PEUGEOT Motocycles

SALES DIVISION
NETWORK TECHNICAL INFORMATION

WORKSHOP MANUAL

50 cc TSDI ENGINE HORIZONTAL CYLINDER

CONTENTS

CHARACTERISTICS

Characteristics

Engine	Single cylinder 2-stroke direct injection
Cooling	liquid
Bore x stroke	39,9 x 39,8 mm
Cubic capacity	49,9 cm^3
Max. power output	3,75 kW à 7500 tr/min
Max. torque at	6500 rpm
Ignition / Carburettor	Synerject ECU
Fuel injector	Siemens green 37.028
Air injector	Synerject blue 37.073
Pressure regulator	Synerject
Fuel pump	Synerject
Throttle unit	Bing 235
Temperature sensor	Synerject
Oil pump	Mikuni ESOP-03
Spark plug	NGK CPR8E
Magneto flywheel	Mitsuba 180W
Starter motor	Mitsuba 250 W
Exhaust	Catalytic

Capacities

Transfer box	0.12 L.

Engine markings

Engine type	HL1

SPECIAL IMPORTANT POINTS

Oil and fuel

This engine is designed to run on 95 or 98 unleaded fuel only
The oil to use for the separate lubrication system is « Esso 2T Spécial » or « Esso 2T Spécial anti-fumée » oil approved by the manufacturer The oil is injected directly into the casing as required
Never run the machine with a petrol/oil mixture.

The fuel inlet and injection manifold return pipes must only be replaced by genuine service parts. The fuel pressure of 8 bars requires special pipes.
The fuel pipes must be changed if they show signs of wear, cracks, etc.
The clips are specific, they must always be changed each time they are removed and replaced with new genuine parts clips

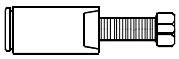
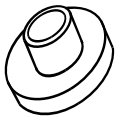
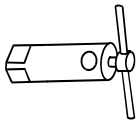
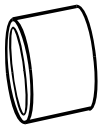
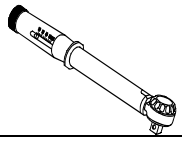
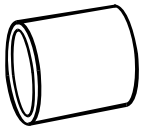
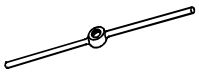
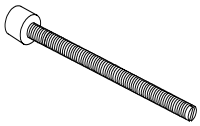
Note :
Petrol is highly inflammable, do not smoke in the working area and avoid proximity to flames or sparks.
Work in a clear and well-ventilated area.

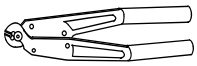
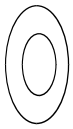
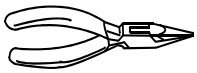
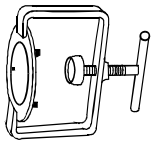
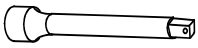
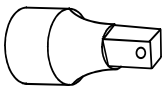
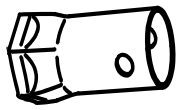
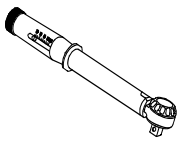
TIGHTENING TORQUES

Tightening torques

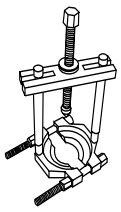
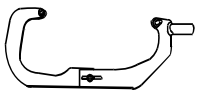
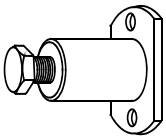
Cylinder head	1,2 m.daN
Cylinder casings	1 m.daN
Covers	1 m.daN
Water pump	1 m.daN
Inlet manifold	1 m.daN
Starter motor	1 m.daN
Rotor	4 m.daN
Stator	1 m.daN
Engine speed sensor.	0,7 m.daN
Drive pulley	4 m.daN
Driven pulley	4,5 m.daN
Spark plug	1 m.daN
Compressor	0,7 m.daN
Injection rail	0,7 m.daN

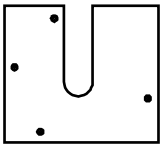
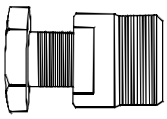
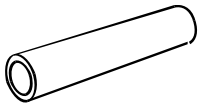
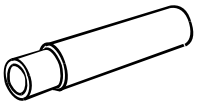
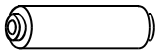
SPECIAL TOOLS

.	Tool N°	Description	Used with
	64706	Casing extractor and opening tool	casing opening plate + pin
	64710	Shoulder locator	64706
	64765	Engine mount	engine support bracket
	68007	Protective cap small model	69254
	68994	Torque wrench 8 Nm to 54Nm	extension 752235 adapter 752236
	69098	Protective cap large model	754003
	69104	Wing nut	750069 + 64711 + 64712 + 64754
	750069	Stud Ø10 pitch 125	69104

	750539	Tie-wrap pliers	
	750808	Thrust washer	64706
	752000	Piston circlip pliers	
	752127	Clutch compression tool	752361
	752235	1/2 extension	69802 or 753977
	752236	1/2-3/8 adapter	69802 or 753978
	752237	Adjustable pin wrench	
	756725	38 mm box wrench	752127
	753977	Torque wrench 30 Nm to 150Nm	extension 752235 adapter 752237

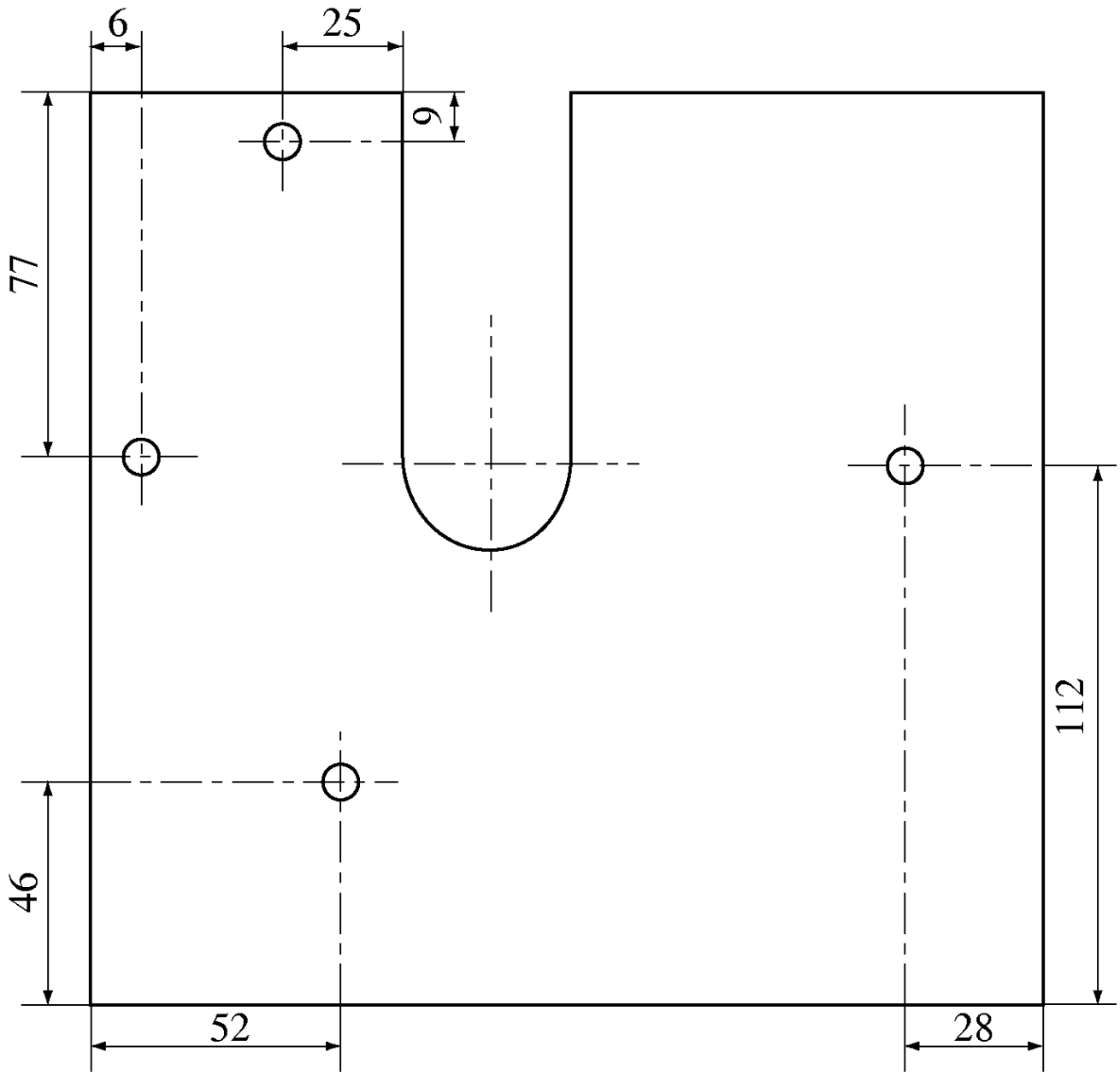
SPECIAL TOOLS

	755585	bearing extractor tool	
	755982	Engine support adapter	64765
	755983	Casing opening tool	64706

	754006	Modified casing opening plate	64706
	755985	flywheel extractor	68007
	755986	air injector setting tool	
	755989	air injector drift	
	756668	Crank assembly lip seal tool	

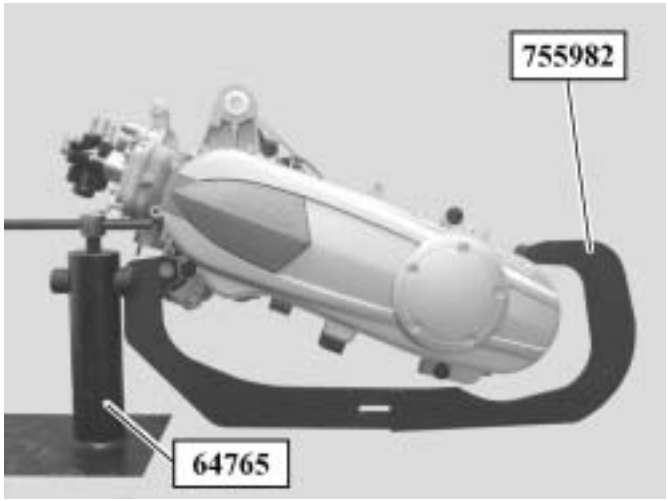
Template for converting the engine casing opening plate P/N 754006 for the HLI engine

- 7 mm diameter holes



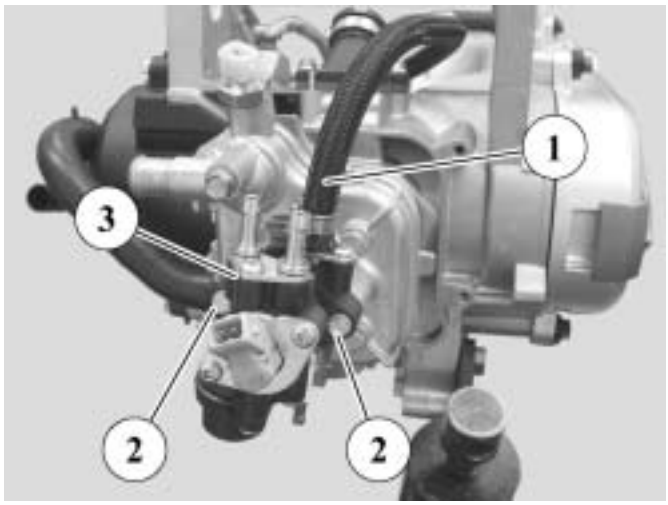
To put the engine on the stand

- Fit the engine to adapter P/N 755982
- Put the assembly on stand P/N 64765 clamped in the jaws of a vice



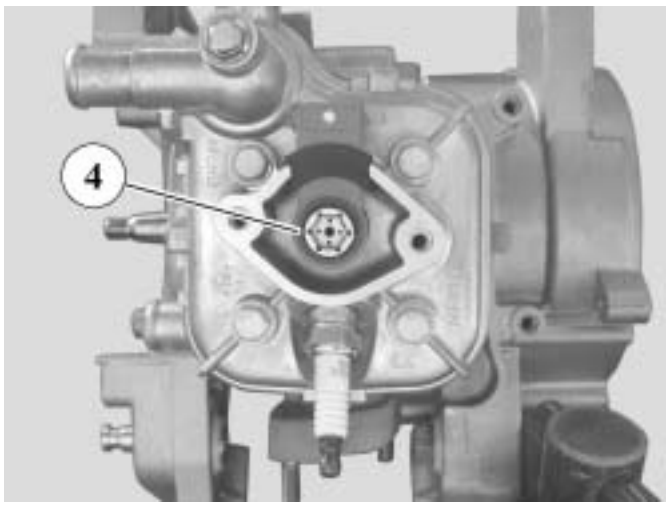
To remove the Injection rail

- Disconnect the air hose (1) from the compressor
- Remove the injection manifold (3) two fixing bolts (2)
- Remove the injection manifold



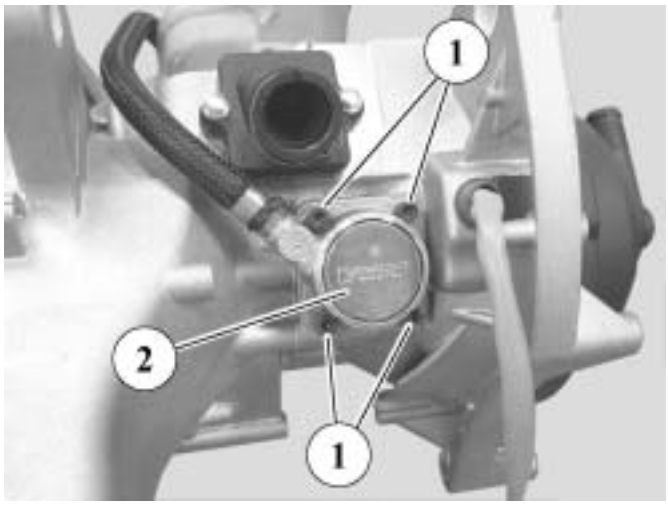
- Remove the O-ring (4) from under the injection manifold

Note: The O-ring must be changed each time it is removed



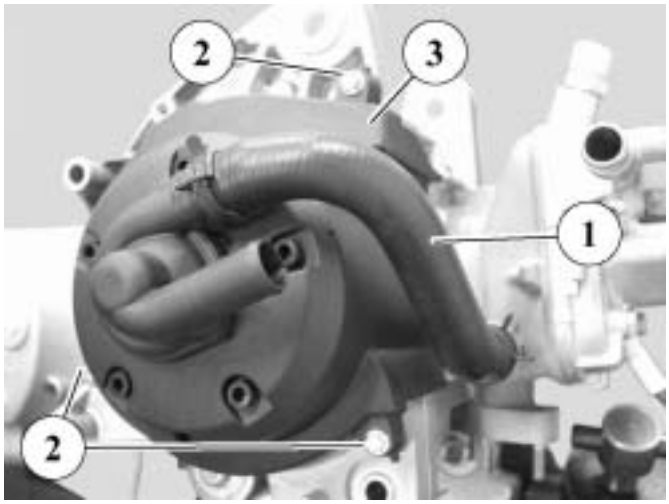
To remove the air compressor

- Remove the compressor (2) four fixing bolts (1)
- Remove the compressor (with its 2 centring sleeves and its O-ring)



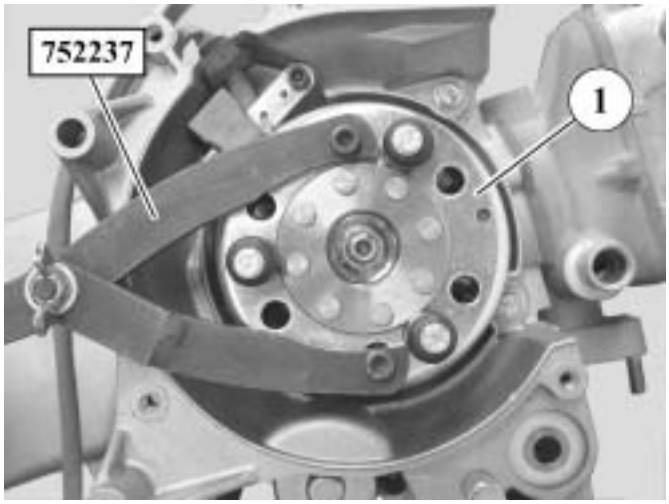
Removal of the water pump

- Remove the pump/cylinder cooling system hose (1)
- Remove the water pump (3) three fixing bolts (2)
- Remove the water pump

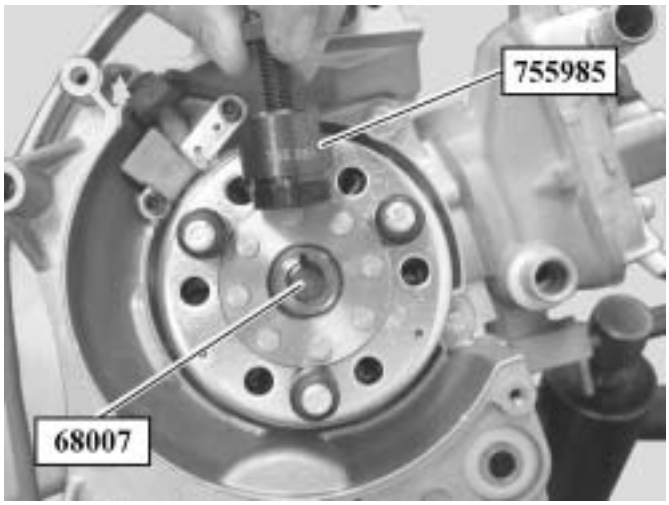


To remove the magneto flywheel

- Hold the rotor (1) with the pin wrench P/N 752237
- Remove the nut

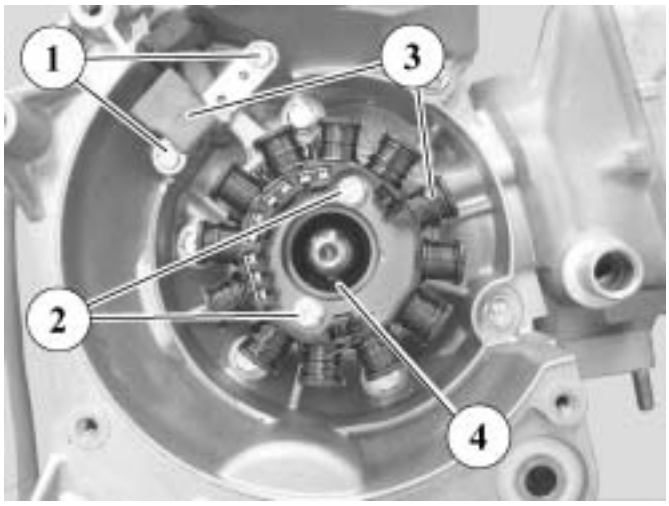


- Fit protective cap P/N 68007 to the end of the crank assembly
- Tighten flywheel extractor P/N 755985 on the rotor
- Lock the flywheel extractor and turn the thrust bolt until the rotor is released



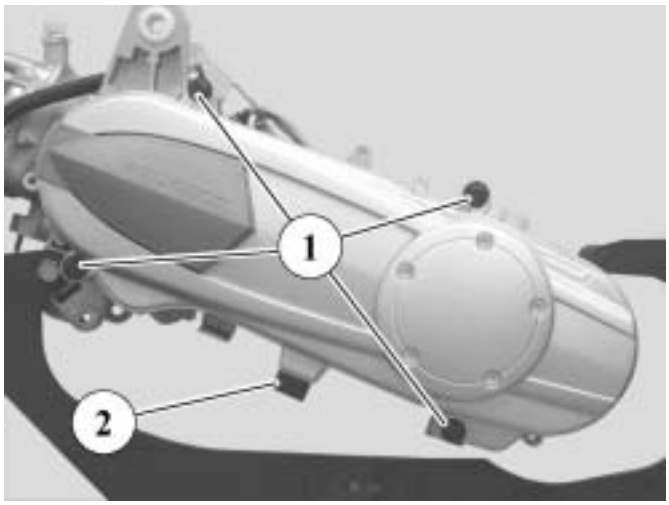
Removal of the stator and engine speed sensor assembly

- Remove the engine speed sensor 2 fixing bolts (1) and the stator assembly 2 fixing bolts (3)
- Remove the stator and sensor assembly (3)
- Remove the key (4) from the crank



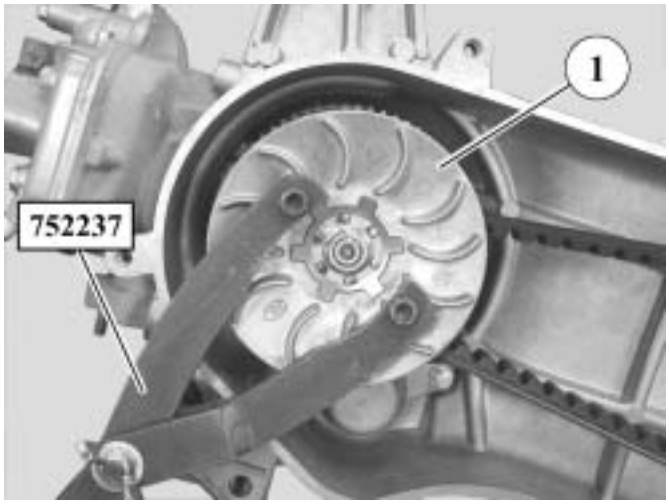
To remove the primary transmission cover

- Remove the transmission cover 4 fixing bolts (1)
- Remove the stand (2) cover and the rubber buffer

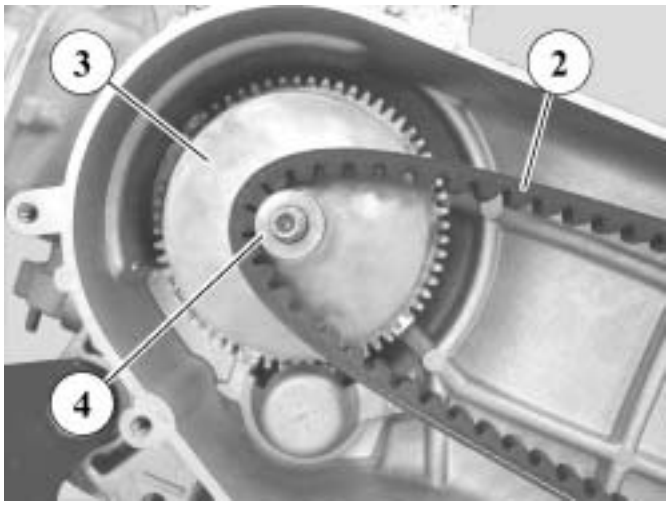


To remove the drive pulley

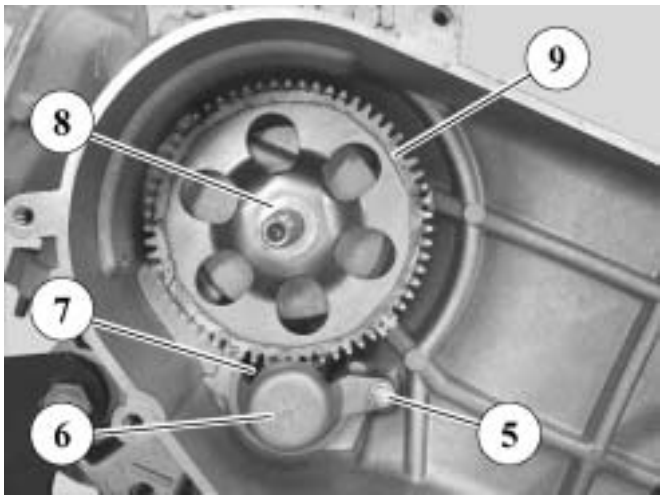
- Lock the fixed flange (1) with tool P/N 752237
- Remove the fixed flange nut and washer
- Remove the fixed flange



- Remove the belt (2)
- Remove the drive pulley (3) with the guide hub (4)

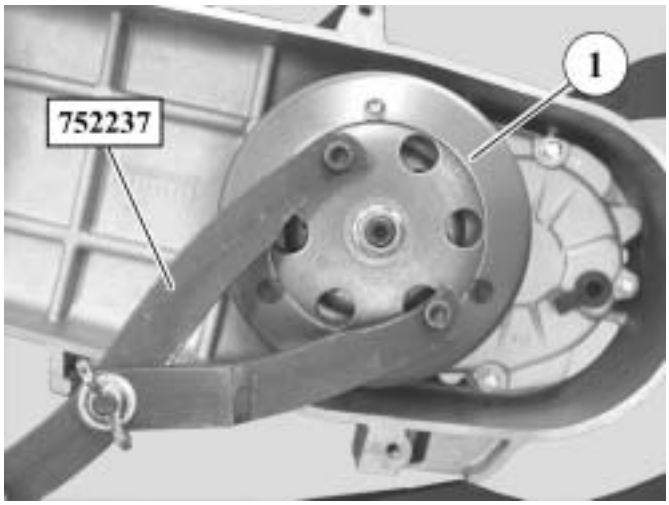


- Remove the starter dog (7) bush fixing bolt (5)
- Remove the bush
- Remove washer 12x22x1 (8)
- Remove the starter ring (9)
- Remove the starter dog



Removal of the driven pulley

- Lock the clutch drum (1) with the pin wrench P/N 752237
- Remove the nut
- Remove the clutch drum and the clutch-drive pulley assembly

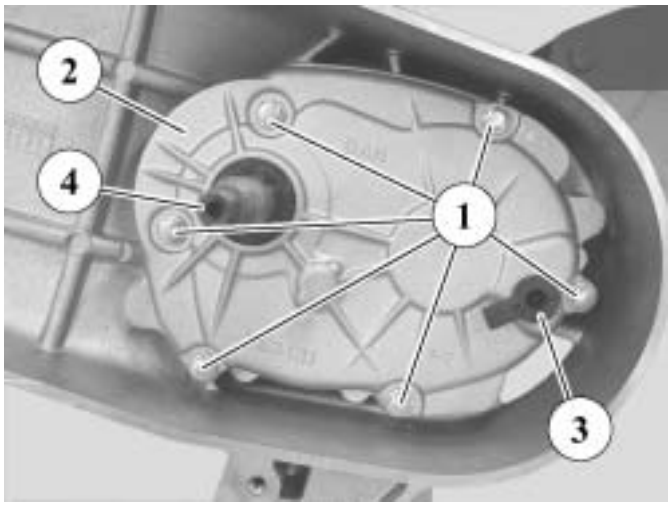


To remove the secondary transmission cover

Note: use a container to catch the transfer box oil when the cover is removed
Filling and checking the transfer box oil level is through the cap (3)

- Remove the cover (2) six fixing bolts (1)
- Remove the cover with the primary shaft (4)

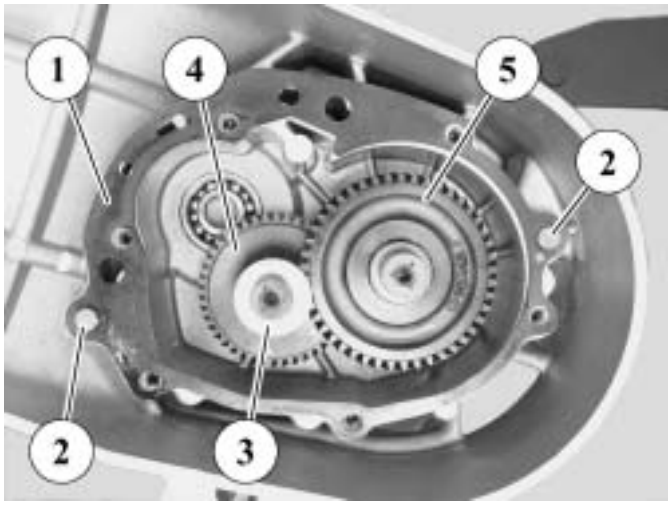
The primary shaft can be drifted out of the cover using a mallet



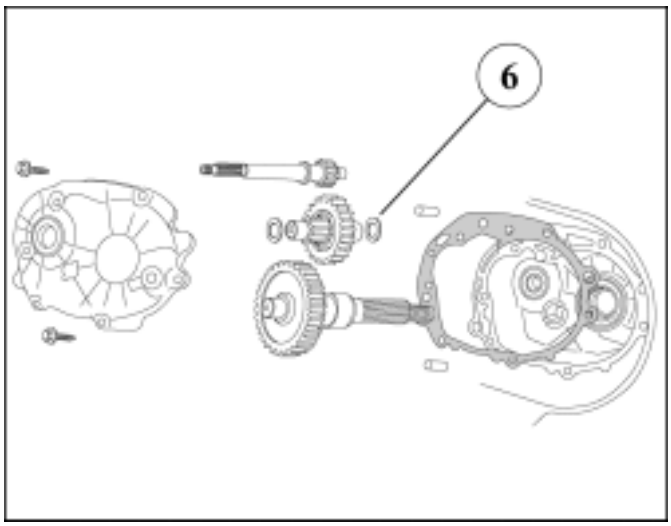
To remove the secondary transmission

- Remove the paper gasket (1) and the 2 locating pins (2)
- Remove the first friction washer (3) (14 x 27 x 0.5) from the intermediate shaft (4)
- Remove the secondary shaft (5)

Note: Take care not to damage the seal on the wheel side when removing the secondary shaft, as the oil could leak out through a drain hole in the casing located between the seal on the wheel side and the bearing



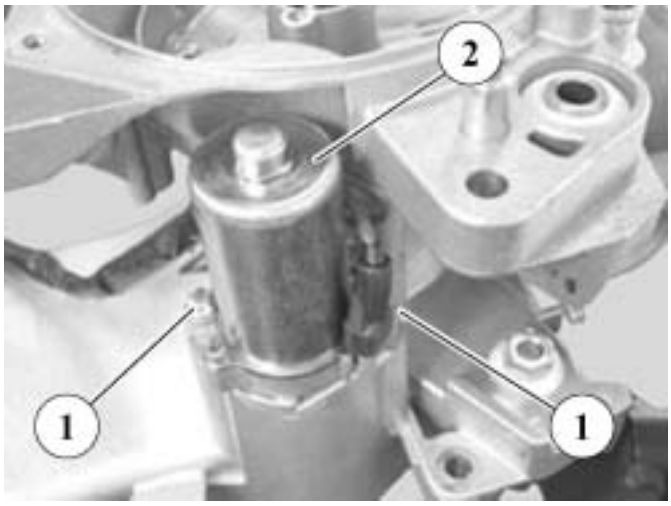
- Remove the intermediate shaft and its second friction washer (6) (14 x 27 x 0.5) located behind it



Removal of the starter motor

- Remove the starter motor (2) two fixing bolts (1) and washers
- Remove the starter motor and its O-ring

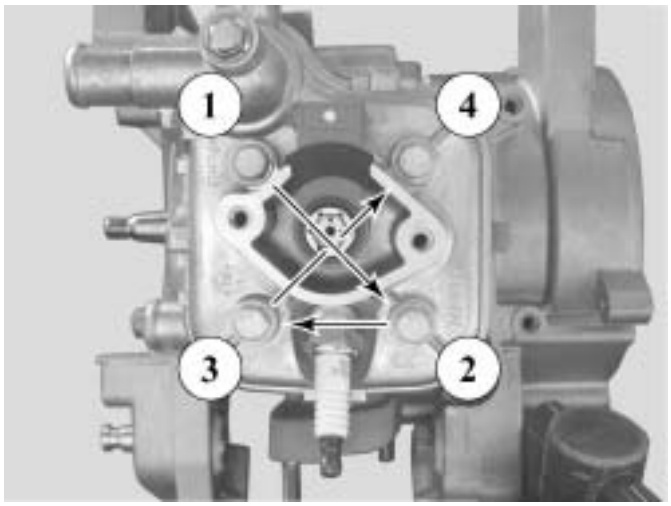
Note: The lower bolt is used for the engine earth (green wire connected to the battery negative terminal)



To remove the cylinder head/cylinder assembly

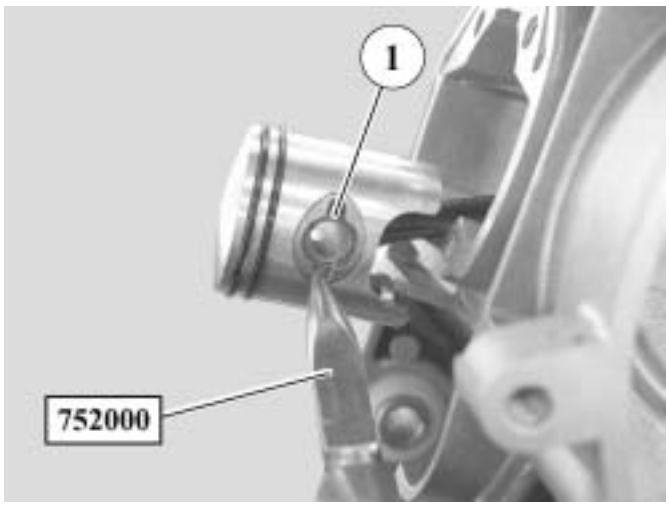
- Remove the spark plug
- Slacken off the cylinder head/cylinder 4 mounting bolts in the order shown, in 2 or 3 stages
- Remove the 4 bolts
- Remove the cylinder head and the O-ring
- Remove the cylinder and its bottom seal

Note : Do not remove the air injector if this is not necessary



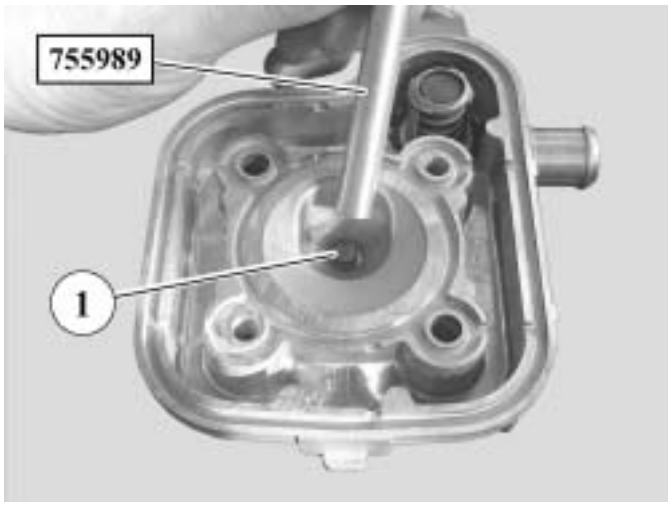
To remove the piston

- Remove the circlips (1) with pliers P/N 752000
- Remove the gudgeon pin
- Remove the piston
- Remove the needle bearing race from the connecting rod end



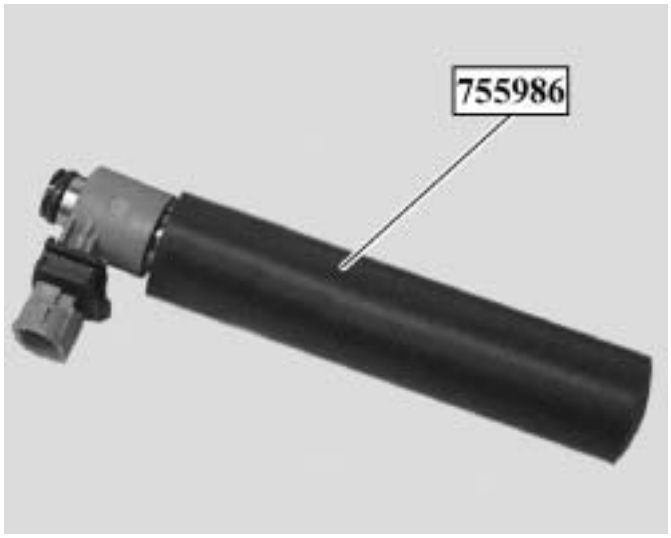
To remove the air injector

- Drift out the air injector (1) with drift P/N 755989
- Remove the O-ring from under the air injector (the O-ring must be renewed each time it is removed)



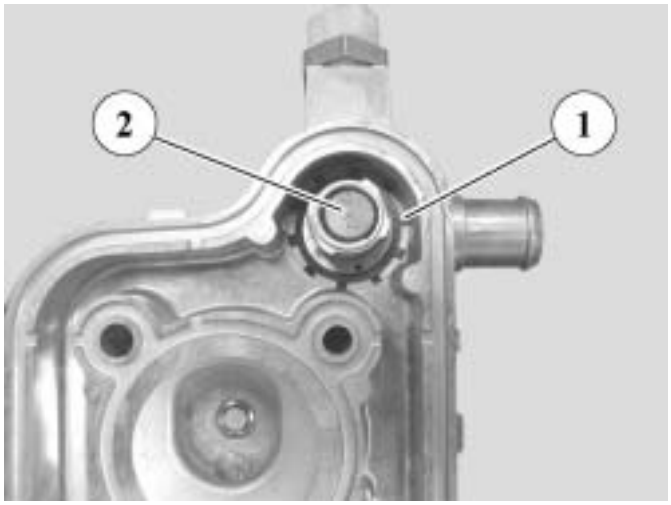
Important : **Put the injector in the holder tool P/N 755986 until ready for refitting**

Nota : The air injector can only be extracted for a short instant from its housing in the cylinder head, as the air injector has a Teflon seal which expands if it is not kept compressed

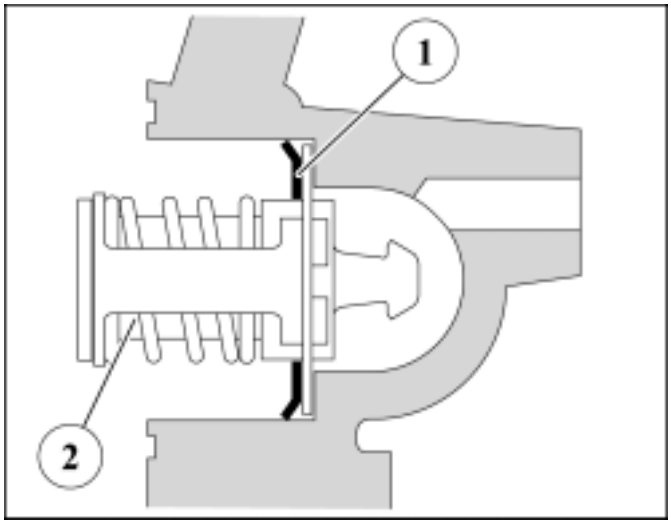


Removal of the thermostat

- Remove the circlip (1) from the thermostat (2)
- Remove the thermostat

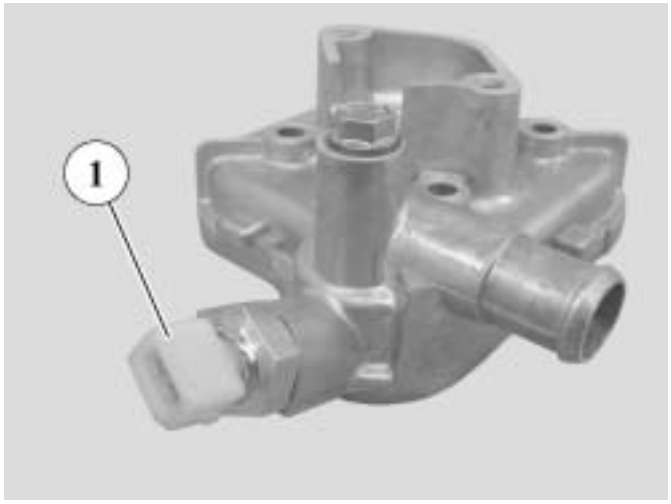


Note: When refitting, ensure the circlip (1) is correctly positioned
The thermostat (2) circlip must be changed each time it is removed



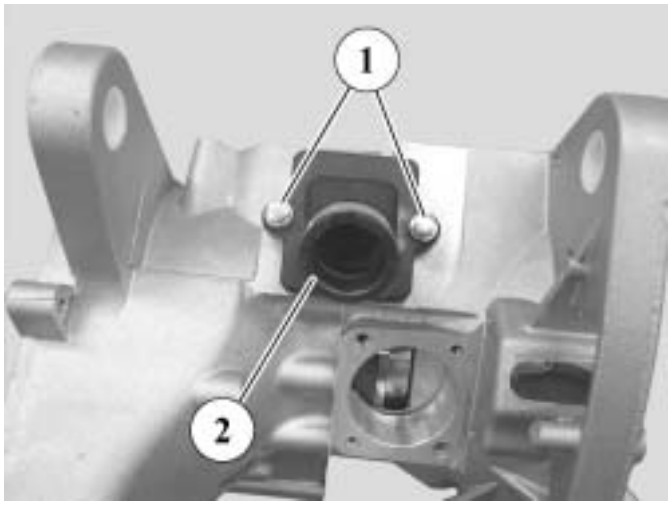
To remove the temperature sensor

Note : The engine temperature sensor (1) seal is provided by a steel gasket

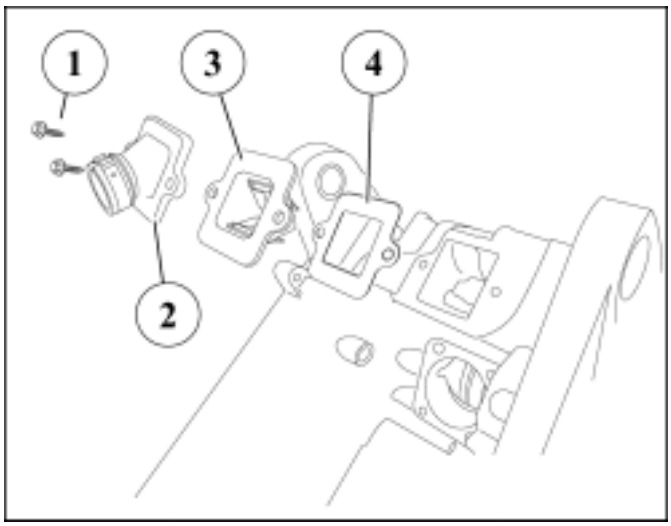


To remove the inlet manifold and valve

- Remove the inlet manifold (2) two fixing bolts (1)
- Remove the inlet coupling



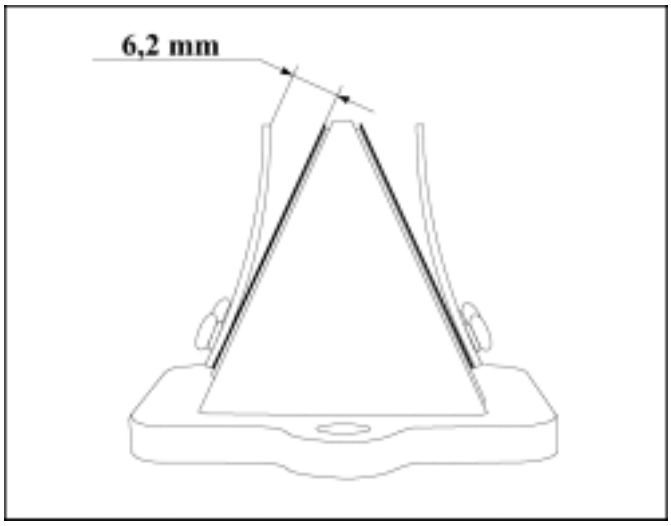
- Remove the valve assembly (3)
- Remove the paper gasket (4)



Note : The paper gasket must be changed each time it is removed

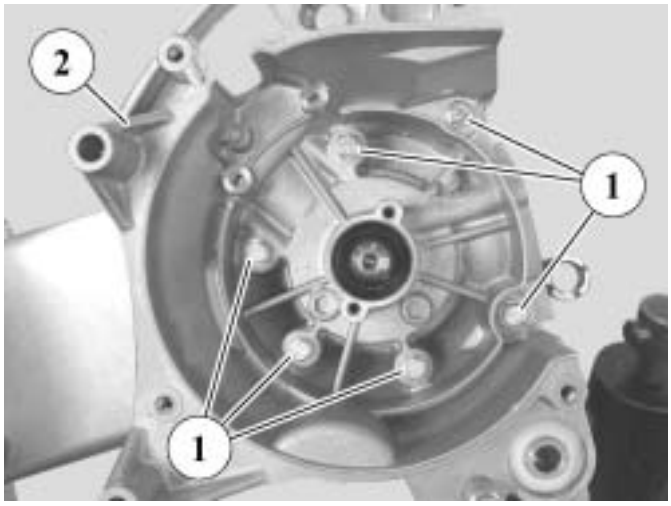
- Check that the valve assembly blades and support are in perfect condition

Note: The position of the buffer must be at 6.2 ± 0.3 mm from the valve support

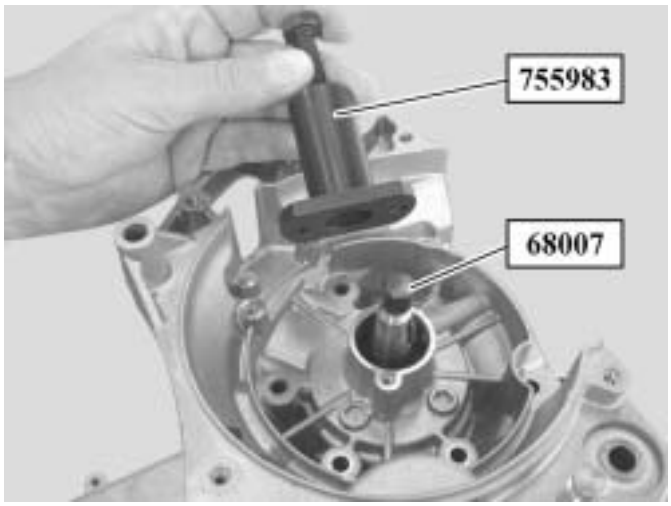


Opening the engine casings

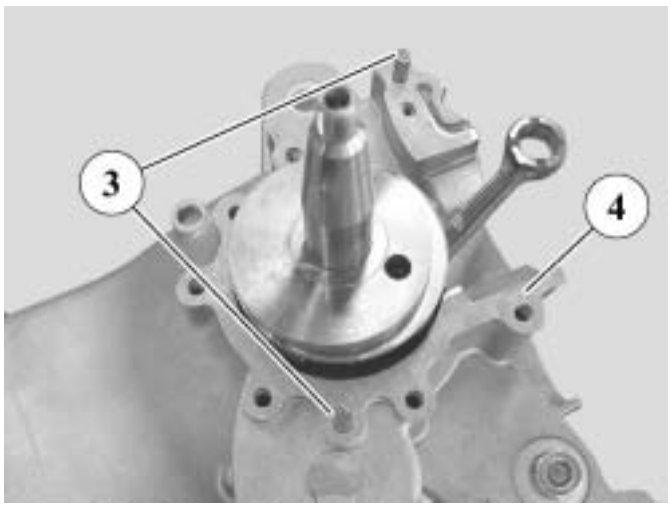
- Remove the RH casing (2) six fixing bolts (1)



- Fit the protective cap P/N 68007 to the crank 68007
- Fit to the RH casing tool P/N 755983 secured by 2 bolts
- Hold the connecting rod to prevent it from coming into contact with the casings
- Tighten the tool centre screw until the casings separate

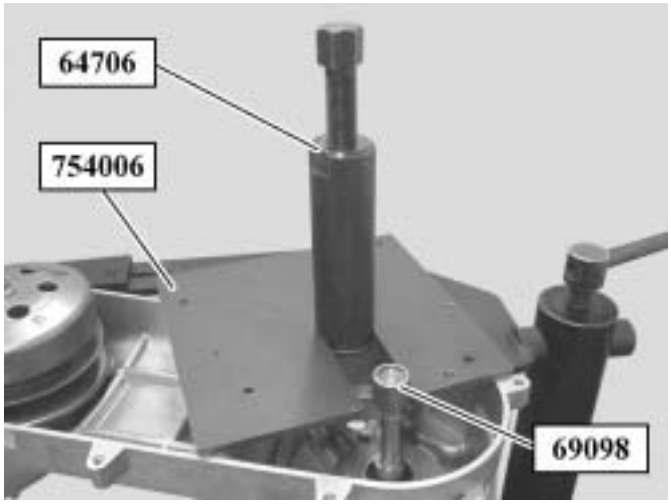


- Remove the RH casing
- Remove the 2 centring pins (3) and the gasket (4)

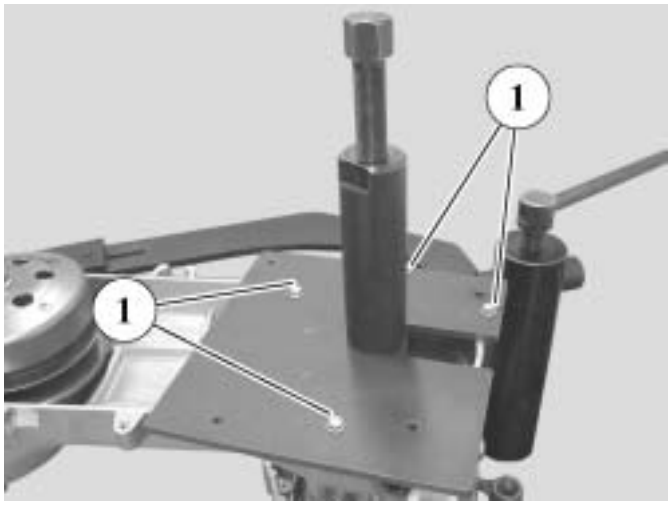


To remove the crankshaft

- Fit the protective cap P/N 68007 to the crank 69098
- Fit to the casing tool P/N 64706 fitted with plate P/N 754006 modified as described in the "Special Tools" chapter

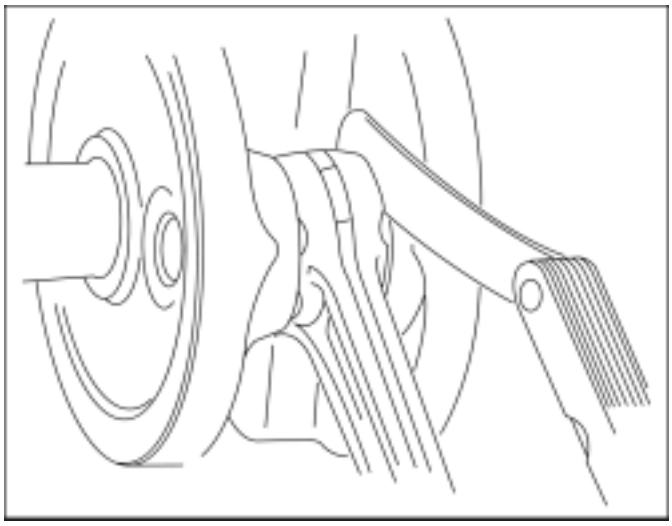


- Fit the assembly to the casing with 4 bolts (1) (the plate opening facing the cylinder side)
- Tighten the tool centre screw holding the crank with one hand on the other side until it is fully extracted

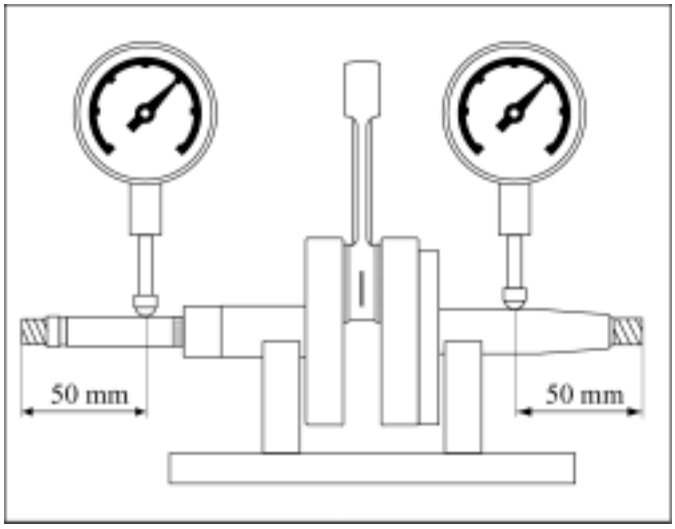


Checking the crank assembly

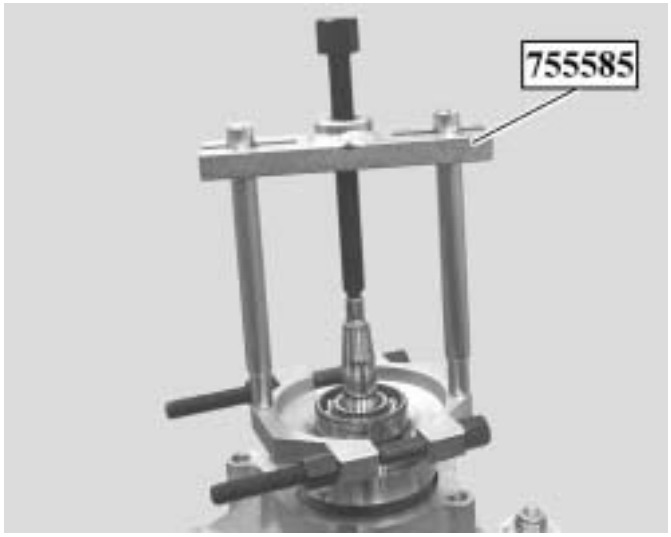
- Using a set of shims, check the big end side play
- The maximum side float on the connecting rod end must not exceed: 5/10 mm



- The out-of-round values measured on the ends of the crank should not exceed 5/100 mm and must be measured:
  - -50 mm from the transmission side end
  - -50 mm from the magneto flywheel end



REFITTING SPECIFIC COMPONENTS



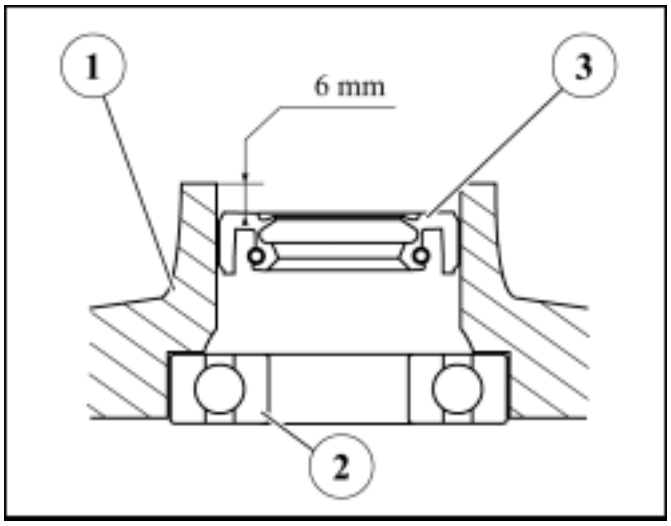
Fitting the crank assembly bearings

Note :

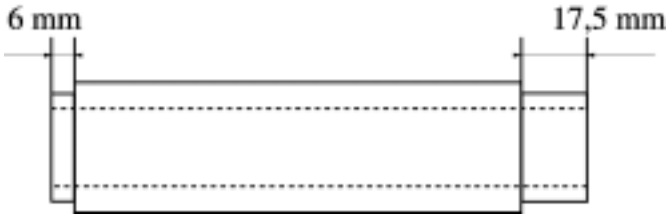
- The bearings and crank seals must be changed each time the engine casings are opened
- When the casings are opened, if the bearings stay on the crank, use tool P/N 755585 to remove them
- If the bearings stay in the casings, the casings should be heated with a heat gun to remove them

This operation should be done quickly in order to remove and refit a bearing to each casing

- Set one of the casings (1) on its mating surface, heat it (80 to 90°C) until the bearing drops out of its own accord
- Remove the seal
- While the casing is expanded fit the new bearing (2) fully home in its housing
- Fit a new seal (3) in each casing using tool P/N 756668



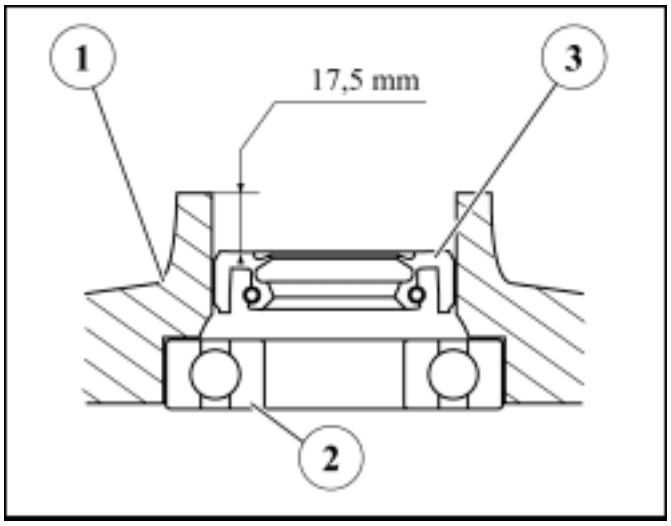
Note : Tool P/N 756668 is used for fitting the two seals. Each end of the tool is designed for fitting one of the seals



The seals should be positioned as follows:

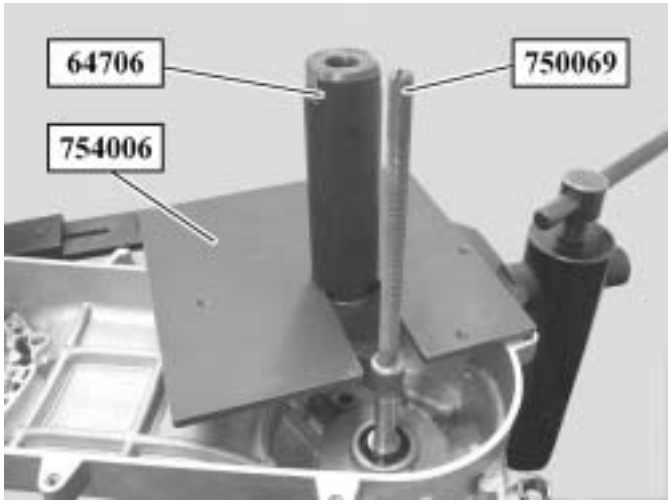
- The seal on the drive pulley side at 6 ±0.5 mm from the outer edge of the casing (LH engine casing

- The seal on the magneto side at 17.5 ±0.5 mm from the outer edge of the casing (RH engine casing)



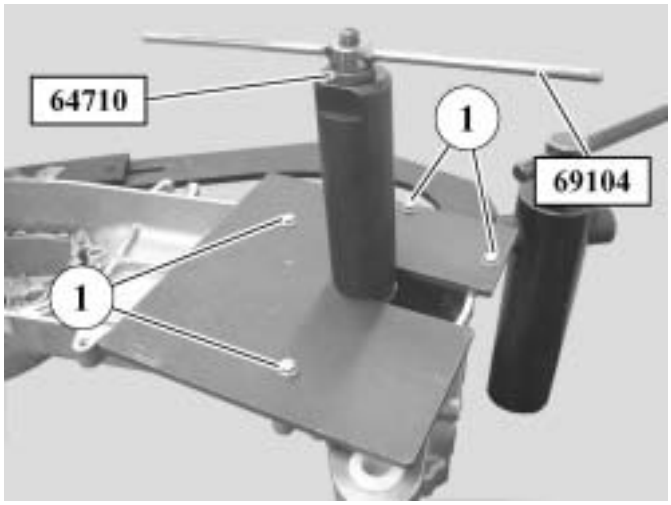
Assembly of the engine casings

- - Insert the crank assembly into the LH casing bearing
- Tighten pin P/N 750069 at the end of the crank assembly
- Fit tool P/N 64706 fitted with plate P/N 754006 on pin

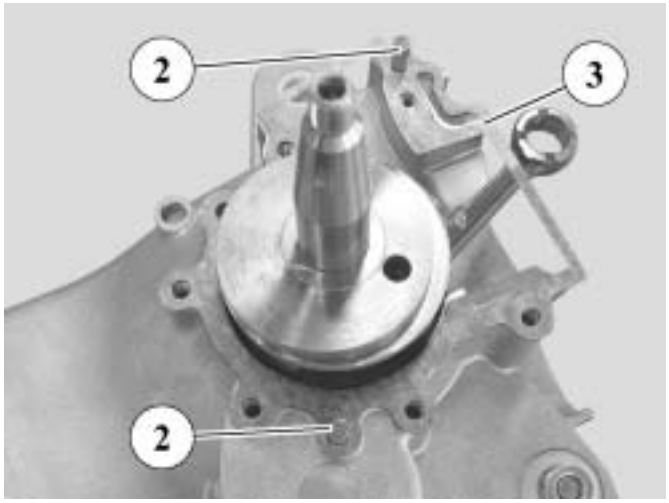


- Centre the assembly to the casing with 4 bolts (1)
- Fit centring tool P/N 64710 to tool P/N 64706
- Tighten pin nut P/N 69104 on pin P/N 750069 in order to bring the crank assembly into contact with the bearing ensuring that the crank is pointing towards the cylinder side

Note : Hold the crank assembly by the RH side of the crank assembly using the rotor fitted on the key

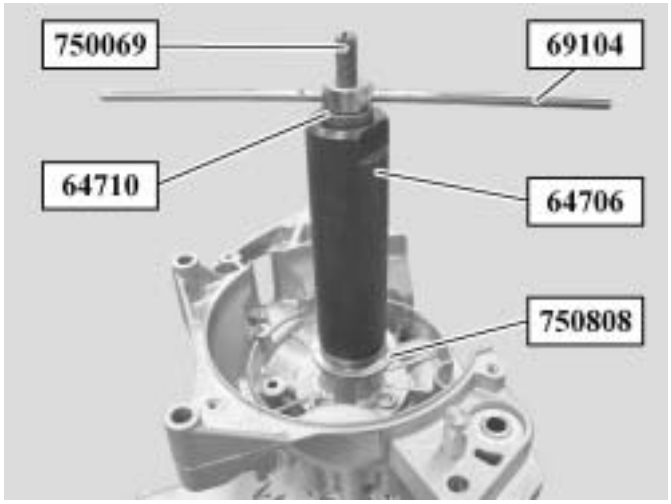


- Fit the two centring pins (2) to the LH casing and a new paper gasket (3) do not use oil or grease



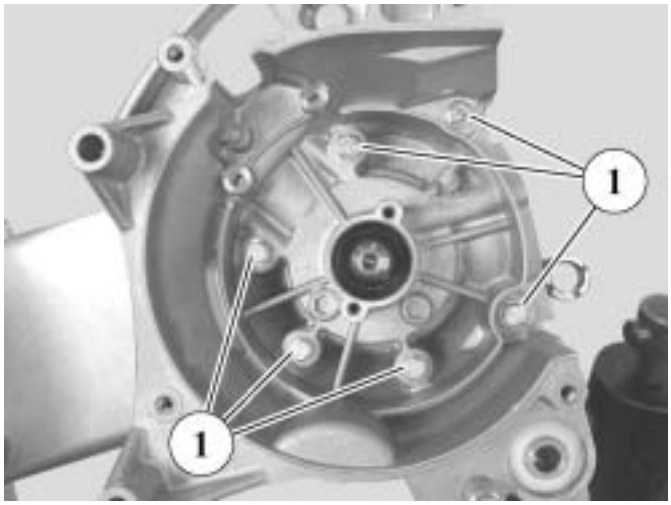
- Fit the RH casing to the LH casing and crank assembly taking care not to damage the seal, over the key if the key has stayed on the crank
- Tighten pin P/N 750069 at the end of the crank assembly
- Fit the following in order to the casing:
    - washer P/N 750808 (50x29x3mm)
    - tool P/N 64706
    - centring tool P/N 64710
- Tighten pin nut P/N 69104 until the casings are fully closed

Note : Hold the crank assembly by the fixed flange fitted to the splines

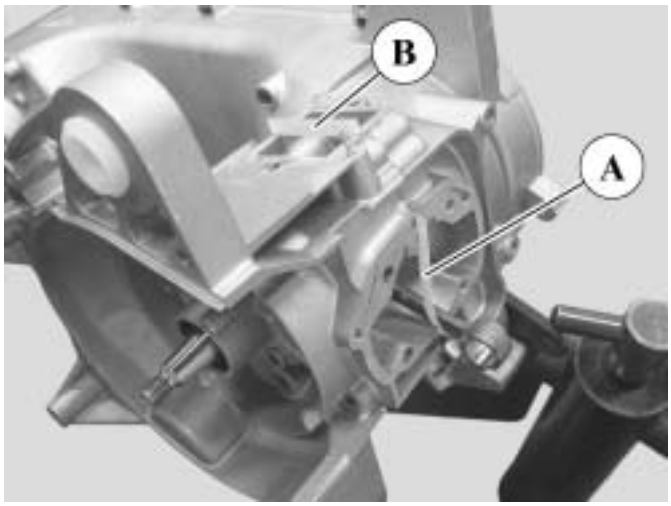


- Fit and tighten the 6 fixing bolts (1)
- Tightening torque: 1 m.daN

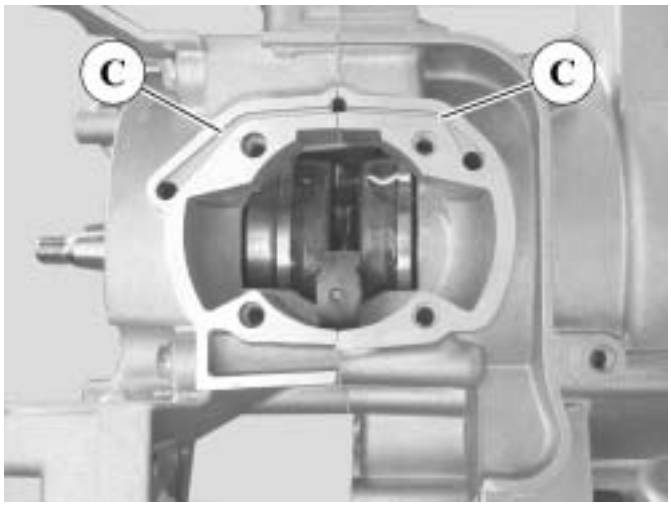
- Check the crank assembly turns freely in the casings



- Cut the casing seal flush at (A) and (B)
- Lightly grease the crank assembly and bearings with 2-stroke oil



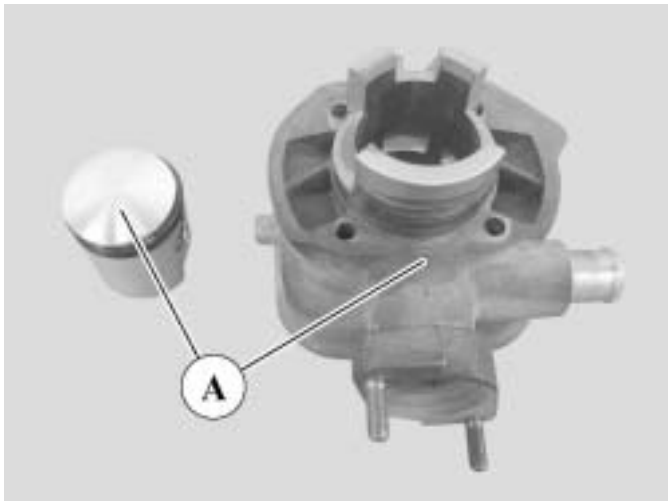
Note : Carefully clean the casing mating faces, and most particularly the separate lubrication circuit (C)



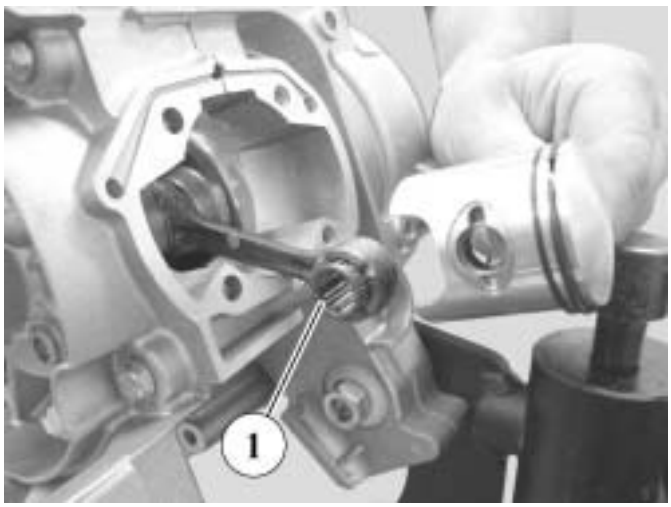
To fit the piston

- Check the cylinder/piston assembly pairing (A)

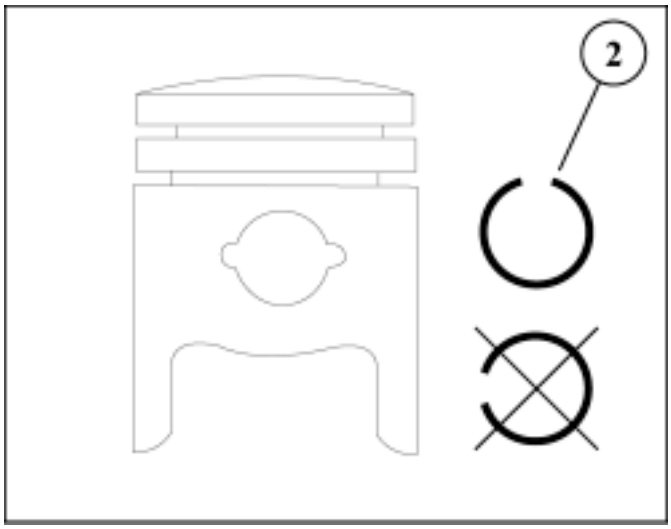
PAIRING	
Cylinder	Piston
1	**A1**
11	
2	**A2**
22	



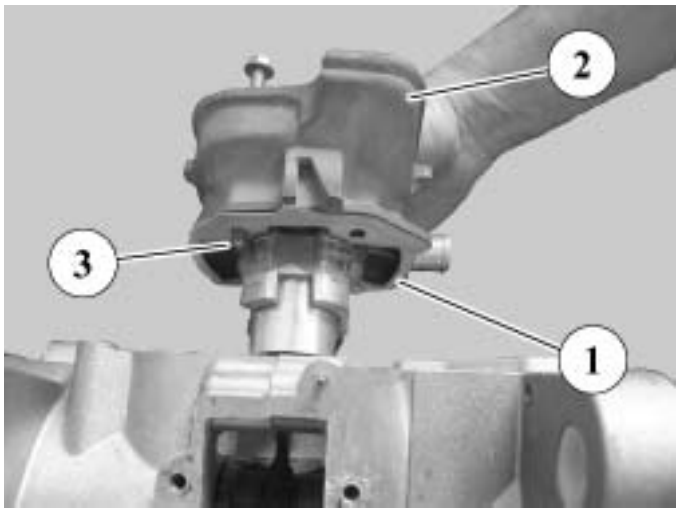
- Fit the needle bearing race (1) into the connecting rod little end after lubricating it with 2-stroke oil
- Fit the piston to the connecting rod, the positioning spigots on the piston rings facing the inlet side
- Fit the gudgeon pin and circlips



Important : - The circlips must be changed each time they are removed
- The circlip gaps (2) must face upwards or downwards, but under no circumstances to the side

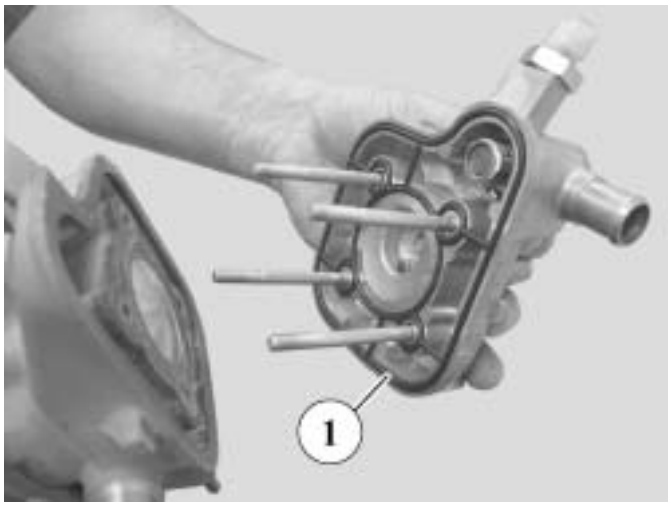


To fit the cylinder
- Fit a new base gasket (1) do not use oil or grease
- Ensure that the piston ring gaps are opposite the piston positioning spigots
- Fit the cylinder (2) and insert it while compressing the piston rings by hand
- Check the bottom seal is properly positioned on the casing using the 2 cylinder head fixing screws (3)



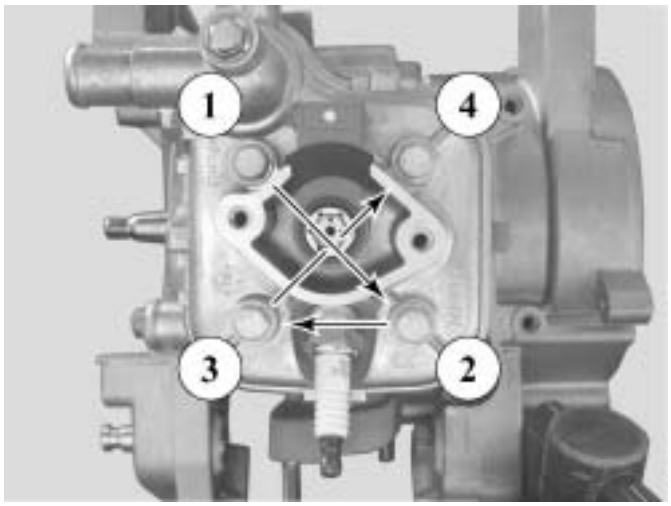
To fit the cylinder head
- Check the O-ring groove in the cylinder head is perfectly clean
- Fit the 4 fixing bolts to the cylinder head with their washers
- Fit a new O-ring (1) to the cylinder head

Important: If one or more bolts are changed, only genuine original parts must be used
Their design guarantees a constant tightening torque whatever the cylinder/piston assembly temperature



- Fit the bolt-washer, cylinder head and O-ring assembly to the cylinder
- Tighten the cylinder head 4 securing bolts down working gradually in the order shown
- Tightening torque: 1.2 m.daN
- Fit the spark plug

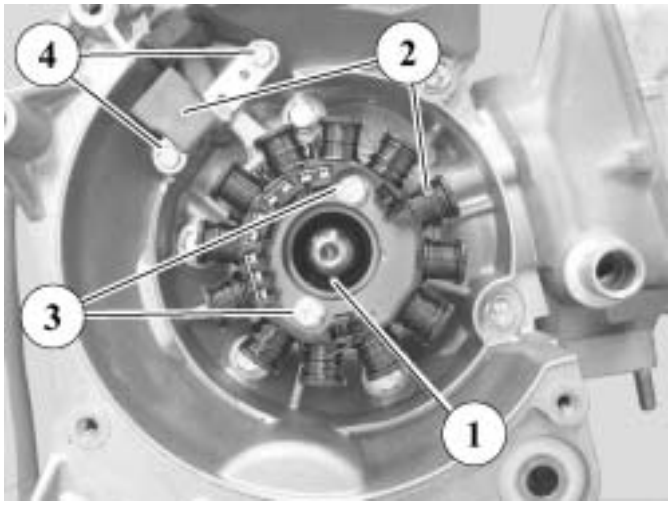
Note: This operation is carried out without removing the air injector



To fit the magneto flywheel

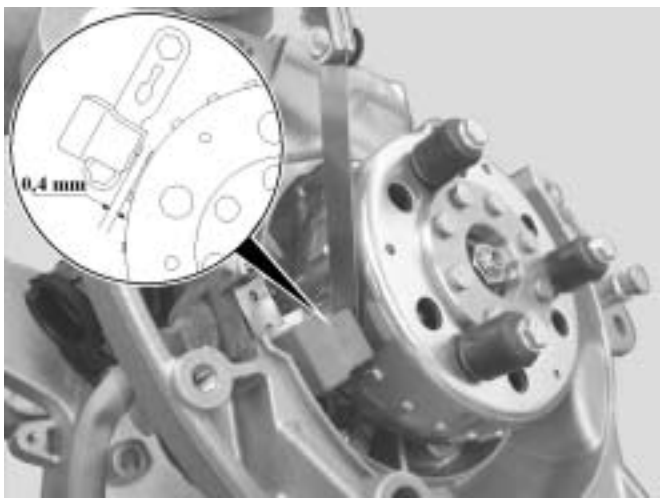
- Fit the key (1) to the crank
- Fit the stator and engine speed sensor (2) assembly
- Fit and tighten the stator assembly two fixing bolts (3)
- Tightening torque: 1 m.daN

- Fit the speed sensor two fixing bolts (4) **but do not tighten them**
- Fit the rotor to the crank ensuring it is positioned on the key
- Lock the rotor with the adjustable pin wrench P/N 752237
- Fit and tighten the rotor nut
- Tightening torque: 4 m.daN



Setting the engine speed sensor gap

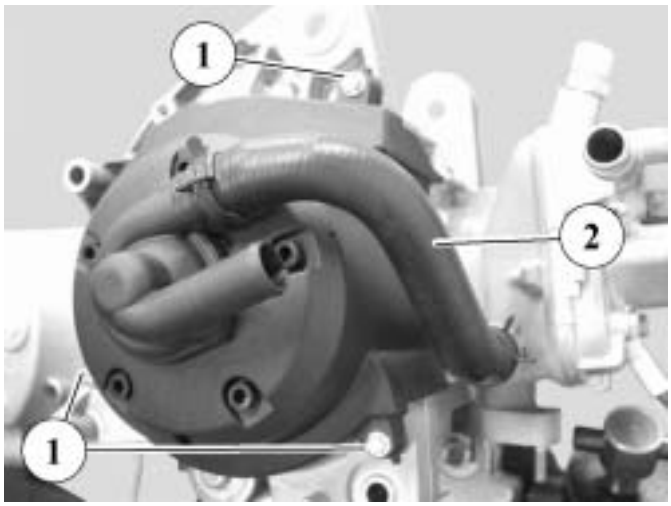
- Insert a 0.4 mm feeler gauge between the sensor and one of the magneto teeth
- Press the sensor against the feeler gauge and tighten the sensor two bolts
- Tightening torque: 0.7 m.daN



Fitting the water pump

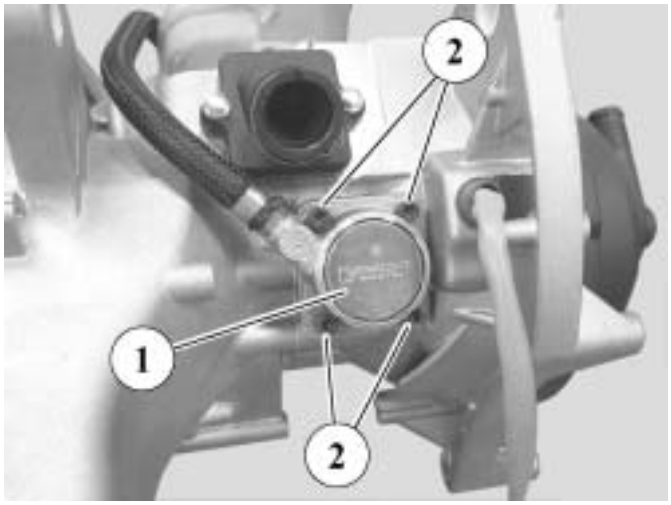
- Fit the pump ensuring it is correctly positioned both on the engine casing and the magneto rotor If necessary, turn the crank assembly to facilitate insertion of the water pump studs into the rotor holes
- Fit and tighten the three fixing bolts (1)
- Tightening torque: 0.7 m.daN

- Connect the pump/cylinder cooling system hose (2)



Fitting the air compressor

- Fit the air compressor (1) with the 2 centring sleeves and a new **lightly** greased O-ring
- Fit and tighten the 4 fixing bolts (2)
- Tightening torque: 0.7 m.daN



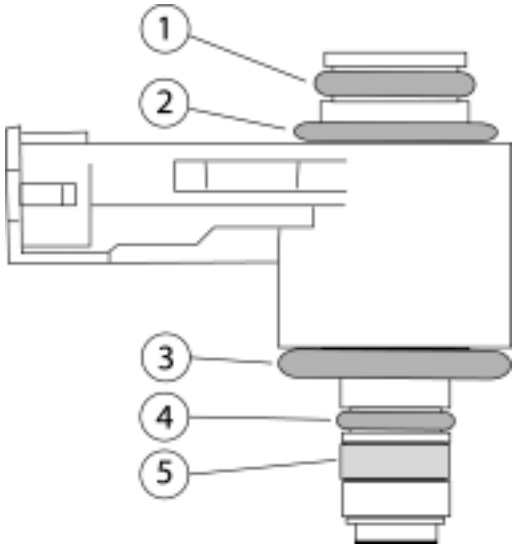
Fitting the injection manifold

- Fit a new O-ring (1) to the air injector

Fitting the air injector seals:

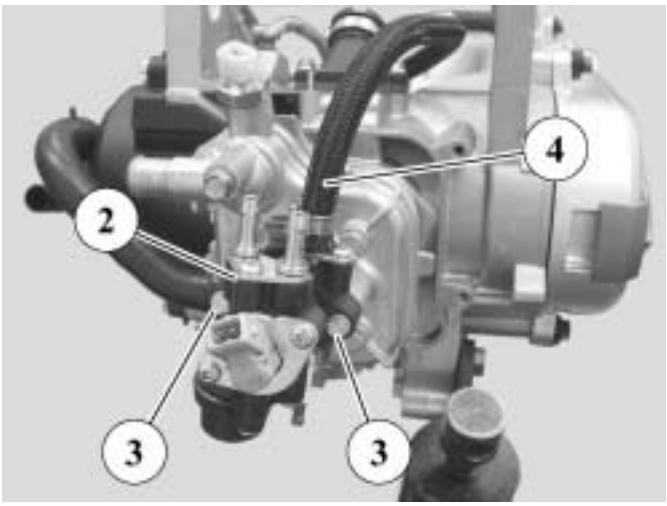
1. O-ring Ö 10x14.2 mm torus Ö 2.4 mm
2. O-ring Ö 13.3x18 mm torus Ö 2.4 mm
3. O-ring Ö 13.7x21 mm torus Ö 3.5 mm
4. O-ring Ö 7.4x10.5 mm torus Ö 1.7 mm
5. Teflon seal

Gaskets 1 and 4 are supplied with the injector
Gaskets 2 and 3 are supplied individually and must be changed when removed



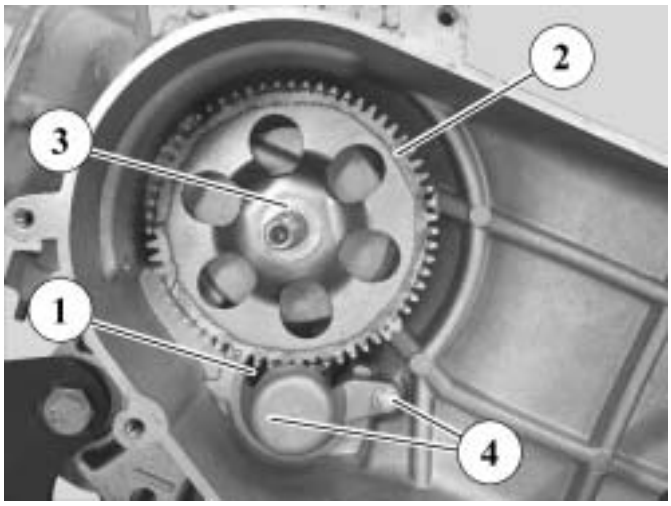
- Fit the injection manifold (2)
- Fit and tighten the injection manifold two fixing bolts (3)
- Tightening torque: 0.7 m.daN

- Connect the compressor air hose (4) to the injection manifold



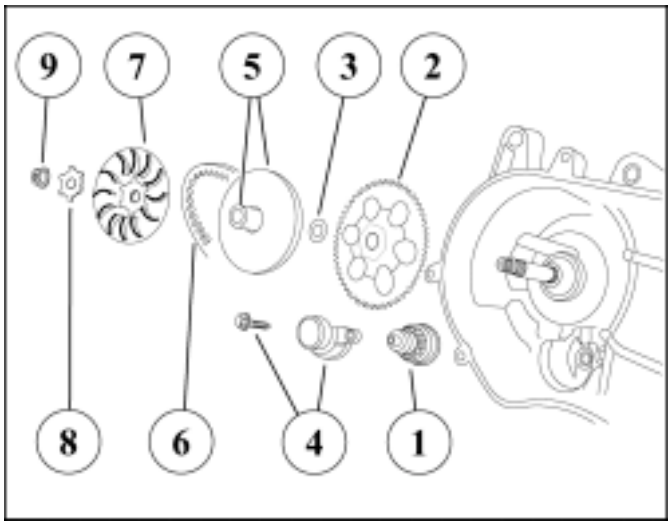
Fitting the starter motor dog

- Fit the starter motor dog (1)
- Fit the starter ring (2) to the crank assembly and fit it to the splines
- Fit washer 12x22x1 (3)
- Fit the bush and its fixing bolt (4)
- Tightening torque: 1 m.daN



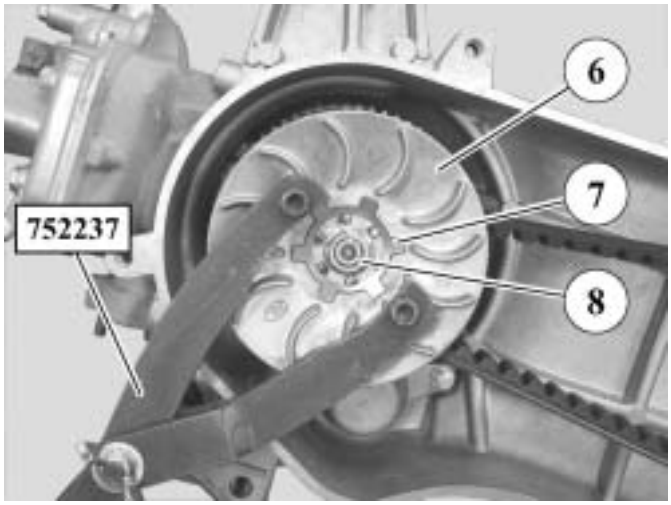
To fit the drive pulley assembly

- Fit the drive pulley with its guide hub (5) onto the crank assembly
- Fit the belt (6) to the guide hub
- Fit the fixed flange (7) to the crank assembly checking it is properly positioned on the crank assembly splines
- Fit the washer (8) and the nut (9) and hand tighten
- Hold the fixed flange with tool P/N 752237
- Tighten the nut
- Tightening torque: 4 m.daN



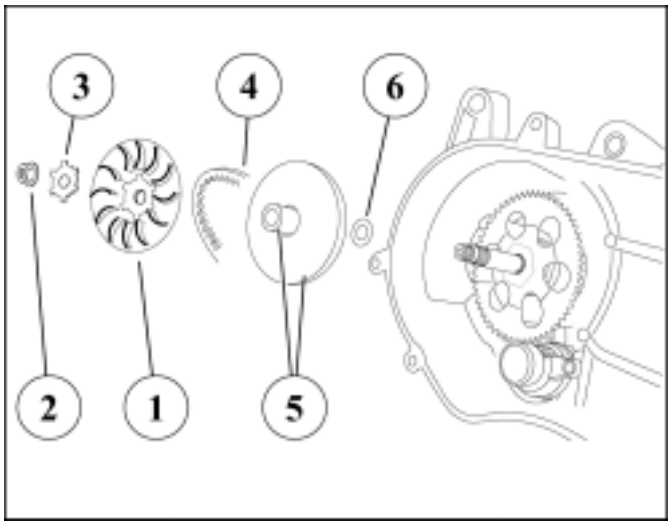
Note : It is forbidden to use a power driver, this may upset the crank position

Important : Precautions when refitting the drive pulley
Certain parts of the drive pulley must not be discarded or cut down to a smaller size.
Any modifications may cause the nut to tighten against the crankshaft splines instead of the fixed flange and damage the crankshaft splines

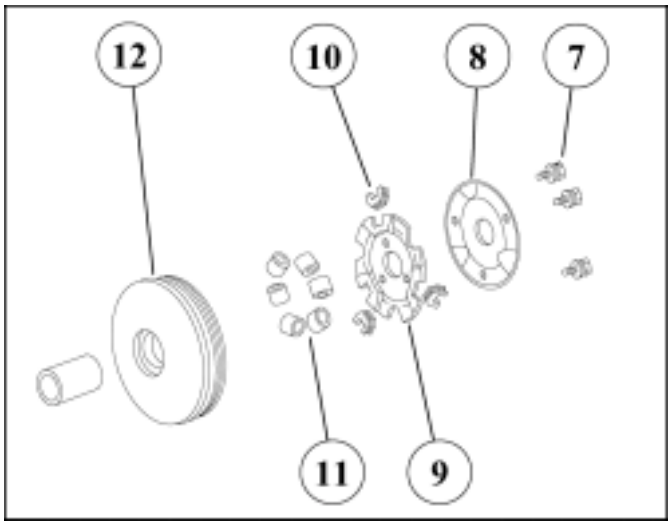


Changing the drive pulley bearings

- Remove the transmission cover 4 fixing bolts
- Remove the cover and the strut rubber bump-stop
- Lock the fixed flange (1) with tool P/N 752237
- Remove the nut (2) and washer (3) from the fixed flange
- Remove the fixed flange
- Remove the belt (4)
- Remove the guide hub and the drive pulley (5)
- Check that the washer 12x22x1 (6) is fitted and its condition



- Remove the bump-stop fixing (8) three fixing bolts (7)
- Remove the bump-stop
- Remove the holder (9) and its 3 plastic guides (10)
- Remove the moving flange (12) six bearings (11)



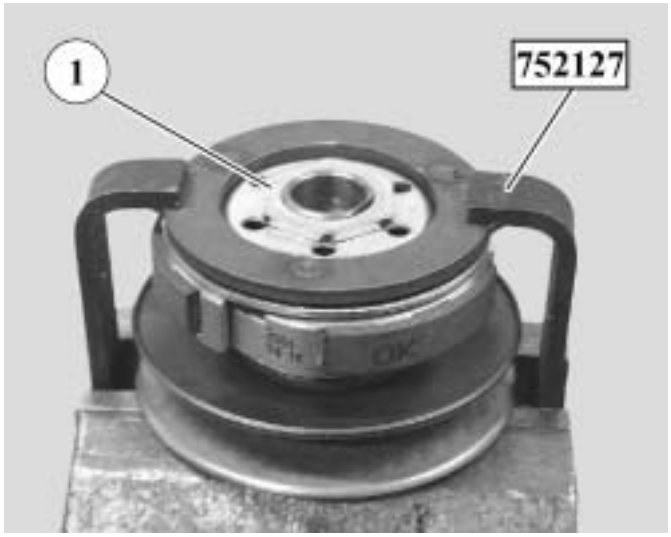
The bearings must be changed if they show major signs of wear

Procede in reverse order to disassembly and do not grease the bearings
Grease the moving flange bore lightly (high temperature grease)

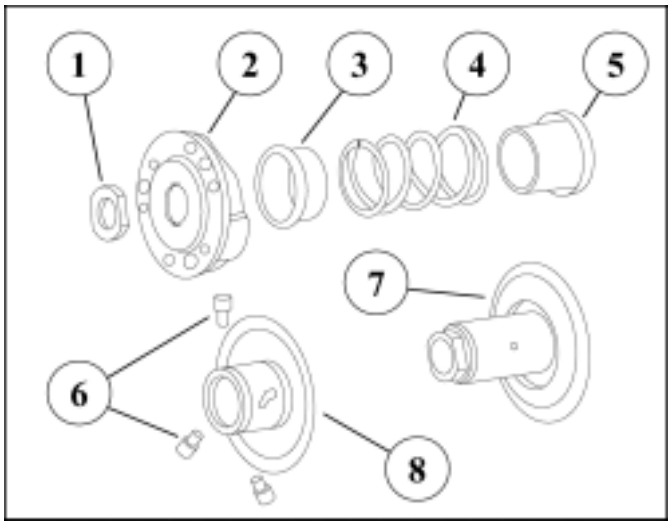
Note : Do not over-grease to avoid splashing the belt

To remove the clutch lining assembly

- Remove the transmission cover 4 fixing bolts
- Remove the cover and the strut rubber bump-stop
- Lock the clutch drum with the pin wrench P/N 752237
- Remove the nut
- Clamp the two strands of the belt to lower it between the flanges
- Remove the clutch drum, the clutch-drive pulley-driven pulley assembly and belt
- Compress the clutch-drive pulley-driven pulley assembly with the tool ref. 752127 clamped in the jaws of a vice
- Remove nut (1) using spanner P/N 756725
- Slacken tool P/N 752127



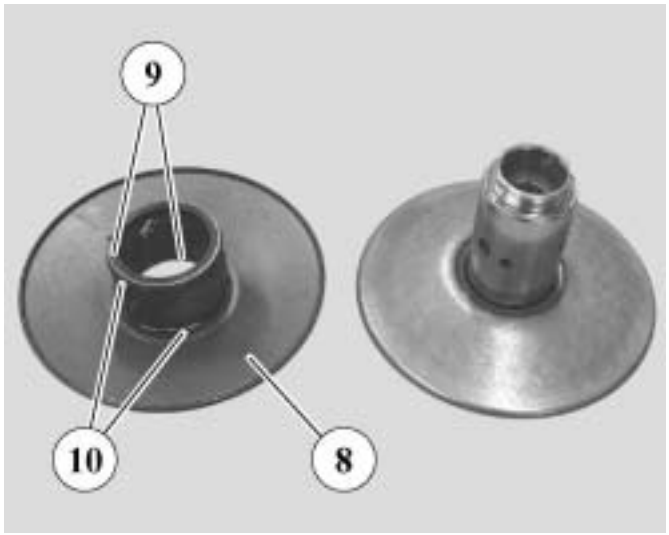
- Remove the clutch linings (2), the upper centring sleeve (3), the spring (4), and the lower centring sleeve (5)
- Remove the 3 pins (6) from the governor seat
- Separate the fixed (7) and rotating (8) flanges



To refit the clutch lining assembly

After checking the 2 lip seals (9) and the 2 O-rings of the rotating flange (8) are in good condition, grease the governor seat 3 pins (6) (high temperature grease) and assemble the parts in reverse order to removal

- Compress the clutch-drive pulley-driven pulley assembly with the tool P/N 752127
- Tighten the nut (1)
- Tightening torque: 4.5 m.daN



Note : Before fitting the clutch-drive pulley-driven pulley to the input shaft, fit the belt into the pulley bottom by opening the flanges by hand

- Fit the clutch-drive pulley-driven pulley assembly
- Fit the clutch cover
- Fit and tighten the nut
- Tightening torque: 4.5 m.daN

- Fit the transmission cover and the stand bump-stop
- Fit and tighten the cover 4 fixing bolts
- Tightening torque: 1 m.daN

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