

03–320 Mounting of crankshaft

Data

Crankshaft standard dimension and repair stages	Crankshaft bearing journal dia.	Width of journal at fitted bearing	Crankpin dia.	Width of pins
Standard dimension	$\frac{63.96}{63.95}$	$\frac{27.00}{27.02}$	$\frac{51.96}{51.95}$	$\frac{50.00}{50.12}$
1st repair stage	$\frac{63.71}{63.70}$	up to 27.50	$\frac{51.71}{51.70}$	up to 50.30
2nd repair stage	$\frac{63.46}{63.45}$		$\frac{51.46}{51.45}$	
3rd repair stage	$\frac{63.21}{63.20}$		$\frac{51.21}{51.20}$	
4th repair stage	$\frac{62.96}{62.95}$		$\frac{50.96}{50.95}$	

Basic bore and bearing play	Crankshaft bearing	Connecting rod bearing	
Basic bore dia.	$\frac{68.50}{68.52}$	$\frac{55.60}{55.62}$	
Permissible out-of-round and conicity of basic bore	0.01	0.01	
Seat width for fitted bearing shell	$\frac{22.379}{22.400}$		
Bearing play, radial	when new	$0.03-0.07^{1)}$	$0.03-0.06^{1)}$
	wear limit	0.09	0.08
Bearing play, axial	when new	0.10–0.24	0.22–0.38
	wear limit	0.30	0.50

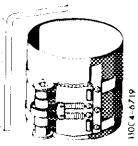
¹⁾ For radial play, try for mean value.

Bearing shells	Wall thickness crankshaft bearing	Width of fitted bearing shells	Wall thickness connecting rod bearing
Standard dimension	2.25	26.80–26.90	1.81
1st repair stage	2.37	27.40–27.60 ¹⁾	1.94
2nd repair stage	2.50		2.06
3rd repair stage	2.62		2.18
4th repair stage	2.75		2.31

¹⁾ The fitted bearing shells for 1st to 4th repair stage are supplied at oversize width and must be finished to fit ground crankshaft bearing journal.

Tightening torques		Nm
Crankshaft bearing bolts	M 10	65
	M 12	80
Connecting rod nuts	initial torque	40–50
	angle of rotation torque	90–100°
Screw on crankshaft front		270–330
Necked-down screws for flywheel or driven plates	initial torque	30–40
	angle of rotation torque	90–100°

Special tools

Clamping strap for piston rings		000 589 04 14 00
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Dial gauge holder for measuring end play		363 589 02 21 00
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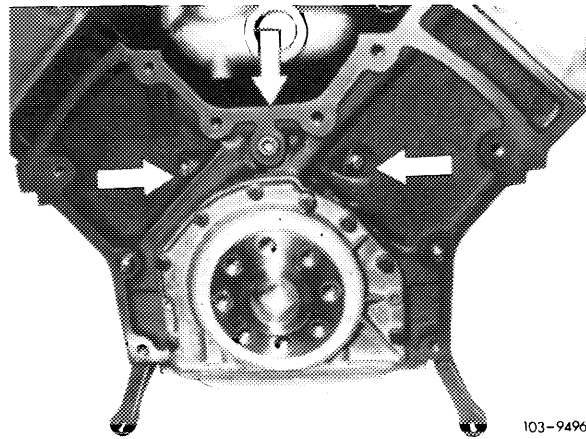
Note

Mount crankshaft with engine removed and disassembled.

Following a bearing defect, remove connecting rods and also remove any chips and the like from connecting rod bores.

Carefully clean oil ducts in cylinder crankcase, crankshaft, timing housing cover, oil filter housing, end cover, oil pump etc.

Check crankshaft for cracks, dimensional accuracy and hardness (03–318).



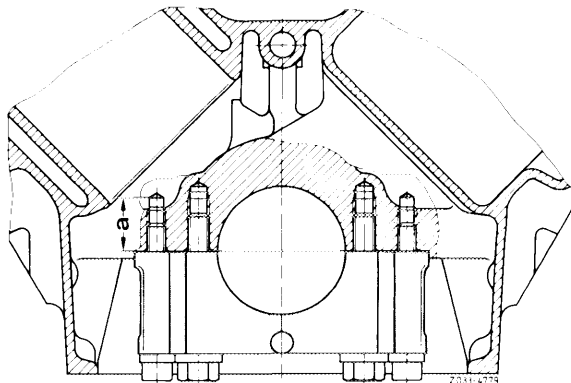
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Association of crankshaft bearings, installation of crankshaft

1 Measure depth "a" of threads in crankcase. Use appropriate hex. socket screws.

Hex. socket screws M 10 x 80 with threads 34 mm deep.

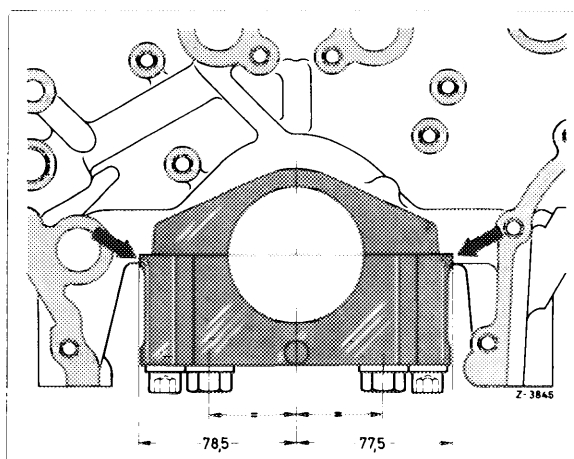
Hex. socket screws M 10 x 75 with threads 29 mm deep.



2 Install crankshaft bearing cap. Pay attention to identification, 1 is at front.

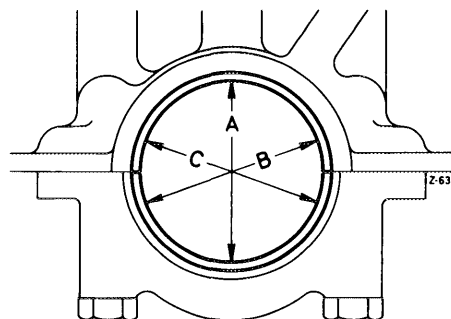
Note: The fitting point is offset from center by 0.5 mm.

Tighten screws to specified torque.



3 Measure basic bore in direction A, B and C along two planes (conicity). Note measured values.

If basic bore exceeds specified value or if bore is conical, touch up bearing cap contact surface on a face plate up to max. 0.02 mm.

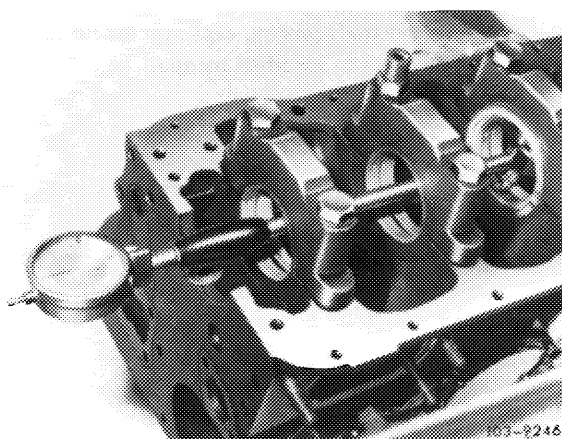


4 Mount crankshaft bearing shells and bearing cap. Tighten bolts to specified torque.

5 Measure bearing dia. and note measured values.

6 Measure crankpins, determine radial crankshaft bearing plate.

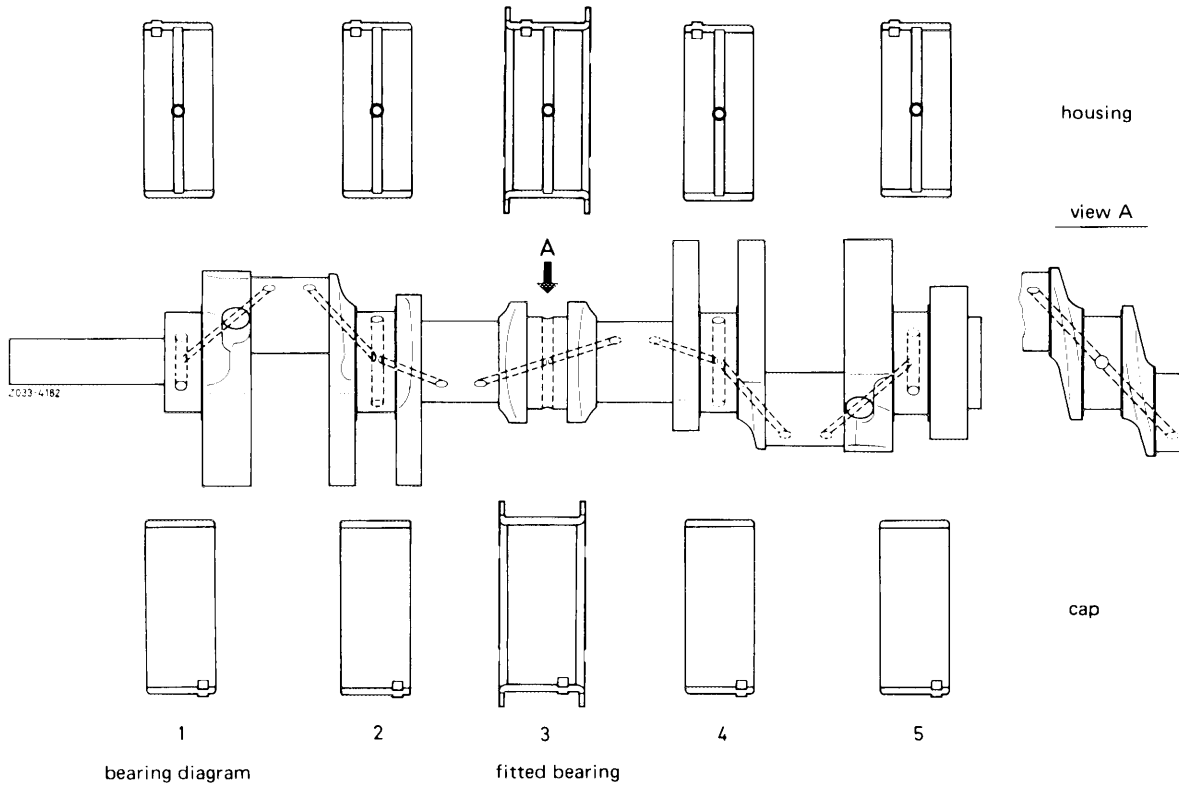
Note: The bearing play can be corrected by exchanging bearing shells, while trying for mean value of specified bearing play. Crankshaft bearing shells without color code are thicker than those with blue color code, while taking into consideration that the wall thicknesses without and with color code may overlap.



7 Measure width of fitted bearing journal and fitted bearing, determine axial crankshaft bearing play.

The fitted bearing shells of the repair stages are supplied at oversize.

Machine both fitted bearing shells together on both sides to width of fitted bearing journal minus end play.

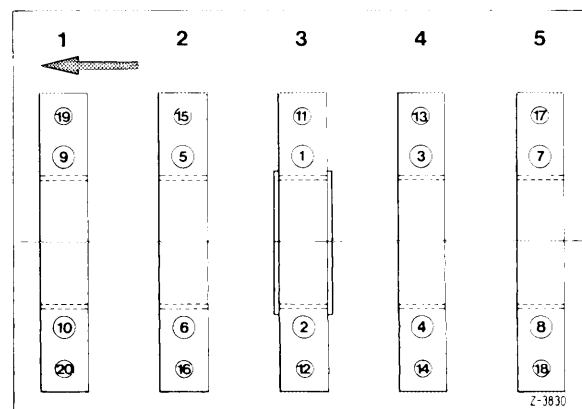


8 Provide bearing shells with crankshaft with engine oil SAE 30 and insert crankshaft.

Attention!

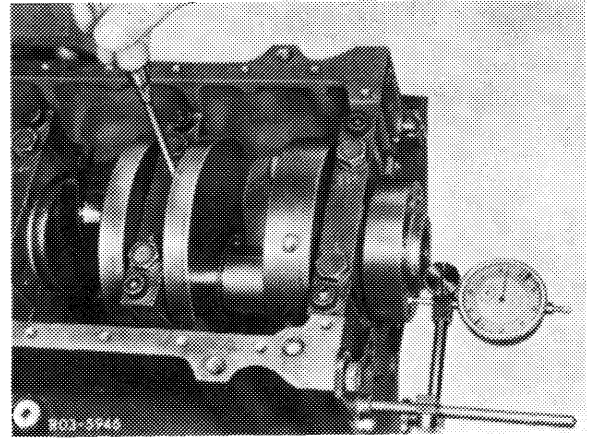
Do not use bearing shells without oil bore in cylinder crankcase, but in cover only.

9 Tighten crankshaft bearing caps in sequence of tightening diagram to specified torque.



10 Measure axial crankshaft bearing play.

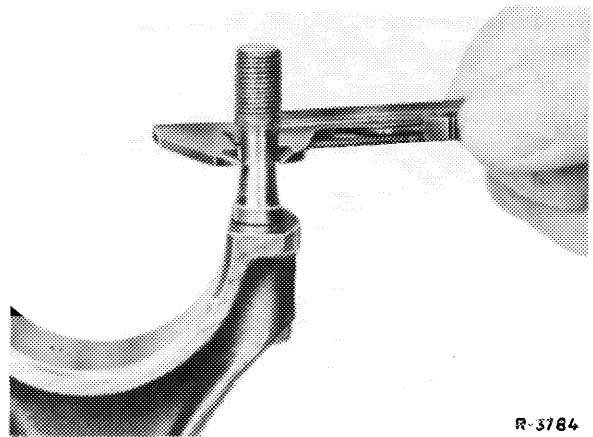
11 Rotate crankshaft manually and check for unobstructed rotation.



Association of connecting rod bearing and installation of connecting rod

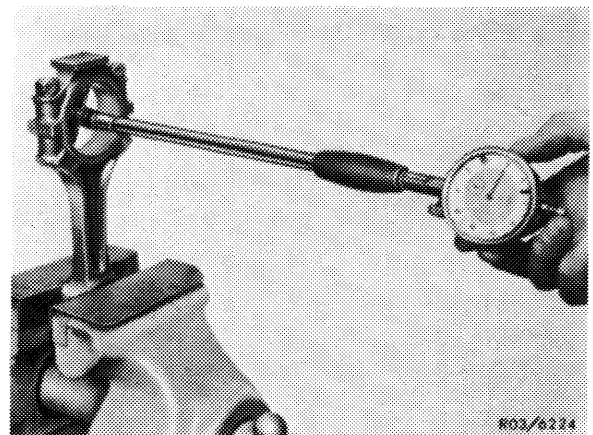
12 Check connecting rod bolts (03-310).

13 Recondition connecting rod and square (03-313).



14 Mount connecting rod bearing cap, pay attention to identification. Tighten connecting rod nuts to 40–50 Nm.

15 Measure basic bore in two directions. If a basic bore exceeds the specified value or is conical, touch up bearing cap contact surface on a face plate up to max. 0.02 mm.

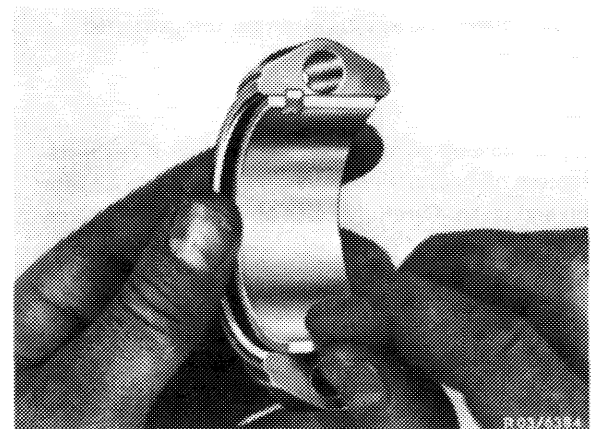


16 Insert connecting rod bearing shells, assemble connecting rod bearing cap and bearing shells and tighten connecting rod nuts to 40–50 Nm.

17 Measure bearing dia. and note.

18 Measure connecting rod bearing journals. Determine connecting rod bearing radial play.

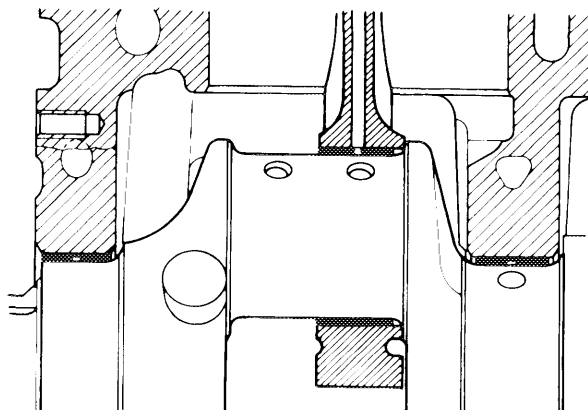
Note: The bearing play can be corrected by exchanging bearing shells, while trying for mean value of specified bearing play. Crankshaft bearing shells without color code are thicker than those with blue color code, while taking into consideration that the wall thicknesses without and with color code may overlap.



19 Mount piston and connecting rod (03–316).

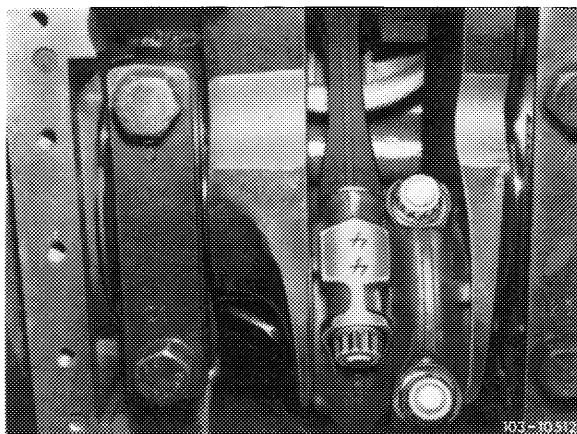
Attention!

Connecting rods are unsymmetrical.

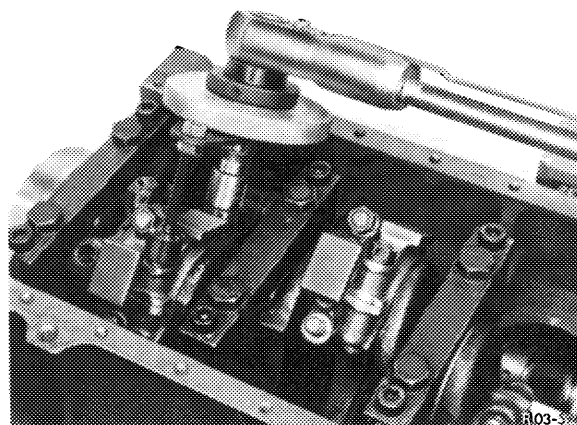


20 Provide bearing shells, crankshaft, piston and cylinder with engine oil SAE 30. Install connecting rod with piston (03–316).

Pay attention to identification!



21 Tighten connecting rod nuts to 40–50 Nm initial torque and 90–100° angle of rotation torque.

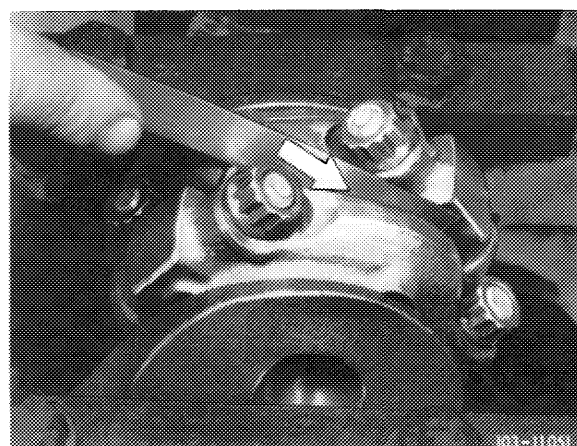


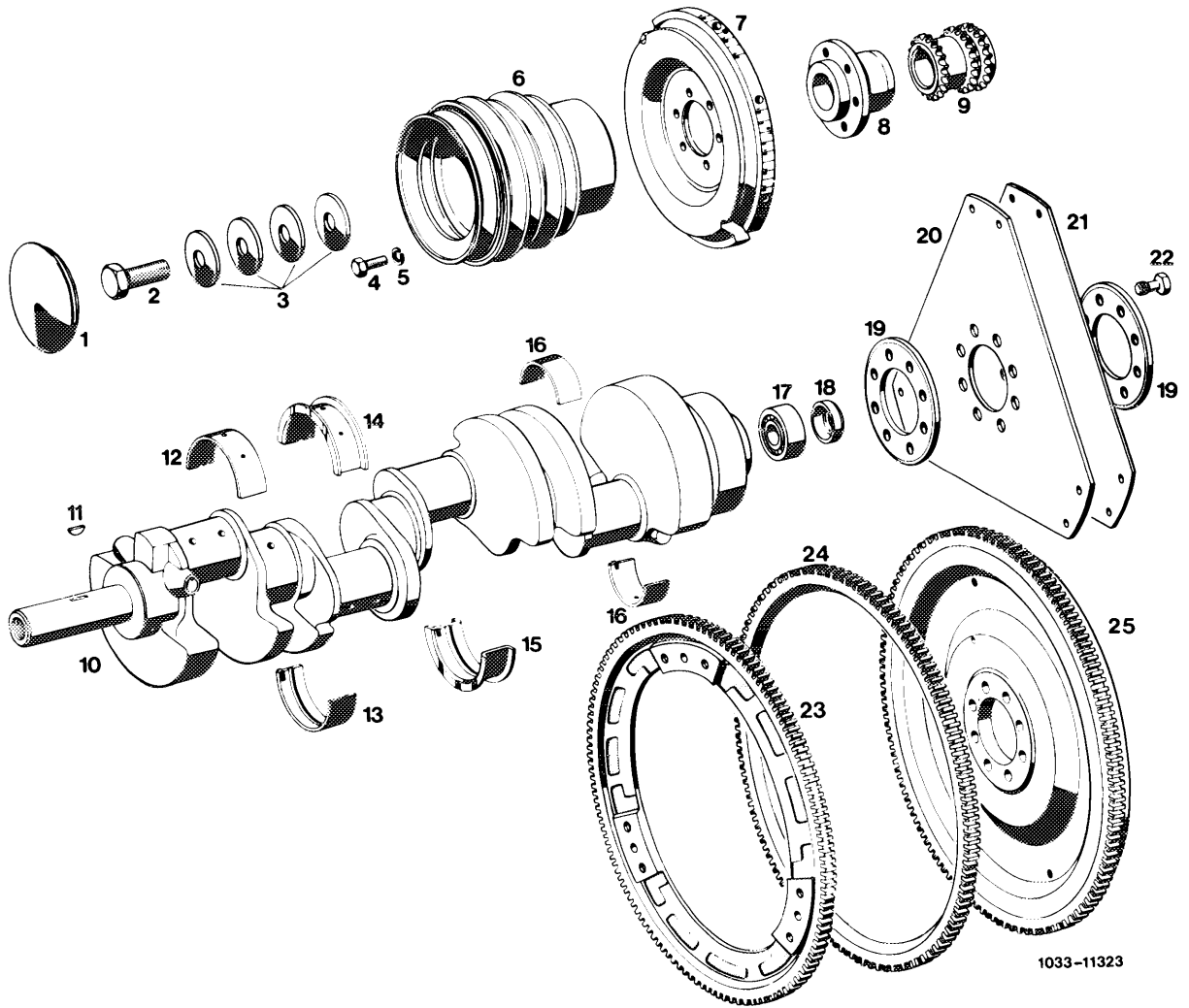
22 Measure connecting rod bearing play axially. Check connecting rod in piston for unobstructed operation.

Attention!

Disassemble oil pump, clean and replace, if required. Replace oil pressure relief valve. Disassemble oil filter top and clean. Carefully clean air-oil cooler. Unscrew oil overflow valve for oil filter element and oil filter bypass valve and clean. Disassemble oil damper and clean.

Install initial operation oil filter element. Change engine oil and oil filter element after 1000–1500 km.





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|----|--|----|---|
| 1 | Cap for pulley
(no longer installed starting November 1979) | 14 | Fitted bearing shell crankcase |
| 2 | Screw M 18 x 1.5 x 45 | 15 | Fitted bearing shell bearing cap |
| 3 | Disc springs (4 each) | 16 | Connecting rod bearing shell (16 each) |
| 4 | Screw M 8 x 22 (6 each) | 17 | Ball bearing 6202 DIN 625 (manual transmission) |
| 5 | Snap ring A 8 (6 each) | 18 | Closing ring (manual transmission) |
| 6 | Pulley | 19 | Spacing washers |
| 7 | Vibration damper | 20 | Driven plate 1.5 mm thick |
| 8 | Hub | 21 | Driven plate 1 mm thick |
| 9 | Crankshaft sprocket | 22 | Necked-down screw for flywheel
or driven plates (8 each) |
| 10 | Crankshaft | 23 | Ring gear (automatic transmission) |
| 11 | Woodruff key | 24 | Ring gear (manual transmission) |
| 12 | Crankshaft bearing shell crankcase (4 each) | 25 | Flywheel with ring gear |
| 13 | Crankshaft bearing shell bearing cap (4 each) | | |