Wheel hub rod without head
[6] Rod locking

2. Slide the fixation bearing with pre-assembled wheel hub rod end onto the mounting cone.

3. Connect the fixation bearing to the adapter cone using the connecting screw and tighten to 200Nm.

4. Place the wheel hub rod in the already positioned sliding anchor and close the clamping collet.

5. Slide the rod locking onto the wheel hub rod and secure it at a suitable point with the corresponding ball lock pin. The rubberised threaded sleeve points away from the vehicle.

6. Slide wheel hub rod into rod end and connect using ball lock pin. Check the engagement function of the ball lock pin.
   Mounting aid no. 3 can be used to align the holes with each other.

 **Note**	First eliminate moisture and dirt (dust, oil, grease) from the rubber coating or fixation rod using a soft cloth and pH-neutral a degreasing agent (all-purpose cleaner) if necessary!

5.4.4 Positioning the second anchor (for diagonal wheel hub rod)

Danger	**Danger of injuries at anchor pivoted joint and at clamping collet holder** Fingers could be crushed. ➔ Never reach into the pivoted joint or the joint of the clamping collet at the anchors!

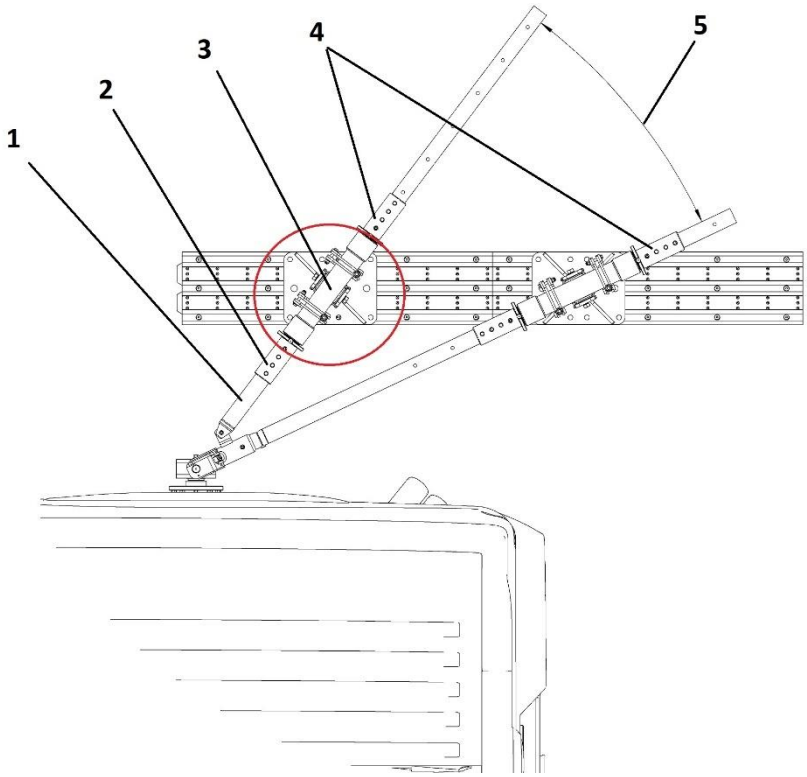


Figure 21: Position for second anchor and diagonal wheel hub rod

[1] Diagonal wheel hub rod
[2] Rod locking no. 2
[3] Position of the second sliding anchor
[4] Rod locking no. 3 and no. 4
[5] Angle approx. 30°

Note	Conditions for the **position of second anchor** (circle in Figure 21) • Angle between the wheel hub rod and diagonal wheel hub rod shall be approx. 30°. • Distance between anchor and wheel: between 1m and 2m. There must be space for the rod locking on both sides of the clamping collet

Note	Condition for **suitable setting of anchor height:** • Maximum allowed inclination of the fixation rod: 3° (5cm height difference within 1m horizontal distance between anchor and vehicle). • Alignment of the anchors to each other and the bar angles is easiest with horizontal rods. Aids may be required to align to the hub height.

5.4.5 Connecting the diagonal wheel hub rod with the wheel hub rod

Note	First eliminate moisture and dirt (dust, oil, grease) from the rubber coating or fixation rod using a soft cloth and pH-neutral a degreasing agent (all-purpose cleaner) if necessary!

1. Insert the diagonal wheel hub rod into the open clamping collet and fold it shut

2. Pull the diagonal wheel hub rod on the fork head towards the fixation bearing.

3. Slide the fork head onto the tab provided on the wheel hub rod.
   The diagonal wheel hub rod must not tilt.
   → If sluggish, check the alignment and height of the sliding anchors.

4. Establish connection with ball lock pin and check latching function.
   Mounting aid no. 3 can be used to align the holes with each other.

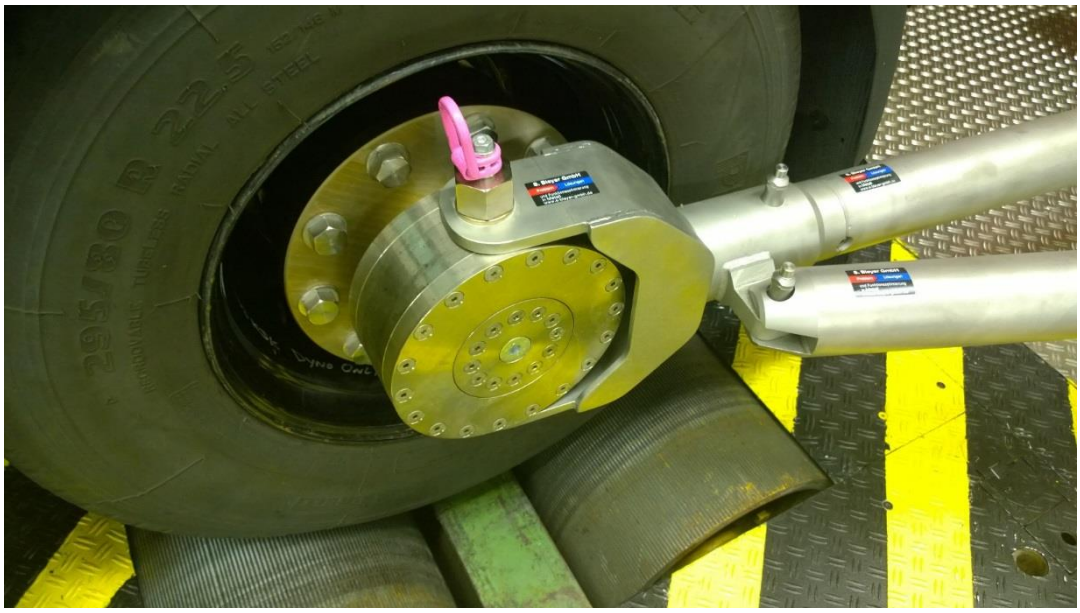


Figure 22: Correctly mounted fixation on the wheel

5.4.6 Clamping both anchors

1. Close both clamping collets and lock them by means of the cylinder head screws.
   To ensure a good connection, the screws are tightened with 40 Nm.
2. Attach another rod locking to each rod end and align all 4 rod locking, apply threaded sleeve to clamping collet and tighten the lock nut.
3. On both sliding anchors: Tighten all nuts at the base plate of sliding anchor according to manufacturer's instructions (120Nm) to fix anchor on T-rails.

Note	After the clamping collets have been closed, the vehicle can no longer move independently. Operation of the test bench is not permitted without the rod locks.

Note	The position of the T-bolts is indicated by a notch at the top of the thread. It must be ensured that the slot nuts are correctly aligned. ➔ The notch must be at right angles to the course of the rail!

5.5 Rolling in/aligning the test vehicle

5. Release the hand brake.
6. Roll in/align the test vehicle.
7. Reapply the hand brake so that test vehicle is secured.
8. Open the fasteners on both anchors and close them again.
   This allows any tension that may have arisen during rolling in/aligning to be released.

 **Caution**	When running the vehicle on the roller, care should also be taken to ensure that the vehicle does not tend to run to one side or the other after the run-in process is completed. The wheel hub fixation allows small steering movements of the vehicle due to its kinematics. This prevents undesired tensioning of the vehicle steering during the course of the test but requires an explicit fixation of the steering on the part of the operator.

5.6 Fixing the remaining wheels

Fix the remaining wheels in the same way.

After mounting all fixation triangles, the vehicle is fixed in its position and cannot be further aligned.

 **Attention**	**Material damage at wheel hub fixation and vehicle!** Rods can bend and become unusable when fixed vehicle is moved. The wheel hub, rim or other components on the vehicle may be damaged in the process. ➔ Before every movement of the fixed vehicle (e.g. raising or lowering of the roller) loosen the latches of all anchors. ➔ After this movement of the vehicle, lock the clamps of all anchors again.

5.7 Running the driving cycle

Caution

Material damage at wheel hub fixation and vehicle!

Screw connections can become loose if they have not been tightened correctly.

➔ After completely setting up the wheel hub fixation, test-run the vehicle.

➔ Then check all screw connections (e.g. thread adapters, connecting screws, fixation screws) for tight fit and appropriate tightening torque.

Note

When operating the vehicle with the wheel hub fixation, it is necessary to ensure that the driver permanently controls and, if necessary, stabilizes the steering wheel, as in real road operation, or that it is permanently fastened in place in the case of operating with a driving robot. The steering dynamics of the vehicle generally ensure that a vehicle runs in a straight line autonomously but in the event of disturbances (flat tires, etc.) careful fixation and checking of the steering system must be assured.

Caution

If there are unusually high levels of vibrations on the test vehicle during operation after the wheel hub fixations are fitted, it is recommended to measure the concentricity of the installed wheel rim adapters. As a result of wrong/inappropriate adapters used and/or also manufacturing inaccuracies or wear and tear of the vehicle rims used, misalignment may occur when the wheel hub restraints are fitted, resulting in a wobbling motion of the wheel rim adapters and this in turn can lead to undesired high vehicle excitations and thus vibrations. The manufacturing tolerances of the wheel hub fixation components are around 1/100mm.
The concentricity of the wheel hub unit is approx. 0.1mm.
The concentricity error of the assembly installed on the vehicle wheel rim should **not be more than 0.2mm** (measured at the wheel rim adapter in horizontal and sideward direction) for a smooth test run.

With **measured values >0.2mm** it may be necessary to have the vehicle rims reworked.

5.8 Overview of all important torques

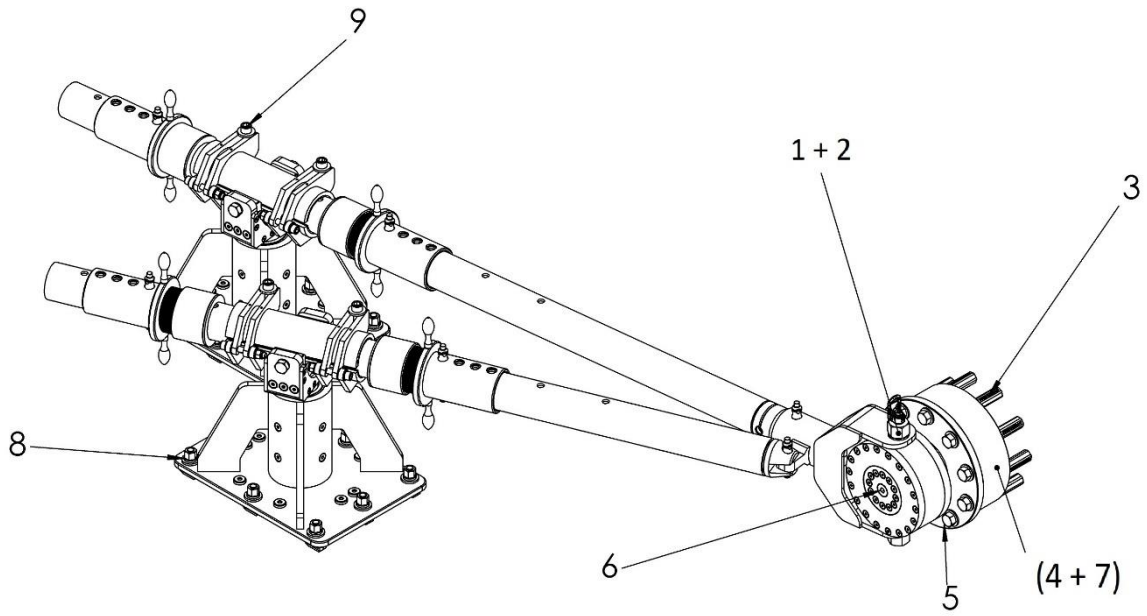
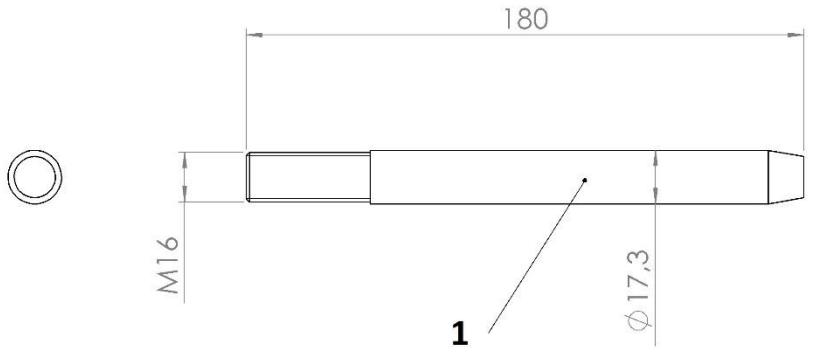


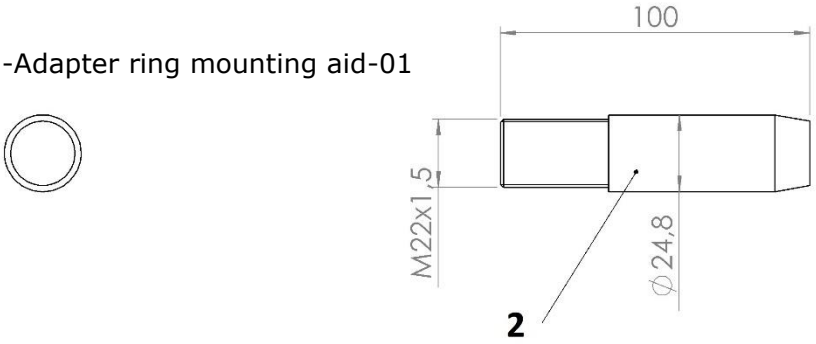
Figure 23: Overview of all important torques

No.	Description	Installed on	Part number	Tightening torque
1	Connecting screw	Wheel hub rod		
2	Attachment eye	Wheel hub rod		
3	Thread adapter			Like original wheel bolt
4	Cylinder head screw	In adapter ring		
5	Connecting screw for fixation bearing			
6				
7				
8	T-bolt M20	Sliding anchor		
9	Lock screw	Clamping collet		

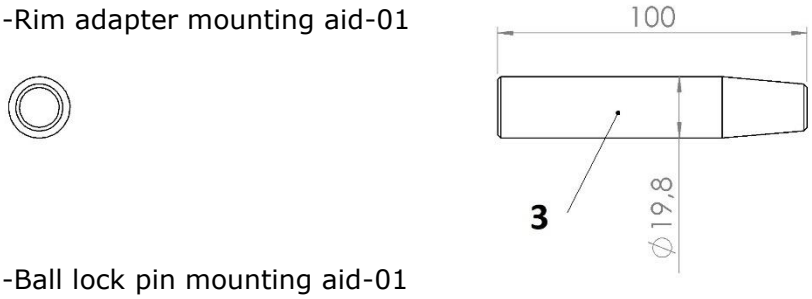
5.9 Accessories and mounting aids



1) MH14-LKW-01-Adapter ring mounting aid-01



2) MH14-LKW-02-Rim adapter mounting aid-01



3) MH14-LKW-03-Ball lock pin mounting aid-01

Figure 24: Mounting aids

6. Disassembling of the wheel hub fixation

6.1 Preparation for disassembly

Warning

Risk of injury due to unsecured vehicle during disassembly!

In case of single rollers, the vehicle could roll off the crest of the roll, injuring people and causing material damage if it is not secured against slipping or rolling away during dismantling.

➔ Before removing the wheel hub fixation, secure the vehicle against slipping or rolling away (centering device, handbrake).

Disassembly of the wheel hub fixation in reverse order of mounting.

6.2 Open both anchors

Danger

Danger of injuries at clamping collets after test run!

Fingers could be crushed during opening of latch clamp if rod is under mechanical tension after test run and jumps off.

➔ Use appropriate personal protective equipment (gloves).
➔ Carefully loosen all connections
➔ Hold fixation rod tight so it cannot jump off.

1. Loosen the lock nuts of the rod locking and turn back the threaded sleeve.
2. Open the cylinder screws of the clamping tube lock.
3. Carefully open the clamping collet which is now freely accessible.
4. Loosen the nuts of the T-bolts on the base plate of the sliding anchor to loosen anchor on T-rails.

Danger

Danger of injuries at clamping collet or pivoted joint!

Fingers could be crushed by careless movement or independent closing and tilting of the components

➔ Never reach into the joints or half shells on the anchors!
➔ Never leave the clamping collet open longer than necessary.

6.3 Dismantling the diagonal wheel hub rod

1. Remove rear rod locking
2. Withdraw ball lock pin from docking unit.
3. Remove diagonal wheel hub rod, disassemble front rod locking and store components in accordance with instructions.
4. Close the clamping collet of the anchor again so that the rubber coating is not damaged during transport and storage.
5. Remove anchor and store it in accordance with instructions.

 **Danger**	**Danger of crushing at pivoted joint!** Fingers could be crushed. Never reach into the pivoted joint at the anchors!

6.4 Dismounting the wheel hub rod

1. Remove the rear rod locking.
2. Remove the ball lock pin on wheel hub rod head and pull wheel hub rod out of head.
6. Remove wheel hub rod, disassemble front rod locking and store components in accordance with instructions.
3. Close the clamping collet of the anchor again so that the rubber coating is not damaged during transport and storage.
4. Remove anchor and store it in accordance with instructions.

 **Danger**	**Danger of injuries at fixation bearing and at fork head!** Fingers could be crushed because the fixation bearing is free to rotate in the fork head! After removing the wheel hub rod, the fork head can rotate freely downwards ➔ Do not reach into the fork head. ➔ Secure the fork head

6.5 Disassembly of fixation bearing including wheel hub-rod end

Danger

Risk of injury due to slipping of the fixation bearing!

Feet could be injured due to loosened slipping fixation bearing or fixation rod.

➔ Secure the fixation bearing by means of a load suspension point on a suitable lifting device and hold it in place as soon as the DIN7991 M24×60 screw is loosened. Otherwise, the fixation bearing may slip off the adapter cone.

➔ The fixation bearing is heavy and can seat tightly and/or come loose suddenly.

➔ Carefully lay down the fixation rods

Danger

Danger of injuries at fixation bearing and at fork head!

Fingers could be crushed because the fixation bearing is free to rotate in the fork head!

➔ Do not reach into the fork head.

1. Loosen and remove the connecting screw on the fixation bearing.
2. Pull fixation bearing with wheel hub rod head off the adapter cone of the rim adapter unit and store in accordance with instructions.

Dismount the remaining fixation triangles in the same way.

6.6 Dismounting the rim adapterunit

Caution

Material damage due to a wider vehicle!

Mounted rim adapter unit with adapter cones project from the wheels. As a result, the vehicle is wider and can cause property damage when passing by.

➔ Move vehicle with mounted rim adapter unit with great caution and care.

Caution

Risk of adapter cone corrosion!

If the rim adapter unit is not dismantled immediately after the test operation, the adapter cones may corrode.

➔ It is imperative that the adapter cones are protected from humidity!

1. Remove all connecting screws on first wheel (arbitrarily selectable).
2. Remove wheel rim adapter unit including adapter cone – consider its weight whilst doing so!

Caution

Injuries due to falling components!

The vehicle wheel detaches completely from its mounting and the vehicle tilts, injuring people and causing material damage if all thread adapters are removed at once.

➔ Replace the thread adapters one by one with the original wheel bolts!

➔ Never remove all thread adapters at once!

3. **Remove a thread adapter and replace it with an original wheel bolt. Tighten original wheel bolt with correct screw torque (as original wheel bolt or in accordance with thread dimensions). Thread adapters may only be replaced 1 to 1 by the wheel bolts.**
4. Replace all further thread adapters with original wheel bolts on the first wheel, step by step.

Deal with the remaining wheels in the same way.

7. Maintenance and cleaning

7.1 General maintenance notes

Perform the inspection and, if necessary, the maintenance work described here on all components of the MDV wheel hub fixation regularly, before each mounting.

This chapter only describes inspection, maintenance and cleaning work that can be performed individually by the operator of the test bench.
Any maintenance work beyond this must be carried out by specially trained service personnel or by the manufacturer S. Bleyer GmbH itself.

Always keep all components of the wheel hub fixation clean, dry and free of grease for mounting and during storage. Always use fixation rods and rubber-coated clamping collets in clean, dry and grease-free condition.

Screw and nut connections secured with screw marking lacquer must not be adjusted or re-tightened by the operator.

If the screw marking lacquer is damaged return the whole anchor to the manufacturer for checking and re-adjustment.

7.2 Maintenance of anchors

7.2.1 Sliding anchor

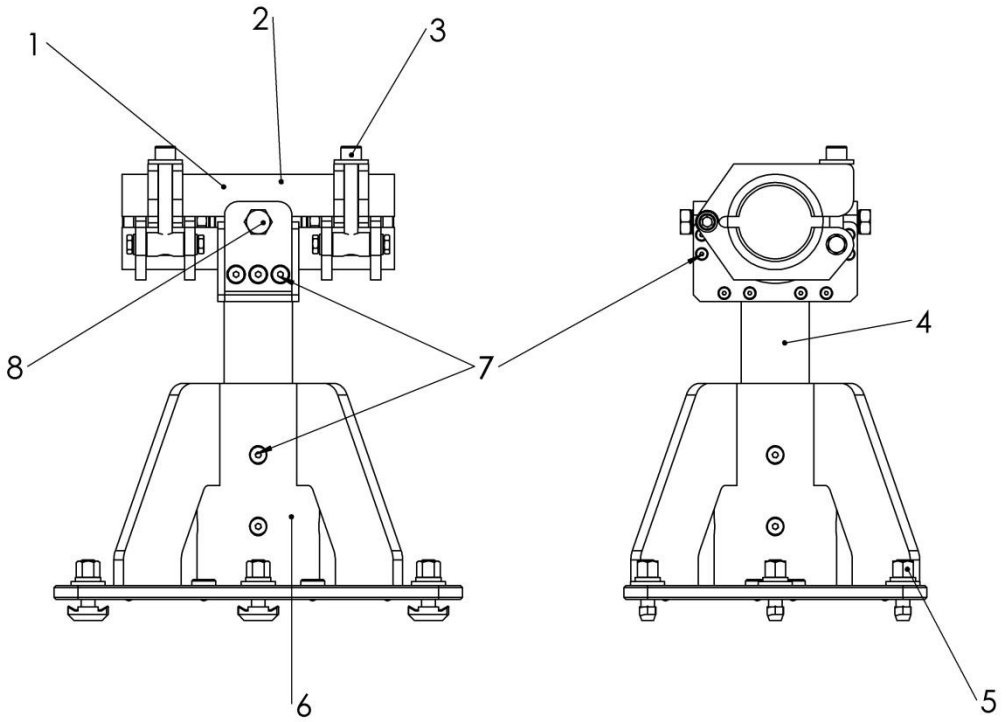


Figure 25: Sliding anchor maintenance

[1] Clamping collet
[2] Warning sticker "danger of crushing"
[3] Lock screw
[4] Guide column
[5] T-bolt with nut, for T-rail
[6] Main body
[7] Screw joints in general
[8] Connecting screw Pivoted joint

7.2.2 Maintenance of individual anchor components

7.2.2.1 Clamping collet

Inspection (defect described)	Maintenance work
Check if rubber coating is damaged.	Replace clamping collet or entire anchor.
Check if rubber coating is dirty, greasy or moist.	Clean and dry rubber coating. Do not use aggressive agents or steam cleaners, only water and all-purpose cleaner.
Check for others damages.	Replace clamping collet or entire anchor.
Check if warning sticker “danger of injuries” is damaged or missing.	Replace the warning sticker “danger of injuries”.

7.2.2.2 Clamping collet locking screw

Inspection (defect described)	Maintenance work
Check for damage and sharp edges Check, especially on the bearing surfaces	Replace the clamping collet locking screw.

7.2.2.3 T-bolts + nuts for T-rails

Inspection (defect described)	Maintenance work
Check if T-bolts incl. nuts are missing or damaged.	T-bolts incl. nuts

7.2.2.4 Guide column

Inspection (defect described)	Maintenance work
Check if height adjustment is damaged or not adjustable.	Replace whole anchor.

7.2.2.5 Main body

Inspection (defect described)	Maintenance work
Screw joints generally loose	Replace whole anchor.

7.3 Maintenance of fixation rods

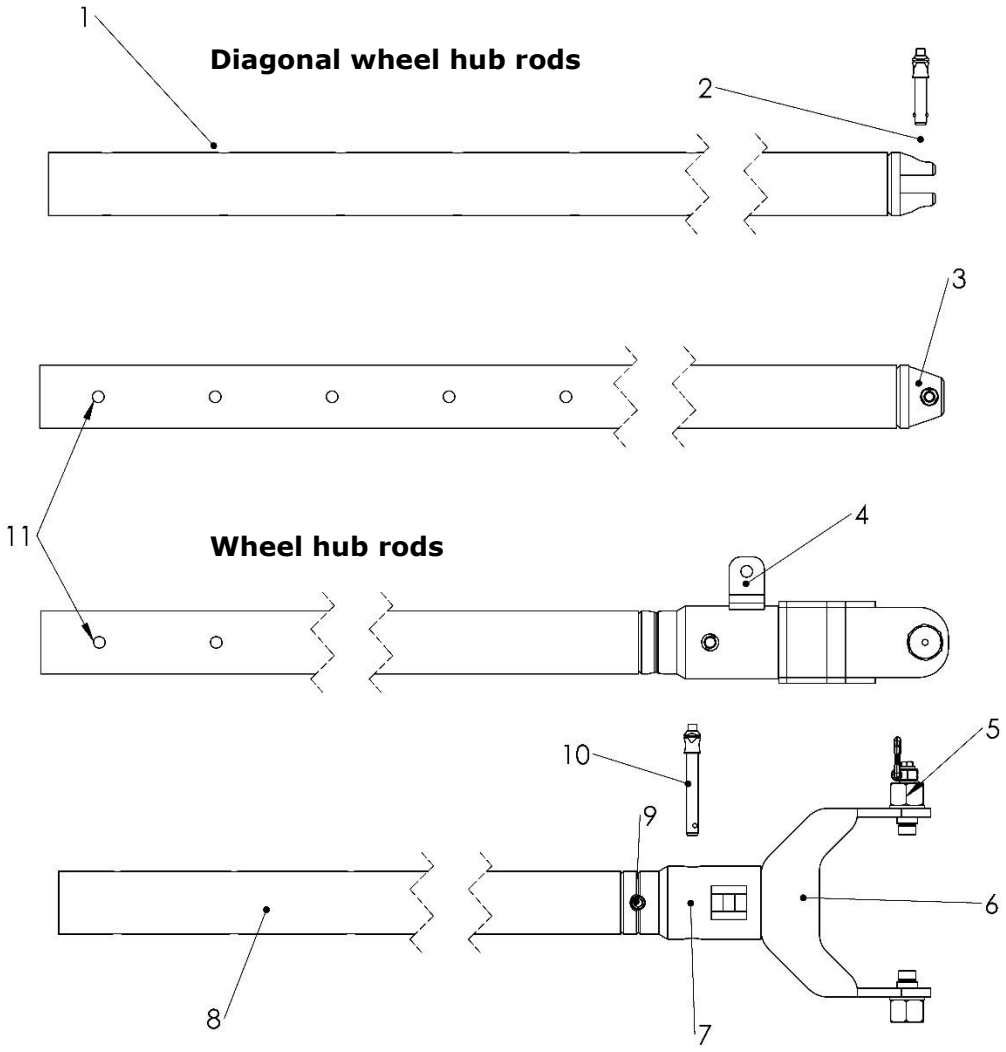


Figure 26: Maintenance of fixation rods

[01] Diagonal wheel hub rod
[02] Ball lock pin
[03] Fork head (diagonal wheel hub rod)
[04] Locating tab
[05] Connecting screw with attachment eye
[06] Fork head (wheel hub rod)
[07] Fork head connection
[08] Wheel hub rod
[09] Alignment screw
[10] Ball lock pin
[11] Holes for ball locking bolts

Note

Detecting deformed fixation rods:
- Place the fixation rod on a flat surface, e.g. calibration table/surface plate.
- Roll fixation rod on the surface, rod head projects beyond table edge.
- Look out for any differences from the longitudinal axis (deformation).
- If largest deviation from the longitudinal axis is more than 10mm, then the fixation rod is deformed beyond its tolerance (danger of buckling).

Do not use deformed fixation rods for safety reasons!

Diagonal wheel hub rod
Carry out visual and functional check before every mounting!

Inspection (defect described)	Maintenance work
Check if rod is dirty, greasy or moist.	Clean and dry rod. Do not use aggressive agents or steam cleaners, only water and all-purpose cleaner.
Check if rod is damaged or deformed by more than 10mm.	Replace whole rod.
Check if swivel head is damaged or deformed.	Replace whole rod.
Check if ball lock pin is missing or deformed.	Replace ball lock pin.

7.3.1 Wheel hub rod

Carry out visual and functional check before every mounting!

Inspection (defect described)	Maintenance work
Check if rod is dirty, greasy or moist.	Clean and dry rod. Do not use aggressive agents or steam cleaners, only water and all-purpose cleaner.
Check if rod is damaged or deformed by more than 10mm.	Replace whole rod.
Check if the docking unit for the diagonal wheel hub rod is damaged or deformed.	Replace whole rod.
Check if fork head is damaged or deformed.	Replace whole rod.
Check if fixation screws are damaged or loose (if fixation bearing is attached to fork head).	Replace or tighten with 600Nm.

7.4 Maintenance of the rim adapter unit and the fixation bearing

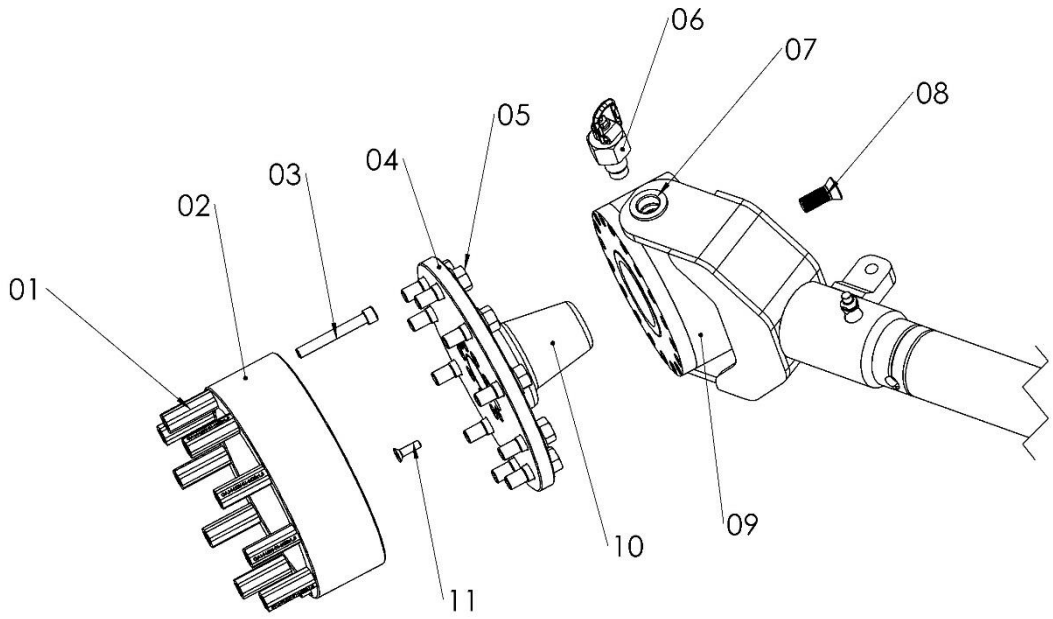


Figure 27: Maintenance rim adapter unit and fixation bearing

[01] Thread adapter
[02] Adapter ring
[03] DIN912 M16 Screw (Length as required)
[04] Rim adapter unit base plate
[05] Connecting screw M22×1.5
[06] Connecting screw M30×1.5
[07] Guide bushing
[08] DIN7991 M24×60
[09] fixation bearing
[10] Adapter cone
[11] DIN7991 M12×40

7.4.1.1 Bolted connections

Before every mounting check all bolted connections for secure connection.

Inspection (defect described)	Maintenance work
Check if screws are damaged or loose.	Tighten or replace. Screw tightening torque see Chapter 5.1

7.4.1.2 Fixation bearing


Note

Maintenance of the fixation bearing after 15,000 operating hours or 1 million kilometers, but at the latest every 3 years.

Never service the fixation bearing yourself!

Inspection (defect described)	Maintenance work
Check if fixation bearing is dirty or damaged.	Clean externally (wipe off only). Replace complete bearing.
Check if warning sticker “danger of injuries” is missing or damaged.	Replace warning sticker.

7.4.1.3 Thread adapter

Carry out visual and functional check before every mounting!

Inspection (defect described)	Maintenance work
Check whether thread adapters are damaged.	Replace thread adapters.

7.4.1.4 Adapter cone

Carry out visual and functional check before every mounting!

Inspection (defect described)	Maintenance work
Check if adapter cone is dirty or greasy.	Clean adapter cone. Do not use aggressive agents or steam cleaners, only water and all-purpose cleaner.
Check if adapter cone is damaged.	Replace the adapter cone.

7.5 Rod locking maintenance

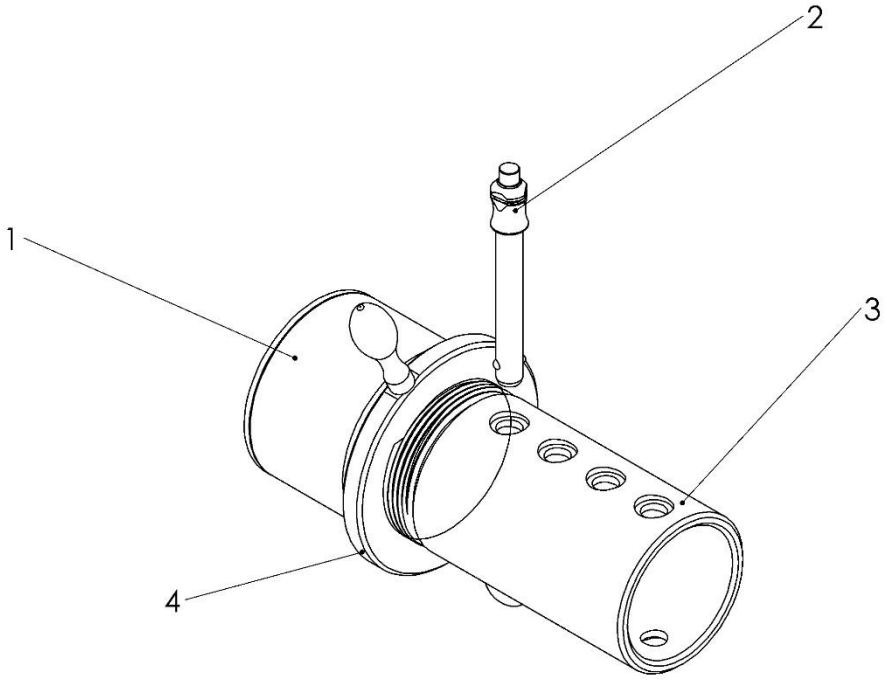


Figure 28: Rod locking maintenance

[01] Union nut
[02] Ball lock pin
[03] Main body
[04] Lock nut

7.5.1.1 Rod locking

Inspection (defect described)	Maintenance work
Check whether individual parts are dirty or damaged.	Clean externally (wipe off only). Replace single parts
Check whether the rubber coating of the union nut is damaged.	Replace rubber coating

7.5.1.2 Ball lock pin

Inspection (defect described)	Maintenance work
Check if ball lock pin is damaged.	Replace ball lock pin.

7.6 Cleaning

Always keep the wheel hub fixation clean and dry. This guarantees operational safety and fault-free long-term functional capability of the wheel hub fixation as well as the test bench.

Note

Wipe the wheel hub fixation periodically with a soft, lint-free cleaning cloth.
Use only water and pH-neutral all-purpose cleaner.
After cleaning, wipe off remaining moisture thoroughly or allow to dry.

Do not use steam jet cleaning machines, high-pressure cleaning equipment or chemically aggressive agents to clean the components of the wheel hub fixation!

8. Transportation and storage

Danger

Danger of injuries at anchor pivoted joint and at clamping collets as well as wheel hub rods fork head when fixation bearing is mounted

Fingers could be crushed.

➔ At the anchors, never reach into the pivoted joint, the clamping collet or the fork head of the wheel hub rods!

Caution

Material damage caused by untrained personnel!

The wheel hub fixation, the body of the vehicle, the test bench or the equipment of the test cell will be damaged if an accident occurs due to untrained personnel.

➔ Selection, mounting, dismounting, maintenance and cleaning, transportation and storage of the wheel hub fixation requires expert knowledge and must be performed only by trained personnel.

➔ Transportation only with suitable transport equipment.

Caution

Risk of injury and material damage due to falling rods!

People can suffer head or limb injuries from falling rods. Material damage can occur.

➔ Secure the rods to prevent them from falling, if stored upright.

Note

Avoid impacts and shocks during transportation and storage!

In particular, the rubber coating of the clamping collet must not be damaged! Therefore, only transport the anchor with the clamping collet closed.

Secure moving parts properly during transport.

Store the wheel hub fixation in weather-protected, clean and dry rooms! Ensure low fluctuation of temperature because otherwise the components are prone to accelerated aging.

The packaging is only intended for shipping and not for storage!

9. Replacement parts and accessories

Spare part/accessory part	Order number
Thread adapter, dimensions as per agreement	MD-GA20
Adapter ring, dimensions as per agreement	
Cylinder screws for thread adapters, Length according to chapter 4.4.5	
Connecting screw M16×1.5	MD-RST20-01-26
Adapter cone	MD-FA20-01-05
Connecting screw for fixation bearing	
Rim adapter unit base plate for LK335-10-hole	
Rim adapter unit base plate for LK225-10-hole	
Fixation bearing	MD-FL20
Wheel hub rod with fork head (RST14)	MD-RST20
Diagonal wheel hub rod (DRST14)	MD-DRST20
Sliding anchor 430–550mm	MD-SA20
Clamping collet lock screw M16	
T-bolts M20 with nut and washer	HSR-M20x75
Ball pressure roller	KDR-D25
Ball lock pin Ø16 l=80	KSB-D16-L80
Ball lock pin Ø16 l=35	KSB-D16-L35
Rod locking	MD-STAR20
Replace the warning sticker “danger of injuries”.	SBHF03-02
All-purpose cleaner for cleaning the components	SBHF03-48
MDV wheel hub fixation user manual (this booklet). Please ask for current version.	BA MDV Wheel Hub Fixation

Danger

Safety warning!

For safety reasons, the vehicle fixation devices from S. Bleyer GmbH may only be used as a complete unit.

Mixing with components from other manufacturers is not permitted.

10. Technical information

10.1 Vehicle and testing parameters

Permissible vehicle mass	max. 7,500kg
Permissible axle weight	max. 4,000kg
Permissible acceleration/braking deceleration	max. 10.0m/s²
Permissible tractive force per axle	max. 40,000N
Kick-down	Permitted
Full braking	Permitted
Anchor height	Variable
Permissible speed	max. 250km/h
Wheel rim diameter of the vehicle	18-inch to 24-inch
Distance between vehicle and sliding anchor	min. 1.4 m max. 2.2m
Temperature range	-40°C to +60°C

10.2 Fixation rods

10.2.1 Wheel hub rod

Length of rod without fork head	2,500 mm
Length of fork head	400 mm
Mass without fork head and locating bearing	Approx. 30kg
Fork head with pre-mounted locating bearing	Approx. 33kg

10.2.2 Diagonal wheel hub rod

Length of complete rod	2.200mm
Mass	Approx. 20kg

10.3 Anchors

Installation Height = distance between middle of the clamping collet and the floor of test bench

Length of the clamping collet	400 mm

10.3.1 Sliding anchor

Dimensions of base plate	350mm × 450mm or per customer's wishes
Axis dimension of holes for T-rails	As required
Diameter of drill holes	for M20 T-head bolt
Installation Height	400–530mm
Height difference per rotation	4mm
Mass	Approx. 90kg

10.4 Wheel rim adapter and fixation bearing

10.4.1 Thread adapter

Shaft length, thread diameter, thread length, head shape	matched to wheel rim shape of the respective test vehicle
Screw quality	8.8
Screw tightening torque	same as original wheel nut

10.4.2 Rim adapter unit

External diameter	matched to wheel rim size and hole circle diameter of the respective test vehicle
Number of drill holes for connecting screws	matched to the rim of the respective test vehicle
Mass	up to 40 kg depending on adapter composition

10.4.3 Fixation bearing

Mass	Approx. 15kg

11. Declaration of conformity

S. Bleyer GmbH

www.s-bleyer-gmbh.de

Declaration of Conformity

according to the European Machine Directive 2006/42/EC, Annex II A

We,

S. Bleyer GmbH
Steinbeisstraße 20
73614 Schorndorf

Tel.: +49 (0)7181 9327-0
Fax: +49 (0)7181 9327-27

herewith declare

that the equipment manufactured by us

- ***Hook Fixation / Wheel Hub Fixation***
- *Function: Vehicle fixation on Chassis Dynamometers*

complies with the requirements of the EC Machinery Directive 2006/42/EC.

Note: the equipment will be delivered with a user manual that contains important instructions for the intended use, possible limitations of use, assembly, mounting, operation and maintenance as well as important safety instructions that must strictly be followed!

Name of person or organization which is authorized at **S. Bleyer GmbH** to compile and make available the technical file:

- Stefan Bleyer / Managing Director

Schorndorf, 27.04.17
Place, Date

Signature