Engine Tune-Up

Change: Model 180 c and modified valve timing gear have been added.

In general it is sufficient to carry out the checking and adjustment operations described in the procedures A–K below for gasoline engines and in the procedures A–G and M–P for fuel injection engines.

It is usually unnecessary to check the valve timing settings; this should only be done in special cases.

An accurate adjustment of the tappets is not possible when the engine is warm and should therefore never be undertaken. For this reason the tappet clearance data always refer to the cold engine.

If it should be necessary to begin adjustment operations with the engine at working temperature, procedures B etc. should be carried out first and, when the engine is cold, the tappet clearance should be adjusted and finally, after the engine has warmed up again, the idle should be adjusted. In the case of the injection engine for model 220 SE the control linkage can only be adjusted after the tappet clearance has been checked.

Operations should be carried out in the following order:

A. Tappet clearance adjustment
B. Compression measurement
C. Cleaning and testing of spark plugs
D. Measurement and adjustment of distributor contact gaps and angle of closure
E. Ignition setting
F. Checking camshaft adjustment
G. Measurement and adjustment of pressure of fuel feed pump
H. Measurement and adjustment of fuel level and injection amount of gasoline engines
I. Trouble-shooting hints on carburetor system
K. Adjustment of carburetor linkage and idle
L. Testing valve timing
M. Measurement of intake pipe vacuum
N. Exhaust gas test values
O. Engine testing on the roller test stand
P. Adjustment of gasoline injection pump in model 220 SE
Q. Checking gasoline injection system of model 220 SE
R. Trouble-shooting hints on gasoline injection system of model 220 SE
S. Adjustment of control linkage, idle adjustment, and readjustment of speed build-up of gasoline injection engine in model 220 SE

A. Tappet Clearance Adjustment

Tappet clearance should only be checked or adjusted with the engine cold!

On models 180a, 180b, 190 SL, 220a, 219, 220S, and 220 SE the tappet clearance is adjusted and checked as described for model 190, with the difference, however, that on model 220 SE not only the cylinder head cover, but also the air filter and the venturi control unit must be removed (see Job No. 01–4, Section A), and that the adjustment of the control linkage must always be checked after the tappet clearance has been checked and after previously removed parts have been reinstalled (see Workshop Manual Passenger Car Models starting August 1959, Job No. 00–16).

Tappet Clearance

Model	220 a	180 a, 180 b, 190, 190 SL	180 c 190 SL[1]	219, 220 S, 220 SE
Inlet	0.08	0.10	0.08	0.12
Exhaust	0.20	0.20	0.15	0.20

During adjustments be sure that the gage (tolerance feeler band) requires a **firm** pull. For setting tappet clearance use only the special Wrench Combination 000 589 11 07 or the short Wrench Combination 000 589 64 09. Using any other tool may prevent full tightening of the hexagon nut on the adjusting screw and the nut may come loose. Also, use of an unsuitable wrench may damage the hex nut during the tightening. Be sure to replace any damaged nuts.

[1] **On the new, further modified valve timing** (Fig. 01–4/20a) the tappet clearance is measured between the slide surface of the rocker arm the cam base circle of the camshaft.

If models 180 c and 190 SL with the new valve timing require a correction of their tappet clearance, adjustments are made by turning the upper portion of the ball pin at the hexagon portion (SW 14) with the adaptor 111 589 00 01 (1) and a torque wrench (0–6 mkg) (2) Fig. 01-3/1). Too small a tappet clearance is increased by screwing ball pin top down, too large a tappet clearance is decreased by screwing the ball pin top out. When turning the ball pin top (3) in its socket (1) the adjusting torque should be at least 1.5 mkg (Fig. 01–4/20a). If the adjusting torque is less, either the ball pin top (3) or the ball pin socket (1) or both parts should be replaced. If the tappet clearance is too small and the ball pin top cannot be further adjusted (turned down) by means of the hexagon SW 14 into the ball pin socket, a thinner thrust piece (7) may be inserted into valve spring retainer (9) (Fig. 01–4/20a). Normally, the thrust plates are 4.5 mm thick, they are also available 3.5 mm and 2.5 mm thick. Replacement of a thrust plate requires disassembly of the rocker arm (refer to Job. No. 05–1).

Valve Arrangement

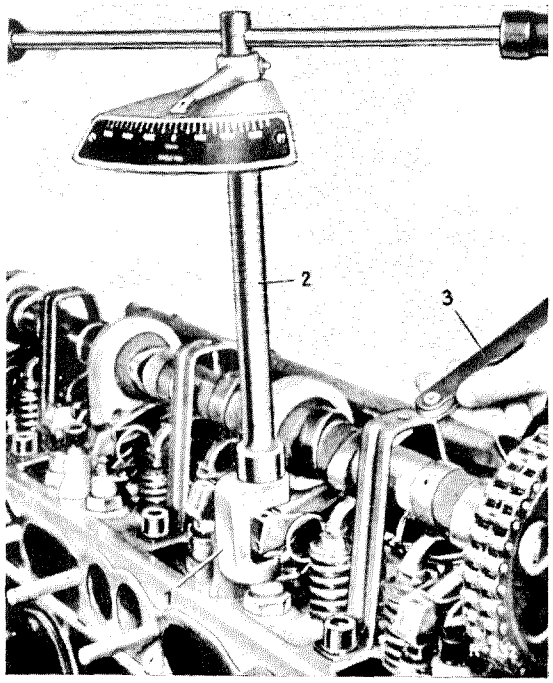

Fig. 01–3/1

1 Adaptor for adjustment of tappet clearance 111 589 00 01
2 Torque spanner
3 Gage with tolerance feeler band 0.08 mm and 0.15 mm

Note: The camshaft with Code No. 33 used in models 219 and 220 S with a compression ratio of $\varepsilon = 8.7:1$ is also available as a replacement for models 220 a, 219 and 220 S with a compression ratio of $\varepsilon = 7.6:1$. When using the camshaft with Code No. 33 for type 220 a inlet tappet clearance should also be set to 0.12 mm. When installing a camshaft with Code No. 33 sodium-filled exhaust valves should be included in the installation.

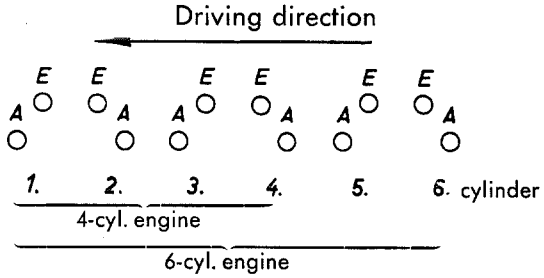

Fig. 01–3/2