10.4.5 Valve clearance – Check and adjustment

Preconditions

☑ Engine is stopped and starting disabled.

☑ Coolant temperature is max. 40 °C.

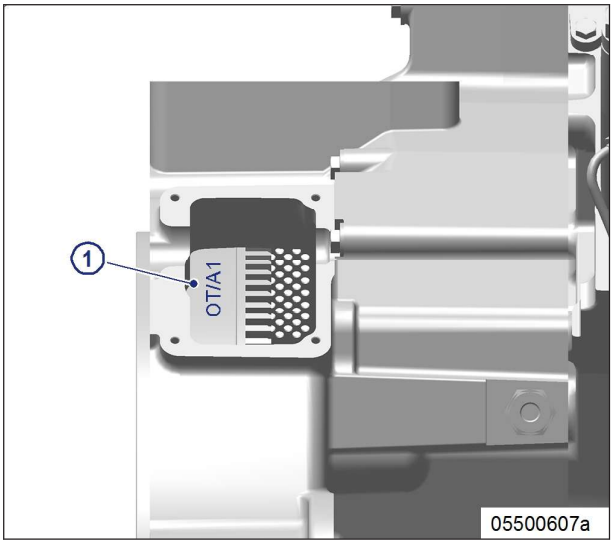
☑ Valves are closed.

Special tools, Material, Spare parts

Designation/Use	Part No.	Qty.
Feeler gauge	Y20098771	1
Valve adjusting gauge	Y4349603	1
Offset screwdriver	F30002815	1
Torque wrench, 60–320 Nm	F30452768	1
Socket wrench, 24 mm	F30039526	1
Engine oil		

Preparatory steps

1. Remove cylinder head cover (→ Page 236).
2. Install barring tool (→ Page 213).
3. The OT/TDC marking (1) (if applicable) on the flywheel outer circumference must not be used for reference.



Note: The pointer (1) is in the lower opening of the flywheel housing (arrowed).

4. Using the barring tool, turn crankshaft in direction of engine rotation until marking OT-A1/ TDC-A1 on the rear side of the flywheel and pointer (1) are aligned.

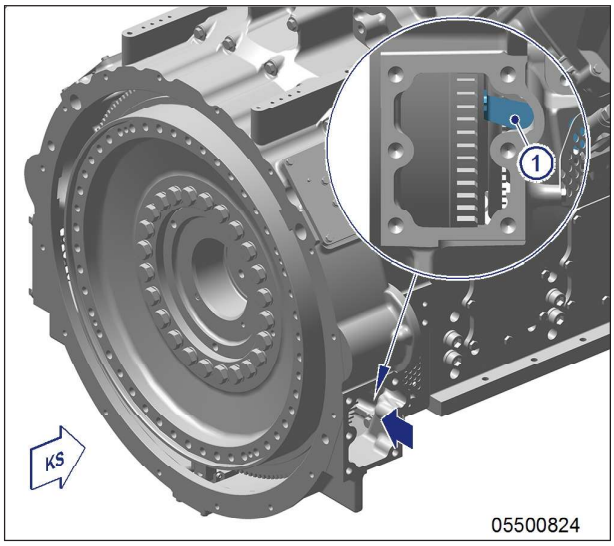


Diagram for 12V engines – two crankshaft positions

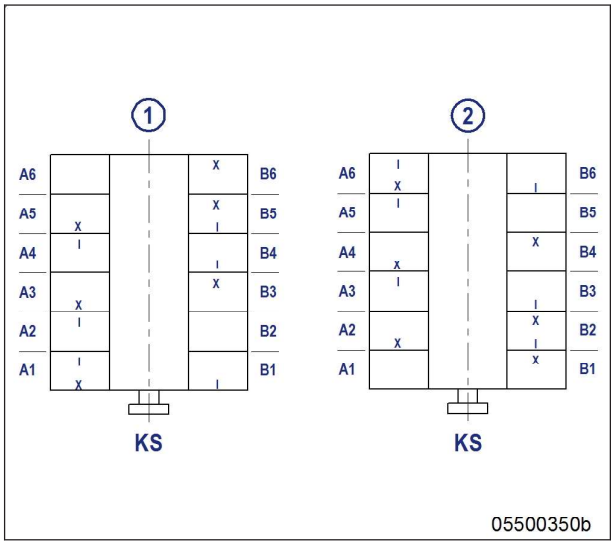


Diagram for 16V engines – two crankshaft positions

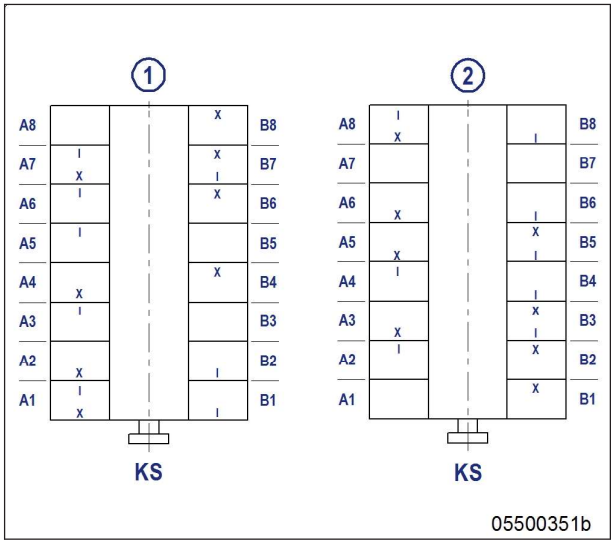
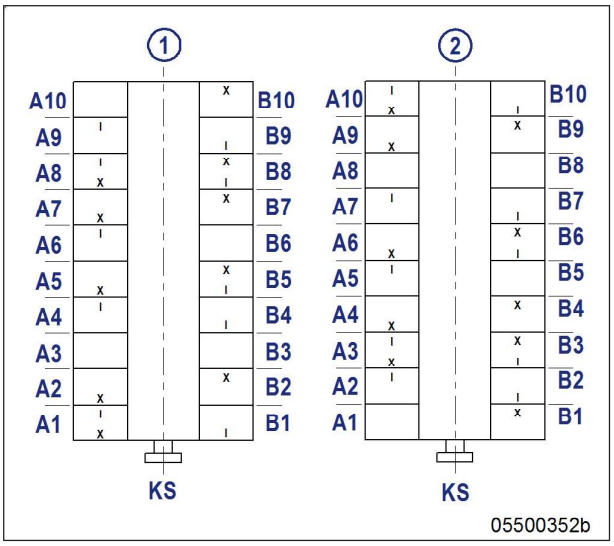


Diagram for 20V engines (two crankshaft positions)



Checking valve clearance at two crankshaft positions

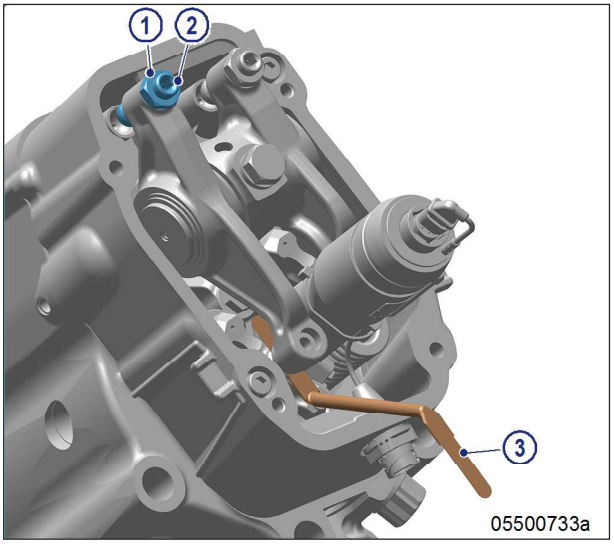
1. Check TDC position of piston in cylinder A1:
   - If rocker arms on cylinder A1 are unloaded, the piston is in firing TDC.
   - If rocker arms on cylinder A1 are loaded, the piston is in overlap TDC.
2. Check valve clearance with cold engine:
   - Inlet (long rocker arm) = 0.2 mm ±0.05 mm
   - Exhaust (short rocker arm) = 0.5 mm ±0.05 mm
3. Check all valve clearances in two crankshaft positions (firing TDC and overlap TDC of cylinder A1) as per diagram:
   - 1 Cylinder A1 is in firing TDC
   - 2 Cylinder A1 is in overlap TDC
   - I Inlet valve
   - X Exhaust valve
4. Use feeler gauge to check the distance between valve bridge and rocker arm.
5. If the deviation from the specified value exceeds 0.1 mm, adjust valve clearance.

Adjusting valve clearance

1. Loosen locknut (1).
2. Insert valve setting gauge (3) between valve bridge and rocker arm.
3. Use offset screwdriver to set adjusting screw (2) so that the specified valve clearance is provided.

Note: Valve setting gauge must just pass through the gap.

4. Pull valve setting gauge (3) between valve bridge and rocker arm.



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5. Use a torque wrench to tighten locknut (1) to specified tightening torque holding the adjusting screw (2) in place to prevent it from turning.

Name	Size	Type	Lubricant	Value/Standard
Locknut	M16x1.5	Tightening torque	(Engine oil)	90 Nm **manual tightening**
Locknut	M16x1.5	Tightening torque	(Engine oil)	95 Nm **machine tightening**

6. Replace or rectify adjusting screws and/or locknuts which do not move freely.
7. Check valve clearance.

Final steps

1. Remove barring tool (→ Page 213).
2. Install cylinder head cover (→ Page 236).
3. Enable engine start.

10.4.6 Cylinder head cover – Removal and installation

Preconditions

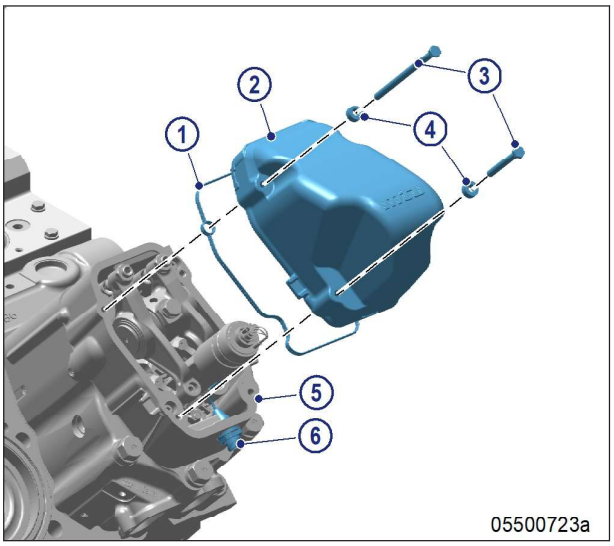
☑ Engine is stopped and starting disabled.

Special tools, Material, Spare parts

Designation/Use	Part No.	Qty.
Torque wrench, 4–20 Nm	F30044239	1
Ratchet bit	F30027340	1
Assembly compound (Kluthe Hakuform 30-15)	X00067260	1
Gasket	(→ Spare Parts Catalog)	
O-ring	(→ Spare Parts Catalog)	

Removing cylinder head cover

1. Clean very dirty cylinder head cover upper section (2) prior to removal.
2. Remove screws (3) and washers (4).
3. Remove cylinder head cover upper section (2) with gasket (1) from cylinder head cover lower section (5).
4. Unscrew IAP connector (6) from cylinder head cover lower section (5).



5. Remove screws (4) and washers (5).
6. Remove cylinder head cover lower section (3) with gasket (1) and coiled spring pin (2) from cylinder head.