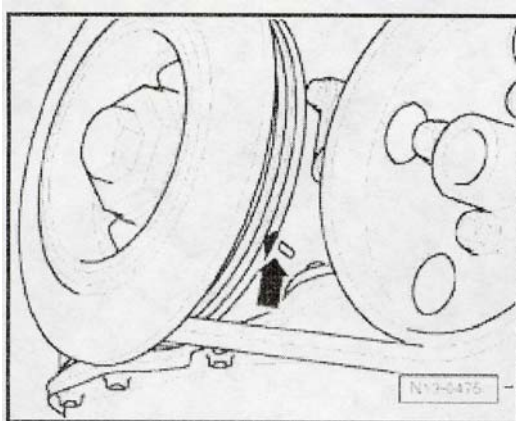
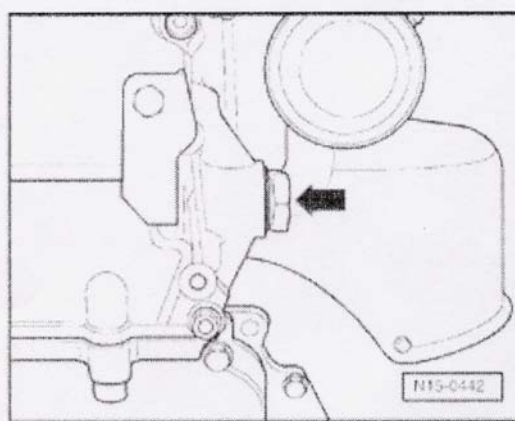


## **8. Remove Cylinder Head**

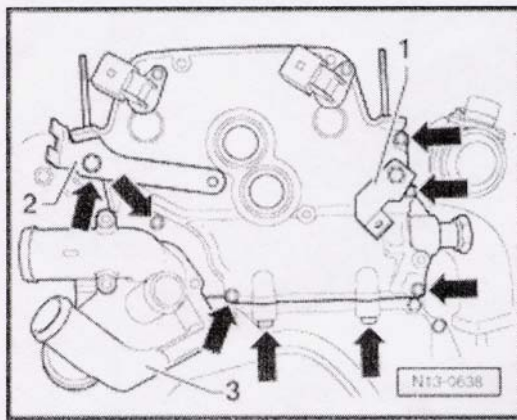
- 91) Turn crankshaft at vibration damper securing bolt in engine direction of rotation to TDC OF CYL # 1. (Fig 8.1)
- 92) Remove cylinder head cover. It is held in by nine 10mm bolts and two 10mm nuts.
- 93) Remove camshaft roller chain tensioner. (Fig 8.2)
- 94) Remove six 5mm allen bolts and two 6mm allen that hold side cover to the head. Then remove from head. (Fig 8.3)
- 95) Next mark camshaft adjusters so you don't mix them up when you reinstall.
- 96) Remove exhaust camshaft adjuster. Counter hold only with 32mm wrench on camshaft. Camshaft bar must not be installed when camshaft adjusters are loosened or tightened. (Fig 8.4)
- 97) Next remove the intake camshaft adjuster.
- 98) Remove the two 6mm allen bolts holding the chain guide rail and remove the rail.
- 99) Place camshaft roller chain aside
- 100) Loosen socket head bolts in a given sequence from outside to inside using a 12mm 12-point socket. Then remove completely. (Fig 8.5)
- 101) Carefully lift cylinder head off.
- 102) Place clean cloth in cylinders so no dirt or emery cloth particles can get in between cylinder wall and piston.
- 103) Also prevent dirt and emery cloth particles from getting into the coolant
- 104) Carefully clean cylinder head and cylinder block sealing surfaces. This will ensure that no scoring or scratches are formed (when using abrasive paper the grade must not be less than 150). Take a lot of care and attention around the cylinders and combustion chamber in the head.
- 105) Once all surfaces are clean it's time to install the head plate.



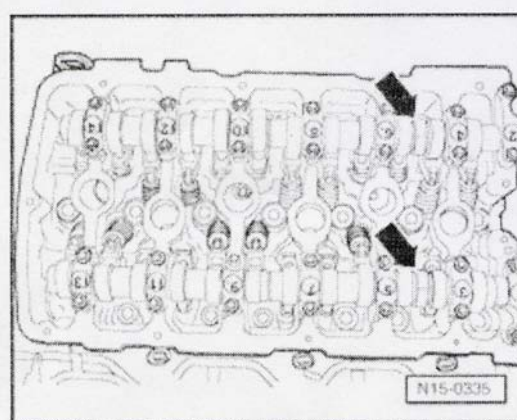
**Fig 8.1**



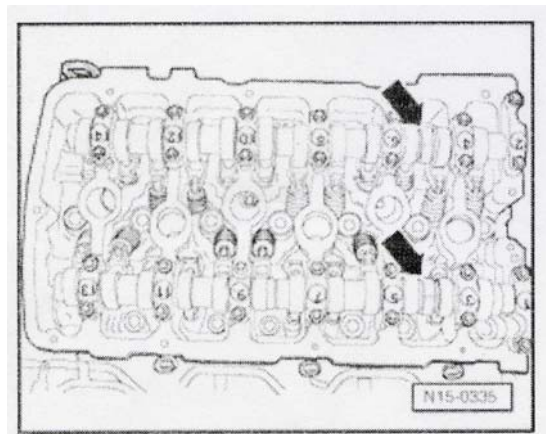
**Fig 8.2**



**Fig 8.3**



**Fig 8.4**



**Fig 8.5**

## **9. Install Head Plate**

- 106) First take silicone and place a dab where the block meets the timing chain cover. You will do this in two places. This step is to be completed between every layer.
- 107) Remove new cylinder head gasket from it's packing and install on block. HANDLE WITH EXTREME CARE. DAMAGING WILL LEAD TO LEAKS. Inscription (part #) must be legible.

- 108) Once again place silicone in the same areas and install head plate.  
MAKE SURE HEAD PLATE IS CLEAN AND FREE OF ANY RIDGES OR FOREIGN PARTICLES.
- 109) Once again place silicone in the same areas and remove new cylinder head gasket from its packing and install.
- 110) Carefully install cylinder head. Make sure dowel pins seat into head.

## **10. Replace Cylinder Head**

- 111) Carefully install new cylinder head bolts into head. Make sure longer bolts are placed in the middle holes of the head.
- 112) Hand tighten all the head bolts first starting from the inside to outside.
- 113) Next pre-tighten all bolts to 22 ft/lbs from inside to outside.
- 114) Then tighten all bolts to 36 ft/lbs from inside to outside.
- 115) Then tighten all bolts ¼ turn (90 degrees) further using a rigid wrench from inside to outside.
- 116) Then once again tighten all bolts ¼ turn (90 degrees) further from inside to outside.
- 117) Finally tighten the middle 9 bolts another ¼ turn (90 degrees) from inside to outside.
- 118) Next install the camshaft bar T10068 A. It must engage both shaft grooves.
- 119) Reinstall guide rail.
- 120) Route chain between tensioning rail and guide rail over control housing.
- 121) Reinstall cam gears starting with the intake one first. Place chain on intake gear then install on cam. Make sure to take up slack of chain when first installed.

The exhaust and intake camshaft adjusters can be turned in two directions. WHEN INSTALLING MAKE SURE BOTH CAMSHAFT ADJUSTERS ARE TURNED CLOCKWISE UNTIL THEY STOP. THE DISTANCE BETWEEN THE INTAKE AND EXHAUST MARKINGS “24E” TO “32A” AMOUNTS TO EXACTLY 16 ROLLERS OF THE CAM SHAFT ROLLER CHAIN

- 122) Turn the sensor wheel at the intake camshaft adjuster to the right until limit stop. Fasten adjuster hand tight in this position to the intake camshaft with camshaft roller chain installed.
- 123) Make sure that the camshaft roller chain rests against the guide rail tightly and has no slack.
- 124) The marking “24E” on the camshaft adjuster must be aligned with the notch of the control housing.
- 125) From the marking “24E” on the adjuster count exactly 16 rollers on the control chain toward the right and mark the roller with a colored marker.
- 126) Turn the sensor wheel of the exhaust camshaft adjuster to the right until the limit stop and hold the adjuster with the sensor wheel in this position.

- 127) Place the exhaust camshaft adjuster with the marking “32A” into the camshaft roller chain, positioned exactly so the 16 pre-counted rollers rest between the markings “24E” and “32A”
- 128) Fasten the exhaust camshaft adjuster to the camshaft hand tight.
- 129) Remove camshaft bar.
- 130) Turn over crankshaft twice in the direction of engine rotation and check valve timing. When turning the crankshaft press hand against the chain tensioner so that the camshaft chain does not jump over.
- 131) If marks don't align repeat the valve timing procedure.
- 132) If marks align hold the camshaft with 32mm wrench and tighten the 18mm bolt 44 ft/lbs + ¼ turn. (90 degrees)
- 133) Clean cover mating surface and head mating surface.
- 134) Coat sealing surface of cover with silicone and place a dab in the two corners above the head gasket and between the head.
- 135) Install cover and install the six 5mm allen bolts and tighten to 10 ft/lbs. Then install the two 6mm allen bolts and tightened to 16 ft/lbs.
- 136) Install camshaft roller chain tensioner with spacer / oil feed for turbo provided and torque to 30 ft/lbs. (Fig 10.1)
- 137) Re install cylinder head cover.

