

INSTALLATION MANUAL

DIGISHOX
by **bitubo**



Code: H0152DST216
Model: HONDA CRF1000L AFRICA TWIN / DCT ABS

Rev. 00
Date: 29/03/19

Mod. ISTR. MONT. DS
Pag. 28 / 54



SERIAL N°:

(SEE PAGE 1)

TO BE MENTIONATED IN CASE OF CLAIM

FIRST YOUR SAFETY !

WARNING !



The Suspension KIT is an important component of the motorcycle and this manual describes the correct way to assemble it.

NOTE: The Suspension KIT must be installed exclusively in a specialised workshop; if you have any doubts regarding these instructions, please contact a Bitubo engineer straight away.

WARNING !



Bitubo cannot be held responsible for any modifications to the Suspension KIT not described in this handbook or not authorised in writing. Moreover Bitubo cannot be held responsible for the incorrect installation of Suspension KIT.

Read this handbook carefully so that you can get the best performance and efficiency out of the Suspensions.

NOTE: The warranty for the Suspension KIT will be invalidated by incorrect installation or modifications carried out without Bitubo's written authorisation.

Bitubo cannot be held responsible for any damages to the product or injuries to people if the instructions of this handbook are not followed to the letter or if the KIT is not fitted in a specialised workshop or by qualified personnel.

BITUBO RECOMMENDS



Pictures and notes reported are purely as an indications; Bitubo s.r.l. reserves the faculty to make any modification or changes.

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PRESENTATION OF THE PRODUCT

The Bitubo DigiShox DS system is a cutting-edge product that incorporates high technology, high performance and simplicity of interaction for use on the track, road and off-road.

The innovation introduced by this Sospension KIT (front cartridges, rear shock absorber and control unit) consists in a very-quickly and efficient electronic management of the compression, extension and spring preload adjustments.

The Bitubo JBH cartridge, on the front, is equipped with hydraulic spring preload adjustment and electronic adjustment of compression and extension.

The Bitubo XXT shock absorber, at the rear, is equipped with electronic adjustment of compression, rebound and spring preload.

The electronic regulation takes place thanks to the use of micro-motors that allow a very high regulation speed. The control unit is equipped with 9 settings preset by the House, not editable. You can add other 3 customized settings by the appropriate application, downloadable from the most known Appstore in your smartphone.

PRECAUTIONS AND SAFETY



Before removing the motorbike fork, take note of the sag values and fork assembly position compared to the steering plates, in the currently used configuration. To identify the adjustment position, see photo on page 37.

Before mounting the shock absorber on the bike, take note of all values of sag, length, hydraulic adjustments and mounting position of the bike fork as standard configuration. Check that Bitubo base setting (length, spring preload and hydraulic adjustments) is according to the data written on the chart at page 45.

Once the shock gets installed, check that there are no interferences with the frame of the bike or moving parts.

Considering that during the production steps the shock and the fork are lubricated, you could find out some trace of oil and grease on the suspension.

WARRANTY

Bitubo cannot be held liable for product installation operations other than those described herein. Furthermore, Bitubo cannot be held liable for any modifications to the product not described in this manual or not authorised in writing.

Read this manual carefully to obtain the best performance.

The product warranty will be invalidated by incorrect installation or modifications carried out without Bitubo's written authorisation.

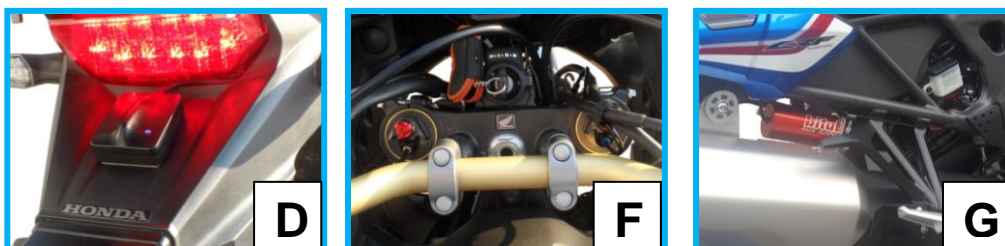
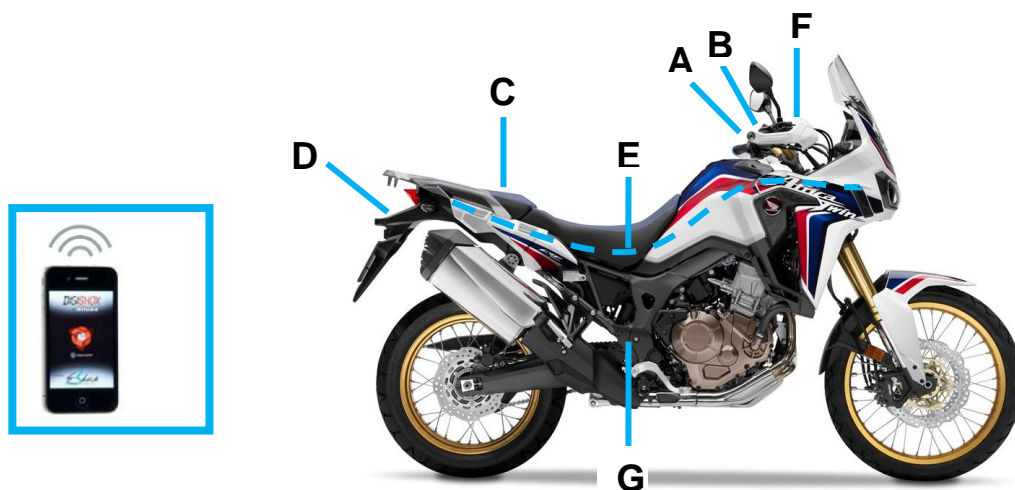
WARNINGS

- The Bitubo shock absorber contains pressurised nitrogen gas.
- If no specific mounting instructions are supplied, observe the procedures described in the Technical Manuals of the motorbike Constructor.
- Please keep this manual in a safe place since it contains information on the initial set-up in addition to the serial number to be used for warranty service.

DigiShox COMPONENTS LIST

The System is composed by the following components:

- A. 1 Led Panel (Trident): Coloured leds dashboard.
- B. 1 Selector: Handlebar selector.
- C. 1 CPU (Neptuny): Adjustment unit control.
- D. 1 GPS sensor (E-Shark).
- E. 1 Wiring: Plug and play wiring.
- F. 1 KIT JBHG1: Fork cartridges with electronically controlled hydraulic adjustment; hydraulic spring preload.
- G. 1 KIT XXTC1: Rear shock absorber with electronically controlled hydraulic adjustment; electronically controlled hydraulic spring preload.
- H. IOS / Android App for the customization of the adjustment.



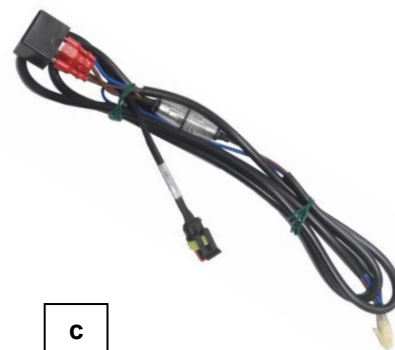
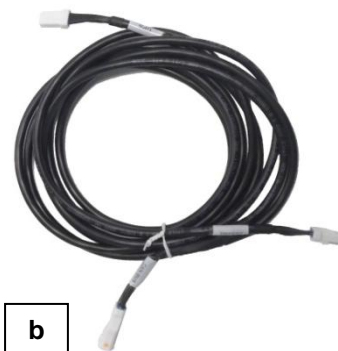
WIRING and CONTROL UNITS

WARNING:

- Before the installation of the Bitubo Wiring it is advised to disconnect the vehicle battery.
- The Bitubo Wiring is equipped with identified connectors.
This system speeds up and simplifies the placing of the connectors in the vehicle.
- Do not allow that the Bitubo Wiring be crushed while the fuel tank mounting.
- The Bitubo wiring must be arranged so as not to be forced (pulled) or crushed during the steering movement.
- The Bitubo wiring must not interpose with the clutch control wire and the accelerator control wires.

Bitubo Wiring is composed by 3 parts:

- a. MAIN WIRING
- b. CONNECTION WIRING (LINEA CAN-BUS)
- c. POWER SUPPLY WIRING



Bitubo wiring assembly:

- 1) Connect the MAIN WIRING to the POWER SUPPLY WIRING by the connectors identified with the name: "NEPTUNY-POWER"

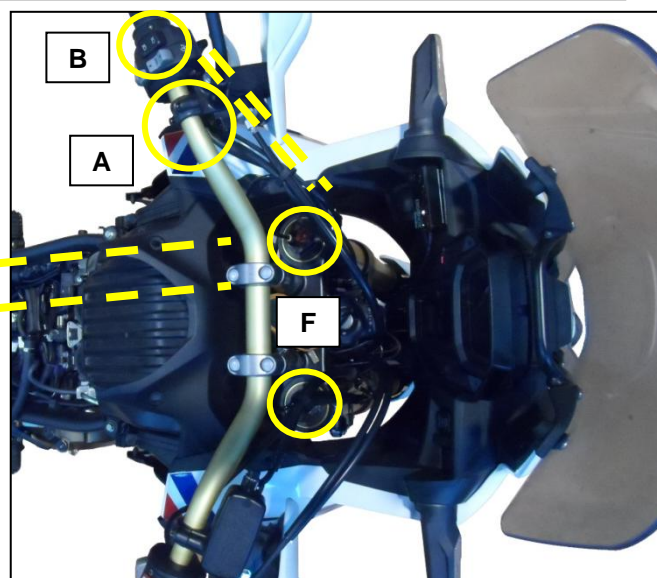
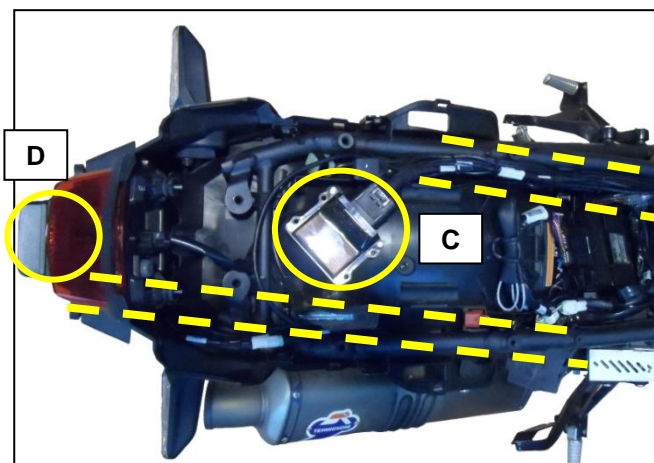
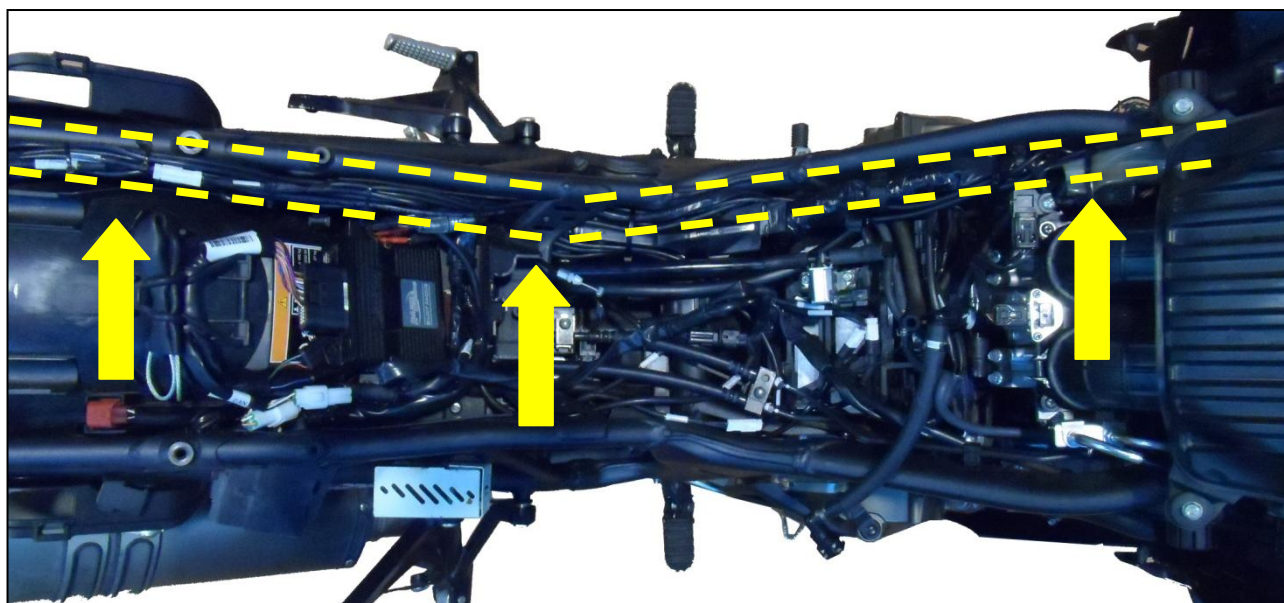


- 2) Connect the MAIN WIRING to the CONNECTION WIRING by the connectors identified with the name: "CAN-BUS"



INSTALLATION OF THE BITUBO WIRING ON THE VEHICLE:

- 1) The Bitubo wiring must be arranged, if possible, next to the main motorcycle wiring, so as to place the CPU in the area of the pigtail / underseat and the battery power cables in the battery compartment.



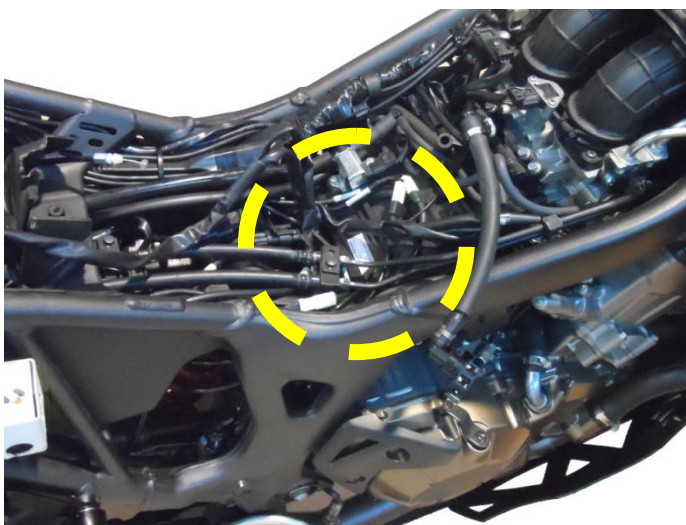
- a. Orient the wires with connectors identified with the following names towards the forecarriage of the vehicle:
- COMPRESSION FRONT
 - REBOUND FRONT
 - TRIDENT



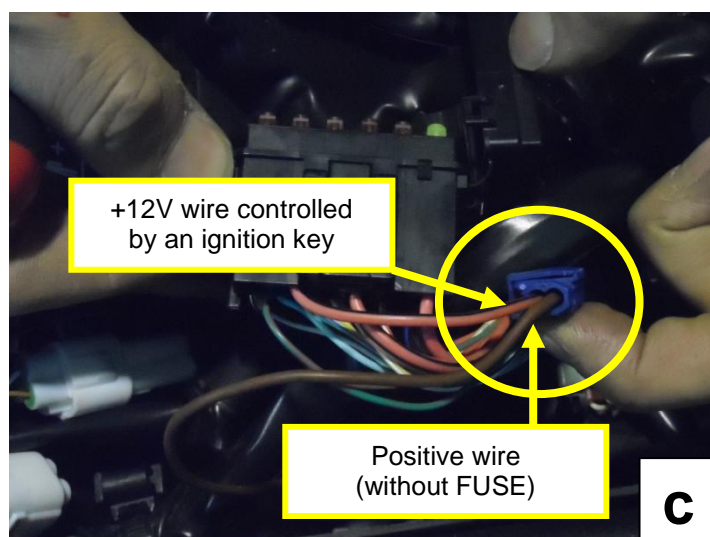
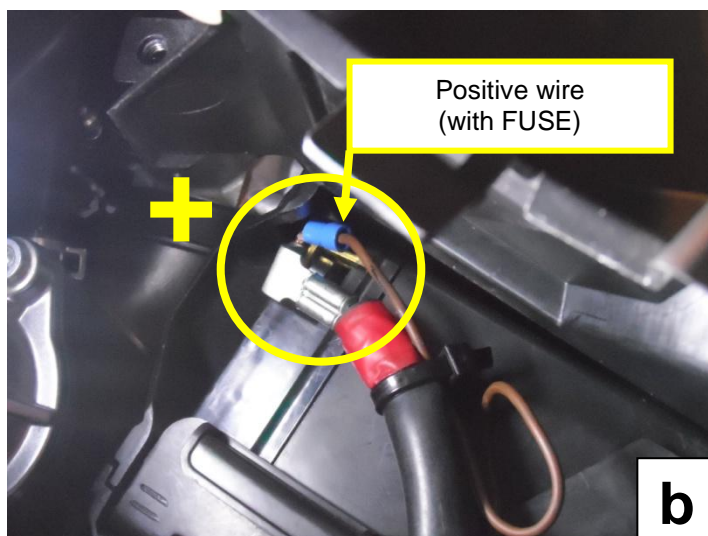
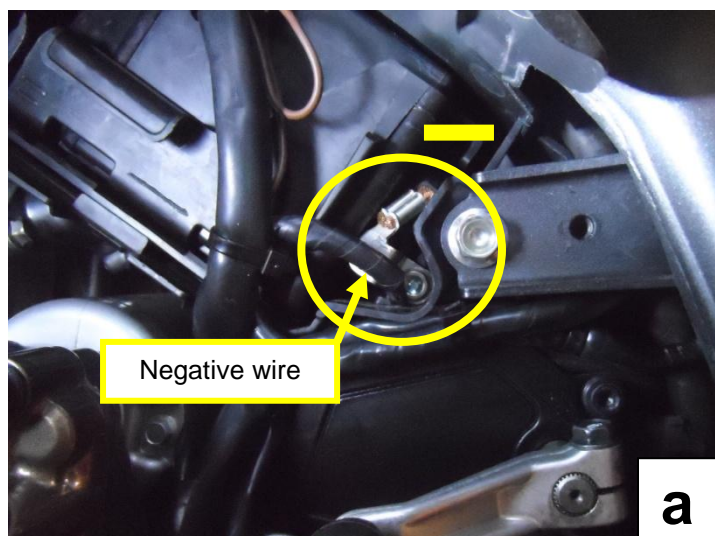
- b. Orient the wire with connector identified with the following name towards the rear area of the vehicle:
- GPS



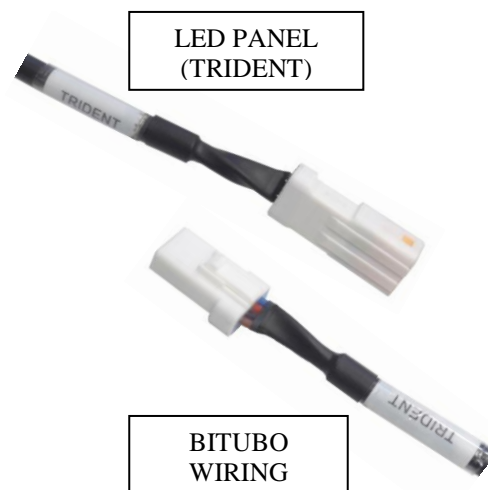
- c. Orient the wires with connectors identified with the following names towards the central area of the vehicle:
- COMPRESSION REAR
 - REBOUND REAR
 - PRELOAD MOTOR (IF PRESENT)
 - PRELOAD ENCODER (IF PRESENT)



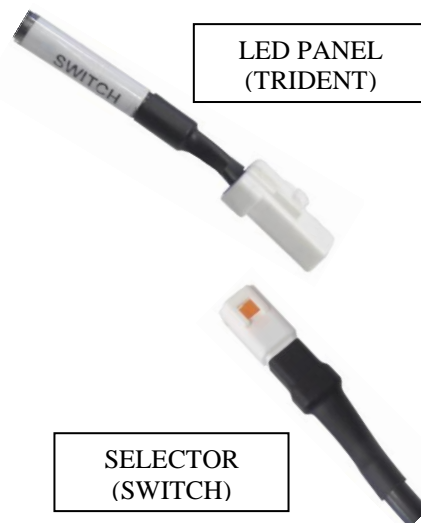
- 2) The system powered occur by 2 BLUE wires (-) and 2 BROWN wires (+):
- a. The BLUE wires have to be connected directly to the negative pole of the battery. The BLUE wire paired to the BROWN wire without fuse could be connected to any GROUND CABLE via current stub
 - b. The BROWN wire with the FUSE must be connected to the positive pole of the battery.
 - c. The single BROWN wire must be connected via a current stub to a **+ 12v wire controlled by an ignition key** near the battery compartment, or in any case a comfortable position to work on.



- 3) The Led Panel (TRIDENT) Bitubo has to be placed and fixed near the dashboard of the vehicle or above the upper plate. It has to be visible during the riding.

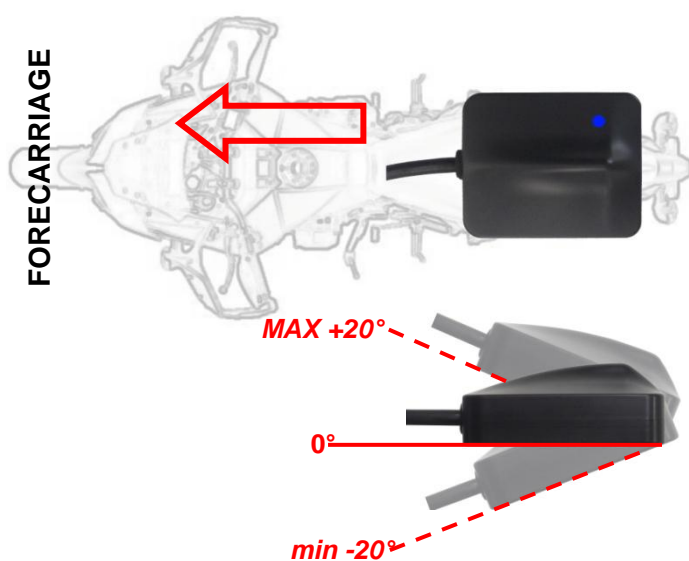


- 4) The Selector (SWITCH) Bitubo has to be placed on the LEFT side of the handlebar between the grip and the controls. Place it in a practical and comfortable position.



- 5) The GPS sensor (E-Shark) Bitubo has to be placed on the rear side of the vehicle (ex. rear tail). It is not necessary that the sensor is exposed, it can also be placed inside the fairing.

For the position of the GPS sensor (E-Shark) refer to the scheme here below:



FRONT FORK CARTRIDGES

Gambale forcella Fork leg	Setting	Cost. Molla Spring rate [kg/mm]	Cost. Molla interna Top out Spring rate [kg/mm]	Precarico Preload [mm]	Regolazione Smorzamento Damping Adjuster [clicks]	Livello olio Oil level [mm]	Sfilamento forcella Fork strip out Q [mm]	Differenza interasse dall'originale Length difference From the original [mm]
COMP.	GR50230	0,60	0,45	5	10	120	Orig.	0
REB.	GR50229	0,60	0,45	5	11	120		



CARTRIDGES ADJUSTMENT

Spring pre-load and hydraulic compression and rebound regulations are found on the upper cap. The two cartridges perform separate hydraulic functions: the cartridge with the **yellow identifier** performs hydraulic compression while the cartridge with the **blue identifier** performs hydraulic rebound.

Thus is it normal that hydraulic rebound force is not felt when the fork leg on which the compression cartridge is installed is compressed and vice versa for the rebound fork leg.

HOW TO ADJUST THE FORK CARTRIDGES

The hydraulic adjustments of Compression and Rebound are electronically adjusted by **Bitubo Digishox** system.

For all the functionality, refer to the "**System User's Guide**".

FORK SLIPPING ADJUSTMENT

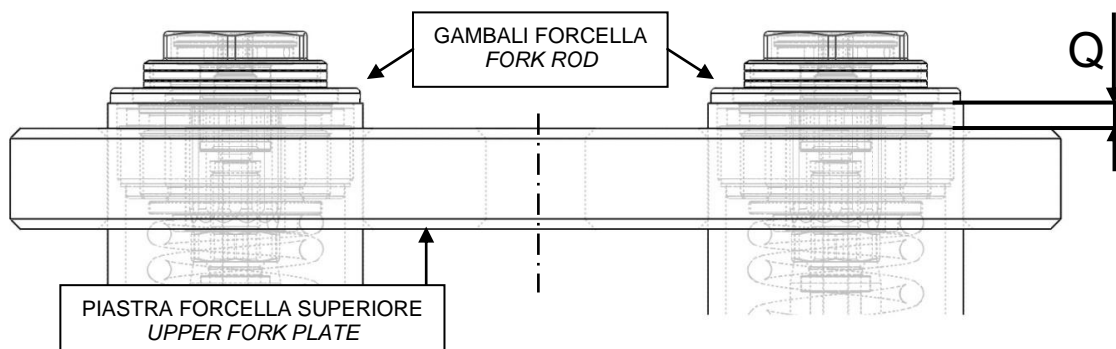
The Bitubo cartridges are of the same length (at maximum extension) as the original cartridges, since equipped with internal spring. Bitubo also supplies cartridges with lengths other than the original. In these cases, the "distance difference from the original" value is indicated in the "base setting" table on page 37.

Thus, restore the correct front axle height (see drawing below):

the **Q** quota is indicated in the "base setting" table on page 1:

Q = orig. → the measurement is like the original assembly (refer to the vehicle technical manual).

Q = value (example: +/- 5mm) → change the original fork slipping by the indicated value.



WARNING: The riding quotas are the result of long tests by the manufacturer, and the **Q** quote was set to provide safe manageability and stability. A 2 or 3mm adjustment changes the vehicle's behaviour.

Changing the **Q** quote changes some riding quotas recommended by the vehicle manufacturer and can reduce vehicle stability, both when riding and parking (on the central or lateral stand), jeopardising riding behaviour and safety.



SPRING PRE-LOAD ADJUSTMENT

The adjustment range is 12mm (12 clicks).
Each click (½ adjuster knob turn) corresponds to 1mm spring pre-load.

1 complete turn (2 clicks) = 2mm

To increase the spring pre-load value rotate the adjuster knob clockwise. To decrease the pre-load value, rotate it counter-clockwise.

For better handling of the preload adjuster knob, you can use the tool (cod. 00416) included in the Cartridge Kit.

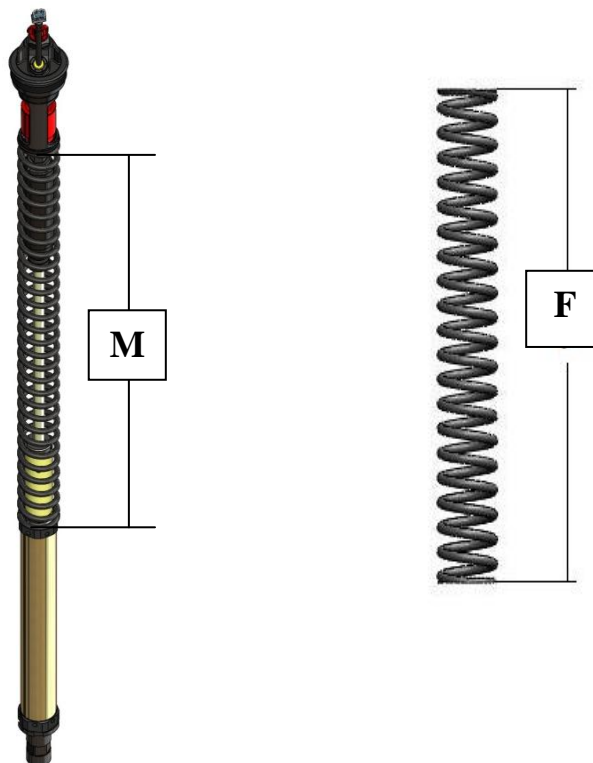


The pre-load values are as important as the fork slipping quota. Pre-load set the bike height off the ground and the dynamic trim in curves thus the fork angle, front axle values, etc., that characterise vehicle behaviour. **Generally, the optimal pre-load values range from 3 to 8mm.** To optimise the pre-load adjustment, see paragraph "SAG ADJUSTMENT AND MEASUREMENTS".



WARNING: this type of fork cartridge is equipped with an internal spring. Thus, check the fully extended suspension measurements not only lifting the bike off the ground, but forcing the suspension, extending them, to fully compress the internal counter-spring.

Spring pre-load is the crushing it suffers when installed on the cartridge → **PRELOAD=F-M**



MOUNTING INSTRUCTIONS

WARNING:

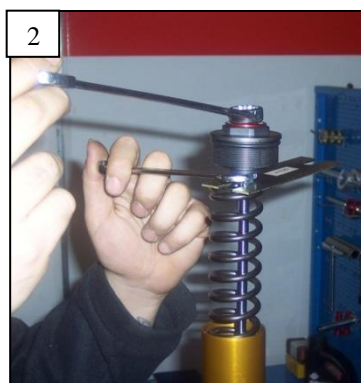
- **The upper cap of the cartridge is not tightened by Bitubo since it must be removed and subsequently tightened for assembly.**
- 1- Safely position the vehicle making sure the front wheel is off the ground, use a suitable tool to work on the fork free of restrictions.
 - 2- Find the **Q** quote indicated in the table in paragraph "**FORK SLIPPING ADJUSTMENT**" on page 5 and refer to the indicated technical recommendations.
 - 3- Loosen the upper steering plate screws that secure the fork legs (indicated with the arrows in illustrative example photo 1) and loosen the upper original fork caps 1 turn.



- 4- Remove the fork legs from the vehicle: to remove the fork legs and original parts, follow the vehicle manufacturer's instructions (User/Maintenance handbook - Garage Manual).

OPERATIONS ON BOTH THE FORK LEGS

- 5- Secure the fork foot in a clamp being careful not to damage it (we recommend using a clamp with soft aluminium or plastic jaws).
- 6- Unscrew the upper fork leg original cap, loosened to point 3 of the outer tube.
- 7- Slowly lower the outer tube and unscrew the cap from the rod inside the cartridge and remove it (see example in photo 2).



- 8- Remove the spacers and the original spring.
- 9- Remove the original cartridge complete with all its components and separate the outer tube from the stem; given the variety of forks, refer to the vehicle manufacturer's instructions (User/Maintenance handbook - Garage manual).

JBH CARTRIDGES INSTALLATION PROCEDURE

- 10- It's suggested to place on the stem of one of the two fork legs a fork stroke reference ring.
- 11- To re-insert the outer tube in the rod, given the variety of forks, refer to the vehicle manufacturer's instructions (User/Maintenance handbook - Garage manual).

N.B.: For better sliding, we recommend you check outer tube-stem bushing play: upper bushings from 0.10 to 0.15 mm, lower from 0.08 to 0.12 mm. Otherwise the bushings must be adjusted or replaced. In alternative, see the **Bitubo** catalogue to check whether the "**KITS**" **sliding kit** made up

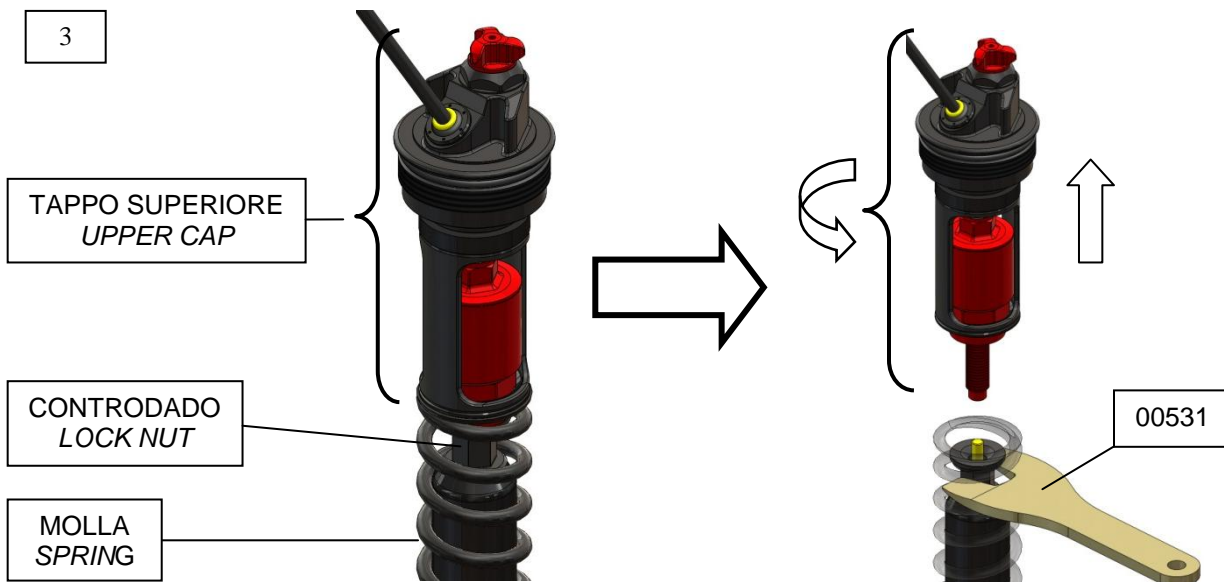
of bushings with tolerances already optimised by the *Bitubo Race Department* and high sliding oil guards can be applied.

When assembled, adequately grease with the specific Bitubo grease, code 997608.

- 12- Remove the upper cap, the spacers (if used) and the spring from the **JBH Bitubo** cartridge: to make easier the operation hold the lock nut with the tool 00531, after that unscrew manually the upper cap.(photo 3).

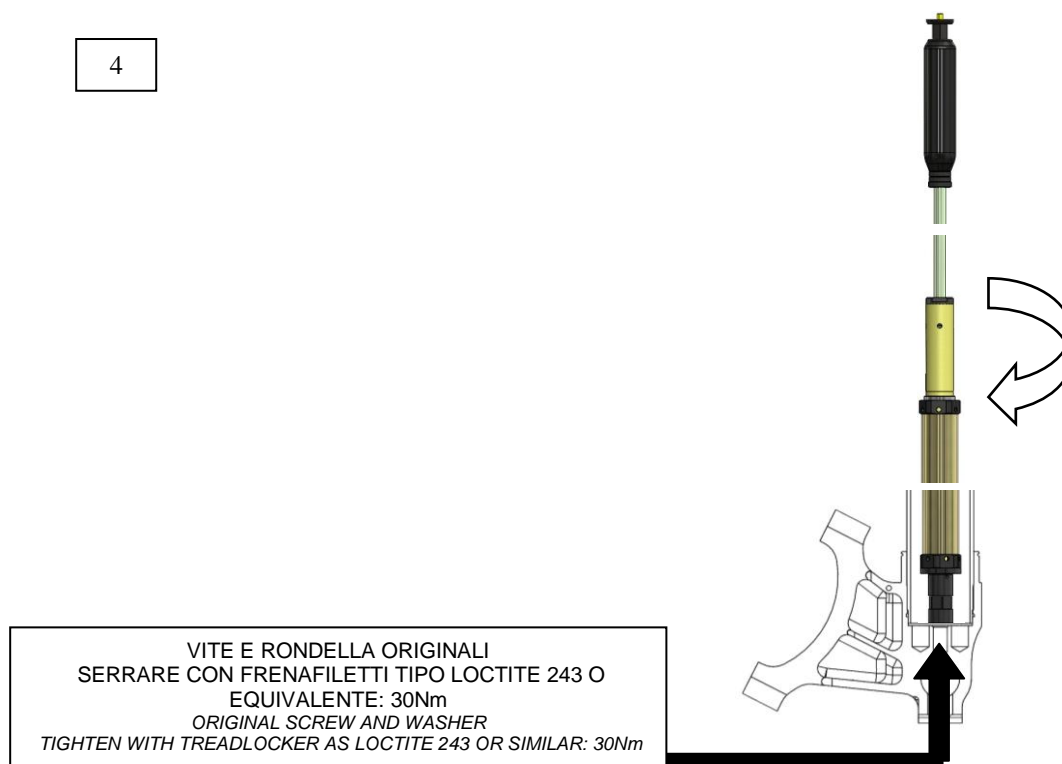
In some cases the springs are not mounted in the cartridges but inserted in the shipment box.

WARNING: once the upper cap is removed, do not touch the adjuster knobs.



- 13- Insert the cartridge in the fork and secure it with the original Allen screw and washer. To facilitate the operation is recommended to use a low intensity impact wrench.

WARNING: Insert the compression cartridge on the left and the rebound cartridge on the right.

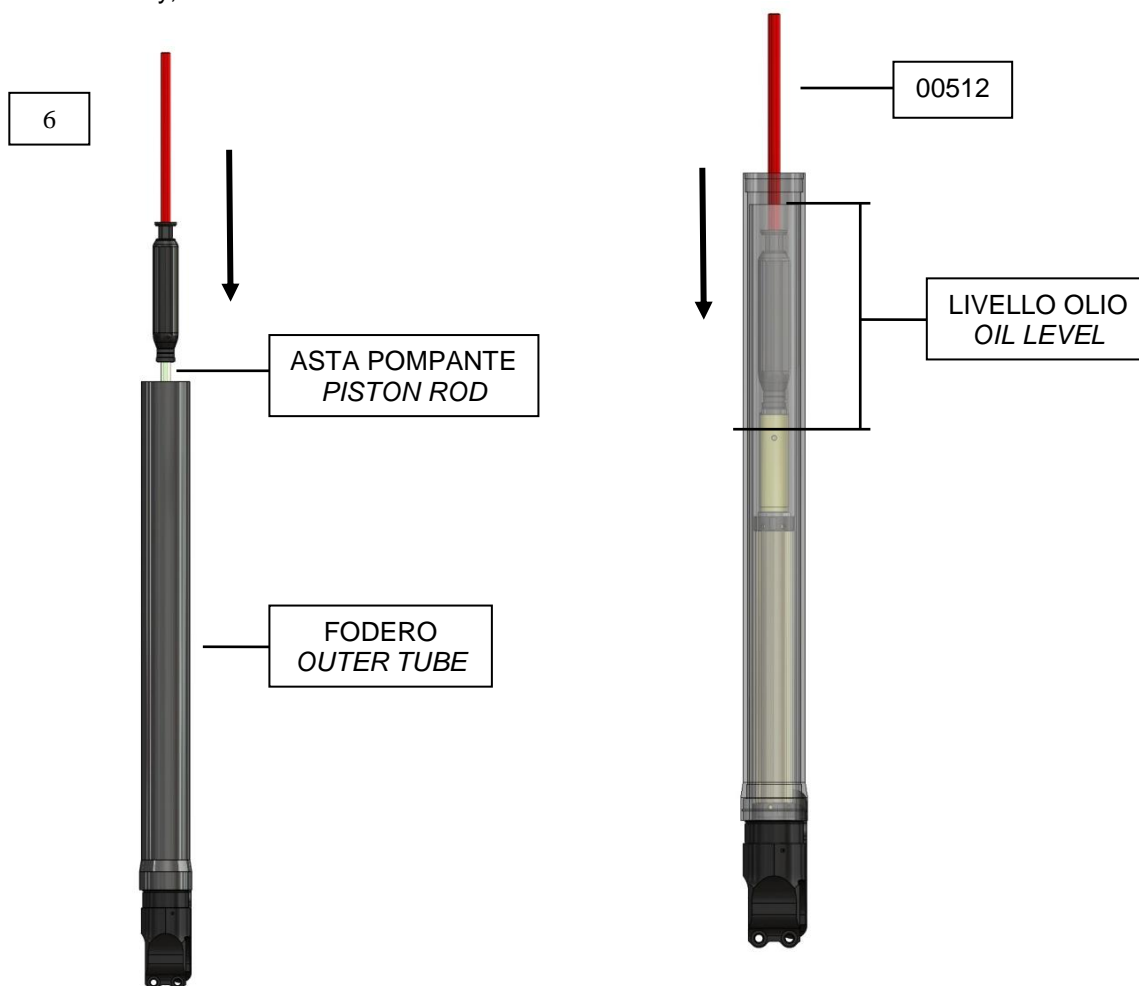


- 14- Bring the outer tube to the maximum compression position. Put BITUBO oil **997630 ISO 22** until the level is over the cartridge body.

- 15- With the tool 00512 perform some compression-extension movements of the piston rod to facilitate the filling of the cartridge and to drain any air.
During the filling operation continue to put oil until the piston rod make fluid movements, that means the cartridge has been correctly filled.
Leave the cartridge to stand for a few minutes and check the fluidity of movements.

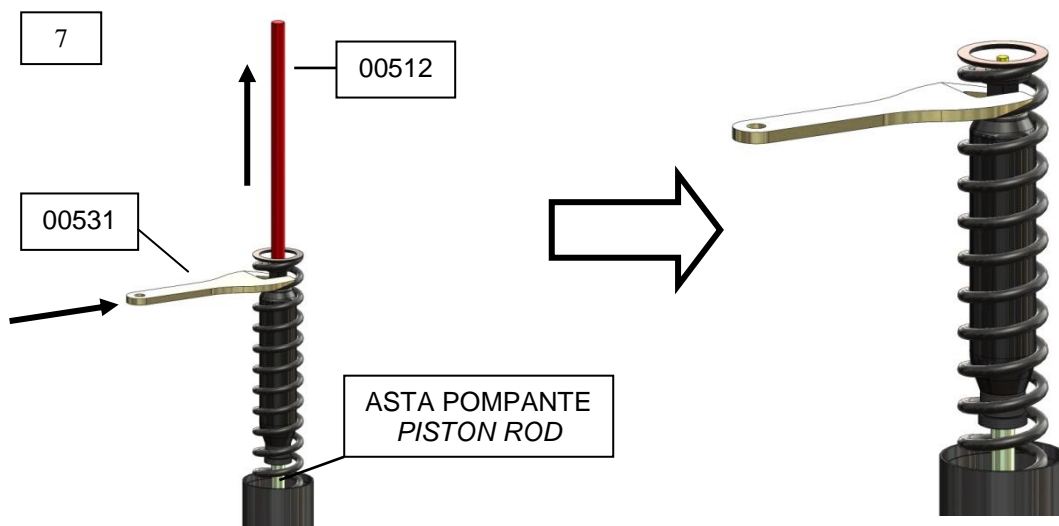


- 16- Move the piston rod to the maximum compression position. Check the oil level from the edge of the outer tube. The oil level is reported in table in page 37.
If necessary, restore the oil level.

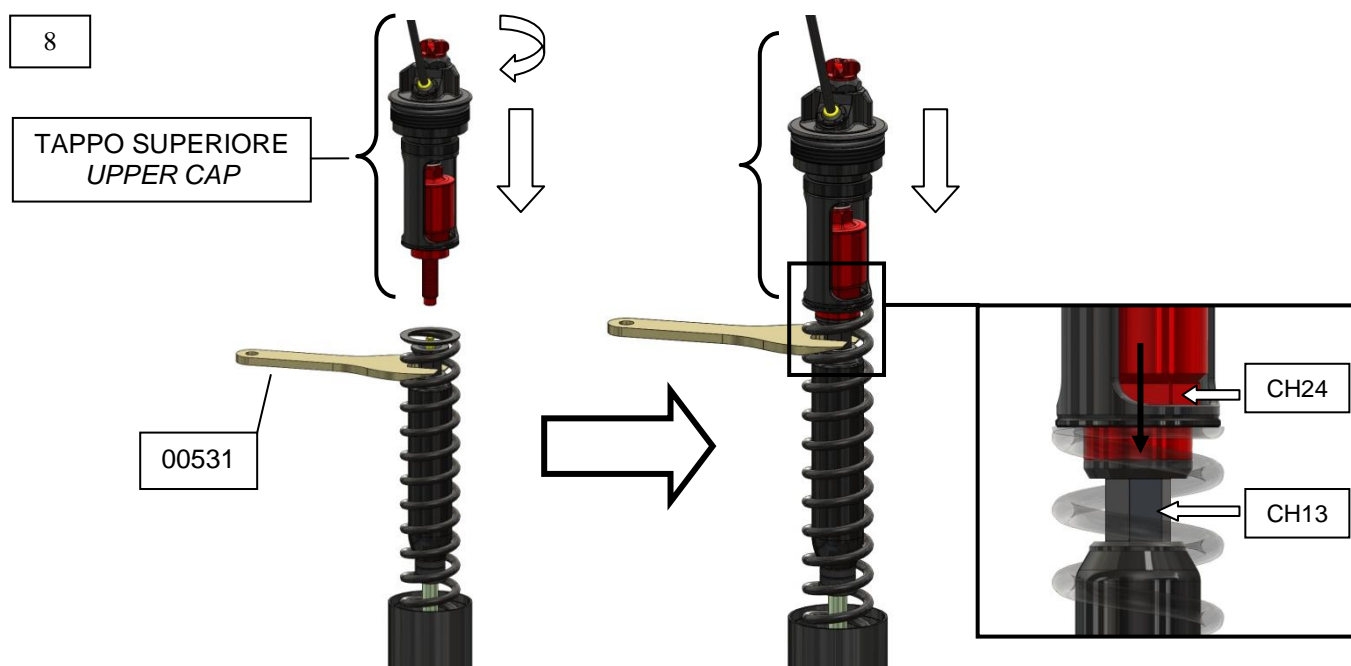


- 17- Perform some compression-extension movements of the outer tube and re-check the oil level repeating the operations of point 16.
18- Insert the spring, removed in point 12 (end with engraved constant elastic K towards the cap).

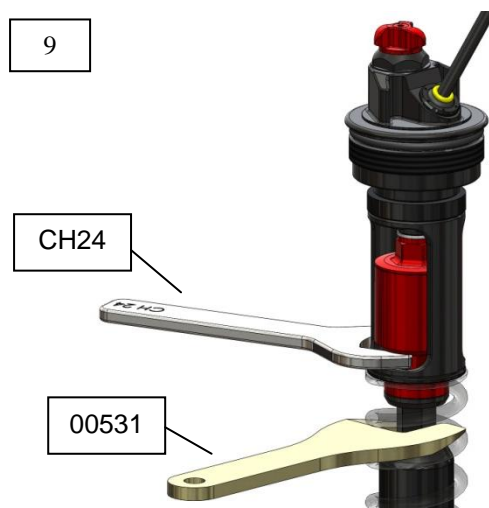
19- Hold and extend the piston rod with the tool 00512 so keep the lock nut with the tool 00531. After that removed the tool 00512.



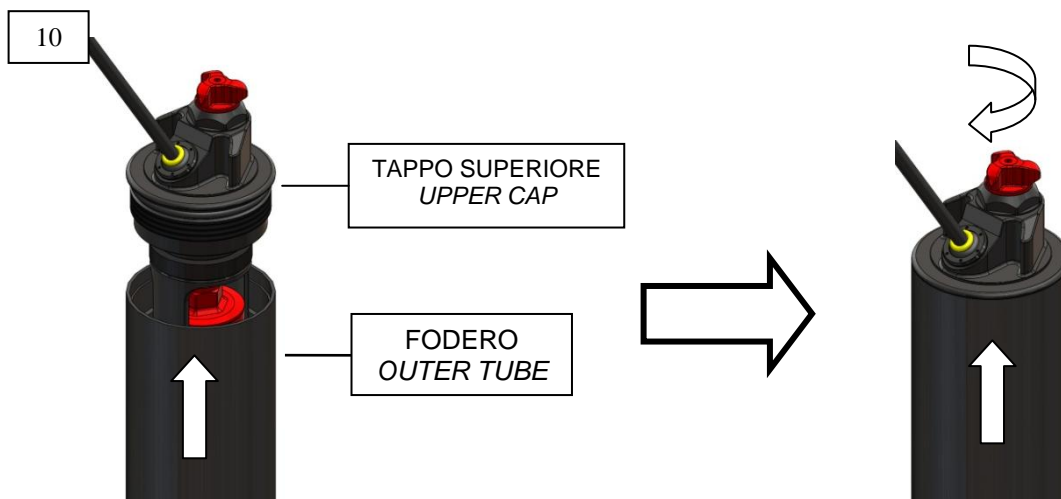
20- Screw manually the upper cap on the lock nut until it reaches limit stop.



21- Tighten the lock nut to the upper cap. Tighten to 9 Nm.

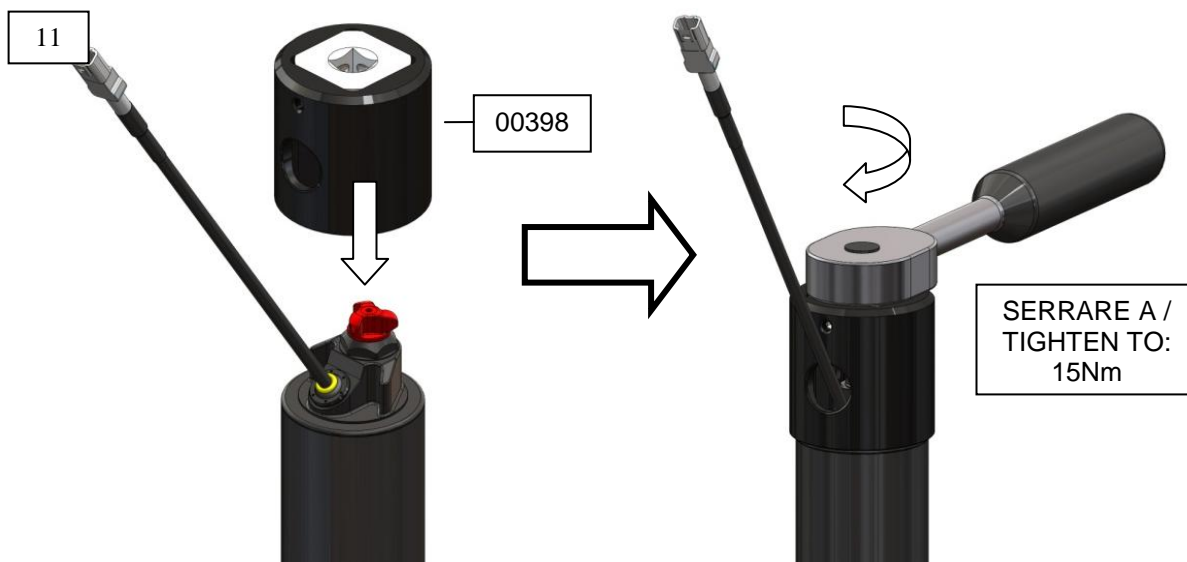


22- Bring the outer tube towards the upper cap. Screw the upper cap without tighten.



23- Reassemble the fork legs on the bike following the instructions in the vehicle manufacturer's Garage manual. Restore sliding **Q** indicated in the table on page 37 and tighten the screws of the lower plate.

24- tighten the upper caps to the torque of 15Nm using the tool 00398. After that tighten the screws of the upper plate.



25- Connect the cartridges connectors to the Bitubo wiring:

- a. COMPRESSION cartridge connector to the Bitubo wiring connector identified as "COMPRESSION FRONT".

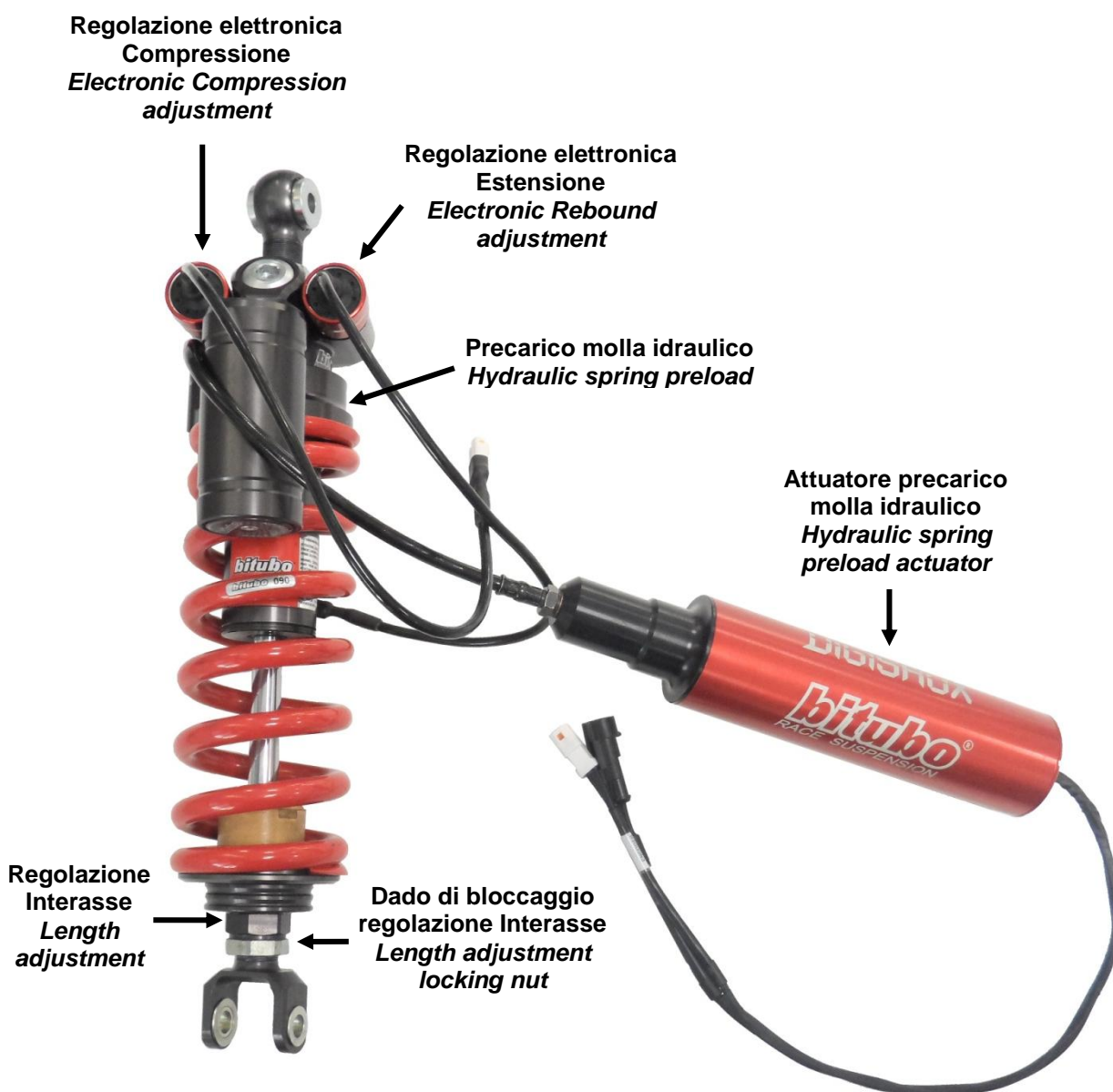


- b. REBOUND cartridge connector to the Bitubo wiring connector identified as "REBOUND FRONT".



REAR SHOCK ABSORBER

<i>Schema comp. / Comp. Scheme / Druck-stufen Schema / Compression regime</i>	<i>Schema est. / Rebound. Scheme / Zugstufen Schema / Extension regime</i>	<i>Rigidezza molla / Spring rate / Federrate / Ressort [kg/mm]</i>	<i>Rigidezza molla interna / Top Out Spring rate / Innenfederrate [kg/mm]</i>	<i>Prearico molla / Spring Preload / Vor- spannung / Precontrainte du ressort [mm]</i>	<i>Estensione/ Rebound/ Zugstuf / Extension [clicks]</i>	<i>Compressione/ Compression/ Druckstufe/ Compression [clicks]</i>	<i>Interasse / Length / Länge / Entraxe [mm]</i>
GR7209	GR7210	9,0	10,0	11,0	15	12	395,0



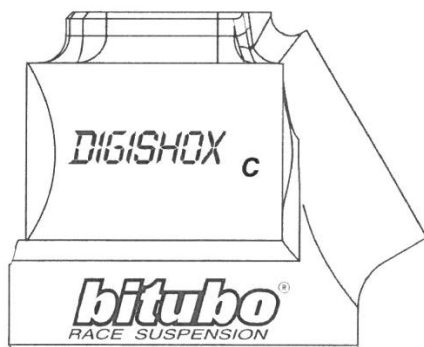
REAR SHOCK ABSORBER SDJUSTMENT

The hydraulic adjustments of Compression and Rebound are electronically adjusted by **Bitubo Digishox** system.

For all the functionality, refer to the "System User's Guide".



C - COMPRESSIONE



E - ESTENSIONE



SPRING PRELOAD ADJUSTMENT

The adjustment range is **12mm**.

The hydraulic spring preload is electronically adjusted by **Bitubo Digishox** system.

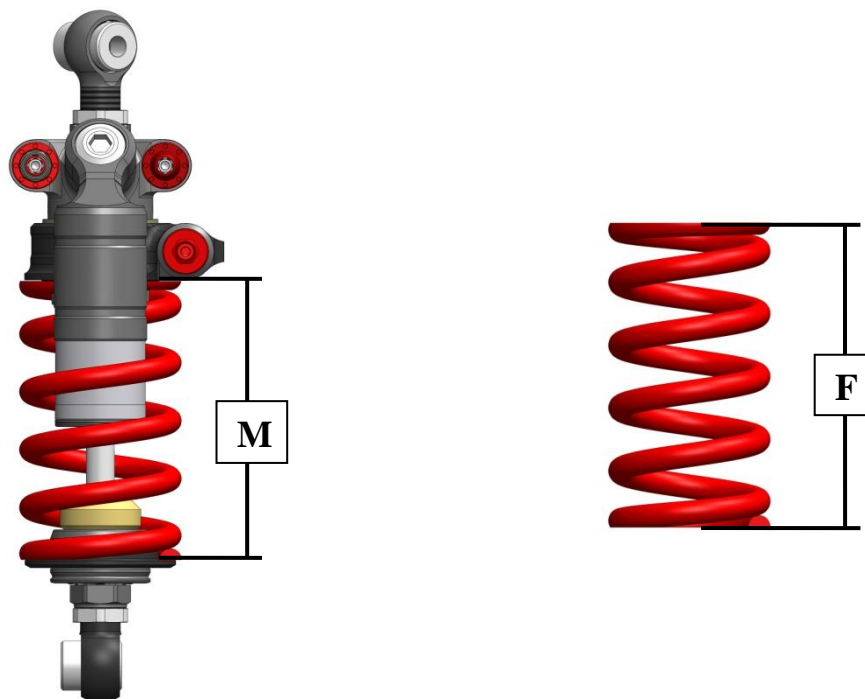
For all the functionality, refer to the "System User's Guide".

The preload defines the height of the bike from the ground as well as the dynamic set-up on a bend, therefore also the angle values of the fork, the front, etc. which characterize the behaviour of the vehicle.



WARNING: this kind of damper is provided by an internal top out spring. Verify the measures at completely extended suspension, not only by lifting the bike from the ground, but forcing the suspension in extension too, in order to compress totally the top out spring.

The spring preload is the pressure to the spring when it is installed on the shock. → **PRELOAD=F-M**



LENGTH ADJUSTMENT

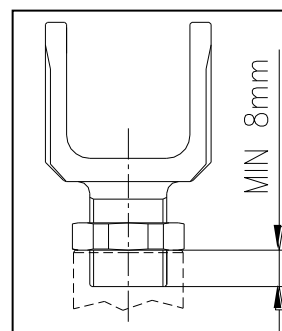
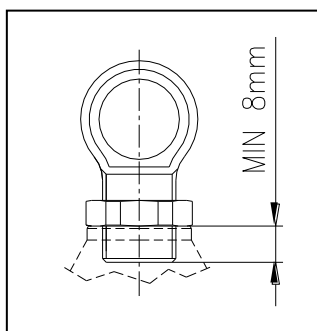


WARNING: The riding quotas are the result of long tests by the manufacturer, and the **Q** quote was set to provide safe manageability and stability. A 2 or 3mm adjustment changes the vehicle's behaviour. Changing the Q quote changes some riding quotas recommended by the vehicle manufacturer and can reduce vehicle stability, both when riding and parking (on the central or lateral stand), jeopardising riding behaviour and safety

The length has to be adjusted only on the lower attachment (unless different information reported on the specific instruction) because the upper attachment adjustment change the position of the shock absorber refer to the vehicle frame and it could get interference with the other parts.



WARNING: adjust the lower attachment being sure that inside the boss you keep at least 8 mm thread.



According to the lower head layout (with holes – left figures; with nut – right figures), insert the Ø8mm tool, supplied inside the package, inside one of the holes or 27mm key in the nut.

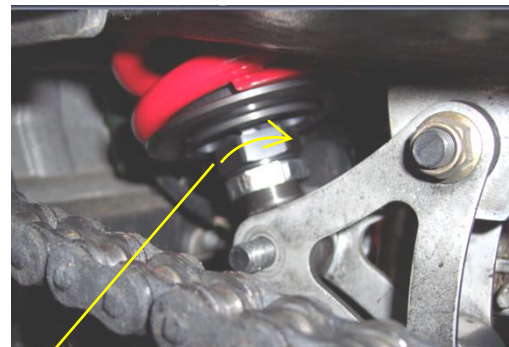
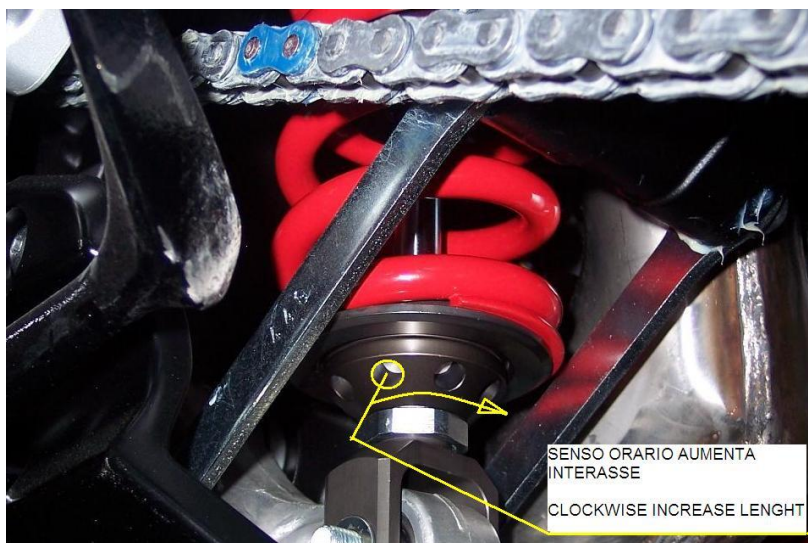
After positioning the bike on a special stand so to avoid any weight on the rear swing arm, loosen the lock nut with 27mm key as for the picture.

If the shock absorber is removed from the bike:

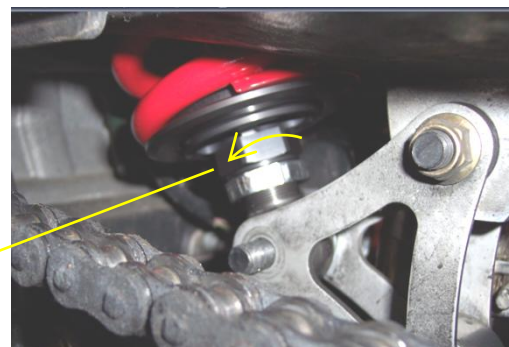
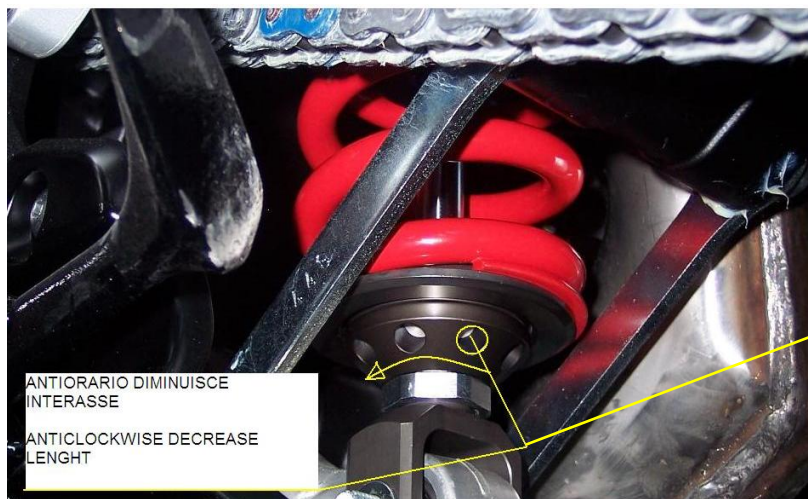
- Unscrew the lower head for **increasing** the length
- Screw the lower head for **decreasing** the length

If the shock absorber is mounted in the bike:

- Turn clockwise the lower attachment for **increasing** the length



- turn anticlockwise the lower attachment for **decreasing** the length

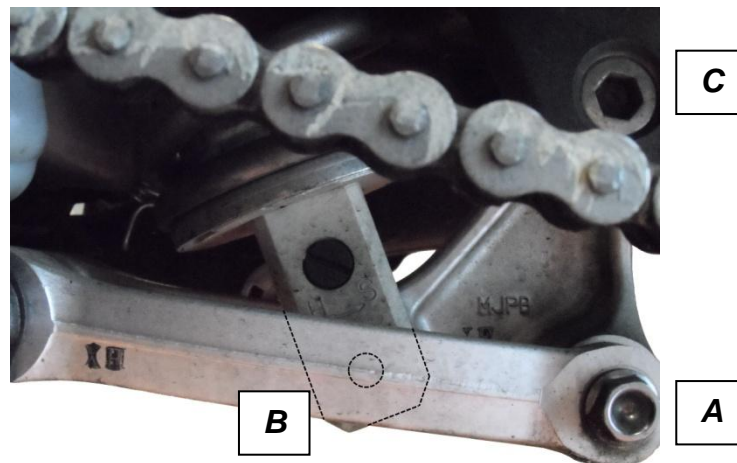


Note: One complete turn of the length adjuster modifies the shock absorber length for 1mm

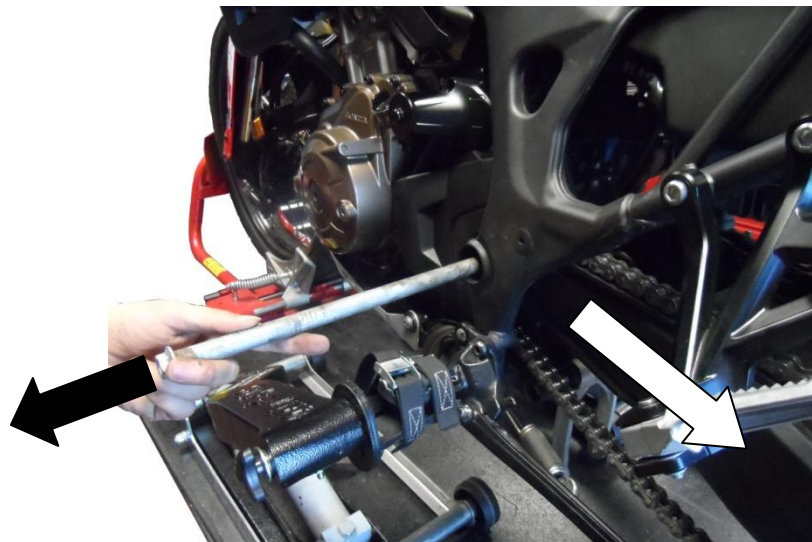
MOUNTING INSTRUCTIONS

ATTENTION: for all assembling and disassembling operations, and the torque settings of the retaining pins, follow the Manufacturer's instructions carefully (Workshop Manual).

- 1) Place the motorbike on a suitable support and lift the back wheel off the ground without any load on the suspension.
- 2) In order to simplify the disassembly-reassembly operations is recommended to remove the back wheel and the passenger RH footpeg (the original screws will not be reused). To carry out these operations, follow the Manufacturer's instructions (Workshop Manual).
- 3) In sequence: Unscrew the front link bolt (**A**) and make the leverage fork rotate downwards, unscrew the lower bolt of the original shock absorber (**B**) and remove the link unscrewing the back bolt (**C**). To carry out these operations, follow the Manufacturer's instructions (Workshop Manual).



- 4) To remove the original shock absorber, the fork must be released from the frame removing the retaining pin, and then withdrawing it from its housing.

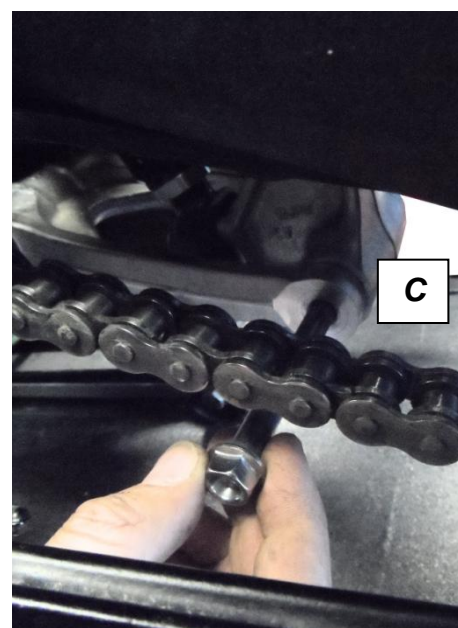
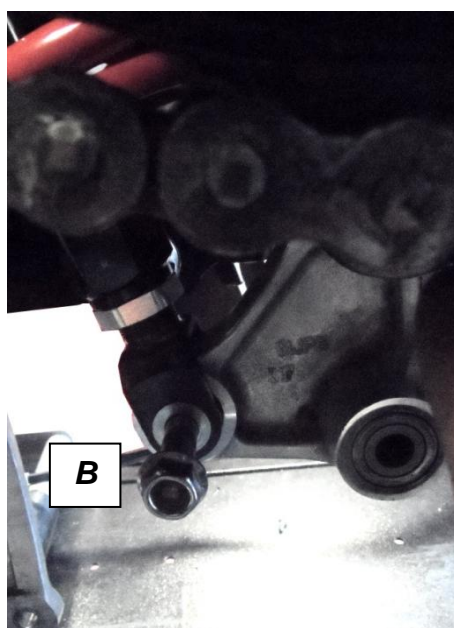
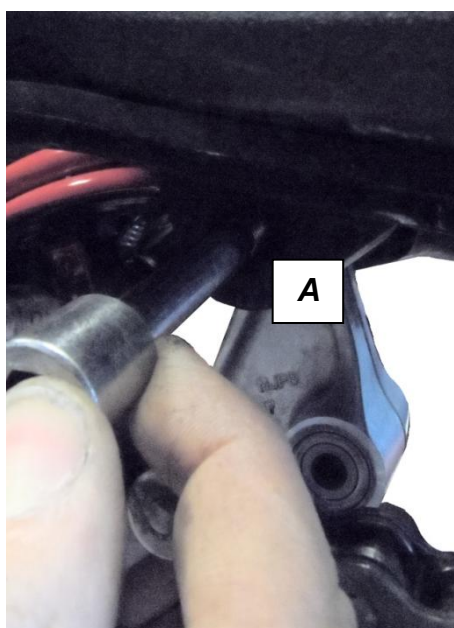


- 5) Unscrew the upper bolt of the shock absorber and take it out from its housing.
- 6) Assemble the *BITUBO* shock absorber; in sequence insert the hydr. spring preload actuator and place it on the right of the bike, near the passenger's RH footpeg anchoring (to avoid impacts, please protect the actuator group carefully), then insert the shock absorber into its housing bringing it near the upper attachment, screw it without tighten.

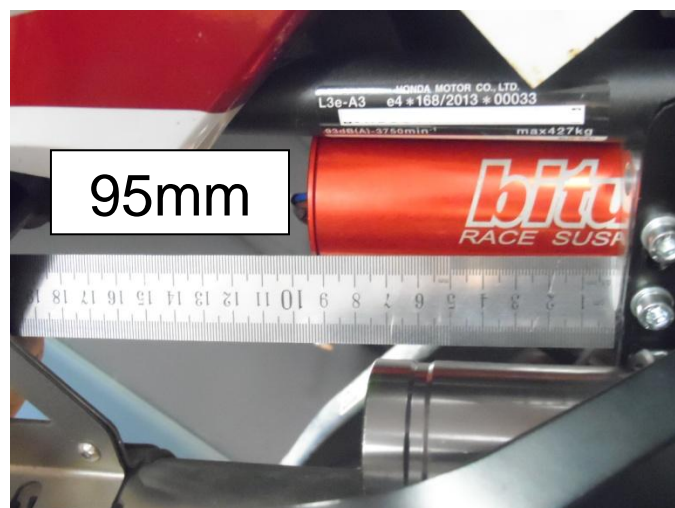


7) Place the swing arm back in its housing, insert the pin and tighten it.

8) Refit the link carrying out the following operations in sequence: screw in and tighten the back bolt (**A**), screw in and tighten the lower bolt of the shock absorber onto the link (**B**) and screw in and tighten the front bolt (**C**).



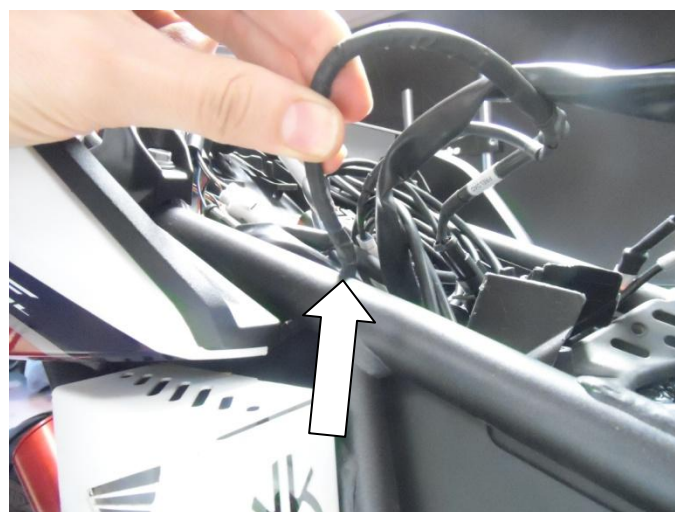
- 9) Insert the actuator group on the support bracket. Place it at 95mm of slipping and tighten the screw to 5 Nm.

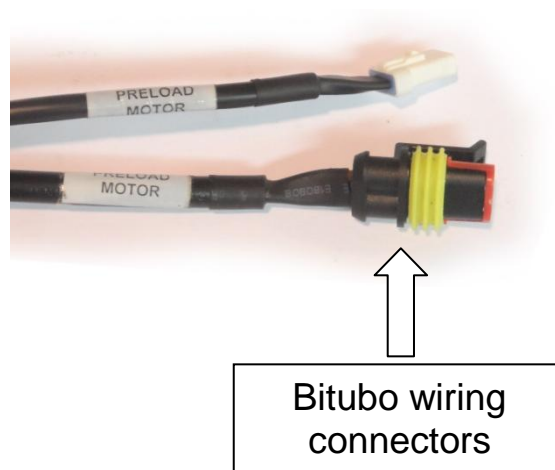
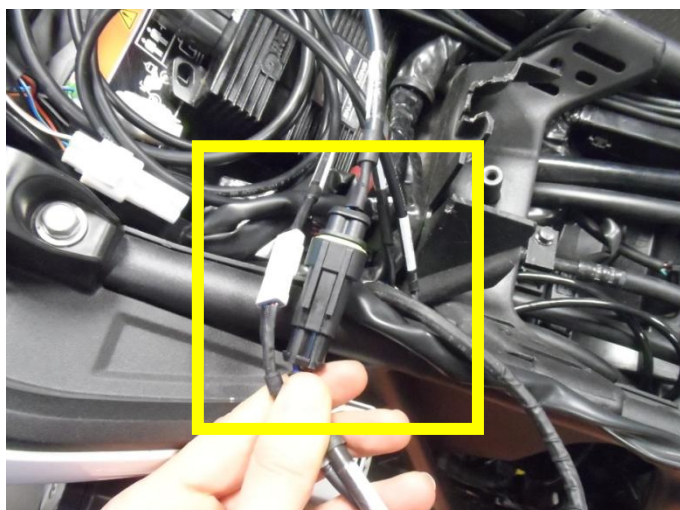


- 10) Place the support bracket between the frame of the motorbike and the RH. Tighten the screws of the footpeg.



- 11) Insert the wires of the actuator group into the fairing then connect them with the Bitubo wiring.





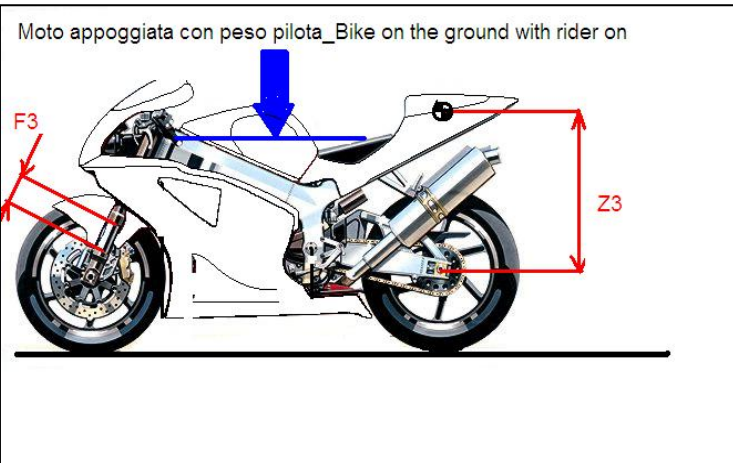
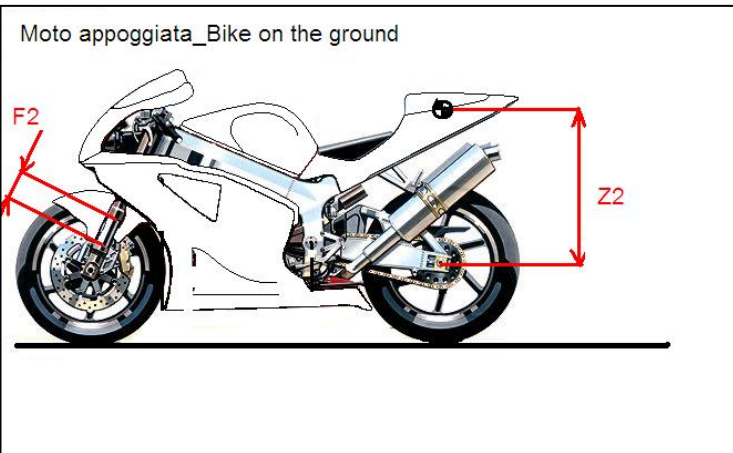
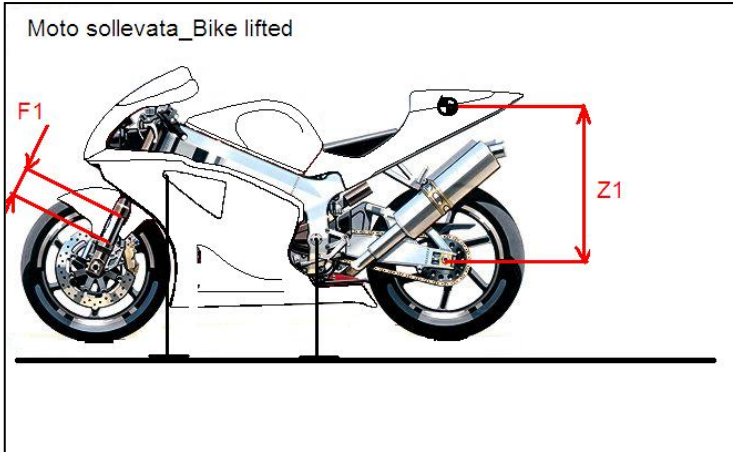
12) Put down the vehicle, and tighten the upper bolt of the shock absorber.

13) Refit all the original components, following the instructions supplied by the Manufacturer.

N.B. To adjust the shock absorber, refer to the suspension manual



ADJUSTMENT AND MEASUREMENT OF SAG



1) Lift the bike (fork free from loading and lifted tyre from the ground) and press the spring retainer forcing the full extension of the kinematic mechanism of the rear suspension. Follow the same procedure also on the fore-carriage.

2) Individuate two reference points on the vertical axe of the tyre pin: one on the centre, the other one fixed on the little frame under the seat of the bike. Both points shall be precise and well defined in order to make this operation again more and more times. Follow the same procedure on the fore-carriage.

Measure the distance between the two points Z1 and F1.

3) Place the bike to the ground with both tyres, press slowly the suspension twice and leave it then be extended freely.

4) Measure the new distance between the two points Z2 and F2.

5) **Z2-Z1 (static sag)** shall be included between **5mm and 15mm** for road replica bikes, between **10mm and 20mm** for road and naked bikes, between **15 and 25mm** for enduro tourism bikes; **F2-F1 (static sag)** shall be included between **25mm and 32mm** for road and naked bikes; **between 30mm and 40mm** for enduro tourism bikes.

6) Make all measurements again having the rider on the bike in position of riding.

7) **Z3-Z1 (rider sag)** shall be included between **25mm and 30mm** for road replica and naked bikes. For enduro and tourism bikes the value shall be included between **30mm and 40mm**. **F3-F1 (rider sag)** shall be included between **35mm and 40mm** for road race replica and naked bikes. For enduro tourism bikes the value should be included between **40mm and 50mm**.

In order to decrease the value of static sag, you shall increase the spring preload adjusting it clockwise (screwing); on the other hand, in order to increase the static sag, you shall decrease the spring preload anti-clockwise (unscrewing the adjustment).

MAINTENANCE**FRONT FORK**

- Fork cleaning and maintenance prevents premature wear and increases performance over time.
- When cleaning the vehicle, be careful not to aim pressurised water jets directly on the fork rod oil guards or upper fork leg caps (upper steering plate).
- Clean the fork and upper caps using non aggressive detergent.
- We recommend checking correct cartridge operations every 10000 Km or at least once a year.
- Every 24 months or 20,000 km of use, we advise you to have the cartridge overhauled at a BITUBO Authorised Service Centre.
- We recommend you periodically check cartridge efficiency checking the damping forces with hydraulic regulations fully open and fully closed. A change in damping is a positive result.
- For best purchased product performance, BITUBO recommends you use its lubricants.

REAR SHOCK ABSORBER

- Cleaning and lubricating your shock prevents its early wear and tear and increases its performances longer.
- On clearing the bike, pay attention not to turn the water jet at high pressure directly to the body and head of the shock absorber.
- Keep clean the shock absorber from dust, ground and any other impurities using a non-aggressive detergent.
- After cleaning vaporize on the shock some cleaner like WD40 or similar and then dry with compressed air jet.
- Bitubo recommends to check yearly, or after 10000Km, the correct work of the shock absorber:
 - o inspection the joints of upper and/or lower attachments, clean with a proper cleaner and lubricant the moving parts.
 - o inspection the shock and check if there are any components leaking oil.
 - o check the internal gas pressure.
- Bitubo recommends the service every 2 years or 20.000 km.
- Bitubo recommends to check periodically the efficiency of the shock absorber performing some compression and extension movement set the hydraulic adjustments from "fully-open" to "fully-closed". The positive result is the damping change.

Maintenance and overhaul frequency suggested by Bitubo at Bitubo service centres (service centre list in the "service" section at www.bitubo.com).