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Assembly instructions

# TWIN-CYLINDER CONVERSION CHIMERA FOR LAMBRETTA



ENTIRELY DEVELOPED  
AND MADE IN ITALY

[www.stflambretta.com](http://www.stflambretta.com)

## Assembly instructions - TWIN-CYLINDER CONVERSION CHIMERA FOR LAMBRETTA

Thank you for choosing **Chimera twin cylinder conversion kit for Lambretta**.

Designed and built to meet the needs of the sportiest and most exuberant spirits, it offers: **modularity**, **high performance** and **customized** configuration.

The strengths of installing **Chimera twin-cylinder conversion kit** are:

- use of the original crankcase and all the original transmission components
- configuration versatility. Chimera allows you to choose the engine you want the most, based on your needs and performance research.

**Chimera twin cylinder conversion kit** can be installed on the following Lambretta models:  
**LI S1 S2 S3 - TV2 - TV3 - LIS - SX - DL.**

**Chimera twin-cylinder conversion kit** is available in the following versions:

- for small crankcase (125 150 175)
- for large crankcase (200 225 250)

### OPTIONAL

- STRAIGHT Chimera 2in1 exhaust with standard connection
- STRAIGHT Chimera 2in1 exhaust with round connection (ts1-Imola-Monza-Stratos226)
- Chimera 2in2 expansion pipes with standard connection
- Chimera 2in2 expansion pipes with round connection (ts1-Imola-Monza-Stratos226)

### PRE-ASSEMBLY: WHAT TO KNOW

**Chimera twin-cylinder conversion kit** has been sized taking into account that a rear hub from LI S3 - LIS - DL. Independent of the Lambretta model; this kit can therefore only be installed with the LI S3 - LIS - DL rear hub.

**Chimera twin-cylinder conversion kit** requires modifications to the crankcase in order to be installed correctly original engine, to the rear footrests, to the side pannels and to the rear footrest support.



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### WARNING

For the correct assembly of **Chimera twin-cylinder conversion kit**, please read carefully instructions and follow the various steps: Scooterthefero declines all responsibility in the event that assembly is not carried out according to the instructions given in this booklet or due to improper use of the product.

Considering the complexity of the system, test the product for a short distance and verify the correct tightening/functionality of all components.

In order to monitor properly the engine functionality, the use of temperature sensors is recommended on the heads of the 2 cylinders.

**Chimera twin-cylinder conversion kit** is an item for sporting use only, to be used on the track or indoors of private property.



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Figure 1

**COMPOSITION OF THE KIT:**

**A1 and A2.** Twin crankshaft chimera, with silver bearing

**B.** Shaft collar with blocking system

**C.** Casting aluminium crankcase

**D1.** Tailor made Ducati Energia Plug&Play wiring for twin cylinder

**D2.** Stator 12 poles 2 pick ups Ducati Energia

**D3.** CNC GP/DL flywheel zero balanced

**D4.** Cooling fan made of technical material

**D5.** Aluminum venturi cone

**D6 and D7.** Electronic CDI coils with Ducati variable advance Energia + spark plug wires + caps shielded candle

**D8.** Ducati voltage regulator Power

**E1 and E2.** High quality CNC cylinder heads cooling down

**F.** Cooling cap reinforced fiberglass plus kevlar

**G.** Shock absorber support rear

**H.** Rear wheel spacer CNC aviation

**I.** Engine pin complete with bushings and bushings offset

**L.** Stainless steel reel support bracket e regulator. Two versions: Lambretta LI S1 S2 and TV2 and



Lambretta LI S3 / LIS / SX / TV3 / DL



**M.** Rear footpeg support kit right side. Two versions: Lambretta LI S1 S2 and TV2 and



Lambretta LI S3 / LIS / SX / TV3 / DL



\* the hardware is pre-assembled, therefore it is recommended to tighten everything accurately after assembly. Use where appropriate strong threadlocker.



## Assembly instructions - TWIN-CYLINDER CONVERSION CHIMERA FOR LAMBRETTA



N. Twin intake manifold system made for all barrels on the market. Types needed to be specified before confirming the order.



Figure 2

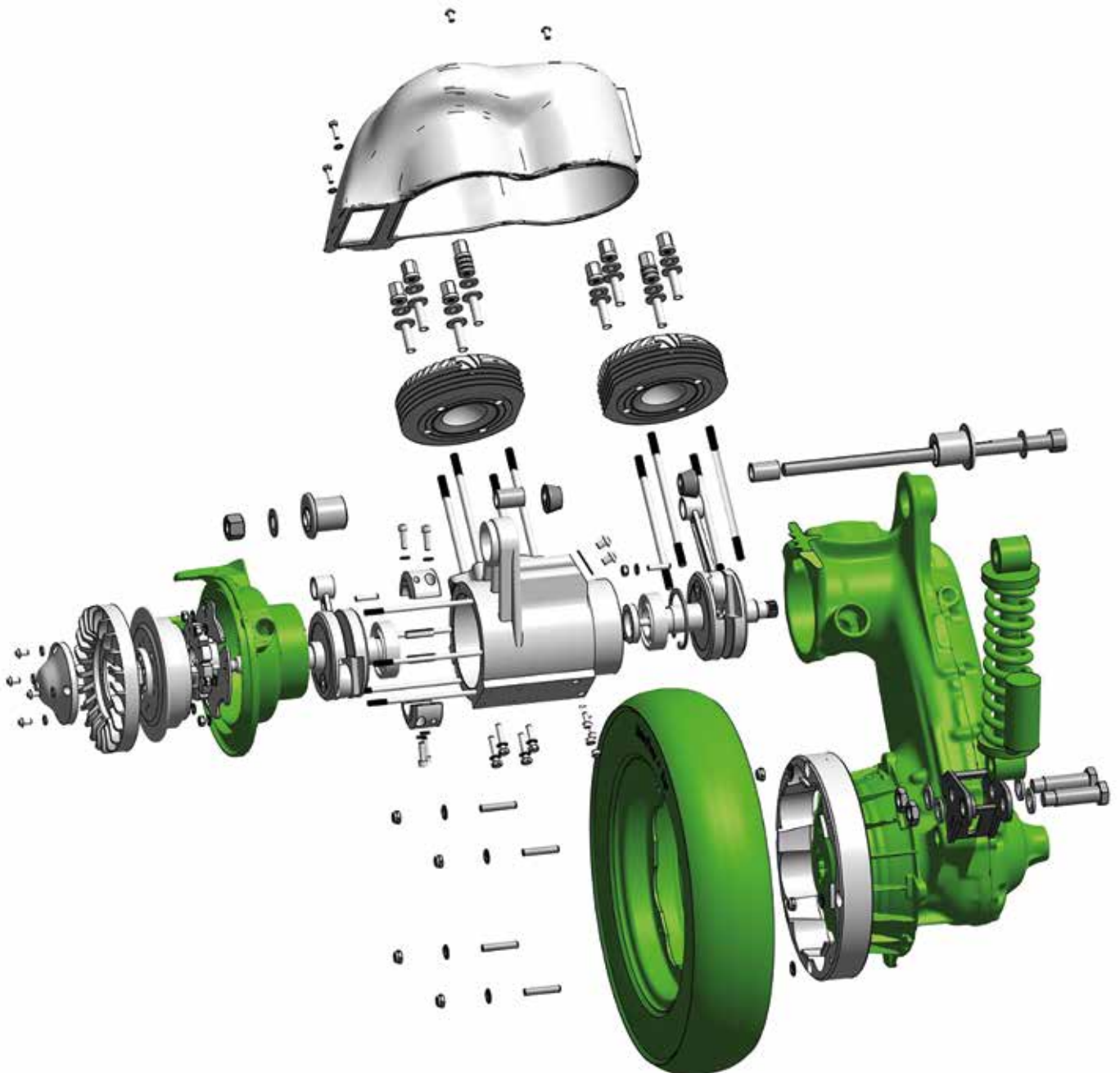
### COMPOSITION OF THE KIT:

- |  |  |   |
|--|--|---|
| 1. Grinding wheel  | 7. Set (8 Studs per cylinder, 8 self-centering brass bushings for cylinder head, 8 Head nuts in brass) | 11. Flywheel flange gaskets                   |
| 2. Cutting disc  | 8. Wheel spacer fixing set CNC   | 12. Flywheel cable outlet plates              |
| 3. Cutting and drilling jig  | 9. Set of 4 screws and 4 fixing washers ignition venturi cone  | 13. Throttle cable splitter                   |
| 4A and 4B. Cylinder cutting template (right and left)                | 10*. Set (2 High Speed Bearings, 1 double seal oil seal in Viton, 2 Seegers)                           | 14. Fuel pipe splitter                        |
| 5. Set (5 studs and special screws seal for chimera crankcase case)  |  | 15. Pair of alignment templates silent blocks |
| 6. Set (3 Studs for mounting - disassembly of the chimera crankcase) |  |   |

\* Attention! The photos in the manual are for demonstration purposes. The bearing supplied in the Chimera kit is roller bearing.

### VIEW 1

The original components are highlighted in green



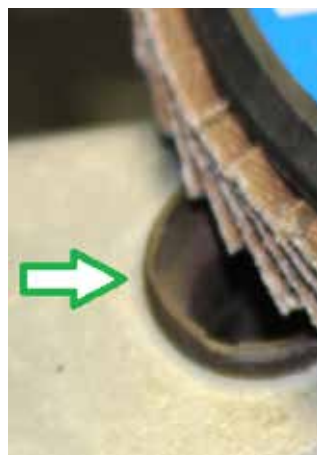


### STEP 1: ENGINE CRANKCASE MODIFICATION

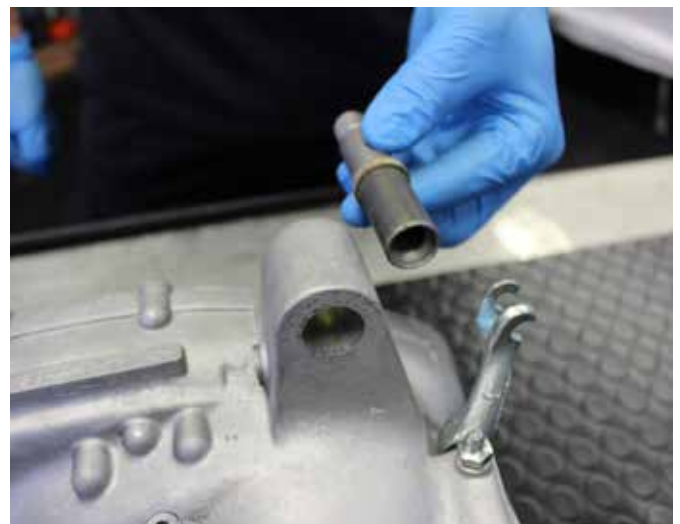
**01** Remove the shock absorber support pin rear placed on the engine crankcase.



Use the grinding disc (Fig.2 - 1) grind the edge of the pin to allow proper ejection of the pin.



The pin is fitted with interference, therefore use an extraction press or heat the area of the crankcase to expand the aluminum and then extract with a punch.

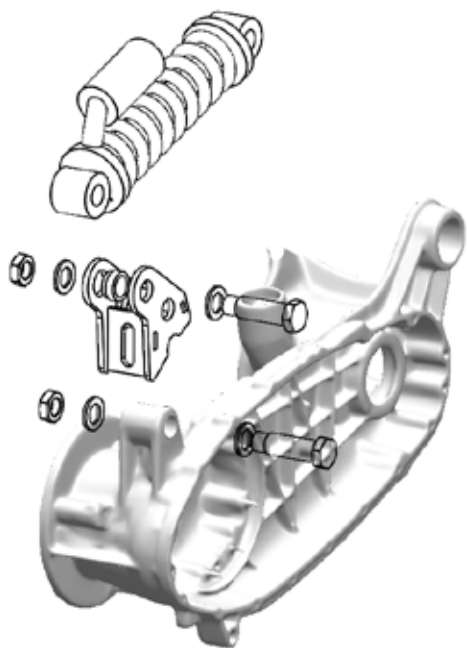
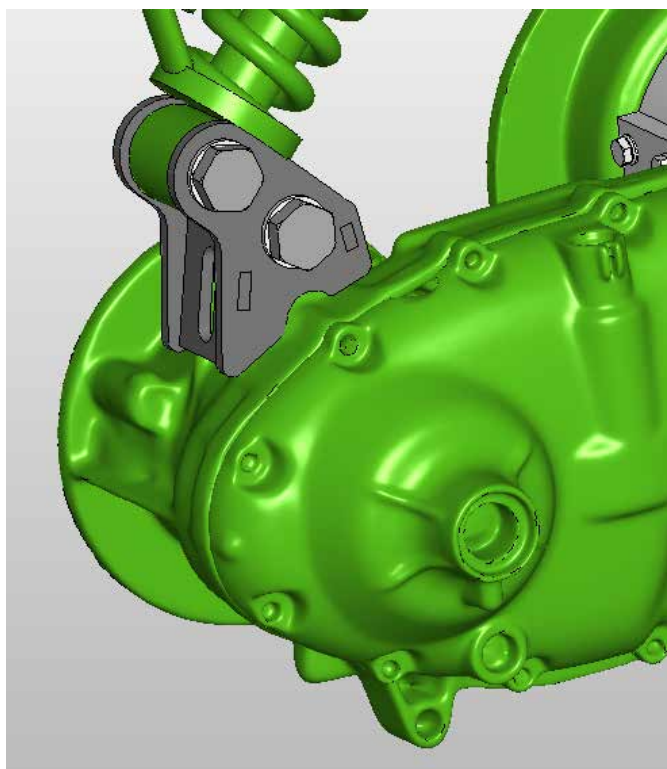




### 02 Rear shock absorber support installation.

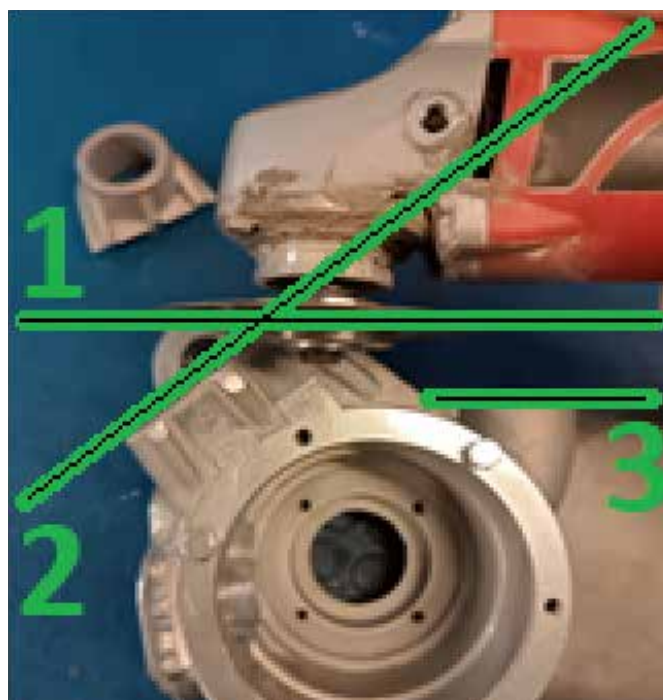
After removing the original rear shock absorber, proceed installing the shock absorber support (Fig.1 - G).

Use washers and shims for the correct alignment of the shock absorber towards the support.



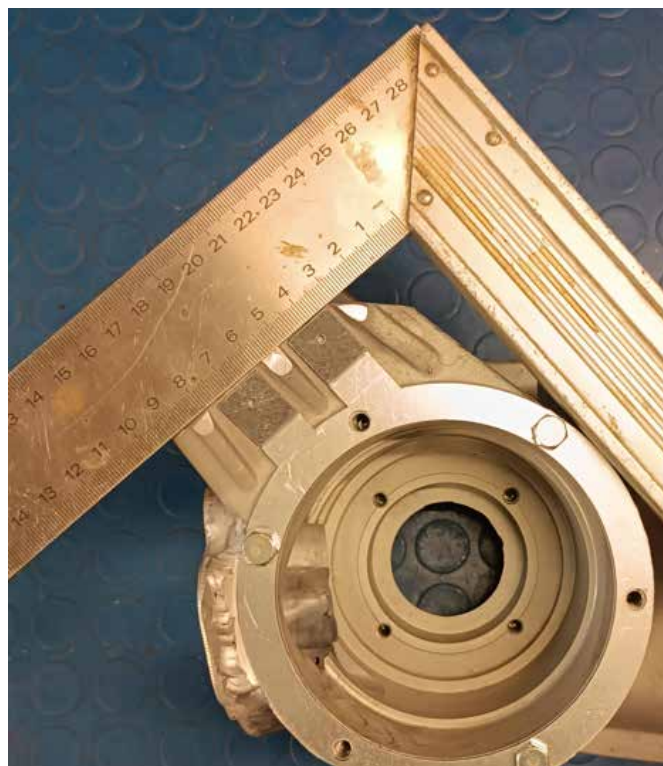
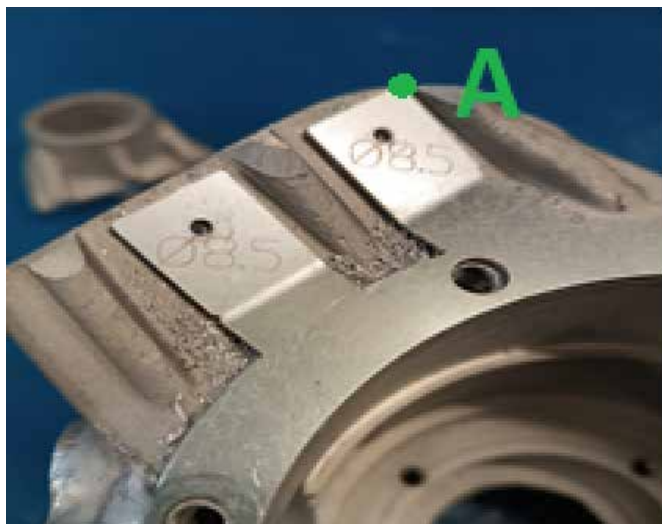
### 03 Cutting of the crankcase support and motor limit switch.

- Install the casing cutting and drilling template (Fig.2 - 3).
- Fix the template on the engine crankcase using no. 6 screws M6 (screws not supplied).
- Using the cutting disc (Fig.2 - 2), proceed to cut the silent-block support following the axes of denominations «1» and «2».



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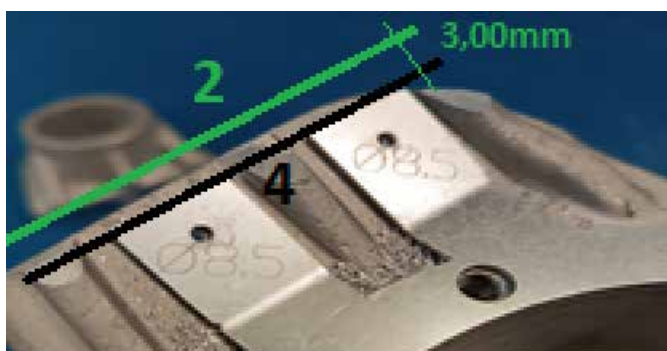
**04** The cut «1» must be performed by taking as reference the extreme point «A» of the cutting template and must be parallel to the plane «3» of the limit switch motor.



Cutout «3» of the motor limit switch is optional and avoids to interfere with a small portion of the fender rear. Alternately it will be enough to bend lightly the rear fender next to motor limit switch. Possibly the cut will have a depth of 17,00mm.



The cut «2» must be parallel (2 // 4) to the template cutting edge and with an offset of 3.00 mm from the end of the template and perpendicular to the plane of the support that is being cut.

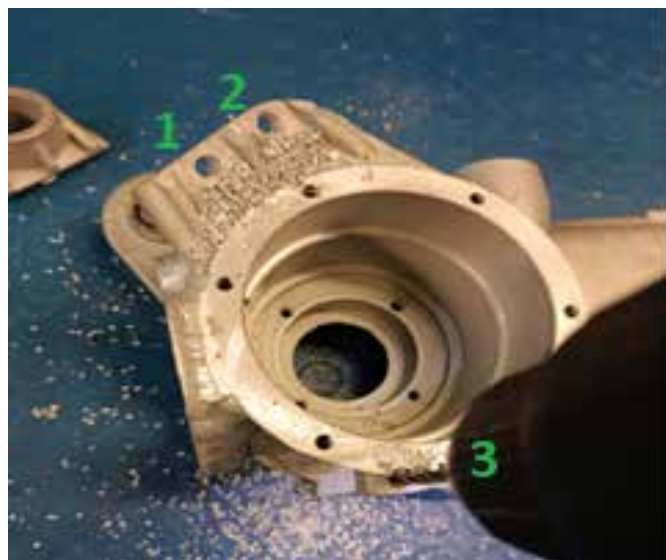




**04 Drilling for additional Chimera fixings**

Proceed with drilling as indicated in the centering holes present on the template (Fig.2 - 2).

The holes «1» and «2» must be able to house an M8 screw. Proceed to final drilling with  $\varnothing 8.5$ mm. The hole «3» must be able to house an M6 screw. Proceed with drilling final with  $\varnothing 6,5$ mm.



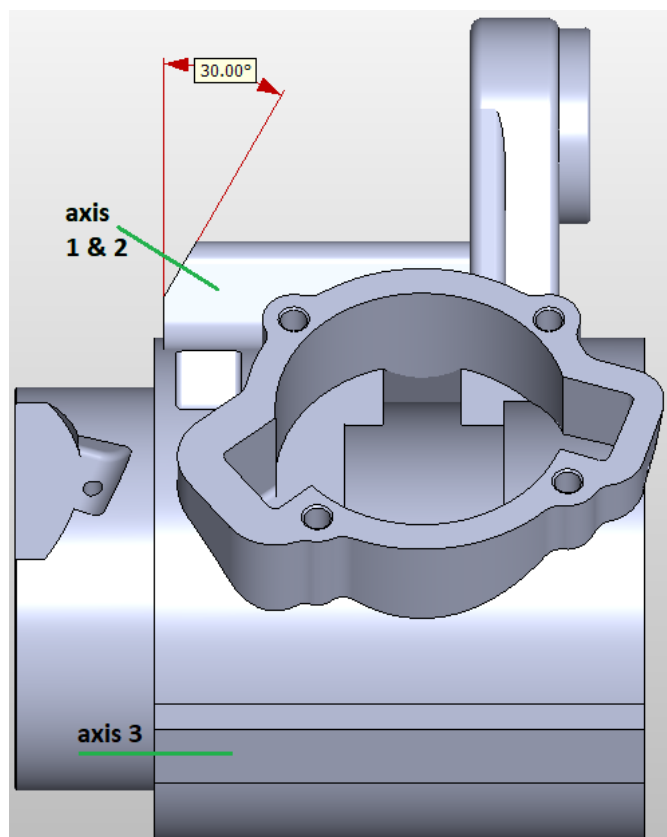
**ADVISE:**

Start the drilling process with reduced diameter (2,5- 3,00mm) in order to identify the centering and improve the operation.



### IMPORTANT:

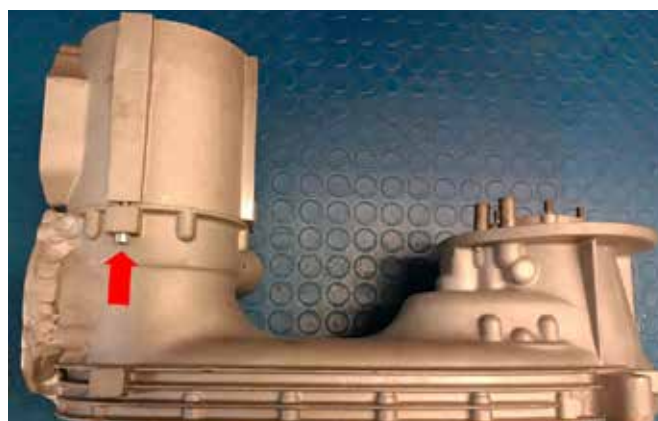
The drilling axis of holes «1» and «2» must be perpendicular to the crankcase plane and consequently on the template plane. The axis is inclined by 30° with respect to the mag housing support surface.



Use the 2 M8X30 screws from the set (Fig.2 - 5) and fix the Chimera casting block (Fig.1 - C) to the crankcase at the top.



Use the M6X35 Allen key from the set (Fig.2 - V), fix the Chimera casting block (Fig.1 - C) to the crankcase at the bottom.



**THE ENGINE CRANKCASE IS NOW CORRECTLY EDITED TO START THE ASSEMBLY OF CHIMERA**

### STEP 2: CHECK CHIMERA ASSEMBLY AND ENGINE COVER

Check the assembly of Chimera crankcase block (Fig.1-C) with the crankcase post-modification engine it is a very important phase in order to continue with the next stages.



### IMPORTANT:

Having ensured the correct casting block-crankcase assembly, go and remove the screws, Allen key and fusion block. Check and make sure all holes and threads of the original engine casing and Chimera casting block (Fig.1 - C) are in good condition. Such control is necessary to prevent possible problems during assembly.



### STEP 3: BARREL MILLING

Mill one side of each Barrel to couple and install the barrel.

To mill properly the barrels, use the cutting templates (Fig.2 - 4a and 4b) which are identified by right (identified with RH) and left cylinder (identified LH).

Use the set studs (Fig.2 - 7) to secure the templates on the cylinders by matching the holes of the template with the holes of the studs on the cylinders.



Use the grinding disc to mill (Fig.2 - 1) the side of the cylinder making full length passes, reaching up to the base of the template.



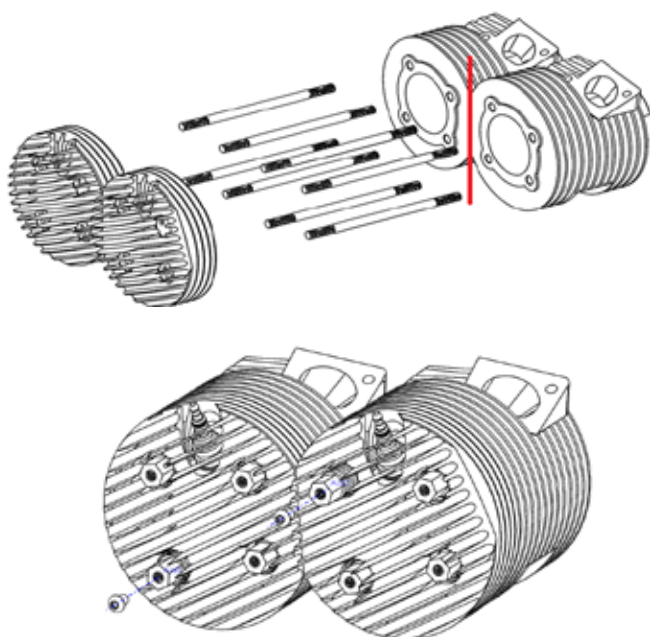


### IMPORTANT:

Before milling check that both barrel and grinding grinding disc to mill fit properly in the crankcase and Chimera. Check that the grinding template are correctly positioned and that the cutter planes will be symmetrical each other once the cylinders are seated in the engine case.

The heads are equipped with self-centering brass bushings (Fig.2 - set 7); it is recommended to widen to  $\varnothing 10,00\text{mm}$  for a depth of 15mm the holes of the cylinder head side studs.

The self-centering bushings will be inserted inside these holes to ensure perfect concentricity between head and cylinder.



### STEP 4: CRANKSHAFT ASSEMBLY A1

Install in the original engine crankcase (sprocket side) the standard components (not supplied in the Chimera kit):

- bearing 6305 (recommended with tolerance C3),
- circular gasket
- Viton oil seal (original seal oil plate).



Fix with the 4 screws (not supplied in the Chimera kit) with tightening torque 10-12 Nm.

Lubricate the shaft on the bearing housing and seat of the oil seal plate.

Insert the crankshaft (Fig.1- A1) on the sprocket side as we proceed with a original crankshaft.





### ADVICE:

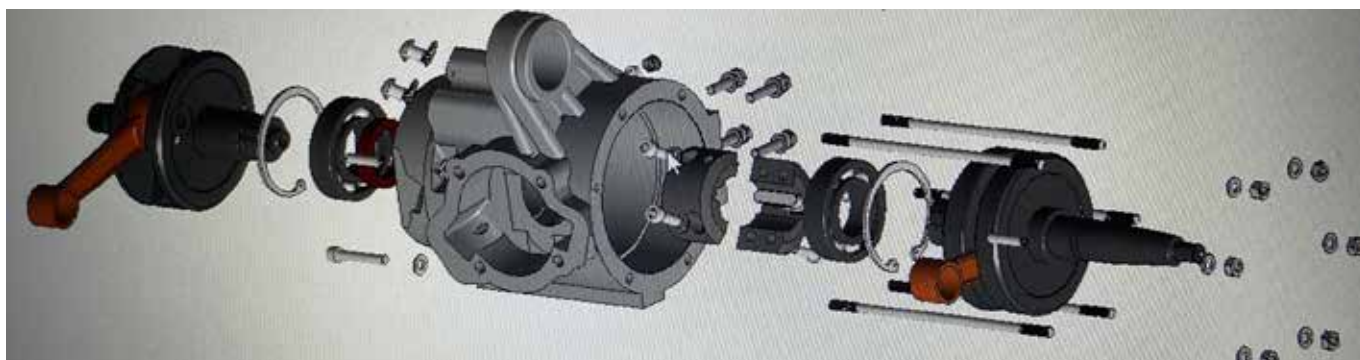
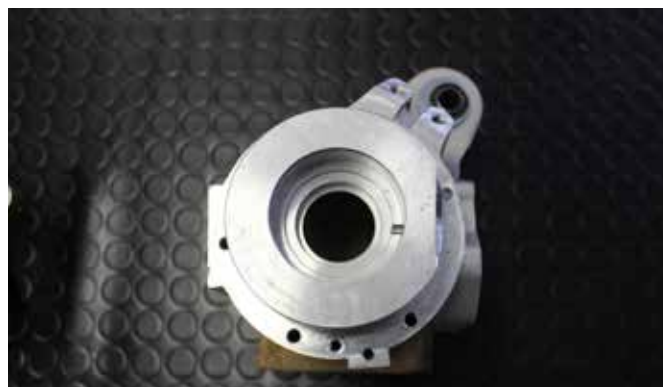
- To ensure correctly crankshaft assembly engine in place, put the crankshaft in the freezer (2 hours before assembly). In this way the clearance between shaft and bearing will increase by reducing efforts during matching.
- To insert the shaft without damaging the balance, we recommend to pull the shaft outwards (sprocket side) using an extractor system and the screw M8 x 1 sprocket damper as in the photo.



### STEP 5: CHIMERA FUSION BLOCK ASSEMBLY

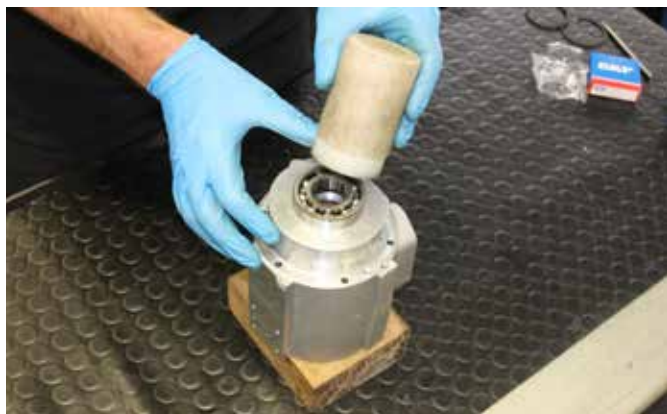


Insert the double seal oil seal from the set (Fig.2 - 10) in the dedicated seat of the casting block Chimera.

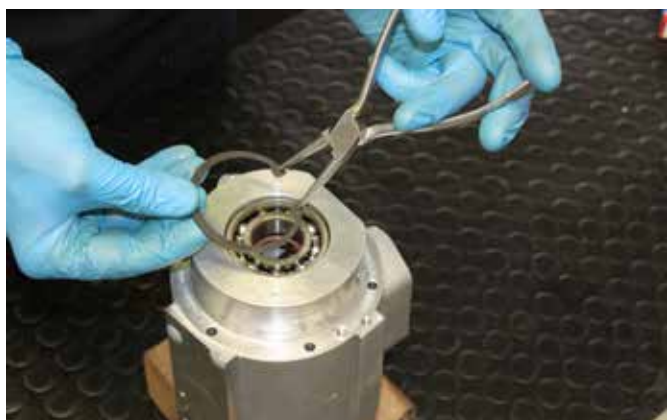


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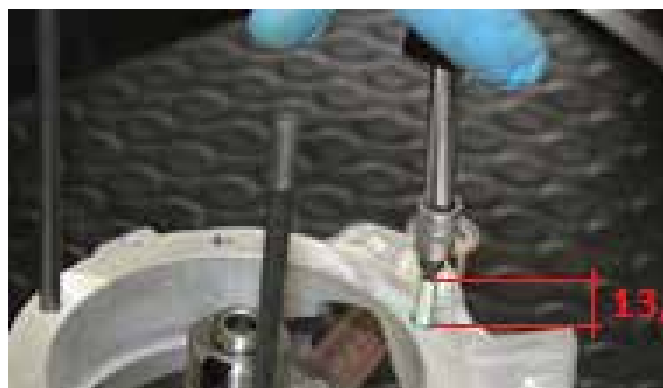
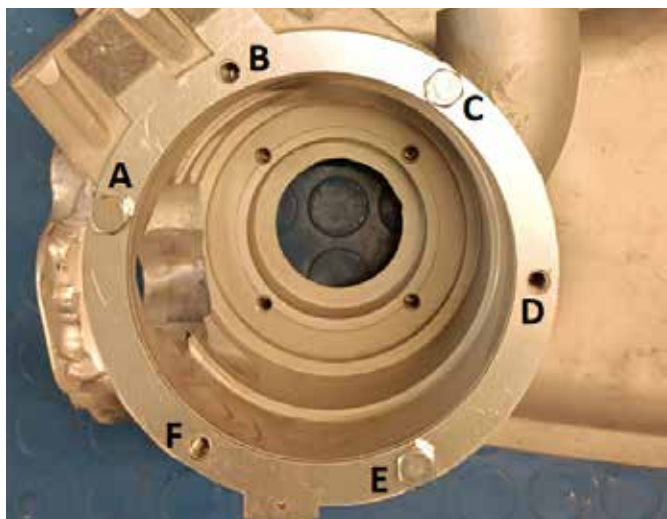
Insert 1 roller bearing in C3 present in the set (Fig.2 -10) in the sprocket side seat of Chimera casting block.



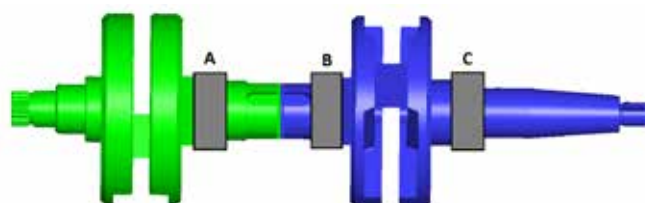
Insert the seeger present in the set (Fig.2 - 10) in the dedicated groove of Chimera fusion block.



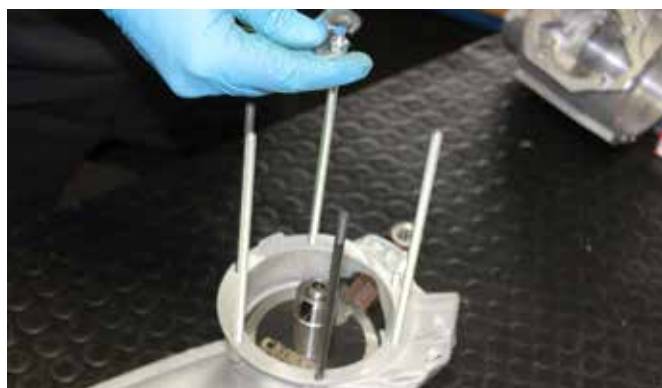
Insert the M6x25 grain screw present in the set (Fig.2 - 5) in the position «A» using Loctite. The grain part that emerges must have a height of 13.00 mm.



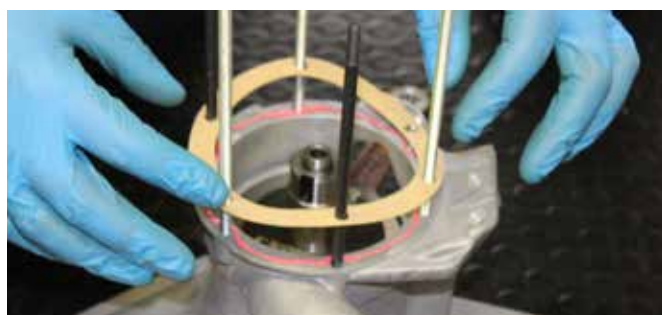
Heating and insert inner roller bearing "A" on crank until the specific shoulder diameter.



Enter no. 2 M6x160 studs present in the set (Fig.2 - 5) in positions «C» and «E» and nr. 3 threaded rods M6x190 present in the set (Fig.2 - 6) in the positions «B» «D» «F».



Insert the flange gasket (Fig.2 - 11). The use of gasket sealant is recommended to ensure the maximum hold.

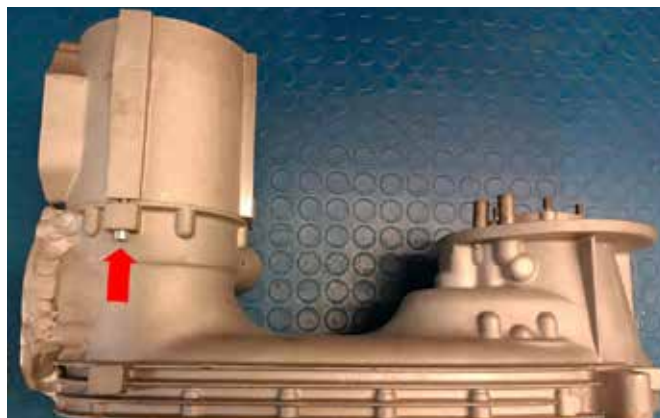




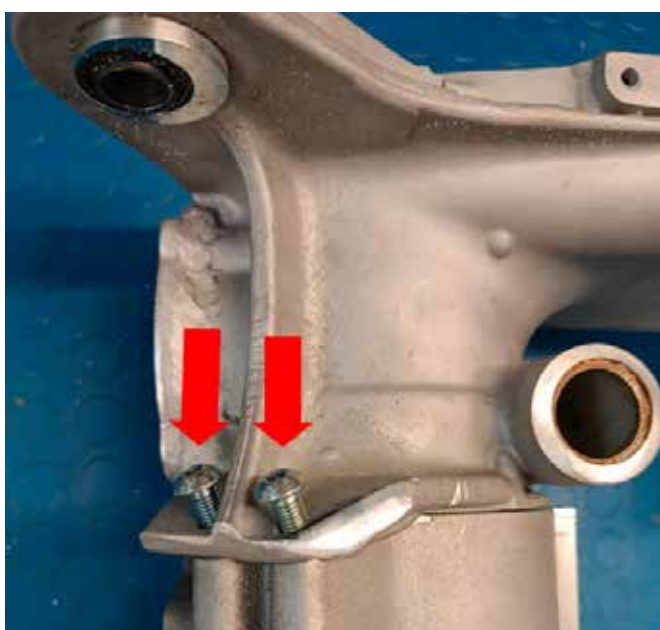
## Assembly instructions - TWIN-CYLINDER CONVERSION CHIMERA FOR LAMBRETTA

Lubricate the roller bearing seat, the oil seal and the relative shaft diameter to reduce friction during assembly.

Insert the Chimera casting block (Fig.1 - C) in the crankcase original engine.



Screw the nuts and washers onto the M6X190 threaded rods previously installed in positions «B» «D» «F», the M6 nuts and relative large washers present in the set (Fig.2 - 6). Tighten the nuts to bring it into position definitive conversion Chimera.



Fit Chimera until final position, making sure that the shaft does not have rotation impediments.

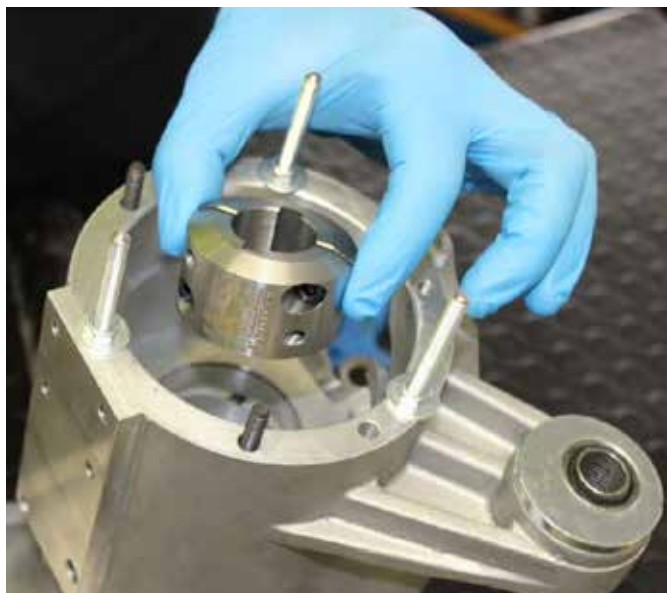
Tighten the 4 screws on the shaft collar with spanners (Fig.1 - B) bringing the two parts of the same in full contact with each other.

Set, without tightening, the M8X30 screws and washers e M6X35 of the set (Fig.2 - 5) in the same positions views for checking the chimera and casing assembly engine (see PHASE 2).



## Assembly instructions - TWIN-CYLINDER CONVERSION CHIMERA FOR LAMBRETTA

Loosen each shaft collar screw with wrenches by making 3 full rounds. This operation allows you to insert the collar on the shaft and have a the proper spacing between the parties.



Given the high accuracy of this coupling lightly lubricate the key and help yourself in insertion with a punch.



Insert the collar on the crankshaft placed inside of the Chimera block.

**IMPORTANT:**

The beveled side of the collar should face towards you during installation.



Position the collar in order to allows you to insert the keys. With the Allen key, inserted into one screw of the collar, hold it in place. Insert the keys in their seats up to the stop (present on the tree).





## Assembly instructions - TWIN-CYLINDER CONVERSION CHIMERA FOR LAMBRETTA

### STEP 6: ASSEMBLING CRANKSHAFT A2



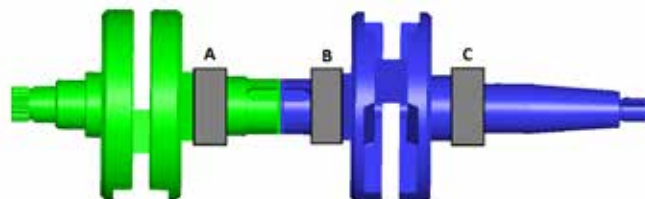
Insert 1 roller bearing in C3 present in the set (Fig.2 -10) in the seat dedicated on chimera block of the Chimera block.



Insert the seeger present in the set (Fig.2 - 10) in the groove of the Chimera block.



Lubricate the internal seat of the roller bearing and its diameter on the crankshaft (Fig.1 - A2). Loosen the 3 M6 nuts previously screwed on threaded rods to allow the 2 shafts to define their natural position during their tightening. Heating and insert inner roller bearing "B" on crank until the specific shoulder diameter.



Insert the crankshaft (Fig.1 - A2) in the Chimera block, remembering to position the crankshaft (Fig.1 - A2) at 180° with respect to the motor shaft (Fig.1 - A1).



## Assembly instructions - TWIN-CYLINDER CONVERSION CHIMERA FOR LAMBRETTA

### IMPORTANT:

Join the 2 crankshaft together by tightening the Allen screw M8 already installed on crankshaft «A1». Tighten the screw to a torque of 22-24Nm.



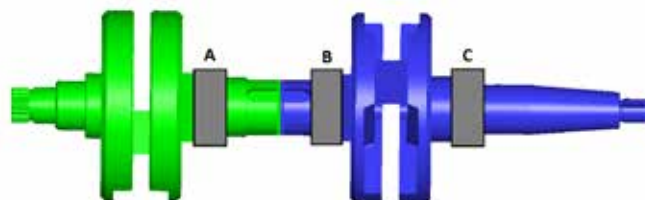
Remove the 3 threaded rods that were in the screw kit (Fig.2 - 6) and replace them with the 3 studs present in the screw kit (Fig.2 - 5).



Install the M6x25 dowel present in the grain screw kit (Fig.2 - 5) in position «F». The part of the grain that comes out must have a height of 13 mm.



Heating and insert inner roller bearing "C" on crank until the specific shoulder diameter.





### IMPORTANT:

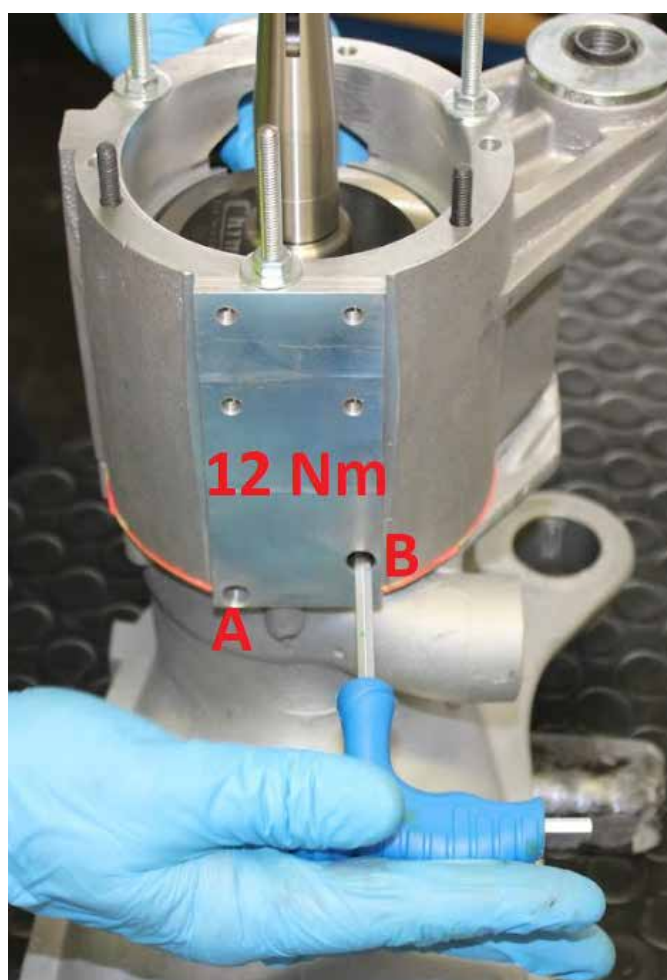
#### Tighten crankshaft collar

Using the allen key previously inserted, tighten the screws by 1.5 turns in the positions A and B. Rotate the crankshaft 180° and repeat the tightening by 1.5 turns at the positions of A and B.

Complete the tightening of the screws at 12 Nm by alternately tightening the screws in the positions A and B.

### WARNING:

Ensure that you have tightened all 4 screw in the same way (torque and number of loops).



### ADVISE:

Fix the caps with silicone paste.

Insert the screws with sealing o-rings (*Fig.2 - 5*) in the holes of the Chimera crankcase «A» and «B». These 2 screws are real sealing plugs. To keep the hole clean, insert the 2 plugs hole cover of the set (*Fig.2 - 5*).

### STEP 7: ELECTRONIC IGNITION ASSEMBLY

#### 01 Flywheel installation

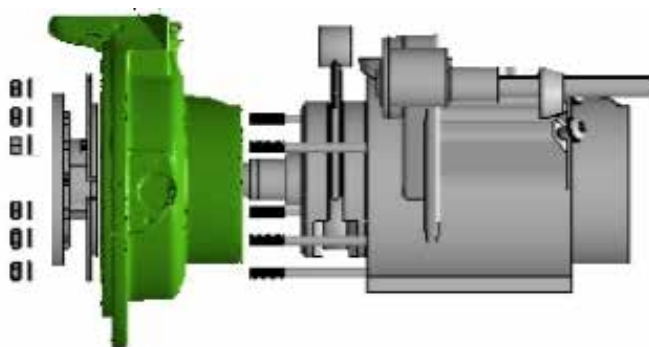
Insert the flywheel flange gasket (Fig.2 - 11) on the Chimera block.

It is recommended to use gasket sealant to ensure maximum sealing.

Install the mag housing nut complete with all elements: outer oil seal - oil seal spacer - roller bearing NU2205 - oil seal - seeger (no supplied in the kit).

#### ADVISE:

Prepare the mag housing before proceeding with the immediate installation.



Install the Ducati Energia 12-pole stator plate by positioning it in the center of the buttonhole.



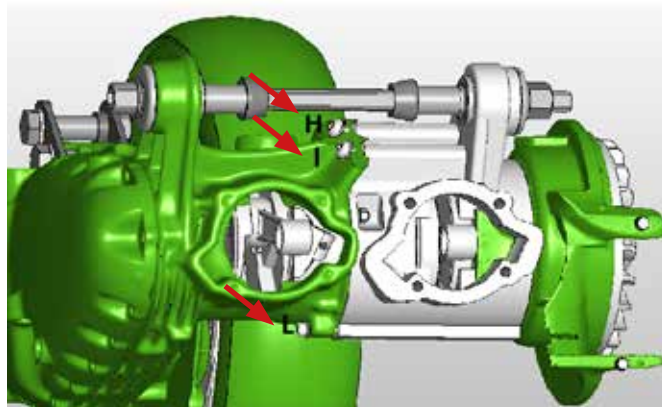
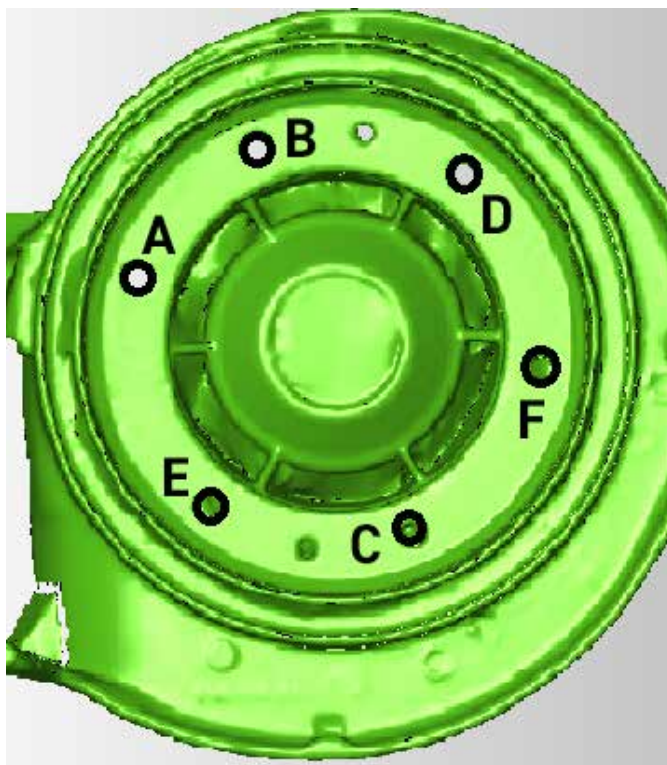
Install the 2 flywheel cable outlet plates (Fig.2 - 12).



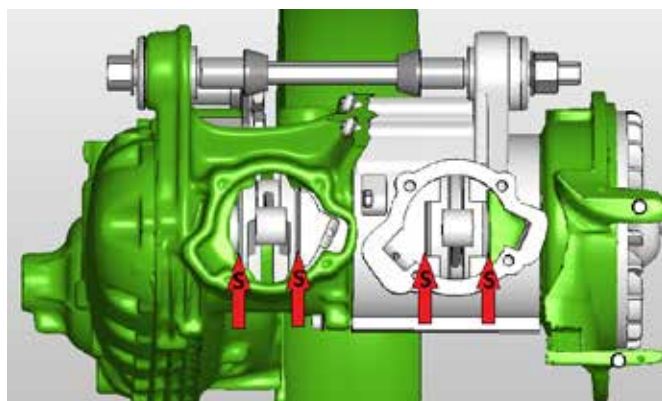


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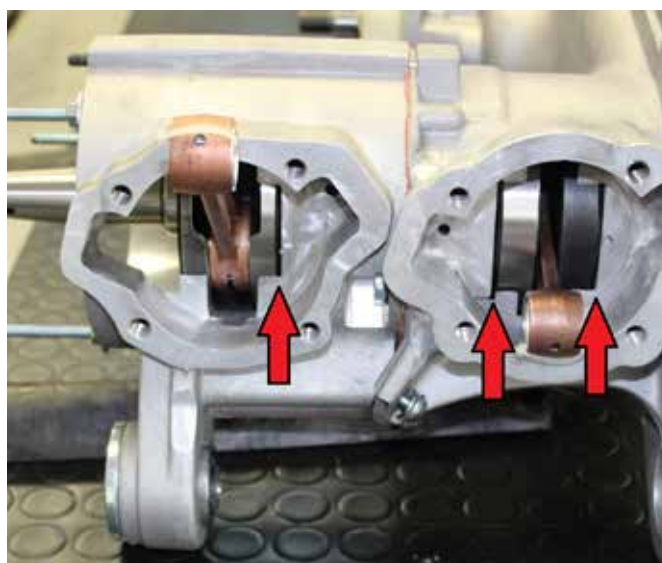
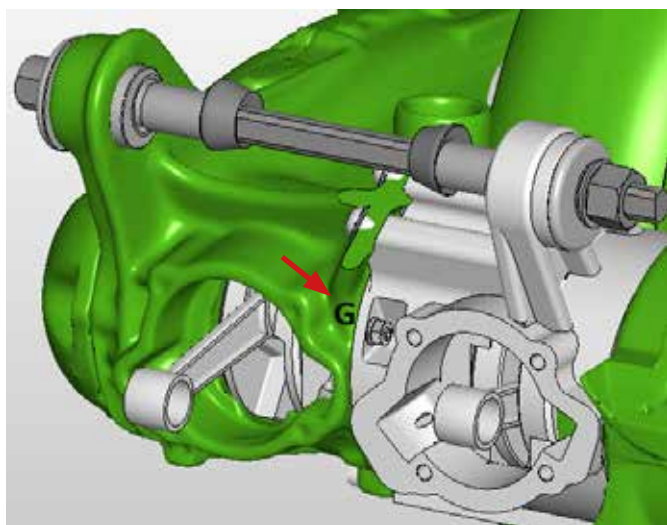
Proceed to tighten all the studs to 12Nm according to the sequence «A» «D» «F» «C» «E» «B» using the nuts and washers present in the kit (Fig.2 - 5).



**IMPORTANT:** Verify that shafts rotate freely and that there is minimal space between crankshafts and carter of «S» of 0,25mm.



Proceed to tighten the nut «G» and the 12Nm screw «L»; 20Nm of the screws «H» and «I» using the nuts e washers present in the kit (Fig.2 - 5).





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### 02 Ducati Energia ignition timing

Install the key (not supplied in the kit), the flywheel (Fig. 1-D), the spring washer and the flywheel nut (no supplied in the kit).

The flywheel is equipped with two graduated scales opposite each other them of 180° to allow to read the phase of the engine for both pickups.



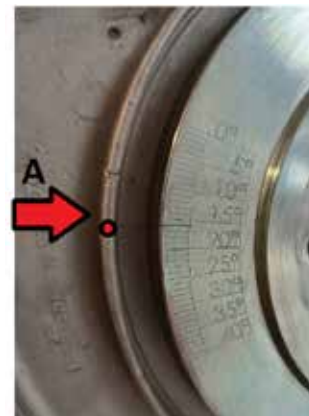
Take a barrel as a reference and position the piston at top dead centre.  
Use a marker pen to mark on area «A» the desired timing.

### IMPORTANT:

The original Lambretta adopt 20/21° in advance. The more timing degrees are elevated, the more position increases temperatures by exercise at the expense of yield.

It is recommended to set initially a timing relatively low around 15-16°.

Next, based to needs and temperatures of work, evaluate whether to increase or not the timing.



Install the cooling fan (Fig.1 - D4)

Install the Venturi (Fig.1 - D5) using the special screws and washers present in the set (Fig.2 - 9).



## Assembly instructions - TWIN-CYLINDER CONVERSION CHIMERA FOR LAMBRETTA

### 03 Fixing the CDI coils (Fig.1 - D6 and D7) and voltage regulator (Fig.1 - D8)

Assembly on Lambretta LI S1 and S2 models:

- Take the CDI Coils (Fig.1-D6 and D7) and Voltage Regulator (Fig.1-D8)
- Install them on the special bracket supplied (Fig.1- L).

See photo below.



Assembly on Lambretta models

LI S3 - TV3 - LIS - SX - DL:

- Take the CDI Coils (Fig.1 - D6 and D7) e Voltage regulator (Fig.1 - D8)
- Install them on the special bracket supplied (Fig.1 - N).

See photo alongside



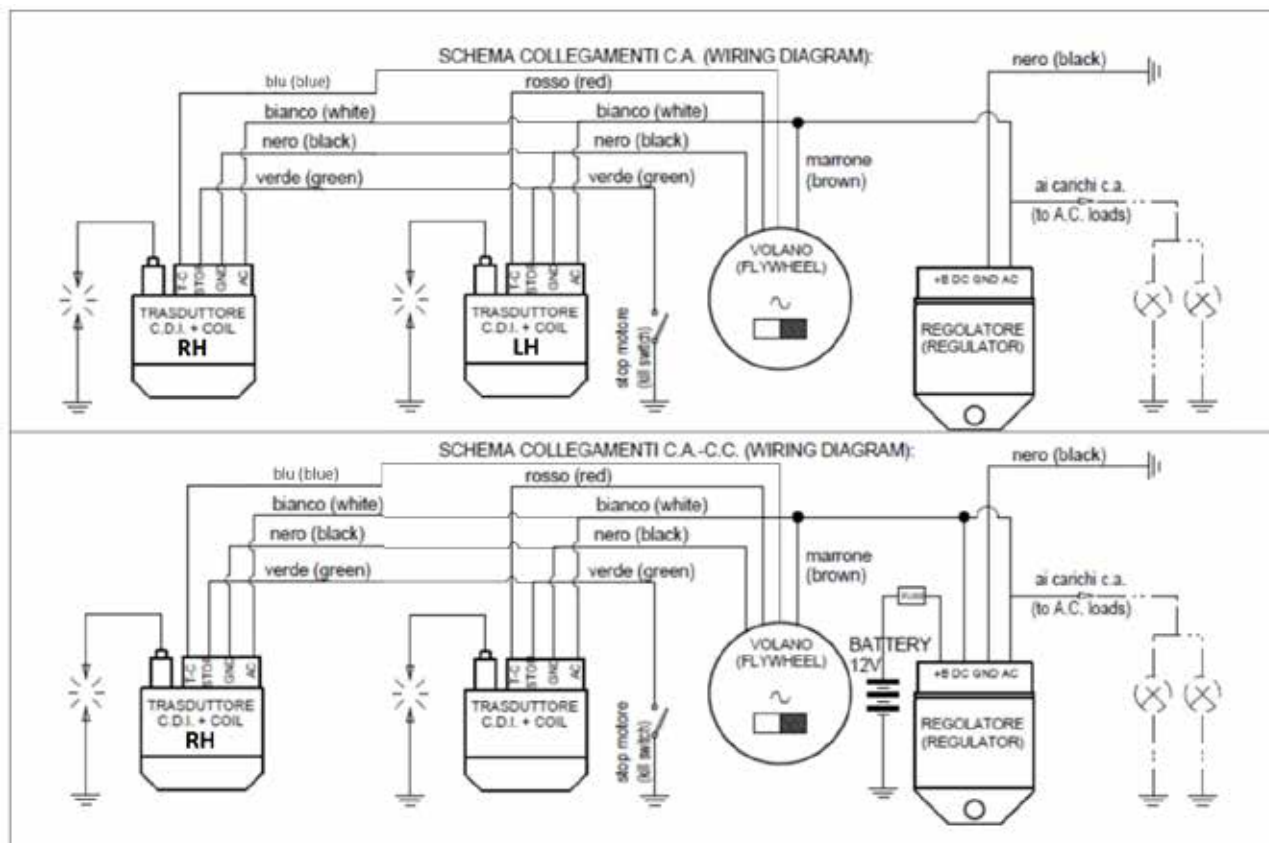
### 04 Electronic ignition connection: electrical system with and without battery

Proceed with the connection of the PLUG&PLAY system (Fig.1 - D1) and with the connection of all the cables. Remember that the shortest CDI coil harness always refers to the left engine coil.

**INFORMATION:** there are 2 pick-ups on the stator; a cable is connected to each of them.

The left cylinder pickup has a RED wire and will go to the left cylinder CDI coil.

The right hand cylinder pickup will have a BLUE wire and will run to the right hand cylinder CDI coil.



## Assembly instructions - TWIN-CYLINDER CONVERSION CHIMERA FOR LAMBRETTA

### STEP 8: REAR RIGHT FOOTPEG SUPPORT ASSEMBLY

#### Assembly on Lambretta LI S1 and S2 models:

- Remove the original support
- Install the footrest support supplied in the kit (Fig.1 - M).



#### Assembly on Lambretta LI S3 - TV3 - LIS - SX - DL:

- Remove the original support
- Use the disc (Fig.2 - 2) to cut a portion of 55mm (see photo below). This operation results optimal for not interfering with the register holder of the engine and is reversible.

Thanks to the reference hole higher, it will be possible to re-weld the cut element and thus restore the original support.



Install the footrest support supplied in the kit (Fig.1 - O).

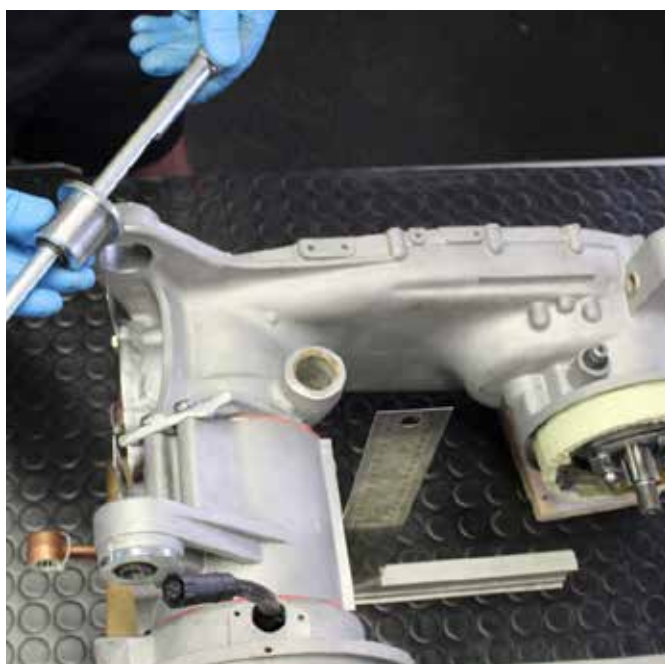




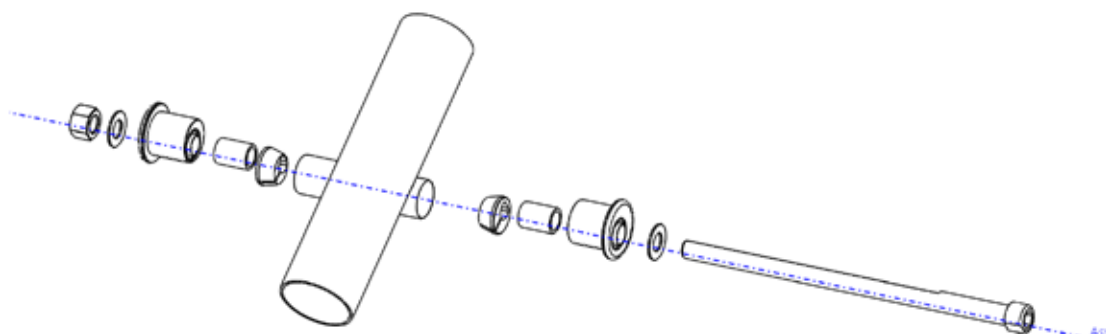
## Assembly instructions - TWIN-CYLINDER CONVERSION CHIMERA FOR LAMBRETTA

### STEP 9: ENGINE SILENT-BLOCK ASSEMBLY

- Take the silent-block fixing templates supplied in the kits (Fig.2 - 15)
- Fix the templates on the cylinder stud holes as pictured below.

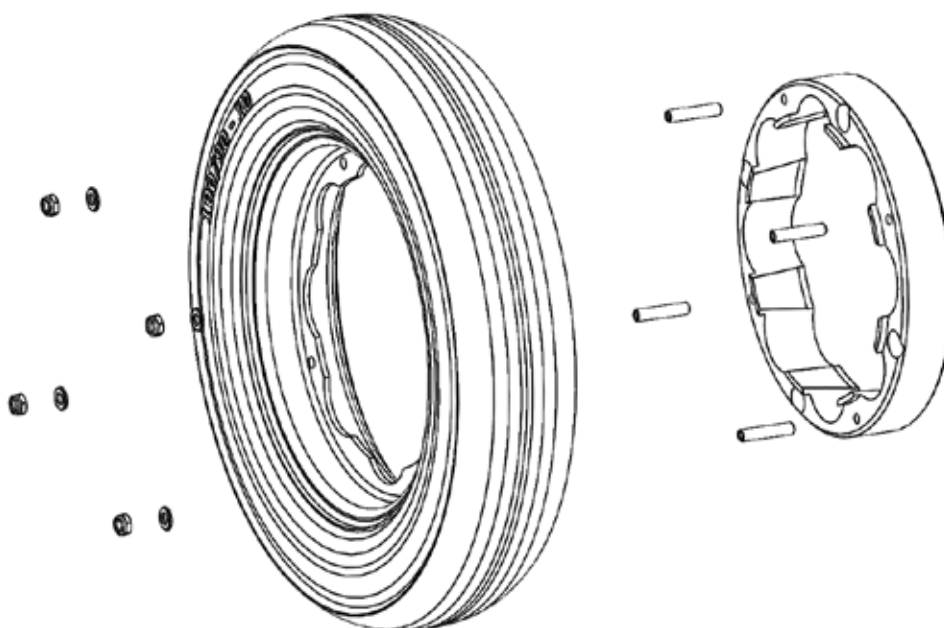
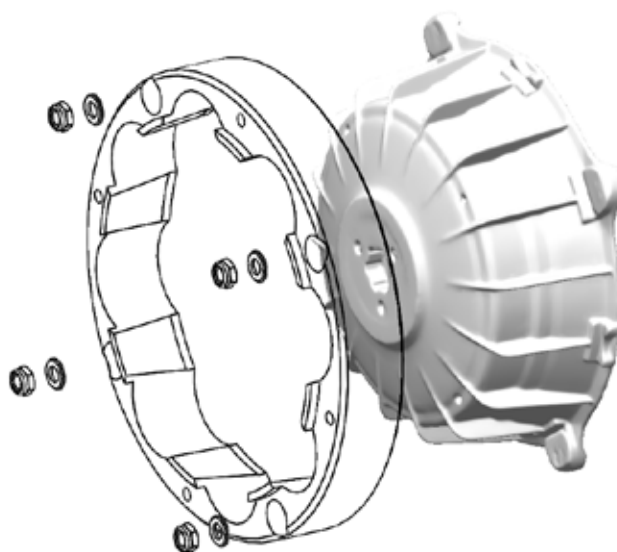


- Take the pin engine (Fig.1 - 1) with the offset silent block
- Lubricate the silent block
- Orient the silent block with the hole offset towards the front of the engine
- Insert the engine pin and rotate the silent block to keep the same distance between pin and fixing templates. In this way you will get the same position as engine silent-block with the Chimera silent-block
- Once the correct position has been found, insert the silent-block at joke.



### STEP 10: WHEEL SPACER ASSEMBLY

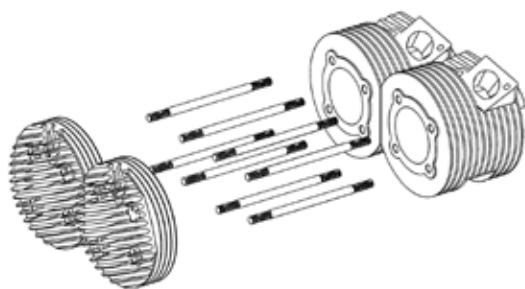
- Take the wheel spacer (Fig. 1 - H) and the relative fixing kit (Fig.2 - 8).
- Fix everything as shown in the image below.



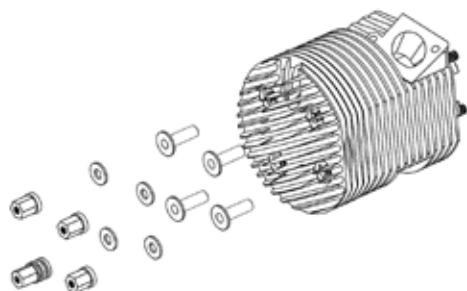
## Assembly instructions - TWIN-CYLINDER CONVERSION CHIMERA FOR LAMBRETTA

### STEP 11: THERMAL GROUP ASSEMBLY

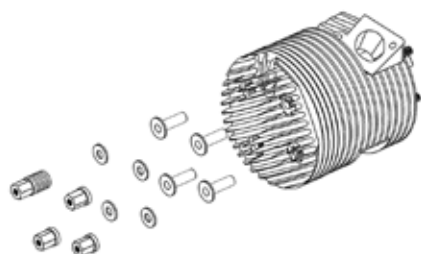
- Install the barrels (not supplied in the kit)
- Install the studs (Fig.2 - set 7) and the 2 heads (Fig.1 - E1 and E2).



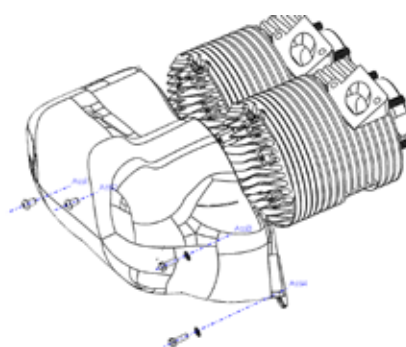
- Install the LH cylinder head nuts (n.1 medium nut e 3 low) in the position indicated in the image.



- Install the RH cylinder head nuts (n.1 high nut and n.3 low) in the position shown in the picture.



- Install the cylinder cooling (Fig.1 - F) using i kit fixings (Fig. 2 - 7).



#### ADVICE:

Adopt 1.4-1.6mm squish height.

Adopt temperature sensors to monitor the temperatures of the 2 barrels and help you understand the correct working range of your engine.



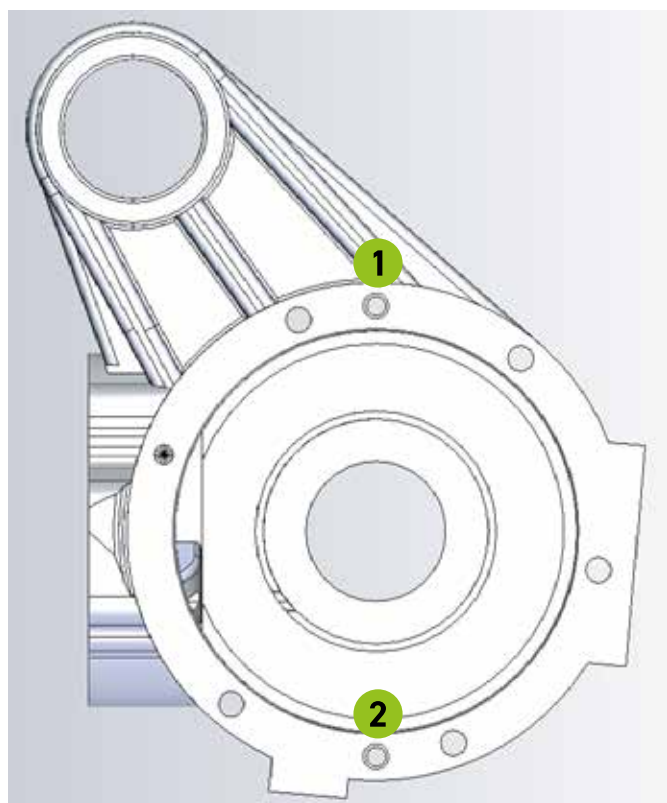
### ATTENTION:

To install the trasmission use a strong threadlocker to fix the screw of sprocket dampers.



### ORIGINAL CRANKCASE DISASSEMBLY - BLOCK CHIMERA FUSION

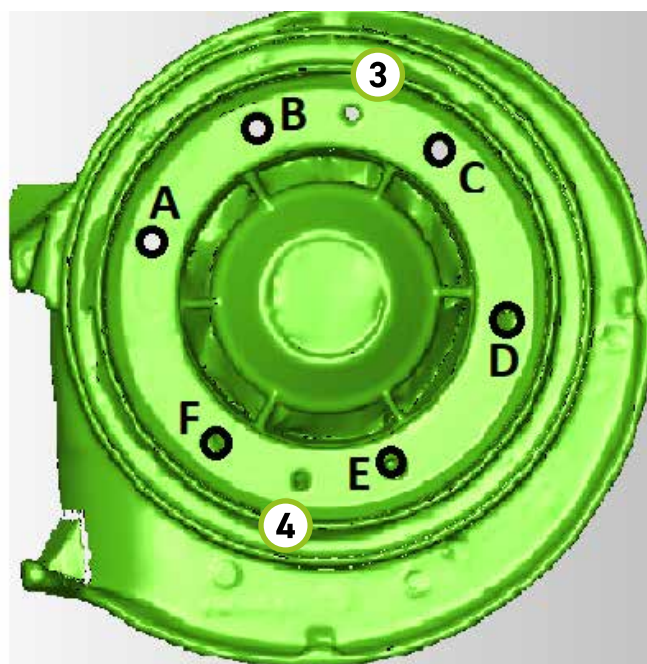
To unpair properly the mag housing, Chimera block and mag housing, can be used the threaded rods and the nut system counter nut of the set (Fig.2 - 6).



Use the threaded holes «1» «2» respectively to remove the chimera casing and the holes «3» «4» to remove the mag housing as usual from Innocenti to remove concept.

### ATTENTION:

Before removing the Chimera block using le threaded rods placed on holes 1 and 2, remember to loosen the shaft connecting collar engine and unscrew the shaft joint screw.



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