



Automated gearboxes are increasingly popular, but how do you determine if faults are mechanical or electrical? HL Smith has some answers.

**Is fault diagnosis easier with automated gearboxes?**

In theory, yes. The electronic control unit (ECU) on the gearbox records any faults as a code which the technician then retrieves. Sometimes the code is displayed as a number on an in-cab display, sometimes it is a blinking light sequence and on some transmissions you need to plug in a diagnostic tool to capture the code.

The code and blink-sequences can vary between the various vehicle manufacturers, so you cannot make assumptions that a fault code on one make will be the same fault on another vehicle. You need to confirm with the service manual or the manufacturer's technical department.

Retrieving the code is only the first step, however. It is then up to the technician to interpret what the ECU is trying to tell him. A generic diagnostic tool might only tell you there is a fault, without specifying the cause, although some do have menus that can help you trace the fault. Dedicated systems are

more specific about the actual fault, but can be expensive for nonspecialists to invest in.

Also, it is not just a question of reading-off the fault codes: skill is needed to interpret them. For example, one code may indicate a certain fault, but if that same code is coupled with a second code, the fault may be an entirely different one.

**So what are typical faults on automated gearboxes?**

Gearboxes are complex pieces of machinery, and while electronics make it easier for the driver and technician, it adds another layer into the diagnostic mix. Automatic and automated gearboxes rely on sensors, plugs and wiring harnesses, all of which can develop faults themselves.

The good news is that electronics protect the gearbox from the majority of mechanical problems that in the past could be attributed to driver misuse or abuse by, for example,

ensuring the gearbox is in the right gear for the current road speed and load conditions, and by making the actual shift smoothly.

However, some faults can still be explained as bad practice, either by the workshop or during operation:

**1. Oil starvation.** This is the most damaging to the health of any gearbox. A transmission has lots of moving components, which without the lubricating benefit of enough oil the gearbox will burn out, rendering it irreparable.

Some automated boxes do have oil level sensors, but often by the time these light up, damage has already been done to components. So it is essential to regularly check oil levels. Low oil levels can be a particular problem if your vehicles have PTOs. If the PTO seal fails, oil will escape. If you can see oil on a seal, don't ignore it.

**2. Water ingress.** Steam cleaning can damage seals, and allow water into otherwise protected areas e.g.



oil seals and/or breathers.

**3. Vibration damage.** The vibration of the truck can cause the plastic coating on the wiring harness to wear away, leaving the wires vulnerable to water ingress and corrosion. Water is an excellent electricity conductor, so there can be spikes in the electrical circuit, causing consequential damage to the sensors.

**Are there some simple checks on the electronics?**

Yes. Sensors, wiring harnesses and connectors are the key items. Automated gearboxes rely on data output from sensors to control gear selection and timing. Throttle motion and proximity sensors can all become faulty, misaligned or out of calibration, affecting the output of data. Check the sensors are within the calibrated range. Check plugs and connectors for corrosion. If you think the harness may be faulty, a simple wiring loop test will tell you if there is continuity around the rest of the circuit.

Build-up of debris on the pedals in some vehicles can result in faulty information being sent.

**What should I do if there is still a fault?**

You want to avoid the situation

where you remove the transmission, send it for repair, only to find that it was an electrical or electronic fault that could have been repaired in-situ, or even that it was not a transmission fault at all, but, for example, related to the engine management system.

Increasingly, the solution is to call out a mobile service engineer from a transmission specialist who will be able to do an in-depth check on the transmission while it is still fitted to the vehicle. HL Smith has been investing in their mobile services for this very reason: it reduces downtime and saves unnecessary cost. Its technicians are trained and equipped with manufacturer-specific transmission diagnostic equipment to get to the bottom of the problem, including Volvo VCAD and ZF's Testman Pro.

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