Clutch

Product competence from EUROPART

- Clutches
- Flywheels and accessories
- Clutch release
- Workshop requirements
- Technical information

EUROPART – Europe's No. 1 for truck, trailer, van and bus spare parts.

Clutches

Clutch kit

suitable for	∅		Order no.	Comparative no.
Renault Rapid Kasten, Super 5 Kasten	180 mm		**9734 005 524**	LuK 618 0217 06
Seat Cordoba Kombi Skoda Fabia Kombi, Octavia Kombi, Roomster VW Bora Kombi, Caddy III, Golf Variant	200 mm		**9734 002 846**	LuK 620 1284 00
Seat Cordoba Kombi Skoda Octavia Kombi VW Bora Kombi, Golf Variant 3, Golf Variant 4	210 mm	[1]	**9734 005 514**	LuK 621 3014 09
Seat Cordoba Kombi VW Golf 3 Variant	210 mm	[1]	**9734 005 518**	LuK 621 1332 09
Skoda Octavia Kombi VW Bora Kombi, Golf 4 Variant	210 mm	[1]	**3564 700 014**	LuK 621 2218 09
VW Golf 3 Kombi, Polo Kombi	190 mm		**9734 005 510**	LuK 619 0286 00

[1] without release bearing

Service life of clutch linings
As a friction clutch is a dry clutch, the wear during the slip phase—in which the difference in speed between the drive and power take-off is compensated—is a completely normal process. The main requirement for a long clutch lining service life is a well-functioning release system. In addition, achieving a long clutch lining service life depends a lot on the driving mode. The possibility of clutch misuse must therefore be excluded.

The service life of the lining is adversely affected by:
- High start-up speeds and incorrect gear selection
- Stop-and-go operation, shunting operation
- Allowing the clutch to slip for a long period of time
- Holding down the clutch pedal continuously
- Using the clutch to hold the vehicle on a gradient
- Allowing the clutch to brake the vehicle rather than using the accelerator pedal to match the speed when shifting down a gear

EUROPART GOOD TO KNOW

This figure corresponds to 9734 005 512

Clutch kit

suitable for	∅		Order no.	Comparative no.
Iveco Daily, 01/1985- Daily, 05/1999- Daily, 05/2006-	240 mm	[1]	**9735 003 134**	LuK 624 1313 00
Iveco Daily, 05/1999-	270 mm	[1]	**9735 003 010**	LuK 627 3010 00
Iveco Daily, 09/2004-04/2006 Daily, 05/2006-	280 mm	[1]	**9735 003 191**	LuK 628 3191 00
Iveco Daily, 11/2001- Daily, 05/2006-	280 mm	[1]	**9735 003 089**	LuK 628 3088 00
Mercedes-Benz Sprinter (901, 902, 903, 904)	240 mm	[2]	**3564 701 611**	LuK 624 3182 09
Mercedes-Benz Sprinter (901, 902, 903, 904)	240 mm	[2]	**3564 700 082**	LuK 624 3148 09
Mercedes-Benz Sprinter (901, 902, 903, 904), Vario	250 mm		**9734 005 512**	LuK 625 3021 00
Mercedes-Benz Sprinter (901, 902, 903, 904), Vito	240 mm		**9734 005 651**	LuK 624 2187 00
VW T4	230 mm		**9734 002 845**	LuK 622 3242 00
Renault Rapid Kasten, Super 5 Kasten	180 mm		**9734 005 524**	LuK 618 0217 06

[1] in exchange
[2] without release bearing, automatic readjustment

Clutch kit

Version automatic readjustment
∅ 240 mm

Application range
Engines with dual mass flywheel

Scope of supply
with central clutch release

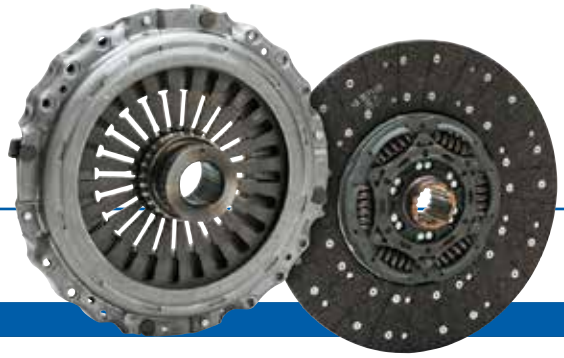
suitable for		Order no.	Comparative no.
Mercedes-Benz Sprinter (901, 902, 903, 904, 905)	[1]	**9734 005 644**	LuK 624 3148 33
Mercedes-Benz Sprinter (901, 902, 903, 904)	[1]	**9734 005 648**	LuK 624 3148 34
Mercedes-Benz Sprinter (901, 902, 903, 904, 905)	[2]	**9734 005 645**	LuK 624 3182 33
Mercedes-Benz Sprinter (901, 902, 903, 904)	[2]	**9734 005 649**	LuK 624 3182 34

[1] for 7.9mm flywheel depth
[2] for 11.9mm flywheel depth

Clutch kit

Version automatic readjustment

suitable for	∅	Order no.	Comparative no.
Mercedes-Benz Sprinter (901, 902, 903, 904) CDI	240 mm	**3564 700 107**	LuK 600 0056 00
Mercedes-Benz Sprinter (901, 902, 903, 904) CDI	240 mm	**9734 006 000**	LuK 600 0060 00
Mercedes-Benz Sprinter (901, 902, 903, 904)	240 mm	**9734 006 500**	LuK 600 0065 00
Mercedes-Benz Sprinter (901, 902, 903, 904)	230 mm	**9734 007 200**	LuK 600 0072 00



This figure corresponds to 9735 003 316

Clutch kit

in exchange

suitable for	∅		Order no.	Comparative no.
MAN Lion's Coach (RH 463), Lion's Star (RH 464) **Neoplan** Cityliner (N 12XX), Starliner (N 52XX), Tourliner (N 2216)	430 mm		**9735 003 308**	LuK 643 3308 00
Mercedes-Benz Citaro I (O 530), Conecto I (O 345)	430 mm		**9735 002 918**	LuK 643 2918 00
Mercedes-Benz Citaro II (O 530), Integro II (O 550), Tourismo II, Travego I (O 580) **Setra** S 315 GT, S 315/319 NF, S 313/315/319 UL, S 315/319 UL-GT, SG 321 UL, S 411/415 HD, S 416/417 HDH, S 415/416/417 GT-HD, S 415/417/419 UL	430 mm		**9735 003 315**	LuK 643 3315 00
Mercedes-Benz Tourino (O 510)	400 mm	[1]	**9735 003 014**	LuK 640 3014 19
Neoplan Cityliner (N 12XX), Tourliner (N 2216)	430 mm	[1]	**9735 003 316**	LuK 643 3316 00
VDL Futura, 09/2001-	430 mm		**9735 003 013**	LuK 643 3013 00
Volvo B12	430 mm	[1]	**9735 003 318**	LuK 643 3318 09

[1] with release bearing

This figure corresponds to 9735 003 201

Clutch kit

suitable for	∅		Order no.	Comparative no.
DAF XF105, CF85	430 mm	[1]	**9735 003 284**	LuK 643 3284 00
Iveco EuroCargo I	310 mm	[1]	**9735 003 097**	LuK 631 3094 00
Iveco EuroCargo I (09/2000-)	350 mm	[1]	**9735 003 514**	LuK 635 3514 00
Iveco EuroCargo I (09/2000-), EuroFire	330 mm		**9736 333 072**	LuK 633 3072 00
Iveco Stralis I, Trakker, EuroStar, EuroTech, EuroTrakker	430 mm	[1]	**9735 003 009**	LuK 643 3009 00
MAN L2000, M2000L	380 mm	[1]	**9735 003 017**	LuK 636 3016 33
MAN L2000, M2000L, M90	360 mm	[1]	**9735 003 002**	LuK 636 3002 33
MAN TGL	360 mm	[1]	**9735 003 343**	LuK 636 3025 33
MAN TGL, L2000, M2000L	360 mm	[1/2]	**9735 003 025**	LuK 636 3025 09
MAN TGM, L2000, M2000M/L	400 mm	[1]	**9735 003 001**	LuK 640 3001 00
MAN TGX, TGS, TGA	430 mm	[1]	**9735 003 207**	LuK 643 3207 00
MAN TGX, TGS, TGA	430 mm	[1]	**9735 003 201**	LuK 643 3201 00
MAN TGX, TGS, TGA	430 mm	[1]	**9735 003 308**	LuK 643 3308 00
Mercedes-Benz Actros I/MP2/MP3, Axor I/II	400 mm	[1]	**9735 003 006**	LuK 640 3006 18
Mercedes-Benz Actros I/MP2/MP3, Axor I/II	430 mm		**9736 009 210**	LuK 343 0192 10
Mercedes-Benz Actros MP2/MP3, Axor I/II, Atego I	430 mm	[1]	**9735 003 292**	LuK 643 3292 00
Mercedes-Benz Atego I/II, LK/LN2, Vario	360 mm	[1/2]	**9735 003 005**	LuK 636 3005 09
Mercedes-Benz Axor I/II, Atego I/II	400 mm	[1/2]	**9735 003 015**	LuK 640 3014 09
Mercedes-Benz Axor II, Atego I/II	400 mm	[1/2]	**9735 003 014**	LuK 640 3014 19
Mercedes-Benz LK/LN2, NG	310 mm	[1]	**9735 002 873**	LuK 631 2873 00
Mercedes-Benz SK, MK	430 mm	[1]	**9735 002 918**	LuK 643 2918 00
Renault Magnum, Premium II, Kerax (10/2005-)	430 mm	[1/2]	**9735 003 318**	LuK 643 3318 09
Scania Series 4	430 mm	[1/2]	**9735 003 087**	LuK 643 3087 09
Volvo FH12, FH16 (01/2003-), FH II (09/2005-), FM12, FM II (09/2005-), FMX	400 mm	[1]	**9735 003 027**	LuK 640 3027 18

[1] in exchange
[2] without release bearing

LuK RepSet SmarTAC – The most powerful clutch system! Self-adjusting. Reliable. OE approved.

Clutch kit

Model LuK RepSet SmarTAC

Scope of supply
Disc, automatic unit, release bearing

This figure corresponds to 9735 003 315

∅		Order no.	Comparative no.
400 mm	[1]	**9735 003 030**	LuK 640 3030 00
430 mm		**9735 004 232**	LuK 643 330 200
430 mm	[1]	**9735 003 231**	LuK 643 3231 00
430 mm	[1]	**9735 003 315**	LuK 643 3315 00
430 mm	[1]	**9735 003 321**	LuK 643 3321 00

[1] in exchange

LuK RepSet SmarTAC is a path-controlled and constantly self-adjusting clutch system. Equipped with its innovative clutch lining, LuK HD 30 PLUS offers a new clutch generation with a unique advantage compared with traditional, self-adjusting technologies:

In operation it works for twice as long! OE approved!

For more information, contact your local branch!

EUROPART GOOD TO KNOW

LuK HD 30 PLUS – The newest generation friction linings

The LuK HD 30 PLUS lining is the result of innovative development, which strives for durability, product innovation and environmental compatibility. This new lining for difficult applications is now available in sizes 430mm, 400mm and 360mm. The clutch lining material is strengthened with continuous fibres. Its special features lie in the two-layer design and the innovative manufacturing process.

The LuK HD 30 PLUS lining offers:
- Very high mileage
- Very good resistance to wear and tear
- Very good resistance to bursting
- High thermal stability
- High fading stability
- First class comfort properties
- Cost neutrality

Manufactured in an environmentally friendly and resource-saving process, free of solvents, asbestos, lead, cadmium, mercury and chromium VI.

EUROPART GOOD TO KNOW

Clutch plate

in exchange

∅	430 mm
Number of teeth	18
Hub profile	50 x 45

suitable for	Motor type	Order no.	Comparative no.
Mercedes-Benz New Actros (07/2011-), Antos (07/2012-), Arocs (01/2013-)	OM 470.906, OM 471.900, OM 471.909	**9757 250 420**	Valeo 827443
Mercedes-Benz New Actros (07/2011-), Antos (07/2012-), Arocs (01/2013-)	OM 936.916	9753 250 410	Valeo 827445

Flywheels and accessories

This figure corresponds to 9060 100 065

Flywheel:
As a mating component of the clutch disc, the flywheel often shows clear markings when the clutch has been in use for a long period of time. Scoring, burn marks or bumps indicate that the flywheel has become very hot. It is essential that these "tracks" are removed. However, this restoration work, i.e. grinding work, may be performed only in line with the specified tolerances. When performing this work, ensure that the mounting surface on the clutch is reworked to the same degree as the contact surface. This work also provides an opportunity to check the starter ring gear and the centring ring for damage.

Flywheel

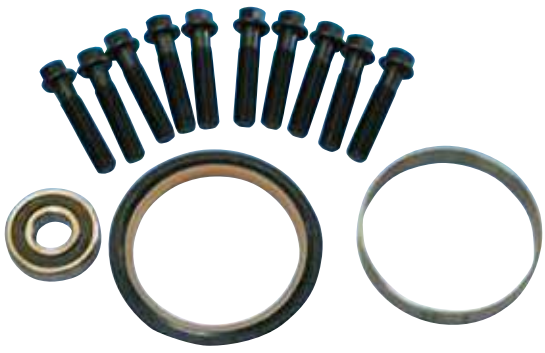
suitable for	∅	Order no.
DAF XF95	430 mm	**6001 314 029**
MAN TGA **MAN** Lion's Classic Ü (A72), Lion's Coach (R07), Lion's Regio (R12) **Neoplan** Tourliner (N 2216), Trendliner (N 3516) **Setra** S 315/317/319 GT-HD, S 313/315/319 UL, S 315/319 UL-GT, SG 321 UL	430 mm	**5230 000 227**
MAN TGS, TGA	430 mm	**9060 100 073**
Mercedes-Benz Actros I/MP2/MP3, Atego I/II/III **Mercedes-Benz** Travego I (O 580) **Setra** S 315/317 HDH/3, S 315/317/319 GT-HD, S 415 HD, S 416/417 HDH, S 431 DT	430 mm	**9060 100 000**
Mercedes-Benz Actros MP2/MP3, Axor I/II/III, Atego I/II/III	362 mm	**9060 100 065**
Mercedes-Benz Atego II **Mercedes-Benz** Intouro II, Tourino (O 510)	395 mm	**9460 303 005**

Fastening set
for flywheel

Length 74 mm
Thread M16 x 1,5
Version complete

Scope of supply
1 axial seal (outside ∅ 140 mm), 1 race (outside ∅ 120 mm), 1 pilot bearing (outside ∅ 62 mm), 10 bolts M16 x1,5

Order no.	Comparative no.
9060 000 103	Mercedes-Benz 010 981 31 25



Fastening set
for flywheel

Thread M16 x 1,5
Length 72 mm
Spanner size 19 mm

Scope of supply
1 axial seal (outside ∅ 140 mm), 1 race (outside ∅ 120 mm), 1 pilot bearing (outside ∅ 62 mm), 10 bolts M16 x1,5

Order no.	Comparative no.
9060 000 104	MAN 51.90020-0298

Pilot bearing (clutch guide bearing):
A faulty pilot bearing causes noise and ultimately leads to the clutch disc being destroyed. If the pilot bearing is missing or faulty, this leads to an angular or parallel displacement between the engine and the transmission. As a result, the transmission input shaft wobbles, causing the torsional damper for the clutch disc and for the bearing of the transmission input shaft to be destroyed.

Guide bearing
for flywheel

Type	6005-2RS1
Outer ∅	47 mm
Inner ∅	25 mm
Height	12 mm

suitable for	Order no.
MAN TGM, TGL **MAN** Lion's Classic Ü (A72)	**8001 600 522**

Guide bearing
for flywheel

Inner ∅	25 mm
Outer ∅	62 mm

suitable for	Height	Order no.
MAN TGX (2007-), TGX (2013-), TGS **MAN** Lion's City (A20), Lion's Classic Ü (A72), Lion's Coach (R07/R08), Lion's Regio (R12/R13), EL (A12), NG (A11), NL (A10/A15) **Neoplan** Cityliner (N 12XX), Skyliner (N 1122/2011-), Starliner (N 52XX), Tourliner (N 2216), Trendliner (N 3516) **Scania** K94/114/124/380, L94	17 mm	**8001 630 520**
Mercedes-Benz Actros MP2/MP3, New Actros (2012-), Axor II **MAN** Lion's Coach (R07/R08) **Mercedes-Benz** Citaro II (O 530), Conecto I (O 345), Integro II (O 550), O 405 N, O 407, O 408, Tourismo I/II (O 350), Travego I/II (O 580) **Neoplan** Cityliner (N 12XX) **Setra** S 309/312/315 HD, S 315 HDH/2, S 315/317 HDH/3, S 328 DT, S 315 GT, S 315/317/319 GT-HD, S 315/319 NF, S 313/315/319 UL, S 315/319 UL-GT, SG 321 UL, S 411/415 HD, S 415/416/417 HDH, S 431 DT, S 415/416/417 GT-HD, S 416 GT-HD/2, S 417/419 UL	24 mm	**8002 546 485**

Shaft sealing rings:
Small traces of grease or oil significantly impair the function of the clutch. Traces of oil in the clutch bell or on the clutch indicate that the shaft sealing rings must be re-sealed. On older vehicles with a higher mileage reading, the seals must be replaced as a general rule. Shaft seal rings that are leaking remain one of the main causes for clutches to fail.

EXPERT TIP
Translation not available

Crankshaft seal

Version	with dust cover, left turn	
Installation location	rear	
Material	PTFE (teflon)	
Inner ∅	115 mm	
Outer ∅	140 mm	
Height	12 mm	(Illustration similar)

Order no.
8002 534 667

Clutch release

This figure corresponds to 0730 514 057

WABCO

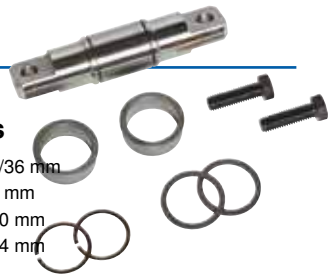
Clutch servo

Operating pressure max. 10 bar

suitable for	Stroke	Order no.	Comparative no.
MAN TGA **MAN** Lion's Coach (R07), Lion's Regio (R13) **Neoplan** Tourliner (N 2216), Trendliner (N 3516)	85 mm	**0730 514 120**	WABCO 970 051 412 7
Mercedes-Benz Actros I/MP2, Atego I **Mercedes-Benz** Conecto I (O 345), Tourismo I (O 350), Travego I (O 580) **Setra** S 315 GT, S 315/317/319 GT-HD, S 315/319 NF, S 313/315/319 UL, S 315/319 UL-GT, SG 321 UL, S 411/415 HD, S 415/417 HDH, S 431 DT	85 mm	**0730 514 057**	WABCO 970 051 431 7
Mercedes-Benz Actros MP2/MP3, Axor I/II/III, Atego I/II/III **Neoplan** Cityliner (N 12XX), Tourliner (N 2216), Trendliner (N 3516)	85 mm	**0730 514 410**	WABCO 970 051 441 0
Mercedes-Benz Actros MP2/MP3 **Mercedes-Benz** Tourismo II, Travego II **Setra** S 417 HDH, S 431 DT	69,5 mm	**9462 500 062**	WABCO 970 150 001 0

Clutch master cylinder

suitable for	Order no.	Comparative no.
Mercedes-Benz Actros MP2	**3500 000 654**	FTE 190084.0.2



Repair kit

for release bearings

Outer ∅	32/36 mm
Bore hole ∅	12 mm
Length	160 mm
Distance between holes	134 mm
Number of holes	2

suitable for	Order no.	Comparative no.
Mercedes-Benz Actros, Axor II	**9460 008 454**	Mercedes-Benz 655 254 02 06

KNORR-BREMSE

Clutch actuator

Version electronic

suitable for	Version	Order no.	Comparative no.
Volvo FH12/16, FM7/9/10/12	electronic	**3400 158 750**	Knorr K015875N50

KNORR-BREMSE

Clutch actuator

Version	electronic
Operating pressure	max. 10 bar
Operating liquid	mineral oil
Stroke	70 mm
Piston ∅	100 mm

suitable for	Order no.	Comparative no.
DAF CF85 II (2006-), XF95, XF105 **Iveco** Stralis II AS **MAN** TGX, TGS, TGA, TGM, TGL **Irisbus** Eurorider **MAN** Lion's Coach (R07/R08), Lion's Regio (R12) **Neoplan** Cityliner (N 12XX), Skyliner (2011-), Tourliner (N 2216)	**3400 158 740**	Knorr K015874N50

Release fork and release shaft:
The bearing points in the release system must operate smoothly and with as little play as possible. Run-in or worn bearing arrangements in the release system lead to the release fork tilting and ultimately to the clutch grabbing.

This figure corresponds to 9460 008 453

Release fork

suitable for	Order no.
Mercedes-Benz Actros MP2/MP3, Axor II	**9460 008 453**
MAN TGX (2013-), TGS, TGM **MAN** Lion's Coach (R07/R08), Lion's Regio (R12) **Mercedes-Benz** Travego I (O 580) **Neoplan** Cityliner (N 12XX), Skyliner (N 1122/2011-), Starliner (N 52XX), Tourliner (N 2216) **Setra** S 416 HDH, S 431 DT	**5231 266 918**
MAN TGX, TGA	**5234 110 007**

Concentric slave cylinder:
Just like the clutch, the concentric slave cylinder is subject to natural wear that is not always possible to locate visually. To be on the safe side, replacing the concentric slave cylinder is also recommended at the same time as the clutch. The installation instructions from the vehicle manufacturer must be observed when installing and bleeding the concentric slave cylinder. Before a new concentric slave cylinder is installed, hydraulic release systems must be purged and then refilled in accordance with the specifications provided by the vehicle manufacturer.

Central release mechanism

suitable for	Version	Operating liquid	Order no.	Comparative no.
Mercedes-Benz Atego I/II, Axor I/II, Unimog	with sensor	Brake fluid	**9305 175 710**	LuK 510 0057 10
Mercedes-Benz Atego I/II, Axor I/II	without sensor	mineral oil	**9305 172 310**	LuK 510 0123 10
Mercedes-Benz Atego I/II, Axor I/II	with sensor	mineral oil	**9305 175 510**	LuK 510 0155 10
MAN TGL	with sensor	mineral oil	**9305 171 910**	LuK 510 0119 10

Workshop requirements

Workshop-pit lifters

air-hydraulic

flexible for use in a pit as well as on the workshop floor under a platform, the telescopic cylinder makes it also ideal for transmission repairs, built-in manual foot pump for fine adjustment, fast and precise air-hydraulics with fast up and down travel, spring-mounted transport base secure against unintentional movements when lifting from 800 kg, dead-man control and safety valve for maximum safety, can be used for all traditional lifting tasks

Load capacity	15 t
Version	floor-running
Seat-∅	60 mm
Height, max.	2206 mm
Height, min.	921 mm
Piston stroke	1285 mm
Cylinder-∅	60 mm
Operating pressure	12 bar
Air consumption	350 l/min
Base plate	844 x 1004 mm

Order no.
5322 520 127

Transmission plate

can be tipped +/- 10° to all sides for the precise removal and installation of transmissions, extremely flat construction offers many possible applications, sturdy construction ensures optimum stability

Load capacity	1 t
Seat-∅	60 mm
Dimensions	542 x 385 mm

Application range
passenger cars and trucks

Scope of supply
2 tightening straps, 4 magnetic rubber supports

Please quote the make of the pit lift and the fitting diameter. Adaptation to different fitting diameters is available on request.

Order no.
5322 520 122

Testing tool kit

for dual mass flywheel

Tests can be performed on the vehicle with the clutch removed, the tests consist of inclination tolerance (axial bearing play) and clearance angle (rotation of the secondary disc in relation to the primary disc until the spring pressure is applied), can be used universally, easy to operate, allows clean, professional and precise work

Application range
fast and professional wear test of the dual mass flywheel

Order no.
9557 050 050

Accessories

Counter (Measuring range 0-10 mm, Scale division 0,01 mm)

Order no.
9557 001 281

Centring process:
Before the clutch pressure plate is screwed into position, the clutch disc must be centred on the flywheel using an alignment tool that is guided through the pilot bearing. The clutch pressure plate must then be screwed onto the flywheel evenly, one section at a time and tightening the opposite screws in each step. In doing so, the specified tightening torque must be observed. The two parts of the clutch bell must be accurately centred in relation to each other. The centring ring or the centring pins and bores must be checked for wear. Later, when pushing together the engine and transmission, ensure that the two assemblies are precisely aligned and that the gearing of the transmission input shaft is very carefully threaded into the hub gearing on the clutch disc.

EUROPART GOOD TO KNOW

KLANN

Clutch centering tool

for trucks, buses and vans with one/ two plate clutch

allows rapid and easy centring of the clutch disc or clutch discs, the centring is done via the guide bearing in the crankshaft

Application range
for trucks, buses and vans with one/two plate clutch

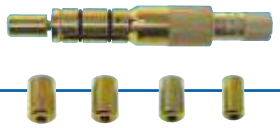
Scope of supply
Clutch centring tool for truck/bus. clutch centring tool for van, in plastic case

	Order no.
	9501 557 045

KLANN

Clutch centering tool

for light commercial vehicles and trucks

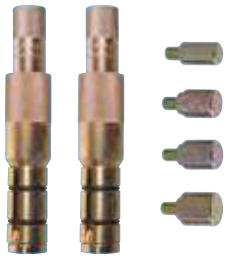


Hub ∅ 24-26 mm

	Order no.
	9501 557 040

Accessories

Description	Order no.
Plastic carrying case	**9515 570 856**



KLANN

Clutch centering tool

for trucks with single/dual disc clutch

single and dual disc clutches of trucks and tractors can be correctly centred towards the engine using the centring mandrel set

mandrel size 1 is suitable for a hub inner diameter of 36-45 mm
mandrel size 2 is suitable for a hub inner diameter of 42-52 mm

Scope of supply	Order no.
centring sleeves with diameter of 20, 25, 27 and 30 mm	**9501 557 043**
centring sleeves with a diameter of 20, 25, 27 and 30 mm, clutch centring mandrel sizes 1 and 2, with plastic case	**9501 557 044**

Accessories

Description	Order no.
Centring mandrel Size 1, ∅ 36-44 mm	**9557 069 610**
Centring mandrel Size 2, ∅ 42-51 mm	**9557 069 620**
Centring sleeve, ∅ 20 mm	**9557 702 298**
Centring sleeve, ∅ 25 mm	**9557 702 306**
Centring sleeve, ∅ 27 mm	**9557 702 314**
Centring sleeve, ∅ 30 mm	**9557 702 322**
Plastic carrying case	**9515 570 856**

Programming the clutch
Programming the clutch is the concluding part of any clutch repair on vehicles with automatic transmission. When the clutch is replaced, the exact position of the clutch is no longer recognised by the electronics. This can lead to faults when various systems are controlled, and these faults are often wrongly interpreted as clutch engagement problems. The engagement and disengagement point of the new clutch must therefore be programmed in the control unit. This process is known as the "small programming process". The "big programming process" must be conducted only when replacing the entire transmission.
As the "small programming process" can differ from vehicle to vehicle, it must be conducted based on the instruction leaflet in the clutch box or in accordance with the specifications provided by the vehicle manufacturer.

Translation not available

TEXA

Diagnosis unit

APT08 Axone 4 Commercial Vehicle/Bus/Trailer

- full and versatile data processing and display interface with internet connection
- large 9.7“ TFT touchscreen with a resolution of 1024 x 768, powerful Intel Atom processor with 2 Gigabytes RAM, 32 Gigabytes solid state hard drive

A Wi-Fi wireless connection (WLAN) is available as standard for connection to the workshop network and to enable downloading of available updates, and the dedicated TEXA interface is used to communicate about the individual repairs over the Bluetooth connection. Equipped with a VGA camera which is useful for documentation and storage of various job steps and is of practical help in spare parts sourcing and also video assistance.
The device has been developed exclusively to connect with a TEXA interface using Bluetooth. It is able to communicate with all other TEXA devices in the area of traditional measurements (UNIProbe and TwinProbe) as well as during on-board diagnosis (OBD MATRIX and OBD Log). Combined and simultaneous use of 2 devices is permitted if necessary.

AXONE 4 can be equipped with an HSDPA module, which then provides a fast telephone connection (via the Internet) with the TEXA servers, to be able to perform updates and make connection with the search function which can be performed outside the particular workshop as well.

Operating temperature	0 to +50 °C
Protection class	IP65
Dimensions	240 x 180 x 45 mm

Scope of supply
Wi-Fi and Bluetooth module, lithium batteries, mini-docking, IDC4 PLUS Premium software and manual
Navigator TXTS PASS-THRU diagnostic interface for vehicles with OBD socket

	Order no.
	9539 003 625

Accessories

Description	Order no.
Accessories set Power supply and adaptor cable truck, new for TXTs	**9539 003 382**
Docking station for table and trolley	**9539 003 670**
Equipment case	**9539 003 673**
Protective frame	**9539 003 015**

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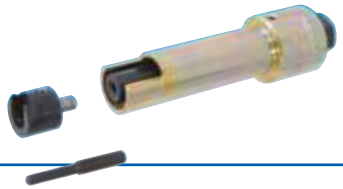
GOOD TO KNOW



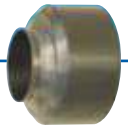
Puller

for release shaft

for extracting the clutch release shaft, necessary during transmission removal, for instance when changing the clutch or for transmission repair

Application range
vehicles with pull type clutch

suitable for	Order no.
Fiat Ducato (1994-)	**9557 201 530**



Dismantling mandrel

for release bearings

Application range
vehicles with pull type clutch

Order no.
9557 201 555

LuK

Mounting tool set

for clutches/flywheels

Application range
LuK SAC clutch

Scope of supply
with case

Order no.	Comparative no.
2300 005 808	LuK 400 0237 10

Angular degree disc

when used together with a 1/2" torque wrench, allows precise tightening of nuts and bolts to torque and angular degree

Order no.
9574 090 302

Fig. 1

Fig. 2

Stierius

Brake maintenance unit

This electric device operates with a pulsating fluid stream. Because of this intermittent movement of the fluid stream, even the smallest air bubbles in the brake/clutch system are removed. The electronic deactivation prevents air from entering the system.

Version steplessly adjustable working pressure
Volume 5 l

Scope of supply
without fluid container

Type	Operating liquid	Fig.	Order no.
VARIO 5 II, incl. standard adapter no. 20 for European vehicles	DOT	1	**9539 500 035**
VARIO 5 MO, incl. clutch connection no. 67 MO	Mineral oil (Pentosin)	2	**9539 500 036**

Stierius

Brake maintenance unit

Vario 5-20 MO

one-main operation, intelligent technology with automatic control mechanisms, suitable for hydraulic clutches and gearshift control, stepless adjustment of pressure control range, with electronic deactivation

Pressure range	0-3,5 bar
Temperature range	0 to 45 °C
Length of filling hose	3,5 m
Length of mains cable	5 m
Power supply	230-60 V

Order no.
9539 500 045

Accessories set

No. 98 MO,
for brake maintenance unit VARIO 5 MO

Scope of supply
adapter, 3 hoses, bleeder bottle

suitable for	Version	Order no.
MAN TGA	5-piece	**9539 500 047**

Accessories set

no. 102 MO,
for brake maintenance unit VARIO 5 MO

for filling and bleeding the clutch and gearshift control

Scope of supply
2 adapters, 3 hoses, canister

suitable for	Version	Order no.
Mercedes-Benz Actros MP2, Axor, Atego	6-piece	**9539 500 048**

Brake fluid

DOT 4

high-grade synthetic brake fluid which has been especially developed for use in brake systems with drum and/or disc brakes, suitable for all hydraulic car brake and coupling systems, except for systems using mineral oil, can be mixed with all brake fluids that meet the same requirements
Specification complies with: FMVSS 116 DOT 4 (Federal Motor Vehicle Safety Standard), SAE J 1703, ISO 4925

Wet boiling point 170 °C
Dry boiling point 260 °C

Also suitable for vehicles with ABS.

Contents	Container	Order no.
250 ml	Bottle	**9785 000 014**
1 l	Bottle	**9785 000 015**
5 l	Canister	**9785 000 016**
20 l	Canister	**9785 000 017**
60 l	Barrel	**9785 000 018**

Hydraulic oil

Divinol Central hydraulic fluid S

Colour green

Contents	Container	Order no.
1 l	Bottle	**9909 028 360**

Technical information

Failure diagnosis and causes of faults

Certain criteria must be taken into account and a specified procedure must be followed when assessing faults on the clutch system, when diagnosing damage and when locating and correcting faults to ensure that the troubleshooting processes are efficient and have a lasting impact.

The order of tasks for troubleshooting on clutch systems is as follows:

1. Reason for complaint
2. Troubleshooting
3. Damage diagnosis
4. Fault elimination

The reason for the complaint provides the basic information for the subsequent troubleshooting process, which will identify one or multiple causes. A visual inspection or, if applicable, a test measurement must be performed on parts that are still installed or that have already been removed. These tasks will provide information about the correct damage diagnosis, leading to the affected clutch components being repaired or replaced.

Reason for complaint
A precise understanding of the reason for the complaint is essential when it comes to eliminating a fault. The different possibilities for a complaint regarding the clutch "can be counted on one hand" and are also relatively easy to describe clearly, meaning in most cases it is easy to determine this information as a starting point.

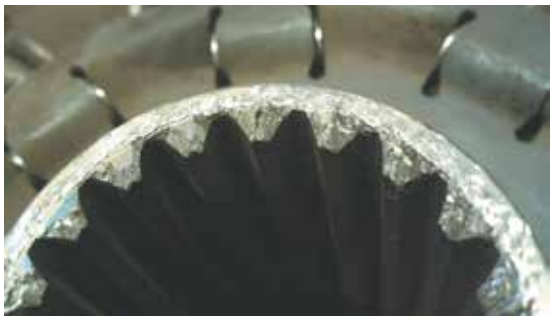
The five possible reasons of complaint for a clutch.

– Clutch does not disengage
– Clutch slips
– Clutch grabs
– Clutch makes a noise
– Clutch operation is stiff

Troubleshooting
A clear statement regarding the reason for the complaint means that troubleshooting can focus on a specific area. However, a common mistake is to begin immediately by disassembling the clutch components, which generally requires a lot of work. Instead, it is a better idea to start by searching for the fault at a point where it could be relatively easy to resolve, i.e. within the clutch environment and, more specifically, within the release system for instance. In the majority of cases, the causes of faults in the clutch environment are not associated with faulty clutch function. Upon closer inspection it often becomes clear that a variety of external influences are impairing the clutch function.

Clutch disc

Damaged spline hub profile



Cause
- Installation error
> Force was applied when the transmission shaft was threaded into the hub splines of the disc (disc was not centred during installation)
- Incorrect disc

Outcome:
Problems disengaging because the clutch disc may no longer be able to slide freely on the transmission input shaft

Remedy:
Replace the clutch
Check the transmission input shaft

Scoring on the lining (flywheel side)

Cause
- Flywheel not replaced
- Friction surface on the flywheel not reworked
> Scoring in the flywheel are introduced on the friction lining

Outcome:
Clutch grabs

Remedy:
Replace the clutch and flywheel

Spline damaged and worn to a taper

Cause
- Missing or faulty pilot bearing
- Parallel or angular displacement between the engine and the transmission
- Bearing arrangement of the main transmission shaft or of the transmission input shaft faulty
- Vibration damage
- Gearing on the transmission input shaft worn

Outcome:
Clutch noise

Remedy:
Check the pilot bearing and replace if necessary
Check the bearing arrangement of the transmission shafts
Replace the clutch

Lateral running deviations shown by the clutch disc (lateral run-out/deformation of the lining pad retainer)

Cause
- Clutch disc was not checked for lateral run-out before installation (maximum of 0.5 mm permitted)
- Shipping damage
- Installation error
> The clutch disc was deformed when the transmission and the engine were pushed together
> Engine or transmission released when being pushed together

Outcome:
Clutch does not disengage

Remedy:
Replace the clutch

Clutch disc

Overheating tracks on the pressure plate; friction linings burnt

Cause
- Thermal overloading due to:
> Driving errors (clutch allowed to slip for a long period of time during start-up and when shifting gears)
- Release system stiff or faulty
- Wear on clutch disc exceeds the wear limit

Outcome:
Clutch slips

Remedy:
Replace the clutch
Check the flywheel and release system

Burst Lining

Cause
The speed of the clutch disc was higher than the burst speed of the lining. This condition occurs when the vehicle is drifting and the clutch is engaged and if the speed of the vehicle is higher than the corresponding maximum speed of the engaged gear.
This damage is not related to the engine speed — the decisive factor is the speed of the main transmission shaft

Outcome:
Clutch does not disengage

Remedy:
Replace the clutch

Lining area carbonised

Cause
- Thermal overloading due to:
> Driving errors (clutch allowed to slip)
> Rotary shaft seal for engine/transmission leaking

Outcome:
Clutch slips

Remedy:
Replace the clutch
Rectify the leak

Lining greased or oiled

Cause
- Hub covered in excess grease
> Excess grease on the hub profile was not removed
- Faulty rotary shaft seal on the engine or transmission

Outcome:
Clutch slips

Remedy:
Replace the faulty rotary shaft seal
Clean the parts; replace the clutch if necessary

Clutch disc

Contact tracks on the torsional damper

Cause
- Installation error
> Disc installed in the wrong position
- Incorrect disc or clutch

Outcome:
Clutch does not disengage; Clutch noise

Remedy:
Replace the clutch; ensure that the installation position is correct

Lining worn down to the rivets

Cause
- Lining wear
> Vehicle has been driven despite the fact that the clutch is slipping
- Driving error
> Clutch allowed to slip for too long
- Incorrect clutch
- Faulty release system

Outcome:
Clutch does not disengage; Clutch slips

Remedy:
Replace the clutch; check the flywheel

Rust and corrosion on the hub splines

Cause
- Hub splines not greased

Outcome:
Clutch grabs and does not disengage correctly

Remedy:
Remove rust from the hub splines and grease them; replace the clutch if necessary

Grease hole plug for the torsional damper destroyed

Cause
- Driving error
> Torsional damper overused as a result of driving at a low speed
- Faulty release system
- Incorrect clutch disc installed

Outcome:
Clutch noise

Remedy:
Replace the clutch; check the flywheel
Replace the faulty parts of the release system

Pressure plate

Diaphragm spring fingers worn

Cause
- Incorrect pre-load on the release bearing
- Faulty release bearing
- Release bearing seized

Outcome:
Clutch grabs, slips and/or makes noise

Remedy:
Check the release system (pre-load spring)

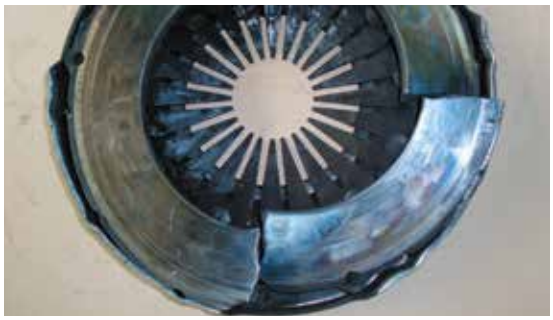
Cam breakage

Cause
- Clutch dropped
- Shipping damage

Outcome:
Clutch does not disengage

Remedy:
Replace the clutch

Pressure plate broken



Cause
- Pressure plate overheats as a result of the clutch being allowed to slip for too long (driving error)
- Release system stiff
- Slave cylinder faulty

Outcome:
Clutch slips; Clutch fails to disengage

Remedy
Replace the clutch, flywheel and slave cylinder as necessary

Tangential straps broken

Cause
- Play within the powertrain
- Operating error
> Gearshift errors
> Improper "tow start" of the vehicle

Outcome:
Clutch does not disengage

Remedy:
Replace the clutch; check the powertrain

Release system/transmission shaft

Release fork worn

Cause
- Faulty release system
> Faulty guide sleeve
> Faulty bearing arrangement on the release shaft

Outcome:
Clutch noise

Remedy:
Replace faulty parts

Release fork carrier on the release bearing worn

Cause
- Release fork worn
> Bearing arrangement on the release shaft worn
> Guide sleeve worn

Outcome:
Clutch noise

Remedy:
Check the release system; replace faulty parts

Release fork shaft stiff

Cause
- Bearing arrangement on the release fork worn

Outcome:
Clutch grabs

Remedy:
Check the release fork shaft; replace if necessary
Check the release bearing

Transmission input shaft worn

Cause
- Transmission input shaft not greased/replaced
> Clutch disc sticks on the gearing and therefore cannot disengage

Outcome:
Clutch grabs

Remedy:
Check the transmission input shaft; replace if necessary
Check the clutch; replace if necessary

Flywheel

Flywheel shows temper colours, scoring and heat cracks

Cause
- Thermal overloading due to:
> Driving errors (clutch allowed to slip)
> Flywheel not reworked/replaced

Outcome:
Clutch grabs

Remedy:
Replace the clutch and flywheel

Centring ring of flywheel broken

Cause
- Installation error
> External centring not observed
> Mounting screws tightened unevenly

Outcome:
Clutch does not disengage

Remedy:
Replace the flywheel

Causes of faults at a glance

For troubleshooting purposes, the causes of the faults described in the following section and their remedies are set out according to the possible reasons for the complaint.

Clutch does not disengage

The cause for this complaint is not necessarily the clutch itself. In many cases, faults on the release system or a faulty pilot bearing are to blame. In addition, important installed instructions are often not followed.

Characteristic	Cause	Remedy
Tangential straps bent	Clutch pressure plate dropped Abrupt load cycle	Replace the clutch pressure plate Check the powertrain
Cover bent	Centring pin not checked Improper installation/handling Shipping damage	Replace the clutch pressure plate
Lateral run-out of the clutch disc too high	Shipping damage/improper handling Lateral run-out not checked (maximum of 0.5 mm permitted)	Align or replace the clutch disc
Lining covered in rust	Vehicle left unused for a long period of time (high level of humidity)	Remove rust from the affected parts (including the lining surface)
Linings sticking	Grease/oil on lining	Replace the clutch disc/seal the clutch environment
Clutch disc stuck to the transmission shaft	Hub profile worn Hub covered in rust Incorrect grease used Hub profile or transmission shaft profile knocked out	Rework hub profile Restore free movement and lubricate Do not use grease that contains adipic components Replace the clutch disc or transmission shaft or both
Dimensions of the clutch disc incorrect	Incorrect clutch disc installed	Use the correct parts
Fouling marks on the Torsional damper	Clutch disc installed the wrong way round or incorrect clutch disc installed	Install the correct clutch disc as specified
Guide sleeve worn	Incorrect release bearing installed Incorrect pairing Not greased (metal – metal pairing)	Replace Use the correct parts Lubricate
Faulty pilot bearing	Wear Angular or parallel displacement of the engine in relation to the transmission	Replace
Release travel too low	Air in the hydraulic system Faulty master/slave cylinder	Bleed Replace faulty components and bleed the system

Clutch noise

Frequent triggers for whistling noises include the release bearing running off-centre, a faulty pilot bearing or the transmission input shaft not being centred.
Clacking noises generally occur during a load cycle if clutch discs with a first stage damper are installed. However these noises have no negative impact on the function of the clutch disc.
Installing the clutch disc in the opposite direction to the intended installation direction or installing incorrect parts can also cause noise.

Characteristic	Cause	Remedy
Vibrations when the engine is running	Clutch imbalance (e.g. improper installation/shipping damage)	Replace the pressure plate and/or the clutch disc
Incorrect clutch disc	Torsional damper does not match the vehicle	Install the correct clutch disc
Torsional damper destroyed	Incorrect clutch disc installed; Play in the powertrain (universal shaft); Incorrect driving behaviour (e.g. low speed)	Use the specified clutch disc Rectify wear in the powertrain
Release bearing faulty	Loss of grease due to overheating Fault in the release system	Replace the release bearing Repair the release system
Faulty pilot bearing	Worn or missing	Replace
Diaphragm spring fingers worn down	Pre-load on the release bearing incorrect (slave cylinder faulty)	Replace the slave cylinder, replace the clutch

Clutch slips

In addition to a faulty clutch disc and pressure plate, there are other things that cause a clutch to slip. The reason is often a faulty release system. An incorrectly reworked flywheel or installing an incorrect clutch can also be the cause.

Characteristic	Cause	Remedy
Pressure plate overheating	Thermal overloading (e.g. by allowing the clutch to slip) Incorrect parts installed Diaphragm spring broken Oil contamination	Replace the entire clutch Seal the clutch environment
Clutch linings worn	Natural wear Clutch allowed to slip for too long Clamp load too weak (incorrect clutch)	Replace the entire clutch
Clutch linings oiled/greased	Oil leakage at the rotary shaft seal (engine/transmission) Excess grease on the hub profile Loss of grease on the release bearing (overheating)	Replace the sealing ring Replace the clutch
Friction lining on the flywheel side shows scoring	Flywheel contact surface shows scoring	Rework the flywheel friction surface; replace the flywheel if necessary
Flywheel friction surface is deeper than the mounting surface (not applicable for a dished flywheel)	When reworking the flywheel friction surface, the mounting surface was not rotated at the same time	Rework the flywheel in its entirety Replace the flywheel
Guide sleeve worn	Not lubricated or incorrectly lubricated (only applicable for metal guide sleeves)	Replace the guide sleeve Lubricate correctly
Heavy operation of the release system	Bearing arrangement on the release shaft worn Bearing arrangement on the release shaft not lubricated Guide sleeve worn	Replace sleeves Lubricate

Heavy Clutch operation

The clutch disc, pressure plate or flywheel very rarely cause clutch operation to be stiff. The problem often lies with the release system and its associated components, such as the release bearing, the release shaft or the guide sleeve.

Characteristic	Cause	Remedy
Incorrect clutch pressure plate	Release load too high	Install the correct clutch pressure plate
Guide sleeve worn	Release bearing eroded, Incorrect pairing, not greased, greased incorrectly	Replace, combine the correct parts, lubricate Do not use grease that contains adipic components
Bearing arrangement on the release shaft worn	Sleeves worn, bearing points not greased	Replace, lubricate
Clutch cable worn	Normal wear Cable routed incorrectly	Replace Route cable correctly

Clutch grabs

A faulty engine bearing or an inaccurate engine setting can prevent soft clutch engagement. Installing an incorrect clutch can also cause the clutch to grab.

Characteristic	Cause	Remedy
Pressure plate lifts at an angle	Tangential leaf spring(s) bent/compressed	Replace the clutch pressure plate
Lining oiled/greased	Faulty rotary shaft seal (engine/transmission) Hub profile covered in excess grease Loss of grease from the release bearing (overheating)	Replace the seal and clutch disc Replace the clutch disc Replace the release bearing
Incorrect clutch disc		Use the specified clutch disc
Heavy operation of the release system Stiff actuation	Bearing arrangement on the release shaft worn Bearing arrangement on the release shaft not lubricated Guide sleeve worn, faulty master/slave cylinder	Replace worn or faulty components
Air in the hydraulic system of the clutch	Hydraulic system leaking or faulty	Replace faulty components as necessary and bleed according to the manufacturer's specifications
Guide sleeve worn	Not greased/incorrectly greased	Replace the guide sleeve, use the specified grease
Engine/transmission suspension	Suspension faulty/knocked out	Repair or replace
Faulty pilot bearing	Angular or parallel displacement between the engine and transmission	Replace the pilot bearing Check the centring of the engine and transmission

Service Info

Image 1: Clutch booster with an extended ram

Leakage in the clutch system

Vehicle type: MAN TGX, TGA, TGS
Neoplan Cityliner, Tourliner, Trendliner

In the vehicles listed above, replacing the clutch can result in leaks in the clutch booster (OE no.: 81.30725.6084).

This is caused by an adverse combination of pressure plate, clutch disc and flywheel tolerances. When this occurs, the clutch booster actuation ram reaches a position outside its operating limit. The effectiveness of the seal is therefore compromised, and hydraulic fluid escapes via the air flow.

This issue can only be resolved with a modified clutch booster. This is fitted with an extended ram and is available from the vehicle manufacturer under part no. 81.30725.6116.

Please observe the vehicle manufacturer specifications!

Clutch system malfunction
Clutch booster does not function correctly

Vehicle type: Mercedes-Benz Actros MP2, Axor (except GE2)
Type: 930, 932, 933, 934
with transmission 715.5
except code GE2
Electronic drive control II
944, 950, 952, 953, 954, 957
with transmission 715.5

In the above-mentioned vehicles, stiff or blocked pistons in the clutch booster can lead to problems disengaging the clutch.

The complaint can be resolved using the repair kits from the vehicle manufacturer. The kit that is used depends on the relevant hydraulic fluid flow rate.

In vehicles with transmission code G39, the cover plate of the clutch booster must also beresealed after the installation of the repair kit.

Clutch systems filled with Pentosin hydraulic fluid can be identified by the green tank fastener.

Please observe the vehicle manufacturer specifications!

Image 1: Repair kit for clutch boosters operated with DOT 4 brake fluid

Clutch disc with new first stage damper
Six spring torsional damper with first stage damper for higher capacity

Six spring damper with first stage damper

In addition to transmitting engine torque, the clutch disc has the task of preventing torsional engine vibrations from reaching the powertrain, ensuring a smooth start and fast switching.

In order to achieve this, the clutch disc is fitted with a variety of devices, including a torsional damper.

The torsional dampers used today normally comprise eight tangentially arranged helical compression springs. These have a variety of spring rates and form the main damper stage.

Most LuK clutch discs are fitted with six torsion springs. Compared to eight spring dampers, the construction of the springs is longer and they therefore have a larger angular deflection, which reduces the tension and increases the damper capacity.

In order to further increase capacity, an additional first stage damper is integrated into the torsional damper. The first stage damper consists of small springs and a friction control device. The operation resembles that of the torsional damper but with a much lower spring rate. This guarantees the isolation of torsional vibrations from the engine even when idle, and effectively avoids gear rattle.

We have supplemented the entire damper unit with a new hub design that allows for some axial misalignment.

Please observe the vehicle manufacturer specifications!

Grabbing clutch
Possibly caused by incorrect adjustment of the clutch booster

Vehicle type: Mercedes-Benz
Actros MP 2 (2003 -2008)
Actros MP 3 (2008 -)

Type: 932, 933, 934
with code (GE2)
EDC II (Electronic Drive Control)
930, 932, 933, 934, 940, 944
with code GE3
Mercedes PowerShift
930, 932, 933, 934
with code (GE7)
Mercedes PowerShift 2

In the vehicles listed above, is possible for the clutch to grab in a variety of driving situations. This may be due to the inaccurate setting of the clutch booster.

In the event of a complaint, the setting of the ram of the clutch booster must be checked first. This can be done using an adjustment device from the vehicle manufacturer.

Directions for use:
- Remove the ram from the release lever, unscrew the lock nut and reset the ram
- Attach the adjustment device (image 2, left)
- Twist the shaft of the ram until it fits closely with the adjustment device without any play (image 1, right)
- Remove the adjustment device
- Remove the ram and retighten the lock nut
- Insert the ram

Please observe the vehicle manufacturer specifications!

Image 1: The ram of the clutch booster can be adjusted

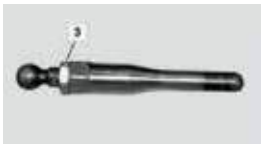


Image 2: Adjustment device from the vehicle manufacturer

Service Info

Release bearings with a plastic sliding sleeve must not be greased

Greasing of the release system
The release bearings and guide sleeve do not always need greasing

A well functioning clutch system includes smooth actuation. Having as little friction as possible between the release bearing and the guide sleeve is therefore paramount.

The sliding sleeves of the release bearings can be made out of either metal or plastic. Due to the various possible material pairings, the following greasing guidelines should be followed during fitment:

• If the sliding contact surfaces of the release bearing and the guide sleeve are made from metal they must definitely be greased

• If release bearings with a plastic sliding sleeve (Image) are installed, these have already been coated with a thin lubricating film at the production stage. They must not be greased

Note:
To avoid mistakes when selecting a lubricant, Castrol Olista Longtime is recommended.

Please observe the vehicle manufacturer specifications!

Problems changing gear after clutch replacement
The clutch actuator push rod must be adjusted after repair

Manufacturer: Iveco
Models: Stralis AT/AD
Eurotronic Automated Gear

In the vehicles listed above, the slave cylinder is fitted with a device which automatically compensates for facing wear of the clutch disc.

For this reason, the slave cylinder push rod must be adjusted precisely when the clutch and/or the clutch actuator is replaced.

Procedure:
• For a removed actuator, move the clutch lever in the direction of the clutch until the idle length is cancelled out
• Measure distance A between the deepest point of the ball socket of the clutch lever and the back face of the clutch actuator
• Completely remove the push rod from the clutch actuator
• Unscrew the bleeder screw from the slave cylinder so that the spring in the cylinder can push the piston forward until it reaches the stop

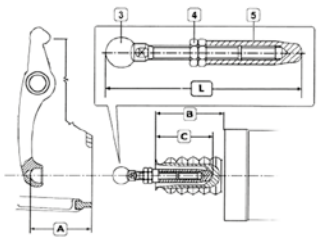
Measure distance B between the back face of the clutch actuator and the front edge of the pressure sleeve. Also measure distance C, which is the depth of the conical pressure sleeve of the piston.

The length (L) of the push rod is then calculated with the following formula:

L = A – B + C + D

A, B and C here are measured values. The measurement D describes the value for the greatest stroke of the clutch actuator, which is 33 mm. If the measured value deviates from this, the ball head and the push rod must be twisted by loosening the nut on the push rod until the required length is reached. The nut on the push rod must subsequently be tightened with 52 Nm and inserted into the clutch actuator.

Please observe the vehicle manufacturer specifications!



The dimensions of the push rod can be calculated with the measured values

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