



SERVICE STATION MANUAL

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RX SX 125



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SERVICE STATION MANUAL

RX SX 125

- This manual provides the main information to carry out regular maintenance operations on your vehicle.
- This manual is intended to aprilia Dealers and their qualified mechanics; several concepts have been deliberately omitted as they are considered unnecessary. As it is not possible to include complete mechanical notions in this manual, users should have basic mechanical knowledge or minimum knowledge about the procedures involved when repairing scooters. Without this knowledge, repairing or checking the vehicle may be inefficient or even dangerous. As the vehicle repair and check procedures are not described in detail, be extremely cautious so as not to damage components or injure individuals. In order to optimise customer satisfaction when using our vehicles, aprilia s.p.a. commits itself to continually improve its products and the relative documentation. The main technical modifications and changes in repair procedures are communicated to all aprilia Sales Outlets and its International Subsidiaries. These changes will be introduced in the subsequent editions of the manual. In case of need or further queries on repair and check procedures, consult aprilia CUSTOMER DEPARTMENT, which will be prepared to provide any information on the subject and any further communications on updates and technical changes related to the vehicle.

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.



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CHARACTERISTICS

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Rules

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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 OR NEAR FUEL VAPOUR. AVOID ANY CONTACT WITH NAKED FLAME, SPARKS OR OTHER HEAT SOURCES WHICH MAY CAUSE IGNITION OR EXPLOSION.

DO NOT ALLOW FUEL TO DISPERSE INTO 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 SPILL COOLANT ONTO HOT ENGINE OR EXHAUST SYSTEM COMPONENTS; THE FLUID MAY IGNITE AND BURN WITH AN INVISIBLE FLAME. WHEN CARRYING OUT MAINTENANCE, 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 PRESSURISED AND MAY CAUSE SCALDING.**

Used engine oil and transmission oil

CAUTION



**IT IS ADVISABLE TO WEAR LATEX 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 YOUR 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, MAY CAUSE BURNING IF IT COMES INTO 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. IN THE EVENT OF CONTACT WITH THE EYES, RINSE WITH PLENTY OF WATER FOR FIFTEEN MINUTES AND CONSULT AN EYE SPECIALIST IMMEDIATELY. IF THE FLUID IS ACCIDENTALLY SWALLOWED, DRINK LARGE QUANTITIES OF WATER OR MILK, FOLLOWED BY MILK OF MAGNESIA OR VEGETABLE OIL AND SEEK MEDICAL ADVICE 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 OR SPILL ON PLASTIC COMPONENTS IN PARTICULAR. ENSURE THAT THE ELECTROLYTIC ACID IS COMPATIBLE WITH THE BATTERY BEING 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 the positions on all connection joints (pipes, cables, etc.) before separating them, and identify them with different 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 altogether.
- 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).

ELECTRIC 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

Engine run-in is essential to ensure engine long life and correct operation. Twisty roads and gradients are ideal to run in engine, brakes and suspensions effectively. Vary your riding speed during the run-in. This ensures that components operate under both "loaded" and "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 RUN-IN PERIOD.

Follow the guidelines detailed below:

- Do not twist the throttle grip abruptly and completely when the engine is working at a low revs, either during or after run-in.
- During the first 100 km (62 miles) brake carefully to avoid rough and long braking. That is to permit the adequate adjustment of the pad friction material to the brake discs.

Vehicle identification

CAUTION

CHANGING THE IDENTIFICATION CODE IS A CRIME THAT MAY BE PUNISHED WITH SERIOUS CRIMINAL CHARGES. FURTHERMORE, THE LIMITED WARRANTY FOR NEW VEHICLES WILL BE CANCELLED IF THE VEHICLE IDENTIFICATION NUMBER (VIN) HAS BEEN MODIFIED OR CANNOT BE QUICKLY DETERMINED.

CHASSIS NUMBER

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



ENGINE NUMBER

The engine number is stamped on the rear side, next to the shock absorber.



Dimensions and mass

DIMENSIONS

SIZES	SX 125	RX 125
Maximum length	2165 mm (82.24 in)	2255 mm (88.78 in)
Max. width (to brake levers)	850 mm (33.46 in)	850 mm (33.46 in)
Max. height (to mirrors)	1390 mm (54.72 in)	1415 mm (55.71 in)
Saddle height	870 mm (34.25 in)	925 mm (36.42 in)
Wheelbase	1480 mm (58.27 in)	1480 mm (58.27 in)
Minimum ground clearance	260 mm (10.24 in)	300 mm (11.81 in)

Engine

ENGINE

Specification	Desc./Quantity
Type	single-cylinder, 2-stroke, with reed intake. Separate lubrication with automatic mixer with variable value (1.0 - 3.0 %).
Cylinder quantity	1
Overall engine capacity	124.82 cm ³ (7.616 cu.in)
Bore/stroke	54 - 54.5 mm (2.12 - 2.14 in)
Compression ratio	12.5 +/- 0.5 :1
Squish	1.5 mm (0.06 in)
Engine revs at idle speed	1250 +/- 100 rpm
Engine revs at maximum speed	11000 ± 100 rpm
Ignition	CDI with electronic timing
Start-up	electric
Clutch	multiple-disk, oil-bathed clutch with hand control on the left side of the handlebar.
Cooling	liquid
Lubrication system	Separate lubrication with automatic mixer with variable value (1.0 - 1.3 %).

GEAR

Specification	Desc./Quantity
Type	mechanic, 6 gear with pedal lever on the left hand side of the engine
Gear lubrication	Splash lubrication

Transmission**TRANSMISSION**

TRANSMISSION	SX 125	RX 125
Gear ratio	19/63 = 1 :3.316	19/63 = 1 :3.316
1st gear ratio	10/30 = 1:3.000	10/30 = 1:3.000
2nd gear ratio	14/29 = 1:2.071	14/29 = 1:2.071
3rd gear ratio	17/27 = 1:1.588	17/27 = 1:1.588
4th gear ratio	19/25 = 1:1.316	19/25 = 1:1.316
5th gear ratio	21/23 = 1:1.095	21/23 = 1:1.095
6th gear ratio	22/21 = 1:0.954	22/21 = 1:0.954
Final gear ratio (11 kW)	16/45 = 1:2.812	16/49 = 1:3.062
Final gear ratio (full power)	15/45 = 1:3.600	15/49 = 1:3.267

Capacities**CAPACITY**

CAPACITY	SX 125	RX 125
Fuel (reserve included)	10 l (2.20 UKgal)	10 l (2.20 UKgal)
Fuel reserve	3 l (0.66 UKgal)	3 l (0.66 UKgal)
Gearbox oil	600 cm ³ (36.61 cu.in)	600 cm ³ (36.61 cu.in)
Mixer oil (reserve included)	1 l (0.22 UKgal)	1 l (0.22 UKgal)
Mixer oil reserve	0.25 l (0.055 UKgal)	0.25 l (0.055 UKgal)
Fork oil	400 cm ³ (24.41 cu.in)	400 cm ³ (24.41 cu.in)
Fork oil level depth from the rim (spring not included; the whole fork comprised)	150 mm (5.90 in)	150 mm (5.90 in)
Coolant (50% H2O + 50% ethylene glycol anti-freeze fluid)	0.8 l (0.17 UKgal)	0.8 l (0.17 UKgal)
Seats	2	2
Kerb weight (full tank)	126 kg (277.8 lb)	126 kg (277.8 lb)
Scooter max load (rider + passenger + luggage)	336 kg (740.7 lb)	336 kg (740.7 lb)

Electrical system**IGNITION**

IGNITION	SX 125	RX 125
IGNITION	Electronic	Electronic
Ignition advance	CDI	CDI

SPARK PLUG

SPARK PLUG	SX 125	RX 125
Standard	NGK BR8ES	NGK BR8ES
Full Power	NGK BR10EG	NGK BR10EG
Spark plug electrode gap	0.7 - 0.8 mm (0.027 - 0.031 in)	0.7 - 0.8 mm (0.027 - 0.031 in)

ELECTRICAL SYSTEM

ELECTRICAL SYSTEM	SX 125	RX 125
Battery	YUASA	YUASA
fuses	20A - 15A - 7.5A	20A - 15A - 7.5A

ELECTRICAL SYSTEM	SX 125	RX 125
(Permanent magnet) Generator	12V - 180W	12V - 180W

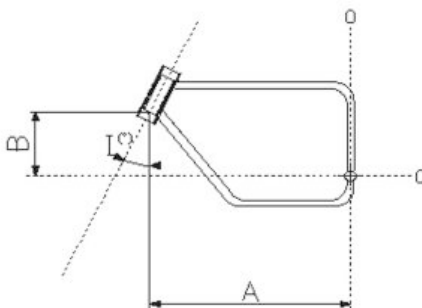
BULBS

BULBS	SX 125	RX 125
License plate bulb	5 W	5 W
Rear tail light /stop light	led	led
Front tail bulb	2V x 3W	2V x 3W
Front/rear turn indicator bulbs	4 x 10W	4 x 10W
Low-/high-beam light bulb	HS1	HS1

WARNING LIGHTS

Warning lights	SX 125	RX 125
Engine oil level warning light	LED	LED
High-beam warning light	LED	LED
Gear in neutral warning light	LED	LED
Turn indicator warning light	LED	LED

Frame and suspensions



CHASSIS

CHASSIS	SX 125	RX 125
Type	Framework with double cradle and high-resistant steel tubes	Framework with double cradle and high-resistant steel tubes
Steering inclination angle	28°	28°
Trail	102 mm (4.02 in) - suspensions fully extended	113 mm (4.45 in) - suspensions fully extended
Size "A"	555 mm (21.85 in)	555 mm (21.85 in)
Size "B"	459 mm (18.07 in)	459 mm (18.07 in)

SUSPENSIONS

SUSPENSIONS	SX 125	RX 125
Front	Upside-down with Ø 40-mm (1.57 in) stems	Upside-down with Ø 40-mm (1.57 in) stems
Front suspension travel	260 mm (10.24 in)	260 mm (10.24 in)
Rear	single gas shock absorber	single gas shock absorber
Rear suspension travel	265 mm (10.43 in)	265 mm (10.43 in)

Brakes

BRAKES

BRAKES	SX 125	RX 125
Front brake	Disc brake, Ø 260-mm (10.24 in) with control	Disc brake, Ø 260-mm (10.24 in) with control
Rear brake	Disc brake, Ø 220-mm (8.66 in) with control	Disc brake, Ø 220-mm (8.66 in) with control

Wheels and tyres

WHEEL RIMS

WHEEL RIMS	SX 125	RX 125
Front	3.00/17"	1.6/21"
Rear	4.25/17"	2.15/18"

TYRES

TYRES	SX 125	RX 125
Type	Radial	Radial
Front	110/70 R17 M/C 54H TL	90/90 - 21 54R MT 21
Rear	150/60 R17 M/C 66H TL	120/90 - 18 65R MT 21
front (rider only)	1.8 bar (180 kPa; 26.11 PSI)	1.4 bar (140 kPa; 20.30 PSI)
rear (rider only)	1.8 bar (180 kPa; 26.11 PSI)	1.6 bar (160 kPa; 23.21 PSI)
front (rider + passenger)	2.0 bar (200 kPa; 29.00 PSI)	1.5 bar (150 kPa; 21.75 PSI)
rear (rider + passenger)	1.8 bar (180 kPa; 26.11 PSI)	1.4 bar (140 kPa; 20.30 PSI)

Supply

FUEL SUPPLY

FUEL SUPPLY	SX 125	RX 125
Carburettor model	Dell'Orto VHST 28 CD	Dell'Orto VHST 28 CD
Fuel	Premium unleaded petrol	Premium unleaded petrol

Tightening Torques

CHASSIS

Name	Torque in Nm
Upper saddle pillar retainer - M8x30 (2)	25 Nm (18.44 lbf ft)
Lower saddle pillar retainer - M8x25 (2)	25 Nm (18.44 lbf ft)
Engine upper plate to chassis retainer - M8x20 (2)	25 Nm (18.44 lbf ft)
Chain tightener roller retainer - M8x60 (1)	25 Nm (18.44 lbf ft)

FOOTRESTS

Name	Torque in Nm
Passenger footrest support to saddle pillar retainer - M8x20 (4)	25 Nm (18.44 lbf ft)
Rider footrest support to chassis retainer - M8x45 (2)	25 Nm (18.44 lbf ft)

STAND

Name	Torque in Nm
Stand retainer (1)	10 Nm (7.37 lbf ft)
Stand retainer - M10x1.25 lower nut (1)	30 Nm (22.13 lbf ft)

SWINGARM

Name	Torque in Nm
Chain guide slider retainer to the fork (1)	5 Nm (3.69 lbf ft)
Chain eye retainer (2)	10 Nm (7.37 lbf ft)
Chain set screw - M8 lower nut (2)	25 Nm (18.44 lbf ft)
Fork pin retainer - M14x1.5 lower nut (1)	80 Nm (59 lbf ft)
Crankcase chain retainer - M5x12 TBEI screw (2)	5 Nm (3.69 lbf ft)

FRONT SUSPENSION

Name	Torque in Nm
Upper plate retainer - M8x35 (2)	25 Nm (18.44 lbf ft)

Name	Torque in Nm
Lower plate retainer - M6x30 (4)	10 Nm (7.37 lbf ft)
Foot lock on wheel pin - M6x25 (2)	10 Nm (7.37 lbf ft)
Bearing pack ring nut preloading (1)	17 Nm (12.54 lbf ft)
Bearings pack ring nut (1)	7 Nm (5.16 lbf ft)
Fork cap (1)	80 Nm (59 lbf ft)

REAR SUSPENSION

Name	Torque in Nm
Shock absorber upper retainer - TCEI M10x55 screw (1)	50 Nm (36.9 lbf ft)
Single connecting rod to chassis attachment retainer - TCEI M12x107 screw (1)	85 Nm (62.7 lbf ft)
Double connecting rod to single connecting rod retainer - TE M10x61 screw (3)	50 Nm (36.9 lbf ft)

ENGINE

Name	Torque in Nm
Engine upper plate to engine retainer - TCEI M8x80 screw (1)	25 Nm (18.44 lbf ft)
Gear shift lever retainer - TCEI M6x20 screw (1)	10 Nm (7.37 lbf ft)
Engine front retainer - TCEI M10x130 screw (1)	50 Nm (36.88 lbf ft)
Engine rear retainer - TCEI M8x60 screw (1)	25 Nm (18.44 lbf ft)
Pinion protection case retainer - TCEI M8x60 screw (2)	25 Nm (18.44 lbf ft)
Solenoid retainer - TE M6x30 screw (1)	10 Nm (7.37 lbf ft)
Coil to chassis retainer - TE M6x40 screw (2)	10 Nm (7.37 lbf ft)

FILTER CASING

Name	Torque in Nm
Filter half-housing retainer (7)	3 Nm (2.2 lbf ft)
Filter cover retainer (4)	3 Nm (2.2 lbf ft)
Filter housing to saddle pillar upper retainer (1)	6 Nm (4.42 lbf ft)
Filter casing / mudflap to saddle pillar lower retainer (2)	6 Nm (4.42 lbf ft)
SAS valve to chassis / horn retainer - TE M6x12 screw (2)	10 Nm (7.37 lbf ft)

EXHAUST SYSTEM

Name	Torque in Nm
Muffler retainer - TE M6x16 screw (1)	10 Nm (7.37 lbf ft)
Intermediate pipe retainer - TE M6x12 screw (1)	10 Nm (7.37 lbf ft)
Protection retainer - TE M6x12 screw (2)	10 Nm (7.37 lbf ft)
Silencer support bracket retainer - TE M6x16 screw (2)	10 Nm (7.37 lbf ft)
Silencer retainer - TCEI M6x16 screw (1)	10 Nm (7.37 lbf ft)
Silencer support retainer - TE M6x16 screw (2)	10 Nm (7.37 lbf ft)

COOLING SYSTEM

Name	Torque in Nm
Radiator to chassis retainer - TE M6x25 screw (6)	10 Nm (7.37 lbf ft)

FRONT WHEEL

Name	Torque in Nm
Wheel pin retainer (1)	80 Nm (59 lbf ft)
Brake disc retainer - TSPEI M8x16 screw (6)	25 Nm (18.44 lbf ft) - Loctite 243

REAR WHEEL

Name	Torque in Nm
Rear wheel pin retainer - M16x1.5 nut (1)	100 Nm (73.75 lbf ft)
Brake disc retainer - TSPEI M6x16 screw (6)	10 Nm (7.37 lbf ft) - Loctite 243
Crown retainer - TSPEI M8x26 screw (6)	25 Nm (18.44 lbf ft) - Loctite 243
Speed sensor support plate retainer - TE M6x12 screw (2)	10 Nm (7.37 lbf ft)
Speed sensor retainer - TE M6x16 screw (1)	10 Nm (7.37 lbf ft)

FRONT BRAKE

Name	Torque in Nm
Front brake calliper to fork feet retainer - TE M8x30 screw (2)	25 Nm (18.44 lbf ft)
Front brake pipe to stem protection retainer - TE M5x16 screw (2)	5 Nm (3.69 lbf ft)
Front brake pipe to stem protection retainer - M5 nut (2)	5 Nm (3.69 lbf ft)

REAR BRAKE

Name	Torque in Nm
Rear brake pump to chassis retainer - TE M6x16 screw (2)	10 Nm (7.37 lbf ft)
Rear brake lever retainer - TCEI M8x50 screw (1)	25 Nm (18.44 lbf ft)
Rear brake calliper to support retainer - TE M8x20 screw (2)	25 Nm (18.44 lbf ft)
Brake pipe to fork retainer - TE M5x16 screw (2)	5 Nm (3.69 lbf ft)

HANDLEBAR AND CONTROLS

Name	Torque in Nm
Front brake pump retainer- TCEI M6x25 screw (2)	10 Nm (7.37 lbf ft)
Clutch control retainer - TCEI M5x15 screw (2)	5 Nm (3.69 lbf ft)
Handlebar U-bolts - TE M7x35 screw (4)	18 Nm (13.28 lbf ft)
Throttle control - TCEI M5x15 screw (2)	5 Nm (3.69 lbf ft)
Throttle control cover - M4x9 screw (2)	3 Nm (2.21 lbf ft)
Left light switch - screw (2)	1.5 Nm (1.1 lbf ft)

ELECTRICAL COMPONENTS

Name	Torque in Nm
Control unit retainer - screw (2)	5 Nm (3.69 lbf ft)
Regulator to mudflap retainer - TE M6x30 screw (2)	10 Nm (7.37 lbf ft)

LIGHTS / INSTRUMENT PANEL

Name	Torque in Nm
Instrument panel retainer - M5 nut (3)	5 Nm (3.69 lbf ft)
Front light retainer - TBEI M6x20 screw (2)	10 Nm (7.37 lbf ft)
Rear light retainer - screw (2)	3 Nm (2.21 lbf ft)
Front turn indicators retainer - TBEI M6x20 screw (2)	10 Nm (7.37 lbf ft)
Rear turn indicators retainer - TBEI M6x20 screw (2)	10 Nm (7.37 lbf ft)
License plate retainer - screw (1)	3 Nm (2.21 lbf ft)

TANK

Name	Torque in Nm
Fuel cock to tank retainer - TE M6x12 screw (2)	7 Nm (5.16 lbf ft)
Tank retainer - TE M6x30 screw (2)	10 Nm (7.37 lbf ft)

BODYWORK

Name	Torque in Nm
Mudflap to saddle pillar retainer - TBEI M5x16 screw (2)	5 Nm (3.69 lbf ft)
License plate holder / mudflap to saddle pillar retainer - TE M6x16 screw (4)	7 Nm (5.16 lbf ft)
Tail to right/left tail section retainer - TBEI M5x9 screw (2)	5 Nm (3.69 lbf ft)
Tail to right/left tail section retainer - screw (2)	3 Nm (2.21 lbf ft)
Tail section / fairing to saddle pillar retainer - TE M5x25 screw (2)	5 Nm (3.69 lbf ft)
rh/lh fairing front retainer - TE M5x16 screw (2)	5 Nm (3.69 lbf ft)
Fairing to mudflap retainer - TBEI M5x10 screw (2)	5 Nm (3.69 lbf ft)
Fork protection guide retainer - TE M5x20 screw (2)	5 Nm (3.69 lbf ft)
Fork protection retainer - TE M5x12 screw (6)	5 Nm (3.69 lbf ft)
Shock absorber protection to mudflap retainer - TE M6x20 screw (2)	10 Nm (7.37 lbf ft)
Front mudguard to lower plate retainer - TE M6x16 screw (4)	7 Nm (5.16 lbf ft)
Tie rods to front mudguard retainer - TBEI M5 screw (2)	5 Nm (3.69 lbf ft)
Tie rods to front mudguard retainer - M5x20 screw (2)	5 Nm (3.69 lbf ft)

Name	Torque in Nm
Instrument panel support / tank to upper plate retainer - TCEI M6x30 screw (1)	10 Nm (7.37 lbf ft)
Tank cover to chassis retainer - TE M6x30 screw (1)	10 Nm (7.37 lbf ft)
Tank cover to tank retainer - TBEI M5 screw (2)	5 Nm (3.69 lbf ft)
Rh/ Lh deflector brackets to radiator system retainer - TBEI M5x9 screw (2)	5 Nm (3.69 lbf ft)
Rh/ Lh deflector bracket to radiator systems retainer - TCB M4x16 screw (2)	3 Nm (2.21 lbf ft)
Rh/ Lh deflector to chassis retainer - TBEI M5x9 (2) screw	5 Nm (3.69 lbf ft)
Rh/ Lh deflector to tank front retainer - TE M5x25 (2) screw	5 Nm (3.69 lbf ft)
Rh/ Lh chassis cover retainer - TBEI M5x12 (2) screw	5 Nm (3.69 lbf ft)

FINISHINGS

Name	Torque in Nm
Saddle lock tongue retainer - screw (1)	3 Nm (2.21 lbf ft)
Switch retainer - TCEI M8x16 screw (1)	25 Nm (18.44 lbf ft)
Switch - shear head screw retainer (1)	Manual

Recommended products chart

LUBRICANTS CHART






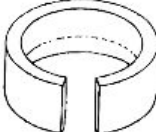
Product	Description	Specifications
Agip GEAR SYNTH, SAE 75W - 90	Gearbox oil	As an alternative for recommended oils, use top branded oils that meet or exceed the API GL - 4 requirements.
AGIP FORK 7.5W	Recommended FORK OIL	If you intend to have an intermediate performance, as an alternative to the recommended AGIP FORK 5W or AGIP FORK 20W use: AGIP FORK 7.5W AGIP FORK 10W AGIP FORK 15W
AGIP SPEED 2T	Mixer oil	As an alternative for recommended oils, use top branded fully synthetic oils that meet or exceed the ISO - L - EGD, JASO FC or API TC specifications requirements.
AGIP GREASE SM 2	Grease for C-ring of the tone wheel	Soap-based lithium grease with NLGI 2 molybdenum disulphide; ISO-L-XBCHB2, DIN KF2K-20
NEUTRAL GREASE OR PETROLEUM JELLY	Battery poles	Neutral grease or petroleum jelly.
AGIP CHAIN GREASE SPRAY	Chain spray grease	-
AGIP BRAKE 4 / BRAKE 5.1	Recommended BRAKE FLUID	-



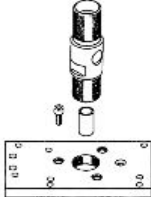




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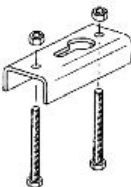
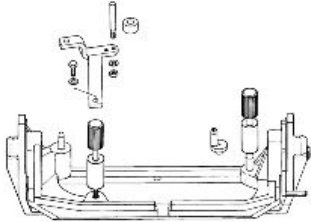
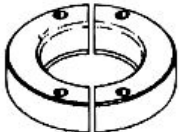

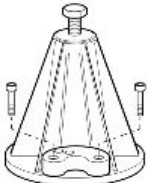
SPECIAL TOOLS


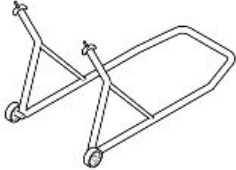
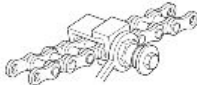
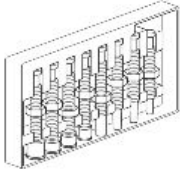

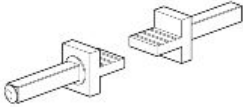

S-TOOLS

SPECIAL TOOLS

Stores code	Description	
AP0277215	Buffer for fitting oil seal 250455	
AP0277875	Buffer for fitting oil seal 230425	
AP0276502	Buffer for fitting oil seal 930675	
AP0276770	Buffer for fitting oil seal 230195	
AP0277970	Guide bushing for oil seal 930675	
AP0876973	Piston ring clamp 54 mm	

Stores code	Description	
AP0276040	Clutch wrench 11 mm	
AP0277180	Bearing tie rod kit	
AP0277455	Extractor plate to separate the crankcase halves	
AP0276380	bolt M10	
AP0276370	Split bushing	
AP0242091	Hexagon nut M10	
AP0276382	Bolt	

Stores code	Description	
AP0276372	Split bushing	
AP0242700	Flanged nut M8	
AP0277445	Guillotine extractor	
AP0277917	Brackets	
AP0276025	Half-ring	
AP0977490	Ring for half-rings	
AP0876298	Extractor for crankshaft bearings	

Stores code	Description	
AP0840681	Allen screw for extractor M8x40	
AP8146486	Front service stand	
AP8140192	Chain fitting kit	
AP8140180	Extractor for bushings	
AP8705021	Rear service stand	
AP8140204	Supports for rear service stand	
AP8140199	Tool panel	

Stores code	Description
AP8101945	Fork pin ring nut



INDEX OF TOPICS

MAINTENANCE

MAIN

Maintenance chart

SX RX 125 ROUTINE MAINTENANCE TABLE

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

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

* Replace every year

** Replace every 2 years

*** Replace every 4 years

**** Lubricate the chain every 500 km (310.98 mi)

km x 1,000	1	4	8	12	16	20	24	28	32	36	40
Rear shock absorber			I		I		I		I		I
Battery / terminal tightening	I	I	I	I	I	I	I	I	I	I	I
Spark plug	I	I	R	I	R	I	R	I	R	I	R
Carburettor, idle speed	A	I	A	I	A	I	A	I	A	I	A
Transmission cables and controls	I	I	I	I	I	I	I	I	I	I	I
Rave (FULL POWER) control unit	I		A		A		A		A		A
Wheel centring	I	I	I	I	I	I	I	I	I	I	I
Steering bearings and steering clearance	I	I	I	I	I	I	I	I	I	I	I
Wheel bearings	I	I	I	I	I	I	I	I	I	I	I
Brake discs	I	I	I	I	I	I	I	I	I	I	I
Air filter	I	I	R	I	R	I	R	I	R	I	R
Mixer oil filter			C		C		C		C		C
Vehicle general operation	I	I	I	I	I	I	I	I	I	I	I
Clutch clearance	A	A	A	A	A	A	A	A	A	A	A
Light circuit	I	I	I	I	I	I	I	I	I	I	I
Cooling system	I	I	I	I	I	I	I	I	I	I	I
Braking systems	I	I	I	I	I	I	I	I	I	I	I
Brake fluid *	I	I	I	I	I	I	I	I	I	I	I
Mixer oil level	I	I	I	I	I	I	I	I	I	I	I
Coolant **	I	I	I	I	I	I	I	I	I	I	I
Muffler / exhaust silencer		I	I	I	I	I	I	I	I	I	I
Fork oil and oil seal **											
Gearbox oil	R	I	I	R	I	I	R	I	I	R	I
Front headlight aiming	A	A	A	A	A	A	A	A	A	A	A
Start-up lever bolt	I	I	I	I	I	I	I	I	I	I	I
Piston and compression rings			I		R		I		R		I
Mixer pump and air bleeding	I		A		A		A		A		A
WHEELS AND TYRES	I	I	I	I	I	I	I	I	I	I	I
Bolts and nuts tightening	I	I	I	I	I	I	I	I	I	I	I
Mixer oil reserve warning light	I	I	I	I	I	I	I	I	I	I	I
Final drive unit (chain, crown, pinion)****	I	I	I	I	I	I	I	I	I	I	I
Fuel pipes ***		I	I	I	I	I	I	I	I	I	I
Braking system pipes***		I	I	I	I	I	I	I	I	I	I
Mixer oil pipes***		I	I	I	I	I	I	I	I	I	I
Clutch wear		I	I	I	I	I	I	I	I	I	I
Brake pads wear	I	I	I	I	I	I	I		I	I	I
Outlet valve (FULL POWER)	I	I	I	I	I	I	I	I	I	I	I

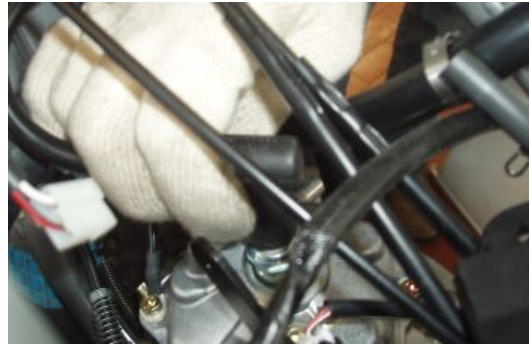
Spark plug

- Remove the spark plug regularly, clean off carbon scales and replace spark plug if necessary.

CAUTION

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

- Take out the spark plug tube.
- Remove the spark plug with the supplied wrench.



Gearbox Oil

Inspection

NOTE

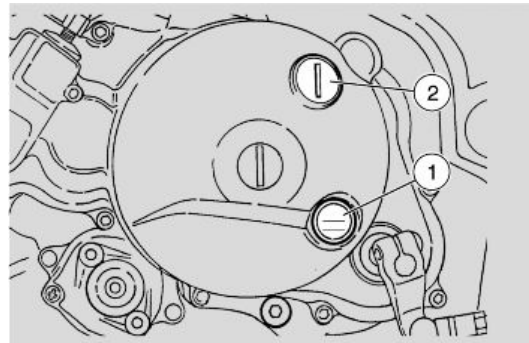
PARK THE VEHICLE ON SAFE AND LEVEL GROUND.

- Stop the engine and let it cool off for at least ten minutes so that the oil in the crankcase flows down and cools as well.
- Keep the vehicle upright with both wheels on the ground.



FAILURE TO FOLLOW THESE OPERATIONS MAY RESULT IN AN INCORRECT READING OF THE ENGINE OIL LEVEL.

- Make sure the oil level covers the checking sight glass (1) completely.



TOPPING-UP

If necessary, top up:

- Unscrew and remove the filler plug (2).
- Pour a small amount of oil and wait about a minute until the oil flows evenly into the crankcase.
- Make sure the oil level covers the sight glass (1) completely.
- If that does not occur, top-up again with small quantities of oil until the recommended level is reached by checking through the sight glass (1).
- At the end of the operation, screw and tighten the filler plug (2).



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 VEHICLE 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.

Replacement

- 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



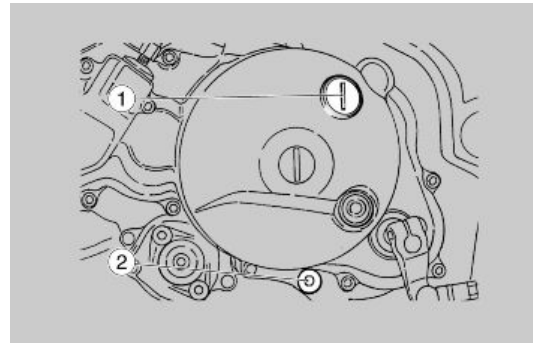
PARK THE VEHICLE ON SAFE AND LEVEL GROUND.

- Stop 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).
- Pour gearbox oil through the filler opening (1).



Characteristic

Gearbox oil

600 cm³ (36.61 cu.in)

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



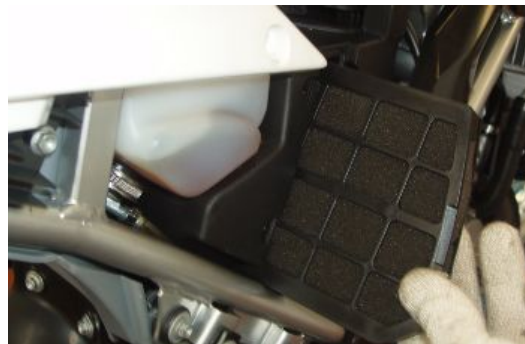
TIGHTEN UP THE FILLER CAP AND MAKE SURE THE OIL DOES NOT SEEP. CHECK REGULARLY THAT THERE ARE NO LEAKS IN THE CRANKCASE COVER GASKET. DO NOT RIDE THE VEHICLE WITH INSUFFICIENT LUBRICATION OR WITH CONTAMINATED OR INCORRECT LUBRICANTS AS THIS ACCELERATES THE WEAR AND TEAR OF THE MOVING PARTS AND CAN CAUSE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

Air filter

- Remove the right side central fairing.
- Undo and remove the 4 screws and remove the filter casing side cover.



- Remove the filtering element together with the mesh.
- Wash the filtering element with clean, non-flammable or high-volatility solvents, and let it dry properly.
- Apply filter oil or heavy oil (SAE 80W - 90) all over the whole surface and then wring the filtering element to eliminate excess oil.



THE FILTERING ELEMENT MUST BE WELL IMPREGNATED BUT SHOULD NOT DRIP.

- Clean the air filter more frequently if the vehicle is used on dusty or wet roads.
- In this case, the air filter can be partially cleaned after such a ride.



AIR FILTER PARTIAL CLEANING DOES NOT EXCLUDE OR POSTPONE REPLACING THE FILTER.

Cooling system

Level check

Check and top-up

CAUTION

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

- Shut off the engine and wait until it cools off.
- Park the vehicle on firm and level ground.
- Keep the vehicle upright with the two wheels on the ground.
- Turn the radiator cap (1) anticlockwise just one click.
- Wait a few seconds so that possible pressure in the circuit may be purged.
- Turn the radiator cap (1) anticlockwise again and remove it.
- Make sure the fluid covers the radiator plates completely.

**CAUTION**

**DO NOT ADD ADDITIVES OR OTHER SUBSTANCES TO THE FLUID.
WHEN USING A FUNNEL OR ANY OTHER ELEMENT,
MAKE SURE IT IS PERFECTLY CLEAN.**

CAUTION

COOLANT IS TOXIC IF INGESTED; CONTACT WITH EYES OR SKIN MAY CAUSE IRRITATION. DO NOT INTRODUCE YOUR FINGERS OR ANY OTHER OBJECT TO CHECK IF THERE IS COOLANT OR NOT.

Braking system

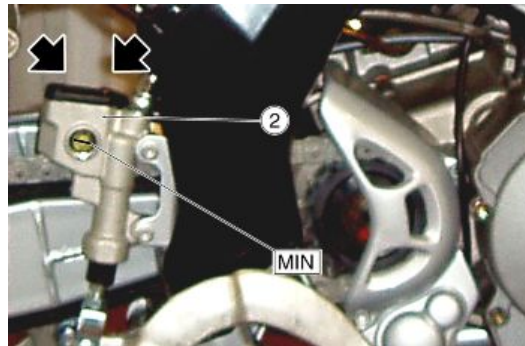
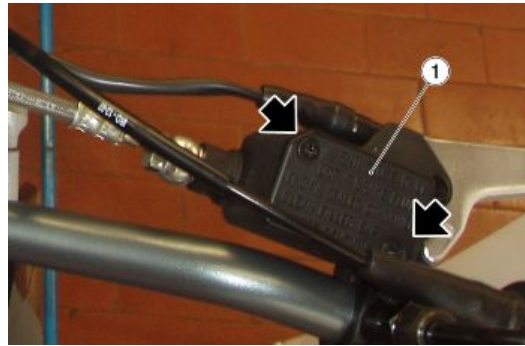
Top-up

- 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.

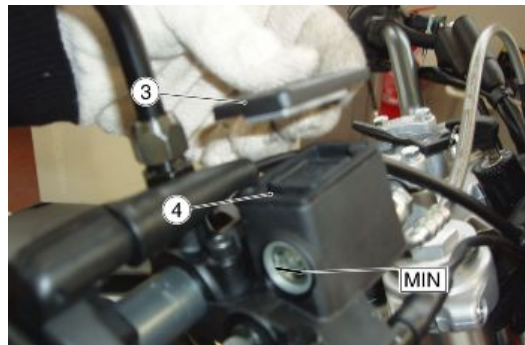
- Depending on whether you are working on the front (1) or the rear (2) brake reservoir, lift and remove the relevant cover (3 or 5) and gasket (4 or 6).

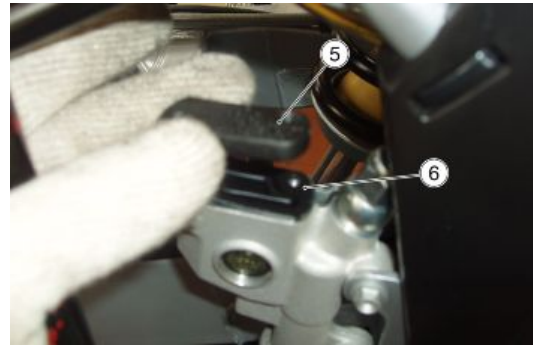


TO AVOID SPILLING FLUID WHILE TOPPING-UP, KEEP THE TANK PARALLEL TO THE RESERVOIR EDGE (IN HORIZONTAL POSITION).

DO NOT ADD ADDITIVES OR OTHER SUBSTANCES TO THE FLUID.

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





- Top-up the reservoir you are working with (1 or 2) until the level goes over the minimum marked MIN.

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.

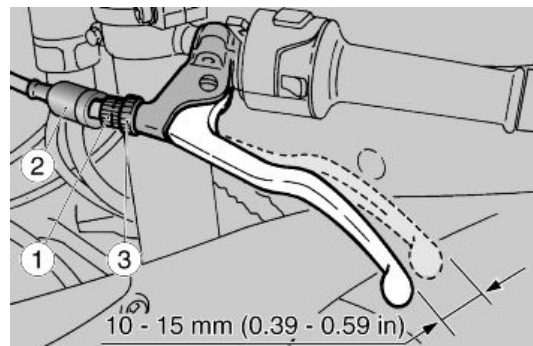
Clutch system

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.

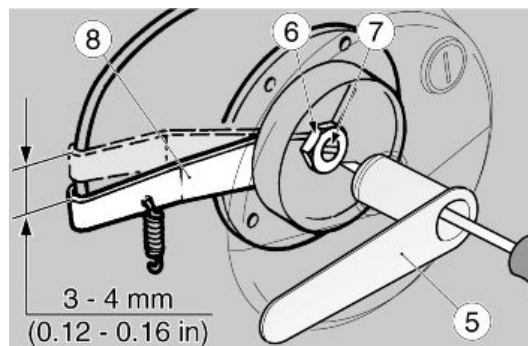
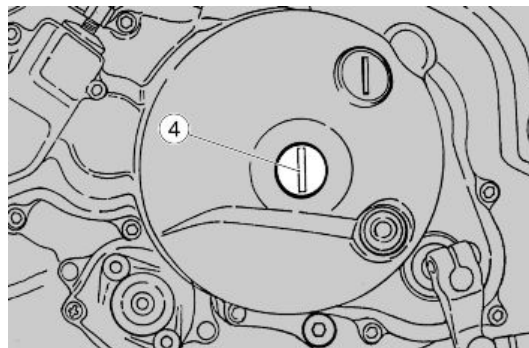
Minor adjustments can be carried out through the set screw (1) :

- Remove the protection casing (2).
- Loosen the nut (3) (screw in).
- 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).



- Tighten (unscrew) the nut (3), locking the set screw (1).
- Check the empty travel at the clutch lever end.
- Refit the protection casing (2).
- If the set screw (1) is fully screwed, fully unscrewed or it is not possible to obtain the correct empty travel:
- Remove the protection casing (2).
- Screw the nut (3) fully on the set screw (1).
- Screw the set screw (1) completely.
- With a plain slot screwdriver (or a coin) unscrew and remove the cap (4).

- Insert the special spanner (5) supplied with the toolkit, and loosen the internal nut (6).
- Introduce a plain slot screwdriver into the special spanner (5) and tighten the set screw (7) completely.
- Loosen the set screw (7) half a turn, about 3 - 4 mm (0.12 - 0.16 in), of the lever travel (8).
- Tighten the set screw (7) with the screwdriver, operate the special spanner (5) and tighten the internal nut (6).
- Screw the cap (4) again.
- Check the empty travel at the end of the clutch control lever (10 - 15 mm, 0.39 - 0.59 in).
- Refit the left side fairing .
- Start the engine.
- Operate the clutch fully and engage the first gear.



Make sure that the engine does not stop, that the vehicle does not tend to move forward and that the clutch does not "slip" when accelerating or riding.

WARNING

CHECK THE CLUTCH CONTROL CABLE 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.

See also

[Side fairings](#)

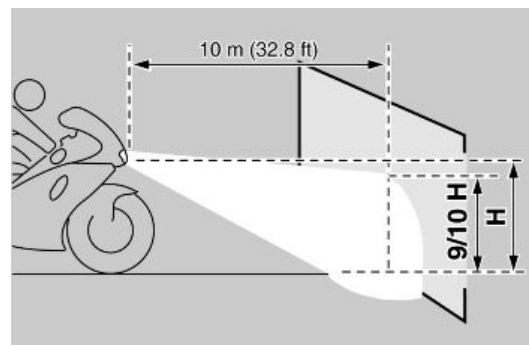
Headlight adjustment

NOTE

IN COMPLIANCE WITH LOCAL REGULATIONS IN FORCE, SPECIFIC PROCEDURES MUST BE FOLLOWED WHEN CHECKING LIGHT BEAM ADJUSTMENT.

For a quick check of the correct adjustment of the front light beam:

- Place the vehicle 10 m (32.81 ft) away from a vertical wall and make sure the ground is level.
- Turn on the low-beam light, sit on the vehicle and check that the light beam projected to the wall is a little below the headlight horizontal straight line (about 9/10 of the total height).



To adjust the light beam:

- Operating on both sides, undo the screw.
- Adjust the headlamp until the desired position is obtained.
- Working from both sides, tighten the screw. After adjusting:



NOTE

CHECK THAT THE LIGHT BEAM VERTICAL DIRECTION IS CORRECT.

INDEX OF TOPICS

TROUBLESHOOTING

TROUBL

CAUTION

IF THERE IS ANY ENGINE FAILURE, THE CONTROL UNIT DOES NOT TURN ON THE EFI WARNING LIGHT. THE EFI WARNING LIGHT IS INACTIVE IN THIS VEHICLE. THE OPERATOR WHO ENCOUNTERS A FAILURE IN THE ENGINE MUST CARRY OUT ALL THE PRESCRIBED AX-ONE CHECKS WITH THE AIM OF ENSURING THE ENGINE HAS BEEN THOROUGHLY CHECKED.

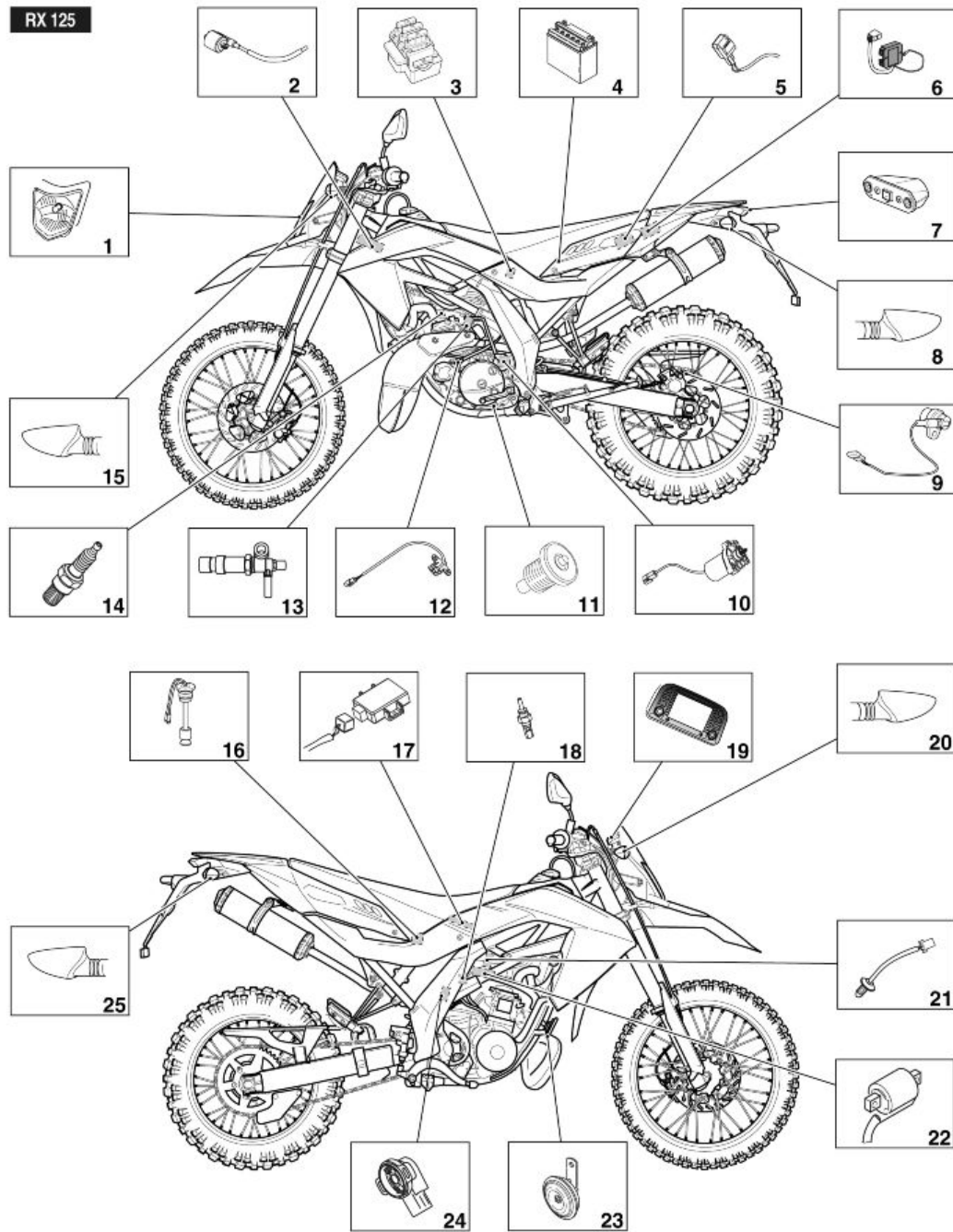


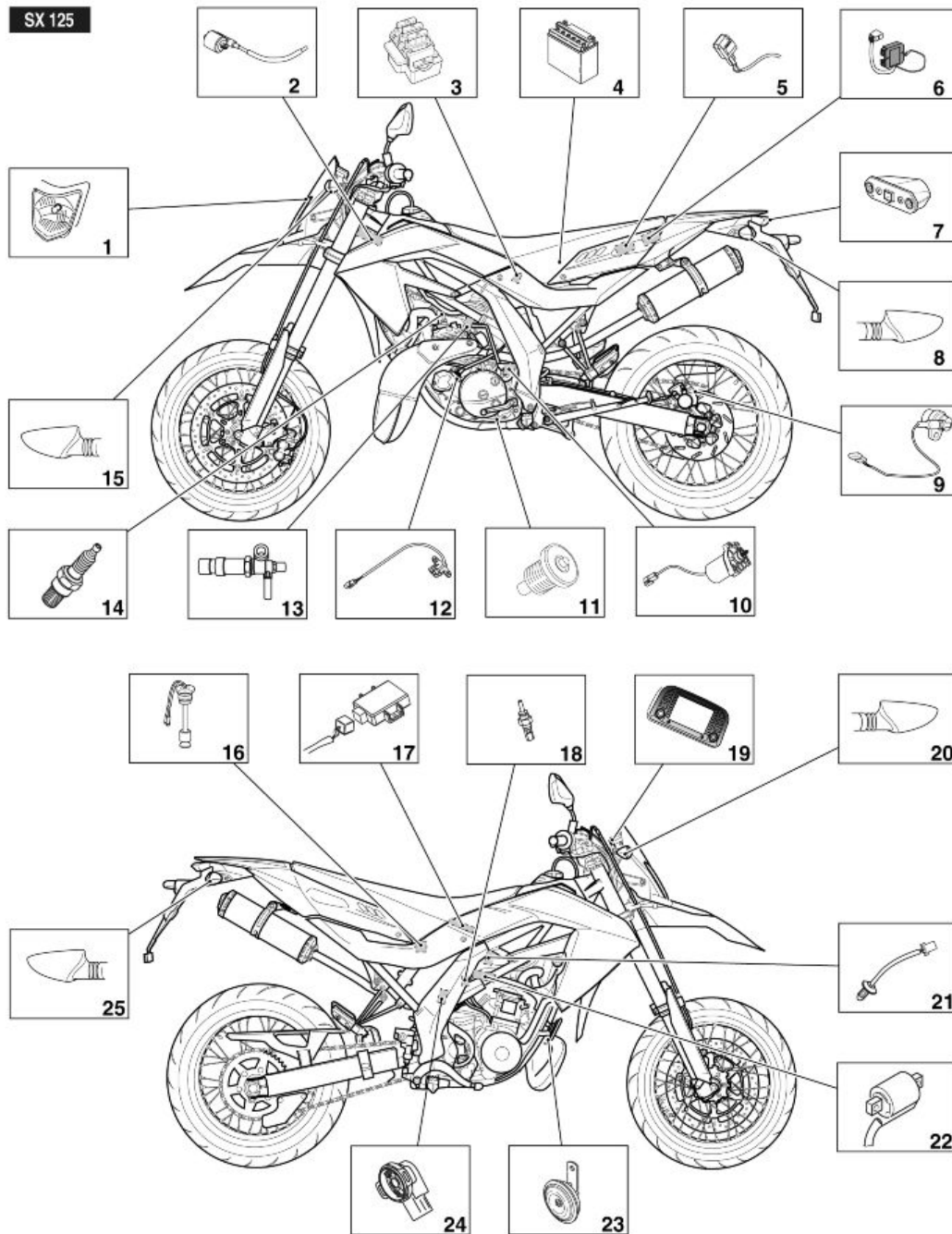
INDEX OF TOPICS

ELECTRICAL SYSTEM

ELE SYS

Components arrangement





Components - Key (RX/SX 125):

1. Front headlamp
2. Coil
3. fuses
4. Battery
5. Turn indicators
6. Voltage regulator

7. Rear light
 8. Right rear turn indicator
 9. Speed sensor
 10. STARTER MOTOR
 11. Neutral sensor
 12. Pick-up sensor
 13. Intake air valve (MAJ2)
 14. Spark plug
 15. Left front turn indicator
 16. Mixer oil level sensor
 17. CDI control unit
 18. Coolant temperature thermistor
 19. Instrument panel
 20. Front right turn indicator
 21. Air temperature sensor
 22. RAVE (Full Power) control solenoid
 23. Horn
 24. Throttle valve position sensor
 25. Rear right turn indicator
-

Electrical system installation

INTRODUCTION

Scope and applicability

The purpose of this document is to define cables laying, their fastening on the motorcycle and possible criticalities, special checks on connections and layouts, all this with the aim of obtaining vehicle reliability.

Materials used and corresponding quantities

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

- 1 Main Cable Harness
- 1 Front Tail Light Cable Harness
- 1 Ground lead
- 1 Cap for Magura Switches
- 1 Safety Diode
- 10 178x4 Large black clamps
- 3 98x2.5 Small black clamps
- 3 Rubber clamps

Special checks for the correct connection and laying of cables

This is the list of connectors the operator in charge of fitting must check they are correctly connected:

- Instrument panel connector
- Pick Up connector
- Regulator connector
- Control unit connectors
- Ground eyelets
- Key switch connector
- Left Light Switch Connector

The connectors listed (indicated with a green dot on the photo) are considered the most critical of all because a possible disconnection may cause the motorcycle to stop. Undoubtedly the connection of the rest of connectors is also important and essential for the correct operation of the vehicle.

Vehicle sections

The wiring distribution is subdivided in three essential sections, as indicated in the figure.

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

Front side

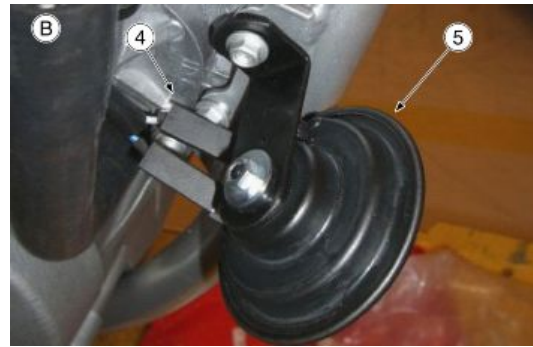
TABLE A - MAIN CABLE HARNESS AND DIODE POSITION

1. Diode
2. Clamp
3. Clamp

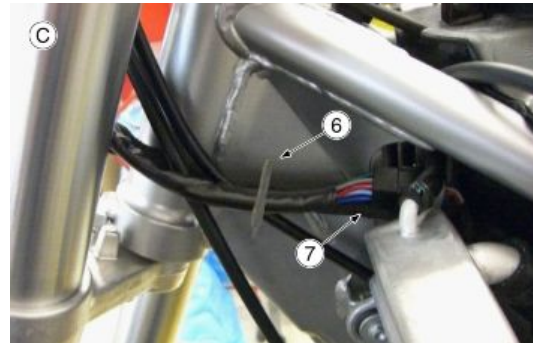


TABLE B - ENGINE AND CARBURETTOR

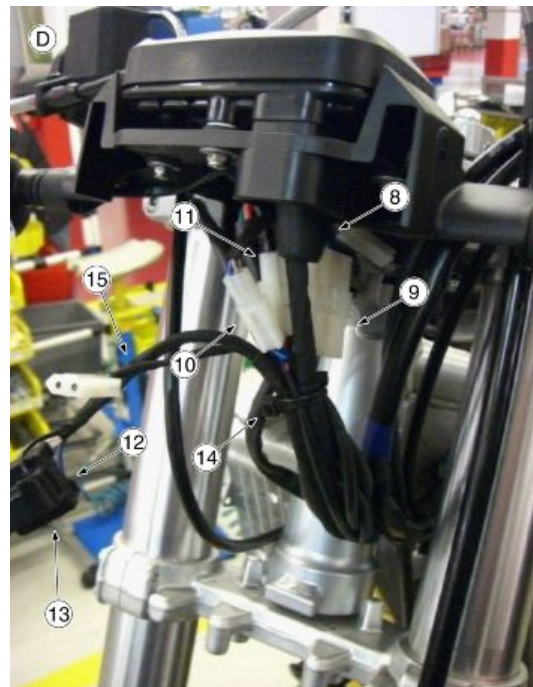
- 4. Faston Horn
- 5. Horn

**TABLE C - FRONT**

- 6. Metallic clamp
- 7. Left light switch connector

**TABLE D - FRONT**

- 8. Instrument panel connector
- 9. Key switch connector
- 10. Front left arrow connector
- 11. Front right arrow connector
- 12. Front tail light connector
- 13. Front headlight connector
- 14. Clamp
- 15. Clamp

**TABLE E - FRONT**

- 16. Clamp
- 17. Rubber cap

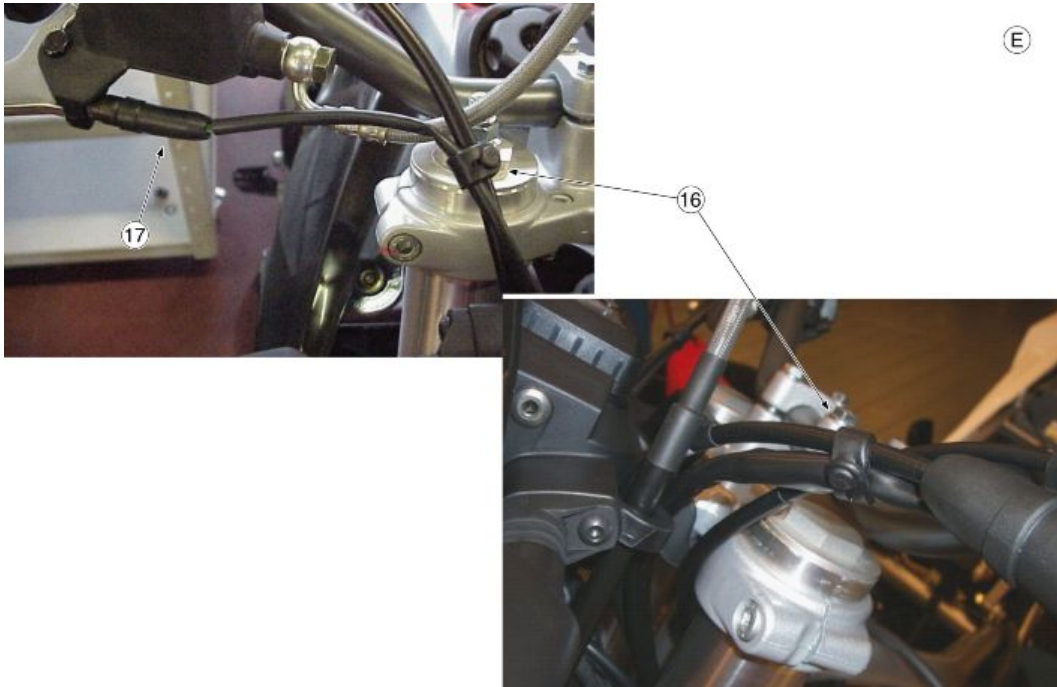


TABLE F - FRONT

- Headlight cable harness
- Place the cable harness in the front inner part.



Central part

TABLE A - MAIN CABLE HARNESS LAYING

- Metallic clamp



TABLE B - FILTER CASING AND CONTROL UNIT

1. Air temperature sensor connector
2. Clamp
3. Regulator connector



TABLE B - FILTER CASING AND CONTROL UNIT

4. Cable harness to the bolt
5. Fuses position
6. Turn indicators connector
7. Clamps

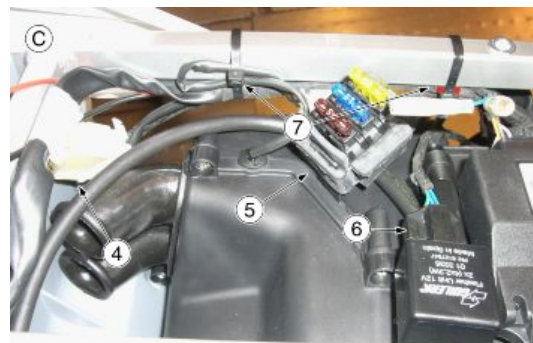


TABLE D - FILTER CASING AND CONTROL UNIT

8. Air solenoid connector
9. Generator connector
10. Pick-up earth connector
11. Cable harness laying
12. Clamp

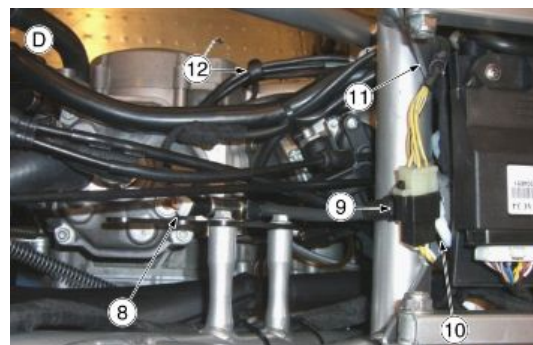
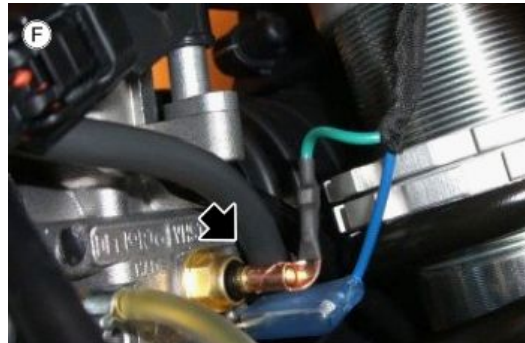


TABLE E - FILTER CASING AND CONTROL UNIT

- 13. ECU 1 connector
- 14. ECU 2 connector
- 15. Oil reserve connector
- 16. Diagnosis connector

**TABLE F - ENGINE AND CARBURETTOR**

- Heater connector

**TABLE G - ENGINE AND CARBURETTOR**

- Throttle valve sensor connector

**TABLE H - ENGINE AND CARBURETTOR**

- 17. Clamps
- 18. Clamp
- 19. Speed sensor connector
- 20. Pick-up connector
- 21. Neutral sensor connector
- 22. Stop switch connector

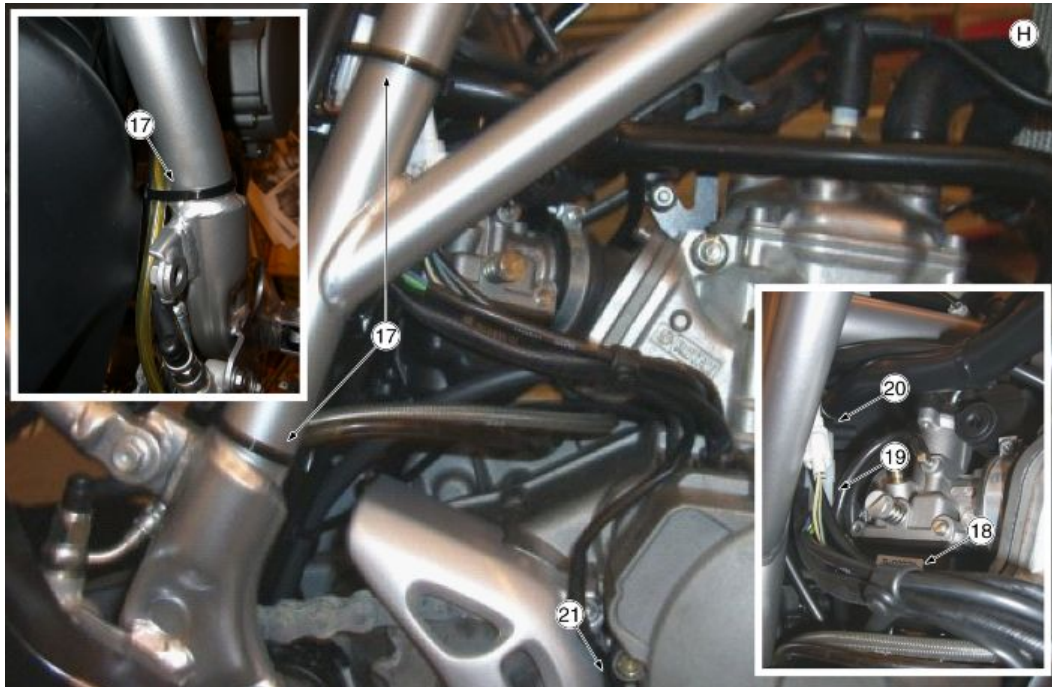


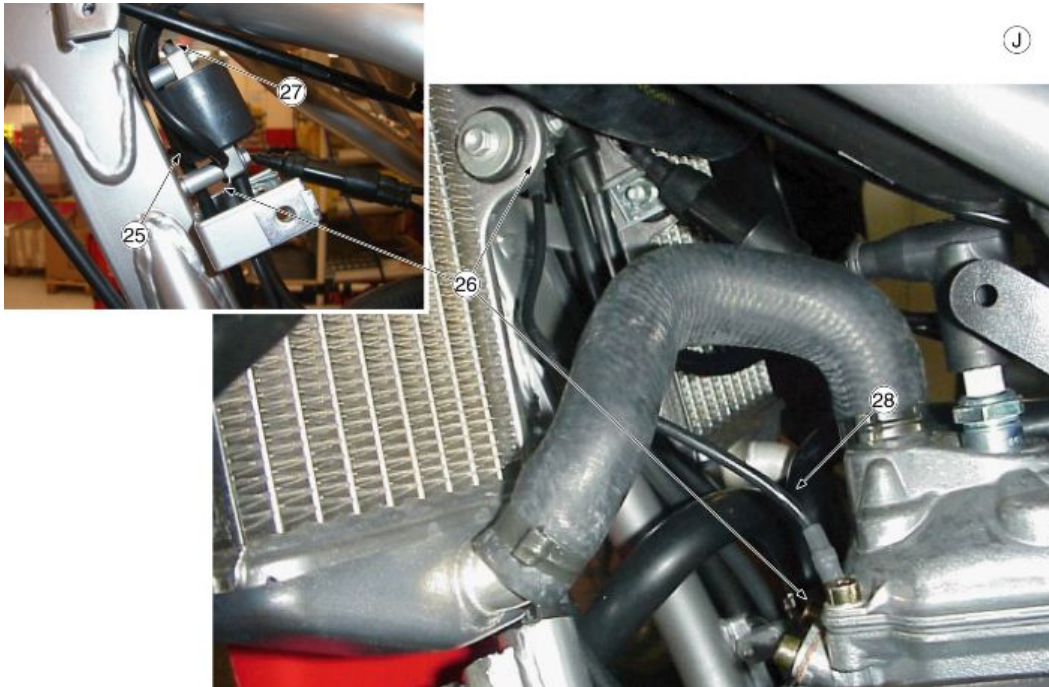
TABLE I - SADDLE PILLAR

- 23. Cable harness laying
- 24. Ground eyelets
- 25. Clamps



TABLE J - GROUND LEAD FITTING

- 26. Ground eyelets
- 27. Faston coil
- 28. Ground lead
- 29. Coil



Back side

TABLE A - SADDLE PILLAR

1. Rear left arrow connector
2. Rear headlight connector
3. License plate connector
4. Rear right arrow connector
5. Clamp
6. Cable harness laying

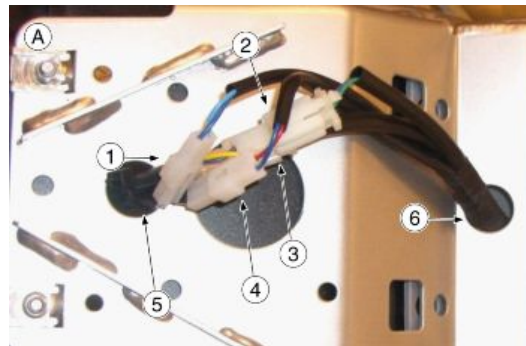


TABLE B - LICENSE PLATE HOLDER PRE-FITTING

7. License plate light cable harness
8. Rear left arrow cable harness
9. Rear light cable harness
10. Rear left arrow cable harness
11. Cable harness laying

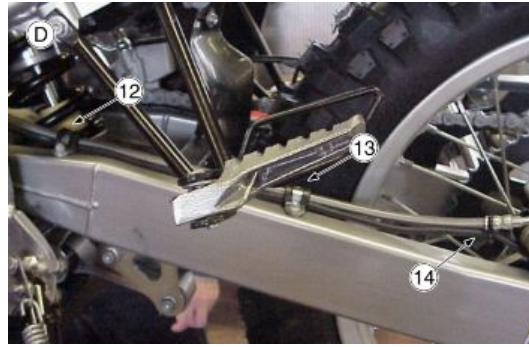


TABLE C - LICENSE PLATE HOLDER PRE-FITTING

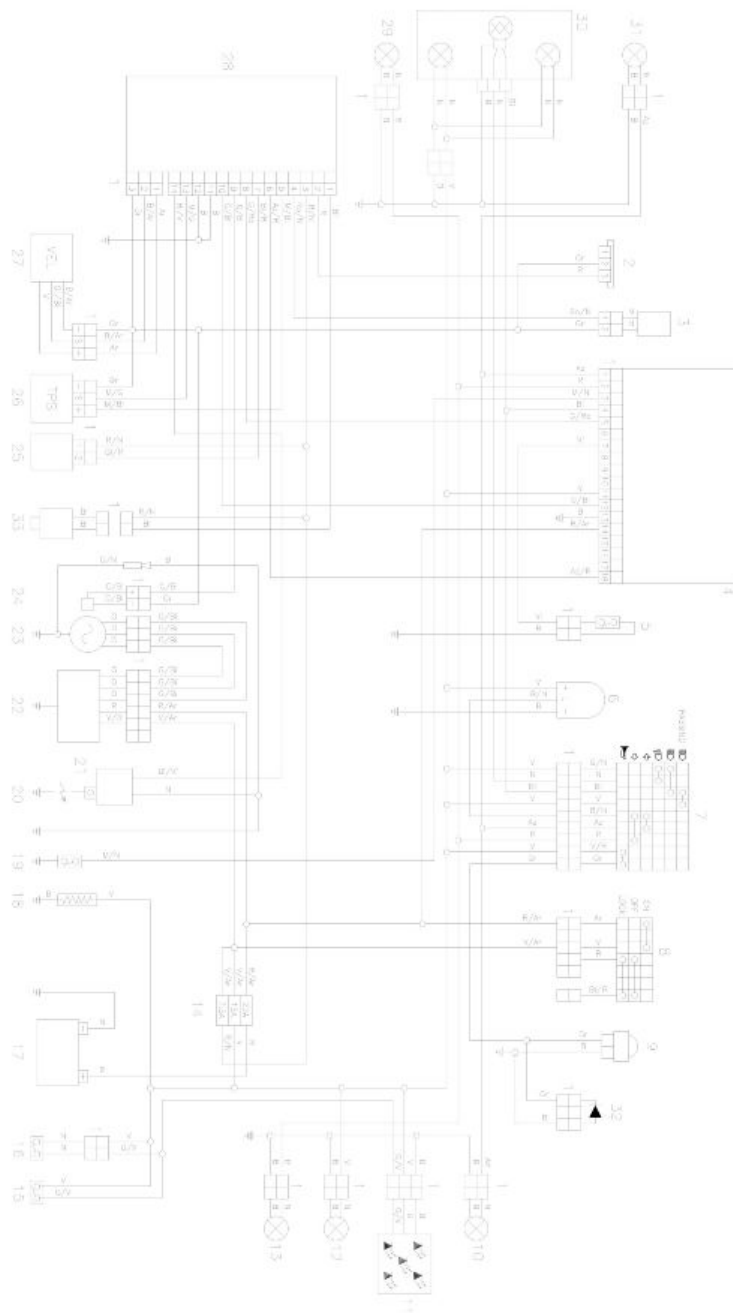


TABLE D - SPEED SENSOR

- 12. Cable harness passes together with brake pipe
- 13. Cable harness passes together with brake pipe
- 14. Clamp



General wiring diagram



Components key :

1. MULTIPLE CONNECTORS
2. ECU DIAGNOSIS
3. AIR TEMPERATURE SENSOR
4. ELECTRONIC INSTRUMENT PANEL

5. LOW OIL SENSOR
6. TURN INDICATORS
7. LEFT LIGHT SWITCH
8. KEY SWITCH
9. HORN
10. REAR LEFT TURN INDICATOR
11. REAR LIGHT
12. LICENSE PLATE LIGHT
13. REAR RIGHT TURN INDICATOR
14. FUSES
15. FRONT STOP SWITCH
16. REAR STOP SWITCH
17. BATTERY
18. FUEL HEATER
19. NEUTRAL POSITION SENSOR
20. SPARK PLUG
21. IGNITION COIL
22. REGULATOR
23. GENERATOR
24. PICK-UP
25. AIR SOLENOID
26. THROTTLE SENSOR (TPS)
27. SPEED SENSOR
28. CDI CONTROL UNIT
29. RIGHT FRONT TURN INDICATOR
30. FRONT HEADLAMP
31. FRONT LEFT TURN INDICATOR
32. DIODE
33. RAVE SOLENOID (OPTIONAL)

Cable colours - 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

CDI Control unit pinout:

1. RAVE VALVE
 2. K LINE
 3. + LIVE
 4. TEMPERATURE SENSOR
 5. +5V TPS
 6. MIL BULB
 7. MAJ2 VALVE
 8. SPEED OUT
 9. PICK-UP IN
 10. RPM OUT
 11. KILL IN
 12. GND
 13. TPS IN
 14. COIL
-
1. + SPEED SENSOR
 2. - SPEED SENSOR
 3. GND SIGNALS

Instrument panel pinout:

1. LEFT INDICATORS INPUT
2. RIGHT INDICATORS INPUT
3. NEUTRAL INPUT
4. INPUT FOR HIGH-BEAM LIGHTS
5. SPEED SENSOR INPUT
6. -
7. OIL LEVEL SENSOR
8. -
9. -
10. -
11. + LIVE
12. RPM INPUT
13. GENERAL GROUND
14. + BATTERY

- 15.-
- 16.-
- 17.-
- 18.EFI WARNING LIGHT

Checks and inspections

Dashboard

To change the setting from km/h to Mph or vice versa:

- hold down the MODE button when inserting the key until WS is displayed in the lower right hand side angle (when the MODE button is released, the word END is displayed).



-
- Pressing the MODE switch fast, the km/h and Mph words are displayed.



- Hold down the MODE button (until dashes - - - - are displayed and the current setting is displayed (km/h or Mph).
- Pressing the MODE switch fast, you can shift from km/h to Mph.
- After selecting the desired unit of measurement, press the MODE button for >3 seconds to set it.

- To exit, turn the key to OFF.

CONFIGURATION OF WHEEL SIZE ON INSTRUMENT PANEL

The first time the RX125 - SX125 instrument panel is switched on, it must be configured according to the correct wheel size.

Upon switching on, the instrument panel is as shown in the figure.



Briefly press the MODE button in the instrument panel and the screen corresponding to the 1891 mm (74.45 in) size for the SX125 model is displayed.



Briefly press the MODE button in the instrument panel and the screen corresponding to the 2066 mm (81.34 in) size for the RX125 is displayed.



In order to configure the instrument panel, press the MODE button until the letters WS are shown on the LCD on the right-hand bottom side.

Now remove and insert the key again. The instrument panel will first turn on the warning lights and the active segments on the LCD. Afterwards, it will display the pre-set wheel size value and then it will shift to regular operation.

Recovery procedure

If an incorrect wheel size value has been configured, the instrument panel can be brought back to the correct configuration.

The procedure is as follows:

- remove the key

- press the MODE button and insert the key again
- press and hold the MODE button until the letters WS are shown on the LCD on the right-hand bottom side (5 sec)
- always holding down the MODE button, operate the high-beam lights to flash 5 times
- release the MODE button and 0001 or 0002 is displayed
- press the MODE button again to change from 0001 (SX 125 17 wheel) to 0002 (RX 125 18 wheel) and vice versa. Hold down the MODE button to confirm and WS will be displayed
- release the MODE button, then set the key to OFF

Resetting the odometer

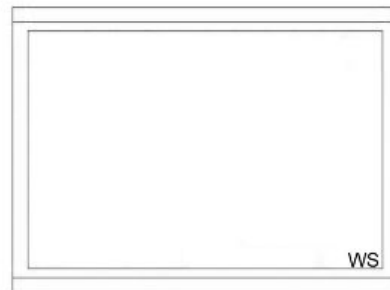
The odometer can be reset only once and within 200 km (124.27 mi)

- remove the key
- press the MODE button and insert the key again
- press and hold the MODE button until the letters WS are shown on the LCD on the right-hand bottom side (5 sec)
- always holding down the MODE button, operate the high-beam lights to flash 10 times + turn indicators to flash 5 times

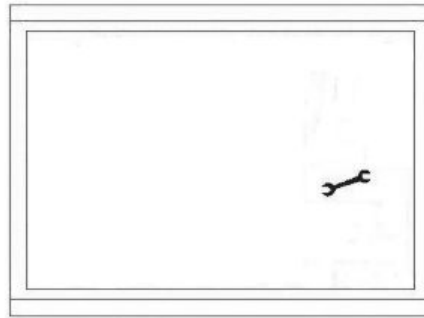
Service warning light reset

The service warning light is reset as follows :

- hold down the MODE button when inserting the key until WS is displayed in the lower right hand side angle (when the MODE button is released, the word END is displayed).



- Press the MODE switch fast until the service icon (Wrench symbol) is displayed. The words km/h - Mph and OIL word are displayed first.



- Hold down the MODE button until the dashes ---- are displayed. Once the key is released, the words NO CLEAR will be displayed.

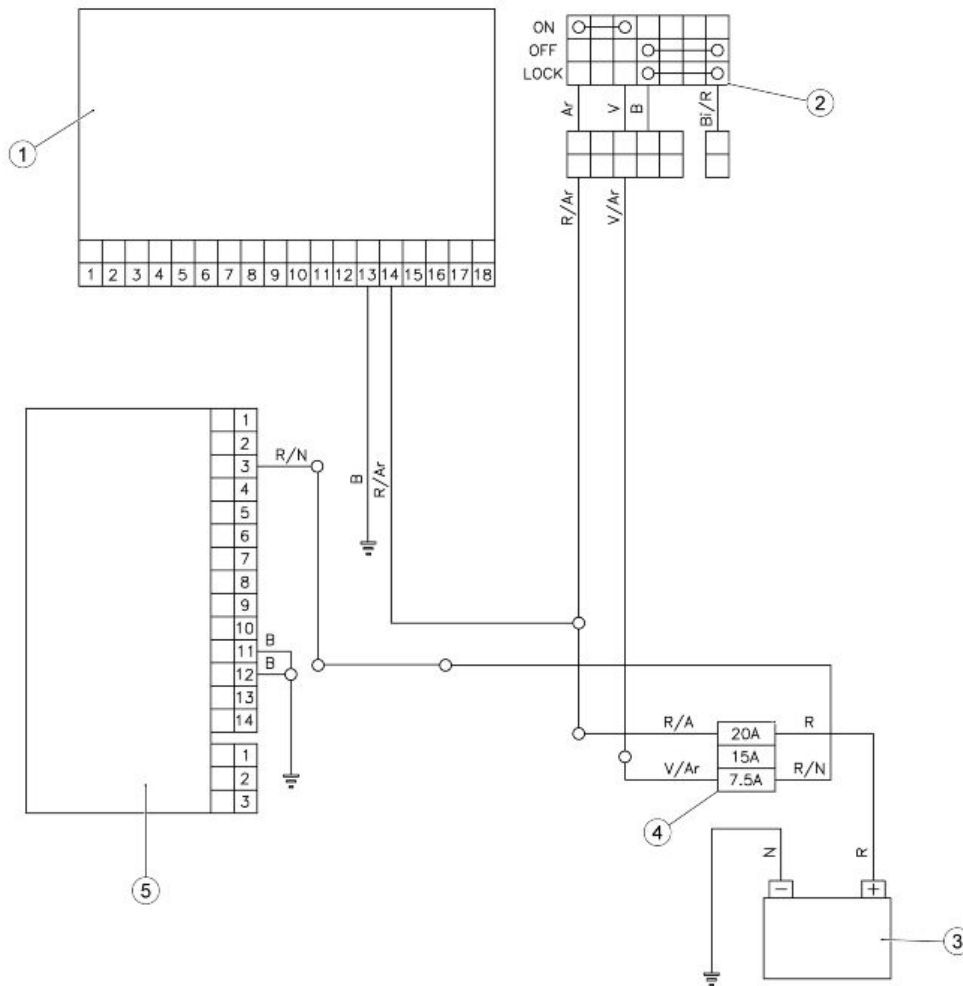


- Pressing the MODE switch fast, you can shift from NO to YES and vice versa.
- If YES CLEAR is displayed, press the MODE switch and hold it for more than three seconds to reset the service icon (Wrench symbol).
- To exit turn the key to OFF.

**CAUTION**

IF A SCREEN DIFFERENT FROM THOSE DESCRIBED IS DISPLAYED, EXIT BY TURNING THE KEY TO OFF.

Ignition circuit



Key:

- 1. Instrument panel
- 2. Key switch
- 3. Battery
- 4. fuses
- 5. CDI control unit

Characteristic

Standard spark plug

NGK BR8ES

Standard spark plug (FULL POWER)

NGK R BR10ES

Electrode gap

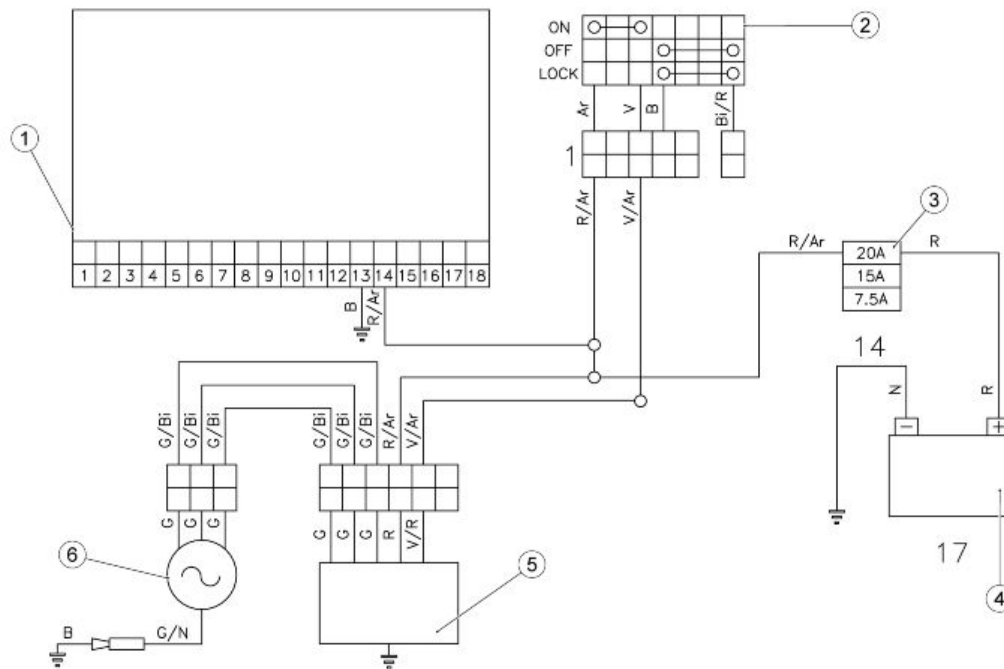
0.7 - 0.8 mm (0.027 - 0.031 in)



Troubleshooting

- Check that the 7.5 A fuse and 20 A fuse are not damaged.
- Check the spark plug and replace it if necessary.
- Check the high voltage wire and the spark plug cap.
- Check the coil.
- Check the pick-up.
- Check that the 15 A fuses are in good conditions.
- Check the diode.
- Check the start-up relay.
- Replace the CDI by another one in proper operating conditions.

Battery recharge circuit



System diagram key:

1. Instrument panel
2. Key switch
3. fuses
4. Battery
5. Voltage regulator
6. Generator

Recharge check

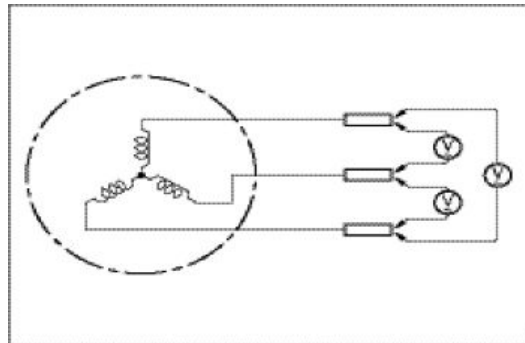
- Start the engine and make it run at 6000 rpm.
- Connect a tester in voltmeter function to check the direct current on the battery leads.
- Turn on the low-beam lights.
- The voltage must be between 13.5 and 15 V.

Troubleshooting

- Check that the fuses are in good conditions.
- Check the starter button.
- Check the start-up relay.
- Check the starter motor.

Control data**Flywheel check**

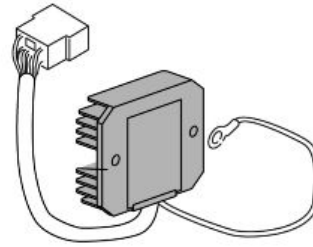
- Disconnect the alternator cable connector.
- Start the engine and make it run at 5000 rpm.
- With the pocket tester measure the voltage (alternating current) among the three yellow cables. If the value indicated by the tester is below 53 V, the generator is faulty.



Standard off-load voltage: above 53 V (AC) at 6000 rpm.

Voltage regulator check

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



Turn signals system check

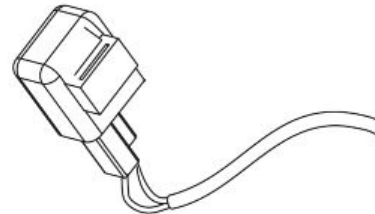
Turn indicator device check

Check placing the tester probes on the poles:

+ / - 5.8 kOhm.

- / L (bulb) 5.3 kOhm.

- / L (bulb) 4.8 kOhm.



-
- Undo and remove the screw and remove the protection glass with caution so as not to break the fitting tooth.
 - Slightly press the bulb and turn it anti-clockwise. Take out the bulb from its fitting.
 - Upon replacement, insert a bulb of equal rating in the bulb holder, making the two guiding pins coincide with their guides on the bulb holder.



Horn control

Testing voltage: 13 V (nominal 12 V)

Input: < 3.5 A



With a tester in ohmmeter function check the continuity of the contacts as per the diagram below.

Diode check

- Disconnect the two-way connector (white).

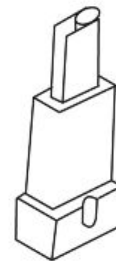
To check diodes operation:

CAUTION

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

Test (C): the bulb does not turn on.

Test (D): the bulb turns on.



With a tester (in diode test function) check the values between the two male terminals inside the diode as indicated in the figure.

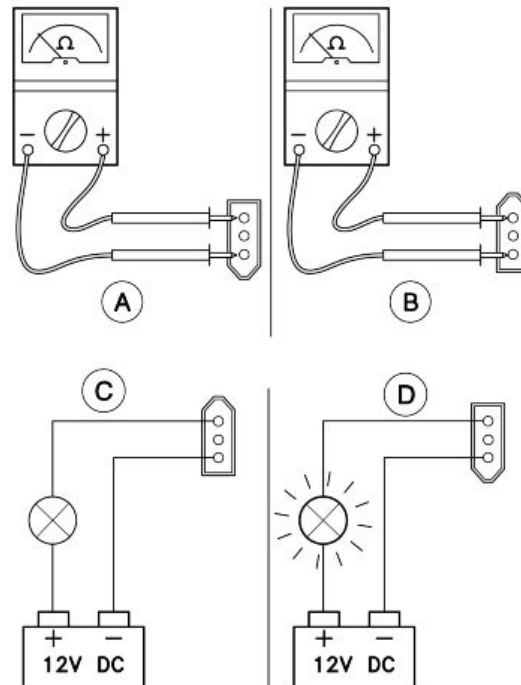
Correct value (measurement A): 0 - 1 Ohm.

Correct value (measurement B): infinite.

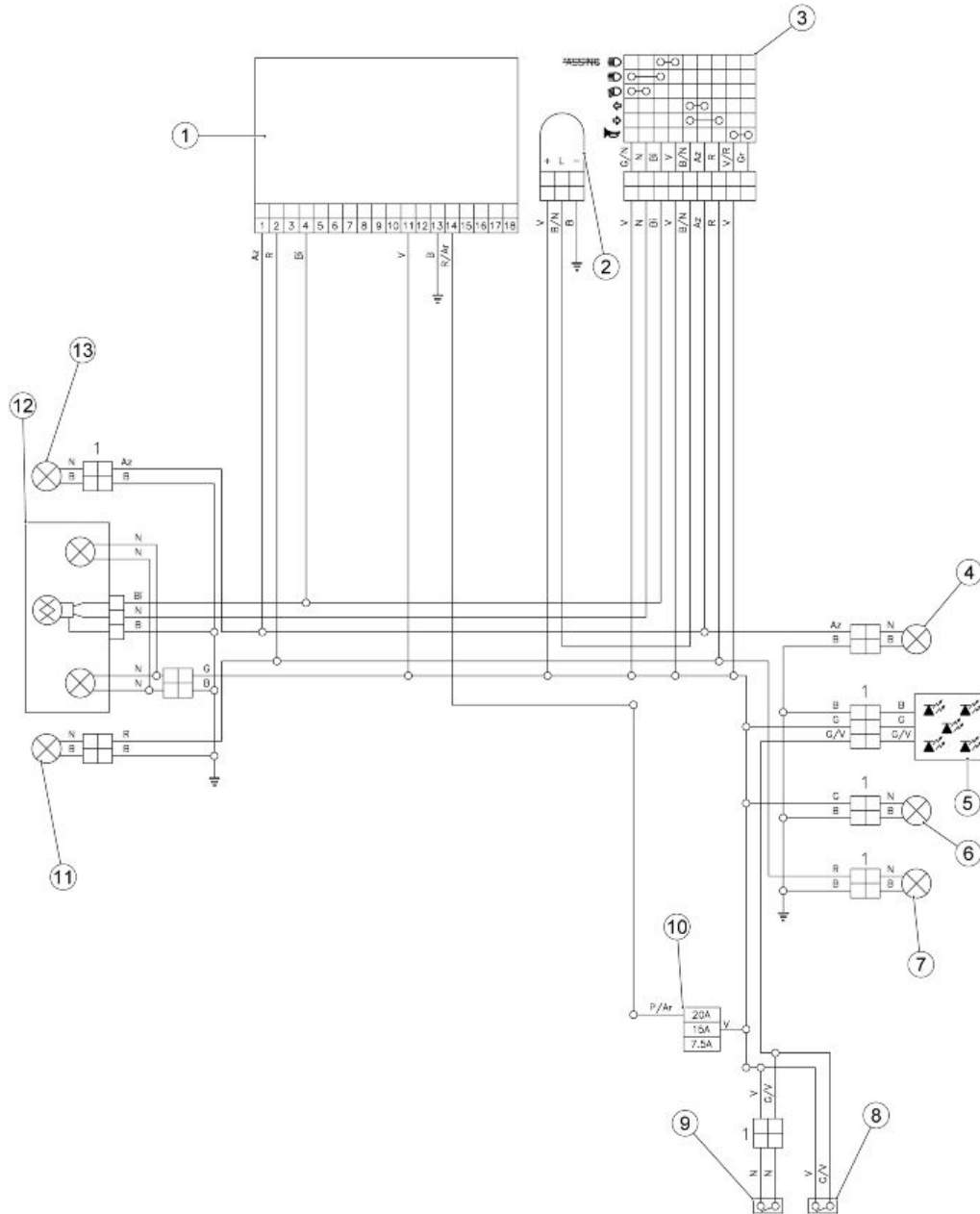
If the tester cannot be used as a diode test tool, supply 12 V voltage, interpose a 12 V - 2 W bulb on the positive lead and connect the diode as indicated in the figure.

CAUTION

DO NOT USE BULBS OVER 2 W BULB OR THE DIODE MAY BE DAMAGED.



Lights list



Key:

- 1. Instrument panel
- 2. Horn
- 3. Diode
- 4. Left rear turn indicator

5. Rear light assembly
6. License plate light bulb
7. Right rear turn indicator
8. Front stop switch
9. Rear stop switch
- 10.fuses
- 11.Right front turn indicator
- 12.Front headlamp
- 13.Left front turn indicator

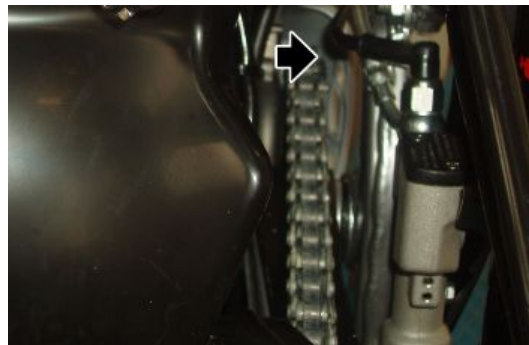
Troubleshooting:

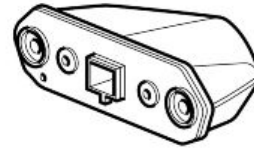
- Check that the 15 and 20 A fuses are in good conditions.
- Check if the stop light bulb is in good conditions.

Switches:

With a tester check the continuity of the switches, referring to the specific diagram provided.

If any malfunction is detected, replace the corresponding switch unit.

**FRONT AND REAR LIGHTS**



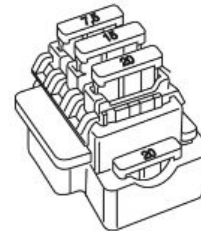
BULBS

BULBS	SX 125	RX 125
License plate bulb	5 W	5 W
Rear tail light /stop light	led	led
Front tail bulb	2V x 3W	2V x 3W
Front/rear turn indicator bulbs	4 x 10W	4 x 10W
Low-/high-beam light bulb	HS1	HS1

Fuses

FUSE DISTRIBUTION

1. **20 A fuse** From battery to ignition switch, voltage regulator, clock.
2. **15 A Fuse** From ignition switch to all light loads and horn.
3. **7.5 A Fuse** From ignition switch to ignition, air solenoid, RAVE (Full Power) solenoid.

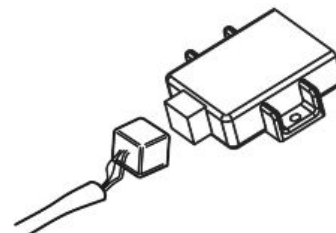


NOTE

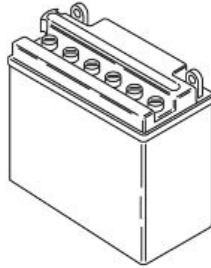
THERE IS ONE SPARE FUSE.

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



BATTERY

(12 V - B9 - B)

(12 V - 4 A)

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: $V_{dc} = 5 \div 24$ V

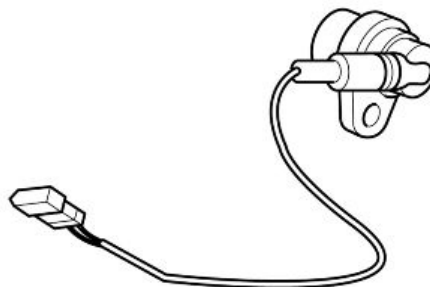
Maximum voltage applicable: 26 V

Maximum reverse voltage: -16 V

Maximum power consumption: 10 mA

Operating temperature:

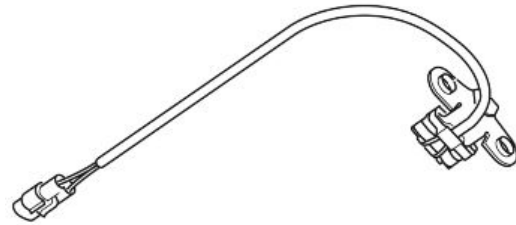
-20 °C \div $+80$ °C (-7.6 °F \div -112 °F)



Engine rpm sensor

Pick-up check

- Disconnect the connector of the pick-up terminals.
- With a pocket tester (1000 Ohm scale) measure the resistance between the terminals of the yellow/blue and yellow/white cables. The resistance value measured should be between 190 and 300 Ohm.
- If the resistance is infinite or lower than the set value, the pick-up needs to be replaced.

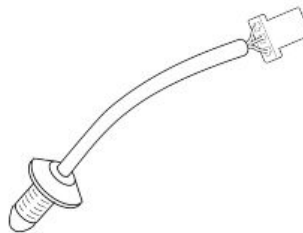


Air temperature sensor

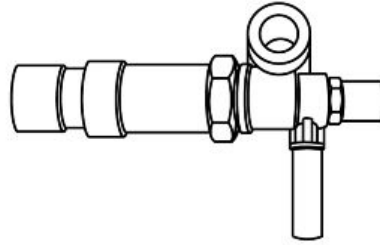
AIR TEMPERATURE SENSOR

Specification	Desc./Quantity
5 °C (41 °F)	5310 Ohm
10 °C (50 °F)	4134 Ohm
25 °C (77 °F)	2053 Ohm
30 °C (86 °F)	1651 Ohm
40 °C (104 °F)	1090 Ohm
50 °C (122 °F)	738 Ohm

Ohm resistance (+/- 10%)



Air intake valve



Air valve resistance 70 - 80 OHM at 25 °C (77 °F)

Not powered: closed valve

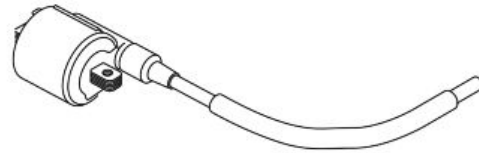
Powered with 12V: open valve

Coil

Coil winding resistance

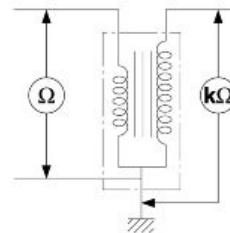
Primary 0.11 - 0.21 Ohm.

Secondary 4.3 - 8.1 kOhm



Checking

Use a pocket tester to check the coil. In every case the continuity of the primary and secondary windings must be checked. The Ohm reading need not be exact, but if the windings are not damaged, their continuity must be detected according to the following Ohm resistance values described above.



Neutral sensor

Check the values with a tester:

- With the gear engaged, the tester indicates an infinite resistance value.
- In neutral position, resistance is equal to 0 Ohm.



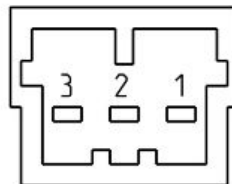
Connectors

ECU

CONNECTOR A

	Specification	Desc./Quantity
1	Pin 1	Speed sensor positive
2	Pin 2	Speed sensor signal
3	Pin 3	Signal ground connection

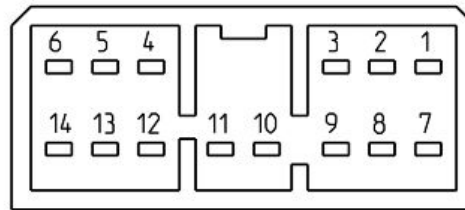
Connettore A



CONNECTOR B

	Specification	Desc./Quantity
1	Pin 1	Rave valve
2	Pin 2	"K" line
3	Pin 3	+ live
4	Pin 4	Temperature sensor input
5	Pin 5	+ 5V TPS
6	Pin 6	Mil bulb
7	Pin 7	Maj2 Valve
8	Pin 8	Speed output
9	Pin 9	Pick-up input
10	Pin 10	RPM output
11	Pin 11	Kill input
12	Pin 12	Ground connection
13	Pin 13	TPS input
14	Pin 14	HV coil

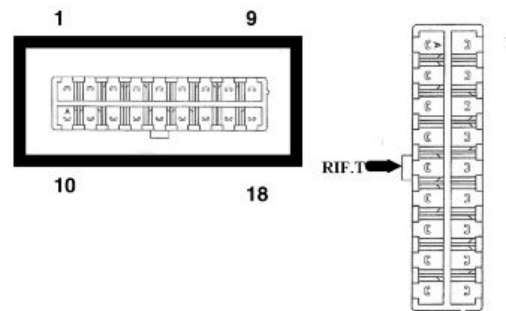
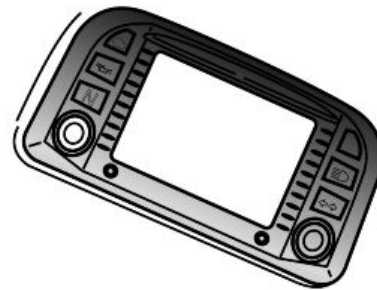
Connettore B



Dashboard

Instrument panel pinout:

1. LEFT INDICATORS INPUT
2. RIGHT INDICATORS INPUT
3. NEUTRAL INPUT
4. INPUT FOR HIGH-BEAM LIGHTS
5. SPEED SENSOR INPUT
6. -
7. OIL LEVEL SENSOR
8. -
9. -
- 10.-
- 11.+ LIVE
- 12.RPM INPUT
- 13.GENERAL GROUND
- 14.+ BATTERY
- 15.-
- 16.-
- 17.-
- 18.EFI WARNING LIGHT



INDEX OF TOPICS

ENGINE FROM VEHICLE

ENG VE

Vehicle preparation

CAUTION



BEFORE CARRYING OUT THE OPERATIONS BELOW, BEAR IN MIND THAT THE ENGINE MUST BE REMOVED FROM THE CHASSIS TOWARDS THE BOTTOM; AFTERWARDS ARRANGE AND POSITION THE NECESSARY TOOLS.

NOTE

GET A HOIST AND BELTS FOR LIFTING.

- Position the vehicle on its OPTIONAL front service stand.
- Support the vehicle rear part using a hoist, fastening two suitable belts to the rear frame.
- Remove the central and front side fairings.
- Remove the fuel tank.
- Lift the hoist arm until the belts are linked to the chassis and are taut.
- Remove the complete exhaust.

Removing the engine from the vehicle

- Remove the battery (1) from its housing.



- Before draining the cooling system, prepare a container of suitable capacity.
- Empty the cooling system by undoing the front screw set to "OUT" on the left-hand side of the crankcase.
- Release the clamps and slide both cooling system pipes off the engine.





- Disconnect the oil pipes and cover them.
- Undo and remove the three screws and remove the oil pump cover.



- Loosen the set nut.



- Slide off the throttle cable from the oil pump.

CAUTION

UPON REFITTING, ADJUST THE THROTTLE CABLE TENSION BY OPERATING THE NUT ON THE OIL PUMP.



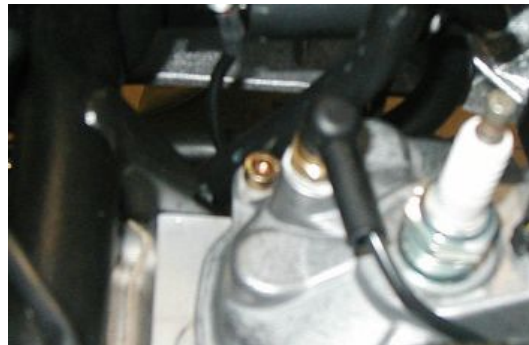
- Slide off the mixer oil pipe.
- Cover the tank outlet and pipe.



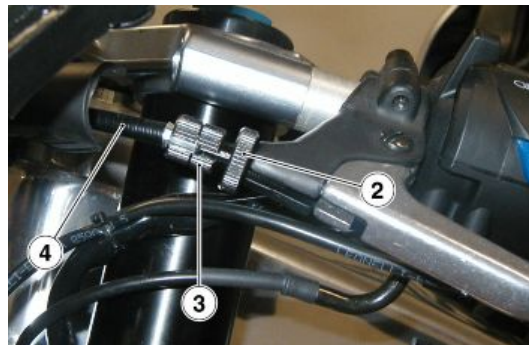
- Disconnect the spark plug tube.



- Disconnect the thermistor electric connector.



- Loosen the locking washer completely (2).
- Loosen the set screw (3) completely.
- Remove the clutch cable (4) from the lever.



- Unscrew and remove the gearbox oil filler cap.



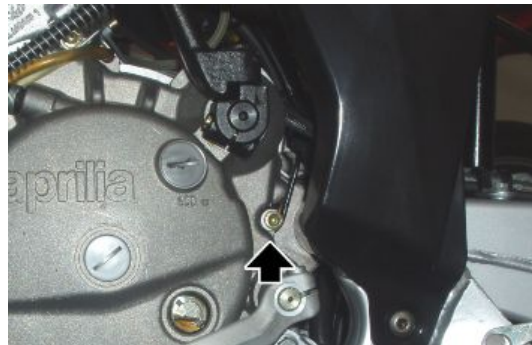
- With a small plain slot screwdriver, remove the clutch cable from its seat.
- Slide off the clutch cable.

CAUTION

UPON REFITTING CHECK THE CLUTCH LEVER CLEARANCE.



- Loosen the fixing screw and move the oil hose guides.
- Detach the oil pipes from the engine crankcase.



- Disconnect the engine oil breather pipe from the crankcase.



- Undo and remove the two screws fixing the pinion protection cover and then remove it.

CAUTION

TO FACILITATE SLIDING OFF THE TRANSMISSION PINION, SLIGHTLY LOOSEN THE DRIVE CHAIN.



- Remove the Seeger ring.



- Slide off the transmission pinion with the chain from the shaft.

- Disconnect the neutral gear sensor.



- Release the cables by removing the clamps indicated.





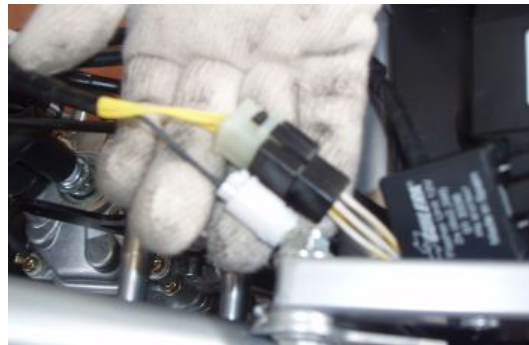
- Working from the left side of the vehicle, undo the screw while keeping the right-hand side nut tightened.



- Release the engine temperature sensor.



- Disconnect the connections.



- Remove the pipe from the hose guide.



- Remove the carburettor.

- Remove the clamp and disconnect the secondary air pipe.



- Undo and remove the screw disconnecting the connectors of the system ground connections.



- Undo and remove the screw and disconnect the speed sensor.



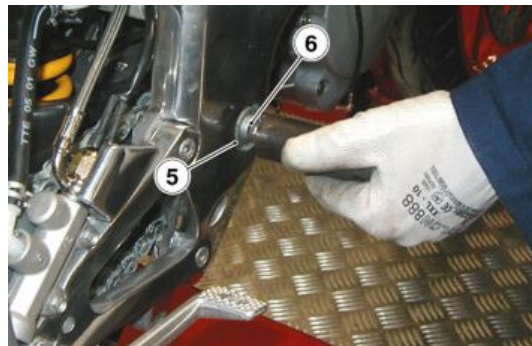
CAUTION

DUE TO THE ENGINE WEIGHT, THE FOLLOWING OPERATIONS REQUIRE THE INTERVENTION OF A SECOND OPERATOR. FIRST AGREE ABOUT THE PROCEDURE TO BE FOLLOWED.

- Working from the right side and using the suitable swingarm pin adjustment tool, fully loosen the ring nut (5).
- Loosen the ring nut set bushing (6).

Specific tooling

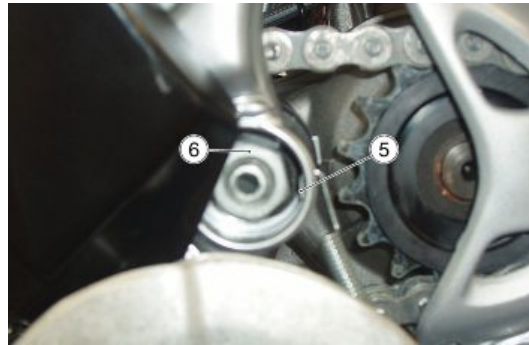
AP8101945 Fork pin ring nut



- Remove the front screw that fixes the engine to the chassis and collect the nut on the right-hand side of the vehicle.



- Working from the right side and using the suitable swingarm pin adjustment tool, fully loosen the ring nut (5).
- Loosen the ring nut set bushing (6).



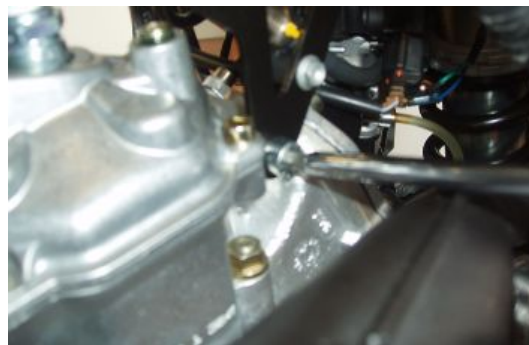
- Working from the left side, undo and remove the swingarm pin and collect the two washers.
- Remove the swingarm from the chassis.



- Sliding it off from the left side of the vehicle, remove the engine from the chassis.

Installing the engine to the vehicle

- Move the engine with small alternating movements until it is perfectly aligned with the fixing holes.
- Insert the upper screw, fit the washer and tighten the nut.





- Insert the front screw that fixes the engine to the chassis and fasten the nut.



- Place the swingarm on the chassis.
- Move it into position so that the holes are aligned and, at the same time, insert the pin fully from the left side.



- The correct adjustment of the swingarm pin clearance is obtained by properly seating the ring nut set bushing (1) and screwing it another 1 / 4 of a turn.



CAUTION

GET THE ADEQUATE SWINGARM PIN ADJUSTMENT TOOL.

Specific tooling

AP8101945 Fork pin ring nut

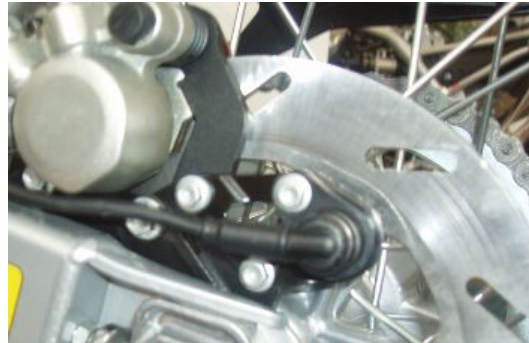
- Firmly hold the bushing (2) and tighten the ring nut (1) using a special tool.
- Now adjust the rear swingarm pin as follows:

- Using the adequate adjustment tool loosen the ring nut (1) completely working from the upper right side.

- Tighten the ring nut set bushing (2) to the prescribed torque.

-
- Tighten the ring nut (1) using an adequate special tool.
 - Tighten the swingarm pin.
-

- Fit the speed sensor and tighten the screw.



- Fit the carburettor.

-
- Replace the clamp and connect the secondary air pipe.



-
- Place the rear brake pipe and the speed sensor cable and tighten them to the chassis fastening the cable guide.



- Connect the following electric connectors in order:
-

- System ground connections, tighten the screw.



- Connect the neutral gear sensor.



- Replace the clamps.



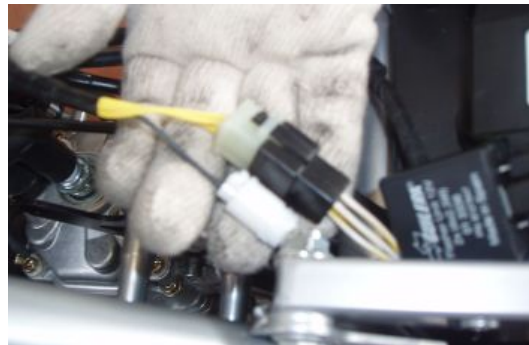
- Control unit ground connection.



- Pick-up



- Generator.



-
- Connect the engine temperature sensor connector.



- Fit the transmission pinion with the chain on the shaft.
- Fit the Seeger ring.



- Fit the pinion protection case and fix it by means of two screws.



- Place the oil pipes on the engine crankcase fastening them with the hose guides.



- Install the battery.
- Replace the clamp and connect the expansion tank pipe.



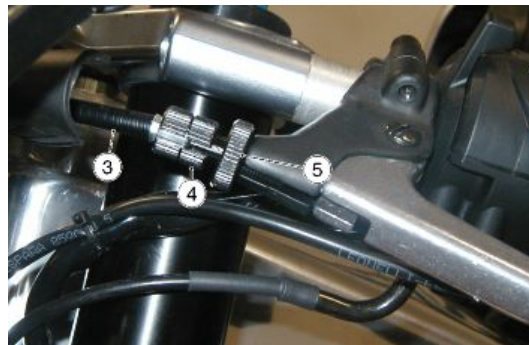
- Reposition the clutch cable in its seat.



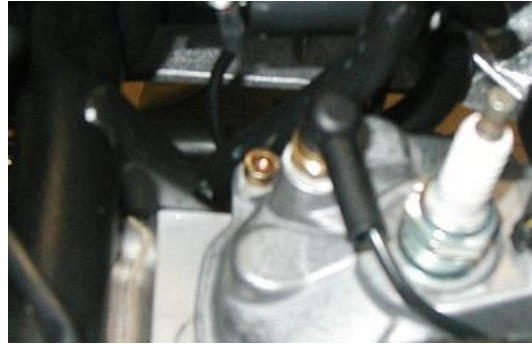
- Tighten the gearbox oil filler cap.



- Fit the clutch cable (3) in the clutch lever.
- Undo the set screw (4).
- Tighten the locking washer (5) partially.
- Check the clutch lever clearance.



- Connect the thermistor electric connector.



- Connect the spark plug tube.

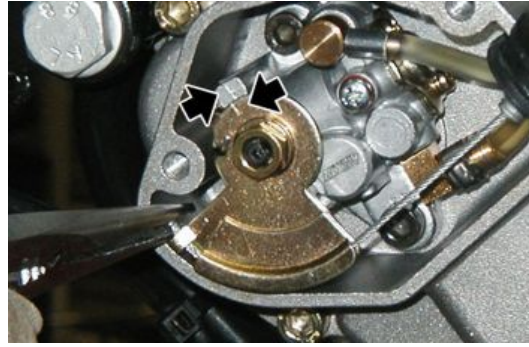


- Place the throttle cable in the oil pump.



- Adjust the throttle cable tension by operating the nut on the oil pump until it is aligned with the two references.





- Position the oil pump cover and tighten the three screws .



- Place the cooling system pipes, replace the clamps.



- Make sure all engine fixing screws / locking nuts are tightened to the prescribed torque.
- Top-up coolant
- Check the drive chain tension and adjust if necessary.

NOTE

CARRY OUT AN OVERALL CHECK ON ALL THE COMPONENTS THAT HAVE UNDERGONE ANY OPERATION, ESPECIALLY THAT:

- the electrical cables are correctly fastened with suitable clamps;

CAUTION**AVOID TWISTING AND CRUSHING CABLES.**

- the electrical connectors are correctly coupled;
 - the pipes and unions are correctly fitted and secured with suitable clamps;
 - the throttle and cold start cables slide freely and do not cause the handlebar to rotate.
-

INDEX OF TOPICS

ENGINE

ENG

Gearbox

Gearbox shafts

Disassembling the gearbox

- Open the crankcase halves.
- Remove the gaskets from the crankcase.
- Take out the countershaft.



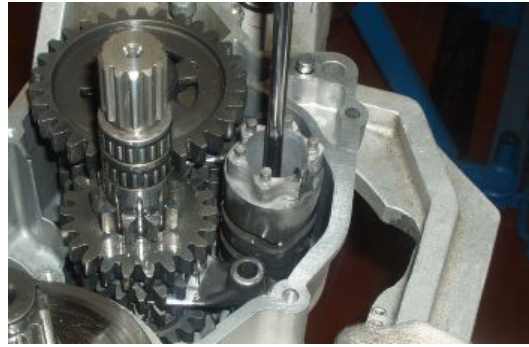
- Fix the flywheel-side crankcase half on the engine support with the adequate screw and spacer.



- Take out both fork rod.



- Unscrew and remove the desmodromic control fixing screw and collect the washer.



- Slide off the three gear forks from the guides of the desmodromic drum control.



- Remove the desmodromic drum control.



- Remove the O-ring.

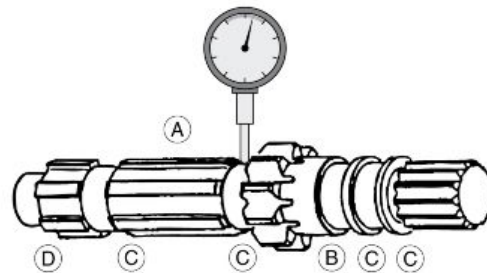


- Rotate the crankcase half on the support to the standard position.
- Remove gearbox unit (primary + secondary).



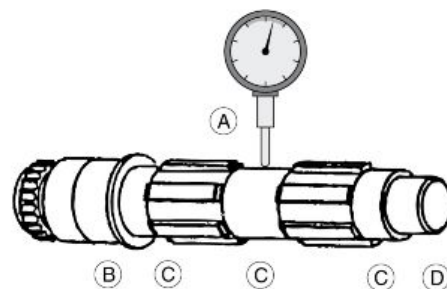
Checking the primary shaft

- Check the state of the joints and grooves. Max. admissible deviation (A) 0.03 mm (0.0012 in); Min. wear limit (B) Diam. 24.96 mm (0.9827 in). Min. wear limit (C) Diam. 20.96 mm (0.8260 in). Min. wear limit (C) Diam. 16.97 mm (0.6681 in).



Checking the secondary shaft

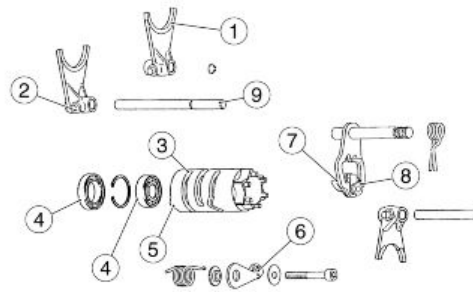
- Check the state of the joints and grooves. Max. admissible deviation (A) 0.03 mm (0.0012 in); Min. wear limit (B) Diam. 24.96 mm (0.9827 in). Min. wear limit (C) Diam. 20.96 mm (0.8260 in). Min. wear limit (C) Diam. 16.97 mm (0.6681 in).



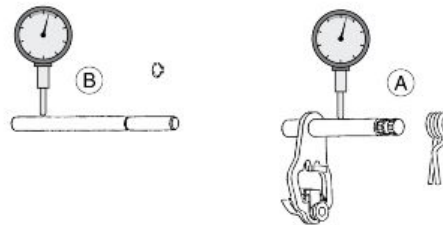
Checking the desmodromic drum

- Check the contact zone on fork (1) and the driving pin (2) of the forks for wear.
- Check the desmodromic drum grooves (3) for wear.
- Make sure that both ball bearings (4) rotate freely and check if there are signs of corrosion.

- The lever roller (6) must rotate freely.
- Check that the stop tab (7) and the relevant spring (8) work properly.
- Check that the gear shaft is not deformed. (A) Max. admissible deviation = 0.15 mm (0.0059 in);
- Check that both fork shafts are not deformed. (B) Max. admissible deviation = 0.05 mm (0.0020 in);



THE END OF THE FORK LONG SHAFT (9) THAT PROTRUDES FROM THE CRANKCASE IS USED AS A TRANSMISSION STOP AND CAN BE BENT IN CASE OF EXCESSIVE LOAD (BUMPING). THE DEVIATION CAN BE CHECKED BY REMOVING THE CLUTCH COVER AND ROTATING THE LONG SHAFT.



Assembling the gearbox

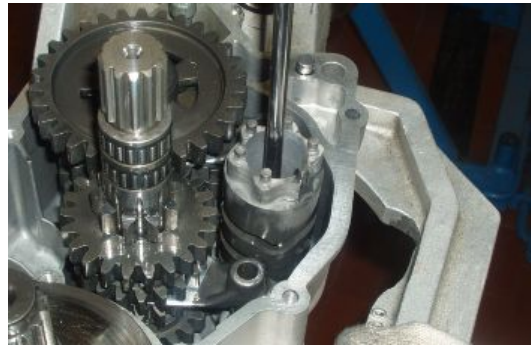
- Place the guiding sleeve on the primary shaft to avoid damaging the oil seal.
- Heat up the engine crankcase.
- Apply LOCTITE Anti-Seize on the bearing seats present on the crankcase.
- Fit the bearings in their seats.
- Fit the gear unit.
- Fit the 5th - 6th gear fork on the gear pinion of the secondary shaft.
- Place the 2nd - 3rd gear fork and the 1st - 4th gear fork on the gear pinion of the primary shaft. The 2nd - 3rd gear fork must be installed with the printed number 123 facing upwards. The 1st - 4th gear fork must be installed with the printed number 113 facing upwards.



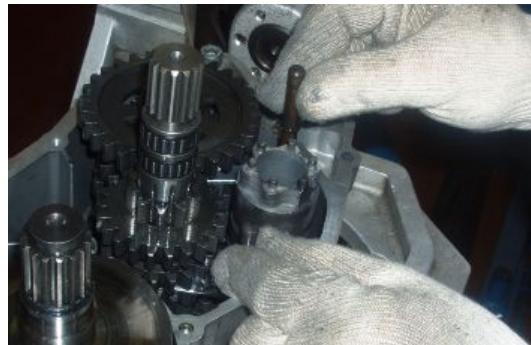
- Apply oil for gears on the grooves of the desmodromic drum.
- Fit the desmodromic in the crankcase.



- Fit the washer and the desmodromic control fixing screw and tighten them.



- Insert all the forks in the desmodromic guides.
- Lubricate the gear shafts and insert them in their seats, paying special attention that the short gear shaft has its chamfering side facing upwards and that the seeger ring on the long one is properly placed.
- Check that all the gear components slide smoothly.



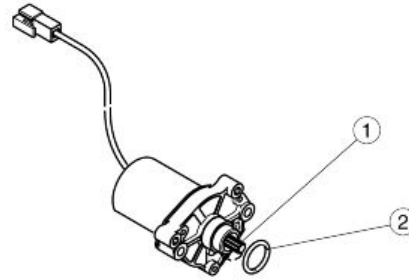
- Warm up the crankcase.
- Apply LOCTITE Anti-Seize to each bearing seat of the countershaft.
- Fit the bearing.
- Fit the countershaft in the bearing.



Starter motor

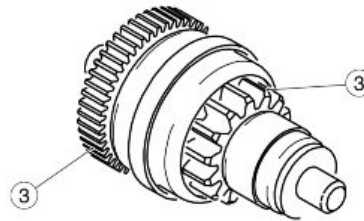
STARTER MOTOR

- 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.



START-UP GEAR

- Make sure that the gears (3) are not worn.
- The start-up gears must be blocked with precision in one direction.



Removing the starter motor

- Undo and remove the two fixing screws.
- Remove the starter motor.

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.
-

Removing the idle gear

- Remove the magneto flywheel.
- Slide off the starter motor gear.



See also

[Magneto flywheel removal](#)

Fitting the idle gear

- Rotate the engine support so that it faces upwards, flywheel side.
- Apply MOLYKOTE 111 to all the bearing housings and the teeth of the start-up gear unit.
- Install the start-up gear unit together with the thrust washer in the hole with the needle bearing.



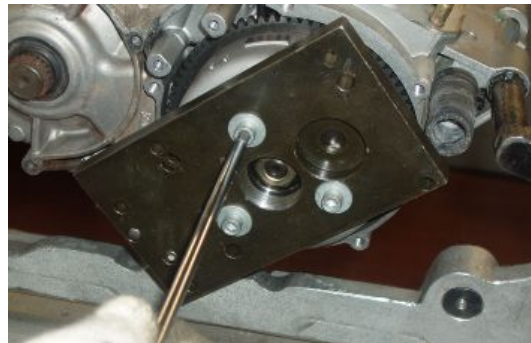
Generator side

Removing the flywheel cover

- Lean the engine on the support in such a way as to place the start-up cover facing upwards.
- Undo and remove the six screws fixing the flywheel cover.



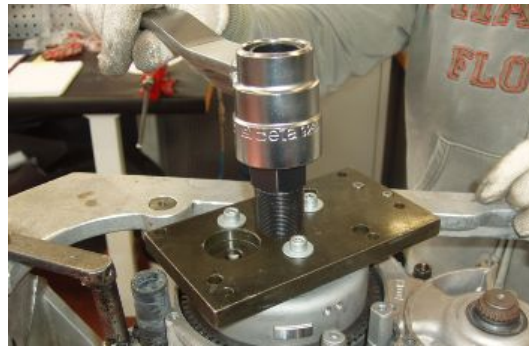
- Place the extractor plate on the flywheel and fix it with the three M6 Allen screws. The flywheel cam must be facing the external "pick up", making sure that the crankshaft is at TDC. When placing the extractor plate, make sure that the position of the support pins is correct.



- Undo and remove the M12x1 hexagonal screw and collect the locking washer.



- Fit the protection sleeve on the crankshaft thread.
- Insert the long threaded end of the extractor screw in the extractor plate and remove the flywheel.



Removing the stator

- Undo and remove the three M6 stator fixing screws.



- Remove the stator, the cable guide and external locking.
- Remove the woodruff key from the crankshaft.



Installing the flywheel

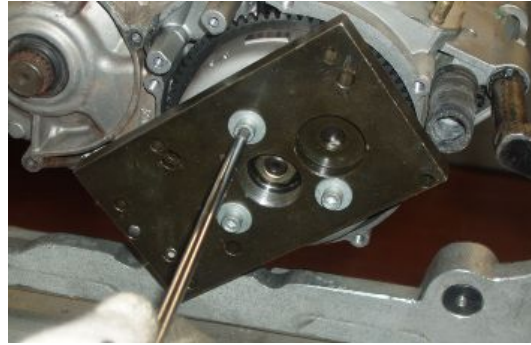
- Degrease the crankshaft conic part and the flywheel.
- Place the flywheel matching the grooves on the shaft.
- Place the washer and the magneto flywheel fixing screw without tightening it.
- Place the flywheel up to the TDC



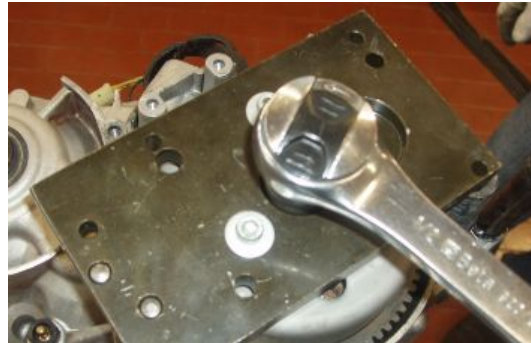
- Place the extractor plate correctly with the locking bolts on the flywheel and fix it with three screws (M6 x 16).

Specific tooling

AP0277455 Extractor plate to separate the crankcase halves



- Tighten the magneto flywheel fixing nut.



- Place the pick up, tighten the two pick-up fixing screws and adjust the pick-up distance to 0.55 mm (0.217 in).



- Apply SILASTIC 732 RTV to the cable guide of coil and stator, then slide it in the crankcase hollow space.
- Fit the electric starter device cover on the starter gear.



Stator installation

- Insert the woodruff key in the crankshaft.
- Place the stator.



- Tighten the three stator fixing screws.

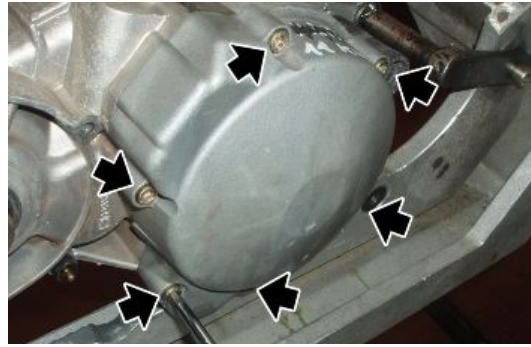


Flywheel cover installation

- Apply a thin layer of SILASTIC 732 RTV on the flywheel cover centring.
- Place the flywheel cover.



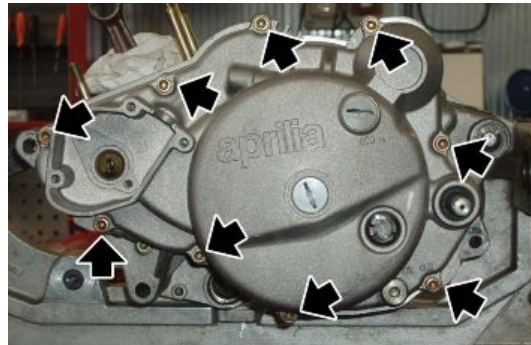
- Tighten the six flywheel cover fixing screws.



Clutch side

Removing the clutch cover

- Undo and remove the nine screws fixing the clutch cover.



- Lift the clutch cover using two screwdrivers as levers at the prearranged points paying special attention not to damage the seal surfaces and the gasket.
- Remove the gasket.



Disassembling the clutch

- Remove the pack of the clutch discs from the clutch base.



- Remove the clutch base of the secondary shaft.

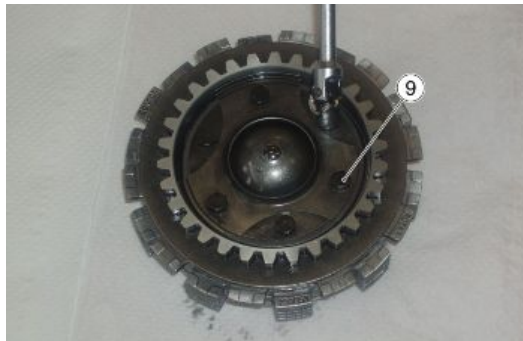


Checking the clutch plates

- Undo and remove the six M5 fixing screws (9) crosswise and remove the clutch.



THE UPPER DISC IS USED AS A SPRING AND MUST BE PUT BACK IN PLACE AT THE SAME UPPER POSITION.



- Check that the plain clutch discs (6) are not deformed; Max. distortion limit 0.15 mm (0.0059 in).
- Check that the coated clutch discs (5) are not worn; Max. wear limit, min. thickness 2.8 mm (0.110 in).



THE UPPER DISC IS USED AS A SPRING AND MUST BE PUT BACK IN PLACE AT THE SAME UPPER POSITION.

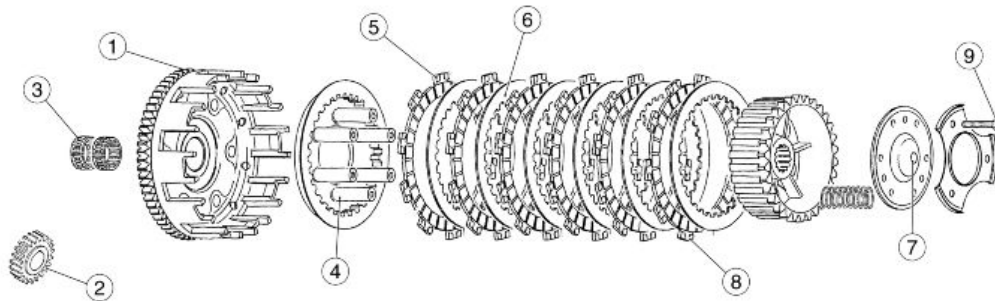
CHECK:

- Clutch bell (1) teeth sides and control gear (2) teeth sides.

- Cage and rollers of both needle bearings (3).
- Internal disc (4) tooting.
- Friction discs (5) for damage.
- Internal clutch discs (6) for damage, scores or wear
- The locking disc ball (7) must move freely and must not be worn.
- When refitting the clutch pay attention that the coated clutch disc placed at the upper end must be fitted in the shortest slots (8).
- Screw the clutch fixing screws (9) without tightening, proceed to the tightening only after the clutch has been fitted.

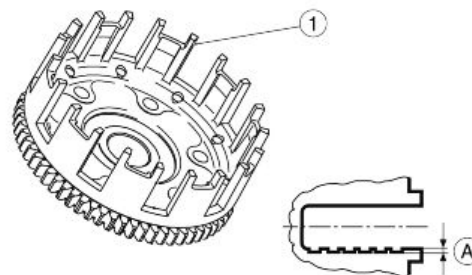


THE UPPER DISC IS USED AS A SPRING AND MUST BE PUT BACK IN PLACE AT THE SAME UPPER POSITION.



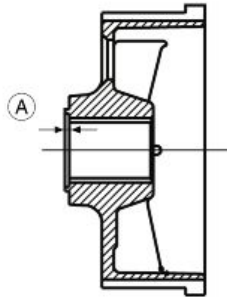
Checking the clutch housing

- 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, this may cause bell sliding problems. Replace the hub if its surface has exceeded the wear limit. Max. wear limit (A) 0.3 mm (0.012 in).



Assembling the clutch

- Check that the needle bearings are installed on the secondary shaft.
- Install the clutch base.



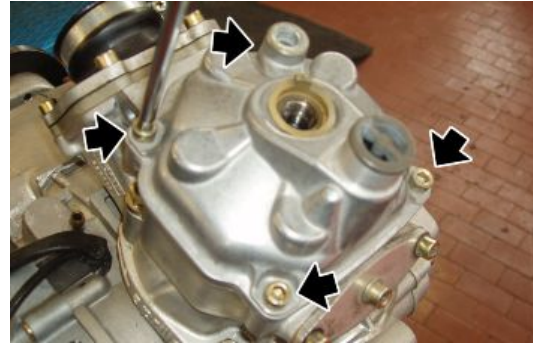
- Fit the disc pack pre-assembled on the clutch base which has been previously placed on the secondary shaft.



Head and timing

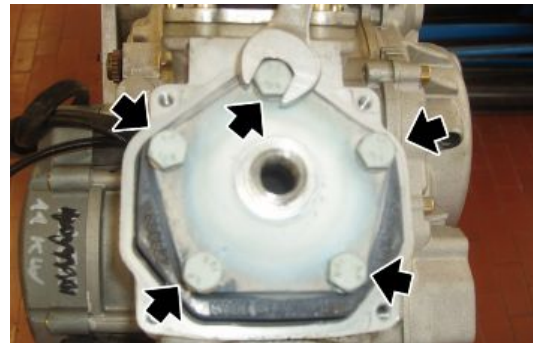
Removing the head cover

- Undo and remove the four Allen screws fixing the head cover.
- Remove the head cover.
- Remove both O-rings.



Removing the cylinder head

- Remove the head cover.
- Remove the five M8 Allen screws and the locking washers.
- Remove the combustion chamber insert together with the O-Ring.



See also

[Removing the head cover](#)

Cylinder head

Checking the cylinder head

HEAD

- Clean off any combustion deposits in the combustion chamber as well as scales on the surfaces in contact with the cooling water.
- Make sure the insert in the combustion chamber is not damaged and the spark plug thread is in good conditions.
- Make sure the seal surfaces are smooth and not damaged.



- The seal surface of the combustion chamber insert gets slightly conic starting from a 63 mm (2.48 in) diameter.

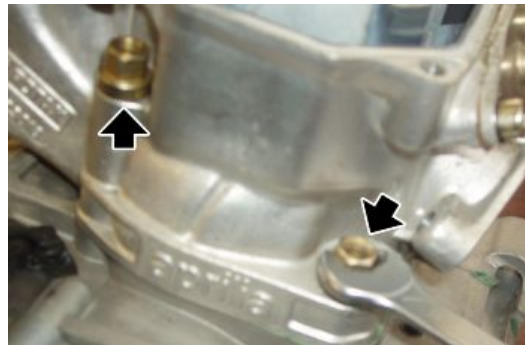
CYLINDER HEAD COVER

- Make sure the seal surfaces of the two O-rings are clean.
- Make sure the cylinder head cover is not damaged.

Cylinder-piston assembly

Removing the cylinder

- Remove the head.
- Working from both sides remove the four fixing screws and collect the washers.
- Take out the cylinder with utmost care trying not to damage the piston.
- Remove the gasket on the cylinder base.



See also

[Removing the cylinder head](#)

Disassembling the piston

- Remove the cylinder.
- Remove one of the two seeger rings of the pin using a suitable tool.

CAUTION

BEFORE TAKING OUT THE PIN SEEGER RING, COVER THE CRANKCASE OPENING WITH A CLOTH SO THAT THE RING DOES NOT FALL INTO THE CRANKCASE.

NOTE

IT IS NOT NECESSARY TO REMOVE BOTH PIN SEEGER RINGS.



- Tap the pin out with a suitable punch.

CAUTION

WHILE TAPPING OUT THE PIN, HOLD THE PISTON WITH ONE HAND SO THAT THE CONNECTING ROAD DOES NOT BEND.



- Remove the piston and collect the ball retainer.

CAUTION

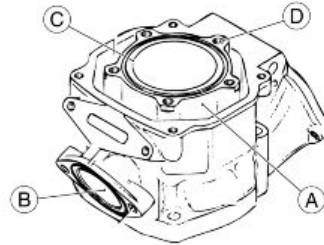
WHILE TAPPING OUT THE PIN, HOLD THE PISTON WITH ONE HAND SO THAT THE CONNECTING ROAD DOES NOT BEND.

**See also**

[Removing the cylinder](#)

Checking the cylinder

- Remove any scales formed by water in the cooling interspace on the cylinder (A).
- Clean off any combustion deposits from the outlet port (B).
- Clean and check the groove of the O-ring (C).
- Make sure all threads (D) are in proper conditions.
- Make sure all the seal surfaces are smooth and not damaged.
- Check the cylinder wall for wear.



Ovality: max. wear limit 0.02 mm (0.0008 in).

Checking the piston

- Check if there are marks of pinging/head knocking on the "squish" area and the piston centre.
- Make sure the piston is not damaged or shows signs of pressure or galling.



SLIGHT SCORINGS CAN BE ELIMINATED BY RUBBING THEM WITH EMERY CLOTH (GRAIN 600 - 800).

- Clean the piston crown and the bottom side as well as the piston ring grooves.



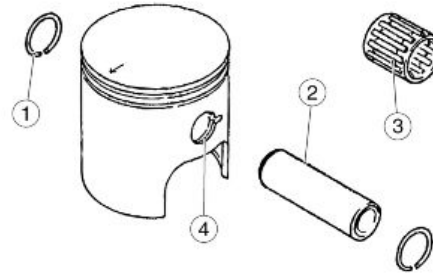
CLEAN THE RING GROOVES THOROUGHLY WITH A SCRAPER OR PREFERABLY WITH A PIECE OF AN OLD PISTON RING.

- Clearance between piston and wall = Cylinder diam. - Piston diam.; Nominal clearance 0.020 - 0.035 mm (0.00079 - 0.00138 in); Max. wear limit 0.080 mm (0.00315 in).



**IF THIS WEAR LIMIT IS EXCEEDED, USE AN OVERSIZED PISTON OR REPLACE BOTH THE CYLINDER AND THE PISTON.
WHEN THE PISTON IS REPLACED, ALSO REPLACE THE TWO SEEGER RINGS (1), THE PIN (2) AND THE BALL RETAINER (3).**

- The pin (2) should be adjusted to the piston without considerable clearance.
- Make sure the grooves of the seeger rings (4) are not worn.



- Measure the axial clearance of the rings with a thickness gauge; max. wear limit = 0.10 mm (0.0039 in).
- Distance between the ends of the piston ring. Nominal distance between the ends 0,05 - 0,20 mm (0.0019 - 0.0079 in) Max. wear limit 0.8 mm (0.032 in).



TO MEASURE THE DISTANCE BETWEEN THE ENDS OF A PISTON RING, PLACE THE RING IN THE CYLINDER USING THE PISTON AS A PUSHING TOOL AND CHECK THE DISTANCE WITH A THICKNESS GAUGE.

Fitting the piston

- Position the cylinder base gasket.



THE CRANKCASE GASKET SHOULD NOT PROTRUDE OR RECESSED COMPARED WITH THE CYLINDER BASE SURFACE SO AS TO AVOID COOLANT LEAKING INTO THE CRANKCASE.

- Place a seeger ring in the piston groove.



USE NEW SEEGER RINGS ONLY. MAKE SURE THE OPEN ENDS OF THE RINGS ARE FACING DOWNWARDS.

- Apply engine oil on the lubrication ducts for the main bearings of the crankshaft, on the head bearings and on the rod small ends.
- Make the ball retainer slide on the connecting rod.



- Place the piston on the connecting rod and insert the pin correctly in its position.



FOR SAFETY REASONS COVER THE CRANKCASE WITH A CLEAN CLOTH SO THAT THE SEEGER RINGS DO NOT FALL INTO THE CRANKCASE.



- Place the second seeger ring.



FOR SAFETY REASONS COVER THE CRANKCASE WITH A CLEAN CLOTH SO THAT THE SEEGER RINGS DO NOT FALL INTO THE CRANKCASE.



Installing the cylinder

- Use the wrench for piston rings.



MAKE SURE THE PISTON RINGS ARE FITTED WITH THEIR ENDS BESIDE THE FIXING PIN IN THE GROOVE. APPLY OIL FOR TWO-STROKE ENGINES TO THE CYLINDER WALL.

Specific tooling

AP0876973 Piston ring clamp 54 mm

- Place the cylinder.



ONLY ASSEMBLE TOGETHER PISTONS AND CYLINDERS BELONGING TO THE SAME TOLERANCE RANGES.



- Take out the wrench for piston rings.
- Working from both sides, fasten the cylinder crosswise with the four M8 nuts and relevant washers.



TIGHTEN THE FIXING NUTS AGAIN, WHEN THE ENGINE IS COLD, AFTER THE FIRST 500 KM (310 MI).



Selecting the cylinder

- The cylinder size code is stamped on the surface of the cylinder base.
- Read the cylinder diameter at TDC.
- The bottom section of the cylinder surface undergoes only slight wear. If the cylinder TDC area is very worn (it is no longer bright, rough and sharp), it can be inferred that the engine has been working fed on a fuel with too much sulphur.



Cylinder "A" Diam. 54.000 - 54.010 mm (2.12597 - 2.12637 in) Diam. 54.060 mm (2.12834 in)

Cylinder "AB" Diam. 54.010 - 54.015 mm (2.12637 - 2.12657 in) Diam. 54.065 mm (2.12853 in)

Cylinder "B" Diam. 54.015 - 54.025 mm (2.12657 - 2.12696 in) Diam. 54.075 mm (2.12893 in)

Selecting the piston

Measure the piston diameter with a micrometer, 11.5 mm from the piston bottom edge.

The piston nominal size is stamped on the piston crown.

Pistons are grouped in types according to their sizes:

- PISTON "A"; Piston diam. = 53.98 mm (2.1252 in), wear limit = 53.93 (2.1232 in), matching cylinder: "A" or "AB".
- PISTON "B"; Piston diam. = 53.99 mm (2.1256 in), wear limit = 53.93 (2.1236 in), matching cylinder: "B" or "AB".
- PISTON "Oversize 1"; Piston diam. = 54.00 mm (2.1260 in), wear limit = 53.93 (2.1240 in), matching cylinder: "B" or re-smoothed cylinder.
- PISTON "Oversize 2"; Piston diam. = 54.00 mm (2.1264 in), wear limit = 53.93 (2.1244 in), matching cylinder: re-smoothed cylinder.

Pistons are available with different types of piston rings which are identified with their part number:

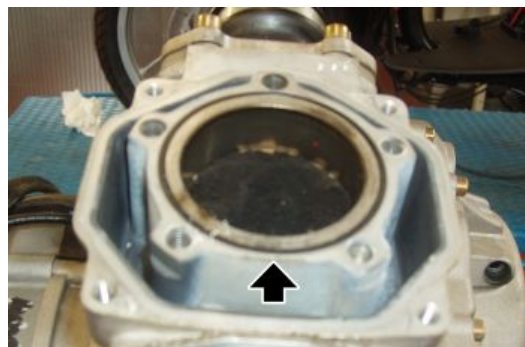
- PISTON (code 294583); chrome-plated PISTON RING (code 215670)
- PISTON (code 294587); chromium-ceramic PISTON RING (code 215720)
- PISTON (code 294589); chromium-ceramic PISTON RING (code 215820)
- PISTON (code 294588); chromium-ceramic PISTON RING (new type) (code 215825)



IF A PISTON SHOWS SIGNS OF EXCESSIVE WEAR AS IT HAS BEEN FUNCTIONING WITH LOW QUALITY FUEL (HIGH IN SULPHUR), USE CHROMIUM-CERAMIC RINGS AND CHANGE THE FUEL BRAND USED.

Installing the cylinder head

- Fit the O-ring in the cylinder groove.



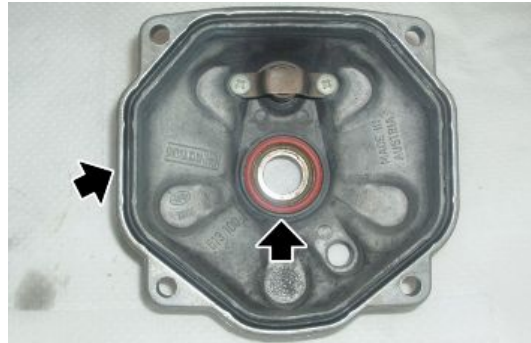
- Place the head.
- Tighten in a star sequence the five socket head screws fixing the head, together with the washers.



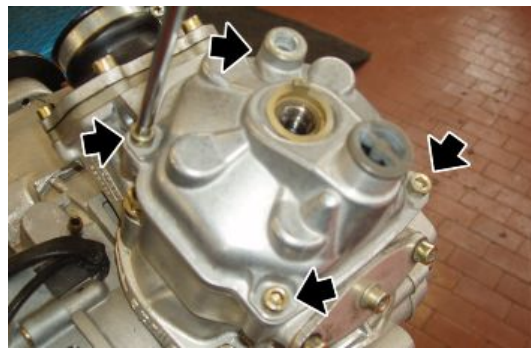
TIGHTEN THE FIXING NUTS AGAIN, WHEN THE ENGINE IS COLD, AFTER THE FIRST 500 KM (310 MI).

Installing the head cover

- Fit the O-rings.



- Fit the head cover already fitted with the thermostat.
- Tighten crosswise the four screws fixing the head cover.



Crankcase - crankshaft

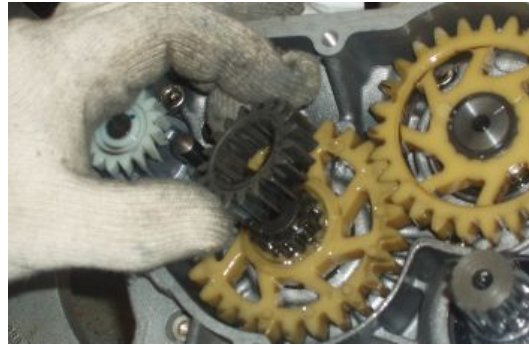
Splitting the crankcase halves

- Remove the snap ring of the crankshaft and that of the countershaft.





- Remove the control gear from the crankshaft.



- Remove the two countershaft gears with a suitable tool.



- Remove the gear shaft and collect the thrust washer.



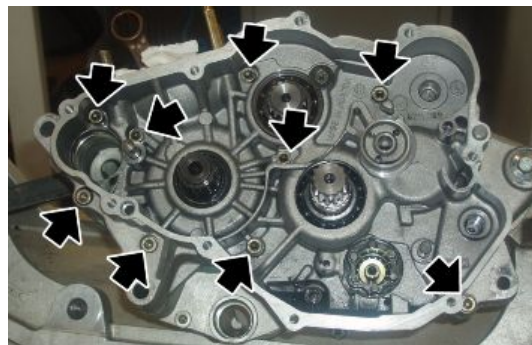
- Undo and remove the screw fixing the lever.



- Remove the lever and collect the spring, the spacer and the washer.



- Undo and remove the nine screws fixing the crankcase halves.



- Undo and remove the support screw.



- Place the extractor plate.
- Fit the three fixing screws.
- Adequately centre the plate with reference to the crankshaft.
- Tighten the three fixing screws.
- Screw the long threaded end of the extractor screw on the extractor plate until the crankcase half on the clutch side starts to get detached. Facilitate the detachment of the crankcase by tapping the secondary shaft with a rubber mallet, being careful that the crankcase half gets detached evenly. Be extremely careful not to tap the seal surfaces.
- Check the thrust washer of the main shaft. When detaching the crankcase, the washer may get glued inside the crankcase halves.
- Once the crankcase halves have been detached, remove the extracting tool before the crankcase halves are fully apart.



Specific tooling

AP0277455 Extractor plate to separate the crankcase halves

Removing the crankshaft

- Turn the crankcase halves on the support so that the high ignition is facing upwards.



- Place the extractor plate and fix it with four M6 fixing screws, but do not fully tighten them.
- Adequately centre the tool.
- Tighten the four M6 fixing screws.
- Insert the extractor screw with the long threaded end in the extractor plate.



Specific tooling

AP0277455 Extractor plate to separate the crankcase halves

- Thrust out the crankshaft operating on the extractor plate screw.



ACT WITH CAUTION WHEN EXTRACTING THE CRANKSHAFT AS IT IS HEAVY. SUPPORT IT ADEQUATELY SO AS TO AVOID DAMAGES.



Inspecting the crankcase halves

- Clean the crankcase halves, the ball bearings and all the bearing gaskets with a non-aggressive detergent.



DO NOT USE DEGREASERS OR SOLVENTS.

- Clean all the seal surfaces.



BE CAREFUL NOT TO DAMAGE THE SEAL SURFACES WHEN CLEANING THEM.

- Check that the crankcase halves show no signs of cracks or any kind of damage.
- Check that the oil flow in the main bearings is not obstructed; clear the passage with compressed air if required.
- Check that the pin of the contact screw moves smoothly and that the spring is pre-loaded. The round end of the pin should not be worn. Fix the contact screw with SILASTIC 732 RTV.
- When the water delivery intake is replaced, fix it with LOCTITE 648.
- Make sure that the oil seals are not worn or damaged.

- Check that all ball bearings move smoothly and are not worn. When replacing the ball bearings, check the negative allowance in the crankcase. Min. ALLOWANCE = 0.010 mm (0.00039 in).

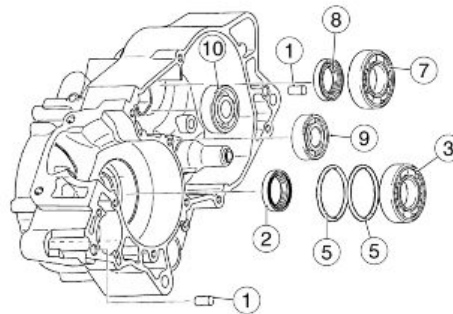


ONLY THE BALL BEARING SEATS OF THE DESMODROMIC DRUM ARE SLIDING.

- Make sure that all the seal surfaces are proper conditions and not damaged.
- Check that all threads are in proper conditions.

FLYWHEEL SIDE CRANKCASE HALF

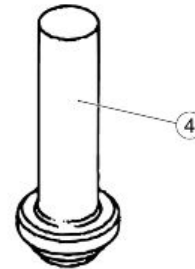
- Pre-warm the crankcase half at approx. 60 - 100 °C (140 - 212 °F).
- Remove both reference pins (1).



PLACE THE CRANKCASE HALF ON A SUITABLE LEVEL SURFACE TO AVOID DAMAGING THE SEAL SURFACES.

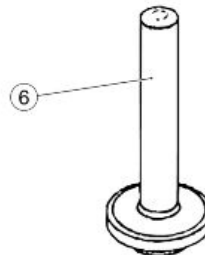
FLYWHEEL SIDE CRANKCASE HALF

- Take out the oil seal (2) and the ball bearing (3) of the crankshaft with a suitable punch (4).



BEHIND THE BALL BEARING THERE ARE SOME SHIM WASHERS FOR THE AXIAL CLEARANCE OF THE CRANKSHAFT (5). ALSO REPLACE THE OIL SEAL IF THE BALL BEARING IS REPLACED.

- Fit the oil seal of the crankshaft using a punch (6).



THE BALL BEARING OF THE CRANKSHAFT (3) IS FITTED TOGETHER WITH THE CRANKSHAFT AFTER CHECKING THE AXIAL CLEARANCE.

Specific tooling

AP0277875 Buffer for fitting oil seal 230425

- First remove the oil seal (8) and then take out the ball bearing (7) of the main shaft with a suitable punch.



DO NOT DAMAGE THE OIL SEAL HOUSING WHEN REMOVING THE SEAL.

- Insert the oil seal (8) of the main shaft from the inside to the outside using a punch for fitting.

Specific tooling

AP0276502 Buffer for fitting oil seal 930675

- Push the ball bearing (7) of the main shaft using a suitable punch.



THE CLOSED SIDE OF THE BALL RETAINER SHOULD BE FACING THE OIL SEAL.

- The ball bearings of the secondary shaft (9) and those of the countershaft (10) can be taken out using the specific extractor for bearings.



PLACE THE OLD CRANKCASE HALF GASKET UNDER THE EXTRACTOR PLATE TO AVOID DAMAGING THE SEAL SURFACE.

Specific tooling

AP0277455 Extractor plate to separate the crankcase halves

AP0276370 Split bushing

AP0276372 Split bushing

- The ball bearings of the secondary shaft and those of the countershaft can be taken out using the specific extractor for bearings.



THE REAR SIDE OF THE BALL BEARING RETAINER SHOULD BE FACING OUTWARDS.

- The needle bearing for the gears of the starter motor can be pulled using a specific extractor for bearings.

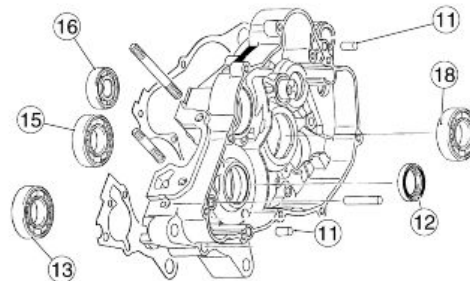
CLUTCH SIDE CRANKCASE HALF

- Pre-warm the crankcase half at 60 - 100 °C (140 - 212 °F).
- Remove both reference pins (11) for the clutch cover.



PLACE THE CRANKCASE HALF ON A SUITABLE LEVEL SURFACE TO AVOID DAMAGING THE SEAL SURFACES.

- Take out the oil seal (12) of the crankshaft.
- Take out the ball bearing (13) of the crankshaft using a suitable punch. Refit following the same procedure, with the closed side of the bearing retainer facing inwards.



- In order to refit the oil seal (12) of the crankshaft, push it into position from the outside to the inside with a punch for fitting (14).

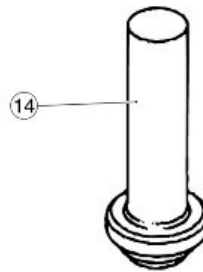


**THE OIL SEAL EDGE SHOULD BE FACING OUTWARDS.
THE OIL SEAL SHOULD NOT BE CONTACTING THE BALL BEARING.**

Specific tooling

AP0277875 Buffer for fitting oil seal 230425

- Remove the ball bearing (15) of the secondary shaft and that of the main shaft with a suitable punch. Refit following the same procedure.



THE CLOSED SIDE OF THE RETAINER OF THE BEARING ON THE SECONDARY SHAFT (15) SHOULD BE FACING OUTWARDS WHEREAS IT SHOULD BE FACING INWARDS FOR THE BEARING ON THE MAIN SHAFT (16).

- Remove the M5 countersunk screw (17) and the locking washer and take out the ball bearing (19) of the countershaft. Follow the same procedure to refit the bearing, fixing the M5 countersunk screw with LOCTITE 221.

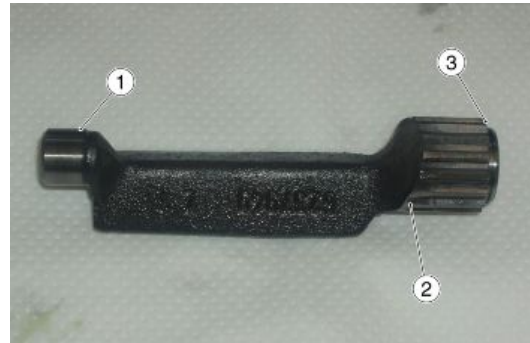


THE CLOSED SIDE OF THE BALL BEARING RETAINER SHOULD BE FACING OUTWARDS.

- Push both reference pins (11) in their positions on the clutch cover.

Checking the counter shaft

- Check countershaft for wear: (1) Fly-wheel side bearing seat, Minimum wear limit diameter: 14.94 mm (0.5882 in) ; (2) Clutch side bearing seat, Minimum wear limit diameter: 24.94 mm (0.9819 in) ;
- Make sure the groove of the snap ring (3) is not worn or damaged.
- Check the internal (4) and external (5) toothing (5) of the gears controlling the countershaft for wear.



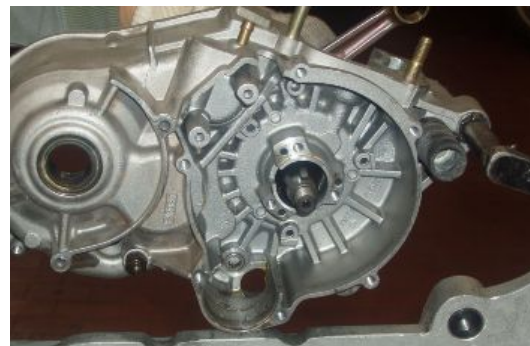
THE GEARS AND THE O-RINGS ON THE REAR SIDE OF THE COUNTERSHAFT GEAR ON THE CRANKSHAFT MUST BE REPLACED AFTER 15,000 KM.

Installing the crankshaft



UPON REFITTING, ALWAYS REPLACE THE GASKETS, THE SAFETY CIRCLIPS, THE O-RINGS AND THE OIL SEALS REMOVED.

- Pre-warm the crankcase at 90 - 100 ° C (194 - 212 °F)
- Fix the flywheel side crankcase half to the support and tighten the screw and the spacer.
- If necessary, fit the shim washers needed to the flywheel side crankcase half.
- Apply LOCTITE Anti-Seize on the bearing seats on the crankshaft.
- Heat up the engine crankcase.
- Fit the bearings in their seats in the crankcase.
- Assemble the crankshaft in the warm crankcase.





NEVER TAP THE CRANKSHAFT UNIT WITH A MALLET TO FIT IT INTO THE CRANKCASE.

Specific tooling

AP0277917 Brackets



IF THE CRANKCASE, THE CRANKSHAFT OF THE MAIN BEARING ON THE CRANKSHAFT HAVE BEEN REPLACED, THE AXIAL CLEARANCE OF THE SHAFT NEEDS TO BE READJUSTED.

- Position the extractor plate with two M6x16 Allen screws.
- Once the plate is positioned, tighten the screws. Do not use the two Allen screws used for positioning; use the holes marked with the number three.
- Fully insert the short threaded end of the extractor screw in the extractor plate.
- Insert the crankshaft in the tapping of the extractor screw by turning the shaft clockwise until it stops.
- Push the crankshaft fully into the crankcase by turning the extractor screw anticlockwise. While fitting the crankshaft, keep the connecting rod in the direction of the cylinder axis.
- Once the fitting is complete, undo and remove the screws fixing the extractor plate.
- Turn the extractor screw clockwise until the extractor plate starts moving up.
- Keep the extractor screw blocked and turn the crankshaft anticlockwise, thus removing the extractor plate unit from the engine.



Specific tooling

AP0277455 Extractor plate to separate the crankcase halves

Refitting the crankcase halves

- Unscrew and remove the fixing bolt and the washer from the support.
- Apply LOCTITE Anti-Seize to each bearing seat of the shafts.
- Fit the crankcase gasket on the flywheel-side crankcase half.
- Insert the O-ring in the crankshaft.



ALWAYS USE NEW GASKETS.

NOTE

THE CRANKCASE GASKET MAY BE GREASED TO KEEP IT IN POSITION. THE CRANKCASE GASKET MUST MATCH ALL THE HOLES ON THE CRANKCASE. OPERATE WITH CAUTION SO THAT THE COUPLING DOES NOT LEAK.

- Warm the clutch side crankcase half at 50 - 60 °C and couple it to the flywheel side crankcase half.



ALWAYS USE NEW GASKETS.

NOTE

THE CRANKCASE GASKET MAY BE GREASED TO KEEP IT IN POSITION. THE CRANKCASE GASKET MUST MATCH ALL THE HOLES ON THE CRANKCASE. OPERATE WITH CAUTION SO THAT THE COUPLING DOES NOT LEAK.

- Fix again the crankcase to the support by tightening the bolts.
- Screw both crankcase halves with new M6 Allen screws.



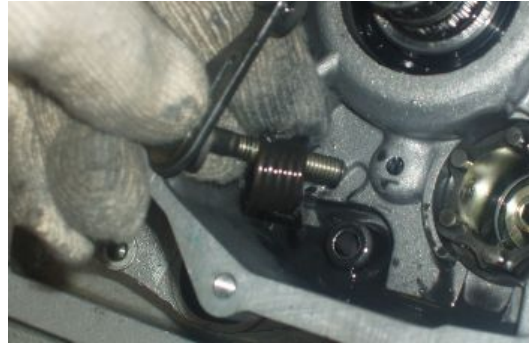
TIGHTEN THE SCREWS CROSSWISE STARTING GRADUALLY FROM THE CRANKCASE CENTRE. USE AN ADDITIONAL SEALING RING ON THE COOLANT DRAINAGE SCREW. USE A KNIFE TO CUT THE PROTRUDING SECTIONS OF THE CRANKCASE GASKETS ON THE CYLINDER CENTRING. OPERATE WITH CAUTION SO AS NOT TO DAMAGE THE SEAL SURFACE.

- Fix the spring, the ring, the lever and the washer with the M6 Allen screw.

NOTE

MAKE SURE THE LEVER MOVES SMOOTHLY.





- Insert the gear shaft pre-assembled in the crankcase.



SET THE GEAR TO IDLE AND MAKE SURE BOTH THE SECONDARY AND THE MAIN SHAFTS MOVE SMOOTHLY. ENGAGE 3rd GEAR AND TURN THE SHAFT TO LEFT AND RIGHT UNTIL THE LATCH TOUCHES THE RELEVANT PIN ON THE DESMODROMIC DRUM. THERE SHOULD BE THE SAME CLEARANCE ON BOTH SIDES. IF CLEARANCES DIFFER, FOLD THE TAB AS REQUIRED.

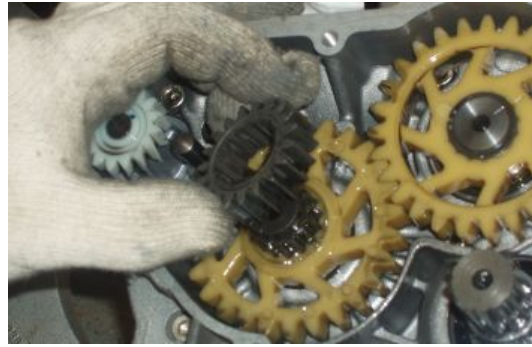


- Place the two countershaft control gears.



MAKE SURE ALL THE MARKS ARE ALIGNED.

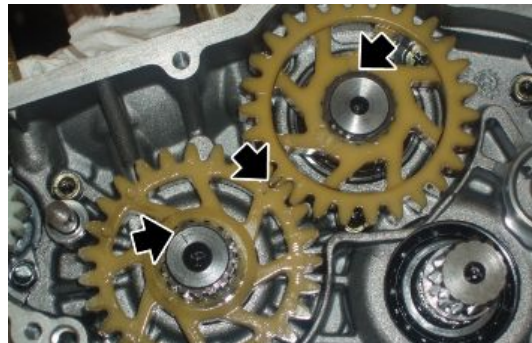
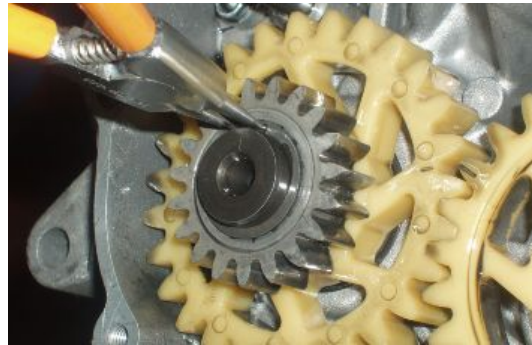
- Fit the crankshaft control gear.



- Fit the locking seeger ring of the crankshaft control and that of the counter-shaft control.



NEVER REUSE OLD SEEGER RINGS. WHEN USING A SEEGER RING, BE CAREFUL NOT TO OVER STRETCH IT. MAKE SURE THE RINGS ARE FULLY INSERTED IN THE GROOVES.

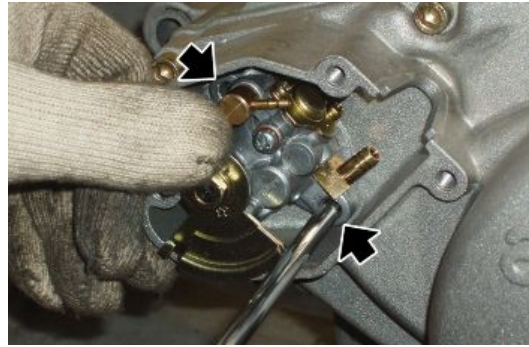


Lubrication

Oil pump

Removing

- Place the engine support so as to facilitate oil pump removal operations.
- Undo and remove the two screws fixing the oil pump.

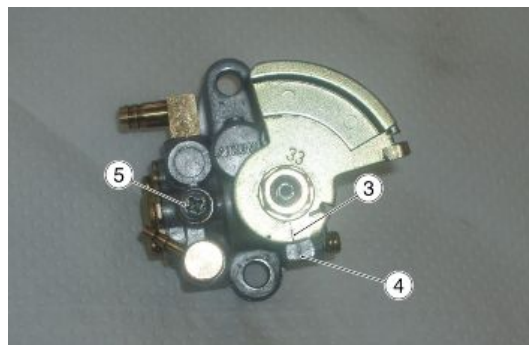
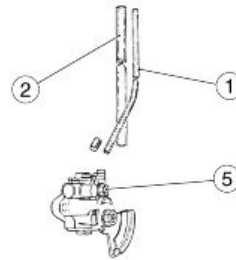


- Remove the oil pump and the O-ring underneath; collect the oil pipes and their guides.



Inspection

- Make sure the delivery (1) and intake (2) pipes do not leak or have pores at their connecting points. Replace if required.
- Clean the oil reservoir, the oil reservoir filter and the oil intake pipe.
- Always replace the oil pump when damaged or leaking.
- After installing the flexible pipe of the oil pump, adjust it so that when in idle position the marks on the pump lever (3) are aligned with the pump (4) seat.



BLEEDING

Purge the oil pump and its pipes:

- Before riding the bike for the first time;
- Each time the engine has been operating with an empty oil reservoir;
- When the lubrication system components have been replaced.

In order to bleed the oil pump and pipes, open the oil bleed screw (5).

Drain the oil until it is completely air-bubble free.

Once the oil is fully bubble free, close the bleed screw (5) again.

With the engine running, check the delivery pipe to see if the oil pump is working properly.

SAS valve

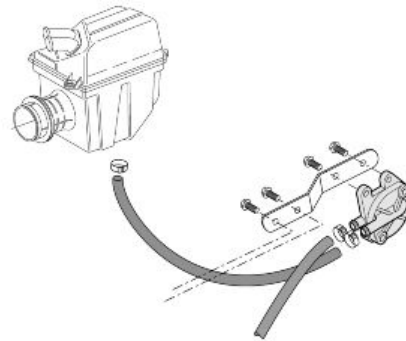
In order to control CO and HC emissions in vehicles without a lambda probe, exhaust fumes undergo a post-combustion process as ambient air (rich in O₂) is supplied to the flow of burned gases. This system is particularly necessary when the engine is idling and at the warming up stage as, given these conditions, the catalytic converter is not able to activate the post-combustion reaction freely.

Thanks to the secondary air system - SAS-, the post-combustion reaction is immediately activated outside the combustion chamber, reducing CO and HC first, and thanks to the heat produced, it accelerates the thermal adjustment of the catalytic converter. The SAS takes advantage of the pressure fluctuation at the exhaust.

At the low-pressure stages (when cleaning), the exhaust sucks in fresh air from the secondary air system; the unburned gases leaving the combustion chamber, warm and still active, continue and complete combustion when in a highly oxidising environment.

At the excess-pressure stages, the secondary air (reed) valve closes the circuit, thus blocking return flows.

The secondary air valve is fitted with a cut-off device, activated by a low-pressure intake on the inlet manifold. This device cuts off the circulation of secondary air when released to avoid excess lean-



ing of the exhaust fumes that might cause bursts in the muffler which may damage the exhaust valves and the catalytic converter.



WHEN ADJUSTING CO DEACTIVATE THE SECONDARY AIR SYSTEM AS THE EXHAUST FUMES DILUTED BY THE SYSTEM DISTORT THE READING OF THE CARBON MON-OXIDE PERCENTAGE. SEE THE CO ADJUSTMENT SECTION TO DEACTIVATE THE SAS.



AFTER ADJUSTING CO, REMEMBER TO RESTORE THE SECONDARY AIR SYSTEM AS THE VEHICLE WORKS REGULARLY ALSO WITH THE SYSTEM DEACTIVATED BUT, GIVEN THESE CONDITIONS, THE HARMFUL EMISSIONS INCREASE. LACK OF AIR CIRCULATION MAY ALSO RESULT IN OVERHEATING AND THIS IN TURN COULD DAMAGE THE SAS COUPLINGS AND PIPING.



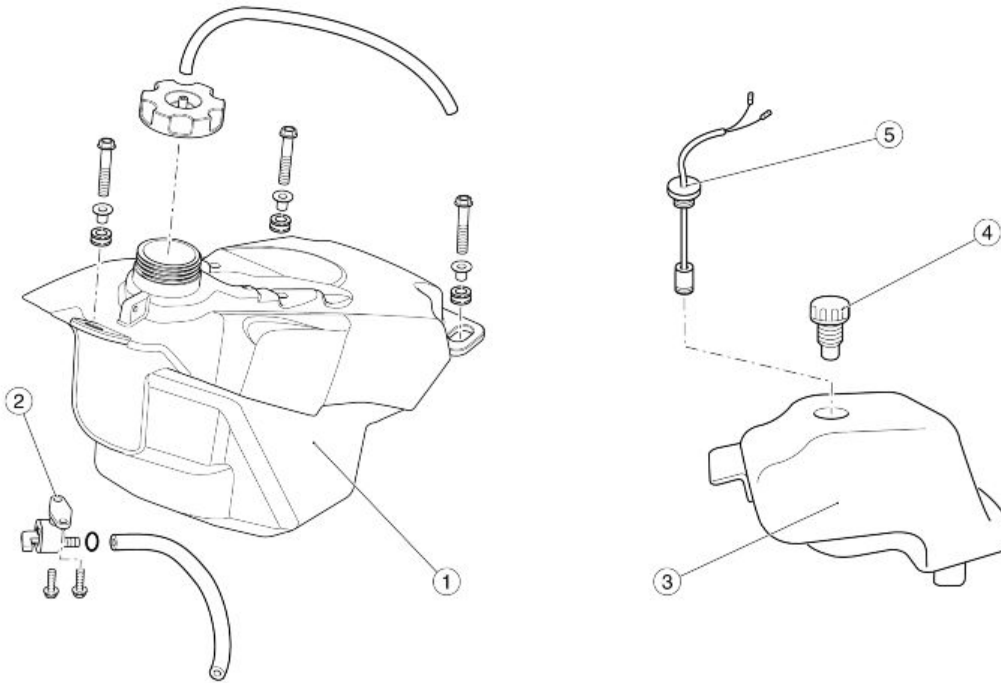
TO BLOCK AIR CIRCULATION USE SUITABLE SYSTEMS ONLY; USING PLUGS TO BLOCK THE AIR INTAKE IN THE FILTER HOUSING MAY DAMAGE THE SECONDARY AIR SYSTEM DUE TO OVERHEATING. IF YOU FORGET A PLUG FITTED, IT MAY GET INTO THE INTAKE DUCT WHEN THE VEHICLE IS USED, THUS BLOCKING THE THROTTLE VALVE AND RESULTING IN LOSS OF CONTROL OVER THE VEHICLE.

INDEX OF TOPICS

POWER SUPPLY

P SUPP

Circuit diagram

**Key:**

1. Fuel tank
2. Fuel cock
3. Oil mixer tank
4. Oil reservoir cap
5. Oil level gauge

Carburettor

Removing

- Remove the fuel tank.
- Undo the two screws.



- Remove the throttle valve but keep it connected to the throttle cable.



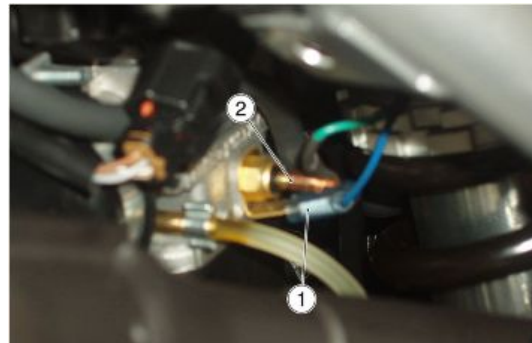
- Remove the screw.



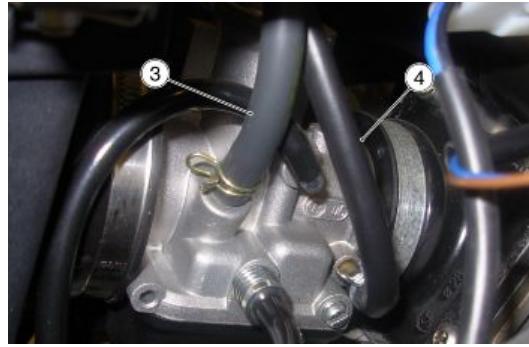
- Remove the cold start control but keep it connected to the cable.



- Disconnect connectors (1) and (2).



- Working from the right side, remove the fuel pump (3) vacuum hose and the fuel hose (4).



- Loosen the clamps.



- Remove the clamp and slide off the filter casing pipe.



- Choke the mix oil hose with a clamp and remove from the carburettor.



- Rotate carburettor to the left.



- Remove the carburettor.
- To refit, follow the procedure described above but in reverse order.
- Be very careful about the correct position of the fuel pipes.

CAUTION

IF FUEL HOSES ARE INCORRECTLY POSITIONED, THIS MAY RESULT IN CRUSHED HOSES AND THEREFORE IRREGULAR FUNCTIONING AND / OR SERIOUS ENGINE DAMAGE.

Disassembling

Removing the carburettor

- Remove the two screws and slide off the throttle valve / throttle valve position sensor unit.



-
- Remove the heater.



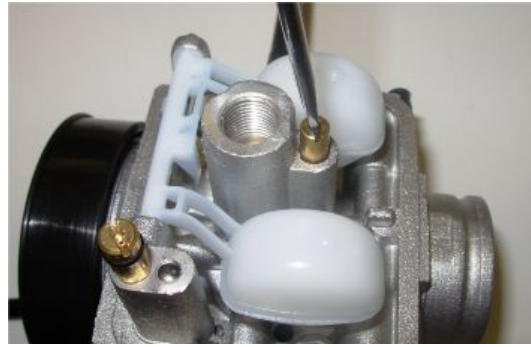
-
- Remove the float chamber cap.



-
- Remove the maximum nozzle cap.



- Remove the minimum nozzle.



- Remove the start-up nozzle.



- Remove the throttle valve position sensor.



Carburettor refitting

- Make sure that the TPS gear (5) is fully turned clockwise; the control arm (6) should be at the fully extended position.



- Assemble the sensor with the fixing eyelet to the left compared with the correct fixing position.



- Turn the sensor clockwise until the eyelets are aligned and fix the position with the corresponding screw.

CAUTION

ONCE THIS OPERATION IS FINISHED, THE MAXIMUM AND MINIMUM POSITIONS OF THE THROTTLE VALVE MUST BE OBTAINED BY MEANS OF THE RELEVANT FUNCTION OF THE AXONE DIAGNOSIS TOOL.



Ignition

Axone use for ignition system

ignition

CAUTION

UNLESS OTHERWISE SPECIFIED, THE VALUES INDICATED ARE ONLY EXAMPLES.

ISO screen page

ISO DISPLAY

Specification	Desc./Quantity
Mapping	SX125_28
Map reading active	1 / 2 indicates whether the control unit is standard (1) or it has been modified for racing on tracks (2)
Hardware code	APG01
Serial number	12
Central unit hardware version	B00
Software version	APG1_210
Type-approval Code	AC29
Engine type	RS125
Reprogramming or production date	22 / 11 / 2006

Engine parameter screen page

ENGINE PARAMETER READING

Specification	Desc./Quantity
Engine revs	rpm, measured with crankshaft rpm detection sensor
Throttle valve opening	%, indication ranges from 0 to 100 %
Air temperature	23 °C, if signal is lost, the control unit set the value to 50 °C
Battery voltage	12 V
Ignition advance	12 °, ignition advance with respect to TDC
Warm - up time (from KEY ON)	s
Vehicle speed	0 km / h

Devices activation screen page

DEVICE ACTIVATION

Specification	Desc./Quantity
Deleting errors	By pressing the 'enter' button, the stored errors (MEM) become part of the historical data (STO). The next time Axone is connected to the ECU, the errors in the historical record (STO) will no longer be displayed
Coil	The coil is activated five times
Outlet valve	The solenoid valve is activated five times
Intake air solenoid valve	The solenoid valve is activated five times
Rpm indicator	The needle should be at 10000 rpm for two seconds
Speed gauge	Activates the speedometer at 100 km / h

Errors display screen page

CAUTION

IF THERE IS ANY ENGINE FAILURE, THE CONTROL UNIT DOES NOT TURN ON THE EFI WARNING LIGHT.

THE EFI WARNING LIGHT IS INACTIVE IN THIS VEHICLE.

THE OPERATOR WHO ENCOUNTERS A FAILURE IN THE ENGINE MUST CARRY OUT ALL THE PRESCRIBED AXONE CHECKS WITH THE AIM OF ENSURING THE ENGINE HAS BEEN THOROUGHLY CHECKED.

ERRORS DISPLAY

Specification	Desc./Quantity
EEPROM : checksum error. Signal not valid	Control unit internal error
Data zone EEPROM not valid : default values reset	Control unit internal error
Crankshaft position sensor Circuit open	An interruption has been detected between pin 9 and pin 3 of the small connector in the control unit
Crankshaft position sensor Shorted to ground	Continuity has been detected between the ground connection and pin 9
Crankshaft position sensor Signal not valid	Abnormal voltage has been detected due to an electric resistance not foreseen in the circuit connecting to the revolution sensor: between pin 9 and pin 3 of the small connector of the control unit
Ignition capacitor Shorted to ground	Error detected in the capacitor charging system in the control unit: check that the power supply and ground connection of the control unit are adequate
Ignition coil (circuit open)	Lack of ground connection to pin 14 has been detected
No ignition	Error detected in the capacitor charging system in the control unit: check that the power supply and ground connection of the control unit are adequate
No ignition	Error detected in the capacitor charging system in the control unit: check that the power supply and ground connection of the control unit are adequate
Incorrect crankshaft signal. Signal not valid	Abnormal error detected by the control unit

Specification	Desc./Quantity
Supply voltage tool low. Below the minimum level	Voltage below 10 V, longer than 10 seconds has been detected at pin 3 of the large connector in the control unit
Supply voltage tool high. Over the maximum level	Voltage over 15.5 V, longer than 20 seconds has been detected at pin 3 of the large connector in the control unit
Throttle position sensor shorted to positive	Voltage about 5 V has been detected at pin 13 (throttle valve position signal input)
Throttle position sensor Circuit open or short circuit to ground	Voltage about 0 V has been detected at pin 13 (throttle position signal input)
Throttle position sensor Out of range	Voltage below the value stored by the throttle self-learning - minimum position or over that stored by the throttle self-learning - maximum position has been detected at pin 13 (throttle position signal input)
Outlet solenoid valve check shorted to positive	High voltage has been detected at pin 1. If Map 1 is active, the error is deactivated
Outlet solenoid valve check. Open circuit or short circuit to ground	Too low or no voltage has been detected at pin 1. If Map 1 is active, the error is deactivated
Intake manifold valve shorted to positive	High voltage has been detected at pin 7 (detected only at engine start-up). If Map 2 is active, the error is deactivated
Intake manifold valve. Open circuit or shorted to voltage	Too low or no voltage has been detected at pin 7. If Map 2 is active, the error is deactivated
Air temperature sensor. Short circuit to ground	Too low or no voltage has been detected at pin 4. If Map 2 is active, the error is deactivated. Whether Map 1 or 2 is active, a recovery value of 50 °C is set
Air temperature sensor. Open circuit or short circuit to ground	Excessive voltage has been detected at pin 4. If Map 2 is active, the error is deactivated Whether Map 1 or 2 is active, a recovery value of 50 °C is set

Adjustable parameters screen page

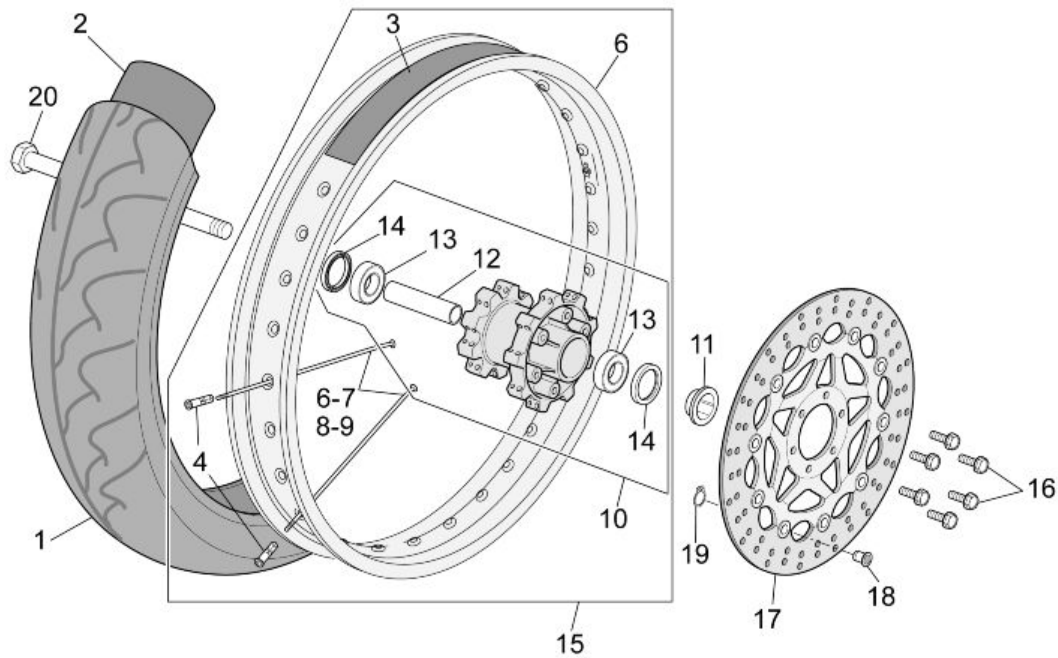
ADJUSTABLE PARAMETERS

Specification	Desc./Quantity
Throttle self-learning, min. position	It enables storing the reference value of the throttle when it is fully in: if the voltage value detected is abnormal or variable, it is not stored and the Axone signals this irregular situation.
Throttle self-learning, max. position	It enables storing the reference value of the throttle when it is at maximum opening position by fully twisting the throttle grip: if the voltage value detected is abnormal or variable, it is not stored and the Axone signals this irregular situation

INDEX OF TOPICS

SSUSPENSIONS

SUSP

Front
**Key:**

1. Tyre
2. Air chamber
3. Wheel flap
4. Nipples
5. Rim
6. Front wheel radius
7. Front wheel radius
8. Front wheel radius
9. Front wheel radius
10. Hub
11. Wheel spacer
12. Bearings spacer
13. Hub bearing
14. Oil seal
15. Bare front wheel
16. TSPEI screw
17. Brake disc
18. Magnet

- 19. Seeger ring
- 20. Front hub pin

Removing the front wheel

CAUTION

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

- Place the vehicle on its OPTIONAL rear service stand.

CAUTION

MAKE SURE THE VEHICLE IS STABLE.

HELPED BY ANOTHER OPERATOR, KEEP THE HANDLEBAR STEADY AND ENGAGED SO THAT THE STEERING IS LOCKED.

- Undo and remove both front calliper fixing screws.
- Remove the brake calliper.

CAUTION

DO NOT ACTUATE THE FRONT BRAKE LEVER AFTER REMOVING THE WHEEL. OTHERWISE, THE CALLIPER PLUNGERS COULD GO OUT OF THEIR SEAT, RESULTING IN BRAKE FLUID LEAKAGE.



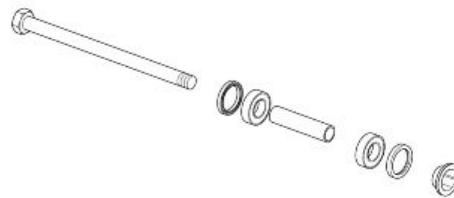
- Working from the right side, loosen both screws.



- Working from the right side, unscrew and remove the cover.



- Place a stand under the tyre to keep the wheel in position once it is free.
- Slide off the wheel pin from the left side.



- Collect the spacer from the left side.
- Remove the wheel by sliding it off from the front.

Checking the front wheel

CAUTION

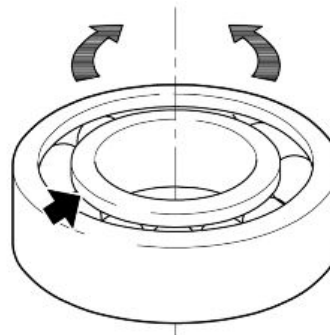
CHECK THAT ALL THE PARTS ARE IN GOOD CONDITIONS, ESPECIALLY THOSE MENTIONED BELOW.

BEARINGS

Turn the internal ring manually; it must rotate smoothly, continuously and silently.

There must be no axial clearance.

The bearings presenting these problems must be replaced.



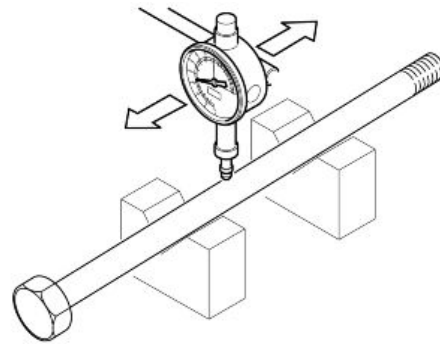
GASKETS

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

WHEEL PIN

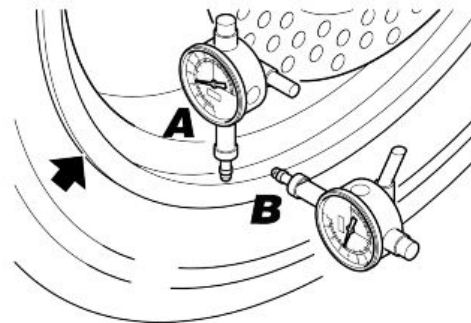
Using a dial gauge, check the wheel pin eccentricity. If the eccentricity exceeds the limit value, replace the pin.

Maximum eccentricity: 0.25 mm (0.0098 in)

**RIM**

Using a dial gauge, check that the radial (A) and the axial (B) eccentricities of the rim do not exceed the limit value. An excessive eccentricity is usually caused by worn or damaged bearings. Replace the rim if, after replacing the bearings, the value is not within the specified limit.

Maximum radial and axial eccentricity: 2 mm.

**TYRE**

Check the tyre conditions.

Installing the front wheel

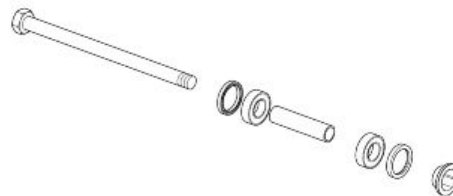
- Spread a thin layer of lubricating grease all along the wheel pin.

CAUTION

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

CAUTION

POSITION THE SPACER WITH THE LARGER DIAMETER SIDE FACING THE FORK RIGHT STEM.



- Fit the spacer in its position on the wheel.
- Fit the wheel between the fork stems, on the support.



RISK OF INJURY. BE CAREFUL NOT TO INTRODUCE YOUR FINGERS TO ALIGN THE HOLES.

- Move the wheel until the central hole is aligned with the holes on the wheel.
- Working from the left side, insert the wheel bolt until it stops.



- Finger tighten the cap.
- Lock the wheel pin so that it does not rotate.
- Screw off the cap.



OPERATE WITH CAUTION SO AS NOT TO DAMAGE THE BRAKE PADS.

- Slide the brake calliper on the disc and position it with the fixing holes aligned with the holes on the support.

CAUTION

UPON REFITTING THE CALLIPER, REPLACE ITS FIXING SCREWS WITH NEW SCREWS OF THE SAME TYPE.

- Screw and tighten both calliper fixing screws.
- Operating the front brake lever, press the handlebar repeatedly to send the fork fully down. In this way the fork stems will be correctly adjusted.



- Tighten the two screws of the wheel pin clamp.



- Remove the (OPTIONAL) front service stand.
- Remove the (OPTIONAL) rear service stand.

CAUTION

AFTER REFITTING, OPERATE THE FRONT BRAKE LEVER REPEATEDLY AND CHECK THAT THE BRAKING SYSTEM OPERATES CORRECTLY.

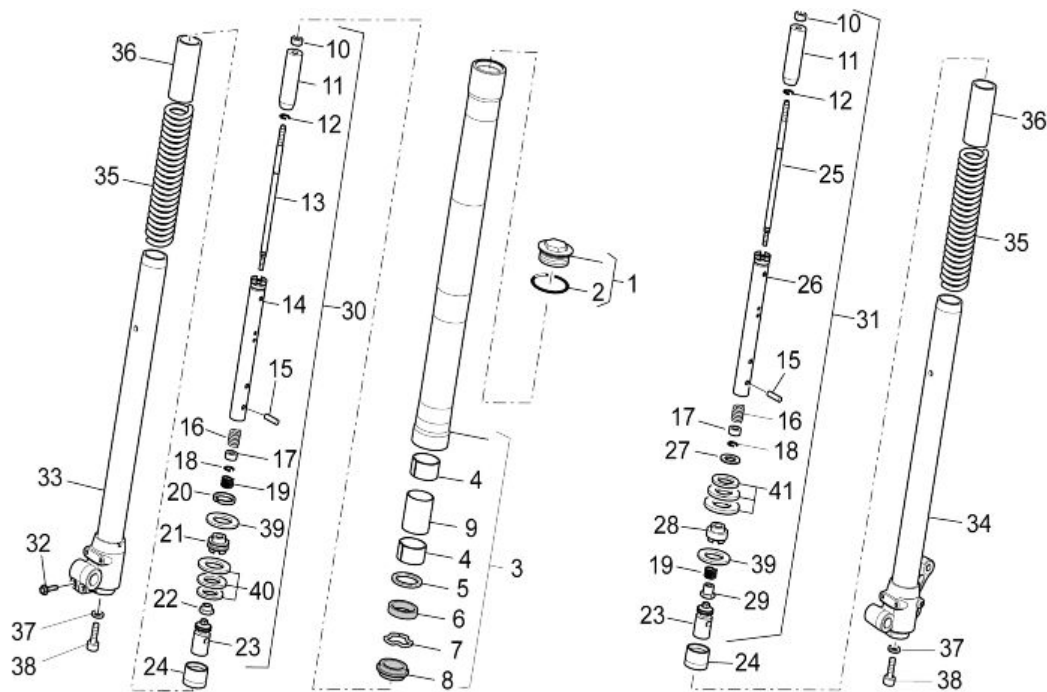
CAUTION

AFTER REFITTING, PULL THE BRAKE LEVER REPEATEDLY AND CHECK THAT THE BRAKING SYSTEM OPERATES CORRECTLY.

- Check that the wheel is centred.

Front fork

Diagram

**Key:**

1. Complete cap
2. O-ring
3. Complete sleeve
4. Sliding bushing
5. Guide bushing cap
6. Sealing ring
7. Snap ring

8. Dust guard with clip
9. Spacer
10. Nut
11. Spring guide
12. Snap ring
13. Right pumping member rod
14. Right pumping member
15. Pin
16. Spring
17. Cap
18. Ring
19. Spring
20. Piston ring
21. Piston
22. Nut
23. Valve
24. Sliding bushing
25. Left pumping member rod
26. Left pumping member
27. Cap
28. Left piston
29. Nut
30. Right pumping member assembly
31. Left pumping member assembly
32. TE flanged screw
33. Stem + right wheel holder
34. Stem + left wheel holder
35. Spring
36. Preloading pipe
37. Sealing washer
38. TCE screw
39. Thickness
40. Thickness
41. Thickness

Removing the fork legs

CAUTION

POSITION THE OPTIONAL FRONT SERVICE STAND HIGH

CAUTION

SUSP - 146

THE FOLLOWING OPERATIONS REFER TO A SINGLE STEM BUT APPLY TO BOTH.

- Undo both locking screws of the lock clamp placed on the brake pipe on left stem protection.



- Release the brake pipe from the left stem protection.

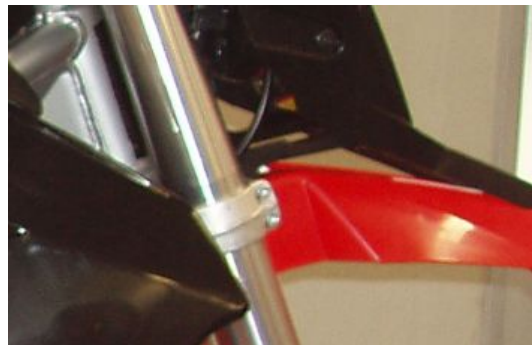
-
- Undo both stem protection fixing screws.



- Remove the stem protection.
 - Remove the front wheel.
-
- Loosen the screw on the upper plate.



-
- Loosen both lower plate screws.



- Slide off the stem downwards, being careful not to damage its surface.

Draining oil

CAUTION

THE FOLLOWING OPERATIONS REFER TO A SINGLE WHEEL HOLDER STEM / SLEEVE BUT APPLY TO BOTH.

- Remove the wheel holder stem / sleeve unit.
- Clean the wheel holder stem / sleeve unit thoroughly.

CAUTION

BEFORE CARRYING OUT THE OPERATIONS BELOW, GET A +440 cm³ (26.85 cu.in) CONTAINER TO COLLECT THE OIL.

- Place the sleeve in a vice fitted with protection shoes.

CAUTION

THE WHEEL HOLDER STEM SLEEVE UNIT CONTAINS OIL. DO NOT TURN IT OVER OR TILT IT TOO MUCH WHEN REMOVING IT.



- Unscrew and remove the upper cap of the shock absorber rod.



- With an open wrench keep the lock nut firm on the shock absorber rod and unlock the upper cap.



- Remove the spring preloading pipe.



- Remove the spring.



- Drain the oil off the stem being careful not to slide the stem sleeve.



- For easy drainage of the oil inside the cartridge, pump it several times with the stem in vertical position.



- Drain again all the oil inside the stem.



Disassembling the fork

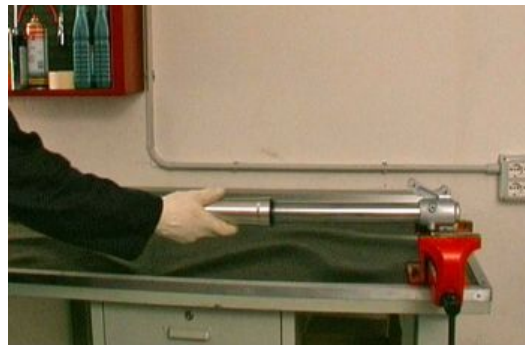
CAUTION

THE FOLLOWING OPERATIONS REFER TO A SINGLE WHEEL HOLDER STEM / SLEEVE BUT APPLY TO BOTH.

- Screw the stem, on the foot side, with a vice fitted with protection jaws to avoid damaging it.
- Loosen the fixing screw and remove the guide of the stem cover.



- Hold the sleeve and firmly slide it off the stem.



- Screw the sleeve in a vice fitted with protection jaws so as to avoid damages.
- With a plain slot screwdriver remove the dust guard, being careful not to damage the sleeve rim.
- The dust guards removed can not be reused.



- Remove the snap ring inside the sleeve using a thin screwdriver.



- With a thick plain slot screwdriver remove the sealing ring from its seat carefully and operate at several points in one third of its circumference without damaging the oil seal and the sleeve rim.



- To take out the sliding bushings and the plastic spacer hit the sleeve end hard on a wooden surface, keeping the sleeve perpendicular to the surface.



- To take out the sliding bushings and the plastic spacer hit the sleeve end hard on a wooden surface, keeping the sleeve perpendicular to the surface.





- Screw the stem, on the foot side, with a vice fitted with protection shoes that avoid damaging it.
- With the cartridge rod firmly in place, unscrew and remove the bottom screw and its gasket.



- Remove the cartridge from the fork stem and properly clean all the components with a suitable detergent.



Checking the components

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 are in 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;
- dust guard;
- O-ring gasket on the cap.

Reassembling the fork

- Check the components.

CAUTION

**BE EXTREMELY CAREFUL IN ORDER THAT NO FOREIGN BODIES GET INTO THE SLEEVE OR THE WHEEL HOLDER STEM.
NEVER REUSE OIL.**

NOTE

SPREAD A THIN LAYER OF FORK OIL ON GASKETS AND BUSHINGS BEFORE REFITTING THEM.

- Lock the sleeve on a vice in a horizontal position.
- Tighten the bottom screw.

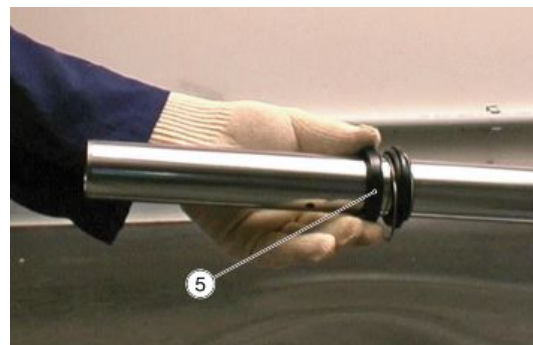
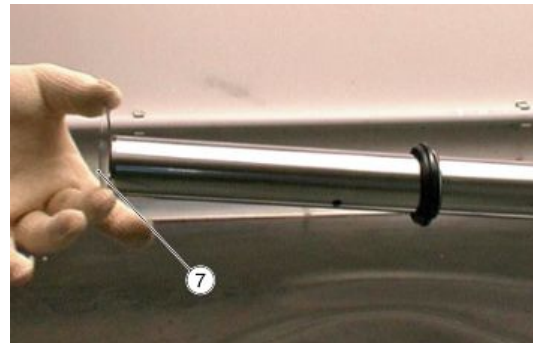
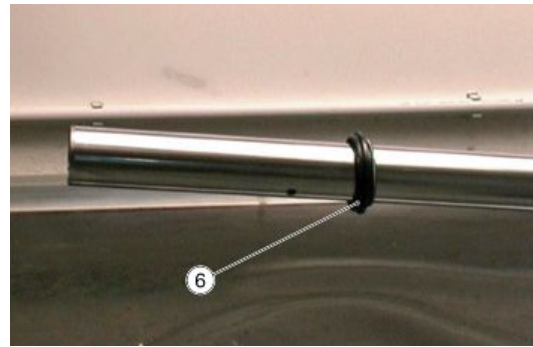




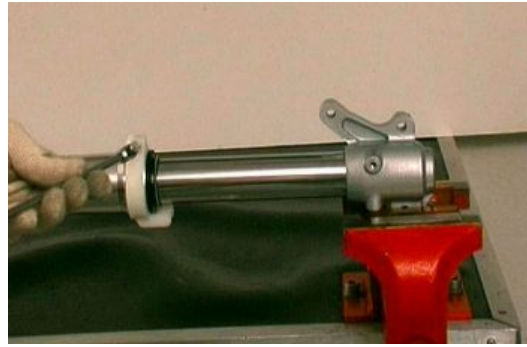
- Insert the sliding bushing (1), use the spacer (2) to push it into the sleeve.
- Then fit another sliding bushing (3); if required, use a buffer of suitable diameter to push in into the sleeve.



- Lubricate the dust guard (6) and the oil seal (5) with a layer of oil .
- Insert on the fork stem: the dust guard (6), the snap ring (7), the oil seal (5) and the guide bushing cap (4).
- Pay attention to the direction in which the dust guard (6) and the oil seal (5) should be placed.

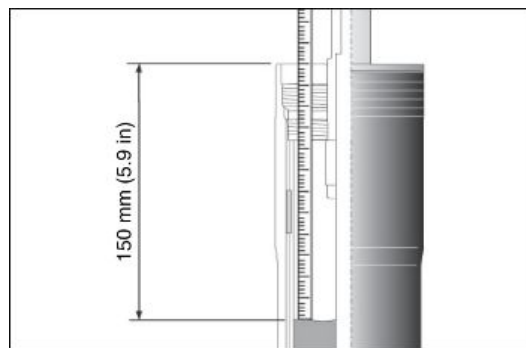


- Place the stem cover guide in the sleeve and tighten the fixing screw.



Filling oil

- Place the sleeve upright in a vice fitted with protection jaws.
- Compress the sleeve in the stem. Place a support under the stem in order to leave it compressed.
- Pour part of the fork oil into the sleeve.
- Wait some minutes until the oil fills all the ducts.
- Pour the remaining oil.
- Pump out oil a few times.
- Measure the air gap between the oil level and the rim.



THE SLEEVE MUST BE PERFECTLY UPRIGHT IN ORDER TO MEASURE THE CORRECT OIL LEVEL. THE OIL LEVEL MUST BE THE SAME IN BOTH STEMS.

Characteristic

Oil level (from sleeve rim, without the spring and with stem at the end of the stroke)

150 mm (5.9 in)

- Slowly move the cartridge upwards and downwards rod so that it is filled with oil.
- Do so until, pulling it upwards, there is a noticeable uniform resistance throughout the whole stroke.
- Tighten the lock nut until it reaches the pumping member stem.



- Take the pumping member rod fully out of the sleeve cartridge.
- Insert the spring keeping the pumping member rod in place.
- Insert an open key under the lock nut to support the pumping member rod and the spring.
- Screw the spring until it is fully inserted into the sleeve end.



- Place the spring preloading pipe.



- Screw the upper locking cap on the pumping member stem.



- Screw the fork upper cap up to the pumping member stem.
- Place the upper cap on the sleeve taking care not to damage the O-ring.
- Tighten the upper cap to the prescribed torque.



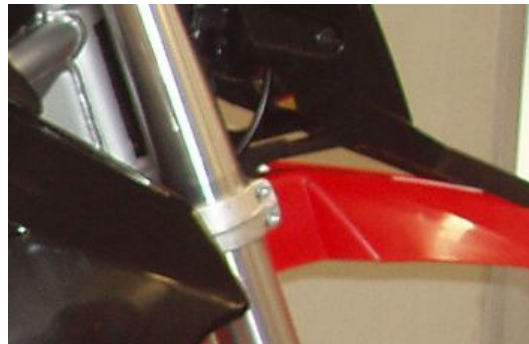


Installing the fork legs

- 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.



- Tighten the screw that locks the lower plate to the sleeve.



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



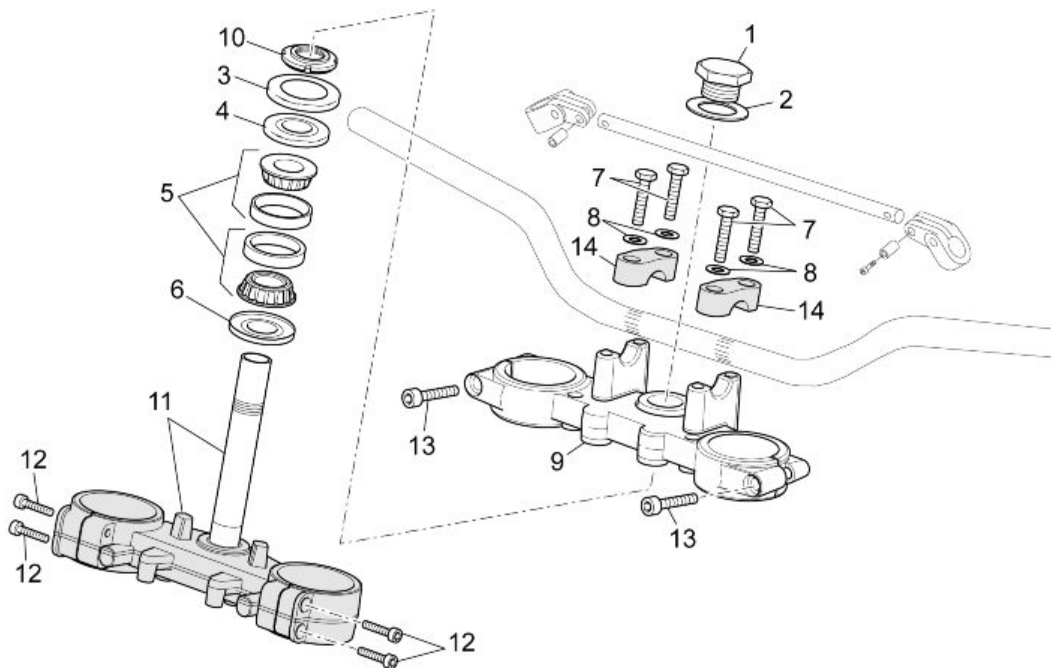
- Slide off the wheel pin.
- Mount the front wheel.



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



Steering bearing



Key:

1. Headstock cap
2. Washer

3. Dust guard
4. Dust guard support ring
5. Roller bearing
6. Sealing ring
7. TE screw
8. Washer
9. Fork upper plate
10. Fork lower ring nut
11. Base with headstock
12. TCE screw
13. Screw
14. U-bolt

Adjusting play

- Unscrew and remove the four screws and collect the washers.
- Remove both U-bolts.



- Undo and remove both upper plate screws.



- Tap the bottom side to push upwards the upper plate together with handlebar and ignition switch / steering lock.
- Move the upper plate forwards, place a piece of cloth to avoid damaging the instrument panel.

- Undo and remove the screw.



- Operating on both sides, loosen the screw.



- Fully loosen the ring nut with a crescent type wrench. Afterwards, tighten the ring nut again to the prescribed torque, restoring the clearance.



- Reposition the upper plate and adjust it adequately.
- Lubricate the thread and the bushing base in contact with the oil.
- Tighten the upper bushing.
- Loosen the bushing and tighten it again to the prescribed torque.



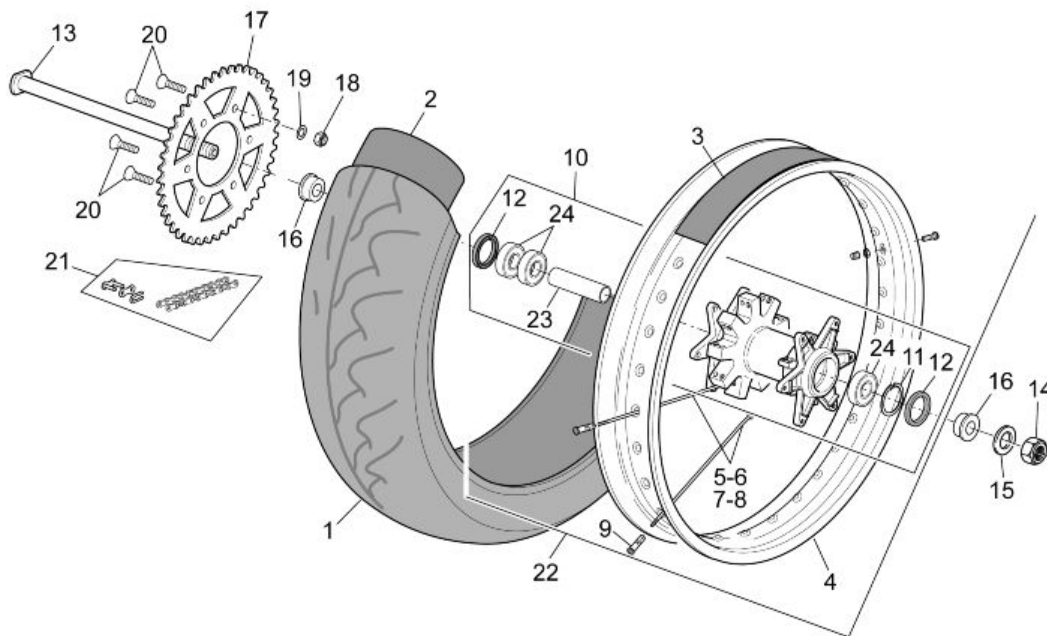
- Screw and tighten the two screws.

CAUTION

ONCE THE OPERATION IS FINISHED, MAKE SURE THE HANDLEBAR ROTATES SMOOTHLY TO AVOID DAMAGING THE SLIDING GUIDES AND COMPROMISING VEHICLE HANDLING.



Rear



Key:

1. Rear tyre
2. Air chamber
3. Wheel flap
4. Rear wheel rim
5. Wheel radius
6. Wheel radius
7. Wheel radius
8. Wheel radius
9. Nipples
10. Rear hub

11. Seeger ring
12. Oil seal
13. Rear wheel pin
14. Low self-locking nut
15. Washer
16. Rear wheel spacer
17. Crown
18. Low self-locking nut
19. Curved spring washer
20. TSPEI screw
21. Chain with master link
22. Bare rear wheel
23. Bearings spacer
24. Hub bearing

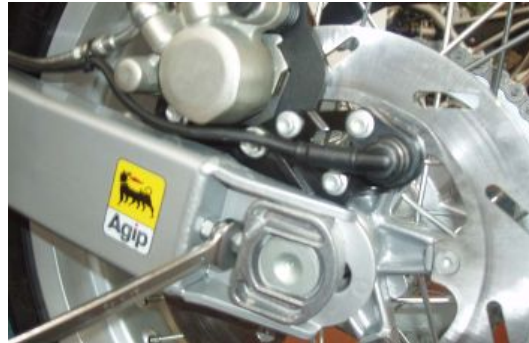
Removing the rear wheel

- Rest the vehicle on the specific OPTIONAL stands.
- Unscrew and remove the nut and retrieve the washer.





- Working in both sides, loosen the set screw.
- Slide off the chain.



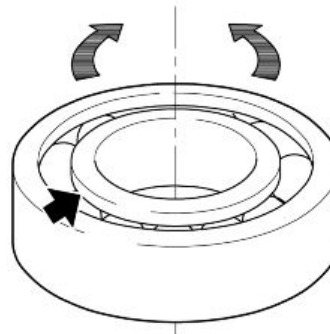
- Collect the chain tensioner
- Use a rubber hammer to slide off the wheel bolt from the vehicle left side; collect the centring shim washers and slide off the wheel backwards.



Checking the rear wheel

CAUTION

CHECK THAT ALL THE PARTS ARE IN GOOD CONDITIONS, ESPECIALLY THOSE MENTIONED BELOW. BEARINGS, GASKETS, WHEEL PIN, RIM.



ANTI-VIBRATION BUFFER

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.

CROWN GEAR

Check the toothing 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

- Position the rear wheel.
- Position the chain.
- Working on both sides, insert the centring shim washers.
- Working from the left side, insert the wheel axle.

CAUTION

DO NOT INVERT THE RIGHT AND THE LEFT CHAIN TENSIONERS.

- Working on the right side, position the washer and screw but do not tighten the wheel axle fixing nut.
- Adjust the chain tension operating the set screws.

CAUTION

AFTER REFITTING, OPERATE THE REAR BRAKE LEVER REPEATEDLY AND CHECK THAT THE BRAKING SYSTEM OPERATES CORRECTLY.

CAUTION

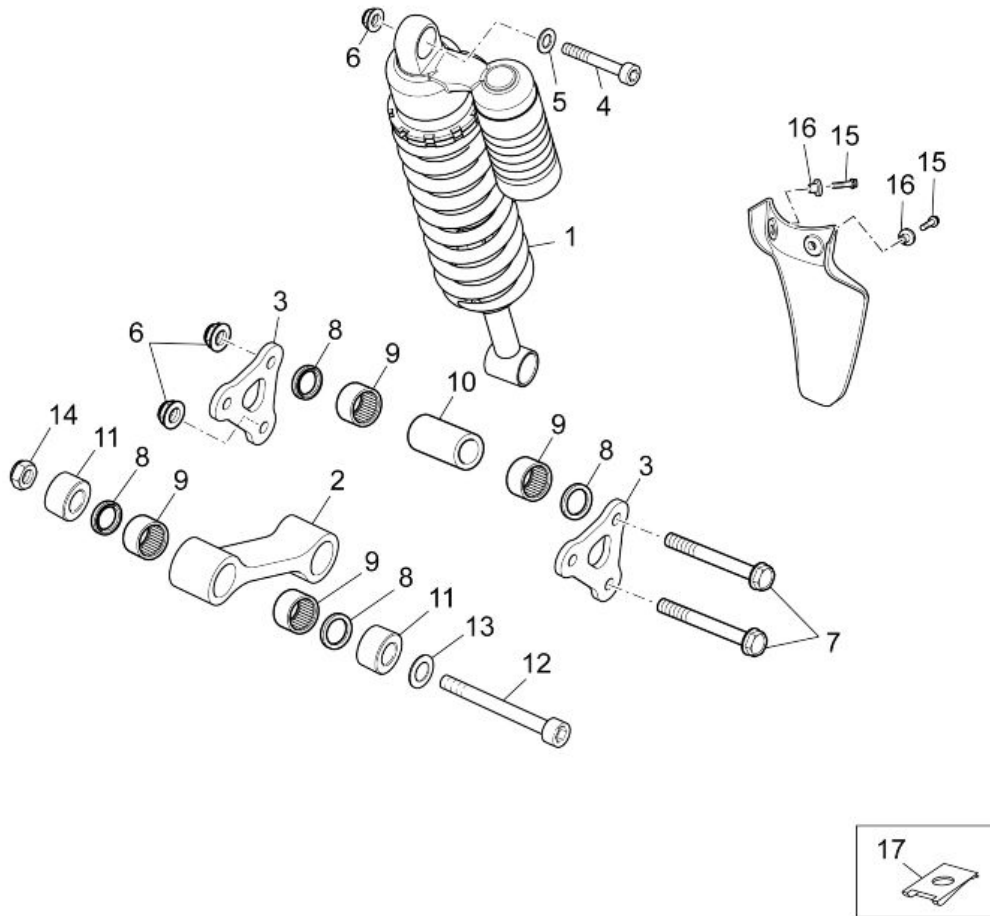
CHECK THAT THE WHEEL IS CENTRED.

- Tighten the wheel axle fixing nut.

See also

[Adjusting](#)

Shock absorbers

**KEY**

1. Shock absorber
2. Single connection rod
3. Double connecting rod
4. TCEI M10x55 screw
5. 10.5x21x2 washer
6. M10 Flanged self-locking nut
7. TE flanged M10x61 screw
8. D18x24x3 oil seal
9. Roller casing
- 10.L=36 pin
- 11.Spacer
- 12.TCEI M12x107 screw

- 13.12.2x22x2 Plain iron washer
- 14.M12 lower self-locking nut
- 15.TE flanged screw M6x20
- 16.Bushing
- 17.Clip M6

Adjusting

The rear shock absorber standard setting is adjusted to suit most low speed riding conditions, whether the vehicle is partially or fully loaded.

However, this setting can be personalised to meet specific needs according to vehicle use.

CAUTION

ALLOW ENGINE AND SILENCER TO COOL OFF BEFORE OPERATING THE SET SCREWS.

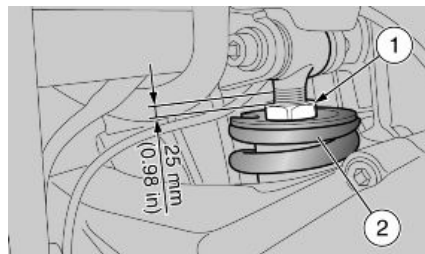


THE SET NUT MUST NOT BE TIGHTEN OVER 25 mm (0.98 in) FROM THE BEGINNING OF THE THREAD. IF SUCH DISTANCE IS EXCEEDED, THERE WILL BE SOME JERKING WHILE RIDING EVEN ON SOME SLIGHTLY UNEVEN ROADS.

- Operate on the set nut (1) (shock absorber spring preloading adjustment).

CAUTION

TURN THE SET NUT (1) GRADUALLY ONE TURN AT A TIME. TRY RIDING THE VEHICLE ON THE STREET UNTIL THE OPTIMUM ADJUSTMENT IS OBTAINED.



REAR SHOCK ABSORBER ADJUSTMENT

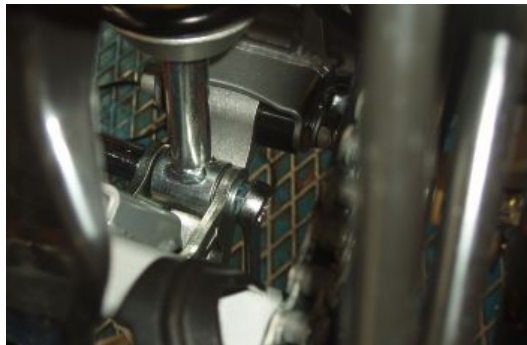
Specification	Desc./Quantity
By tightening the set nut (1)	Spring (2) preloading increases The scooter suspension is very hard. Advisable for smooth or ordinary roads and when riding with passenger.
By loosening the set nut (1)	Spring (2) preloading decreases The vehicle suspension is very soft. Advisable for uneven roads, without passengers.

Removing

- Place the vehicle on its OPTIONAL front service stand.
- Remove both central side fairings.
- Support the vehicle rear part using belts and hoist.
- Place a support between the swingarm and the saddle post frame so that the shock absorber is in neutral position.
- Working from the vehicle left side, unscrew and remove the link rod screw and collect the nut from the right side.



- Working from the left side, unscrew and remove the rear shock absorber fixing screw and collect the nut from the opposite side.
- Carefully place the fork upper part.



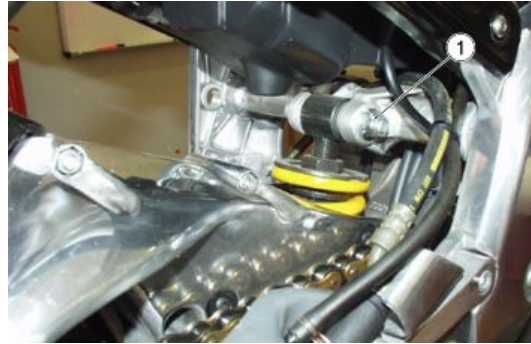
- Undo the upper screw and remove it from the left side.
- Slide the rear shock absorber downwards.



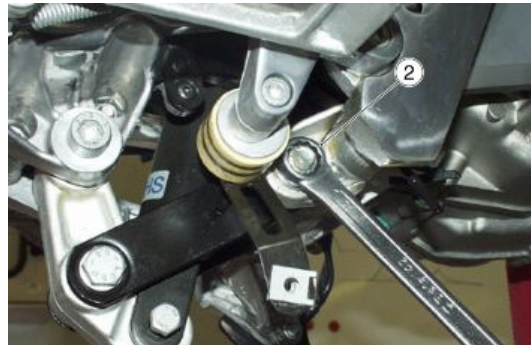
Installing

SHOCK ABSORBER FITTING

- Fit the shock absorber by inserting from the bottom.
- Insert the shock absorber upper screw with the washer from the left side.
- Working from the opposite side, tighten the nut (1).



- Position the connecting rod assembly on the shock absorber.
- Insert the shock absorber lower screw from the right side.
- Working from the opposite side, tighten the nut (2).



- Place the double connecting rod in its seat on the chassis.
- From the left side insert the nut fixing the connecting rod assembly plus the washer in the chassis.
- Working from the opposite side, tighten the nut (3).
- Remove the support between the swingarm and the saddle post frame.



Linkages

Removing

- Working from the right side, unscrew and remove the nut (1).
- Slide off the screw from the opposite side and collect the washer.

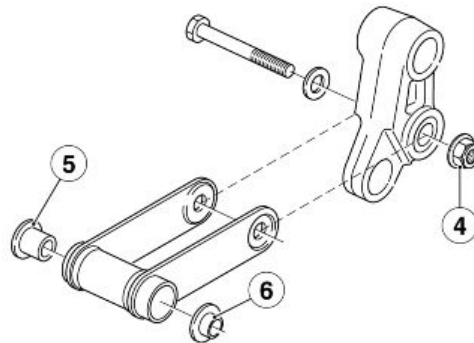


- Working from the left side, unscrew and remove the nut (2).
- Slide off the screw from the opposite side.
- Working from the left side, unscrew and remove the nut (3).
- Slide off the screw from the opposite side and collect the washer.
- Remove the complete suspension connecting rod assembly unit.

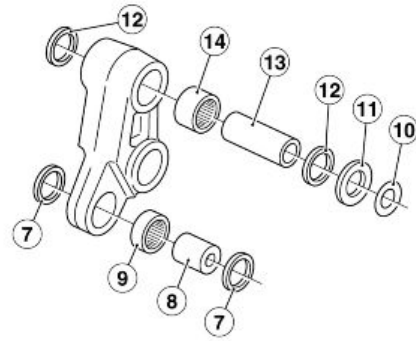


CONNECTING ROD ASSEMBLY REMOVAL

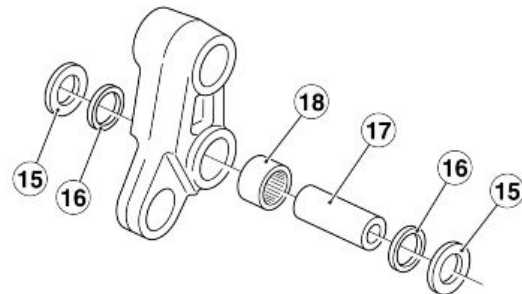
- Remove the complete suspension connecting rod assembly unit.
- Unscrew and remove the nut (4).
- Slide off the screw from the opposite side and collect the washer.
- Remove the single connecting rod.
- Remove the right bushing (5) and the left bushing (6) from the single connecting rod.



- Remove the oil seals (7) from the double connecting rod.
- Slide off the pin (8).
- Using a specific extractor, take out the ball retainer (9).
- Remove the belleville spring (10).
- Remove the sealing ring (11).
- Remove both oil seals (12).
- Slide off the pin (13).
- Using a specific extractor, take out the ball retainer (14).



- Remove both sealing rings (15).
- Remove both oil seals (16).
- Slide off the pin (17).
- Using a specific extractor, take out the ball retainer (18).

**CAUTION**

WASH ALL THE PARTS WITH CLEAN DETERGENT.

Checking

CAUTION

CHECK THAT NO COMPONENT IS NOTICEABLY DISTORTED, DAMAGED, CRACKED AND/OR DENTED.

REPLACE ALL DAMAGED COMPONENTS.

BALL RETAINER

Turn the ball retainers manually; they must rotate smoothly, continuously and silently.

There must be no axial clearance.

Replace the ball retainers that present these problems.

Apply grease on the rollers.

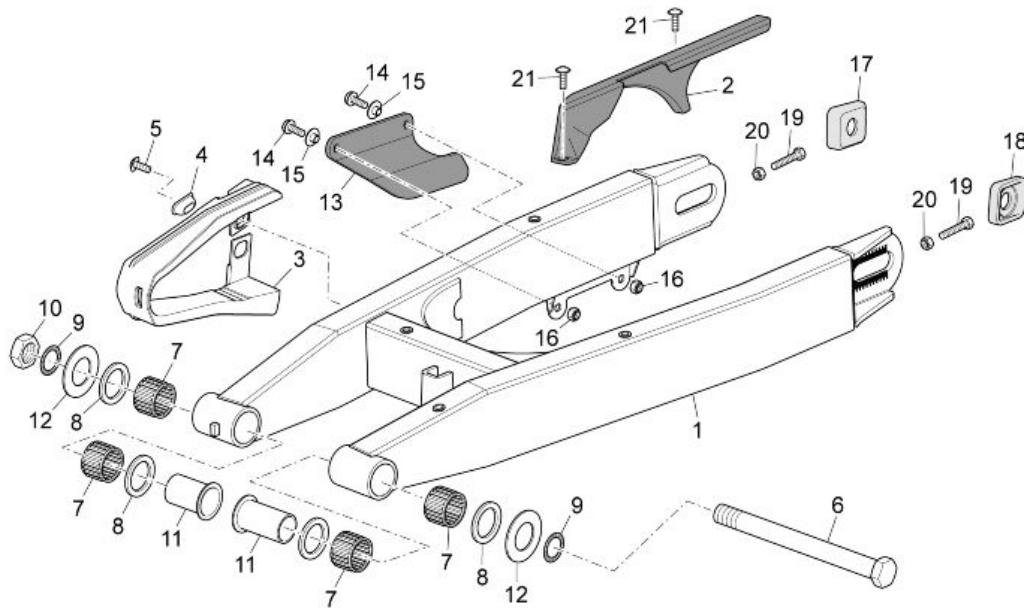
GASKETS

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

INDEX OF TOPICS

CHASSIS

CHAS

Swinging arm
**KEY**

1. Swingarm
2. Chain guard
3. Chain guide slider
4. Slider cap
5. TCB M4.8x13 screw
6. Swing arm pin
7. 22x28x16 Roller casing
8. Sealing ring
9. D15x22x1 knurled washer
- 10.M14x1.5 lower nut
- 11.Swing arm pin bushing

12. Thrust washer
13. grey rear chain guide
14. TE flanged screw M6x20
15. T-shaped bushing
16. M6 lower self-locking nut
17. Rh chain tensioner
18. Lh chain tensioner
19. Chain tensioner set screw
20. M8 lower nut
21. TBEI flanged M5x12 screw

Removing

CAUTION

HOLD THE VEHICLE STEADY WITH THE OPTIONAL SERVICE STAND FROM THE FRONT AND BELTS ATTACHED TO AN OPTIONAL HOIST FROM THE REAR.

- Fasten the belts to the chassis at the engine upper support.
- Lift the hoist arm until the belts are taut.
- Remove the chain.
- Remove the rear wheel.
- Working from the left side, unscrew and remove the nut (1) and collect the washer.
- Slide off the screw from the opposite side.
- Remove the connecting rod assembly from the swingarm.
- Undo and remove the internal screw (2).
- Detach the pipe clamp still attached to the rear brake pipe from the swingarm.



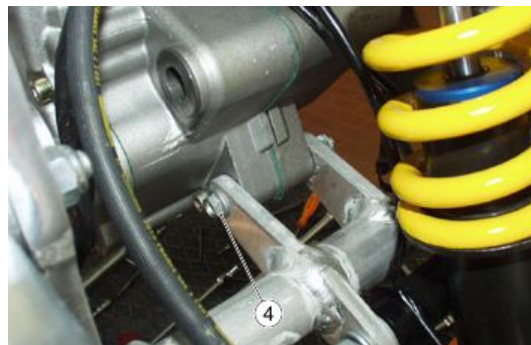
- Undo and remove the external screw (3).
- Detach the pipe clamp still attached to the rear brake pipe from the swingarm.



- Undo and remove the screw and remove the speed sensor.



- Loosen the screw fixing the chassis on the engine (4) to facilitate removing the swingarm.



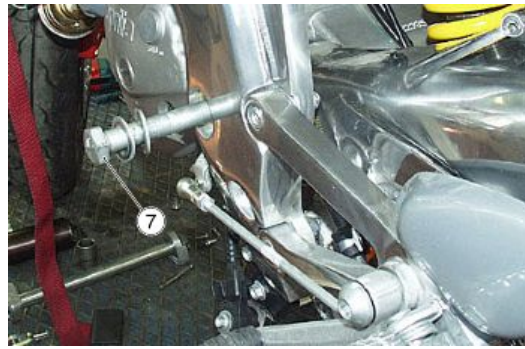
- Working from the right side, fully loosen the ring nut (5) with the specific box-spanner.
- Loosen the ring nut set bushing (6).

Specific tooling

AP8101945 Fork pin ring nut

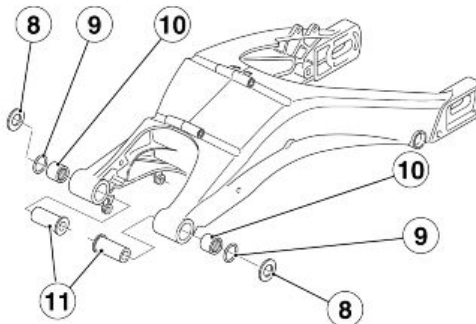


- Working from the left side, undo and remove the swingarm pin (7) and collect the two washers.
- With the help of a second operator, remove the swingarm from the chassis.



SWINGARM REMOVAL

- Remove the swingarm
- Place the swingarm on a supporting surface.
- Clean the two sides of the bearing seats with a cloth.
- Remove the external plastic washers (8).
- Slide off both needle bearing (11) bushings from inside the swingarm.
- Take out the two O-rings (9).
- Using a buffer of suitable diameter take out the two roller casings (10).



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 smoothly, continuously and silently.

There must be no axial clearance.

Replace the roller casings that present these problems.

Apply grease on the rollers.

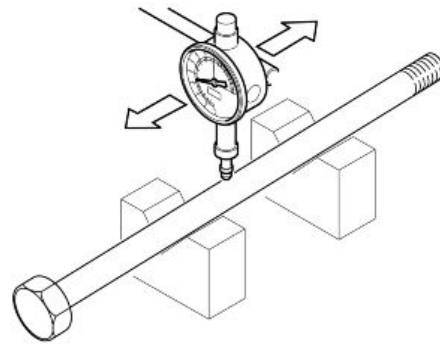
GASKETS

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

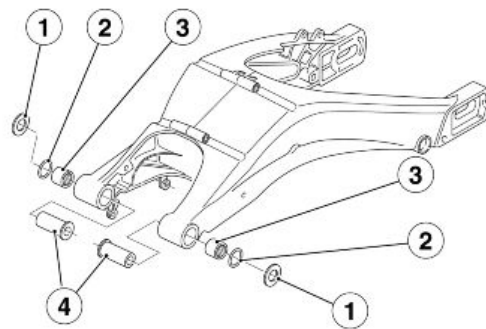
SWINGARM PIN

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****CAUTION****REPLACE BOTH ROLLER CASINGS**

- Clean all the swingarm coupling components completely and grease them with lithium grease.
- Using a buffer of suitable diameter assemble the two new roller casings (3) centring them axially in their housing.
- Fit the two O-rings (2).
- Fit both needle bearing (4) bushings inside the swingarm.
- Fit the external plastic washers (1).

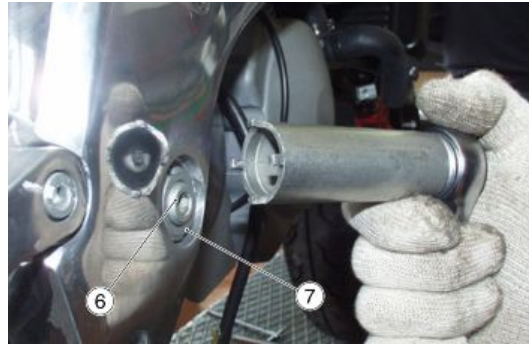
**CAUTION**

DUE TO THE REARCARRIAGE WEIGHT, THE FOLLOWING OPERATIONS REQUIRE THE INTERVENTION OF A SECOND OPERATOR.

- Place the swingarm on the chassis.
- Move it into position so that the holes are aligned and, at the same time fully insert the pin (5) from the left side.



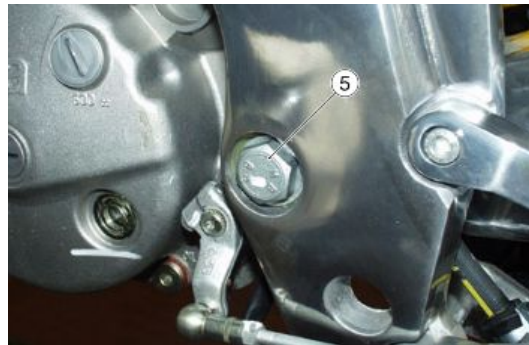
- The correct adjustment of the swing-arm pin clearance is obtained by properly seating the ring nut set bushing (6) and screwing it another 1 / 4 of a turn.
- Firmly hold the bushing (6) and tighten the ring nut (7) using a special tool.



Specific tooling

AP8101945 Fork pin ring nut

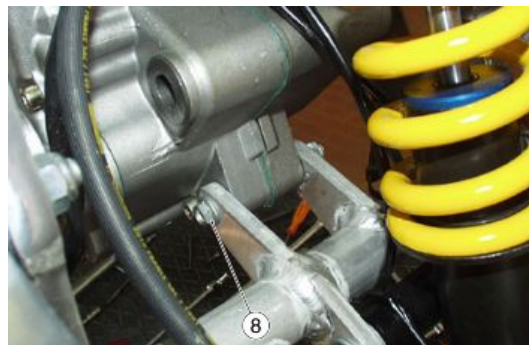
- Now adjust the rear swingarm as follows:
 - Loosen the pin (1), working from the left side.



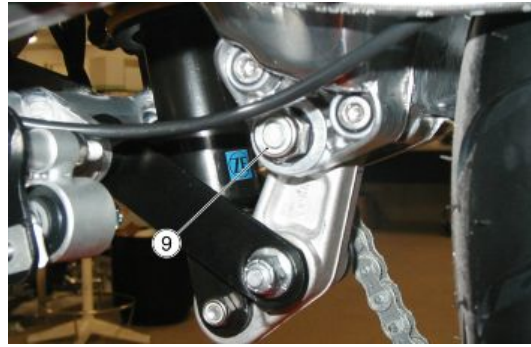
- Working from the right side, fully loosen the ring nut (6) with the specific box-spanner.
- Tighten the set bushing (6) to the prescribed torque
- Use the specific box-spanner to tighten the ring nut (7).
- Tighten the pin.



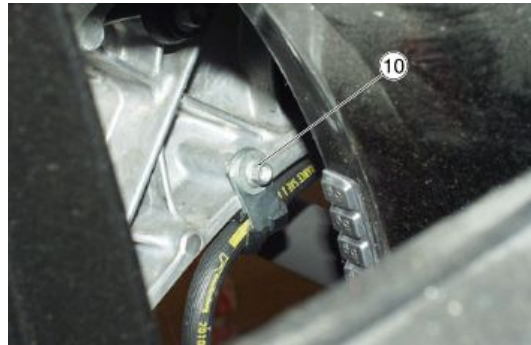
- Tighten the chassis fixing screw (8) on the engine.



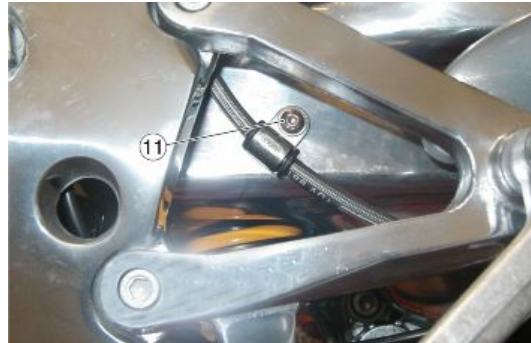
- Place the connecting rod assembly on the swingarm.
- Insert the screw from the right side.
- Fit the washer and tighten the nut (9).



- Position the brake hoses on the swingarm.
- Fasten the internal brake pipe clamp with the screw (10).



- Fasten the brake hose guide with the screw (11).
- Mount the rear wheel.
- Assemble the chain.
- Lower the hoist arm.
- Release the belts from the chassis.
- Install the fuel tank.



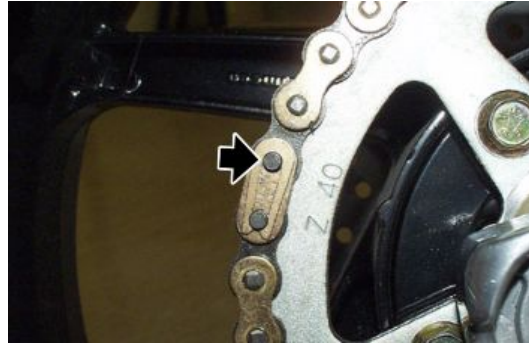
- Place the speed sensor.



Drive chain

Removing

- Loosen the chain tension.
- Rotate the rear wheel until the master link can be identified.
- Slide off the clip.
- Remove the plate underneath.



- Remove the master link from the opposite side.
- Remove the chain.



CAUTION

REPLACE THE ENTIRE UNIT IF THE CHAIN IS PARTICULARLY WORN.

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.

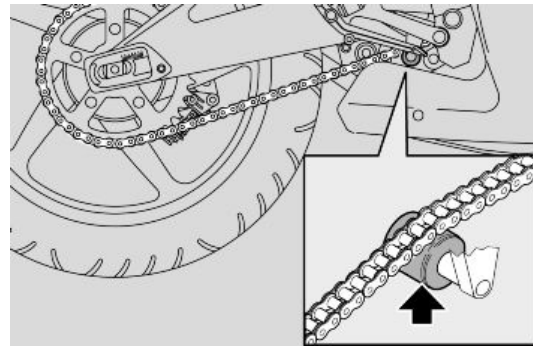
CAUTION

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.

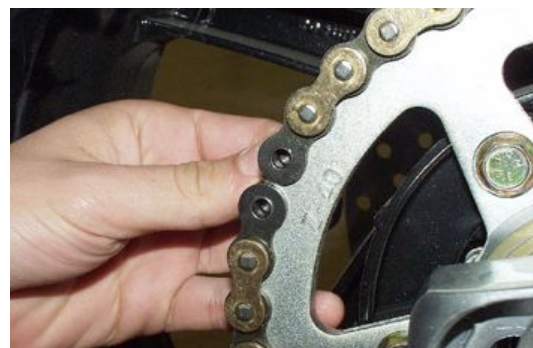
FLATTENED OR JAMMED CHAIN LINKS SHOULD BE LUBRICATED AND GOOD OPERATING CONDITIONS RESTORED.

- Check the chain tensioner roller for wear.
- Finally, check the swingarm protection pad for wear.



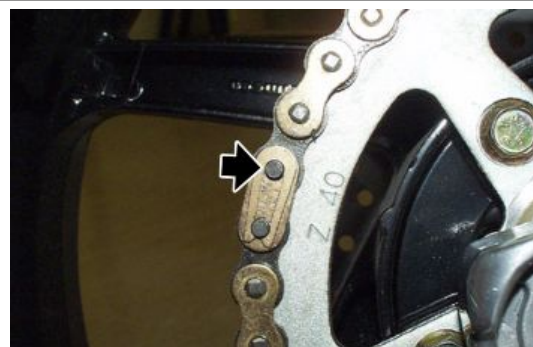
Installing

- Check the correct positioning of the chain on the pinion and the crown.
- Fit the chain with the two ends joined at a point between the pinion and the crown 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 backlash:

- Stop the engine.
- Place the vehicle on its stand.
- Set the gear level to neutral.
- Check that the vertical oscillation, between the pinion and the crown in the lower chain branch, is about 25 - 35 mm (0.99 - 1.38 in)

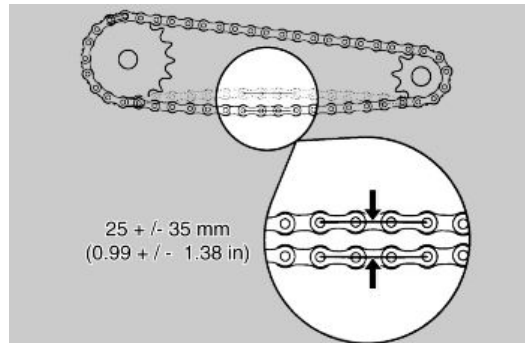
- Move the vehicle forward so as to also check the chain vertical oscillation in other positions; clearance should remain constant during all wheel rotation phases.

CAUTION

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

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

Adjust backlash if it is uniform but over or below 25 - 35 mm (0.99 - 1.38 in), adjust it.

**CAUTION**

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

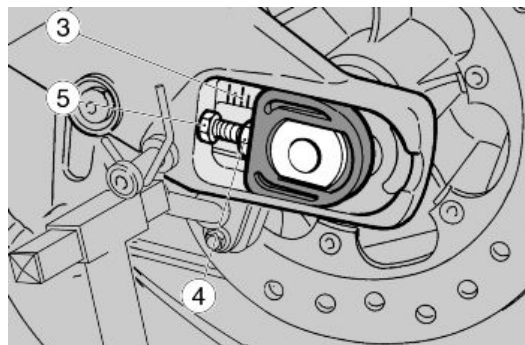
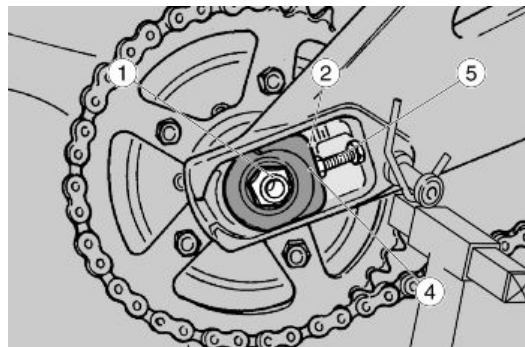
If chain tension needs adjusting after the check:

- Place the scooter on its rear service stand (OPT).
- Loosen the nut (1) completely.



WHEEL CENTRING IS CARRIED OUT USING IDENTIFIABLE FIXED REFERENCES (2-3) IN THE TENSIONER MOUNTS ON THE SWING ARMS BEFORE THE WHEEL PIN.

- Loosen both lock nuts (4).
- Actuate on the set screws (5) and adjust the chain backlash checking that the references (2 - 3) match on both sides of the vehicle.
- Tighten both lock nuts (4).
- Tighten the nut (1).
- Wheel nut tightening torque (1):

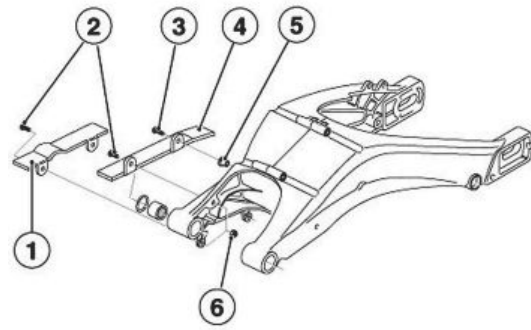
**Locking torques (N*m)**

Rear wheel fixing pin 100

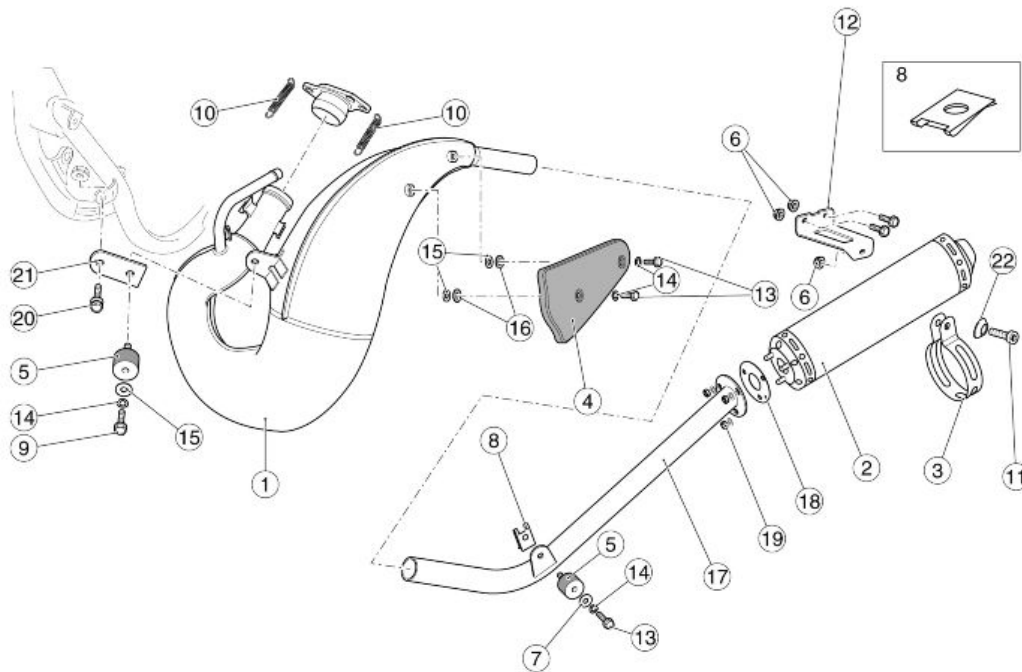
Chain sliders**CAUTION**

FOR SPACE REASONS DETACH THE CHAIN.

- Undo and remove the upper screw (2) and collect the nut (6).
- Undo and remove the screw (3) and collect the rubber ring (5).
- Remove the upper chain guide slider (4).
- Undo and remove the two lower screws (2).
- Remove the lower chain guide slider (1).



Exhaust



KEY

- 1. Muffler

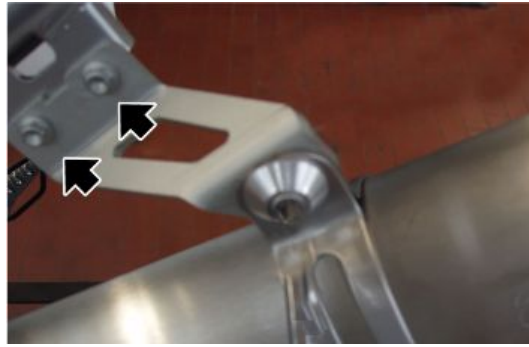
2. Silencer
3. Silencer clamp
4. Muffler protection
5. Silent-block
6. M6 Flanged self-locking nut
7. Insulating washer
8. Clip M6
9. TE flanged screw M6x16
10. Traction cyl. helical spring
11. TCEI M6x16 screw
12. Silencer plate
13. M6x12 TE flanged screw
14. 6.4X11X0.5 spring washer
15. 6.6x18x1.6 washer
16. Insulating washer
17. Central exhaust pipe
18. Silencer gasket
19. Lower self locking nut
20. Pull screw
21. Plate
22. Washer

Removing the tail pipe

- Rotating it on the screw, move the fairing that covers the chassis.
- Undo and remove the front fixing screw of the silencer pipe and collect the washer.



- Undo and remove both screws that fix the silencer support bracket to the chassis and collect the washer.



- Slide off the silencer backwards.

See also

[Side body panels](#)

Removing the exhaust manifold

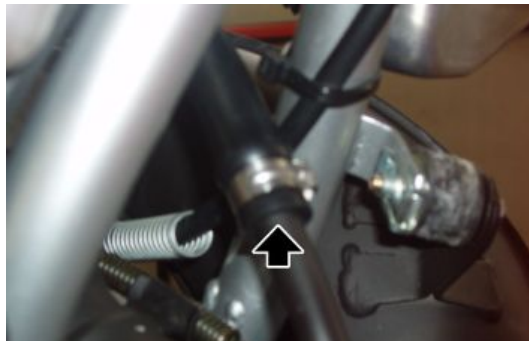
- Undo and remove the screw that fixes the muffler to the chassis and collect the washer.



- Release the two cylinder attachment springs.



- Release the secondary air pipe sealing clamp and slide off the pipe.



- Undo and remove the two fixing nuts of the manifold and collect bracket and washer.



- Slide off the muffer forwards.

CAUTION

WHEN REFITTING, REPLACE THE EXHAUST GASKET AND CHECK THE CORRECT POSITIONING OF THE FIXING BRACKETS.

Rave valve

The exhaust valve is operated by a solenoid through a flexible cable.

The solenoid is enabled within a given range of the electric control unit that receives the engine rotation signal from the primary circuit frequency.

CAUTION

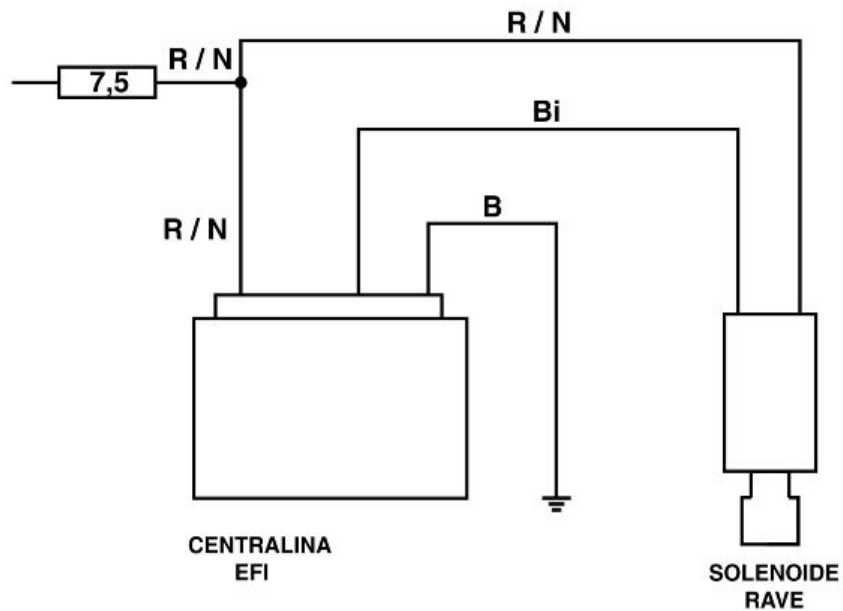
FITTING THE EXHAUST VALVE ON 11 KW HOMOLOGATED VEHICLES RENDERS SUCH CERTIFICATION INVALID. IT CAN ONLY BE USED FOR RACING OR ON RACETRACKS AND CIRCUITS NOT OPEN TO THE PUBLIC.

RAVE operation

- The exhaust valve opens between 500 and 2500 rpm for the valve stem self-cleaning.
- It closes between 2500 rpm and the actuation point (about 8000 rpm).
- It remains open beyond the actuation point.

RAVE valve actuation points

8000 rpm



The solenoid controlled by the rave control unit opens the exhaust valve at 8000 rpm.

TROUBLESHOOTING

- Check that the 7.5 A fuse is in good conditions.
- Check the if the solenoid is working properly by powering it directly with a 12 V battery.
- Check the flywheel
- Replace the regulator with another one in proper operating conditions.
- Replace the EFI control unit with another one in proper operating conditions.



CAUTION

THE RAVE VALVE CHECKING FUNCTION IS ACTIVATED WHEN THE EFI CONTROL UNIT JUMPER IS CUT OFF.

SOLENOID

- Check that the piston moves freely.
- Measure the resistance between the wires with a tester:
- Correct value = 2.2 Ohm + / - 10%.
- Start the vehicle, go over 6500 rpm
- Let the engine idling

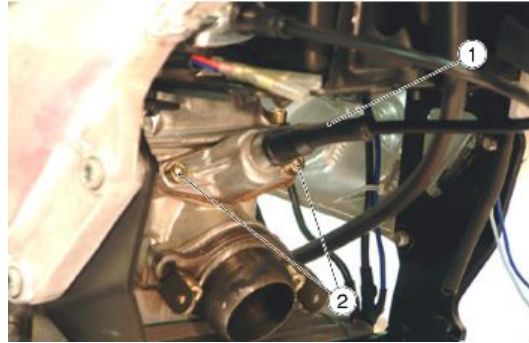
- Check that the solenoid activates the RAVE at 0.5-sec pulse intervals.

Removing

- Remove the fuel tank
- Remove the battery with the battery housing.

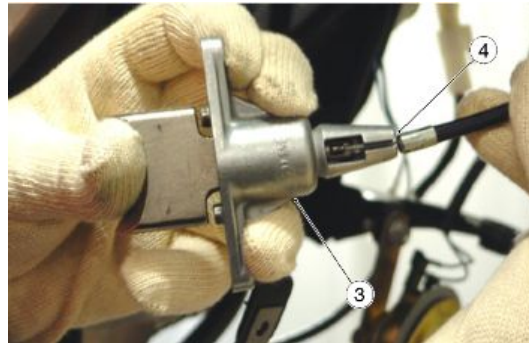
PARTIAL

- Detach the protection casing (1).
- Undo and remove both screws (2) and collect the locking washers.



If the valve moves freely:

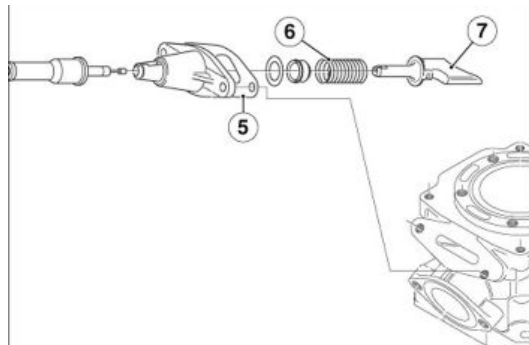
- Take out the exhaust valve unit together with the flexible cable from the cylinder.
- Turn the stem valve (3) seat by 180° and disconnect the flexible cable (4).
- If the exhaust valve is blocked at the opening position (due to combustion deposits):
- Push the valve stem (3) housing back with a screwdriver.



CAUTION

PAY ATTENTION NOT TO DAMAGE THE SEAL SURFACE.

- Turn the stem valve (3) seat by 180° and disconnect the flexible cable (4).
- Remove the stem valve (3) housing and collect the spring (6) and the gasket (5).
- Take out the exhaust valve (7) using the specific valve extractor

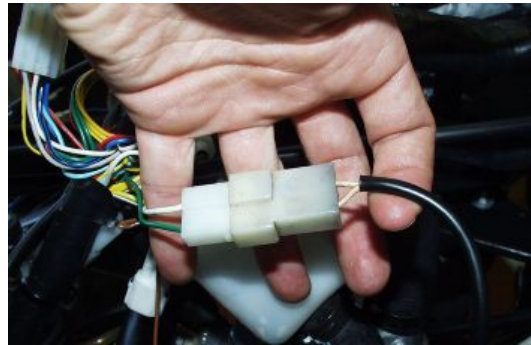


TOTAL

- Undo and remove both RAVE valve screws and collect the locking washers.
- Take out the exhaust valve unit from the cylinder.



- Disconnect the connector of the system control unit.



- Undo and remove both screws (8) from the battery housing frame.
- Remove the whole RAVE valve.

**Checking****GASKETS**

- Check that the valve gasket (1) and the O-ring (2) (fitted to the valve seat) are not worn or damaged.

EXHAUST VALVE

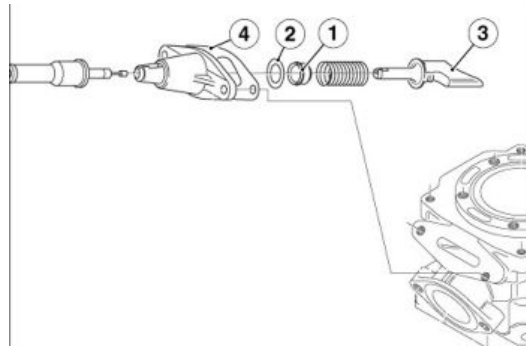
- Clean off any combustion deposits from the exhaust valve (3) and from the valve duct in the cylinder.
- Make sure that the exhaust valve is not worn or damaged.

CYLINDER GASKET

The cylinder gasket (4) must be replaced at every refitting operation.

SOLENOID

- Check the control unit as per the diagram.

**Installing**

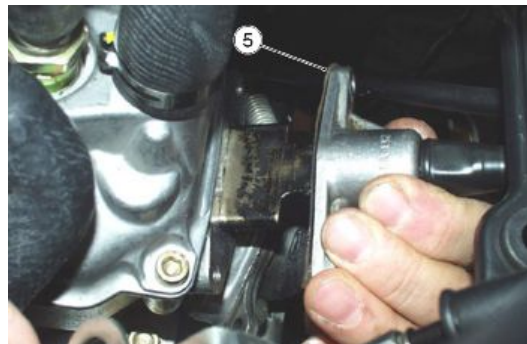
- Remove the fuel tank.
- Remove the battery with the battery housing.
- If the vehicle is a crossover version, remove the fixed guillotine by undoing the two screws (1) and collect the washers before fitting the RAVE valve.

**TOTAL**

- Insert the exhaust valve unit with the gasket (5) in the cylinder.

CAUTION

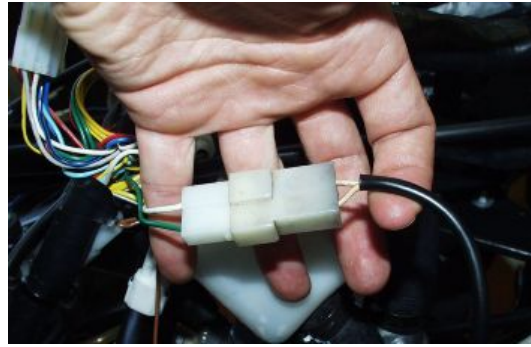
REPLACE THE GASKET (5) AT EVERY REFITTING OPERATION.



- Fit the exhaust valve unit by means of the two screws (1) with the fixed guillotine washers.
- Fit the control unit with the two screws (2) on the battery housing frame.



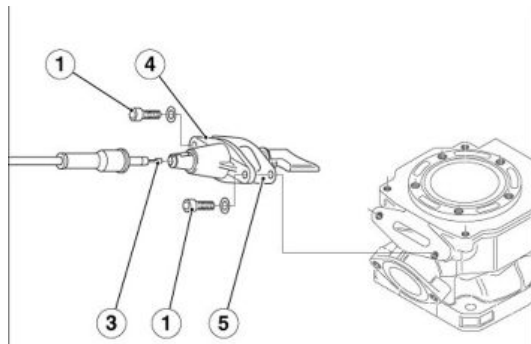
- Connect the connector of the control unit to the system.



- Connect the flexible cable (3) to the stem valve housing (4).
- Rotate the stem valve housing (4) by 180°.

CAUTION

THE CABLE CONNECTION SHOULD BE FACING DOWNWARDS..



- Refit the protection casing.
- Insert the exhaust valve unit with the gasket (5) in the cylinder.

CAUTION

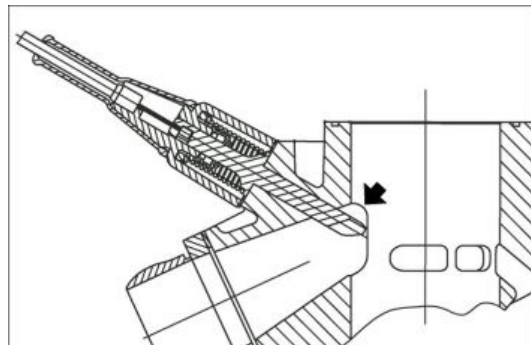
REPLACE THE GASKET (5) AT EVERY REFITTING OPERATION.

- Tighten the two exhaust valve unit screws (1) with their washers.

CAUTION

AFTER FITTING THE EXHAUST VALVE UNIT, CHECK:

- With the valve fully open, the valve stem end should be at the same level with the exhaust port. To do so, it is necessary to remove the exhaust flange.
- make sure that the exhaust valve moves freely.

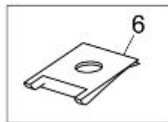
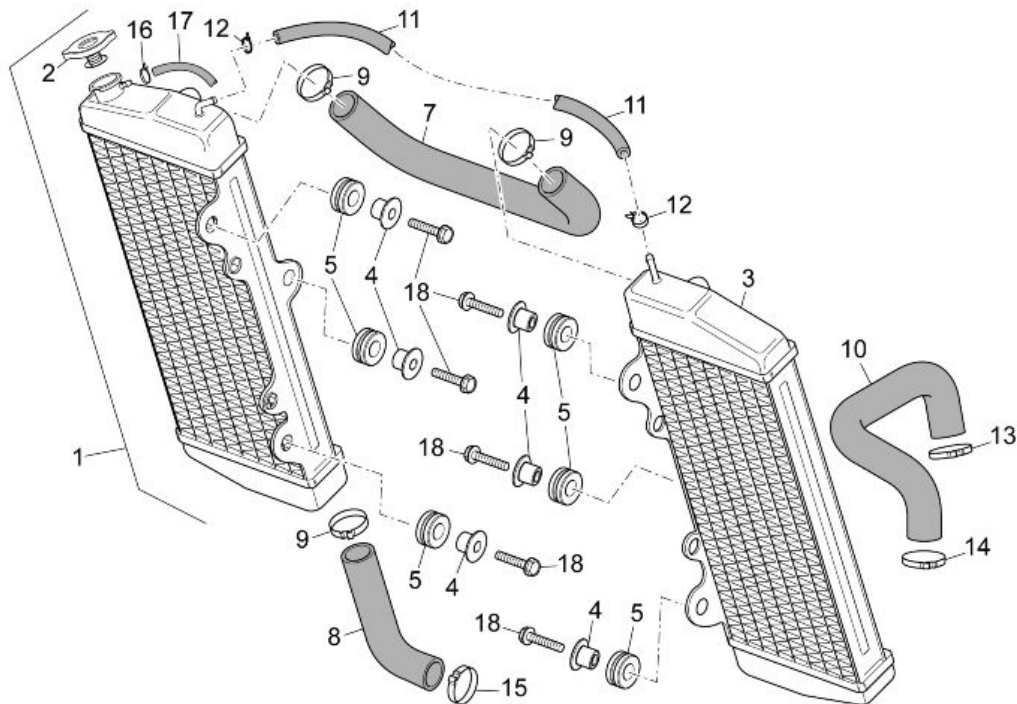


INDEX OF TOPICS

COOLING SYSTEM

COOL SYS

Circuit diagram



KEY

- 1. RH Radiator
- 2. Radiator cap
- 3. LH Radiator
- 4. T-shaped bushing
- 5. 11.5x23x9.3 rubber cap
- 6. Clip M6
- 7. Radiators water pipe
- 8. Radiator-pump pipe
- 9. D24.24.5x8.6 clic clamp
- 10. Head-radiator pipe
- 11. d.7x11 fuel pipe

- 12.D11x6.6x1 green clic clamp
- 13.D28x8.6 clic clamp
- 14.D23.5x8 clic clamp
- 15.D23.5x8 clic clamp
- 16.D10.1 clamp
- 17.5x9 pipe
- 18.TE flanged screw M6x25

Coolant replacement

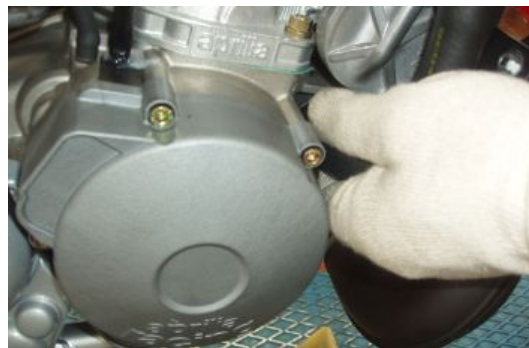
CAUTION

DO NOT USE YOUR VEHICLE IF THE COOLANT IS BELOW THE MINIMUM LEVEL. CHECK THE COOLANT LEVEL PERIODICALLY OR AFTER LONG TRIPS.

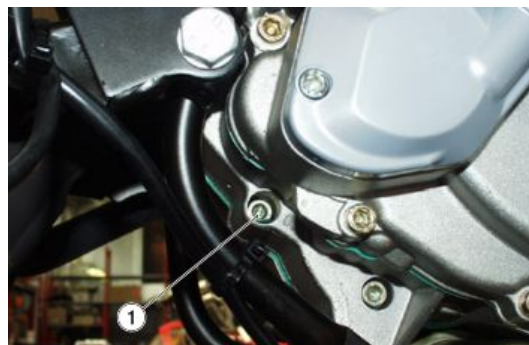
- Remove both front side fairings.
- Place a container of suitable capacity underneath the sleeve.
- Release the clamp.



- Slide off the sleeve.
- Empty the liquid into the container.
- Open the radiator cap to facilitate drainage.



- Unscrew and remove the drainage plug (1) indicated by the mark OUT.
- Unscrew and remove the radiator plug to facilitate draining the coolant.



CAUTION



DO NOT DISPOSE OF THE FLUID INTO THE ENVIRONMENT.

- Wait for the coolant to drain off and tighten the screw.

- Top-up with coolant.

CAUTION

DO NOT DISPOSE OF THE FLUID INTO THE ENVIRONMENT.

See also

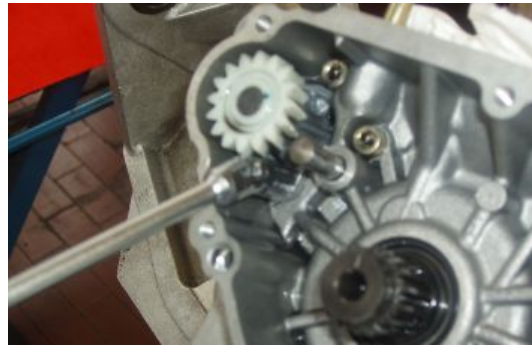
[Side body panels](#)

Water pump

- Remove the water pump control gear.



- Undo and remove the M5 fixing screw.



- Slide off the water pump gear.



- Remove the water pump with the help of a square screwdriver.



REFITTING

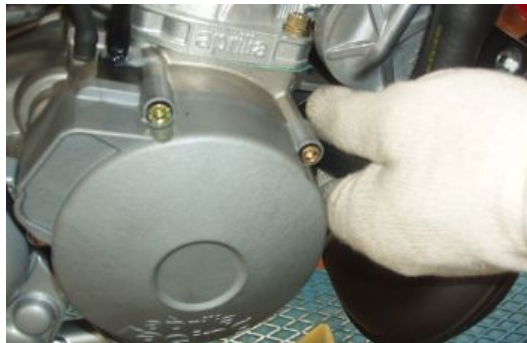
- Upon refitting follow the removal steps but in reverse order, paying special attention to the alignment of the water pump control wheel, which must be aligned with the reference on the crankcase when refitting.

Removing the radiator

- Remove both front side fairings.
- Place a container of suitable capacity underneath the sleeve.
- Release the clamp.



- Slide off the sleeve.
- Empty the liquid into the container.
- Open the radiator cap to facilitate drainage.



- Working on both sides, release the clamps between the aluminium tube and the rubber hose in the radiator.



- Remove the right and left delivery pipes.



- Remove the radiator breather pipe.



- Working on both sides, undo the two screws and collect the spacer.





- Operating on both sides of the chassis, undo and remove the two screws and collect the washers and remove the radiator.

CAUTION

THE RADIATORS ARE INTERCONNECTED THROUGH THE LOWER PIPE.



INDEX OF TOPICS

BODYWORK

BODYW

Seat

- Place the vehicle on the service stand.
- Insert the key in the lock.
- Turn the key anticlockwise.
- Lift and remove the saddle.



**UPON REFITTING:
BEFORE LOWERING AND LOCKING THE SADDLE,
CHECK THAT THE KEY HAS NOT BEEN LEFT INSIDE THE
GLOVE-BOX / TOOLKIT COMPARTMENT.**



- Fit the saddle making sure to position the corresponding rear hooks correctly.
- Lower and press the saddle to trip the lock.

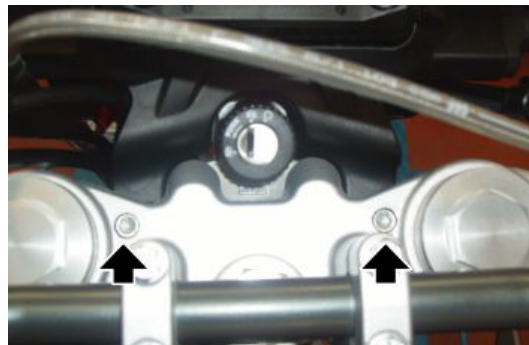


**BEFORE RIDING, MAKE SURE THAT THE SADDLE IS
CORRECTLY LOCKED INTO POSITION.**



Headlight assy.

- Undo and remove both screws on the upper plate.



- Undo and remove the two screws fastening the mudguard and collect the nuts and washers from the bottom.



- Slide off the front brake pipes from the hose guide.
- Remove the headlight assembly forwards, releasing it carefully from the front fitting slots on the mudguard.



- Remove the rubber cap and disconnect the instrument panel connector.

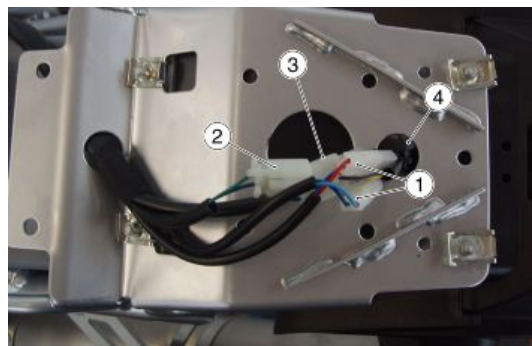


- Disconnect the front headlight bulb connectors.



Taillight assy.

- Remove the tail and the rear side fairings.
- Disconnect the turn indicators connectors (1), license plate light (2), rear light (3).
- Remove the clamp (4).



TURN INDICATORS

- If necessary, remove the turn indicators working from any side, then undo and remove the screw and carefully slide off the gauge with cables.



LICENSE PLATE LIGHT

- If necessary, remove the license plate light, undo and take out the screw and carefully slide off the light with cables.



REAR LIGHT

- If necessary remove the rear light, undo and take out both screws and collect the washers.
- Slide off the rear light with cables carefully.



Side body panels

CENTRAL FAIRING

The following operations refer to only one fairing but are valid for both.

- Unscrew and remove the screw and collect the collar.



- Unscrew and remove the screw and collect the collar.



- Undo and remove the lower screw.



- Remove the central side fairing.



FRONT FAIRING

- Remove saddle, central fairings and tank cover.
- Undo and remove the right-side screw and collect the nut from the left side.

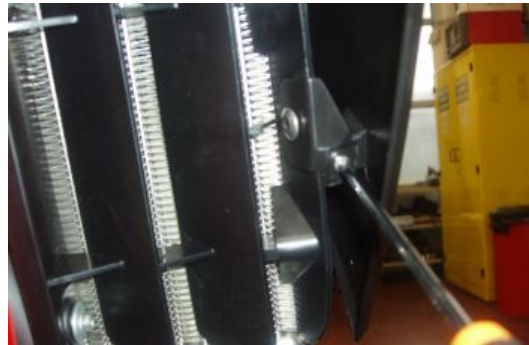


- Undo and remove the fixing screw.



The following operations refer to only one fairing, but are valid for both.

- Undo and remove the radiator fixing screw.



- Remove the front side fairing.



CHASSIS COVER

- They are placed in the central area on both sides of the vehicle. For regular operations remove the three clamps and turn the cover according to visibility requirements, acting on the lower screw slightly loose.

If necessary, remove them from the vehicle:

- Remove the three retaining clamps.



- Undo and remove the lower screw, paying attention to the rear brake lever placed on the right-hand side.

Upon refitting, replace clamps with the same type and size of clamps.



See also

[Seat](#)

Fuel tank

Air box

- Support the vehicle with a suitable under-ump stand.
- Support the scooter rearcarriage with a hoist and suitable belts.

- Remove the saddle.
- Remove both central fairings.
- Remove the six chassis side cover clamps and loosen the lower screws to rotate the cover rightwards.



- Working from the right side, undo and remove the screw and collect the collar and the rubber ring.



- Working from both sides, undo and remove the screw and collect the washer.



- Remove the clamp and slide off the piping.



- Loosen the clamp and release the sleeve.



- Undo and remove the two screws and move the control unit sideways.



- Remove the clamp.



- Release the fuses housing from the filter casing sliding it upwards.
- Release the relay from the filter casing sliding it rightwards.



- Disconnect the connector.



- Remove the chassis clamp.



- Operating from both sides, undo and remove the chassis fixing screw and collect the nut.

CAUTION

ONCE THE CHASSIS IS RELEASED PAY ATTENTION TO THE REAR SIDE OF THE MOTORCYCLE AND PLACE IT ON THE GROUND LOWERING THE HOIST.



- Slide the filter casing upwards.

Fuel tank**TANK COVER**

- Remove the saddle.
- Undo and remove the two screws.



- Undo and remove the front screw.



- Disconnect the fuel vapour recovery pipe.
- Unscrew and remove the fuel tank cap.

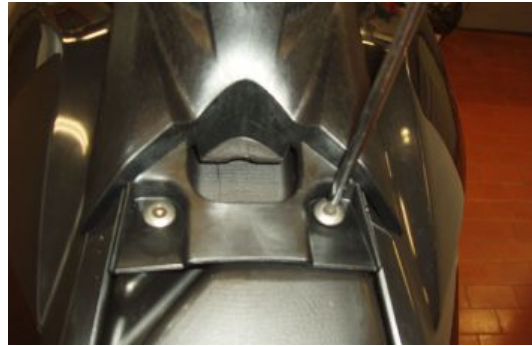


- Remove the fuel tank cover and screw the cap again.

See also

Seat

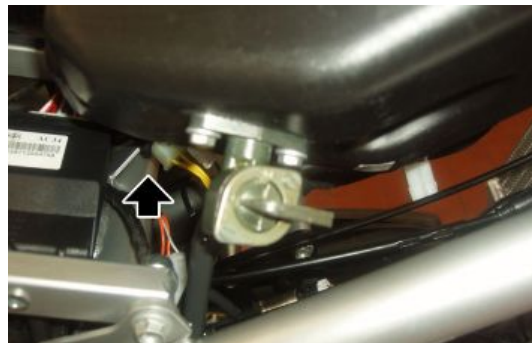
- Remove the front side fairings and the tank cover.
- Undo and remove the two screws paying attention to the corresponding collars and spacers.



- Lift the tank from the side and close the fuel supply valve.



- Disconnect the fuel pump connector.



- Loosen the clamp and detach the pipe.

**See also**

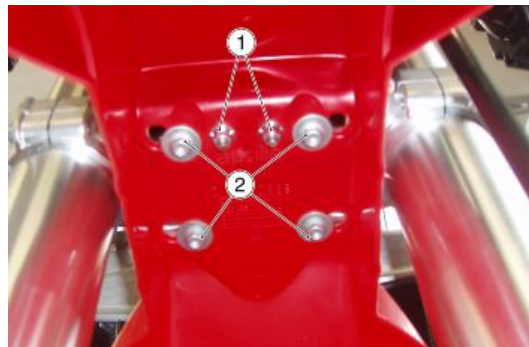
[Side body panels](#)

Front mudguard

- Undo and remove the two screws and collect the washers.



- Undo and remove the two upper screws and collect the nuts (1) and washers.
- Unscrew and remove the four screws (2) and collect the washers.



- Slide off the front mudguard forwards, paying attention to the front fitting slots.



Mixture oil tank

- Remove saddle, central right and left fairings and right chassis cover.
- Remove the clamp.



- Lift the fuel tank without removing it.
- Remove the clamp.



- Disconnect the oil level probe connectors.



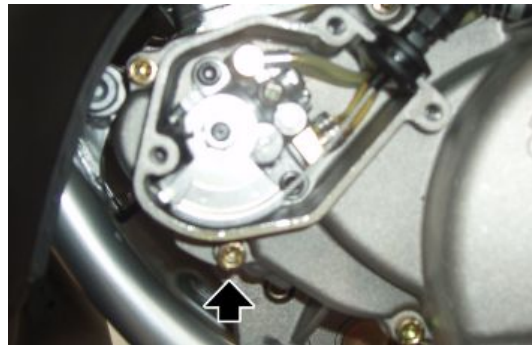
- Place a container of suitable capacity underneath the vehicle.
- Loosen the clamp and drain the reservoir in the container.



REFITTING

EACH TIME THE MIX OIL RESERVOIR IS DRAINED, REFILL AND BLEED.

- Mount the mix oil reservoir following the same removal procedure but in reverse order.
- Undo and remove the three pump screws on the LHS of the vehicle and remove the cover.
- Remove the bleed screw indicated.
- Pour oil in the reservoir until air bubbles are no longer formed in the pipe.



- Tighten the bleed screw again and fill the reservoir until the oil reaches the recommended level.

Battery

BATTERY REMOVAL

- Remove the saddle.
- Make sure the ignition switch is set to «OFF».
- Disconnect the negative (-) lead first and then the positive (red) (+) one.
- Remove the battery breather pipe.
- Remove the battery from its housing and put it away on a level surface in a cool and dry place.



CAUTION



ONCE REMOVED, THE BATTERY MUST BE PUT AWAY IN A SAFE PLACE OUT OF THE REACH OF CHILDREN.

Tail guard

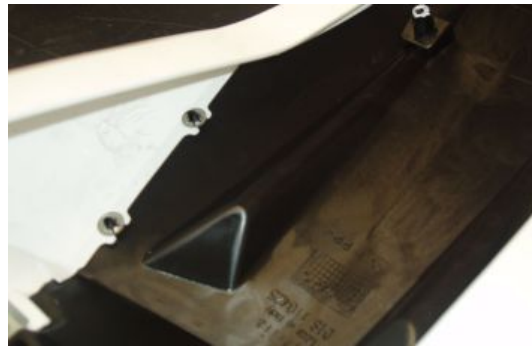
- Remove the saddle and the central side fairings.
- Undo and remove the two screws.



- Undo and remove the two lower screws.



- To detach the rear fairings from the tail section, check the fittings alongside the rim, from the lower side of the tail.



- Remove fairings and tail.



INDEX OF TOPICS

PRE-DELIVERY

PRE DE

Carry out the listed checks before delivering the vehicle.

WARNING

BE EXTREMELY CAUTIOUS WHEN HANDLING FUEL.

Aesthetic inspection

- Paintwork
 - Fitting of Plastic Parts
 - Scratches
 - Dirt
-

Tightening torques inspection

- Safety locks:
 - 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 start-up
 - 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. IN CASE OF CONTACT WITH YOUR EYES OR SKIN, WASH WITH ABUNDANT WATER FOR APPROX. 15 MIN. AND SEEK MEDICAL ATTENTION IMMEDIATELY. IF ACCIDENTALLY SWALLOWED, IMMEDIATELY DRINK LARGE QUANTITIES OF WATER OR VEGETABLE OIL. SEEK MEDICAL ATTENTION IMMEDIATELY. 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.

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