



Quality Management
After-Sales

WORKSHOP MANUAL



**ENGINE 400 CC 4 STROKE
4 VALVES
P 6 A/B**

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PRODUCTS DANGER SYMBOLS USED

Protection of individuals and of the environment.

	Möbius band	Recyclable.	Means that the product or the package can be recycled. However, this does not guarantee that the product will be recycled.
	Irritant	The product can irritate the skin, eyes and respiratory organs.	Avoid contact with skin and clothes. Wear gloves, safety glasses and appropriate clothing such as a cotton overall. Do not breath fumes. If in contact, wash thoroughly with water.
	Flammable	The product is flammable.	Keep it away from flames or any heat source (barbecue, radiator, heating, etc.). Do not leave the product in the sun.
	Corrosive	The product can damage living tissues or other surfaces.	Avoid contact with skin and clothes. Wear gloves, safety glasses and appropriate clothing such as a cotton overall. Do not breath fumes.
	Explosive	The product can explode under certain circumstances (flame, heat, impact, friction).	Avoid impacts, friction, sparks and heat.
	Hazardous to the environment	The product affects fauna and flora. Do not dump it in dustbins, sinks or in the environment.	The ideal solution is to bring this product to your nearest household waste recycling centre.
	Toxic	The product can seriously affect health if it is inhaled, ingested or in contact with skin.	Avoid direct contact with the body, even by inhalation. If you feel unwell, seek medical advice immediately.
	Do not throw away into a garbage can	One of the product's component is toxic and can be hazardous to environment. Example: Used batteries.	This symbol informs the consumer that the used product shall not be thrown away into a garbage can, but shall be brought back to the merchant or dropped at a specific collection point.
	Compulsory gloves	Operation that can be dangerous for people.	People's safety can be seriously affected if the recommendations are not fully respected.



PRODUCTS DANGER SYMBOLS USED

	People's safety	Operation that can be dangerous for people.	People's safety can be seriously affected if the recommendations are not fully respected.
	Important	Operation that can be hazardous to the vehicle	Indicate the specific procedures that shall be followed in order not to damage the vehicle.
	Good operating condition of the vehicle	The operation must be carried out in strict compliance with the documents.	Serious damage to the vehicle and in certain cases a cancellation of the warranty can be involved if the recommendations are not fully respected.
	Note	Operation that can be difficult.	Indicate a note which gives key information to make the procedure easier.
	Lubricate	Lubricate the parts to be assembled.	Indicate the specific procedures that shall be followed in order not to damage the vehicle.
	Grease	Grease the parts to be assembled.	Indicate the specific procedures that shall be followed in order not to damage the vehicle.
	Glue	Glue the parts to be assembled.	Indicate the specific procedures that shall be followed in order not to damage the vehicle.
	New part	Use a new part.	Indicate the specific procedures that shall be followed in order not to damage the vehicle.



CHARACTERISTICS

Marking	P 6 A/B
Type	4-stroke single-cylinder 4 valves per cylinder with chain driven overhead camshaft
Cooling	By forced water circulation using a centrifugal pump driven by a chain from the crankshaft
Bore x stroke	84 x 72 mm
Cubic capacity	399 cc
Max. power output	27.4 kW at 7250 rpm
Max. torque rating	38.1 Nm at 5500 rpm
Compression	Compression ratio 11.8
Compression ratio	16 bars at 600 rpm
Lubrication	Trochoid pump driven by a chain from the crankshaft
Transmission	By 2 variable pulleys and V-type belt
Clutch	Centrifugal automatic
Exhaust	Catalytic
Spark plug	NGK CPR8 EB / CPR9 EB Electrode gap: 0.7-0.8 mm
Magneto flywheel	KOKUSAN 450 W
Fuel supply	Indirect electronic injection (EFI)
Standards	Euro 2/3

■ Capacities

Crankcase	2.1 l (1.8 l at oil change) (2 l at oil filter change) SAE 5W40 Synthetic Minimum grade: API SJ
Relay box	0.25 l SAE 80W90 Lifelong lubrication Minimum grade: API GL4

SPECIAL IMPORTANT POINTS

■ Oil and fuel



This engine is designed to run on 95 or 98 unleaded fuel only.

Never run the machine with a petrol/oil mixture.



Fuel pipes must absolutely be changed if there are any 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.



Petrol is highly inflammable, do not smoke in the working area and avoid proximity to flames or sparks.



SERVICE SCHEDULE AND COMMISSIONING

Heavy duty servicing applies to vehicles used under rugged operating conditions: door-to-door deliveries, intensive urban use (courier), short journeys with engine cold, dusty areas, ambient temperature over 30°C.

Normal servicing in km	500	10000	20000	30000	40000
Extensive servicing in km ^a	500	5000	10000	15000	20000
Minimum servicing	1 month	24 months	48 months	72 months	96 months

To be checked at each service										
Engine oil level.	Every 1000 km									
Service operations										
Spark plug.			R		R					
Drive pulley rollers and guides / Flange wear.		C	C	C	C					
Transmission belt.		R	R	R	R					
Driven pulley caged needle bearing.		G	G	G	G					
Belt anti-flapping roller.		C	C	C	C					
Transmission air filter.		N	N	N	N					
Valve clearances.			V		V					
Engine oil.	R	R	R	R	R					
Oil filter.	R	R	R	R	R					
Coolant.	R Once every 5 years									
V: Check, clean, adjust. R: Change. G: Check, clean, lubricate. C: Inspect and change if necessary. N: Clean.										
After 40000 km, resume the service schedule again from 10000 km.										

a.Carry out this servicing if the vehicle is used in "severe" conditions : damp or dusty environment, high temperature, exclusively town use, etc..

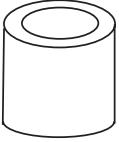
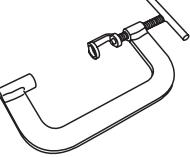
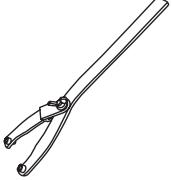
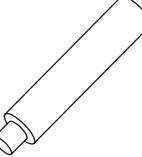
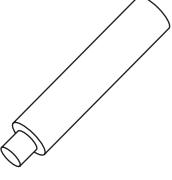
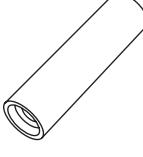
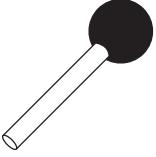
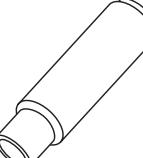
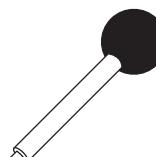
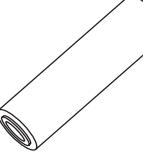
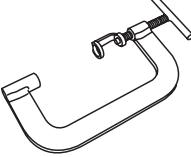
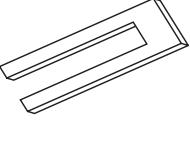
TIGHTENING TORQUES

TIGHTENING TORQUES

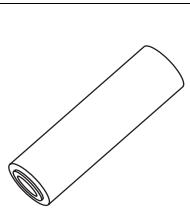
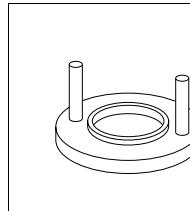
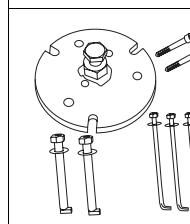
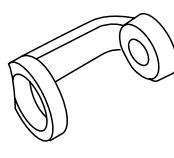
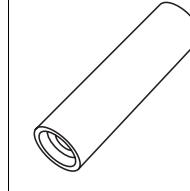
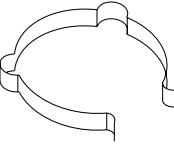
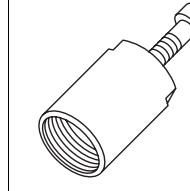
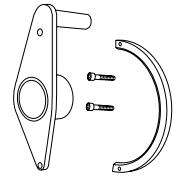
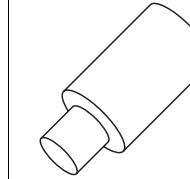
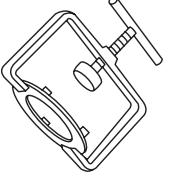
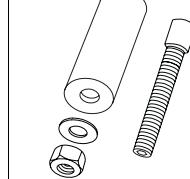
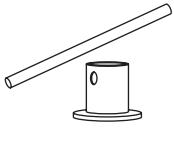
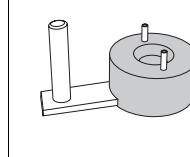
Designation	Quantity	Dimension	Tightening torque
Spark plug	1	M14 - 1.5	10 to 12 Nm
Engine drain plug	1	M14 - 1.5	25 to 30 Nm
Oil filter (Cartridge)	1	M10 - 1.5	11.7 to 15.7 Nm
Cylinder head	4	M10 - 1.5	Procedure
Nut Ø10 mm	2	M6 - 1.0	12 to 14 Nm
Screw Ø6 mm			
Cylinder head cover	3	M6 - 1.0	8 to 12 Nm
Camshaft gear	1	M10 - 1.25	43 to 47 Nm
Camshaft stopper plate	1	M6 - 1.0	8 to 10 Nm
Automatic tensioner	2	M6 - 1.0	8 to 12 Nm
Automatic tensioner plug	1	M8 - 1.0	5 to 7 Nm
Exhaust studs	2	M8 - 1.25	13 to 17 Nm
Lambda sensor	1		16.5 to 19.5 Nm
Water temperature probe	1		8 to 12 Nm
Oil pressure switch	1		8 to 12 Nm
Thermostat valve	2	M6 - 1.0	8 to 12 Nm
Chain tensioner	1	M6 - 1.0	8 to 12 Nm
Inlet manifold	2	M6 - 1.0	8 to 12 Nm
Throttle unit attachment			3 to 5 Nm
Petrol injector	1	M6 - 1.0	8 to 12 Nm
Cylinder casings	13	M6 - 1.0	8 to 12 Nm
Flywheel magneto cover	10	M6 - 1.0	8 to 12 Nm
Oil pump	3	M6 - 1.0	8 to 12 Nm
Relief valve			25 to 35 Nm
Anti-splash plate	3	M6 - 1.0	8 to 12 Nm
Water pump cap	5	M6 - 1.0	8 to 12 Nm
Water pump impeller	1		4.5 to 6.5 Nm
Starter motor	2	M6 - 1.0	8 to 12 Nm
Kick starter stopper	3	M6 - 1.0	8 to 12 Nm
Rotor	1	M6 - 1.0	155 to 165 Nm
Freewheel	6	M6 - 1.0	8 to 12 Nm
Stator	2	M6 - 1.0	8 to 12 Nm
Engine speed sensor	2	M6 - 1.0	4.4 to 6.5 Nm
Transmission cover			
• Screw Ø6 mm	7	M6 - 1.0	8 to 12 Nm
• Screw Ø8 mm	4	M8 - 1.25	13 to 17 Nm
Plastic transmission cover	2	M6 - 1.0	8 to 12 Nm
Transmission air filter	3	M6 - 1.0	8 to 12 Nm
Drive pulley			160 to 175 Nm
Belt anti-flapping roller	1	M8 - 1.25	20 to 25 Nm
Driven pulley			90 to 92 Nm
Clutch plate and shoes			65 to 75 Nm
Relay box cover	7	M8 - 1.25	20 to 25 Nm
Relay box filler cap	1	M8 - 1.25	35 to 45 Nm



SPECIAL TOOLS

	Tool N°	Designation	Used with		Tool N°	Designation	Used with
	069098	Protective end-piece large model	803132		754035	Valve lifter	758595
	752237	Adjustable pin wrench			754041	Timing casing seal drift	
	754009	Water pump pin drift			756057	Drift driver	
	754033	Camshaft locking pin			756532	Drift driver	
	754034	Crankshaft locking pin			756574	Drift driver	
	754035	Valve lifter	758595		756575	Piston locking fork	
	754041	Timing casing seal drift			757989	Drift driver	

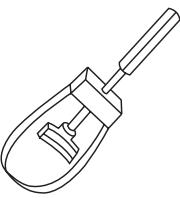
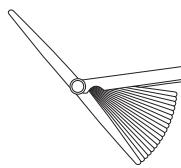
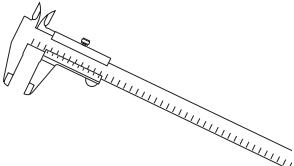
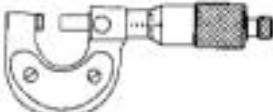
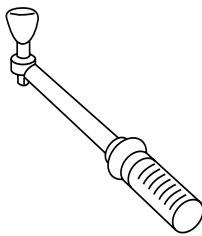
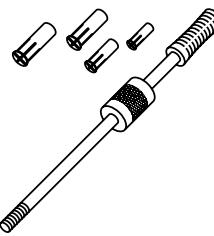
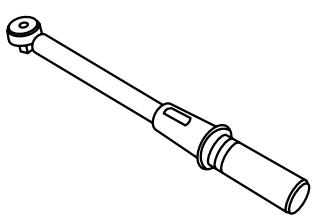
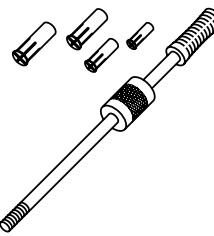
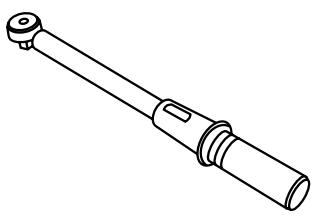
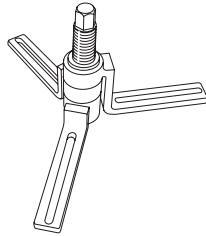
SPECIAL TOOLS

	Tool N°	Designation	Used with		Tool N°	Designation	Used with
	757990	Drift driver			759492	Driven pulley pin spanner	
	758722*	Cover extraction screw			802638*	Extraction tool	
	758595	Valve spring lifter adapter	754035		802676*	Water pump seal drift	
	759468	Piston ring installation collar			803132*	Flywheel puller	068007
	759469	Fixed flange locking tool			803133*	Drift driver	
	759474	Clutch compression tool	759475		803134*	Crankshaft assembly tool	
	759475	55 mm pipe casing seal drift	759474		803246	Flywheel magneto holder tool*	

(*) New or modified tool



STANDARD TOOLS

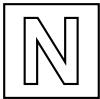
	Strap wrench Type: Facom P/N. U.46		Set of shims
	Slide calipers		Micrometer
	Heat gun		Automatic resetting type torque wrench 5 to 25 Nm Type: Facom R.306A25
	Intertia type extractor tool for bearings from 6 to 18 mm Type: Facom U.49PJ3		Automatic resetting type torque wrench 10 to 50 Nm Type: Facom J.208A50
	Intertia type extractor tool for bearings from 18 to 50 mm Type: Facom U.49PJ2		Automatic resetting type torque wrench 40 to 200 Nm Type: Facom S.208A200
	Casing separator Marolotest P/N 601010		Protractor
	Long socket Facom J.24HLA		



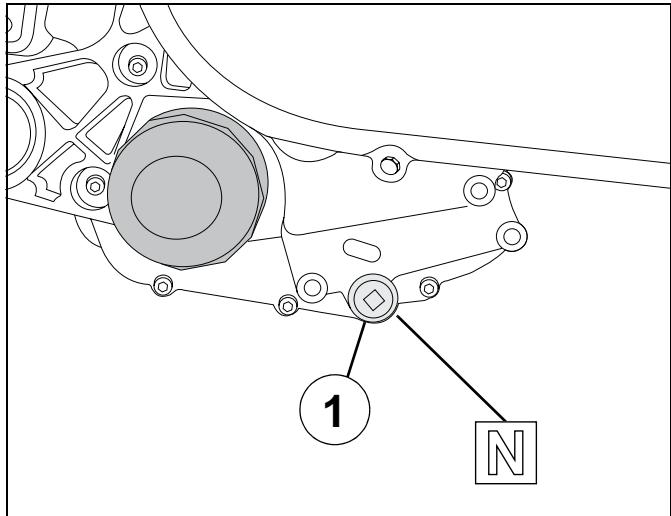
OPERATION**■ Changing the engine oil**

Remove the drainage cap and its seal (1) and allow the oil to drip into a recipient.

Tightening torque: 40 Nm.



Replace the copper seal every time you change oil.

**■ Removal of the oil filter**

- Remove the oil filter using a Facom U.46 type strap wrench.

With a strap wrench:

Fit a new cartridge tightened by hand and lock it with a 1 turn

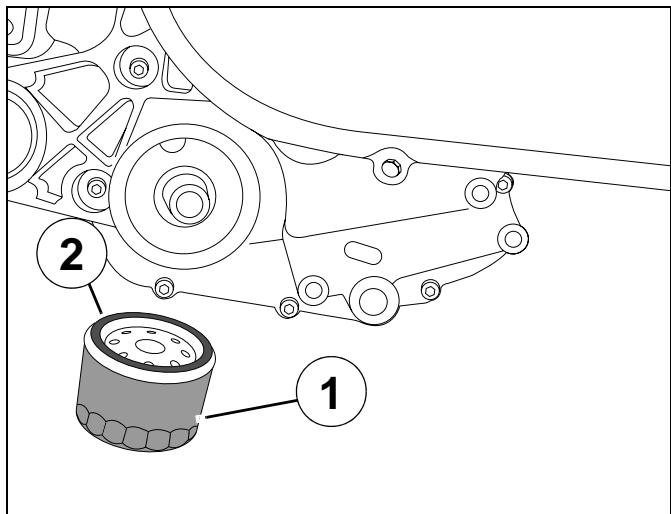
With a socket-type filter wrench:

Tightening torque: 14 Nm.

- Remove the oil filter (1).



Check the condition of the O-ring (2).

**Oil capacity:**

- 1.8 l at oil change.
- 2 l at oil filter change.
- 2.1 l after opening the casings.



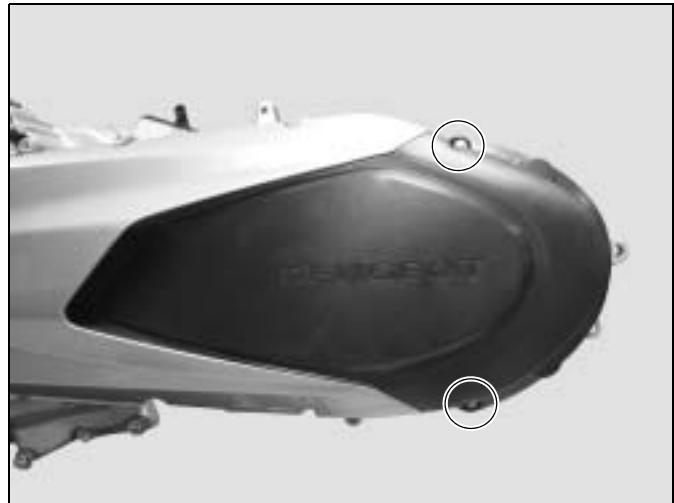
PRIMARY TRANSMISSION

■ Removal of the primary transmission cover

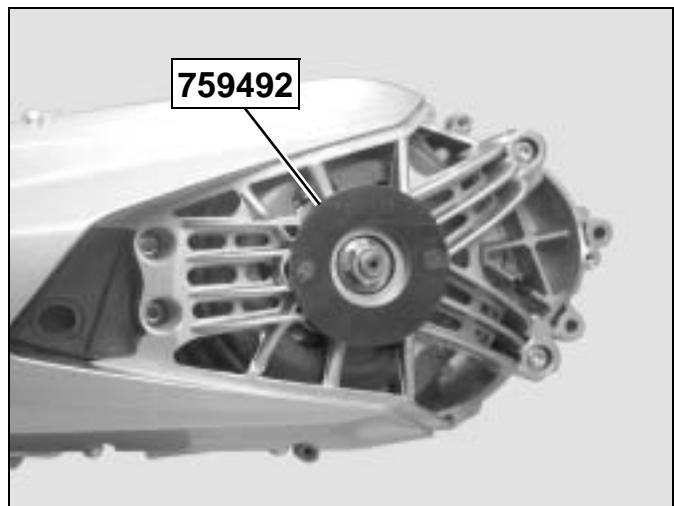
- Remove the plastic transmission cover. (2 screw).

Tightening torque: 10 Nm.

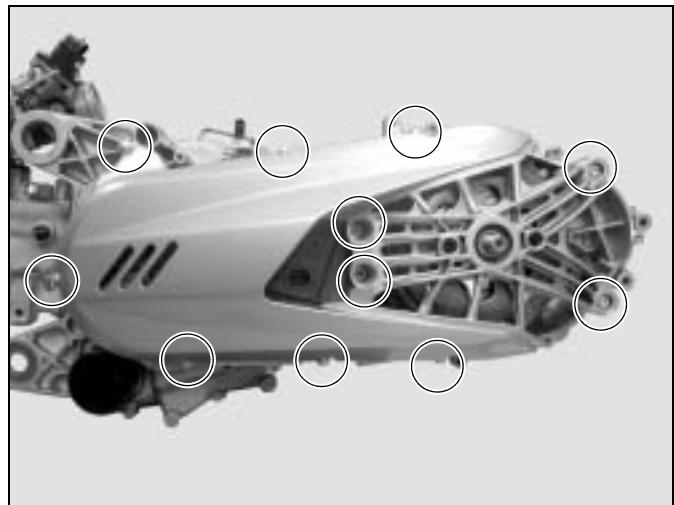
- Remove the soundproofing.



- Lock the clutch drum with the pin wrench P/N 759492.
- Remove the nut.
- Remove the shoulder washer.



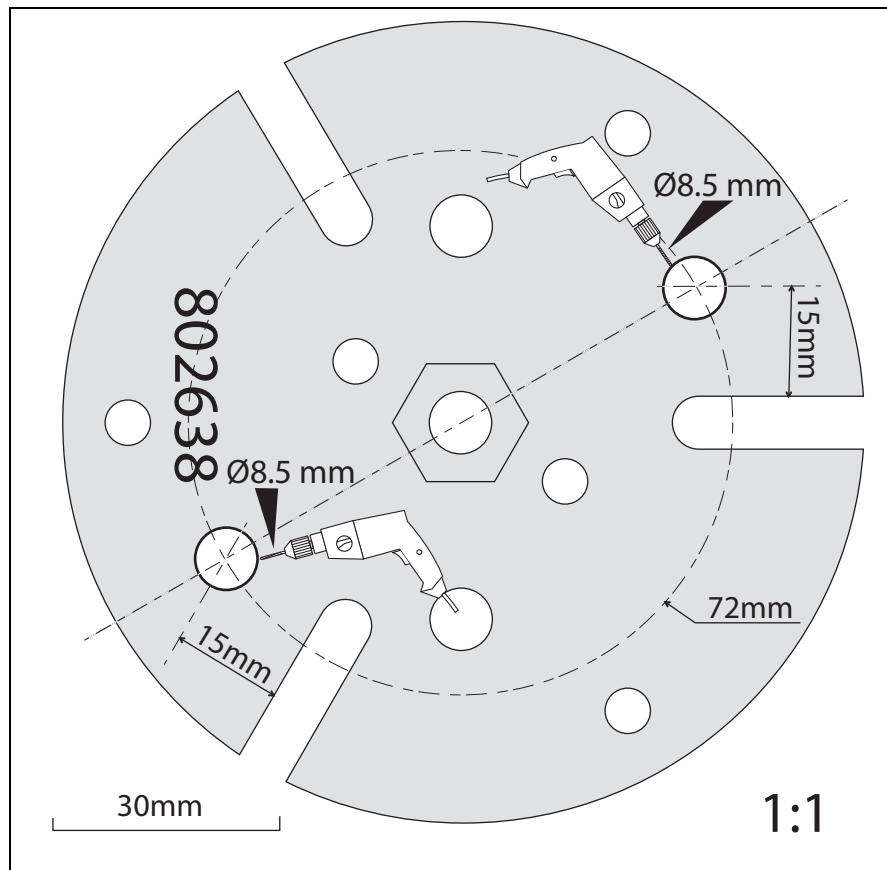
- Remove the transmission cover.
 - 4 screw Ø 8 mm
 - 7 screw Ø 6 mm



■ Tool to be modified

Modify the extraction tool ref. 802638 as follows:

- Using a drill and a 8.5 mm bit, drill 2 holes in the extraction tool as shown in the illustration.

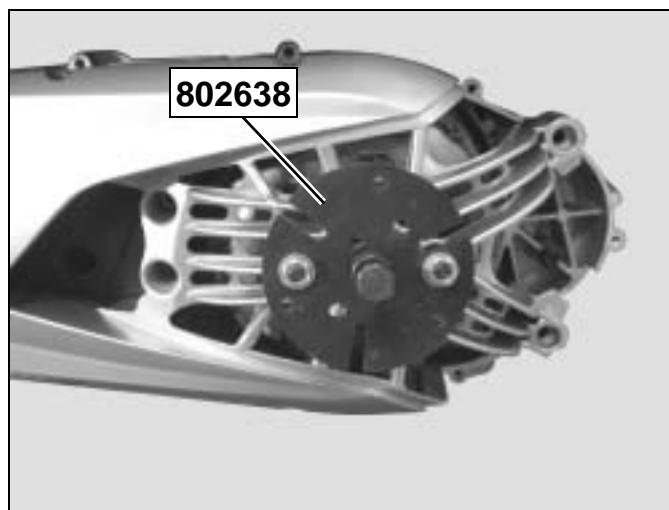


If the transmission cover bearing is seized on the shaft:

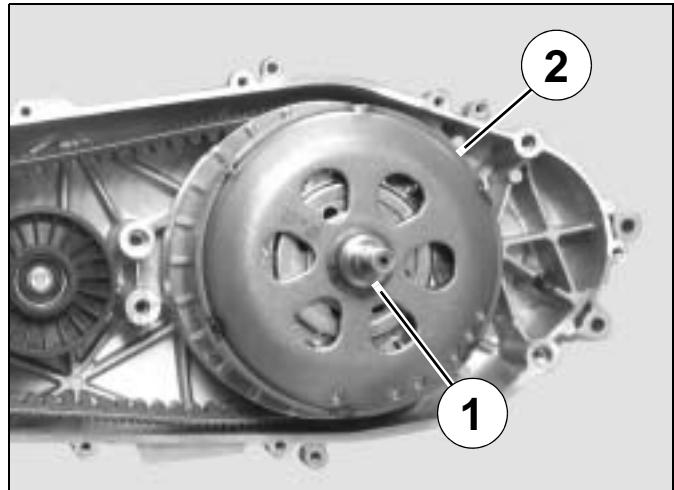
- Remove the transmission cover using the modified extraction tool ref. 802638.



Position the hooks on the tool in the direction of the shaft.



- Remove the tapered washer (1).
- Remove the clutch cover (2).

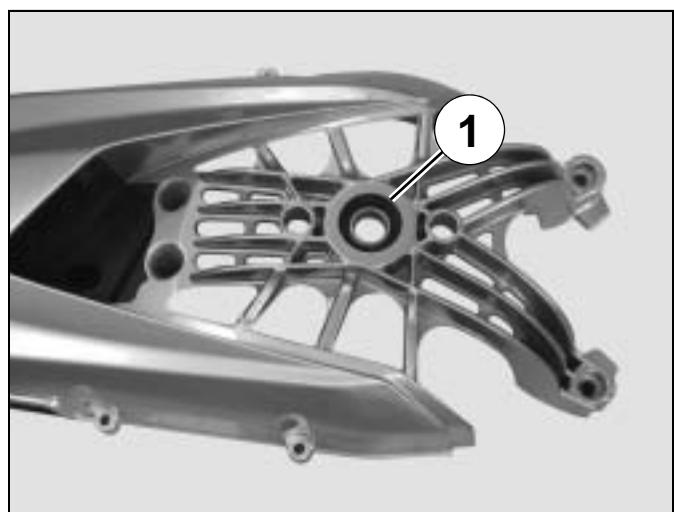


■ Checking the transmission cover bearing

- Check the condition of the bearing seals (1).
- Using your finger, turn the internal bearing ring; it should turn freely and silently.
- Check that the bearing is tightly fitted to the casing.

Replacement

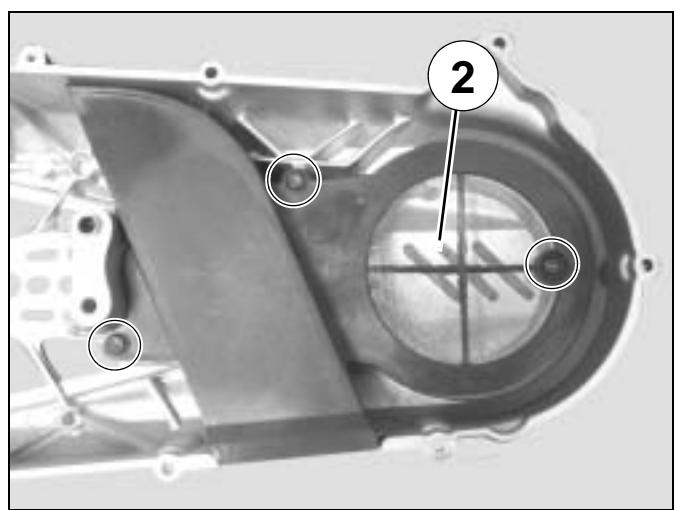
- Remove the circlip.



- Place the cover on its gasket seat surface, heat it (80 to 90°C) until the bearing (1) falls out by itself.
- While the casing is expanded fit the new bearing fully home in its housing.

■ Removal of the transmission air filter

- Remove the transmission air filter (2). (4 screw)
- Blow the air filter with compressed air.

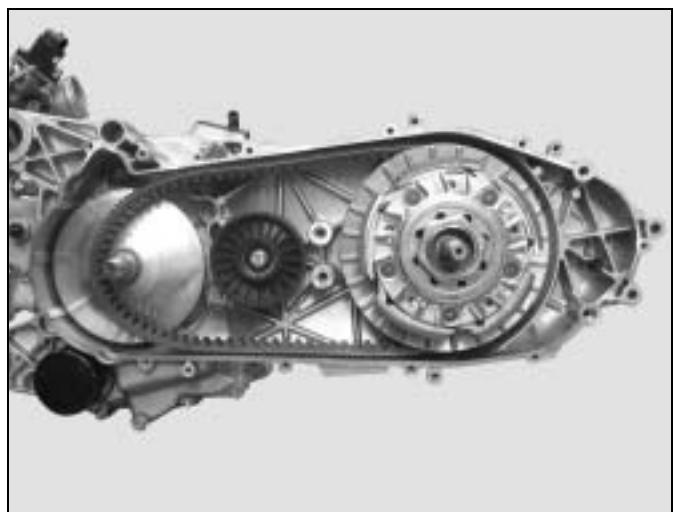


■ Removal of the primary drive

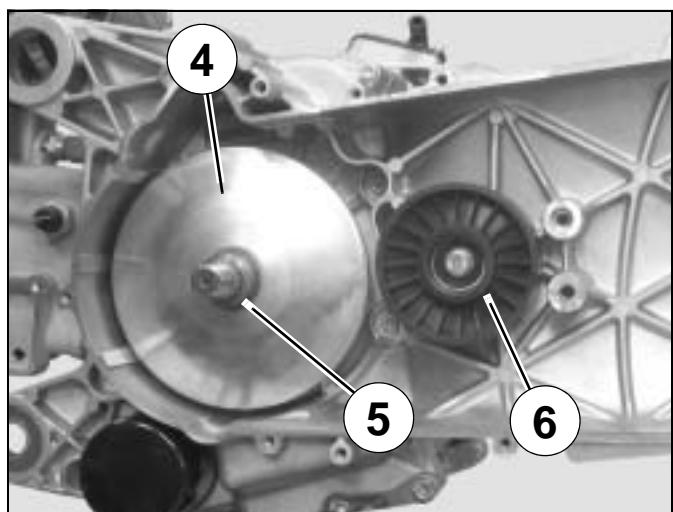
- Hold the fixed flange with tool P/N 759469.
- Remove the nut, tapered washer and flat washer.
- Remove the fixed flange and the washer.



- Remove the clutch and driven pulley assembly together with the belt.



- Remove the drive pulley (4) together with the guide hub (5).
- Remove the tapered washer.
- Remove the belt anti-flapping roller (6).



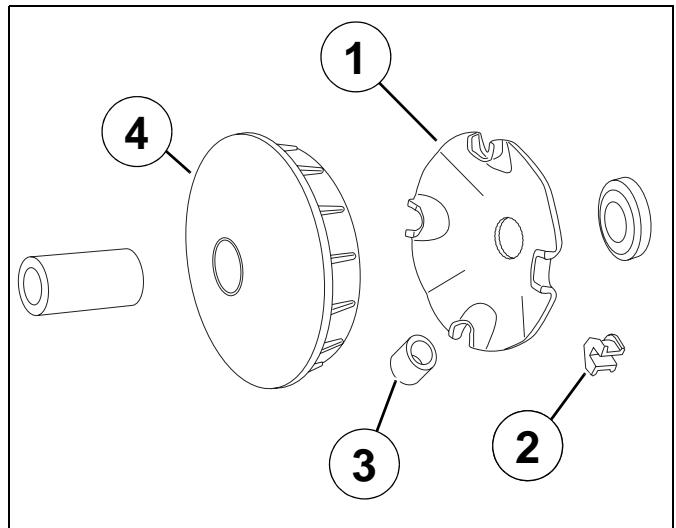
■ Changing the drive pulley bearings

- Remove the holder (1) and its 4 plastic guides (2).
- Remove the moving flange (4) 8 bearings (3).

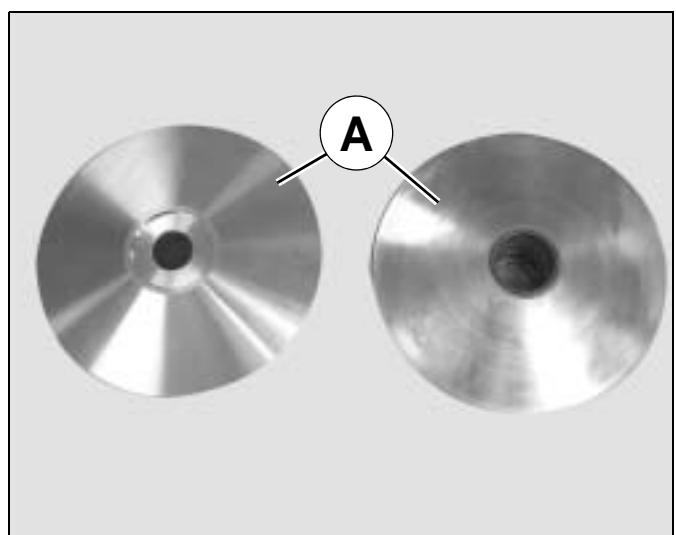


The bearings must be changed if they show major signs of wear.

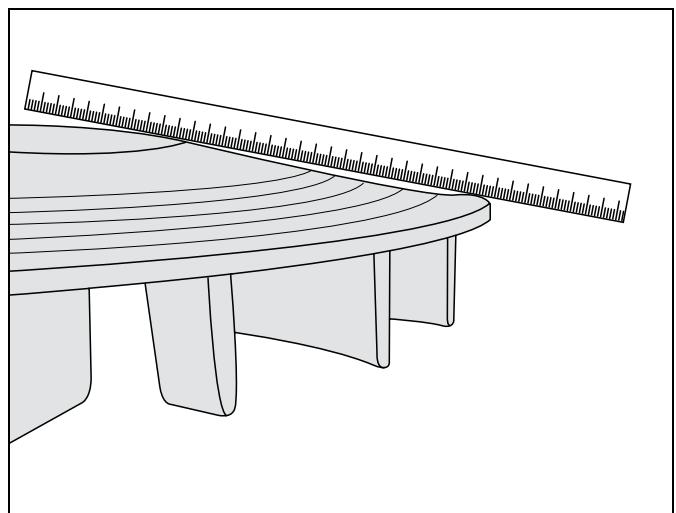
The guides shall be replaced if they show signs of wear.



Make sure surface of the plates in contact with the belt does not show any cracks or signs of abnormal wear (A).

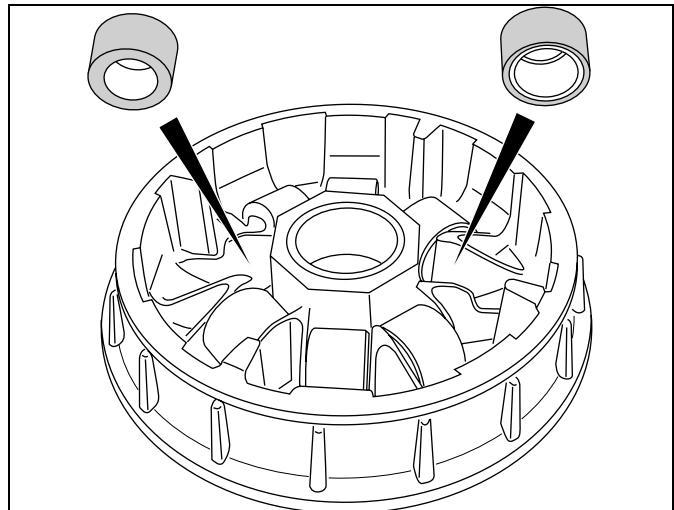
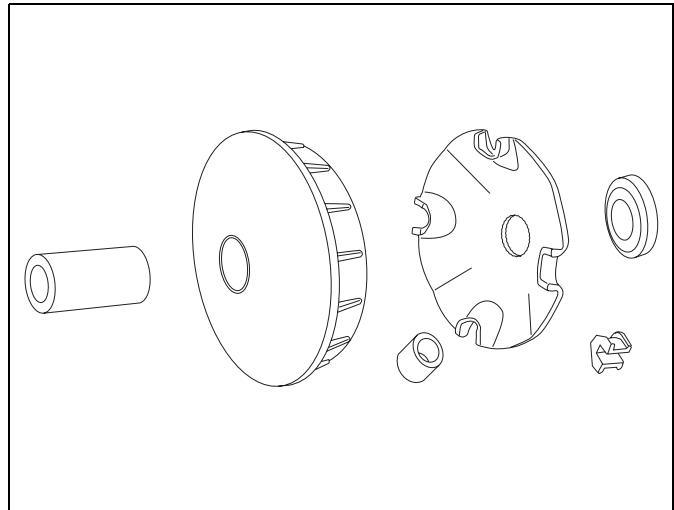


Using a ruler, check the wear on the fixed flange. Maximum wear permitted between the fixed flange and the ruler must not exceed 0.5 mm.



Reassembly:

- Fit the drive rollers, variator pulley cam, and its guide without using grease.



■ Checking the belt anti-flapping roller

- Make sure the roller and ball bearing are not worn.

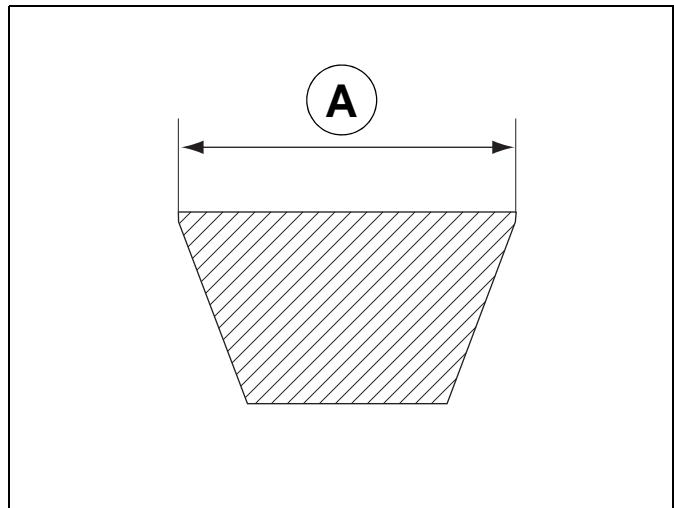


■ Checking the drive belt

- Measure the width of the belt (A).

Minimum width: 25.5 mm.

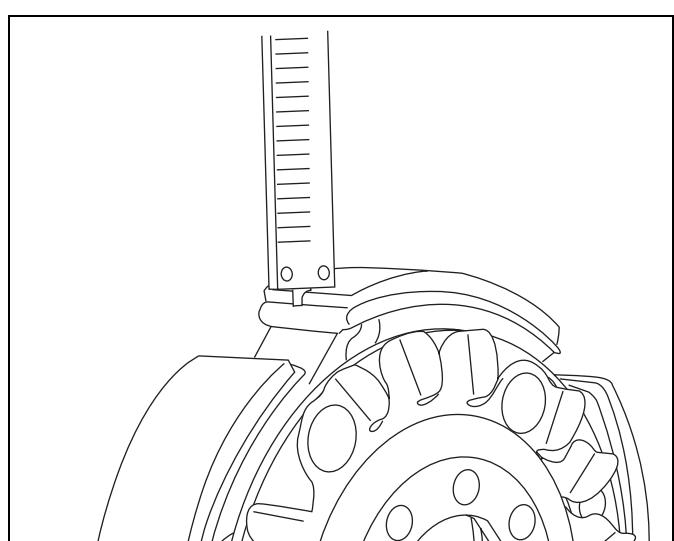
- Make sure the belt is not cracked.



■ Checking the thickness of the clutch linings

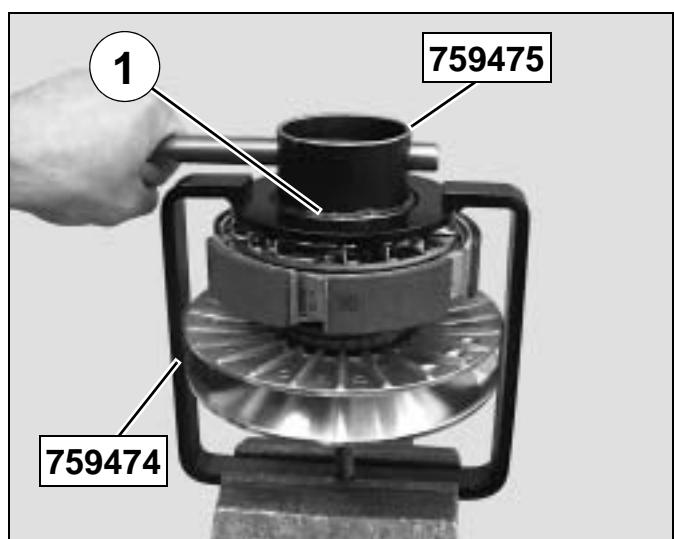
- Using the depth calliper, measure the thickness of the clutch linings.

Min. thickness: 1 mm.

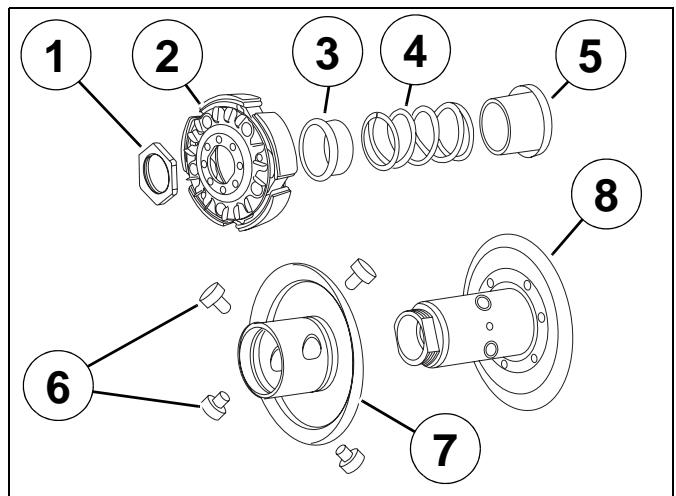


■ Removal of the clutch lining assembly

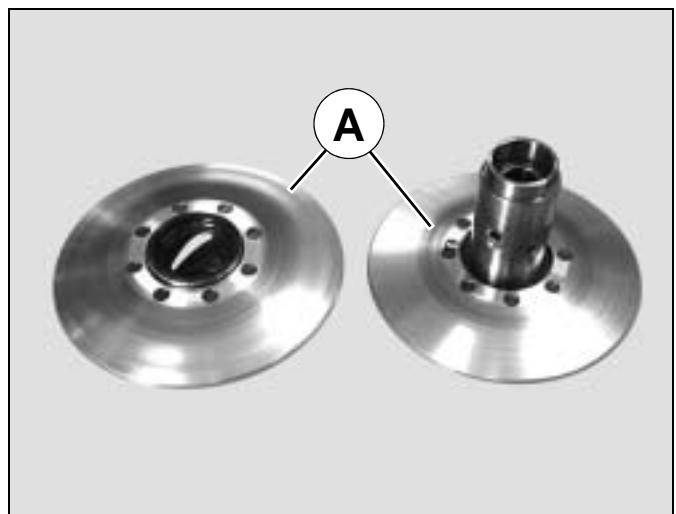
- Compress the clutch drive pulley and driven pulley assembly with the tool P/N 759474 clamped in the jaws of a vice.
- Remove nut (1) using spanner P/N 759475.
- Slacken tool P/N 759474.



- Remove the clutch linings (2), the upper centring sleeve (3), the spring (4), and the lower centring sleeve (5).
- Remove the 4 pins (6) from the variable speed drive seat.
- Separate the fixed (7) and rotating (8) flanges.
- Make sure surface of the plates in contact with the belt does not show any cracks or signs of abnormal wear.

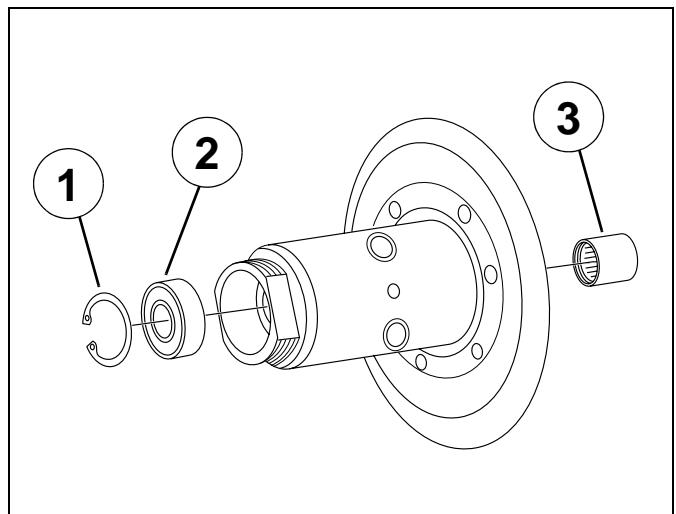


- Make sure surface of the plates in contact with the belt does not show any cracks or signs of abnormal wear (A).

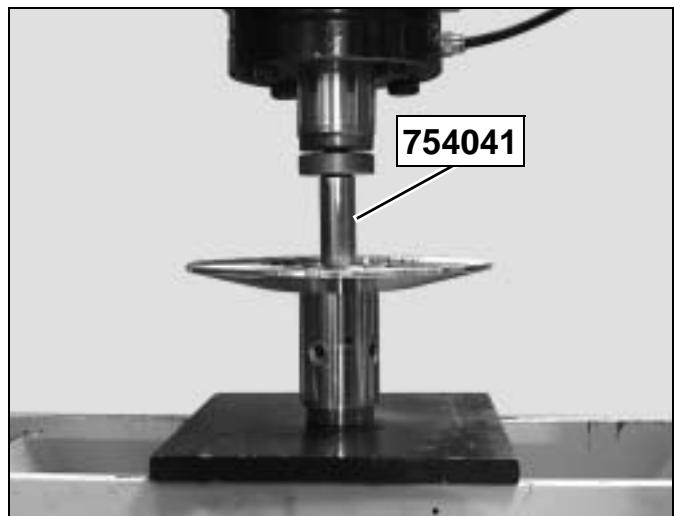


■ Changing the bearings of the driven pulley stationary clutch plate

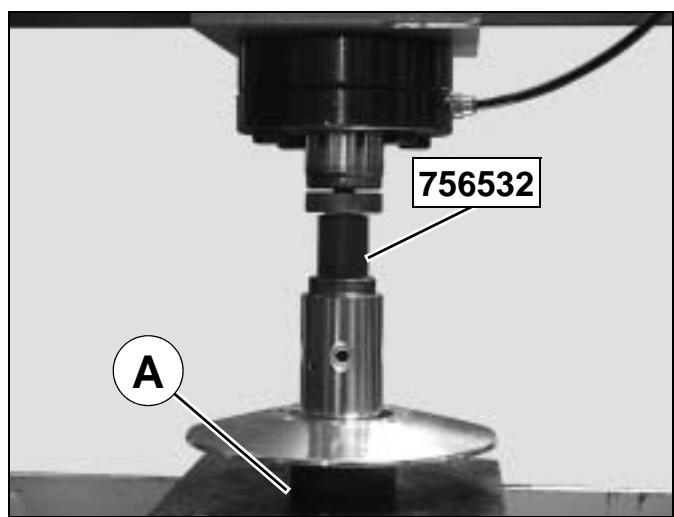
- Remove the circlip, using a circlip plier (1).



- Using a press and push tool P/N 754041, remove the ball bearing. (2)



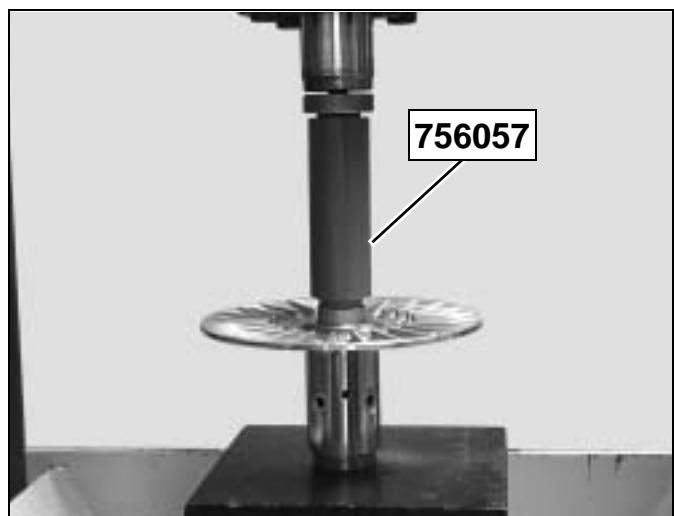
- In order not to damage the fixed clutch plate, use tool P/N 759475 as a support. (A)
- Using a press and push tool P/N 756532, remove the needle bearing. (3)



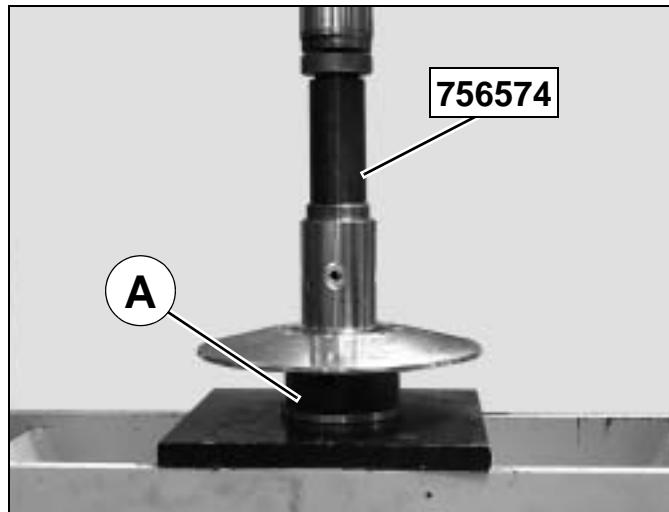
- Using push tool P/N 756057, install a new caged needle bearing.

	Install the caged needle bearing with the seal outwards.
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The caged needle bearing is set back 6 mm from the fixed clutch plate.

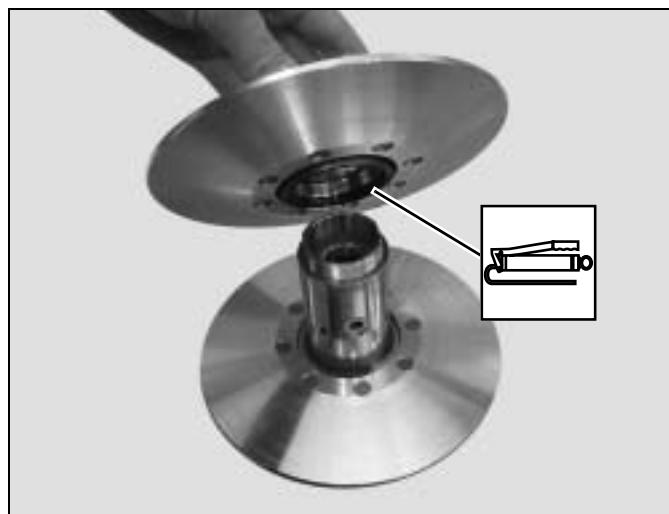


- In order not to damage the fixed clutch plate, use tool P/N 759475 as a support. (A)
- Install a new bearing using tool P/N 756574.

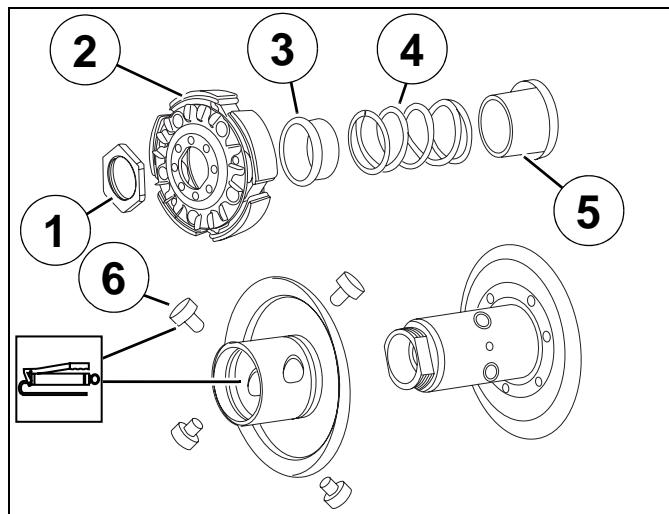


■ Assembling the driven pulley

- Fit a new lipped seal and O-ring on the movable clutch plate.
- Grease the moving flange bore lightly (high temperature grease).
- Lubricate the lip seals.
- Place the movable clutch plate on the fixed clutch plate while making sure not to damage the lip seals.



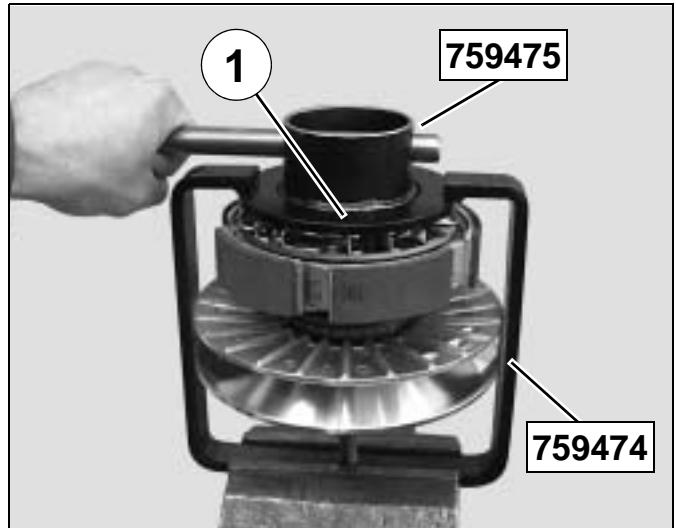
- Grease and fit the 4 guide pins. (6)
- Fit the lower centring sleeve. (5)
- Fit the spring (4) and its upper centring sleeve. (3)
- Removal of the clutch lining assembly. (2)



- Compress the clutch drive pulley and driven pulley assembly with the tool P/N 759474 clamped in the jaws of a vice.

- Tighten the nut (1).

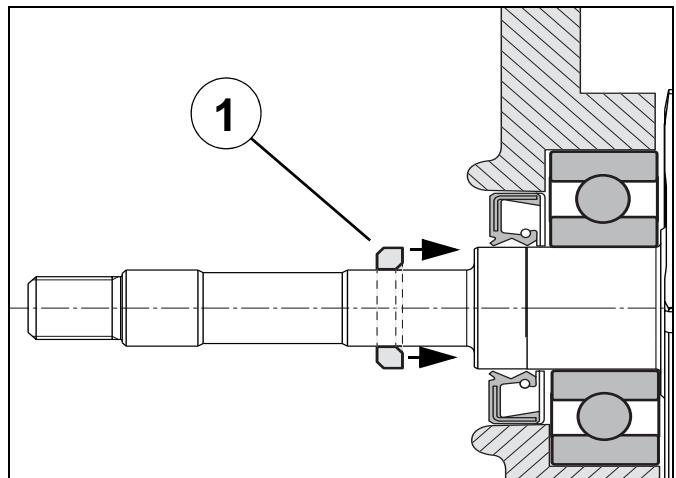
Tightening torque: 70 Nm.



■ Installing the primary drive

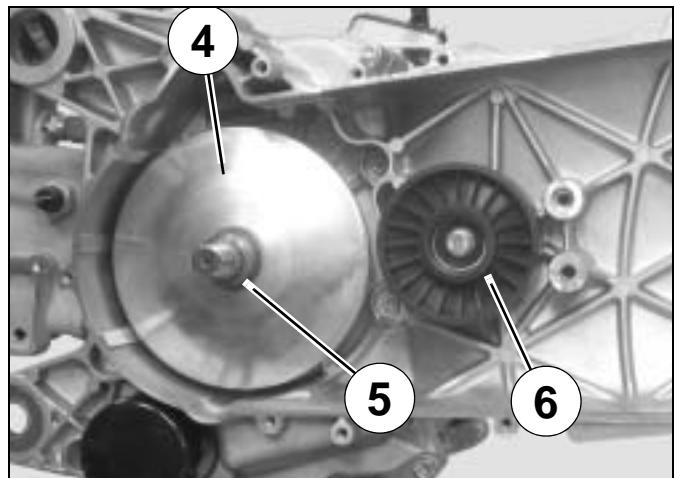
- Check that the washer is provided. (1)

	Inside chamfer towards the crankshaft.
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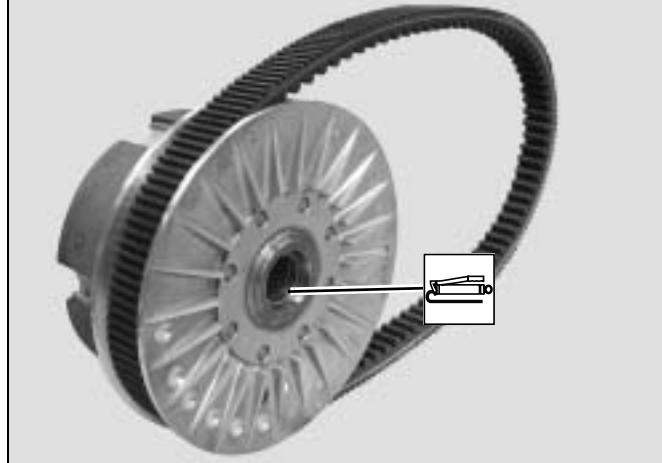
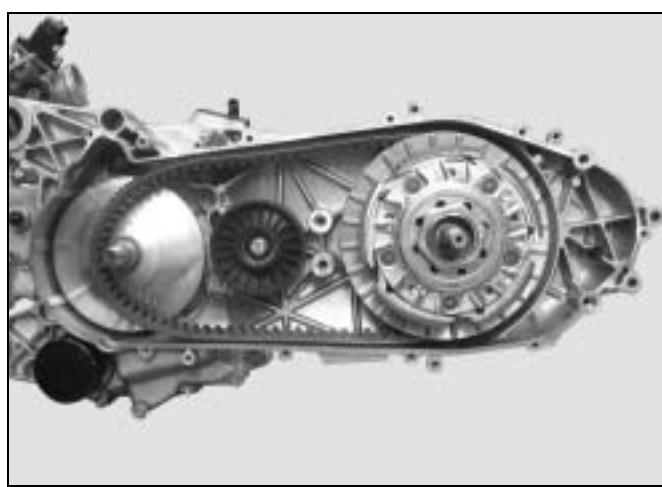
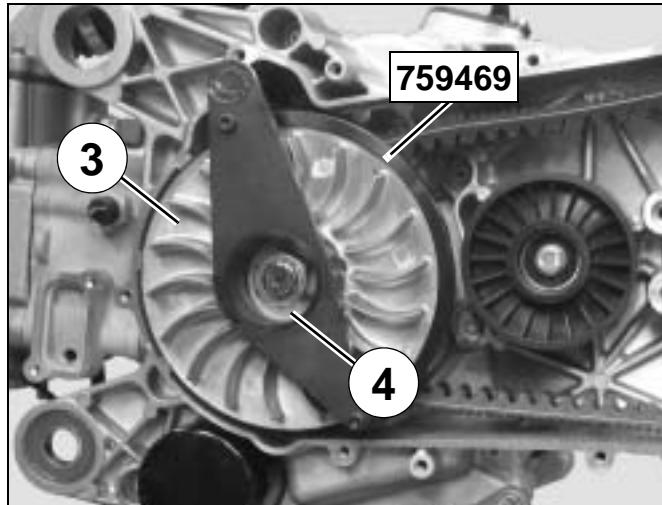
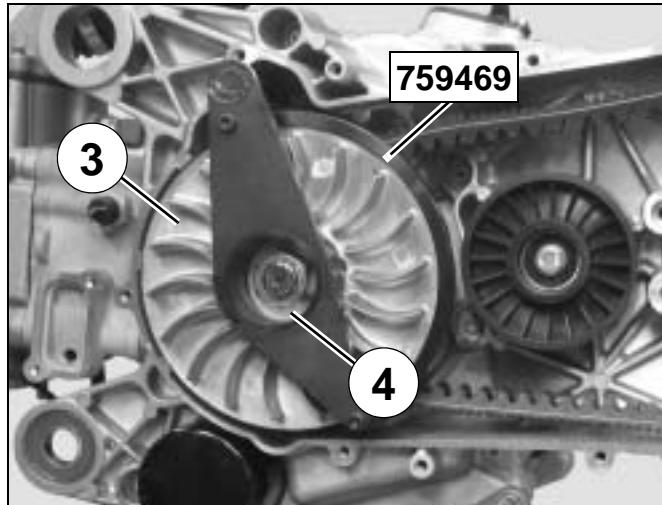


- Fit the drive pulley with its guide hub (5) onto the crank assembly.
- Install the belt anti-flapping roller. (6)

Tightening torque: 22 Nm.



PRIMARY TRANSMISSION

	<ul style="list-style-type: none"> - Lightly grease the drawn cup needle roller bearing of the driven pulley. 	
	<p>Before fitting the clutch drive pulley and driven pulley to the input shaft, fit the belt into the pulley bottom by opening the flanges by hand.</p> <p>Respect the direction of rotation of the belt which is shown by an arrow.</p>	
<ul style="list-style-type: none"> - Fit the clutch drive pulley and driven pulley assembly. 		
<ul style="list-style-type: none"> - Fit the plain washer. - Fit the fixed flange (3) to the crank assembly checking it is properly positioned on the crank assembly splines. - Lock the fixed flange (3) with tool P/N 759469. - Fit the plain washer. - Fit the tapered washer (4) with the rounded side towards the nut. - Fit and tighten the nut. 		

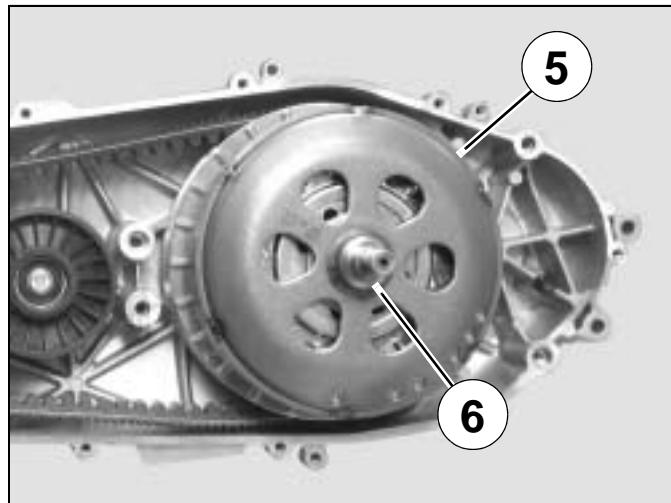
Tightening torque: 170 Nm.



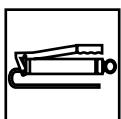
- Fit the clutch cover (5).
- Fit the spacer (6).



Chamfer facing you.



■ Fitting the primary transmission cover



When reassembling, lightly grease the end of the shaft. Use lithium soap grease.

- Fit the 2 centring pins (A).
- Install the transmission cover.
- 7 screw Ø 6

Tightening torque: 10 Nm.

- 4 screw Ø 8

Tightening torque: 15 Nm.

- Lock the clutch drum with the pin wrench P/N 759492.

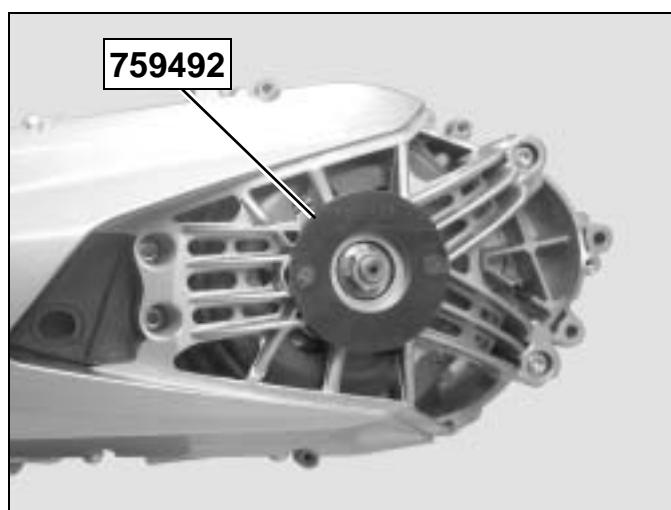
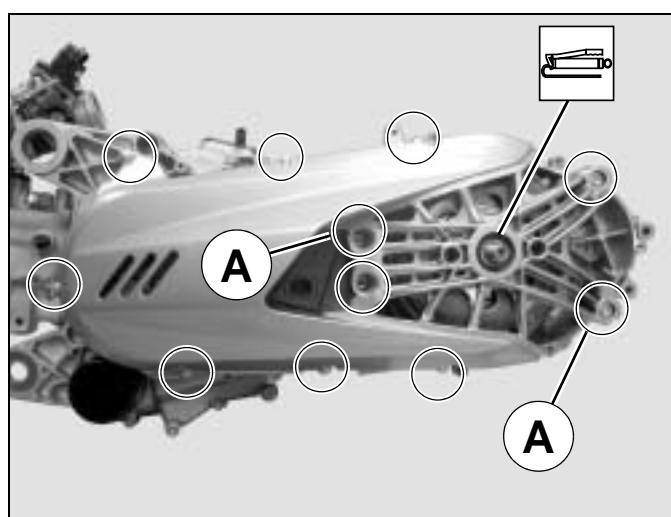


Fit the shoulder washer with the shoulder on the bearing side.

- Fit and tighten the nut.

Tightening torque: 91 Nm.

- Remove the tool ref. 759492.



PRIMARY TRANSMISSION

- Fit the soundproofing.
- Fit the plastic cover.
- 2 screw Ø 6

Tightening torque: 10 Nm.



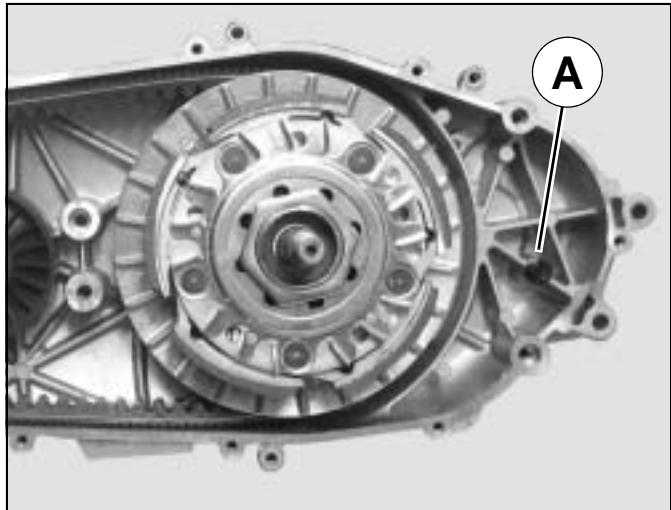
SECONDARY TRANSMISSION

■ Removal of the secondary transmission



Use a drip pan to catch the transfer box oil when the cover is removed.

- Remove the transmission cover.
- Remove the primary drive.
- Filling and checking the transfer box oil level is through the cap (A).

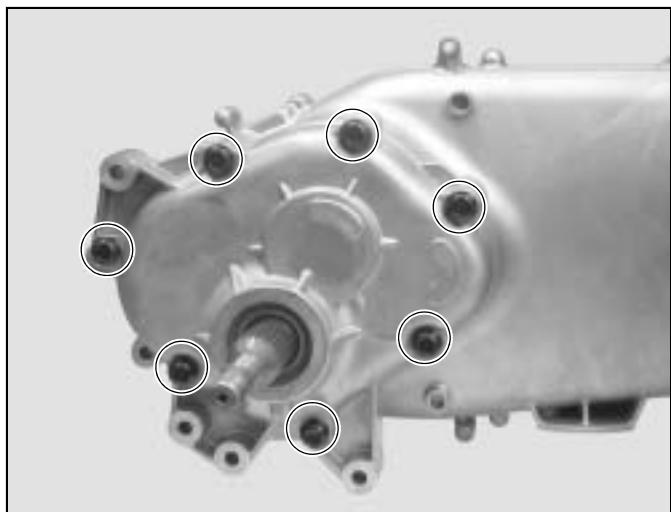


- Remove the cover and the secondary shaft. (7 screw).

Tightening torque: 22 Nm.

Oil capacity:

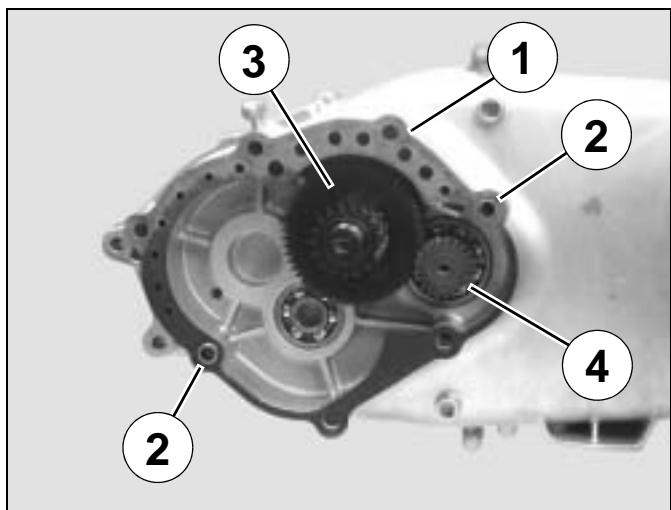
- 0.25 l



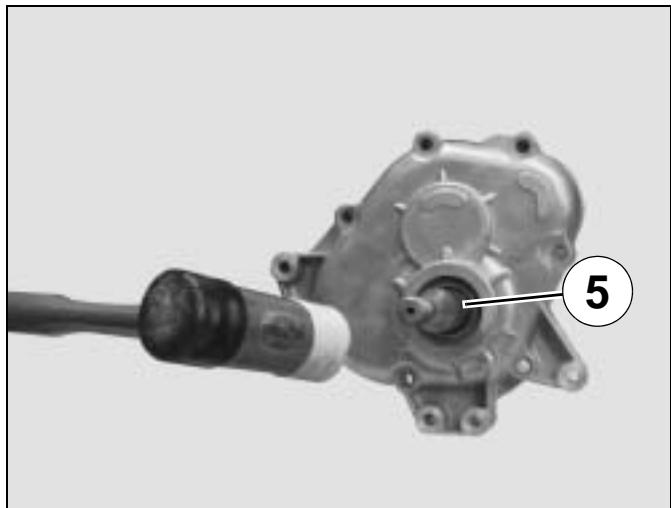
- Remove the paper gasket (1) and the 2 locating pins (2).
- Remove the countershaft. (3)
- Remove the primary shaft. (4)



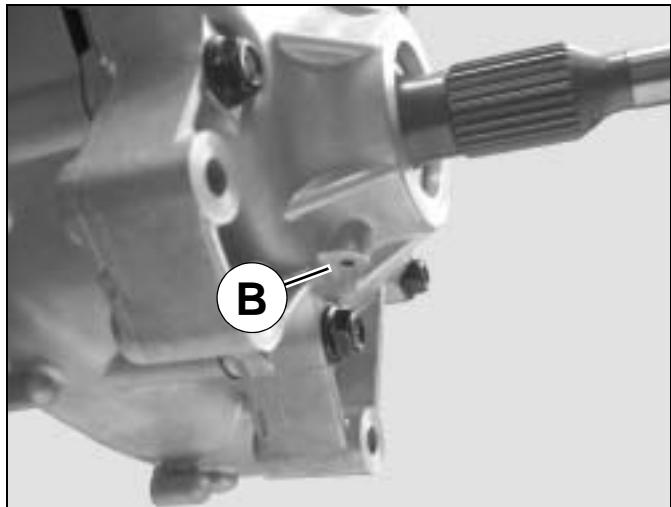
Make sure not to damage the gasket on the wheel side when removing the secondary shaft.



- The secondary shaft (5) can be knocked out of the cover using a mallet.



In case the gasket is damaged, oil will flow through the casing's drain hole (B) located between the gasket (on the wheel side) and the bearing.



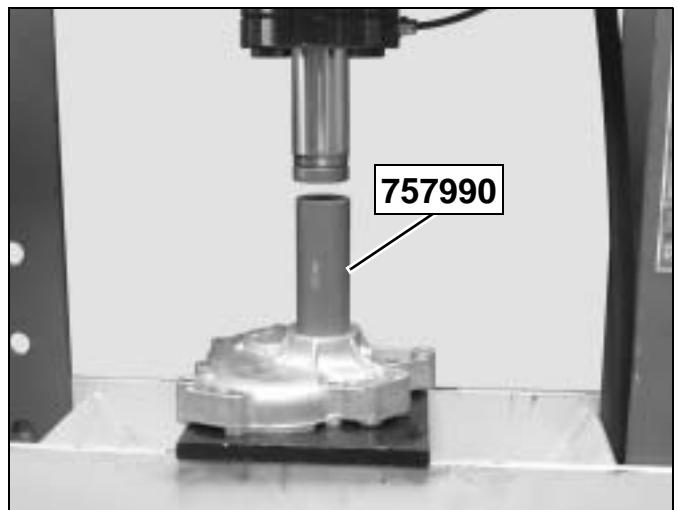
■ Check

- Check the condition of every gear.
- Check the condition of the lip seals.
- Using your finger, turn the internal bearing ring; it should turn freely and silently.
- Check that the bearing is tightly fitted to the casing.

■ Replacing the bearings of the relay box

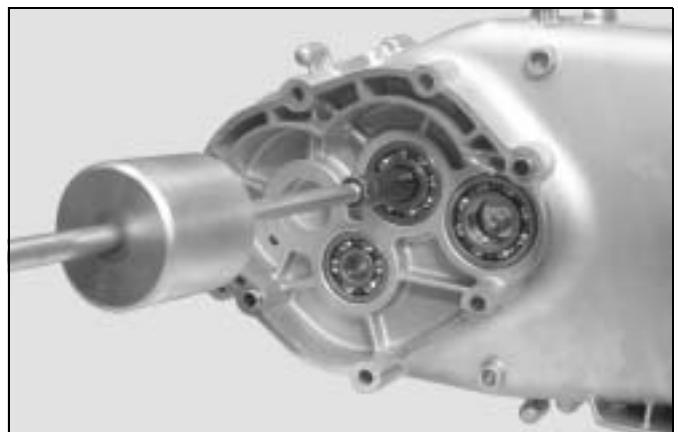


- Remove the seals.
- Remove the ball bearing from the cover using a press and the pusher ref. 757990.



Wear gloves in order not to get burnt.

- Using a heat gun, heat the crankcase to a temperature between 80 and 90°C.
- Use an inertia type extractor tool to remove the bearings.
- While the casing is expanded fit the new bearing fully home in its housing.



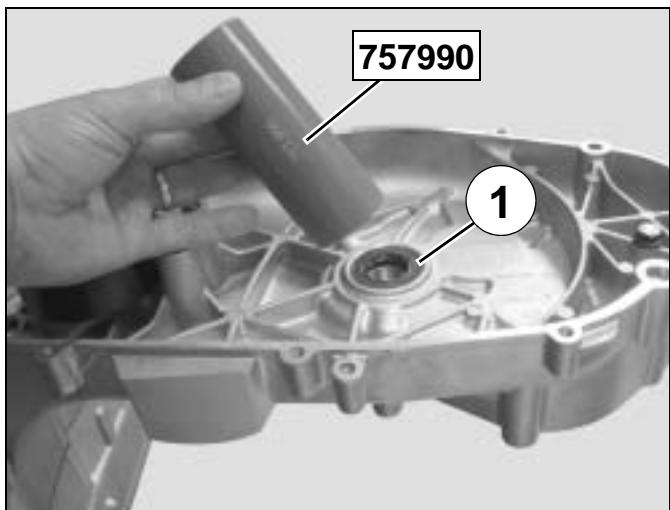
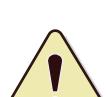
Fit the bearings so that the inscription is visible.



■ Fitting the seals and gaskets**Crankcase**

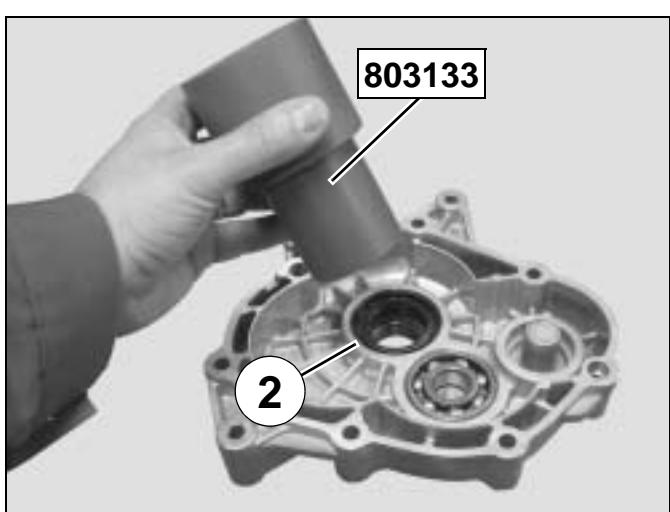
Fit the seal, with the lip towards the bearing.

- Using fitting tool P/N 757990, fit a new lightly greased gasket (1).

**Relay box cover**

Install radial shaft seal, with the lip oriented towards the tool.

- Using fitting tool P/N 803133, fit a new lightly greased gasket (2).

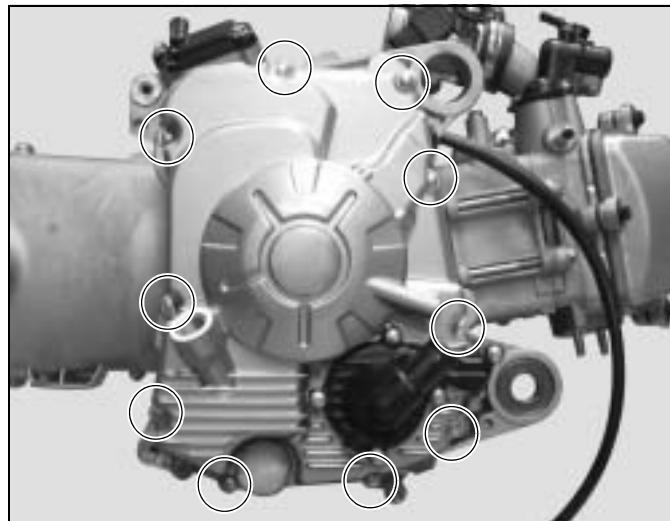


MAGNETO FLYWHEEL / WATER PUMP

■ Removal of the RH cover

- Remove the flywheel magneto cover. (10 screw)

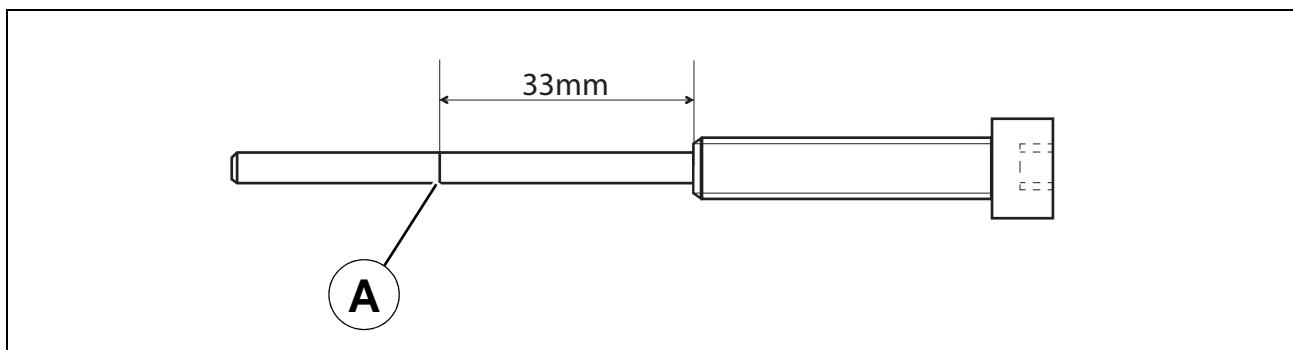
Tightening torque: 10 Nm.



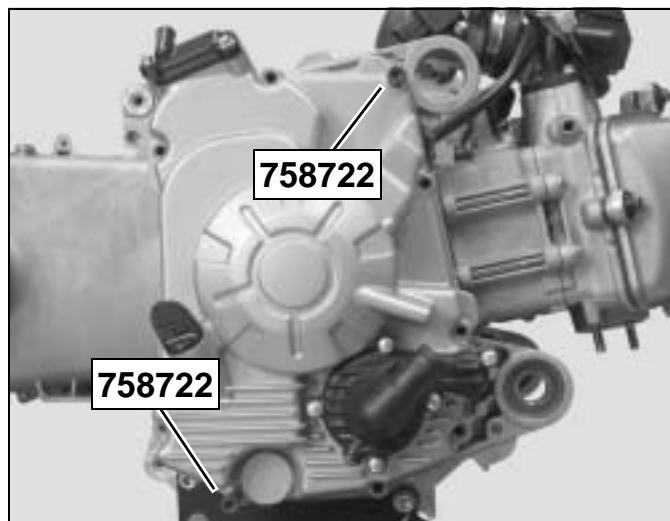
■ Tool to be modified

Modify the extraction tool ref. 758722 as follows:

- Use a hack saw to cut the extraction tool at (A) as shown in the illustration.



- Screw the tools 758722 until the cover unseats completely.
- Remove the paper gasket and the two 2 centering pins.



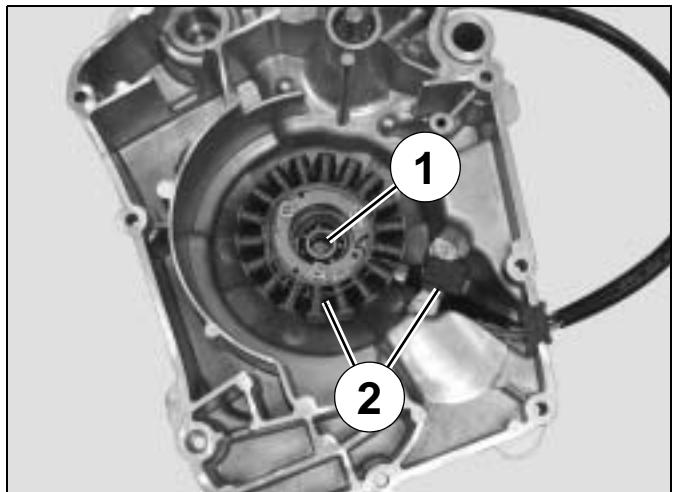
- The tightness of the oil lubrication system between the cover and the RH stem of the crankshaft is provided by a seal (1).
- Check the condition of the seal.

Replacement

- Remove the stator and sensor assembly (3) (2).

Tightening torque:

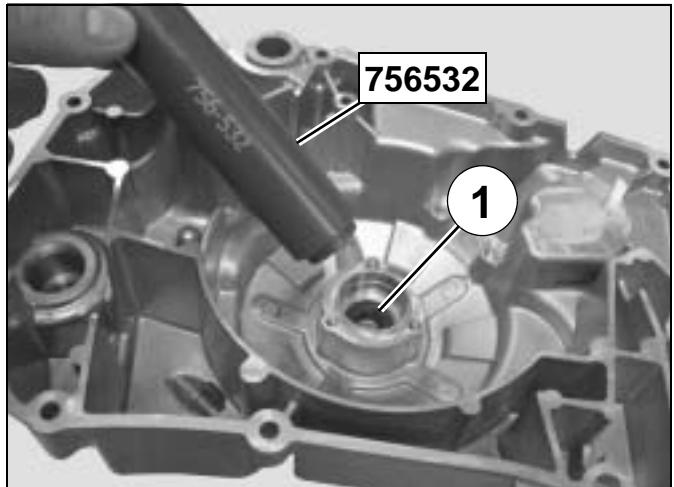
- Stator: 10 Nm.
- Sensor: 5 Nm.



- Remove the circlip.
- Remove the bearing using an inertia extractor.
- Remove the lip seal.
- Using fitting tool P/N 756532, fit a new lightly greased gasket (1).

	The seal is placed in the casing with its lip on the casing side.
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- Fit the plain washer.

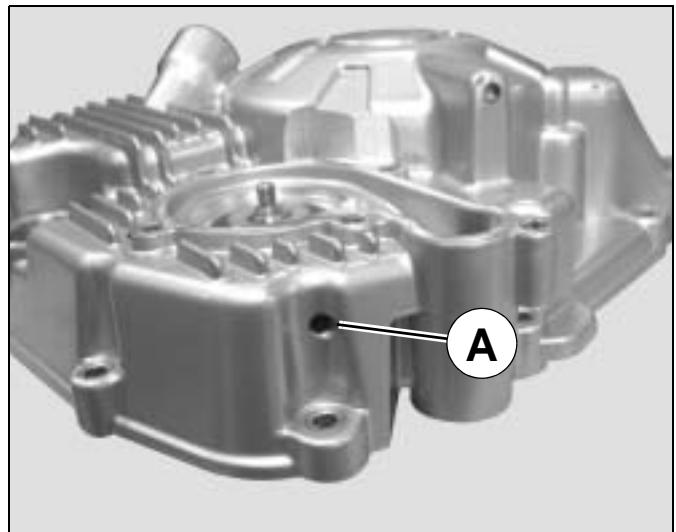


- Install a new bearing using tool P/N 756532.
- Install the circlips.

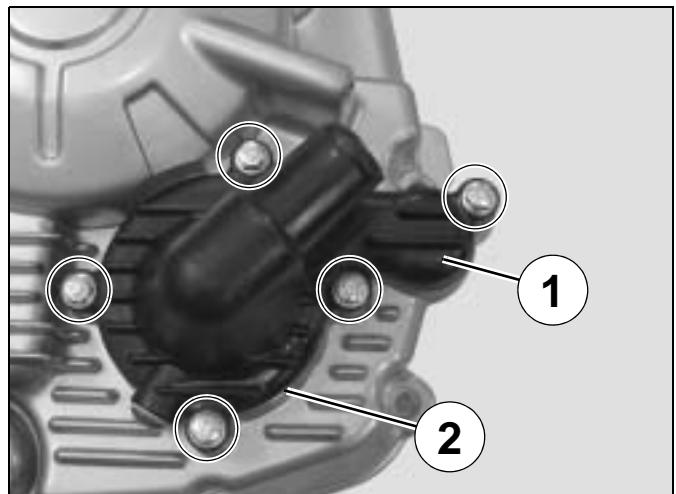


■ Removal of the water pump

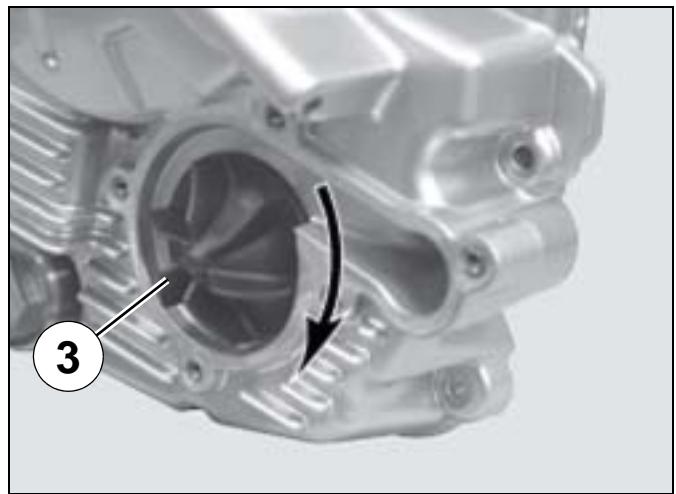
- Check and if necessary clean the water pump drain hole (A).



- Remove the water pump cover (1) 5 fixing bolts.
- Remove the paper gasket. (2)



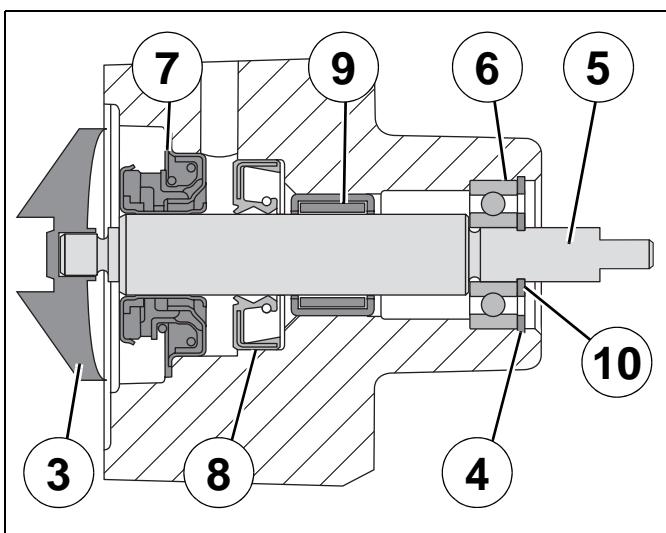
- Immobilise the pump shaft using a clamp and unscrew the turbine (3). (Left-hand thread)



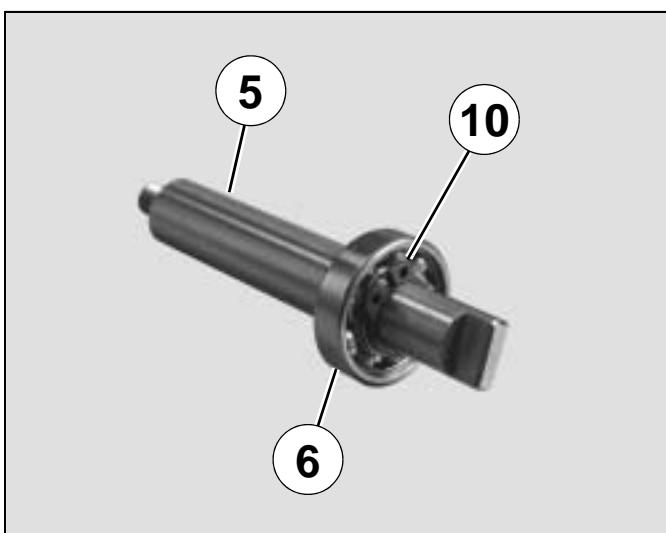
- Remove the circlip (4) located on the bearing side.
- Drive out the shaft (5) and the bearing (6) on the timing side by pushing it out over the pump drive shaft.
- Drive out the mechanical joint (7) from the turbine side.
- Drive out the seal (8) from the turbine side.
- Drive out the caged needle bearing (9) from the turbine side.



All the components must be changed every time the pump is serviced..

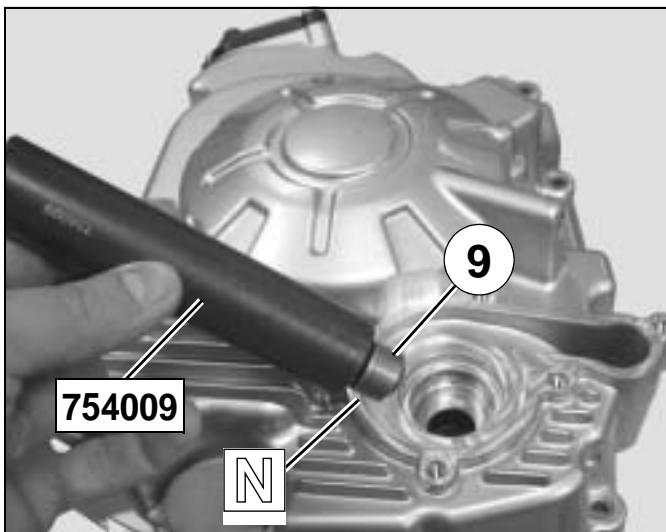


- Remove the circlip. (10)
- Remove the bearing (6), driving out the shaft (5).

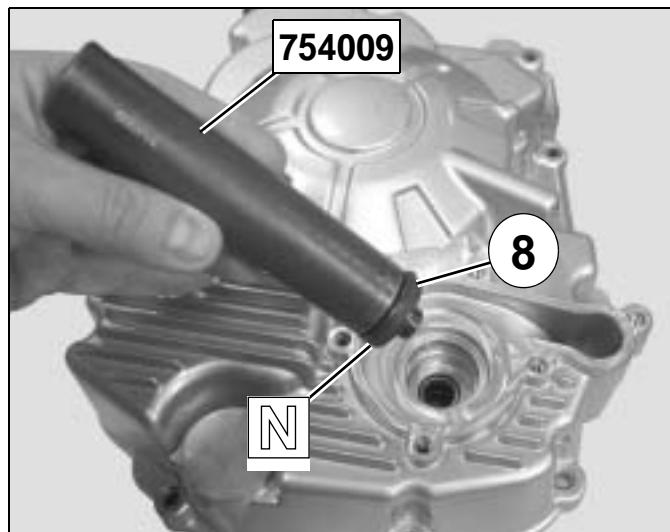


Reassembly

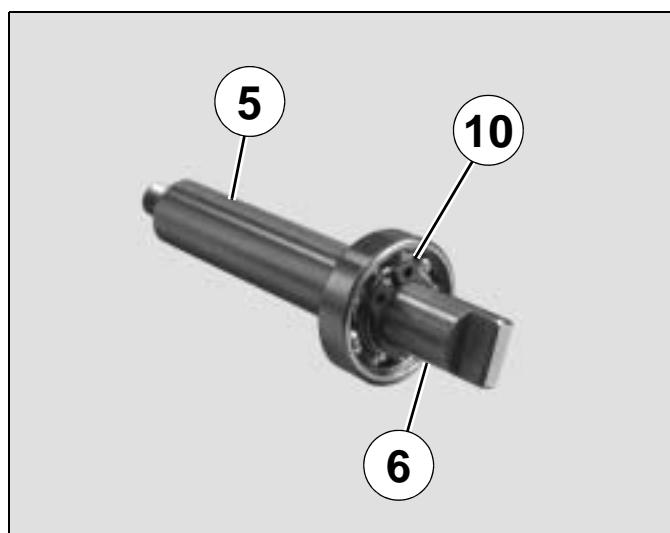
- Fit the caged needle bearing (9) into the casing on the turbine side using the pin drift P/N 754009.



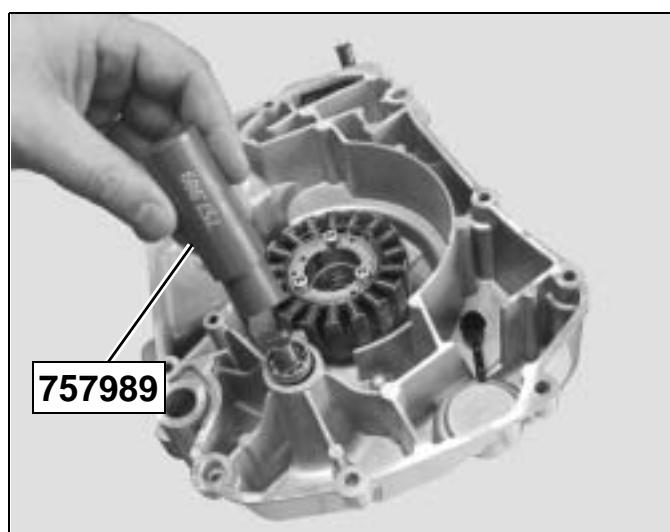
- Fit the seal (8) using the drift P/N 754009, the seal's lips shall be directed towards the caged needle bearing..



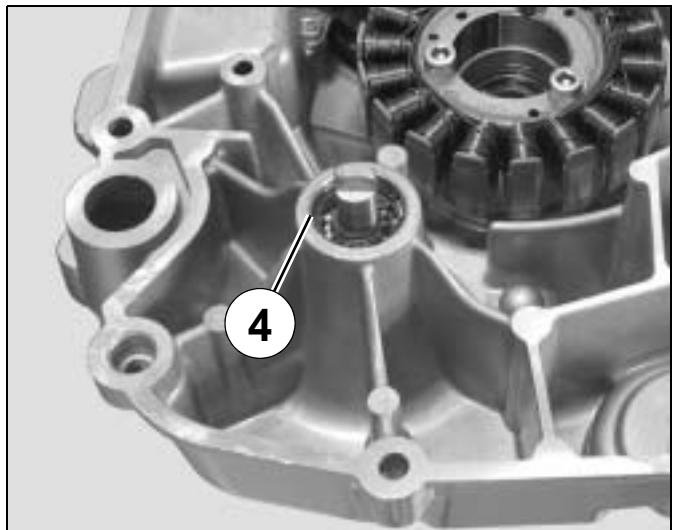
- Fit the bearing (6) on the drive shaft (5) pushing it by the inner cage.
- Install the circlips (10).



- Fit the drive shaft and bearing assembly by the outer cage using the bearing drift P/N 757989.



- Install the circlips (4).



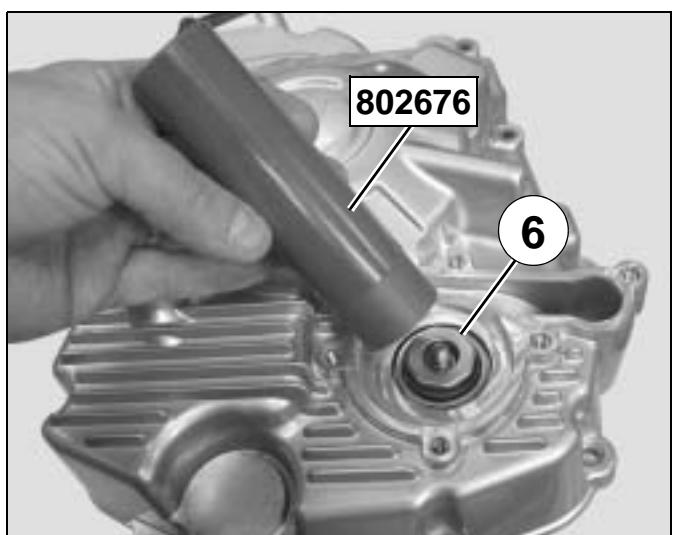
	Check the mechanical seal housing is perfectly clean.
--	--

- Fit the mechanical joint (7) using the seal drift P/N 802676.
- Install the turbine.

Tightening torque: 5.5 Nm.

- Install the water pump cover and a new O-ring.

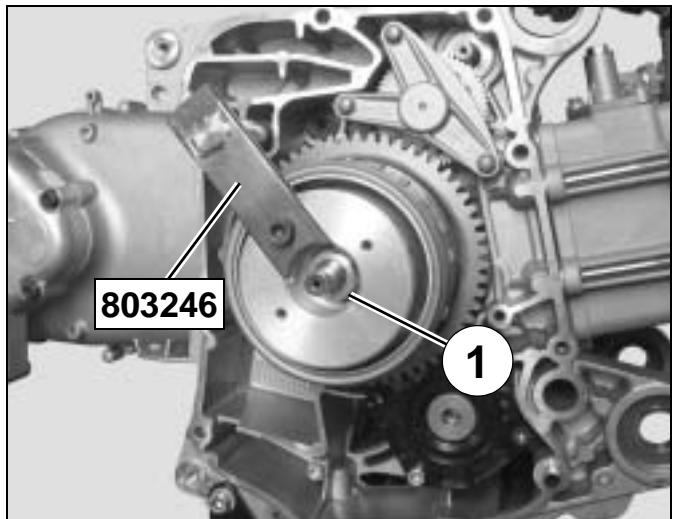
	The new mechanical joint is delivered with a blocking product coated on the surface which is in contact with the casing.
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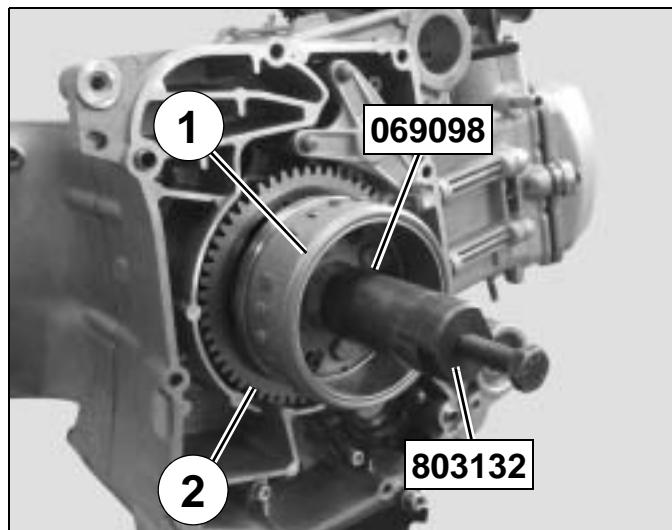
■ Remove the rotor and the overrunning clutch

- Fit the immobilisation tool ref. 803246, engaging its 2 pins in the 2 drilled holes on the flywheel magneto.
- Remove the nut using a long socket Facom J.24 HLA. (1)

Tightening torque: 160 Nm.

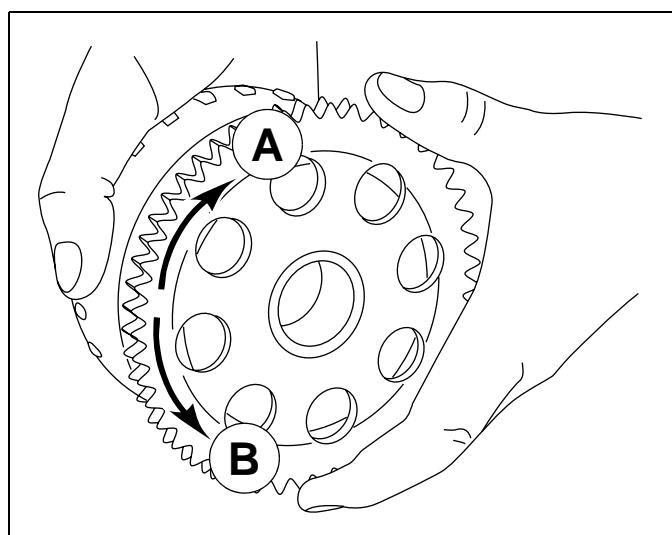


- Fit protective cap P/N 069098 to the end of the crank assembly.
- Tighten flywheel extractor P/N 803132 on the rotor. Lock the flywheel extractor and turn the thrust bolt until the rotor is released.
- Remove the rotor. (1)
- Remove the key from the crankshaft.
- Remove the starter ring (2).
- Remove the washer.

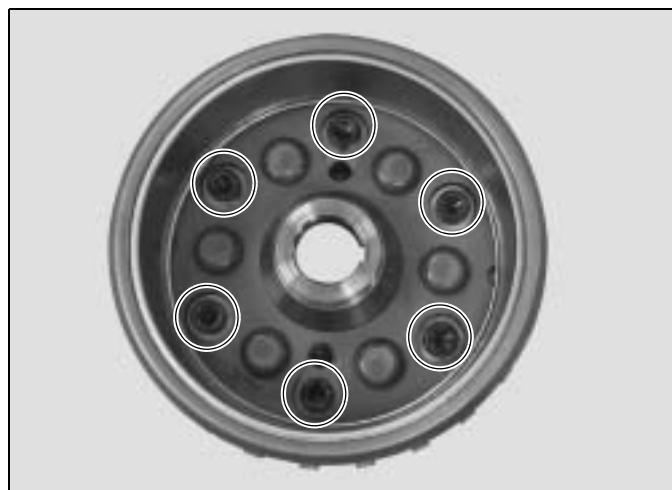


■ Checking the overrunning clutch

- Remove the starter sprocket retainer plate.
- Rotate the overrunning clutch by hand:
 - It must rotate in direction (A).
 - It must be block in direction (B).
- If it doesn't, replace the overrunning clutch.



- Remove the 6 screws that secure the overrunning clutch.
- When re-installing, fit a screw with standard thread lock.

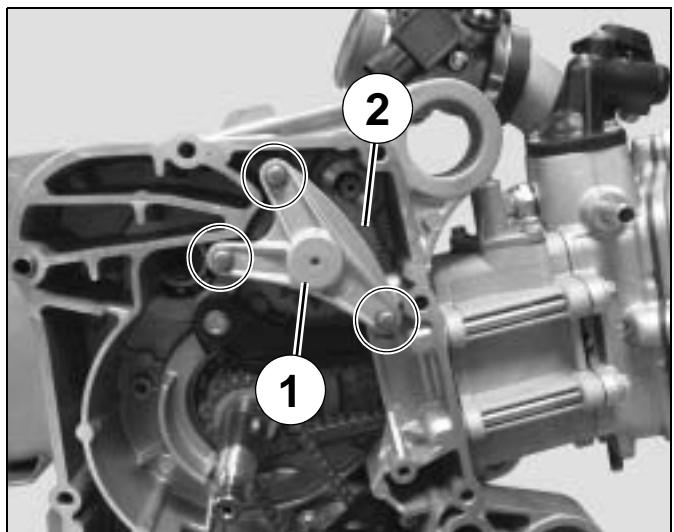


MAGNETO FLYWHEEL / WATER PUMP

- Remove the torque limiter pinion bracket (1). (3 screw)
- Remove the torque limiter pinion (2).

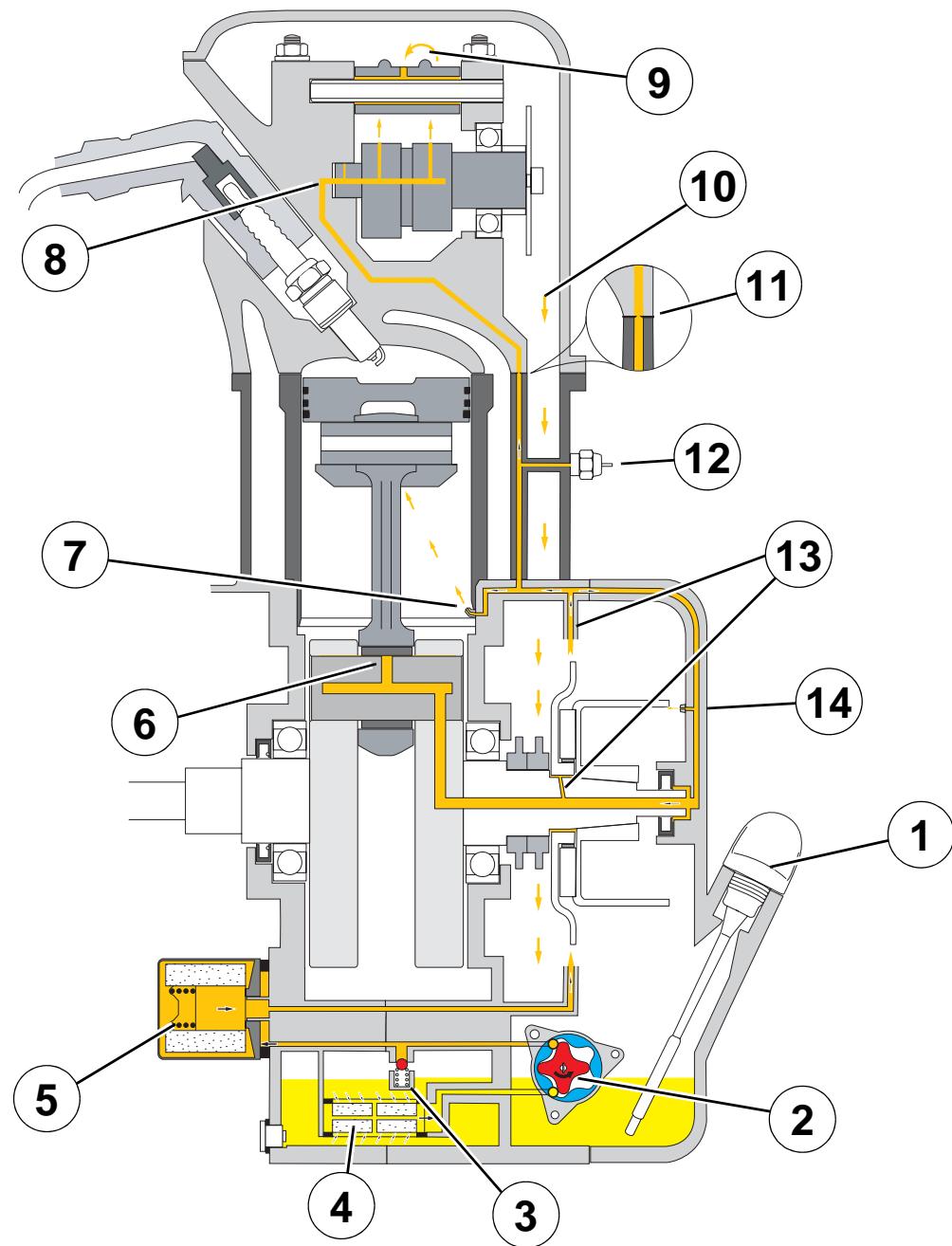


The torque limiter pinion cannot be removed.



- Check the condition of the teeth of the starter pinion.



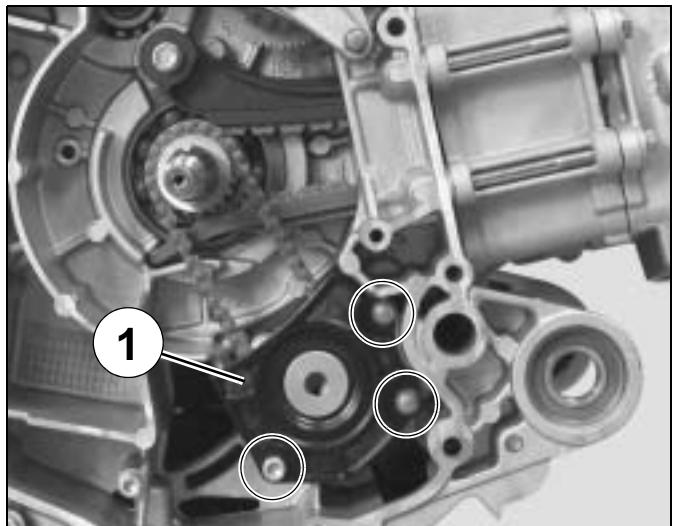
LUBRICATION**■ Lubrication system**

- 1. Oil level gauge.
- 2. Oil pump.
- 3. Relief valve.
- 4. Screen.
- 5. Oil filter with safety valve.
- 6. Lubrication of the conrod bushing.
- 7. Piston crown overflow and lubrication of the small rod end.
- 8. Cam shaft lubrication.
- 9. Lubrication by recovery of the rockers.
- 10. Oil return by the chain well.
- 11. Entry of oil into the cylinder head via the calibrated hole in the cylinder head gasket.
- 12. Oil pressure sensor.
- 13. Lubrication of the overrunning clutch.
- 14. Flywheel magneto cooling jet.

■ Removal of the oil pump

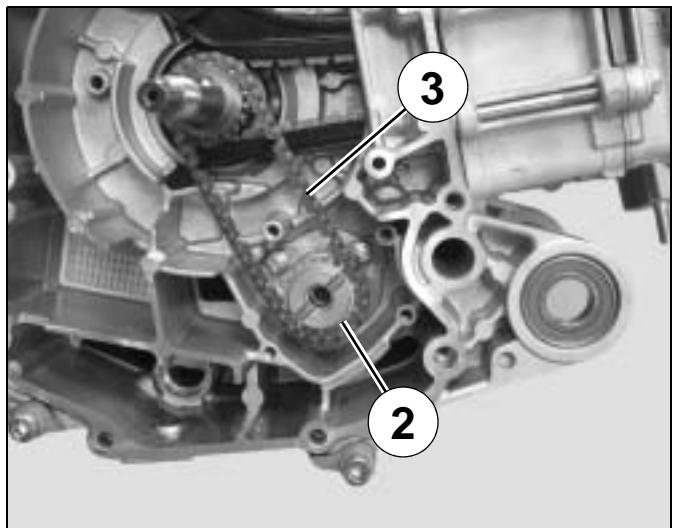
- Remove the anti-splash plate (1). (3 screw).

Tightening torque: 10 Nm.



- Remove the pinion (2).

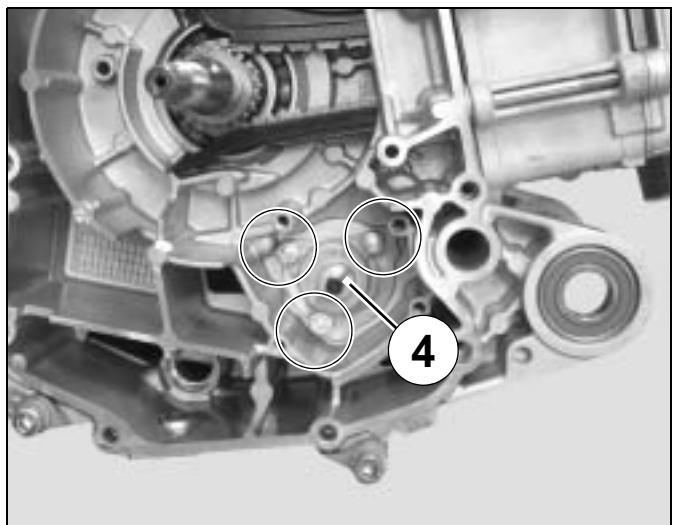
	- Remove the oil pump drive chain and notice its direction of rotation. (3)
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- Remove the oil pump (3 screw).

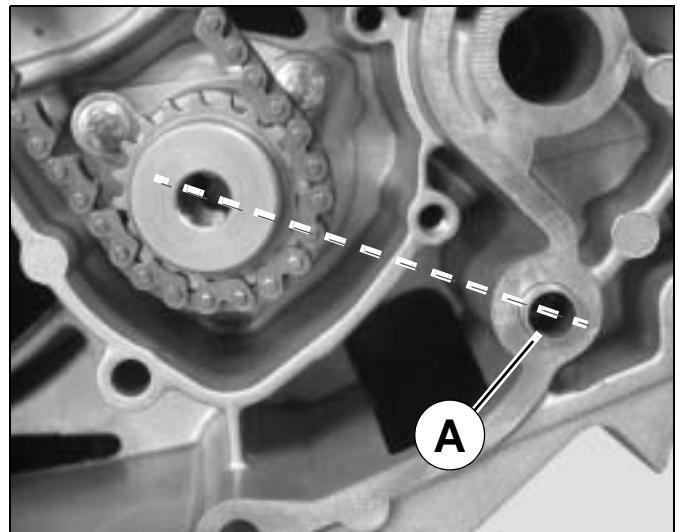
Tightening torque: 10 Nm.

	Before re-assembling, lubricate the oil pump by dipping it into a pan containing clean motor oil.
	When refitting the oil pump, check that the pin is in place (4).

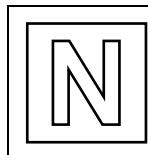
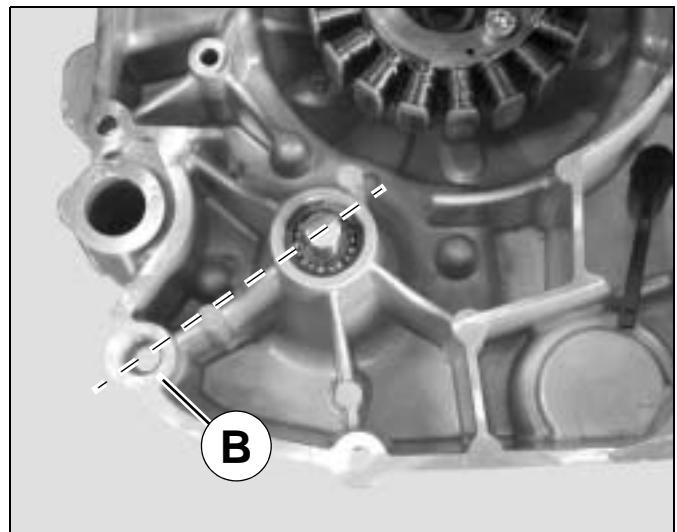


■ Installing the RH cover

- Align the machining on the pinon with the fastening hole (A) in the casing.



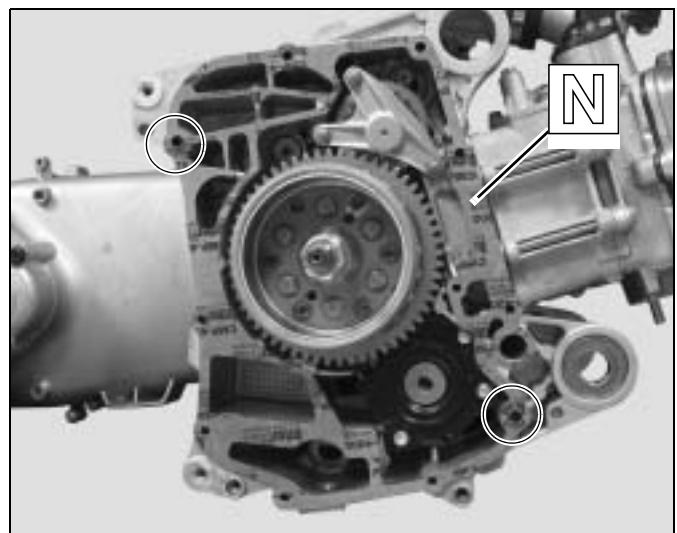
- Align the flat parts of the water pump with the fastening hold (B) on the RH cover.



Fit the 2 locating pins and a new paper gasket.

- Fit the RH cover, tapping it gently with a mallet.
- Fit the 10 fastening screws on the RH cover.

Tightening torque: 10 Nm.



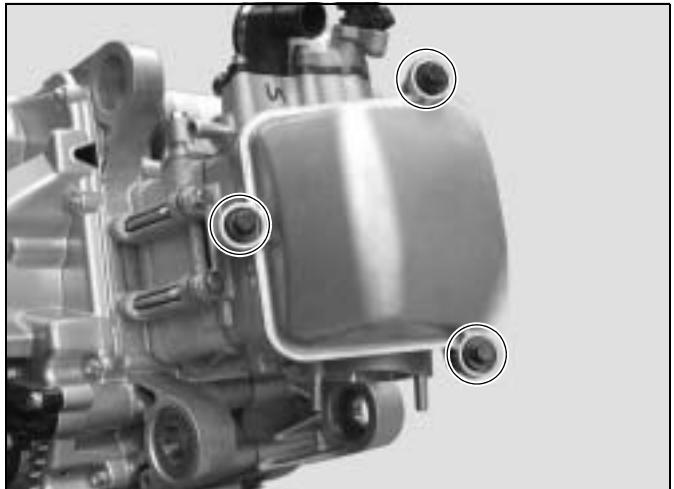
CYLINDER HEAD/CYLINDER/PISTON**■ Removal of the cylinder head**

- Remove the primary drive.
- Remove the throttle box.
- Remove the spark plug.

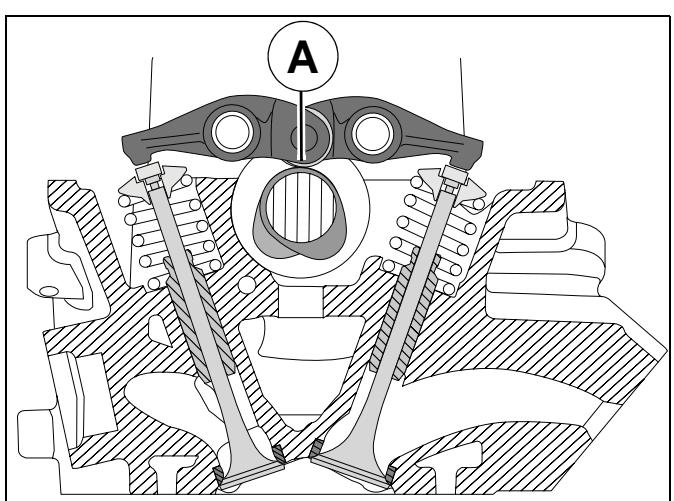
Tightening torque: 12 Nm.

- Remove the cylinder head cover equipped with its rubber gasket. (3 screw).

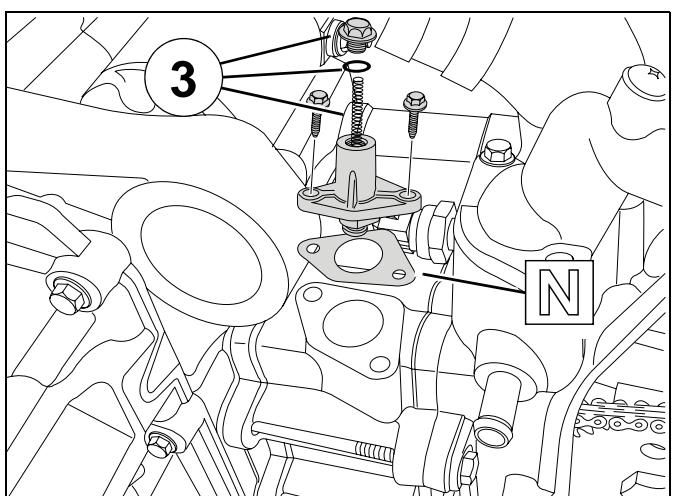
Tightening torque: 10 Nm.



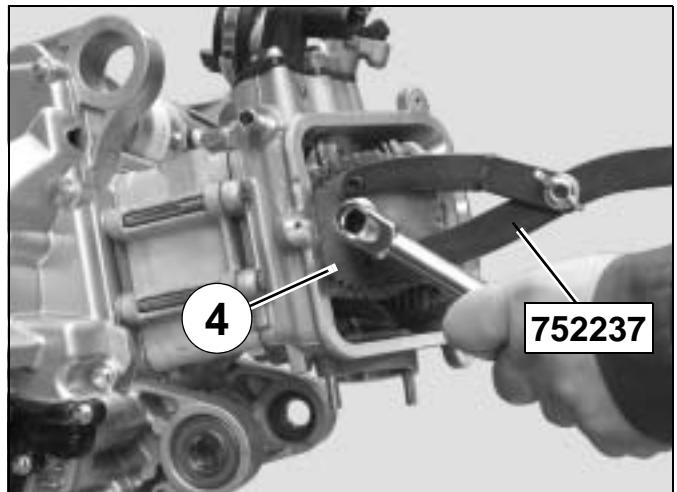
- Rotate the engine by hand in the direction of operation (clockwise) by means of the fixed flange in order to bring the rocker bearings over the camshaft cam lobes. (A).



- Remove the screw, the O-ring and the tensioner spring (3).
- Removal of the chain tensioner (2 screw).

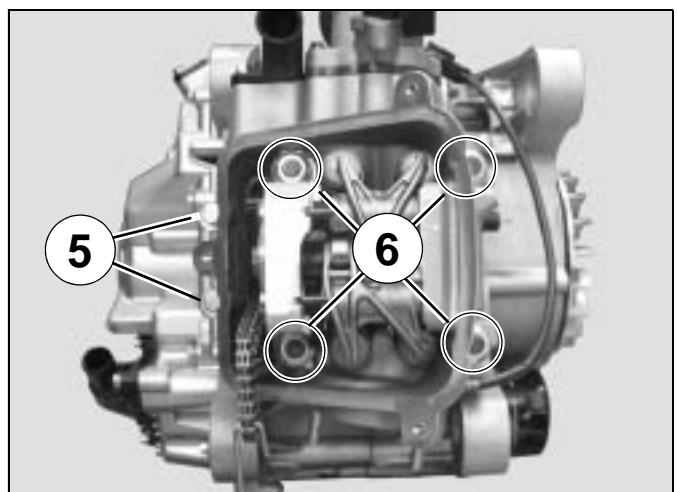


- Immobilize the camshaft gear (4) using the adjustable pin wrench P/N 752237.
- Remove the camshaft gear.
- Tie a wire to the timing chain in order to prevent it from falling into the crankcase.

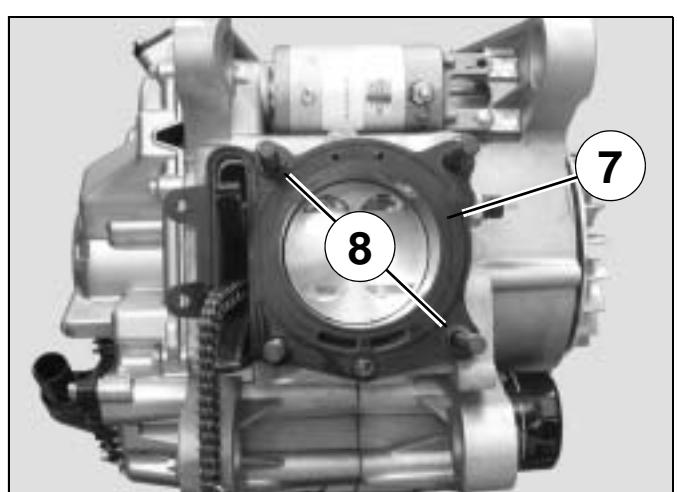


Any operations requiring the cylinder head to be dismantled lead to the compulsory replacement of the 4 cylinder pins.

- Loosen the 2 washers screws (5).
- Gradually loosen in a crosswise order the 4 nuts which secure the cylinder head (6).



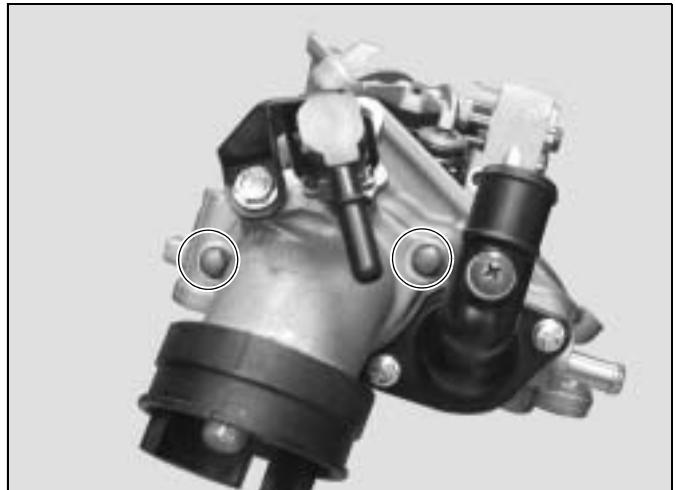
- Remove the cylinder head, the metal seals (7) and the 2 centring pillars (8).
- Remove the 4 cylinder pins.



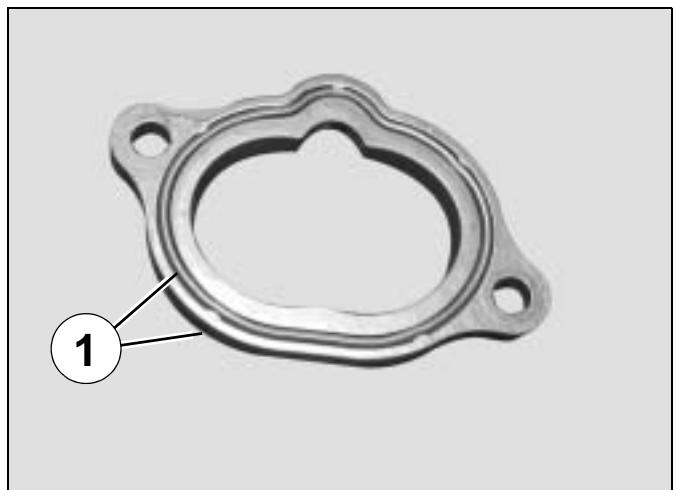
■ Removal of the intake pipe

- Remove the inlet coupling (2 screw).

Tightening torque: 10 Nm.



Check the condition of the O-rings (1).



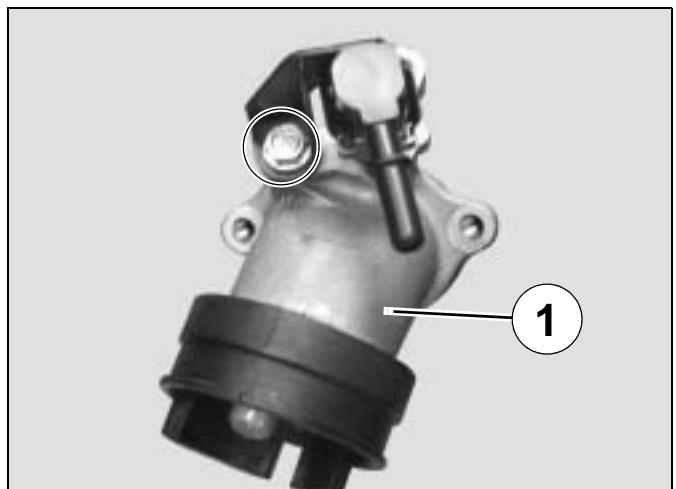
■ Removal of the fuel injector



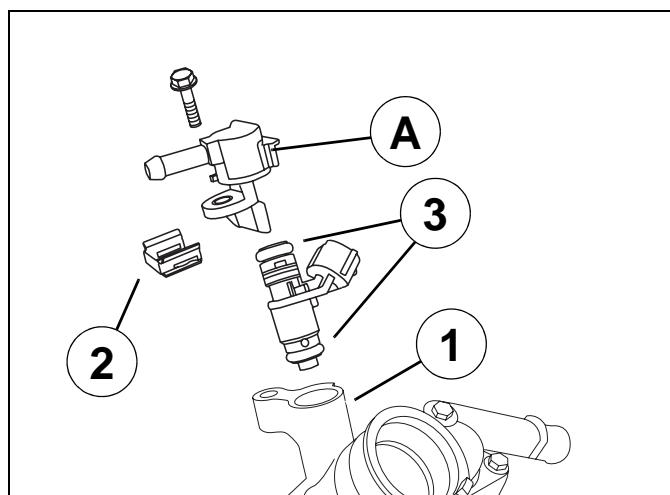
This part shall be removed only if it is absolutely necessary.

- Remove the manifold / fuel injector assembly from the intake pipe (1) (1 screw).

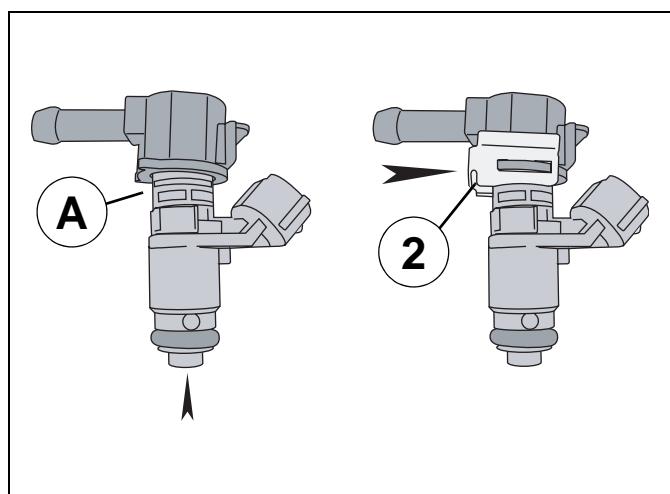
Tightening torque: 10 Nm.



- Remove the holder clip (2) from the injector.
- Remove the injector from the injection manifold.
- Check the condition of the O-rings (3).



- When re-installing, fit the fuel injector into the injection manifold until it reaches the groove (A).
- Install the holder clip (2) by fitting it into the injector's groove.



■ Fitting the thermostatic valve

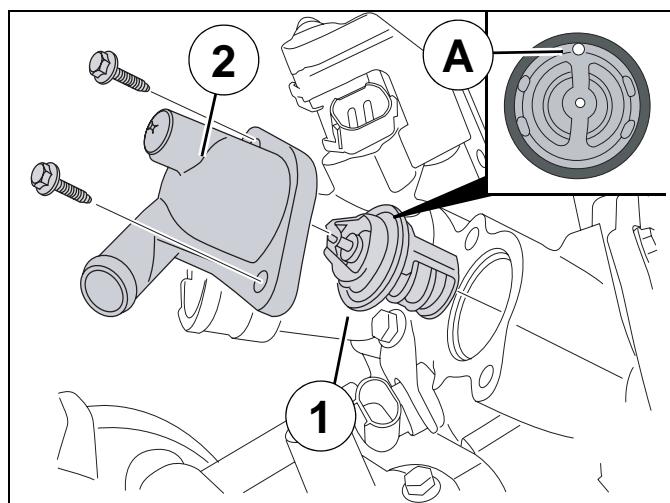
- Fitting the thermostatic valve (1).



**Check the condition of the seal.
When refitting, ensure that the degassing hole (A) is at the highest point.**

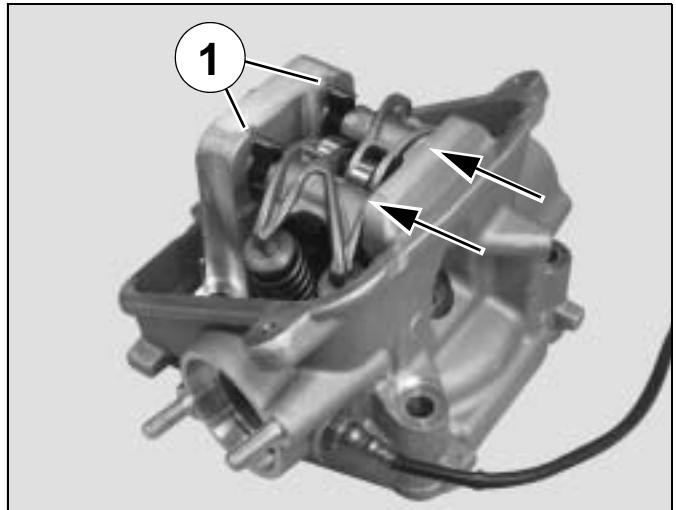
- Fitting the thermostatic valve cover (2).

Tightening torque: 8 Nm.



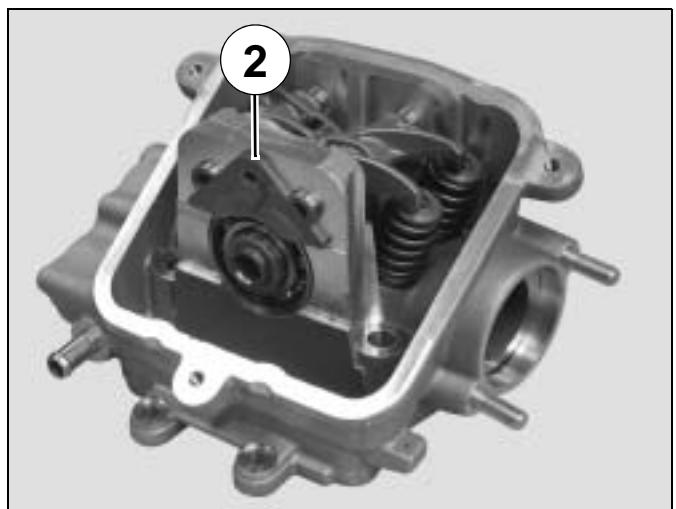
■ Removal of the camshaft and/or rockers

- Remove the cylinder head.
- Insert the pin P/N 754034 into the cylinder head gauging hole.
- Rotate the camshaft until the pin enters the camshaft gauging hole.
- Remove the 2 rocker shaft clips (1).
- Move the 2 rockers.
- Use a magnet to remove the 4 disks, noting their location.

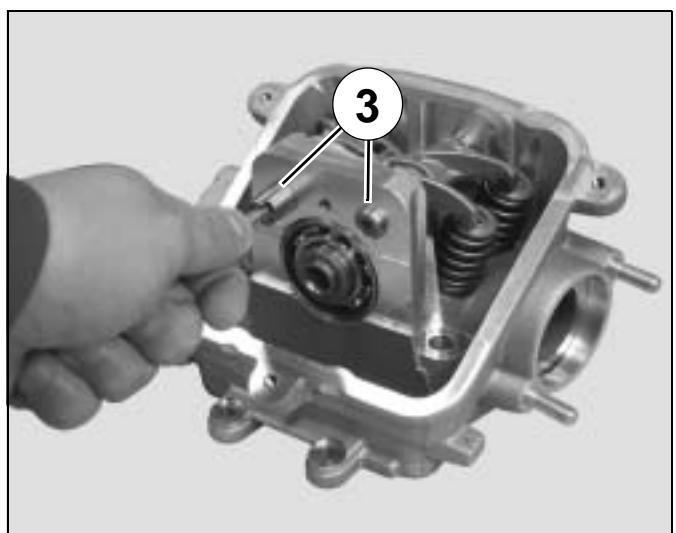


- Remove the stopper plate (2) (1 screw).

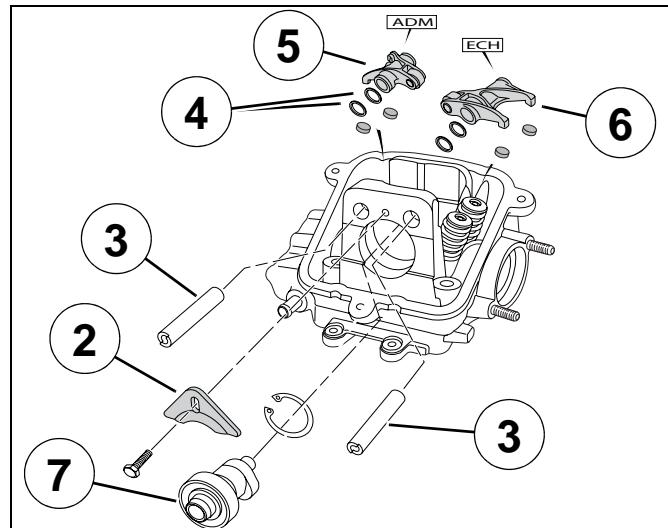
Tightening torque: 10 Nm.



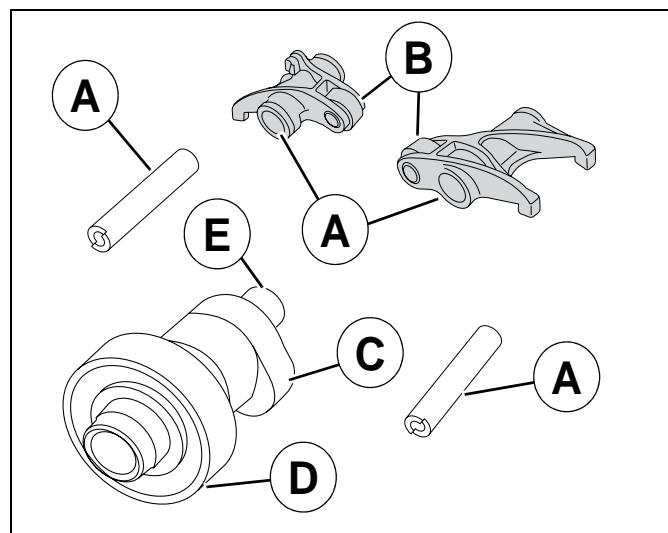
- Remove the pins from the rockers using a Ø6 mm screw (3).



- Remove the 4 thrust washers (4).
- Remove the inlet (5) and exhaust (6) rockers.
- Remove the camshaft (7).

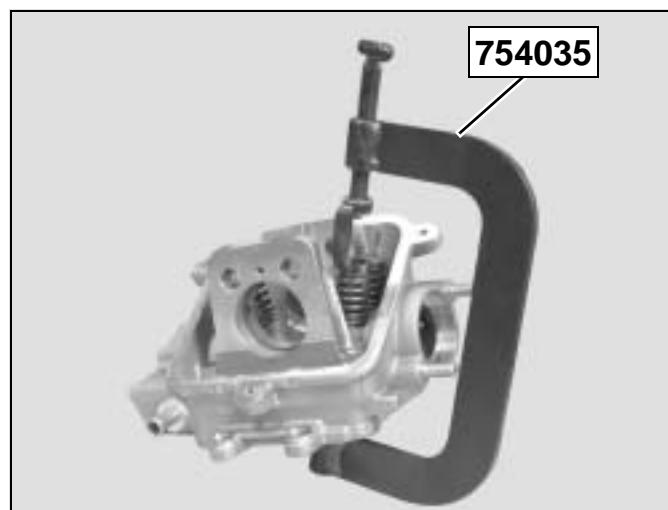


- Make sure the rocker pins and rockers are not worn (A).
- Turn the rollers of the rockers; they must turn freely and silently (B).
- Make sure the cams on the camshaft are not worn (C).
- Rotate the ball bearing on the cam shaft. It should rotate freely and soundlessly (D).
- Check that the cam shaft bearing pin is not worn (E).

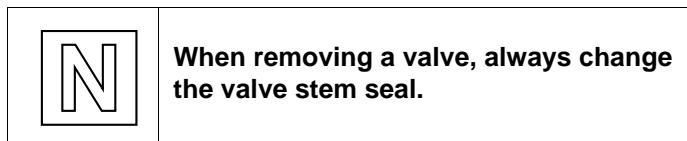
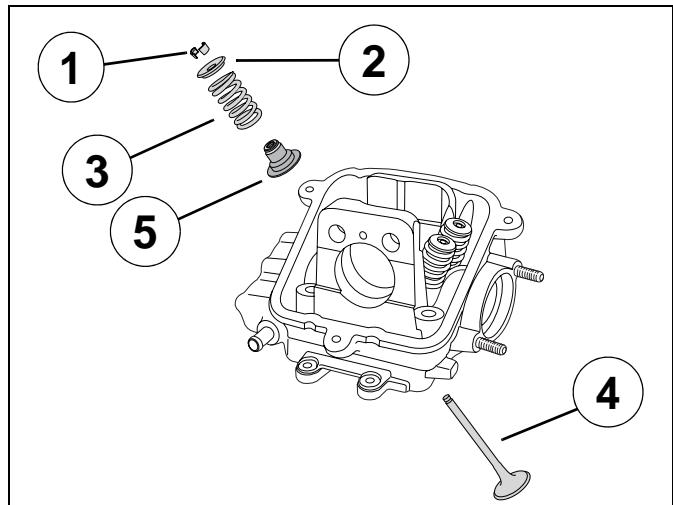


■ Removal of the valves or valve stem seals

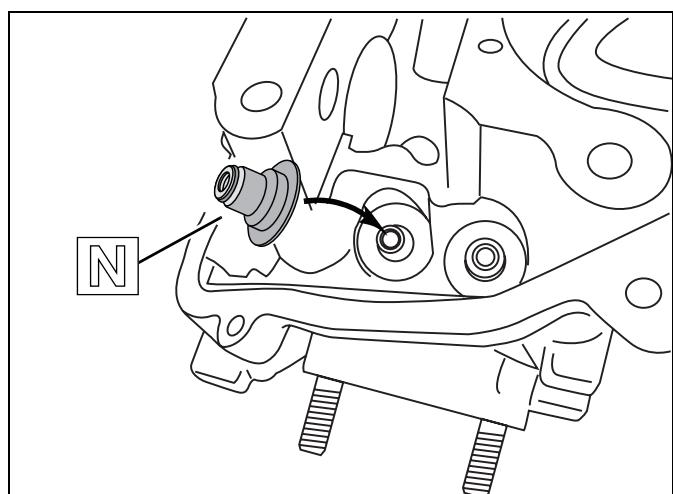
- Compress the spring of one of the valves using the valve lifter P/N 754035.
- Remove the 2 half cones (1).
- Uncompress the spring and remove the tool.



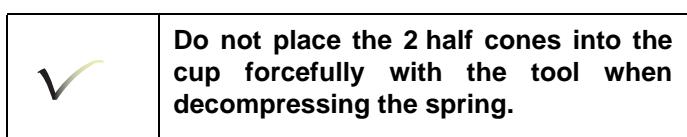
- Remove:
 - The upper cup (2).
 - The spring (3).
 - The valve (4).
 - The valve stem seal (5).
- Remove the 2nd valve in the same way.



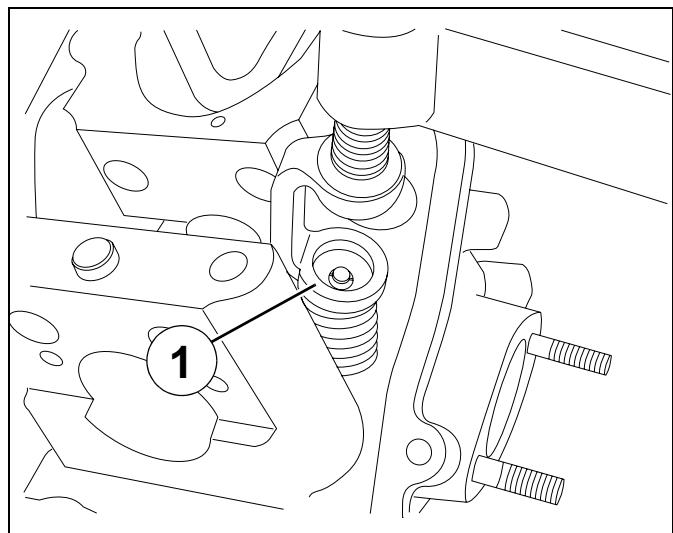
- Fit a new valve stem seal.
- Fit the valve.



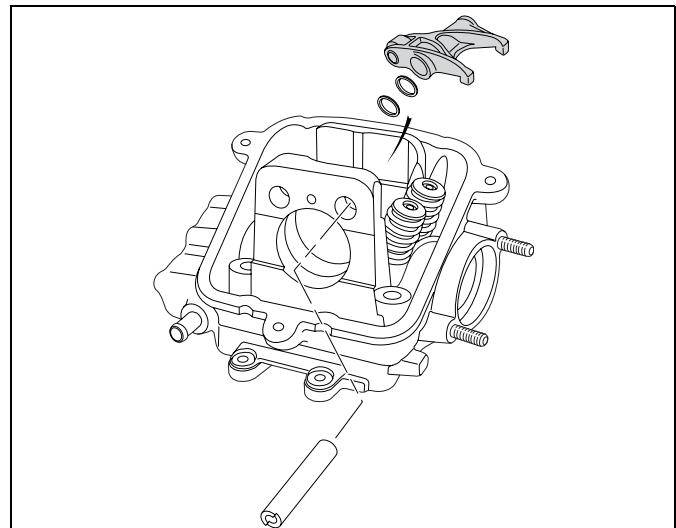
- Fit the valve spring with the small diameter against the rocker.
- Fit the upper cup.
- Fit the 2 half-cones (1), lightly grease them to hold them in the groove on the valve stem.



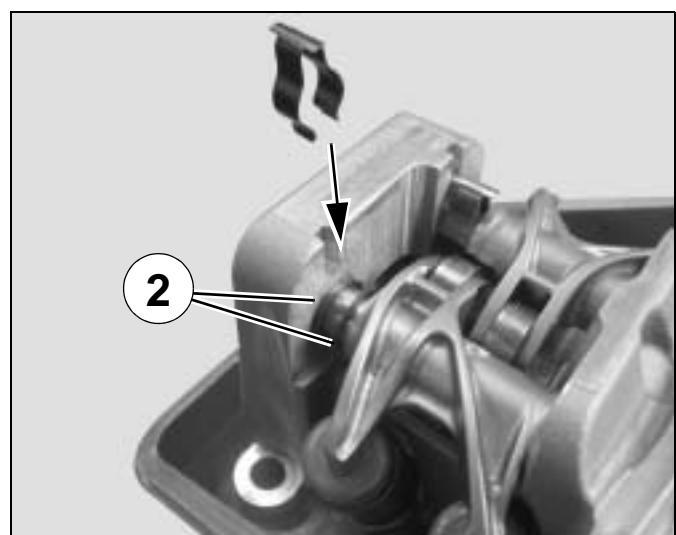
- Repeat the operation with the other valves.



- Fit the pin, the 2 washers and the rocker.



- Fit the 2 lightly greased disks in their original seatings.
- Move the rocker.
- Fit the clip between the 2 washers (2).

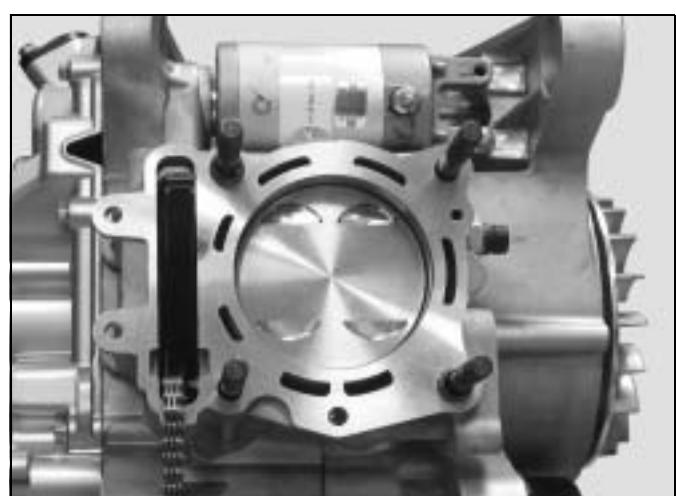


■ Removal of the cylinder / piston

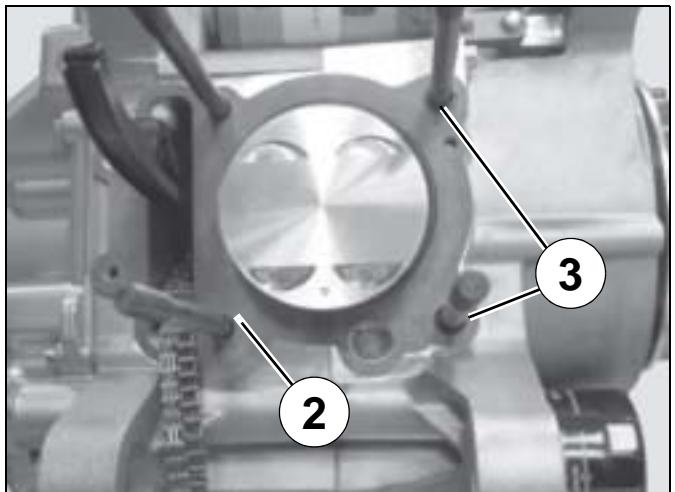


Any operations requiring the cylinder head to be dismantled lead to the compulsory replacement of the 4 cylinder pins.

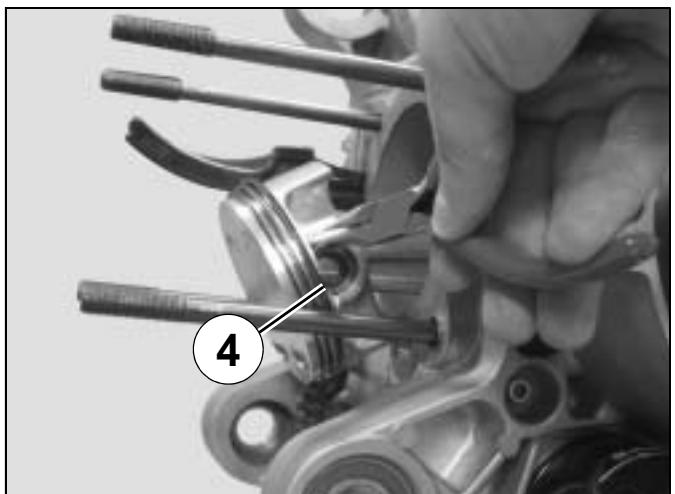
- Remove the cylinder head.
- Remove the chain guide pad .



- Remove the cylinder.
- Remove the base gasket (2) and the 2 centring pillars (3).

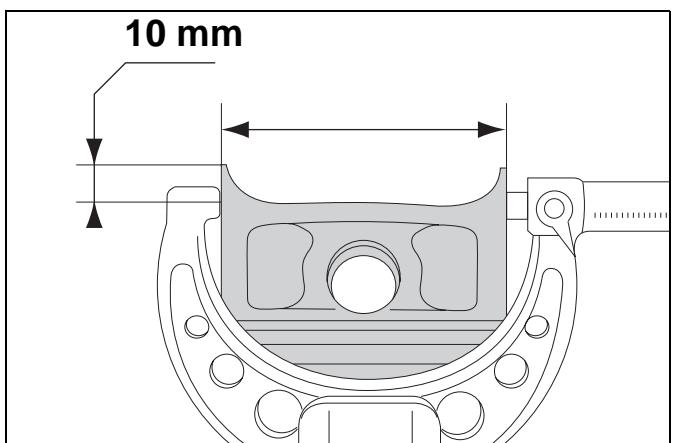


- Remove one of the circlips (4) with pliers.
- Remove the gudgeon pin.
- Remove the piston.
- Remove the 4 cylinder pins.



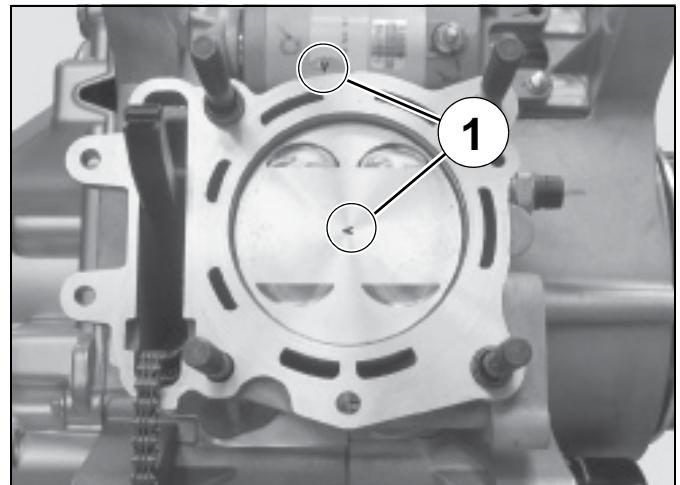
■ Checking the piston

- The piston should show no traces of scoring or seizure.
- The rings must be free in their grooves.
- Measure the piston diameter at 10 mm from the piston skirt.



■ Checking the cylinder

- The cylinder should show no traces of scoring or seizure.
- Check the cylinder/piston assembly pairing (1).



Pairing

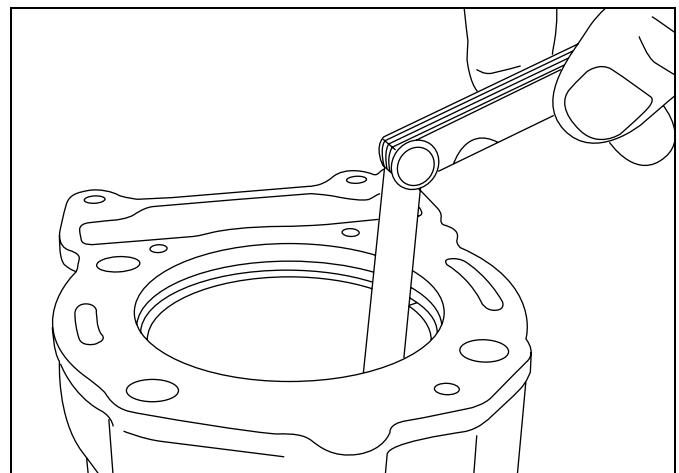
Class identification	Cylinder	Piston	Cylinder & piston set
A	84.000/84.010 mm	83.970/83.980 mm	0.020/0.040 mm
B	84.010/84.020 mm	83.980/83.990 mm	0.020/0.040 mm

■ Checking the piston rings

- Carefully remove the piston rings.
- Place a ring in the bore parallel to it and measure the gap using a feeler gauge.

Piston ring gap:

- Top compression ring gap: 0.15 to 0.35 mm.
- Compression ring gap: 0.3 to 0.5 mm.
- Oil control ring gap: 0.25 to 0.55 mm.

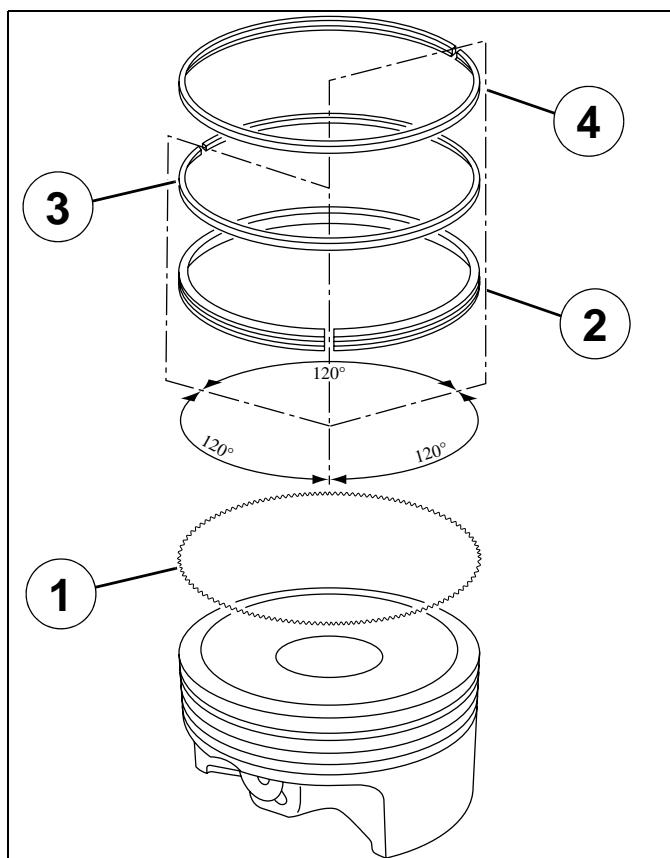


■ Installing the piston rings on the piston

- Proceed in the following order in order to install the oil control rings:
 - A. Install the spring (1).
 - B. Install the oil control ring (2) by placing the "TOP" mark upwards.
 - C. Install the compression ring (3) by placing the "TOP" mark upwards.
 - D. Install the top compression ring (4) by placing the "TOP" mark upwards.



Move the piston ring gap by 120°.



■ Fitting the piston

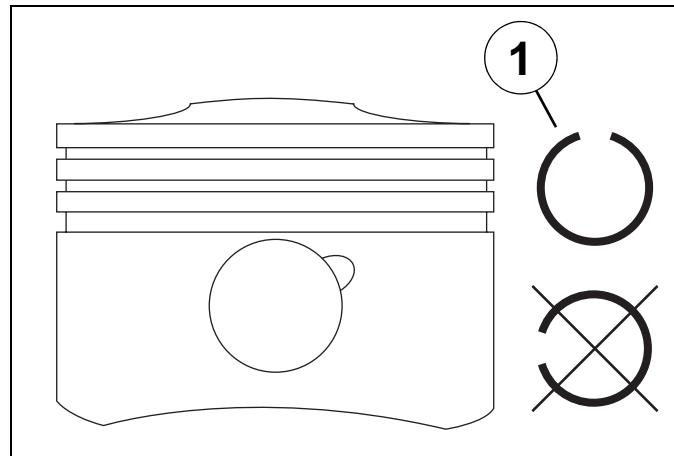
- Install the piston with its arrow stamped into the piston crown pointing at the exhaust.
- Fit the gudgeon pin and circlips.



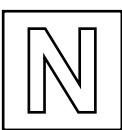
- The circlip gaps (1) must face upwards or downwards, but under no circumstances to the side.



Use new rings.



■ Fitting the cylinder



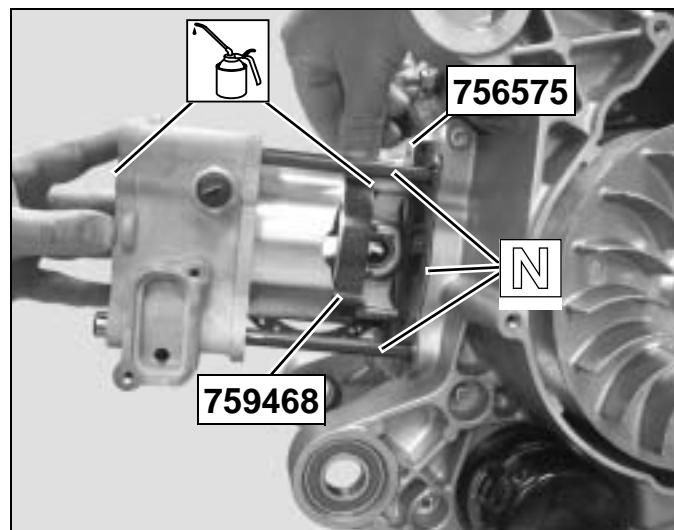
Fit the 4 new pins.

Tightening torque: 5 Nm.

- Install the cylinder base gasket and the 2 guiding pillars on the crankcase.



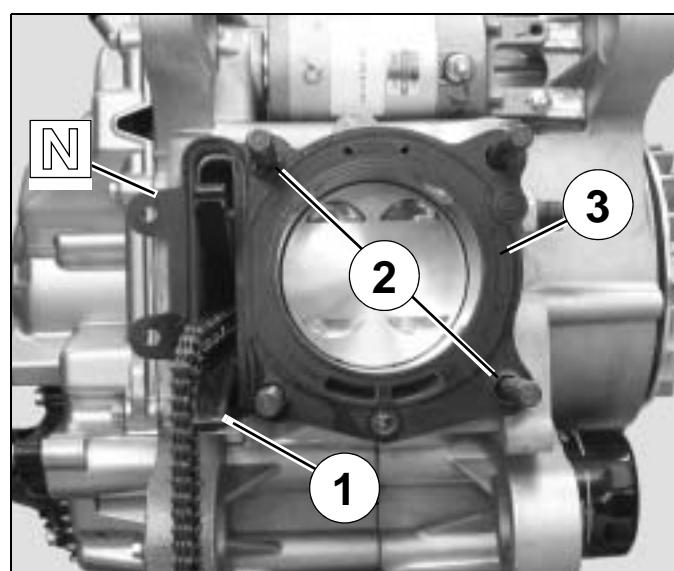
Lubricate the cylinder.



- Fit the chain and the chain guide tensioner into the timing chain tunnel.
- Using a piston locking fork P/N 756575 and a piston ring installation collar 759468, install the cylinder.

■ Fitting the cylinder head

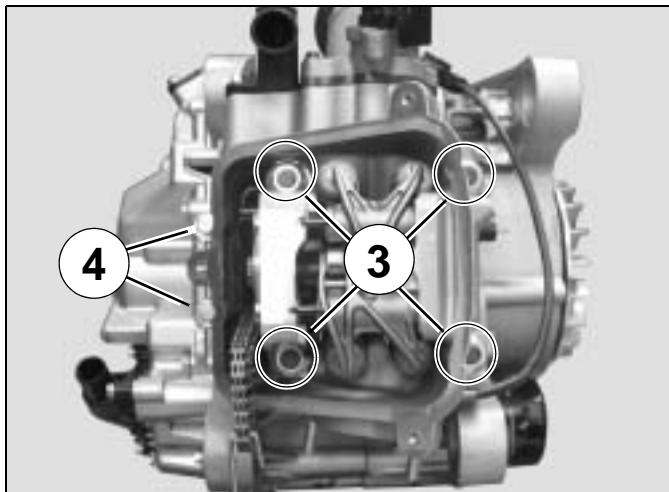
- Fit the chain guide pad (1).
- Fit the 2 guiding pillars (2) and the metal gasket on the cylinder (3).
- Fit the timing chain through the cylinder head timing well.
- Install the cylinder head.



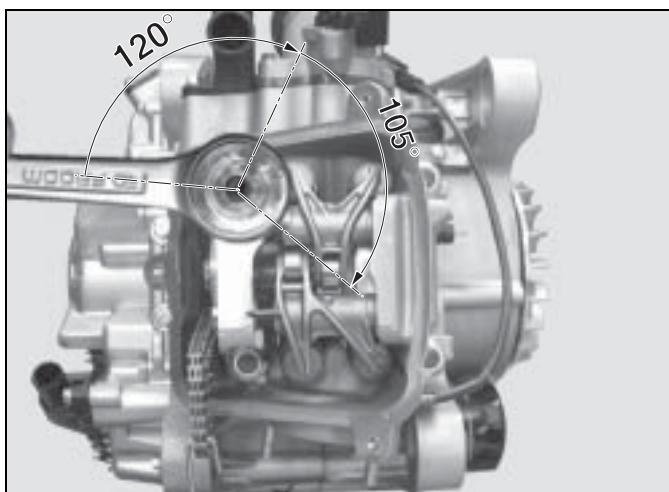
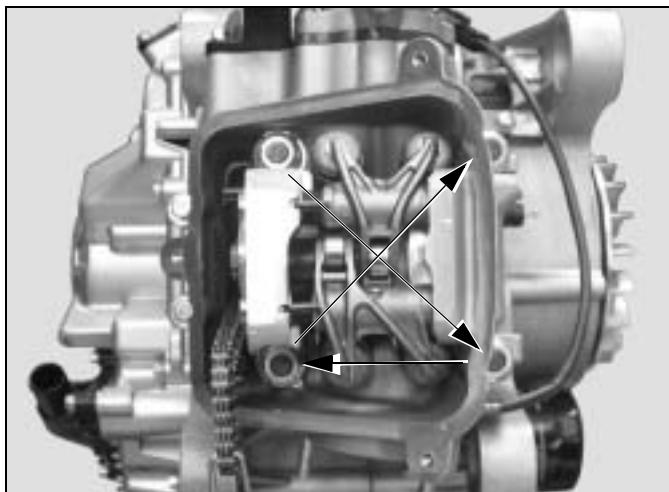
■ Method for tightening the cylinder head

This operation is carried out in several steps.

- Slightly lubricate the studs.
- Fit the 4 washers.
- Tighten the 4 nuts (3) and the 2 washer screws (4) slightly.



1. Torque the nuts to 6 Nm.
2. Pre-tighten the 4 nuts in a crosswise order to 20 Nm.
3. Unscrew the 4 fastening nuts on the cylinder head 180° crossways nut by nut.
4. Torque the nuts to 20 Nm in a crosswise order.
5. Tighten the nuts again crossways at an angle of 120°.
6. For each nut, complete the tightening operation by a 105° angle in a crosswise order.
7. Tighten the 2 washer screws to 13 Nm.



In the event of a problem or fault with the screwing, unscrew the 4 nuts and start again at step 1.



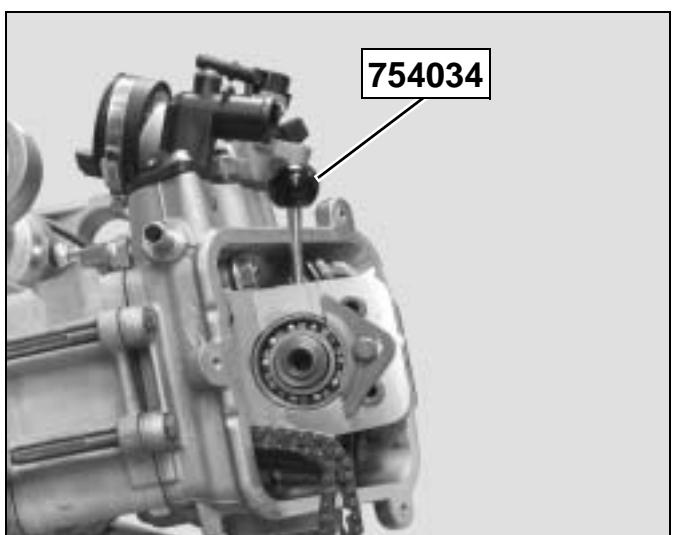
DISTRIBUTION**■ Setting the timing**

- Remove the transmission cover.
- Remove the RH casing.
- Remove the rotor.

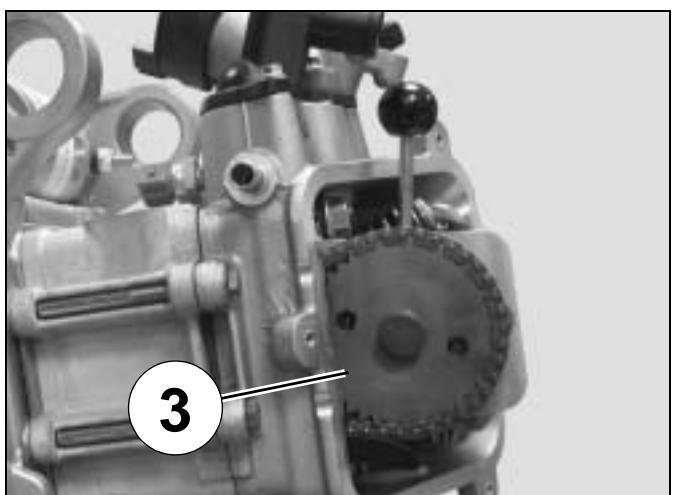
- Fit the locking pin P/N 754033 in the crankcase gauge hole.
- Rotate the crankshaft until the pin enters the crankshaft gauging hole.



- Insert the pin P/N 754034 into the cylinder head gauging hole.
- Rotate the camshaft until the pin enters the camshaft gauging hole.



- Place the camshaft gear (3) in the timing chain so that you can immobilize it using the adjustable pin wrench.
- Fit the camshaft gear screw but do not tighten it.

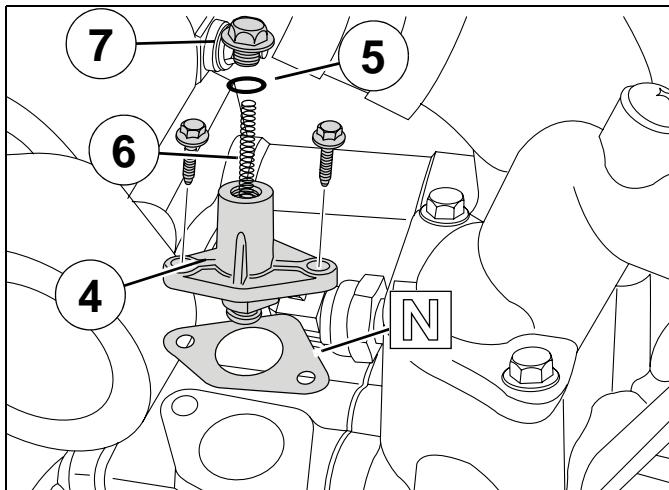


- Fit the chain tensioner gasket.
- Install the chain tensioner and the 2 attachment screws (4).

Tightening torque: 10 Nm.

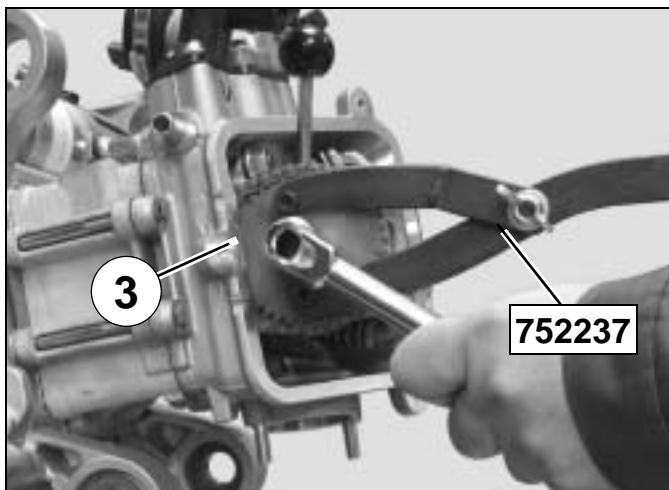
- Fit the O-ring (5).
- Install the spring (6).
- Install the tensioner cap (7).

Tightening torque: 10 Nm.



- Immobilize the camshaft gear (3) using the adjustable pin wrench P/N 752237.
- Tighten the camshaft gear screw.

Tightening torque: 45 Nm.

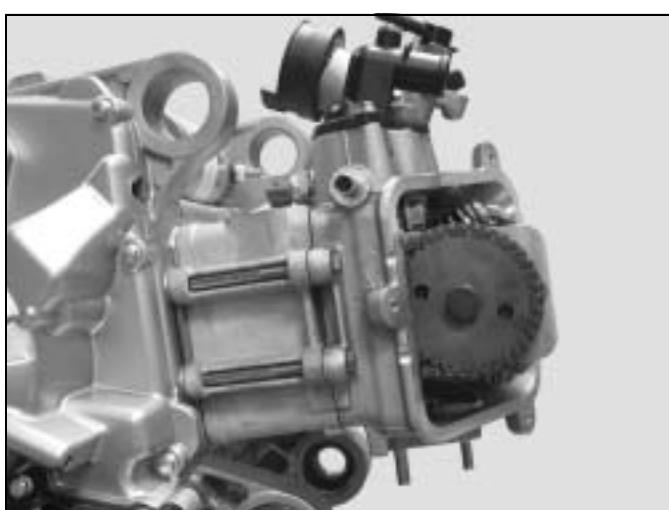


■ Checking the timing

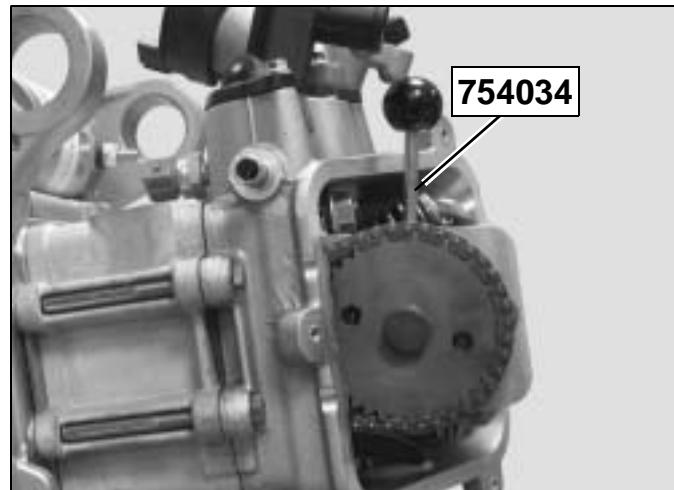
- Remove the 2 timing pins.
- Rotate the engine twice: 2 revolutions in the engine's operating direction.
- Fit once again the pins in order to make sure timing is set correctly.
- If the pins do not enter reset the timing.

■ Checking and adjustment of valve clearance

- The engine must be cold.
- Remove the transmission cover.
- Remove the spark plug.
- Remove the rocker cover.



- Insert the pin P/N 754034 into the cylinder head gauging hole.
- Rotate the camshaft until the pin enters the camshaft gauging hole.



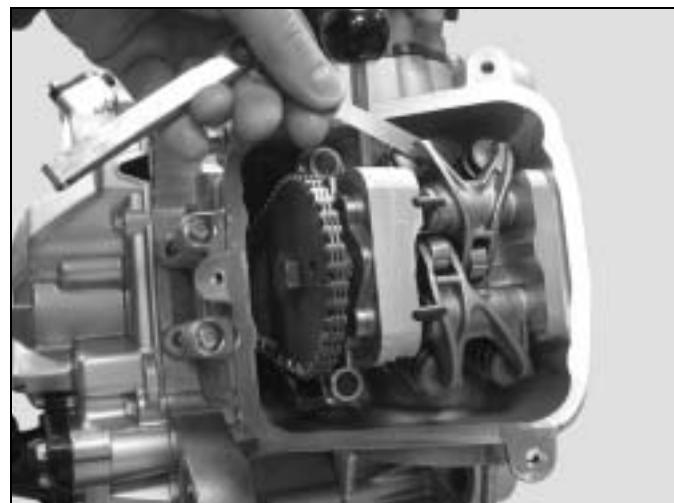
- Using the set of feeler gauges, measure the clearance of each valve.

Clearances:

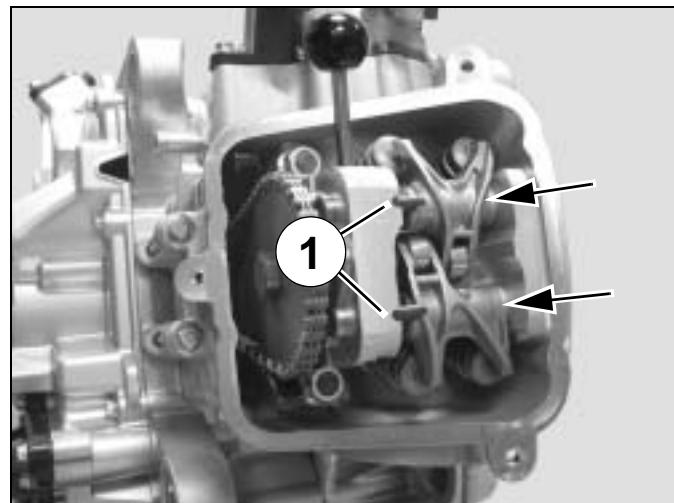
- From 0.10 mm to 0.15 mm at the inlet.
- From 0.20 mm to 0.25 mm at the exhaust.

If the clearances are outside the limits:

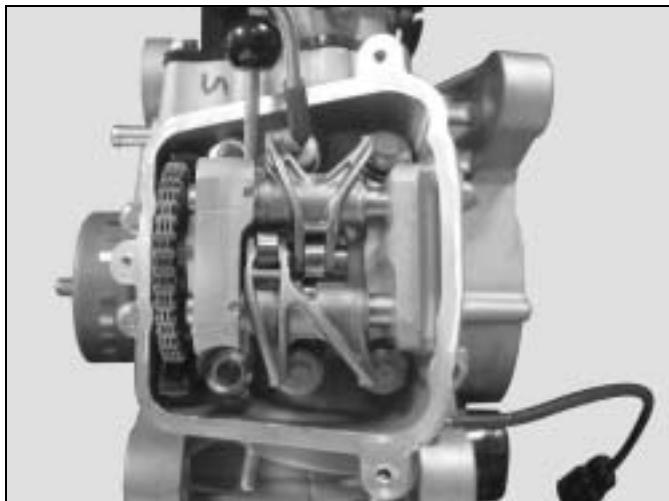
- Record the clearance measured for each valve on the document provided for this purpose.



- Remove the 2 rocker shaft clips (1).
- Move the 2 rockers.



- Using a magnet, remove the 1st disk for which the clearance is outside the limits.



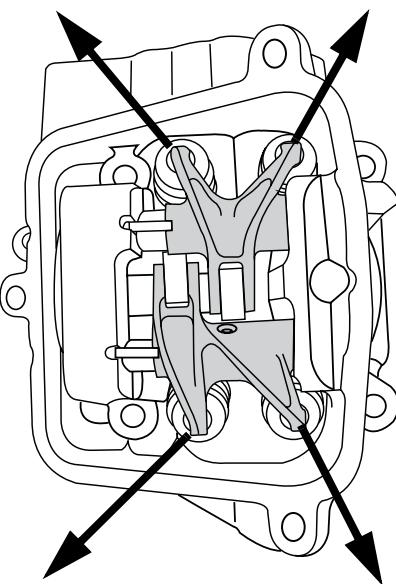
- Measure the thickness of the disk using the micrometer and record the value on the document in the place where it was located.
- Repeat the operation with all the other disks having clearance outside the limits.
- Perform the calculations.



■ Calculation of the thickness of the new disks

Clearances:

- From 0.10 mm to 0.15 mm at the inlet. Standard clearance 0.12 mm
- From 0.20 mm to 0.25 mm at the exhaust. Standard clearance 0.22 mm

Perform the calculations on the inlet side	
$(..... - 0.12) + =$ (measured clearance - standard clearance) + thickness of old disk = thickness of new disk	$(..... - 0.12) + =$ (measured clearance - standard clearance) + thickness of old disk = thickness of new disk
	
$(..... - 0.22) + =$ (measured clearance - standard clearance) + thickness of old disk = thickness of new disk	$(..... - 0.22) + =$ (measured clearance - standard clearance) + thickness of old disk = thickness of new disk
Perform the calculations on the exhaust side	

Example:

- The clearance measured at the inlet valve is 0.18 mm.
 - With the disk lifted, measured using the micrometer 1.70 mm.
- $(0.18 - 0.12) + 1.70 = 1.76$
- Select the disk closest to the calculated value: 1.76 => 1.75.
 - Fit the disk.
 - Check the clearance again to ensure the correct disks have been selected.

Thickness of the disks																
Reference	784159	784160	784161	784162	784163	784164	784165	784166	784167	784168	784169	784170	784171	784172	784173	784174
Thickness	1.60	1.65	1.70	1.75	1.80	1.85	1.90	1.95	2.00	2.05	2.10	2.15	2.20	2.25	2.30	2.35

- Use the table to select the disk for fitting.



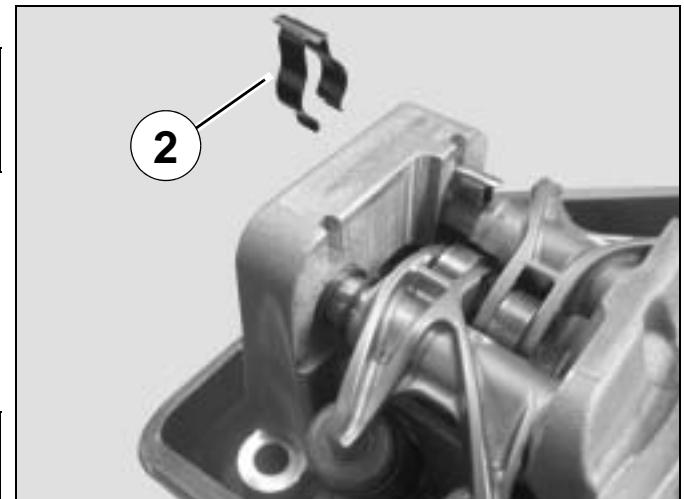
The last figure must be rounded up or down to the nearest value, in compliance with the manufacturer's tolerances.

16 thicknesses of disk are available from the after-sales service, between 1.60 mm and 2.35 mm at 0.05 mm intervals.

- Fit the new disk on the corresponding valve lightly greased with lithium soap.
- Move the 2 rockers.



Fit the 2 rocker pin clips (2) between the thrust washers.



- Check the clearance again to ensure the correct disks have been selected.

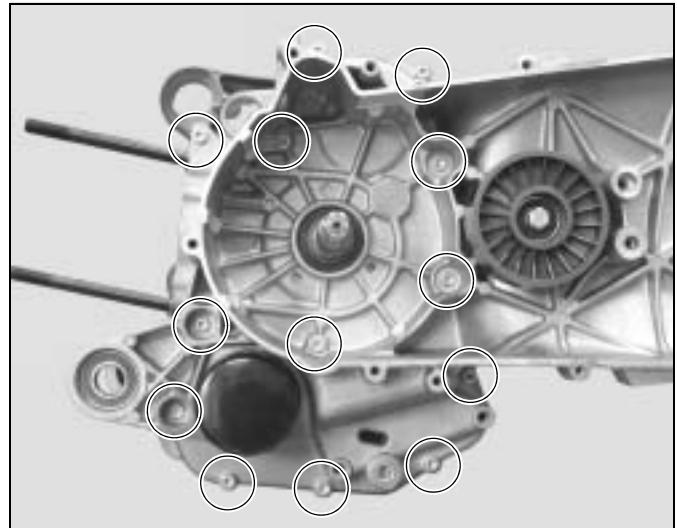


REMOVAL OF THE CRANKSHAFT

- Remove the primary drive.
- Remove the cylinder and the piston.
- Remove the flywheel magneto.
- Remove the overrunning clutch.
- Remove the oil pump drive chain and notice its direction of rotation.

- On the left side, remove the 13 fastening screws from the RH half casing.

Tightening torque: 10 Nm.



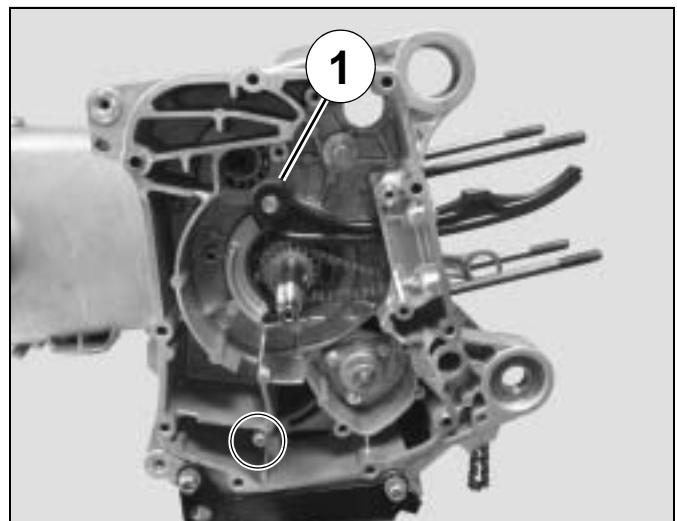
- Remove the chain tensioner slipper (1 screw). (1)

Tightening torque: 10 Nm.

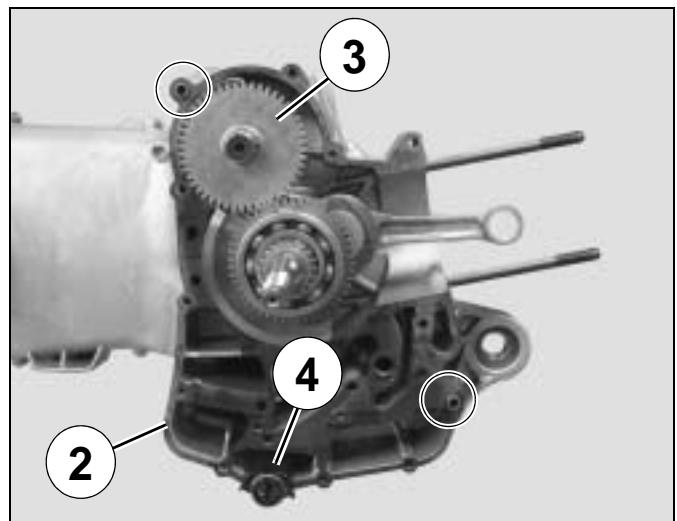
- Remove the timing chain and notice its direction of rotation.
- Remove the fastening screw from the RH half-casing.

Tightening torque: 10 Nm.

- Remove the RH casing.



- Remove the 2 centring pillars and the paper gasket (2).
- Remove the balancing shaft. (3)
- Remove the strainer. (4)



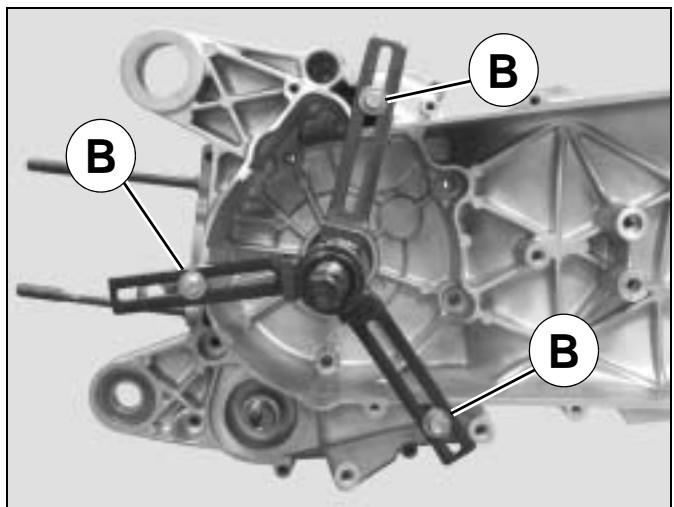
- Fit the MAROLO casing separator tool ref. 601010 on the left casing.
- Fix the assembly to the casing using 3 bolts (B).
- Screw P/N 726979
- Washer P/N 853096

Tightening torque: 10 Nm.

- Tighten the tool centre screw holding the crank with one hand on the other side until it is fully extracted.

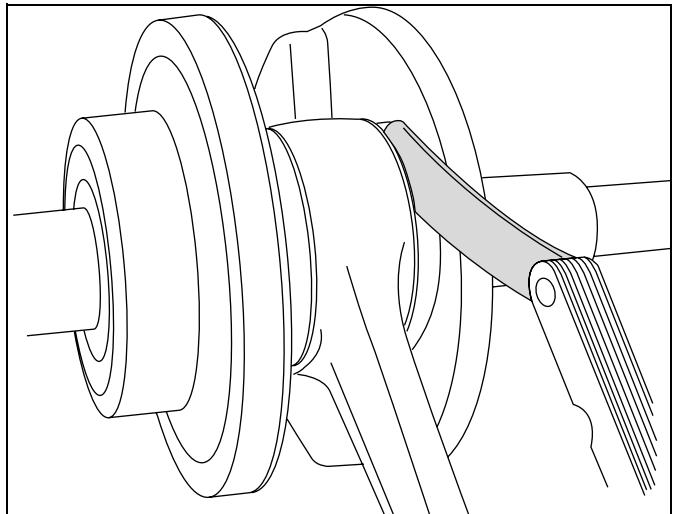


When the casings are opened, if the bearings stay on the crank, use tool P/N 755585 to remove them.

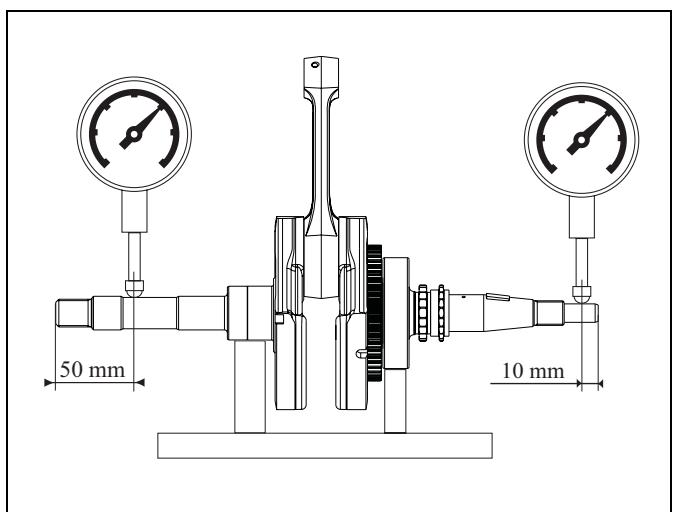


■ Checking the crankshaft and conrod assembly

- Using a set of shims, check the big end side play.
- The maximum side play on the conrod end must not exceed: 0.33 to 0.62 mm.

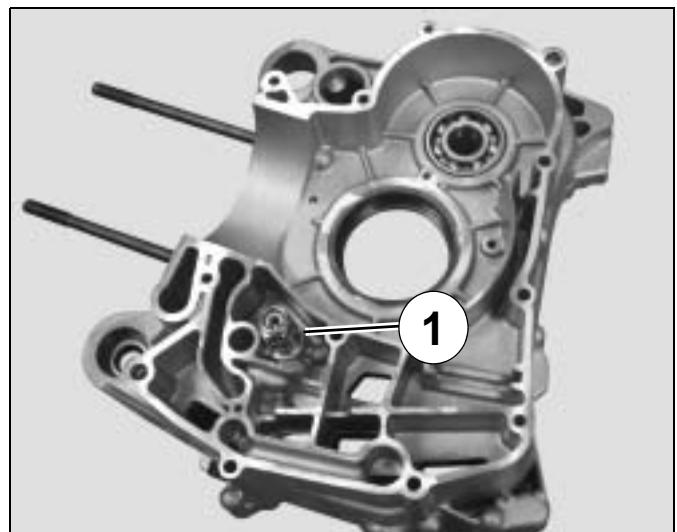


- The out-of-round values measured on the ends of the crank should not exceed 0.03 mm and must be measured:
 - 50 mm from the transmission side end.
 - 10 mm from the flywheel magneto end.



- Remove the discharge valve (1).

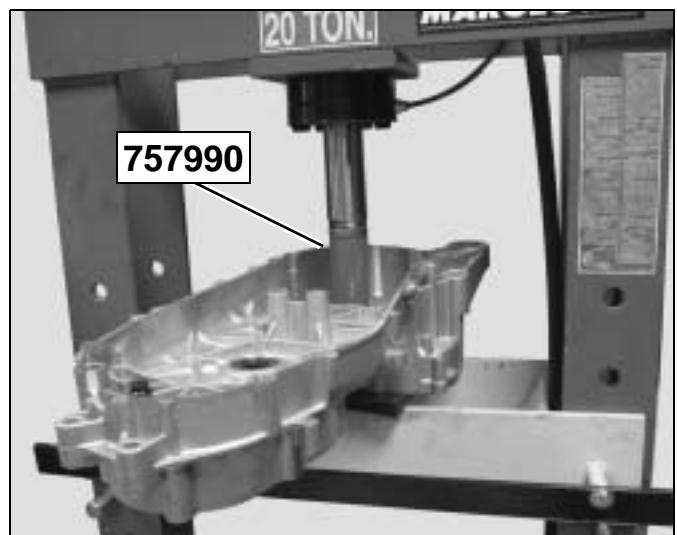
Tightening torque: 30 Nm.



■ Replacing the crankshaft bearing

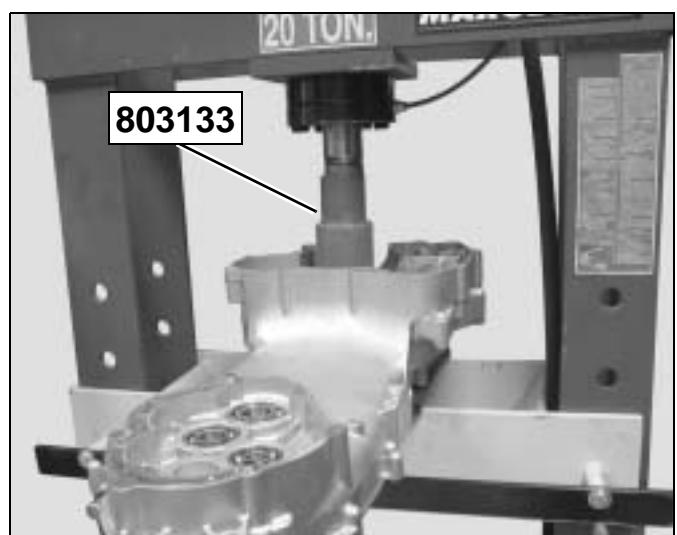
	<p>The ball bearing is fitted into an iron insert of the LH casing. Do not heat the casing.</p>
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- Remove the lip seal.
- Using a press and push tool P/N 757990, remove the ball bearing.



	<p>Fit the bearings so that the inscription is visible.</p>
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- Using a press and a drift driver 803133, place a new bearing in the casing, by pushing against the outer cage of the bearing.

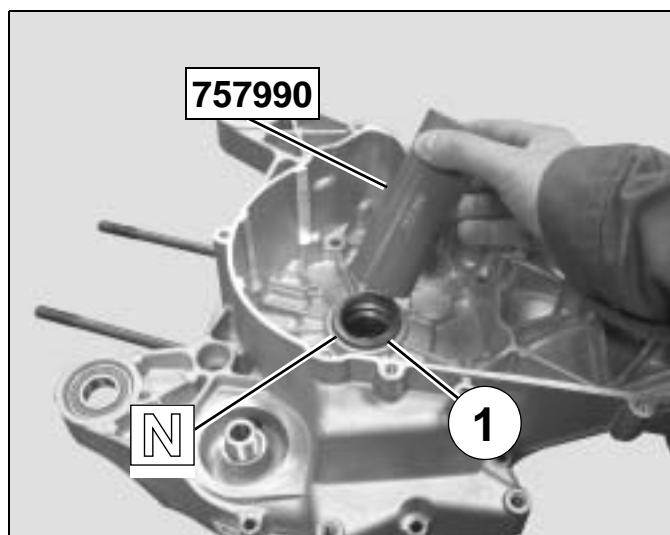


REMOVAL OF THE CRANKSHAFT

- Using fitting tool P/N 757990, fit a new lightly greased gasket (1).



Fit the seal, with the lip towards the bearing.

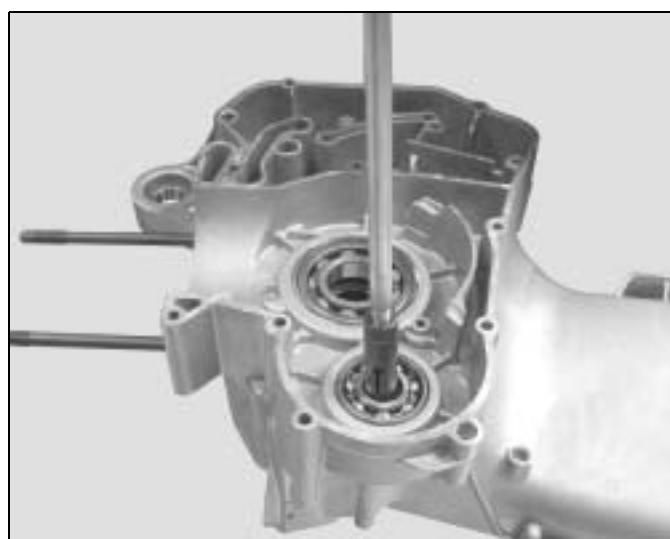


■ Replacing the balance shaft bearings



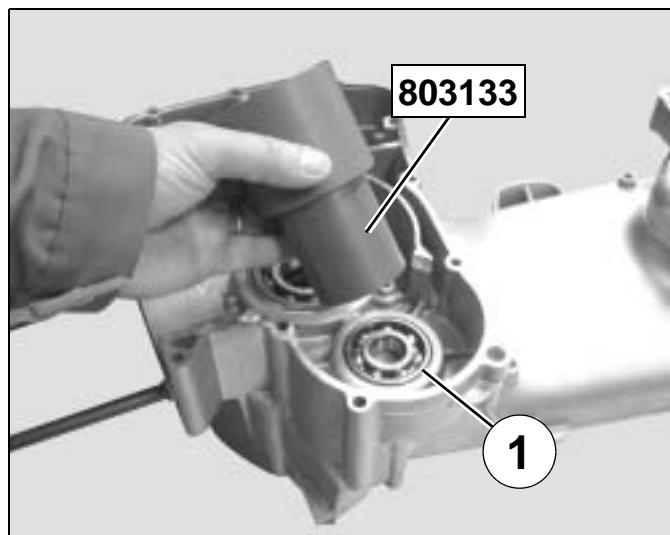
Wear gloves in order not to get burnt.

- Using a heat gun, heat the crankcase to a temperature between 80 and 90°C. Use an inertia type extractor tool to remove the bearings.



Fit the bearings so that the inscription is visible.

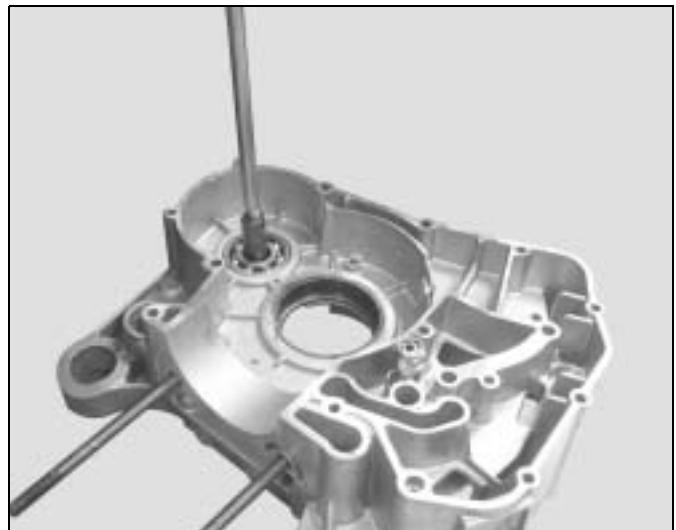
- While the casing is expanded fit the new bearings (1) fully home in their housings, using bearing drift P/N 803133.





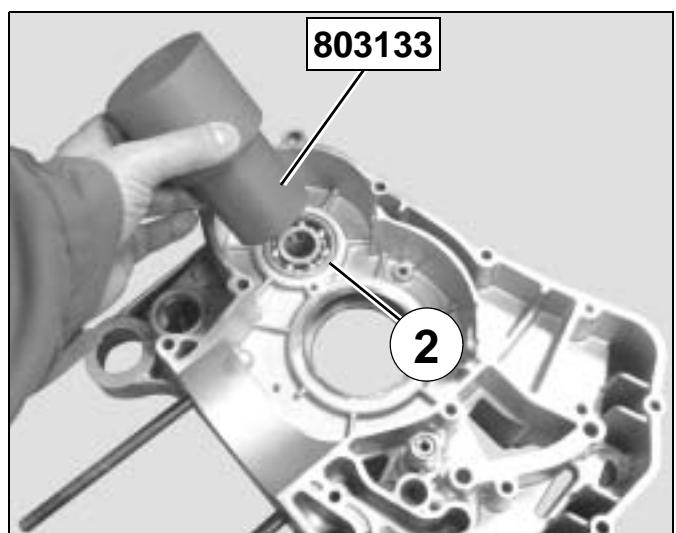
Wear gloves in order not to get burnt.

- Using a heat gun, heat the crankcase to a temperature between 80 and 90°C. Use an inertia type extractor tool to remove the bearings.



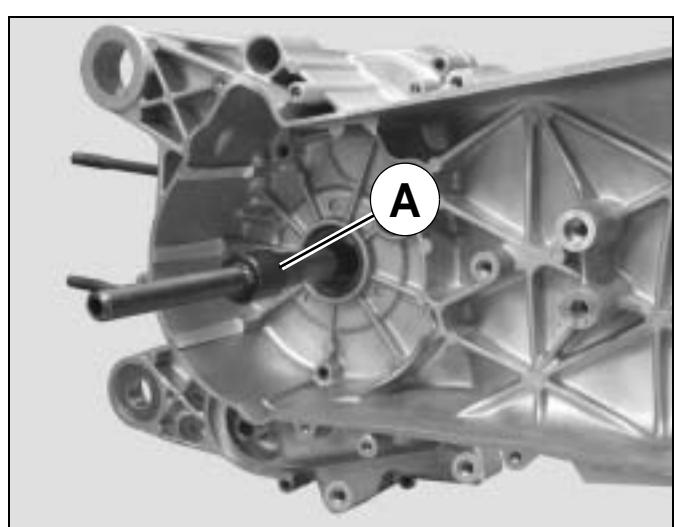
Fit the bearings so that the inscription is visible.

- While the casing is expanded fit the new bearings (2) fully home in their housings, using bearing drift P/N 803133.



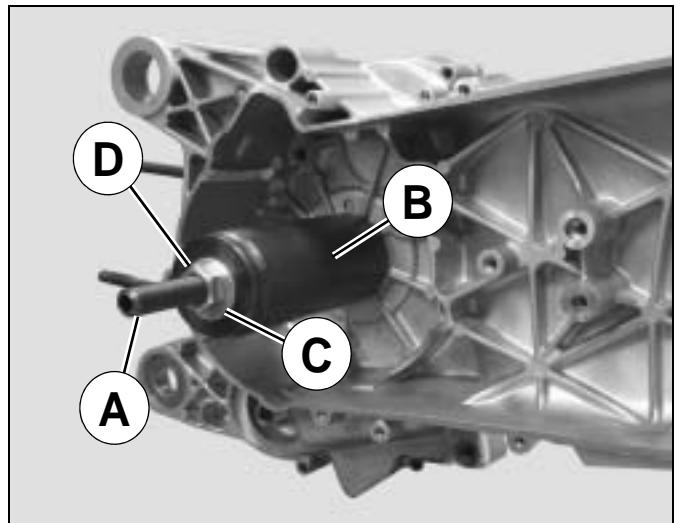
■ Assembly of the engine casings

- Insert the crank assembly into the LH casing bearing.
- Screw the tool pin (A) ref. 803134 onto the end of the crankshaft.

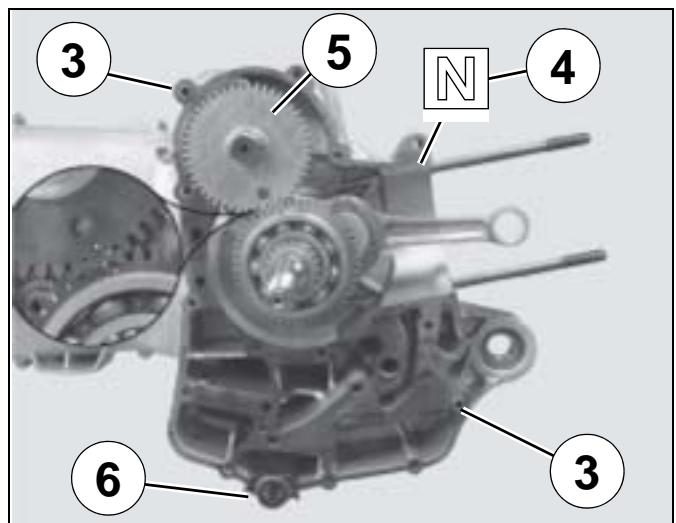


REMOVAL OF THE CRANKSHAFT

- Fit the cylinder (B) of the tool ref. 803134 onto the pin (A).
- Fit washer (C).
- Tighten the nut (D) on the pin (A) of the tool ref. 803134 to bring the crankshaft into contact with the bearing, ensuring that the crank is pointing towards the cylinder side.
- Hold the crank assembly by the RH side using the rotor fitted on the key.



- Fit the 2 guiding bushes (3) to the LH casing and a new paper gasket (4), do not use oil or grease.
- Install the balance shaft (5) by lining up the mark of the balance shaft pinion with the mark of the conrod and crankshaft assembly.
- Fit the strainer (6).



	Check that the discharge valve is present in the RH casing.
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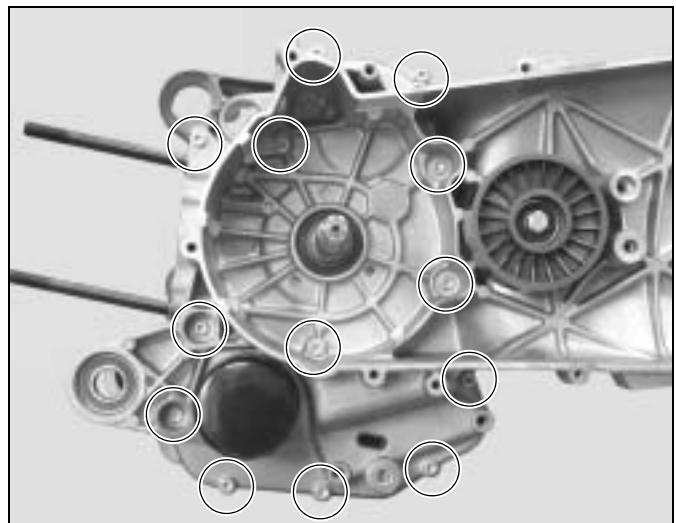
- Place the RH casing over the LH casing assembly. (1 screw)

Tightening torque: 10 Nm.

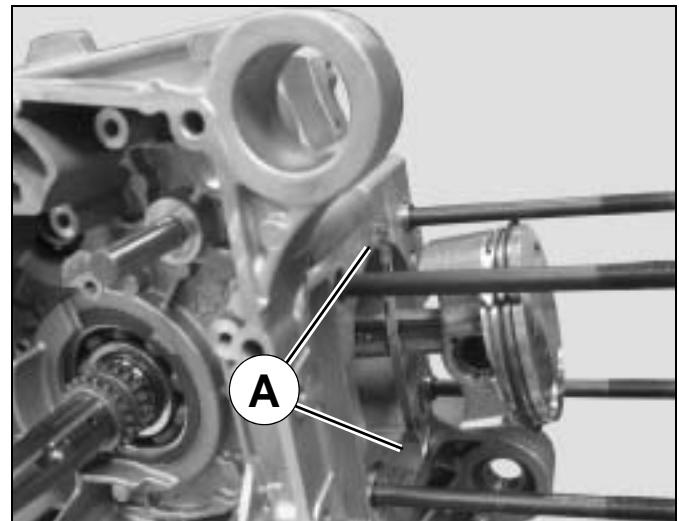
	No tools are necessary for assembling the casings, which shall be carried out without effort.
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- Fit and tighten the 13 clamping bolts.

Tightening torque: 10 Nm.



- Trim the casing gasket in (A).
- Lightly grease the crank assembly and bearings with 4 stroke oil.



P/N MA0048GB

*In our permanent concern to make improvements PEUGEOT Scooters reserves the right to suppress, modify,
or add any reference mentioned.*

DC/APV 8/7/13 (non contractual pictures)