

VOLKSWAGEN

1.8L 4-Cylinder - New Beetle - APH, AWV & AWP Engines

MANUFACTURER'S SUGGESTED SCHEDULED MAINTENANCE

The manufacturer suggests the timing belt AND tensioner be replaced at 105,000 mile intervals.

CAUTION: This application is an interference engine. Do not rotate camshaft or crankshaft when timing belt is removed, or engine damage may occur.

REMOVAL & INSTALLATION

TIMING BELT

Removal

1. Remove engine cover. Remove noise insulation pan from under engine compartment.
2. Remove air duct pipe between turbocharger and charge air cooler. See **Fig. 1** . Air duct pipe is located along bottom right of cross member.
3. Mark rotation direction of serpentine drive belt. Move serpentine drive belt tensioner as shown to release tension on belt. See **Fig. 2** . Secure tensioner using a drift, about .18" (4.5 mm) x 2.2" (55 mm). See **Fig. 3** . Remove serpentine drive belt. Remove serpentine drive belt tensioner.

NOTE: On vehicles without headlight cleaning system, Connecting Rod Support (3090) can also be used to secure tensioner.

4. Rotate crankshaft so that No. 1 cylinder is at TDC of compression stroke. Ensure that TDC marks on flywheel and bellhousing are aligned. See **Fig. 4** or **Fig. 5** .
5. Remove coolant expansion tank and set aside. Label all vacuum hoses for reassembly reference, and disconnect vacuum hoses from fuel evaporative canister. Disconnect vacuum hoses at throttle body.
6. Remove upper timing belt cover. See **Fig. 6** .
7. Attach Engine Support Bridge (10-222A) with Bracket (10222), and engage retainer in right lifting eye bolt located at cylinder head. Lift engine slightly to remove weight from engine mounts. Engine may also be supported from below with a floor jack.
- 8.

CAUTION: Engine mount assembly is secured by torque-to-yield bolt. Crankshaft pulley CENTER bolt is also a torque-to-yield bolt. These bolts MUST be replaced if they are loosened or removed.

Remove bolts from engine mount assembly at timing belt end of engine. Remove engine mount.

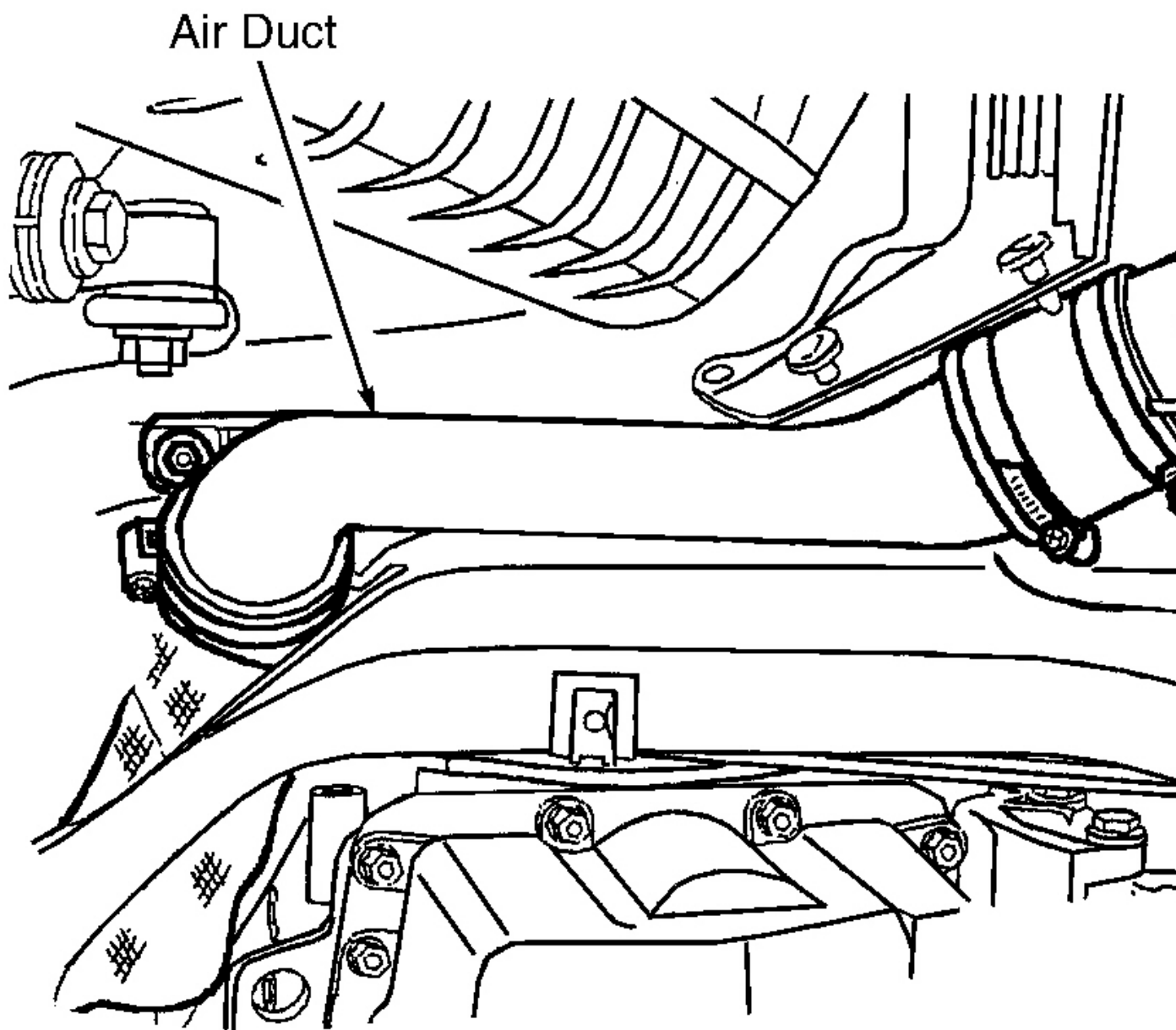
9. Remove crankshaft pulley outer bolts. Remove crankshaft pulley. It is NOT necessary to remove crankshaft pulley center bolt.
10. Remove lower and middle timing belt covers. Remove engine bracket from engine block. See **Fig. 7** . If reusing old timing belt, mark timing belt with arrow to indicate original direction of rotation.
11. Screw Tensioning Bolt (T10092) or M5 x 55 x 1 stud into timing belt tensioner bracket. See **Fig. 8** .

Install hex nut and washer onto stud.

12. SLOWLY turn hex nut on stud to compress timing belt tensioner. Compress tensioner just enough so that Locking Pin (T40011) or drill bit can be inserted through the tensioner body, locking the tensioner in place.
- 13.

CAUTION: When turning camshaft, crankshaft must not be at TDC, or there is a potential for valves to contact pistons. Install timing belt when engine is cold or lukewarm.

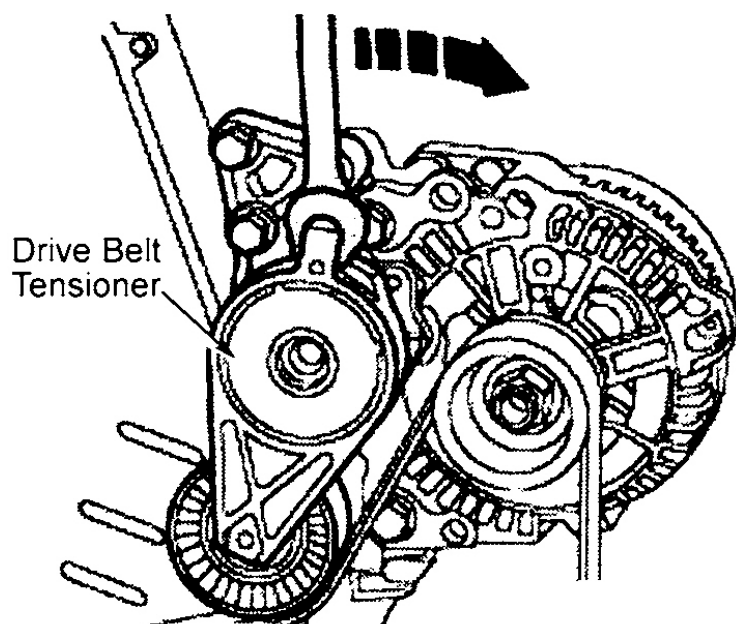
Remove timing belt. Turn crankshaft back just slightly to ensure that crankshaft is not at TDC for any cylinder in case camshaft moves.



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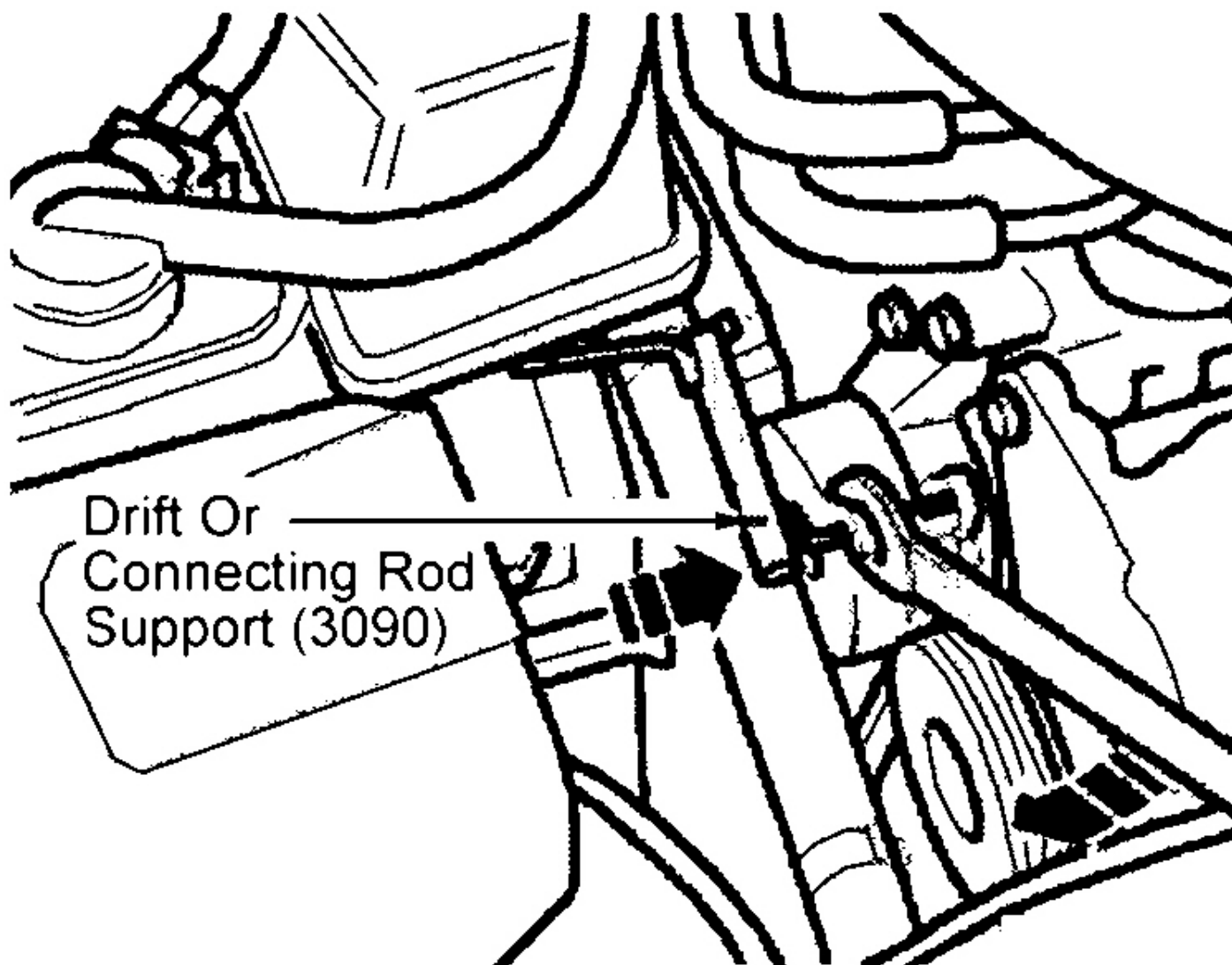
Fig. 1: Identifying Air Duct

Courtesy of VOLKSWAGEN UNITED STATES, INC.



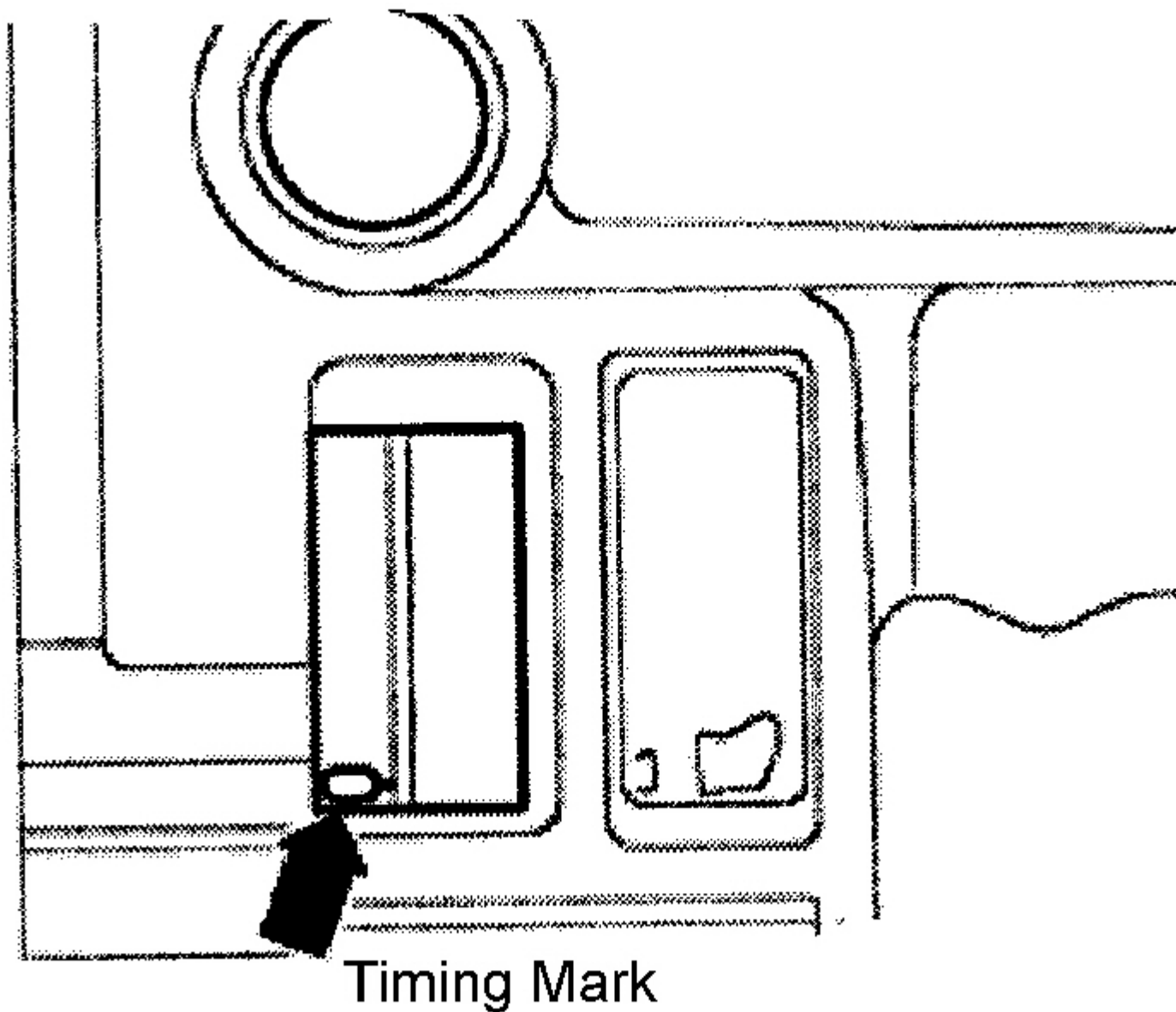
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Fig. 2: Releasing Serpentine Drive Belt Tension (1 Of 2)
Courtesy of VOLKSWAGEN UNITED STATES, INC.



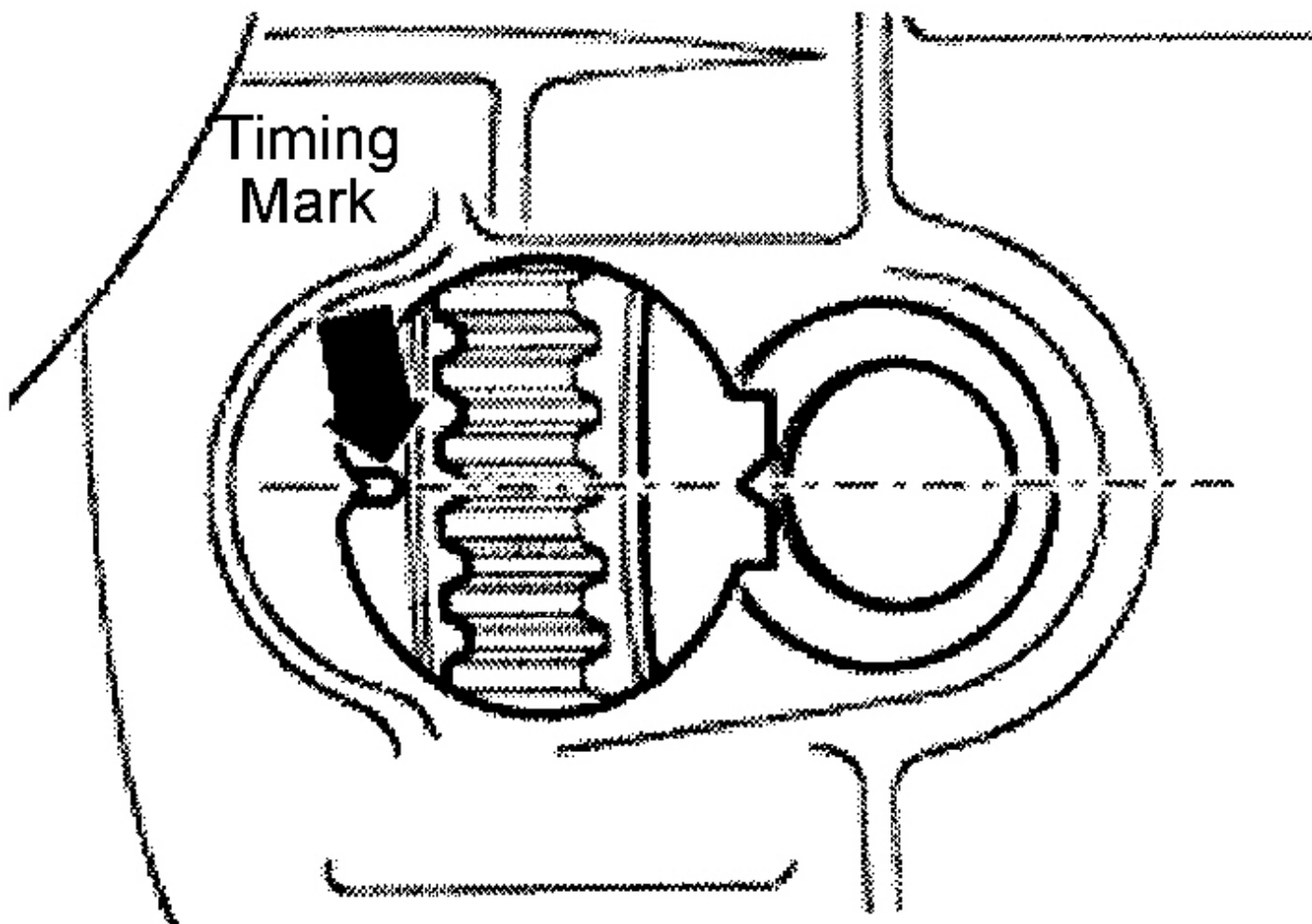
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Fig. 3: Releasing Serpentine Drive Belt Tension (2 Of 2)
Courtesy of VOLKSWAGEN UNITED STATES, INC.



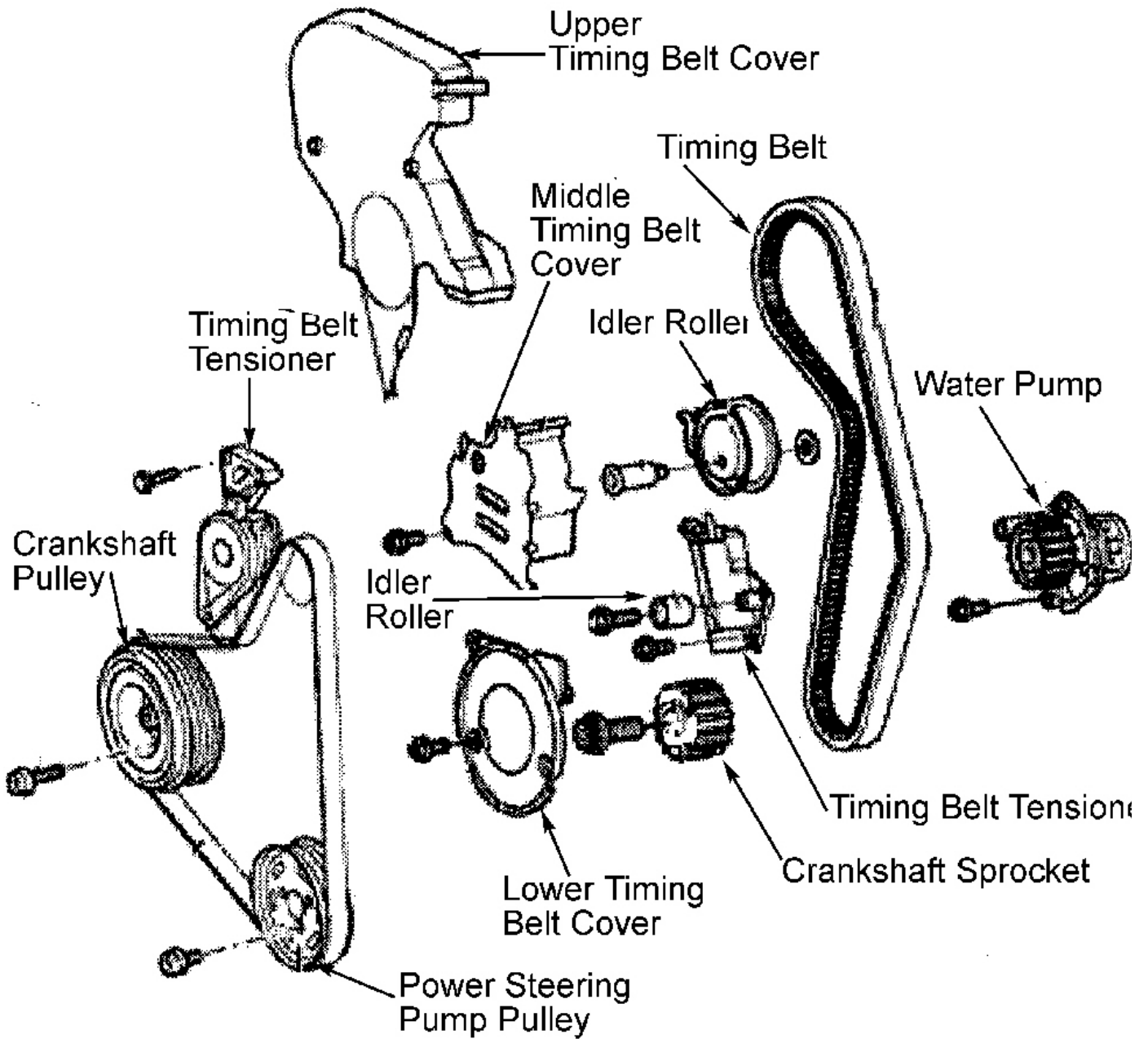
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Fig. 4: Setting Crankshaft to TDC (Automatic Transmission)
Courtesy of VOLKSWAGEN UNITED STATES, INC.



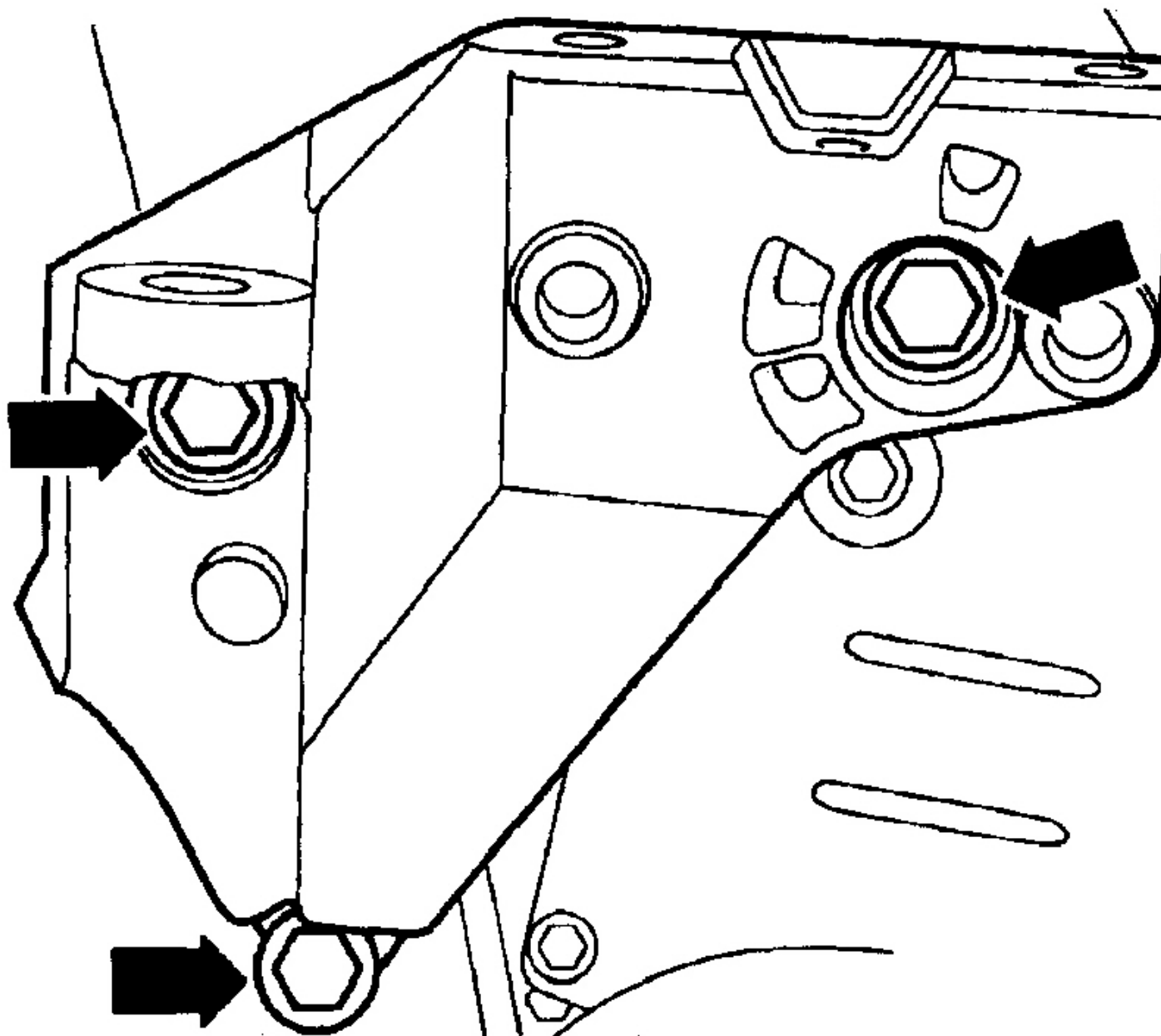
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Fig. 5: Setting Crankshaft to TDC (Manual Transmission)
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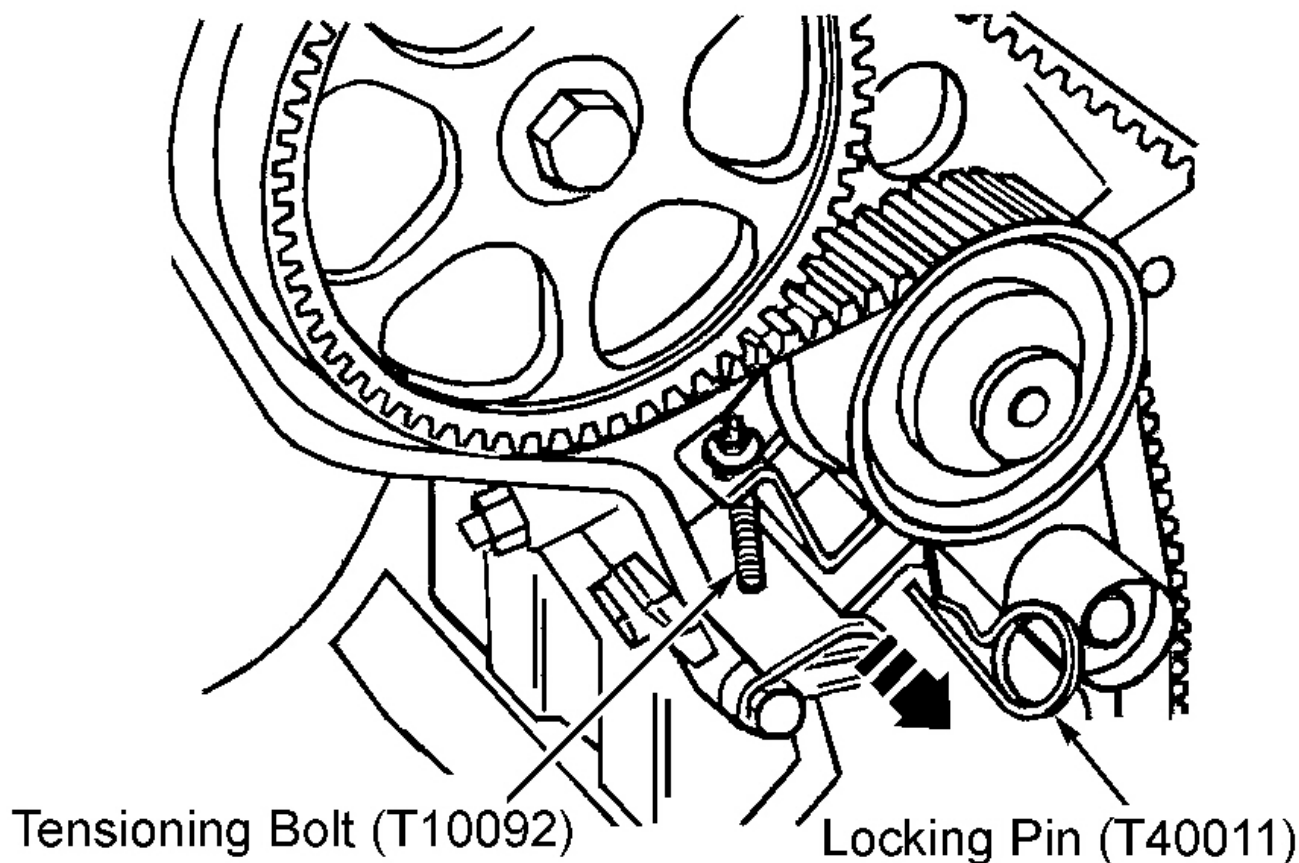
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Fig. 6: Exploded View of Timing Belt & Components
Courtesy of VOLKSWAGEN UNITED STATES, INC.



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Fig. 7: Locating Engine Bracket-To-Block Bolts
Courtesy of VOLKSWAGEN UNITED STATES, INC.



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Fig. 8: Installing Timing Belt Tensioner Locking Pin
 Courtesy of VOLKSWAGEN UNITED STATES, INC.

Installation

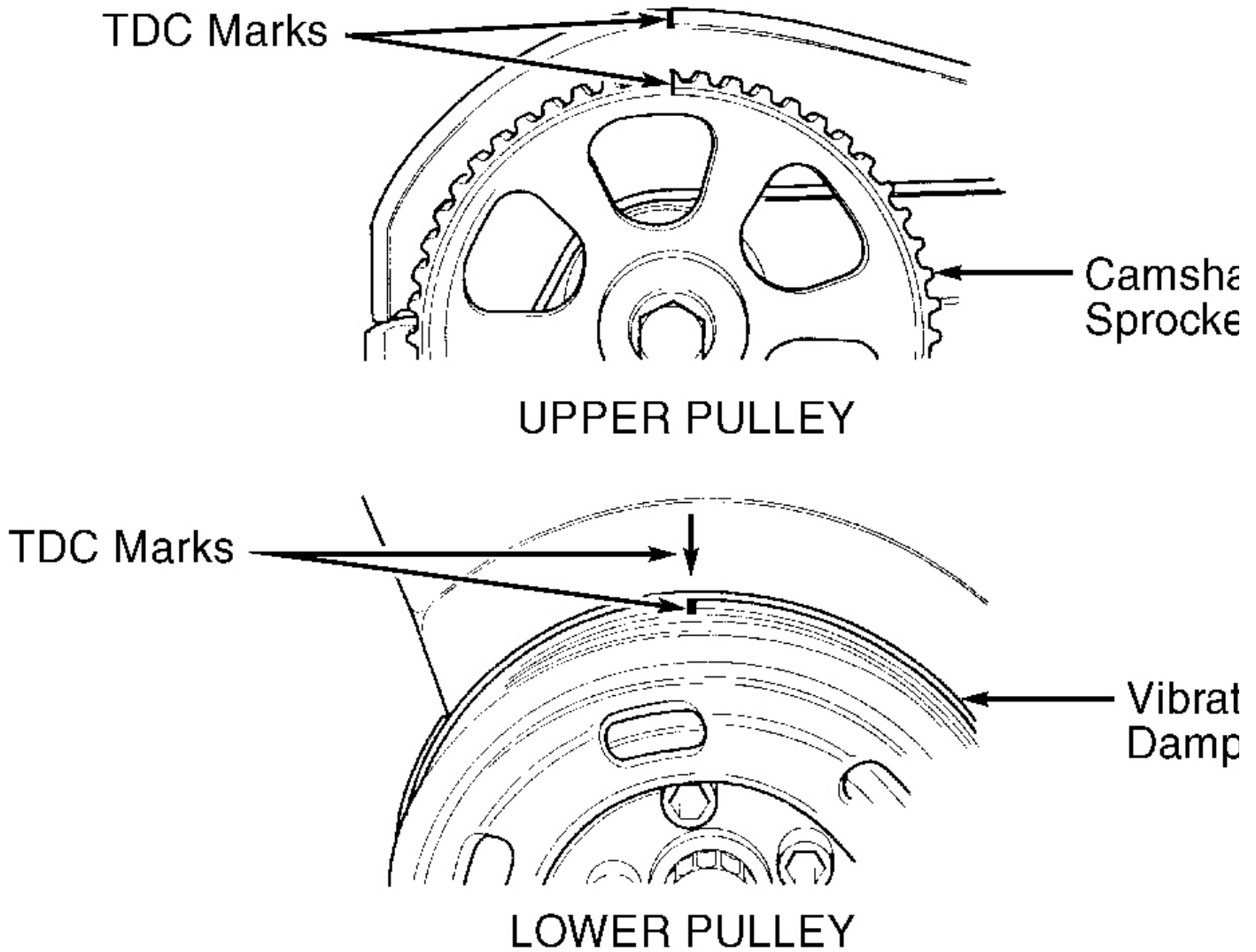
1. Ensure crankshaft is still at TDC of compression stroke for No. 1 cylinder. Align timing marks on camshaft sprocket with mark on cylinder head cover. See **Fig. 9**.
- 2.

NOTE: Before installing engine mount, insert bolts into engine mount.

Install timing belt around crankshaft sprocket. If installing used belt, ensure it is installed in original direction of rotation. Install engine mount bracket to block. Install lower timing belt guard. Use Locking Fluid (D 000 600 A2) on lower timing belt cover bolts. Install crankshaft pulley, and tighten bolt to specification. See **TORQUE SPECIFICATIONS**.

3. Rotate crankshaft to TDC No. 1 cylinder. See **Fig. 9**. Place timing belt on water pump, tensioner pulley and camshaft sprocket.
4. Remove Locking Pin (T40011) or drill bit and unscrew Tensioning Bolt (T10092). See **Fig. 8**.
5. Turn crankshaft 2 revolutions, and check that camshaft and crankshaft marks align properly. See **Fig. 9**.
6. Install middle and upper timing belt covers. Tighten bolts to specification. See **TORQUE SPECIFICATIONS**.
7. Install engine mount to engine bracket and body using NEW bolts. Adjust engine mount clearance. See **Fig. 10**.

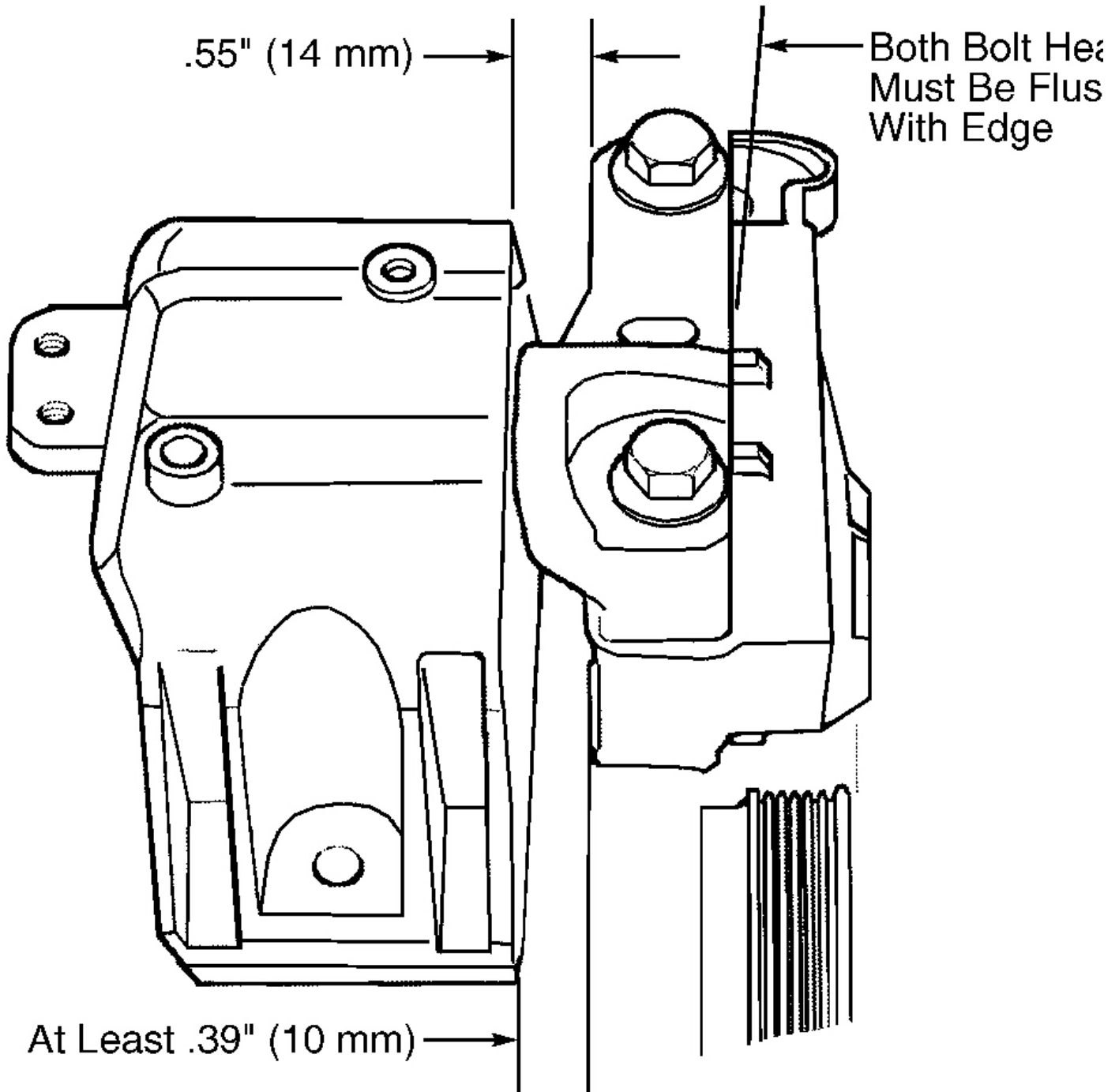
8. Remove engine support bridge or floor jack. Install serpentine drive belt tensioner. Install serpentine drive belt. Install the A/C compressor drive belt (if equipped). Ensure used belts are installed in original direction of rotation.
9. To complete installation, reverse removal procedure. Tighten all fasteners to specification. See **TORQUE SPECIFICATIONS**.



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Fig. 9: Aligning Camshaft & Crankshaft Timing Marks

Courtesy of AUDI OF AMERICA, INC.



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Fig. 10: Adjusting Engine Mount Clearance
 Courtesy of VOLKSWAGEN UNITED STATES, INC.

TORQUE SPECIFICATIONS

TORQUE SPECIFICATIONS

Application	Ft. Lbs. (N.m)
Camshaft Sprocket Bolt	59 (80)
Crankshaft Pulley Bolt	18 (25)
Crankshaft Sprocket Center Bolt ⁽¹⁾	

2003 Volkswagen New Beetle GLS

TIMING BELT REPLACEMENT - 1.8L

Step 1	66 (90)
Step 2	Plus 1/4 Turn (90 Degrees)
Engine Mount Bracket-To-Engine	33 (45)
Engine Mount-To-Body ⁽¹⁾	
Step 1	30 (40)
Step 2	Plus 1/4 Turn (90 Degrees)
⁽¹⁾ Engine Mount-To-Engine Bracket	
Step 1	44 (60)
Step 2	Plus 1/4 Turn (90 Degrees)
Serpentine Drive Belt Tensioner Bolt	18 (25)
Timing Belt Cover Bolt	15 (20)
Timing Belt Idler Pulley Bolt	15 (20)
Timing Belt Tensioner Mount Bolt	11 (15)
Timing Belt Tensioner Pulley Bolt	18 (25)
Water Pump Bolt	11 (15)
⁽¹⁾ Replace bolts if loosened or removed.	