



**ZF INDEPENDENT
WHEEL SUSPENSION
RL-75 E/EC/A
RL-82 EC**

(ZF-Wheel head with compact bearing)

REPAIR MANUAL

for ZF Independent Wheel Suspension

RL-75 E/EC/A

RL-82 EC

IMPORTANT INFORMATION:

Due to the great variety of ZF units it is necessary to limit disassembly and reassembly manuals to a current ZF production unit. Continuous technical upgrading of the ZF units and extensions concerning design options may require differing steps, which can be carried out by qualified specialists without greater difficulties by means of the perspective views included in the corresponding spare parts lists.

This disassembly and reassembly manual is based on the design level of a ZF production unit at the time of issue of the manual.

ZF Friedrichshafen AG reserves the right to replace this disassembly and reassembly manual by a successive edition at any time without advance notice. Upon request, ZF Friedrichshafen AG will advise which edition is the latest one.

Any maintenance work is to be done in accordance with ZF's Operating Instructions (ZF Order No.: 5871 197 902) and ZF's List of Lubricants TE-ML 12!

The ZF list of lubricants is being continuously updated and can be obtained or viewed as follows:

- in all ZF plants
- in all ZF service organizations
- Internet <http://www.zf.com>

ATTENTION:

Observe the vehicle manufacturer's instructions and specifications for the installation and commissioning of the unit!

ZF Friedrichshafen AG

ZF Services

Donaustr. 71

D - 94034 Passau

Section.: MAIP21

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Design level

2007/12

3. Edition

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PREFACE

This documentation has been developed for specialized staff trained by ZF Friedrichshafen AG for repair and maintenance work to be made on ZF units.

This documentation describes a ZF series product with a design level valid at the date of edition.

Due to the continuous technical upgrading of the product, however, the repair of the unit at your disposal may require both deviating work steps and differing setting and testing data.

We would therefore recommend you to entrust masters and servicemen with the work on your ZF product whose practical and theoretical training is constantly updated in our training school.

The Service Stations established by ZF Friedrichshafen all over the world offer you:

1. Permanently trained staff
2. Specified equipment, e.g. special tools
3. State-of-the-art genuine ZF spare parts

All work is done there with utmost care and reliability.

In addition, repair work carried out by ZF Service Stations is covered by the ZF warranty within the terms of the currently applicable contractual conditions.

Any damage resulting from work which is done in an improper and unprofessional manner by third parties and any consequential costs incurred shall be excluded from this contractual liability. This shall also be applicable if other than genuine ZF spare parts are used.

This manual is based on the state-of-the-art at the time of printing.

It was prepared with utmost care in order to avoid errors.

However, we shall not be liable for any possible errors in figures or descriptions.

ZF Friedrichshafen AG

GENERAL

The Service Manual covers all work required for disassembly and the relating reassembly.

When repairing the unit, ensure utmost cleanliness and that the work is done in a professional manner.

Dismantle the unit only if any damaged parts must be replaced. After removing screws or nuts, loosen lids and housing parts which were installed with seals by slight blows with a plastic hammer. Use suitable pulling devices for removing parts being tightly installed on the shafts, such as bearings, bearing rings and similar.

Carry out disassembly and reassembly work on a clean working place. Use special tools which have been developed for this purpose. Prior to reinstallation of the parts, clean contact faces of housings and lids from residues of seals. Remove any burrs or similar irregularities with an oil stone. Clean housings and end covers, in particular corners and angles, with a suitable detergent. Damaged or heavily worn parts must be replaced, with an expert assessing whether parts subject to normal wear during operation, such as bearings, thrust washers etc. will be reinstalled.

Parts such as seal rings, locking plates, split pins etc. must generally be replaced. Radial seal rings with worn or broken sealing lip must also be renewed. In particular, ensure that no chips or other foreign bodies remain in the housing. Check the lube oil holes and grooves regarding unhindered passage.

Oil according to the relating List of Lubricants shall be applied to all bearings prior to their installation:

NOTE: Only a heating furnace or an electric drier is permitted to be used for heating up parts such as bearings, housings, etc.!
Parts fitted in heated state must be readjusted after cooling down to ensure a perfect contact.

CAUTION:

When assembling the unit, exactly observe the tightening torques and setting data indicated in the manual. Tighten screws and nuts according to the enclosed standard table, unless otherwise specified.

When fitting snap rings and retaining rings, pay attention to an exact contact in the grooves!

The use of fluid sealing agents or Molykote is not permitted for the control part in transmissions – due to a possible malfunction.

Never wash disks having organic friction linings (e.g. paper disks) - adverse effect on lining adhesion.
Only dry cleaning is permitted (leather cloth).



DANGER

When using detergents, observe the manufacturer's instructions regarding their handling.

Structure of the Service Manual

The structure of this repair manual reflects the sequence of work steps for completely dismantling the removed unit.

Tools required for carrying out the repair work are listed in the current text as well as in chapters “WS” (List of Special Tools) and “WH” (Commercial Tools).

Important information on labor safety

As a basic principle, the workshop carrying out the repair or maintenance of ZF units shall be fully responsible for labor safety.

The observance of all valid safety regulations and legal requirements is a prerequisite for avoiding any damage to persons and products during maintenance and repair work.

Repair workshops must familiarize themselves with these regulations prior to starting any work.

A suitably trained and skilled staff is required for a proper repair of these ZF products.

The repair workshop shall be responsible for the training.

The following safety references are used in this manual:

 CAUTION	This symbol serves as a reference to special working procedures, methods, information, use of auxiliaries etc... indicated in this repair manual.
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 DANGER	This symbol identifies situations in which lacking care may lead to personal injury or damage to the product .
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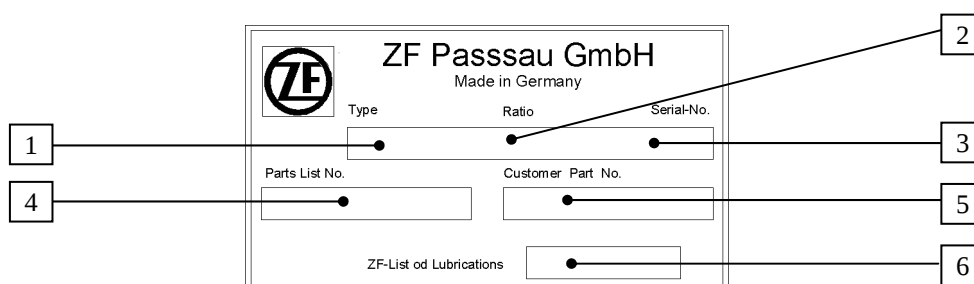
<u>NOTE:</u>	Thoroughly study this manual before starting any tests or repair work.
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<u>NOTE:</u>	Figures, drawings and parts in this manual do not always represent the original; they show the working procedure. Since the figures, drawings and parts are not shown to scale, do not draw any conclusions on size and weight (not even within one and the same illustration). Carry out work according to the legend.
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<u>NOTE:</u>	After repair work and tests, the expert staff must verify that the product is perfectly functioning again.
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LABELING OF IDENTIFICATION PLATE

- 1 = Axle type
- 2 = Ratio
- 3 = Unit-No.: (Serial-No.)
- 4 = ZF-Parts List-No.
- 5 = Customer part no. (Vehicle - Ident-No.)
- 6 = ZF- List of lubrications



NOTES REGARDING THE SPARE PARTS ORDERS:

When ordering genuine ZF-Spare Parts, please indicate:

- 1. = Axle type
- 2. = Serial-No.
- 3. = ZF-Parts List-No.
- 4. = Mark and type of vehicle
- 5. = Denomination of the spare part
- 6. = Spare parts-No.
- 7. = Way of transport

See Model identification Plate!



When all of the above required indications are considered, errors in the delivery of spare parts Orders can be avoided!

VERGLEICHSTABELLE FÜR MASSEINHEITEN
CONVERSION TABLE
TABLEAU DE CONVERSION

25.40 mm	=	1 in (inch)
1 kg (Kilogramm)	=	2.205 lb (pounds)
9.81 Nm (1 kpm)	=	7.233 lbf x ft (pound force foot)
1.356 Nm (0.138 kpm)	=	1 lbf x ft (pound force foot)
1 kg / cm	=	5.560 lb / in (pound per inch)
1 bar (1.02 kp/cm ²)	=	14.5 psi (pound force per square inch lbf/in ²)
0.070 bar (0.071 kp/cm ²)	=	1 psi (lbf/in ²)
1 Liter	=	0.264 Gallon (Imp.)
4.456 Liter	=	1 Gallon (Imp.)
1 Liter	=	0.220 Gallon (US)
3.785 Liter	=	1 Gallon (US)
1609.344 m	=	1 Mile (land mile)
0° C (Celsius)	=	+ 32° F (Fahrenheit)
0 ° C (Celsius)	=	273.15 Kelvin

BEZEICHNUNG DER GESETZLICHEN EINHEITEN
DENOMINATION OF STANDARD DIMENSIONS
DÉNOMINATION DES DIMENSIONS STANDARDISÉES

Hinweis : längenbezogene Masse in kg/m; flächenbezogene Masse in t/m²

Note : linear density in kg/m; areal density in t/m²

Nota : Densité linéaire en kg/m; Densité superficielle en t/m²

Begriff Unit Unité	Formelzeichen Symbol Symbole	Neu New Nouveau	Alt Old Vieux	Umrechnung Conversion Conversion	Bemerkungen Note Nota
Masse Density Masse	m	kg (Kilogramm)	kg		
Kraft Force Force	F	N (Newton)	kp	1 kp = 9.81 N	
Arbeit Work Travail	A	J (Joule)	kpm	0.102kpm = 1J = 1Nm	
Leistung Power Puissance	P	KW (Kilowatt)	HP (DIN)	1 HP = 0.7355 KW 1 KW = 1.36 HP	
Drehmoment Torque Couple	T	Nm (Newtonmeter)	kpm	1 kpm = 9.81 Nm	T (Nm) = F (N) · r (m)
Kraftmoment Moment (Force) Moment (Force)	M	Nm (Newtonmeter)	kpm	1 kpm = 9.81 Nm	M (Nm) = F (N) · r (m)
Druck (Über-) Pressure (Over-) Pression (Sur-)	pü	bar	atü	1.02 atü = 1.02 kp/cm ² = 1 bar = 750 torr	
Drehzahl Speed Nombre de Tours	n	min ⁻¹ rpm tr/min			

TIGHTENING TORQUES FOR SCREWS (in Nm) ACC. TO ZF STANDARD 148

Friction coefficient: $\mu_{\text{tot.}} = 0.12$ for screws and nuts without rework, as well as phosphated nuts.

Tighten manually!

Unless otherwise specified, the tightening torques can be taken from the following chart:

Metric ISO standard thread DIN 13, page 13

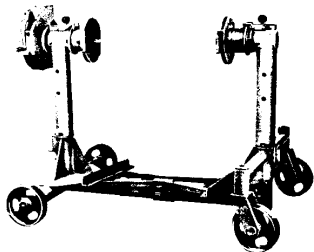
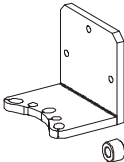
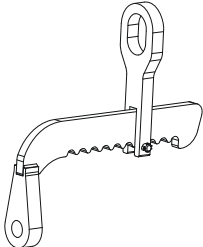
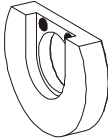
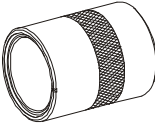
Dimension	8.8		10.9		12.9
M4	2.8		4.1		4.8
M5	5.5		8.1		9.5
M6	9.5		14		16.5
M7	15		23		28
M8	23		34		40
M10	46		68		79
M12	79		115		135
M14	125		185		215
M16	195		280		330
M18	280		390		460
M20	390		560		650
M22	530		750		880
M24	670		960		1100
M27	1000		1400		1650
M30	1350		1900		2250
M33	1850		2600		3000
M36	2350		3300		3900
M39	3000		4300		5100

Metric ISO fine thread DIN 13, page 13

Dimension	8.8		10.9		12.9
M 8 x 1	24		36		43
M 9 x 1	36		53		62
M 10 x 1	52		76		89
M 10 x 1.25	49		72		84
M 12 x 1.25	87		125		150
M 12 x 1.5	83		120		145
M 14 x 1.5	135		200		235
M 16 x 1.5	205		300		360
M 18 x 1.5	310		440		520
M 18 x 2	290		420		490
M 20 x 1.5	430		620		720
M 22 x 1.5	580		820		960
M 24 x 1.5	760		1100		1250
M 24 x 2	730		1050		1200
M 27 x 1.5	1100		1600		1850
M 27 x 2	1050		1500		1800
M 30 x 1.5	1550		2200		2550
M 30 x 2	1500		2100		2500
M33 x 1.5	2050		2900		3400
M 33 x 2	2000		2800		3300
M 36 x 1.5	2700		3800		4450
M 36 x 3	2500		3500		4100
M 39 x 1.5	3450		4900		5700
M 39 x 3	3200		4600		5300

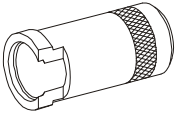
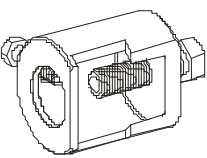
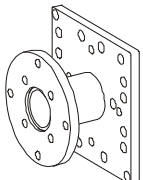
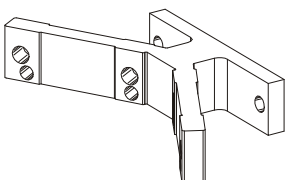
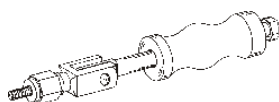
SPECIAL TOOLS FOR DISASSEMBLY AND REASSEMBLY

RL-75 E/EC/A / RL-82 EC

Cons. No.	Figure	Designation Order No.	Qty	Chapter/Fig
1		Assembly truck assy with tilting device 5870 350 000	1	1/3 2/2 3/1 3/3
2		Clamping angle With spacer bush 5870 350 101	1	1/3 2/2
3		Bracket 5870 281 043	1	1/3 2/2 3/8 4/10 5/32
4		Pressure piece 5870 100 059	1	1/5 2/4 2/7
5		Pressing bush 5870 506 134	1	1/6 1/9 2/5 2/8 6/2 7/2 7/16

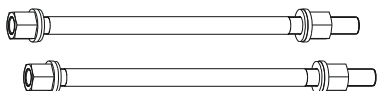
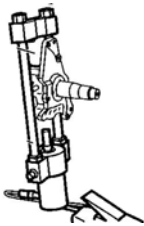
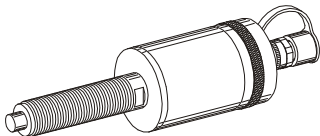
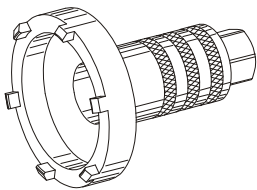
SPECIAL TOOLS FOR DISASSEMBLY AND REASSEMBLY

RL-75 E/EC/A / RL-82 EC

Cons. No.	Figure	Designation Order No.	Qty	Chapter/Fig
6		Pressure piece 5870 100 056	1	1/6 1/9 2/5 2/8 6/2 7/2 7/16
7		Forcing device 5870 080 052	1	1/8
8		Fixing plate 5870 350 119	1	3/1 3/3
9		Clamping angle 5870 350 093	1	3/1 3/3
10		Striker 5870 650 001	1	3/5 4/19

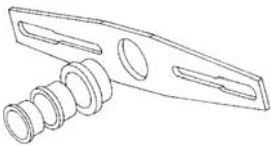
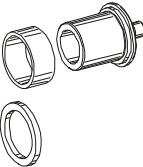
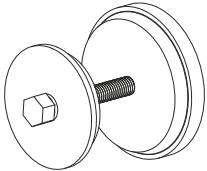
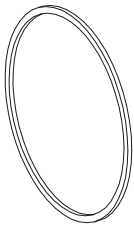
SPECIAL TOOLS FOR DISASSEMBLY AND REASSEMBLY

RL-75 E/EC/A / RL-82 EC

Cons. No.	Figure	Designation Order No.	Qty	Chapter/Fig
11		Pull rods 5870 285 028	1	3/6 3/8 4/20
12		Pressure plates 5870 285 027	1	3/6 3/8 4/20
13		Hydraulic spindle 5873 003 007	1	3/6 3/8 4/20
14		Hydraulic pump 5870 287 010	1	3/6 3/8 4/20
15		Slotte nut wrench 5870 401 136	1	4/9 5/33

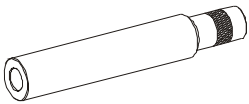
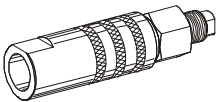
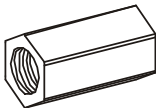
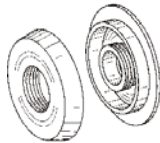
SPECIAL TOOLS FOR DISASSEMBLY AND REASSEMBLY

RL-75 E/EC/A / RL-82 EC

Cons. No.	Figure	Designation Order No.	Qty	Chapter/Fig
16		Centering bracket 5870 912 012		4/9 5/33
17		Driver tool 5870 055 107	1	5/2
18		Handle 5870 260 003	1	5/2
19		Assembly fixture AA01 046 851	1	5/5
20		Adjusting disc 0630 000 197	1	5/6

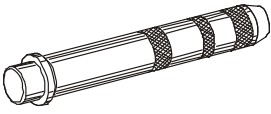
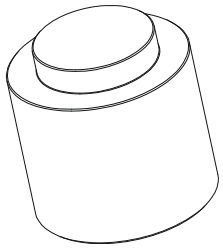
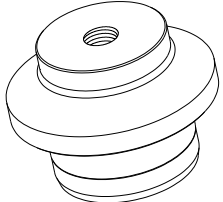
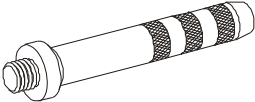
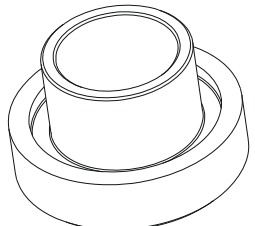
SPECIAL TOOLS FOR DISASSEMBLY AND REASSEMBLY

RL-75 E/EC/A / RL-82 EC

Cons. No.	Figure	Designation Order No.	Qty	Chapter/Fig
21		Thermometer 5870 220 011	1	5/10
22		Centering pin 5870 912 018	1	5/11
23		Wheel stud puller – basic tool 5870 610 010	1	5/17
24		Insert M22x1,5 5870 610 002	1	5/17
25		Driver tool 5870 050 003	1	5/20

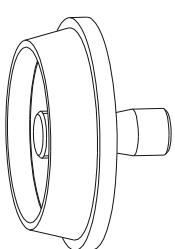
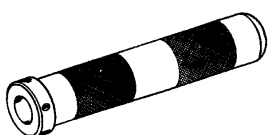
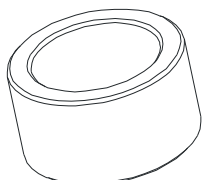
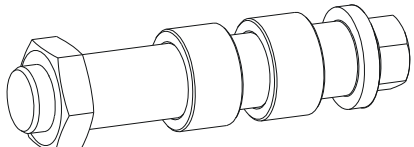
SPECIAL TOOLS FOR DISASSEMBLY AND REASSEMBLY

RL-75 E/EC/A / RL-82 EC

Cons. No.	Figure	Designation Order No.	Qty	Chapter/Fig
26		Handle 5870 260 004	1	5/20
27		Support 5870 345 121	1	5/22 5/23 5/26 5/27 5/28 5/29 5/30
28		Driver tool 5870 053 026	1	5/26
29		Handle 5870 260 011		5/26
30		Driver tool 5870 048 317		5/27

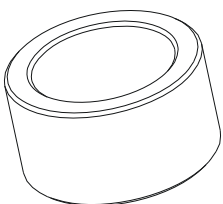
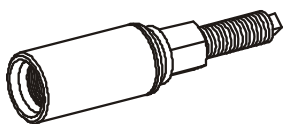
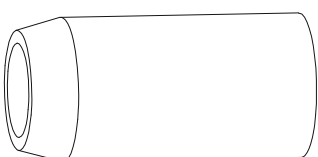
SPECIAL TOOLS FOR DISASSEMBLY AND REASSEMBLY

RL-75 E/EC/A / RL-82 EC

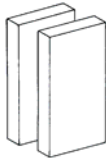
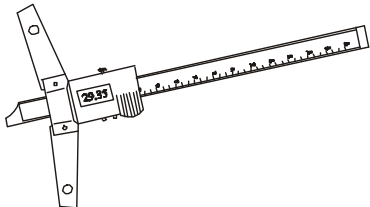
Cons. No.	Figure	Designation Order No.	Qty	Chapter/Fig
31		Inner installer 5870 651 099		5/31
32		Driver tool 5870 058 084	1	6/3 7/3 8/3
33		Handle 5870 260 002	1	6/3 7/3 8/3
34		Pressure sleeve 5870 100 064	1	8/4
35		Assembly mandrel 5870 345 091		6/4 7/4 7/16 8/4

SPECIAL TOOLS FOR DISASSEMBLY AND REASSEMBLY

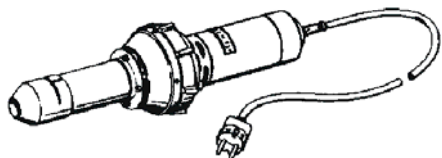
RL-75 E/EC/A / RL-82 EC

Cons. No.	Figure	Designation Order No.	Qty	Chapter/Fig
36		Pressure sleeve 5870 100 060	1	6/4 7/4 7/16
37		Mounting fixture 5870 000 097	1	6/12 6/14 7/12 7/14 8/12 8/13
38		Thread insert 5870 000 104	1	8/12 8/13

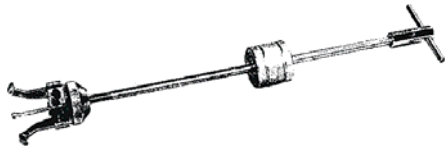
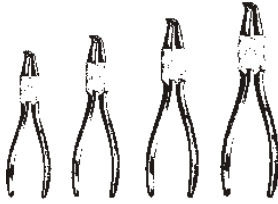
COMMERCIAL TOOLS FOR DISASSEMBLY AND REASSEMBLY

Cons. No.	Figure	Designation Order no.	Qty.	Chapter/Fig
1		<u>Magnetic stand</u> 5870 200 055	1	Universal
2		<u>Dial indicator</u> 5870 200 057	1	Universal
3		<u>Gauge blocks</u> 5870 200 066 70 mm 5870 200 067 100 mm	1	Universal
4		<u>Digital depth gauge</u> 5870 200 072 200 mm 5870 200 114 300 mm	1	Universal
5		<u>Digital caliper gauge</u> 5870 200 109 150 mm	1	Universal

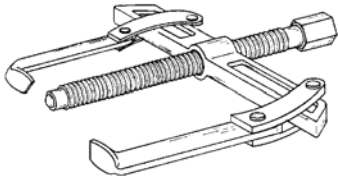
COMMERCIAL TOOLS FOR DISASSEMBLY AND REASSEMBLY

Cons. No.	Figure	Designation Order no.	Qty.	Chapter/Fig
6		<u>Torque wrench</u> 5870 203 030 0.6 -6.0 Nm 5870 203 031 1.0 – 12 Nm 5870 203 032 3.0 – 23 Nm 5870 203 033 5.0 – 45 Nm 5870 203 034 10 – 90 Nm 5870 203 039 80 – 400 Nm 5870 203 016 140 – 750 Nm 5870 203 011 750 - 2000 Nm	1	Universal
7		<u>Hot air blower</u> 5870 221 500 230 V 5870 221 501 115 V	1	Universal
8		<u>Plastic hammer</u> 5870 280 004 Ø 60 mm <u>Substitute nylon insert</u> 5870 280 006	1	Universal
9		<u>Lifting strap</u> 5870 281 026	1	Universal

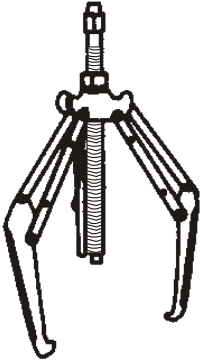
COMMERCIAL TOOLS FOR DISASSEMBLY AND REASSEMBLY

Cons. No.	Figure	Designation Order no.	Qty.	Chapter/Fig
10		<u>Lifting chain</u> 5870 281 047	1	Universal
11		<u>Pry bar</u> 5870 345 071	1	Universal
12		<u>Striker</u> 5870 650 004	1	Universal
13		<u>Set of internal pliers</u> I1-I2-I3-I4 5870 900 013	1	Universal
14		<u>Set of internal pliers</u> I11-I21-I31-I41 90° 5870 900 014	1	Universal

COMMERCIAL TOOLS FOR DISASSEMBLY AND REASSEMBLY

Cons. No.	Figure	Designation Order no.	Qty.	Chapter/Fig
15		<u>Set of external pliers</u> A1-A2-A3-A4 5870 900 015	1	Universal
16		<u>Set of external pliers</u> A01-A02-A03-A04 90° 5870 900 016	1	Universal
17		<u>Two-armed puller</u> 5870 970 001 Jaw width 80 mm Throat depth 100 mm 5870 970 002 Jaw width 120 mm Throat depth 125 mm 5870 970 003 Jaw width 170 mm Throat depth 125 mm 5870 970 004 Jaw width 200 mm Throat depth 175 mm 5870 970 006 Jaw width 350 mm Throat depth 250 mm 5870 970 007 Jaw width 520 mm Throat depth 300 - 500 mm 5870 970 026 Jaw width 250 mm Throat depth 200 mm 5870 970 028 Jaw width 380 mm Throat depth 200 mm	1	Universal

COMMERCIAL TOOLS FOR DISASSEMBLY AND REASSEMBLY

Cons. No.	Figure	Designation Order no.	Qty.	Chapter/Fig
18		<u>Three armed puller</u> 5870 971 001 Jaw width 85 mm Throat depth 65 mm 5870 971 002 Jaw width 130 mm Throat depth 105 mm 5870 971 003 Jaw width 230 mm Throat depth 150 mm 5870 971 004 Jaw width 295 mm Throat depth 235 mm 5870 971 005 Jaw width 390 mm Throat depth 230 mm 5870 971 006 Jaw width 640 mm Throat depth 290 mm	1	Universal

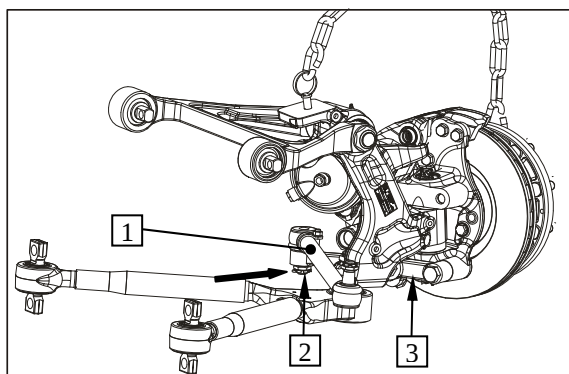


Figure 1

1. Disassembly of RL-75 E suspension

Lift independent wheel suspension RL-75 E by means of lifting device and prepare it for attachment to the assembly truck.

Remove split pin (see arrow) from the tie rod (1), loosen castle nut (2) and separate tie rod from tie rod arm (3).

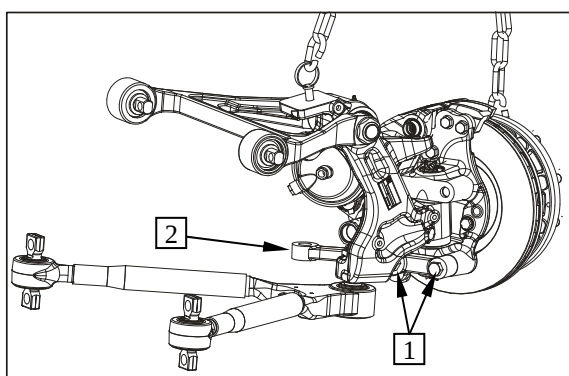


Figure 2

Separate tie rod arm (2) from steering knuckle by loosening the hexagon screws (1).



Pay attention that tie rod and tie rod arm do not drop!

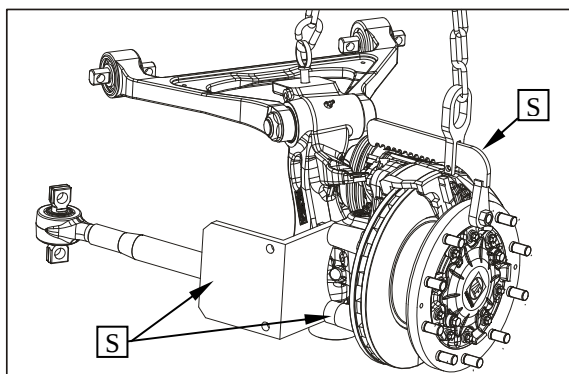


Figure 3

Attach RL-75 E independent wheel suspension to the assembly truck.

(S) Assembly truck	5870 350 000
(S) Clamping angle with spacer bush	5870 350 101
(S) Bracket	5870 281 043

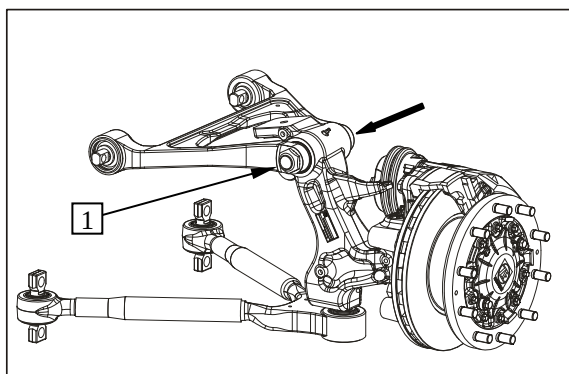


Figure 4

1.1 Disassembly of upper control arm:

Disassemble upper control arm (Figures 4 to 6).

Loosen hexagon nut (1).



Heat up hexagon nut with hot-air blower!



If required, hold a square insert against the inner square (see arrow)!

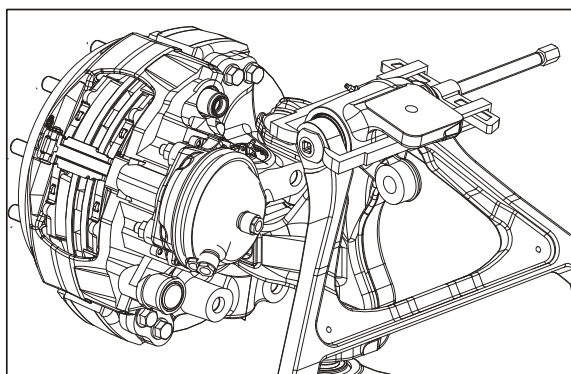


Figure 5

Press out the bolt, using a two-armed puller.

Now remove components of the control arm bearing.

(S) Pressure piece 5870 100 059



Pay attention that the control arm does not drop!

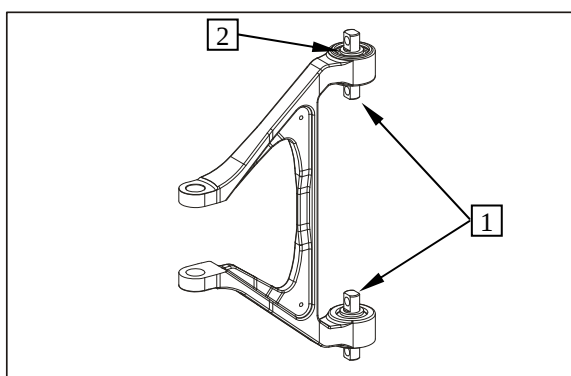


Figure 6

Preload joint assy (1) with a press and remove retaining rings (2).
Remove spacer ring.

Use a plastic hammer to force the joint out of the control arm hole.

(S) Pressing bush 5870 506 134

(S) Pressure piece 5870 100 056

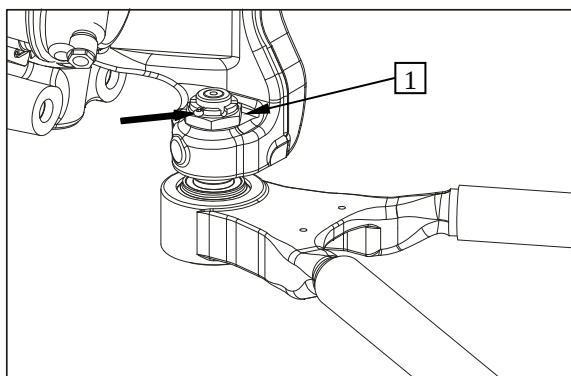


Figure 7

1.2 Disassembly of lower control arm:

Disassemble lower control arm (Figures 7 to 9).

Remove split pin (see arrow) and loosen hexagon nut (1).

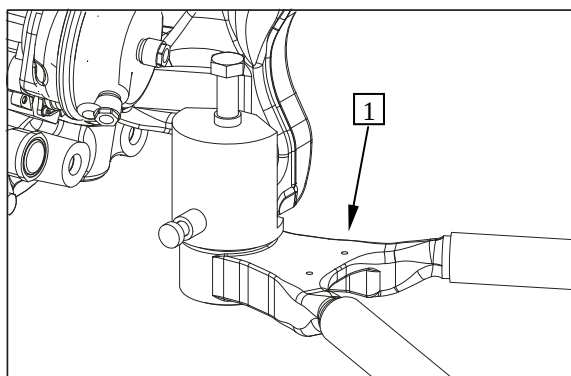


Figure 8

Use forcing device to force control arm (1) out of the steering knuckle carrier hole.

(S) Forcing device 5870 080 052



Pay attention that the control arm does not drop!

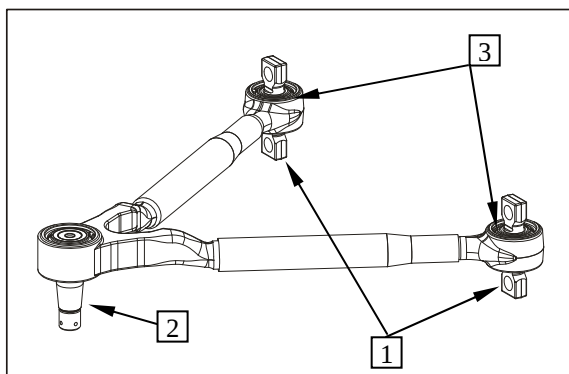


Figure 9

Preload joints (1) and ball stud (2) with a press and remove retaining ring (3).
Remove spacer ring.

Use a plastic hammer to force the joints (1) and ball stud (2) out of the control arm hole.

(S) Pressing bush	5870 506 134
(S) Pressure piece	5870 100 056

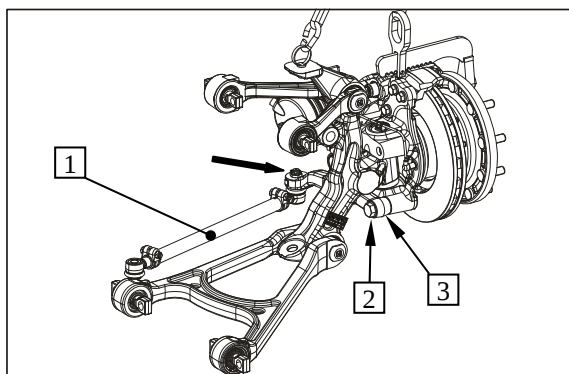


Figure 1

2. Disassembly of RL-75 EC/RL-82 EC suspension

Lift independent wheel suspension RL-75 EC / RL-82 EC by means of lifting device and prepare it for attachment to the assembly truck.

Remove split pin (see arrow) from the tie rod (1), loosen castle nut (2) and separate tie rod from tie rod arm (3).

Separate tie rod arm (3) from steering knuckle by loosening the hexagon screws (2).



Pay attention that tie rod and tie rod arm do not drop!

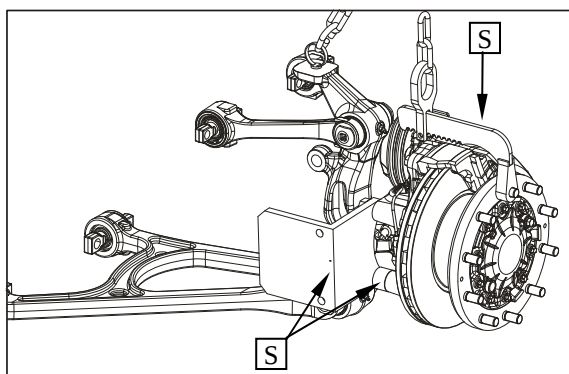


Figure 2

Attach RL-75 EC / RL-82 EC independent wheel suspension to the assembly truck.

(S) Assembly truck	5870 350 000
(S) Clamping angle with spacer bush	5870 350 101
(S) Bracket	5870 281 043

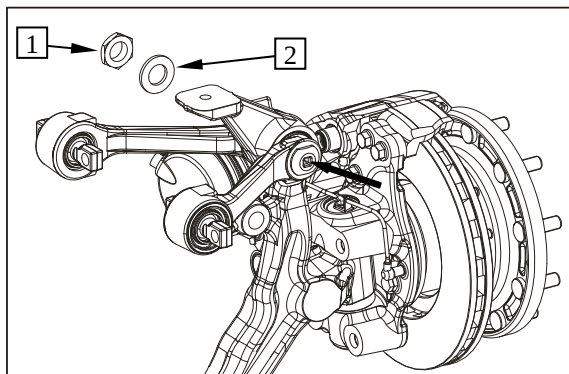


Figure 3

2.1 Disassembly of upper control arm:

Disassemble upper control arm (Figures 3 to 5).

Loosen hexagon nut (1) and remove shim (2).

Heat up hexagon nut with hot-air blower!



If required, hold a square insert against the inner square (see arrow)!

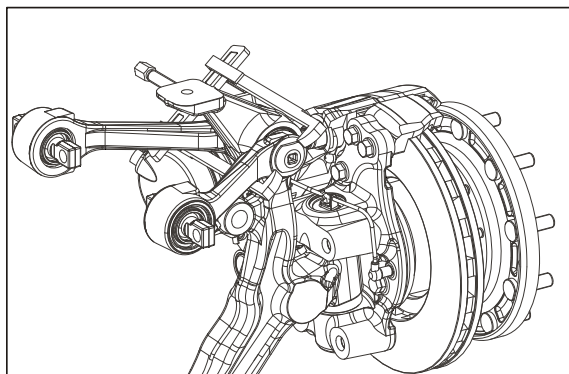


Figure 4

Press out the bolt, using a two-armed puller.

Now remove components of the control arm bearing.

(S) Pressure piece	5870 100 059
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Pay attention that the control arm does not drop!

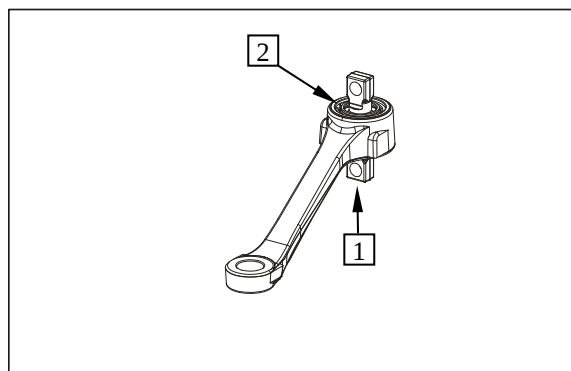


Figure 5

Preload joint assy (1) with a press and remove retaining ring (2).
Remove spacer ring.
Use a plastic hammer to force the joint out of the control arm hole.

(S) Pressing bush	5870 506 134
(S) Pressure piece	5870 100 056

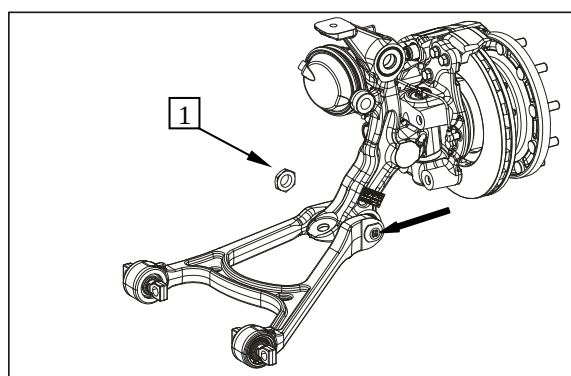


Figure 6

2.2 Disassembly of lower control arm:

Disassemble lower control arm (Figures 6 to 8).

Loosen hexagon nut (1) and remove shim.

Heat up hexagon nut with hot-air blower!



If required, hold a square insert against the inner square (see arrow)!

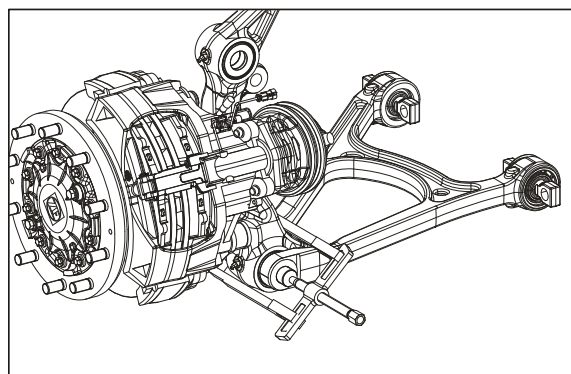


Figure 7

Press out the bolt, using a two-armed puller.

Now remove components of the control arm bearing.

(S) Two-armed puller	5870 970 007
(S) Pressure piece	5870 100 059



Pay attention that the control arm does not drop!

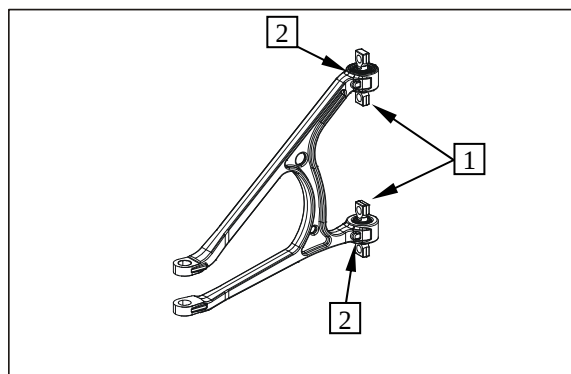


Figure 8

Preload joint assies (1) with a press and remove retaining ring (2).
Remove spacer ring.
Use a plastic hammer to force the joint out of the control arm hole.

(S) Pressing bush	5870 506 134
(S) Pressure piece	5870 100 056

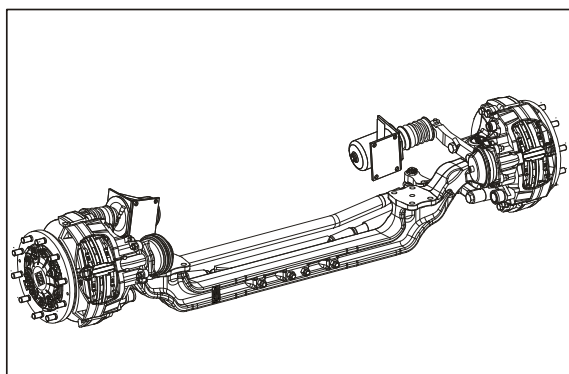


Figure 1

3. Disassembly of RL-75 A components

3.1 Removal of various components - version „A“:

Attach RL-75 A, ZF front/tag axle to the assembly truck.

(S) Assembly truck	5870 350 000
(S) Fixing plate	5870 350 119
(S) Clamping angle	5870 350 093

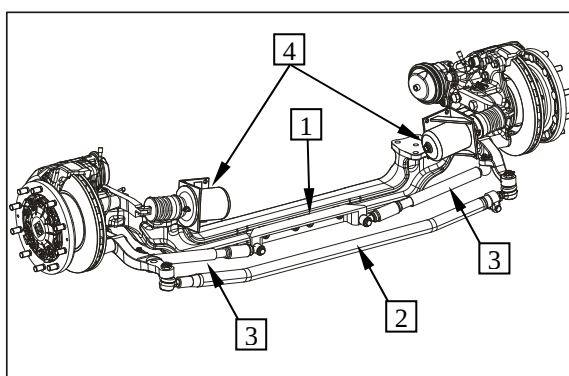


Figure 2

Remove components:

- 1 = Fixture
- 2 = Tie rod
- 3 = Absorber
- 4 = Cylinder



Pay attention that the components do not drop!

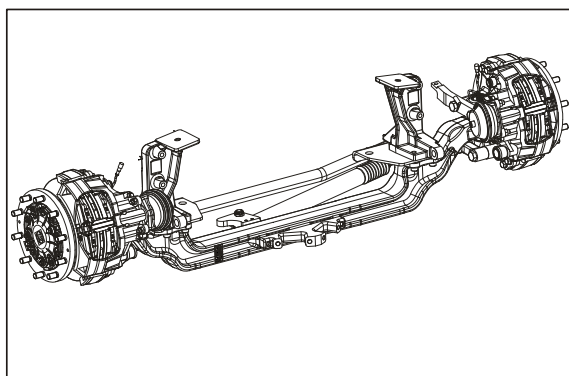


Figure 3

3.2 Removal of various components - version „B“:

Attach RL-75 A, ZF front/tag axle to the assembly truck.

(S) Assembly truck	5870 350 000
(S) Fixing plate	5870 350 119
(S) Clamping angle	5870 350 093

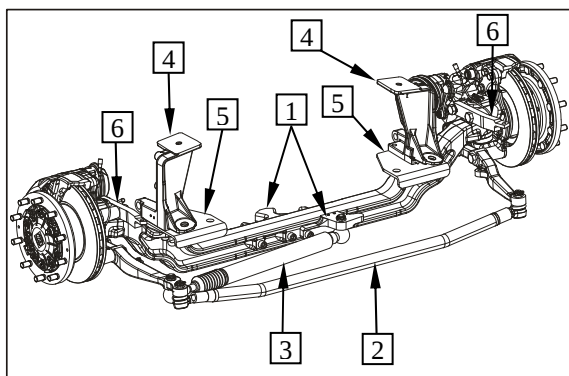


Figure 4

Remove components:

- 1 = Fixture
- 2 = Tie rod
- 3 = Absorber
- 4 = Spring carrier
- 5 = Console
- 6 = Lever



Pay attention that the components do not drop!

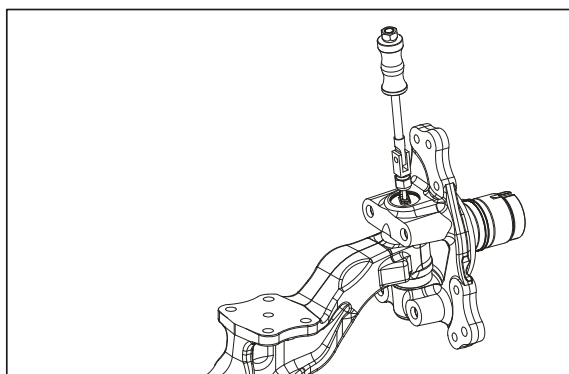


Figure 5

3.3 Pressing-out of axle bolt (axle removed):

Remove grease nipple and snap out retaining ring.

Use striker to force closing cover out of the steering knuckle hole.

(S) Striker 5870 650 001

 Remove lower seal holder analogously.

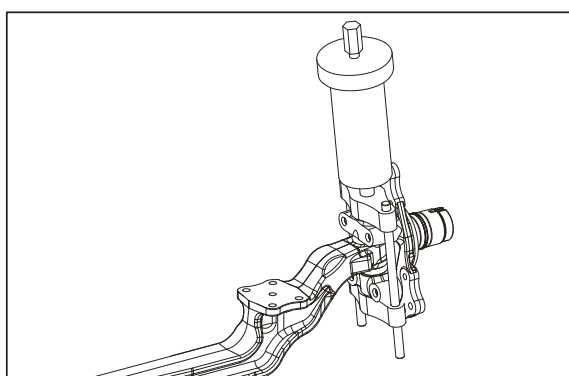


Figure 6

 All further work steps for disassembling the wheel head see Chapter 4!

Attach forcing device to the steering knuckle. Use a hydraulic cylinder to press out the axle bolt.

 Pay attention that the axle bolt does not drop!

(S) Pull rods 5870 285 028
(S) Pressure plates 5870 285 027
(S) Hydraulic spindle 5873 003 007
(S) Hydraulic pump 5870 287 010

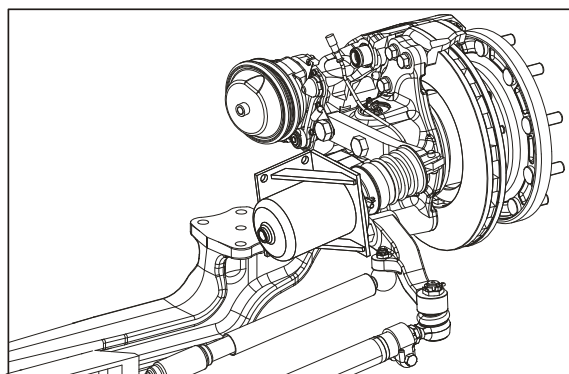


Figure 7

3.4 Pressing-out of axle bolt (axle installed into the vehicle):

 Observe the safety regulations and instructions of the vehicle manufacturer!

 For removal of brake see notes in Chapter 4!

 Remove seal holder according to Figure 5!

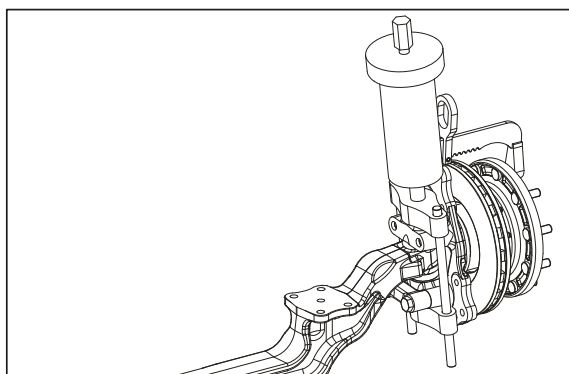


Figure 8

Attach forcing device to the steering knuckle. Use a hydraulic cylinder to press out the axle bolt.

 Pay attention that the axle bolt does not drop!

(S) Pull rods 5870 285 028
(S) Pressure plates 5870 285 027
(S) Hydraulic spindle 5873 003 007
(S) Hydraulic pump 5870 287 010
(S) Bracket 5870 281 043

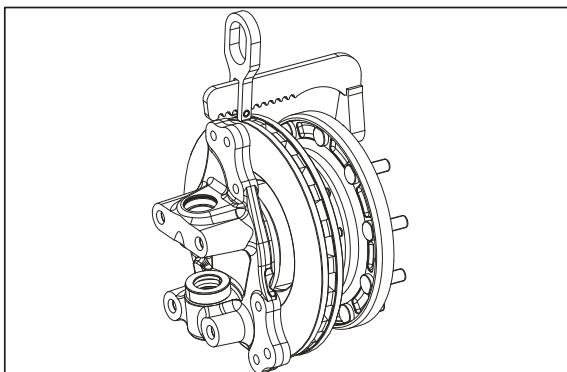


Figure 9

☞ The installation situation and available space can vary depending on the frame version.

The axle bolt may also be pressed out from the bottom. In this case, attach the forcing device to the axle housing in a 180° turned position as shown in Figure 8.

☞ All further work steps for disassembling the wheel head see Chapter 4!

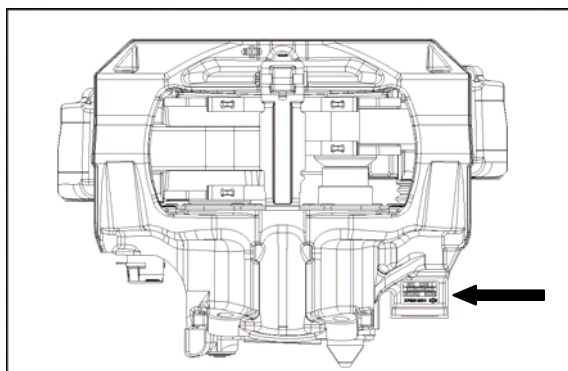


Figure 1

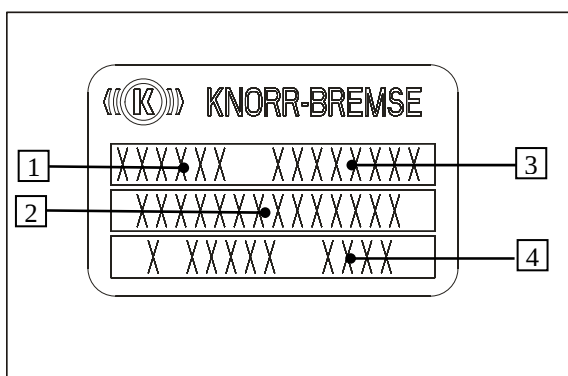


Figure 2

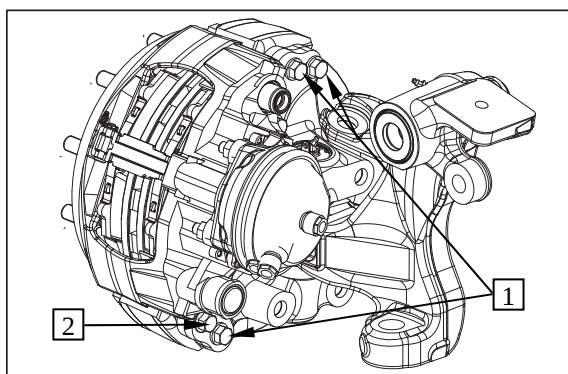


Figure 3

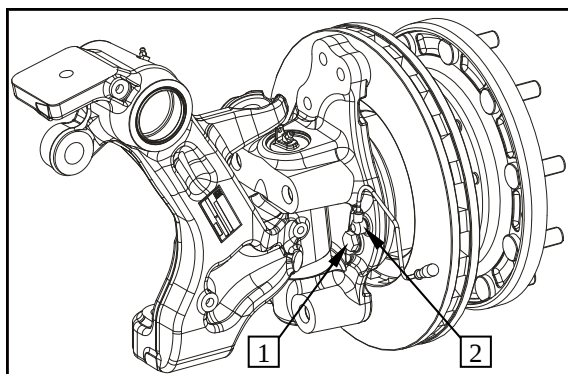


Figure 4

4. Disassembly of RL-75 E/EC/A/ RL-82 EC wheel head



4.1 Separation of brake from steering knuckle (Fig. 1 to 3):

The brake manufacturer's instructions and specifications are mandatory for any operations done on the brake system!

The relating information is included in the repair, maintenance and service manuals of the component manufacturer.

The applicable instructions are to be requested from the brake manufacturer or can be viewed on the brake manufacturer's internet site!

<http://www.Knorr-bremse.com>
<http://www.Knorr-bremsen.com>

Brake manufacturer and brake type are indicated on the identification plate of the brake caliper!

Figure 1 shows the position of the identification plate (arrow) using the KNORR brake as an example!

Figure 2 shows the identification plate.

- 1 = Brake type
- 2 = ZF Order No.
- 3 + 4 = Brake manufacturer's indications

Loosen hexagon screws (1) and tight-fit screw (2) and separate brake caliper from steering knuckle.

Remove stop screw with hexagon nut (1) and tachometer with clamping bush (2).

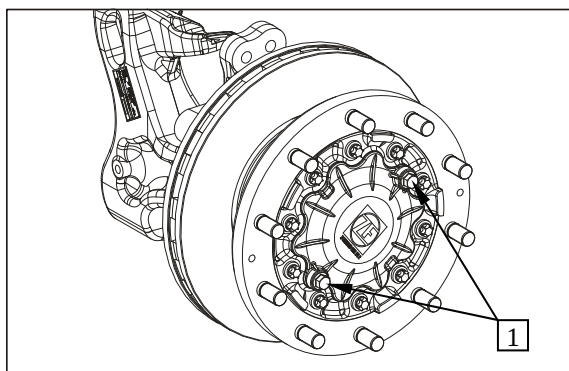


Figure 5

4.2 Disassembly of wheel head

Loosen hexagon screws (1).

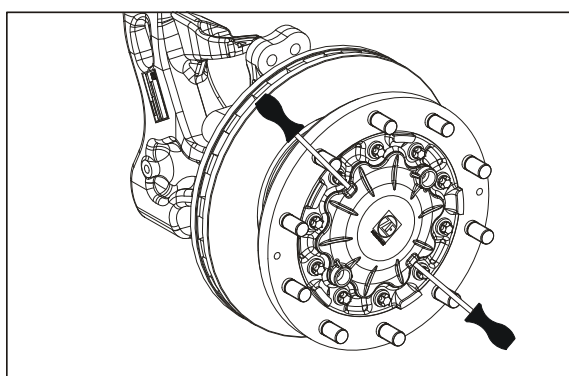


Figure 6

Separate cover from hub.

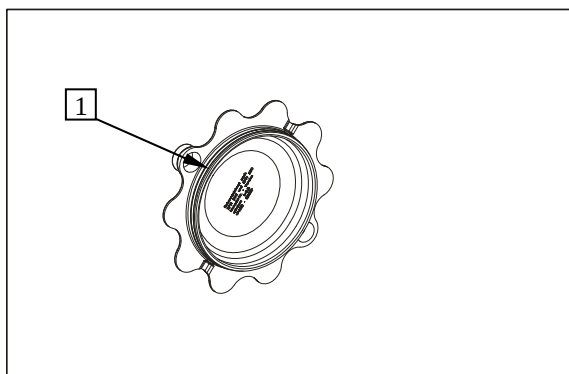


Figure 7

Remove O-ring (1).

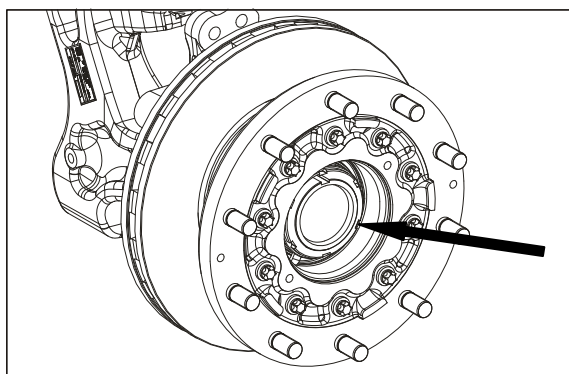


Figure 8

Unlock outer slotted nut (see arrow).

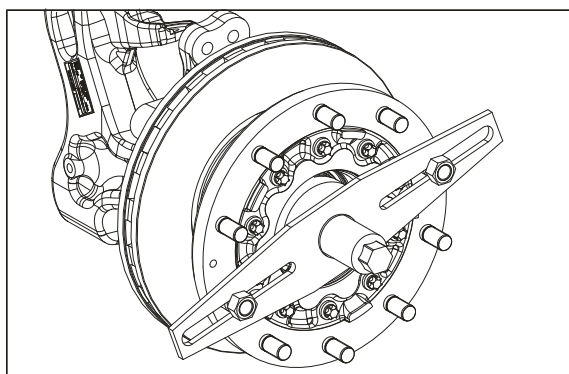


Figure 9

Loosen outer slotted nut, remove locking plate and loosen inner slotted nut.

(S) Slotted nut wrench 5870 401 136
(S) Centering bracket 5870 912 012

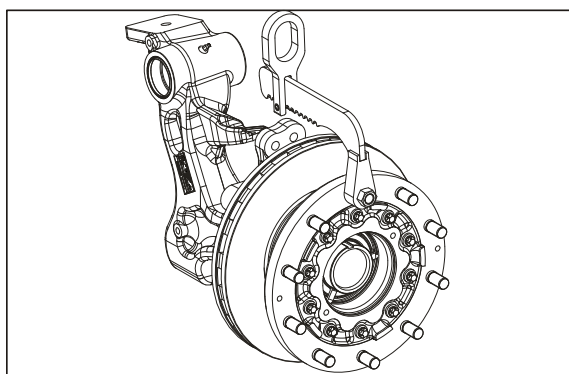


Figure 10

Separate hub/brake disk from steering knuckle.

(S) Lifting bracket 5870 281 043

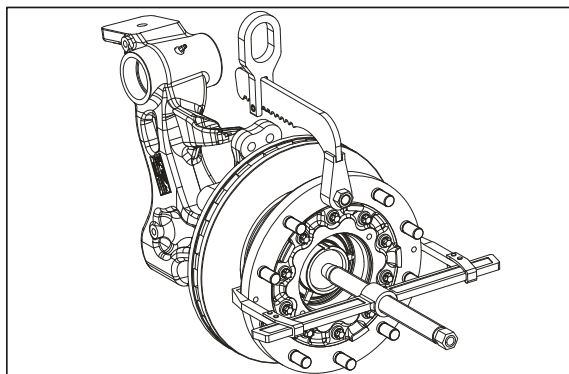


Figure 11

 **In case the bearing inner rings are stuck due to fretting corrosion as a consequence of water entry, use a two-armed puller to facilitate the separation.**

Place a pressure piece into the steering knuckle hole and pull hub/brake disk off the steering knuckle.

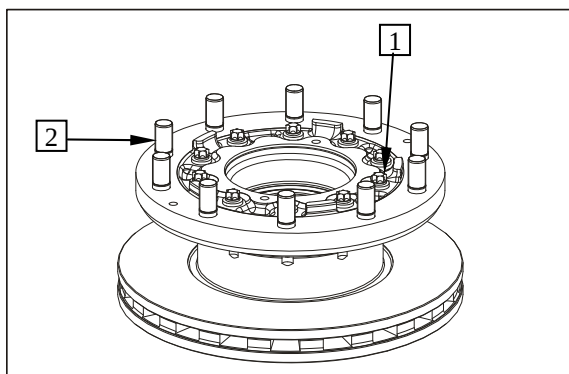


Figure 12

Loosen bolted connection (1) and separate brake disk/hub.

 **It is not necessary to press out the wheel studs (2)!**

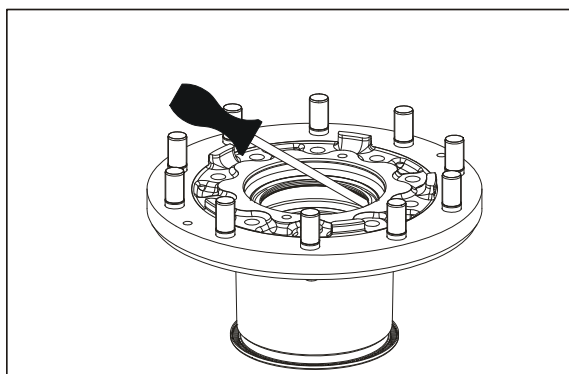


Figure 13

Remove shaft seal on side of wheel stud from the hub hole.

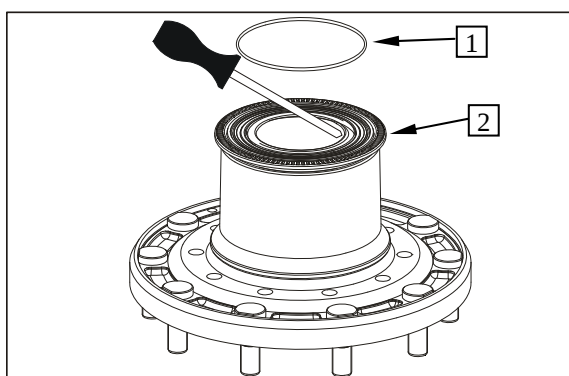


Figure 14

Remove O-ring (1).

Remove cassette-type seal on side of brake disk from the hub hole.

✎ Impulse disk (2) only needs to be removed in case of damage!

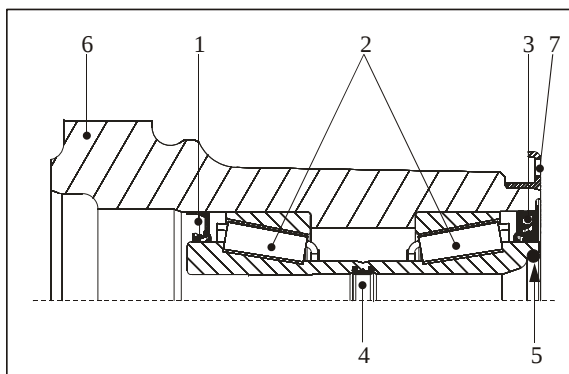


Figure 15

Check compact bearing and remove it (Figures 15 to 17).

✎ Inspection of the compact bearing inside followed by a grease change is also required

- within the maintenance interval, see List of Lubricants TE-ML 12.
- in case of grease leakage on the shaft seal (1) and cassette-type seal (3).
- in case of overheated brake parts (e.g. burnt bellows on pressure pieces).

Legend to Figure 15:

- 1 = Shaft seal (on side of wheel stud) *
- 2 = Bearing inner and outer ring
- 3 = Cassette-type seal (on side of brake disk)*
- 4 = Retaining ring
- 5 = O-ring*
- 6 = Hub
- 7 = Impulse disk

} Bearing unit

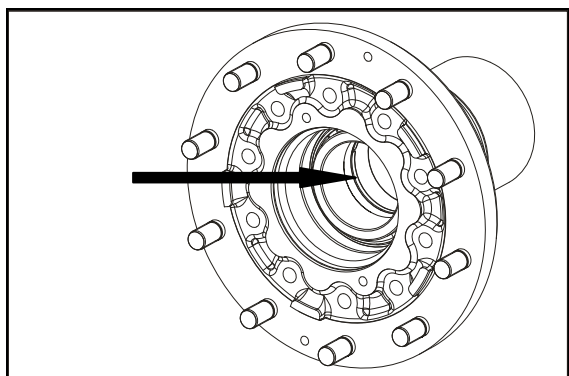


Figure 16

✎ * These spare parts are available separately!

Remove retaining ring (see arrow – legend item 4).

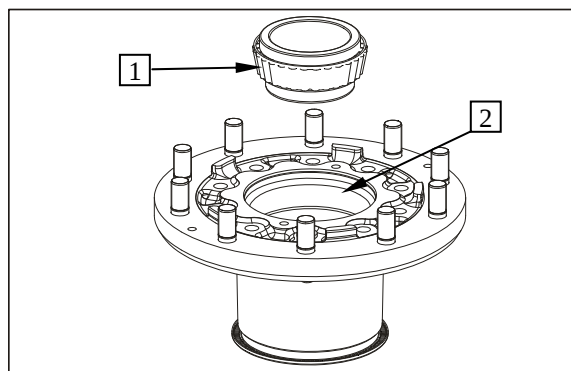


Figure 17

Remove both bearing inner rings (1).

If required, remove both bearing outer rings (2).

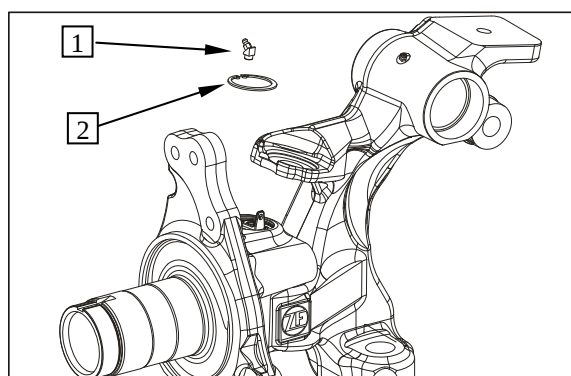


Figure 18

4.3 Disassembly of steering knuckle / steering knuckle carrier:

Remove grease nipple (1).

Snap out retaining ring (2).

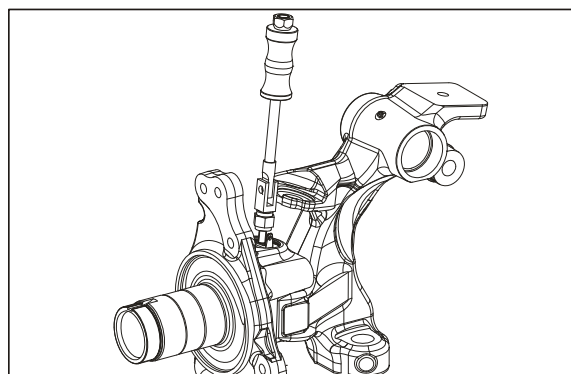


Figure 19

Use a striker to force closing cover out of the steering knuckle hole.

(S) Striker

5870 650 001



Remove lower seal holder according to Figures 18 and 19.

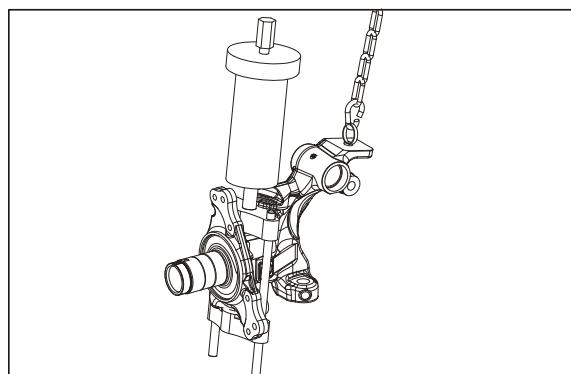


Figure 20

Attach forcing device to the steering knuckle. Use hydraulic cylinder to press out the axle bolt.



Pay attention that the axle bolt does not drop!

(S) Pull rods

5870 285 028

(S) Pressure plates

5870 285 027

(S) Hydraulic spindle

5873 003 007

(S) Hydraulic pump

5870 287 010

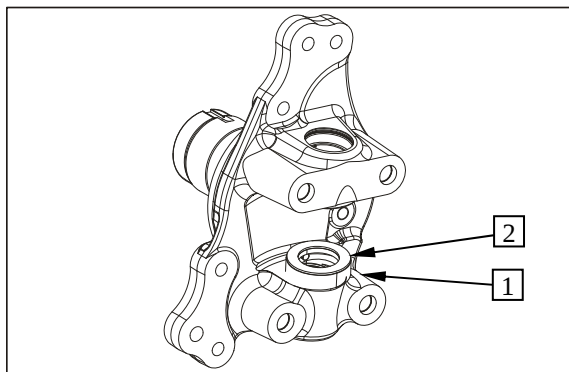


Figure 21

Remove axial roller bearing (1) and shim (2).

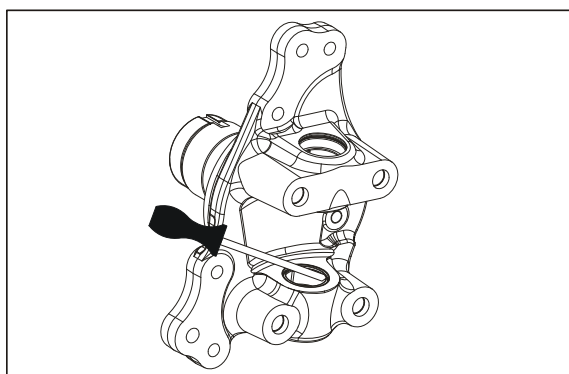


Figure 22

Remove upper and lower sealing rings from the steering knuckle hole (there might be no lower ones, depending on the version).

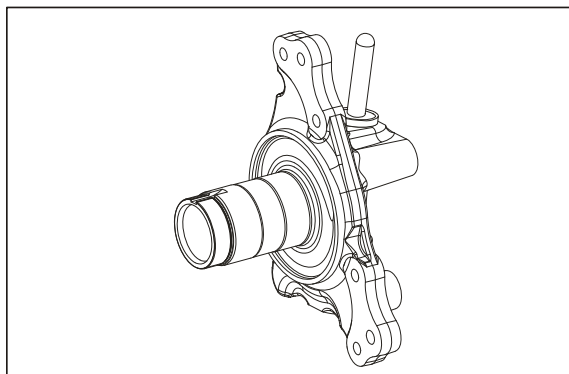


Figure 23

Force upper needle sleeves and lower needle sleeves/sliding bearing bush (depending on the version) out of the steering knuckle.

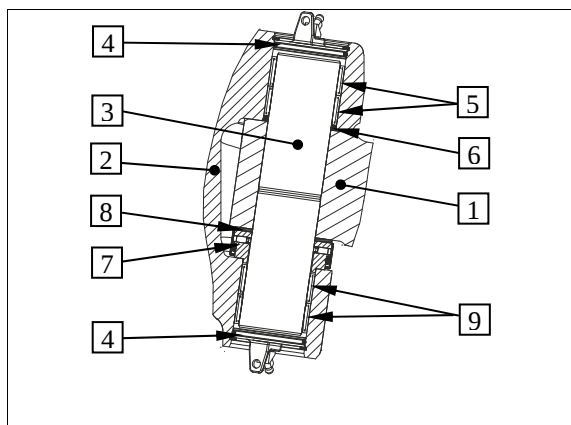


Figure 1

5. Reassembly of RL-75 E/EC/A/ RL-82 EC wheel head

5.1 Reassembly of steering knuckle/steering knuckle carrier:

The figure shows the assembled axle bolt.

- 1 = Steering knuckle carrier
- 2 = Steering knuckle
- 3 = Axle bolt
- 4 = Seal holder with grease nipple and retaining ring
- 5 = Needle sleeves
- 6 = Seal ring
- 7 = Axial roller bearing
- 8 = Shim (adjusting shim for axial play)
- 9 = Needle sleeves/sliding bearing bush (depending on the version)

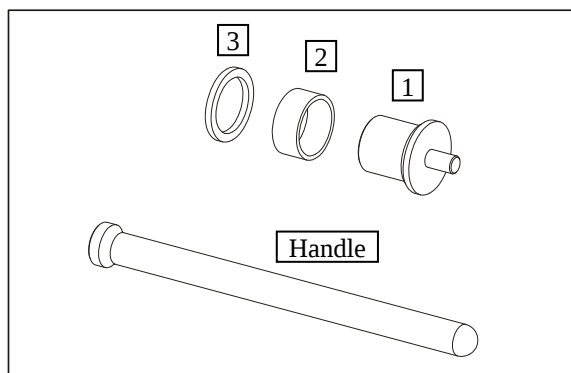


Figure 2

The figure shows the required special tool for assembling the needle sleeve/sliding bearing bush and the seal rings (see figure 4)



Use the specified special tool to obtain the exact installation position!

(S) Driver tool set (part 1 to 3)

5870 055 107

(S) Handle

5870 260 003

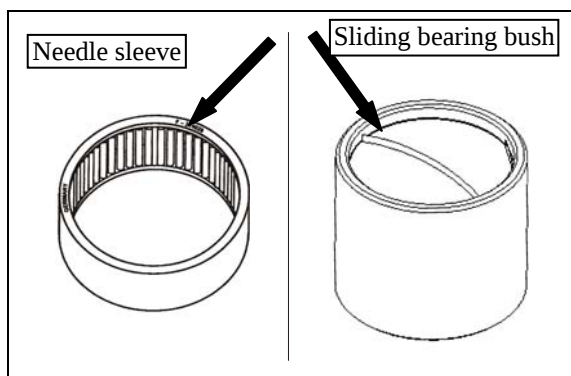


Figure 3



When pressing in the needle sleeves, always place the press-fit mandrel onto the marked (hardened) side (arrow) to avoid damage to the needle sleeves.

Observe installation position of the sliding bearing bush. Groove (arrow) must face the axial roller bearing (figure 1, item 7)



For version with sliding bearing bush (bottom) only install upper needle sleeve.

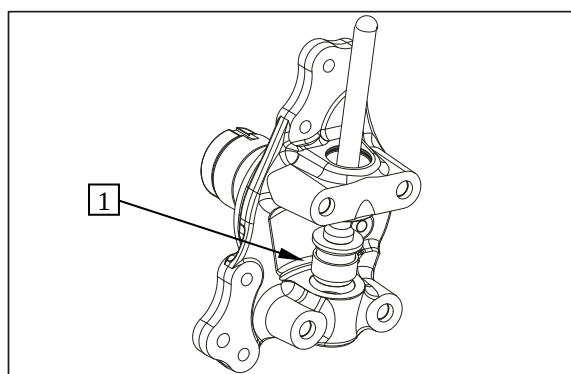


Figure 4

As an initial step, press in the first needle sleeve (1) with special tool (part 1) until contact is obtained.

Then use special tool (part 1 and part 2) to bring the needle sleeve into the final position.

Now press in the second needle sleeve with special tool (part 1) until contact is obtained.



In the version with sliding bearing bush, press in the sliding bearing bush until contact is obtained by using a special tool (part 1). Mount upper bearings analogously.

Press in seal ring (1) with special tool (part 1 and part 3) until contact is obtained (look at figure 1).



Install the seal ring with the open side to face the special tool!

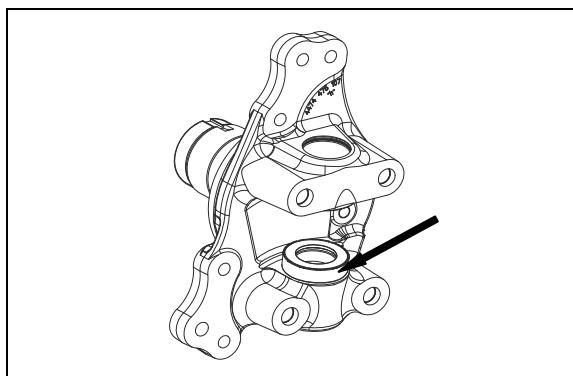


Figure 5

Bring axial roller bearing into contact position with steering knuckle, with the carrier facing downwards.

(S) Assembly fixture

AA01 046 851

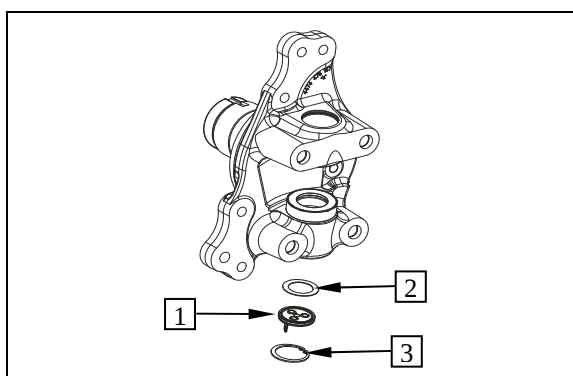


Figure 6

Place seal holder (1) with assembly disk (2) into the lower steering knuckle hole, preliminarily without O-ring, and fix them with retaining ring 58x2 (3).



The installation of the assembly disk is necessary to ensure the exact axial position of the axle bolt.



Remove the assembly disk after having fitted the axle bolt.

Adjusting disc

0630 000 197

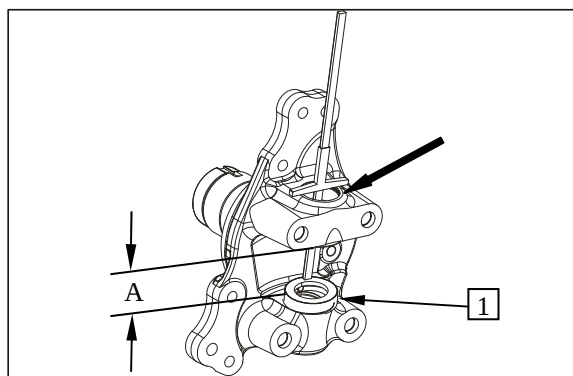


Figure 7

Setting of steering knuckle axial play 0.05 – 0.15 mm

Determine dimension „A“.



The contact surface for the digital depth gauge (see arrow) must be machined and clean to avoid inaccuracies in measurement!



It is also possible to determine the dim. „A“ with an inside micrometer!

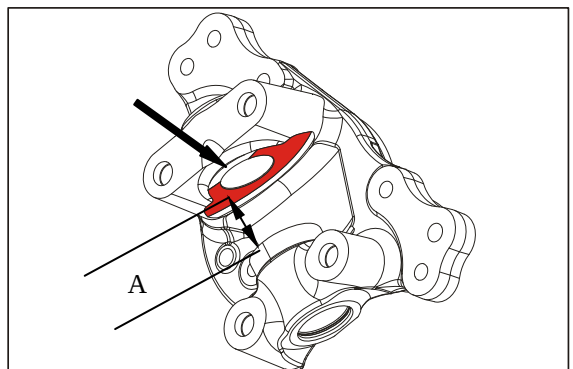


Figure 8



Pay attention to measuring faults:

The dim. „A“ must be determined from the contact surface of the steering knuckle (marked surface) to the axial roller bearing!

Countersink 0.2^{-0.1} (see arrow) is required for grease overflow after lubrication of the steering knuckle bearing!!

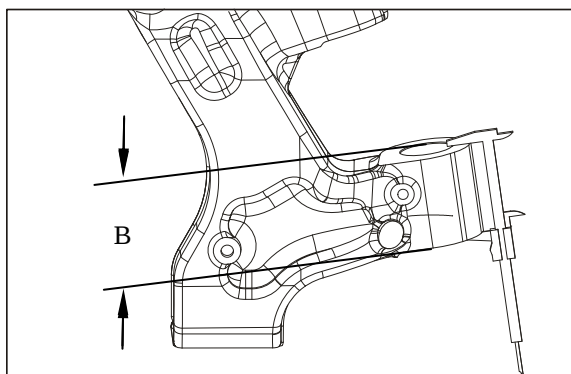


Figure 9

Determine dim. „B“.

Example of calculation:

Dim. „A“	90.4 mm
Dim. „B“	- 87.5 mm
Difference	= 2.9 mm
Required axial play 0.05-0.15 e.g.	- 0.1 mm
Shim (adjusting shim) thickness	= 2.8 mm

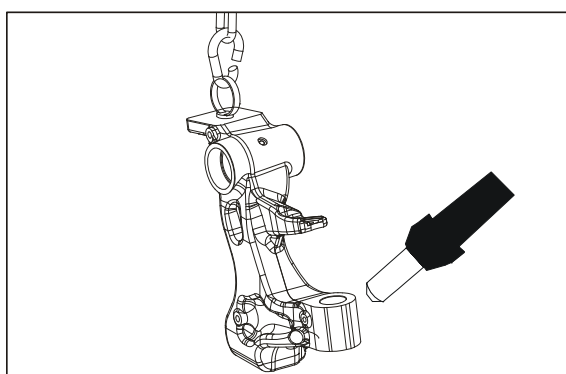


Figure 10



When fitting the axle bolt it is highly important to do the work steps (Figures 10 to 12) immediately one after the other.



Prior to fitting the axle bolt, heat up the hole of the steering knuckle carrier to max. 100° C and undercool the axle bolt to approx. -10° C ... -20° C.

(S) Thermometer 5870 220 011



Use a hot-air blower to ensure that the hole is heated up evenly. Check with a thermometer. Unqualified heating (e.g. flame) is not allowed.

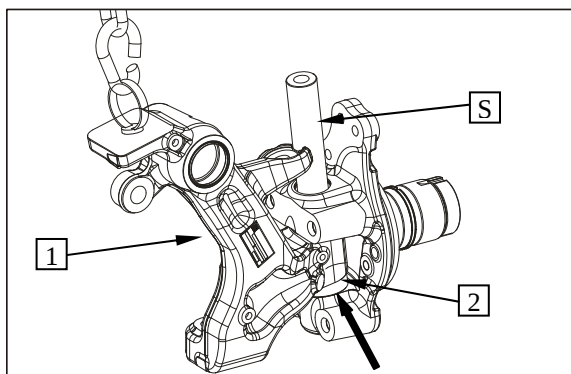


Figure 11

Position the steering knuckle carrier (1) with the lifting device, fit shim (2) and align them with the centering pin (S).



See also sketch in Figure 1!



Make sure that the crimping of the axial roller bearing faces the steering knuckle (see arrow)!

(S) Centering pin 5870 912 018

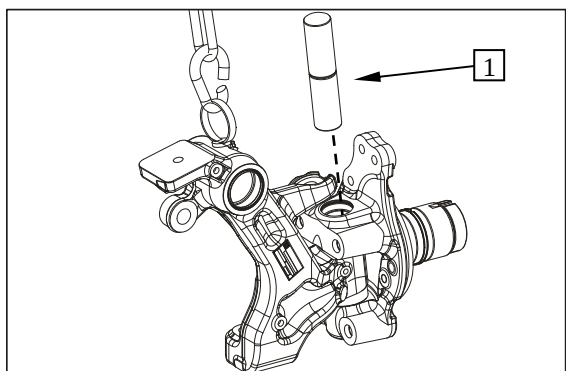


Figure 12

Mount undercooled axle bolt (1) until contact is obtained.



Wear protective gloves!



Install axle bolt free of grease!

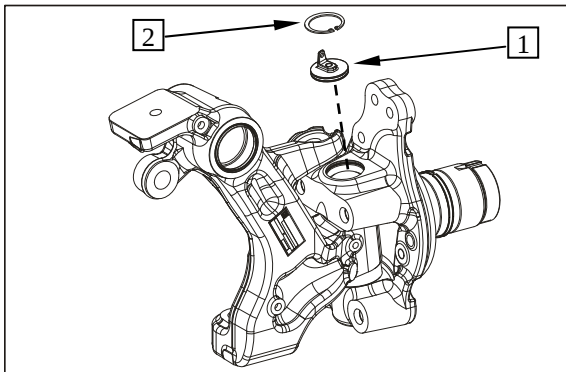


Figure 13

Place O-ring 55x3 into the groove of the seal holder (1) and grease it.

Place seal holder (1) into the steering knuckle hole and fix it with a retaining ring (2).



Installation position of tab see Figure 16!

Tab serves as a guide for the tachometer cable (ABS)!

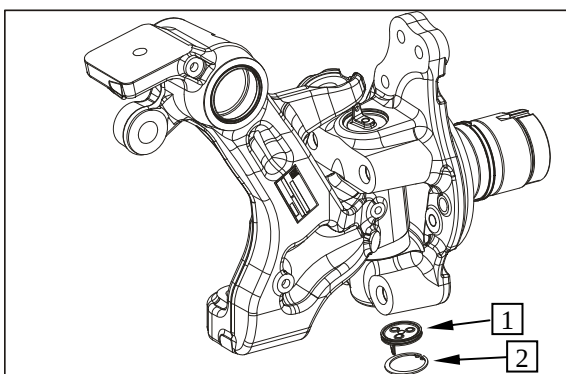


Figure 14

Place O-ring 55x3 into the groove of the seal holder (1) and grease it.

Place seal holder into the steering knuckle hole and fix it with retaining ring 58x2 (2).



Remove lower preassembled seal holder.

Remove assembly disk (see Figure 6).

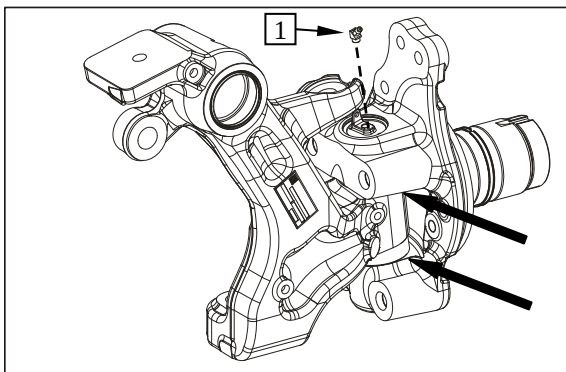


Figure 15

Fit upper and lower grease nipple M10x1 (1).

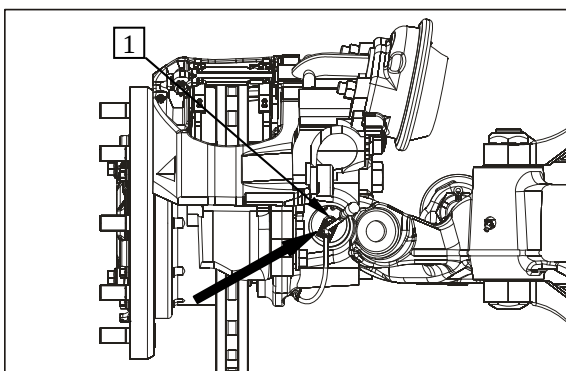


Figure 16

Installation position of seal holder's tab see arrow.

Use a grease gun to lubricate the steering knuckle bearing at the lower and upper grease nipple (1) until grease comes out at the seal ring.



Grease overflow at the seal ring after lubrication (see arrows Figure 15)!



See Operating Instructions 5871 197 902 and ZF List of Lubricants TE-ML 012! e.g. grease Renolit 283 EP (Fuchs)

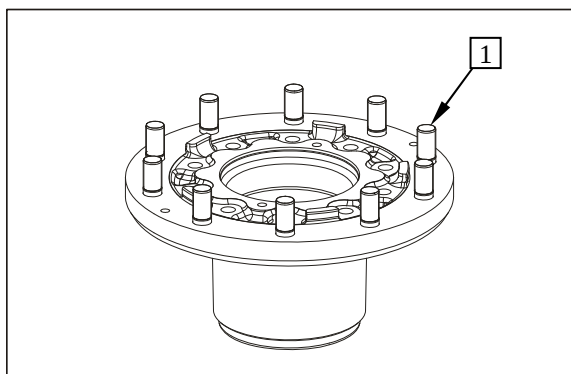


Figure 17

5.2 Reassembly of wheel head

If wheel studs (1) need to be replaced, use the proper special tool for fitting.

(S) Wheel stud puller - basic tool 5870 610 010

(S) Insert M22x1.5 5870 610 002

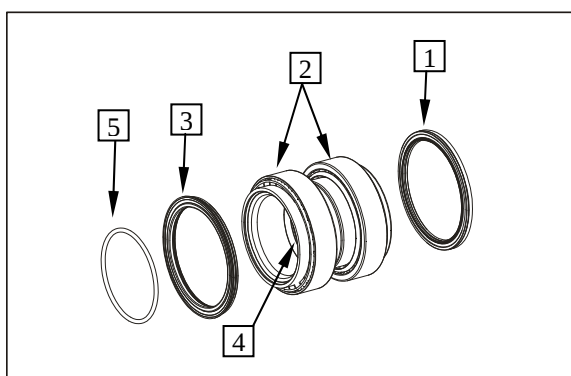


Figure 18

Reassembly of bearing unit (Figures 18 ...25)



When replacing the compact bearing or when changing grease within the maintenance interval, make sure that hub and compact bearing are cleaned thoroughly.

Figures 18 and 19 show the single parts of the compact bearing and their installation position.

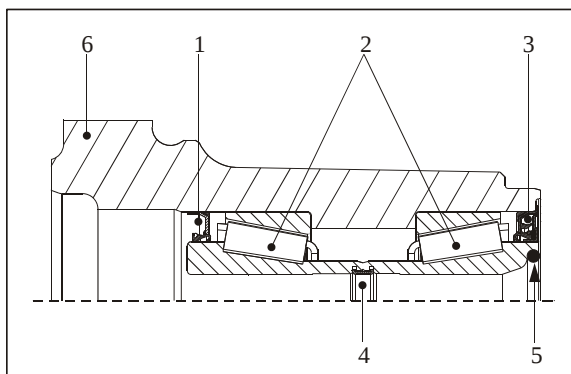


Figure 19

1 = Shaft seal (on side of wheel studs) *

2 = Bearing inner and outer ring

3 = Cassette-type seal (on side of brake disk)*

4 = Retaining ring

5 = O-ring*

6 = Hub

} bearing unit



* These spare parts are available separately, and are supplied as loose parts for the bearing unit!

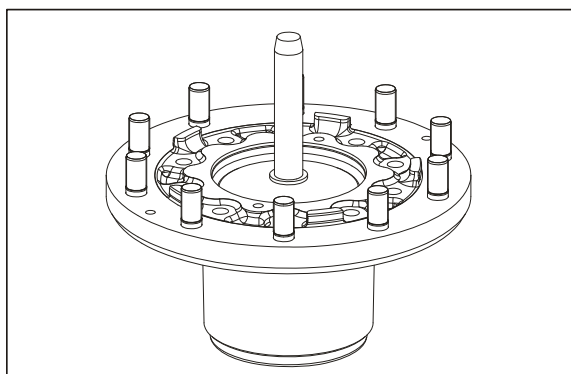


Figure 20

Press in both bearing outer rings until contact is obtained.

(S) Driver tool 5870 050 003

(S) Handle 5870 260 004

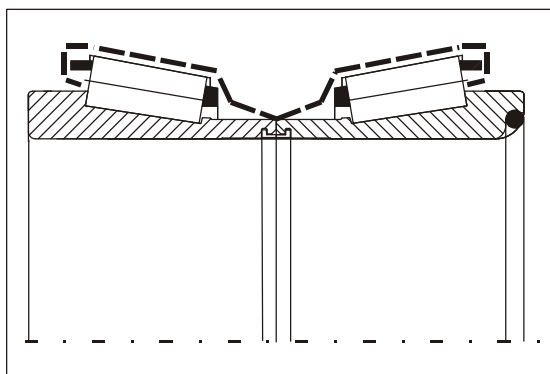


Figure 21

Grease compact bearing in the marked area - - - .



Grease quantity: 96 g



Richly grease the bearing rollers inside and outside and on the front sides!



Do not use grease types other than those approved by ZF (e.g. Renolit LX-NHU 2, ZF Order No.: 0671 190 177).

The binding ZF List of Lubricants is TE-ML 12!

The latest update of the List of Lubricants is available at internet site www.zf.com Service/Techn. Information!

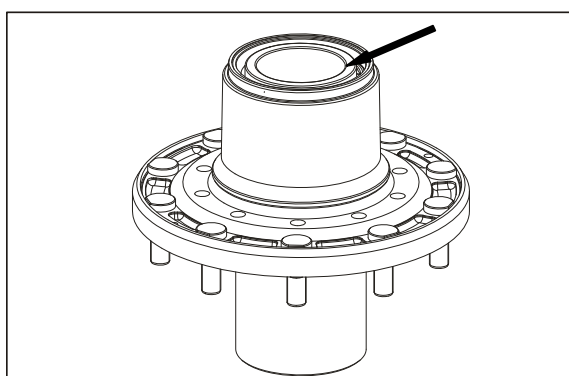


Figure 22

Place hub onto the support and fit bearing inner ring on brake disk side.



To ensure the exact contact position of the bearing rollers in the bearing outer ring, press bearing inner ring firmly and rotate it several times (rolling in)!



The brake-disk-sided bearing inner ring can be identified by the annular groove for the O-ring (arrow) and has an inner diameter of $\varnothing 100$ mm!

(S) Support

5870 345 121

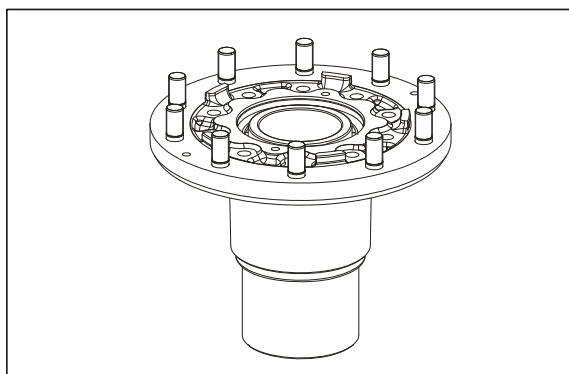


Figure 23

Turn hub upside down, place it onto the support and fit outer bearing inner ring.



To ensure the exact contact position of the bearing rollers in the bearing outer ring, press bearing inner ring firmly and rotate it several times (rolling in)!

Clearance-free contact of both bearing inner rings must be ensured!

The bearing inner ring has a diameter of $\varnothing 99.8$ mm!

(S) Support

5870 345 121

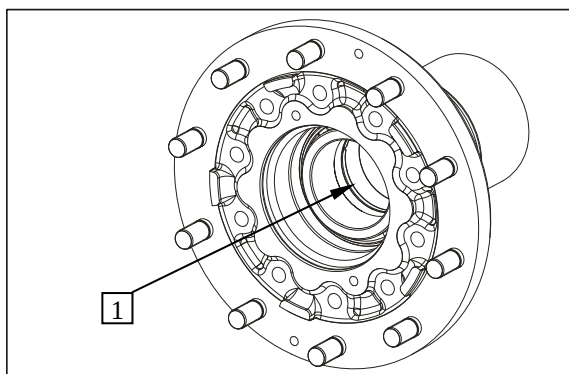


Figure 24

Fix both bearing inner rings with a retaining ring (Figures 24 and 25).



Pay attention to the exact installation position of the retaining ring. When it is correctly fixed, the reference dimension is:

135 ± 0.4 mm



Lifting of the outer bearing inner ring is no longer possible!

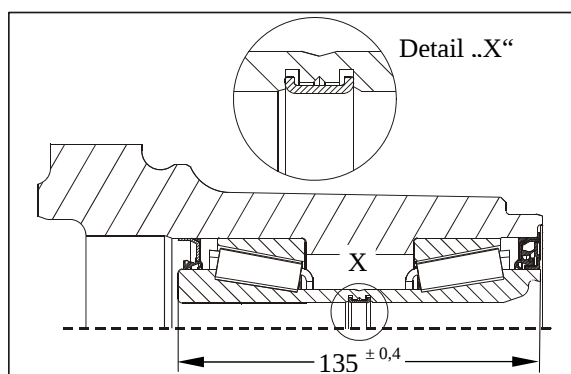


Figure 25

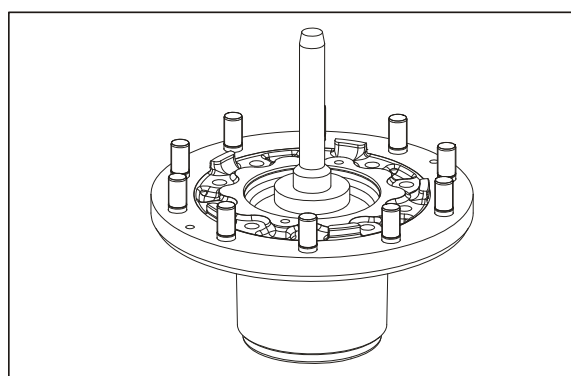


Figure 26

Fitting of shaft seal on side of wheel studs.

 **Install the shaft seal with the open side facing the special tool (see Figure 19; item 1)!**

 **Use the specified special tool (S) to obtain the correct installation depth!**

(S) Driver tool	5870 053 026
(S) Handle	5870 260 011
(S) Support	5870 345 121

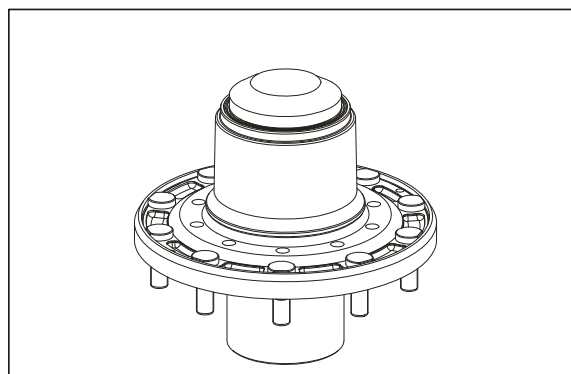


Figure 27

Fit cassette-type seal on side of brake disk.

 **The crimped side on the outer diameter must face the special tool (see Figure 19, item 3)!**

 **Use the specified special tool (S) to obtain the correct installation depth!**

(S) Driver tool	5870 048 317
(S) Support	5870 345 121

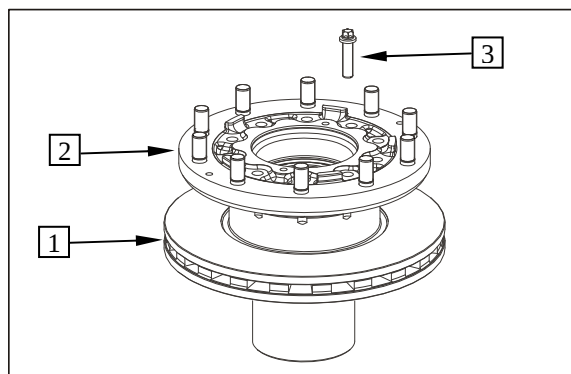


Figure 28

Bring brake disk (1) into contact position on the hub (2) and tighten it with Torx screws M16x1.5x60 (3).

Tightening torque (M16/10.9x1.5x60)..... $M_A = 240 \text{ Nm}$

(S) Support	5870 345 121
-------------	--------------

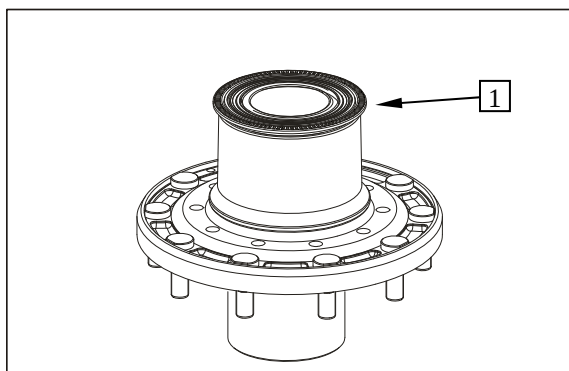


Figure 29

Press impulse disk (1) onto the hub evenly.



Pay attention to avoid any damage to the impulse disk!

(S) Support

5870 345 121

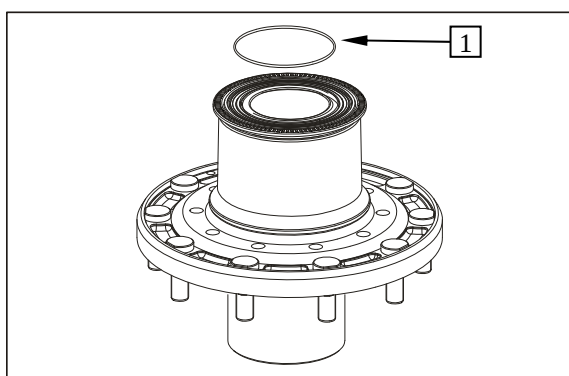


Figure 30

Place O-ring 109x5 (1) into the annular groove of the bearing inner ring and grease it.

(S) Support

5870 345 121

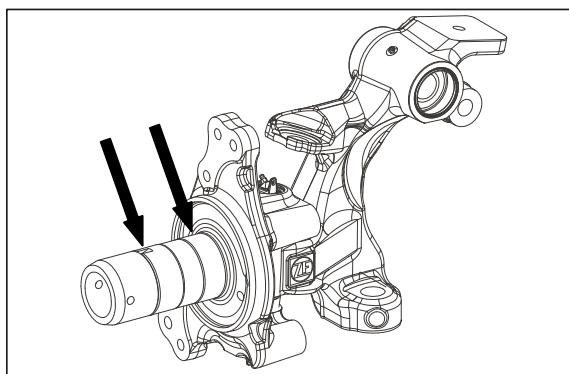


Figure 31

Grease bearing seat (see arrows) with lubricant „MOLYKOTE DX“.



Protection against fretting corrosion!

Mount inner installer onto the steering knuckle.

(S) Inner installer

5870 651 099

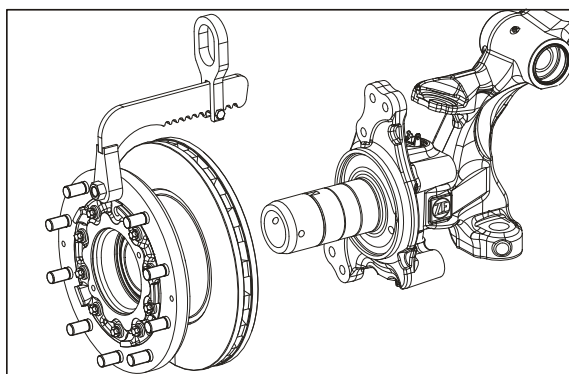


Figure 32

Use the lifting device to carefully bring the preassembled hub into contact position.

Now remove inner installer.

(S) Lifting bracket

5870 281 043

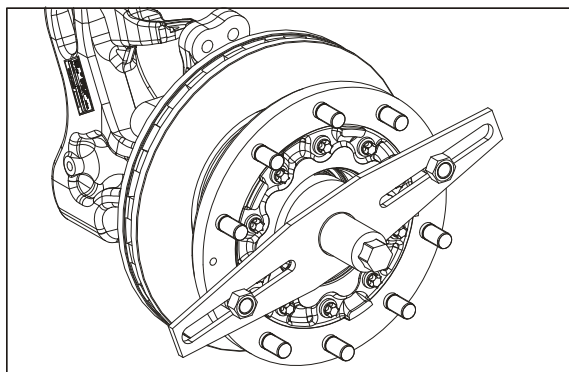


Figure 33

Fit internal slotted nut M95x1.5.

☞ Pay attention to the installation position of the slotted nut - chamfer to show outwards!

First step: Tighten slotted nut with 100 Nm.

☞ Rotate hub 15 times.

Second step: Tighten slotted nut to torque.

☞ Rotate hub 15 times.

Tightening torque (inner slotted nut) $M_A = 850 \text{ Nm}$

(S) Slotted nut wrench

5870 401 136

(S) Centering bracket

5870 912 012

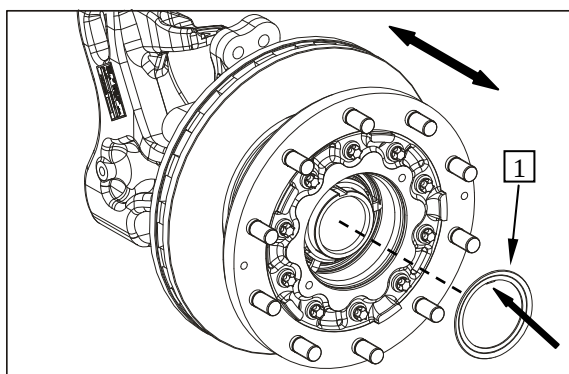


Figure 34

☞ If during the tightening process of the slotted nut (Figure 33) no increase of the bearing rolling torque is noticeable, or if an axial play of the wheel bearing is detected (Figure 34), this may be caused by the unsnapping of the retaining ring (Figures 24 and 25).

Correct assembly fault, if required!

Mount locking plate (1) and fit outer slotted nut.

☞ Pay attention to the installation position of the locking plate. Securing clip (see arrow) to show inwards!

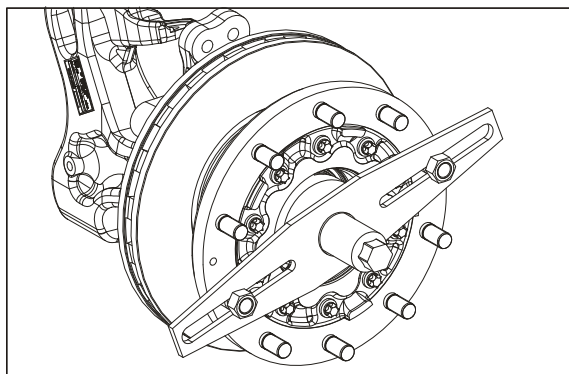


Figure 35

☞ Pay attention to the installation position of the slotted nut - chamfer to show inwards!

☞ Rotate hub 15 times.

Tightening torque (outer slotted nut) $M_A = 1200 \text{ Nm}$

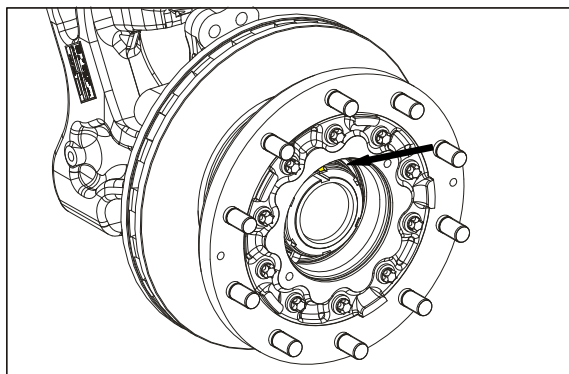


Figure 36

Secure slotted nut by deforming the locking plate, i.e. by indenting the locking plate into a groove of the outer slotted nut.

☞ Now mark the indentation of the locking plate at the groove with safety marking paint - see arrow!

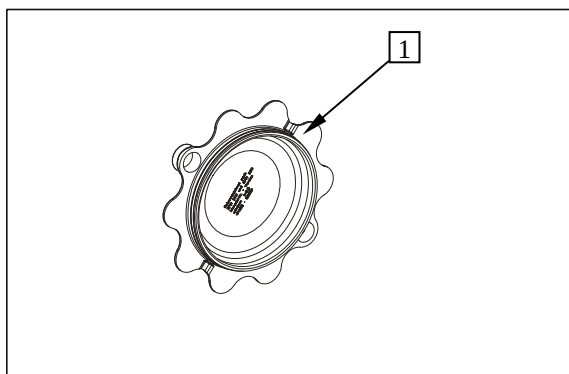


Figure 37

Insert O-ring 155x3 (1) into the annular groove of the cover and grease it.

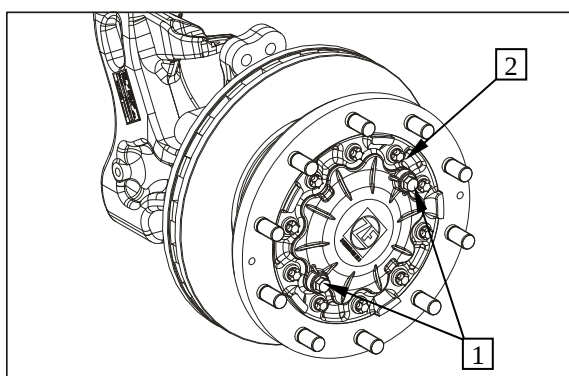


Figure 38

Mount cover and fix it with hexagon screws M12x25 (1).

Tightening torque (M12/10.9x25..... $M_A = 100 \text{ Nm}$)

Tighten the Torx screws M16x1.5x60 (2) of the bolted connection -brake disk/hub- to torque.

Tightening torque (M16/10.9x1.5x60)..... $M_A = 240 \text{ Nm}$

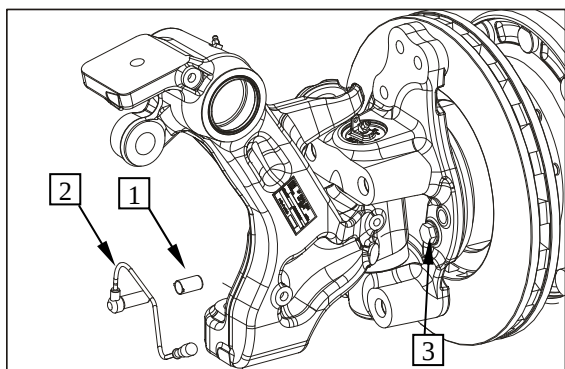


Figure 39

 **Lubricate the outer diameter of the sensor with silicone grease (corrosion protection), front surface (sensing area) to be free of grease!**

Insert bushing (1) and press tachometer (2) into the bushing until contact is obtained, without using striking tools.

The distance between tachometer and measuring ring is automatically adjusted by the wheel play.

 **Install new bushing!**

Tightening torque without lock nut (M16/10.9x1.5x30)
 $M_A = 300 \text{ Nm}$

Tightening torque with lock nut (M16/10.9x1.5x30)
 $M_A = 130 \text{ Nm}$

 **Adjust steering angle by stop screw M16x1.5x30 (3) according to the vehicle manufacturer's specifications.**

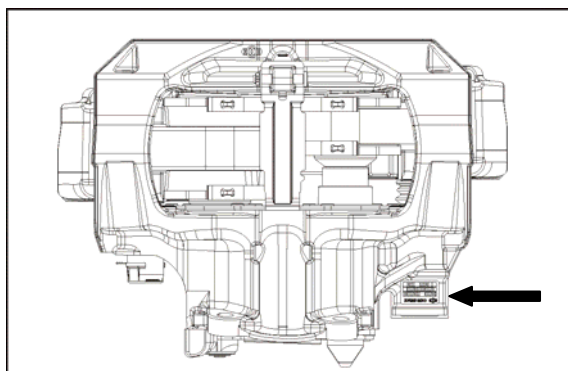


Figure 40

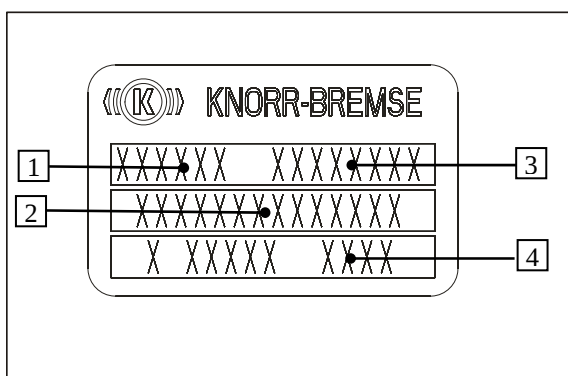


Figure 41

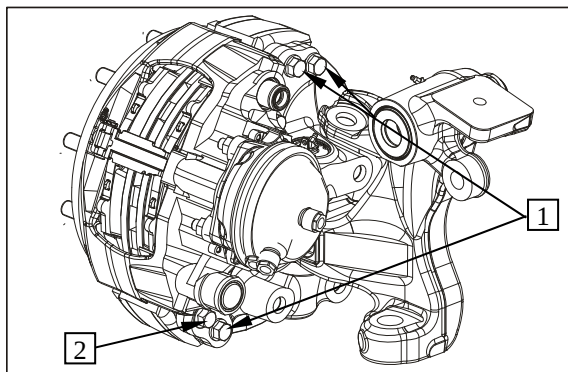


Figure 42

5.3 Fitting of brake (Figures 38 to 40):

The brake manufacturer's instructions and specifications are mandatory for any operations done on the brake system.

The relating information is included in the repair, maintenance and service manuals of the component manufacturer!

The applicable instructions are to be requested from the brake manufacturer or can be viewed on the brake manufacturer's internet site!

<http://www.Knorr-bremse.com>

<http://www.Knorr-bremsen.com>

Brake manufacturer and brake type are indicated on the identification plate of the brake caliper!

Figure 40 shows the position of the identification plate (arrow) using the KNORR brake as an example!

Figure 41 shows the identification plate.

- 1 = Brake type
- 2 = ZF order No.
- 3 + 4 = Brake manufacturer's indications

Fix brake to the steering knuckle using hexagon screws M16x1.5x60 (1) and tight-fit screw $\varnothing 19$ mm (2).

Tightening torque (M16/10.9x1.5x60) MA = 270 Nm

Tightening torque (M16/10.9x1.5x60) MA = 270 Nm
(tight-fit screw)

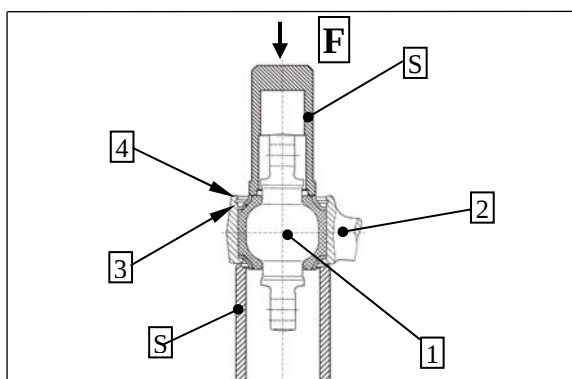


Figure 1

6. Reassembly of RL-75 E suspension

6.1 Reassembly of upper control arm:

Place joint (1) into the control arm (2). Press spacer ring (3) and retaining ring (4) with the pressure piece (S) under axial pressure until the retaining ring has snapped in.

 The opening of the retaining ring eyes must face the housing shaft axis. (Opening to show towards the tube side or towards the control arm bracket). The opening of the spacer ring must be located 180° towards the opening of the retaining ring.

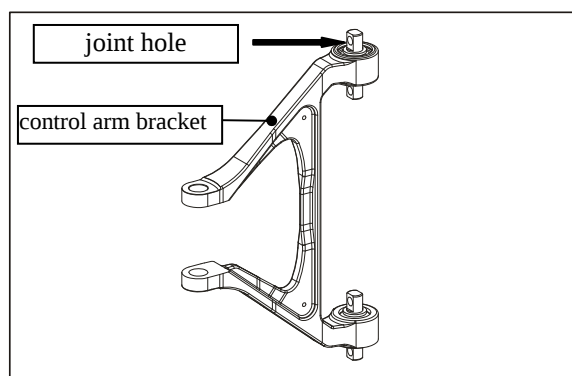


Figure 2

 The hole of the joint must be parallel to the control arm bracket (see arrow).

(S) Pressure piece	5870 100 056
(S) Pressure sleeve	5870 506 134

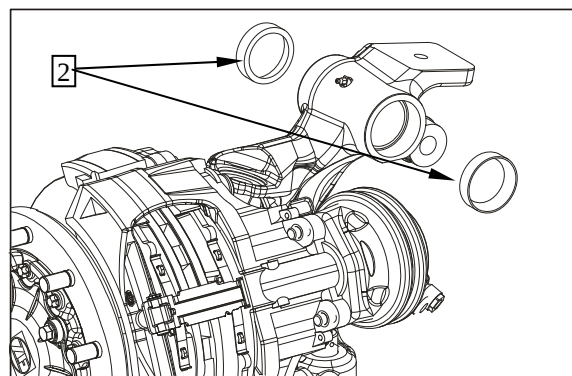


Figure 3

Press both bearing outer rings (1) into the steering knuckle carrier (2) until contact is obtained.

(S) Driver tool	5870 058 084
(S) Handle	5870 260 002

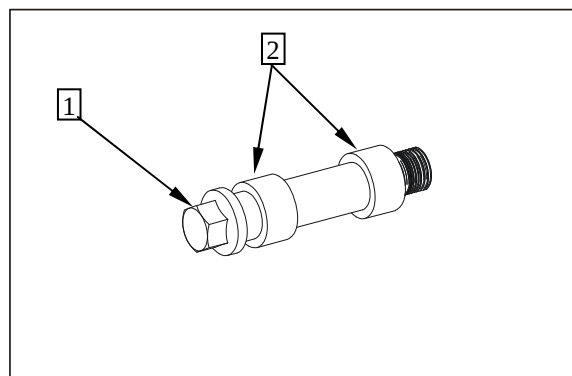


Figure 4

 **Adjust rolling torque of control arm bearing to 8 - 15 Nm (without sealing elements) – see Figures 5 to 8.**

The figure shows the required special tool for adjusting the rolling torque.

1 = Assembly mandrel
2 = Assembly bushing (2x)

(S) = Assembly mandrel (assy)	5870 345 091
(S) = Pressure sleeve	5870 100 060

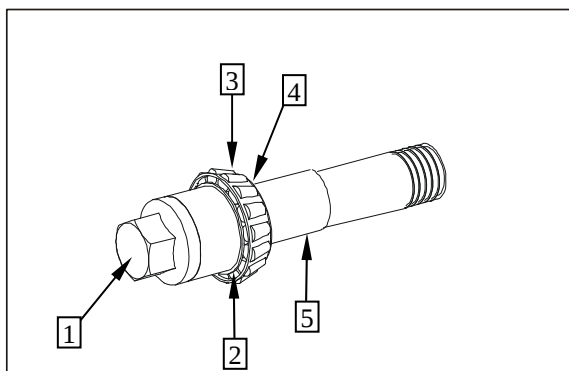


Figure 5

Mount single parts onto the assembly mandrel according to Figure 5.

- 1 = Assembly mandrel
- 2 = Ring
- 3 = Bearing inner ring
- 4 = Shim
- 5 = Bushing

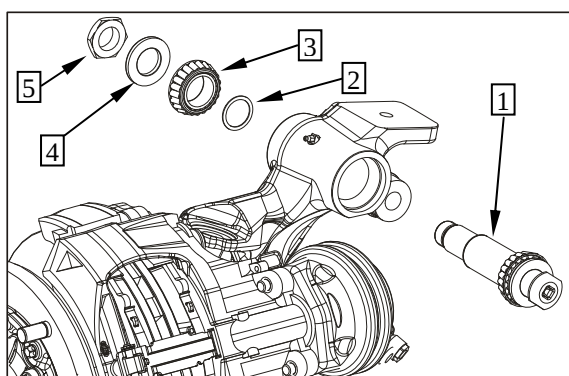


Figure 6

Insert preassembled assembly mandrel (1) into the steering knuckle carrier, mount shim (2), bearing inner ring (3) and ring (4) from the other side and fit hexagon nut (5).

 The hexagon nut collar must face the ring (4).

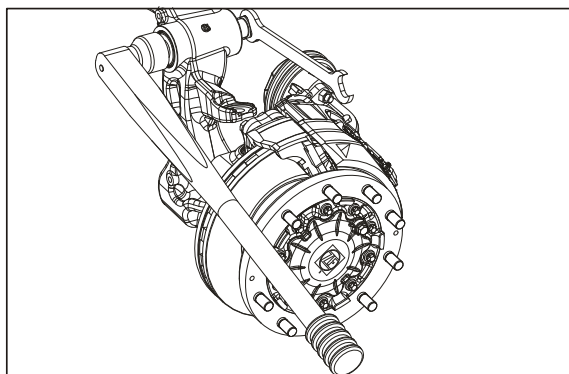


Figure 7

Tighten hexagon nut M36x1.5.

Tightening torque $M_A = 500 \text{ Nm}$

 While tightening, rotate the control arm bearing in both directions several times!

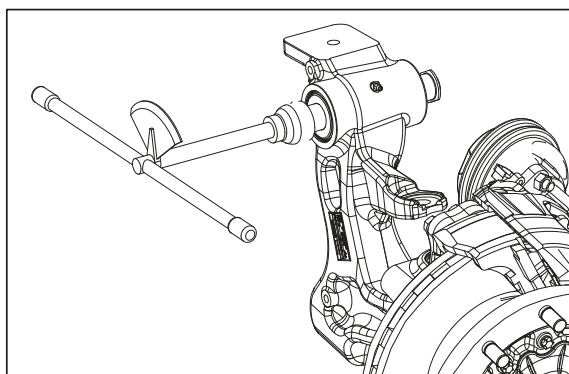


Figure 8

Check rolling torque 8 to 15 Nm.

 Any deviation from the required rolling torque must be corrected by appropriate shims (Item 4 Figure 5, or Item 2 Figure 6).

Loosen hexagon nut and remove single parts.

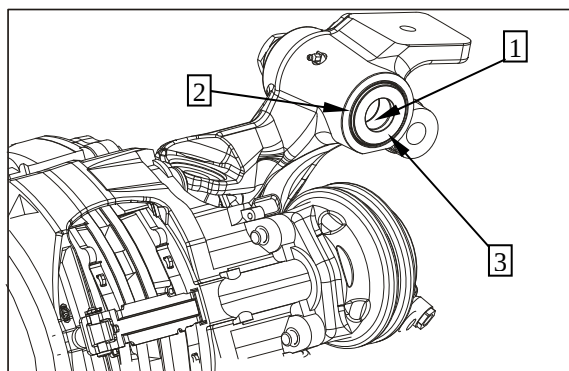


Figure 9

Install bearing inner ring (1), scraper (2) and ring (3) in this order.

☞ Pay attention to the installation position of the scraper (2) (see arrow „A“, Figure 10).

☞ Insert ring (3) with grease, with the radius on the outer diameter facing the bearing inner ring (see arrow „B“, Figure 10).

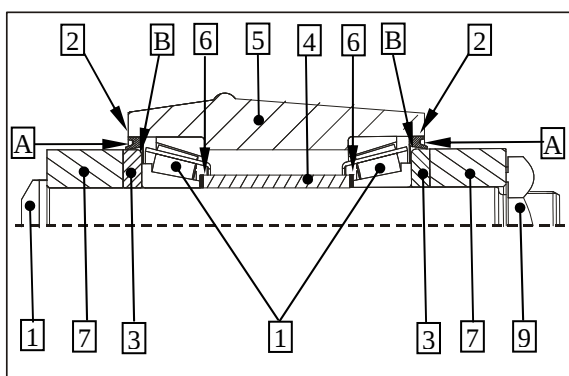


Figure 10

Legend to Figure 10:

- 1 = Roller bearing assy
- 2 = Scraper
- 3 = Ring
- 4 = Bushing
- 5 = Steering knuckle carrier
- 6 = Shim
- 7 = Control arm
- 8 = Bolt
- 9 = Hexagon nut

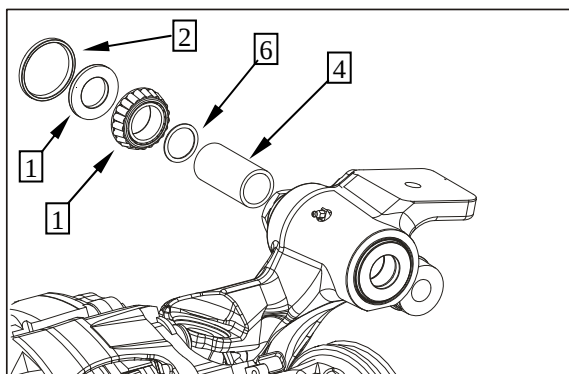


Figure 11

Fit bushing (4) and determined shim (6) to the opposite side of the steering knuckle carrier.

☞ Fit bearing inner ring (1), scraper (2) and ring (3) according to Figure 9.

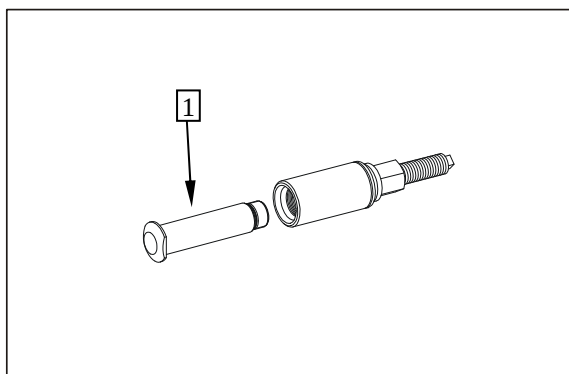


Figure 12

Fit control arm bolt (Figures 12 to 15).

Figure 12 shows the required special tool for fitting the control arm bolt (1).

(S) Mounting fixture 5870 000 097

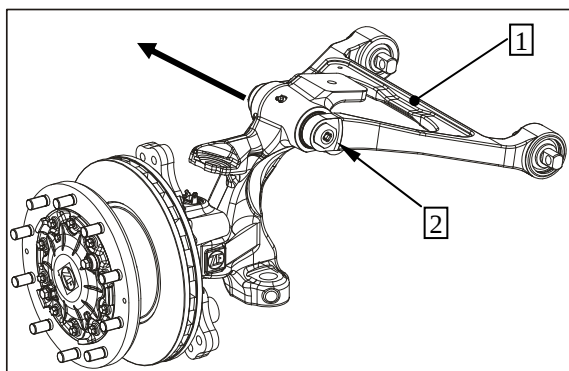


Figure 13

Position control arm (1) and install it with mounting fixture.



Installation of the control arm bolt (2) is only permitted in driving direction (see arrow).

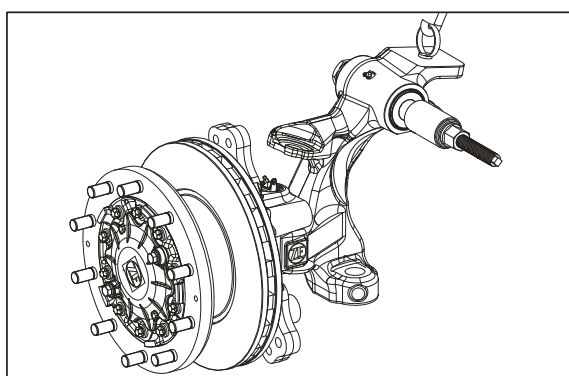


Figure 14

Use the mounting fixture to press in the control arm bolt until contact is obtained.

Now remove mounting fixture.

(S) Mounting fixture 5870 000 097

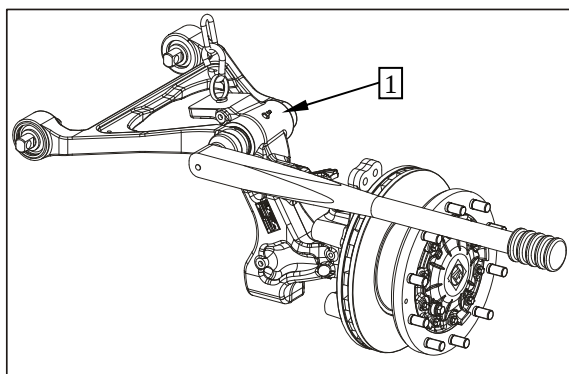


Figure 15



Install hexagon nut with the collar facing the control arm.

Wet thread of hexagon nut with Loctite type No. 262!

Tighten hexagon nut.

Tightening torque $M_A = 1000 \text{ Nm}$

Fit grease nipple (1) and lubricate control arm bearing until grease comes out at the seals.

Industrial EP multi-purpose grease, type Glissando 283 EP 2 LF
ZF Order No. 0671 190 079!

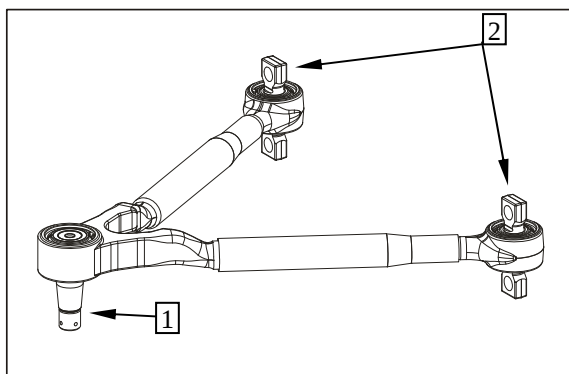


Figure 16



6.2 Reassembly of lower control arm:

Install ball stud (1) and joints (2) according to Figure 1 - 14.

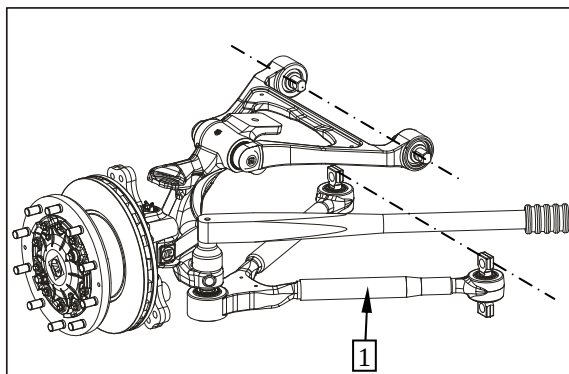


Figure 17

Place lower control arm (1) into the steering knuckle carrier hole and tighten it with castle nut.

Tightening torqueapprox. $M_A = 600 \text{ Nm}$

Secure castle nut with split pin!

☞ If it is not possible to secure with the split pin, increase the tightening torque until exact alignment split pin – groove/hole ball stud!

☞ The joints of the lower and upper control arm must be in parallel position to each other (see auxiliary lines)!

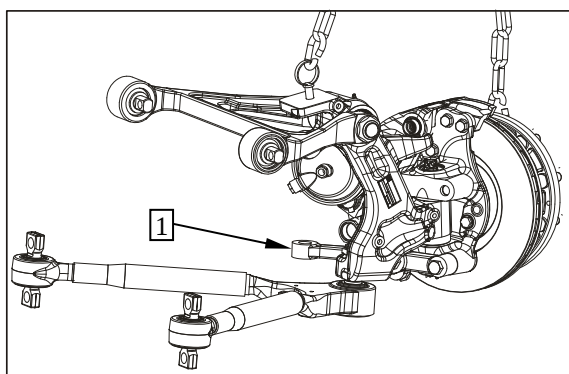


Figure 18

☞ Remove wheel head from assembly truck.

Fix tie rod arm (1) to the steering knuckle using hexagon screws.

Tightening torque (M24/10.9x1.5x90)..... $M_A = 1\,100 \text{ Nm}$

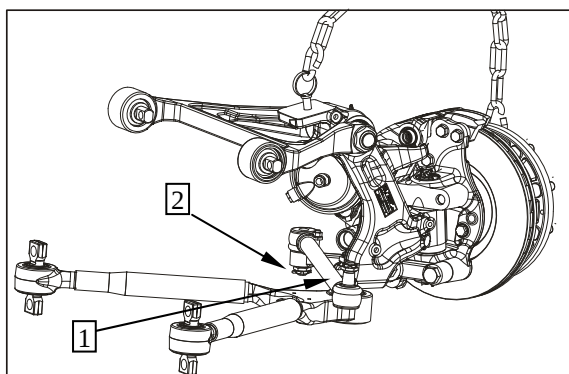


Figure 19

Fix tie rod (1) to the tie rod arm by means of castle nut (2).

Tightening torque (M24x1.5) $M_A = 250 - 280 \text{ Nm}$

Secure castle nut (3) with split pin!

☞ Toe-setting is to be done according to the vehicle manufacturer's specifications.

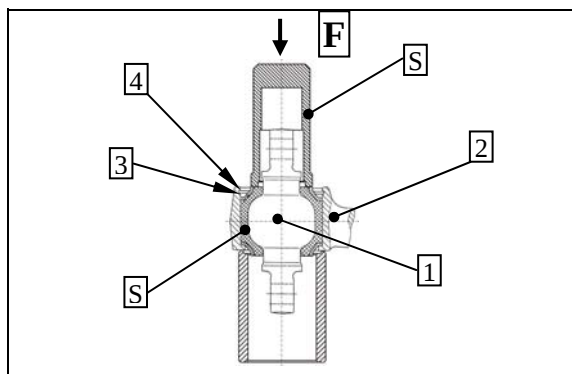


Figure 1

7. Reassembly of RL-75 EC/RL-82 EC suspension

7.1 Reassembly of upper control arm:

Place joint (1) into the control arm (2). Press spacer ring (3) and retaining ring (4) with the pressure piece (S) under axial pressure until the retaining ring has snapped in.

☞ The opening of the retaining ring eyes must face the housing shaft axis. (Opening to show towards the control arm bracket). The opening of the spacer ring must be located 180° towards the opening of the retaining ring.

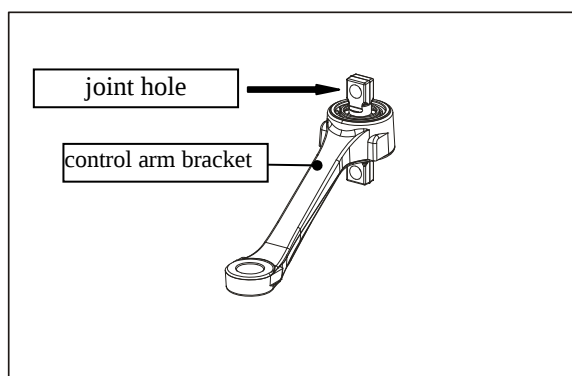


Figure 2

☞ The hole of the joint must be parallel to the control arm bracket (see arrow).

(S) Pressure piece	5870 100 056
(S) Pressure sleeve	5870 506 134

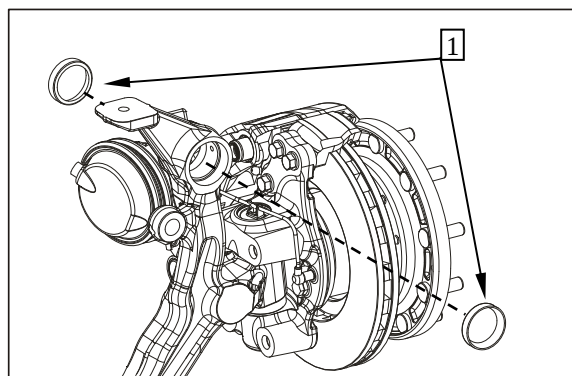


Figure 3

Press both bearing outer rings (1) into the steering knuckle carrier (2) until contact is obtained.

(S) Driver tool	5870 058 084
(S) Handle	5870 260 002

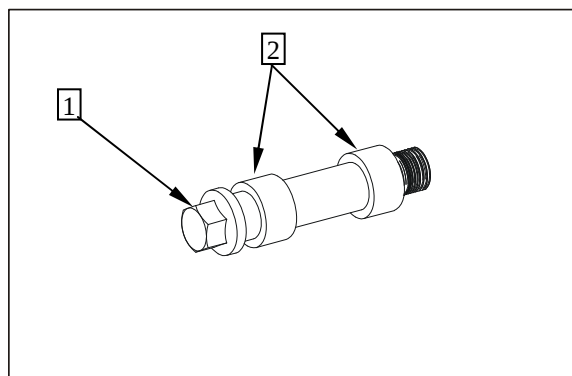


Figure 4

☞ Adjust rolling torque of control arm bearing to 8 - 15 Nm (without sealing elements) – see Figures 5 to 8.

The figure shows the required special tool for adjusting the rolling torque.

1	= Assembly mandrel
2	= Assembly bushing (2x)

(S) = Assembly mandrel (assy)	5870 345 091
(S) = Pressure sleeve	5870 100 060

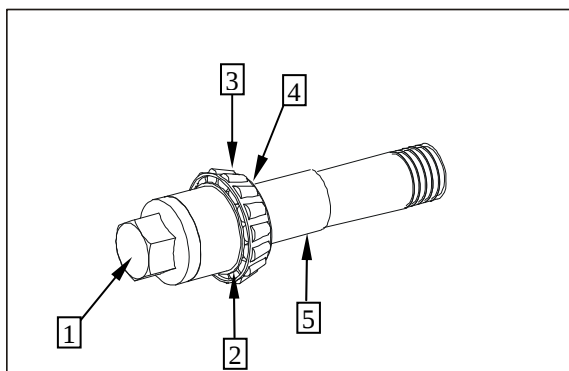


Figure 5

Mount single parts onto the assembly mandrel according to Figure 5.

- 1 = Assembly mandrel
- 2 = Ring
- 3 = Bearing inner ring
- 4 = Shim
- 5 = Bushing

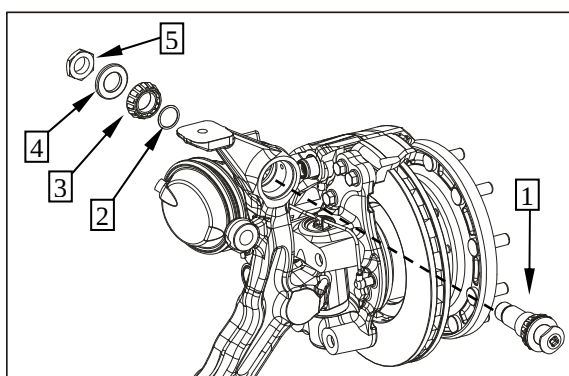


Figure 6

Insert preassembled assembly mandrel (5) into the steering knuckle carrier, mount shim (2), bearing inner ring (3) and shim (4) from the other side and fit hexagon nut (5).

 The hexagon nut collar must face the ring (4).

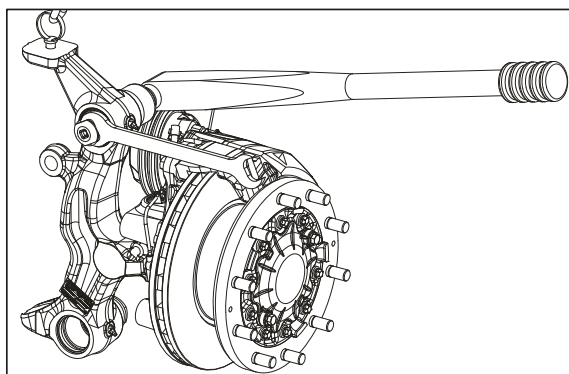


Figure 7

Tighten hexagon nut M36x1.5.

Tightening torque..... $M_A = 500 \text{ Nm}$

 While tightening, rotate the control arm bearing in both directions several times!

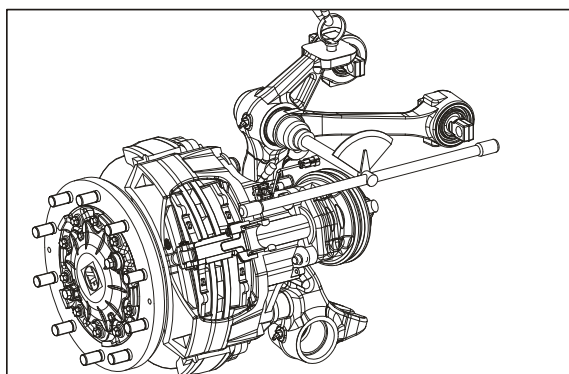


Figure 8

 Check rolling torque 8 to 15 Nm.

 Any deviation from the required rolling torque must be corrected by appropriate shims (Item 4 Figure 5, or Item 2 Figure 6).

Loosen hexagon nut and remove single parts.

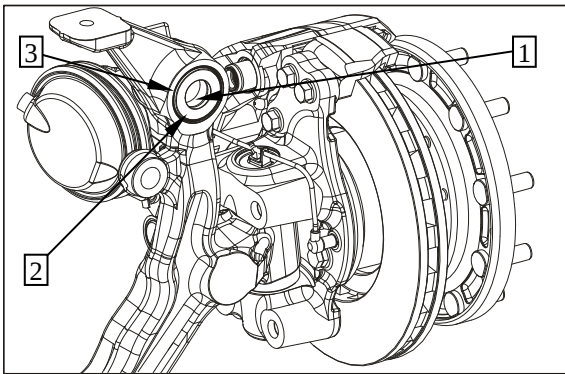
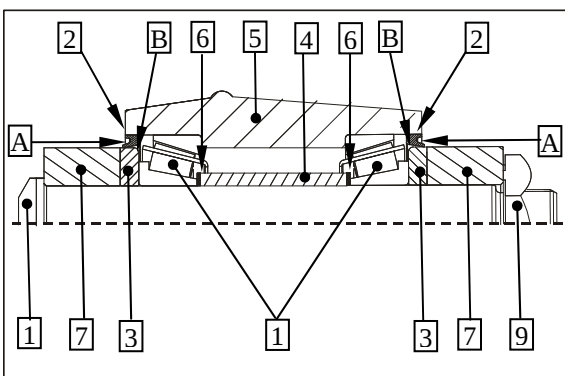


Figure 9

Install bearing inner ring (1), scraper (2) and ring (3) in this order.

☞ Pay attention to the installation position of the scraper (2) (see arrow „A“, Figure 10).

☞ Insert ring (3) with grease, with the radius on the outer diameter facing the bearing inner ring (see arrow „B“, Figure 10).



Legend to Figure 10:

- 1 = Roller bearing assy
- 2 = Scraper
- 3 = Ring
- 4 = Bushing
- 5 = Steering knuckle carrier
- 6 = Shim
- 7 = Control arm
- 8 = Bolt
- 9 = Hexagon nut

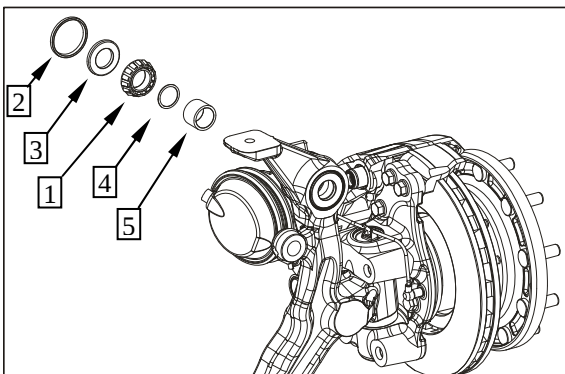


Figure 11

Fit bushing (5) and determined shim (4) to the opposite side of the steering knuckle carrier.

☞ Fit bearing inner ring (1), scraper (2) and ring (3) according to Figure 9.

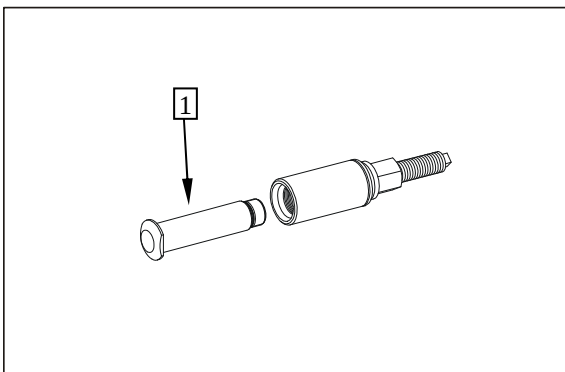


Figure 12

Fit control arm bolt (Figures 12 to 15).

Figure 12 shows the required special tool for fitting the control arm bolt (1).

(S) Mounting fixture 5870 000 097

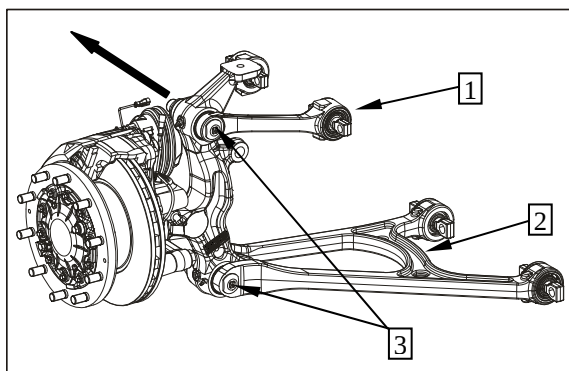


Figure 13

Position upper control arm (1) and lower control arm (2) and install them with mounting fixture.



Installation of the control arm bolt (3) is only permitted in driving direction (see arrow).

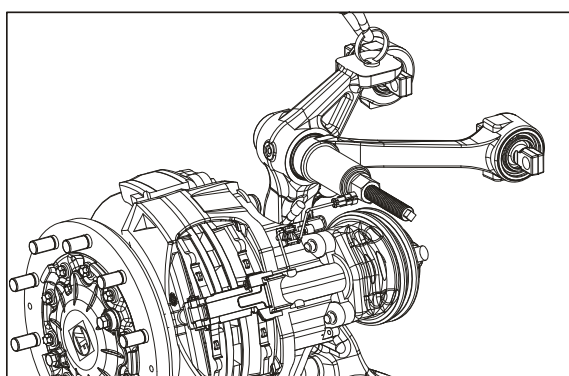


Figure 14

Use the mounting fixture to press in the control arm bolt until contact is obtained.



Now remove mounting fixture.

(S) Mounting fixture

5870 000 097

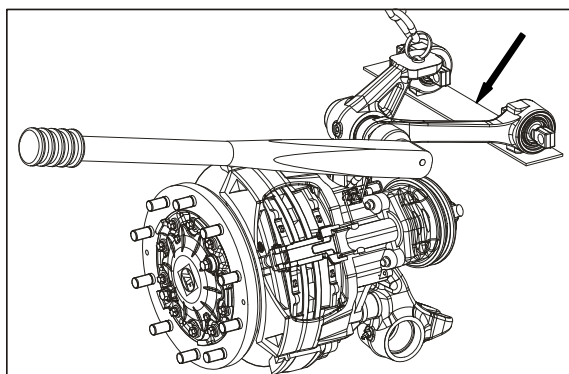


Figure 15

Install hexagon nut with the collar facing the control arm.



Wet thread of hexagon nut with Loctite type No. 262!

Tighten hexagon nut.

Tightening torque..... $M_A = 1000 \text{ Nm}$



Use straightedge to parallelly align control arm (see arrow)!

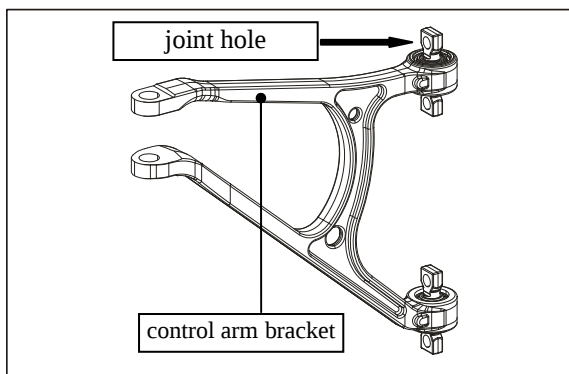


Figure 16

7.2 Reassembly of lower control arm:

Assemble lower control arm according to Figures 1 – 2.



The joint hole must be parallel to the control arm bracket (see arrow)

(S) Pressure piece

5870 100 056

(S) Pressure sleeve

5870 506 134

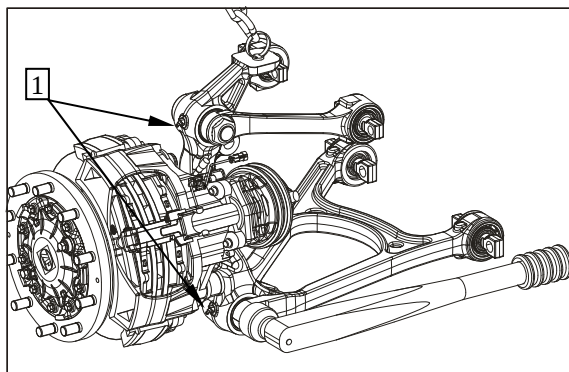


Figure 17

Install hexagon nut with shim, with the hexagon nut collar facing the control arm.



Wet thread of hexagon nut with Loctite type No. 262!

Tighten hexagon nut.

Tightening torque $M_A = 1000 \text{ Nm}$

Fit grease nipple (1) and lubricate upper and lower control arm bearing until grease comes out at the seals.

Industrial EP multi-purpose grease, type Glissando 283 EP 2 LF
ZF Order No. 0671 190 079!

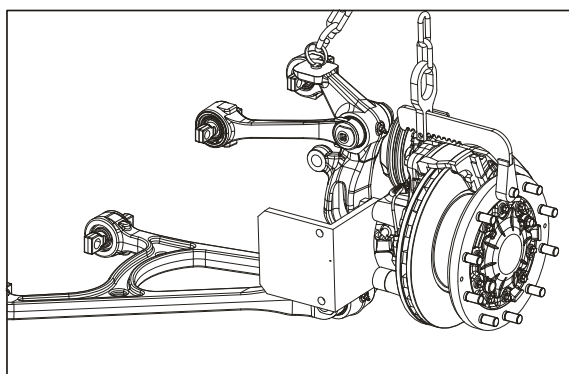


Figure 18



Remove wheel head from assembly truck.

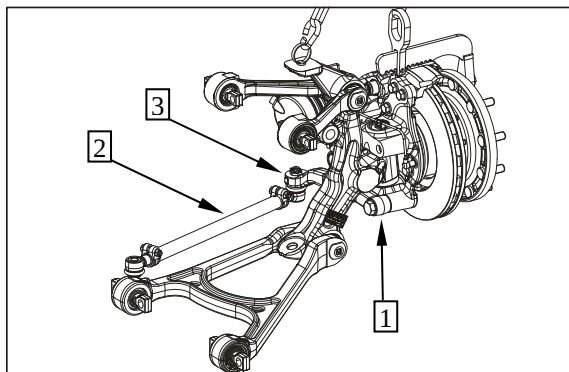


Figure 19

Fix tie rod arm (1) to the steering knuckle using hexagon screws.

Tightening torque (M24/10.9x1.5x90)..... $M_A = 1100 \text{ Nm}$

Fix tie rod (2) to the steering lever (3) by means of castle nut.

Tightening torque (M24x1.5) $M_A = 210 - 230 \text{ Nm}$

Secure castle (3) nut with split pin!

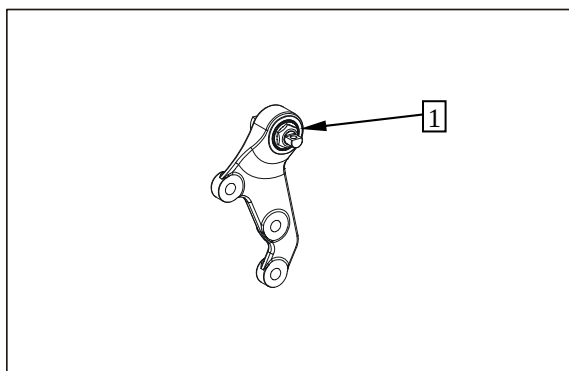


Figure 1

8. Fitting and removal of various RL-75 EC/RL-82 EC peripheral parts

8.1 Disassembly of relay lever:

Disassemble relay lever (Figures 1 and 2).

Loosen hexagon nut (1).

Heat up hexagon nut with hot-air blower.

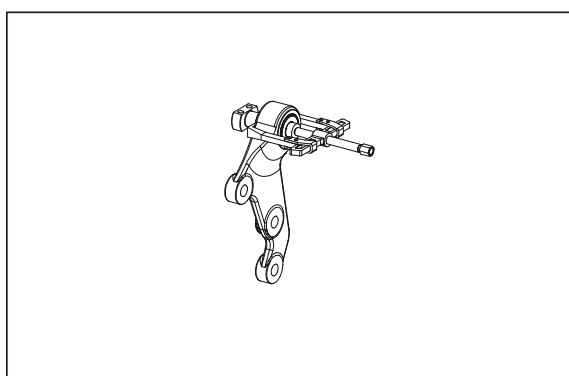


Figure 2

Press out bearing bolt (1) with two-armed puller.

 **Now remove single parts of relay lever support.**

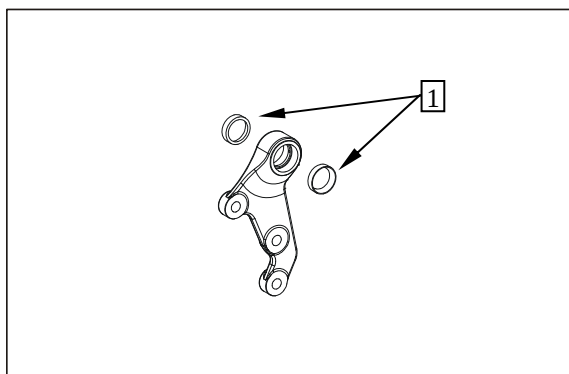


Figure 3

8.2 Reassembly of relay lever:

Press both bearing outer rings (1) into the relay lever until contact is obtained.

(S) Driver tool

5870 058 084

(S) Handle

5870 260 002

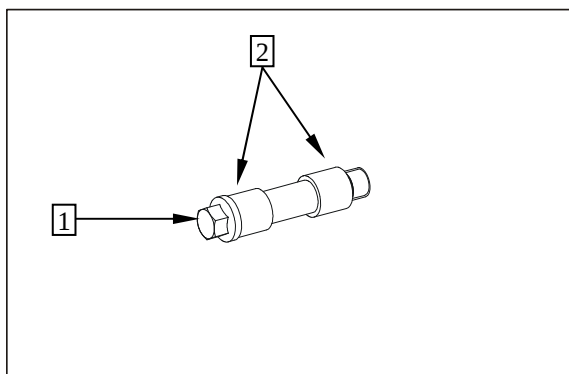


Figure 4

**Adjust rolling torque of relay lever support to 5 - 12 Nm
(without sealing elements) – see Figures 5 to 8.**

The figure shows the required special tool for adjusting the rolling torque.

1 = Assembly mandrel

2 = Assembly bushing (2x)

(S) = Assembly mandrel (assy)

5870 345 091

(S) = Pressure sleeve

5870 100 064

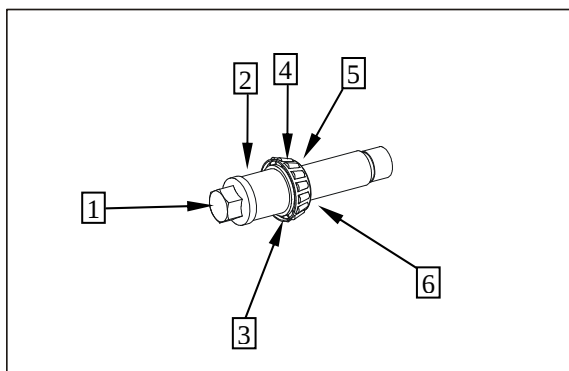


Figure 5

Mount single parts onto the assembly mandrel according to Figure 5.

- 1 = Assembly mandrel
- 2 = Pressure sleeve
- 3 = Ring
- 4 = Bearing inner ring
- 5 = Shim
- 6 = Bushing

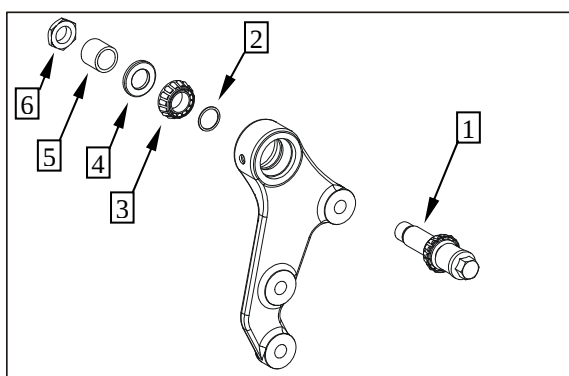


Figure 6

Insert preassembled assembly mandrel (1) into the relay lever, mount shim (2), bearing inner ring (3), ring (4) and pressure sleeve (5) from the other side and fit hexagon nut (6).

 The hexagon nut collar must face the pressure sleeve (5).

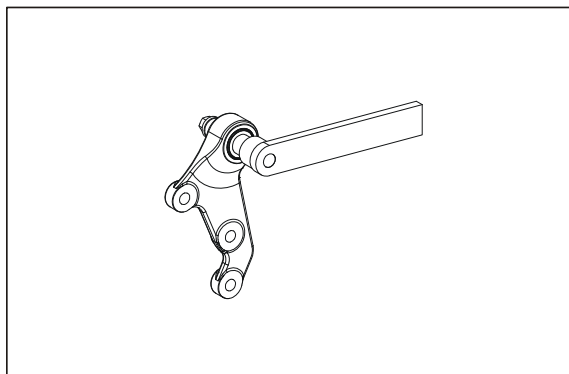


Figure 7

Tighten hexagon nut.

Tightening torque $M_A = 500 \text{ Nm}$

 While tightening, rotate the relay lever support in both directions several times!

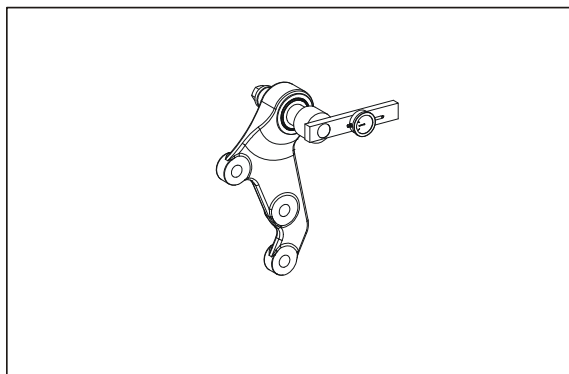


Figure 8

Check rolling torque 5 to 12 Nm.

 Any deviation from the required rolling torque must be corrected by appropriate shims (Item 5 Figure 5, or Item 2 Figure 6).

Loosen hexagon nut and remove single parts.

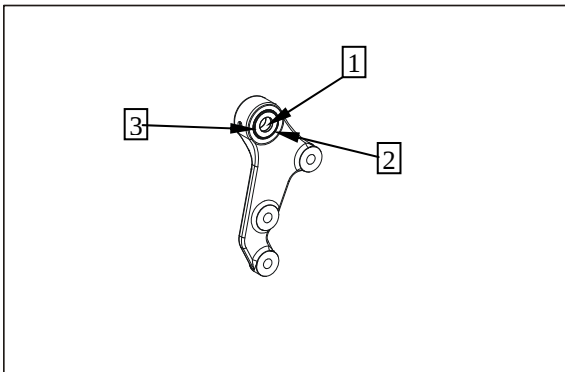


Figure 9

Install bearing inner ring (1), scraper (2) and ring (3) in this order.

☞ Pay attention to the installation position of the scraper (2) (see arrow „A“, Figure 10).

☞ Insert ring (3) with grease, with the radius on the outer diameter facing the bearing inner ring (see arrow „B“, Figure 10).

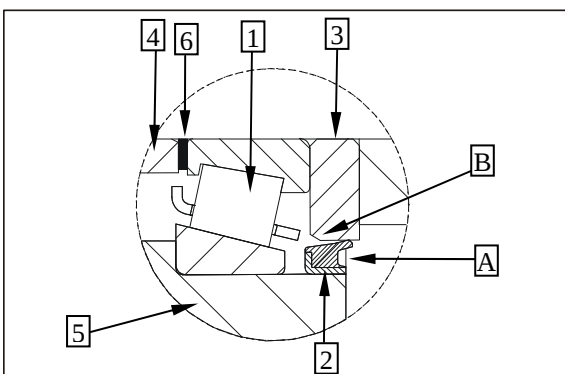


Figure 10

Legend to Figure 10:

- 1 = Roller bearing assy
- 2 = Scraper
- 3 = Ring
- 4 = Bushing
- 5 = Relay lever
- 6 = Shim
- 7 = Hexagon nut

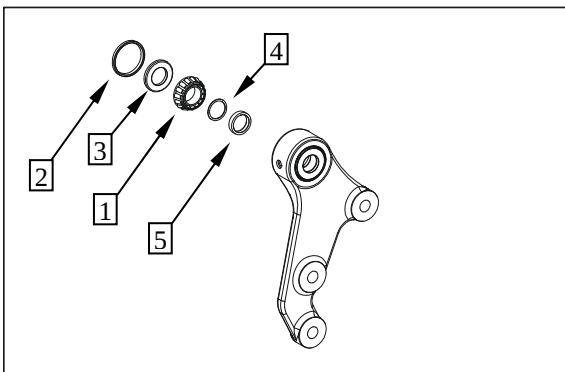


Figure 11

Fit bushing (5) and determined shim (4) to the opposite side of the relay lever.

☞ Fit bearing inner ring (1), scraper (2) and ring (3) according to Figure 9.

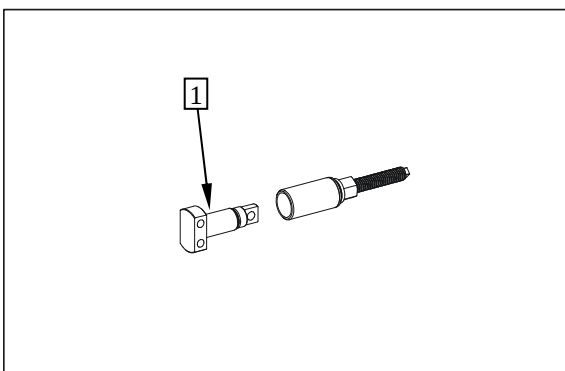


Figure 12

Install relay lever support (Figures 12 to 14).

Figure 12 shows the required special tool for fitting the bearing bolt (1).

- | | |
|----------------------|--------------|
| (S) Mounting fixture | 5870 000 097 |
| (S) Thread insert | 5870 000 104 |

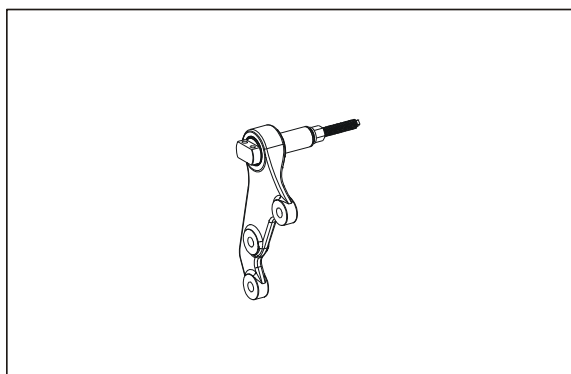


Figure 13

Use the mounting fixture to press in the bearing bolt until contact is obtained.

Now remove mounting fixture.

(S) Mounting fixture	5870 000 097
(S) Thread insert	5870 000 104

 **Make sure that the bearing bolt (1) is pressed into the hole from the flat side of the relay lever (2).**

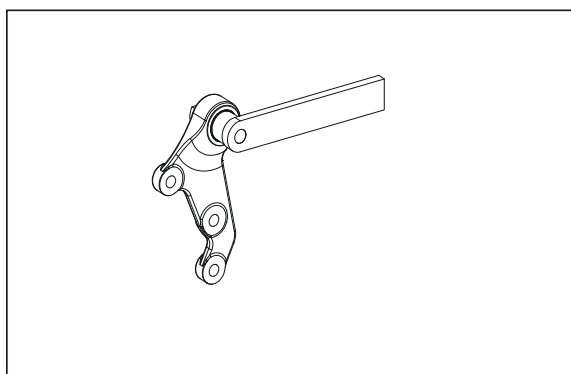


Figure 14

Fit hexagon nut with the collar facing the ring.

 **Wet thread of hexagon nut with Loctite type No. 262!**

Tighten hexagon nut.

Tightening torque..... $M_A = 1000 \text{ Nm}$

Fit grease nipple (1) and lubricate control arm bearing until grease comes out at the seals.

Industrial EP multi-purpose grease, type Glissando 283 EP 2 LF
ZF Order No. 0671 190 079!

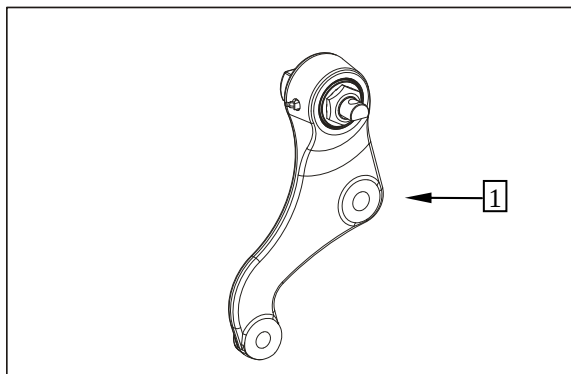


Figure 15

8.3 Reassembly of intermediate lever:

 **Disassemble and reassemble the intermediate lever (1) according to Figures 1 – 14!**

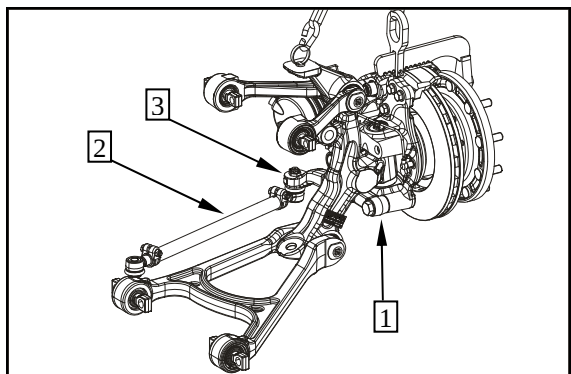


Figure 16

8.4 Fitting of tie rods, relay lever and steering lever:

Fix tie rod arm (1) to the steering knuckle using hexagon screws.

Tightening torque (M24/10.9x1.5x90)..... $M_A = 1\,100 \text{ Nm}$

Fix tie rod (2) to tie rod arm by means of castle nut (3).

Tightening torque (M20x1.5) $M_A = 210 - 230 \text{ Nm}$

Secure castle nut (3) with split pin!

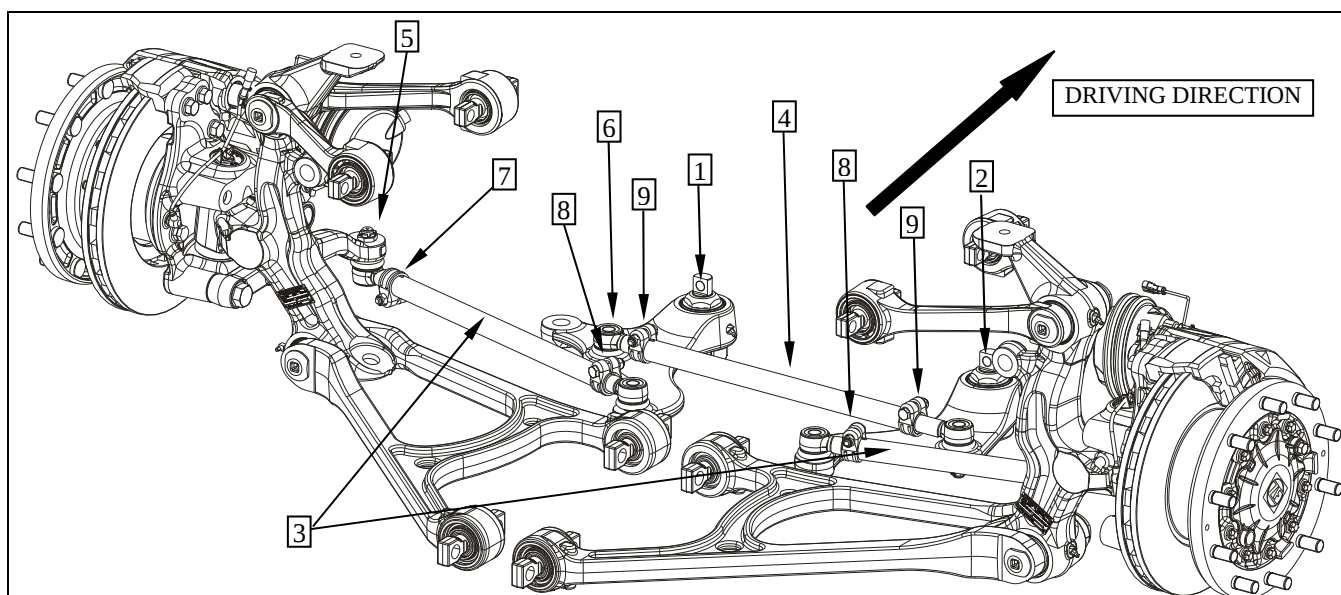


Figure 17

Use castle nuts (5) to fix tie rods (3) to the tie rod arm and steering lever or relay lever.

Tightening torque (M20x1.5) $M_A = 210 - 230 \text{ Nm}$

Secure castle nuts with split pin!

Fix tie rod (4) to the steering lever and relay lever.

Tightening torque (M24x1.5) $M_A = 250 - 280 \text{ Nm}$

Secure castle nuts with split pin!

Legend:

- 1 = Relay lever
- 2 = Steering lever
- 3 = Tie rod (2x)
- 4 = Tie rod
- 5 = Castle nut M20x1.5 (4x)
- 6 = Castle nut M24x1.5 (2x)
- 7 = Clamp
- 8 = Clamp
- 9 = Clamp

Assembly position of clamps:

- Tie rod (3) → vertically downwards (Figure No. 7)
(fit opposite side analogously)
→ vertically upwards (Figure No. 8)

- Tie rod (4) → vertically upwards (Figure No. 9)

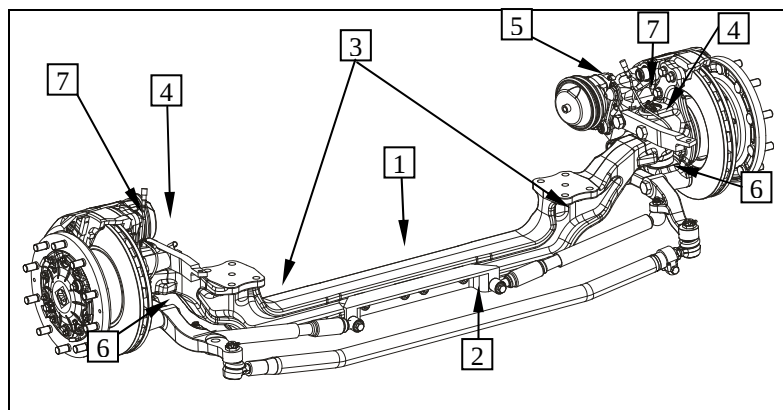
Tightening torque (M12x1.5) $M_A = 80 - 90 \text{ Nm}$



Toe-setting is to be done according to the vehicle manufacturer's specifications.

9. Fitting of various RL-75 A components

9.1 Version A:



Legend:

- 1 = Fixture (absorber)
- 2 = Tie rod
- 3 = Absorber
- 4 = Lever
- 5 = Fixture (tachometer cable)
- 6 = Tie rod arm
- 7 = Steering knuckle

Figure 1

Attach fixture (1) to the axle housing using cylindrical screws M20x1.5x155 and hexagon nuts M20x1.5.



Wet thread of hexagon nut with Loctite type No. 262!

Tightening torque (hexagon nut M20x1.5)..... $M_A = 620 \text{ Nm}$

Attach absorber (3) to the fixture (1) by means of hexagon screw M14x1.5x70 and hexagon nut M14x1.5, and to the tie rod arm (6) using castle nuts M14x1.5.

Secure castle nuts with split pin!

Tightening torque (hexagon nut M14x1.5) $M_A = 90 \text{ Nm}$

Tightening torque (castle nut M14x1.5) $M_A = 80 \text{ Nm}$

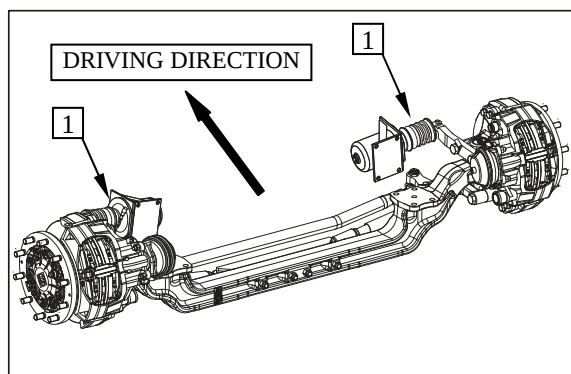
Attach tie rods (2) to the tie rod arm (6) by means of castle nuts M24x1.5.

Secure castle nuts with split pin!

Tightening torque (castle nut M24x1.5) $M_A = 250 - 280 \text{ Nm}$

Attach lever and fixture (4) to the steering knuckle (7) using hexagon screws M24x1.5x75.

Tightening torque (M24/10.9x1.5x75)..... $M_A = 1100 \text{ Nm}$



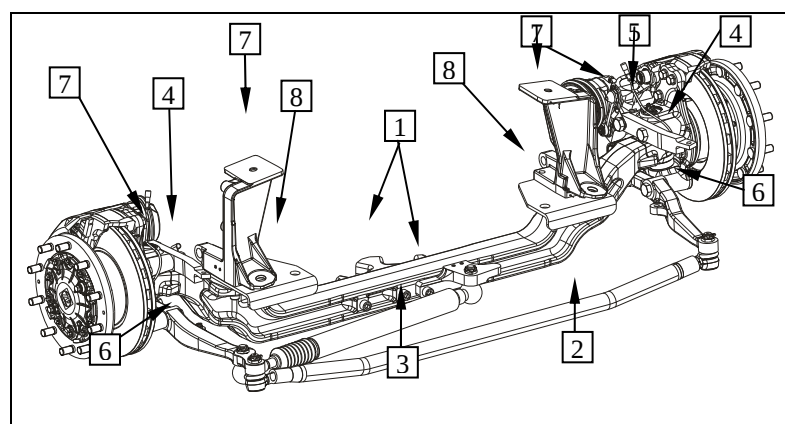
Use bolt to fix cylinder (1) to the lever and secure it with split pin.



Toe-setting is to be done according to the vehicle manufacturer's specifications.

Figure 2

9.2 Version B:



Legend:

- 1 = Fixture (absorber)
- 2 = Tie rod
- 3 = Absorber
- 4 = Lever
- 5 = Fixture (tachometer cable)
- 6 = Tie rod arm
- 7 = Spring carrier
- 8 = Bracket

Figure 3

Attach fixture (1) to the axle housing using cylindrical screws M20x1.5x175 and M20x1.5x155.

Wet cylindrical screws with Loctite type No. 262!

Tightening torque (M20/10.9x155)..... $M_A = 620 \text{ Nm}$

Tightening torque (M20/10.9x175)..... $M_A = 620 \text{ Nm}$

Attach tie rods (2) and absorber (3) to the tie rod arm (6) using castle nuts M24x1.5.

Secure castle nuts with split pin!

Tightening torque (castle nut M24x1.5) $M_A = 250 - 280 \text{ Nm}$

Attach lever and fixture (4) to the steering knuckle (7) using hexagon screws M24x1.5x75.

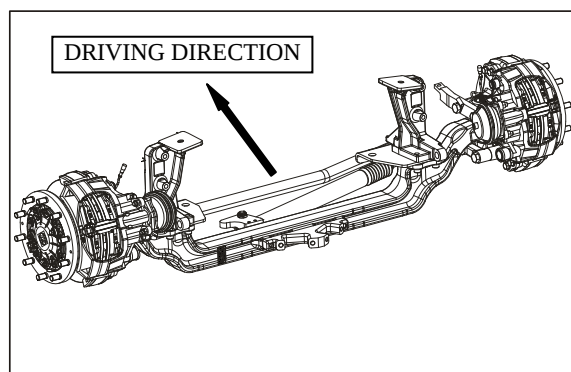
Tightening torque (M24/10.9x1.5x75)..... $M_A = 1100 \text{ Nm}$

Fix spring carrier (7) and bracket (8) to the axle housing.

- Force cylindrical pin 20x32 into the axle housing
- Fix spring carrier and bracket to the axle housing using 4 cylindrical screws M20x1.5x60.

Tightening torque (M20/10.9x1.5x60) $M_A = 620 \text{ Nm}$

Wet cylindrical screws with Loctite type No. 262!



 Toe-setting is to be done according to the vehicle manufacturer's specifications.

Figure 4