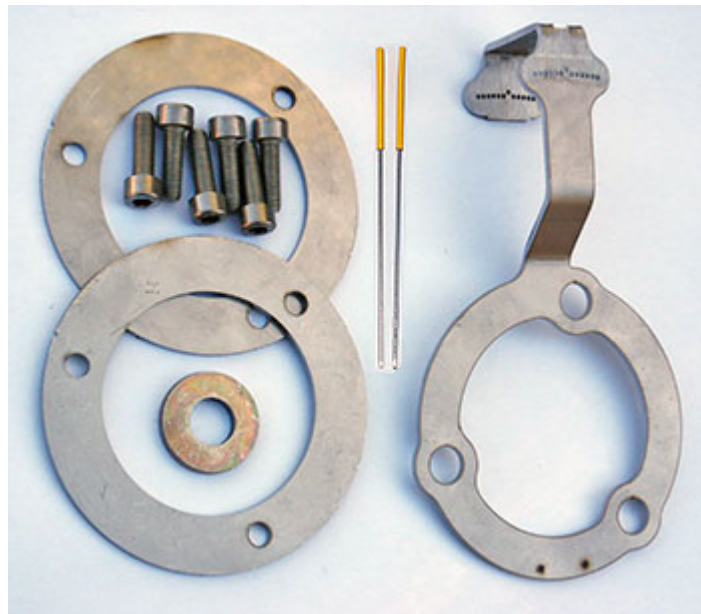


PORSCHE

928

32V'r V1 INSTRUCTIONS



Tools

Long socket wrench or breaker bar with 27mm socket

3/8" torque wrench with 17mm socket

17mm, 32mm wrenches

4mm allen key

32V'r - V1

Each hole is two crank degrees. The center, raised hole is zero.

When looking at installed tool, counterclockwise/left of zero hole is advance, clockwise/right is retard.

A good basic setting (=factory zero), measured with a cold engine, is 1-4: 0°, 5-8: +2°. *The difference on the 1-4 side is to compensate for engine expansion when warm*

Note that the factory zero is measured differently with the V1 than the V2 tool. The holes on the V2 are retarded -2° so that both sides are 'zero' when measured warm.

Conventions used in text

Left is USA drivers side, **right** is passenger side.

Author assumes that reader has access to workshop manuals and has the basic knowledge, tools, and skills to change a timing belt.

Notes are in italic font.

TDC 0 | T
20° 2 | 0
45° 4 | 5

CW clockwise
CCW counterclockwise
TDC top dead center

Warnings

Do not run engine with indicator or spacer installed!

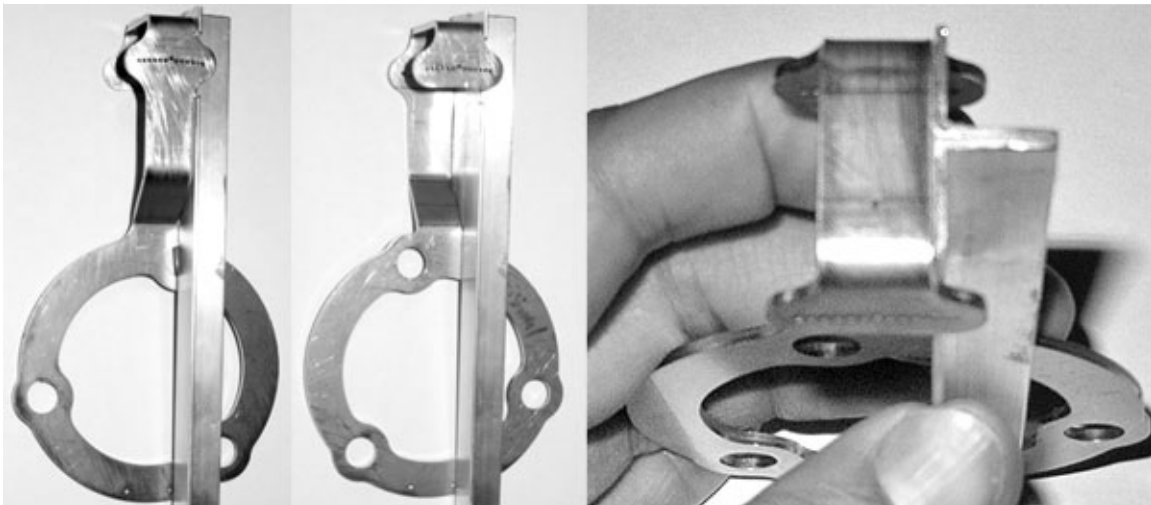
Always counter hold the cam bolt shoulder washer with 32mm wrench while loosening or tightening cam bolt.

Tighten 5mm clamp ring bolts evenly!

Indicator needle is sharp!

Alignment

Hold alignment bar tightly against both ends of the arm, and the ring. Note the position where the bar crosses the alignment hole in the ring. Flip tool over, and check again. Ideally, each side will reveal the same amount of alignment hole. If the reveal is larger on one side, clamp the arm in a vice, and gently pull or push the ring to even the reveal. Very slight movement is all that is needed. Check for twist in the arm as shown. Roll the needles along a flat surface to check for flatness. Use finger pressure to gently straighten them if necessary.





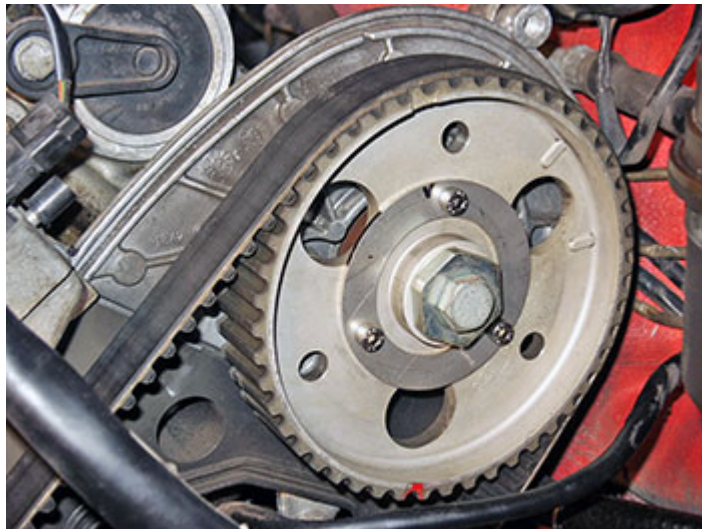
Rotate the crank clockwise using the crank bolt, until the balancer indicates cylinder #1 TDC.

The large cast indentation on the front of the cam gear and/or small notch on the rear, should be pointing upwards near the V notch cast in the aluminum of the rear timing belt cover.

If the indentations/notches on the cam gears are pointing downward, then the engine is at cylinder #6 TDC.

Install clamp rings with 5mm allen head bolts on both left and right cam gears.

One bolt is offset, so the clamp rings will fit in one position only.



Slip 32V'r over clamp ring bolts.



Insert needle into hole that most closely fits into the housing indentation **V**.

Each hole is two crank degrees. Left of zero is advance, right retard.

It is possible that the needle will not rest in the absolute center of the **V**.

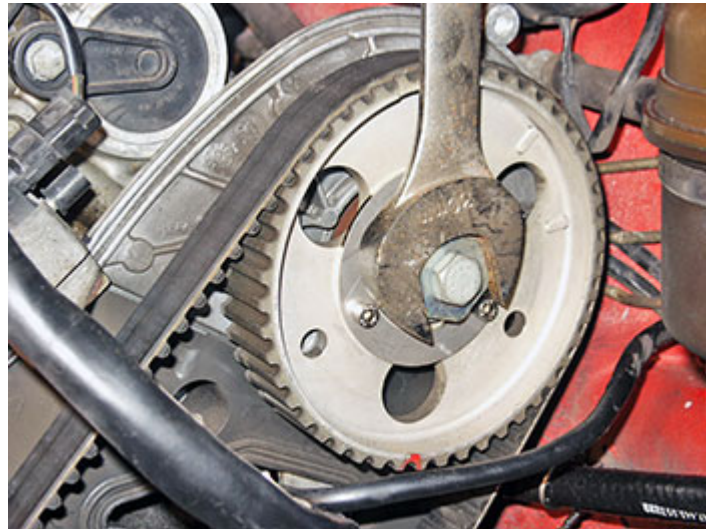
Use two needles to split the difference, or use one needle, and swap in between two adjacent holes, for one degree.





Tighten clamp ring bolts.

Counter hold cam bolt washer and loosen cam bolt.



Reinstall cam bolt with spacer.

Counter hold cam bolt washer, tighten cam bolt to specification using torque wrench.



For advancing, or clockwise adjustment, slide indicator into the hole that corresponds to the amount of advance desired, with crankshaft at #1 TDC.

Loosen the clamp ring bolts and using a wrench on the cam bolt, rotate the cam bolt clockwise until the needle rests in the **V**.

For retarding, or counter-clockwise adjustment, there is too much valve spring pressure to use the cam bolt to rotate the cam.

Remove 32V'r and rotate the crankshaft clockwise using the crank bolt until 20 degrees before #1 TDC.

Replace 32V'r, and slide needle into the hole that corresponds to the amount of retard desired.

Rotate crank clockwise using the crank bolt until the needle rests in the **V**.

Loosen the clamp ring bolts, and while holding the cam bolt with a wrench, rotate the engine clockwise to #1 TDC.



While still holding cam bolt with wrench, tighten clamp ring bolts. Remove 32V'r.

Counter hold cam bolt washer, loosen and remove cam bolt. Reinstall cam bolt without spacer. Counter hold cam bolt washer, tighten cam bolt to specification using torque wrench.

Using crank bolt, rotate crankshaft again to #1 TDC. Use 32V'r to recheck cam position. (For best results, remove fuel pump relay, and crank engine to even out the belt tension, then recheck.)

When a consistent reading is attained after rotating crankshaft, recheck cam bolt torque using torque wrench, and remove clamp ring. **Confirm that spacer is not installed!**