Service Information

Caterpillar Motoren GmbH & Co. KG product support information for medium-speed engines

Engine platform: M32
Engine section: Piston

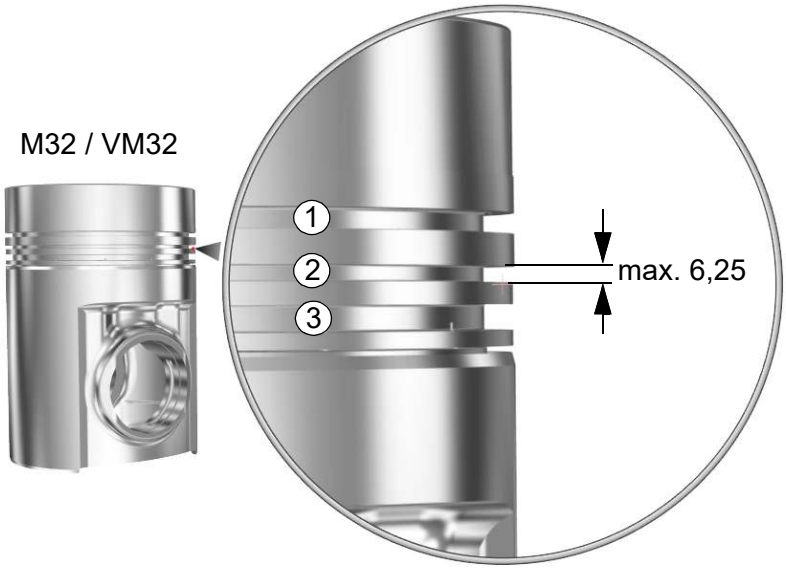
Motortyp: M32 / VM32
Gültigkeit: until revoked

Nr. 0015M32 - issue 1; 09 April 2025

Action: At your convenience

Piston rings and grooves / Wear limit

In alignment with our policy to constantly improve our products, **Caterpillar Motoren** has reduced the wear limit of the 2nd piston ring groove of the M32 & VM32 pistons. Both the wear limit and the clearance between piston ring and the 2nd piston ring groove were updated in the respective job card *(**A5.05.02.07.01.n0 / Piston Rings and Grooves**)*.



Please replace the obsolete job card in your Maintenance Handbook by the updated version. The new specification applies to all M32 & VM32 engines. Check the parts according to the new instruction and replace them if they have reached their wear limits.

The content of this Service Information reflects the status at the time of publication. **Caterpillar Motoren** does not provide an extra Service Information to inform on minor updates and amendments.

Therefore make sure that you always use the latest document versions. Check at regular intervals, and in any case prior to upcoming maintenance work, if updates are available.

To obain a copy of the latest document versions, contact your authorized **Caterpillar Motoren** Dealer.

Note

After replacing the piston rings, the piston or the cylinder liner, a running-in procedure must be performed.

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Piston Rings and Grooves
Check / Replacement

A5.05. **02.07.01.10**

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See also: *A5.05.02.06.01.nn, A5.05.02.10.01.nn*

Spare parts sheets:

Personnel requirement: *1 pers.*

Personnel qualification: *Skilled engine hand*

Fuel: *Every fuel*

Activities:

1. Check the piston rings and grooves

Engine type	Tools and auxiliary materials	Index	Tool No.	
M 20 C	Piston ring expander	W1	2.9227 A	*
	Barring rod		2.9100-380	*
M 25 C / M 25 E	Piston ring expander	W1	259227 A	
M 32 C / VM 32 C M 32 E	Piston ring expander	W1	6.9227 B	
GCM34 / M 34 DF	Piston ring expander	W1	349227 A	*
M 43 C / VM 43 C	Piston ring expander	W1	431001 A	*
M 46 DF / VM 46 DF	Piston ring expander	W1	461046 A	*
* no picture				

CAUTION

After installing **new** piston rings the engine has to be run in according to the running-in instructions, see ***engine documentation, chapter "Operating Instructions"***!

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Piston Rings and Grooves
Check / Replacement

A5.05. **02.07.01.10**

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1. Check the piston rings and grooves

1.1 Make sure that the safety measures (see **A5.05.00.nn**) remain effective.

1.2 Remove all crankcase doors.

1.3 Check the running surfaces of all cylinder liners from the crankcase.

1.4 Remove the piston with the worst running pattern (**A5.05.02.06.01.nn**).

NOTE

When inspecting a piston, particular attention has to be paid to the following:
- Sharp edges of piston rings
- Ring tension
- Sticking of rings due to coking

A full inspection of all pistons may be postponed to a later date, based on critical judgement, but not beyond the operating hours indicated in the maintenance schedule, if:

- the running surfaces of all cylinder liners do not show any score marks, blank spots or other damage,
- the components of the removed pistons are in perfect condition,
- all piston rings are freely moveable in the grooves, and
- none of the components is affected by impermissible wear.

Do **not** remove the graphite layer on the piston skirt.

1.5 In case of sticking or burnt piston rings remove **all** pistons.

1.6 Record the position of the ring joints with regard to the installation position of the piston on the measuring sheet.

CAUTION

Install/remove the piston rings **only** with the piston ring expander (W1) provided for this purpose.

1.7 Remove and clean the piston rings.

1.8 Check the ring flanks and running surfaces of the piston rings for wear, especially at the joint and the side opposite to the joint. In case of obvious wear and/or if the chrome layer is partly not existing any more, all piston rings of the affected piston must be replaced by new ones.

1.9 In case of wear on one piston ring or the chrome layer, the piston rings of **all** pistons must be checked.

1.10 Remove any oil or loose combustion residues from the piston by means of a soft rag.

1.11 Check the ring grooves for possible coke build-up in the groove root and the ring groove flanks for wear. Dissolve and remove any coking by soaking with water or diesel oil. In case of

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significant score marks on the ring groove flanks the affected piston crown (piston) must be replaced/reconditioned.

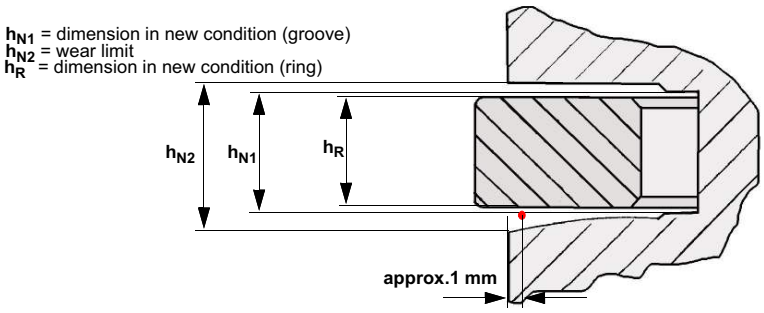
NOTE

When the limit for piston ring groove height is exceeded, there is a possibility to have the piston crowns (pistons) refinished. For this purpose, please contact your authorized **Caterpillar** dealer.

1.12 Measure the groove height h_{N2} in the front area of the groove (approx. 1 mm from the outside edge of the piston) on both sides in longitudinal and transverse axis of the engine and compare to the wear limit (see table "**Standard piston ring equipment**"). If the wear limit is exceeded, the corresponding piston crown (piston) may not be reused and has to be replaced or reconditioned.

1.13 Measure the piston ring height h_R at **four** opposite points and note down the values.

1.14 Calculate the limit clearances ($h_{N2} - h_R$ **= limit clearance**), check it based on the table "**Standard piston ring equipment"**, and replace if necessary.



Permissible piston groove height and piston ring limit clearances

Groove	Wear limit - groove height h_{N2} [mm]	Limit clearance $h_{N2} - h_R$ [mm]
M 20 C		
1st groove (top compression ring)	**5.60**	**0.65**
2nd groove (compression ring)	**5.60**	**0.65**
3rd groove (oil control ring)	**6.50**	**0.50**

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Groove	Wear limit - groove height h_{N2} [mm]	Limit clearance h_{N2} - h_R [mm]
M 25 C / M 25 E		
1st groove (top compression ring)	**6.45**	**0.50**
2nd groove (compression ring)	**6.45**	**0.50**
3rd groove (oil control ring)	**8.20**	**0.30**
M 32 C / VM 32 C / M 32 E		
1st groove (top compression ring)	**8.45**	**0.50**
2nd groove (compression ring)	**6.25**	**0.32**
3rd groove (oil control ring)	**10.20**	**0.30**
GCM34 / M 34 DF		
1st groove (top compression ring)	**8.45**	**0.50**
2nd groove (compression ring)	**6.45**	**0.50**
3rd groove (oil control ring)	**10.20**	**0.30**
M 43 C / VM 43 C		
1st groove (top compression ring)	**10.50**	**0.90**
2nd groove (compression ring)	**10.50**	**0.60**
3rd groove (oil control ring)	**10.30**	**0.40**
M 46 DF / VM 46 DF		
1st groove (top compression ring)	**10.50**	**0.75**
2nd groove (compression ring)	**10.50**	**0.75**
3rd groove (oil control ring)	**10.30**	**0.30**

1.15 Insert new (see 1.8) or reusable piston rings into the ring grooves with the marking pointing upwards and ring joints alternately displaced by **120°** in the longitudinal axis of the engine.

1.16 Install the piston (**A5.05.02.10.01.nn**) and all crankcase doors.

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