

# Special Tools

Job No.

100 — 0

The following list of special tools and equipment (with BE-Nos.) is intended as a survey to facilitate selection.

All tools marked with an asterisk appear in more than one group and are used for repair procedures described under various Job Nos.

All special tools can be ordered from our works; when ordering please state Order Nos.

## Test Runs — Group 00

Designation	Order No.
Tool kit for test runs	000 589 07 23
Electrical distant-reading thermometer for measuring oil temperature	000 589 21 27
Stop watch	—
Fuel-mileage tester	—

## Engine — Groups 01 — 24

Designation	Order No.
Spark plug toggle wrench	186 581 03 36
Spark plug cleaner	or 000 581 00 67
Spark plug adjusting gage, range 0.7 — 1.0 mm	000 589 01 68
or range 0.3 — 1.1 mm	000 589 03 23
Compression recorder for gasoline engines	000 589 09 23
Revolution counter and closure angle meter	000 589 18 21
Flash stroboscope	000 589 12 21
Electrical test light 6 — 12 volts	000 589 48 21
Mechanic's tool set, 20 pieces	000 589 02 27
Ratchet set $\frac{3}{8}$ " (for mechanic's tool set 2107)	000 589 21 07
Ratchet $\frac{1}{2}$ " approx. 250 mm long	000 589 53 09
1 set socket wrench sockets SW 10, 14, 17, 19, 22, 24, 32 mm ( $\frac{1}{2}$ " square)	000 589 18 09
Socket wrench socket SW 21 mm for spark plugs	000 589 63 09
1 tool set $\frac{1}{4}$ " for carburetor, radio, electric equipment etc.	000 589 08 23
Oiler for filling carburetor oil shock absorber	—
Measuring tube 10 cc for measuring carburetor injection amount	000 589 31 21
Measuring tube 100 cc for measuring compression chamber	—
Adapter for car jack for raising and lowering the front of the car at the sub-frame	BE 10 986 a
Lifting rig for raising and lowering the front and rear part of the car	BE 10 989
Adapter for stands (proper support at chassis base panel)	BE 10 994
Tail wheel for holding and transporting the engine together with transmission and sub-frame	BE 10 990 a
Bridge for engine at the front for removal and installation of the sub-frame	BE 10 988
Holding support for transmission or engine at the rear (to be made by repair shop) (see sketch on Page 33 — 1.2)	—
Special valve-adjusting combination wrench SW 14 mm (long)	187 589 01 09
	or 000 589 11 07

Designation	Order No.
Special valve-adjusting combination wrench SW 14 (short)	000 589 64 09
Valve gage holder (double)	136 589 00 23
1 set tolerance feeler bands 15 mm wide, 1/2 meter each, in the following thicknesses: 0.04, 0.05, 0.10, 0.12, 0.15, 0.18, and 0.20 mm	000 581 00 30
Valve lifter consisting of supporting bar, valve lifter and 2 inserts	186 589 02 31
Mounting bridge for removal and installation of valves	121 589 01 63
Cylindrical brush for cleaning valve guides (16 mm $\phi$ )	000 583 04 38
Testing plug gage 9.0 — 9.015 mm $\phi$ for inlet valve guides	636 589 00 21
Testing plug gage 10.0 mm — 10.015 mm $\phi$ for exhaust valve guides	187 589 01 21
Hand honing tool with nut and setting wrench	000 589 01 67
Adapter No. 7 for hand honing tool with collet	000 589 03 31
Honing shaft 9 mm $\phi$ for hand honing tool for inlet valve guide	000 589 04 67
Honing shaft 10 mm $\phi$ for hand honing tool for exhaust valve guide	000 589 05 67
Drift for knocking out the valve guides	136 589 00 39
Forcing sleeve for valve guides	187 589 10 39
Internal micrometer for 10—18 mm $\phi$ (for measuring the base bores for the valve guides in the cylinder head)	000 589 01 19
Tester for valve seats, consisting of:	
Dial gage holder	187 589 04 21
Testing sleeve for inlet valve seats	187 589 02 21
Testing plug for inlet valve seats	187 589 05 21
Testing sleeve for exhaust valve seats	187 589 03 21
Testing plug for exhaust valve seats	187 589 06 21
Dial gage, 10 mm travel, 1/100 mm reading accuracy, (10 mm travel is required for measuring the valve timing)	000 589 14 21
Set of tools for milling the valve seats, consisting of:	
Cutting arbor 9 mm $\phi$ for milling inlet valve seats	636 589 06 31
Cutting arbor 10 mm $\phi$ for milling exhaust valve seats	187 589 02 31
Handle for cutting arbor	187 589 06 31
Valve seat milling cutter for inlet valve seats	187 589 01 51
Valve seat milling cutter for exhaust valve seats	187 589 04 51
Portable milling cutter for inlet valve seats	121 589 00 51
Portable milling cutter for exhaust valve seats	121 589 01 51
Valve seat grinder	000 589 00 67
Valve seat turning tool (Hunger)	000 589 00 69
Valve seat ring turning tool (Hunger)	000 589 01 69
	or 000 589 02 69
Internal micrometer for valve seat ring recess in cylinder head	000 589 10 21
Valve tester	136 589 02 21
Valve and clutch spring test gage	000 589 00 65
Dial gage holder for valve timing	198 589 01 21
	or 121 589 00 21
Graduated disk mounted on camshaft for valve timing	180 589 07 23
Lever for bleeding the chain tightener	187 589 02 63
Torque wrench 0 — 6 mkg (1/2" square) (for tightening the nuts of the connecting rod cap bolts and the stretch screws of the rocker arm blocks)	000 589 27 21
Torque wrench 0 — 13 mkg (1/2" square) (for tightening the cylinder head screws, the hexagon screws for the crankshaft bearing caps, etc.)	000 589 22 21
Flexible torque wrench 0 — 12 mkg (1/2" square)	000 589 24 21
Socket screw wrench for hexagon sockets SW 5 mm, 275 mm long for oil pan and cylinder cover	187 589 02 07
Socket screw wrench for hexagon sockets SW 6 mm, 425 mm long for cylinder head and oil pan	187 589 03 07
Socket screw wrench for hexagon sockets SW 8 mm, 300 mm long for oil passage plug	187 589 04 07
Socket screw wrench for hexagon sockets SW 10 mm, 375 mm long for cylinder head	187 589 05 07
Socket screw wrench socket 1/4" square for torque wrench for hexagon socket SW 10 mm, 140 mm long, for cylinder head	000 589 05 07

Designation	Order No.
Puller for chain guide pivot pin	187 589 07 33
Puller for camshaft sprocket	187 589 01 33
Gage for checking the alignment of sprockets	187 589 02 23
Puller for idling gear	187 589 02 35
Tool for the removal and installation of idling gear shaft and for the installation of the idling gear	187 589 07 61
Puller for the rear bearing bushing of the idling gear / distributor drive	186 589 09 33
Dismantling tool for opening endless chains	000 589 03 25
Fuel feed pump tester	000 589 30 21
Puller for the water pump seal retainer	136 589 33 33
Forcing sleeve and arbor for the impeller and the water pump shaft	187 589 01 35
Fitting sleeve for the water pump seal	187 589 07 39
Fitting sleeve for the water pump annular grooved bearing	187 589 04 39
Fitting sleeve for forcing on the water pump retainer ring	187 589 08 39
Fitting sleeve for the water pump seal retainer	180 589 09 39
Fitting sleeve for the water pump spacer ring and ventilator hub	187 589 09 39
Puller for the counterweight of the crankshaft and the pulley of the water pump	000 589 17 33
Bell-shaped puller for the crankshaft sprocket	187 589 00 33
Puller for the bearing cover and for the ball bearing of the crankshaft (flywheel side)	136 589 07 33
Arbor fixture for balancing the flywheel	180 589 00 27
Static balancer for balancing the flywheel	000 589 15 21
Cylinder inspection lamp	000 583 11 19
Internal micrometer for 50—100 mm $\phi$ (for cylinder bores, crankshaft and connecting rod bearings, etc.)	000 589 04 19
Internal micrometer for 35—60 mm $\phi$ (for camshaft bearing bore)	000 589 03 19
Internal micrometer for 18—35 mm $\phi$ (for piston pin bushing bore)	000 589 02 19
Micrometer for 0—25 mm $\phi$ for measuring washers etc.	000 589 06 19
Micrometer for 25—50 mm $\phi$ for camshaft bearing surfaces	000 589 07 19
Micrometer for 50—75 mm $\phi$ for crankshaft bearing surfaces	000 589 08 19
Micrometer for 75—100 mm $\phi$ for pistons etc.	000 589 09 19
Piston ring clamp 80—85 mm $\phi$	121 589 00 61
Piston ring pliers 50—100 mm $\phi$	000 589 00 37
Feeler gage 0.03—1.0 mm	000 581 01 30
Depth gage 160 mm long	—
Spring scale for measuring the spring tension of the rotor arm of the distributor (Kontactor GK size 6, 100—1000 g)	000 589 73 21
Scleroscope (harness tester)	000 589 20 21
Connecting rod alignment gage	—

### Clutch — Group 25

Designation	Order No.
Special wrench SW 17 mm, extra long, for the screws fixing the clutch housing to the engine	000 589 05 03
3 hold-down clamps with chain for removal and installation of the clutch	136 589 23 61
Centering arbor for the clutch disk	136 589 00 61
Puller with dismantling sleeve for the throw-out bearing	136 589 25 33
Tester for valve and clutch springs	000 589 00 65 *
Depth gage 160 mm long	—
Dial gage, 10 mm travel, $\frac{1}{100}$ mm reading accuracy	000 589 14 21 *
Dial gage holder	—