

No. MP546

TASK DESCRIPTION
INSPECT PISTON COMPRESSION RINGS AND LINERS (Tier 2/UL Engine)
BUILDER'S OR VENDOR'S MAINTENANCE INSTRUCTIONS
16-710G3B-T2 Engine Maintenance Manual
Electro Motive Diesel, Inc. Service Advisories - SA # 09-007, rev.0 and SA # 08-040, rev. 0.
SPECIAL TOOLS REQUIRED:
RELATED MAINTENANCE PROCEDURES MODIFICATIONS, POINTERS, ETC.
SAFETY PRECAUTIONS:
CONTRACTOR TO ASSUME RESPONSIBILITY FOR SAFETY RULES AND COMPLIANCE.
PREPARATION:
Engine shut down.

PROCEDURE



WARNING

Precautions should be taken, before proceeding to prevent the engine from being started.

1. Open all cylinder test valves to facilitate rotation of the crankshaft, using the turning jack.
2. Rotate crankshaft until piston of cylinder being inspected is at bottom centre.
3. Inspect cylinder wall and top of piston. A wet piston crown indicates a leaky injector. Check cylinder walls to make sure there is no scoring and inspect for water leaks.
4. Rotate crankshaft to move piston toward TDC until compression rings are visible through liner ports.
5. At the liner ports visually inspect the piston compression rings for the following:
 - 5.1 Measure side clearance of the No. 1 piston ring between the top of the ring and the ring groove using a feeler gauge.
 - 5.2 A ring in good condition will appear bright and move freely in its groove. In addition the normal contact patterns for Tier 2/UL Engine rings will appear as follow:

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5.2.1 On the No. 1 piston ring the normal face contact pattern is represented by a shiny bright band biased towards the bottom side of the piston ring. As the ring wears, this shiny bright band will grow wider and eventually encompass the entire face width.

5.2.2 On the No. 2 and No. 3 piston rings the normal face contact pattern is a shiny bright band located relatively in the middle of the ring face. A narrower shiny bright band will frequently be noted on the No. 3 ring when compared to the No. 2 ring due to its lower gas pressure loading.

5.2.3 On the No. 4 piston ring the normal face contact pattern is a shiny bright band initiating at the bottom side of the ring.

5.3 Inspect the face of the rings for vertical brown streaks or blow-by. Renew or replace power assembly when this condition becomes severe.

Note: *Evidence of microscopic lines across face of ring reflect naturally occurring chrome cracking in a ring and should not be misinterpreted as problematic or reason for removal. Oil can “wick” into these microscopic cracks and enhance their appearance.*

5.4 Inspect ring land areas between rings for evidence of combustion byproducts (blow-by). Evidence of blow-by below the second and third ring and below the fourth ring on the piston skirt indicates a ring problem requiring further inspection.

5.5 Check for ring wear-through by looking for a dull contact pattern within the wide shiny bright band (chrome). This condition will normally first appear on the No.1 compression ring and warrants renewal or replacement of the power assembly.

Note: *Tier 2/UL Engine piston rings will normally wear greatest at the ring tips, a normal condition typically referred to as “blooming”. Therefore use face of piston rings when evaluating the condition of the rings.*

5.6 With rings located within port window inspect for broken or defective piston rings by performing the following:

5.6.1 Look for evidence of scuffing inside a cylinder liner in either the upper or lower bore.

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- 5.6.2 Look for rings blackened across the complete face width by combustion byproducts (blow-by). This condition can indicate a broken ring opposite the ring gap. Care should be taken to wipe such ring faces to assure that what is viewed is not merely residual lube oil buildup that can accumulate as an engine is barred over during an upper airbox inspection.
- 5.6.3 Check the outward spring tension by using a nonmetallic device to push each piston ring into its groove. Perform this step at several points around the entire ring circumference. Lack of outward spring tension indicates a defective or broken ring requiring further inspection.
- 5.6.4 Using a nonmetallic device rotate each ring to look for broken sections and/or abnormal wear defects along the entire ring circumference.
- 5.6.5 If visible, inspect the ring gap, checking for proper equal clearance and/or chipping. Ring gaps should be approximately equal in size. Individual ring gaps exceeding 1/4 inch may be an indication of a ring problem requiring further investigation.

- 6. Inspect piston skirt for scoring or scuffing.
- 7. Inspect air box for foreign material and signs of water or oil leakage.
- 8. Report any discrepancies to supervisor.

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