



## Crankshaft check (L3)

Readily available commercial tools:

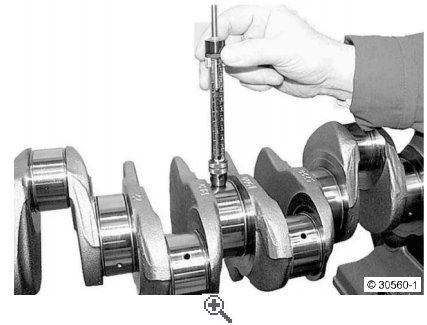
- Magnetic stand for measurements
- Palmer
- Internal bore meter
- Prisms
- Hardness tester

Special tools:

- Dial gauge: 100400

### Check the hardness of the main journal

- Apply the hardness tester on the bearing pins.



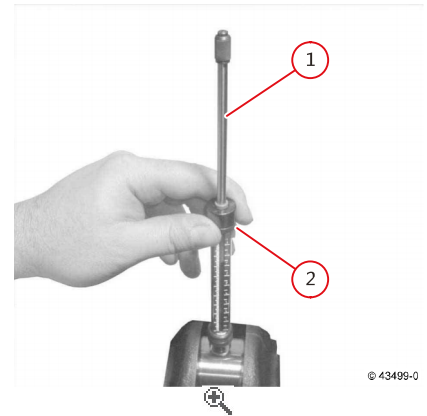
1.

- Lift (1) the probe and press the release device (2).



#### Note

The probe (1) falls downward, briefly hits the surface and goes up to the measurement value.



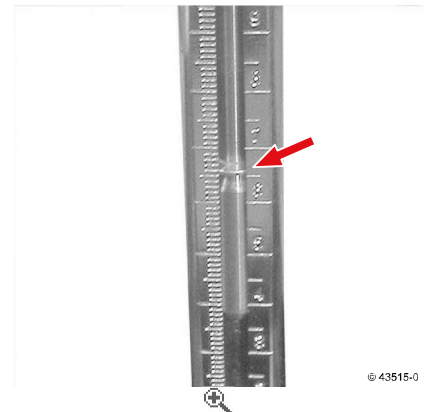
2.

- Read the value indicated (arrow) by the hardness tester.
- Nominal, minimum value: 55 HRC



#### Note

The measurement values must be converted using the tester table.



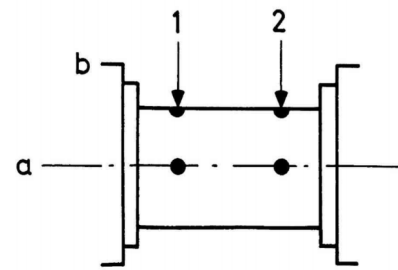
3.

### Check the diameter of the main bearing pins



**Note**

Measurement diagram of the main journals on points 1 and 2 in surfaces a and b.



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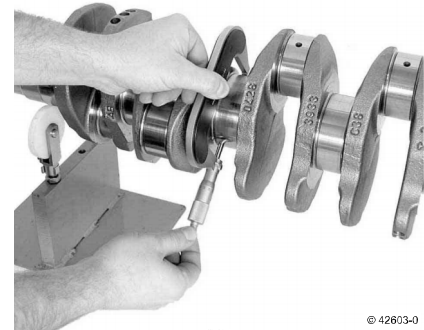


1.

- Measure the main bearing pins with the palmer.
- Nominal value:
  - Standard:  $84(+0,-0.02)$  mm
  - Degree of undersizing: 0.25 mm

**Note**

Measurement points, see diagram.



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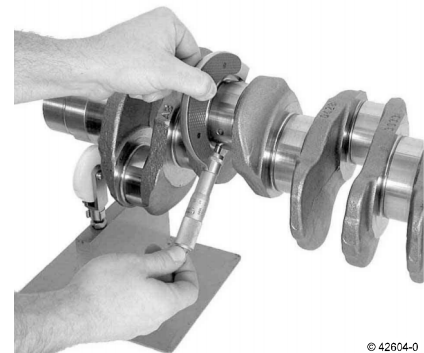
2.

**Check the diameter of the connecting rod pins**

- Measure the main journal with the palmer.
- Nominal value:
  - $69,994(+0,-0.02)$  mm
  - Degree of undersizing: 0.25 mm

**Note**

Measurement points, see diagram.



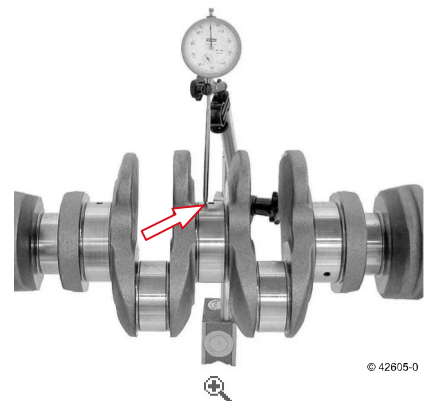
© 42604-0



1.

**Check the coaxiality**

- Rest the crankshaft on the prisms.
- Apply the magnetic stand for measurements.
- Fit the dial gauge
- Apply the preloaded probe on the main bearing pins (arrow) and adjust the dial gauge to "0".
- Uniformly turn the crankshaft and check the coaxiality.
  - Nominal value: 0.1 mm
- Remove the magnetic stand for measurements.
- Disassemble the dial gauge.



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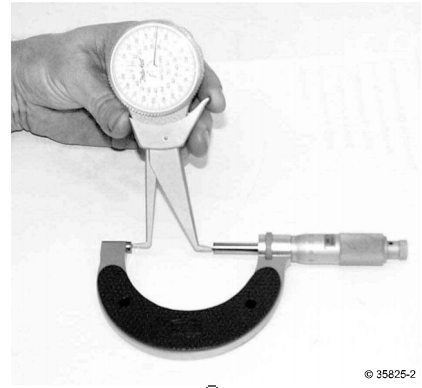


1.

**Measuring the length of the flanged bearing**

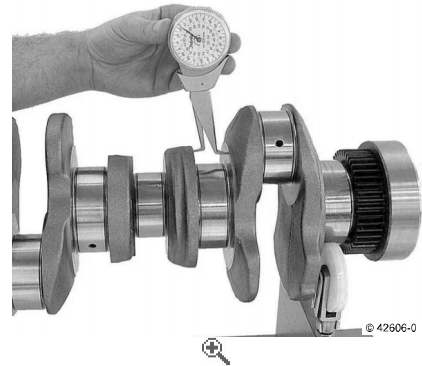
- Adjust the palmer to 32 mm.

- o Push the internal bore meter between the test surfaces of the palmer and bring to "0".



1.

- o Measure the width of the flanged bearing using the internal bore meter between the support surfaces of the thrust rings.
  - Nominal value: 32.2(+0.04,+0) mm
  - Degree of undersizing: 0.4 mm



2.

### Technical data

### Test data and settings

ID no.	Designation	Additional information	Value
P02 03	Main bearing pins, diameter	Standard	84(+0,-0.02) mm
P02 04	Main bearing pins, diameter	two degrees of undersizing, each	0.25 mm
P02 07	Main bearing pin, manoeuvre pin, surface hardness		55 HRc
P02 11	Guide bearing pin, width	Standard	32.2(+0.04,+0) mm
P02 12	Guide bearing pin, width	one degree of oversizing	0.4 mm
P02 21	Manoeuvre pins, width		32.08(+0.02,+0) mm
P02 22	Manoeuvre pin, diameter	Standard	69.994 (+0 – 0.02) mm
P02 23	Manoeuvre pin, diameter	one degree of undersizing	0.25 mm
P02 26	Crankshaft eccentricity	maximum permitted deviation	0.1 mm



## Check the endfloat of the crankshaft (L3)

Readily available commercial tools:

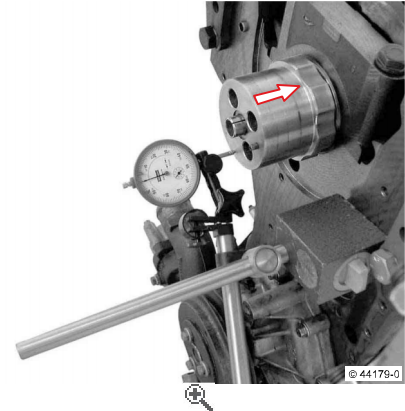
- Magnetic stand for measurements
- Palmer
- Internal bore meter

Special tools:

- Dial gauge 100400

### Check the endfloat

- Apply the magnetic stand for measurements.
- Insert the dial gauge.
- Apply the preloaded probe on the end of the crankshaft.
- Press the crankshaft towards the arrow.
- Adjust the dial gauge to "0".



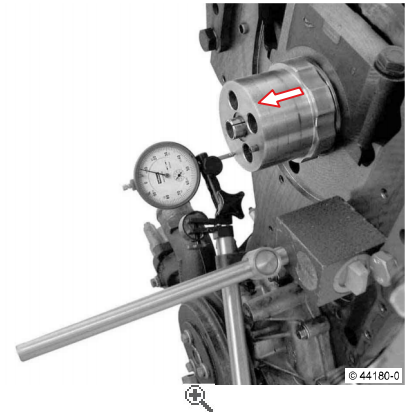
1.

- Press the crankshaft towards the arrow.
- Read the value measured.
  - Nominal value: 0.1 - 0.28 mm



#### Note

If there is a difference in the endfloat, set the permitted value by replacing the halves of the thrust ring.



2.

- Measure the wall thickness of the thrust ring halves.
  - Standard: 2.0 (+0.05, + 0) mm
  - Interference: 2.0 (+0.05, + 0) mm
- Select the thrust ring halves based on the measured value.

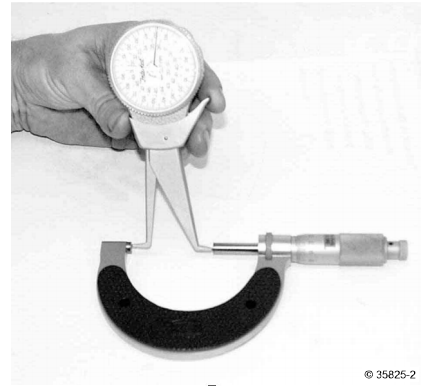


3.

- Adjust the palmer to 32 mm.
- Push the internal bore meter between the test surfaces of the palmer and bring to "0".

4.

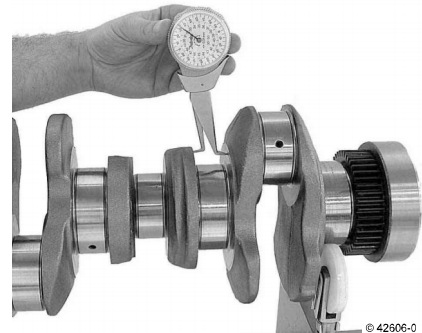
- o Measure the width of the flanged bearing.
- o Make a note of dimension (a).



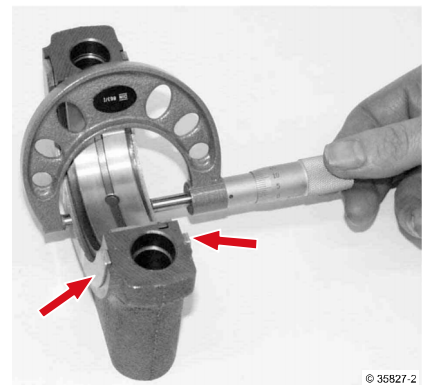
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5.

- o Apply the thrust ring halves on the flanged bearing cover (arrows).
- o Measure the width with the palmer.
- o Make a note of dimension (b).
- o Determine the endfloat.
  - Nominal value: 0.1 - 0.28 mm



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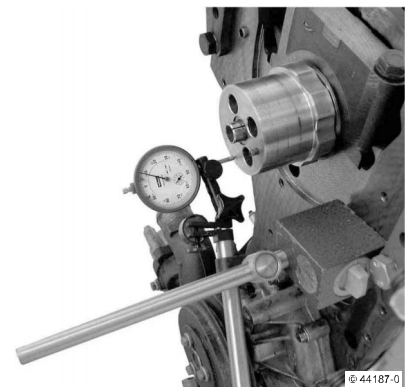
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**Calculation example:**

Target:	Endfloat
Data:	-
Measured value:	(a) = 32.8 mm
Calculation:	(b) = 32.7 mm
Dimension (a) - dimension (b)	
The results of all this are:	= 0.1 mm

6.

- o Check the crankshaft endfloat.
  - Nominal value: 0.1 - 0.28 mm
- o Remove the magnetic stand for measurements.
- o Disassemble the dial gauge.



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7.

**Test data and settings**

<b>ID no.</b>	<b>Designation</b>	<b>Additional information</b>	<b>Value</b>
P02 34	Crankshaft, permitted endfloat	From assembled	0.1 - 0.28 mm
P02 35	Shoulder, wall thickness	Standard (upper and lower half)	2.0 (+0.05,+ 0) mm
P02 36	Shoulder, wall thickness	Degree of oversizing	2.0 (+0.05,+ 0) mm

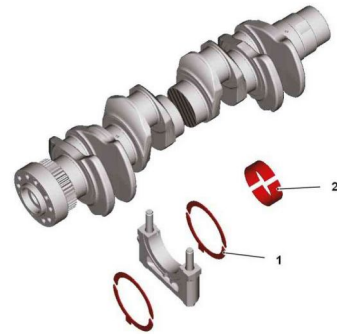
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## Fitting and removing crankshaft bearings (L3)

### Removing crankshaft bearings

1	Main bearing	Standard
2	Thrust	Standard
952	Main bearing	Degree of undersizing
953	Thrust	Degree of undersizing



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1.

- Disassemble the crankshaft bearing covers.



#### Construction unit

01

- Disassemble the crankshaft.



#### Construction unit

05

- Remove both the shims (1).
- Remove all the main bearing shells (2).



#### Note

Put the components to one side in the order in which they were removed. Note the cylinder order.

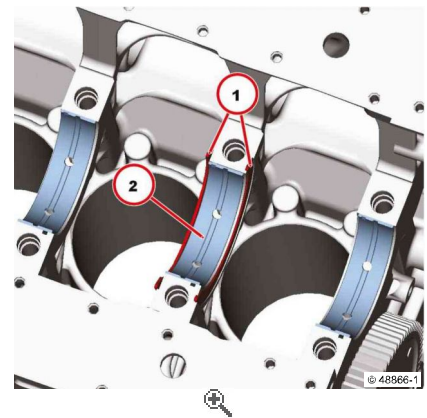
2.

- Remove all the main bearing shells (1).

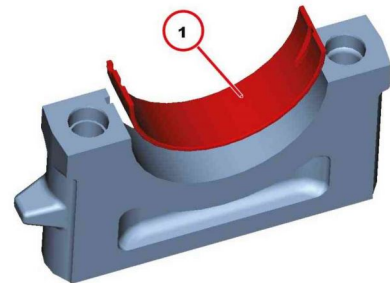


#### Note

Put the components to one side in the order in which they were removed. Note the cylinder order.



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© 48867-0

3.

### Fitting crankshaft bearings

- Insert the upper shells of the main bearings.



#### WARNING

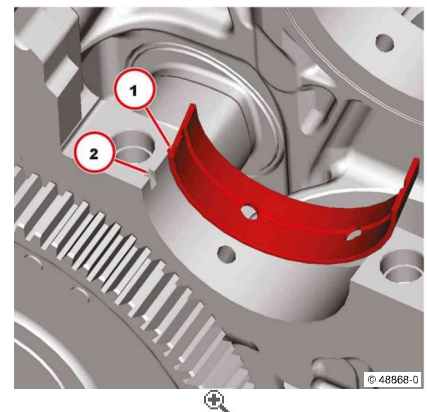
Take care to couple the bearing shells. The anti-twist safety (1) must enter the groove (2).

- Fit the crankshaft.



#### Construction unit

05



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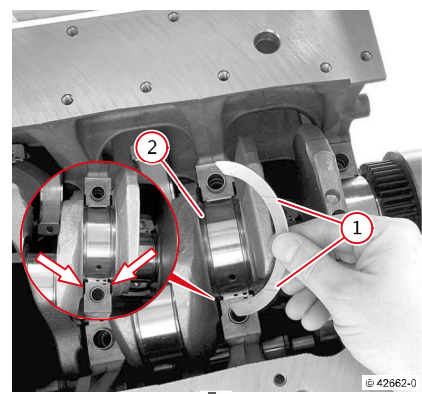
1.

- o Fit half of the shims in relation to the endfloat measured.
- o Fit half of the shims between the crankshaft and the crankcase (arrows).



**Note**

The oil grooves (1) face towards the shoulder disc (2) of the crankshaft.



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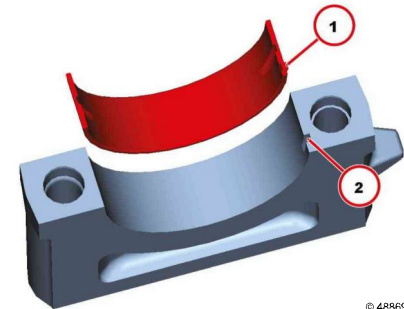
2.

- o Insert the lower shells of the main bearings in the relative main bearing covers.
- o Fit the bearing shell, with the anti-twist retainer (1) in the groove (2).



**WARNING**

Take care to couple the bearing shells.



© 48869-0

3.

- o Fix the two halves of the shims onto the flanged bearing cover with a little grease.



**Note**

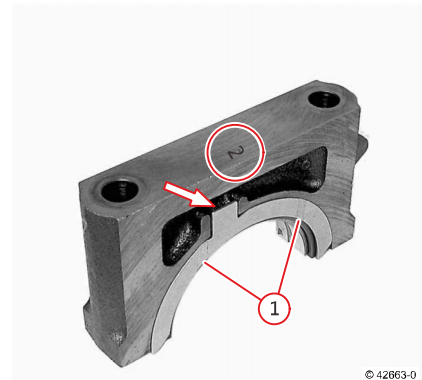
Flanged bearing cover marked with "2". Use the halves of the thrust ring with the key (arrow). The oil grooves (1) face towards the shoulder disc of the crankshaft.

- o Assemble the crankshaft bearing covers.



**Construction unit**

01



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4.





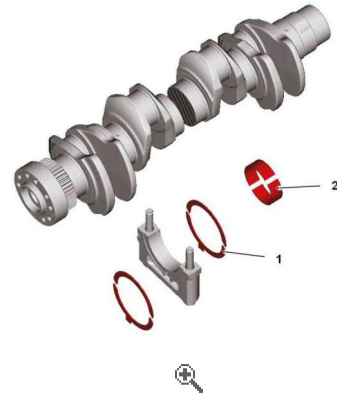
## Check the crankshaft bearings (L3)

Readily available commercial tools:

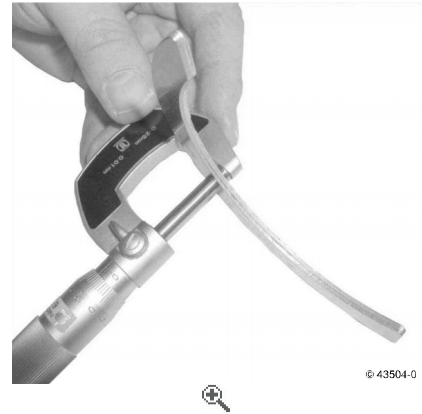
- Palmer
- Internal bore meter

## Check the crankshaft bearings

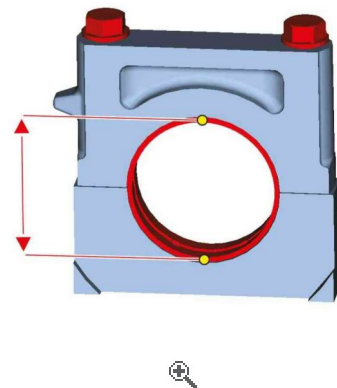
1	Main bearing	Standard
2	Thrust	Standard
952	Main bearing	Degree of undersizing
953	Thrust	Degree of undersizing



- o Measure the thickness of the shoulder wall with the palmer.
    - Standard: 2.0 (+ 0.05, + 0) mm
    - Degree of oversizing: 2.0 (+ 0.05, + 0) mm



- o Measure the diameter of the main bearing using an internal bore meter.
    - Nominal value: 84.030 (+ 0.042, + 0) mm



3.

## Technical data

### Test data and settings

ID no.	Designation	Additional information	Value
P02 31	Main bearing shells, internal diameter	Standard	84.030 (+ 0.042, + 0) mm
P02 32	Main bearing shells, internal	one degree of undersizing	0.25 mm

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