

ENGINE

2.5 Liter - Cylinder Head, Valvetrain - Engine Code(s): CBUA (SportWagen)

15 CYLINDER HEAD, VALVETRAIN

DESCRIPTION AND OPERATION

CYLINDER HEAD AND COVER OVERVIEW

NOTE: If a replacement cylinder head is installed, several contact surfaces between the support elements, roller rockers and cam lubricating surfaces of the camshaft must be lubricated before installing the cylinder head cover.

The plastic protectors installed to protect the open valves must only be removed immediately before installing the cylinder head.

Replace the cylinder head bolts.

When replacing the cylinder head or cylinder head gasket, the coolant must be completely replaced.

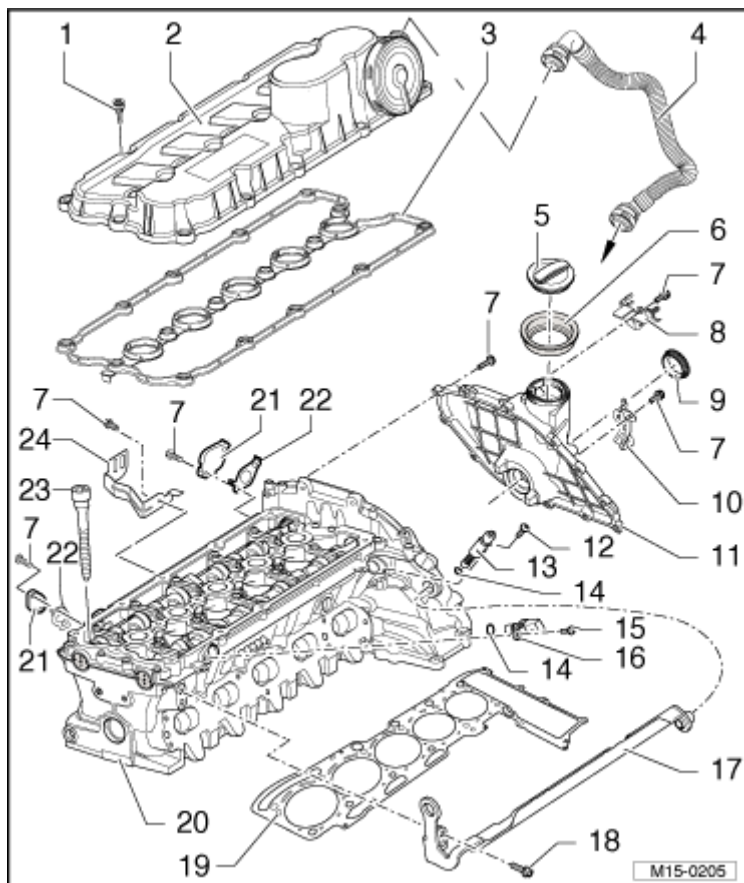


Fig. 1: Identifying Cylinder Head, Assembly Overview
Courtesy of VOLKSWAGEN GROUP OF AMERICA, INC.

1. **Bolt**
 - 10 Nm
2. **Cylinder Head Cover**
 - With the pressure regulator valve for the crankshaft housing ventilation.
 - Tightening sequence, refer to **Fig. 2**.
 - Removing and installing, refer to **CYLINDER HEAD COVER**.
3. **Cylinder Head Cover Gasket**
 - Replace if damaged or leaking.
4. **Crankcase Ventilation Hose**
 - To the intake manifold.
5. **Oil Filler Cap**
6. **Gasket**
 - Replace if damaged or leaking.
7. **Bolt**
 - 10 Nm
8. **Wire Bracket**
9. **Seal**
 - Removing and installing, refer to **CHAIN COMPARTMENT COVER SEAL**.
10. **Wire Bracket**
11. **Chain Compartment Cover**
 - Removing and installing, refer to **CHAIN COMPARTMENT COVER**.
12. **Bolt**
 - 2 Nm
13. **Camshaft Adjustment Valve 1 -N205-**
 - Check using the vehicle diagnosis, testing and information system VAS 5051.
14. **O-ring**
 - Replace if damaged.
 - For the camshaft position sensor, refer to "Camshaft Position Sensor -G40-" in item: 16 no replacement part.
15. **Bolt**
 - 10 Nm
16. **Camshaft Position Sensor -G40-**
17. **Transport Strap**
18. **Bolt**
 - 25 Nm

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19. Cylinder Head Gasket

- Always replace.
- After replacing, replace the entire amount of coolant.

20. Cylinder Head

- Removing and installing, refer to **CYLINDER HEAD**.
- Checking the cylinder head for warpage, refer to **Fig. 3**.
- It is not permitted to rework the sealing surface.
- With the coolant pipe connection pressed in.

-- If necessary, remove coolant deposits using a copper wire brush or fine sandpaper (minimum 100 grit).

-- If the pipe connection is worn, replace it using liquid locking fluid D 000 600 A2.

21. Cap

- On engines without a Secondary Air Injection (AIR) system only.
- Engines with a AIR system, refer to **SECONDARY AIR INJECTION SYSTEM OVERVIEW**.

22. Gasket

- Always replace.

23. Bolt

- 40 Nm + 180° (1/2) additional turn.
- Always replace.
- Follow the loosening/tightening sequence. Refer to **CYLINDER HEAD**.

24. Wire Bracket

- For the heated oxygen sensor -G39-.

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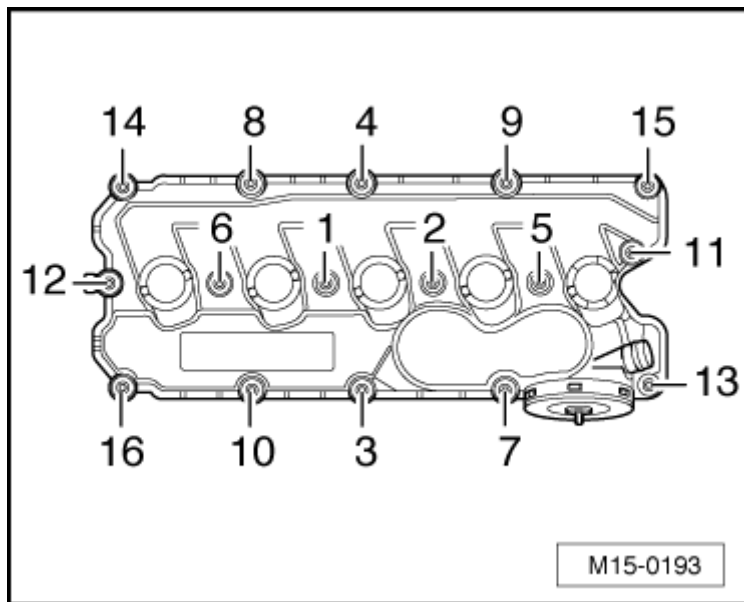


Fig. 2: Identifying Cylinder Head Cover Bolt Removal Sequence
Courtesy of VOLKSWAGEN GROUP OF AMERICA, INC.

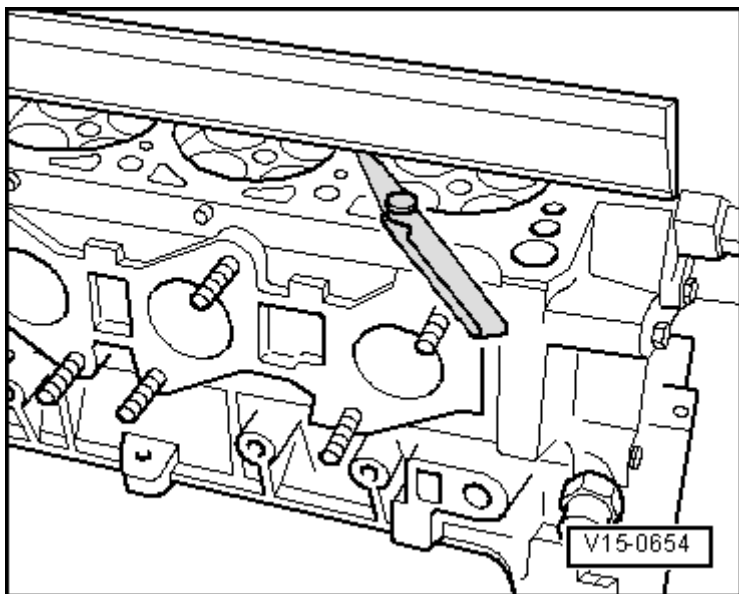


Fig. 3: Identifying Check Of Cylinder Head For Distortion
Courtesy of VOLKSWAGEN GROUP OF AMERICA, INC.

-- Check the cylinder head at multiple points for distortion, using a straight edge and feeler gauges.

- Maximum permissible distortion: 0.05 mm

If this value is exceeded, the cylinder head must be replaced. It is not permissible to rework the sealing surface.

VALVE TIMING, ADJUSTING

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Special tools and workshop equipment required

- Torque Wrench (5-50 Nm) V.A.G 1331
- Torque Wrench (40-200 Nm) V.A.G 1332
- Locking Pins T03006
- Multipoint Socket T10035
- Counterhold Tool Touareg V10 T10172
- Camshaft Clamp T40070
- 2 M8 x 16 Bolts

Modifying the Counterhold Tool Touareg V10 T10172:

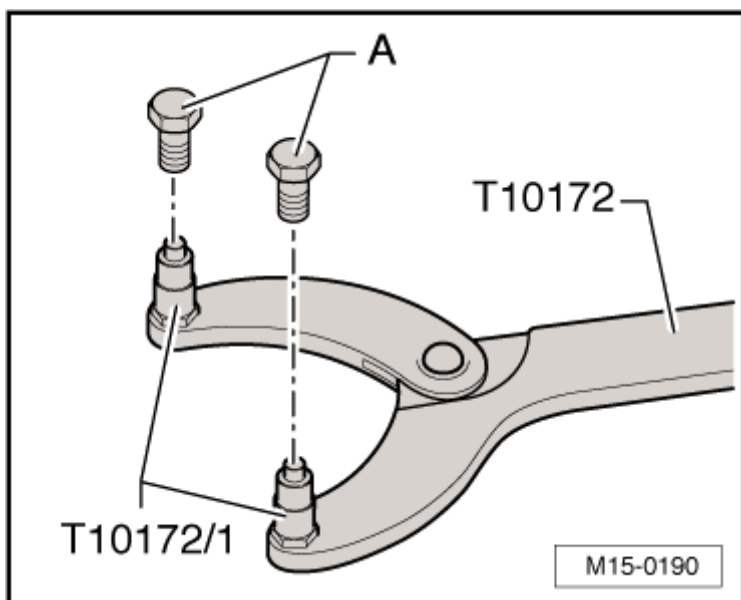


Fig. 4: Identifying Bolts Attached To Adapter T10172/1 For Installation
Courtesy of VOLKSWAGEN GROUP OF AMERICA, INC.

-- Remove the adapters T10172/1 and install 2 M8 x 16 bolts -A-.

NOTE: The valve timing must be adjusted if the camshaft sprockets were loosened during repairs or if the valve timing is not set.

Securing the Camshafts if the Valve Timing is Correct:

-- Remove the chain compartment cover. Refer to CHAIN COMPARTMENT COVER.

-- Remove the cylinder head cover. Refer to CYLINDER HEAD COVER.

-- Lock the crankshaft for adjusting the valve timing. Refer to TO CHECK/ADJUST VALVE TIMING.

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-- Install the camshaft clamp T40070 as shown onto the camshafts and tighten the bolts to 20 Nm.

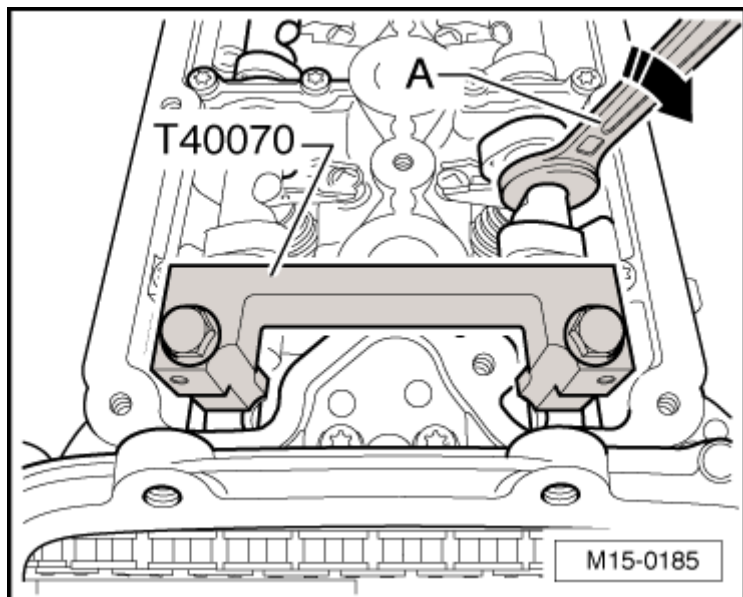


Fig. 5: Identifying Camshaft Clamp T40070 Installed On To Camshafts
Courtesy of VOLKSWAGEN GROUP OF AMERICA, INC.

If the bolts could not be installed easily, attempt to rotate the exhaust camshaft at the recess using an open end wrench -A- (18 or 19 mm, depending on wrench width) slightly in the -direction of the arrow- in order to eliminate any play in the chain.

-- Relieve the tension on the timing chain. To do so, insert a screwdriver of appropriate size between the piston in the chain tensioner and the tensioning rail and press in the -direction of the arrow-.

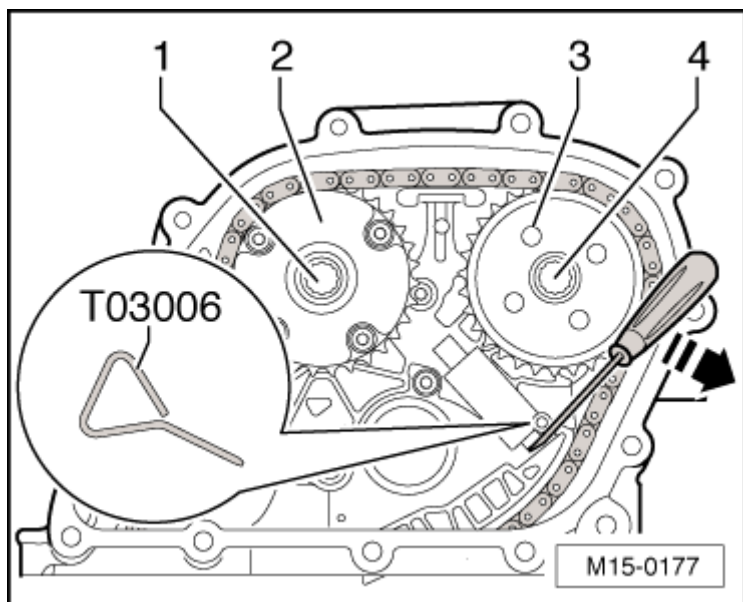


Fig. 6: Identifying Chain Sprockets Placed Into Timing Chain

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-- Secure the completely pressed in piston using the locking pin T03006. The locking pin must be inserted until it stops.

Securing the Camshafts if the Valve Timing is Not Correct:

-- Remove the chain compartment cover. Refer to **CHAIN COMPARTMENT COVER**.

-- Rotate the crankshaft to Top Dead Center (TDC) for cylinder 5, refer to **TO CHECK/ADJUST VALVE TIMING** , however do not lock the crankshaft using the locking pin T40069.

-- Rotate the crankshaft so that the camshaft clamp T40070 can be installed easily onto the camshafts as shown.

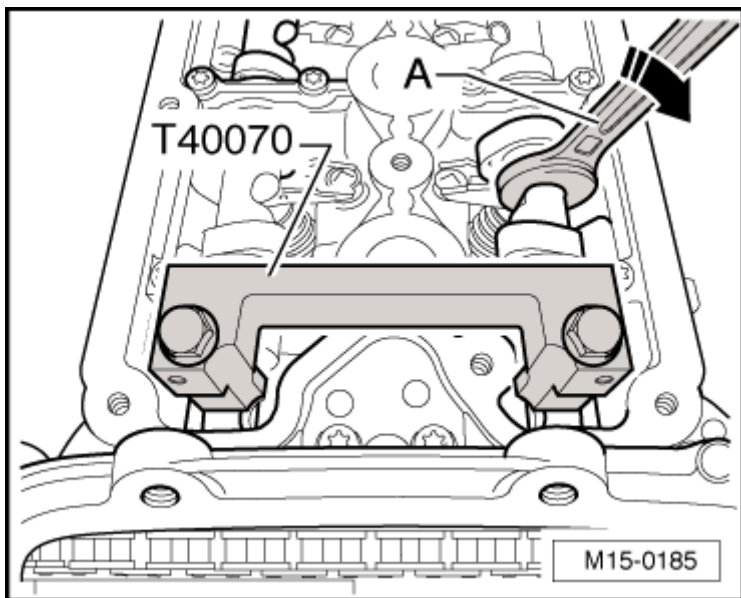


Fig. 7: Identifying Camshaft Clamp T40070 Installed On To Camshafts
Courtesy of VOLKSWAGEN GROUP OF AMERICA, INC.

-- Tighten the camshaft clamp T40070 bolts to 20 Nm.

Removing the Adjuster and Sprocket from the Camshafts:

-- Relieve the tension on the timing chain. To do so, insert a screwdriver of appropriate size between the piston on the chain tensioner and the tensioning rail and press in the -direction of the arrow-.