LuK Repair Solution for Dry Double clutches

Fault diagnosis
Special tools/Disassembly and assembly

Renault
6-speed gearbox DC4

SCHAEFFLER
AUTOMOTIVE AFTERMARKET

LuK INA FAG

Contents

1 Diagnostics of double clutch transmission

1.1 General notes on testing the system

Before starting repair work on the double clutch, the customer needs to answer some basic questions in order to get as precise a picture of the fault as possible.

If the vehicle is still driveable, we recommend that it is taken for a test drive. The customer should be behind the wheel in order to demonstrate any malfunctions.

Specific questions for the customer:

- What exactly is not working/what is the complaint precisely?
- When did the problem start?
- Did the problem occur suddenly or did it develop gradually?
- When does the problem occur?
  Sporadically, often, always?
- Under what driving conditions does the problem occur?
  E.g. when starting from a standstill, accelerating, slowing down, when cold or at normal operating temperature?
- What is the mileage of the vehicle?
- Is the vehicle subjected to unusual stresses?
  E.g. towing, high payload, frequent mountain driving, being used as a taxi, fleet vehicle, rental car, driving school?
- What does the driving profile look like?
  City vehicle, short trips, long-distance, motorway?
- Have repairs already been performed on the clutch/transmission system?
  If so, at what mileage? What was the complaint at the time? What repairs were carried out?

General checks to perform on the vehicle

The following items should be checked prior to starting repair work on the vehicle:

- Error code entries in the ECU (engine, transmission, clutch, amenities, CAN-BUS, etc.)
- Battery power

Double clutch, engine side

Double clutch, gearbox side

1.2 Wear testing

Clutch wear cannot be determined by a test drive. The clutch and transmission system has a sophisticated electronic monitoring system, so if the wear limit is reached a warning will appear on the instrument panel.

1.3 Visual inspection

Before any repairs are carried out in the area of the clutch assembly, it should, as a matter of course, be checked for leaks and damage. Damage due to broken parts or oil leaks due to defective gaskets or o-rings must first be repaired before replacing the clutch. If there is oil on the clutch, it must be replaced.

1.4 Noise

When assessing noises coming from the area of the double clutch during a test drive, it must be ensured that no noises are being generated by surrounding components, such as the exhaust system, heat shields, engine mountings, auxiliary units, etc. The radio, air conditioning and ventilation system should be switched off while diagnosing noises. When in the workshop, a stethoscope can be used to help isolate the source of the noise.

1.5 Diagnostics

The gearbox and clutch electronics have a diagnostic function. The contents of the fault memory must be downloaded using a suitable diagnostic device prior to carrying out repair work, and if possible, printed out and kept as a hard copy. The fault memory log provides an initial overview of system errors and serves as a basis for identifying and implementing further repair measures. It also provides valuable data for assessing fault symptoms (important when contacting the LuK INA FAG service centre or in the case of warranty).

After completing all work on the double clutch, the clutch electronics must be reset.

Note:
If you have any questions about diagnostic and repair work, you can call our Service Center on: +49 6103 753-333.

2 Description and scope of the LuK RepSet® 2CT

The LuK RepSet® 2CT (twin clutch technology) includes all of the components necessary to replace the double clutch system. It is recommended that the engagement system is replaced at the same time as the double clutch. After all, it's likely to suffer wear too.

With LuK RepSet® 2CT, Schaeffler Automotive Aftermarket offers a practical and comprehensive solution. The components contained in the kit are precisely matched to one another at the factory. This ensures that problems that can occur due to mis-matched components can be prevented from the outset.

1 Double clutch
2 Lever actuator for clutch 1 (K1)
3 Return springs for lever actuator K1
4 Lever actuator for clutch 2 (K2)
5 Return springs for lever actuator K2
6 Centring sleeve
7 Engagement bearing for K1 and K2
8 Retaining ring
9 Retaining bolts for lever actuators
10 Retaining bolts for centring sleeve
11 Retaining bolts for servomotors

3 Description and scope of delivery of the LuK special tools

The LuK special tool is essential for the correct dismantling/assembly of the Renault double clutch. The double clutch must be pulled off from the gearbox input shaft during dismantling, and pressed back on again during assembly. In addition, the return springs must be correctly adjusted and the transport locks on clutches K1 and K2 released following mounting.

If a previously removed double clutch is reused (for instance, due to work being carried out on the gearbox gasket), the transport lock must be re-enabled.

Schaeffler Automotive Aftermarket has developed a modular tool system specifically for current and future LuK brand dry double clutch systems. The modular units are all compatible with one another.

Note:
If you have any questions about the special tools, please call our LuK INA FAG Service Centre on: +49 6103 753-333.

3.1 Basic tool kit

The basic tool set (part no. 400 0418 10) constitutes the basis of the modular tool system. It includes the tools generally needed to perform all double clutch repairs.

Together with a vehicle-specific tool set, they complement each other to form a full set of tools for carrying out professional repairs. This applies to all dry double clutch systems currently available from LuK.

1 Cross brace with spindle and thrust piece
2 3 knurled screws
3 3 threaded bolts, M10, 100 mm long
4 3 threaded bolts, M10, 160 mm long
5 Retaining ring pliers, angled
6 Magnet
7 Gearbox support with height adjustment
8 2 stoppers for differential openings
9 DMF extraction tool
10 Release tool
11 Special open-end spanner
12 DVD with removal / installation instructions and training video

3.2 Renault tool kit

This tool set (part no. 400 0423 10) includes all the tools needed to perform professional repairs on a Renault dry double clutch (6-speed gearbox DC4). It is intended to be used in conjunction with the basic tool set.

1 3 hooks
2 Thrust sleeve installation
3 Support sleeve removal
4 Locking piece
5 DVD with removal/ installation instructions and training video

3.3 Reset tool kit

All new double clutches for Renault with DC4 gearboxes are equipped with a transport lock. Consequently no additional work is required prior to installation.

If the double clutch is reused following removal (for instance, due to work being carried out on the gearbox gasket), the transport lock must be re-enabled. The alignment tool set (part no. 400 0425 10) should be used for this purpose.

1 Base plate with spindle
2 Locking nut
3 Adapter
4 2 locating pins
5 2 knurled nuts
6 Thrust piece K2 - Ø 115 mm
7 Thrust piece K2 - Ø 131 mm
8 Thrust ring K1 - Ø 85 mm
9 Thrust ring K1 - Ø 105 mm
10 Locating ring K1
11 Locating ring K2
12 3 locating lugs K1
13 DVD with removal/ installation instructions and training video

4 Disassembly and assembly of the double clutch

LuK RepSet® 2CT training DVD

The 'LuK RepSet® 2CT - Renault' training video illustrates and explains all the steps involved in removing and installing the double clutch using the LuK special tools.

The clear and easy-to-understand video and brochures are contained on the DVD included in our special tools toolbox. We will also send the DVD to you on request (part no. 999 6003 500).

Note:
If you have any questions about the DVD, please call our LuK INA FAG Service Centre on: +49 6103 753-333.

The latest version of the training video and brochure can be downloaded at any time from www.RepXpert.com and www.schaeffler-aftermarket.com.

4.1 Repair guidelines

These guidelines apply to:
Renault 6-speed gearbox DC4 with dry double clutch

Pre-fitted with:
LuK RepSet® 2CT, part no. 602 0005 00

Using the special tools:
LuK basic tool set, part no. 400 0418 10
LuK Renault tool set, part no. 400 0423 10
LuK alignment tool set, part no. 400 0425 10

Important information for a professional repair:

- Repairs should only be performed by qualified personnel and with workshop tools and equipment appropriate for the job
- Due to the constant implementation of technical advancements in the series by the vehicle manufacturer, changes to the repair process or the special tools required may arise
- A repair must always be carried out using the latest repair manual and corresponding special tool

Up-to-date information and instructions can be found at:
www.schaeffler-aftermarket.com oder www.RepXpert.com

- Should transmission oil leak out during the repair work, the oil level must be checked after installing the transmission and topped up as necessary.
- The dual mass flywheel (DMF) must be inspected when replacing the clutch and replaced if necessary. Particular attention should be given to the internal gear teeth and locking ring when doing so. You can find more information about the DMF in the brochures ‘The dry double clutch’ and ‘Dual Mass Flywheel’.
- As with a repair on a standard clutch, the pilot bearing must be inspected and replaced if necessary.
- Before installing the double clutch, the gearbox input shaft must be thoroughly cleaned and carefully inspected for damage. Then a suitable lubricant must be applied to the gear teeth, making sure that it complies to the correct vehicle manufacturer recommendations and specifications. If the manufacturer makes no lubricant recommendations, then high-temperature, ageing-resistant, high-performance greases with MoS2 (e.g. Castrol Olista Longtime 2 or 3) can be used as an alternative.
- The components of the engagement and clutch system must not be greased or oiled.
- After installing the clutch and gearbox, a suitable diagnostic system must be used to perform the basic adjustment of the system.
- Oily and/or dirty gearbox parts must be cleaned before the new components can be used. Particular care must be taken to ensure cleanliness throughout the course of the repair process.
- If the double clutch is to be reused following removal (for instance, due to work being carried out on the gearbox gasket), the double clutch transport lock must be re-enabled.

Caution:
- DMF or double clutch assemblies which have been dropped may no longer be used.
- Assemblies and components should not be cleaned with a pressure washer.
- The disassembly of components is not permitted.

4.2 Removal of the double clutch

Caution:
Remove the transmission according to the vehicle manufacturer's instructions!

- After removing, seal the transmission openings of the differential with the stoppers (KL-0500-8012)

- Mount the transmission on an assembly jig or place on a work bench and secure it with the gearbox support (KL-0500-802) so that the transmission is stable and the clutch housing is positioned horizontally

- Remove the retaining ring from the upper clutch disc hub (K1) using a screwdriver

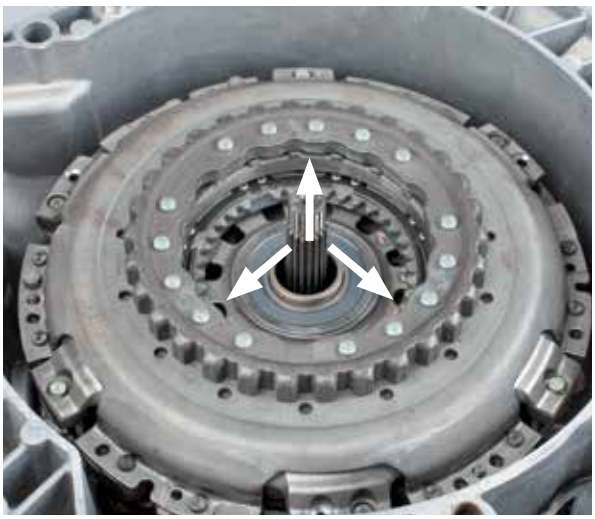
4.2 Removal of the double clutch

- Remove the retaining ring and clutch disk hub (K1)

- Remove the retaining ring from the hollow shaft with the retaining ring pliers (KL-0192-12); the ring usually gets damaged in the process and needs replacing

Note:
If the retaining ring cannot be removed from the groove in the hollow shaft, depress the clutch slightly with the help of the special tool set as illustrated on page 32.

- Insert 3 hooks (KL-0500-824) each offset by 120° into the clutch assembly



- Set the magnetic lifter of the hook on the clutch

- Push the hook down and swivel into the clutch housing

- Repeat the procedure with the two remaining hooks

4.2 Removal of the double clutch

- Place the support sleeve (KL-0500-8212) on the hollow shaft

- Guide the locking piece (KL-0500-8210) with the central hole over the support sleeve and attach the hooks

Note:
This ensures that the hooks don't slip out when pulling off the double clutch.

- Snap 120° locking mechanisms onto the cross brace; place the cross brace (KL-0500-601A) on supporting sleeve and hooks

- Position the spindle so that the hooks can be mounted to the cross brace without strain using the knurled screws

- Screw the knurled screw hand tight into the hooks

- Tighten the 3 Allen screws on the cross brace

- Remove the clutch assembly from the hollow shaft by turning the spindle

4.2 Removal of the double clutch

- Remove the clutch assembly with the cross brace

Caution:
If the clutch is to be reused, lay it carefully on a soft surface. Otherwise there is a risk of damaging the plate springs.

4.3 Removal of the engaging system

- Remove the engagement bearings K1 and K2

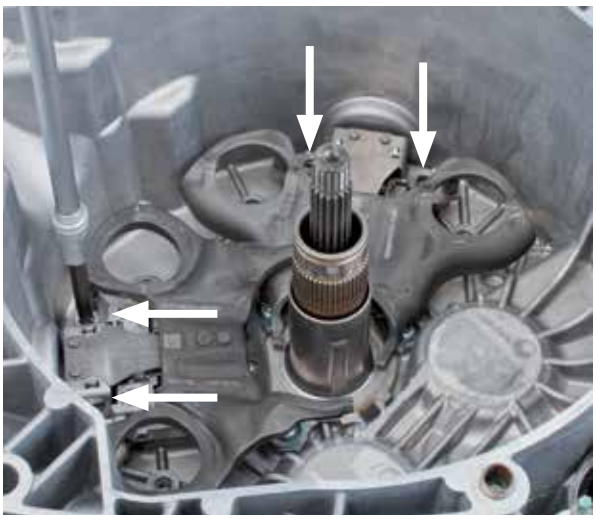
- Remove the screws holding the two servomotors (for K1 and K2)

4.3 Removal of the engaging system

- Remove the servomotors

- Loosen and remove the return springs

- Unscrew and remove the retaining bolts securing the lever actuators



4.3 Removal of the engaging system

- Remove both lever actuators

Note:
If the lever actuators are to be reused, they must be removed on the base plate and placed on a soft surface.

- Remove the 3 screws holding the centring sleeve

- Remove the centring sleeve

- Check the radial shaft sealing rings on the transmission input shafts for leaks

- Clean the transmission input shafts

Caution:
The bearing seat for the hollow shaft must be cleaned and be in perfect condition! If the bearing seat is oxidised or damaged, the force when depressing the clutch is increased to inadmissible levels resulting in damage to the hollow shaft bearing in the gearbox!

- Check that guide sleeves and pins are firmly seated

4.4 Installation of the engaging system

- Insert new centring sleeve; these only fit in one position

- Make sure that the centring sleeve is correctly seated

4.4 Installation of the engaging system

- Tighten the new screws to 8 Nm

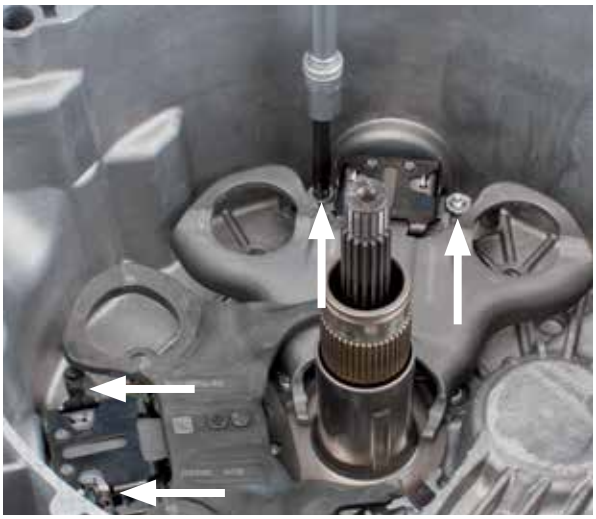
- Insert new lever actuators for K2 (narrow fork opening). The correct position is determined by the guide sleeve and guide pin

Note:
During installation, the lever actuators for K1 and K2 must be held by the base plate. Failure to do so may result in malfunction of the engagement system

- Insert new lever actuators for K1 (wide fork opening). The correct position is determined by the guide sleeve and guide pin

- Plug in the two servomotors and if applicable fix with a screw (the plug on the lever actuator of K1 is mounted horizontally and the plug on the lever actuator of K2 vertically)
- If the gear teeth don’t match up right away, the motor shaft must be rotated slightly

- Tighten the new screws on the base plate of the lever actuators to 19 Nm



- Return spring and lever actuator are matched to each other at the factory and must therefore be correctly paired up

4.4 Installation of the engaging system

- The middle 4 digits on the return spring and the last 4 digits on the lever actuator must be identical

Note:
The LuK RepSet® 2CT always contains four return springs and two lever actuators. Two of each of the return springs have the same four-digit number and are used in pairs in the corresponding lever actuator.

- Tighten the return spring to 26 Nm

Note:
It sometimes happens that after tightening the return spring, the markings on the housing of the return spring do not match the markings on the lever actuator. If this is the case, the return spring must be realigned.

- Use the special open-end spanner (KL-0500-8010) on the housing of the return spring and turn it so that the markings are aligned facing each other

- Remove the transport lock from both lever actuators

Caution:
Failure to remove them may result in damage to the clutch!

4.4 Installation of the engaging system

- Insert the engagement bearing for K1 and K2

Caution:
The two engagement bearings are connected to each other and should not be disassembled. When inserting, hold by the outer ring and carefully slide onto the centring sleeve. Installation is only possible in one position .

4.5 Installation of the double clutch

If a used double clutch is to be reinstalled following removal (for instance, due to work being carried out on the gearbox gasket), the double clutch transport lock must be reactivated (see chapter 5).

- Arrange two pea-sized portions (0.2 grams each) of lubricant on a piece of cardboard

Note:
Make sure that the lubricant meets vehicle manufacturer recommendations and specifications. If no information is available, then a high-temperature, ageing-resistant, high-performance grease with MoS2 (e.g. Castrol Olista Longtime 2 or 3) can be used.

- Use a paintbrush to apply one portion of lubricant to the teeth of the hollow shaft

- Use the paintbrush to apply the other portion to the teeth of the solid shaft

Caution:
Excessive use of lubricant can impair operating comfort and/or cause the dual clutch to fail.

4.5 Installation of the double clutch

- Moisten the full circumference of the bearing seat of the transmission input shaft with a drop of oil

Caution:
Excessive use of lubricant can impair operating comfort and/or cause the dual clutch to fail.

- Prepare the clutch for installation (mount the special tool)

Caution:
Inserting the clutch without using the special tool may result in injury!

- Use support sleeve (KL-0500-8212) when inserting

- Put the new clutch assembly on the hollow shaft; turning slightly ensures that the gear teeth of clutch plate K2 and the hollow shaft mesh with each other

4.5 Installation of the double clutch

- Remove cross brace, locking piece, press-fit sleeve and extractor hooks from the clutch assembly

- Disengage the 120° lock mechanisms on the cross brace

- Check whether the clutch is seated securely on the shaft. To do this, measure the distance from the upper edge of the bearing inner ring to the end face of the hollow shaft; this may not exceed 7 mm

- If the gap exceeds that distance, then the teeth are not properly engaged

- Place thrust sleeve (KL-0500-8211) onto the bearing inner ring of the clutch assembly

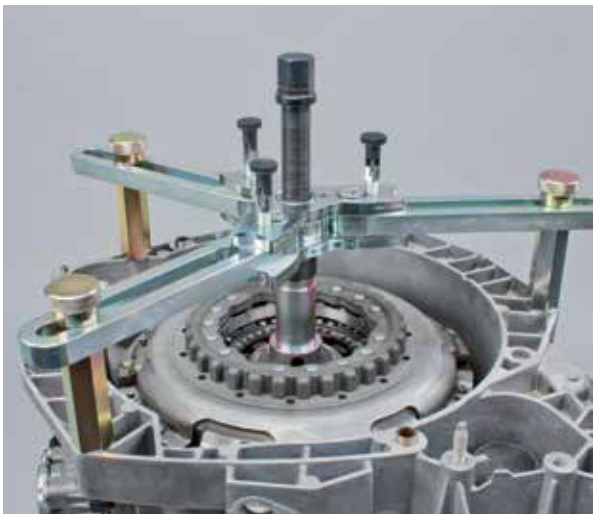
- Fit 3 threaded bolts (KL-0500-6021 or KL-0500-6022) to the gearbox housing using collar nuts

Note:
Bolts with long or short threads are used depending on the mounting options on the gearbox.

- Position the threaded bolts at angles of roughly 120° to each other

- Fix cross brace (KL-0500-60) to the threaded bolts using knurled screws (KL-0500-6020), ensuring that it is not under strain

Note:
The spindle must be aligned with the centre of the clutch, fit into the press-fit sleeve, and slide smoothly (lubricated).



- Tighten the 3 Allen screws on the cross brace

4.5 Installation of the double clutch

- Press the clutch onto the hollow shaft by turning the spindle above the press-fit sleeve; the press-fitting procedure is complete as soon as the groove for the retaining ring is completely visible through one of the windows in the press-fit sleeve, and the effort required to turn the spindle increases noticeably.

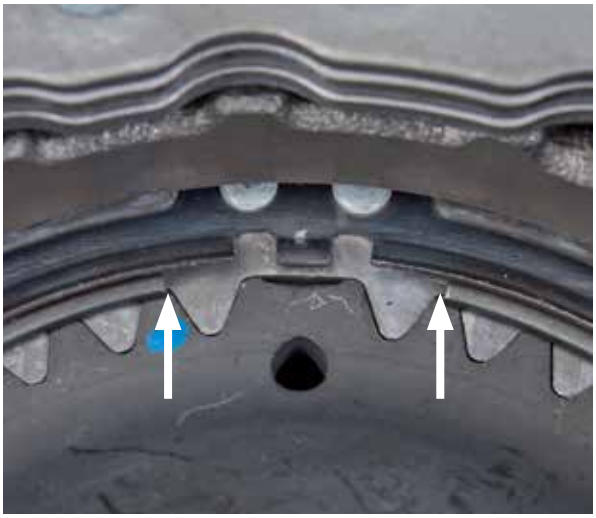
Caution:
Turning the spindle further will result in damage to the hollow shaft bearing. The consequence of this is gearbox failure!

Note:
The spindle should be operated using a torque wrench set to a maximum torque of 9 Nm. The force applied to the spindle must not lead to the torque wrench being triggered! If it triggers before the clutch has reached its final position, this indicates a problem!

- Fit a new retaining ring onto the hollow shaft using retaining ring pliers (KL-0192-12); the side of the retaining ring on which the opening is smaller must be facing up

- Fit the clutch disc hub of the upper clutch disc (K1); installation is only possible in one position

- Install the retaining ring in such a way that the abutting surface of the ring is centred on the metal tab, i.e. sits opposite the large tooth



4.6 Disabling the transport locks of the double clutch

- Remove both servomotors

- Insert the release tool (KL-0500-8011) into the lever actuator for K2 with the marking (on the grooved surface) upwards

4.6 Disabling the transport locks of the double clutch

- Turn the release tool in an anti-clockwise direction until a sound is heard. Then turn the release tool one more time

- Max 12 turns

Caution:
The release tool is under tension and should not be let go of suddenly. The spring tension must be released gradually by slowly winding back, otherwise the lever actuator will be damaged.

- Insert the release tool into the lever actuator for K1 with the marking upwards

- Turn the release tool in an anti-clockwise direction until a sound is heard. Then turn the release tool one more time

- Max 12 turns

Caution:
The release tool is under tension and should not be let go of suddenly. The spring tension must be released gradually by slowly winding back, otherwise the lever actuator will be damaged.

- Install both servomotors tightening torque: 5.5 Nm

- Refit the transmission according to the vehicle manufacturer's specifications

Caution:
It must be possible to fit the engine and transmission together by hand to the extent that engine and gearbox flanges are fully in contact. Only then may the components be screwed together. Failure to do so may result in damage to the double clutch!

Caution:
If transmission oil leaks out during the repair work, the oil level must be checked after installing the transmission and topped up as necessary. After installing the clutch and transmission, the system should be reset to the factory settings with the help of a suitable diagnostic system!

5 Enabling the transport lock of an already used double clutch

If a used double clutch is to be reinstalled following removal (for instance, due to work being carried out on the gearbox gasket), the double clutch transport lock must be reactivated. The alignment tool set (part no. 400 0425 10) is required for this purpose.

- Clamp the base plate with spindle (KI-0500-713) in a vice

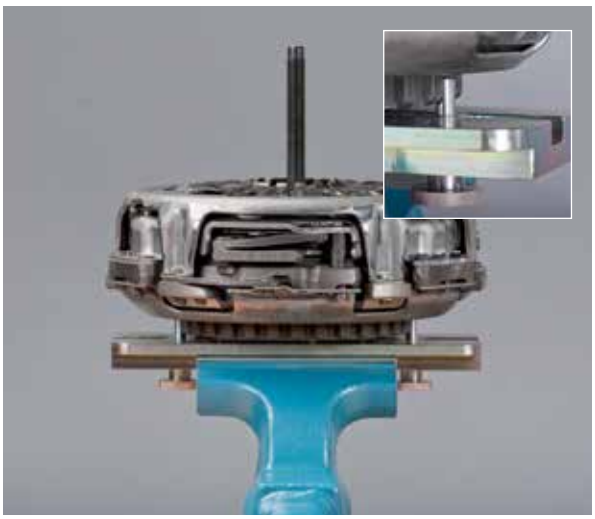
5 Enabling the transport lock of an already used double clutch

- Insert the locating pins in the guides of the base plate and fit the knurled nuts

- Slide both locating pins outwards

- Place the double clutch on the base plate with the plate springs facing upwards

- Slide the locating pins into the teeth of the DMF attachment and tighten the knurled nuts



- Attach thrust piece K2, Ø 115 mm (KL-0500-716)

Note:
Position the three long brackets of the thrust piece above the inner bolts of the double clutch between the plate spring tabs.

- At first, only turn the clamping nut on the spindle far enough so that it lies against the thrust piece

- Place the large locating ring for K2 (KL-0500-714) on the double clutch and fit into the tabs of the adjusting ring

- Rotate the locating ring in an anti-clockwise direction (the direction of the arrow on the ring) as far as it will go and hold

- Hold the locating ring in this position with one hand and screw down the locking nut with the other until the force needed to do so increases noticeably

Note:
Transport lock K2 is engaged when an obvious sound is to be heard.

Caution:
Do not let go of the locating ring until the transport lock is engaged.

- Remove the clamping nut, locating ring claw fastener and locating ring

Note:
A readjustment sound will be heard when releasing the clamping nut. This happens for technical reasons and merely confirms the proper function of the automatic adjustment function of clutch K2.

- Check whether all the transport lock spring clips are engaged

- Place thrust ring K1, Ø 85 mm (KL-0500-7110), on top of plate spring K1

- Plug the adapter into the thrust plate

- At first, only turn the locking nut on the spindle far enough so that it rests against the adapter

- Insert the small locating ring for K1 (KL-0500-715) into the 3 slots of the adjusting ring for K1

- Turn the locating ring in a clockwise direction (direction of arrow) as far as it will go

- Hold the locating ring in this position with one hand and screw down the locking nut with the other until the transport lock clips can be hooked in
- Remove the locating ring

- Insert the tabs of transport lock K1 with the help of the locating lugs

- Release the locking nut and unscrew (the locating lugs will fall over)

Note:
A readjustment sound will be heard when releasing the clamping nut. This happens for technical reasons and only demonstrates that the automatic adjustment function of clutch K1 is working properly.

- Remove the remaining special tools
- Check whether all the lugs of transport lock K1 are hooked in
- The double clutch is now ready to be reinstalled

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	LuK	●	●	●	●	
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