ENGINE

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1

1 ENGINE

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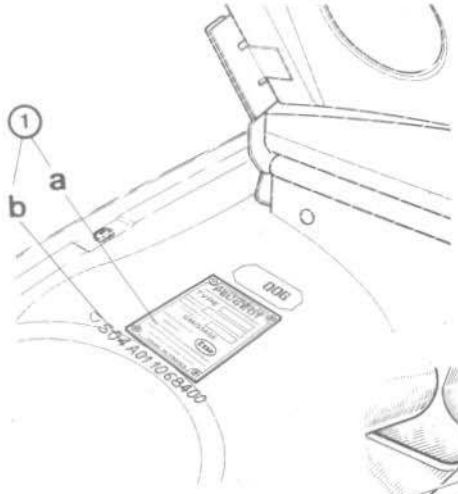
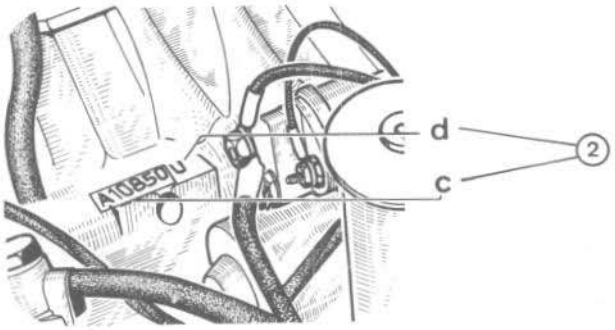


SERIAL NUMBER (1)

The serial number stamped on the L.H. engine mounting lug is :

- preceded and followed by an "X",
- identical to the number stamped on the maker's plate **(a)** and on the R.H. wing valance **(b)**.

WARNING - In the event of replacement of the cylinder block or the engine, the number as defined above, must be stamped on the engine, using 8 mm letters, in the space provided **(1)**.



ENGINE NUMBER (2)

The engine number stamped on the camshaft tunnel consists of :

- a production number **(c)** (a letter followed by 5 figures),
- an identification letter **(d)** (see table below)

WARNING - In the event of replacement, the new cylinder block must be stamped with the engine number in the space provided **(2)**.

Identification letter	Type of engine	
P	XM - (Carburettor - 10 CV for BA7 gearbox)	free expanding liners
R	KF6/KF5 - (Injection - 10 CV for BA7 gearbox)	
T	XM - ZF - (Carburettor - 10 CV for ZF transmission)	
U	XN1 *	compressed liners*
UA	XN1 US. 7.6 : 1 comp. - (Carburettor - 11 CV for BA7 gearbox)	
UB	XN1 7.6 : 1 comp.	
V	XN2 - (Injection - 11 CV for BA7 gearbox)	
W	XN2 - (Injection - 11 CV for ZF transmission)	
X	XN1	
XA	XN1 US. 7.6 : 1 comp. - (Carburettor - 11 CV for ZF transmission)	
XB	XN1 7.6 : 1 comp.	
Y	XM7 7.5 : 1 comp. - (Carburettor - 10 CV for BA7 gearbox)	
E	XM7 8.3 : 1 comp. - (Carburettor - 10 CV "Export")	

* Compressed liners fitted since July 1970 and from serial number 1 178 001.

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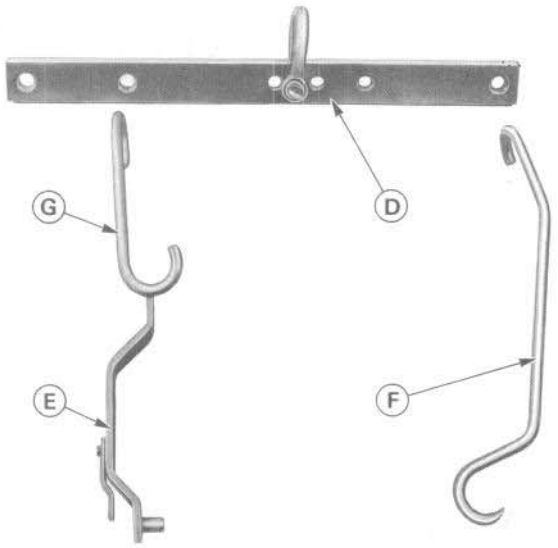
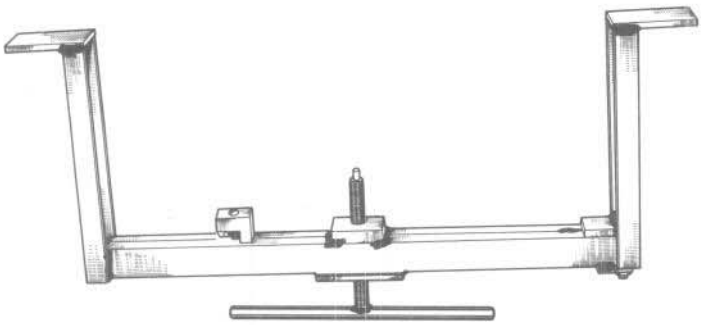


TOOLS TO BE USED

8.0102 X

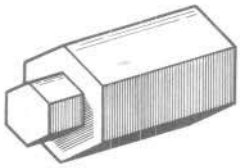
Engine hoisting apparatus.

D - Hoist beam
E - Front hook
F - Rear hook
G - Short hook



8.0208

Key for the clutch housing securing bolts.



8.0125

Engine or gearbox support bar.

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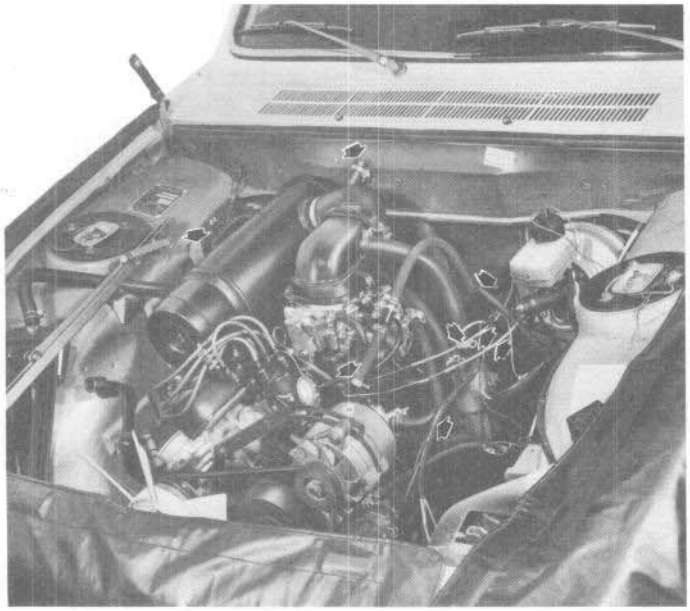
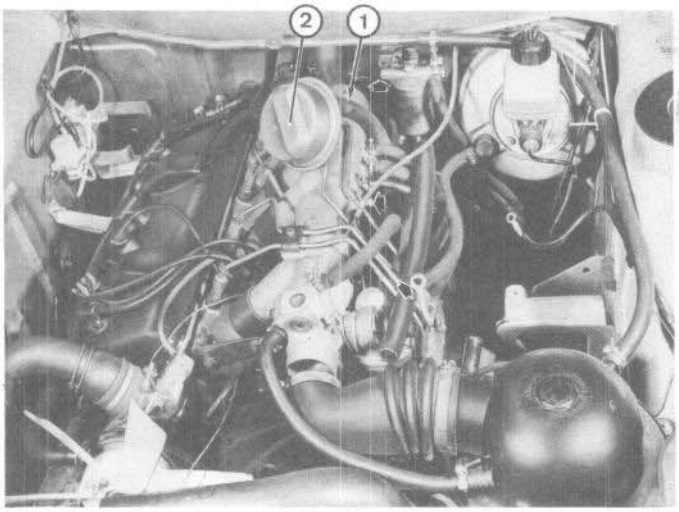


– On 504 with automatic transmission, drain the transmission.

– Remove :
- the battery and its tray,
- the bonnet,
- the radiator,
- the ignition coil,
- the starter,
- the windscreen washer bottle.

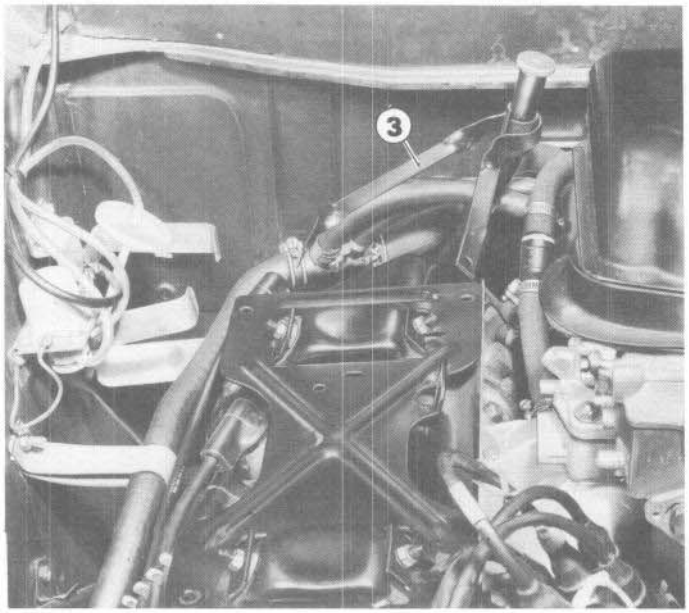
– Disconnect :
- the heater hoses,
- the fuel feed line,
- the carburettor controls,
- the Master-Vac vacuum line,
- the wiring.



– On 504 Petrol Injection

– Disconnect :
- the air ducts,
- the throttle cable.

– Remove :
- the electrovalve **(1)**,
- the altitude corrector **(2)**.

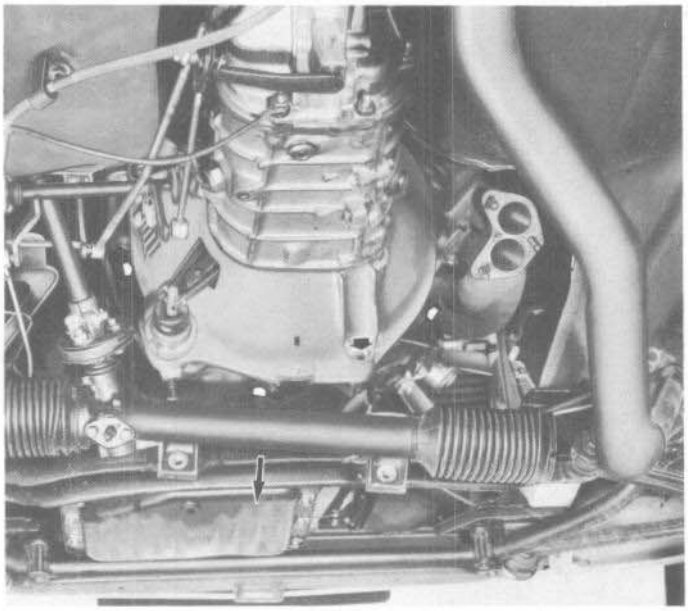


– On 504 Automatic.

– Remove :
- the air filter,
- the bracket **(3)**.

ENGINE

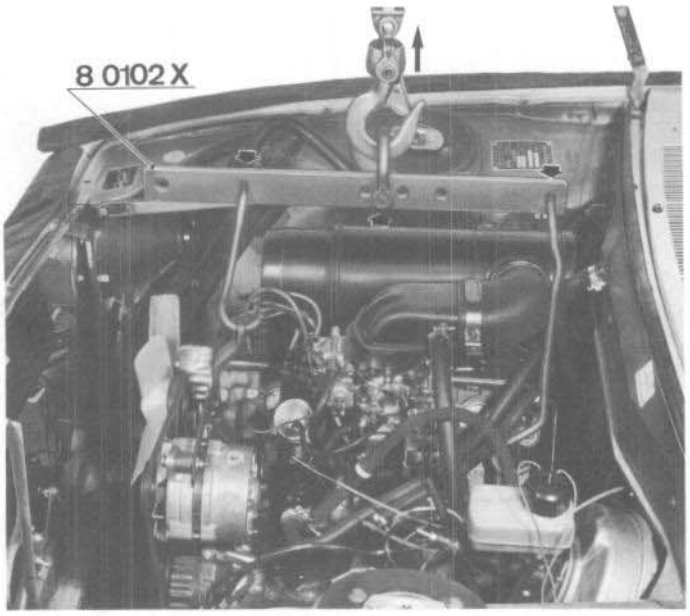
REMOVAL



- Lower the steering rack housing (turn the steering wheel to the left). 8 mm allen

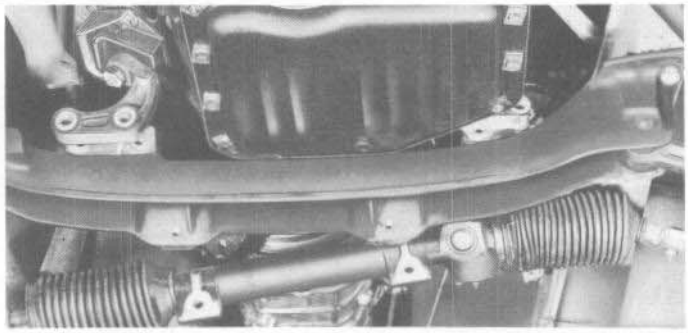
- Disengage the exhaust pipe from the manifold.

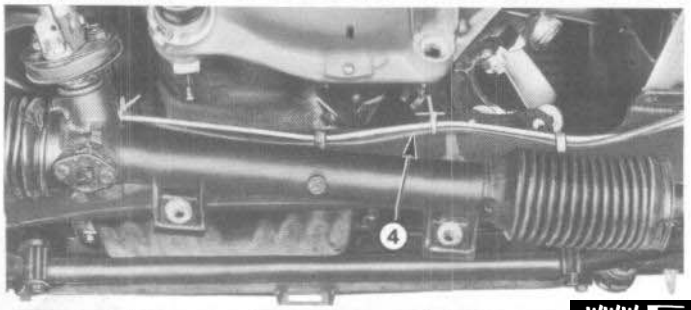
- Remove :
  - the flywheel protector plates,
  - the clutch housing bolts. — 10 mm allen



- Position the hoisting apparatus as shown opposite (locate the hooks in the holes marked " 404 ").

- Raise the apparatus until it is under load.

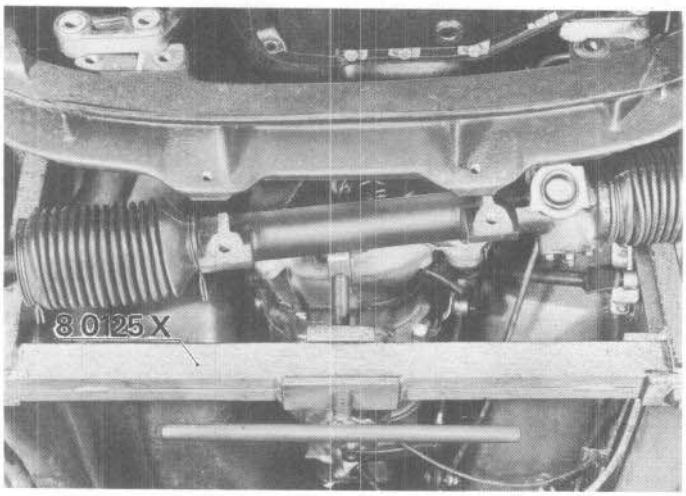




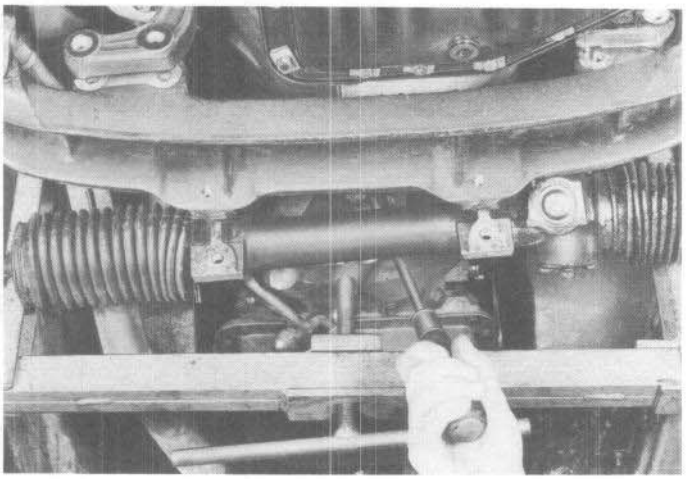
- Remove the four bolts securing the engine mountings to the crossmember.

WARNING - Make sure that the front L.H. brake line is hard up against the crossmember.

- Raise the engine until the gearbox abuts on the tunnel.



– Place the gearbox support bar under the gearbox and bring the centre bolt into contact with the housing.

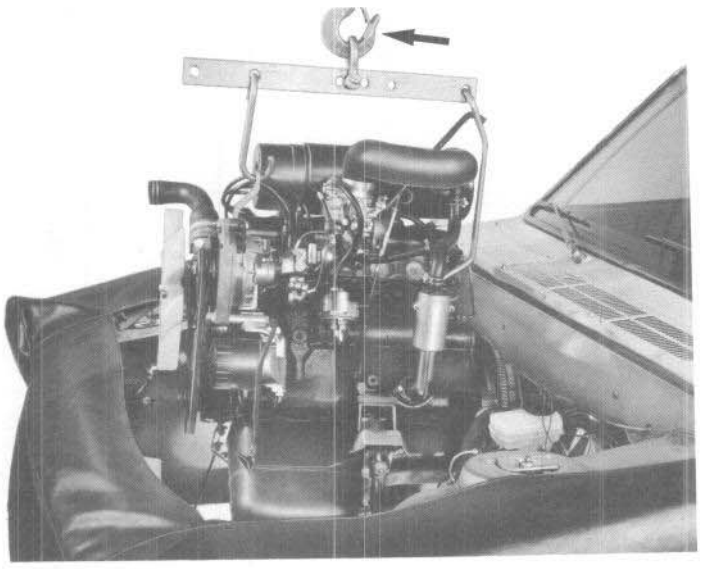


On 504 Automatic :

– Remove the 4 bolts securing the convertor to the flywheel.

– Disengage the convertor.

WARNING - Never remove the engine with the convertor ; make sure that the convertor remains attached to the transmission.



– Separate the engine from the gearbox without altering the position of the hoisting apparatus.

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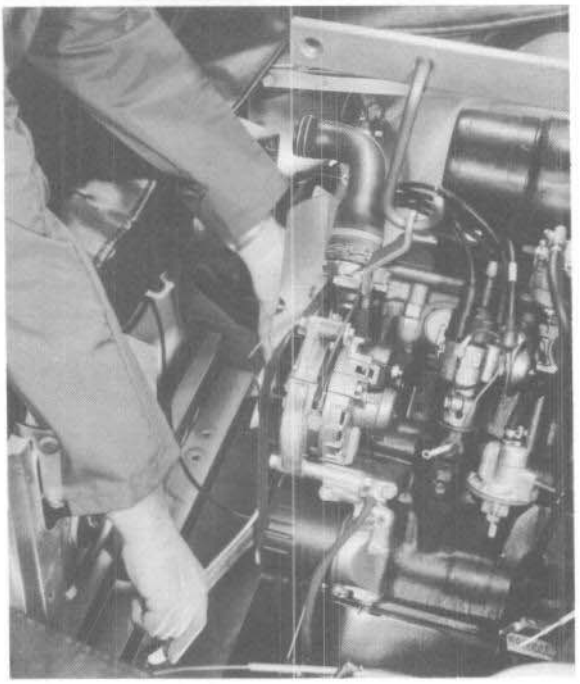
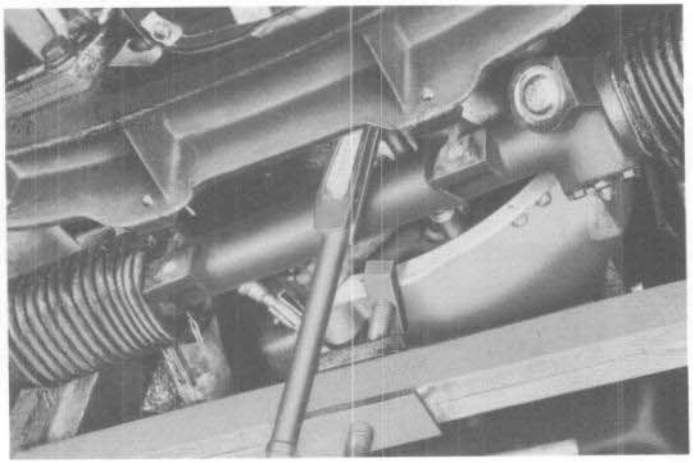


- Reinstallation is a reversal of the removal procedure.

- Particular points :

  - engage one of the gears (BA 7),

  - couple the engine to the gearbox by turning the flywheel to line the two components up exactly.



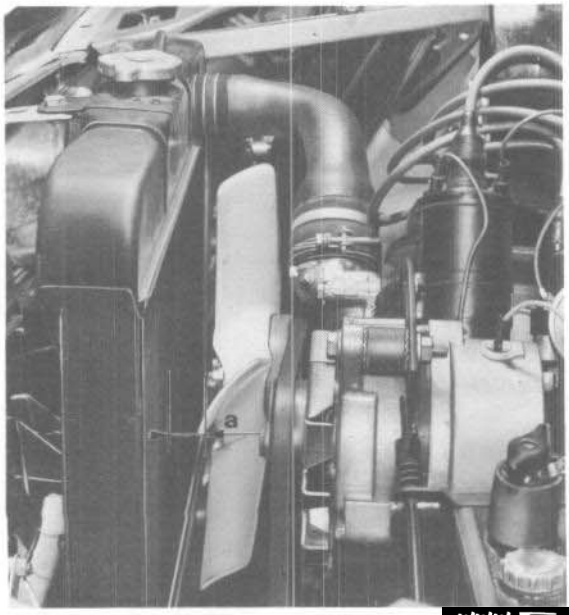
On 504 Automatic.

- Secure the convertor housing to the cylinder block.

- Bring one of the openings in the flywheel to the bottom.

- Rotate the convertor (using a screwdriver engaged in the cooling fins) to line up one of the threaded holes with the coupling plate on the flywheel.

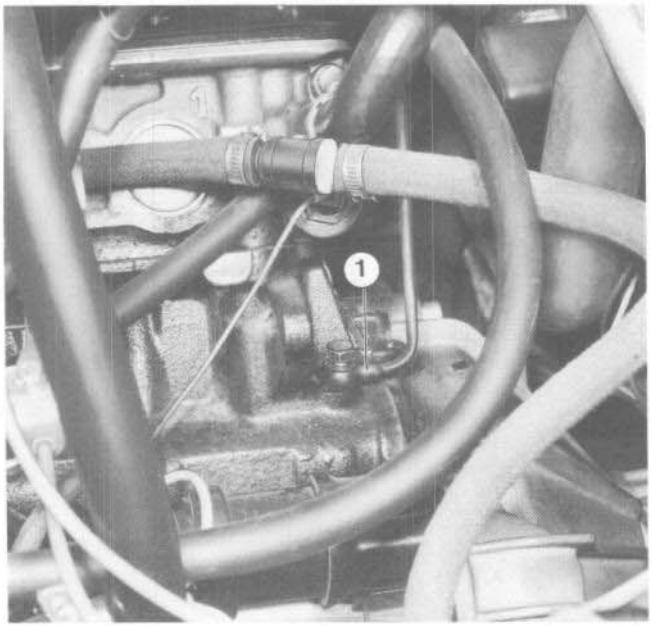
- Tighten the bolts to **2.25 m.kg (16 ft.lbs).**



- When fitting the radiator, respect the dimension **(a)** : 15 to 20 mm.

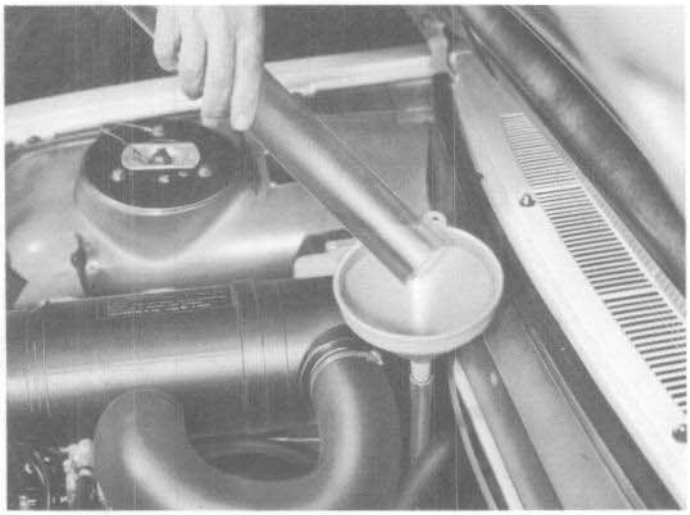
ENGINE

REINSTALLATION



– Before starting the engine :

- check the oil level and top up if necessary,
- slacken off the banjo **(1)**,
- with the engine being driven by the starter, the oil should flow freely.

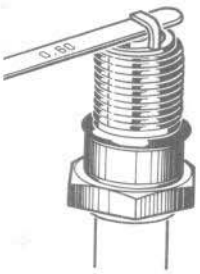


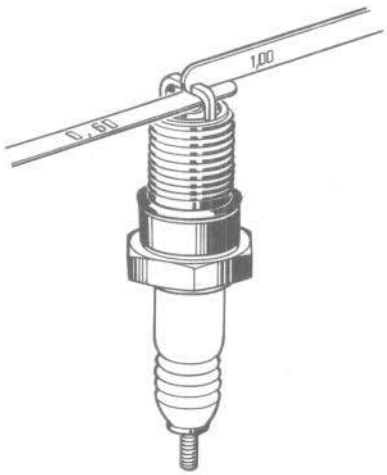
On 504 Automatic.

– Refill the transmission with the correct fluid.

In addition to checking and adjusting the ignition system, an engine tune-up may include the following operations :

- Compression check (page 0401)
- Valve clearance setting (page 0422)
- Oil pressure check (page 1401)
- Cleaning the carburettor, fuel pump and air filter (page 1211)
- Checking the cooling fan air gap (0.35 mm - 0.014")
- Adjusting the engine idling (page 1201 or 1211)





SPARK PLUGS

– Carburettor engines :

– For { XM - XM7 / XM and XN1 U.S. :
- Marchal 35 HS
- AC 44 XL
- Champion N9Y

– For : XN1
- Marchal 35 HS
- AC 44 XL
- Champion N7Y

Electrode gap : 0.6 mm (0.024")

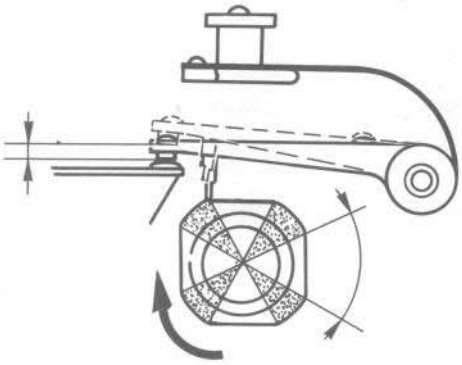
– Injection engines

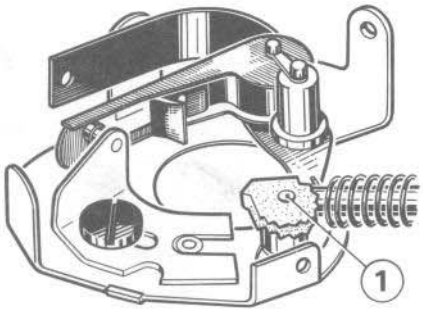
– For : XM KF6
- Marchal GT 34 HD
- Champion N6Y

Electrode gap : 0.5 mm (0.020")

– For : XM KF5 - XN2
- Marchal GT 34 HD
- AC 42 XL
- Champion N6Y

Electrode gap : 0.6 mm (0.024")





CHECKING THE DISTRIBUTOR

Dwell angle : 57° ± 2°

(Dwell percentage : 63 % ± 3 %)

which corresponds to a points gap of approximately 0.40 mm (0.016") except in the case of S.E.V. Marchal "cassette" points sets where the gap is approximately 0.30 mm (0.012").

NB - On Ducellier distributors, check the dwell angle :

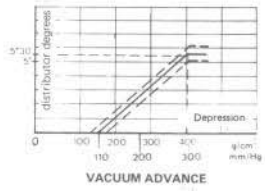
1 - *vacuum unit disconnected (atmospheric pressure)*

2 - vacuum unit submitted to a depression of 300 mm Hg.

The dwell angle must be the same in both cases. If it varies, correct by rotating the cam **(1)**.

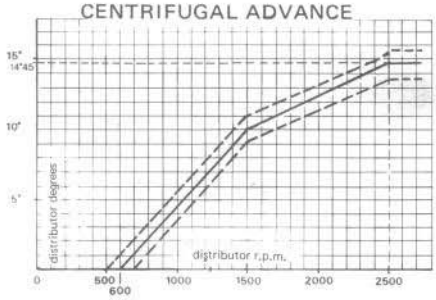
VACUUM ADVANCE

M 48



VACUUM ADVANCE

CENTRIFUGAL ADVANCE

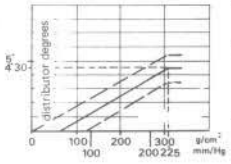


Advance curves :

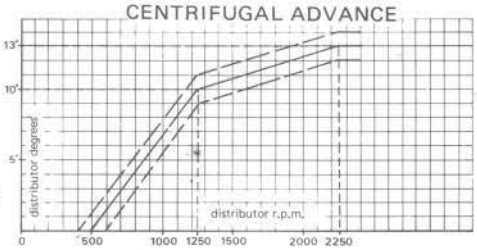
- 504 with carburettor engine
  - M 48 curve
- 504 with injection engine
  - M 53 curve

VACUUM ADVANCE

M 53

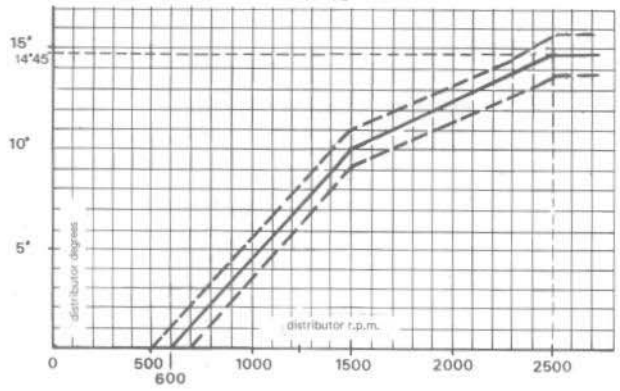


CENTRIFUGAL ADVANCE



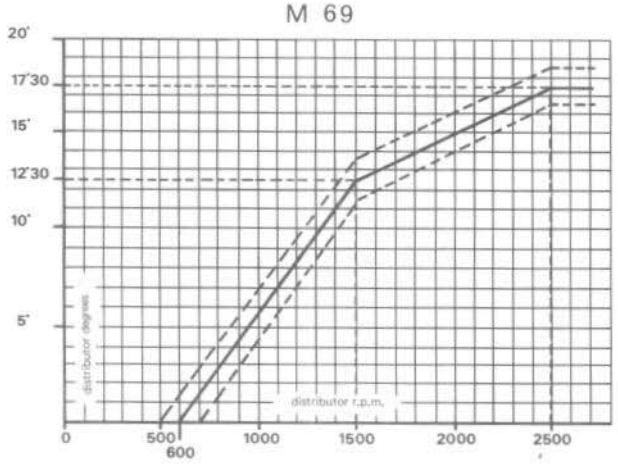
CENTRIFUGAL ADVANCE

M 48



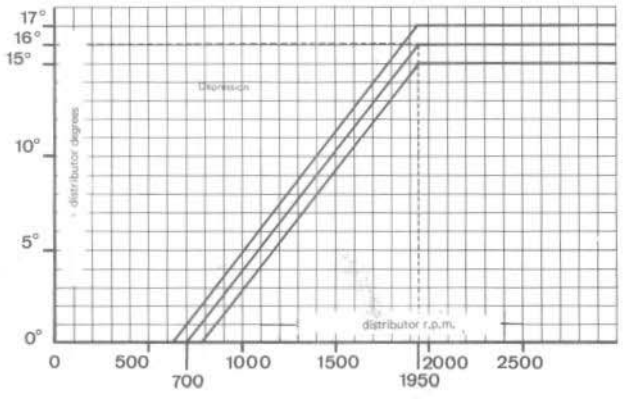
CENTRIFUGAL ADVANCE

M 69



CENTRIFUGAL ADVANCE

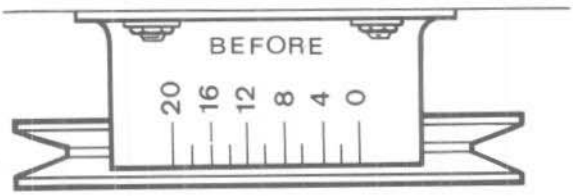
M 74



Advance curves :

The distributors fitted to 504 U.S. models have no vacuum advance correction.

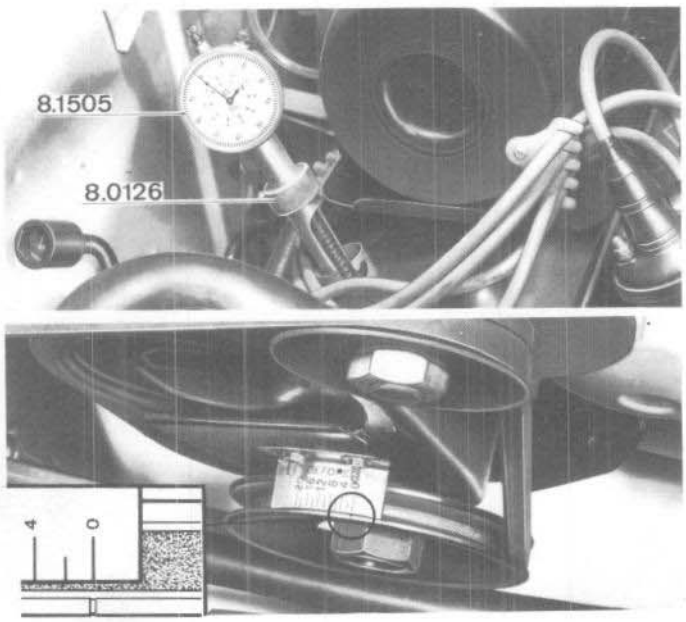
- 504 US "69 Standards"
  - M. 48 curve
- 504 US "70 and 71 Standards"
  - M 69 curve
- 504 US "72 and 73 Standards"
  - M 74 curve



SETTING THE TIMING PLATE

WARNING - Make sure that the timing plate has not moved.

If in doubt, check the setting and adjust as follows.



- **Position No. 4 piston at T.D.C.**

- **Move the timing plate to line the '0' up with the mark on the crankshaft pulley.**

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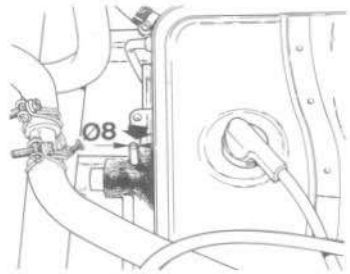
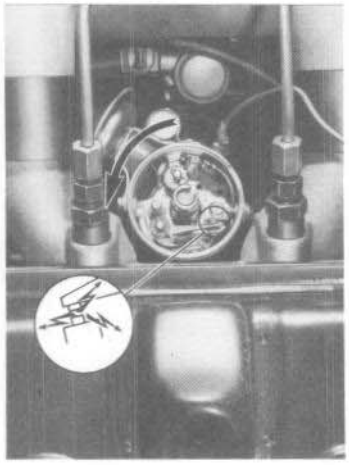




STATIC IGNITION TIMING

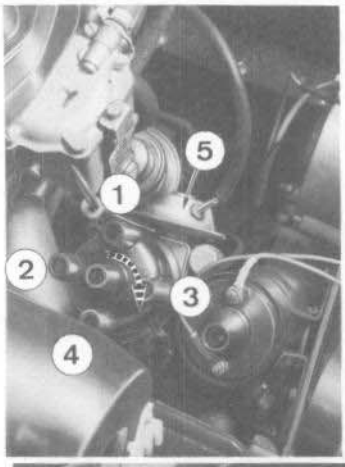
IGNITION TIMING WITH A STROBOSCOPE

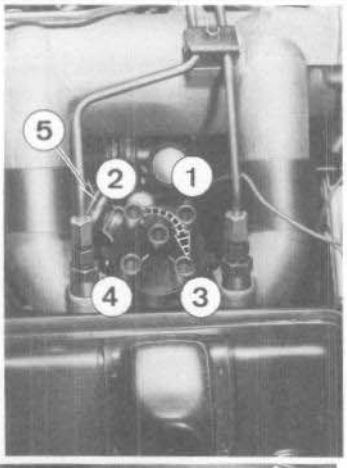
– **Dwell angle correct**

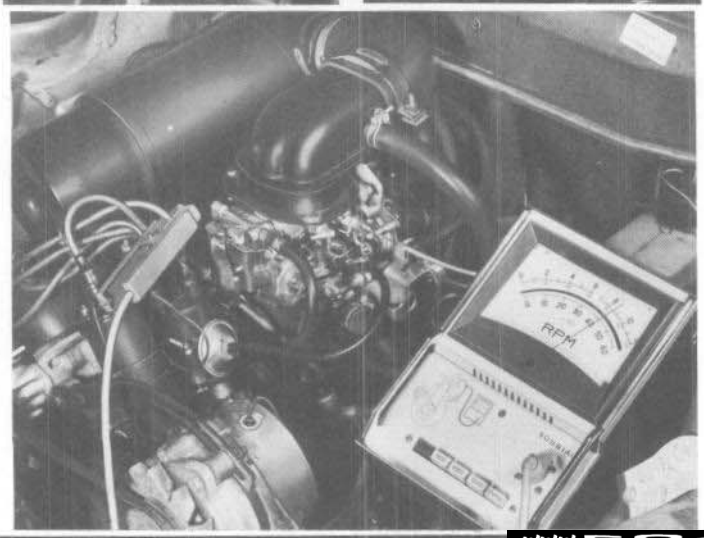
– **Timing plate set**

– **Set the distributor approximately**

- Find T.D.C. :
  (1) - with 8 mm diameter rod
  (2) - pulley mark lined up with the "0" on the plate.
- Position the distributor as shown :
  (3) - carburettor engine
  (4) - injection engine
- Connect up the low tension wire
- Switch on the ignition
- Rotate the distributor :
  - clockwise to fully close the points
  - anticlockwise until the points begin to open (spark visible between them).
- Lightly clamp the distributor.







– Fit the distributor cap and connect up the plug leads.

– **Disconnect the vacuum line from the unit 5 (where fitted) and seal off the nozzle**

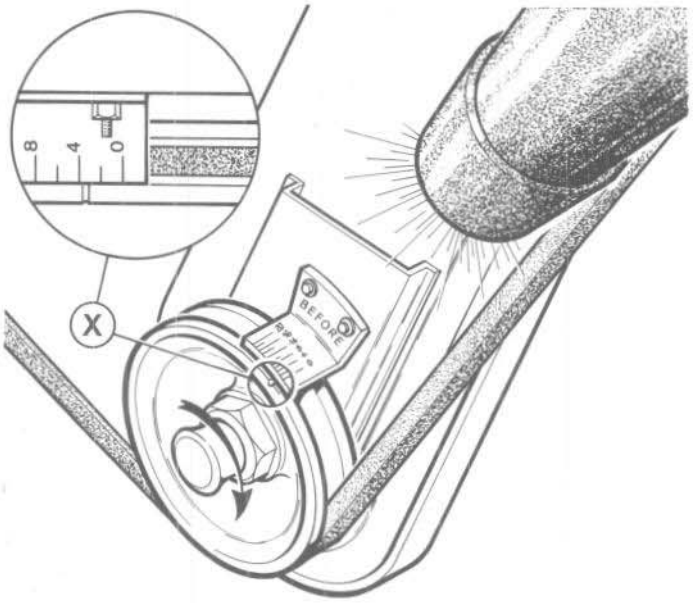
– Connect :

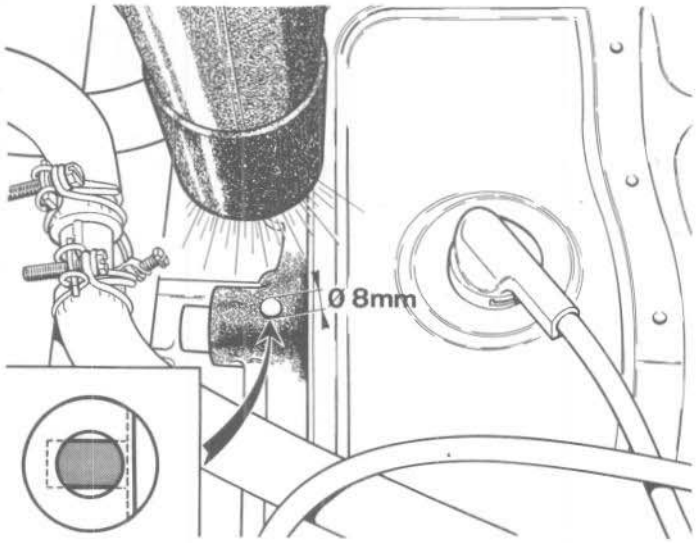
- a stroboscope lamp **with the sensor clamp on the coil HT lead.**
- a rev-counter.

– Start up the engine.

The engine speed must not exceed 850 r.p.m. during the setting.

– **Turn the dephaser needle to "0"**





– Point the stroboscope at the timing plate, holding it perpendicular to the plate.

– **Rotate the distributor until the :**

- **reference mark on the pulley is in line with the correct reference (X) on the timing plate.**

(X) = 0° for 504 US "71 Standards"

(X) = 5° B.T.D.C. on { XN1 - XN2 (11 CV) engines / 504 US "70, 72, 73 Standards"

(X) = 10° B.T.D.C. on { XM7 (10 CV) engines / 504 US "69 Standards"

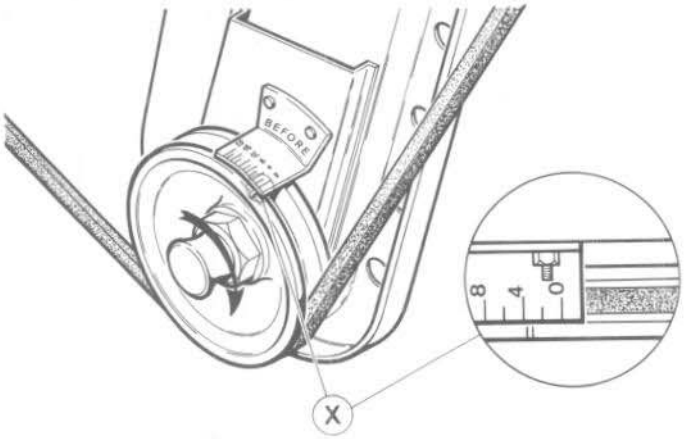
- **or , on engines with no timing plate : until the mark on the flywheel is apparent in the 8 mm hole in the clutch housing.**

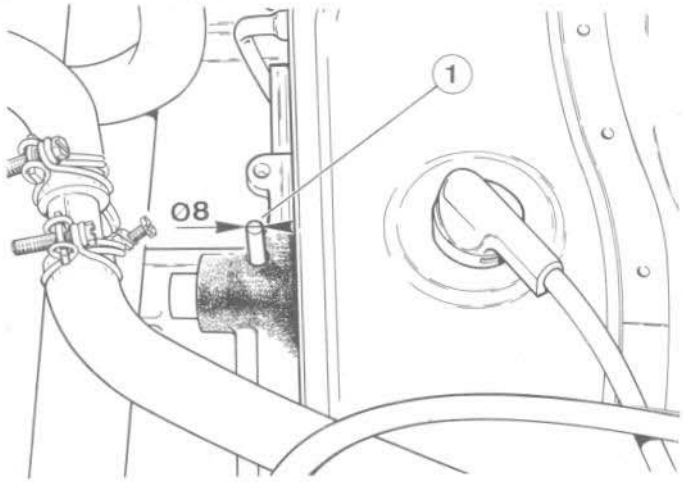
– Tighten the distributor clamp

– Check :

- the engine speed
- the dephaser (on zero)
- the lining up of the timing marks.

– **Reconncet the vacuum line (where vacuum unit is fitted).**





IGNITION TIMING WITH A TEST LAMP

– Dwell angle correct

– Timing plate set

1 - Engines fitted with a timing plate

– **Rotate the crankshaft clockwise until the mark on the pulley is in line with the graduation on the timing plate (X).**

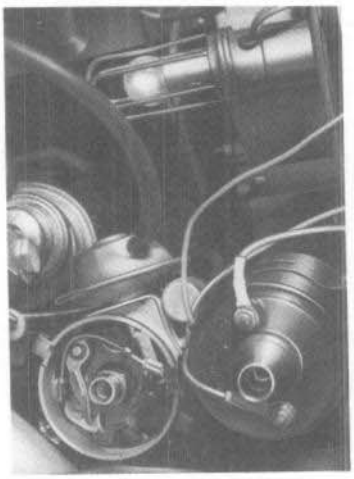
(X) = 0° for 504 US "71 Standards"

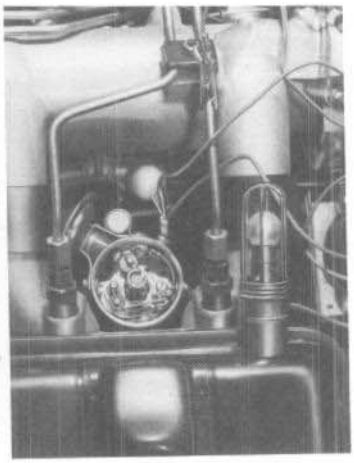
(X) = 5° B.T.D.C. { for XN1-XN2 (11 CV) engines / for 504 US "70, 72, 73 Standards"

(X) = 10° B.T.D.C. { for XM7 (10 CV) engines / for 504 US "69 Standards"

2 - Engines with no timing plate

– **Rotate the crankshaft clockwise until the 8 mm rod engages in the flywheel.**





– Position the distributor as shown opposite

– Connect :
- the low tension wire
- a test lamp (5W bulb)

– Switch on the ignition

– **Rotate the distributor**
- **clockwise**
- **anticlockwise until the light comes on, while holding the rotor arm "fully retarded".**

– Tighten the distributor clamp

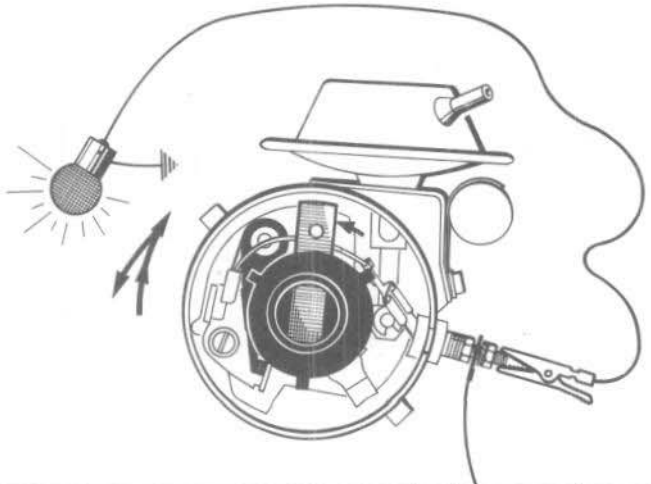
– **Check, by turning the crankshaft clockwise :**

- the light must come on :
1 - when the pulley reference is in line with the graduation **(X)** on the timing plate

2 - when the 8 mm rod engages in the flywheel

– **Remove the rod and the test lamp**

– Fit the distributor cap and connect up the HT leads



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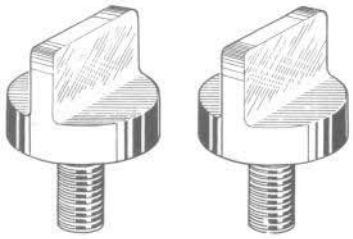
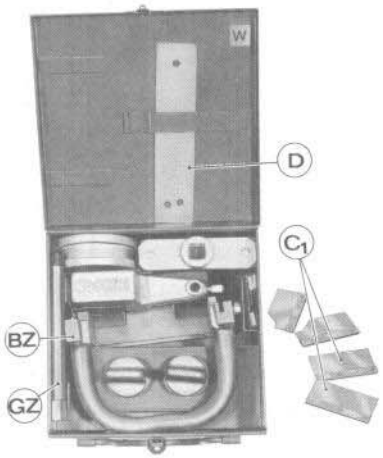


TOOLS TO BE USED

8.0104 D

– Set of 2 cylinder liner retaining screws.



8.0110 W

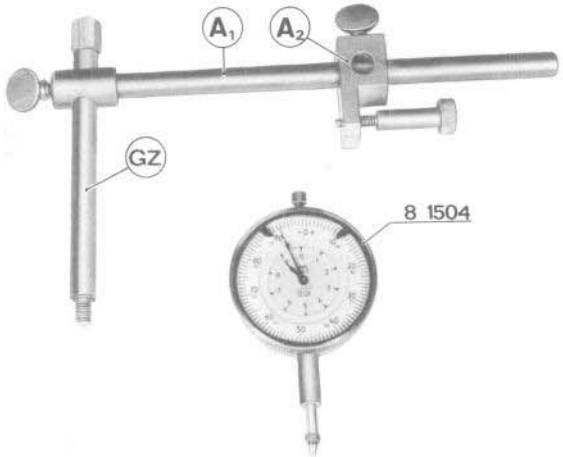
Engine tool chest.

BZ - Apparatus for fitting rear bearing cap seals.

C1 - Diverse shim plates.

D - 0.5 mm gauge.

GZ - Dial indicator support (with Ø 7 mm x 100 pitch threading).



– Apparatus for checking crankshaft end float consisting of :

8.0110 GZ - Dial gauge support.

8.0504 { **A1** - Support rod
A2 - Support.

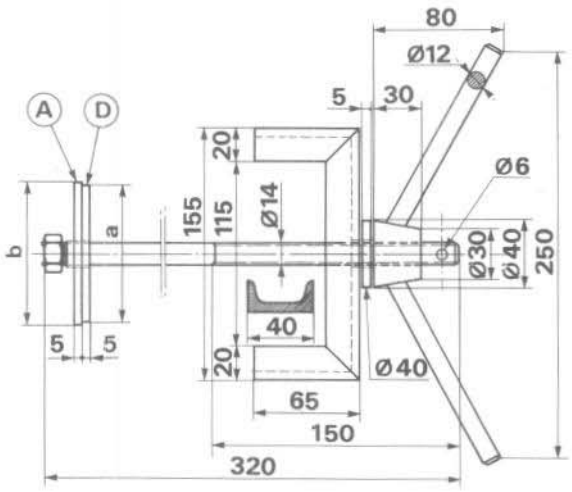
8.1504 - Dial gauge.

8.0207

– Clutch plate centering tool.

ENGINE

DISMANTLING - REASSEMBLY



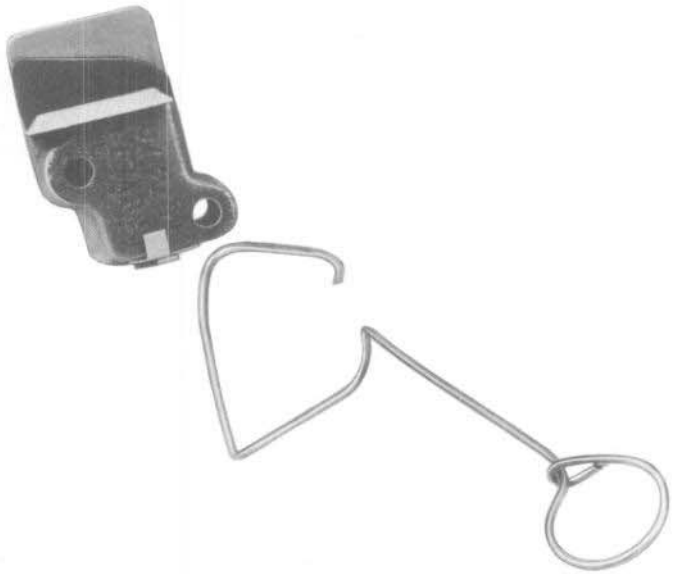
TOOLS TO BE REALISED

0.0101

Cylinder liner extractor :

A - for XM engines
Ø a = 83.5 mm
Ø b = 88 mm.

D - for XN 1 - XN 2 engines
Ø a = 87.5 mm
Ø b = 92 mm.

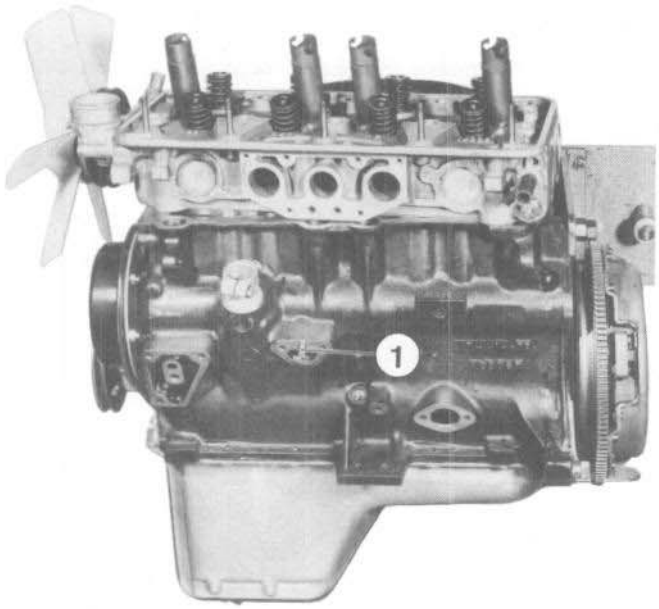


0.0137

– Chain tensioner retaining tool for KF 6 - KF 5 and XN 2.
(Ø 2 mm piano wire).

RECOMMENDED TOOLS

Tool	Make
Piston ring clamp	Muller 582 bis T Height = 80 mm
Engine supports	Desvil
Connecting rod twist checking tool	Muller 519 T



If the liners and pistons are to be replaced, the engine must be removed.

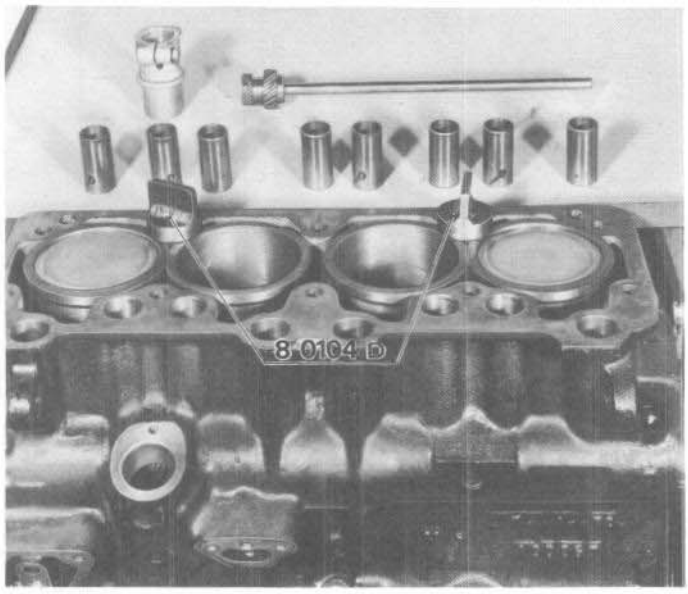
– Drain off the engine oil.

– Strip the engine to the extent shown opposite.
- withdraw the petrol pump plunger **(1).**

– On XM/KF and XN 2 engines : remove the injection equipment (see pages 13).

– Remove the cylinder head.

WARNING - Pivot the cylinder head so as not to disturb the liners when removing it.



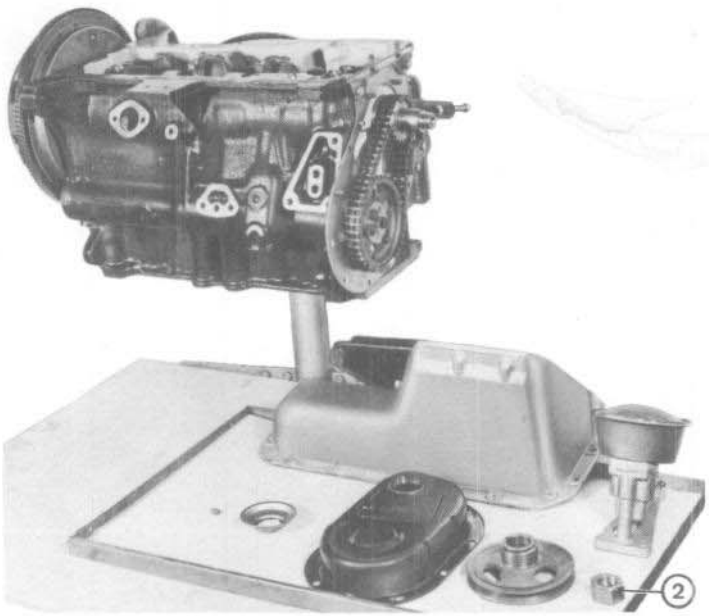
– Secure the liners, using the screws **8.0104 D.**

– Remove :

- the cam followers and **set them aside in the order of removal.**

- the distributor support,

- the distributor drive rod.



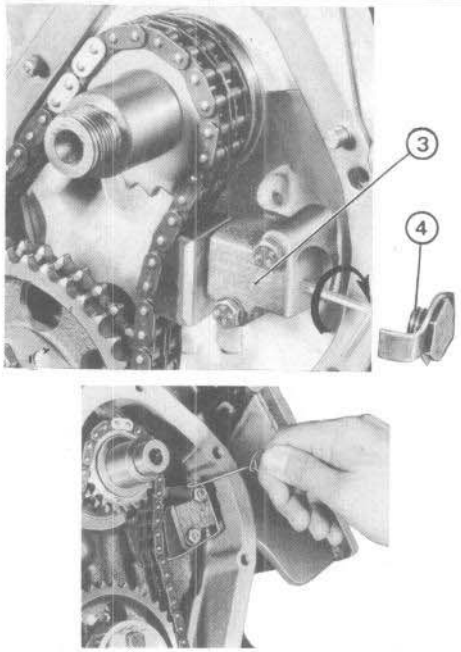
– Remove :

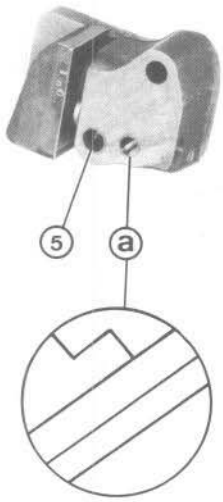
- the oil sump and oil pump,

- the timing housing
(place a block of wood between the crankshaft and cylinder block, in order to lock the crankshaft to remove the pulley nut **(2).**

ENGINE

DISMANTLING





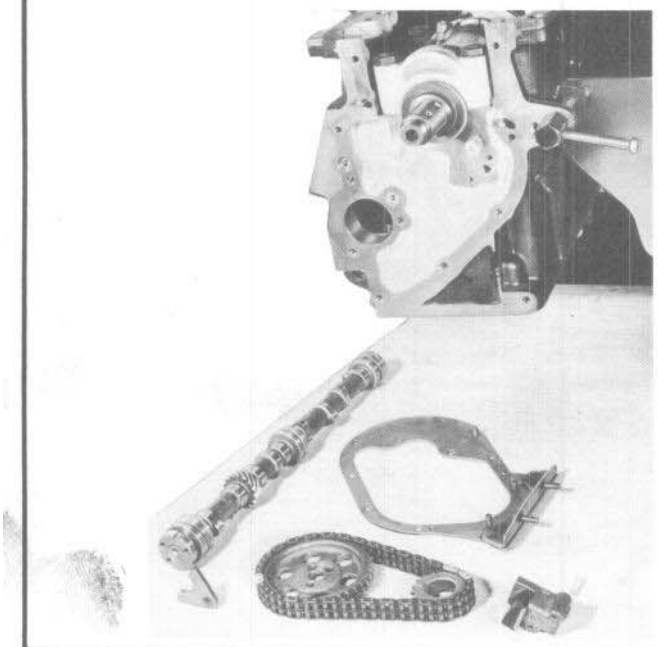
– **Neutralise the spring action** by locking the pad.

Renold tensioner **(3).**

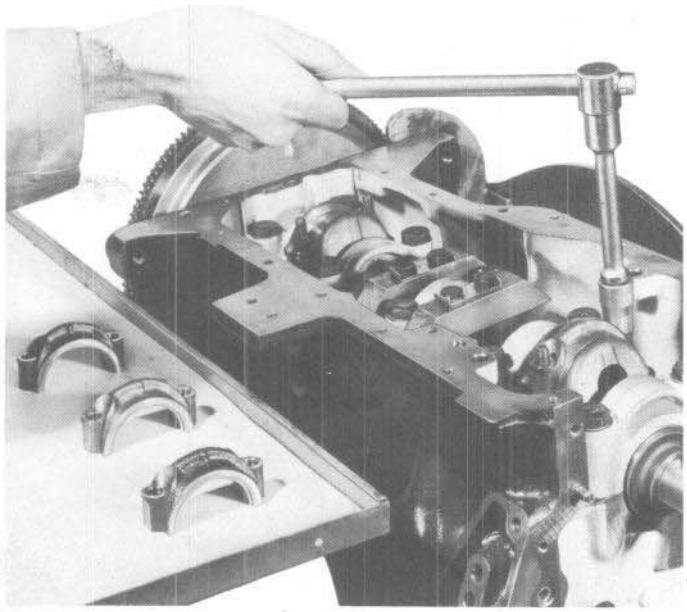
On XM - XM 7 and XN 1 engines :
- Remove the plug **(4).**
- Turn the arming screw clockwise (3 mm allen key).

On KF 6 - KF 5 and XN 2 engines
- Use the pad retaining key.

Sedis tensioner **(5).**
- Turn the ratchet screw **(a)** anticlockwise.



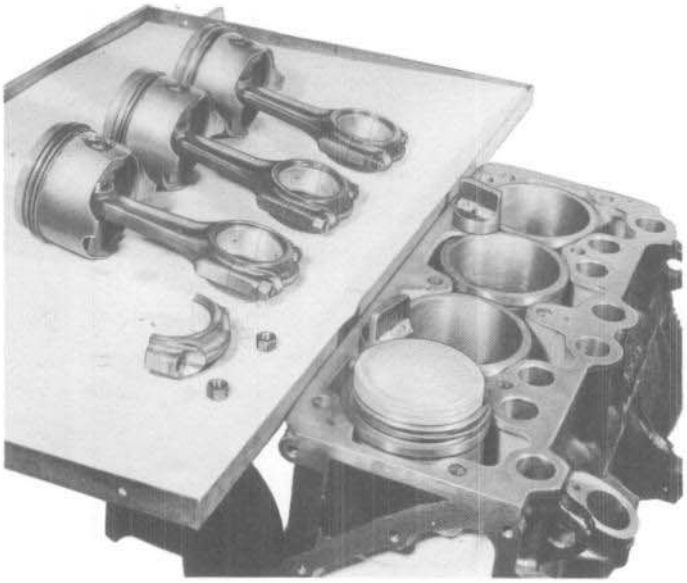
– Remove the timing drive components.



– Remove the big end bearing caps.

– Remove the bearing shells.

– Place the caps on the bench in their order of removal.

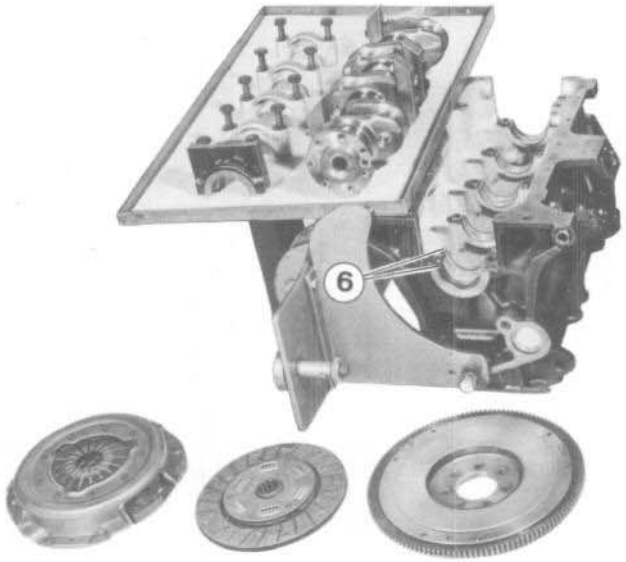


– Remove the pistons/connecting rods.

– Remove the bearing shells.

– Assemble the connecting rods and their end caps.

– **Mark the rods 1 to 4.**



– Mark the position of the clutch mechanism in relation to the flywheel and remove the mechanism.

– Remove :

- the flywheel,

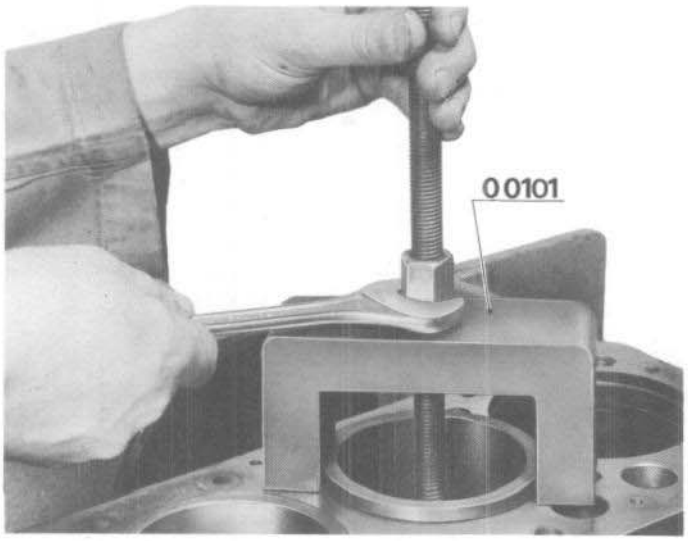
- the crankshaft.

– Recover the half thrust washers **(6).**

WARNING

XM/ZF - XM 7 - XN 1 and XN 2 engines are also fitted with two thrust washers in the rear main bearing cap.

- remove the main bearing shells.



– Remove the cylinder liners, using the extractor **0.0101** if necessary.

WARNING - The cylinder block must **never** be skimmed.

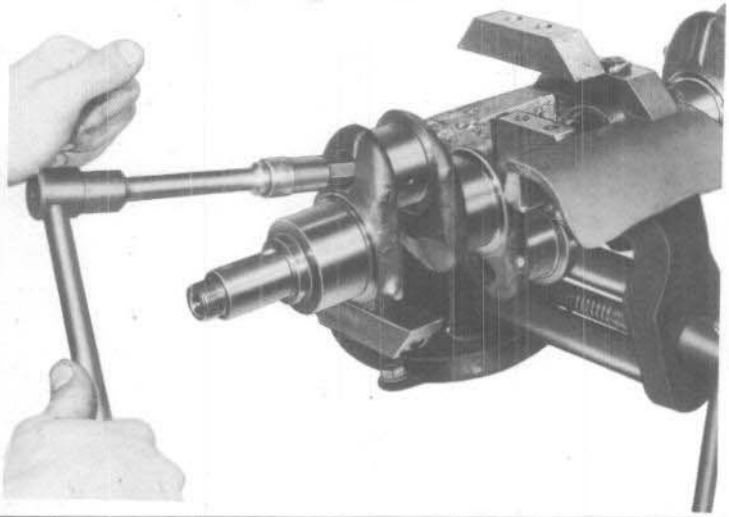
ENGINE

DISMANTLING

Connecting rods - pistons.

- Remove :
  - the gudgeon pin circlips;
  - the gudgeon pins.

- Check the connecting rods :
  - for twist or distortion using the Muller 519 T apparatus.

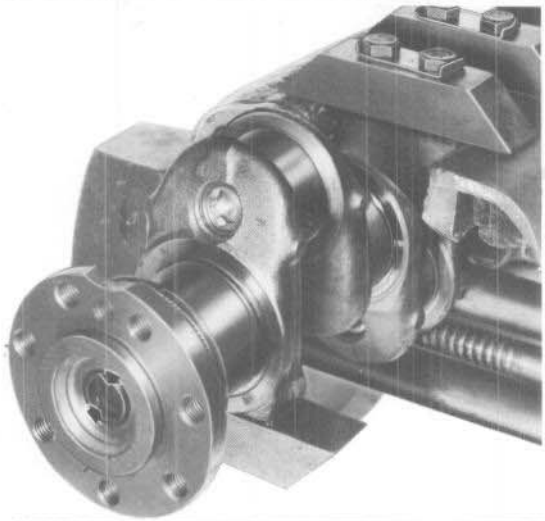


Crankshaft.

- Remove the sludge trap plugs.

- Clean the oil galleries out thoroughly.

- If the counterweights are to be removed, mark them precisely before removing them.



- If the centering bush is worn, remove it and its seal (see class 2).

WARNING - This bush is self lubricating and, in order to retain these properties, it must never be washed in petrol or carbon tetrachloride.

Lubricate it with engine oil.

CRANKSHAFT REGRIND SIZES :

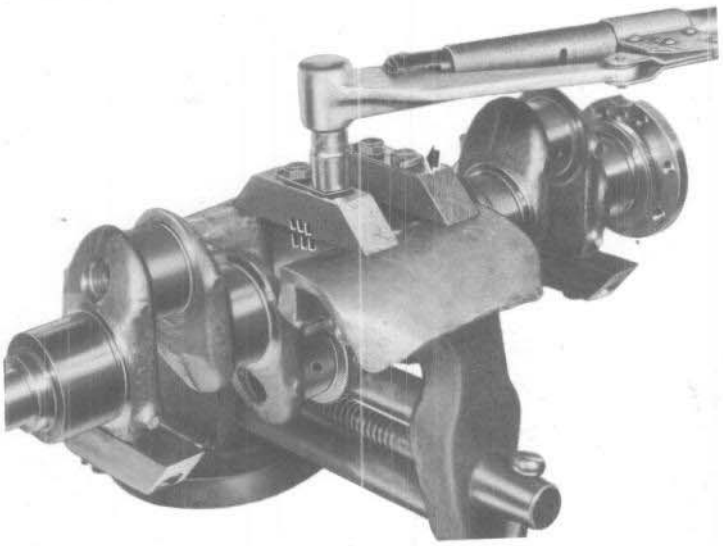
Bearing	Original diameter (in mm)	Regrind diameter (-0.30 mm)
Rear journal	54.905 to 54.980	54.605 to 54.620
Int. rear journal	56.140 to 56.165	55.850 to 55.865
Centre journal	57.174 to 57 189	56.874 to 56.889
Int. front journal	58.548 to 58.573	58.258 to 58.273
Front journal	59.401 to 59.416	59.104 to 59.116
* Crankpins	49.984 to 50	49.675 to 49.691

* Only the crankpins can be reground on XM - XMKF6 - XMKF5 engines.

PREPARATION

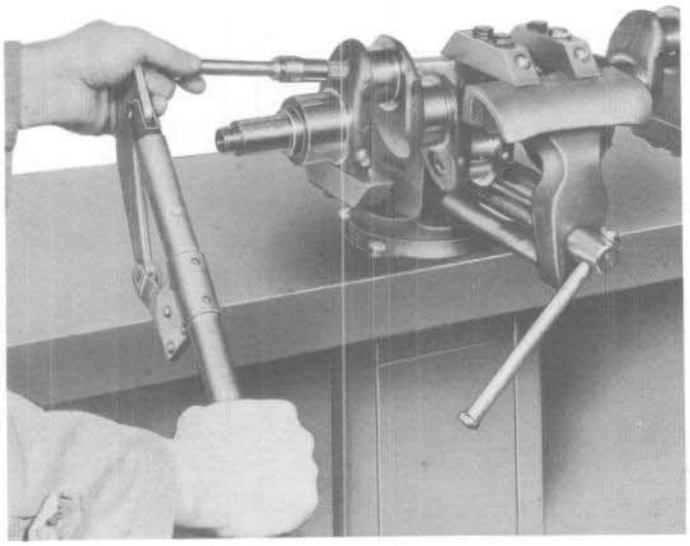
- **Only parts which are perfectly clean and free from defect are to be used.**
- **Use MAGSTRIP to clean the mating faces**
  - wear protective gloves
  - spread the MAGSTRIP using a brush ; leave it to dry for ten minutes

  Then remove the deposit with a plastic or wood scraper.
- Lubricate all moving parts during assembly with engine oil.

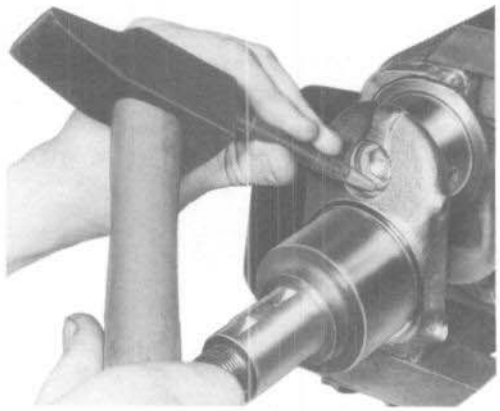


Crankshaft.

- Fit the counterweights respecting the marks made when dismantling.
  - tighten the bolts to **6.75 m.kg (49 ft.lbs),**
  - bend up the tab washers around the bolt heads.



- Screw a Ø 24 x 150 finishing tap into the sludge trap plug holes (10 mm maximum).
- Fit **new** plugs after smearing them with sealing compound
  - tighten them to **5.5 m.kg (40 ft.lbs).**
  - lock them with a centre punch.

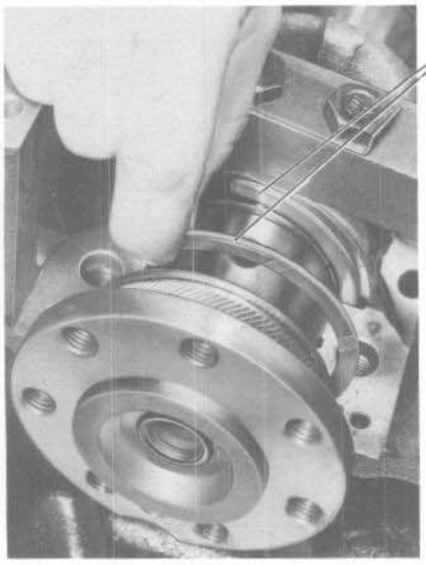


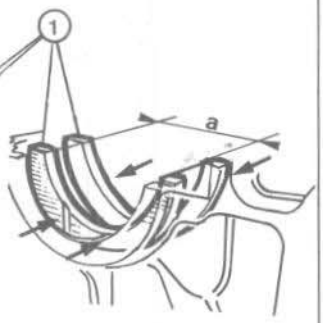
N.B. - *Refit the centering bush and its seal (see class 2).*

- *Lubricate it with engine oil.*

ENGINE

REASSEMBLY





– Insert the main bearing half shells :
  - original size : e = 1.082 to 1.888 mm
  - oversize* : e = 2.032 to 2.038 mm
  * (to be fitted on XN1 and XN2 engines with reground crankshaft)

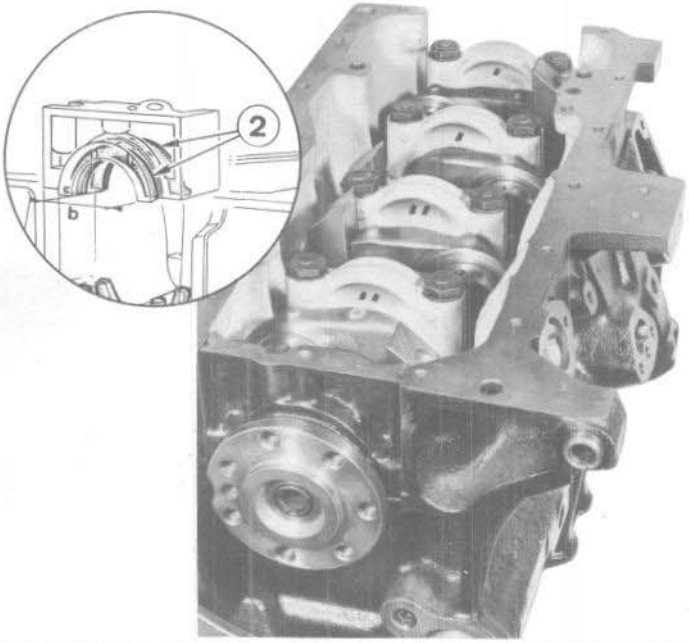
– Install the crankshaft carefully.

– Insert the thrust washers **(1)** which were fitted originally (lubrication grooves facing the crankshaft) : 2.3 mm thick.

WARNING

On XN1 - XN2 and XM7 engines, the diameter of the rear main bearing is 54.92 mm in place of 51.18 mm.

*Consequently the appropriate bearing shells and thrust washers (***(a)** *: 61.5 mm) must be fitted.*



WARNING

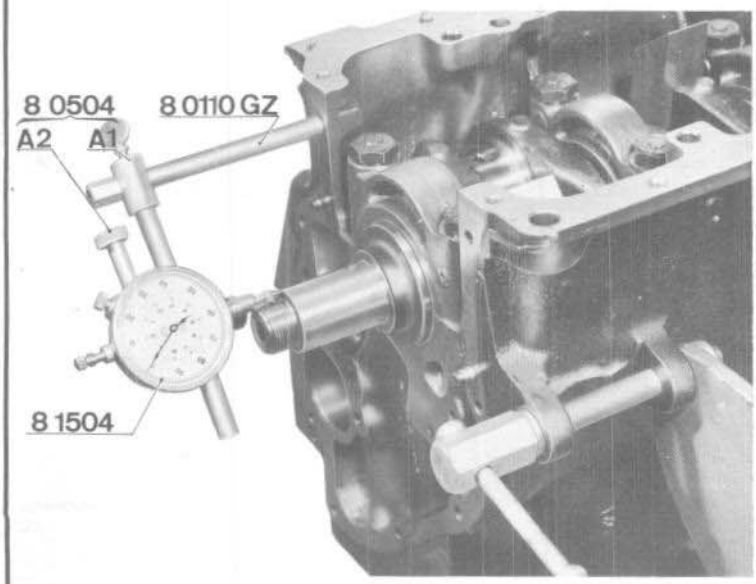
*On XM/ZF - XM7 - XN1 and XN2 engines : fit a 2.3 mm thrust washer** **(2)** *on each side of the rear bearing cap with the lubrication grooves facing the crankshaft.*

* XM/ZF : b = 58 mm – XM7 - XN1 - XN2 : b = 61.5 mm

– Fit :
  - the bearing caps, with their shells in place, as shown opposite,
  - the rear bearing cap, without lateral seals.

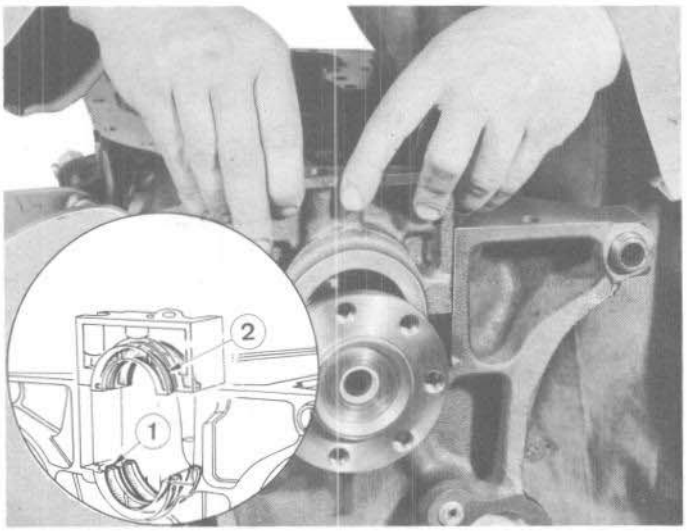
– **Tighten the 10 bolts, fitted with new Onduflex washers, to 7.5 m.kg (55 ft. lbs).**

– **The crankshaft should rotate freely.**



– Fit the end float checking assembly as shown opposite.

– **Note the amount of end float, which must be between 0.08 mm and 0.20 mm.**



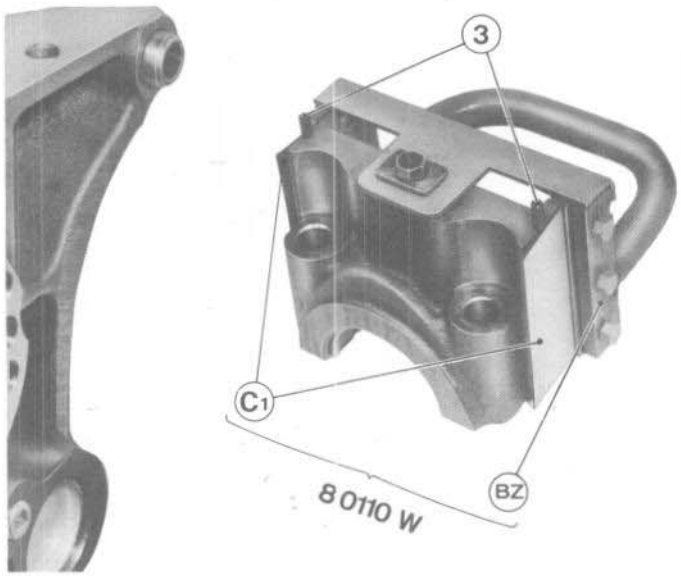
– **If the end float exceeds 0.2 mm :**

- on XM engine : replace the thrust washer **(1)**,

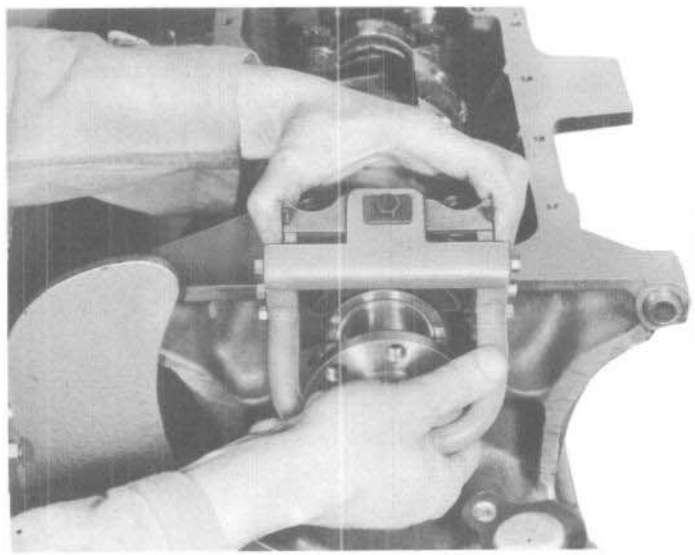
- on XM/ZF - XM7 - XN1 and XN2 : replace the thrust washers **(1)** and **(2)** on the rear of the bearing using one of the oversize washers.

Oversize washers : thickness available :

2.40 mm – 2.45 mm – 2.50 mm.

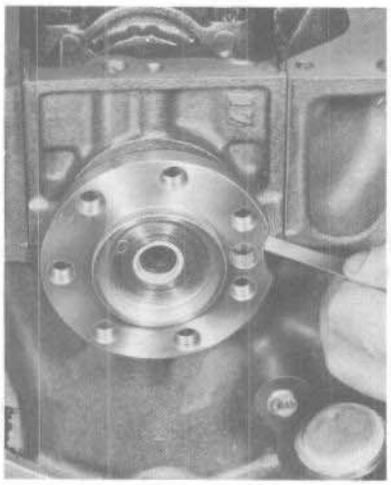


– Install the lateral seals **(3)** on the bearing cap and hold them in place using the apparatus **8.0110 W,** as shown opposite.



– After lubricating, tighten the shim plates by hand and engage the assembly in the cylinder block at an angle.

– Straighten up the cap and position correctly.

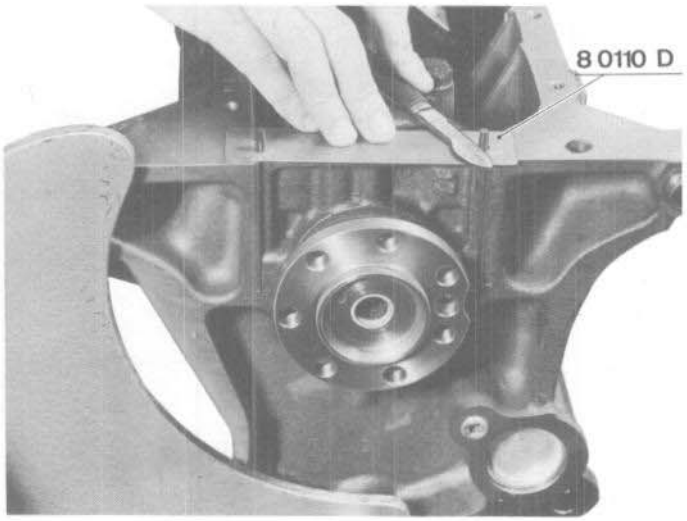


– Fit the bolts.

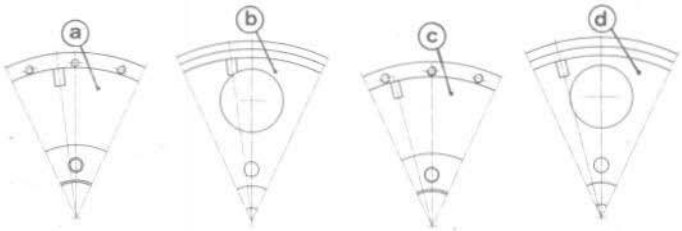
– Withdraw the apparatus.

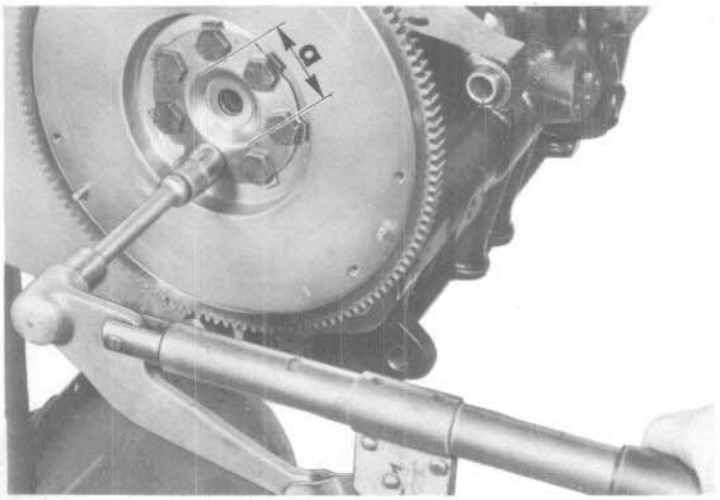
– Tighten the bolts to **7.5 m.kg (55 ft.lbs).**

– Using a 0.05 mm feeler gauge, check that the cap is bearing on the block.



– Cut the lateral seals off at 0.5 mm from the block using the gauge **8.0110** as a guide.





Flywheel - Clutch

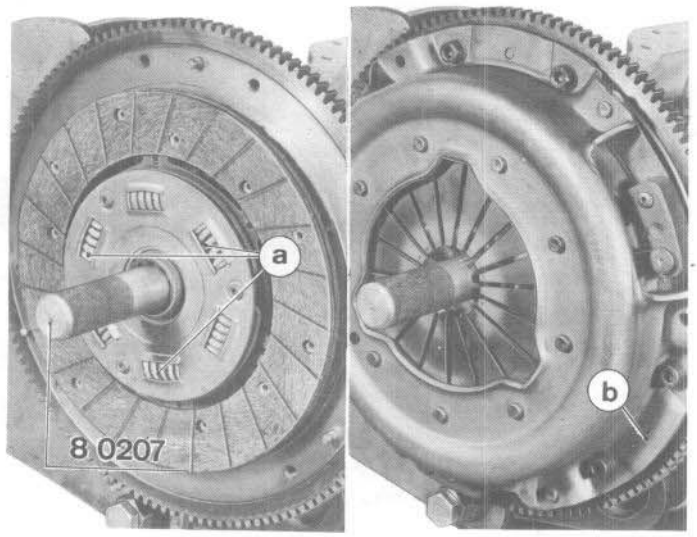
WARNING

In the event of replacement of the flywheel :

– *on XM - XM 7 with 10° ignition advance :*
  - *flywheel* **(a)** *for BA 7 gearbox,*
  - *flywheel* **(b)** *for ZF transmission.*

– *on XN 1 - XN 2 with 5° ignition advance.*
  - *flywheel* **(c)** *for BA 7 gearbox*
  - *flywheel* **(d)** *for ZF transmission.*

– Fit the flywheel :
  - use a new tab washer (Ø **(a)** = 44 mm),
  - **tighten the bolts to 6.75 m.kg (49 ft.lbs),**
  - bend the tabs up around the bolt heads.



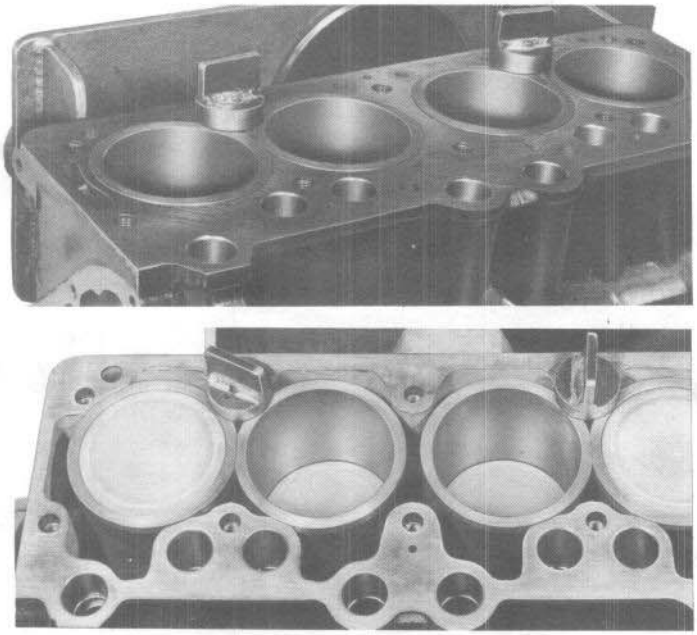
– Locate the clutch plate as shown opposite and centre it.

WARNING

On XN1 and XN2 engines :
- a plate with 3 grey springs and 3 mauve springs **(a)**,
- a mechanism rated at 450 kg **(b), must** *be used.*

– Fit the mechanism, lining up the marks made while dismantling.

– Tighten the bolts, fitted with **new** Onduflex washers, to **1.5 m.kg (11 ft.lbs).**



Cylinder liners - pistons.

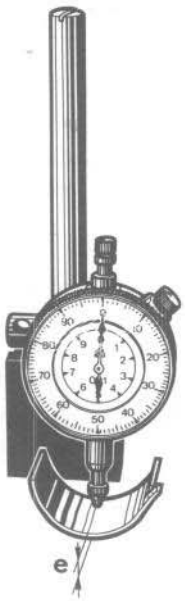
– Fit the liners, following the mothod indicated on page 06 01 to 06 05, class 1.

Connecting rods.

– Big end shells :

- original size : e = 1.812 to 1.818
- oversize * : e = 1.962 to 1.968

* (to be fitted when crankpins have been reground).



WARNING - If new liners and pistons are being fitted, respect the pairing of :
- the liners/pistons,
- the pistons/gudgeon pins.

– **Position the piston with the mark "AV" at right angles to the oil thrower on the rod as shown opposite.**

– Fit the pistons to the rods by hand.

N.B. - *It may be necessary to heat the pistons in boiling water in order to fit the gudgeon pins.*

– Fit the snap rings **(4).**

ENGINE

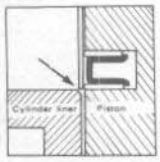
REASSEMBLY

– **Fit the " Perfect-Circle " oil scraper as shown opposite (gaps at 20 to 50 mm from the centre of the gudgeon pin hole).**

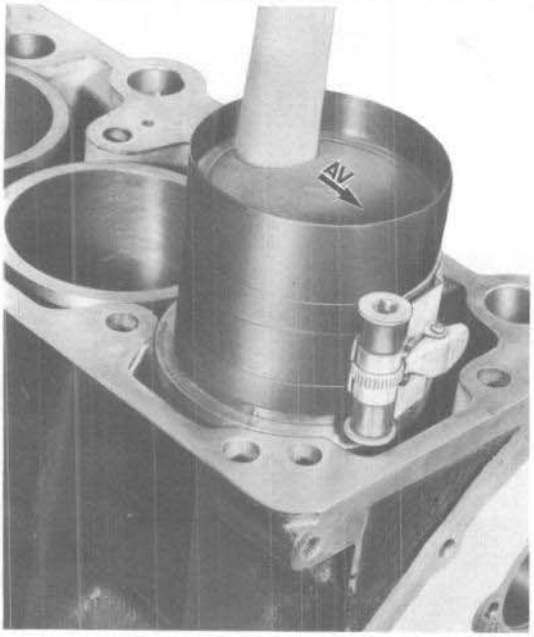
– Fit the remaining piston rings with the gaps at approximately 120° from the gap **(a)** in the expander ring.

N.B. - *Never alter the length of the expander.*

- *The mark on the piston rings must be facing the crown of the piston.*



Correct assembly

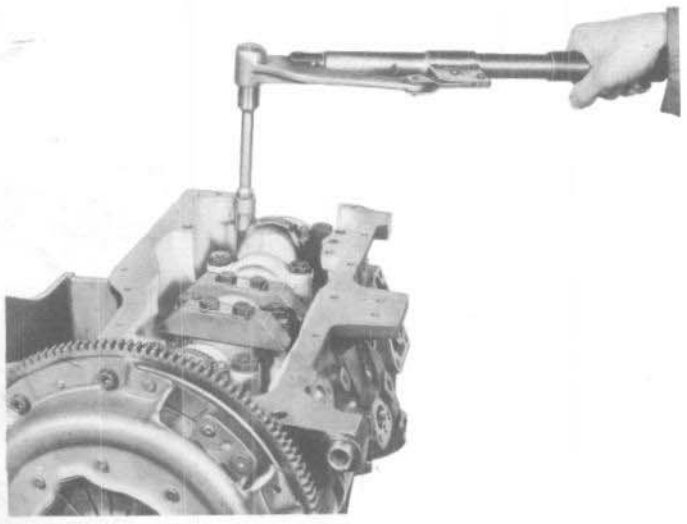


– Fit the piston ring clamp on the piston.

– **Insert the piston/rod assembly, without turning it, making sure that :**

- **the arrow is facing the front of the engine,**

- **the order " 1-2-3-4 ", marked during dismantling is respected.**

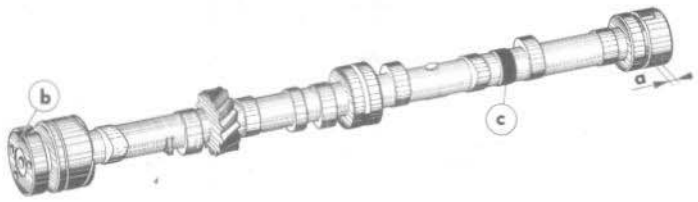


– Whilst pushing the piston down, guide the big end onto the crank pin.

– Assemble each big end as the rod is fitted.

– **Tighten the new nuts to 4 m.kg (29 ft.lbs).**

N.B. - *The marks on the rod and the cap must be on the same side.*



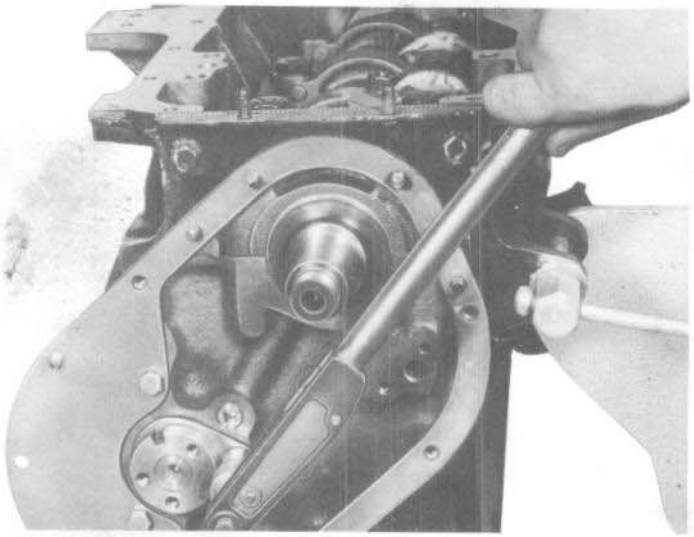
Timing

– Fit the camshaft.

WARNING

On some XM engine camshafts, the groove **(a)** *is 8 mm wide instead of 5 mm to ensure correct lubrication of the rocker assembly.*

Camshafts with the reference XN 1 or XN 2 at **(b)** *(with the boss* **(c)***) can be fitted on XM - KF 6 or KF 5 engines on condition that black valve springs are fitted.*



On 504 U.S. models :

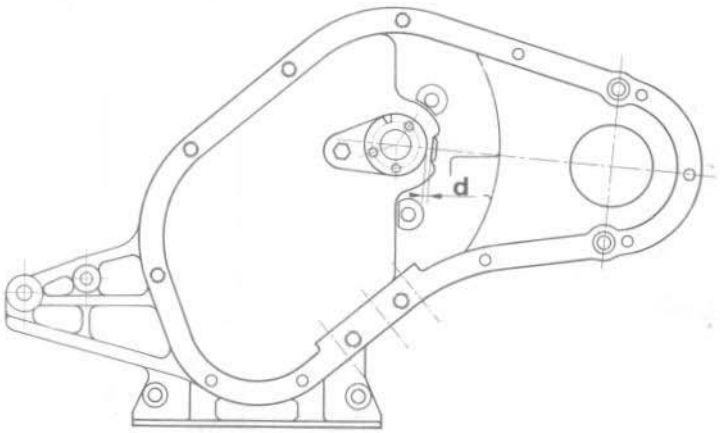
– The camshaft marked AP or US at **(b)**, is to be used for 69, 70, 71 and 72 models (Emission control standards) and yellow valve springs are to be fitted

– The camshaft marked XN1 at **(b)** and with a shoulder at **(c)**, is to be used for 73 models and black valve springs are to be fitted.

– Tighten the retaining plate to 1.7 m.kg (12 ft.lbs).

– Install :

- the paper gasket
- the steel plate



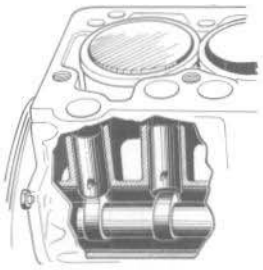
KF 6 - KF 5 and XN 2 engines.

– When securing the timing housing, the gap **(d)** of 0.55 mm (or 2.5 mm, depending on the housing) between the boss and the camshaft end must be respected.

– Install and set the timing gear (see page 10 01 to 10 07, class 1).

ENGINE

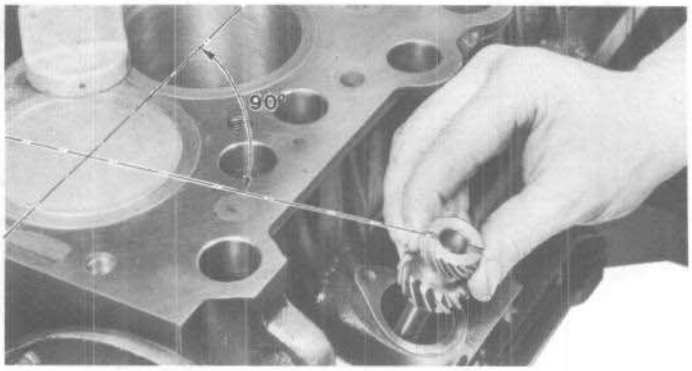
REASSEMBLY

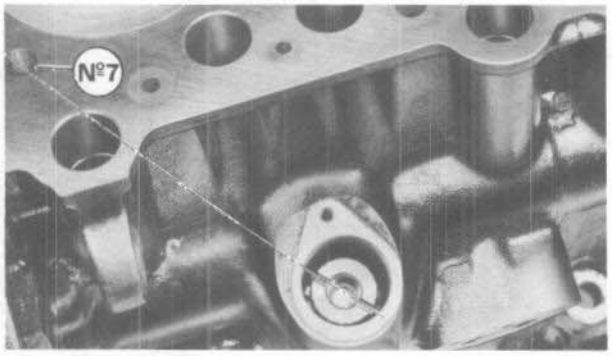


Distributor/Oil pump drive rod.

To install the drive rod correctly :

– **Position N° 1 piston at T.D.C.** (firing stroke).

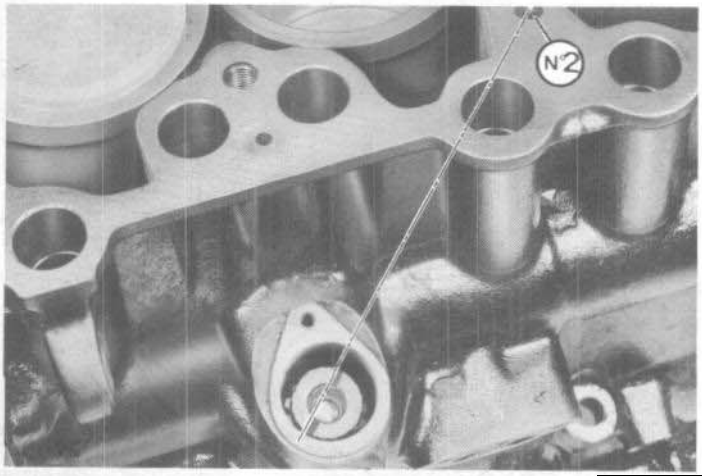




XM and XM 7 engines.

– Present the distributor drive as shown opposite (large side facing the fly wheel, the slot at right angles to the engine).

– When fully engaged, the slot should be more or less in line with the cylinder head bolt hole N° 7.

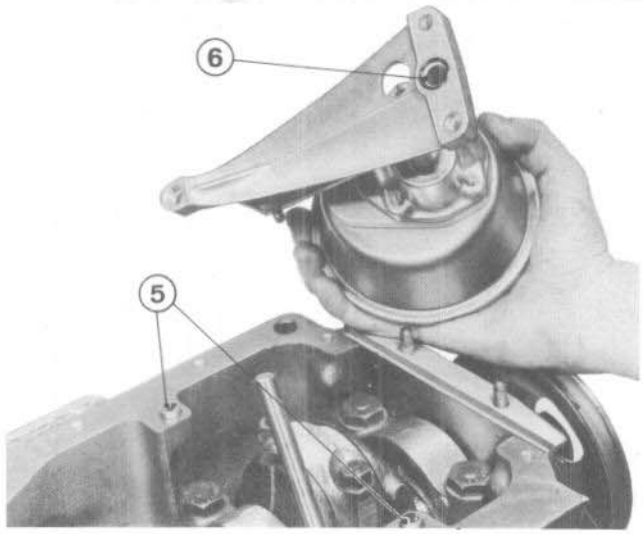


KF 6 - KF 5 - XN 1 and XN 2.

– Present the distributor drive as shown opposite (large side facing away from the block, the slot parallel to the cylinder block).

– When fully engaged, the slot should be more or less in line with the cylinder head bolt hole N° 2.

– Fit the distributor support with its machined face smeared with sealing compound.



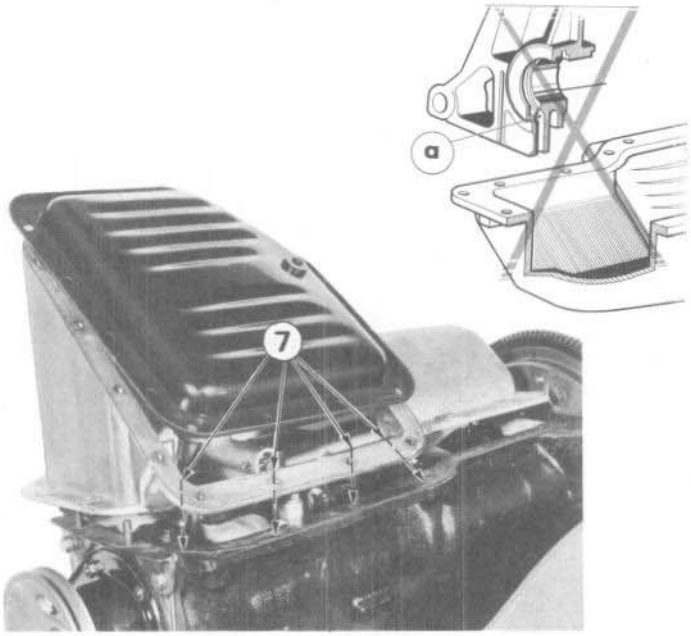
Oil pump - Oil sump.

– Install :

- the centering pins **(5)** in the cylinder block,
- a **new** O-ring **(6)** on the pump.

– Fit the oil pump making sure that the drive blade engages the drive rod.

– Tighten the bolts to **1 m.kg (7.25 ft.lbs).**



– Fit the sump using **new** gaskets.

WARNING

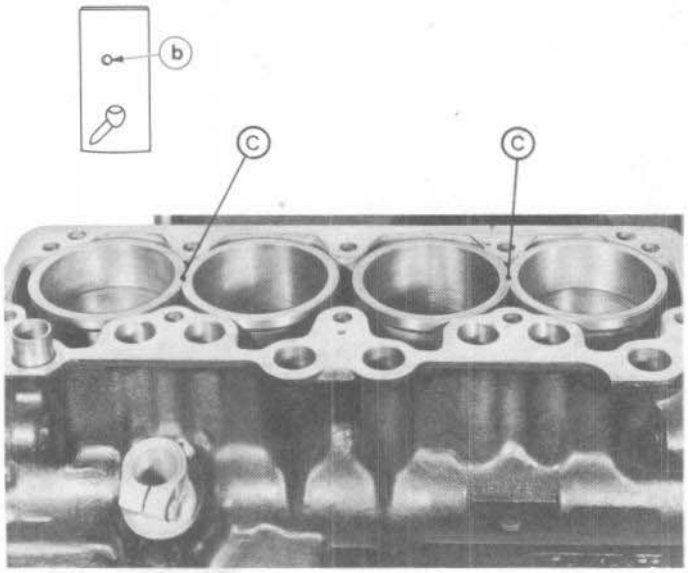
Oil sumps, in pressed steel or aluminium, which do not have an oil return passage, must not be fitted on XM engines with a rear main bearing cap which incorporates the hole **(a).**

A special gasket in rubber/asbestos must be fitted on USA models with an alloy sump.

– Fit the four bolts **(7)** after smearing the threads with "normal holding" LOCTITE.

– Tighten them to **1 m.kg (7.25 ft.lbs).**

– Tighten the drain plug.



– Fit the cam followers.

WARNING - On KF 6 - KF 5 and XN 2 engines, only the cam followers with a 3 mm hole **(b)** are to be used.

– Remove the liner retaining screws.

– **Make sure that the flats (c) on the liners of 1-2 and 3-4 cylinders are parallel.**

– Refit the cylinder head.

WARNING

There are two methods for tightening down the head (see page 04 06, class 1) which must be followed.

– Fit the remaining components.

– Adjust the fan belt tension (2 to 3% stretch).

– Refill with oil when the engine has been refitted.

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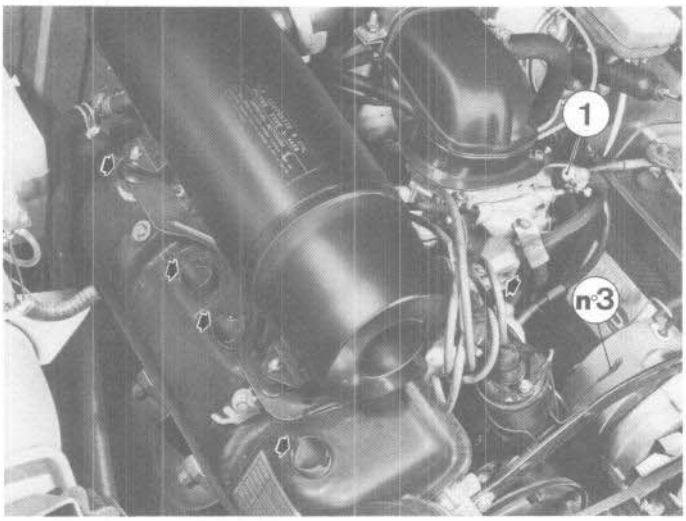
– Use the compression gauge :

Motometer ref. 623 000 1004.



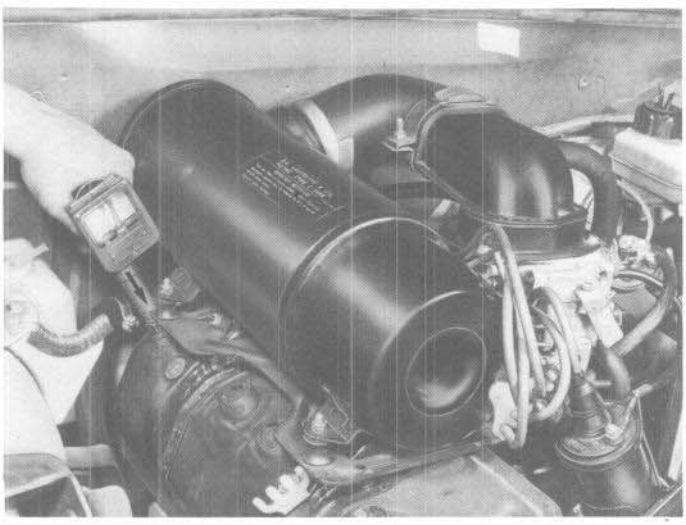
The engine must be at operating temperature (approximately 80° C).

– Disconnect :
- **the fuel line (1) from the carburettor and seal it off,**
- **the lead n° 3 from the coil.**

– Drain the carburettor float bowl :
- on XM engines, by removing the choke jet.
- on XN1 engines, by removing the float bowl plug.

– **Lock the throttle flap fully open.**

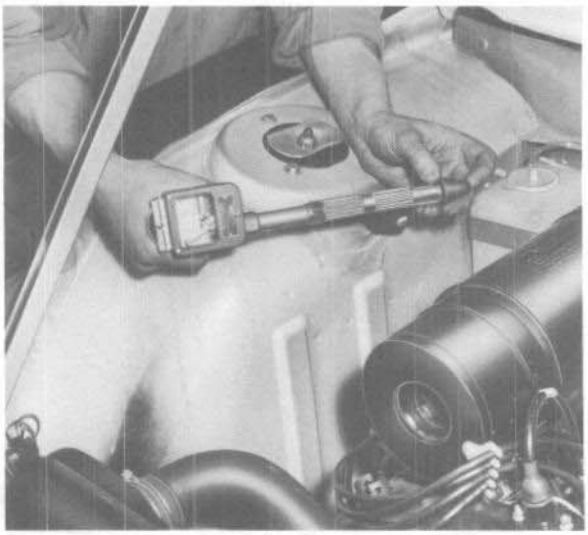
– Remove the spark plugs.



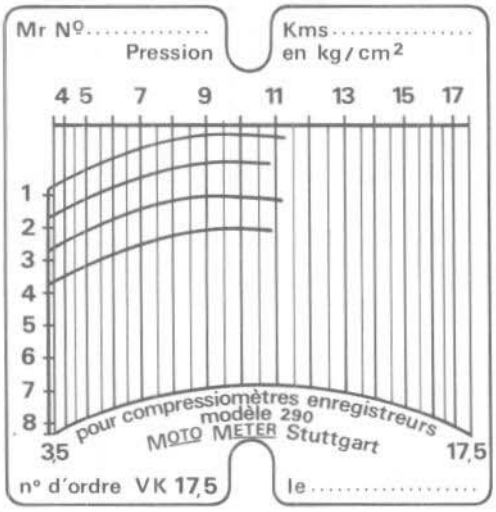
– Beginning on N° 1 cylinder, insert the gauge firmly in the plug hole.

– Turn the engine, using the starter, for 4 seconds.

ENGINE
CYLINDER HEAD
CHECKING THE COMPRESSION



- Decompress the gauge by pressing the point on the tip of the rubber cone.
- Raise the card to the 2nd position and carry out the same operation on N° 2 cylinder.
- Check the other cylinder in the same way.
- Refit the components removed.



- Withdraw the card.

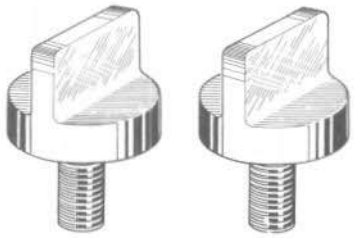
PRESSURE READING TO BE OBTAINED :

11 bars approximately for XM-KF6-KF5-XN1-XN2.

10 bars approximately for XM 7 (7,5:1 compression).

- Maximum variation between cylinders :

1 bar.



TOOLS TO BE USED

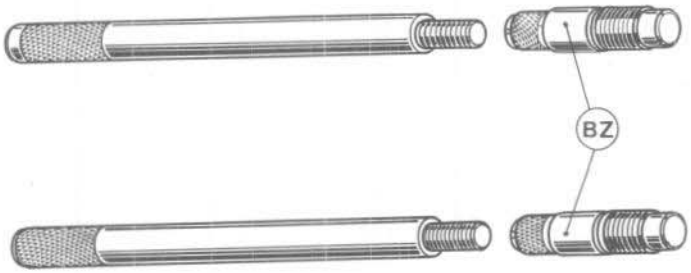
8.0104 D

– Set of 2 cylinder liner retaining screws.

8.0106 Z

– Spark plug spanner

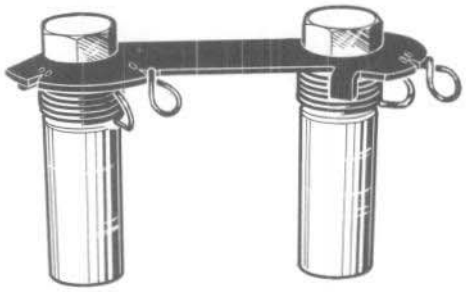
360 mm long - 27.5 mm outer diameter of the socket.



8.0115 Y

– Set of 2 cylinder head guides.

BZ - Guide screws.



8.0129

– Double cylinder head bolt socket for XN 1 - XN2 and XM 7 engines.

RECOMMENDED HAND TOOLS

Tool	Make
Torque wrench	Sunnen PN 50

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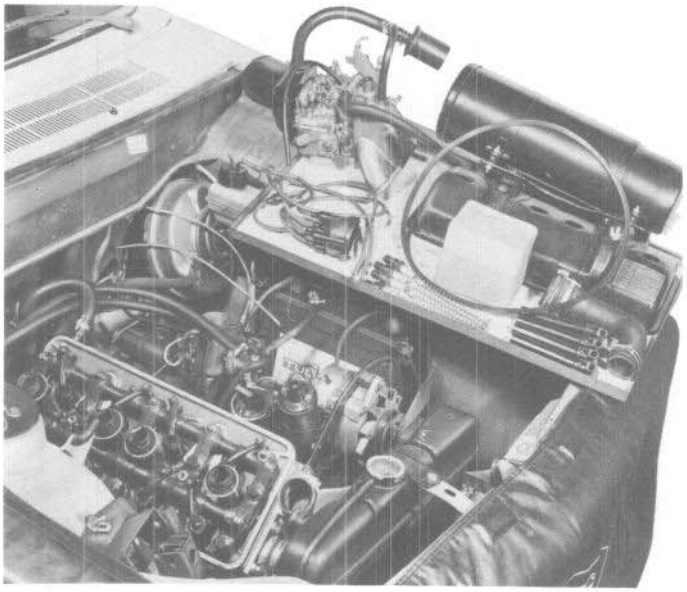


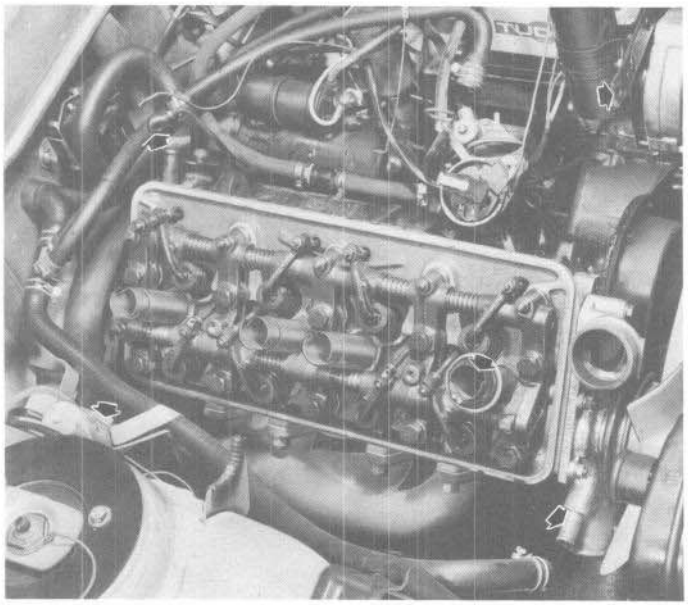
WARNING - Removal of the head must only be realised with the engine cold, to avoid any risk of distortion.

– Drain the water from the block.

– Remove the components as shown opposite.

– On KF 6 - KF 5 and XN 2 engines :

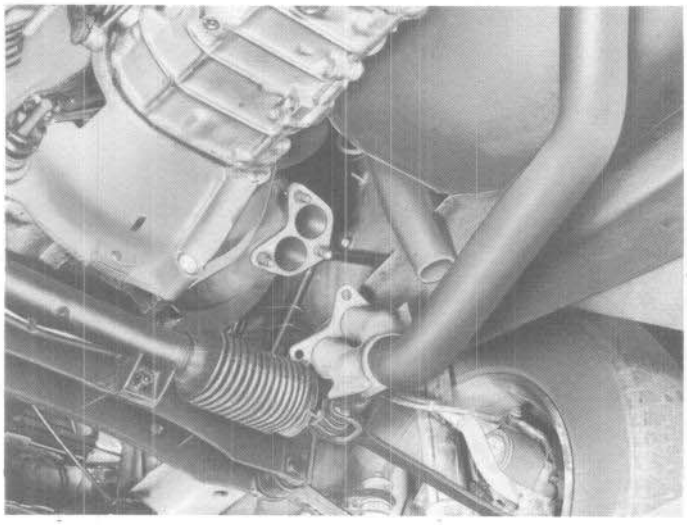
- remove the injector lines (protect the delivery valves and injector unions with caps),
- separate the air distribution chamber from the inlet manifold.



– Disconnect the leads and hoses.

– Disengage the various lugs.

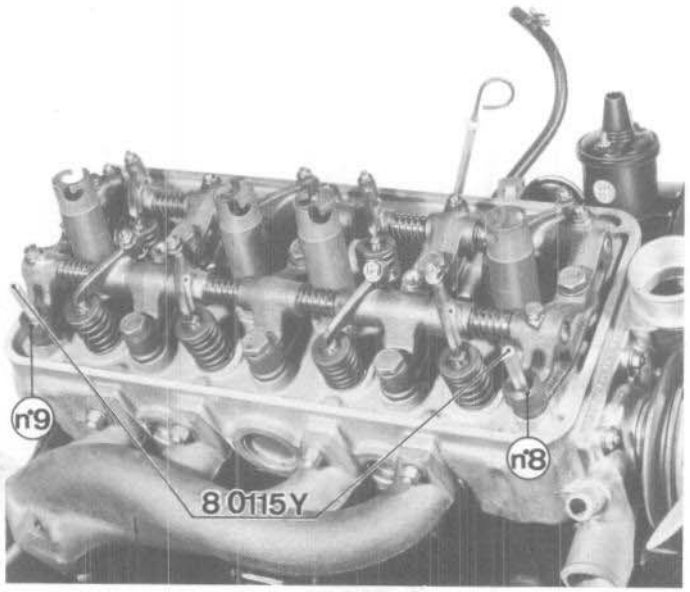
– Remove the plug tube seals and their cups.



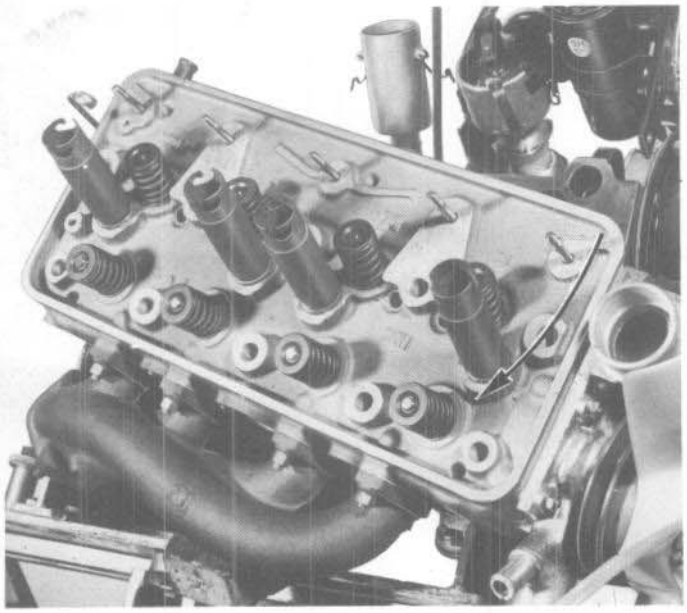
– Separate the exhaust pipe from the manifold.

ENGINE

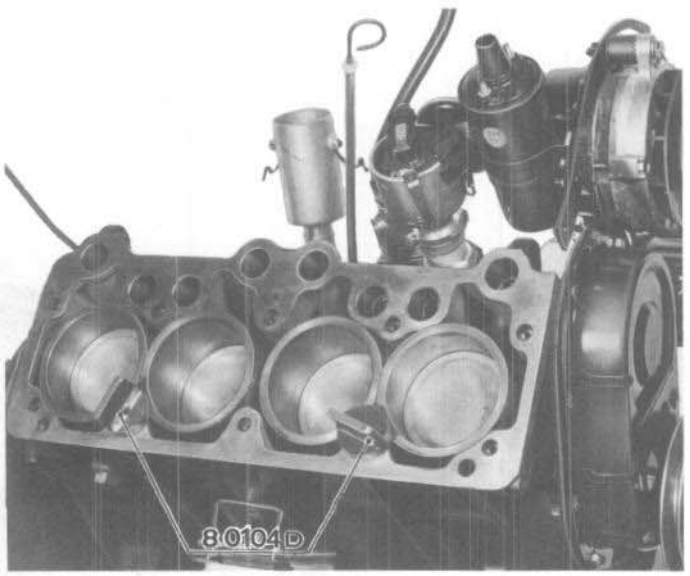
CYLINDER HEAD - REMOVAL



- Remove head bolts **(8)** and **(9)** and fit the cylinder head guides.
- Remove the rocker shaft assembly.
- Remove the push rods and **lay them out in the correct order from (1) to (8).**



- Remove the head guide from hole N° 8.
- **Pivot the head** to separate it from the block and cylinder liners.
- Remove :
  - the cylinder head and gasket,
  - the second cylinder head guide.



- Lock the liners with the two retaining screws.

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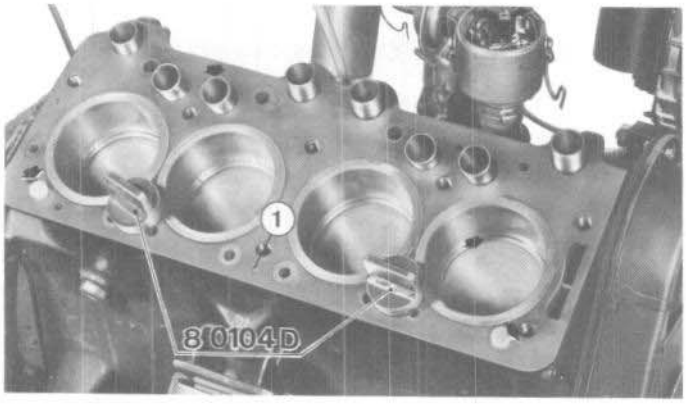
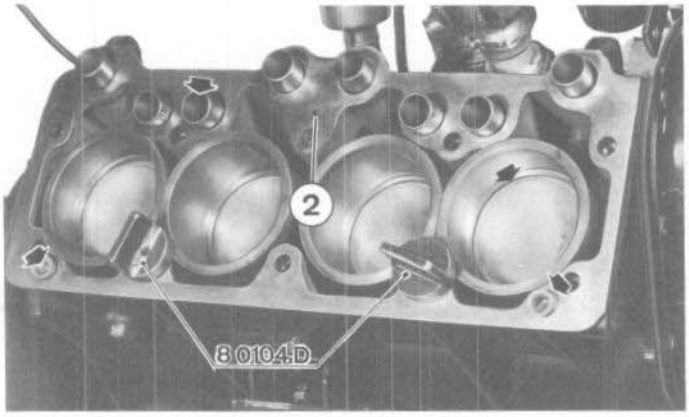




PREPARATION

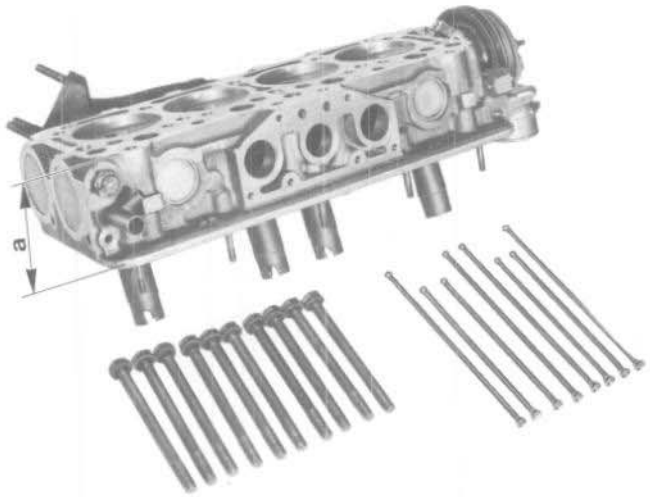
– **Clean the face of the block* (including the threaded holes in the block) taking care :**

- to place an old piston ring on top of all four pistons,
- to seal off the oil return holes,
- to clean out the petrol drain hole **(1)** on XM - KF 6 and KF 5 blocks, **(2)** on XN1 - XN2 and XM7 blocks.

WARNING - Do not scrape the carbon from the piston crowns.

– Clean and check the cam followers.

– Remove all burrs from the face of XN1 - XN2 and XM7 blocks.



– **Clean :**

- the face of the cylinder head,*
- the cylinder head bolts,
- the push rods (check them for distorsion).

– **Check the surface condition of the cylinder head : maximum out of true : 0.05 mm.**

– If the distortion is more, skim the face :

- normal cylinder head height **(a)** : 92.5 ± 0.15 mm
- **height after skimming (a) :** min. 92 ± 0.15 mm.

* Use MAGISTRIP :

- wear protective gloves
- apply the product using a brush (do not let the Magistrip run down into the block)
- leave it for ten minutes then scrape off the deposit using a plastic or wood scraper.

ENGINE

CYLINDER HEAD - REFITTING

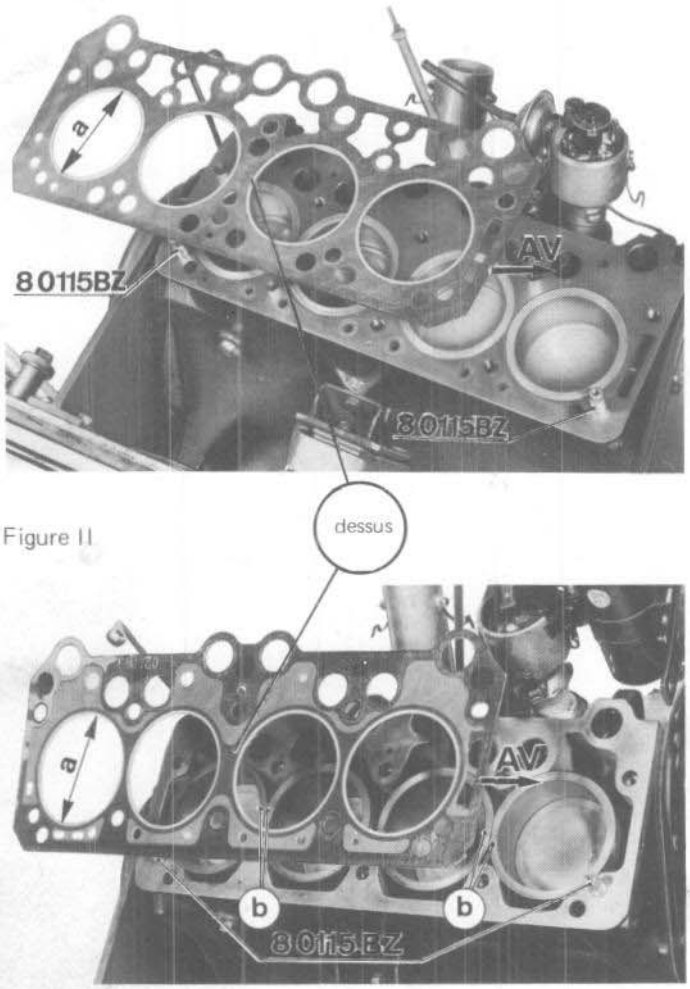


Figure II

FITTING THE CYLINDER HEAD GASKET

– Remove the liner retaining screws.

WARNING - Wipe the face of the cylinder block and head with a rag soaked in petrol.

- Take the gasket out of its wrapping at the last moment and only handle it with clean hands.

XN 1 and XN 2 engines :

- Make sure that the flats **(b)** are parallel on liners 1-2 and 3-4.

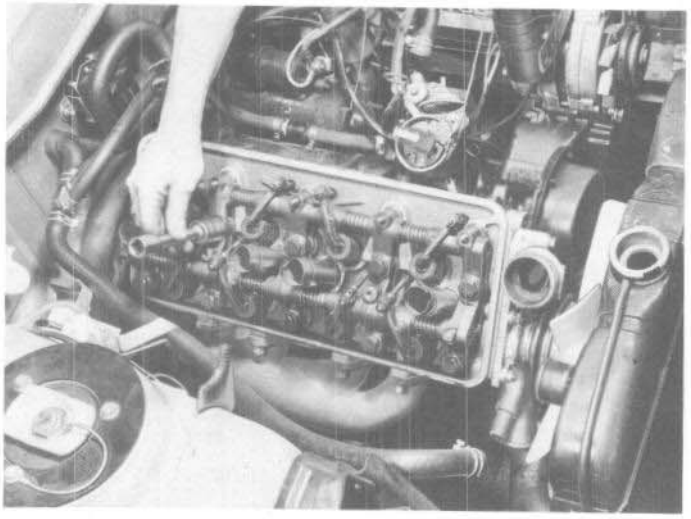
– Fit the guide screws **BZ.**

– **Position the gasket (dry) with inscription "DESSUS" facing up.**

WARNING

THREE GASKETS ARE AVAILABLE.

- *figure I for XM engines : : a = 86.5 mm*
- *figure II* { *for XN1 and XN2 engines : a = 90 mm*; *for XM7 engines : a = 86.5 mm.*



TIGHTENING THE HEAD

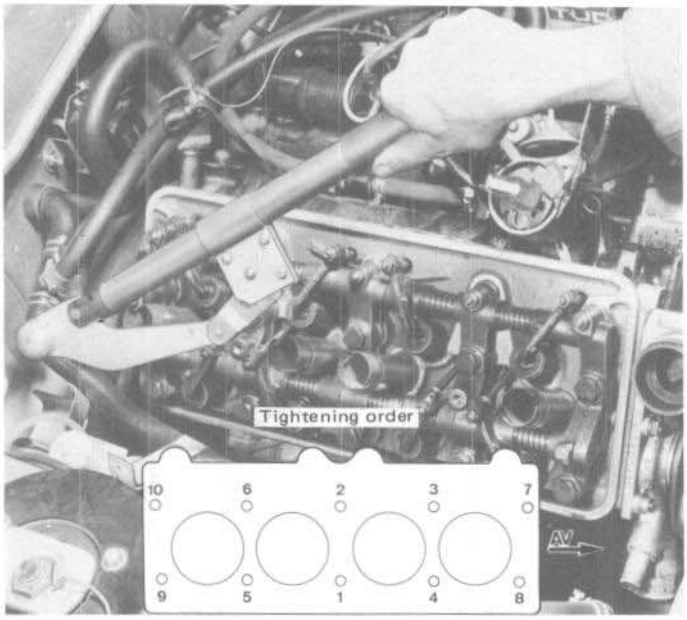
– Fit the head.

– Fit :
- the push rods, **in the order in which they were removed.**
- the rocker shaft assembly.

– Smear the bolt threads with **tallow,** fit the flat washers and tighten the bolts down moderately.

WARNING - The bolts must turn freely.

- fit the rocker shaft support nuts.



WARNING

There are two methods for tightening the head.

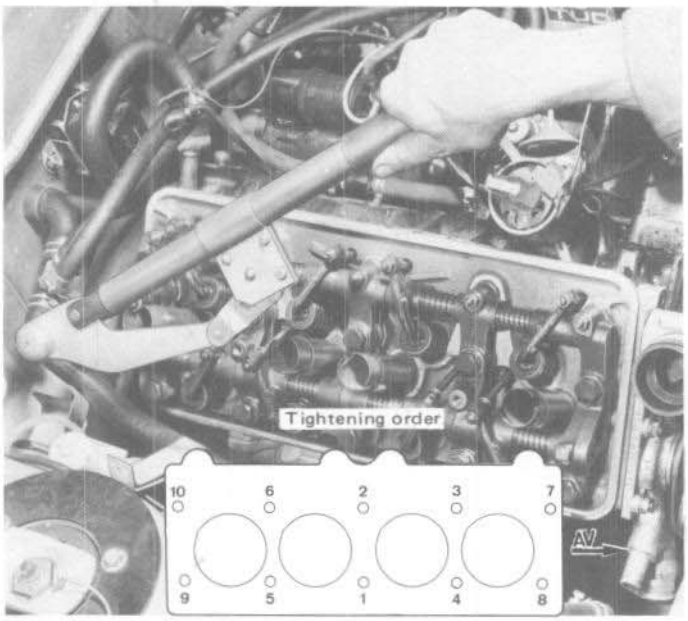
On XM engines with free expanding liners :

- Following the order shown opposite :

- pretighten to 6 m.kg (43.5 ft.lbs)

- final tighten to 8.25 m.kg (60 ft.lbs).

- Tighten the rocker shaft support nuts to **1.5 m.kg (11 ft.lbs).**



On XN 1 - XN 2 and XM 7 engines (compressed liners) :

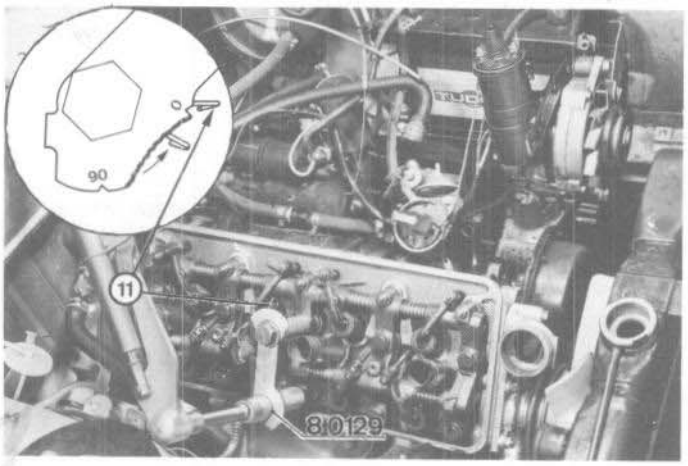
- Following the order shown opposite :

- Pretighten to 5 m.kg (36 ft.lbs).

- Tighten the rocker shaft support nuts to **1.5 m.kg (11 ft.lbs).**

ENGINE

CYLINDER HEAD - REFITTING



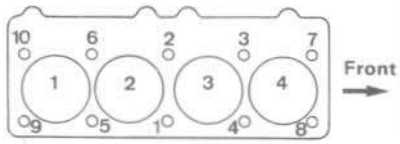
– Place the double socket on the two central bolts.

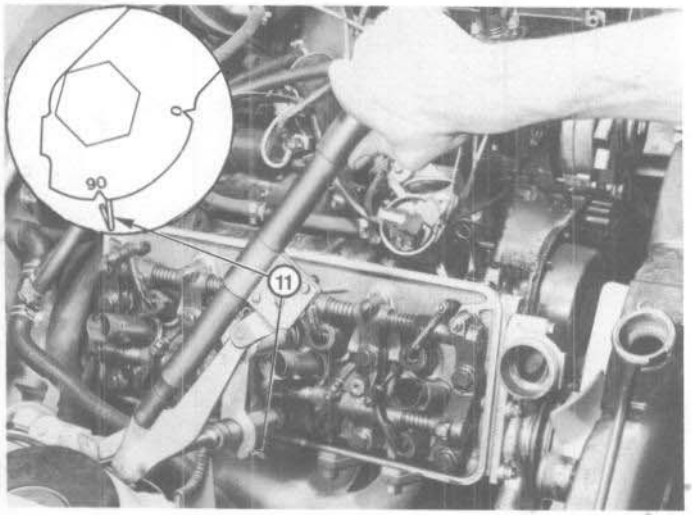
– **Slacken off N° 1 bolt completely and retighten it to 2 m.kg** using the Sunnen P.N. 50 wrench.

– **Hold the wrench under tension.**

– **Place the pointer (11) opposite the notch "0" on the quadrant of the double socket,** by pushing on the lower prong of the spring.

Tightening order





– **Continue tightening until the pointer (11) is in line with notch "90" on the quadrant.**

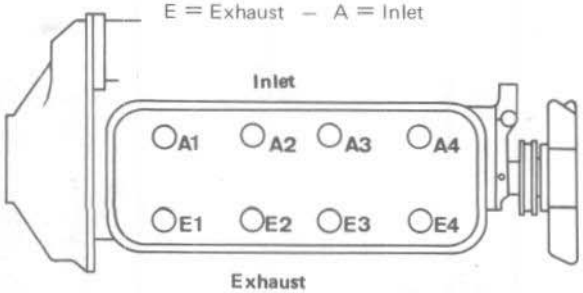
– Repeat this operation on N° 2 bolt.

– Place the double socket on the other bolts in the order shown opposite (i.e. bolts 3-4, 5-6, etc.). and tighten them as indicated above.

N.B. - *If in doubt about the tightening of any one bolt, slacken it off completely and repeat ALL THE ABOVE OPERATIONS.*

Set fully open	to adjust	
E_1	A_3	E_4
E_3	A_4	E_2
E_4	A_2	E_1
E_2	A_1	E_3

E = Exhaust – A = Inlet



ADJUSTING THE VALVE CLEARANCES

– Follow the order shown opposite.

– **Gap to be obtained with the engine cold, after refitting the head.**

- Inlet 0.15 mm (0.006").
- Exhaust 0.30 mm (0.012").

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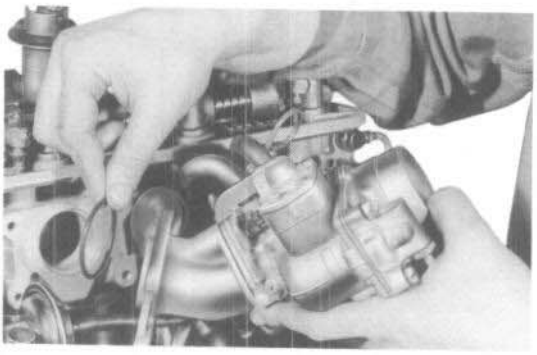

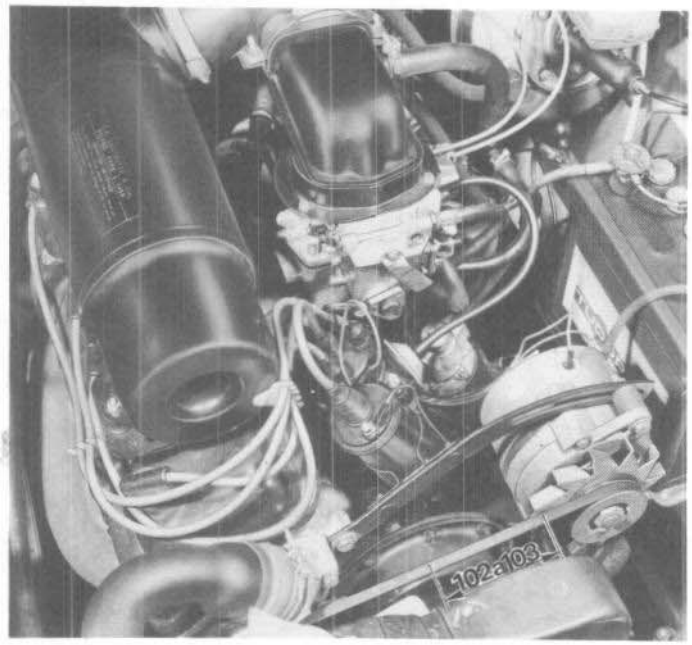

– Refit all the components in the opposite order to removal taking care :

- to fit the inlet manifold O-ring (dry) on **XM and XM 7 engines.**

- to clean or replace the air filter element.

- to leave 2 mm of dead stroke on the throttle cable.

- to obtain 2 to 3% stretch of the fan belt (two reference marks 100 mm apart when slack should be 102 to 103 mm apart when it is taut).

- to adjust the idling.

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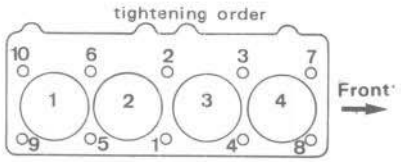
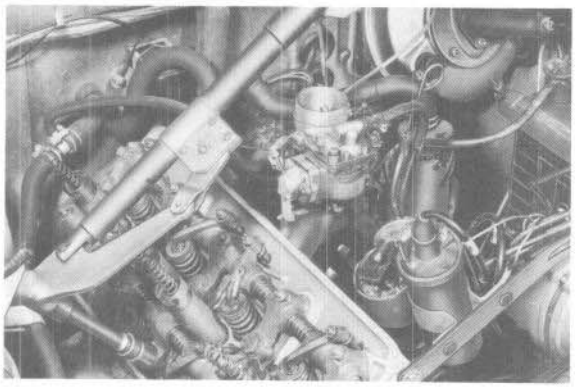




TIGHTENING DOWN AFTER 1,000 km (600 miles).

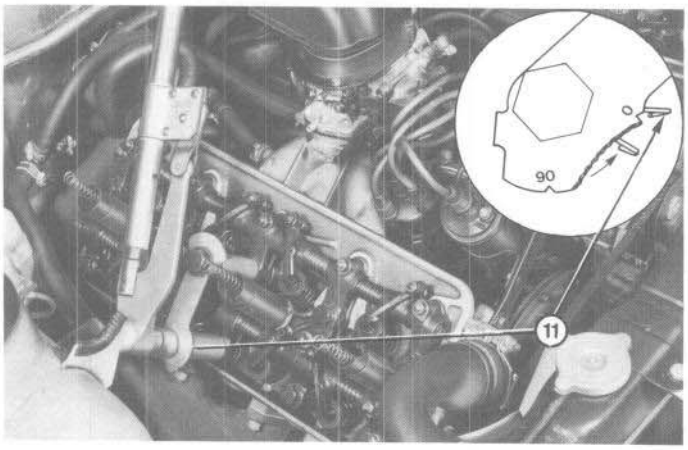
The retightening must be carried out with the engine cold.

WARNING

Two methods to be respected.

– XM - KF 6 and KF5 (up to "1970 Motor Show").

- slacken off each bolt in turn and tighten to **8,25 m.kg (60 ft.lbs)** in the order shown opposite.



– XN1 - XN2 and XM7 (since "1970 Motor Show ") with reference label on the rocker cover.

- place the double socket on the two central bolts.

- slacken off bolt N° 1 completely and retighten it to **2 m.kg (14,5 ft.lbs).**

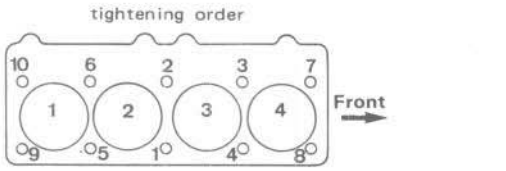
- hold the wrench under tension.

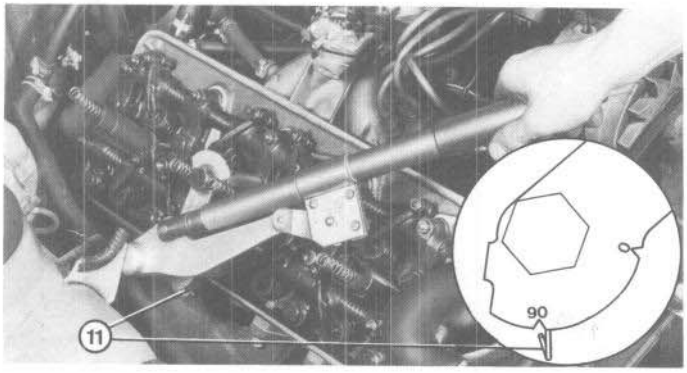
- place the pointer **(11)** on the "0" notch on the quadrant.

- continue tightening until the pointer **(11)** is in line with the notch " 90 " on the quadrant.

- repeat these operations on bolt N° 2.

- place the double socket on bolts 3 - 4 and, following the order shown opposite repeat the operations on the remaining bolts.





N.B. - *On R.H.D. vehicles, move the Master-Vac/ master cylinder assembly forward to gain access to bolt N° 9 (do not disconnect the brake lines from the master cylinder).*

- *If in doubt about the tightening of any of the bolts, slacken it off completely and carry out all the operations.*

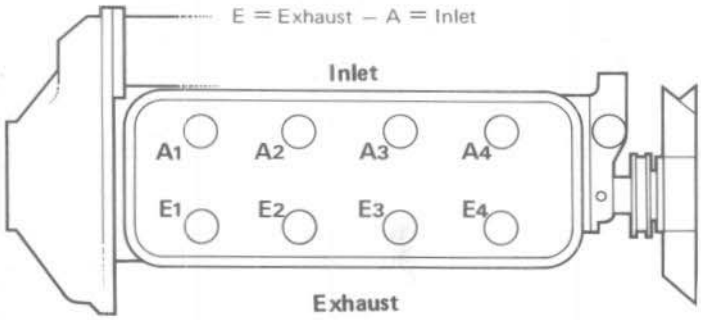
– Retighten the rocker shaft support nuts.

ENGINE

CYLINDER HEAD - RETIGHTENING

Set fully open	To adjust	
E_1	A_3	E_4
E_3	A_4	E_2
E_4	A_2	E_1
E_2	A_1	E_3

E = Exhaust – A = Inlet



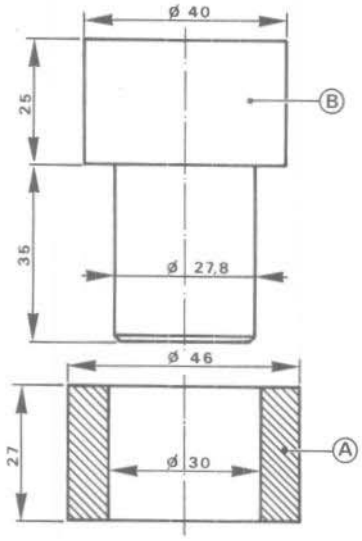
ADJUSTING THE VALVE CLEARANCES

– Follow the order shown opposite.

– Gaps to be set with the engine cold.

Inlet : 0.10 mm (0.004")
Exhaust : 0.25 mm (0.010").

N.B. - *Retighten : the exhaust manifold*
the inlet manifold
the carburettor.



TOOLS TO BE USED

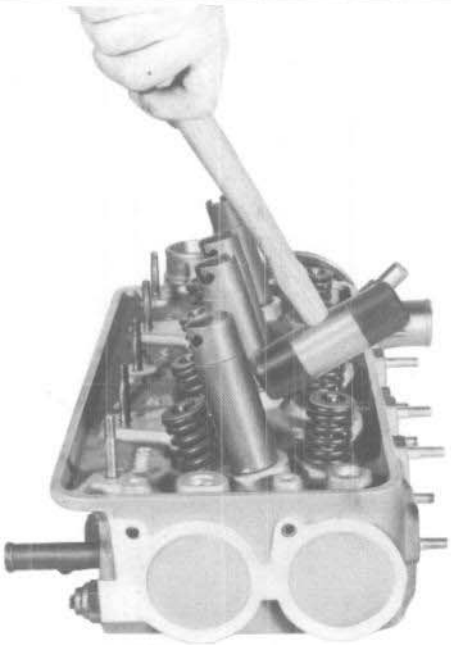
Tools to be realised.

0.0135

– Tools for refitting the tubes.

A - Bush

B - Drift.



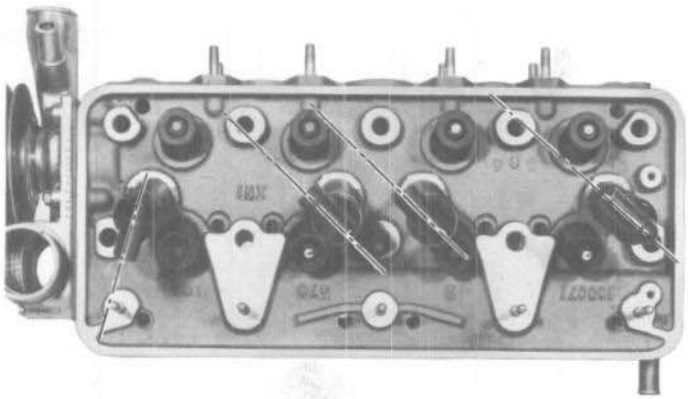
REMOVAL

N.B. - *With the head in place :*

- Screw the plugs in, without their springs, to prevent dirt falling into the cylinders.

– Remove the tubes using a mallet or the appropriate extractor.

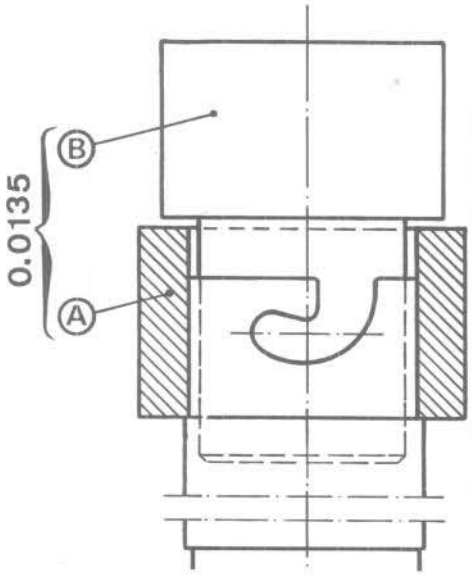
WARNING - If removed, new tubes must be fitted.



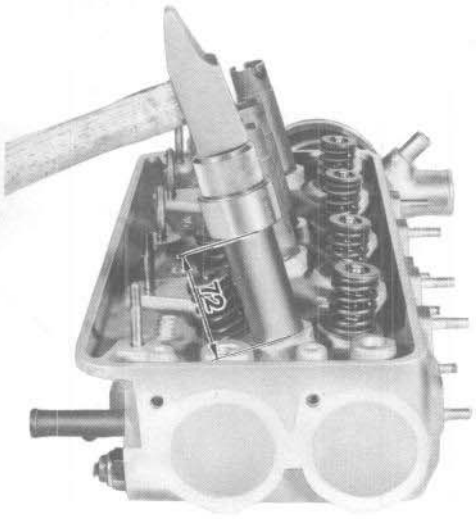
REFITTING

– **Smear sealing compound on the tubes and insert them so that the plug caps are pointing in the directions shown opposite.**

ENGINE
CYLINDER HEAD
REPLACING THE SPARK PLUG TUBES



– Install the tools as shown opposite.



– **Drive the tubes in to obtain a protrusion of 72 mm** as shown opposite.

N.B. - *With the head in place :*

- *Blow all traces of dirt or dust out of the tubes before removing the spark plugs.*

TOOLS TO BE USED

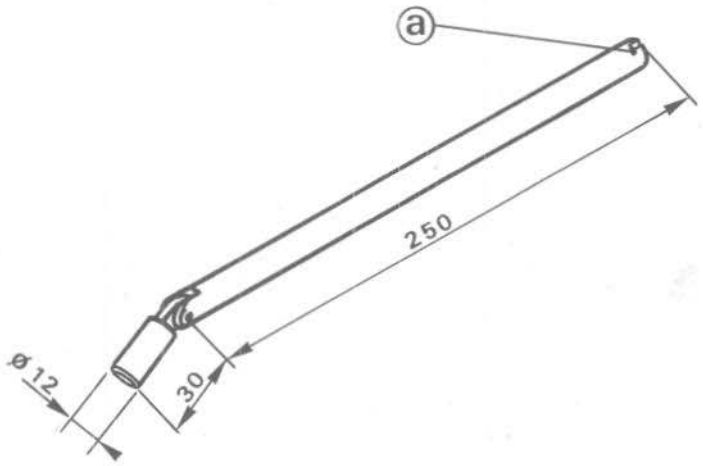
8.0105 Y

– Valve spring compressor.

N.B. - *The lever* **8.0105 Z** *can be converted to* **8.0105 Y** *by fitting :*

- the hook : **8.0105 B**

- the compressor : **8.0105 C.**



TOOLS TO BE REALISED

0.0136

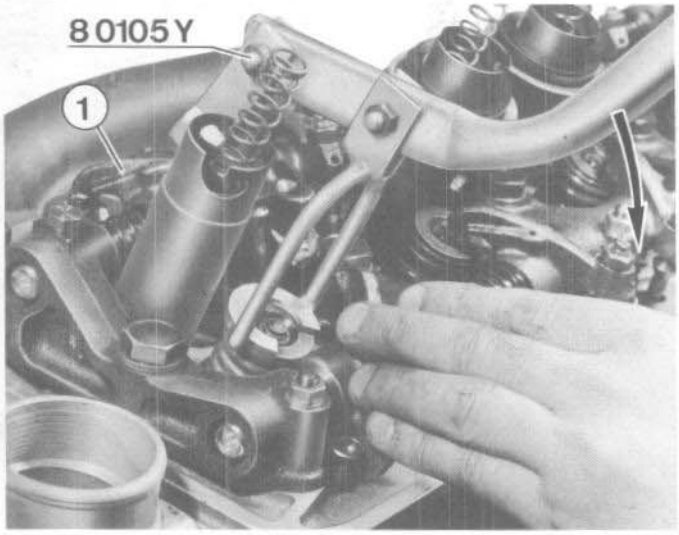
– Hinged rod for removing exhaust valve springs.

Cut a groove at **(a)** in the direction of bending of the hinge.

ENGINE
CYLINDER HEAD
REPLACING A VALVE SPRING (HEAD IN PLACE)

IDENTIFICATION AND RATING OF THE SPRINGS

Description	XM engine		XN1-XN2-XM7 engines
	up to 5/70	since 5/70	since 7/70
Protective varnish	GREY	YELLOW	BLACK
Outer spring			
Height	30.8 mm	30.8 mm	30.8 mm
Under a load of	70 kg	66 kg	62 kg
Inner spring			
Height	26.8 mm	26.8 mm	26.8 mm
Under a load of	35.5 kg	33.5 kg	31.5 kg



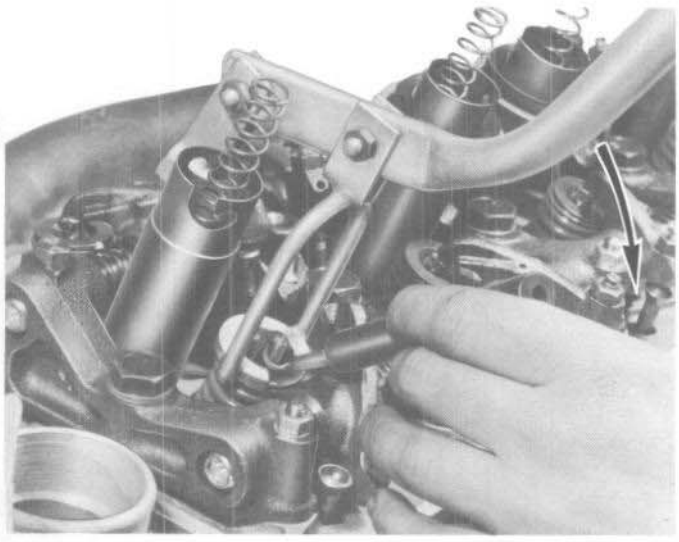
REPLACING A VALVE SPRING (HEAD IN PLACE)

I - INLET VALVE SPRING

WARNING - Turn the crankshaft in its direction of rotation.

– Bring exhaust valve (1) to beginning of opening.

– Disengage the inlet rocker as shown opposite.



– Bring the piston to T.D.C. (firing stroke)

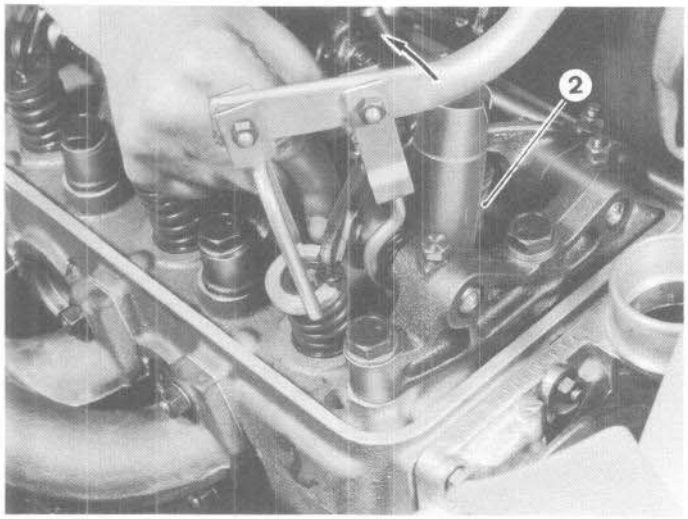
– Diesengage the valve spring collets.

– Remove the upper spring cup and the springs.

– Replace the springs.

– Reassemble in the reverse order.

– Adjust the valve clearances if the engine is cold.



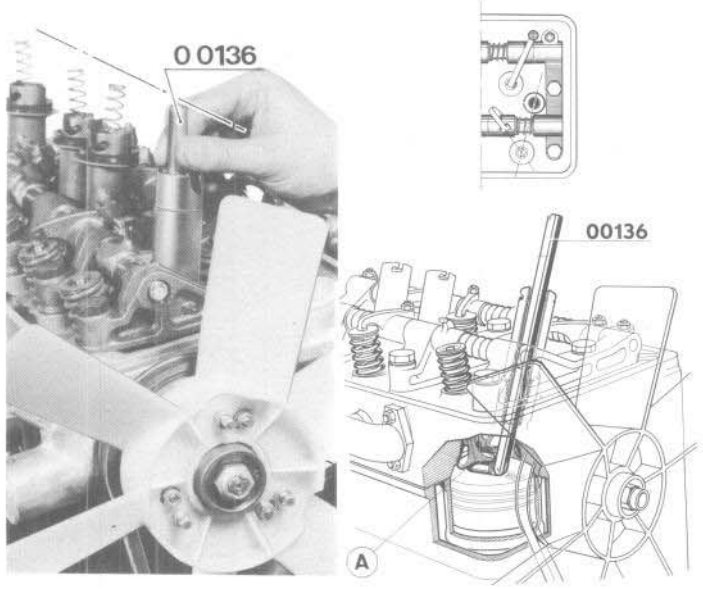
II - EXHAUST VALVE

WARNING - Turn the crankshaft in the direction of rotation of the engine.

– Remove the plug from the cylinder in question.

– **Bring the inlet valve (2) to the fully closed position.**

– Disengage the rocker arm from the exhaust valve as shown opposite.

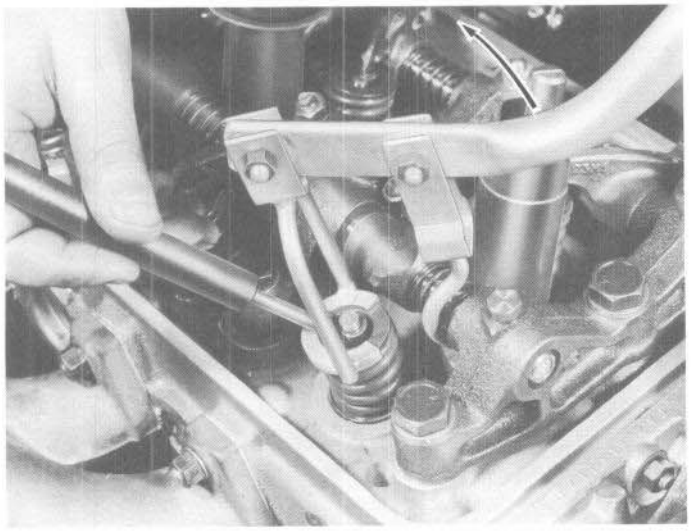


– **Insert the hinged rod through the plug hole.**

– **Turn the hinged rod through 90°.**

– **Position the notch in the end in line with the valve stem.**

– **Bring the piston to T.D.C.** without forcing, as the hinged part of the rod **(A)** comes in contact with the valve.



– Remove the valve spring collets.

– Remove the valve spring cups and the springs.

– Fit the new springs.

– **Reassemble in the reverse order.**

– Adjust the valve clearances if the engine is cold.

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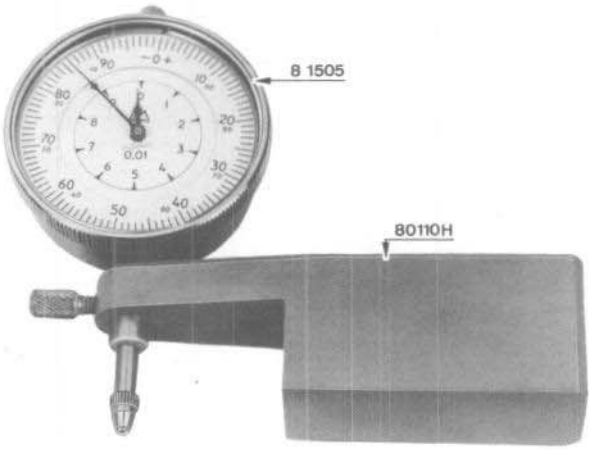
TOOLS TO BE USED

8.0104 D

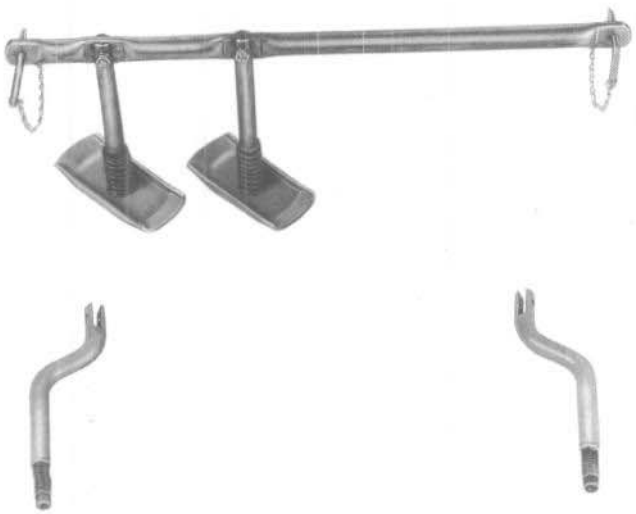
Set of two cylinder liner retaining screws.



Dial Gauge indicator :

8.0110 H - Support block.

8.1505 - Dial gauge.

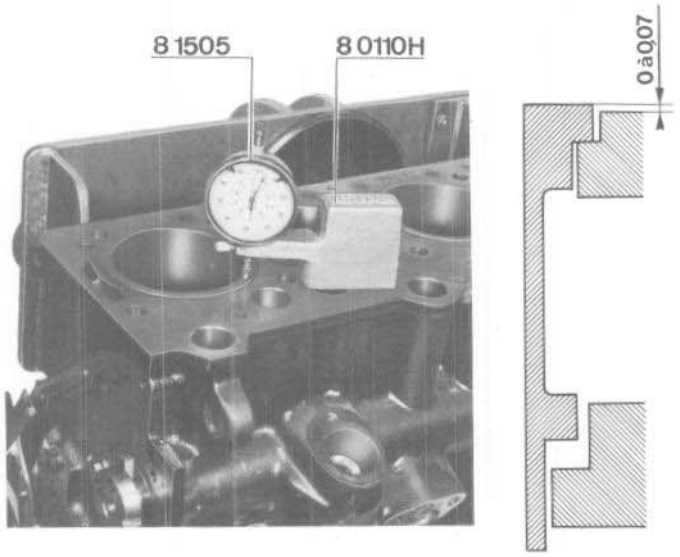


8.0128

Liner compressor apparatus.

ENGINE

CYLINDER LINERS - REFITTING

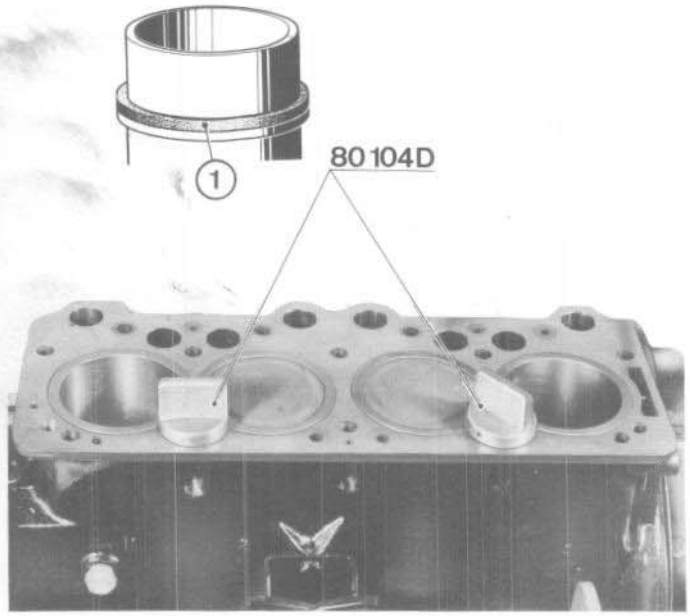


FREE EXPANDING LINERS ON XM - KF 6 - KF 5 ENGINES.

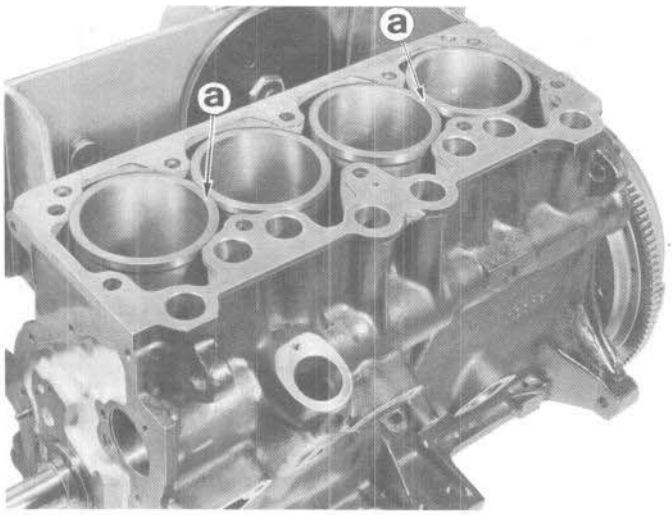
The components must be clean and free from impact marks.

WARNING - Do not alter the piston/liner pairing.

- **Fit the liners without their seals.**
- **Check the protrusion which must be between 0 and 0,07 mm.**



- Fit a new seal **(1)** on all the liners.
- Fit the liners.
- Install the retaining screws.



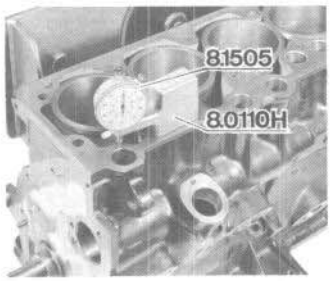
COMPRESSED LINERS ON XN 1 - XN 2 AND XM 7 ENGINES.

WARNING - Do not alter the piston/liner pairing.

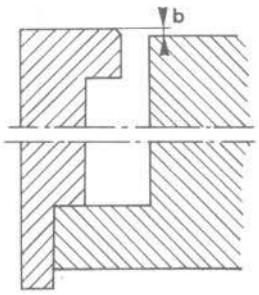
– The parts must be clean and free from impact marks.

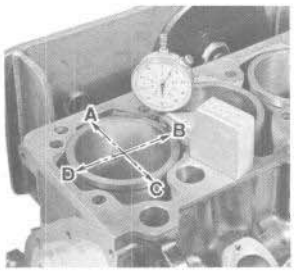
– Make sure that there are no burr marks on the face of the cylinder block.

– **Insert the liners, without base gaskets, with the flats (a) on the upper shoulders of liners 1-2 and 3-4 parallel (on XN 1 and XN 2 engines).**



– Place the dial gauge and support on the block face.

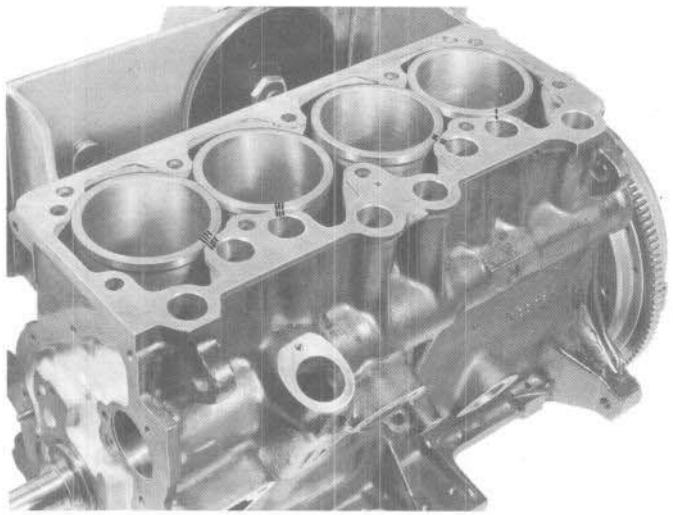




– Set the dial at 0 and 5.

– **Check each liner at (A), (C), (B) and (D), noting the reading which is highest (point (b)).**

– **The maximum difference between two diametrically opposed points must be less than 0.07 mm.**



– If it is more find the reason (burrs, dust, etc.) and, if necessary, change the position of the liners.

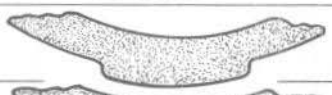
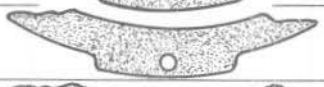
– Mark the liners I, II, III and IV with a felt tip pencil.

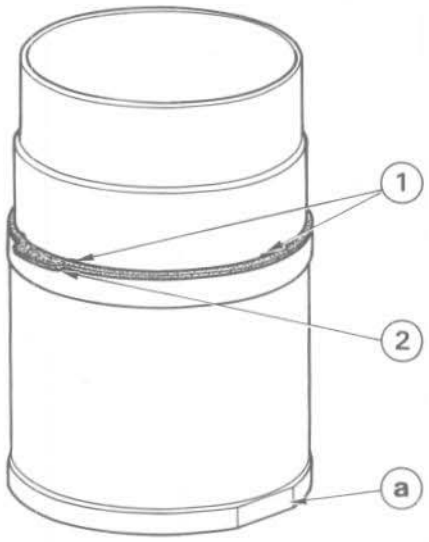
ENGINE

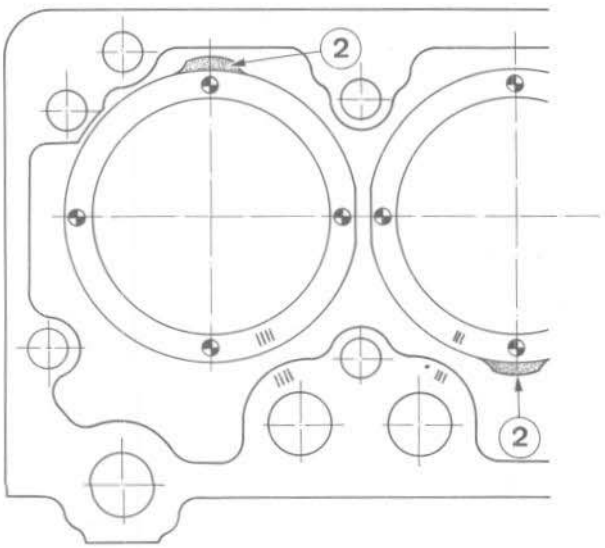
CYLINDER LINERS - REFITTING

Select a base gasket for each liner which will give a protrusion of as close to 0.11 mm as possible - (minimum 0.04 mm).

WARNING - Only use ONE GASKET per liner.

HIGHEST POINT ON THE LINER (Without gasket)	GASKET TO BE FITTED	
	Reference	Thickness
from 0.036 to 0.06		0.050
from 0.011 to 0.035		0.075
from 0 to 0.010		0.100
Negative reading		0.125



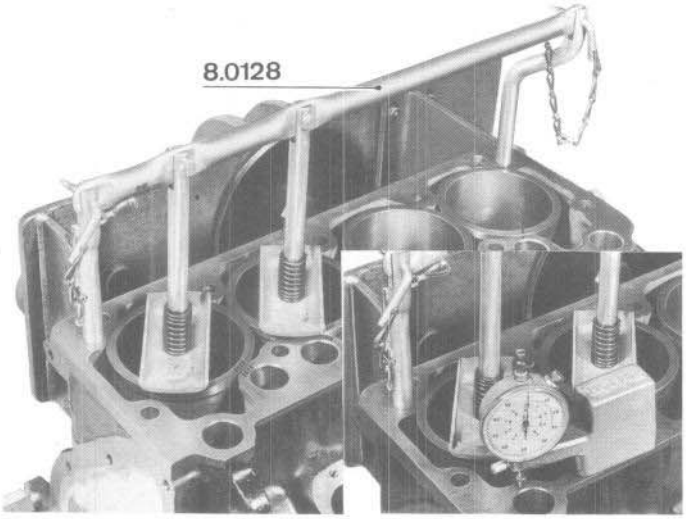


– **Fit the correct gasket on the liner carefully.**

– Engage the inner tabs **(1)** in the groove in the liner.

– Position the tab with the reference mark on it **(2)** at right angles to the flat **(a)**.

– **Fit the liners with the tabs (2) in the position shown opposite.**

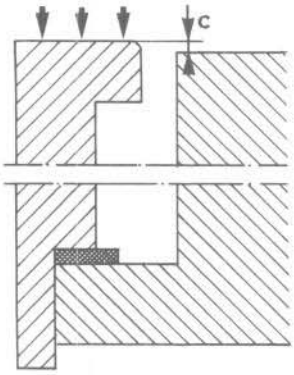


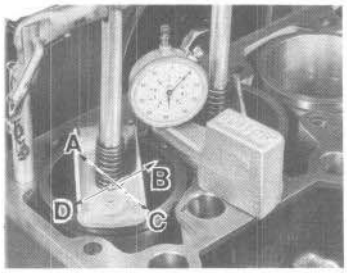
- Install the liner compressing tool as shown opposite.

- Check the setting of the dial gauge at 5 and 0 on the block.

- Check the protrusion at **(A), (B), (C)** and **(D).**

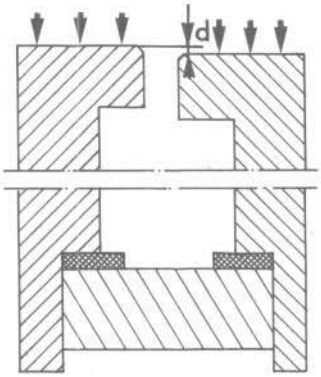
- **The protrusion at the highest point should be as close as possible to 0.11 mm (point c).**

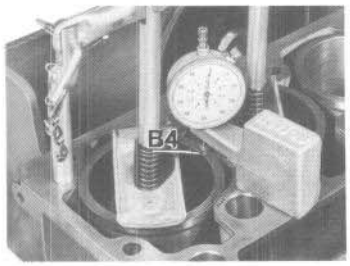


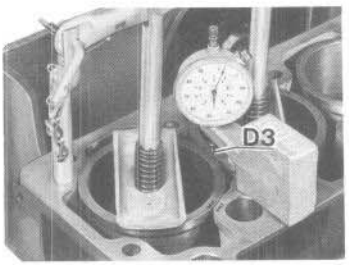


- **The maximum difference between the diametrically opposed points (A), (C) and (B), (D) must be less than 0.07 mm.**

- If it is more, find the reason.







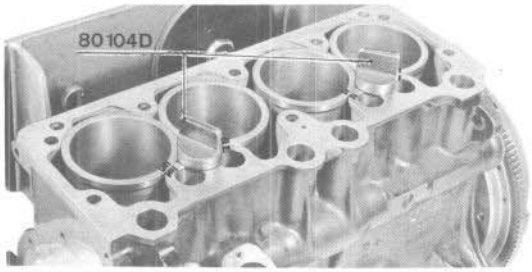
- Set the dial gauge at 0 on point B4 (liner N° 4).

- Place the dial gauge on point D3 (liner N° 3).

- **The difference in protrusion between the two liners must not exceed 0.04 mm (point d).**

- If it does, change the gasket on the liner which protrudes the most and fit a gasket one size smaller.

- Turn the compressor round and check the liners 1 and 2.



- Remove the compressor and fit the retaining screws.

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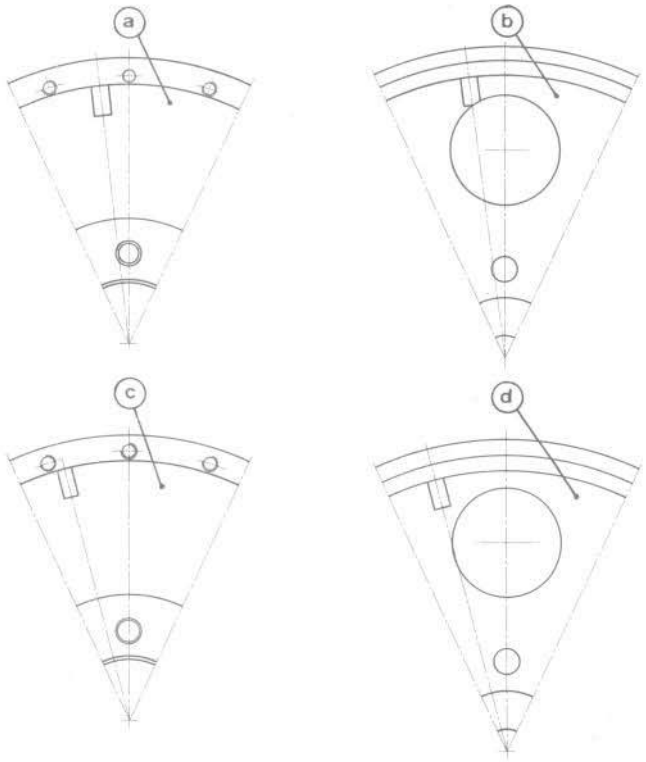


REPLACING A FLYWHEEL

WARNING

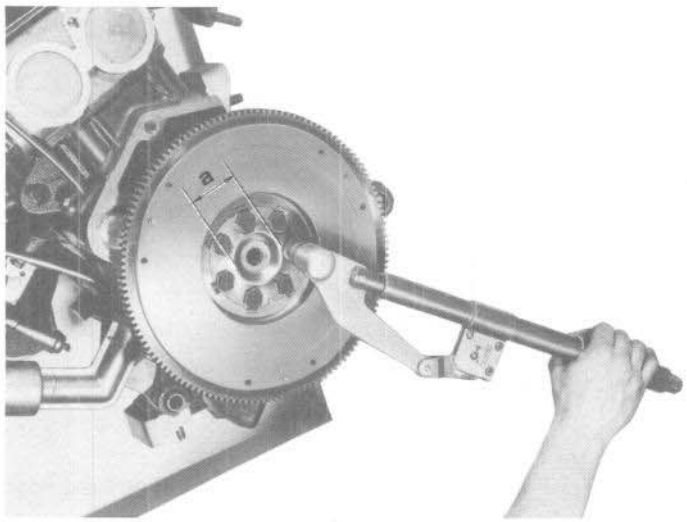
In the event of replacement of the flywheel :

– *On XM - KF6 - KF5 and XM7 engines (Ignition advance 10°)*

- with BA 7 gearbox : Flywheel **(a)**
- with ZF transmission : Flywheel **(b).**

– *On XN1 - XN2 engines (Ignition advance 5°)*

- with BA 7 gearbox : Flywheel **(c)**
- with ZF transmission : Flywheel **(d).**



– Use a new tab washer (Ø **(a)** = 44 mm)

– Tighten the bolts to **6.75 m.kg (49 ft.lbs).**

– Bend the tabs up around the bolt heads.

REPLACING THE STARTER RING GEAR

TOOLS TO BE USED

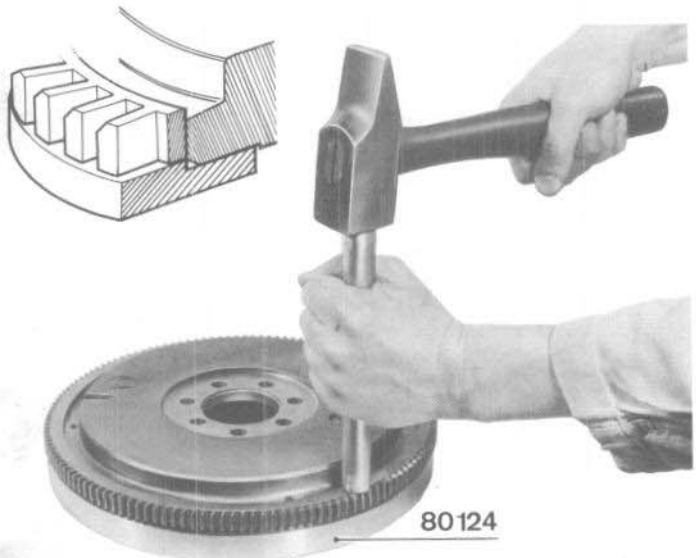
8.0124

– Flywheel support for fitting the ring gear.

WARNING - The flywheel must be removed to replace the ring gear.

REMOVAL

– Drive the ring gear off, **away from the clutch thrust side.**



REFITTING

– Mount the flywheel on the base (clutch side facing down).

– Heat up the ring gear using a blow torch.

– **Position the ring gear with the champfered edge of the teeth facing up.**

– **Using a bronze drift,** hammer the ring gear onto the flywheel, until it abuts on the support.

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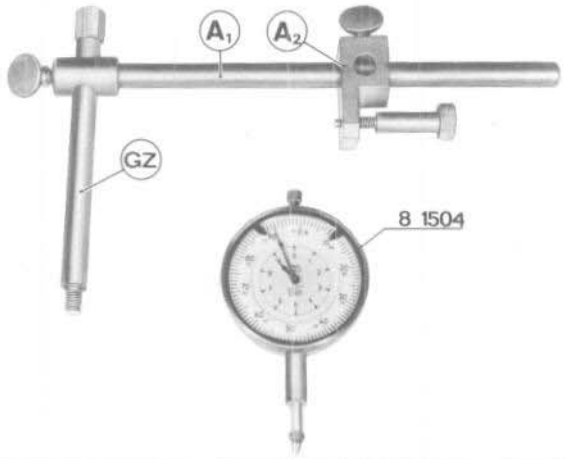


TOOLS TO BE USED

Apparatus for checking the valve opening :

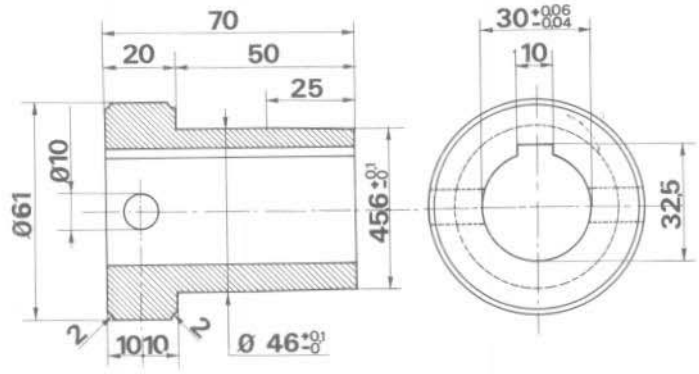
8.0110 GZ - Dial gauge support.

8.0504 **A1** - Support rod
A2 - Support.

8.1504 - Dial gauge with lug.

8.0126 - T.D.C. feeler.

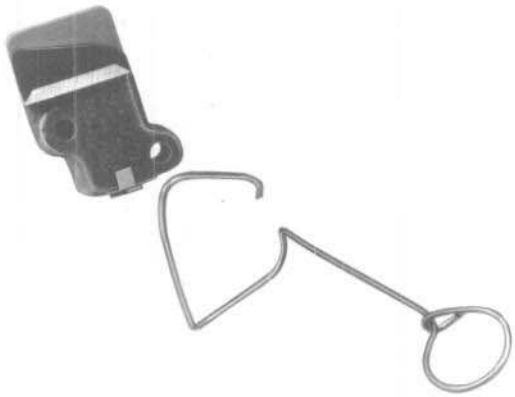
8.1505 - Dial gauge.



TOOLS TO BE MADE

0.0128

– Timing housing centering piece.



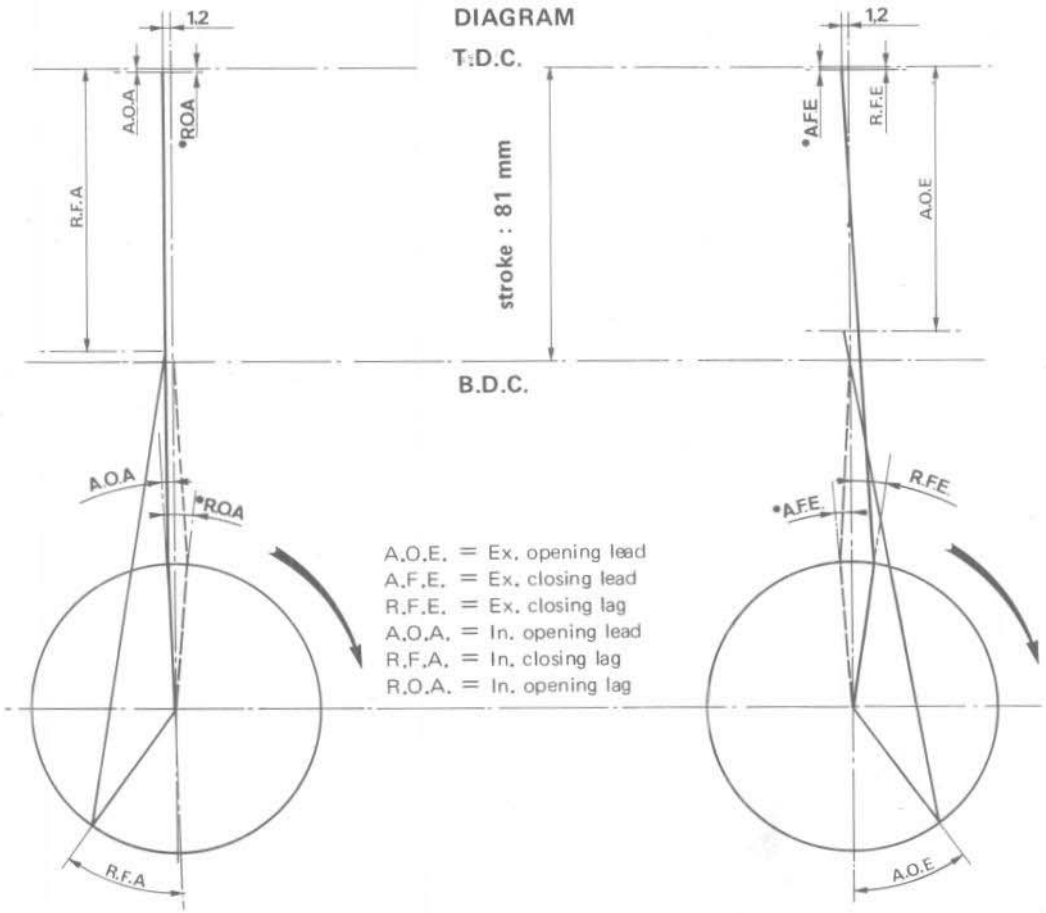
0.0137

– Tool for retaining the chain tensioner pad for XM/KF and XN 2 engines.

(Ø 2 mm piano wire).

ENGINE

TIMING

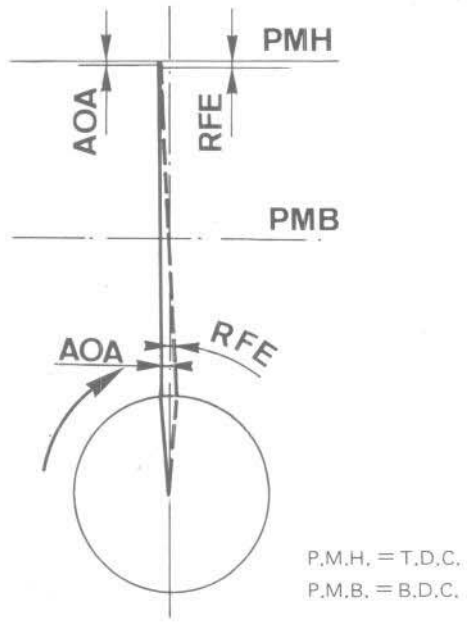


Valve clearances : 0.7 mm on the cylinder being considered.

	XM XM USA "1969"		XN1 - XM7 Up to October 1972	
	Angle on Flywheel	Piston Stroke (mm)	Angle on Flywheel	Piston Stroke (mm)
A.O.A.	0°30'	0,002	1°00'	9,009
R.E.A.	35°00'	75.700	36°00'	75.440
A.O.E.	35°30'	75.580	33°00'	76.310
R.F.E.	10°00	0.800	5°30'	0.243

	XM USA "1970" XN1 USA "1971" – "1972"			XN1 - XM7 Since Oct. 72 XN1 USA "1973"	
	Angle on Flywheel	Piston Stroke (mm)		Angle on Flywheel	Piston Stroke (mm)
*R.O.A.	4°	0.130	*R.O.A.	2°00'	0.020
R.F.A.	34°	76.570	R.F.A.	39°00'	74.460
A.O.E.	34°	76.030	A.O.E.	30°00'	77.130
A.F.E.	4°	0.130	R.F.E.	8°30'	0.570

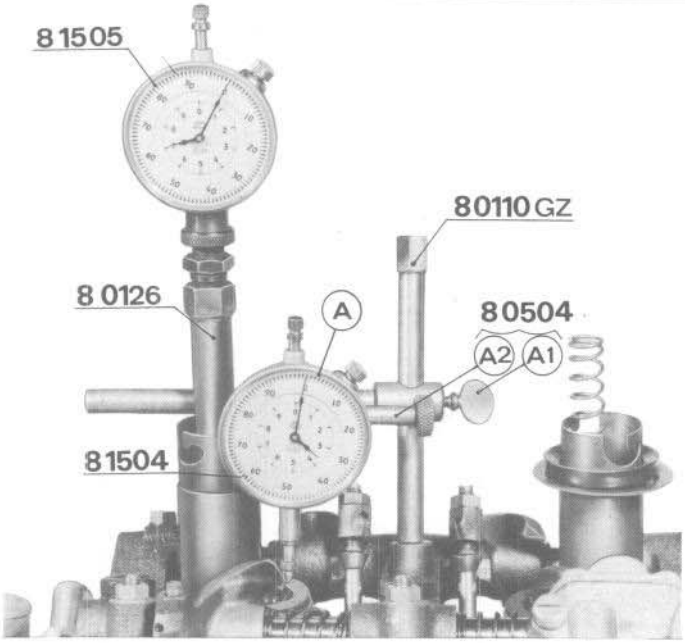
	K F 6 and K F 5		XN2 Up to October 1972		XN2 Since October 1972	
	Angle on Flywheel	Piston Stroke (mm)	Angle on Flywheel	Piston Stroke (mm)	Angle on Flywheel	Piston Stroke (mm)
*A.O.A.	1°30'	0.018	2°30'	0.050	0° ± 3°	0
R.F.A.	36°00'	75.440	42°00'	73.430	44°30'	72.490
A.O.E.	35°30'	75.580	36°00'	75.440	33°30'	76.440
R.F.E.	9°00	0.660	7°00'	0.394	9°30'	0.720



CHECKING

– **Check the timing at approximately T.D.C. (A.O.A. or R.F.E.) due to the angle of the spark plug holes.**

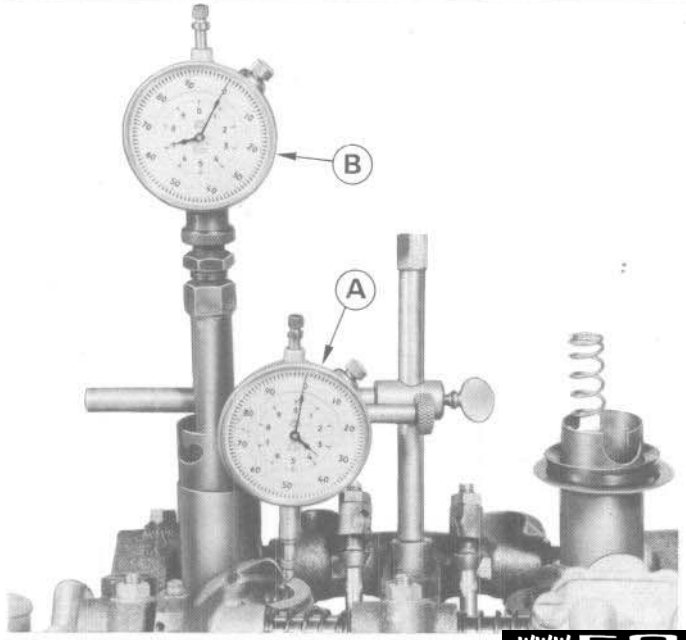
N.B. - *A timing setting which is one tooth out will be noticed immediately. To check the R.F.A. or A.O.E., the cylinder head must be removed.*



– **Set the inlet valve gap on N° 4 cylinder to 0.70 mm.**

– Install the dial gauges as shown opposite.

– **Set the dial gauge (A) at " 0 " on the inlet valve spring cup.**



– **Turn the crankshaft in the direction of rotation of the engine.**

– Find the exact T.D.C. and set the dial gauge **(B)** at " 0 ".

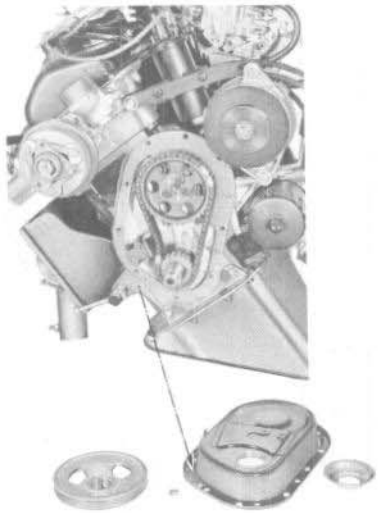
– **Note the position of the piston (gauge (B)) when the inlet valve just begins to open (gauge (A)).**

– Check the value obtained with the one given on the table on page 10 02, class 1.

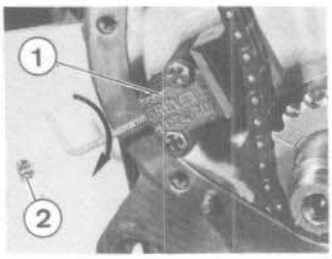
DISMANTLING THE TIMING GEAR (HEAD IN PLACE).

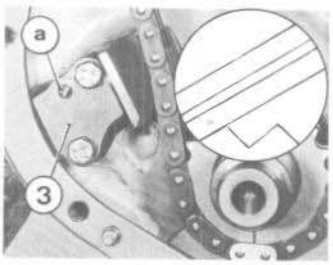
– Remove :
- the radiator,
- the fan belt,
- the spark plugs.

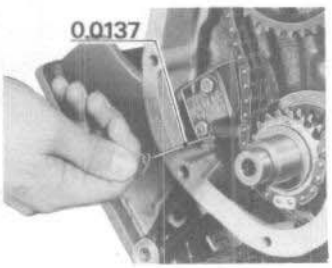
– Remove the crankshaft pulley nut :
- with a BA 7 gearbox : apply the handbrake and engage 4th Gear.
- with a ZF transmission, remove the protector plates and block the flywheel with a lever.

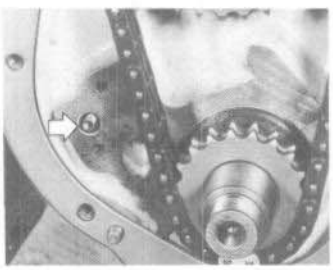


– Remove the timing housing.









– **Neutralise the chain tensioner spring.**

Renold tensioner **(1)** :

on XM - XM 7 and XN 1 engines :
- remove the plug **(2)**,
- turn the Allen key clockwise (3 mm key).

on KF 6 - KF 5 and XN 2 engines :
- use the pad retaining tool.

Sedis tensioner **(3)**.
- place the ratchet **(a)** in the position shown opposite.

– Remove the tensioner and its plate.

– Recover the filter.

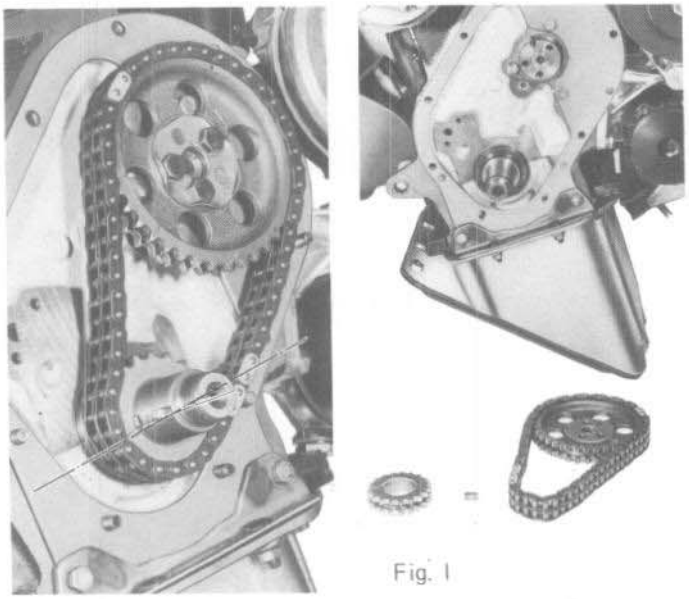


Fig. I

WARNING - Position the crankshaft as shown in the fig. I to avoid contact between valves and pistons when rotating the crankshaft with the timing chain removed.

– Remove in the following order :

- the camshaft sprocket,
- the timing chain,
- the crankshaft sprocket,
- the woodruff key.

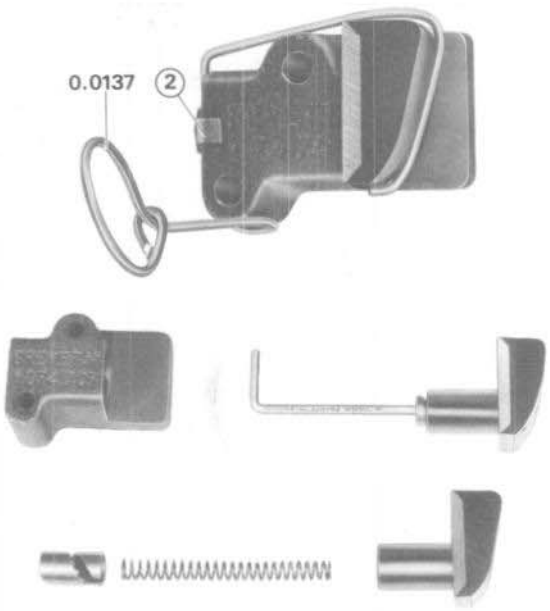


Fig. II

DISMANTLING - REASSEMBLING THE TENSIONER

WARNING - When reassembling, make sure that all the components slide freely in the housing and that the oil galleries are perfectly clean.

Renold Tensioner

– KF 6 - KF 5 and XN 2 :

- remove the plug **(2),** lock the tensioner spring and withdraw the retaining tool.
- turn the Allen key clockwise while holding the pad, to release the spring.
- withdraw the spring and ratchet from the pad.
- after cleaning, reassemble in the reverse order.

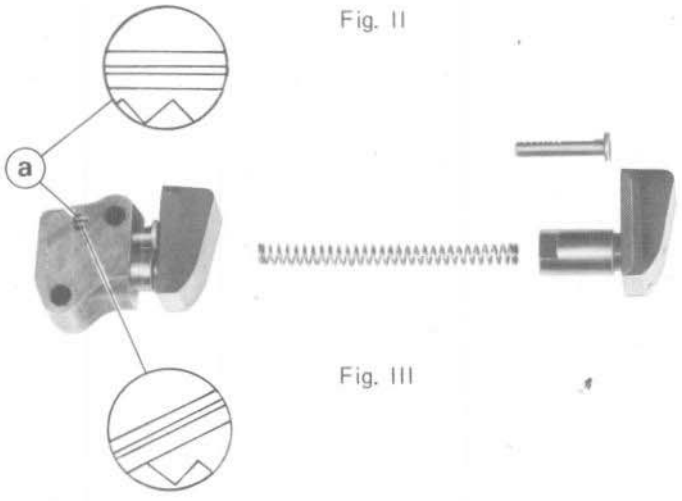


Fig. III

Sedis Tensioner

– Position the ratchet screw **(a)** as shown opposite (fig. II).

– Remove the pad, rack and spring together.

WARNING

Never remove the screw **(a)** *(its return spring will render its reinstallation impossible).*

– After cleaning, reassemble it in the reverse order.

– Lock the tensioner by turning the screw **(a)** anti-clockwise (fig. III).

Fig. I

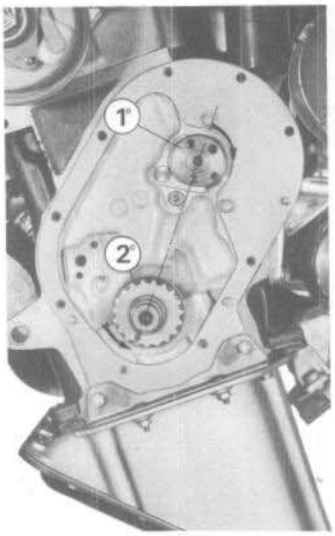
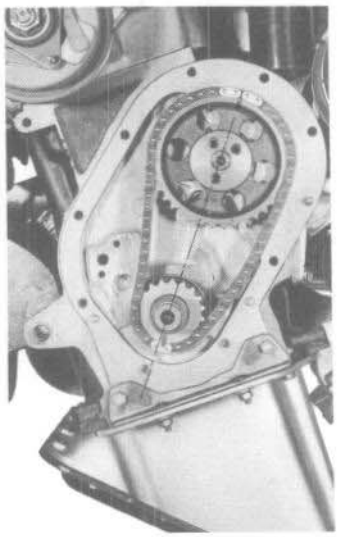
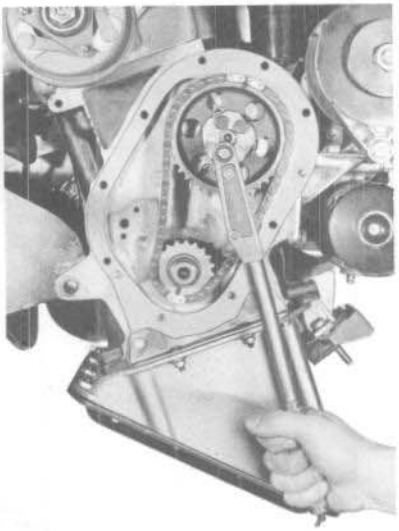


Fig. II





REASSEMBLY - SETTING

– Without altering the position of the crankshaft, fit :

- the woodruff key
- the sprocket

– Position the camshaft and the crankshaft, in that order, as shown opposite (fig. I).

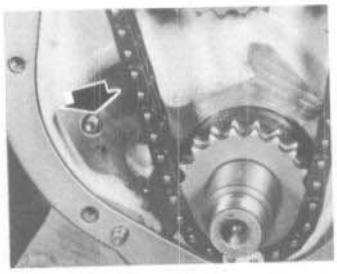
– **Install the chain on the camshaft sprocket then the assembly on the crankshaft sprocket (fig. II).**

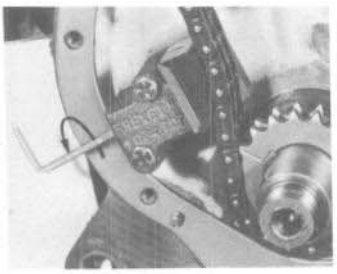
WARNING - The reference marks on the two sprockets must be in line and on the axes of the crankshaft and camshaft.

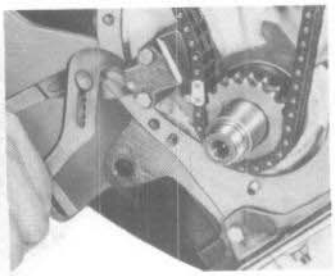
– Fit a new tab washer on the camshaft sprocket.

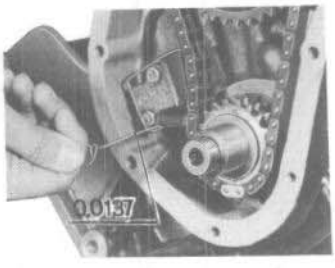
– Tighten the bolts to **2.25 m.kg (16 ft.lbs).**

– Bend the tab washer up around the bolt heads.









Renold Tensioner.

– Insert the filter.

– Fit the tensioner.

– **Load it by turning the allen key clockwise.**

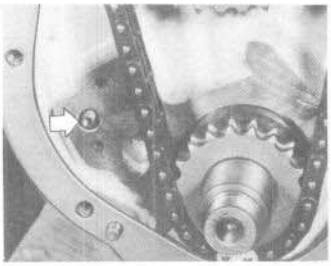
– Fit a new tab washer on the plug and fit the plug.

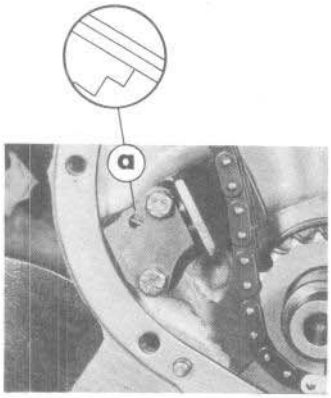
– Bend the tab up around the plug head.

– **For KF 6 - KF 5 and XN 2 engines :** assemble the tensioner, install the retaining tool, load it and fit the plug and tab washer before fitting the tensioner on the block.

– Withdraw the tool when the tensioner is installed.

WARNING - Never assist the tensioner action.





Sedis tensioner

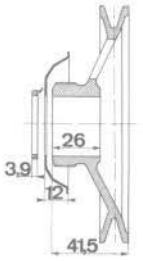
– Insert the filter.

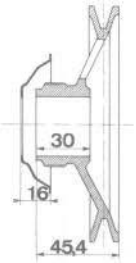
– Fit the plate and the tensioner.

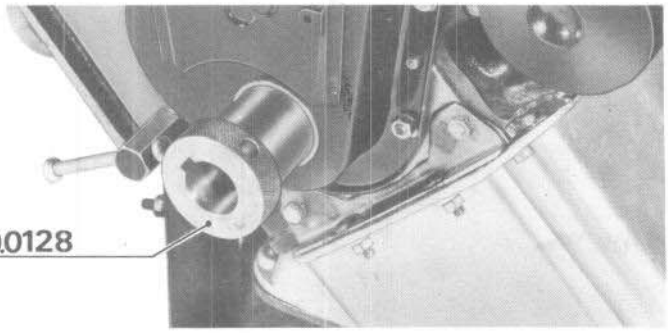
– Load the tensioner by turning the screw **(a)** clockwise.

WARNING - Never assist the tensioner action.

N.B. - *The Renold and Sedis tensioners are interchangeable as a unit.*





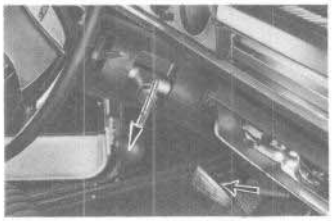


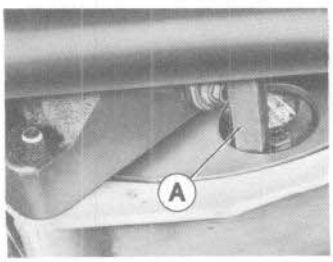
WARNING

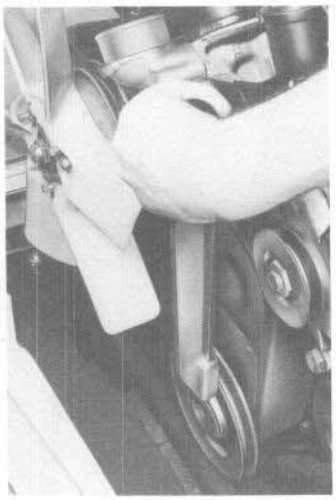
For XM engines there are two crankshaft pulleys, which are not interchangeable, available.

– Fit :
- the thrust washer where necessary,
- the oil thrower cup,
- a new timing housing gasket.

– Centre the housing with the tool **0.0128** and secure it.







– Fit :
- the woodruff key,
- the crankshaft pulley.

Fit a new tab washer.

– Fit the nut with the threads facing the pulley.

– Tighten it to **17 m.kg (123.5 ft.lbs).**
- with BA 7 gearbox - apply the handbrake and engage 4th gear,
- with ZF transmission - lock the flywheel using a lever **(A).**

– Bend the tab washer up around the nut.

– Refit the components which were removed.

WARNING - Check and if necessary, correct the ignition timing.

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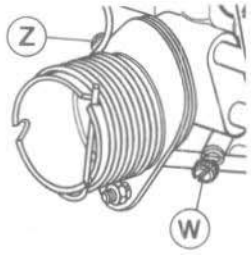
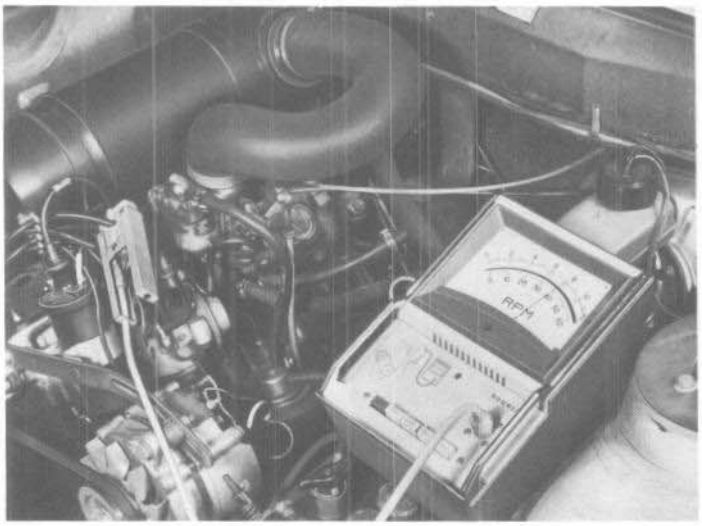




ADJUSTING THE IDLING

WARNING - The ignition system must be in good condition and the timing set perfectly.
- The engine must be warm (fan engaged).
- The exciter wire (n° 8) must be disconnected from the alternator.

– Use a rev-counter.

– Act on the stop screw **(Z)** to obtain an engine speed of approximately 860 r.p.m.

– Increase the engine speed as much as possible by acting on the mixture screw **(W)**.

– Bring the engine speed back to 860 r.p.m. by acting on stop screw **(Z)**.

– Repeat these operations until the maximum engine speed obtainable with the mixture screw, is 860 r.p.m.

– Screw in the screw **(W)** until the engine speed drops to 800 r.p.m. without upsetting the regularity of the idling.

XM U.S.A. ENGINE

Set the idling at 800 r.p.m. but by obtaining an engine speed of :

825 r.p.m. for **" 1969 " 504** (1 carburettor)

860 r.p.m. for **" 1970 " 504** (2 carburettors) when acting on the stop screw **(Z)**.

WARNING - The setting of the screw situated just above the mixture screw **(W)** must never be altered.
- The setting of the second carburettor must never be altered.

Fig. I

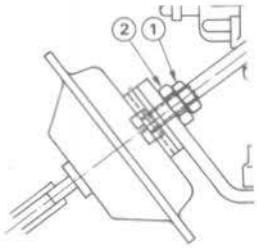


Fig. II

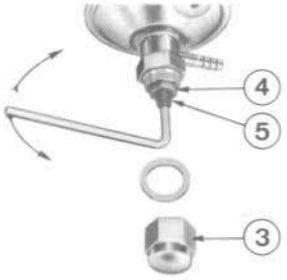


Fig. III

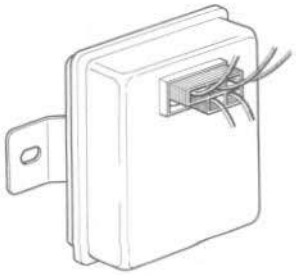
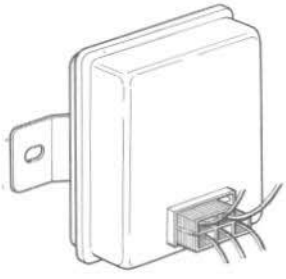


Fig. IV



ADJUSTING THE FAST IDLING (US)

– Disconnect the lead from the electronic control box to obtain the fast idling.

WARNING

Earthing of lead n° 83 (feed to the electrovalve) will immediately destroy the control box.

504 " 1969 " (1 carburettor) fig. I

– Slacken the lock nut **(1)**.

– Adjust the nut **(2)** to obtain an engine speed of 1,400 r.p.m.

504 " 1970 " (2 carburettors) fig. II.

– Remove the cap **(3)**.

– Slacken the lock nut **(4)**.

– Adjust the allen screw **(5)** to obtain an engine speed of 1,500 r.p.m.

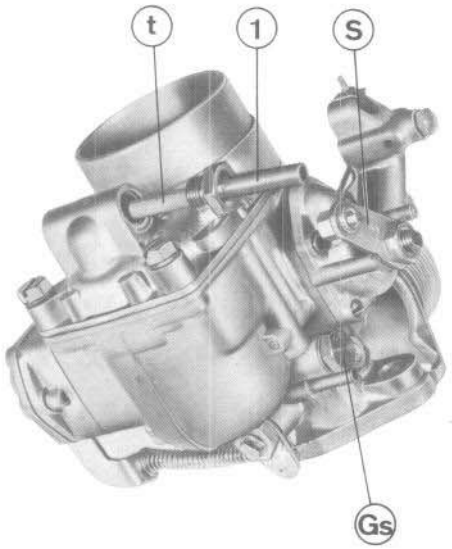
– When the lead is reconnected to the control box (fig. III or fig. IV) the engine speed should drop to 800 r.p.m.

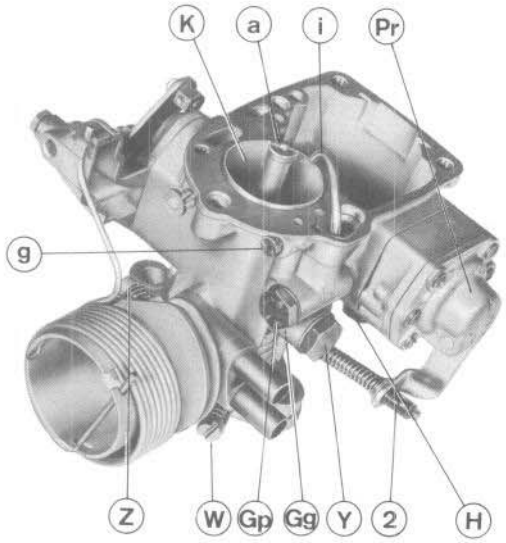
Supersedes page 12 13 and 12 14, class 1

TABLE OF SOLEX 34 PBICA CARBURETTOR SETTINGS XM AND XM 7 ENGINES

VEHICLE	504 A01 and A03								504 A91 and A93	
ENGINE	XM with BA 7 gearbox		XM with ZF transmission		XM7 7.5:1	XM7 8.35:1	XM USA "1969" BA7 or ZF		XM USA "1970" BA7 or ZF	
CARBURETTOR	34 PBICA.5 L.H.D. (ref.33) R.H.D. (ref.34)	34 PBICA.7 (ref.48) (ref.49) (1)	34 PBICA.5 (ref.35) (ref.36)	34 PBICA.7 L.H.D. ou R.H.D (ref. 50) (2)	34 PBICA.9 L.H.D. or R.H.D. (ref. 54)	34 PBICA.9 L.H.D. or R.H.D. (ref. 65)	34 PBICA.6 BA7 (ref. 43) ZF (ref. 44) (3)		32 PBICA.8 (ref. 51) (4)	34 PBICA.8 (ref. 52) 4)
Venturi	27		27		27	27	27		24	24
Main jet	145		145		145	145	137.5		120	130
Correction jet	170		170	160	200	170	200		195	200
Emulsion tube	28		28	130	E.8	28	17		101	17
Pilot jet	50		50		47.5	50	52		55	50
Air jet	210 on bowl	210 below choke	210 on bowl	210 below choke	210 in choke	210 below choke	210 below choke		210 below choke	210 below choke
Pump jet	-	50	-	50	50	50	-		-	-
Pump injector	45		45		50	45	40		50	50
End of pump stroke for throttle opening of :	3 mm ± 0.5		3 mm ± 0.5		3.5 mm ± 0.5	3 mm ± 0.5	6.5 mm ± 0.5		4 mm ± 0.5	6 mm ± 0.5
Air bleed	3 holes Ø 110		3 holes Ø 110		130/120	3 holes Ø 110	125/105		2 holes Ø 115	2 holes Ø 110
Econostat	-		-		100	-	100		-	-
Enricher jet	-		-		-	-	-		60	-
Choke petrol jet	160		160		160	160	160		190	-
Vacuum jet	-		-			-	0.45		0.45	-
Needle valve	1.70		1.70		1.70	1.70	1.70		1.50	1.50
Float	5.7 g		5.7 g		5.7 g	5.7 g	5.7 g		5.7 g	5.7 g

(1) - 34 PBICA.7 on XM engine with BA 7 gearbox since May 1970.
(2) - 34 PBICA.7 on XM engine with ZF transmission since May 1970, but with ball valve.
(3) - 34 PBICA.6 on USA XM engine, up to December 1969.
(4) - 32 PBICA.8 and 32 PBICA.8 on USA engine since January 1970.





DESCRIPTION

1 - Fuel intake union.

2 - Acceleration pump adjusting nut.

a - Correction jet.

Gg - Main jet.

Gp - Pump jet.

Gs - Choke jet.

g - Pilot jet.

H - Acceleration pump valve and filter.

i - Pump injector.

K - Choke tube.

Pr - Acceleration pump.

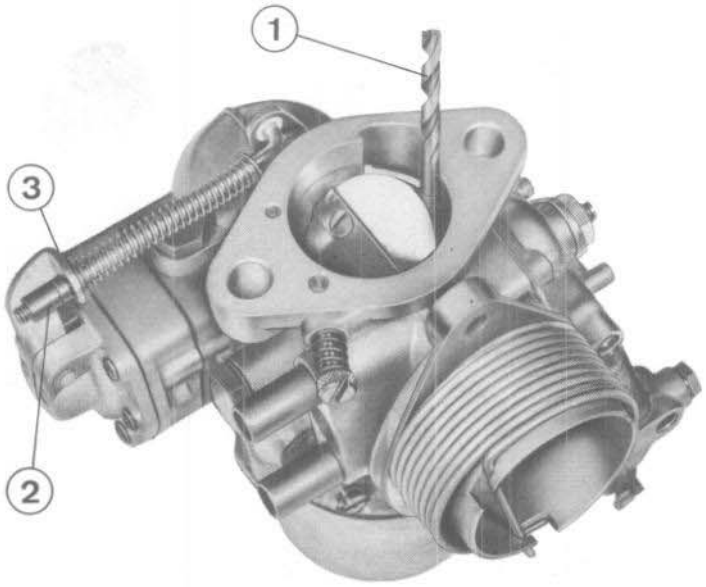
S - Choke lever.

t - Fuel intake filter.

W - Mixture screw.

Y - Main jet holder.

Z - Throttle stop screw.

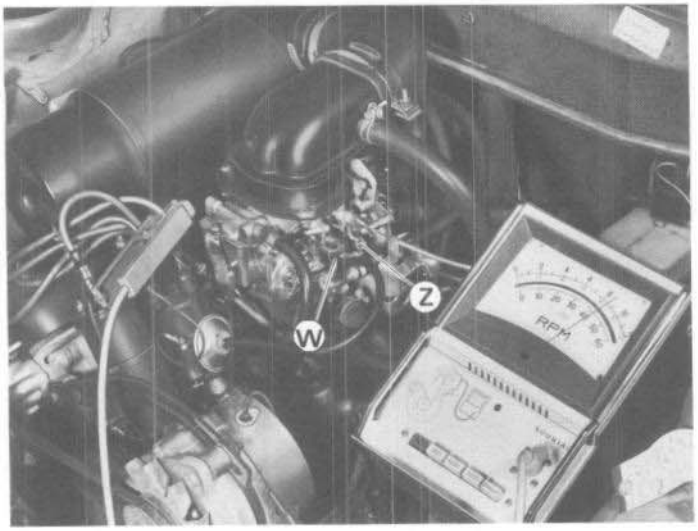


ADJUSTING THE ACCELERATION PUMP STROKE

– Hold the throttle flap open using a rod **(1)** of :

Ø 3 mm - for { 34 PBICA.5 / 34 PBICA.7
Ø 3.5 mm - for 34 PBICA.9
Ø 4 mm - for 34 PBICA.8
Ø 6 mm - for 34 PBIC.8
Ø 6.5 mm - for 34 PBICA.6

– Slacken off nut **(2)** completely then tighten it down until it is just in contact whith lever **(3)**.



ADJUSTING THE IDLING

WARNING - The ignition system must be in good condition and perfectly set.

- The engine must be warm (fan engaged).

– The setting of the secondary carburettor Must not be altered.

– Use a rev-counter

504 Europe-ralenti

504 Europe-cycle

504 U.S. "1971 standards"

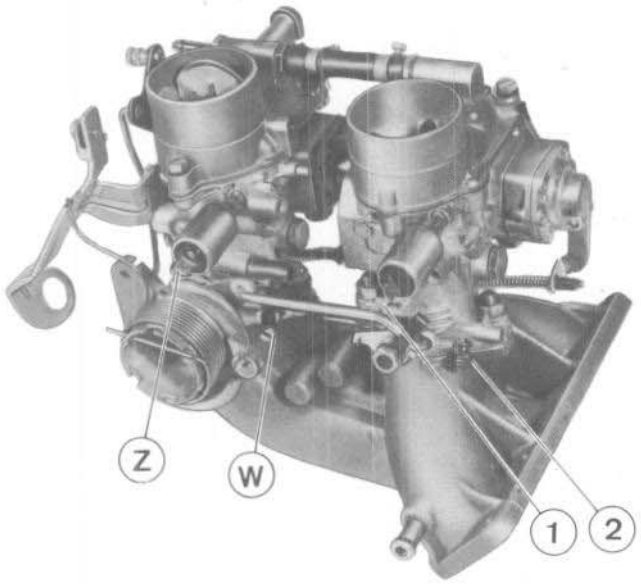
– Acting on stop screw **(Z)**, obtain an engine speed of 840 r.p.m.

– Find the maximum engine speed, by acting on mixture screw **(W)**.

– Bring the engine speed back to 840 r.p.m. acting on the stop screw **(Z)**.

– Repeat these operations until the maximum obtainable engine speed is 840 r.p.m.

– Screw the screw **(W)** in until the engine speed drops to 800 r.p.m. without upsetting the regularity of the idling.



504 US "1972 standards"

504 US "1973 standards"

– Act on screw **(Z)** to obtain an engine speed of :

- 820 r.p.m. for 1972 models

- 800 r.p.m. for 1973 models

– Unscrew **(W)** until the idle running is steady

– Act on screw **(Z)** to obtain an engine speed of :

- 870 r.p.m. for 1972 models

- 830 to 880 r.p.m. for 1973 models

– Finish off the adjustment by screwing in **(W)** to obtain an idling speed of :

- 800 r.p.m. for 1972 models

- 800 to 850 r.p.m. for 1973 models

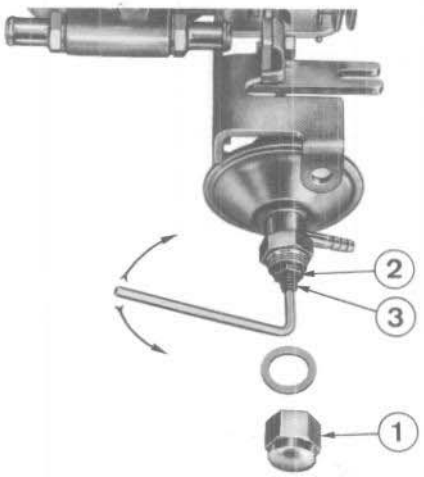
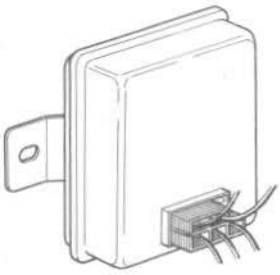


Fig. I



ADJUSTING THE FAST IDLING (U.S.A.)

– Disconnect the connector from the electronic control box to obtain the fast idling.

WARNING

Earthing of the lead N° 83 will lead to immediate damage to the control box.

– Remove the cap **(1)**.

– Slacken the lock nut **(2)**.

– Act on the allen screw **(3)** to obtain an engine speed of 1,400 r.p.m.

– When the connector is reconnected (fig. 1) the engine speed should drop to 800 r.p.m.

TABLE OF SOLEX 32/35 SEIEA CARBURETTOR SETTINGS
XN 1 ENGINE

VEHICLE	504 A11 - A13											
ENGINE GEARBOX USED	XN1 "EUROPE-RALENTI" BA 7		XN1 "EUROPE-RALENTI" ZF		XN1 "EUROPE-CYCLE" (3) BAZ		XN1 "EUROPE-CYCLE" (3) ZF		XN1 - "7.6 : 1 COMPRESSION" BA 7		XN1 - "7.6 : 1 COMPRESSION" ZF	
CARBURETTOR SEIEA 32/35 CHOKE	L.H.D. ref. 57-1 (4) R.H.D. ref. 58-1 (4)		ref. 68-1 (4) ref. 69-1 (4)		ref. 70-1 (4)		ref. 71-1 (4)		ref. 89 ref. 99		ref. 90 ref. 92	
	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd
Venturi	24	27	24	27	24	27	24	27	24	27	24	27
Main jets	125	137.5	122.5	140	125	137.5	122.5	140	125	137.5	122.5	140
Correction jets	140	150	140	150	140	140	140	150	140	150	140	150
Emulsion tubes	ND	S1	ND	S1	ND	S1	ND	S1	ND	S1	ND	S1
Pilot jet	55 / 50 (2)		55 / 50 (2)	-	50	-	50	-	60	-	60	-
Idling air bleed	80	-	80	-	80	-	80	-	80	-	80	-
Calibrated orifice	200	-	200	-	200	-	200	-	200	-	200	-
Pump injectors	50 (1)	35 (1)	50 (1)	35 (1)	50 (1)	35 (1)	50 (1)	35 (1)	50	35	50	35
Pump stroke (control)	cam		cam		cam		cam		cam		cam	
Progressivity jet	110/100	120	110/100	120	-	120	-	120	-	120	-	120
Petrol bleed	-	55	-	55	-	55	-	55	-	55	-	55
Air bleed	-	80	-	80	-	80	-	80	-	80	-	80
Progressivity slot	7.1x0.6 (2)	-	7.1x0.6 (2)	-	7.1 x 0.6	-	7.1 x 0.6	-	7.1 x 0.6	-	7.1 x 0.6	-
Econostat	-	100	-	100	-	100	-	100	-	100	-	100
Vacuum jet	-	-	-	-	-	-	-	-	-	-	-	-
Needle valve	1.80		1.80		1.80		1.80		1.80		1.80	

(1) - Pump injector of 50-35 instead of 40-40 since November 1970 with modified pump cam, with reference XX

(2) - Progressivity slot of 7.1 x 0.6 instead of 110/100 jet and pilot jet of 50 instead of 55 since January 1971.

(3) - "EUROPE-CYCLE" - on 504 for SWEDEN-NORWAY since July 1970 and for GERMANY-AUSTRIA-DENMARK-SWITZERLAND since January 1971.
- on 504 for BENELUX-FINLAND-ITALY since July 1971 and for FRANCE-MARTINIQUE-GUADELOUPE-GUYANE-REUNION-ANDORRA-MONACO since July 1972.

(4) - Suppression of insulating gasket and float cover with controls on it since March 1972.

The carburettors with the 70-1 and 71-1 reference can be fitted in place of the carburettors with the 57-1/58-1 and 68-1/69-1 reference but the reverse is not to be realised.

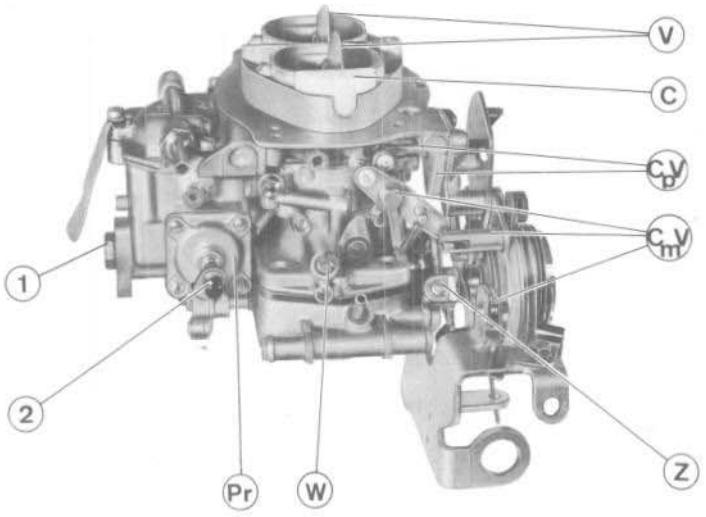
SOLEX CARBURETTOR SETTINGS - XN1 USA ENGINE

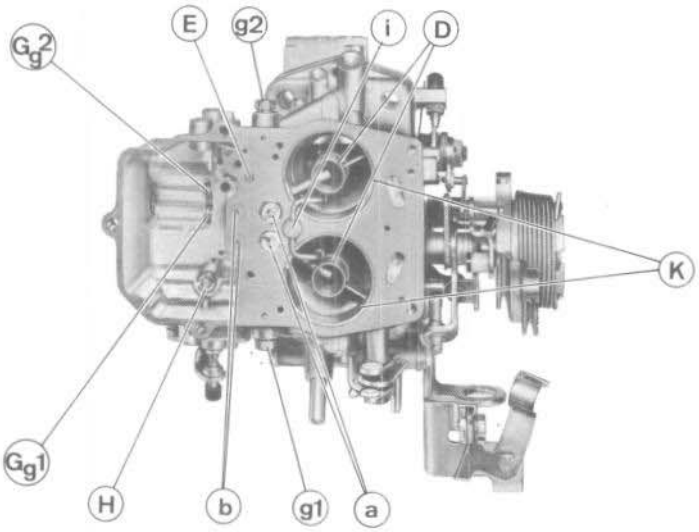
A91 and A93 vehicles

ENGINE	XN1 "71 standards"			
TRANSMISSION FITTED	BA7		ZF	
CARBURETTOR	32-35 SEIEA		32-35 SEIEA	
REFERENCE	56		67	
CHOKE	1st	2nd	1st	2nd
Venturi	24	27	24	27
Main jet	122.5	140	120	142.5
Correction jet	140	150	140	150
Emulsion tube	ND	S1	ND	S1
Idling jet	50	-	50	-
Idling air bleed	80	-	80	-
Calibrated orifice	200	-	200	-
Pump injector	40	40	40	40
Pump stroke (control)	cam		cam	
Progressivity jet	-	120	-	120
Petrol bleed	-	55	-	55
Air bleed	-	80	-	80
Progressivity slot	7.1x0.6	-	7.1x0.6	-
Econostat	-	100	-	100
Vacuum jet	0.55	-	0.55	-
Needle valve	1.80		1.80	

ENGINE	XN1 "72 standards"				XN1 "73 standards"	
TRANSMISSION FITTED	BA7		ZF		BA7 - ZF	
CARBURETTOR REFERENCE	32 BICSA2 79	34 PBIC8 80	32 BICSA2 81	34BICSA2 80	32 BICSA2	34 PBIC8
Venturi	24	24	24	24	24	24
Main jet	*117,5±2,5	*112,5±2,5	*112,5±2,5	*112,5±2,5	*122,5±2,5	*122,5±2,5
Correction jet	210	130	210	130	*180 ± 5	210 ± 5
Emulsion tube	135	17	135	17	136	137
Idle electrovalve	55	50	55	50	55	50
Idling jet (in choke)	120	210	120	210	120	210
Idling air jet	90	- -	90	-	90	-
Pump injector	40	50	40	50	40	50
Main jet cap	Ø 3,2	Ø 3,2	Ø 3,2	Ø 3,2	Ø 3,2	Ø 3,2
Vacuum jet	0,55	-	0,55	-	-	-
End of pump stroke for throttle opening of :	1,5 mm±0,5	6 mm ± 0,5	1,5 mm±0,5	6 mm ± 0,5	3,5 mm±0,5	6 mm±0,5
Air bleed (2 holes)	Ø 130	Ø 110	Ø 130	Ø 110	Ø 130	Ø 110
Econostat	-	-	-	-	-	90
Needle valve	1,2	1,5	1,2	1,5	1,2	1,5
Float	5,7 g	5,7 g	5,7 g	5,7 g	5,7 g	5,7 g

*WARNING - The exact calibration of the main and correction jets, within the limits given, is obtained with a test bench. They must therefore never be changed.





INDEX TO PARTS

1 - Float bowl plug (access to main jets).

2 - Acceleration pump adjusting screw

C - Plastic plug.

CmV - Manual strangler control.

CpV - Pneumatic partial strangler opening control.

Pr - Acceleration pump.

V - Strangler flap.

W - Mixture screw.

Z - Throttle stop screw.

a - Correction jets (fixed).

b - Overflow jets (fixed).

D - Sprayers (removable).

E - Econostat jet (removable).

g1 - Pilot jet (1st choke).

g2 - Bleed jet (2nd choke).

Gg1 - Main jet (1st choke).

Gg2 - Main jet (2nd choke).

H - Acceleration pump valve (removable).

i - Double acceleration pump injector (removable).

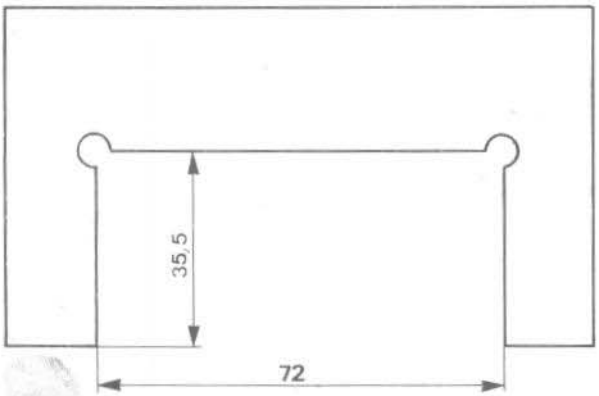
K - Venturis (1st choke : Ø 24 -2nd choke : - Ø 27, incorporating idling air jets (removable).

WARNING - The setting of screws :

3 - Second throttle flap stop.

4 - Partial opening of first throttle flap when starting the engine.

should never be altered.



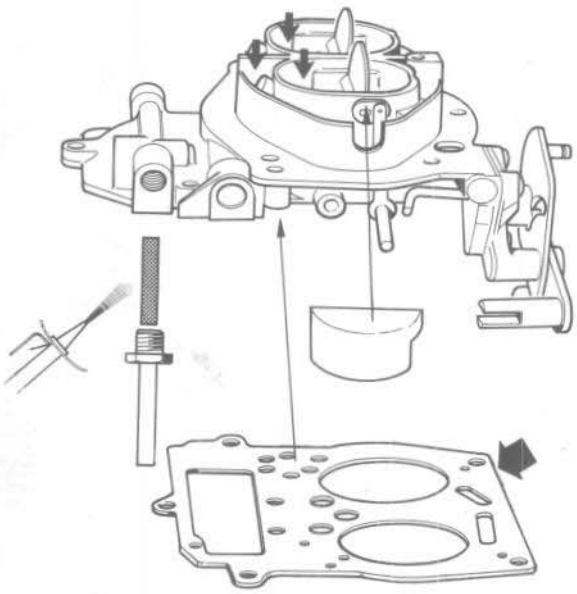
CLEANING AND CHECKING

The removal of the carburettor is not necessary for cleaning.

TOOLS TO BE MADE

0.0138.

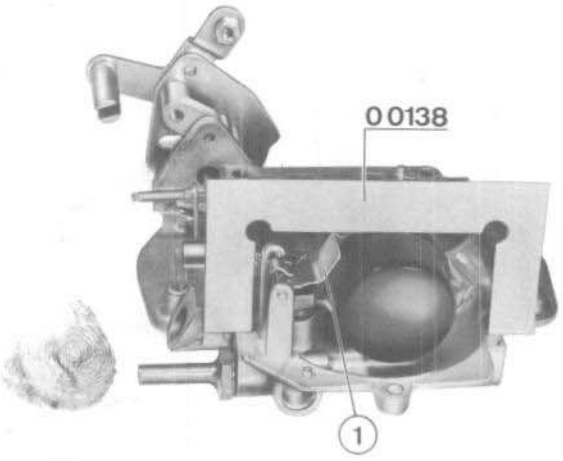
– Carburettor float level gauge.



Float bowl cover

– Remove :
  - the cover
  - the gasket (check and replace if necessary)

– Clean and blow dry :
  - the cover
  - the idling air bleed holes
  - the fuel filter



Check the float level

– Place the gauge on the cover with the gasket removed (the gauge resting on the mating face of the cover).

– The smaller diameter of the float should be in contact with the gauge, the needle valve being closed.

– Adjust by bending the pivot arm **(1)** on the float.

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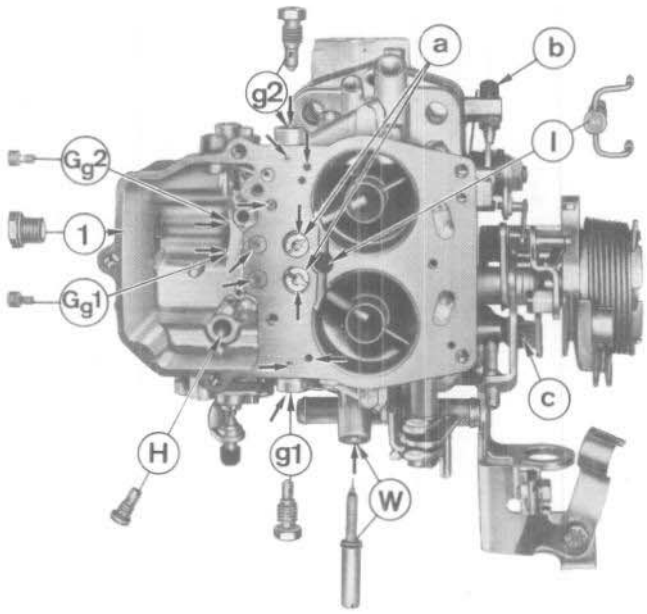


WARNING :

- Do not remove the correction jets (a) and never alter their position.

- Do not alter the setting of screws (b) and (c).

– Remove :

(2) - the float bowl plug

(W) - the mixture screw

(g1) - the idling jet

(g2) - the idling by pass jet

(H) - the acceleration pump valve

(I) - the acceleration pump injectors

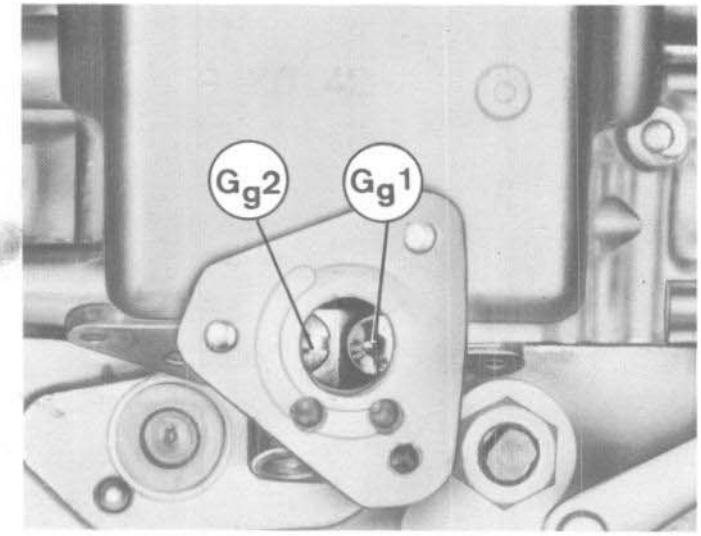
(Gg1) - the main jet (1st choke - small Ø)

(Gg2) - the main jet (2nd choke - large Ø)

– Clean the float bowl.

– Blow :

- through all the holes marked with an arrow
- through all the jets which have been removed.

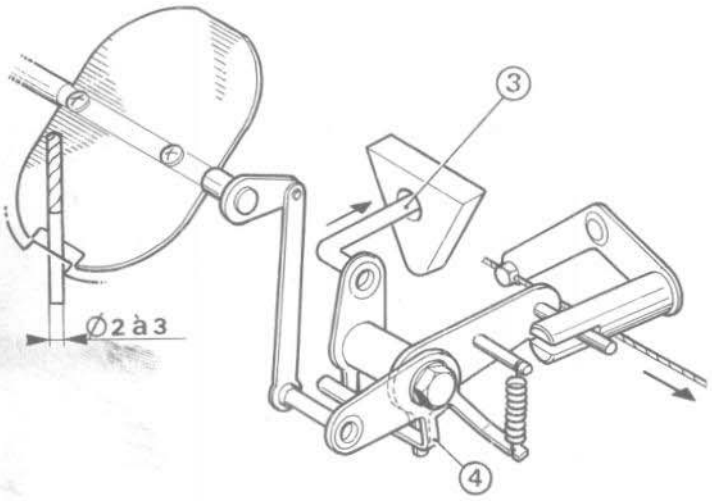


– Reassemble the carburettor

WARNING

– *Do not invert*
  - *the main jets*
  - *the idling jets*
  (see table of carburettor settings).

REMINDER - The main jet Gg1 (smaller Ø) is fitted on the acceleration pump side.



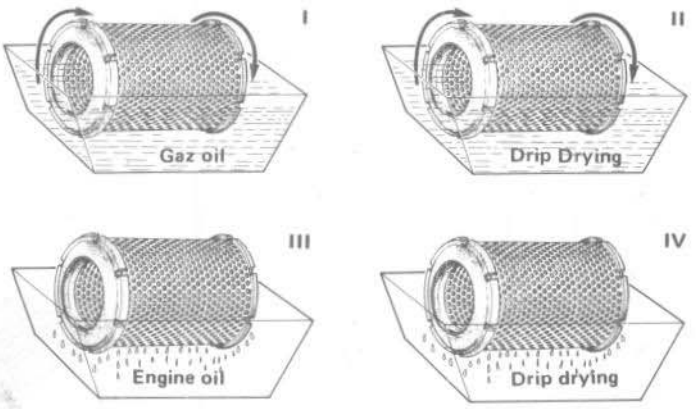
CHECKING THE PARTIAL OPENING OF THE STRANGLER FLAPS

– Pull out the choke knob.

– Push in the rod **(3)** until it abuts, to obtain the partial opening of the flaps.

– The flap in the 1st choke should be open 2 3 mm ; check as shown opposite.

– Adjust if necessary by bending lever **(4)**.



AIR FILTER

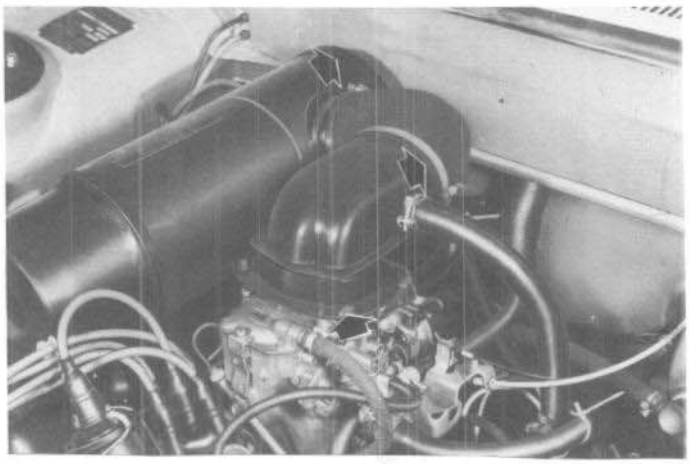
1 - Nylon filter element

– Change the element every 40 000 km (24 000 miles).

– Clean it every 10 000 km (6 000 miles).
  - Blow the element clean.
  - Rinse it in diesel fuel and leave to drain.
  - Immerse in engine oil and, after draining it, refit.

2 - Polyurethene foam element

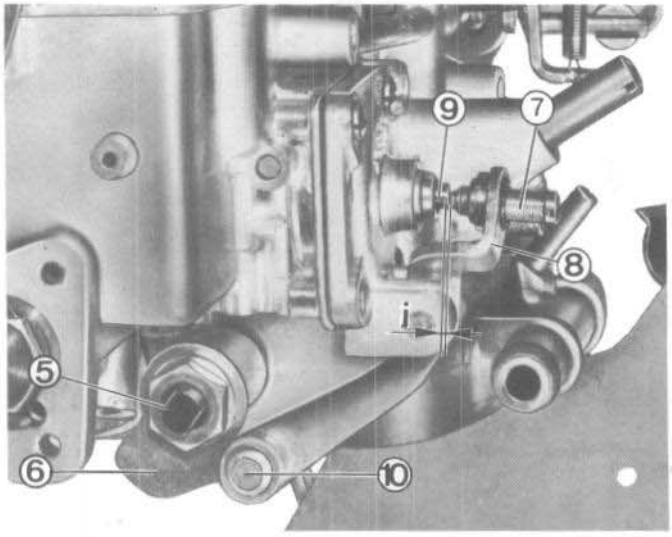
– Change the element every 20 000 km (12 000 miles) or every 10 000 km (6 000 miles) if the vehicle is used in very dusty areas.



- Clean and blow dry
  - the air intake hoses
  - the filter bowl.

- Refit the filter
  - change the gasket at the carburettor/intake hose joint.

- Check for leaks
  - the air filter bowl
  - the air intake hose

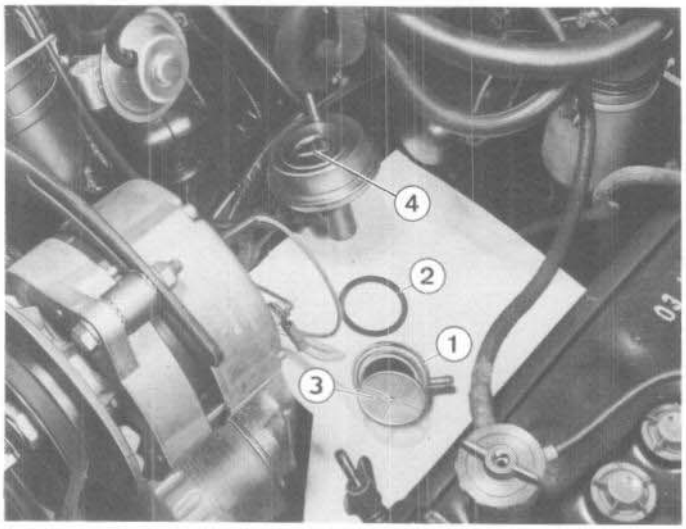


ACCELERATION PUMP ADJUSTMENT

- Make sure that :
  - the idling is correctly adjusted
  - the nut **(5)** on the cam **(6)** is tight.

- Unscrew the screw **(7)** to obtain a gap at **(J)**.

- Screw in the screw **(7)** until it just touches the plunger **(9)** in order that the roller **(10)** is free on the cam **(6)**.



FUEL PUMP

- Remove :
  - the cover **(1)**
  - the gasket **(2)** ; check and replace if necessary.

- Clean the pump filter in petrol

- Clean and blow the upper part of the pump dry.

WARNING

In order not to damage the valves **(3)** *only use low pressure air.*

- Reassemble the pump.

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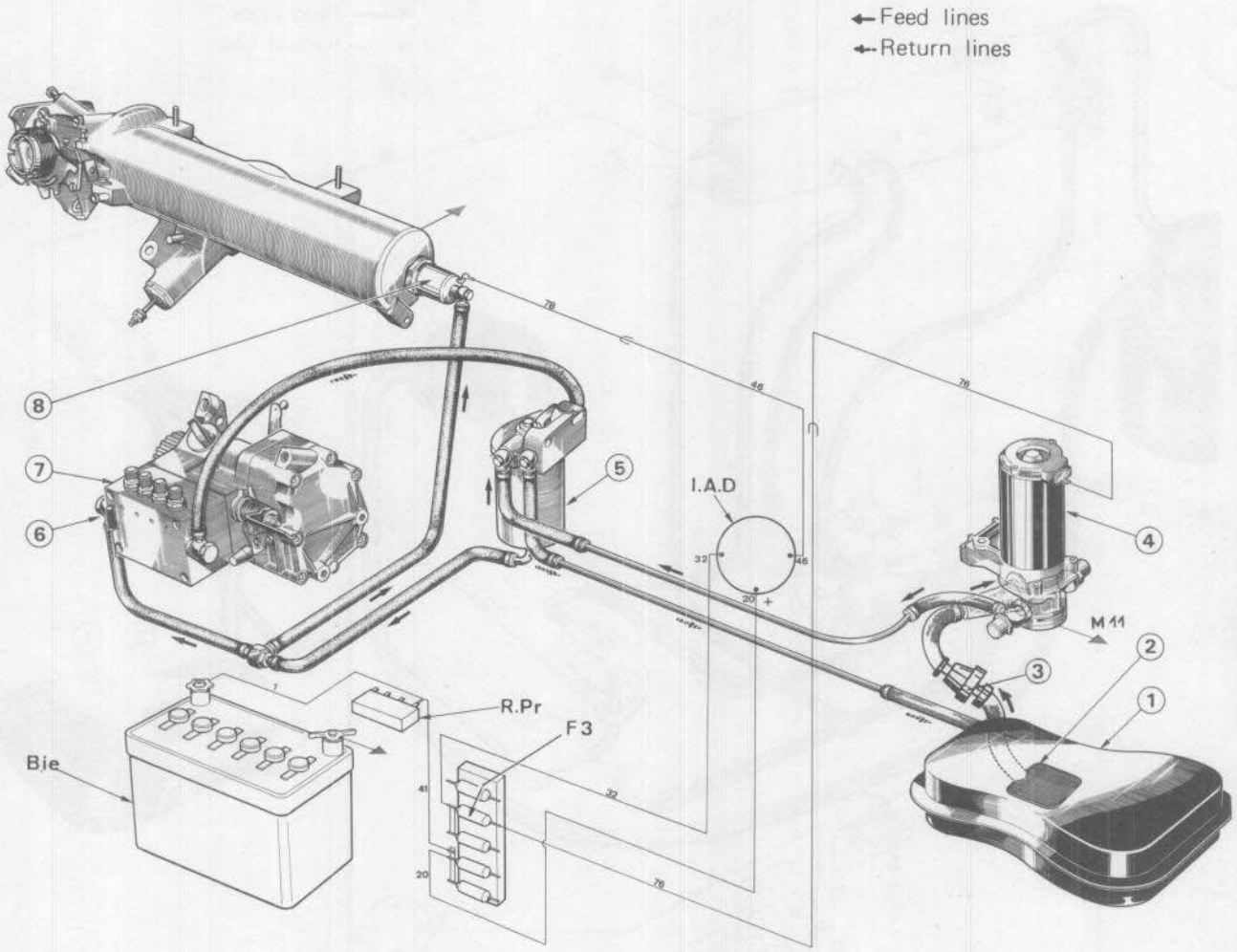
Feed circuit



DESCRIPTION

WIRING

Bie - Battery
R.Pr. - Relay
F3 - Fuse
I.A.D. - Ignition switch

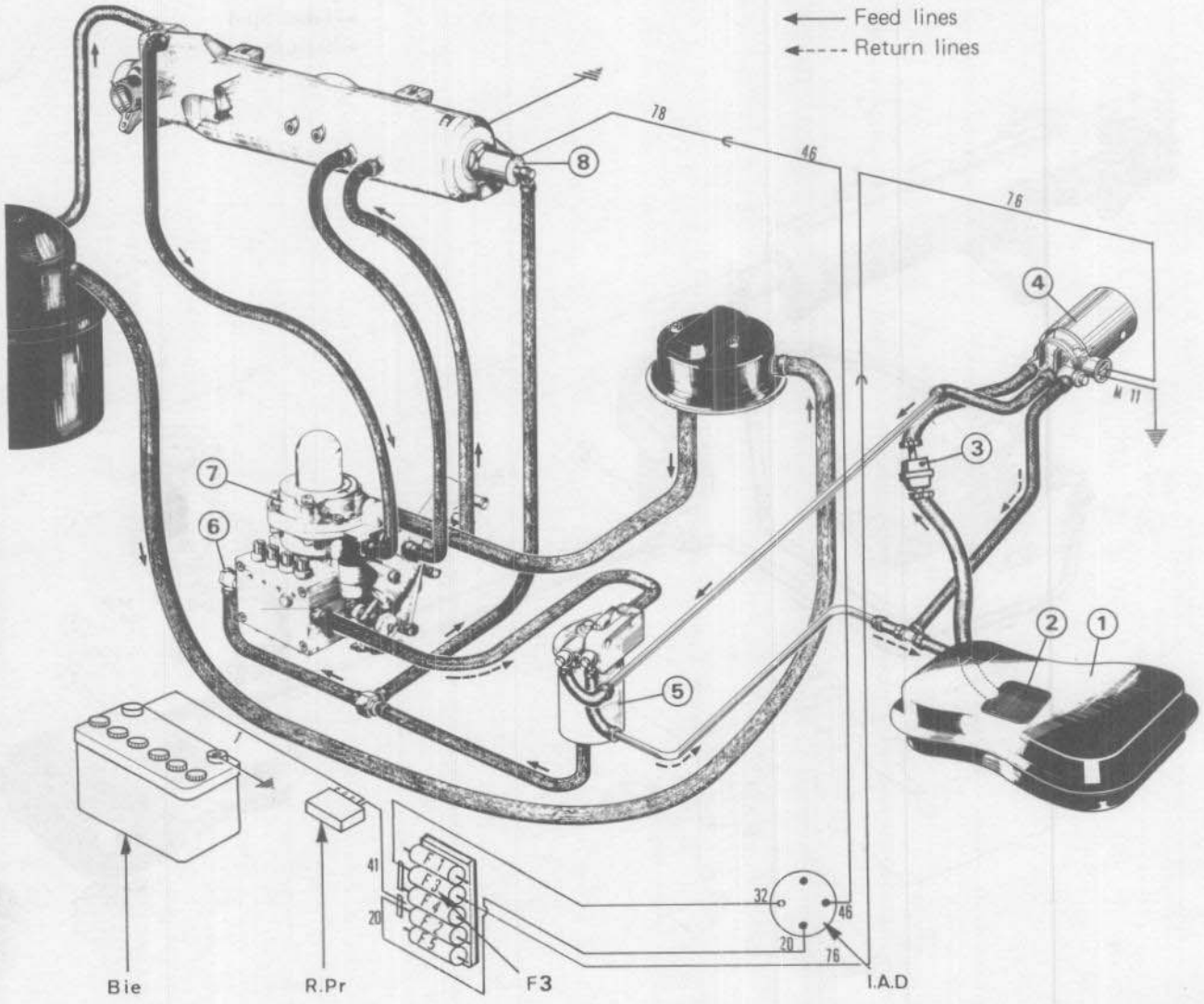
HYDRAULIC CIRCUIT

1 - Fuel tank
2 - Fuel strainer
3 - Pre-filter
4 - Electric lift pump
5 - Degassing filter (water trap)
6 - Injection pump filter
7 - Injection pump
8 - Electrovalve.

PETROL INJECTION ENGINE

FEED CIRCUIT - KF 5 AND XN 2 ENGINES

Feed circuit



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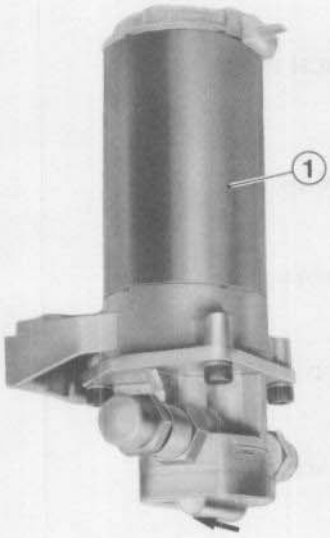
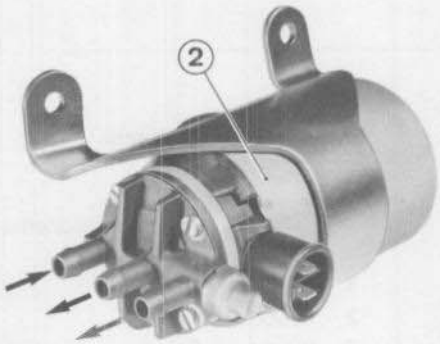




LIFT PUMPS

IDENTIFICATION

KF 6 engine

PLF 6 pump **(1)**

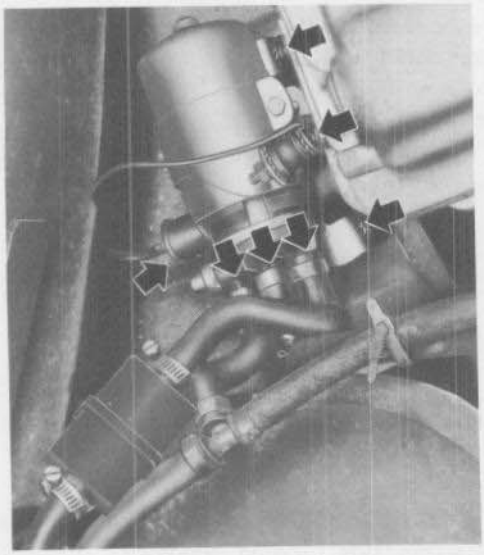
- Hydraulic part : Kugelfischer
- Electric part : A.E.G.

KF 5 and XN 2 engines

Bosch pump **(2)**

Characteristics

- Feed voltage : : 12 V
- Current absorbed : 2.3 A
- Output : 50 litres/hour at 1.2 bars

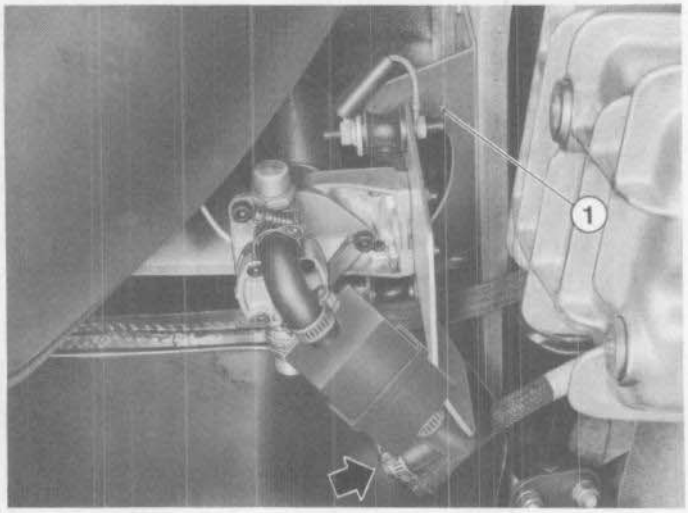


REMOVAL

- Disconnect
  - the wires
  - the fuel lines (seal them off).
- Remove the pump

REFITTING

- Replace all the copper union seals on PLF 6 pumps.



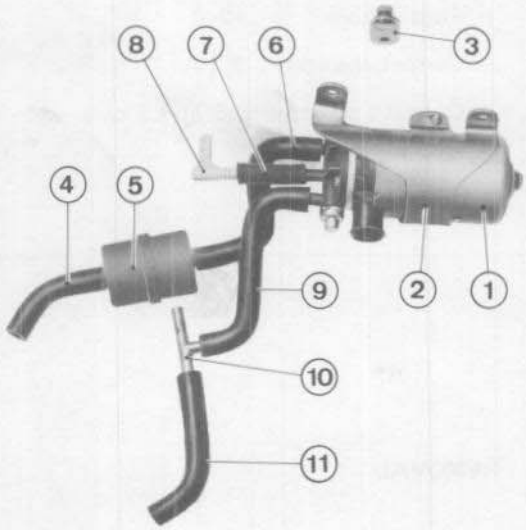
ADAPTING A BOSCH PUMP

Removing the PLF 6 pump

– Disconnect the wires.

– Remove the pump and the bracket **(1).**

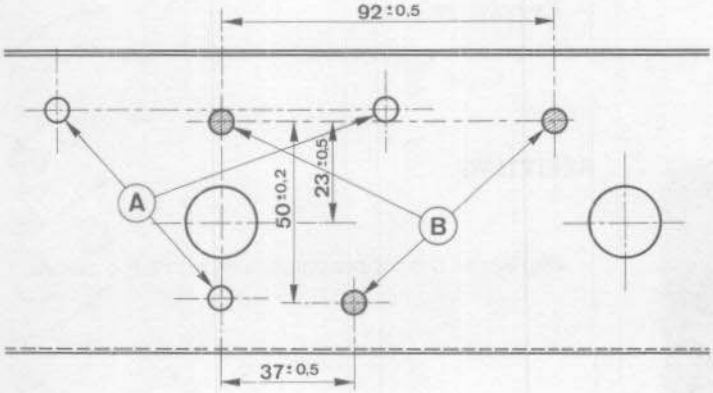
– Seal of the fuel lines.



Fitting the Bosch pump.

The following components must be used :

1 - Lift pump
2 - Bracket
3 - Support plate
4 - Feed line
5 - Pre-filter
6 - Line between pre-filter and pump
7 - Pump outlet line
8 - Two way union
9 - Fuel return line
10 - " T " union
11 - Fuel return line.



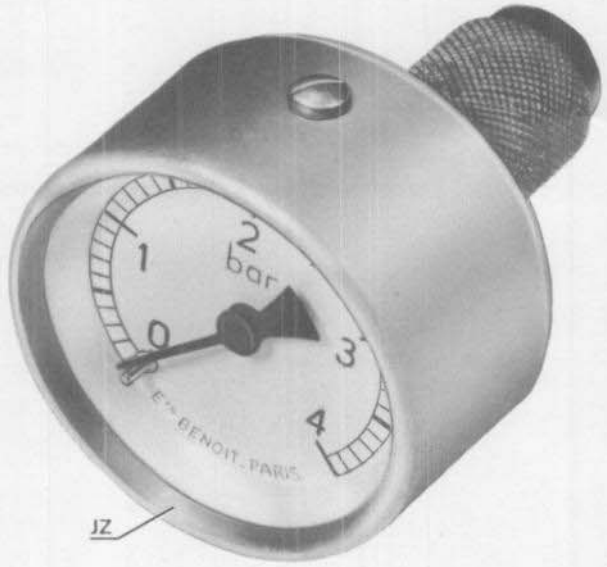
Bosch pump mounting holes

– Drill 3 holes (Ø 7.2 mm) in the rear floor reinforcement (see drawing opposite).

A - PLF 6 pump mounting holes

B - Bosch pump mounting holes

N.B. - *The positions for the 3 holes are marked with a punch from body N° 156 995.*

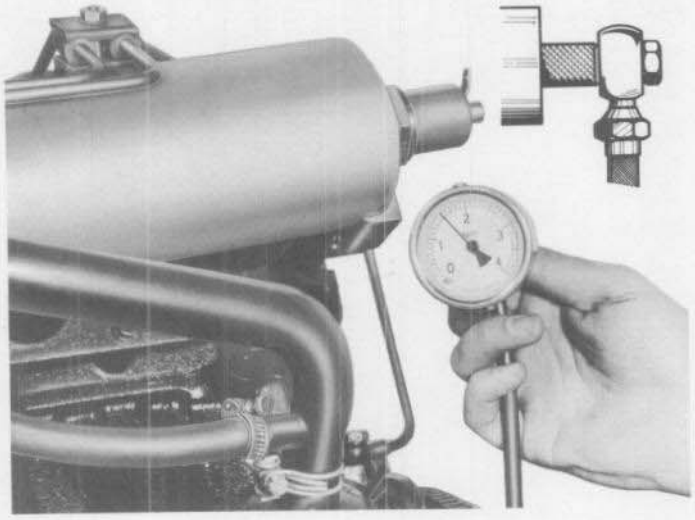


CHECKING THE FEED PRESSURE

Tools to be used.

8.0112 W - Petrol injection engine tool chest

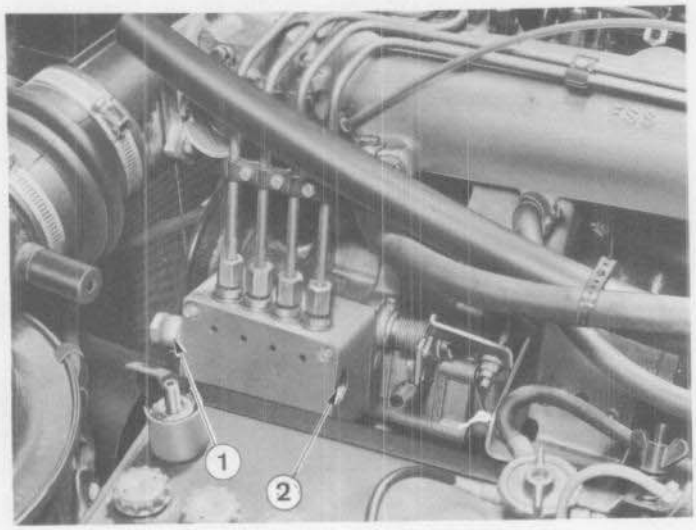
JZ - Pressure gauge.



– Install the pressure gauge as shown opposite.

– Switch on the ignition.

– The pressure must be between 1 and 2.5 bars.



– If the pressure is lower than 1 bar, check :
- the amount of fuel in the tank,
- the fuel line connections on the tank,
- the pump feed voltage : 12 V ± 0.1,
- the circuit for leaks,
- the condition of the pre-filter and the degassing filter cartridge.

– Repeat the check and, if necessary, replace the pump.

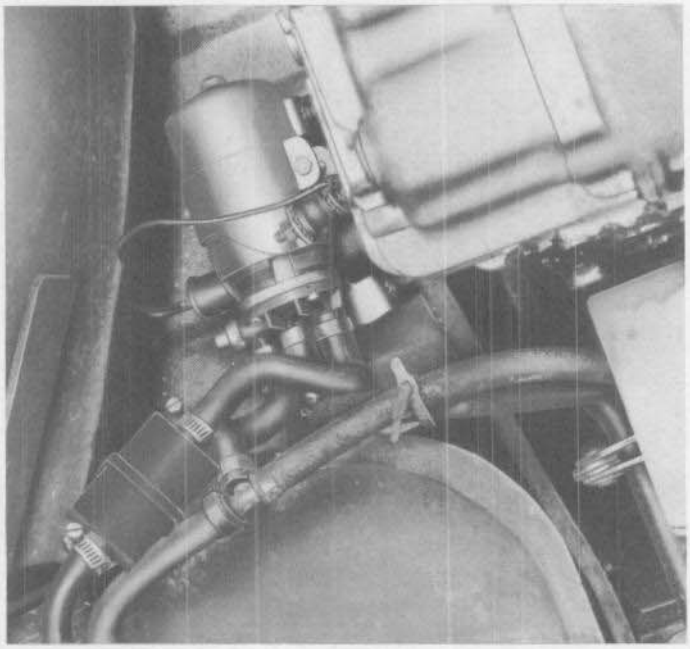
– If the pressure is higher than 2.5 bars, check :
- the pump intake filter **(1)**,
- the jet **(2)** in the hydraulic head, after removing the union,
- the return lines.

N.B. - *A pressure of slightly more than 2.5 bars will have no ill effect on the operation of the injection pump.*

– Reconnect the fuel line to the electrovalve, using new sealing washers.

PETROL INJECTION ENGINE

LIFT PUMPS



- Install the pump and realise the various connections.
- Start up the engine.
- Make sure that there are no leaks.

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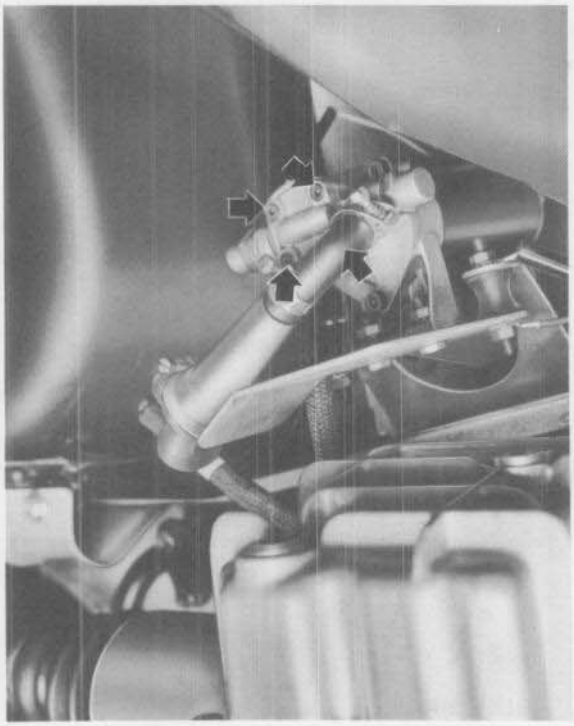


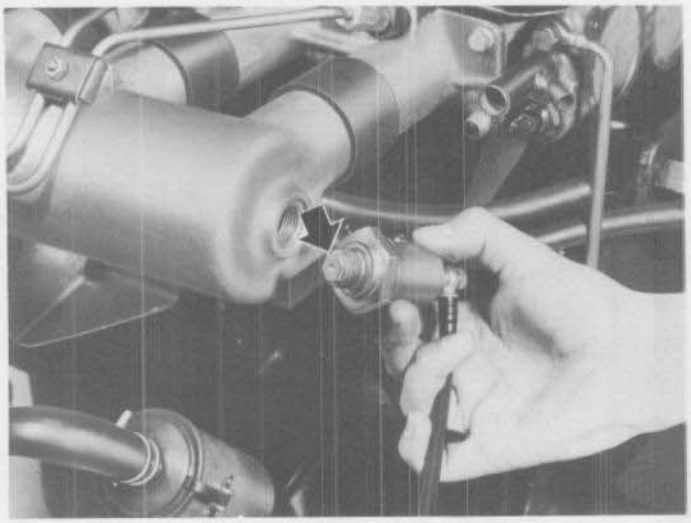
CHECKING FOR LEAKS

Feed circuit.

There should be no apparent leakage from the pump body and unions.

If there are, check the tightness of the allen screws on the pump body.

If the unions leak, replace the seals rather than tighten the screws.



Electrovalve

– Remove the electrovalve.

– Refit the petrol feed union.

– Reconnect the feed wire.

– Switch on the ignition.

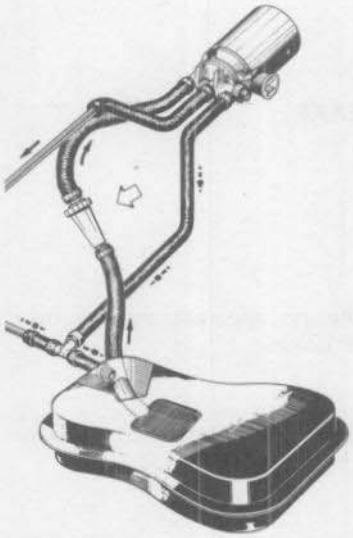
The valve should not leak. If it does, change the unit.

– When refitting replace the seals.

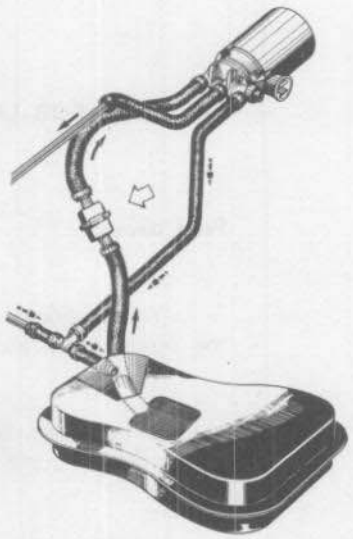
PETROL INJECTION ENGINE

FILTERING

1st Fitting



2nd Fitting



FILTERING

Pre-filter

1st Fitting
– A.M.F.G. filter.

2nd Fitting
– Bosch filter.

Maintenance
– Replace the filter every 15,000 km.
– Never blow it clean with compressed air.

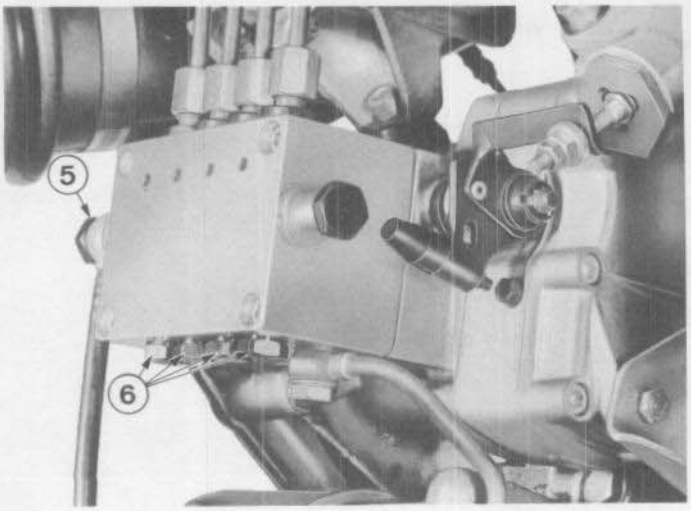
N.B. - *In the event of replacement, only use the 2nd fitting filter (Bosch).*

BLEEDING

– Place a recipient under the filter.

– Bleed the filter through screw **(3).**

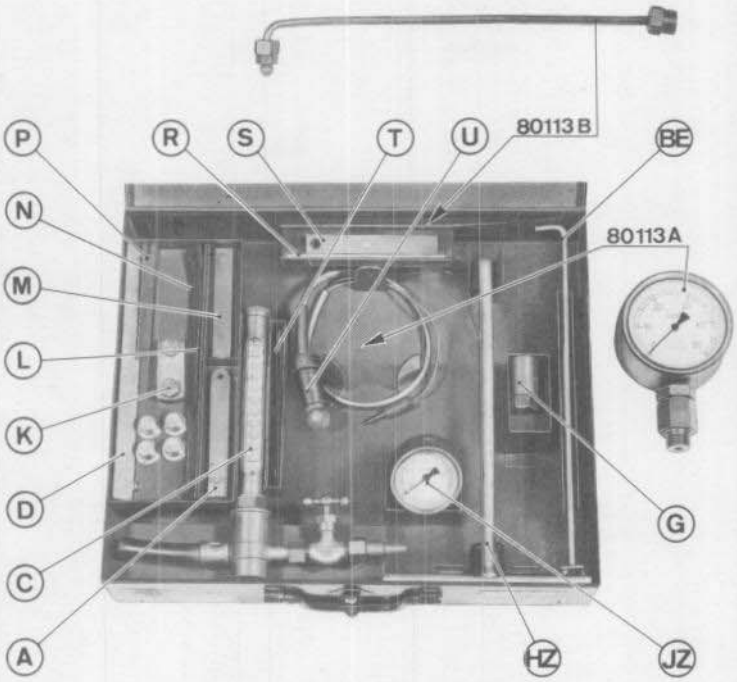
WARNING - If more than 10 c.c. of water are recovered :
- remove the filter bowl and clean it,
- drain the fuel tank,
- blow through the fuel lines,
- replace the C113 cartridge **(4),** if necessary.



– Check :

- the pump intake filter **(5),**

- the suction valve filters **(6),**
(see page 13 14, class 1).



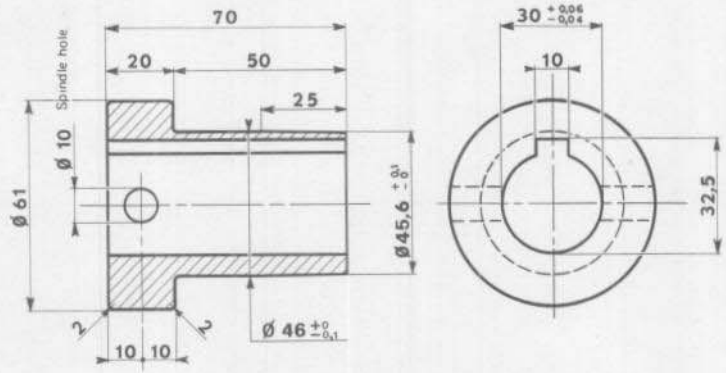
TOOLS TO BE USED

Tool chest for petrol injection engines.
404 KF - KF 2
504 KF 6 - KF 5 - XN 2.

8.0112 W

A - Gauge
B/E - Positioning rod
C - Thermometer
D - Gauge
G - Socket for bleeding the delivery valves
HZ - "T" wrench
JZ - Pressure gauge
K - Puller
L - Feeler for KF 2
M - Gauge for KF 2
N - Feeler
P - Retaining key
R - Gauge for adjusting the pump-throttle link
S - Gauge for setting the mean throttle flap position.
T - Gauge for adjusting the thermostat
U - Lamp for adjusting the throttle flap.

Empty spaces for storing **8.0113 A** and **8.0113 B.**



TOOLS TO BE REALISED

0.0128

Bush for centering the timing cover.

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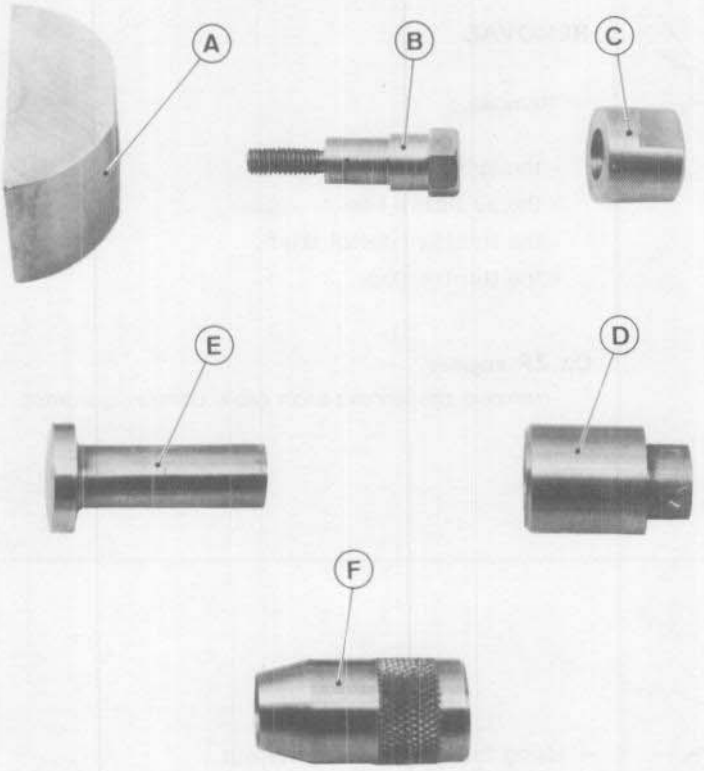


TOOLS TO BE REALISED 0.0143

(see page 01 01, class 15).

A - Nut for installing the DU bush

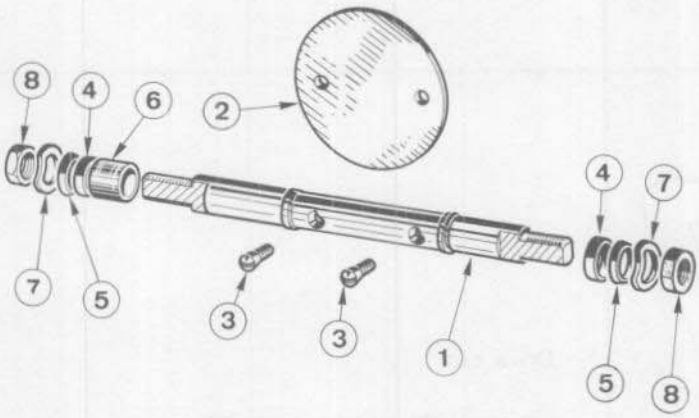
B - Draw bolt

C - Throttle spindle retaining nut

D - Guide for the 2nd bush

E - Drift for the 2nd bush

F - Drift for the seals.



REPAIR KIT

1 - Throttle spindle

2 - Throttle flap

3 - Throttle flap screws

4 - DU bush - 10 x 12 x 10 mm

5 - Nylon seal

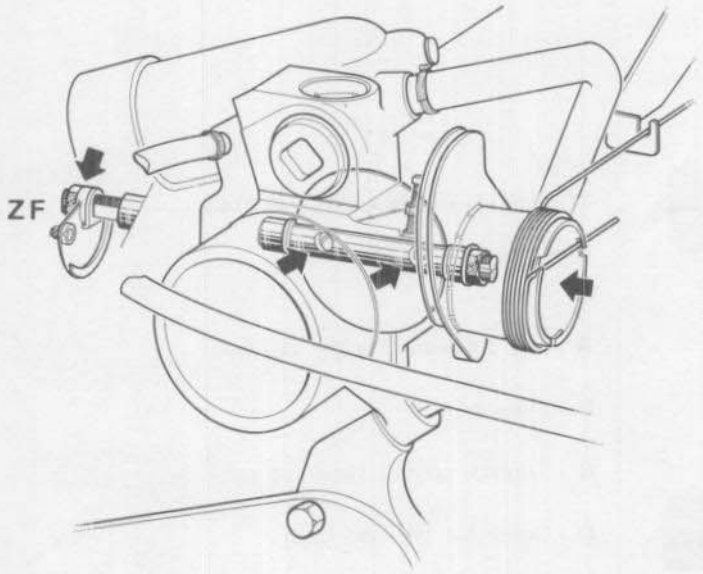
6 - Spacer

7 - Onduflex washer (Ø 8 mm)

8 - Nut

PETROL INJECTION ENGINE (KF 5 - XN 2)

REPLACING THE THROTTLE FLAP SPINDLE



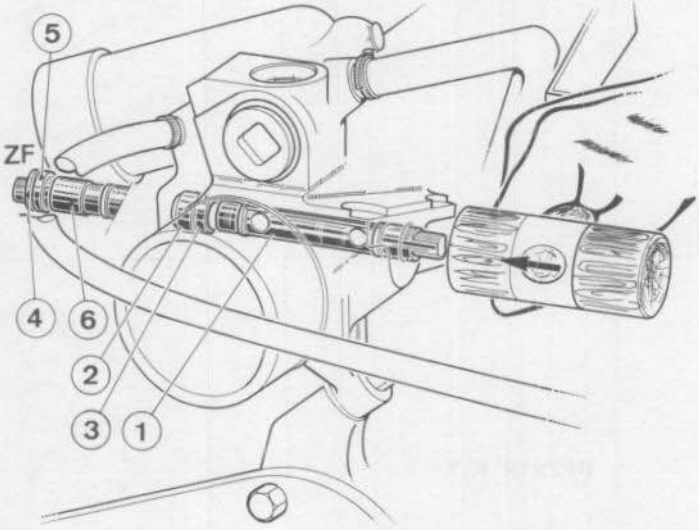
REMOVAL

– Remove :

- the ignition coil,
- the air intake hose,
- the throttle control drum,
- the throttle flap.

On ZF engines

- remove the acceleration cable control quadrant.

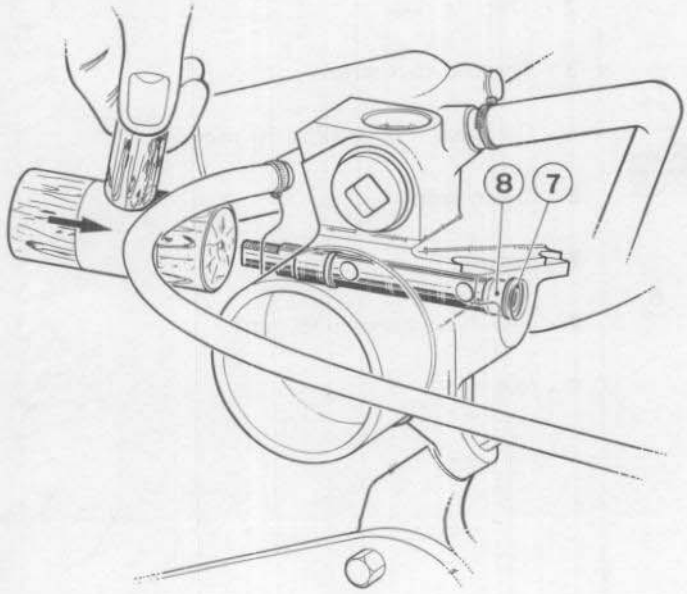


– Using the spindle **(1)**, drive out :

- the plug **(2)** and the bush **(3)**.

On ZF engines

- the seal **(4)** the spacer **(5)** and the bush **(6)**.



– Drive out :

- the seal **(7)** and the bush **(8)**.

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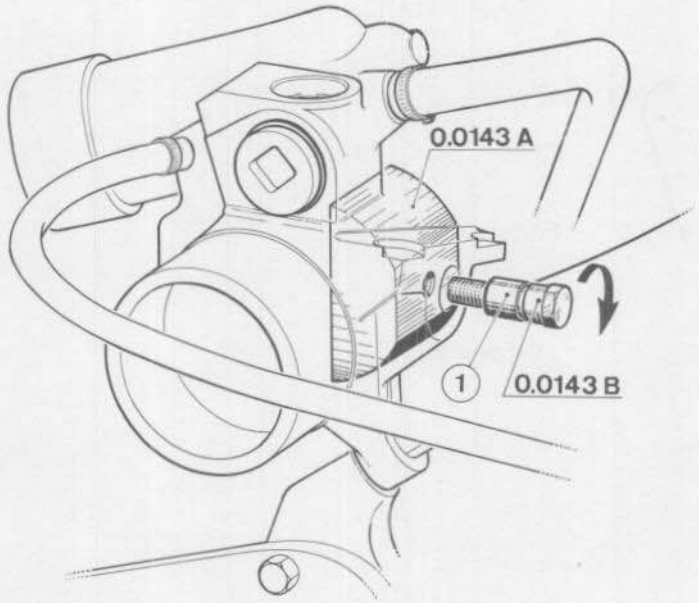
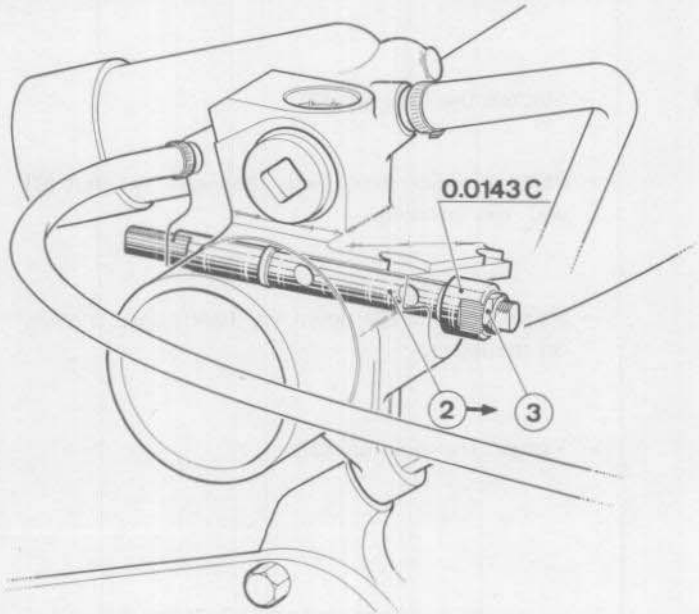
REASSEMBLY

- The air distribution chamber must be in perfect condition and spotlessly clean.
- Use all the parts in the repair kit.



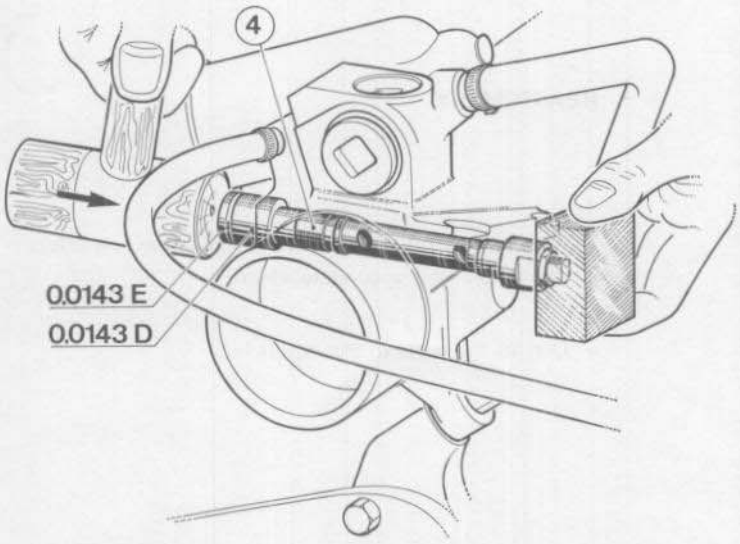
- Fit the bush **(1)** on the throttle drum side.
- Tighten the draw bolt **(B)** until it abuts.



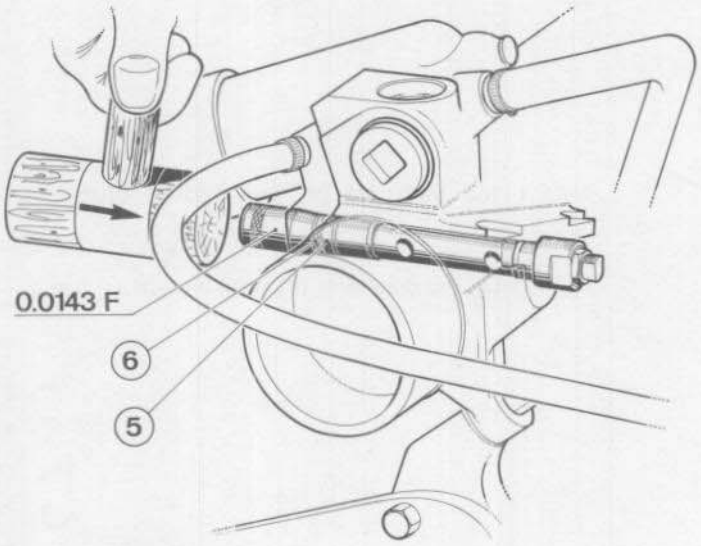
- Lock the spindle **(2)** using the nut **(C),** with the flats facing away from the housing (short threaded end on the drum side).
- Tighten the lock nut **(3),** whilst holding the nut **(C)** with a 17 mm spanner.

PETROL INJECTION ENGINE (KF 5 - XN 2)

REPLACING THE THROTTLE FLAP SPINDLE

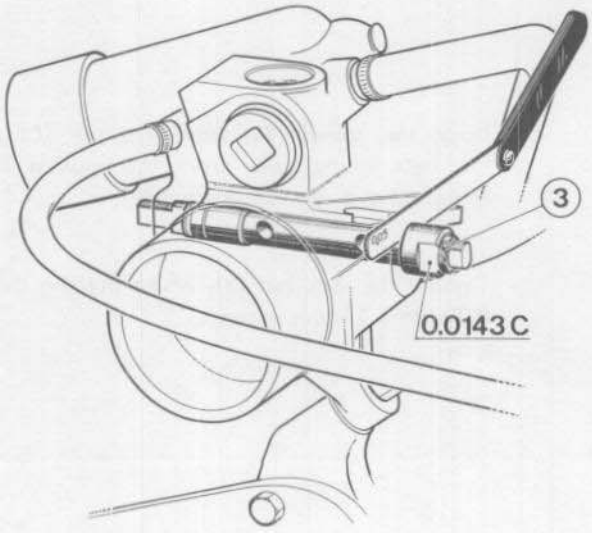


– Install the bush **(4)**, with the spindle in place, bearing against a lead block.



– Fit :

- the spacer **(5)**,
- the seal **(6)**.

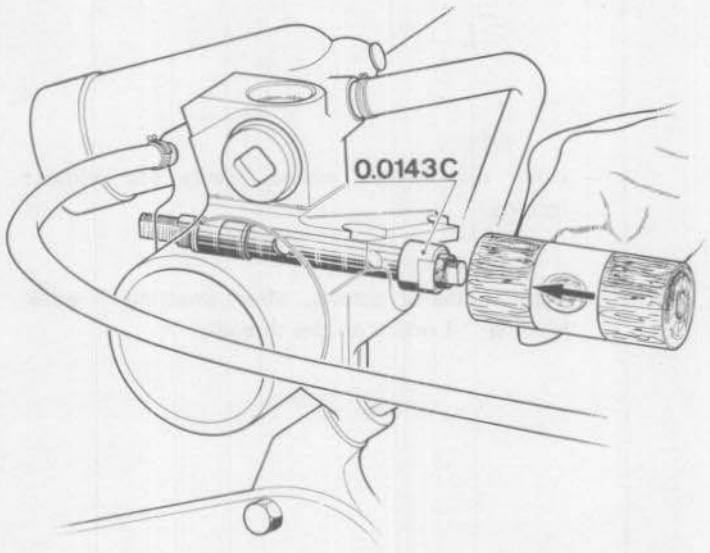


– Slacken the lock nut **(3)**.

– Place a 0.05 mm feeler between the nut **(C)** and the housing.

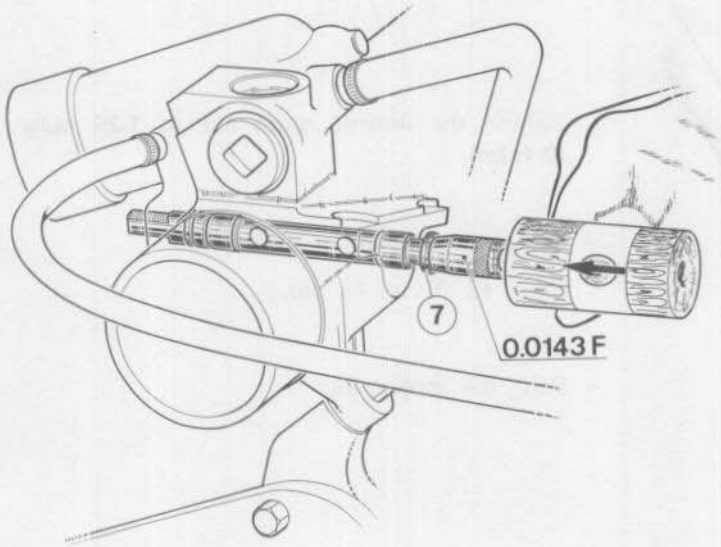
– Screw the nut **(C)** down, by hand, until it abuts on the feeler.

– Tighten the lock nut **(3)**.



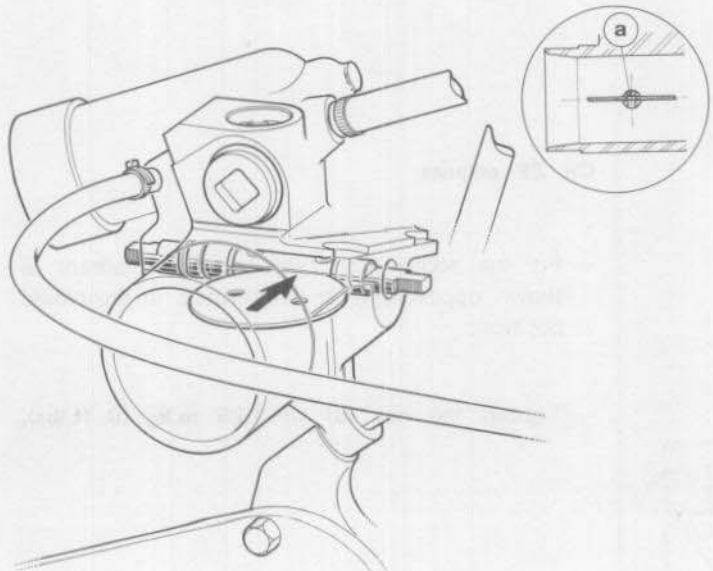
- Bring the nut **(C)** up against the housing by tapping on the end of the spindle.

- Remove the lock nut **(3)** and the nut **(C)**.



- Make sure that the spindle rotates freely with an end float of approximately 0.05 mm.

- Fit the nylon seal **(7)**.



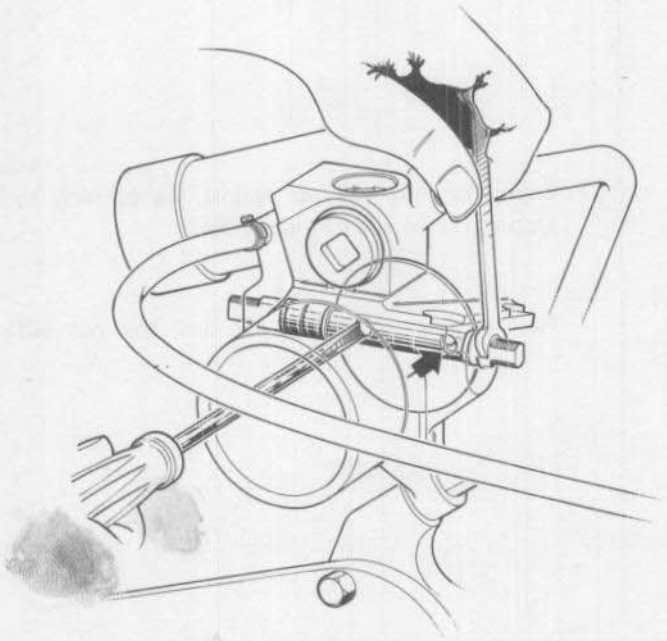
- Position the spindle with the countersunk holes **(a)** facing up.

- Insert the throttle flap in the slot as shown, opposite.

- Make sure that it is centered by snapping the throttle shut a number of times.

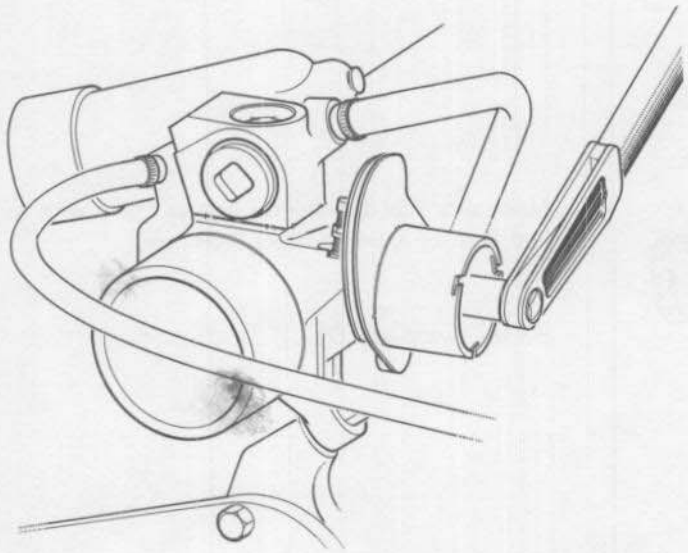
PETROL INJECTION ENGINE (KF 5 - XN 2)

REPLACING THE THROTTLE FLAP SPINDLE



– Hold the throttle closed, firmly but without forcing.

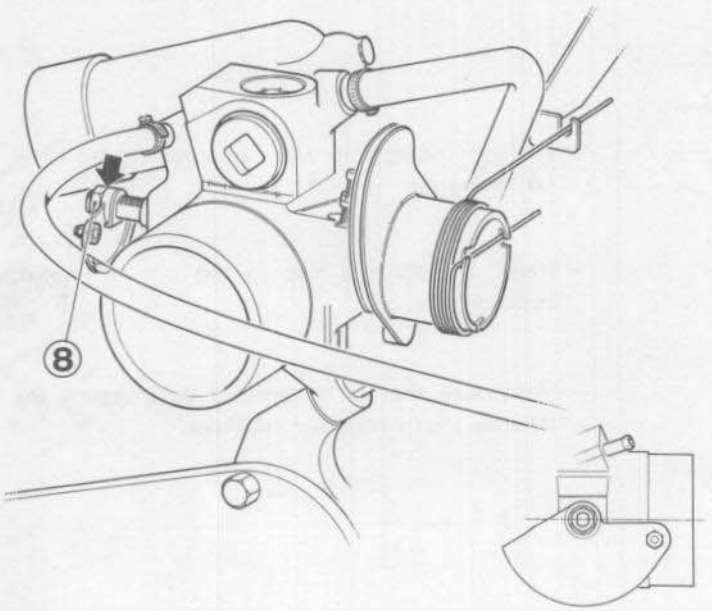
– Tighten the 2 screws, after smearing " weak holding " Loctite on the threads.



– Tighten the throttle drum nut to **1.25 m.kg (9 ft.lbs).**

– Carry out the various adjustments (page 13 31 to 13 36).

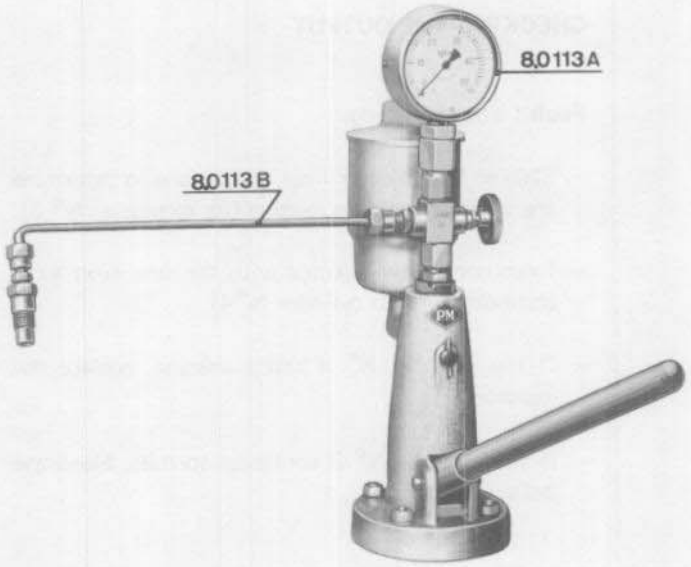
– Refit the accessories.



On ZF engines

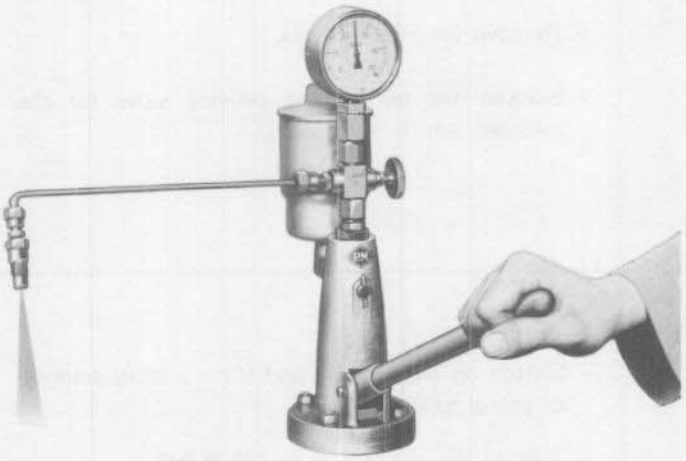
– Fit the acceleration cable control quadrant as shown opposite, with the throttle in the closed position.

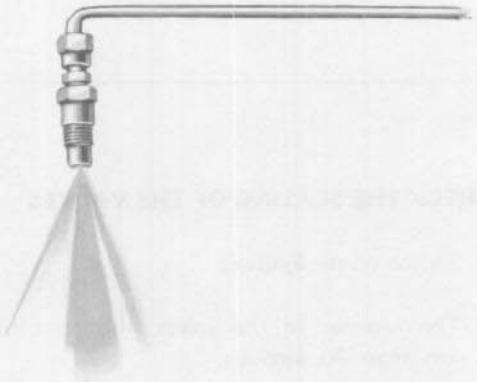
– Tighten the nut **(8)** to **1.25 m.kg (9 ft.lbs).**



TOOLS TO BE USED

- Apparatus : PM : type 22.41.01.0002
  or Bosch ref : 068.1143.013.
- Pressure gauge, 0 to 50 bars : **8.0113 A.**
- Injector support tube : **8.0113 B.**





CHECKS

- Remove the injector.

  Before checking, flush the injector thoroughly by several rapid strokes of the pump.

  - Pressure

  Initial : 30 to 38 bars
  Minimum : 15 bars
  (no possible adjustment).

  - Sealing

  No formation of drops after 5 seconds at 15 bars.

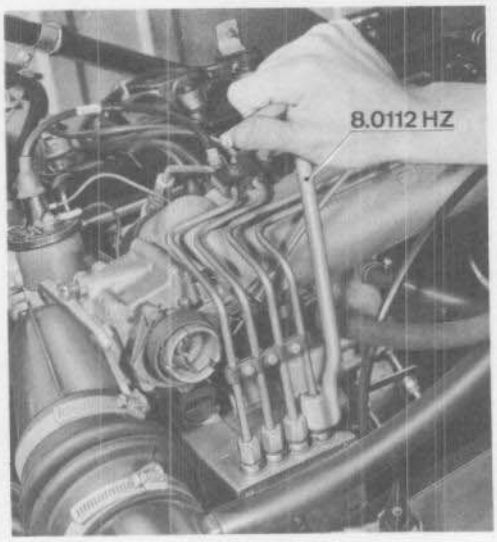
  - Shape of the jet

  Fine conical jet with no splashing

- Refit the injector :
  - tighten the injector to **2 m.kg (14.5 ft.lbs).**
  - tighten the injector line to **2.5 m.kg (18 ft.lbs).**

PETROL INJECTION ENGINE

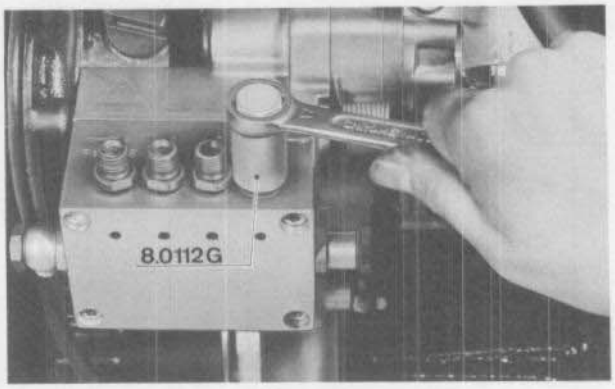
DELIVERY VALVES



CHECKING THE OUTPUT

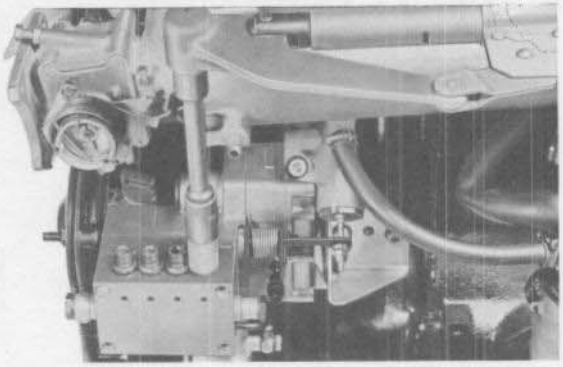
Fault : irregular idling.

- Slacken the injector lines one by one to determine the cylinder which is missing (for example : N° 3).
- Interchange the injector with the one next to it (cylinder N° 3 to cylinder N° 4).
- If the cylinder N° 4 starts missing, replace the injector.
- If the cylinder N° 3 continues to miss, bleed the delivery valve.

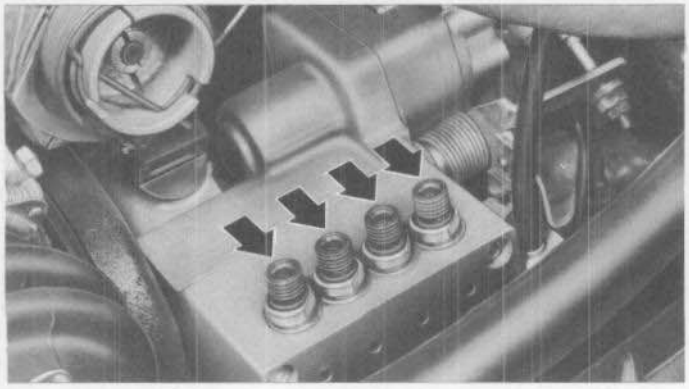


BLEEDING A DELIVERY VALVE

- Remove the injector lines.
- Slacken the nut of the delivery valve for the cylinder which is missing.

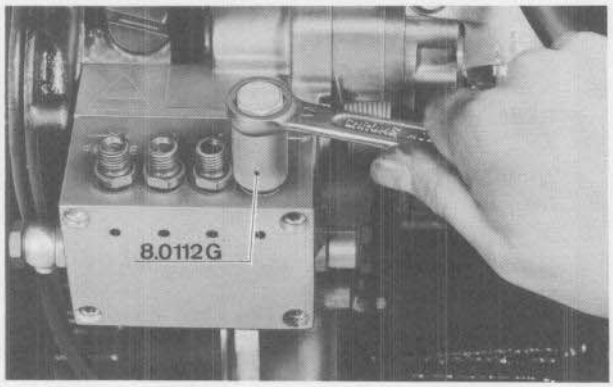


- Switch on the ignition and allow a small amount of petrol to flow.
- Tighten the nut to **5 m.kg (36 ft.lbs).**
- Refit the injector lines :
  - tighten to **2.5 m.kg (18 ft.lbs).**
- Check that the lines do not leak.



CHECK THE SEALING OF THE VALVES

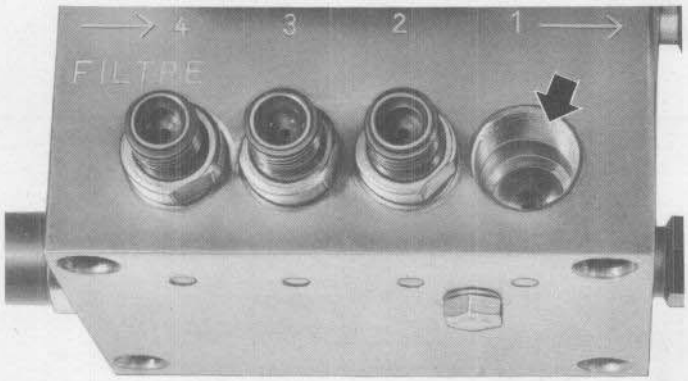
- Switch on the ignition.
  - The recesses in the valves must not fill up in less than 30 seconds.
- If they do, replace the defective ones.



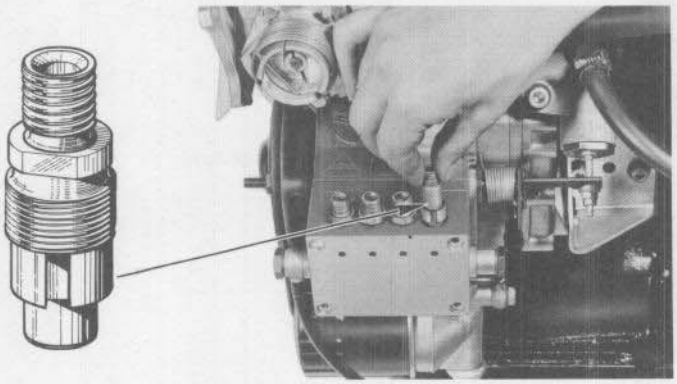
REPLACING A DELIVERY VALVE

– Clean the top of the hydraulic head thoroughly to prevent dirt getting into the pump.

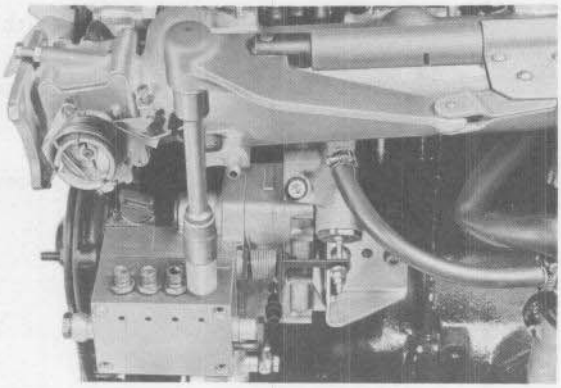
– Remove the delivery valve.



– Blow out the inside of the valve recess and pour a few drops of oil in.



– Fit the new valve fitted with its spacer, as shown opposite.



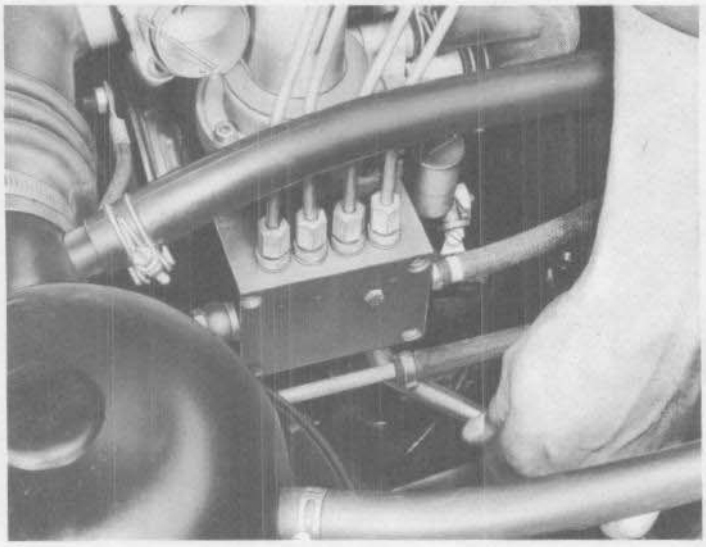
– Tighten the nut to **5 m.kg (36 ft.lbs).**

– Refit the injector lines :
- tighten the unions to **2.5 m.kg (18 ft.lbs).**

– Check the sealing.

PETROL INJECTION ENGINE

SUCTION VALVES



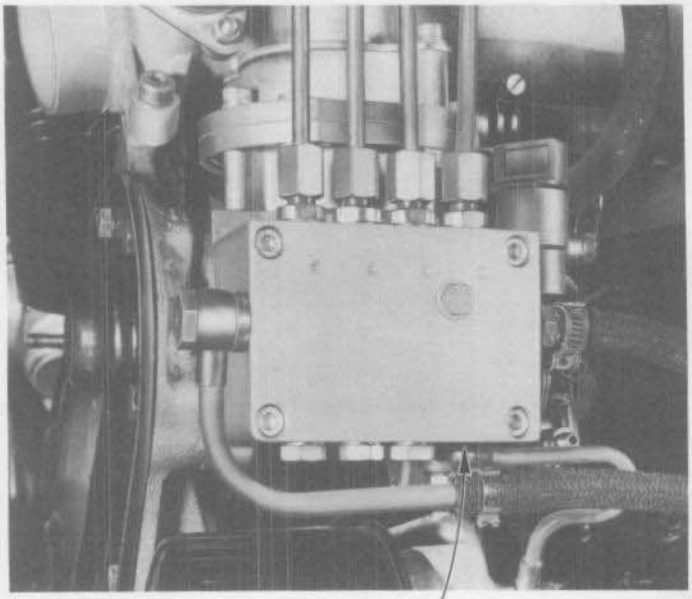
REPLACING A SUCTION VALVE

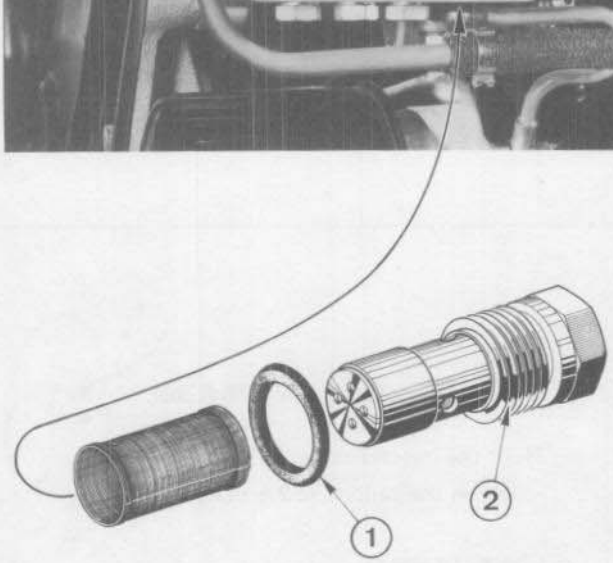
Removal

– Clean the hydraulic head thoroughly.

– Remove :

- the suction valve with its O-ring,
- the filter.





Refitting

– Clean the new valve assembly (valve body, O-ring, filter) thoroughly.

– Lightly oil :
- the O-ring **(1)**,
- the thread **(2)**.

– Fit the valve (hand tighten only).

BLEEDING

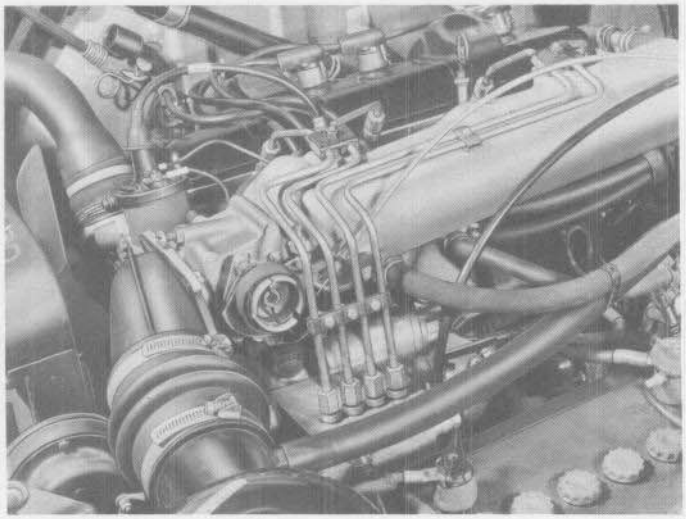
– Operate the lift pump.

– Slacken off the suction valve until petrol is flowing from it.

– Tighten the valve to **2.5 m.kg (18 ft.lbs).**

– Bleed the corresponding delivery valve (page 13 10, class 1).

– Make sure that the hydraulic head does not leak.



REMOVAL OF THE INJECTION PUMP

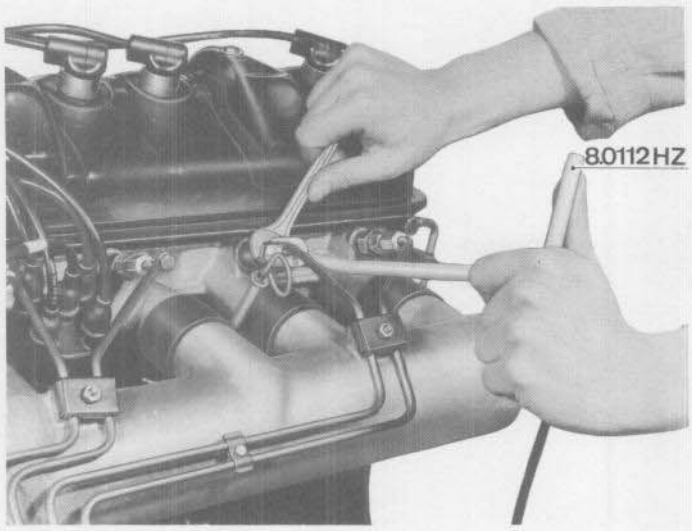
– Remove :

- the battery,
- the air intake hose from the air chamber.

On KF 6 :

– Remove :

- the oil vapour recirculation hose (from the filter end),
- the vacuum lines (distributor and Master-Vac).
- the electrovalve petrol line and feed wire,
- the throttle cable.



– Remove the injector lines.

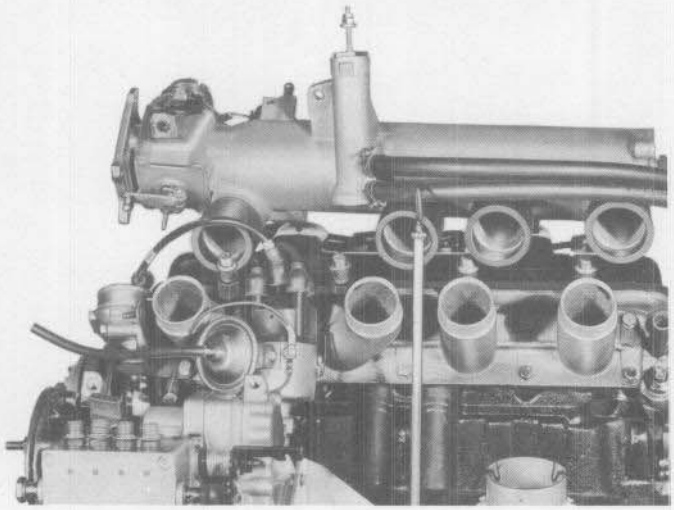
– Protect the pump and injector unions.

– Disconnect :

- the fuel feed and return lines from the pump.

On KF 5 and XN 2 :

– Disconnect the return line from the degassing filter (to avoid dismantling the Staubli collar).



On KF 5 and XN 2 :

– Disconnect :

- the four chamber/manifold rubbers,
- the two hoses from the thermostat (secure them pointing upwards so as not to drain off the water).

– Remove :

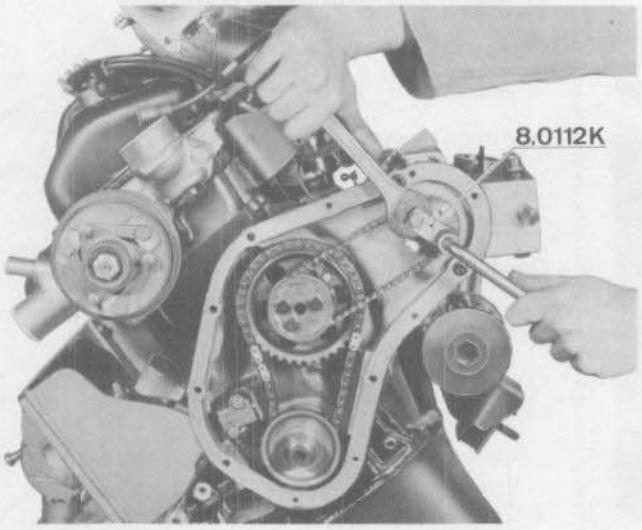
- the oil line (oil filter to pump).

On KF 6 :

– Remove the air chamber and turn it over, to rest it on the rocker cover.

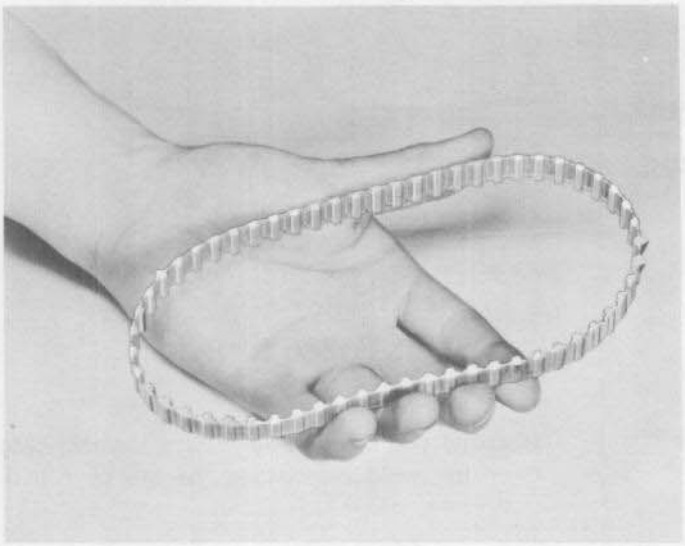
PETROL INJECTION ENGINE

INJECTION PUMP

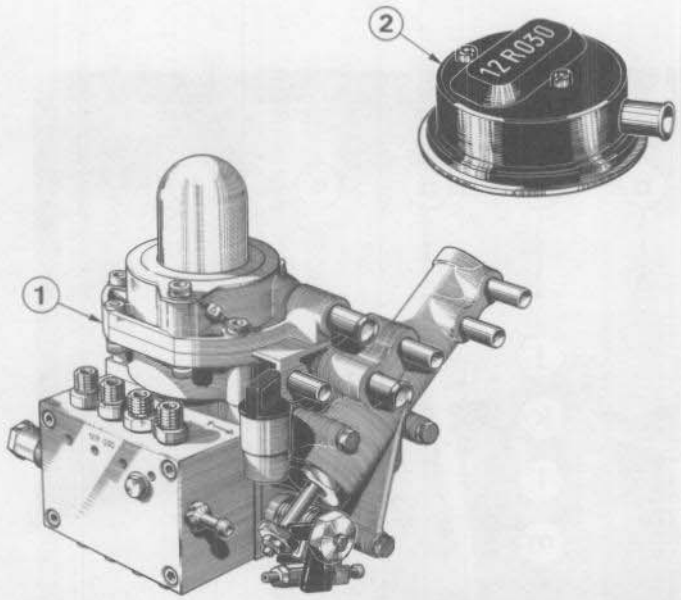


— Remove :

- the fan belt and alternator drive belt,
- the crankshaft pulley,
- the timing cover,
- the injection pump pulley with the drive belt in place,
- the injection pump.



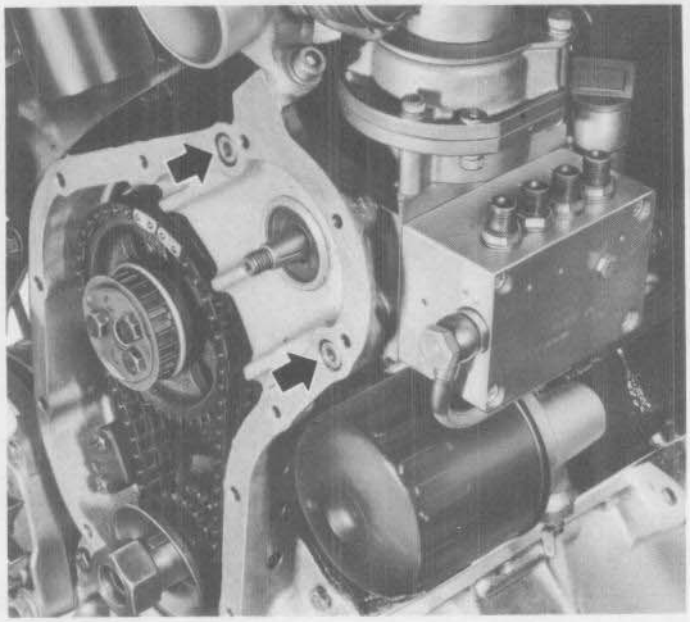
WARNING - Never bend the belt, once removed, to form an arc of less than 20 mm in diameter.



REFITTING THE INJECTION PUMP

WARNING - KF 5 and XN 2 - the injection pump **(1)** and the altitude corrector **(2)** form an inseparable unit.

A defect in one or other of these parts entails replacement of **both** of them.



- Smear sealing compound on the mating face of the pump.
- Secure the pump to the timing housing. Tighten to **2 m.kg (14.5 ft.lbs).**

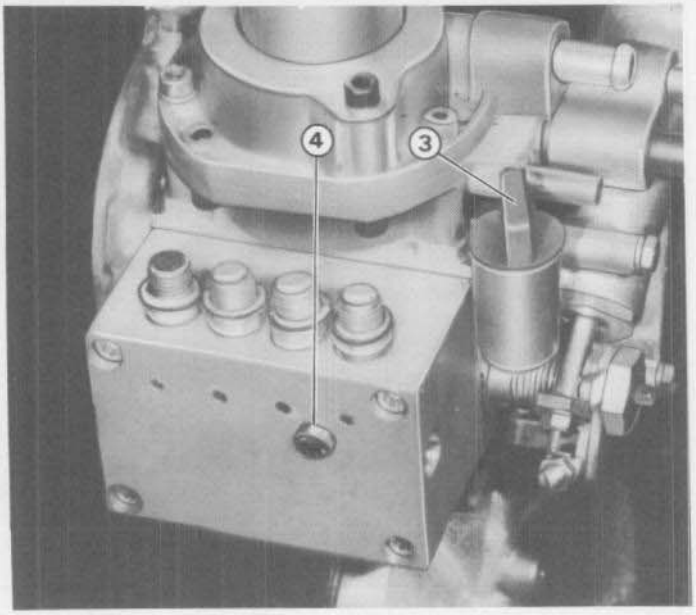
On KF 5 and XN 2:

- Secure the rear bracket between pump and oil filter. Tighten to **2 m.kg (14.5 ft.lbs).**

On KF 6 :

- Secure the rear mounting bracket to the block while holding it up tight against the rear of the pump. Tighten to **2 m.kg (14.5 ft.lbs).**
- Fit the two support bolts in the rear of the pump. Tighten to **0,75 m.kg (5.5 ft.lbs).**

WARNING - If difficulty is encountered, slacken the two allen screws on the front and, after retightening them, tighten the rear bolts.



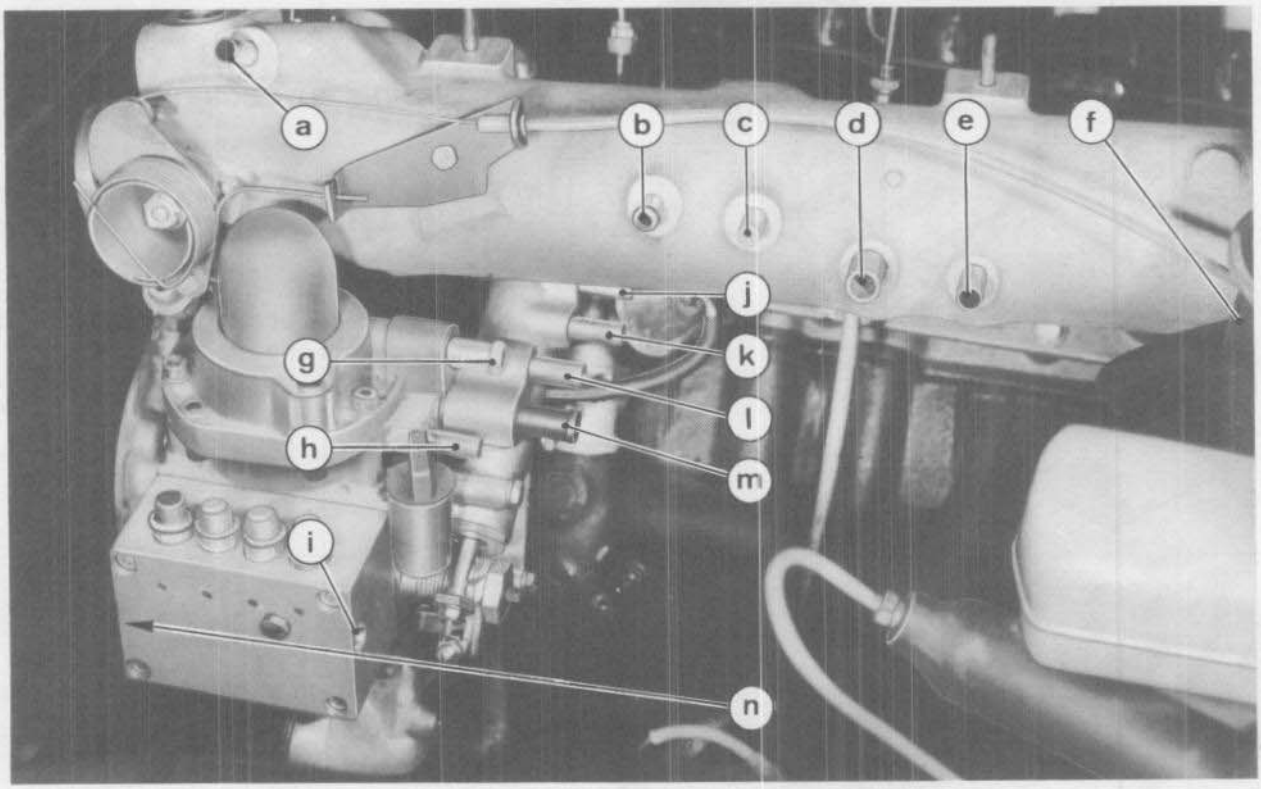
- Check the oil level in the pump.
- Top up, if necessary, using ESSOLUBE 10 W. Pour the oil in through the orifice **(3)** until it flows from the level hole **(4).** Refit the two plugs.

N.B. - *On KF 6 pumps, the level is checked with the dipstick in the plug* **(3).**

- Pump capacity :

- KF 6 - 0.4 litres (0.7 pints),

- KF 5 - XN 2 - 0.15 litres (0.26 pints).

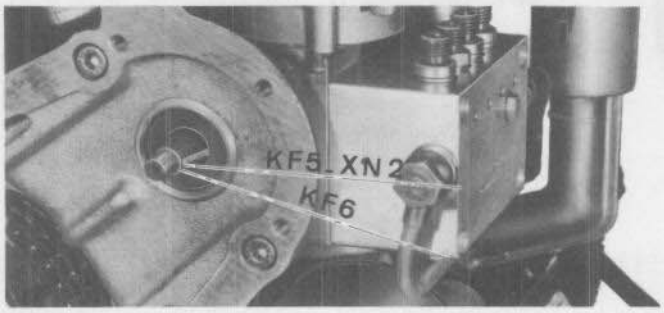


CONNECTING THE VARIOUS HOSES TO THE PUMP (KF 5 - XN 2)

The connections must be realised in the following order.

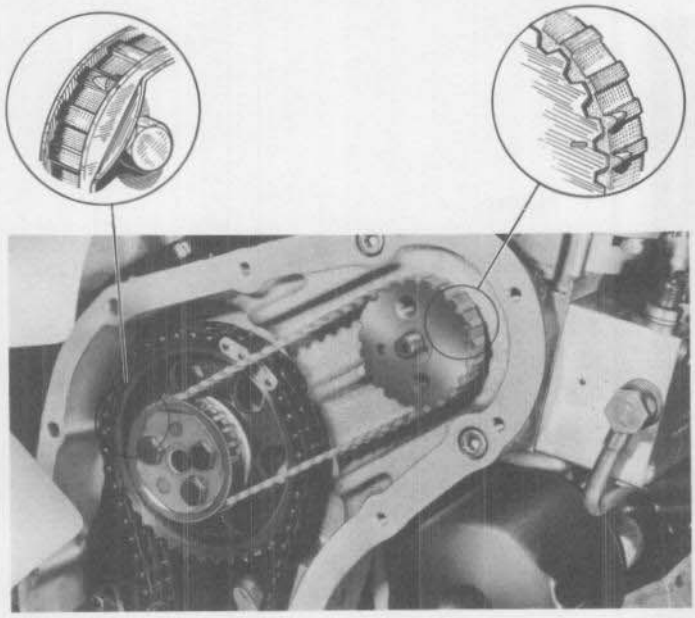
From	To	Identification
Cylinder head	(j)	Thermostat intake
Water pump	(k)	Thermostat outlet
Air chamber (e)	(l)	Fast idling air intake (Ø 10 mm)
Air chamber (d)	(m)	Counter pressure line (Ø 13 mm)
Corrector (f)	(g)	Altitude correction line (Ø 13 mm)
Air chamber (a)	(h)	Pneumatic governing line (Ø 10 mm)
Air chamber (b)		Master-Vac vacuum line*
Air chamber (c)		Oil vapour recirculation line*
	(n)	Fuel feed
	(i)	Fuel return

* The removal of these lines is not essential.

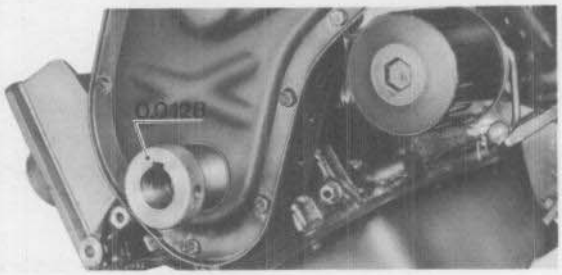


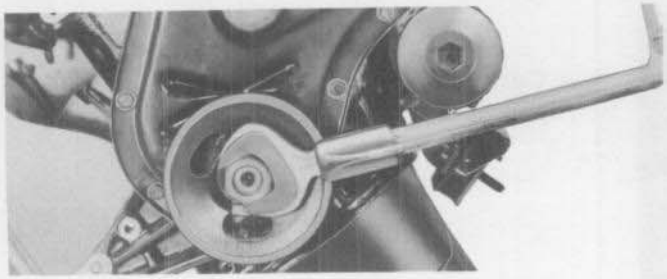
SETTING THE INJECTION PUMP

- Fit the crankshaft pulley nut temporarily.
- Rotate the crankshaft to position the rotor arm contact between N° 1 and N° 3 HT terminals.
- Position the injection pump pulley keyway as shown opposite.



- Mount the drive belt on the camshaft pulley and pump pulley, lining up the reference marks.
- Locate the pulley on the pump shaft.
- Rotate the crankshaft backwards through one turn and then check by rotating it through one turn in the normal direction of rotation.
- Tighten the pump pulley nut to **3.5 m.kg (25 ft.lbs)** and lock it.





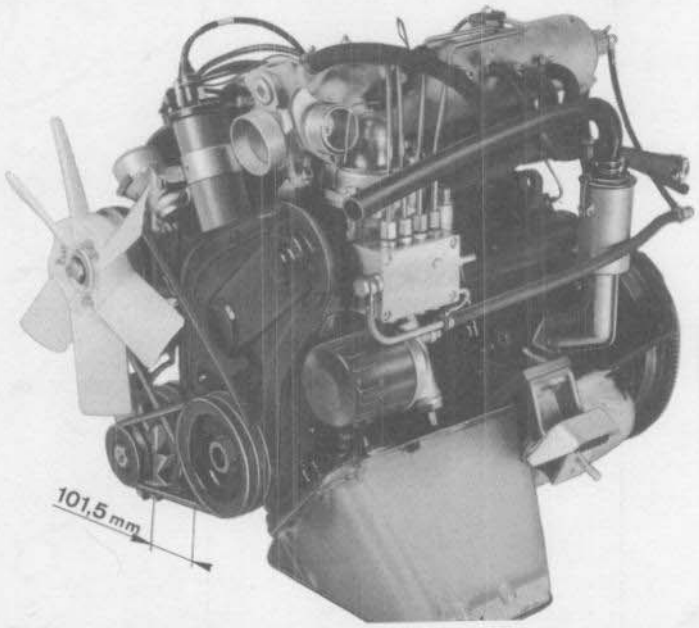
- Fit :
  - the timing cover (centering it),
  - the crankshaft pulley,
  - the tab washer and nut.
- Tighten to **17 m.kg (123.5 ft.lbs)** and lock the nut.

On KF 6

- Fit the air distribution chamber making sure that the thermostat rod engages in the groove in the enrichener lever.
- Secure the chamber. Tighten the allen screws on the pump body to **2 m.kg (14.5 ft.lbs).**

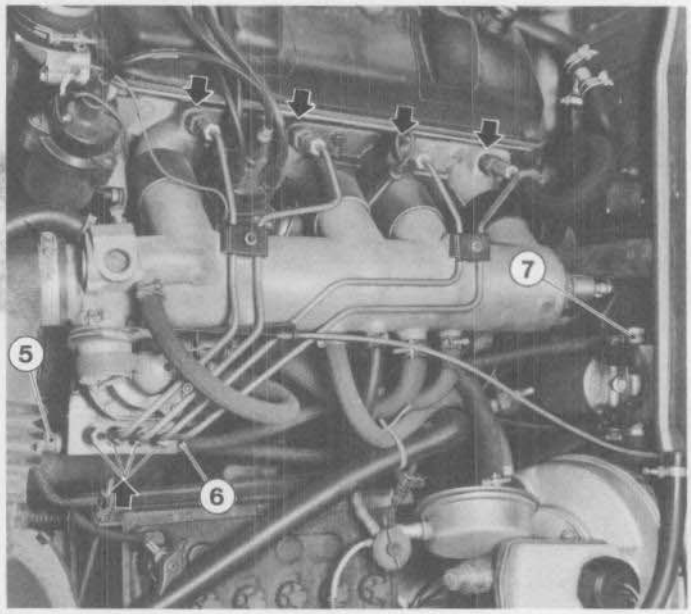
PETROL INJECTION ENGINE

INJECTION PUMP

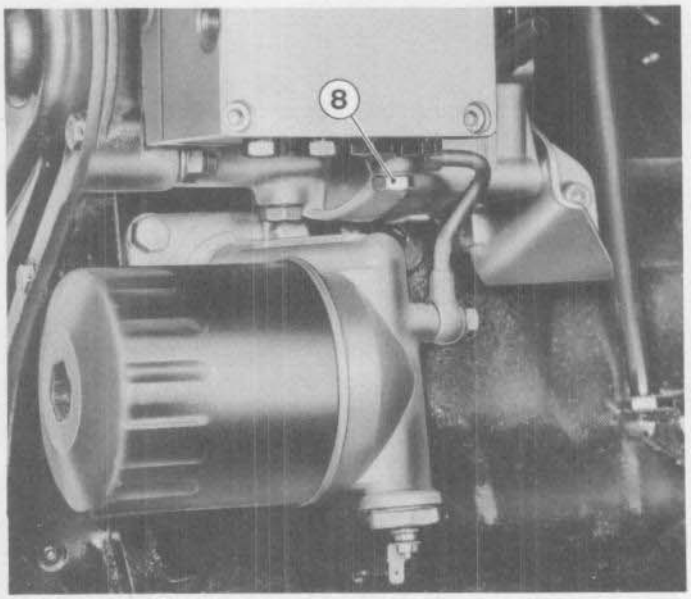


Refit and reconnect the different components in the reverse order to removal, making sure of the following :

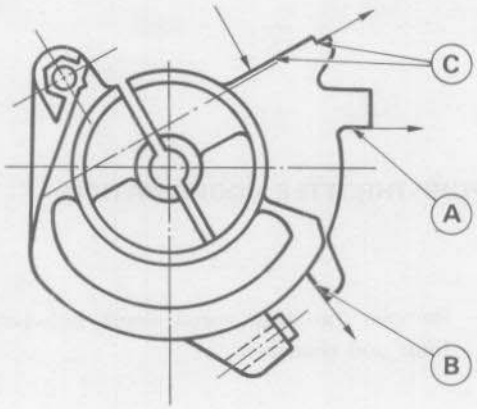
- Tighten the alternator belt.
- Mark two lines on the belt, 100 mm apart.
- Stretch the belt to obtain a distance between them of :
  - 101.5 mm on KF 5 and XN 2,
  - 103.5 mm on KF 6.



- Tighten :
  - the fuel feed union **(5)** to **2 m.kg (14.5 ft.lbs)**,
  - the return union **(6)** to **1.75 m.kg (13 ft.lbs)** and **(7)** to **2 m.kg (14.5 ft.lbs)**,
  - the injector line unions to **2.5 m.kg (18 ft.lbs)**.



- Bleed the oil line **(8)** after starting up the engine.
- Make sure that the fuel lines, water hoses and oil lines do not leak.
- Carry out the checks and adjustments given on page 13 31 to 13 36, class 1.



ADJUSTMENTS

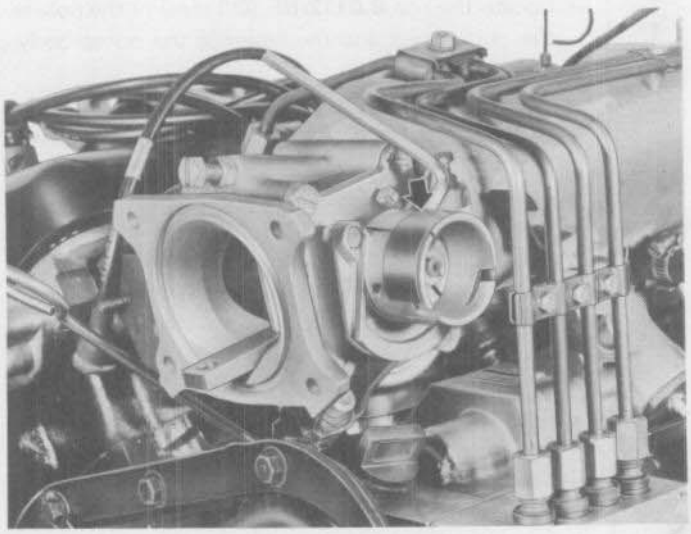
CONTROL QUADRANT

The throttle drum incorporates the quadrant which enables the setting of the various throttle flap positions.

Position **A** - throttle open at 43° - 1st adjustment.

Position **B** - throttle open at 94° (fully open) 2nd adjustment.

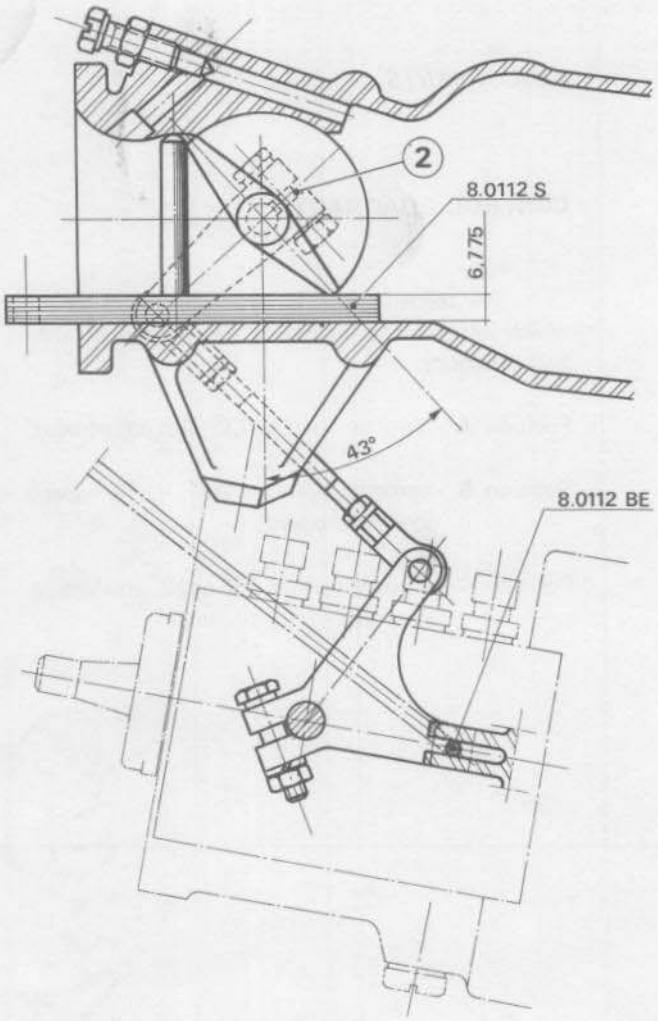
Position **C** - throttle open at 10° or 12° (minimum opening) - 3rd adjustment.



The throttle drum is secured to the spindle by an allen screw, which is accessible after removal of the return spring.

PETROL INJECTION ENGINE (KF 6)

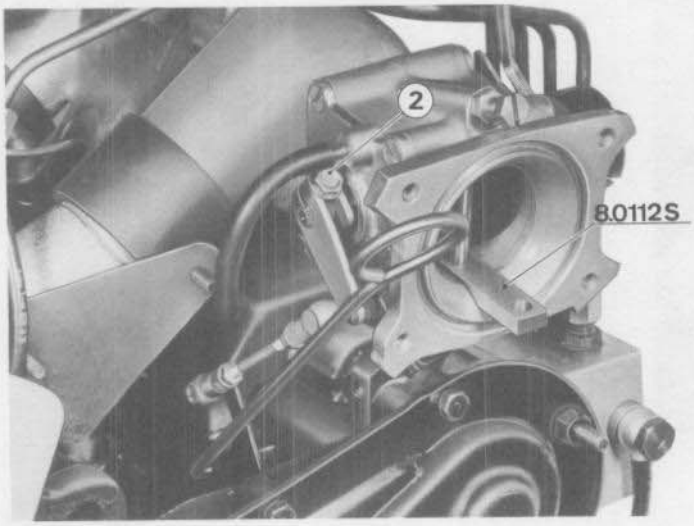
INJECTION PUMP

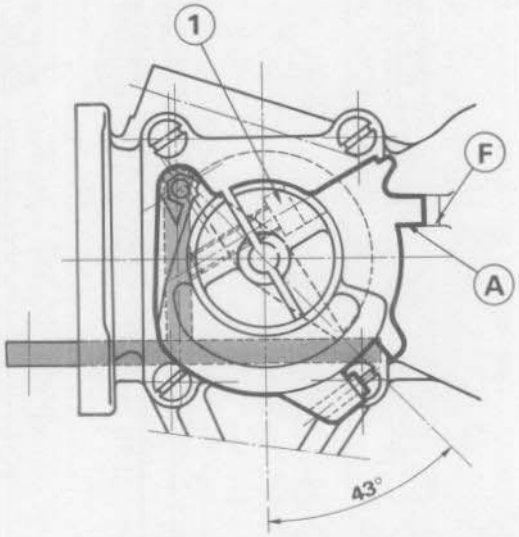


1st ADJUSTMENT

PUMP-THROTTLE COORDINATION

- Remove the sheet metal sleeve between the air filter and chamber.
- Remove the pump/throttle link.
- Check the centre to centre distance of the ball heads (97.3 ± 0.1 mm) using the gauge **8.0112/R** ; adjust, if necessary, after slackening off the lock nuts.
- Tighten the lock nuts.
- Refit the link.
- Locate the rod **8.0112/BE** (Ø5 mm) in the hole in the pump lever and the recess in the pump body.
- Slacken the bolt **(2)** and remove the lever.
- Insert the gauge **8.0112/S** in the groove in the bottom of the air chamber inlet so that the rod on the gauge abuts on the throttle flap. The hole in the gauge should be facing outwards.
- Refit the lever and tighten the bolt **(2)** making sure that the setting has not altered and leaving a clearance of 2 mm between the lever and the housing (hold the gauge **8.0112/S** under tension while tightening the bolt **(2)**).



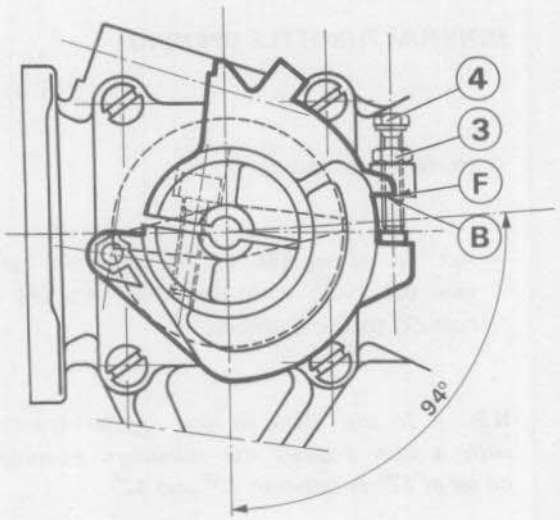


– Unhook the throttle return spring - slacken the allen screw **(1)**.

– Line up the reference face **(A)** (43°) with the lower face **(F)** of the boss on the air chamber.

– Tighten the allen screw **(1)**, making sure that the setting has not altered ; leave a clearance of 1 mm between the drum and the housing.

– Withdraw the gauge **8.0112/S** and the rod **8.0112/BE.**



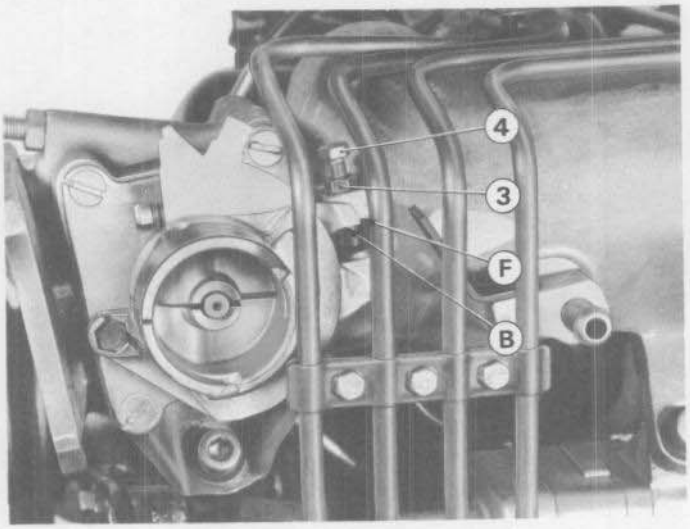
2nd ADJUSTMENT

MAXIMUM THROTTLE OPENING

– Engine switched off, accelerator at end of stroke.

– Slacken the lock nut **(3)**.

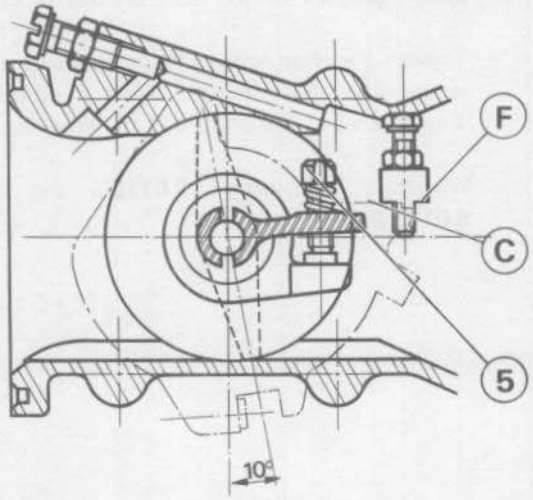
– Act on screw **(4)** to bring the reference face **(B)** (94°) into line with the lower face **(F)** of the boss on the housing.



– Tighten the lock nut **(3)**, making sure that the setting does not alter.

– Refit the return spring.

– Check the maximum opening by depressing the accelerator pedal.



3rd ADJUSTMENT

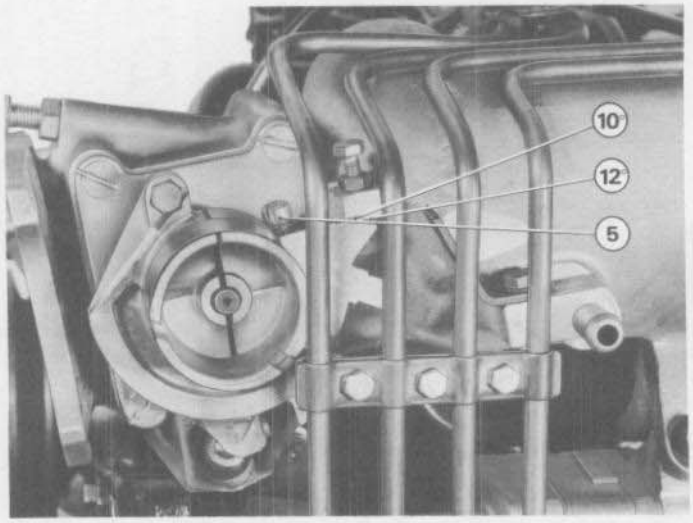
MINIMUM THROTTLE OPENING

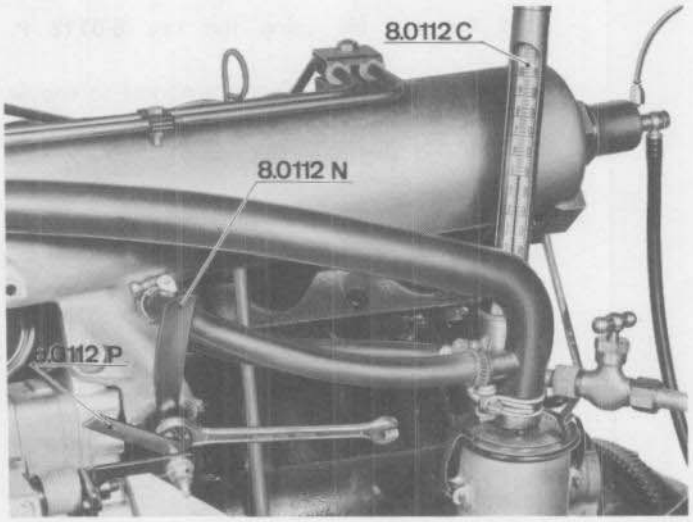
Accelerator released.

– Act on screw **(5)** to line up the reference face **(C)** (10°) with the lower face **(F)** of the boss on the air chamber.

N.B. - *If the idling is not regular (particularly with a new engine) the minimum opening may be set at 12° or between 10° and 12°.*

However, if backfiring occurs when the minimum setting is at 12°, a position of approximately 11° should be obtained.





4th ADJUSTMENT

ENRICHENER

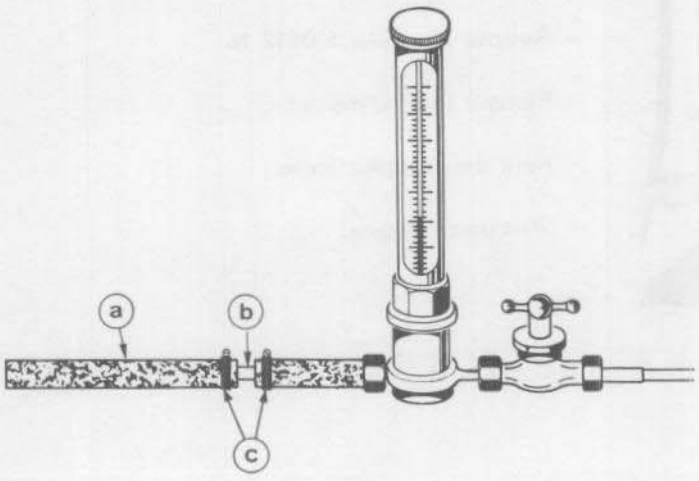
– Install the thermometer* **8.0112 C** with the tap open, in the water return circuit (hose going to the water pump).

– Start up the engine and unscrew the idling air bleed screw to obtain an engine speed of more than 1,000 r.p.m.

– Slow down the rise in temperature by decreasing the flow of water around the thermostat (by closing the tap slightly) to stabilise the temperature at 50°C.

N.B. - *Never close the tap completely as the cooling down of the thermostat element will render the setting inexact.*

– Adjust the air valve immediately, whilst making sure that the temperature remains stable at 50° C.



* The hose on the thermometer **8.0112 C** must be lengthened by 200 mm to enable installation.

To realise this, use :

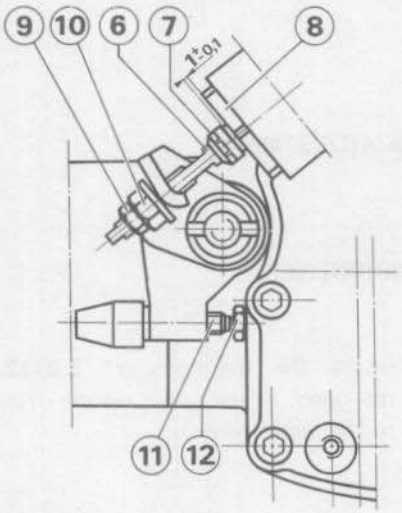
a - a Diesel hose (7 x 16 mm - P.N. 1559.10).

b - a copper tube (ext. Ø 8 mm).

c - 2 collars (P.N. 1565.09).

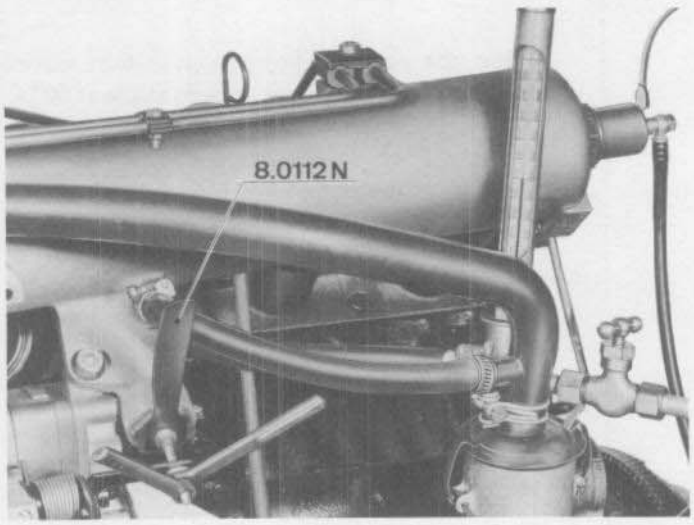
PETROL INJECTION ENGINE (KF 6)

INJECTION PUMP



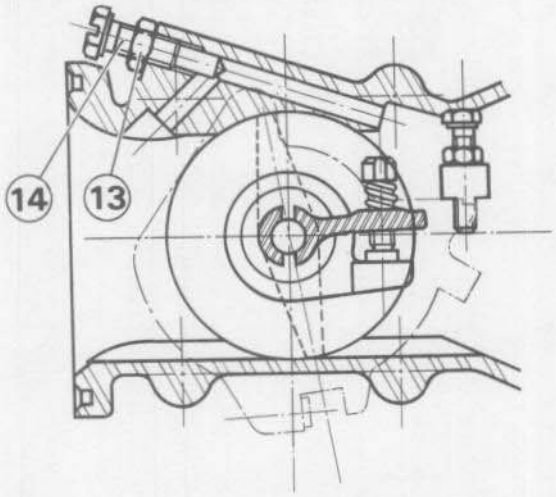
ADJUSTING THE AIR VALVE

- Hold the rod **(6)** using the key **8.0112 P.**
- Slacken the nut **(7)** (10 mm spanner) to enable insertion of the feeler **8.0112 N** between the nut **(7)** and the plug **(8).**
- Tighten the nut to obtain the clearance of 1 mm ± 0.1 mm, determined by the feeler.
- Leave the feeler **8.0112 N** in place.
- Withdraw the key **8.0112 P.**
- Stop the engine.
- Close the tap on the thermometer.



ADJUSTING THE ENRICHENER

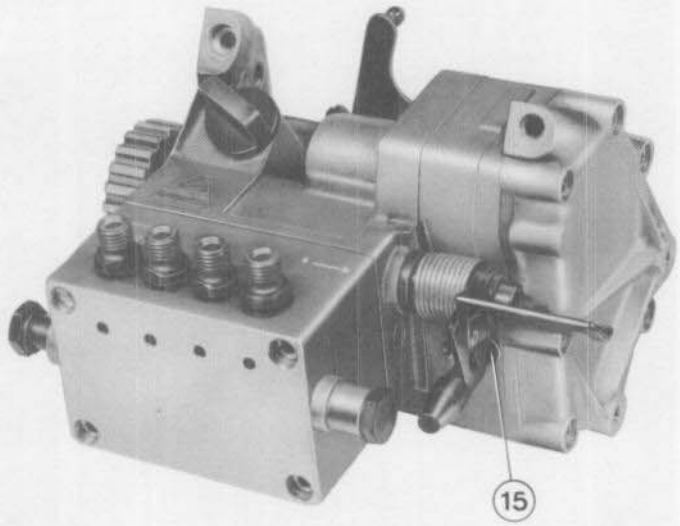
- Slacken the lock nut **(9)** (8 mm spanner).
- Slacken the nut **(10)** (10 mm spanner) to free off the lever **(11)** so that it comes into contact with the stop **(12)** on the injection pump body.
- Screw up the nut **(10)** until it just touches the enrichener lever.
- Tighten the lock nut **(9).**
- Remove the feeler **8.0112 N.**
- Remove the thermometer.
- Refit the air intake sleeve.
- Start up the engine.



5th ADJUSTMENT

ADJUSTING THE IDLING

- This adjustment is to be realised with the engine at its normal operating temperature (electro-magnetic fan engaged).
- Slacken the lock nut **(13).**
- Act on the air bleed screw **(14)** to obtain an engine speed of 800 to 850 r.p.m.
- Screw it in to decrease the engine speed.
- Screw it out to increase the engine speed.
- Retighten the lock nut **(13).**



WARNING - The 0.5 mm thick flat washer **(15)** situated under the enrichener stop (which serves to slightly richen the mixture during the running in) must be removed after the first 1,000 km of operation of a new or rebuilt engine.

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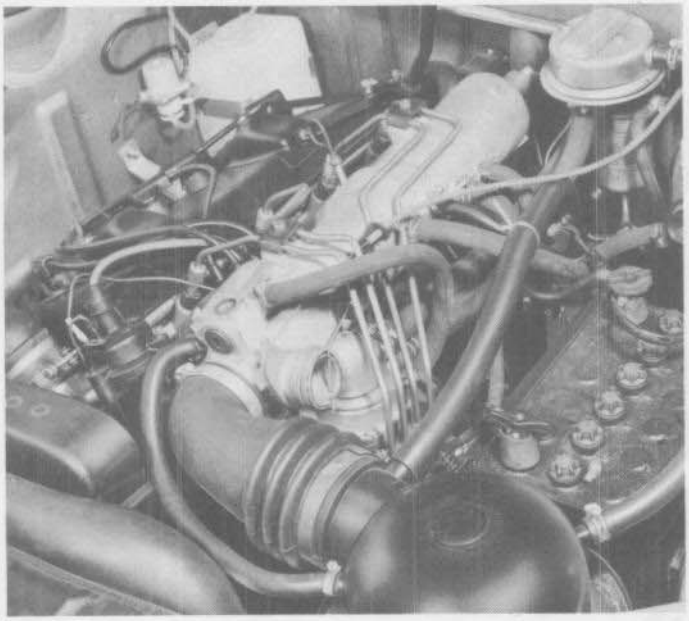
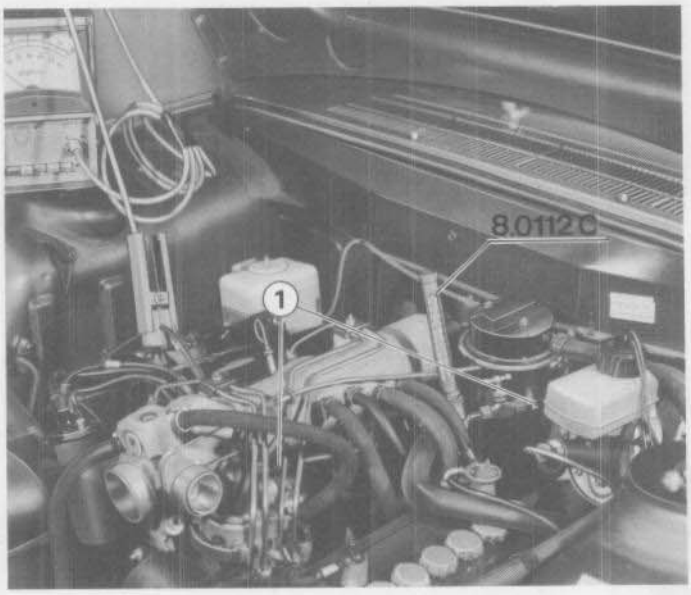


ADJUSTMENTS

WARNING - Even the very slightest air leak will cause poor engine operation (idling difficult to set). Before carrying out any adjustments check :

- that all lines connected to the air chamber are air tight.
- the condition of the air cleaner,
- the engine compression,
- the condition and setting of the ignition (distributor/ spark plugs).



PREPARATION

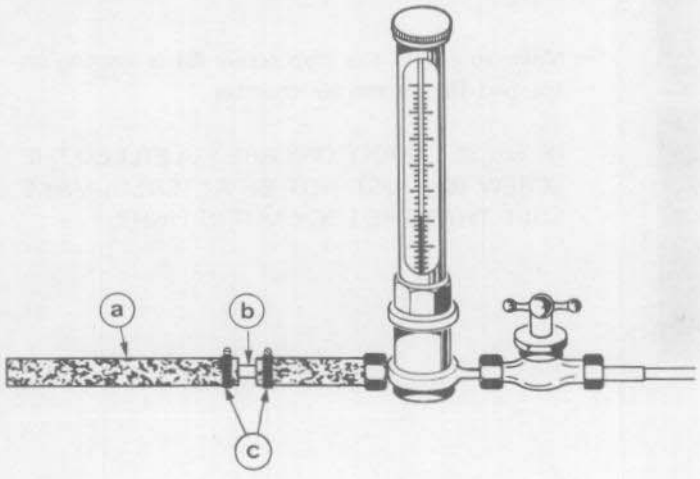
– Disconnect :

- the oil vapour recirculation line from the air filter,
- the air intake hose from the air chamber,
- the water return hose **(1)** from the thermostat (lower hose),

– Install the thermometer*.

N.B. - *Pass the return hose behind the degassing filter to connect it to the thermometer.*

– Install the rev-counter.



* To enable installation of the thermometer **8.0112 C**, the hose must be extended by 140 mm.

Use :

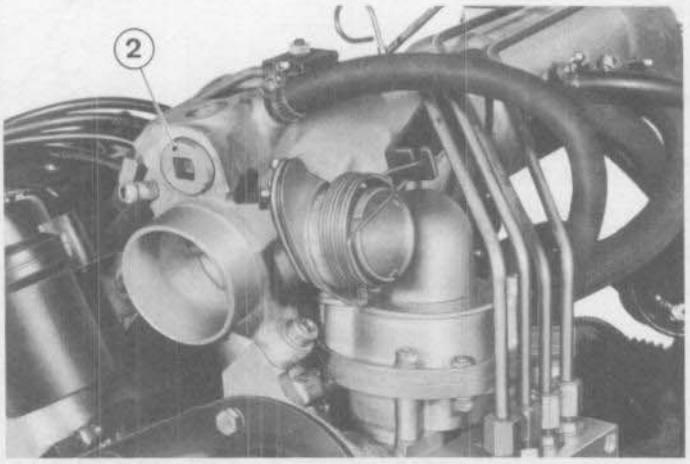
a - an 8 x 16 mm hose - 140 mm long.

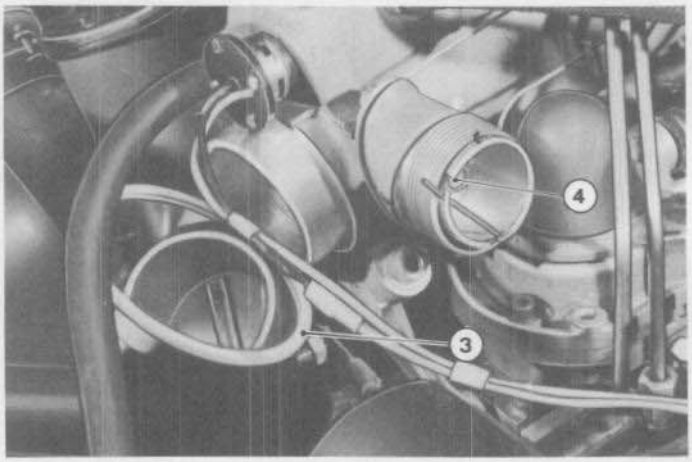
b - a copper tube : ext. Ø 8 mm.

c - two collars.

PETROL INJECTION ENGINE (KF 5 - XN 2)

INJECTION PUMP





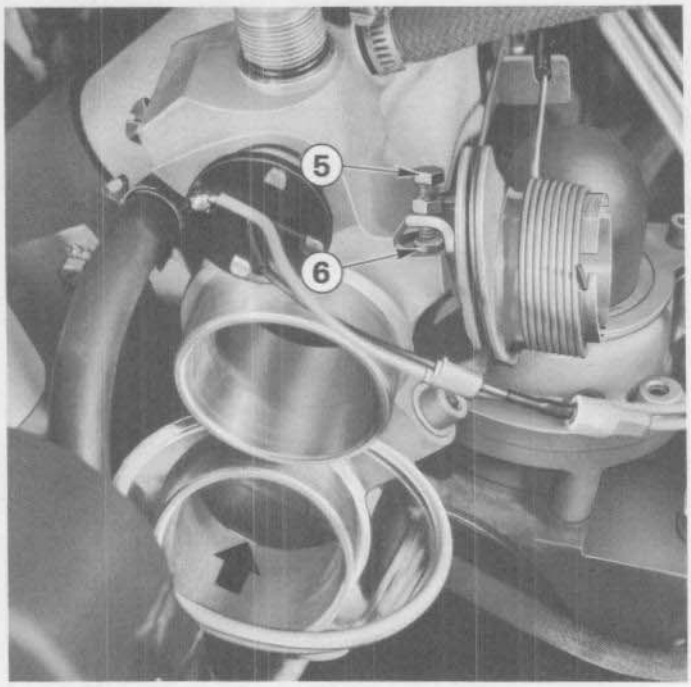
1st ADJUSTMENT

– Remove the plug **(2).**

– Insert the lamp in the bore and connect it to the battery.

– Place a mirror **(3)** in front of and below the air chamber intake so that the top edge of the throttle flap is clearly visible.

– Make sure that the nut **(4)** is tightened to **1.25 m.kg (9 ft.lbs).**



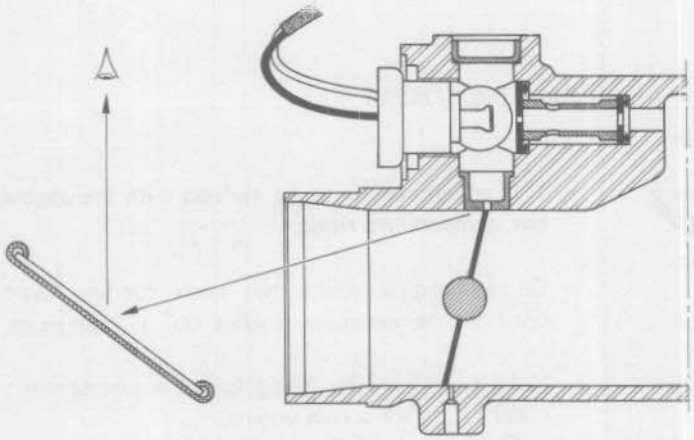
Checking the 1st adjustment.

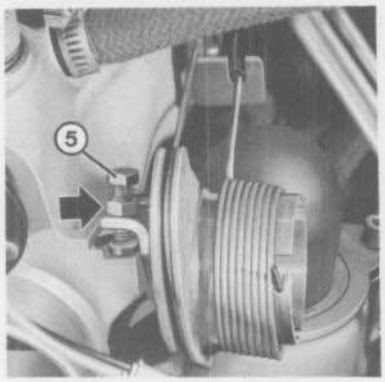
– Engine stopped

A small strip of light must appear as soon as the throttle flap is moved slightly.

– Make sure that the stop screw **(5)** is bearing on the pad **(6)** on the air chamber.

IF THESE CONDITIONS ARE FULFILLED THE SCREW **(5)** MUST NOT BE ALTERED. MAKE SURE THAT THE LOCK NUT IS TIGHT.



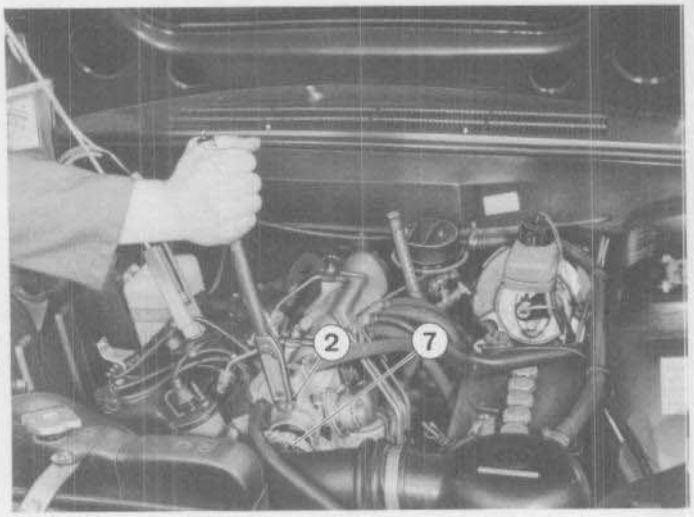


If the check shows an incorrect setting (too much light or none at all).

– Slacken the stop screw **(5)** until a thin strip of light is apparent above the top edge of the throttle flap.

– Slacken the screw off slowly until the light just disappears. Screw it back in one tenth of a turn **maximum** to obtain a slight clearance (the strip of light should **just** reappear).

– Retighten the lock nut.



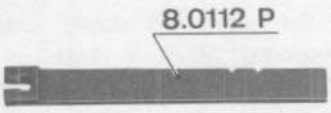
– Make sure that the correction jet is in place (washer with a 2.5 mm hole (KF 5), or 2.3 mm hole (XN 2), made of tin-foil).

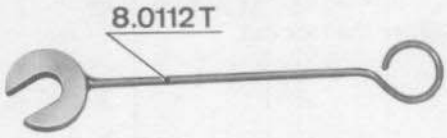
– Tighten the plug **(2)**, oiled and fitted with a new O-ring, to **2 m.kg (14.5 ft.lbs)**.

– Refit the air intake hose on the air chamber.

PETROL INJECTION ENGINE (KF 5 - XN 2)

INJECTION PUMP





2nd ADJUSTMENT

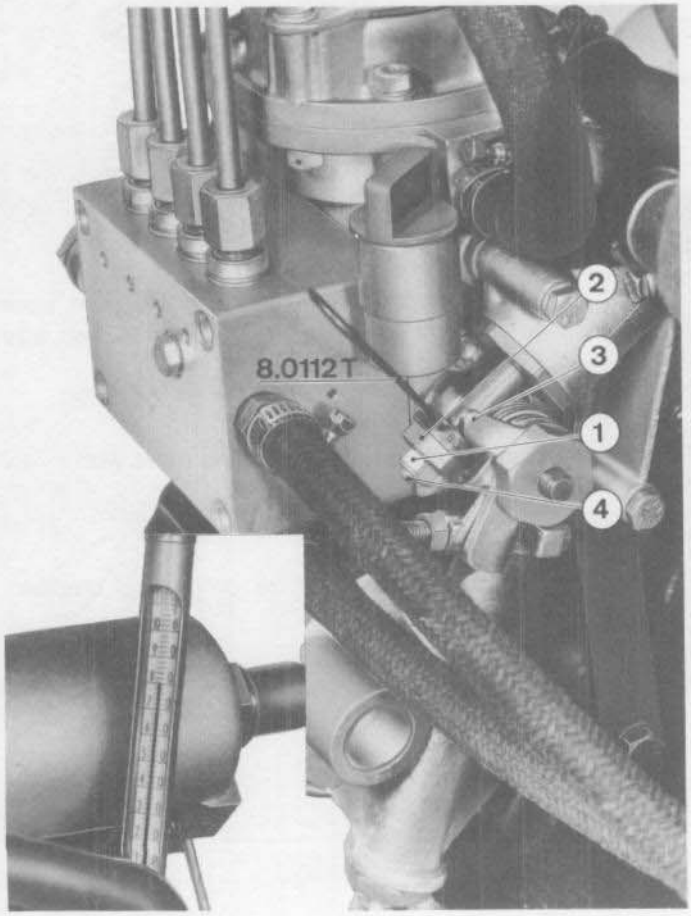
– **This adjustment is to be realised with the engine hot, temperature rising.**

– On an engine which has been running, wait until the temperature reaches 65° C maximum.

– Make sure that the idling speed is not below :
- 900 r.p.m. for a new engine,
- 850 r.p.m. for a " run-in " engine.

– If necessary, adjust the idling speed by acting on the air bleed screw.

– Set aside :
- a 17 mm open end spanner for the thermostat valve,
- a 10 mm open end spanner for the lock nut,
- the key for holding the thermostat rod,
- the gauge.



– Slacken the lock nut **(1)** and the nut **(2)**.

– Start up the engine and run it at idling speed.

– Prepare the gauge to insert it between the nut **(2)** and the enrichener lever **(3)**.

When the temperature reaches 80° C on the thermometer,

SWITCH OFF THE ENGINE

The mechanic has approximately 2 minutes to carry out the adjustment by acting on the nut **(2)** while holding the rod **(4)** with the key.

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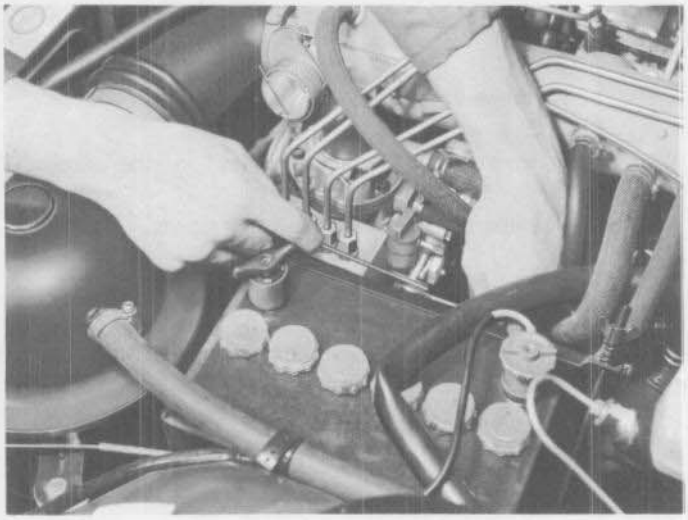
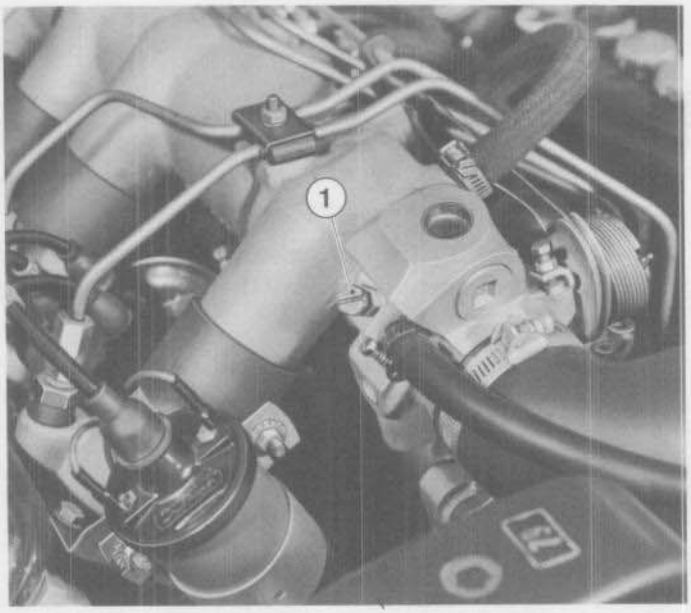
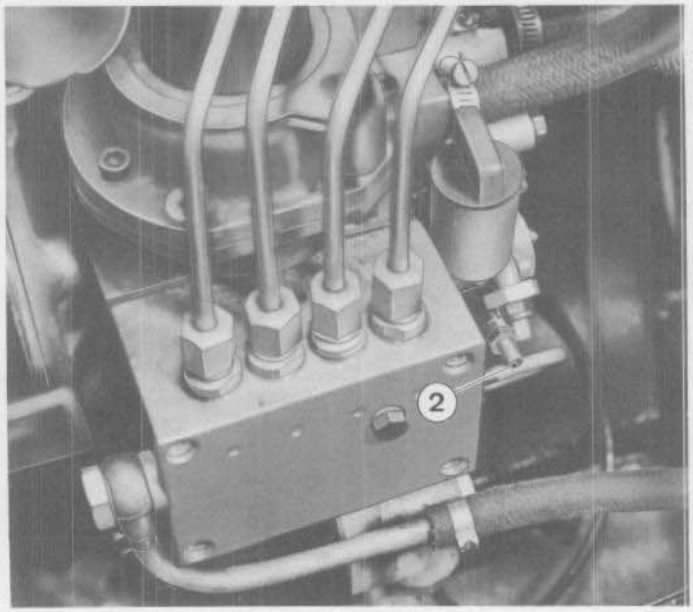


– **If the temperature drops to below 75° C the** engine should be warmed up again from 70° C.

– Repeat the check with the gauge at 80° C and adjust if necessary taking care to work rapidly in order to complete the setting before the temperature drops to 75° C.





3rd ADJUSTMENT

Air/petrol metering at idling speed.

– The idling setting is obtained by acting on the following two screws :

- air bleed screw **(1)** to meter the air,
- enrichener stop screw **(2)** to meter the petrol.

N.B. - *By screwing* **(2)** *in, the mixture becomes richer ; by unscrewing it, the mixture becomes leaner.*

The optimum mixture is determined by a " richness " test while checking the engine speed.

Adjusting the idling :

– To be carried out with the engine hot (approximately 80° C).

– Disconnect the exciter wire from the alternator.

– Adjust screw **(1)** to obtain :

- 900 r.p.m. on a new engine (less than 5,000 km),
- 850 r.p.m. on a " run-in " engine (more than 5,000 km).

PETROL INJECTION ENGINE (KF 5 - XN 2)

INJECTION PUMP

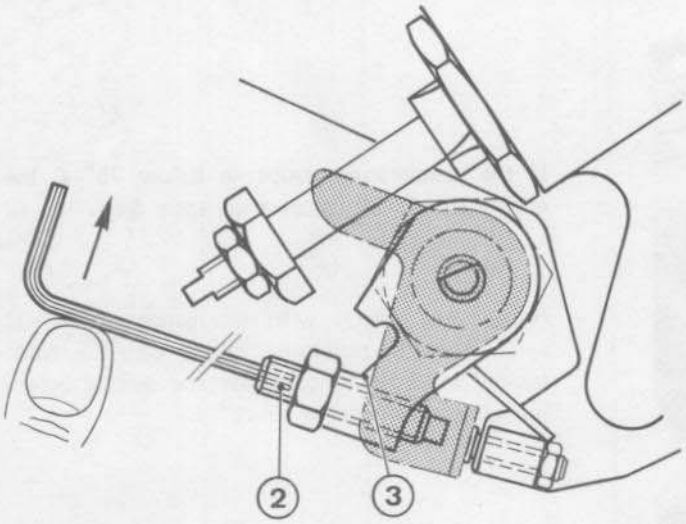


Fig. I

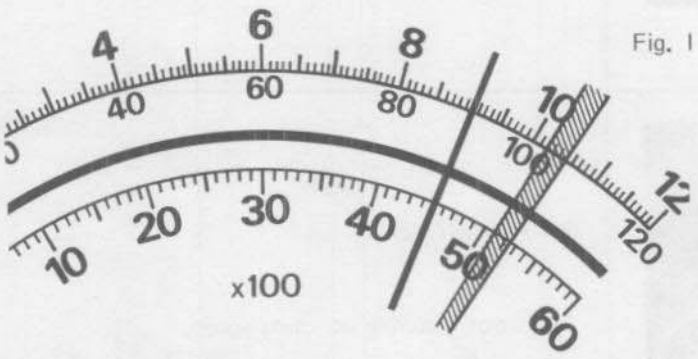
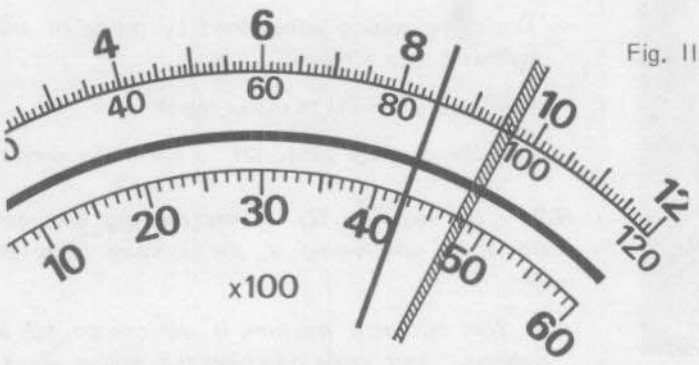
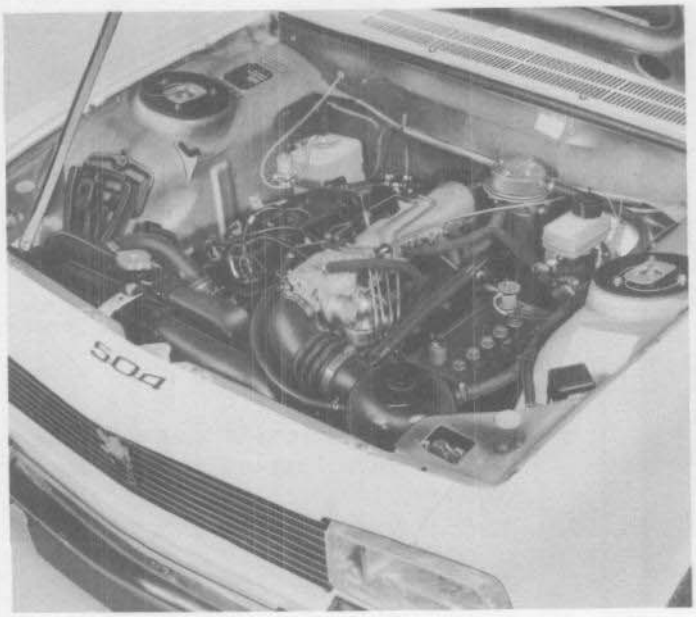


Fig. II





Richness Test

– Insert a 3 mm Allen key in the screw **(2)**

– Raise the enrichener lever **(3)** slowly.

– Check the rev-counter.

– If the engine speed increases, make sure that it is between :
- 1,020 and 1,050 r.p.m. (new engine) fig. I.
- 950 and 970 r.p.m. (" run in " engine) fig. II.

Resetting

– If the engine speed exceeds 1,050 (or 970) r.p.m. the mixture is too lean. Screw in the stop **(2)** one quarter of a turn.

– If the engine speed is less than 1,020 (or 950) r.p.m. the mixture is too rich. Unscrew the stop **(2)** one quarter of a turn.

WARNING - The idling speed of 900 (or 850) r.p.m. must be reset using screw (1) after each adjustment of the stop (2).

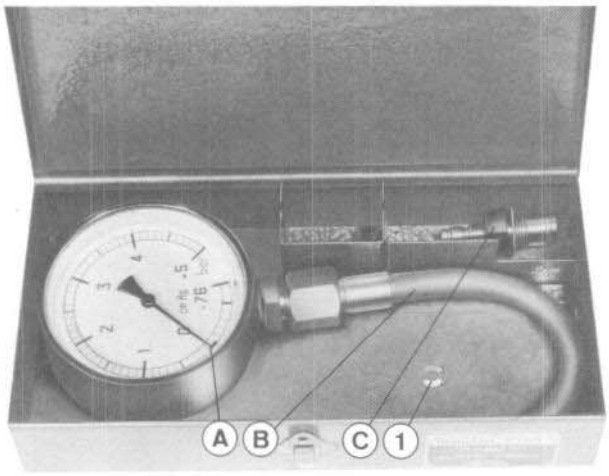
It is also necessary to check the richness after each alteration of the air bleed screw (1), until the engine speeds given above are obtained.

– Reconnect the water return hose.

– Top up the radiator.

– Make sure that the cooling system is not leaking.

– Reconnect the exciter wire to the alternator.



CHECKING THE OIL PRESSURE

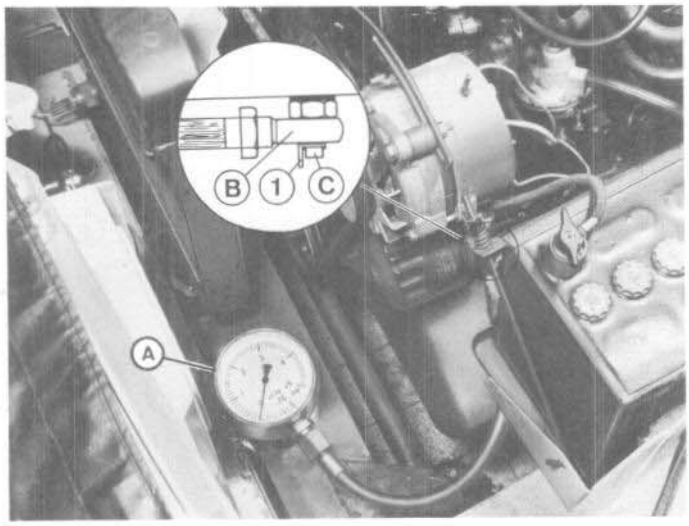
TOOLS TO BE USED

8.1503

Tool chest for checking oil pressure.

Consisting of :

A - Pressure gauge with two readings : 76 cm/Hg to 0 and from 0 to 5 bars.
B - Hose for checking engine oil pressure.
C - Union.
1 - Snap ring.

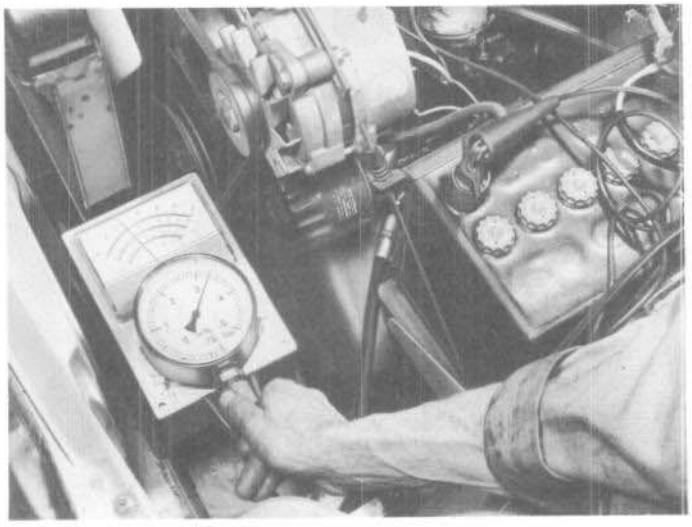


CHECKING

– Connect up the pressure gauge **(A)** in place of the oil pressure switch.

– **The check must be carried out with the oil at 90°C.**

- starting with the engine cold (ambiente temperature 20°C), run the engine at 3,500 r.p.m. and note the pressure 5 minutes after the fan engages.



– **Pressures to be obtained at 90°C.**

- 850 r.p.m. - 2.7 ± 0.8 bars.
- 2,000 r.p.m. - 3.3 ± 0.7 bars.
- 4,000 r.p.m. - 3.8 ± 0.8 bars.

N.B. - *Depending on the mileage covered by the car these pressures may be reduced by 0.2 to 0.4 bars.*

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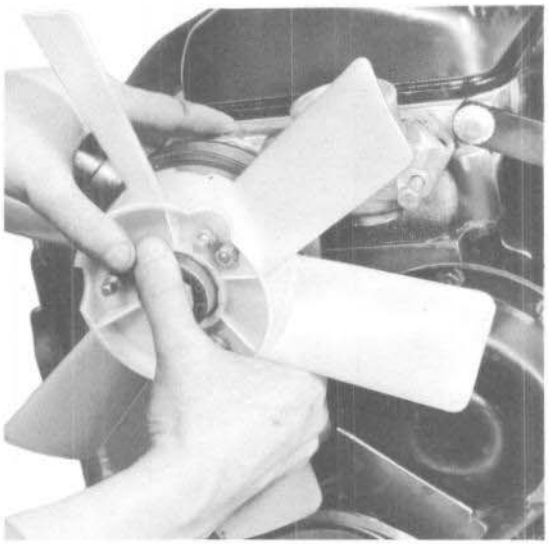
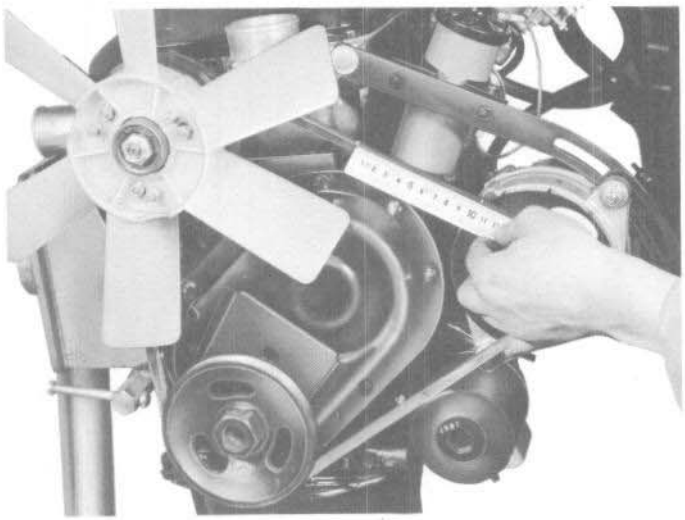


REMOVAL

– Remove :
  - the radiator.
  - the top hose,
  - the fan belt.

– Disconnect :
  - the heater hose from the pump,
  - the self disengaging fan brush holder.

– Remove the pump.



REFITTING

– Clean the mating faces of the pump and head thoroughly.

– Fit a new gasket.

– Refit the pump and hoses in the reverse order to removal.

– Fit the fan belt and tighten it to obtain 2 - 3% stretch (the references 100 mm apart when the belt is slack must be 102 to 103 mm apart when the belt is tight).

– Refill the radiator.

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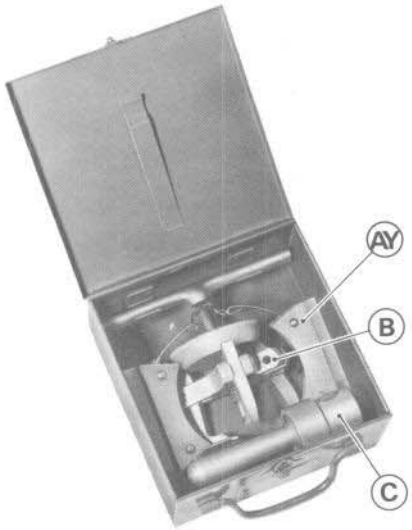


TOOLS TO BE USED

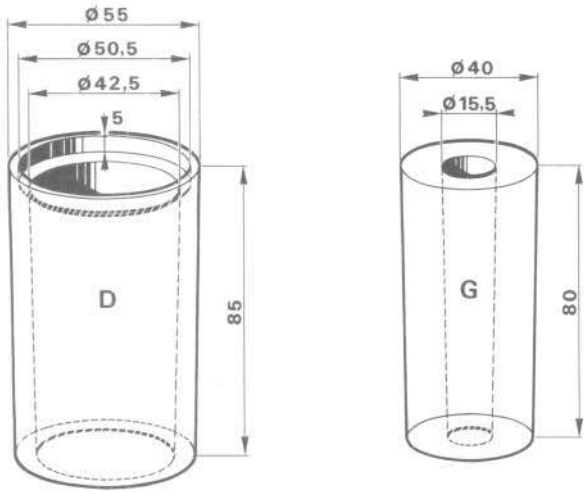
8.0107 Y

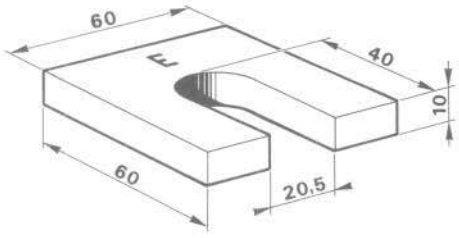
– Tool chest for the water pump.

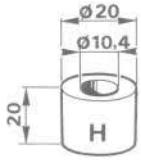
AY - Jaws for holding the pulley.

B - Impeller extractor.

C - AD seal extractor.







Tools to be realised.

0.0107

– Additional tools for water pump.

D - Spacer.

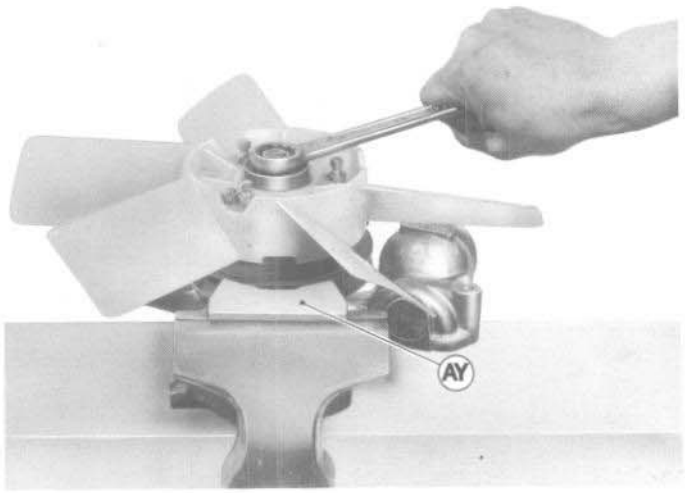
E - Plate.

G - Tube.

H - Tube

ENGINE

WATER PUMP - DISMANTLING

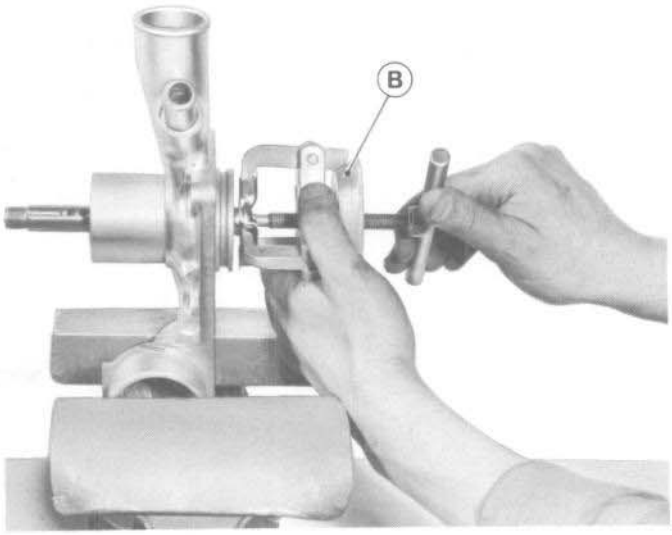


– Remove the pump hub nut.

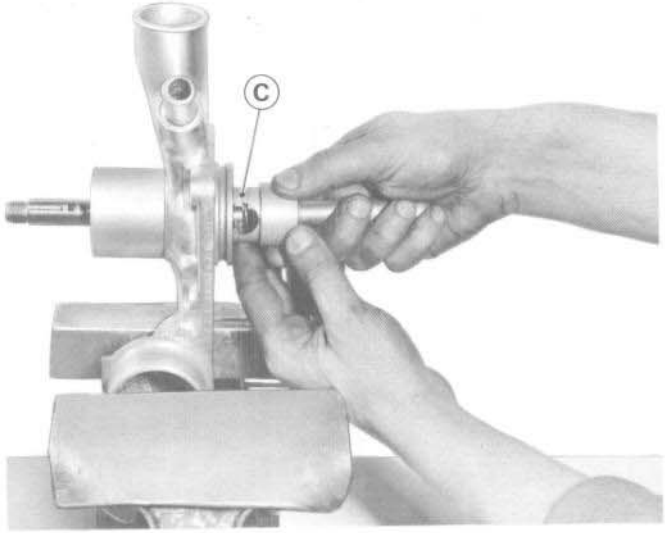
– Hold the pulley and tap the end of the shaft to disengage the pump body.

WARNING - Do not lay the pulley on the bronze commutator ring.

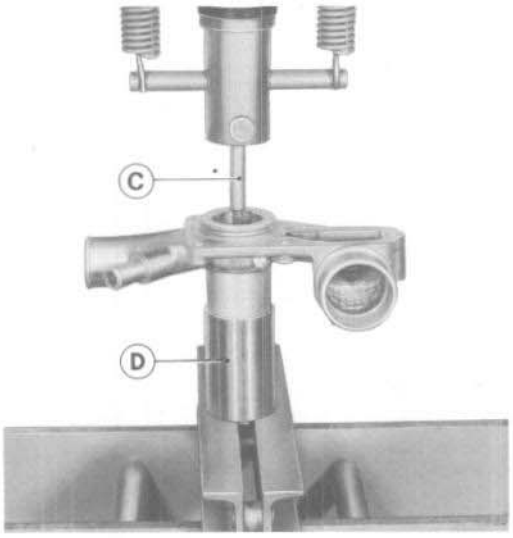
– Recover the key.



– Remove the impeller.



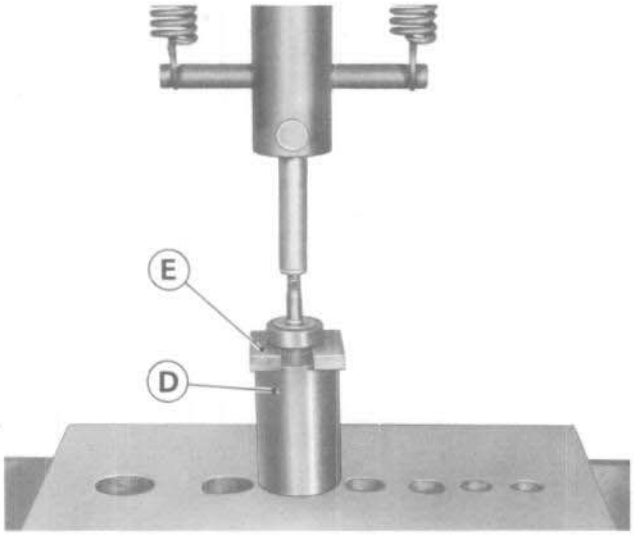
– Remove the AD seal.



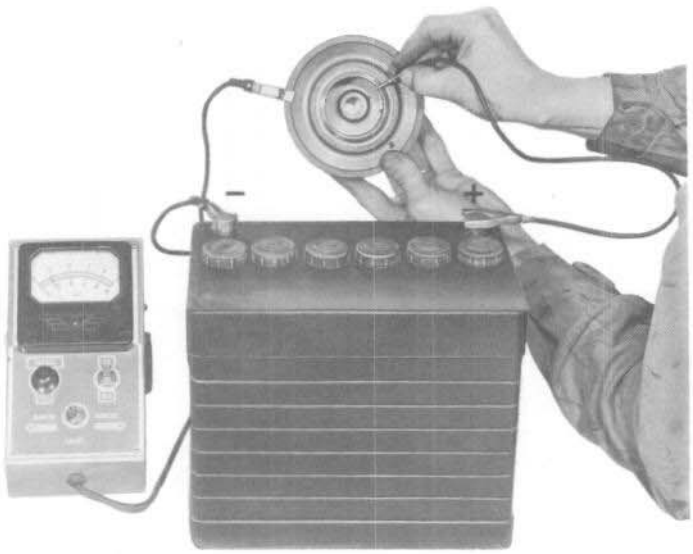
– Remove the front bearing snap ring.

– **Immerse the pump body in boiling water.**

– Remove the shaft and its bearings on a press.



– If necessary remove the front and rear bearings.



– Check the condition of the bearings, the AD seal and its bearing face in the pump body.

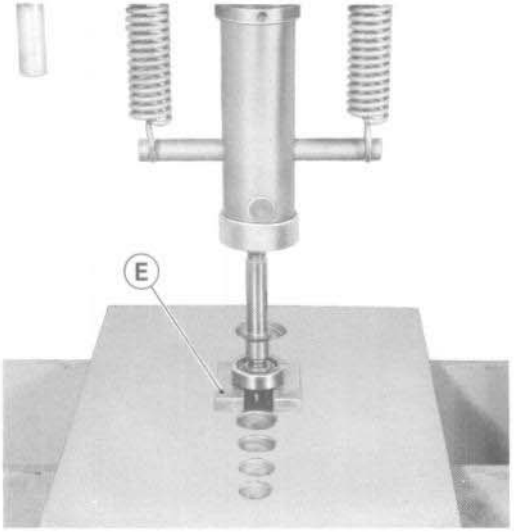
– Check the electro-magnet on the fan pulley using an ammeter.
- place the feeler inside the commutator ring so as not to scratch the brush face ; clamp the "crocodile" on the pulley body.

Reading on the ammeter	Indication
0	Winding broken
0.7 to 0.9	Normal
Higher reading	Winding earthed

– Replace all defective components.

ENGINE

WATER PUMP - REASSEMBLY

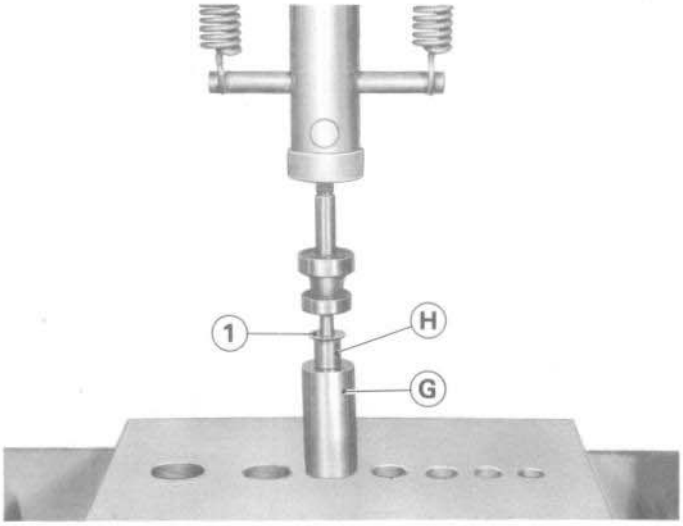


– Pack the bearings with ESSO MULTIPURPOSE GREASE H.

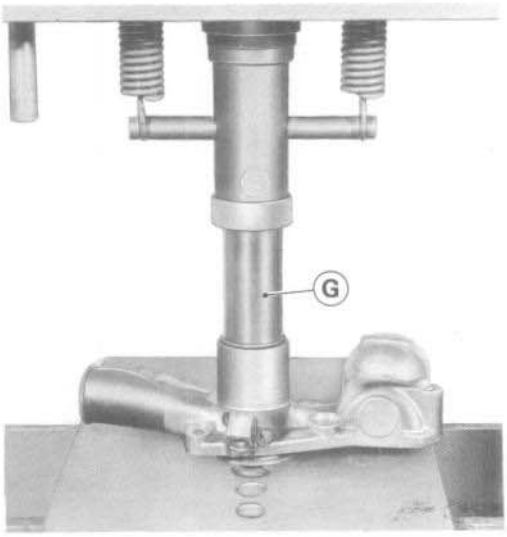
– Fit the bearings on the shaft.

WARNING - The unprotected sides of the bearings must be face to face.

– Pack the space between the bearings with grease.

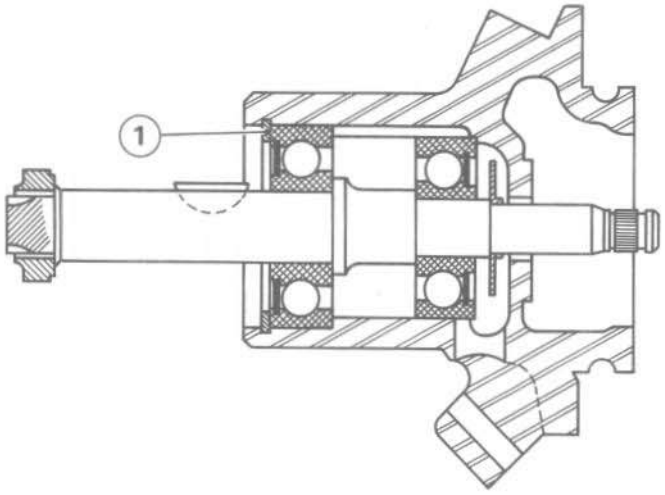


– Fit the deflector **(1)** carefully.



– Immerse the pump body in boiling water.

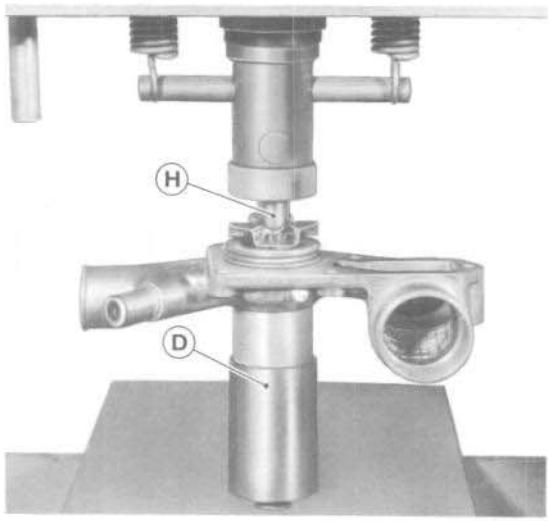
– Insert the shaft, with the bearings, in the pump body.



– Install the snap ring **(1)** using the thickest one possible, to eliminate end float in the shaft.

– Thickness of snap rings available :

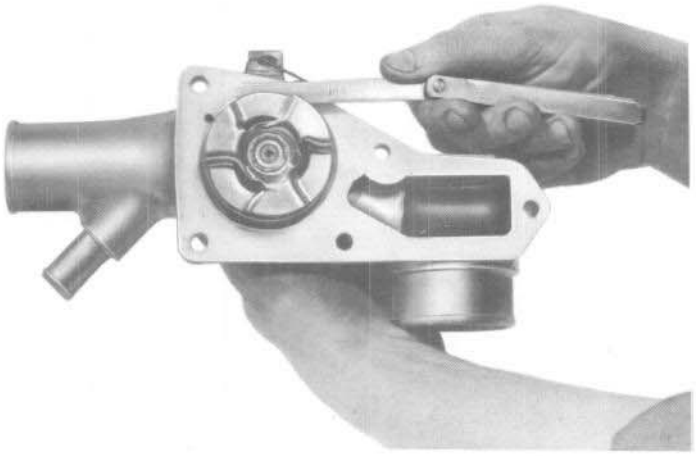
1.75 mm - 1.80 mm - 1.85 mm - 1.90 mm - 1.95 mm.



– Grease the extremity of the shaft and the AD seal bearing face.

– Place the seal/impeller assembly on the shaft with the splines engaging correctly.

– Engage the assembly fully, on the press.

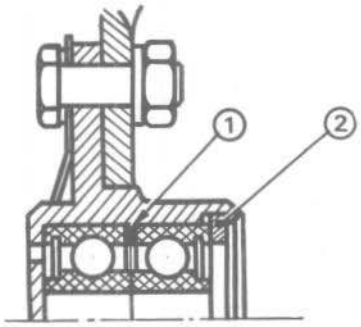


– Check the position of the impeller and reset it if necessary.

– It must turn without run out, with a maximum clearance of 1 mm measured between the impeller and pump shoulder.

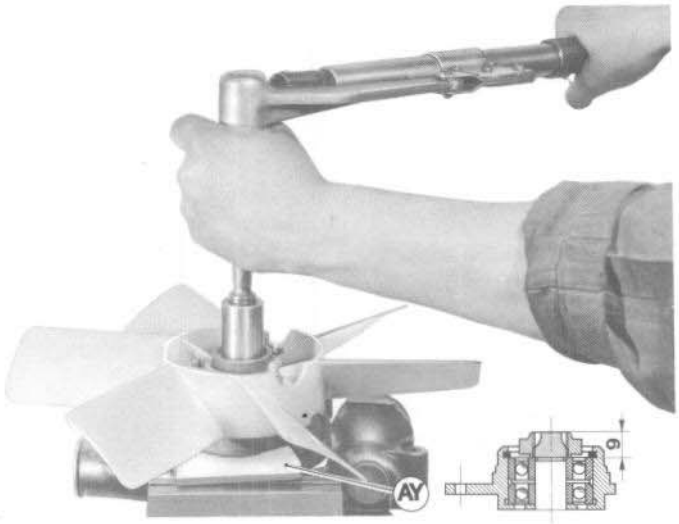
ENGINE

WATER PUMP - REASSEMBLY



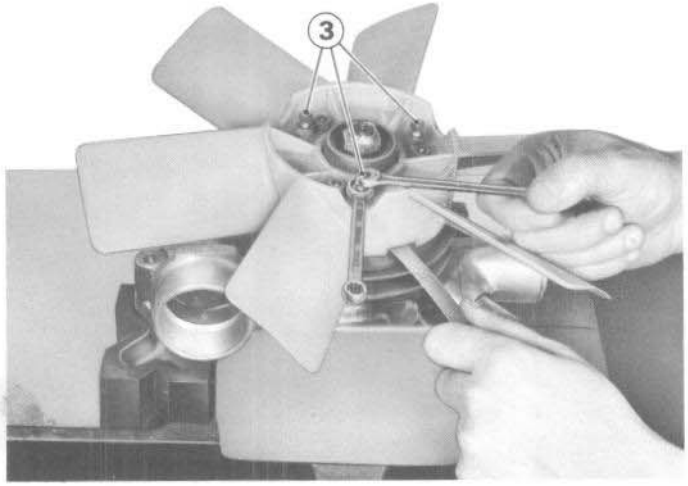
Hub with two separate bearings :

- Replace the paired bearings and the spacer **(1).**
- Insert the snap ring **(2)** using the thickest possible snap ring to eliminate the end float.
- Thickness of snap ring available :
  1.50 mm - 1.55 mm - 1.60 mm - 1.65 mm
  1.70 mm - 1.75 mm - 1.80 mm - 1.85 mm.



- Fit the key on the shaft.
- Position the pulley and the fan hub.
- Clamp the pulley in a vice using the special jaws **(AY).**
- Tighten the nut to **3.5 m.kg (25 ft.lbs)** and lock it.

WARNING - When fitting a new pump fit a 9 mm thick nut on a hub with two separate bearings.

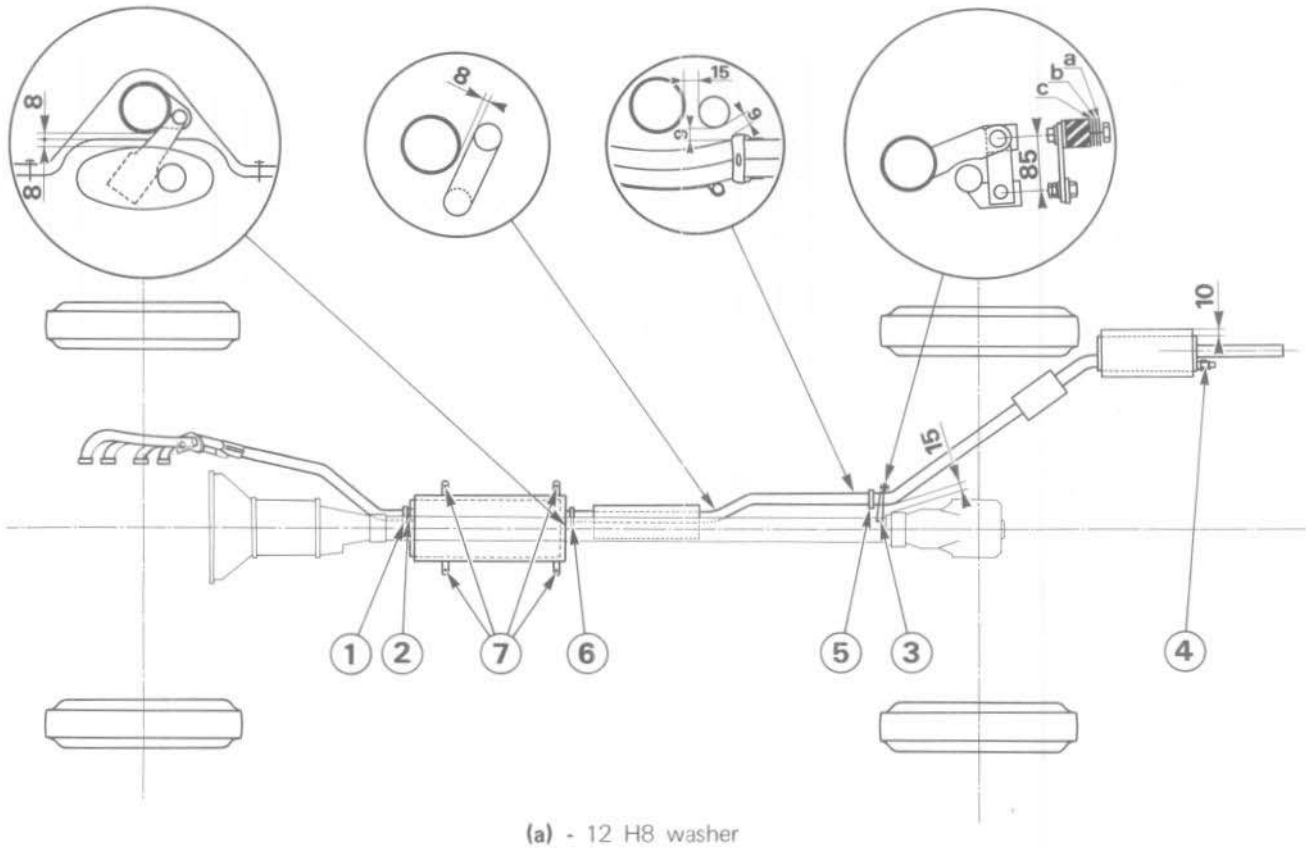


Checking :

- Check the fan air gap which must be 0.3 mm (0.012") and adjust it if necessary using the 3 square head screws **(3).**
- Check the operation of the fan on the work bench by connecting the brush holder lead to the + and the pump body to the – terminal of a battery.
- Refit the water pump.
- Start up the engine and, using a thermometer (placed in the radiator), check the fan engagement :
  - engagement at 87 ± 3°C
  - disengagement at 79° ± 3°C.
- If it does not engage check the fuse F3 and then short the 2 switch terminals : if the fan engages, the switch is defective.
- In the event of operation outside the given temperature range, replace the switch (tightening torque : **4 m.kg (19 ft.lbs)**).

504 SALOON

A - CLEARANCE BETWEEN THE PIPE AND THE MECHANICAL COMPONENTS



(a) - 12 H8 washer
(b) - Rear support
(c) - Double tooth washer.

B - PIPE ASSEMBLY

– Assemble the exhaust pipe without tightening the nuts.

– Tighten the 3 nuts on the manifold.

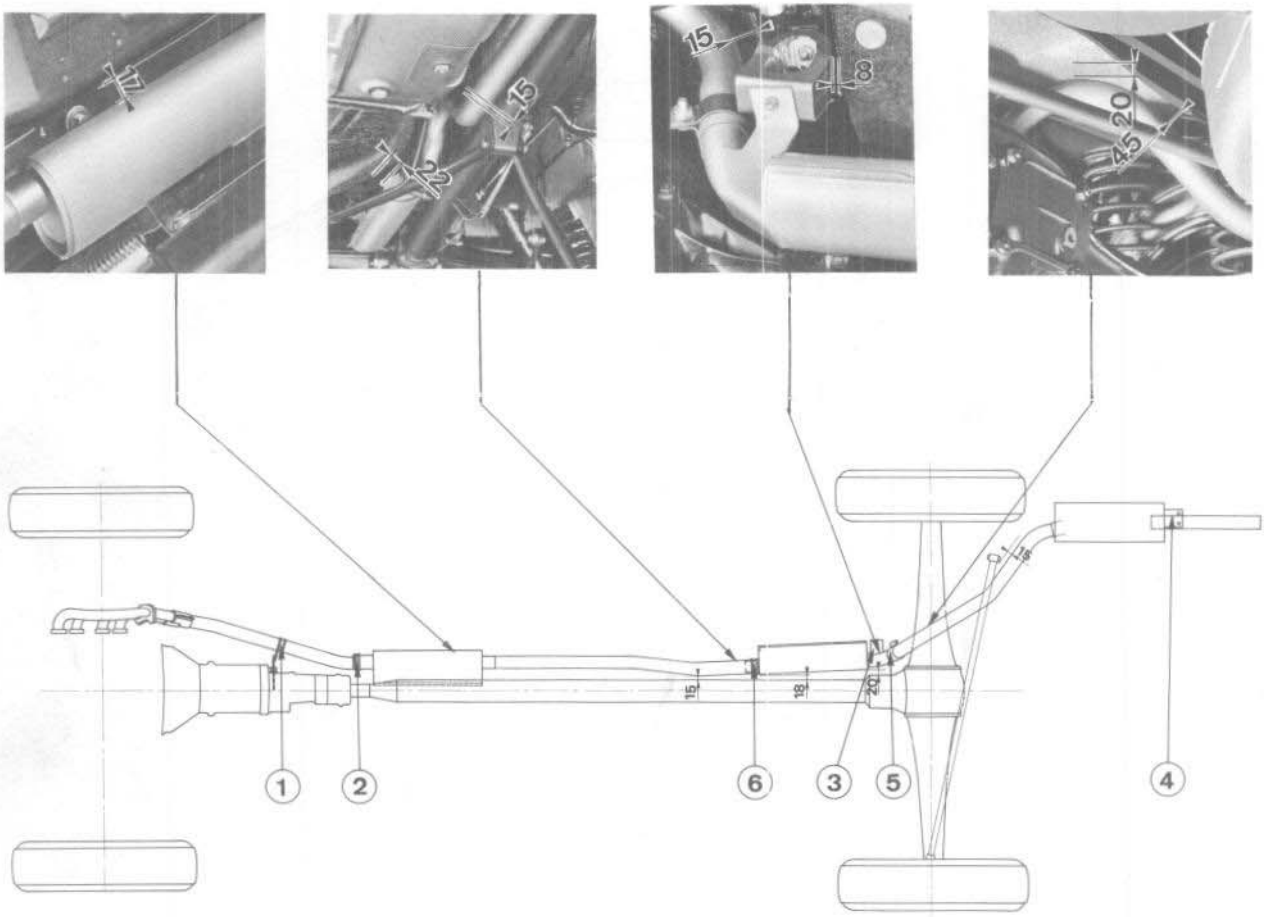
– Position the front silencer and tighten :
- the clamp **(1)**,
- the mounting **(2)** on the torque tube.

– Position :
- the intermediate pipe and silencer.
- the rear pipe.

– Tighten in the following order :
- the rear pipe mounting **(3)**,
- the rear silencer mounting **(4)**,
- the intermediate/rear pipe clamp **(5)**,
- the intermediate pipe clamp **(6)**,
- the nuts **(7)** on the dissipation plate, respecting the pipe/plate clearance.

504 FAMILY SALOON AND STATION WAGON

A - CLEARANCE BETWEEN THE PIPE AND THE MECHANICAL COMPONENTS



N.B. - *The 504 Station Wagon has no front silencer.*

B - PIPE ASSEMBLY

– Assemble the exhaust pipe without tightening the nuts.

– Tighten the nuts on the manifold and the clamp **(1).**

– Position the front silencer and tighten the clamp **(2).**

– Position :
- the intermediate pipe and silencer,
- the rear pipe.

– Tighten in the following order :
- the intermediate mounting **(3)**,
- the rear mounting **(4)**,
- the intermediate/rear pipe clamp **(5)**,
- the intermediate pipe clamp **(6).**