

## 31424700 - Land Rover TD5 Compression Tester User Guide

The Sykes-Pickavant 31424700 Land Rover TD5 compression tester is an on vehicle solution for complete engine compression testing on Land Rover vehicles fitted with the 5 cylinder in-house diesel engine that is usually referred to as TD5 or “Storm”; produced between 1998 & 2007.

Engine codes covered: 10P, 15P & 16P

This 5 cylinder engine family only has 4 glow plugs fitted, thereby when testing compression via the glow plugs – 1 cylinder cannot be tested; so the only way it can be tested is via removal of the full set of unit injectors – and with a dummy injector method... essentially how this tool works.

### Instructions for use:

Engines to be tested should be in a good state of service. Please check first and ensure the air cleaners and engine oil are fit for purpose - If not, replace first before undertaking any compression testing.

The same criteria applies to starter motors and batteries. Check condition of starter motor using a Sykes-Pickavant amps clamp to ensure the starter motor draws no more than 250-300 amps during cranking. Batteries should be checked using a Sykes-Pickavant MDX390 – which critically does not subject the battery to a potentially harmful load test, instead this multi-manufacturer approved tester works via conductance of the battery cells.

A good battery support type smart charger connected to the battery during these tests will be beneficial – e.g. Keepower 15 Amp Charger (88813400) & 30 Amp XL-Pro Charger (88813800)

- 1) If fitted (some may be missing) - remove the large plastic sound guard fitted over the engine bay - This is held in place with 3 bolts.
- 2) Remove the breather hose from the top of the rocker cover, clean away any dirt & debris from the cover, then remove the 13 bolts and spacer washers that secure it to the cylinder head. Lift the cover clear to reveal the fuel injector area – be careful with the spacer washers as they can be very difficult to source should you lose any.
- 3) Disconnect all electrical connections to the 5 fuel injectors. It is possible to remove the injector wiring harness section – via plug connector under the rocker cover o/s/f. Inspect and replace if any damage is seen – this can cause a lack of performance.
- 4) Slacken off the injector actuation adjusters and then the rocker shaft. Be careful to release this evenly or it could easily be damaged. **Note: Land Rover recommends that both the injector adjusters & the rocker mounting bolts should be replaced; and should not be re-used as are single use items subject to stretching.**
- 5) Disconnect all fuel connections to the cylinder head (at both fuel cooler and pressure regulator) then drain the fuel from it. This engine has a gallery that holds a small amount of fuel and removing the fuel filter should help. Dispose of all captured fuel carefully.
- 6) Disable the fuel delivery & pressure warning mechanism – so not to pump fuel during testing and put warning lights (DTC's) on the car dashboard - which you may not be able to easily later remove.
- 7) Carefully remove the small horseshoe shaped injector clamps and mark them – so that they are reused in the same position.
- 8) Remove all 5 fuel injectors - To do this, the engine may need to be rotated to ensure the camshaft actuation lobes clear the injector body. Always ensure each injector is marked as they have to go back in the exact same location to avoid issues & error / fault codes later on. This is because the Engine Control Unit has each injector identity coded into a specific position and swapping the injector positions is very likely to cause issues which you should try to avoid.

- 9) Pull the injectors straight up to release them. Do not twist or pry the injectors out as it can damage them. They may be tight for the first 5mm or so then should come out more easily.
- 10) Before refitting the fuel injectors, remove copper washers from cylinder head with a tool like SP injector seal removers 08581000 & 08581500 and then clean seats (017500V2 - Injector seat cleaning kit). Always fit new seal and washer - Part numbers: ERR 7004 & ERR 6417.
- 11) Locate the tester body into a fuel injector hole with a copper washer in the base for sealing. Ensure the threaded collar is adjusted so the tester is held down tight when secured by the original injector clamp which is used to hold it in place during the tests.
- 12) Fit the compression test gauge, then crank engine to establish the individual cylinders reading - Ensure the starter motor is not engaged for more than 10 seconds per test and allow as much resting time as is used for cranking before the next attempt.
- 13) Record each measurement and compare against all the others.
- 14) Re-assemble with care - Torque both the injector clamps and rocker shaft to 32Nm. Use care - any more torque and they may fail.
- 15) Each injector actuator should be set individually:
  - a. Rotate engine so that the cam is at full lift onto the injector, then carefully wind down the adjuster until it loads up and comes to the end of its travel.
  - b. Slackened off the adjuster 360°, then locked off and torque the lock-nut to 16Nm.
- 16) Rocker cover bolts should be torqued to 9Nm.
- 17) Re-connect all fuel system pipes and prime the fuel system: Switch on ignition – then quickly cycle (fully depress and fully release) the accelerator pedal at least 5 times until the check engine dash lamp illuminates. An automated procedure will then begin to remove the air from the fuel in the cylinder head and prime the injectors. This will actuate the fuel pumps and could take a few minutes to complete – allow the procedure to complete before turning the ignition off.

Upon rebuild of the removed and disassembled systems, check and test for correct operation of fuel system and attend to any leaks.

Expected test pressure: 25-28 bar per cylinder for a cool engine (15 °C), lowering to 21 – 23 Bar for an engine at operating temperature (40°C). A slight variation between individual cylinder pressure readings is quite normal, however a variation greater than 10% indicates an issue in an individual cylinder which should be investigated further.

Sykes-Pickavant recommend wet & dry pressure testing comparisons to identify cylinder ring, bore / liner wear. This should be done by first taking a standard reading then using a few drops of correct grade engine oil (1-2ml only) applied onto the piston top/sides & then repeat the test. If the 2<sup>nd</sup> test shows a pressure rise of 0-5% this indicates little internal wear. A 5 - 15% pressure increase indicates some wear (quite normal for engines circa 125-50,000miles/200-240,00Km). Results above 15% indicates greater wear amongst the engines mechanical components.



Image shows testing a TD5 engine with 31424700 connected to an old SP Pressure Gauge