

Guide to diagnosing clutch malfunctions and failures

v.1.0

KAWWE Clutch Academy

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Guide to diagnosing clutch malfunctions and failures v.1.0
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1. Checklist when assembling a new KAWE clutch.

1. Drive in the vehicle before replacing the clutch.
This will indicate if problems not related to the clutch (such as noise, judder etc.) are in the vehicle.
 2. Disassemble the clutch. Mark the direction of the disc (which side towards clutch cover or flywheel).
 3. Check if oil seals of the gearbox and engine are OK (no oil in bell housing).
 4. Clean the bell housing. In case of hydraulic bearings; never use aggressive fluids such as: brake cleaner, fuel, etc.
 5. Check the pilot bearing.
 6. Make sure the flywheel surface is flat, free from cracks, free from heat spots, etc. Machining or replacing a flywheel is advised to prevent clutch engaging judder.
 7. Check the splines of the shaft(s).
 8. Check the bearings of the shaft(s).
 9. Check the release fork on wear, etc.
 10. Check the guide bushing for release bearing(s) on defects, wear, etc.
 11. Check the complete disengaging system on defects, wear, etc.
 12. Check if splines of the disc(s) move smoothly over the splines of the shaft(s).
 13. Put small special high viscosity grease on the splines of the shaft(s).
 14. - In case of release bearing with metal bushing:
put grease on the inner diameter of the bearing
- In case of release bearing with plastic bushing:
put small amount oil or thin grease on the inner diameter of the bearing.
 15. Put special high viscosity grease on the release bearing(s) where the fork has contact.
 16. Assemble the clutch bearing(s).
 17. Place the clutch disc and align it (alignment tool is advised).
 18. Assemble the clutch cover by cross fixing the bolts.
 19. Remove the transport clips when present.
 20. Adjust parts on the clutch cover when necessary (attached manual).
 21. Assemble the gearbox by smoothly sliding it towards engine. Make sure the shaft(s) are perfect in line with the hubs (otherwise disc(s) will be damaged).
 22. Assemble all other parts.
 23. Adjust free play of the release bearing(s) and pedal when necessary.
 24. Bleed the system in case of hydraulic fluid.
 25. Calibrate new clutch with correct software in case of sensor on release bearing.
 26. Use clutch first moments gently without heavy clutch work (as new brakes).
- Always: If parts related to the clutch have too much wear; correct or replace them!

2. Recognizing clutch malfunctions by complaint

2.1 Clutch is not (correctly) disengaging.

- Disc is bent/deformed.
- Pilot bearing defective (on dual clutch, this can also be bearing between 2 shafts.)
- Flywheel step incorrect.
- Release mechanism defective or parts not greased.
- Flywheel machined too much/too often (under minimum dimension).
- Hub in disc slides not freely over shaft.
- Clutch system suffers from grease, dust or dirt.
- Parts of the clutch system broken or damaged.
- Too heavy to operate -> Release mechanism not okay.
- Wrong part number(s) used.

2.2 Clutch slipping.

- Oil/grease on clutch facing or inside clutch.
- Driving with partly disengaged clutch due to defect in release mechanism.
- Driving with partly disengaged clutch due to driver error -> Foot resting to pedal.
- Flywheel step incorrect.
- Poor flywheel surface.
- Facing material is worn out.
- In case of dual clutch; driving with disengaged PTO.
- Wrong part number(s) used.

2.3 Clutch judder during engaging.

- Poor flywheel surface.
- Disc is bent/deformed.

- Disc can not rotate freely.
- Splines of shaft worn.
- Too much play in drivetrain.
- Oil/grease in clutch.
- Parts in the clutch are broken.
- Release mechanism defective.
- Fork defective.
- Guide bushing for release bearing defective.
- Hub in disc slides not freely over shaft.
- Parts of the clutch system broken or damaged.
- Wrong part number(s) used.

2.4 Clutch vibrations at certain rpm, regardless of clutch use (= unbalance).

- Diameter or pins on flywheel for centering clutch cover incorrect.
- Flywheel not correctly centered on crankshaft.
- Dirt between flywheel and clutch cover.
- Clutch has much grease and/or dirt on one spot.
- Parts in the clutch are broken.
- Wrong part number(s) used.

2.5 Clutch noise.

- Parts are jamming.
- Parts in the clutch are broken or damaged.
- During engaging -> Flywheel surface not okay.
- During disengaging -> No grease on contact parts release mechanism.
- During disengaged situation -> Release bearing defective.
- Wrong part number(s) used.

2.6 Clutch premature failure.

- Facing worn out.
- Extreme clutch use.
- Parts in the clutch are broken.
- Wrong part number(s) used.

3. Recognizing clutch malfunctions by defective parts

3.1 Clutch disc

A. Damper broken, springs, damaged (broken) and/or come out.

Major causes:

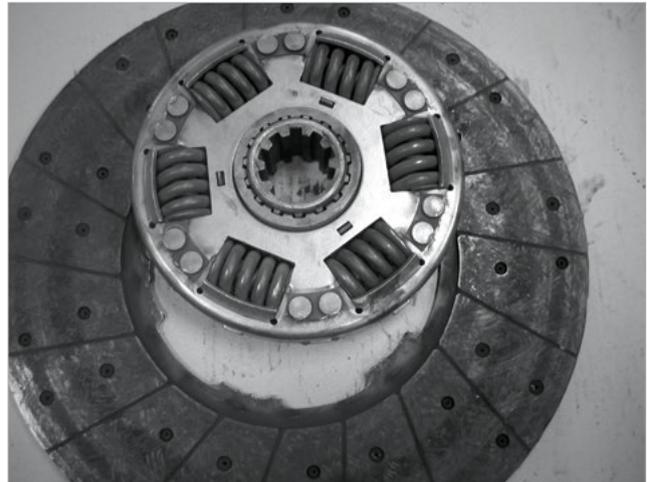
- Driving in too low rpm.
- Stick-slip.
 - Clutch slipping partly (e.g.: 1 rotation of the engine gives 0,9 rotation on primary shaft).
 - Leads to extreme vibrations and wear on clutch.
- Oil in the clutch.
- Overload on the clutch.
- Wrong part number(s) used.



B. Damper completely torn out.

Major causes:

- Overload on clutch. Disc is constructed to break up in case of overload, to protect the drive train.
- Driving in too low rpm.
- Stick-slip.
 - Clutch slipping partly (e.g.: 1 rotation of the engine gives 0,9 rotation on primary shaft)
- Leads to extreme vibrations and wear on clutch.
- Oil in the clutch.
- Wrong part number(s) used.



C. Disc bent, too much wrong out.

Major causes:

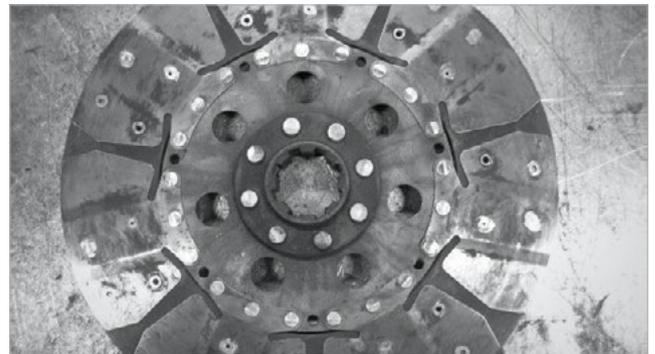
- Assembling error. Splines input shaft gearbox not in line with hub splines.
- Transport damage.
- Bad splines on input shaft.
- Disc assembled wrong way around.
- Wrong part number(s) used.



D. Facing burnt, worn out, broken or completely off.

Major causes:

- Clutch slipping.
- Extreme many clutch engagements and/or under very heavy conditions.
- Exceeding max. rpm (shifting gear error).
- Engaging error (too aggressive).
- Poor flywheel surface.
- Wrong part number(s) used.

**E. Hub splines damaged.**

Major causes:

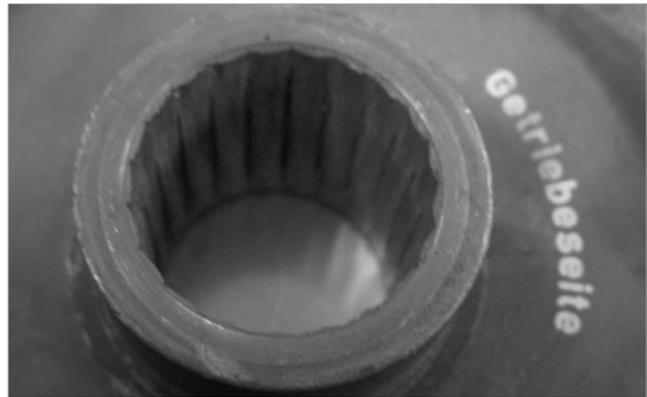
- Assembling error. Splines input shaft gearbox not in line with hub splines.
- Wrong part number(s) used.



F. Hub splines partly or completely hammered out.

Major causes:

- Worn out splines input shaft.
- Pilot bearing missing or too much play.
- Irregular running engine (e.g. cold start).
- Too much play in drive train.
- Wrong part number(s) used.



G. Stop pins damaged.

Major causes:

- Towing vehicle, shifting gear error, extreme engine braking.
- Stick-slip.
- Irregular running engine (e.g. cold start).
- Extreme clutch engagements and/or under very heavy conditions.
- Too much play in drive train.

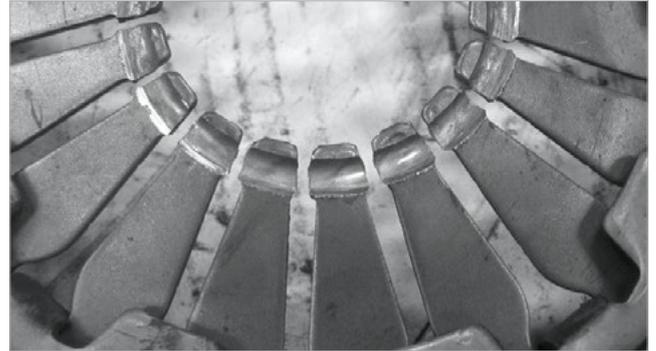


3.2 Clutch cover.

A. Diaphragm tips worn in, release levers worn in/damaged.

Major causes:

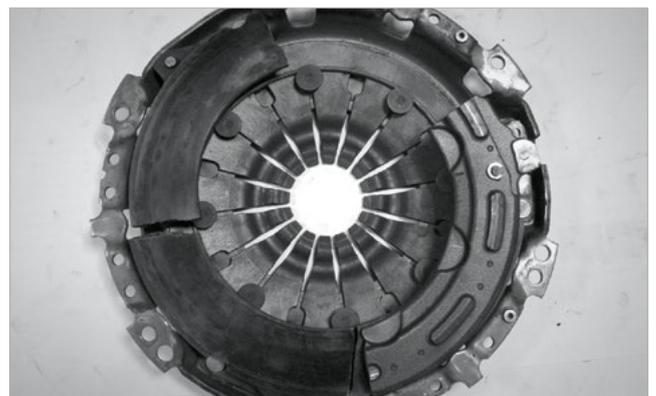
- Release bearing not running freely.
- Release bearing rotating not concentric to clutch cover.
- Preload release bearing incorrect.
- Diaphragm damaged during assembling gearbox.



B. Pressure plate blue, colored spots and/or broken.

Major causes:

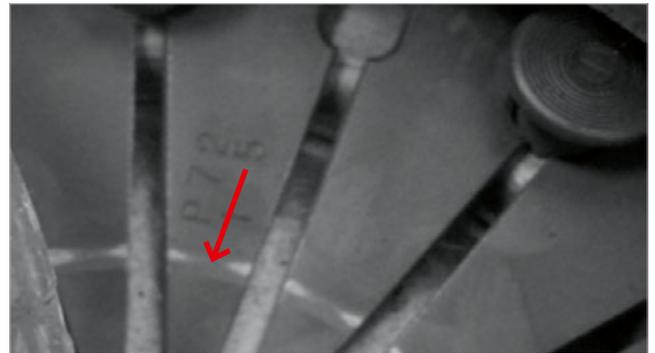
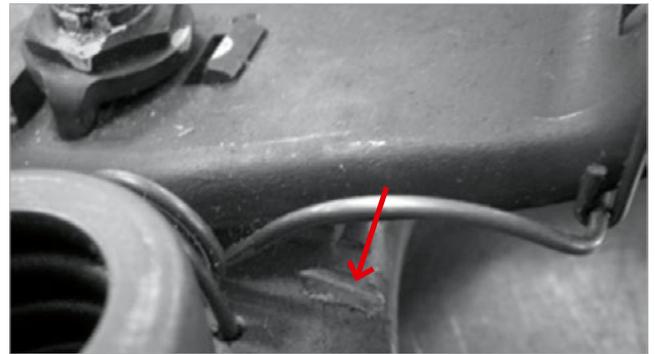
- Overheating due to slipping.
- Extreme engagement vibrations.
- Stick-slip in clutch.



E. Levers / diaphragm jammed on lower side.

Major causes:

- Pushed in too far.
- Flywheel step incorrect.
- Clutch disc too thick (always use disc and clutch cover from same supplier).
- Clutch disc assembled wrong way around.

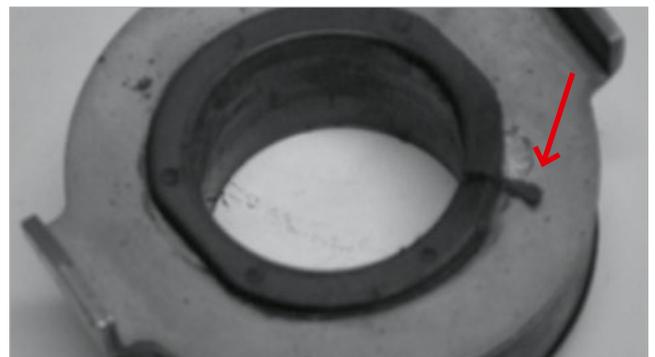
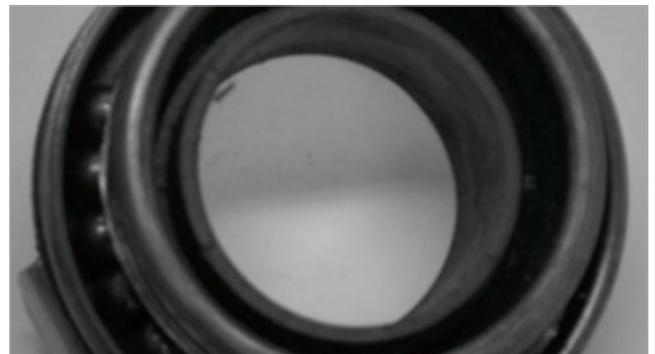


3.3 Release bearing.

A. Failed, damaged.

Major causes:

- Assembling error.
- Incorrect preload.
- Worn out guide tube.
- Worn out fork.
- Overheated clutch.



B. Making noise (when noise is in engaged situation, mostly it is not the release bearing).

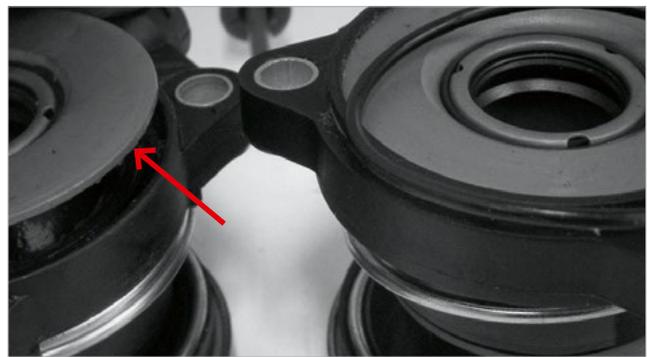
Major causes:

- Assembling error.
- Incorrect preload.
- Worn out guide tube.
- Worn out fork.
- Overheated clutch.

C. Leaking (hydraulic, pneumatic bearing).

Major causes:

- Assembling error.
- When necessary: rubber spacer ring forgotten.
- Wrong fluid got into bearing (engine oil, gearbox oil, brake cleaner, fuel, etc).
- Seal connection tube not OK.
- Overheated clutch.
- Wrong part number used (there are bearings for DOT fluid and bearings for Mineral oil). Absolutely not interchangeable.



Back plate out.



Seal swollen and/or out.

4. Trouble shooting (fill in completely to get good feedback)

Customer name	
Date	
Article no. KAWE	
Your ref. (name your customer, your ref nr., Other)	
Contact person	
E-mailadress (for testreport)	

Vehicle data

Brand + Type + Model					
Vin nr.					
Year of make					
Date assembled					
Date disassembled					
Running time	<table border="1"> <tr> <td></td> <td>Kilometer/Hour</td> </tr> <tr> <td></td> <td>Strike what's not correct</td> </tr> </table>		Kilometer/Hour		Strike what's not correct
	Kilometer/Hour				
	Strike what's not correct				

Problem (make a selection and add extra info)

Not disengaging With dual clutch: Drive and/or PTO?	
Judder during engaging/driving off	
Making noise At which conditions?	
Vibrations (unbalance) NOTE: Clutch use has no influence At which rpm?	
Clutch worn out premature	
Other. Namely:	

Description: Give a clear and detailed description of the problem and under which circumstances it is occurred.

What was noticed during use after installation.

What was noticed on the parts.

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