



SERVICE STATION MANUAL

B043126



RS4 125



SERVICE STATION MANUAL

RS4 125

THE VALUE OF SERVICE

As a result of continuous technical updates and specific mechanic training programs for Aprilia products, only **Aprilia Official Network** mechanics know this vehicle fully and have the special tools necessary to carry out maintenance and repair operations correctly.

The reliability of the vehicle also depends on its mechanical state. Checking the vehicle before riding it, its regular maintenance and the use of **Original Aprilia Spare Parts** only are essential factors!

For further information contact the nearest **Official Dealer and/or Service Centre**, or consult the Yellow Pages or search directly on the inset map in our Official Website:

www.aprilia.com

Only by requesting Aprilia Original Spare Parts can you be sure of purchasing products that were developed and tested during the actual vehicle design stage. All Aprilia Original Spare Parts undergo quality control procedures to guarantee reliability and durability.

The descriptions and illustrations given in this publication are not binding; While the basic characteristics as described and illustrated in this booklet remain unchanged, Aprilia reserves the right, at any time and without being required to update this publication beforehand, to make any changes to components, parts or accessories, which it considers necessary to improve the product or which are required for manufacturing or construction reasons.

Not all versions/models shown in this publication are available in all countries. The availability of individual versions/models should be confirmed with the official aprilia sales network.

© Copyright 2011 **Aprilia**. All rights reserved. Reproduction of this publication in whole or in part is prohibited. **Aprilia** - After sales service.

The Aprilia trademark is the property of Piaggio & C. S.p.A.

SERVICE STATION MANUAL

RS4 125

NOTE Provides key information to make the procedure easier to understand and carry out.

CAUTION Refers to specific procedures to carry out for preventing damages to the vehicle.

WARNING Refers to specific procedures to carry out to prevent injuries to the repairer.



Personal safety Failure to completely observe these instructions will result in serious risk of personal injury.



Safeguarding the environment Sections marked with this symbol indicate the correct use of the vehicle to prevent damaging the environment.



Vehicle intactness The incomplete or non-observance of these regulations leads to the risk of serious damage to the vehicle and sometimes even the invalidity of the guarantee



INDEX OF TOPICS

CHARACTERISTICS

CHAR

SPECIAL TOOLS

S-TOOLS

MAINTENANCE

MAIN

ELECTRICAL SYSTEM

ELE SYS

ENGINE FROM VEHICLE

ENG VE

ENGINE

ENG

POWER SUPPLY

P SUPP

SUSPENSIONS

SUSP

CHASSIS

CHAS

BRAKING SYSTEM

BRAK SYS

COOLING SYSTEM

COOL SYS

BODYWORK

BODYW

PRE-DELIVERY

PRE DE

INDEX OF TOPICS

CHARACTERISTICS

CHAR

Rules

Safety rules

Carbon monoxide

If you need to keep the engine running while working on the vehicle, please ensure that you do so in an open or very well ventilated area. Never run the engine in an enclosed area. If you do work in an enclosed area, make sure to use a fume extraction system.

CAUTION



EXHAUST EMISSIONS CONTAIN CARBON MONOXIDE, A POISONOUS GAS WHICH CAN CAUSE LOSS OF CONSCIOUSNESS AND EVEN DEATH.

Fuel

CAUTION



THE FUEL USED TO POWER INTERNAL COMBUSTION ENGINES IS HIGHLY FLAMMABLE AND MAY BE EXPLOSIVE UNDER CERTAIN CONDITIONS. IT IS THEREFORE RECOMMENDED TO CARRY OUT REFUELLING AND MAINTENANCE PROCEDURES IN A VENTILATED AREA WITH THE ENGINE SWITCHED OFF. DO NOT SMOKE DURING REFUELLING AND NEAR FUEL VAPOURS, AVOIDING ANY CONTACT WITH NAKED FLAMES, SPARKS OR OTHER SOURCES WHICH MAY CAUSE THEM TO IGNITE OR EXPLODE.

DO NOT DISPERSE FUEL IN THE ENVIRONMENT.

KEEP OUT OF THE REACH OF CHILDREN

Hot components

The engine and the exhaust system components become very hot and remain hot for some time after the engine has been switched off. When handling these components, wear insulating gloves or wait until the engine and the exhaust system have cooled down.

Coolant

The coolant contains ethylene glycol which, under certain conditions, can become flammable.

When it burns, ethylene glycol produces an invisible flame which however can cause burns.

CAUTION



TAKE CARE NOT TO POUR COOLANT ONTO HOT ENGINE OR EXHAUST SYSTEM COMPONENTS; THE FLUID MAY CATCH FIRE AND BURN WITH INVISIBLE FLAMES. WHEN CARRYING OUT MAINTENANCE OPERATIONS, IT IS ADVISABLE TO WEAR LATEX GLOVES. EVEN THOUGH IT IS TOXIC, COOLANT HAS A SWEET FLAVOUR WHICH MAKES IT VERY ATTRACTIVE TO ANIMALS. NEVER LEAVE THE COOLANT IN OPEN CONTAINERS IN AREAS ACCESSIBLE TO ANIMALS AS THEY MAY DRINK IT.

**KEEP OUT OF THE REACH OF CHILDREN
DO NOT REMOVE THE RADIATOR CAP WHEN THE ENGINE IS STILL HOT. THE COOLANT IS UNDER PRESSURE AND MAY CAUSE BURNS.**

Used engine oil and transmission oil

CAUTION



IT IS ADVISABLE TO WEAR PROTECTIVE IMPERMEABLE GLOVES WHEN SERVICING THE VEHICLE.

THE ENGINE OR GEARBOX OIL MAY CAUSE SERIOUS INJURIES TO THE SKIN IF HANDLED FOR PROLONGED PERIODS OF TIME AND ON A REGULAR BASIS.

WASH YOUR HANDS CAREFULLY AFTER HANDLING OIL.

HAND THE OIL OVER TO OR HAVE IT COLLECTED BY THE NEAREST USED OIL RECYCLING COMPANY OR THE SUPPLIER.

DO NOT DISPOSE OF OIL IN THE ENVIRONMENT

KEEP OUT OF THE REACH OF CHILDREN

Brake and clutch fluid



BRAKE AND CLUTCH FLUIDS CAN DAMAGE THE PLASTIC OR RUBBER PAINTED SURFACES. WHEN SERVICING THE BRAKING SYSTEM OR THE CLUTCH SYSTEM, PROTECT THESE COMPONENTS WITH A CLEAN CLOTH. ALWAYS WEAR PROTECTIVE GOGGLES WHEN SERVICING THESE SYSTEMS. BRAKE AND CLUTCH FLUIDS ARE EXTREMELY HARMFUL FOR YOUR EYES. IN THE EVENT OF ACCIDENTAL CONTACT WITH THE EYES, RINSE THEM IMMEDIATELY WITH ABUNDANT COLD, CLEAN WATER AND SEEK MEDICAL ADVICE.

KEEP OUT OF THE REACH OF CHILDREN

Battery electrolyte and hydrogen gas

CAUTION



THE BATTERY ELECTROLYTE IS TOXIC, CORROSIVE AND AS IT CONTAINS SULPHURIC ACID, IT CAN CAUSE BURNS WHEN IN CONTACT WITH THE SKIN. WHEN HANDLING BATTERY ELECTROLYTE, WEAR TIGHT-FITTING GLOVES AND PROTECTIVE APPAREL. IN THE EVENT OF SKIN CONTACT WITH THE ELECTROLYTIC FLUID, RINSE WELL WITH PLENTY OF CLEAN WATER. IT IS PARTICULARLY IMPORTANT TO PROTECT YOUR EYES BECAUSE EVEN TINY AMOUNTS OF BATTERY ACID MAY CAUSE BLINDNESS. IF THE FLUID GETS IN CONTACT WITH YOUR EYES, WASH WITH ABUNDANT WATER FOR FIFTEEN MINUTES AND CONSULT AN EYE SPECIALIST IMMEDIATELY. THE BATTERY RELEASES EXPLOSIVE GASES; KEEP IT AWAY FROM FLAMES, SPARKS, CIGARETTES OR ANY OTHER HEAT SOURCES. ENSURE ADEQUATE VENTILATION WHEN SERVICING OR RECHARGING THE BATTERY.

KEEP OUT OF THE REACH OF CHILDREN

BATTERY LIQUID IS CORROSIVE. DO NOT POUR IT OR SPILL IT, PARTICULARLY ON PLASTIC COMPONENTS. ENSURE THAT THE ELECTROLYTIC ACID IS COMPATIBLE WITH THE BATTERY TO BE ACTIVATED.

Maintenance rules

GENERAL PRECAUTIONS AND INFORMATION

When repairing, dismantling and reassembling the vehicle, follow the recommendations given below carefully.

BEFORE DISASSEMBLING COMPONENTS

- Before dismantling components, remove dirt, mud, dust and foreign bodies from the vehicle. Use the special tools designed for this bike, as required.

COMPONENTS REMOVAL

- Do not loosen and/or tighten screws and nuts using pliers or any other tools than the specific wrench.
- Mark positions on all connection joints (pipes, cables etc.) before separating them, and identify them with distinctive symbols.
- Each component needs to be clearly marked to enable identification during reassembly.
- Clean and wash the dismantled components carefully using a low-flammability detergent.
- Keep mated parts together since they have "adjusted" to each other due to normal wear.
- Some components must be used together or replaced completely.
- Keep away from heat sources.

REASSEMBLING COMPONENTS**CAUTION**

BEARINGS MUST ROTATE FREELY, WITHOUT JAMMING AND/OR NOISE, OTHERWISE, THEY NEED TO BE REPLACED.

- Only use ORIGINAL Aprilia SPARE PARTS.
- Comply with lubricant and consumables use guidelines.
- Lubricate parts (whenever possible) before reassembling them.
- When tightening nuts and screws, start either from the components with the largest diameter or from the innermost components, proceeding diagonally. Tighten nuts and screws in successive steps before applying the tightening torque.
- Always replace self-locking nuts, washers, sealing rings, circlips, O-rings (OR), cotter pins and screws with new parts if the thread is damaged.
- When assembling the bearings, make sure to lubricate them well.
- Check that each component is assembled correctly.
- After a repair or routine maintenance, carry out pre-ride checks and test the vehicle on private grounds or in an area with low traffic.
- Clean all mating surfaces, oil seal rims and gaskets before refitting. Smear a thin layer of lithium-based grease on the oil seal rims. Reassemble oil seals and bearings with the brand or batch number facing outward (visible side).

ELECTRICAL CONNECTORS

Electric connectors must be disconnected as described below; failure to comply with this procedure causes irreparable damage to both the connector and the wiring harness:

Press the relative safety clips, if applicable.

- Grip the two connectors and disconnect them by pulling them in opposite directions.

- If any signs of dirt, rust, moisture, etc. are noted, clean the inside of the connector carefully with a jet of compressed air.
- Ensure that the cables are correctly fastened to the internal connector terminals.
- Then connect the two connectors, ensuring that they couple correctly (if fitted with clips, you will hear them "click" into place).

CAUTION

DO NOT DISCONNECT CONNECTORS BY PULLING THE CABLES.

NOTE

THE TWO CONNECTORS CAN ONLY BE CONNECTED IN ONE DIRECTION: CONNECT THEM THE RIGHT WAY ROUND.

TIGHTENING TORQUES**CAUTION**

REMEMBER THAT THE TIGHTENING TORQUES FOR ALL FASTENING ELEMENTS ON WHEELS, BRAKES, WHEEL AXLES AND ANY OTHER SUSPENSION COMPONENTS PLAY A KEY ROLE IN ENSURING VEHICLE SAFETY AND MUST COMPLY WITH SPECIFIED VALUES. CHECK THE TIGHTENING TORQUES OF FASTENING ELEMENTS ON A REGULAR BASIS AND ALWAYS USE A TORQUE WRENCH TO REASSEMBLE THESE COMPONENTS. FAILURE TO COMPLY WITH THESE RECOMMENDATIONS MAY CAUSE ONE OF THESE COMPONENTS TO LOOSEN OR EVEN DETACH, CAUSING A WHEEL TO LOCK OR COMPROMISING VEHICLE HANDLING. THIS MAY LEAD TO FALLS, WITH THE RISK OF SERIOUS INJURY OR DEATH.

Running-in

Running the engine in correctly is essential for ensuring engine longevity and functionality. Twisty roads and gradients are ideal for running in the engine, brakes and suspension effectively. Vary your riding speed during the running in period. This ensures that components operate in "loaded" conditions and then "unloaded" conditions, allowing the engine components to cool.

CAUTION

THE FULL PERFORMANCE OF THE VEHICLE IS ONLY AVAILABLE AFTER THE SERVICE AT THE END OF THE RUNNING IN PERIOD.

Follow the guidelines detailed below:

- Do not fully open the throttle grip abruptly at low engine speeds, either during or after the running in period.
- During the first 100 Km (62 miles) use the brakes gently, avoiding sudden or prolonged braking. That is to permit the adequate adjustment of the pad friction material to the brake discs.

Vehicle identification

CAUTION

THE MODIFICATION OF THE IDENTIFICATION CODES IS A SERIOUS PUNISHABLE CRIME. HOWEVER, THE LIMITED WARRANTY FOR NEW VEHICLES WILL BE VOID IF THE VEHICLE IDENTIFICATION NUMBER (VIN) HAS BEEN MODIFIED OR NOT PROMPTLY DETERMINED.

Chassis number

The chassis number is stamped on the right hand side of the headstock.

This number consists of numbers and letters, as in the example shown below.

ZD4TW0000YSXXXXXX

KEY:

ZD4: WMI (World manufacturer identifier) code;

TW: model;

000: version variation;

0: free digit

Y year of manufacture

S: production plant (H= Martorelles (Spain); S= Scorzè (Italy); 4= Zongshen (China); 5= Pontedera (Italy); M= Mandello del Lario (Italy)

XXXXXX: serial number (6 digits);



CHASSIS NUMBER

The chassis number is stamped on the right hand side of the headstock.

Dimensions and mass

DIMENSIONS

Specification	Desc./Quantity
Maximum length	1,953 mm (76.89 in)
Maximum width (with mirrors)	740 mm (29.13 in)
Maximum height to the windshield	1,138 mm (44.80 in)
Saddle height	837 mm (32.95 in)
Height passenger saddle	978 mm (38.50 in)
Height handlebar	840 mm (33.07 in)
Minimum ground clearance	137 mm (5.39 in)
Wheelbase	1,350 mm (53.15 in)
Kerb weight	140 kg (308.64 lb)
Weight (without fuel)	135.8 kg (299.39 lb)

Engine

ENGINE

Specification	Desc./Quantity
Engine type	Single cylinder 4 stroke
Engine capacity (125)	124.2 cm ³ (7.58 cu.in)
Bore x Stroke	(58 x 47) mm; (2.28 x 1.85) in
Compression ratio	12.6 +/- 0.5 : 1
Electric starter	Electric starter
Idle speed	1900 +/- 100 rpm
Clutch	multiple-disk, oil-bathed clutch with hand control on the left side of the handlebar.

Specification	Desc./Quantity
Cooling	Coolant
Valve clearance at intake	0.15 mm (0.0059 in)
Exhaust valve clearance	0,25 mm (0.0098 in)

GEAR

Specification	Desc./Quantity
Type	mechanic, 6-speed gearbox with pedal on the engine left side which operates the selector with fork and distribution drum.

Transmission**GEAR RATIOS**

Specification	Desc./Quantity
1st gear ratio	11 / 33 = 1 : 3,000
2nd gear ratio	15 / 30 = 1 : 2,000
3rd gear ratio	18 / 27 = 1 : 1,500
4th gear ratio	20 / 24 = 1 : 1,200
5th gear ratio	25 / 27 = 1 : 1,080
6th gear ratio	23 / 22 = 1 : 0,956
Final drive gear ratio	13 / 60

Capacities**CAPACITY**

Specification	Desc./Quantity
Fuel tank	14.5+/-0.5 l (3.19+/-0.11 UK gal; 3.83 +/-0.13 US gal)
Fuel tank reserve	3.3 l (3.19+/-0.72 UK gal; 0.87 USgal)
Engine oil	1,200 cm ³ (73.23 cu.in)
Seats	2
Coolant	0.78 l (0.171 UKgal; 0.206 US gal)
Coolant reserve	0.23 l (0.0506 UKgal; 0.0607 US gal)
Vehicle maximum load (rider + passenger + luggage)	180 kg (396.83 lb)
Vehicle load without passenger (rider + luggage)	105 kg (231.48 lb)

Electrical system**IGNITION**

Specification	Desc./Quantity
Type	CDI

SPARK PLUG

Specification	Desc./Quantity
Spark plug	NGK CR9 EB Alternatively Champion RG4HC
Electrode gap	0.5 mm (0.020 in)

ELECTRICAL SYSTEM

Specification	Desc./Quantity
Battery	12V - 6 Ah
Fuses	30A, 20A, 15A, 7.5A
Alternator	13 V - 235 W

BULBS

Specification	Desc./Quantity
Low beam light	- 12 V - 35 W H4
High beam light	H11 - 12V - 55W

Specification	Desc./Quantity
2 daylight running lights	12V - 5W
Turn indicator light	Micro bulb
Rpm indicator lighting	12 V - LED
Rear daylight running light/stop light	LED
License plate lamp (where provided)	12V - 5W

WARNING LIGHTS

Specification	Desc./Quantity
Instrument panel warning lights	LED

Frame and suspensions

CHASSIS

Specification	Desc./Quantity
Chassis type	Aluminium dual beam
Trail	93.6 mm (3.68 in)

SUSPENSIONS

Specification	Desc./Quantity
Front	Hydraulic action telescopic fork with upside-down stems
Front wheel travel	110 mm (4.33 in)
Rear	single hydraulic shock absorber
Rear wheel travel	122 mm (4.80 in)

Brakes

BRAKES

Specification	Desc./Quantity
Front	Ø 300 mm (11.81 in) disc brake
Rear	Ø 218 mm (8.58 in) disc brake

Wheels and tyres

WHEEL RIMS

Specification	Desc./Quantity
Type	made of light alloy
Front	2.75 x 17"
Rear	3.50 x 17"

TYRES

Specification	Desc./Quantity
Front - size (where applicable for approvals)	100 / 80 17" 52H or alternatively 110 / 70 17" 54H
Front inflation pressure - rider only	1.7 bar (170 kPa) (24.66 PSI)
Front inflation pressure - rider + passenger	1.8 bar (180 kPa) (26.11 PSI)
Rear - size (where applicable for approvals)	130 / 70 17" 62H or alternatively 150 / 60 17" 66H
Rear inflation pressure - rider only	1.8 bar (180 kPa) (26.11 PSI)
Rear inflation pressure - rider + passenger	1.9 bar (190 kPa) (27.56 PSI)

Supply

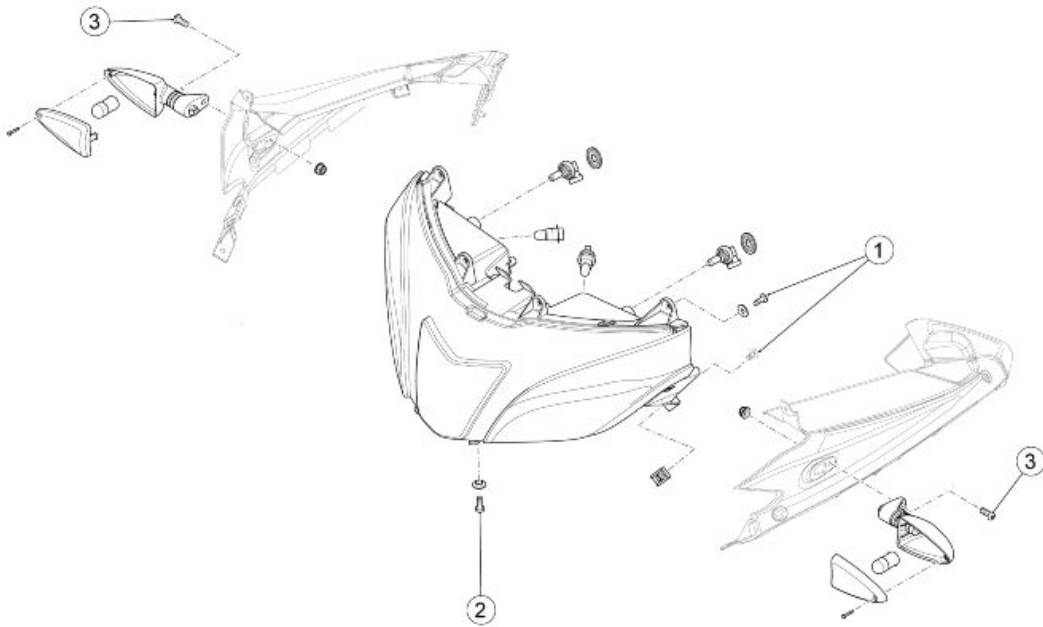
FUEL SYSTEM

Specification	Desc./Quantity
Fuel	premium unleaded petrol as per DIN 51 607, minimum octane rating of 95 (NORM) and 85 (NOMM).

Tightening Torques

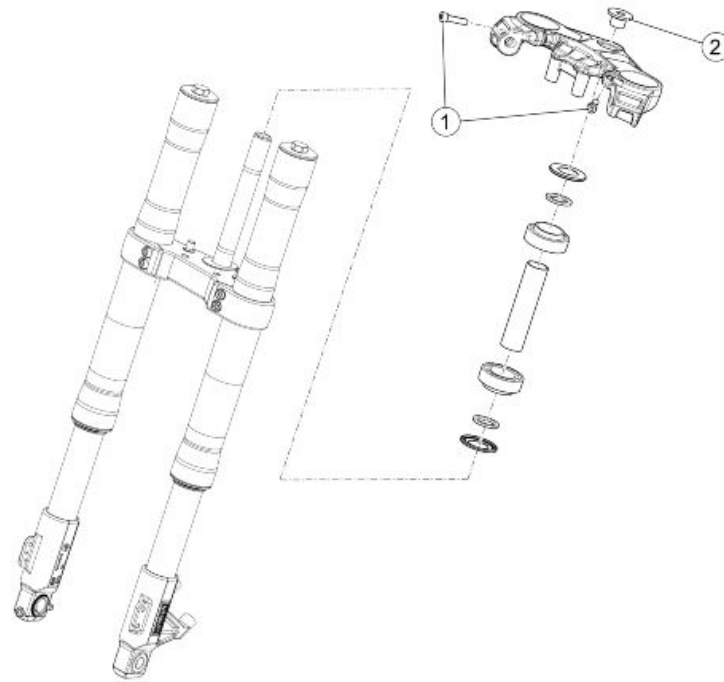
Chassis

Front side



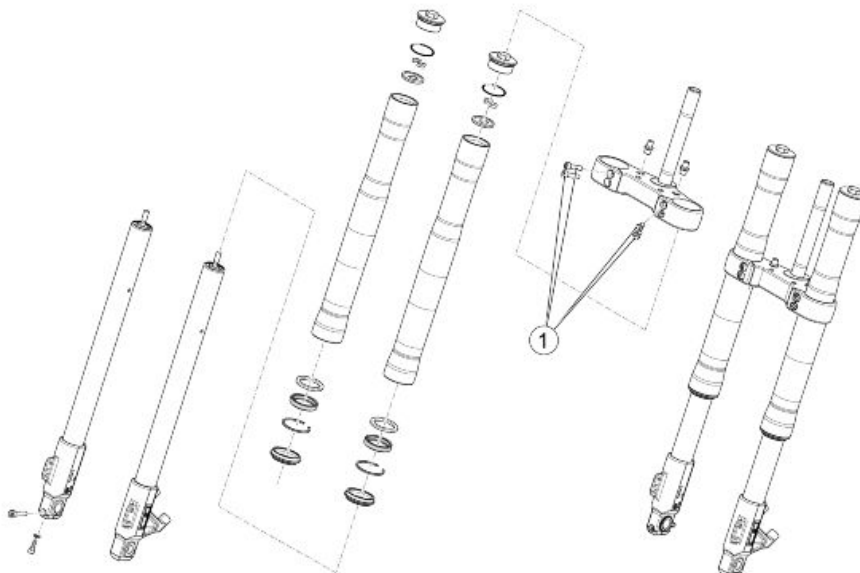
FRONT LIGHTS

pos.	Description	Type	Quantity	Torque	Notes
1	Headlamp fixing screw	M5x14	4	2.5 Nm (1.84 lbf ft)	-
2	Self-tapping screw	M5	1	1.5 Nm (1.11 lbf ft)	-
3	Turn indicator fixing screw	M5	2	1.5 Nm (1.11 lbf ft)	-



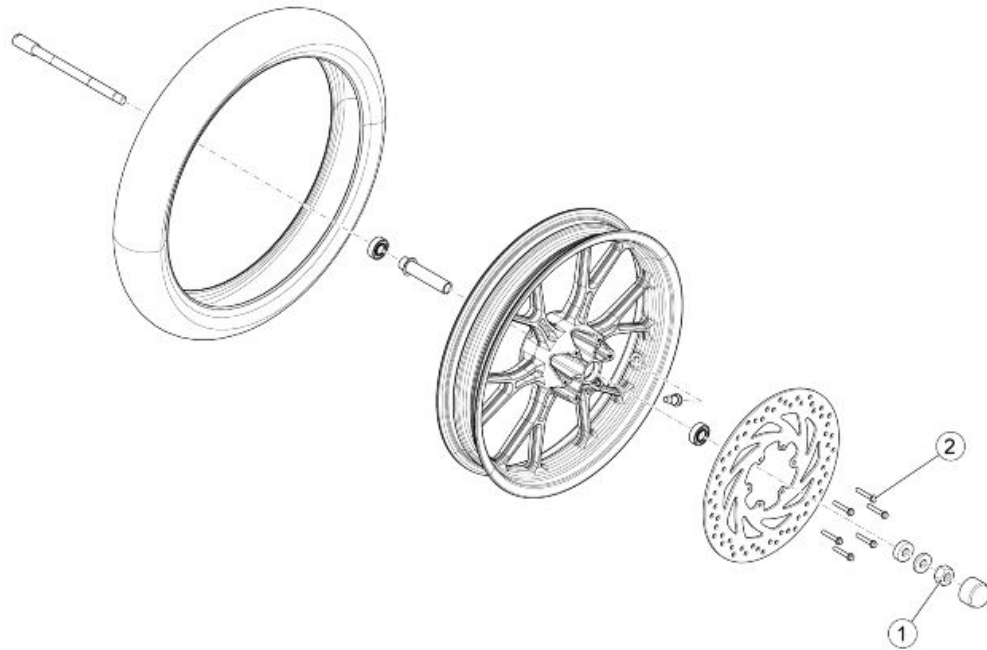
STEERING

pos.	Description	Type	Quantity	Torque	Notes
1	Upper yoke fastening to sleeve	M8	2	25 Nm (18.43 lbf ft)	-
2	Steering retainer nut	M20	1	48 Nm (35.40 lbf ft)	-



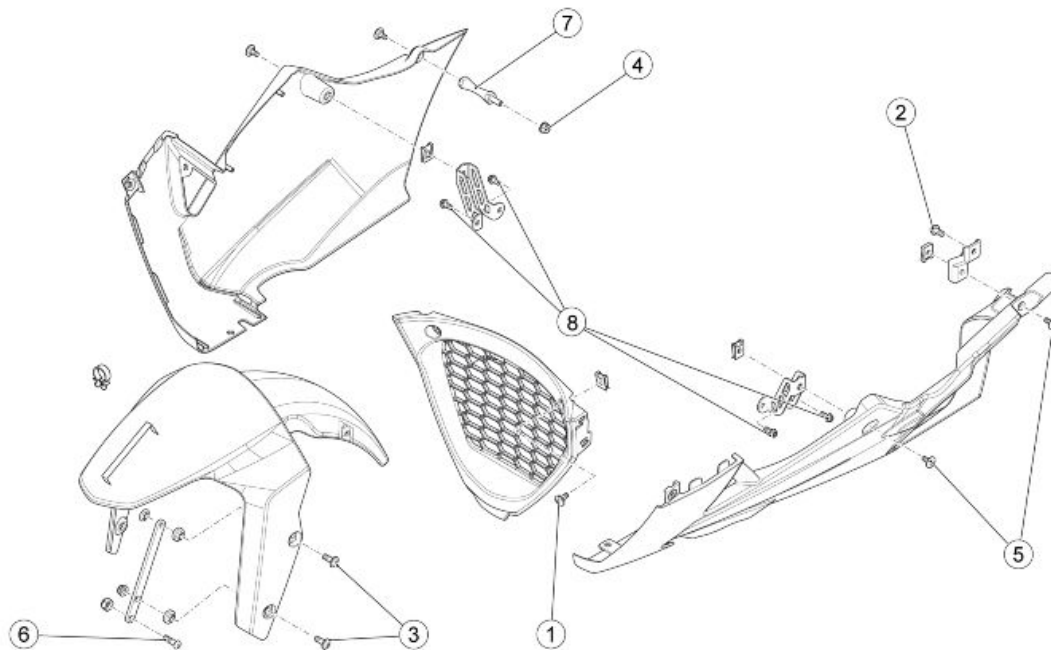
FRONT SUSPENSION

pos.	Description	Type	Quantity	Torque	Notes
1	Screws fastening lower yoke to sleeve	M8	2x2	25 Nm (8.43 lbf ft)	-



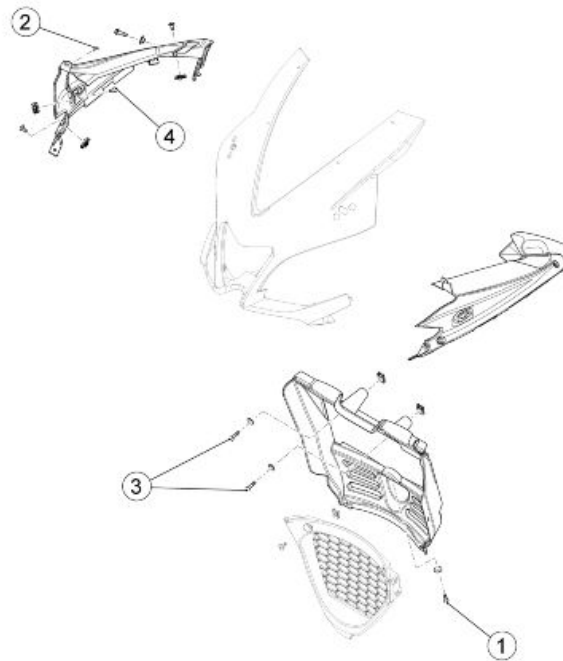
FRONT WHEEL

pos.	Description	Type	Quantity	Torque	Notes
1	Front wheel spindle nut	M14	1	78 Nm (8.85 lbf ft)	-
2	Front disc fixing screw	M6x20	6	12 Nm (8.85 lbf ft)	-



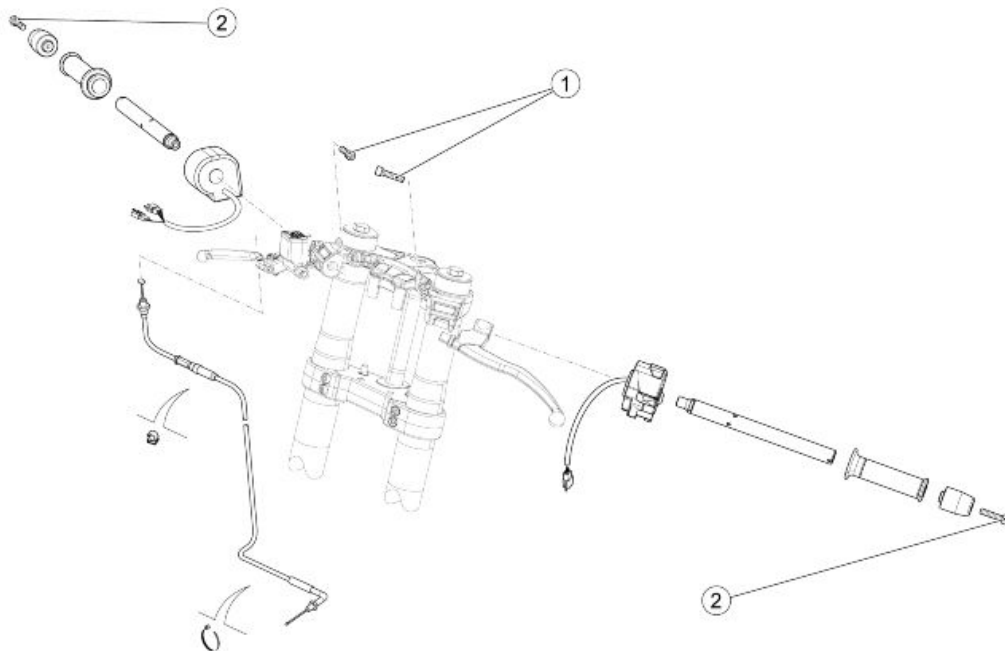
FRONT MUDGUARD - LUG

pos.	Description	Type	Quantity	Torque	Notes
1	Lug fixing screw	M5x9	2	3 Nm (2.21 lbf ft)	-
2	Side fairing fixing screw	M6x12	2	6 Nm (4.42 lbf ft)	-
3	Front mudguard fixing screw	M6x25	3	4.4 Nm (3.24 lbf ft)	5 Nm (3.68 lbf ft)
4	Flanged self- locking nut	M6	1	6 Nm (4.42 lbf ft)	-
5	Screws fastening lower fairing to cradle	M5x12	4	3 Nm (2.21 lbf ft)	-
6	Front mudguard support fixing screw	M6x20	2	5 Nm (3.68 lbf ft)	Max 6 N (4.42 lbf ft)
7	Fairing spacer	M6	1	12 Nm (8.85 lbf ft)	-
8	Right/Left fairing support fixing screw	M5	2+2	5 Nm (3.69 lbf ft)	-



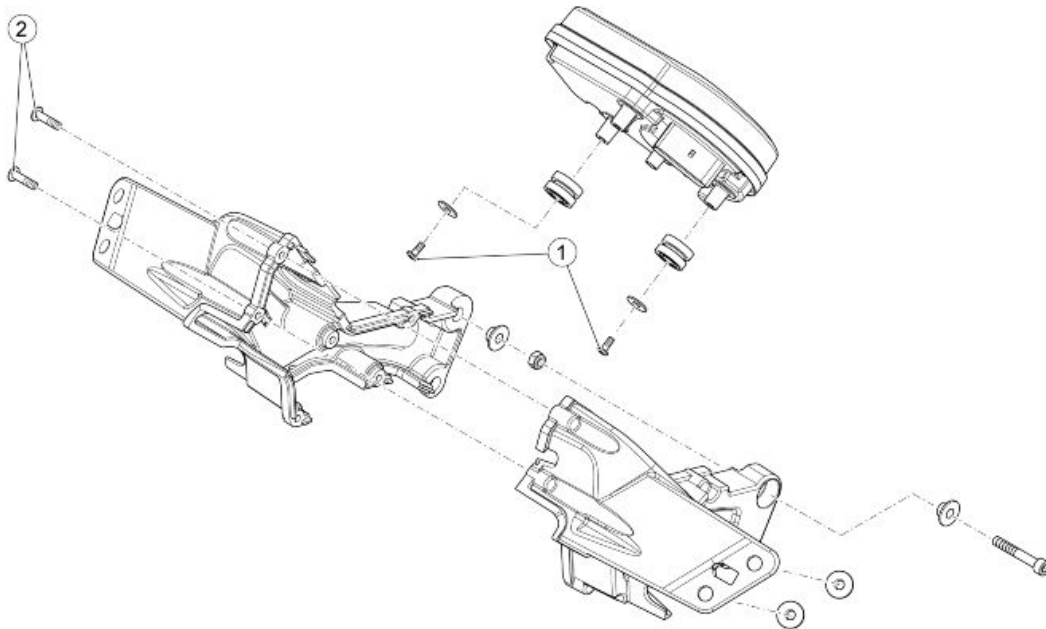
AIR DEFLECTORS

pos.	Description	Type	Quantity	Torque	Notes
1	Radiator frame screw	M5x16	1	2 Nm (1.47 lbf ft)	Max 2.5 N (1.84 lbf ft)
2	Front fixing screw	Self-t. 3.9	2	1 Nm (0.74 lbf ft)	-
3	TCEI screw	M5x20	2	2 Nm (1.47 lbf ft)	Max 2.5 N (1.84 lbf ft)
4	Flanged TBEI screw	M5x16	2	3 Nm (2.21 lbf ft)	-



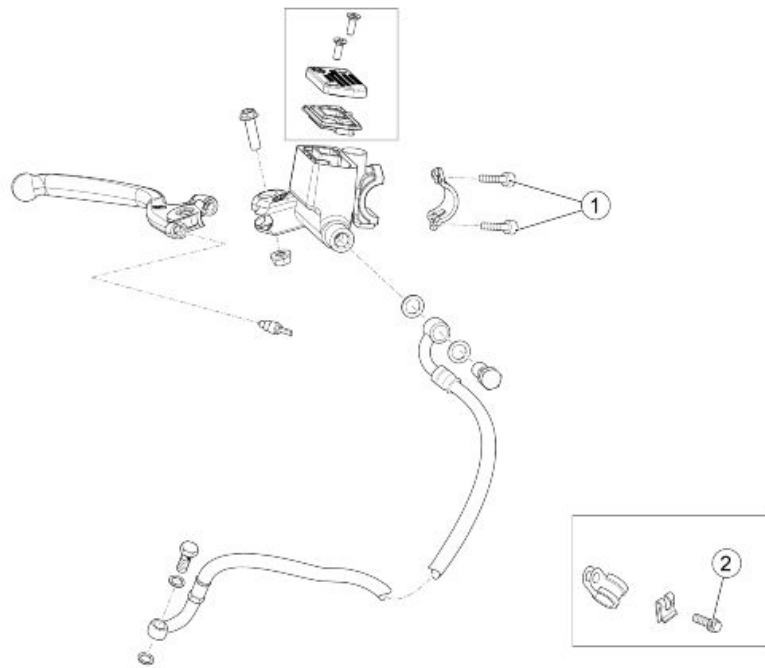
HANDLEBAR AND CONTROLS

pos.	Description	Type	Quantity	Torque	Notes
1	Semi-handlebar retainer	M8x30	2	25 Nm (18.44 lbf ft)	Loctite 243
2	Handlebar counterweight retainer	M5x50	2	5 Nm (3.69 lbf ft)	Loctite 243



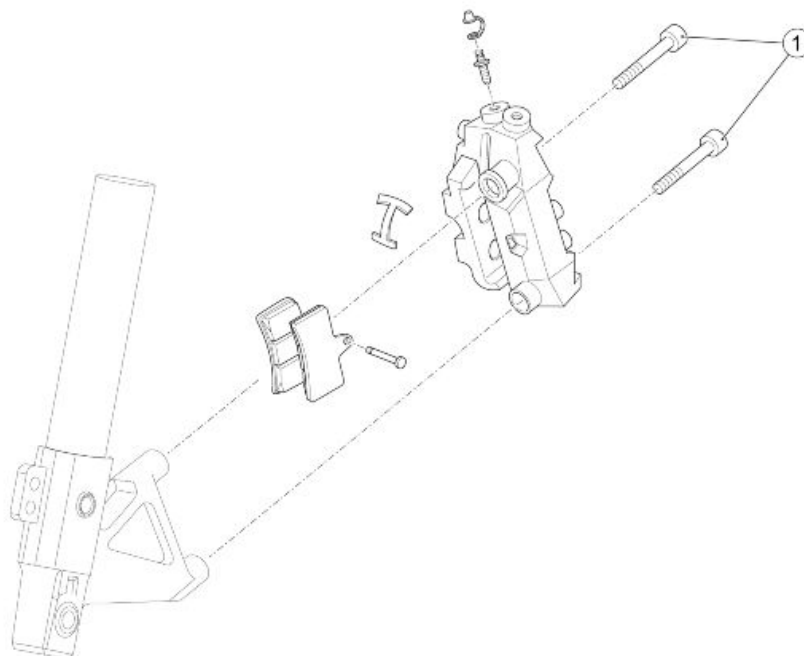
INSTRUMENT PANEL

pos.	Description	Type	Quantity	Torque	Notes
1	Self-tapping screw	M5x4	3	2.5 Nm (1.84 lbf ft)	-
2	Instrument panel fixing screw	M5x20	6	2 Nm (1.47 lbf ft)	-



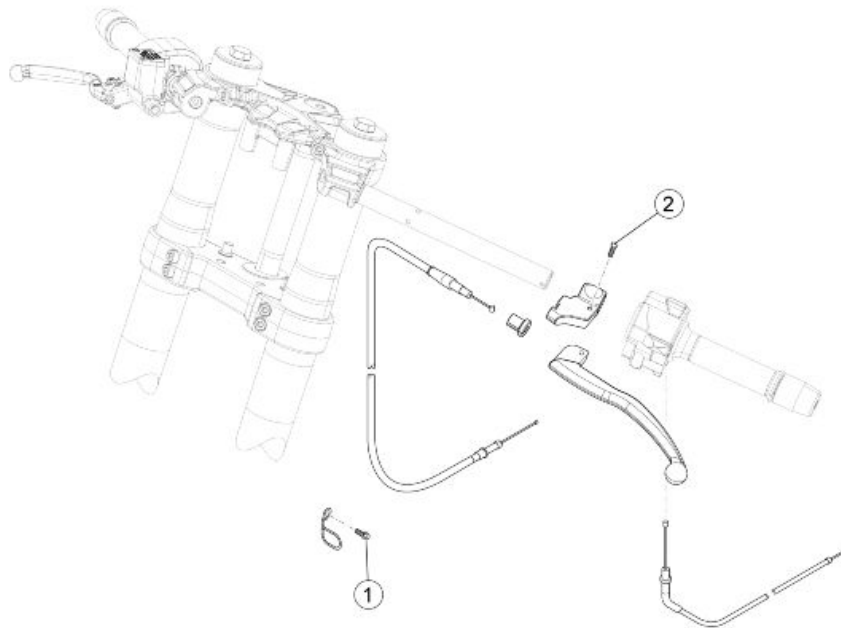
FRONT BRAKE PUMP

pos.	Description	Type	Quantity	Torque	Notes
1	Front brake pump fixing screw	M5	2	5 Nm (3.68 lbf ft)	-
2	Brake pipe clamp fixing screw	M5x16	1	5 Nm (3.68 lbf ft)	-



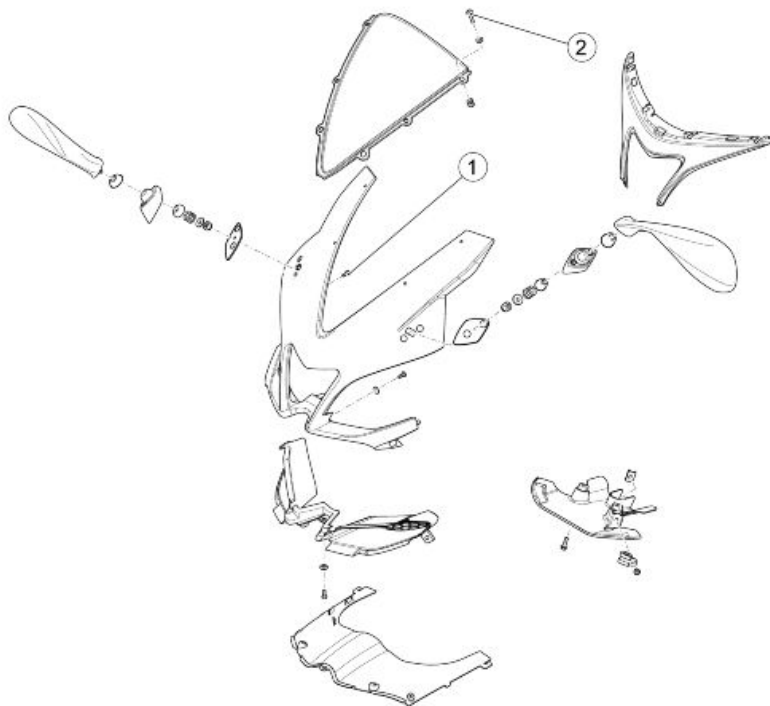
FRONT CALLIPER

pos.	Description	Type	Quantity	Torque	Notes
1	Front calliper fixing screw	M10x60	2	50 Nm (36.87 lbf ft)	-



CLUTCH CONTROL

pos.	Description	Type	Quantity	Torque	Notes
1	Throttle cable ring fixing screw	M6x16	1	6 Nm (4.42 lbf ft)	-
2	Throttle control fixing screw	M6x20	1	10 Nm (7.37 lbf ft)	-

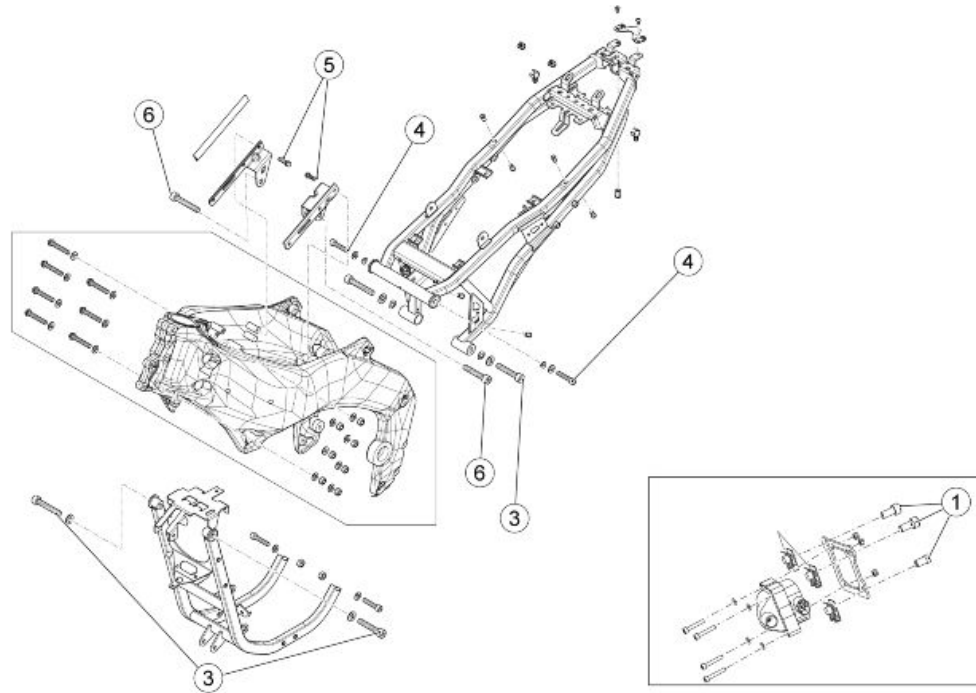


WINDSHIELD

pos.	Description	Type	Quantity	Torque	Notes
1	Rear view mirror fixing screw	Self-t. 3.9	4	0.4 Nm (0.29 lbf ft)	-

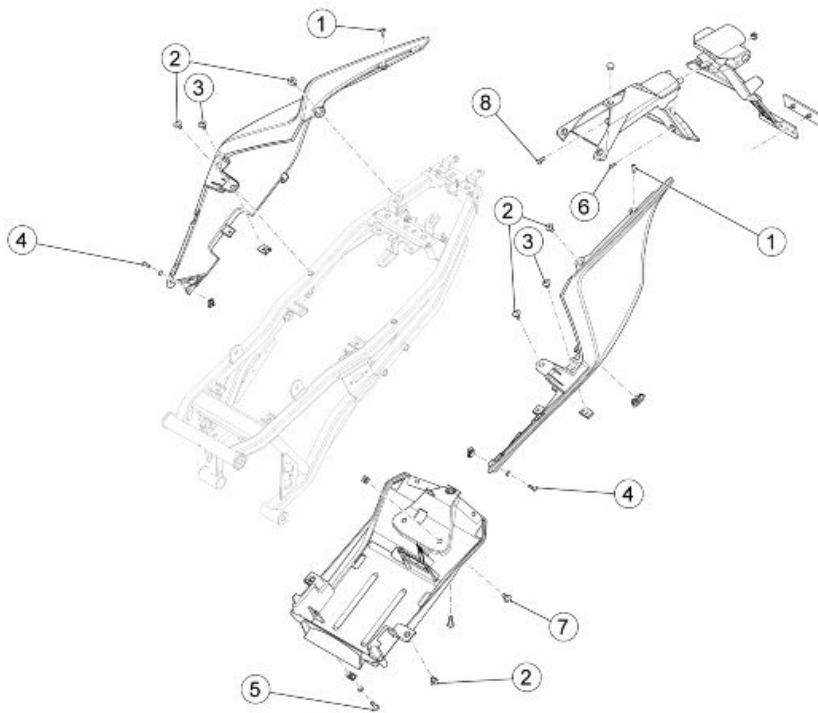
pos.	Description	Type	Quantity	Torque	Notes
2	Top fairing glass fixing screw	M4	4	1 Nm (0.73 lbf ft)	-

Central part



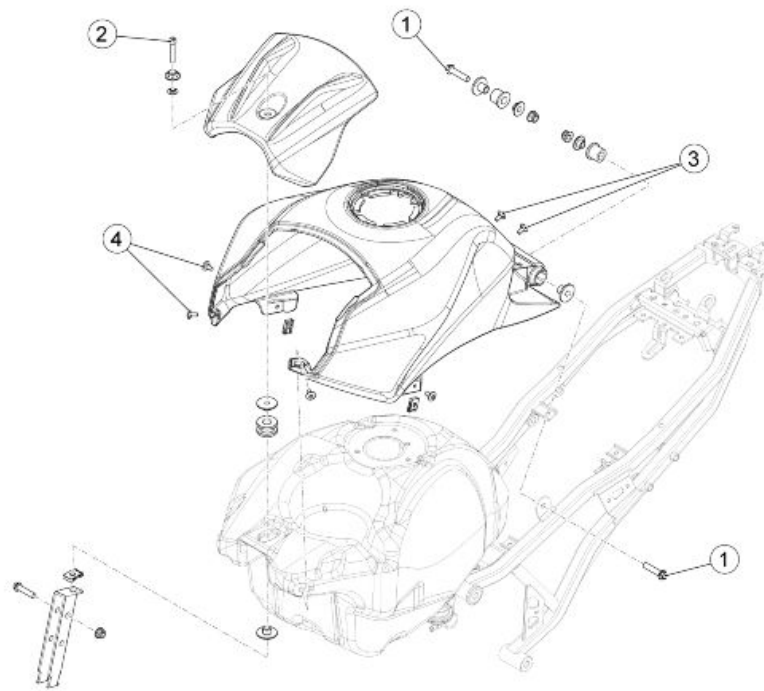
CHASSIS

pos.	Description	Type	Quantity	Torque	Notes
1	Support coil fixing screw	M8	2	20 Nm (14.75 lbf ft)	-
2	TCEI screw	M8	2	25 Nm (18.43 lbf ft)	-
3	TCEI screw	M10x45	4	50 Nm (36.88 lbf ft)	-
4	TE screw	M8x40	2	25 Nm (18.43 lbf ft)	-
5	TE screw	M6x16	2	12 Nm (8.85 lbf ft)	Loctite 243
6	Right and left engine mount	M10x16	2	38 Nm (28.02 lbf ft)	Loctite 243



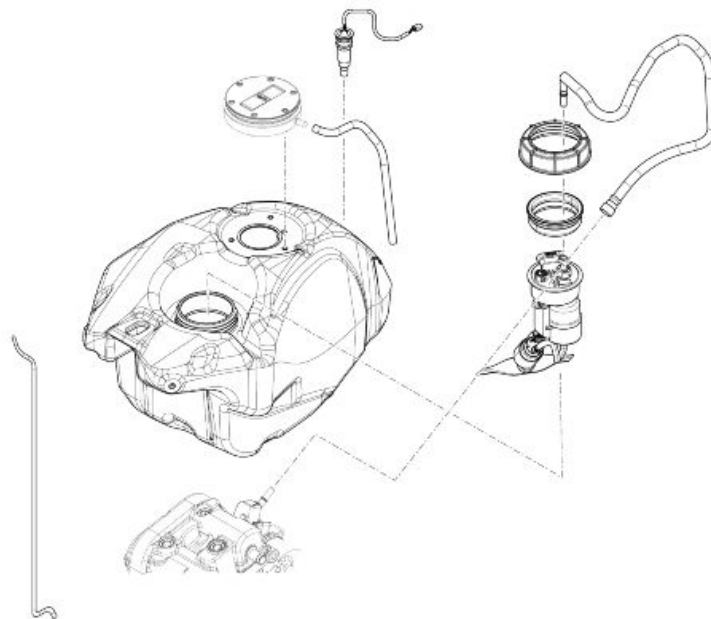
REAR BODYWORK

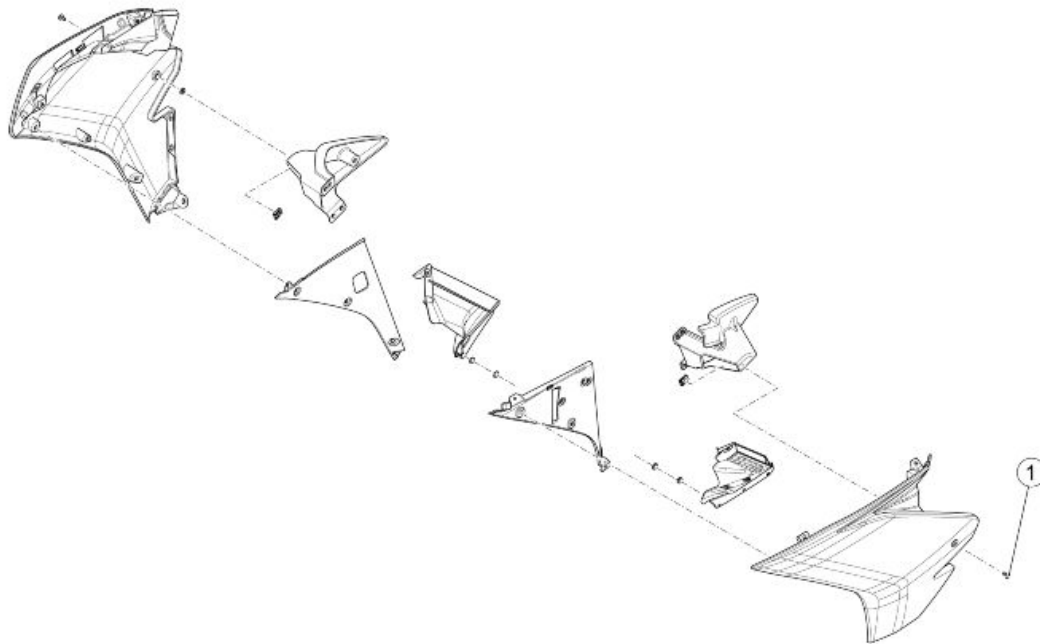
pos.	Description	Type	Quantity	Torque	Notes
1	Side fairing to chassis fixing screw	M4x14	2	-	-
2	Plastic panel fixing screw	M5x12	6	3 Nm (2.21 lbf ft)	-
3	Side fairing to chassis fixing screw	M5x9	2	3 Nm (2.21 lbf ft)	-
4	Side fairing to chassis fixing screw	M5x9	2	3 Nm (2.21 lbf ft)	-
5	SWP Screw	M5x20	2	2 Nm (1.47 lbf ft)	-
6	Self-tapping screw	3.9x10	4	0.4 Nm (0.29 lbf ft)	-
7	Self-tapping screw	M5x14	2	1.5 Nm (1.11 lbf ft)	-
8	TBEI screw	M5x12	1	3 Nm (2.21 lbf ft)	-



TANK

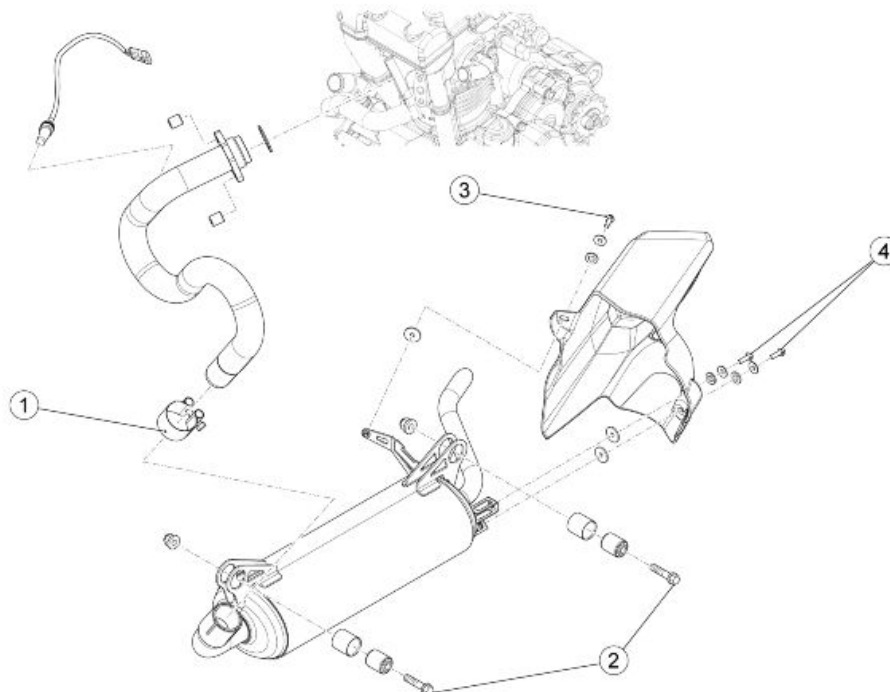
pos.	Description	Type	Quantity	Torque	Notes
1	Rear tank fixing screw	M8x40	1+1	25 Nm (18.44 lbf ft)	-
2	Front tank fixing screw	M6x35	1	10 Nm (7.37 lbf ft)	-
3	Fastener screw	M5x9	4	3 Nm (2.21 lbf ft)	-
4	Tank cover fixing screw	M5x9	4	3 Nm (2.21 lbf ft)	-





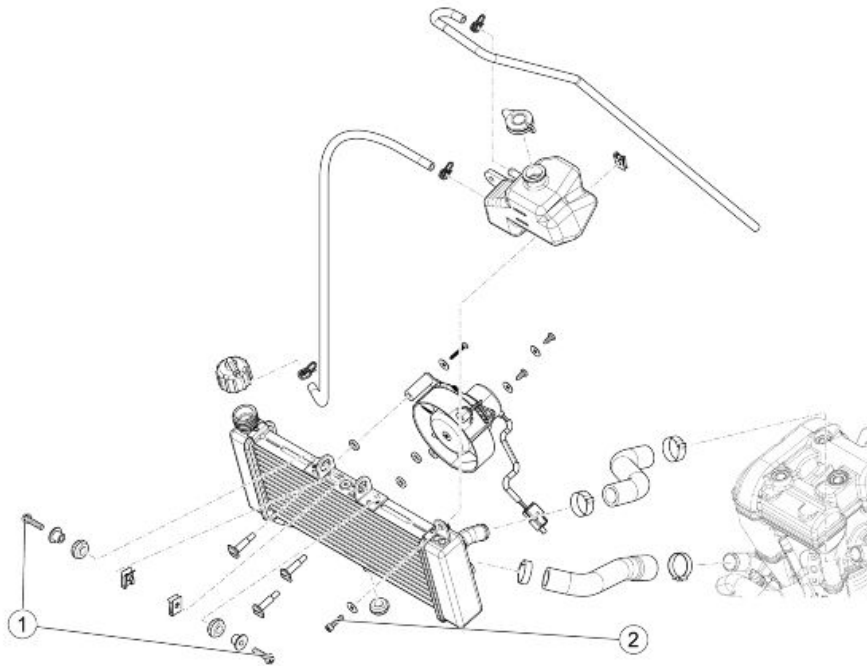
SIDE FAIRINGS

pos.	Description	Type	Quantity	Torque	Notes
1	Side fairing fixing screw	M5x9	6	1.7 Nm (1.25 lbf ft)	Max 2 Nm (1.47 lbf ft)



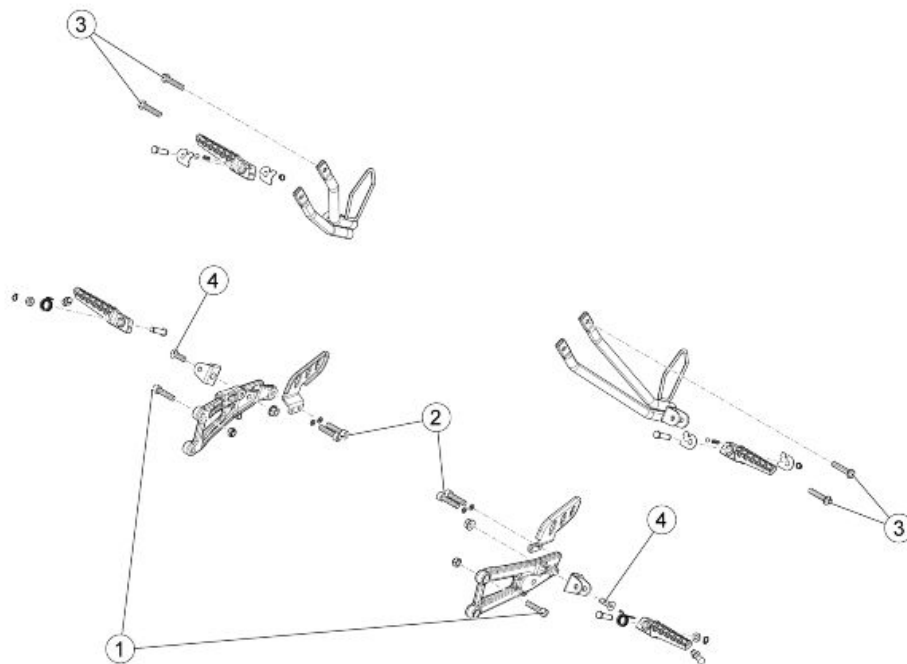
EXHAUST

pos.	Description	Type	Quantity	Torque	Notes
1	Drainage retainer	M6x20	2	10 Nm (7.37 lbf ft)	-
2	Footrest retainer	M8x40	1	25 Nm (18.43 lbf ft)	-



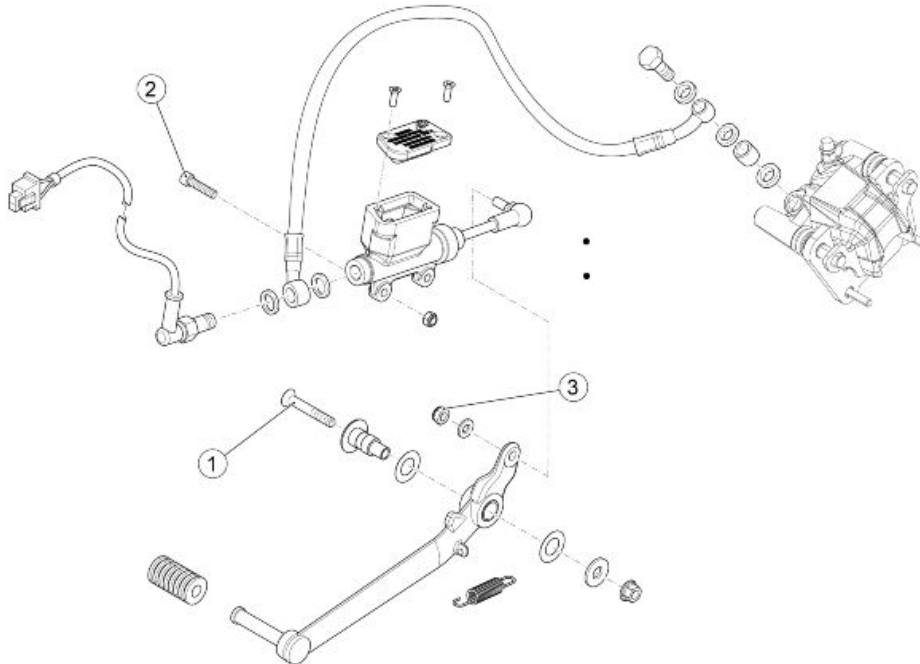
RADIATOR

pos.	Description	Type	Quantity	Torque	Notes
1	Radiator retainer	M6x25	2	10 Nm (7.37 lbf ft)	-
2	Expansion tank support fixing screw	M6x20	1	3.5-4 Nm (2.58-2.95 lbf ft)	-



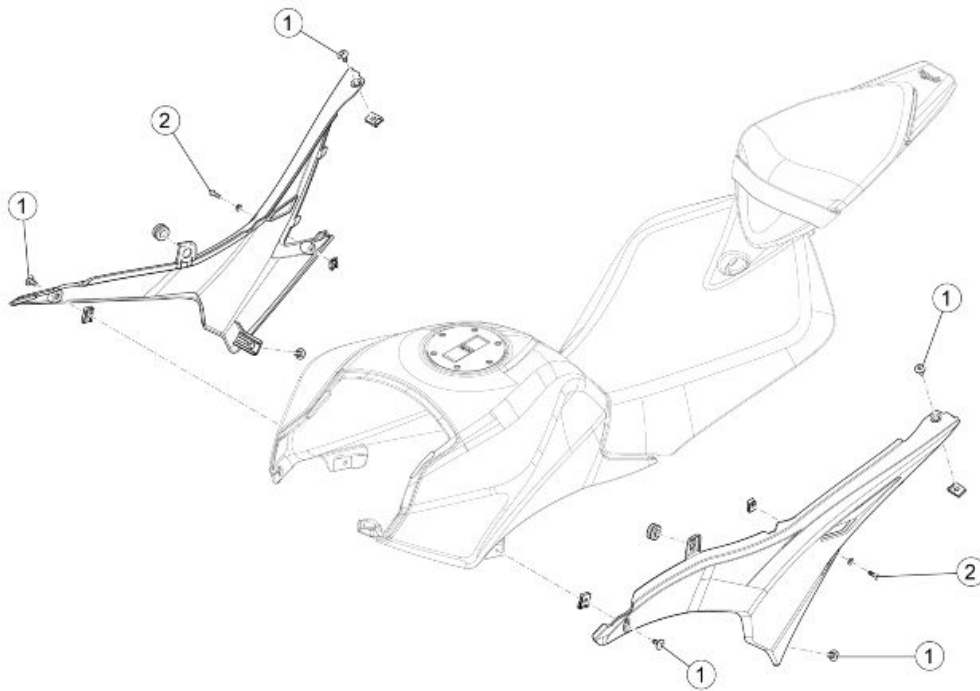
FOOTRESTS

pos.	Description	Type	Quantity	Torque	Notes
1	Rider footrest support fixing screw	M8x25	1+1	25 Nm (18.43 lbf ft)	Loctite 243
2	Footrest protection fixing screw	M5x12	2+2	5 Nm (3.69 lbf ft)	-
3	Passenger footrest fixing screw	M8x40	4	20 Nm (14.75 lbf ft)	-
4	Rider pedal retainer	M8x26	2	25 Nm (18.44 lbf ft)	-



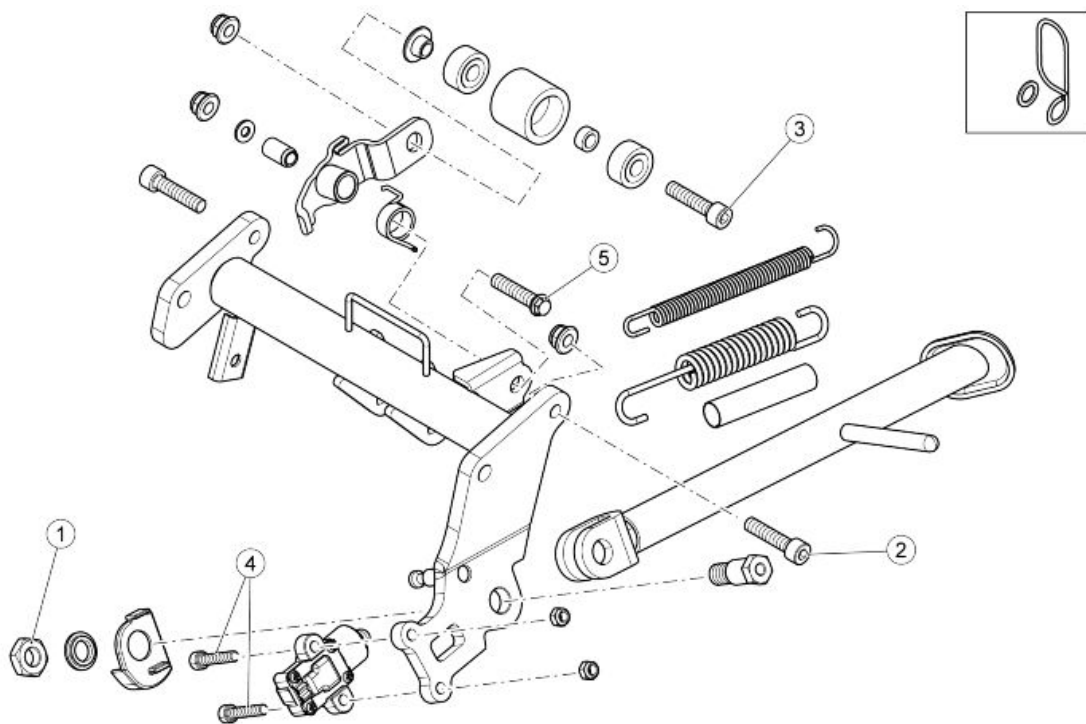
REAR BRAKING SYSTEM

pos.	Description	Type	Quantity	Torque	Notes
1	Brake lever fixing screw	M6x40	1	12 Nm (8.85 lbf ft)	-
2	Rear brake pump fixing screw	M6x30	2	10 Nm (7.37 lbf ft)	-
3	Brake pump joint retainer	M6	1	10 Nm (7.37 lbf ft)	-



CENTRAL BODYWORK

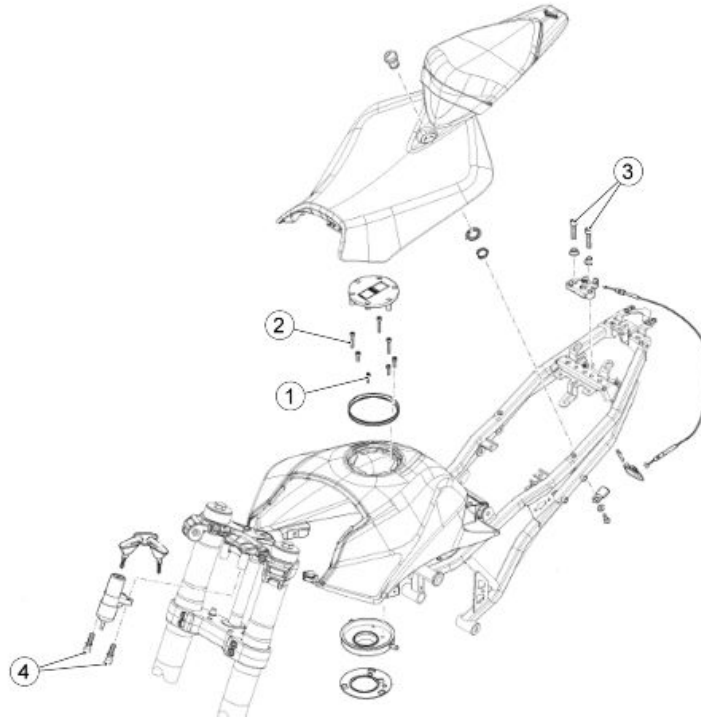
pos.	Description	Type	Quantity	Torque	Notes
1	Fairing upper fixing screw	M5x9	6	3 Nm (2.21 lbf ft)	-
2	Fairing lower fixing screw	M4x14	2	-	-



STAND

pos.	Description	Type	Quantity	Torque	Notes
1	Thin nut	M10x1.25	1	10 Nm (7.38 lb ft)	-

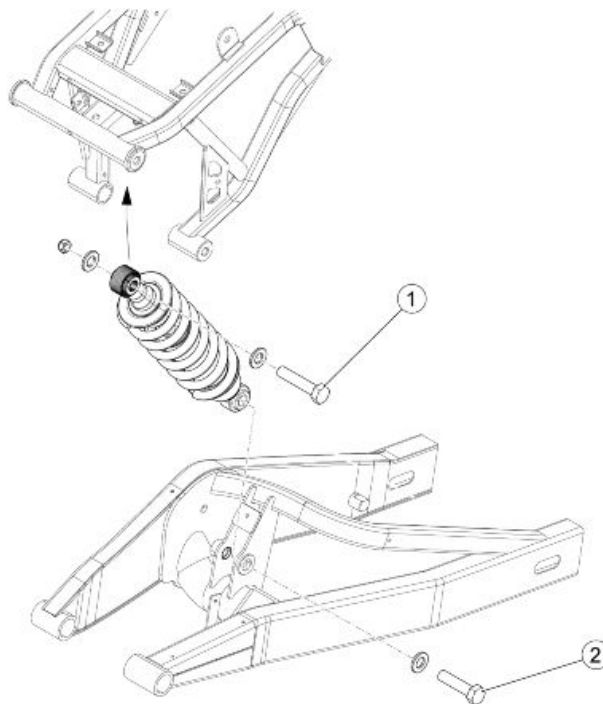
pos.	Description	Type	Quantity	Torque	Notes
2	TCEI screw	M8x30	2	25 Nm (18.43 lb ft)	Loctite 243
3	TCEI screw	M8x45	1	25 Nm (18.43 lb ft)	-
4	TE Screws Flang.	M5x25	2	3 Nm (2.21 lb ft)	-
5	TE Screws	M6x30	2	10 Nm (7.38 lb ft)	-



LOCKS

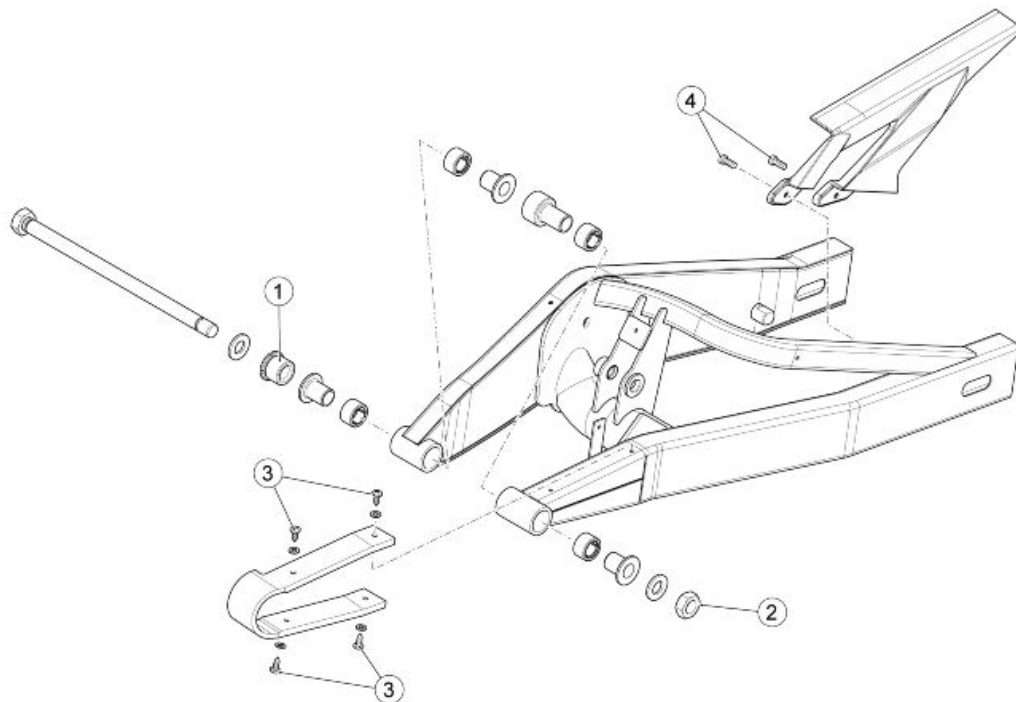
pos.	Description	Type	Quantity	Torque	Notes
1	Fuel tank cap retainer	M5x16	3	3 Nm (2.21 lb ft)	-
2	Fuel tank cap retainer	M5x30	2	3 Nm (2.21 lb ft)	-
3	Saddle lock retainer	M6x30	2	6 Nm (4.42 lb ft)	-
4	Steering lock retainer	M8x20	2	6.5 Nm (4.79 lb ft)	-

Back side



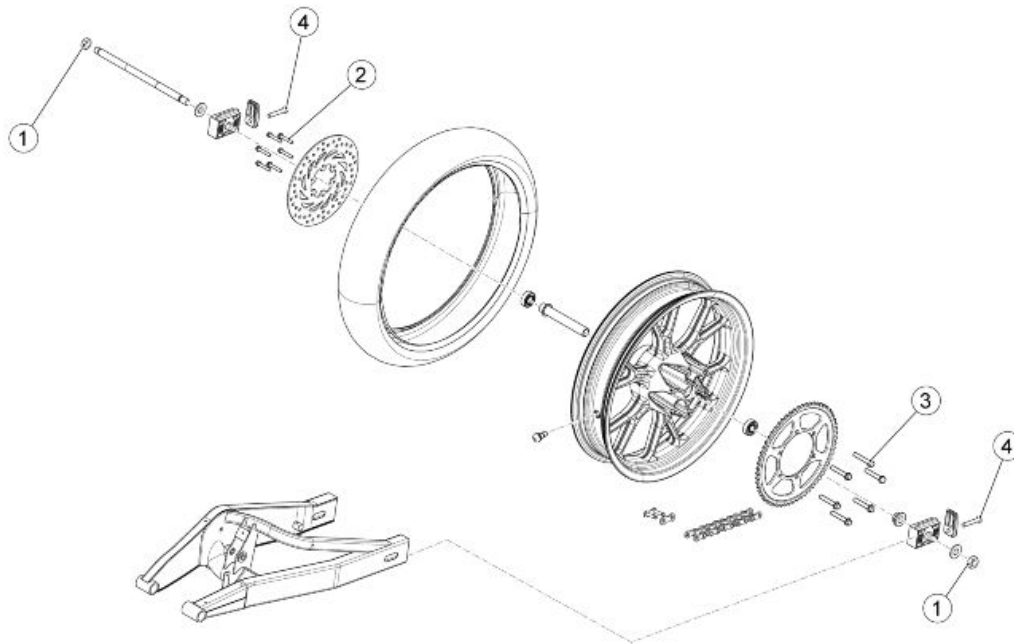
REAR SUSPENSION

pos.	Description	Type	Quantity	Torque	Notes
1	Upper retainer	M12	1	58 Nm (42.78 lbf ft)	-
2	Lower retainer	M12	1	58 Nm (42.78 lbf ft)	Loctite 243



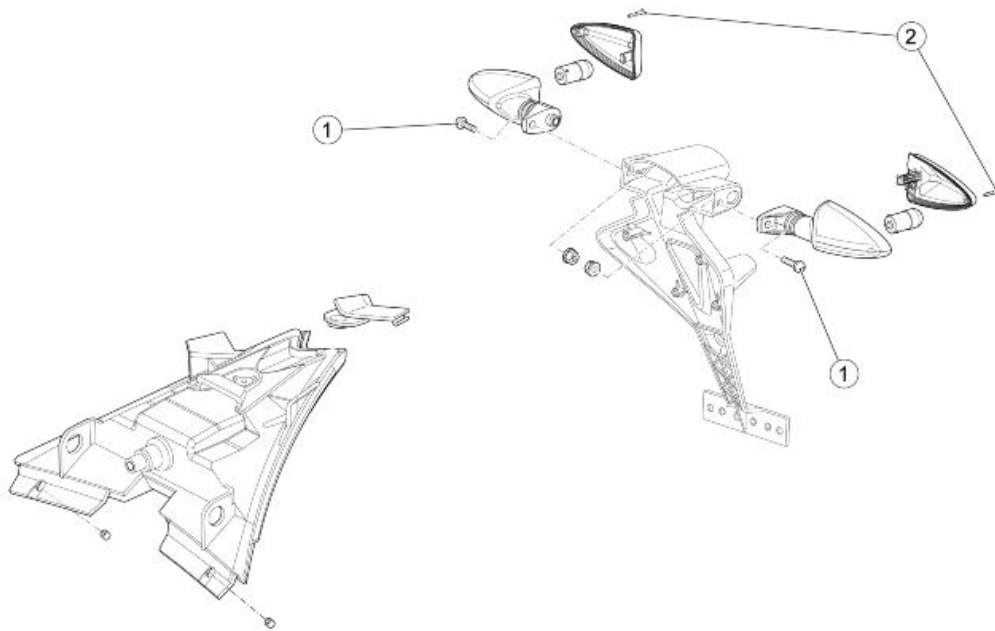
SWINGARM

pos.	Description	Type	Quantity	Torque	Notes
1	Swingarm to chassis adjustment nut	M25x1.5	1	15 Nm (11.06 lbf ft)	-
2	Swingarm pin nut	M14	1	78 Nm (57.52 lbf ft)	-
3	Chainguard fixing screw	M 4.8x13	4	1 Nm (0.74 lbf ft)	-
4	Chainguard fixing screw	Self-tap.	2	-	-



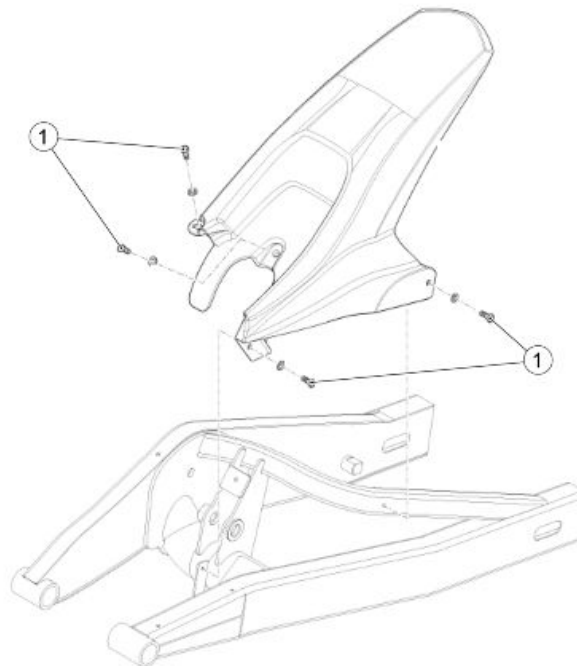
REAR WHEEL

pos.	Description	Type	Quantity	Torque	Notes
1	Rear wheel axle nut	M14	2	78 Nm (57.53 lbf ft)	-
2	Rear disc fixing screw	M6x20	6	12 Nm (8.85 lbf ft)	-
3	Sprocket fixing screw	TEF M8	6	25 Nm (18.44 lbf ft)	-
4	Chain tensor fixing screw	M8	2	12 Nm (8.85 lbf ft)	Loctite 243



REAR LIGHTS

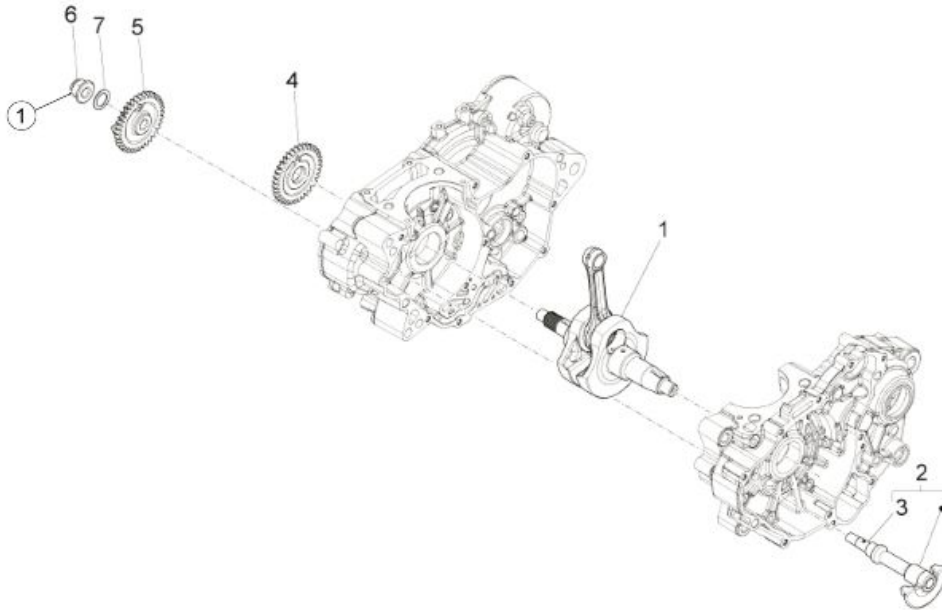
pos.	Description	Type	Quantity	Torque	Notes
1	Turn indicator retainer	M5	2	3 Nm (2.21 lbf ft)	-
2	Turn indicator cover retainer	-	2+2	0.3 Nm (0.22 lbf ft)	-



REAR MUDGUARD

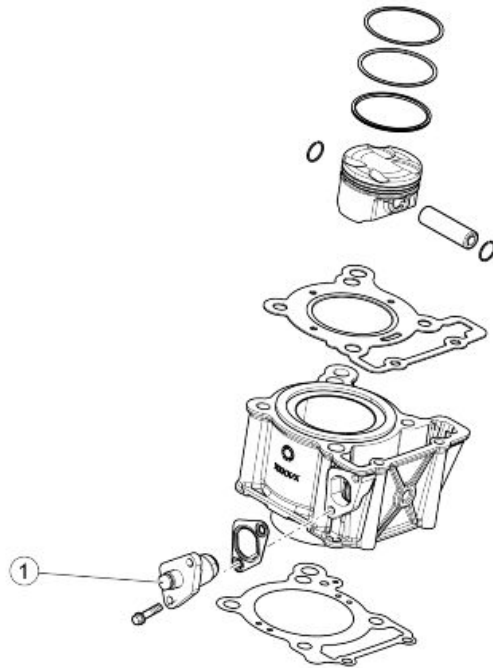
pos.	Description	Type	Quantity	Torque	Notes
1	Rear mudguard to swingarm fixing screw	Self-tap.	4	3 Nm (2.21 lbf ft)	Max 4.5 Nm (3.31 lbf ft)

Engine



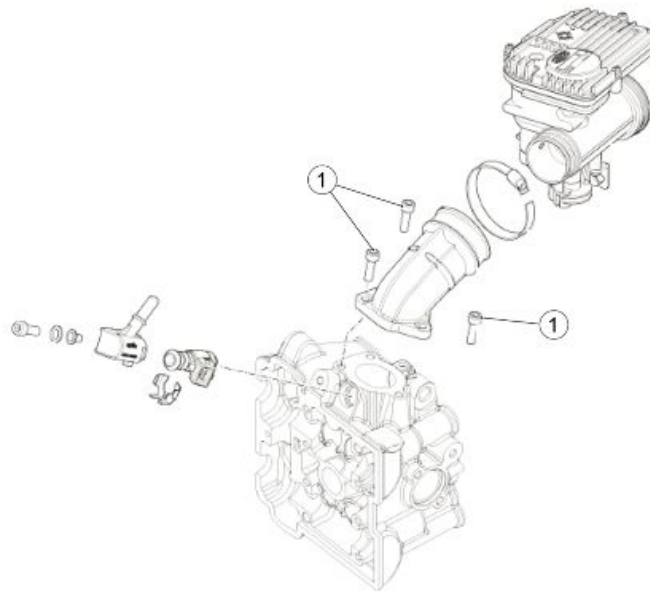
CRANKSHAFT

pos.	Description	Type	Quantity	Torque	Notes
1	Countershaft gear retainer nut	M10	1	35 - 45 Nm (25.81 - 33.19 lbf ft)	-



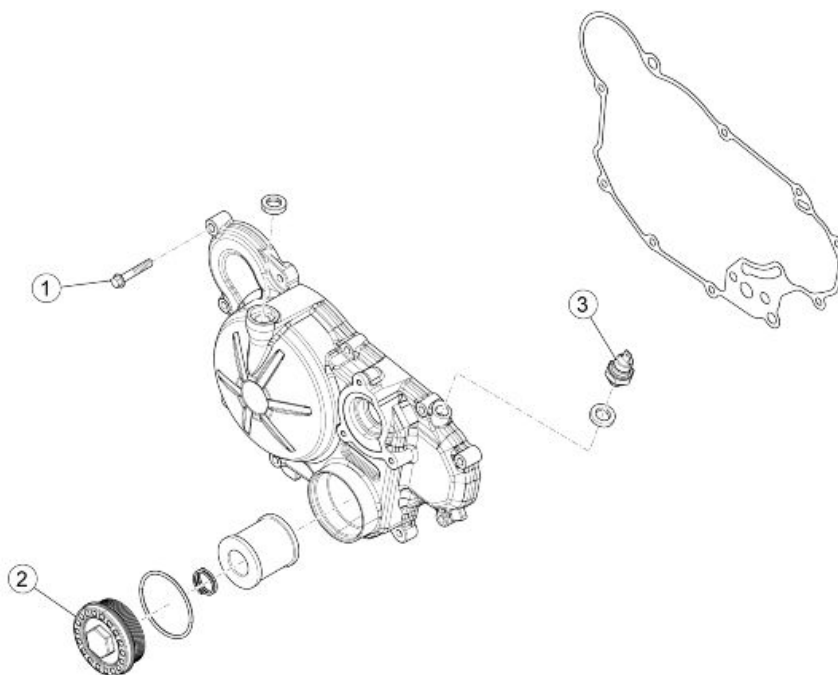
CYLINDER - PISTON

pos.	Description	Type	Quantity	Torque	Notes
1	Chain tensioner screw	M8	1	6 Nm (4.43 lbf ft)	-



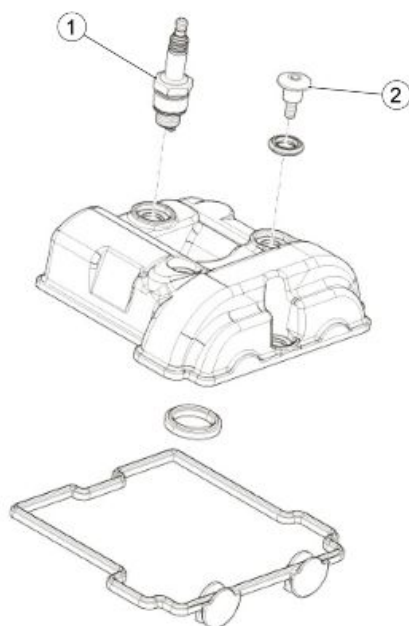
THROTTLE BODY

pos.	Description	Type	Quantity	Torque	Notes
1	Intake manifold fixing screw	M6x20	3	10 Nm (7.38 lbf ft)	-



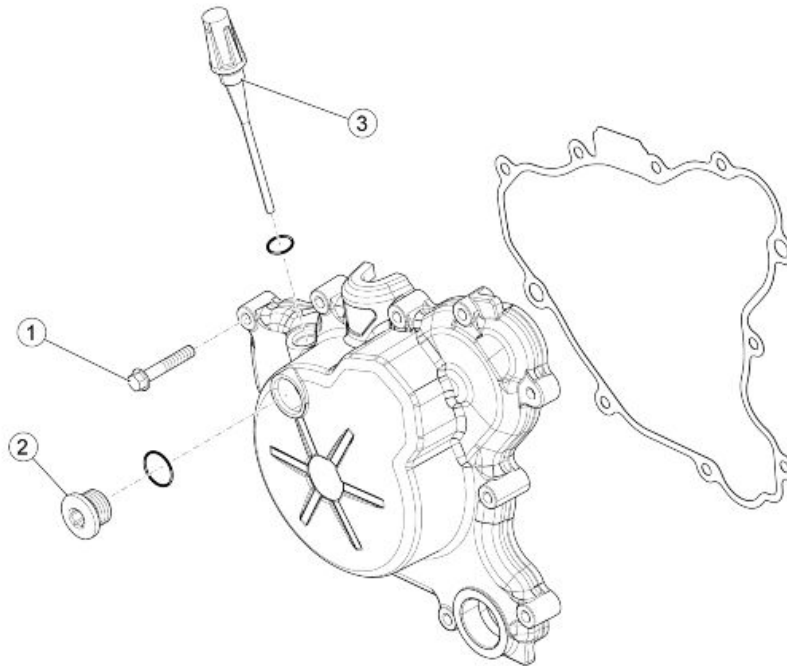
CLUTCH COVER

pos.	Description	Type	Quantity	Torque	Notes
1	Clutch cover fixing screw	M6x35	10	11 - 13 Nm (8.11 - 9.58 lbf ft)	-
2	Oil filter cover	M56x1.5	1	24 - 26 Nm (17.70 - 19.17lbf ft)	-
3	Oil pressure sensor	M10	1	12 - 14 Nm (8.85 - 10.32 lbf ft)	-

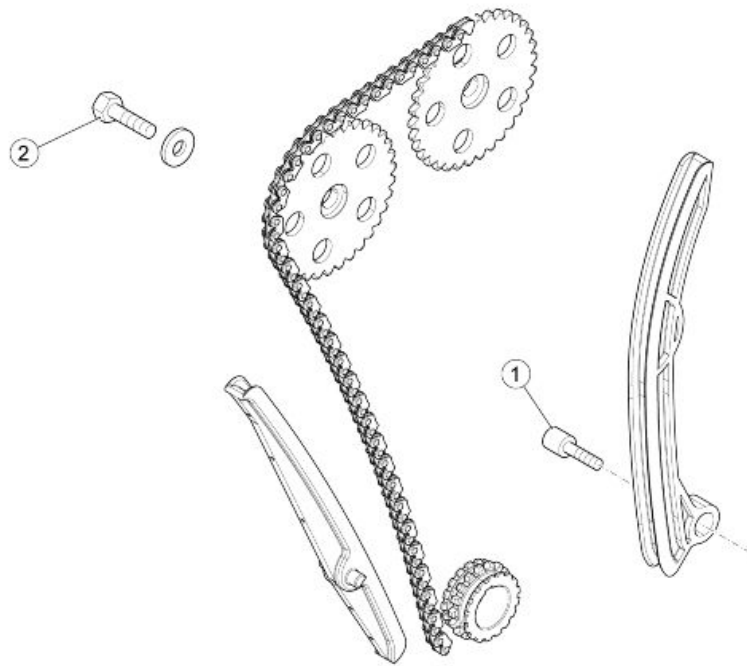


HEAD COVER

pos.	Description	Type	Quantity	Torque	Notes
1	Spark plug	M10	1	12 - 14 Nm (8.85 - 10.32 lbf ft)	-
2	Head cover fixing screw	M6	4	10 - 12 Nm (7.38 - 8.85 lbf ft)	-

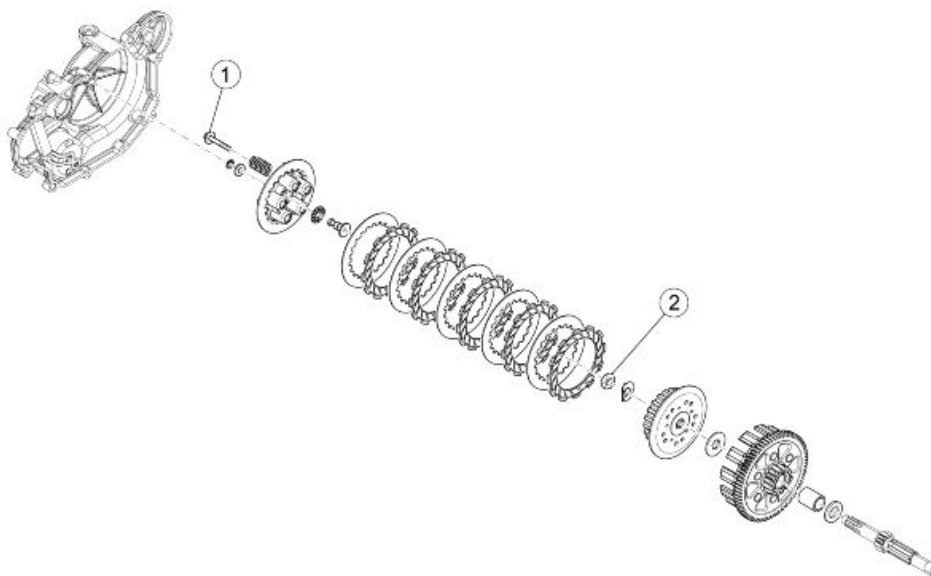
**FLYWHEEL COVER**

pos.	Description	Type	Quantity	Torque	Notes
1	Flywheel cover fastener screw	M6	10	11 - 13 Nm (8.11 - 9.58 lbf ft)	-
2	Timing control cover	M18	2	3.5 - 4.5 Nm (2.58 - 3.31 lbf ft)	-
3	Oil dipstick	M12x1.5	1	4 - 6 Nm (2.95 - 4.42 lbf ft)	-



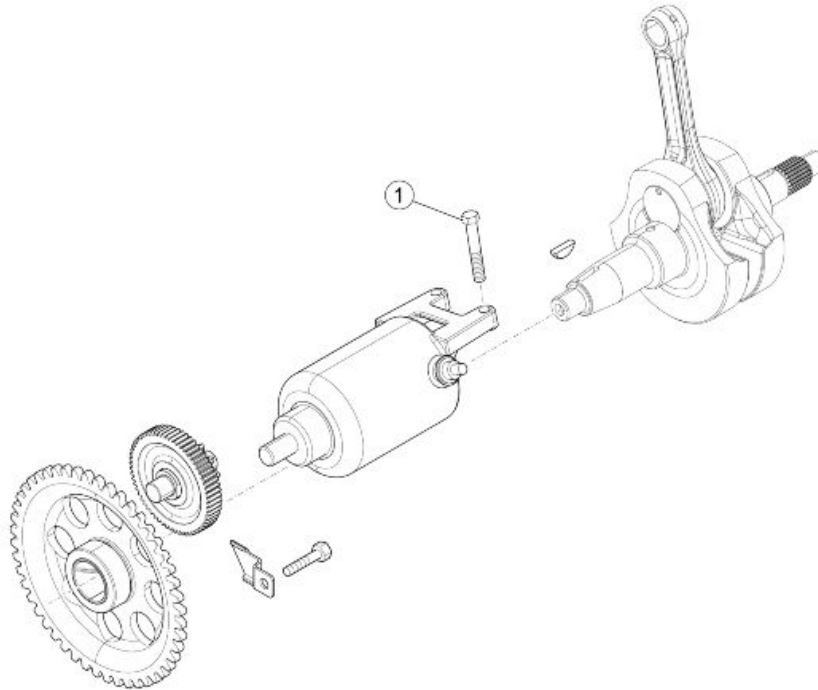
TIMING SYSTEM

pos.	Description	Type	Quantity	Torque	Notes
1	Chain tensioner slider fulcrum fixing screw	M6x16	1	10 Nm (7.38 lbf ft)	Loctite 243
2	Transmission timing gear fixing screw	M8x40	1	27 Nm (19.91 lbf ft)	Loctite 243

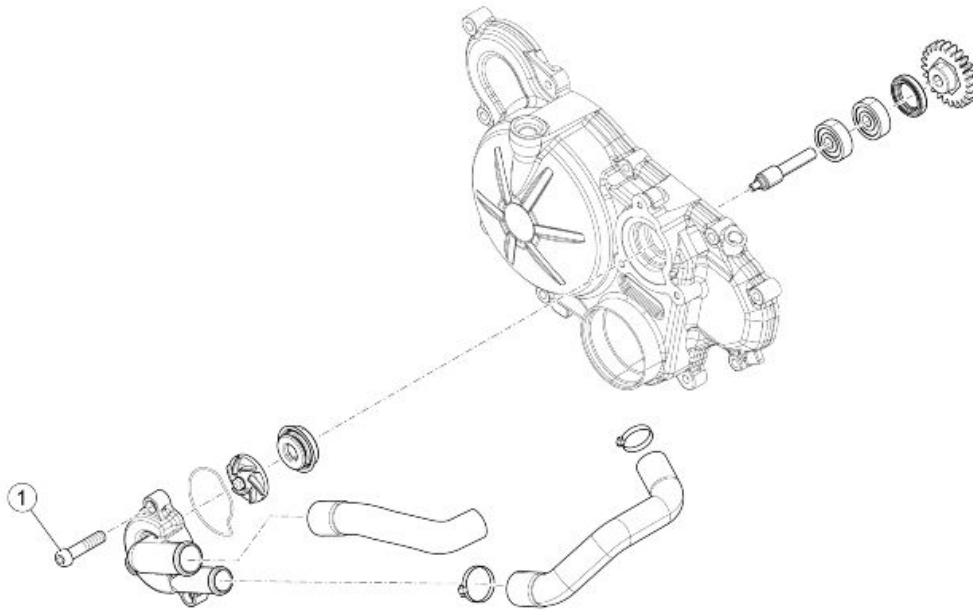


CLUTCH

pos.	Description	Type	Quantity	Torque	Notes
1	Clutch spring screw	M5	5	3.5 - 4.5 Nm (2.58 - 3.31 lbf ft)	-
2	Clutch housing retainer nut	M12	1	35 - 45 Nm (25.81 - 33.19 lbf ft)	-

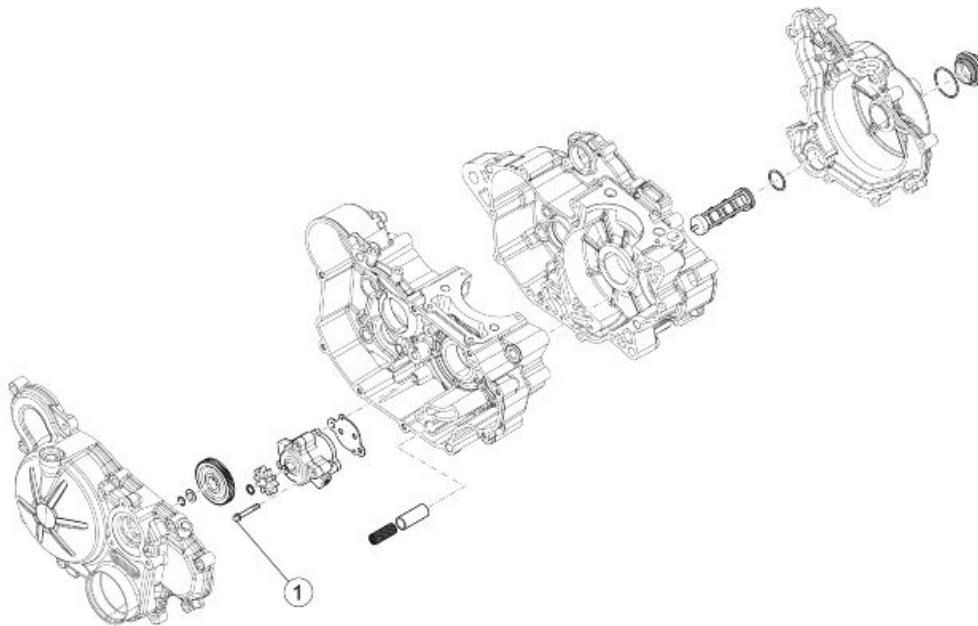
**STARTER MOTOR**

pos.	Description	Type	Quantity	Torque	Notes
1	Starter motor fixing screw	M6x25	2	11 - 13 Nm (8.11 - 9.58 lbf ft)	-



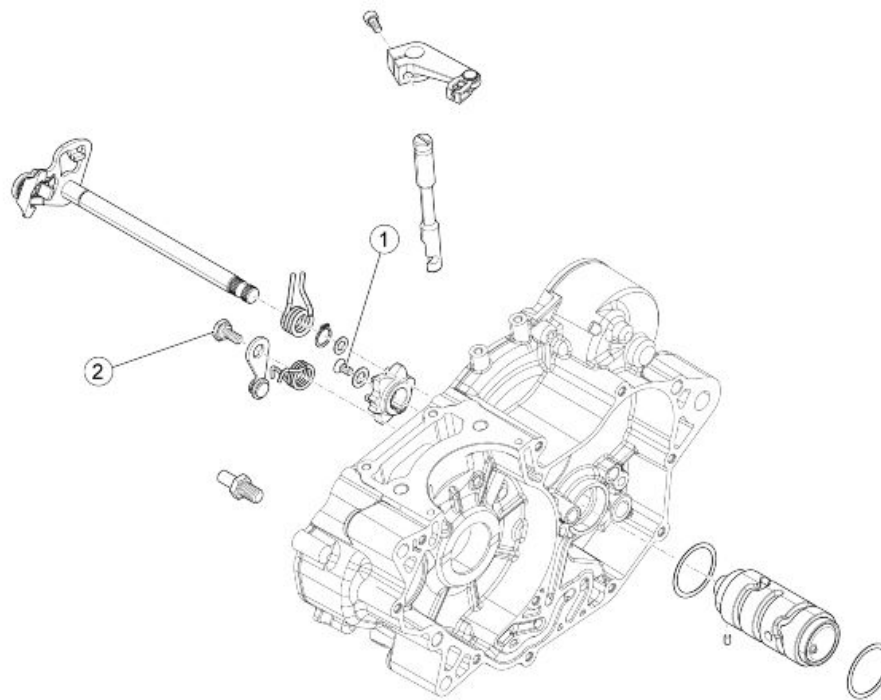
WATER PUMP

pos.	Description	Type	Quantity	Torque	Notes
1	Water pump fixing screw	M5	3	5 - 6 Nm (3.68 - 4.42 lbf ft)	-



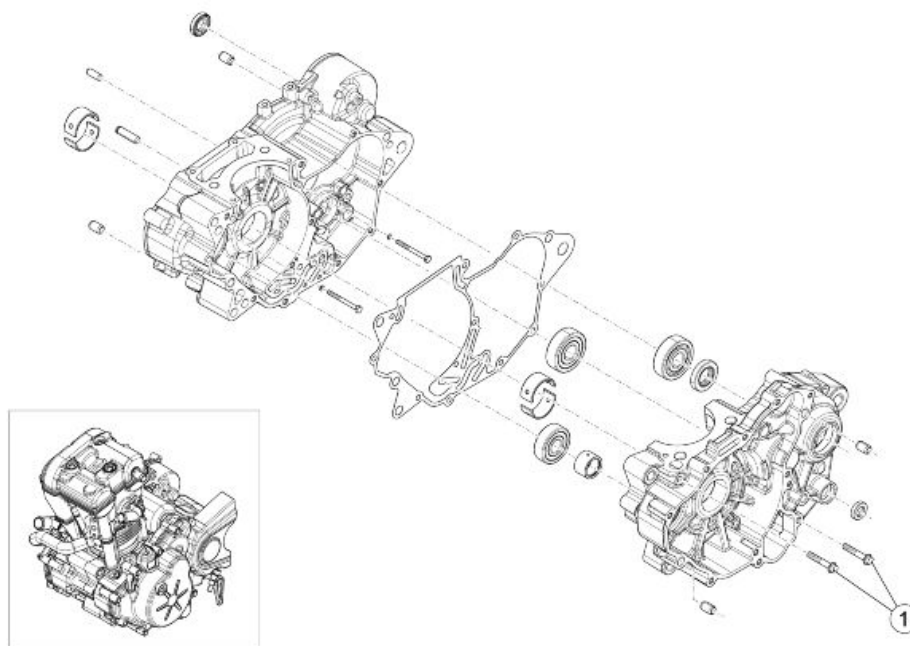
OIL PUMP

pos.	Description	Type	Quantity	Torque	Notes
1	Oil pump fixing screw	M6x25	3	10 Nm (7.38 lbf ft)	Loctite 243



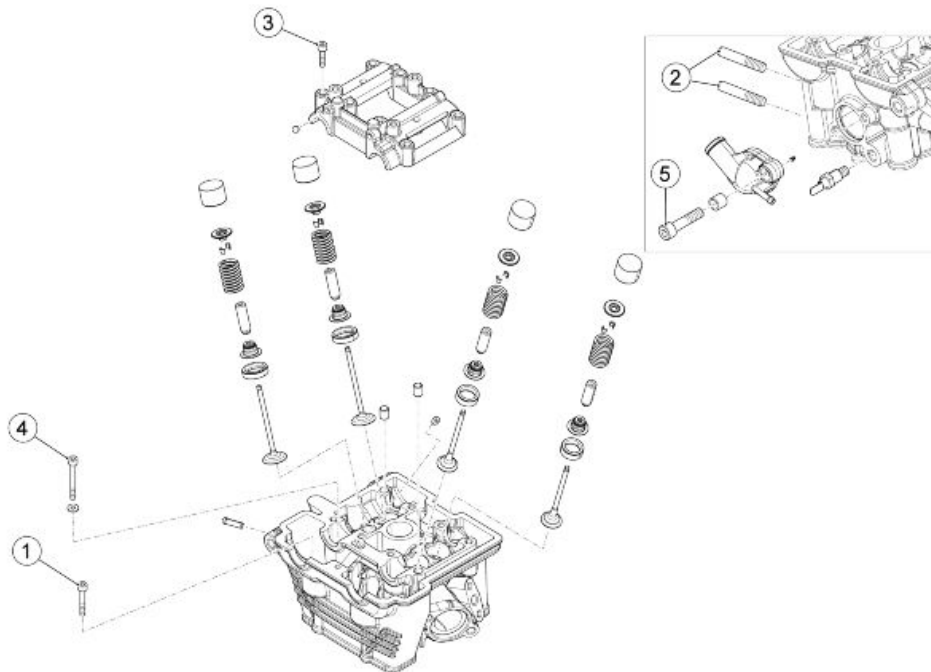
GEAR SELECTOR

pos.	Description	Type	Quantity	Torque	Notes
1	Selector spider screw	M5	1	3.5 - 4.5 Nm (2.58 - 3.31 lbf ft)	-
2	Engaging lever screw	M6	1	8 - 10 Nm (5.90 - 7.38 lbf ft)	-



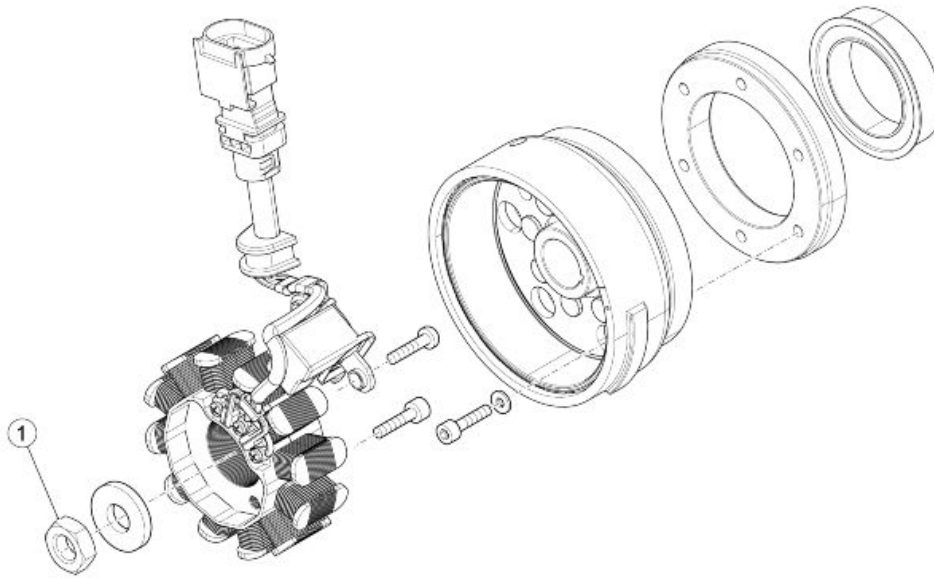
ENGINE CRANKCASE

pos.	Description	Type	Quantity	Torque	Notes
1	Crankcase halves union	M6	12	11 - 13 Nm (8.11 - 9.58 lbf ft)	-



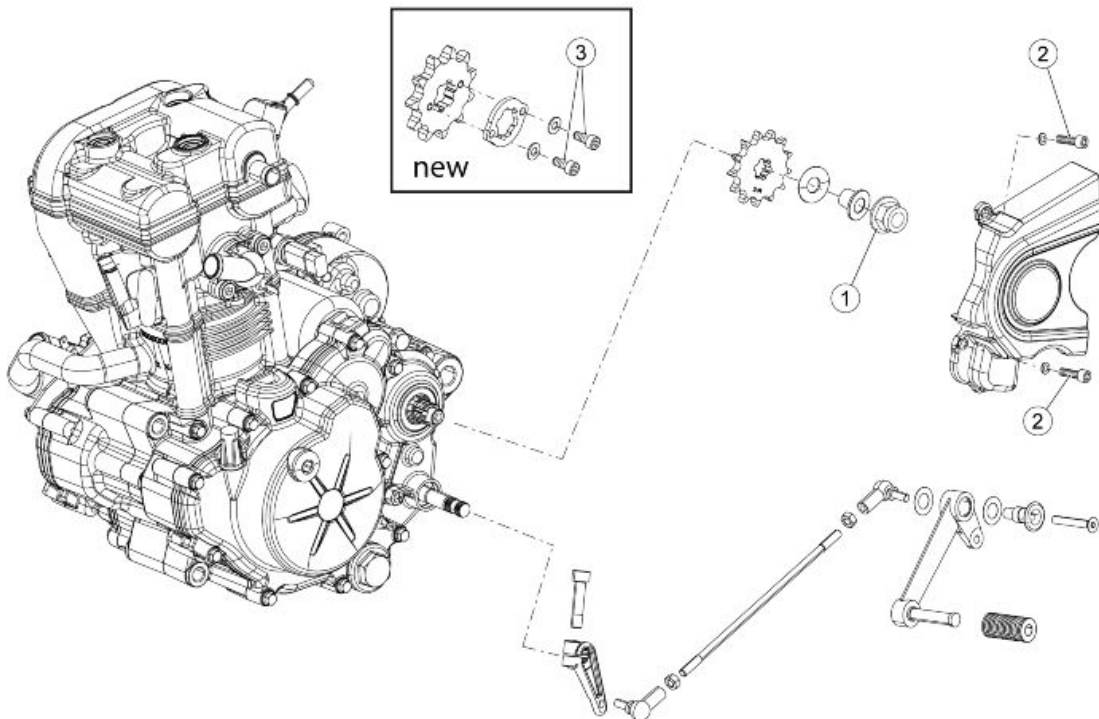
HEAD - VALVES

pos.	Description	Type	Quantity	Torque	Notes
1	Head fastener screw, chain side	M6x130	2	11 Nm (8.11 lbf ft)	-
2	Exhaust side fixing stud bolt	M8x40	2	12 Nm (8.85 lbf ft)	-
3	Camshaft support fixing screw	M6x40	8	10 Nm (7.38 lbf ft)	-
4	Head fixing screw	M8x166	4	25 Nm + 90° (18.44 lbf ft + 90°)	-
5	Thermostat cover fixing screw	M6x20	2	10 Nm (7.38 lbf ft)	-



IGNITION UNIT

pos.	Description	Type	Quantity	Torque	Notes
1	Flywheel rotor fixing screw	M14x1.5	1	83 - 90 Nm (61.21 - 66.38 lb ft)	-



LEVERS

pos.	Description	Type	Quantity	Torque	Note
1	Pinion retainer nut	M12x1.25	1	30 Nm (22.12 lb ft)	Loctite 270

pos.	Description	Type	Quantity	Torque	Note
2	Pinion cover fixing screw	TEF M5x16	2	4 Nm (2.95 lb ft)	Maximum torque: 5.0 Nm (3.68 lb ft)
3	TCEI Screws pinion retainer	M5x10	2	4 Nm (2.95 lb ft)	Maximum torque: 5.0 Nm (3.68 lb ft) - Loct. 270

Cylinder - piston assy.

CYLINDER - PISTON COUPLING CLEARANCE 125 CM³

Coupling categories with cast-iron cylinder

NAME	ABBREVIATION	CYLINDER		PISTON		FITTING CLEARANCE	
		min	max	min	max	min	max
Cylinder/Piston	M	58.010	58.017	57.963	57.970	0.040	0.054
Cylinder/Piston	N	58.017	58.024	57.970	57.977	0.040	0.054
Cylinder/Piston	O	58.024	58.031	57.977	57.984	0.040	0.054
Cylinder/Piston	P	58.031	58.038	57.984	57.991	0.040	0.054

Rod small end - pin - piston

Characteristic

Rod small end

Maximum diameter: 15.023 mm (0.591 in)

Standard diameter: 15.010 - 15.018 mm (0.5910 - 0.5912 in)

Crankcase - crankshaft - connecting rod

BUSHING SEAT DIAMETER ON CRANKCASE

Specification	Desc./Quantity
Class 1	MIN 36.500 mm (1.4370 in) MAX 36.508 mm (1.4373 in)
Class 2	MIN 36.508 mm (1.4373 in) MAX 36.516 mm (1.4376 in)

CRANKSHAFT DIAMETER

Specification	Desc./Quantity
Class 1	MIN 32.480 mm (1.2787 in) MAX 32.485 mm (1.2789 in)
Class 2	MIN 32.485 mm (1.2789 in) MAX 32.490 mm (1.2791 in)

BUSHING THICKNESS

Specification	Desc./Quantity
Red	MIN 2.005 mm (0.0789 in) MAX 2.010 mm (0.0791 in)
Blue	MIN 2.010 mm (0.0791 in) MAX 2.015 mm (0.0793 in)

CRANKSHAFT COUPLING/BUSHING SEAT DIAMETER

Specification	Desc./Quantity
Crankshaft type 2	Type 1 crankcase diameter RED + RED Type 2 crankcase diameter RED + BLUE
Crankshaft type 1	Type 1 crankcase diameter RED + BLUE Type 2 crankcase diameter BLUE + BLUE

Recommended products chart
RECOMMENDED PRODUCTS TABLE

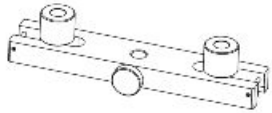
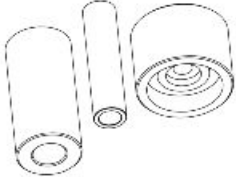
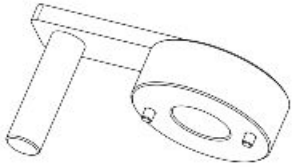
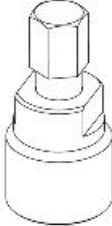
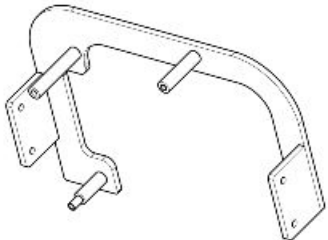

Product	Description	Specifications
ENI I-RIDE PG 5W - 40	Engine oil	SAE 5W - 40. As an alternative for recommended oils, top-branded oils that meet or exceed the requirements of CCMC G-4 A.P.I. SG specifications can be used.
SPEZIAL ENI ANTIFREEZE	Coolant	Fluid without amines, nitrites or phosphates, intended to be used in mixtures with de-ionised water.
AGIP BRAKE 4	Brake fluid	As an alternative to the recommended fluid, other fluids that meet or exceed the required specifications may be used. SAE J1703, NHTSA 116 DOT 4, ISO 4925 Synthetic fluid
AGIP GREASE 30	Grease for steering bearings, pin seats and swinging arm	
NEUTRAL GREASE OR PETROLEUM JELLY	BATTERY POLES	Neutral grease or petroleum jelly.
AGIP CHAIN GREASE SPRAY	Recommended CHAIN oil	Grease
AGIP FORK 7.5W	Fork oil	As an alternative it is possible to use AGIP FORK 5W oil for forks.

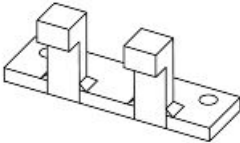

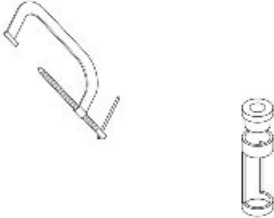


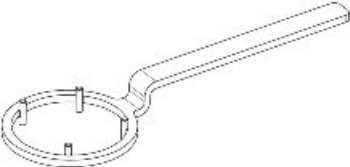
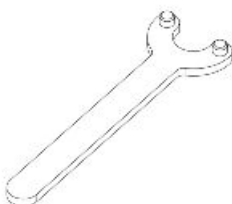
INDEX OF TOPICS

SSPECIAL TOOLS

S-TOOLS

SPECIFIC TOOLS

Stores code	Description	
AP8140266	Dial gauge mounting	
866380	Water pump tool set	
865259	Flywheel retainer	
864868	Flywheel extractor	
020911Y	Fitting adaptor engine RS 125 + 020710Y	
864567	Locking pins timing camshafts	

Stores code	Description	
864486	Blocking the countershaft	
00H05600351	Guide for oil seal	
020382Y011	Tool to remove/fit valves	
020287Y	tool for sealing ring fitting	
865261	Piston locking pin	
00H05300041	Clutch retainer	
865260	Camshaft sprocket lock	

Stores code	Description
-------------	-------------

020376Y

Adapter handle



020359Y

42 x 47-mm adaptor



020358Y

37 x 40-mm adaptor



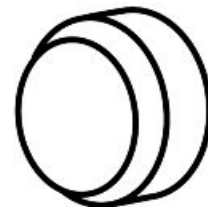
020357Y

32 x 35 mm adaptor



020439Y

Shaft 2 oil seal punch 17 mm



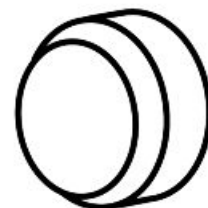
020891Y

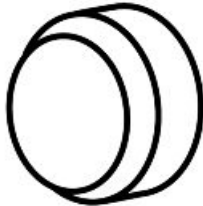




Adapter 25 mm (0.98 in)



020363Y

Crankshaft oil seal punch D 20 mm



Stores code	Description	
020412Y	Clutch oil seal punch D 15 mm	
020375Y	28x30 mm punch	
020483Y	30 mm guide	
020364Y	25 mm Adaptor	
866714	Swingarm adjustment	

INDEX OF TOPICS

MAINTENANCE

MAIN

Maintenance chart

Correct maintenance is fundamental for ensuring the longevity of your vehicle and maintaining optimum function and performance.

To this end, Aprilia offers a set of checks and maintenance services (at the owner's expense), that are summarised in the table shown on the following page. Any minor faults must be reported without delay to an **Authorised Aprilia Dealer or Sub-Dealer** without waiting until the next scheduled service to solve it.

All scheduled services must be carried out at the specified intervals and mileage, as soon as the pre-determined mileage is reached. Carrying out scheduled services on time is essential for the validity of your warranty. For further information regarding Warranty procedures and "Scheduled Maintenance", please refer to the "Warranty Booklet".

NOTE

CARRY OUT MAINTENANCE OPERATIONS AT HALF THE INTERVALS SPECIFIED IF THE VEHICLE IS USED IN PARTICULAR RAINY OR DUSTY CONDITIONS, OFF ROAD OR FOR TRACK USE.

I: INSPECT AND CLEAN, ADJUST, LUBRICATE OR REPLACE IF NECESSARY

C: CLEAN, R: REPLACE, A: ADJUST, L: LUBRICATE

(1) Grease every 500 Km (310 mi) and before each use in severe conditions.

(2) Replace every 2 years or 18000 Km (11185 mi).

(3) Replace every four years.

(4) Check every month.

(5) Check at each starter (brakes, direction, clutch, suspension, engine, lights, warning lights).

(6) Replace when reaching the first of the following two options: 36,000 km (22,369 mi) or 48 months.

SCHEDULED MAINTENANCE TABLE

km(mi)x1000	1 (0.621)	6 (3.728)	12 (7.456)	18 (1.184)	24 (14.913)	30 (18.641)	36 (22.369)	42 (26.097)	48 (29.826)
Battery		I	I	I	I	I	I	I	I
Spark plug		I	R	I	R	I	R	I	R
Headstock			I		I		I		I
Timing system chain						I			I-R
Side stand			I		I		I		I
Horn		I	I	I	I	I	I	I	I
General maintenance and checks (5)	I	I	I	I	I	I	I	I	I
Electric fan and connector		I	I	I	I	I	I	I	I
Air filter		R	R	R	R	R	R	R	R
Oil filter	R	R	R	R	R	R	R	R	R
Swingarm			I		I		I		I
Front headlight assembly		A	A	A	A	A	A	A	A
Final drive kit (1)	I	I	I	I	I	I	I	I	I
Brake lever and throttle grip		I	I	I	I	I	I	I	I
Coolant level		I	I	I	I	I	I	I	I
Brake fluid level (2)				I-R			I-R		
Coolant (2)	I	I	I	I-R	I	I	I-R	I	I
Handlebar and controls	I	I	I	I	I	I	I	I	I
Engine oil	R	R	R	R	R	R	R	R	R
Brake pads		I	I	I	I	I	I	I	I

km(mi)x1000	1 (0.621)	6 (3.728)	12 (7.456)	18 (1.184)	24 (14.913)	30 (18.641)	36 (22.369)	42 (26.097)	48 (29.826)
Callipers and brake disc									
Tyres									
Tyres pressure (4)									
Radiator - External cleaning			C		C		C		C
Valve adjustment									
Odometer gear									
Wheels (4)									
Discharge									
Tightening screws									
Front suspension: oil (6)							R		
Warning lights									
Fuel and oil + filters pipes (3)			R			R			R
Brakes pipes									
Engine support screws									

Spark plug

- Lift the tank.



- Disconnect the spark plug HV wire cap;
- Unscrew the spark plug using the socket wrench;
- Examine the condition of the spark plug, check that the insulating material is whole and measure the distance between the electrodes using a feeler gauge.
- Adjust the distance, if necessary, by bending the side electrode very carefully. In the case of defects, replace the spark plug with one of the specified type.
- Engage the spark plug with the due inclination and screw it right down by hand, then do it up with the wrench at the prescribed torque.
- Fit the cap on the spark plug as far as it will go.

CAUTION

THE SPARK PLUG MUST BE REMOVED WHEN THE ENGINE IS COLD. THE SPARK PLUG MUST BE REPLACED EVERY 12,000 KM. USE OF NOT CONFORMING STARTERS OR SPARK PLUGS DIFFERENT FROM THOSE DESCRIBED CAN SERIOUSLY DAMAGE THE ENGINE.

SPARK PLUG

Specification	Desc./Quantity
Spark plug	NGK CR9 EB Alternatively Champion RG4HC
Electrode gap	0.5 mm (0.020 in)



Engine oil

Check

Check the engine oil level frequently.

NOTE

CARRY OUT MAINTENANCE OPERATIONS AT HALF THE INTERVALS SPECIFIED IF THE VEHICLE IS USED IN PARTICULAR RAINY OR DUSTY CONDITIONS, OFF ROAD OR FOR TRACK USE.



ENGINE OIL LEVEL MUST BE CHECKED WHEN THE ENGINE IS WARM.

IF YOU CHECK LEVEL WHEN THE ENGINE IS COLD, OIL LEVEL COULD TEMPORARILY DROP BELOW THE "MIN" MARK.

THIS SHOULD NOT BE CONSIDERED A PROBLEM PROVIDED THAT THE ALARM WARNING LIGHT AND THE ENGINE OIL PRESSURE ICON DO NOT TURN ON SIMULTANEOUSLY ON THE DISPLAY.

CAUTION

DO NOT LET THE ENGINE IDLE WITH THE VEHICLE AT STANDSTILL TO WARM UP THE ENGINE AND OBTAIN THE OPERATING TEMPERATURE OF ENGINE OIL. PREFERABLY CHECK THE OIL AFTER A JOURNEY OF AFTER TRAVELLING APPROXIMATELY 15 Km (10 miles) IN EXTRAURBAN CONDITIONS (ENOUGH TO WARM UP THE ENGINE OIL TO OPERATING TEMPERATURE).

- Stop the engine and wait at least five minutes.
- Keep the vehicle upright with both wheels on the ground.
- Working on the left hand side of the engine, unscrew and retrieve the oil level cover- dipstick (1).
- Dry the dipstick with a clean cloth and insert it back into the seat by tightening it.
- Unscrew and remove the cover-dipstick again and check that the engine oil level is guaranteed between the two reference marks:

MAX = maximum level;

MIN = minimum level.

- The oil level is correct when it is close to the "MAX" reference.



- Otherwise, top-up until the indicated level.

Fill with engine oil as required:

- Unscrew and remove the cap (1).

When using a funnel or any other element, make sure it is perfectly clean.



DO NOT ADD ADDITIVES OR OTHER SUBSTANCES TO THE OIL.

CAUTION

USE OIL WITH THE SPECIFICATIONS INDICATED IN THE RECOMMENDED PRODUCTS TABLE GIVEN AT THE END OF THE MANUAL.

CAUTION



DO NOT GO BEYOND THE "MAX" AND BELOW THE "MIN" LEVEL MARK TO AVOID SEVERE ENGINE DAMAGE.

- Top-up the oil in the reservoir until you reach the correct level.

Replacement

- Remove the left fairing lug beforehand.
- Start the engine and let it idle for a few minutes; in this way, it is easier to drain the oil during the subsequent drainage stage.

CAUTION



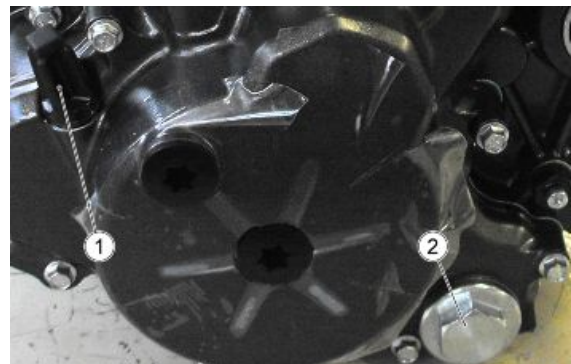
PARK THE MOTORCYCLE ON SAFE AND LEVEL GROUND.

- Shut off the engine.



OIL BECOMES VERY HOT WHEN THE ENGINE IS HOT; BE CAREFUL NOT TO GET BURNED WHEN CARRYING OUT THE OPERATIONS DESCRIBED BELOW.

- Keep the vehicle upright with both wheels on the ground.
- Place a container with suitable capacity under the drainage plug (2).
- Unscrew and remove the drainage plug (2).
- Unscrew and remove the filler plug (1).



- Drain the oil into the container; allow several minutes for oil to drain out completely.
- Remove any metal scrap attached to the drainage plug (2) magnet.
- Check and, if necessary, replace the drainage plug (2) sealing washer.
- Screw and tighten the drainage plug (2) to the prescribed tightening torque.
- Pour the prescribed quantity of engine oil into the filling opening (1).

Recommended products

ENI I-RIDE PG 5W - 40 Engine oil

SAE 5W - 40. As an alternative for recommended oils, top-branded oils that meet or exceed the requirements of CCMC G-4 A.P.I. SG specifications can be used.

Characteristic

Engine oil

1,200 cm³ (73.23 cu.in)

- Screw the filler plug (1).
- Start the engine and let it at idle speed for about a minute to allow the oil circuit to get filled.
- Check the oil level and refill if necessary.



**TIGHTEN UP THE FILLER CAP AND MAKE SURE THE OIL DOES NOT SEEP.
CHECK REGULARLY THAT THERE ARE NO LEAKS IN THE CRANKCASE COVER GASKET.
DO NOT RIDE THE MOTORCYCLE WITH INSUFFICIENT LUBRICATION OR WITH CONTAMINATED OR INCORRECT LUBRICANTS AS THIS ACCELERATES THE WEAR AND TEAR OF THE MOVING PARTS AND CAN CAUSE IRRETRIEVABLE DAMAGE.**

Engine oil filter

- Remove the fairing lug beforehand and empty the engine oil.

- Unscrew and remove the oil filter plug.



- Remove the spring and oil filter.



Gearbox Oil

Air filter

- Remove the passenger saddle and collect the supporting rod of the fuel tank.
- Lift the fuel tank and fasten it with the supporting rod.
- Unscrew and remove the two screws (1).



- Lower the tank, unscrew and remove the two screws (2) collecting the nuts underneath.
- Operating on the rear area of the tank, lift the filter box cover (3) and sliding it together with the filtering element (4), making it slide upwards and backwards.
- Separate the filtering element (4) on the clean and dry surface of the filter box cover (3).

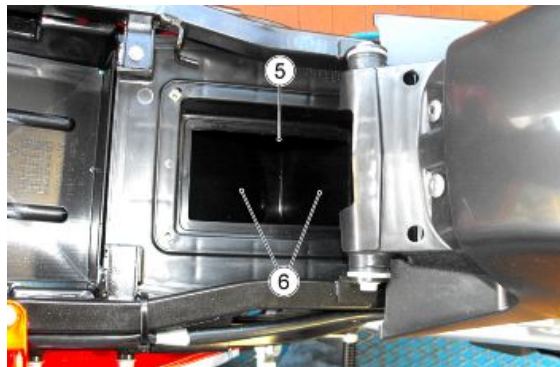


COVER THE HOLE WITH A CLEAN CLOTH SO THAT NO FOREIGN ELEMENTS GET INTO THE INLET DUCTS.

AIR FILTER CLEANING



DO NOT USE SCREWDRIVERS OR ANY OTHER ELEMENT ON THE FILTER.



- Clean the air filter (4) with a blast of compressed air direct from the inner to the outer part of the filter.
- Clean the external side of the air filter (4) with a clean cloth.
- Clean the inside of the filter casing (5) and the intake ducts (6) with a clean cloth.

CAUTION

WHEN CLEANING THE FILTERING ELEMENT, CHECK THAT IT IS NOT TORN. IF IT IS, REPLACE THE FILTERING ELEMENT.

AIR FILTER REPLACEMENT

Replace the air filter (1) with a new one of the same type.

NOTE

NEVER REUSE AN OLD FILTER.

Cooling system



DO NOT USE THE SCOOTER IF THE COOLANT LEVEL IS BELOW THE MINIMUM MARK. WHEN CARRYING OUT MAINTENANCE OPERATIONS, IT IS ADVISABLE TO WEAR LATEX GLOVES.

TAKE YOUR SCOOTER TO AN OFFICIAL aprilia DEALER TO HAVE COOLANT CHANGED.

Coolant solution is 50% water and 50% antifreeze fluid.

This is the ideal mixture for most operating temperatures and provides good corrosion protection.

It is advisable to use the same mixture even in hot weather as this minimises loss due to evaporation and the need of frequent top-ups.

Thus, less evaporated water means fewer mineral salt deposits in the radiators, which helps preserve the efficiency of the cooling system.

When the external temperature drops below zero degrees centigrade, check the cooling system frequently and add more antifreeze solution if needed (up to 60% max.).

Use distilled water in the coolant mixture to avoid damaging the engine.



DO NOT REMOVE THE EXPANSION TANK PLUG WHEN THE ENGINE IS HOT, SINCE COOLANT IS UNDER PRESSURE AND VERY HOT.

CAUTION



WAIT FOR THE ENGINE TO COOL DOWN BEFORE CHECKING OR TOPPING-UP COOLANT LEVEL.

Level check

- Make sure the vehicle is in a vertical position.
 - Examining from the front side of the vehicle, under the left fairing, check that the cooling liquid level is between the two reference notches that indicate the maximum and the minimum quantity of this liquid.
 - If the level is under the minimum level, top up as described.
-
- Shut off the engine and wait until it cools off.

CAUTION



PARK THE MOTORCYCLE ON SAFE AND LEVEL GROUND.



Top-up

- Turn the handlebar to the right.

- Top-up the coolant until the liquid level reaches the upper notch at the front of the coolant tank.
- Do not exceed this level; otherwise, the coolant will spill during engine operation.
- Refit the filler cap.
- Check the liquid level, as described above.

CAUTION

IF THERE IS AN EXCESSIVE CONSUMPTION OF COOLANT OR WHEN THE EXPANSION TANK REMAINS EMPTY, CHECK THAT THERE ARE NO LEAKS IN THE CIRCUIT.

NOTE

FOR REPAIRS, CONTACT AN aprilia official Dealer.

Once the check is performed, if necessary top up the cooling liquid; proceed as follow:

- slide the filler cap;
- wait a few seconds so that any pressure in the system is purged.

CAUTION

COOLANT IS TOXIC IF INGESTED; CONTACT WITH YOUR EYES OR SKIN MAY CAUSE IRRITATION. IF THE FLUID GETS IN CONTACT WITH THE EYES OR SKIN, RINSE REPEATEDLY WITH PLENTY OF WATER AND SEEK MEDICAL ADVICE. IF SWALLOWED, INDUCE VOMITING, RINSE MOUTH AND THROAT WITH PLENTY OF WATER AND SEEK MEDICAL ADVICE IMMEDIATELY.

Braking system

Level check

Periodically check the brake fluid level via the brake fluid reservoir sight glasses (1 - 2) located on the right hand side of the handlebar (front brake) and on the right hand side of the swingarm (rear brake).

The brake fluid level should be above the sight glass with the reservoir completely level.

Otherwise, top-up.



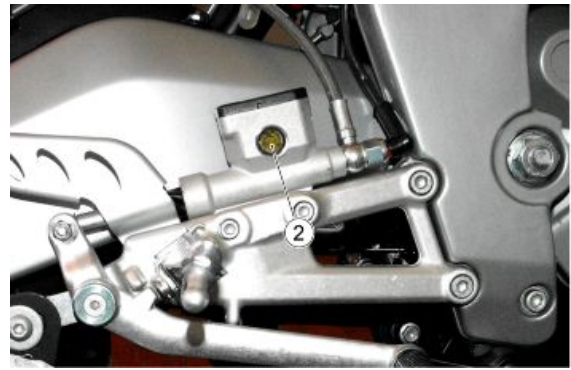
THE SYSTEM MUST ONLY BE TOPPED UP WITH DOT4 TYPE BRAKE FLUID.



BRAKE FLUID IS HIGHLY CORROSIVE - AVOID CONTACT WITH PAINTWORK. IN THE EVENT OF SPILLAGE ON PAINTED PARTS, RINSE IMMEDIATELY WITH WATER.

WARNING

THE FLUID IN THE BRAKING CIRCUIT IS HYGROSCOPIC, THAT IS, IT ABSORBS MOISTURE FROM THE SURROUNDING AIR. IF THE MOISTURE CONTENT IN THE BRAKE FLUID EXCEEDS A CERTAIN VALUE, WATER VAPOUR BUBBLES MAY FORM IN THE CIRCUIT, OR THE PUMP AND CALLIPERS MAY SEIZE, CAUSING THE BRAKES THEMSELVES TO SEIZE. NEVER USE BRAKE LIQUID IN OPEN OR PARTIALLY USED CONTAINERS.



Brake fluid check

- Rest the scooter on its stand.
- For the front brake, turn the handlebar fully to the right.
- For the rear brake, keep the vehicle upright so that the fluid in the reservoir is at the same level with the plug.
- Check that the fluid level in the reservoir is above the "
- MIN

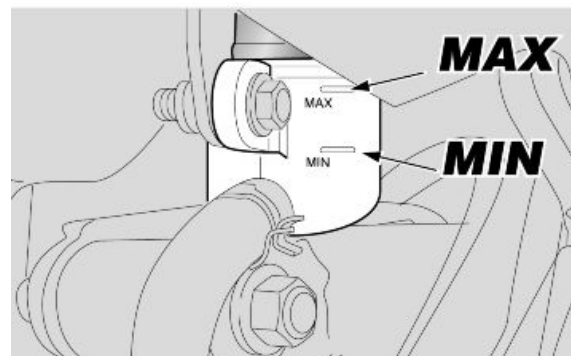
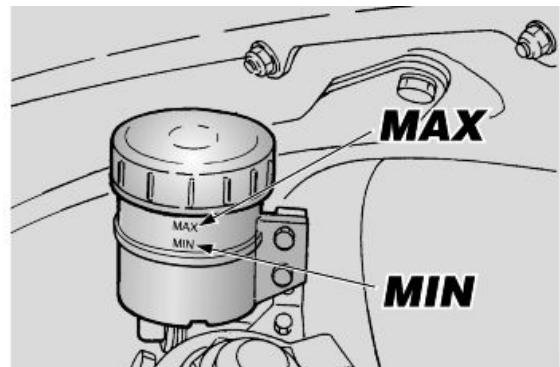
" reference mark:

MIN = minimum level

MAX = maximum level

If the fluid does not reach at least the "**MIN**" reference mark:

- Check the brake pads and disc for wear.
- If the pads and/or the disc do not need replacing, top-up the fluid.
- If the pads and/or the disc need replacing, check the brake fluid and top-up if necessary.



Top-up

- The following operations refer to one braking system but they are valid for both braking systems:

- Front brake fluid reservoir (1);
- Rear brake fluid reservoir (2).

CAUTION

RISK OF BRAKE FLUID SPILLS. DO NOT PULL THE BRAKE LEVER WHEN THE COVER FIXING SCREWS ARE LOOSE OR, MAINLY, WHEN THE BRAKE FLUID RESERVOIR COVER HAS BEEN REMOVED.

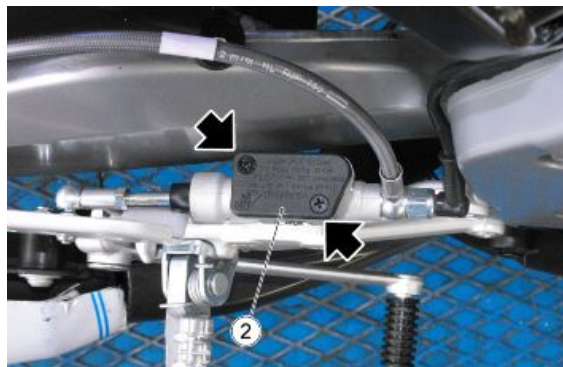


- Undo and remove the two screws fixing the brake fluid reservoir cover.

CAUTION



AVOID PROLONGED AIR EXPOSURE OF THE BRAKE FLUID. BRAKE FLUID IS HYGROSCOPIC AND ABSORBS MOISTURE WHEN IN CONTACT WITH AIR. LEAVE THE BRAKE FLUID RESERVOIR OPEN ONLY FOR THE TIME NEEDED TO COMPLETE THE TOPPING UP PROCEDURE.



- Lift and remove the cover and seals.



TO AVOID SPILLING FLUID WHILE TOPPING-UP, KEEP THE TANK PARALLEL TO THE RESERVOIR EDGE (IN HORIZONTAL POSITION).

DO NOT ADD ADDITIVES OR ANY OTHER SUBSTANCE TO THE FLUID.

WHEN USING A FUNNEL OR ANY OTHER ELEMENT, MAKE SURE IT IS PERFECTLY CLEAN.



- Top up the tank you are working on until the inspection sight glass is fully covered

CAUTION



TOP-UP TO MAXIMUM LEVEL MARK ONLY WHEN BRAKE PADS ARE NEW. BRAKE FLUID LEVEL DECREASES GRADUALLY AS BRAKE PADS WEAR OUT. WHEN TOPPING-UP, DO NOT EXCEED THE MAXIMUM LEVEL MARK WHEN BRAKE PADS ARE WORN AS YOU RISK SPILLING FLUID WHEN CHANGING THE BRAKE PADS.

- Check braking efficiency.



- In case of excessive travel of the brake lever or poor performance of the braking system, purge the air in the system.



RISK OF BRAKE FLUID SPILLS. DO NOT OPERATE THE BRAKE LEVER WITH BRAKE FLUID RESERVOIR CAP LOOSENED OR REMOVED.

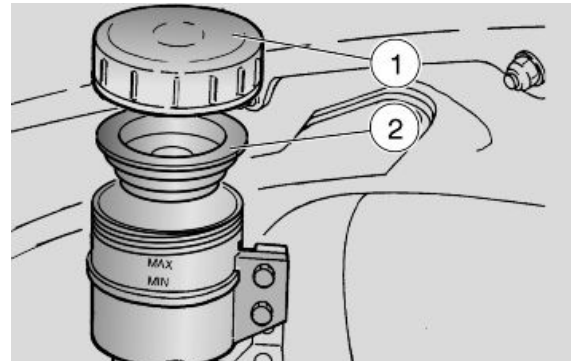
CAUTION



AVOID PROLONGED AIR EXPOSURE OF THE BRAKE FLUID. BRAKE FLUID IS HYGROSCOPIC AND ABSORBS MOISTURE WHEN IN CONTACT WITH AIR. LEAVE THE BRAKE FLUID RESERVOIR OPEN ONLY FOR THE TIME NEEDED TO COMPLETE THE TOPPING UP PROCEDURE.



TO AVOID SPILLING BRAKE FLUID WHILE TOPPING-UP, KEEP THE FLUID LEVEL IN THE RESERVOIR PARALLEL TO THE RESERVOIR EDGE (IN HORIZONTAL POSITION). DO NOT ADD ADDITIVES OR OTHER SUBSTANCES TO THE FLUID. IF A FUNNEL OR ANY OTHER ELEMENT IS USED, MAKE SURE THAT IT IS PERFECTLY CLEAN.



Recommended products

AGIP BRAKE 4 Brake fluid

As an alternative to the recommended fluid, other fluids that meet or exceed the required specifications may be used. SAE J1703, NHTSA 116 DOT 4, ISO 4925 Synthetic fluid

FRONT BRAKE FLUID TOP-UP

- Unscrew and remove the cap (1).
- Remove the gasket (2).

CAUTION

DO NOT EXCEED THE "MAX" LEVEL MARK WHEN TOPPING UP. TOP UP TO "MAX" LEVEL MARK ONLY WHEN BRAKE PADS ARE NEW. BRAKE LEVEL DECREASES GRADUALLY AS BRAKE PADS WEAR DOWN. WHEN TOPPING-UP, DO NOT EXCEED THE "MAX" LEVEL MARK WHEN BRAKE PADS ARE WORN AS YOU RISK SPILLING FLUID WHEN CHANGING THE BRAKE PADS.

REAR BRAKE FLUID TOP-UP

- Keeping the reservoir upright, unscrew and remove the cap (4).
- Remove the gasket (3).
- Keeping the reservoir upright, and with the aid of a syringe, top-up the reservoir with brake fluid up to the correct



level, that is between the two "MIN" and "MAX" reference marks.

Clutch system

Adjusting the lever

Adjustment clutch when the engine stops or the vehicle tends to move forward even when clutch lever is operated and the gear engaged, or if the clutch "slides", resulting in acceleration delay considering the engine revs.

Minor adjustments can be carried out through the set screw (1):

- Rest the vehicle on its stand.
- Remove the protection casing (2).
- Loosen the lock nut (3).
- Turn the set screw (1) until the empty travel at the clutch lever end is approximately 10 - 15 mm (0.39 - 0.59 in) (see figure).
- After adjusting, tighten the check nut (3) to lock the adjuster screw (1).
- Check the empty travel at the clutch lever end.
- Refit the protection casing (2).



NOTE

CHECK THE CLUTCH WIRE IS IN GOOD CONDITIONS: THERE SHOULD BE NO SIGNS OF CRUSHING OR WEAR ALL ALONG THE SHEATH.

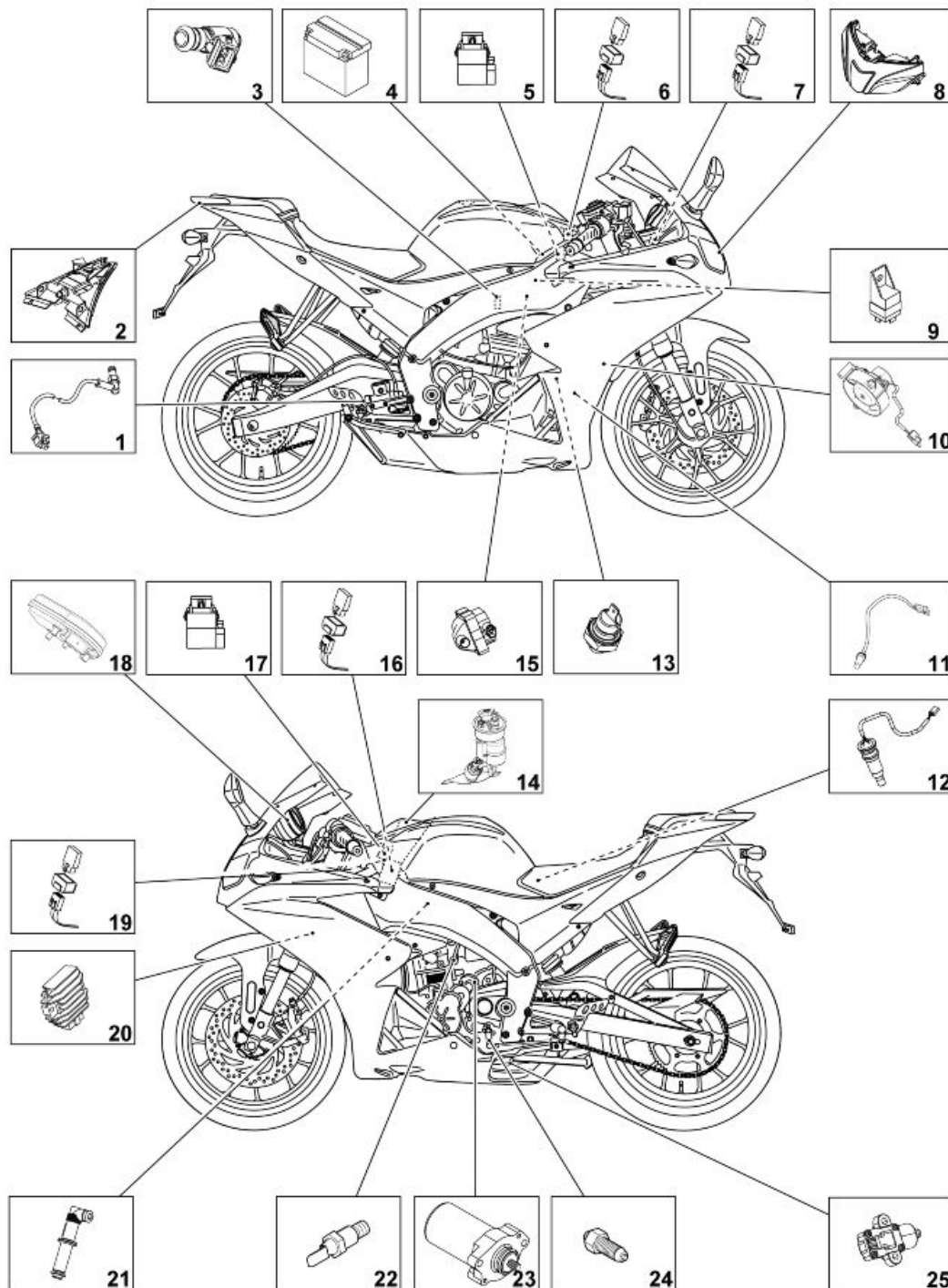
- Lubricate the clutch wire frequently with an appropriate grease to avoid early wear and corrosion.

INDEX OF TOPICS

ELECTRICAL SYSTEM

ELE SYS

Components arrangement



KEY:

- 1. Stop switch
- 2. Taillight
- 3. Injector

4. Battery
5. Main fuses
6. Fan relay
7. Light relay
8. Front headlight assembly
9. Start-up relay
10. Electric fan
11. Lambda probe
12. Fuel reserve sensor
13. Oil pressure sensor
14. Fuel pump
15. Coil/ECU
16. Injection relay
17. Secondary fuses
18. Instrument panel
19. Turn indicators
20. Regulator
21. Spark plug boot
22. Control unit
23. Temperature sensor
24. Starter motor
25. Neutral sensor
26. Stand sensor

Electrical system installation

Scope and applicability

The purpose of this document is to define the position of the vehicle cable harness, its routing and how it is fixed on the chassis, tool kit compartment support and the saddle mounting, any potential problems and particular checks to be carried out on the connections and routings in order to reach the objectives of vehicle reliability.

Materials used and corresponding quantities

The electrical system consists of the following cable harnesses and parts:

- No.1 Main Cable Harness
- No.1 Headlight Cable Harness
- No.1 License Plate Cable Harness
- No. 1 Frame - Engine Ground Cable
- No. 2 Turn indicators cable harness

- No. 1 H.V. Cable
- No. 1 Starter relays 12 V / 80 A
- No. 3 Relays 12 V / 30 A

Small parts and mountings:

- No. 7 Large black clamps 290x4.5 (11.42x0.18 in)
- No. 6 Medium black clamps 190x4,5 (7.48x0.18 in)
- No. 5 Small black clamps 160x4,5 (6.30x0.10 in)
- No. 6 Rubber clamps
- No. 2 Cable guide
- No. 2 White adhesive wire holders
- No. 3 Cable guide
- No. 1 Elastic clip
- No. 3 Retaining clip
- No. 1 TCEI M6x8 screw
- No. 1 Spring washer

Special checks for the correct connection and laying of cables

It is extremely important that any security-locks for the following connectors are properly connected and correctly tightened to ensure proper engine, and therefore proper vehicle, operation. The operator in charge must mark these connectors with a permanent marker sign.

- Connection and vibration absorption sponge on the license plate bracket light - REAR SECTION, TABLE B2.
- Check the ECU connection cable and insertion of protective rubber - CENTRAL SECTION, TABLE E4.
- Check correct securing of metallic bracket screw on the throttle body - CENTRAL SECTION, TABLE E5.
- Check injector connection - CENTRAL SECTION, TABLE E3.
- Check water temperature sensor connection, - CENTRAL SECTION, TABLE E4.
- Check injector and water temperature sensor cable clip - CENTRAL SECTION, TABLES E4-E5.
- Check correct insertion of the H.V. cable with the coil - CENTRAL SECTION, TABLE D1.
- Check the coil connection and correct fixing of the coil ground eyelet - CENTRAL SECTION, TABLE D2
- Check correct insertion of the engine oil hood. CENTRAL SECTION, TABLE K1.
- Check the starter motor ground clamp, starter motor positive and relative hood - CENTRAL SECTION, TABLE L1.
- Check the Neutral cable clamp - CENTRAL SECTION, TABLES J6-M.
- Check the fuel reserve sensor connection - CENTRAL SECTION, TABLE N2.

- Check the fuel pump connection - CENTRAL SECTION, TABLES B-N1-N4.
- Regulator connector - FRONT SECTION, TABLE H.
- Check the chassis-engine cable clamp - CENTRAL SECTION, TABLES I1-I2.
- Check the flywheel connection - FRONT SECTION, FRONT TABLE I.
- Check the Lambda connection (with security lock) - CENTRAL SECTION, TABLE K2.
- Check correct running of the lambda probe cable - CENTRAL SECTION, TABLE K1.

The connectors in the list are circled in "green" in the different pictures. The listed connectors are considered more critical than the others because their disconnection could cause the vehicle to stop or malfunction. Obviously, the correct connection of the other connectors is also important and essential for proper vehicle operation.

It is also important and essential that the instructions regarding the routing and fixing of the cable harness in the various areas are followed meticulously in order to guarantee functionality and reliability.

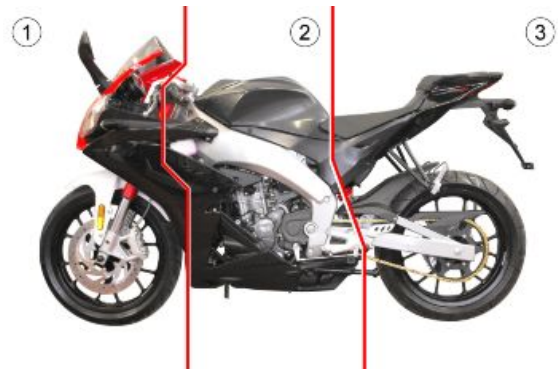
WIRING DIAGRAM

Ensure that you have the most up to date electrical circuit diagram, downloading it from the network.

Electrical circuit diagrams RS4 125 MY2011 - **898459**.

The installation is shown on the three ideal divisions of the vehicle:

1. Front section
2. Central section
3. Rear section



Front side

A TABLES - FRONT HEADLIGHT ASSEMBLY

TABLE A1 - Pre-fitting

1. Daylight running light (5W).
2. Cable guide.
3. Lights relay
4. Low beam light
5. Headlight cable harness.
6. High beam light

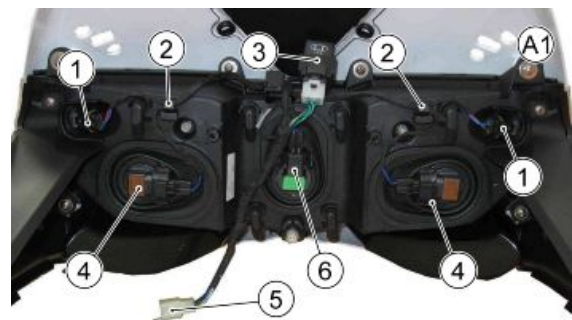


TABLE A2 - Running of headlight cables: left side

1. Daylight running light (5W).
2. Cable guide.
4. Low beam light
17. Turn indicator cable harness.
18. Headlight cable harness.

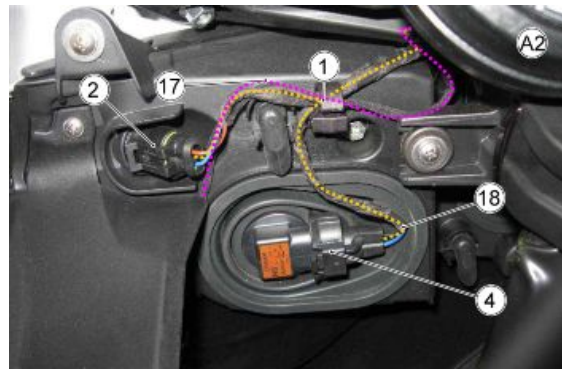


TABLE A3 - Headlight cable running: right side

1. Daylight running light (5W).
2. Cable guide.
4. Low beam light
19. Turn indicator cable harness.
20. Headlight cable harness.

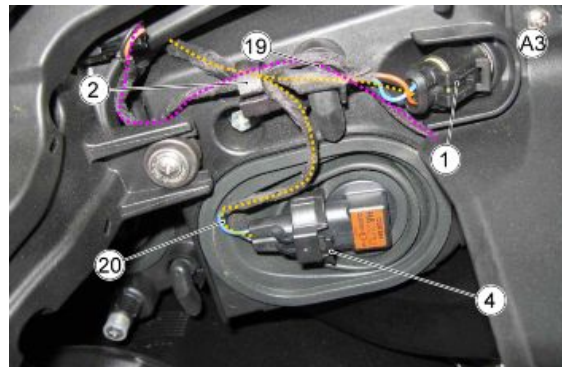


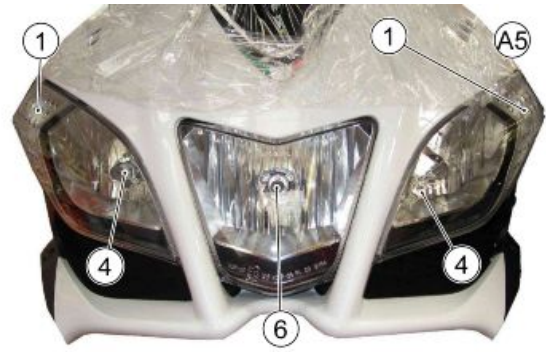
TABLE A4

3. Lights relay
6. High beam bulb
7. Clamp.
8. Grey sheathing. Indicates that the connector must be connected to the central bulb (high beam).



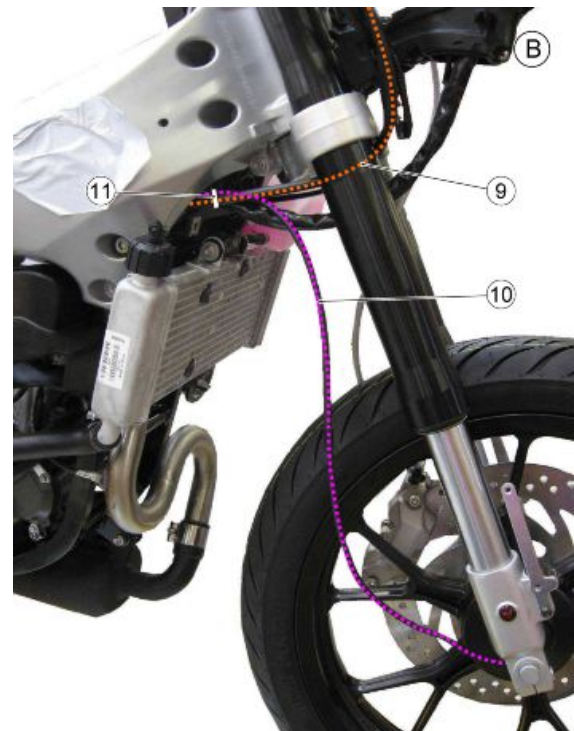
TABLE A5

- 1. Daylight running light (5W).
- 4. Low beam light (35W).
- 6. High beam light (35W).

**TABLE B - SPEED SENSOR**

The speed sensor must be fixed with a clamp (11) on the clutch cable (9) and must be positioned with a wide radius bend in order to avoid damage.

- 9. Clutch cable.
- 10. Speed sensor cable.
- 11. Clamp



**C TABLES - LEFT AND RIGHT POSITIONING
OF CABLES**

TABLE C1

12. Rubber clamp

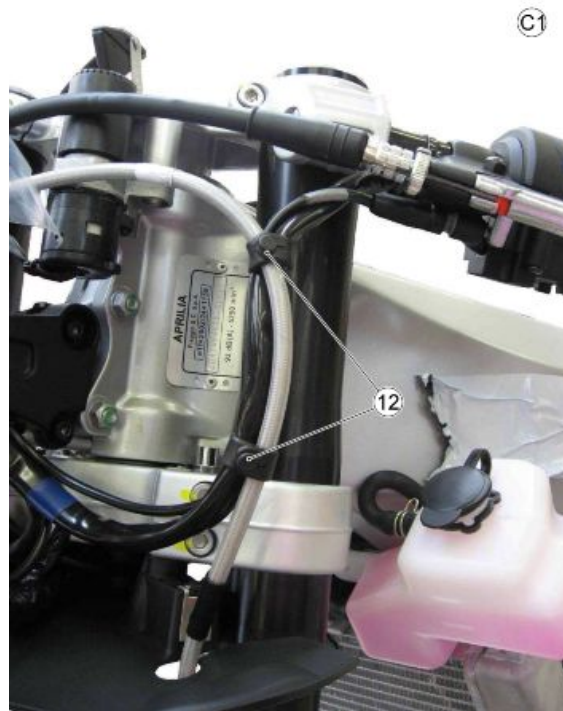


TABLE C2

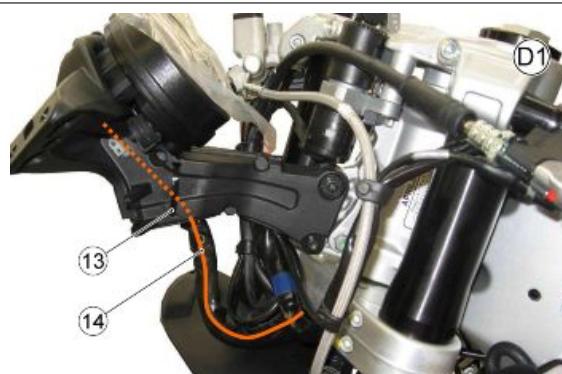
12. Rubber clamp



D TABLES - SUPPORT**TABLE D1**

13. Clamp: the clamp must secure all cables inside the instrument holder support; the main cable harness must be secured with the clamp on the grey taping.

14. Main cable harness.

**TABLE D2**

15. Front headlamp cable harness connector.

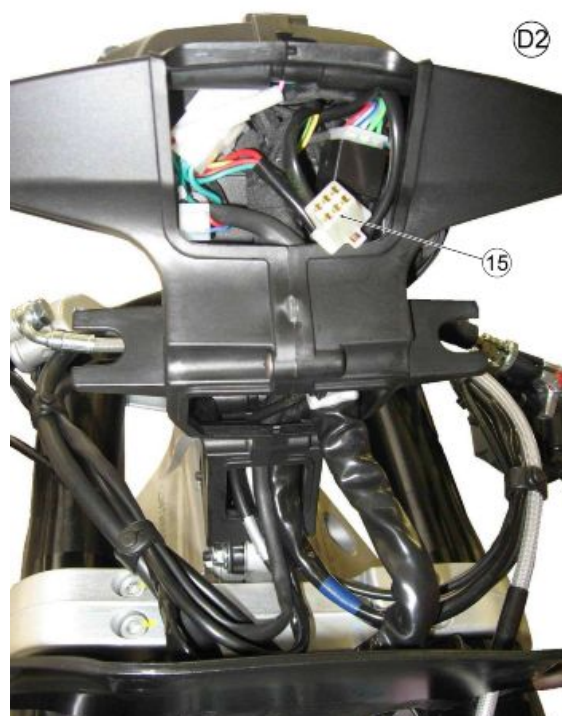


TABLE E - LIGHTS DETAIL

16. Clamps

17. Left light switch: The clamp must secure the light switch cable.

18. Right light switch: The clamp must secure the light switch cable.

**TABLE F - KEY SWITCH**

19. Starter cable.

20. Key switch.



TABLE G - INSTRUMENT PANEL

21. Engine oil pressure warning light.

**TABLE H - REGULATOR POSITIONING**

22. Main cable harness

23. Regulator

CAUTION

CHECK THE CORRECT CONNECTION OF THE REGULATOR.

IN THE AREA HIGHLIGHTED IN RED (REGULATOR CABLE, BEHIND THE RADIATOR) THE FLYWHEEL CONNECTION MUST NOT COME OUT, BUT MUST BE HIDDEN INSIDE THE PLASTIC OF THE COVER.

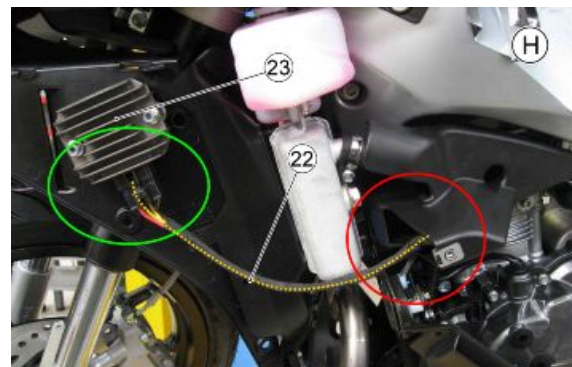


TABLE I - FLYWHEEL POSITIONING

CAUTION

CHECK THE CORRECT CONNECTION OF THE FLY-
WHEEL.



Central part

TABLE A - PRE-FITTING CHASSIS

TABLE A1

1. Retaining clip.
2. Cable guide.
3. Cable guide (throttle cable).

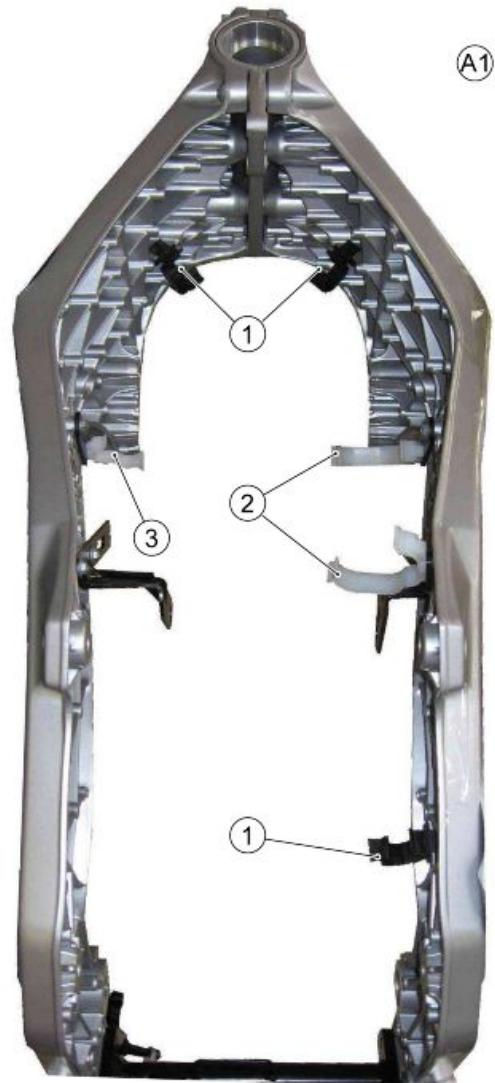


TABLE A2

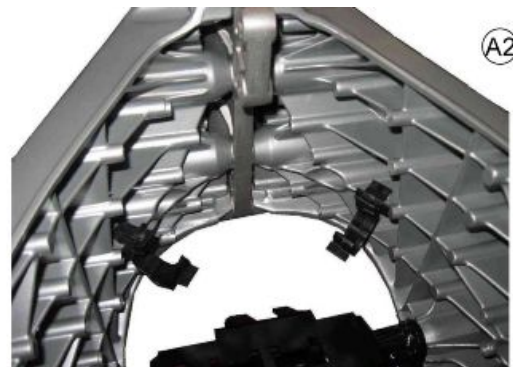


TABLE A3



TABLE A4



TABLE A5

Free hole for chassis ground



TABLE B - FUEL RESERVE PROBE PRE-FITTING

- 4. Fuel pump
- 5. Fuel reserve sensor

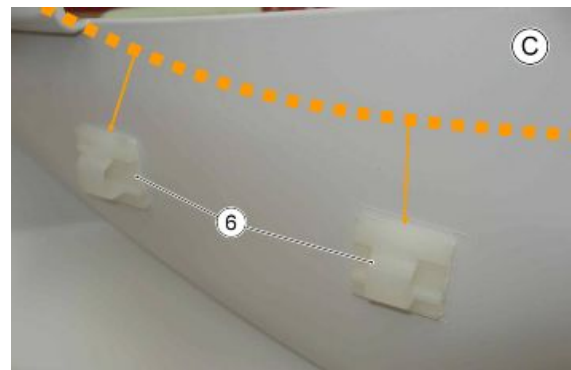


TABLE C

6. Main cable harness

CAUTION

THE ADHESIVE CABLE TIES (6) MUST BE POSITIONED WITH THE CABLE INTAKE OPENING UPWARD SO THAT THE CABLE HARNESS IS INSERTED FROM THE TOP SIDE.


D TABLES - COIL PRE-FITTING - H.V. CABLE - SPARK PLUG CAP
TABLE D1

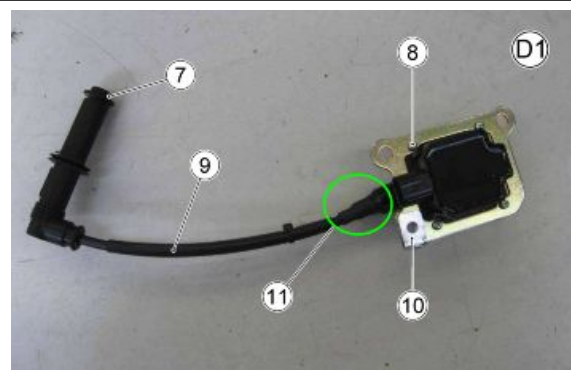
7. Spark plug cap

8. Coil and support brackets.

9. H.V. Cable

10. Elastic clip.

11. Coil - H.V. Cable connection

**CAUTION**

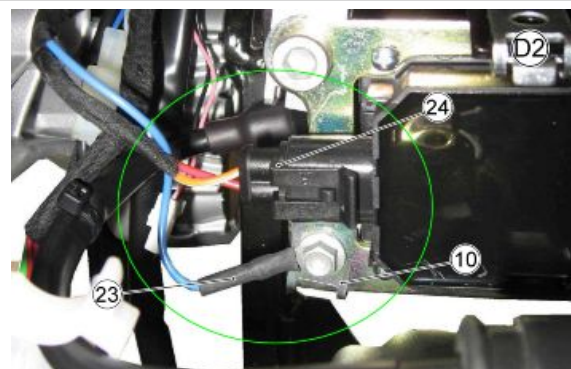
CHECK THAT THE H.V. CABLE IS PROPERLY CONNECTED WITH THE COIL. BE CAREFUL NOT TO DAMAGE THE TERMINAL DURING FITTING.

TABLE D2

10. Elastic clip.

23. Coil ground.

24. Coil connector.

**CAUTION**

CONNECT THE COIL CONNECTOR (24). FIT THE BLUE GROUND CABLE (23) ON THE ELASTIC CLIP (10).

E TABLES - MIU CONTROL UNIT CONNECTION (3G) - INJECTOR - WATER TEMPERATURE SENSOR
TABLE E1

12. Protective rubber

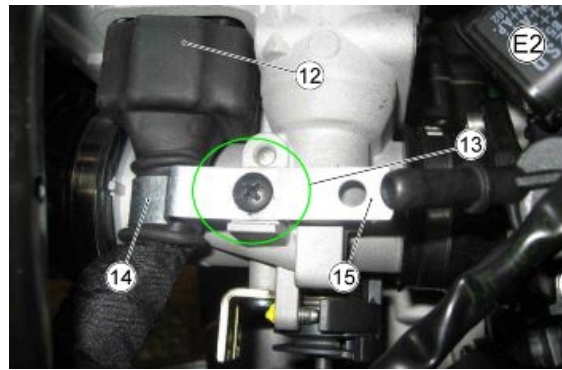


TABLE E2

- 12. Protective rubber
- 13. Bracket retainer screw
- 14. Metallic bracket
- 15. Free hole for running injector cable and water sensor cable cable ties.

CAUTION

POSITION THE METAL BRACKET (14), BLOCKING THE ECU AND FIXING WITH SPECIFIC SCREW (13).

**TABLE E3**

- 16. Connector
- 17. Injector

CAUTION

CONNECT THE CONNECTOR (16) TO THE INJECTOR AND ENSURE THAT IT IS CORRECTLY CONNECTED.

**TABLE E4****CAUTION**

CONNECT THE GREEN WATER TEMPERATURE SENSOR (18) AND ENSURE THAT IT IS CORRECTLY CONNECTED. CHECK THE POSITIONING OF THE INSULATING SLEEVE.

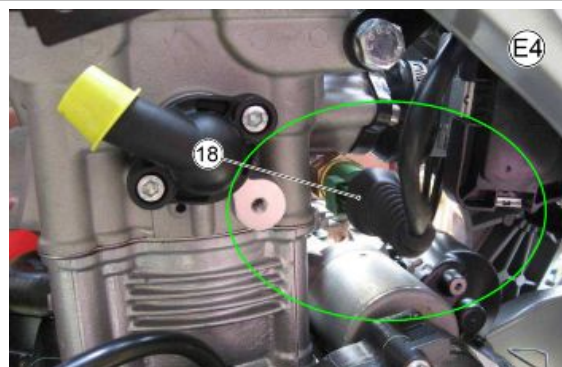


TABLE E5

19. Clamp

CAUTION

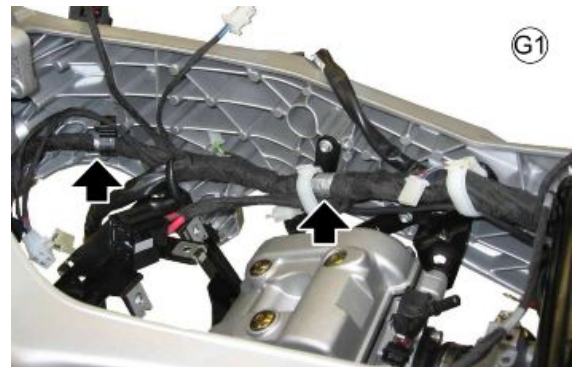
JOIN THE TWO CABLES (WATER SENSOR - INJECTOR), SECURE THEM WITH A CLAMP ANCHORING THEM TO THE METALLIC BRACKET THROUGH THE FREE HOLE ON THE BRACKET ITSELF.

**TABLE F - PRE-FITTING OF THE RADIATOR**

FAN

**G TABLES - THE MAIN CABLE HARNESS FITTING****TABLE G1****CAUTION**

POSITION THE GREY REFERENCES IN THE CABLE HARNESS ON THE RESPECTIVE CLAMPS AND CLOSE THEM, POSITIONING THE CABLE HARNESS CORRECTLY AS ILLUSTRATED.

**TABLE G2****CAUTION**

POSITION THE GREY REFERENCE PRESENT ON THE CABLE HARNESS ON THE RESPECTIVE CLAMP AND CLOSE IT, POSITIONING THE CABLE HARNESS AS SHOWN IN THE PHOTO.

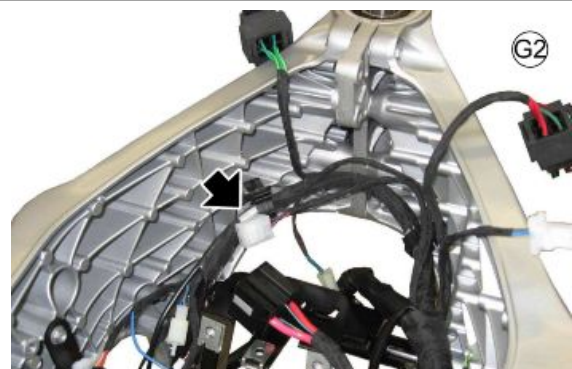


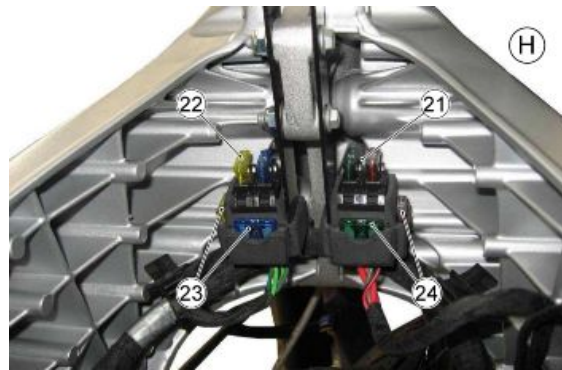
TABLE H - FUSES

- 21. Main fuses.
- 22. Auxiliary fuses.
- 23. Reserve fuses (auxiliary).
- 24. Reserve fuses (main)

CAUTION

POSITION THE FUSES ON THE METALLIC BRACKET OBSERVING THE POSITION:

- GREEN AND BROWN FUSES (RIGHT) - Main (21)
- YELLOW AND BLUE FUSES (LEFT) - Auxiliary (22)



I TABLES

TABLE I1

- 25. Engine - chassis ground lead
- 26. Screw and spring washer

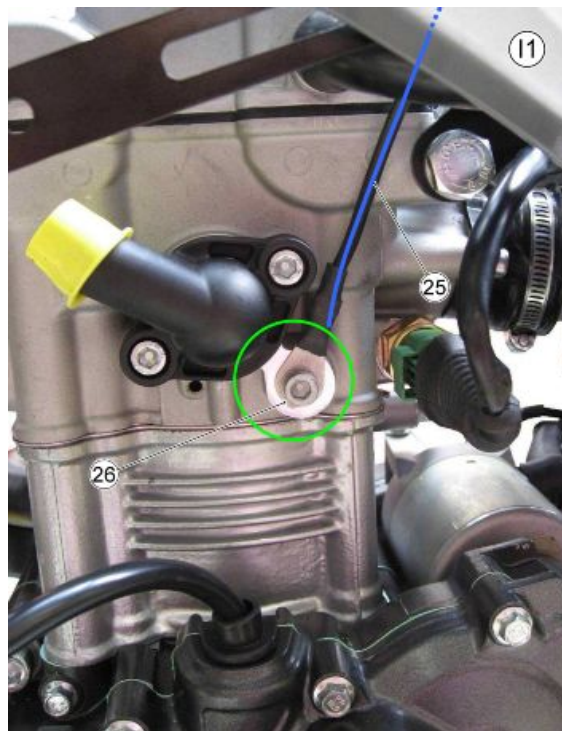


TABLE I2

- 25. Engine - chassis ground lead

CAUTION

CHECK CORRECT SECURING OF THE ENGINE - CHASSIS CABLE.

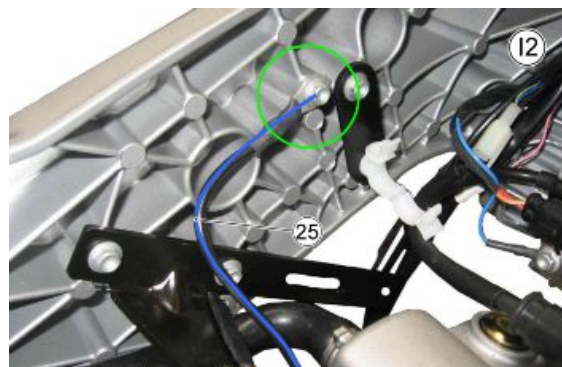


TABLE J - BATTERY AREA COMPONENTS**TABLE J1**

- 27. Turn indicators
- 28. 12V 30A Fan relay
- 29. 30A 12V Injection relay

**TABLE J2**

- 30. Electric fan connector: insert the connector in the specific tongue in the battery support after connecting it.

**TABLE J3**

- 31. 80A 12V Starter relay



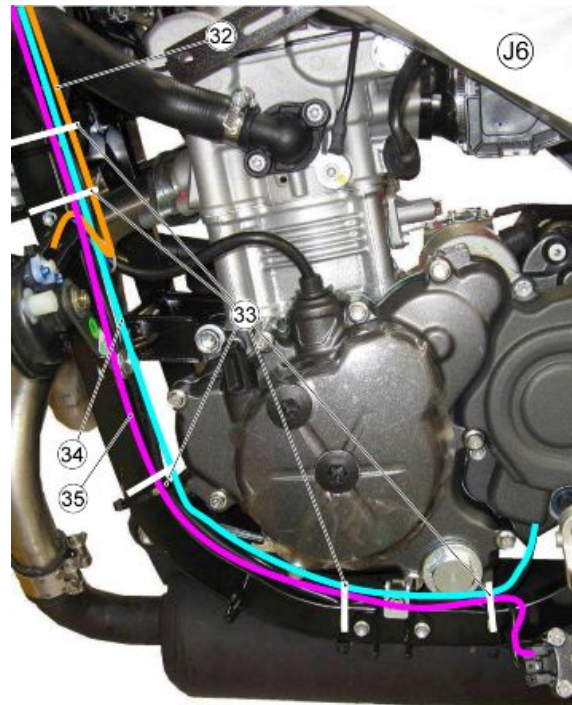
TABLE J4

- Correct positioning of the battery.

**TABLE J5 - RUNNING REAR BRAKE SENSOR**

TABLE J6

32. Horn cable: the horn cable must be secured with the two indicated clamps.
33. Five clamps for fixing horn cable, stand sensor cable, neutral cable.
34. Neutral cable.
35. Stand sensor cable.

**TABLE K1 - Lambda probe and engine oil sensor cable run**

36. Rubber clamp.
37. Lambda probe.
38. Oil bulb.

CAUTION

CHECK CORRECT INSERTION OF THE HOOD ON THE ENGINE OIL BULB (38).

THE LAMBDA PROBE CABLE (37) MUST BE POSITIONED WITH A WIDE RADIUS BEND. PAY CLOSE ATTENTION TO THE MOVEMENTS OF THE CABLE IN ORDER TO AVOID DAMAGING IT.



TABLE K2 - Starter motor cable run

CAUTION

ENSURE CORRECT CONNECTION (39); CHECK LOCKING OF THE GREY SECURITY LOCK.



TABLE L - Starter motor cable run

40. Starter motor ground screw.

41. Starter motor positive screw.

CAUTION

CHECK TIGHTNESS OF THE STARTER MOTOR GROUND SCREW (40) AND THE STARTER MOTOR POSITIVE SCREW (41). CHECK CORRECT INSERTION OF THE HOOD.

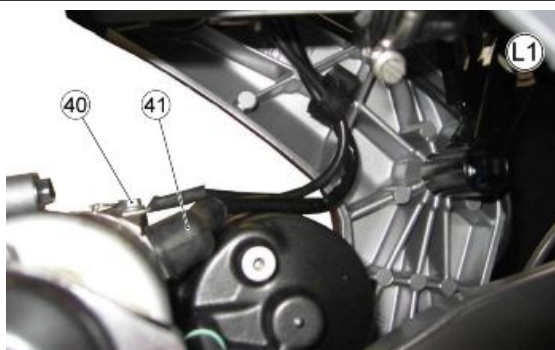
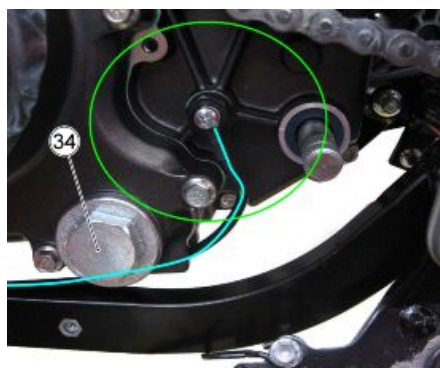


TABLE M - Neutral cable detail

34. Neutral cable.

CAUTION

CHECK THAT THE NEUTRAL CABLE (34) IS CORRECTLY FIXED WITH THE SCREW.

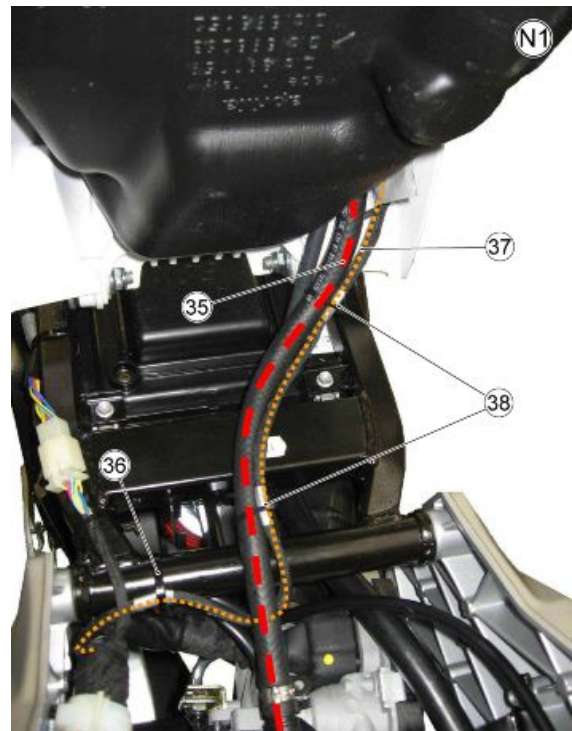


N TABLES - Fuel tank cable harness**TABLE N1**

- 35. Fuel pipe
- 36. Clamp.
- 37. Fuel sensor and pump cable.
- 38. Clamps

CAUTION

ANCHOR THE CABLE HARNESS BRANCH (37) (FUEL RESERVE SENSOR AND PUMP) WITH THE FUEL HOSE (35), USING TWO CLAMPS (38) IN CORRESPONDENCE WITH THE GREY TAPINGS. THE THIRD CLAMP (36) MUST SECURE THE CABLE HARNESS (37) ON THE SADDLE MOUNTING.

**TABLE N2**

- 37. Fuel sensor and pump cable.

CAUTION

CONNECT THE RESERVE FUEL SENSOR TO THE MAIN CABLE HARNESS.



TABLE N3

6. Pre-fitted cable ties.

37. Fuel sensor and pump cable.

CAUTION

PASS THE BRANCH ON THE LEFT SIDE OF THE TANK, INSERTING IT ON THE SPECIFIC CABLE TIES (6) PREVIOUSLY FITTED.

**TABLE N4**

39. Fuel pump cable

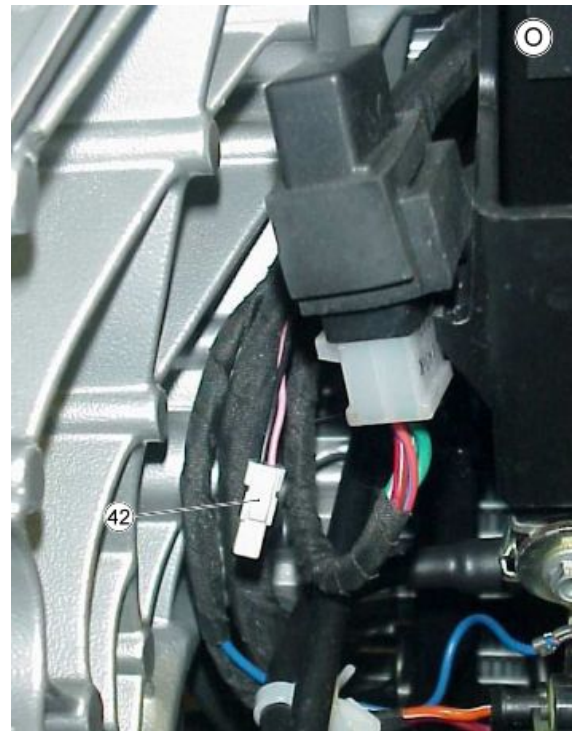
CAUTION

CONNECT THE FUEL PUMP AND CHECK THAT THE CONNECTOR IS PROPERLY CONNECTED; CHECK THAT THE THREE RED CAPS ARE STILL IN THE SEAT AFTER CONNECTION.

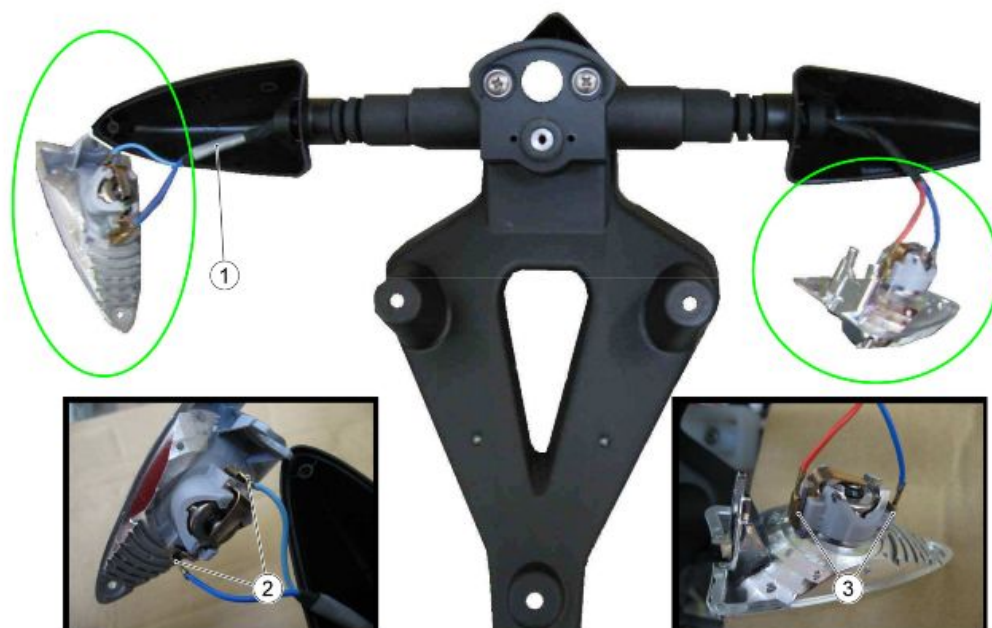


TABLE O - QUICK SHIFT PREPARATION

42. The connector for Quick Shift preparation is not connected and should be left free.

**Back side****TABLE A - REAR LIGHT PRE-FITTING**

1. Grey sheathing that indicated the left turn indicator
2. Faston of 2.8 mm (0.11 in); cable colour: light blue and blue
3. Faston of 2.8 mm (0.11 in); cable colour: red and blue



B TABLES - REAR LIGHT UNIT

TABLE B1

- 1. Rear left turn indicator.
- 2a-2b. Faston: light blue and blue wires.
- 3a-3b. Faston: red and blue wires.
- 4. Rear left turn indicator cable harness run.
- 5. License plate frame cable harness
- 6. Rear right turn indicator cable harness run.
- 7. Rear right turn indicator
- 8. License plate light.

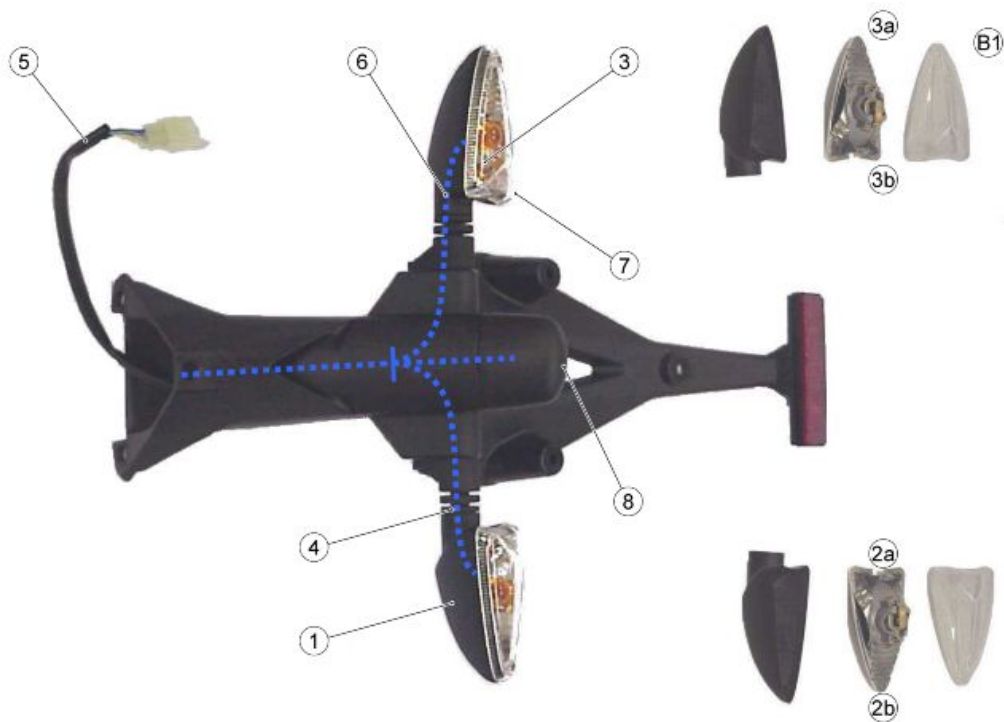


TABLE B2

CAUTION

VERIFY THE PRESENCE OF THE VIBRATION ABSORPTION SPONGE BETWEEN THE SUPPORT AND THE LICENSE PLATE LIGHT.



TABLE C

- Breather pipe

**D TABLES: DIAGNOSTICS CABLE DETAIL
(STEPS FOR CORRECT FITTING)**

TABLE D1 - Step 1

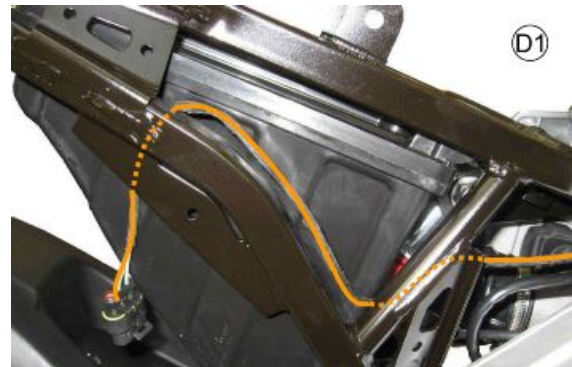


TABLE D2 - Step 2



TABLE D3

9. Insert the diagnostics plug in the specific support.



E TABLES - TAIL FAIRING CABLE HARNESS CLAMP

TABLE E1

10. Pay close attention to the positioning of the cable harness.



TABLE E2

11. Taillight Cable harness

12a. Clamps: join the taillight cable harness and the diagnostics cable.

12b. Optional clamp

12c. Clamp.

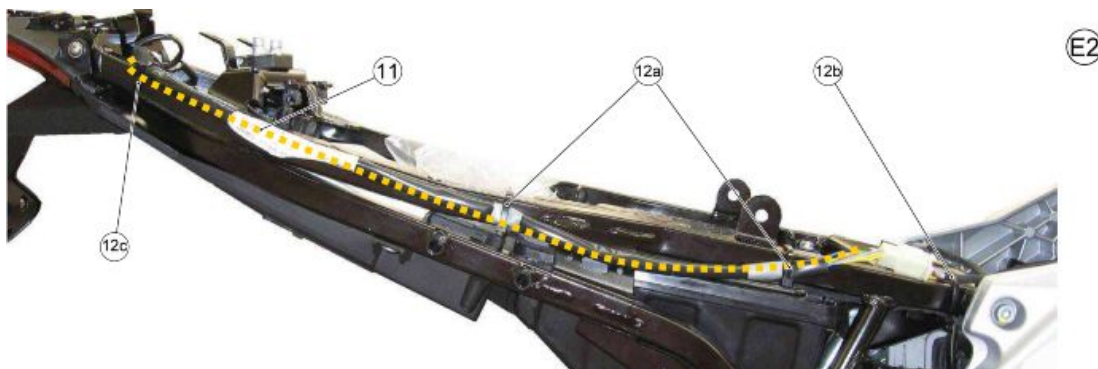


TABLE E3

10. Connector positioning.

11. Taillight cable harness.

13. Main cable harness.

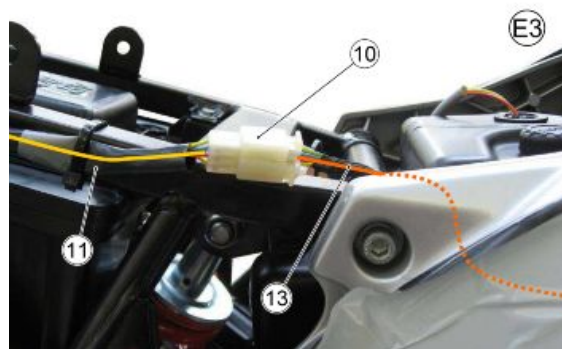
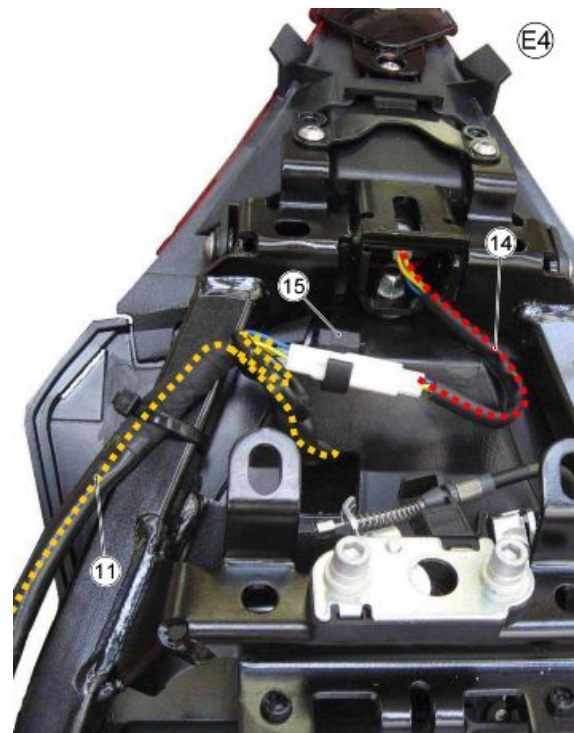
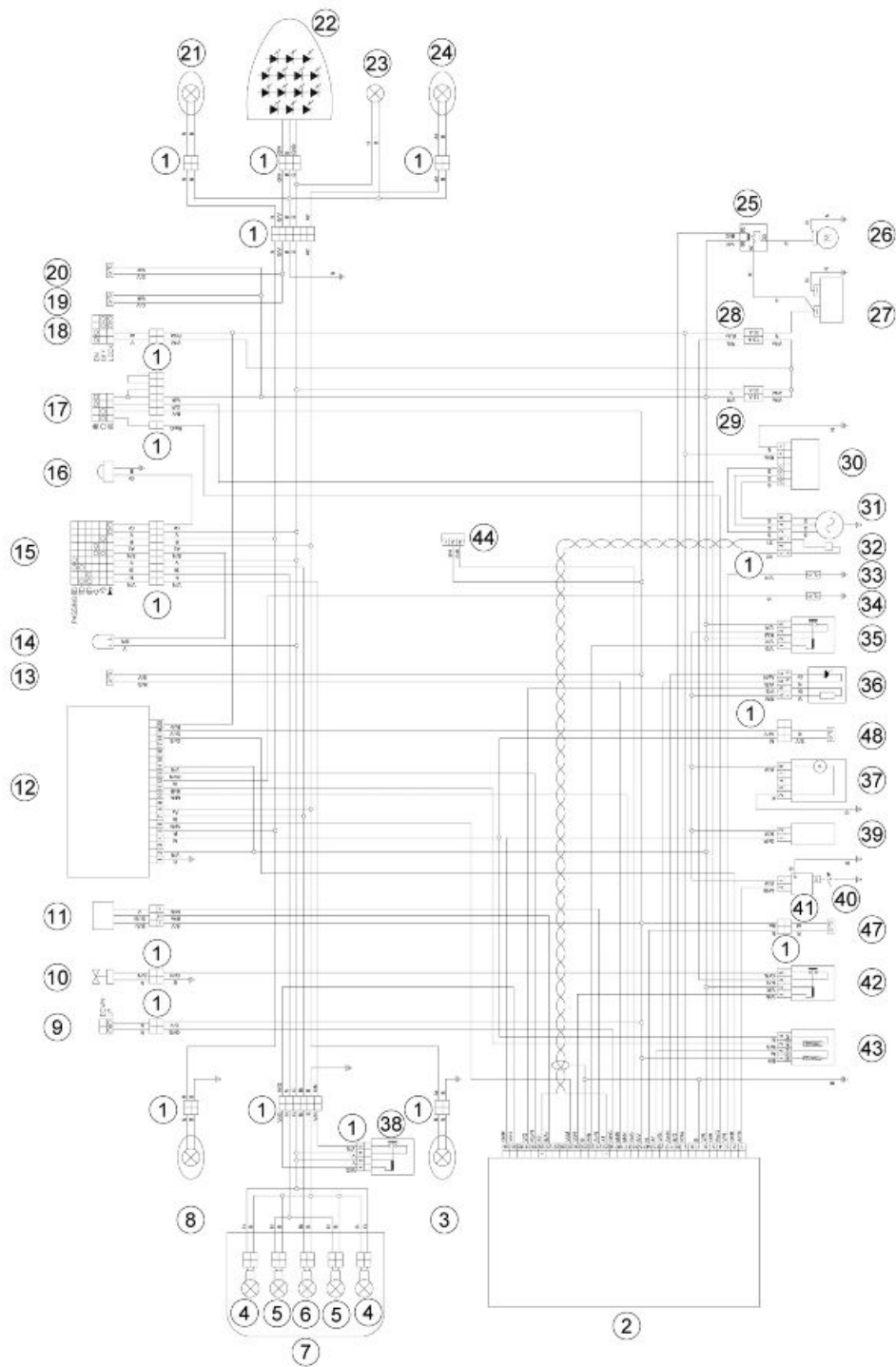


TABLE E4

- 11. Taillight cable harness.
- 14. LED Rear light
- 15. Cable guide.



General wiring diagram



Key

- 1. MULTIPLE CONNECTORS
- 2. ECU
- 3. FRONT LEFT TURN INDICATOR
- 4. TAIL LIGHT BULB

5. LOW BEAM BULB
6. HIGH BEAM BULB
7. COMPLETE HEADLAMP
8. FRONT RIGHT TURN INDICATOR
9. SIDE STAND SWITCH
- 10.FAN
- 11.SPEED SENSOR
- 12.INSTRUMENT PANEL
- 13.CLUTCH SWITCH
- 14.TURN INDICATORS
- 15.LEFT LIGHT SWITCH
- 16.HORN
- 17.Right light switch
- 18.IGNITION SWITCH
- 19.REAR STOP SWITCH
- 20.FRONT STOP SWITCH
- 21.Rear right turn indicator
- 22.TAILLIGHT (LED)
- 23.LICENSE PLATE LIGHT BULB
- 24.REAR LEFT TURN INDICATOR
- 25.START-UP RELAY
- 26.STARTER MOTOR
- 27.Battery
- 28.FUSES 1
- 29.FUSES 2
- 30.Voltage regulator
- 31.ALTERNATOR
- 32.PICK-UP
- 33.GEAR IN NEUTRAL SWITCH
- 34.OIL LEVEL SENSOR
- 35.INJECTION RELAY
- 36.LAMBDA PROBE
- 37.FUEL PUMP
- 38.LIGHT LOGIC RELAY
- 39.INJECTOR
- 40.SPARK PLUG
- 41.COIL
- 42.FAN CONTROL RELAY

- 43. Water Temperature Sensor
- 44. ECU DIAGNOSIS
- 45. -
- 46. -
- 47. ELECTRONIC TRANSMISSION
- 48. FUEL RESERVE SENSOR

Colour key:

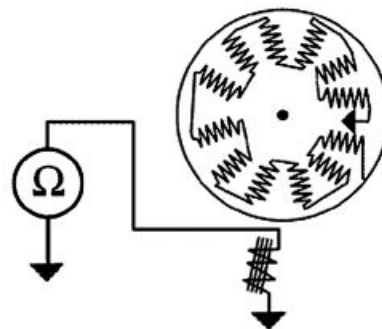
- Ar Orange
- Az Sky blue
- B Blue
- Bi White
- G Yellow
- Gr Grey
- M Brown
- N Black
- R Red
- Ro Pink
- V Green
- Vi Purple

Checks and inspections

In case the cause of ignition failure or malfunction cannot be easily identified at sight, first of all replace the control unit by another one in operating conditions.

Remember that disconnection due to replacement of the central unit must be done with the engine off.

If after replacement the vehicle starts properly, the control unit is failing and must be replaced.



If the failure persists, check the alternator and the stator components as follows:

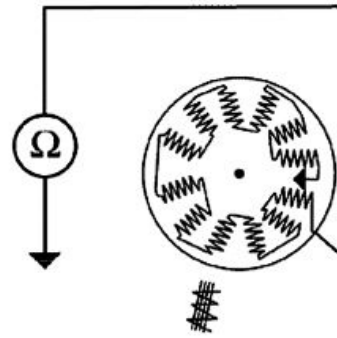
After a sight control of the electrical connections, use a specific tester to measure the stator winding and the pick-up.

If checks on the loading coil, pick-up detect irregularities, **replace the stator and the failing components.**

Disconnect the connector on the flywheel cover and measure the resistance between either contact and the earth.

Specific tooling

020331Y Digital multimeter



Dashboard

Diagnosis

Oil level

- If low oil level has been detected, check if the general warning light and the icon turn on. There are no reference indicators.
- It is necessary to check if there is no engine oil left in the reservoir.
- If a circuit break has been detected, the general warning light does not turn on and the icon remains off. There are no reference indicators.
- Periodically check for correct functioning.



Low fuel

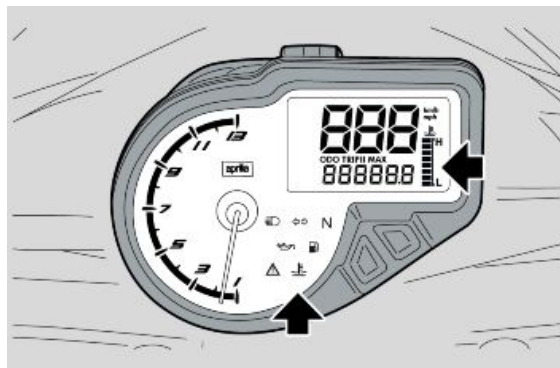
- In case of short circuit the general warning light does not turn on, no icon and no reference indicator turns on. The low fuel orange light remains always on.

- In case the circuit is interrupted the general warning light does not turn on, no icon and no reference notch turn on. Even when the tank is empty the low fuel warning light does not turn on.



Water temperature

- If coolant temperature is too high ($T > 116^\circ$), the general warning light turns on. The icon will be lit along with all of the temperature indication bars.



Operation of the instrument panel is controlled by the SET A (2) and SET B (1) buttons.



- Segments turned on in the Key on configuration.



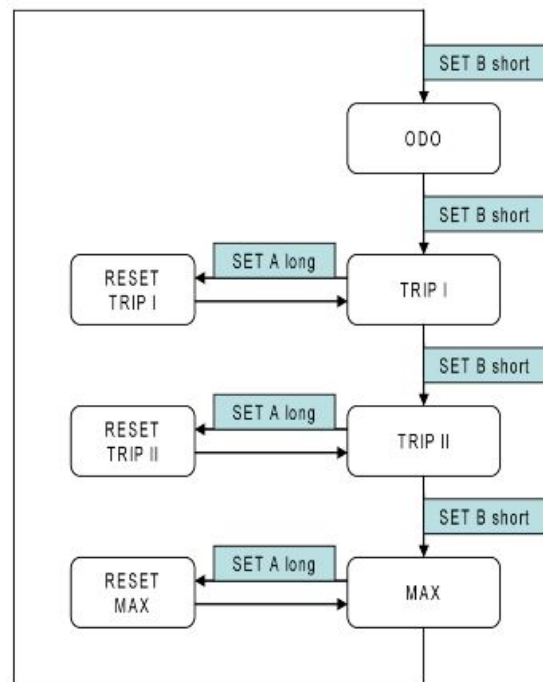
Following the diagram indicated, it is possible to scroll through the display functions:

- ODO
- TRIP I
- TRIP II
- MAX

The switch from km to miles is achieved by holding in the SET A (2) and SET B (1) buttons for ten seconds from 1 to 5 seconds after switching on the key. The conversion is applied to the instantaneous speed, the maximum speed, the total odometer and trip counters

Within the desired function, hold in (for 10 seconds) the SET A (2) control button to respectively RESET the TRIP I, TRIP II and MAX functions

The ODO function (total odometer) function can be reset only once in the life of the instrument panel and within the first 255km travelled. Use the SET B (1) button to display the total odometer ODO and hold in SET B (2) for more than 5 seconds.



Ignition circuit

Characteristic

Spark plug

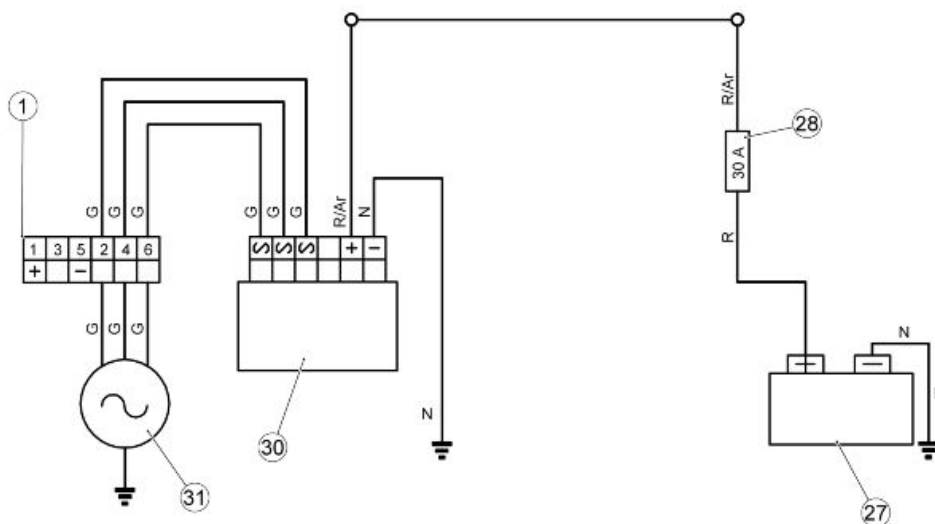
NGK CR9EB

Electrode gap

0.5 mm (0.020 in)



Battery recharge circuit



KEY:

1. MULTIPLE CONNECTORS

27. Battery

28. MAIN FUSES

30. Voltage regulator

31. ALTERNATOR

RECHARGING SYSTEM

- Disconnect the six-way connector (1) (black colour) located behind the left side cover.

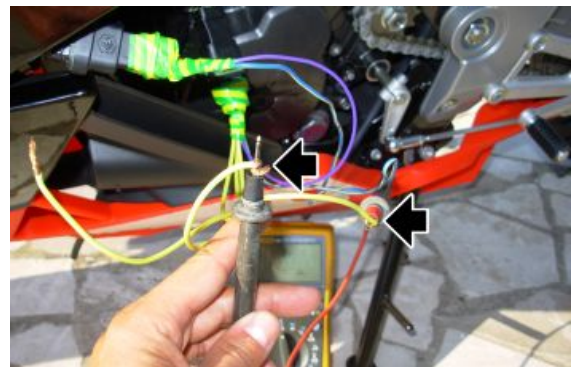
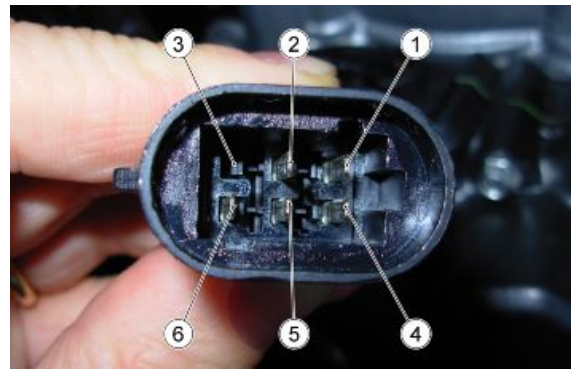
NOTE

THE ENGINE SIDE IS IDENTIFIED WITH THE LETTER "A"



Measurement of resistance (with engine off)

- For a correct detection of the alternator resistance, an ambient temperature measurement must be carried out and afterwards a heat stabilisation (after turning fan on) by using a tester, using alternatively 3 of the 5 connector pins (no. 2, 4, 6): stage "1" (pin 2-4), stage "2" (pin 2-6), stage "3" (pin 4-6).



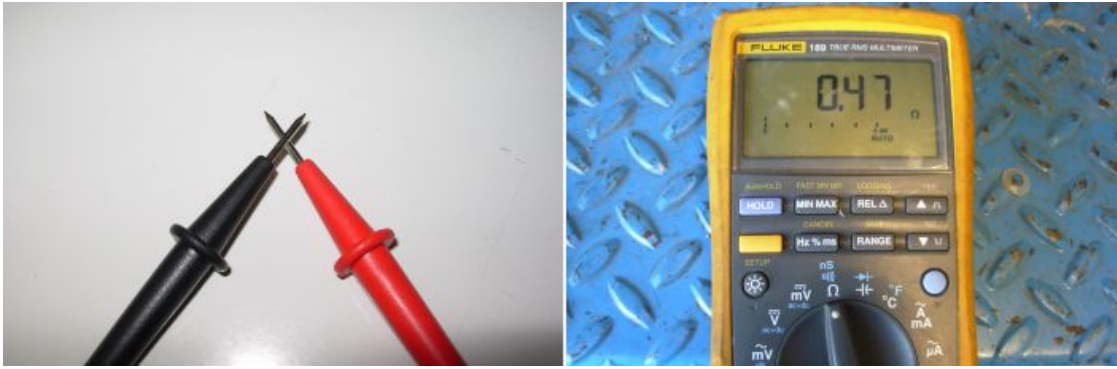
- Take the measurement; The correct value is determined by the value measured for each stage in which from time to time the resistance of the tester wires is subtracted, obtained by touching the two lugs.

Example:

- Resistance of stage 1 read on the display = 0.67 Ohm



- Resistance of the wires read on the display = 0.47 Ohm



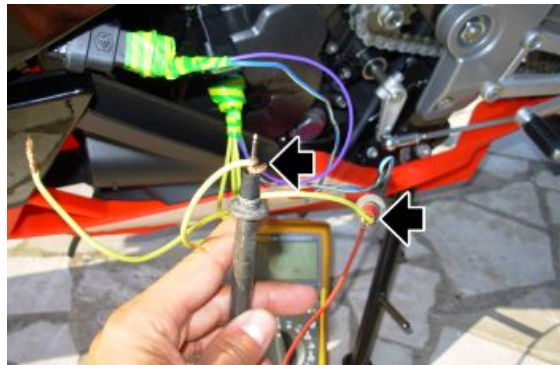
- Effective resistance stage 1 = $0.67 - 0.47 = 0.20$ Ohm
- If there is a significant difference between one stage and another (other than 0.20 Ohm), this means that the alternator is defective and must be replaced.

RESISTANCE MEASUREMENT

Winding stage	Ambient temperature (ohm)	Afterwards heat stabilisation (ohm)
Stage 1	0.15 - 0.30	0.20 - 0.35
Stage 2	0.15 - 0.30	0.20 - 0.35
Stage 3	0.15 - 0.30	0.20 - 0.35

Empty voltage

- Disconnect the six-way connector (1).
- Make a special cable harness using two connectors that can be coupled with those on the alternator side and the chassis side of the motorcycle. The outgoing wires from pins 1 and 5 must maintain the continuity of the positive and negative of the pick-up, otherwise the engine will not start; while the outgoing cables from pins 2, 4, 6 (alternator side) must have the ends free in order to perform the appropriate action.



CAUTION

KEEP THE THREE ENDS OF THE FREE CABLES WELL SEPARATED TO AVOID DANGEROUS SHORT CIRCUITS.

- For a correct detection of the alternator voltage, the measurements must be carried out using alternatively the 3 ends of the free cables: stage "1" (outgoing cables from pins 2 and 4), stage "2" (outgoing cables from pins 2 and 6), stage "3" (outgoing cables from pins 4 and 6).
- Start the engine and carry out the measurement.

- If there is a significant difference between one stage and another (other than 15 V), this means that the alternator is defective and must be replaced.

CAUTION

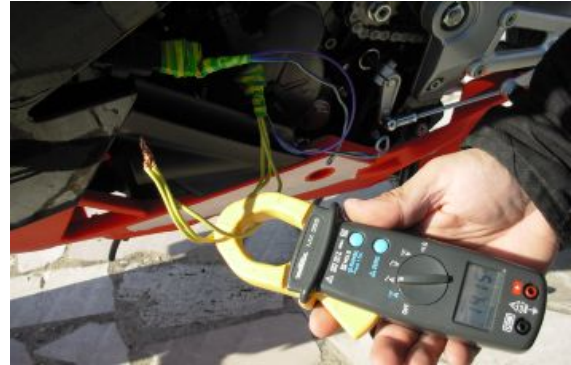
WITH THE ENGINE HOT THE VALUES RECORDED ARE ON AVERAGE 4-5 V LESS THAN THOSE DETECTED WITH THE ENGINE COLD.

EMPTY VOLTAGE

rpm	2000	6000	8000
Vm linked voltage Reference values (V rms)	20 - 30	75 - 85	95 - 105

Short circuit current

- For correct detection of short circuit current it is necessary to make a special cable harness using two connectors that can be coupled with those on the alternator side and the chassis side of the motorcycle. The outgoing wires from pins 1 and 5 must maintain the continuity of the positive and negative of the pick-up, otherwise the engine will not start; while the ends of the outgoing cables from pins 2, 4, 6 (alternator side) must be short circuited with each other in order to be able to perform the appropriate action.
- Start the engine and with an ammeter clamp measure each single cable.
- If there is a significant difference between the measurement taken of the single cables (other than 10 A), this means that the alternator is defective and must be replaced.

**CAUTION**

WITH THE ENGINE HOT THE VALUES RECORDED ARE ON AVERAGE 2-3 A LESS THAN THOSE DETECTED WITH THE ENGINE COLD.

WARNING

NEVER KEEP THE ENGINE RUNNING FOR MORE THAN ONE MINUTE; FAILURE TO DO SO COULD CAUSE SERIOUS OVERHEATING DAMAGES TO THE MOTORCYCLE CIRCUITS.

COLD SHORT CIRCUIT CURRENT

RPM	2000	4000	6000	8000
RMS DC current (Arms) (average of the 3 stage currents)	12 - 18	12 - 18	12 - 18	12 - 18

Voltage on battery poles with engine speed always between 3000 - 5000 RPM

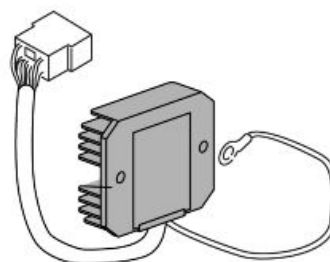
- Start the engine, after about one minute of operating bring the speed to 3000-5000 RPM, then measure with a tester the voltage at the battery poles that must always be between 13V and 15V. Otherwise, if the correct operation of the alternator has already been checked, replace the regulator.

CAUTION

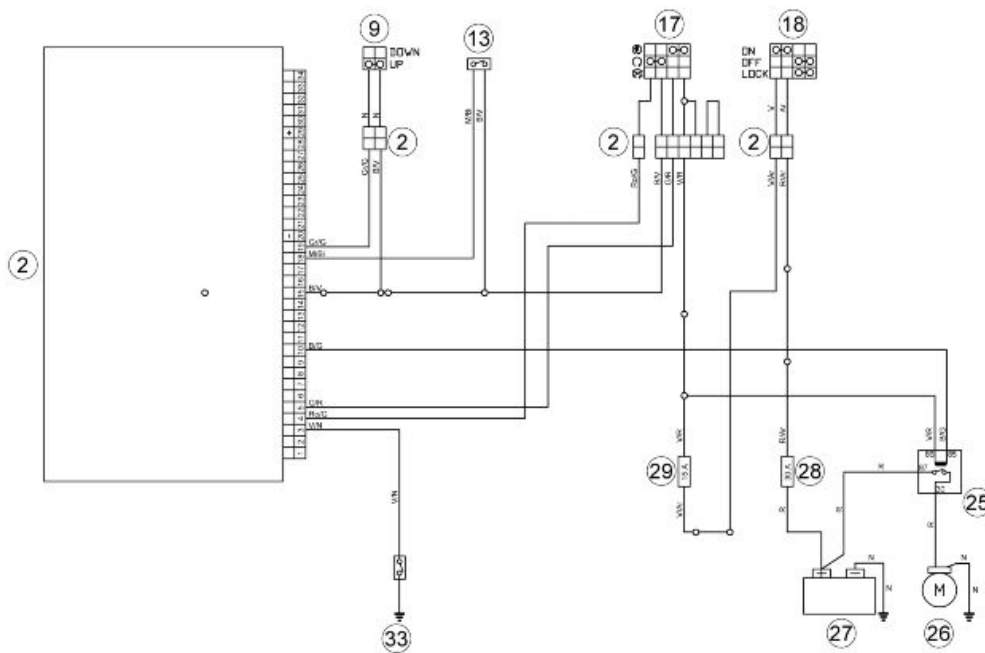
PERFORM THE CHECK DESCRIBED ABOVE WITH A BATTERY IN GOOD CONDITION (START VOLTAGE ABOUT 13V) MAKING SURE THAT THERE ARE NO ELEMENTS IN THE SHORT CIRCUIT.

Voltage regulator check

- Output voltage 13.5 V - 15 V
- Output current higher than 10 A (with load)



Start-up system check

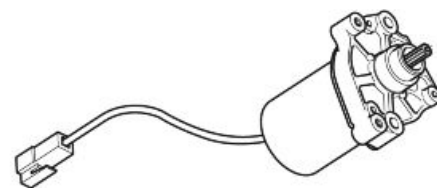


KEY:

- 1. MULTIPLE CONNECTORS
- 2 ECU control unit
- 9. SIDE STAND
- 13. CLUTCH SWITCH
- 17. Right light switch
- 18. IGNITION SWITCH
- 25. START-UP RELAY
- 26. STARTER MOTOR
- 27. Battery
- 29. Secondary fuses
- 33. GEAR IN NEUTRAL SWITCH

STARTER MOTOR - CHECK

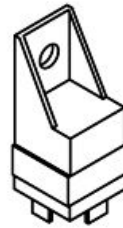
- To check, power the starter with a 12 V 9 AH battery.
- With a DC ammeter clamp measure the current requirement at continuous running (after 5 seconds).



Correct value 50 - 60 A.

START- UP RELAY CHECK

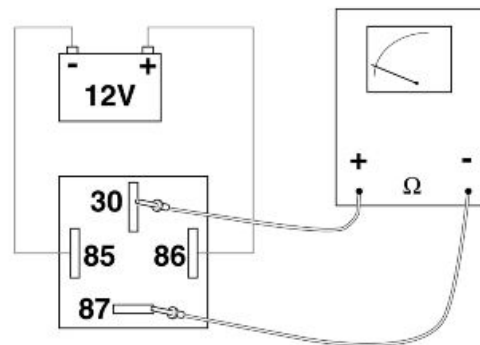
- To check relay operation:
- Supply 12 V voltage to the two male terminals (85 - 86).
- Use a tester (in Ohm meter function) to check the circuit continuity between the other two terminals (87 - 30).



Correct value with powered relay: 0 Ohm

Correct value with non-powered relay: infinite Ohm

- Replace the relay involved if the resulting values do not correspond to those specified.



STARTER COMMAND

Function

Commands engine starting through the injection control unit.

Operation / Operating principle

The starter button, the brake switches, the No. 25 starter command relay and the injection control unit between PIN 5 and 10 are involved.

ELECTRICAL ERRORS

Starter command P0170 - shorted to positive.

Error cause

Shorted to positive: excessive voltage at PIN 10 of the control unit connector.

Troubleshooting

Shorted to positive:

- This malfunction is detected with a brake activated and the starter button pressed (voltage of 12V read at PIN 5).
- If the battery voltage does not drop (thanks to the absorption of the No. 25 starter command relay excitation coil) the control unit understands that PIN 10 is shorted to battery.
- Restore the cabling (if the short is in the cabling) or the relay (if the short is in the relay).

NOTE

IN CASE OF SHORT TO GROUND / OPEN CIRCUIT NO ERROR WILL APPEAR: SEE THE TROUBLESHOOTING CHAPTER, THE ENGINE DOES NOT START.

Horn control

Testing voltage: 13 V (nominal 12 V)

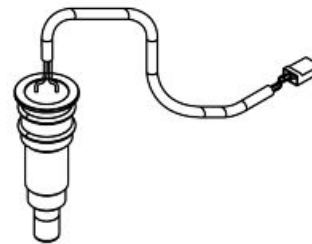
Input: < 3.5 A



level indicators

Sensor operation check

- Lift the fuel tank.
- Disconnect the connector.
- With a tester check the values between the male terminals inside the connector.



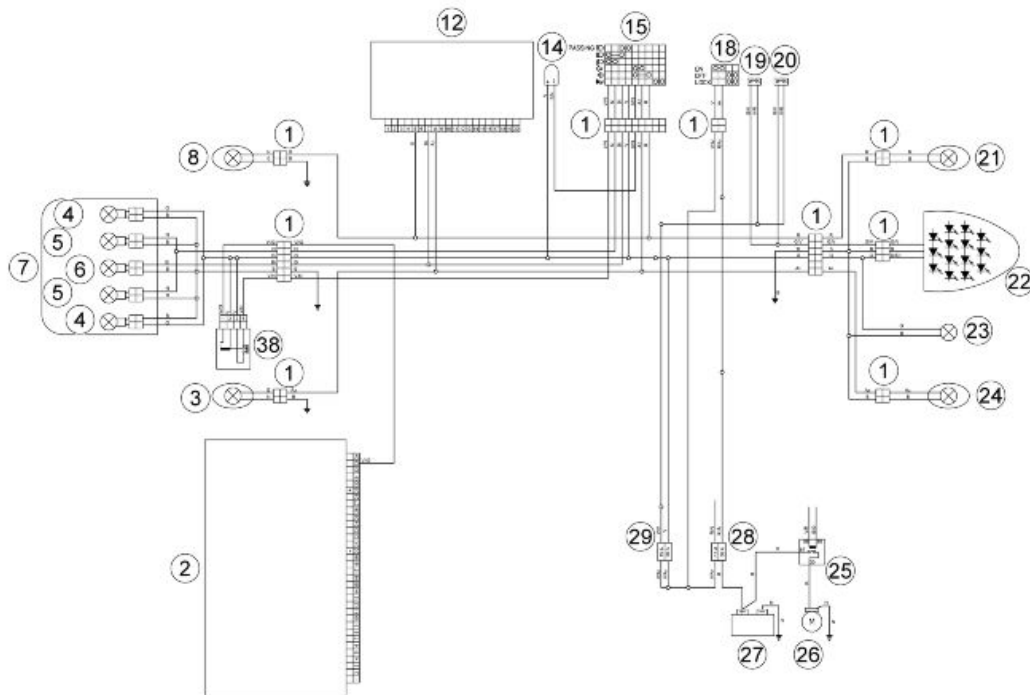
Correct value: Warning light off: approximately 1 kOhm.

Warning light on: Magnitude range: MOhm

CAUTION

UPON REFITTING, MAKE SURE THE ELECTRIC CONNECTOR IS CORRECTLY COUPLED.

Lights list



key:

1. Electronic instrument panel
2. Turn indicators
3. Left light switch
4. Rear right turn indicator
5. Twin tail light/stop light bulb
6. License plate light
7. Rear right turn indicator
8. Rear stop switch
9. Front stop switch
10. Front right turn indicator
11. High beam bulb
12. Tail light bulb
13. Complete headlamp
14. Tail light bulb
15. Low beam bulb
16. Front left turn indicator

Operating voltage: Vdc 5÷20 V

Maximum applicable voltage (for 1 minute): 24 V

Maximum reverse voltage: -16 V

Maximum power consumption: 10 mA (not including pull-up resistance)

Maximum input current (sink): 20 mA

Maximum output voltage - low level: 500 mV

Maximum output voltage - high level: Vdc of the pull-up resistance

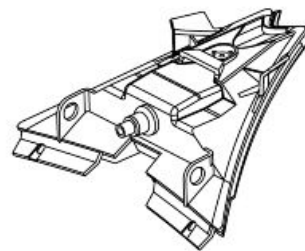
Operating temperature range: -20÷60 °C (-4 °F÷140 °F)



REAR LIGHT

Rear tail light / license plate light /stop light

12 V - 5 / 21 W

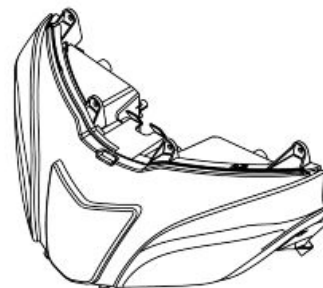


FRONT HEADLAMP

(Halogen) low beam light: 12 V - 55 W H 11

(Halogen) high beam light: 12 V - 55 W H 11

Tail light: 12V - 5W



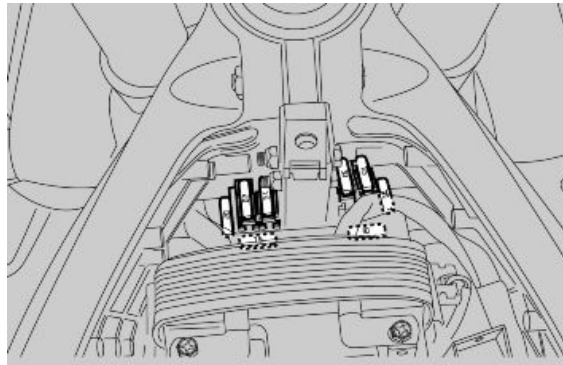
Fuses

AUXILIARY FUSES

- 20A fuse: rear light unit, blinker, light relay, front headlight assembly
- 15A fuse: start-up relay, injection relay, instrument panel, fan relay, control unit.
- 20A and 15A fuses: spare fuses

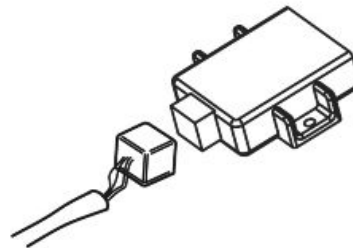
MAIN FUSES

- 30A fuse: battery recharge, control unit
- 7.5A fuse: fan.
- 7.5A and 30A fuses: spare fuses



Control unit

- The control unit has been designed for internal self-diagnose. In case of malfunction, install a control unit in proper operating conditions on the vehicle.



Battery

This vehicle is fitted with a battery without maintenance.

If the battery is exhausted or disconnected and the engine is started with a not conventional method, or in case that the battery is disconnected during the running or there is a collapse of an element, can be checked the following problems:

- turn indicators the proper flashing function is not ensured, according to the Regulations;
- headlamps: it is not ensured that the light intensity is the same as having a normal component function;
- instrument panel: malfunctions can be checked in the screen page of the display and in the instrument panel functions; it is possible that the speed indications are not right.



IN CASE OF A FAILURE IN THE BATTERY OR A BUMP STARTER, THE CORRECT OPERATION OF THE VEHICLE AND THE RESPECT FOR THE REGULATIONS IN FORCE ARE NOT GUARANTEED.

WARNING

BATTERY ELECTROLYTE IS TOXIC AND IT MAY CAUSE SERIOUS BURNS. IT CONTAINS SULPHURIC ACID. AVOID CONTACT WITH YOUR EYES, SKIN AND CLOTHING. IF IT ACCIDENTALLY COMES INTO CONTACT WITH YOUR EYES OR SKIN, WASH WITH ABUNDANT WATER FOR APPROX. 15 MIN. AND SEEK IMMEDIATE MEDICAL ATTENTION.

IF ACCIDENTALLY SWALLOWED, IMMEDIATELY DRINK LARGE QUANTITIES OF WATER OR MILK FOLLOWED BY MAGNESIUM MILK, BEATEN EGG OR VEGETABLE OIL. SEEK IMMEDIATE MEDICAL ATTENTION.

BATTERIES PRODUCE EXPLOSIVE GASES; KEEP CLEAR OF NAKED FLAMES, SPARKS OR CIGARETTES; VENTILATE THE AREA WHEN RECHARGING INDOORS.

ALWAYS WEAR EYE PROTECTION WHEN WORKING IN THE PROXIMITY OF BATTERIES. KEEP OUT OF THE REACH OF CHILDREN.

Characteristic**Battery**

12 V - 4 Ah MF

Battery maintenance

If the vehicle is not be used for a certain time (1 month or more), the battery needs to be recharged periodically.

The battery runs down completely in about three months. If it is necessary to refit the battery in the vehicle, be careful not to reverse the connections, remembering that the ground wire (**black**) marked (-) must be connected to the **-negative** clamp while the other two **red** wires marked (+) must be connected to the clamp marked with the **+positive** sign.

1) Recharging the battery

First detach the negative terminal before removing the battery from the vehicle.

Regular bench charging must be carried out with the specific battery charger, (single) or (multiple), setting the battery charger selector to the type of battery to be recharged. Connections to the power supply source must be implemented by connecting the corresponding poles (+ to+ and - to -).

2) Cleaning the battery

The battery should always be kept clean, especially its top side, and the terminals should be coated with petroleum jelly.

CAUTION

NEVER USE FUSES WITH A CAPACITY HIGHER THAN THE RECOMMENDED CAPACITY. USING A FUSE OF UNSUITABLE RATING MAY SERIOUSLY DAMAGE THE VEHICLE OR EVEN CAUSE A FIRE.

CAUTION

ORDINARY DRINKING WATER CONTAINS MINERAL SALTS THAT ARE HARMFUL TO THE BATTERY. CONSEQUENTLY, ONLY USE DISTILLED WATER.

CAUTION

TO ENSURE MAXIMUM PERFORMANCE THE BATTERY MUST BE CHARGED BEFORE USE. LACK OF PROPER CHARGING OF THE BATTERY BEFORE FIRST USE AT LOW ELECTROLYTE LEVEL, CAN LEAD TO PREMATURE BATTERY LIFE.

Specific tooling

020333Y Single battery charger

020334Y Multiple battery charger

WARNING

BATTERY ELECTROLYTE IS TOXIC AND IT MAY CAUSE SERIOUS BURNS. IT CONTAINS SULPHURIC ACID. AVOID CONTACT WITH YOUR EYES, SKIN AND CLOTHING. IF IT ACCIDENTALLY COMES INTO CONTACT WITH YOUR EYES OR SKIN, WASH WITH ABUNDANT WATER FOR APPROX. 15 MIN. AND SEEK IMMEDIATE MEDICAL ATTENTION.

IF ACCIDENTALLY SWALLOWED, IMMEDIATELY DRINK LARGE QUANTITIES OF WATER OR MILK FOLLOWED BY MAGNESIUM MILK, BEATEN EGG OR VEGETABLE OIL. SEEK IMMEDIATE MEDICAL ATTENTION.

BATTERIES PRODUCE EXPLOSIVE GASES; KEEP CLEAR OF NAKED FLAMES, SPARKS OR CIGARETTES; VENTILATE THE AREA WHEN RECHARGING INDOORS.

ALWAYS WEAR EYE PROTECTION WHEN WORKING IN THE PROXIMITY OF BATTERIES. KEEP OUT OF THE REACH OF CHILDREN.

1) Battery preparation

Position the battery on a flat surface. Remove the adhesive sheet closing cells and proceed as quickly as possible to run the subsequent activation phases.



2) Electrolyte preparation.

Remove the container of the electrolyte from the pack. Remove and preserve cover strips from the container, in fact, the strip will later be used as a closing cover.

Note: Do not pierce the sealing of the container or the container itself because inside there is sulphuric acid.



3) Procedure for filling the battery with acid.

Position the electrolyte container upside down with the six areas sealed in line with the six battery filler holes. Push the container down with enough force to break the seals. The electrolyte should start to flow inside the battery.

Note: Do not tilt the container to prevent the flow of electrolyte from pausing or stopping.



4) Control the flow of electrolyte

Make sure air bubbles are rising from all six filling holes. Leave the container in this position for 20 minutes or more.

Note: If there are no air bubbles coming out of the filling holes, lightly tap the bottom of the container two or three times. Do not remove the container from the battery.

5) Take out the container.

Make sure all the electrolyte in the battery is drained. Gently tap the bottom of the container if electrolyte remains in the container. Now, gently pull the container out from the battery, only do this when the container is completely empty, and proceed immediately to the next point.

6) Battery closing.

Insert the airtight cover strips into the filling holes. Press horizontally with both hands and make sure that the strip is levelled with the top part of the battery.

Note: To do this, do not use sharp objects that could damage the closing strip, use gloves to protect your hands and do not bring your face close to the battery.

The filling process is now complete.

Do not remove the strip of caps under any circumstances, do not add water or electrolyte.

Place the battery down for 1 to 2 hours prior to the charging from the battery.

7) Recharging the new battery

With the above-mentioned procedure, the battery will have gained around 70% - 75% of its total electrical capacity. Before installing the battery on the vehicle, it must be fully charged and then must be recharged.

If the battery is to be installed on the vehicle prior to this pre-charged one, the battery will not be able to exceed 75% charge without jeopardising its useful life on vehicle.

The dry charge battery MF like the completely loaded YTX, must have a no-load voltage between 12.8 - 13.15 V Bring the battery to full charge, using the 020648Y battery charger:

- a - select the type of battery with the red switch on the left of the panel battery charger panel
- b - select NEW on the yellow timer
- c - connect the clamps of the battery charger to the battery poles (black clamp to negative pole (-) and red clamp to positive pole (+)).



d - Press the red button, as shown in figure.



e - Press the "MF" black button to activate the battery recharge **Maintenance Free** as shown in figure.



f - Check the ignition of the green LED indicated with a red arrow in figure.



g - The activation cycle of the new battery lasts for 30 minutes after the ignition of the recharge LED has taken place



h - Disconnect the clamps from the battery and check the voltage, if voltages are detected of less than 12.8 V, proceed with a new recharge of the battery starting from point c of the recharge procedure of **the new battery**, otherwise go to point i



i - The battery is now completely activated, disconnect the battery charger from the fuel supply grid, disconnect the clamps from the battery and proceed to fitting the battery on the vehicle.

BATTERY

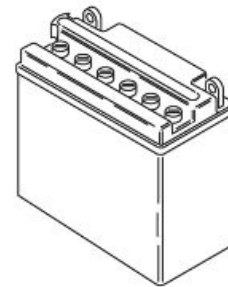
(12 V - B9 - B)

In case of malfunction check first that the recharge system works properly. To check the battery, remove it from the vehicle, and proceed as follows; visually check that:

- there are no signs of sulphation (signalled by white colouring of one or more cells);
- the electrolyte level is between the two "MIN" and "MAX" reference notches;
- the container (outer casing) does not leak.

Charge the battery slowly for at least 10 hours.

With a densimeter check the electrolyte density at every cell after recharging. If the density is below 1.26 at any cell or if the off-load voltage is lower than 12V, the battery surely needs to be replaced.



Speed sensor

Operating voltage: Vdc 5÷20 V

Maximum applicable voltage (for 1 minute): 24 V

Maximum reverse voltage: -16 V

Maximum power consumption: 10 mA (not including pull-up resistance)

Maximum input current (sink): 20 mA

Maximum output voltage - low level: 500 mV



Maximum output voltage - high level: Vdc of the pull-up resistance

Operating temperature range: -20÷60 °C (-4 °F÷140 °F)

Function

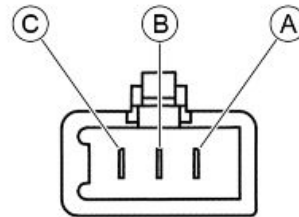
To indicate the vehicle speed by reading the front wheel turning speed.

Operation / Operating principle

Magneto-resistive sensor: generation of a square wave.

Pin-out:

- A. Control unit power
- B. Control unit ground
- C. Signal



ELECTRICAL ERRORS

Sensor/vehicle speed signal P0500 - over maximum limit/ signal not valid.

Error cause

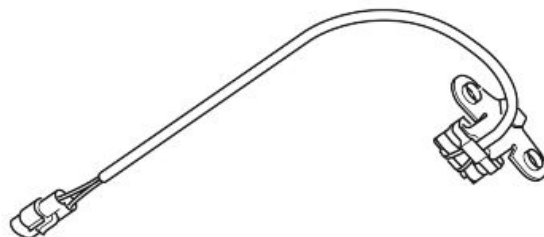
Faulty sensor or cabling, interference on the signal.

Troubleshooting

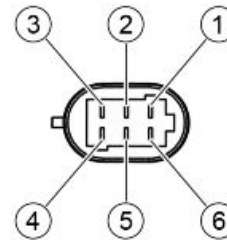
- Disconnect the sensor connector.
- Verify, with the key ON, the presence of voltage (5V) between PIN A and B of the control unit side connector.
- If no voltage is read verify the continuity of the cabling between the control unit side sensor connector (PIN A, B and C) and the control unit connector itself (PIN 21, 15 and 28).
- If the cabling is intact but still no voltage is read, verify the insulation from ground of PIN A control unit side sensor connector.

Engine rpm sensor

Ohmic resistance normalised at a temperature of 20 °C (68 °F): 105-124 Ohm



On the stator connector PIN 1 (+) and PIN 5 (-) are the ones relative to the engine speed sensor.



Engine temperature sensor

Resistance (PIN B1 - B2) to 25 °C (77 °F): 2.05
kOhm +/- 100 Ohm

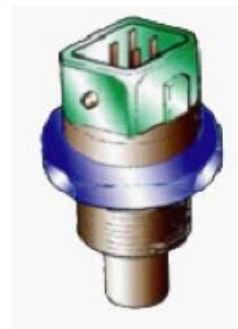
Resistance (PIN B1 - B2) to 60 °C (158 °F): 575
Ohm +/- 15 Ohm

Resistance (PIN B1 - B2) to 90 °C (194 °F): 230
Ohm +/- 5 Ohm

Resistance (PIN A1 - A2) to 25 °C (77 °F): 2.4
kOhm +/- 200 Ohm

Resistance (PIN A1 - A2) to 60 °C (158 °F): 557
Ohm +/- 30 Ohm

Resistance (PIN A1 - A2) to 90 °C (194 °F): 196
Ohm +/- 8 Ohm



Function

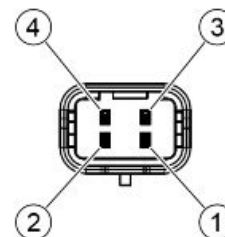
Serves the purpose of communicating the engine temperature to the control unit in order to optimise performance.

Operation / Operating principle

NTC type sensor (resistance sensor, inversely variable with temperature).

Pin-out:

1. Control unit ground (B2)
2. Instrument panel power (A2)
3. Control unit power (B1)
4. Instrument panel ground (A1)



CAUTION

BEFORE CARRYING OUT ANY TROUBLESHOOTING, CAREFULLY READ THE GENERAL TROUBLESHOOTING CONCEPTS FOR ELECTRICAL DEVICES AT THE BEGINNING OF THE CHECK AND CONTROL SECTION IN THE ELECTRICAL SYSTEM CHAPTER.

ELECTRICAL ERRORS

Engine temperature sensor P0115 - open circuit or shorted to positive / shorted to negative.

Error cause

Open circuit or shorted to positive: interruption of the circuit or excessive voltage at PIN 13 of the control unit connector.

Shorted to negative: null voltage between PIN 13 and 15 of the control unit connector.

Troubleshooting

The circuit is open:

- Disconnect the connector of the control unit.
- Measure the resistance value of the sensor at different temperatures between PIN 13 and 15.
- Disconnect the sensor connector.
- Verify continuity of the cabling between the sensor connector and the control unit connector: Control unit PIN 13 - sensor PIN 3 and control unit PIN 15 - sensor PIN 1. If necessary, restore the cable harness.
- If the cabling is intact but the sensor resistance value is incorrect, this means that the sensor is faulty and must be replaced, otherwise proceed with the checks.

Shorted to positive:

- With the sensor connector and the control unit disconnected, verify that the fault is shorted with the battery positive of sensor connector PIN 3 (or control unit PIN 13) and restore the cabling.

Shorted to negative:

- Disconnect the sensor connector.
 - Check the sensor connector PIN 3 ground insulation.
 - If there is no ground insulation restore the cabling.
 - If PIN 3 is insulated from the ground and the error persists, this means that there is a probable fault in the control unit.
-

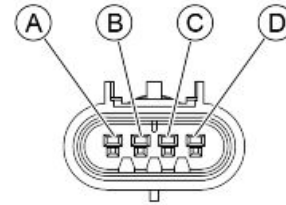
Lambda sensor

Function

In charge of telling the control unit whether the mixture is lean or rich.

Operation / Operating principle

Based on the difference of oxygen in the exhaust fumes and the environment, this generates voltage which is read and interpreted by the injection control unit. It does not require an external supply source but, in order to work properly, it should reach a high operating temperature: that is why there is a heating circuit inside.



Pin-out:

1. Heater power (A)
2. Heater ground (B)
3. Sensor signal + (C)
4. Sensor signal - (D)

CAUTION

BEFORE CARRYING OUT ANY TROUBLESHOOTING, CAREFULLY READ THE GENERAL TROUBLESHOOTING CONCEPTS FOR ELECTRICAL DEVICES AT THE BEGINNING OF THE CHECK AND CONTROL SECTION IN THE ELECTRICAL SYSTEM CHAPTER.

ELECTRICAL ERRORS

Check the air-fuel ratio / Lambda probe P0130 - short to positive / open circuit, short to negative or carburetion excessively lean / signal not plausible for abnormal title correction or probe signal fault.

Error cause

Shorted to positive: excessive voltage at PIN 11 or PIN 12 of the control unit connector.

Circuit open or shorted to negative: interruption of the circuit or null voltage between control unit connector PIN 11 and 12.

Troubleshooting

Shorted to positive:

- Disconnect the control unit connector and the sensor connector.
- Verify that there is no short to battery positive on sensor connector PIN C (corresponding to control unit connector PIN 11); if there is a short, restore the cabling.
- Verify that there is no short to battery positive on sensor connector PIN D (corresponding to control unit connector PIN 12); if there is a short, restore the cabling.

The circuit is open:

- Disconnect the control unit connector and the sensor connector.

- Verify continuity of the cabling between the sensor connector and the control unit connector: Control unit PIN 11 - sensor PIN C and control unit PIN 12 - sensor PIN D. Restore the cabling if necessary.
- If the cabling is intact and the error persists, proceed with the following checks.

Shorted to negative:

- Disconnect the sensor connector and the control unit connector.
- Check the sensor connector PIN C ground insulation. In the absence of insulation restore the cabling.
- Check the sensor connector PIN D ground insulation. In the absence of insulation restore the cabling.
- If PIN C and PIN D are insulated from the ground and the error persists, this means that there is a probable fault in the control unit.

Lambda probe heater P0135 - shorted to positive / shorted to negative / open circuit.

Error cause

Shorted to positive: excessive voltage at PIN 31 of the control unit connector.

Shorted to negative: lack of insulation from ground on the sensor connector PIN A.

The circuit is open: interruption of the circuit.

Troubleshooting

Shorted to positive:

- Disconnect the control unit connector and the sensor connector.
- Verify that there is no short to battery positive on sensor connector PIN B (corresponding to control unit connector PIN 31); if there is a short, restore the cabling.

The circuit is open:

- Disconnect the control unit connector and the sensor connector.
- Verify continuity of the cabling between the sensor connector and the control unit connector: control unit PIN 31 - sensor PIN B. Restore the cabling if necessary.
- Verify continuity of the cabling between the sensor connector and the injection relay: sensor PIN A - injection relay PIN 3. Restore the cabling if necessary.
- If the cabling is intact and the error persists, proceed with the following checks.

Shorted to negative:

- Disconnect the sensor connector.
 - Check the sensor connector PIN B ground insulation. In the absence of insulation restore the cabling.
 - If PIN B is insulated from ground and in the absence of other errors (fuel pump, injector, coil), this means that the control unit is most likely faulty.
-

Injector

Function

To supply the correct amount of petrol at the right timing.

Operation / Operating principle

Injector coil is excited for the petrol passage to open.

Pin-out:

1. Control unit ground
2. Relay powered

CAUTION

BEFORE CARRYING OUT ANY TROUBLESHOOTING, CAREFULLY READ THE GENERAL TROUBLESHOOTING CONCEPTS FOR ELECTRICAL DEVICES AT THE BEGINNING OF THE CHECK AND CONTROL SECTION IN THE ELECTRICAL SYSTEM CHAPTER.

ELECTRICAL ERRORS

Injector P0201 - shorted to positive / shorted to negative / open circuit.

Error cause

Shorted to positive: excessive voltage at PIN 34 of the control unit connector.

Shorted to negative: null voltage at PIN 2 of the injector connector.

The circuit is open: interruption of the circuit.

Troubleshooting

Shorted to positive:

- Disconnect the injector connector, turn the key to ON and activate the component through the diagnostics instrument.
- Verify the absence of voltage at the injector connector PIN 1; if present restore the cable harness, otherwise proceed with the following checks.

Shorted to negative:

- Disconnect the injector connector, turn the key to ON and activate the component through the diagnostics instrument.
- Verify the presence of voltage at the ends of the injector connector; if there is no voltage, restore the cable harness, otherwise proceed with the following checks.

The circuit is open:

- Carry out the check procedure of the injector and control unit connectors.
- Verify continuity of the cabling between the control unit connector and the injector connector (control unit PIN 34 - injector PIN 1). If there is no continuity, restore the cable harness.

Fuel pump

CAUTION

BEFORE CARRYING OUT ANY TROUBLESHOOTING, CAREFULLY READ THE GENERAL TROUBLESHOOTING CONCEPTS FOR ELECTRICAL DEVICES AT THE BEGINNING OF THE CHECK AND CONTROL SECTION IN THE ELECTRICAL SYSTEM CHAPTER.

ELECTRICAL ERRORS

Fuel pump relay P0230 - shorted to positive / shorted to negative / open circuit.

Error cause

Shorted to positive: excessive voltage at PIN 22 of the control unit connector.

Shorted to negative: null voltage at PIN 2 of the injection relay.

The circuit is open: interruption of the circuit.

Troubleshooting

Shorted to positive:

- Disconnect the injection relay (No. 35 on the electrical circuit diagram), turn the key to the ON position and activate the relay through the diagnostics instrument.
- Verify the presence of voltage between relay connector PIN 1 and 2 toward the cabling.
- If no voltage is read, disconnect the control unit and verify insulation from battery positive of the relay PIN 1 (or control unit PIN 22). Restore the cabling if necessary.

Shorted to negative:

- Disconnect the injection relay (No. 35 on the electrical circuit diagram) and the control unit.
- Verify ground insulation of the relay connector PIN 1 and 2 toward the cabling: if there is no insulation, restore the cabling.

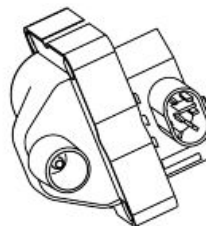
The circuit is open:

- Disconnect the injection relay (No. 35 on the electrical circuit diagram) and the control unit.
- Verify continuity of the cabling between the relay and control unit: Relay PIN 1 - control unit PIN 22. Restore the cabling if necessary.

Coil

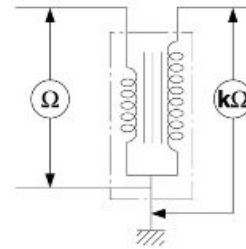
Primary: 550 +/- 50 mOhm

Secondary: 3.3 +/- 0.3 kOhm



Check

A tester can be used for the check. In every case the continuity of the primary and secondary windings must be checked. The reading in ohms does not need to be exact but, if the windings are intact, their continuity must be detected with the resistance values indicated above.

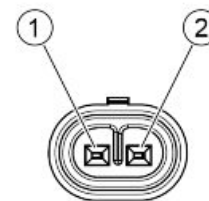


Function

Allows generation of the electrical discharge on the spark plug, with an increase of voltage.

Pin-out:

1. Relay powered (PIN 3 relay side)
2. Activation by control unit (control unit side PIN 1)



CAUTION

BEFORE CARRYING OUT ANY TROUBLESHOOTING, CAREFULLY READ THE GENERAL TROUBLESHOOTING CONCEPTS FOR ELECTRICAL DEVICES AT THE BEGINNING OF THE CHECK AND CONTROL SECTION IN THE ELECTRICAL SYSTEM CHAPTER.

ELECTRICAL ERRORS

H.V. Coil P0351 - shorted to positive / open circuit or shorted to negative.

Error cause

Shorted to positive: excessive voltage at PIN 1 of the control unit connector.

Circuit open or shorted to negative: interruption of the circuit or null voltage at PIN 1 of the control unit connector.

Troubleshooting

Shorted to positive:

- Disconnect the coil connector, turn the key to ON and activate the component through the diagnostics instrument.
- Verify the presence of voltage on the coil connector PIN 2: if present, restore the cabling, otherwise replace the coil.

The circuit is open:

- Carry out the check procedure of the coil and control unit connectors.
- Verify continuity of the cabling between the coil and control unit: Coil PIN 2 - control unit PIN 1. In the absence of continuity restore the cabling.

- Verify, with the key turned ON, the presence of voltage on the coil connector PIN 1. If no voltage is read, verify the continuity of the cabling between coil and injection relay (No. 35 on the electrical circuit diagram): Coil PIN 1 - relay PIN 3.
- If the above tests provided a positive result, the coil should be replaced.

Shorted to negative:

- Disconnect the control unit connector and the coil connector.
- Verify the coil connector PIN 2 ground insulation (or control unit connector PIN 1). Restore the cabling if necessary.

Neutral sensor

Check the values with a tester:

- with the gear engaged the tester indicates a voltage value of 5 Volt between the ground and the sensor; the resistance is "infinite".
- In neutral position the tester indicates a voltage value of zero Volts between the ground and the sensor.

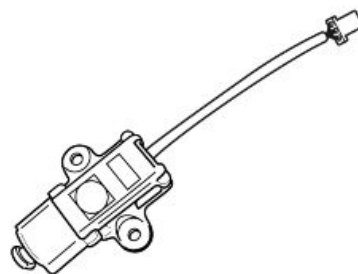


Side stand sensor

Switch check

With a tester check the values between the two terminals:

- With the stand unfolded, the tester indicates an infinite resistance value.
- With the stand folded up, resistance is equal to 0 Ohm.



Electric fan circuit

Function

Radiator fan and coolant - Operation.

Operation / Operating principle

The control unit closes the fan control relay excitation circuit to ground until the temperature drops.

CAUTION

BEFORE CARRYING OUT ANY TROUBLESHOOTING, CAREFULLY READ THE GENERAL TROUBLESHOOTING CONCEPTS FOR ELECTRICAL DEVICES AT THE BEGINNING OF THE CHECK AND CONTROL SECTION IN THE ELECTRICAL SYSTEM CHAPTER.

ELECTRICAL ERRORS

Fan relay P0480 - shorted to positive / shorted to negative / open circuit.

Error cause

Shorted to positive: excessive voltage at PIN 24 of the control unit connector.

Shorted to negative: null voltage at PIN 24 of the control unit connector.

The circuit is open: interruption of the circuit.

Troubleshooting

Shorted to positive:

- Disconnect the fan control relay (No. 42 on the electrical circuit diagram) and, turning the key to the ON position, measure the voltage read at the relay connector PIN 1 toward the cabling: if the voltage is 12V restore the cabling. If the voltage is zero replace the relay.

Shorted to negative:

- Disconnect the fan control relay (No. 42 on the electrical circuit diagram) and the control unit.
- Verify ground insulation of the cable between the fan control relay (PIN 1) and the control unit (PIN 24). Restore the cabling if necessary.

The circuit is open:

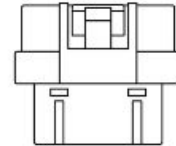
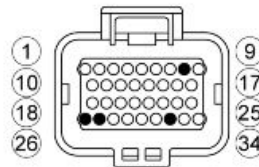
- Carry out the check procedure of the control unit and relay connectors.
- Verify electrical continuity of the cable between the relay connector (PIN 1) and the control unit connector (PIN 2).
- Verify electrical continuity of the cable between the relay connector (PIN 2) and the secondary fuses.
- Verify continuity between relay PIN 1 and PIN 2. If there is no continuity replace the relay.

Connectors

ECU

Key

1. COIL (orange - white)
2. INSTRUMENT PANEL (grey - blue)
3. NEUTRAL SENSOR (green - black)
4. RIGHT LIGHT SWITCH (pink - yellow)
5. RIGHT LIGHT SWITCH (yellow - red)
6. ECU CONTROL UNIT (green - red)
7. ECU CONTROL UNIT (blue)
8. -
9. ECU CONTROL UNIT (red - orange)
10. STARTER RELAY (red - yellow)
11. LAMBDA PROBE (sky blue - black)
12. LAMBDA PROBE (green - white)
13. WATER TEMPERATURE SENSOR (orange)
14. ECU CONTROL UNIT (black)
15. ECU CONTROL UNIT (blue - green)
16. ECU CONTROL UNIT DIAGNOSTICS (white - blue)
17. INSTRUMENT PANEL (brown - black)
18. CLUTCH SWITCH (brown - white)
19. SIDE STAND SWITCH (grey - yellow)
20. FLYWHEEL (cable x1)
21. SPEED SENSOR (orange - black)
22. INJECTION RELAY (red - blue)
23. ECU CONTROL UNIT (blue)
24. FAN RELAY (blue)
25. INSTRUMENT PANEL (purple - brown)
26. -
27. -
28. SPEED SENSOR (blue - orange)
29. FLYWHEEL (cable x2)
30. INSTRUMENT PANEL (pink - black)
31. LAMBDA PROBE (green - yellow)
32. -
33. FRONT HEADLAMP (purple - red)

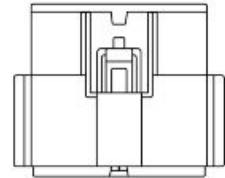
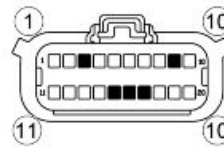


34. INJECTOR (grey - red)

Dashboard

key:

1. GROUND
2. + LIVE
3. (Not connected)
4. GROUND FOR SENSORS
5. RIGHT TURN INDICATOR WARNING LIGHT
6. EFI WARNING LIGHT
7. HIGH BEAM WARNING LIGHT
8. LEFT TURN INDICATOR WARNING LIGHT
9. IMMOBILIZER / ABS WARNING LIGHT (not used)
10. NEUTRAL WARNING LIGHT
11. WATER TEMPERATURE WARNING LIGHT
12. OIL PRESSURE WARNING LIGHT
13. RPM INPUT
14. CONFIGURATION PIN
15. (Not connected)
16. (Not connected)
17. (Not connected)
18. SPEED SENSOR
19. FUEL RESERVE SENSOR
20. + BATTERY



INDEX OF TOPICS

ENGINE FROM VEHICLE

ENG VE

Vehicle preparation

- Rest the vehicle on its stand
- Support the vehicle rear part using belts and hoist.
- Drain off the cooling system.
- Beforehand, remove the lug, the side fairings, the battery, the fuel tank, the side fairings, the drive chain, the air filter box, the radiator and the expansion tank.
- Position an under-sump stand that will be supported on the lower side of the engine.

See also

[Air box](#)

Side fairings

[Removing the expansion tank](#)

[Removing the radiator](#)

Coolant replacement

Fuel tank

[Lower cowl](#)

Removing the engine from the vehicle

- Prepare the vehicle as described.
- Disconnect the quick coupler.



- Loosen the clutch adjuster screw.



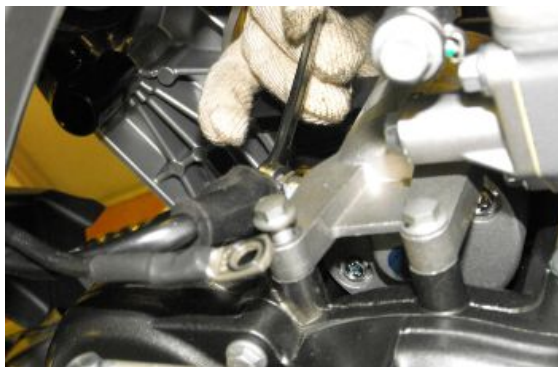
See also

Vehicle preparation

- Unhook the clutch cable and free it from the cable grommet.
- Undo and remove the screw and disconnect the starter ground cable.



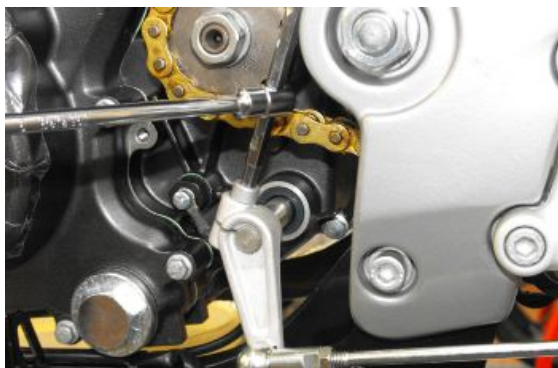
- Remove the rubber plug and loosen the screw.
- Disconnect the starter motor cable.



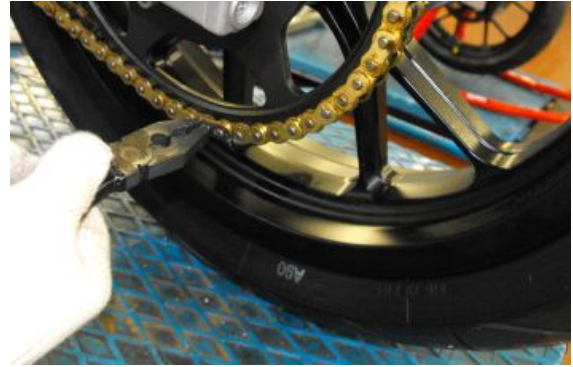
- Unscrew and remove the two fixing screws.
- Remove the pinion cover.



- Undo and remove the fixing screw.
- Take out the gearbox rod.



- Unhook the chain and remove it.



- Water temperature connector.



- Disconnect the neutral sensor connector



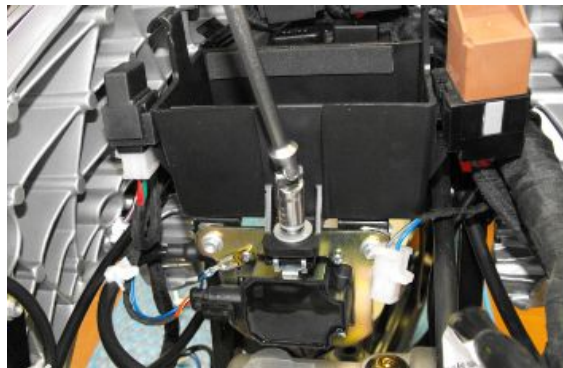
- Remove the oil temperature sensor.



- Remove the oil temperature sensor.



- Remove the battery compartment.



- Remove the coil.



- Remove the clamp.
- Remove the breather pipe.



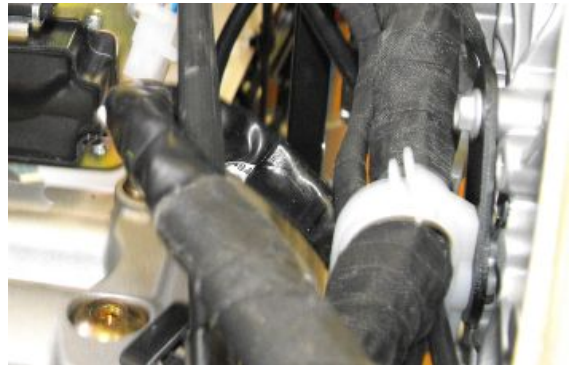
- Remove the screw.
- Remove the cable guide.



- Disconnect the injector connector.



- Remove the main cable harness cable grommet.



- Working on both sides, unscrew and remove the two fixing screws.



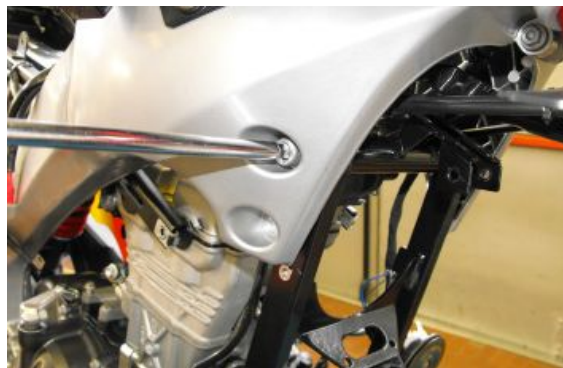
- Secure the vehicle adequately.
- - Working on the left side, loosen the swingarm pin.



- Operating from both sides, remove the pass through screws and collect the retaining nuts.



- Operating from both sides, remove the upper fixing screws.



- Working from the right side, slide off the pin.



- Collect the ring nut.



Installing the engine to the vehicle

- Place the ring nut and tighten it to the prescribed torque.

Specific tooling

866714 Swingarm adjustment



- Insert the swingarm pin from the right side and slide it until it reaches the other side.



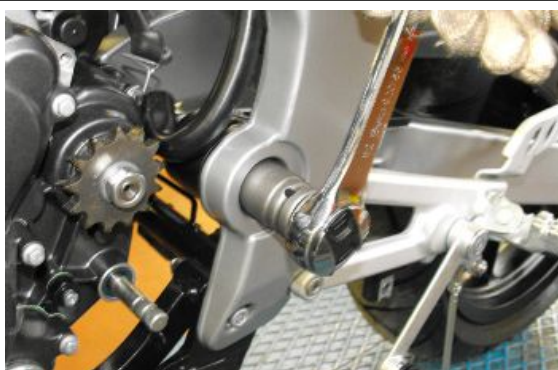
- Working from both sides, tighten the upper screw with the relative washer.
- Tighten the screw to the prescribed torque.



- Working from both sides, start the through screw with the nut.
- Tighten the screws to the prescribed torque.



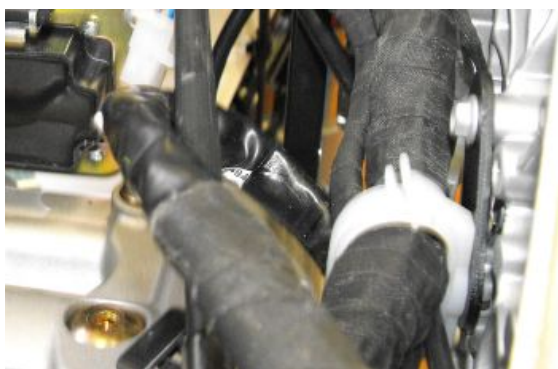
- On the left side place the washer on the swingarm pin and start the nut.
- Ensure the presence of the washer and the nut on the swingarm pin on the right side.
- Working from both sides, tighten the nuts to the prescribed torque.



- Working on both sides, start the two plate screws.
- Tighten the screws to the prescribed torque.



- Place the main cable harness in the cable grommet.



- Connect the injector connector to the main cable harness.



- Place the cable guide.
- Tighten the screw to the prescribed torque.



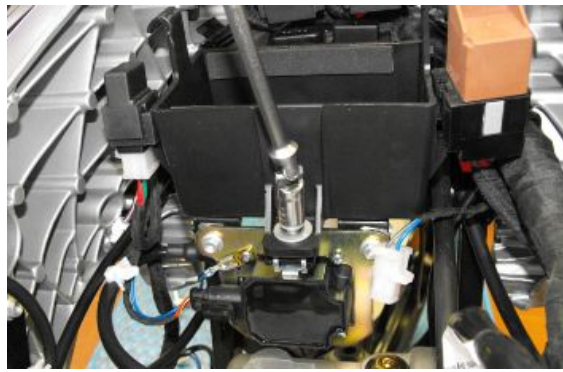
- Place the breather pipe and secure it with the clamp.



- Connect the ground and fix it with the screw.
- Connect the coil connector.



- Place the battery compartment and insert the relays in the appropriate seats.
- Tighten the battery compartment screw to the prescribed torque.



- Connect the horn.



- Connect the oil temperature sensor.



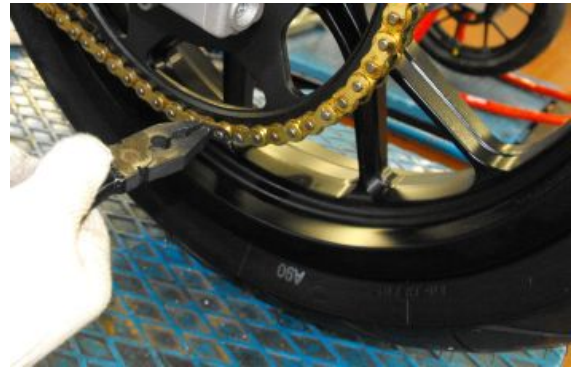
- Connect the neutral sensor.



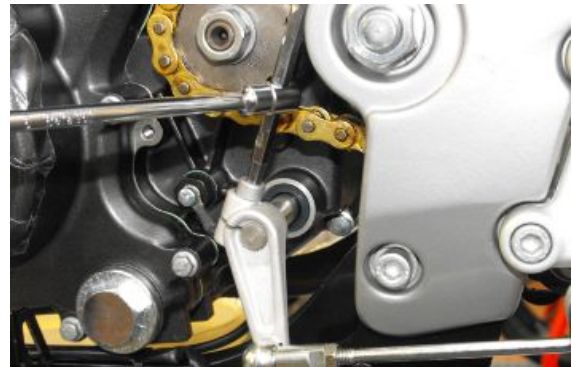
-
- Connect the water temperature sensor.



-
- Place and reconnect the chain.



-
- Place the gear lever and tighten the screw to the prescribed torque.



-
- Place the pinion cover and tighten the two screws to the prescribed torque.



- Connect the starter motor cable and tighten the screw to the prescribed torque.
- Fit the rubber hose.



- Connect the starter motor ground wire and tighten the screw to the prescribed torque.



- Reconnect the clutch cable, being careful to insert it in the cable guide.
- Adjust the clutch cable.



- Insert the quick coupling.



- Fit the previously removed units following the reverse order of the vehicle preparation description.

INDEX OF TOPICS

ENGINE

ENG

Gearbox

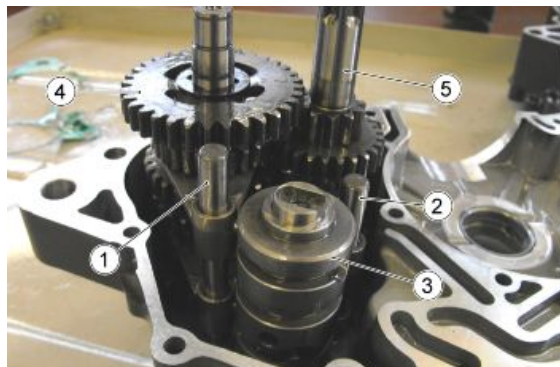
Gearbox shafts

Disassembling the gearbox

- Open the crankcase halves.
- Remove the gaskets from the crankcase.



- Take out both fork rods and the transmission forks (1) (2).
- Take out the desmodromic control (3).
- Take out the secondary axle (4).
- Take out the primary axle (5).



See also

Crankcase opening

Checking the primary shaft

COUPLING CLASSES

The gears of the primary drive are classified according to the coupling with the gear of the clutch housing and with the gear of the balancing countershaft and follow the logic shown in the tables listed below:

COUPLING CLASSES CLUTCH HOUSING - FIRST GEAR SHAFT

Coupling classes on Crankcase	Clutch housing gear	Transmission gear
X	X	X
Y	Y	Y

COUPLING CLASSES FIRST GEAR SHAFT - BALANCING COUNTERSHAFT

Coupling classes on Crankcase	Transmission gear	Balancing countershaft gear
S	S	S
T	T	T

NOTE

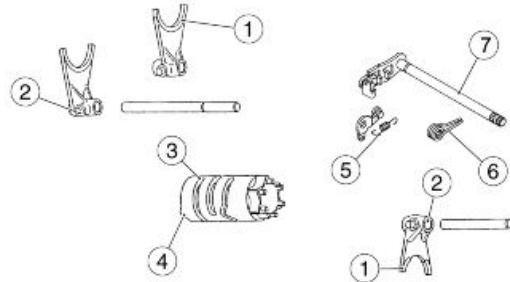
THE CLASS AS WELL AS BEING REPRODUCED ON TWO COUPLING ELEMENTS IS ALSO SHOWN ON THE TWO CRANKCASE HALVES OF THE CRANKCASE.

NOTE

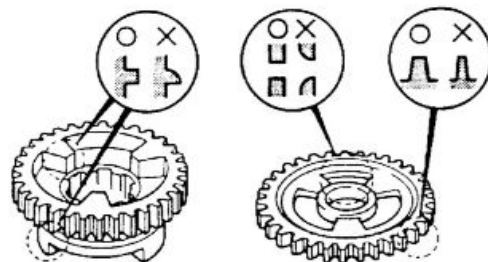
CRANKCASE SPARE PARTS ARE ALWAYS CLASS X.

Checking the desmodromic drum

- Check the contact zone on fork (1) and the driving pin (2) of the forks for wear.
 - Check the desmodromic drum (4) grooves (3) for wear.
 - Make sure that both ball bearings rotate freely and check if there are signs of corrosion.
-
- Check the eccentricity of the transmission shafts.
 - Check the condition of the two springs (5) and (6) of the selector (7).

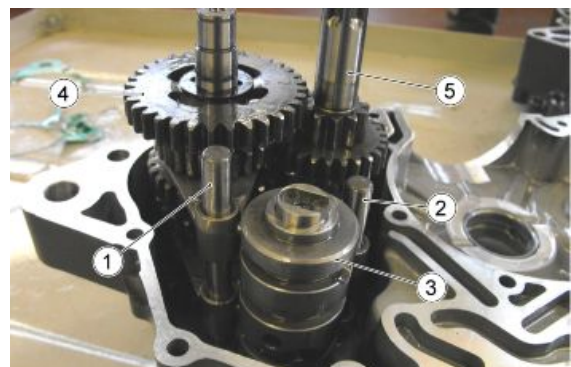


- Check the condition of the gears, replace them if they are blue, if they have cracks or are worn.



Assembling the gearbox

- Place the specific tool on the secondary shaft to avoid damaging the oil seal.
- Heat up the engine crankcase.
- Apply LOCTITE Anti-Seize on the bearing seats present on the crankcase.
- Fit the bearings in their seats.
- Insert the gears unit (5).
- Apply oil for gears on the grooves of the desmodromic drum.

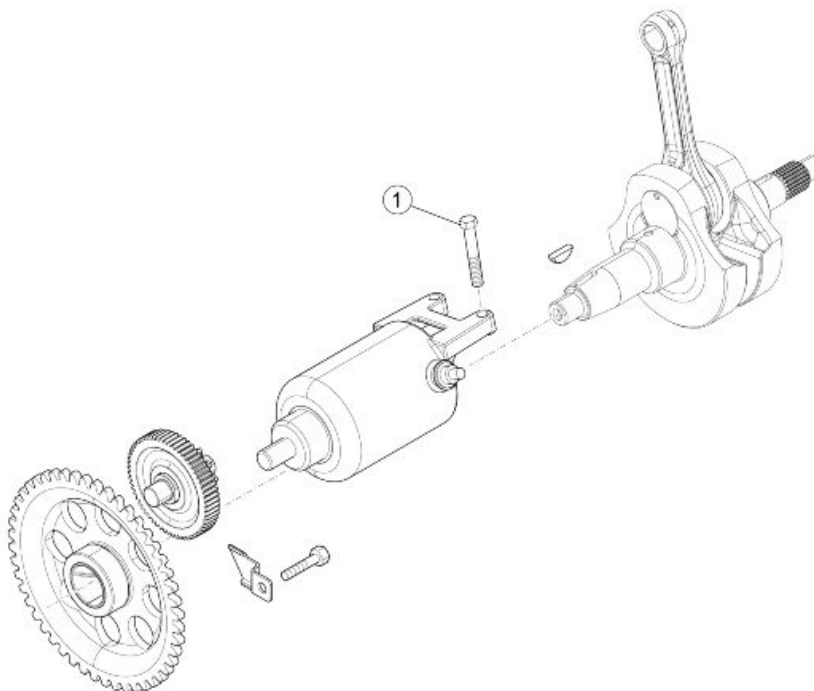


- Position the desmodromic drum in the crankcase (3).
- Fit the two axles of the transmission forks (1)(2).
- Fit the two transmission forks.
- Finally, fit the crankshaft.

Specific tooling

00H05600351 Guide for oil seal

Starter motor

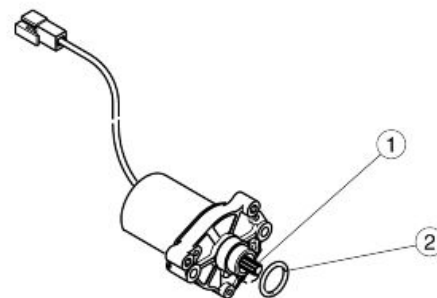


STARTER MOTOR

pos.	Description	Type	Quantity	Torque	Notes
1	Starter motor fixing screw	M6x25	2	11 - 13 Nm (8.11 - 9.58 lbf ft)	-

STARTER MOTOR

- Make sure that the tothing (1) is not deformed or worn.
- Make sure that the O-ring (2) is not damaged or worn.
- The electric starter motor is not fitted for repair. If necessary, replace the whole motor.

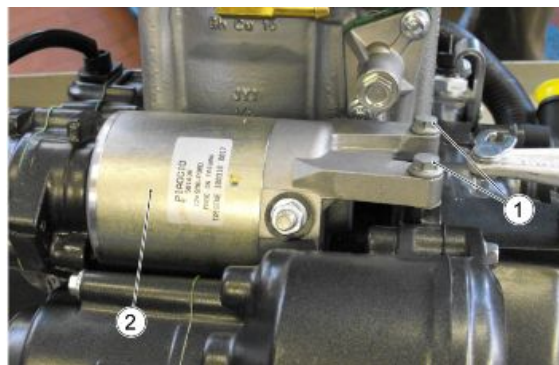


Removing the starter motor

- Undo and remove the two fixing screws (1).
- Remove the starter motor (2).

NOTE

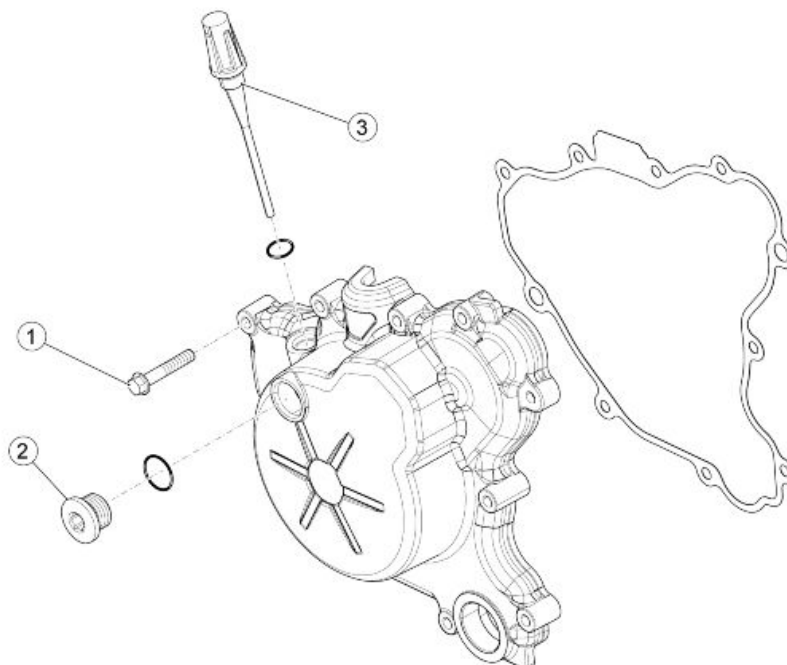
THE STARTER MOTOR CAN ALSO BE REMOVED IF THE ENGINE IS FITTED TO THE VEHICLE.



Installing the starter motor

- Place the electric starter motor.
- Apply LOCTITE 221.
- Tighten the starter motor fixing screws.

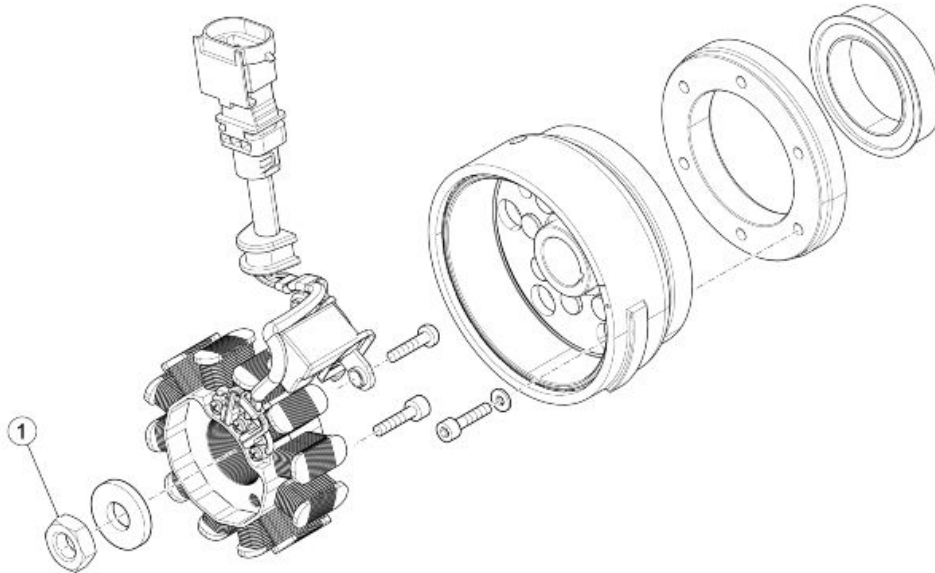
Generator side



FLYWHEEL COVER

pos.	Description	Type	Quantity	Torque	Notes
1	Flywheel cover fastener screw	M6	10	11 - 13 Nm (8.11 - 9.58 lbf ft)	-

pos.	Description	Type	Quantity	Torque	Notes
2	Timing control cover	M18	2	3.5 - 4.5 Nm (2.58 - 3.31 lbf ft)	-
3	Oil dipstick	M12x1.5	1	4 - 6 Nm (2.95 - 4.42 lbf ft)	-

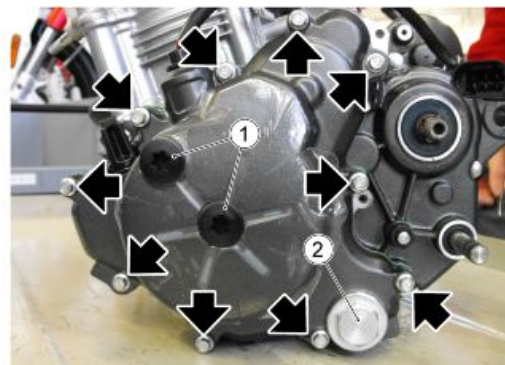


IGNITION UNIT

pos.	Description	Type	Quantity	Torque	Notes
1	Flywheel rotor fixing screw	M14x1.5	1	83 - 90 Nm (61.21 - 66.38 lb ft)	-

Removing the flywheel cover

- Unscrew and remove the two adjustment plugs (1).
- Unscrew and remove the engine oil pre-filter plug (2).
- Remove the engine oil pre-filter.
- Undo and remove the ten screws fixing the flywheel cover.
- Remove the flywheel cover.



Magneto flywheel removal

- Remove the starter motor gear.



- Position the locking tool.
- Unscrew and remove the hex head screw and retrieve the washer.

Specific tooling

865259 Flywheel retainer



- Position the tool.
- Remove the flywheel and its spline.

Specific tooling

864868 Flywheel extractor





- Remove the oil filter.



Freewheel removal

- Undo and remove the screw from the lock.
- Remove the freewheel.



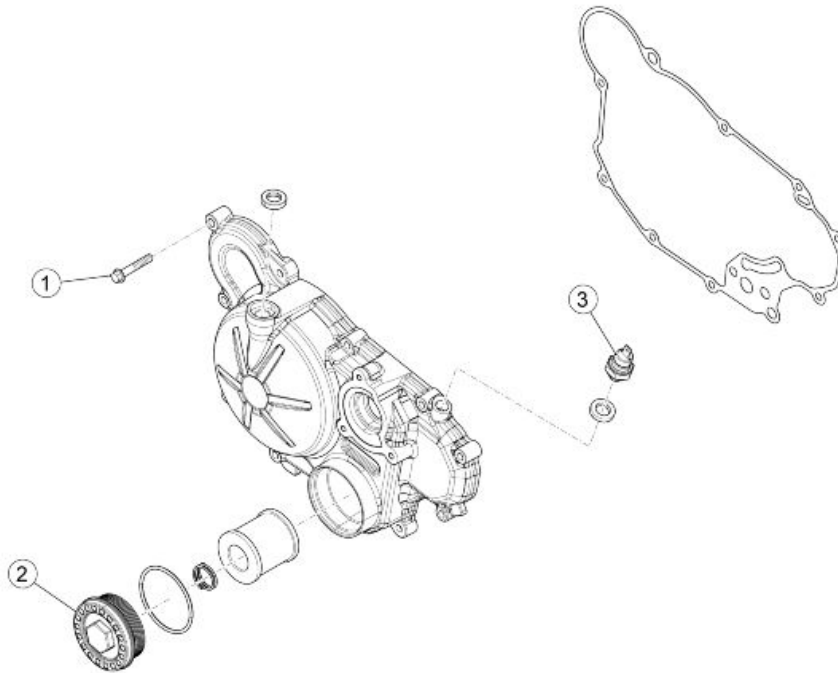
Installing the flywheel

For refitting follow the operations described previously in reverse order.

See also

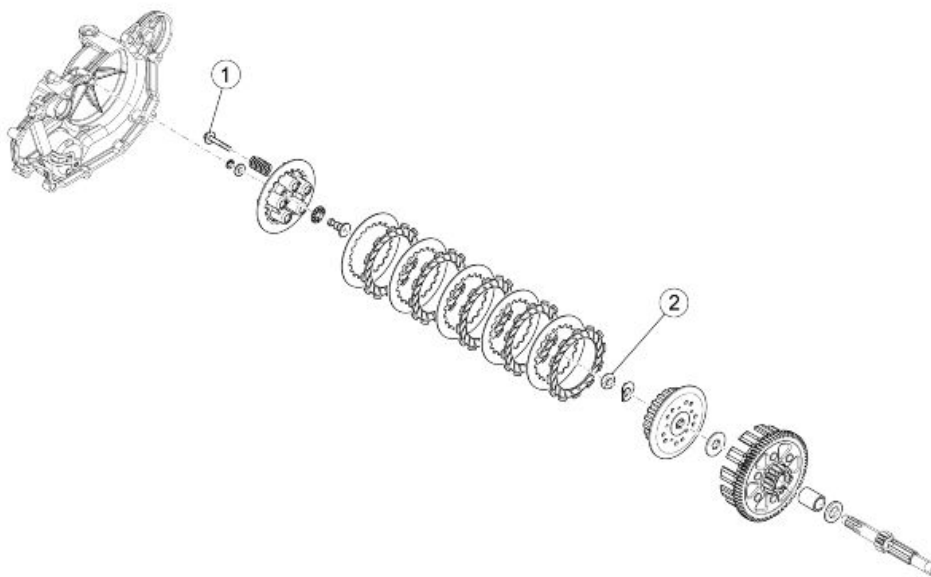
Magneto flywheel removal

Clutch side



CLUTCH COVER

pos.	Description	Type	Quantity	Torque	Notes
1	Clutch cover fixing screw	M6x35	10	11 - 13 Nm (8.11 - 9.58 lbf ft)	-
2	Oil filter cover	M56x1.5	1	24 - 26 Nm (17.70 - 19.17lbf ft)	-
3	Oil pressure sensor	M10	1	12 - 14 Nm (8.85 - 10.32 lbf ft)	-

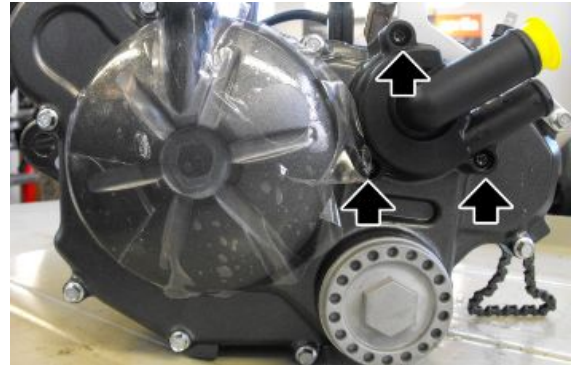


CLUTCH

pos.	Description	Type	Quantity	Torque	Notes
1	Clutch spring screw	M5	5	3.5 - 4.5 Nm (2.58 - 3.31 lbf ft)	-
2	Clutch housing retainer nut	M12	1	35 - 45 Nm (25.81 - 33.19 lbf ft)	-

Removing the clutch cover

- Unscrew and remove the three water pump cover screws.

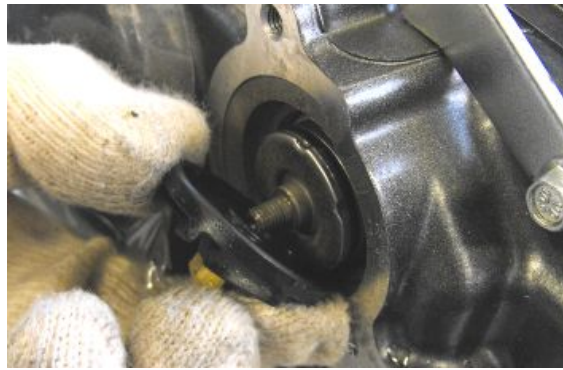


- Remove the water pump cover.



- Unscrew and remove the rotor fixing screw.
- Remove the rotor.





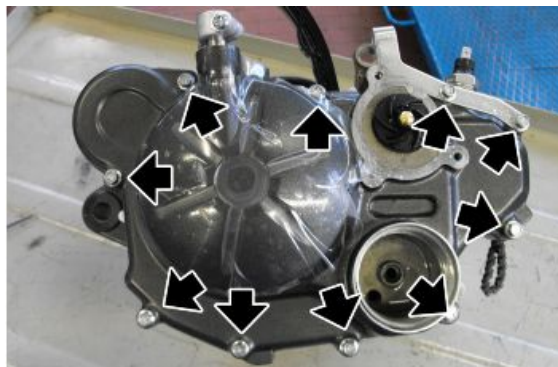
- Unscrew and remove the oil filter plug.



- Remove the spring and oil filter.



- Unscrew and remove the ten clutch cover screws.
- Remove the clutch cover and the gasket.
- Collect the dowel pins.

WARNING**REPLACE THE GASKET DURING REFITTING.**

- Remove the lubrication circuit by-pass spring.

**Disassembling the clutch**

- Unscrew and remove the six screws by loosening them 1/4 of a turn at a time; operate in stages and diagonally, and retrieve the washers and the clutch springs.



- Remove the thrust bearing.
- Remove the discs.



- Release the screw by lowering the lock tab.



- Block clutch bell rotation using the specific tool.
- Unscrew and remove the clutch bell fixing nut.
- Remove the clutch hub.



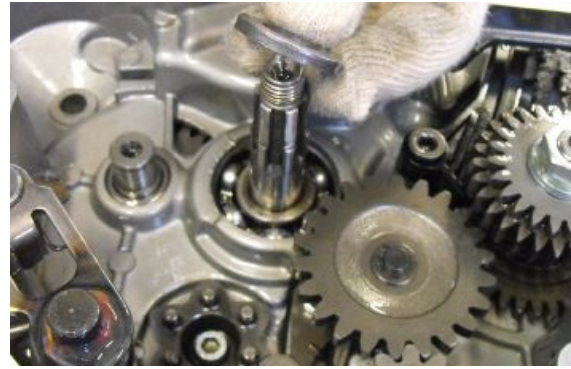
Specific tooling

00H05300041 Clutch retainer

- Remove the shim and the clutch housing.



- Remove the shim.



Checking the clutch plates

Characteristic

Driving plates thickness

2.85 - 2.95 mm (0.112 - 0.116 in)

Number of driving plates

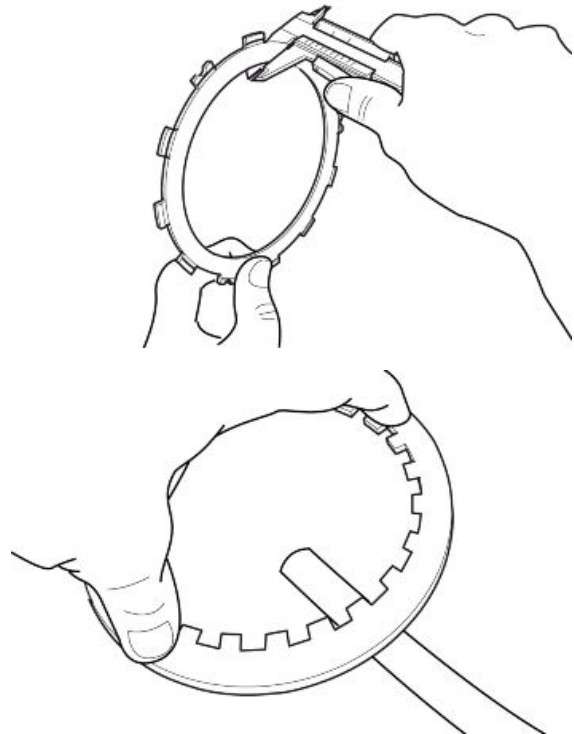
5

Driven plates thickness

1.46 - 1.53 mm (0.057 - 0.06 in)

Number of driven plates

4



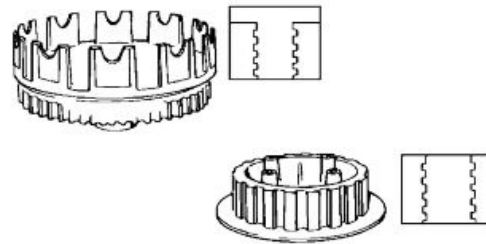
Checking the clutch housing

COUPLING CLASSES

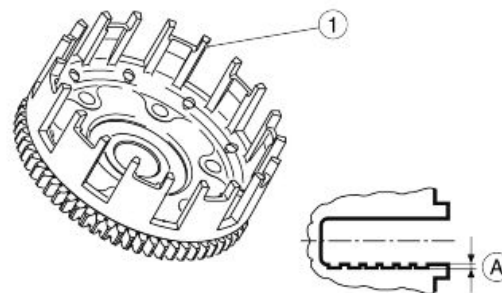
The gears that are coupled to each other: clutch housing, first gear shaft and balancing countershaft, indicate the coupling classes; in this regard, see section "Checking the primary shaft" within the topic "Gearshift".

Check the primary driven gear for damage and wear and, if necessary, replace the primary driven gear and the clutch bell all together.

Make sure there is not excessive noise during operation; if necessary, replace the primary drive gear and the clutch bell all together.

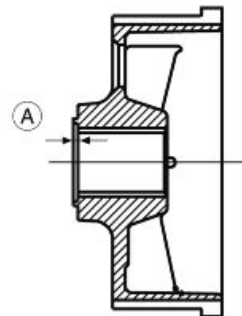


- Check the worn guiding grooves of the clutch bell (1); max. insertion depth (A) = 0.5 mm (0.020 in).

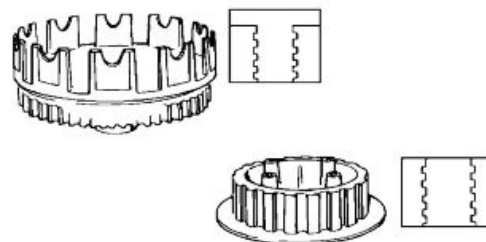


Checking the clutch hub

- When the clutch hub is worn it can create problems with sliding of the housing. The hub should be replaced if the surface of the spring has exceeded the wear limits. Max. wear limit (A) 0.3 mm (0.012 in).

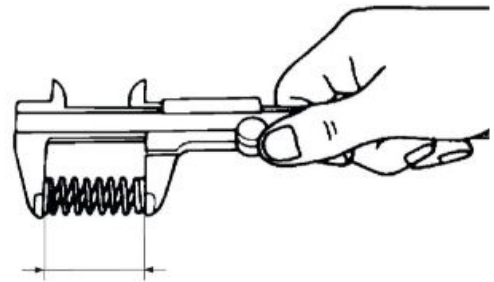


Check the clutch hub for damage and wear that may result in clutch irregular operation. If necessary, replace the hub.



Checking the springs

- Check the springs for damage and, if necessary, replace them all together.
- Measure the clutch spring length when unloaded; if necessary, replace the springs all together.



Characteristic

Minimum wear limit in the release position of the individual clutch springs

31.6 mm (1.24 in)

Assembling the clutch

- Insert the shim.



- Fit the clutch housing.
- Fit the shim washer.



- Insert the clutch hub.
- Screw in the retainer nut locking the rotation of the clutch housing with the specific tool.

Specific tooling**00H05300041 Clutch retainer**

- Lift one side of the lock tab.



- Insert the disc covered with the friction material into the bell.
- Continue inserting, alternating a metal disc with one with friction material, finishing with a friction material disc with a black tooth.

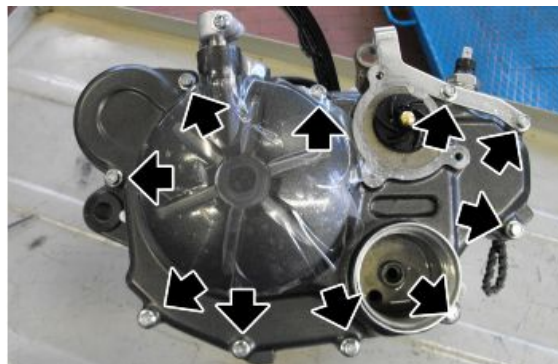


- Place the thrust plate.



- Fit the clutch springs.
- Fit the screw washers.
- Tighten the six screws operating in stages and diagonally.

- Insert a new gasket.
- Position the dowel pins and the cover.
- Position the clutch cable support.
- Screw in the ten screws, tightening diagonally and in stages.
- Refit the water pump.
- Refit the oil filter.
- Add engine oil up to the correct level.

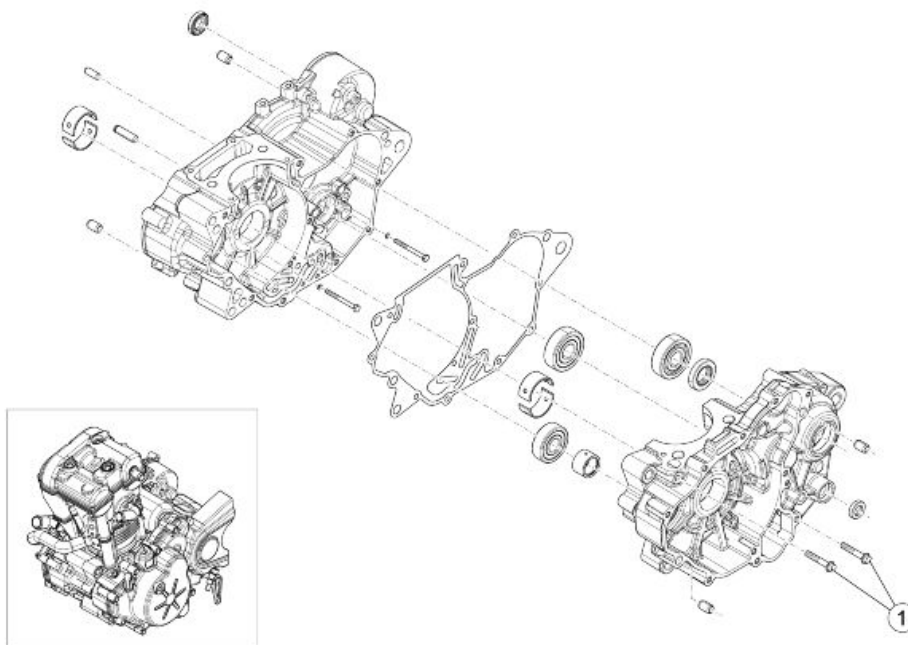


WARNING



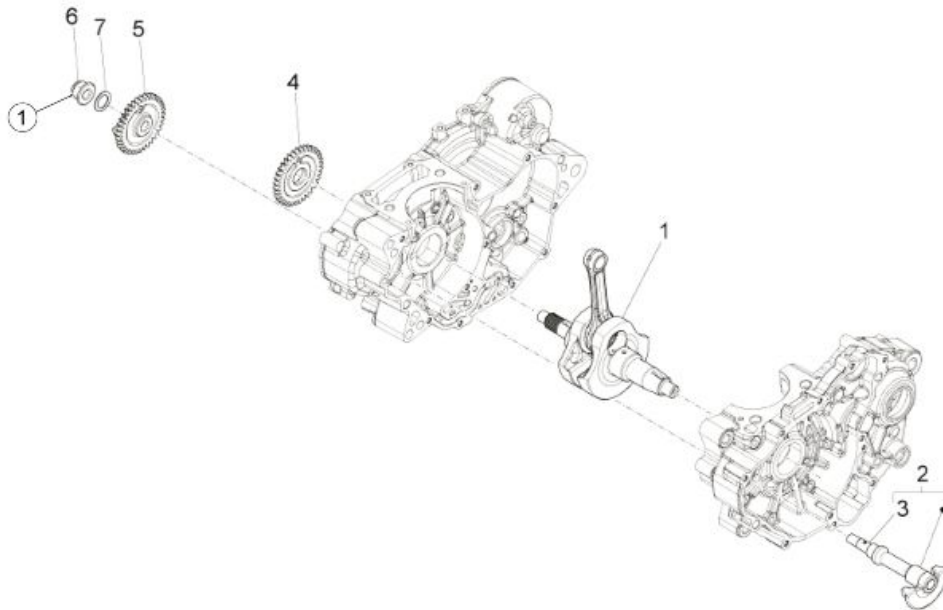
TO FACILITATE INSERTION OF THE COVER, ROTATE WATER PUMP THE ROTOR UNTIL THE GEARS ENGAGE.

Crankcase



ENGINE CRANKCASE

pos.	Description	Type	Quantity	Torque	Notes
1	Crankcase halves union	M6	12	11 - 13 Nm (8.11 - 9.58 lbf ft)	-



CRANKSHAFT

pos.	Description	Type	Quantity	Torque	Notes
1	Countershaft gear retainer nut	M10	1	35 - 45 Nm (25.81 - 33.19 lbf ft)	-

Balancing countershaft removal

- Before taking out the balancing countershaft the clutch cover and flywheel cover must be removed.
- Lock the countershaft with the specific tool.



Specific tooling

864486 Blocking the countershaft

- Unscrew and remove the nut and collect the washer



See also

Removing the
clutch cover
Removing the flywheel cover

- Remove the countershaft gear.



- Remove the countershaft from the alternator side.

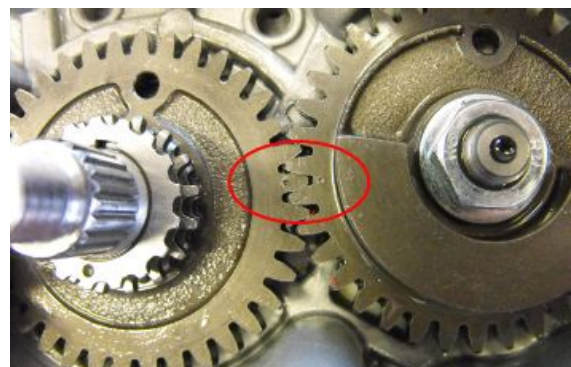


Balancing countershaft fitting

- Insert the countershaft from the alternator side.



- Insert the gear aligning its reference to the primary gear.
- Using the specific tool, tighten the nut remember first to place the washer.



Specific tooling

864486 Blocking the countershaft

Crankcase opening

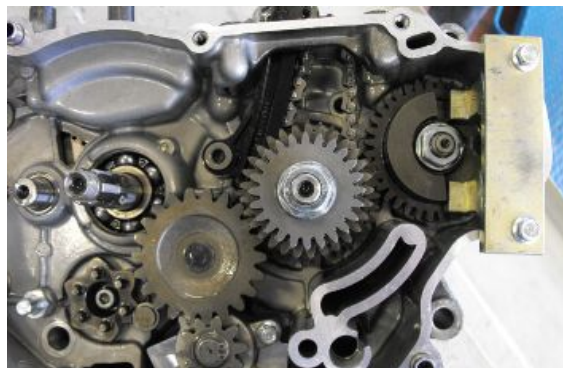
- Beforehand remove the clutch cover and the clutch.
- Remove the gear selector.



- Install the countershaft blocking tool.

Specific tooling

864486 Blocking the countershaft



- Remove the primary gear unscrewing and removing the nut.
- Collect the washer.
- Remove the countershaft gear.



- Remove the primary remaining gears.
- Remove the head and cylinder.



See also

[Removing the](#)

cylinder

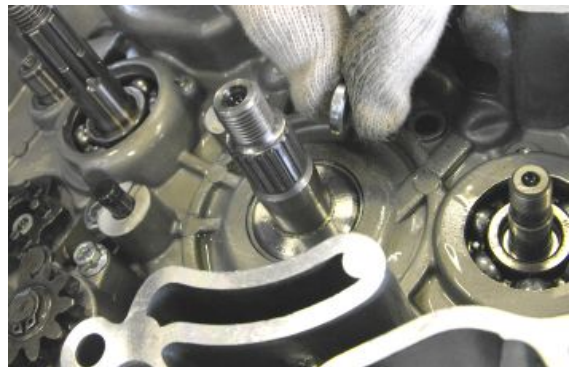
- Remove the chain guide slider, unscrewing and removing the fixing screw.
- Remove the timing chain gear.



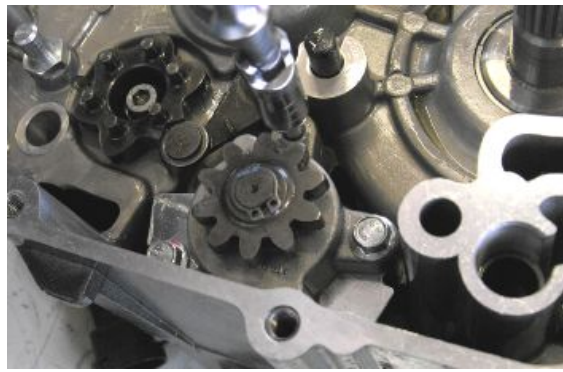
- Remove the pump drive gear, removing the seeger and recovering the washer.



- Remove the base gear of the main shaft.
- Remove the cotter.



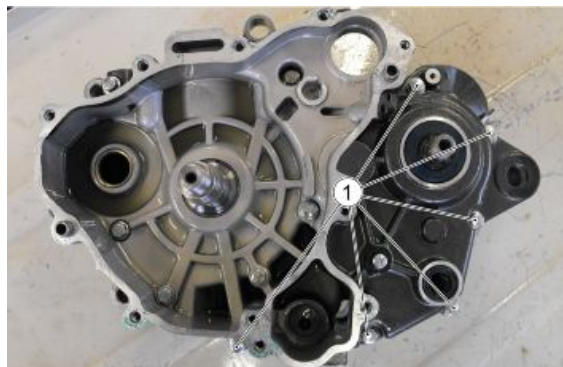
- Remove the oil pump unscrewing the three fixing screws.
- Collect the gasket.



- Remove the gear spider screw, unscrewing and removing the fixing screw.



- Moving from the left side of the engine, remove the flywheel and all of its components beforehand.
- Unscrew and remove the six screws on the outside of the crankcase (1).



See also

Magneto flywheel removal

- Unscrew and remove the longest screw (2).



- Unscrew and remove the five screws (3).
- Unscrew and remove the short screw (4).



- Remove the left crankcase.



Bearing removal

- Heat the crankcase surface with a heat gun.
- Remove the bearing using the specific extractor.

List of extractors to be used with sleeve 020376Y:

RIGHT CRANKCASE

- Insertion of main shaft bearing: 020439Y+020359Y Removal of the main shaft bearing: 020358Y
- Insertion of desmo bearing: 020439Y+020357Y Removal of desmo bearing: 020891Y
- Insertion of secondary shaft roller bearing cage: 020891Y Removal of the secondary shaft roller bearing cage:020363Y
- Insertion of countershaft bearing: 020412Y+020358Y Removal of countershaft bearing: 020375Y

LEFT CRANKCASE

- Insertion of main shaft bearing: 020439Y+020359Y Removal of the main shaft bearing: 020358Y
- Insertion of desmo roller bearing cage: 020375Y Removal of desmo roller bearing cage: use universal extractor

- Insertion of secondary shaft roller bearing cage: 020363Y Removal of the secondary shaft roller bearing cage: use universal extractor
- Insertion of countershaft roller bearing cage: 020483Y Removal of countershaft roller bearing cage: 020364Y

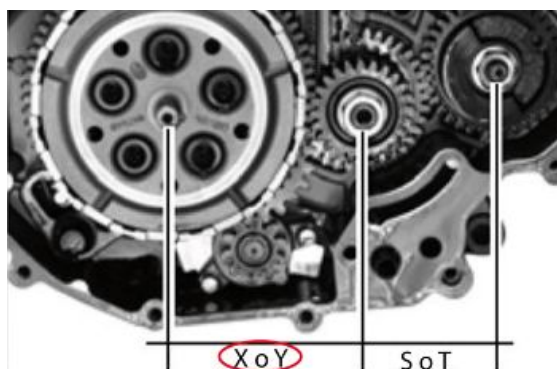
Crankcase check

There are two classes of couplings highlighted on the crankcases (X-Y and S-T).

The coupling between the gears of the crankshaft and the first gear shaft has been classified into two classes. These classes are defined according to the interaxial distance that exists between two elements:

COUPLING CLASS INTERVALS CRANKSHAFT - FIRST GEAR SHAFT

Specification	Desc./Quantity
X	86.00 - 86.04 mm (3.386 - 3.388 in)
Y	85.96 - 86.00 mm (3.384 - 3.386 in)



Therefore, the couplings will be:

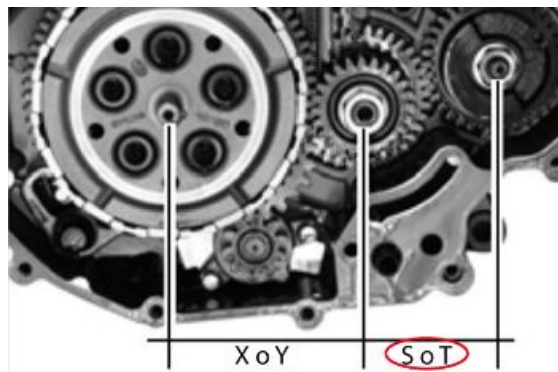
COUPLING CLASSES CLUTCH HOUSING - FIRST GEAR SHAFT

Coupling classes on Crankcase	Clutch housing gear	Transmission gear
X	X	X
Y	Y	Y

The coupling between the gears of the first gear shaft and gear of the balancing countershaft has been classified into two classes. These classes are defined according to the interaxial distance that exists between two elements:

COUPLING CLASS INTERVALS FIRST GEAR SHAFT - BALANCING COUNTERSHAFT

Specification	Desc./Quantity
S	64.00 - 64.03 mm (2.520 - 2.521 in)
T	63.97 - 64.00 mm (2.519 - 2.520 in)

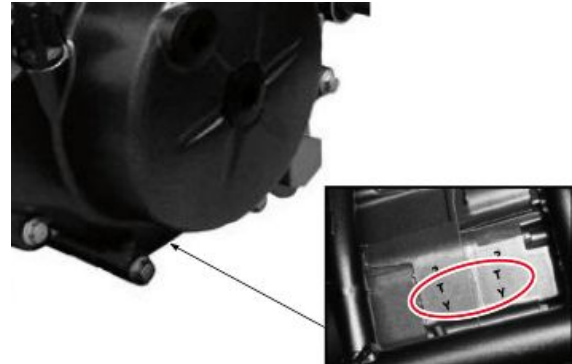


Therefore, the couplings will be:

COUPLING CLASSES FIRST GEAR SHAFT - BALANCING COUNTERSHAFT

Coupling classes on Crankcase	Transmission gear	Balancing countershaft gear
S	S	S
T	T	T

The classes of the transmission elements are also listed on the two crankcase halves.



NOTE

CRANKCASE SPARE PARTS ARE ALWAYS CLASS X.

Crankshaft check

- Before checking the crankcase halves, thoroughly clean all the surfaces and the oil pipes.
- For the crankcase half on the transmission side, take particular care when handling the housing and hoses for the oil pump, the duct with the by-pass valve and the main bushings.
- As already described in the lubrication chapter, it is especially important that the by-pass valve housing shows no wear that may impair the proper sealing of the lubrication pressure adjustment ball.
- Check that the surfaces are free from dents or deformations, with special attention to both the crankcase coupling and the cylinder-crankcase surfaces.
- Defects in the crankcase coupling gasket or the surfaces indicated in the figure can cause a drop in the oil pressure and affect the lubrication pressure for the main bushings and the connecting rod.

- Check that the surfaces that limit crankshaft axial clearance show no signs of wear. To measure and check sizes follow the procedure described previously for checking crankshaft axial clearance and dimensions.

Balancing countershaft check

COUPLING CLASSES

The gears that are coupled to each other: clutch housing, first gear shaft and balancing countershaft, indicate the coupling classes; in this regard, see section "Checking the primary shaft" within the topic "Gearshift".

Bushing selection

BUSHING SEAT DIAMETER ON CRANKCASE

Specification	Desc./Quantity
Class 1	MIN 36.500 mm (1.4370 in) MAX 36.508 mm (1.4373 in)
Class 2	MIN 36.508 mm (1.4373 in) MAX 36.516 mm (1.4376 in)

CRANKSHAFT DIAMETER

Specification	Desc./Quantity
Class 1	MIN 32.480 mm (1.2787 in) MAX 32.485 mm (1.2789 in)
Class 2	MIN 32.485 mm (1.2789 in) MAX 32.490 mm (1.2791 in)

BUSHING THICKNESS

Specification	Desc./Quantity
Red	MIN 2.005 mm (0.0789 in) MAX 2.010 mm (0.0791 in)
Blue	MIN 2.010 mm (0.0791 in) MAX 2.015 mm (0.0793 in)

CRANKSHAFT COUPLING/BUSHING SEAT DIAMETER

Specification	Desc./Quantity
Crankshaft type 2	Type 1 crankcase diameter RED + RED Type 2 crankcase diameter RED + BLUE
Crankshaft type 1	Type 1 crankcase diameter RED + BLUE Type 2 crankcase diameter BLUE + BLUE

Bearing fitting

- Heat up the crankcase using the thermal gun.
- Fit the bearing in the seat with the aid of the specific tool.

List of tools for refitting, to be coupled with sleeve 020376Y:

RIGHT CRANKCASE

- Insertion of main shaft bearing: 020439Y+020359Y Removal of the main shaft bearing: 020358Y

- Insertion of desmo bearing: 020439Y+020357Y Removal of desmo bearing: 020891Y
- Insertion of secondary shaft roller bearing cage: 020891Y Removal of the secondary shaft roller bearing cage:020363Y
- Insertion of countershaft bearing: 020412Y+020358Y Removal of countershaft bearing: 020375Y

LEFT CRANKCASE

- Insertion of main shaft bearing: 020439Y+020359Y Removal of the main shaft bearing: 020358Y
- Insertion of desmo roller bearing cage: 020375Y Removal of desmo roller bearing cage: use universal extractor
- Insertion of secondary shaft roller bearing cage: 020363Y Removal of the secondary shaft roller bearing cage: use universal extractor
- Insertion of countershaft roller bearing cage: 020483Y Removal of countershaft roller bearing cage: 020364Y

NOTE: insertion of the roller bearing cages in line with the crankcase is recommended from the inside to the outside.

Crankcase closing

- After fitting the transmission, fit a new gasket.
- Close the two crankcases using the dowel pins.



- Position and screw the short screw (4).
- Position and screw the five screws (3).



See also

[Assembling the gearbox](#)

- Position and screw the long screw (2).
- Moving from the left side of the crankcase, position and screw the six screws (1).
- Fit the countershaft.



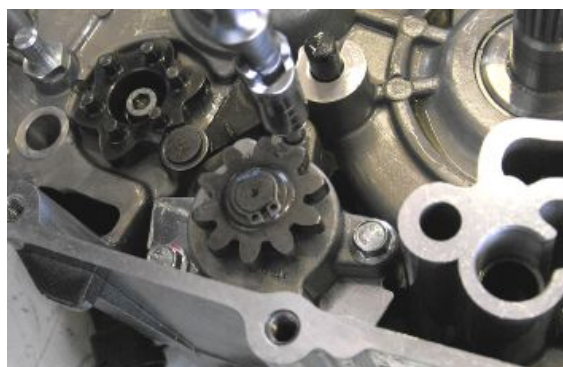
- Position the selection spider screw.
- Position and screw the screw.



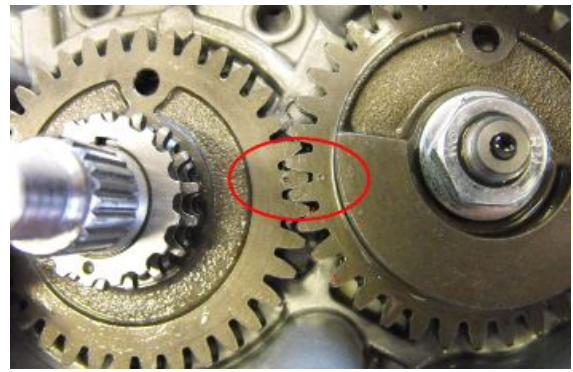
See also

[Balancing](#)
countershaft fitting

- Fit a new oil pump gasket.
- Fit the oil pump, screwing the three screws.



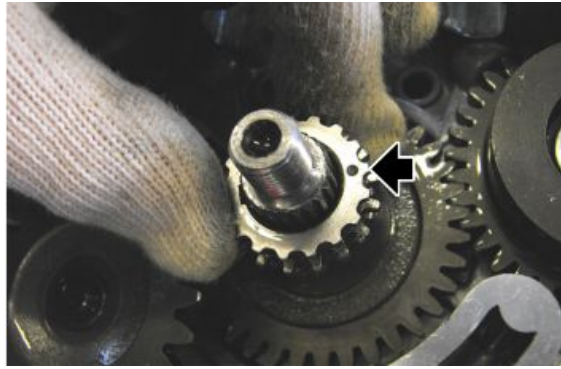
- Insert the countershaft gear and position the washer.
- Use the specific tool to tighten the nut.
- Apply the cotter to the main shaft.
- Position the base gear of the primary, aligning the two references.



- Insert the pump drive gear.
- Insert the washer and apply the fixing seeger.



- Insert the timing chain gear, paying attention to the direction. The engraving must face upward.
- Fit the timing chain.



- Position the chain guide slider.
- Position and screw the fixing screw.



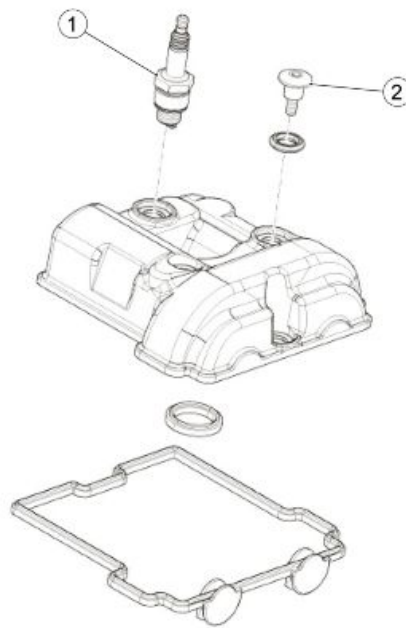
- Fit the rest of the primary gears.
- Tighten the fixing nut.
- Remove the countershaft locking tool.



- Fit the gear selector.

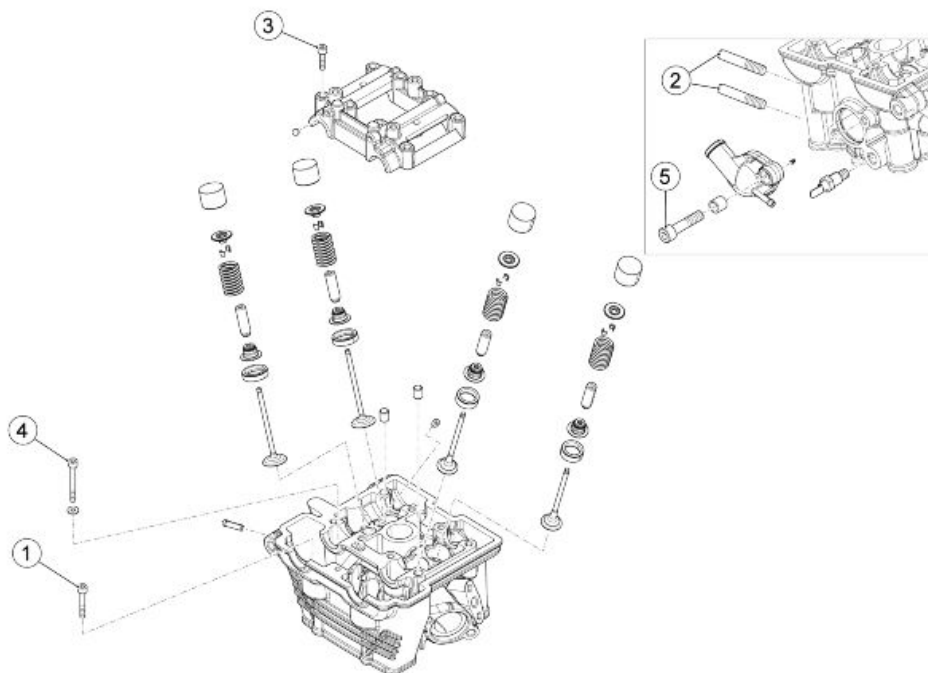


Head and timing



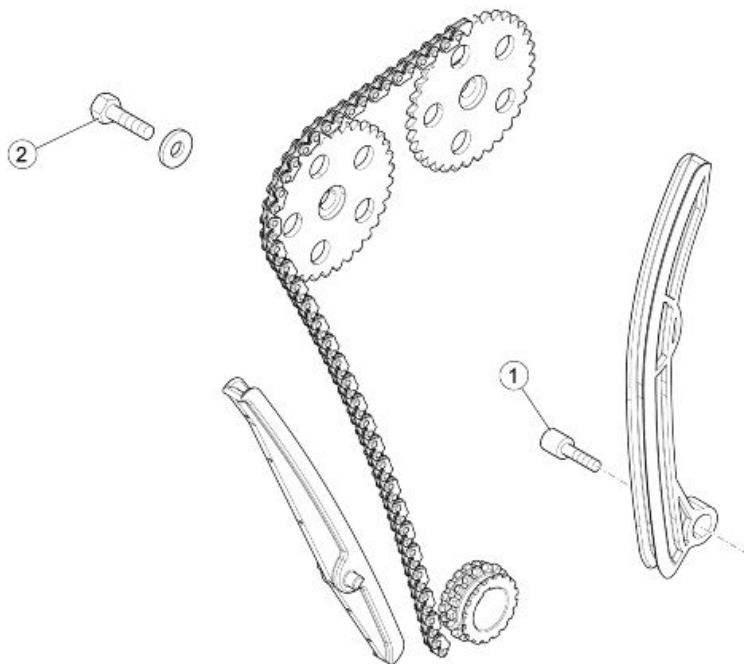
HEAD COVER

pos.	Description	Type	Quantity	Torque	Notes
1	Spark plug	M10	1	12 - 14 Nm (8.85 - 10.32 lbf ft)	-
2	Head cover fixing screw	M6	4	10 - 12 Nm (7.38 - 8.85 lbf ft)	-



HEAD - VALVES

pos.	Description	Type	Quantity	Torque	Notes
1	Head fastener screw, chain side	M6x130	2	11 Nm (8.11 lbf ft)	-
2	Exhaust side fixing stud bolt	M8x40	2	12 Nm (8.85 lbf ft)	-
3	Camshaft support fixing screw	M6x40	8	10 Nm (7.38 lbf ft)	-
4	Head fixing screw	M8x166	4	25 Nm + 90° (18.44 lbf ft + 90°)	-
5	Thermostat cover fixing screw	M6x20	2	10 Nm (7.38 lbf ft)	-



TIMING SYSTEM

pos.	Description	Type	Quantity	Torque	Notes
1	Chain tensioner slider fulcrum fixing screw	M6x16	1	10 Nm (7.38 lbf ft)	Loctite 243
2	Transmission timing gear fixing screw	M8x40	1	27 Nm (19.91 lbf ft)	Loctite 243

Removing the head cover

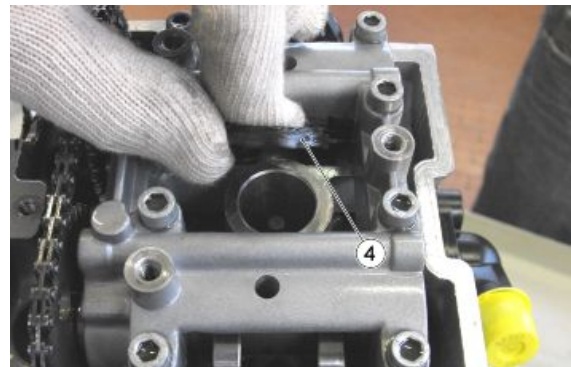
- Remove the adjuster screw covers (1).



- Unscrew and remove the four cylinder head screws (2).
- Remove the cylinder head (3).



- Remove the gasket (4).

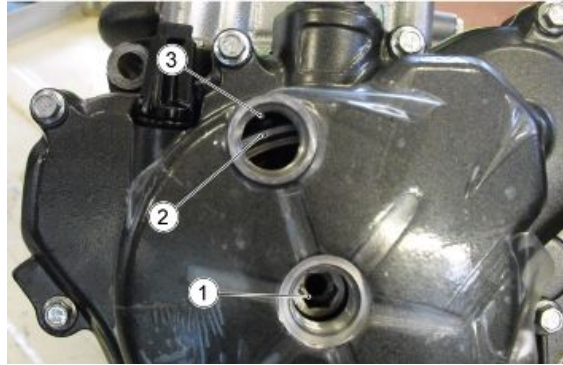


- Remove the spark plug.



Removing the timing control

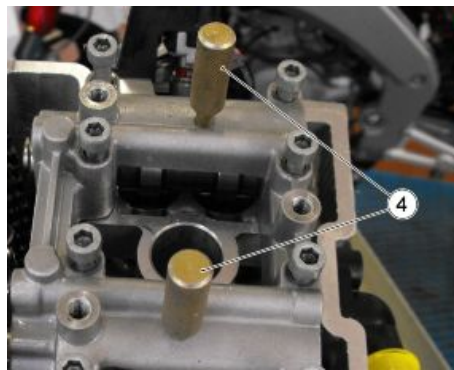
- Turn the crankshaft from the hole on the cover (1)
- Take the piston to TDC.
- The sign (2) must be aligned with the sign (3).



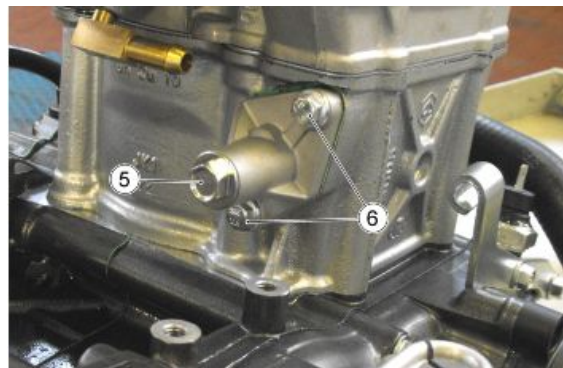
- Insert the specific pins (4) on the valves cam tower.

Specific tooling

864567 Locking pins timing camshafts



- Remove the starter motor beforehand.
- Loosen and remove the tensioner screw (5).



- Remove the spring.
- Unscrew and remove the two screws (6) and remove the entire tensioner control.



See also

[Removing the starter motor](#)

- Lock the timing gear using the specific tool.

Specific tooling

865260 Camshaft sprocket lock



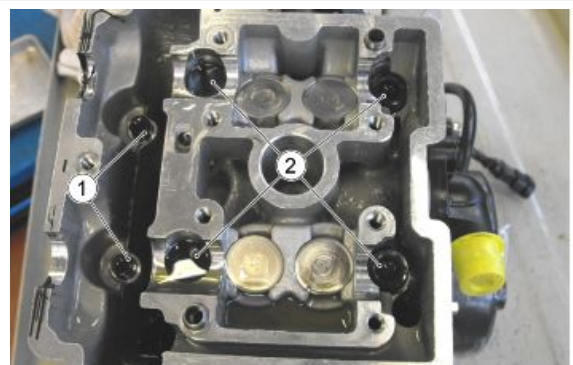
- Unscrew and remove the gear.
- Repeat the operation with the other gear.



Cylinder head

Removing the overhead camshaft

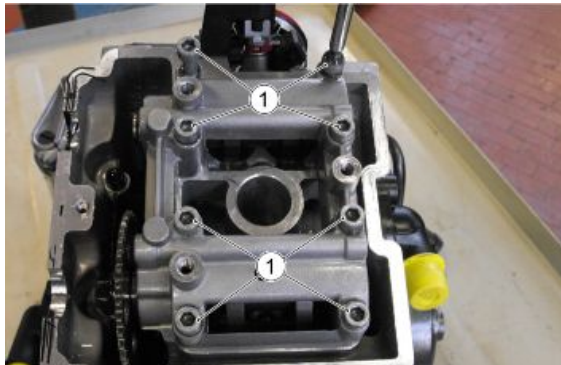
- Unscrew and remove the six screws (1) and (2).
- Remove the cylinder head (3).



- Remove the cylinder head (3).



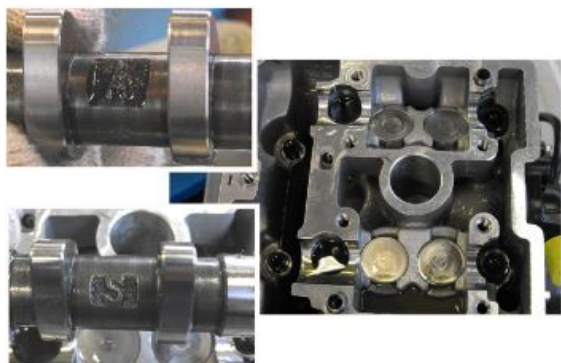
- Remove the two pins from the valves cam tower.
- Remove the eight screws (1).



- Remove the valve cam tower (2).



- Remove the two camshafts, intake and exhaust side.



Removing the valves

- Remove the head.
- Place the head on supporting surface.
- Number the valves and their bucket tappets in order to position them correctly upon refitting.



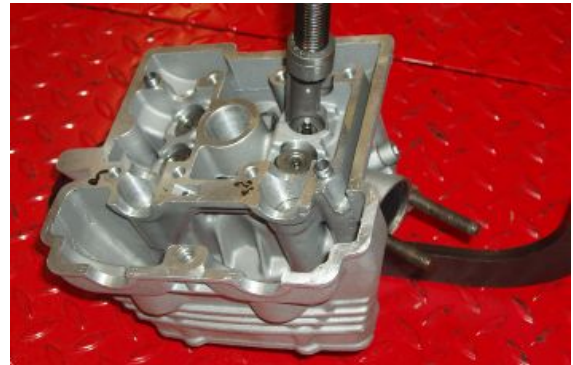
-
- Remove the valve bucket tappets.



-
- Compress the valve spring using the specific tool.

Specific tooling

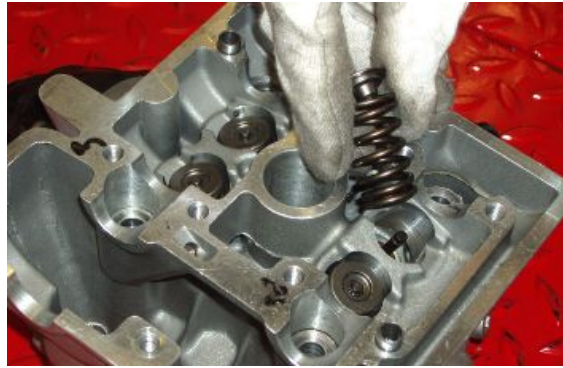
020382Y011 Tool to remove/fit valves



-
- Remove both cotter pins.



- Release the valve springs.
- Remove the cap and the valve spring.



Checking the overhead camshaft

- Check the camshaft bearings for signs of abnormal wear.

Characteristic

Standard diameter - Bearing A

19.980 - 19.959 mm (0.7866 - 0.7858 in)

Minimum diameter allowed - Bearing A

19.95 mm (0.7854 in)

Inlet cam height

31.488 mm (1.23968 in)

Exhaust cam height

30.864 mm (1.21511 in)

- Check that the holes used for timing and their shoulders are not worn.
- If values measured are not within the specified limits or there are signs of wear, replace the defective components with new ones.



Characteristic

Maximum axial clearance allowed:

0.4 mm (0.0157 in)

Valve check

- Measure the width of the sealing surface on the valve seats and on the valves themselves.
- If the sealing surface on the valve is wider than the specified limit, damaged in one or more points or curved, replace the valve with a new one.

CAUTION

DO NOT CHANGE THE VALVE FITTING POSITION (RH - LH).

Characteristic

Minimum diameter allowed - Intake

3.96 mm (0.1559 in)

Minimum diameter allowed - Exhaust:

3.95 mm (0.1555 in)

Standard clearance - Intake:

0.015/0.042 mm (0.00059/ 0.0016 in)

Standard clearance - Exhaust:

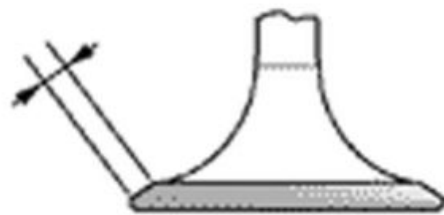
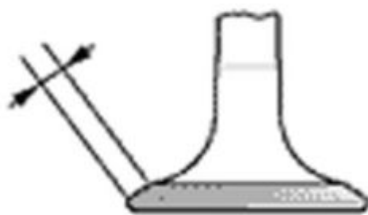
0.025/0.052 mm (0.00098/ 0.00204 in)

Maximum clearance admitted - Intake:

0.060 mm (0.0023 in)

Maximum clearance admitted - Exhaust:

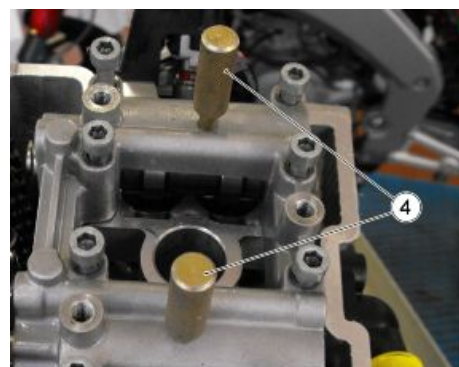
0.070 mm (0.0027 in)



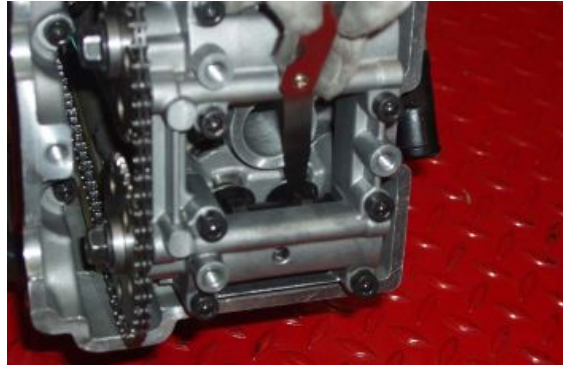
- Remove the head cover.
- Bring the engine to reach the top dead centre and lock it at that position using the specific tool (4).

Specific tooling

864567 Locking pins timing camshafts



- Use a feeler gauge to check clearance on the four valves.
- If the values measured differ from the values specified, record the difference between MAXIMUM ALLOWED CLEARANCE e CLEARANCE MEASURED.



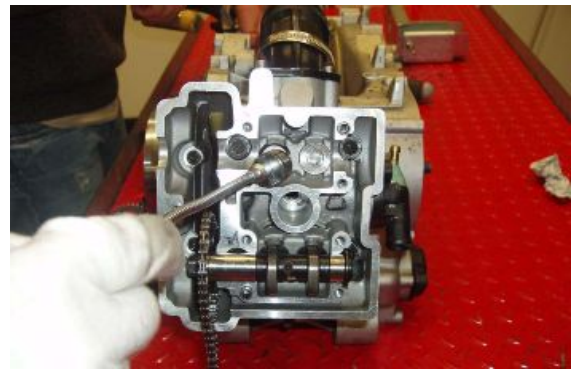
- Remove the chain tensioner.
- Undo and remove the eight screws and remove the cam tower.



- Remove the timing chain and the gears of the camshaft of the valves in question.



- Remove the bucket tappet of the valve in question and read the calibration value for that bowl, found inside the bucket tappet itself.
- Replace the bucket tappet with new one of a size suitable to restore the correct clearance.



Characteristic

Valve clearance at intake

0.15 mm (0.0059 in)

Exhaust valve clearance

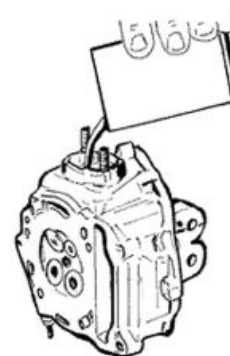
0,25 mm (0.0098 in)



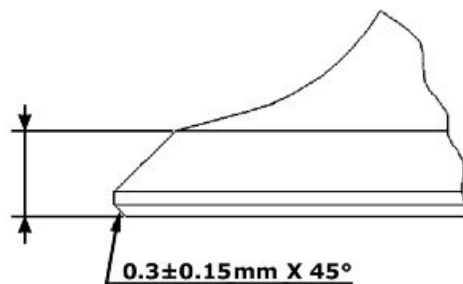
- Fit the camshaft, the gears and the chain in their correct positions, using the references located on the flywheel side of the crankcase.
- Fit the cam tower and tighten the eight screws to the prescribed torque.
- Fit the chain tensioner.
- Check for correct valve clearance.
- Fit the head cover.

Inspecting the valve sealings

- Fit the valves into the cylinder head.
- Alternatively test the intake and exhaust valves.
- This test should be carried out by filling the manifold with petrol and checking that the head does not excessively ooze through the valves.



- Measure the sealing surface width on the valve seats.



VALVE SEALING SURFACE

Specification	Desc./Quantity
Inlet valve - seal surface	2.30 +/- 0.15 mm (0.0905 +/- 0.0059 in)
Outlet valve - seal surface	2.95 +/- 0.15 mm (0.1161 +/- 0.0059 in)
Valve chamfering	0.2 +/- 0.1 mm x 45° (0.0079 +/- 0.0039 in x 45°)

Inspecting the valve housings

- Remove any carbon deposits from the valve guides.
- Measure the inside diameter of each valve guide.
- Measure according to the thrust direction at three different heights.

Characteristic

Intake guide - standard diameter

4.012 mm (0.1579 in)

Intake guide: Wear limit

4.020 mm (0.1582 in)

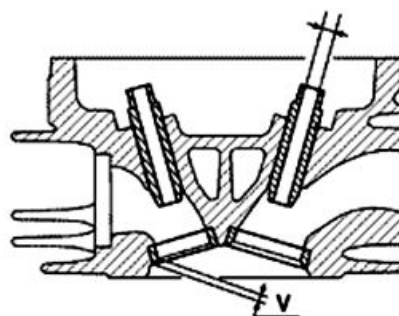
Discharge guide - standard diameter

4.012 mm (0.1579 in)

Discharge guide: Wear limit

4.020 mm (0.1582 in)

- Replace the head if the values corresponding to the width of the mark on the valve seat or the valve guide diameter exceed the specified limits.
- Check the width of the mark on the valve seat «V».



Characteristic

Wear limit for the width of the mark on the valve seat "V"

- Intake: 1.6 mm (0.0630 in)
- Outlet: 1.8 mm (0.0708 in)

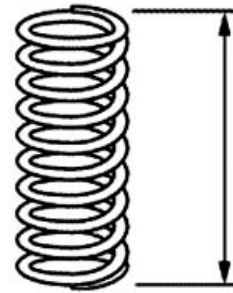
Inspecting the springs and half-cones

- Check that the spring upper supporting caps and the cotters show no signs of abnormal wear.
- Check the unloaded spring length.

Characteristic

Valve spring length:

33.24 +/- 0.25 mm (1.3086 +/- 0.0098 in)



Checking the cylinder head

- Using a trued bar, check that the head surface is not worn or distorted.
- Check that the camshaft bushings are not worn.
- Check that the head cover surface, the intake manifold and the exhaust manifold are not worn.

Installing the valves

- Lubricate the valve guides with engine oil.
- Position the two oil seals on the cylinder head.

- Fit the valves, the springs and the caps. Using the specific tool, compress the springs and fit the cotters in their seats.

Specific tooling

020382Y011 Tool to remove/fit valves



Checking the chain tensioner

CHAIN TENSIONER

- Remove the central screw with the washer and the tensioner spring. Check that the one-way mechanism is not worn.
- Check the condition of the tensioner spring.
- If signs of wear are found, replace the whole assembly.

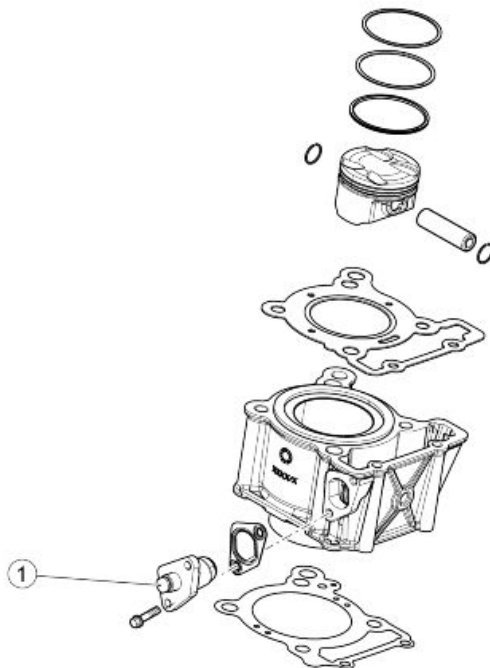


Checking the chain

- Check that the guide slider and the tensioner pad are not excessively worn.
- Check that the chain assembly, the camshaft driving pulleys and the sprocket wheel are not worn.
- Replace the parts if signs of wear are found.



Cylinder-piston assembly

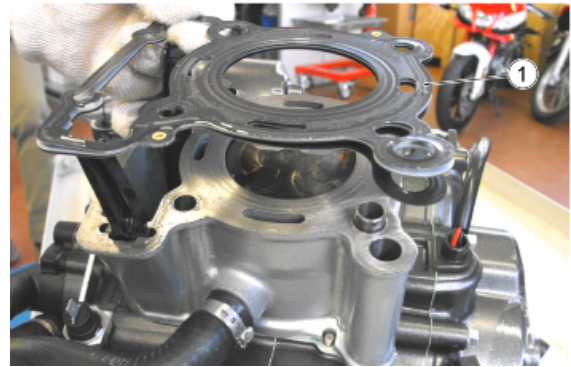


CYLINDER - PISTON

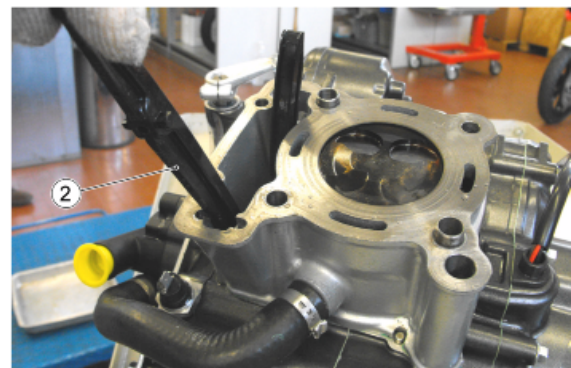
pos.	Description	Type	Quantity	Torque	Notes
1	Chain tensioner screw	M8	1	6 Nm (4.43 lbf ft)	-

Removing the cylinder**CYLINDER REMOVAL**

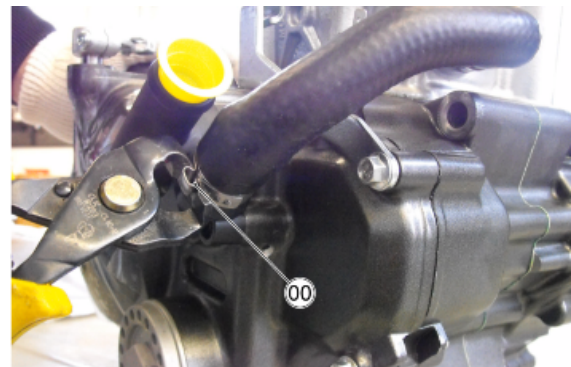
- Remove the cylinder head gasket (1).



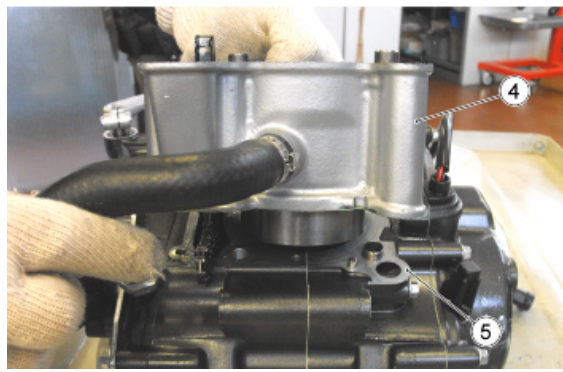
- Remove the guide slider (2).



- Remove the water sleeve clamp (3).



- Remove the cylinder (4).
- Remove the gasket (5).

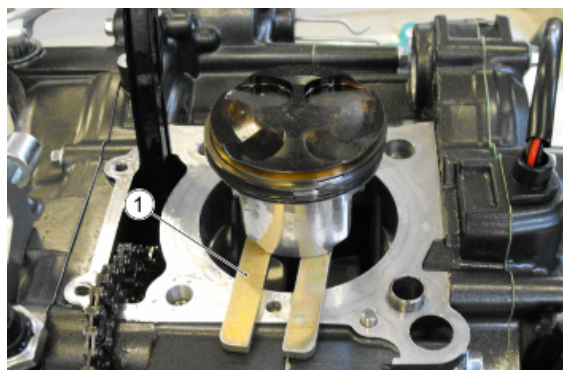


Disassembling the piston

- Apply the tool under the piston (1).
- Cover the base of the cylinder with a cloth.

Specific tooling

865261 Piston locking pin



- Remove the retainer ring which locks the pin (2).



- Remove the pin (3).
- Remove the piston (4).

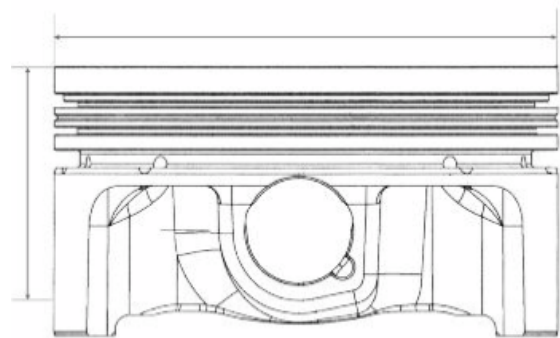


Checking the piston

- Measure the pin seat diameter on the piston.
- Calculate the pin - piston coupling clearance.



- Measure the piston outside diameter, perpendicular to the pin axis.
- Take the measurement at 6 mm (0.24 in) from the base, at the position shown in the figure.



- Carefully clean the sealing rings housings.
- Measure the sealing rings - grooves coupling clearance using suitable sensors, as shown in the diagram
- If clearances measured exceed the limits specified in the table, the piston should be replaced by a new one.



NOTE

MEASURE CLEARANCE BY INSERTING THE BLADE OF THE FEELER GAUGE FROM THE 2nd SEALING RING SIDE.

Characteristic

Piston / cylinder

Piston pin hole - standard: 15.003 - 15.008 mm
(0.5907 - 0.5908 in)

Maximum piston / cylinder coupling clearance after use

- top ring: 0.075 mm (0.0029 in)

- middle ring: 0.065 mm (0.0025 in)

- oil scraper: 0.25 mm (0.0098 in)

Standard piston / cylinder coupling clearance

- top ring: +0.03 / 0.062 mm (0.0012 / 0.0024 in)
- middle ring: +0.02 / 0.052 mm (0.0008 / 0.0020 in)
- oil scraper: +0.01 / 0.19 mm (0.0004 / 0.007480 in)

cylinder check

- Using a bore meter, measure the cylinder inside diameter at three different points according to the directions shown in the figure.
- Check that the coupling surface with the head is not worn or misshapen.



CAUTION
THE MARKING IS LOCATED ON THE PISTON CROWN.

Characteristic

Maximum run-out allowed:

0.05 mm

CYLINDER - PISTON COUPLING CLEARANCE 125 CM³

Coupling categories with cast-iron cylinder

NAME	ABBREVIATION	CYLINDER		PISTON		FITTING CLEARANCE	
		min	max	min	max	min	max
Cylinder/Piston	M	58.010	58.017	57.963	57.970	0.040	0.054
Cylinder/Piston	N	58.017	58.024	57.970	57.977	0.040	0.054
Cylinder/Piston	O	58.024	58.031	57.977	57.984	0.040	0.054
Cylinder/Piston	P	58.031	58.038	57.984	57.991	0.040	0.054

Inspecting the wrist pin

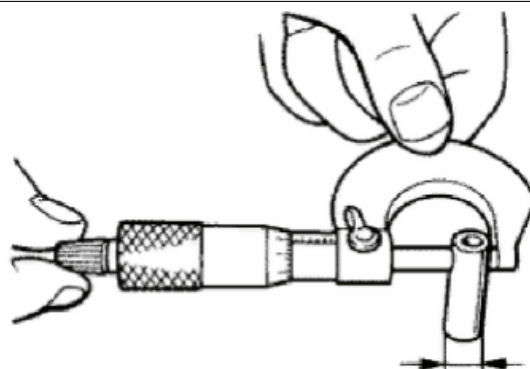
- Check the pin outside diameter.

Characteristic

Pin

Minimum diameter: 14.995 mm (0.590 in)

Standard diameter: 15.0000 +0/-0.0030 mm (0.00012 in)



Inspecting the piston rings

ANELLI DI TENUTA

Specification	Desc./Quantity
Compression ring (top)	0.2 / 0.35 mm (0.0079 / 0.014 in)
Compression ring (middle)	0.2 / 0.35 mm (0.0079 / 0.014 in)

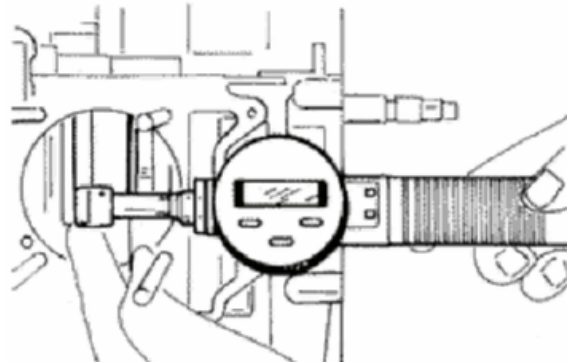
Specification	Desc./Quantity
Oil scraper ring	0.2 / 0.7 mm (0.0079 / 0.027 in)
Top ring maximum value	0.45 mm (0.18 in)
Middle ring maximum value	0.45 mm (0.18 in)

Checking the connecting rod small end

- Measure the inside diameter of the connecting rod small end using a specific micrometer.

NOTE

IF THE CONNECTING ROD SMALL END DIAMETER EXCEEDS THE MAXIMUM DIAMETER ALLOWED, SHOWS SIGNS OF WEAR OR OVERHEATING, REPLACE THE CRANKSHAFT AS DESCRIBED IN THE "CRANKCASE AND CRANKSHAFT" CHAPTER.



Characteristic

Rod small end

Maximum diameter: 15.023 mm (0.591 in)

Standard diameter: 15.010 - 15.018 mm (0.5910 - 0.5912 in)

Fitting the piston

- Install piston and pin onto the connecting rod, aligning the piston arrow the arrow facing towards the exhaust.



- Fit the retainer ring.



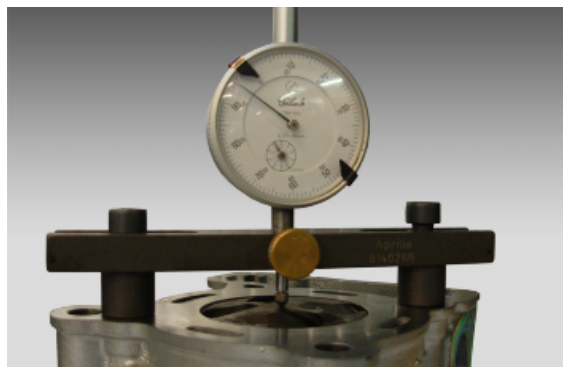
- Temporarily install the cylinder on the piston, without the gasket of the cylinder's base.
- Fit a dial gauge on the specific tool.
- Take the piston to TDC.
- Position the dial gauge on one side of the cylinder and fasten it in order to detect the zero position correctly.



Specific tooling

AP8140266 Dial gauge mounting

- Move the dial gauge diagonally and measure the piston protrusion in relation to the reference surface.
- Calculate the necessary thickness of the gasket, selecting it based on the values shown in the table below.

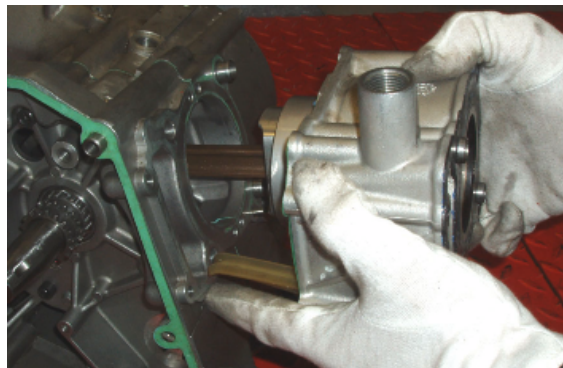


Installing the cylinder

- Fit a new cylinder base gasket of the chosen thickness.
- Refit the cylinder as indicated in the figure using the specific clamp tighten-er tool.

NOTE

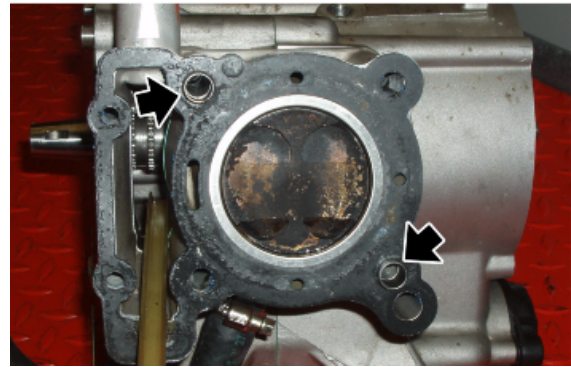
BEFORE FITTING THE CYLINDER, CAREFULLY BLOW AIR INTO THE LUBRICATION DUCT AND LUBRICATE THE CYLINDER LINER.



Specific tooling

020287Y tool for sealing ring fitting

- Fit a new gasket between the cylinder and the head.
- Place the two dowels.
- Install the head.



Selecting the base gasket

BASE GASKET SELECTION

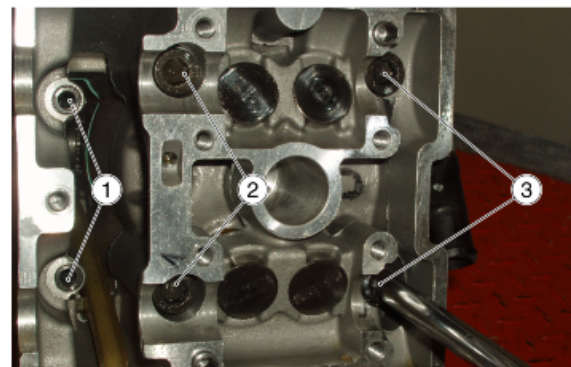
Specification	Desc./Quantity
Size measured: 0.95 / 1.09 mm (0.037 - 0.042 in)	Gasket 0.3+/-0.05 mm (0.012+/-0.001 in)
Size measured: 1.1 / 1.25 mm (0.043 - 0.049 in)	Gasket 0.4+/-0.05 mm (0.015+/-0.001 in)
Size measured: 1.26 / 1.45 mm (0.049 - 0.057 in)	Gasket 0.5+/-0.05 mm (0.019+/-0.001 in)

Installing the cylinder head

- Fit the chain guide slider onto the cylinder.
- Fit the head gasket and the alignment dowels
- Fit the head.



- Screw but do not tighten both central long screws (3) and position the washers.
- Screw but do not tighten both central long screws (2) and position the washers.
- Screw but do not tighten the two side short screws (1).



NOTE

BEFORE INSTALLING THE HEAD, MAKE SURE THAT THE LUBRICATION CHANNEL IS GENERALLY CLEAN AND USE A JET OF COMPRESSED AIR FOR CLEANING.

- Tighten the four central screws (2 - 3) crosswise.
- Lastly, tighten the two side screws (1).

- Insert the timing control chain on the crankshaft.
- Insert the chain tensioner pad of the head and lock it with the fixing screw.

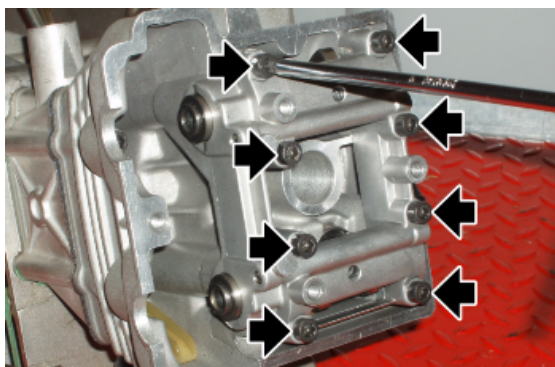


- Insert the camshafts in their seats on the head, remember to position the camshaft marked with the letter (A) on the intake side and the camshaft marked with the letter (S) on the exhaust side.

**WARNING**

POSITION THE CAMS OF BOTH SHAFTS FACING OUTWARDS.

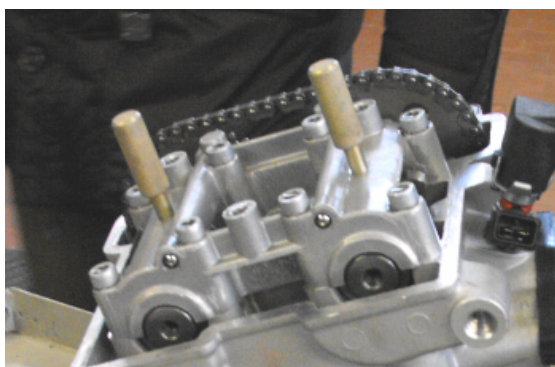
- Position the cam tower cap.
- Screw but do not and tighten the eight screws.



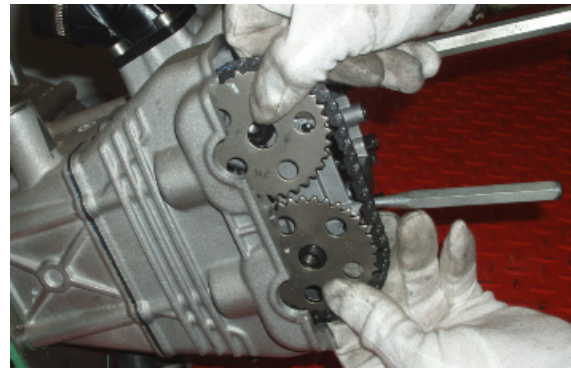
- Place the pins in their positions on the overhead camshafts.

Specific tooling

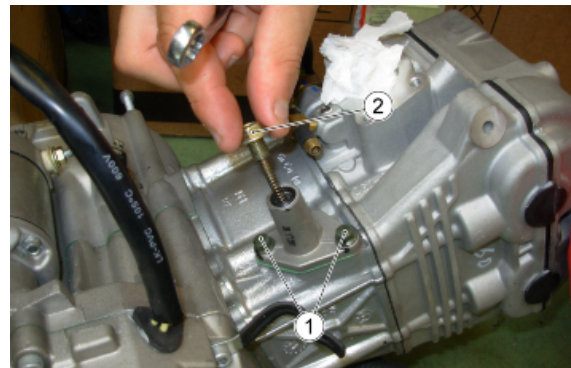
864567 Locking pins timing camshafts



- Place the camshaft gears on the chain, be careful not to invert the original direction of rotation.
- Keep the camshafts locked with the pins and screw but do not tighten the screws fixing the gears using Loctite 243.

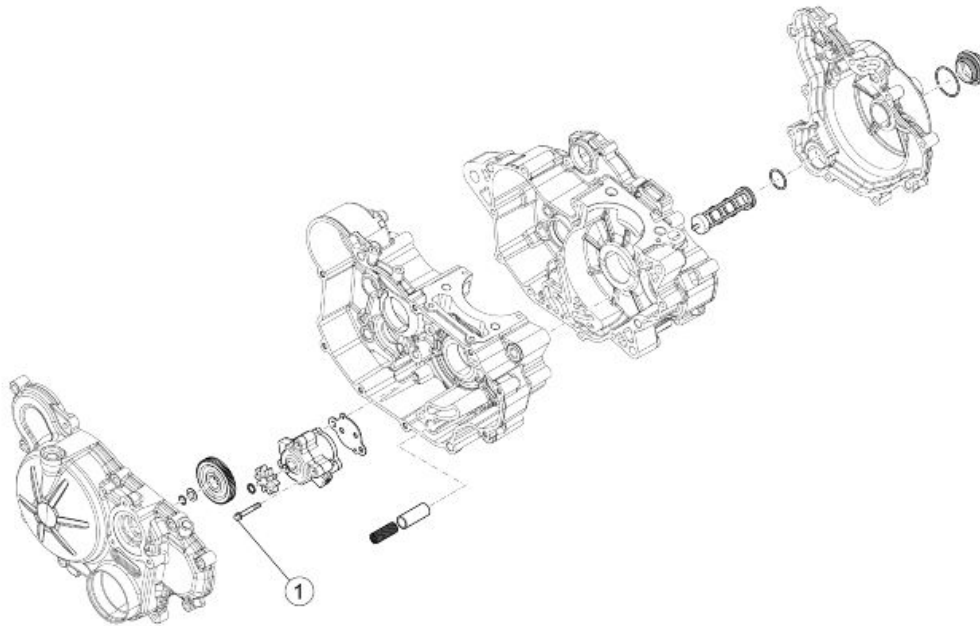


- Fit the chain tensioner on the cylinder using a new gasket, and tighten the two screws (1) to the prescribed torque.
- Insert the spring with the central screw (2) and o-ring, and tighten the cap to the prescribed torque.



- Tighten the screws fixing the camshaft gears to the prescribed torque.
- Remove the pins on the camshafts.
- Remove the specific crankshaft locking tool.
- Tighten the screw on the crankcase.
- Check the valve clearance and adjust it if required.
- Refit the tappet cover.

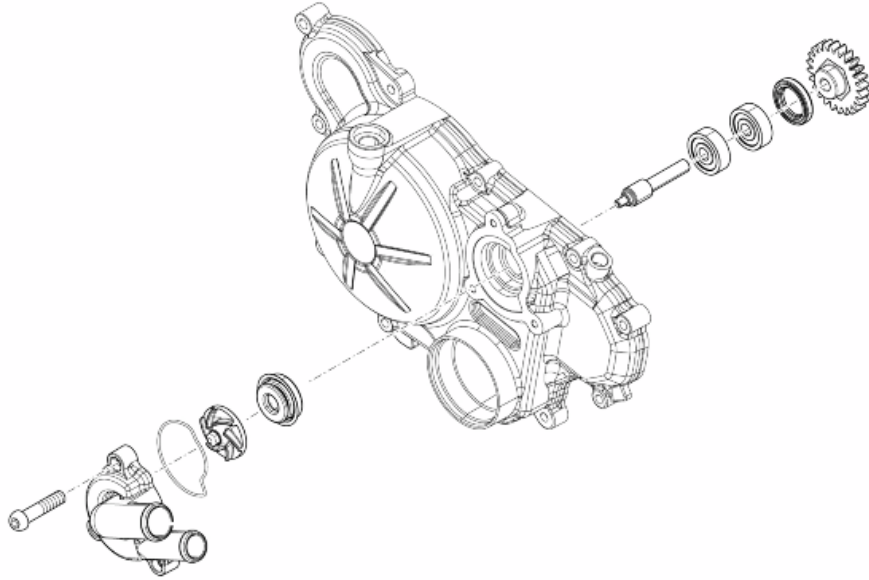
Lubrication



OIL PUMP

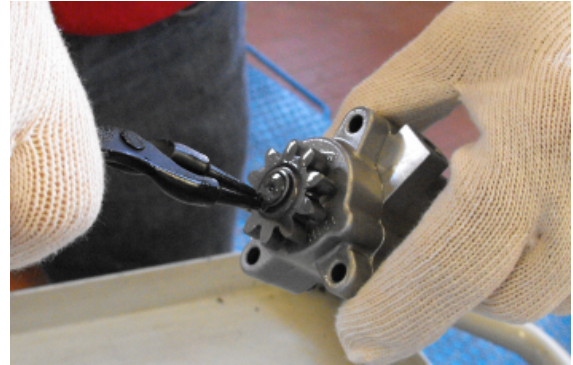
pos.	Description	Type	Quantity	Torque	Notes
1	Oil pump fixing screw	M6x25	3	10 Nm (7.38 lbf ft)	Loctite 243

Conceptual diagrams



Removing

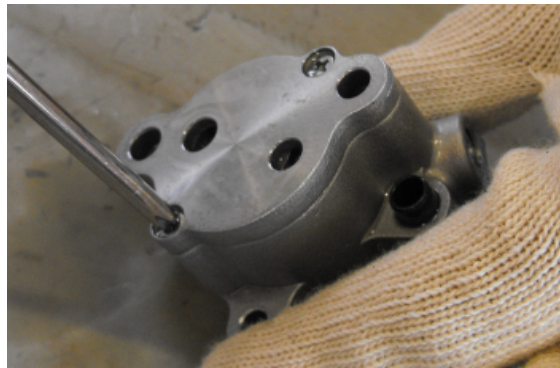
- Remove the Seeger ring.



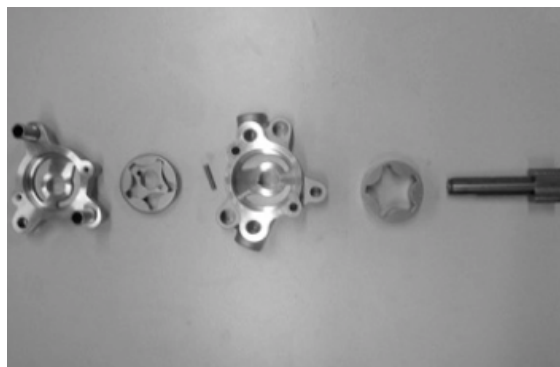
- Remove the pump gear.



- Remove the pump gear.

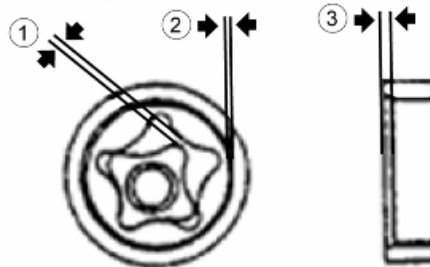


- Separate the components to inspect them.



Inspection

- Measure distance between rotors with a feeler gauge at the positions shown in the picture.



Characteristic

Oil intake rotor

Thickness: 13.5 mm (0.53 in)

Oil supply rotor

Thickness: 8.5 mm (0.33 in)

Standard values

Radial clearance (1) between points of the rotor:

0.04 mm (0.0015 in)

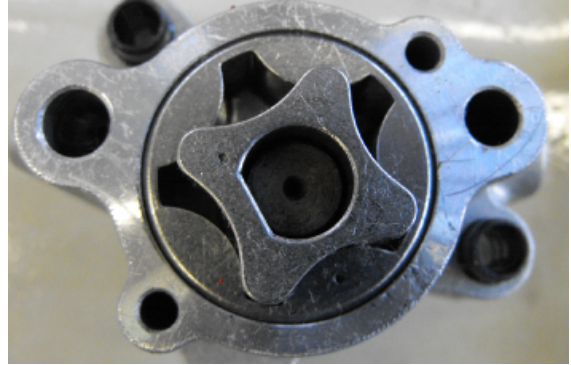
Radial clearance (2) between points of the rotor: 0.08 mm (0.003 in)

Radial clearance (3) between rotor 1 and the pump body: 0.04 mm (0.0015 in)

Radial clearance (3) between rotor 2 and the pump body: 0.05 mm (0.0019 in)

Installing

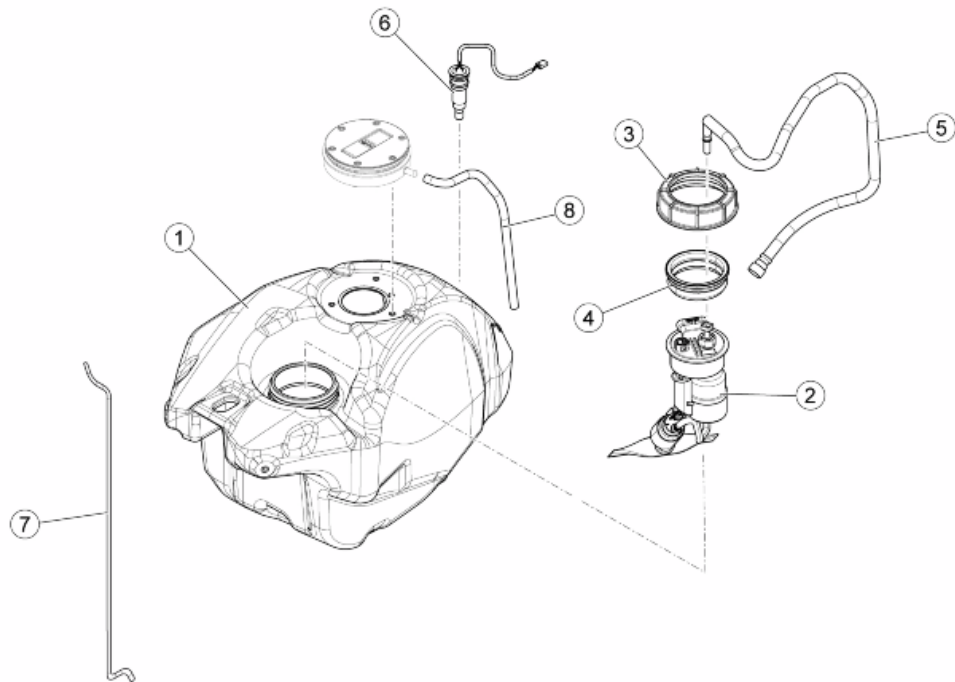
- Refit the oil pump proceeding in reverse order of disassembly. Pay attention to the direction of the rotor, the dot should stay on the opposite part of the resting face.



INDEX OF TOPICS

POWER SUPPLY

P SUPP

Circuit diagram**key:**

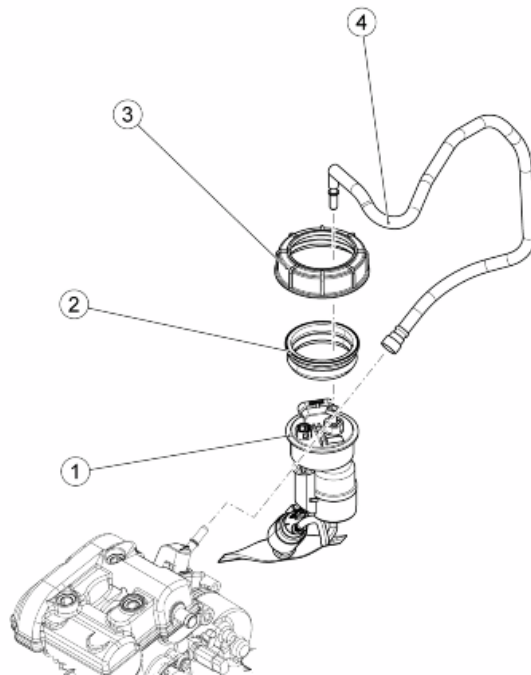
1. Fuel tank
2. Fuel pump
3. Fuel pump ring nut
4. Fuel pump gasket
5. Fuel pipe
6. Fuel level sensor
7. Tank opening rod
8. Fuel breather pipe

Fuel pump

Removing

Remove and empty the fuel tank.

- Remove the fuel hose (4).
- Loosen the ring nut (3) and slide off the gasket (2).
- Remove the pump (1).

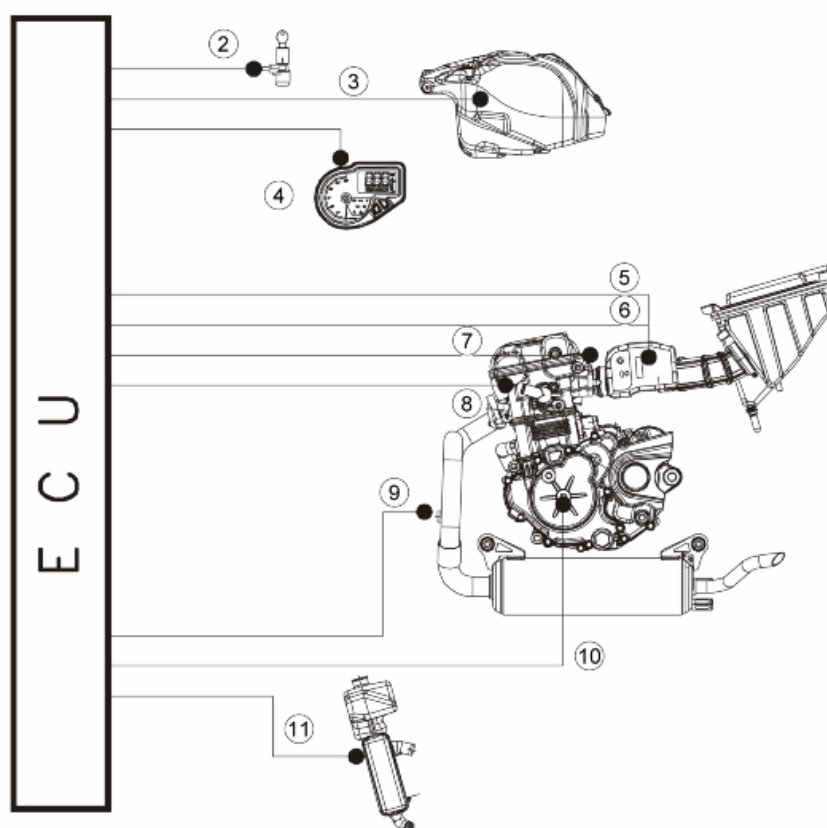
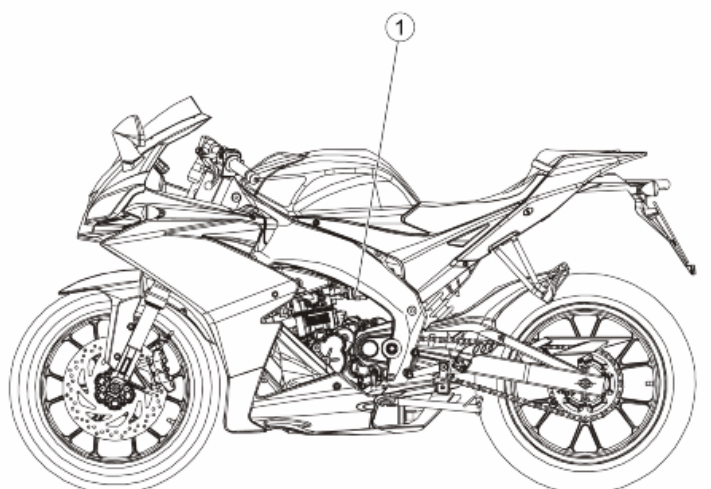


See also

Fuel tank

Injection

Diagram

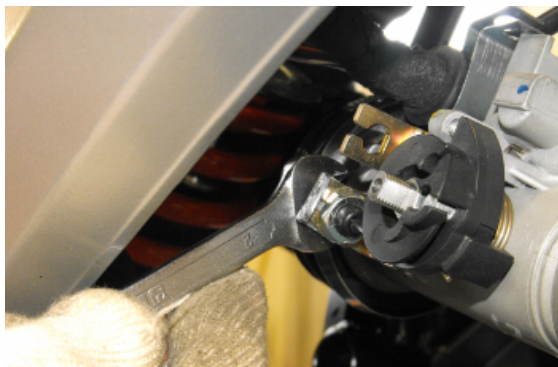
**Key**

1. ECU control unit position
2. Ignition switch
3. Fuel pump
4. Instrument panel

5. Air temperature sensor
6. Throttle valve position sensor
7. Injector
8. Coolant temperature sensor
9. Lambda probe position
10. Engine revolution sensor
11. Electric fan

Removing the throttle body

- Remove the filter box.
- Loosen and remove the nut and unhook the throttle cable.



- Disconnect the connector.



- Undo and remove the screw and remove the cable guide.



- Loosen the clamp and remove the throttle body.

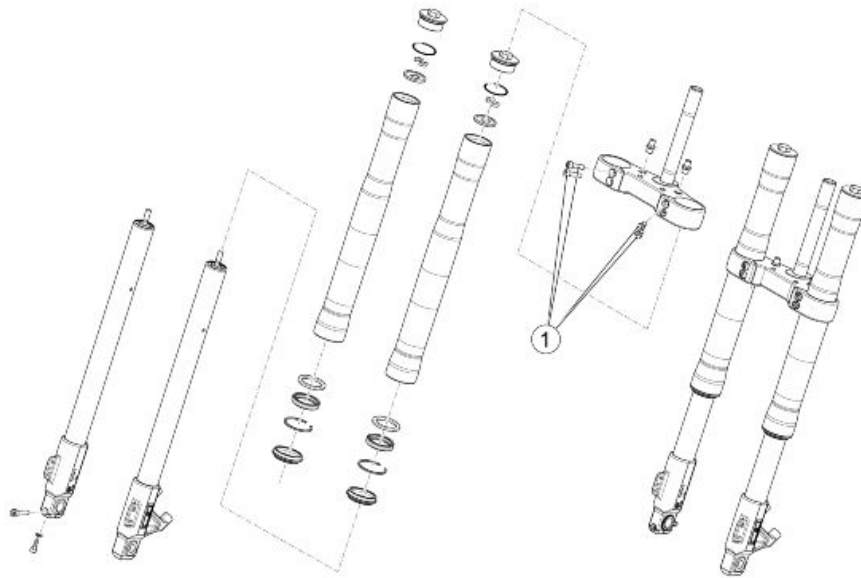


INDEX OF TOPICS

SSUSPENSIONS

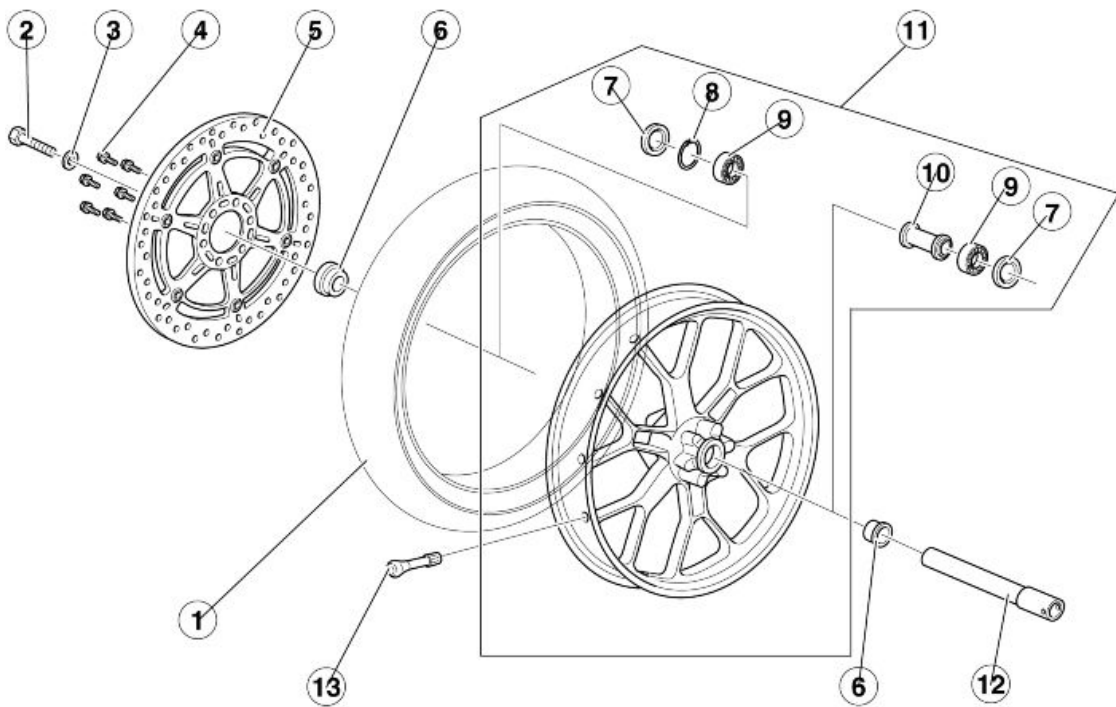
SUSP

Front



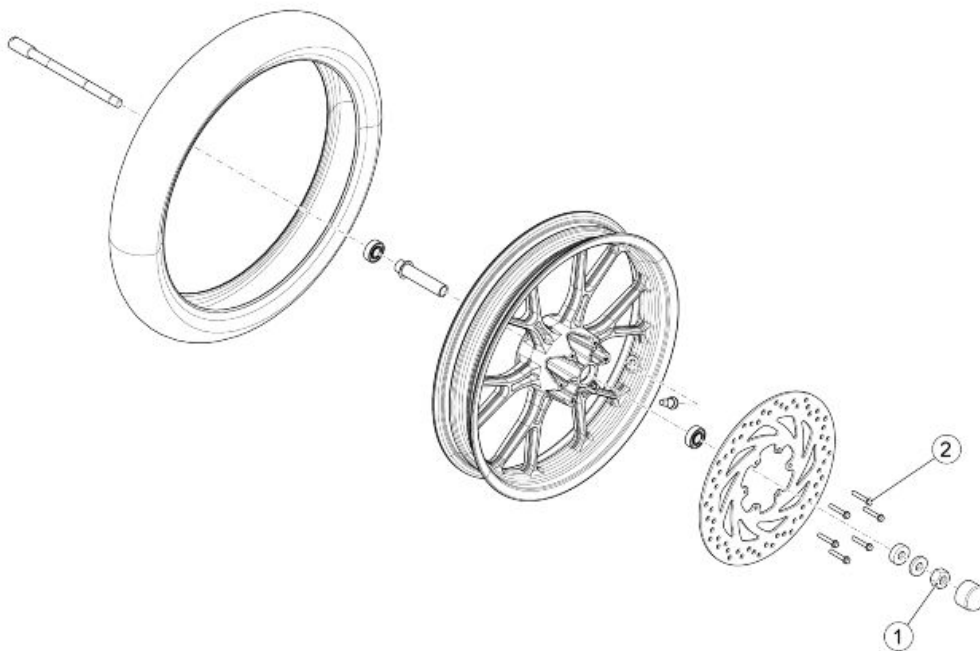
FRONT SUSPENSION

pos.	Description	Type	Quantity	Torque	Notes
1	Screws fastening lower yoke to sleeve	M8	2x2	25 Nm (8.43 lbf ft)	-



Key:

1. Front tyre
2. Wheel bolt special screw
3. Washer
4. TE flanged screw
5. Front brake disc
6. Front wheel right external spacer
7. Sealing ring
8. Circlip
9. Bearing
10. Internal spacer
11. Bare front wheel
12. Front wheel pin
13. Tubeless valve



FRONT WHEEL

pos.	Description	Type	Quantity	Torque	Notes
1	Front wheel spindle nut	M14	1	78 Nm (8.85 lbf ft)	-
2	Front disc fixing screw	M6x20	6	12 Nm (8.85 lbf ft)	-

Removing the front wheel

- Support the vehicle at the front, by fastening a suitable belt to the handlebar and a crane.
- Slide off the nut cover.



- Unscrew and remove the wheel axle fixing nut and collect the washer.



- Loosen the lock screw of the calliper mounting bracket.
- Extracting the wheel, slide off the pin from the right side of the vehicle, paying attention to the speed sensor collar.
- Remove the front wheel.



Checking the front wheel

WHEEL INSPECTION

NOTE

BALANCE THE WHEEL, IF A TYRE OR A WHEEL WAS REPLACED.

WARNING



WHEEL RIM REPAIRS MUST NOT BE CARRIED OUT.

- Check the wheel axle by turning the wheel rim on a flat surface.
- If there are bends, replace it.

WARNING

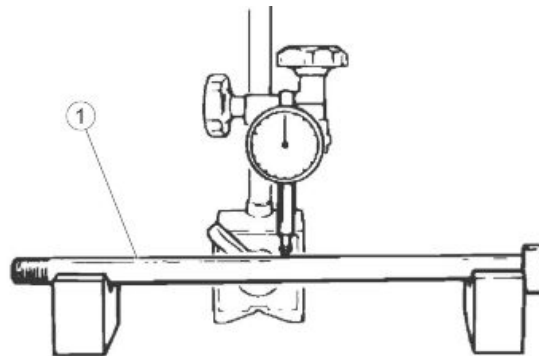


NEVER TRY TO STRAIGHTEN THE BEND AXLE.



Wheel axle bending limit (1):

0.2 mm

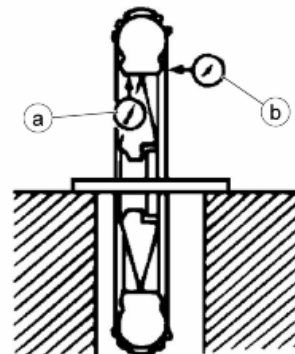


TYRES

- Check the tyres for wear; If they are damaged, replace them.

WHEEL RIMS

- Check the wheel deformation.
- If there are bends or damages, replace it.
- Check the wheel deformation limits.



Radial limit (a): 0.6 mm

Lateral limit (b): 0.5 mm

- If the measured values exceed the limit, replace the wheel rim.

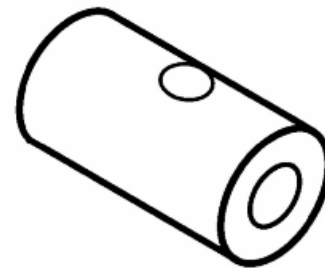
- Check wheel bearings.

NOTE

BEARINGS MUST ROTATE FREELY, WITHOUT JAMMING AND/OR NOISE, OTHERWISE, THEY NEED TO BE REPLACED.



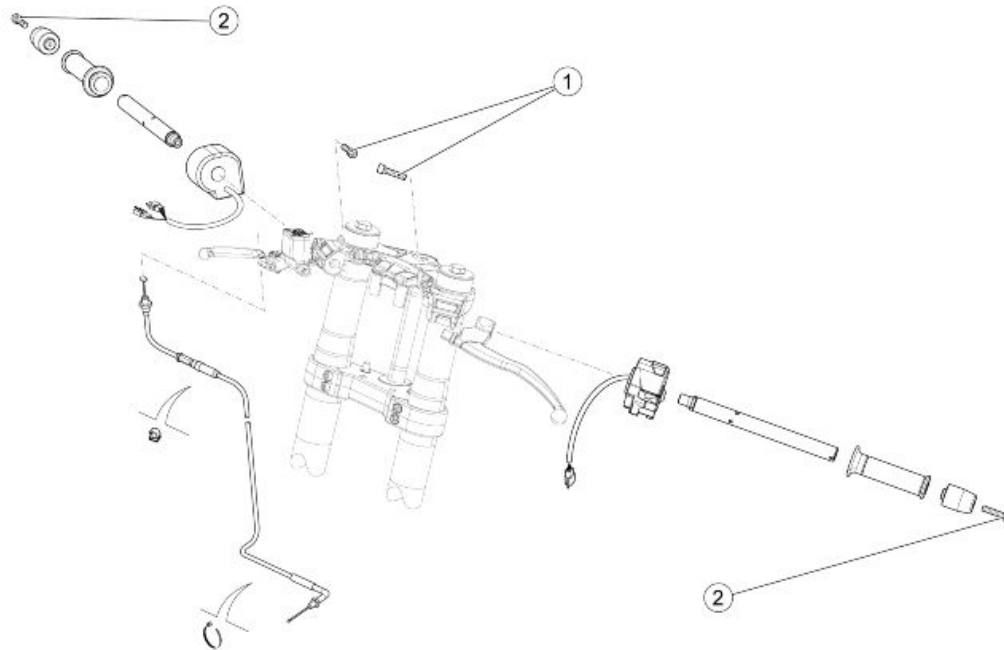
-
- Check the spacer.
 - Replace together with the retaining ring if there are scorings or signs of deterioration.



Installing the front wheel

- Follow the steps described in the front wheel removal in reverse, be very careful when positioning the components and the corresponding tightening torque.
-

Handlebar



HANDLEBAR AND CONTROLS

pos.	Description	Type	Quantity	Torque	Notes
1	Semi-handlebar retainer	M8x30	2	25 Nm (18.44 lbf ft)	Loctite 243
2	Handlebar counterweight retainer	M5x50	2	5 Nm (3.69 lbf ft)	Loctite 243

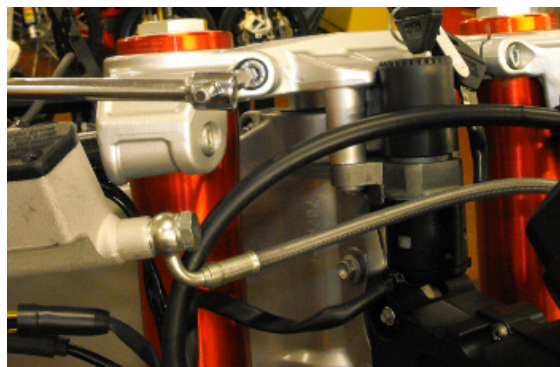
Front fork

Removing the fork legs

The following operations are described for the Mingxing fork, but are identical for the operation with the fork model Paioli, except where specified.

The following operations only refer to one fork, but they apply to both.

- Support the vehicle at the front, by fastening a suitable belt to the handlebar and a crane.
- Position a support under-sump stand and the rear stand.
- Remove the front wheel and the front brake callipers.



- Loosen the fixing screw at the upper steering plate.

See also

[Rear mudguard](#)
[Removing the front wheel](#)

- For the operation with Mingxing fork, loosen the two fixing screw at the lower plate.
- For the operation with fork Paioli, loosen the fixing screw at the lower plate.
- Slide the stanchion downwards to remove it.



Disassembling the fork

PAIOLI FORKS

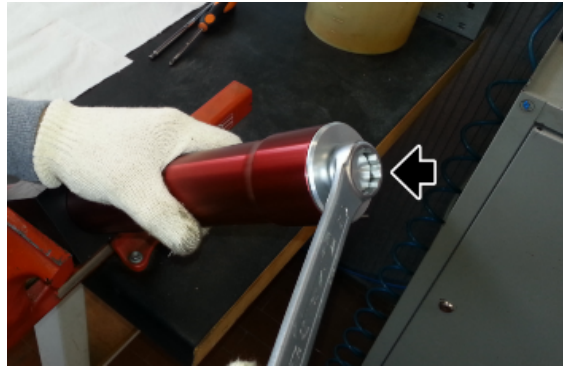
CAUTION

THE FOLLOWING PROCEDURES ARE FOR A SINGLE WHEEL CARRIER STANCHION/SLEEVE ASSEMBLY, BUT ARE APPLICABLE TO BOTH.

- Fit the fork in the vice using the special Teflon grips.



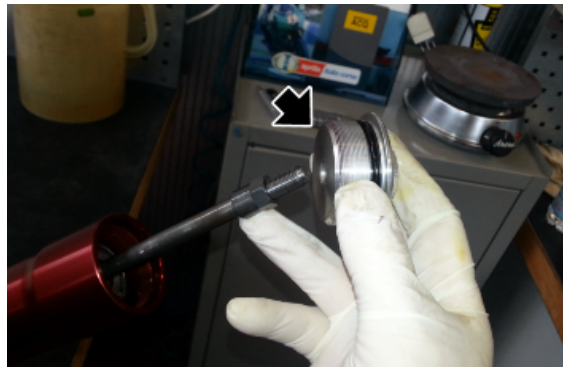
- Undo the cap and partially pull out the piston



- Using a wrench to prevent the internal piston from rotating

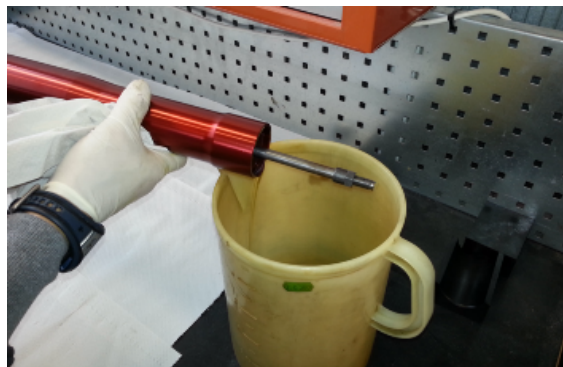


- Remove the cap

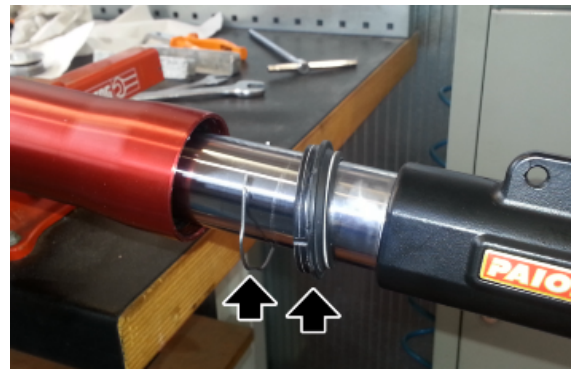
**CAUTION**

BEFORE PROCEEDING WITH THE FOLLOWING OPERATIONS GET A SUITABLE COLLECTION CONTAINER.

- Remove the stem from the vice and drain off the oil inside it into the collection container.



- Reposition the stem in the vice using the specific Teflon shoes.
- Remove the dust gaiter, taking care for the surface of the stem and the integrity of the dust gaiter.
- Remove the retainer ring.



- Remove the stem from the sleeve.

CAUTION

BE CAREFUL NOT TO DAMAGE THE SLEEVE INTERIOR WHEN REMOVING THE DIFFERENT COMPONENTS.



- Remove the oil seal from the sleeve, taking care not to damage it

**CAUTION**

ONLY FOR THE RIGHT STEM IT IS POSSIBLE TO REMOVE THE COMPLETE PISTON OPERATING AS FOLLOWS

- Undo and remove the piston retaining screw on the foot of the fork





- Remove the complete piston

MINGXING FORK

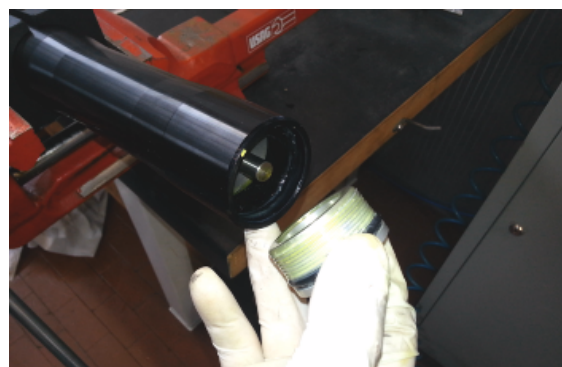
CAUTION

THE FOLLOWING PROCEDURES ARE FOR A SINGLE WHEEL CARRIER STANCHION/SLEEVE ASSEMBLY, BUT ARE APPLICABLE TO BOTH.

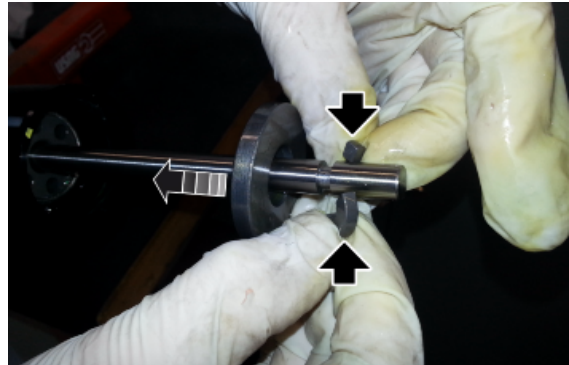
- Fit the fork in the vice using the special Teflon grips.



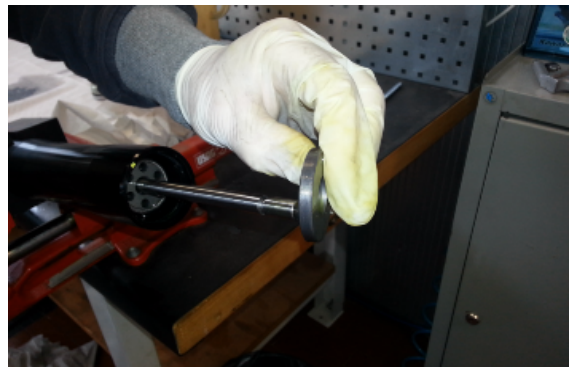
- Unscrew and remove the cap



- Remove the internal piston and, lowering the lock washer, remove the two half cylinders



- Remove the lock washer

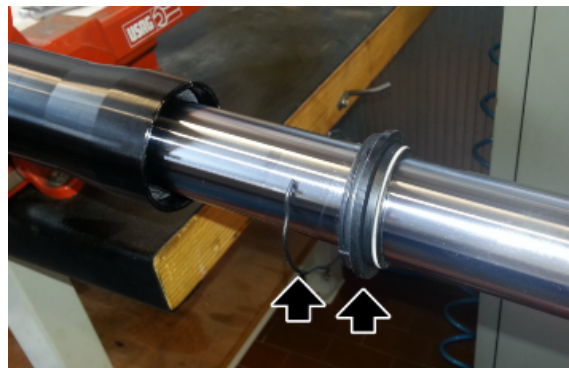
**CAUTION**

BEFORE PROCEEDING WITH THE FOLLOWING OPERATIONS GET A SUITABLE COLLECTION CONTAINER.

- Remove the stem from the vice and drain off the oil inside it into the collection container.



- Reposition the stem in the vice using the specific Teflon shoes.
- Remove the dust gaiter, taking care for the surface of the stem and the integrity of the dust gaiter.
- Remove the retainer ring.



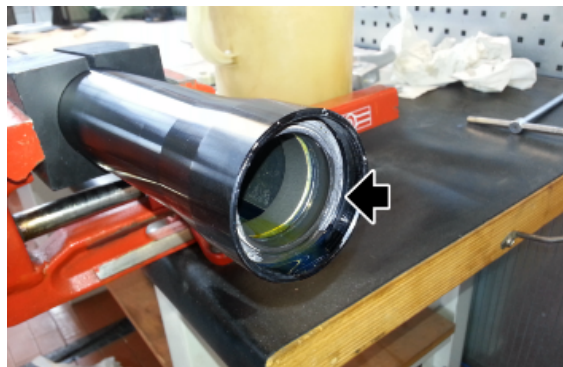
- Remove the stem from the sleeve.

CAUTION

BE CAREFUL NOT TO DAMAGE THE SLEEVE INTERIOR WHEN REMOVING THE DIFFERENT COMPONENTS.



- Remove the oil seal from the sleeve, taking care not to damage it

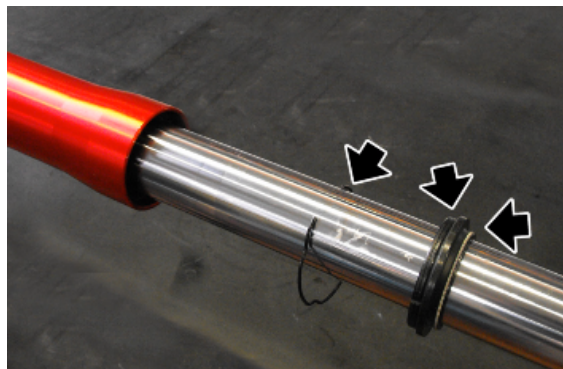


Checking the components

MINGXING FORK

WHEEL HOLDER STEM

- Check the sliding surface for scorings and/or scratches. These scorings can be eliminated by rubbing them with wet sandpaper (grain 1).
- If the scorings are deep, replace the stem.
- Use a dial gauge to check that the stem bending is below the limit value.
- If over the value, replace the stem.



Bending limit: 0.2 mm

CAUTION

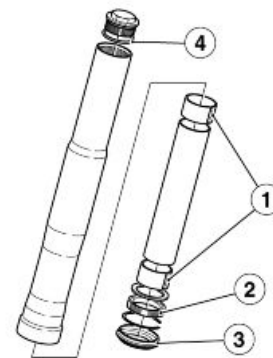
A BENT STEM SHOULD NEVER BE STRAIGHTENED BECAUSE ITS STRUCTURE WOULD BE WEAKENED AND USING THE VEHICLE MAY BECOME DANGEROUS.

- Replace the following components with new ones:

- sealing ring;
- dust guard;

- O-ring gasket on the cap.

- Check that there are no damages and/or cracks; otherwise, replace it.
- Check that the sliding bushings (1) for good conditions.
- If there are signs of excessive wear or damage, replace the affected component.



CAUTION

REMOVE ANY IMPURITY IN THE BUSHINGS, TAKING CARE NOT TO SCRATCH THEIR SURFACE.

PAIOLI FORKS

WHEEL HOLDER STEM

- Check the sliding surface for scorings and/or scratches. These scorings can be eliminated by rubbing them with wet sandpaper (grain 1).
- If the scorings are deep, replace the stem.
- Use a dial gauge to check that the stem bending is below the limit value.
- If over the value, replace the stem.

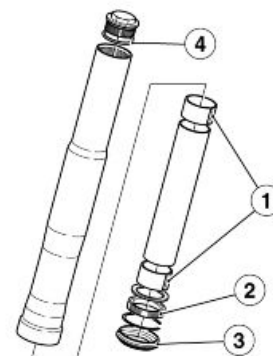
Bending limit: 0.2 mm

CAUTION



A BENT STEM SHOULD NEVER BE STRAIGHTENED BECAUSE ITS STRUCTURE WOULD BE WEAKENED AND USING THE VEHICLE MAY BECOME DANGEROUS.

- Check that there are no damages and/or cracks; otherwise, replace it.
- Check that the sliding bushings (1) for good conditions.
- If there are signs of excessive wear or damage, replace the affected component.



CAUTION

REMOVE ANY IMPURITY IN THE BUSHINGS, TAKING CARE NOT TO SCRATCH THEIR SURFACE.

Replace the following components with new ones:

- sealing ring (2);
- dust scraper (3);
- O-rings on the cap (4).

Reassembling the fork

PAIOLI FORKS

CAUTION

ONLY FOR THE RIGHT STEM IT IS POSSIBLE TO INSTALL THE COMPLETE PISTON OPERATING AS FOLLOWS



- Tighten the piston retaining screw on the foot of the fork and tighten it to the prescribed torque

**CAUTION**

THE FOLLOWING PROCEDURES ARE FOR A SINGLE WHEEL CARRIER STANCHION/SLEEVE ASSEMBLY, BUT ARE APPLICABLE TO BOTH.

- Insert the oil seal in the sleeve



- After inserting the dust gaiter in the stem as well as the retainer ring, insert the stem itself in the sleeve



- Position the retainer and push the dust gaiter into its seat

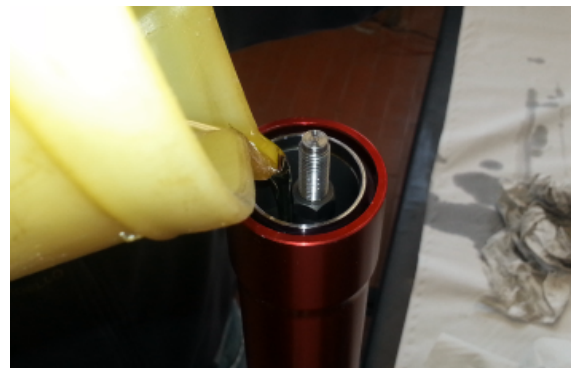


- Position the fork vertically in a vice
- Fill the fork with oil

Characteristic

Fork Paioli oil

390+/-5 ml (0.086 +/-0.0010 UK gal; 0.103 +/-0.0013 US gal) (for each stem)



- Screw the cap on the piston and tighten it



- Screw the cap on the sleeve

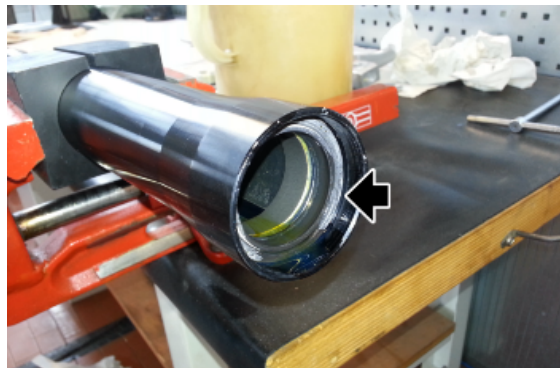


MINGXING FORK

CAUTION

THE FOLLOWING PROCEDURES ARE FOR A SINGLE WHEEL CARRIER STANCHION/SLEEVE ASSEMBLY, BUT ARE APPLICABLE TO BOTH.

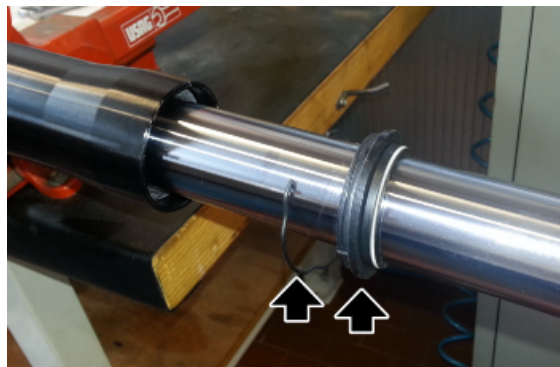
- Insert the oil seal in the sleeve



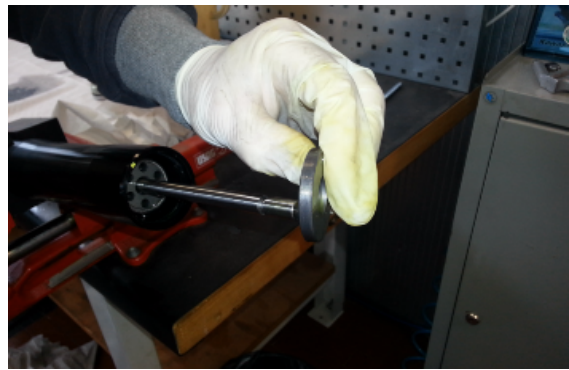
- After inserting the dust gaiter in the stem as well as the retainer ring, insert the stem itself in the sleeve



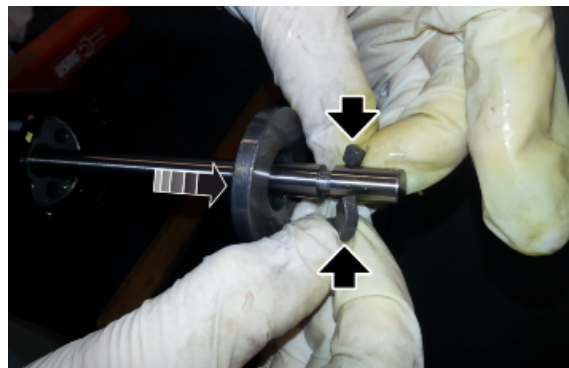
- Position the retainer and push the dust gaiter into its seat



- Insert the retainer ring



- Position the two half cylinders and lock them in place with the retainer ring



- Position the fork vertically in a vice
- Fill the fork with oil

Characteristic

Fork MingXing oil quantity

Right stem: 355 +/- 5 ml (0.0781 +/- 0.0011 UK gal;
0.0938 +/- 0.0013 US gal)

Left stem: 360 +/- 5 ml (0.0792 +/- 0.0011 UK gal;
0.0951 +/- 0.0013 US gal)



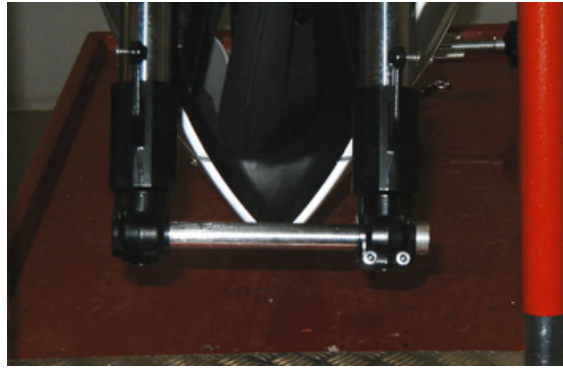
- Screw the cap on the sleeve



Installing the fork legs

The following operations are described for the Paioli fork, but are identical for the operation with the fork model Mingxing, except where specified.

- Insert the sleeve together with the wheel holder stem on the lower and upper plates.
- Insert the wheel pin through both stems to align the holes.



- Insert the stems holding pipe on the lower plate, in the clamps of the front headlamp and on the upper plate.
- Insert the wheel pin through both sheaths to align the holes.

- Align the end of the upper plate to the top of the holding pipes (except the plug).
- Provisionally tighten the screw that locks the upper plate on the holding pipes.



- Tighten the screws that lock the lower plate to the holding pipes to the prescribed torque.
- Tighten completely the screws that lock the upper plate to the holding pipes to the prescribed torque.



- For the operation with Paioli fork, tighten the sleeve fixing screw to the lower plate.
- For the operation with the Mingxing fork, operate in the same way on the two sleeve fixing screws at the lower plate.

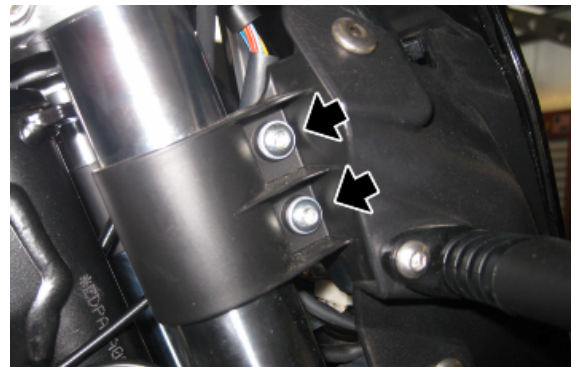




- Tighten the screw that tightens the upper plate to the sleeve.



- Tighten the two screws on the front headlamp clamp.



- Fasten the brake piping to the left sheath.
- Slide off the wheel axle.
- Mount the front wheel.



- Fit the front brake calliper and tighten the two fixing screws.

See also

[Removing the front wheel](#)
[Removal](#)

- Lower the hoist arm.

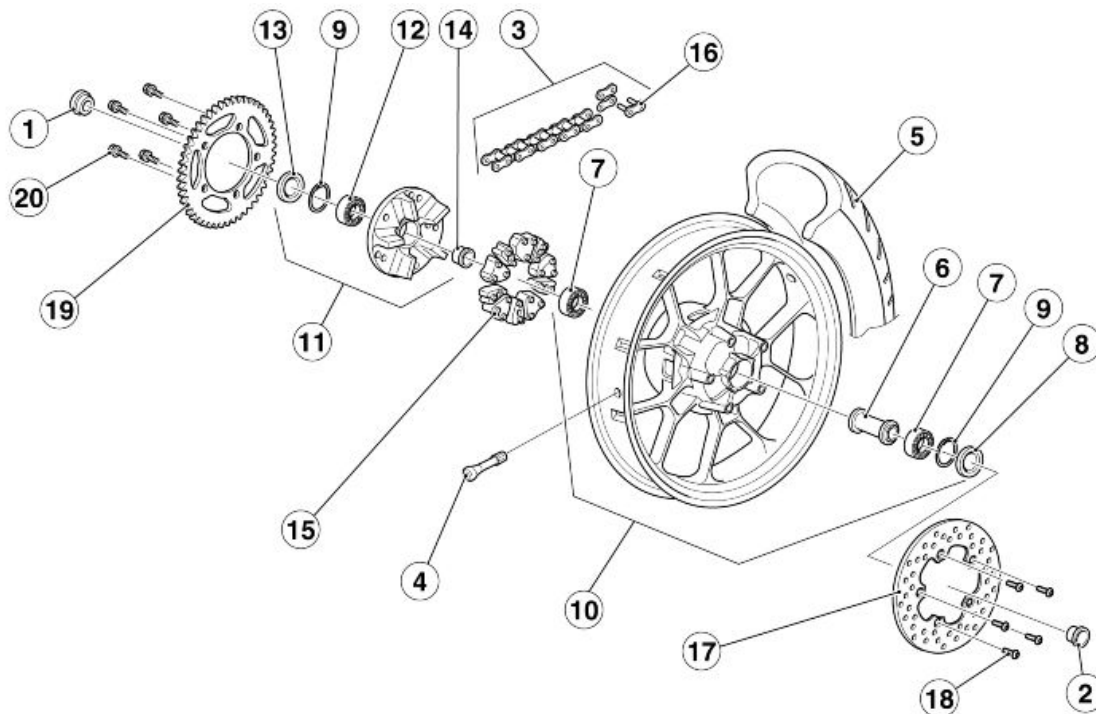
CAUTION

BEFORE RELEASING THE BELTS MAKE SURE THAT THE OPTIONAL REAR SERVICE STAND IS ADEQUATELY POSITIONED.

- Correctly fit the lower shield, the mudguard, the front wheel, the brake callipers.
- Release the belts from the chassis.
- Check the proper fork operation by operating on the front brake and pushing repeatedly on the fork.
- The brake should operate progressively and there should be no oil marks on the stems.

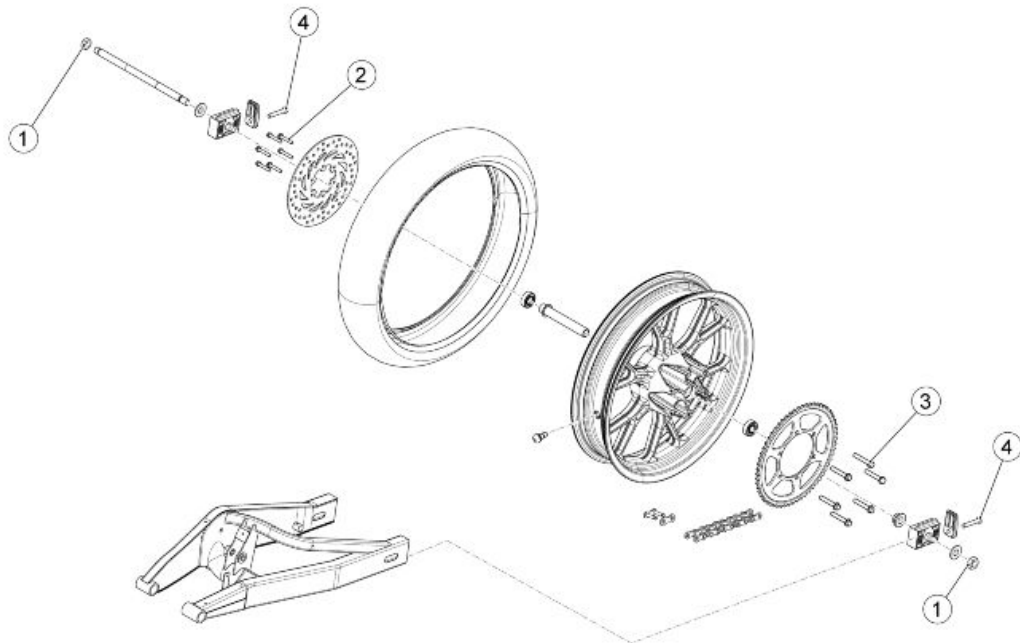
CAUTION

BEFORE RIDING, CHECK THAT THE VEHICLE IS CORRECTLY SET.

Rear**key:**

1. Right ext. wheel spacer
2. Left ext. wheel spacer
3. Chain with master link
4. Tubeless valve
5. Rear tyre 150/60"
6. Rear wheel int. spacer
7. Bearing 20x47x14
8. Sealing ring 28x47x7

9. Circlip d47
10. Bare rear wheel blue
11. Sprocket carrier
12. Bearing 25x47x14
13. Sealing ring 30x47x7
14. Int. spacer
15. Anti-vibration rubber buffer
16. Master link
17. Rear brake disc
18. TSPEI screw m8x20
19. Crown z=40
20. TE flanged screw m10x30



REAR WHEEL

pos.	Description	Type	Quantity	Torque	Notes
1	Rear wheel axle nut	M14	2	78 Nm (57.53 lbf ft)	-
2	Rear disc fixing screw	M6x20	6	12 Nm (8.85 lbf ft)	-
3	Sprocket fixing screw	TEF M8	6	25 Nm (18.44 lbf ft)	-
4	Chain tensor fixing screw	M8	2	12 Nm (8.85 lbf ft)	Loctite 243

Removing the rear wheel



BEFORE CARRYING OUT THE FOLLOWING OPERATIONS AND IN ORDER TO AVOID BURNS, ALLOW THE ENGINE AND SILENCER TO COOL OFF TO AMBIENT TEMPERATURE.

CAUTION

UPON REMOVING, PAY ATTENTION NOT TO DAMAGE THE BRAKE HOSES, DISCS AND PADS.

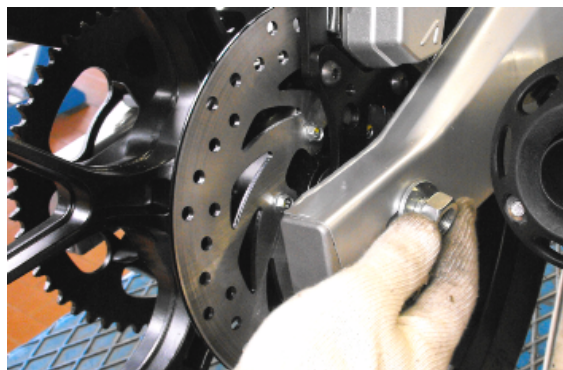
CAUTION

TO REMOVE THE REAR WHEEL, GET THE APPROPRIATE REAR SERVICE STAND (OPTIONAL).

- Place the vehicle on its optional rear stand.
- Remove the drive chain.
- Operating from both sides, remove the two adjuster screws.



- Working from the right side of the vehicle, unscrew and remove the fixing nut and retrieve the washer.

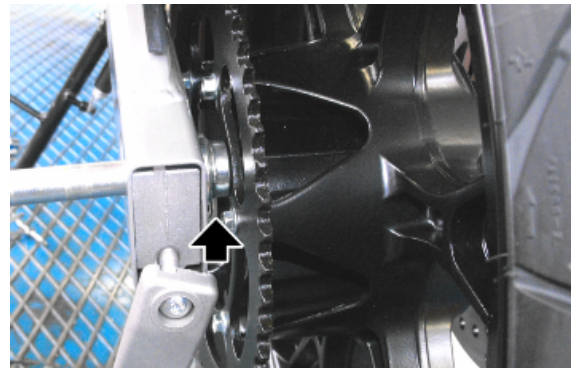


See also

Drive chain

- Move the wheel a few millimetres and extract it, slide the pin off the left side.
- Collect the washer and the spacer.



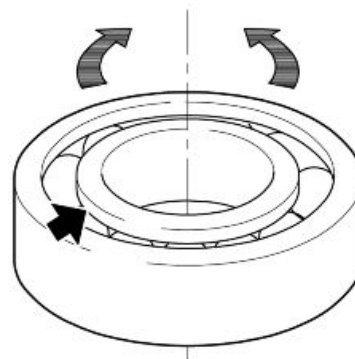


- Slide the rear wheel completely off and check the mechanical components.

Checking the rear wheel

CAUTION

CHECK THAT ALL PARTS ARE IN GOOD CONDITION, ESPECIALLY THOSE LISTED AS FOLLOWS. BEARINGS, GASKETS, WHEEL PIN, RIM.



FLEXIBLE COUPLING

Check that the anti-vibration buffer is not damaged and/or excessively worn. Replace the buffer if necessary.

Insert the anti-vibration buffer in the wheel hub.

Fit the entire final transmission unit on the wheel, manually rotate the crown gear to right and left and check the clearance between the anti-vibration buffer and the hub. Replace the anti-vibration buffer if excessive clearance is found.

SPROCKET

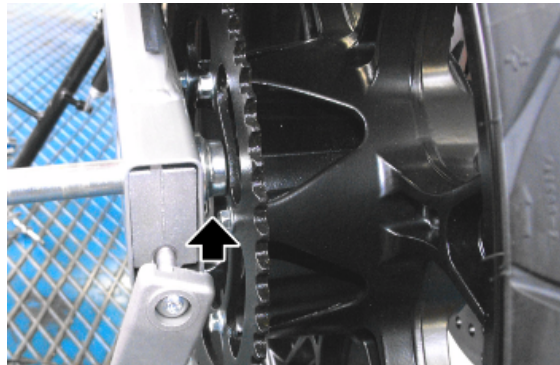
Check the tothing of the crown and the pinion. If excessive wear is found, replace: the crown, the pinion and the drive chain.

CAUTION

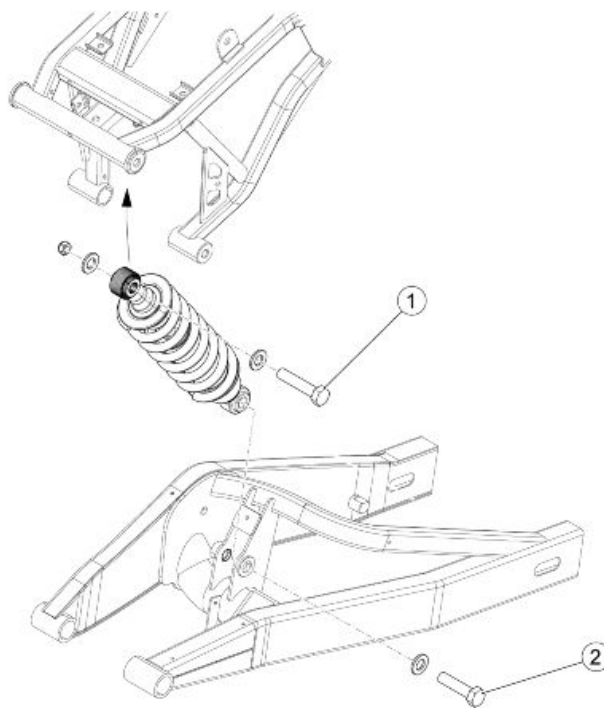
REPLACE ALL THREE PARTS TO PREVENT EARLY WEAR OF NEW COMPONENTS.

Installing the rear wheel

- Follow the removal steps but in reverse order, be careful to adequately position the spacers on the left side as indicated in the figure.
- Tighten the nuts to the prescribed torque.



Shock absorbers

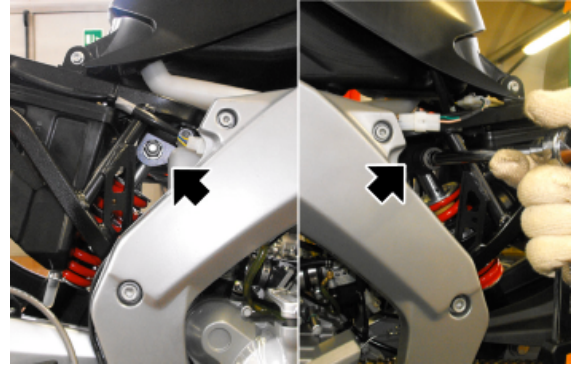


REAR SUSPENSION

pos.	Description	Type	Quantity	Torque	Notes
1	Upper retainer	M12	1	58 Nm (42.78 lbf ft)	-
2	Lower retainer	M12	1	58 Nm (42.78 lbf ft)	Loctite 243

Removing

- Remove both central side fairings.
- Place the vehicle on its optional front service stand.
- Support the vehicle rear part using belts and hoist.
- Place a support under the swingarm, so that it stays in neutral position.
- Unscrew and remove the front screw and collect the washer
- At the same time, collect the nut and washer from the right side.



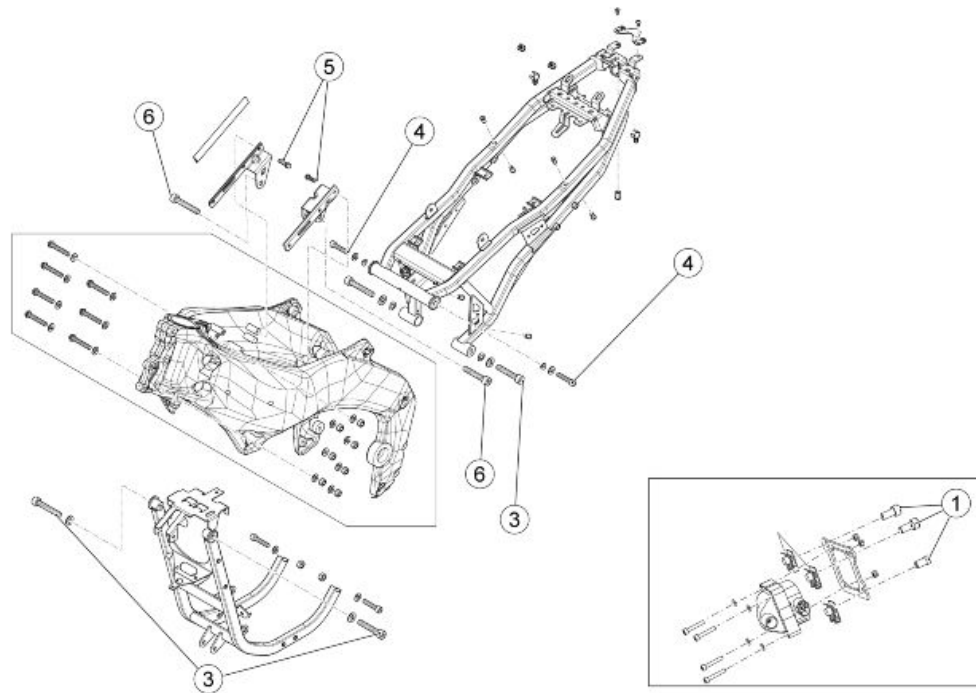
- Unscrew and remove the lower screw on the left side and collect the washer
- At the same time, collect the nut and washer from the right side.



INDEX OF TOPICS

CHASSIS

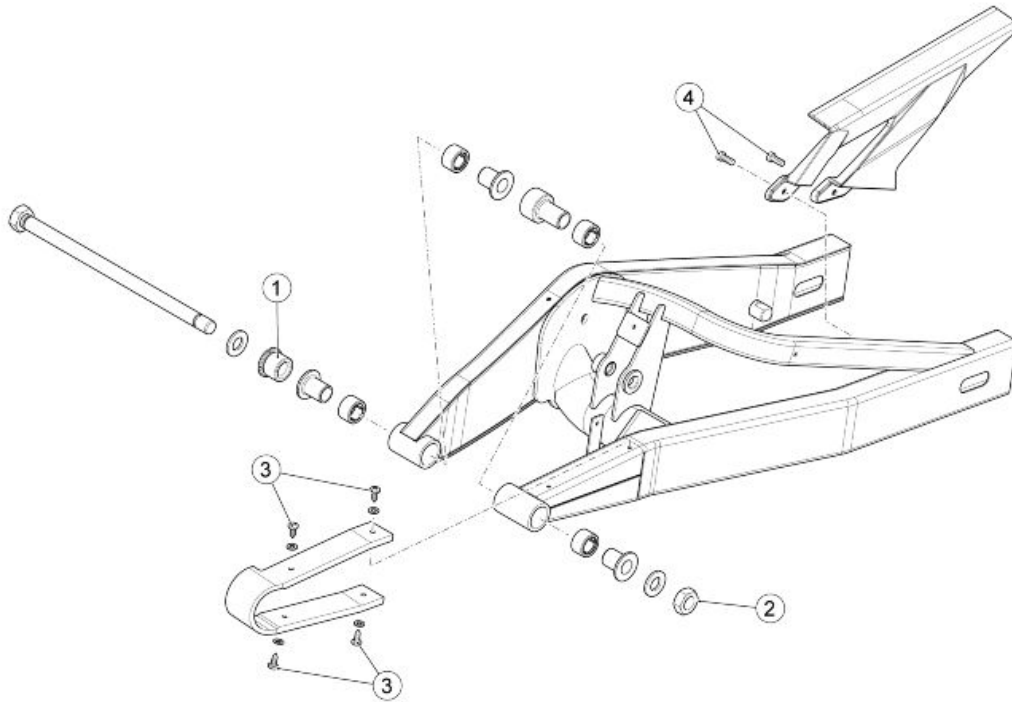
CHAS



CHASSIS

pos.	Description	Type	Quantity	Torque	Notes
1	Support coil fixing screw	M8	2	20 Nm (14.75 lbf ft)	-
2	TCEI screw	M8	2	25 Nm (18.43 lbf ft)	-
3	TCEI screw	M10x45	4	50 Nm (36.88 lbf ft)	-
4	TE screw	M8x40	2	25 Nm (18.43 lbf ft)	-
5	TE screw	M6x16	2	12 Nm (8.85 lbf ft)	Loctite 243
6	Right and left engine mount	M10x16	2	38 Nm (28.02 lbf ft)	Loctite 243

Swinging arm

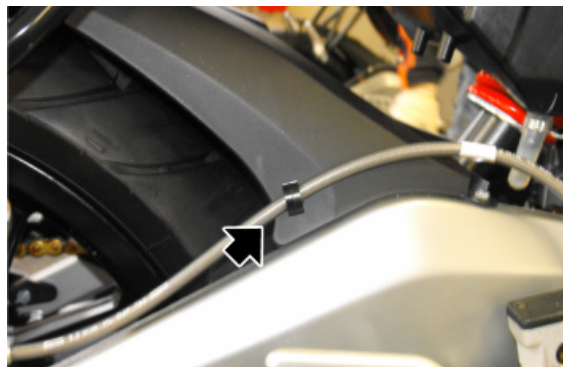


SWINGARM

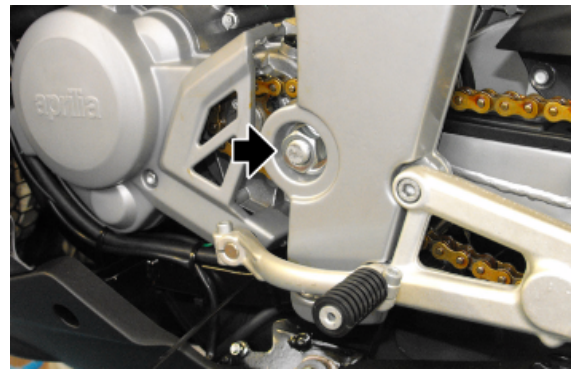
pos.	Description	Type	Quantity	Torque	Notes
1	Swingarm to chassis adjustment nut	M25x1.5	1	15 Nm (11.06 lbf ft)	-
2	Swingarm pin nut	M14	1	78 Nm (57.52 lbf ft)	-
3	Chainguard fixing screw	M 4.8x13	4	1 Nm (0.74 lbf ft)	-
4	Chainguard fixing screw	Self-tap.	2	-	-

Removing

- Place the vehicle on its OPTIONAL front service stand.
- Support the vehicle rear part using belts and hoist.
- Remove the rear brake calliper and take off the pipe.
- Remove the wheel and rear shock absorber.



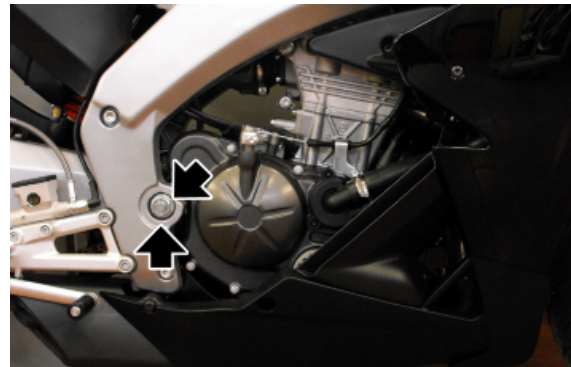
- Operating on both sides, loosen the swingarm pin tightening nut.
- Working on the left side, unscrew and remove the nut and collect the washer.



See also

[Removing the rear wheel](#)

- Working from the right side of the vehicle, unscrew and remove the nut and retrieve the washer.
- Then loosen the tightening ring with the suitable special key.



Specific tooling

866714 Tools for the swingarm nut adjustment

- Lightly tap with a rubber hammer, slide the swingarm pin off the left side of the vehicle.
- If necessary, remove the rear mudguard and the chainguard.

Checking

CAUTION

**CHECK THAT NO COMPONENT IS NOTICEABLY DISTORTED, DAMAGED, CRACKED AND/OR DENTED.
REPLACE ALL DAMAGED COMPONENTS.**

ROLLER CASINGS

Turn the roller casings manually; they must rotate continuously and silently.

There must be no axial clearance.

Replace the roller casings that present these problems.

Apply grease on the rollers.

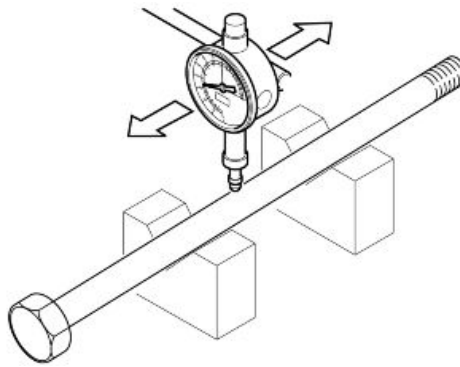
GASKETS

Check that the gaskets are in good conditions; replace them if they show signs of damage or excessive wear.

SWINGARM PIN

With a dial gauge check if the pin eccentricity exceeds the limit value. Otherwise, replace the pin.

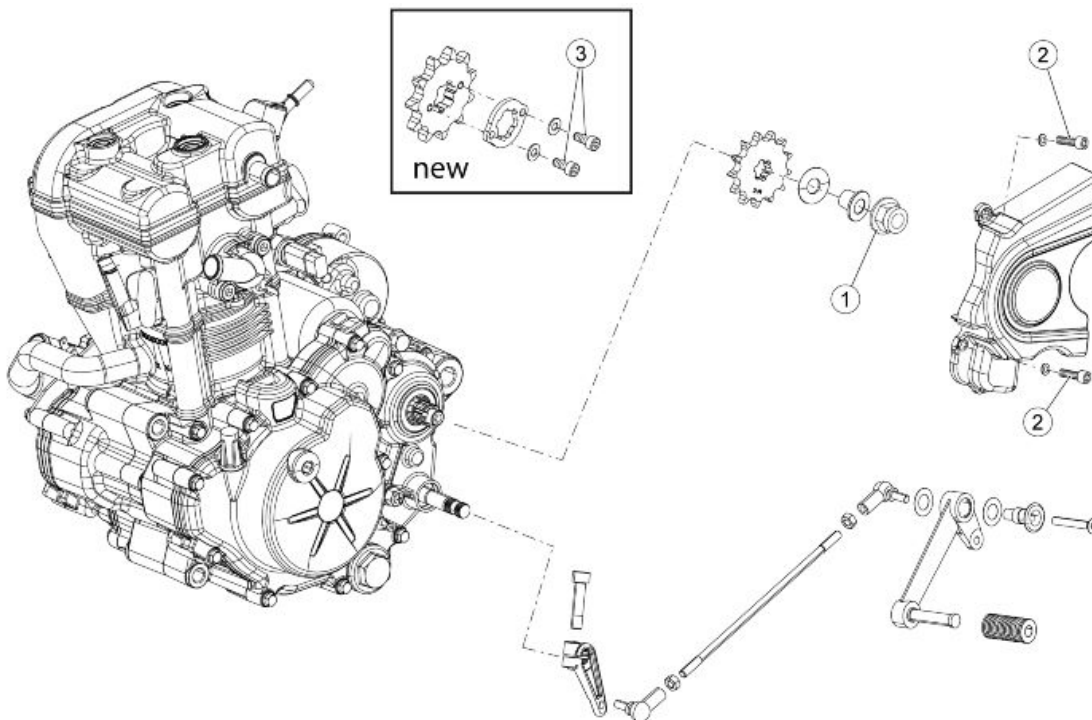
Maximum pin eccentricity: 0.3 mm (0.01 in)



Installing

- To install the swingarm follow the operations described for removal in reverse order, being careful to tighten the ring nuts, nuts and screws to the prescribed torque.

Pinion



LEVERS

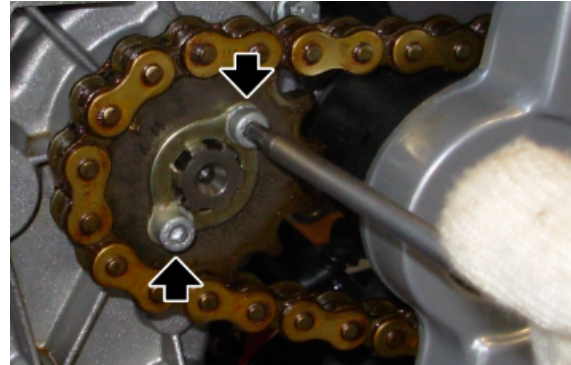
pos.	Description	Type	Quantity	Torque	Note
1	Pinion retainer nut	M12x1,25	1	30 Nm (22.12 lb ft)	Loctite 270
2	Pinion cover fixing screw	TEF M5x16	2	4 Nm (2.95 lb ft)	Maximum torque: 5.0 Nm (3.68 lb ft)
3	TCEI Screws pinion retainer	M5x10	2	4 Nm (2.95 lb ft)	Maximum torque: 5.0 Nm (3.68 lb ft) - Loct. 270

Removing

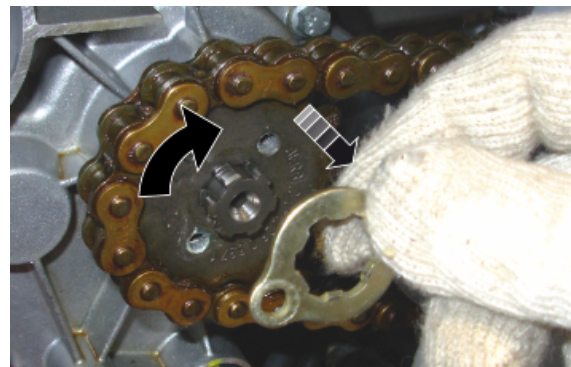
- Remove the pinion cover crankcase.
- Increase the chain clearance to allow removal of the pinion

OPTION 01

- Remove fixing screws of the pinion lock plate



- Rotate the pinion lock plate to remove it from the shaft.

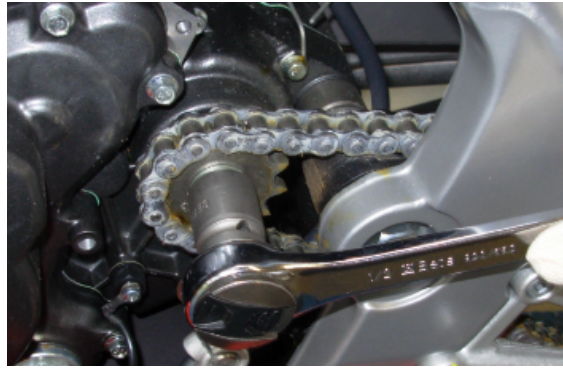


- Remove the pinion



OPTION 02

- Unscrew and remove the pinion lock nut



- Remove the Belleville spring



- Remove the pinion



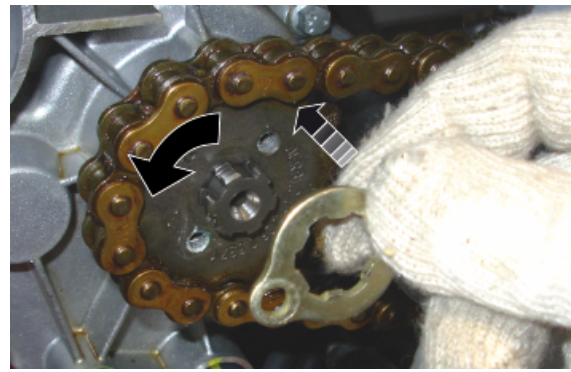
Installing

OPTION 01

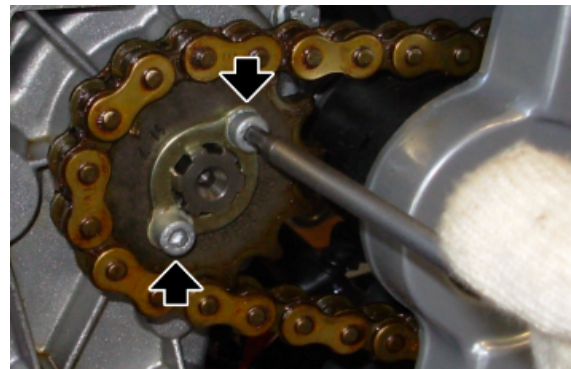
- Insert the pinion on the shaft.



- Insert the pin retainer plate and rotate it to match the holes.



- Insert the fixing screws of the pinion and tighten them to the prescribed torque.



OPTION 02

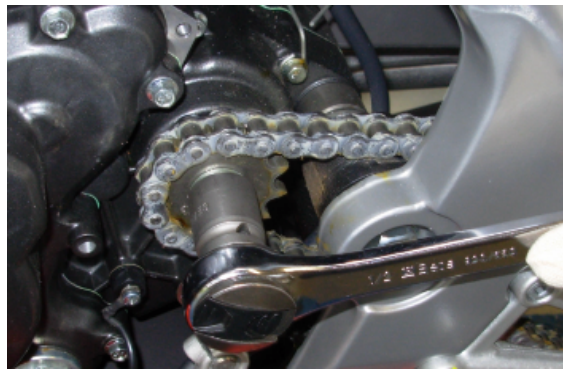
- Insert the pinion on the shaft.



- Insert the Belleville spring



- Place the nut and tighten it to prescribed torque



- Insert the pinion cover crankcase.
- Tension the chain so that there is a correct clearance

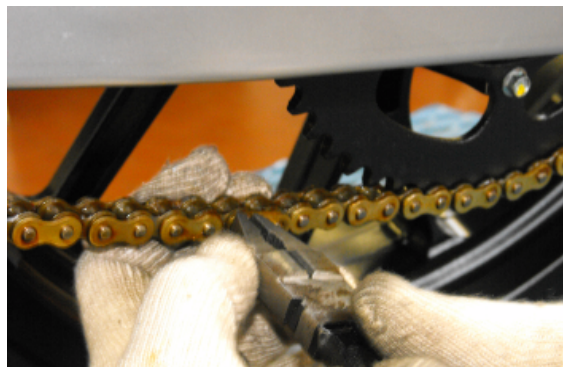
See also

[Adjusting](#)

Drive chain

Removing

- Support the vehicle with the optional rear stand.
- Loosen the chain tension, by unscrewing the rear adjuster screws.
- Identify the master link; slide off the clip.
- Remove the plate underneath.
- Collect the chain.



CAUTION

REPLACE THE ENTIRE UNIT IF THE CHAIN IS PARTICULARLY WORN.

See also

[Adjusting](#)

inspection

Also check the following parts and make sure that the chain, pinion and crown do not present:

- Damaged rollers.
- Loose pins.
- Dry, rusty, flattened or jammed chain links.
- Excessive wear.
- Excessively worn or damaged pinion or crown teeth.

CAUTION

**IF THE CHAIN ROLLERS ARE DAMAGED AND / OR THE PINS ARE LOOSE, THE ENTIRE CHAIN UNIT (PINION, CROWN AND CHAIN) SHOULD BE REPLACED.
LUBRICATE THE CHAIN ON A REGULAR BASIS, PARTICULARLY IF YOU DETECT DRY OR RUSTY PARTS.
FLATTENED OR JAMMED CHAIN LINKS SHOULD BE LUBRICATED AND GOOD OPERATING CONDITIONS RESTORED.**

Installing

- Check the correct positioning of the chain on the pinion and the sprocket.
- Fit the chain with the two ends joined at a point between the pinion and the sprocket on the lower branch of the chain.
- Join the two ends of the chain and fit the master link pins from the inside to the outside.
- Insert the plate on the pins.
- Fit the clip on the pins.

CAUTION

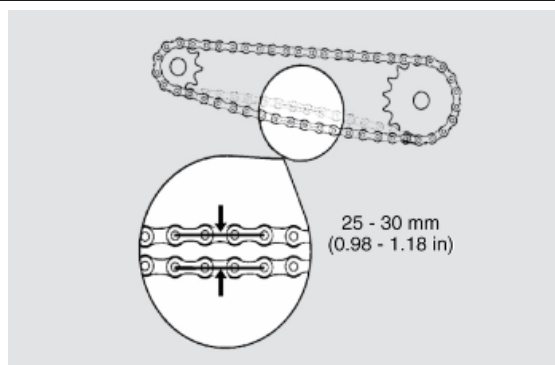
THE MASTER LINK CLIP MUST BE FITTED WITH ITS OPEN SIDE FACING DIRECTION OPPOSITE THE CHAIN FORWARD MOVEMENT.



Adjusting

To check clearance:

- Shut off the engine.
- Rest the vehicle on its stand.
- Engage neutral gear.
- Check the vertical oscillation at a point between the pinion and the sprocket on the lower branch of the chain.
- If the chain clearance is less than 25 mm (0.98 in) or exceeds 30 mm (1.18 in), adjust the chain.
- Move the vehicle forward so as to check vertical oscillation of the chain in other positions too. clearance should remain constant at all wheel rotation phases.



CAUTION

IF CLEARANCE IS GREATER AT SOME POSITIONS, THIS MEANS THAT SOME CHAIN LINKS ARE FLATTENED OR JAMMED.

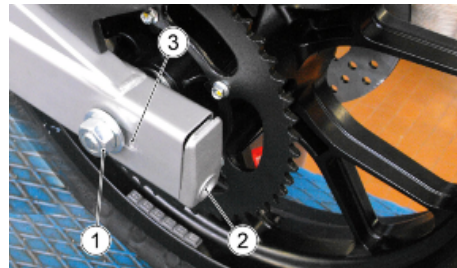
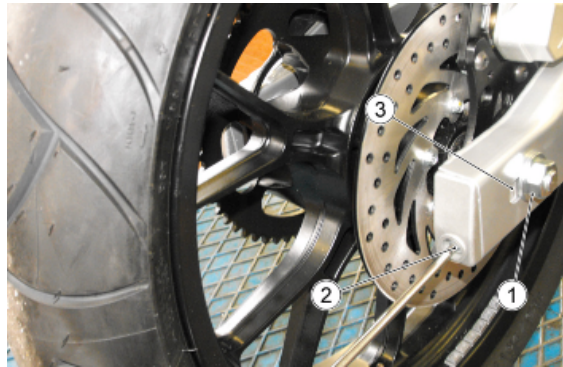
TO AVOID RISK OF SEIZURE, LUBRICATE THE CHAIN ON A REGULAR BASIS.

CAUTION

GET A SPECIFIC REAR SERVICE STAND (OPT) TO ADJUST THE CHAIN.

If you need to adjust the chain tension after the check, perform the following.

- Place the vehicle on its optional rear service stand.
- Working from both sides, loosen the nut (1) completely.
- Actuate on the adjuster screws (2) and adjust the chain clearance according to the references (3).
- Check that the references (3) are aligned on both sides.
- Then tighten the nuts (1).



CAUTION

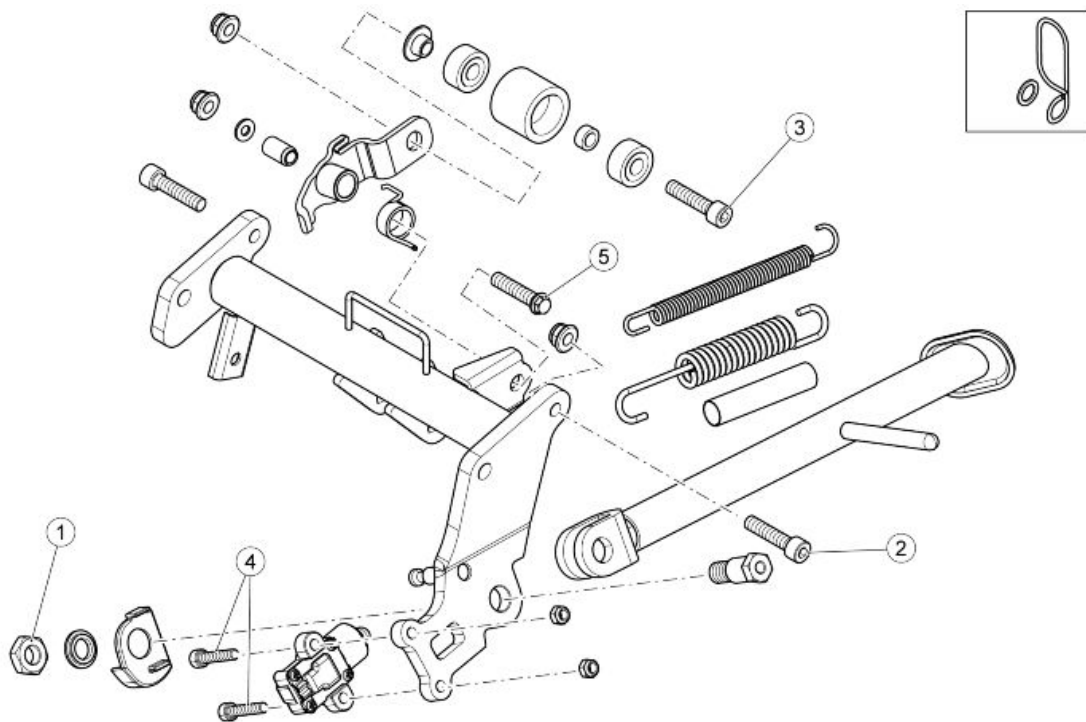
IF CLEARANCE IS GREATER AT SOME POSITIONS, THIS MEANS THAT SOME CHAIN LINKS ARE FLATTENED OR JAMMED.

TO AVOID RISK OF SEIZURE, LUBRICATE THE CHAIN ON A REGULAR BASIS.

CAUTION

GET A SPECIFIC REAR SERVICE STAND (OPT) TO ADJUST THE CHAIN.

Chain tensioner

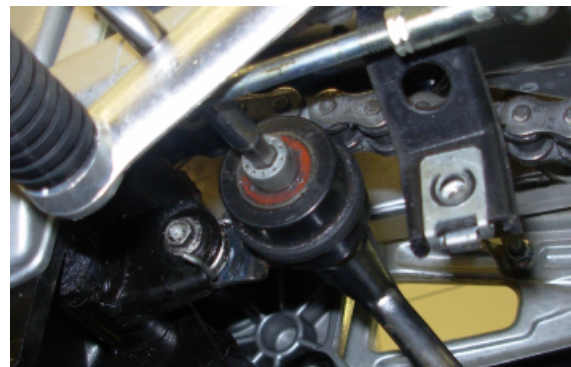


STAND

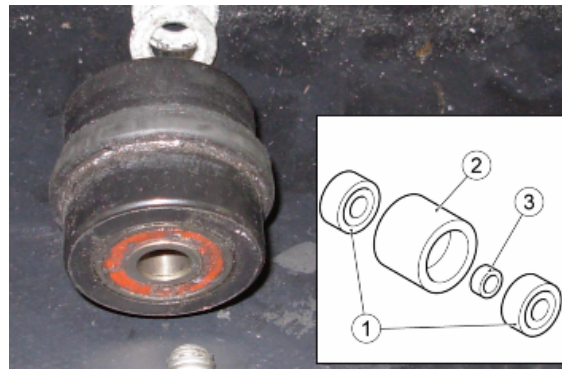
pos.	Description	Type	Quantity	Torque	Notes
1	Thin nut	M10x1.25	1	10 Nm (7.38 lb ft)	-
2	TCEI screw	M8x30	2	25 Nm (18.43 lb ft)	Loctite 243
3	TCEI screw	M8x45	1	25 Nm (18.43 lb ft)	-
4	TE Screws Flang.	M5x25	2	3 Nm (2.21 lb ft)	-
5	TE Screws	M6x30	2	10 Nm (7.38 lb ft)	-

Removing

- Remove the screw with the relative retainer nut being careful to recover the shimming washers.



- In case replacing the roller bearings only, be careful to retrieve the spacer between the two.



- Remove the screw and the relative retainer nut of the chain tensioner plate.

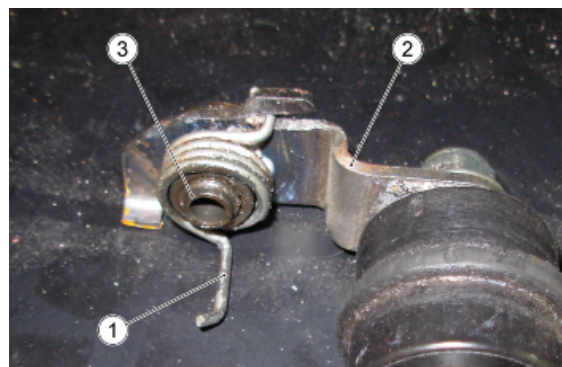


- If necessary, replace the spring.



Installing

- Insert the spring (1) on the chain tensioner plate (2) paying attention to correct the positioning.
- Place the bushing (3) with milling address as shown in the figure.



- Insert the screw with related washer and the special nut to secure the chain tensioner plate paying attention to correct positioning of the spring.



- Fit the roller on the chain tensioner plater after having assembled it complete with bearings and spacer.

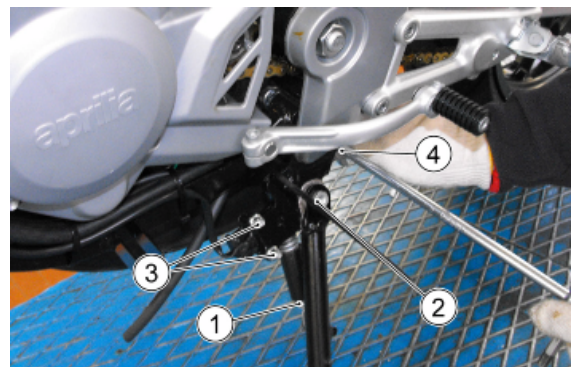
Stand

Side stand

- Rest the vehicle on the optional rear stand.

Stand rod removal

- With closed stand, release the spring (1)
- Unscrew and remove the nut (2).

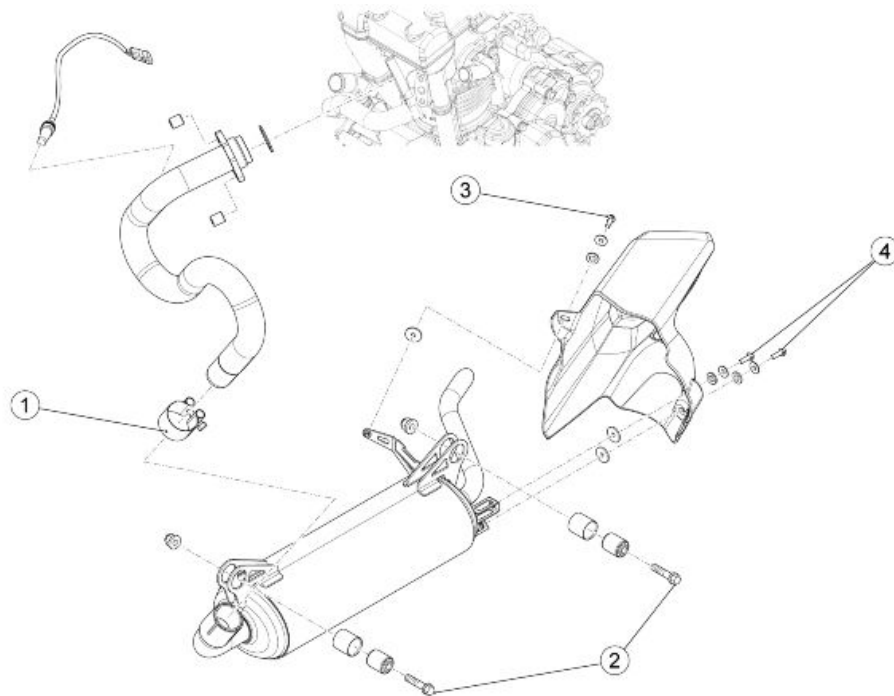


Remove stand together with the plate

- Unscrew and remove the two stand switch fixing nuts (3).
- Unscrew and remove the internal nut and the pin (4) by collecting the washer.
- Slide off the nut and remove the cable grommet.
- Slide off the stand together with the plate.



Exhaust

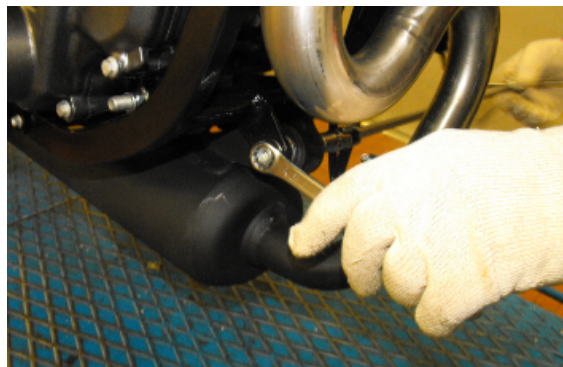


EXHAUST

pos.	Description	Type	Quantity	Torque	Notes
1	Drainage retainer	M6x20	2	10 Nm (7.37 lbf ft)	-
2	Footrest retainer	M8x40	1	25 Nm (18.43 lbf ft)	-

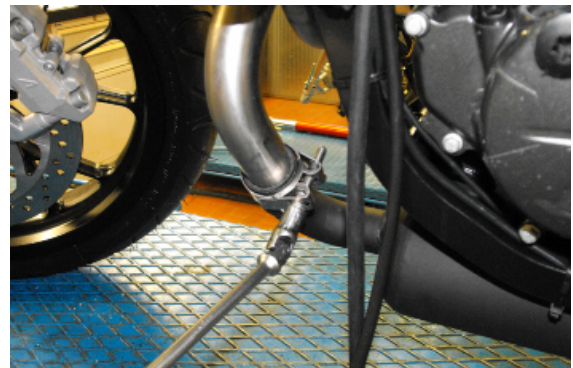
Removing the tail pipe

- Undo and remove the two upper stay-screws and collect the relative nuts and washers.

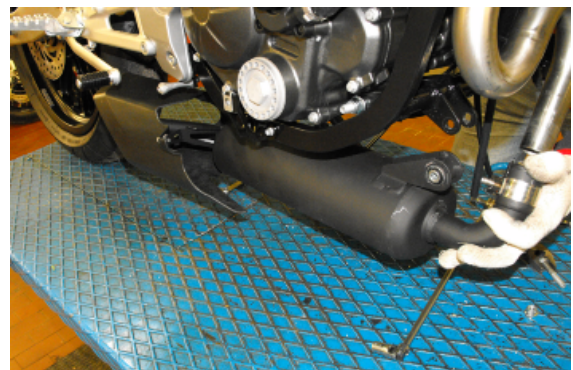




- Beforehand, remove the side fairings and the fairing lug.
- Loosen the clamp.

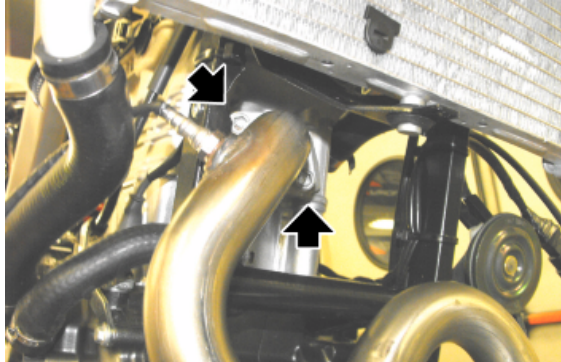
**See also**Side fairings

- Remove the exhaust end.



Removing the exhaust manifold

- Unscrew and remove the two screws.
- Remove the manifold.



-
- Remove the muffler.
 - Lift the saddle and disconnect the lambda probe connector.



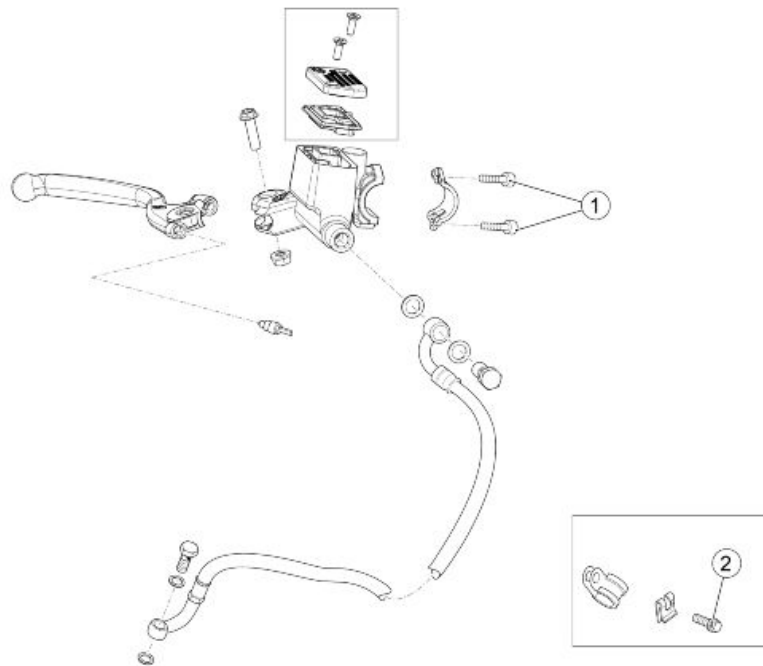
See also

[Removing the tail pipe](#)

INDEX OF TOPICS

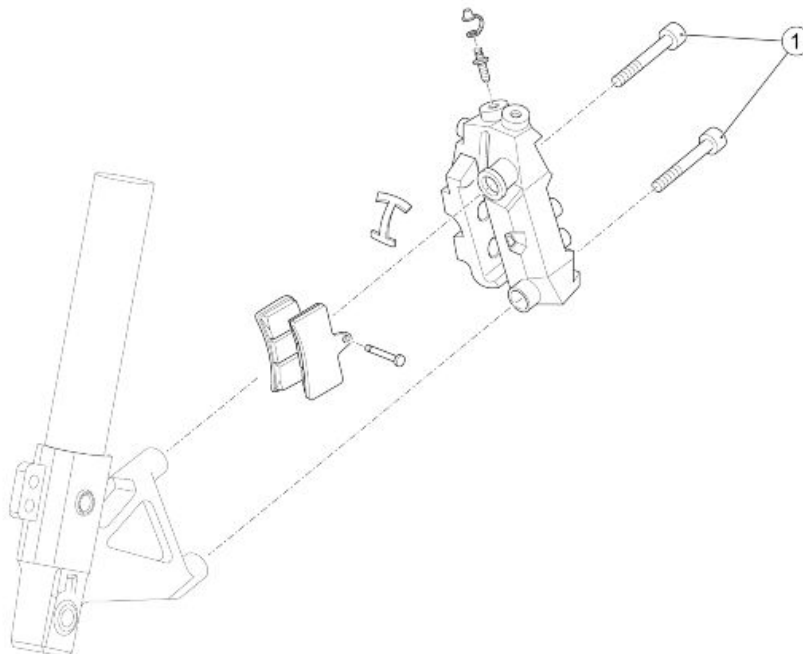
BRAKING SYSTEM

BRAK SYS



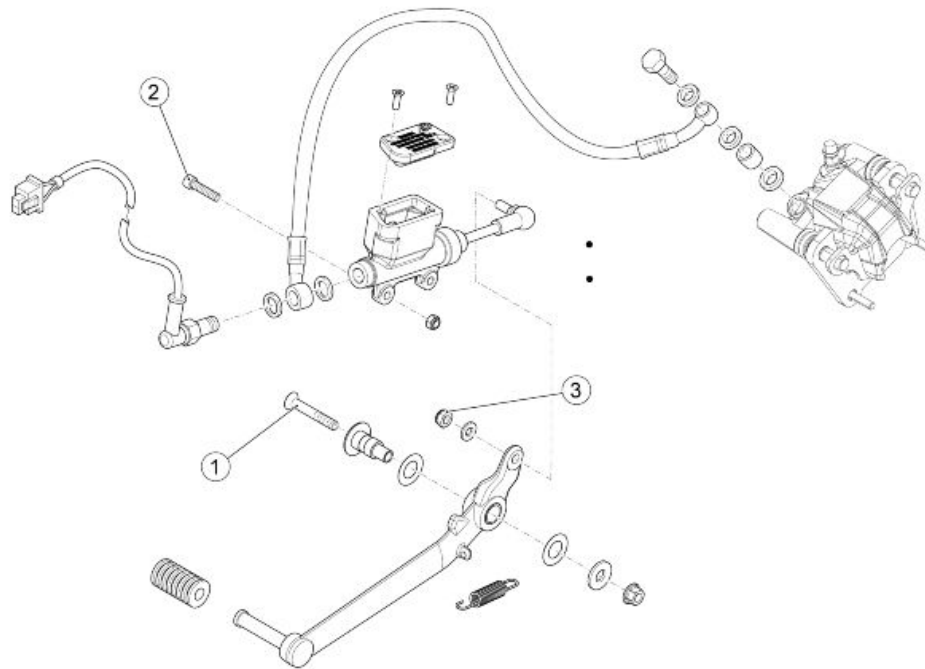
FRONT BRAKE PUMP

pos.	Description	Type	Quantity	Torque	Notes
1	Front brake pump fixing screw	M5	2	5 Nm (3.68 lbf ft)	-
2	Brake pipe clamp fixing screw	M5x16	1	5 Nm (3.68 lbf ft)	-



FRONT CALLIPER

pos.	Description	Type	Quantity	Torque	Notes
1	Front calliper fixing screw	M10x60	2	50 Nm (36.87 lbf ft)	-



REAR BRAKING SYSTEM

pos.	Description	Type	Quantity	Torque	Notes
1	Brake lever fixing screw	M6x40	1	12 Nm (8.85 lbf ft)	-
2	Rear brake pump fixing screw	M6x30	2	10 Nm (7.37 lbf ft)	-
3	Brake pump joint retainer	M6	1	10 Nm (7.37 lbf ft)	-

Rear brake calliper

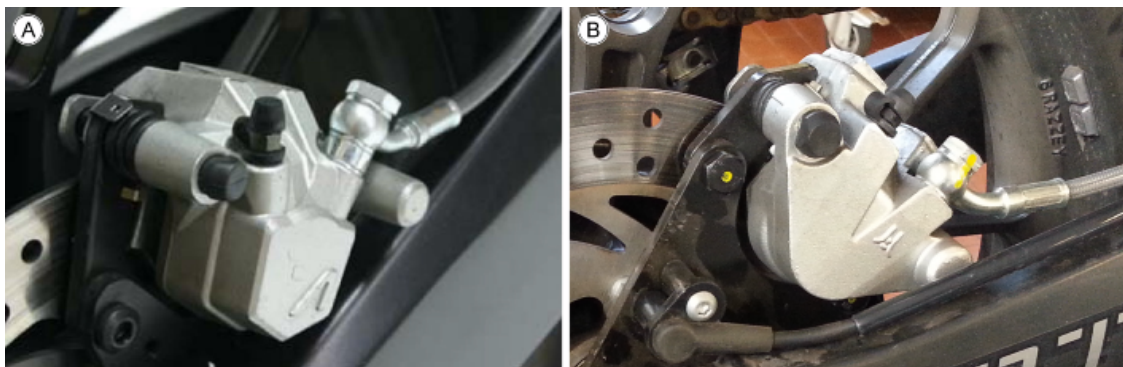
CAUTION

THE MOTORCYCLE MAY BE FITTED WITH AN A.J.P. OR J.JUAN BRAKING SYSTEM.
THE PROCEDURES FOR REMOVING AND INSTALLING THE BRAKE CALLIPER ARE IDENTICAL

key:

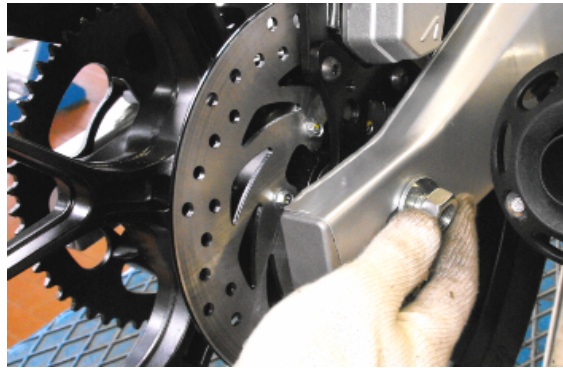
A) A.J.P. Brake calliper

B) J.JUAN Brake calliper

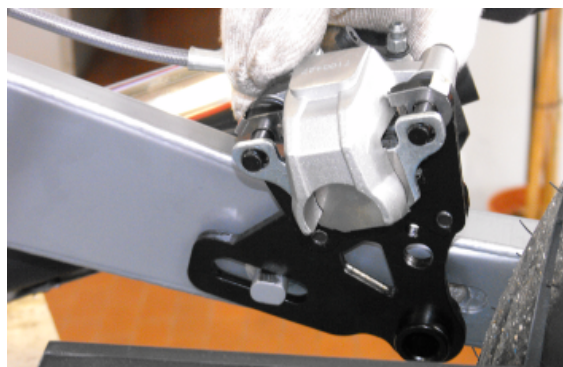


Removal

- Release the chain.
- Loosen the wheel axle, acting on the nut, from the right side of the vehicle and on the pin, from the left side.



-
- Move the rear wheel.
 - Move the rear brake calliper plate until the end and slide it one off.



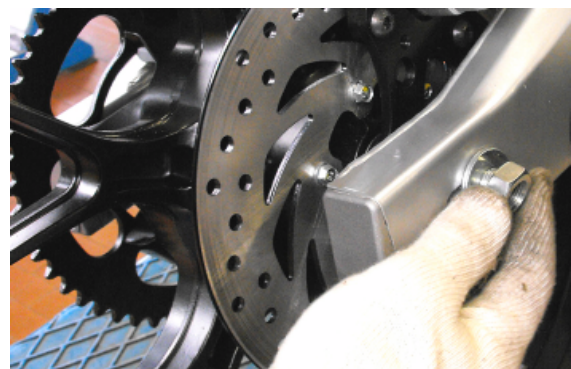
- Undo the joint from the rear calliper after placing an appropriate container to collect the brake fluid.
 - Remove the speed sensor.
 - It is now possible to remove the complete calliper
-

Installing

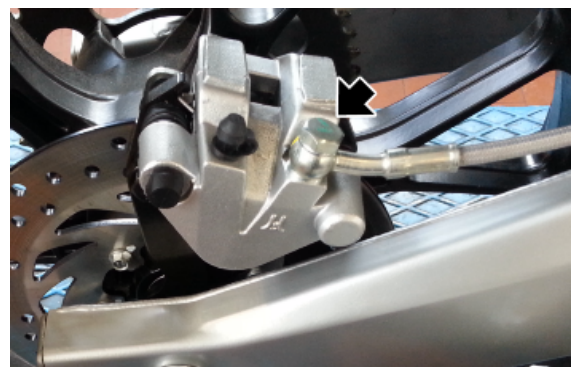
- Place the complete calliper on the specific lodging on the swingarm.
- Connect the drive chain after positioning the wheel and insert the retaining pin



- Insert the washer, the nut and fix the pin at the prescribed torque



- Connect the braking system line to the calliper and proceed with bleeding.



Front brake calliper

CAUTION

THE MOTORCYCLE MAY BE FITTED WITH AN A.J.P. OR J.JUAN BRAKING SYSTEM. THE PROCEDURES FOR REMOVING AND INSTALLING THE BRAKE CALLIPER ARE IDENTICAL

key:

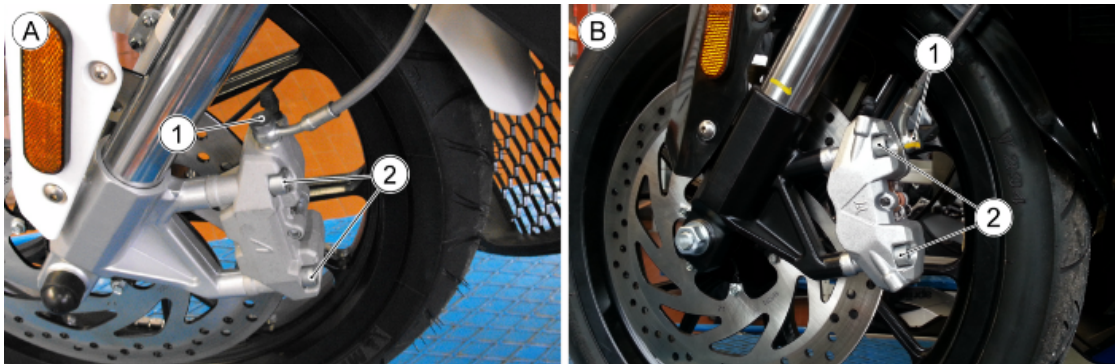
A) A.J.P. Brake calliper

B) J.JUAN Brake calliper

Removal

- Carry out the drainage of the front braking system.
- Unscrew the screw (1) and slide off the brake oil pipe.

- Unscrew and remove both calliper fixing screws (2).
- Slide off the front brake calliper.



See also

[Bleeding the braking system](#)

Rear brake disc

Removal

- Remove the wheel.
- Unscrew and remove the six disc fixing screws.
- Upon refitting, position the disc adequately so that the inscriptions are on the external side.
- Tighten to the specified torque.

Disc Inspection

- Check the disc thickness (1) at the most worn points.
- If the disc thickness is less than the minimum limit, replace it. The measurement area is approximately at the point (2).

In case of cracks or slots, replace it.

Standard thickness of the disc: 3.5 mm (0.13 in).

Serviceability limit: 3 mm (0.11 in).



- Check the decentralisation with a micrometer by placing it on the disc (A) and turning the wheel.
- If the decentralisation exceeds the serviceability limit, replace the disc.

Decentralisation of the disc: 0.2 mm



Front brake disc

Removal

- Remove the wheel.
- Unscrew and remove the six disc fixing screws.
- Upon refitting, position the disc adequately so that the inscriptions are on the external side.
- Tighten to the specified torque.

Locking torques (N*m)

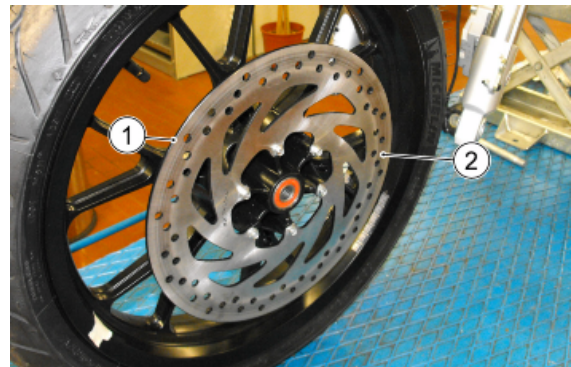
Front brake disc 10 - 12

Disc Inspection

- Check the disc thickness (A) at the most worn points. If the disc is worn more than the specific limit, replace it.

Measurement area (2).

- Check that there are no cracks and slots, if it does not comply with the specifications, replace it.



Standard thickness of the disc: 4mm (0.15 in)

Serviceability limit: 3.50 mm (0.13 in)

- Check the decentralisation with a micrometer by placing it on the disc (A) and turning the wheel.
- If the decentralisation exceeds the serviceability limit, replace the disc.

Decentralisation of the disc: 0.2 mm

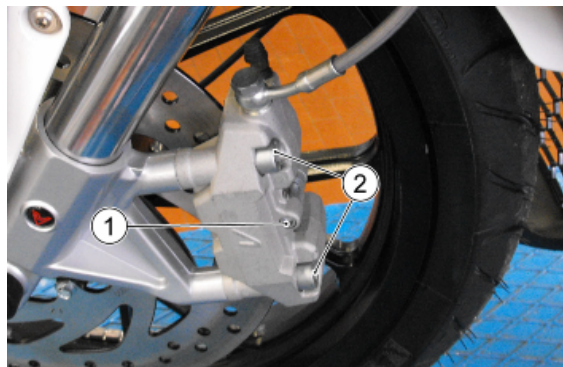


Front brake pads

Removal

A.J.P. BRAKE CALLIPER

- Loosen the central pad fastener screw (1) on the front brake calliper, on the left hand side of the vehicle.
- Undo and remove the two screws (2) fastening the brake calliper.



- Remove the brake calliper.
- Remove the screw (1) and retrieve the two pads from below.



- Check the pads.
- Measure the thickness of the brake pads. If one of the two falls under the serviceability limit, replace them.

Serviceability limit 1.5 mm (0.05 in).

WARNING

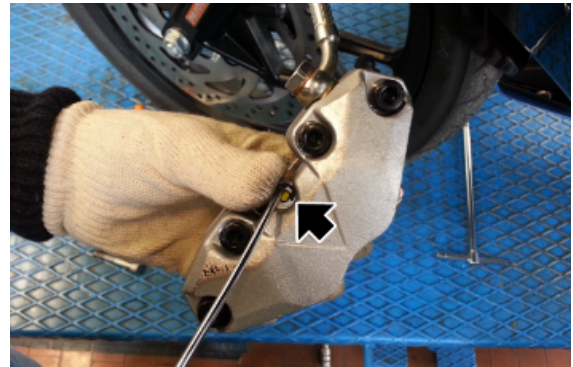
IF THE BRAKE LEVER STARTS WITHOUT THE CALLIPER IT MAY BE NECESSARY TO CARRY OUT BLEEDING.

J.JUAN BRAKE CALLIPER

- On the front brake calliper on the left hand side of the vehicle, undo and remove the two brake calliper fastener screws.



- Remove the circlip.



- Remove the pad fastener pin.



- Remove the pads.



- Check the pads.

- Measure the thickness of the brake pads. If one of the two falls under the serviceability limit, replace them.

Serviceability limit 1.5 mm (0.05 in).

WARNING

IF THE BRAKE LEVER STARTS WITHOUT THE CALLIPER IT MAY BE NECESSARY TO CARRY OUT THE CORRESPONDING BLEEDING.

Rear brake pads

Removal

NOTE

THE PAD DISASSEMBLY AND INSTALLATION PROCEDURES FOR THE BRAKE CALLIPER ARE THE SAME FOR BOTH THE A.J.P AND THE J.JUAN SYSTEM.

WARNING

IF THE BRAKE LEVER STARTS WITHOUT THE CALLIPER IT MAY BE NECESSARY TO CARRY OUT BLEEDING.

- Remove the rear brake calliper.
- Press on the external pad in the direction of the arrow.



- Remove the pads.



- Check the pads.
- Measure the thickness of the brake pads. If one of the two falls under the serviceability limit, replace them.

Serviceability limit 1.5 mm (0.05 in).

WARNING

IF THE BRAKE LEVER STARTS WITHOUT THE CALLIPER IT MAY BE NECESSARY TO CARRY OUT THE CORRESPONDING BLEEDING.

Bleeding the braking system

NOTE

IF AIR CONTINUES TO COME OUT DURING THE BLEED OPERATION EXAMINE ALL THE FITTINGS:

IF SAID FITTINGS DO NOT SHOW SIGNS OF BEING FAULTY, LOOK FOR THE AIR INPUT AMONG THE VARIOUS SEALS ON THE PUMP AND CALLIPER PISTONS.

CAUTION

DURING THESE OPERATIONS, THE VEHICLE MUST BE UPRIGHT.

NOTE

DURING THE BLEEDING OPERATIONS FREQUENTLY CHECK THE LEVEL TO PREVENT AIR GETTING INTO THE SYSTEM THROUGH THE PUMP.

WARNING

BRAKE FLUID IS HYGROSCOPIC; IT TENDS TO ABSORB MOISTURE FROM THE SURROUNDING AIR.

IF THE LEVEL OF MOISTURE IN THE FLUID EXCEEDS A GIVEN VALUE, BRAKING EFFICIENCY WILL BE REDUCED.

THEREFORE, ALWAYS USE FLUID FROM SEALED CONTAINERS.

UNDER NORMAL DRIVING AND CLIMATIC CONDITIONS YOU SHOULD CHANGE THIS LIQUID EVERY TWO YEARS.

IF THE BRAKES ARE USED INTENSELY AND/OR IN HARSH CONDITIONS, CHANGE THE FLUID MORE FREQUENTLY.

CAUTION

WHEN CARRYING OUT THE OPERATION, BRAKE FLUID MAY LEAK FROM BETWEEN THE BLEED SCREW AND ITS SEAT ON THE CALLIPER. CAREFULLY DRY THE CALLIPER AND DEGREASE THE DISC SHOULD THERE BE OIL ON IT. WHEN THE OPERATION IS OVER, TIGHTEN THE OIL BLEED SCREW TO THE PRESCRIBED TORQUE.

CAUTION

MAKE SURE THE BRAKE FLUID DOES NOT GET INTO YOUR EYES OR ON YOUR SKIN OR CLOTHES. IF THIS HAPPENS ACCIDENTALLY, WASH WITH WATER.

WARNING

BRAKE CIRCUIT FLUID IS VERY CORROSIVE; DO NOT LET IT COME INTO CONTACT WITH THE PAINTED PARTS.

key:

A) A.J.P. Brake calliper

B) J.JUAN Brake calliper

Front

Any air trapped in the hydraulic circuit acts as a cushion, absorbing much of the pressure applied by the brake pump and minimising the braking power of the calliper.

The presence of air is signalled by the "sponginess" of the brake control and poor braking efficiency.



CONSIDERING THE DANGER FOR VEHICLE AND RIDER, IT IS STRICTLY NECESSARY, AFTER REFITTING BRAKES AND RESTORING THE BREAKING SYSTEM TO THE REGULAR USE CONDITIONS, THAT THE HYDRAULIC CIRCUIT BE AIR PURGED.

NOTE

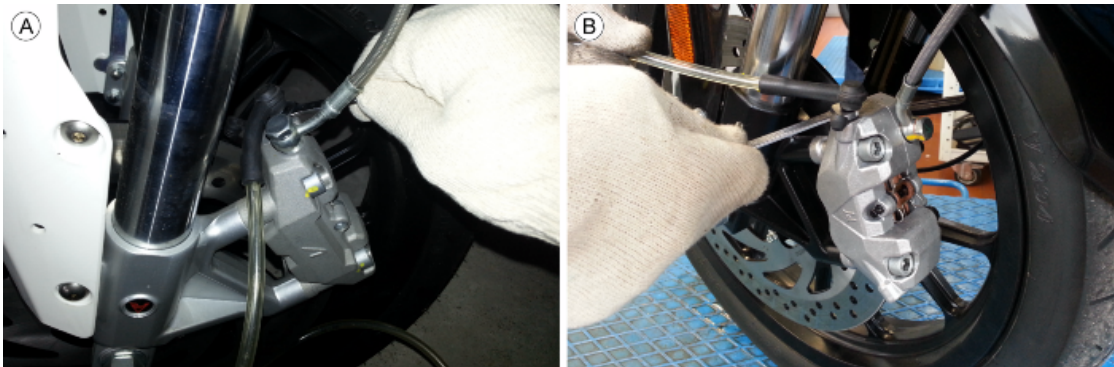
THE FOLLOWING OPERATIONS REFER TO ONLY ONE FRONT BRAKE CALLIPER BUT APPLY TO BOTH CALLIPERS. THE VEHICLE MUST BE ON LEVEL GROUND TO BE PURGED. WHILE PURGING THE HYDRAULIC SYSTEM, FILL THE RESERVOIR WITH THE NECESSARY QUANTITY

OF BRAKE FLUID. CHECK THAT, DURING THE OPERATION, THERE IS ALWAYS BRAKE FLUID IN THE RESERVOIR.

- Remove the rubber protection cover from the bleed valve.
- Insert the transparent plastic pipe in the front brake calliper bleed valve and slide the other end of this pipe in a container to collect the fluid.
- Remove the front brake fluid reservoir cap.
- Quickly press and release the front brake lever several times and then keep it fully pressed.
- Loosen the bleed valve 1/4 of a turn so that the brake fluid flows into the container. This will release the tension on the brake lever and will make it reach the end of stroke.
- Close the bleed valve before the lever reaches its end of stroke.
- Repeat the operation until the fluid draining into the container is air-bubble free.

NOTE

WHILE PURGING THE HYDRAULIC SYSTEM, FILL THE RESERVOIR WITH THE NECESSARY QUANTITY OF BRAKE FLUID. CHECK THAT, DURING THE OPERATION, THERE IS ALWAYS BRAKE FLUID IN THE RESERVOIR.



- Screw the bleeding valve and remove the pipe.
- Top-up the reservoir until the correct brake fluid level is obtained.
- Refit and block the front brake oil reservoir cap.
- Refit the rubber protection cover.

Rear

Any air trapped in the hydraulic circuit acts as a cushion, absorbing much of the pressure applied by the brake pump and minimising the braking power of the calliper.

The presence of air is signalled by the "sponginess" of the brake control and poor braking efficiency.

CAUTION

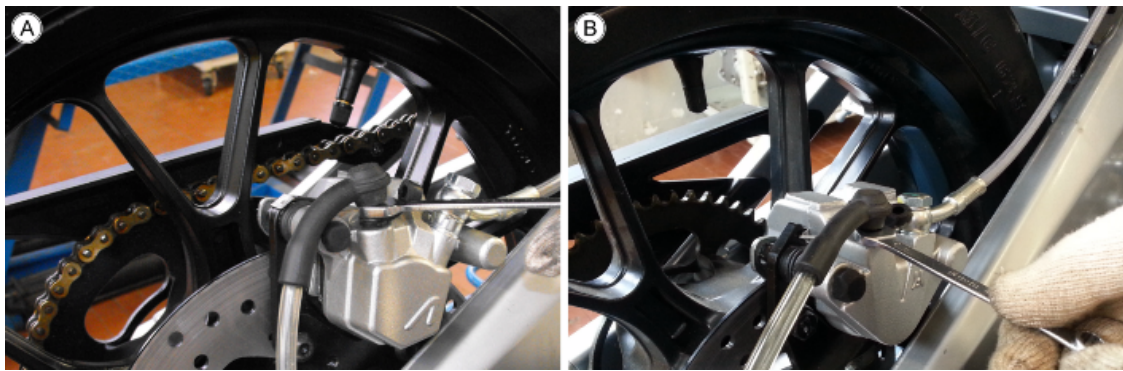
CONSIDERING THE DANGER FOR VEHICLE AND RIDER, IT IS STRICTLY NECESSARY, AFTER REFITTING BRAKES AND RESTORING THE BRAKING SYSTEM TO THE REGULAR USE CONDITIONS, THAT THE HYDRAULIC CIRCUIT BE AIR PURGED. THE VEHICLE MUST BE ON LEVEL GROUND TO BE PURGED. WHILE PURGING THE HYDRAULIC SYSTEM, FILL THE RESERVOIR WITH THE NECESSARY QUANTITY OF BRAKE FLUID. CHECK THAT, DURING THE OPERATION, THERE IS ALWAYS BRAKE FLUID IN THE RESERVOIR.

- Remove the rubber protection cover from the bleed valve.

- Insert the transparent plastic pipe in the rear brake calliper bleed valve and insert the other end of this pipe into a container to collect the fluid.
- Remove the rear brake fluid reservoir cap.
- Quickly press and release the rear brake lever several times and then keep it fully pressed.
- Loosen the bleed valve 1/4 of a turn so that the brake fluid flows into the container. This will release the tension on the brake lever and will make it reach the end of stroke.
- Close the bleed valve before the lever reaches its end of stroke.
- Repeat the operation until the fluid draining into the container is air-bubble free.

NOTE

WHILE PURGING THE HYDRAULIC SYSTEM, FILL THE RESERVOIR WITH THE NECESSARY QUANTITY OF BRAKE FLUID CHECK THAT, DURING THE OPERATION, THERE IS ALWAYS BRAKE FLUID IN THE RESERVOIR.



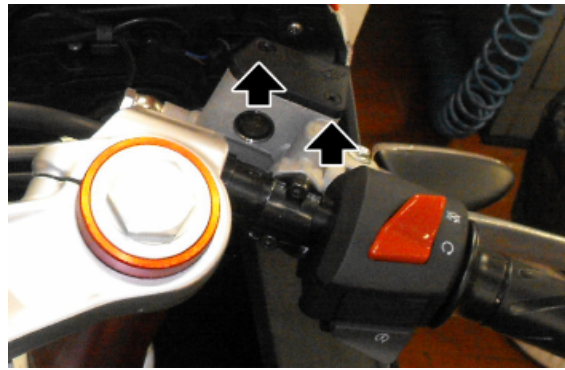
- Screw the bleeding valve and remove the pipe.
- Top-up the reservoir until the correct brake fluid level is obtained.
- Refit and lock the rear brake oil reservoir cap.
- Refit the rubber protection cover.

Changing the brake fluid

- To replace the brake fluid, operate the same way as for the front part and for the rear one.
- Open the brake fluid tank, unscrewing the two screws and removing the cover and gasket.
- Drain the system as for the bleeding procedure, proceeding till reaching the indicated level in the inspection glass.
- Place the gasket and the cover and tighten the two fixing screws.

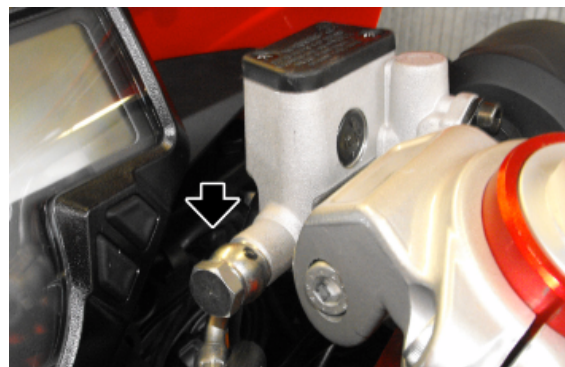
**WARNING**

IF THE BRAKE LEVER STARTS WITHOUT THE CALLIPER IT MAY BE NECESSARY TO CARRY OUT THE CORRESPONDING BLEEDING.



Front brake pump

- Unscrew and remove the screw and, by disconnecting the hoses, collect the brake oil in the tank, in an adequate container.
- Unscrew and remove the two U-bolt fixing screw at the handlebar and slide off the front brake pump tank.
- During the refit, carry out the described operations, in reverse order, tightening the screws to the prescribed torque.



Rear brake pump

Rimozione

- Unscrew the screw, disconnect the pipe, collect the break fluid in an adequate container.



- Unscrew and remove the two screws and collect the corresponding nuts.



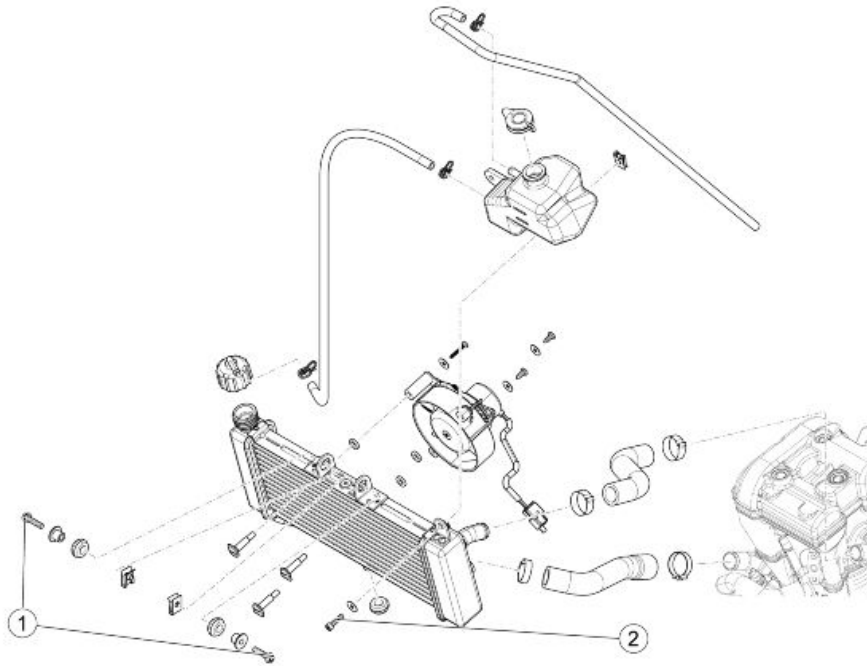
- Unscrew and remove the nut, retrieving the nut.
- Slide off the rear brake pump.
- During the refit, work in reverse order as described.



INDEX OF TOPICS

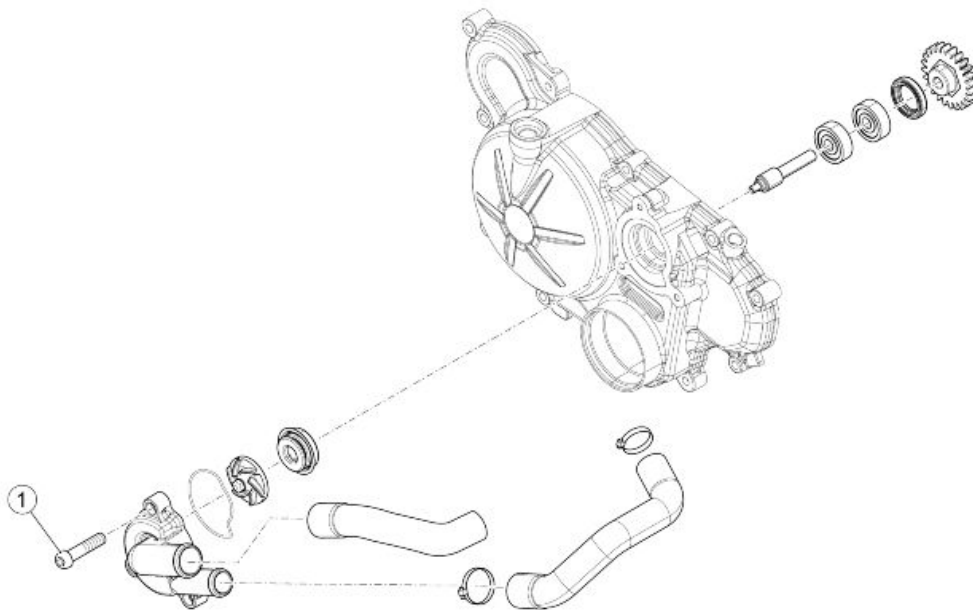
COOLING SYSTEM

COOL SYS



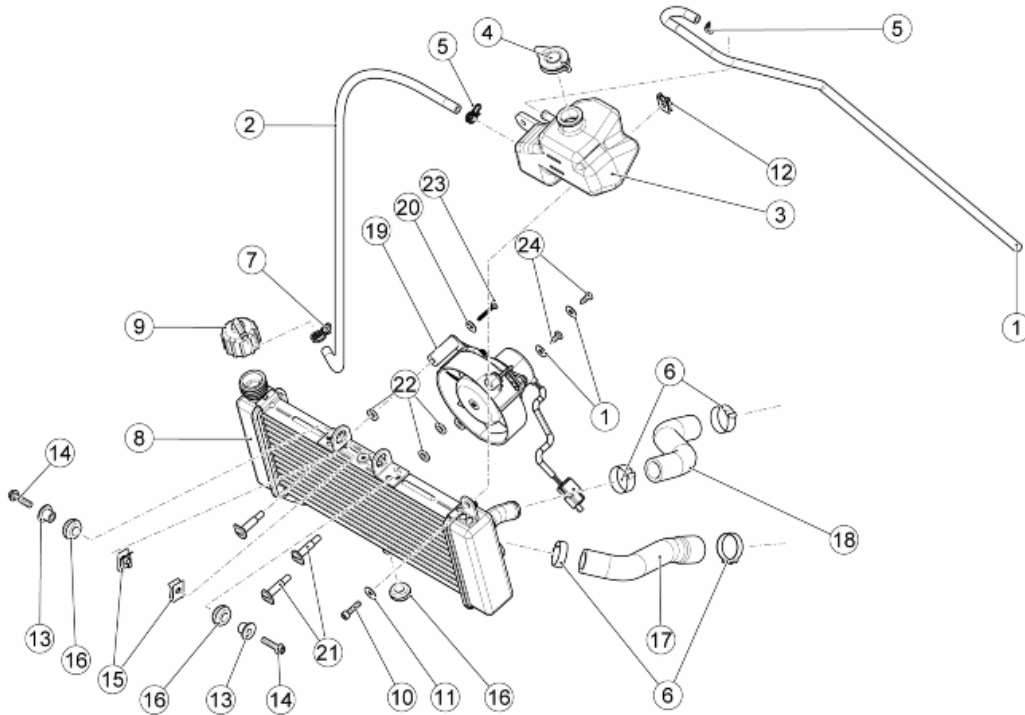
RADIATOR

pos.	Description	Type	Quantity	Torque	Notes
1	Radiator retainer	M6x25	2	10 Nm (7.37 lbf ft)	-
2	Expansion tank support fixing screw	M6x20	1	3.5-4 Nm (2.58-2.95 lbf ft)	-



WATER PUMP

pos.	Description	Type	Quantity	Torque	Notes
1	Water pump fixing screw	M5	3	5 - 6 Nm (3.68 - 4.42 lbf ft)	-

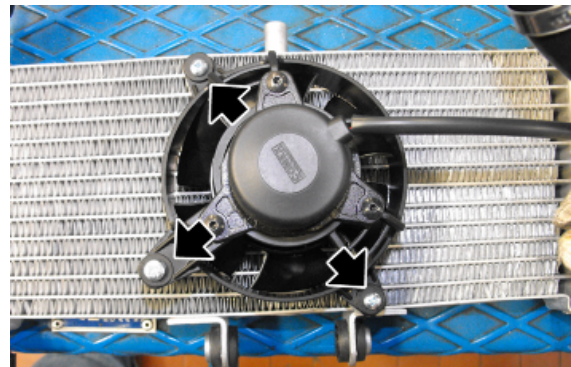
Circuit diagram**key:**

1. Breather pipe
2. Radiator - expansion tank pipe
3. Cooling liquid reservoir
4. Cap
5. Clamp
6. Clamp D16-24x8
7. D10.1 clamp
8. Water radiator
9. Cap
10. TCEI screw M6x20
11. 6.6x18x1.6 washer
12. Elastic plate M6
13. T-shaped bushing
14. TE flanged screw M6x25
15. Elastic plate M6

16. Cable grommet rubber ring
17. Pump-radiator pipe
18. Head-radiator pipe
19. Electric fan
20. Washer
21. Pin
22. Washer
23. Screw
24. Screw

Electric fan

- Remove the radiator
- Undo and remove the three screws and collect the washers; remove the electric fan.



See also

[Removing the radiator](#)

Coolant replacement

CAUTION

DO NOT USE YOUR VEHICLE IF THE COOLANT IS BELOW THE MINIMUM LEVEL. CHECK THE COOLANT LEVEL PERIODICALLY OR AFTER LONG TRIPS.

- Remove the right fairing.
- Working on the left side of the vehicle, open the expansion tank cap.



See also

Side fairings

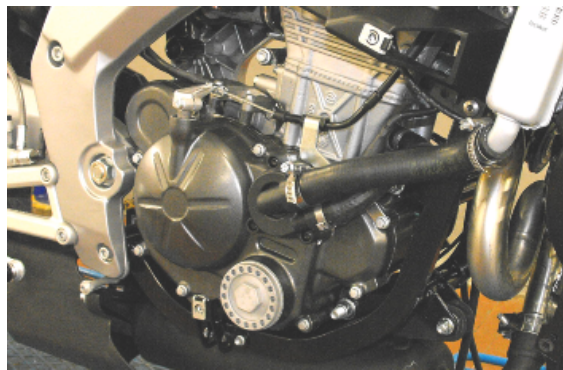
- Release the clamp.



Slide the pipe off and let the cooling liquid spill out, by pouring it into a container of a suitable capacity.

CAUTION

DO NOT DISPOSE OF THE FLUID INTO THE ENVIRONMENT.



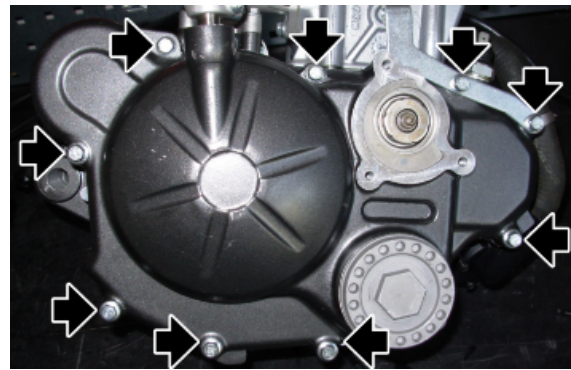
Water pump

Removal

- Remove the water pump and rotor cover;
- Remove the rotor;



- Remove the clutch cover;



- Heat the clutch cover to facilitate extraction of the water pump spindle assembly;
- Support the clutch cover on a press and with the specific tool "B", remove the water pump shaft group, acting from the external part to the internal one.

Specific tooling

866380 tool description



- Turn the clutch cover and acting from the internal part to the external one with the specific tool "C", take out the seal ring;

Specific tooling

866380 tool description



- Support the group of the water pump shaft on a vice and after it is sufficiently heated up, separate it with a punch from the gear;



Installing

CAUTION

ALWAYS REPLACE THE BEARINGS, THE OIL SEAL, AND THE SEALING RING, WHENEVER IT IS NECESSARY TO REMOVE THE WATER PUMP.

- Place the new bearings on the press and with the specific tool "B" push the shaft until it stops;



Specific tooling

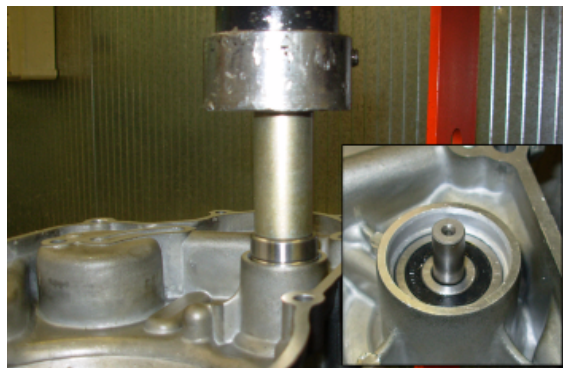
866380 tool description

- Warm up the clutch cover to facilitate the insertion of the shaft with the bearings;
- Place the specific tools "B" and "A" as in the figure in order to push with the press the shaft and the bearings until it stops;



Specific tooling

866380 tool description



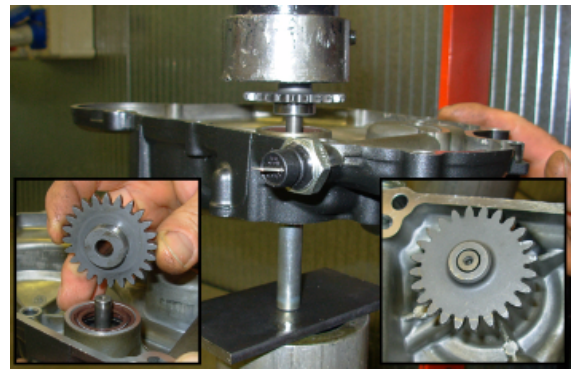
- Place the oil seal as in figure and push it until it stops;



- Place the gear paying attention that the operation is oriented to the cover;
- Use the specific tool "B" as an endstop in order to push the gear, with the press, until it is in line with the shaft.

Specific tooling

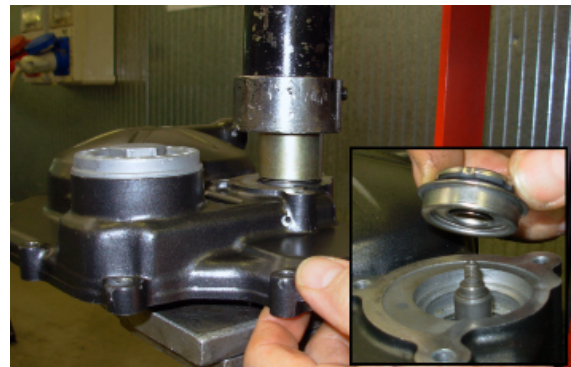
866380 tool description



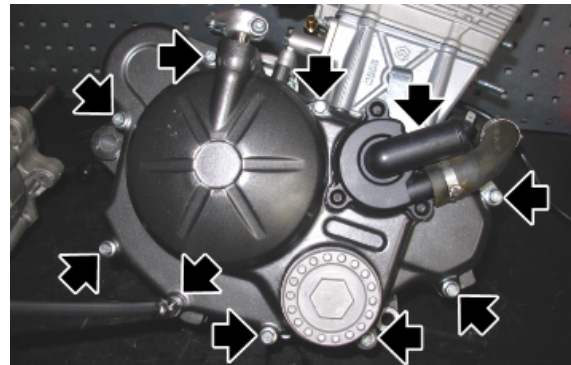
- Place the sealing ring and push it until it stops with the specific tool "C" by using the press.

Specific tooling

866380 tool description



- Install the clutch cover;
- Install the rotor and the water pump cover.



Removing the radiator

- Remove the expansion tank and the radiator cowl.
- Unscrew the screw and loosen the radiator hose fastening clamp.



- Lift the fuel tank and disconnect the electric fan connector.



See also

[Removing the expansion tank](#)

- Unscrew the radiator cover and let it connect to the hoses.



- Loosen the clamp with a screwdriver.
- Slide off the radiator - head pipe.

WARNING

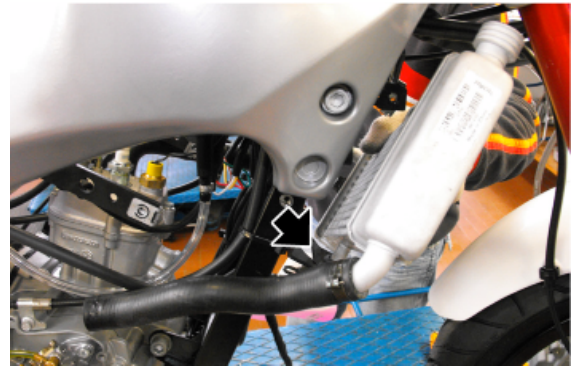
CARRY OUT THESE OPERATIONS WHEN THE ENGINE IS COLD, SCALDING FLUID OR ITS VAPOURS CAN CAUSE SERIOUS BURNS. COLLECT THE FLUID IN A SUITABLE CONTAINER. THE COOLANT IS HARMFUL. AVOID CONTACT WITH THE SKIN AND EYES.



- Unscrew and remove both screws fixing from the radiator to the chassis.



-
- Sliding it off the fitting slots, remove the radiator.



-
- Remove the electric fan if necessary.



Radiator installation

- Install the radiator following the removal operations but in reverse order.
- Fill the coolant tank with the recommended product.
- Check that the system does not show leaks.

Removing the expansion tank

- Remove the left side fairing and drain off the coolant.
- Lift the tank and fasten it in position with the supplied supporting stem.
- Unscrew and remove the two screws and slide the piping out.



- Loosen the clamp and slide off the hoses.

**See also**

Side fairings

Coolant replacement

- Unscrew and remove the tank fixing screw.
- Slide off the coolant tank.

INSTALLATION

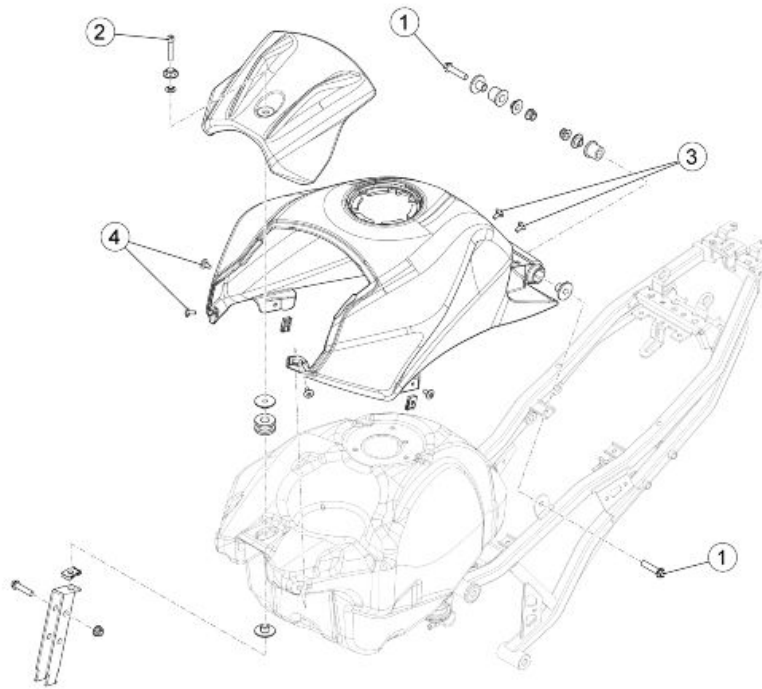
- For the installation, proceed in reverse order as described and fill the system after having replaced the recommended clamps.



INDEX OF TOPICS

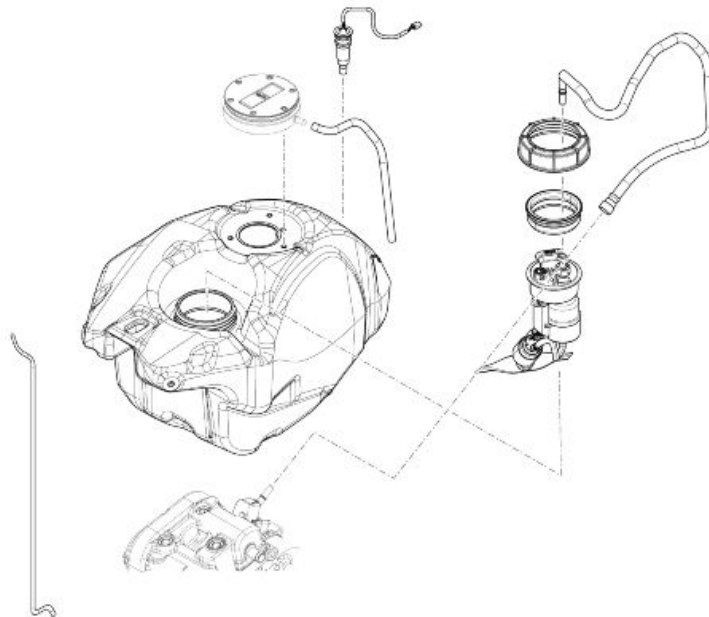
BODYWORK

BODYW



TANK

pos.	Description	Type	Quantity	Torque	Notes
1	Rear tank fixing screw	M8x40	1+1	25 Nm (18.44 lbf ft)	-
2	Front tank fixing screw	M6x35	1	10 Nm (7.37 lbf ft)	-
3	Fastener screw	M5x9	4	3 Nm (2.21 lbf ft)	-
4	Tank cover fixing screw	M5x9	4	3 Nm (2.21 lbf ft)	-



Driving mirrors

- Unscrew and remove the two nuts inside the top fairing, two for each mirror.
- Remove the rear-view mirrors.

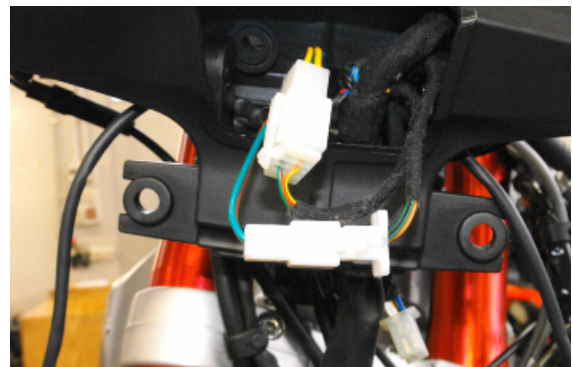


Instrument panel

- Remove the windshield.
- Lift the instrument panel and disconnect the connector.



- Disconnect the two connectors from the turn indicator and remove the instrument panel from the support.



See also

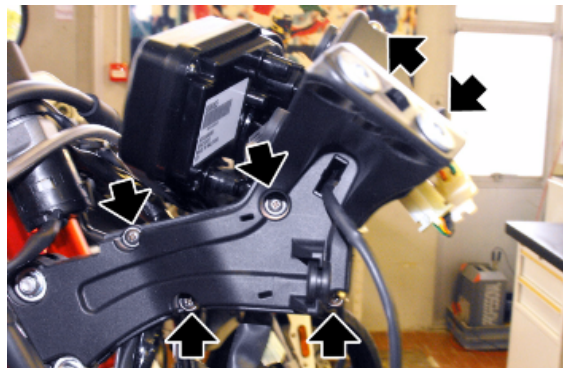
Headlight fairing

INSTRUMENT PANEL SUPPORT REMOVAL

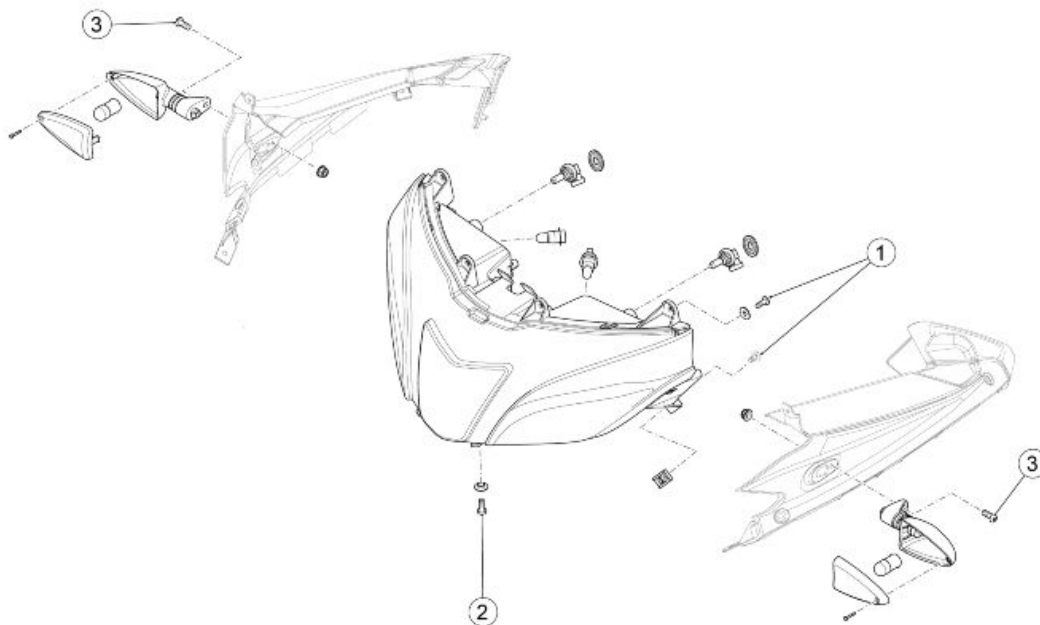
- Unscrew and remove the two stay-bolts and retrieve the washer from the left side and the nut from the right side.



- Unscrew and remove the six perimeter screws and remove the two shells.



Headlight assy.



FRONT LIGHTS

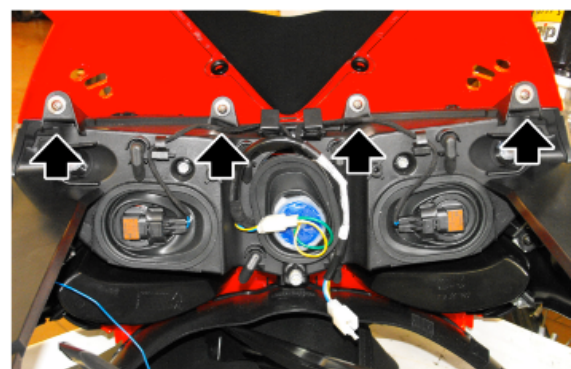
pos.	Description	Type	Quantity	Torque	Notes
1	Headlamp fixing screw	M5x14	4	2.5 Nm (1.84 lbf ft)	-
2	Self-tapping screw	M5	1	1.5 Nm (1.11 lbf ft)	-

pos.	Description	Type	Quantity	Torque	Notes
3	Turn indicator fixing screw	M5	2	1.5 Nm (1.11 lbf ft)	-

- Remove the top fairing.
- Disconnect the two bulb connectors.
- Operating from both sides, disconnect the connectors from the turn indicators.



- Unscrew and remove the four fixing screws at the top fairing.
- Remove the headlight assembly.



See also

Headlight fairing

Headlight fairing

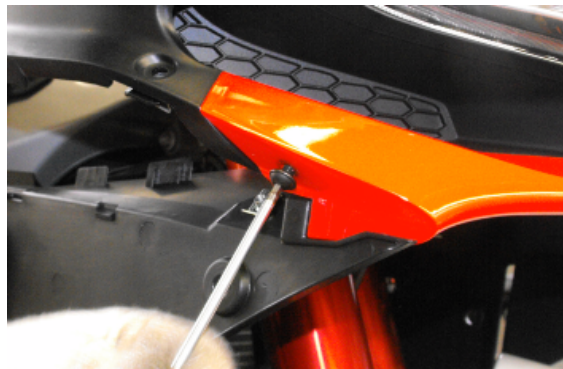
- Remove the fairing and the rear-view mirrors.
- Unscrew and remove the screw of the direction arrow.
- Remove the glass and disconnect the two wires from the bulb.
- Remove the two screws placed in the inside the top fairing from both sides of the motorcycle.



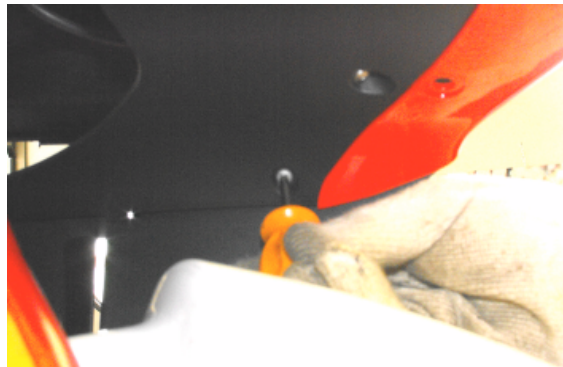
- Remove the two side screws fixing the top fairing to the chassis.



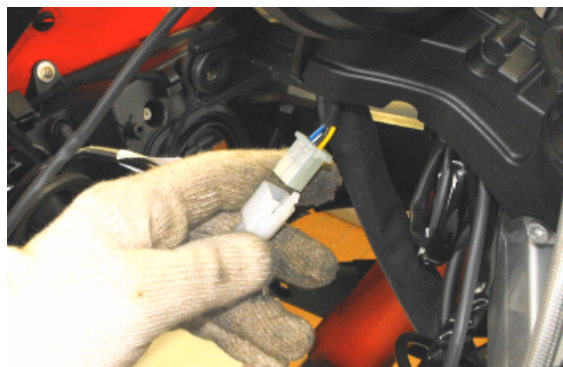
- Unscrew and remove the two top fairing side screws.



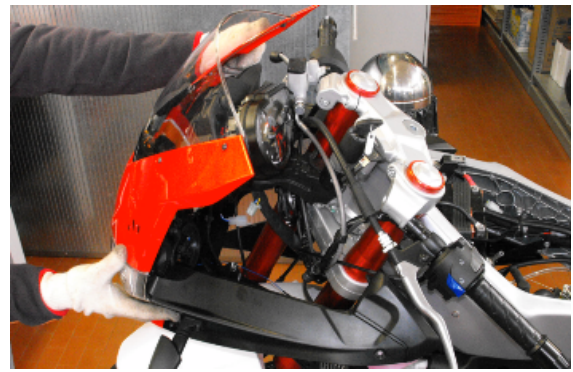
- Unscrew and remove the two screws on the front fairing.



- Disconnect the instrument panel connector.



- Remove the windshield.



Front wheelhouse

- Remove the fairing from the side of the wheel housing that you want to remove.
- Operating from the left shield, unscrew and remove the regulator fixing screw, collecting the nut and the washer.



- Operating from both sides, Unscrew and remove the lower screw.
- Remove the wheel housing.

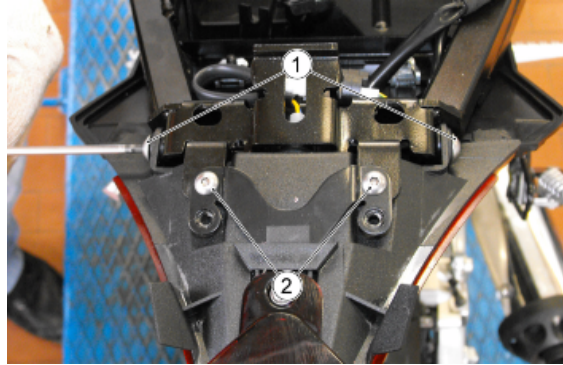


See also

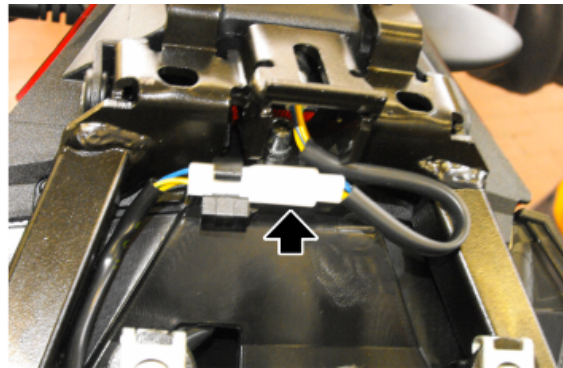
Side fairings

Taillight assy.

- Remove the tail fairing and the passenger saddle.
- Remove the two side screws (1).
- Remove the two upper screws (2).



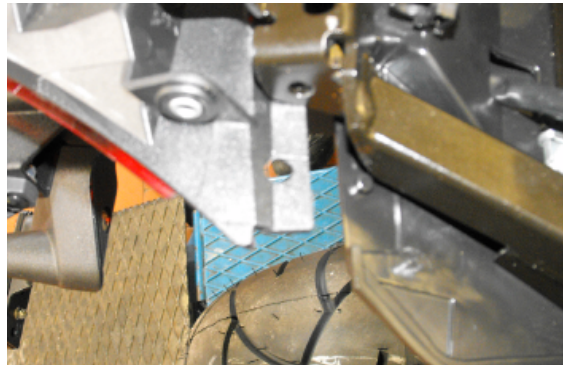
- Disconnect the connector.



See also

[Tail guard](#)

- Take off the rear light unit, by removing it from the hooks.

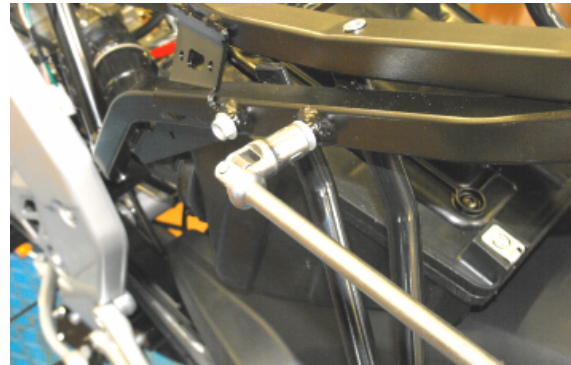


Footrest

PASSENGER FOOTREST

The following procedures only refer to one footrest, but they are applicable to both.

- Remove the tail fairing.
- Unscrew and remove the two fixing screws.
- Remove the passenger footrest.



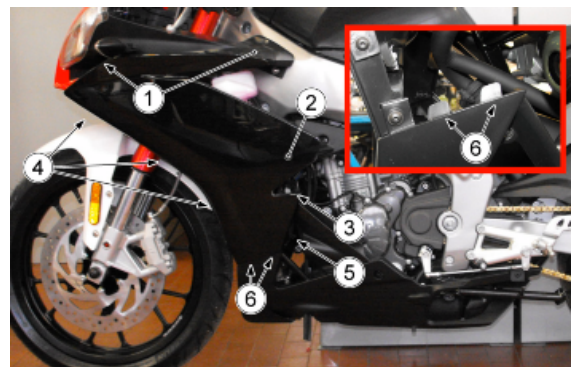
See also

[Tail guard](#)

Side fairings

The following operations only refer to one fairing, but they apply to both.

- Rest the vehicle on its stand.
- Remove the side fairing.
- Unscrew and remove the two screws (1) and collect the corresponding washers.
- Unscrew and remove the screw (2) and collect the washer.
- Remove the rivet (3).
- Working on the front side of the vehicle, remove the three rivets (4).
- Loosen and remove the screw (5).
- Sliding it off the fixing tongues (6) and paying attention to the integrity of the plastic parts, remove the fairing.



License plate holder

- Remove the passenger saddle.
- Remove the lower licence plate support cover.



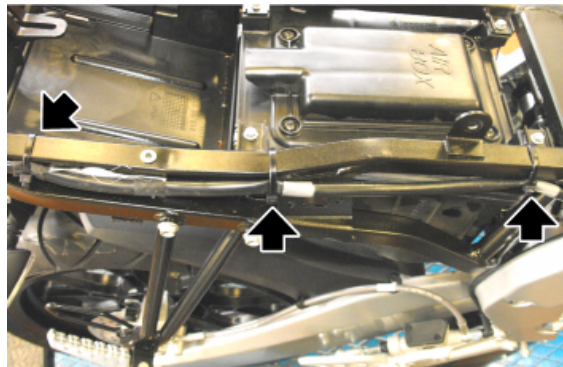
- Unscrew and remove the central lower screw.



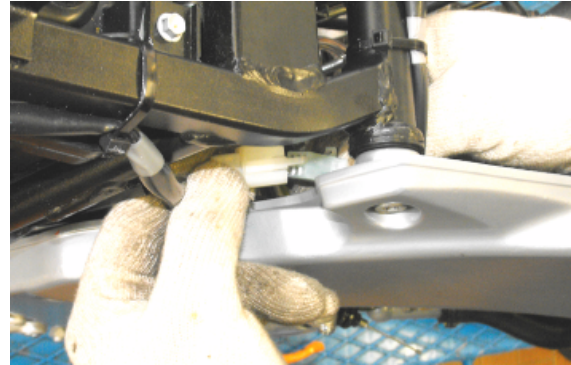
- Unscrew and remove the two lower screws.



- Remove the three clamps.

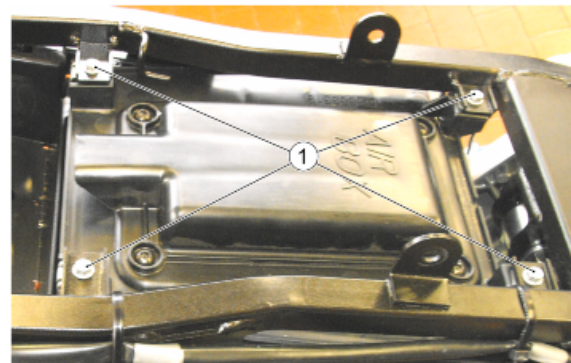


- Disconnect the connector.
- Remove the license plate support.

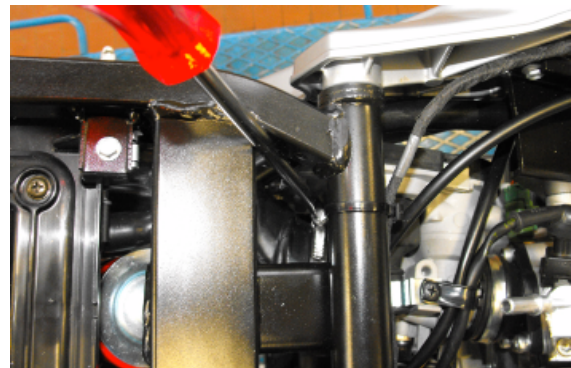


Air box

- Remove the passenger footrest, the saddle, the tank, the fairing and the splash guard.
- Unscrew and remove the four screws (1).



- Loosen the clamp and remove the intake tube.



See also

[Footrest](#)

[Fuel tank](#)

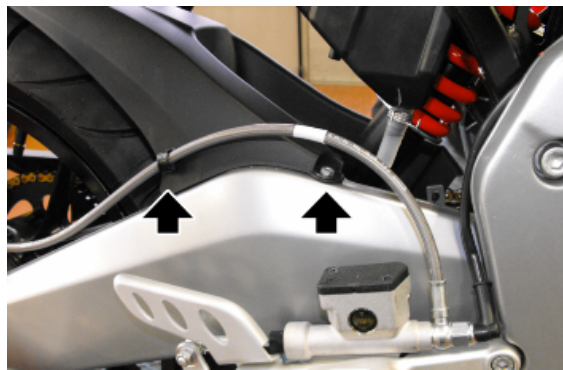
[Rear wheelhouse](#)

- Remove the air filter box.



Rear mudguard

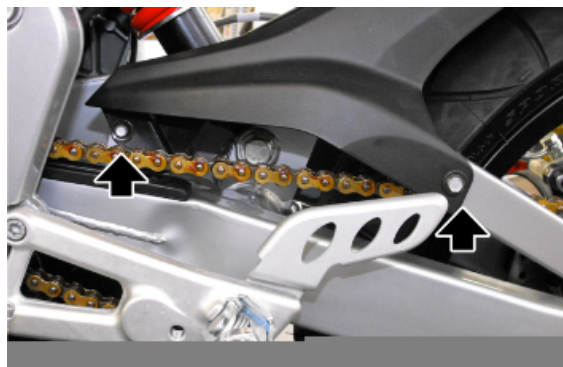
- Unscrew and remove the screw.
- Slide off the pipe grommet.



- Operating from the right side, unscrew and remove the central screw.

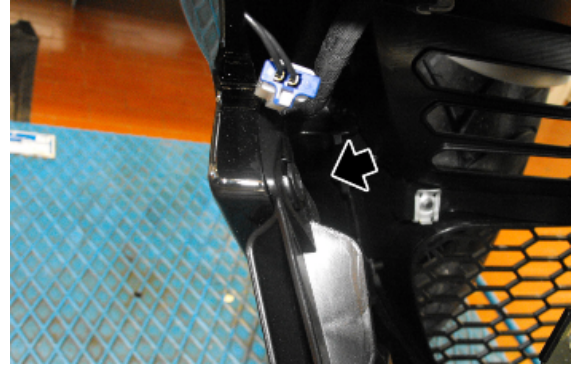


- Working on the left side, unscrew and remove the two screws.
- Remove the rear mudguard.

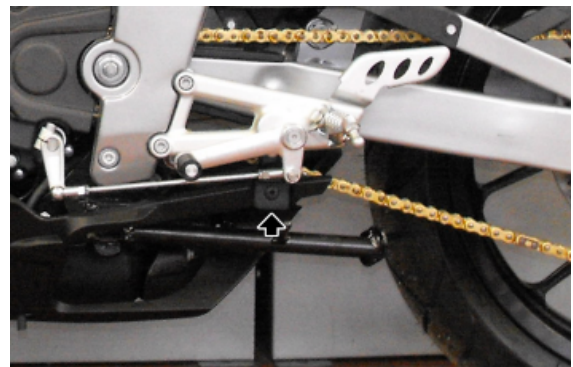


Lower cowl

- Remove the side fairings.
- Position the vehicle on the optional rear stand, with the vehicle on the open side stand.
- Remove the side rivet.



- Carry out the following operations on one side of the vehicle and then on the other.
- Unscrew and remove the rear screw.



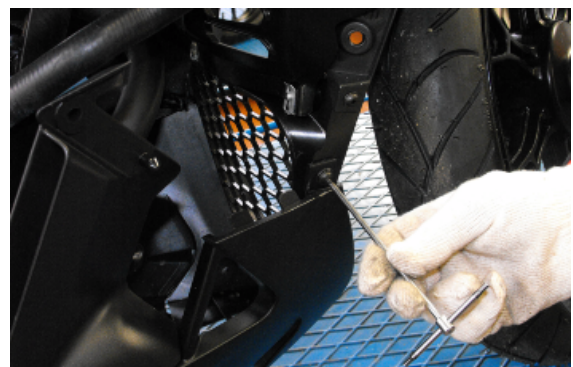
See also

Side fairings

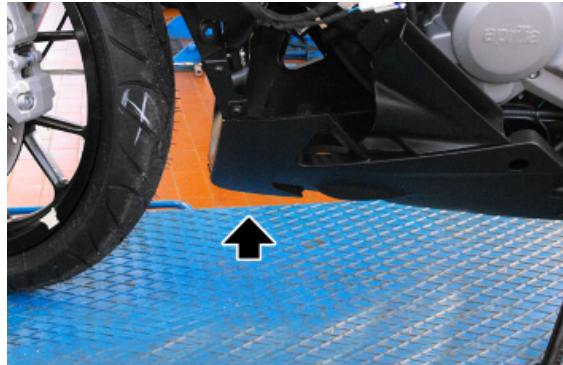
- Unscrew and remove the central screw.



- Unscrew and remove the front screw, following the lug downwards.



- Remove the lower rivet.
- Slide the right semi-lug off from the right side.
- Slide off the left semi-lug from the left side, along the stand profile.



Fuel tank

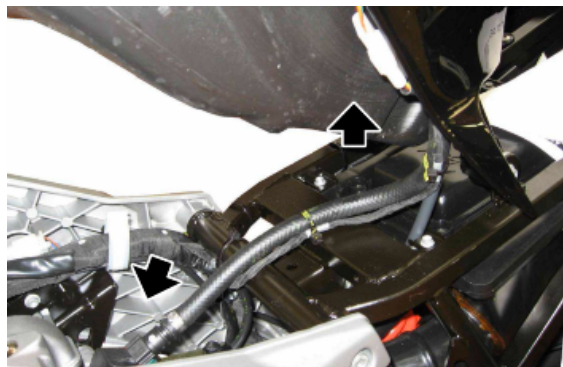
- Remove the rider saddle.
- Working from both sides, unscrew and remove the side screw.



- After having removed the passenger saddle, collect the supporting rod of the fuel tank.
- Lift the tank and support it appropriately.



- Remove the clamps as indicated in the electrical system fitting.
- Disconnect the quick release and the fuel reserve connector.



CAUTION



FIRE HAZARD. FUEL OR ANY OTHER FLAMMABLE SUBSTANCES MUST NOT BE CLOSE TO ELECTRICAL COMPONENTS.

See also

Central part

- Slide off the fuel breather pipe.



- Operating from both sides, unscrew and remove the screw and collect the nut on the internal side.
- Keeping the tank in position, lower it by removing the supporting rod.
- Remove the tank.



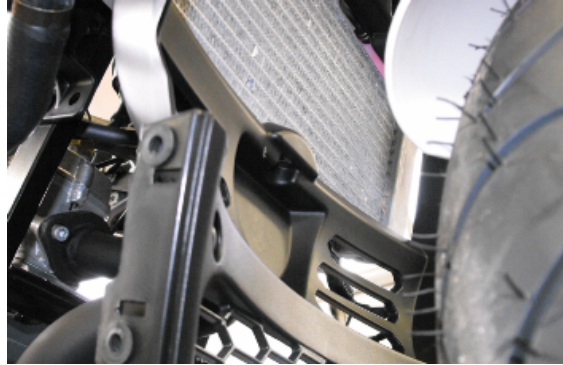
Rear wheelhouse

- Beforehand, remove the tail fairing, the taillight the saddle and the passenger saddle.
- Unscrew and remove the two fixing screws.
- Remove the mudflap.

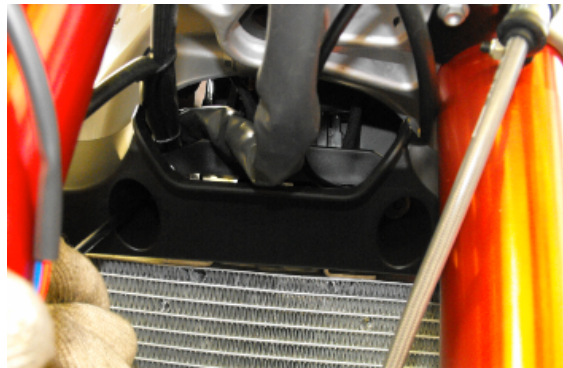


Radiator cover

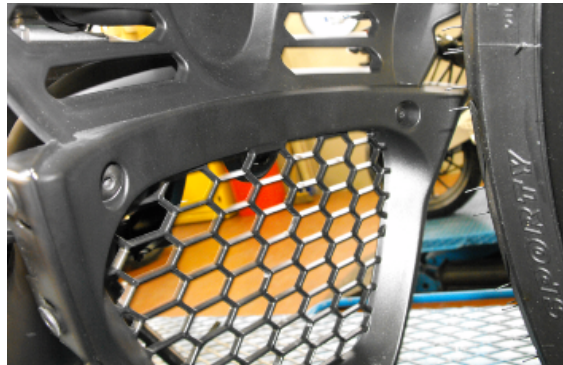
- Unscrew and remove the central screw.



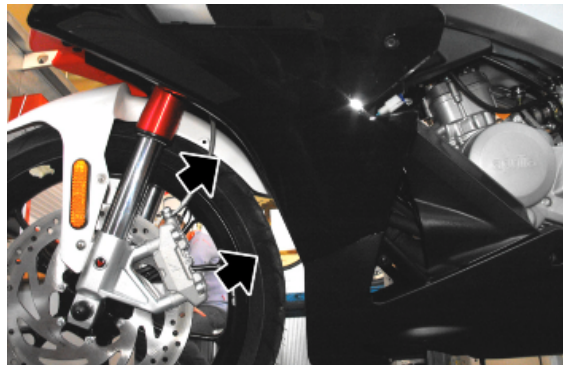
- Unscrew and remove the two upper screws.
- Retrieve the corresponding washers.



-
- Unscrew and remove the two lower screws.
 - Slide off the radiator cover.

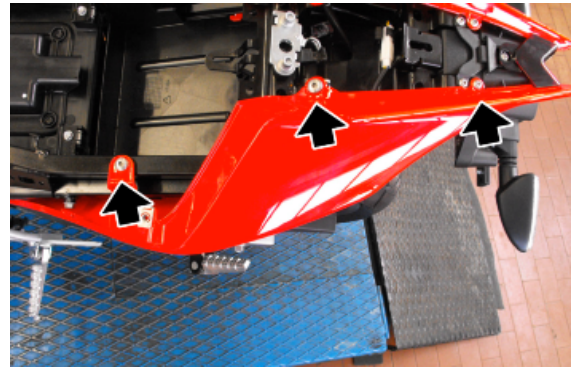


- Working from both sides of the vehicle, release the two rivets and slide off the front lug.



Tail guard

- The following procedures refer to the left side of the vehicle, but apply to both.
- Remove the central side fairing and the passenger saddle.
- Unscrew and remove the two front screws and the rear screw.



- Slide off the fairing.

CAUTION

DURING THE REMOVAL, PAY ATTENTION TO THE FITTINGS.



INDEX OF TOPICS

PRE-DELIVERY

PRE DE

Carry out the listed checks before delivering the motorcycle.

WARNING

HANDLE FUEL WITH CARE.

Carry out the listed checks before delivering the motorcycle.

WARNING

HANDLE FUEL WITH CARE.

Aesthetic inspection

- Paintwork
 - Fitting of Plastic Parts
 - Scratches
 - Dirt
-

Tightening torques inspection

- Safety fasteners:
 - front and rear suspension unit
 - front and rear brake calliper retainer unit
 - front and rear wheel unit
 - engine - chassis retainers
 - steering assembly
 - Plastic parts fixing screws
-

Electrical system

- Main switch
 - Headlamps: high beam lights, low beam lights, tail lights (front and rear) and their warning lights
 - Headlight adjustment according to regulations in force
 - Front and rear stop light switches and their bulbs
 - Turn indicators and their warning lights
 - Instrument panel lights
 - Instrument panel: fuel and temperature indicator (if present)
 - Instrument panel warning lights
-

- Horn
- Electric starter
- Engine stop via emergency stop switch and side stand
- Helmet compartment electrical opening switch (if present)
- Through the diagnosis tool, check that the last mapping version is present in the control unit/s and, if required, program the control unit/s again: consult the technical service website to know about available upgrades and details regarding the operation.

CAUTION

TO ENSURE MAXIMUM PERFORMANCE, THE BATTERY MUST BE CHARGED BEFORE USE. INADEQUATE CHARGING OF THE BATTERY WITH A LOW LEVEL OF ELECTROLYTE BEFORE IT IS FIRST USED SHORTENS BATTERY LIFE.

CAUTION

UPON INSTALLING THE BATTERY, ATTACH THE POSITIVE LEAD FIRST AND THEN THE NEGATIVE ONE, AND PERFORM THE REVERSE OPERATION UPON REMOVAL.

WARNING

THE BATTERY ELECTROLYTE IS POISONOUS AS IT MAY CAUSE SERIOUS BURNS. IT CONTAINS SULPHURIC ACID. AVOID CONTACT WITH YOUR EYES, SKIN AND CLOTHING. IF IT ACCIDENTALLY COMES INTO CONTACT WITH YOUR EYES OR SKIN, WASH WITH ABUNDANT WATER FOR APPROX. 15 MIN. AND SEEK IMMEDIATE MEDICAL ATTENTION. IF ACCIDENTALLY SWALLOWED, IMMEDIATELY DRINK LARGE QUANTITIES OF WATER OR VEGETABLE OIL. SEEK IMMEDIATE MEDICAL ATTENTION. BATTERIES PRODUCE EXPLOSIVE GASES; KEEP CLEAR OF NAKED FLAMES, SPARKS OR CIGARETTES. VENTILATE THE AREA WHEN RECHARGING INDOORS. ALWAYS WEAR EYE PROTECTION WHEN WORKING IN THE PROXIMITY OF BATTERIES. KEEP OUT OF THE REACH OF CHILDREN.

CAUTION

NEVER USE FUSES WITH A CAPACITY HIGHER THAN THE RECOMMENDED CAPACITY. USING A FUSE OF UNSUITABLE RATING MAY SERIOUSLY DAMAGE THE VEHICLE OR EVEN CAUSE A FIRE.

Levels check

- Hydraulic braking system fluid level
- Clutch system fluid level (if present)
- Gearbox oil level (if present)
- Transmission oil level (if present)
- Engine coolant level (if present)
- Engine oil level

- Mixer oil level (if present)
-

Road test

- Cold start
 - Instrument panel operation
 - Response to throttle control
 - Stability when accelerating and braking
 - Front and rear brake efficiency
 - Front and rear suspension efficiency
 - Abnormal noise
-

Static test

Static check after test drive:

- Restarting when warmed up
 - Starter operation (if present)
 - Minimum holding (turning the handlebar)
 - Uniform turning of the steering
 - Possible leaks
 - Radiator electric fan operation (if present)
-

Functional inspection

- Hydraulic braking system
- Stroke of brake and clutch levers (if present)
- Clutch - Check for correct operation
- Engine - Check for correct general operation and absence of abnormal noise
- Other
- Documentation check:
- Chassis and engine numbers check
- Supplied tools check
- License plate fitting
- Locks checking
- Tyre pressure check
- Installation of mirrors and any possible accessories



NEVER EXCEED THE RECOMMENDED INFLATION PRESSURES AS TYRES MAY BURST.

CAUTION

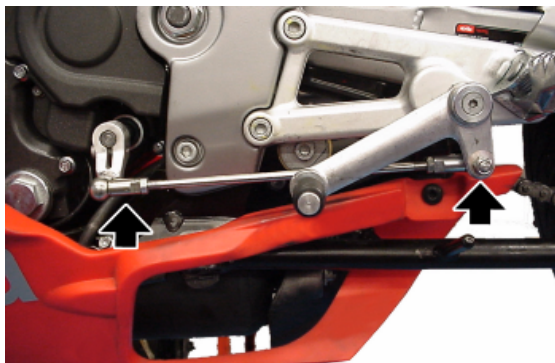


CHECK AND ADJUST TYRE PRESSURE WITH TYRES AT AMBIENT TEMPERATURE.

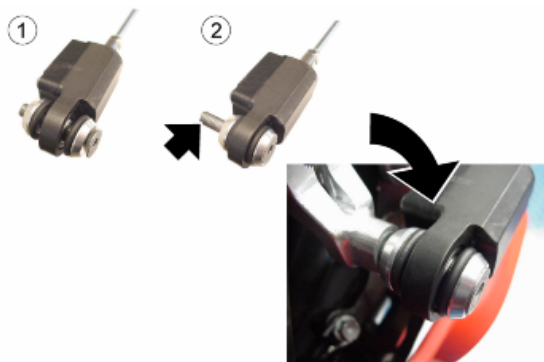
Specific operations for the vehicle

To fit the Quick Shift, follow these assembling instructions.

- Remove the gear tie rod by unscrewing the two fixing screws.



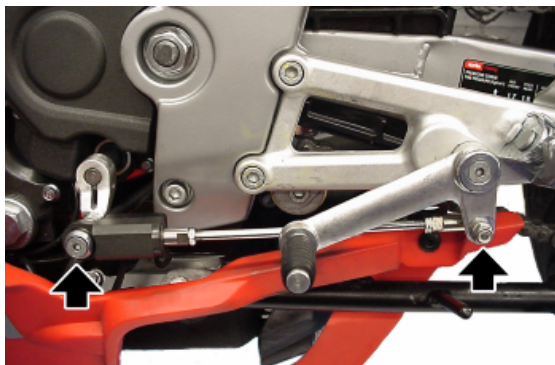
- Position the screw (1) with its components in the ball joint of the Quick Shift Sensor.



WARNING

BEFORE POSITIONING AND TIGHTENING THE QUICK SHIFT SENSOR, APPLY LOCTITE 243 ON THE FIXING SCREW OF THE BALL JOINT.

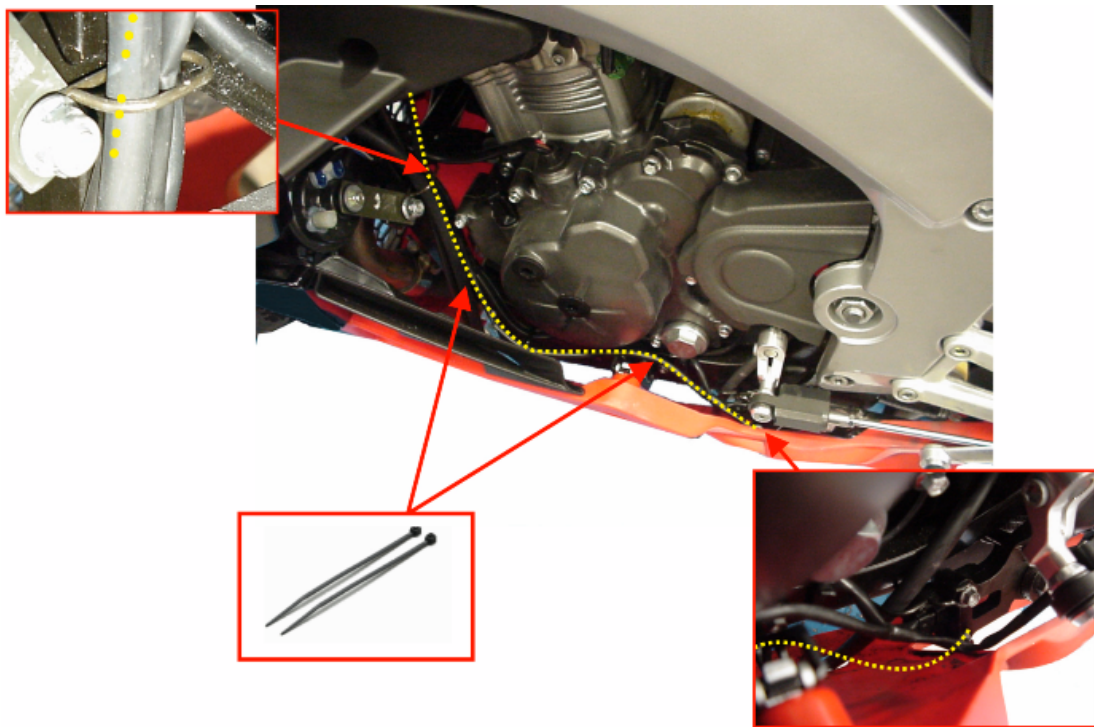
- Install the gear tie rod with integrated Quick Shift sensor by tightening the two screws to the specified torque.



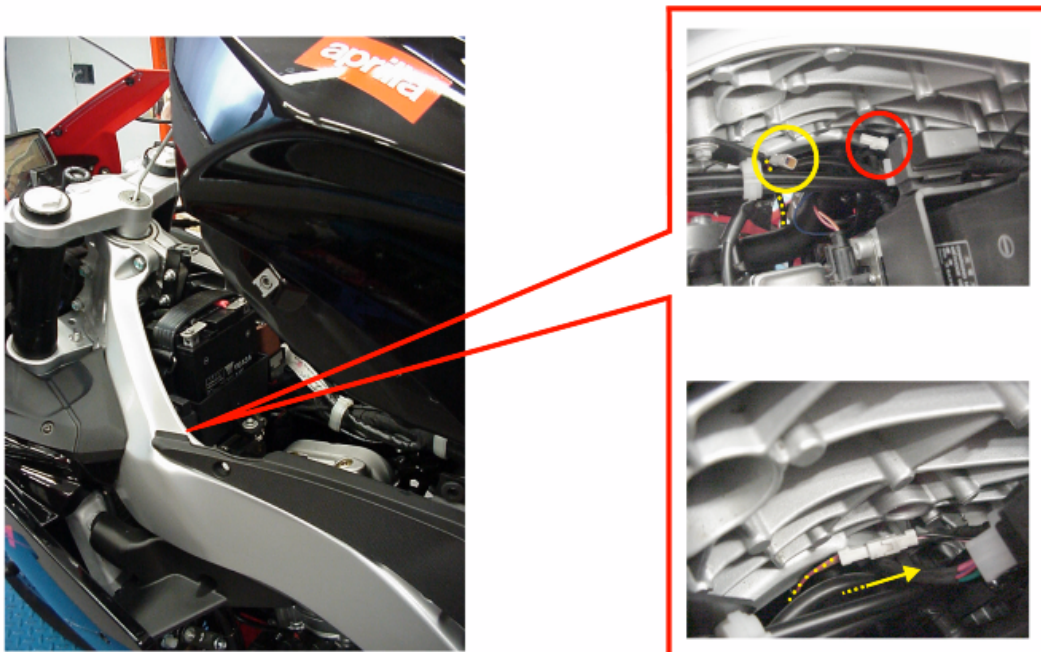
QUICK SHIFT TIE ROD

pos.	Description	Type	Quantity	Torque	Note
1	Nut fixing tie rod to gear lever	M6	1	10 Nm (7 lb ft)	-
2	Screw fixing tie rod to selector shaft	M6	1	10 Nm (7 lb ft)	Loctite 243

- Pass the connecting cable as shown in figure.



- Access the Quick Shift connector by lifting the tank, the connector is placed, as shown in the figure, internally on the left side of the chassis.
- Connect the two cables.



A

Air filter: 55

B

Battery: 98, 108

Brake: 249, 251–254, 256, 259, 260

Brake calliper: 249, 251

Brake disc: 252, 253

Brake fluid: 259

Brake pads: 254, 256

Brake pump: 260

Bulbs:

C

Chain: 184, 226, 238, 241

Chain tensioner: 184, 241

Clutch: 62, 148, 149, 151, 153–155, 159

Coil: 120

Connectors: 123

coolant: 127, 265, 272

Coolant: 127, 265, 272

Countershaft: 158, 159, 166, 168

Crankcase: 42, 140, 157, 160, 164, 167

Crankshaft: 42, 165

Cylinder: 42, 161, 175, 183, 185, 190, 191

D

Desmodromic drum: 141

Drive chain: 238

E

ECU: 124

Electric fan: 122, 265

Electrical system: 11, 64, 65, 291

Engine oil: 52

Engine temperature sensor: 115

Exhaust: 244, 246

Exhaust manifold: 246

F

Fairings: 127, 245, 266, 272, 279, 281, 285

Fork: 210, 211, 218, 221

Front wheel: 207, 209, 211, 223

Fuel: 119, 127, 199, 200, 283, 286

Fuel pump: 119, 199

Fuses: 108

G

Gearbox oil: 55

H

Handlebar: 210

Head cover: 172

Headlight: 275–277

Horn: 105

I

Identification: 9

Instrument panel: 275

L

License plate holder: 282

M

Magneto flywheel: 145, 147, 162

Maintenance: 7, 50

Mirrors: 275

Mudguard: 211, 284

O

Oil filter: 54

P

Primary shaft: 140

R

Radiator: 127, 265, 269, 288

Rear wheel: 225, 227, 228, 233

Recommended products: 43

S

Scheduled maintenance:

Shock absorbers: 228

Side fairings: 281

Side stand: 122, 243

Side stand sensor: 122

Spark plug: 51

Speed sensor: 113

Stand: 122, 243

Start-up: 103

Starter motor: 142, 143, 174

T

Tank: 127, 200, 270, 271, 283, 286

Throttle body: 202

Transmission: 11

Tyres: 12

V

Voltage regulator: 102

W

Warning lights:

Water pump: 266

Windshield:

Wiring diagram: 92