ENG-14, Balance Shaft Oil Seal Replacement

Introduction

The following procedure will provide instructions for replacing the balance shaft seals on a 944. It will also provide instructions for resealing the balance shaft cover.

At the back of the balance shaft housing there is also a large diameter plug which uses an o-ring to seal the rear of the housing. I don't normally recommend replacing this o-ring or resealing the balance shaft cover unless they actually start leaking. The reason for this is that removing the balance shaft covers can require significant disassembly of engine components, particularly on turbocharged cars.

Also, on 1985½ and newer models, there is a seal between the upper balance shaft bearing cap and cover. This seal is used to direct oil flow from the upper balance shaft bearing to a fitting on the balance shaft cover which supplies the turbocharger on turbocharged cars. On normally aspirated cars the balance shaft cover is not tapped for a turbocharger oil supply fitting. However, the normally aspirated cars use the same bearing cap as the turbocharged cars. The seal must be installed to ensure adequate lubrication of the upper balance shaft bearing. If the balance shaft cover needs to be resealed or the rear sealing plug o-ring needs to be replaced, the bearing cap-to-cover seal must be replaced at the same time. This is not a concern on models through early 1985 as the bearing cap is machined integral to the balance shaft cover.

Tools

- Jack stands
- Floor Jack
- Metric Socket set
- Metric Wrench set
- Porsche Timing Belt Tension tool (P9201)
- Flywheel Lock (P9206)
- Balance Shaft Pin Spanner (P9200) or equivalent
- Gear puller
- Seal Puller
- Small screwdriver or probe
- Bearing grease
- Loctite 638 and velour roller (if balance shaft cover is removed)

Other Procedures Needed

- ENG-03, Flywheel Lock Installation
- ENG-13, Locating and Setting Engine to Top Dead Center (TDC), Cylinder 1
- AF-01, Air Filter Housing and Air Flow Sensor - Removal and Installation
- ENG-05, Camshaft and Balance Shaft Belt Removal
- ENG-06, Camshaft and Balance Shaft Belt Installation
- ENG-10, Camshaft and Balance Shaft Belt Tension - Checking and Adjusting
- ENG-08, Balance Shafts Sprocket Installation and Alignment

Procedure

NOTE

It is possible to remove the camshaft belt without removing the crankshaft gear. However, to replace the water pump, balance shaft seals, or front crankshaft oil seal, the crankshaft gear must be removed.

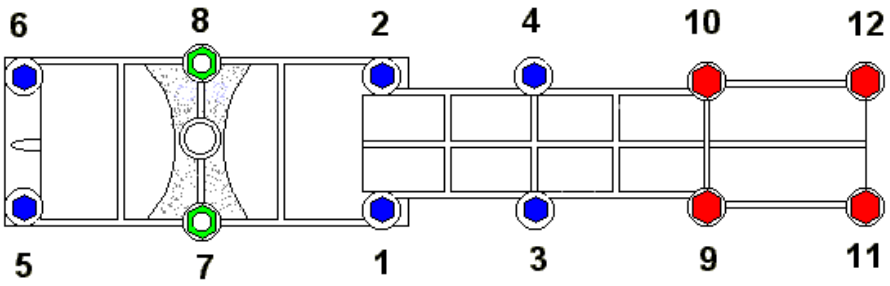
1. Using ENG-05, remove the camshaft and balance shaft belts, all rollers, tensioners, balance shaft sprockets, crankshaft gears, and rear timing cover.
2. Remove the woodruff key from the slot in the balance shaft.
3. Remove the retaining bolts (3) that hold the front balance shaft support in place and slide the support off the end of the balance shaft.
4. If the balance shaft cover needs to be resealed or the rear plug o-ring needs to be replaced, remove the balance shaft cover bolts and remove the cover and rear plug.
5. Using a seal puller, remove the main seals from the front of the balance shaft support. If you don't have a seal puller, you can remove the seal by sliding a screwdriver under the inside lip of the seal and pry the seal out of the support.
6. Remove the spacer from the balance shaft support.
7. Using a small screwdriver or probe remove the large o-ring from the balance shaft support.
8. Apply a thin coat of bearing grease to the o-ring groove in the balance shaft support, install the o-ring, and apply a thin coat of bearing grease to the outside of the o-ring.
9. Apply a thin coat of bearing grease to the contact surfaces of the support spacer and install the spacer into the support housing.

CAUTION

While the main balance shaft seals appear identical, there is actually a 1 mm difference in the outside diameter of the seals. Don't confuse them or you will end up doing this job again.

10. Apply a thin coat of bearing grease to the sealing surfaces of the main balance shaft seal and slide the seal into the front of the support. Tap the seal into place using a socket of slightly smaller outside diameter than the seal.
11. If the balance shaft cover has been removed, perform the following:
    a. Install a new o-ring onto the rear housing plug and position the plug into the housing.
    b. Apply a thin coat of Loctite 574 (used to be Loctite 638) to the cover mating surface using a velour roller. Position the cover in place on the balance shaft housing.
    c. Install the balance shaft cover retaining bolts finger tight. Do not torque until front support is installed.
12. Install the thin plastic seal onto the end of the balance shaft.
13. Install the front support (with spacer and seal installed) onto the balance shaft and slide into the front of the housing until fully seated.
14. Install the front support retaining bolts (3) finger tight.
15. If the balance shaft cover was removed, torque the cover retaining bolts using the torque specs and sequence for your vehicle below:

Lower Balance Shaft (1983 - 1985)



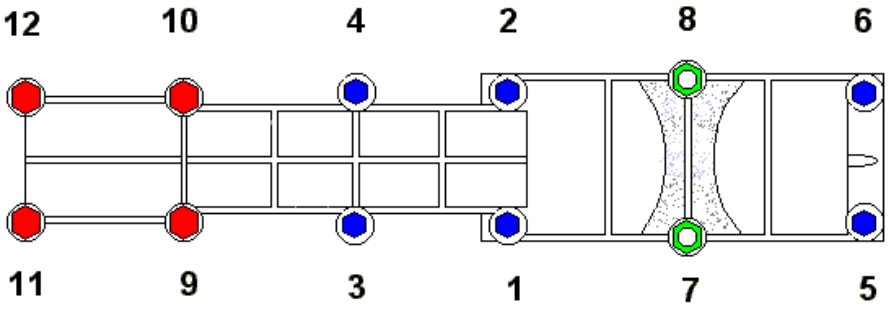
Tightening Torques:

M6 Bolts - 8 Nm (6 ft-lb)

M8 Nuts on studs - Stage 1 15 Nm (11 ft-lb)
Stage 2 30 Nm 22 ft-lb)

M8 Bolts - Stage 1 15 Nm (11 ft-lb)
Stage 2 - 20 Nm (14 ft-lb)

Upper Balance Shaft (1983 - 1985)



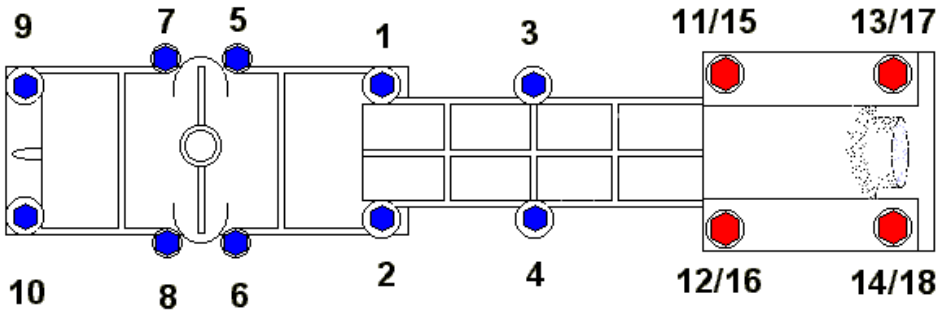
Tightening Torques:

M6 Bolts - 8 Nm (6 ft-lb)

M8 Nuts on studs - Stage 1 15 Nm (11 ft-lb)
Stage 2 30 Nm 22 ft-lb)

M8 Bolts - Stage 1 15 Nm (11 ft-lb)
Stage 2 - 20 Nm (14 ft-lb)

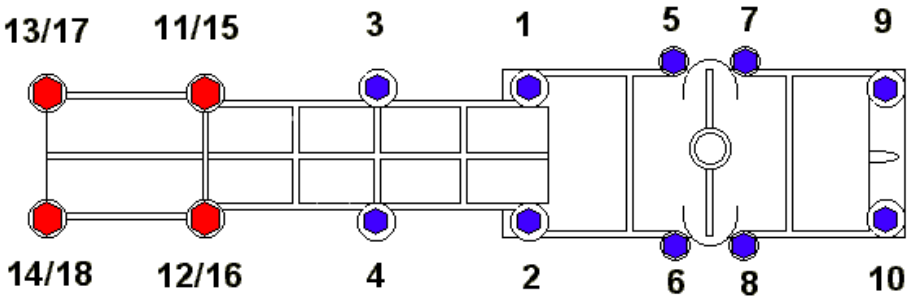
Lower Balance Shaft (1985.5 - 1987)



1. Tightening torque for the M6 bolts: 10 Nm (7 ft-lb).
2. Tightening the M8 bolts is done in two stages:

1st Stage: 15 Nm (11 ft-lb)
2nd Stage: 20 Nm (14 ft-lb)

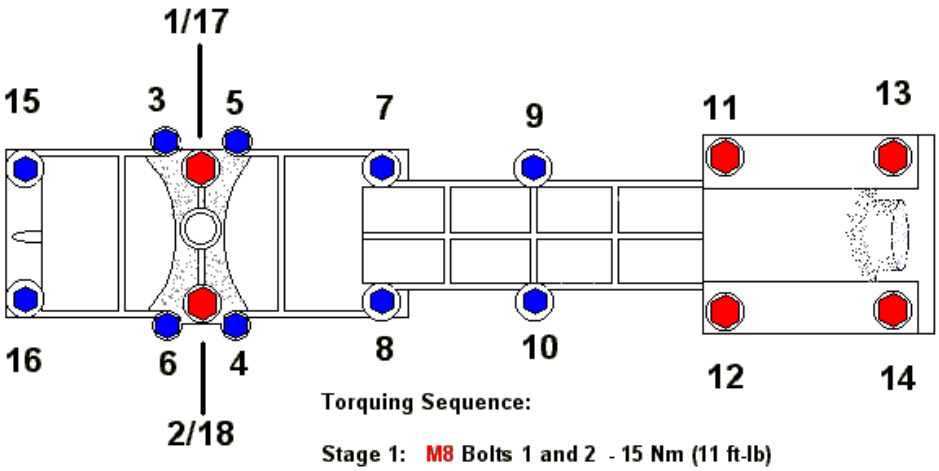
Upper Balance Shaft (1985.5 - on)



1. Tightening torque for the M6 bolts: 10 Nm (7 ft-lb).
2. Tightening the M8 bolts is done in two stages:

1st Stage: 15 Nm (11 ft-lb)
2nd Stage: 20 Nm (14 ft-lb)

Lower Balance Shaft (1987 - on)



Torquing Sequence:

Stage 1: M8 Bolts 1 and 2 - 15 Nm (11 ft-lb)

Stage 2: M6 Bolts 3 thru 16 - 10 Nm (7 ft-lb)
M8 Bolts 11 thru 14 - 20 Nm (14 ft-lb)

Stage 3: M8 Bolts 17 and 18 - 33 Nm (24 ft-lb)

16. Torque the front support bolts (M8) to 20 Nm (15 ft-lb).
17. Using ENG-06, install and tension the balance shaft and camshaft belts.