



Starter

Fault diagnosis

Electrical faults in the starter can mostly to be put down to an overload. This can be due to short-circuits to earth in field and rotor winding, but sometimes also in the winding of the control components (solenoid switches). Carbon brushes and commutator are heavy duty contact components and are more vulnerable to faults than the generator. E.g. sticking carbon brushes in the generator do not cause any current build up and no load. In the starter, this leads to the formation of considerable arcs due to the high current, through this the commutator is often damaged. Multimeter and an amperemeter are needed for fault diagnosis. But failure sources (e.g. pinions) can also be identified by noise recognition. Please note the technical info: "Ground (31)". The following table shows possible failure causes and the remedy:

Fault	Diagnosis/Cause	Remedy
Starter doesn't turn when ignition turned to position 2 (start)	Switch on dipped beam. Lights dim or go out when ignition turned = Cable or earth strap defective; insufficient current through loose or oxidised connections; Discharged battery or alternator defective. Solenoid doesn't activate: Terminal 30 and 50 bridge on starter, starter runs and engages = Defective Ignition Switch or cabling. Solenoid activates: remove battery cable from terminal 30 and touch the terminal directly underneath it. Starter turns = Solenoid contacts dirty or corroded. <i>If the starter does not turn when terminal 30 is touched directly on the terminal below connector 30.</i> Brushes worn out Sticking brushes Brush springs weak or broken Commutator dirty Commutator worn or burnt Field or coil windings defective	Test battery cable and contacts Clean Battery pole and connector Check earth/ground connections Check battery voltage Check alternator Renew ignition switch Repair cabling Renew/clean solenoid and contacts Renew brushes Clean brushes and guides Renew springs Clean commutator Overhaul or renew Starter



Starter engages but doesn't or slowly turns engine	Flat battery Restricted current flow due to corroded or oxidised terminals Sticking brushes Brushes worn out Dirty commutator Burnt or worn commutator Field or Coil windings defective	Charge, test battery Clean battery poles and terminals Clean brushes and guides Renew brushes Clean commutator Overhaul or renew Starter
Starter pinion tries to and creates noise	Starter dog defective Flywheel ring gear teeth defective	Renew Starter Dog Overhaul flywheel ring gear teeth or renew ring gear if necessary
Starter dog doesn't attempt to engage	Shaft or thread dirty or damaged Solenoid defective Return spring worn or damaged	Overhaul or if necessary renew Starter Renew Solenoid Renew return spring
Starter turns after ignition key is let go of.	Defective ignition switch Starter relay defective Switch off engine immediately	Renew ignition switch Renew Starter relay

Attention!

Using the old pinion guide can also lead to considerable malfunctions. This has to be taken into account and replaced also when replacing the starter.

When removing and refitting the starter, the battery should be disconnected.