

# **SHERCO**

MANUEL D'ATELIER | WORKSHOP MANUAL | MANUAL DE TALLER

**250 SE-R**

**250 SE FACTORY**

**300 SE-R**

**300 SE FACTORY**









# TECHNICAL SPECIFICATION

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# FOREWORD

This manual is primarily intended for qualified mechanics working in a properly equipped workshop.

A solid knowledge of mechanics and the specific SHERCO tools for the 250 SE-R and 300 SE-R engines are required to perform the various operations.

This workshop manual complements the SHERCO 250 SE-R and 300 SE-R user manual

# TOOLS LIST 250-300 SE

Tool reference	Designation
5749	Clutch block
4753	Ignition block
2067	Swing-arm pin tool
R467	Right crankcase primary shaft bearing tool
R465	Secondary shaft bearing tool
5397	Gearbox output shaft bearing tool
R446	Gearbox output spi tool
5398	Barrel selection bearing tool
5399	Left crankcase crankshaft bearing tool
R469	Right crankcase crankshaft bearing tool
5400	Clutch side crankshaft spi tool
5401	Ignition side crankshaft spi tool
5402	HK0808 needle cage tool (water pump, starter drive double pinion, starter drive)
1968	Water pump spi seal tool
1821	Engine support
5206	Primary pinion block tool
2073	Spring block (pin selection)
R462	Magnetic flywheel puller
R464	Crankshaft ring extractor
R453	Selector axis bearing assembly tool
R444	Selector spi seal tool
6267	Diagnostic Key less tool
4967	Diagnostic briefcase



# TECHNICAL SPECIFICATION

## ENGINE

	250	300
Type	Single cylinder 2 stroke liquid cooling	
Capacity	249.32 CC	293.14 CC
Bore/Stroke	66.4/72 mm	72/72 mm
Petrol	Unleaded with an octane rating of at least 98 mixed with 2-stroke oil (2 %)	
Cooling	Liquid with forced circulation	
Ignition system	Synerject electronic ignition	
Spark plug	NGK BR7ES/DENSO W22ESRU	
Distance between spark plug electrodes	0.7 mm	
Piston	Cast aluminum	
Engine oil	750 ml SAE 10W40	
Primary transmission	27 : 75	
Gearbox :	6 speeds	
1st	14 : 32	
2nd	15 : 26	
3rd	29 : 27	
4th	21 : 24	
5th	23 : 22	
6th	25 : 21	
Final transmission	14 X 49	
Clutch	Oil bathed multi disks, hydraulic control	
Starter	Electric starter	
Battery	12V 4Ah	
Alternator	220W	

## CARBURETOR

	250	300
Carburetor type	KEIHIN PWK 36S AG	KEIHIN PWK 36S AG
Needle position	3rd position from the top	3rd position from the top
Jet needle	N1EG (N84K)	N8RE (N84K)
Main jet	KEA 162 (KEA 115)	KEA 172 (KEA 115)
Idle jet	KEP 40 (KEA38)	KEP 42 (KEA 38)
Choke jet	85 (50)	85 (50)
Air regulating screw opening	1T 1/4	1T 1/2
Valve spacing	N°7	N°7



# TECHNICAL SPECIFICATION

## CYCLE PART

<b>Frame</b>	Semi-perimeter CrMo steel with aluminum sub frame
<b>Fork</b>	KAYABA USD Ø48mm Closed cartridge(FACTORY) WP XPLOR USD Ø48mm (RACING)
<b>Rear suspension</b>	KAYABA suspension with separate cylinder (FACTORY) WP suspension with separate cylinder (RACING) Aluminum swing arm
<b>Travel Front/Rear</b>	FACTORY 330/330mm RACING 300/330mm
<b>Front brake</b>	rotor Ø 260mm
<b>Rear brake</b>	rotor Ø 220mm
<b>Brake disc</b>	Limit : 2.7mm front et 3.6mm rear
<b>Front tire</b>	90/90-21"
<b>Rear tyre</b>	140/80-18"
<b>Pressure front / Rear</b>	0.9 bar
<b>Fuel tank capacity</b>	10.4LI with1 liter of reserve
<b>Angle of the steering column</b>	27.3°
<b>Wheel base</b>	1480mm
<b>Weight (without fuel)</b>	119 kg



# STANDARD ADJUSTMENT

## FORK

Factory settings – Fork KAYABA USD Ø48 mm

<b>Compression</b>	Comfort	20 clicks back
	Standard	13 clicks back
	Sport	8 clicks back
<b>Rebound</b>	Comfort	18 clicks back
	Standard	13 clicks back
	Sport	10 clicks back
<b>Spring</b>	Rider weight: 65-75 kg	4.0N/mm (Original)
	Rider weight: 75-85 kg	4.2N/m
	Rider weight: 85-95	4.4N/m
<b>Fork oil</b>	01M	345 CC

Racing settings – Fork WP XPLOR suspension USD Ø48mm

<b>Compression</b>	Comfort	18 clicks back
	Standard	15 clicks back
	Sport	12 clicks back
<b>Rebound</b>	Comfort	18 clicks back
	Standard	15 clicks back
	Sport	12 clicks back
<b>Preload</b>	Comfort	+0 tours
	Standard	+0 tours
	Sport	+6 tours
<b>Spring stiffness</b>	Rider weight: 65 - 75 kg	4.2N/mm
	Rider weight: 75 - 85 kg	4.4N/mm (Original)
	Rider weight: 85 - 95 kg	4.6N/mm
<b>Type of oil</b>		SAE 4
<b>Spring length with preload spacer</b>		474 mm
<b>Quantity of oil</b>		606ml
<b>Oil level measurement (fork compressed and spring removed) from the top of the fork tube</b>		100mm (min30-max 120 mm)

# STANDARD ADJUSTMENT

## SHOCK ABSORBER

Factory Settings – KAYABA shock absorber

<b>Low-speed compression</b>	Comfort	20 clicks back
	Standard	14 clicks back
	Sport	12 clicks back
<b>High-speed compression</b>	Comfort	2,5 turns back
	Standard	1.5 turns back
	Sport	1 turn back
<b>Rebound</b>	Comfort	15 clicks back
	Standard	13 clicks back
	Sport	11 clicks back
<b>Spring stiffness</b>	Rider weight : 65-75 kg	46N/mm
	Rider weight : 75-85 kg	48N/mm (original)
	Rider weight : 85-95 kg	50N/mm
Type of oil		K2C

Racing Settings – WP suspension shock absorber

<b>Low-speed compression</b>	Comfort	17 clicks back
	Standard	12 clicks back
	Sport	9 clicks back
<b>High-speed compression</b>	Comfort	2 turns back
	Standard	1.5 turns back
	Sport	1 turn back
<b>Rebound</b>	Comfort	16 clicks back
	Standard	14 clicks back
	Sport	12 clicks back
<b>Spring stiffness</b>	Rider weight : 65-75 kg	51N/mm
	Rider weight : 75-85 kg	54N/mm (original)
	Rider weight : 85-95 kg	57N/mm



# OPERATIONS REQUIRING DISASSEMBLY OR NOT ENGINE

	Operation requiring engine removal	Operation not requiring engine removal
Crankshaft (including the crank kit)	•	
Complete gearbox	•	
Crankshaft bearing	•	
Gearbox bearing	•	
Piston		•
Cylinder		•
Cylinder head		•
Ignition		•
Starter gear set		•
Complete clutch		•
Water pump		•
Speed selection assembly		•



# REMOVING / REINSTALLING THE ENGINE

## REMOVING THE ENGINE

### WARNING

To remove the engine, you must remove the swing arm's pivot bolt to detach the rear wheel/swing arm assembly. Secure the chassis with a jack to prevent the motorcycle from overturning.

- Drain (refer to the owner's manual)
  - the engine oil
  - the engine coolant
- Remove the seat.
- Disconnect the battery.
- Remove the fuel tank and its covers.
- Disconnect all the electrical wiring connectors from the engine. (Starter, TPS sensor, water temperature sensor, coil, fuel injector)
- Remove the exhaust.
- Remove the ignition coil.
- Remove the carburetor.
- Remove the chain.
- Remove the chain guard.
- Remove the clutch slave cylinder.

### WARNING

When the clutch slave cylinder is removed, the piston is no longer held in place. Secure the piston with a plastic collar.

- Remove all of the water hoses connected to the engine.
- Remove the left radiator.
- Loosen all of the engine bolts.
- Loosen the swing arm bolt.
- Remove the brackets that attach the cylinder head to the chassis.
- Remove the engine mounting bolts.
- Remove the swing arm bolt.
- Remove the motor.

## REASSEMBLING THE ENGINE IN THE FRAME

The motor should be reinstalled in the frame in the reverse order of how it was removed. The following torque values should be utilized.

### Tightening torques:

**Engine mounting bolts: 60Nm**

**Swing arm axle nut: 100 Nm**

**Clutch receiver screws: 10 Nm**

**Cylinder head bracket bolts: 23Nm**

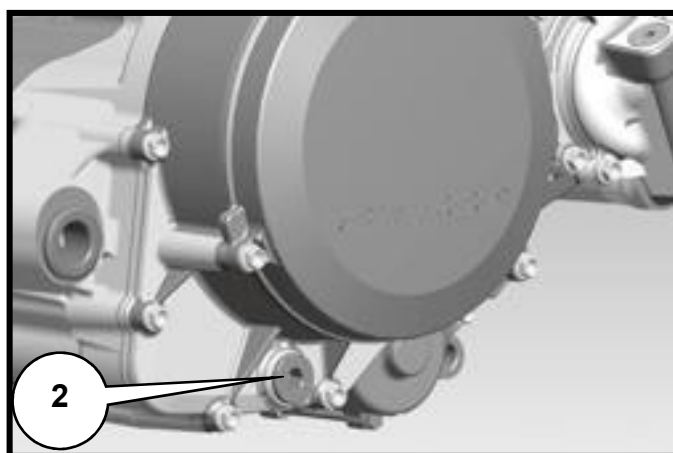
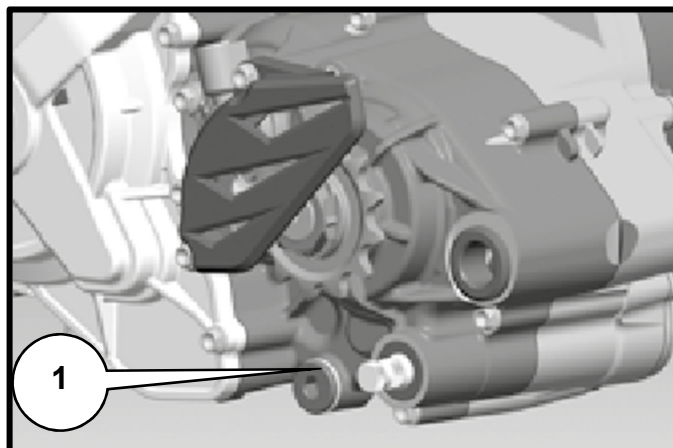
**Exhaust mounting bolts: 10Nm**



# DISMANTLING THE ENGINE

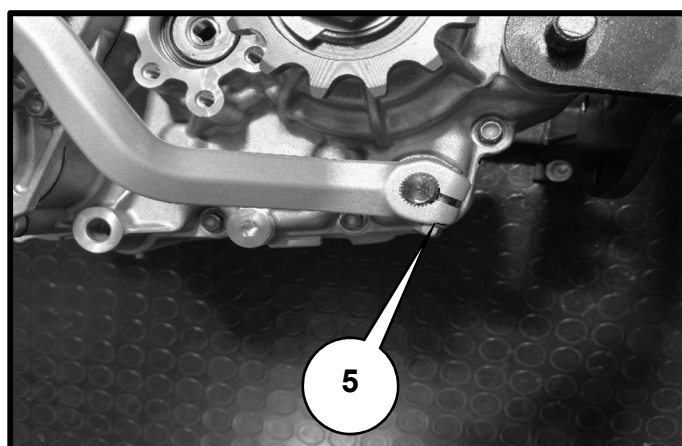
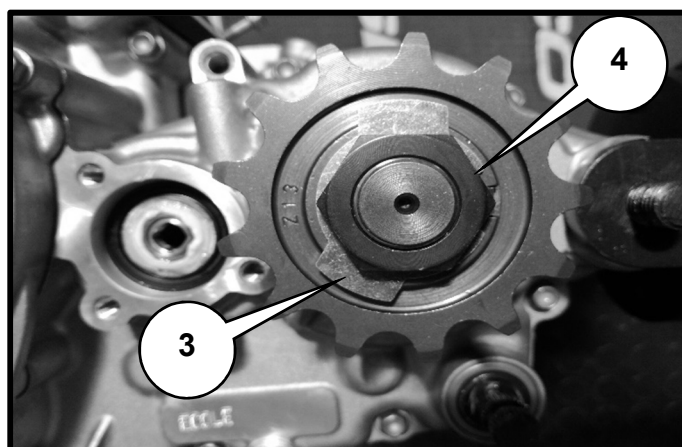
## » Gear box drainage

- Remove drainage plugs [1] and [2], let the oil flow out.



## » Removing the pinion and selector

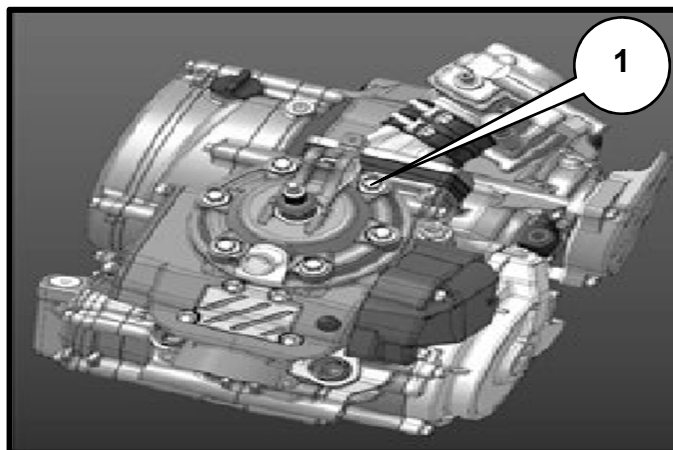
- Unfold the safety washertab [3] using a punch device.
- Remove the gearbox output pinion [4].
- Remove the screw first [5] first and then the selector.
- Release the clutch control rod.



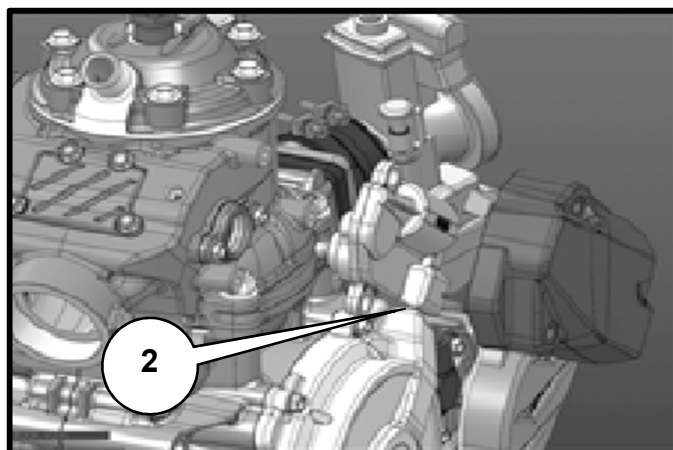
# DISMANTLING THE ENGINE

## ›) Removing the cylinder head / the cylinder / the piston

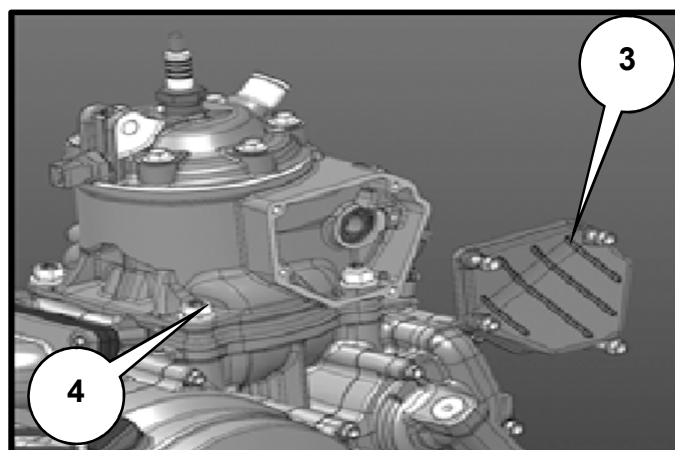
- Remove the shoulder screws **[1]** the copper cashers, remove the cylinder head and the two O-rings



- Remove the exhaust valve actuator **[2]**

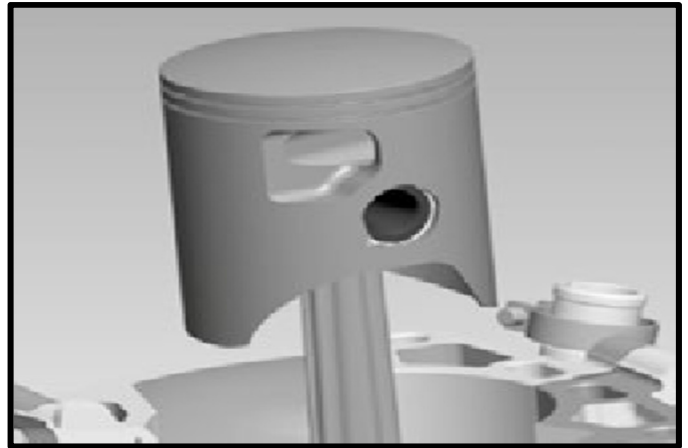


- Remove the exhaust chamber cover.
- Remove the 4 screws **[4]** on the base of of
- The cylinder and remove it.
- Mask the cover.



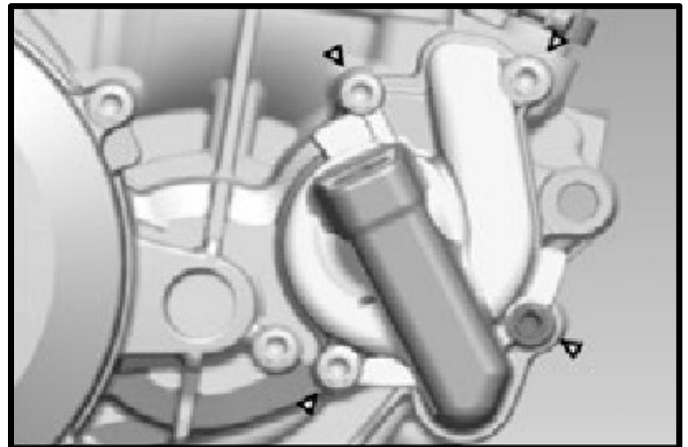
# DISMANTLING THE ENGINE

- Remove the piston pin clips.
- Remove the piston pin.
- Remove the piston and extract the needle bearing from the connecting rod.
- Remove the gasket

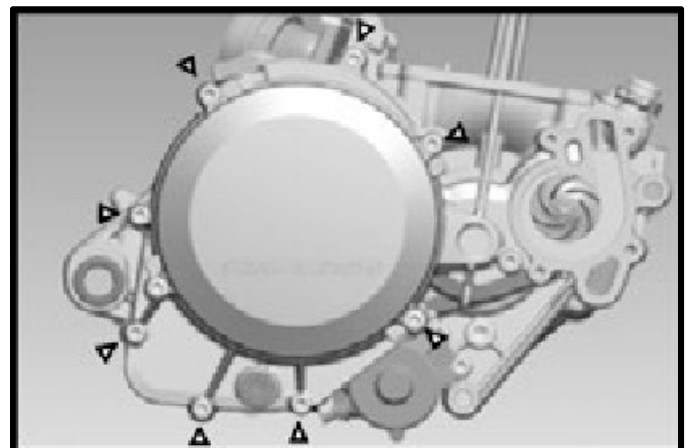


## » Removing the clutch housing

- Remove the screws and the water pump cover.
- Remove the gasket.



- Remove the screws and extract the clutch housing.
- Remove the gasket

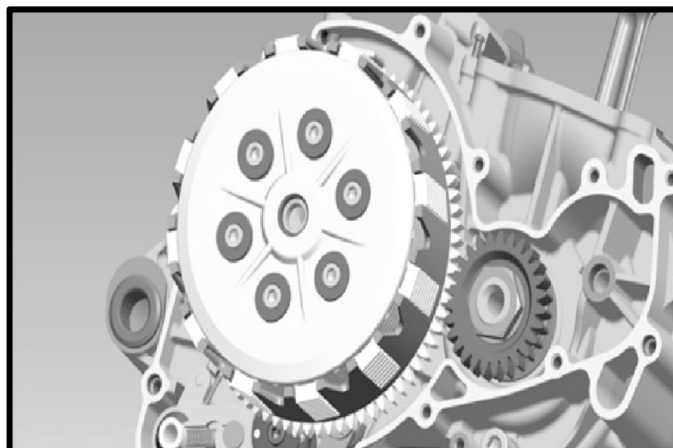




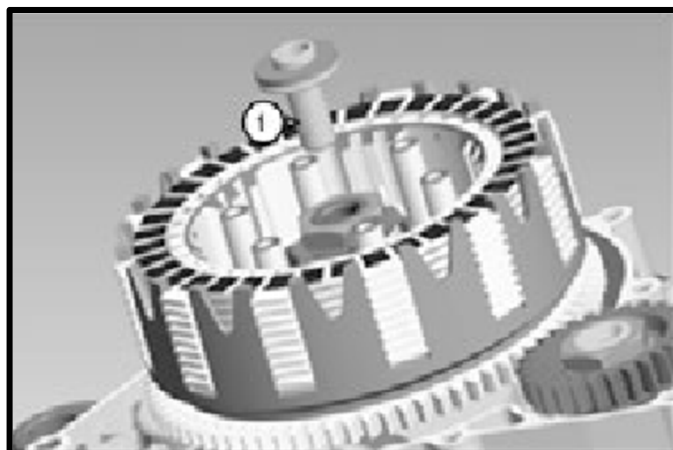
# DISMANTLING THE ENGINE

## ›| Removing the pressure plate and discs

- Loosen the pressure plate screws
- Remove the screws, springs and springs cups.

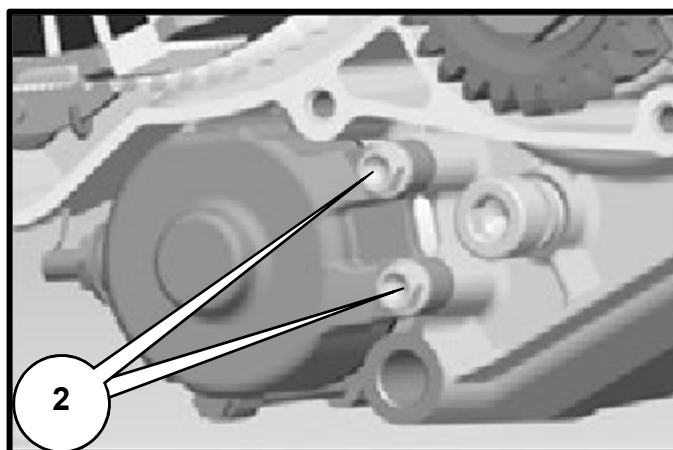


- Remove the pressure plate and discs from housing.
- Remove the support part **[1]** on the primary shaft



## ›| Remove the electric starter

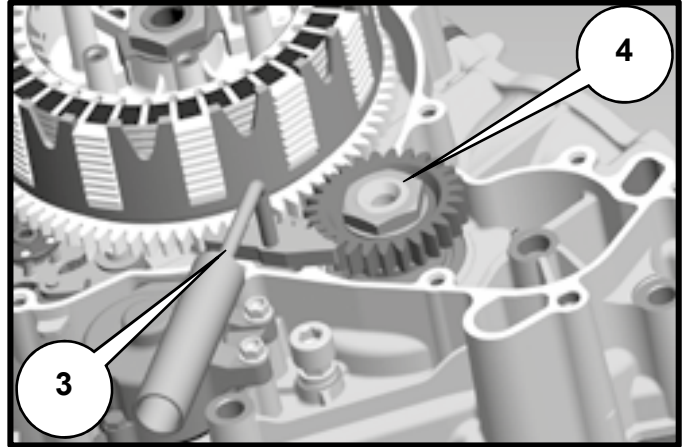
- Remove the 2 screws **[2]**



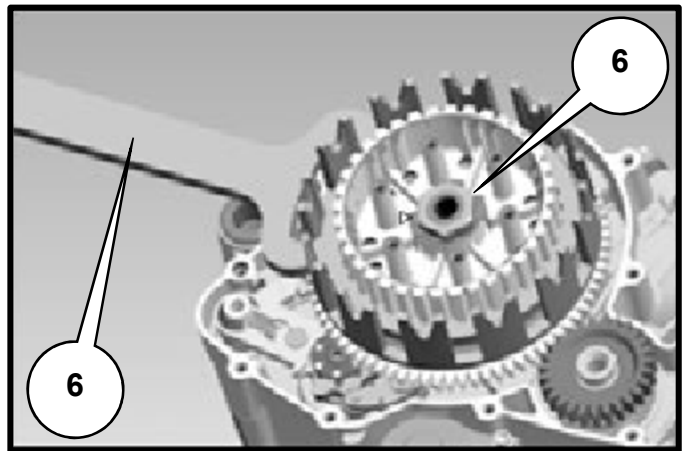
# DISMANTLING THE ENGINE

## › Removing the primary transmission

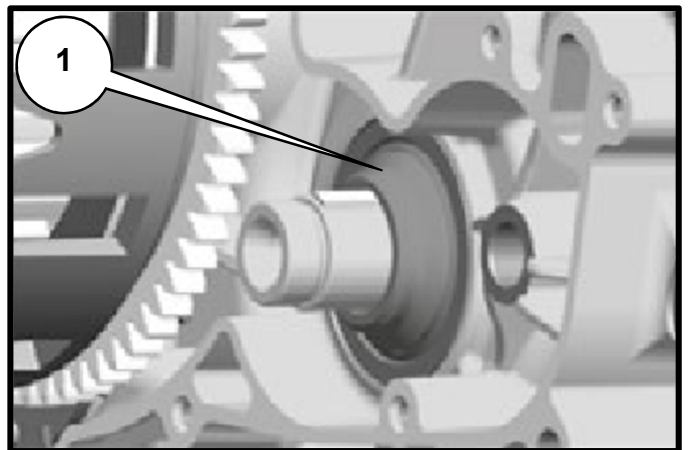
- Lock the pinion at the end of the crankshaft with the 5206 tool [3]
- Unscrew the primary transmission nut [4] and then remove it with its conical washer



- Open the clutch boss lock washer [5]
- Apply the 5749 tool [6] which is designed to hold the boss, then loosen the nut.
- Remove the tool.
- Remove the boss the crenellated washer, the housing with 2 needle cages

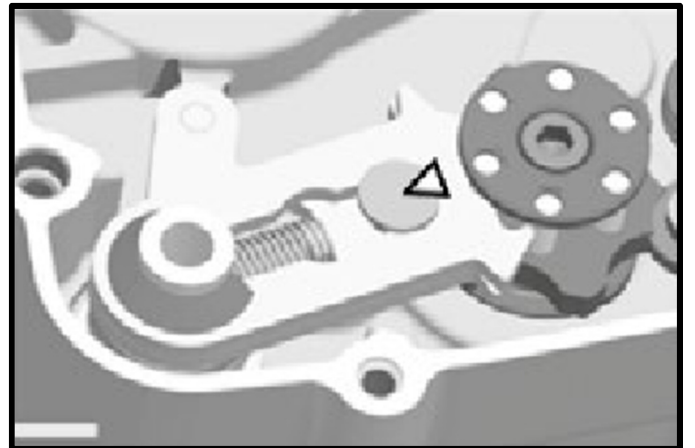
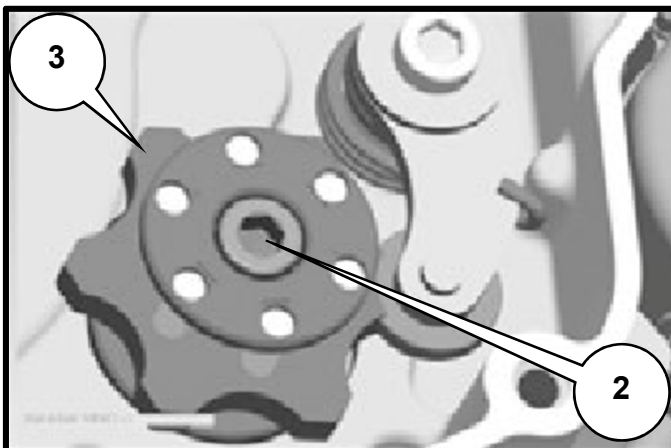


- Removing the primary transmission pinion and the spacer [1] at the end of the crankshaft



### WARNING

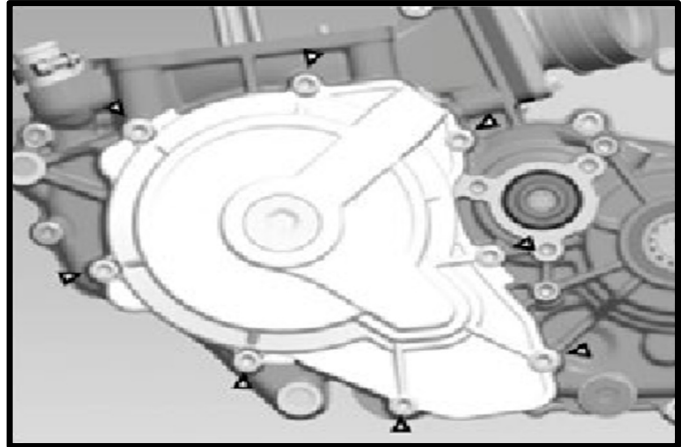
To the pin and the o-ring. The primary transmission pinion and the clutch housing ring are paired, which is why they can not be changed separately. Always replace them together.



# DISMANTLING THE ENGINE

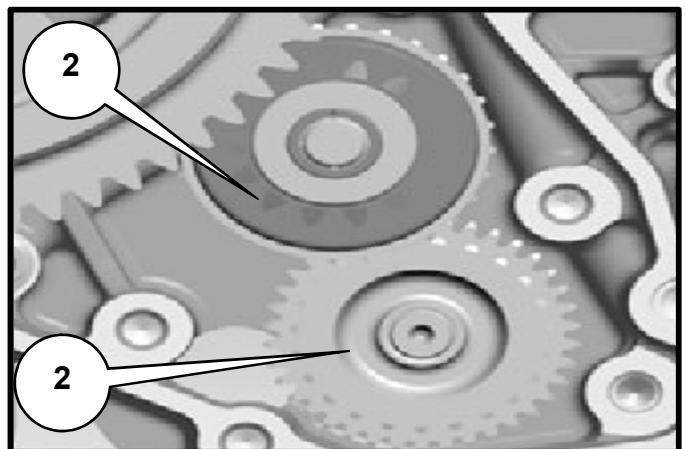
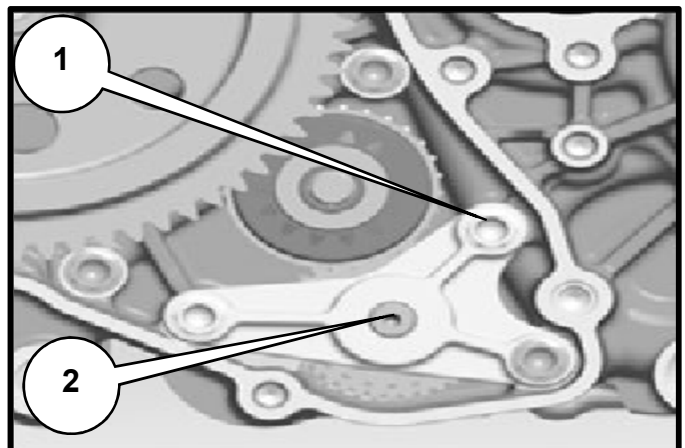
## » Removing the primary transmission

- Remove the screws and extract the ignition housing with its gasket



## » Removing the torque limiter and the starter drive

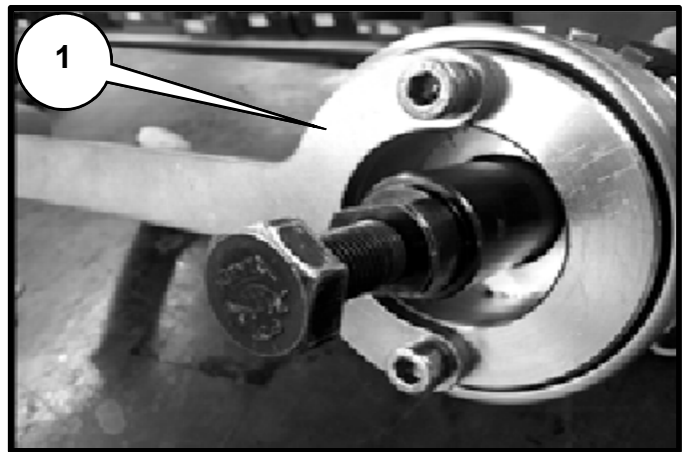
- Remove the 3 shoulder screws [1]
- Remove the torque limiter lug [2]
- Remove the starter drive [3]
- Remove the torque limiter [4]



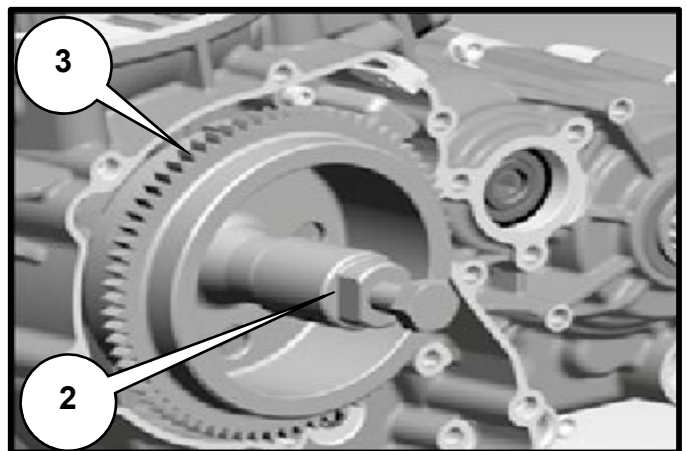
# DISMANTLING THE ENGINE

## ›| Removing the ignition

- Hold the flywheel with the 4753 tool [1] and unscrew the shoulder nut.

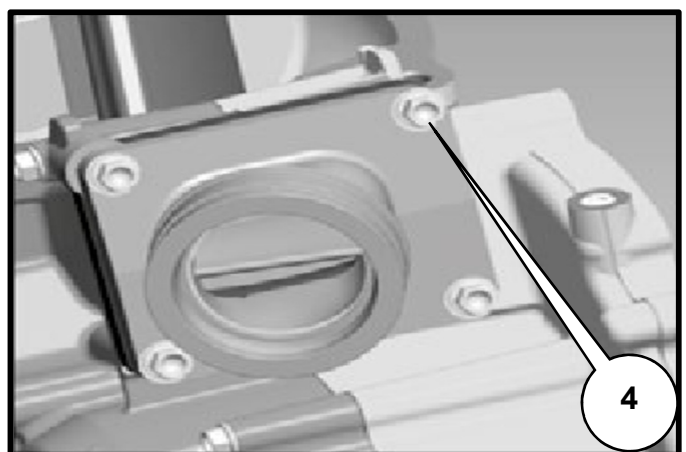


- Position the R462 puller [2] and extract the magnetic wheel [3]



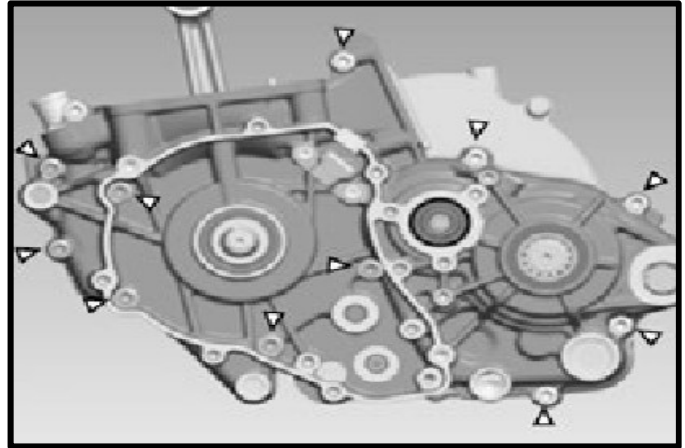
## ›| Intake pipe and valve box

- Remove the 4 THEP screws [4]
- Remove the pipe, the valve box, and their respective gasket.



# DISMANTLING THE ENGINE

- Separate the half crankcases.
- Tilt the engine so that the ignition side is facing you.
- Remove all the fixing screws.
- Remove the seal ring and its o-ring from the gearbox output shaft.
- Lift the left half crankcase by lightly tapping the gearbox output shaft with a plastic mallet to separate it from the other half.
- Remove the half crankcase and the central gasket

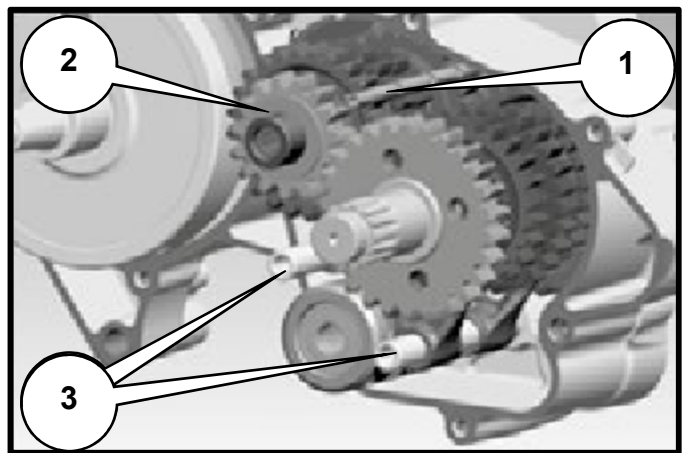


## WARNING

Prizing a screwdriver or other tool between the half housings to separate them should be avoided as much as possible. You may damage the gasket surfaces.

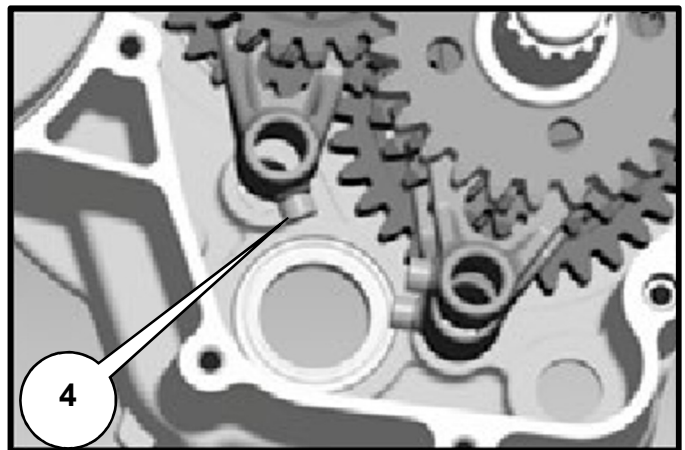
## WARNING

Pay attention to the gearbox shafts' set rings. They can remain stuck inside the housing



## Remove the gear selection

- Remove the gearbox lubrication tube ,
- Remove the set ring from the primary shaft [2]
- Remove the two pin from the shift forks [3] and push the shift forks to the side to release them from the cylinder
- Remove the selection cylinder from its bearing
- Remove the shift forks
- Remove the primary and secondary shaft from their bearing together.



## WARNING

When dismantling, take care not to lose the small rollers [4] on the fork studs identify which is the corresponding fork for each roller to facilitate reassembly



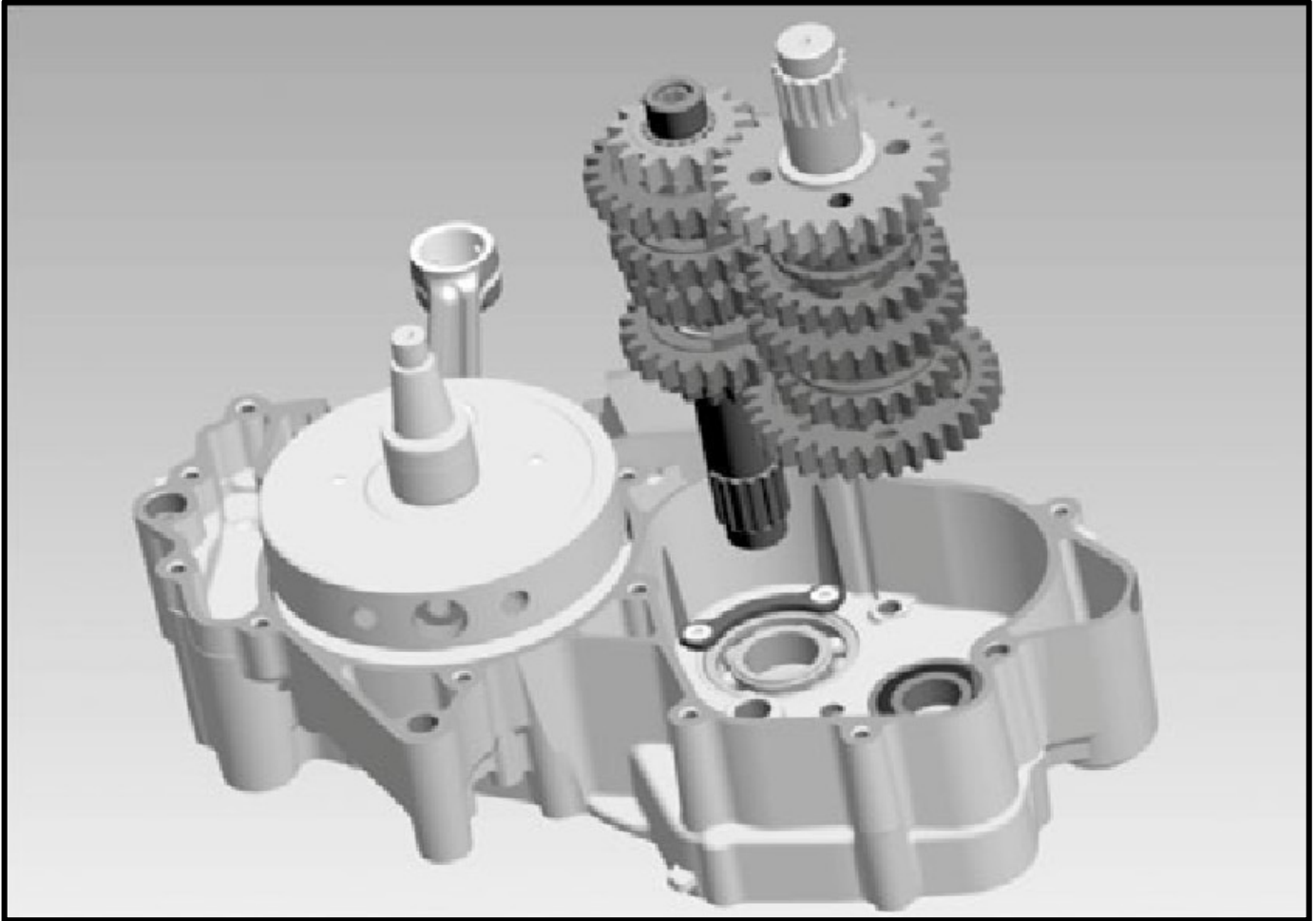
# DISMANTLING THE ENGINE

## ›| Removing the connecting rod assembly

- Remove the connecting rod assembly from its bearing (if necessary by tapping lightly with a plastic mallet on the end of the crankshaft).
- Clean all parts and check for wear. Replace if necessary.

### WARNING

When completely dismantling the engine, it is best to replace all gaskets, spi seals, o-rings and even bearings



## ›| Connecting rod assembly

- If the roller bearing has been changed, the inner ring which sits against the balance weight must also be changed.
- Heat the R464 tool to approximately 150°C, immediately thread it onto the inner ring. Place the tool correctly on the ring to encourage heat transfer, then extract the ring.
- To mount the new ring, heat the tool to approximately 150°C. Insert the new ring and thread it immediately onto the connecting rod assembly.

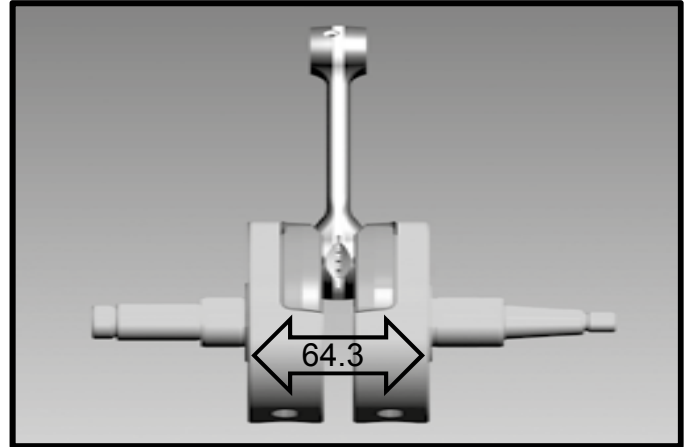


# CHECKING ENGINE COMPONENTS

## ›| Balance weight, checking the external dimensions

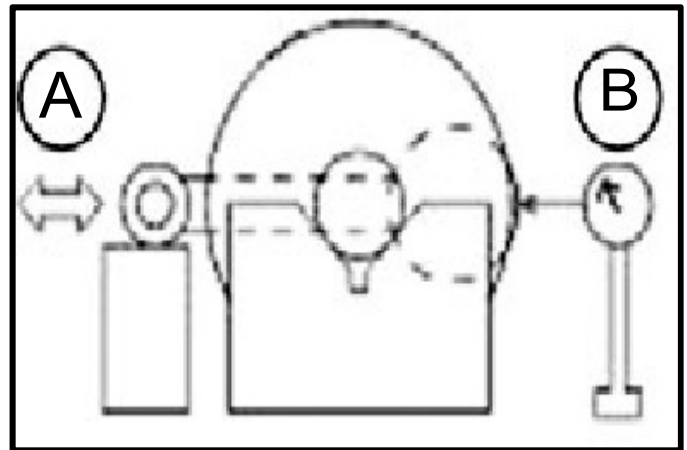
- Use a caliper to measure the external distance of the balance weights:

**External value** : 64.3mm +0 / -0.2



## ›| Radial play of the connecting rod head

- Position the crankshaft on the V and place a dial gauge [A] against the connecting rod head.
- Push B the connecting rod head towards the gauge, then in the opposite direction.
- The difference between these two measurements corresponds to the radial play.



Radial play of the connecting rod head :

**Standard** : 0.015 mm – 0.025 mm

**Tolerable limit** : 0.06 mm

If the radial play is greater than the tolerated limit, the crankshaft must be replaced

## ›| Checking the crankshaft run out

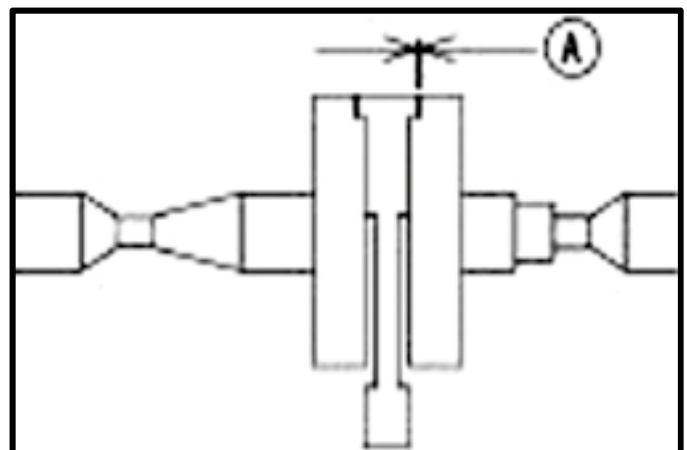
- Measure the lateral play of the connecting rod head [A] ;

**Lateral play of the connecting rod head :**

**Standard** : 0.8 mm - 1 mm

**Tolerable limit** : 1.25 mm

If the play is greater than the tolerated limit, the crankshaft must be replaced



# CHECKING ENGINE COMPONENTS

## ›| Piston

- If you want to install a used piston, check the following points :
- Skirt : look for any marks (tightening). Light marks can be removed with a soft stone.
- Segment grooves : Segments must not get stuck in their groove. These can be cleaned with an old segment or emery cloth (400 grit).
- Segment retainers must be tightly held and must not be worn.
- Segments : Check the condition and gap spacing.

## ›| Gap spacing

- Thread the segment into the cylinder and position it with the piston (about 10 mm from the top edge of the cylinder).
- Using a spacer, the gap spacing is measured.

### Gap spacing :

**Standard** 0.35-0.45mm ,

**Max** 0.65mm.

### **WARNING**

If the gap is greater than indicated, check the condition of the cylinder and the piston. If their dimensions are within the tolerance range, replace the segment

## ›| Piston pin check

Piston pin diameter

Standard 17,995-17,998 mm

Tolerable limit 17,962

piston pin hole diameter

Standard : 18.006-18.010mm

Tolerable limit : 18.08

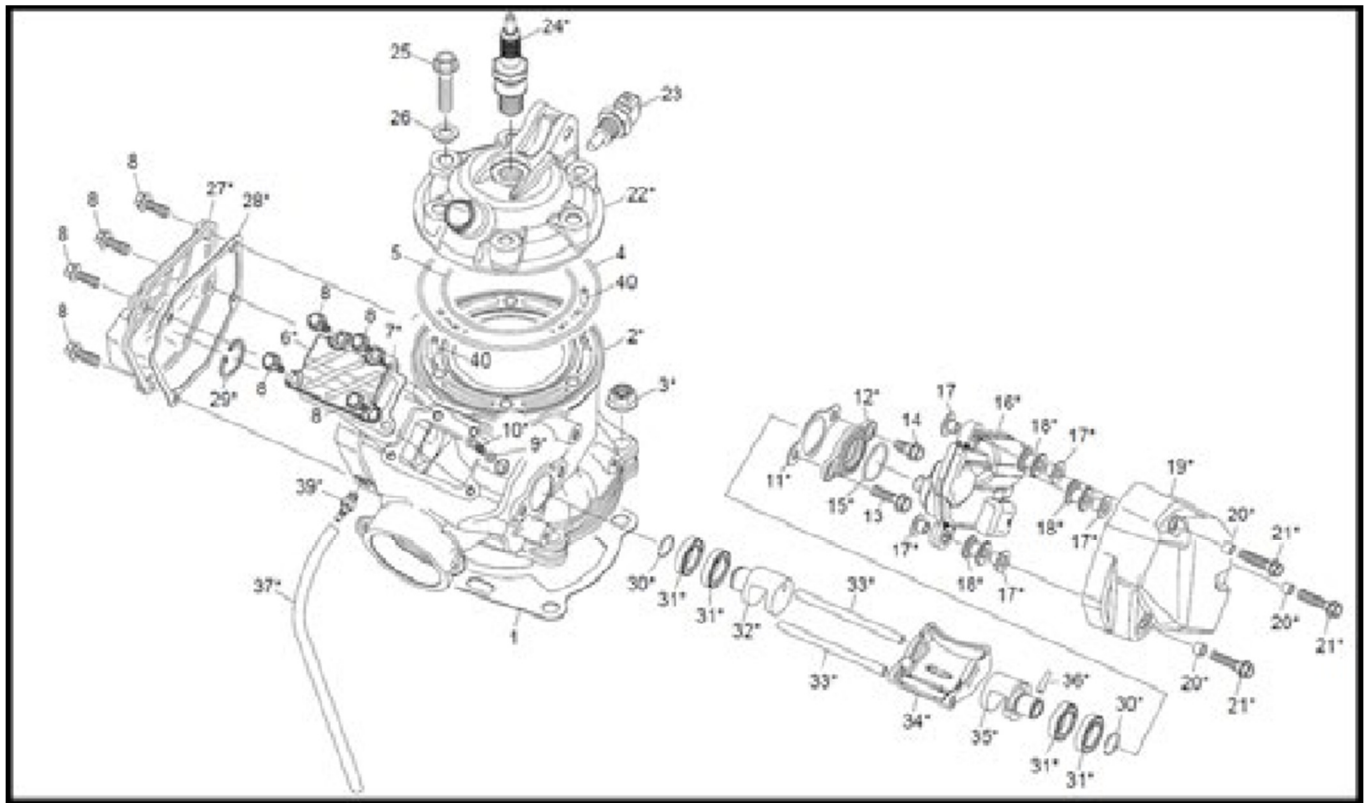
## ›| Checking the wear condition of the cylinder

- To detect cylinder wear, the bore is measured with a bore comparator at about 10 mm from the top edge of the cylinder. Measure from both direction to identify any potential ovality.

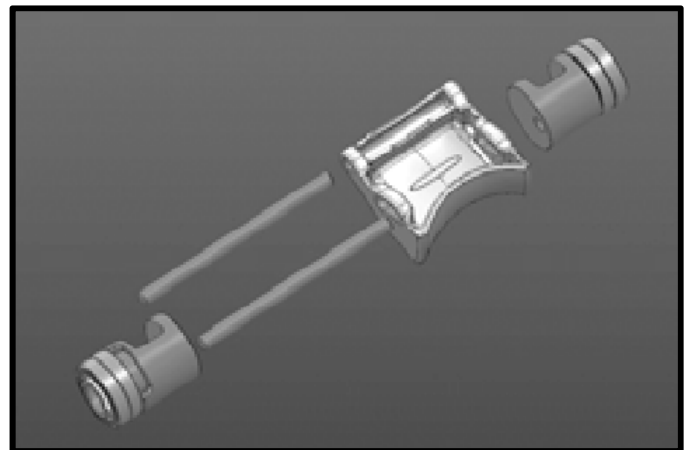
Cylinder	Cylinder bore	Piston
250	66.410-66.420	A
	66.421-66.430	B
300	72.10-72.020	A
	72.021-72.030	B



# CHECKING ENGINE COMPONENTS



- Remove the valve cover [6].
- Remove the actuator support [12].
- Remove the stop screw [10] with the copper sealing washer [9].
- Remove the bore circlip with circlip pliers [29].
- Remove the valve mechanism assembly



## ») Functional check

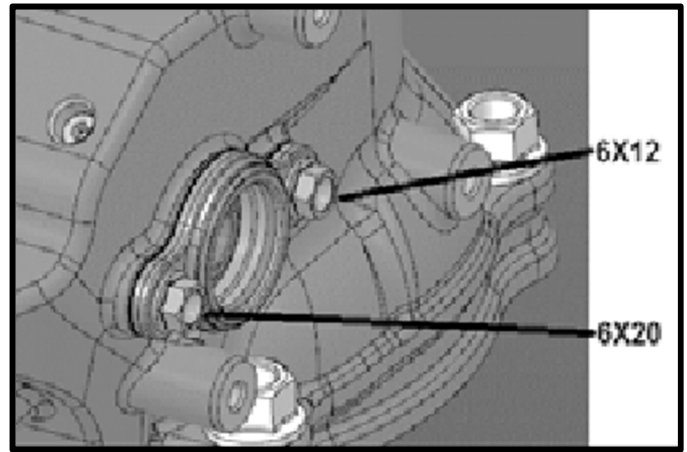
- Clean and descale all the dismantled parts.
- Check with your fingernail that there are no notches on the exhaust barrels [32] and [35], visually check their seating in the cylinder.
- Inspect the axis of rotation of the exhaust valve [33], replace it if there are notches that you can feel with your fingernail.
- Test the play in the exhaust barrel bearings [31] and check that there is no hard point over 360°.
- Systematically change all the gaskets on the top of the engine [28, 7, 26, 4, 5, 11, 15, 9] before reassembling.
- To reassemble, follow the disassembly procedure in reverse, paying attention to the following points.



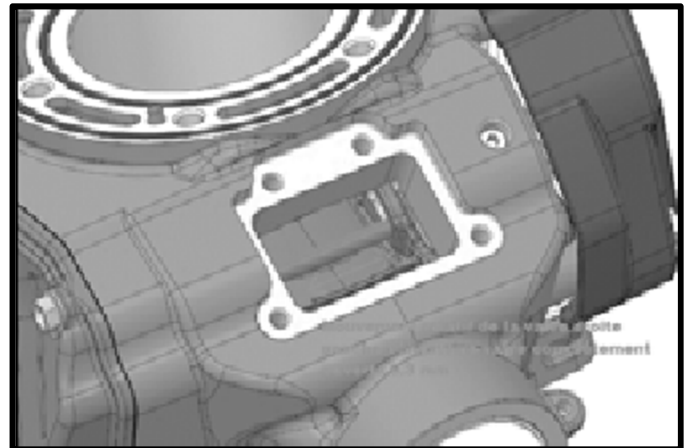
# CHECKING ENGINE COMPONENTS

## WARNING

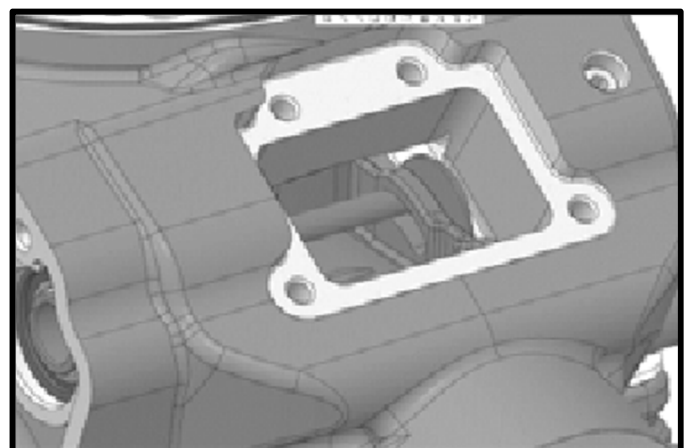
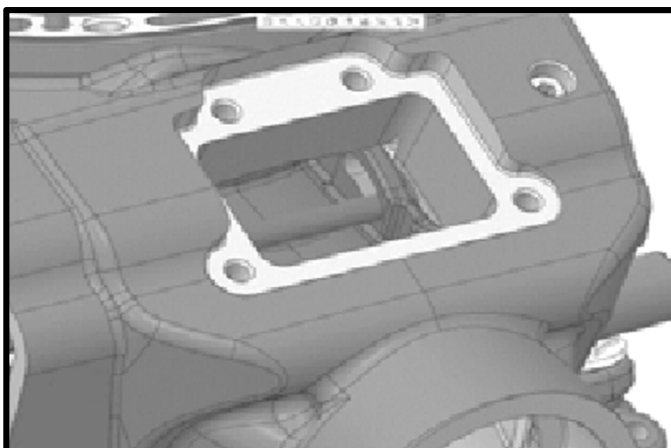
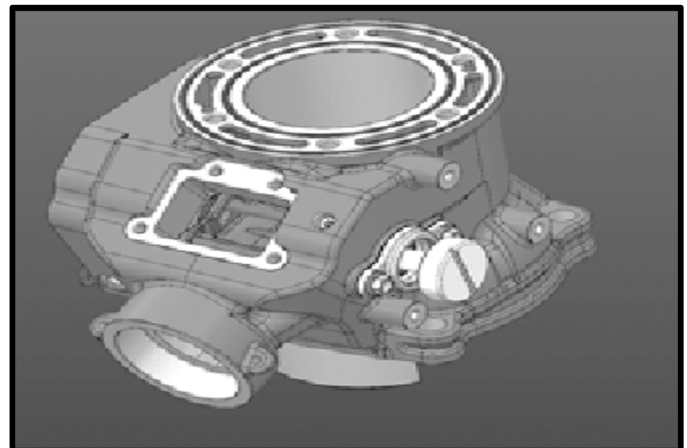
When reassembling the actuator support [12], be careful that the 2 screws are not the same length



- After reassembly, check the lateral play of the central valve minimum 0.1 mm



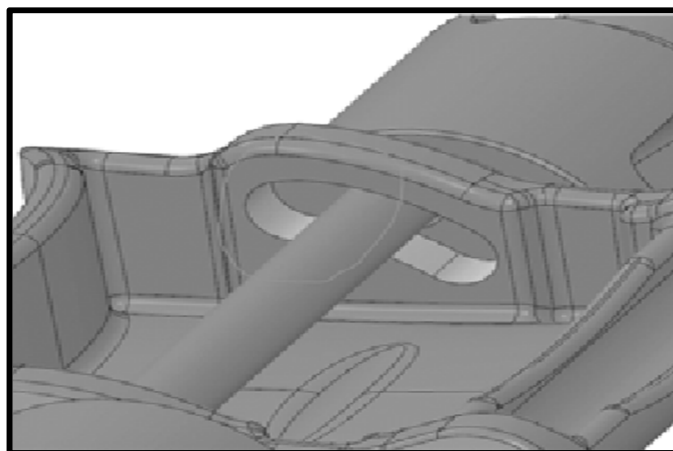
- Check that the pin stops against the valve (kidney-shaped contact) when it is 100 % open.
- Check that the pin stops against the valve (kidney-shaped contact) when it is 100 % closed



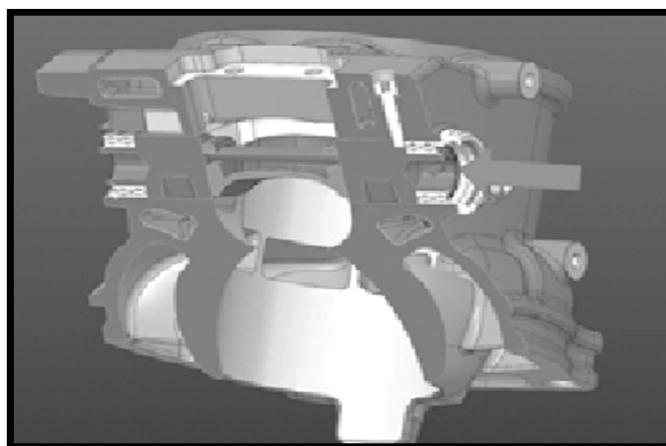
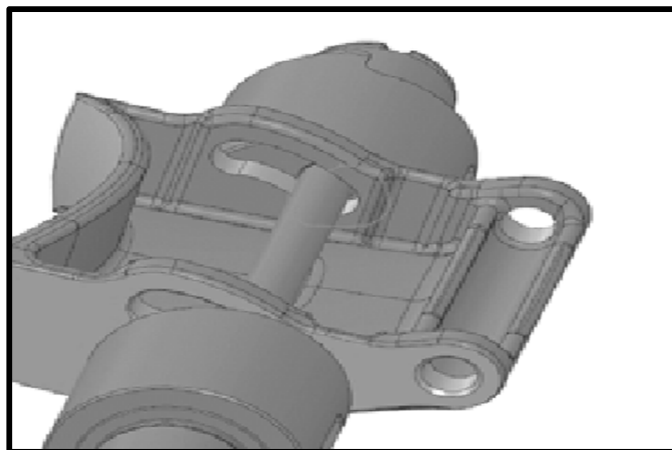
# CHECKING ENGINE COMPONENTS

## WARNING

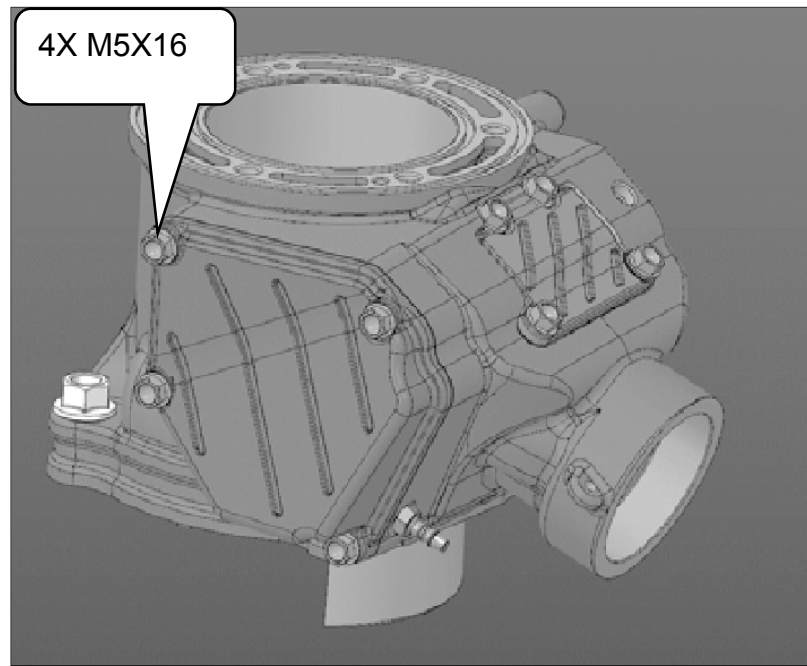
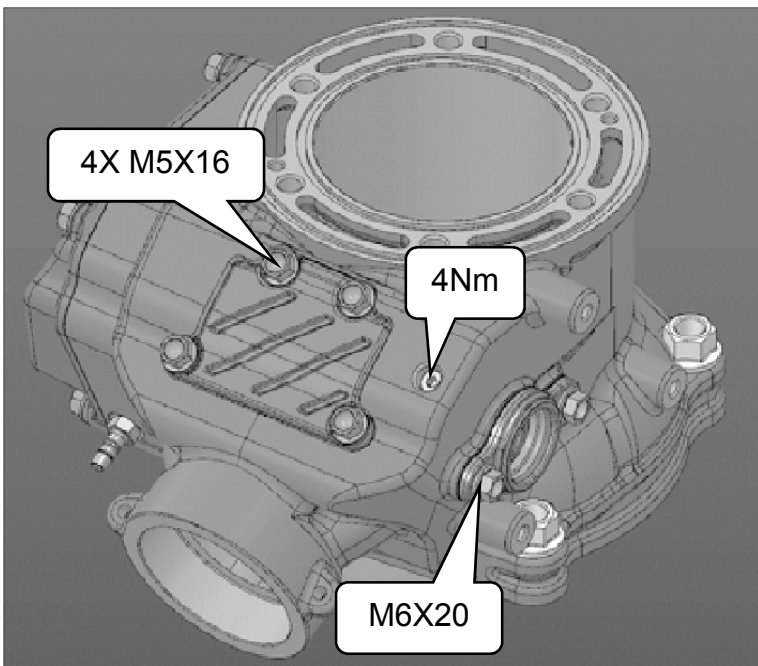
In the following cases the valve must not reach the stopper during opening and closing



- Check the lateral play of all the mechanics minimum 0.1 mm



# CHECKING ENGINE COMPONENTS



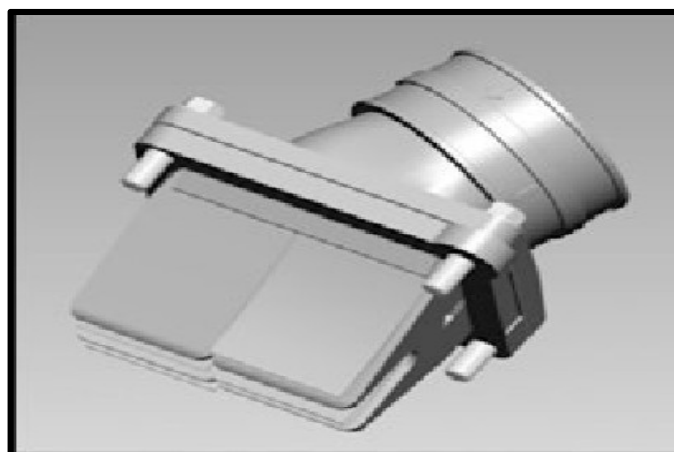
## ›| Valve stop learning after cylinder reassembly

### WARNING

After any maintenance operation on the internal parts of the cylinder and/or after changing the cylinder, the Sherco diagnostic tool's machine learning application must be run (see p63 diagnostic tool chapter).

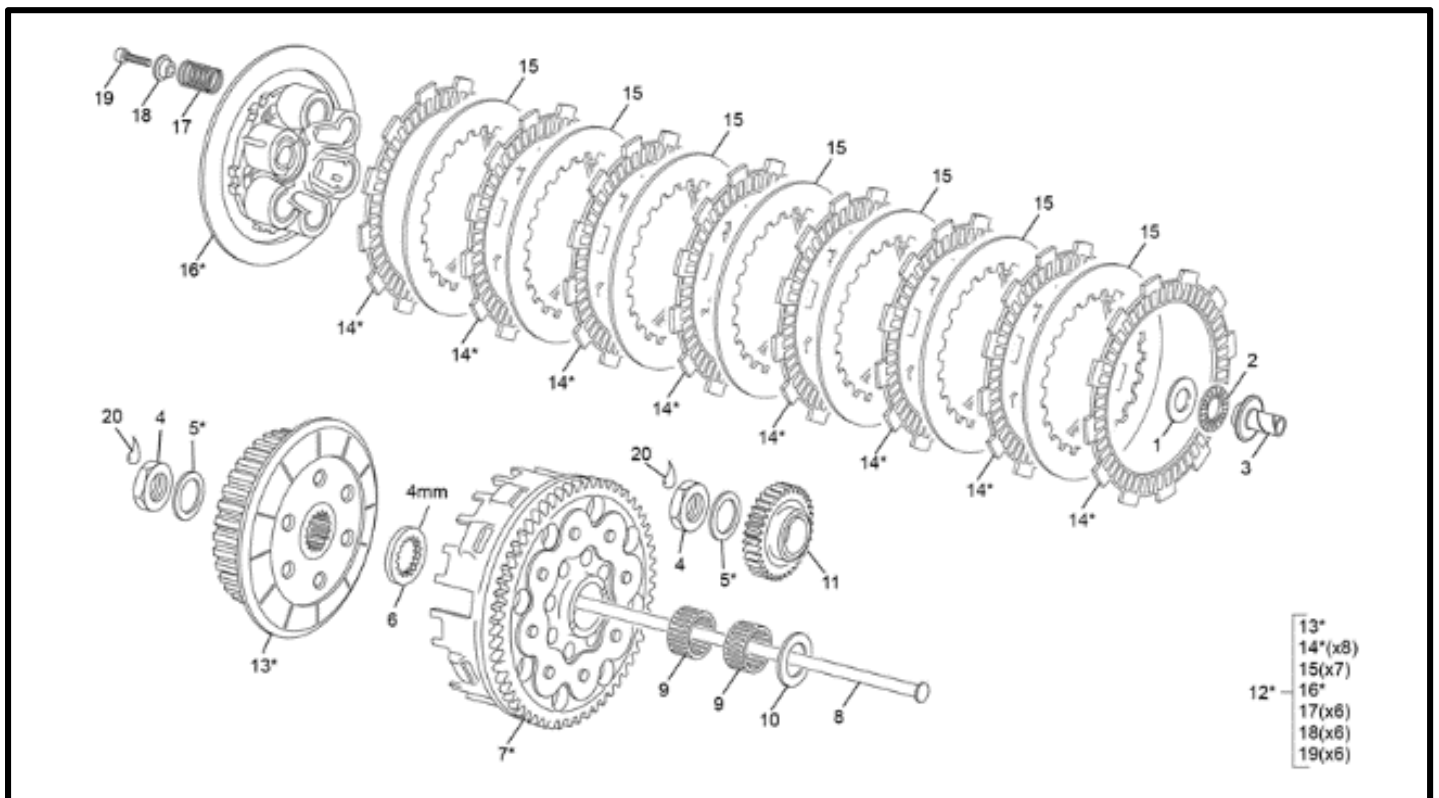
## ›| Valve box intake pipe sleeve

- Over time the carbon tabs gradually lose their elasticity, which results in a loss of power.
- Replace the worn or damaged box.
- Check the condition of the intake sleeve, especially if it is not cracked



# CHECKING ENGINE COMPONENTS

## ›| Clutch

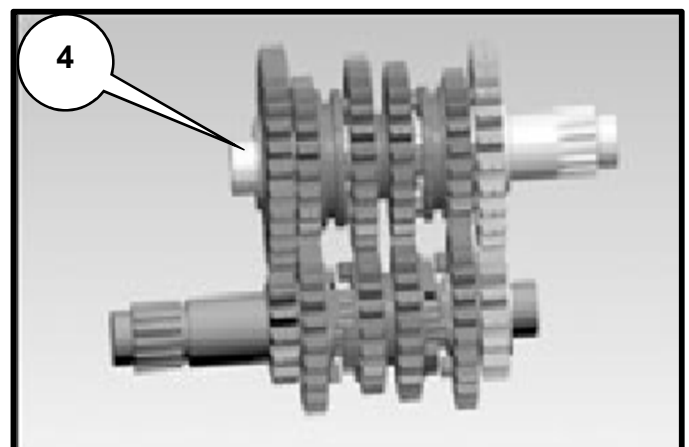


- Stopper **[3]** check wear.
- Rod **[8]** check for wear. Minimum length : 194.7 mm.
- Springs **[17]** Check their length. Minimum spring length 45 mm. Replace the 6 springs if necessary.
- 8 clutch plates **[14]** Minimum thickness 2.68 mm.
- The 7 smooth disks must be in good condition with a maximum deformation limit of 0.05 mm.

Refer to the 250 SE-R/300 SE-R spare parts catalogue for exploded views

## ›| Gearbox

- Apply grease to the shift fork studs and thread the rings **[1]** over them.
- Fix the securing washers **[2]** on the primary and secondary shaft.
- Position both the primary and secondary shafts and push them into their respective bearings until they stop.
- Identify the direction and location of the forks on the picture. Fork **[3]** corresponds to the primary shaft.

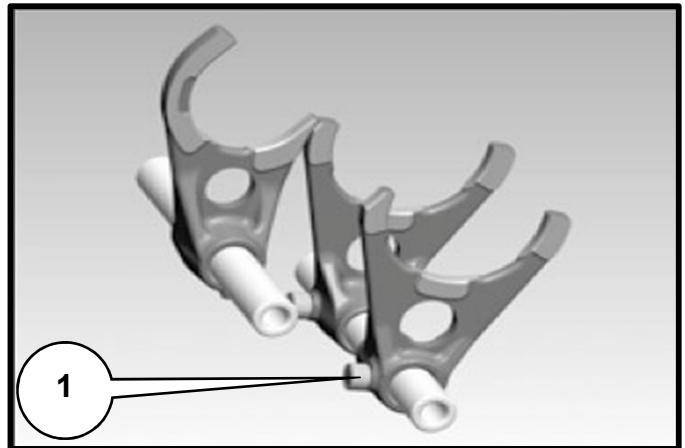


# CHECKING ENGINE COMPONENTS

## WARNING

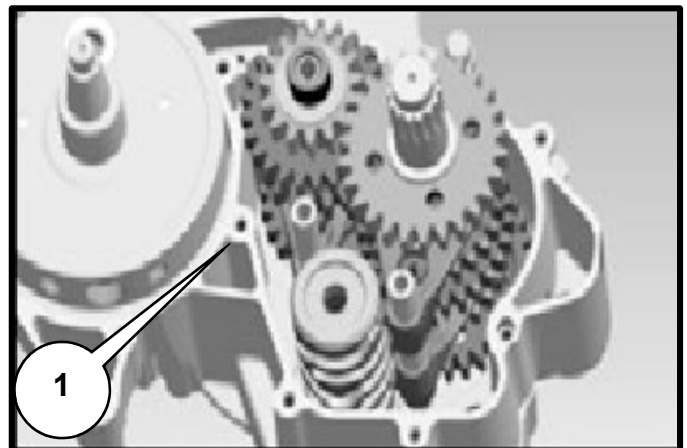
A used fork must have its original pinion and its rollers

- Attach the forks in the grooves of the sliding gears and push the barrel into its ball bearing.
- Oil the fork shafts and thread them into the forks. Push the forks into their housing in the housing until they stop.



## WARNING

When the forks are attached in the barrel, it is important to be careful that the rollers do not fall off the studs



## WARNING

The gearbox shafts must now turn without any hard points.

# REASSEMBLING THE ENGINE

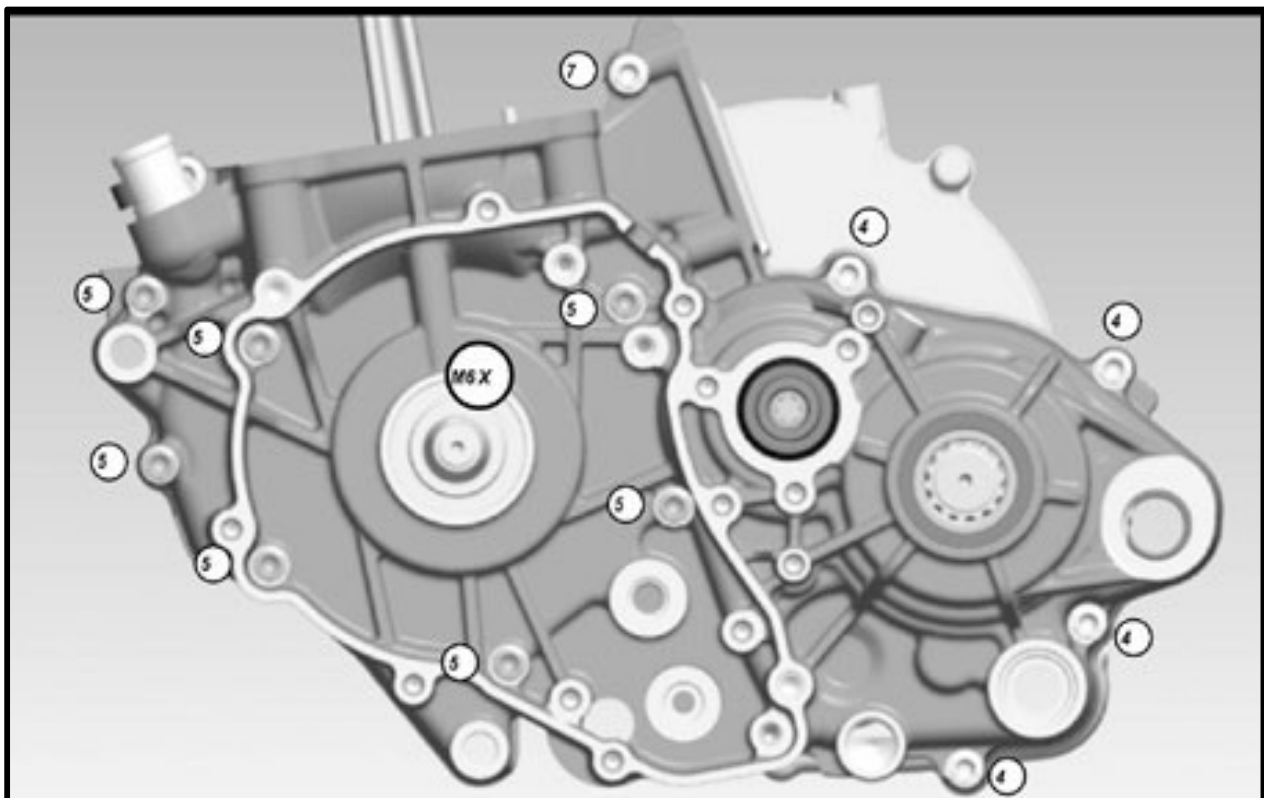
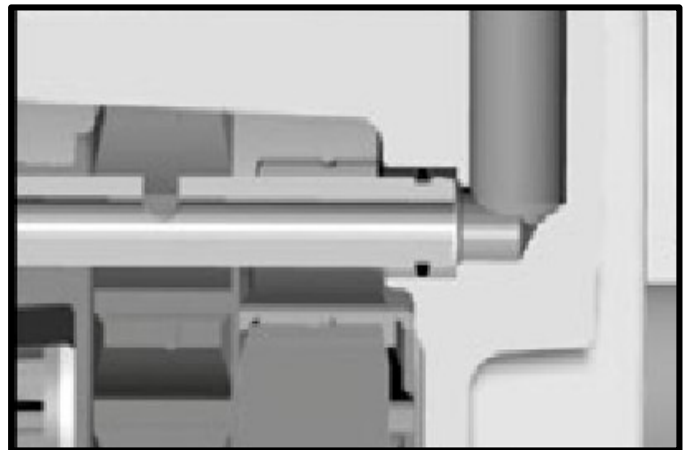
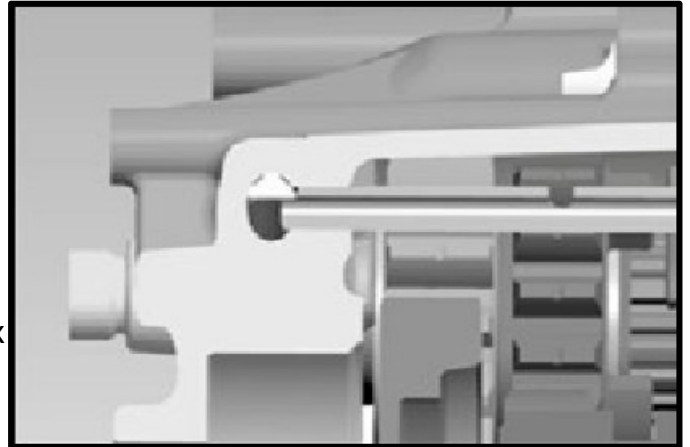
## » Assembling the half crankcases

- Assemble the gearbox lubrication tube on the right half crankcase

### WARNING

Pay attention to the tube indexing, flat section near oil cap rivet.

- Fit the o-ring onto the gearbox lubrication tube.
- Make sure that the centering rings are in place on the right half crankcase and that the gearbox shaft washers are also assembled.
- Lubricate the seals of the left half housing and put in position.
- Fix the screws and tighten to 10 Nm.
- Next, lightly tap the crankshaft with a plastic mallet and check that the shafts turn without any hard points



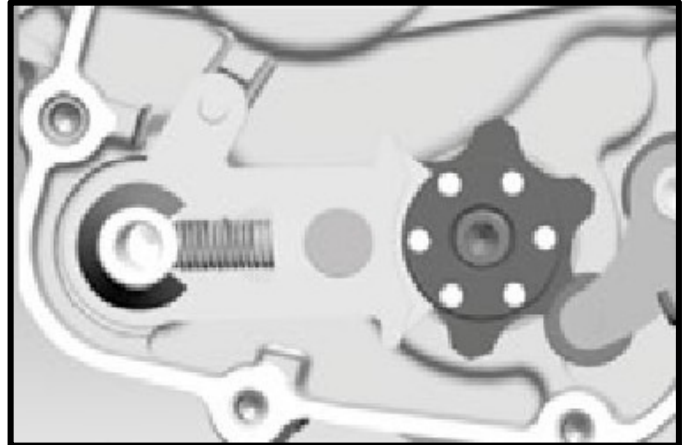
# REASSEMBLING THE ENGINE

## › Gear selection mechanism

- Put the spring in the crankcase with the strand bent upwards.
- Thread the spacer, the locking pin the washer, coat the CHC M6X20 screw with blue threadlock and assemble all parts.
- Attach the spring to the lever. The other end of the spring must be pressed against the housing.
- Fit the star selector's indexing pin onto the drum.
- Pull the lock lever back to position the star selector.
- Coat the screw with blue threadlock and assemble the star selector on the drum



- Grease the already assembled selection pin and thread it into the needle bearings without forgetting the lock washer.
- When the prong stops against the star selector push it back so that the shaft can be lowered completely



- Check that the return spring strands are against the pin on each side of the housing.
- Position the selector and try changing all the gears. You will have to turn the gearbox output shaft to change the different gears. Remove the selector again

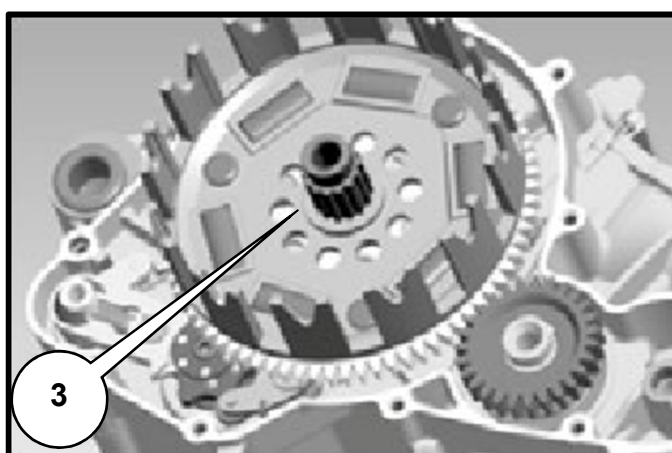
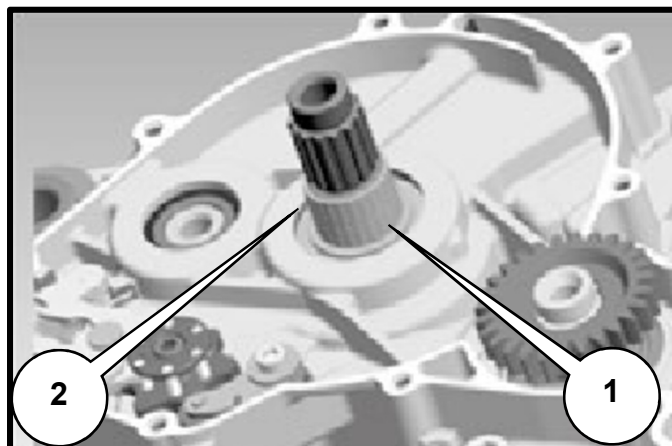




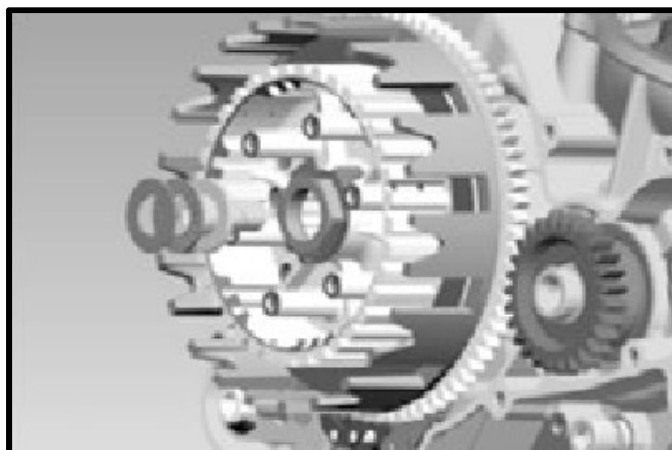
# REASSEMBLING THE ENGINE

## » Primary transmission and clutch

- Grease the connecting rod assembly seal.
- Thread the previously oiled o-ring onto the connecting rod assembly, then fit the steel spacer with the groove on the same side as the balance weight.
- Install the half-moon pin in its housing.
- Thread the pinion onto the rear of the crankshaft with the shoulder facing down.
- Thread the washer [1] and the two oiled needle cages [2] onto the primary shaft



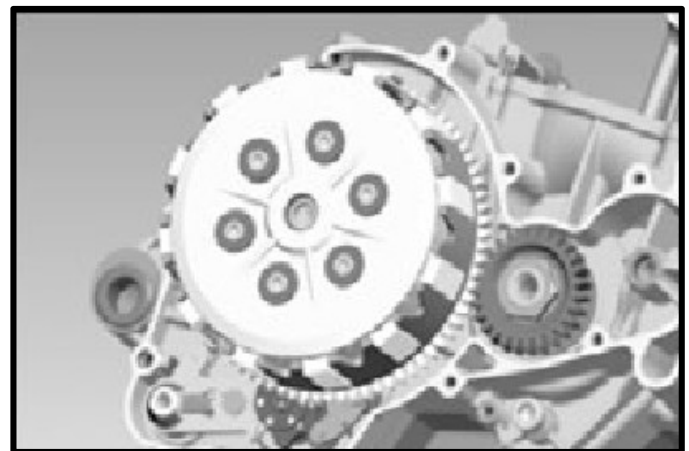
- Fit the clutch housing and its crenellated washer [3]
- Coat the threads of the primary shaft with blue threadlock.
- Mount the clutch boss on the primary shaft, coat its nut with red threadlock and a new safety washer.
- Employ the 5749 tool and tighten the nut to 100Nm.
- Remove the tool and brake the nut by folding the edge of the lock washer.
- Put blue threadlock on the crankshaft thread.
- Assemble the conical washer and nut.
- Lock the primary gear with the 5206 tool and tighten the crankshaft pinion nut to 150 Nm using red threadlock.
- Remove the 5206 tool and check there are hard points in the primary transmission by rotating the connecting rod



# REASSEMBLING THE ENGINE

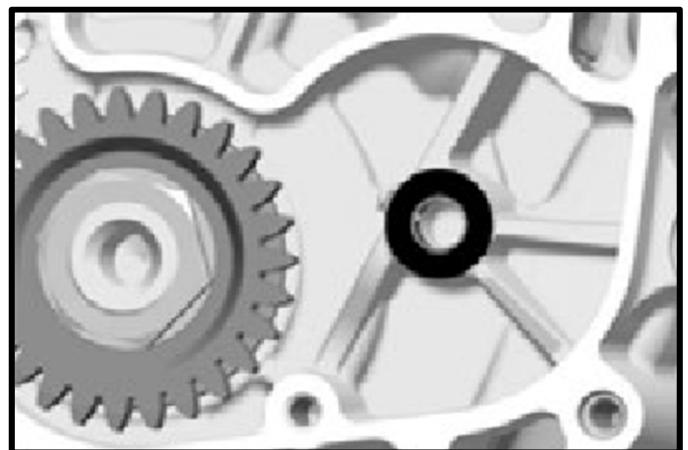
## » Clutch discs, pressure plate

- Oil the push pin [1] and thread it onto the primary shaft.
- Before assembly oil the clutch plates.
- Start with clutch plate. The 8 clutch discs and the 7 smooth discs are alternated.
- Place the pressure plate, springs, cups and CHC screws.
- Tighten the screws crosswise to 10 Nm



## » Clutch housing

- Check that the two centering bushing are in place in the clutch housing.
- Fit the housing gasket and hold it in place with a Little grease.
- Glue the water pump set ring [2] with a little grease.
- Position the clutch housing making sure that the water pump assembly is in place. The connecting rod assembly must be rotated so that the water pump pinion can engage the end of the crankshaft.
- Fix the THEP M6 screws and tighten to 10Nm except for the M6X12 to 6Nm

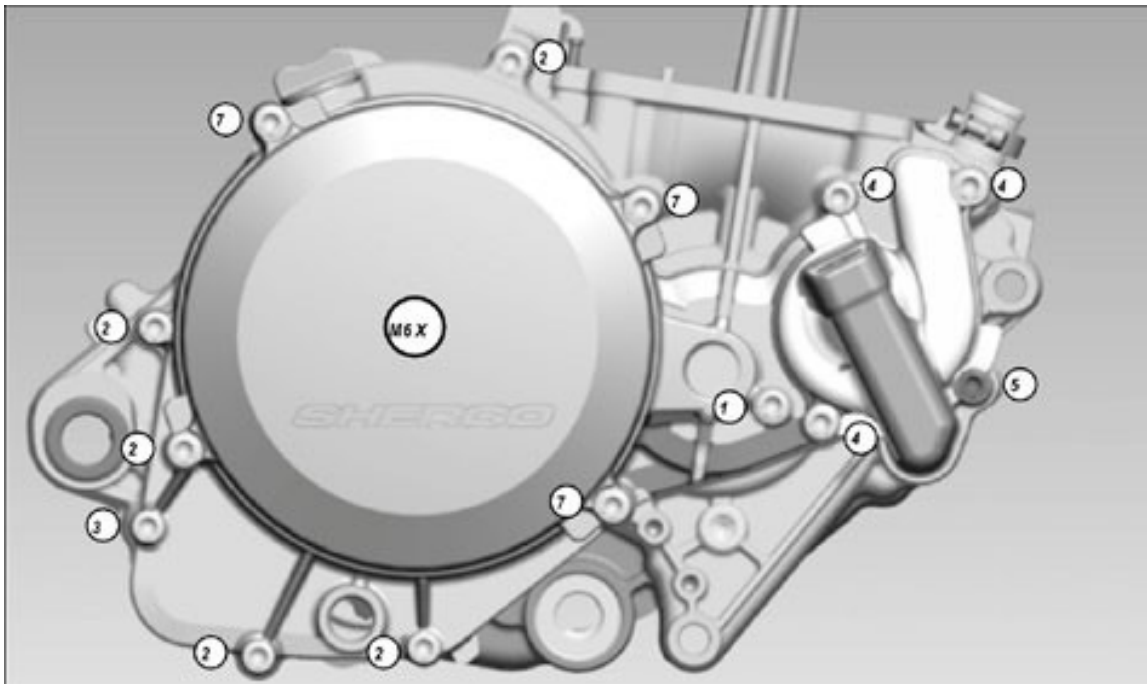


### WARNING

Put a new seal on the M6x50 screw, cooling liquid drain screw, and the M6x12 screw.

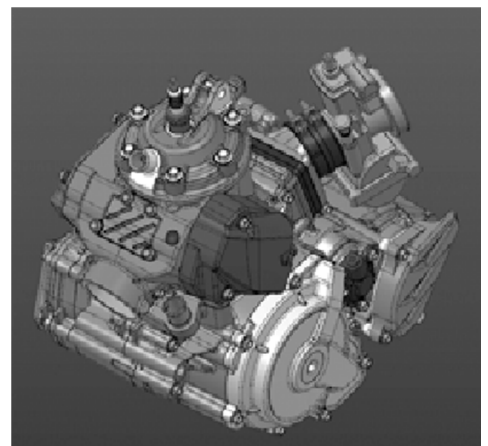
- Check that the shafts turn without any hard points

# REASSEMBLING THE ENGINE



## » Piston and cylinder

- Oil the parts thoroughly before reassembling.
- Thread the needle bearing into the small end, position the piston (the arrow on the top of the piston in the direction of the exhaust).
- Position the shaft and the clips with the open side down.
- Place the 0.5 mm header gasket.
- Correctly position the segments, reference marks facing up.
- Install the cylinder.
- Tighten the flange nuts in 2 passes.
- The 1st to 20 Nm and the 2nd to 35 Nm.
- Check the squish by measuring the distance between the piston surface at top dead center and the cylinder head surface



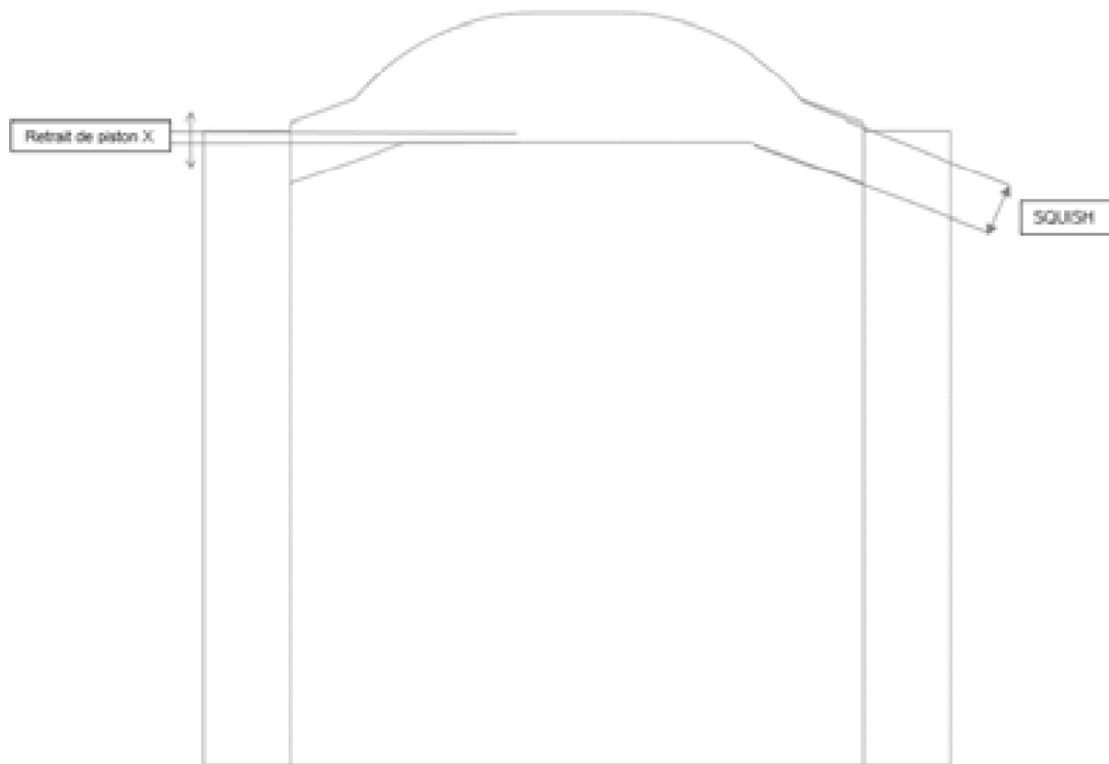
### WARNING

firstly measure after having placed a 0.5 mm header gasket), depending on the value obtained from the following squish adjustment table, adjust with one or more header gaskets



# REASSEMBLING THE ENGINE

## ›| Squish table



Squish, Standard =  $1.7 \pm 0.1$  mm (Set back of piston =  $-0.05$  mm)

Measurement of piston's overrun or set back (-) (X mm) Made with a 0.5 mm gasket	Squish 1st measurement 0.5 mm gasket	Thickness of gasket to have a 1.7 mm Squish	Sherco reference gasket(s) to be mounted for 1.7 mm Squish
$X \leq -0,25$	1,9 mm	0,3 mm	4942
$-0,25 < X \leq -0,15$	1,8 mm	0,4 mm	7238
$-0,15 < X \leq -0,05$	1,7 mm	0,5 mm	3840
$-0,05 < X \leq 0,05$	1,6 mm	0,6 mm	4932 + 4942
$0,05 < X \leq 0,15$	1,5 mm	0,7 mm	7238 + 4942
$0,15 < X \leq 0,2$	1,45 mm	0,75 mm	4943

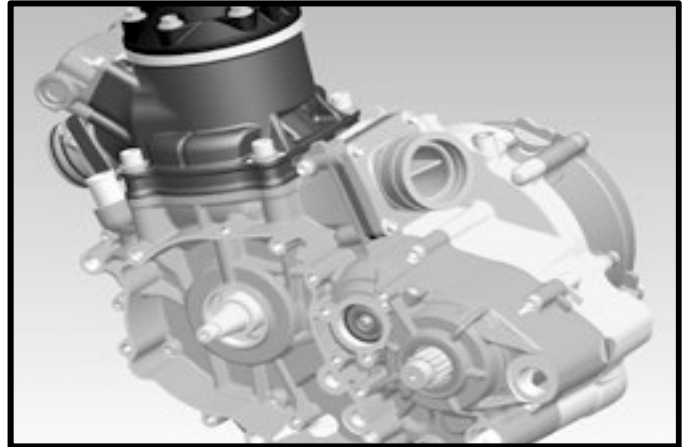
## ›| Cylinder head

- Clean the cylinder gasket and cylinder head surfaces.
- Put the 2 centering pins on the cylinder.
- Position the cylinder head.
- Fit the M8 shouldered screws with new copper washers.
- Tighten three times crosswise to 25Nm

# REASSEMBLING THE ENGINE

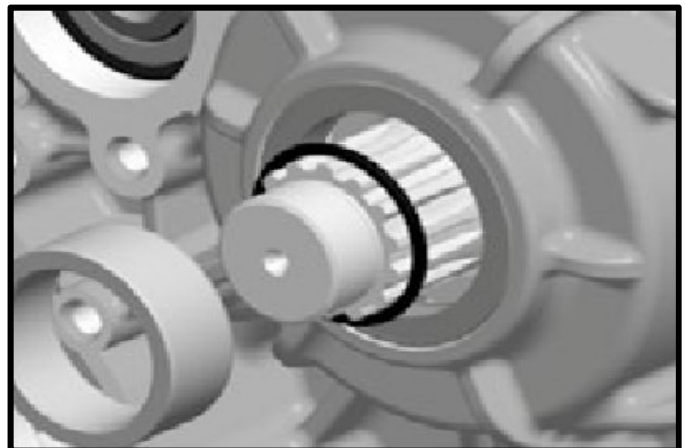
## » Valve box and intake pipe

- Place a new valve box gasket.
- Put the complete valve box in the intake duct.
- Install a new intake pipe gasket.
- Assemble the intake pipe with the 4M6 screws.
- Install the intake sleeve with its metal collar



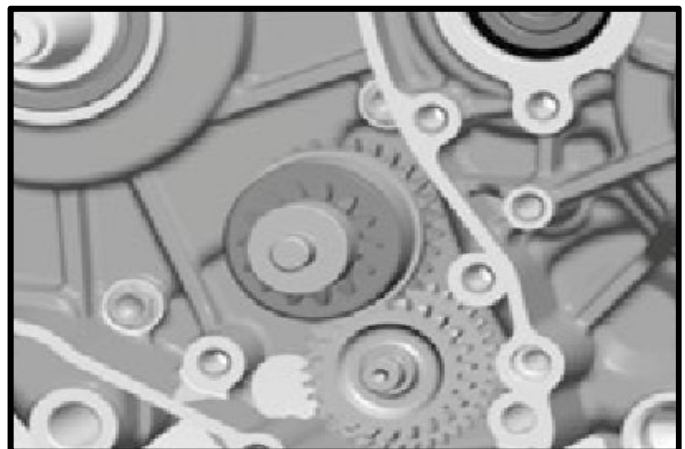
## » Gearbox output pinion

- Oil the o-ring and thread it onto the output shaft.
- Thread over the spacer so that the gasket sits in place.
- Place the gearbox output pinion, the safety washer.
- Put blue threadlock on the thread.
- Thread the safety washer.
- Fix the nut to tighten to 150Nm.
- Unfold the safety washer's tab onto the nut.



## » Starter drive assembly

- Put the double pinion in the needle cage.
- Put the starter drive in place.
- Position the retaining triangle and fix the 3 THEP screws.
- Lubricate the pinions with grease spray



# REASSEMBLING THE ENGINE

## » Mounting the ignition and its cover

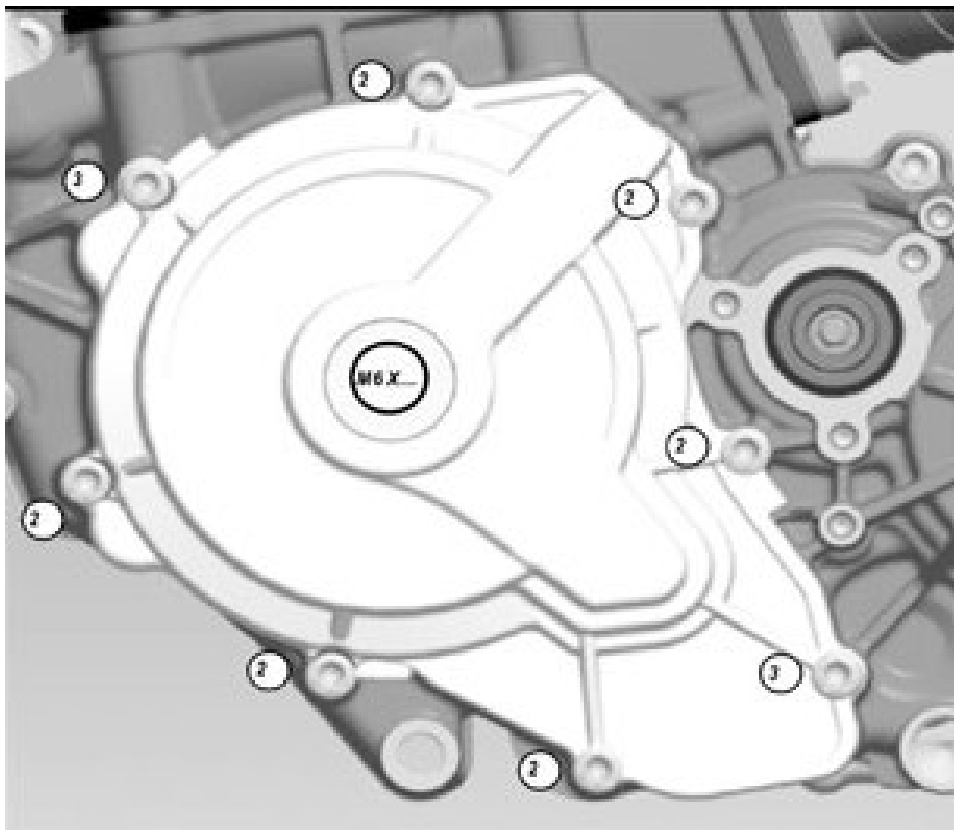
- Put the half moon pin in its housing on the crankshaft.
- Thread the rotor onto the crankshaft.
- Put blue threadlock on the thread.
- Using the 5207 tool, put on the nut and tighten to 60Nm.
- Put the 2 centering sleeves in position.
- Fit a new gasket and secure the ignition cover

## » Mounting the electric starter

- Replace the starter's o-ring with a new gasket.
- Lightly grease the o-ring.
- Install the starter into the right crankcase.
- Fix the starter with the 2 THEP screws.
- Finish by oiling and threading the clutch control rod into the primary shaft.
- Fit the speed selector with its screw and washer
- Fit the two drain plugs with a new seal.

### WARNING

The gear box must be filled when the engine is back on its frame ; if not, a certain amount of oil will escape out the primary shaft.



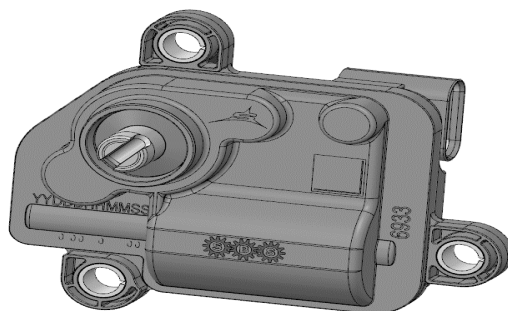
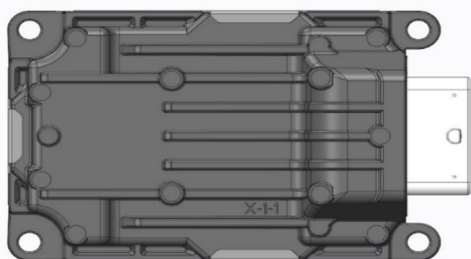
## INTRODUCTION SYNERJECT SYSTEM

### 1.1- Synerject system



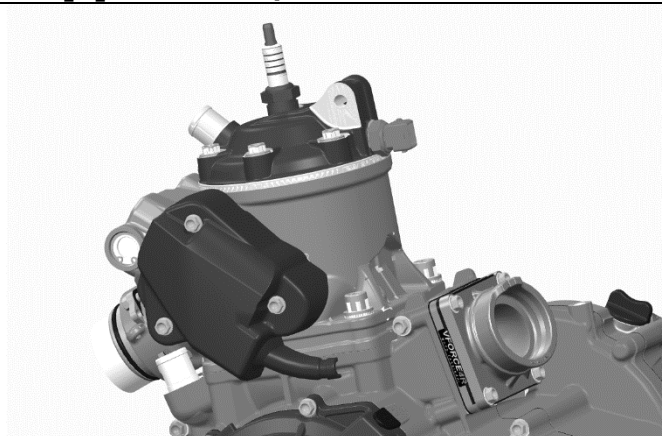
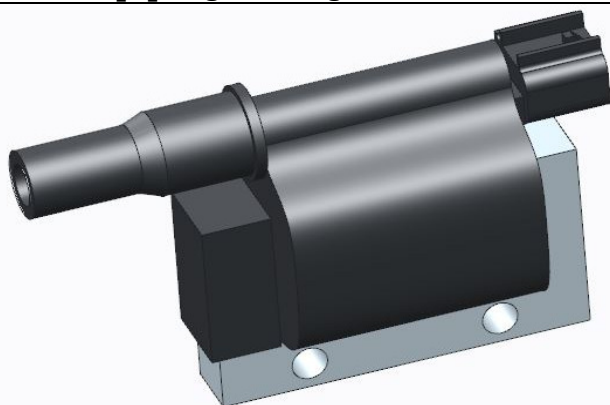
**[1] Synerject M3C controller : 3459**

**[2] Engine actuator : 6933**



**[3] High voltage coil : 8308**

**[4] Water temperature sensor : 0380**



### 1.2- Description Exxodiag diagnostic Tools référence 4967

Your Sherco 250 SE-R and 300 SE-R is equipped with a Synerject electronic management system consisting of an M3C controller, an ignition, an engine actuator, a high voltage coil, a water temperature sensor and a specific electrical harness



## 1.3- Diagnostic tool kit contents.

The case consists of a USB to MUX output cable, a MUX peripheral device, a MUX to motorcycle diagnostic connector cable, an installation CD (or the link below), a user manual

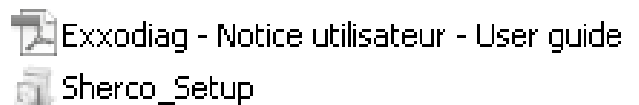
## 1.4- Installation of the diagnostic tool

*In case of problem during the installation please contact EXWOTEST at +33 (0)4 50 02 34 34 or by mail to [courrierxxotest.com](mailto:courrierxxotest.com).*

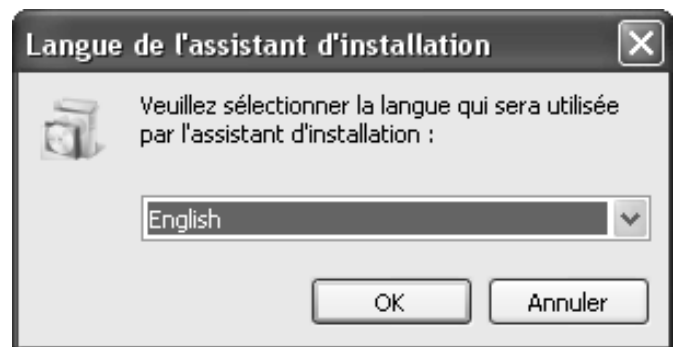
### A- Installing the software and drivers

- Open the installation CD on your computer

- Run “sherco\_setup”



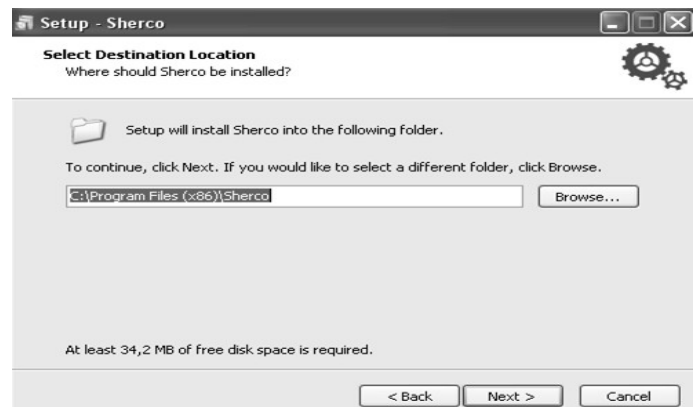
- Select the language.



- Click on « Next ».



- Choose the installation folder.

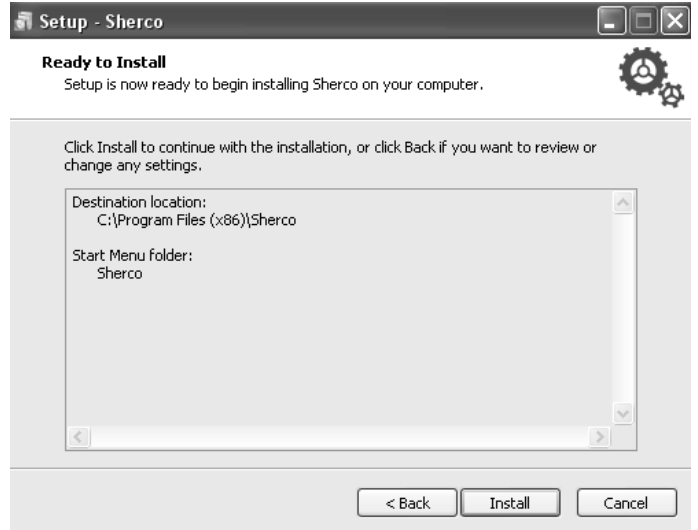




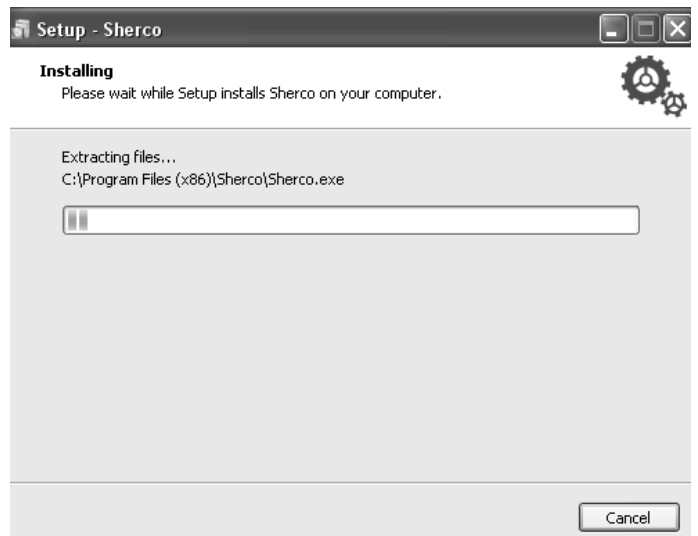
- Click on « Next ».



- Click on « Install ».



- Installation in progress.



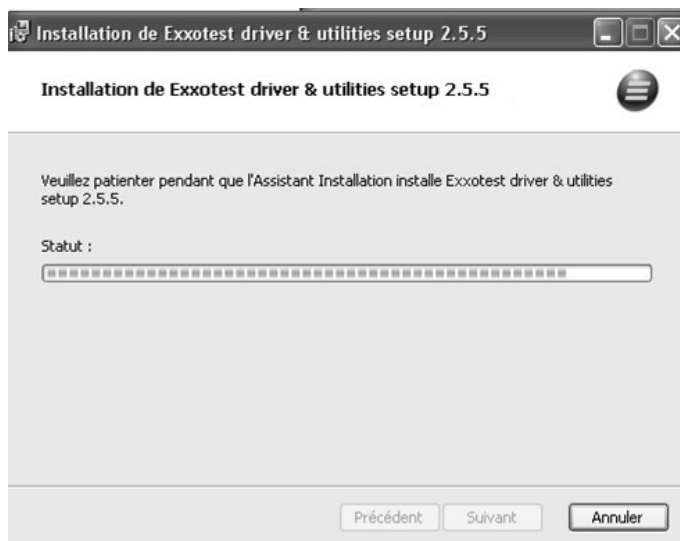
- Check the box « Start the driver installation » and click on « Finish ».



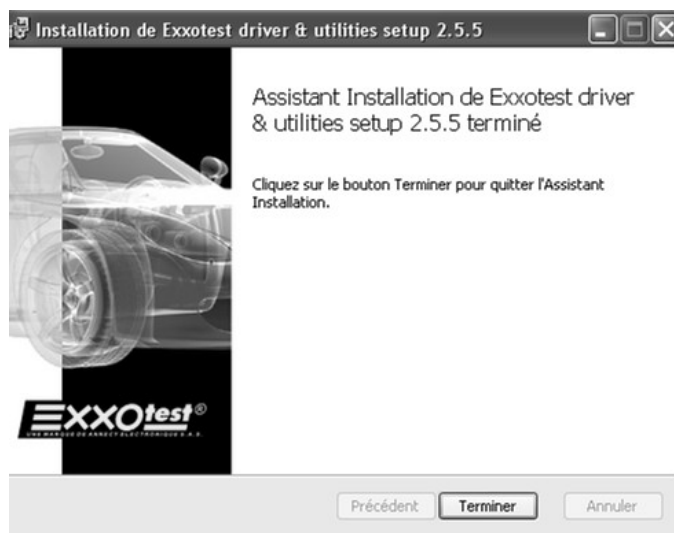
- The following window will open. Read the terms of the license agreement. Check the box « I accept the terms of the license agreement » and click on « Install ».



- Installation in progress.



- The following window will open. Click on « Finish ».



The installation is complete.

## **B- Connect the « MUXDIAG II » cable and its interface to a USB port on your computer**

Connect the cable to the diagnostic connector of the motorcycle.

Make sure the « MUXDIAG II » unit is properly powered by checking the LED:

- **Solid blue:** PC connection properly established.
- **Flashing blue:** communication with PC in progress.
- **Blue off:** no connection to the PC, or device in standby; it can also indicate a problem with the USB connector.
- **Solid green:** firmware issue.
- **Flashing green (slow):** firmware correctly run.
- **Flashing green (fast):** communication with PC in progress.
- **Green off:** no firmware.
- **Solid red:** correct power supply to the card.
- **All LEDs OFF:** the outlet is not powered on, or is off or USB in on standby mode.



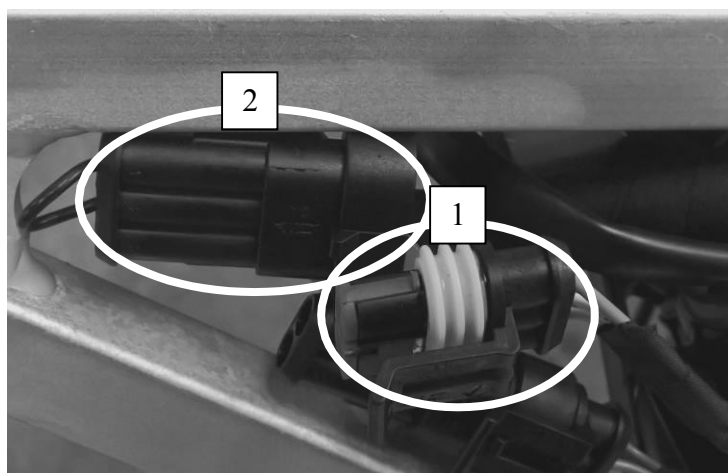
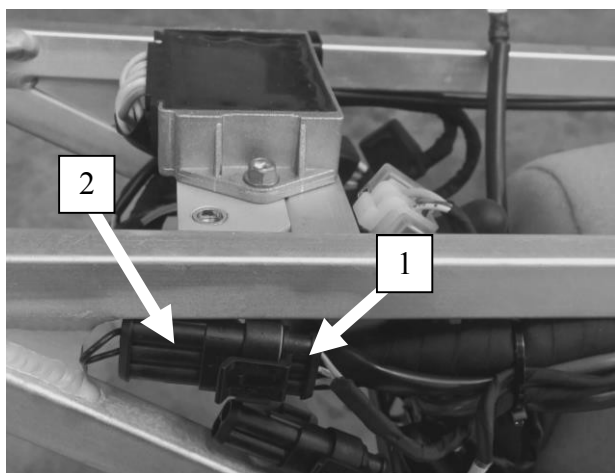
## PRESENTATION OF THE SOFTWARE

### 2.1- Connection with Keyless system

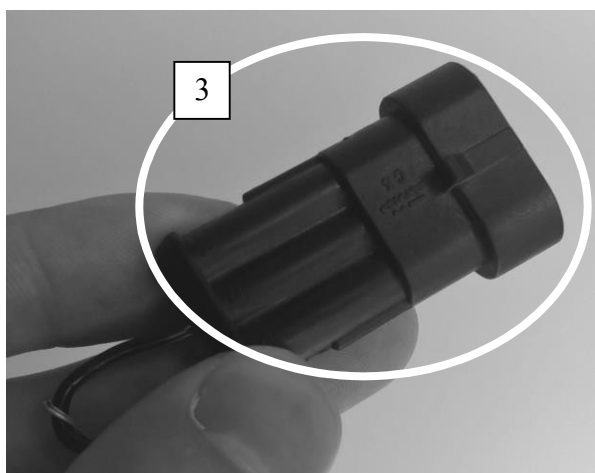
Sherco had a Keyless system on its motorcycles which allows the bike to switch on without any key and switch off automatically after 30seconds of non-use.

This last point blocks the diagnostic, this is why it is necessary to follow the steps down below before doing it.

1. Remove the plug **(1)** from the connector **(2)** (located on the rear sub frame – on the right part of the bike).



2. Take the shunt **(3)** (*reference 6267*) and connect the plug **(1)** into it.



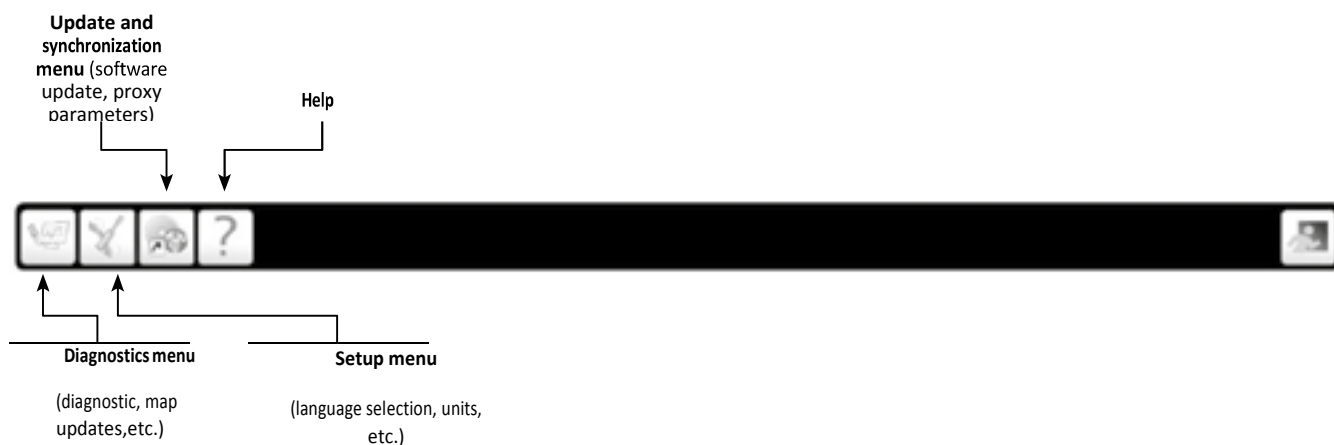
3. You can now do the diagnostic by following the next explanations.

**Information:** To set up the connection with the motorcycle, the motorcycle must be switched on (On). To navigate through the different menus, the USB cable with the «MUXDIAG II» device only may be connected to the computer.

Run the software using the icon



The following menu will come up:



## 2.2- Software settings: configuration menu



In this menu, you can modify:




### Configuration



- The diagnostic plug. You can refresh the list by hitting the button. The number must match the number of the « MUXDIAG II » device.
- The languages available in the software: English, French, Spanish, Portuguese, German, Italian (the installation CD provided may not include all languages). Update the software-> page 53).
- Set the unit system.



- Click  to return to the home screen.

- Click  to save the changes.

## 2.3 Update menu and synchronization



### A- In this menu, you can update the diagnostic software tool



- To determine whether an update is available, check that you have an Internet connection, and then click on the following icon




- If an update is available, the following window will come up:




- If no update is available, the following message will come up:



- Click on update.  to start downloading the




- The following message will come up
- Click on  to start installation



- Resume the installation process -> page 41. It is not necessary to restart the installation of the drivers

## **B- Configuration of Internet access parameters**

It may be necessary to set up a proxy server to access the Internet.

- Click on 

- Fill in the following settings if necessary.

### **Configuration of proxy settings**

- None
- Use the following settings

#### **Customized settings**

Address / Port	<input type="text"/>	<input type="text"/>
User	<input type="text"/>	
Password	<input type="text"/>	

- Click on  to save your changes.



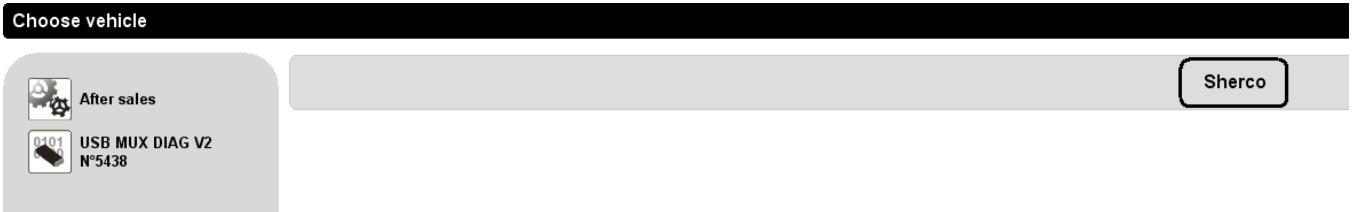
## 3 Using the software

Diagnostic menu and injection mapping update



### General

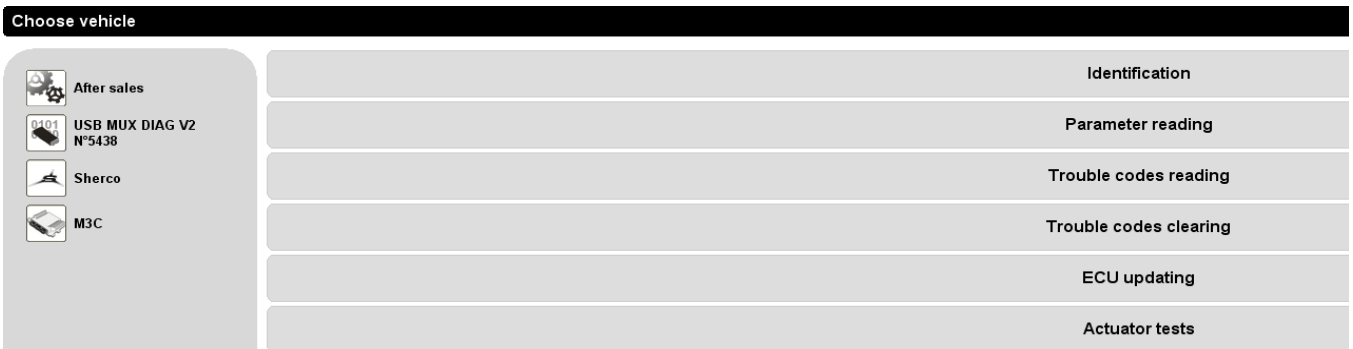
- Click on « Sherco ».



- Click on « M3C ».

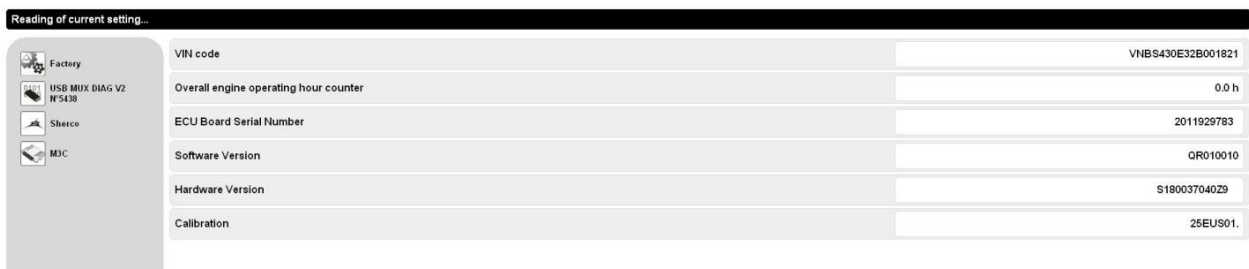


- You get the following menu :



## 3.1 Identification

You can check the identification of the following (serial number, hours of operation, calibration number)



## A. Parameter measurements

### General parameters

Choose category...

After sales USB MUX DIAG V2 N°5438 Sherco M3C	Engine information
	Throttle Position
	Misc

## B. Engine information

Displayed below are the main system values :

Reading of current setting...

After sales USB MUX DIAG V2 N°5453 Sherco M3C 	RPM	0 tr/mn
	Engine Temperature	31 °C
	Battery Voltage	11.9 V
	Air temperature	28 °C
	Ambient pressure	1012 mb
	Stepper position	0
	Throttle position	0 %

## 3.2 Reading the default codes

When you click on "read default codes" the system starts checking.

- If no default appears exit the menu by clicking on this icon:



Choose vehicle

After sales USB MUX DIAG V2 N°5438 Sherco M3C	Identification
	Parameter reading
	Trouble codes reading
	Trouble codes clearing
	ECU updating
	Actuator tests

- If a default appears:









**Breakdown list...**

After sales

0101 USB MUX DIAG V2 N°5438

Sherco

M3C

	Fugitive failure	Permanent failure 
	Throttle Position Sensor (P0122)	
	Electric fuel pump (P0231)	
	Air pressure sensor (P0107)	
	Intake air temperature sensor (P0113)	
	Stepper motor (P1508)	
	Cooling fan (P0485)	

- You can get the details of the default by clicking on the default display :


**Details of breakdown code...**

After sales

0101 USB MUX DIAG V2 N°5438


Sherco

M3C



Throttle Position Sensor (P0122)

Short circuit to ground or overload



- Number of occurrence of present failure = 59
- RPM = 0 tr/mn
- Engine Temperature = -40 °C
- Battery voltage = 4,0 V
- Air Temperature = 29 °C
- Ambient pressure = 64 mb
- Applied Ignition angle = -29 °CRK
- Injection Time = 35 ms
- Engine state = ES
- Overall engine operating counter = 0 h
- Engine operating minute counter since last engine start = 237 min
- Throttle Position in degrees = 0 °TPS
- Intake manifold air pressure = 1360 mb
- Mass air flow = 40 mg/tdc
- Adaptive value of integral term of the idle speed controler = -50.00 %

- Record the defaults and exit the menu by clicking on this icon

**Note:**

- 1- **Transient default/permanent default:** a transient default becomes permanent after a certain number of engine cycles of the following components (injector, fuel pump, etc). For a permanent default to disappear it takes 40 cycles without the engine default reappearing.
- 2- **Fan Default :** If there is no fan installed on the bike, there will always be a rise in the fan default code (P0485)



## 3.3 Erasing default codes


1- **If a default appears:** go to the menu « Erasing default codes »

**Choose vehicle**

<ul style="list-style-type: none"> <li> After sales</li> <li> USB MUX DIAG V2 N°5438</li> <li> Sherco</li> <li> M3C</li> </ul>	Identification
	Parameter reading
	Trouble codes reading
	<b>Trouble codes clearing</b>
	ECU updating
	Actuator tests




Effacer tous les codes défauts ?

Click this icon  in order to erase all of the default codes

The following screen will appear:

**Current service in execution...**


- After sales
- USB MUX DIAG V2 N°5438
- Sherco
- M3C




Service in execution...

**Information**

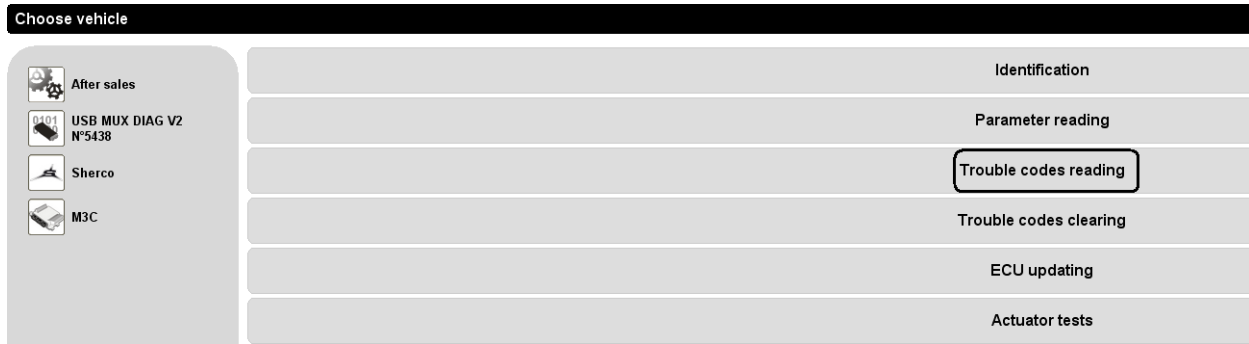
---



Erasing of trouble codes successful.

Confirm by clicking on this icon 

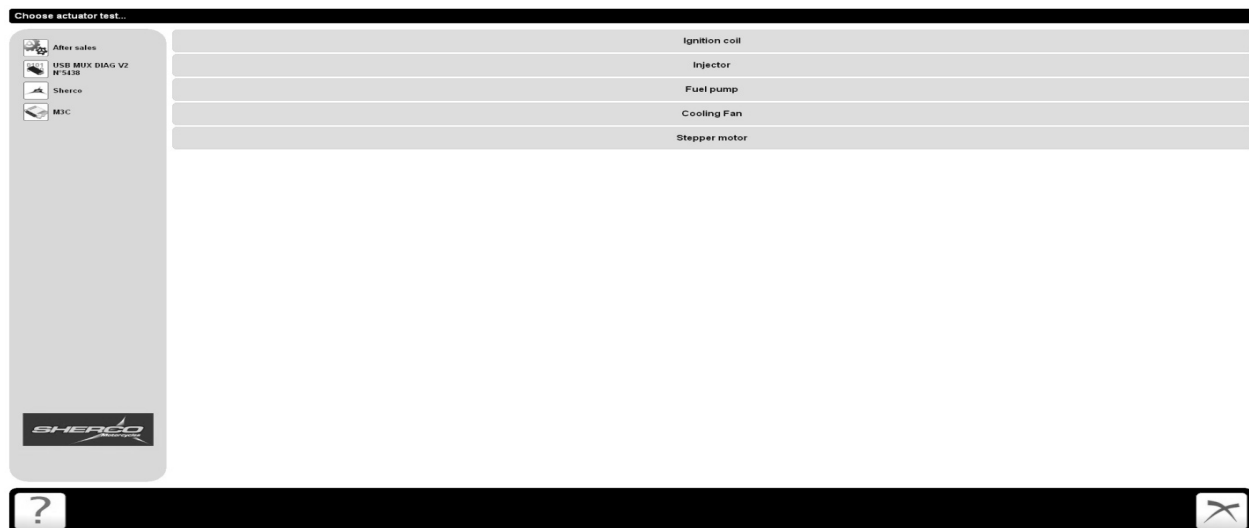
## Return to the menu « reading default codes »



Check and make sure that the defaults are the same as before. Check/replace the defective parts. Check all of the connections.

### 3.4 Test the actuators

In addition to reading default codes you can also check some of the system components:



#### 1- Ignition coil

When you launch the ignition coil test, the following message will appear :



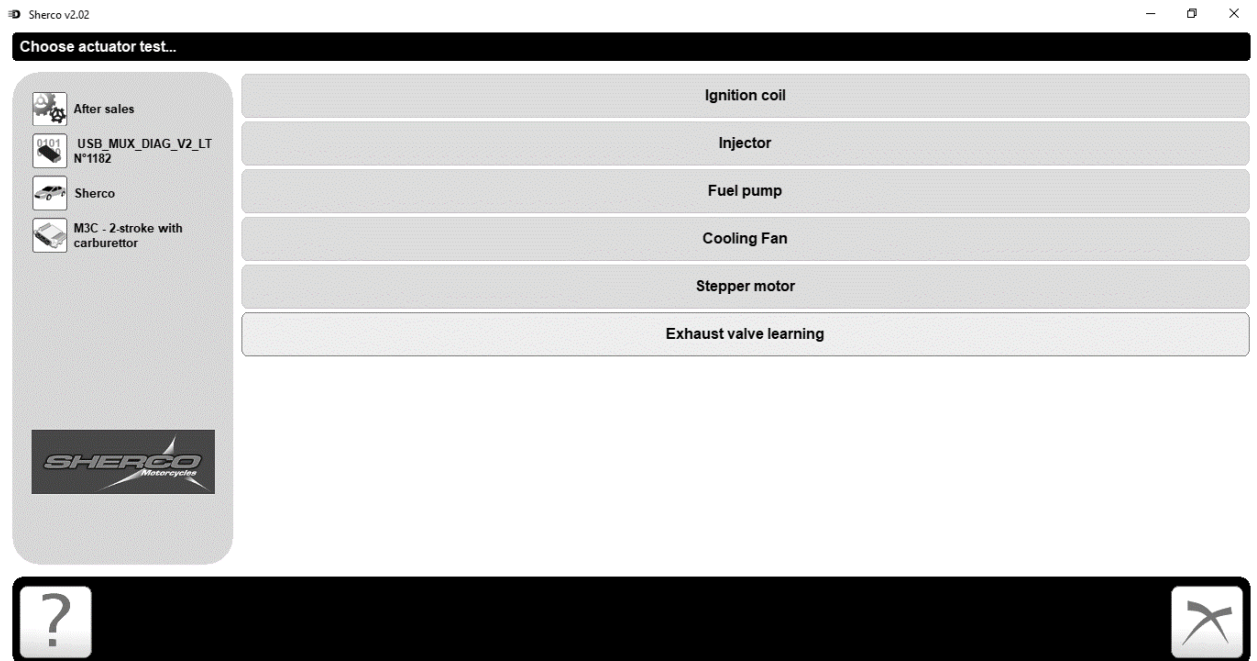
The system is not able to detect an ignition coil failure with the engine stopped. The test results will be the same if the coil is faulty or not. Therefore, when testing the ignition coil make sure that the engine makes the correct sound for a properly functioning ignition coil.



## 2- Fan

For the fan perform a standard test. If there is a default it twill appear as a classic default

## 3- Exhaust valve learning.



## 3.5 Updating the ECU

By using the diagnostic tool it is possible to make updates to the injection mapping (calibration). An example would be the fitting of a racing silencer or there is an update from the factory. These files will be freely available on sherconetwork:

**You must pay attention to the model, the displacement, the type of silencer, etc.**

In case of doubt, contact technical support.

1. Download the desired update (file.mot)

ShercoNetwork → Information → Technical information → Injection Map

The screenshot shows the Sherco Network website interface. The 'INJECTION MAP' menu item is highlighted with a red oval. Below the navigation menu, there is a table of available files for download.

Date	Description	File	View
09/07/2019		2020 SHERCO_MANUEL_450_500-SEF-R-4T.pdf	DOWNLOAD
20/06/2019		2020 SHERCO_MANUEL_250_300_SER-2T.pdf	DOWNLOAD
20/06/2019		2020 SHERCO_MANUEL_250_300_SEF-R-4T.pdf	DOWNLOAD
20/06/2019		2020 SHERCO_MANUEL_125_SER-2T.pdf	DOWNLOAD
14/06/2019		SHERCO-WORKSHOP-MANUAL-125-SER-2T-2019-EN.pdf	DOWNLOAD
14/06/2019		SHERCO-MANUEL-ATELIER-125-SER-2T-2019-FR.pdf	DOWNLOAD
12/06/2019		504EUS01 500 SEF 2020 STANDARD.mot	DOWNLOAD
12/06/2019		504EUR02 500 SEF AKRAPOVIC 2020.mot	DOWNLOAD
12/06/2019		454EUS03 450 SEF 2020 STANDARD.mot	DOWNLOAD

2- Power up the motorcycle

The screenshot shows the diagnostic tool interface. On the left, there is a 'Choose vehicle' menu with options: After sales, USB MUX DIAG V2 N°5438, Sherco, and M3C. On the right, there is a list of diagnostic functions: Identification, Parameter reading, Trouble codes reading, Trouble codes clearing, ECU updating (highlighted with a red box), and Actuator tests.

3- Click on the computer update





## Update ECU now ?

Confirm by clicking on this icon



Select the calibration file (.mot) that was previously downloaded and click open.

### 4. The file is being downloaded



Downloading ... (14.2%)

### WARNING

**DO NOT TURN OFF THE MOTORCYCLE DURING THE DOWNLOAD OPERATION (FLASH)**

**DO NOT ABRUPTLY STOP THE FLASH DOWNLOAD PROCESS THERE IS A RISK OF IRREPAIRABLE DAMAGE TO THE COMPUTER**

### 5. At the end of the download the fuel pump will start and the following message will appear :

INFORMATION : Download was successful

Confirm by clicking on this icon



### 6. Check to make sure that the correct calibration file was allocated by clicking on « Identification »






Choose vehicle

 After sales	<input type="button" value="Identification"/>
	Parameter reading
	Trouble codes reading
	Trouble codes clearing
	ECU updating
	Actuator tests

Check to make sure that the file name matches the file that was download



## Lecture des paramètres en cours...

 Usine  USB MUX DIAG V2 N°5453  Sherco  M3C 	Numéro de série du véhicule (VIN)	BS630E3DB003296
	Compteur temps d'utilisation moteur	0.0 h
	N° de série du calculateur	2011980210
	Version logicielle	QR010010
	Version matérielle	S180037040Z9
Calibration	25EUS01.	

**Information:** the information on serial number and operating hours are not reset during a calibration update.






7. Put back the “shunt” on the connector in the air filter box to switch back on “keyless” mode.
8. -The ECU power latch will proceed during 20 s.
9. -Wait 30 s until the ECU stop before starting the bike.
10. Start the bike, stop it and wait 30 s before to restart the bike 11-Switch on the bike and verify that the parameters of the motor are normal



## 3.6 Screen printing function

If you are communicating with technical support and need help identifying potential problems you can perform a screen print operation by pressing F10 on your keyboard. This will allow you to attach these files to your inquiry.

The "identification" screen contains all of the important information about the motorcycle (serial number of the bike, number of hours of operation, calibration, etc)

Reading of current setting...

 Factory  USB MUX DIAG V2 N°5453  Sherco  M3C 	VIN code	VNBS430E32B001821
	Overall engine operating hour counter	0.0 h
	ECU Board Serial Number	2011929783
	Software Version	QR010010
	Hardware Version	S180037040Z9
	Calibration	25EUS01.



# TORQUES TABLE

Standard tightening torque		Threadlock
M5	7 Nm	
M6	10 Nm	
M8	25 Nm	
Chassis tightening torque		Threadlock
Rear wheel nut	100 Nm	
Rear cradle fixing screw	24 Nm	•
Front wheel nut	40 Nm	
Fork end pinch screw	15 Nm	
Brake pad pin screw	8 Nm	•
Pinch screw for lower fork tees	WP 12 Nm KYB15 Nm	
Pinch screw for upper fork tees	WP 17 Nm KYB 17 Nm	
Engine screw	60 Nm	
Swivel-arm screw	100 Nm	
Head-frame screw	24 Nm	
Engine torque		Threadlock
RPM sensor screw	8 Nm	•
Coolant drain screw	10 Nm	
Oil level screw	6 Nm	
Clutch slave cylinder screw	9 Nm	
Cylinder head crosswise tightening torque	25 Nm	
Crankshaft handhold plug	8 Nm	
Clutch pressure screw	10 Nm	
Water pump housing screw	10 Nm	
Ignition flywheel nut	60 Nm	•
Clutch boss nut	100 Nm	•
Primary transmission pinion nut	150 Nm	•
Ignition housing screw	10 Nm	
Central crankcase screws	10 Nm	
Barrel screw	10 Nm	•
Starter triangle screw	10 Nm	
Starter screw	10 Nm	
Cylinder nut	Pass No. 1 20 Nm Pass No. 2 35 Nm	
Gearbox output pinion nut	150 Nm	•

# CARBURETOR ADJUSTEMENT TABLE

## SE 250-Carburetor adjustments table

Sea level	Temperature	-20°C→ -7°C	-6°C→ 5°C	6°C→ 15°C	16°C→ 24°C	25°C→ 36°C	37°C→ 49°C
3.000 m to 2.301 m	Air screw adjustment	1T1/4 42	1T3/4 42	1T3/4 40	2T1/4 38	2T1/4 35	
	Idle jet	N1EG	N1EG	N1EH	N1EH	N1EI	
	Needle	3	2	2	2	2	
	Needle position	165	162	160	160	158	
	Main jet						
2 300 m to 1 501 m	Air screw adjustment	1T1/4 45	1T1/4 42	1T3/4 42	1T3/4 40	2T1/4 38	2T1/4 35
	Idle jet	N1EG	N1EG	N1EG	N1EH	N1EH	N1EI
	Needle	3	3	2	2	2	2
	Needle position	165	165	162	160	160	158
	Main jet						
1 500 m to 751 m	Air screw adjustment	1T 45	1T1/4 45	1T1/4 42	1T3/4 42	1T3/4 40	2T1/4 38
	Idle jet	N1EF	N1EG	N1EG	N1EG	N1EH	N1EH
	Needle	3	3	3	2	2	2
	Needle position	168	165	165	162	160	158
	Main jet						
750 m to 301 m	Air screw adjustment	1T 48	1T 45	1T1/4 45	1T1/4 42	1T3/4 42	1T3/4 40
	Idle jet	N1EF	N1EF	N1EG	N1EG	N1EG	N1EH
	Needle	4	3	3	3	2	2
	Needle position	170	168	165	162	162	160
	Main jet						
300 m to 0 m	Air screw adjustment	1T 50	1T 48	1T 45	1T/4 45	1T1/4 42	1T3/4 42
	Idle jet	N1EE	N1EF	N1EF	N1EG	N1EG	N1EG
	Needle	4	4	3	3	3	2
	Needle position	172	170	168	165	165	162
	Main jet						



# CABURETOR ADJUSTEMENT TABLE

## » SE 300-Carburetor adjustments table

Sea level	Temperature	-20°C ... -7°C	-6°C ... 5°C	6°C ... 15°C	16°C ... 24°C	25°C ... 36°C	37°C ... 49°C
3.000 m	Air screw adjustment	1T1/2	1T1/2	2T	2T	2T1/2	3T
to 2.301 m		Idle jet	42	42	42	42	42
	Needle	N8RE	N8RE	N8RF	N8RF	N8RG	N8RH
	Needle position	3	2	2	1	1	1
	Main jet	172	172	170	168	165	165
2 300 m	Air screw adjustment	1T	1T1/2	1T 1/2	2T	2T	2T1/2
to 1 501 m		Idle jet	42	42	42	42	42
	Needle	N8RD	N8RE	N8RE	N8RF	N8RF	N8RG
	Needle position	3	3	3	2	2	1
	Main jet	175	172	172	170	168	165
1 500 m	Air screw adjustment	1T	1T	1T1/2	1T1/2	2T	2T
to 751 m		Idle jet	45	42	42	42	42
	Needle	N8RC	N8RD	N8RE	N8RE	N8RF	N8RF
	Needle position	3	3	3	3	2	1
	Main jet	178	175	172	172	170	168
750 m	Air screw adjustment	1T	1T	1T	1T1/2	1T/12	2T
to 301 m		Idle jet	48	45	42	42	42
	Needle	N8RC	N8RC	N8RD	N8RE	N8RE	N8RF
	Needle position	4	3	3	3	3	2
	Main jet	180	178	175	172	172	170
300 m	Air screw adjustment	1/2T	1T	1T	1T	1T1/2	1T 1/2
to 0 m		Idle jet	48	45	45	42	42
	Needle	N8RB	N8RC	N8RC	N8RD	N8RE	N8RE
	Needle position	4	4	3	3	3	3
	Main jet	182	180	178	175	172	172

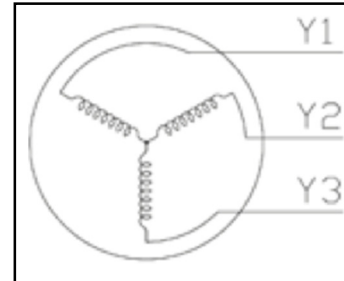
# CHECKING THE LOAD CIRCUIT

## ›) Static control value

For this control please make sure the bike is off

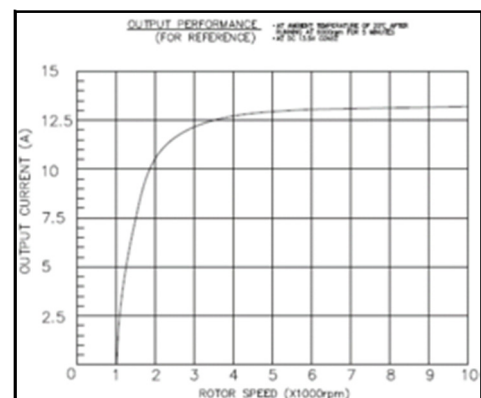
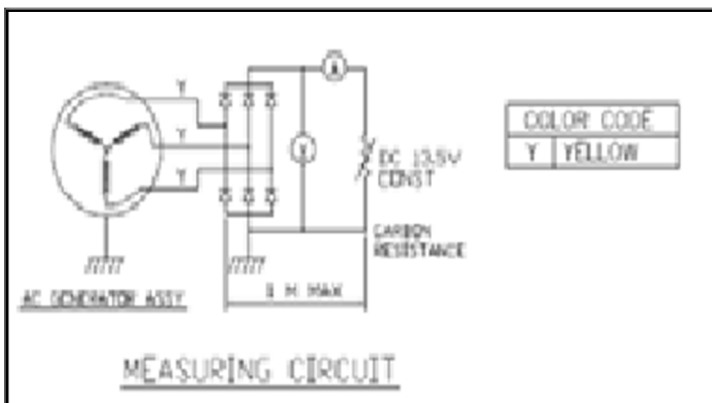
- Battery voltage > 12.5V.
- Resistance values of stator windings : Measurement of the resistance between each winding.

Y1-Y2	0.44Ω±20
Y2-Y3	% (at
Y1-Y3	20°C)



## ›) Dynamic control values

- Voltage regulator :  
AC (calibrated 200V AC) When idling  
22V ±2V  
At 6000 rpm min : 77V±3V DC  
On regulator output (Calibrated 20V DC) At 4000 rpm  
: 14.6V + Red/White, - Green
- Alternator :

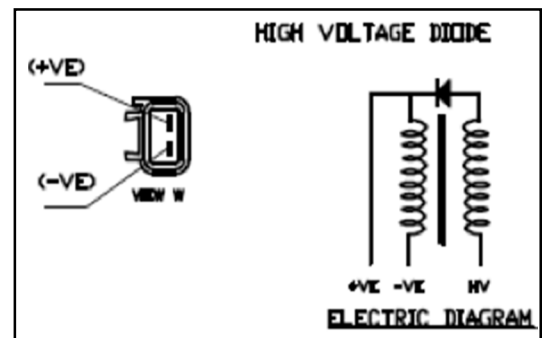


# T° SENSOR, ENGINE RPM SENSOR, HIGH VOLTAGE COIL

- Water temperature sensor resistance (on cylinder head)

TEMP (°C)	RESIST (K Ω)
-40	100.950
-30	53.100
-20	29.121
-10	16.599
0	9.750
+10	5.970
+20	3.747
+25	3.000
+30	2.547
+40	1.598
+50	1.150
+60	0.746
+70	0.565
+80	0.377
+90	0.275
+100	0.204
+110	0.153
+125	0.102

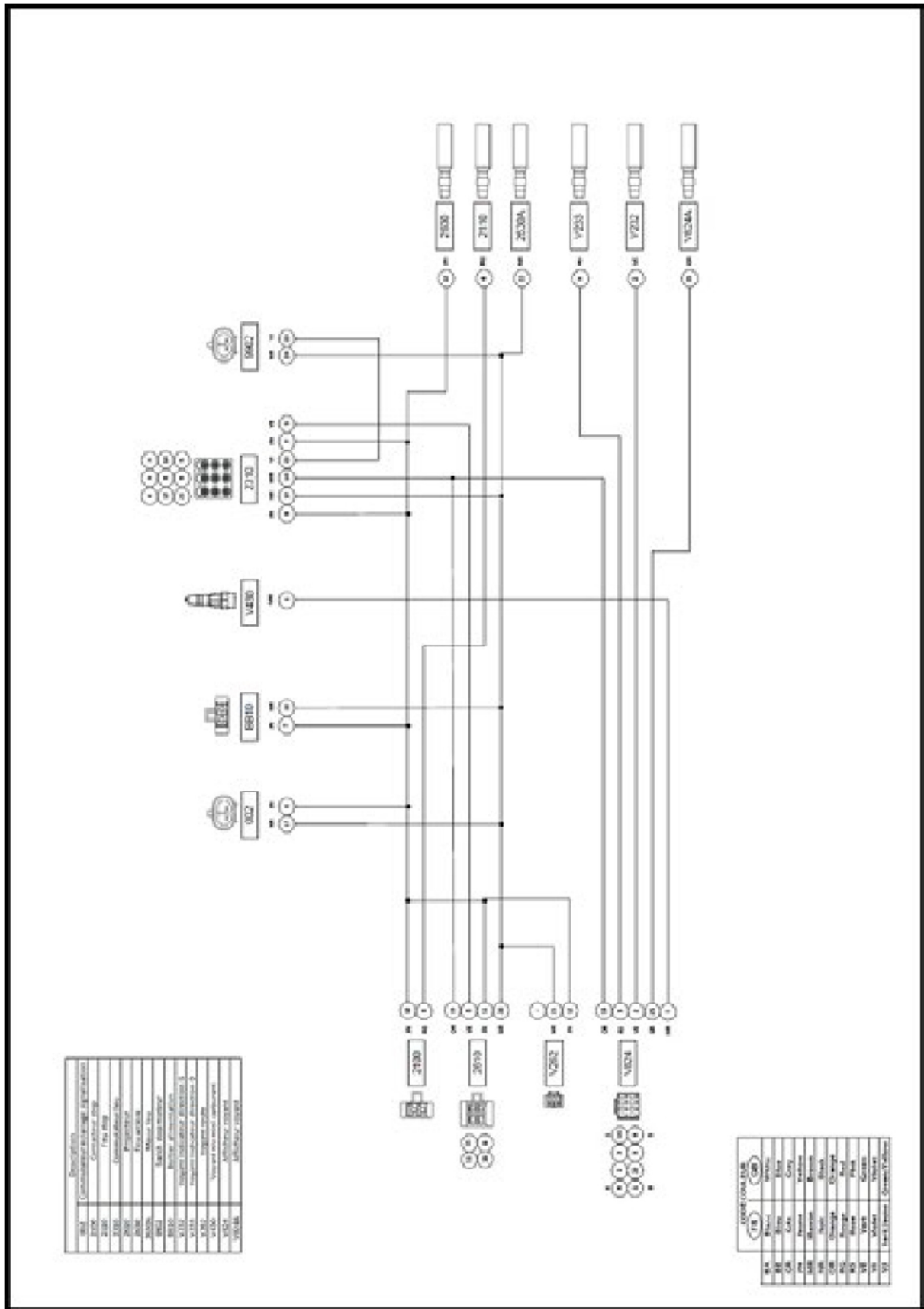
- Pick UP sensor resistance (RPM sensor): Red ~ Green  $100 \Omega \pm 20\%$  (at  $20^\circ\text{C}$ ).
- High voltage coil
- Primary coil  $0.75 \Omega \pm 10\%$  (at  $25 \pm 2.5^\circ\text{C}$ )





# WIRING DIAGRAM

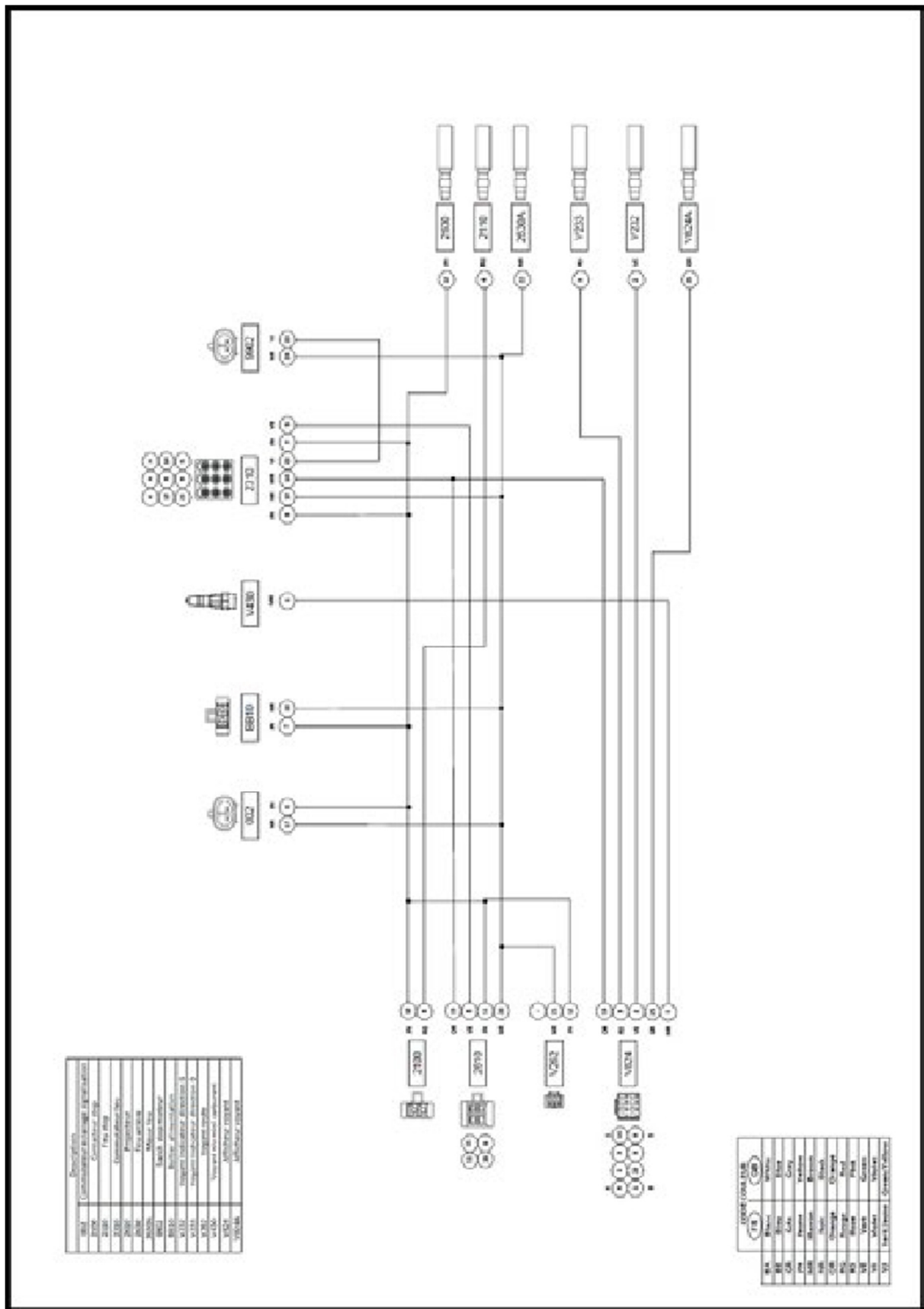
## ›) Standard lights harness





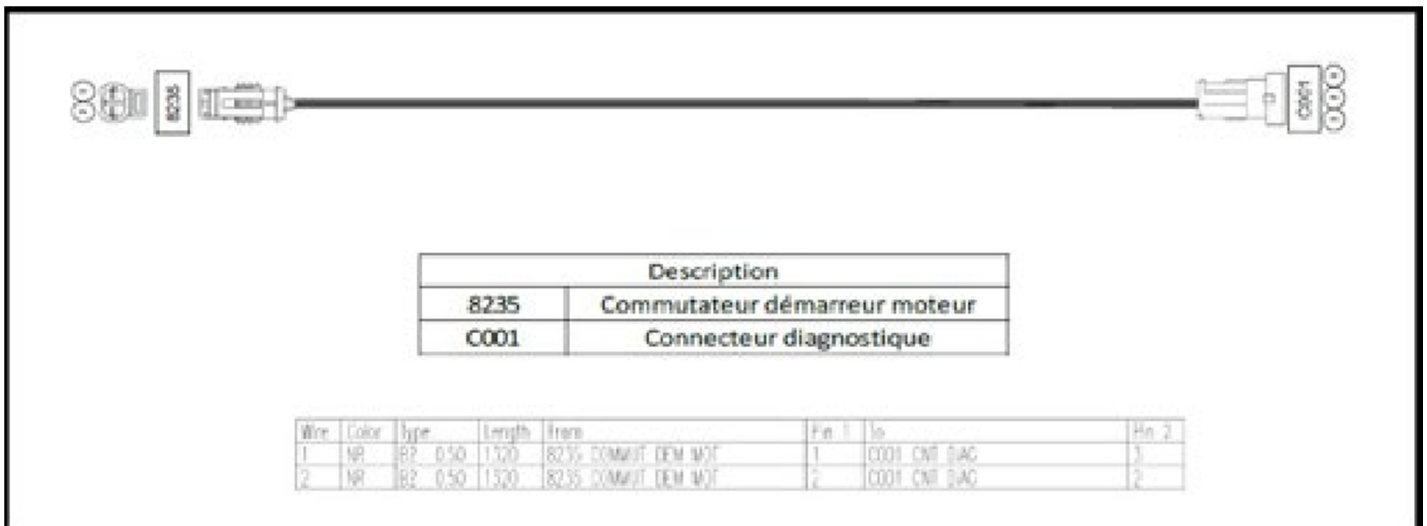
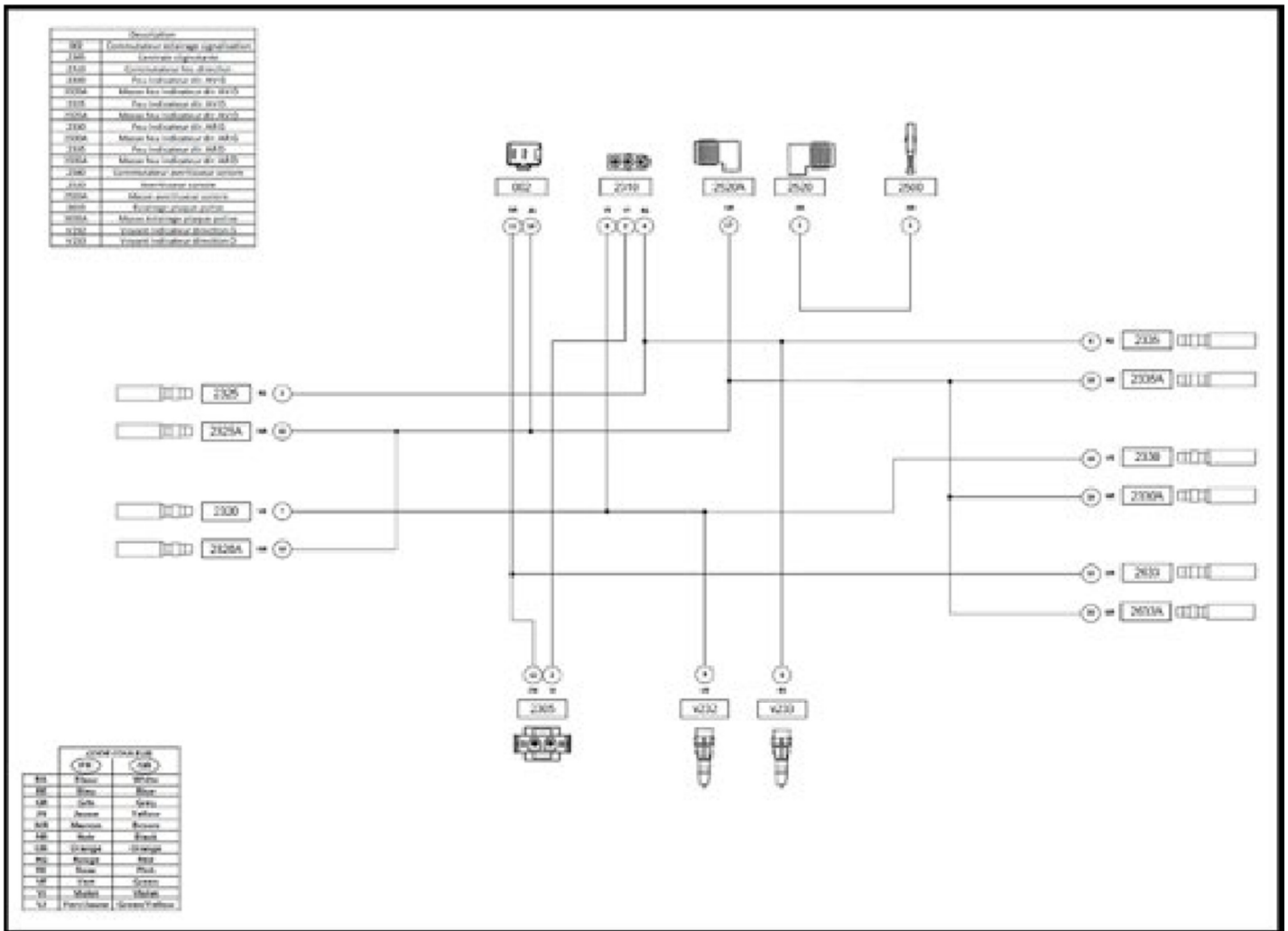
# WIRING DIAGRAM

## » Racing lights harness



# WIRING DIAGRAM

## » Accessories harness



# SHERCO

[WWW.SHERCO.COM](http://WWW.SHERCO.COM)

