WORKSHOP MANUAL

404

fuel injection engine

PEUGEOT

Class index

404 WORKSHOP MANUAL - FUEL INJECTION ENGINE

Ref : 540 E

SUPPLEMENT N° 15

This supplement supersedes the following pages :

Class 1 - Pages 04 01(1) - 04 02(1) - 07 01 - 07 02 - 08 03 - 08 04 - 14 01
Class 14 – Page 01 01(2)

NEW PAGES

Class	Page	Alterations
1	04 01(2)	Added : "Perfect Circle" seals installation
	07 02(1)	Added : Installation of the Aluminium-tin alloy bearings Alteration of the connecting rod bearing thickness dimensions.
	08 03(1)	Added : Installation of the main bearing shells made of aluminium - tin alloy Added : Theoretical diametral play (4th fitting)
	14 02	New page
	14 03	New page
14	01 01(3)	Added : oil filter bowl Added : replacement of Purflux or Easy-Change cartridge Periodicity up to 6 000 miles (10 000 km) Added : PLF 5

File this sheet behind the class index

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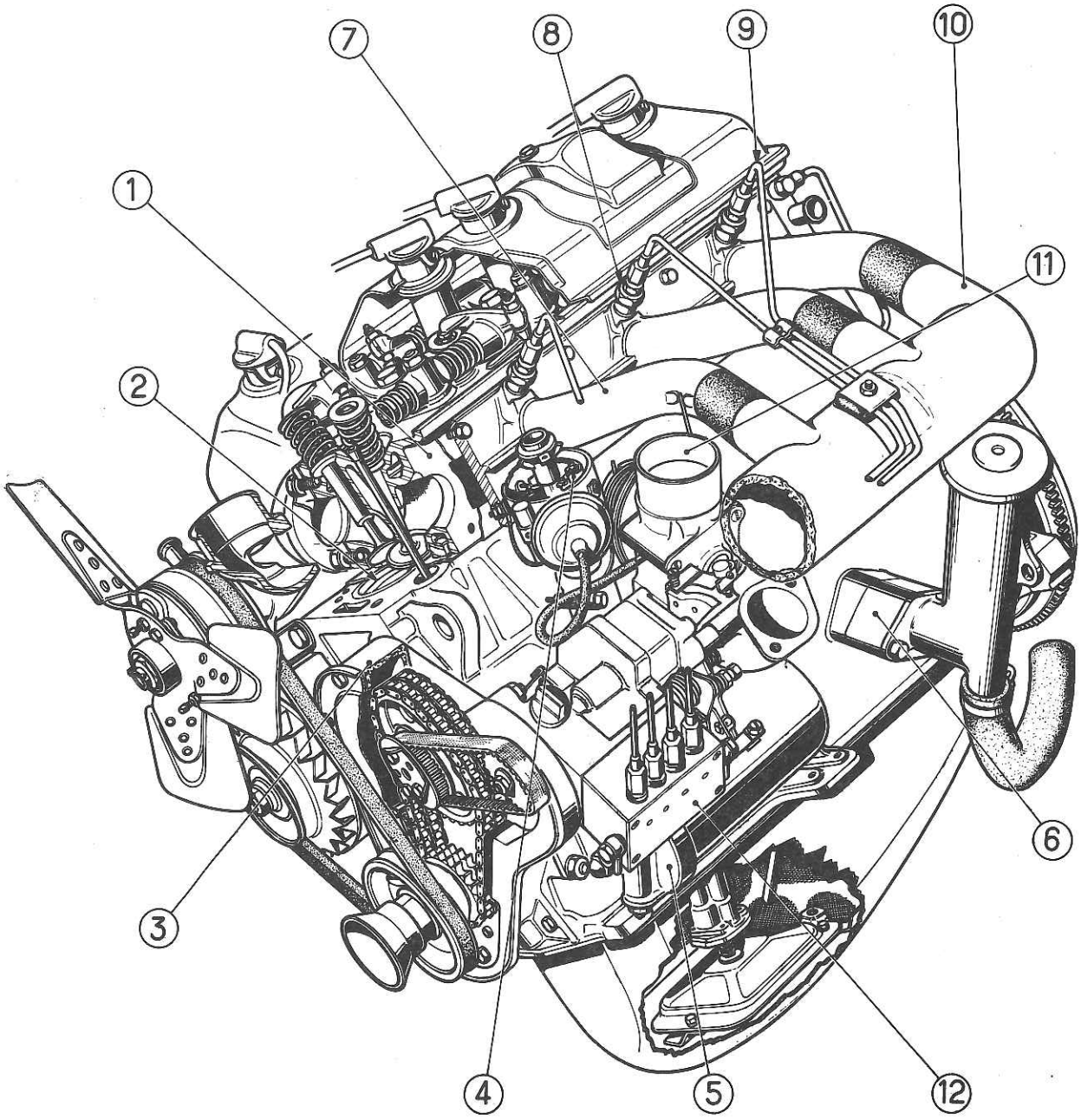


1 - Cylinderhead
2 - Pistons
3 - Timing gear cover
4 - Distributor
5 - Oil filter body
6 - Breather spacer
7 - Intake hose
8 - Injectors
9 - Injection pipes
10 - Intake manifold
11 - Air valve body
12 - Kugelfischer injection pump

PRINCIPLE OF OPERATION

of Carburettor and Injection Petrol Engines and Diesel Engine
(4 stroke cycle)

PETROL engines, whether they are fed by a carburettor or an injection system, are EXPLOSION engines, with CONTROLLED IGNITION, while the DIESEL is a SELF-IGNITION COMBUSTION engine.

The only likeness between PETROL INJECTION and DIESEL engines is in the injection system.

The feeding processes are different :

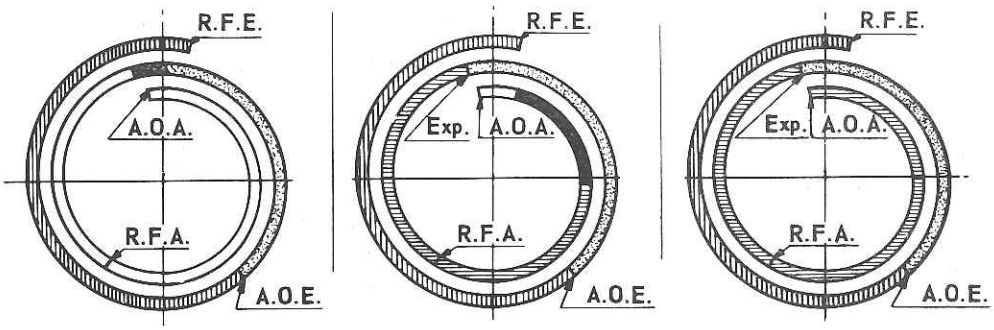
PETROL injection & CARBURETTOR, by a proportional mixture of air & petrol.

Diesel : only by proportioning of the fuel.

COMPARISON TABLE

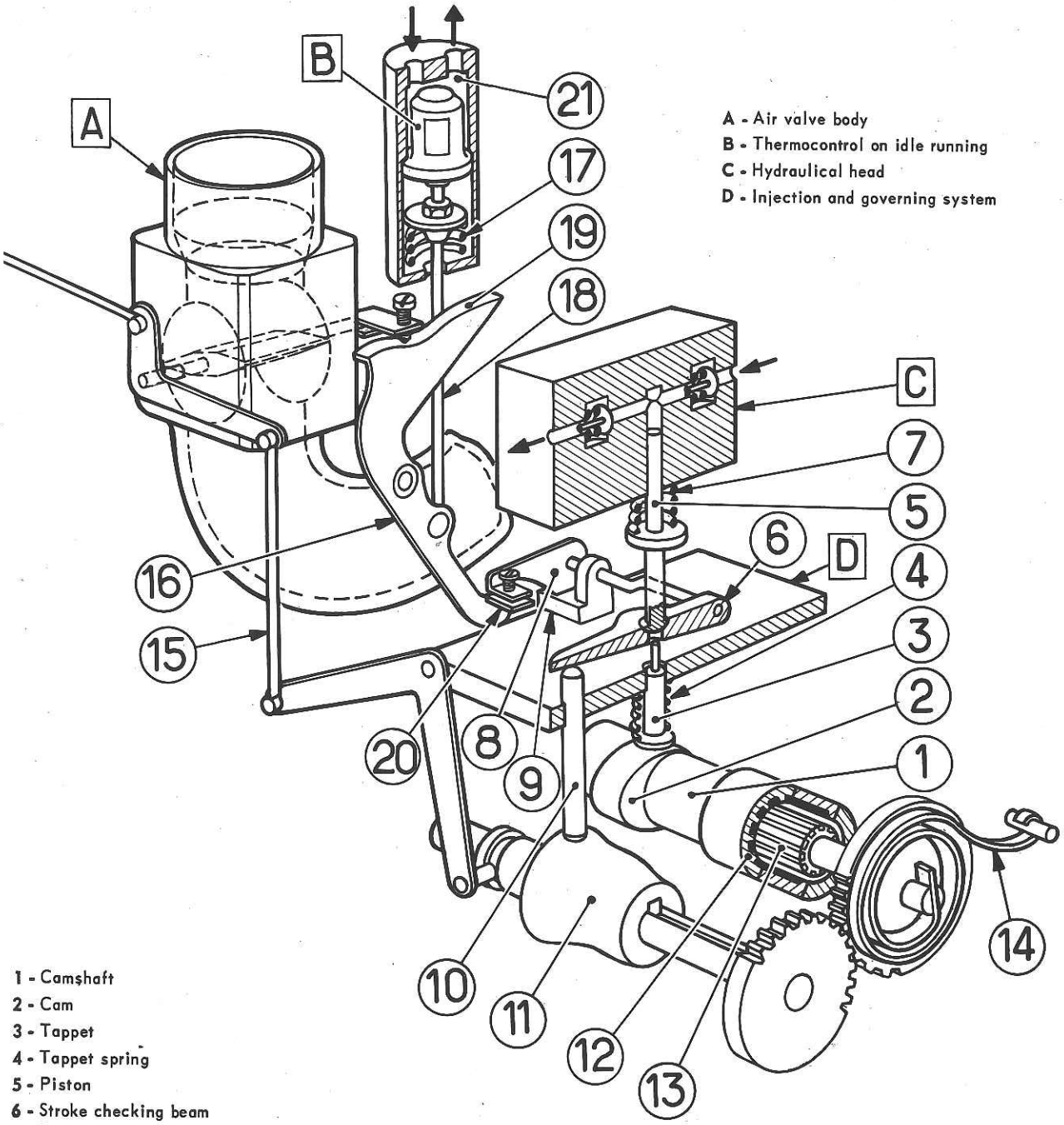
Stroke	Diesel	Petrol Injection	Carburetter
INLET	Air sucked in	Air sucked in Petrol injected during air inlet	Air & Petrol proportionate mixture sucked in through carb.
COMPRESSION	Very high compression of air. Ratio 21/1. Temperature raises 600° C.	High compression of mixture. Ratio 8,8/1. Temperature 380° C.	Compression of mixture. Ratio 7,4/1. Temperature 300° C.
At end of stroke	Fuel injected, ignites spontaneously.	Mixture ignition controlled by plug spark.	
EXPANSION	Compression and expansion	Explosion and Expansion	
EXHAUST	Elimination of burnt gases		

R.F.E. : E Cl lg
A.O.A. : I O. ld
R.F.A. : I Cl lg
A.O.E. : E.O. ld
Exp. : Exp.



Pure air
Gas mixture
Injection
Explosion
Exhaust

SKETCH SHOWING THE PRINCIPLE OF OPERATION OF THE INJECTION PUMP



A - Air valve body
B - Thermocontrol on idle running
C - Hydraulical head
D - Injection and governing system

1 - Camshaft
2 - Cam
3 - Tappet
4 - Tappet spring
5 - Piston
6 - Stroke checking beam
7 - Piston spring
8 - Richness lever
9 - Stop
10 - Finder
11 - Adjustment cam

12 - Magnetic bars sleeve
13 - Armature
14 - Checking spring
15 - Link rod
16 - Accelerated idle running control

17 - Thermo control spring
18 - Control rod
19 - Idle running control check fan
20 - Sole piece
21 - Water sleeve in manifold

PRINCIPLE OF OPERATION OF INJECTION PUMP KF 1

Camshaft **1** working at half the engine speed, including several cams corresponding to the engine cylinders.

Cam **2** acts on rod **3** which is driven back by spring **4**.

The rod lifts the half-shperical end of piston **5** applying pressure on cam **6** under the pressure of spring **7**.

The dead position base varies as it is determined by the angle of the cam whose two ends are in motion.

The rear end articulates on an excentric which is controlled by the enriching lever **8**. This lever, in normal running, rests against stop **9**.

The front end position varies under impulsions from the finder **10** which rests against cam **11**. Cam **11** is the main component of the governing system.

The control of petrol quantities injected is made by variations of piston **5** stroke, the quantity injected being greater for a longer stroke, which is obtained through a smaller radius of cam **11** or through a lowering of cam **6**.

Cam **11** moves in two connected directions :

1 - **Angular displacement,** about 300° , controlled by a magnetic correcting device which includes :
- one magnetic sleeve **12**, driven by the pump camshaft.
- one armature **13** within the magnetic field, connected with the cam **11** through meshings. The way the armature is driven by the magnetic field is proportional to the engine r.p.m.
- a resistor spring **14** which opposes the driving torque and keeps the connection system in balance for each speed, and permits the rotation of the cam to a given angle for a given revolution speed.

2 - **Lateral displacement** through link rod **15** which connects the pump control lever with the butterfly valve control.

Richness for cold starts

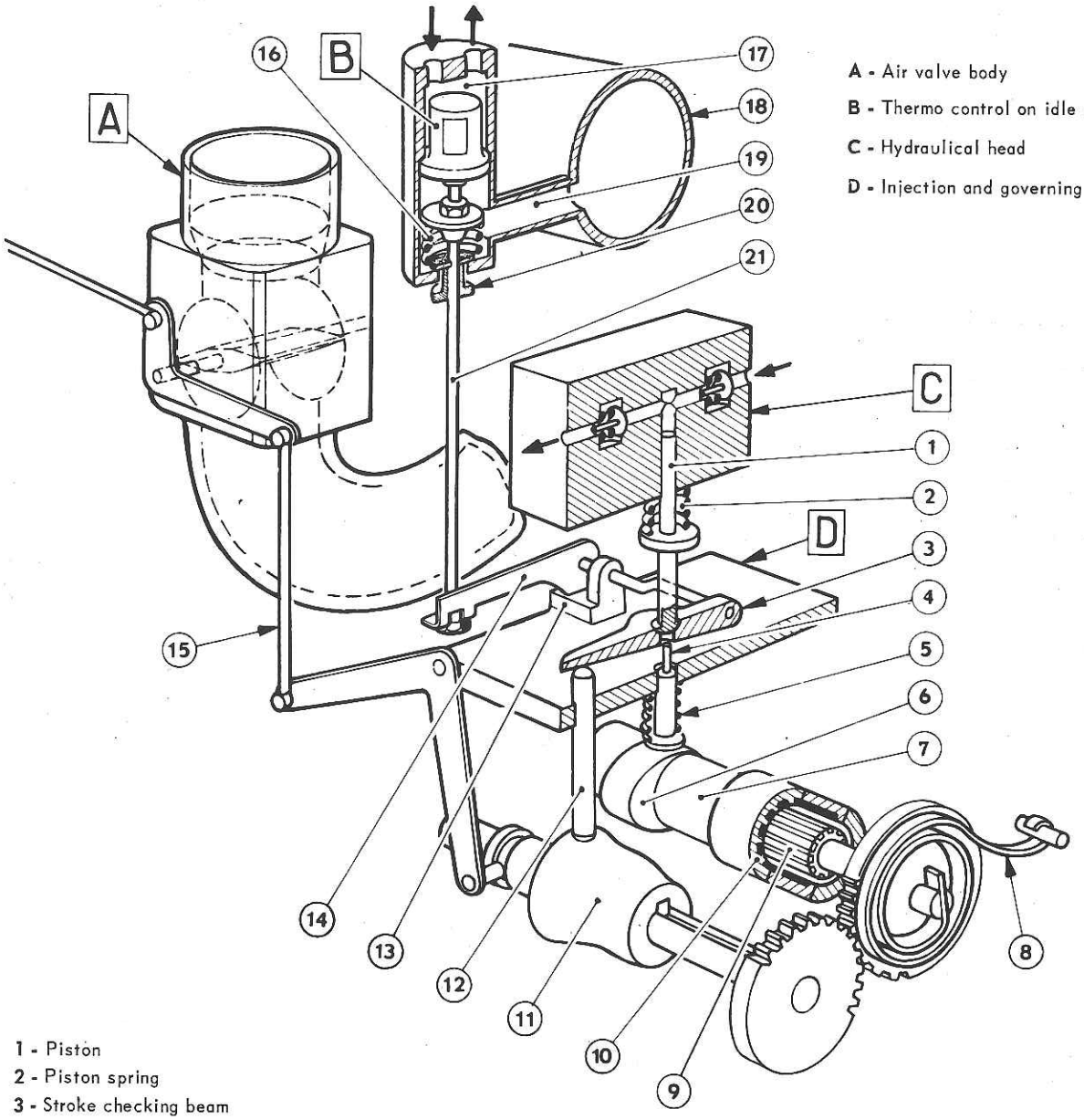
As long as the engine temperature keeps under 65° C, the richness of the mixture is controlled automatically and is proportionate to the temperature.

WHILE THE ENGINE IS COLD the proper richness is provided by the rocking of the accelerated idle running lever **16**, under impulsion of the spring **17** which pulls up the rod **18**.

In rocking this lever synchronizes, through check face **19** and sole piece **20**, the opening of airevalve and the displacement of petrol richness lever **8**.

WHEN WARM the petroleum wax in the thermo-control B expands (thermo-control is located within water sleeve of intake manifold **21**) and forces back control rod **18**, thus making void the effect of the check face **19** and sole piece **20**.

SKETCH SHOWING THE PRINCIPLE OF OPERATION OF INJECTION PUMP KF 2



A - Air valve body
B - Thermo control on idle running
C - Hydraulical head
D - Injection and governing system

1 - Piston
2 - Piston spring
3 - Stroke checking beam
4 - Tappet
5 - Tappet spring
6 - Cam
7 - Camshaft
8 - Checking spring
9 - Armature
10 - Magnetic bars sleeve
11 - Adjustment cam
12 - Finder
13 - Stop
14 - Richness lever
15 - Link rod
16 - Thermo control spring
17 - Water sleeve in manifold
18 - Distributor
19 - Air boost pipe
20 - Valve
21 - Control rod

PRINCIPLE OF OPERATION OF INJECTION PUMP KF 2

The camshaft **7**, driven at half engine speed, has one cam for each engine cylinder.

The cam **6** controls the tappet **4**, which is driven back by the spring **5**.

The rod lifts the half-spherical end of piston **1** which rests against beam **3** under the pressure of spring **2**.

BDC of piston is made variable and is controlled by the displacement of the beam, both ends of which are mobile.

The rear end articulates on the excentric which is controlled by the richness lever **14**. The lever, in normal running, rests against stop **13**.

The front end position varies under impulses from finder **12** which rests against variable cam **11**, which constitutes the main component of the governing system.

The control of petrol quantities injected is made by variations of piston **1** stroke, **the quantity injected being greater for a longer stroke**, which is obtained through a smaller radius of cam **11** or through a lowering of the joint on beam **3**.

Cam **11** moves in two ways :

1 - **Angular deplacement**, about 300°, controlled by a magnetic correcting device which is composed of :

- one magnetic sleeve **10** driven by the pump camshaft
- an armature **9** within the magnetic field, connected with the cam **11** through meshings. The way the armature is driven by the magnetic field, is proportional to the engine r.p.m.
- a resistor spring **8** which opposes the driving torque and keeps the connection system in balance for each speed, and permits the rotation of the cam to a given angle for a given revolution speed.

2 - **Lateral displacement**, a function of the position of the accelerator pedal and its load, through link rod **15** which connects the pump control lever with the butterfly valve control.

RICHNESS FOR COLD STARTS

As long as the engine temperature keeps under 50° C, the richness of the mixture is controlled automatically and is proportionate to the temperature.

WHILE THE ENGINE IS COLD the proper richness is provided by the rocking of richness lever **14** through the action of control rod **21** pushed by spring **16**.

The movement of control rod **21** causes valve **20** to open to receive an air boost.

WHEN WARM the petroleum wax in thermo-control **B** (located within water sleeve **17** of intake manifold) forces back control rod **21**, thus making void the effect of valve **20** and richness lever **14**.