

TECHNICAL BULLETIN



MODEL/DERIVATIVE:
Freelander (LN)

Bulletin N°: 0036
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Issue: 1
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AFFECTED RANGE:
All 1.8 K Series derivatives from VIN WA 60000 onwards

PROBLEM:
ENGINE OVERHEATING - ENGINE REPAIR DIAGNOSIS

CAUSE:
A leak from any part of the engine/cooling system.

ACTION:
With the cylinder head removed refer to this bulletin to ensure the engine is not rebuilt with a potential defect.

Identify components requiring rectification/replacement:

- Establish whether the engine has been severely overheated and its oil contaminated.
- Check for any signs of excessive overheating e.g. thermal distortion/melted inlet manifold plastic components/oil level gauge handle, heavily de-laminated cam cover gasket, or if the engine was heard running and it had an obvious bottom end knock.
- Establish whether overheating has damaged the cylinder head.
- On confirmation that the cylinder head gasket is leaking, the cylinder head must be checked for serviceability.

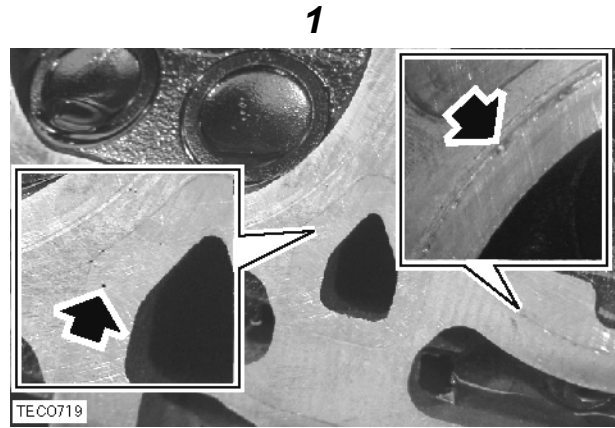
Cylinder head - overheating damage examination

The cylinder head must be examined for damage prior to re-installation. For further details of cylinder head examination refer to the cylinder head overhaul section in the Freelander Workshop Manual (Global Technical Reference (GTR), Freelander Workshop Manual, part number LRL0350 (7th edition), Engine - K Series 1.8, cylinder head - overhaul). A complete overhaul of the cylinder head is not required but the following must be carried out:

- Clean the cylinder head face using a soft cloth or paper towel and solvent (such as gasket stripper STC50541), or a general purpose cleaner (such as STC50543 or STC50544).

CAUTION: *Do not use a metal scraper.*

- Check cylinder head for damage, paying particular attention to the gasket face of the cylinder head. Any pitting/porosity/pinholes may cause the gasket to fail again. If there is pitting or porosity (see illustration 1), the cylinder head must be replaced.
- Check the cylinder head face for warping, across the centre and from corner to corner using a straight edge and a feeler gauge.



NOTE: *Cylinder head face flatness must be within 0.05mm (0.002in).*

- Look for any sign of an indentation made by the bore eyelets of the head gasket. If there is an indentation from any of the four bore eyelets, the head has been overheated and the heat treatment properties of the cylinder head casting has been lost. The cylinder head must be replaced.

NOTE: *Indentation in the cylinder head does not indicate that the engine block is unserviceable.*

- Scratches or handling damage up to 0.2mm deep may be repaired by having the head refaced. After the head has been refaced, the height of the head must not be less than 118.75mm.

Engine block assembly - overheating damage examination

The engine block assembly must be examined for damage prior to re-installation of the cylinder head. A complete overhaul of the engine block assembly is not required but the following must be carried out:

- Check the condition of the cylinder bores for scuffing/scoring as evidence of pistons picking up. If there is any sign of bore damage other than normal wear, the engine must be replaced.
- Check for a slight rocking movement of the pistons in the bores. The pistons should move slightly. If the pistons cannot move then the piston rings may be seized. If any piston rings have seized, the engine must be replaced.

NOTE: *The cylinder liners of the K series engine are a slip fit into the block. Free rotation of the liners is normal and does not indicate engine block damage. However, it is not good practice to move the liners if this can be avoided.*

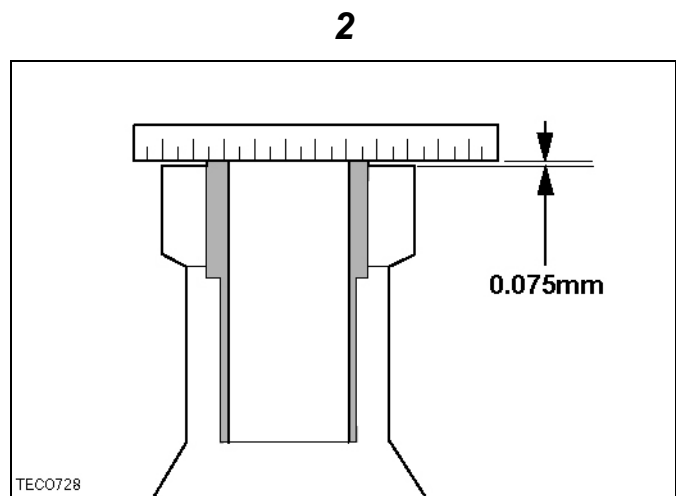
- Check for any other signs of excessive overheating e.g. melted inlet manifold, heavily de-laminated cam cover gasket, etc. If there are any of these signs, the engine must be replaced.
- If the oil was badly contaminated with coolant, check the condition of the big end bearings.
 - Remove the engine sump, refer to GTR, Freelander Workshop Manual, part number LRL0350 (7th edition), Engine - K Series 1.8, Sump - Engine Reseal, repair number 12.60.38.

- Referring to the Freelander Workshop Manual Crankshaft and Main Bearings overhaul procedure (GTR, Freelander Workshop Manual, part number LRL0350 (7th edition), Engine - K Series 1.8, overhaul). Remove the oil pick up pipe, the oil rail and the two centre bearing caps taking care to note the fitted positions.
- Examine the condition of the bearing shells.
- If there is any sign of damage to the bearings due to lack of oil other than normal wear, the engine must be replaced.
- If only normal wear is present, install the bearing caps in the original fitted positions.
- Install the oil rail, oil pick up pipe and the sump. Refer to the procedure and tightening torques in the Workshop Manual.

Cylinder liner position

Cylinder liner position is the distance that the liner protrudes above or is below the face of the cylinder block. Liners can be level with or 0.075mm (0.003in) above the face of the block. If the liners have dropped below the block face, the engine must be replaced.

- Check the cylinder liner by placing a straight edge across the cylinder liner and using a feeler gauge measure the distance between cylinder block surface and the straight edge (see illustration 1 and 2). This must be carried out on the inlet and exhaust manifold sides of the liner.




Cylinder head - re-installation

If the cylinder head and the engine block assembly are not exhibiting any of the issues detailed in this bulletin, the cylinder head can be re-installed using a new gasket and the new steel dowels supplied with the gasket:

1. Referring GTR, Freelander Workshop Manual, part number LRL0350 (7th edition), Engine - K Series 1.8, Gasket - Cylinder Head, repair number 12.29.02, replace the cylinder head gasket with a new part. Ensure that the old nylon dowels are removed from block and discarded. Replace with the new steel dowels supplied with the later type head gasket. Also, note the following during re-installation:

NOTE: *Fit dowels to a height of 10 to 11mm above the engine block face.*

- Remove and replace the inlet manifold gasket.
- Clean mating faces of cylinder head and cylinder block and check for damage.
- Ensure that correct cylinder head bolt torque and tightening sequence is used.
- If the engine oil was contaminated with coolant, flush engine using an approved engine flush product before refilling with correct grade oil.
- Replace all coolant hoses if excessively contaminated with oil.

- If coolant was contaminated with oil, flush system thoroughly and replace any excessively contaminated cooling system components if necessary e.g. radiator or heater matrix. Flush the cooling system as many times as required to ensure that system is clear of contamination.
- Before refilling the coolant system ensure the inlet manifold bleed valve pin is not restricted, freeing this pin will allow air to bleed from the cylinder head during coolant fill. Locate the inlet manifold bleed valve and remove bleed hose from valve. Connect suitable tube to valve spout and blow through to ensure valve pin is not sticking. Discard tube and refit bleed hose when done.
- Ensure the correct specification of anti-freeze is in the cooling system. Refer to Technical Bulletin  0001.
- Ensure that cooling system is bled correctly.
- In all instances carry out a final cooling system pressure test to confirm no loss of pressure. If any loss is detected investigate further to establish the cause, i.e. check all hose connections etc.

PARTS INFORMATION:

Not applicable

WARRANTY CLAIMS:

Refer to Repair Time Searcher (RTS) for individual repair times.

Normal warranty policy and procedures apply.