

Engine Assembly Tips for the Type 1 VW



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Preparing the Engine Case

Taking the time to prepare all the engine components, prior to assembly, will make engine assembly easier and add to the life of your engine.



Preparing the Engine Case

Round
square
corners.



Preparing the Engine Case

Restrictor Plug

Restricts oil to
the number 4
bearing.



Preparing the Engine Case

Removing restrictor plug:

- ✓ Drill plug with #21 drill bit
- ✓ Tap with 10/32 tap
- ✓ Insert 10/32 screw or bolt
- ✓ Remove plug with hammer
- ✓ Tap hole with 1/16" pipe tap



Preparing the Engine Case

Case needs cleaned up between the oil pressure port and cylinder head stud insert.



Preparing the Engine Case

Oil temperature port should be drilled and tapped into the case.



Preparing the Engine Case

Clean off any
burrs left
from machine
work.



Preparing the Engine Case

The case has
two dowel
pins to align
the case
halves.



Preparing the Engine Case

This is the
second dowel
pin to align
the case
halves.



Preparing the Engine Case

Main Bearing Dowel Pin Installation

- ✓ Dowel Pins may need to be hand fit to the holes in the Case.



Preparing the Engine Case

The oil cooler usually is attached here.

If you have cowling height restrictions, you may need to drill and tap these two ports.



Crankshaft Preparation

Proper preparation
and installation can
prevent
catastrophes.



Crankshaft Preparation

Four types of crankshafts:

- Cast
- Forged
- Billet
- Welded



Crankshaft Preparation

Crankshaft Gear Kit

- Cam Timing Gear
- Spacer
- Brass Drive Gear
- Snap Ring (Optional)
- Large Woodruff Key
- Small Woodruff Key



Crankshaft Preparation

Cam Drive Gear

Make sure the Key
slides through the
slot in the Gear.



Crankshaft Preparation

Brass Drive Gear

Make sure the Key slides through the slot in the Gear.

A Spacer fits between the Gears on the Crankshaft.



Crankshaft Preparation

- ✓ Measure rod journal diameter
- ✓ Measure rod journal radius
- ✓ Visually inspect oil feed holes



Crankshaft Preparation

Shrink Fit
Prop Hub
Installation



Crankshaft Preparation

Main Bearings

The number two Main Bearing may be made from aluminum or layered Babbitt material.



Crankshaft Preparation

Main Bearings

- Silverline Bearings are the preferred choice.
- Mahle Bearings have an all aluminum number two Main Bearing.



Crankshaft Preparation

Flywheel
Dowel
Pins



Crankshaft Preparation

Flywheel O Ring Seal Installation

✓ Not all Flywheels use
an O Ring.



Connecting Rod Preparation

- ✓ Mark Connecting Rods.
- ✓ Check Rod to Case clearance.
- ✓ Check Rod to Camshaft clearance.
- ✓ Check Rod to Piston skirt clearance.



Connecting Rod Preparation

**Forging
Mark.**



Camshaft Preparation

Depending upon the crankshaft's stroke and connecting rods used, the center cam bearing may require minor machine work.



Camshaft Preparation

Desired
Camshaft End
Play is .002"



Camshaft Preparation

Don't use
grease on
your lifters
– use oil!



Camshaft Preparation

Check
Camshaft
to Lifter
Clearance.



Case Closure

- ✓ Lifter Clips
- ✓ Case Dowel Pins
- ✓ Camshaft Timing
- ✓ Free Rotation
- ✓ Case Sealant
- ✓ End Play



Cylinder Head Preparation

Choosing a Cylinder Head

- ✓ Source
- ✓ Fin Area
- ✓ Flashing
- ✓ Valve Size
- ✓ Head Chamber Thickness



Cylinder Head Preparation

Choosing a Cylinder Head

- ✓ Clear exhaust ports
- ✓ Clear intake ports
- ✓ Clear valve guide area



Cylinder Head Preparation

- ✓ Spark Plug length.
- ✓ Valve Sealing.
- ✓ CC'ing the Heads.



Cylinder Head Preparation

Rocker Arm
Shaft
Clearance
Check.



Cylinder Head Preparation

Valve Cover
Bolt
Length.



Cylinder Head Preparation

Check
Pushrod
Tube Length.



Cylinder Head Preparation

Expand end
of pushrod
tube with
channel lock.



Cylinder Head Preparation

Cylinder
Head Stud
Washers.



Pushrod Preparation

Flush pushrods
after all machine
work is complete.



Pushrod Preparation

Heat the end
of the pushrod
on a hot plate.



Pushrod Preparation

Use a piece of
steel/aluminum
with a hole in it to
hold the pushrod.



Valve Cover Gasket Preparation

Use spray
adhesive to
hold gasket in
place.



How Not To Install...

This was a
heli-coil
installation
gone bad...



How Not To Install...

Rocker
Arms



How Not To Install...

*Case
Sealer.*



How Not To Install...

Case Sealer



How Not To Install...

Pushrod
Tubes



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