

**tmm**  
**RACING**



# Workshop Manual



**EN 250 - 300  
450**

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### Foreword

This publication, to be used by **TM Racing** workshops, has been drawn-up to assist authorised personnel in the maintenance and repair of motorcycles handled. Perfect knowledge of the technical data stated herein is decisive for the most complete professional training of the operator.

In order to make it easier to understand, the paragraphs have been distinguished by schematic illustrations, which highlight the topic in question.

This manual states information notes with particular meanings:

**⚠ DANGER** : Accident-prevention regulations for the operator and anyone operating in the vicinity.

**⚠ WARNING:** There is a possibility of damage to the vehicle and/or its components.

**NOTE:** Additional information inherent the operation in progress.

### Useful advice

In order to prevent problems on reaching an excellent final result, **TM Racing** srl recommends that the following generic regulations are complied with:

- in the event of any repair, assess the impressions of the Customer reporting the operating anomalies of the motorcycle and formulate appropriate questions in order to clarify the symptoms of the problem;
- clearly diagnose the cause of the anomaly. From this manual it is possible to assimilate the essential theoretical bases, which, moreover, must be integrated by personal experience and the participation of courses, which are periodically organised by **TM Racing**;
- plan the repair rationally, in order to prevent downtimes, receiving spare parts, preparation of tools etc.;
- reach the item to repair, limiting to the essential operations.

In this regard, consulting the disassembly sequence shown in this manual, will be of great help.

### General repair-related regulations

- 1 Always replace the gaskets, sealing rings and the cotter pins with new parts.
- 2 When loosening/tightening nuts or screws, always start with the largest ones or from the centre. Lock at the coupling torque prescribed, following a crosswise pathway.
- 3 Always mark all parts or positions that could be exchanged on re-mounting.
- 4 Use original **TM Racing** spare parts and recommended lubricants.
- 5 Use special tools, where specified.
- 6 Consult official Technical Memos, since they could contain more updated state adjustment data and methods of intervention, with respect to this manual.

**IMPORTANT:** Before operating on the motorcycle, disconnect the negative pole on the battery.



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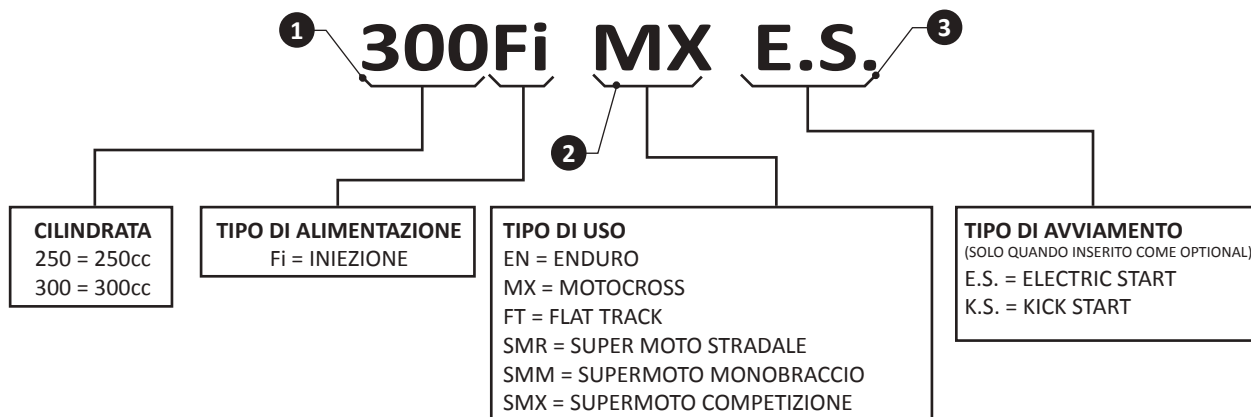
## 1. IDENTIFICATION OF THE VEHICLE





## RICONOSCERE I MODELLI DI MOTO TM RACING

ESEMPIO DI MODELLO MOTO



The displacement, type of power source and type of use define the motorcycle model and engine of each TM Racing motorcycle. The combination of codes 1 and 3 identifies the standard engine type. The combination of the three codes fully identifies the motorcycle model. All 3 codes are usually used in this Manual, to specify the motorcycle model to which certain information refers. If only codes 1 and 3 are indicated, followed by the word "ALL", it means that the information relates to all motorcycles with standard engine, regardless of the type of use. Code 2 (Type of Use) used alone means that the information refers to all motorcycles with that type of use, regardless of displacement and power source. All EN/SMR/SMM models are equipped as standard with electric start (E.S.) as well as kick start (K.S.). MX/SMX models have K.S. as standard and may be equipped with E.S. as an option.

Please make a note of your motorcycle's serial numbers in the boxes below.

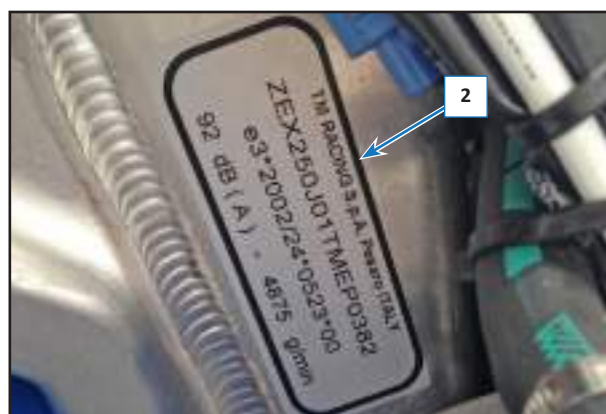
When it is necessary to contact TM for spare parts, updates or to report any issues, always quote the model, displacement, year of manufacture and, above all, the frame serial number and engine serial number.

### FRAME SERIAL NUMBER

The frame serial number (1) is stamped on the right-hand side of the steering head.

Make a note of this number in the space provided.

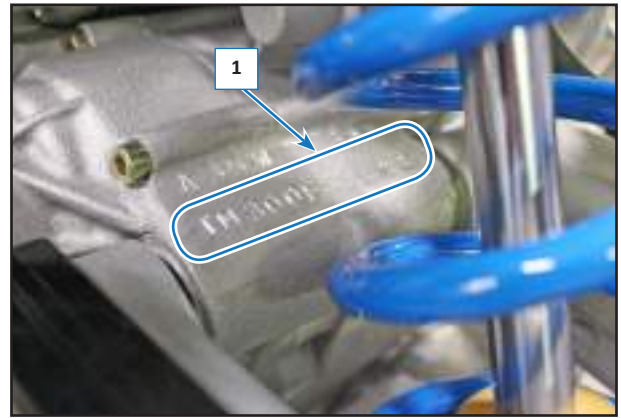
The serial number is also shown on a data plate (2) located on the left-hand side for EN / SMR / SMM models.



## ENGINE SERIAL NUMBER

The engine serial number (1) is embossed into the rear part of the engine, near to the shock absorber.

Make a note of this number in the relevant space at the beginning of the manual.



## KAYABA FORK CODE

The fork code (2) is a capital letter printed on the inside of each foot.



## TM SHOCK ABSORBER CODE

The shock absorber code (3) is printed on an adhesive label applied near to the compression braking valve.





## 2. TECHNICAL SPECIFICATIONS



## 2. TECHNICAL SPECIFICATIONS



FRAME TECHNICAL DATA 250Fi-300Fi-450Fi EN EU4 - 250Fi-300Fi-450Fi-530Fi EN				
MOTORCYCLE MODEL	250	300	450	530
Frame	High resistance aluminium alloy perimeter			
Front suspension	Kayaba USD Fork Ø 48 mm			
Front/rear suspension run	front 310mm -rear 320 mm			
Rear suspension	Aluminium swing arm, Progressive linkage, TM Racing Shock absorber			
Front disc brake	Ø 270 mm floating calliper			
Rear disc brake	Ø 245 mm floating calliper			
Front/rear brake disc wear limit	min 3.5 mm			
Front tyre	90/90 - 21" (100/80 - 21 OPT)			
Air pressure	1.0 bar (off-road) / 1.5 bar (on road)			
Rear tyre	120/90 - 18" (140/80 - 18" Opt.)		140/80 - 18"	
Off-road air pressure	1.0 bar (off-road) / 1.5 bar (on road)			
Tank capacity	6.75 litres			
Chain	O-Ring 5/8 x 1/4"			
Optional sprockets	48, 49, 50, 51, 52, 53			
Bulbs	High/low beam EU4 .....Led 13.2V 7.3W/14.7W Front position light EU4. ....Led 13.5V 0.8W High/low beam headlight..... HS1 12V 35/35W Front position light..... W5W 12V 5W Rear pos./stop/number plate lights ..... LED 12V 0.9W / 0.06W Turn indicator signal.....R10W 12V 10W			
Battery	12V - 24Wh - EQ - 5Ah			
Coolant fluid	1 litre			

LUBRICATION, TOP-UPS TABLE				
MOTORCYCLE MODEL	250	300	450	530
Engine gearbox, primary transmission lubrication oil	SAE 10W/50 (1.25/1.35 litres)		SAE 20W/50 (1.4/2.5 litres)	
Engine coolant fluid	fluid, 40% antifreeze, 60% water (up to -25°C) - forced circulation with pump			
Braking systems fluid	DOT 4			
Clutch fluid	DOT 4			

**250Fi - 300Fi EN MAINTENANCE TABLE**
**A CLEAN MOTORCYCLE CAN BE INSPECTED FASTER AND AT A LOWER COST**

	After 1 hour	Every 15 hours	Every 30 hours (after every ride)	Every 45 hours	Every 135 hours (75 hours of sports use)	Every year
Check steering bearings and play adjustment	•	•	•			
Clean and grease steering bearings and relative sealing elements						•
Bleed telescopic fork		•	•			
Clean dust scraper			•			
Check seal and operation of fork and shock absorber			•			
Full fork maintenance				•	•	
Full shock absorber maintenance				•	•	
Check tightness of screws and smooth linkage running for rear suspension		•	•			
Check frame and swing arm		•	•			
Check swing arm bearings			•			
Lubricate movable parts (side stand, levers, etc.) and check their movement		•	•			
Check tightness of chassis screws (fork plates, fork feet, wheel pin nuts and screws, swing arm pin, shock absorber)	•	•	•			
Check wear on chain, junction mesh, pinion, sprocket and guides, chain tension		•	•			
Lubricate chain		•	•			
Check fluid level in hydraulic clutch control tank		•	•			
Replace hydraulic clutch fluid						•
Check brake fluid level, pad thickness, front and rear brake discs		•	•			
Replace front and rear brake fluid						•
Check condition and sealing of brake pipes		•	•			
Check operation, adjustment, smoothness and free play of front brake lever and rear brake pedal		•	•			
Check tightness of braking system screws		•	•			
Check wheel hubs, spoke tension and rim centring	•	•	•			
Check wheel bearing play		•	•			
Check tyre condition and pressure	•	•	•			
Check battery and charge it if necessary		•	•			
Treat battery connections with grease for contacts		•	•			
Treat electrical contacts and switches with spray for contacts		•	•			
Check headlight direction	•	•	•			
Check electrical system operation (low beam, high beam, stop light, turn indicator signals, control indicators, horn, safety button/switch)		•	•			

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## 250Fi - 300Fi EN MAINTENANCE TABLE

A CLEAN MOTORCYCLE CAN BE INSPECTED FASTER AND AT A LOWER COST

	After 1 hour	Every 15 hours	Every 30 hours (after every ride)	Every 45 hours	Every 135 hours (75 hours of sports use)	Every year
Check cooling system seal and coolant level	•	•	•			
Check condition and arrangement of rubber pipes without bends	•	•	•			
Check condition and arrangement of bleed hoses without bends	•	•	•			
Check electric fan operation (if installed)	•	•	•			
Replace silencer soundproofing material			•			
Check exhaust system sealing and fixing	•	•	•			
Clean air filter and filter housing		•	•			
Check condition and sealing of throttle body coupler and filter housing		•	•			
Check fuel pressure		•	•			
Check accelerator cables play and idle speed adjustment	•	•	•			
Check conditions, smoothness and arrangement without bends, adjustment and lubrication of control cables		•	•			

 **WARNING**

Components must be replaced if a defect is detected or wear limit values are exceeded at the check.  
The afore-mentioned operations must be performed by an authorised TM workshop or by specialised personnel.

The hour meter is integrated inside the dashboard.

### 450FI EN MAINTENANCE TABLE

A CLEAN MOTORCYCLE CAN BE INSPECTED FASTER AND AT A LOWER COST

	After 1 hour	Every 15 hours	Every 30 hours (after every ride)	Every 45 hours	Every 135 hours (75 hours of sports use)	Every year
Check steering bearings and play adjustment	•	•	•			
Clean and grease steering bearings and relative sealing elements						•
Bleed telescopic fork		•	•			
Clean dust scraper			•			
Check seal and operation of fork and shock absorber			•			
Full fork maintenance				•	•	
Full shock absorber maintenance				•	•	
Check tightness of screws and smooth linkage running for rear suspension		•	•			
Check frame and swing arm		•	•			
Check swing arm bearings			•			
Lubricate movable parts (levers, etc.) and check their movement		•	•			
Check tightness of chassis screws (fork plates, fork feet, wheel pin nuts and screws, swing arm pin, shock absorber)	•	•	•			
Check wear on chain, junction mesh, pinion, sprocket and guides, chain tension		•	•			
Lubricate chain		•	•			
Check fluid level in hydraulic clutch control tank		•	•			
Replace hydraulic clutch fluid						•
Check brake fluid level, pad thickness, front and rear brake discs		•	•			
Replace front and rear brake fluid						•
Check condition and sealing of brake pipes		•	•			
Check operation, adjustment, smoothness and free play of front brake lever and rear brake pedal		•	•			
Check tightness of braking system screws		•	•			
Check wheel hubs, spoke tension and rim centring	•	•	•			
Check wheel bearing play		•	•			
Check tyre condition and pressure	•	•	•			
Check battery and charge it		•	•			
Treat battery connections with grease for contacts		•	•			
Treat electrical contacts and switches with spray for contacts		•	•			
Check headlight direction	•	•	•			

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## 450FI EN MAINTENANCE TABLE

## A CLEAN MOTORCYCLE CAN BE INSPECTED FASTER AND AT A LOWER COST

	After 1 hour	Every 15 hours	Every 30 hours (after every ride)	Every 45 hours	Every 135 hours (75 hours of sports use)	Every year
Check electrical system operation (low beam, high beam, stop light, turn indicator signals, control indicators, horn, safety button/switch)		•	•			
Check cooling system seal and coolant level	•	•	•			
Check condition and arrangement of rubber pipes without bends	•	•	•			
Check condition and arrangement of bleed hoses without bends	•	•	•			
Check electrovalve operation (if installed)	•	•	•			
Replace silencer soundproofing material			•			
Check exhaust system sealing and fixing	•	•	•			
Clean air filter and filter housing		•	•			
Check condition and sealing of throttle body coupler and filter housing		•	•			
Check fuel pressure		•	•			
Check accelerator cables play and idle speed adjustment	•	•	•			
Check conditions, smoothness and arrangement without bends, adjustment and lubrication of control cables		•	•			

 **WARNING**

Components must be replaced if a defect is detected or wear limit values are exceeded at the check.  
The afore-mentioned operations must be performed by an authorised TM workshop or by specialised personnel.  
The hour meter is integrated inside the dashboard.

## FRAME COUPLING TORQUES

Front wheel pin flanged nut	M20x1.5	40 Nm
Front brake calliper fix. screw (EN/MX)	M8	25 Nm
Front brake calliper fix. screw (SMR/SMM/SMX)	M10	40 Nm
Rear brake calliper fix. screw (SMM)	M8	25 Nm
Front brake disc fix. screw	M6 cl. 10.9	15 Nm
Rear brake disc fix. screw (EN/MX/SMR/SMX)	M6 cl. 10.9	15 Nm
Rear brake disc fix. screw (SMM)	M8	25 Nm
Upper fork head tightening screw	M8	20 Nm
Lower fork head tightening screw	M8	15 Nm
Kayaba fork foot tightening screw	M8	20 Nm
Rear wheel pin flanged nut	M22x1.5	80 Nm
Swing arm pin flanged nut	M16x1.5	70 Nm
Handlebar tightening cap screws	M8	15 Nm
Handlebar elastic support nut	M10	45 Nm
Upper shock absorber nut	M10x1.25	40 Nm
Lower shock absorber nut	M10x1.25	35 Nm
Sprocket nuts	M8	35 Nm
Rear brake pedal adjusting nut	M6	15 Nm
Engine fixing screw	M10	45 Nm
Generic frame screws	M6 M8 M10	10 Nm 25 Nm 45 Nm
Generic frame nuts	M6 M8 M10	15 Nm 30 Nm 50 Nm







## 3. DIAGNOSIS





Performing the scheduled maintenance on your motorcycle will make problems unlikely. However, should a problem occur, check the troubleshooting table and follow the instructions provided to solve the problem.



The table has two columns indicating who should perform the intervention:

- the  symbol indicates that the intervention must be performed by the user:
- the  symbol indicates that the intervention must be performed by a technician or at an authorised TM workshop.



Therefore, for your safety, have such work performed only at a specialised TM workshop, where your motorcycle will be serviced optimally by specifically trained personnel. Contact a TM dealer if you have any questions. For anything not covered in this paragraph, consult the “PDA” section.

PROBLEM	CAUSE	SOLUTION		
<b>ENGINE DOES NOT TURN OVER (MODELS WITH E.S.)</b>	Incorrect command (EN/SMR/SMM).	Correctly repeat the procedure to activate the starter motor according to the motorcycle model.	•	
	Ignition key not inserted or not turned (SMR/SMM).	Insert the ignition key and turn it clockwise.	•	
	Incorrect command (MXE.S. and SMXE.S.).	Correctly repeat the procedure to activate the starter motor according to the motorcycle model.	•	
	Faulty start relay.	Check the start relay and replace it.		•
	Battery dead.	Charge the battery and find the cause of discharging.		•
	Very low environment temperature.	Start the engine using the kick starter vigorously.	•	
	Faulty starter motor.	Check the starter motor		•
	30A fuse burned	Check the fuse and replace it if necessary	•	

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PROBLEM	CAUSE	SOLUTION		
<b>ENGINE TURNS OVER BUT FAILS TO START</b>	Incorrect command	Correctly repeat the engine start procedure according to the motorcycle model.		
	No fuel supply to the engine.	Refuel.	•	
		Check the petrol pump and fuel pipe connections.	•	
		Check fuel pressure.		•
	Incorrect idle speed adjustment.	Correctly adjust the idle speed.	•	
	Engine flooded.	Follow the hot start procedure.	•	
	Spark plug wet.	Clean and dry the spark plug or replace it if required	•	
	Incorrect distance between electrodes.	Adjust the distance between electrodes to 0.8 mm.	•	
	Faulty ignition system.	Check the ignition system (PDA).		•
	Faulty injection system.	Check the injection system (PDA).		•
	Damaged wiring	Check the wiring, earth connections, connectors, cables and sheaths integrity		•
Damaged spark plug cap	Check the spark plug cap and replace it if required.	•		
Faulty stop switch (EN/SMR/SMM).	Check the start and stop command.		•	
Faulty engine stop button (MX/SMX).	Check the engine stop button.		•	
<b>ENGINE DOES NOT KEEP RUNNING AT IDLE</b>	Incorrect idle speed adjustment.	Correctly adjust the idle speed.	•	
	Damaged spark plug.	Replace the spark plug.	•	
	Faulty ignition system.	Check the ignition system (PDA).		•
	Insufficient valve play.	Adjust valve play.		•
<b>ENGINE DOES NOT REACH FULL SPEED</b>	Faulty ignition system.	Check the ignition system (PDA).		•
	Faulty injection system.	Check the injection system (PDA).		•
	Faulty ECU.	Replace the ECU.		•

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PROBLEM	CAUSE	SOLUTION		
<b>INSUFFICIENT ENGINE POWER</b>	Air filter clogged.	Clean or replace the air filter.	•	
	Faulty injection system.	Check the injection system (PDA).		•
	Exhaust system not sealed, deformed or silencer fibreglass needs replacing.	Check the faulty parts on the exhaust system, replace the fibreglass in the exhaust silencer.		•
	Insufficient valve play.	Adjust valve play.		•
	Faulty ignition system.	Check the ignition system (Diagnostic Tool)		•
	Faulty ECU.	Replace the ECU.		•
	Fuel filter clogged.	Replace the fuel filter.		•
<b>ENGINE MISFIRES OR SWITCHES OFF WHILE RUNNING</b>	No fuel supply to the engine.	Refuel. Check the petrol pump and fuel pipe connections. Check fuel pressure.	•	•
	Damaged spark plug.	Replace the spark plug.	•	
	Faulty ignition system.	Check the ignition system (Diagnostic Tool)		•
	Faulty injection system.	Check the injection system (Diagnostic Tool)		•
	Faulty ECU.	Replace the ECU.		•
<b>ENGINE OVERHEATS ExCESSIVELY</b>	Insufficient fluid in the cooling system.	Check and top-up the coolant level. Check the sealing of the cooling system.	• •	
	Insufficient ventilation.	Ride for a while on a flat road at moderate speed without stressing the engine (an optional electric fan can be fitted).	•	
	Air in cooling circuit.	Bleed the cooling system.	•	
	The radiator fins are very dirty.	Clean the radiator fins with water (not pressurised).	•	
	Formation of foam in the cooling system.	Replace the coolant using a good brand of anti-freeze.	•	
<b>LIGHTS, SPEEDOMETER, HORN AND DIRECTION INDICATOR SIGNALS DO NOT WORK</b>	Services fuse burned	Check the 10A services fuse and replace it.	•	
<b>BATTERY IS DISCHARGED EVEN IF THE MOTORCYCLE HAS BEEN USED RECENTLY</b>	The battery is not charged by the generator.	Check the generator and voltage regulator.		•
	The battery is damaged.	Replace the battery.		•

In order to allow authorised workshops and the most demanding users to work directly on the EFI system, TM Racing has an (optional) PDA for TM Racing motorcycles equipped with a fuel injection system.

This instrument, with dimensions of 228 x 168 x 45, is suitable for any operating conditions, in the workshop, on the track and on the test bench. It has an internal rechargeable battery, which can power the control unit and is able to communicate even when the engine is off.

Alternatively, it is possible to connect the instrument to an external 12V battery and communicate with the control unit using the same procedures. The 7" colour display is a touch-screen that can also interact with a pen, track ball or mouse connected via the instrument USB port, which can also be used for USB pendrives.

The instrument is also equipped for Ethernet, has COM port, mini USB port and power supply connections.

When connected via CAN to the control unit, the instrument allows the following to be performed:

- Check the motorcycle EFI system operation (Electronic diagnosis)
- Check some engine functions (Mechanical diagnosis)
- Check the data entered in the control unit
- Change the maps in the control unit (only Racing models)
- Display the engine operating hours
- Upload new maps provided by TM Racing (Racing models only)
- Acquire data in real time in 2D and numerical format.

The instrument receives continuous software and firmware updates allowed by the specific hardware configuration without additional costs, and is available for sale to all TM Racing Clients.

**⚠ WARNING**

In order to improve its products continuously, TM Racing reserves the right to vary the afore-mentioned data.

Thanks to the use of the diagnostic PDA, it is possible to correct the basic maps, in terms of ignition advance and injection timing, within a specific value range in motorcycles intended for off-road or competition use.

This instrument also allows the map to be changed to an already mapped control unit, adapting it to another type of motorcycle.

For the safety of people and in order to retain the warranty, it is prohibited to use maps created by TM Racing for a specific model on another motorcycle of different displacement and/or type.

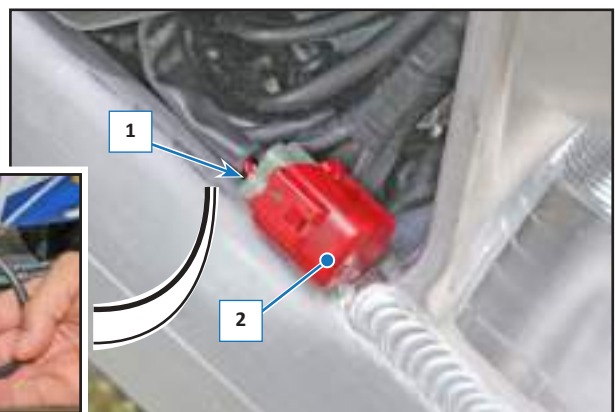
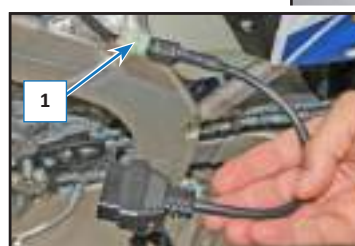


## CONNECTING OBD TOOL TO EURO 4 MOTORCYCLES

- The socket for connecting this tool is on the left of the motorcycle, below the Airbox.
- Extract the socket (1), remove the protective cap (2) and connect the tool.

**⚠ WARNING**

After having performed the required adjustments, put the protective cap (2) back into the socket (1).







## 4. REGISTRATIONS/ADJUSTMENTS



### 4.1 CHECKING COOLANT LEVEL

With the engine cold, open the radiator filler cap. The fluid must cover the channels by approximately 10 mm. If the level is too low, top up immediately with more fluid mix and bleed the air.

Use water only if strictly necessary and in small amounts, to avoid reducing the properties of the fluid.

#### **⚠ DANGER**

- IF POSSIBLE, CHECK THE COOLANT LEVEL WHILE THE ENGINE IS COLD. IF IT IS NECESSARY TO OPEN THE RADIATOR FILLER CAP WHILE IT IS HOT, FIRST COVER IT WITH A CLOTH AND THEN SLOWLY OPEN IT TO DISCHARGE THE OVERPRESSURE.

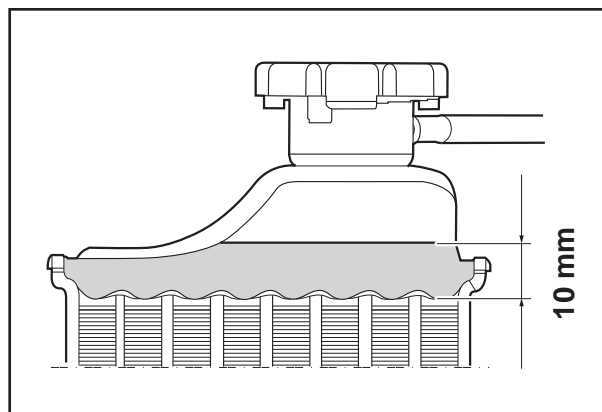
CAUTION: DANGER OF BURNS!

- IN CASE OF BURNS, IMMEDIATELY PLACE THE AREA AFFECTED UNDER COLD RUNNING WATER AND SEEK MEDICAL ADVICE.
- COOLANT IS TOXIC! KEEP IT OUT OF THE REACH OF CHILDREN.
- IF COOLANT IS SWALLOWED, SEEK MEDICAL ADVICE IMMEDIATELY.
- IF COOLANT GETS IN YOUR EYES, RINSE THEM IMMEDIATELY WITH COLD WATER AND SEEK MEDICAL ADVICE.

**NOTE:** The coolant is a mixture of 40% antifreeze and 60% water. However, the antifreeze protection limit must be at least -25°C. This mixture protects against freezing and is good for preventing corrosion. Therefore, it must not be replaced with pure water.

#### **⚠ WARNING**

- Always use top quality products to prevent corrosion or the formation of foam.



## 4.2 DRAINING, FILLING AND BLEEDING COOLING SYSTEM

Coolant can be drained by removing the screw (1) from the water pump cover on the right side of the engine. Prepare a suitable recipient to collect the fluid drained. The radiator cap must be open to drain the fluid. Once finished, screw in the drain screw and tighten to 12 Nm.

**NOTE:** Replace the aluminium sealing washer.

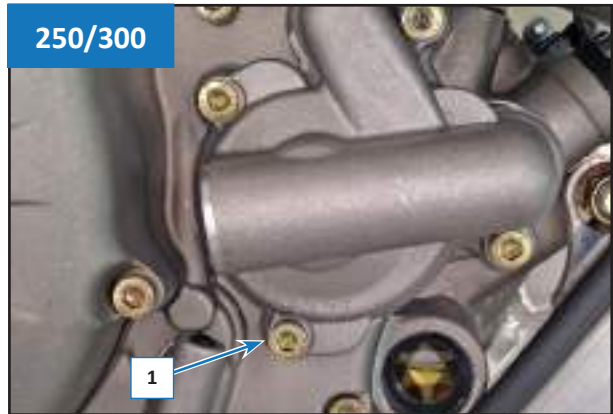
To fill the cooling system, pour the amount of coolant indicated in the "Technical Data" table through the filler neck (2). Close the radiator filling cap and start the engine for a few seconds. Switch off the engine, open the cap and check the level. Add fluid, if required. After a short ride check the coolant level again.

### **⚠ DANGER**

- DRAIN THE COOLANT, IF POSSIBLE WITH A COOL ENGINE. IF YOU MUST DRAIN THE COOLANT WITH A HOT ENGINE, SLOWLY OPEN THE RADIATOR CAP, BEING CAREFUL TO COVER IT WITH A CLOTH TO DISCHARGE OVERPRESSURE.  
**CAUTION: DANGER OF BURNS!**
- IN CASE OF BURNS, IMMEDIATELY PLACE THE AREA AFFECTED UNDER COLD RUNNING WATER AND SEEK MEDICAL ADVICE.
- COOLANT IS TOXIC! KEEP IT OUT OF THE REACH OF CHILDREN.
- IF COOLANT IS SWALLOWED, SEEK MEDICAL ADVICE IMMEDIATELY.
- IF COOLANT GETS IN YOUR EYES, RINSE THEM IMMEDIATELY WITH COLD WATER AND SEEK MEDICAL ADVICE.

### **⚠ WARNING**

- When the coolant has been drained, when re-filled it is absolutely necessary to bleed the cooling system.
- Always use top quality products to prevent corrosion or the formation of foam.



## 4.3 HYDRAULIC CLUTCH PUMP

### ADJUSTING THE LEVER POSITION

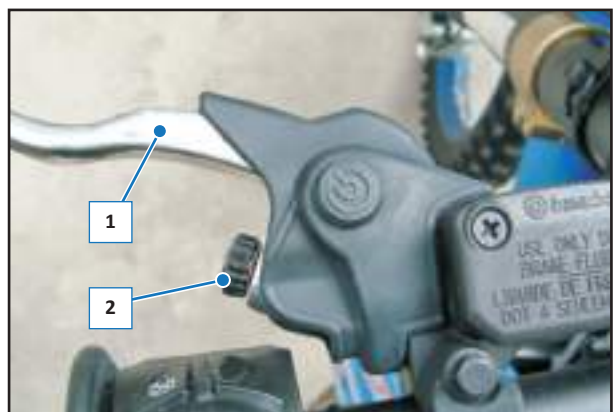
The position of clutch lever (1) with respect to the grip can be changed with the adjusting knob (2).

- Turn the knob (2) clockwise in steps to move the lever away or anticlockwise to move the lever closer.

### **⚠ WARNING**

When the operation is complete, make sure that the clutch lever has free travel before engaging the clutch.

The free travel must be approx. 3 mm



### CHECKING AND TOPPING UP THE HYDRAULIC FLUID LEVEL

The fluid tank is part of the clutch pump located on the handlebar.

- Remove screws (3), cover (4) and membrane (5).
- The fluid level must be 5 mm below the edge with the tank in horizontal position.
- Top-up if required. Use DOT4 brake hydraulic fluid.
- Re-mount the membrane, cover and screws and tighten. Use water to wash away any hydraulic fluid that overflowed or was spilled.



#### **⚠ DANGER**

- IF THE LEVEL OF THE HYDRAULIC FLUID DROPS BELOW THE PRE-ESTABLISHED MEASUREMENT, THERE MIGHT BE LEAKS IN THE SYSTEM OR A MECHANICAL PROBLEM.
- KEEP THE HYDRAULIC FLUID OUT OF THE REACH OF CHILDREN.
- THE HYDRAULIC FLUID MAY IRRITATE SKIN. AVOID CONTACT WITH SKIN AND EYES. IF THE HYDRAULIC FLUID SPLASHES IN THE EYES, RINSE CAREFULLY WITH WATER AND SEEK MEDICAL ADVICE.

#### **⚠ WARNING**

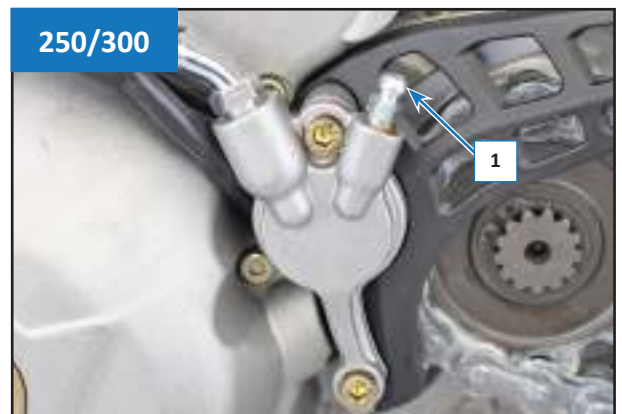
- Only use DOT4 brake hydraulic fluid for the clutch hydraulic control. Never use DOT5 or other fluids.
- Keep the brake hydraulic fluid from coming into contact with painted parts; brake fluid corrodes paint.
- Only use clean brake fluid coming from hermetically-sealed containers.

### 4.4 BLEEDING HYDRAULIC CLUTCH

- To bleed the air, disassemble the cover of the clutch pump on the handlebar.
  - Connect the suction device to bleeder screw (1) of the clutch cylinder on the engine and activate it, while simultaneously loosening bleeder screw (1). Continue until no air and only fluid comes out of the bleeder screw (1).
  - Tighten the bleeder screw (1).
  - Disconnect the suction device.
- During this operation, check that the clutch pump tank level is always sufficient to prevent the pump from taking up air. Top-up with DOT4 brake hydraulic fluid, when required.

#### **⚠ WARNING**

- Only use DOT4 brake hydraulic fluid for the clutch hydraulic control. Never use DOT5 or other fluids.
- Keep the brake fluid from coming into contact with painted parts; brake fluid corrodes paint.
- Only use clean brake fluid coming from hermetically-sealed containers.



### 4.5 NISSIN FRONT BRAKE PUMP

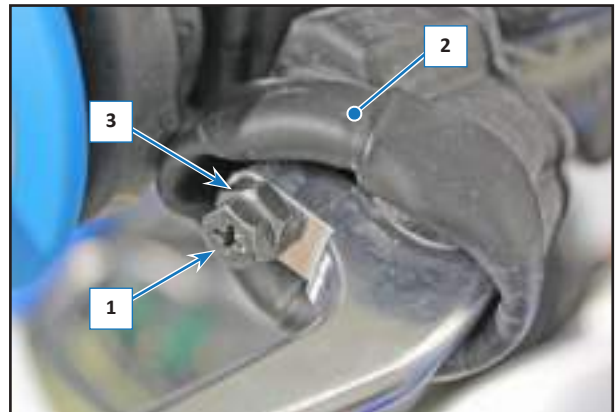
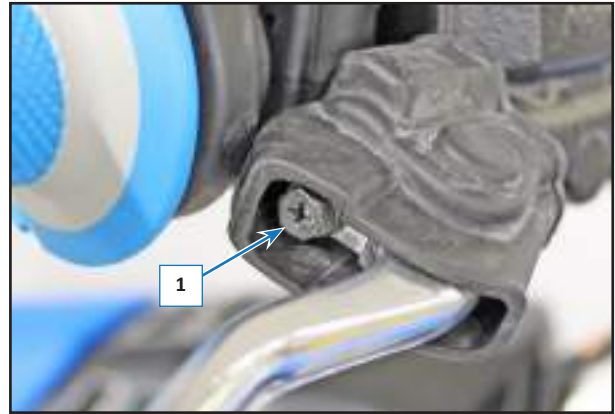
#### ADJUSTING THE LEVER POSITION

The position of front brake lever with respect to the grip can be changed with the adjusting screw (1).

- Remove the rubber protection (2).
- Loosen counter-nut (3) and rotate the screw clockwise to move the lever away or anticlockwise to move the lever closer.
- Tighten the counter-nut again (3).

#### ⚠ WARNING

When the operation is complete, make sure that the front brake lever has free travel of 3 mm before engaging the brake and that the front wheel can rotate freely with the lever at rest. If there is no free travel, pressure forms in the brake system, and as a result, the front wheel brake may fail due to overheating or to the wheel itself locking.

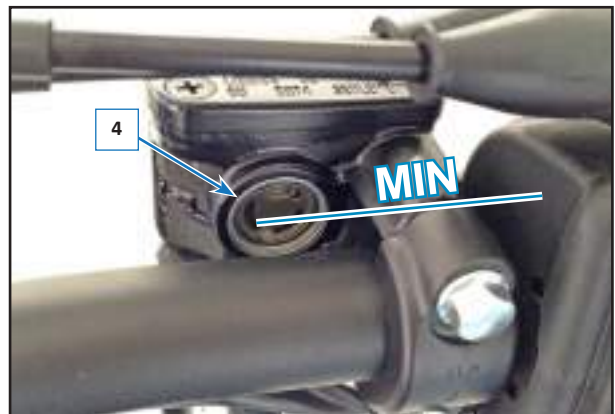


#### CHECKING BRAKE FLUID LEVEL

The fluid tank is part of the front brake pump located on the handlebar and has an inspection indicator (4). With the tank in horizontal position, the fluid level must never drop below the indicator centreline.

#### ⚠ DANGER

IF THE BRAKE FLUID LEVEL DROPS BELOW THE MINIMUM VALUE, IT MEANS THERE IS A LEAK IN THE BRAKE SYSTEM OR THAT THE BRAKE PADS ARE BEYOND THE LIMITS ALLOWED.



#### TOPPING UP BRAKE FLUID

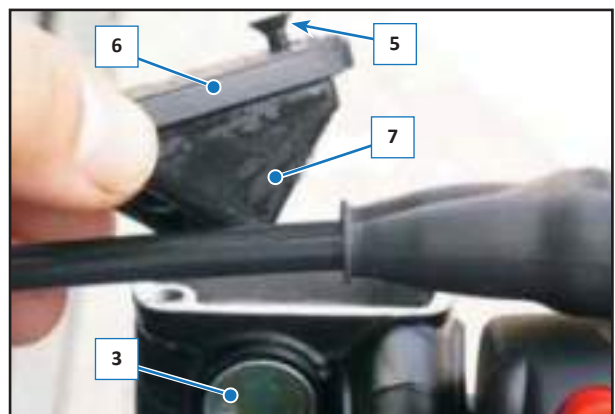
- Remove screws (5), cover (6) and membrane (7).
- Place the tank horizontally and top-up with DOT4 brake fluid up to the upper limit of the inspection indicator (3).
- Re-mount the membrane, cover and screws and tighten. Use water to wash away any brake fluid that overflowed or was spilled.

#### ⚠ DANGER

- KEEP THE BRAKE FLUID OUT OF THE REACH OF CHILDREN.
- THE BRAKE FLUID MAY IRRITATE SKIN. AVOID CONTACT WITH SKIN AND EYES. IF THE BRAKE FLUID SPLASHES IN THE EYES, RINSE CAREFULLY WITH WATER AND SEEK MEDICAL ADVICE.

#### ⚠ WARNING

- Keep the brake fluid from coming into contact with painted parts; brake fluid corrodes paint.
- Only use clean brake fluid coming from hermetically-sealed containers.



## 4.6 BREMBO FRONT BRAKE PUMP

### ADJUSTING THE LEVER POSITION

- The position of front brake lever with respect to the grip can be changed with the adjusting screw (1).
- Turn the knob (1) clockwise to move the lever away or anticlockwise to move the lever closer.

### ⚠ WARNING

When the operation is complete, make sure that the front brake lever has free travel of 3 mm before engaging the brake and that the front wheel can rotate freely with the lever at rest. If there is no free travel, pressure forms in the brake system, and as a result, the front wheel brake may fail due to overheating or to the wheel itself locking.

### CHECKING BRAKE FLUID LEVEL

The fluid tank is part of the front brake pump located on the handlebar and has an inspection indicator (2). With the tank in horizontal position, the fluid level must never drop below the indicator centreline.

### ⚠ DANGER

IF THE BRAKE FLUID LEVEL DROPS BELOW THE MINIMUM VALUE, IT MEANS THERE IS A LEAK IN THE BRAKE SYSTEM OR THAT THE BRAKE PADS ARE BEYOND THE LIMITS ALLOWED.

### TOPPING UP BRAKE FLUID

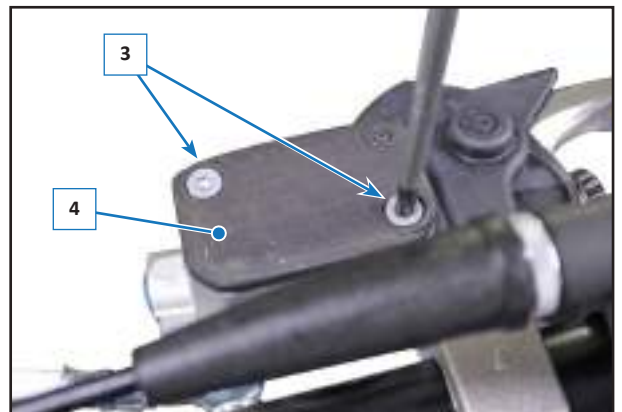
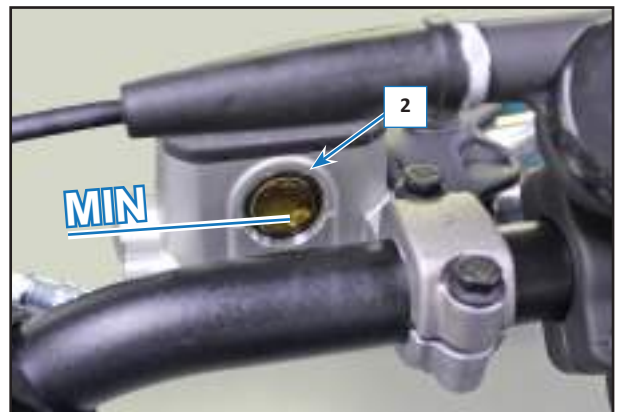
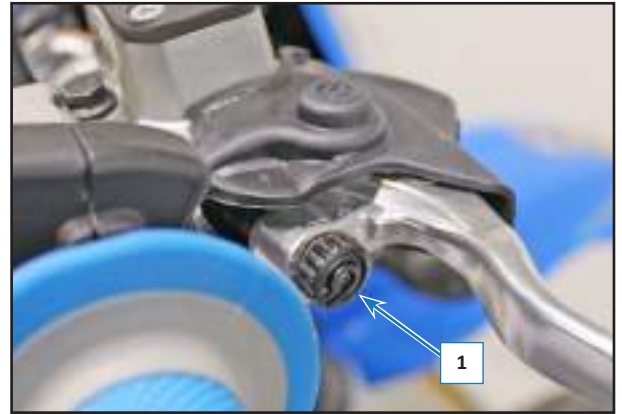
- Remove screws (3), cover (4) and membrane (5).
- Place the tank horizontally and top-up with DOT4 brake fluid up to the upper limit of the inspection indicator (2).
- Re-mount the membrane, cover and screws and tighten.
- Use water to wash away any brake fluid that overflowed or was spilled.

### ⚠ DANGER

- KEEP THE BRAKE FLUID OUT OF THE REACH OF CHILDREN.
- THE BRAKE FLUID MAY IRRITATE SKIN. AVOID CONTACT WITH SKIN AND EYES. IF THE BRAKE FLUID SPLASHES IN THE EYES, RINSE CAREFULLY WITH WATER AND SEEK MEDICAL ADVICE.

### ⚠ WARNING

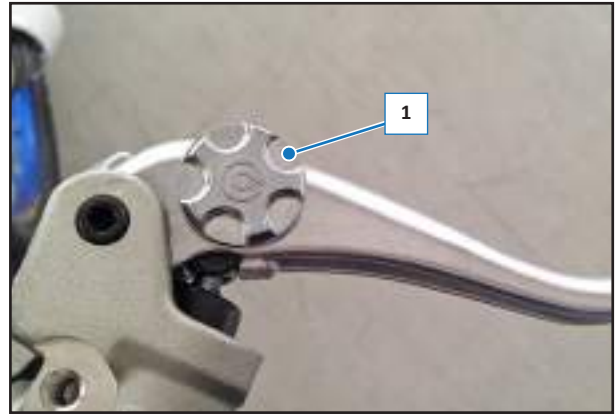
- Keep the brake fluid from coming into contact with painted parts; brake fluid corrodes paint.
- Only use clean brake fluid coming from hermetically-sealed containers.



### 4.7 BREMBO RADIAL FRONT BRAKE PUMP

#### ADJUSTING THE LEVER POSITION

The position of front brake lever with respect to the grip can be changed with the adjusting ring nut (1). Rotating clockwise, the lever moves away, rotating anticlockwise, to move it closer.



#### ⚠ WARNING

- When the operation is complete, make sure that the front brake lever has free travel of at least 3 mm before engaging the brake and that the front wheel can rotate freely with the lever at rest. If there is no free travel, pressure forms in the brake system, and as a result, the front wheel brake may fail due to overheating or to the wheel itself locking.

#### CHECKING BRAKE FLUID LEVEL

The fluid tank (2) is transparent to allow you to inspect the fluid level. With the tank in an upright position the fluid level must always be within the MAX and MIN indexes.

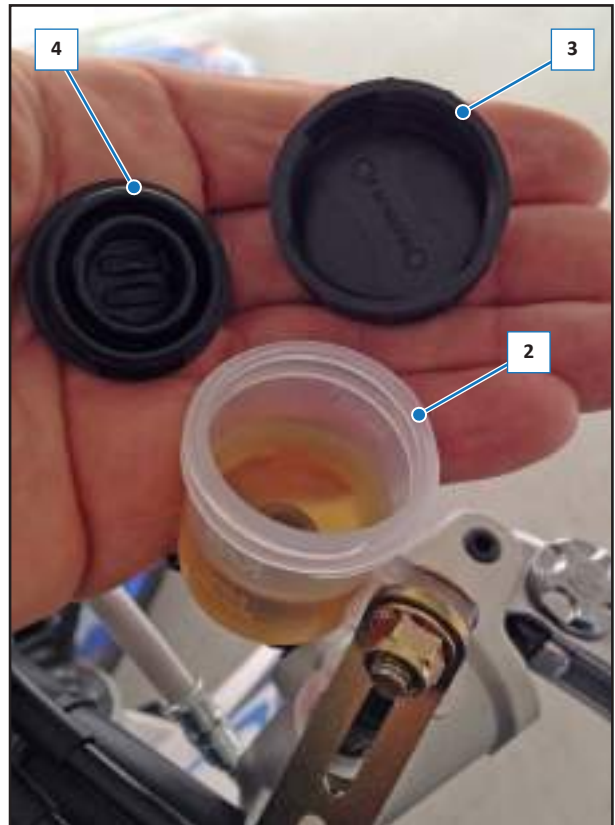
#### ⚠ DANGER

- IF THE BRAKE FLUID LEVEL DROPS BELOW THE MINIMUM VALUE, IT MEANS THERE IS A LEAK IN THE BRAKE SYSTEM OR THAT THE BRAKE PADS ARE BEYOND THE LIMITS ALLOWED.

#### TOPPING UP BRAKE FLUID

Loosen and remove the cover (3) and membrane (4). Place the tank vertically and top-up with DOT4 brake fluid to the tank's MAX index. Re-mount the membrane and cover and tighten.

Use water to wash away any brake fluid that overflowed or was spilled.



#### ⚠ DANGER

- KEEP THE BRAKE FLUID OUT OF THE REACH OF CHILDREN.
- THE BRAKE FLUID MAY IRRITATE SKIN. AVOID CONTACT WITH SKIN AND EYES. IF THE BRAKE FLUID SPLASHES IN THE EYES, RINSE CAREFULLY WITH WATER AND SEEK MEDICAL ADVICE.

#### ⚠ WARNING

- Keep the brake fluid from coming into contact with painted parts; brake fluid corrodes paint.
- Only use clean brake fluid coming from hermetically-sealed containers.



## 4.8 BREMBO 16X18 RADIAL FRONT BRAKE PUMP

### ADJUSTING THE LEVER POSITION

The position of front brake lever with respect to the grip can be changed with the adjusting wheel (1). Rotating clockwise, the lever moves away, rotating anticlockwise, to move it closer.

#### **⚠ WARNING**

- When the operation is complete, make sure that the front brake lever has free travel of 3 mm before engaging the brake and that the front wheel can rotate freely with the lever at rest. If there is no free travel, pressure forms in the brake system, and as a result, the front wheel brake may fail due to overheating or to the wheel itself locking.

### CHECKING BRAKE FLUID LEVEL

The fluid tank (2) is transparent to allow you to inspect the fluid level. With the tank in an upright position the fluid level must always be within the MAX and MIN indexes.

#### **⚠ DANGER**

- **IF THE BRAKE FLUID LEVEL DROPS BELOW THE MINIMUM VALUE, IT MEANS THERE IS A LEAK IN THE BRAKE SYSTEM OR THAT THE BRAKE PADS ARE BEYOND THE LIMITS ALLOWED.**

### TOPPING UP BRAKE FLUID

Loosen and remove the cover (3) and membrane (4). Place the tank vertically and top-up with DOT4 brake fluid to the tank's MAX index. Re-mount the membrane and cover and tighten.

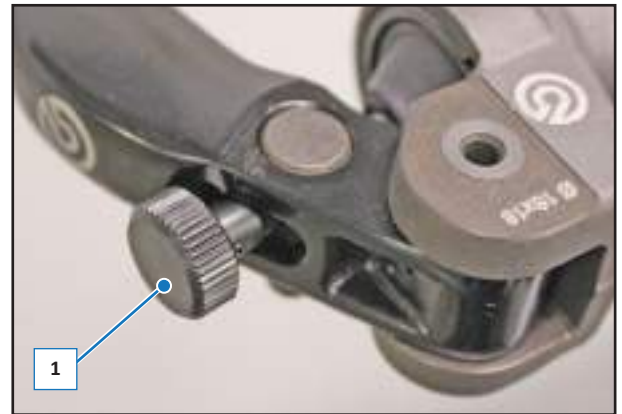
Use water to wash away any brake fluid that overflowed or was spilled.

#### **⚠ DANGER**

- **KEEP THE BRAKE FLUID OUT OF THE REACH OF CHILDREN.**
- **THE BRAKE FLUID MAY IRRITATE SKIN. AVOID CONTACT WITH SKIN AND EYES. IF THE BRAKE FLUID SPLASHES IN THE EYES, RINSE CAREFULLY WITH WATER AND SEEK MEDICAL ADVICE.**

#### **⚠ WARNING**

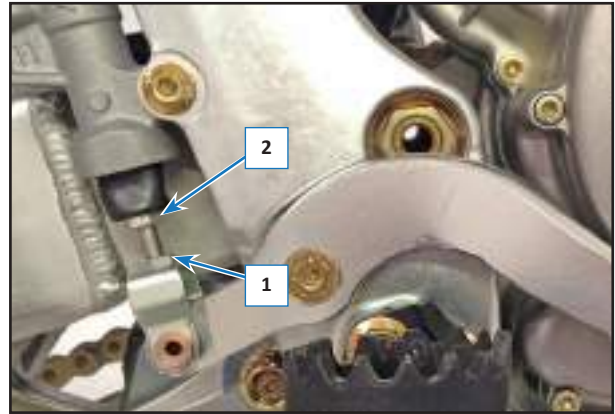
- Keep the brake fluid from coming into contact with painted parts; brake fluid corrodes paint.
- Only use clean brake fluid coming from hermetically-sealed containers.



### 4.9 CHANGING BASE POSITION OF REAR BRAKE PEDAL

Loosen the low M6 counter-nut (1) and rotate the adjustment screw using the hex head (2). Once the ideal position has been found, tighten the counter-nut.

The pedal free travel is given by the run of the pump piston. Make sure that the pedal has about 1.5 cm of free travel before starting to brake.



**⚠ WARNING**

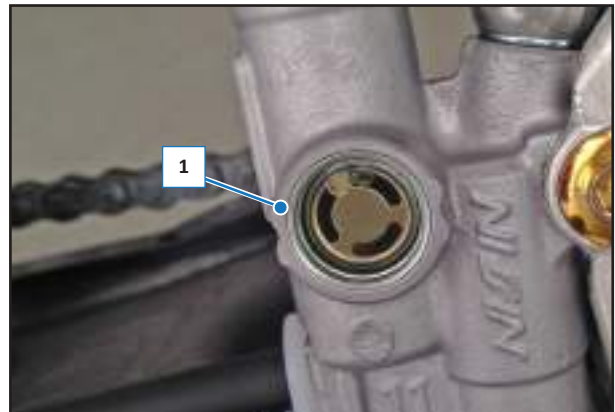
- If there is no free travel the brake system develops pressure that consequently brakes the rear wheel. The brake system overheats and, in extreme cases, it can fail completely.

### 4.10 CHECKING REAR BRAKE FLUID LEVEL

The rear disc brake fluid container is incorporated in the rear brake pump. When the motorcycle is upright, the level must always exceed the centreline of the indicator (1) located on the pump body.

**⚠ DANGER**

- IF THE BRAKE FLUID LEVEL DROPS BELOW THE MINIMUM VALUE, IT MEANS THERE IS A LEAK IN THE BRAKE SYSTEM OR THAT THE BRAKE PADS ARE COMPLETELY WORN.



#### TOPPING UP REAR BRAKE FLUID

Top-up as soon as the rear brake fluid level reaches the centreline of the indicator located on the pump body. To do this, loosen the two screws (1) and remove the cover (2). Top-up with DOT4 brake fluid to the end of the indicator. Re-mount the cover and tighten the screws.

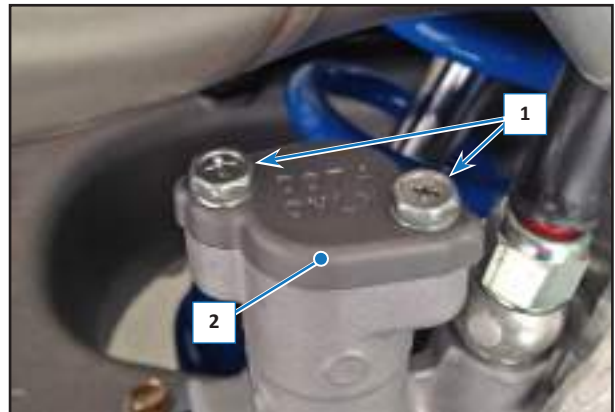
Use water to wash away any brake fluid that overflowed or was spilled.

**⚠ DANGER**

- KEEP THE BRAKE FLUID OUT OF THE REACH OF CHILDREN.
- THE BRAKE FLUID MAY IRRITATE SKIN. AVOID CONTACT WITH SKIN AND EYES. IF THE BRAKE FLUID SPRAYS IN THE EYES, RINSE CAREFULLY WITH WATER AND SEEK MEDICAL ADVICE.

**⚠ WARNING**

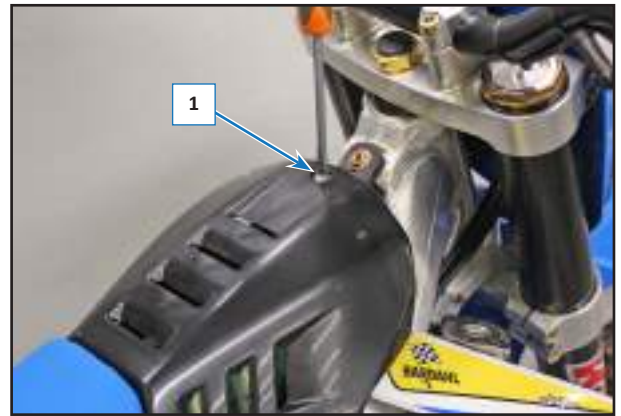
- Keep the brake fluid from coming into contact with painted parts; brake fluid corrodes paint!
- Only use clean brake fluid coming from hermetically-sealed containers.



#### 4.11 CLEANING THE AIR FILTER

Clean the air filter and perform maintenance on a regular basis. A dirty air filter affects air flow, reduces engine power, and increases fuel consumption. In some cases dust may enter the engine causing serious damage. Maintenance must therefore be performed on the air filter on a regular basis.

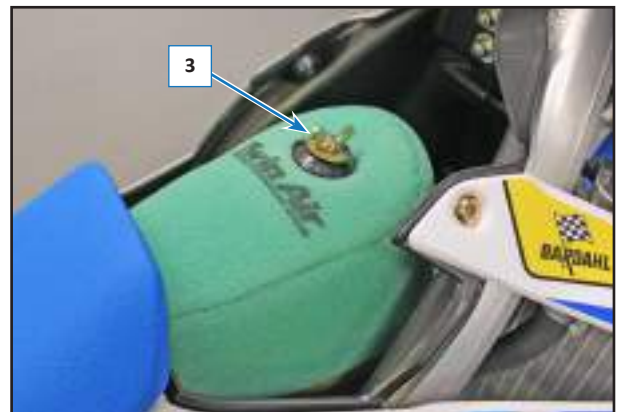
- Rotate the screw (1) by 1/4 of a turn.



- Lift the filter cover (2) and remove it.



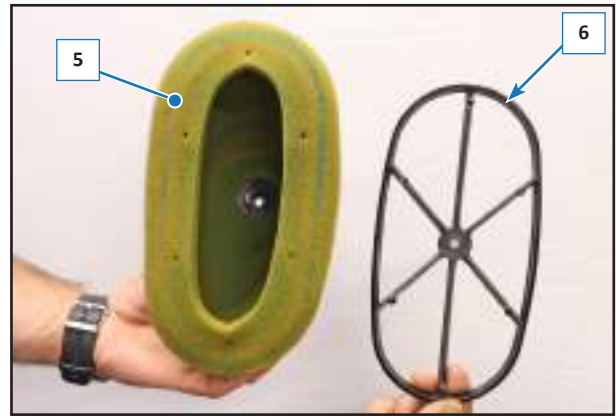
- Loosen the butterfly screw (3) and remove it.



- Carefully remove the filter (4) from its housing.



- Separate the sponge element (5) from the plastic cage (6). Carefully wash the sponge element with a special cleaning solution and let it air dry thoroughly. If necessary, squeeze the sponge gently but never wring it. Clean the plastic cage and the filter case and check that the sleeve that connects the throttle body to the filter case is intact and positioned correctly.
- Reassemble the sponge and the cage, making sure it has been previously oiled using filter oil. Re-mount the air filter, positioning it correctly on the support surface. Make sure none of the sponge edges are lifted or are non-adherent to the support surface.
- Tighten the butterfly screw (3) again.
- Re-mount the filter cover (2).



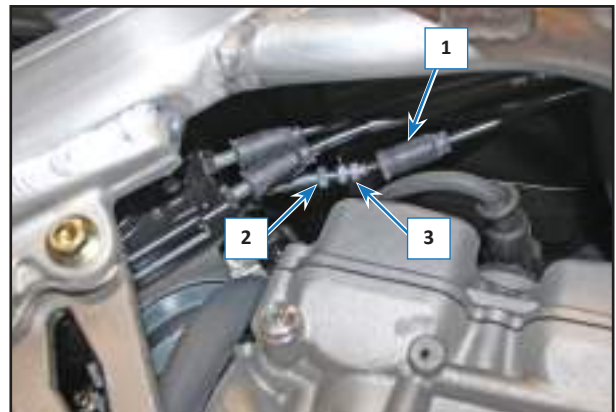
### **⚠ WARNING**

- Do not clean the sponge element with petrol or petroleum, which may corrode it. For correct maintenance, use specific products available on the market for cleaning and lubrication.
- Never start the motorcycle without the air filter. The infiltration of dust and dirt may cause damage and serious wear.
- Make sure that the seal between the rubber sleeve and filter case is perfect and make sure that the sponge element has been correctly assembled on the plastic cage. Any leaks can take sand or dirt into the engine.

### 4.12 STARTER AUXILIARY DEVICE

The starter auxiliary lever must have free travel of 1 - 15 mm. Operate as follows to adjust play:

- Move the protection cap (1) onto the throttle body;
- Loosen the counter-nut (2) and operate on the adjuster (3) until the play required is obtained. By tightening the screw (3), free travel increases.



### 4.13 ACCELERATOR COMMAND CABLES ADJUSTMENT

#### THROTTLE BODY

The accelerator grip must be adjusted according to the preference of the rider, but must always have at least 4-5 mm play.

- To adjust the play, move the protective caps (1).
- First, adjust the opening cable (upper) and then the closing cable (lower). Refer also to the wording on the sheaths.

#### Opening cable

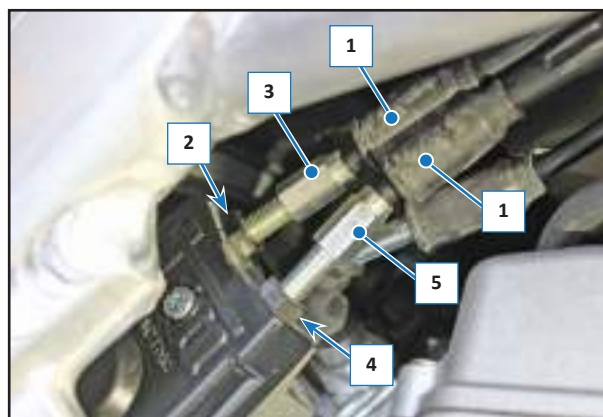
- Loosen the counter-nut (2) and tighten or loosen the adjuster (3) until the play required is obtained. Tightening the adjuster free travel increases.
- By loosening the adjuster free travel decreases.
- Tighten the counter-nut and make sure the grip rotates smoothly.

#### Closing cable

- Loosen the counter-nut (4) and tighten or loosen the adjuster (5) until the play required is obtained. Tightening the adjuster free travel increases.
- By loosening the adjuster free travel decreases.
- Tighten the counter-nut and make sure the grip rotates smoothly.
- When adjustment has been completed, re-position the protective caps.

#### ⚠ WARNING

- With the engine running, make sure that the minimum idle speed is correct and that it does not increase when you steer to the right or left up to stopping.



### 4.14 ADJUSTING IDLE SPEED

Adjusting the idle speed greatly affects engine start-up, i.e. an engine with correctly adjusted idle speed will be easier to start than an engine with incorrect idle speed adjustment.

Every TM Racing motorcycle is delivered with idle speed adjustment suitable for the type of motorcycle. This adjustment can be varied when needed.

With the engine running, sufficiently warm and, without touching the accelerator grip, rotate knob (1) on the left side of the motorcycle. Rotating clockwise increases the idle speed or anticlockwise decreases it.

Do not adjust the idle speed too low. If you have a rev. counter, never drop below 2500 rpm for 250 / 300 cc. and 2200 rpm for 450 / 530 cc. with engine warm.

Alternatively to the rev. counter, the TM Racing "hand-held instrument" for diagnosis and programming can be used.

#### ⚠ WARNING

- Never adjust the minimum idle speed with the engine off as the engine may not start-up again.

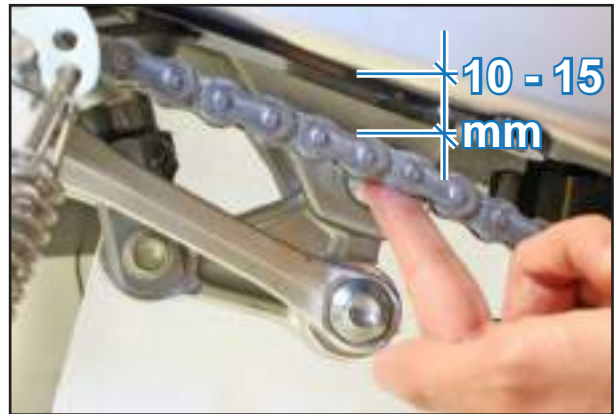


**4.15 CHECKING CHAIN TENSION**

- Put the motorcycle up on the centre stand to check the chain tension.
- Push the chain upwards at the end of the drive chain runner.

The upper part of the chain must be taut.

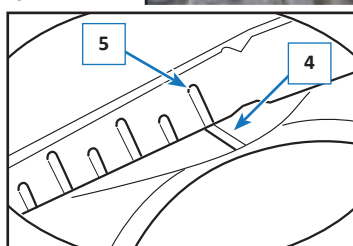
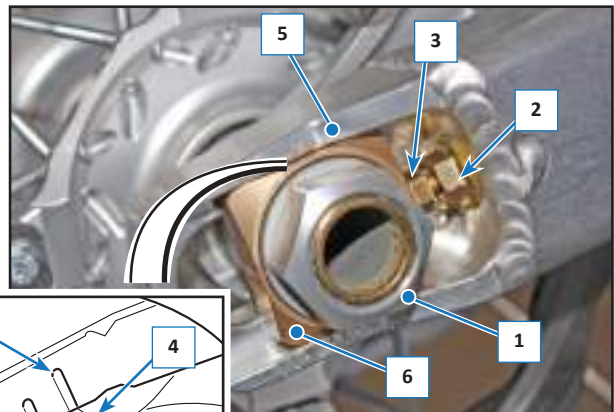
The distance between the swing arm and the lower part of the chain (A) must be approx. 10-15 mm. Adjust the tension, if required.


**⚠ DANGER**

- **IF THE CHAIN IS TOO TIGHT, THE FINAL TRANSMISSION COMPONENTS (CHAIN, PINION AND SPROCKET, BEARINGS, GEARBOX AND REAR WHEEL) ARE GREATLY STRESSED. IN ADDITION TO EARLY WEAR, IN EXTREME CASES, THE CHAIN OR THE SECONDARY GEARBOX SHAFT CAN BREAK.**
- **IF THE CHAIN TENSION IS INSUFFICIENT, IT CAN JUMP OFF THE PINION AND LOCK THE REAR WHEEL OR DAMAGE THE ENGINE.**
- **IN BOTH CASES, CONTROL OF YOUR MOTORCYCLE CAN BE LOST EASILY.**

**4.16 CHAIN TENSIONING (EN/MX/SMR/SMX)**

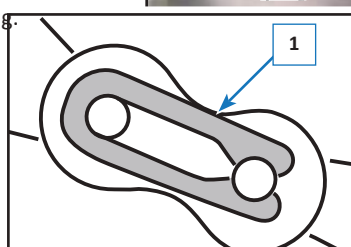
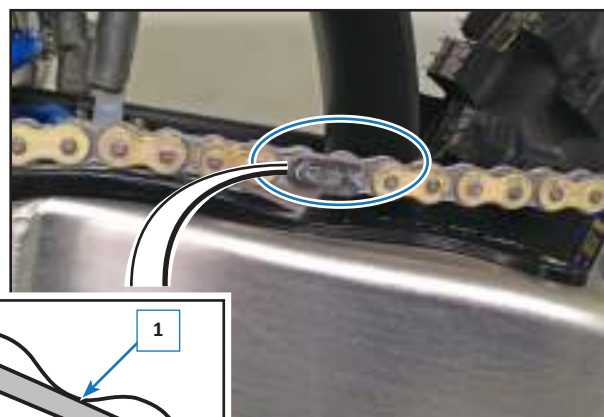
- Loosen nut (1) of the wheel pin. loosen the counter-nuts (2) from both sides and operate on the adjustment screws (3) from both sides by the same amount.
- To increase the chain tension, loosen the adjustment screws.
- To decrease the chain tension, tighten the adjustment screws. Obtain correct chain tension.
- To align the rear wheel correctly, the marks (4) on the right and left chain tensioner must be in the same position as the reference marks (5).
- Tighten the counter-nuts (2) of the adjustment screws (3).
- Before locking the wheel pin nut, check that the chain tensioners (6) are resting on the heads of the adjustment screws and that the rear wheel is aligned with the front wheel.
- Tighten the wheel pin nut (1) to 80 Nm.


**⚠ WARNING**

If you do not have a torque wrench for mounting, have the coupling torque checked by a specialised TM workshop as soon as possible. An incorrectly tightened wheel pin may make the motorcycle unstable.

### 4.17 CHAIN MAINTENANCE

Duration of the chain depends above all on maintenance. Chains without an O-ring must be regularly cleaned with petroleum and then immersed in hot oil (specific for chains) or be treated with spray (specific for chains). Maintenance of chains with O-ring is minimised. The best cleaning method is using plenty of water. Never use brushes or solvents to clean the chain. When the chain is dry, use a spray specific for chains with O-rings.



**⚠ DANGER**

**PREVENT THE LUBRICANT FROM REACHING THE REAR TYRE AND THE BRAKE DISC, OTHERWISE THE TYRE'S ADHERENCE TO THE GROUND AND THE REAR BRAKE ACTION COULD BE CONSIDERABLY REDUCED AND CONTROL OF YOUR MOTORCYCLE COULD BE LOST EASILY.**

**⚠ WARNING**

On mounting the chain joint (1), the closed part must always be in the direction of travel. Always check wear of the pinion, sprocket and guide runners. Replace these parts, if necessary.

### 4.18 CHAIN WEAR

Carefully follow the instructions below to check the state of wear of the chain:

- Shift into neutral gear, pull the upper part of the chain upwards applying a force of 10 - 15 Kg.
- At this point, measure the distance of 18 links on the lower part of the chain. If the distance exceeds 272 mm, replace the chain.

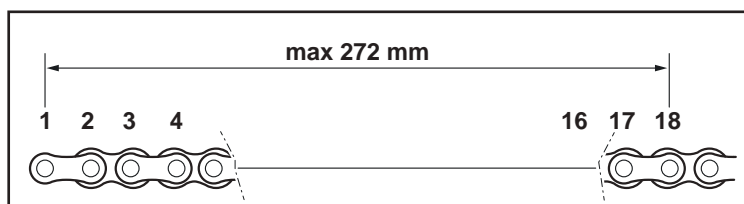


Chains do not wear evenly, therefore repeat the measurement in different points.

When a new chain is mounted we also recommend replacing the pinion and the sprocket. A new chain wears faster when installed on old and worn pinions.

**⚠ WARNING**

When replacing the chain, pinion, and sprocket, it is recommended to mount new self-locking nuts and to tighten using a crosswise sequence. Coupling torque at nuts 35 Nm.



### 4.19 CHECKING SHOCK ABSORBER STATIC SAG

Correct shock absorber static sag should correspond to static lowering of the motorcycle of approx. 35 mm.

Variations exceeding 2 mm may greatly affect motorcycle performance.

Procedure:

- Place the motorcycle on a stand so that the rear wheel does not touch the ground.
- Measure the distance between the rear wheel pin and a fixed point (e.g. a reference on the side panel), making sure that the straight line that connects the wheel pin to the fixed point is as perpendicular to the ground as possible and make note of the value as measurement A.
- Place the motorcycle back on the ground.
- Ask someone to keep the motorcycle in an upright position.
- Measure the distance between the rear wheel pin and the fixed point again and make note of the value as measurement B.
- The static sag is the difference between the two measurements A and B.

**Example:**

- Motorcycle on stand (measurement A): ..... 600 mm
- Motorcycle on the ground without load (measurement B): ..... 565 mm
- Static sag: ..... 35 mm

If static sag is lower, the shock absorber spring pre-load must be decreased. If static sag is greater, spring pre-load must be increased.

See "Varying pre-load and replacing shock absorber spring" chapter.



### 4.20 CHECKING SHOCK ABSORBER RIDER SAG

Correct shock absorber rider sag should correspond to a lowering of the motorcycle of approx. 90±105 mm.

Procedure:

- Ask for help to hold the motorcycle. Sit on the motorcycle wearing full protective gear in normal position (feet on the footrests) and bounce up and down several times to normalise the rear suspension set up.
- With the motorcycle loaded, measure the distance between the same measurement points and make note of the value as measurement C.
- The rider sag is the difference between the two measurements A and C.

**Example:**

- Motorcycle on stand (measurement A) ..... 600 mm
- Motorcycle on the ground with the driver (measurement C) ..... 510 mm
- Rider sag ..... 90 mm

If rider sag is less than 90 mm, the spring is too "hard" (spring rate too high). If the rider sag is higher than 105 mm, the spring is too "soft" (spring rate too low).

The spring rate is indicated on the spring wire. Once a different spring has been mounted, static sag must be readjusted to 35 mm (± 2 mm).

In our experience, after having replaced the spring with one with a different spring rate, the degree of compression damping can remain unvaried. With a "softer" spring the degree of rebound damping can be reduced by several clicks, and with a "harder" spring it can be increased by several clicks.



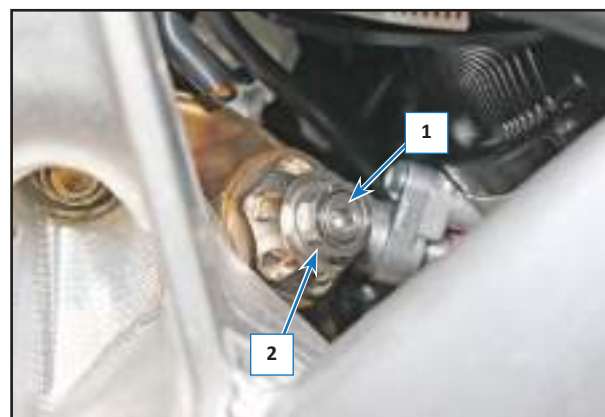


## 4.21 SHOCK ABSORBER COMPRESSION ADJUSTMENT

### TM SHOCK ABSORBER

Access the adjustment screw from the right part of the motorcycle.

- Low speeds** The adjustment screw (1) is positioned on the top of the shock absorber gas tank. Use a 5 mm Allen wrench. By rotating clockwise, braking increases, or anticlockwise it decreases. A total number of 24 clicks are available.



#### STANDARD ADJUSTMENT

<b>250-300 MX</b>	16 clicks from all closed
<b>450 MX</b>	15 clicks from all closed
<b>250-300 EN</b>	15 clicks from all closed
<b>450 EN</b>	18 clicks from all closed
<b>250-300 SMX</b>	18 clicks from all closed
<b>450 SMX</b>	10 clicks from all closed
<b>450 SMR</b>	18 clicks from all closed
<b>450 SMM</b>	18 clicks from all closed

- High speeds** The adjuster is a hex ring nut (2) and is concentric to the low speed adjustment screw. Use a 14 mm hex wrench. By rotating clockwise, braking increases, or anticlockwise it decreases. A total number of 28 clicks are available.

#### STANDARD ADJUSTMENT

<b>250-300 MX</b>	12 clicks from all closed
<b>450 MX</b>	14 clicks from all closed
<b>250-300 EN</b>	12 clicks from all closed
<b>450 EN</b>	16 clicks from all closed
<b>250-300 SMX</b>	8 clicks from all closed
<b>450 SMX</b>	16 clicks from all closed
<b>450 SMR</b>	16 clicks from all closed
<b>450 SMM</b>	16 clicks from all closed

#### WARNING

Before starting, it is recommended to tighten the adjuster from the standard position to the "all closed" position and counting the clicks. Make note of the number of clicks in order to be able to restore standard adjustment. It is normal to count the clicks starting from the "all closed" position.

### 4.22 SHOCK ABSORBER REBOUND ADJUSTMENT

#### TM SHOCK ABSORBER

Access the adjustment screw from the left part of the motorcycle.

The adjustment screw (1) is located on the fork coupling, connecting the shock absorber to the linkage. Use a screwdriver. By rotating clockwise, braking increases, or anticlockwise it decreases. A total number of 34 clicks are available.



#### ⚠ WARNING

Before starting, it is recommended to tighten the adjuster from the standard position to the “all closed” position and counting the clicks. Make note of the number of clicks in order to be able to restore standard adjustment. It is normal to count the clicks starting from the “all closed” position.

STANDARD ADJUSTMENT	
250-300 MX	22 clicks from all closed
450 MX	18 clicks from all closed
250-300 EN	18 clicks from all closed
450 EN	28 clicks from all closed
250-300 SMX	15 clicks from all closed
450 SMX	22 clicks from all closed
450 SMR	19 clicks from all closed
450 SMM	12 clicks from all closed

### 4.23 VARYING PRE-LOAD AND REPLACING SHOCK ABSORBER SPRING

The spring pre-load can be varied by rotating the adjustment ring nut. At every turn of the regulation ring nut, the pre-load varies by 1.5 mm. To facilitate the operation, it is recommended to disassemble and carefully clean the shock absorber.

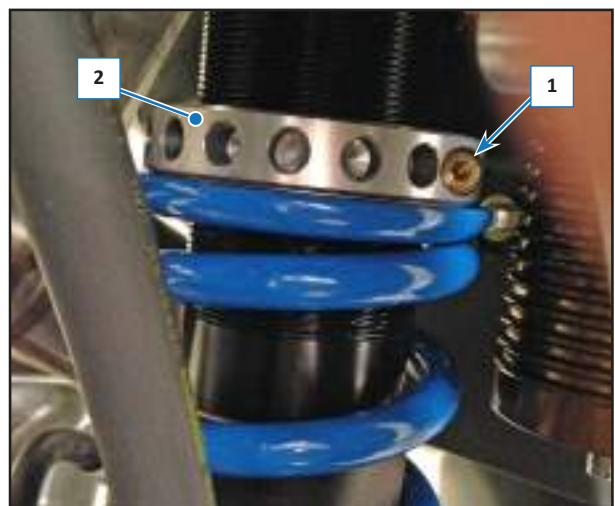
If the pre-load variation is not sufficient, replace the spring with another one with a different spring rate.

#### ⚠ WARNING

Before starting the operation, it is recommended to write down the basic adjustment, e.g. how many threaded spirals are visible above the adjustment ring.

#### PRE-LOAD ADJUSTMENT

- Use a 4 mm Allen wrench to loosen the locking screw (1) of the ring nut (2) and rotate the ring nut itself.
- by rotating anti-clockwise (viewed from above), pre-load decreases; by rotating clockwise (viewed from above) pre-load increases.
- After adjustment, tighten the locking screw (1).



**4.24 FORK COMPRESSION ADJUSTMENT**

The compression hydraulic brake system determines how the fork behaves in the compression phase. The degree of compression hydraulic braking can be adjusted on the basis of the rider's preference and/or installed spring rate.

**MARZOCCHI USD FORK**

The adjustment screw (1) is positioned on the upper part of the fork cap. Use a screwdriver. By rotating clockwise, braking increases, or anticlockwise it decreases. A total number of 28 clicks are available.

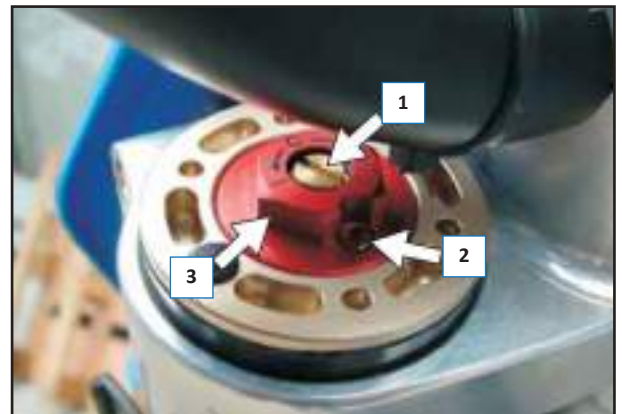
**⚠ WARNING**

- Do not touch the lateral bleed screw (2).
- Do not operate on the red hex screw (3) since brake compression variation is not required .

**⚠ WARNING**

Before starting, it is recommended to tighten the adjuster from the standard position to the "all closed" position and counting the clicks. Make note of the number of clicks in order to be able to restore standard adjustment. It is normal to count the clicks starting from the "all closed" position. Both rods must be adjusted the same way.

Standard Adjustment: 16 clicks from all closed.



**KAYABA USD FORK**

The adjustment screw (1) is positioned on the upper part of the fork cap. Use a screwdriver. By rotating clockwise, braking increases, or anticlockwise it decreases. A total number of 19 clicks are available.

**⚠ WARNING**

Do not touch the bleed screw (2).

**⚠ WARNING**

Before starting, it is recommended to tighten the adjuster from the standard position to the "all closed" position and counting the clicks. Make note of the number of clicks in order to be able to restore standard adjustment. It is normal to count the clicks starting from the "all closed" position. Both rods must be adjusted the same way.



STANDARD ADJUSTMENT	
<b>MX</b>	12 clicks from all closed
<b>EN</b>	14 clicks from all closed
<b>SMR</b>	17 clicks from all closed
<b>SMM</b>	17 clicks from all closed

### 4.25 FORK REBOUND ADJUSTMENT

The rebound hydraulic brake system determines how the fork behaves in the rebound phase.

The degree of rebound hydraulic braking can be adjusted on the basis of the rider's preference and/or installed spring rate.

#### MARZOCCHI USD FORK

The adjustment screw (1) is positioned on the lower part of the fork foot.

- Use a screwdriver. By rotating clockwise, braking increases, or anticlockwise it decreases. A total number of 28 clicks are available.

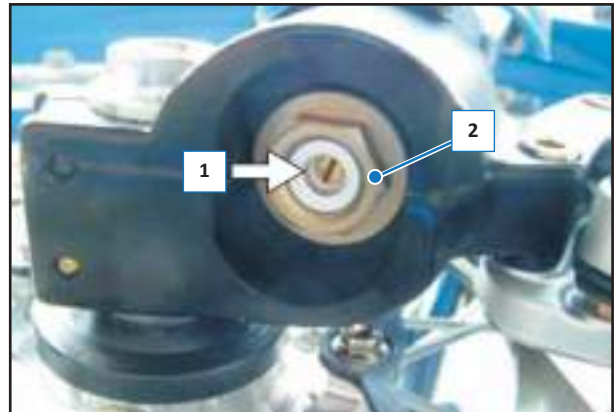
**⚠ WARNING**

Do not operate on the hex nut (2) since brake rebound variation is not required .

**⚠ WARNING**

Before starting, it is recommended to tighten the adjuster from the standard position to the "all closed" position and counting the clicks. Make note of the number of clicks in order to be able to restore standard adjustment. It is normal to count the clicks starting from the "all closed" position. Both rods must be adjusted the same way.

Standard Adjustment: 16 clicks from all closed.



#### KAYABA USD FORK

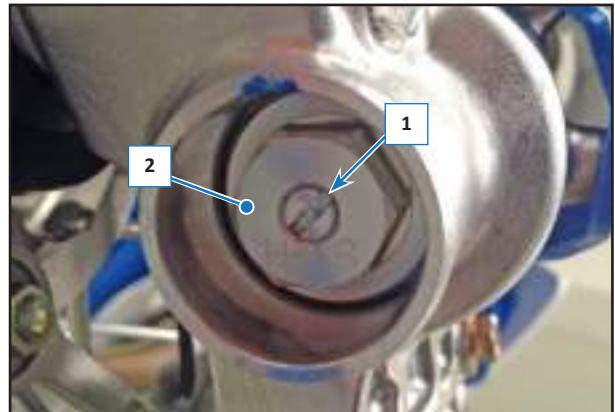
The adjustment screw (1) is positioned on the lower part of the fork foot. Use a screwdriver. By rotating clockwise, braking increases, or anticlockwise it decreases. A total number of 21 clicks are available.

**⚠ WARNING**

- Do not operate on the hex nut (2) since brake rebound variation is not required .

**⚠ WARNING**

Before starting, it is recommended to tighten the adjuster from the standard position to the "all closed" position and counting the clicks. Make note of the number of clicks in order to be able to restore standard adjustment. It is normal to count the clicks starting from the "all closed" position. Both rods must be adjusted the same way.



STANDARD ADJUSTMENT	
MX	12 clicks from all closed
EN	14 clicks from all closed
SMR	15 clicks from all closed
SMM	15 clicks from all closed

#### 4.26 VARYING PRE-LOAD AND REPLACING FORK SPRINGS

Partially disassemble the springs to vary the spring pre-load (see the specific manual regarding the fork fitted on the motorcycle).

**It is NOT recommended to vary the pre-load of the springs on forks fitted by TM Racing.**

Replace the springs with others featuring different rates if required.

#### **⚠ WARNING**

For further and more detailed information regarding the forks, refer to the instructions supplied by the fork manufacturer.

#### 4.27 BLEEDING TELESCOPIC FORK

Every 5 hours of use during competitions, operate on the bleeder screws or valves to release any over-pressure inside the fork.

##### **MARZOCCHI USD FORK**

Marzocchi forks are equipped with a valve (1), which is protected by a rubber cap (2).

Remove the rubber cap and gently press the valve stem. Before using the valve, put the motorcycle up on its stand so that the front wheel does not touch the ground.

If the motorcycle is used mostly on road, it is sufficient to carry out this operation only during periodical maintenance.



#### **⚠ WARNING**

Excessive pressure inside the fork may cause oil to leak from the fork. If oil should leak from the fork, try bleeding the air before replacing the sealing elements.

##### **KAYABA USD FORK**

The Kayaba fork has one screw (1).

- Before operating on the screw, put the motorcycle up on its stand so that the front wheel does not touch the ground.
- Completely unscrew the screw (1) without removing it and bleed the air.
- Tighten the screw (1) again.
- If the motorcycle is used mostly on the road, it is sufficient to carry out this operation during periodical maintenance only.

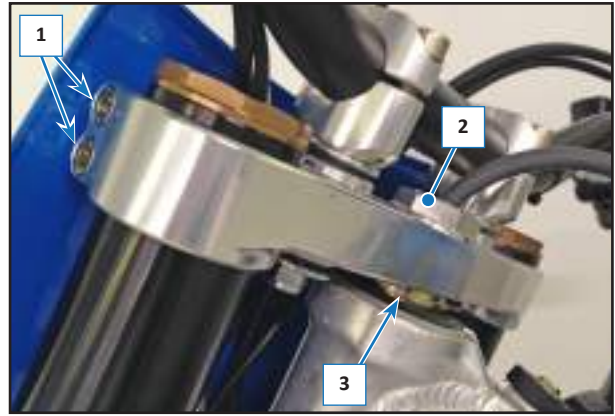


#### **⚠ WARNING**

Excessive pressure inside the fork may cause oil to leak from the fork. If oil should leak from the fork, try bleeding the air before replacing the sealing elements.

### 4.28 CHECKING STEERING BEARINGS AND PLAY ADJUSTMENT

- Periodically check steering bearing play.
- To check, position the motorcycle so that the front wheel is lifted. Turn the handlebar in both directions and move the fork back and forth. If the steering is hard to turn, the bearings are too tight and the ring-nut (3) must be loosened. If the steering vibrates, the bearings have play and the ring-nut (3) must be tightened.
- To adjust, loosen the four M8 screws (1) and nut (2) of the fork head and tighten or loosen the ring-nut (3) as necessary. Do not tighten the ring nut (3) beyond the play elimination point; this prevents damage to the bearings. Tighten the fork head nut and then the four x M8 17 Nm screws.
- Make sure steering is smooth, without jamming or play.

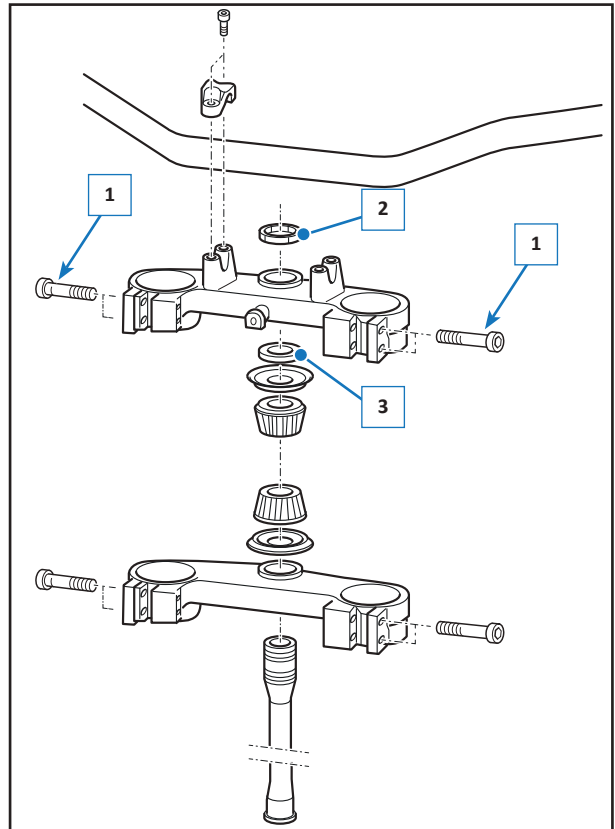


**⚠ DANGER**

IF THE STEERING BEARINGS ARE TOO TIGHT OR HAVE PLAY, PERFORMANCE ON THE ROAD MAY BE IRREGULAR AND CONTROL OF YOUR MOTORCYCLE COULD BE EASILY LOST.

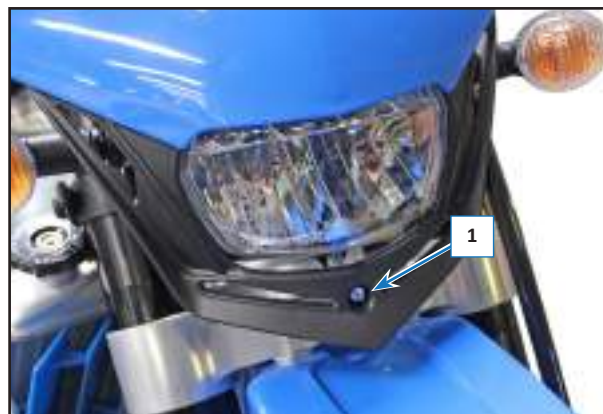
**⚠ WARNING**

Long journeys with incorrect adjustment of the steering bearings risks ruining the steering bearings as well as their housing in the frame. The steering bearings must be greased at least once a year.



#### 4.29 ADJUSTING MAIN LIGHT HEIGHT

The front headlight is height-adjustable. After having adjusted the fixing plastic straps to the forks in order to level the headlight frontally, the front screw (1) can be used to adjust the height of the headlight. Turn it clockwise to lift it or anti-clockwise to lower it.

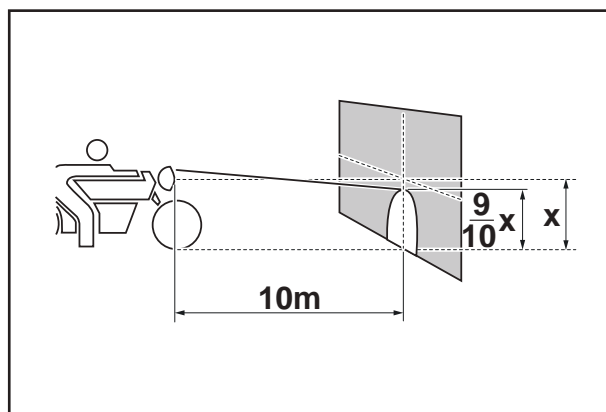


#### 4.30 HEADLIGHT HEIGHT ADJUSTMENT

To check whether the headlight is positioned correctly, position the motorcycle, with the tyres inflated to the right pressure and with a person sitting on the seat, perfectly perpendicular with the longitudinal axis. Facing a wall or screen at a distance of 10 metres, trace a horizontal line corresponding to the height of the centre of the headlight, and a vertical in line with the longitudinal axis of the vehicle.

Perform the check, possibly in the penumbra.

When switching the high beam on, the upper demarcation limit between the dark and illuminated area must result at a height not exceeding  $\frac{9}{10}$  of the height from the ground of the centre of the projector.









## 5. GENERAL OPERATIONS

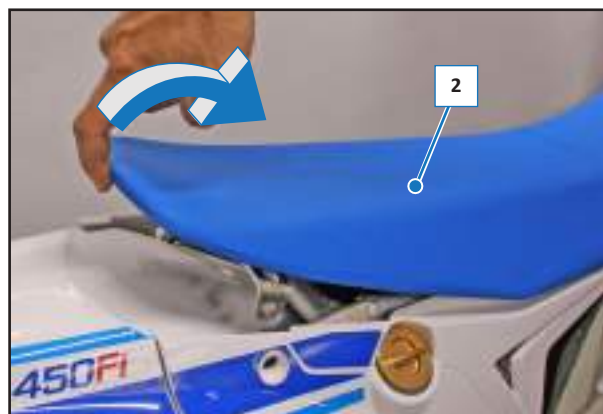


### 5.1 SEAT REMOVAL

- Loosen the screws (1) on both sides.



- Lift the rear part of the seat (2).



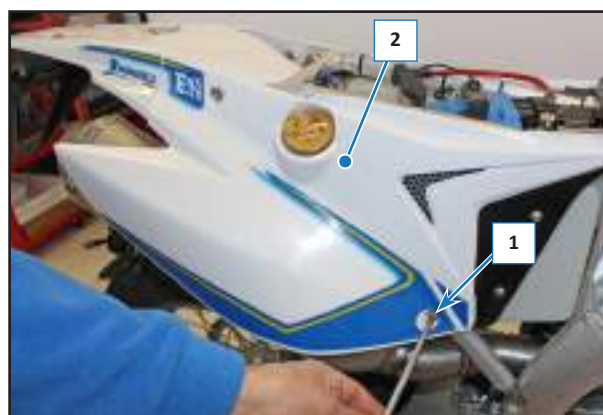
- Slide the seat (2) out towards the rear of the motorcycle.



### 5.2 LATERAL PANELS DETACHMENT

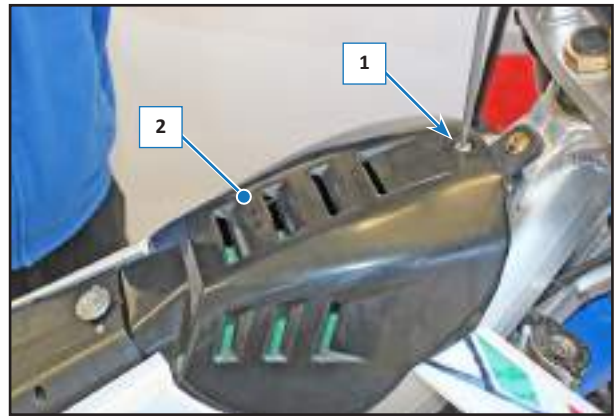
- Remove the seat as described in the relative paragraph.
- Unscrew the screw (1) and remove the panel (2).
- Proceed in the same manner for the left panel.

**NOTE:** On re-mounting, position the bushes correctly under the screws.

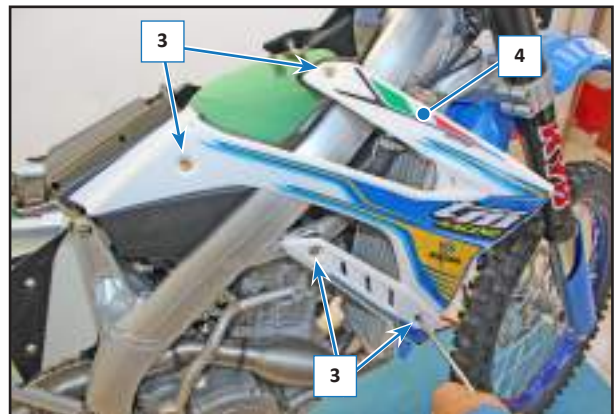


### 5.3 RADIATOR CONVEYORS REMOVAL

- Remove the seat as described in the relative paragraph.
- Rotate the airbox (2) fixing screw (1) by 1/2 turn and remove it.



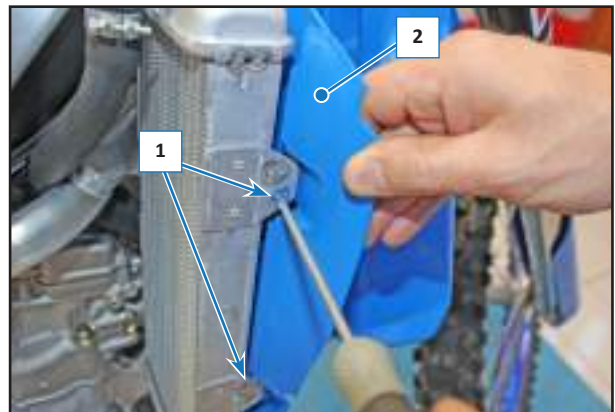
- Unscrew the four screws (3) and remove the right conveyor (4).
- Proceed in the same way for the left conveyor.



**NOTE:** On re-mounting, position the bushes correctly under the screws.

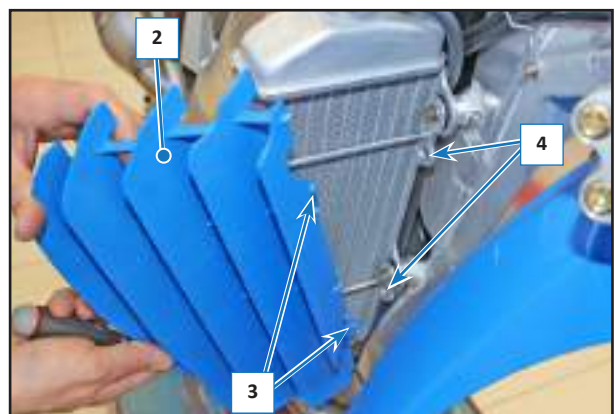
### 5.4 RADIATOR FINS REMOVAL

- Remove the radiator conveyors as described in the relative paragraph.
- Use a screwdriver to press on the clamps (1), until the fins (2) are released.



- Remove the fins (2), releasing the pegs (3).

**NOTE:** On re-mounting, insert the pegs (3) correctly into the relative holes (4).



### 5.5 DISASSEMBLY AND MOUNTING THE FRONT WHEEL

- Position the motorcycle with the frame cradle on a stand to keep the front wheel off the ground.
- Loosen the aluminium flanged screw (1), loosen fixing screws (2) and (3) on the left and right fork feet, and finish unscrewing the flanged screw (1).
- Keep the front wheel still and slide out the wheel pin (4). If necessary, to help the wheel pin escape, lightly tap the threaded end of the pin with a mallet (hammer with plastic head). Alternatively, use a normal hammer and a plastic punch.

#### **⚠ WARNING**

Never use the hammer directly on the pin; the pin could be irreversibly damaged.

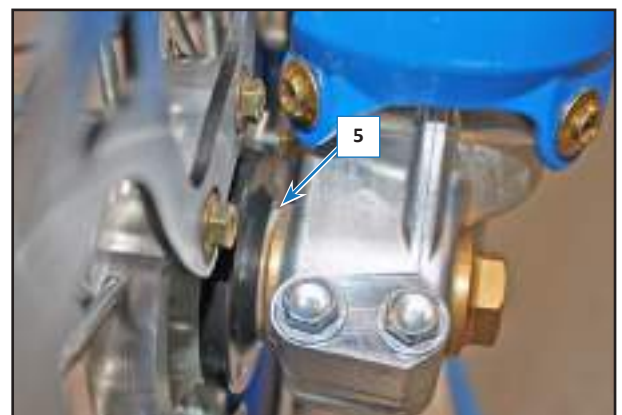
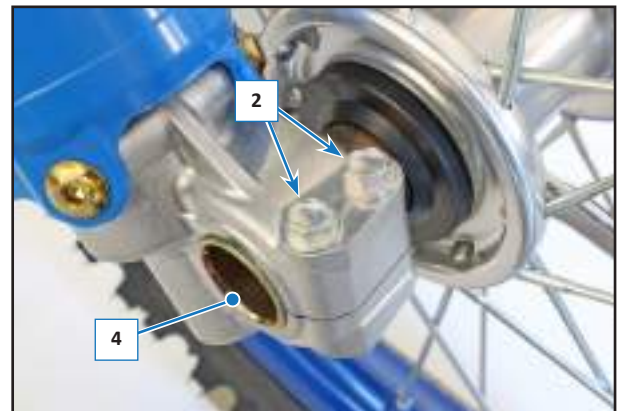
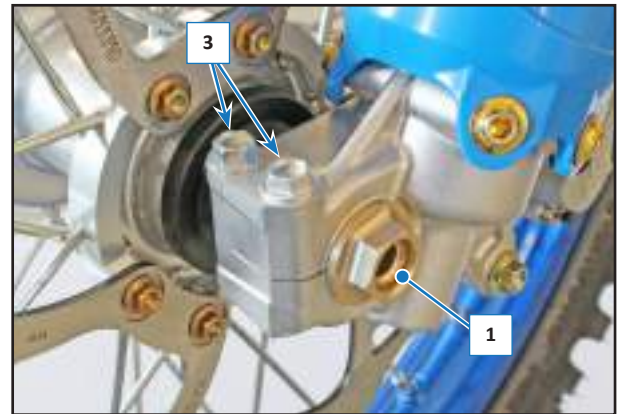
- Carefully remove the front wheel from the fork.

#### **⚠ WARNING**

- Never activate the brake lever when the front wheel has been removed.
- Always position the wheel on the level with the brake disc upwards to prevent damage.
- To re-mount the front wheel, carefully insert it into the fork, inserting the disc between the brake pads without damaging them. Position the wheel correctly and mount the wheel pin (4), positioning the spacer (5) on the left part of the wheel.
- Temporarily screw and tighten the flanged screw (1) until the wheel spacer is blocked. Tighten the locking screws (2) onto the right fork foot to prevent the wheel pin from turning, and tighten the flanged screw to 40 Nm.
- Tighten the locking screws (3) on the left fork foot to 12 Nm.
- Loosen the locking screws (2) again on the right foot and remove the motorcycle from the stand. Engage the front brake and force the fork down several times to align the rods.
- End by tightening the locking screws (2) on the left fork foot to 12 Nm.

#### **⚠ DANGER**

- **AN INCORRECTLY TIGHTENED WHEEL PIN MAY MAKE THE MOTORCYCLE UNSTABLE.**
- **AFTER HAVING MOUNTED THE FRONT WHEEL. REPEATEDLY ACTIVATE THE FRONT BRAKE LEVER AND MAKE THE PADS ADHERE TO THE DISC. CHECK THE BRAKE FLUID LEVEL.**
- **THE BRAKE DISC MUST ALWAYS BE FREE OF OIL AND GREASE. IF THIS IS NOT THE CASE, THE BRAKING EFFECT WOULD BE GREATLY REDUCED.**



## 5.6 DISASSEMBLY AND MOUNTING THE REAR WHEEL

- Position the motorcycle with the frame cradle on a stand to keep the rear wheel off the ground. Unscrew the flanged nut (1) and, supporting the wheel, slide out the wheel pin (2), remove the chain tensioner slide (3), the calliper (4) with its support, take the chain off the sprocket and carefully remove the rear wheel from the swing arm. Pay attention to the sprocket side and brake side wheel spacers (5).

### ⚠ WARNING

- Never activate the brake pedal when the rear wheel has been removed.
- Always position the wheel on the level with the brake disc upwards to prevent damage.
- When the wheel pin has been removed, clean the threading of both the wheel pin and the flanged nut. Re-grease them to prevent the threading from seizing.

### ⚠ WARNING

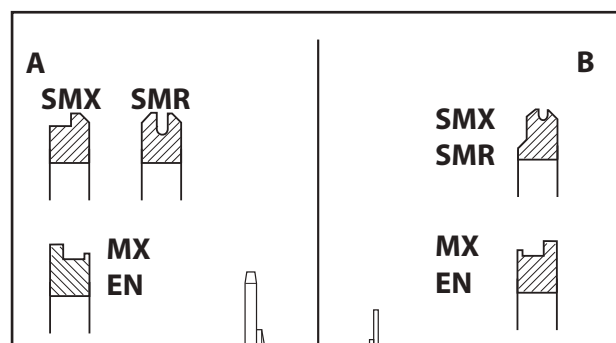
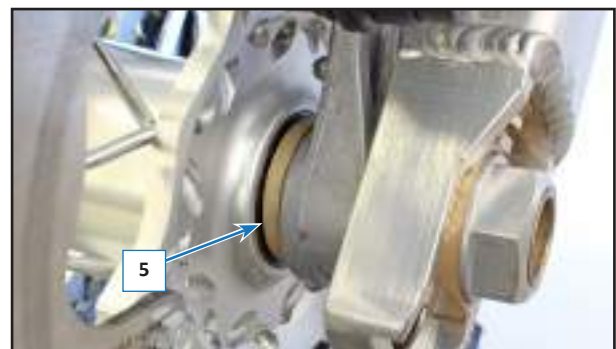
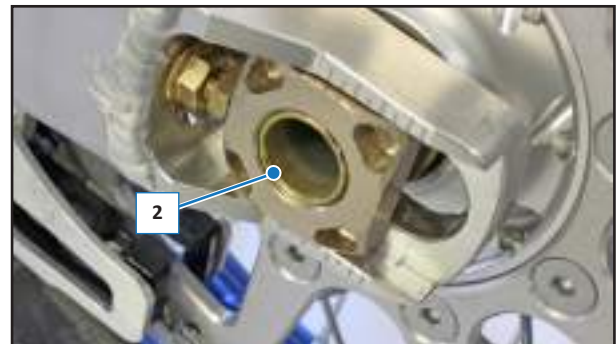
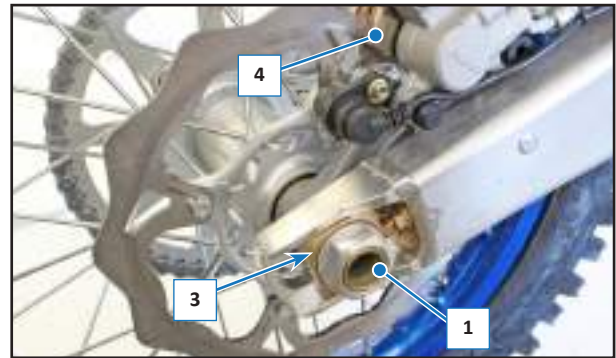
- Re-mount the spacers (5) as indicated in table "A".

Table- A		
	A	B
SMx	9 mm	8.5 mm
SMR	6 mm	8.5 mm
Mx/EN/FT	13.7 mm	13.7 mm

- To re-mount the rear wheel, insert the spacer (sprocket side) in the hub, insert the wheel into the swing arm and, supporting the wheel, mount the chain on the sprocket and position the calliper (4) with its support. Insert the wheel pin (2) from the sprocket side halfway into the wheel to allow the spacer to be positioned (brake side).
- Insert the pin completely, insert the chain tensioner slide (3), screw the nut (1) and tighten to 80 Nm.
- Before tightening the flanged nut, push the rear wheel forward to allow the chain tensioners to touch the heads of the adjustment screws.

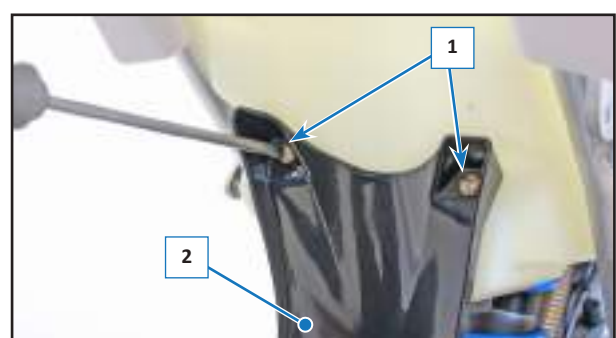
### ⚠ DANGER

- AN INCORRECTLY TIGHTENED WHEEL PIN MAY MAKE THE MOTORCYCLE UNSTABLE.
- AFTER HAVING MOUNTED THE REAR WHEEL. REPEATEDLY ACTIVATE THE FRONT BRAKE PEDAL AND MAKE THE PADS ADHERE TO THE DISC. CHECK THE BRAKE FLUID LEVEL AND FREE TRAVEL.
- THE BRAKE DISC MUST ALWAYS BE FREE OF OIL AND GREASE IN ORDER TO AVOID SIGNIFICANTLY REDUCING THE BRAKING EFFECT.



## 5.7 SPRAY GUARD REMOVAL

- Remove the rear wheel as described in the relevant paragraph.
- Unscrew the screws (1) and remove the spray guard (2).





## 6. PARTS REMOVAL

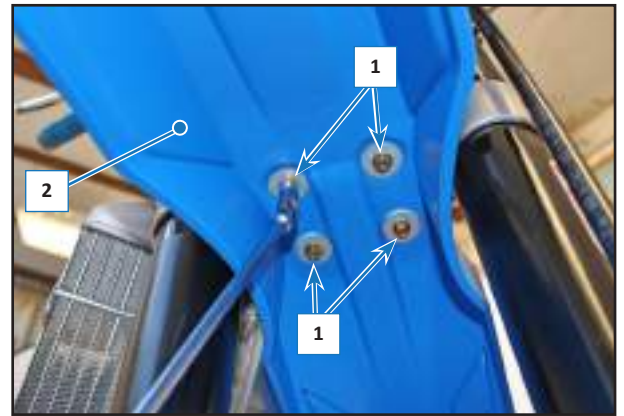




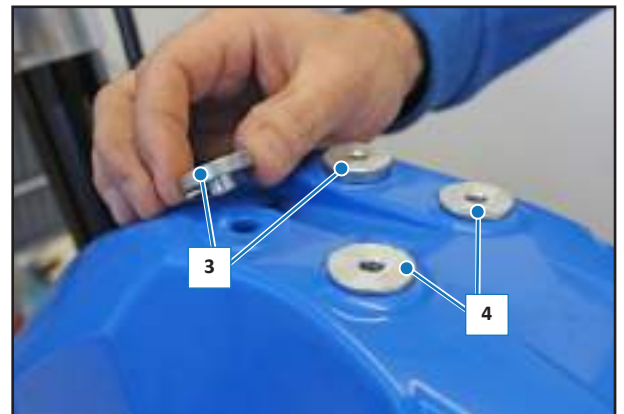
## 6.1 MUD GUARDS REMOVAL

### FRONT MUD GUARD REMOVAL

- Loosen the screws (1) from below with relative washer and remove the mud guard (2).

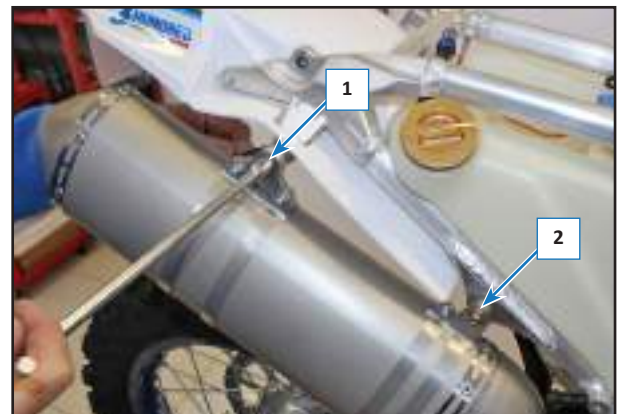


**NOTE:** On re-mounting, insert thicker spacers (3) onto the rear screws and thinner spacers (4) onto the front screws.

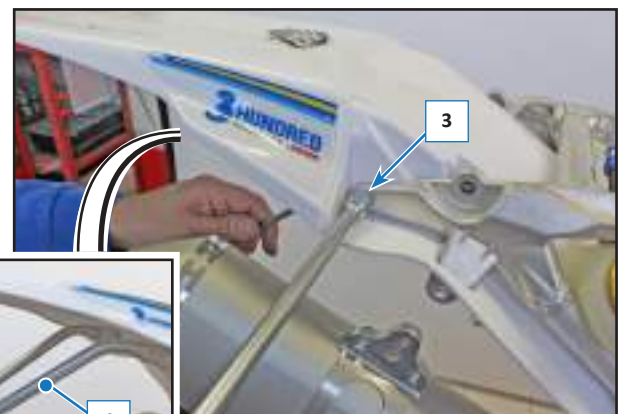


### REAR MUD GUARD REMOVAL

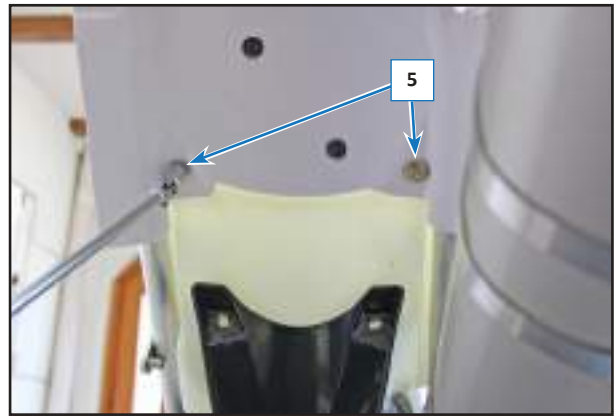
- Remove the seat, the right and left side pods and the licence plate holder as described in the relevant paragraphs.
- Loosen the silencer fixing screws (1) and (2) (10 mm internal wrench and 8 mm external).



- Loosen the screws (3) (4 mm internal Allen wrench and 10 mm external) that fix the mud guard support subframe and remove the latter (4).



- Loosen the screws (5), with relative washer, which fix the mud guard to the tank.



- Remove the mud guard (6).

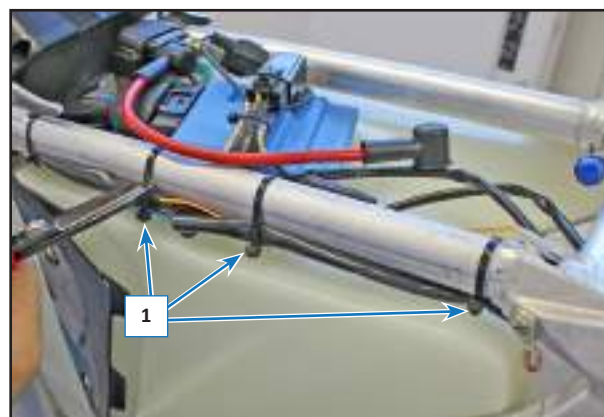


**NOTE:** Re-mount everything in reverse order to disassembly, paying attention to position the wide spacer (7) on the lower support and the narrow one (8) on the rear support, when mounting the silencer.

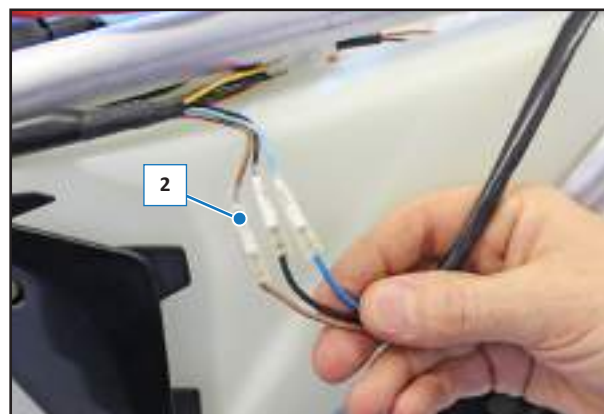


## 6.2 REAR MUD GUARD REMOVAL COMPLETE WITH LICENCE PLATE HOLDER AND DIRECTION INDICATORS

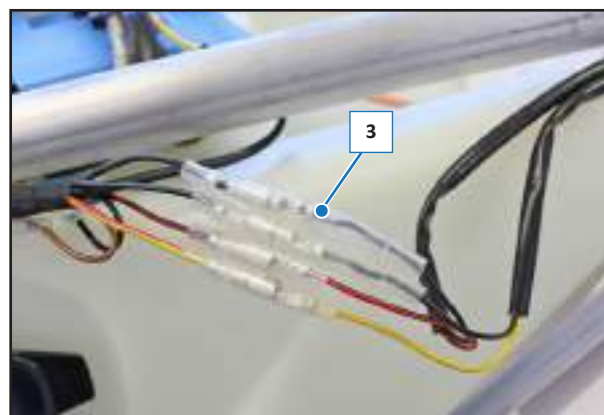
- Remove the seat, the right and left side pods as described in the relevant paragraphs.
- Cut the straps (1).



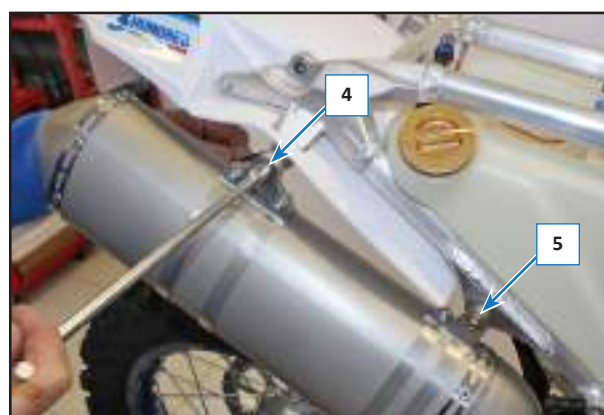
- Disconnect the tail light wires (2).



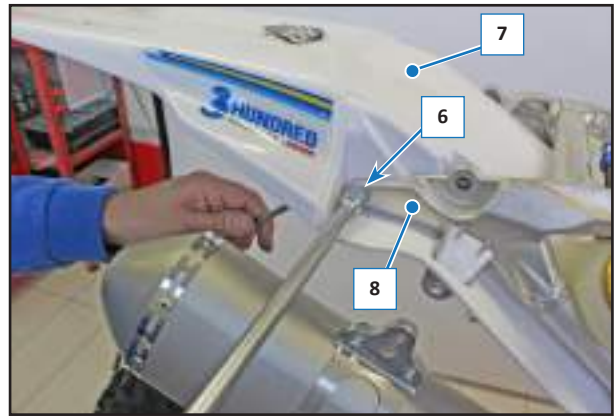
- Disconnect the wires (3) of the rear direction indicators.



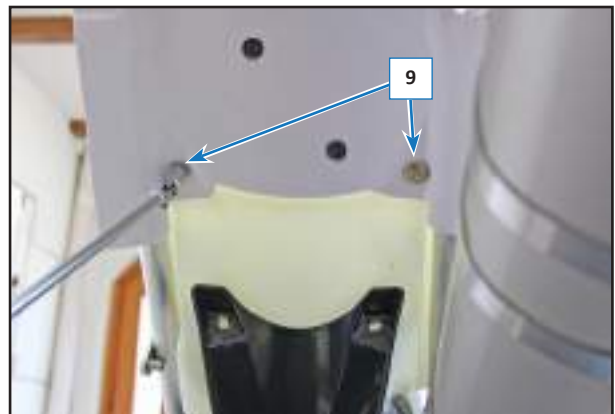
- Loosen the silencer fixing screws (4) and (5) (10 mm internal wrench and 8 mm external).



- Loosen the screws (6) (4 mm internal Allen wrench and 10 mm external) that fix the mud guard (7) support subframe to the motorcycle rear subframe (8).



- Loosen the screws (9), with relative washer, which fix the mud guard to the tank.



- Remove the complete mud guard (10).

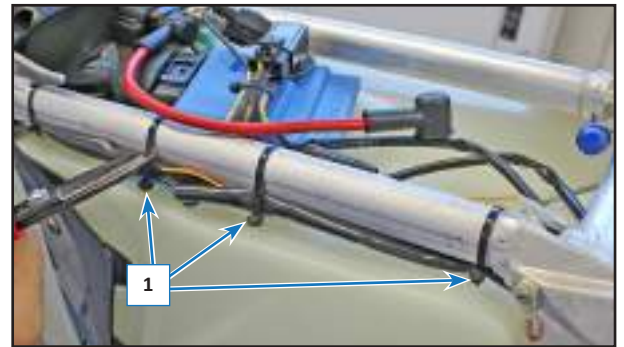


**NOTE:** Re-mount everything in reverse order to disassembly, paying attention to position the wide spacer (11) on the lower support and the narrow one (12) on the rear support, when mounting the silencer.

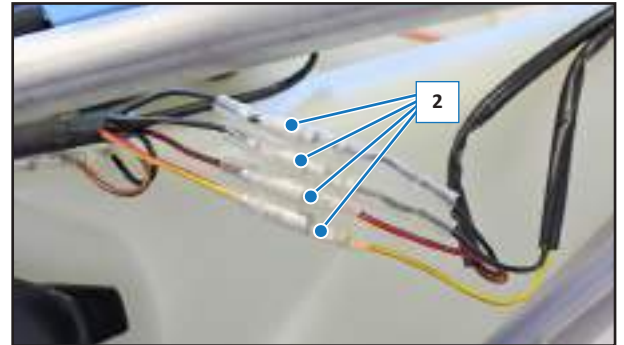


### 6.3 REAR POSITION INDICATOR LIGHT REPLACEMENT

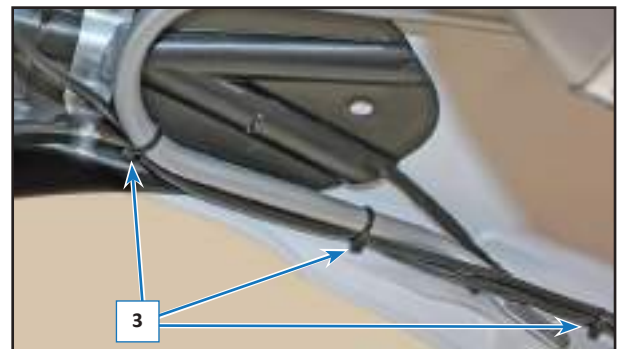
- Remove the seat and left lateral panel as described in the relevant paragraphs.
- Cut the straps (1).



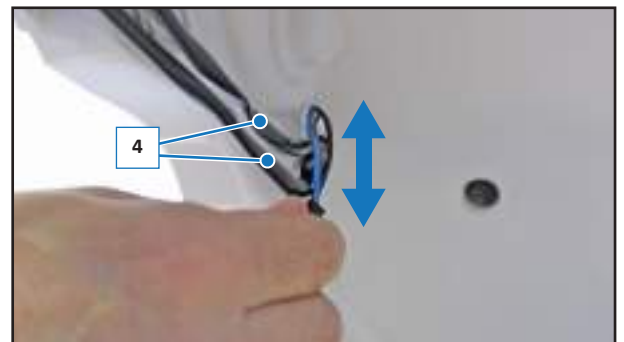
- Disconnect the wires (2).



- Cut the straps (3).



- Slide the cables (4) of the direction indicators out from the hole in the mud guard.



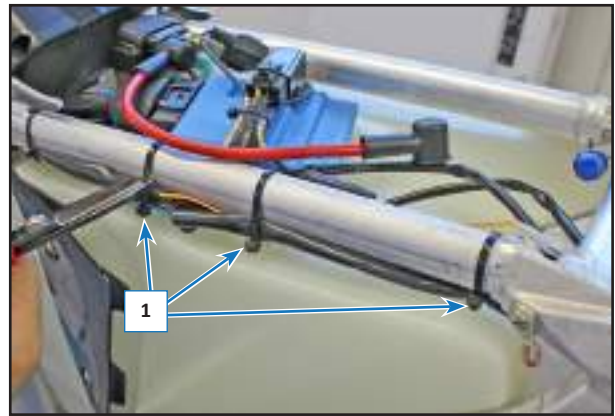
- Loosen the screw (5) with the relative nut and remove the rear direction indicator (6).



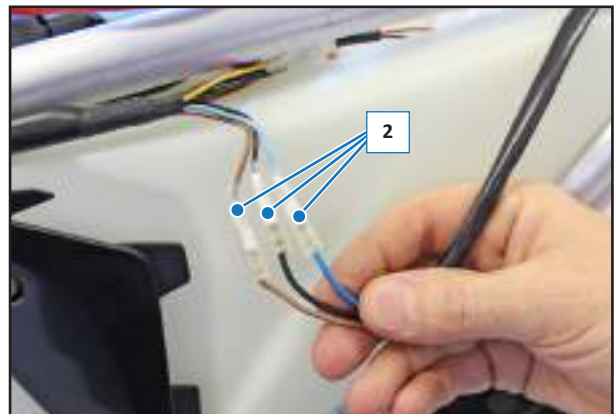
**NOTE:** On re-mounting, fix the cabling with plastic straps, positioning them as originally and connect the direction indicators colour with colour:  
 Right indicator = red/black wire + black wire  
 Left indicator = red/yellow wire + black wire

### 6.4 TAIL LIGHT REPLACEMENT

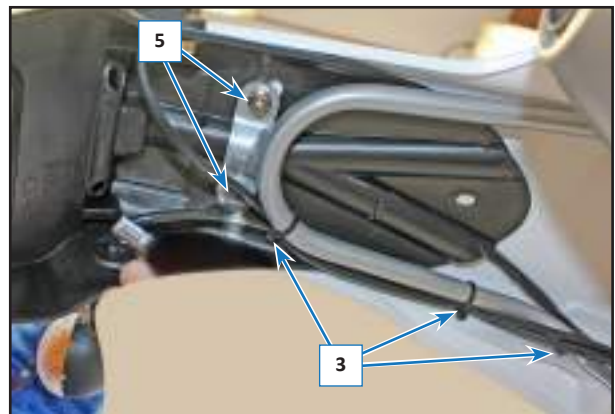
- Remove the seat and left lateral panel as described in the relevant paragraphs.
- Cut the straps (1).



- Disconnect the wires (2).



- Cut the straps (3).

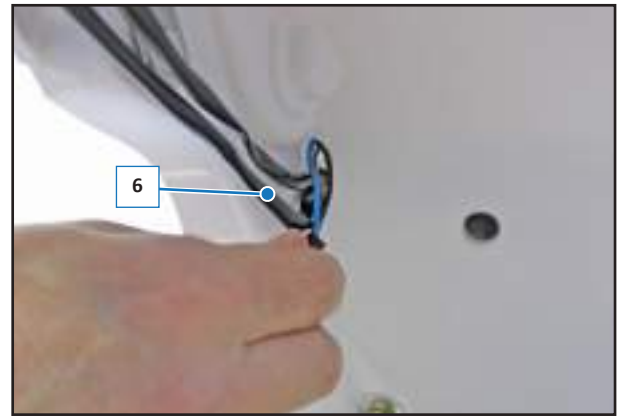


- Unscrew the screws (4) with nut (5) in the lower part.

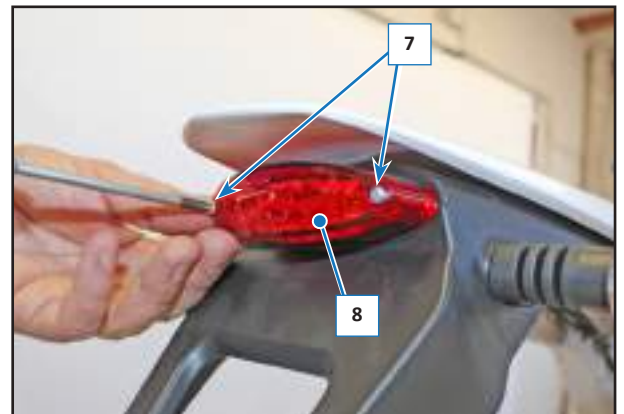


## 6. PARTS REMOVAL

- Slide the cable (6) out from the hole in the mud guard.



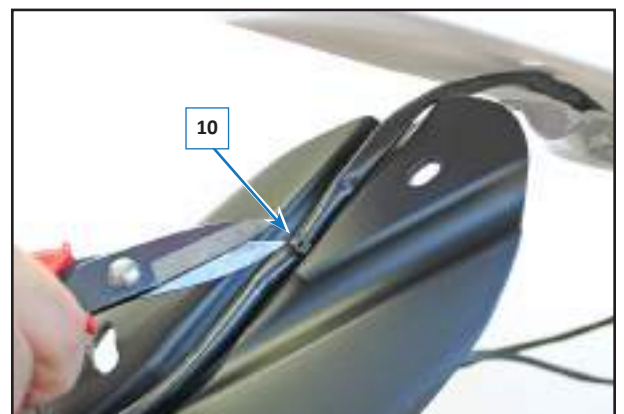
- Unscrew the screws (7) of the tail light (8).



- Slide the licence plate holder (9) from the support subframe.



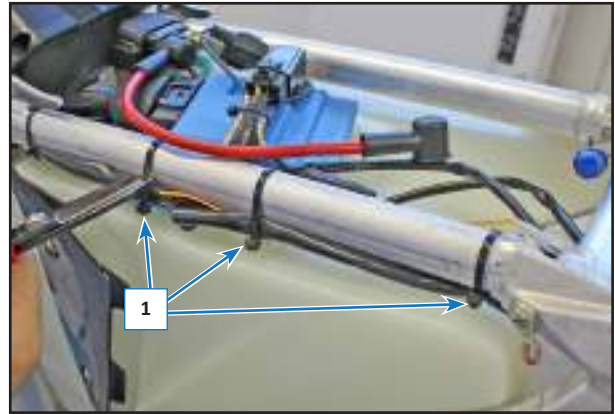
- Cut the strap (10) and remove the tail light.



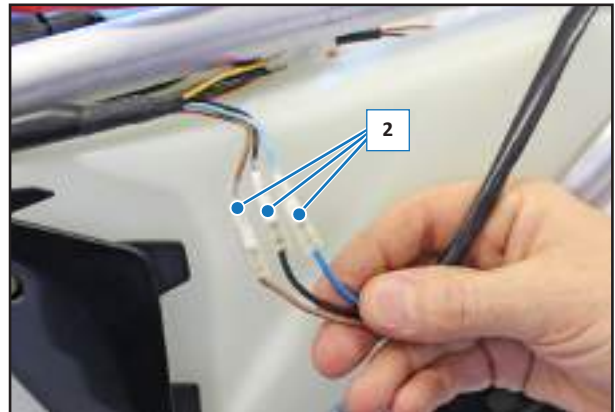
**NOTE:** Re-mount everything proceeding in reverse order to disassembly, fix the cabling with plastic straps, positioning them as originally and connect the tail light colour with colour:

**6.5 LICENCE PLATE HOLDER REMOVAL**

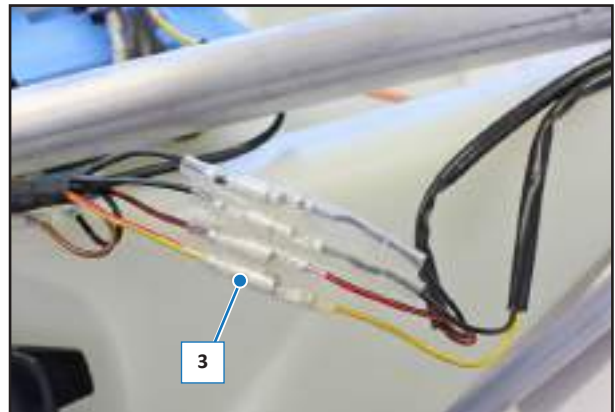
- Remove the seat and left lateral panel as described in the relevant paragraphs.
- Cut the straps (1).



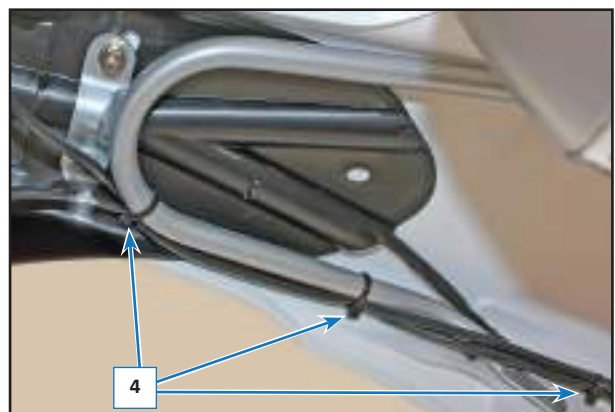
- Disconnect the tail light wires (2).



- Disconnect the wires (3) of the rear direction indicators.



- Cut the straps (4).



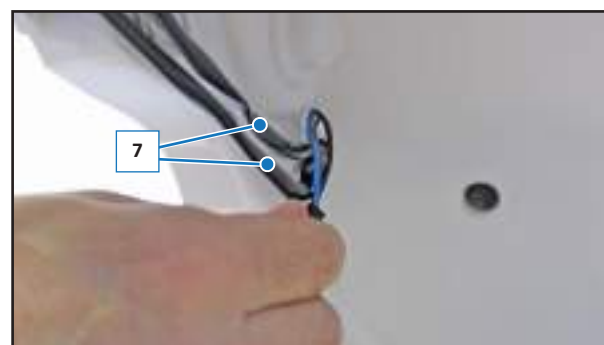


## 6. PARTS REMOVAL

- Unscrew the screws (5) with nut (6) in the lower part.



- Slide the cable (7) out from the hole in the mud guard.



- Remove the licence plate holder (8) complete with tail light and direction indicators.



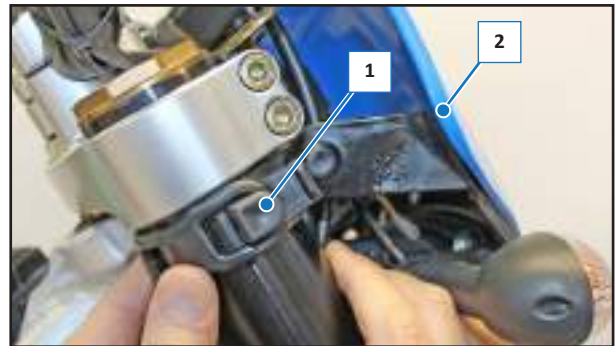
- Cut the strap (9).
- Remove the direction indicators and tail light by unscrewing the relative screws.



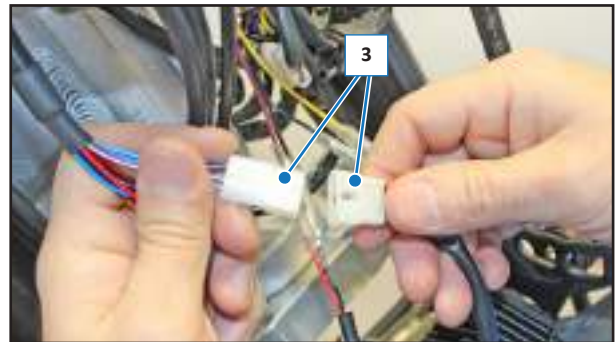
**NOTE:** Re-mount everything proceeding in reverse order to disassembly, fix the cabling with plastic straps, positioning them as originally and connect the tail light and the direction indicators colour with colour:

**6.6 HEADLIGHT REMOVAL/REPLACEMENT**

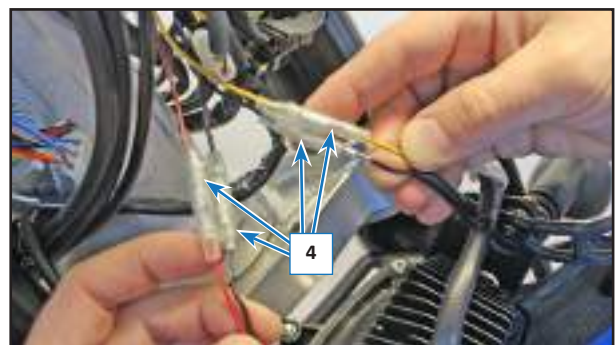
- Release the four elastics (1) that block the headlight (2) onto the fork rods.



- Disconnect the connector (3) from the headlight.



- Disconnect the connectors (4) of the front direction indicators.



- Unscrew the two screws (5) that fix the headlight (6) to the mask.



- Unscrew the headlight adjustment screw (7) completely and remove the headlight (6).



**NOTE:** Re-mount the headlight, proceeding in reverse order to disassembly, paying attention to correctly position the spring (8) and the nut (9) and connect the direction indicator connectors (4) colour with colour.

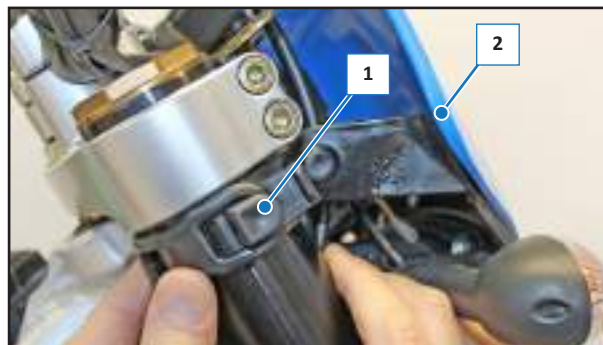
Right indicator = red/black wire + black wire  
 Left indicator = red/yellow wire + black wire

Adjust the height of the headlight as described in the relative paragraph.

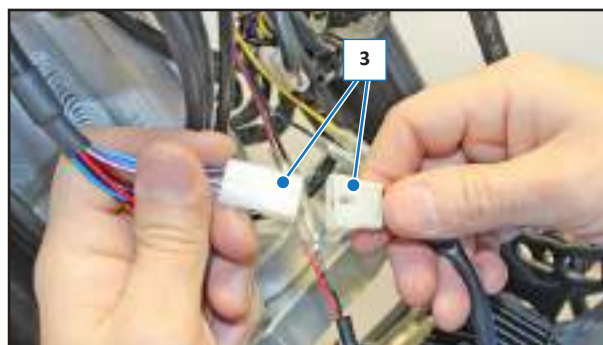


### 6.7 FRONT DIRECTION INDICATOR LIGHT REPLACEMENT

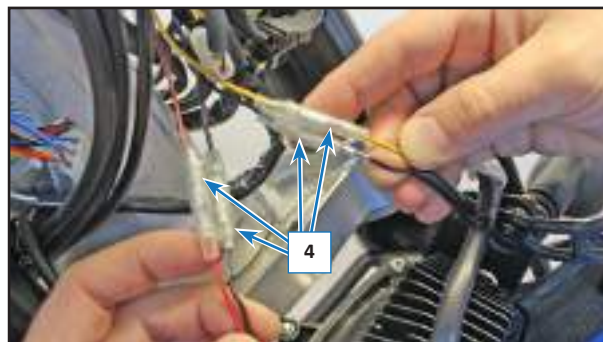
- Release the four elastics (1) that block the headlight (2) onto the fork rods.



- Disconnect the connector (3) from the headlight.

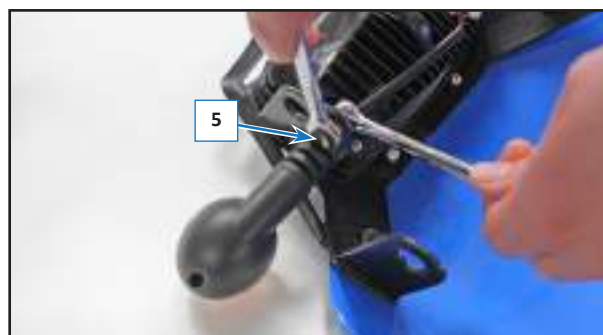


- Disconnect the connectors (4) of the front direction indicators.

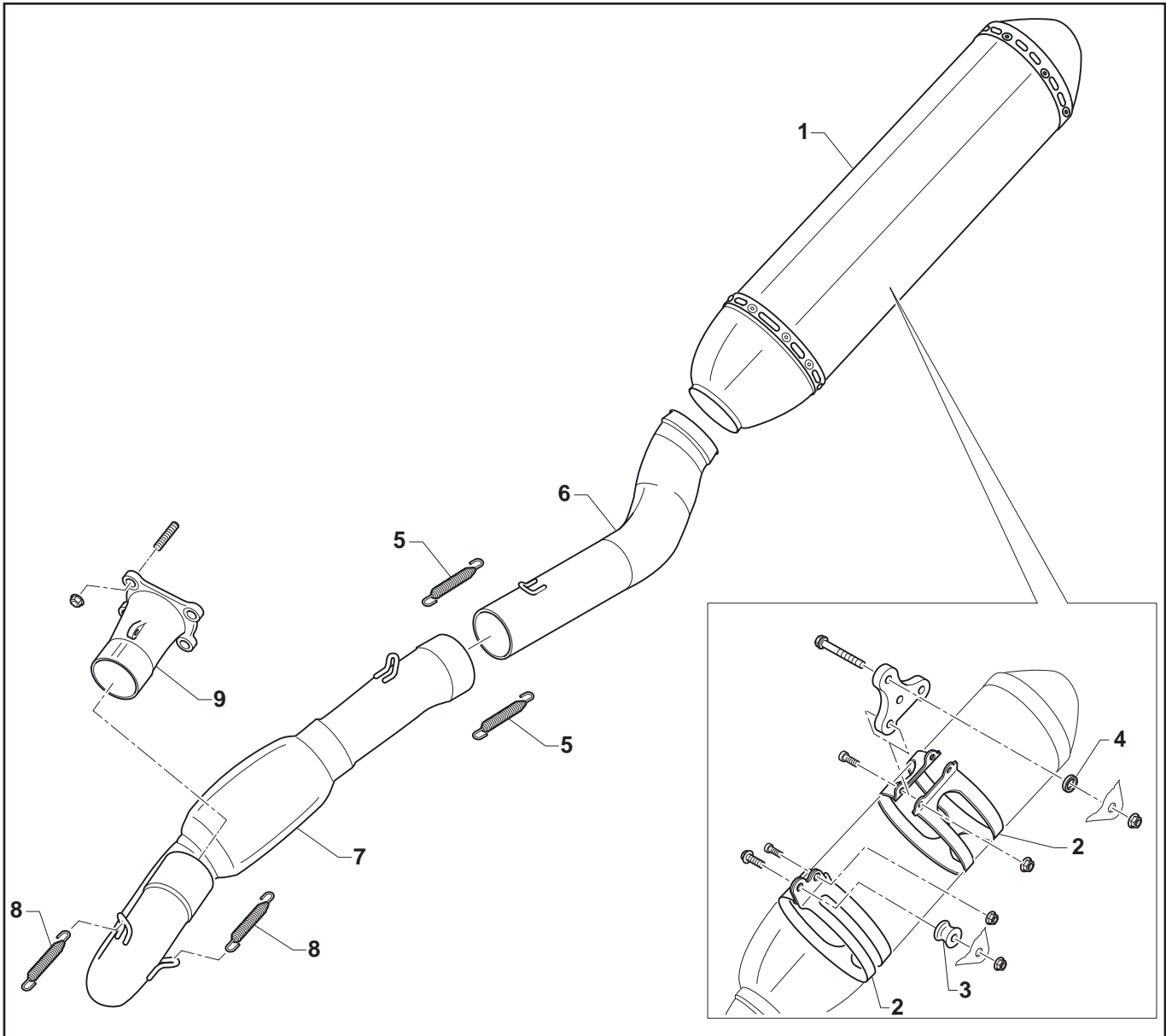


- Loosen the screw (5) with the relative nut and remove the rear direction indicator.

**NOTE:** Re-mount the headlight, proceeding in reverse order to removal, paying attention to connect the direction indicator connectors (4) colour with colour.



6.8 EXHAUST UNIT

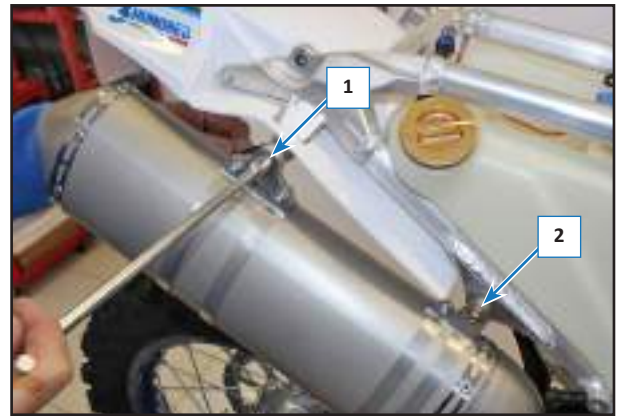


Key

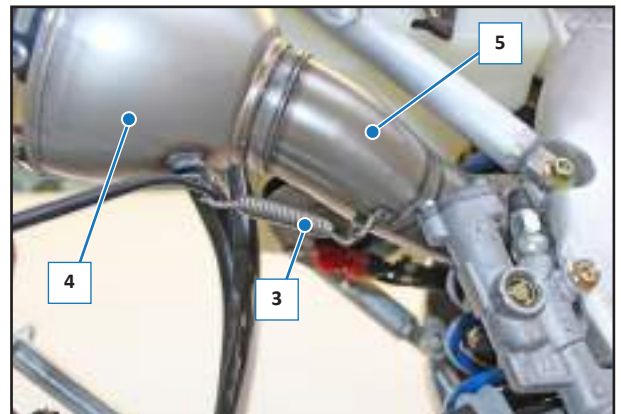
- 1) Silencer
- 2) Silencer support straps
- 3) Spacer
- 4) Spacer
- 5) Springs
- 6) Extension
- 7) Manifold
- 8) Springs
- 9) Manifold on cylinder

### 6.9 EXHAUST UNIT REMOVAL

- Remove the seat and right side pod as described in the relevant paragraphs.
- Loosen the silencer fixing screws (1) and (2) (10 mm internal wrench and 8 mm external).



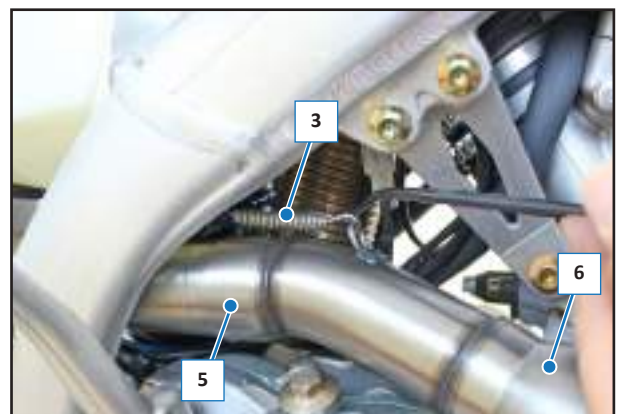
- Release the spring (3) that blocks the silencer (4) and extension (5) in position.



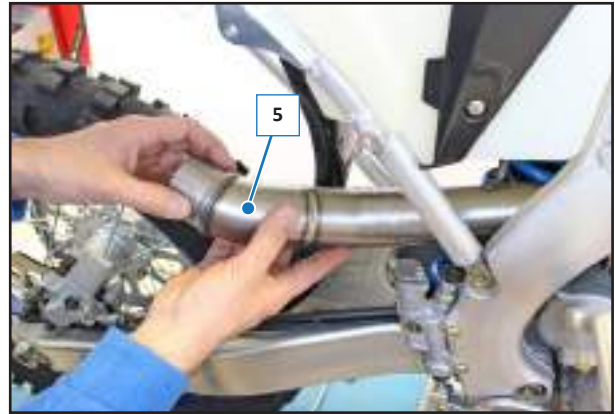
- Remove the silencer (4).



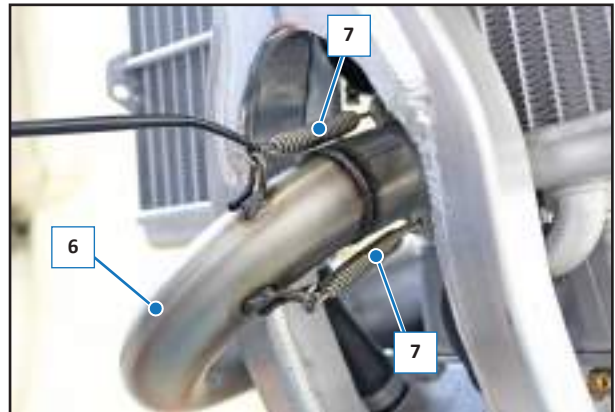
- Release the spring (3) that blocks the extension (5) and exhaust manifold (6) in position.



- Slide out the extension (5).



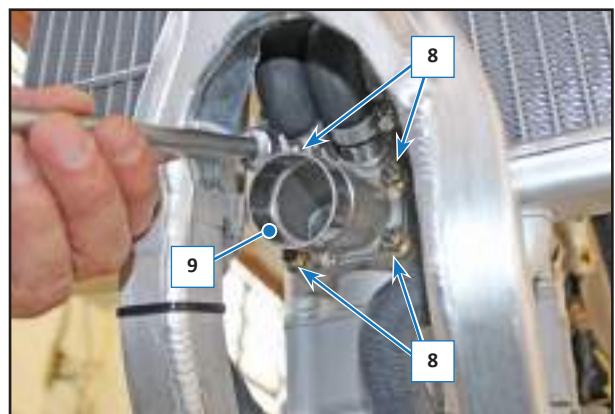
- Release the two springs (7) that connect the exhaust manifold (6) to the manifold on the cylinder.



- Remove the manifold (6).

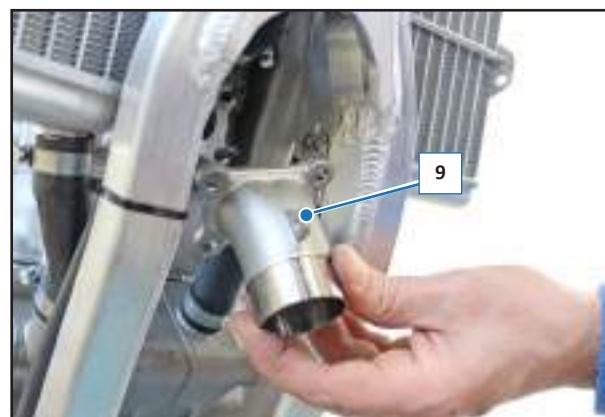


- Loosen the manifold (9) fixing nuts (8) on the cylinder.



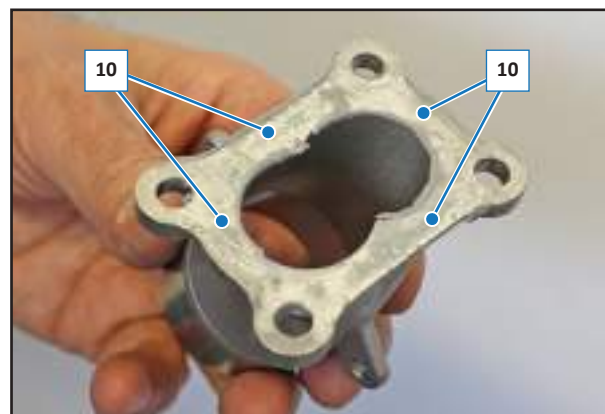
## 6. PARTS REMOVAL

- Remove the manifold (9).



**NOTE:** Re-mount everything, proceeding in the opposite order, paying attention:

- When re-mounting the manifold (9), to clean the contact surfaces (10) of the manifold and cylinder from residues of Threebond 1215 sealant and tighten the nuts (8) with a torque of 12 Nm/ 1.2 kgm/ 8.85 ft/lb + Loxeal 82-33

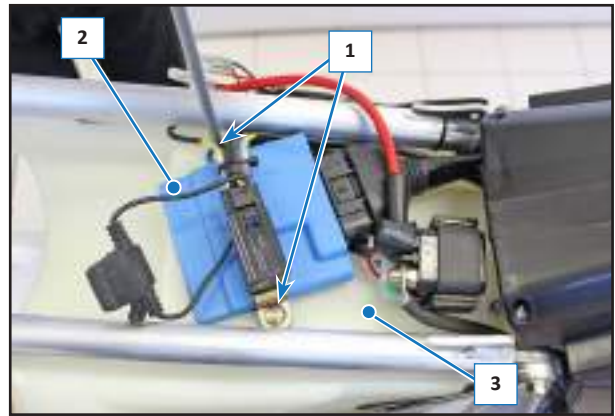


- To position the wide spacer (11) on the lower support and the narrow one (12) on the rear support, when mounting the silencer.

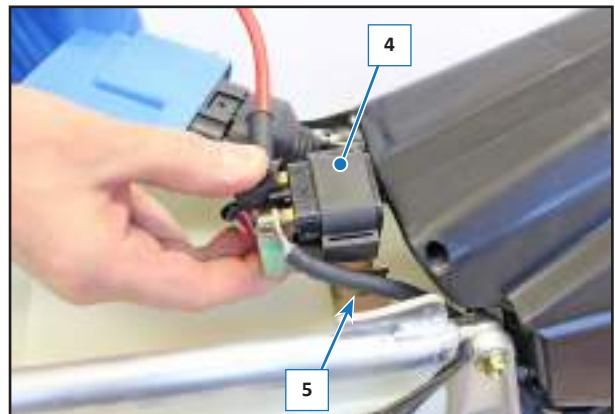


### 6.10 TANK REMOVAL

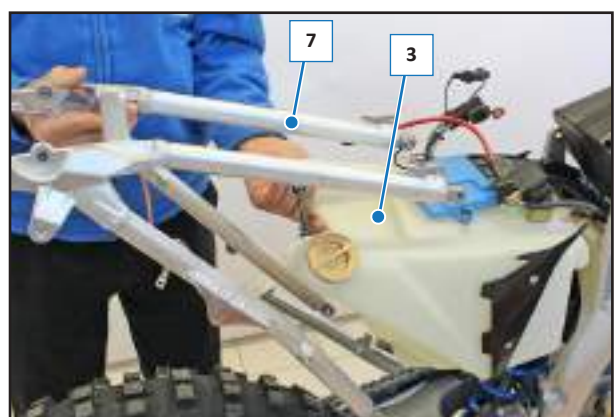
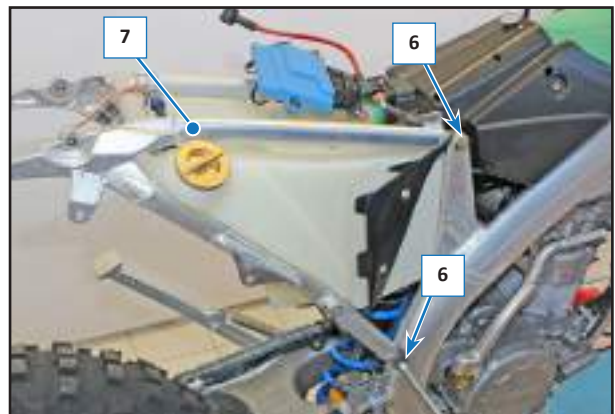
- Remove the complete mud guard and the splash guard as described in the relevant paragraphs.
- Loosen the two screws (1) that fix the control unit (2) to the tank (3).



- Lift the contactor (4) releasing it from the support bracket (5).



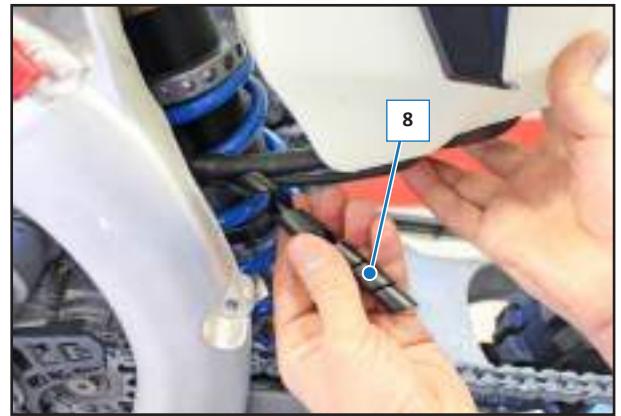
- Loosen the screws (6) from both sides and remove the rear subframe (7), while supporting the tank (3).





## 6. PARTS REMOVAL

- Remove the hoses protection sheath (8).

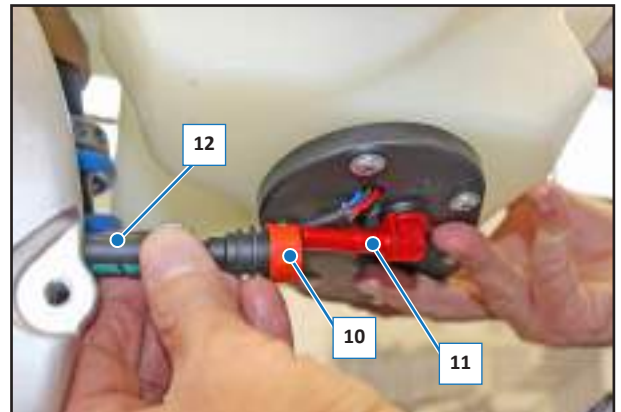


- Disconnect the fuel pump connector (9).



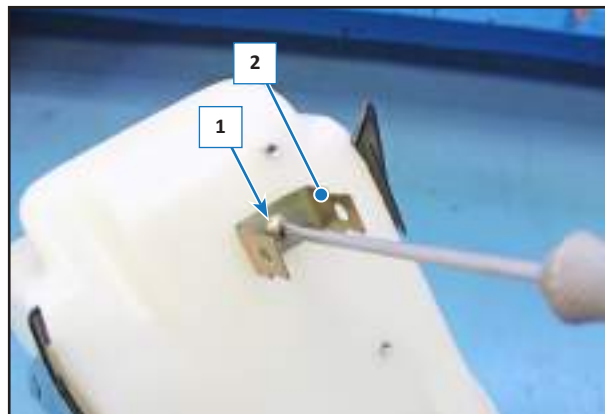
- Push the quick coupling ring nut (10) towards the fitting (11) and disconnect the hose (12) from the tank.

**NOTE:** Re-mount everything proceeding in reverse order to disassembly, paying attention to wrap the sheath (8) around the fuel hose (12) and the pump electric connection cable.

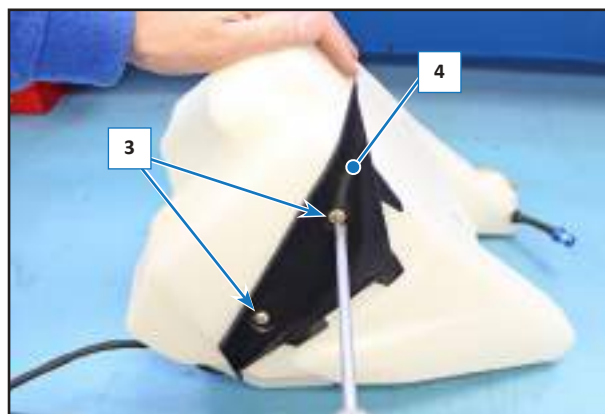


**6.11 TANK DISMANTLING**

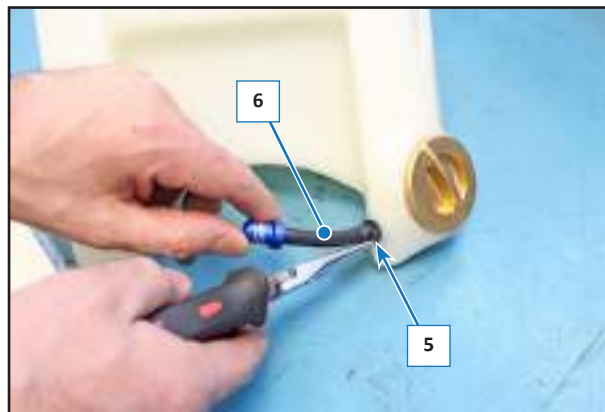
- Remove the tank as described in the relative paragraph.
- Unscrew the screw (1) and remove the contactor support plate (2).



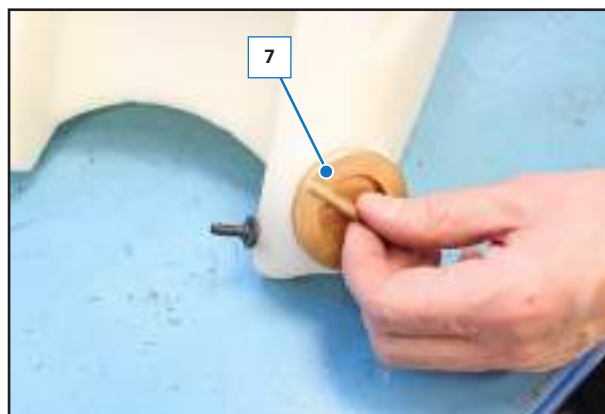
- Loosen the screws (3) and remove the fins (4).



- Stretch the strap (5) and remove the bleeder hose (6).



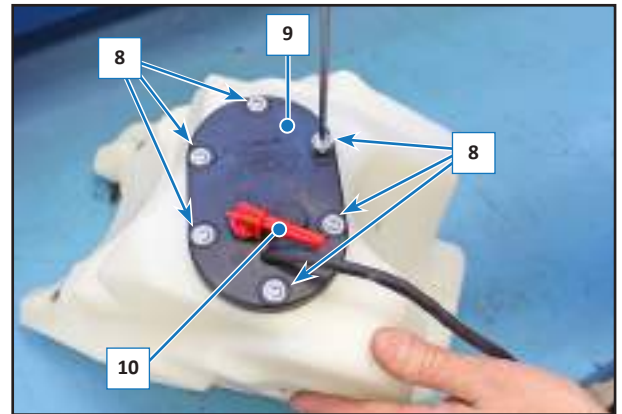
- Unscrew and remove the cap (7).



## 6. PARTS REMOVAL

- Loosen the screws (8) and remove the pump (9).

**NOTE:** On re-mounting the pump, check that the fitting (10) is positioned as in the figure.



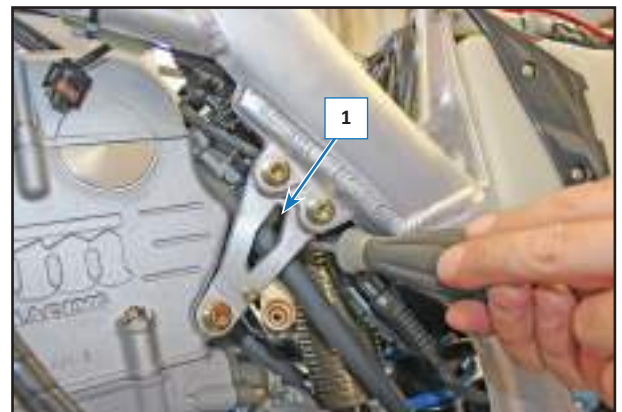
Check that the gasket (11) is not ruined and is positioned correctly, then tighten the screws (8) gradually cross-wise, until they are fully home on the plastic of the pump (9) compressing the gasket (11). At this point, tighten them by 1/2 turn, 1 turn max.

**NOTE:** Do not tighten the screws too much so as not to damage the tank or pump.



### 6.12 INJECTOR REPLACEMENT

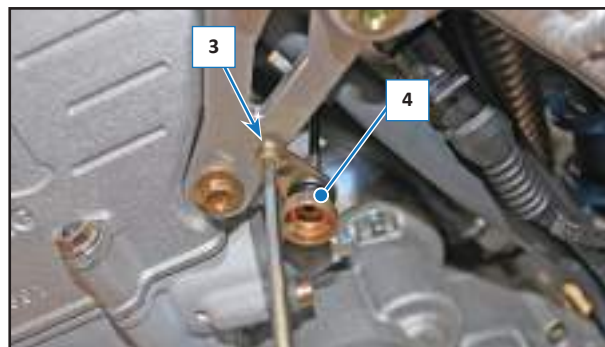
- Remove the Airbox as described in the relevant paragraph.
- Loosen the strap (1) between the throttle body and the coupling.



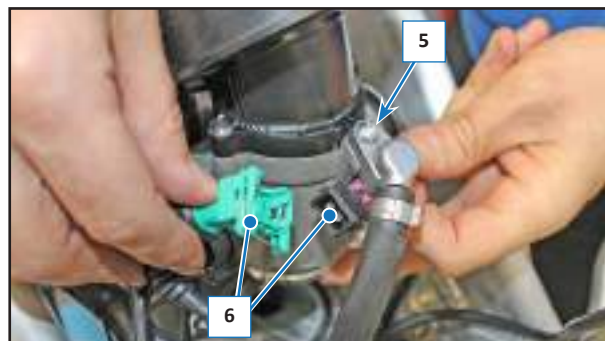
- Disconnect the hose (2) from the fuel pump.



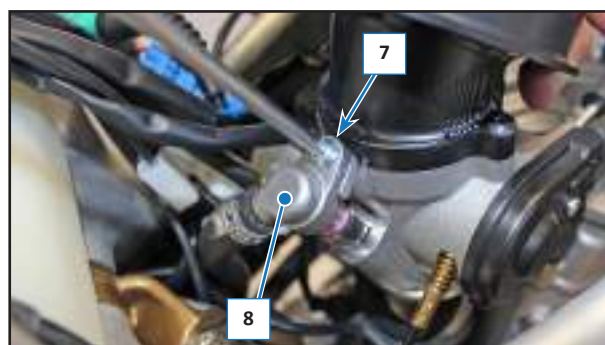
- Unscrew the screw (3) that fixes the idle speed adjustment knob (4).



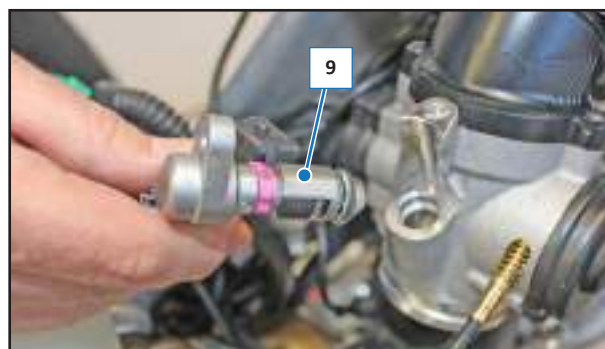
- Lift the throttle body (5) detaching it from the coupling and disconnect the injector connector (6).



- Loosen the screw (7) of the injector supply fitting (8).



- Extract the injector (9) from the throttle body.



- Slide the injector (9) out and replace it.



**NOTE:** When re-mounting the injector, pay attention not to invert it.

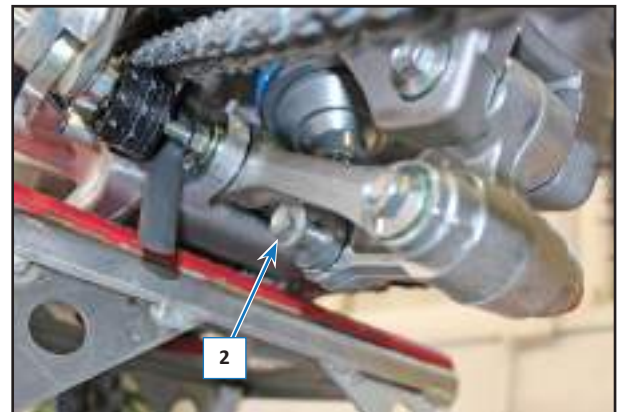
### 6.13 SWING RM REAR SHOCK ABSORBER

#### REAR SHOCK ABSORBER REMOVAL

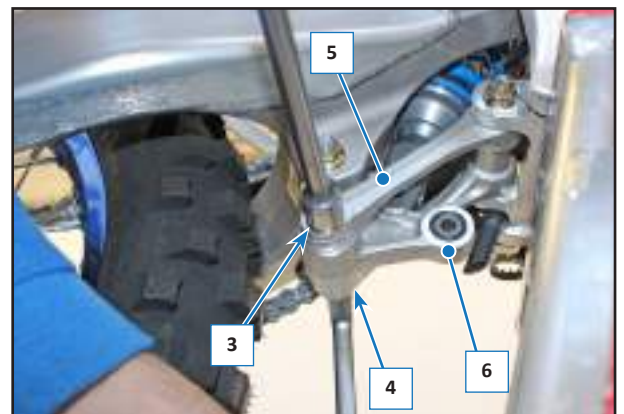
- Remove the rear subframe complete with tank and mud guard as described in the relevant paragraph.
- Unscrew the nut (1) of the shock absorber lower pin (2).



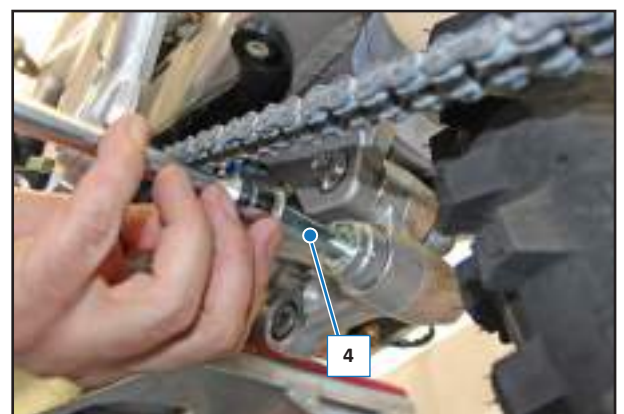
- Slide the pin (2) out.



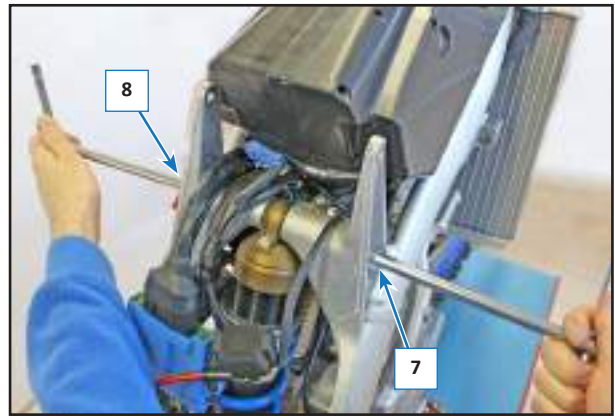
- Loosen the nut (3) pin (4) fixing the tie-rod (5) to the rocker (6).



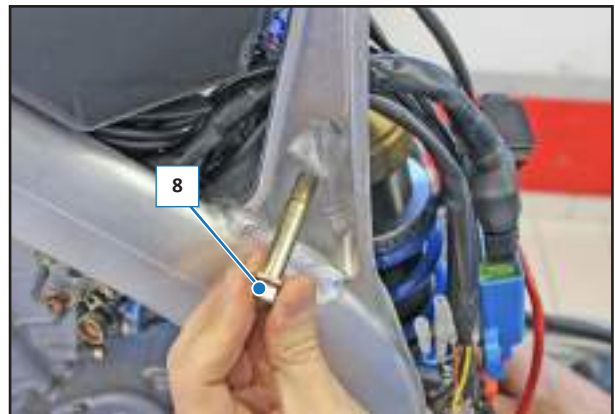
- Slide the pin (4) out.



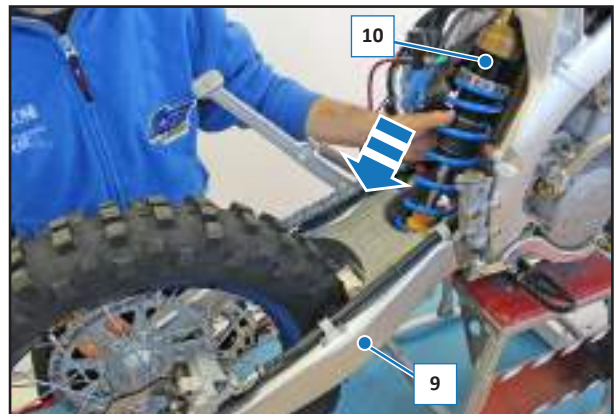
- Unscrew the nut (7) of the shock absorber upper pin (8).



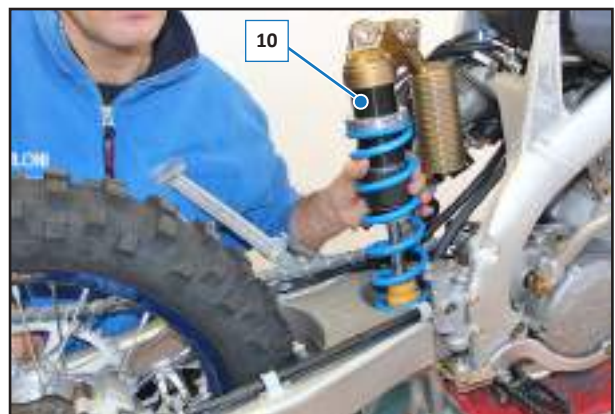
- Remove the pin (8).



- Lift the rear swing arm (9), so that it is parallel to the ground and then lower the shock absorber (10) in a way to slide it from the upper attachment.



- Remove the shock absorber (10) from the frame.



**NOTE:** Re-mount everything in reverse order, paying attention to re-mount the pins (2), (4) and (8) from the left side of the motorcycle and the relative nuts from the right side.

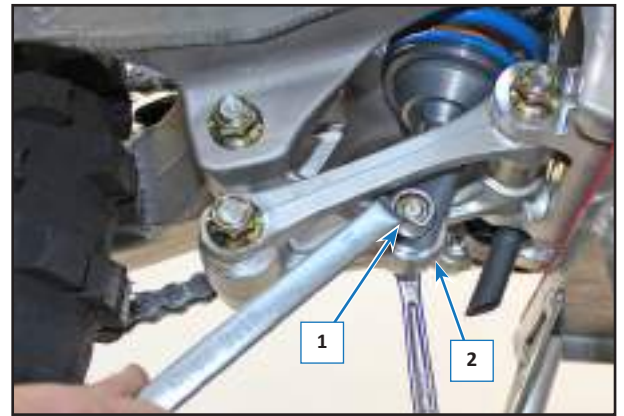
Tighten the nut (1) with a torque of 35 Nm/ 3.5 kgm/ 25.81 ft/lb

Tighten the nut (3) with a torque of 60 Nm/ 6 kgm/ 44.25 ft/lb

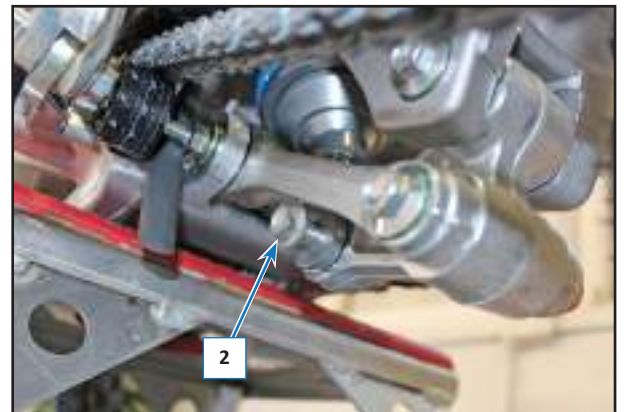
Tighten the nut (7) with a torque of 40 Nm/ 4.0 kgm/ 29.5 ft/lb

### 6.14 REAR SHOCK ABSORBER ROCKERS AND TIE-ROD REMOVAL

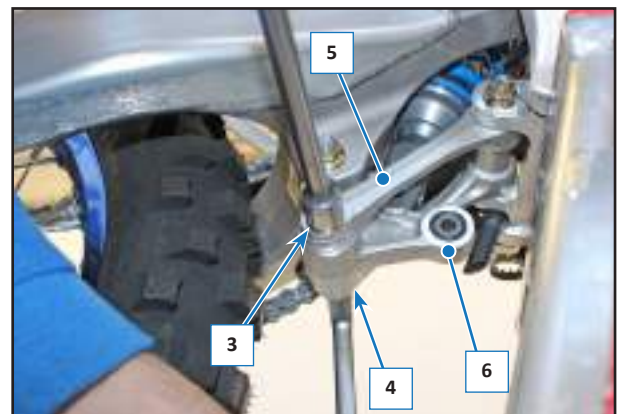
- Unscrew the nut (1) of the shock absorber lower pin.



- Slide the pin (2) out.



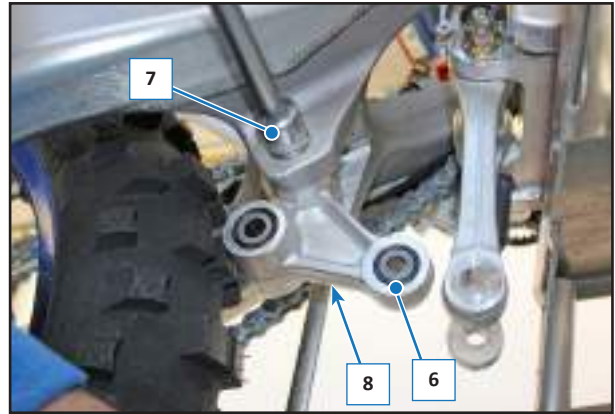
- Loosen the nut (3) pin (4) fixing the tie-rod (5) to the rocker (6).



- Remove the pin (4).

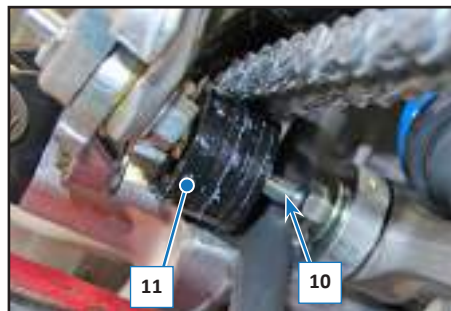
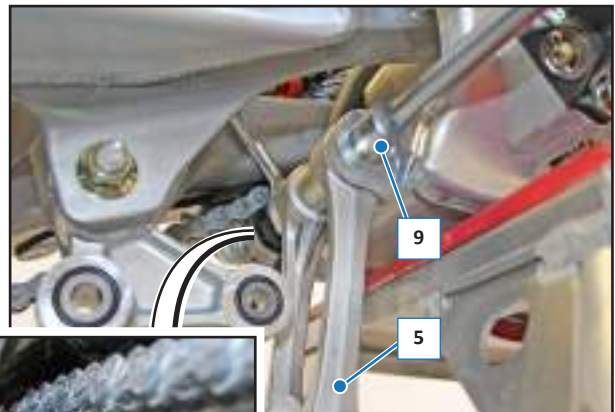


- Loosen the nut (7) of the pin (8) that fixes the rocker (6) to the rear swing arm and then remove the rocker.



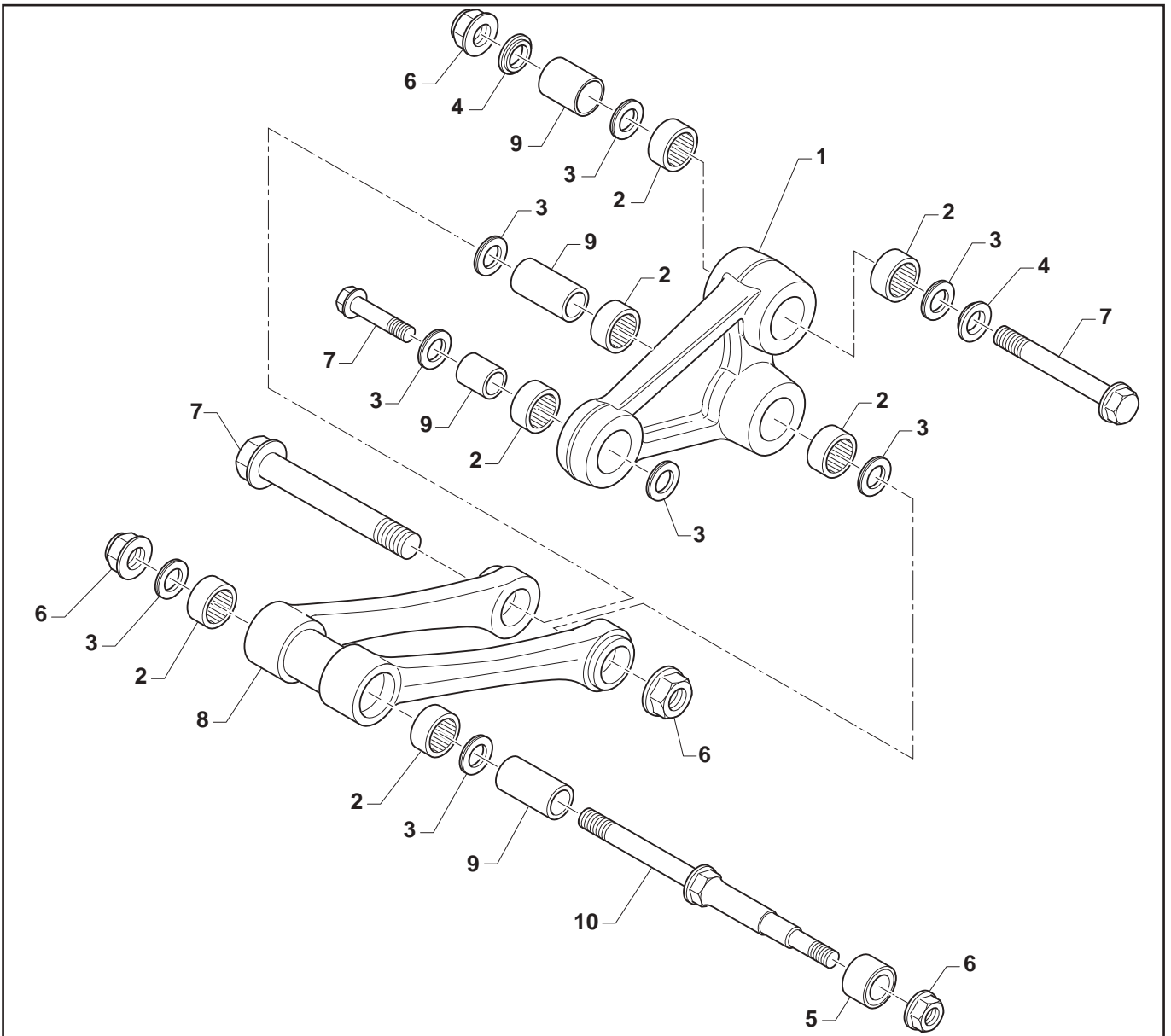
- Loosen the nut (9) and remove the pin (10) with the chain roll (11) and the tie-rod (5).

**NOTE:** Re-mount everything in reverse order, paying attention to re-mount the pins (2), (4) and (8) from the left side of the motorcycle and the relative nuts from the right side.  
 Tighten the nut (1) with a torque of 35 Nm/ 3.5 kgm/ 25.81ft/lb  
 Tighten the nut (3) with a torque of 60 Nm/ 6 kgm/ 44.25 ft/lb  
 Tighten the nut (7) with a torque of 60 Nm/ 6 kgm/ 44.25 ft/lb  
 Tighten the nut (9) with a torque of 40 Nm/ 4 kgm/ 29.50 ft/lb + medium threadlocker (blue)





6.15 LINKAGES

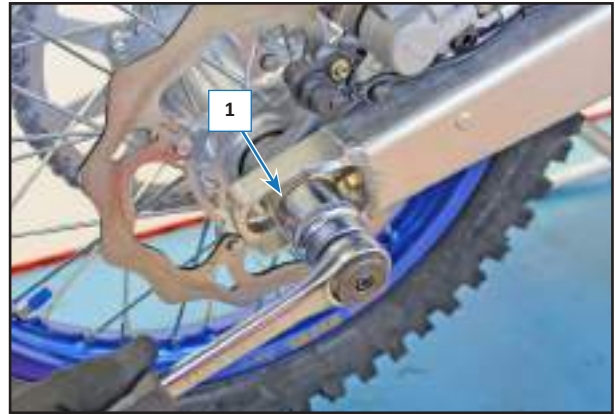


Key

- 1) Rocker
- 2) Roller cage
- 3) Oil seal
- 4) Bush cover
- 5) Chain wheel
- 6) Nut
- 7) Screw
- 8) Front suspension rod
- 9) Spacer
- 10) Pin

### 6.16 REAR SWING ARM REMOVAL

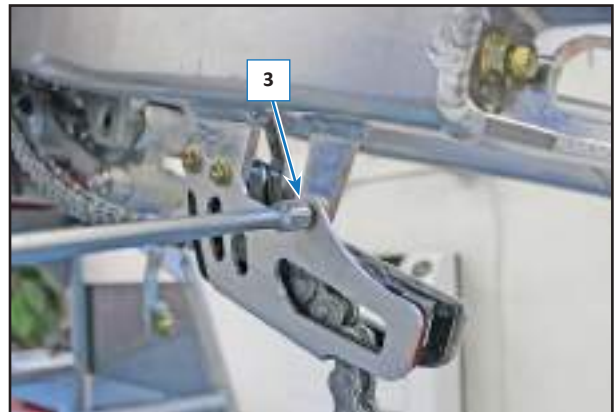
- Unscrew the nut (1) and slide the pin out from the opposite side.



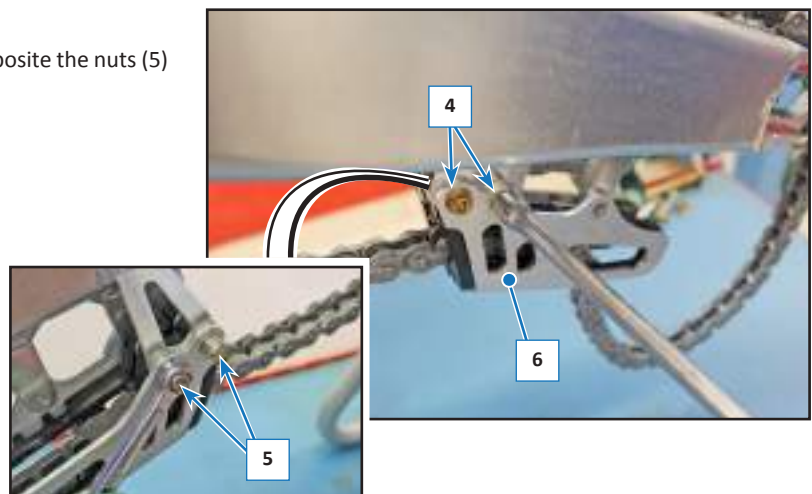
- Remove the wheel (2).
- If the chain has a connecting link, remove it and remove the chain.
- If the chain does not have a connecting link, the chain runner must be removed to release the chain itself.



- Unscrew the screw (3).



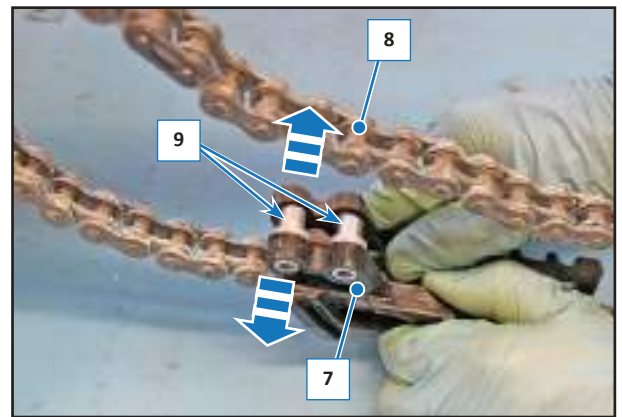
- Loosen the two screws (4) blocking from the part opposite the nuts (5) and remove the chain guide (6).



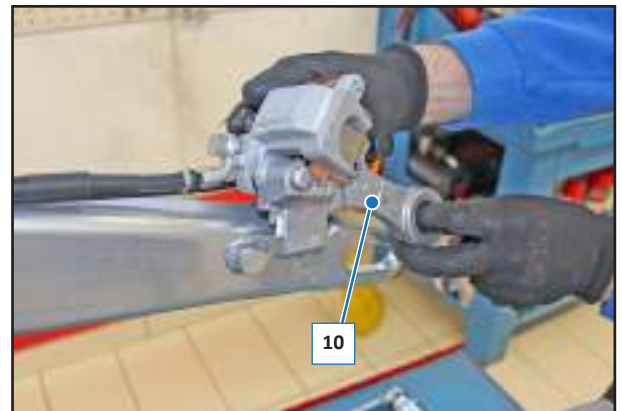
## 6. PARTS REMOVAL

- Open the chain runner (7) and release the chain (8).

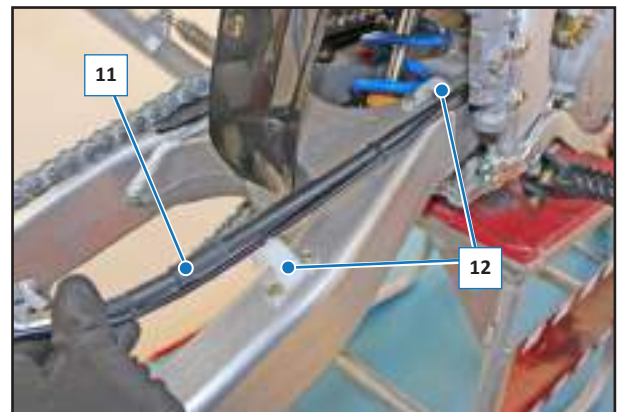
**NOTE:** On re-mounting the chain runner, make sure the two spacers are re-positioned correctly (9).



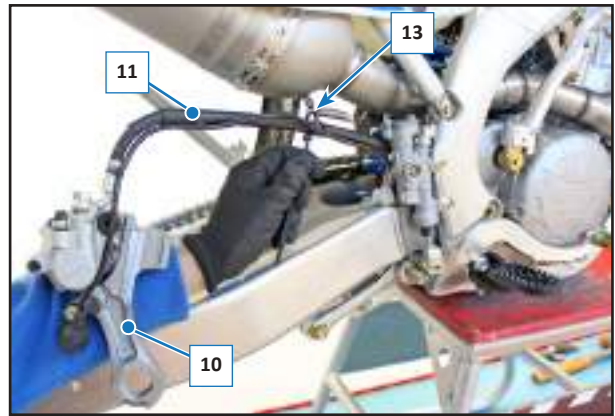
- Slide the calliper support (10) out from the attachment on the swing arm.



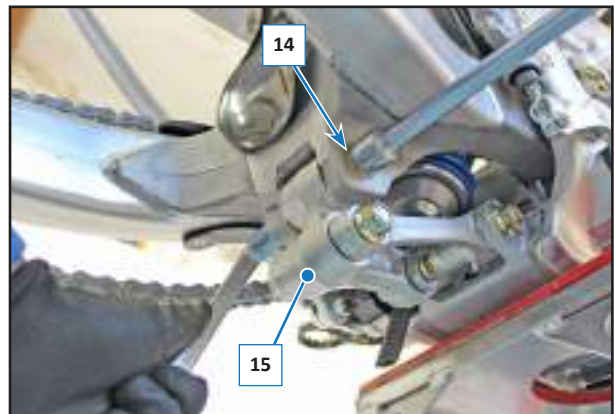
- Releases the hoses (11) from the supports (12).



- Support the calliper (10) and the hoses (11) with a strap (13) fixed to the silencer.



- Loosen the nut (14) fixing the swing arm to the rocker (15).

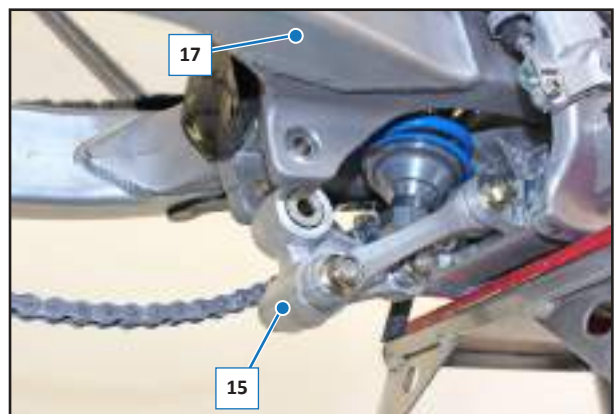


- Slide the rocker pin (16) out.

**NOTE:** On re-mounting, insert the pin (16) from the left part and the nut from the right part.

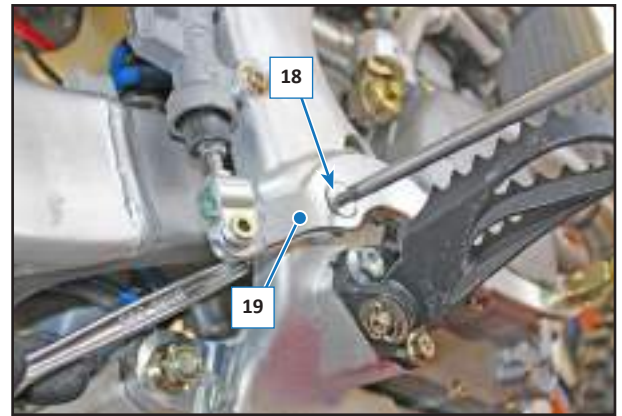


- Lower the rocker (15) in a way to release the spring arm (17).

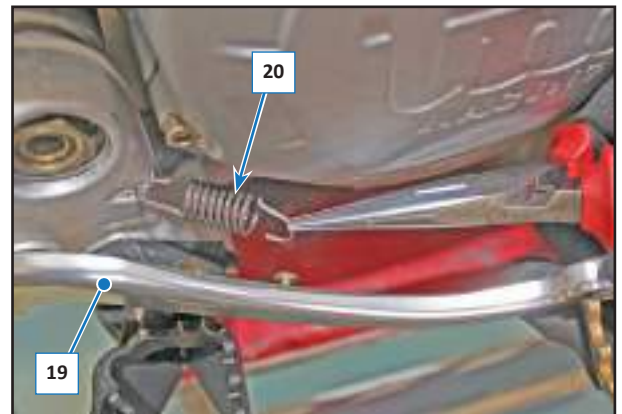


## 6. PARTS REMOVAL

- Unscrew the screw (18) of the brake pedal lever (19).



- Release the spring (20) releasing the lever (19) in a way to access the swing arm pin.



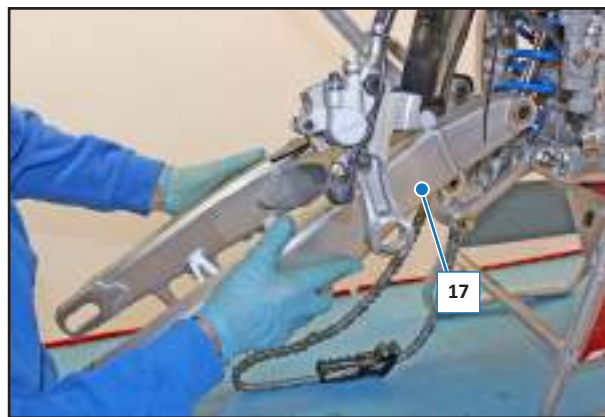
- From one side loosen the nut (21) of the swing arm pin.



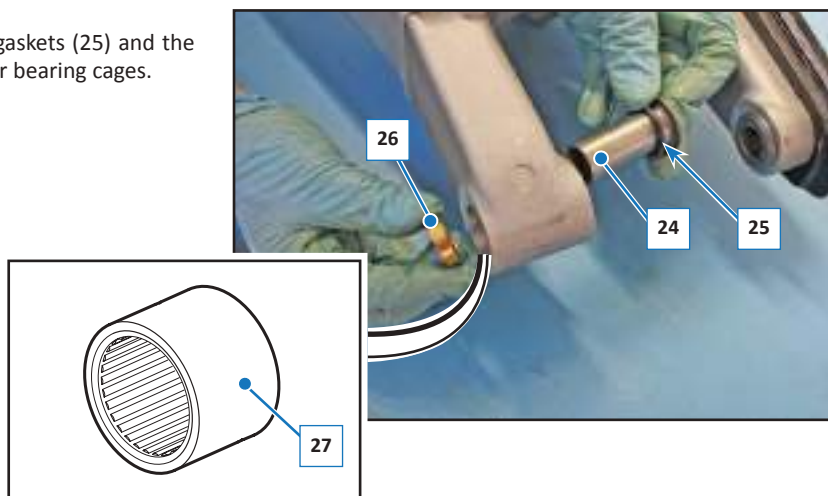
- Slide the pin (22) out from the opposite side.
- Loosen the shock absorber upper fixing pin in a way that the frame widens.



- Remove the swing arm (17).



- Remove the bushes (24) and with relative "OR" gaskets (25) and the bushing (26); use an extractor to remove the roller bearing cages.



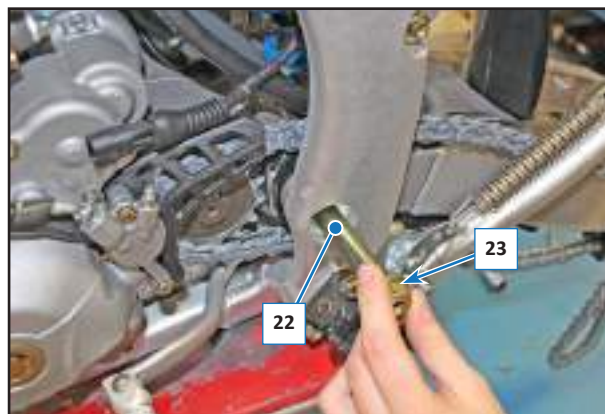
**NOTE:** Re-mount everything, proceeding in the opposite order, pay attention to:

- Correctly re-mount the swing arm pin (22); grease before inserting and then check that the nut (23) is tightened flush to the pin. Now, tighten the nut positioned from the opposite side with a torque of 40 Nm/ 4.0 kgm/ 29.5 ft/lb.

- Tighten the nut (14) of the rocker pin, with a torque of 60 Nm/ 6 kgm/ 44.25 ft/lb

- Grease and tighten the nut (1) of the wheel pin, with a torque of 80 Nm/ 8.0 kgm/ 59 ft/lb

- Grease the roll cages (27) and replace the "OR" gaskets (25).



### 6.17 FRONT SWING ARM REMOVAL

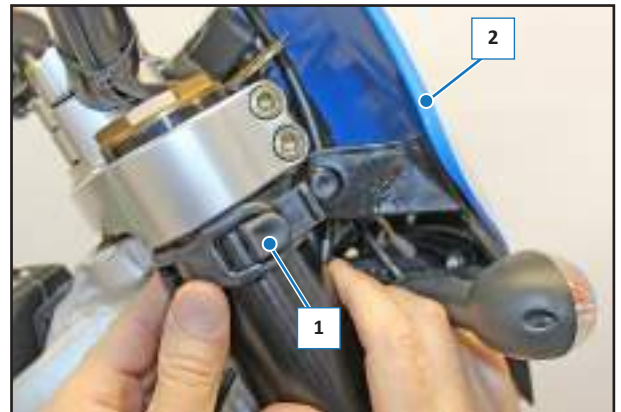
- Measure the distance between the upper part of the fork and the steering plate, in a way to position the rod correctly on re-mounting.



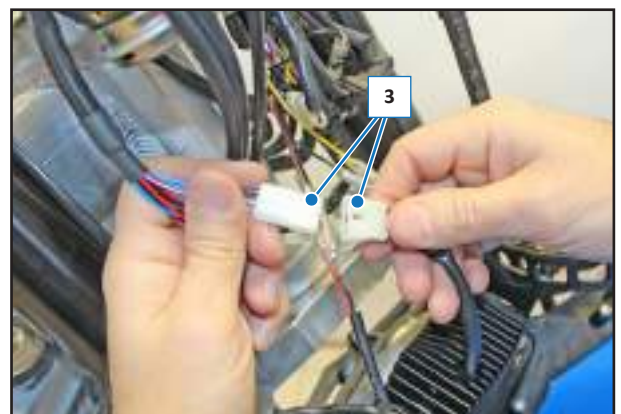
**NOTE:** Normally the distance is approx. 13 mm on the first reference notch of the rod.



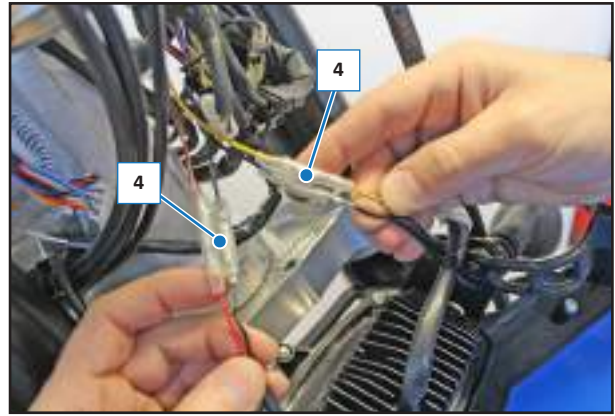
- Release the four elastics (1) that block the headlight (2) onto the fork rods.



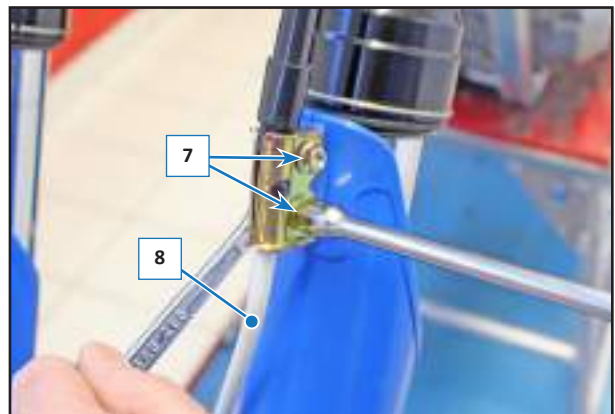
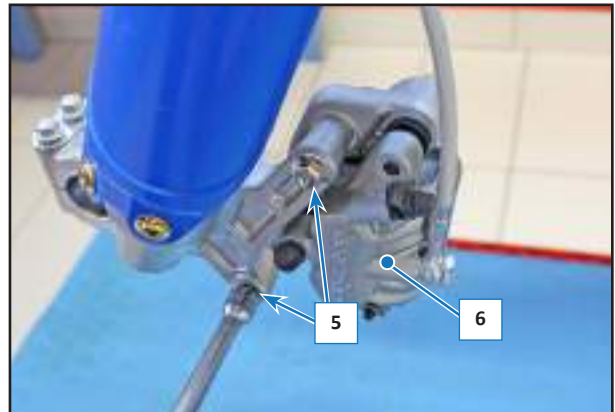
- Disconnect the connector (3) from the headlight.



- Disconnect the connectors (4) of the front direction indicators.



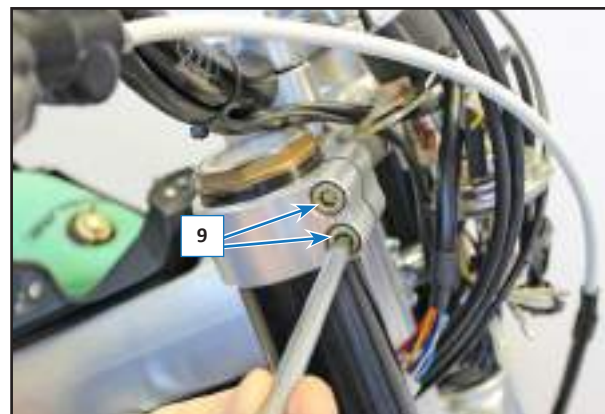
- On the left rod, loosen the screws (5) and move the brake calliper (6), then loosen the screws (7) and strip the hose (8).





## 6. PARTS REMOVAL

- Loosen the screws (9) and (10) and slide the fork rod (11) out.



**NOTE:** On re-mounting, position the rods on the upper steering plate at the measurement obtained and then tighten the screws (9) with a torque of 20 Nm/ 2.0 kgm/ 14.75 ft/lb and the screws (10) with a torque of 15 Nm/ 1.5 kgm/ 11.06 ft/lb. Re-mount the brake calliper on the left fork, tightening the screws (5) to a torque value of 25 Nm 2.5 Kgm - 18.44 ft/lb.

Re-mount everything, proceeding in reverse order and re-connect the direction indicator connectors (4) colour with colour.

## 6.18 FRONT SWING ARM DISMANTLING

The fork system uses a multi-valve damping system, which allows the rebound and compression to be checked and adjusted, and spring for the static load. Hydraulic damping in compression is realised by a special valve positioned on the top of every rod. Hydraulic damping of rebound takes place via the use of a cartridge sealed inside every load bearing pipe. Every rod is fitted with external registers for adjustment of the compression and rebound phase.

Both rods have air bleeding valves inside the sleeve and screws for bleeding the oil in the cartridge.

### LOAD BEARING

**PIPES:** In special high-tensile steel, with chrome-plating.

**ROD-HOLDERS:** Made in aluminium alloy; machined with cnc. anodised and polished internally.

### RUNNING

**BUSHES:** with Teflon® coating; no first detachment friction.

**GASKETS:** Sealing rings designed by computer ensure maximum sealing in compression and minimum friction in extension.

**SPRINGS:** Made in steel and available with different stiffness constants (K). (For more detailed information, refer to the Table).

**OIL:** KAYABA with special formula, eliminates the formation of foam and maintains the features of viscosity unaltered in every work condition;

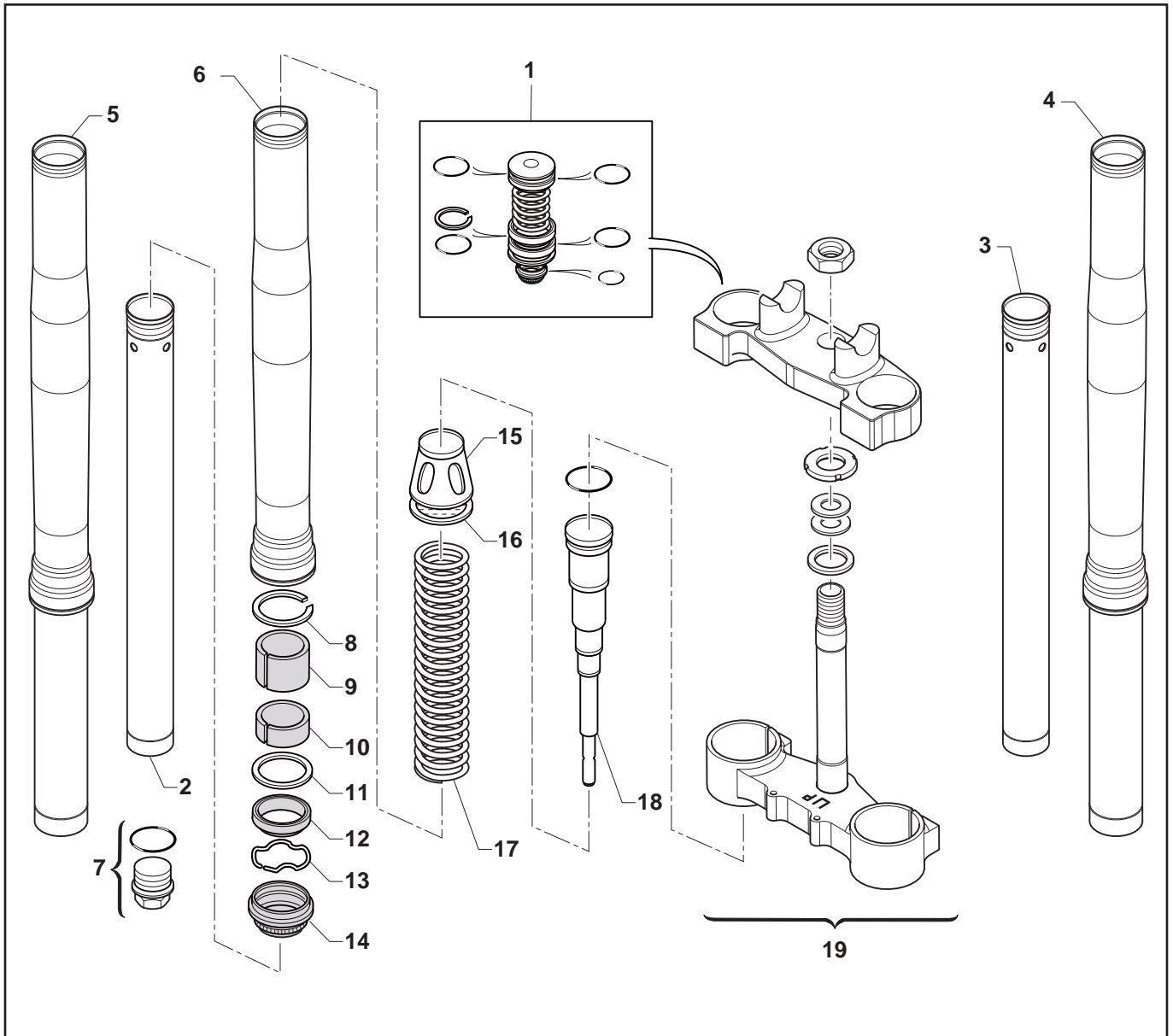
### SPRINGS TABLE

The static load of the fork is realised by the spring, positioned in the lower part of every rod:

SPRING TYPE	CONSTANT K (N/mm)
A	4.5
B	4.4
C	4.3
D	4.0

### Front suspension

The front suspension is KAYABA telescopic hydraulic with advanced axle upside down; rods with diameter of 48 mm. Wheel travel on the legs axis is 310 mm.



**Key**

- 1) Compression valve
- 2) Right rod
- 3) Left rod
- 4) Lh leg
- 5) Rh leg
- 6) Rod-holder
- 7) Extension adjuster
- 8) Lock ring
- 9) Bush
- 10) Bush
- 11) Washer
- 12) Sealing ring
- 13) Lock ring
- 14) Dust scraper
- 15) Bush
- 16) Bush
- 17) Spring
- 18) Complete pumping unit
- 19) Steering wheel

- Loosen the upper cap of every rod-holder.

**NOTE:** It is good practice to slightly loosen the caps before removing the rods from the motor cycle.



- Eliminate the oil from the shock absorber unit.



- Block the wheel pin support and loosen the adjustment screw.



- Push the internal pipe downwards.
- Position the tool in the figure between the wheel pin support and the cartridge unit nut.
- Hold the nut in its housing with a wrench and remove the adjustment screw.  
**Pay attention not to injure fingers.**



## 6. PARTS REMOVAL

- Remove the cartridge assy from the external pipe.



- Do not remove the nut in the lower part of the cartridge assy.



- Remove the foot valve unit from the cartridge assy.  
Use an appropriate tool to block the orthogonal external area of the cartridge assy.  
Use the same tool in the orthogonal internal area of the foot valve assy.  
Loosen the foot valve unit using a wrench.



- Check that the OR rings on the foot valve unit are not damaged.  
Replace them, if necessary.



- If the internal and external pipes are not disassembled, turn the rod over for at least 20 minutes to eliminate the oil completely.



- Remove the dust scraper using a flat tip screwdriver.



- Remove the lock ring using a flat tip screwdriver.



- Extract the internal pipe from the external one.

**NOTE:** To facilitate the operation, make the pipes run quickly (but carefully) forwards and backwards several times, until they are separated.



## 6. PARTS REMOVAL

- Remove the sealing rings and the metal rings mounted on the internal pipe.  
Do not re-use metal parts that have been removed.  
Replace them with new ones.  
Replace the damaged sealing rings.  
The washer and the lock ring can be re-used, if not damaged.



- Check that the internal rod has no distortions or damage.  
Replace it, if necessary.



- Check the extension register.  
Replace the damaged OR rings.  
Replace the complete unit (do not re-use it).



- Check the spring.  
Replace it if:  
The external diameter is damaged or excessively worn. The free length is equal to or less than 475 mm (18.7 in.).



- Check the internal pipe.  
Replace it if distortions are detected.  
(Do not repair or re-use a pipe with distortions).  
If the pipe has surface defects, clean the surface with sand paper. If repair is not possible, replace the pipe.  
(Do not use an internal pipe if it is marked or has projections on the external surface).



- Check the external pipe.  
Replace the pipe if distortions are detected or if the running surface is damaged.



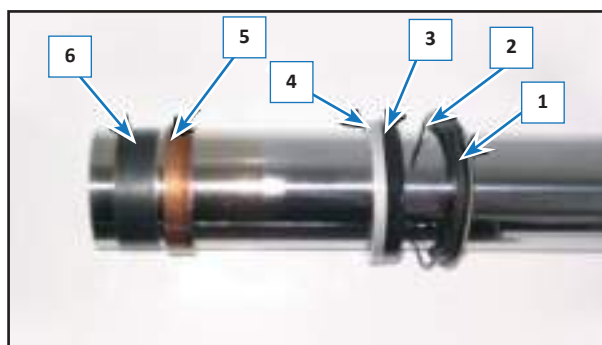
- Mount the sealing rings and the metal parts on the internal pipe.  
For the mounting sequence, see the figure given below.



**NOTE:** Apply grease to the edge of the sealing ring.

When mounting the sealing ring on the internal pipe, cover the end part of the latter with a plastic casing, as shown in the figure.

This will protect the lip of the ring, thus preventing damage.



- Mount the metal bush and the washer on the external pipe, inserting them into the housing with the aid of a guide.  
Mount the oil seal on the external pipe and insert it into the housing with a guide. Make sure that the grooves of the lock ring in the internal surface of the external pipe is clearly visible.



- Mount the lock ring.  
Make sure that the lock ring is correctly in the housing in the grooves on the internal surface of the external pipe.





- Mount the dust protector on the external pipe.  
Make sure there is no play between the dust protector and the external pipe.



### Re-mounting the cartridge assy

- Tighten the nut until it is locked on the internal rod.  
Make sure that the length of the threading on the internal rod is minimum 15 mm (0.6 in.).



- Fill the cartridge with specific oil (200 cm<sup>3</sup> - 12.2 in<sup>3</sup>).



- Eliminate the air from the cylinder by moving the piston rod up and down several times.



- Compress the piston rod completely and install the foot valve assy. With the foot valve assy mounted, check that the piston rod is completely extended.



- Block the orthogonal external area of the cartridge assy. Use the same tool in the orthogonal internal area of the foot valve assy. Use a wrench to tighten the foot valve assy to 29 Nm (21.4 ft/lb).



- Hold the cartridge assy with the end part of the piston rod facing downwards, as shown in the figure.
- Pump the piston rod up and down approx. 10 times to distribute the oil evenly in all the assy.



- Drain the excess oil from the cartridge by moving the shock absorber unit along its entire travel. Pay attention not to deform or damage the piston rod or the other parts. Remember that the excess oil can escape from the lateral hole at the tank.

If no oil escapes, it means that there is not enough oil in the cartridge.

- Add oil to the cartridge before re-mounting it.



## 6. PARTS REMOVAL

- Drain the excess oil from the tank.



- Clean the excess oil from the cartridge.
- Mount the spring guide and the spring on the cartridge assy.



- Insert the cartridge assy into the internal pipe.



- Push the internal pipe downwards.
- Position the tool in the figure between the wheel pin support and the cartridge unit nut.
- Insert the internal rod into the piston rod and tighten the adjustment screw.  
Pay attention not to injure fingers.



- Tighten the adjustment screw to the stop position.  
Make sure that there is play between the lower part of the adjustment screw and the upper limit of the nut.



- Use a wrench to tighten the nut and adjustment screw to 28 Nm (20.6 ft/lb).



- Block the wheel pin support and tighten the adjustment screw to it at 50 Nm (36.8 ft/lb).



- Pour the envisioned amount of oil into the external pipe: 350 cm<sup>3</sup> - 21.36 in<sup>3</sup>;

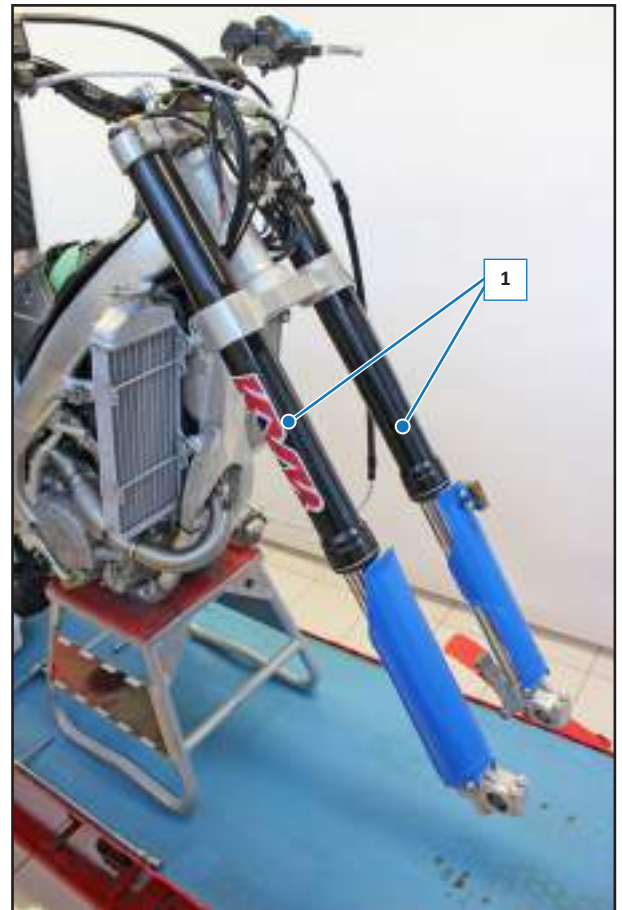


- Tighten the cylinder onto the external pipe at 29 Nm (21.4 ft/lb).



### 6.19 STEERING PLATE/STEERING BEARINGS REMOVAL

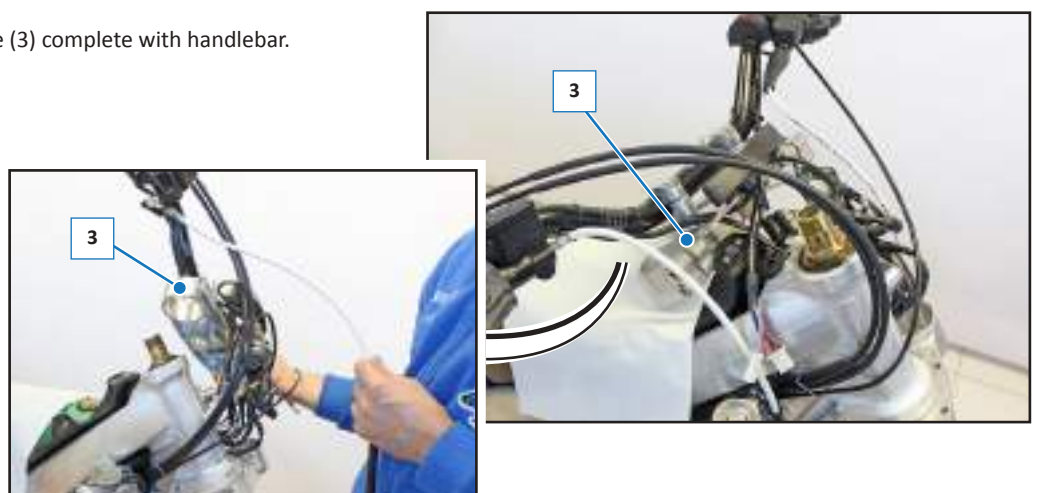
- Remove the fork rods (1) as described in the relative paragraph.



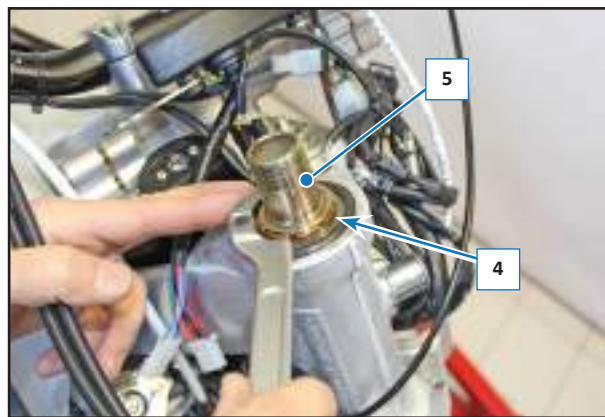
- Unscrew the central nut (2).



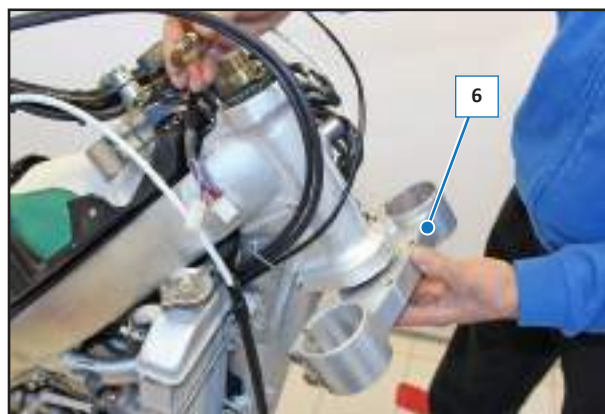
- Move the upper steering plate (3) complete with handlebar.



- Using a spanner, loosen the ring nut (4) of the steering pin (5).



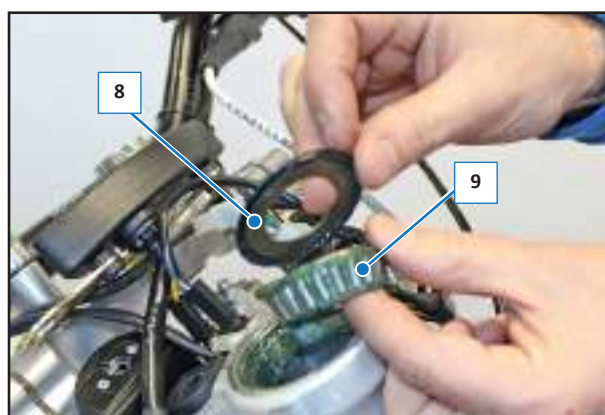
- Slide the lower plate (6) out complete with bearing.



- Heat the pin (5) and the plate (6) and use relevant tools to remove the bearing (7).



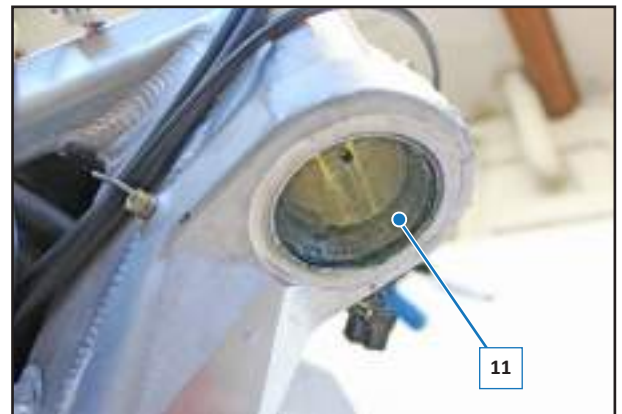
- Remove the oil seal (8) and the upper bearing (9).



## 6. PARTS REMOVAL

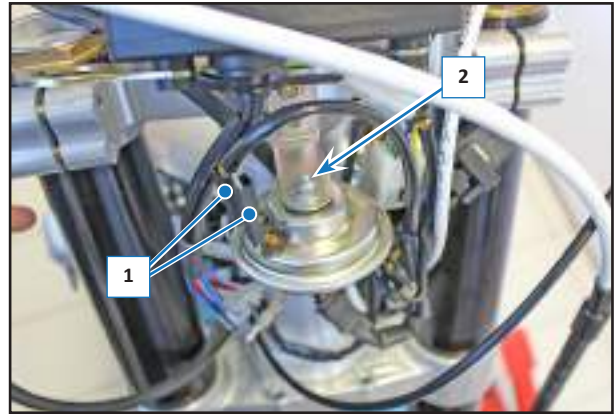
- Remove the housing (10) and (11) using a punch.

**NOTE:** On re-mounting, clean the inside of the steering head and the steering pin well. Insert the bearing housing using a punch. Re-mount the bearings, greasing both the housing and the bearings.



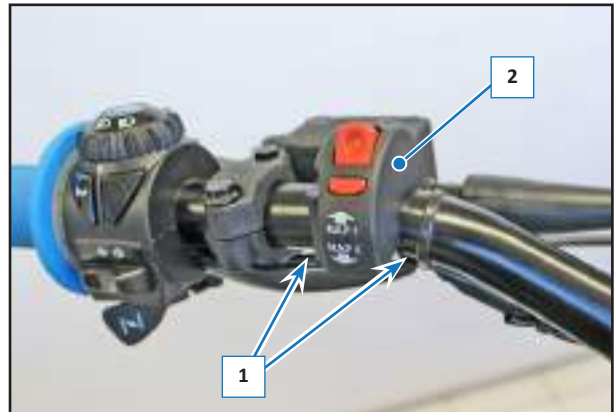
### 6.20 ACOUSTIC SIGNAL REPLACEMENT

- Release the four elastics that block the headlight onto the fork rods and move it without removing it.
- Disconnect the two connectors (1) and loosen the nut (2).
- Replace the acoustic signal device and re-mount everything in reverse order to disassembly.



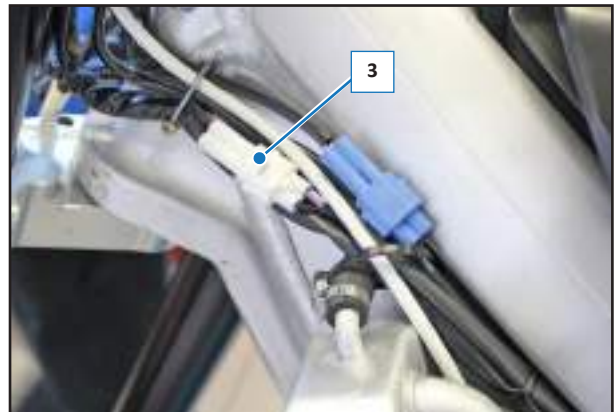
### 6.21 MAP CHANGE SELECTOR SWITCH REPLACEMENT

- Remove the left radiator conveyor as described in the relevant paragraph.
- Unscrew the two screws (1) that fix the selector switch (2) to the handlebar.



- Release the connector (3), cut the straps that block cabling and replace.

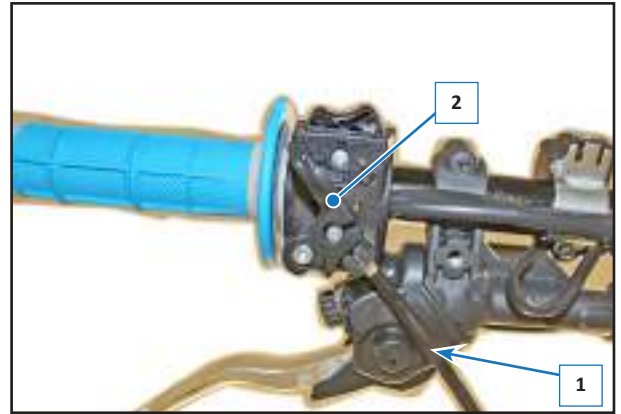
**NOTE:** On re-mounting, fix the cabling as previously, using plastic straps.



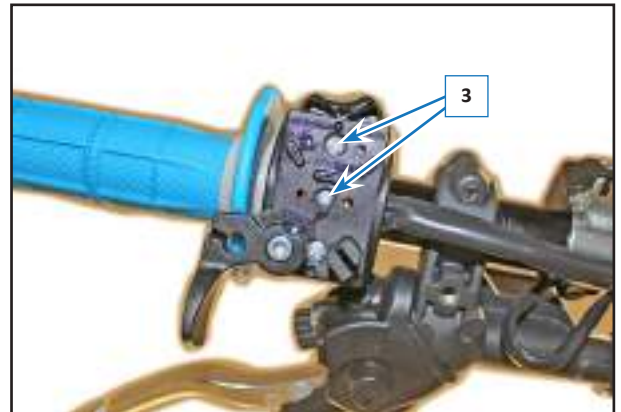


### 6.22 COMBINATION SWITCH REPLACEMENT

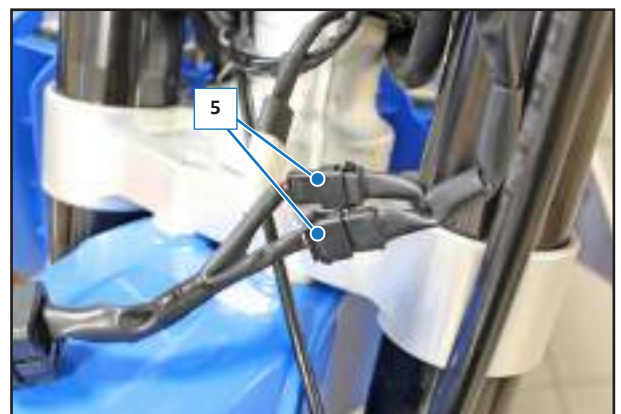
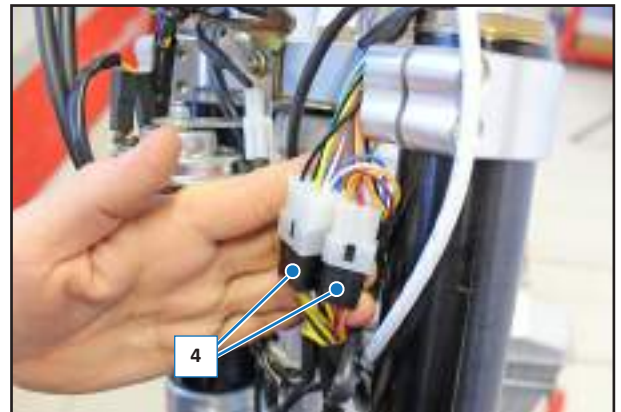
- Release the four elastics that block the headlight onto the fork rods and move it without removing it.
- Disconnect the cable (1) of the starter auxiliary lever (2).



- Loosen the two screws (3) to detach the switch from the handlebar.

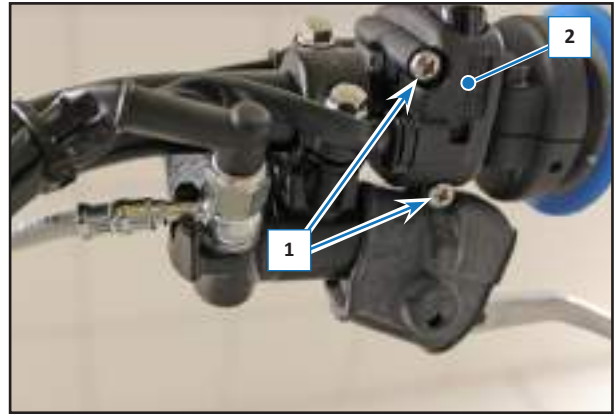


- Disconnect connectors (4) and (5), cut the straps and remove the switch.
- Replace the switch, re-mount everything in reverse order and fix the cabling with plastic straps, as described previously.



### 6.23 START COMMAND REPLACEMENT

- Remove the Airbox as described in the relevant paragraph.
- Loosen the two screws (1) and detach the start command (2) from the handlebar.



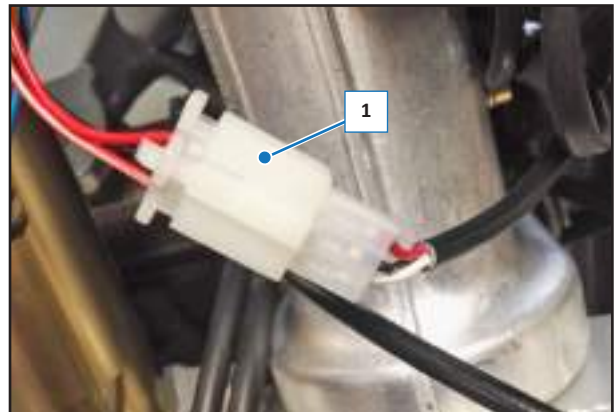
- Cut the plastic straps that fix the cabling.
- Disconnect the connector (3) and replace the start command.

**NOTE:** On re-mounting, fix the cabling as previously, using plastic straps.

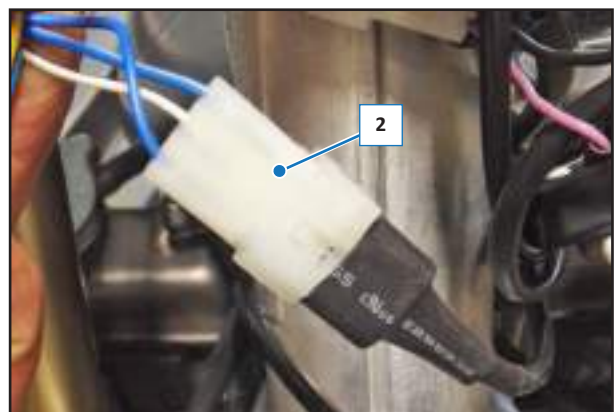


### 6.24 INSTRUMENT REPLACEMENT

- Release the four elastics that block the headlight onto the fork rods and move it without removing it.
- Disconnect the fuel reserve connector (1).

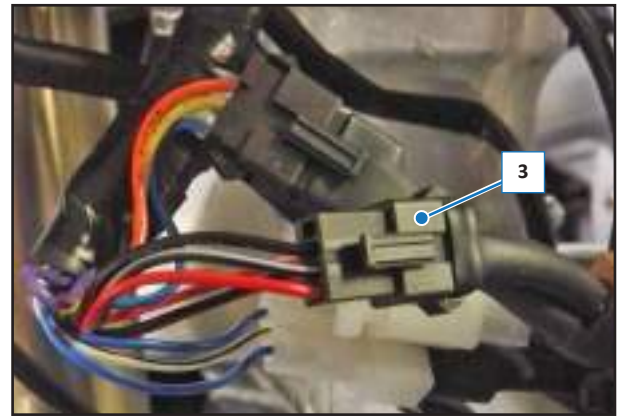


- Disconnect the odometer sensor connector (2).

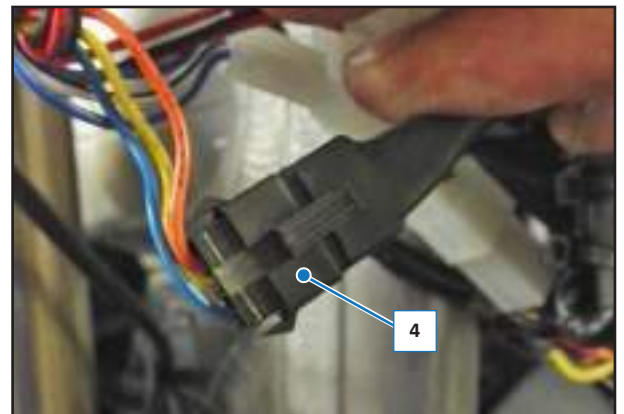


## 6. PARTS REMOVAL

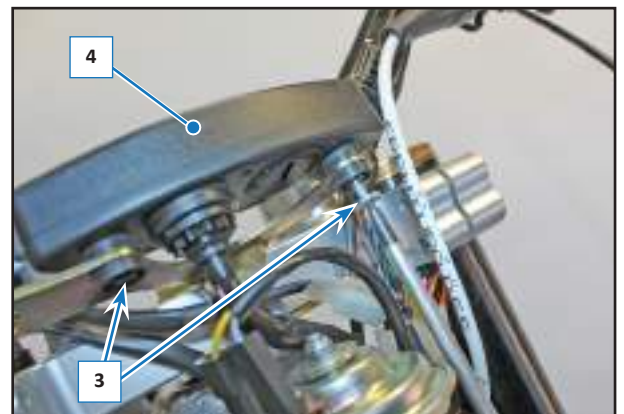
- Disconnect the instrument lighting connector (3).



- Disconnect the direction indicators connector (4).

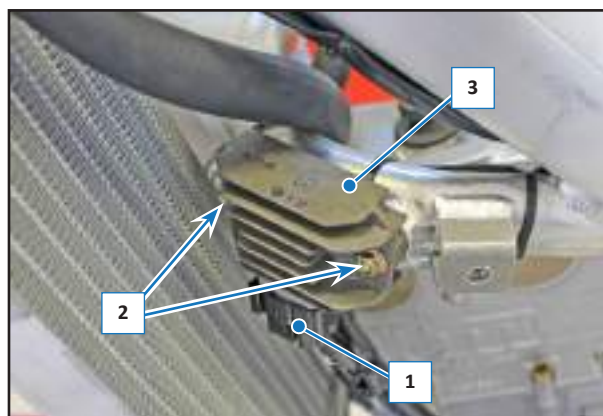


- Unscrew the two screws (3) and replace the instrument (4).



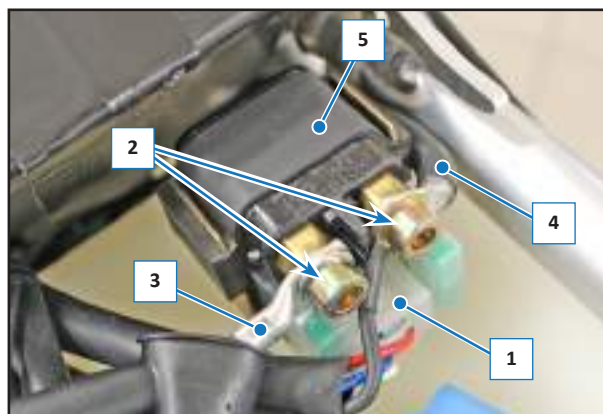
**6.25 VOLTAGE ADJUSTER REPLACEMENT**

- Remove the left conveyor as described in the relevant paragraph.
- Disconnect the connector (1).
- Unscrew the screws (2) and remove the adjuster (3).

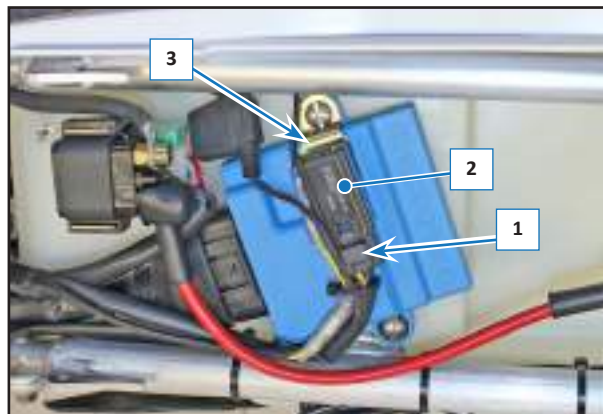

**6.26 START CONTACTOR REPLACEMENT**

- Remove the seat as described in the relative section.
- Disconnect the connector (1).
- Loosen the two screws (2) connecting the battery positive cable (3) and the starter motor cable (4).
- Remove the contactor (5).

**NOTE:** Replace the contactor and re-mount the cables (3) and (4) in the same position. DO NOT INVERT.

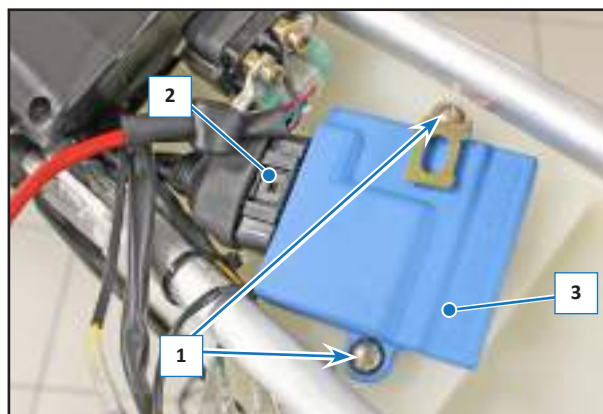

**6.27 INDICATOR LIGHT REPLACEMENT**

- Remove the seat as described in the relative section.
- Disconnect the connector (1).
- Slide the indicator light (2) from the support bracket (3).


**6.28 CONTROL UNIT REPLACEMENT**

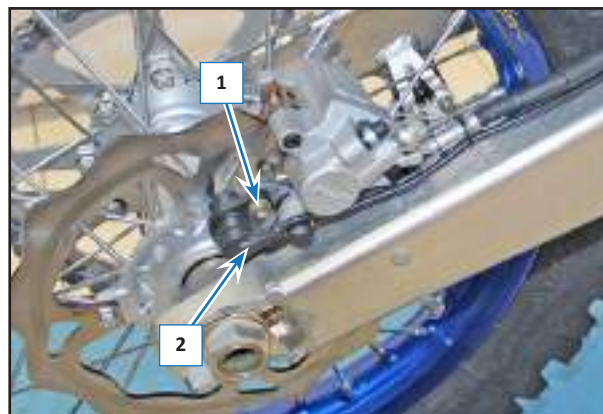
- Remove the seat and Indicator light as described in the relevant paragraphs.
- Unscrew the screws (1).
- Disconnect the connector (2) and remove the control unit (3).

**NOTE:** The control unit is supplied programmed.



### 6.29 SPEED SENSOR REPLACEMENT

- Remove the headlight, seat and Airbox as described in the relevant paragraphs.
- Unscrew the screw (1) and disconnect the sensor (2).



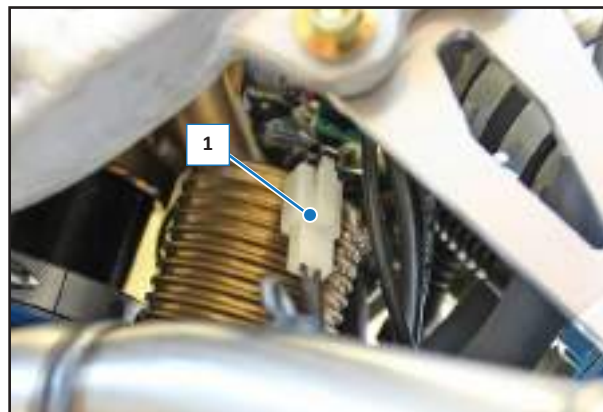
- Disconnect the connector (3).
- Cut the straps that fix the cabling and replace the sensor.



**NOTE:** On re-mounting, fix the cabling using plastic straps, as previously described.

### 6.30 REAR STOP SENSOR REPLACEMENT

- Disconnect the connector (1).
- Cut the plastic straps that fix the cabling.



- Unscrew the sensor (2) from the rear brake pump and replace it with a new one.

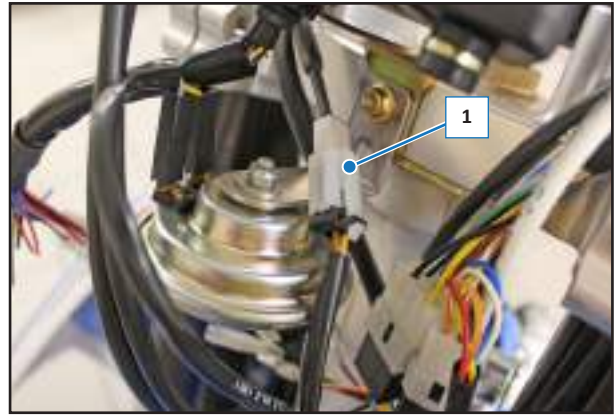
**NOTE:** DO NOT press the brake pedal with the sensor removed. After having replaced the rear stop sensor, the oil level in the tank must be checked. If necessary, add as described in the relative paragraph.

- Fix the cabling using plastic straps, as previously described.



### 6.31 FRONT STOP SENSOR REPLACEMENT

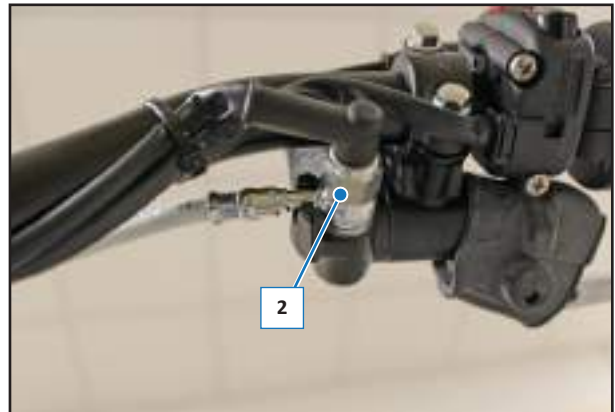
- Remove the headlight as described in the relative paragraph.
- Disconnect the connector (1).



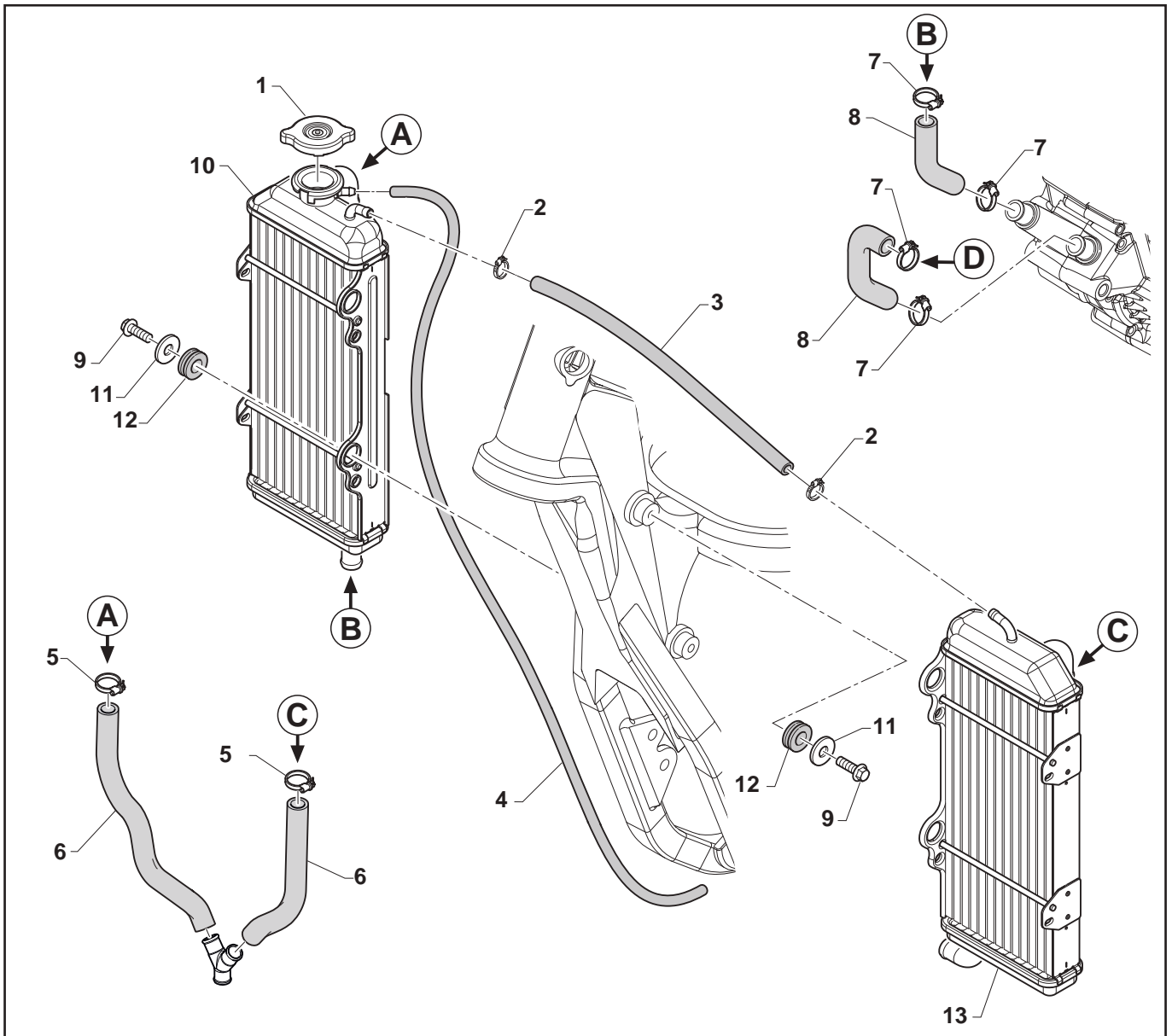
- Unscrew the sensor (2) from the front brake pump and replace it with a new one.

**NOTE:** DO NOT press the brake lever with the sensor removed. After replacing the front stop sensor it is necessary to perform the function of the front brake and, if necessary, bleed it as described in the relevant paragraph.

- Fix the cabling using plastic straps, as previously described.



6.32 COOLING SYSTEM



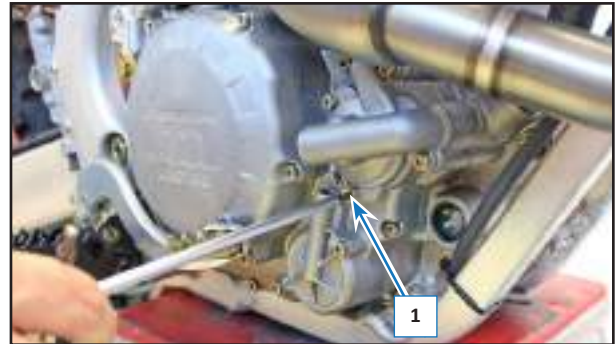
Key

- 1) Radiator cap
- 2) Strap
- 3) Radiators connection hose
- 4) Bleeder hose
- 5) Strap
- 6) Upper hose
- 7) Strap
- 8) Lower hose
- 9) Screw
- 10) Right radiator
- 11) Washer
- 12) Vibration damper
- 13) Left radiator

### 6.33 RADIATORS REMOVAL

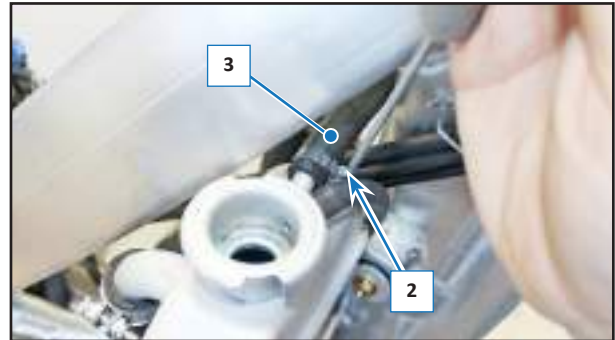
- Remove the right and left conveyor as described in the relevant paragraph.
- Loosen the screw (1), remove the radiator cap and drain all of the coolant contained in the radiators.

**NOTE:** On re-mounting the screw (1) replace the aluminium washer.

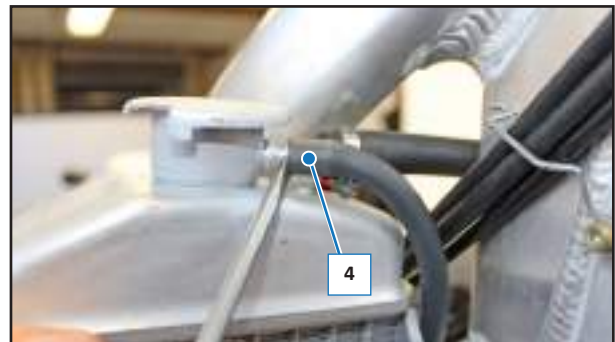


#### Right radiator

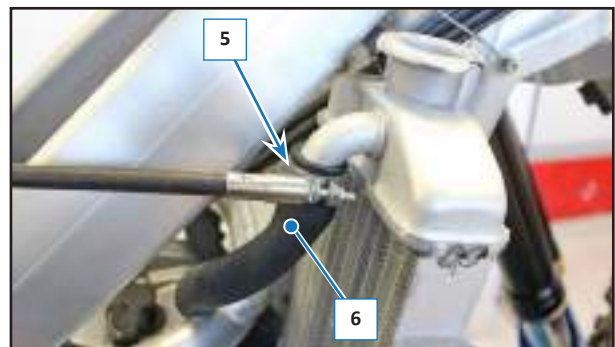
- On the right radiator, loosen the strap (2) of the connection hose (3) of the two radiators.



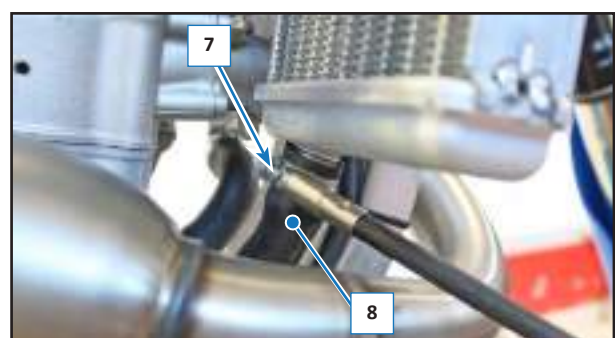
- Use a screwdriver to detach the bleeder hose (4).



- Loosen the strap (5) and disconnect the upper hose (6).



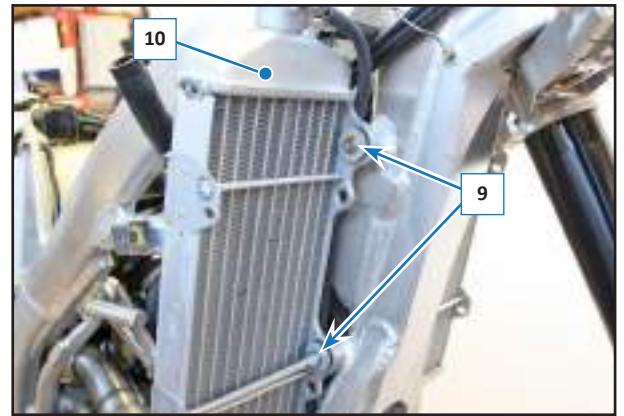
- Loosen the strap (7) and disconnect the lower hose (8).





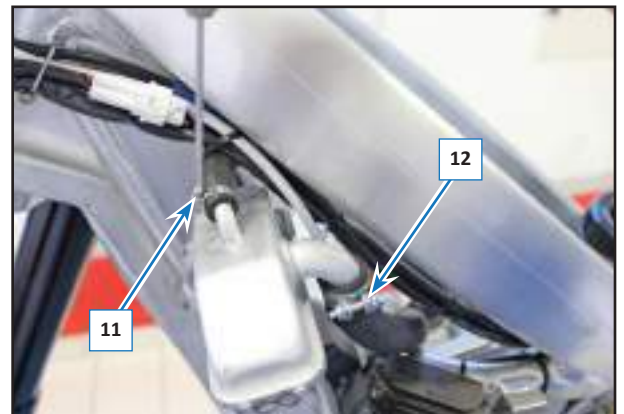
## 6. PARTS REMOVAL

- Unscrew the two screws (9) and remove the right radiator (10).

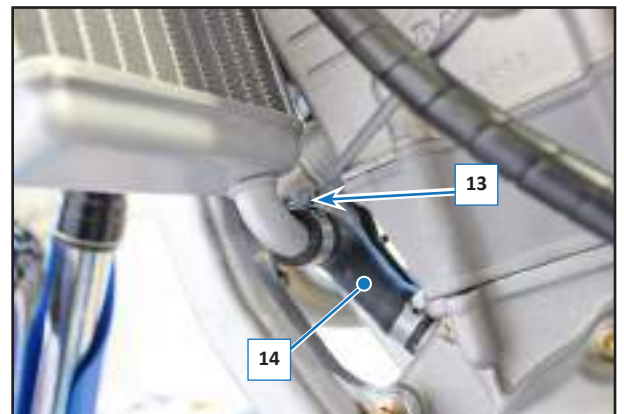


### Left radiator

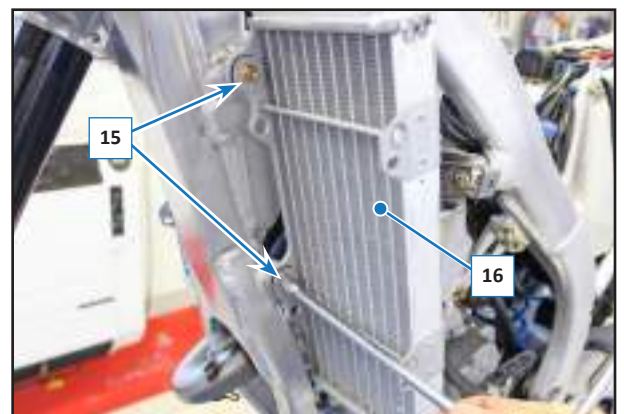
- Loosen the strap (11) and strap (12) and detach the relevant hoses.



- Loosen the strap (13) and disconnect the hose (14).

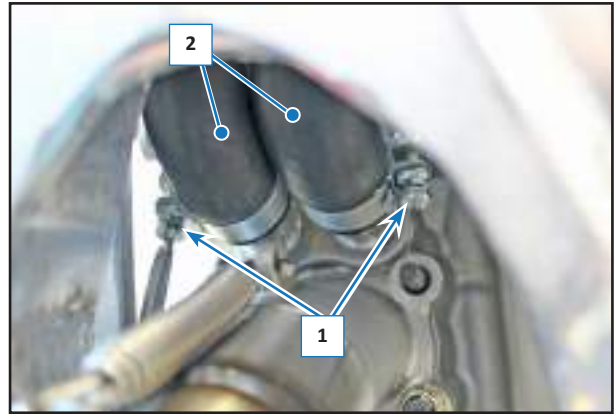


- Unscrew the two screws (15) and remove the right radiator (16).

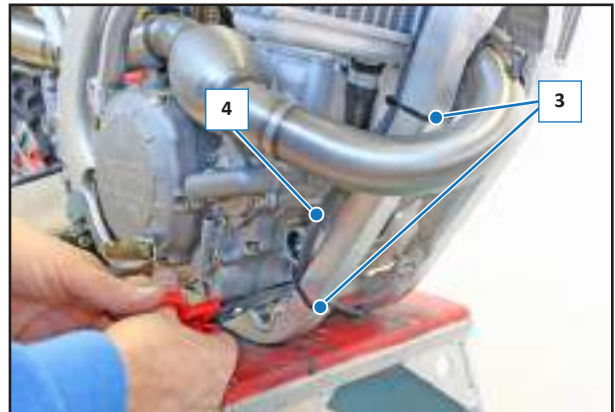


**6.34 ENGINE REMOVAL FROM THE MOTORCYCLE**

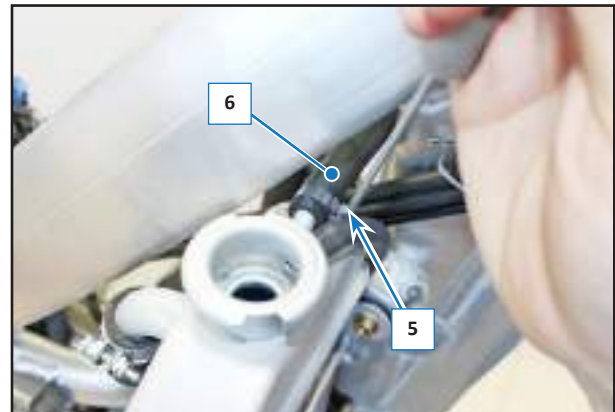
- Disconnect the cables from the battery
- Remove the seat, the conveyors and the Airbox as described in the relevant paragraphs.
- Drain the coolant from the radiators as described in the relevant paragraphs.
- Loosen the straps (1) and disconnect the radiator hoses (2) from the head.



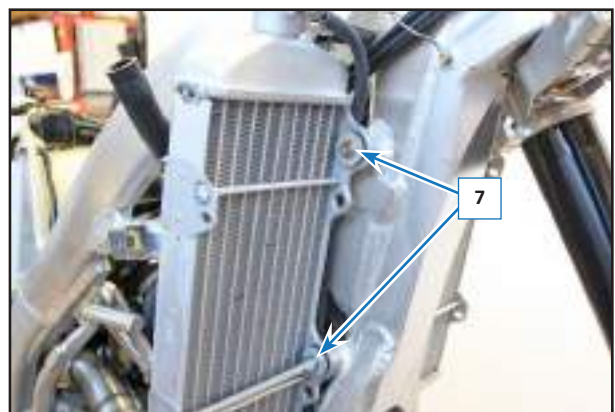
- Cut the straps (3), which fix the bleeder hose (4).



- Loosen the strap (5) and disconnect the radiators connection hose (6).

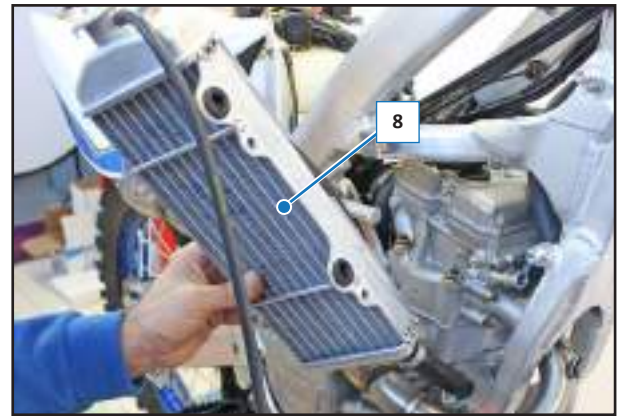


- Unscrew the two screws (7).

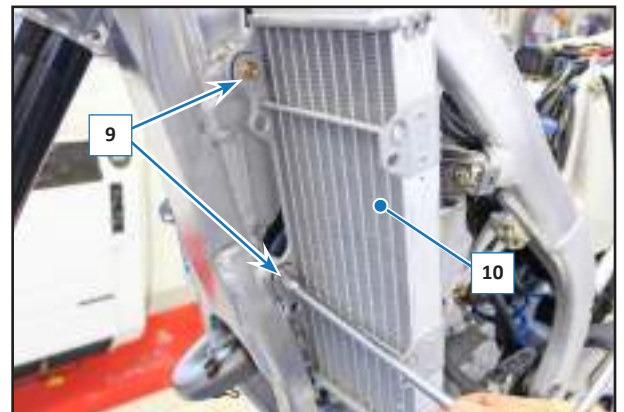


## 6. PARTS REMOVAL

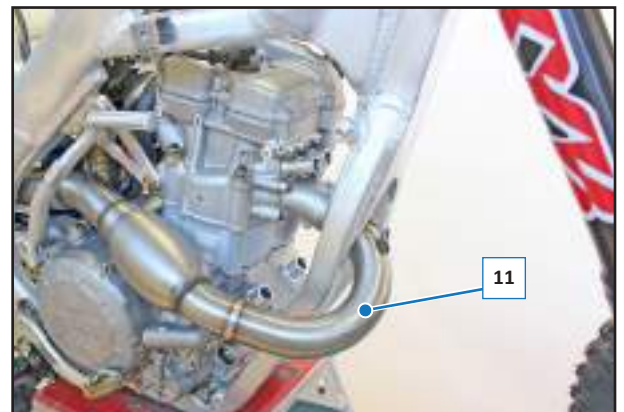
- Remove the right radiator (8) complete with hoses.



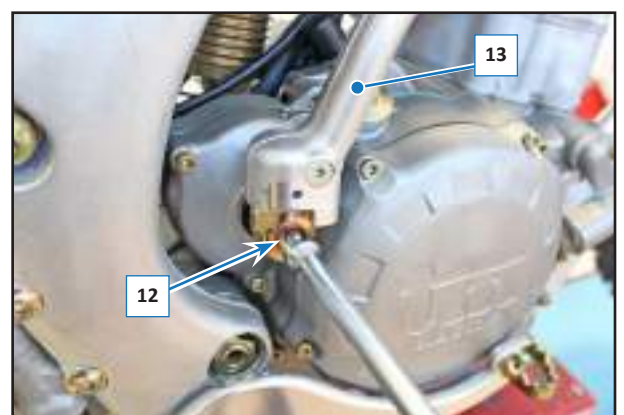
- Unscrew the two screws (9) and remove the left radiator (10) complete with hoses.



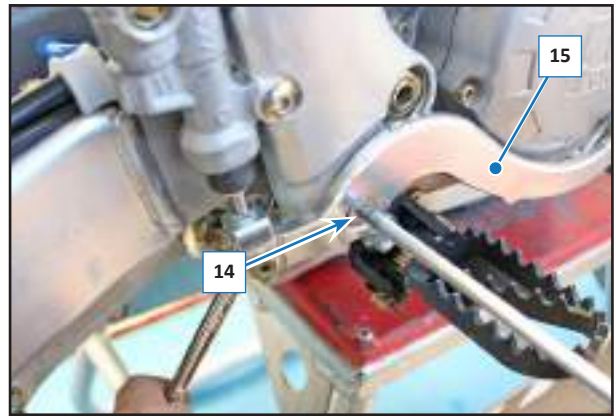
- Remove the drain hose (11) as described in the relative paragraph.



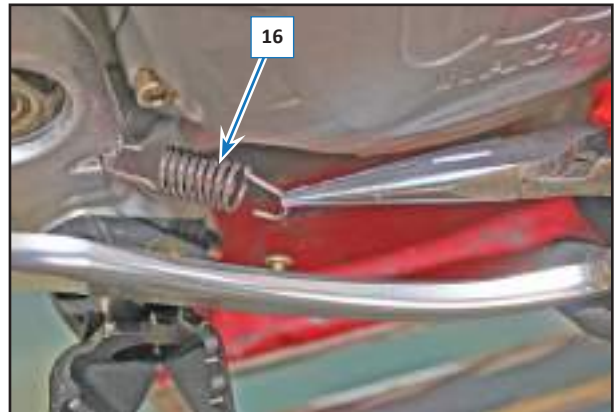
- Unscrew the screw (12) and remove the kick start lever (13).



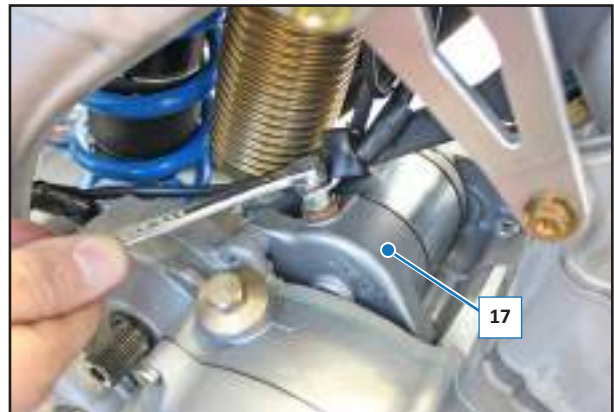
- Unscrew the pin (14) of the brake pedal (15).



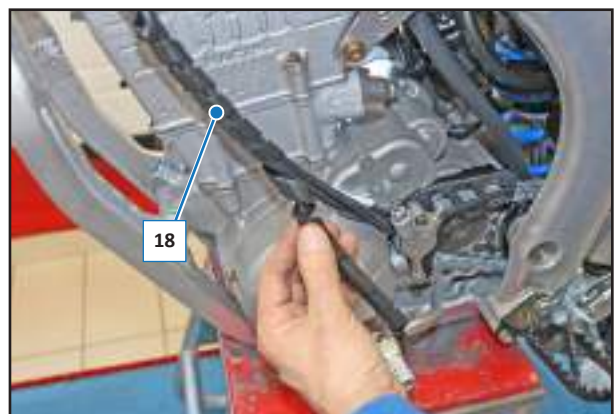
- Release the spring (16) and move the brake pedal.



- Disconnect the starter motor electric connections (17).

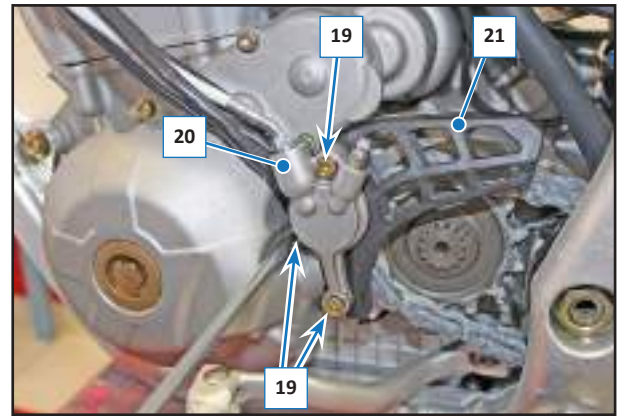


- Unwind the sheath cover (18).

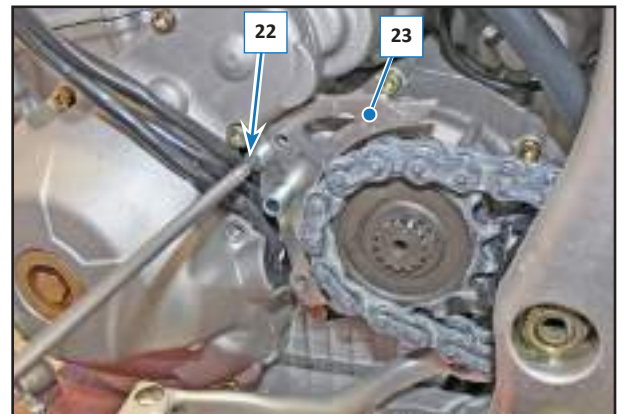


## 6. PARTS REMOVAL

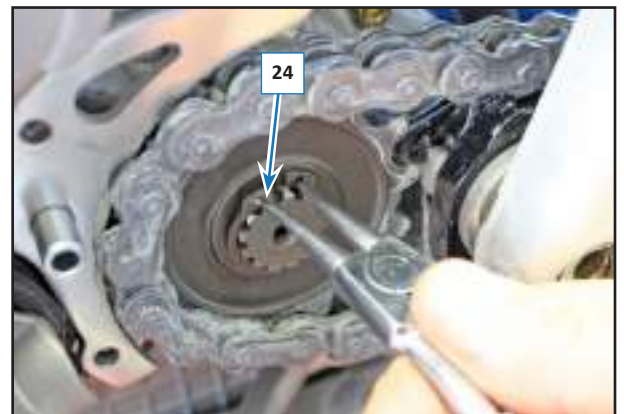
- Loosen the screws (19) and detach the clutch actuator (20) with the pinion cover casing (21).



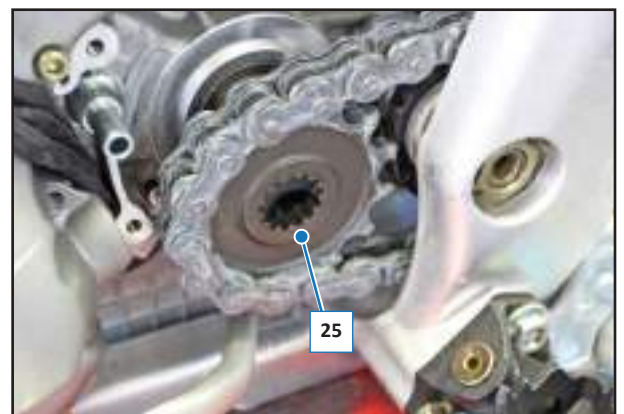
- Unscrew the screw (22) and remove the pinion cover support (23).



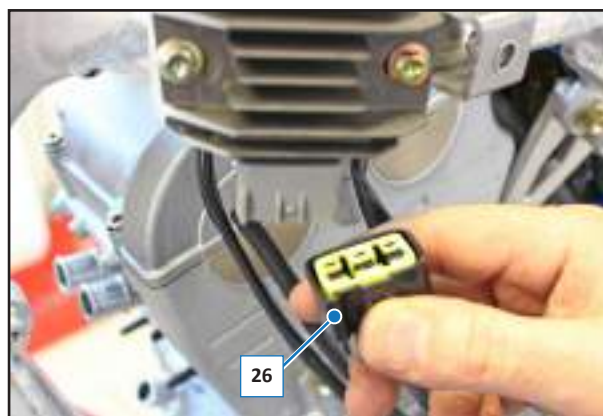
- Remove the seeger ring (24).



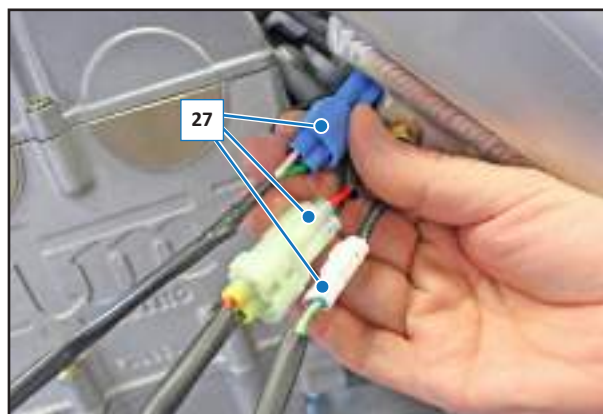
- Slide out the pinion (25) with the chain.



- Detach the voltage adjuster connection connector (26).



- Disconnect the engine electric connection connectors (27).



- Detach the spark plug cap (28).



- Disconnect the fuel hose (29) from the pump.

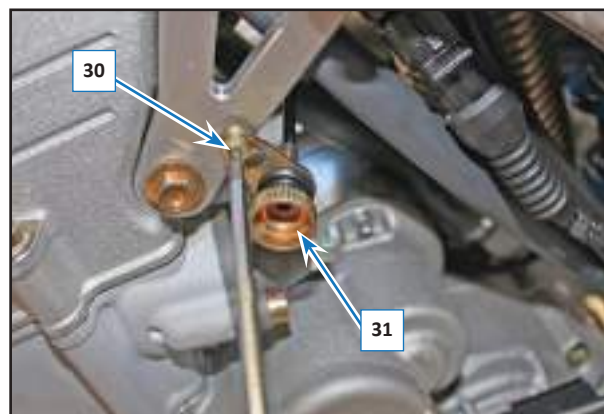


## 6. PARTS REMOVAL

- Loosen the strap between the throttle body and the coupling.



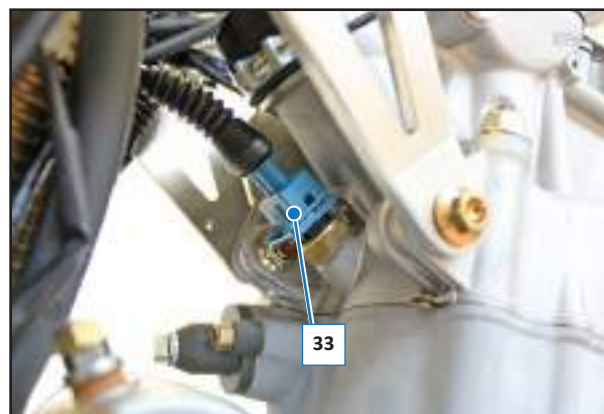
- Unscrew the screw (30) that fixes the idle speed adjustment knob (31).



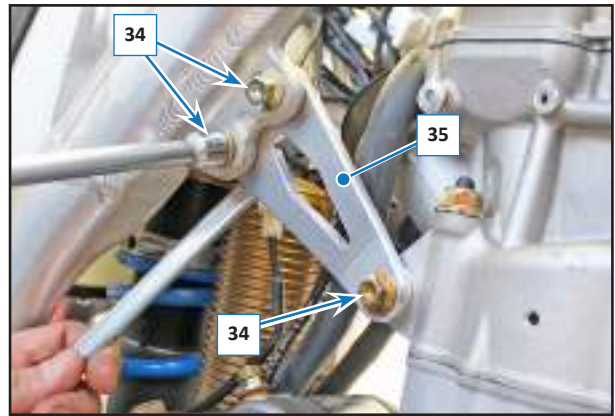
- Detach the throttle body (32) from the engine.



- Disconnect the temperature sensor connector (33).

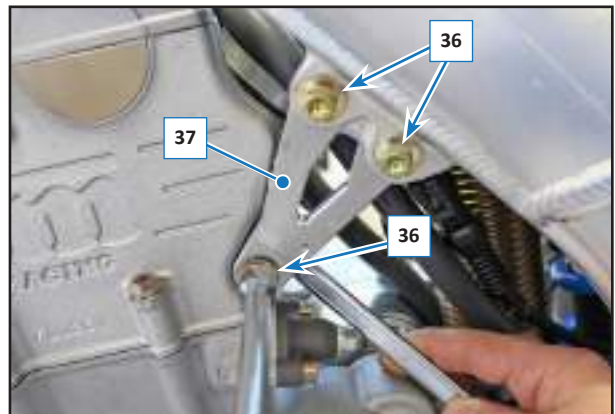


- Unscrew the three screws (34) of the bracket (35) and remove it.

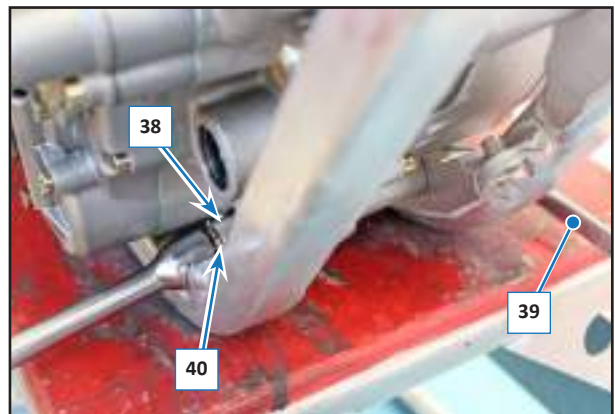


- Unscrew the three screws (36) of the bracket (37) and remove it.

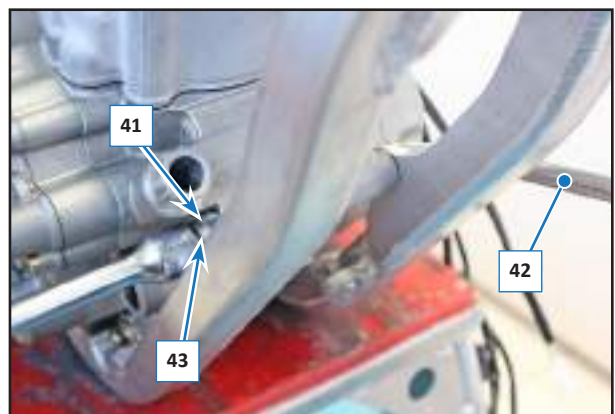
**NOTE:** The two brackets are the same; mark them in order to re-mount them correctly.



- Loosen the engine lower fixing pin (38); block the pin using a 12 mm socket wrench (39) and loosen the nut (40) using a 14 mm closed-end spanner.



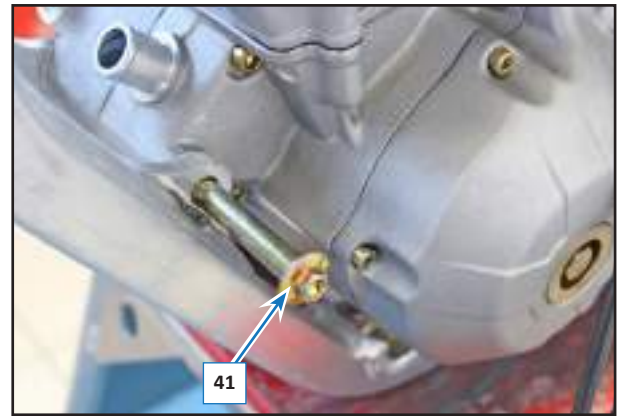
- Loosen the engine upper fixing pin (41); block the pin using a 12 mm socket wrench (42) and loosen the nut (43) using a 14 mm closed-end spanner.



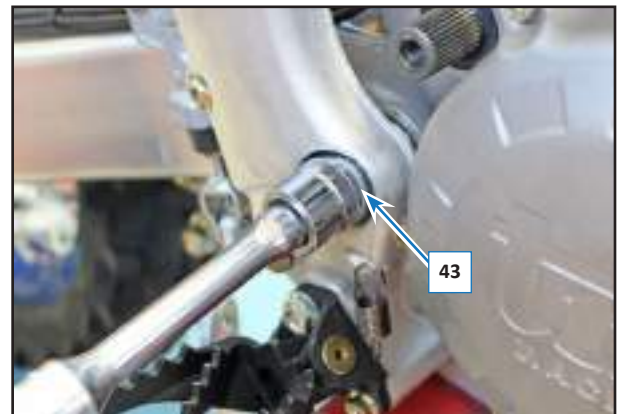


## 6. PARTS REMOVAL

- Slide the upper pin (41) out and leave the lower pin (38) mounted.



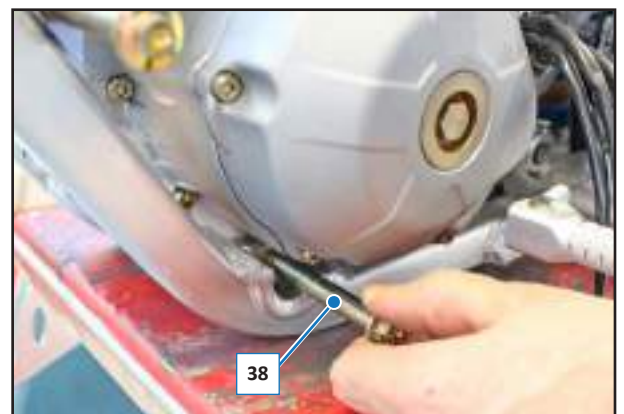
- Unscrew the swing arm pin (43).



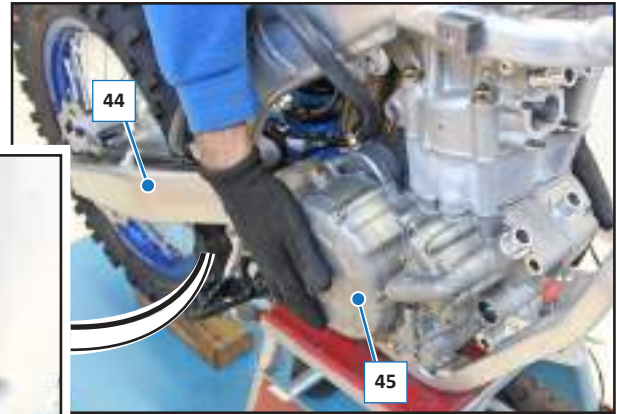
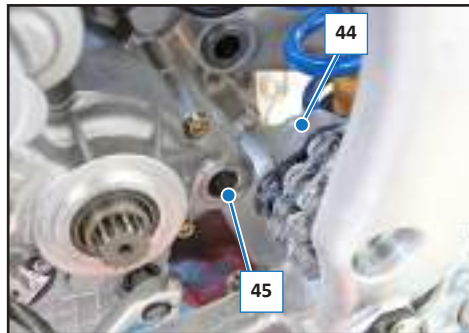
- Slide out the swing arm pin (43).



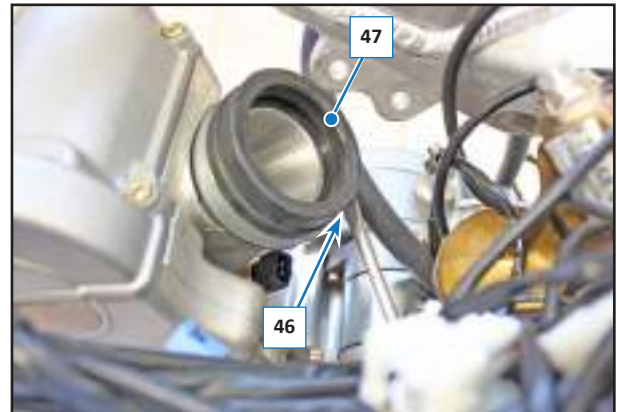
- Slide out the lower pin (38).



- Move the swing arm (44) back as much as possible and the engine (45) forward as much as possible in a way to detach it from the swing arm.



- Loosen the strap (46), mark the manifold (47) in order to re-mount it in the same direction and then remove it.



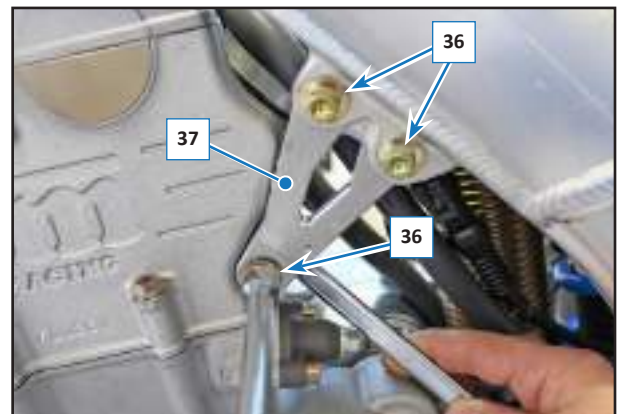
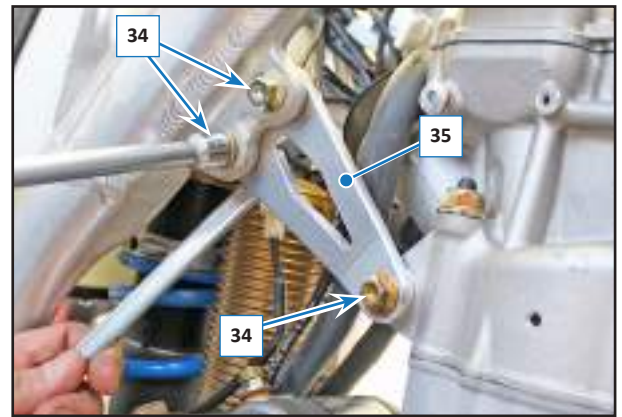
- Rotate the engine (45) and remove it from the right side of the motorcycle.



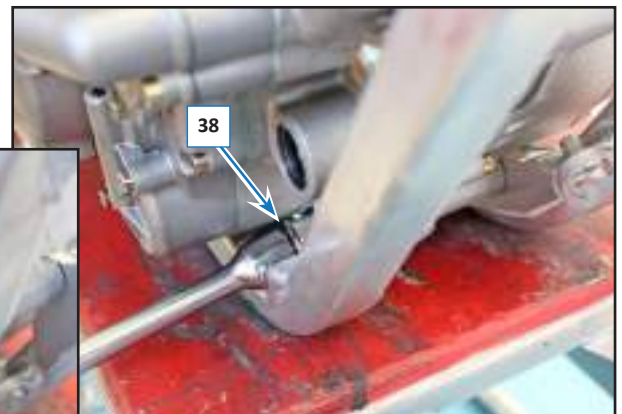
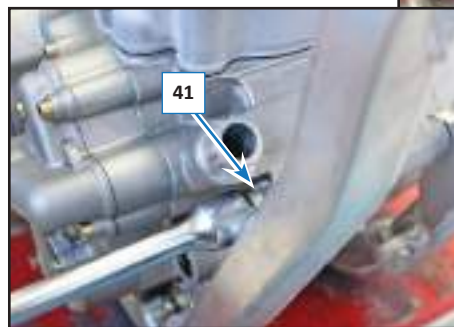
### 6.35 ENGINE RE-MOUNTING

Re-mount the engine, proceeding in reverse order to disassembly.

- Re-mount the engine support brackets (35) and (37), tightening the screws (34) and (36) with a torque of 22 Nm, 2.2 kgm, 16.22 ft/lb.



- Tighten the pins (38) and (41) with a torque of 45 Nm/ 4.5 kgm/ 33.19 ft/lb



- Tighten the swing arm pin (43) with a torque of 70 Nm/ 7.0 kgm/ 51.6 ft/lb following that indicated in the "Swing Arm Removal" paragraph.



