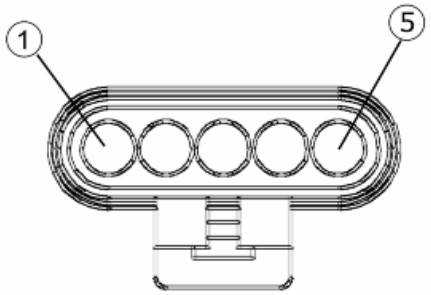
FUEL PUMP

Function

Pump fuel from the tank to introduce it in the injection circuit.



Pin-out:

1. Not connected
2. Negative from control unit (injector activation)
3. Not connected
4. Not connected
5. Positive from control unit

ELECTRICAL ERRORS

Low fuel pump voltage P0231 - open circuit or short-circuit to negative.

Error cause

Open circuit or short-circuit to negative: interruption of the circuit or null voltage at PIN 2 of the pump connector.

Troubleshooting

Open circuit:

- Perform the check of the fuel pump and control unit connectors.
- Check the continuity of the wiring harness between the control unit connector and pump connector: Control unit PIN 1 - pump PIN 2 and control unit PIN 9 - pump PIN 5. If there is no continuity, restore the wiring harness.

Short-circuit to negative:

- Disconnect the control unit connector and the pump connector.
- Check the pump connector PIN 2 ground insulation (corresponding to control unit connector PIN 1). If there is no insulation, restore the wiring harness.

High fuel pump voltage P0232 - short-circuit to positive.

Error cause

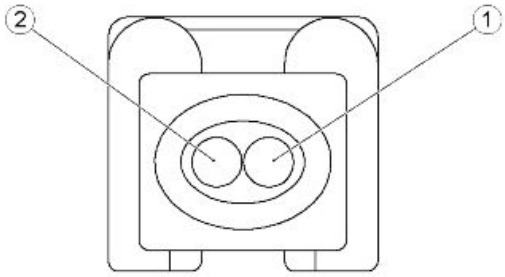
Short-circuit to positive: excessive voltage at PIN 1 of the control unit connector.

Troubleshooting

Short-circuit to positive:

- Disconnect the control unit connector and the pump connector.
- Verify that there is no short to battery positive on pump connector PIN 2 (corresponding to control unit connector PIN 1); if there is a short circuit, restore the wiring harness.

ENGINE TEMPERATURE SENSOR



Function

Serves the purpose of communicating the engine temperature to the control unit in order to optimise performance.

Operation / Operating principle

NTC type sensor (resistance sensor, inversely variable with temperature).

Pin-out:

1. Injection ECU
2. Control unit ground

ELECTRICAL ERRORS

Low engine temperature sensor voltage P0117 - short-circuit to negative.

Error cause

Short-circuit to negative: null voltage at PIN 16 of the control unit connector.

Troubleshooting

Short-circuit to negative:

- Disconnect the sensor connector.
- Check the sensor connector PIN 1 ground insulation.
- If there is no ground insulation restore the wiring harness.

High engine temperature sensor P0118 - open circuit or short-circuit to positive.

Error cause

Open circuit or short circuit to positive: interruption of the circuit or excessive voltage at PIN 16 of the control unit connector.

Troubleshooting

Open circuit:

- Disconnect control unit and sensor connectors and carry out the check procedure.
- Check the continuity of the wiring harness between the sensor connector and control unit connector: Sensor PIN 1- control unit PIN 16 and sensor PIN 2- control unit PIN 7. Repair the wiring harness if necessary.

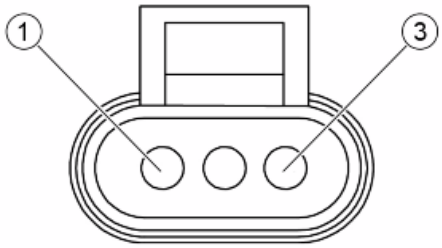
Short-circuit to positive:

- With the sensor connector and the control unit disconnected, verify that the fault is a short with the battery positive of sensor connector PIN 1(or control unit PIN 16) and restore wiring.

THROTTLE BODY POSITION SENSOR (TPS)

Function

In charge of sending the size of throttle opening to the control unit.



Pin-out:

1. Control unit ground
2. Control unit power
3. Throttle position signal

ELECTRICAL ERRORS

Low TPS sensor voltage input P0122 - open circuit or short-circuit to negative.

Error cause

Open circuit or short-circuit to negative: interruption of the circuit or null voltage at PIN 7, 14 or 18 of the control unit connector.

Troubleshooting

Open circuit:

- Disconnect control unit and sensor connectors and carry out the check procedure.
- Check the continuity of the wiring harness between the sensor connector and control unit connector: Sensor PIN 1 - control unit PIN 7, sensor PIN 2 - control unit PIN 18 and sensor PIN 3 - control unit PIN 14. Repair the wiring harness if necessary.

Short-circuit to negative:

- Disconnect the sensor connector.
- Check the ground insulation of the three PIN of the sensor connector.
- If there is no ground insulation restore the wiring harness.

High sensor voltage input P0123 - short-circuit to positive.

Error cause

Short-circuit to positive: excessive voltage to PIN 7, 14 or 18 of the control unit connector.

Troubleshooting

Short-circuit to positive:

- With the sensor connector and the control unit connector disconnected, verify that the fault is shorted with the battery positive of one of the three PIN of the sensor connector and restore the wiring harness.

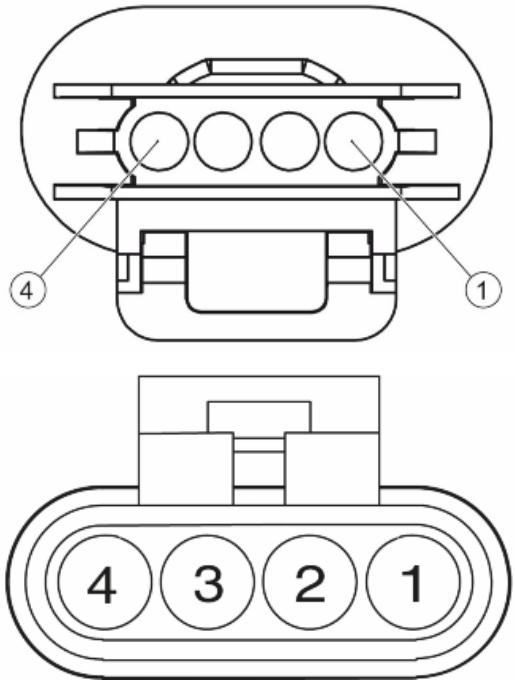
LAMBDA PROBE

Function

In charge of telling the control unit whether the mixture is lean or rich.

Operation / Operating principle

Based on the difference of oxygen in the exhaust fumes and the environment, this generates voltage which is read and interpreted by the injection control unit. It does not require an external supply source but, in order to work properly, it should reach a high operating temperature: that is why there is a heating circuit inside.



Pin-out:

1. Sensor signal +
2. Sensor signal -
3. Heater ground
4. Heater power

ELECTRICAL ERRORS

Low lambda probe voltage P0131 - short-circuit to negative.

Error cause

Short-circuit to negative: null voltage at PIN 13 of the control unit connector.

Troubleshooting

Short-circuit to negative:

- Disconnect the connector of the probe and the control unit connector and carry out the check procedure.
- Check the sensor connector PIN 1 ground insulation. If there is no insulation, restore the wiring harness.

High Lambda probe voltage P0132 - short-circuit to positive.

Error cause

Short-circuit to positive: excessive voltage to PIN 13 of the control unit connector.

Troubleshooting

Short-circuit to positive:

- Disconnect the control unit connector and the probe connector and perform the check procedure.
- Verify that there is no short to battery positive on sensor connector PIN 1 (corresponding to control unit connector PIN 13); if there is a short circuit, restore the wiring harness.

Low lambda probe voltage P0031 - open circuit or short-circuit to negative.

Error cause

Open circuit or short-circuit to negative: interruption of the circuit or null voltage at PIN 3 of the control unit connector.

Troubleshooting

Open circuit:

- Disconnect the control unit connector and the heater connector and perform the check procedure.
- Check the continuity of the wiring harness between the sensor connector and control unit connector: Control unit PIN 3 - sensor PIN 3 and control unit PIN 9 - sensor PIN 4. If necessary, restore the wiring harness.
- If the wiring harness is intact and the error persists, proceed with the following checks.

Short-circuit to negative:

- Disconnect the control unit connector and the heater connector and perform the check procedure.
- Check the sensor connector PIN 3 ground insulation (corresponding to control unit connector PIN 3). If there is no insulation, restore the wiring harness.

High heater lambda probe voltage P0032 - short-circuit to positive.

Error cause

Short-circuit to positive: excessive voltage to PIN 3 of the control unit connector.

Troubleshooting

Short-circuit to positive:

- Disconnect the control unit connector and the heater connector and perform the check procedure.
- Verify that there is no short to battery positive on sensor connector PIN 3 (corresponding to control unit connector PIN 3); if there is a short circuit, restore the wiring harness.

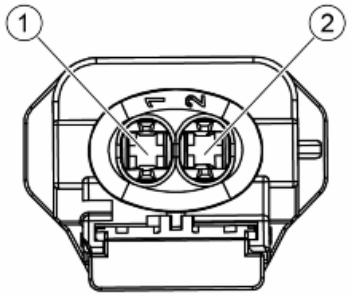
IDLE VALVE

Function

Check the minimum engine speed depending on the temperature and different load conditions.

Pin-out:

1. Negative from control unit (valve activation)
2. Positive from control unit



ELECTRICAL ERRORS

Low idling adjustment device voltage P0508 - open circuit or short-circuit to negative.

Error cause

Open circuit or short-circuit to negative: interruption of the circuit or null voltage at PIN 1 of the valve connector.

Troubleshooting

Open circuit:

- Perform the check of the valve and control unit connectors.

- Check the continuity of the wiring harness between the control unit connector and valve connector: Control unit PIN 17 - valve PIN 1 and control unit PIN 9 - valve PIN 1. If there is no continuity, restore the wiring harness.

Short-circuit to negative:

- Disconnect the control unit connector and the valve connector.
- Check the valve connector PIN 1 ground insulation (corresponding to control unit connector PIN 17). If there is no insulation, restore the wiring harness.
- With the valve connector disconnected and the control unit connector connected, turn ignition switch to ON and activate the component using the diagnostic tool.
- Check the voltage (for 10 seconds) at the ends of the valve connector.
- If there is no voltage, check the continuity of the wiring harness between control unit PIN 9 and valve PIN 2 and restore it if necessary.
- If the above tests provided a positive result, the valve should be replaced.

High idling adjustment device voltage P0509 - short-circuit to positive.

Error cause

Short-circuit to positive: excessive voltage to PIN 17 of the control unit connector.

Troubleshooting

Short-circuit to positive:

- Disconnect the control unit connector and the valve connector.
- Verify that there is no short to battery positive on valve connector PIN 1 (corresponding to control unit connector PIN 17); if there is a short circuit, restore the wiring harness.
- With the valve connector disconnected and the control unit connector connected, turn ignition switch to ON and activate the component using the diagnostic tool.
- Check the voltage (for 10 seconds) at the ends of the valve connector.
- If there is no voltage, check the continuity of the wiring harness between control unit PIN 9 and valve PIN 2 and restore it if necessary.
- If the above tests provided a positive result, the valve should be replaced.

Check that the opening time of the idle check valve is below the maximum value, a higher value can be caused by soiling of the intake system.

Characteristic

Maximum idle check valve opening time

20,000us (20ms)

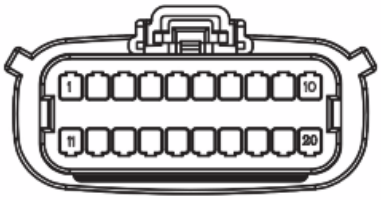
INJECTION WARNING LIGHT

Function

Indicates a fault of the injection system.

Instrument panel connector pin-out:

16. Injection warning light



ELECTRICAL ERRORS

Low MIL warning light voltage P1651 - open circuit or short-circuit to negative.

Error cause

Open circuit or short-circuit to negative: interruption of the circuit or null voltage at PIN 2 of the control unit connector.

Troubleshooting

Open circuit:

- Disconnect the instrument panel connectors and of the control unit and perform the check procedure.
- Check the continuity of the wiring harness between the control unit connector and instrument panel connector: Control unit PIN 2 - Instrument panel PIN 16. Repair the wiring harness if necessary.

Short-circuit to negative:

- Disconnect the instrument panel connectors and of the control unit and perform the check procedure.
- Check the instrument panel PIN 16 from ground insulation.
- If there is no ground insulation restore the wiring harness.

High MIL warning light voltage P1652 - short-circuit to positive.

Error cause

Short-circuit to positive: excessive voltage at PIN 2 of the control unit connector.

Troubleshooting

Short-circuit to positive:

- Disconnect the instrument panel connectors and of the control unit and perform the check procedure.
- Verify that the fault is shorted with the battery positive of instrument panel connector PIN 16 (or control unit connector PIN 2) and restore the wiring harness.

If the above tests provided a positive result, proceed with the following check:

- Verify, with the key turned ON, the presence of voltage on the instrument panel connector PIN 16, otherwise check the related wiring harnesses, the ignition switch contacts and the fuses 1 and 2.

ELECTRICAL ERRORS

Smeared throttle body P1003

Error cause

The control unit shows the error P1003 (ATT or MEM) once it receives an abnormal increase of the engine idling speed.

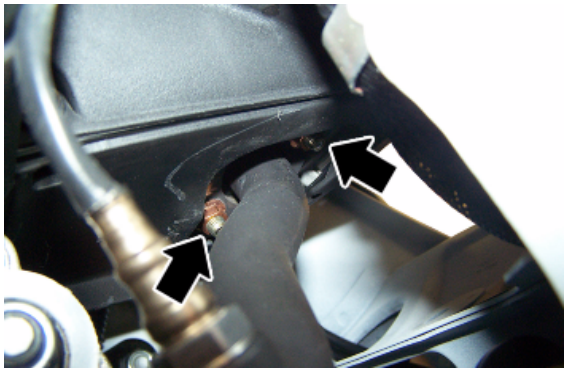
Troubleshooting

- Remove the throttle body and thoroughly clean it as described in the section «Injection > Throttle body removal».
- After refitting, delete the error and reset the adaptive parameters.
- Keep the engine running at idle speed for 15 minutes.

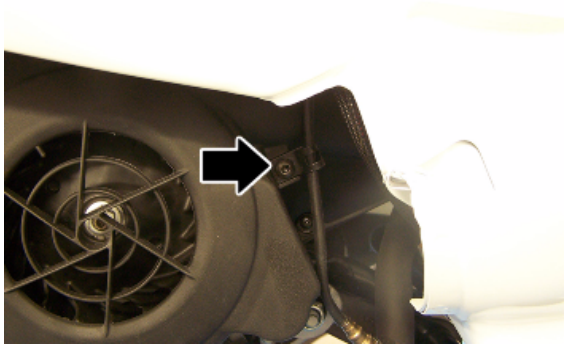
INDEX OF TOPICS

Exhaust assy. Removal

- Remove the 2 fixing nuts from the manifold to the head



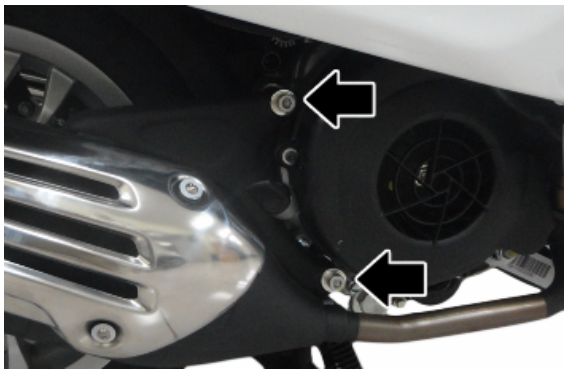
- Remove the Lambda probe from its support and disconnect it.
- Release the lambda probe cable from the bracket on the fan cover.



CAUTION

FREE THE CABLES OF THE LAMBDA PROBE BEFORE REMOVING THE SILENCER, PUTTING THIS CABLE HARNESS UNDER AN EXCESSIVE VOLTAGE MAY DAMAGE IT.

- Loosen the 2 exhaust fixing screws to the crank-case, then remove the whole silencer.



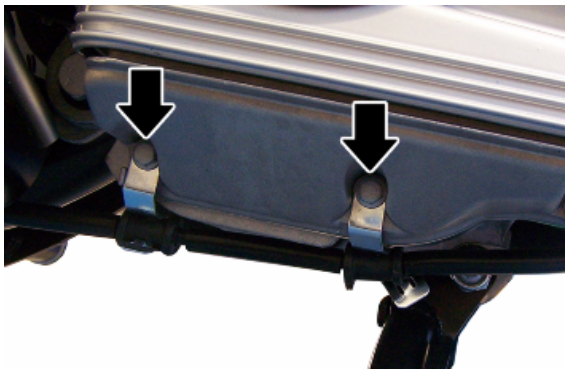
- Remove the lambda probe from the manifold.

Removal of the engine from the vehicle

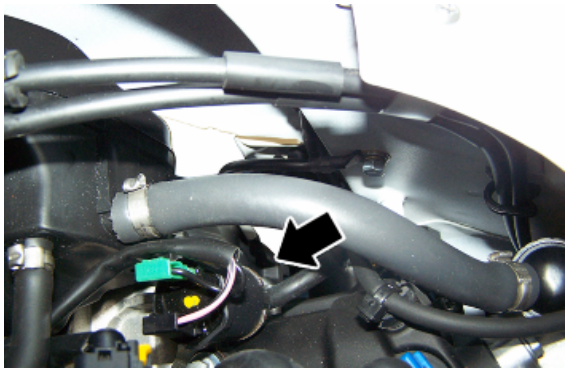
CAUTION

SUPPORT THE VEHICLE ADEQUATELY.

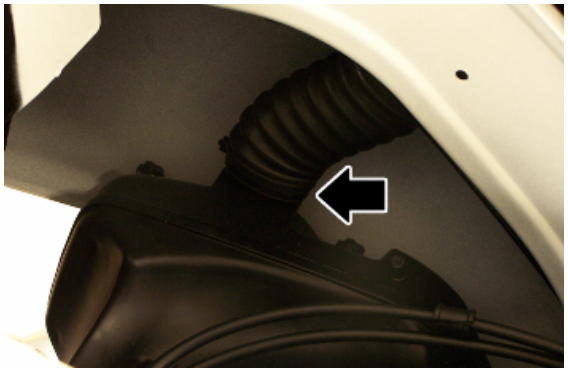
- Disconnect the battery.
- Remove the footrest.
- Remove the helmet compartment.
- Remove the complete silencer.
- Free the sheath on the 2 rear brake transmission securing brackets indicated in the photo.
- Disconnect the rear brake transmission by unscrewing the adjuster screw.



- Disconnect the belt cooling pipe indicated in the picture.
- Disconnect the ground lead from the engine.

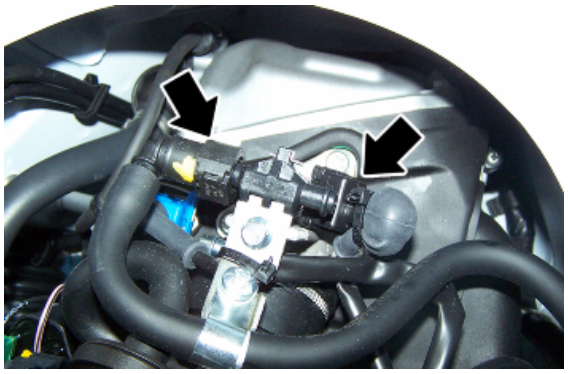


- Disconnect the air intake pipe from the filter box.

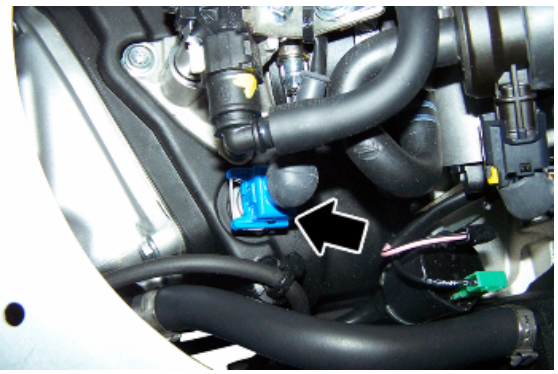


- Remove the ground lead and the positive cable from the starter motor shown in the figure.

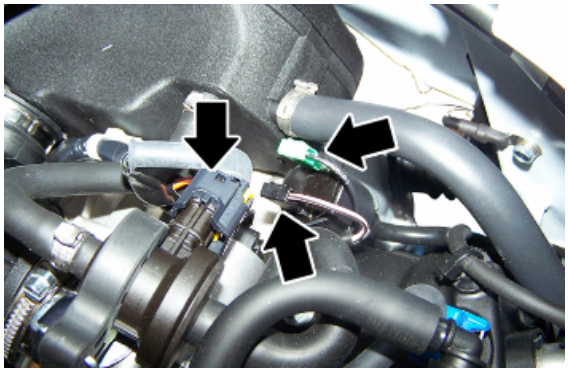
- Disconnect the fuel hoses and the main wiring harness from the injector.



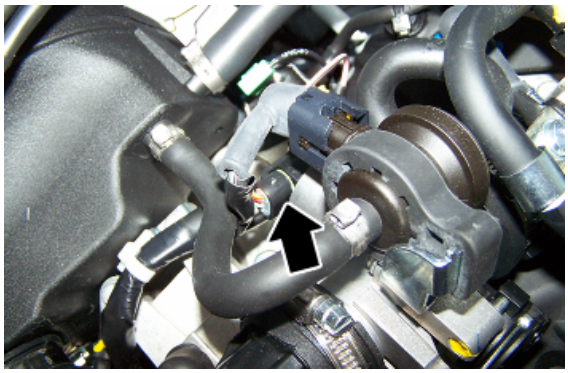
- Disconnect the main wiring harness from the engine temperature sensor.



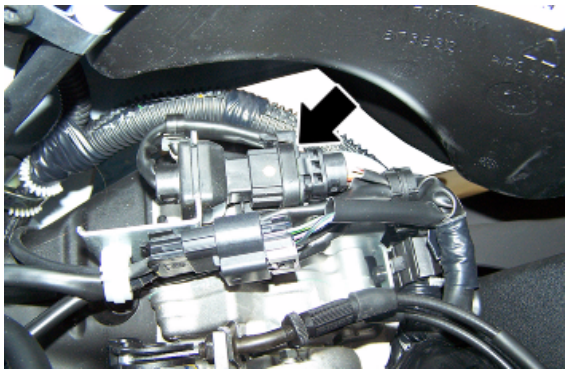
- Remove the connector from the idle speed adjustment device
- Remove the connectors of the H.V.coil



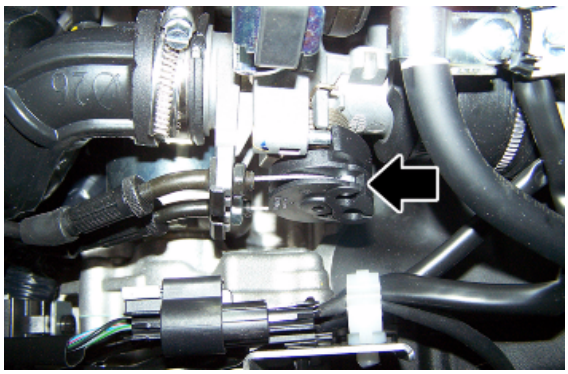
- Remove the throttle position sensor connector.



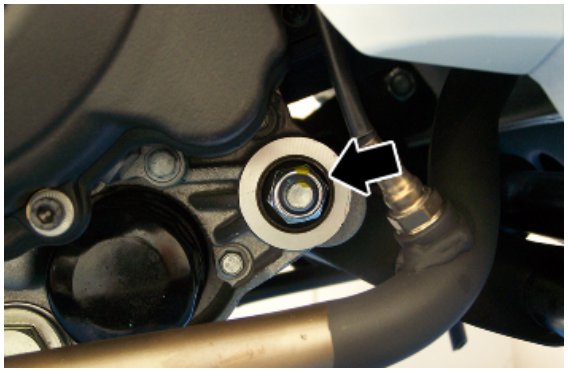
- Disconnect the flywheel connector



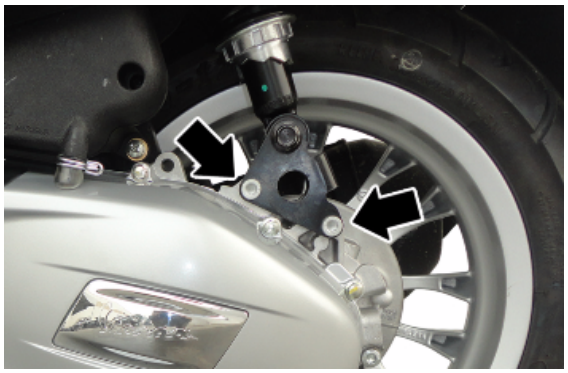
- Remove the throttle grip cables.



- Working on the right side, unscrew and remove the nut which holds the coupling bolt swinging arm - engine.
- Working on the left side, remove the bolt, be careful to collect the spacer.



- Support the vehicle adequately (with a jack) and remove the shock absorber lower clamping.



INDEX OF TOPICS

ENGINE	ENG

This section describes the operations to be carried out on the engine and the tools to be used.

Automatic transmission

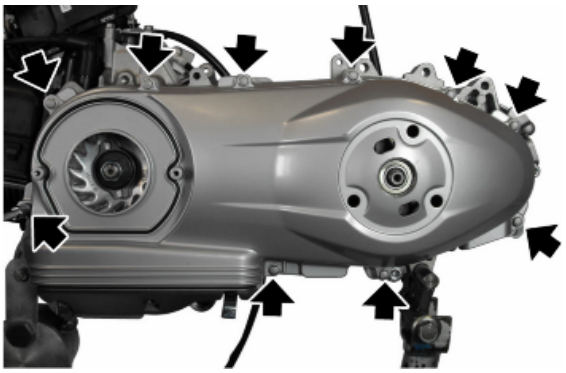
Transmission cover

- Remove the air duct.
- Remove the plastic cover that has the vehicle logo on it.
- Insert the specific tools, rotate the engine until the driven pulley stops and remove the nut, recovering the washer.

Specific tooling

020994Y Driven pulley stop

- Unscrew the ten screws fixing the engine and remove the transmission cover.



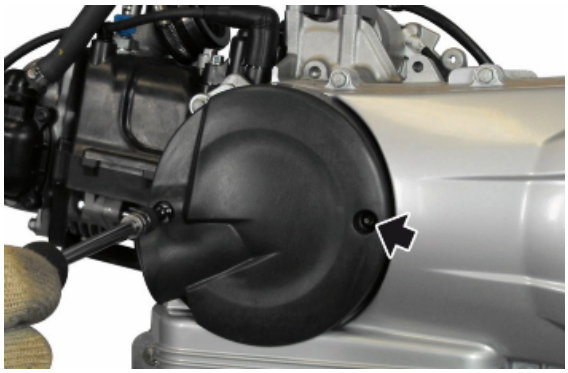
See also

Air duct

Air duct

- Remove the plastic cover.

- Unscrew the screws indicated and remove the duct.



Removing the driven pulley shaft bearing

- Remove the Seeger ring.

CAUTION

PLACE THE COVER ON A SURFACE, REMOVING OR EXCLUDING THE ALIGNMENT DOWELS.

- Support the transmission cover adequately.
- Using appropriate tools, remove the bearing.

Specific tooling

020376Y Adaptor handle

020357Y 32 x 35-mm Adaptor

020412Y 15-mm guide

Refitting the driven pulley shaft bearing

- Use the heat gun to heat the inner part of the lid.
- Using the equipment plant a new bearing, apply grease on the adapter and guide in order to maintain the position of the bearing during operation on the vertical axis.

Specific tooling

020151Y Air heater

020376Y Adaptor handle

020358Y 37 x 40 mm Adaptor

020412Y 15-mm guide

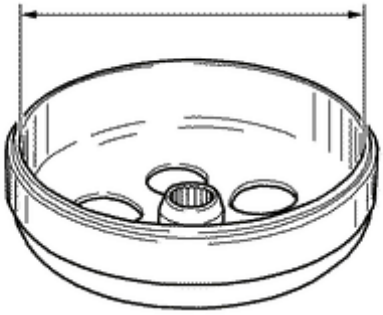
- Insert the Seeger ring.
- Insert the alignment dowels if removed during disassembly.

Removing the driven pulley

- Undo the clutch fixing screw, recovering the lining.
- Remove the clutch drum.
- Remove the driven pulley.

Inspecting the clutch drum

- Make sure that the clutch housing is not worn or damaged.
- Measure the clutch housing inside diameter.



Characteristic

Clutch housing max. value

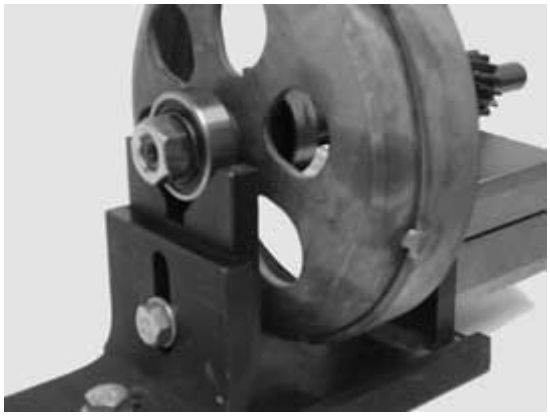
Max. value: Ø 134.5 mm

clutch housing standard value

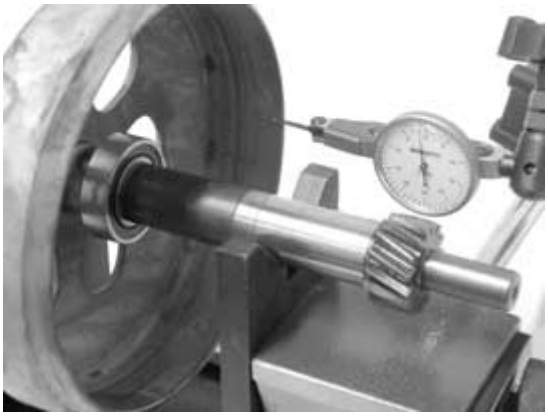
Standard value: Ø 134 - 134.2 mm

Checking the bell working surface eccentricity

- Install the bell on a driven pulley shaft using 2 bearings (inside diameter: 15 and 17 mm).
- Lock with the original spacer and nut.
- Place the bell/shaft unit on the support to check the crankshaft alignment.



- Using a dial gauge and the magnetic base, measure the bell eccentricity.
- Repeat the measurement at 3 positions (Central, internal, external).
- In case of faults, replace the bell.



Specific tooling

020074Y Support base for checking crankshaft alignment

020335Y Magnetic mounting for dial gauge

Characteristic

clutch housing check: Limit eccentricity.

Admissible limit eccentricity: 0.15 mm

Removing the clutch

- Prepare the locking tool for the driven pulley with the pins half-screwed in the tool set to «**C**».
- Introduce the adapter ring 11 with the chamfering facing the inside of the tool.

- Fit the driven pulley unit in the tool so as the bolt get into the masses clutch support holes. Afterwards make the support screw make contact with a minimum force.
- Using the specific wrench, inserted 46 mm from the side, remove the clutch central locking nut.

- Separate the components of the driven pulley.

CAUTION

THE TOOL MUST BE FIRMLY FIXED IN THE VICE AND THE CENTRAL SCREW MUST NOT BE TIGHTENED WITH EXCESSIVE TORQUE AS THIS MAY DAMAGE THE PULLEY OR DEFORM THE SPECIFIC TOOL.

Specific tooling

020444Y Tool for installing/removing clutch on/from driven pulley

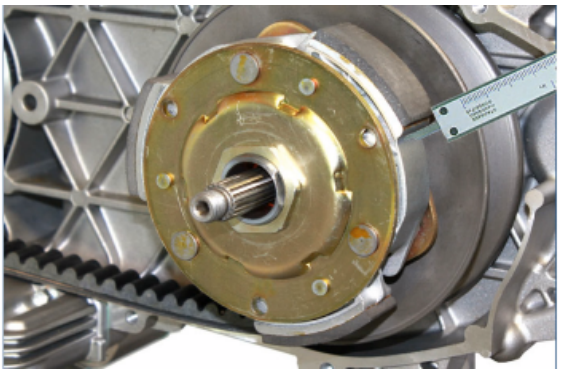
020444Y011 adapter ring

020444Y009 wrench 46 x 55

Inspecting the clutch

- Check the thickness of the clutch mass friction material.

- The masses must exhibit no traces of lubricants; in that case, check the driven pulley unit seals.



N.B.

UPON RUNNING-IN, THE MASSES MUST EXHIBIT A CENTRAL FACING SURFACE AND MUST NOT BE DIFFERENT FROM ONE ANOTHER.
VARIOUS CONDITIONS CAN CAUSE THE CLUTCH TO TEAR.

CAUTION

DO NOT USE TOOLS TO OPEN THE MASSES TO AVOID VARIATION IN THE RETURN SPRING LOAD.

Characteristic

Check minimum thickness

1 mm

Pin retaining collar

- Simultaneously turn and pull the collar manually to remove it.

N.B.

USE TWO SCREWDRIVERS IF YOU HAVE ANY DIFFICULTY.

N.B.

BE CAREFUL NOT TO PUSH THE SCREWDRIVERS IN TOO FAR TO AVOID DAMAGE THAT COULD COMPROMISE THE O-RING SEAL.

Inspecting the driven fixed half-pulley

- Measure the outside diameter of the pulley bushing.

Characteristic

Standard diameter:

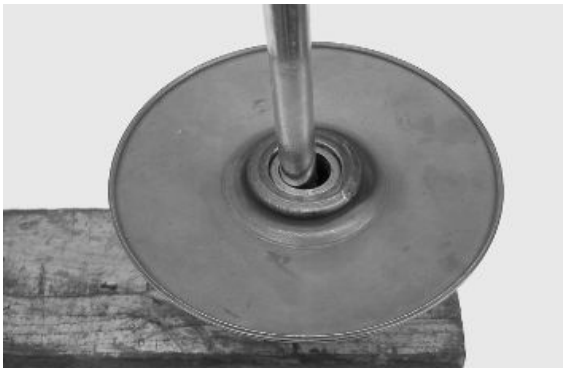
Ø 40.1 ± 0.05 mm

Removing the driven half-pulley bearing

- Remove the retainer ring using two flat blade screwdrivers.
- Using a hammer and pin, knock the ball bearing out as shown in the figure.
- Remove the bearing and the rollers with the specific extractor.

N.B.

REST THE DRIVEN PULLEY ON A WOODEN SURFACE TO AVOID DAMAGING ITS THREADED BUSHING. ALSO DO THIS UPON REMOVAL.



Specific tooling

001467Y008 Clamp to extract 17 mm ø bearings

001467Y009 Bell for OD 42-mm bearings

Refitting the driven half-pulley bearing

- Assemble a new roller bearing using the specific punch, fit the bearing with the label facing outward and insert it completely up to the punch on the half-pulley.

N.B.

REST THE DRIVEN PULLEY ON A WOODEN SURFACE TO AVOID DAMAGING ITS THREADED BUSHING. ALSO DO THIS UPON REMOVAL.

Specific tooling

020424Y Driven pulley roller casing fitting punch

- To assemble the new ball bearing, insert it fully down in its seat with the specific punch and finally fit the seeger ring.

Specific tooling

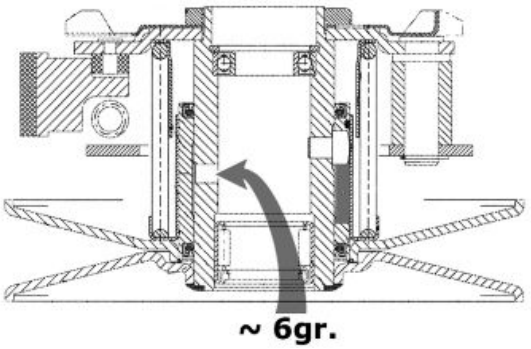
020375Y 28 x 30 mm adaptor

020376Y Adaptor handle

020439Y 17-mm guide

Refitting the driven pulley

- Check that the faying surfaces of the 2 half-pulleys and the belt do not show any signs of wear, scoring or grease.
- Insert the new oil seals and O-rings on the movable half-pulley.
- Fit the half-pulley on the bushing with the appropriate protection sheath.
- Make sure the pins and collar are not worn, refit the pins and the collar.
- Use a greaser with a curved spout to lubricate the driven pulley unit with around 6 g of grease. This operation must be done through one of the holes inside the bushing until grease comes out of the opposite hole. This operation is necessary to avoid the presence of grease beyond the O-rings.



Specific tooling

020263Y Driven pulley assembly sheath

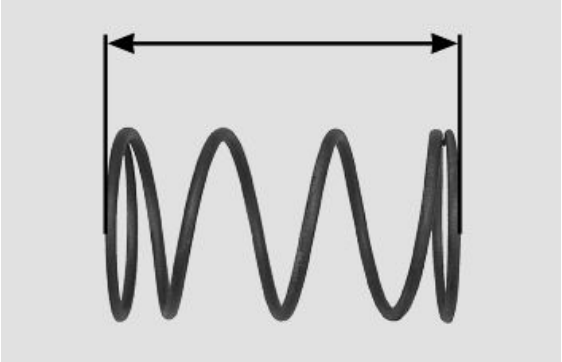
Inspecting the clutch spring

- Measure the length of the spring when it is relaxed.

Characteristic

Standard length:

106 mm



Refitting the driven pulley

- Reassemble the clutch housing and spacer.

Drive-belt

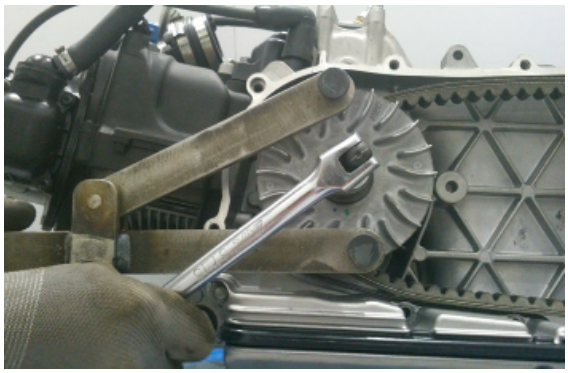
- Make sure the drive belt is not damaged and does not show abnormal wear.
- Replace according to the scheduled maintenance table.

Removing the driving pulley

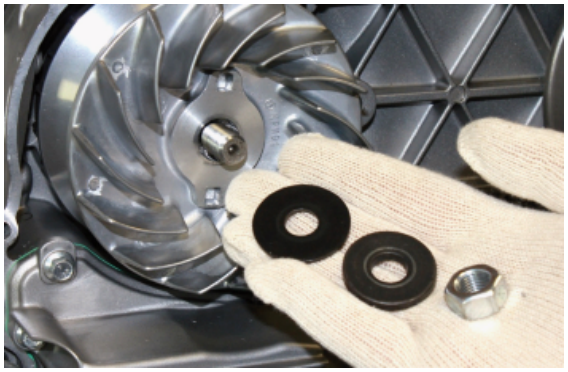
- using specific tools, lock the driving pulley and loosen the nut.

Specific tooling

020442Y Pulley lock wrench



- remove the flat washer and the cup washer.



- remove the stationary half-pulley and the washer.

- disengage the belt.
- remove the complete roller housing.

Inspecting the rollers case

- Check that the internal bushing shown in the figure is not abnormally worn and measure inner diameter A.
- Measure outer diameter B of the pulley sliding bushing shown in the figure.
- Check that the rollers are not damaged or worn.
- Check the sliding shoes for the variator backplate are not worn.
- Check the wear of the roller housings and of the belt facing surfaces on both pulley halves.

- Check that stationary driving pulley does not show signs of abnormal wear on the grooved edge and on the surface in contact with the belt.

CAUTION

DO NOT LUBRICATE OR CLEAN SINTERED BUSHINGS

Characteristic

movable driving half-pulley bushing: Standard Diameter

26.000 - 26.021 mm

Sliding bushing

Ø26 (-0.020 -0.041)mm

Characteristic

CVT rollers ø 19 mm

Wear limit ø 18.4 mm

Refitting the driving pulley

- perform the operations in reverse order of disassembly.

CAUTION

INSERT THE ROLLERS WITH THE LARGEST SUPPORT SURFACE ACCORDING TO THE DIRECTION OF ROTATION.

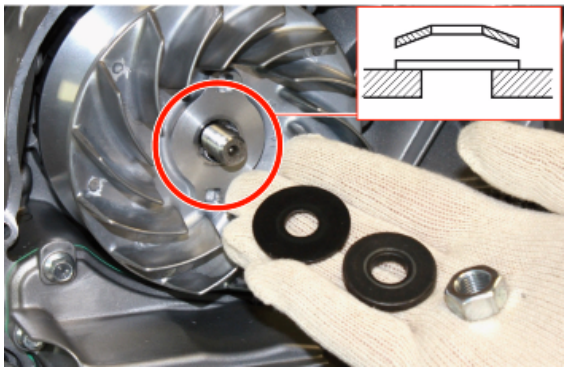
- tighten the torque using the specific tool to lock the pulley.

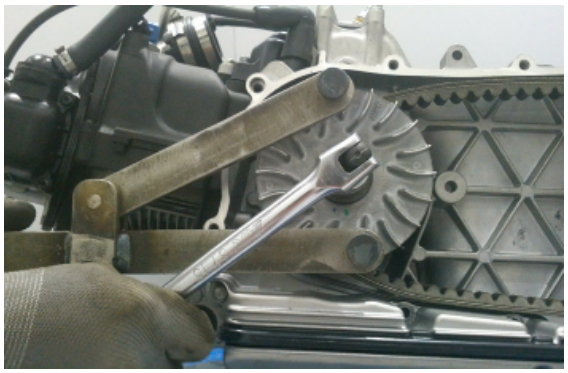
CAUTION

DURING THE INSTALLATION PAY SPECIAL ATTENTION TO THE ASSEMBLY OF THE SPRING WASHER, AS SHOWN IN FIGURE.

Locking torques (N*m)

driving pulley retainer nut 75 - 83





Refitting the transmission cover

Follow the removal steps but in reverse order; be careful to tighten to the prescribed torques.

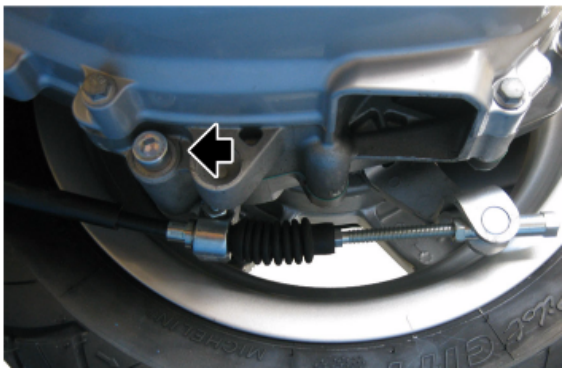
Locking torques (N*m)

Clutch cover retainer screws 10.8 - 12.8

End gear

Removing the hub cover

- Use a container large enough to recover the final reduction oil. Unscrew the indicated screw and recover the aluminium seal.
- Unscrew the oil filler screw in order to facilitate bleeding.



Recommended products

Transmission oil 80W-90 Lubricant for gearboxes and transmissions.

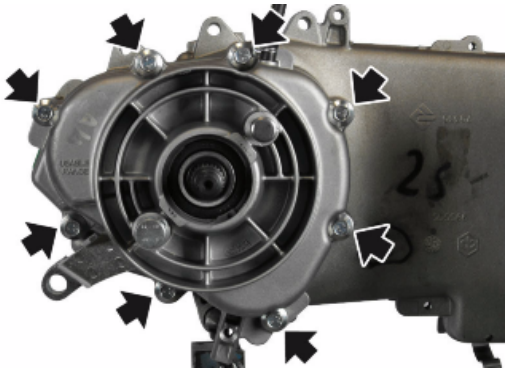
SAE 80W-90 API GL-4

Characteristic

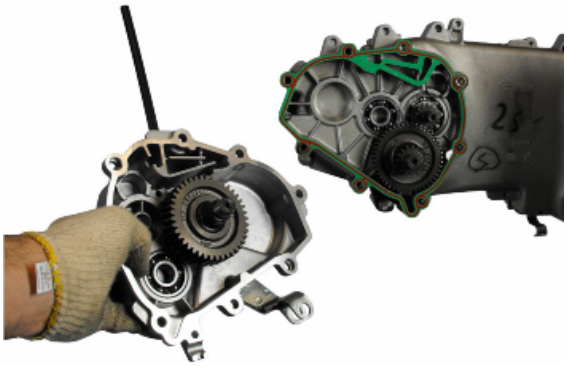
Hub oil quantity

325 cm^3

- Remove the brake shoe.
- Unscrew the eight hub cap fixing screws.



- Remove the final reduction cap complete with the wheel axle, being careful not to drop the intermediate gear.



Removing the wheel axle

- Remove the intermediate gear.
- Remove the wheel axle.

Removing the hub bearings

Removing the clutch shaft bearing

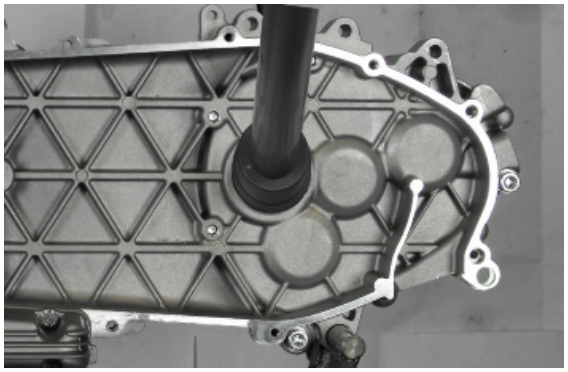
- Remove the Seeger ring.
- Remove the oil seal from the opposite side.
- Remove the bearing working from the external side and using the specific tools.

Specific tooling

020376Y Adaptor handle

020363Y 20-mm guide

020357Y 32 x 35-mm Adaptor



Removing the intermediate gear bearing

- Remove the bearing using the specific tools

Specific tooling

001467Y009 Bell for OD 42-mm bearings

001467Y013 Calliper to extract ø 15-mm bearings

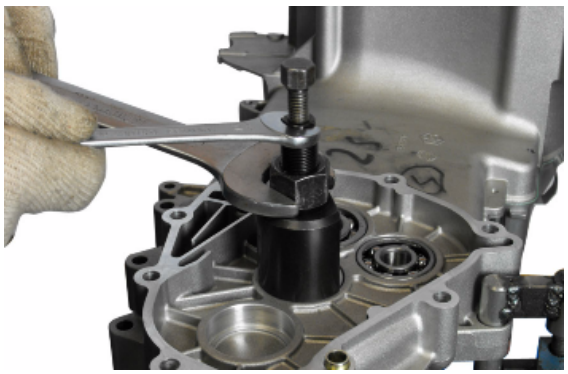
Wheel axle bearing removal

- Remove the bearing using the specific tools

Specific tooling

001467Y009 Bell for OD 42-mm bearings

001467Y013 Calliper to extract ø 15-mm bearings



Removing the wheel axle bearings

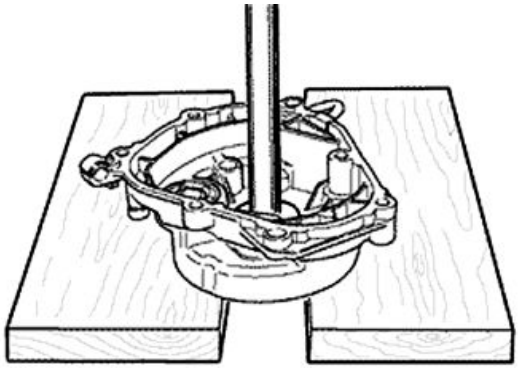
- Support the hub cover properly to avoid damaging the sealing surface with the crankcase.
- Remove the Seeger ring from the outside.
- Operating on the inside, remove the oil seal.
- Remove the wheel axle bearing using the specific tool.

Specific tooling

020376Y Adaptor handle

020364Y 25-mm guide

020359S 42 x 47 mm Adaptor



Removing the intermediate gear bearing

- Remove the bearing using the specific tools

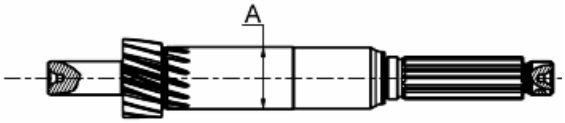
Specific tooling

001467Y013 Calliper to extract ø 15-mm bearings

001467Y009 Bell for OD 42-mm bearings

Inspecting the hub shaft

- Check the three shafts and the intermediate gear for wear or distortion of the toothed surfaces, the bearing housings, and the oil seal housings.
- In case of faults, replace the damaged parts.



Characteristic

Driven pulley shaft

A: 22(-0.01 -0.02)mm

Wheel axle

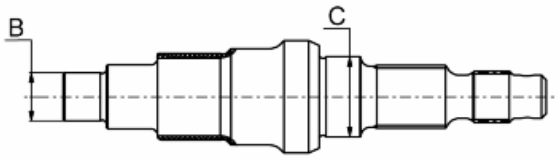
B: 15(-0.010 -0.020)mm

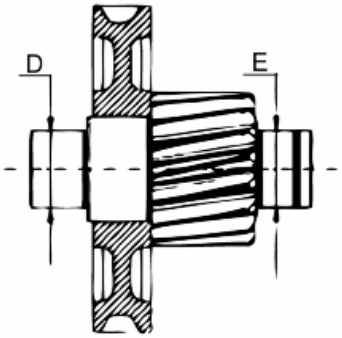
C: 25(-0.007 -0.020)mm

Intermediate gear

D: 15(-0.01 -0.02)mm

E: 15(-0.01 -0.02)mm



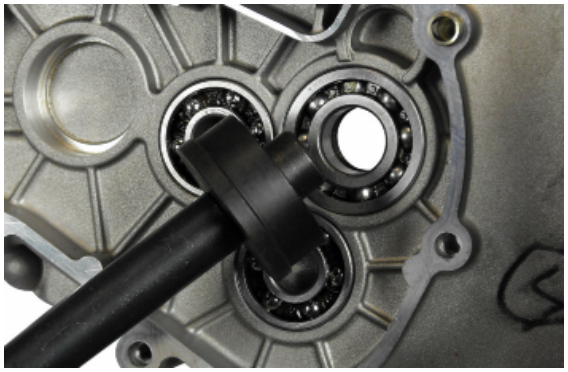


Inspecting the hub cover

- Check that the fitting surface is not dented or distorted.
- Check the bearing bearings.
- In case of faults, replace the damaged components.

Refitting the driven pulley shaft bearing

- Use the heat gun to heat the bearing seat.
- Set a new bearing using the specific equipment.
- Insert a locking seeger.



Specific tooling

020151Y Air heater

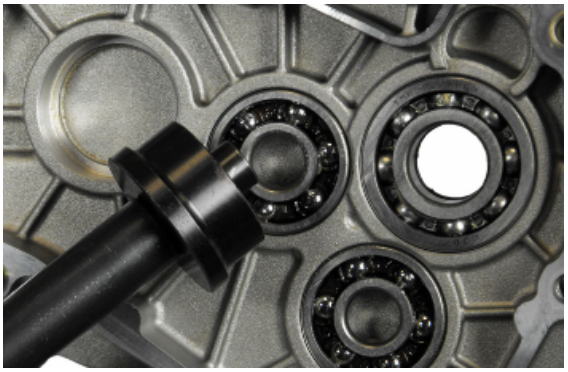
020376Y Adaptor handle

020360S 52 x 55 mm adaptor

020363Y 20-mm guide

Fitting the transmission shaft bearing

- Use the heat gun to heat the bearing seat.
- Set a new bearing using the specific equipment.



Specific tooling

020151Y Air heater

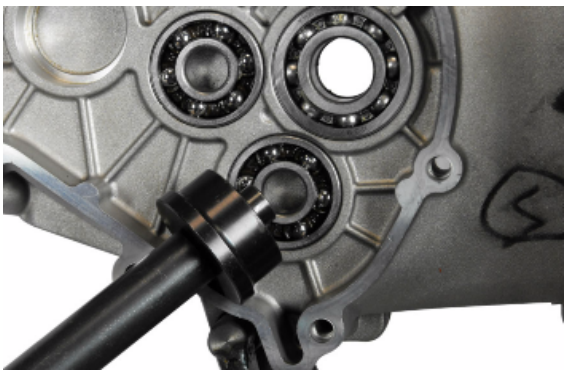
020376Y Adaptor handle

020359S 42 x 47 mm Adaptor - For main bearings and wheel axle

020412Y 15-mm guide

Fitting the Wheel axle bearing

- Use the heat gun to heat the bearing seat.
- Set a new bearing using the specific equipment.



Specific tooling

020151Y Air heater

020376Y Adaptor handle

020359S 42 x 47 mm Adaptor - For main bearings and wheel axle

020412Y 15-mm guide

Refitting the hub cover bearings

Fitting the Wheel axle bearing

- Use the heat gun to heat the bearing seat.
- Plant a new bearing using the equipment, apply grease on the adapter and guide in order to maintain the position of the bearing during operation on the vertical axis.
- Insert the Seeger ring.

Specific tooling

020151Y Air heater

020376Y Adaptor handle

020360S 52 x 55 mm adaptor

020364Y 25-mm guide

Fitting the transmission gear bearing

- Use the heat gun to heat the bearing seat.
- Using the equipment set a new bearing.

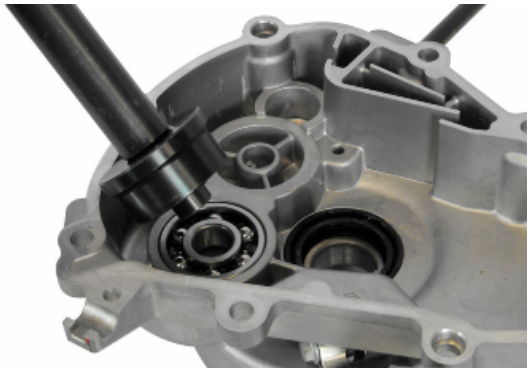
Specific tooling

020151Y Air heater

020376Y Adaptor handle

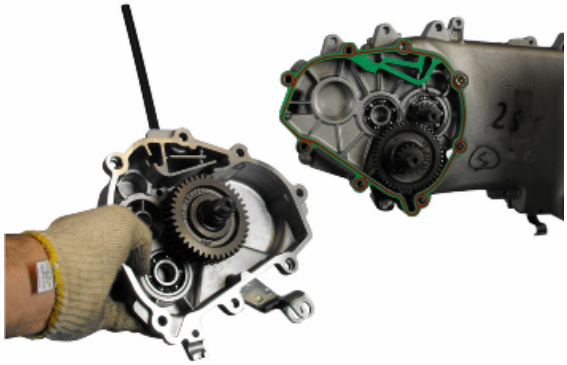
020359S 42 x 47 mm Adaptor

020412Y 15-mm guide



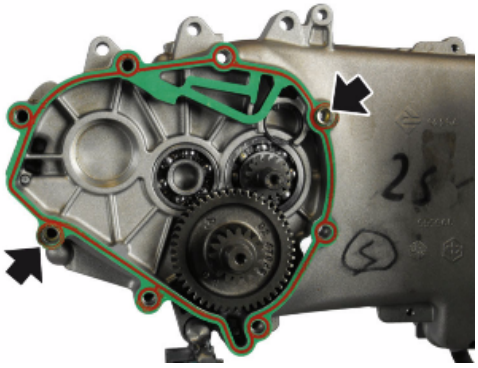
Refitting the hub bearings

- Insert the gears in the cover in order to prevent abnormal movements during insertion into the engine.
- Insert the wheel axis.

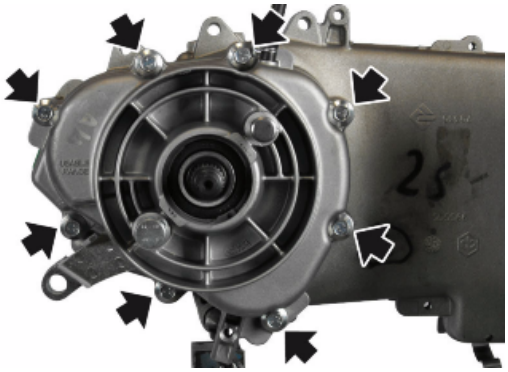


Refitting the ub cover

- Clean the engine crankcase and reduction cover surfaces adequately.
- Working in reverse with respect to the disassembly, inert the command pinion and the intermediate gear into the hub box.
- Pay attention to the correct positioning of the alignment dowels.
- Insert the gasket.



- Insert the gears of the reduction unit in the reduction cover and tighten the screws to the specified torque, tightening in crossed sequence.
- Check the correct the tightening drainage screw.



Locking torques (N*m)

Hub cover fixing screws 23.53 to 26.48 **Reduction unit oil drainage screw** 15 to 17

- Restore the level of oil inside reduction unit with the recommended product, acting on the filler screw until touching.
- Tighten to the specified torque.

Recommended products

Transmission oil 80W-90 Lubricant for gearboxes and transmissions.

SAE 80W-90 API GL-4

Characteristic

Hub oil quantity

325 cm³

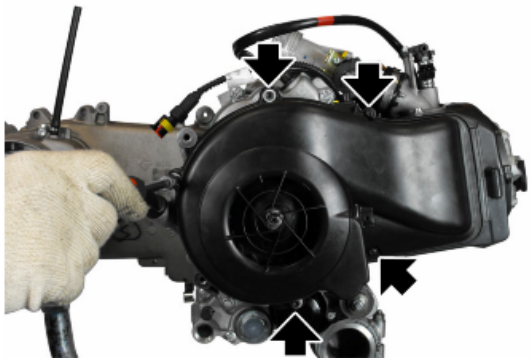
Locking torques (N*m)

Oil relief screw 15 to 17

Flywheel cover

Cooling hood

- Unscrew the five indicated screws and remove the cooling cap.



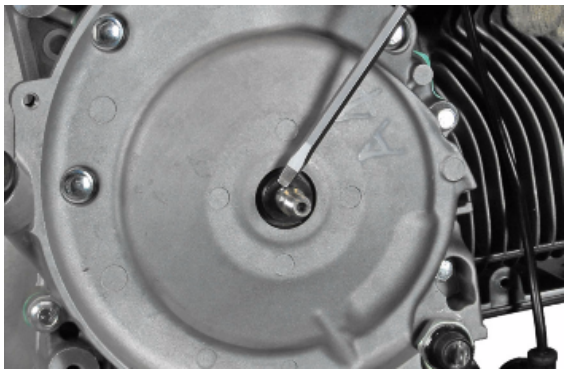
Cooling fan

- Remove the front part of the fan, unscrewing the three fixing screws.

- Using the specific tool, unscrew the cooling fan fixing screw.
- Remove the fan.
- Recover the wrench.

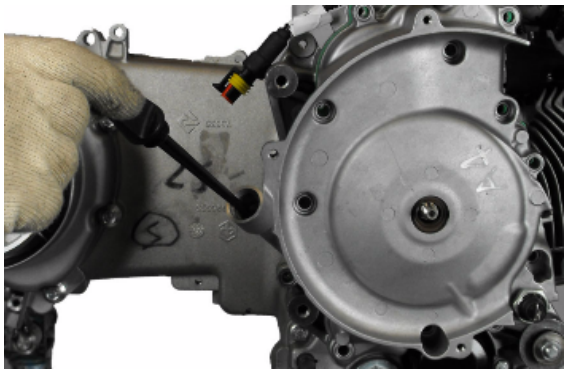
Specific tooling

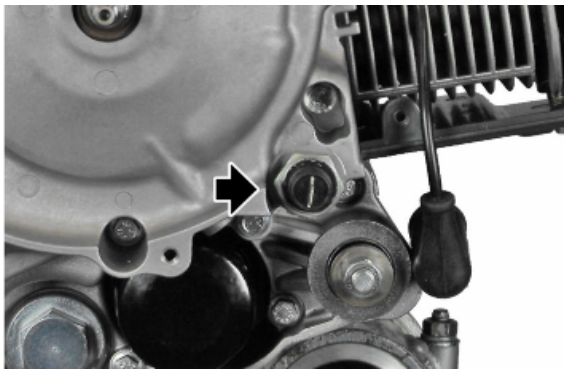
020442Y Pulley lock wrench

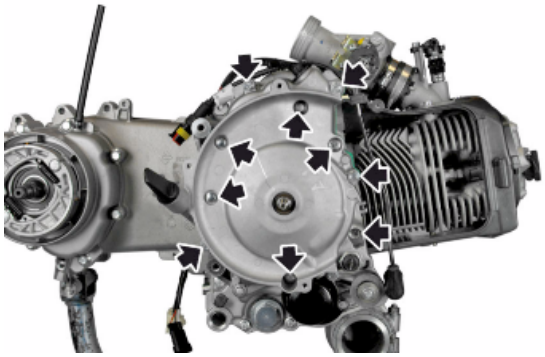


Removing the hub cover

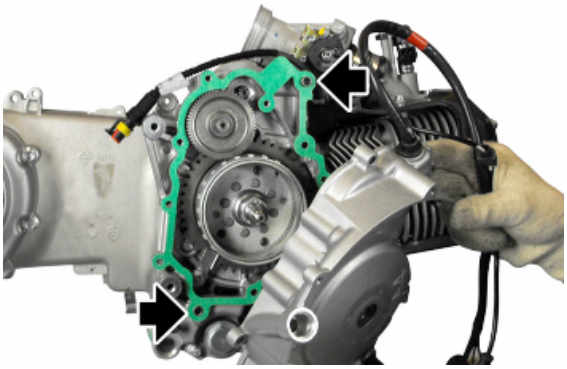
- Remove the oil dipstick.
- Remove the sensor connector.
- Unscrew the eleven fixing screws of the flywheel cover.





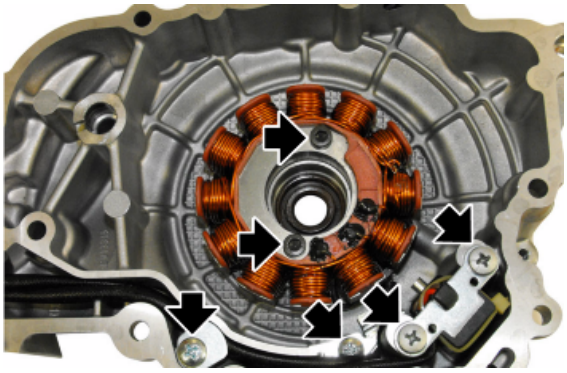


- Remove the cover.
- Remove the gasket.
- Pay attention to the alignment dowels.



Removing the stator

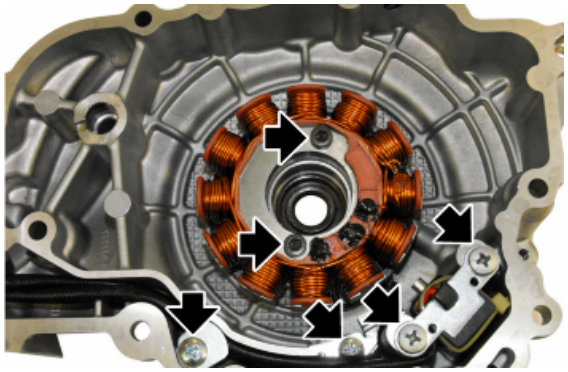
- Remove the flywheel cover.
- Unscrew the 2 flywheel fixing screws and the four pick-up fixing screws and wiring harness retainer screws.



- Remove the flywheel and the pick-up complete with wiring harness.

Refitting the stator

- Refit the stator and flywheel carrying out the removal procedure in reverse, tightening the retainers to the specified torque.
- Respect the operation of the pick-up.

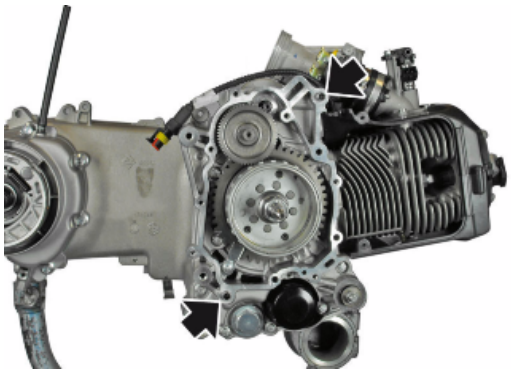


Locking torques (N*m)

Stator fixing screws 8 to 10 **Pickup fixing screws** 3 - 4

Refitting the flywheel cover

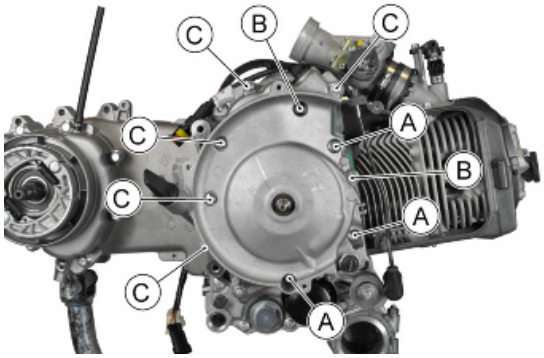
- Fit the gasket and be careful with the two alignment dowels.



- Tighten the screws and tighten to the specified torque.

CAUTION

TO AVOID DAMAGING THE OIL SEAL, USE THE SPECIFIC TOOL PRIOR TO POSITIONING THE FLYWHEEL COVER.



Specific tooling

020940Y Flywheel cover oil seal gasket

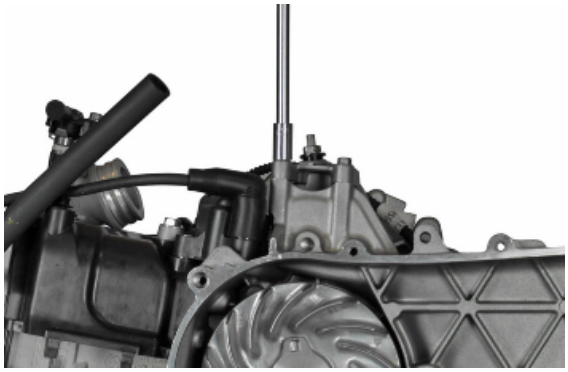
FLYWHEEL COVER SCREWS

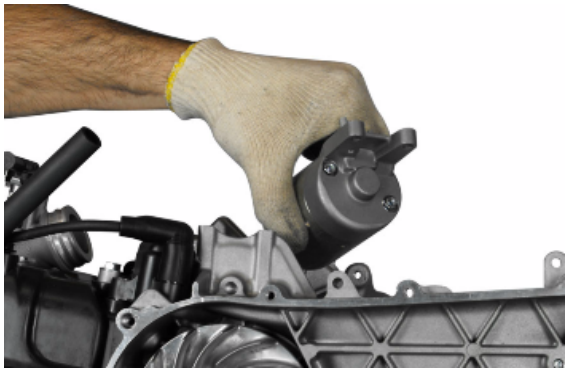
POSITION	DIMENSIONS	TORQUE (Nm)
A	M6x90	11 to 13
B	M6x35	11 to 13
C	M6x30	11 to 13

Flywheel and starting

Removing the starter motor

- Undo the two fixing screws and remove the starter motor.





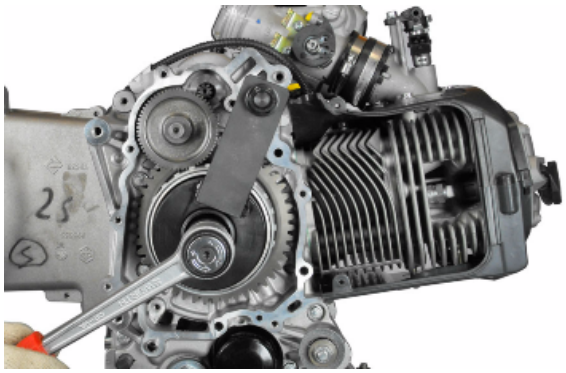
Removing the flywheel magneto

- Undo the screw indicated and remove the plate.

- Install the specific tool and unscrew the retainer nut of the flywheel, recovering the washer.

Specific tooling

020939Y Flywheel retainer

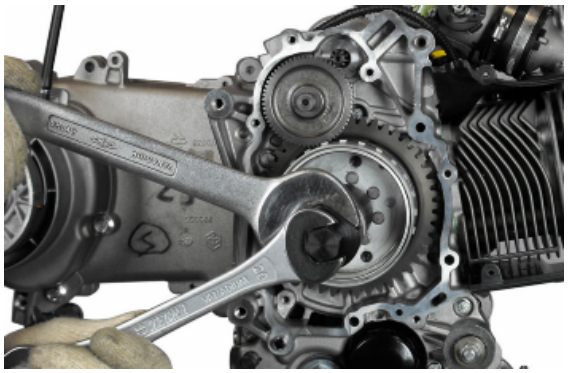


- Before screwing in the flywheel extractor the protection tool provided in the specific tool must be positioned.

Specific tooling

020933Y Flywheel extractor

- Acting on the extractor, remove the flywheel together with the starting sprocket and intermediate gear.



Inspecting the flywheel components

- Check the integrity of the internal plastic parts of the flywheel and the Pick-up control plate.

- Check the integrity of the internal plastic parts of the flywheel and the Pick-up control plate.

Refitting the flywheel magneto

- Perform the procedure in reverse order of disassembly, taking care to tighten to specified torque.

Locking torques (N*m)

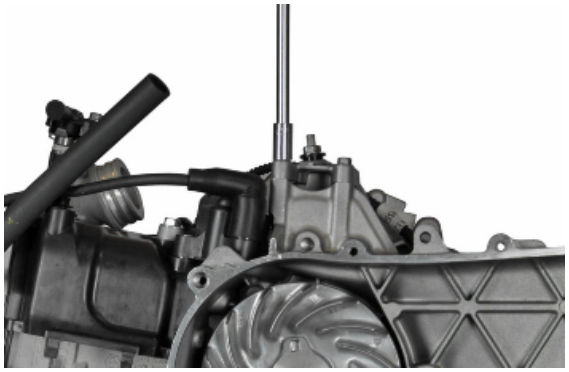
Flywheel fixing nut 100 - 110

Refitting the starter motor

- Fit a new O-ring on the starter motor and lubricate it.
- Fit the starter motor on the crankcase and lock the two screws to the prescribed torque.

Locking torques (N*m)

Starter screws **10.8 - 12.8**



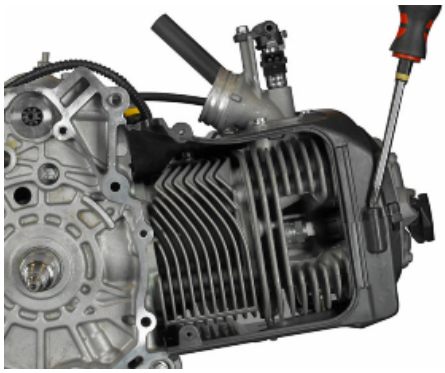
Cylinder assy. and timing system

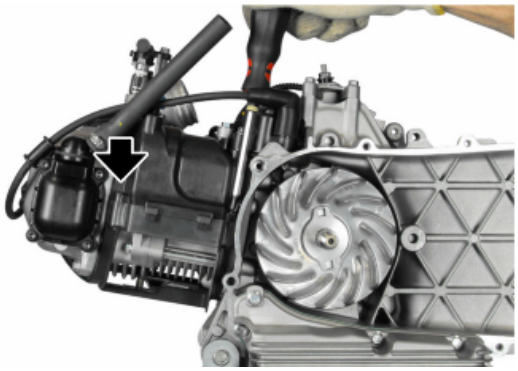
Removing the intake manifold

- The intake manifold is positioned on the head, loosen the clamps and remove the sleeve connecting to the throttle body.
- Undo the three manifold fixing screws and remove it.

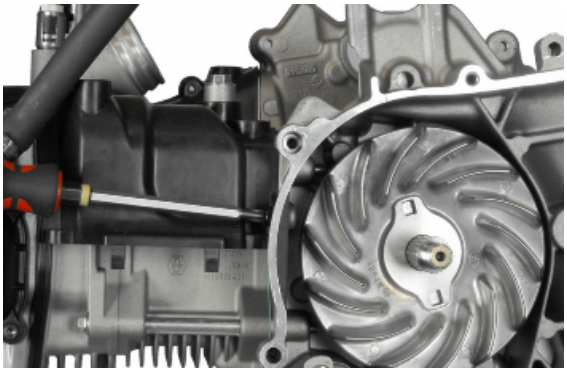
Removing the rocker-arms cover

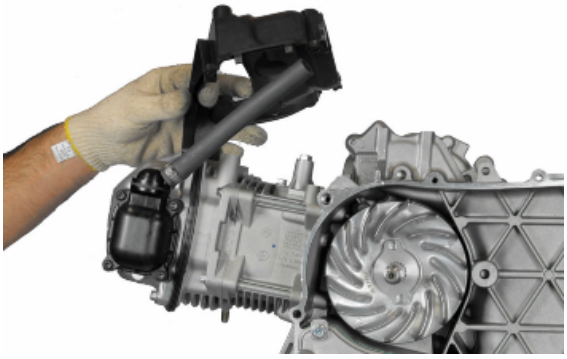
- Remove the protective cover, undoing the three screws.





- Remove the engine temperature sensor.
- Undo the screw indicated.
- remove the upper part of the cover.

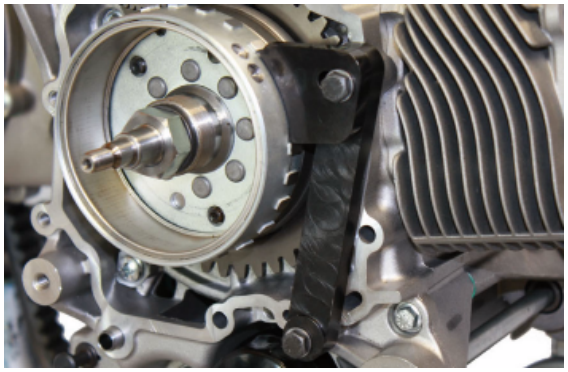




- Unscrew the four screws and remove the tappet cover.

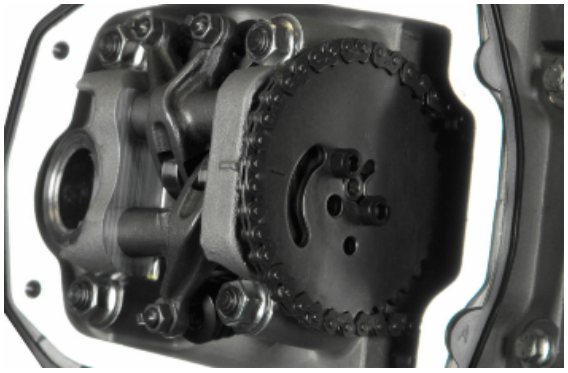
Removing the timing system drive

- Before carrying out operations on the timing system we recommend positioning the engine at TDC in compression. To do this use the specific tools.
- Use the holes on the engine crankcase to secure the tool.
- Position the specific tool in the window between the flywheel pick-up references as illustrated in the figure.



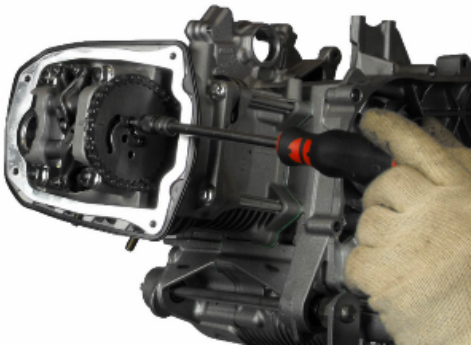
Specific tooling

020941Y Crankshaft timing adjustment tool

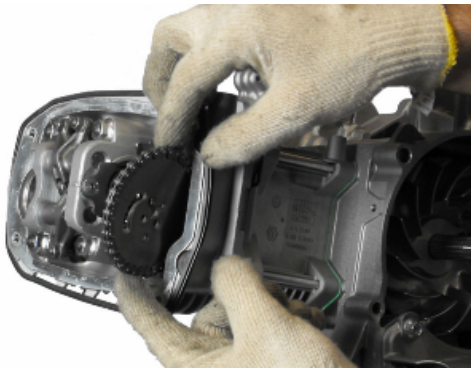


- First loosen the tensioner and unscrew the fixing screws.
- Remove the tensioner complete with gasket.

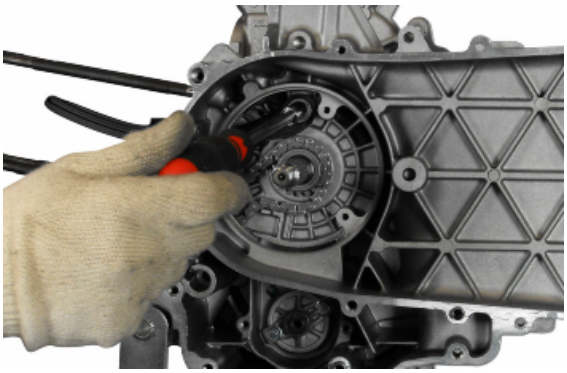
- Undo the two screws on the timing system gear.



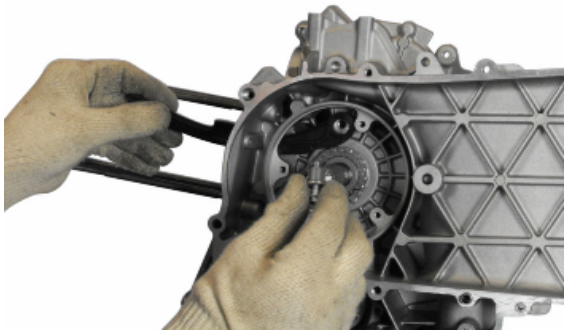
- Disengage the timing system gear and remove the camshaft control sprocket.
- Remove the cylinder as described in section «**Engine/Piston cylinder disassembly**»



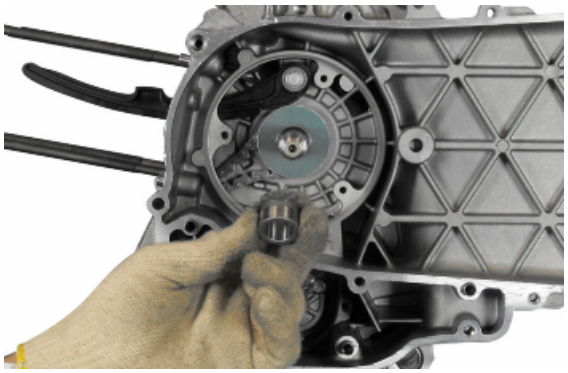
After removing the head the camshaft control components can be removed:
- Remove the inspection cover as described in sec. «**Lubrication/Main bushing oil seals removal**».
- Remove the oil pump command as described in section «**Lubrication/Oil pump/Disassembly** ».
- Undo the chain tensioner pad fixing screw, remove the bushing and the slider.

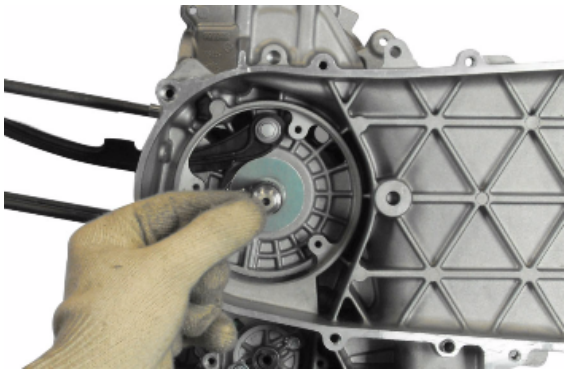


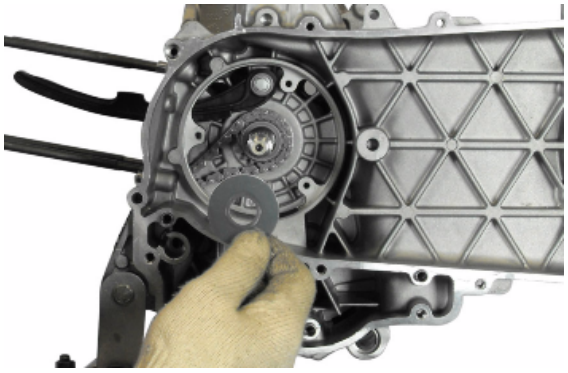
- Remove the chain tensioner pad.



- Remove the control gear.
- Remove the seal OR.
- Remove the flat washer.

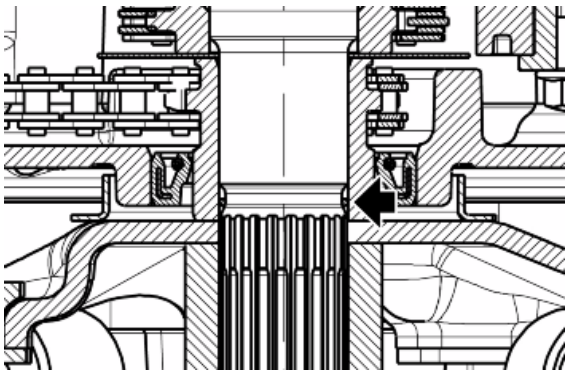




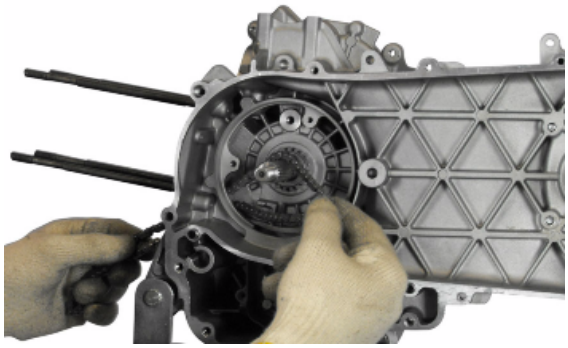


CAUTION

REMEMBER TO CORRECTLY POSITION THE SEAL OR IN THE REFITTING PHASE.



- Release the timing chain from the crankshaft.
- Remove the control gear.



See also

Removal
Removing the cylinder - piston assy.

Removing the cam shaft

- Undo the camshaft lock screw.

- Remove the lock.
- Remove the two pins and the rockers.
- Remove the camshaft.

Removing the cylinder head

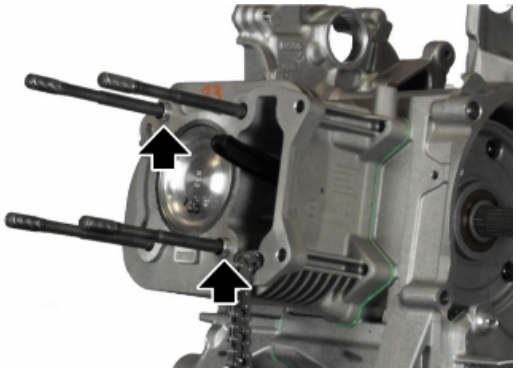
- Gradually loosen the four screws in crossed sequence and recover the washers.
- Undo the two external screws.

- Remove the cylinder head.
- Remove the chain guide slider and the gasket.

- Remove the gasket.

N.B.

ON ASSEMBLY PAY CLOSE ATTENTION TO THE TWO DOWELS.



Removing the valves

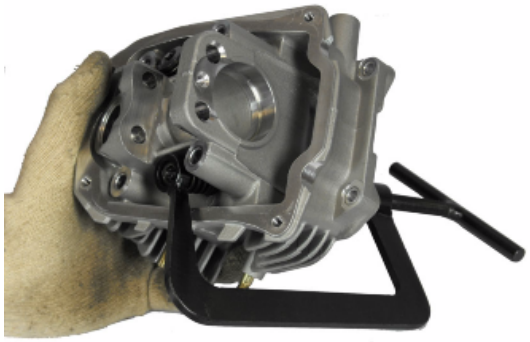
- Use the specific tool to remove the cotters, cap and spring.

CAUTION

PROPERLY REPLACE THE PADS AND ROCKERS SO AS TO PRESERVE THE COUPLINGS.

CAUTION

DURING ASSEMBLY, POSITION THE VALVE SPRINGS WITH THE GREEN COLOURED COIL FACING UPWARD.



Specific tooling

020382Y Valve fitting/ removal tool