

See also: A5.05.01.06.01.nn, A5.05.07.07.01.nn

Spare parts sheets:

Personnel requirement: 1 pers.

Personnel qualification: Qualified personnel

Operating medium: Every fuel

Activities:

1. Remove the nozzle sleeve
2. Install the nozzle sleeve

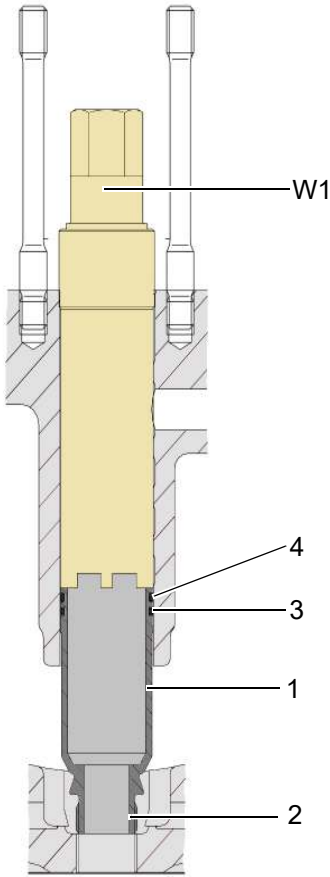
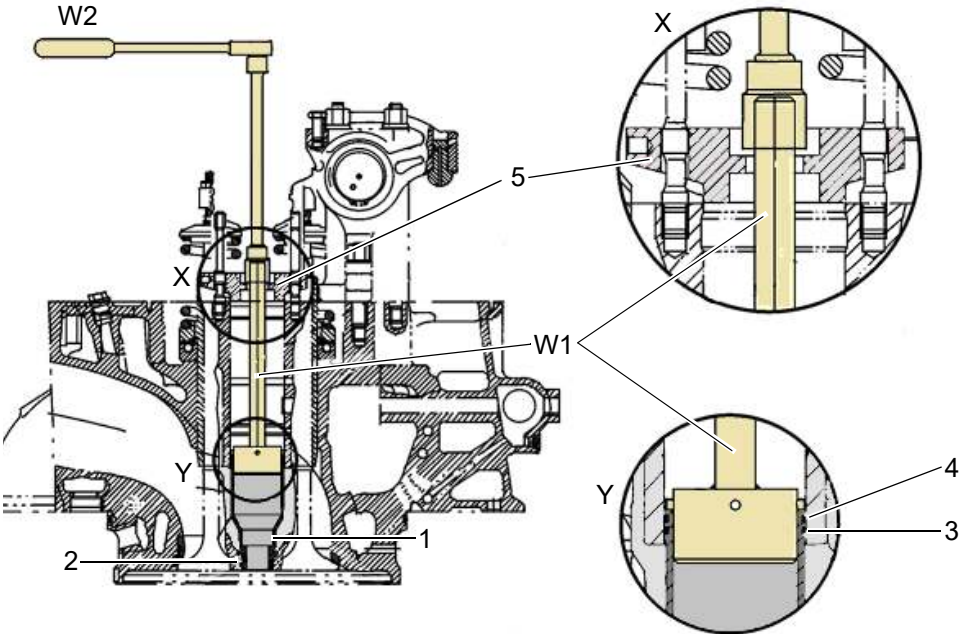
Engine type	Tools and auxiliary materials	Pos.	Reference No.	
M 20 C	Pin wrench for nozzle sleeve	W1	2.9122 B	*
	Torque wrench 40 - 200 Nm	W2	1.9454-200	*
M 25 C / M 25 E	Pin wrench for nozzle sleeve	W1	259222-301	
	Torque wrench 60 - 300 Nm	W2	1.9454-300	*
M 32 C / VM 32 C / M 32 E / VM 32 E M 34 DF	Nozzle sleeve mounting and removal device	W1	9.9220 C	*
	Torque wrench 100 - 400 Nm	W2	1.9454-400	*
M 43 C / VM 43 C M 46 DF / VM 46 DF	Pin wrench for nozzle sleeve	W1	432119 A	*
	Torque wrench 200 - 500 Nm	W2	1.9454-500	*
All engines	Adhesive and sealing agent "Loctite 510"			*
	Petro Gel Amber		461114-041	*
	Molykote paste "G-Rapid Plus"		1.9493-001	*
* no picture				

CAUTION

Avoid any high probability of leaks occurring!
Any reuse of used nozzle sleeves will most probably cause leaks. Therefore, only use new and genuine **Caterpillar** spare parts.
Carry out a pressure test prior to reinstalling the cylinder head.
Recutting the nozzle sleeve thread in the cylinder head is not permissible!
If you have any questions, please contact your authorized **Caterpillar** dealer.

NOTE

It is recommended to use **MaK "Genuine Spare Parts"**!
If spare parts of other origin are used, this may result in an expiry of the IMO approval in the marine area up to a shutdown of the engine.

Engine type	Schematic diagrams
M 20 C M 32 C / VM 32 C M 32 E / VM 32 E M 34 DF	
M 25 C / M 25 E M 43 C / VM 43 C M 46 DF / VM 46 DF	

1. Remove the nozzle sleeve

- 1.1 Remove the cylinder head (see **A5.05.01.06.01.nn**).
- 1.2 Remove the fuel injector, see **A5.05.07.07.01.nn**.
- 1.3 Place the pin wrench (W1) onto the nozzle sleeve (1). The pins of the pin wrench are meshing in the grooves of the nozzle sleeve.
- 1.4 **M 25 C / M 25 E / M 43 C / VM 43 C / M 46 DF / VM 46 DF only:**
Put on the centring flange (5).

	CAUTION
	<p>Damage to the cylinder head possible due to improper removal of the nozzle sleeve!</p> <p>If the nozzle sleeve is removed in an improper manner, this may cause irreparable damage to the nozzle sleeve seat and the thread in the cylinder head.</p> <p>In the factory, the threads of the nozzle sleeves are inserted using "Loctite". If the nozzle sleeve cannot be loosened without causing deformation, the nozzle sleeve seat can be heated up carefully from the combustion chamber side. This should make it easier to remove the nozzle sleeve. Caution: Avoid overheating! In case of doubt, contact your authorized Caterpillar dealer.</p>

- 1.5 Using a suitable tool turn the pin wrench (W1) counter-clockwise and thus carefully dismount the nozzle sleeve.
- 1.6 **M 25 C / M 25 E / M 43C / VM 43 C / M 46DF / VM 46 DF only:**
Remove the centring flange (5).
- 1.7 Carefully press the nozzle sleeve from the combustion chamber out of the cylinder head using a suitable tool.

	CAUTION
	<p>Avoid any high probability of leaks occurring!</p> <p>Any reuse of used nozzle sleeves will most probably cause leaks. Therefore, only use new and genuine Caterpillar spare parts.</p> <p>Recutting the nozzle sleeve thread in the cylinder head is not permissible!</p>

- 1.8 Dispose of O-rings (3 and 4) and nozzle sleeve in accordance with the local environmental and waste disposal regulations.
- 1.9 Thoroughly check the upper and lower nozzle sleeve seat in the cylinder head for damage. Carefully smooth minor scratches and uneven spots using fine emery cloth. Remove any glue rests from the sealing surface and thread of the cylinder head. If necessary, carefully clean the thread with a brass brush

2. Install the nozzle sleeve

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	CAUTION
	<p>Leaks and engine damage possible due to incorrect installation of the O-rings!</p> <p>The nozzle ring is inserted with different O-rings. Make sure prior to installing the nozzle sleeve that the O-rings are inserted untwisted and correctly positioned.</p>

- 2.1 Lightly coat the contact area of the O-rings in the cylinder head with "Petro Gel Amber".
- 2.2 Lightly lubricate **new** O-rings (3 and 4) with "Petro Gel Amber" and insert them untwisted into the respective grooves.

	CAUTION
	<p>Apply "Loctite 510" carefully and with caution!</p> <p>If an excessive or insufficient amount of Loctite is applied, this may cause leaks. Carefully coat the nozzle sleeve thread (2) and the sealing surface (contact surface) with Loctite. Use a suitable brush to apply an even and thin coat of sealant adhesive.</p>

- 2.3 Apply a thin coat of "Loctite 510" to the thread (2) and sealing surface of the nozzle sleeve (1).
- 2.4 Introduce the nozzle sleeve into the cylinder head and tighten it by means of the pin wrench so as to be finger tight.
- 2.5 **M 25 C / M 25 E / M 43 C / VM 43 C / M 46DF / VM 46 DF only:**
Install the centring flange (5).
- 2.6 Tighten the nozzle sleeves to the following tightening torques :

Engine type	Nozzle sleeve (1) tightening torque
M 20 C	100 Nm (72.75 lb ft)
M 25 C, M 25 E	140 Nm (103 lb ft)
M 32 C, VM 32 C M 32 E, VM 32 E M 34 DF M 43 C, VM 43 C M 46 DF, VM 46 DF	300 Nm (221 lb ft)

- 2.7 **M 25 C / M 25 E / M 43 C / VM 43 C / M 46 DF / VM 46 DF only:**
Remove the flange (5).
- 2.8 Carry out a leak test.
- 2.9 Install the fuel injector, see **A5.05.07.07.01.nn**.
- 2.10 Fit the cylinder head, see **A5.05.01.11.01.nn**.