Land Rover
Range Rover

Workshop Bulletin

ATTENTION SERVICE MANAGER

SEPTEMBER 1987
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LAND ROVER

TURBO-CHARGER MAINTENANCE

2.5 LITRE TURBO-CHARGED DIESEL ENGINE

Further supplies of this Bulletin can be obtained, free of charge, from:

Land Rover Merchandising Service
P.O. Box **534,** Erdington, Birmingham B24 0QS

The following supplementary maintenance schedule for the 2.5 litre Turbo-Charged Diesel engine replaces the schedule printed in Workshop Bulletin 01/86 dated October 1986.

Daily or Weekly depending on operating conditions, and at every maintenance inspection.
— Check engine oil level.

At 1,600km (1,000 miles), 10,00km (6,000 miles) and 20,000km (12,000 miles) then every 20,000km (12,000 miles).
— Checktappets, and adjust if required.

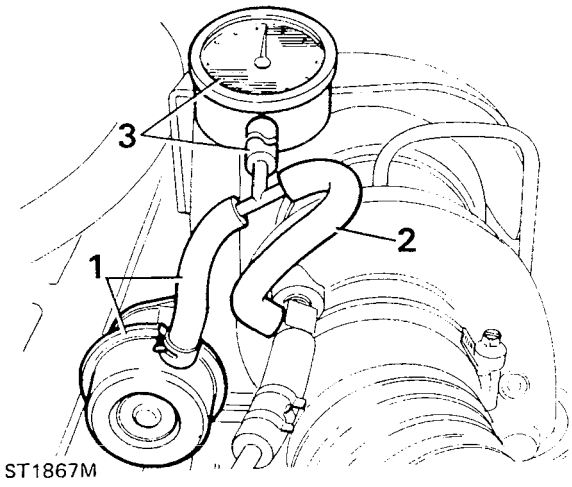
Every 40,000km (24,000 miles)
— check the turbo-charger boost pressure and if below the bottom limit – 44cm Hg – (8.5 p.s.i.g.), clean the turbo-charger compressor housing internally, as described in the following pages.

CHECKING BOOST PRESSURE

Maximum boost pressure – 50cmHg (9.7 p.s.i.g.)

Minimum boost pressure – 44cmHg (8.5 p.s.i.g.)

1. Disconnect, from the turbo-charger, the hose to the actuator and insert into the free end a suitable 'T' piece.
2. Connect a short length of slave hose to the turbo charger and connect the other end to the 'T' piece.
3. Connect a further slave hose to the third leg of the 'T' piece and the other end to a pressure gauge capable of reading in excess of 50cm of Mercury. The pressure gauge hose must be long enough to reach into the cab of the vehicle so that the gauge can be observed by the driver or passenger.



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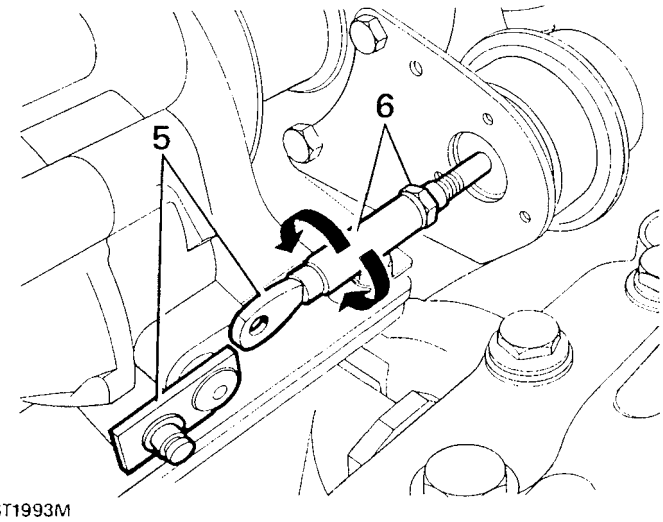
4. To check the maximum boost pressure drive the vehicle normally but in such a manner that full throttle can be maintained whilst climbing a hill with the engine speed held steady between 2,500 – 3,000 r.p.m. Under these circumstances, the boost pressure should be between 44-50 cmHg (9.7-8.5 p.s.i.g.). If the pressure requires adjustment carry out the following instructions.
5. Taking care not to burn the fingers remove the retaining clip and disconnect the actuator control rod from the waste gate lever.
6. Hold the rod with a pair of grips and release the locknut.
7. Turn the rod-end, by no more than one turn, clockwise to increase the boost pressure or anti-clockwise to decrease the pressure.



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8. Reconnect the actuator rod to the waste gate lever, secure with the clip and tighten the locknut.
9. Road test the vehicle again and if necessary repeat instructions 5 to 8.
10. Disconnect the test equipment and reconnect the hoses.
11. If the correct boost pressure range is not attained after several attempts, a general condition check of the engine should be undertaken. Examine the air intake system for damaged pipes or a blocked air filter. Check that the inlet manifold nuts and bolts are tight and if necessary retorque. Examine and if necessary, renew the hose between the turbo-charger compressor housing and the actuator and the boost control pipe from the distributor pump. Inspect the exhaust system for general condition and check that the joints are secure and not leaking. Check also that the hose between the

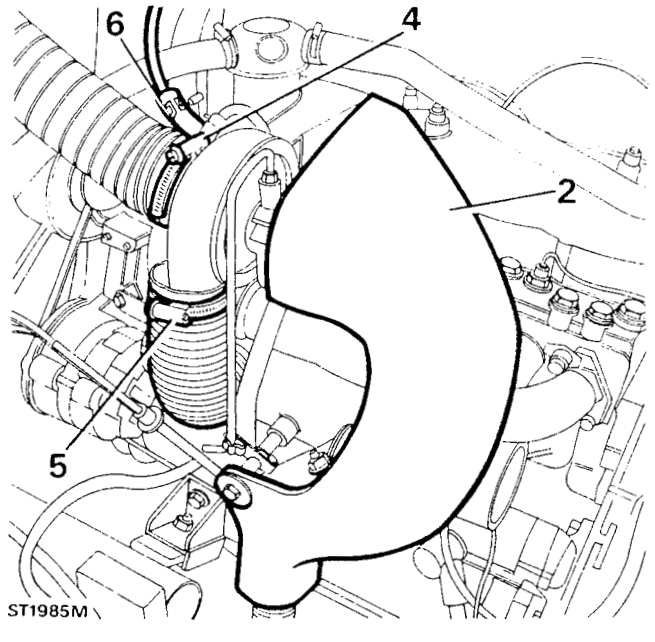
turbo-charger and inlet manifold is satisfactory and the clips are tight. Check that the four nuts securing the turbo-charger to the exhaust manifold are correctly torqued to 21-26 ▼ ▼ (15-19lbf.ft).

12. If any defects were found and corrected, reconnect the test equipment and road test the vehicle again. Should the boost pressure figure still be unsatisfactory clean the compressor housing.

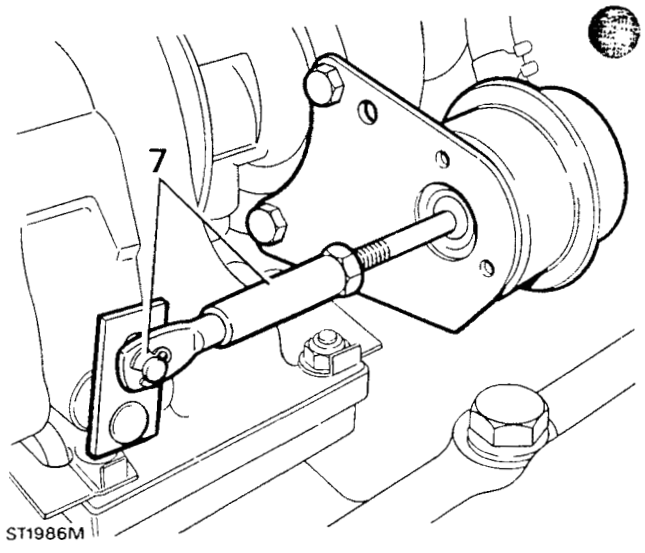
CLEANING TURBO-CHARGER COMPRESSOR HOUSING

Removing

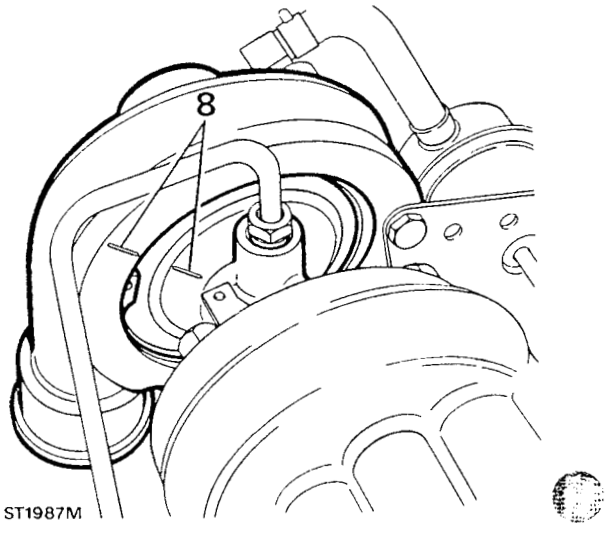
1. Remove the vehicle bonnet panel.
2. Remove the heat shield.
3. Clean the exterior of the turbo-charger with a non-caustic solvent.
4. Disconnect, at the turbo-charger, the air inlet hose from the air cleaner.
5. Remove the inlet manifold to turbo-charger hose.
6. Disconnect the boost control pipe.



7. Remove the clip and disconnect the actuator rod from the waste gate lever pin. This can be more easily achieved if a pressure of 57 to 62cm HgG (11 to 12 Psi) is applied to the actuator.



8. Mark the position of the compressor housing in relation to the centre housing with a scribe line to assist reassembly.



9. The circlip retaining the compressor housing to the centre housing is tapered, in cross section, on one side. It is necessary to 'break' the taper to enable the circlip to be removed in the usual manner. Using a flat nosed punch, carefully tap each car of the circlip away from the groove in the compressor housing.

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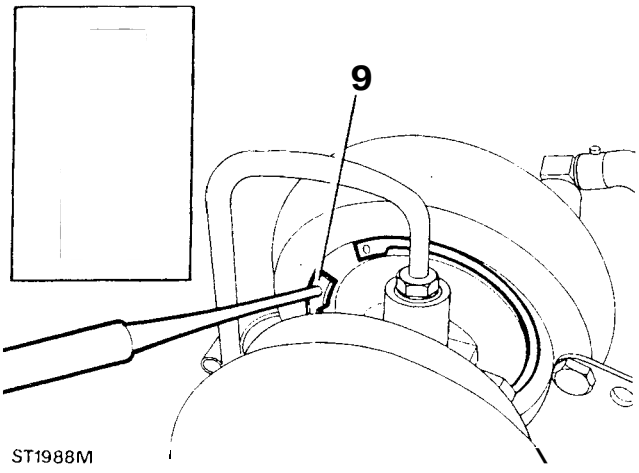
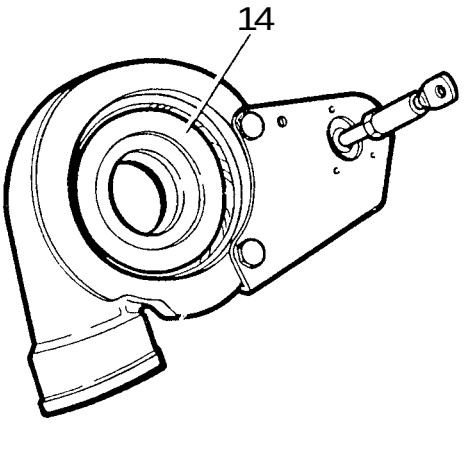
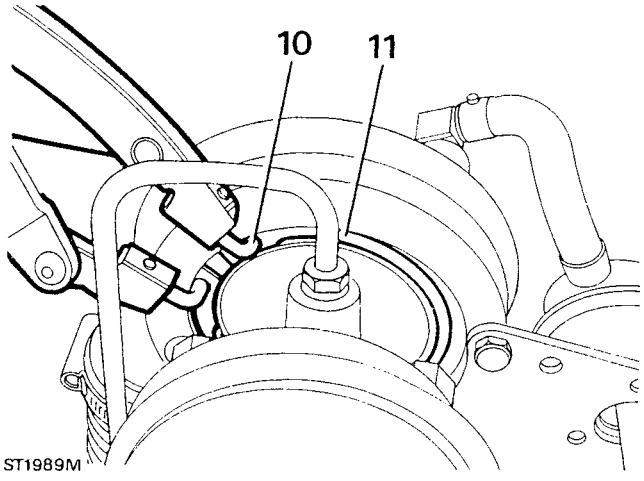




10. Remove the circlip using a strong pair of circlip pliers with well fitting 90 degree angle tips.
11. Remove any burrs made on the back plate clearance diameter of the compressor housing before removing it from the centre housing.



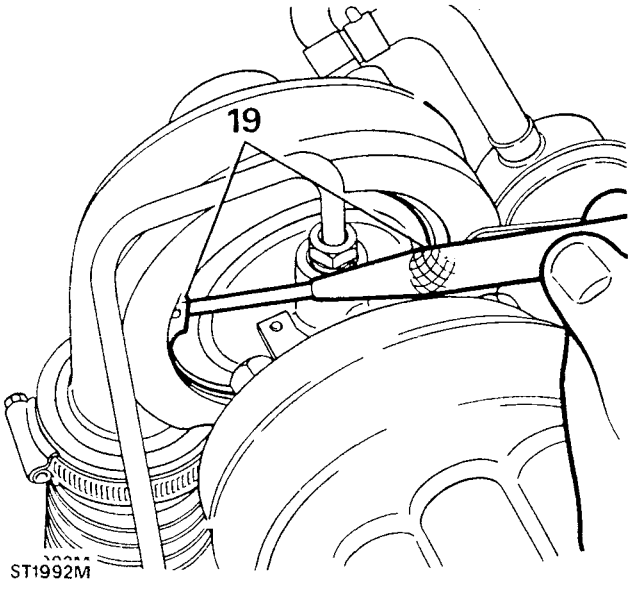
12. Withdraw the compressor housing complete with the actuator. To avoid damaging the compressor wheel withdraw the housing squarely without tilting the housing.

Cleaning

13. Remove the 'O' ring seal from the back plate.
14. Clean the internal surfaces of the compressor housing, the compressor wheel and back plate with a soft brush and a non-caustic solvent. Do not use compressed air to dry the compressor wheel and back plate.
15. Clean the circlip, remove burrs, and repair any damage caused during removal.

Refitting

16. Fit a new 'O' ring seal to the back plate.
17. Place the circlip in position over the centre housing with the tapered side towards the rear of the vehicle.
18. Offer-up the compressor housing, taking care not to damage the compressor wheel and back plate, and line up the scribe marks made before removal.
19. Secure the housing with the circlip and carefully tap the ears and inner diameter of the circlip with a flat nosed punch to ensure that it is fully seated in the groove.



20. Connect the actuator rod to the wastegate lever and secure with the clip.

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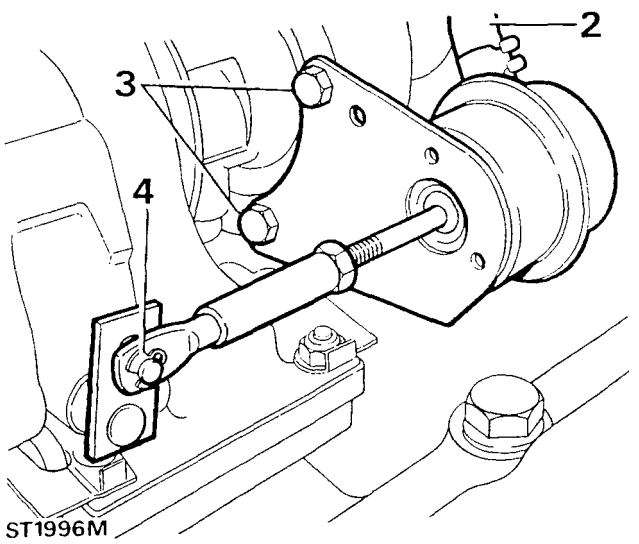
21. Connect the boost control pipe.
22. Fit the inlet manifold to turbo charger hose and secure with the clips.
23. Connect the air intake hose and secure with the clip.
24. Fit the heat shield.
25. Fit the bonnet.
26. Re-check the boost pressure.
27. If the boost pressure is still not satisfactory, change the actuator.

RENEW TURBO-CHARGER ACTUATOR

1. Remove the heat shield.
2. Remove the actuator hose.
3. Remove the two screws securing the actuator bracket to the turbo-charger.
4. Remove the clip retaining the actuator rod to the wastegate lever pin and withdraw the actuator from the engine.



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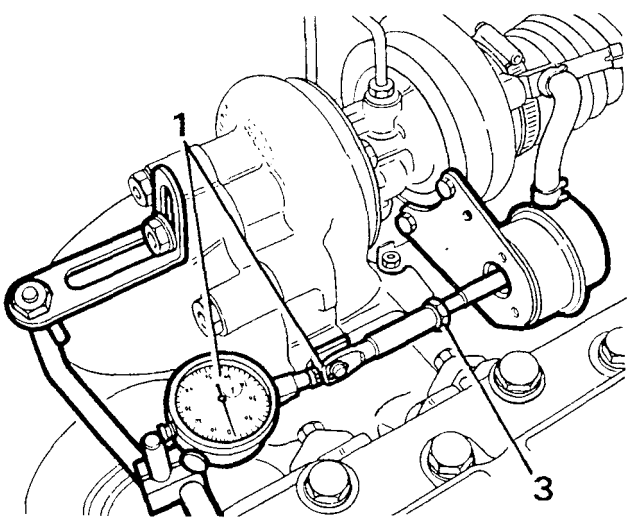
5. Fit the replacement actuator with the two bolts and single nut and bolt. Tighten the bolts to 12.5 to 14.0 Nm (111 to 124 ins lbs.)
6. Push the wastegate lever as far as possible towards the actuator and apply pressure to keep the lever in this position.
7. Pressurise the actuator to 57 to 62cm HgG (11 to 12 p.s.i.g.) and hold this pressure.

CAUTION: Use only the threaded rod-end to make adjustments. Forcing the complete rod in or out will change the calibration with the possibility of damaging engine boost.

8. Screw the rod end in either direction until the rod end eye will locate easily over the wastegate lever pin and secure with the retaining clip.
9. Release the pressure and tighten the rod end luck nut.

STATIC CALIBRATION OF ACTUATOR

1. Mount a dial test indicator so that the stylus rests on the end of the actuator rod.
2. Pressurise the actuator until the lever moves 0.38mm (0.015ins). **At** this point the pressure should be 11.5p.s.i.g. ± 0.5 p.s.i.g.
3. If the pressure is higher, slacken the lock nut and lengthen the actuator rod. Should the pressure be lower, shorten the rod.
4. When the correct pressure is achieved, tighten the rod end lock nut.



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5. Fit the heat shield.
6. Check the boost pressure on the road as previously described.

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