BREAKING-IN AND ACCEPTANCE STANDARDS

Breaking-in and Testing Engines

52 EN

General

The life and performance of an engine depends greatly on the treatment it receives during the first few hours of operation. New or reconditioned engines should therefore be treated with great care during the break-in period.

The following basic rules should be observed

1. The engine should be broken-in under its own power.
2. Let the engine warm up slowly.
3. Increase speed slowly.
4. Run the engine at high speed only as long as is necessary to check for oil leaks, oil pressure, proper blower operation, and to measure the power output.
5. Use only high quality no-additive oil.
   Summer: SAE 30
   Winter: SAE 20

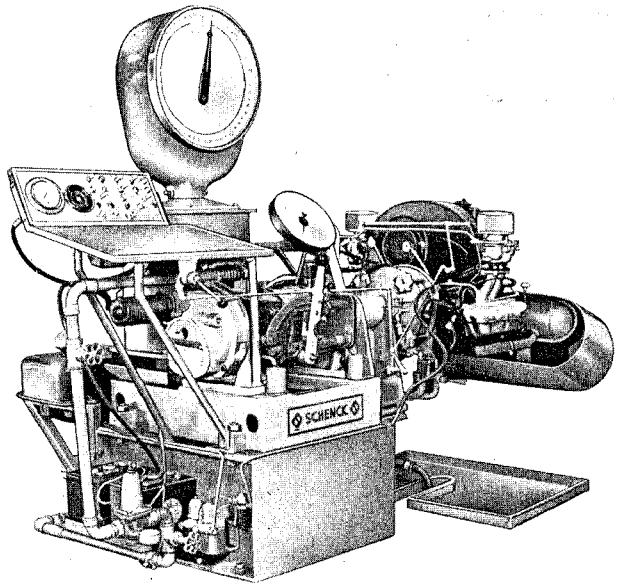


Fig. 248

Note:

After break-in or when changing the oil the first time at 500 km (300 mi.) the no-additive engine oil should be replaced with high quality approved HD-oil. At this time the by-pass oil filter element should be replaced. Thereafter the oil should be changed as specified in the lubrication chart.

Rebuilt Engines

53 EN

Rebuilt engines are considered to be those which have (among other parts) new pistons, cylinders, and bearings.

Preliminary inspection

1. Adjust valve clearance (31 EN).
2. Adjust contact-breaker points and ignition timing.
3. Check V-belt tension (8 EN).
4. Fill engine to dip stick full mark with high quality oil (approx. 5 l or 5.4 qts.).
5. Check compression.

   This test is best carried out with a spark plug compression gauge or a recording compression gauge. The throttle valve should be wide open. Remove all spark plugs and crank the engine with the starter.

   The variation in pressure readings for all four cylinders should not exceed 1.2 kg/cm² (17 psi).

6. Check oil pressure.

Starting

Crank the engine several times with the ignition switched off before starting. In the case of engines that have been stored for some time it is advisable to oil the cylinders through the spark plug holes or to introduce oil through the intake while starting.

When the engine has started, the green oil-pressure warning lamp must go out immediately as the engine increases speed. If the lamp does not go out no oil is being pumped to the bearing surfaces.

The red generator warning lamp must also go out as engine speed increases.

54 EN

Testing during Break-in

Breaking-in

The time required for breaking-in the engine on the test stand should normally not exceed 60 minutes.
This should be allocated as follows:

(kg values given for standard Schenk dynamometer are not mkg torque.)

20 minutes at 1500 rpm 2 to 4 kg
11 to 22 ft. lb.
20 minutes at 2000 to 2500 rpm 4 to 6 kg
22 to 33 ft. lb.
20 minutes at 3000 to 3500 rpm 6 to 8 kg
33 to 44 ft. lb.

A. Fuel System

After the engine has been started, check for fuel leaks at the fuel pump, fuel lines, or carburetors. Check fuel pump pressure and adjust idling speeds.

B. Fuel Consumption and bhp tests at Full Load

When the engine has been run for 30 minutes, full load may applied only for short periods.
The following guiding values should be obtained:

Engine Type	RPM	Time for Consumption of 50 cc fuel (sec)	bhp DIN
1600	3500	11—12	48
1600 S	4000	10—12	58

In order to keep an accurate check on the engine temperature while these tests are being carried out, it is essential that an accurately calibrated remote reading oil thermometer be used.

C. Generator, Regulator, and Blower

Check the generator for smooth quiet running, and that the regulator functions properly. The blower impeller must under no circumstances drag against the blower casing. The engine requieres several hours of operation under gradually increased loads and speed on the test stand for proper break-in.

Final Inspection

55 EN

A. Oil Leaks

After load and fuel consumption test inspect engine for oil leaks at the push rod tubes, oil pump, oil cooler, crankcase joint, and rocker box cover.

B. Oil Change

When the tests have been completed it is advisable to drain the oil, clean the oil strainer, and refill to full mark with a high quality no-additive oil.
HD oil should not be employed until the oil change at 500 km (300 mi). After this change follow the lubrication schedule on the lubrication chart.

C. Pre-installation Inspection

Before installing the engine, insure that the ignition, valve clearance, V-belt tension, and oil level are correct. Air filters should have new elements.

D. Storing Engines

Engines which will not be installed for some time after break-in tests should be protected against corrosion by injecting preservative oil into the carburetor air intakes during the last few revolutions before the engine stops. The exterior of the engine should also be sprayed with preservative.

Testing Partly Rebuilt Engines

56 EN

If an engine has been only partly rebuilt (i.e. new valves installed and seated), the full power tests should not be carried out until the engine has been run for at least 30 minutes on the test stand. If the crankshaft, bearings, pistons and cylinders have not been renewed, it is not absolutely necessary that the oil be changed after break-in is completed.

The following procedure should be carried out when testing partly rebuilt engines:

1. Preliminary inspection.
2. Check fuel system.
3. Fuel consumption and bhp tests at full load.
4. Check for oil leaks.
5. Pre-installation inspection.

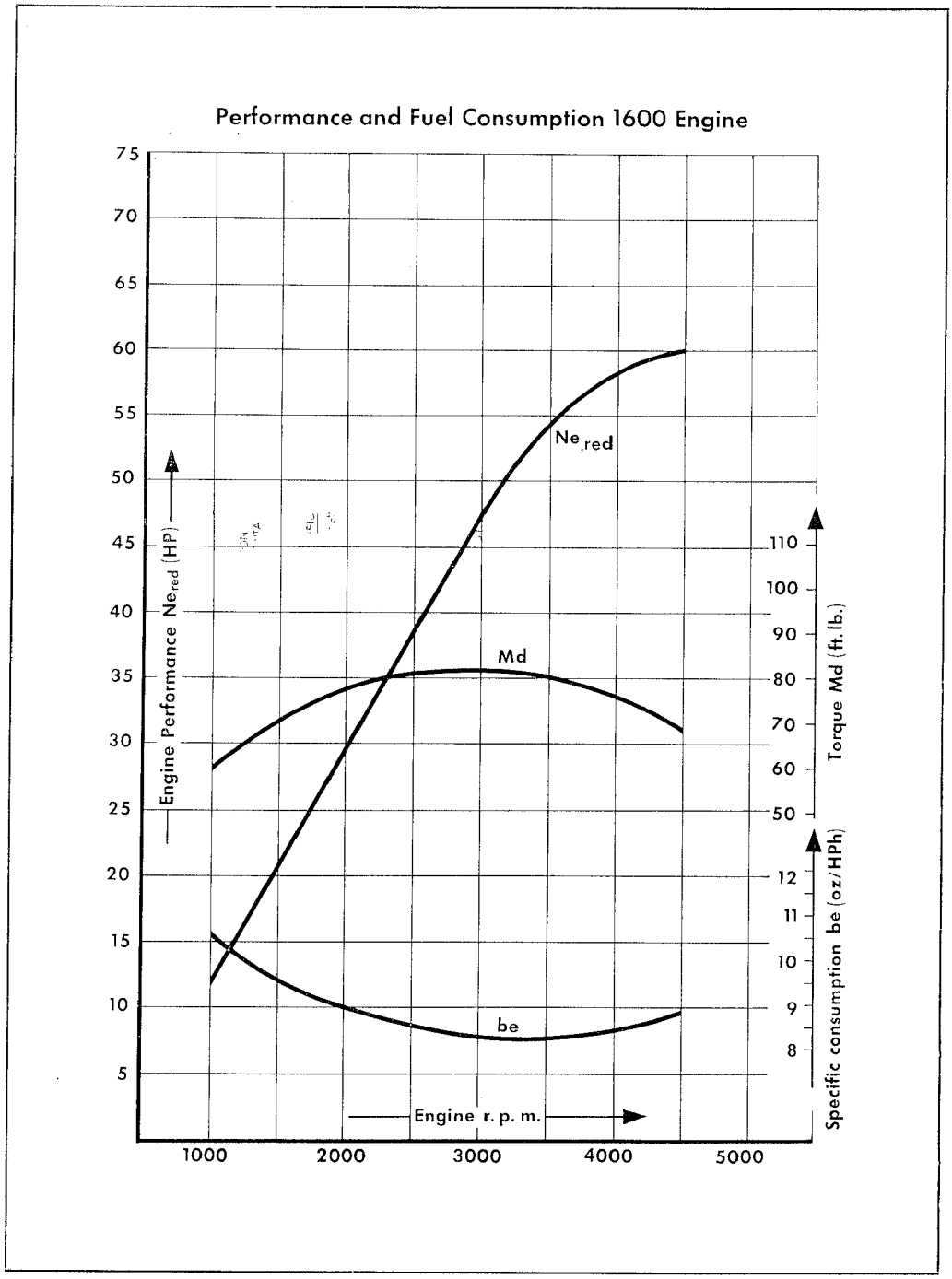
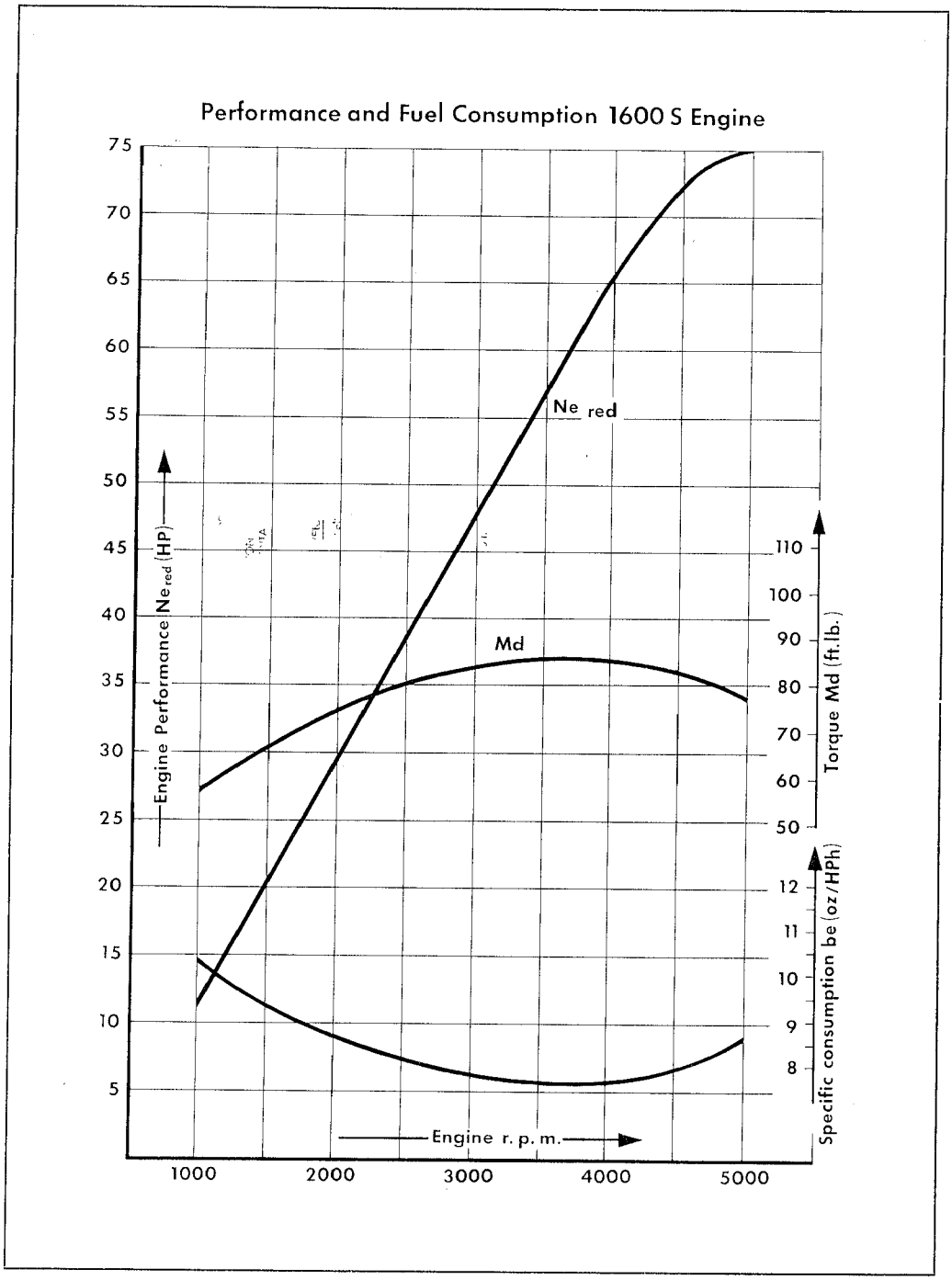

Performance and Fuel Consumption 1600 Engine
75
70
65
60
55
50
45
40
35
30
25
20
15
10
5
Engine Performance Ne red (HP)
Ne red
Md
be
110
100
90
80
70
60
50
Torque Md (ft. lb.)
12
11
10
9
8
Specific consumption be (oz/HPh)
Engine r. p. m.
1000
2000
3000
4000
5000

Fig. 249


Performance and Fuel Consumption 1600 S Engine
Engine Performance Nered (HP)
Torque Md (ft.lb.)
Specific consumption be (oz/HPh)
Ne red
Md
Engine r. p. m.
75
70
65
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55
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45
40
35
30
25
20
15
10
5
110
100
90
80
70
60
50
12
11
10
9
8
1000
2000
3000
4000
5000

Fig. 250

CLUTCH

Description

General

A single plate dry clütch is mounted on the flywheel between the engine and gearbox. The spring cushioned double faced clutch plate slides on the splined gearbox main shaft. The clutch assembly consisting of a disc spring, clutch housing, and pressure plate is bolted to the flywheel. When the clutch is engaged the spring cushioned clutch plate is pressed against the flywheel by the disc spring which presses on the pressure plate. When the clutch plate is held firmly between the flywheel and pressure plate power can be transmitted to the gear box.

The cross shaft and clutch release bearing are mounted in the transmission housing. The clutch release bearing which requires no maintenance slides on a sleeve surrounding the gearbox main shaft.

Operation

The clutch is released by the force transmitted through the clutch pedal, cable, cross shaft, and release bearing. The clutch release bearing pushes against the 18 fingers of the disc spring thereby flattening the disc spring and releasing the pressure from the pressure plate lifting it from the clutch plate. This motion interrupts the power train from the engine to the gearbox.

Maintenance

The only maintenance the clutch requires is adjustment of free travel of the clutch pedal which should always be adjusted to 20 to 25 mm (¾ to 1 in.) as the clutch linings become thinner through wear. The clutch itself requires adjustment only if it has been repaired. This is accomplished with the engine removed from the car and the clutch mounted on the flywheel or preferably using the VW 254 clutch testing and adjusting device.

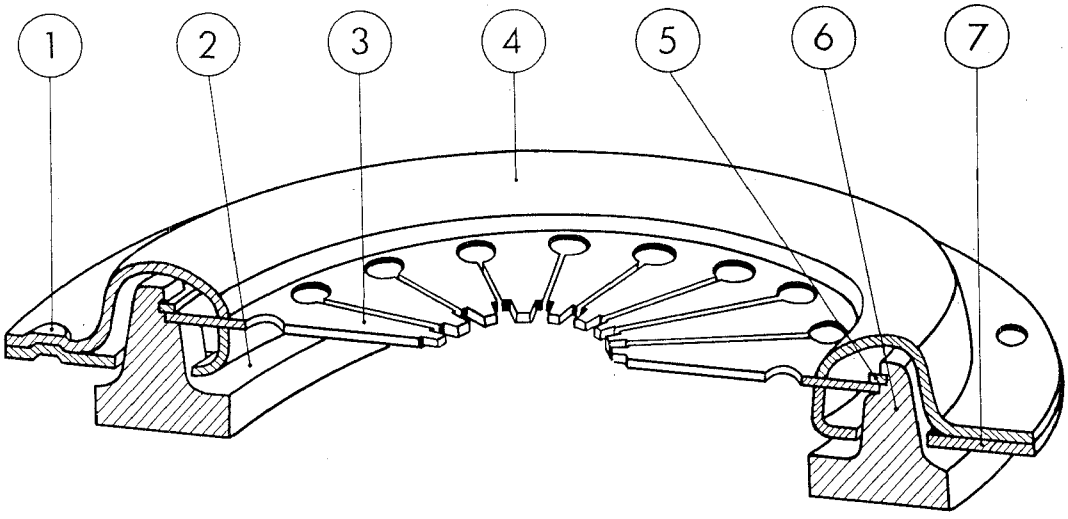


Fig. 251

① Index dent
② Pressure plate
③ Disc spring
④ Clutch cover
⑤ Lock ring
⑥ Spring carrier
⑦ Counter plate

57 EN

Removing and Installing Clutch

Special Tools: VW 219 Stub shaft for centering clutch plate

Removal

1. Remove engine (1 EN).

2. Loosen six clutch mounting screws several turns at a time until the spring pressure is released, thereby protecting the clutch cover and spring from uneven stresses and possible damage.

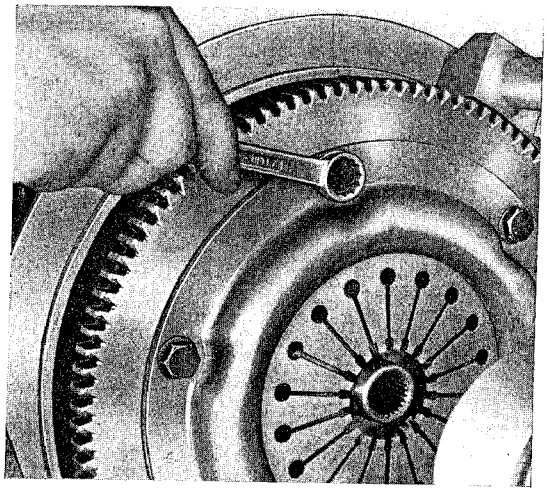


Fig. 252

3. Remove clutch.

4. Remove clutch plate.

Installation

The installation is accomplished in the reverse order of removal observing the following points:

1. Clean the flywheel surface on which the clutch bears and inspect for wear. If necessary reface, not to exceed 0.2 mm (.008 in.) and polish with super fine emery. If necessary install a new flywheel.

2. Inspect the clutch plate for lining wear, eccentricity, and proper alignment of the segments. Note especially the rivets holding the plate to the hub. If necessary install a new clutch lining or a complete plate.

3. Inspect clutch assembly.

4. Inspect release bearing for wear and replace if necessary.

5. Inspect cross shaft bearings in transmission housing.

6. Lubricate the bushing in the gland nut with approx. 2 cc. ($^1/_{10}$ cu. in.) special graphite grease.

7. Install the clutch plate using stub shaft VW 219 or a sawed off main shaft.

8. Install the clutch noting that the index dents of the cover and counter plate are in line.

9. Tighten the six mounting screws one turn at a time each until the clutch is tight against the flywheel, thereby avoiding clutch spring distortion or damage to the cover.

Disassembly

1. Remove cover.

2. Remove lock ring starting at one end (Fig. 255).

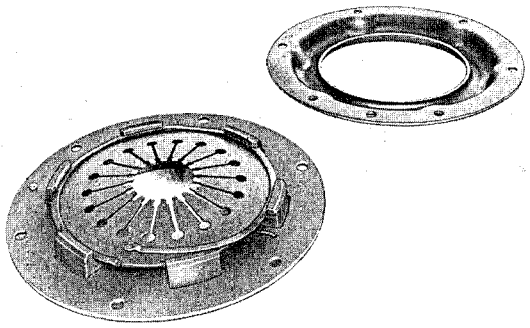


Fig. 255

3. Remove disc spring.

4. Mark counter plate and pressure plate since these parts have been balanced as a unit (Fig. 256).

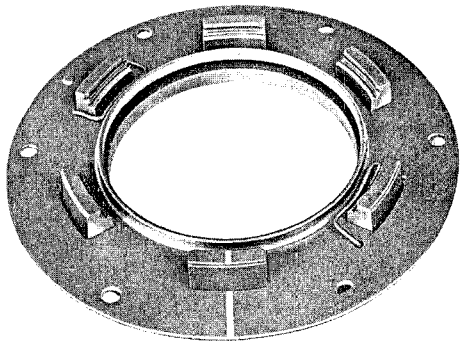


Fig. 256

5. Press pressure plate from the slots in the counter plate.

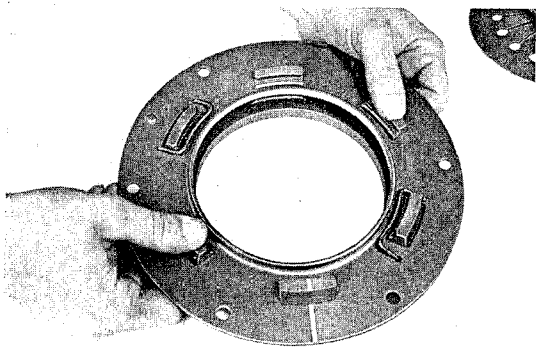


Fig. 257

59 EN

Pressure Plate Inspection

1. Clean parts with solvent.

2. Inspect the pressure plate for wear, distortion, and scored or burned areas. If necessary reface or replace. The pressure plate surface must not be ground down more than 0.2 mm (.008 in.). The refaced surface of the pressure plate must be parallel to the bearing surface of the disc spring carriers.

   The pressure plate must not be held in a vise or chuck by the spring carriers but should only be held by its outer rim.

   A pressure plate with uneven contact is conducive to clutch chatter.

3. Inspect disc spring for cracks and replace if necessary.

Assembling Clutch

60 EN

Special Tools: **P 79** **Gauge ring**
VW 254 **Clutch testing and adjusting drive**

1. Insert the pressure plate into the holes of the counter plate noting the marks (Fig. 256) previously scribed. Apply a light film of graphite grease to the sides of the spring carriers.

2. Insert the hooks of the tensioners into the counter plate. Raise the counter plate from pressure plate slightly and press the tensioner over the spring carrier (Fig. 258).

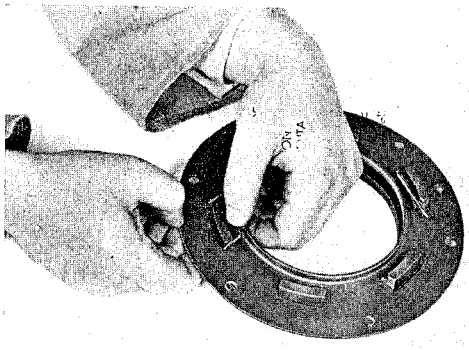


Fig. 258

3. Lubricate the bearing surface of the spring carriers with a light film of graphite grease and install the disc spring.

4. Insert the lock ring in the grooves of the spring carriers so that the flat sections lie in the grooves and the arched sections bear against the disc spring. Make certain that the lock ring is firmly seated in the root of the carrier grooves.

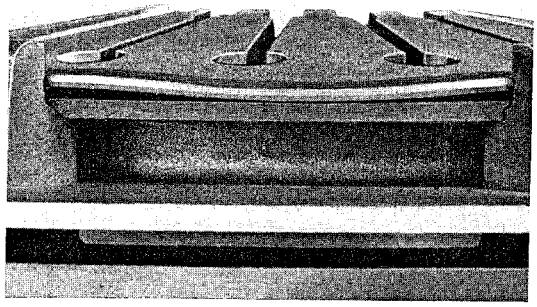


Fig. 259

5. Install the cover so that the index dent fits over the corresponding dent in the counter plate.

6. Screw the clutch assembly and the clutch spacer ring to the adjusting device VW 254. Place gauge ring P 79 on the disc spring fingers and compress clutch spring. Tighten the clutch mounting screws. Release and engage clutch several times by the actuating lever.

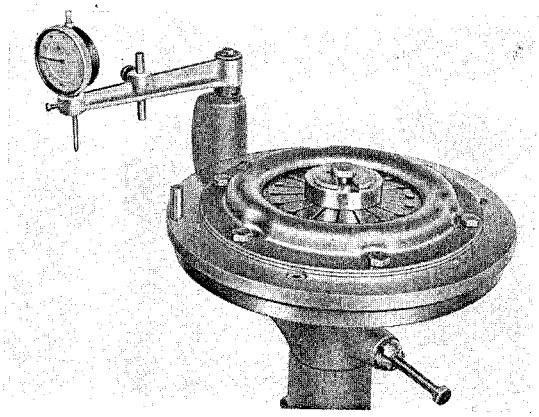


Fig. 260

7. Zero dial gauge on adjusting peg (26 mm high).

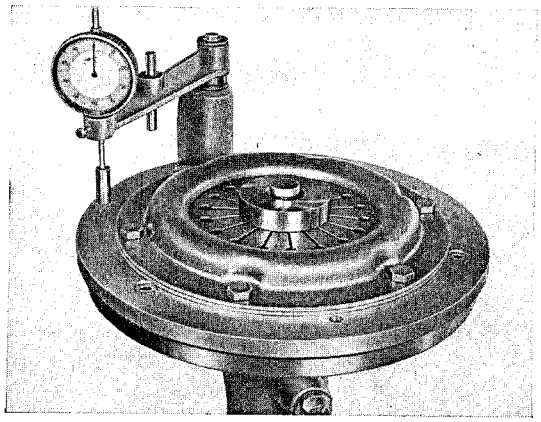


Fig. 261

When riveting new linings to the clutch plate it is very important that every second hole is countersunk through the lining, and that the linings are riveted to the tabs which are dished toward the respective lining as in Fig. 269.

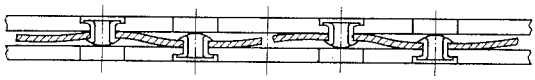


Fig. 269

6. Test clutch plate with new linings for alignment. Maximun permissible deflection: 0.5 mm (.020 in.).

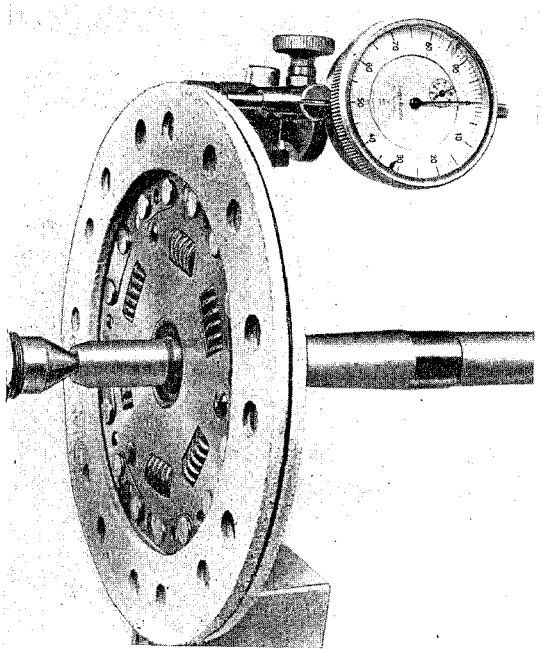


Fig. 270

7. Measure clutch plate uncompressed thickness.

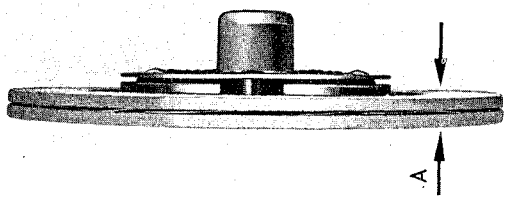


Fig. 271

Thickness: 8.6 to 9.2 mm (.339 to .362 in.).

8. Inspect torsional damper springs. If springs are slack or broken install a new clutch plate.

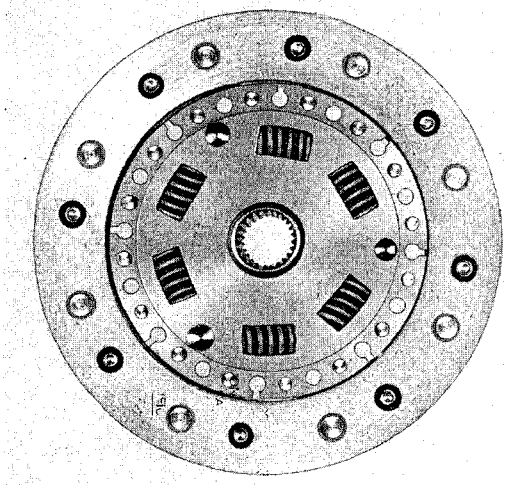


Fig. 272

62 EN

Removing and Installing Clutch Release Bearing

Special Tools: P 35a Adjusting gauge

Removal

1. Remove engine (1 EN).

2. Disconnect clutch pedal return spring.

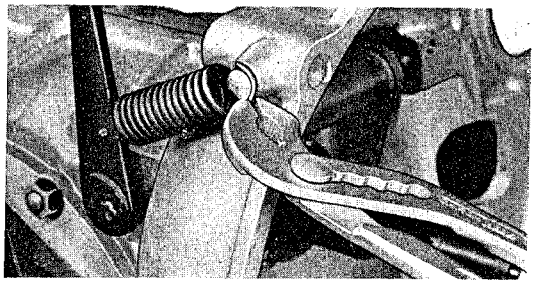


Fig. 273

3. Remove clutch release bearing from guide sleeve.

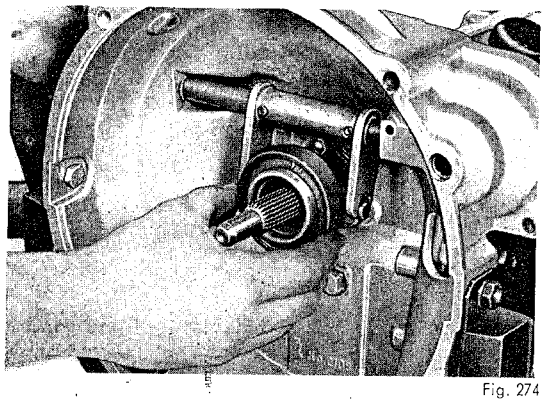


Fig. 274

Installation

The installation is accomplished in the reverse order of removal observing the following points:

1. Apply a thin film of graphite grease to the clutch release fork.
2. Install clutch release bearing.
3. Adjust the clutch release bearing 50 mm ($1^{31}/_{32}$ in.) back from face the clutch housing using tool P 35a. Adjustment is made by shortening or lengthening the clutch cable clevis (Fig. 275). Do not. tighten the cable clevis past the end of the threads where it will bind with the lever. Secure the clevis by tightening the lock nut, inserting the clevis pin locking it with the spring clip.

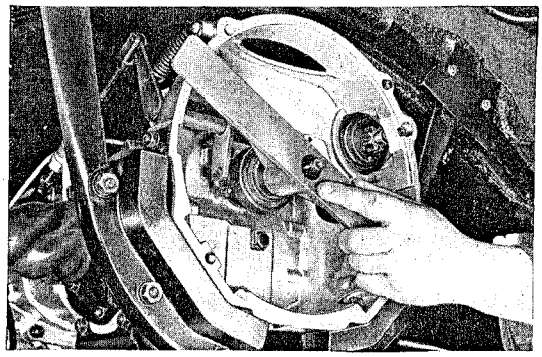


Fig. 275

4. Install engine.
5. Check clutch pedal travel and adjust if necessary.

Removing and Installing Clutch Cable

63 EN

Removal

1. Remove floor board behind clutch pedal.
2. Remove lock nut and adjusting nut from the clutch cable.

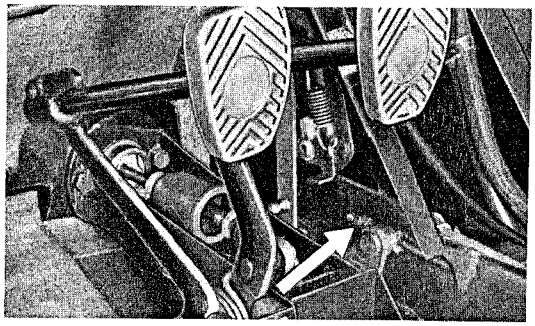


Fig. 276

3. Block up left rear of car and remove wheel.
4. Release spring clip of clevis pin and remove pin.

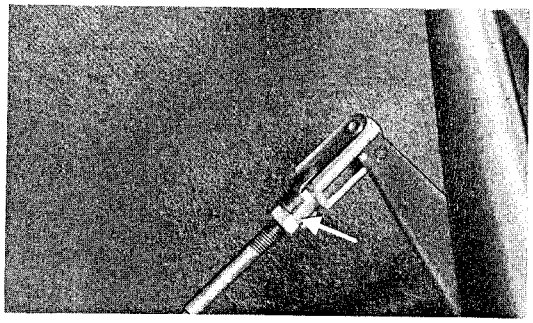


Fig. 277

5. Remove clevis and lock nut from clutch cable.
6. Remove cable housing from clamp on the gearbox.
7. Pull clutch cable out of channel to rear.

Installation

1. Grease clutch cable.
2. Slide cable through the flexible housing several times.
3. Pump grease into the channel in the frame with a grease gun until clean grease appears at the forward end (to be observed by a helper).
4. Install the clutch cable so that the threaded end of the cable housing faces the adjusting bracket on the gear box. While the cable is being inserted in the tube an assistant should hold the forward end of the tube shut to prevent the grease from being pushed out.

3. By turning the clevis the clutch cable can be shortened or lengthened. The clevis may be tightened until the clutch cable bolt reaches the clutch lever. Connect the clevis to the clutch lever inserting the clevis pin from the outside so that the spring clip lies on top of the clevis.

   After pumping the clutch pedal serveral times check the free travel. 20 to 25 mm (3/4 to 1 in.).

4. After completing adjustment tighten the lock nut and check the spring clip of the clevis pin. Grease the adjustment threads to prevent rust.

   Adjustment should be made carefully because incorrect clearance will cause clutch slip or drag and thereby burn the linings.

Testing and Adjusting Clutch Pedal Travel

65 EN

Note:

The disc clutch spring requires accurate clutch release bearing travel for proper performance. After any clutch adjustment the pedal travel should be checked or adjusted.

Testing:

a) Run gearbox until warm.

b) Depress the clutch pedal to the stop. In this position the reverse gear must just be able to be engaged silently.

Adjustment

The pedal stop consists of a slotted steel plate attached to the pedal wall by two M 6 screws.

1. Remove floor mat.

2. Using a socket wrench loosen both pedal stop M 6 screws.

3. Adjust stop plate forward or back.

4. Tighten M 6 screws.

5. Check adjustment as in part (b) testing.

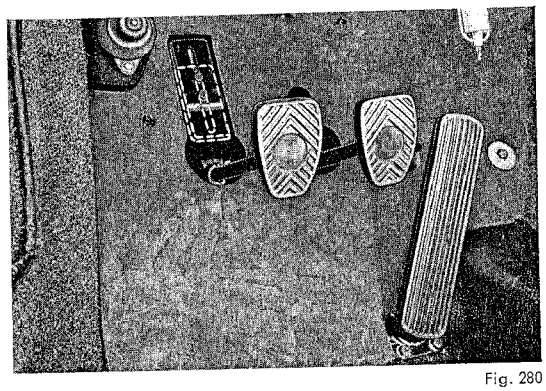


Fig. 280

5. Pull the cable forward as far as possible and connect to link of clutch pedal lever.

6. Install adjusting and lock nuts. The bevel of the adjusting nut fits in the anchor bracket.

7. Insert the end of the flexible cable housing into the bracket on the gearbox so that at least three threads on which the rubber dust cap can be mounted protrude from the bracket (Fig. 278).

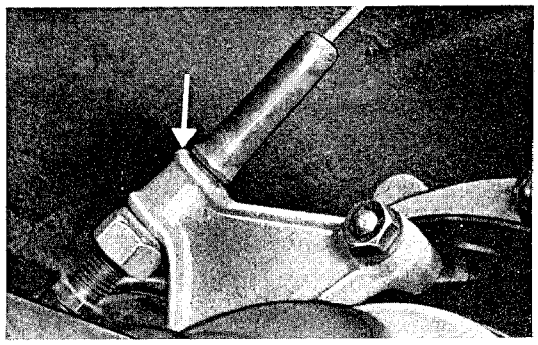


Fig. 278

8. Connect the greased clevis to the clutch release lever.

9. Adjust clutch travel.

10. Tighten lock nuts.

64 EN

Clutch Adjustment

General

The clutch cable is threaded on both ends and may be adjusted either at the clutch pedal or at the clutch lever. The clutch is correctly adjusted when the pedal has from 20 to 25 mm ($^3/_4$ to 1 in.) free travel.

Adjustment should be made carefully because incorrect clearance will cause clutch slip or drag and thereby burn the linings.

Adjustment at Clutch Pedal

1. Remove the floor mat and floor board from behind the pedals.

2. Loosen the lock nut and tighten or loosen the adjusting nut as necessary until a free travel of 20 to 25 mm ($^3/_4$ to 1 in.) is obtained. Hold the cable bolt with pliers if necessary.

3. Install floor board and floor mat.

Adjustment at Clutch Lever

1. Block up car and remove left rear wheel.

2. Loosen the lock nut of the clutch lever clevis and remove the clevis by releasing the spring clip.

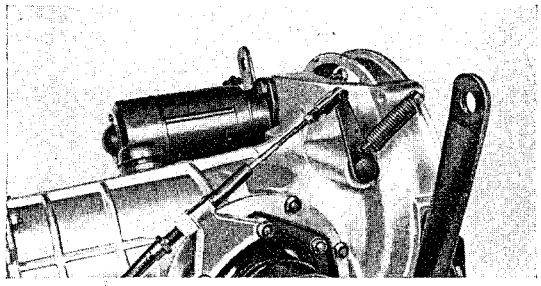


Fig. 279

Service Diagnosis

Failure	Cause	Repair
1. Noisy Clutch	a) Worn bushing in gland nut.	a) Install new bushing and lubricate with 2 cc. ($^1/_{10}$ cu. in.) graphite grease.
	b) Worn clutch release bearing.	b) Install new clutch release bearing. Note correct clutch pedal clearance.
	c) Broken or loose damper springs in clutch plate.	c) Install new clutch plate.
2. Clutch chatters	a) Gearbox not firmly attached to mount.	a) Tighten suspension nuts, install new mounts if damaged.
	b) Worn pressure plate.	b) Reface or install new pressure plate.
	c) Disc spring is distorted.	c) Adjust or install new disc spring.
	d) Cable housing slack.	d) Adjust cable housing.
	e) Clutch plate cushion springs are flat.	e) Remove linings and tension springs or install new clutch plate.
3. Clutch fails to release	a) Free pedal travel to great.	a) Adjust pedal travel to 20 to 25 mm ($^3/_4$ to 1 in.).
	b) Clutch plate or main shaft out of alignment.	b) Align or replace parts in question.
	c) Clutch plate cushion springs excessively tensioned or broken lining.	c) Install new clutch plate or new linings.
	d) Gland nut bushing has too tight a fit to main shaft.	d) Ream bushing to proper diameter.
	e) Free pedal travel to small.	e) Adjust pedal travel to 20 to 25 mm ($^3/_4$ to 1 in.).
4. Clutch slips	a) Free pedal travel to small resulting from clutch wear.	a) Adjust pedal travel to 20 to 25 mm ($^3/_4$ to 1 in.).
	b) Oil on clutch plate.	b) Install new clutch linings and install new oil seal at gearbox or crankshaft.
	c) Weak disc spring.	c) Install new disc spring.
	d) Worn clutch linings.	d) Install new clutch linings.

SUMMARY OF TOLERANCES AND WEAR LIMITS

GROUP E

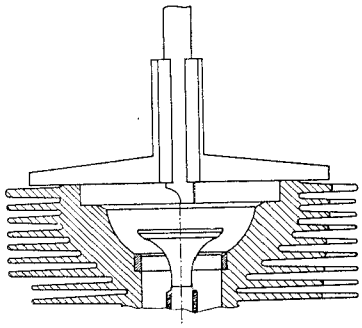
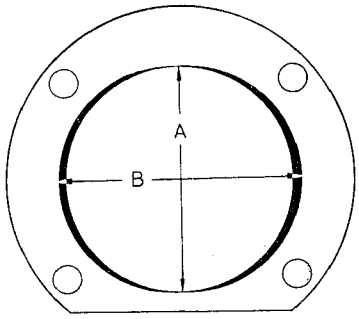
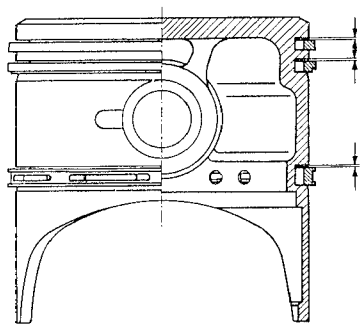
Torque Values for Cap Screws and Nuts of 1600 and 1600 S Engines

	mkg	ft. lb.
Crankcase screws M 8	2.5	18
Timing case cover nuts	2.0	14.5
Connecting rod nuts	4.5	32.6
Crankcase through-bolt nuts	4.0	29
Cylinder head nuts	3.0	21.8
Rocker arm bracket mounting screws M 10 (Formerly 5 mkg)	3.5 to 4	25.4 to 29
Rocker arm spindle securing nuts 1600 S (only on light alloy rocker arm brackets)	2 to 2.5	14.5 to 18
Camshaft gear retaining nuts	2.5	18
Blower impeller nut	10.0	72.5
Flywheel gland nut	35 to 37.5	254 to 272

Tolerances and Wear Limits

The figures given in these tables are valid for all Model 356 B 1600 and 1600 S Engines. Values which differ for particular engines are specifically noted.

ENGINE

Measuring point	Tolerance (new) mm	Wear limit mm	
1. Cylinder seat in cylinder head	9.500 – 9.600	10.000	
2. Cylinder ovality (see sketch) B minus A	–	0.020	
3. Piston / cylinder clearance Light alloy cylinder 1600 S Engine Cast iron cylinder 1600 Engine	 0.015 – 0.025 0.041 – 0.059	 0.10 0.20	———
4. Compression ring / groove clearance 1600 S Engine Ring 1. Ring 2.	 0.045 – 0.072 0.025 – 0.052	0.30	
5. Oil ring / groove clearance	0.025 – 0.052	0.30	

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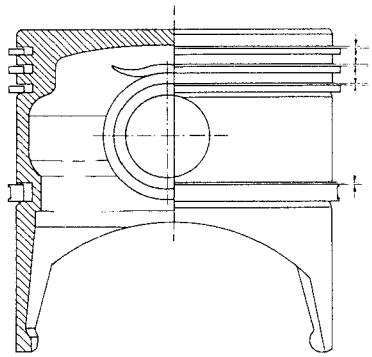
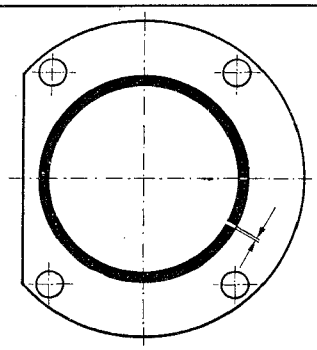
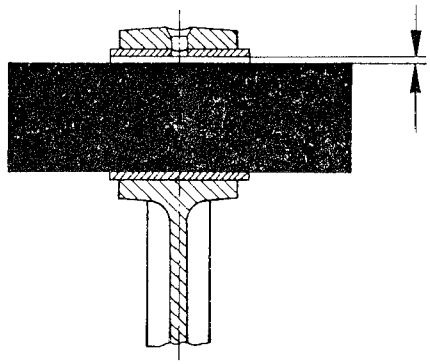
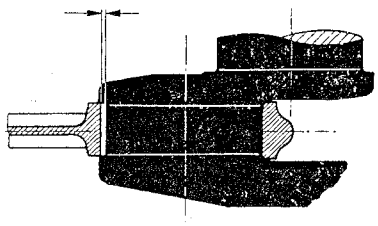
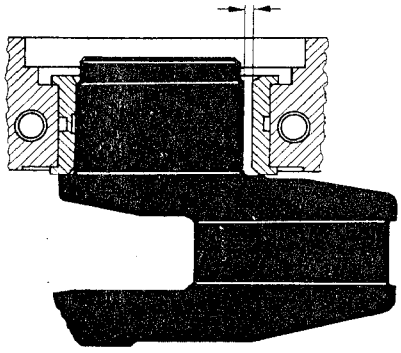
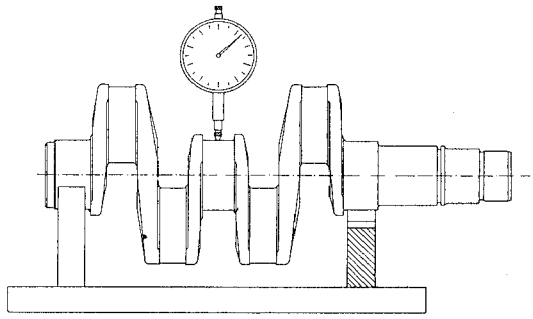
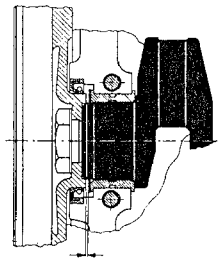
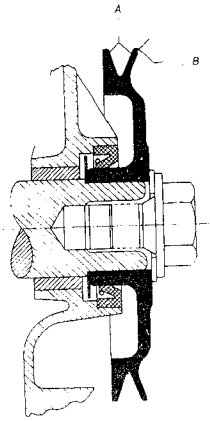
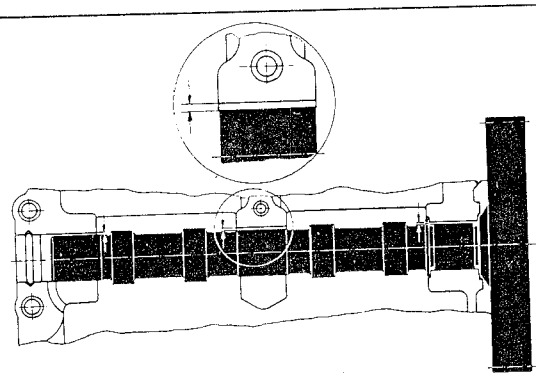
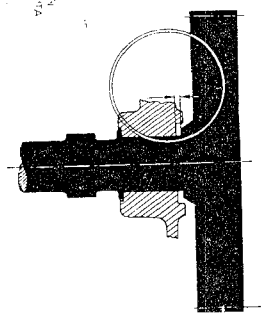
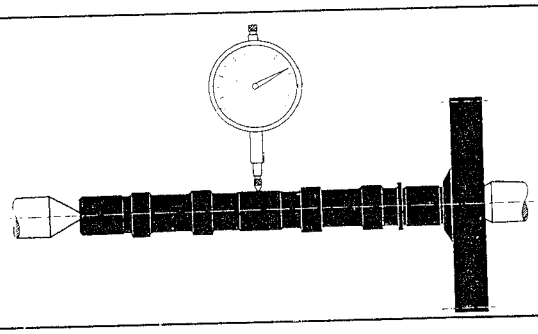
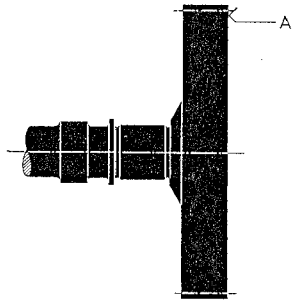
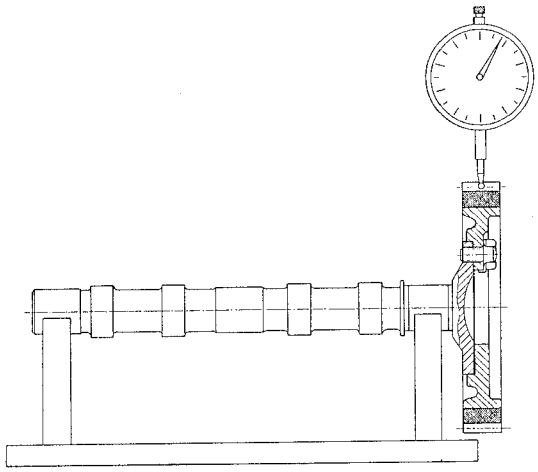
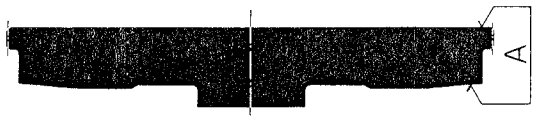
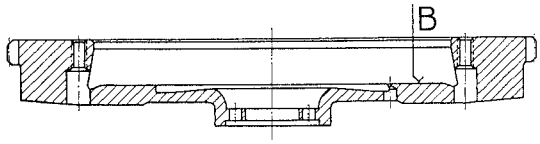
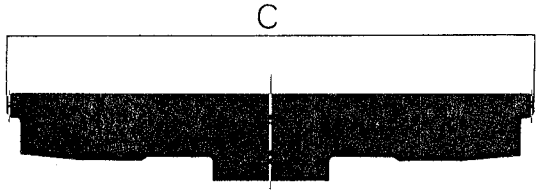
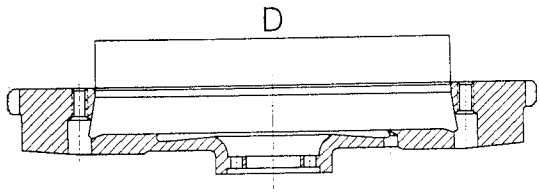
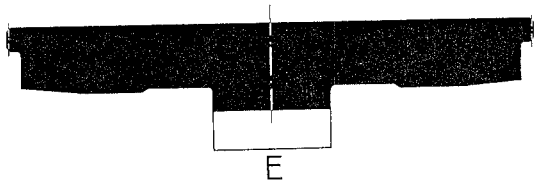
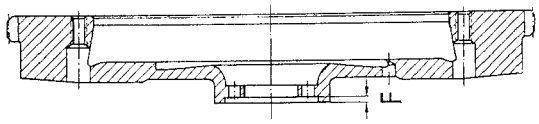
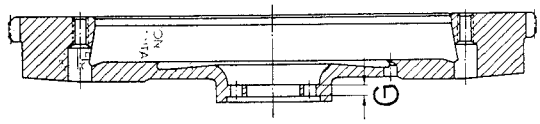
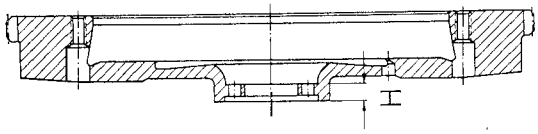
Measuring point		Tolerance (new) mm	Wear limit mm	
6. Compression ring / groove clearance 1600 Engine	Ring 1. Ring 2. Ring 3.	0.075 – 0.107 0.060 – 0.080 0.035 – 0.062	0.30	
7. Oil ring / groove clearance		0.025 – 0.052	0.30	
8. Piston ring gap, all rings 1600 S Engine 1600 Engine		0.10 – 0.45 0.25 – 0.50	0.95 0.95	
9. Weight difference for pistons of one engine		max. 10 g *)	—	———
10. Weight difference for connecting rods of one engine		max. 15 g *)	—	———
11. Piston pin / connecting rod clearance		0.020 – 0.036	0.050	
12. Connecting rod bearing clearance		0.040 – 0.092	0.130	

* Pistons and connecting rods should be paired so that their combined weights give a minimum difference within one engine.

Measuring point	Tolerance (new) mm	Wear limit mm	
13. Crankshaft main bearing clearance (installed in crankcase)			
a) Bearing 1	0.028 – 0.078	0.170	
b) Bearing 2 and 3	0.046 – 0.100	0.170	
c) Bearing 4	0.040 – 0.104	0.170	
14. No. 2 and No. 4 main bearing journals (with No. 1 and No. 3 on knife edges) deflection	max. 0.020	0.030	
15. Crankshaft end play	0.130 – 0.180	0.300	
16. Main bearing journal ovality	–	0.020	———
17. Connecting rod journal ovality	–	0.020	———
18. Crankcase bores for main bearings			
a) Bearings 1, 2 and 3 dia.	60.235 – 60.245	–	See table of dimensions page E 81
b) Bearing 4 dia.	50.000 – 50.025	–	

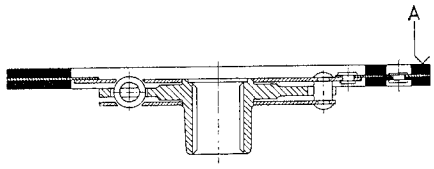
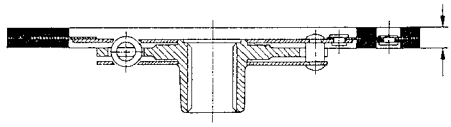
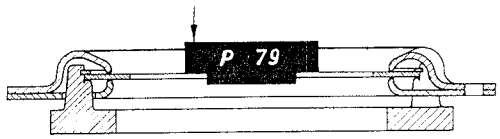
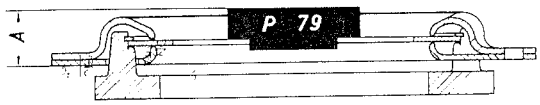
Measuring point		Tolerance (new) mm	Wear limit mm	
19. V-belt pulley	eccentricity wobble	A max. 0.250 B max. 0.250	— —	
20. Crankcase bore for camshaft	dia.	24.020 – 24.041	24.070	———
21. Camshaft clearance		0.020 – 0.054	0.120	
Thrust bearing end play		0.040 – 0.080	0.100	
Deflection at center bearing camshaft mounted on centers		0.020	0.025	

Measuring point	Tolerance (new) mm	Wear limit mm	
22. Timing gear bolted and pinned to camshaft wobble	max. 0.100	–	
Tooth clearance	0.015 – 0.040	–	
Timing gear bolted and pinned to camshaft eccentricity	0.025	0.040	
23. Flywheel (measured at rim) wobble A	max. 0.300	–	
(measured on clutch surface) wobble B	max. 0.040	–	
(measured at rim) eccentricity C	max. 0.20	–	

Measuring point	Tolerance (new) mm	Wear limit mm	
(measured in clutch plate recess) eccentricity D	max. 0.100	–	
when mounted on crankshaft (combined out of balance force)	max. 5 cmg	–	———
Hub outer dia. E	59.900 – 60.100	59.700	
Depth of recess to web F	3.10 – 3.15	–	
Web thickness G	6.3 – 6.85	min. 4.800	
Width of oil seal surface H	9.250 – 10.250	–	
Turning down of damaged tooth edges	–	max. 2.000	———
24. Valve stem dia. Intake Exhaust	9.990 – 9.978 9.970 – 9.958	9.940 *) 9.940 *)	See page E 48

* Valid only if stem to guide clearance limit is not exceeded.

CLUTCH

Measuring point	Tolerance (new) mm	Wear limit mm	
1. Clutch plate wobble A	max. 0.5	–	
2. Clutch plate with linings compressed thickness	8.2 – 8.6	7.5	
3. Clutch pedal free travel	20 – 25	–	———
4. Clutch mounted on stand VW 254, gauge ring P 79 installed. wobble	0.8	1.2	
5. Clutch mounted on stand VW 254, gauge ring P 79 installed. Height of top of gauge ring over mounting surface.	26 – 1.5	26 + 1.5	
6. Complete clutch assembly out of balance	max. 15 cmg	–	———

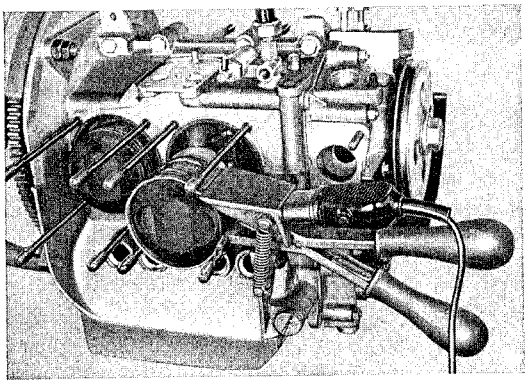
SPECIAL TOOLS

FOR

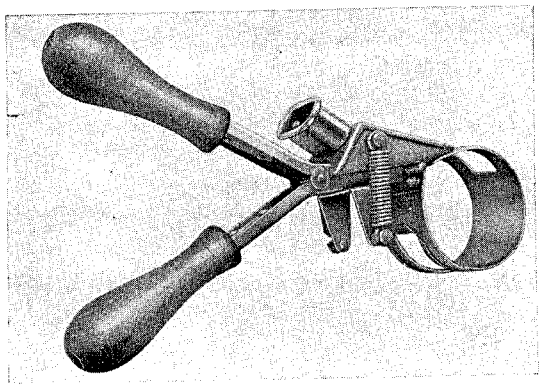
SECTION E

Electric Piston Heater

P 1a



Example of use



Tool

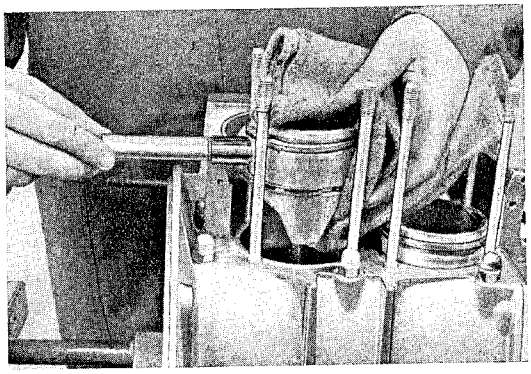
Use: To heat pistons to remove and install piston pins

See operation 2 EN

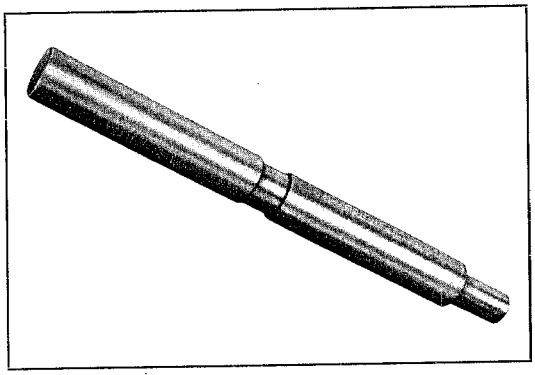
Subject to change

Piston Pin Mandrel

P 2



Example of use



Tool

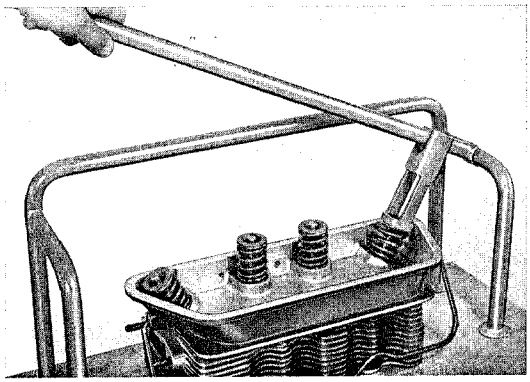
Use: To remove and install piston pins

See operation 2 EN

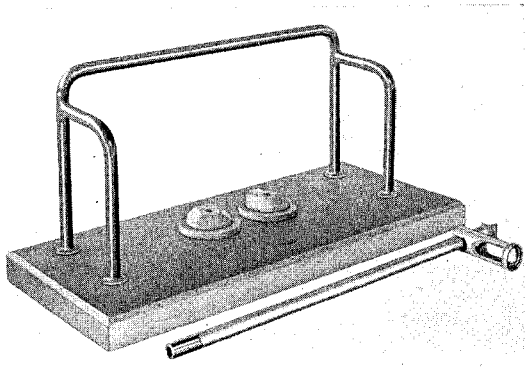
Subject to change

Valve spring compressor set

P 7



Example of use



Tool

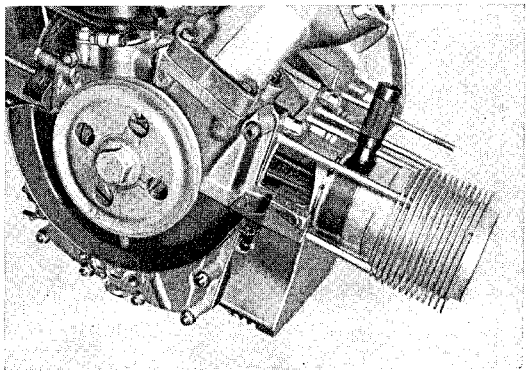
Use: To remove and install valve springs and valves

See operation 24 EN

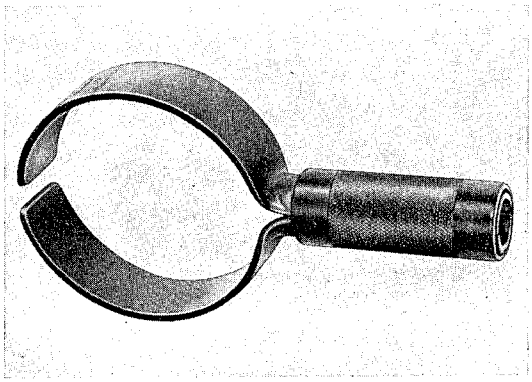
Subject to change

Piston ring compressor 82,5 mm dia.

P 8a



Example of use



Tool

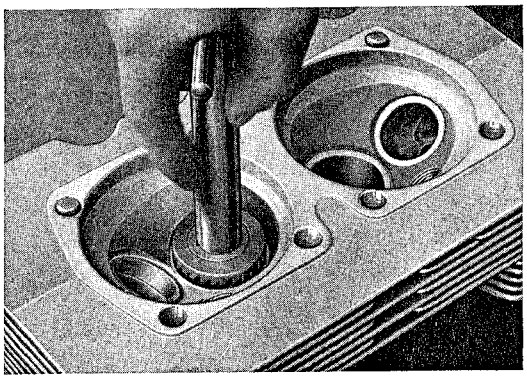
Use: To compress piston rings when installing cylinders

See operation 2 EN

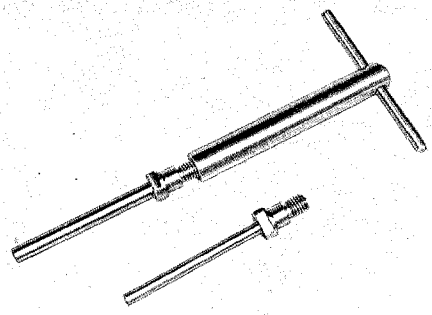
Subject to change

Valve seat cutter handle and shaft

P 11



Example of use



Tool

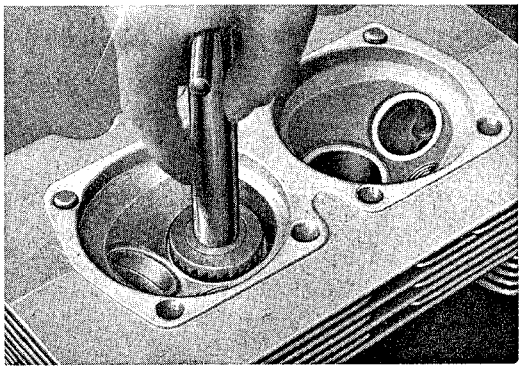
Use : To cut valve seats using cutter set P 12

See operation 26 EN

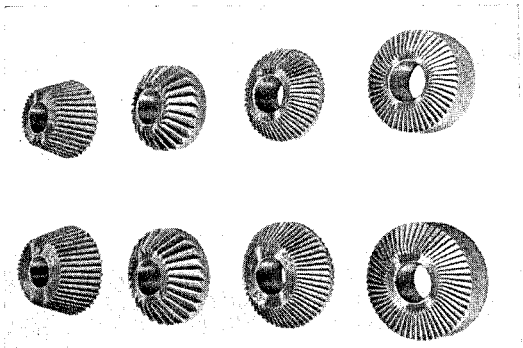
Subject to change

Valve seat cutter set

P 12



Example of use



Tool

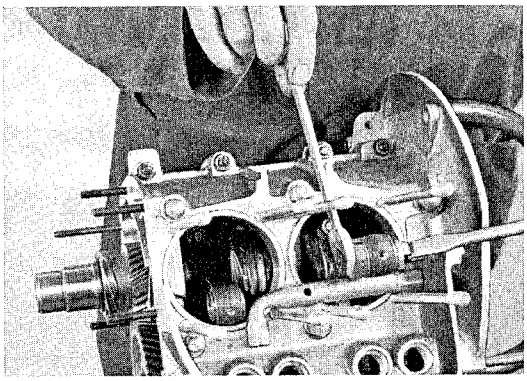
Use : To cut valve seats using handle and shaft P 11

See operation 26 EN

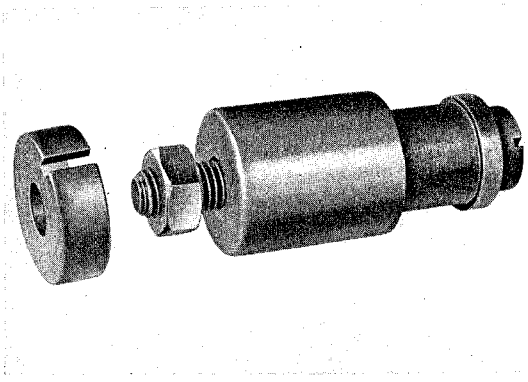
Subject to change

Piston pin bushing extractor and press

P 15



Example of use



Tool

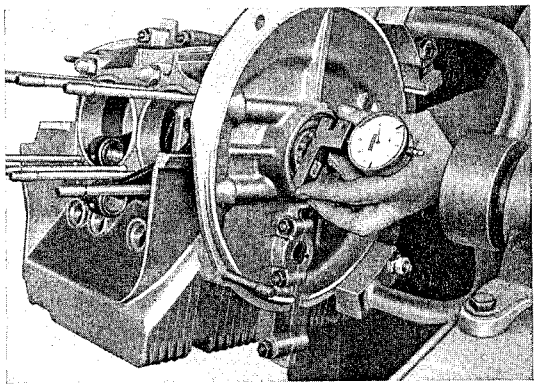
Use: To extract and install piston pin bushings

See operation 47 EN

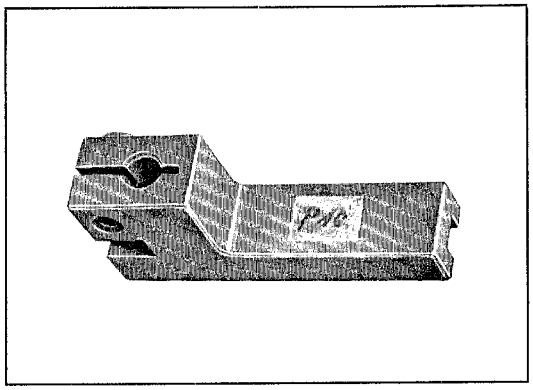
Subject to change

Dial gauge holder

P 16



Example of use



Tool

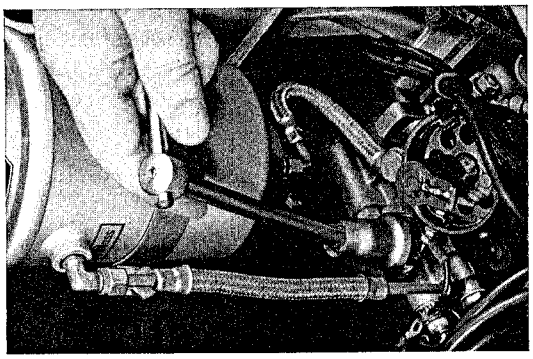
Use: To measure shim thickness for correct crankshaft end play

See operation 50 EN

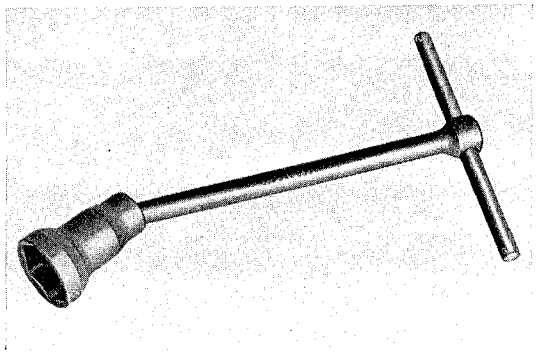
Subject to change

T-handled socket wrench 24 mm

P 19a



Example of use



Tool

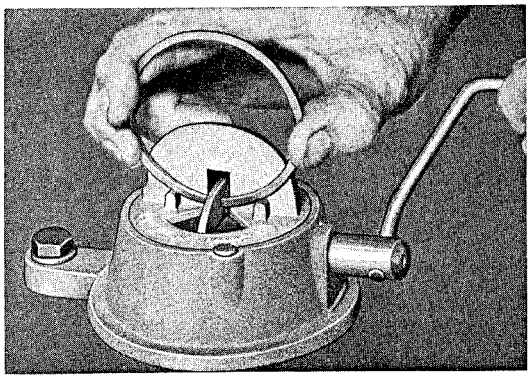
Use: To remove and install oil pressure indicator switch

See operation 2 EN

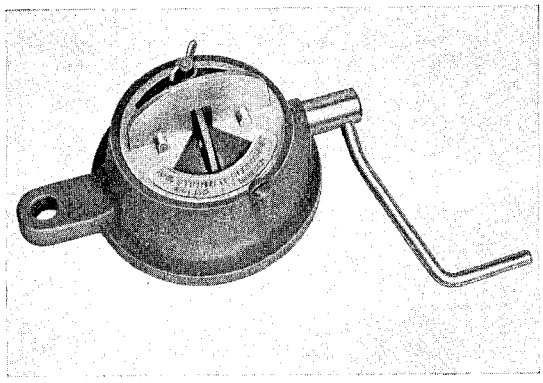
Subject to change

Piston ring gap grinder

P 20



Example of use



Tool

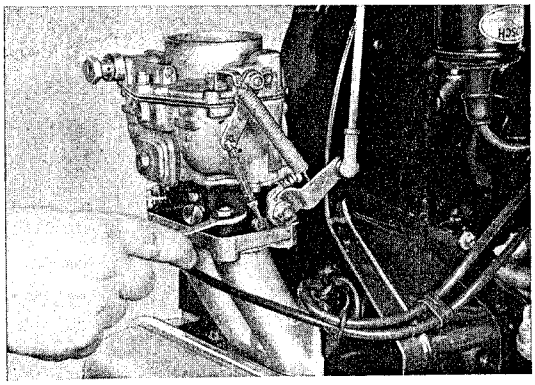
Use: To adjust piston ring gap

See operation 34 EN

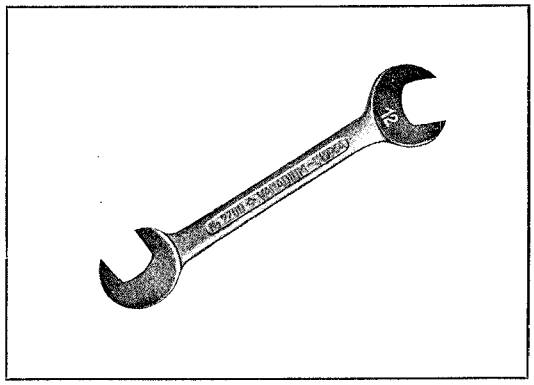
Subject to change

Carburetor wrench 12 mm

P 23



Example of use



Tool

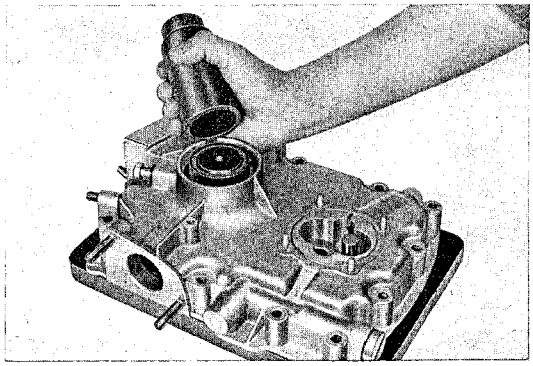
Use: To remove and install carburetors

See operation 23 EN

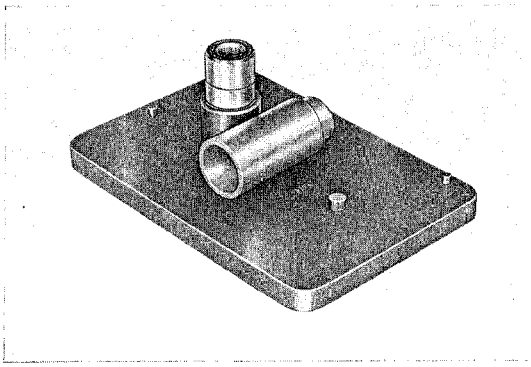
Subject to change

Assembly plate

P 27a



Example of use



Tool

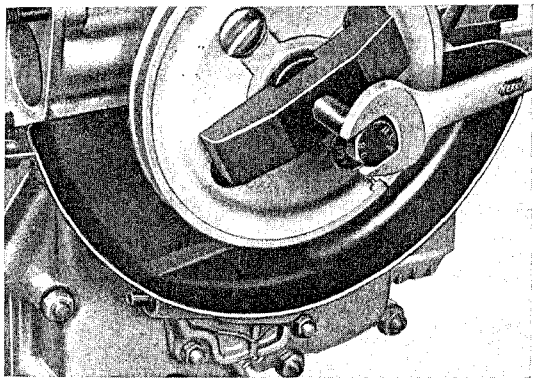
Use: To remove and install main bearing No. 4 in the timing case cover and to install the crankshaft oil seal using tool P 73

See operation 39 EN

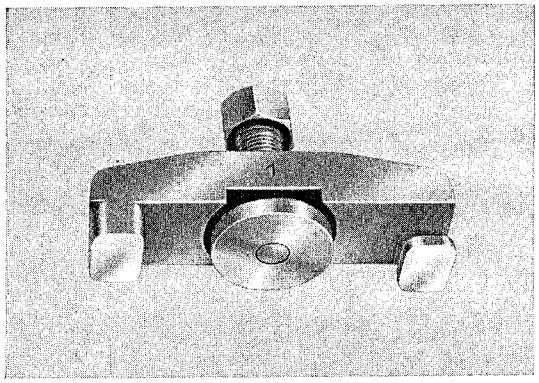
Subject to change

Puller for V-belt pulley

P 43



Example of use



Tool

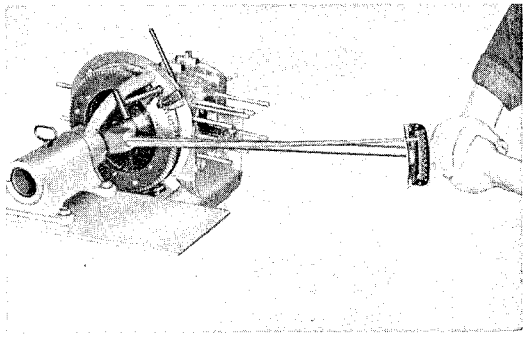
Use: To remove the V-belt pulley from the crankshaft

See operation 42 EN

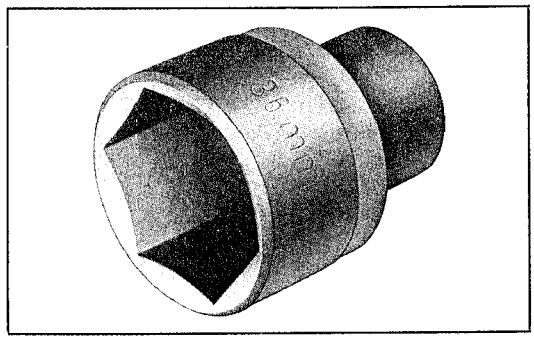
Subject to change

Socket 36 mm

P 44



Example of use



Tool

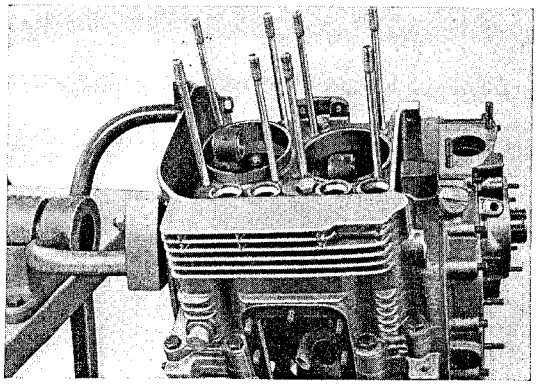
Use: To remove and tighten the flywheel gland nut

See operation 41 EN

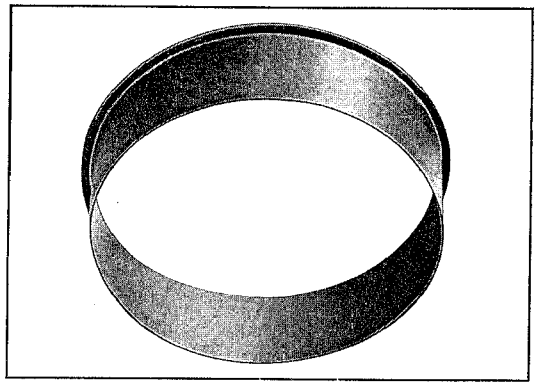
Subject to change

Sleeve (4)

P 51



Example of use



Tool

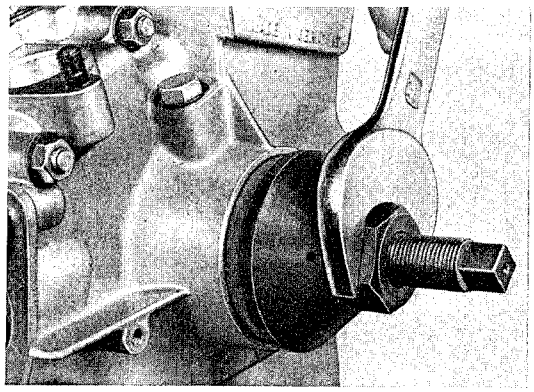
Use : To protect the crankcase bores while rotating the crankshaft with the cylinders removed

See operation 36 EN

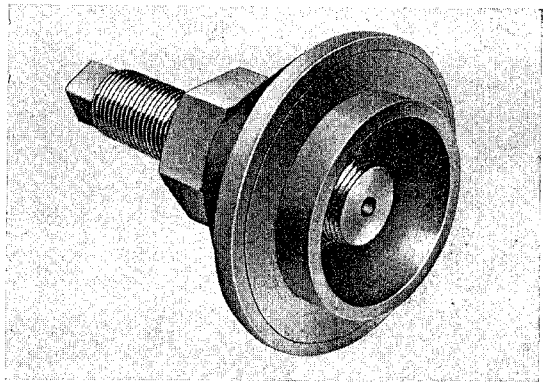
Subject to change

Press for installing oil seal

P 73



Example of use



Tool

Use : To install crankshaft oil seal in the timing case cover

See operation 38 EN

Subject to change