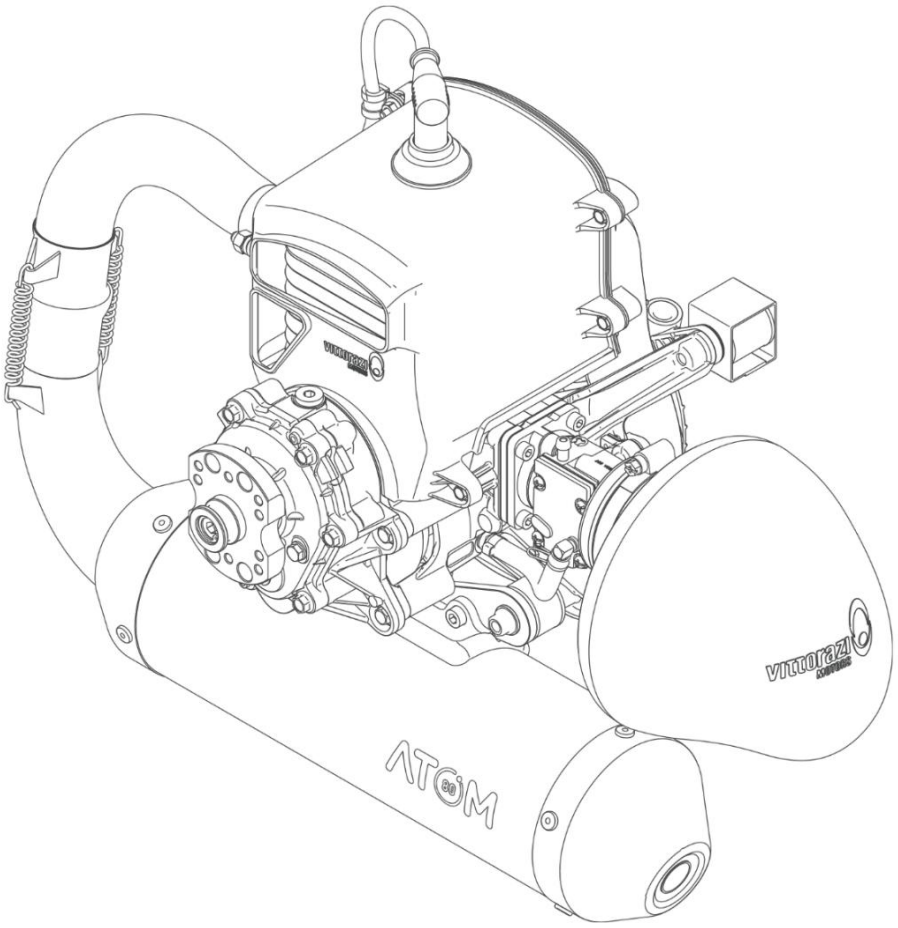
ATOM 80

Maintenance manual

release V1/2025

valid for MY25 version



vittorazi MOTORS

Contents

1 Introduction

Congratulations and thanks for being a Vittorazi qualified professional.

This manual is intended as a point of reference for aircraft manufactures, dealers, professional people dealing with Vittorazi Motors. Please study this professional manual carefully before starting the maintenance activity. The purpose of this manual is to provide all the necessary information to the professional in order to allow a proper maintenance of the engine, carried out autonomously and in total security. The professional manual includes: technical descriptions of the maintenance phase and reference values.

All the components of Vittorazi Motors are checked and tested in a process of industrial quality control before the assembling. Then by sampling the complete motors are checked to assure the functionality of all the parts through a complete test of twenty minutes on the bench. Note that the reliability, performance and durability of the engine also strongly depend on the correct maintenance of which you are in charge.

In case you need further explanations, you can contact directly the headquarters of Vittorazi Motors. Please include in the request, the six-digit serial number that identifies the motor and a photo of the item in question.

Also take into account the availability of Illustrated Parts Catalogue (IPC), manual updates, service bulletins, FAQs, other documents in our official website. The video tutorials are available on the Vittorazi Motors official YouTube channel. Below the links.

IPC, manuals, bulletins, newsletter, warranties, FAQ

https://www.vittorazi.com/en/services/

Vittorazi Official YouTube channel: video and free tutorials available

https://www.youtube.com/user/VITTORAZIMOTORS

Reading tips:

Attention, danger, risk
Any situation or condition which may result in a serious danger

Recommendation, warning, important advice

2 Be careful! Read it completely

To fly in total safety, you must read the following recommendations:

- This engine is not certified. This engine does not fulfil airworthiness regulations. The products are dedicated to non-certified aircraft and flying as a recreational or sporting activity.
- Final-user must be aware that the engine can stop, break or shut down at any time. Such an event may require an immediate and forced landing in inadequate, congested or impervious areas, with the possibility in the end of causing the death of the pilot or other persons involved.
- The aircraft equipped with this engine must be conducted in full compliance with rules and regulations in force relating to the activity of leisure and sport aviation, with regard to the country in which the operations are carried out.
- Vittorazi Motors and its distributors decline any direct or indirect responsibility related to this kind of activity. By using a new engine, the owner agrees that these terms and conditions have been accepted at the time of purchase of the product.
- The engine is not covered by any liability insurance. The use of the engine automatically determines the assumption of all risks and personal liability for personal injury or damage to third parties resulting from the activity.
- Improper use of the products or improper technical service (in relation to the specifications contained in the user, installation and maintenance manual) will held harmless the company from any liability for any damage due to the malfunctioning and immediately void the warranty of the product. So, do not use the motor if it has not been properly maintained or if it has not been used correctly over time.
- Vittorazi does not assume any responsibility for those engines that are used with parts that are not original, not approved, modified or that have suffered an improper use. Use of spare parts not original and not recognized by Vittorazi, can make the engine dangerous and will void the warranty.
- Unauthorized modifications to the motor, to the reduction, to the propeller can invalidate the warranty of the motor and can compromise the reliability of the aircraft and its safety. In case it is necessary to intervene, we invite you to contact an authorized dealer Vittorazi.
- Some geographical areas, due to particular weather conditions such as pressure, temperature and humidity can affect the performance of the engine. Before taking off, test the engine on the ground and make sure it does not behave abnormally.
- Always start the engine on a flat and clean surface, without stones or sand. During all phases in which the engine is kept running near the ground (such as heating, take off, landing) it is necessary to maintain a safe distance from the engine. A good safety distance is 100 meters in every direction.

The following engine speed limits must be respected to avoid engine failures, to keep the warranty valid and to have a correct maintenance scheduling according to the Vittorazi program:

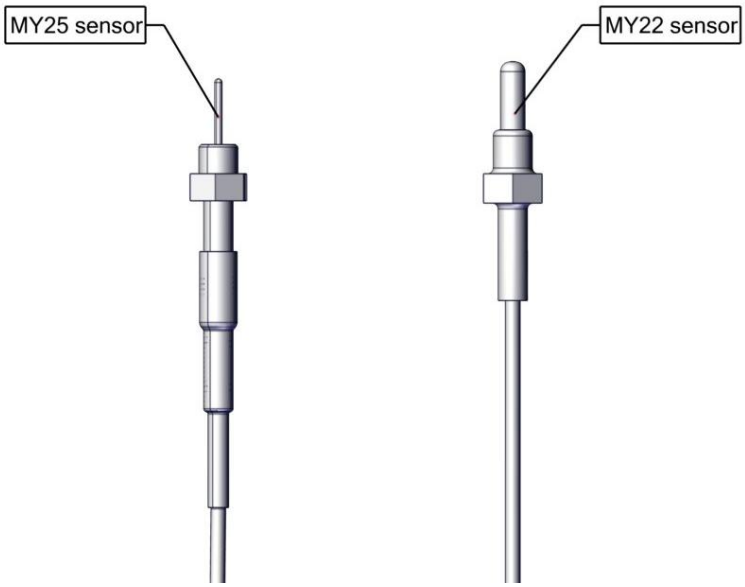
- Do not keep the engine at full revs for more than 60 seconds.
- Do not keep revs higher than 8.000 RPM during long cruising flights or long climbs. The average power delivered by the engine during a flight should remain below the indicated threshold. Contact the aircraft manufacturer for further clarification.

The temperature limit of CHT is:

- If measured with CHT under spark plug sensor (ACC023/ACC024): 180 °C.
- If measured with CHT MY25 Vittorazi dedicated sensor (ACC029): 120 °C.
  This sensor ensures a more accurate measurement of the cylinder head temperature and is subject to less interference from the spark plug.

Do not persist above this temperature threshold, engine overheating and irreversible damage could occur.

The temperature limit of EGT varies depending on the engine speed and the probe used for measurement, please refer to the EGT graphs on page 11 of the User manual. Do not persist above this temperature thresholds, engine overheating and irreversible damage could occur.
The new MY25 EGT sensor (ACC030), allows a more accurate measurement of the exhaust gas temperature.



3 Maintenance

To ensure a safe, long-lasting product and to keep the warranty valid, the user must follow a maintenance schedule as outlined in the manuals and record the service work in the service booklet (available in the Warranty chapter of the user manual). An hour meter integrated in the aircraft is required, always working and well installed to the engine.

Any procedure of installation, maintenance and/or repair of the products must be carried out exclusively with the original Vittorazi Motors parts and tools specified by Vittorazi, in compliance with the specifications contained in the user, installation and/or maintenance manual of the products; to ensure maximum safety and performance of the products, the above-mentioned procedures will be carried out by mechanics with proven experience in the ultralight aviation or general aviation or with experience gained by Vittorazi Motors professional training courses. Failure to do so, will held harmless the company from any liability for any damage due to the malfunctioning and immediately void the warranty of the product.

Maintenance work must be carried out when the engine is cold.

3.1 Maintenance schedule

Refer to the following maintenance indicated time schedule to fly in total safety. Work on the engine is only allowed to be carried out by experienced mechanic and authorized dealers. These are prescribed checks at certain interval times to avoid engine problems through preventative maintenance.

Caption:

 Cleaning

 Check

 Measuring

 Replacement

Note:

1) or after a year

2) rope, spring, hooks or a new pull starter system

3) add new silicone

4) oil leaks

5) replace rivets, add new silicone or a new silencer

6) each time the component is disassembled

7) head, exhaust port, decompressor hole

Flight hours	Before each flight	Every 10 h	Every 25 h	Every 50 h	Every 100 h	Every 150 h	Every 200 h
Pre-flight checklist							
Screws and nuts (tightening)							
Carburation from spark plug colour							
Spark plug							
Spark plug connector							
Carburettor							
Carburettor membranes					 1)		
Airbox Snaplock							
Airbox			 				
Airbox sponge and sleeve			 		 1)		
Airbox safety strap							
Reed valve petals							

The table follows in the next page

Flight hours	Before each flight	Every 10 h	Every 25 h	Every 50 h	Every 100 h	Every 150 h	Every 200 h
Pull starter system					 2)		
Aluminium exhaust bushing with O-ring							
Exhaust manifold with springs							
Spherical joint				 3)			
Silencer				 4)		 5)	
Soundproofing material silencer							
Gaskets (cylinder, carburettor, reed valve, transmission)					 6)		
Piston					 		
Piston roller bearing							
Head and cylinder					 7) 		
O-ring head					 6)		
Rubber mountings (engine, exhaust)						 1)	

The table follows in the next page

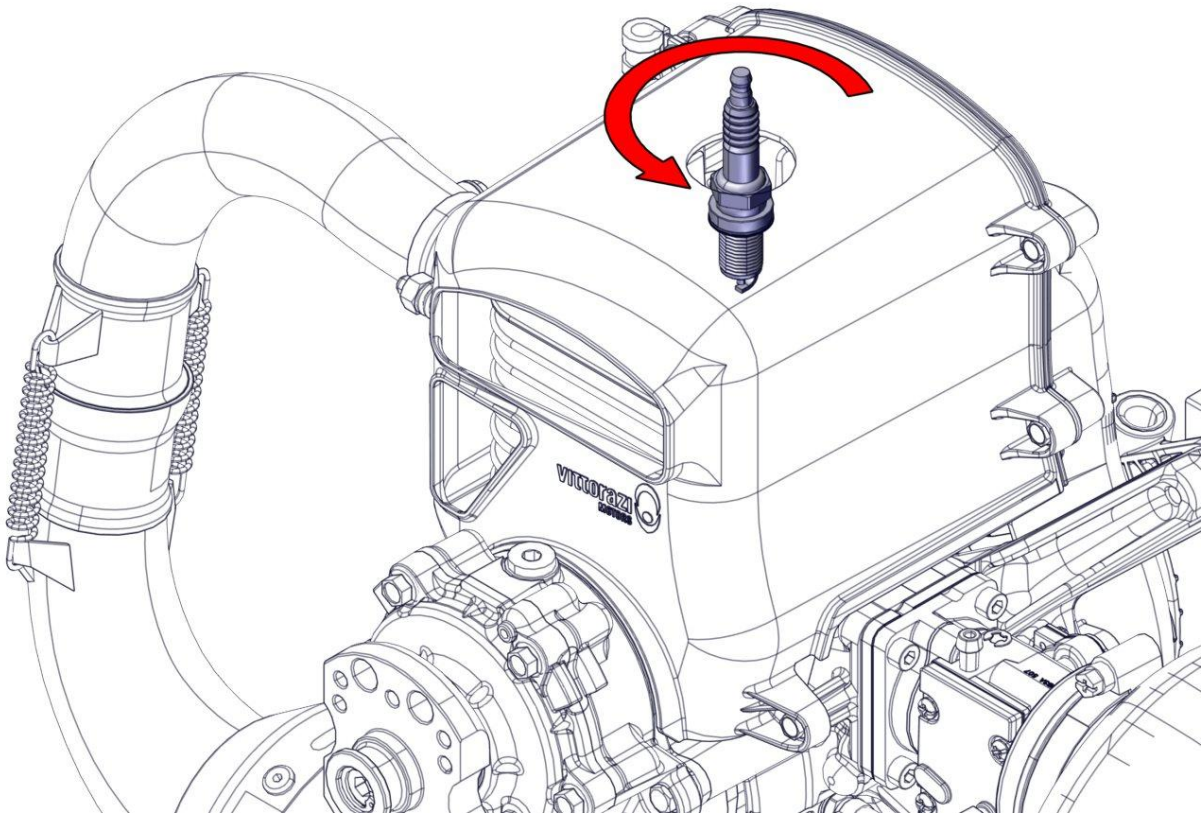
Flight hours	Before each flight	Every 10 h	Every 25 h	Every 50 h	Every 100 h	Every 150 h	Every 200 h
Oil seal carter case							
Crankshaft bearings							
Crankshaft							
Gearbox oil							
Transmission bearings							
Transmission oil seal and O-ring							
Centrifugal clutch							
Clutch bell							
CHT sensor (Optional)							
EGT sensor (Optional)							

3.2 Spark plug

Components to replace	<table><tr><th></th><th>Time limit</th></tr><tr><td>Spark plug (M020)</td><td>25 h</td></tr><tr><td>Spark plug connector</td><td>On condition</td></tr></table>
Special tools	Not required.
Values	Spark plug: 25 Nm.

3.2.1 Spark plug disassembly

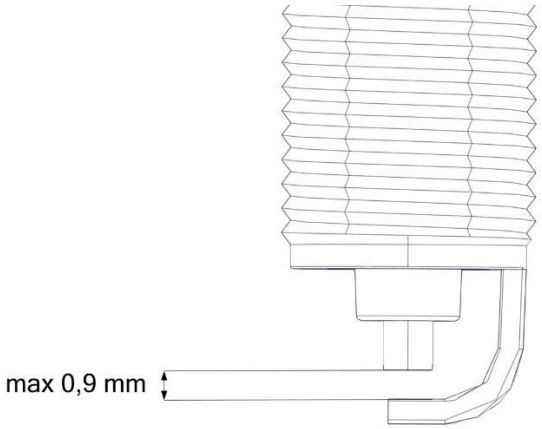
Disconnect the spark plug connector and unscrew the spark plug.



3.2.2 Spark plug maintenance

Check the colour of the spark plug: see user manual.
Use a feeler gauge to measure the distance between the spark plug electrodes.

Worn spark plug limit (mm)
0,9



If the distance between the electrodes is equal to or greater than the indicated limit or if scheduled maintenance is required, replace the spark plug.

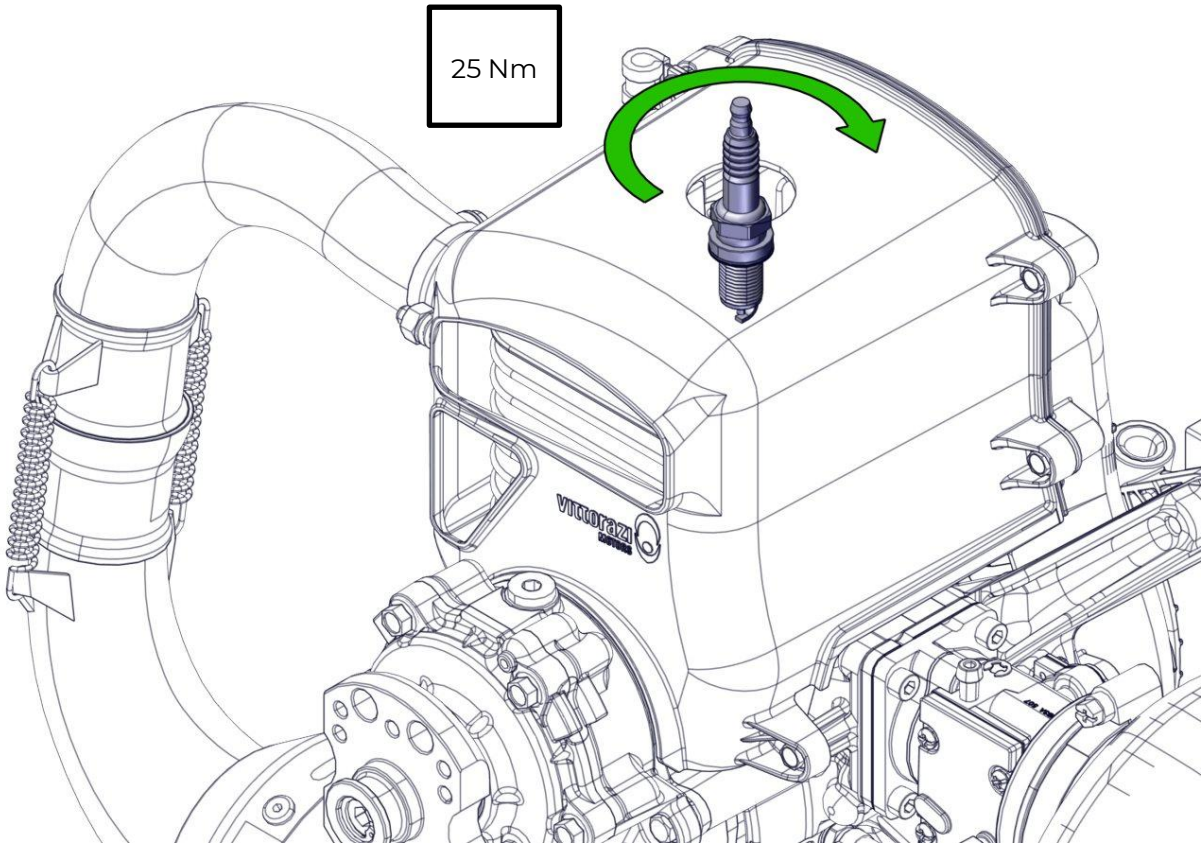
The new spark plug for the engine must be of the same type and rating as the one to be replaced (NGK BR9ES).

Check the spark plug connector: if it is damaged or the connection to the spark plug is not stable, replace it.
Check the ignition cable: there must be no cuts or cracks, otherwise replace the ignition coil (including ignition cable).

3.2.3 Spark plug assembly

The distance between the electrodes of the new spark plug must be 0,7 mm, otherwise adjust.

Screw the spark plug into the head and tighten with the torque shown in the figure.



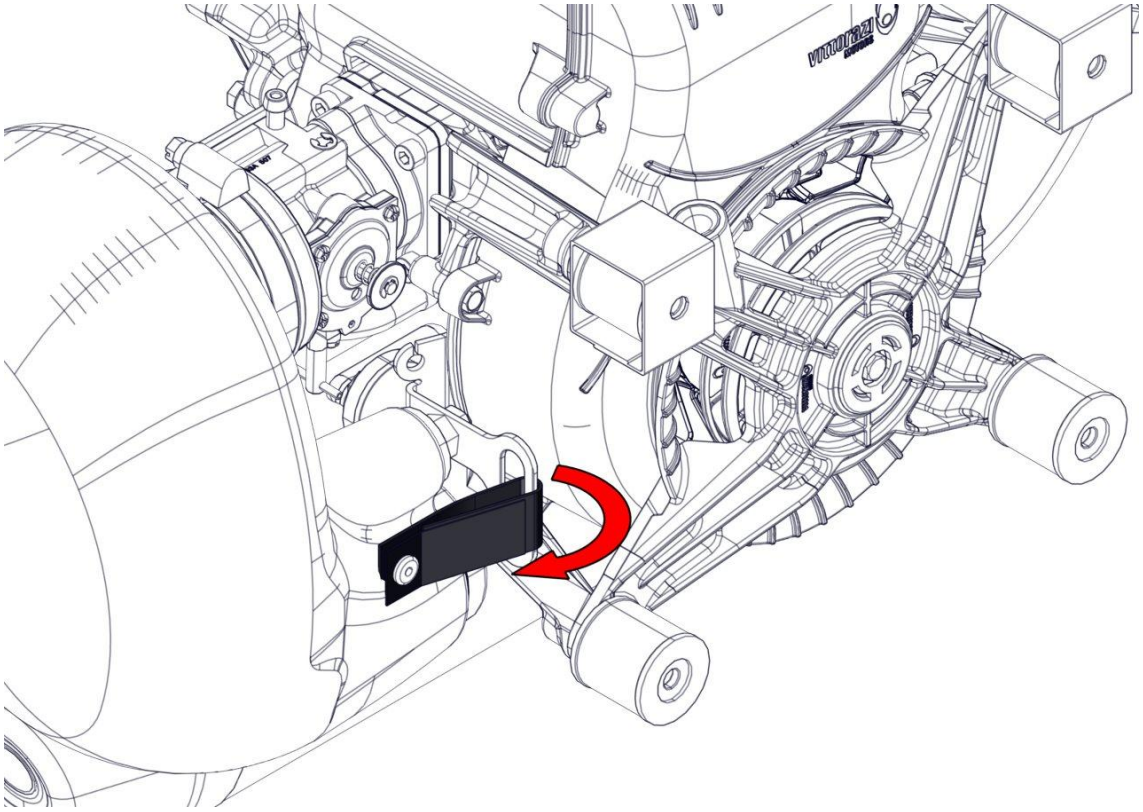
Insert the spark plug connector.

3.3 Airbox

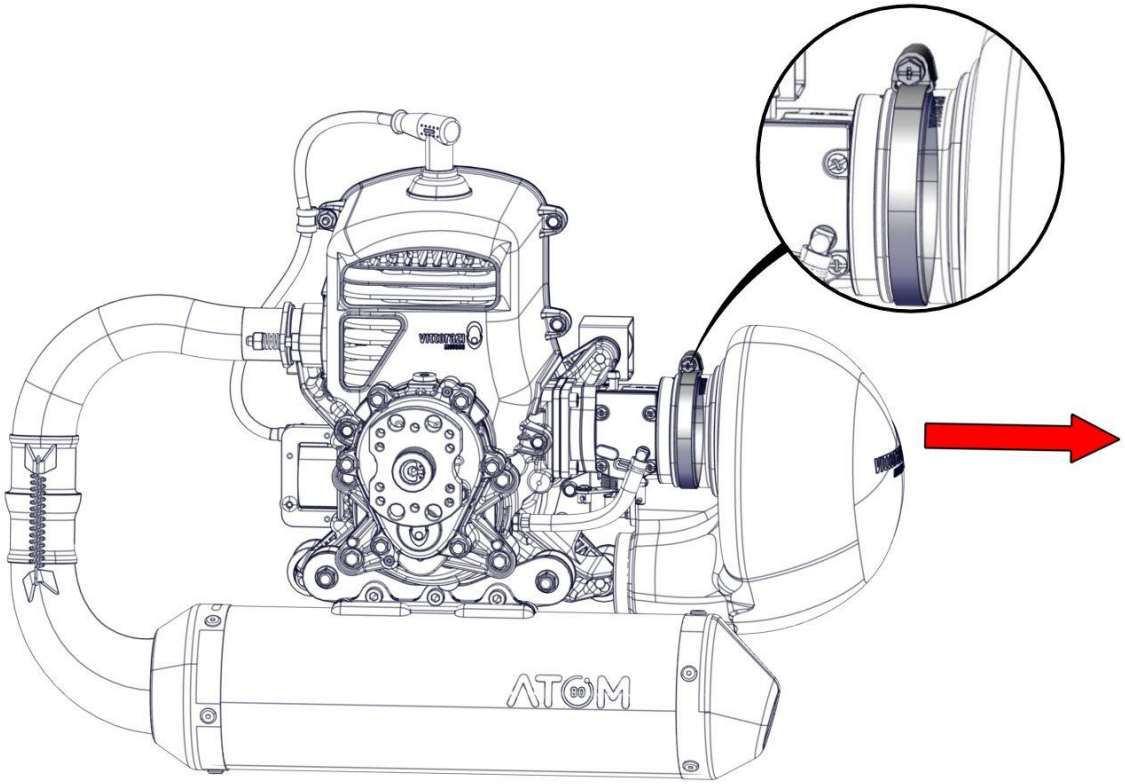
<table>
<tr><td>Components to replace</td><td>
<table>
<tr><th></th><th>Time limit</th></tr>
<tr><td>Sleeve with filter (AT093a)</td><td>100 h or 1 year</td></tr>
<tr><td>Snaplock (MP093d)</td><td>25 h</td></tr>
<tr><td>Safety strap (AT093e)</td><td>On condition</td></tr>
</table>
</td></tr>
<tr><td>Special tools</td><td>Not required.</td></tr>
<tr><td>Values</td><td>Clamp screw: 2,5 Nm.</td></tr>
</table>

3.3.1 Airbox disassembly

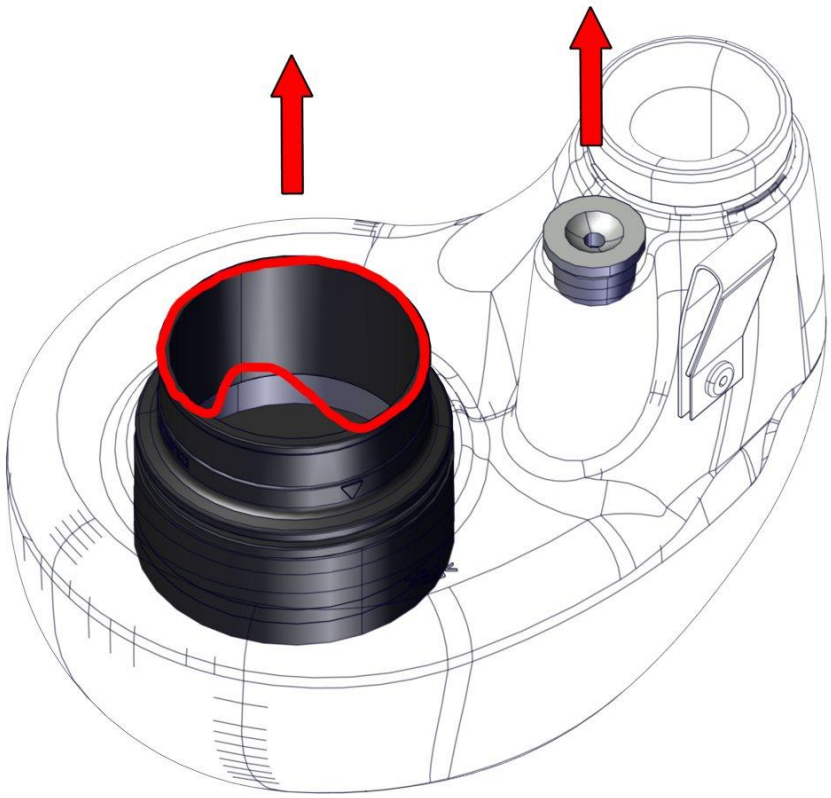
Unhook the safety strap from the back support.



Loosen the screw of the clamp securing the sleeve to the carburettor and remove the airbox.

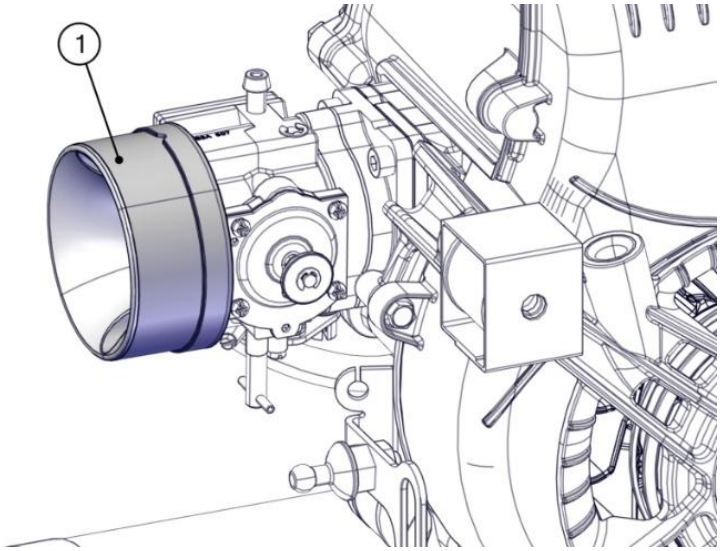


Fold the sleeve inwards and remove it from the airbox.
Remove the Snaplock.



3.3.2 Airbox maintenance

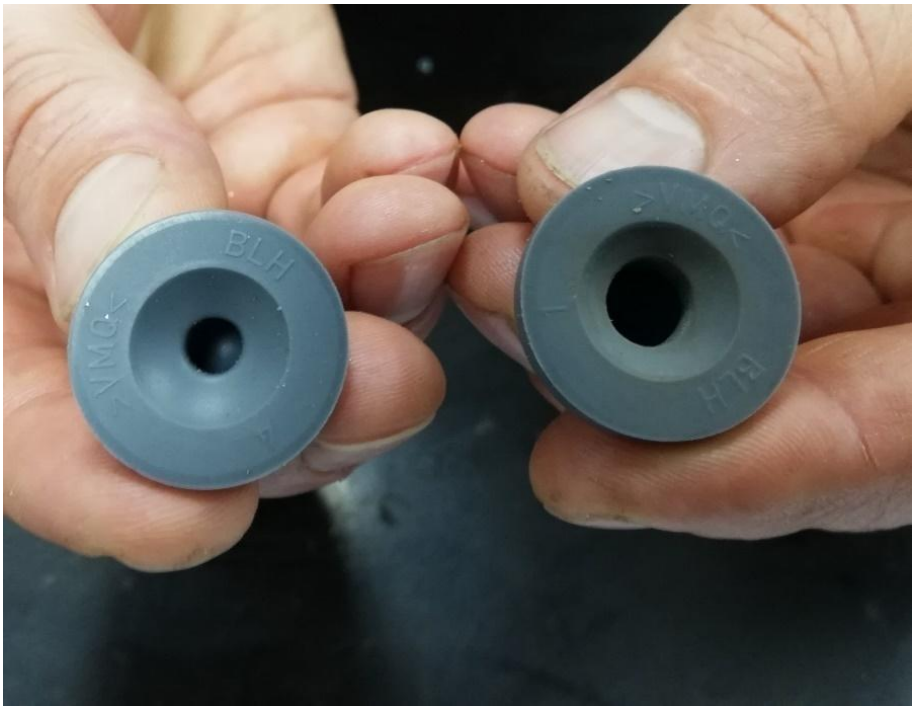
Clean the sponge with specific filter chemicals. Clean the airbox cavity with compressed air. To obtain a good seal between the components, degrease the connector of the airbox (1) and the internal part of the sleeve (2) with a product suitable for cleaning rubber (the sleeve is made up of a mixture of NBR and PVC).



Check the integrity of the airbox.
Check the sleeve groove.

Check the filter, in particular the bonding with the sleeve and the various parts of the sponge.

Check the Snaplock, in particular the central hole (the photo shows a comparison between a new component on the left and a worn one on the right).
Connect the Snaplock to the pin on the motor to check that the engagement is stable.

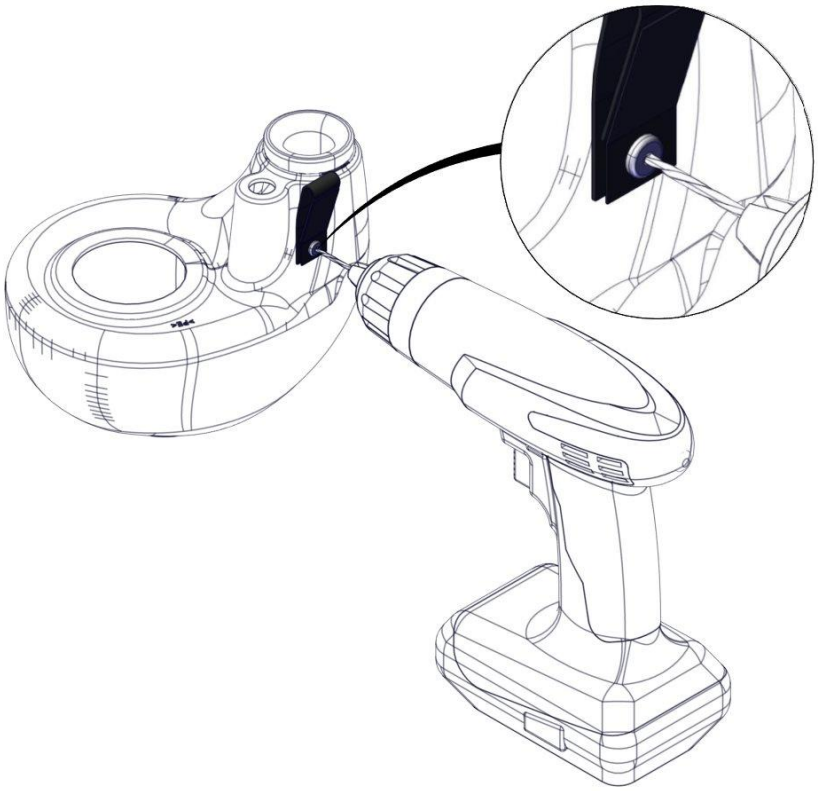


Check the Venturi: it must be firmly attached to the airbox and have no play in the seat.

Check the integrity of the safety strap.

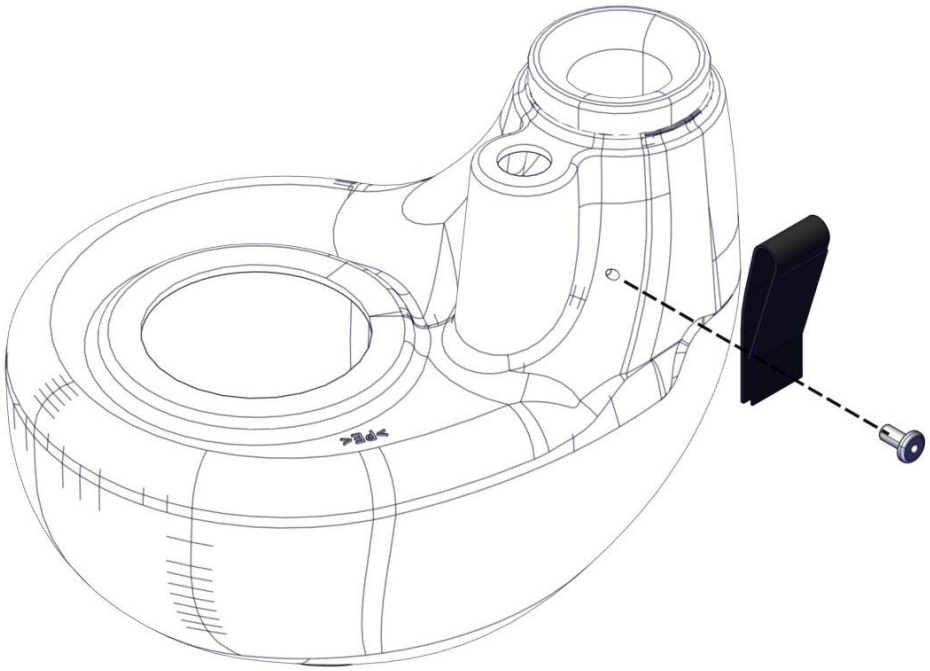
If the above components are damaged, replace them immediately. For routine maintenance, follow the table.
Use extreme caution when checking, as failure to replace damaged components can lead to detachment of the airbox and impact with the propeller.

To replace the safety strap drill the rivet centrally using a drill with a 5 mm diameter bit and remove the safety strap.



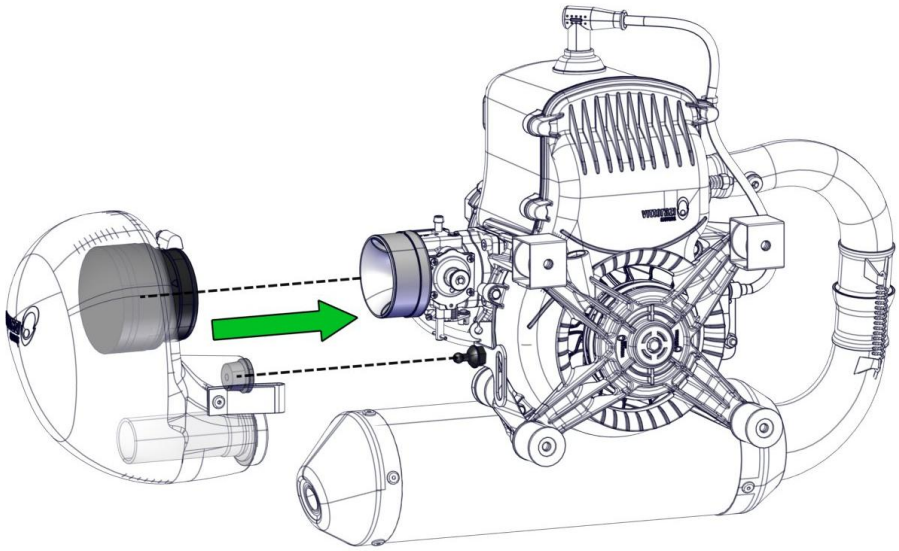
Do not drill too deep or you will damage the airbox.

Carefully clean the inside of the airbox to remove any residue from the drilling process.
Position the safety strap and fix it with a rivet.



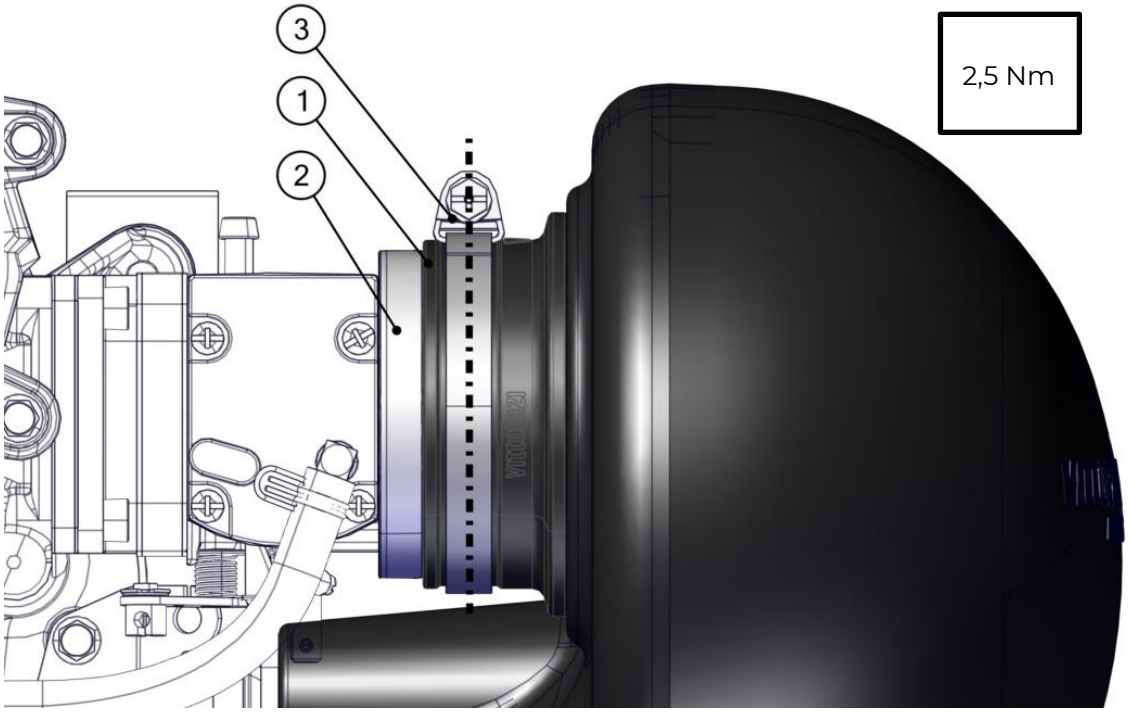
3.3.3 Airbox assembly

Insert the sleeve into the airbox. Insert the Snaplock.
Connect the airbox sleeve to the carburettor and attach the Snaplock.

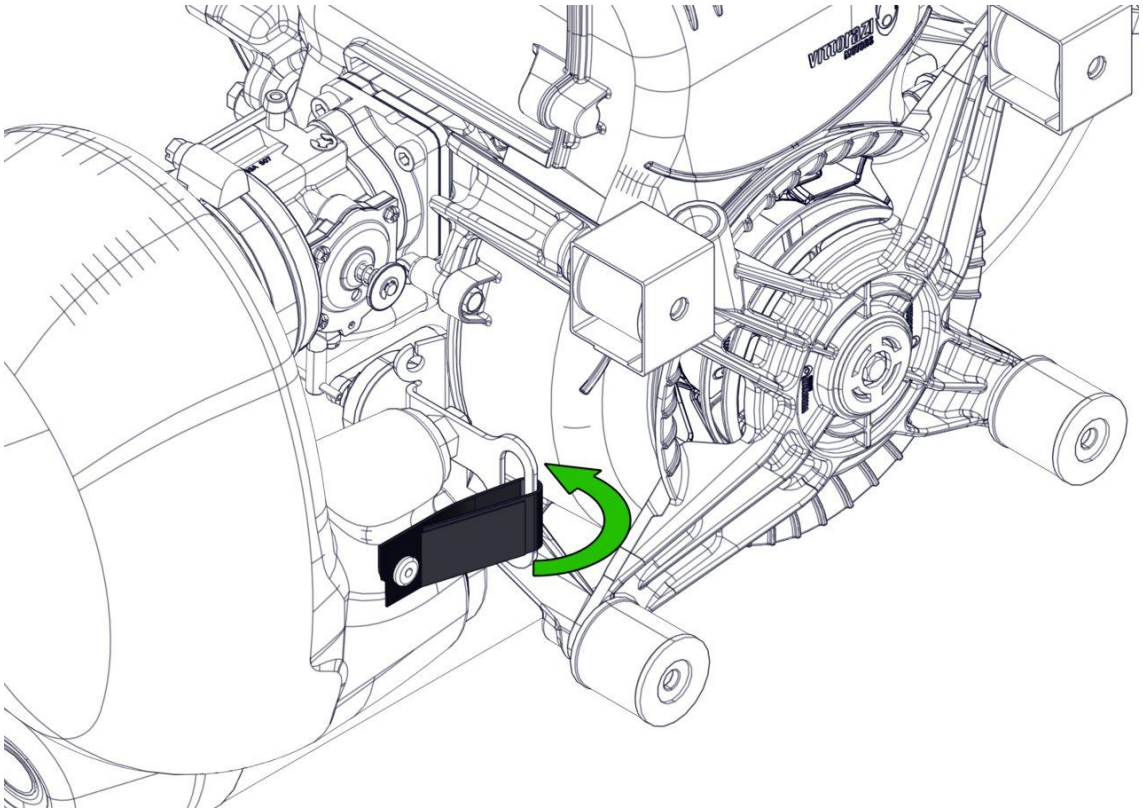


The airbox sleeve (1) must be completely inserted into the airbox connector (2), the fixing clamp (3) must be correctly inserted on the center of the designed seat of the sleeve and vertically aligned as shown in the figure.

Tighten the fixing clamp by applying the torque shown in the figure.



Attach the safety strap to the support bracket behind the airbox, ensuring that the strap is not too tight to prevent friction between the safety strap and the support bracket from cutting the safety strap.



After installation, check that there is no relative movement between the rubber sleeve and the airbox connector.

3.4 Carburettor

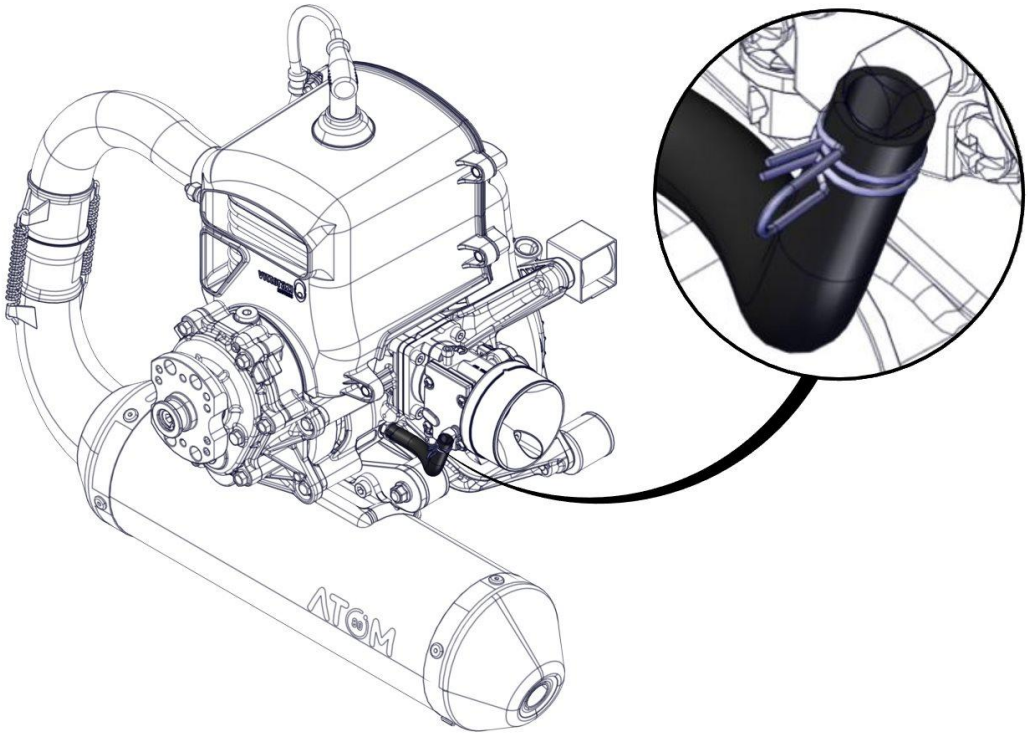
<table>
<tr><td>Components to replace</td><td>
<table>
<tr><th></th><th>Time limit</th></tr>
<tr><td>O-ring (M091a).</td><td>100 h or 1 year</td></tr>
<tr><td>Gaskets (ME088) *</td><td>100 h or 1 year</td></tr>
<tr><td>Internal carburettor diaphragms and gaskets. (M097)</td><td>100 h or 1 year</td></tr>
<tr><td>Pulse line hose (M095a, M096)</td><td>on condition</td></tr>
</table>
</td></tr>
<tr><td>Special tools</td><td>Walbro tool for measuring metering lever. (ACC129)
Pressure tester (ACC130).</td></tr>
<tr><td>Values</td><td>Metering lever opening pressure: 1,05-1,15 bar.
Screws: M6x60 - 6 Nm.</td></tr>
</table>

*Always replace it when disassembled.

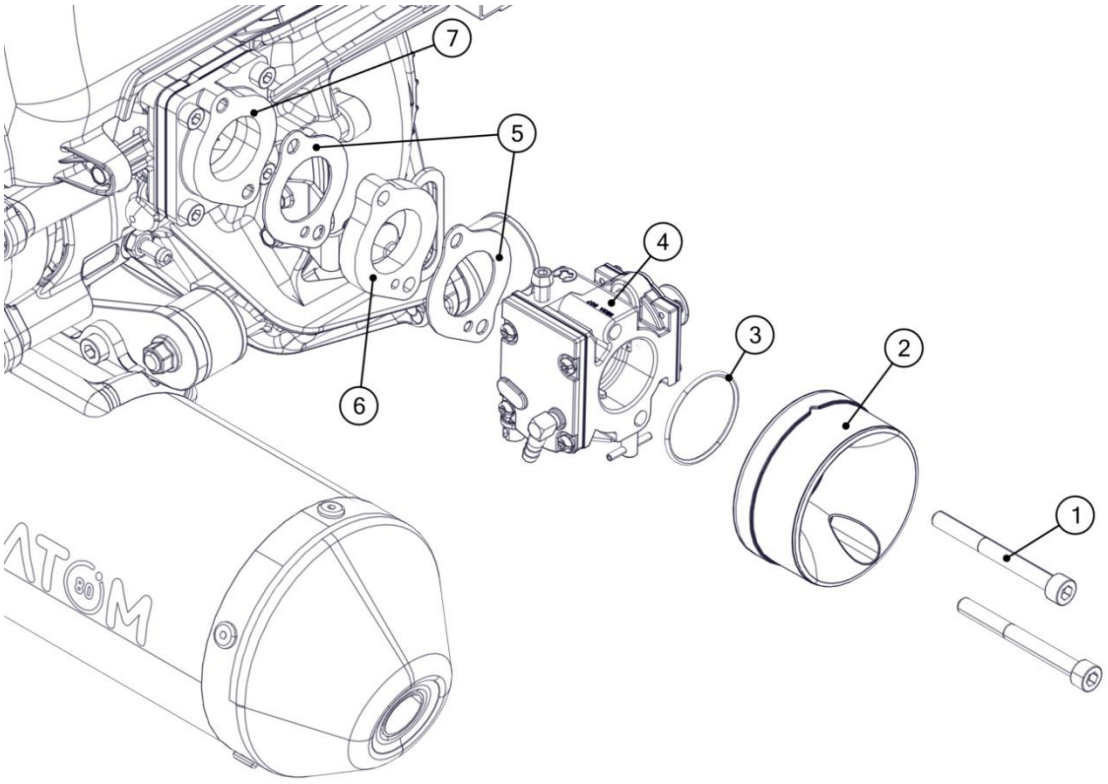
3.4.1 Carburettor disassembly

Before disassembling the carburettor, remove the airbox (3.3 Airbox).

Remove the double wire hose clamp from the pulse line hose and disconnect the hose.

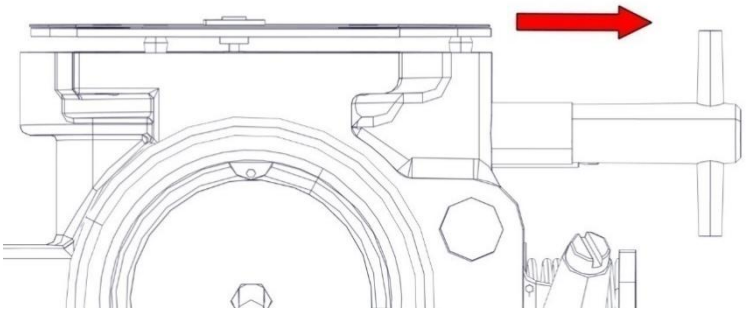


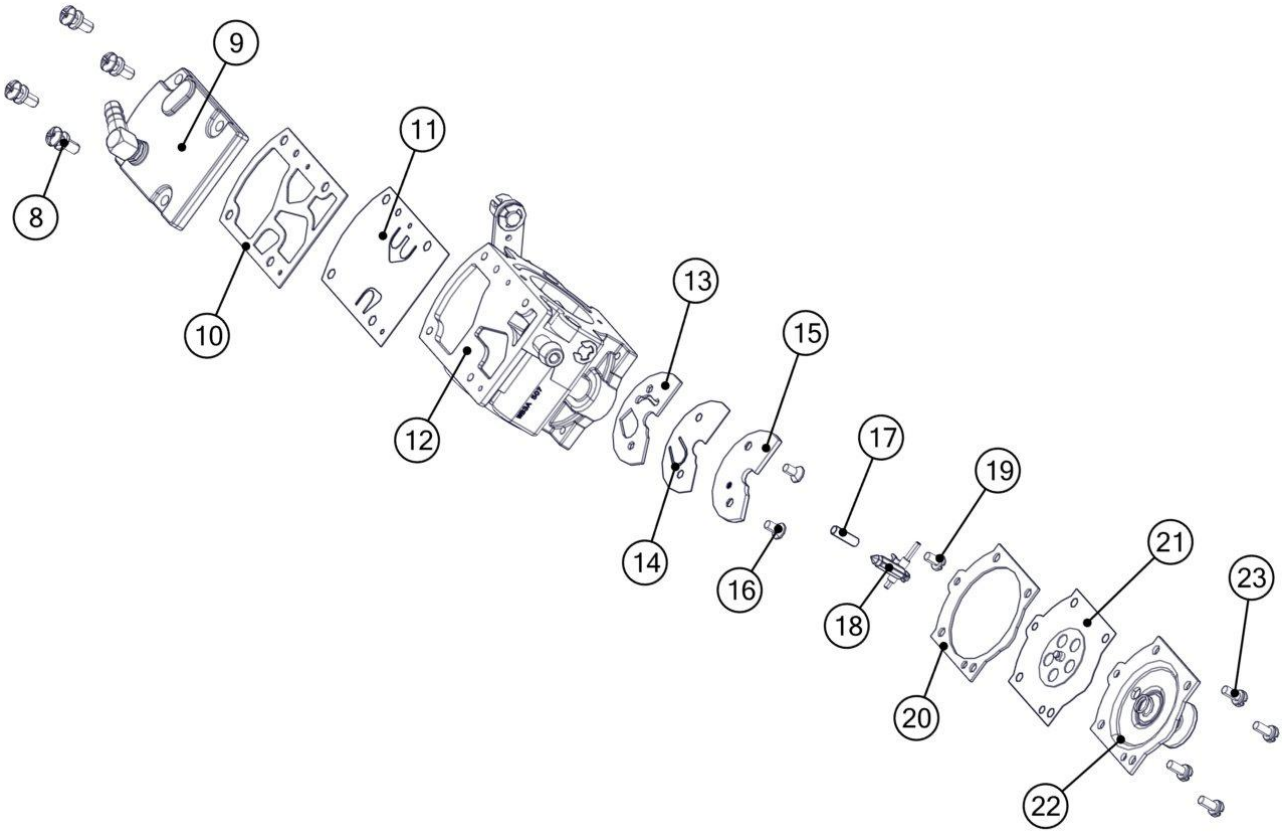
Remove the 2 Allen screws M6x60 (1) from the airbox connector (2).
Remove the connector of the airbox (2).
Remove the O-ring (3).
Remove the carburettor (4).
Remove the following components from the carburettor flange (7): the gasket (5), the spacer (6), the gasket (5).



Disassemble the carburettor by removing the components shown in the figure.

Remove the metering diaphragm (21) by sliding it sideways in the direction of the adjusting screws, without lifting it up, so as not to bend the metering lever (18).

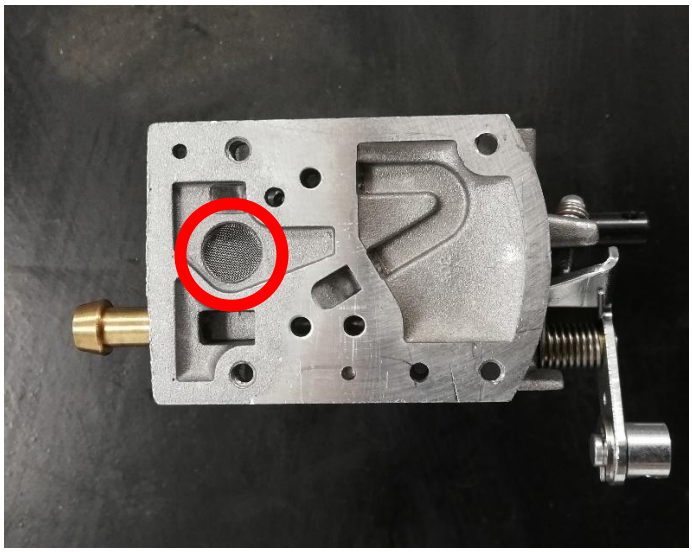


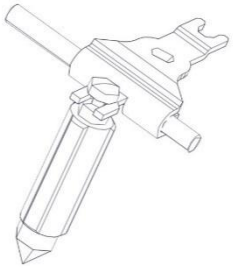


8	Screws with captive washers fuel pump cover (x4)	16	Lunette screws (x2)
9	Fuel pump cover	17	Metering lever spring
10	Fuel pump gasket	18	Metering lever
11	Fuel pump diaphragm	19	Metering lever screw
12	Carburettor case	20	Metering diaphragm gasket
13	Lunette gasket	21	Metering diaphragm
14	Lunette diaphragm	22	Metering diaphragm cover
15	Lunette	23	Metering diaphragm cover screws (x4)

3.4.2 Carburettor maintenance

Immerse the carburettor case in a container containing solvent for a few minutes. Carefully clean the carburettor body and covers with a brush, removing any gasket residue. Then gently blow the various parts with compressed air.
Pay particular attention to cleaning the mesh (highlighted in the photo) and the metering lever needle.





Check the condition of the membranes: they must be soft and free of cuts, otherwise they must be replaced. For routine maintenance, follow the table.
Check the needle: the tip must have a conical shape as shown in the figure, otherwise replace it.

Check the pulse line hose: there must be no cracks or damaged areas, otherwise replace it.

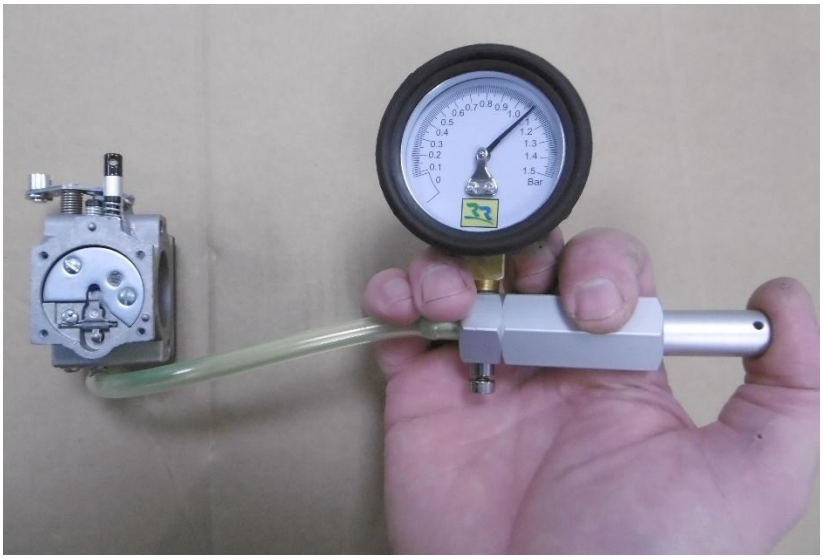
3.4.3 Carburettor assembly

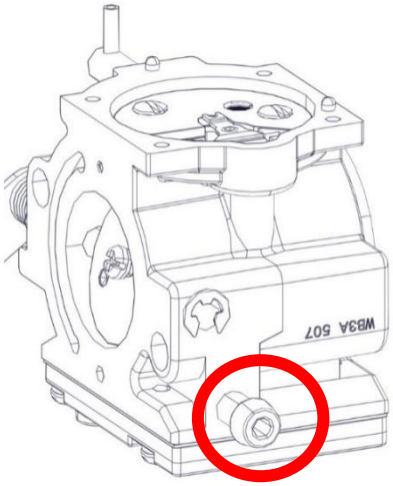
Replace the diaphragms and gaskets (10, 11, 13, 14, 20, 21). Take care to select from the original Walbro spare parts kit the components identical to those to be replaced. For example, the photo shows two gaskets with a similar but not identical geometry, therefore not interchangeable. The incorrect choice of these components compromises the correct functioning of the carburettor.

Assemble the carburettor components without temporarily inserting components 20, 21, 22, 23.

Place the Walbro tool for measuring metering lever (ACC129) to check the correct height.

Connect the carburettor's fuel inlet pipe (highlighted in the figure) to the pressure tester (ACC130) via a tube.

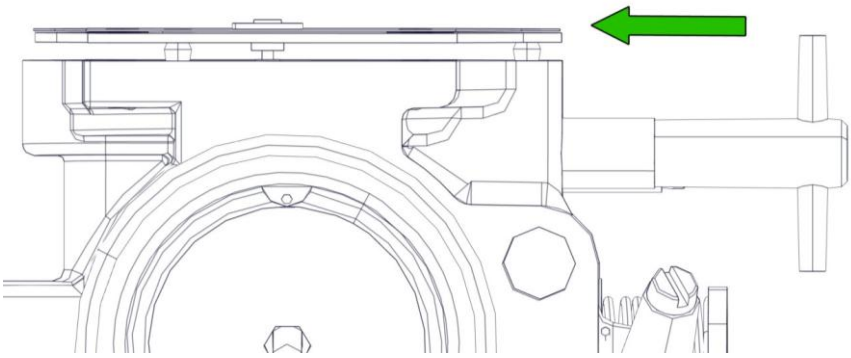




Set a pressure value lower than the values in the table and check that the needle of the metering lever does not allow air to escape. Carry out further tests by gradually increasing the pressure.

WB3A
1,05-1,15 bar

In the event of a fault, measure the height of the metering lever again and replace the spring (17) if necessary.
Once the above checks have been carried out, fit components 20, 21, 22 and 23 to the carburettor.

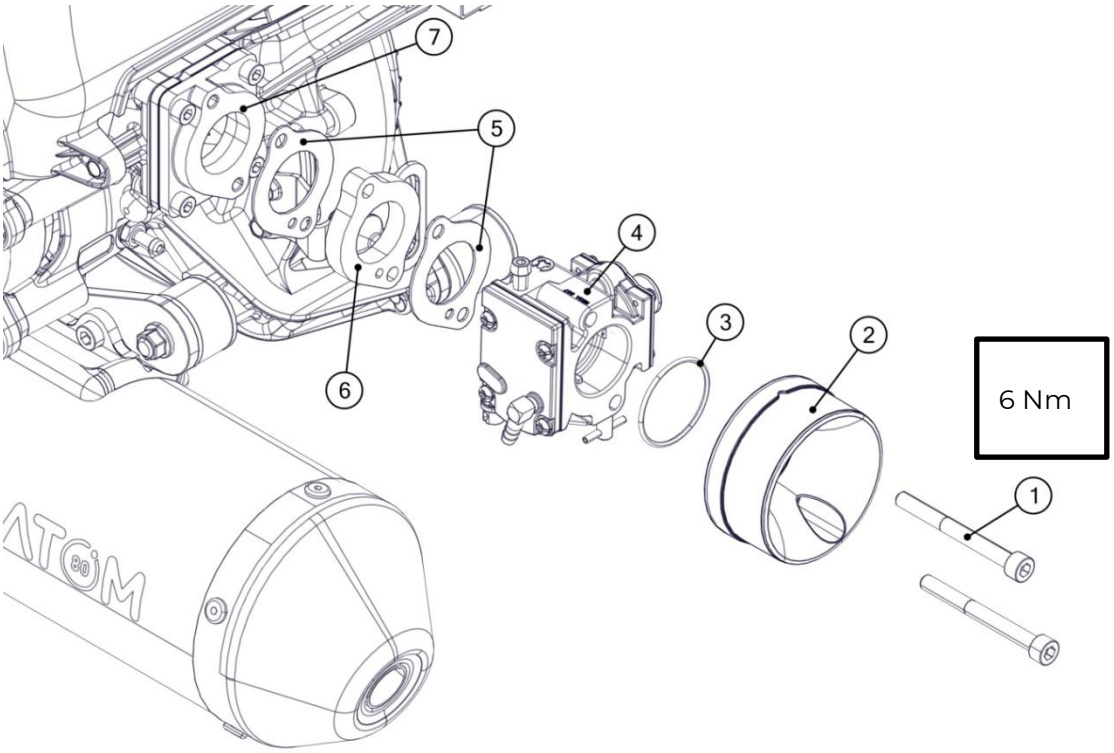


Replace the gaskets (5) and the O-ring (3).

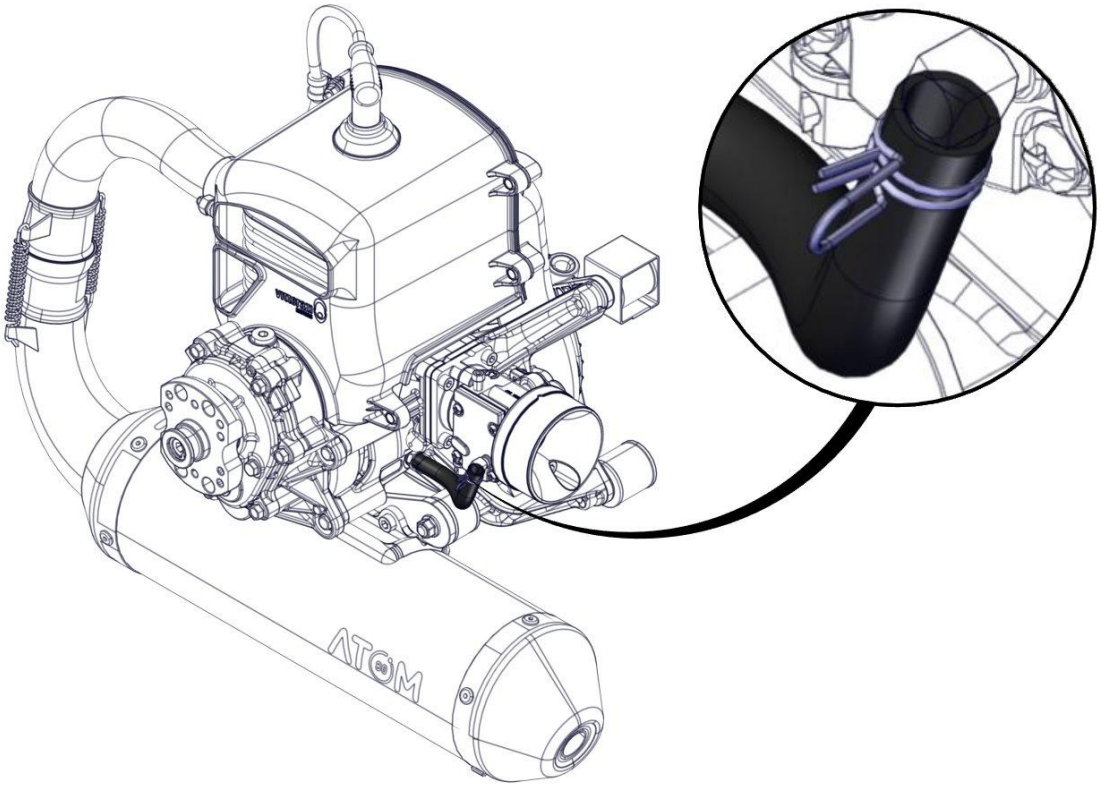
Place the following components on the carburettor flange (7): gasket (5), spacer (6), gasket (5). Position the carburettor (4).

Insert the O-ring (3) into the airbox connector (2), taking care not to pull it out of the housing.

Insert the 2 Allen screws M6x60 (1) with threadlocker (recommended Loxeal 55-03/Loctite 243) in the connector of the Airbox (2), screw progressively, then tighten to 6 Nm.



Connect the vacuum hose to the carburettor and secure it with the two-wire clamp.



3.5 Reed valve

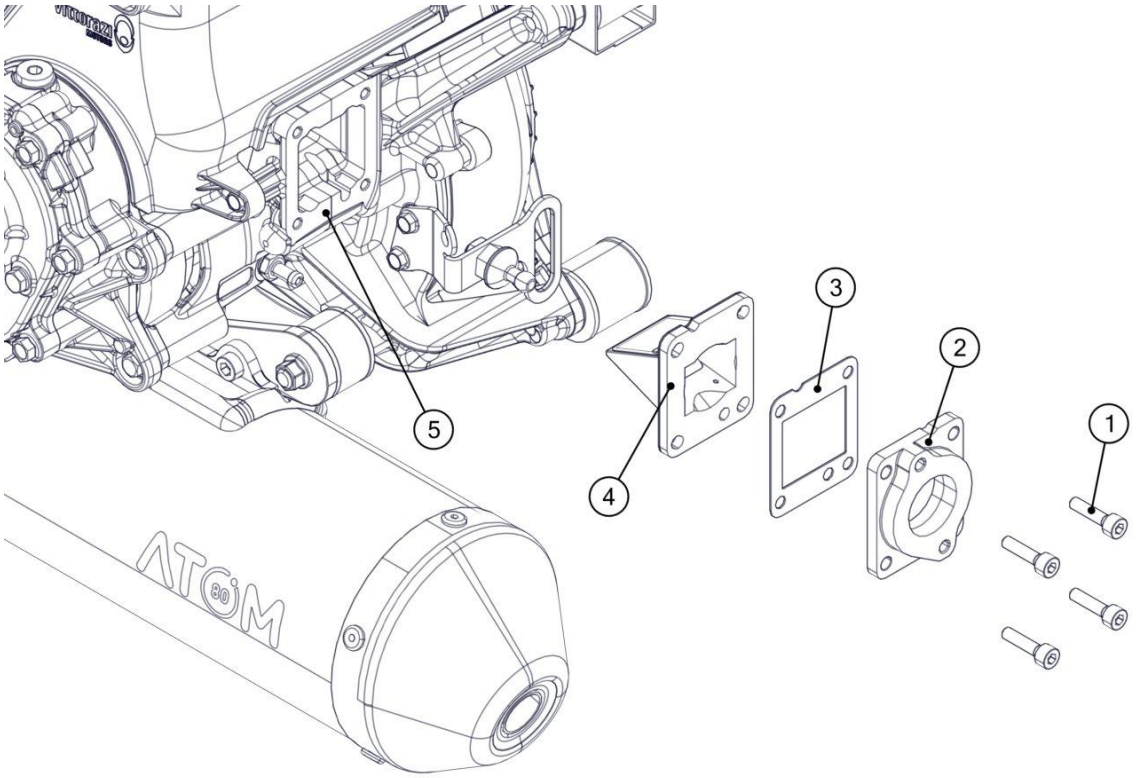
Components to replace	<table><tr><th></th><th>Time limit</th></tr><tr><td>Petals (AT082)</td><td>150 h</td></tr><tr><td>Gaskets* (AT083)</td><td>100 h</td></tr><tr><td>Loxeal 24-18/Loctite 222*</td><td></td></tr></table>
Special tools	Not required.
Values	Screws M5x20: 8 Nm.

*Always replace it when disassembled.

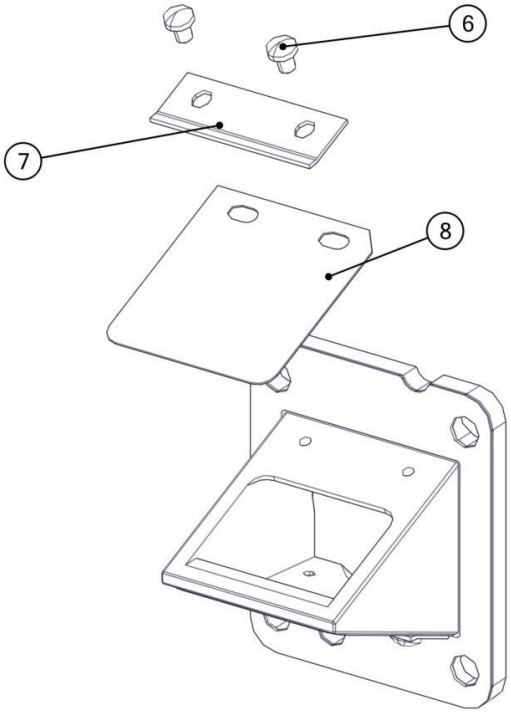
3.5.1 Reed valve disassembly

Before disassembling the reed valve, remove the airbox (3.3 Airbox) and the carburettor (3.4 Carburettor).

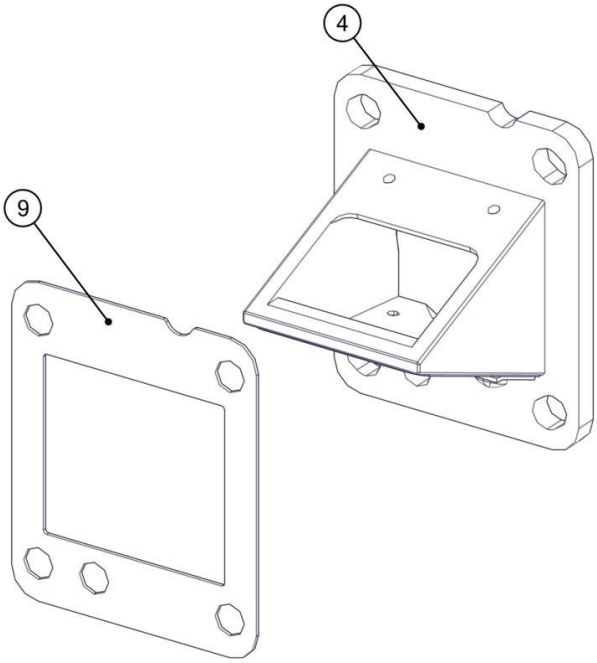
Remove the 4 Allen screws M5x20 (1) from the carburettor flange (2).
Remove the following components from the crankcase (5): carburettor flange (2), gasket (3), reed valve (4).



Remove the 2 screws (6) from one side of the reed valve.
Remove the stoppers (7) and petals (8).

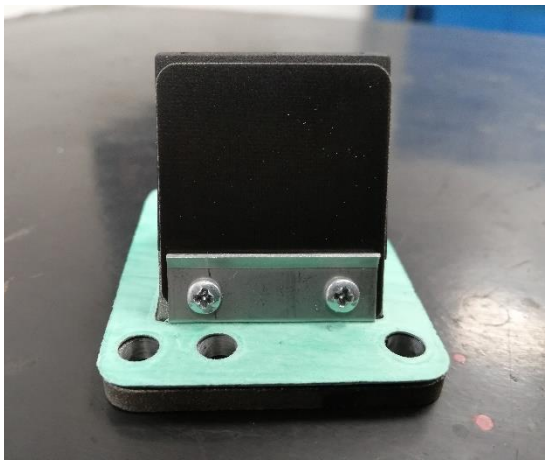


Carry out the same operations on the other side of the reed valve.
Remove the gasket (9).

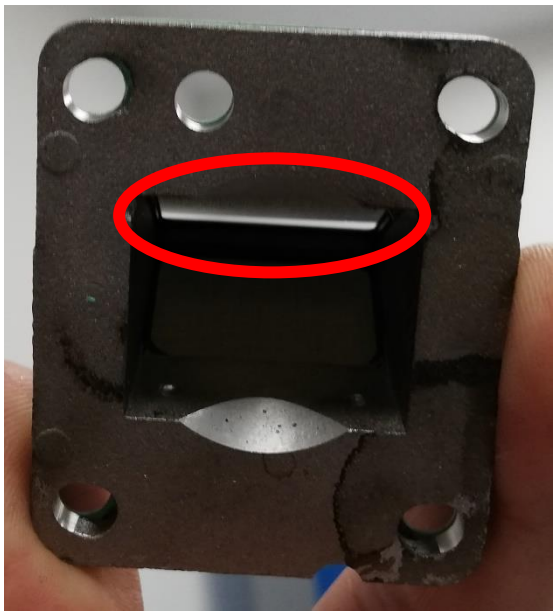


3.5.2 Reed valve maintenance

Check the petals: they must be intact (the photo on the left shows new petals and the photo on the right shows a typical break on worn petals).



Also check that the petals are not deformed: looking at the inside of the reed valve, the petals should close the opening perfectly (photo on the left). In the photo on the right, you can see deformed petals that remain slightly raised.

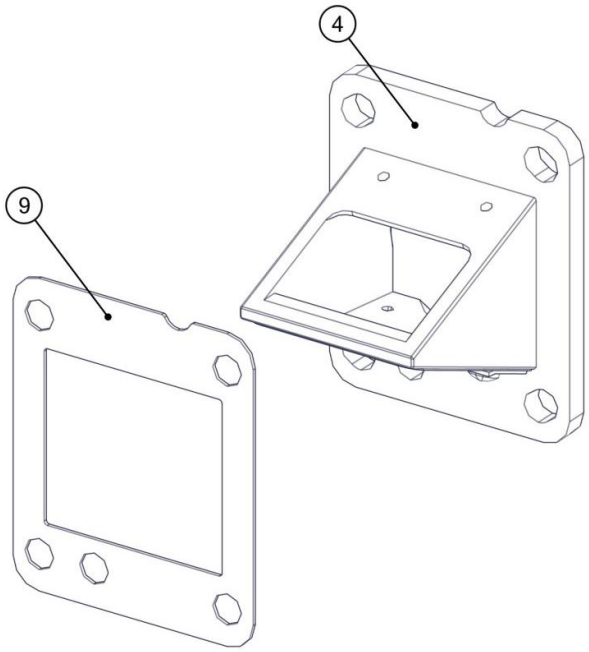


If the previous checks are not passed or if routine maintenance is required, replace the petals.

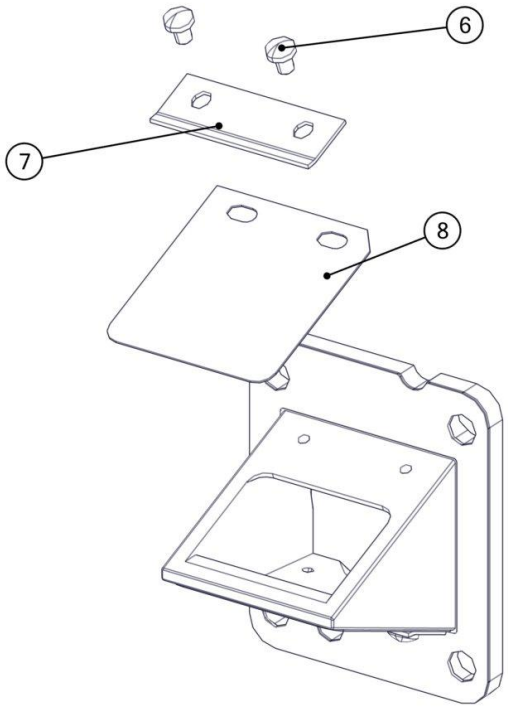
3.5.3 Reed valve assembly

Replace the gaskets (3,9) each time they are disassembled.

Place the gasket (9) on the reed valve.

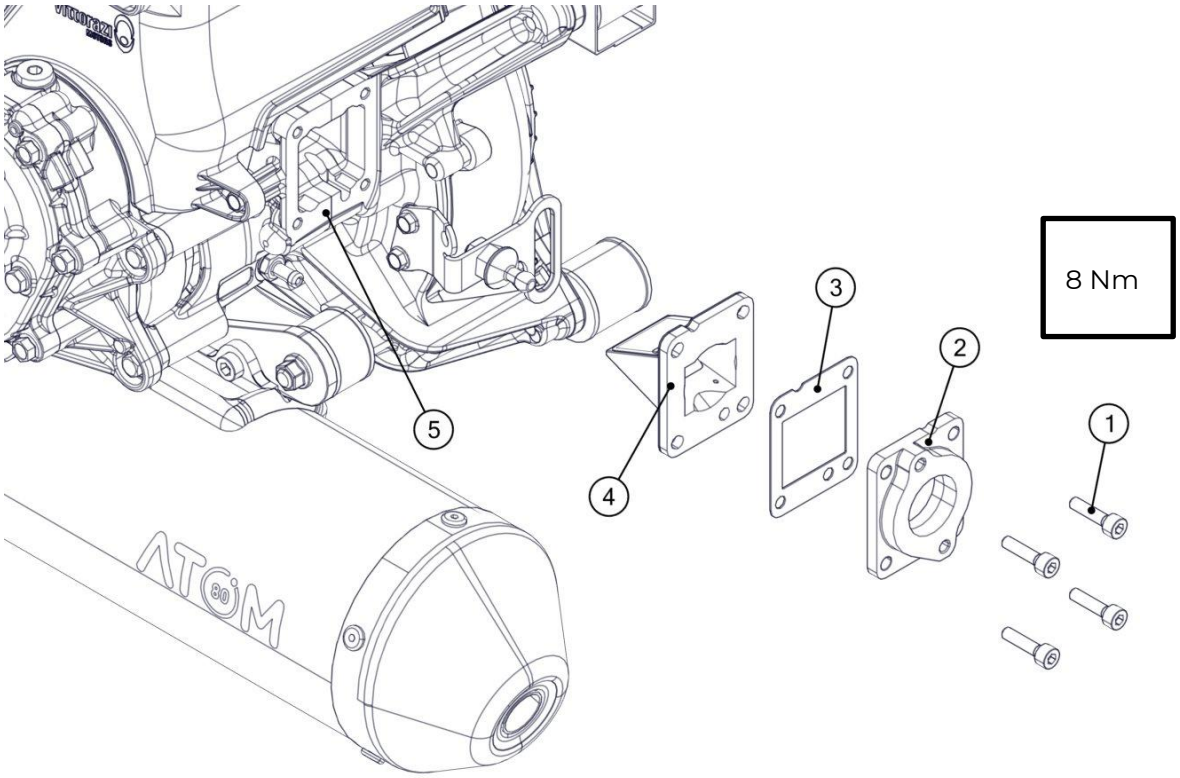


Place the petals (8) against the bearing surface (9).
Position the stoppers (7) and insert the 2 screws (6) with threadlocker (recommended Loxeal 55-03/Loctite 243).



Check that the petals rest perfectly on the surface of the reed valve (see previous photos).

Carry out the same operations on the other side of the reed valve.
Place the reed valve (4) with the gaskets (3) on the crankcase (5).
Insert the carburettor flange (2).
Insert the 4 Allen screws M5x20 (1) into the carburettor flange (2), tighten progressively, with the torque shown in the figure.



3.6 Gaskets

Always replace the gaskets when removing components in contact with them or in the event of leakage. Also, if the motor is not used for a long period of time, check the condition of the gaskets.

For gasket replacement see the following chapters: 3.4 Carburettor, 3.5 Reed valve, 3.7 Exhaust system, 3.11 Transmission, 3.12 Piston, cylinder, head.

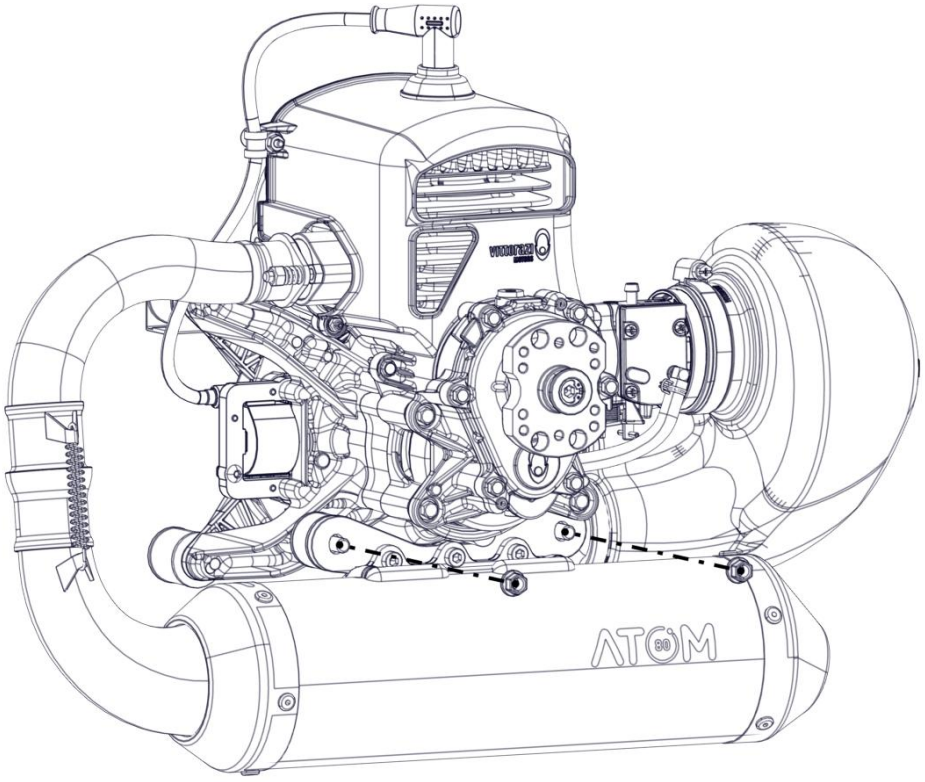
3.7 Exhaust system

Components to replace	<table><tr><th></th><th>Time limit</th></tr><tr><td>Exhaust bushing (AT172)</td><td>150 h</td></tr><tr><td>O-rings (AT171, AT173).</td><td>150 h</td></tr><tr><td>Self-locking nuts M6 (MP047a).*</td><td>150 h</td></tr><tr><td>Exhaust manifold (AT180a).</td><td>200 h</td></tr><tr><td>Springs (M139, MP140, MP141).</td><td>200 h</td></tr><tr><td>Silencer soundproofing material (AT184).</td><td>150 h</td></tr><tr><td>Rivets (MP161).*</td><td>150 h</td></tr><tr><td>Self-locking nuts M8 (M019).*</td><td>150 h</td></tr><tr><td>Silicone HT Sil.</td><td></td></tr><tr><td>FP Siliconpound 225</td><td></td></tr><tr><td>Silicone Protec SSCG-NVHT.</td><td></td></tr></table>
Special tools	Not required.
Values	Exhaust studs M6: 10 Nm. Self-locking nuts M8: 18 Nm.

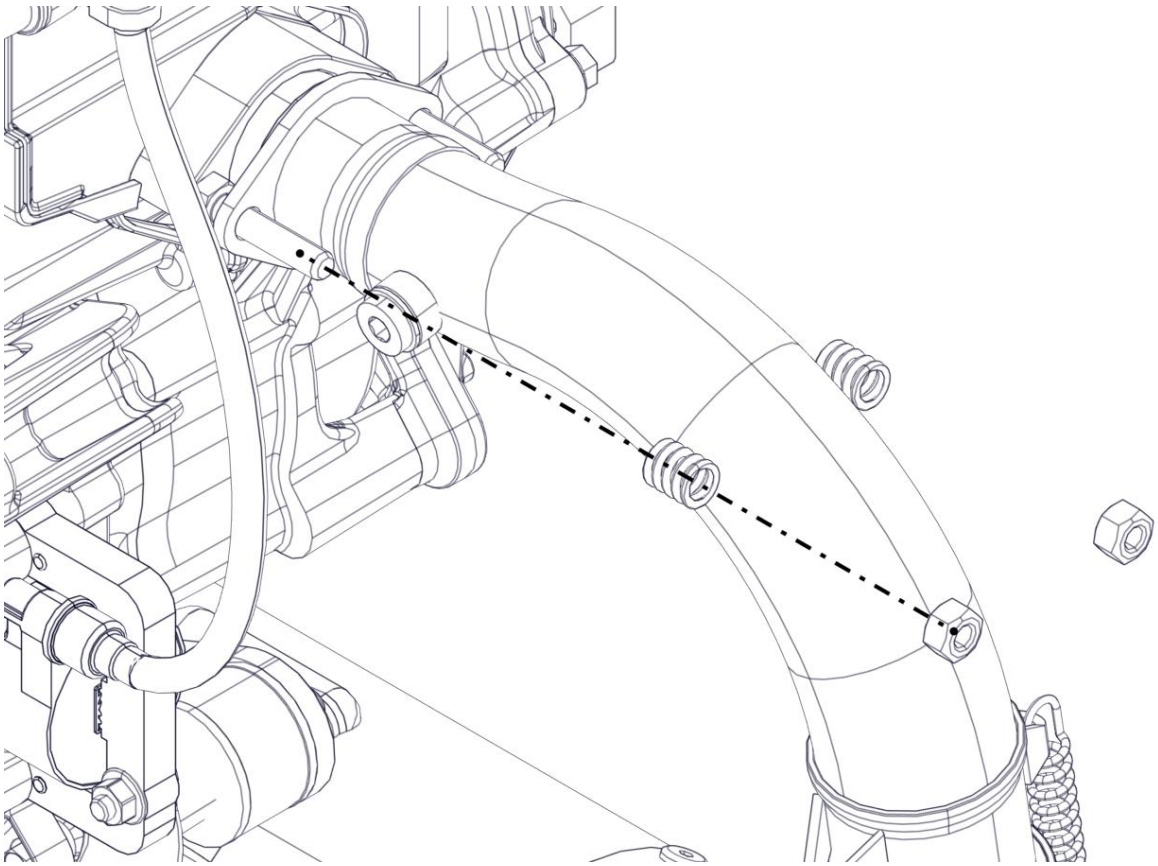
*Always replace it when disassembled.

3.7.1 Exhaust system disassembly

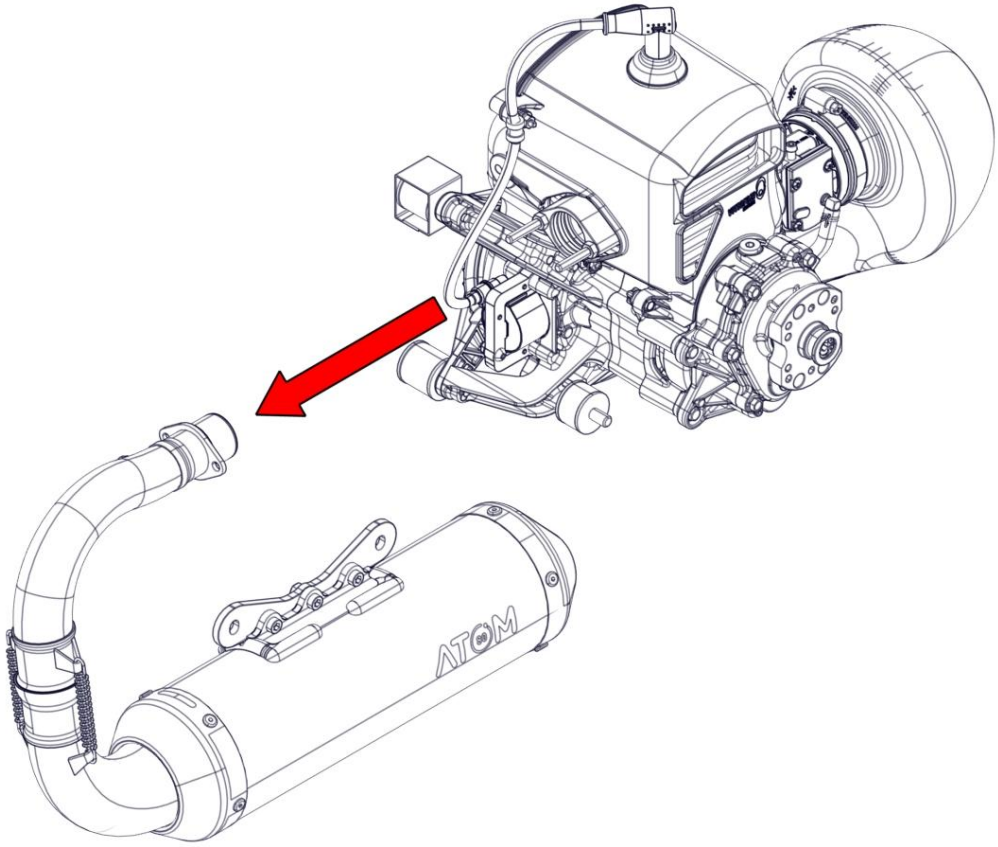
Remove the 2 self-locking nuts M8 from the rubber mountings of the exhaust system.



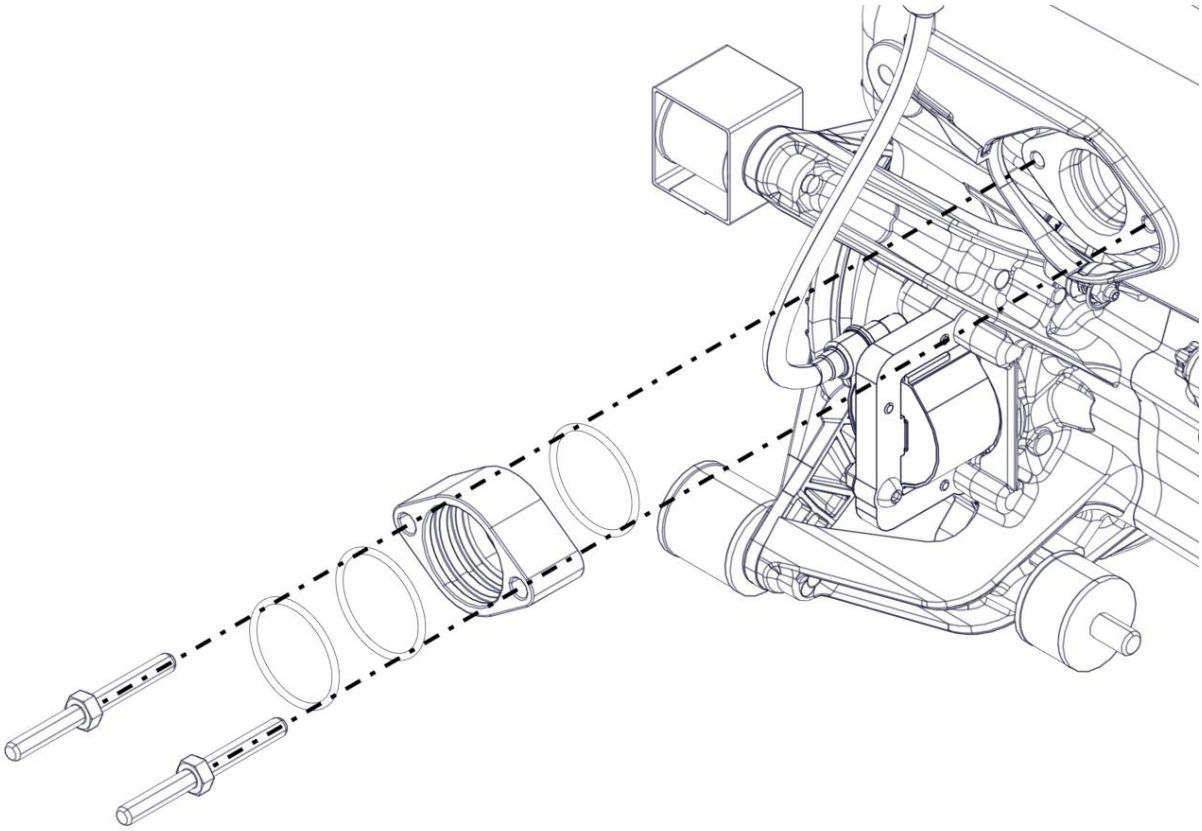
Remove the 2 self-locking nuts M6 and 2 springs from the exhaust studs.



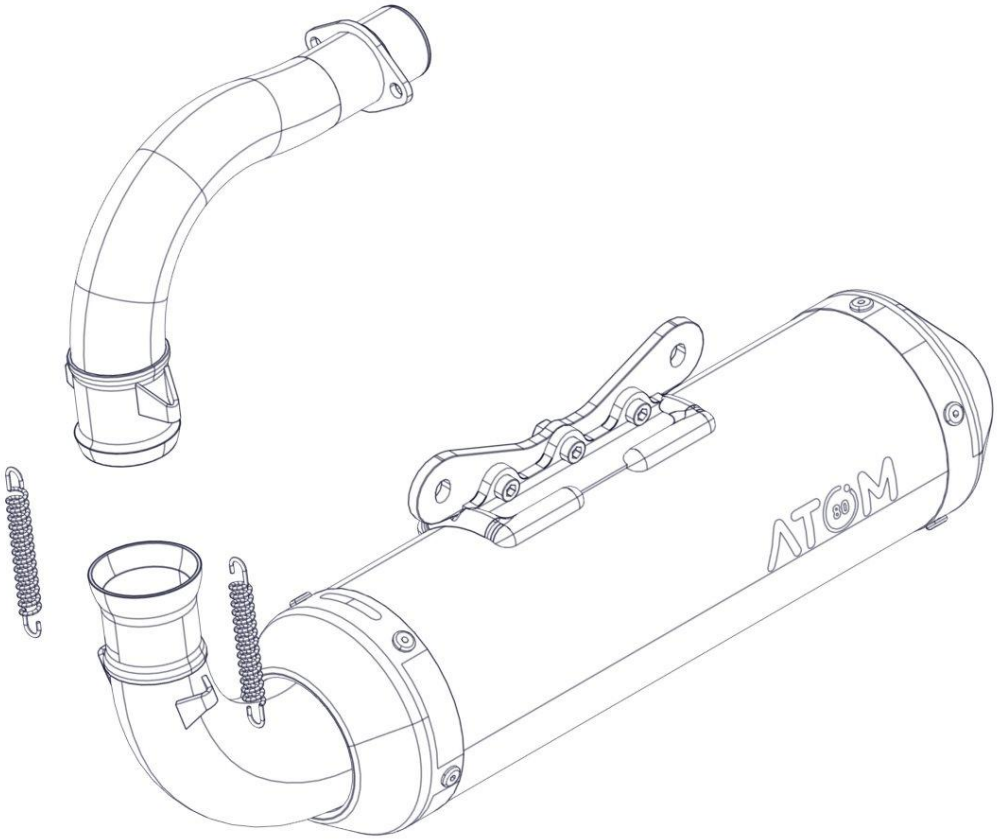
Remove the exhaust system.



Remove the 2 studs M6 and the bushing.
Remove the 3 O-rings from the bushing.
Apply FP Siliconpound 225 to the o-rings



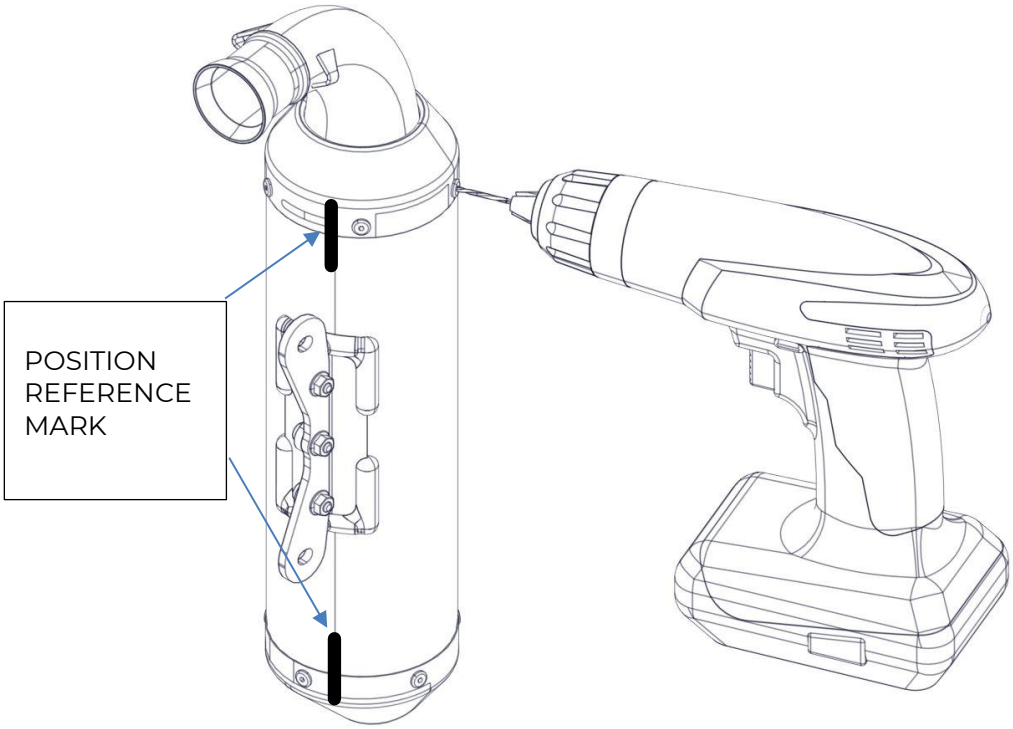
Remove the 2 safety cables around the springs of the coupling.
Remove the 2 springs.



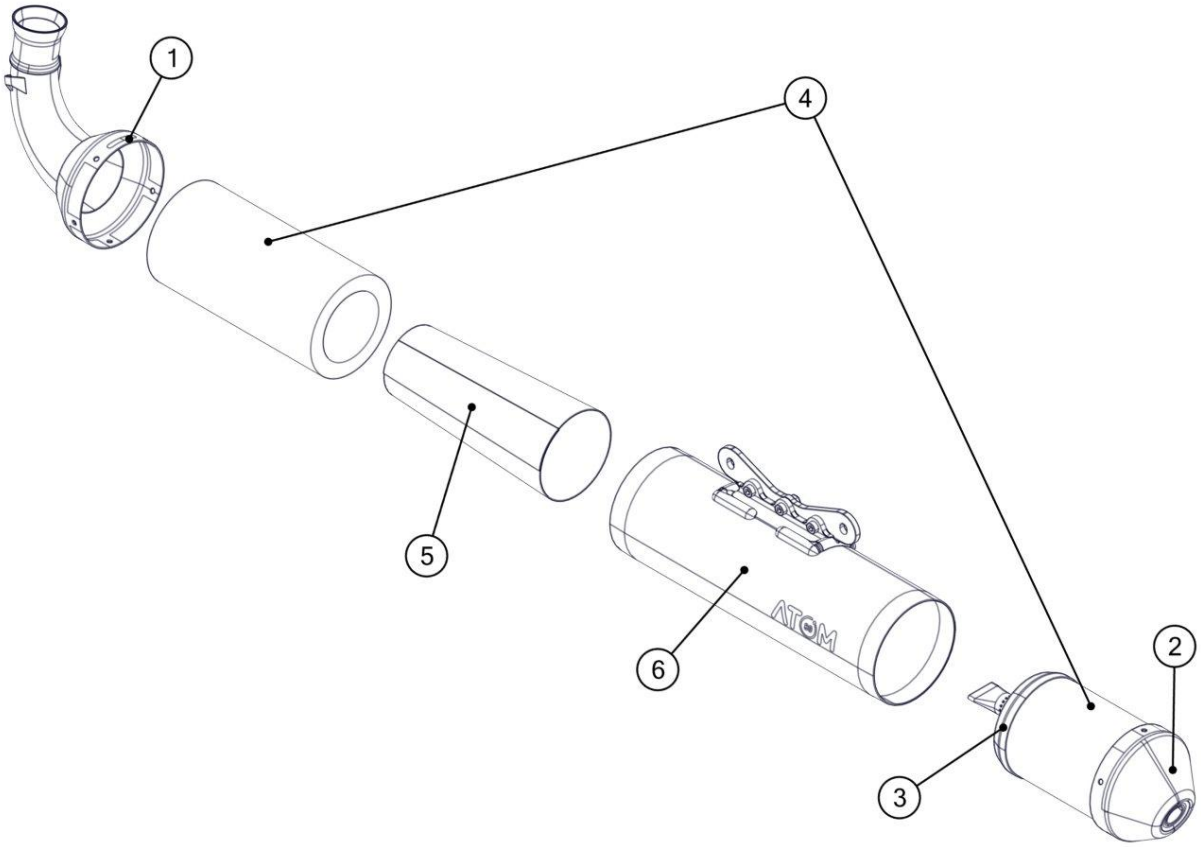
Drill the 10 rivets centrally using a drill with a 5 mm diameter bit.

Before disassembling de silencer mark the position of the end caps with an erasable marker

Do not drill too deep or you will damage the wire mesh inside the silencer.



Use a heat gun to heat the end caps (6, 9) in order to facilitate the release of the silicone.
Remove the following components from the silencer housing (6): the end caps (1, 2-3), the sound-absorbing material (4) and the wire mesh (5).



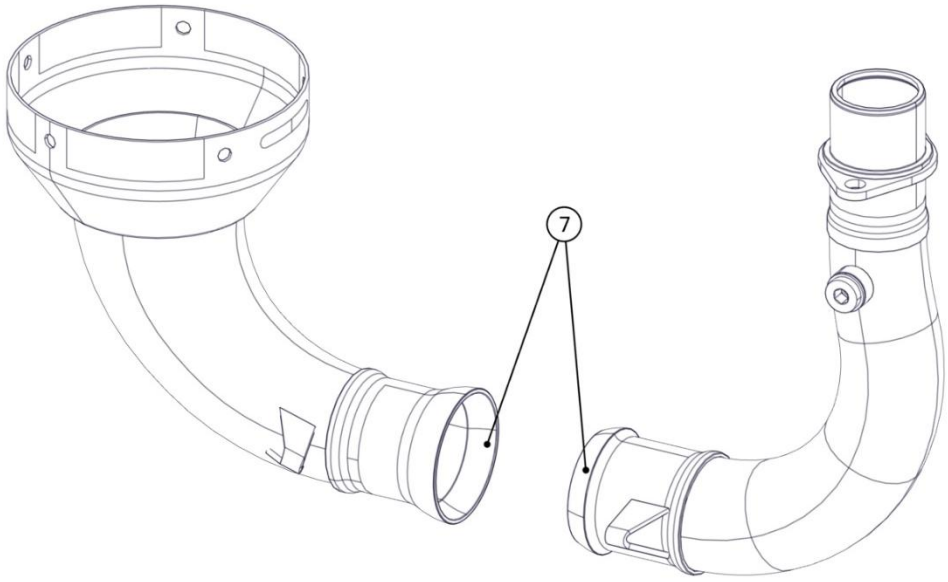
3.7.2 Exhaust system maintenance

Remove silicone residue from inside the silencer.

Thoroughly clean the bottoms and body of the silencer with a cloth and thinner.
Check the integrity of the silencer body both internally and externally: there must be no cracks or damaged areas, otherwise replace it. For routine maintenance, follow the table.

Check the integrity of the exhaust manifold: there must be no cracks or damaged areas, otherwise it must be replaced. For routine maintenance, follow the table.

Clean the ball joint (7) with an abrasive sponge (e.g. Scotch-Brite),



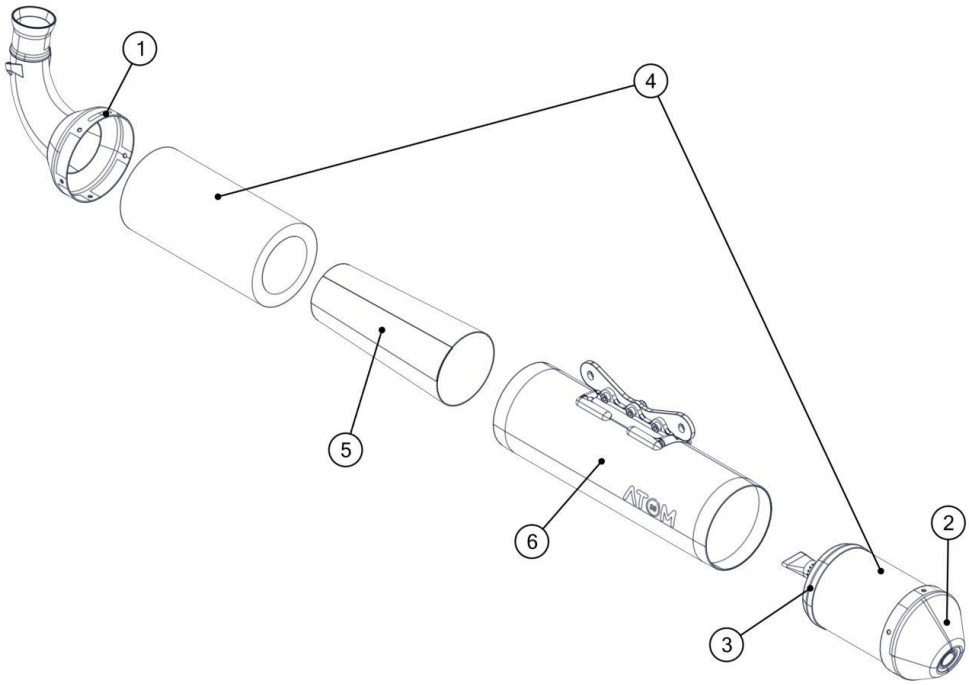
3.7.3 Exhaust system assembly

Put high-temperature silicone (HT Sil) on the inside edge of the end cap (2).
Place the sound-absorbing material (4) on the end cap (2) then position them in the silencer body (6).
Wet 5 rivets with high-temperature silicone (HT Sil) and fix them on the end cap (2).
Put high-temperature silicone (HT Sil) on the inner end cap (3).

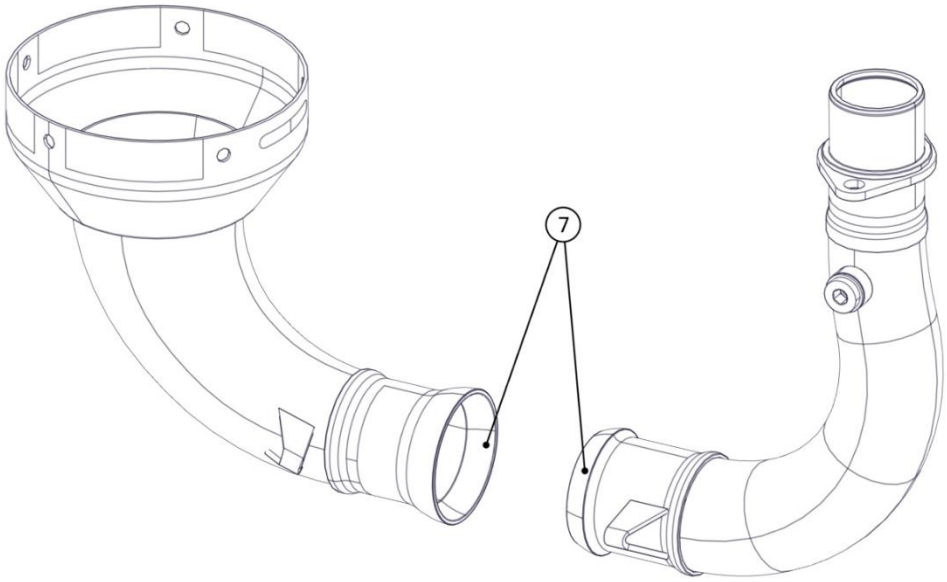
Correctly orient the wire mesh (5): the smaller diameter of the mesh is on the side of the initial boss (1).

Place the sound-absorbing material (4) on the wire mesh (5) then position them in the silencer body (6).
Put high-temperature silicone (HT Sil) on the inside edge of the initial boss (1).
Position the start boss (1) on the silencer body (6).
Wet 5 rivets with high-temperature silicone (HT Sil) and fix them on the initial boss (1).





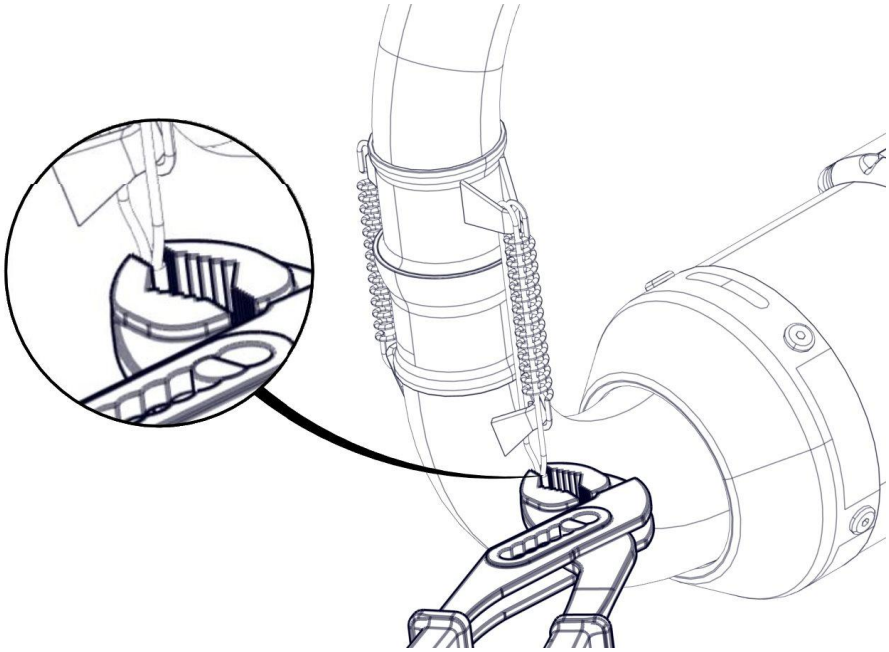
Degrease it with solvent and apply Protec SSCG-NVHT silicone.



Hook the 2 springs onto the joint.

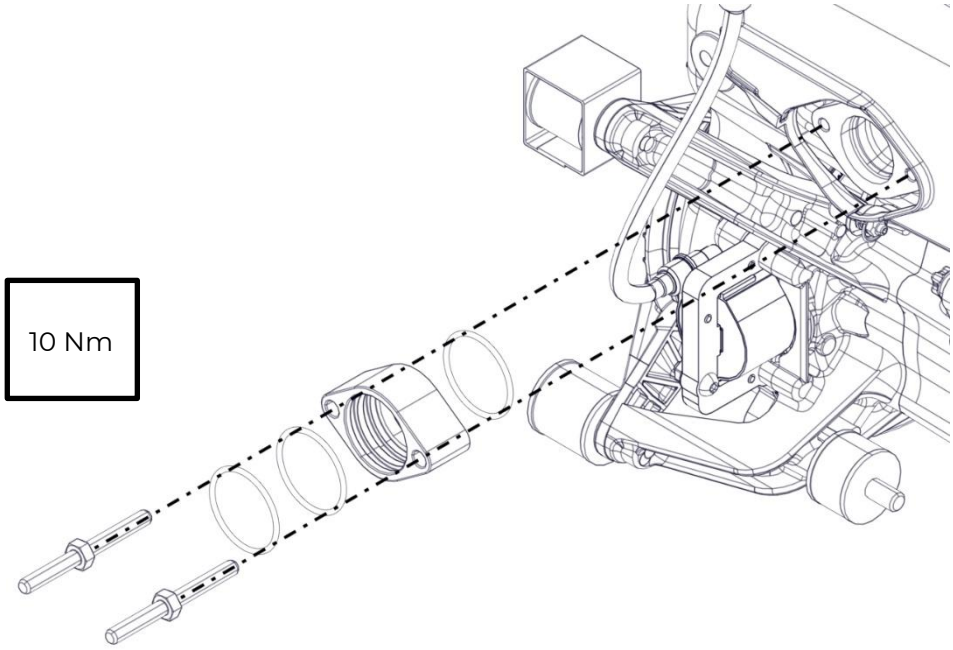
Run 2 cables around the springs of the joint (one cable for each spring), insert a clamp on the ends and tighten with pliers.

Apply heat shrinkable hoses.

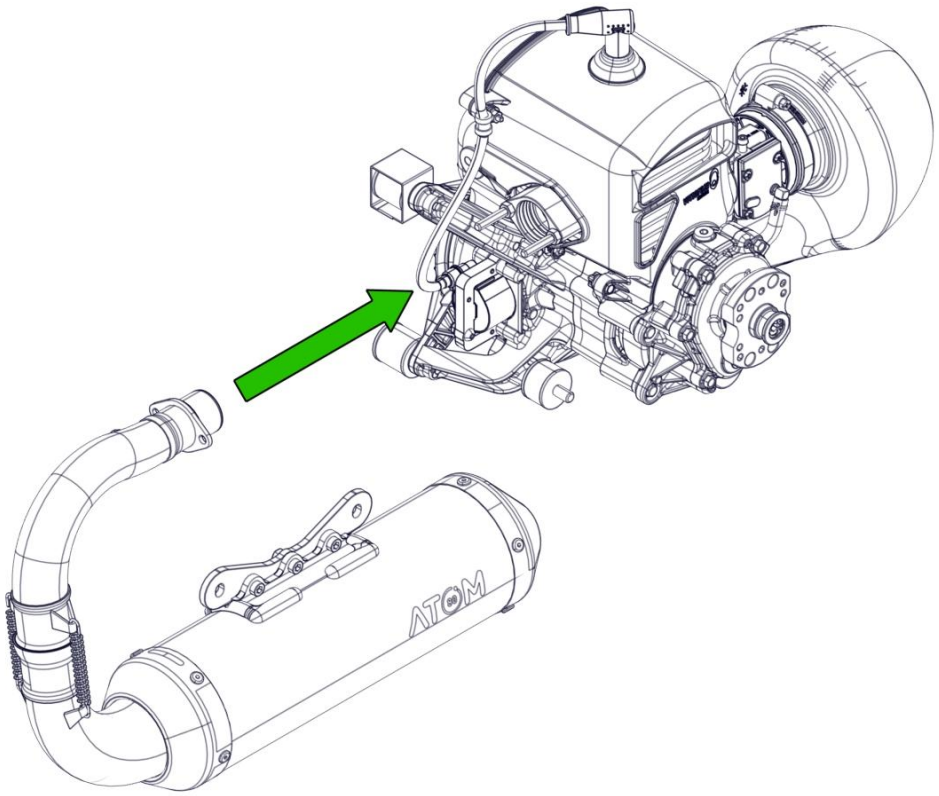


Replace the bushing and the 3 O-rings.

Insert the 3 O-rings into the bushing.
Insert the bushing, the 2 studs M6 and tighten with the torque shown in the figure.

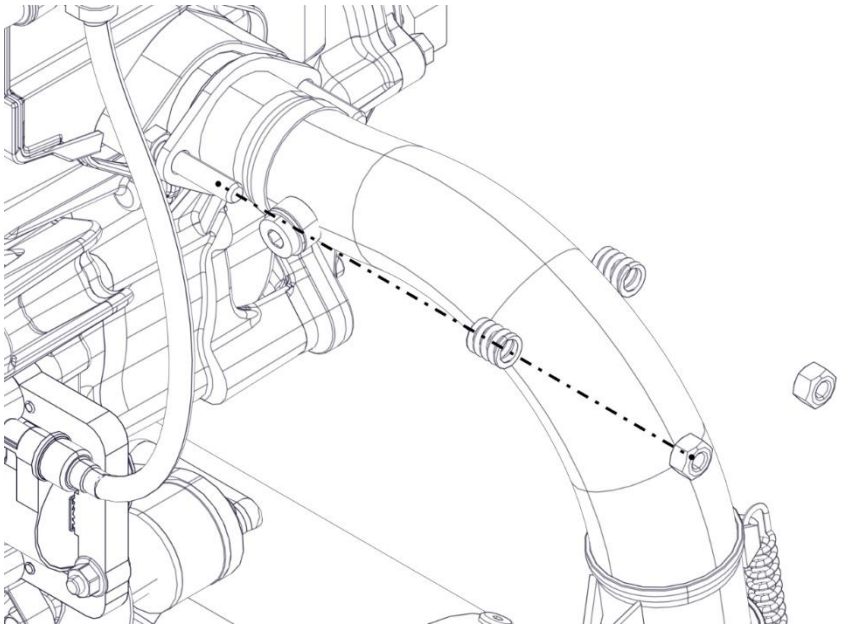


Connect the exhaust pipe.



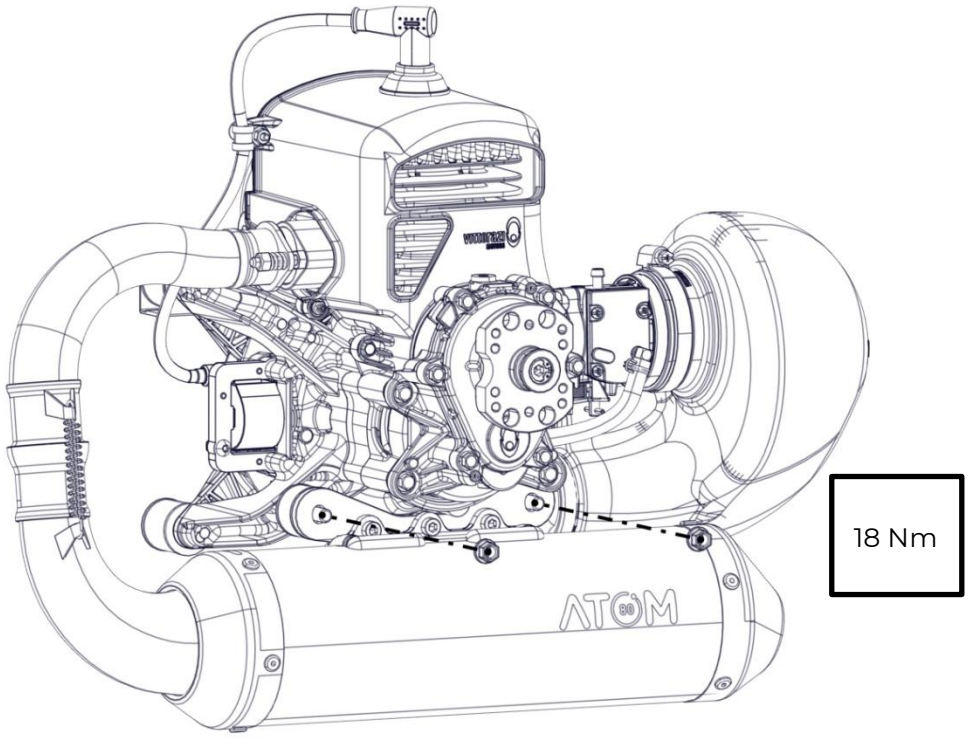
Replace the 2 self-locking nuts M6.

Insert the 2 springs, the 2 self-locking nuts M6 on the exhaust studs and tighten by hand.



Replace the 2 self-locking nuts M8.

Insert the 2 self-locking nuts M8 on the rubber mountings of the exhaust system and tighten with the torque shown in the figure.



3.8 Rubber mountings

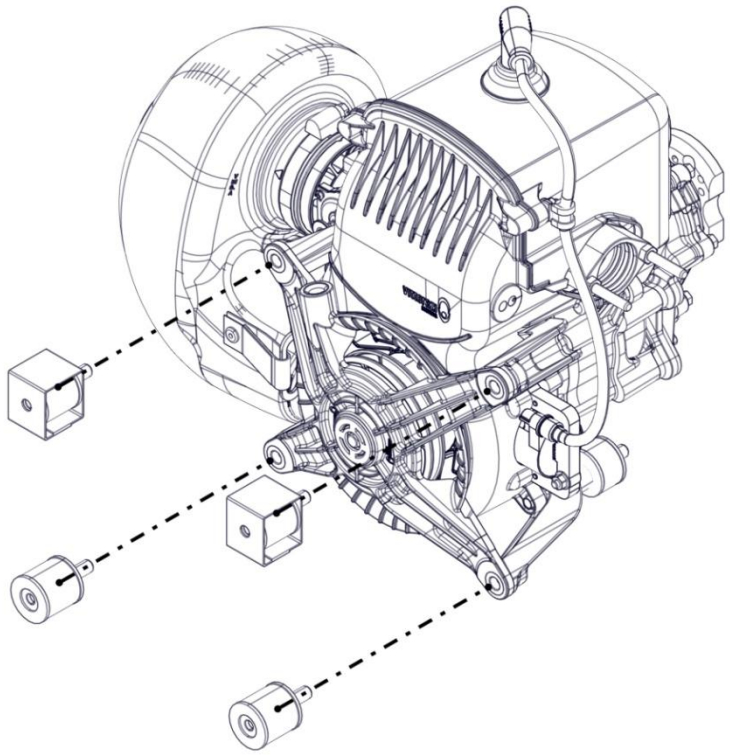
Components to replace	<table><tr><th></th><th>Time limit</th></tr><tr><td>Engine rubber mountings (M021, M021f).</td><td>150 h or 1 year</td></tr><tr><td>Exhaust system rubber mountings (M151c).</td><td>150 h or 1 year</td></tr></table>
Special tools	Not required.
Values	No values

3.8.1 Rubber mountings disassembly

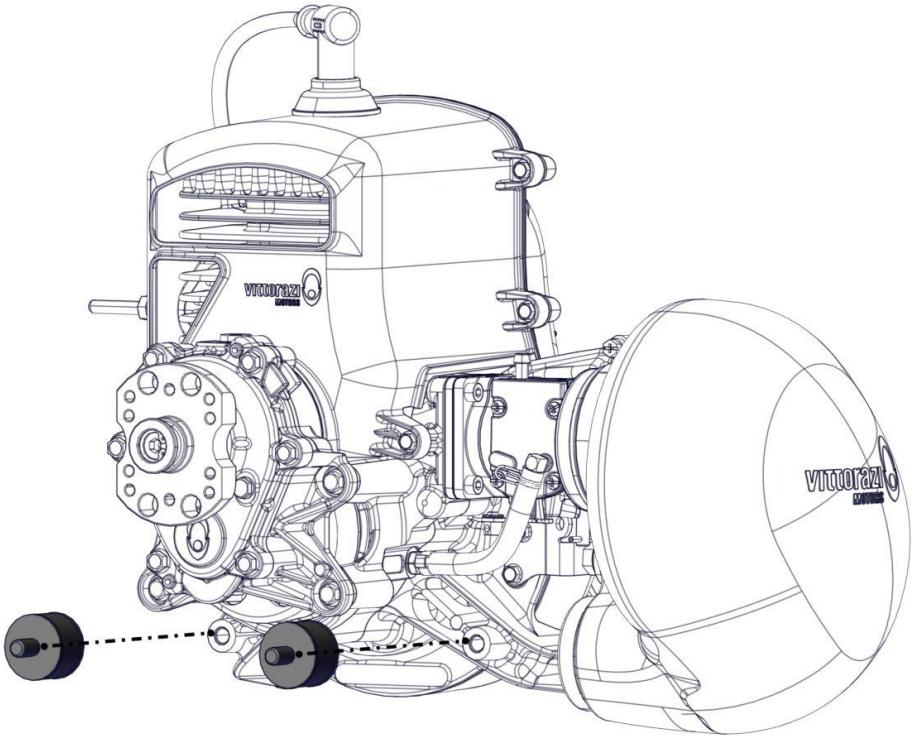
When locking the rubber mountings during maintenance take care not to damage them.

Before dismantling the rubber mountings, remove the exhaust system (3.7 Exhaust system).

Remove the 4 rubber mountings from the motor mount.



Remove the 2 rubber mountings of the exhaust system.

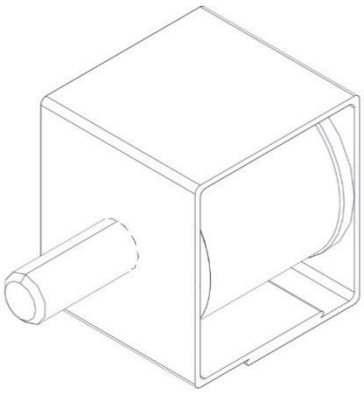


3.8.2 Rubber mountings maintenance

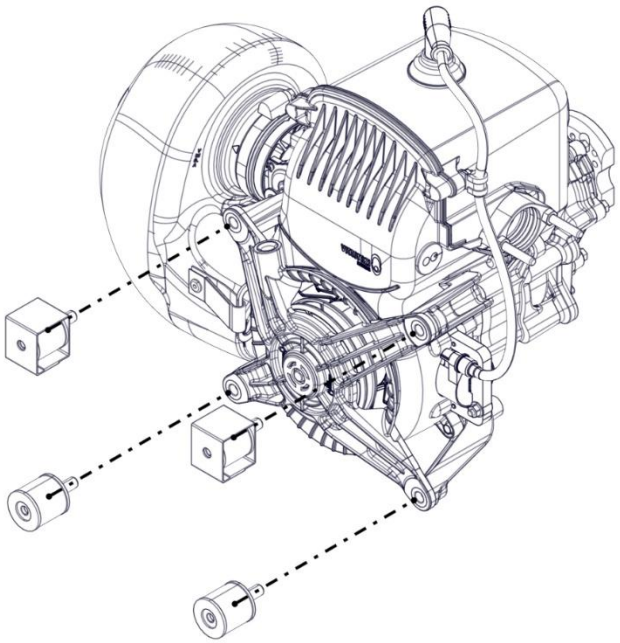
Check the integrity of the rubber mountings: there must be no cracks or detachment of material, otherwise they must be replaced. For routine maintenance, follow the table.

3.8.3 Rubber mountings assembly

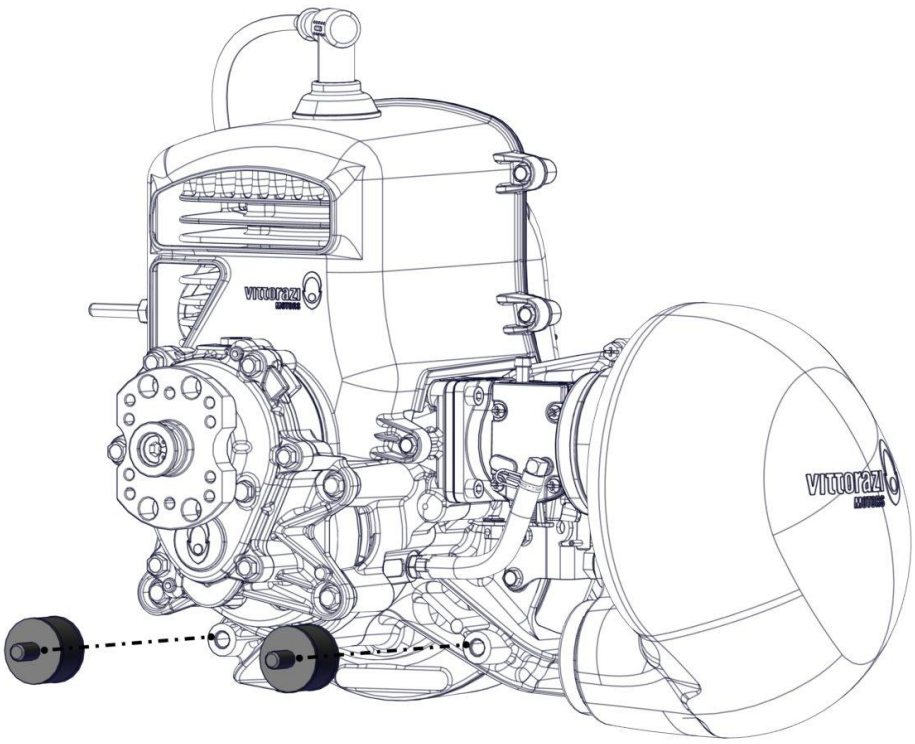
Replace the safety belts, the 2 rubber mountings of the engine mount as shown in figure.



Insert the 4 rubber mountings of the motor bracket.



Insert the 2 rubber mountings of the exhaust system.



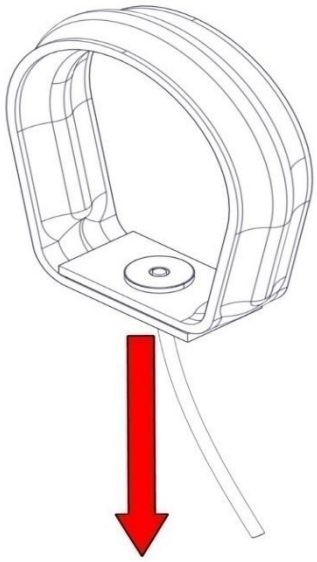
3.9 Pull starter system

Components to replace	<table><tr><th></th><th>Time limit</th></tr><tr><td>Rope (M043)</td><td>100 h</td></tr><tr><td>Hooks spring (MP057)</td><td>100 h</td></tr><tr><td>Hooks (MP055)</td><td>100 h</td></tr><tr><td>Nanotech lubricant*</td><td>100 h</td></tr><tr><td>HHS grease*</td><td>100 h</td></tr><tr><td>Loxeal 83-55/Loctite 270*</td><td>100 h</td></tr><tr><td>Loxeal 24-18/Loctite 222*</td><td>100 h</td></tr></table>
Special tools	Not required.
Values	Screws M6x25: 10 Nm.

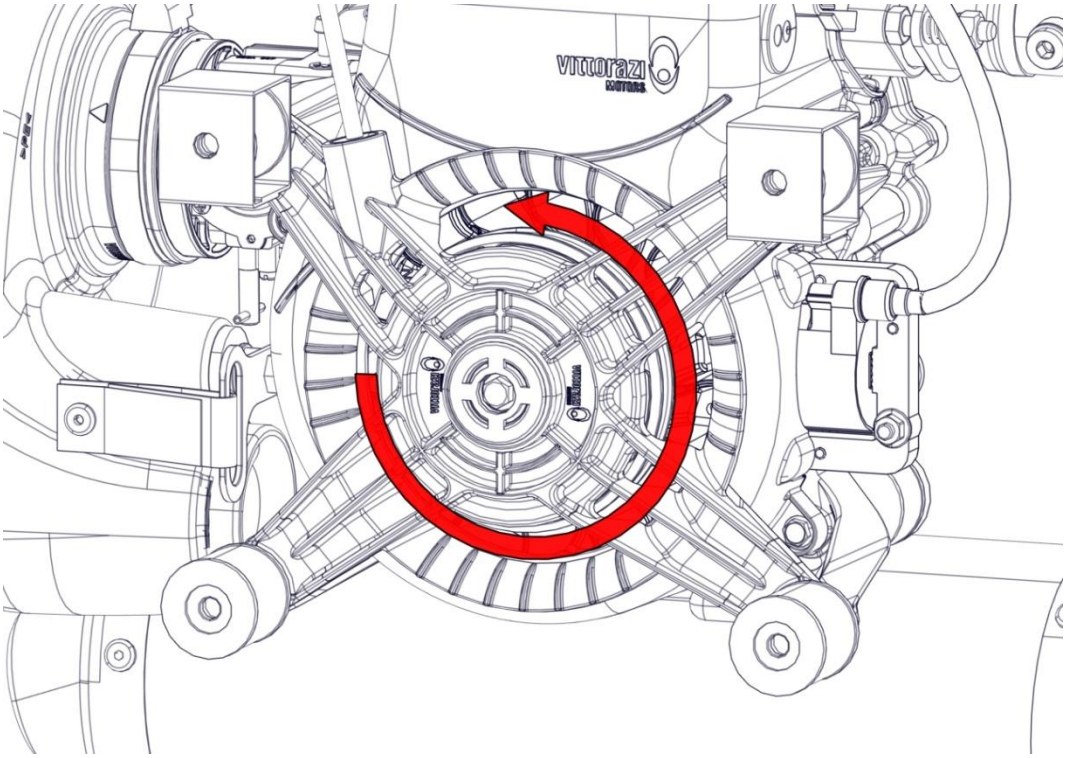
*Always replace it when disassembled.

3.9.1 Pull starter system disassembly

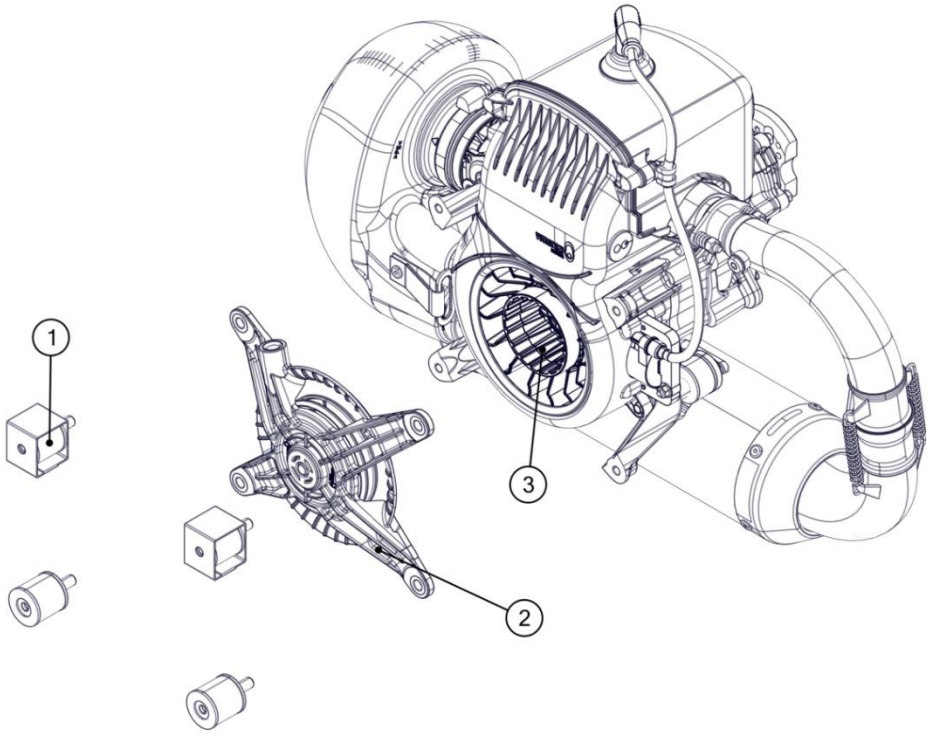
Remove the starter handle from the rope.



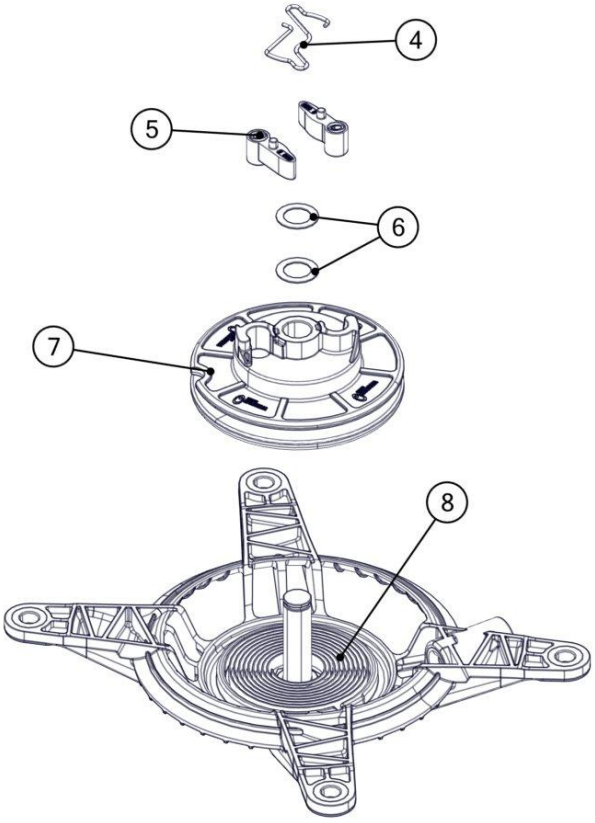
Allow the winding pulley to rotate so that the tension given by the recovery spring is lost.



Remove the 4 rubber mountings (1) from the manual starter bracket (2).
After removing the manual starter, the cup (3) mounted on the flywheel will be visible.



Remove the spring of the hooks (4), the 2 hooks (5), the washers (6) and the pulley (7) taking care to leave the recovery spring (8) in its place.

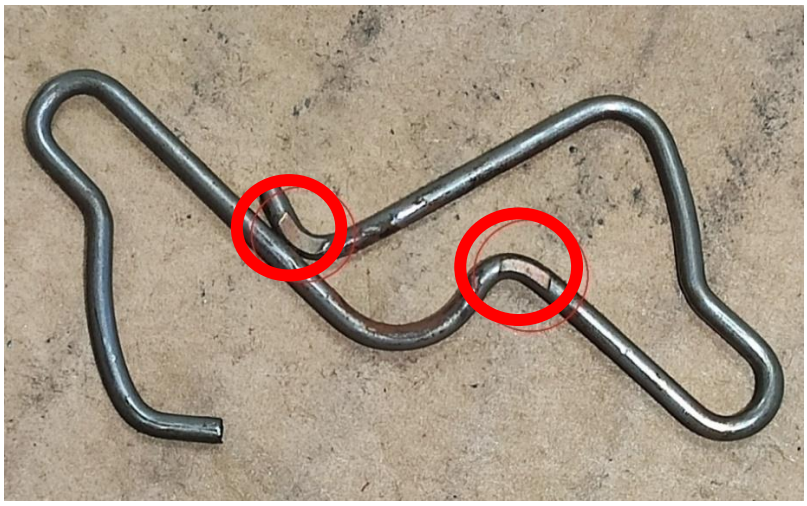


Remove the rope by untying the knot and pulling it off the pulley

3.9.2 Pull starter system maintenance

Check the rope: replace it if it shows signs of wear. For routine maintenance, follow the table.

Check the spring of the hooks: if it shows signs of wear as in the picture, replace it. For routine maintenance, follow the table.



Check the hooks, in particular the tips must not be damaged, otherwise they must be replaced. For routine maintenance, follow the table.

Check the washers: if they show signs of wear as in the picture, replace them with new washers of the same thickness.

Check that the return spring is intact and not deformed, particularly in the area shown in the photo, otherwise replace it.

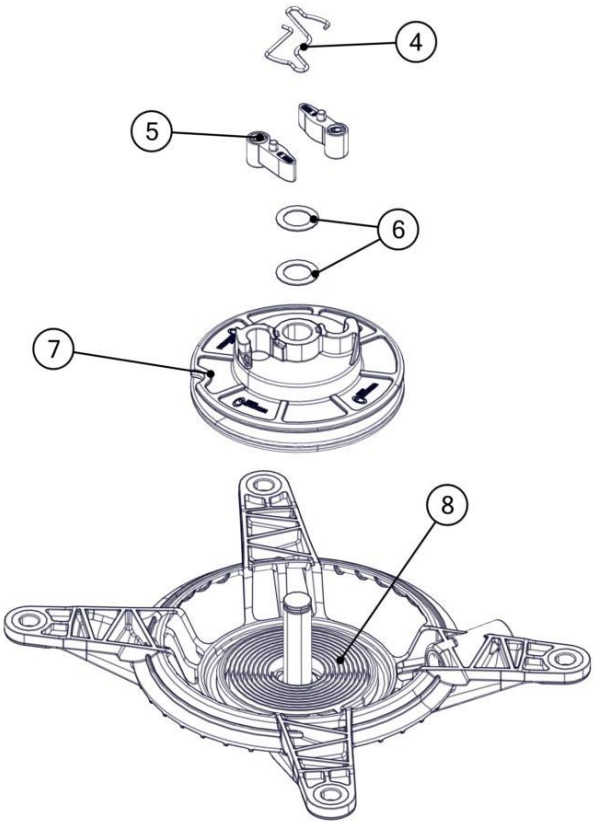
Insert the spring of the hooks on the central pin and turn it, if any blockage or jamming occurs the pin must be replaced.

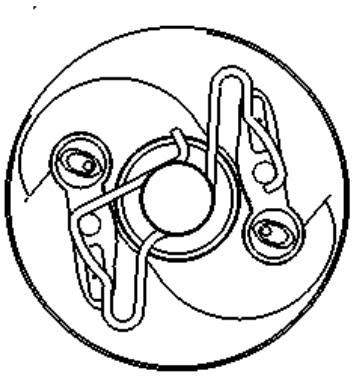
Failure to replace a worn pin can block the movement of the pulley and thus prevent the manual starter rope from being rewound correctly.

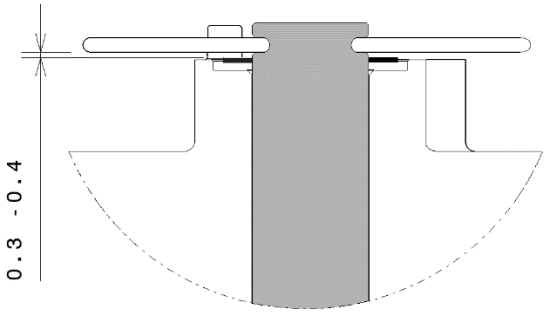
3.9.3 Pull starter system assembly

If the washers are different, place the thinner ones first and then the thicker ones.

Insert the washers (6), the 2 hooks (5) and the spring of the hooks (4).
Position the pulley and the hooks according to the image below, check that the gap between spring and washers are is between 0.35 and 0.45 mm if not remove the washers and use washers with different thickness.





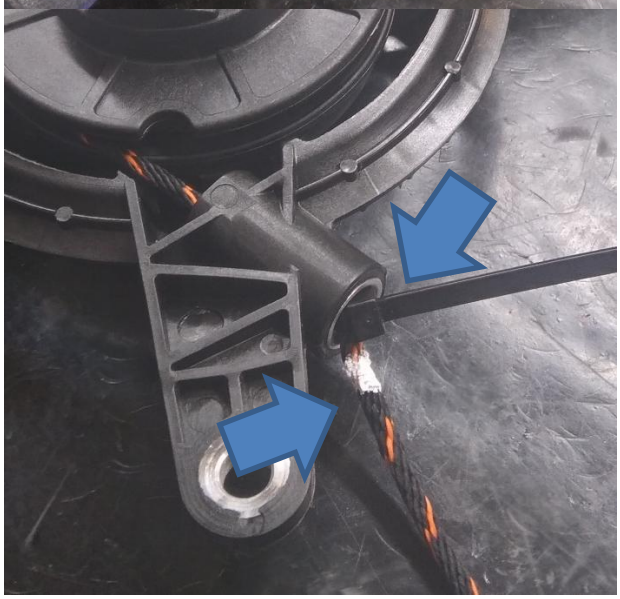


Preload the pulley

Turn the pulley until you find the origin of the spring tension

Hold the pulley and wind 4 turns of rope counterclockwise.

Turn the pulley 2 turns anticlockwise to get the correct preload of the recovery spring.

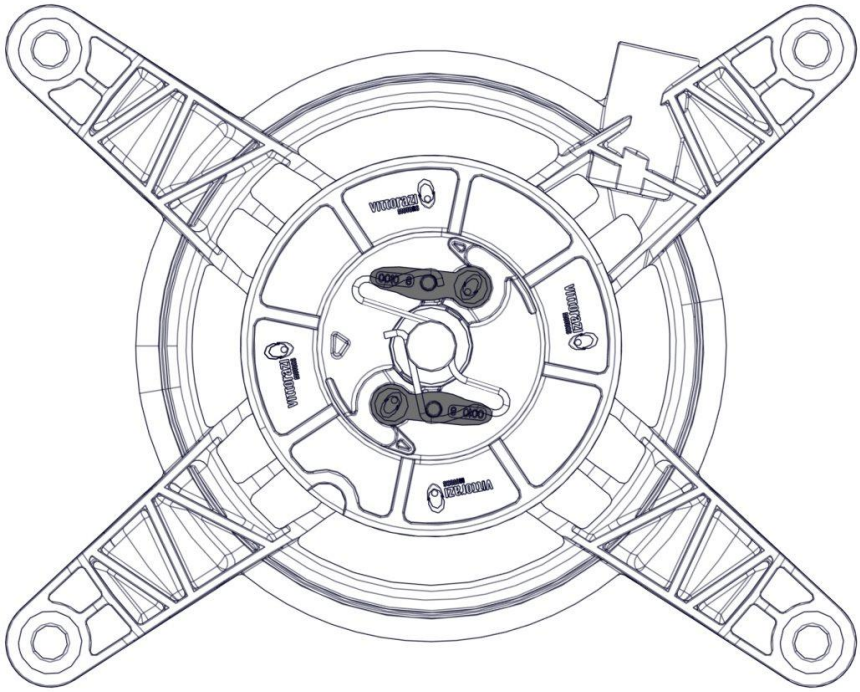


Insert the rope into the rope guide.

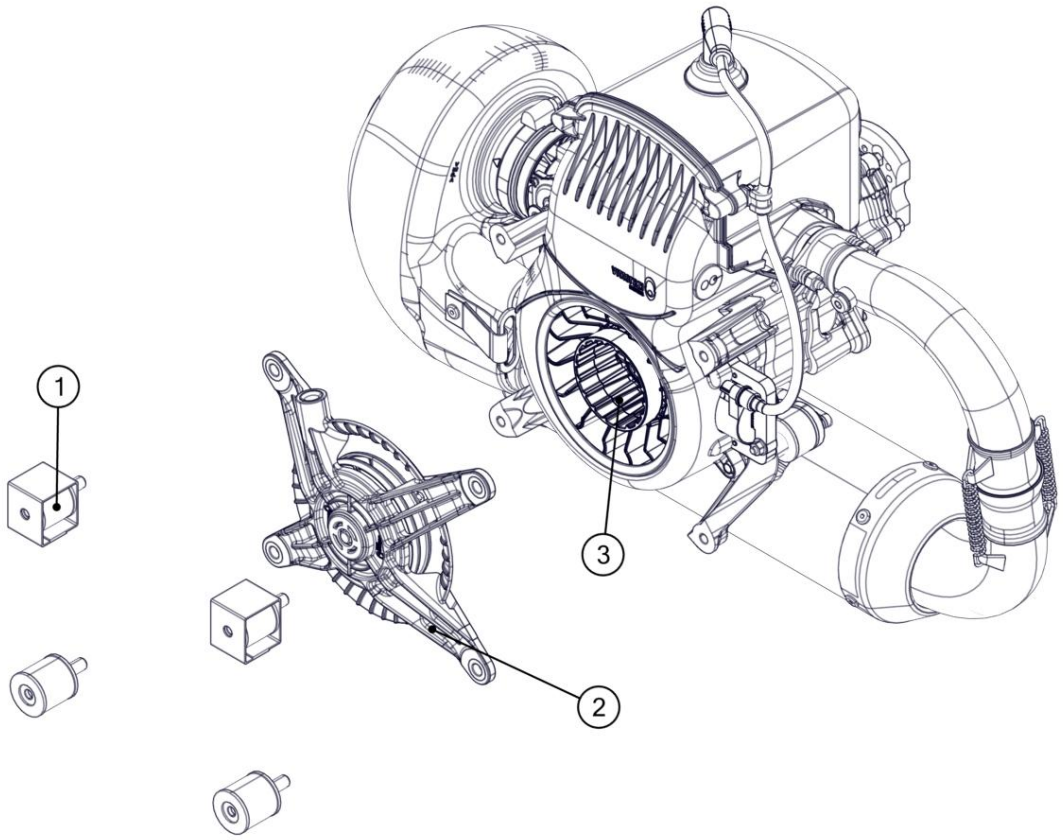
Secure the rope with a cable tie and make a mark on the rope.

.

Before final assembly of the manual starter on the engine, check that the hooks are in the closed position, otherwise they may be damaged.



Insert the 4 rubber mountings into the manual starter bracket (2).



Insert the rope into the guide eyelet of the handle and tie a knot to prevent it from slipping out. Pull the handle and check that the pulley rotates smoothly without blocking.

3.10 Flywheel, coil

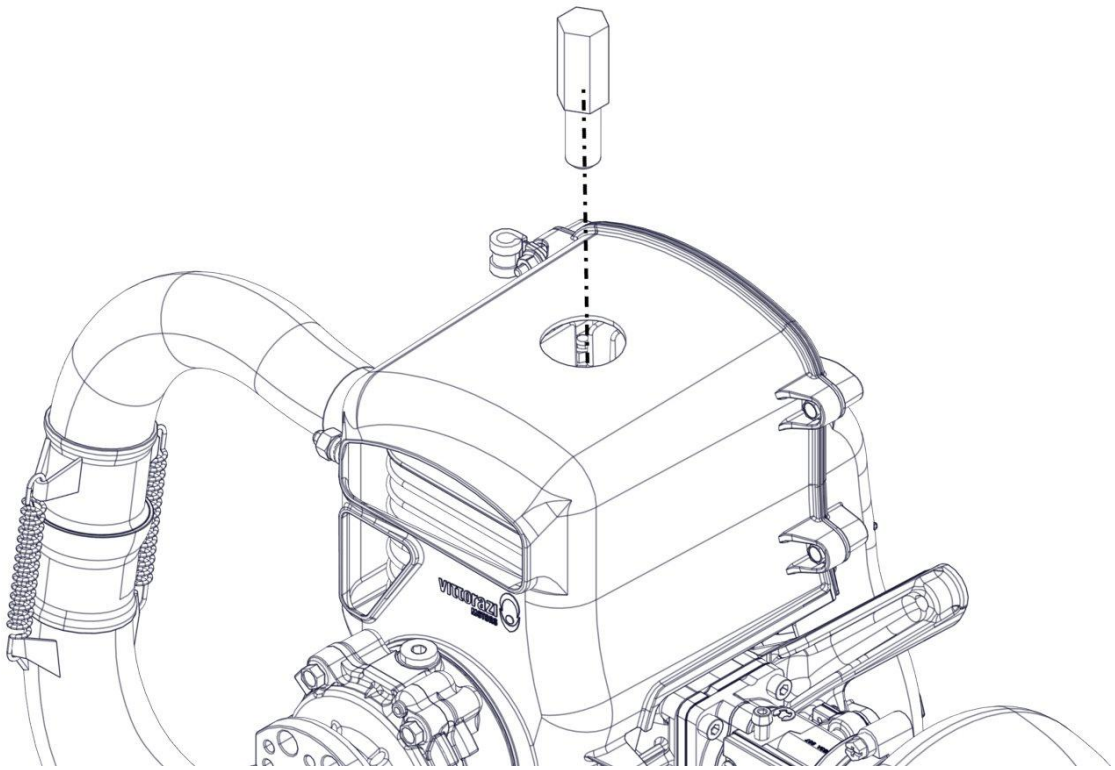
Components to replace	<table><tr><th></th><th>Time limit</th></tr><tr><td>Flywheel (AT034)</td><td>on condition</td></tr><tr><td>Nut M10x1,25 (M037)</td><td>200 h</td></tr><tr><td>Washer* (M036)</td><td>200 h</td></tr><tr><td>Loxeal 83-55/Loctite 270*</td><td>200 h</td></tr></table>
Special tools	Piston lock (ACC104) Flywheel extractor “Selettra” ø 26 mm (ACC103).
Values	Nut M10x1,25: 52 Nm. Ignition coil to flywheel distance: 0.3 mm

*Always replace it when disassembled.

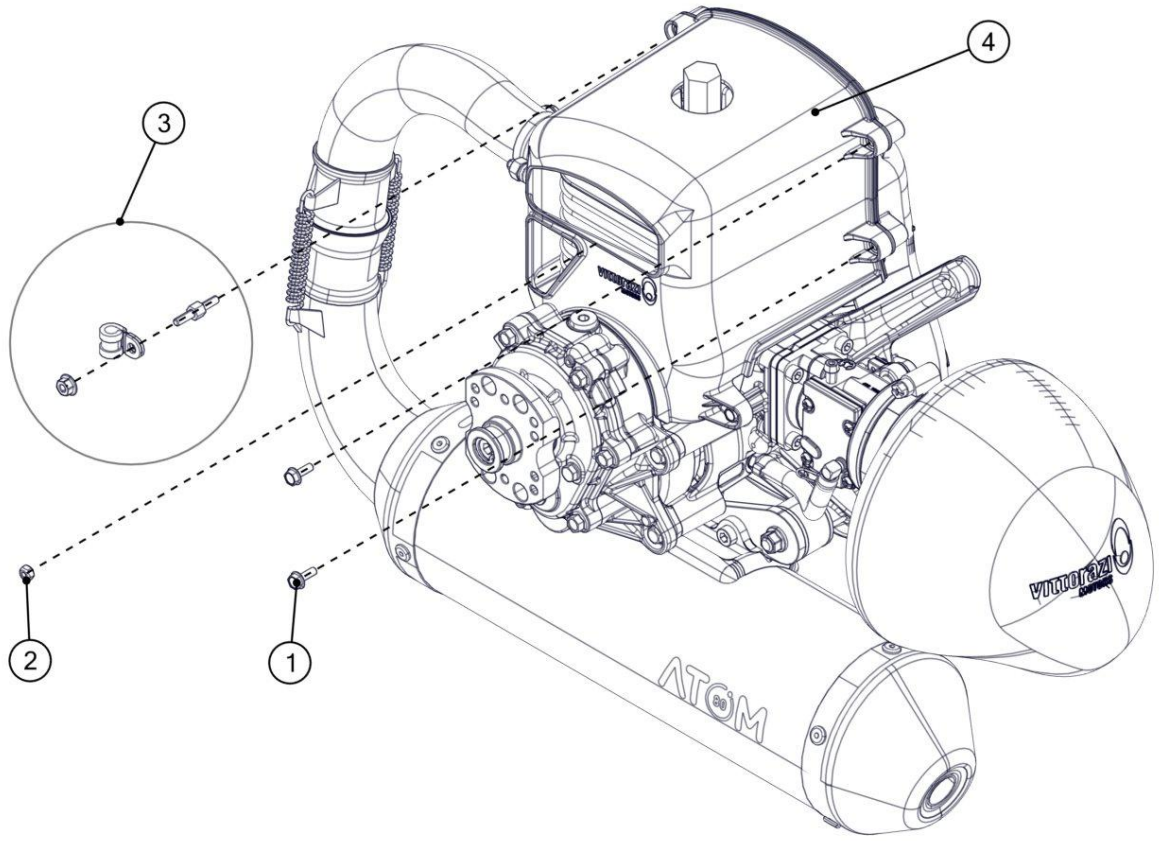
3.10.1 Flywheel, coil disassembly

Before dismantling the flywheel, remove the spark plug (3.2 Spark plug) and pull starter system (3.9 Pull starter system).

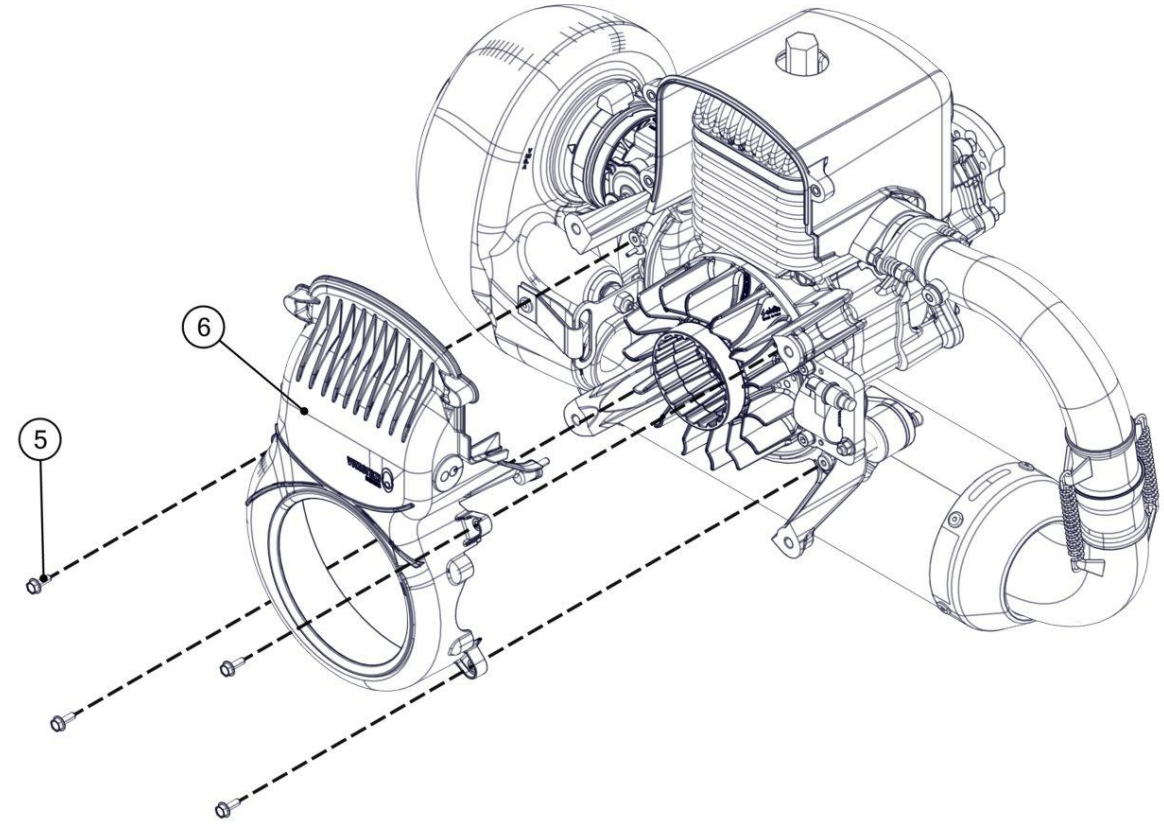
Screw the piston lock into the spark plug hole.



Remove the 2 flange-head screws M4x12 (1), the nut M4 (2) and the stud M4 (3) from the front conveyor (4).

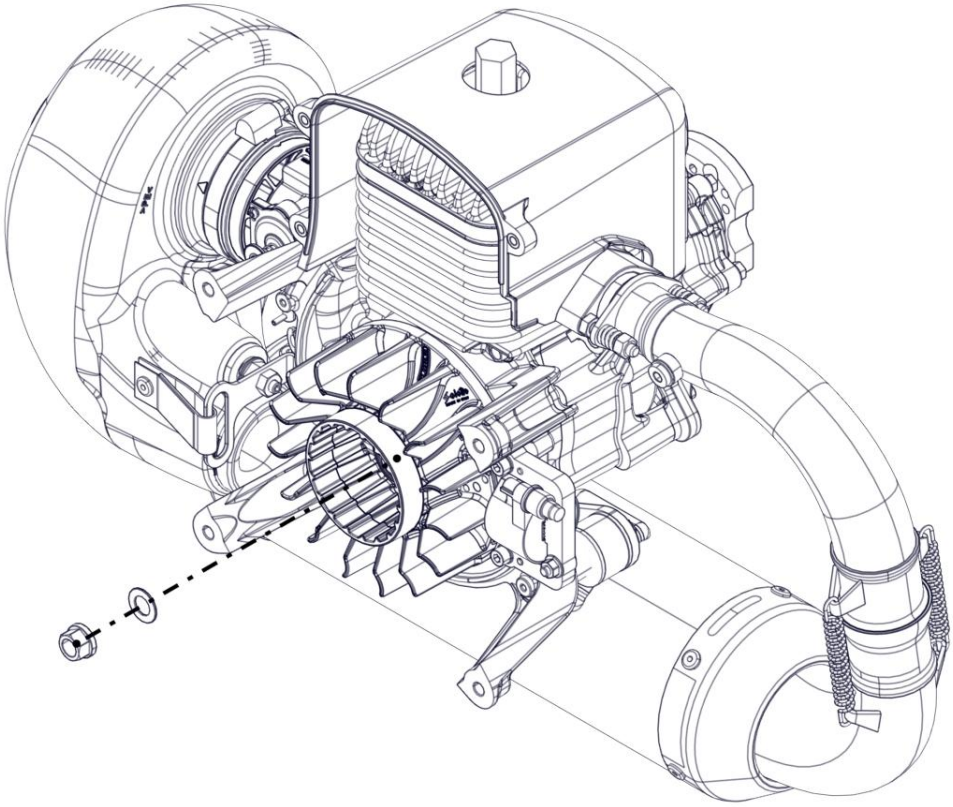


Remove the 4 flange head screws M4x12 (5) from the rear conveyor (6).
Remove the rear conveyor (6).

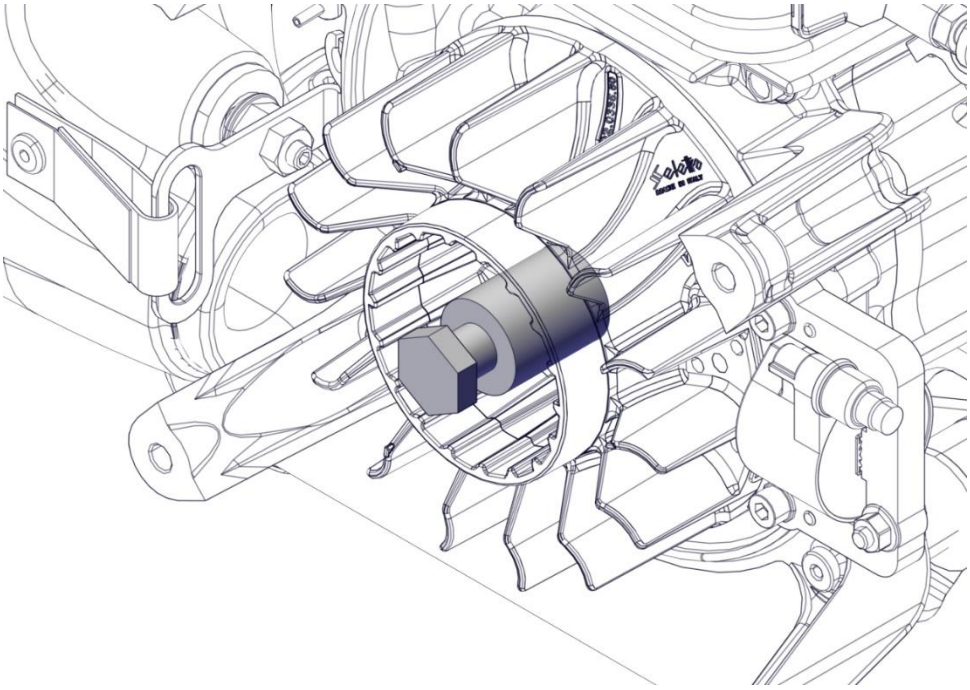


Unscrew the nut M10x1,25. Do not use a pneumatic impact screwdriver, otherwise the piston may be damaged.

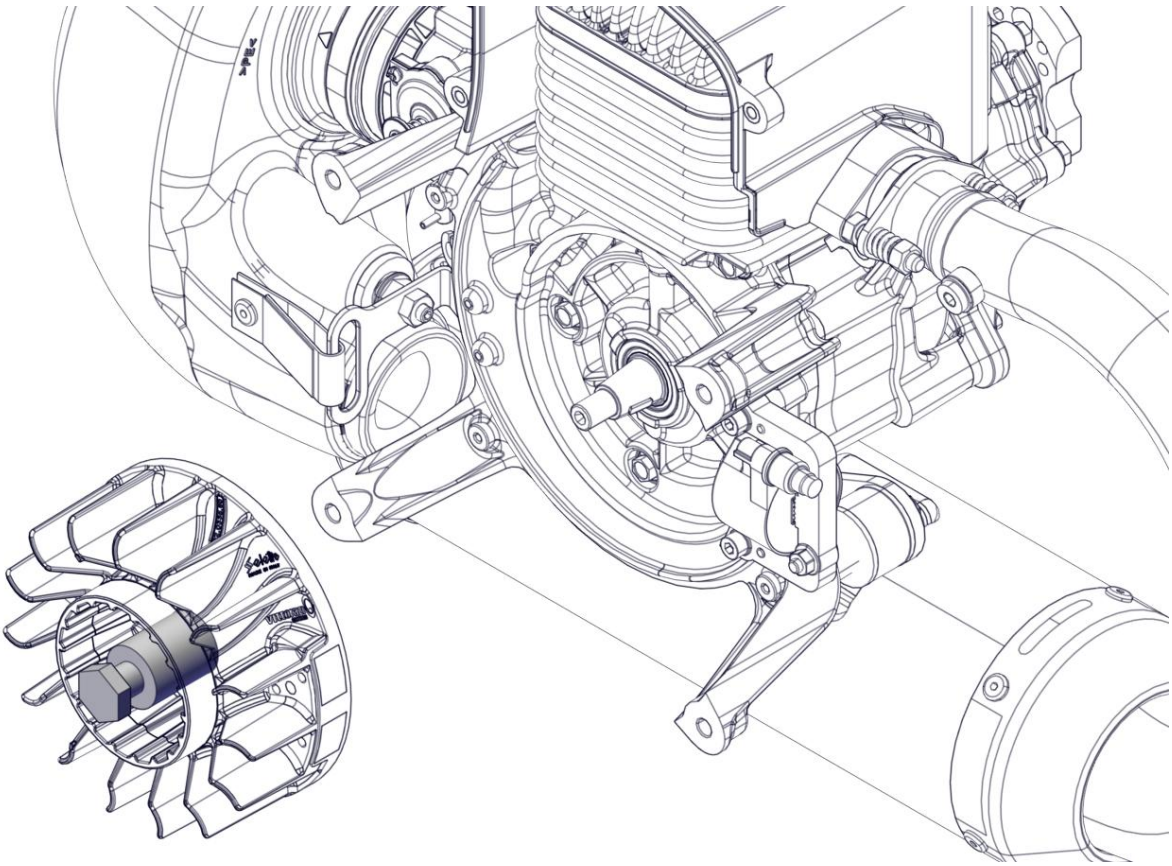
Remove the nut M10x1,25 with the washer.



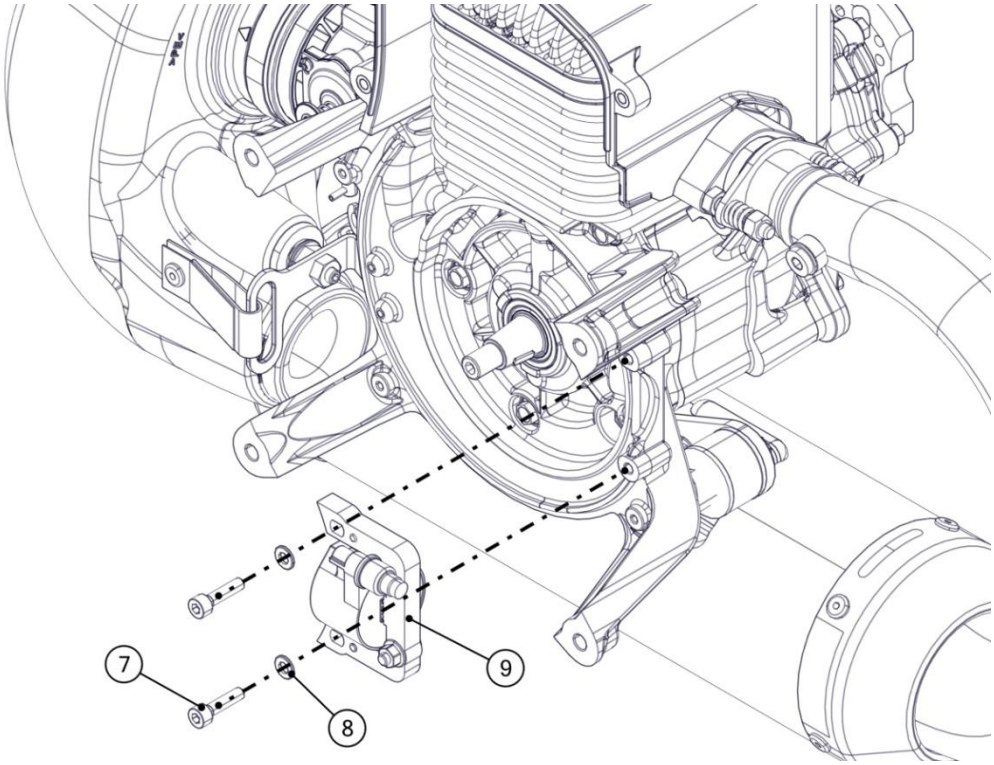
Screw the flywheel extractor into the starter cup.



Turn the central pin of the extractor until the flywheel is removed from the crankshaft.



Remove the 2 Allen screws M5x20 (7) with washers (8) and the coil (9).



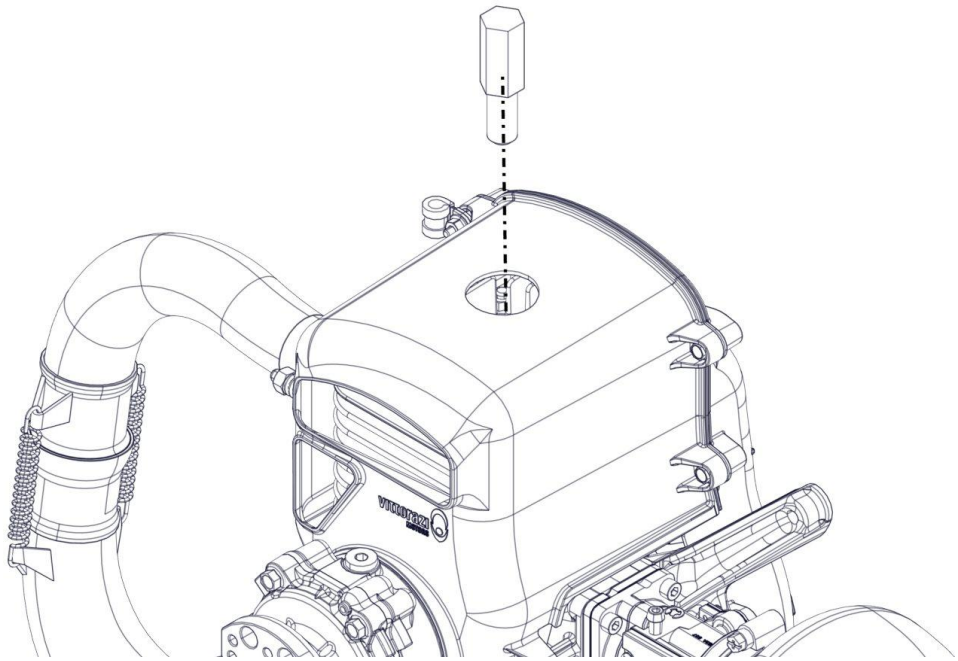
3.10.2 Flywheel, coil maintenance

Check the integrity of the flywheel: there must be no cracks or damaged areas, otherwise replace it.

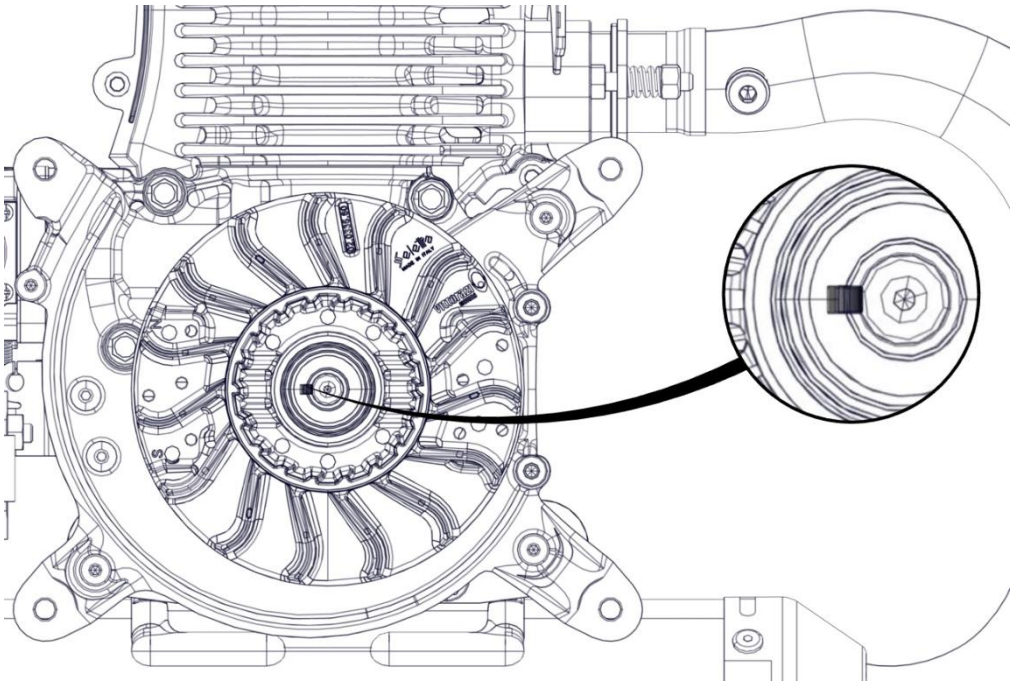
COIL	POSITION	RESISTANCE
IGNITION COIL	HV.CABLE-EARTH	4,8 kOhm +/- 10%, (@25°C)
IGNITION COIL	FASTON-EARTH	CONTINUITY OR CLOSE TO 1 OHM

3.10.3 Flywheel, coil assembly

Screw the piston block into the spark plug hole.

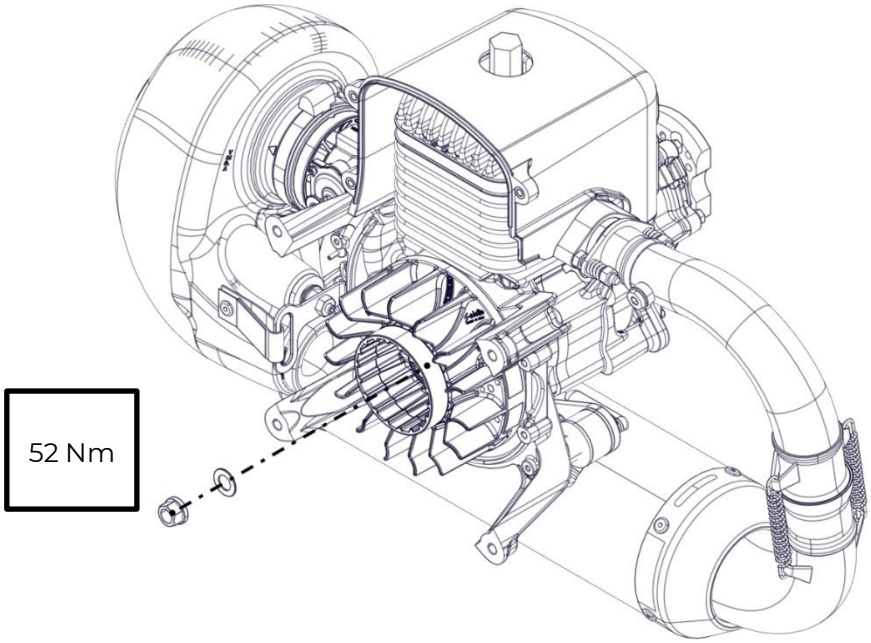


Position the flywheel on the crankshaft by aligning the key with the flywheel groove. The position of the key and therefore of the flywheel determines the timing of the engine.

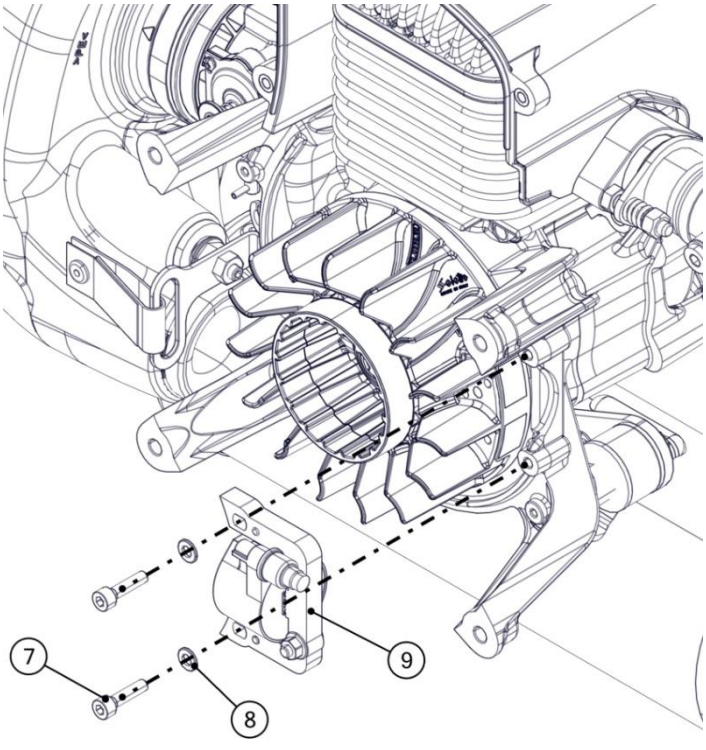


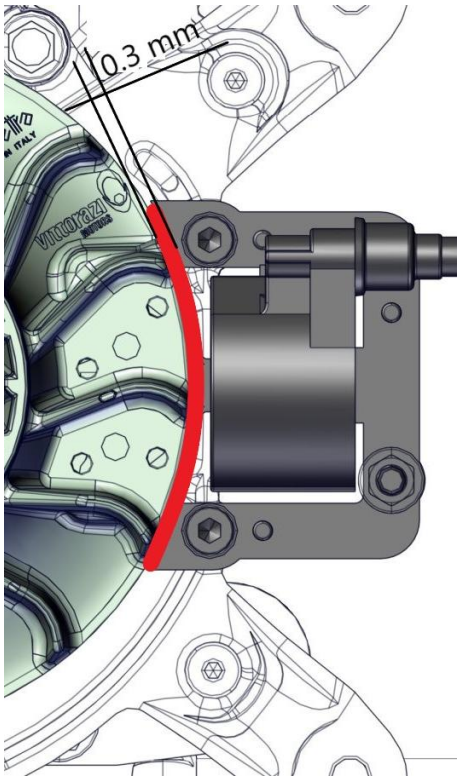
Replace nut M10x1,25 and washer.

Insert the nut M10x1,25 with washer and tighten with the torque shown in the figure.

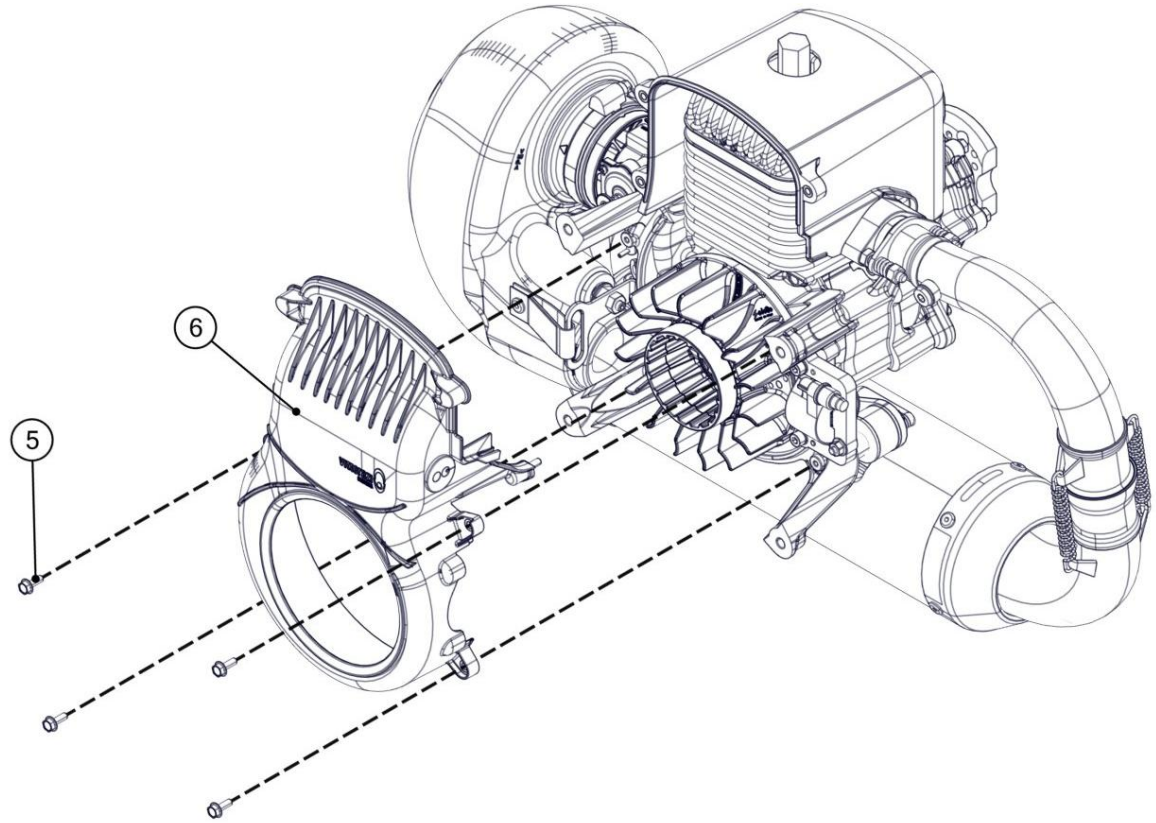


Insert the coil (9) and the 2 Allen screws M5x20 (7) with washers (8) without tightening.
Place 0,3 mm shims between the coil and the flywheel.
Tighten the coil screws by hand.
Remove the shims.

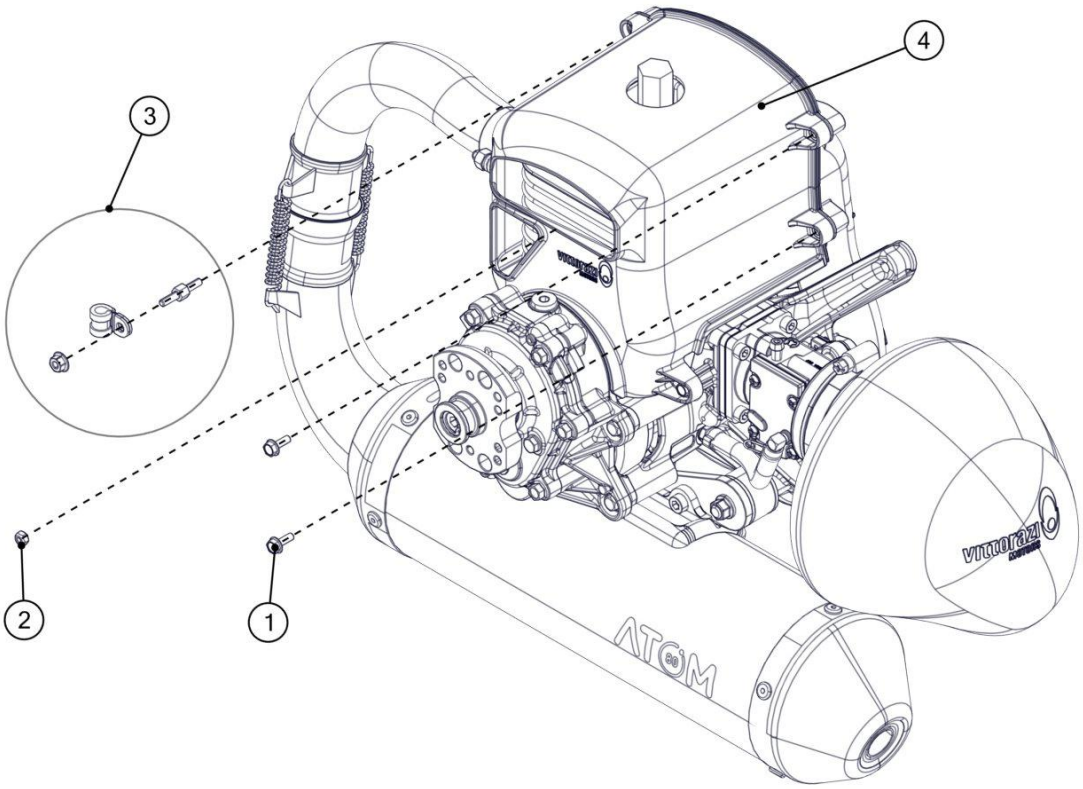




Position the rear conveyor (6) in its place.
Insert the 4 flange-head screws M4x12 (5) on the rear conveyor (6) and tighten by hand.



Insert the 2 flange head screws M4x12 (1) and nut M4 (2) on the front conveyor (4) and tighten.
Insert the stud M4 (3) with threadlocker (Loxeal 83-55/Loctite 270 recommended) on the front conveyor (4) and tighten by hand.



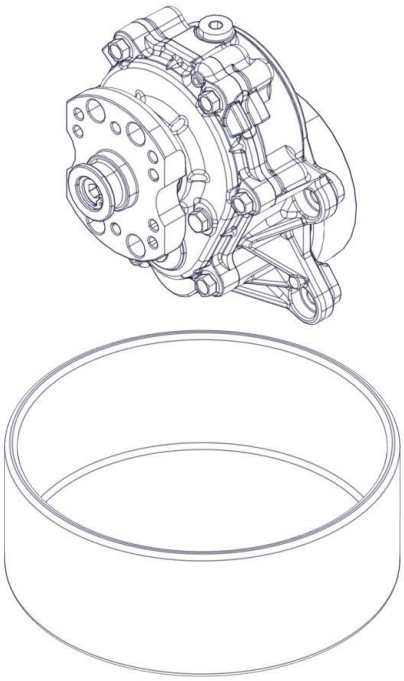
3.11 Transmission

<table>
<tr>
<td>Components to replace</td>
<td>
<table>
<tr><th></th><th>Time limit</th></tr>
<tr><td>Washers (AT151, AT162, AT162a, F160).*</td><td>50 h</td></tr>
<tr><td>Transmission bearings (F139b, AT139, AT141).</td><td>200 h</td></tr>
<tr><td>Oil seals (AT143, M006).</td><td>200 h</td></tr>
<tr><td>O-rings (AT152, AT163, AT164).</td><td>200 h</td></tr>
<tr><td>Centrifugal clutch (AT127).</td><td>200 h</td></tr>
<tr><td>Clutch bell (AT136).</td><td>200 h</td></tr>
<tr><td>Transmission oil (AT160).</td><td>50 h</td></tr>
<tr><td>FP Silicompound 225.</td><td></td></tr>
</table>
</td>
</tr>
<tr>
<td>Special tools</td>
<td>Extractor multifunction (ACC113) (for Hub and clutch)
Piston lock. (ACC104)
Specific tool - transmission oil seals assembly (ACC123)
Screws M4x30 (ACC111)
Screws M8x45 (ACC122)
Specific tool – transmission Seeger assembly (ACC128a)</td>
</tr>
<tr>
<td>Values</td>
<td>Clutch nut: 52 Nm.
Screws M5x20: 6,5 Nm.
Screw M8x20: 19 Nm.
Screws M6x25: 10 Nm.
Oil: 30 ml.</td>
</tr>
</table>

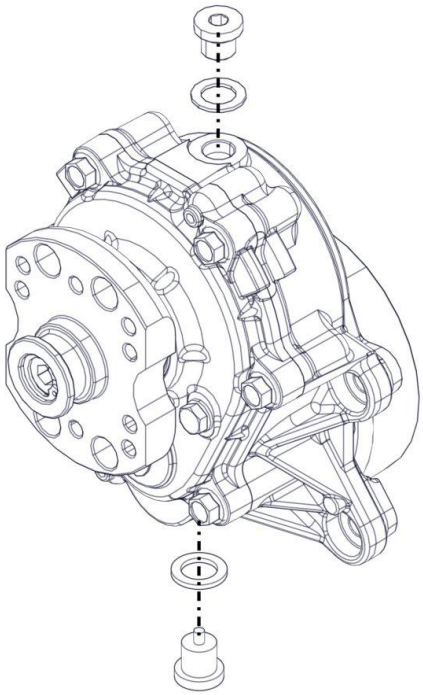
*Always replace it when disassembled.

3.11.1 Oil replacement

Place a container under the transmission to collect the oil.



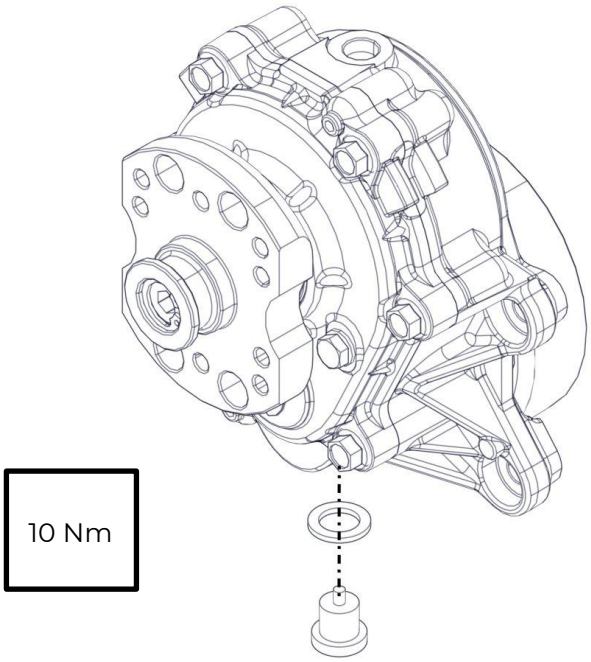
Hold the engine upright and remove the lower cap with the copper seal.
Loosen the upper cap.
Remove the upper cap with copper seal.



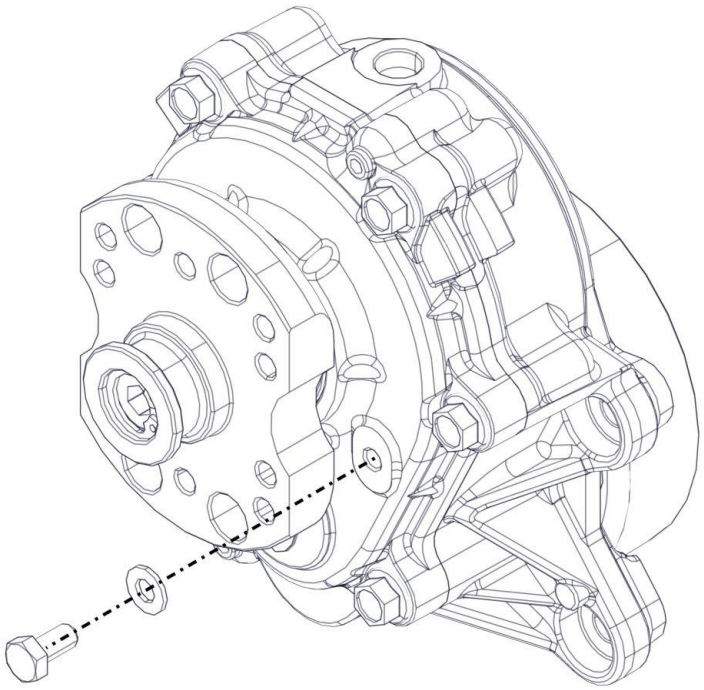
Wait a few minutes for all the oil to drain.

Replace the copper seal each time it is disassembled.

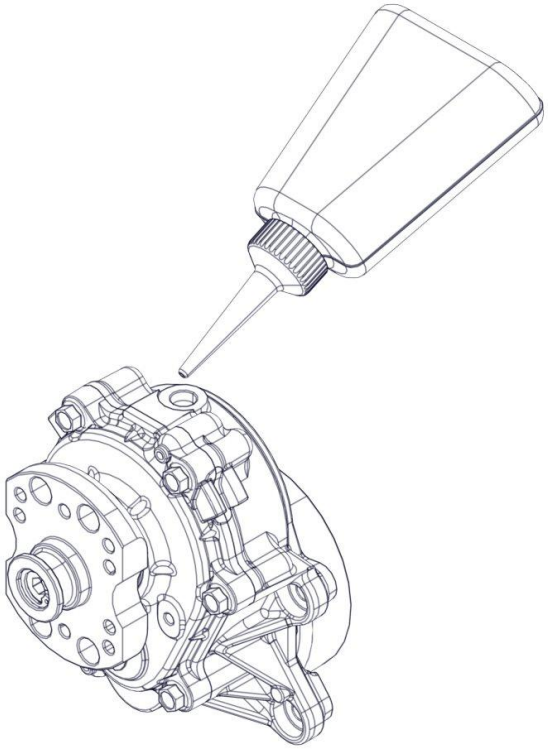
Clean the lower cap, insert it with the copper seal and tighten with the torque shown in the figure.



Remove the front screw with the copper seal.



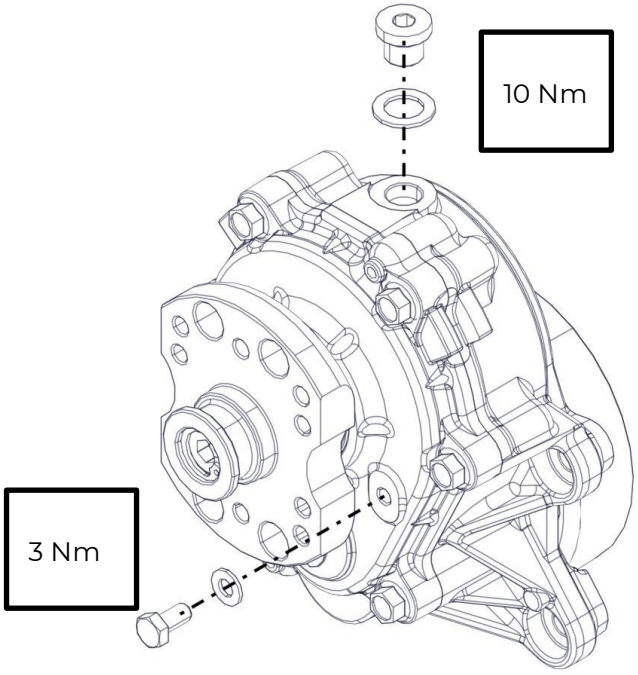
Fill the transmission with the specific oil (Maconoil Supermoly 220 with 3,5 % Mos2). Vittorazi supplies 30 ml bottle (AT160) that is required to fill completely the transmission box.



Fill the oil until is leaking from the front hole.
Wait a few minutes for the oil to settle.

Replace the copper seal each time it is disassembled.

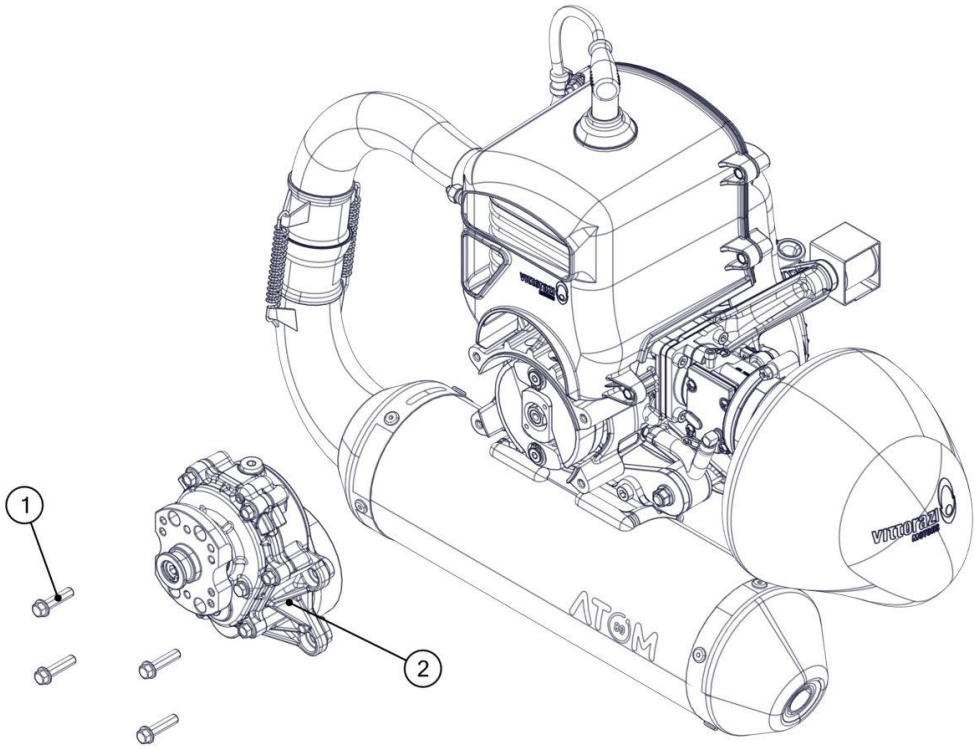
Insert front screw with copper seal and tighten with the torque shown in the figure.
Insert upper cap with copper seal and tighten with the torque shown in the figure.



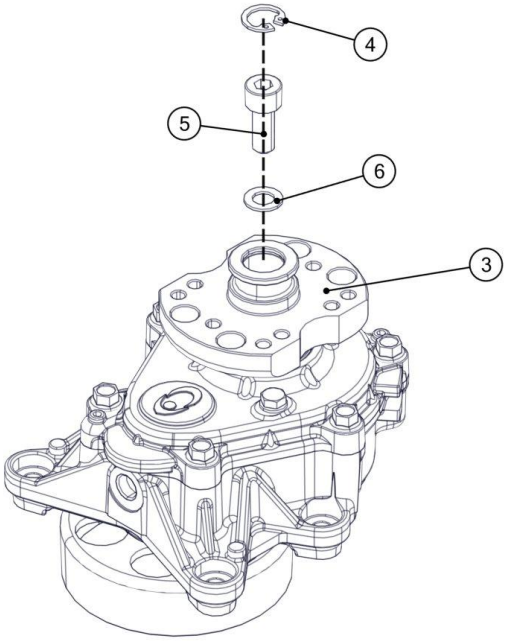
3.11.2 Transmission disassembly

Remove the oil before disassembling the transmission.

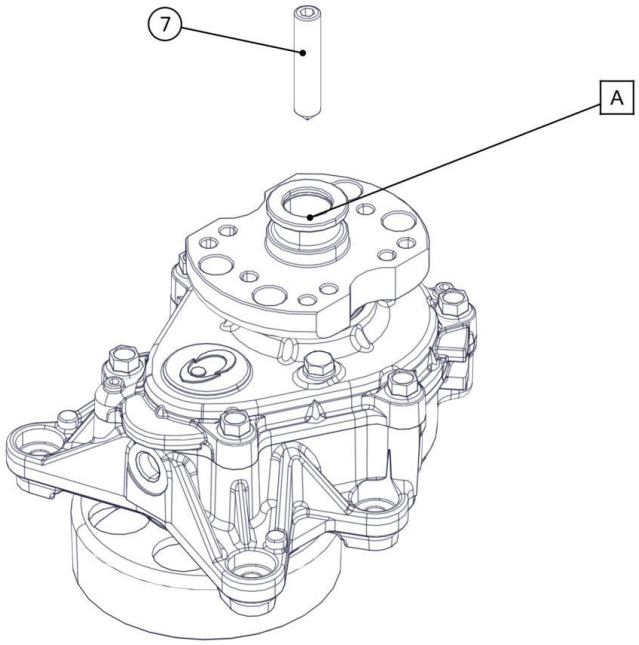
Remove the 4 flange head screws M6x25 (1) from the transmission (2).
Remove the transmission (2).



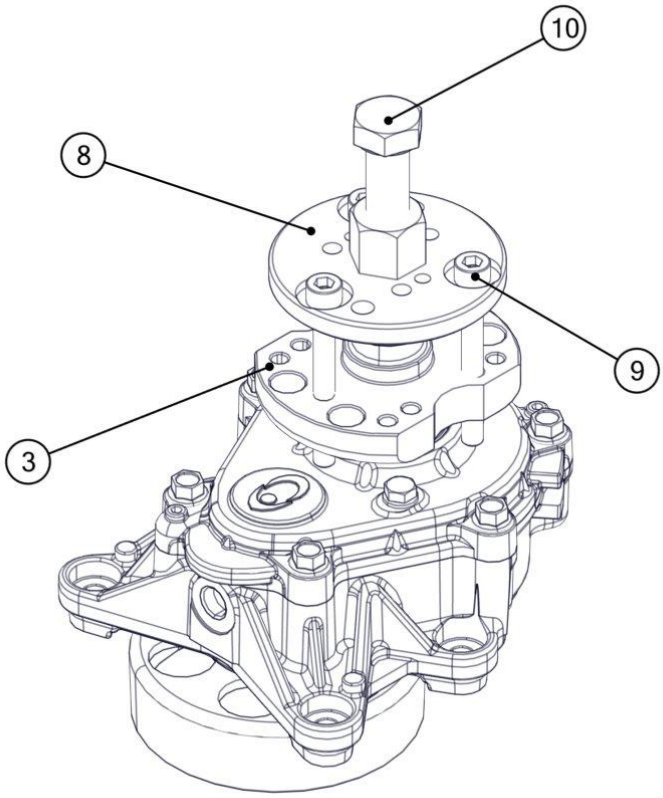
Remove the Seeger ring (4) and the Allen screw M8x20 (5) with washer (6) from the hub (3).

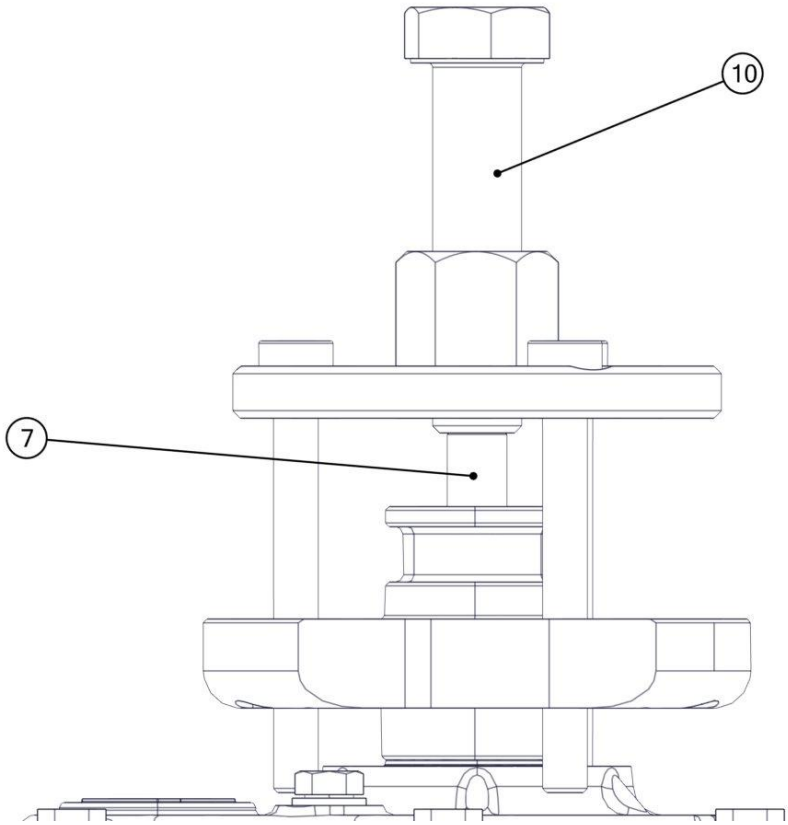


Place the set screw M8x45 (7) (ACC122) into the position A.

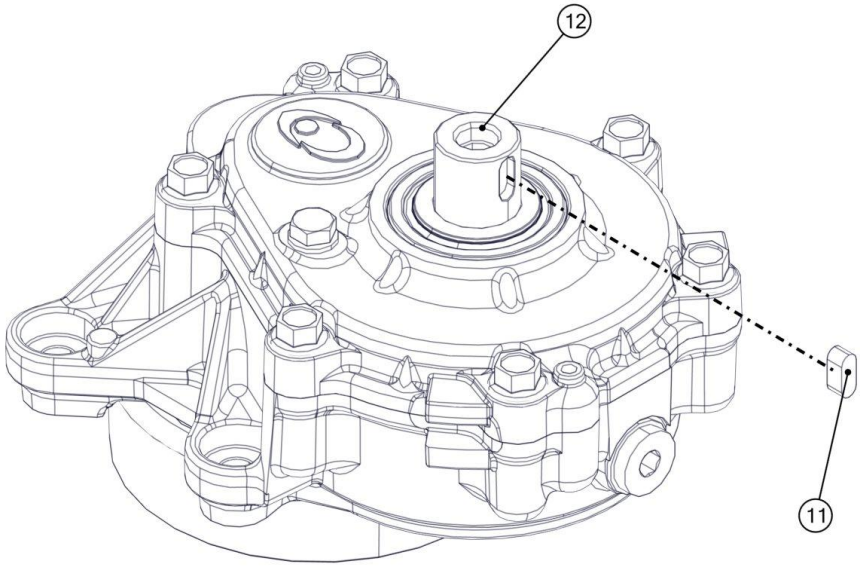


Place the extractor multifunction (ACC113) (8) on the hub (3) and tighten the 3 screws M6 (9).
Slightly heat the hub to a maximum of 100 °C.
Turn the central pin (10) until the hub is removed.

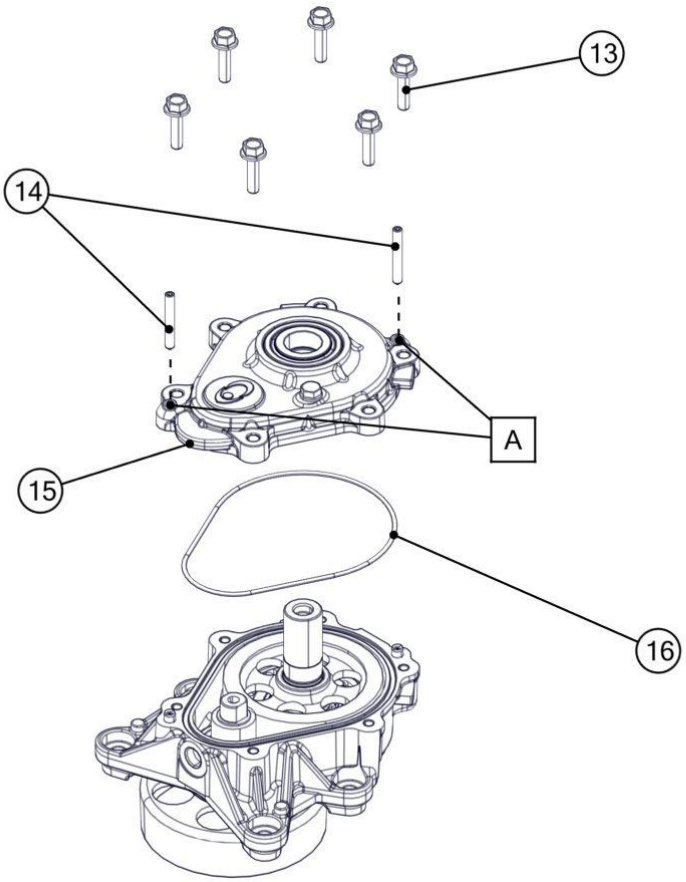




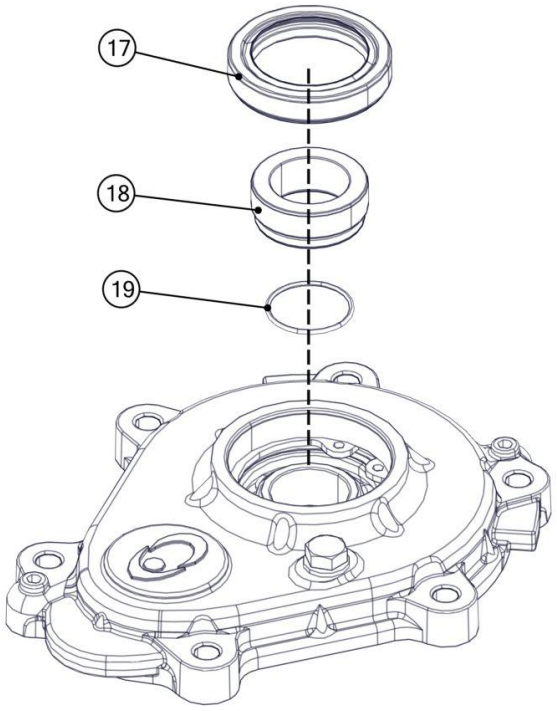
Remove the key (11) from the propeller shaft (12) with pliers.



Remove the 6 flange-head screws M5x20 (13).
Place the 2 set screws M4x30 (14) (ACC111) into the position A and screw in alternately until the cover (15) is removed.
Remove the O-ring (16) from the transmission.

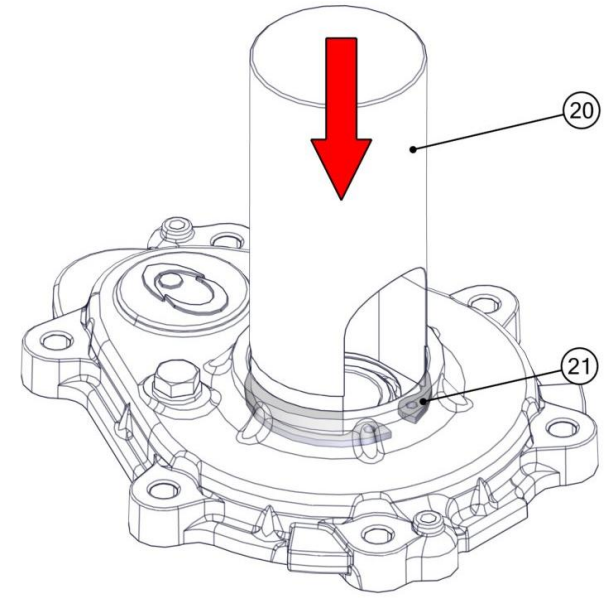


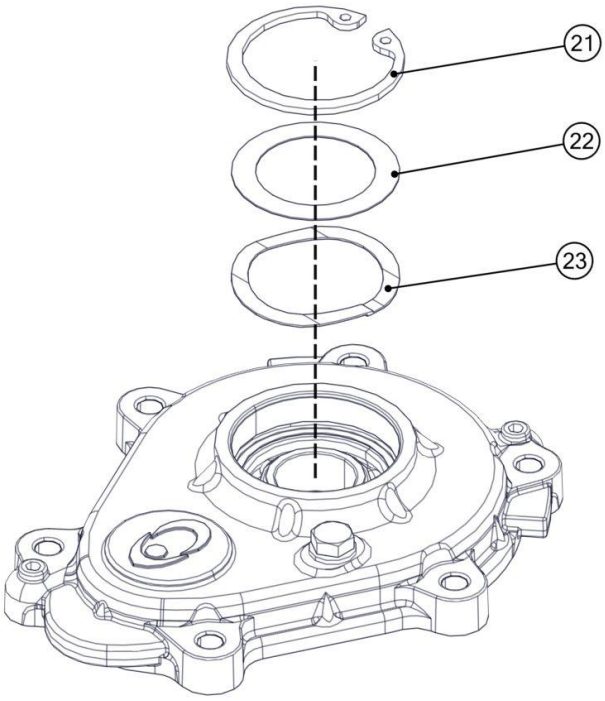
Remove the oil seal (17), the bushing (18) and the O-ring (19).



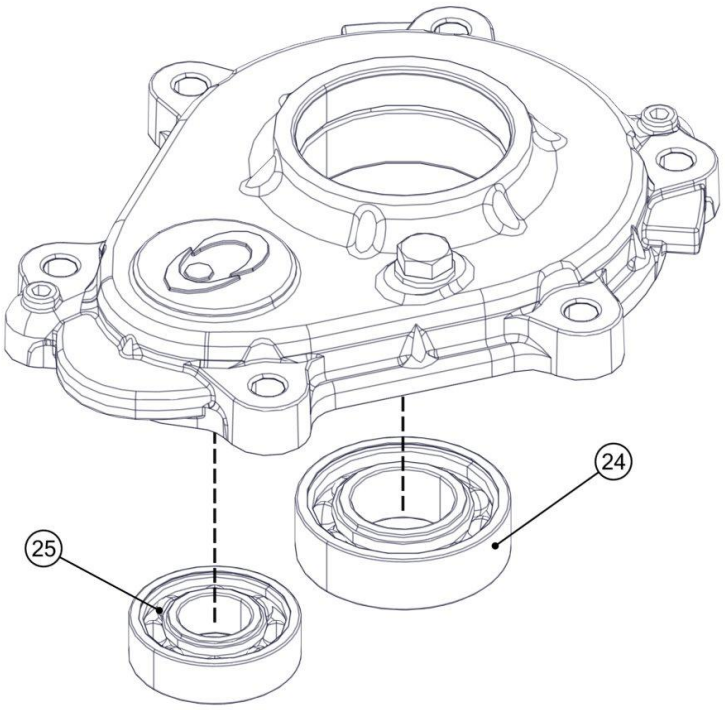
Use the specific tool – transmission Seeger assembly (ACC128a) (20) to contrast the spring thrust when removing the Seeger ring.

Remove the Seeger ring (21), the washer (22) and the spring (23).

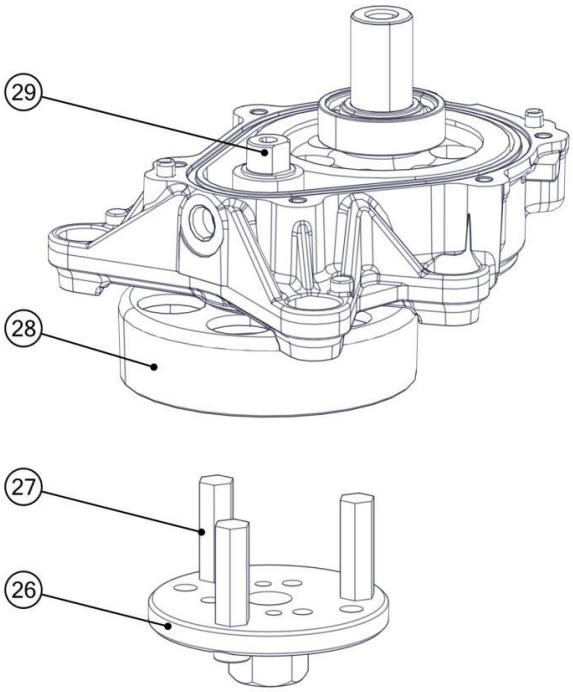




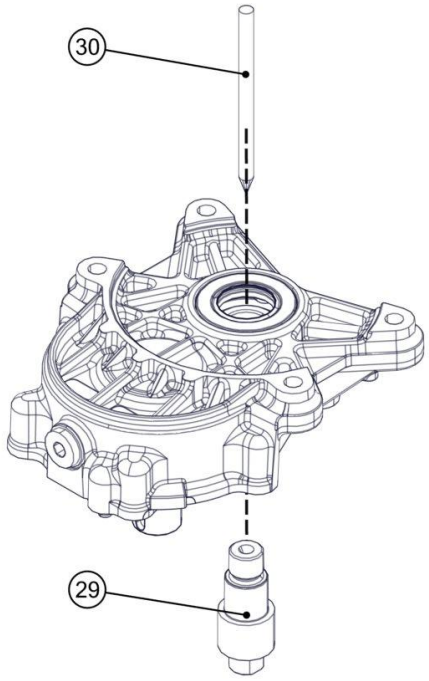
Clean the cover from oil residues.
Heat the cover at the bearing seats at 120 °C.
Remove the propeller shaft bearing (24) and the pinion bearing (25).
To facilitate removal of the pinion bearing (25) use a bearing extractor for blind housings.



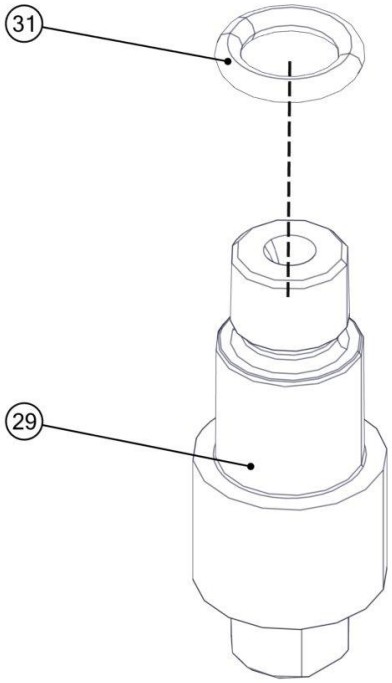
Place the extractor multifunction (26) and columns (27) (tool ACC113) under the clutch bell (28).
Clamp the extractor in a vise.
Unscrew the pinion (29) with a 10 mm wrench.



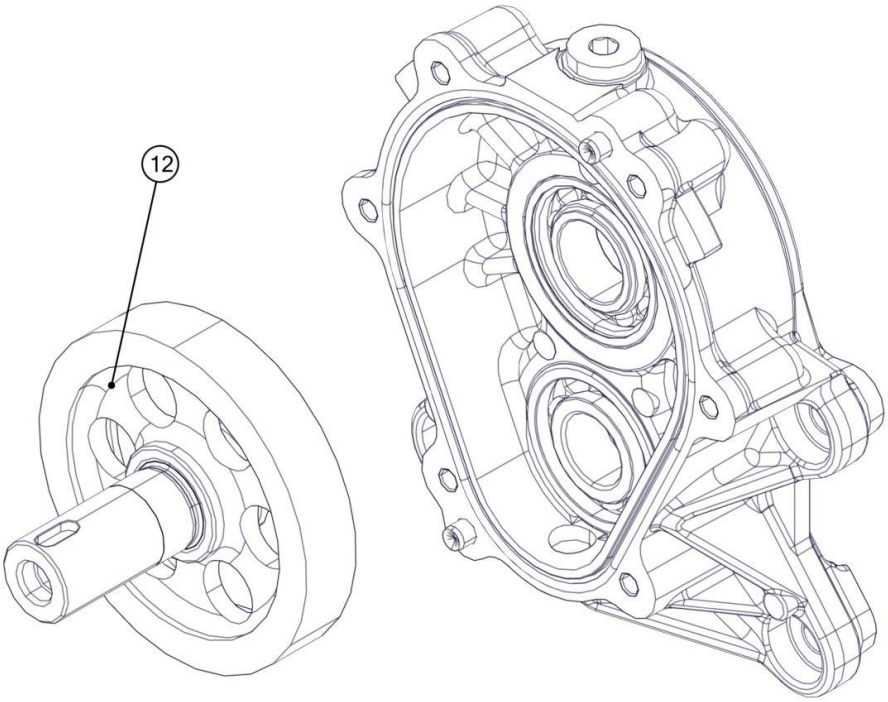
Remove the pinion (29) using an awl (28).



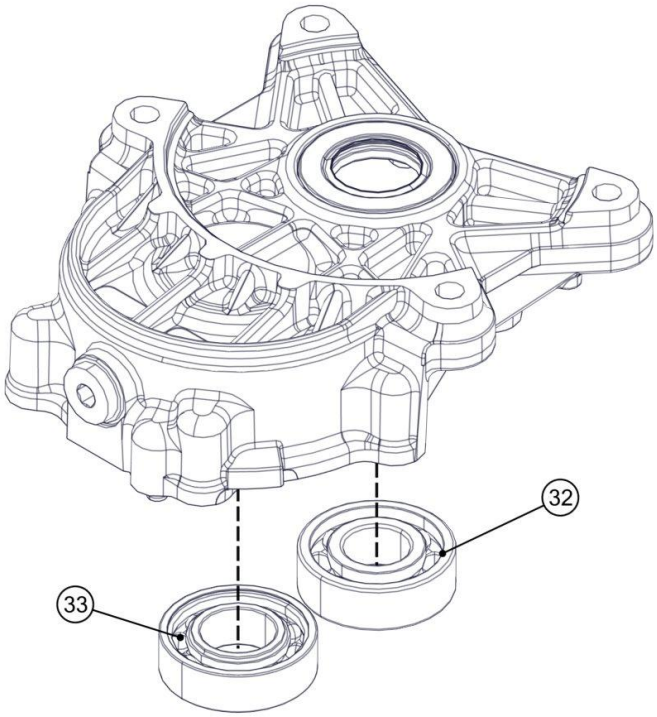
Remove the O-ring (31) from the pinion (29).



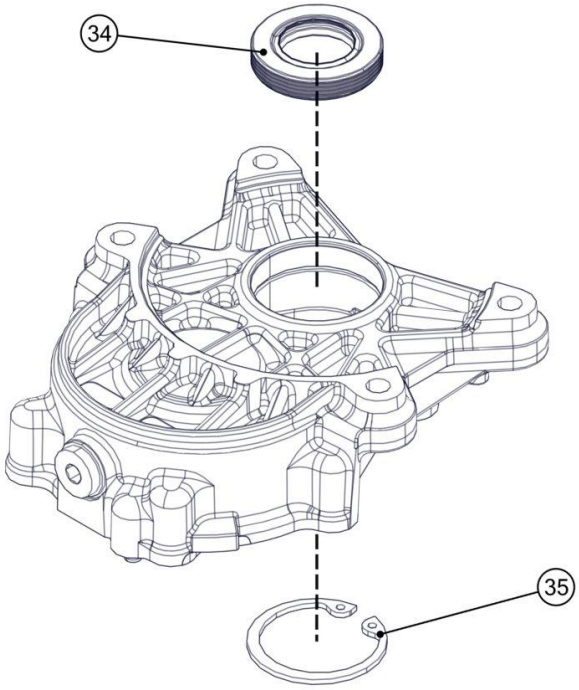
Remove the propeller shaft (12) using an extractor.



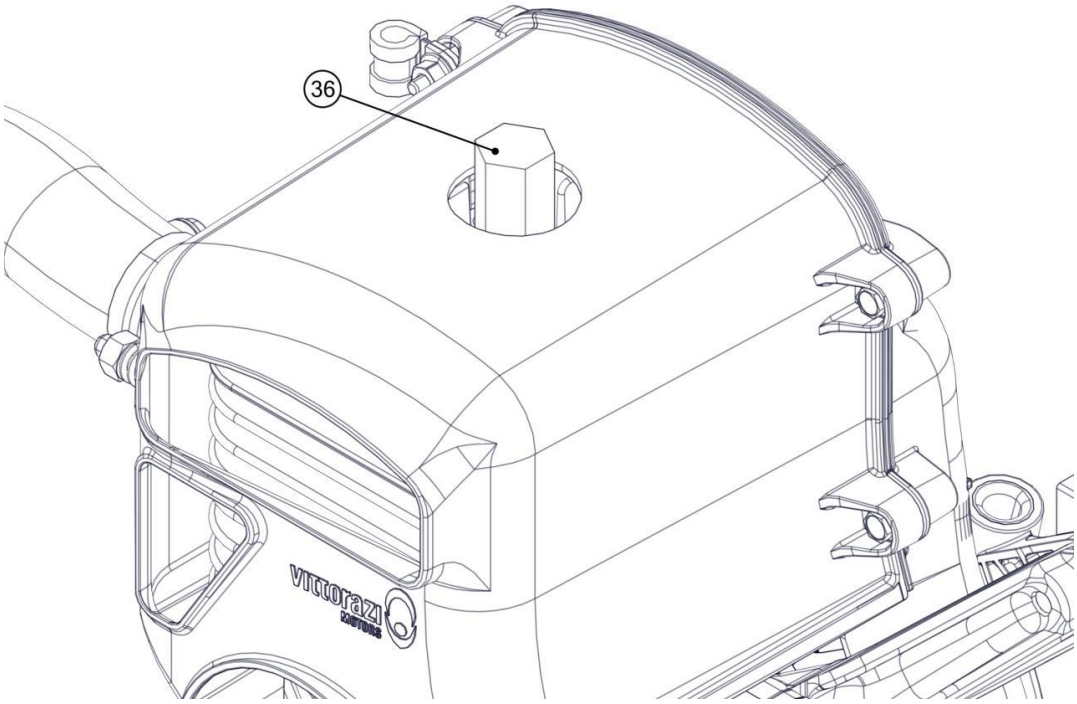
Clean the transmission case from oil residues.
Heat the transmission case at the bearing seats.
Remove the pinion bearing (32) and the propeller shaft bearing (33).
To facilitate removal of the propeller shaft bearing (33) use a bearing extractor for blind seats.



Remove the oil seal (34) and the Seeger ring (35).



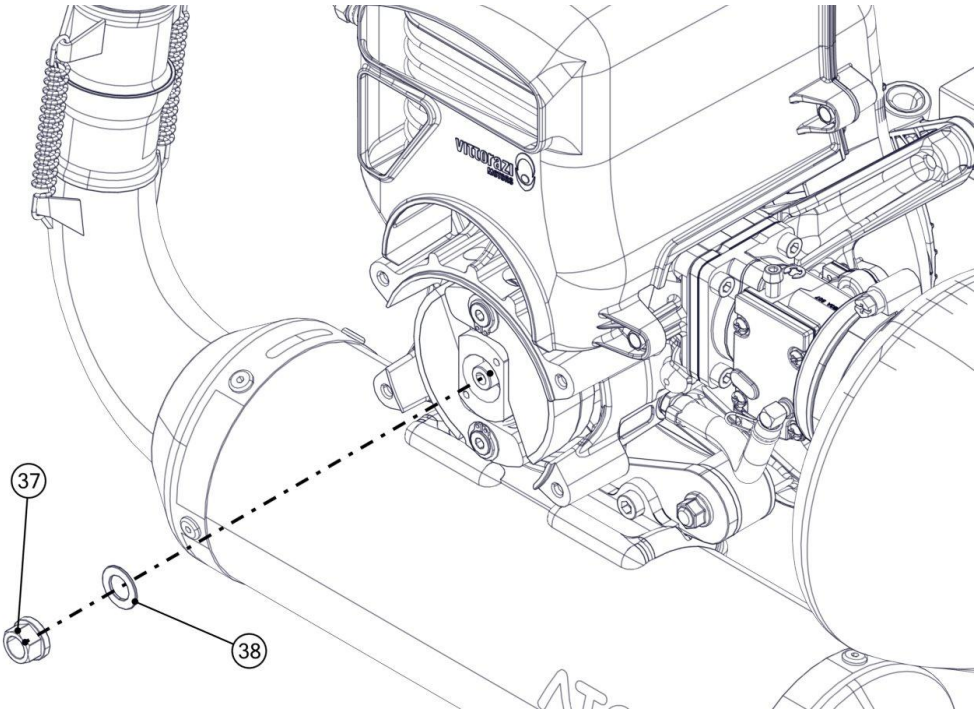
Screw the piston lock (ACC104) (36) into the spark plug hole.



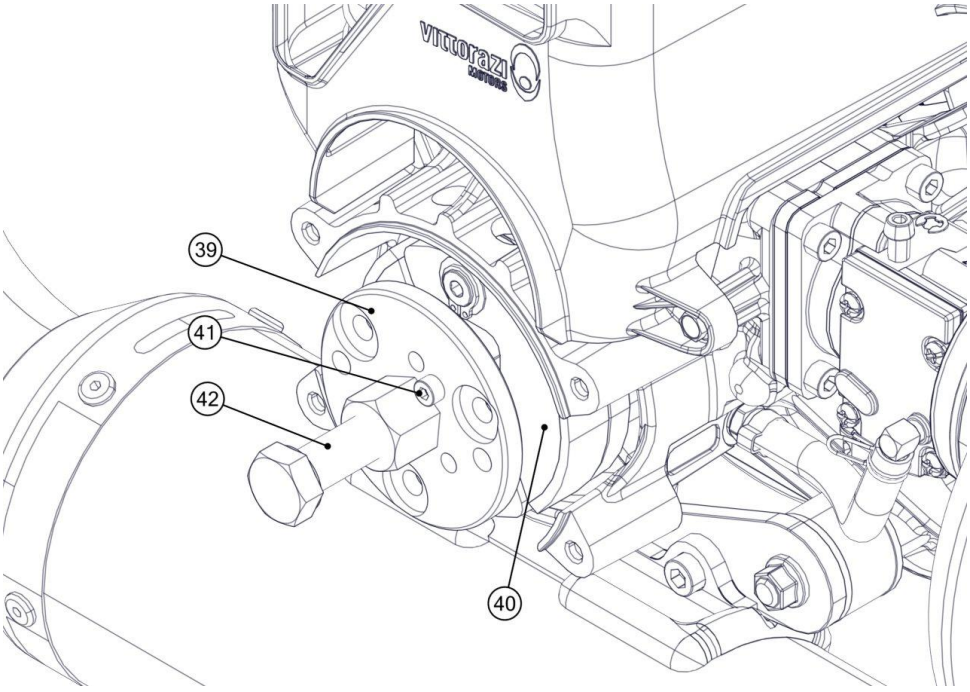
Turn the clutch until the piston is in contact with the piston lock.

Unscrew the nut M10x1,25 (37). Do not use a pneumatic impact screwdriver, otherwise the piston may be damaged.

Remove the nut M10x1,25 (37) with the washer (38).



Position the extractor multifunction (tool ACC113) (39) on the clutch (40) and tighten the 2 screws M4 (41).
Turn the central screw (42) until the clutch (40) is removed.



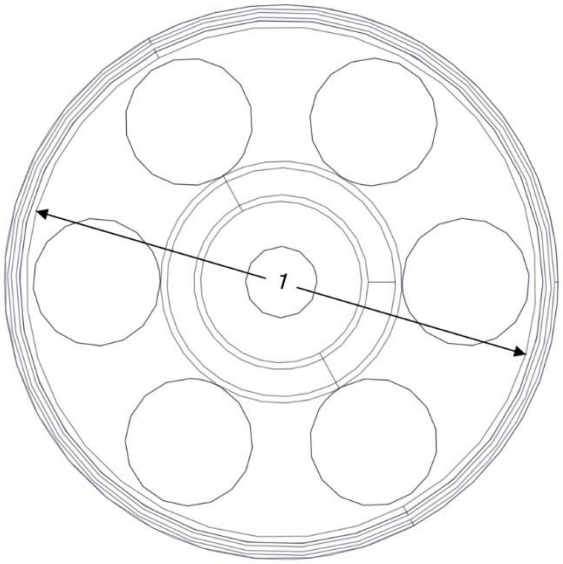
3.11.3 Transmission maintenance

Clean components thoroughly with aluminium-specific degreasers.

Check teeth: on the 2 gears. Replace them if they show signs of wear or damage.

Check the clutch bell, in particular the inner surface in contact with the friction material must not show any scratches or different colouring due to overheating and there must be no cracks (e.g. in the lightening holes), otherwise (as in photo) it must be replaced. For routine maintenance, follow the table.

Measure the internal diameter of the clutch bell, the table shows the factory settings.

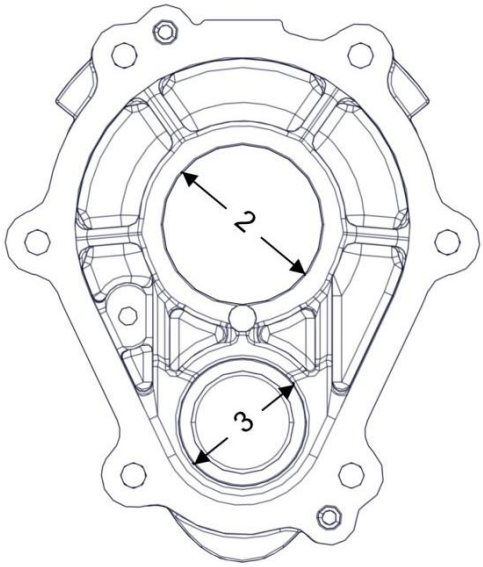


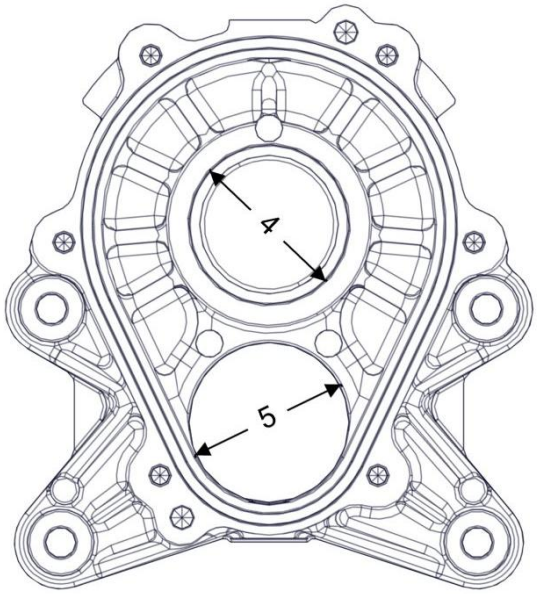
Dimension	Factory settings at 20° C (mm)
1	77,9-78,1

Check the clutch: the friction material on the pads must not show any scoring or burn marks.
Check the movement of the pads with a screwdriver as shown in the figure.
If the above checks are not satisfied, replace the clutch. For routine maintenance, follow the table.

Check the bushing of the transmission cover: the side surface must be smooth and free of signs of wear, otherwise (as in photo) it must be replaced.

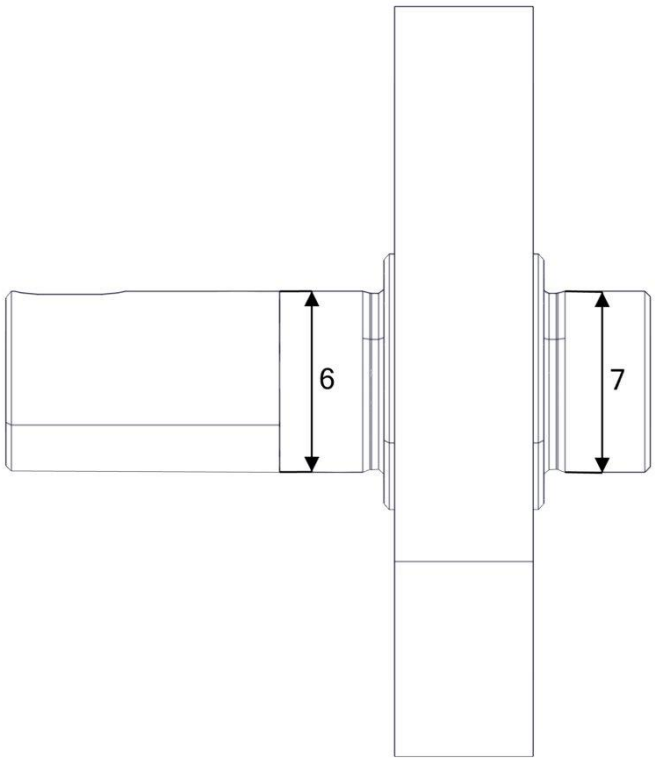
Check the 4 bearing seats: there must be no polished areas. Also measure the diameter of the 4 seats, the table shows the factory settings.





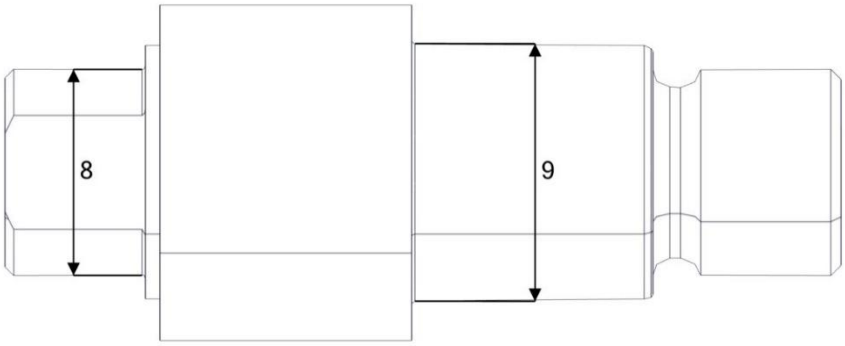
Dimension	Factory settings at 20° C (mm)
2	34,969-34,985
3	27,978-27,991
4	34,969-34,985
5	34,978-34,991

Measure the diameter of the 2 bearing seats, the table shows the factory settings.



Dimension	Factory settings at 20° C (mm)
6	16,995-17,005
7	16,995-17,005

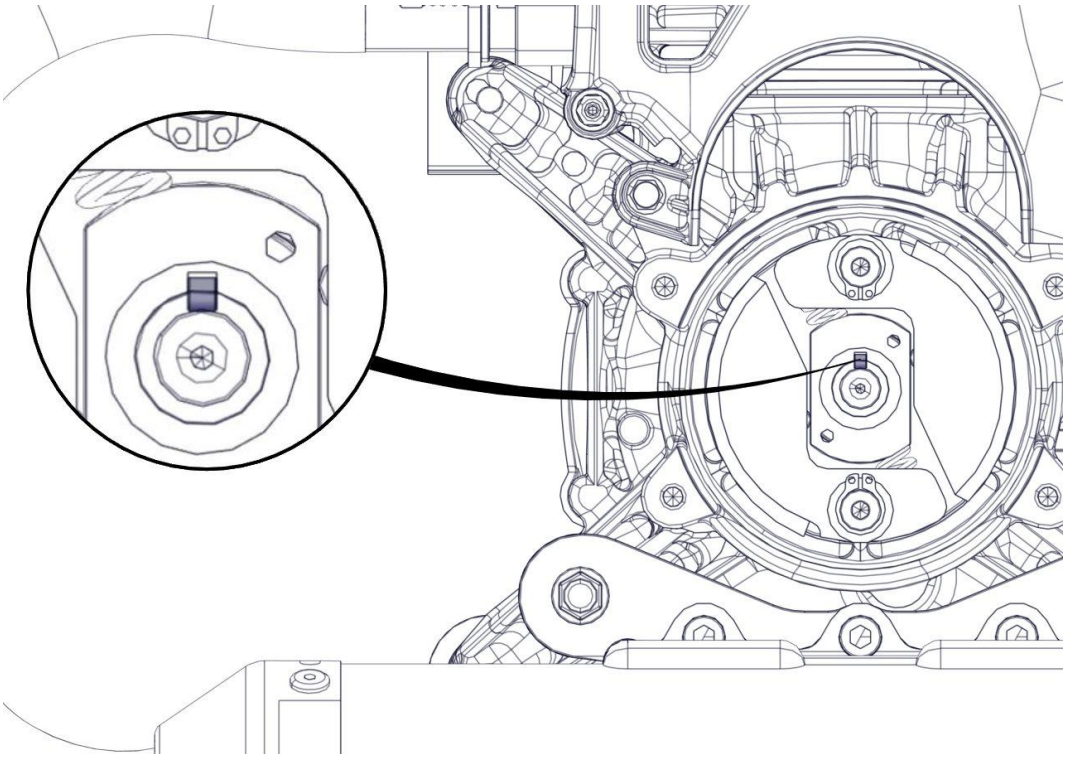
Measure the diameter of the 2 bearing seats, the table shows the factory settings.



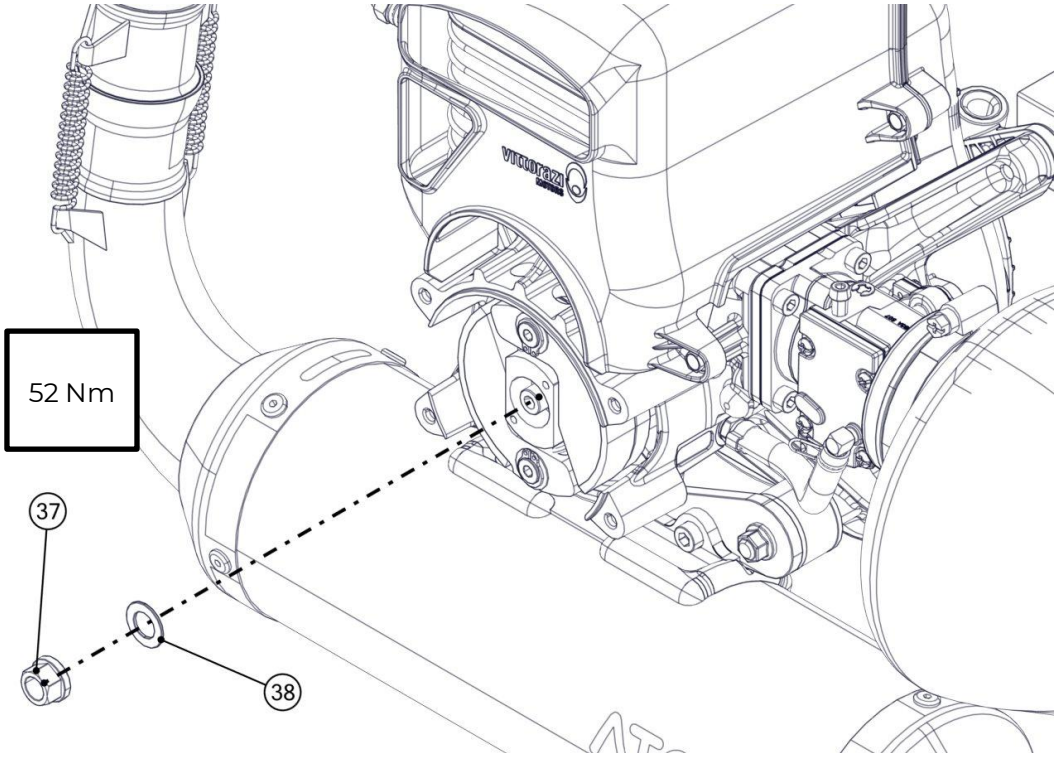
Dimension	Factory settings at 20° C (mm)
8	11,992-12,000
9	14,997-15,005

3.11.4 Transmission assembly

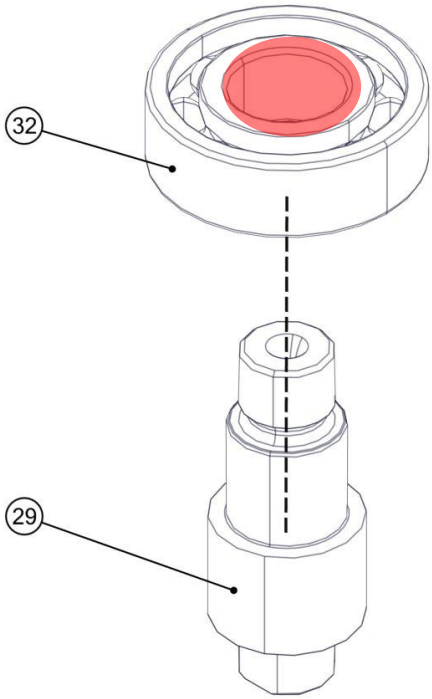
Position the clutch on the crankshaft, aligning the key with the clutch groove.



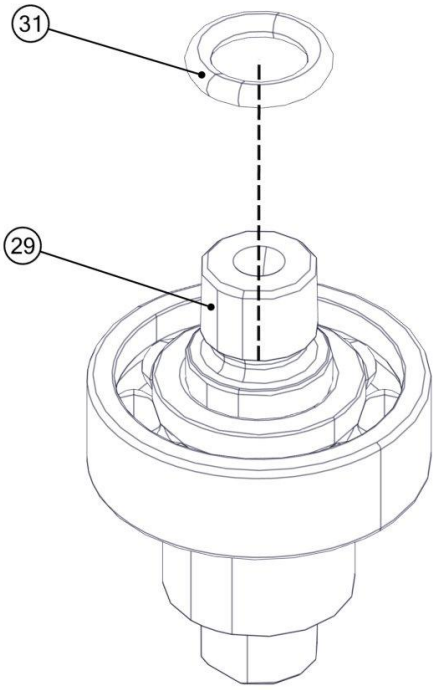
Insert the nut M10x1,25 (37) with the washer (38) and tighten with the torque shown in the figure.



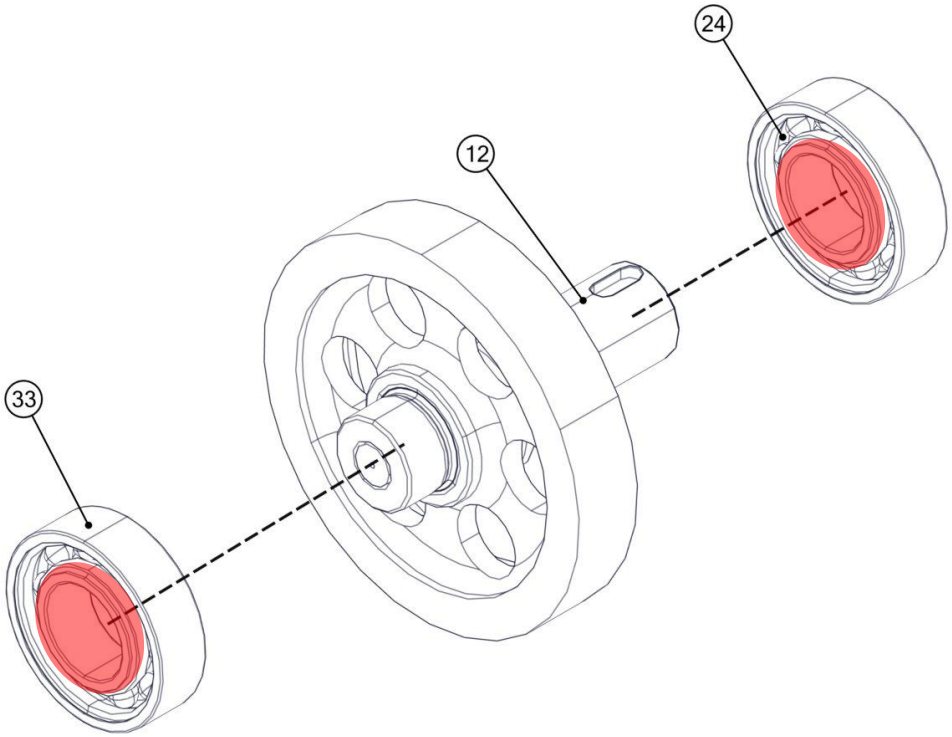
Heat the inner ring of the bearing (32) to 120 °C and fit it on the pinion (29).



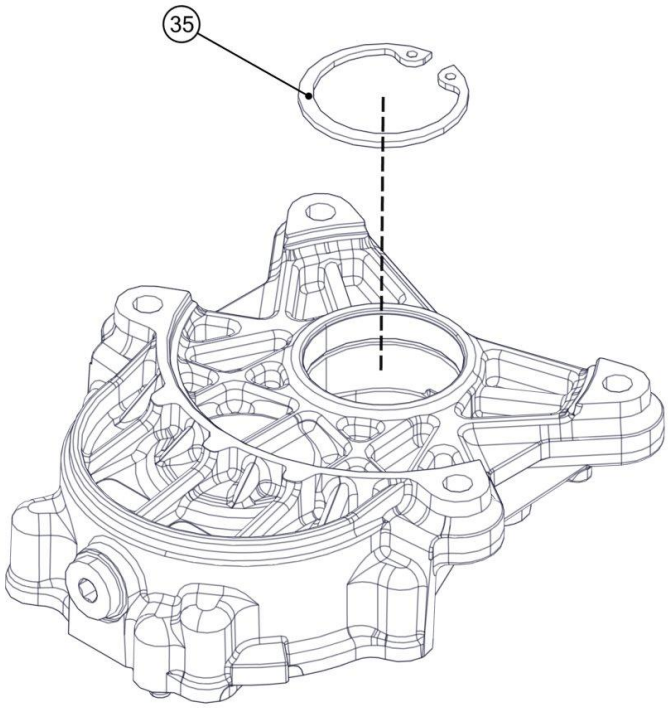
Fit the O-ring (31) on the pinion (30).



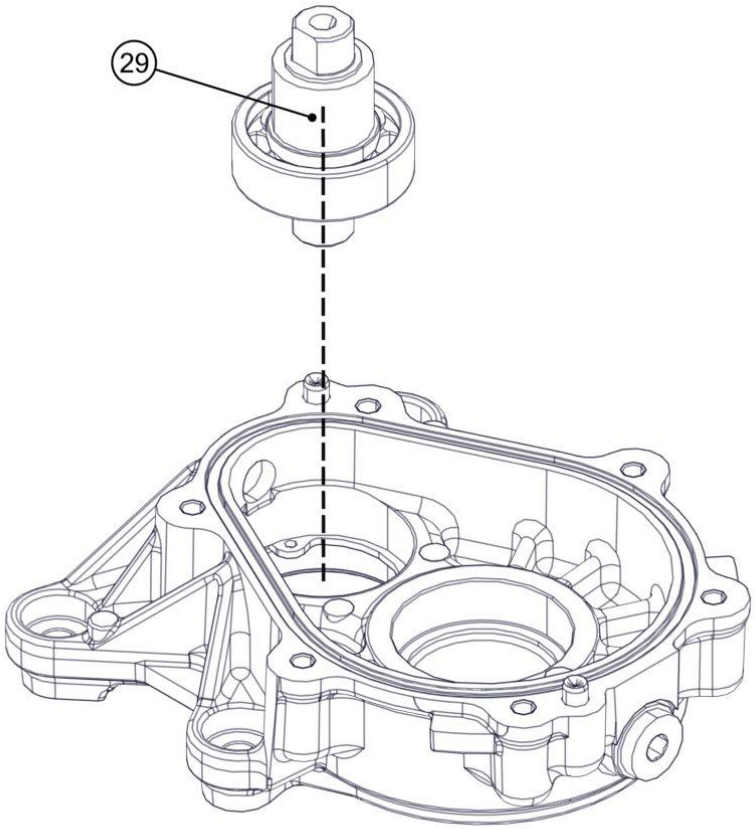
Heat the inner rings of the 2 bearings (24, 33) to 120 °C.
Fit the 2 bearings (24, 33) on the propeller shaft (12).



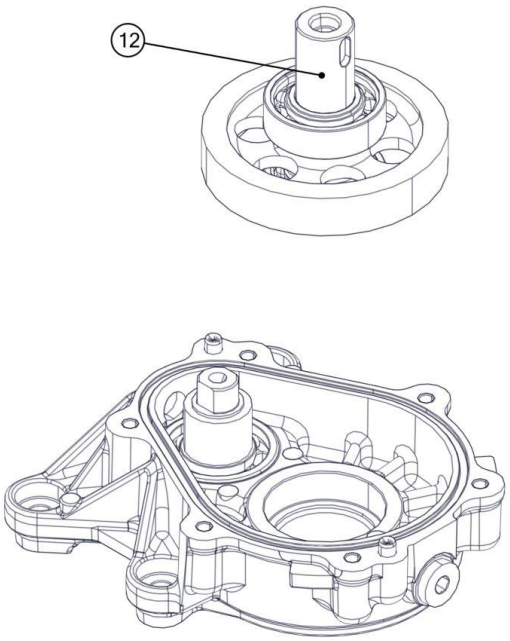
Insert the Seeger ring (35).



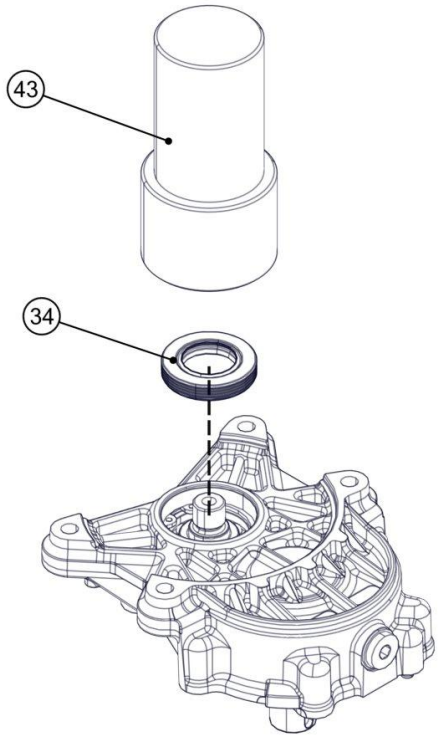
Heat the bearing seats to 120 °C and insert the pinion (29).



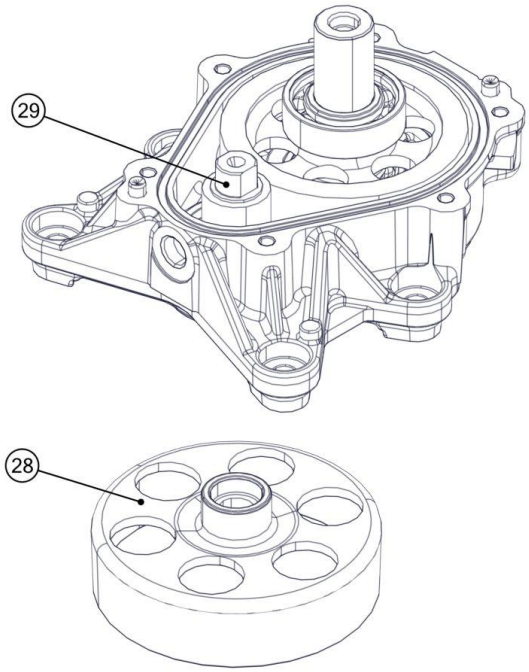
Insert the propeller shaft (12).



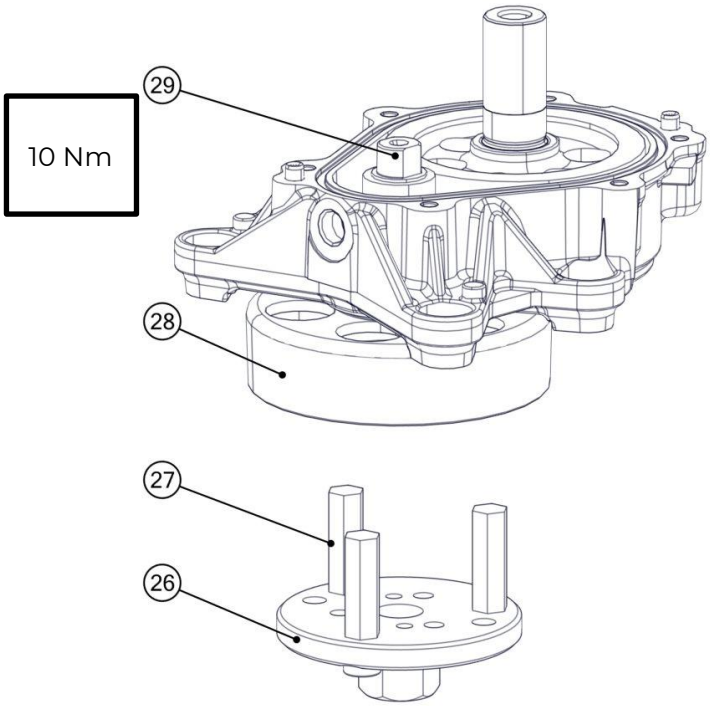
Grease the oil seal (34) with FP Silicompound 225 and insert it into the gearbox with specific tool – transmission oil seals assembly (ACC123) (43).



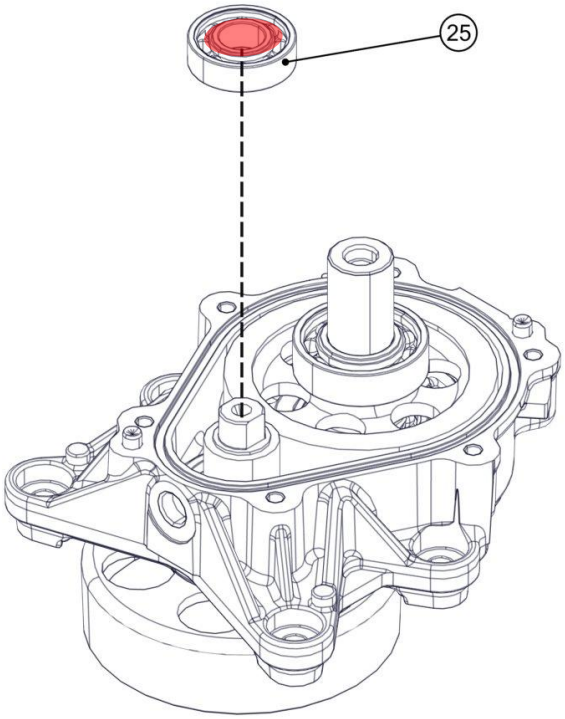
Grease the central hole in the clutch bell (28) with FP Silicompound 225.
Screw the clutch bell (28) onto the pinion (29).



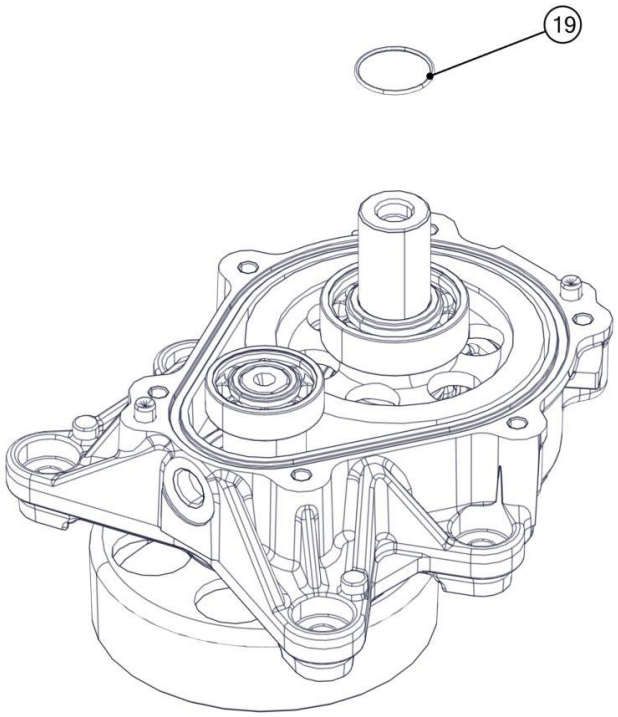
Place the extractor multifunction (26) and columns (27) (tool ACC113) under the clutch bell (28).
Clamp the tool in a vise.
Screw the pinion (29) with a 10 mm wrench and tighten with the torque shown in the figure.



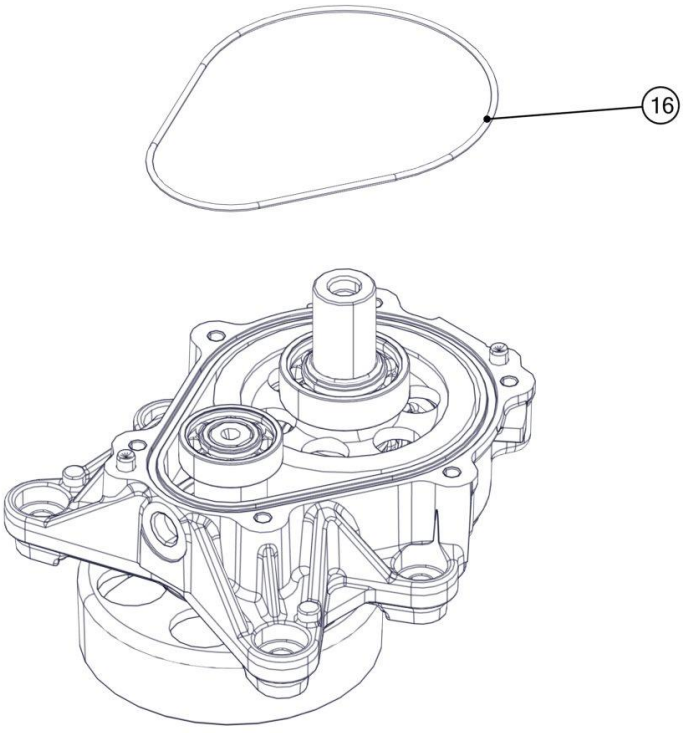
Heat the inner bearing ring (25) and fit it on the pinion.



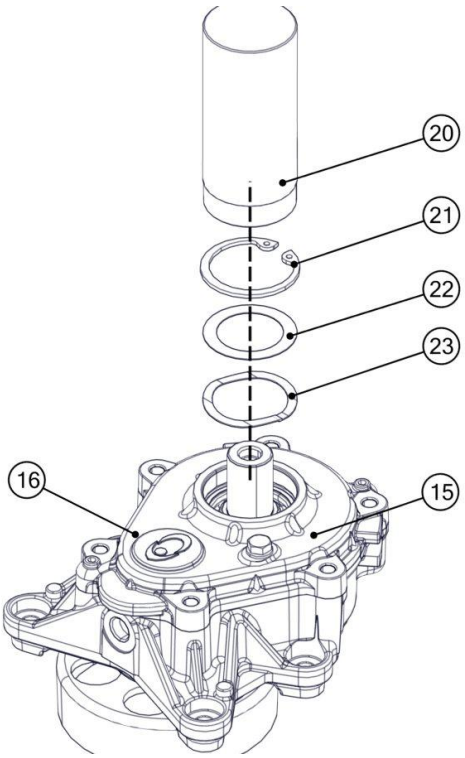
Insert the O-ring (19) on the propeller shaft.



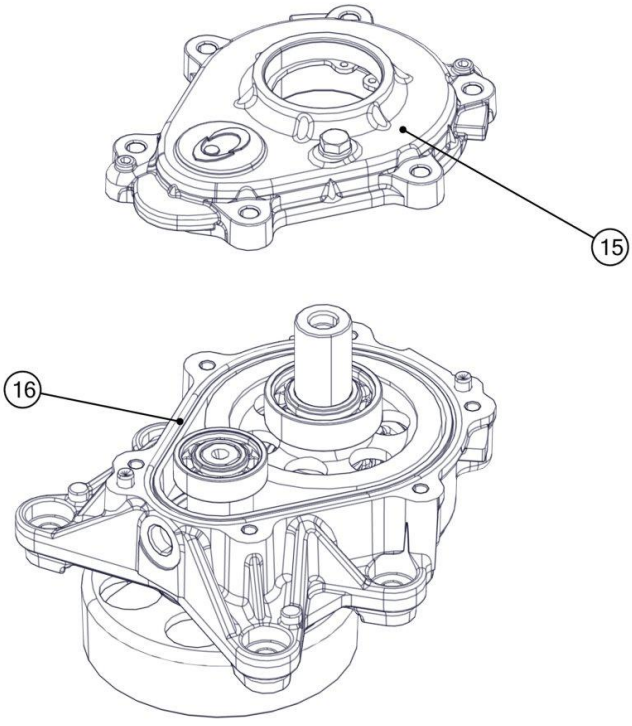
Insert the O-ring (16) between on the gearbox.



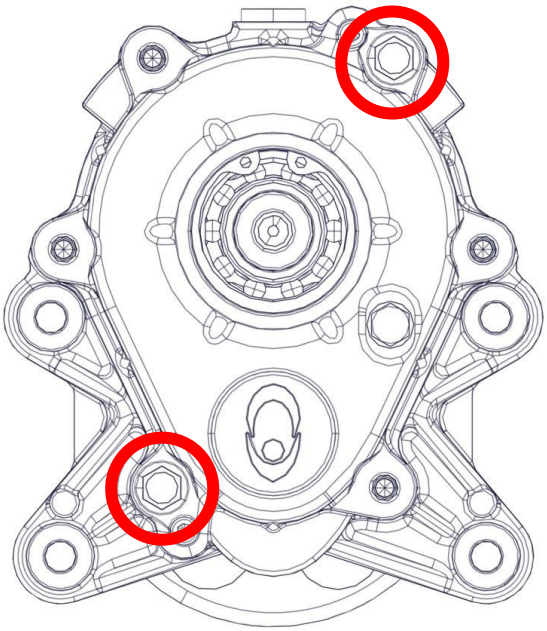
Insert the spring (23), the washer (22) and the Seeger ring (21) into the transmission cover using the specific tool – transmission Seeger assembly (ACC128a) (20) to push the Seeger in the seat.



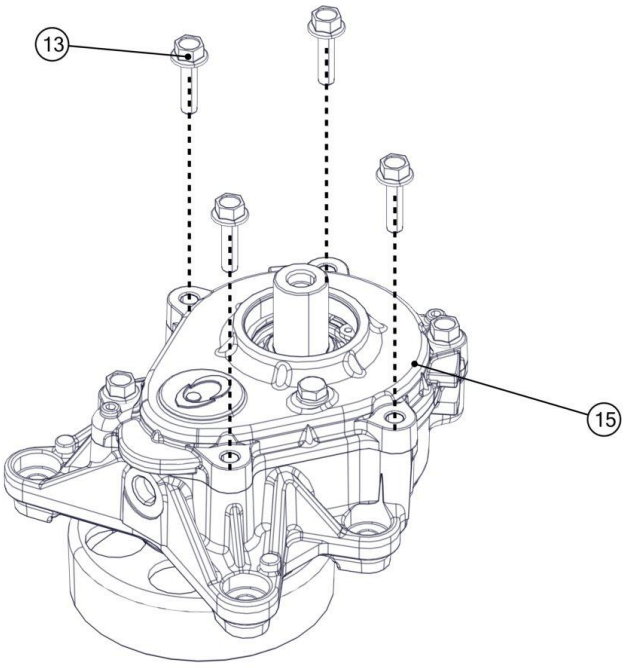
Heat the cover at the bearing seats at 120 °C.
Place the cover (15) on the gearbox checking the position of the O-ring (16).



Insert and pre-tighten alternately the 2 highlighted flanged head screws M5x20.



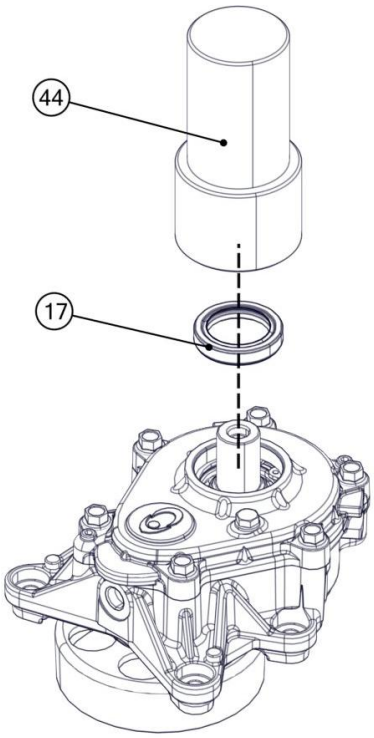
Insert the remaining 4 flanged head screws M5x20 (13) into the cover (15).



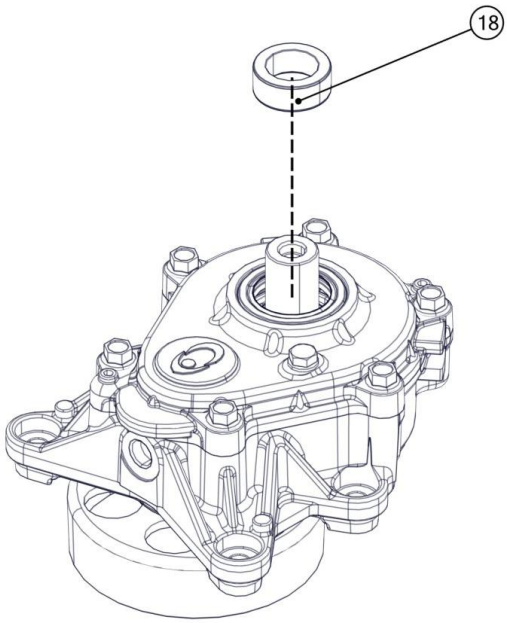
Pre-tighten progressively, then tighten in crosswise order to 6,5 Nm.
Let the transmission cool down.
Check that all screws are tightened correctly.
Check the sliding of shaft on the bearings.

Replace the oil seal (18) each time it is disassembled.

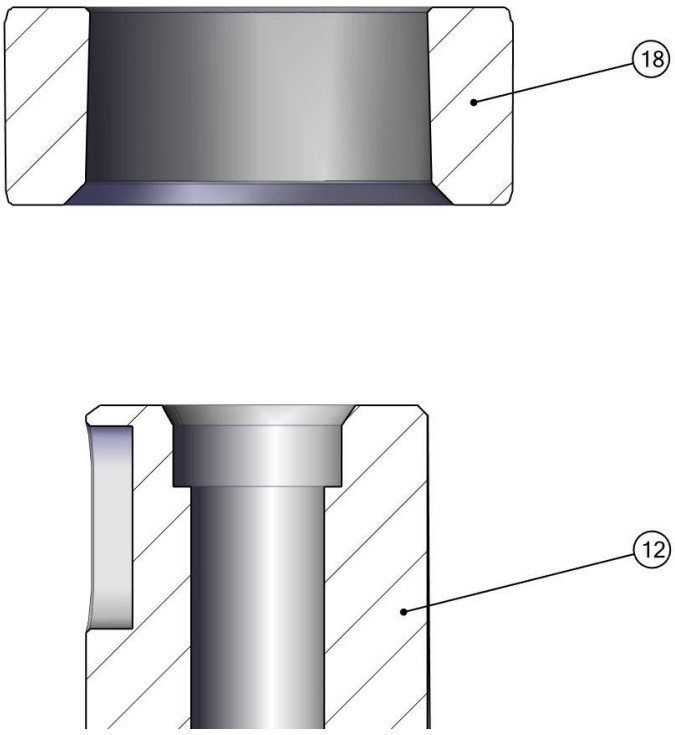
Grease the oil seal (17) with FP Silicompound 225 and place it on the transmission cover using the specific tool – transmission oil seals assembly (ACC123) (44) to insert it.



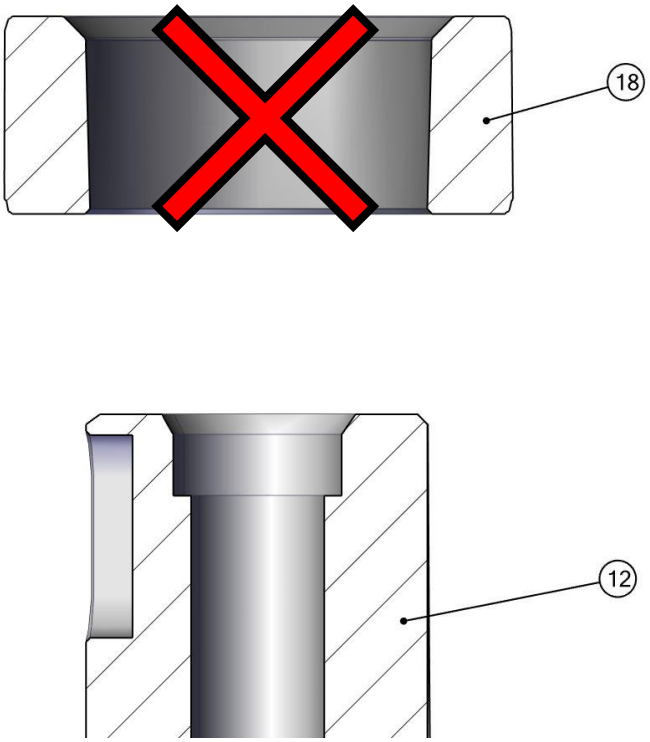
Insert the bushing (18) by positioning it with the countersink for the O-ring on the underside.



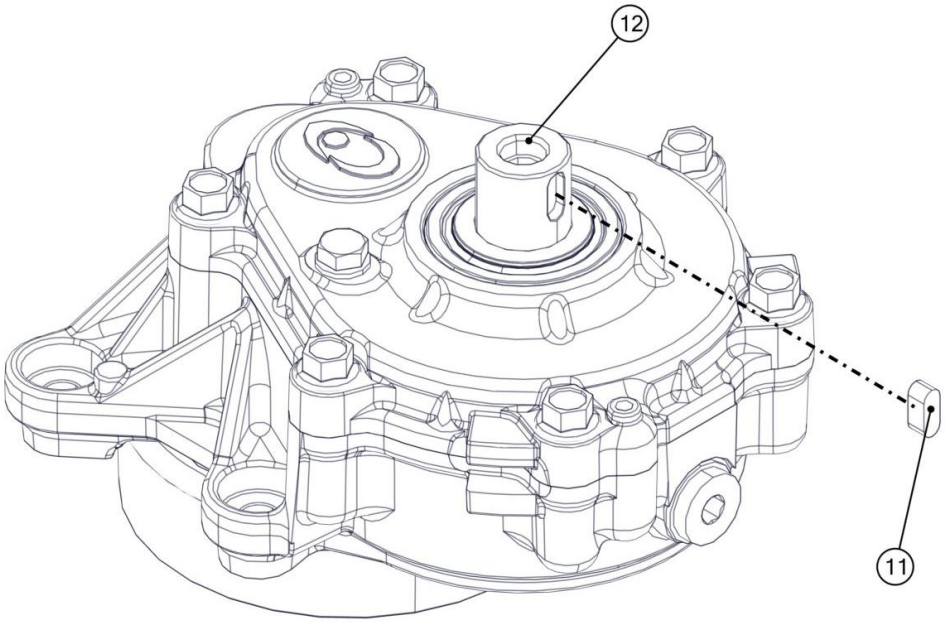
Correct bushing (18) orientation.



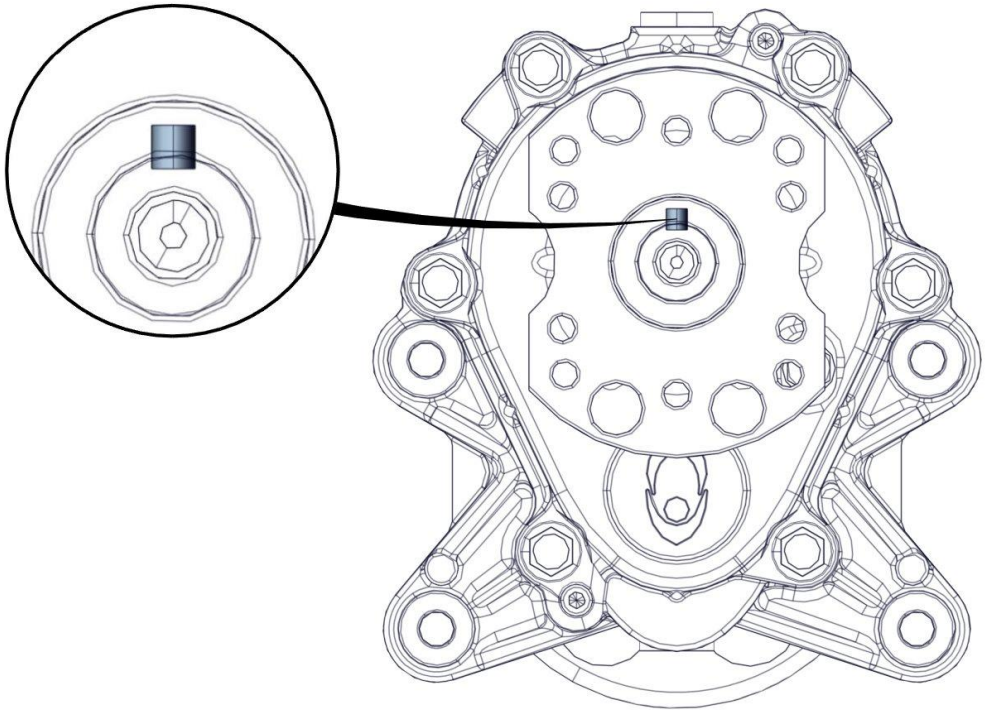
Wrong bushing (18) orientation.



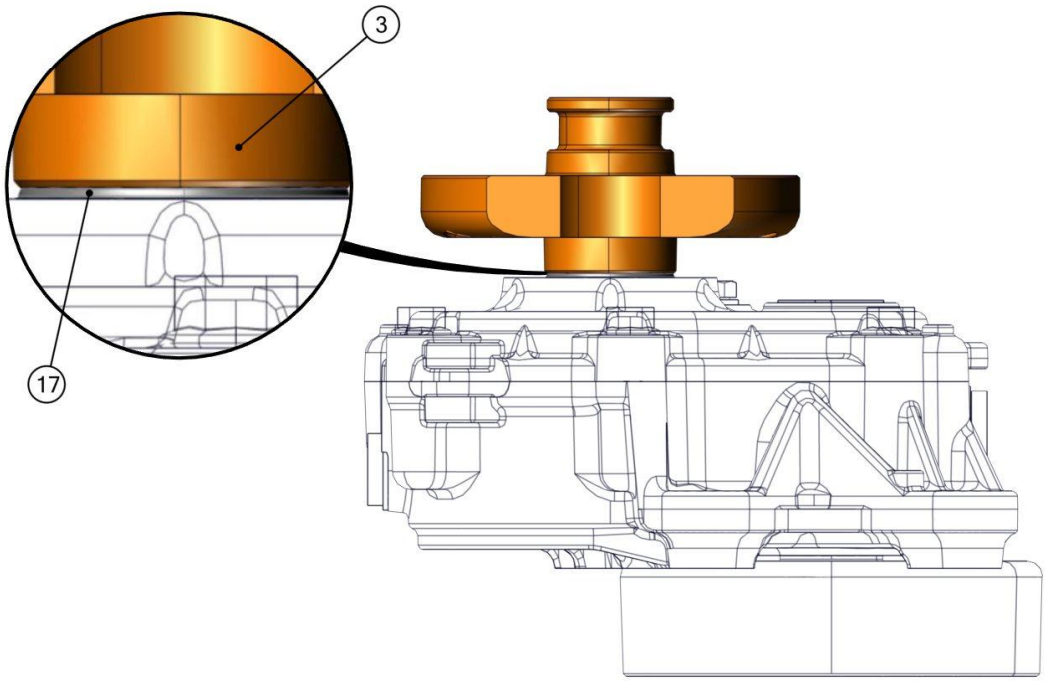
Insert the key (11) on the propeller shaft (12).

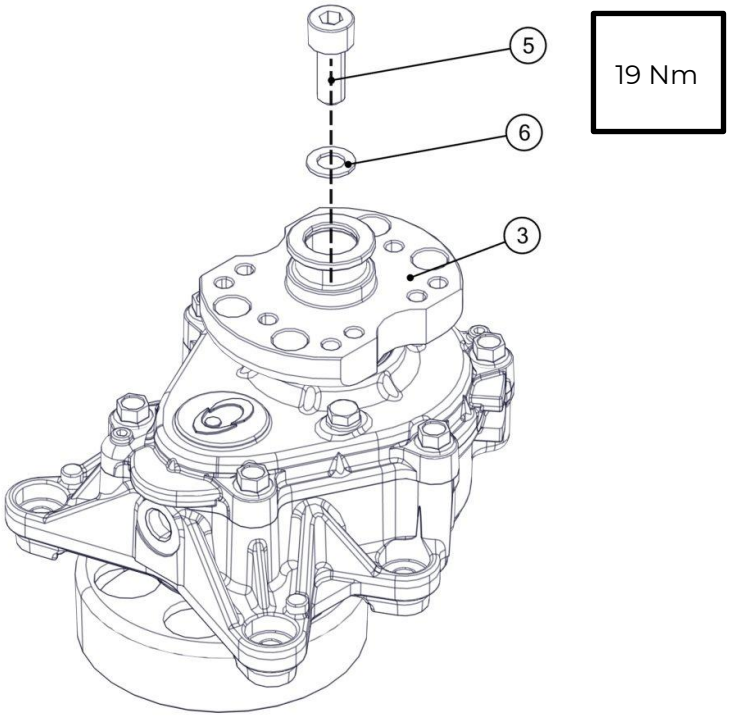


Heat the hub to approx. 150 °C.
Aligning the key with the hub groove.

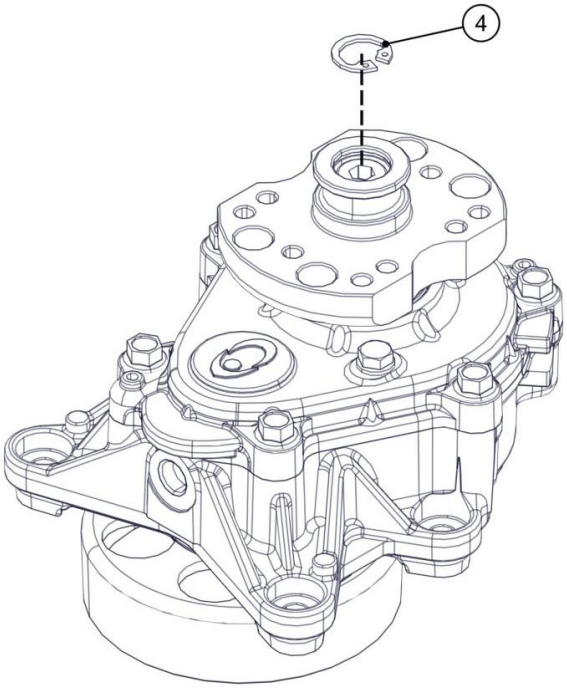


Insert the hub (3) still warm at 150 °C onto the propeller shaft.
Check that the hub (3) comes into contact with the bushing (17) to ensure a correct and secure coupling.
Replace the washer (6) each time it is disassembled.
Insert the screw M8x20 (5) with the washer (6) into the hub (3).
Lock the hub and tighten the screw with the torque shown in the figure.

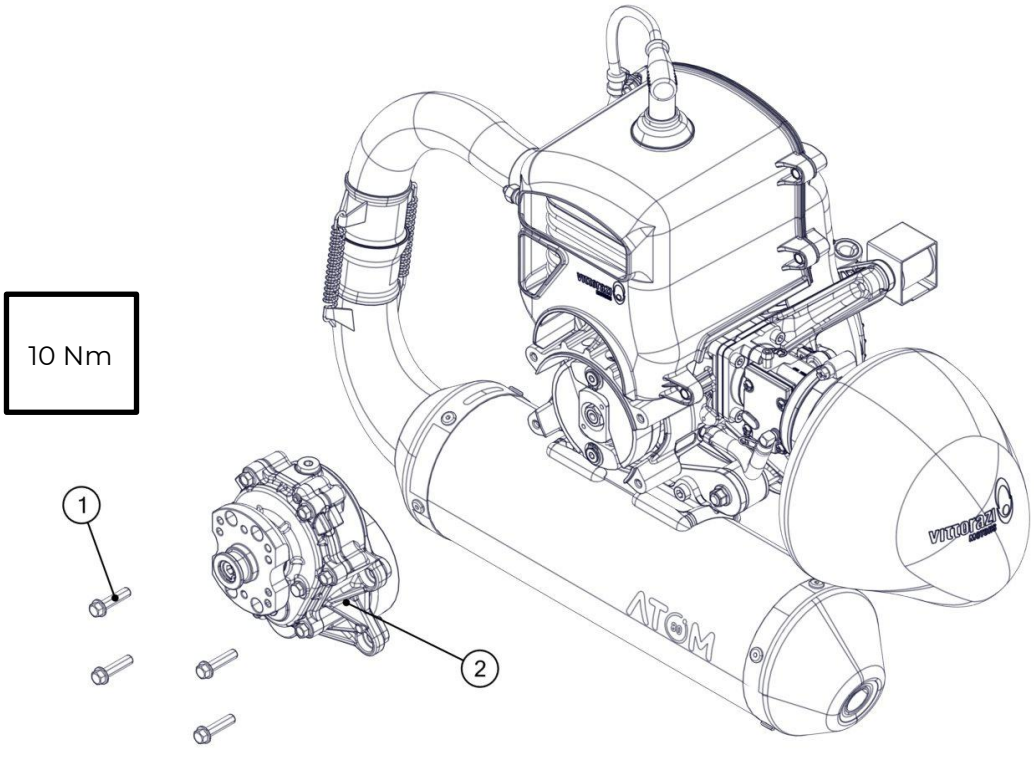




Insert the Seeger ring (4).



Position the transmission in its housing.
Insert the 4 flange-head screws M6x25 (1) and tighten with the torque shown in the figure.



After assembly, fill the transmission with oil.

3.12 Piston, cylinder, head

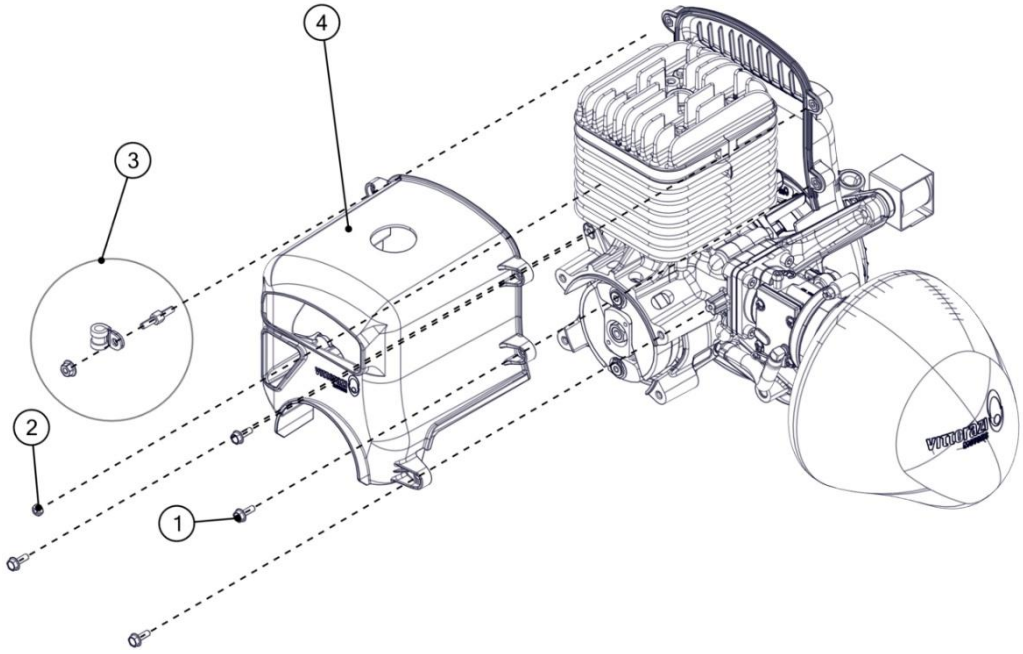
<table>
<tr>
<td>Components to replace</td>
<td>
<table>
<tr><th></th><th>Time limit</th></tr>
<tr><td>Self-locking nuts M6 (AT019) *</td><td>150 h</td></tr>
<tr><td>O-ring head* (AT016) *</td><td>150 h</td></tr>
<tr><td>Roller bearing (AT009).</td><td>150 h</td></tr>
<tr><td>Piston / Piston ring / Pin / Circle clip (AT010, AT013, AT011).</td><td>150 h</td></tr>
<tr><td>Copper paste*</td><td></td></tr>
<tr><td>Loxeal 83-55/Loctite 270*.</td><td></td></tr>
<tr><td>FP Silicompound 225*.</td><td></td></tr>
</table>
</td>
</tr>
<tr><td>Special tools</td><td>Not required.</td></tr>
<tr><td>Values</td><td>Self-locking nuts M6: 10 Nm.</td></tr>
</table>

*Always replace it when disassembled.

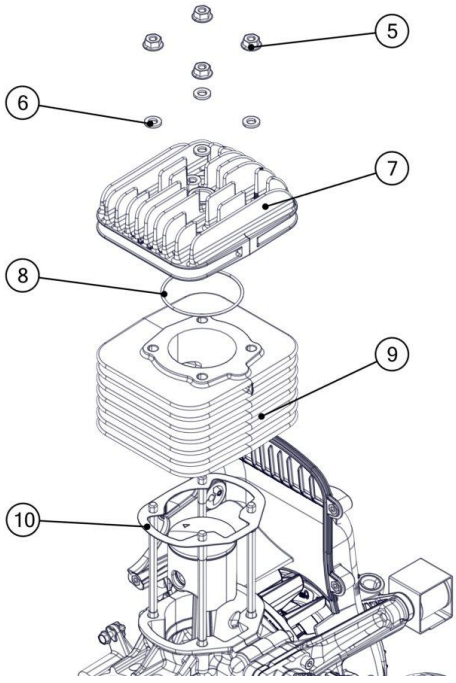
3.12.1 Piston, cylinder, head disassembly

Before disassembling the cylinder unit, remove the spark plug (3.2 Spark plug), the exhaust system (3.7 Exhaust system) and the transmission (3.11 Transmission).

Remove the 4 flange head screws M4x12 (1), nut M4 (2) and stud assembly (3) (composed of nut M4, clamp and stud M4) from the front conveyor (4).
Remove the front conveyor (4).

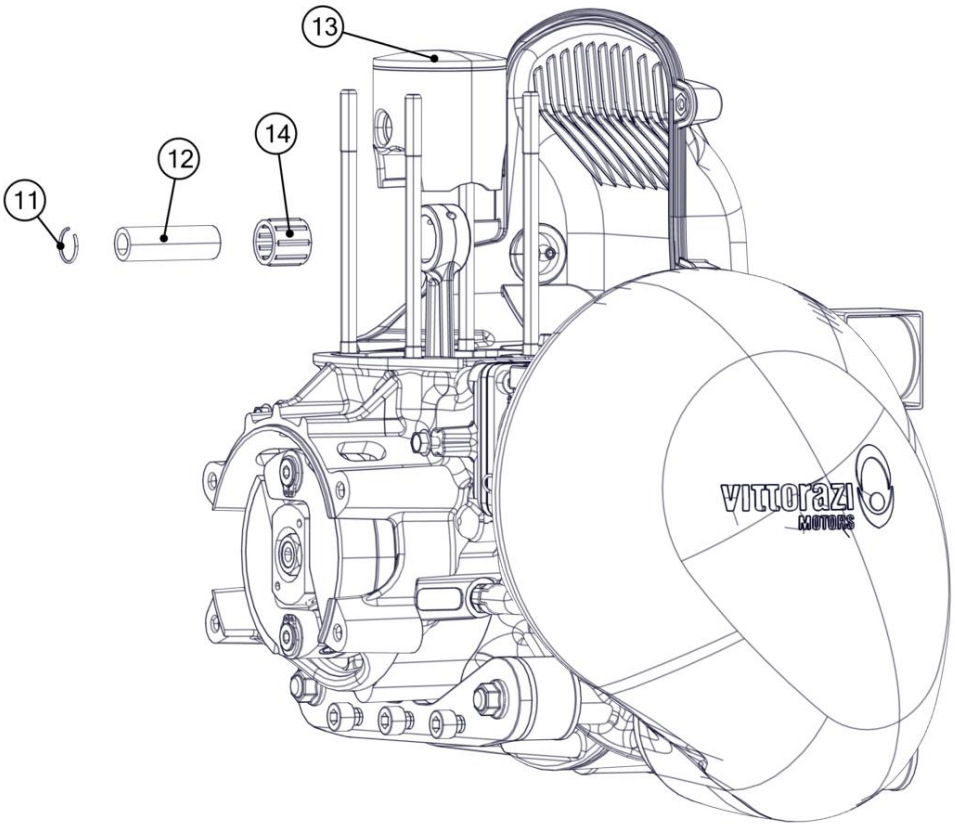


Remove the 4 self-locking nuts M6 (5) with washers (6) from the engine head (7).
Remove the head (7), the O-ring (8), the cylinder (9) and the gasket (10).

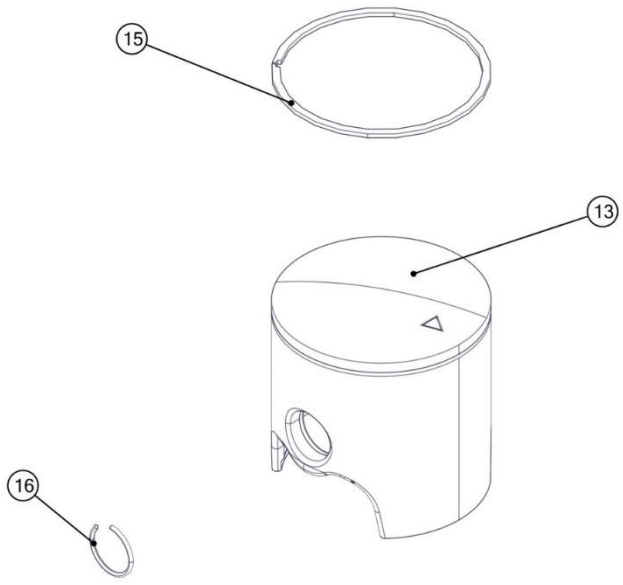


Close the inside of the crankcase with paper to prevent foreign bodies from accidentally falling into the engine.

Remove the circle clip (11), the pin (12), the piston (13) and the roller bearing (14).
Removal of the pin (12) can be facilitated by using a heat gun on the piston in the pin area.



Remove the piston ring (15) and the circle clip (16) from the piston (13).

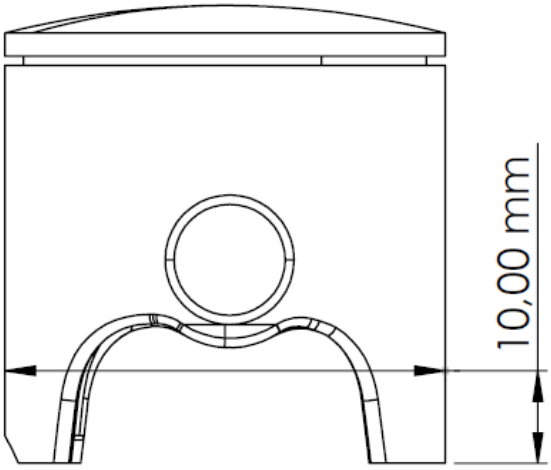


3.12.2 Piston, cylinder, head maintenance

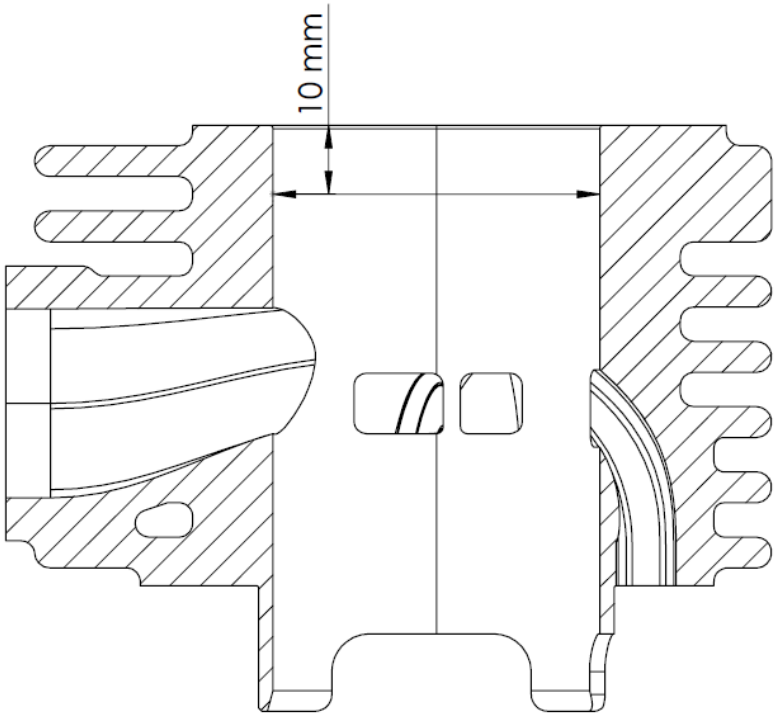
Do not use abrasive tools and corrosive liquids that may damage the surface.

Carefully remove gasket residues from the cylinder and the crankcase.
Thoroughly clean the piston crown, the piston groove, the exhaust port on the cylinder and internal surface of head.
Immerse the piston, cylinder and head in an ultrasonic bath containing cleaning liquid for aluminum.

The cylinder and piston belong to different selection classes according to tolerance.
Check the selection class engraved on the piston.
Measure the diameter of the piston 10 mm from the base of the shell.



Measure the diameter of the cylinder at 10 mm from the top.



The table shows the cylinder, the piston sizes and the factory nominal clearance for new components.
Maximum clearance refers to worn components.

Selection	Cylinder ø* (mm)	Piston ø* (mm)	Factory nominal clearance* (mm)	Maximum clearance* (mm)
A	47,580-47,590	47,535-47,545	0,035-0,055	0,13
B	47,590-47,600	47,545-47,555		
C	47,600-47,610	47,555-47,565		

* at 20 °C

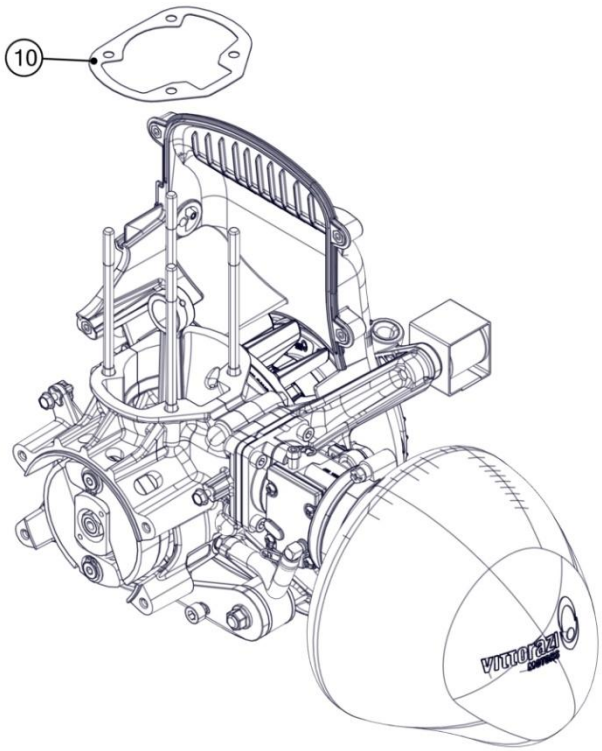
Determine the maximum clearance, if equal to or greater than the indicated value replace the piston and/or cylinder.

Check the piston and cylinder for signs of seizure, otherwise replace them. For routine maintenance, follow the table.

Check the piston ring seat on the piston, especially on the exhaust side: it must not be deformed. Insert the piston ring on the seat and check that there is play, otherwise replace the piston. For routine maintenance, follow the table.

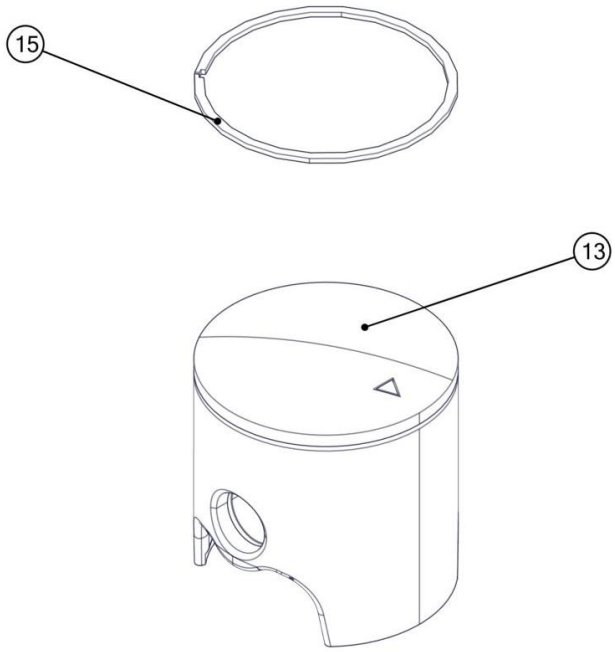
Replace the same thickness with one or more gaskets (possible sizes: 0,2-0,3-0,5 mm).

Insert the gasket (10).

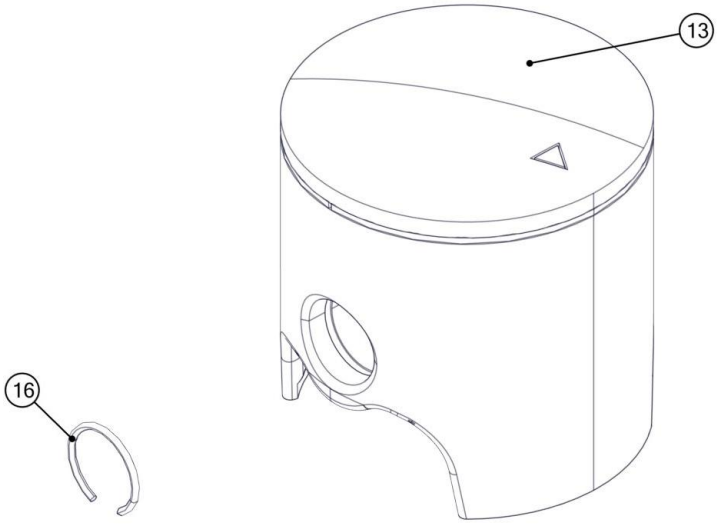


Oil the following components with the oil used for the mixture: the roller bearing (14), the pin (12), the piston ring (15) and the piston (13).

Insert the piston ring (15) into the piston groove (13), paying attention to the position of the piston ring retainer.

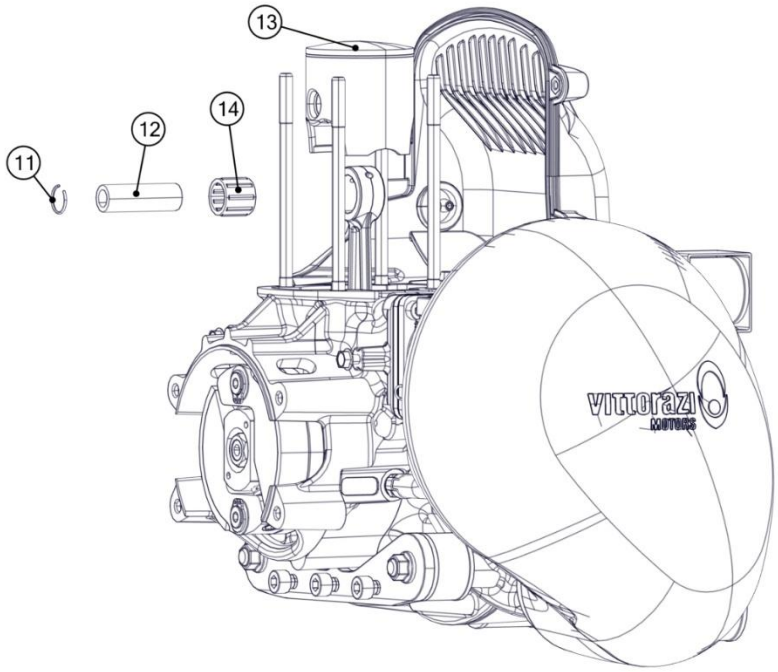


Insert the circle clip (16) on the piston (13) on the manual starter side respecting the position shown in the photo.



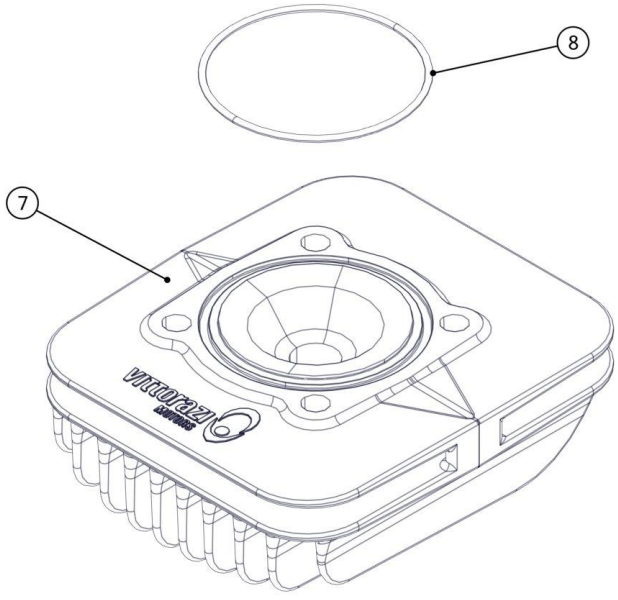
The triangle on the top of the piston indicates the exhaust side.

Insert the roller bearing (14), the piston (13), the pin (12) and the circle clip (11).

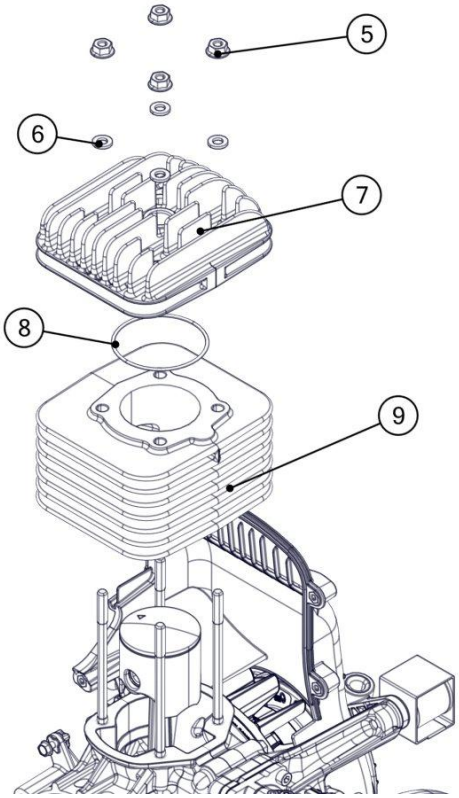


Replace the O-ring (8) and the 4 self-locking nuts M6 (5) each time they are disassembled.

Fit the O-ring (8) on the head (7).



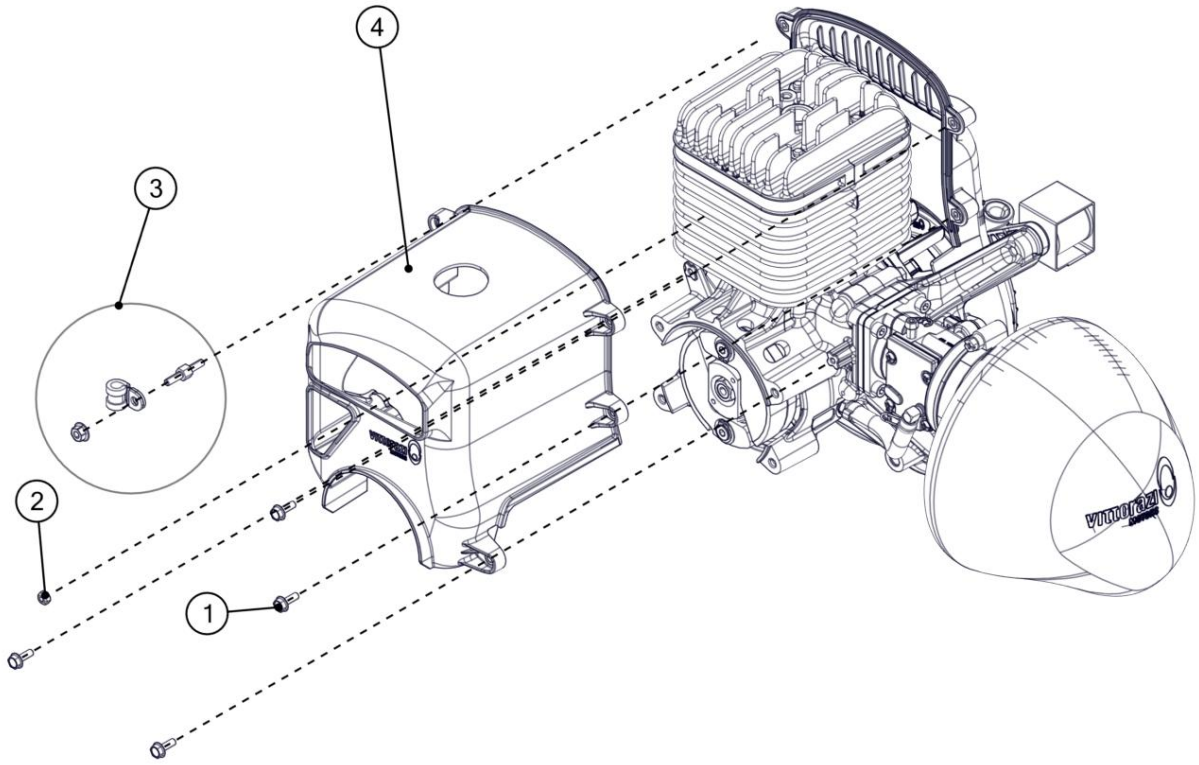
Insert the cylinder (9).
Add copper paste to the nuts.
Place the head (7) on the cylinder (9) and the 4 self-locking nuts M6 (5) with washers (6).



Tighten the nuts progressively, then cross-tighten to 10 Nm.

Check the squish measurement on the pin axis: acceptable values range **from 0,7 mm to 0,9 mm.**
If the squish is out of tolerance, increase or decrease the thickness of the cylinder base gasket until the required result is obtained.

Position the front conveyor (4) in its place.
Insert the 4 flange head screws M4x12 (1) and the nut M4 (2) on the front conveyor (4) and tighten.
Insert the stud assembly (3) (composed of nut M4, clamp and stud M4) with threadlocker (Loxeal 83-55/Loctite 270 recommended) on the front conveyor (4) and tighten.



3.13 Crankcase

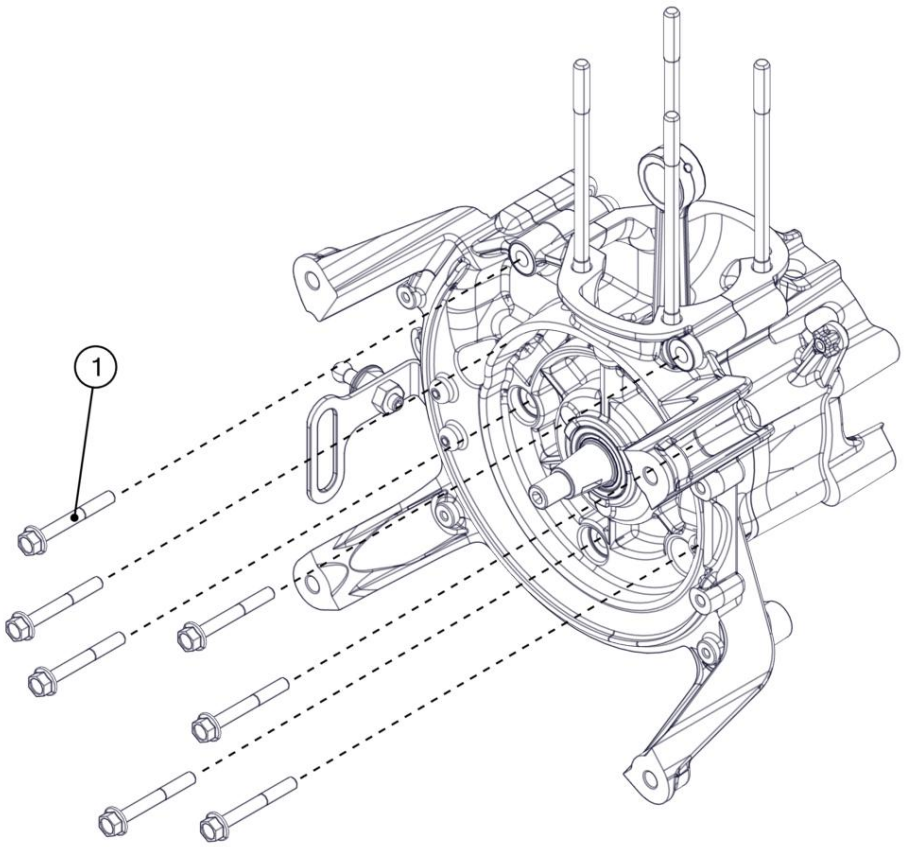
<table>
<tr><td> 
Components to replace</td><td>
<table>
<tr><th></th><th>Time limit</th></tr>
<tr><td>Crankshaft (AT001).</td><td>on condition</td></tr>
<tr><td>Bearings (F003).</td><td>150 h</td></tr>
<tr><td>Oil seals (AT006)</td><td>150 h</td></tr>
<tr><td>Three Bond 1215 silicone paste.</td><td></td></tr>
<tr><td>FP Silicompound 225.</td><td></td></tr>
</table>
</td></tr>
<tr><td> 
Special tools</td><td>Specific tool – transmission side crankshaft oil seal assembly (ACC125)
Specific tool – flywheel side crankshaft oil seal assembly (ACC126)</td></tr>
<tr><td> 
Values</td><td>Screws M5x40: 6,5 Nm.</td></tr>
</table>

*Always replace it when disassembled.

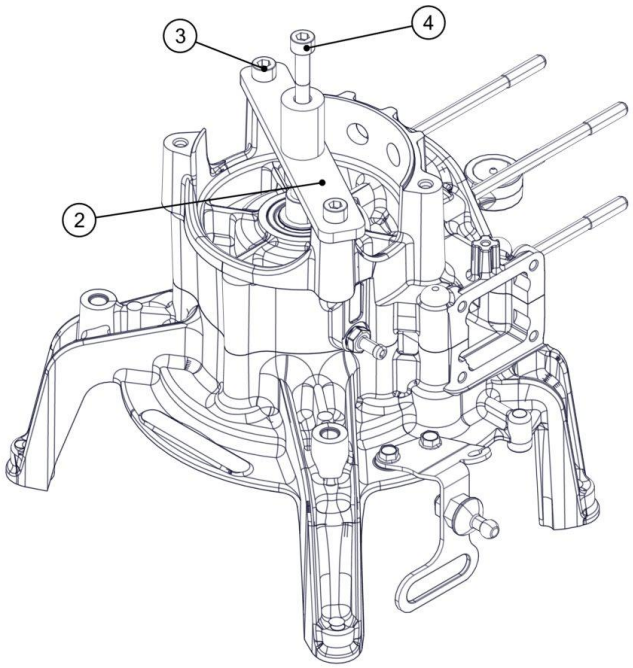
3.13.1 Crankcase disassembly

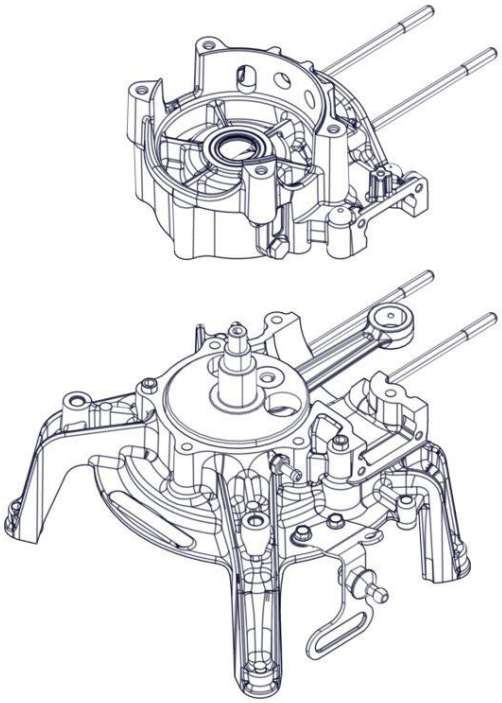
Before disassembling the crankcase, remove the Airbox (3.3 Airbox), the carburettor (3.4 Carburettor), the reed valve (3.5 Reed valve), the exhaust system (3.7 Exhaust system), the rubber mountings (3.8 Rubber mountings), the pull starter system (3.9 Pull starter system), the flywheel, the coil (3.10 Flywheel, coil), the transmission (3.11 Transmission) and the cylinder unit (3.12 Piston, cylinder, head).

Remove the 7 flange-head screws M5x40 (1).

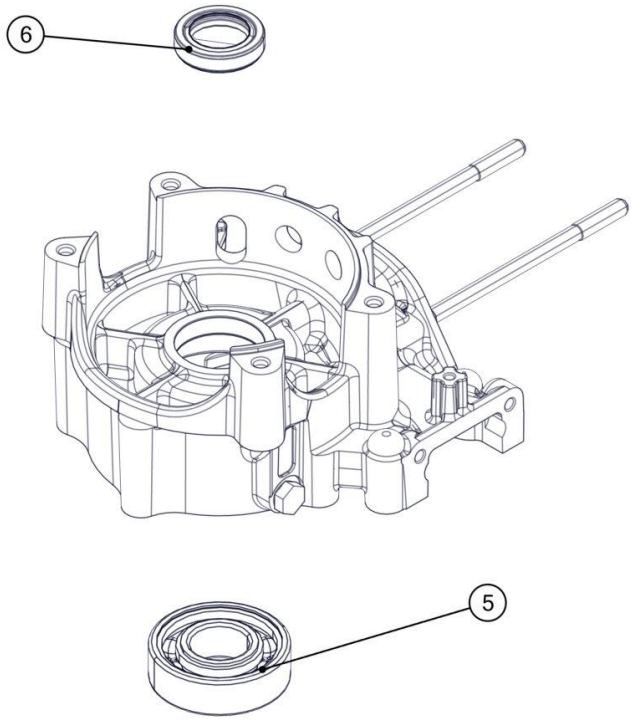


Position the extractor (2) as shown in figure, tighten the 2 screws M6 (3) and turn the central pin (4) until the 2 case-half are separated.

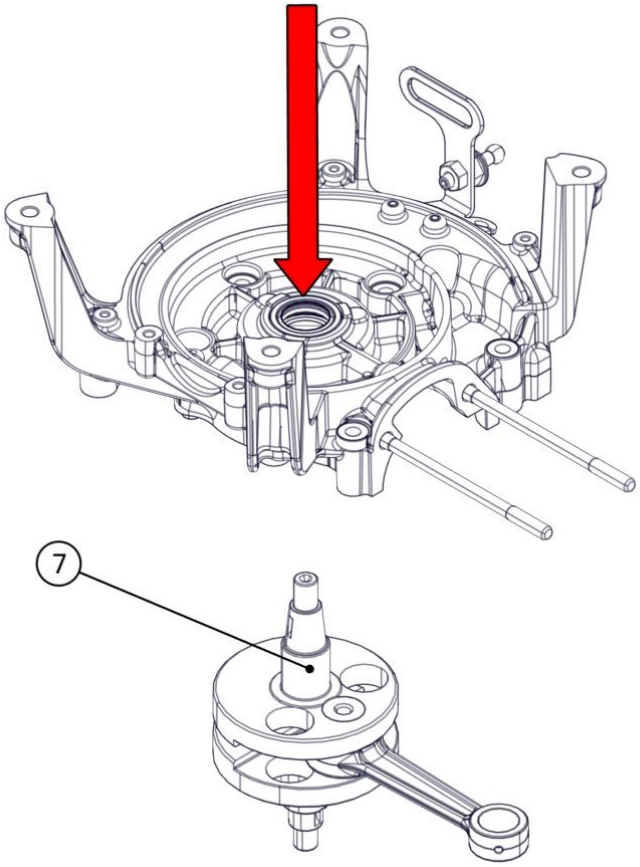




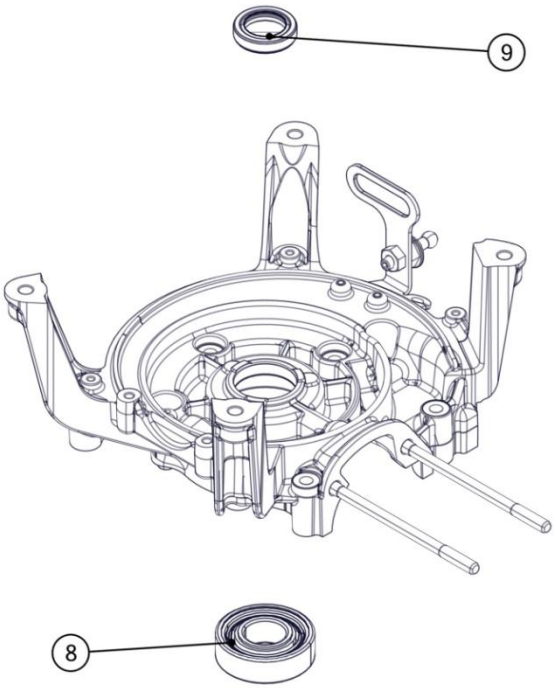
Heat the transmission side crankcase to 120 °C.
Remove the bearing (5) and the oil seal (6).



Remove the crankshaft (7) using a press in the direction shown in the figure.



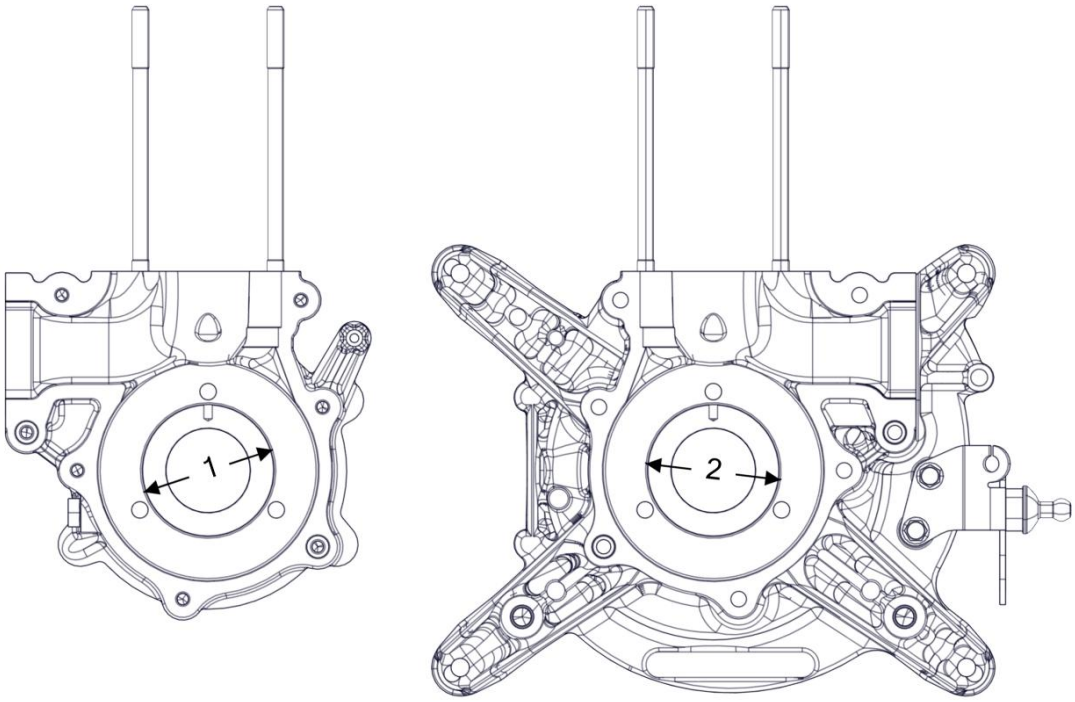
Heat the manual starter side crankcase to 120 °C.
Remove the bearing (8) and the oil seal (9).



3.13.2 Crankcase maintenance

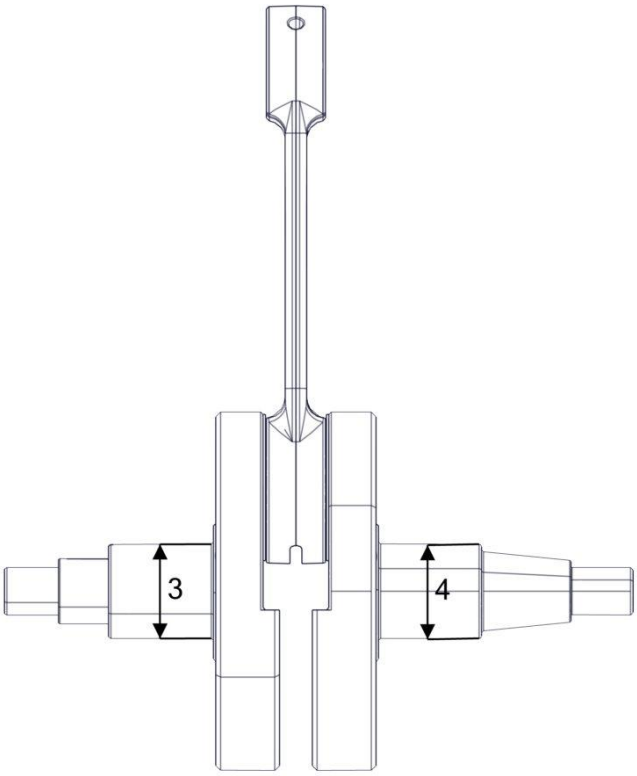
Degrease the bearing seats and the profile of the case-half with specific products for aluminium.
Check the case-half: check for integrity and abnormal marks.

Check the 2 bearing seats: there must be no polished areas. Also measure the diameter of the 2 seats, the table shows the factory settings.



Dimension	Factory settings at 20° C (mm)
1	46,958-46,983
2	46,958-46,983

Measure the diameter of the 2 bearing seats on the crankshaft, the table shows the factory settings.



Dimension	Factory settings at 20° C (mm)
3	20,003-20,006
4	20,003-20,006

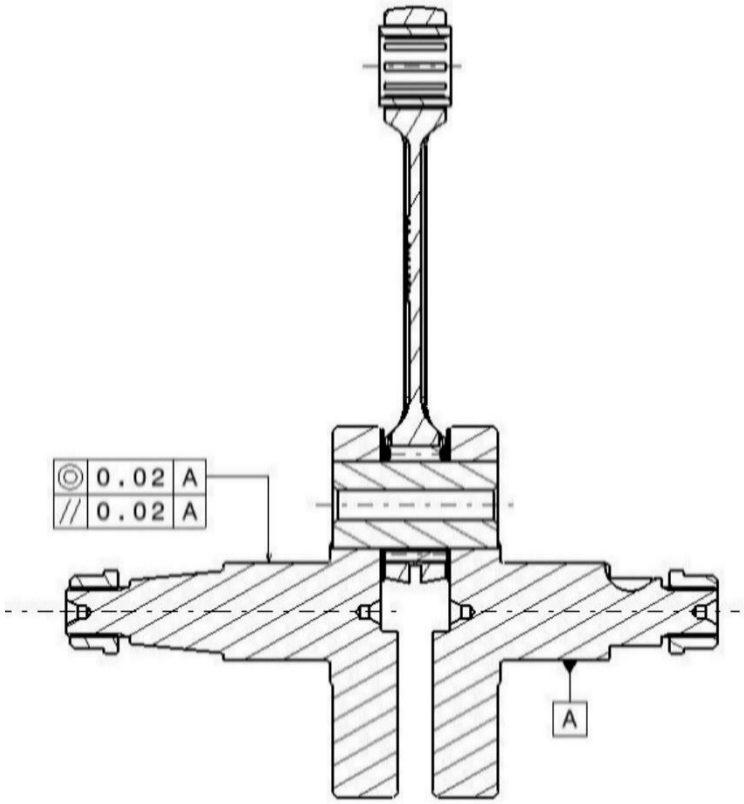
Measure the clearance at the small end and big end of the connecting rod.

	Factory nominal clearance* (mm)
Small end	0,009-0,017
Big end	0,020-0,029

* at 20 °C

Check on the connecting rod that there are no areas of different colour due to overheating.

Measure the eccentricity of the crankshaft, the factory settings are shown in the figure.

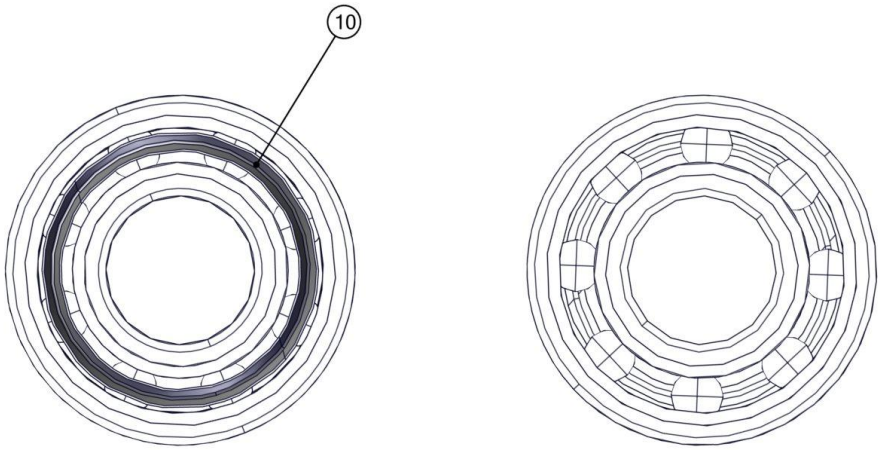


Check that the seat of the key is undamaged.

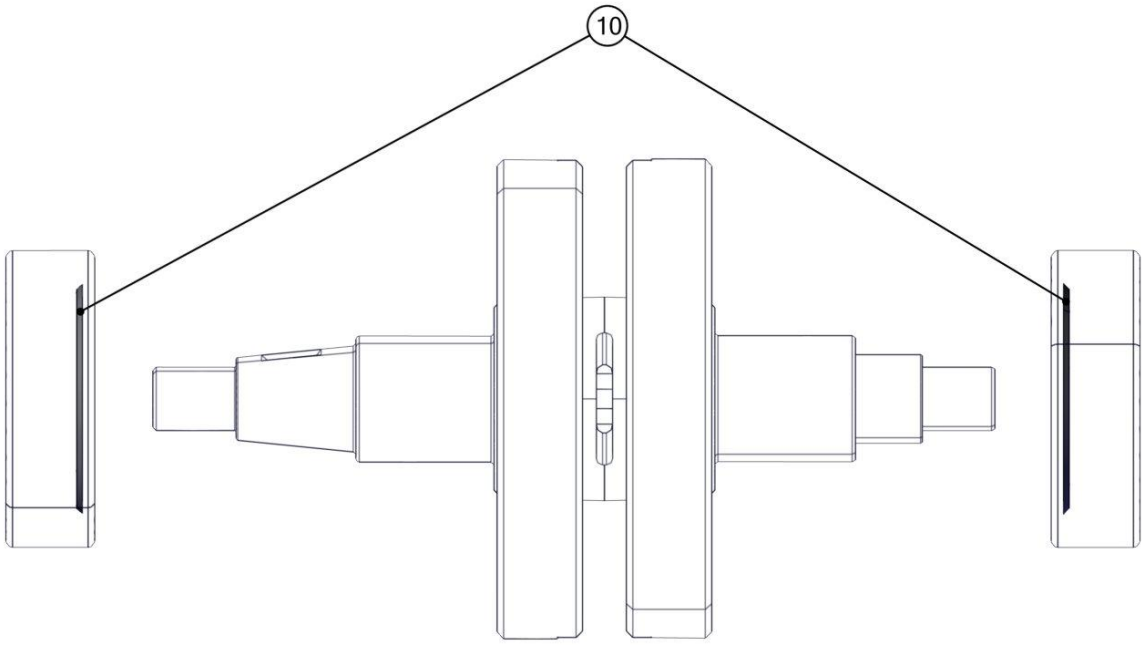
If the above checks are not passed, replace the crankshaft.

3.13.3 Crankcase assembly

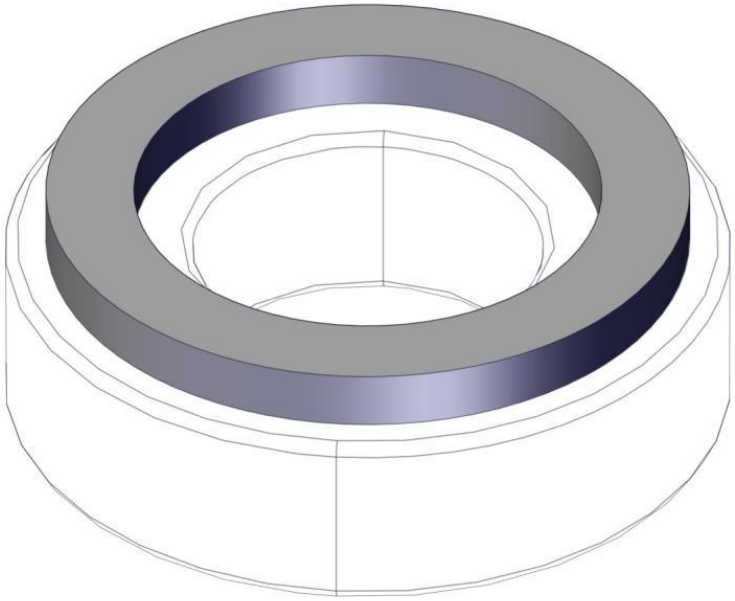
Bearings are not symmetrical: one of the two sides has an intermediate ring (10) which partially covers the balls.



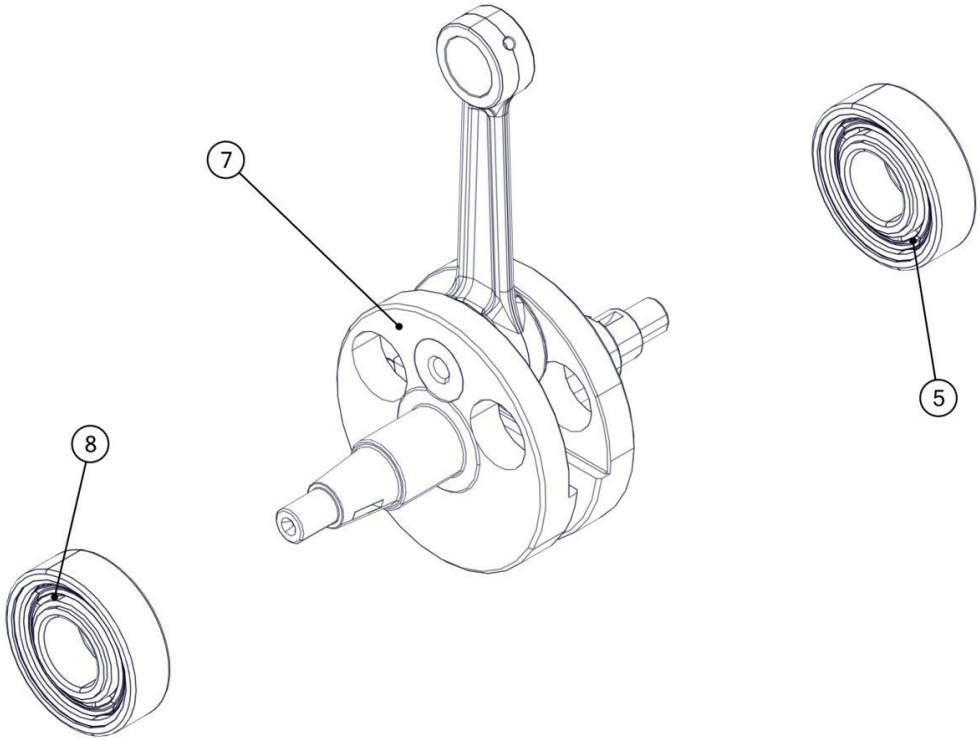
To ensure correct lubrication of the bearings, orient them as shown in the figure: the intermediate rings (10) are on the inner sides.



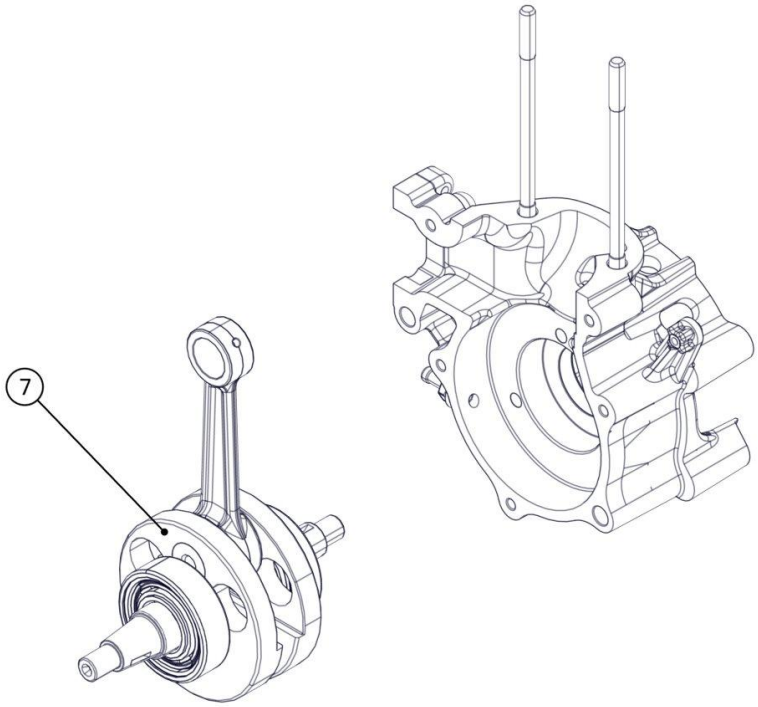
Cover the bearing cage with a ring as shown in the figure and heat the inside of the bearing to 80 °C.



Fit the 2 bearings (5, 8) on the crankshaft (7).



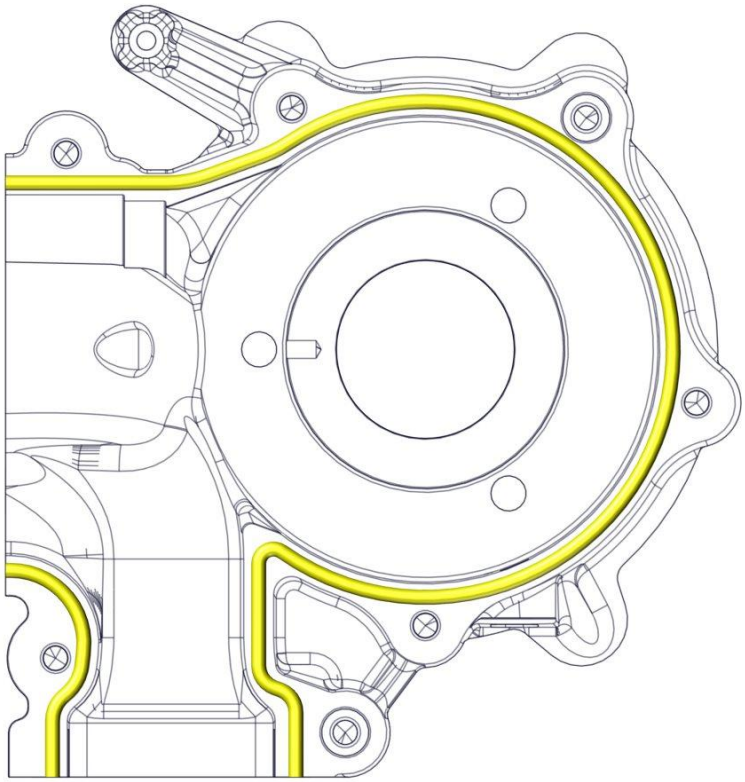
Heat the transmission side crankcase to 120 °C.
Insert the crankshaft (7) with the bearings.

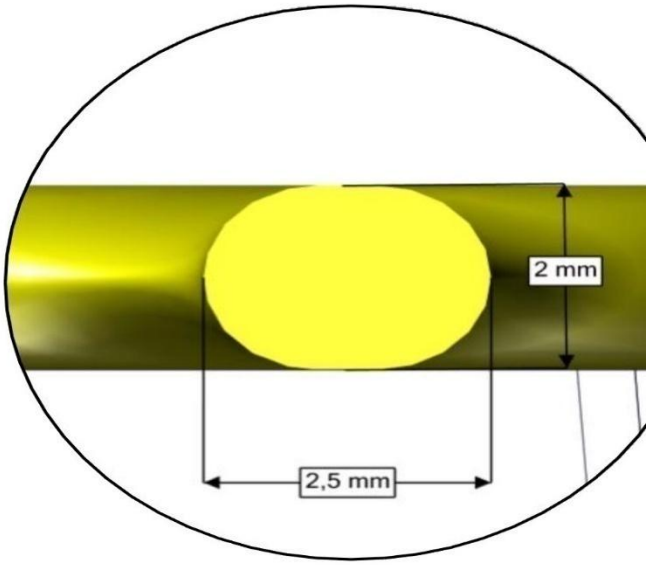


Heat the manual starter side crankcase to 120 °C.

Carry out subsequent operations within a maximum of 5 minutes (application of silicone and closing of the crankcase).

Carefully add silicone paste (Three Bond 1215) to the crankcase profile as shown in the figure.
Height, width silicone profile: 2 mm x 2,5 mm.





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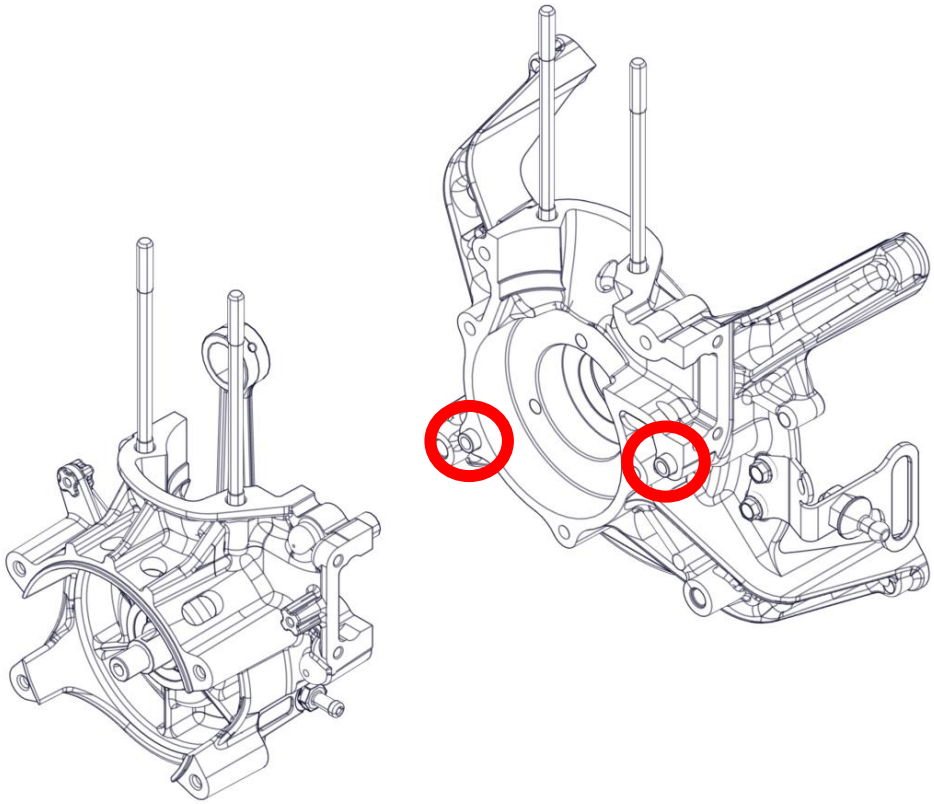
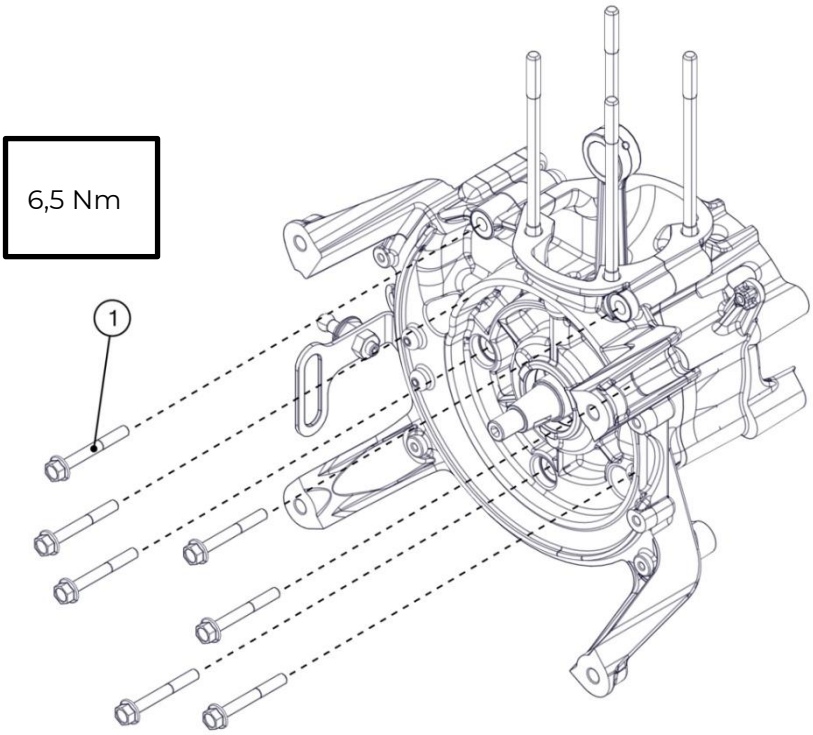
Check that the 2 bushings are in their respective seats (highlighted in the figure).

Close with the manual starter side crankcase still warm at 120 °C.



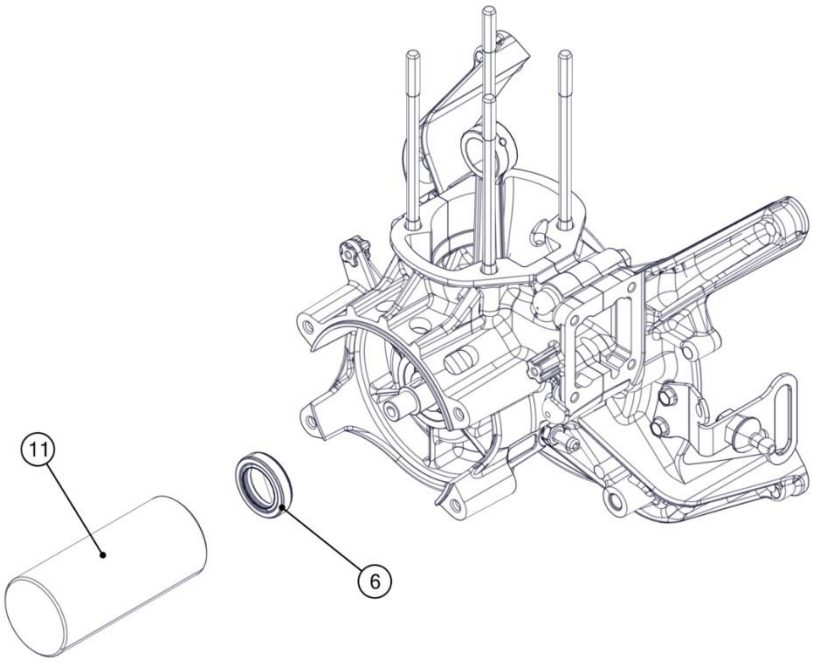
Insert the 7 flange-head screws M5x40 (1) and tighten with the torque shown in the figure.



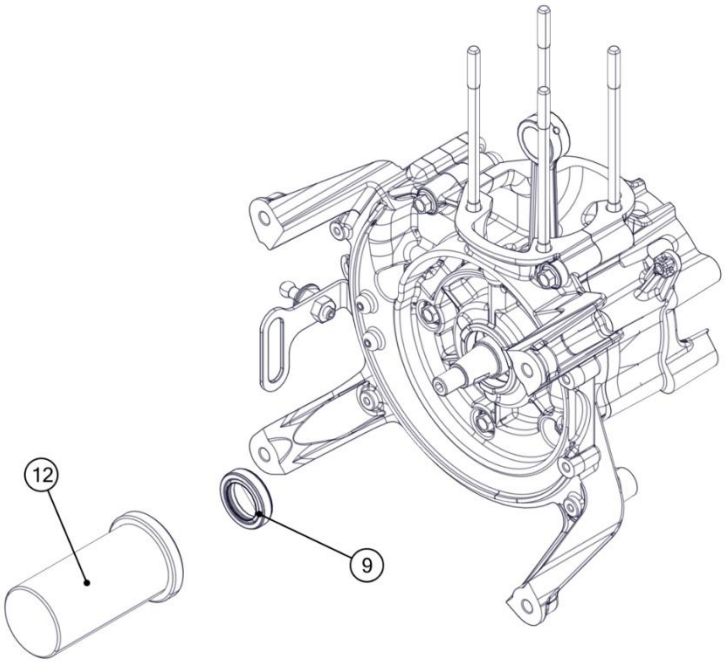
Clean the excess silicone from the crankcase perimeter with a cloth.
Wait for the crankcase to cool down.

Replace the 2 oil seals (6, 9) each time they are disassembled.

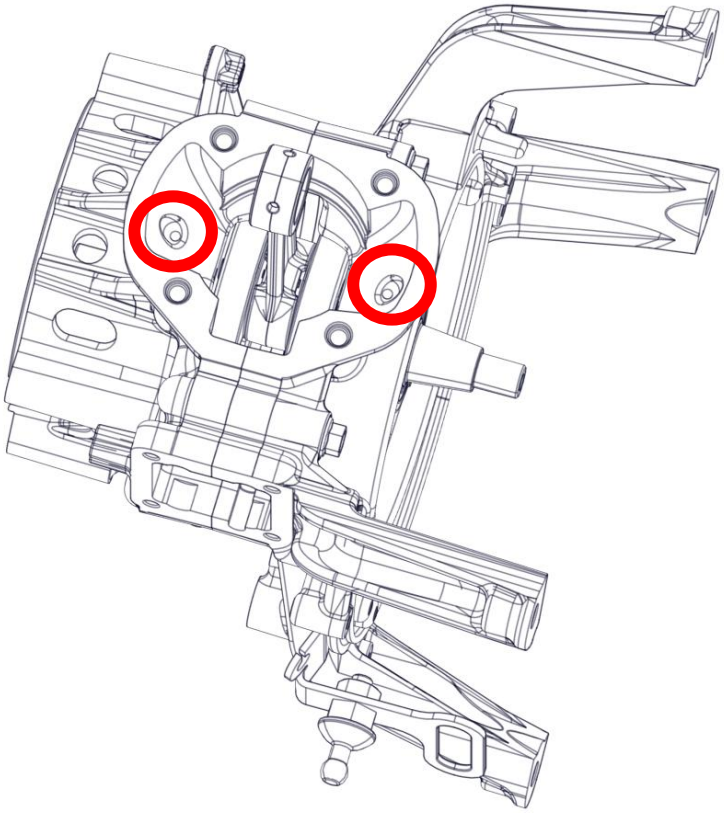
Grease the oil seal (6) with FP Silicompound 225 and place it on the crankshaft using the Specific tool – transmission side crankshaft oil seal assembly (ACC125) (11) to insert it.



Grease the oil seal (9) with FP Silicompound 225 and place it on the crankshaft using the specific tool – flywheel side crankshaft oil seal assembly (ACC126) (12) to insert it.



Check the tightening of screws.
Insert oil into the 2 lubrication holes (highlighted in the figure).



Check the sliding of crankshaft on the bearings.

3.14 Temperature probes (optional)

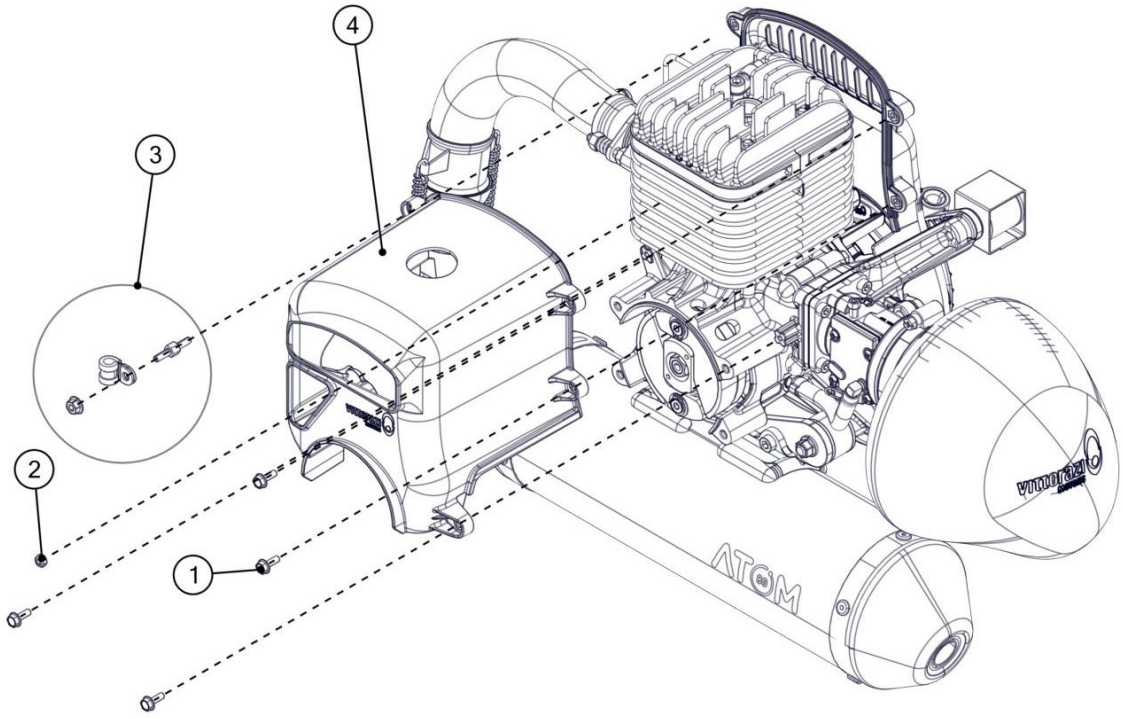
<table>
<tr><td>Components to replace</td><td>
<table>
<tr><th></th><th>Time limit</th></tr>
<tr><td>CHT sensor (ACC029)</td><td>200 h</td></tr>
<tr><td>EGT sensor (ACC030)</td><td>200 h</td></tr>
<tr><td>Loxeal 55-03/Loctite 243 *</td><td></td></tr>
<tr><td>Interflon paste HT1200 *</td><td></td></tr>
</table>
</td></tr>
<tr><td>Special tools</td><td>Not required.</td></tr>
<tr><td>Values</td><td>Screw M6x10: 10 Nm
EGT sensor: 7 Nm</td></tr>
</table>

*Always replace it when disassembled.

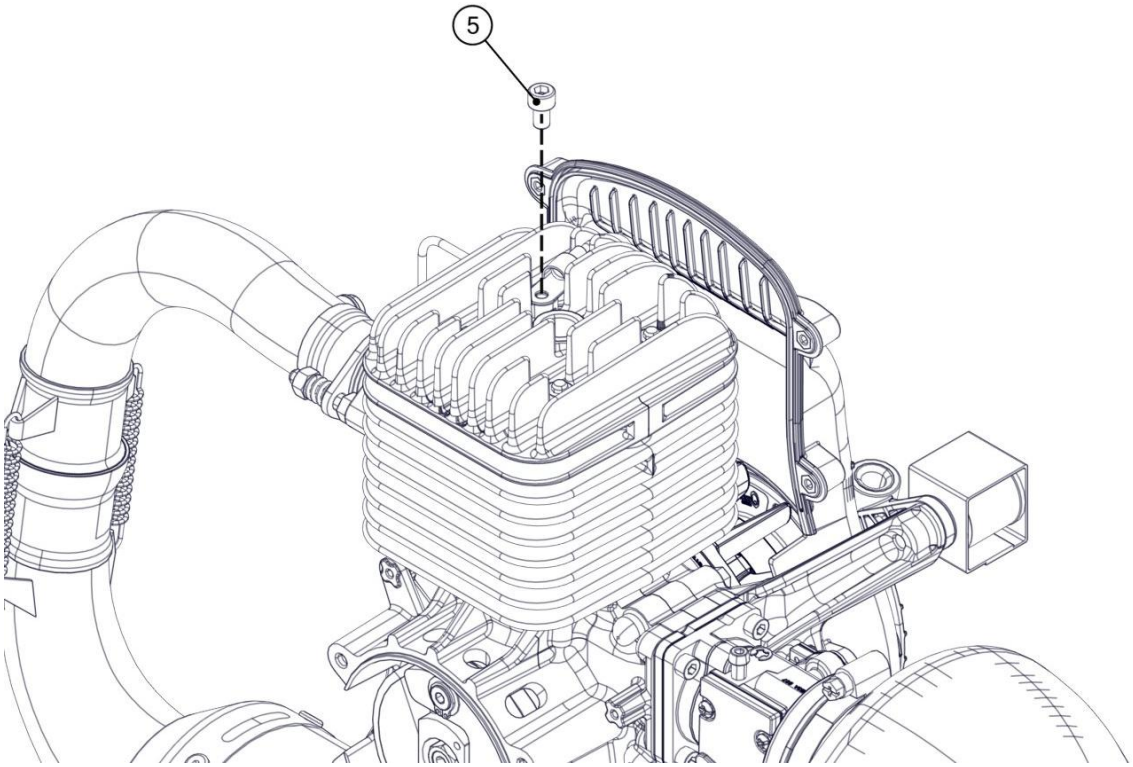
3.14.1 CHT sensor disassembly

Before disassembling the CHT sensor, remove the spark plug (3.2 Spark plug) and the transmission (3.11 Transmission).

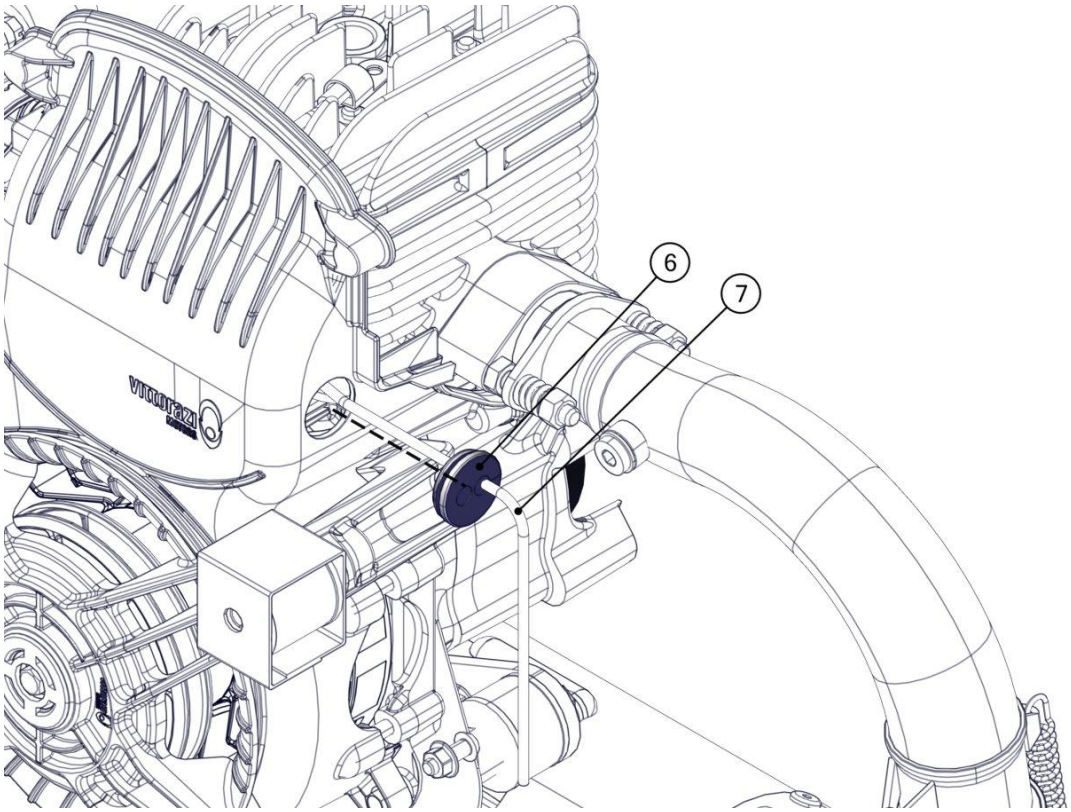
Remove the 4 flange head screws M4x12 (1), nut M4 (2) and stud assembly (3) (composed of nut M4, clamp and stud M4) from the front conveyor (4).
Remove the front conveyor (4).



Extract the Allen screw M6x10 (5)



Remove the rubber stopper (6) from the rear conveyor and extract the CHT sensor (7).

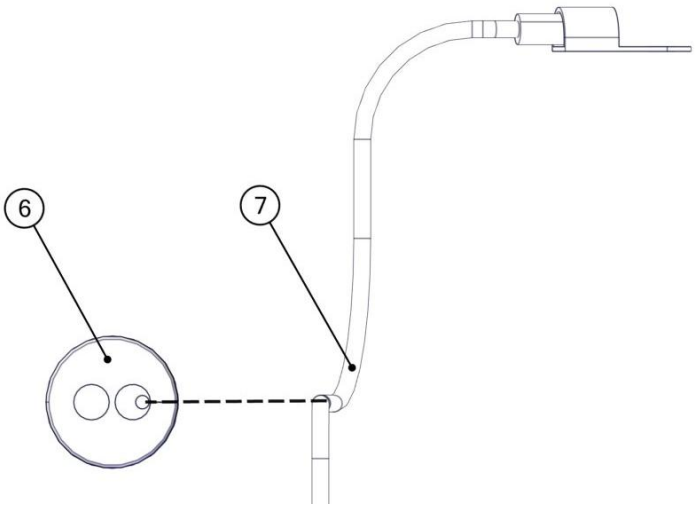


3.14.2 CHT sensor maintenance

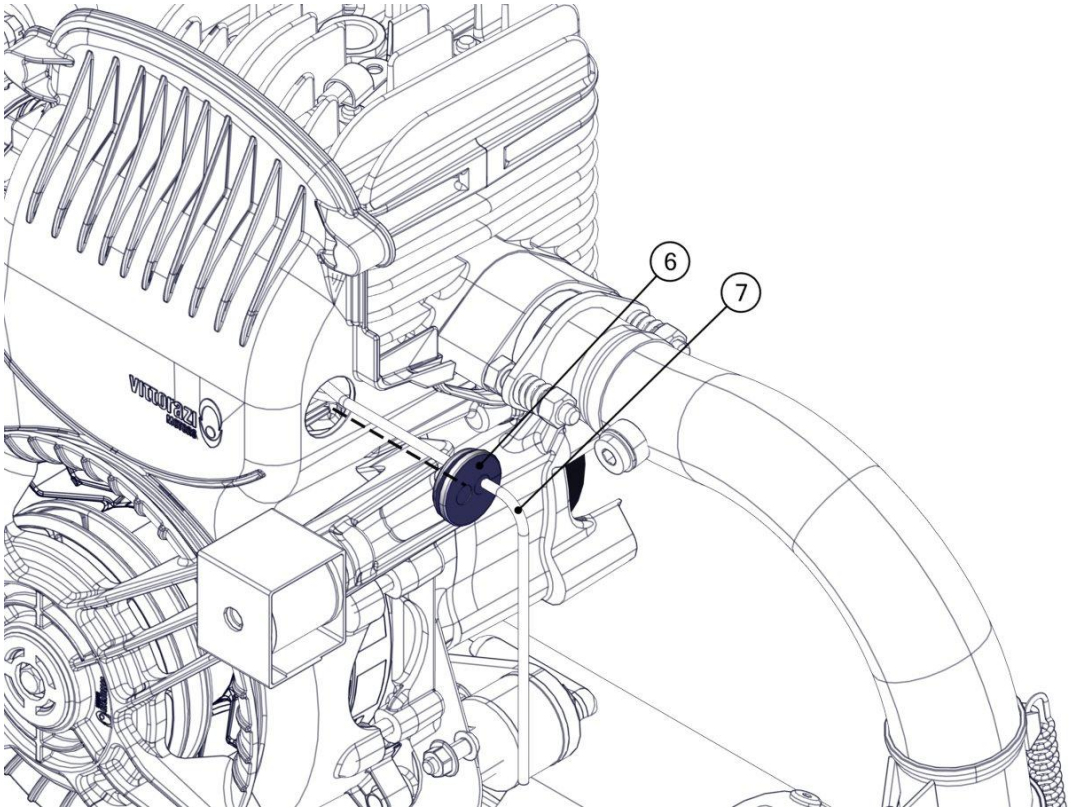
Check that the measured temperature is correct and that the signal is transmitted continuously without loss of signal or delay in response, otherwise replace the CHT sensor.
Check the CHT sensor cable: there must be no cuts or cracks, otherwise replace the CHT sensor.

3.14.3 CHT sensor assembly

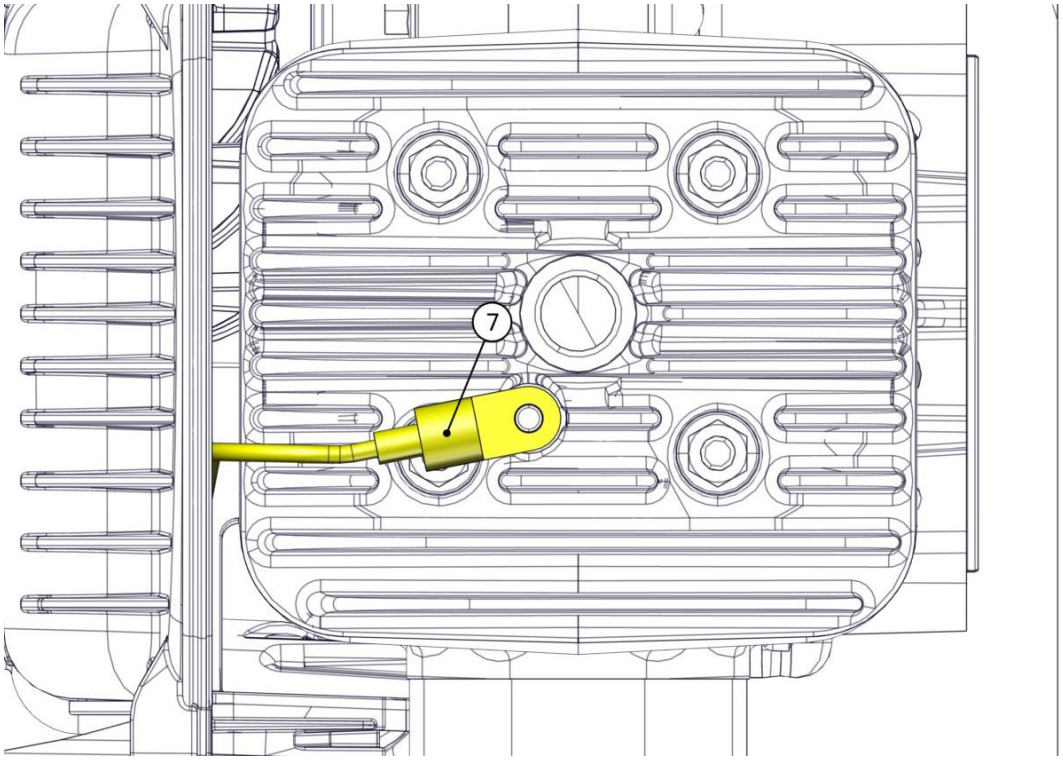
Place the CHT sensor cable (7) inside the rubber stopper (6)

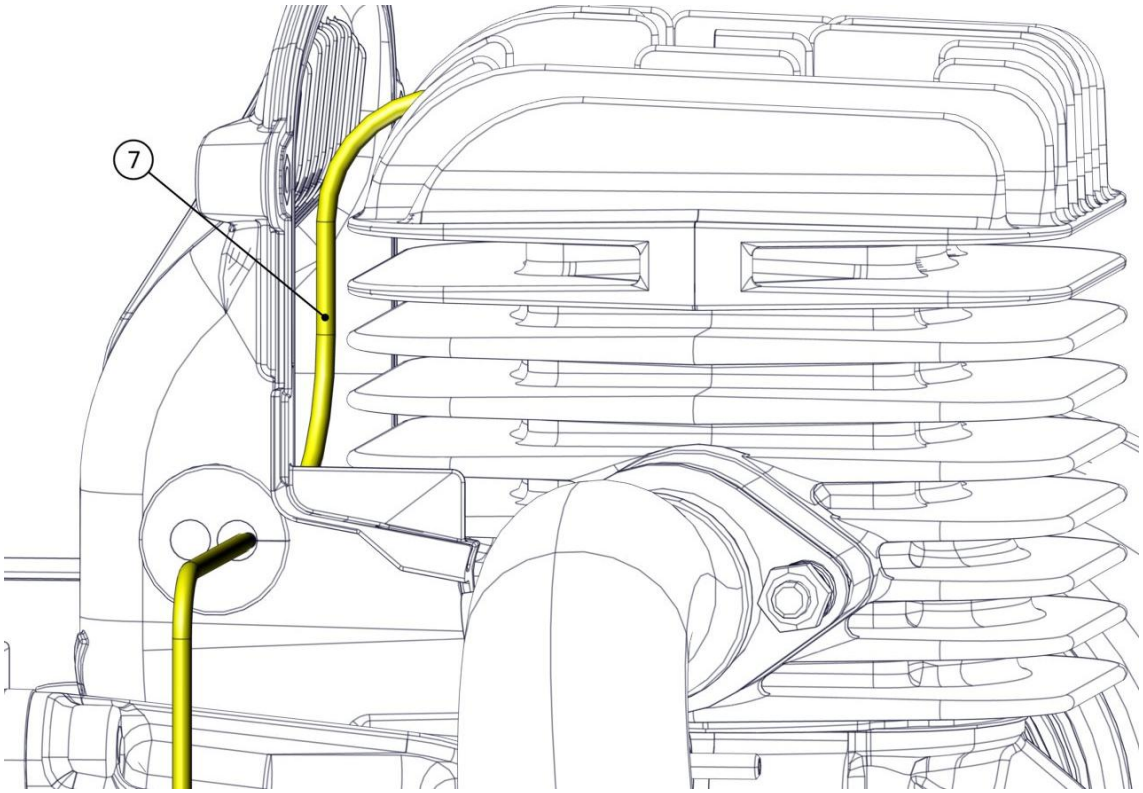


Pass the CHT sensor (7) inside the rear conveyor hole and insert the rubber stopper (6).

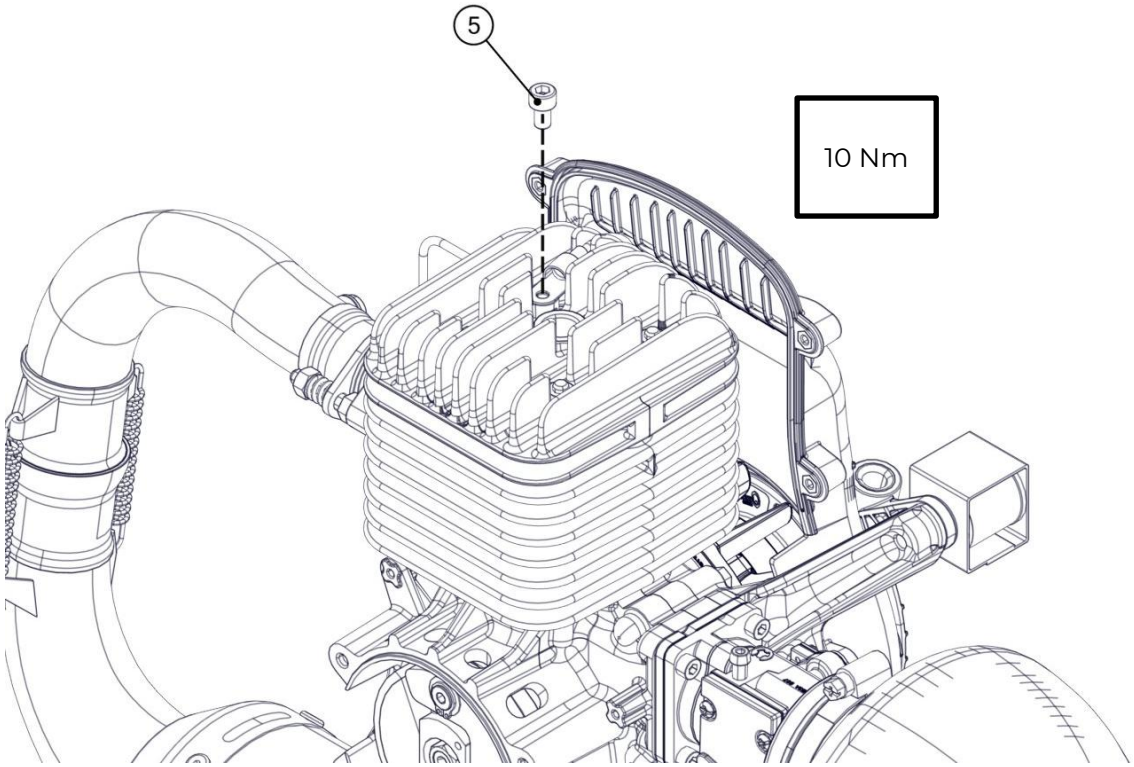


Adjust the CHT sensor cable inside the rear conveyor as shown in the figure. Make sure that the cable is not pulled and it doesn't touch the cylinder head or the cylinder.



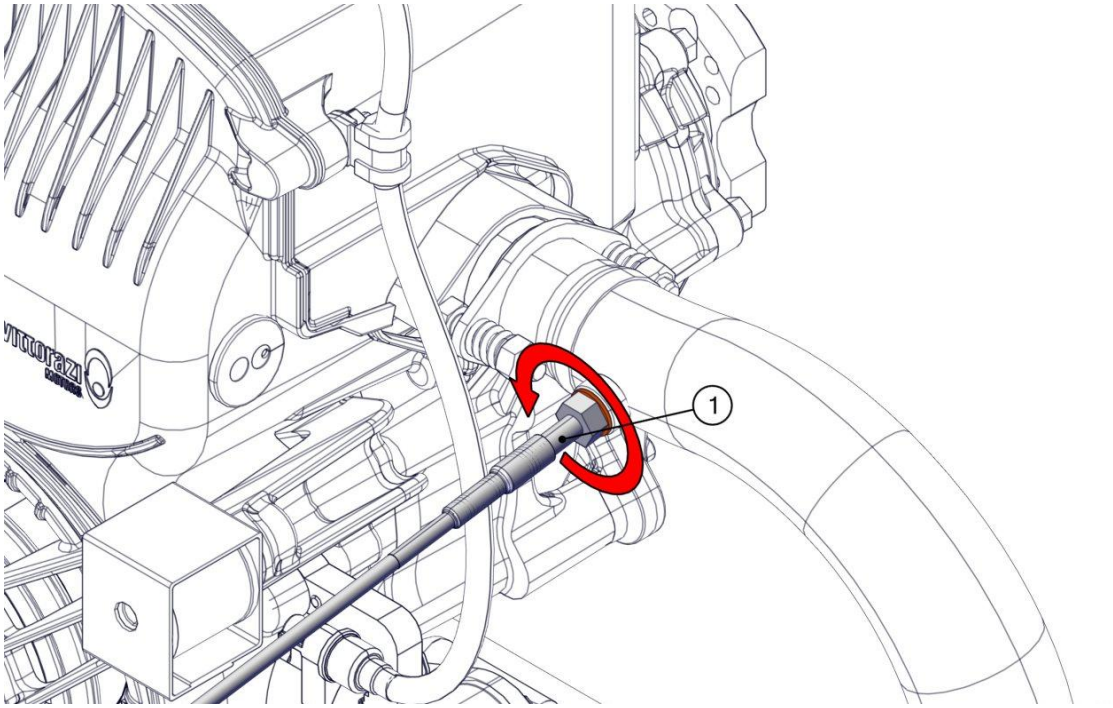


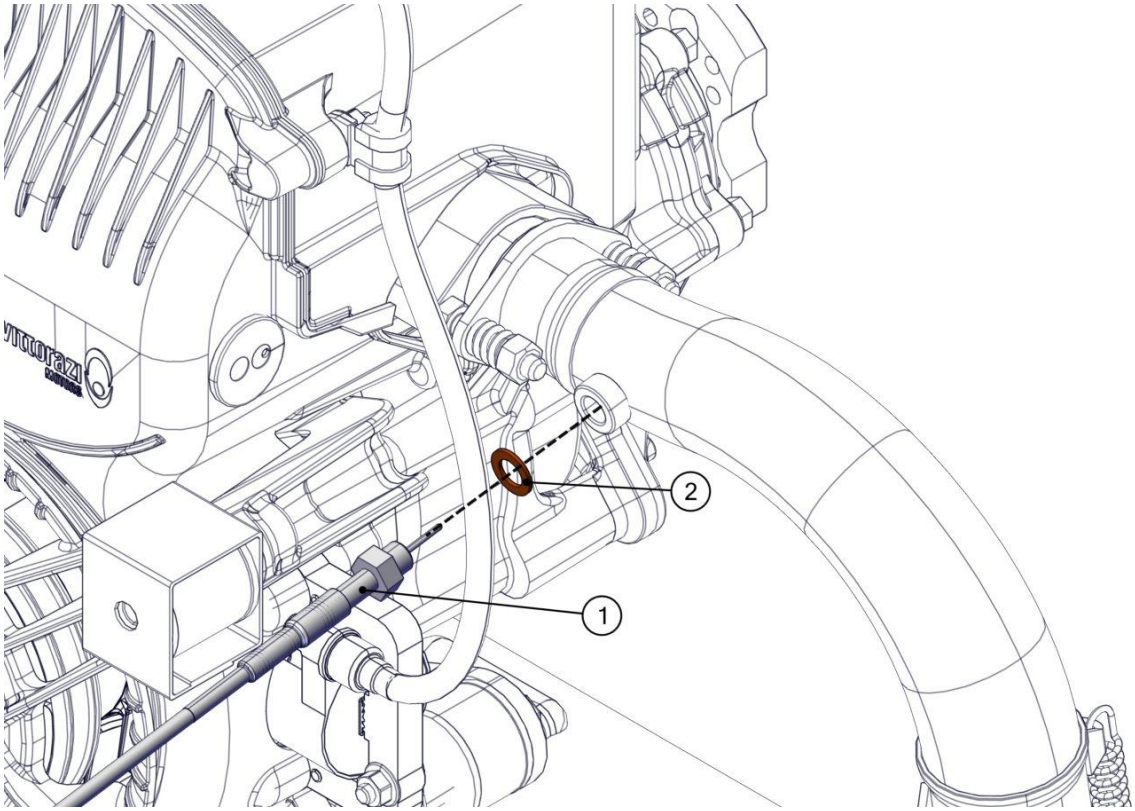
Insert the Allen screw M6x10 (5) with threadlocker (recommended Loxeal 83-55/Loctite 270) and tighten with the torque shown in the figure.



3.14.4 EGT sensor disassembly

Unscrew the EGT sensor (1) and the cooper washer (2).



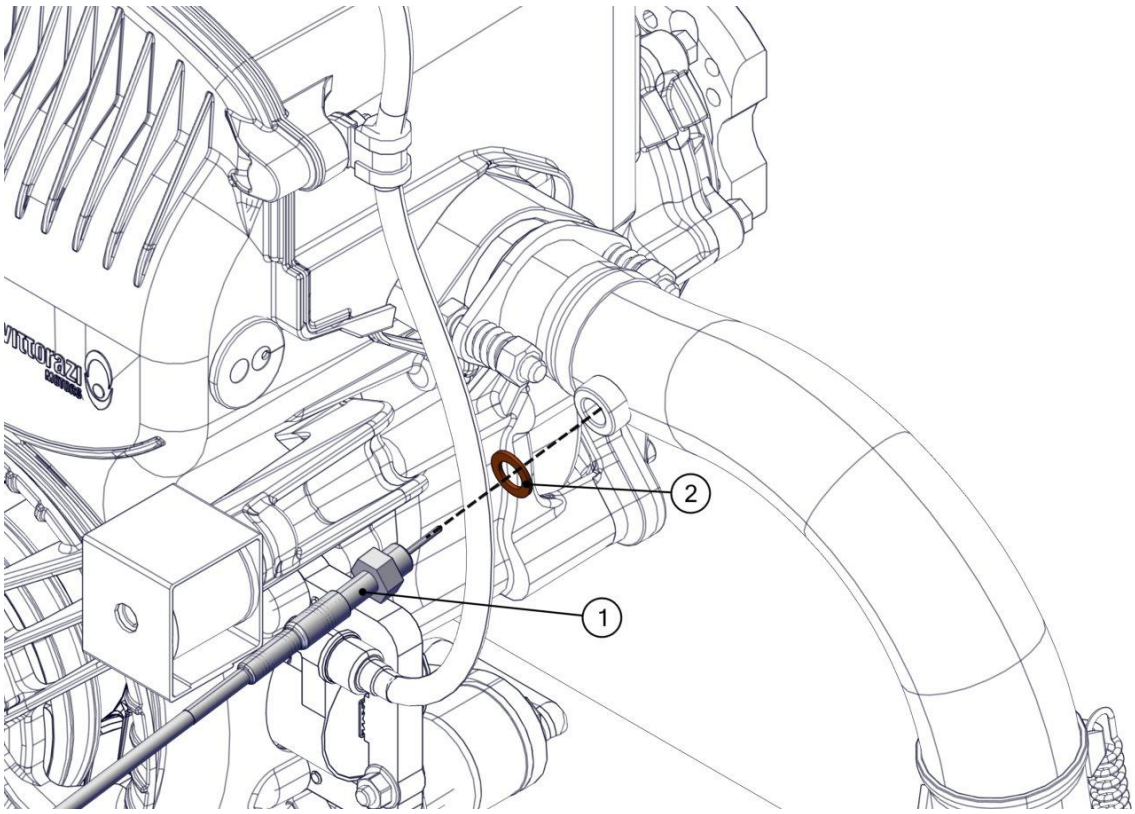


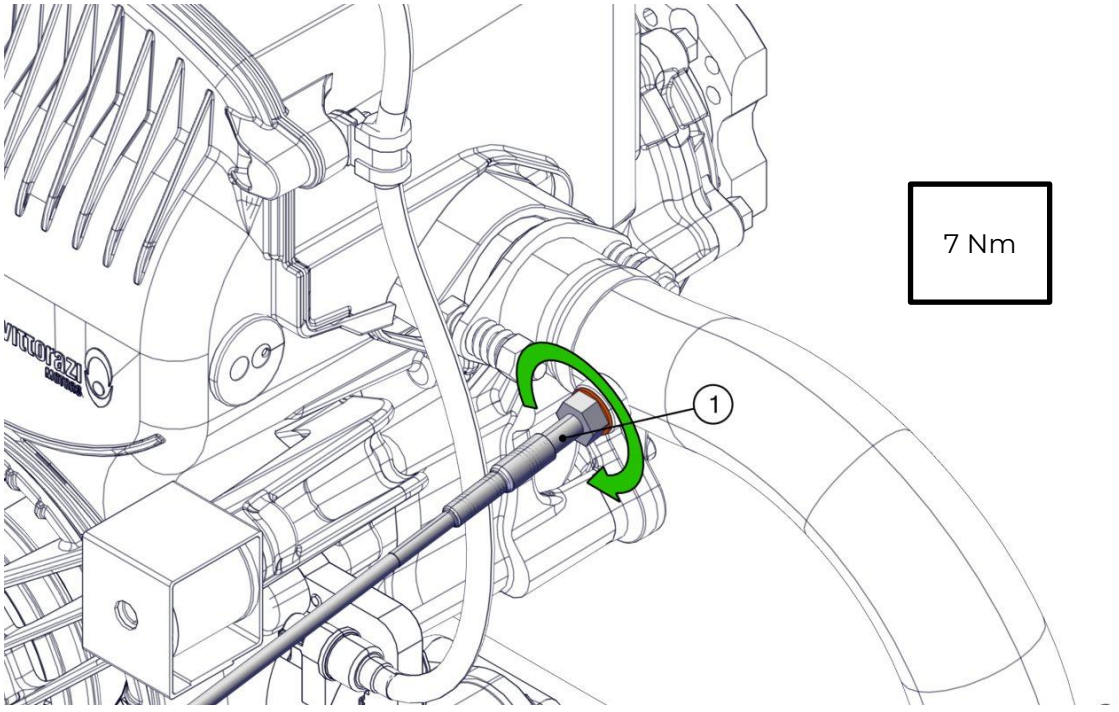
3.14.5 EGT sensor maintenance

Check that the measured temperature is correct and that the signal is transmitted continuously without loss of signal or delay in response, otherwise replace the EGT sensor.
Check the EGT sensor cable: there must be no cuts or cracks, otherwise replace the EGT sensor.

3.14.6 EGT sensor assembly

Insert the EGT sensor (1) and the copper washer (2) with Interflon paste HT1200 on the EGT sensor thread and tighten with the torque shown in the figure.





3.15 Tightening values

Component	Torque value	Thread size	Lubricant / sealant
Engine carter screws	6,5 Nm	M5x40	
Cylinder studs	8 Nm	M6	
Cylinder head nuts	10 Nm	M6x1,0	Copper paste
Spark plug	25 Nm	M14x1,25	
Exhaust studs	10 Nm	M6	
Exhaust nuts	hand tightening	M6x1,0	
Rubber mounting nuts	18 Nm	M8	
Silencer nuts and bolts	hand tightening	M6-M6x16	
Carburettor flange screws	8 Nm	M5x20	
Carburettor screws	hand tightening	M6x60	Loxeal 55-03/ Loctite 243
Snaplock airbox pivots	10 Nm	M6	Loxeal 55-03/ Loctite 243
Airbox fixing clamp	2,5 Nm	50-70 mm (clamp size)	
Flywheel nut	52 Nm	M10x1,25	
Electronic ignition coil bolts	hand tightening	M5x20	
Clutch nut	52 Nm	M10x1,25	
Starter central pin screw	12 Nm	M6x25	Loxeal 83-55/ Loctite 270
Reduction drive case screws	6,5 Nm	M5x20	
Reduction drive case screws	10 Nm	M6x25	

The table follows in the next page

Hubber center screw	19 Nm	M8x20	
Plastic air-conveyor screw	hand tightening	M4x12	
Plastic air-conveyor stud	hand tightening	M4	Loxeal 83-55/ Loctite 270
Wooden propeller screws	6-7 Nm	M6	
Carbon propeller screws	10-12 Nm	M6	
CHT sensor	10 Nm	M6x10	Loxeal 83-55/ Loctite 270
EGT sensor	7Nm	M8x6	Interflon paste HT1200