SERVICE STATION MANUAL

Mission 125 / 200

THE VALUE OF SERVICE

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

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

For information about the nearest **Official Dealer and/or Service Centre**, consult the Yellow Pages or search directly from the map on our Official Website:

www.ksr-group.com

Only by requesting KSR Original Spare Parts can you be sure of purchasing products that were developed and tested together with the actual vehicle itself. All KSR Original Spare Parts undergo quality control procedures to guarantee reliability and durability.

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

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

SERVICE STATION MANUAL
Mission 125 / 200

- This manual provides the main information to carry out regular maintenance operations on your vehicle.
- This manual is intended to KSR 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, KSR 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 KSR 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 KSR 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.


GO
FASTER

INDEX OF TOPICS

INDEX OF TOPICS

Rules

Safety rules

GENERAL PRECAUTIONS AND INFORMATION

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

CAUTION

USE OF NAKED FLAMES IS FORBIDDEN DURING ALL TYPES OF OPERATION. BEFORE STARTING ANY MAINTENANCE OPERATION OR INSPECTION ON THE VEHICLE, SWITCH OFF THE ENGINE AND REMOVE THE KEY. WAIT UNTIL THE ENGINE AND THE EXHAUST SYSTEM ARE COLD, IF POSSIBLE, RAISE THE VEHICLE USING A SUITABLE TOOL ON FIRM AND LEVEL GROUND. TO AVOID BURNS PAY SPECIAL CARE WITH HOT ENGINE AND EXHAUST SYSTEM PARTS.
DO NOT HOLD ANY MECHANICAL OR OTHER MOTORCYCLE PARTS WITH YOUR MOUTH: MOTORCYCLE COMPONENT ARE NOT EDIBLE, ON THE CONTRARY SOME OF THEM ARE HARMFUL AND EVEN TOXIC.

CARBON MONOXIDE

If you need to keep the engine running in order to carry out any procedure, please ensure that you do so in an open or very well ventilated area.

Never let the engine run in an enclosed area.

If you do work in an enclosed area, make sure to use a smoke-extraction system.

CAUTION

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

FUEL

CAUTION

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

CAUTION

DO NOT DISPOSE OF FUEL INTO THE ENVIRONMENT.

CAUTION

KEEP OUT OF THE REACH OF CHILDREN.

HIGH-TEMPERATURE COMPONENTS

The engine and the components of the exhaust system can get very hot and remain hot for some time even after the engine has been switched off.

Before handling these components, make sure that you are wearing insulating gloves or wait until the engine and the exhaust system have cooled down.

TRANSMISSION OIL AND USED FORK OIL

CAUTION

IT IS ADVISABLE TO WEAR LATEX GLOVES WHEN CARRYING OUT SERVICE WORK.
THE TRANSMISSION OIL MAY CAUSE SKIN DAMAGE IF HANDLED FREQUENTLY AND FOR LONG PERIODS.
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.
IT IS ADVISABLE TO WEAR LATEX GLOVES WHEN CARRYING OUT SERVICE WORK.

CAUTION

DO NOT DISPOSE OF OIL INTO THE ENVIRONMENT.

CAUTION

KEEP OUT OF THE REACH OF CHILDREN.

BRAKE FLUID

CAUTION

THE BRAKE FLUID MAY DAMAGE PAINTED, PVC OR RUBBER SURFACES. WHEN SERVICING THE BRAKE SYSTEM, PROTECT THESE COMPONENTS WITH A CLEAN CLOTH.
ALWAYS WEAR PROTECTIVE GOGGLES WHEN SERVICING THE BRAKE SYSTEM.
THE BRAKE FLUID IS EXTREMELY DANGEROUS TO THE EYES.
IN THE EVENT OF ACCIDENTAL CONTACT WITH THE EYES, RINSE THEM IMMEDIATELY WITH ABUNDANT COLD, CLEAN WATER AND SEEK MEDICAL ADVICE.

CAUTION

KEEP OUT OF THE REACH OF CHILDREN.

HYDROGEN GAS AND BATTERY ELECTROLYTE

CAUTION

THE BATTERY ELECTROLYTE IS TOXIC, CORROSIVE AND AS IT CONTAINS SULPHURIC ACID, IT CAN CAUSE BURNS WHEN IN CONTACT WITH THE SKIN.
WHEN HANDLING THE BATTERY ELECTROLYTE, WEAR TIGHT-FITTING GLOVES AND PROTECTIVE APPAREL.
IF THE ELECTROLYTIC FLUID GETS INTO CONTACT WITH THE SKIN, WASH WITH ABUNDANT COOL WATER.
IT IS PARTICULARLY IMPORTANT TO PROTECT THE EYES BECAUSE EVEN TINY AMOUNTS OF BATTERY ACID MAY CAUSE BLINDNESS. IF IT COMES INTO CONTACT WITH THE EYES,

RINSE THEM CAREFULLY WITH WATER FOR FIFTEEN MINUTES, THEN SEE AN EYE SPECIALIST AS SOON AS POSSIBLE.
IF IT IS ACCIDENTALLY SWALLOWED, DRINK LARGE QUANTITIES OF WATER OR MILK, FOLLOWED BY MILK OF MAGNESIA OR VEGETAL OIL, AND SEEK MEDICAL ADVICE IMMEDIATELY.
THE BATTERY RELEASES EXPLOSIVE GASES. KEEP IT AWAY OF FLAMES, SPARKS, CIGARETTES OR ANY OTHER HEAT SOURCE.
ENSURE ADEQUATE VENTILATION WHEN SERVICING OR RECHARGING THE BATTERY.

CAUTION

KEEP OUT OF THE REACH OF CHILDREN.

CAUTION

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

Maintenance rules

GENERAL PRECAUTIONS AND INFORMATION

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

CAUTION

UNLESS OTHERWISE INDICATED, REFIT THE UNIT FOLLOWING THE REMOVAL STEPS BUT IN REVERSE ORDER. THE POSSIBLE OVERLAPPING OF OPERATIONS REFERRED TO IN THE OTHER CHAPTERS MUST BE CARRIED OUT LOGICALLY, AVOIDING ANY UNNECESSARY RE- MOVAL OF COMPONENTS. DO NOT POLISH MATT PAINTWORK WITH ABRASIVE PASTES.
NEVER USE FUEL AS SOLVENT FOR CLEANING THE MOTORCYCLE.
DO NOT USE ALCOHOL, PETROL OR SOLVENTS TO CLEAN RUBBER AND PLASTIC PARTS AND THE SADDLE. USE ONLY WATER AND NEUTRAL SOAP INSTEAD.
DISCONNECT THE NEGATIVE CABLE (-) OF THE BATTERY IF YOU INTEND TO CARRY OUT ELECTRICAL WELDING WORK.

BEFORE REMOVING COMPONENTS

- Before disassembling components, remove dirt, mud, dust and foreign bodies from the vehicle.
- Use the special tools designed for this vehicle, 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 coupled parts together since they have "adjusted" to each other due to normal wear and tear.
- Some components must be used together or replaced altogether.
- Keep away from heat sources.

REASSEMBLING COMPONENTS

CAUTION

NEVER REUSE A CIRCLIP; IF A CIRCLIP HAS BEEN REMOVED, IT MUST BE REPLACED WITH A NEW ONE. WHEN INSTALLING A CIRCLIP, ENSURE THAT ITS ENDS ARE NOT STRETCHED MORE THAN IS NECESSARY TO FIT IT ONTO THE SHAFT.
AFTER INSTALLING THE CIRCLIP, CHECK THAT IT IS FULLY AND CLEANLY INSTALLED IN ITS SEAT.
DO NOT USED COMPRESSED AIR TO CLEAN BEARINGS.

NOTE

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

- Use only ORIGINAL KSR SPARE PARTS.
- Comply with lubricant and consumables usage 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 the oil seal and the bearings with the brand or lot number facing outward (visible side).

ELECTRIC CONNECTORS

Electric connectors must be disconnected as described below as non-compliance with the procedure so described causes irreparable damage to both the connector and the cable harness: Press the relevant safety hooks, if any.

CAUTION

DO NOT DISCONNECT CONNECTORS BY PULLING THE CABLES.

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

- In presence of dirt, rust, humidity etc., clean the connector's internal parts carefully, using a pressurised air jet.
- Ensure that the cables are correctly fastened to the internal connector terminals.

NOTE

THE TWO CONNECTORS CONNECT ONLY FROM ONE SIDE; CONNECT THEM THE RIGHT WAY ROUND.

- Then fit the two connectors making sure that they couple correctly (if the relevant hooks are provided, you will hear them "click" into place).

TIGHTENING TORQUES

CAUTION

DO NOT FORGET THAT TIGHTENING TORQUES OF ALL FASTENING ELEMENTS ON WHEELS, BRAKES, WHEEL AXLES AND OTHER SUSPENSION COMPONENTS PLAY A KEY ROLE IN ENSURING THE VEHICLE'S SAFETY AND MUST COMPLY WITH SPECIFIED VALUES.
CHECK THE TIGHTENING TORQUES OF FASTENING PARTS ON A REGULAR BASIS AND ALWAYS USE A TORQUE WRENCH TO REASSEMBLE THESE COMPONENTS.
IF THESE RECOMMENDATIONS ARE NOT COMPLIED WITH, ONE OF THE COMPONENTS MAY BECOME LOOSE AND EVEN DETACHED, THUS BLOCKING A WHEEL, OR OTHERWISE COMPROMISING THE VEHICLE'S MANOEUVRABILITY. THIS CAN LEAD TO FALLS, WITH THE RISK OF SERIOUS INJURY OR DEATH.

BRAKE FLUID

CAUTION

DO NOT USE FLUIDS OTHER THAN THOSE PRESCRIBED AND DO NOT MIX DIFFERENT LIQUIDS WHEN TOPPING UP IN ORDER NOT TO DAMAGE THE BRAKE SYSTEM.
DO NOT USE BRAKE FLUID TAKEN FROM OLD CONTAINERS OR FROM CONTAINERS THAT HAVE BEEN OPEN FOR A PROLONGED TIME.
SUDDEN CHANGES IN THE CLEARANCE OR ELASTIC RESISTANCE IN THE BRAKE LEVERS ARE DUE TO FAULTS IN THE HYDRAULIC CIRCUIT.
MAKE ESPECIALLY SURE THAT BRAKE DISCS AND THE FRICTION MATERIAL ARE NOT SMEARED OR GREASY, PARTICULARLY AFTER CARRYING OUT MAINTENANCE AND INSPECTION OPERATIONS.
CHECK THAT BRAKE WIRES ARE NOT TWISTED OR WORN.
ENSURE THAT WATER OR DUST DO NOT INGRESS INADVERTENTLY INTO THE CIRCUIT.
IT IS ADVISABLE TO WEAR LATEX GLOVES WHEN SERVICING THE HYDRAULIC CIRCUIT.

DISC BRAKE

CAUTION

ANY OIL OR OTHER LIQUIDS ON A DISC WILL SOIL THE BRAKE PADS.
SOILED PADS MUST BE REMOVED AND REPLACED. A SOILED DISC OR A DISC WITH TRACES OF OIL MUST BE CLEANED WITH A TOP QUALITY DEGREASING AGENT.
IF THE MOTORCYCLE IS USED CLOSE TO WATER OR ON DUSTY OR UNSURFACED ROADS, OR IF IT IS USED FOR SPORTS APPLICATION, HALVE THE SERVICE INTERVALS.

COOLANT

Coolant liquid solution is 50% water and 50% antifreeze. This is the ideal mixture for most operating temperatures and provides good corrosion protection.

This solution is also suited to the warm season, as it is less prone to evaporative loss and will reduce the need for top-ups.

Thus, mineral salt deposits formed in the radiator by evaporated water are also minimised and the efficiency of the cooling system is not affected.

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

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

Depending on the freezing temperature of the coolant mixture you wish to achieve, add the percentage of coolant indicated in the following table to the water:

FREEZING POINT C° (-°F)

Specification	Desc./Quantity
-20° (-4)	Coolant 35% by volume
-30° (-22)	Coolant 45% by volume
-40° (-40)	Coolant 55% by volume

NOTE

THE DIFFERENT ANTIFREEZE LIQUIDS HAVE DIFFERENT CHARACTERISTICS. THE DEGREE OF PROTECTION GUARANTEED CAN BE FOUND ON THE LABEL OF THE PRODUCT.

CAUTION

USE ONLY ANTIFREEZE AND CORROSION INHIBITORS WITHOUT NITRITE THAT ENSURE A PROTECTION OF AT LEAST -35°C (-31°F).

TYRES

CAUTION

CHANGING, REPAIR, MAINTENANCE AND BALANCING ARE IMPORTANT OPERATIONS THAT ARE CARRIED OUT BY QUALIFIED PERSONNEL USING SUITABLE TOOLS.
THE NEW TYRES MAY BE COVERED WITH A THIN LAYER OF PROTECTIVE COATING THAT IS SLIPPERY. DRIVE CAREFULLY FOR THE FIRST FEW KILOMETRES (MILES).
NEVER USE RUBBER TREATMENT AGENTS OF ANY KIND ON THE TYRES.
IN PARTICULAR ENSURE THAT THE TYRES DO NOT COME INTO CONTACT WITH LIQUID FUEL THAT WOULD CAUSE A RAPID DETERIORATION OF THE RUBBER.
A TYRE THAT HAS BEEN IN CONTACT WITH OIL OR PETROL MUST BE REPLACED AND NOT SIMPLY CLEANED.
DO NOT FIT TYRES WITH INNER TUBES ON WHEEL RIMS FOR TUBELESS TYRES AND VICE VERSA.

Vehicle identification

These numbers are necessary for vehicle registration.

NOTE

ALTERING IDENTIFICATION NUMBERS CAN BE SERIOUSLY PUNISHED BY LAW, PARTICULARLY MODIFYING THE CHASSIS NUMBER WILL IMMEDIATELY INVALIDATE THE WARRANTY.

Engine number

The engine number ① is stamped on the rear side, next to the left shock absorber.

Chassis number

The chassis number ② is stamped on the front frame; to read it, open the glove-box and remove the protection cover.

Dimensions and mass

WEIGHT AND DIMENSIONS

Specification	Desc./Quantity
Max. length	2000mm
Max. width	745mm
Max. height (to windshield)	1150mm
Saddle height	800mm
Wheelbase	1450mm
Minimum ground clearance	145mm
Weight in running order (kerb weight)	154kg

Engine

ENGINE TECHNICAL DATA

Specification	Desc./Quantity
Engine model	JC1P58MI-3C (125) JC1P63ML-4C (200)
Engine type	Single-cylinder, 4-stroke, 4 valves, wet sump forced lubrication system, double overhead camshaft.
Overall engine capacity	124.2 cm³ (125) 180.8 cm³ (200)
Bore/stroke	58 mm x 47 mm (125) 63 mm x 58 mm (200)
Compression ratio	12.0 ± 0.5 : 1 (125) 11.6 ± 0.5 : 1 (200)
Valve clearance	Intake: 0.10 to 0.15 Exhaust: 0.20 - 0.25
Ignition	starter
Idle speed	1800 ± 180 rpm (125) 1800 ± 180 rpm (200)
Clutch	Automatic centrifugal dry clutch

Specification	Desc./Quantity
Gearbox	Automatic
Cooling	50% antifreeze + 50% deionized water
Fuel system	EFI
Throttle body diffuser	Ø 28 mm Ø 32 mm
Fuel	Premium unleaded petrol, minimum octane rating of 95 (NORM) and 85 (NOMM)
Ignition type	Electronic
Standard spark plug	NGK PMR9B

Transmission

TRANSMISSION

Specification	Desc./Quantity
Transmission (125 - 200)	CVT with belt + final reduction unit
CVT ratio (125)	2.700 : 1 - 0.840: 1
CVT ratio (200)	2.380: 1 - 0.860 : 1
Gear ratio (125)	47/ 14 x 47 / 15
Gear ratio (200)	45 / 16 x 47 / 15
Variator	continuous, automatic
Primary drive	V-belt
Secondary	With gears
Engine/wheel total ratio (125)	minimum: 28.401 maximum: 8.836
Engine/wheel total ratio (200)	minimum: 20.974 maximum: 7.579
Variable speed rollers (125)	- minimum diameter: 18.50 mm (0.73 in) - standard diameter: 19.0 ± 0.1 mm (0.748 ± 0.004 in)
Variable speed rollers (200)	- minimum diameter: 20.1 mm (0.79 in) - standard diameter: 20.6 ± 0.1 mm (0.81 ± 0.004 in)
Pulley sliding bushing (125 - 200)	- minimum diameter: 25.95 mm (1.022 in) - standard diameter: 26.00 (-0.02/-0.041) mm (1.0236 (-0.0008/ + 0.0016 in))
Movable pulley bushing (125 - 200)	- maximum diameter: 26.121 mm (1.028 in) - standard diameter: 26.000 (+0/0.121) mm (0.8661 (+0/+ 0.0047 in))
Driving belt width (125 - 200)	- minimum: 21.0 mm (0.827 in) - standard: 22.0 +/- 0.2 mm (0.8661 +/- 0.0079 in)

Capacities

CAPACITY

Specification	Desc./Quantity
Engine oil (Engine oil change and engine oil filter replacement)	900 cm³
Transmission oil	130 cm³
Coolant	1.15 l (50% water + 50% ethylene glycol antifreeze fluid)
Depth of fork oil level from the rim - without spring - fork included	80 mm
Seats	2
Vehicle max. load (rider + passenger + luggage)	309kg

Electrical system

ELECTRICAL SYSTEM

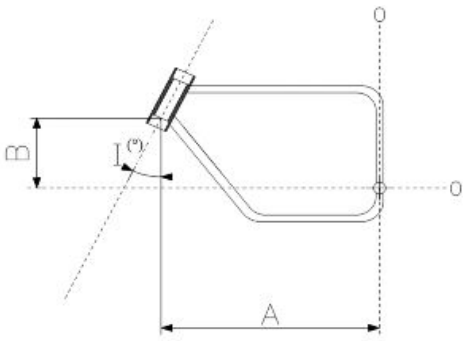
Specification	Desc./Quantity
Battery	12V - 8 Ah
fuses	20 - 15 - 15 - 15 - 1- 1A
(Permanent-magnet) Alternator	12 V - 200W at 8000 rpm

BULBS/WARNING LIGHTS

	Specification	Desc./Quantity
1	High-/low-beam bulb	12 V 55/55 W H7
2	Front position bulb	12V - 5W W5W
3	Front turn indicator bulbs	12V - 10 W XRY10W (amber)
4	Rear turn indicator bulbs	12V - 10 W EWRY10W (amber)
5	License plate light bulb	12V - 5W W5W
6	Tail light bulb	12V - 5/21W P21/5W
7	Instrument panel lighting bulb (*)	LED
8	Turn indicator warning light (*)	LED
9	High-beam warning light (*)	LED
10	Low fuel warning light (*)	LED
11	Engine oil pressure warning light (*)	LED
12	Electronic fuel injection check warning light (*)	LED

(*) Cannot be replaced

Frame and suspensions



CHASSIS AND SUSPENSION

Specification	Desc./Quantity
Size "A"	538.4 mm
Size "B"	439.3 mm
Steering rake angle	26.30°
Chassis type	High-strength steel tubular chassis, single spar at the front, superimposed double cradle at the rear.
Front suspension	Hydraulic action telescopic fork
Front suspension travel	104 mm
Rear suspension	hydraulic double-acting shock absorber and adjustable preloading
Rear suspension travel	80 mm

Brakes

BRAKES

Specification	Desc./Quantity
Front brake	Ø 267 mm disc brake with hydraulic transmission
Rear brake	Ø 220-mm disc brake with hydraulic transmission

Wheels and tyres

WHEELS AND TYRES

Specification	Desc./Quantity
Wheel Rims	made of light alloy

Specification	Desc./Quantity
Front wheel rim	3.00 x 13"
Rear wheel rim	3.50 x 13"
Tyres	Without inner tube (Tubeless)
Front tyre	120/70 - 13" 53 P
Rear tyre	130/70 - 13" 63 P
Front tyre standard inflation pressure	200 kPa (2.0 bar)
Rear tyre standard inflation pressure	200 kPa (2.0 bar)
Front tyre standard inflation pressure with passenger	210 kPa (2.1 bar)
Rear tyre standard inflation pressure with passenger	220 kPa (2.2 bar)

Tightening Torques

FRONT BODYWORK UNIT

Name	Torque in Nm
M6 screw fixing wheel housing to chassis and radiator support	6 (4.44 lbf ft)
M6 screw fixing front mudguard to fork	10 (7.4 lbf ft)
M5 screw fixing front mudguard to stem cover	4 (2.96 lbf ft)
M8 screw fixing of mudguard support to fork stems	25 (18.5 lbf ft)
Screw fixing bumpers to front shield fairings	1 (0.74 lbf ft)
Screw fixing chrome-plated moulding to internal shield	1 (0.74 lbf ft)
Screw fixing front shield fairings to shield fairing, lower section	2 (1.48 lbf ft)
Screw fixing wheel housing to front shield fairing	2 (1.48 lbf ft)
Screw fixing internal shield cover, internal section	1 (0.74 lbf ft)
Radiator grille to case fixing screw	1 (0.74 lbf ft)
Case to internal shield fixing screw	2 (1.48 lbf ft)
M5 screw fixing case to wheel housing	4 (2.96 lbf ft)

CENTRAL BODYWORK UNIT

Name	Torque in Nm
Footrests to chassis fixing screw	4 (2.96 lbf ft)
M6 screw fixing battery access to footrest	4 (2.96 lbf ft)
Footrest to under-footrest fixing screw	1 (0.74 lbf ft)
Screw fixing under-footrest to rear lower side footrest	1 (0.74 lbf ft)
M5 screw fixing engine head access	4 (2.96 lbf ft)
Screw fixing engine head access, top side	1 (0.74 lbf ft)
Screw fixing side stand access to under-footrest	1 (0.74 lbf ft)
M6 screw fixing screw saddle lock to glove-box	5 (3.7 lbf ft)
M6 screw fixing glove-box to chassis	5 (3.7 lbf ft)
Screw fixing footrests to left and right tail fairing	1 (0.74 lbf ft)
Carburettor access fixing screw	1 (0.74 lbf ft)
Screw fixing right and left shield fairings to internal shield	2 (1.48 lbf ft)
Screw fixing glove-box lock to internal shield	1 (0.74 lbf ft)
M6 nut fixing saddle hinge to saddle	6 (4.44 lbf ft)
M5 screws fixing saddle hinge to saddle	4 (2.96 lbf ft)
Glove-box lid fixing screw	1 (0.74 lbf ft)
Screw fixing glove-box lid to internal shield	1 (0.74 lbf ft)

REAR BODYWORK UNIT

Name	Torque in Nm
M6 screw fixing license plate holder to rear mudguard	5 (3.7 lbf ft)
Screw fixing tail fairing to helmet compartment, top and front	1 (0.74 lbf ft)
Taillight to tail fairing fixing screw	1 (0.74 lbf ft)
Rear passenger grab handle M8 fixing screw	25 (18.5 lbf ft)
Passenger grab handle cover fixing screw	1 (0.74 lbf ft)
M6 screw fixing rear mudguard to rear frame	5 (3.7 lbf ft)
M6 screw fixing rear mudguard to tail fairing	4 (2.96 lbf ft)
Screw fixing lower closure to Left and right side tail fairing	1 (0.74 lbf ft)
Screw fixing license plate light to rear mudguard	1 (0.74 lbf ft)
M5 screw fixing rear mudguard to silencer supporting plate	6 (4.44 lbf ft)

HEAD INSTRUMENT PANEL UNIT

Name	Torque in Nm
Screw fixing instrument panel to headlamp panel, top section	1 (0.74 lbf ft)
Screw fixing instrument panel to headlamp panel, bottom section	2 (1.48 lbf ft)
Screw fixing instrument panel to headlamp panel, bottom section, close to indicators	1 (0.74 lbf ft)
Instrument panel support fixing screw	1 (0.74 lbf ft)
Screw fixing instrument panel support to instrument panel	1 (0.74 lbf ft)
Screw fixing indicators cover to headlamp panel	1 (0.74 lbf ft)
Headlamp to headlamp panel fixing screw	1 (0.74 lbf ft)
Headlamp panel to handlebar fixing screw	1 (0.74 lbf ft)
M5 screw fixing left and right light switch	2 (1.48 lbf ft)

FRAME ASSEMBLY

Name	Torque in Nm
M8 screw fixing curved support behind licence plate holder	25 (18.5 lbf ft)

HANDLEBAR UNIT

Name	Torque in Nm
M10 screw fixing handlebar	52 (38.48 lbf ft)
M8 safety screw for handlebar	20 (14.8 lbf ft)

ENGINE LINK ROD UNIT

Name	Torque in Nm
M10 screw fixing connecting rod to engine	50 (37 lbf ft)
M10 screw fixing connecting rod to timing buffer	50 (37 lbf ft)
M12 pin fixing connecting rod to chassis	60 (44.4 lbf ft)
M12 pin fixing single connecting rod to double connecting rod	60 (44.4 lbf ft)

STAND UNIT

Name	Torque in Nm
M10 screw fixing stand to stand support	50 (37 lbf ft)
M8 screw fixing screw stand support to engine	25 (18.5 lbf ft)

BRAKING SYSTEM UNIT

Name	Torque in Nm
M8 screw fixing front brake calliper	25 (18.5 lbf ft)
M8 screw fixing rear brake calliper	25 (18.5 lbf ft)
M6 screw fixing front brake pump to handlebar	10 (7.4 lbf ft)
Screw fixing the rear brake pump to the handlebar	10 (7.4 lbf ft)
M8 screws fixing front brake disc	25 (18.44 lbf ft) + Loctite 243
M8 screws fixing rear brake disc	25 (18.44 lbf ft) + Loctite 243

EXHAUST SYSTEM UNIT

Name	Torque in Nm
M8 nut fixing nut exhaust manifold to engine	15 (11.1 lbf ft)
M10 screw fixing screw silencer clamp to exhaust manifold	17 (12.58 lbf ft)
M8 screw fixing silencer to plate	25 (18.5 lbf ft)
Lambda probe	50 (36.88 lbf ft)

COOLING SYSTEM UNIT

Name	Torque in Nm
M6 fixing screw for radiator (on plastic)	6 (4.44 lbf ft)
Coolant piping clamp retainers	3 (2.22 lbf ft)
Screw fixing the electric fan to the radiator	1.5 (1.11 lbf ft)
M6 screw fixing expansion tank	4 (2.96 lbf ft)

Name	Torque in Nm
Thermal switch retainer	20 (14.8 lbf ft)

ELECTRICAL SYSTEM UNIT

Name	Torque in Nm
M6 screw fixing ignition key lock	10 (7.4 lbf ft)
M5 screw fixing screw HV coil to chassis	5 (3.7 lbf ft)
M8 fixing screw for horn	20 (14.8 lbf ft)
M6 fixing screw for voltage regulator	10 (7.4 lbf ft)
M6 fixing nut for start-up relay cables	6 (4.44 lbf ft)
M5 screws fixing fall sensor	4 (2.96 lbf ft)
M8 screw fixing fall sensor support	25 (18.5 lbf ft)
M6 screw fixing coil support	10 (7.4 lbf ft)
M3 screw fixing coil	2 (1.48 lbf ft)

FUEL TANK UNIT

Name	Torque in Nm
M6 screw fixing tank to chassis	10 (7.4 lbf ft)
Ring nut fixing fuel pump	22 (16.23 lbf ft)

REAR SUSPENSION UNIT

Name	Torque in Nm
M8 upper screw fixing shock absorber	25 (18.5 lbf ft)
M10 lower screw fixing shock absorber	50 (37 lbf ft)
M8 screw fixing shock absorber lower support to engine	25 (18.5 lbf ft)

REAR WHEEL UNIT

Name	Torque in Nm
M14 fixing nut for rear wheel	110 (81.4 lbf ft)

FRONT SUSPENSION UNIT

Name	Torque in Nm
Steering nut	15 (11.1 lbf ft) unscrew ¼ of a turn
Steering lock nut	110 (81.4 lbf ft)
M6 screw fixing front wheel axle clamp	10 (7.4 lbf ft)

FRONT WHEEL UNIT

Name	Torque in Nm
Wheel axle fixing screw	50 (37 lbf ft)

ENGINE UNIT

Name	Torque in Nm
Intake manifold EI fixing screws - M6x20 (3)	10 Nm (7.38 lbf ft)
Oil filter cover EI fixing screws - M6x20 (2)	10 Nm (7.38 lbf ft)
Oil pump housing EI fixing screws - M6x25 (2)	10 Nm (7.38 lbf ft) - Loctite 243
Head fixing screw - M8x166 (4)	25 Nm + 90° (18.44 lbf ft + 90°)
Thermostat cover EI fixing screws - M6x20 (2)	10 Nm (7.38 lbf ft)
Head fixing screw (chain side) - M6x130 (2)	11 Nm (8.11 lbf ft)
Drainage fixing screw stud - M8x40 (2)	12 Nm (8.85 lbf ft)
Camshaft support EI fixing screws - M6x40 (8)	10 Nm (7.38 lbf ft)
Valve cover EI fixing screws - M6 (4)	10 Nm (7.38 lbf ft)
Chain tensioner retainer - M6x16 (2)	12 Nm (8.85 lbf ft)
Chain tensioner guide pad fulcrum fixing screws - M6 (1)	10 Nm (7.38 lbf ft) Loct. 243
Transmission gear timing fixing screw - M8x20x1 (2)	27 Nm (19.91 lbf ft) - Loctite 243
Transmission oil drainage plug - M12x1.5 (1)	25 Nm (18.44 lbf ft)
Right side crankcase oil drainage plug - M18x1.5 (1)	35 Nm (25.81 lbf ft)
Overpressure valve cap - M18x1.5 (1)	35 Nm (25.81 lbf ft)
Transmission oil filler cap - M14 x 1.5	-
Oil level cap - M16x1.5 (1)	-

Name	Torque in Nm
Crankcase fixing screws - M6x50 (2)	11 Nm (8.11 lbf ft)
Crankcase fixing screws - M6x70 (1)	11 Nm (8.11 lbf ft)
Ignition cover fixing screws - M6x110 (5)	11 Nm (8.11 lbf ft)
Ignition cover fixing screws - M6x140 (1)	11 Nm (8.11 lbf ft)
Ignition cover fixing screws - M6x170 (1)	11 Nm (8.11 lbf ft)
Ignition cover EI screws - M6x25 (1)	11 Nm (8.11 lbf ft)
Crankshaft timing hole cap EI screws - M8x14 (1)	15 Nm (11.06 lbf ft)
Oil pump plate EI screws - M5x12 (4)	6 Nm (4.42 lbf ft) - Loctite 243
Water pump housing EI fixing screws - M5x18 (3)	6 Nm (4.42 lbf ft)
Cover fixing screws CVT (125 cm³) - M6x35 (12)	10 Nm (7.38 lbf ft)
Cover fixing screws CVT (180 cm³) - M6x35 (11)	10 Nm (7.38 lbf ft)
Transmission cover EI fixing screws - M6x30 (8)	10 Nm (7.38 lbf ft)
Freewheel housing EI fixing screws - M8x20 (3)	25 Nm (18.44 lbf ft) - Loctite 243
Starter motor EI fixing screws - M6x25 (2)	10 Nm (7.38 lbf ft)
Stator EI fixing screws - M6x25 (3)	10 Nm (7.38 lbf ft) - Loctite 243
Rotor TEF fixing screw - M8x25 (1)	25 Nm (18.44 lbf ft) - Loctite 243
Rear CVT pulley fixing flanged nut - M12x1 (1)	60 Nm (44.25 lbf ft) - Loctite 243
Front CVT pulley fixing flanged nut - M12x1 (1)	75 Nm (55.32 lbf ft) - Loct. 243
Pick-up EI fixing screws	6 Nm (4.42 lbf ft)
Stator cable bracket fixing screw - M5x8 (1)	4 Nm (2.95 lbf ft) - Loctite 243
Fuel injector fixing screw - M6x16 (1)	8 Nm (5.90 lbf ft)
Chain tensioning cover - M8 (1)	6 Nm (4.43 lbf ft)
Spark plug (1)	10 Nm (7.38 lbf ft)
Oil pressure switch TE screws - M10x1 (1)	10 Nm (7.38 lbf ft)
Thermistor fixing screws - M12x1.5	22 Nm (16.23 lbf ft)
Screw fixing the silencer plate to the engine	25 (18.5 lbf ft)
M6 screw fixing filter casing to engine	8 (5.92 lbf ft)
Sleeve clamp retainer in the throttle body	2 Nm (1.47 lbf ft)
Sleeve clamp on filter casing retainer	2 (1.48 lbf ft)
Water pump rotor	2 Nm (1.47 lbf ft)
Variator cover switch plate (125)	10 Nm (7.38 lbf ft)

Overhaul data

Assembly clearances

Cylinder - piston assy.

CYLINDER - PISTON COUPLING CLEARANCE 125 CM³

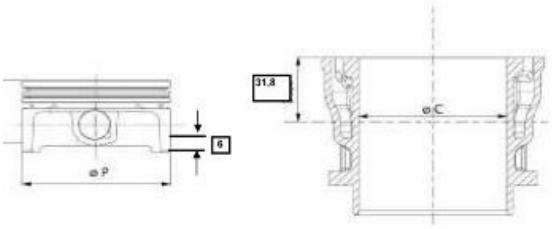
Coupling categories with cast-iron cylinder

NAME	ABBREVIATION	CYLINDER		PISTON		FITTING CLEARANCE	
		min	max	min	max	min	max
Cylinder/Piston	M	58,010	58,017	57,963	57,970	0,040	0,054
Cylinder/Piston	N	58,017	58,024	57,970	57,977	0,040	0,054
Cylinder/Piston	O	58,024	58,031	57,977	57,984	0,040	0,054
Cylinder/Piston	P	58,031	58,038	57,984	57,991	0,040	0,054

CYLINDER - PISTON COUPLING CLEARANCE 200 CM³

Coupling categories with cast-iron cylinder

NAME	ABBREVIATION	CYLINDER		PISTON		FITTING CLEARANCE	
		min	max	min	max	min	max
Cylinder/Piston	M	63,010	63,017	62,958	62,965	0,045	0,059
Cylinder/Piston	N	63,017	63,024	62,965	62,972	0,045	0,059
Cylinder/Piston	O	63,024	63,031	62,972	62,979	0,045	0,059
Cylinder/Piston	P	63,031	63,038	62,979	62,986	0,045	0,059



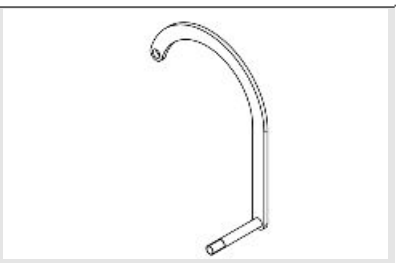
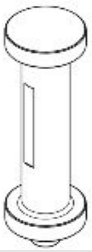
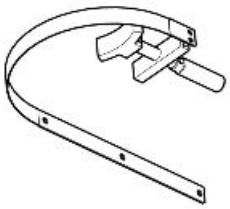
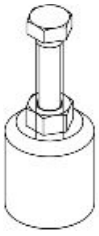
Products

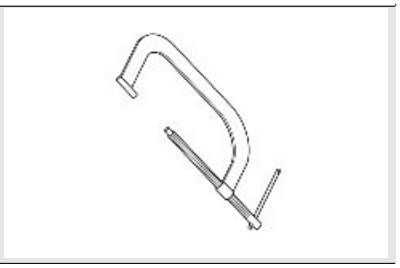
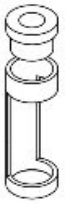
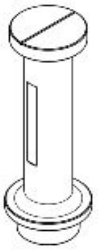
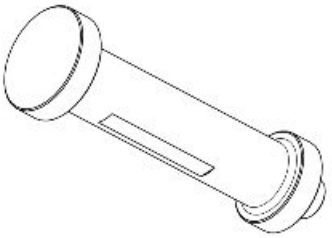
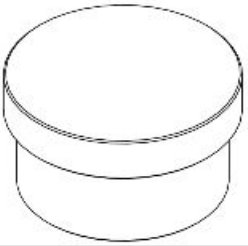
RECOMMENDED PRODUCTS TABLE

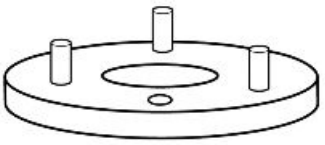
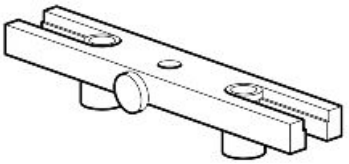
Product	Description	Specifications
AGIP TEC 4T, SAE 10W-40	Engine oil	75W-80
AGIP GEAR SYNTH SAE 75W-90	Gearbox oil	API GL4, GL5
AGIP FORK 7.5W	Fork oil	
AGIP GREASE SM2	Lithium grease with molybdenum for bearings and other points needing lubrication	NLGI 2
AGIP BRAKE 4	Brake fluid	FMVSS DOT4+
AGIP PERMANENT SPEZIAL	Coolant	Ready mixed biodegradable coolant with "long life" technology and characteristics (red). Freezing protection up to -40°C. Compliant with CUNA 956-16 standard.
AGIP FILTER OIL	Oil for air filter sponge	-
NEUTRAL GREASE OR PETROLEUM JELLY	BATTERY POLES	-

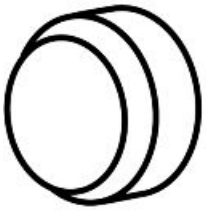
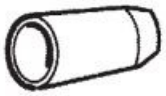
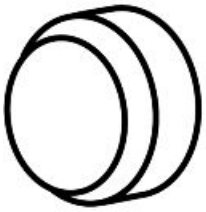
INDEX OF TOPICS

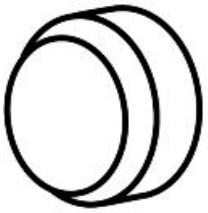
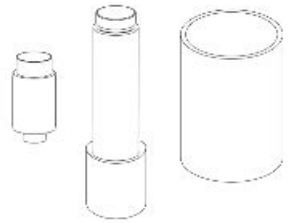
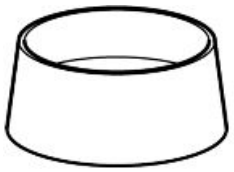
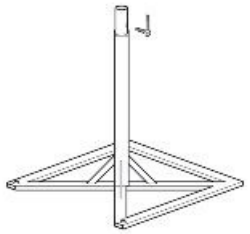
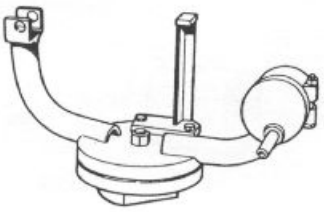
TOOLS

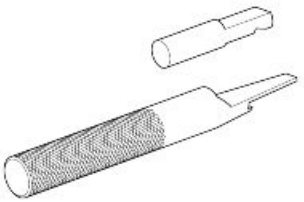
Stores code	Description	
020708Y	Adaptor for engine support	
AP8140535	driving pulley lock wrench	
020702Y	Main shaft bearing punch (15 x 42 x 13) on transmission cover	
020700Y	Water seal punch	
AP8140838	Flywheel rotor locking	
020707Y	Flywheel extractor	

Stores code	Description	
AP8140179	Valve spring compressor	
AP9100838	Tool for valve pressure plate	
020705Y	Piston seeger ring fitting	
020701Y	Punch for bushings	
020703Y	Clutch shaft support bearing punch (15x35x11) on crankcase cover	
0240880	Threaded bolt for locking crankshaft at TDC	
020704Y	Extractor for bushings	

Stores code	Description	
AP8140259	Tool for fitting/ removing the driven pulley clutch	
AP8140665	Adapter for clutch assembly removal	
AP8140266	Comparator door	
020074Y	Support base for checking crankshaft alignment	
020359Y	42 x 47-mm adaptor	
020360Y	52 x 55-mm adaptor	

Stores code	Description	
020364Y	25 mm Adaptor	
020376Y	Adapter handle	
020439Y	Shaft 2 oil seal punch 17 mm	
020455Y	10-mm guide for oil seal on water pump shaft	
020456Y	24 mm punch	
020335Y	Magnetic mounting for dial gauge	

Stores code	Description	
020375Y	28x30 mm punch	
AP8140662	Punch for roller casing	
AP8140664	Guide to mount the movable driven pulley	
AP8140187	Engine support stand	
002095Y	Engine support	
020331Y	Digital multimeter	

Stores code	Description	
AP0277512	Fitting buffer	
AP8104517	Belt removal kit	

INDEX OF TOPICS

Maintenance chart

ROUTINE MAINTENANCE TABLE

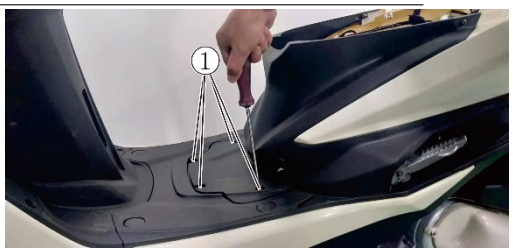
I: INSPECT AND CLEAN, ADJUST, LUBRICATE OR REPLACE IF NECESSARY
C: CLEAN, R: REPLACE, A: ADJUST, L: LUBRICATE
** Check level every 3,000 km*
*** Replace every 2 years*
**** Replace every 4 years*

km x 1,000	1	6	12	18	24	30	36	42	48	54	60
Driven pulley roller casing			L		L		L		L		L
Safety fasteners	I		I		I		I		I		I
Plastic bushing in variator cover			R		R		R		R		R
Clutch bell		C	C	C	C	C	C	C	C	C	C
Spark plug			R		R		R		R		R
Driving belt			R		R		R		R		R
Throttle control	A		A		A		A		A		A
Air filter		C	C	C	C	C	C	C	C	C	C
Transmission cover air duct filter			I		I		I		I		I
Engine oil filter	R		R		R		R		R		R
Valve clearance			A		A		A		A		A
Braking systems	I	I	I	I	I	I	I	I	I	I	I
Electrical system and battery	I		I		I		I		I		I
Brake fluid **	I		I		I		I		I		I
Coolant level**	I		I		I		I		I		I
Hub oil	R		I		R		I		R		I
Engine oil*	R	I	R	I	R	I	R	I	R	I	R
Headlight aiming adjustment			A		A		A		A		A
Sliding blocks / variable speed rollers			R		R		R		R		R
Vehicle road test	I		I		I		I		I		I
Variator front movable half-pulley			I		I		I		I		I
Radiator			C				C				C
Wheels/tyres	I	I	I	I	I	I	I	I	I	I	I
Suspension			I		I		I		I		I
Steering	I		I		I		I		I		I
Transmission			L		L		L		L		L
Fuel pipes ***	I		I		I		I		I		I

Spark plug

Spark plug replacement instructions

- Turn off ignition switch and remove central protecting cover.
- Unscrew and remove the four screws ① on the central protecting cover.



- Unscrew and remove the two screws ② on the left and right sides of central protecting cover (Each side has one screw.).

CAUTION

BE CAREFUL TO OPERATE.
DO NOT DAMAGE THE LOWER FIXING TABS AND/OR THEIR CORRESPONDING SLOTS.
HANDLE AND PROTECT THE PLASTIC AND PAINTED COMPONENTS WITH ACRE. DO NOT SCRATCH OR SPOIL THEM.

- Open and pull out the central protecting cover.
- Remove the two fixing bolts of the rectifier.

NOTE

UPON RE-INSTALLING, INSERT THE FITTING TABS INTO THEIR SLOTS CORRECTLY.

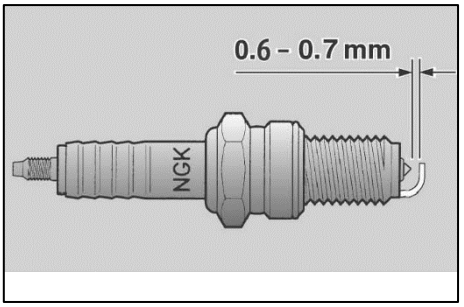
For removal and cleaning:

CAUTION

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

- Pull out the spark plug cap ①.
- Remove dirt from the spark plug base. Then remove the spark plug with the special spark plug sleeve provided in the tool box. Be careful not to let dust or any other substance into the cylinder.

- Remove carbon deposits from the spark plug with a small wire brush or spark plug cleaning tool. The spark plug clearance is adjusted to 0.6mm-0.7mm with the spark plug clearance thickness gauge. When the clearance is larger than 1.1 mm, the spark plug must be replaced. After removing the carbon deposits, it is necessary to check the color of the spark plug electrode. Whether the standard spark plug is applicable can be judged by this color. A spark plug with normal performance is light brown or tan. If the spark plug is white, it shall be replaced with a cold spark plug because it is working under overheating conditions. If the spark plug is wet and black, it may



be appropriate to replace it with a hot spark plug.

- Screw the spark plug into the thread with the spark plug sleeve carefully until it cannot be screwed by hand.
- The torque required for spark plug installation is specified as 10 Nm. In the absence of a torque wrench, the new spark plug is further screwed 1/2 turn after being tightened, and the old spark plug is further screwed 1/8 turn after being tightened.
- Insert the spark plug cap into the spark plug mounting hole.

CAUTION

TIGHTEN THE SPARK PLUG CORRECTLY. OTHERWISE, THE ENGINE MAY OVERHEAT AND GET DAMAGED IRRETRIEVABLY.

USE THE RECOMMENDED TYPE OF SPARK PLUG ONLY, OTHERWISE, THE SERVICE LIFE AND PERFORMANCE OF THE ENGINE MAY BE AFFECTED.

Performance parameters

Standard spark plug：NGK PMR9B

Spark plug electrode clearance：0.6-0.7 mm

Locking torques (N * m): Spark plug (1)10 Nm (7.38 lbf ft)

- Re-install the spark plug cap ① firmly to prevent it from falling off in case of engine vibration.
- Re-install the central protecting cover.

Hub oil

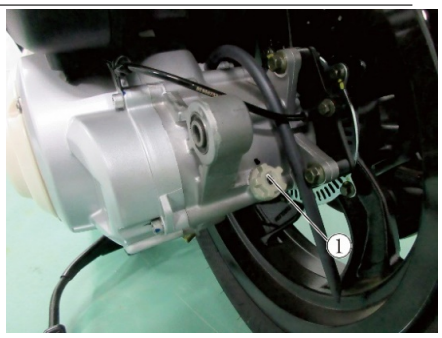
NOTE

USE THE RECOMMENDED OIL ONLY. GEARBOX OIL GRADE: 75W-80 SPECIAL OIL FOR GEARBOX.

- Park the vehicle on firm and level ground.
- Support the vehicle with the centre stand.

The gearbox oil lubricates and protects the gears and gear shafts in the gearbox. It shall be replaced regularly, which is beneficial to reduce gear wear and prolong the service life of the engine.
The gearbox oil shall be replaced for the first time when the vehicle drives 1000km or half a year for the first time and the gearbox oil shall be replaced thereafter when the vehicle drives every 10000km.

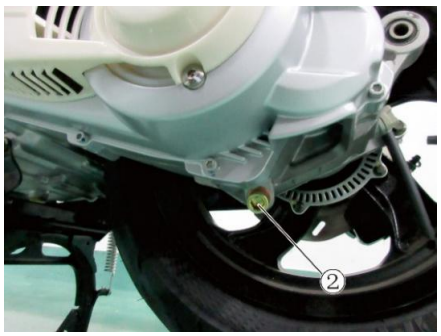
The replacement steps are as follows:



- Unscrew and remove the oiling plug screw ①.

NOTE

PLEASE PREPARE A COLLECTING CONTAINER BEFORE PERFORMING THESE OPERATIONS.



- Unscrew and remove the oil drainage bolt ②.
- Drain the old oil and tighten the oil drainage bolt ②.
- Fill 130ml gearbox oil.
- Tighten the oiling plug screw ①.

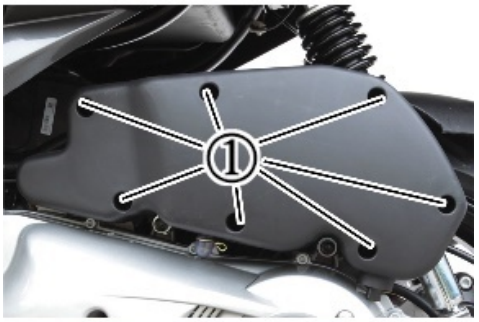
CAUTION

DO NOT RIDE THE MOTORCYCLE WITH INSUFFICIENT LUBRICATION OR CONTAMINATED OR INCORRECT LUBRICANTS AS THIS ACCELERATES THE WEAR AND TEAR OF THE MOVING PARTS AND MAY CAUSE IRRETRIEVABLE DAMAGE.

Air filter

Use the following procedures to remove the air filter element.

- Support the vehicle with the centre stand.
- Unscrew and remove the seven screws ①.
- Remove the bracket ② and polyurethane foam filter element ③.
- Clean and replace the filter element regularly according to the schedule of "regular maintenance items list".
- Re-install the cleaned filter in reverse order of disassembly. It must be installed firmly and sealed well.



Clear the air filter element

Clean the filter element as follows:

- Pour nonflammable cleaning agent into a cleaning basin with a proper size and then immerse the filter element in the solution for cleaning.
- Squeeze the cleaning solution from the washed filter element with the palms of both hands. Do not twist and rub the filter element, otherwise the filter element will crack.

CAUTION

Run the engine when the air filter element is not installed in place, which will cause sparks from the engine to splash to the air filter, or cause the dust to enter the engine. This can cause fire or get the engine damaged.
If the vehicle is rode in dusty, wet or muddy environment, clean or replace the air filter element frequently. If the air filter element is stuck in these environments, it may get the engine damaged, and bring poor performance and fuel economy to the engine.
If there is water in the air filter, clean the air filter chamber and filter element immediately.

CAUTION

Do not make the filter element become deformed in the process of cleaning.
If the filter element is too dirty or damaged, it shall be replaced.
Do not run the engine without a filter to avoid increasing the burden on the engine and affect the

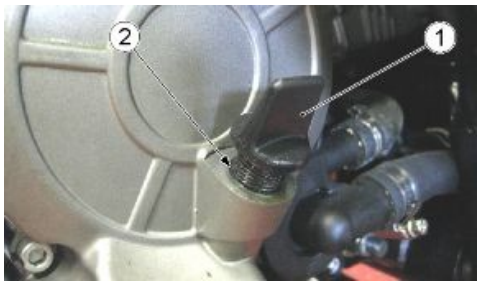
service life of the engine.
A cracked air filter element can cause dust to enter the engine to get the engine damaged.
In the process of cleaning, check whether there is any crack carefully. If there is any crack, replace it with a new filter element.

Engine oil

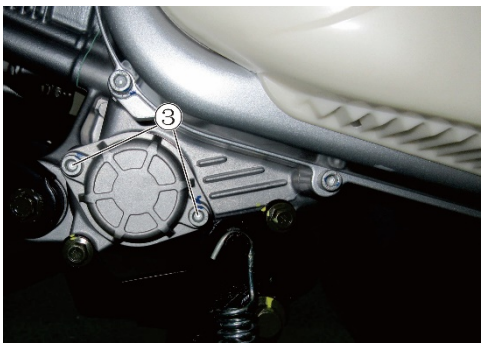
Replacement

CAUTION

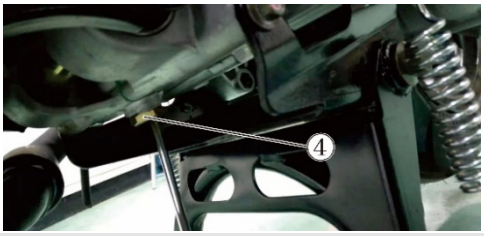
PARK THE MOTORCYCLE ON FIRM AND LEVEL GROUND.
Wait until the engine and exhaust system cool off.



- Support the vehicle with the centre stand.
- Turn off the engine and let it cool off to allow the oil in the crankcase to flow down and cool off.
- Unscrew and pull out the dipstick ①.



- Place the collecting container under the oil drainage plug ④.
- Unscrew and remove the oil drainage plug ④, drain all oil into the collecting container and insert the oil drainage plug ④.
- Remove the bolts ③ from the protecting cover and pull out the engine oil filter with a hex wrench.



- Install a new oil filter, tighten the protecting cover and the two bolts ③.
- Screw and tighten the engine oil drainage plug ④.

CAUTION

WHEN REPLACING THE OIL FILTER COVER AGAIN, BE CAREFUL NOT TO DAMAGE THE 0-RING.

- Fill about 950ml (58 cubic inch) oil through the oil filler ②.
- Screw and tighten the dipstick ①.
- Run the engine for several minutes. Turn off the engine to let it cool off.
- Check the engine oil level again.

Check

- Support the vehicle with the centre stand.

CAUTION

PARK THE MOTORCYCLE ON FIRM AND LEVEL GROUND.

CAUTION

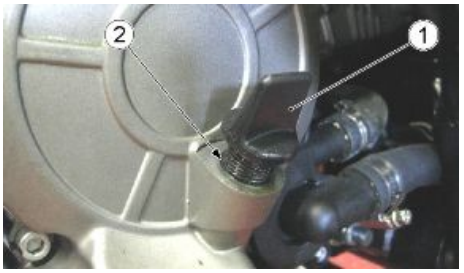
THE ENGINE AND EXHAUST SYSTEM COMPONENTS CAN GET VERY HOT AFTER THE ENGINE IS TURNED OFF FOR A PERIOD OF TIME. WEAR INSULATING GOLVES OR WAIT UNTIL THE ENGINE AND EXHAUST SYSTEM HAVE COOLED OFF BEFORE OPERATING THESES PARTS.

- Turn off the engine and let it cool off. This will allow the oil to settle into the crankcase and cool off.

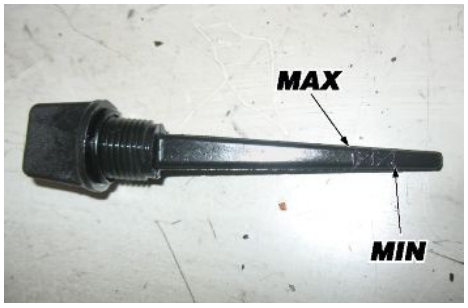
NOTE

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

- Unscrew and pull out the dipstick ①。
- Remove the oil dipstick① and wipe up it.
- Re-insert the oil dipstick ① into the oil filler ②, but do not turn it.



- Pull out the oil dipstick ① again and read the oil level on the oil dipstick ①.
- When measuring, the oil level shall be between MAX and MIN of the oil dipstick ①. It is correct that the oil level is close to the MAX of oil level marked on the oil dipstick ①.
- Please top up if necessary.



TOP-UP

- Fill a small amount of oil through the oil filler ② and wait for about five minutes to let the oil flow evenly into the crankcase.
- Check the oil level and oil filling amount (if necessary).
- Fill oil slowly until the recommended oil level is reached.
- After filling the oil, screw and tighten the oil dipstick ①.

CAUTION

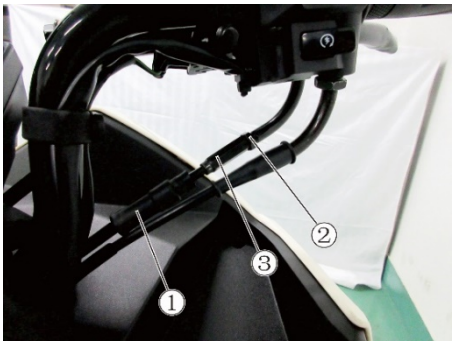
DO NOT RIDE THE MOTORCYCLE WITH INSUFFICIENT LUBRICATION OR CONTAMINATED OR INCORRECT LUBRICANTS AS THIS ACCELERATES THE WEAR AND TEAR OF THE MOVING PARTS AND MAY CAUSE IRRETRIEVABLE DAMAGE.

Transmission

Free clearance adjustment of throttle

The idle stroke of the throttle handle shall be 2-3 mm (0.08-0.12 in), which is measured by the throttle trim. If not, follow these steps to operate:

- Support the vehicle with the centre stand.
- Open the protecting cover ①.
- Unscrew the lock nut ②.
- Turn the regulator ③ to adjust the idle stroke of the throttle handle.
- After adjustment, tighten the lock nut ② and check the idle stroke again.
- Re-install the protecting cover ①.



CAUTION

AFTER ADJUSTMENT, CHECK THAT MOVING THE HANDLE DOES NOT CHANGE THE ENGINE IDLE SPEED, AND ONCE IT IS RELEASED, THE THROTTLE HANDLE WILL AUTOMATICALLY AND SMOOTHLY RETURN TO THE ORIGIN POSITION.

Cooling system

Level check

CAUTION

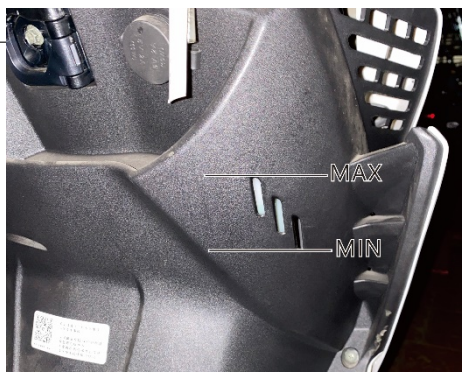
WAIT FOR THE ENGINE TO COOL OFF BEFORE CHECKING THE COOLANT LEVEL OR TOPPING UP THE EXPANSION TANK WITH THE COOLANT.

- Turn off the engine until it cools off.

CAUTION

PARK THE MOTORCYCLE ON FIRM AND LEVEL GROUND.

- Check the coolant level in the expansion tank.
- Make sure that the coolant level in the expansion is between MAX and MIN of the reference marks.



MIN = minimum level.

MAX = maximum level.

Otherwise, please top

up the expansion tank

with the coolant.

CHECK THE COOLANT LEVEL IN THE RADIATOR:

- Remove the front shield.
- Loosen it (rotate it counterclockwise),

  but do not remove the radiator cover ③.
- Wait a few seconds to release the

  pressure in the cooling system.
- Remove the radiator cover ③.
- Check whether there is coolant in the radiator;

  If necessary, please top up the radiator with the coolant first.

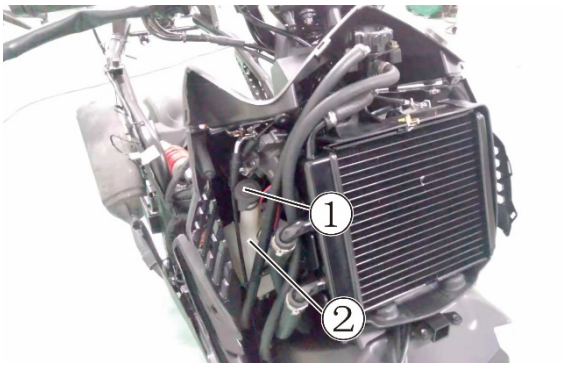
TOP-UP

CAUTION

WAIT FOR THE ENGINE TO COOL OFF BEFORE CHECKING THE COOLANT LEVEL OR TOPPING UP THE EXPANSION TANK WITH THE COOLANT.

- Remove the front shield.
- Open the cover ① of the expansion

  tank ②.



CAUTION

DO NOT ADD ANY ADDITIVE OR ANY OTHER SUBSTANCE TO THE COOLANT.

- Fill the coolant until the level is close to the "MAX" of the reference mark.
- Do not exceed this level. Otherwise, the coolant will splash out when the engine is running.
- Re-install the filler cover ①.

CAUTION

IF THERE IS AN EXCESSIVE CONSUMPTION OF COOLANT OR WHEN THE EXPANSION TANK REMAINS EMPTY, CHECK WHETHER THERE IS ANY LEAK IN THE PIPELIN.

TOP UP THE RADIATOR WITH THE COOLANT:

CAUTION

WAIT FOR THE ENGINE TO COOL OFF BEFORE CHECKING THE COOLANT LEVEL OR TOPPING UP THE EXPANSION TANK WITH THE COOLANT.

- Loosen it (rotate it counterclockwise)

  but do not remove the radiator cap ③.
- Wait for a few seconds to release the pressure in the cooling system.
- Remove the radiator cover ③.
- Top up the radiator with the coolant.

Braking system

CAUTION

IN VIEW OF THE HARM TO THE VEHICLE AND PASSENGERS, IT IS VERY NECESSARY TO CHECK THE SYSTEM AFTER RE-BRAKING AND RESTORING THE BRAKING SYSTEM ACCORDING TO THE NORMAL SERVICE CONDITIONS OF THE HYDRAULIC SYSTEM.

NOTE

THIS VEHICLE IS FITTED WITH A BRAKING SYSTEM COMPRISING:

- A FRONT BRAKE DISC;
- A REAR BRAKE DISC.

Operating the right brake lever exerts pressure on the front brake caliper.

Operating the left brake lever exerts pressure on the front and rear brake calipers.

Level check

- Support the vehicle with the centre stand.
- Turn the handlebar so that the fluid in the brake fluid tank is parallel to the MIN of the reference mark indicated on the sight glass ①.
- Check whether the level in the tank exceeds The MIN of the reference mark indicated on sight glass ①.

MIN = minimum level.

If the brake fluid does not reach the **MIN** of the reference mark:

CAUTION

WHEN THE BRAKE PADS ARE WORNM THE BRAKE FULID LEVEL WILL GENERAL DROP.

• Check whether the brake pads and discs are worn. If it is not necessary to replace the pads and/or the discs, please fill up with the brake fluid.

Top-up

- Unscrew the four screws ④ to remove the brake pump cover ⑤.

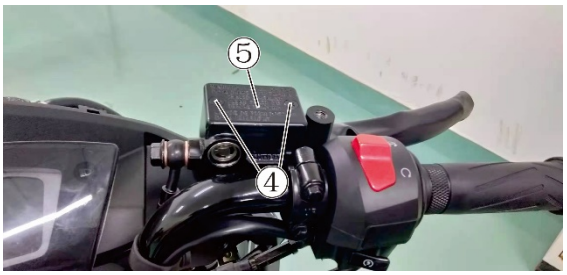
CAUTION

RISK OF BRAKE OIL LEAKAGE. DO NOT PULL THE FRONT BRAKE LEVER WHEN UNSCREWING THE SCREW, OR REMOVING THE BRAKE PUMP COVER. PLACE A CLEAN COTTON CLOTH UNDER THE BRAKE FLUID RESERVIOR TO PREVENT ANY FLUID SPLASHING.

CAUTION

THE BRAKE FLUID LEVEL CAN REACH THE MAXIMUM LEVLE ONLY WHEN BRAKE PADS ARE NEW. THE BRAKE FLUID LEVEL DROPS GENERALLY WHEN THE BRAKE PADS ARE WORN AND TEAR.
DO NOT REPLACE THE BRAKE PAD WHEN IT IS TOTALLY WORN DURING MAINTENCE. DO NOT EXCEED THE MAXIMUM LEVEL MARK WHEN FILLING THE BRAKE FLUID.

- Fill up with the brake fluid.



System check

NOTE

THE FOLLOWING INFORMATION APPLIES BOTH FRONT AND REAR BRAKE CHANNELS.

Carry out a quick check for the braking system:

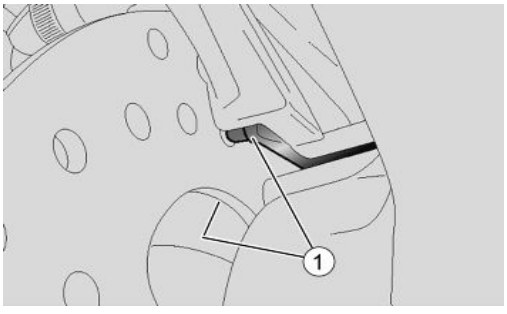
- Support the vehicle with the centre stand.
- Visually check the brake discs and pads as follows.

Front brake caliper

Check the two pads from the front bottom side.

Rear brake caliper

Check the two pads from the back bottom side ①.

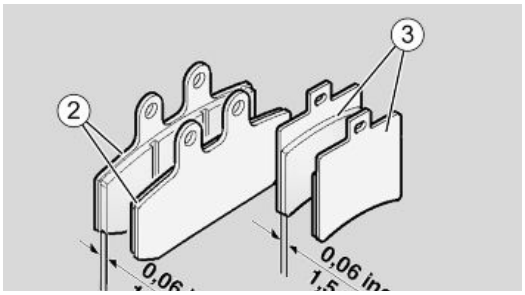


- Replace those two pads if the friction material thickness (even in only one

pad) is reduced to about 1.5 mm.

Front pads ②.

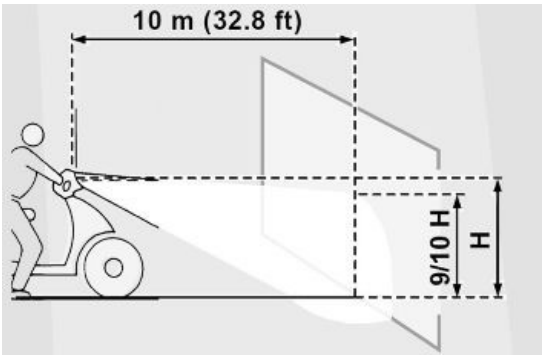
Rear pads ③.



Headlight adjustment

EU - For a quick inspection of the correct aiming of the front light beam:

- Park the vehicle 10 m (32.8 ft) away from a vertical wall and make sure that the ground is level.
- Turn on the low-beam light, sit on the vehicle and check whether the light beam projected to the wall is below the horizontal straight line of the headlight (about 9/10 of the total height).

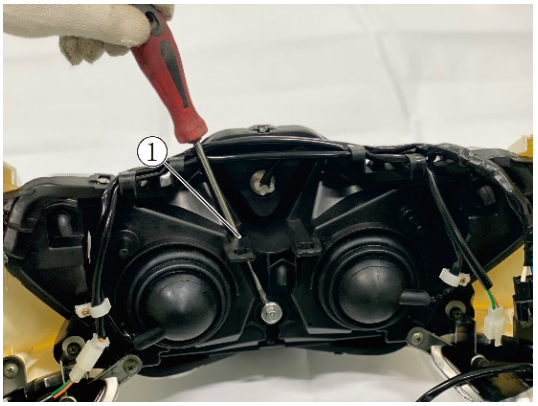


Adjust the light beam:

● Use a screwdriver to operate the specific screw hole ① located below the rear handlebar cover.

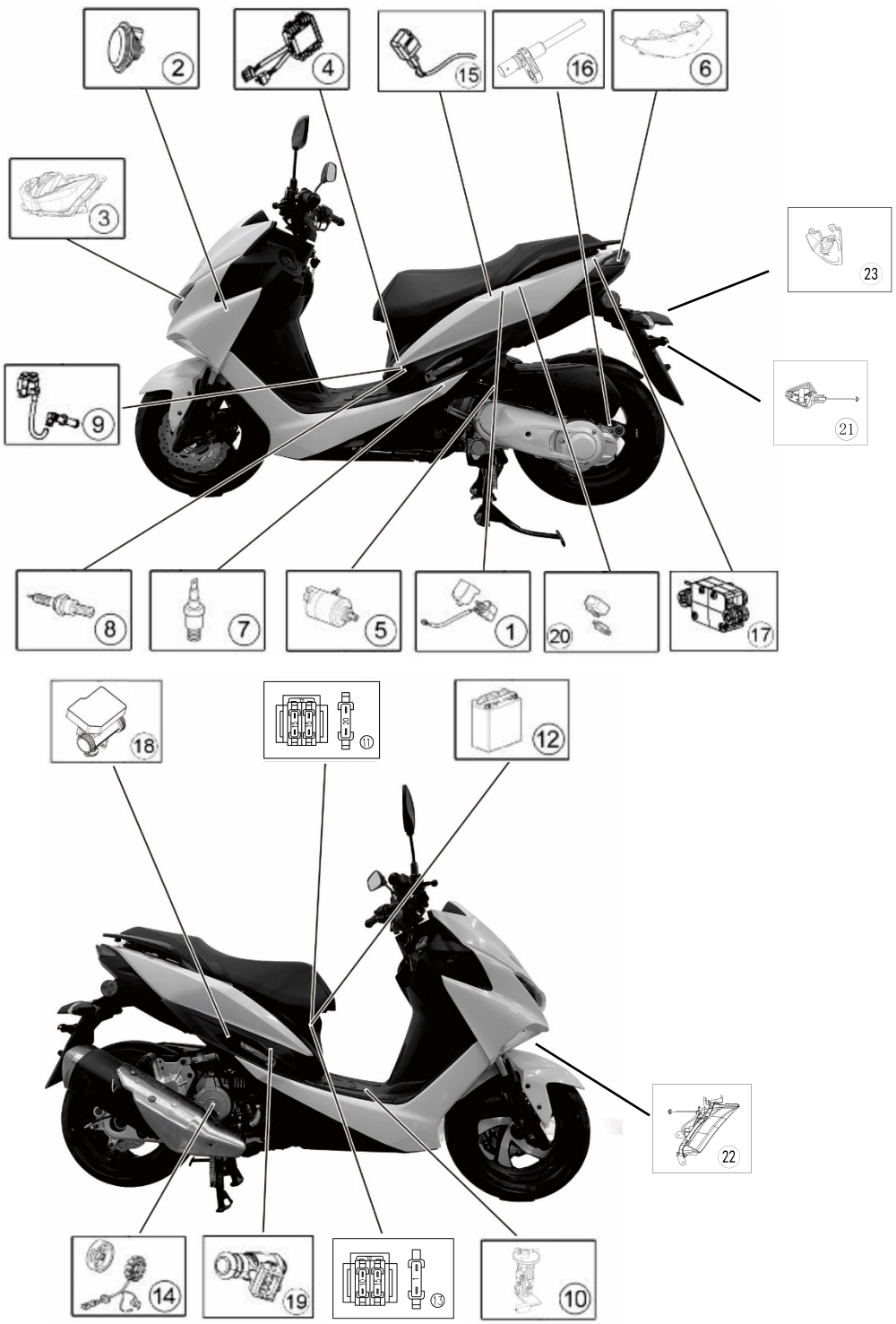
Tighten the screw (clockwise) to raise the light beam.

Unscrew the screw (counterclockwise) to lower the light beam.



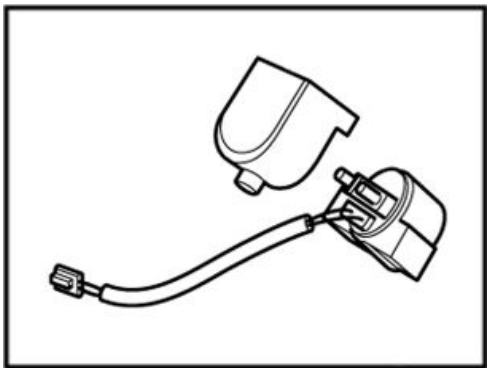
INDEX OF TOPICS

Components arrangement



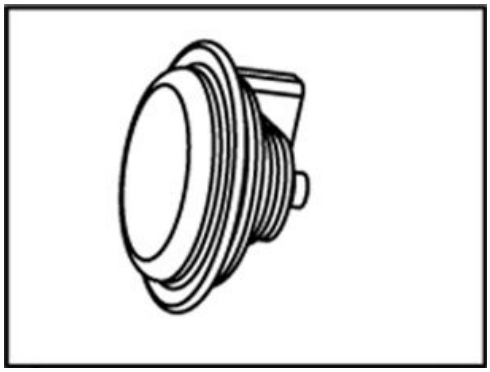
1. Starting relay

- Starting relay resistance is 0 Ohm after power on.
- Starting relay resistance is infinite without power on.



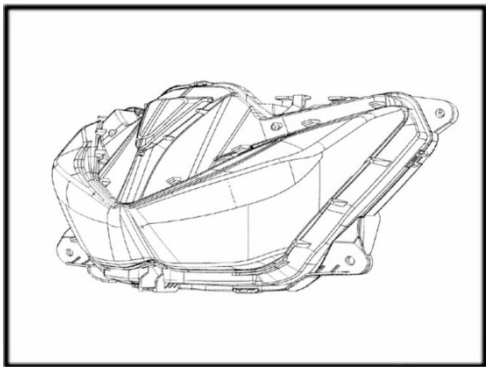
2. Horn

- The voltage of horn is battery voltage when the horn is activated.
- The voltage of horn is 0 V when the horn is forbidden to use.



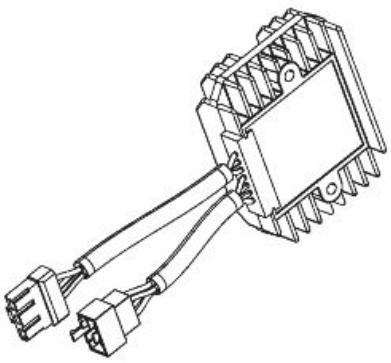
3. Headlight

- Positionlamp: 12V - 5W
- High-/low-beam lights: 12V - 55W/12V - 55W H7
- Front turn indicator lamp: 12V - 10 W (RY amber bulb）



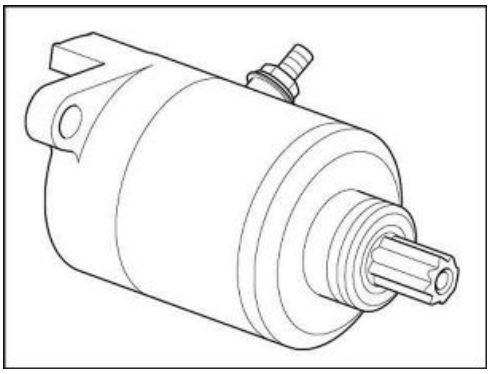
4. Voltage regulator

- Recharging voltage: 14 - 15 V



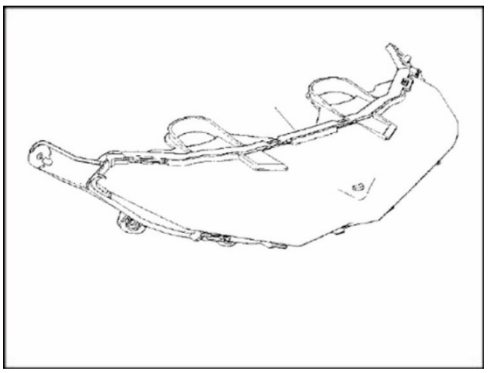
5. Starting motor

- The voltage of relay is battery voltage after power on.
- Resistance: 0.5 Ohm

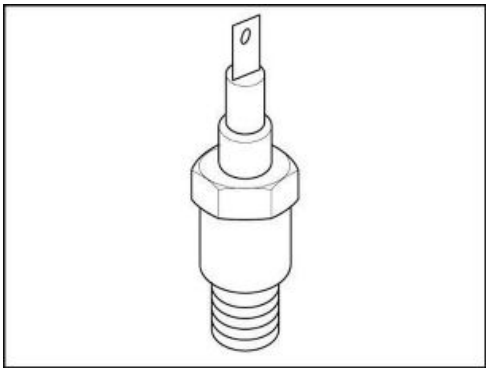


6. Taillight

- Rear position/stop lamp: 12V - 5W/21W
- Rear direction indicator lamp: 12V - 10 W (RY amber bulb）
- License plate light: 12V - 5W



7. Engine water temperature sensor

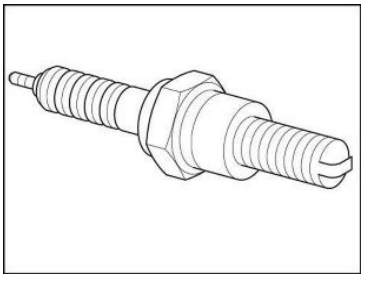


COOLANT TEMPERATURE (°C) / RESISTANCE VALUE (OHM)

Coolant temperature	Characteristic injection contact values	Dashboard contact values
50°	807	820
120°	105	80.6

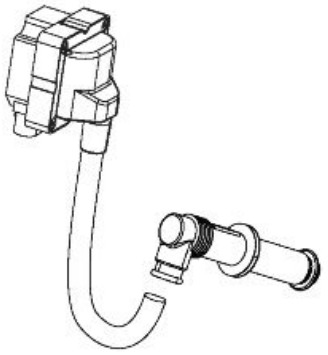
8. Spark plug

Standard spark plug: NGK CR9EB or NGK PMR9B



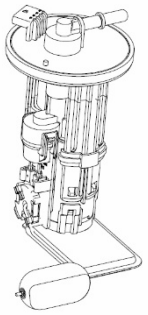
9. High voltage coil

- Coil primary resistance: 0.5 Ohm
- Coil secondary resistance: 3.1 KOhm



10. Fuel level sensor

Conduct operation check for the fuel level sensor (it is removed from the vehicle).

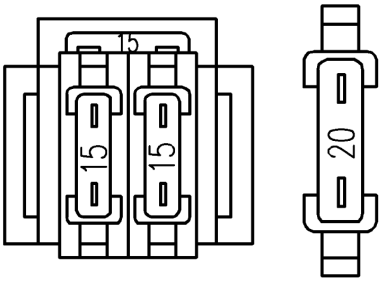


RESISTANCE BETWEEN THE CABLES (COLOUR - OHM) - CORRECT INDICATIONS

	Specification	Desc./Quantity
1	Grey/Green - Brown (14 Ohm)	[4/4 ± 5%]
2	Grey/Green - Brown (306 Ohm)	[0 ± 5%]
3	Grey/Green - Brown (176 Ohm)	[The warning light is on]

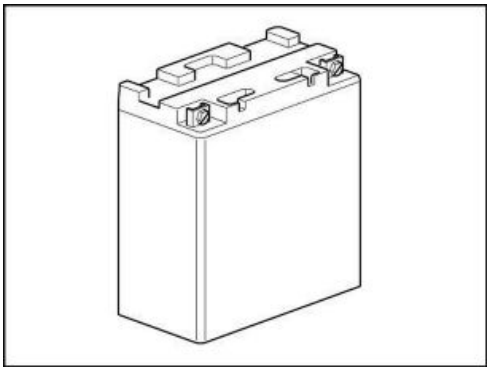
11. Main fuses

- 20A fuse: direct positive (voltage regulator, dashboard, ignition switch, socket fuse, electric fan relay and ECU power supply) .
- 15A fuse: socket power supply.
- 20A fuse: spare part.



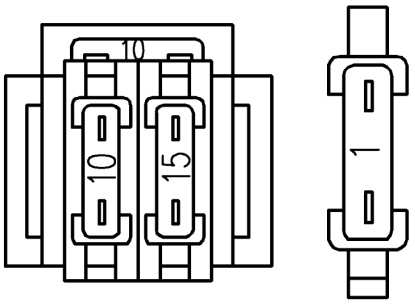
12. Battery

12V - 8 Ah YTX9-BS



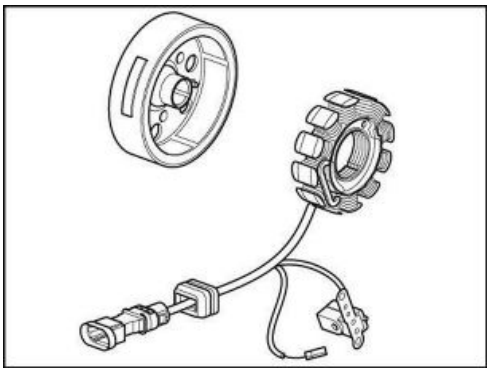
13. Auxiliary fuses

- 15A fuse: from ignition switch to all light loads, license plate light, direction indicator lamp and horn.
- 15A fuse: ignition /injection and starting power supply.
- 15A fuse: spare part.



14. Generator

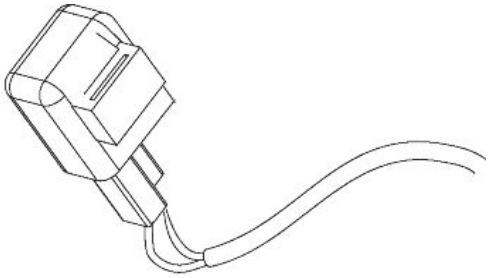
- Permanent magnet: battery voltage 12 V - 300 W at 6000 rpm.
- Rated power: 300 W
- Resistance value: 0.36 - 0.44 Ohm
- Resistance between the cables and the stator support: infinite
- Crankshaft angle sensor resistance: 129 +/-10% ohm



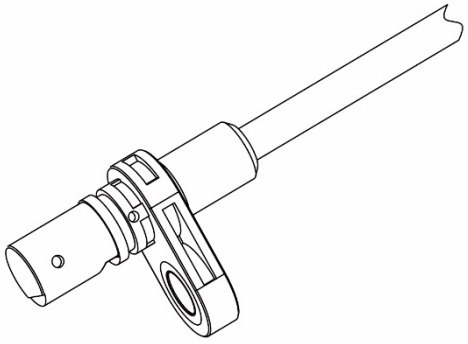
15. Direction indicators

12.8 V

2x10W+3.4W

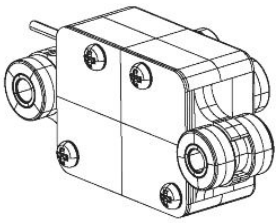


16. Speed sensor

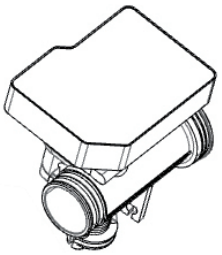


17. Fall sensor

- Horizontal position: 61.9 KOhm
- Tilt position > 45°: 0 Ohm

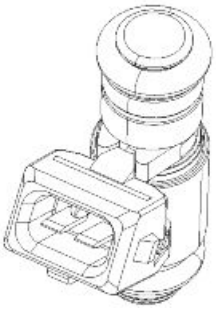


18. Control unit / throttle body



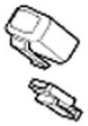
19. Injector

Resistance at ambient temperature: 14.5 Ohm



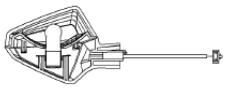
20. Relay

- Cooling fan
- EFI system



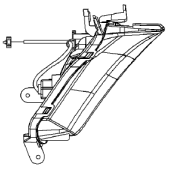
21.Rear direction indicator lamp

-Rear direction indicator lamp:12V-10W (RY amber bulb)



22.Front turn indicator lamp

-Front turn indicator lamp:12V-10W (RY amber bulb)



23.License plate light

-License plate light: 12V-5W

Electrical system installation

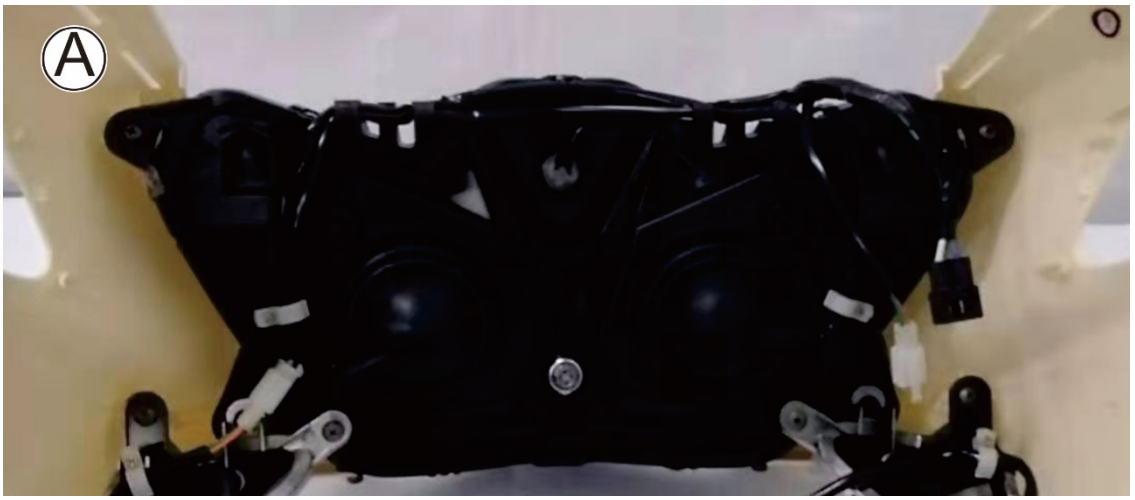
Motorcycle division

The wiring position is divided into two essential sections as shown in the figure.

1. Front section
2. Rear section

Front side

A- Front headlight



B-Handlebar

C-Steering

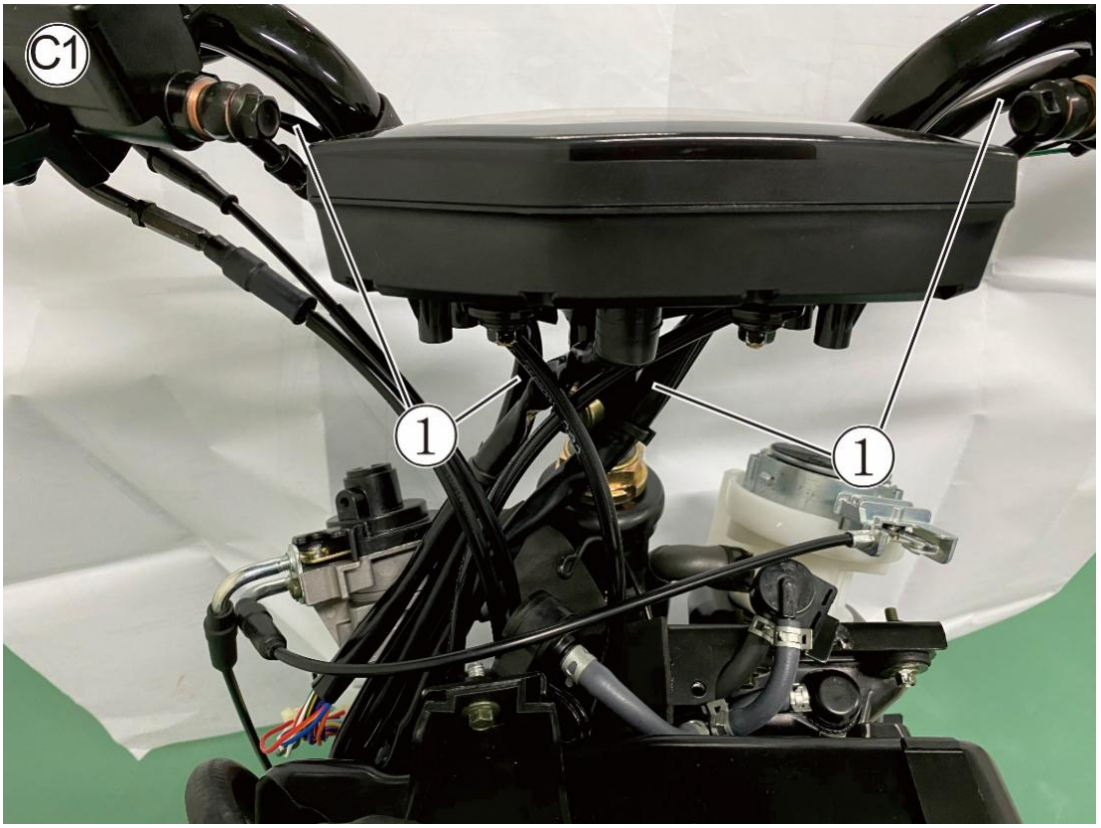
1- The wire harnesses passes through the openings in the handlebar.

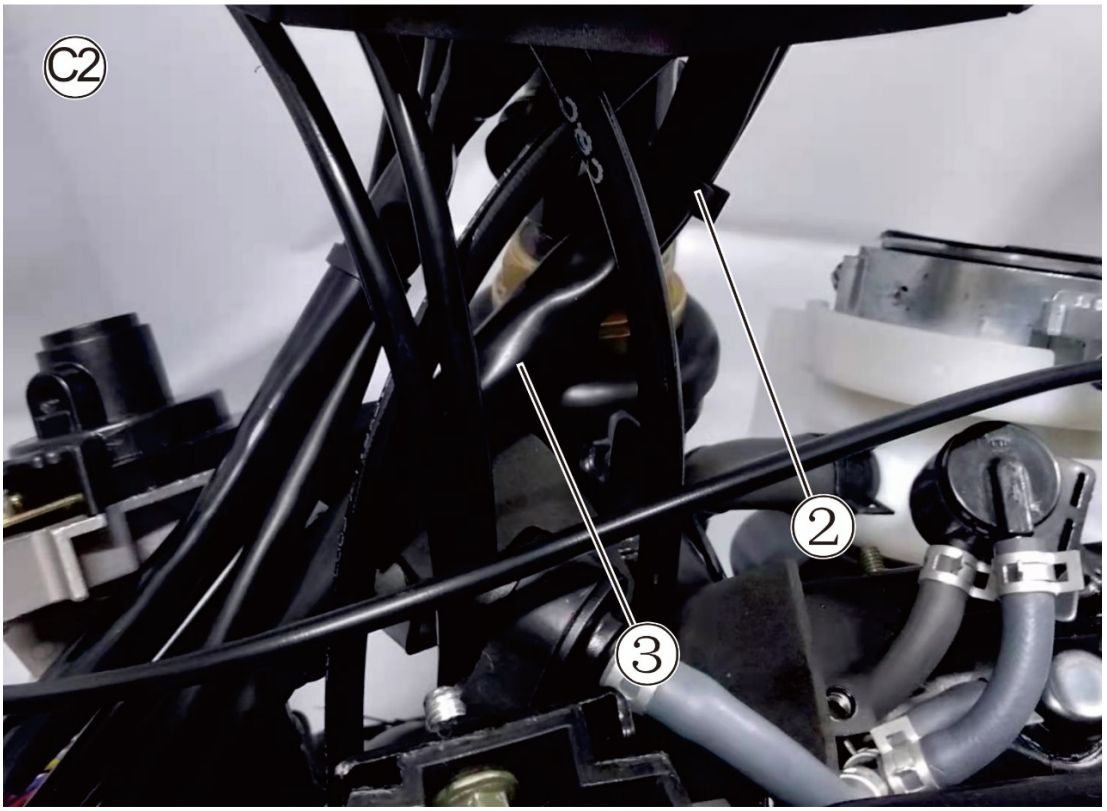
2- The red tie on the wire harness must be aligned with the cable sleeve.

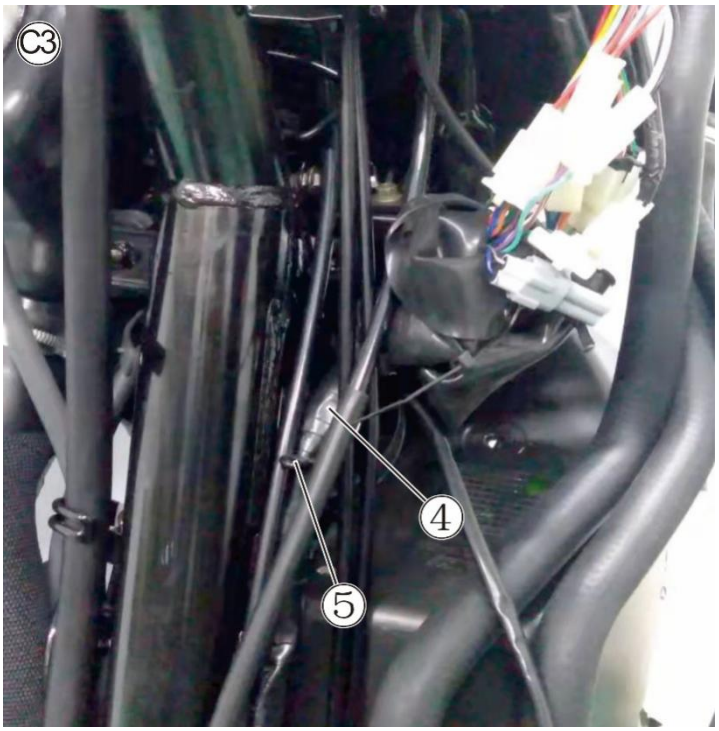
3- The main wire harness must pass through the back of the metal cable sleeve.

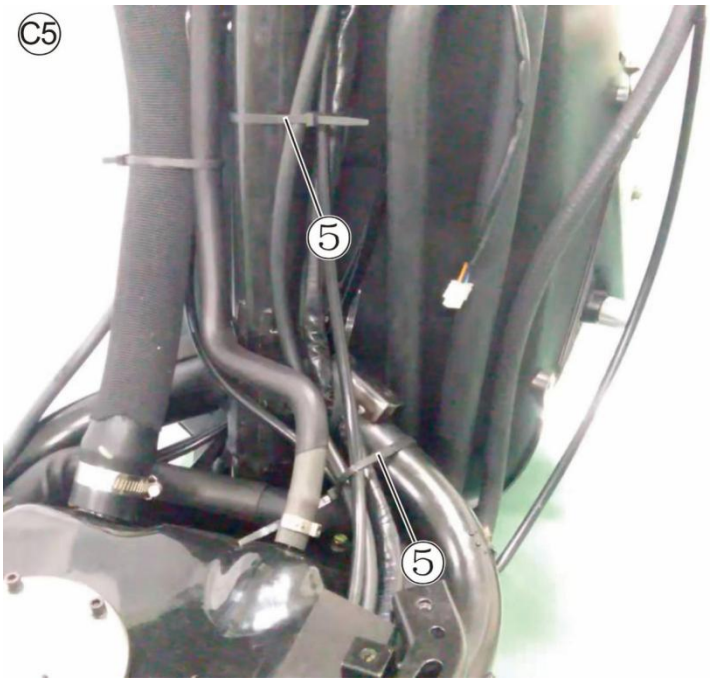
4- The fan connector must be placed behind the steering gear.

5- Plastic clamp.


C1
1
1


C2
2
3


C3
4
5


C5
5
5

D- Footrest

6 - Battery negative clamp.

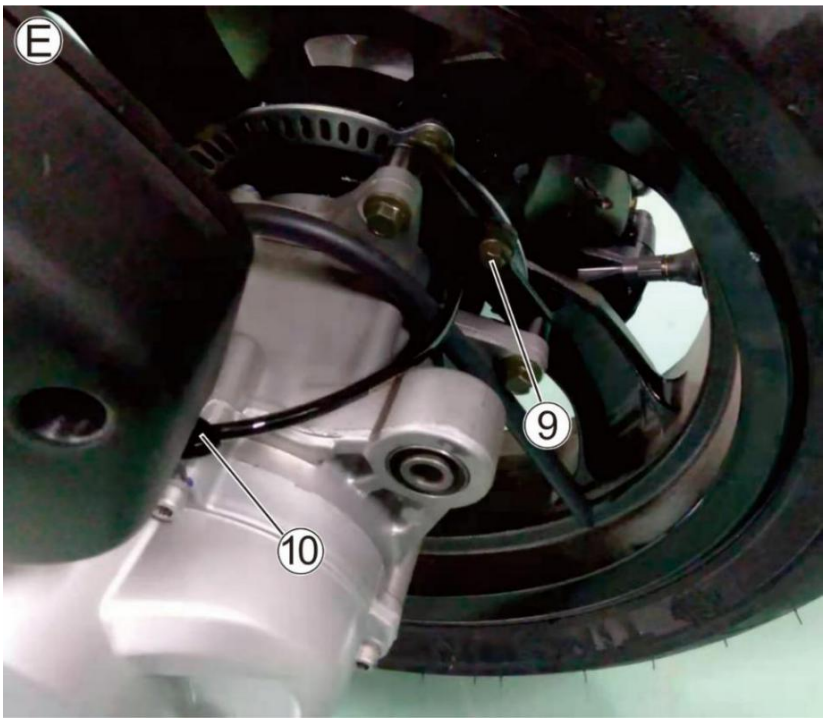
7 - Diagnostic connector.

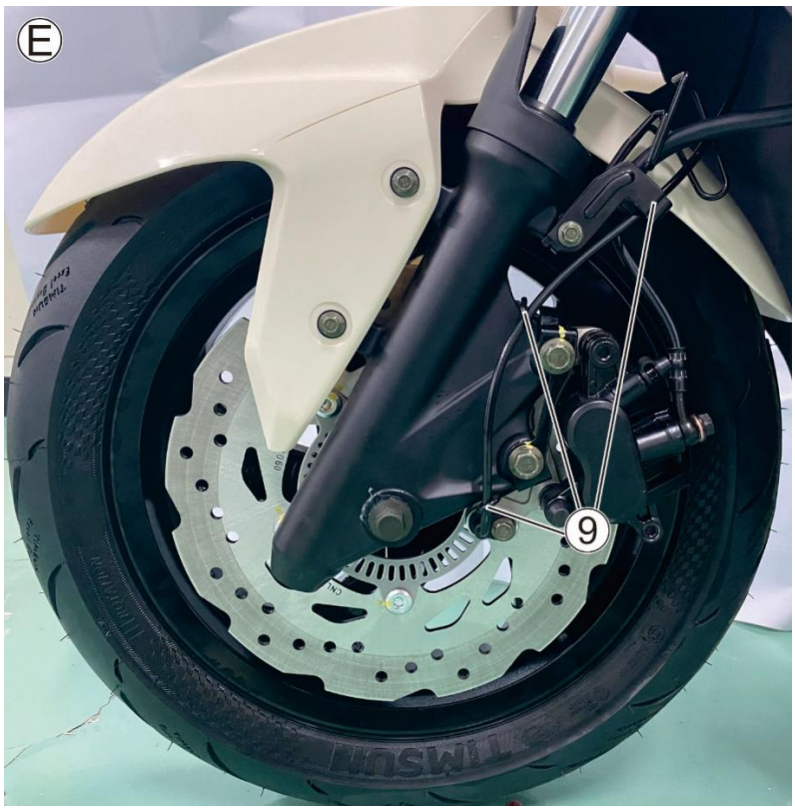
8 - Battery positive clamp.

E-Speed sensor

9- The cable washer ring must be inserted in the base provided by the mental bracket.

10- The wire harness must pass through the metal ring and the pipe must be in the central position.





Back side

A-Footrest

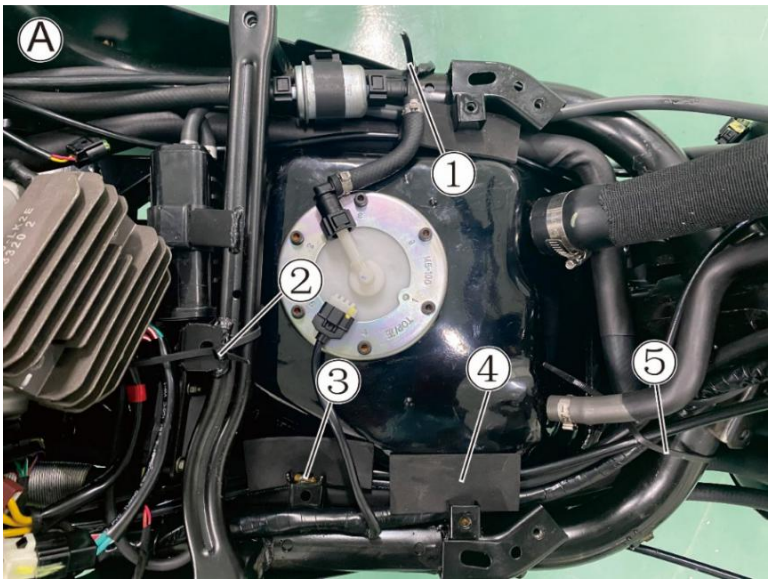
1- All three parts of the wire harness in the red tie must be fixed to the frame with a clamp.

2- All three parts of the wire harness must pass through the throttle grip cables.

3- The horn terminal must be fixed to the bottom of the frame.

4- The wire harness must be aligned with the retainer.

5- Plastic clamp.



B- Engine

6 - Plastic clamp.

7 - The engine wire harness must pass under the water pipe.

8- Check whether the control unit is connected correctly.

9- The wire harness must be fixed with a clamp.

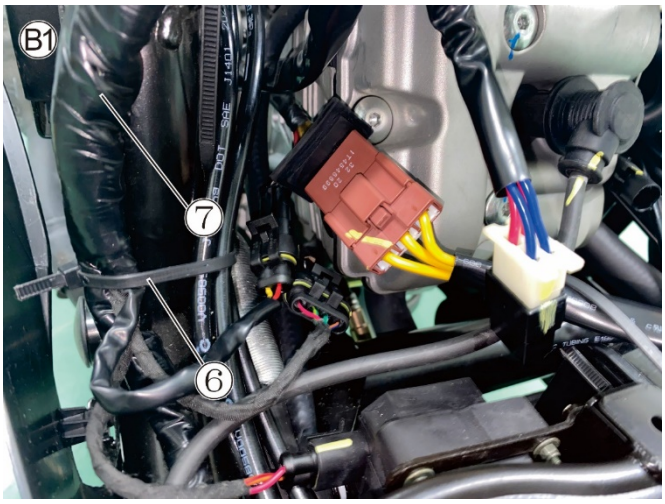
10- The rear wire harness must pass through the metal ring.

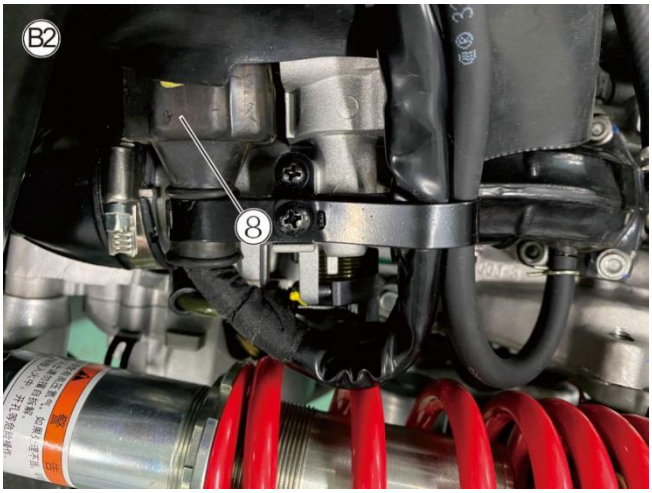
11- The ground lead must be fixed to the starting motor screw.

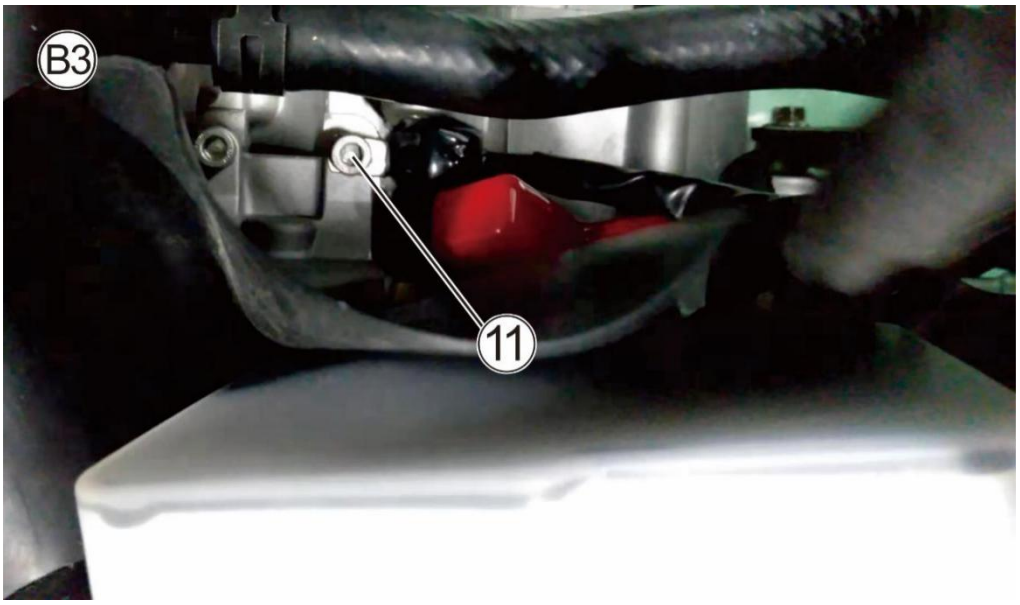
12- Plastic clamp with locking system.

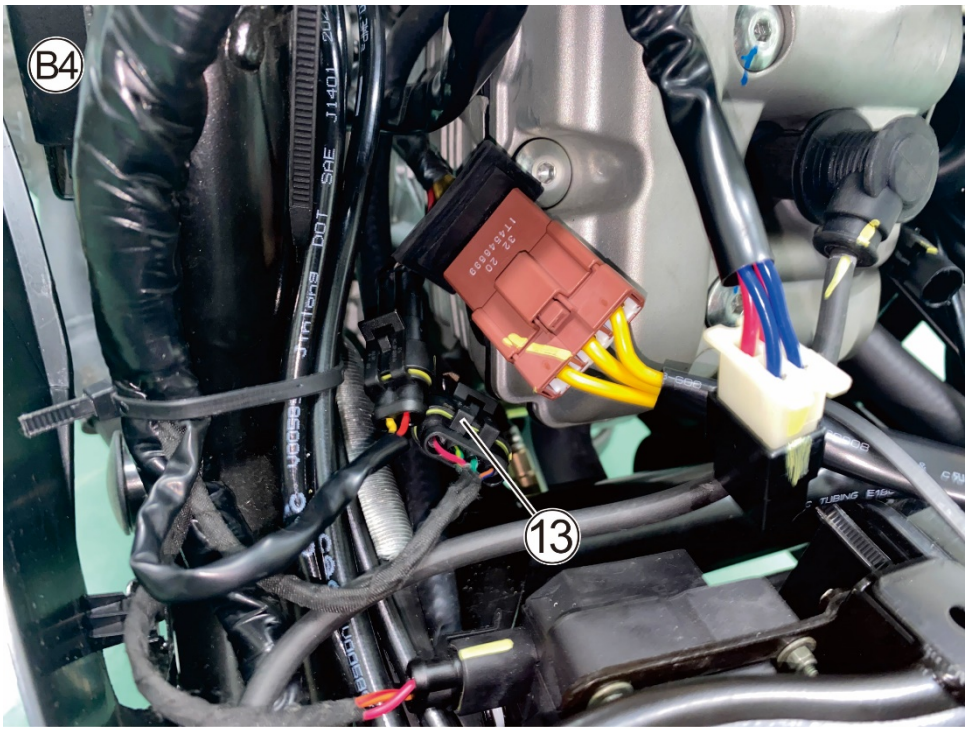
13 - The lambda probe connector must be fixed to the engine with a clamp.

14 - The wire harnesses of the starting motor and alternator must pass through the clamp.









C- Right side

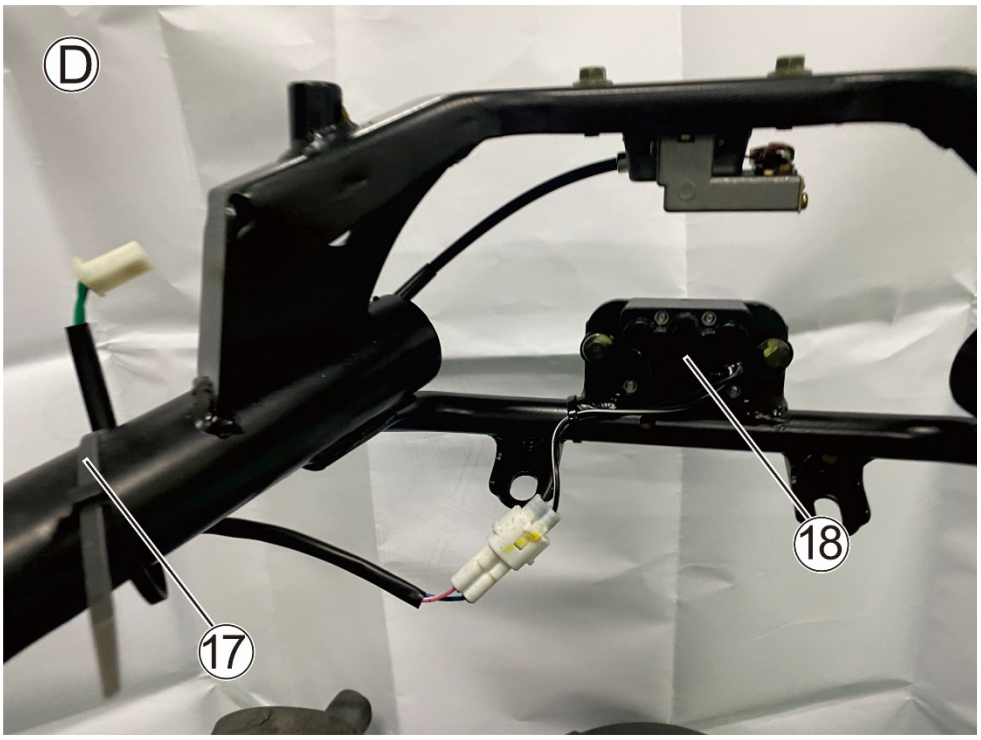
15- Plastic clamp.

16- The rear wire harness must pass through the metal ring.

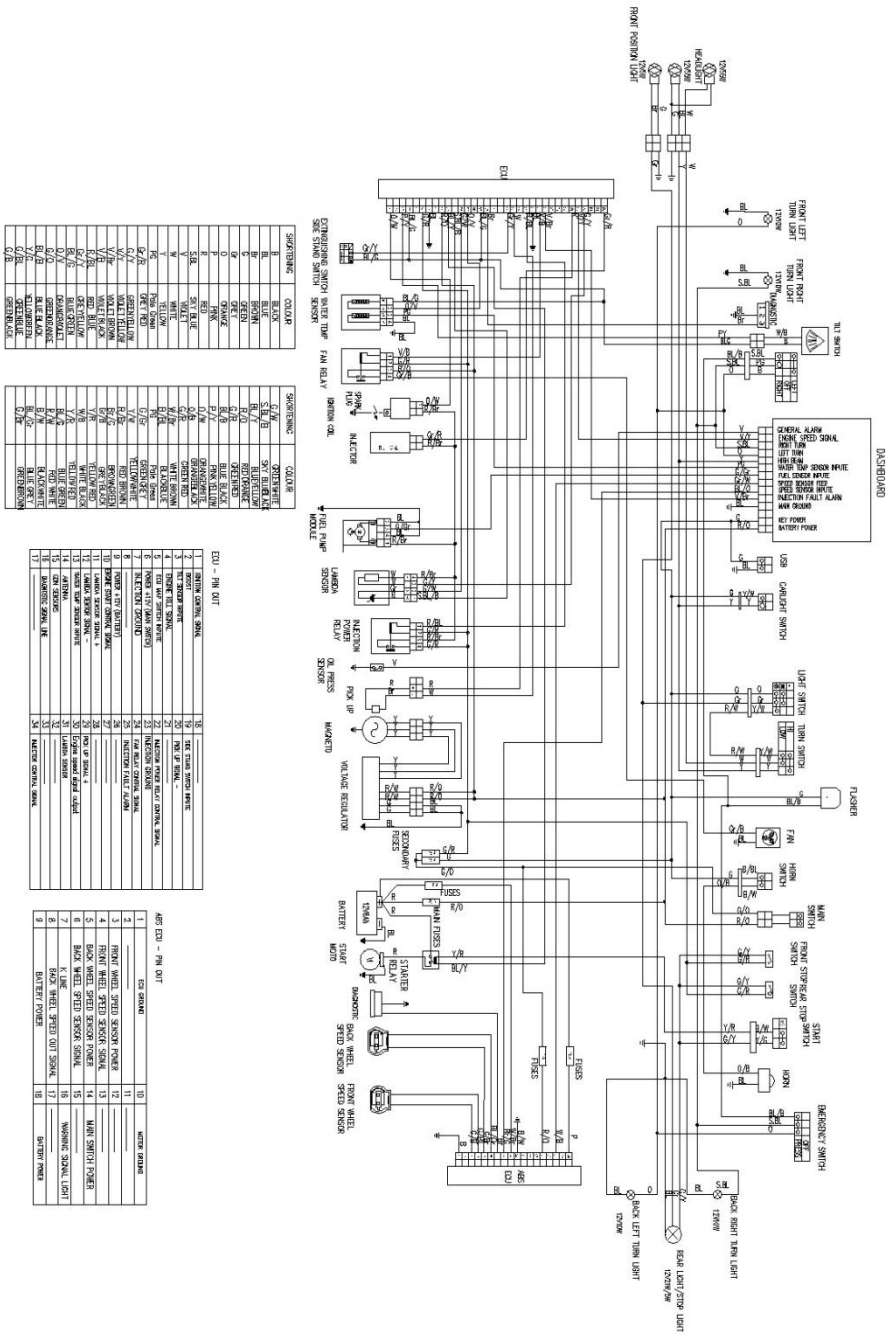
D- Rear wire harness

17- Plastic clamp.

18- Fit the fall sensor with the arrow facing up.


D
17
18

Schematic diagram of electrical apparatus



SHORTENING	COLOUR
B	BLACK
Bl	BLUE
Br	BROWN
G	GREEN
Gr	GREY
O	ORANGE
P	PINK
R	RED
S	SKY BLUE
V	VIOLET
W	WHITE
Y	YELLOW
R/B	RED/BLACK
G/Y	GREEN/YELLOW
V/R	VIOLET/RED
V/W	VIOLET/WHITE
B/R	BRD. BLUE
G/O	GREEN/ORANGE
O/G	ORANGE/GREEN
O/Y	ORANGE/YELLOW
R/G	RED/GREEN
R/W	RED/WHITE
B/Bl	BLACK/BLUE
G/Bl	GREEN/BLUE
G/R	GREEN/RED

SHORTENING	COLOUR
G/W	GREEN/WHITE
Bl/Y	BLUE/YELLOW
R/O	RED/ORANGE
G/Bl	GREEN/BLUE
R/G	RED/GREEN
P/V	PINK/VIOLET
P/Bl	PINK/BLUE
O/W	ORANGE/WHITE
O/G	ORANGE/GREEN
G/R	GREEN/RED
W/Br	WHITE/BROWN
B/Y	BLACK/YELLOW
G/Sc	GREEN/SKY
Y/W	YELLOW/WHITE
R/Br	RED/BROWN
G/Bl	GREEN/BLUE
G/R	GREEN/RED
Y/R	YELLOW/RED
Y/B	YELLOW/BLACK
Bl/G	BLUE/GREEN
R/W	RED/WHITE
Bl/W	BLUE/WHITE
Bl/Gr	BLUE/GREY
Br/Gr	BROWN/GREY

ECU - PIN OUT

1	IGNITION SIGNAL SIGNAL	18	———
2	BOOST	19	TPS SIGNAL
3	———	20	TPS_UP SIGNAL
4	TACHIMETER SIGNAL	21	———
5	ECU KEY SWITCH INPUTE	22	INJECTION POWER RELAY CONTROL SIGNAL
6	POWER +12V (KEY SWITCH)	23	IGNITION GROUND
7	INJECTION GROUND	24	FAN RELAY CONTROL SIGNAL
8	POWER +12V (BATTERY)	25	INJECTION FAULT ALARM
9	———	26	———
10	ENGINE START CONTROL SIGNAL	27	———
11	LAMBDA SENSOR SIGNAL +	28	PICK UP SIGNAL +
12	LAMBDA SENSOR SIGNAL -	29	PICK UP SIGNAL -
13	WATER TEMP SENSOR INPUTE	30	Engine speed signal output
14	ANTENA	31	LAMBDA SENSOR
15	———	32	———
16	———	33	———
17	———	34	INJECTION CONTROL SIGNAL
18	WARNING SIGNAL LIKE		

ABS ECU - PIN OUT

1	———	10	MOTOR ORDERS
2	ECU GROUND	11	———
3	FRONT WHEEL SPEED SENSOR POWER	12	———
4	FRONT WHEEL SPEED SENSOR SIGNAL	13	———
5	BACK WHEEL SPEED SENSOR POWER	14	MAIN SWITCH POWER
6	BACK WHEEL SPEED SENSOR SIGNAL	15	———
7	K LINE	16	WARNING SIGNAL LIGHT
8	BACK WHEEL SPEED OUT SIGNAL	17	———
9	BATTERY POWER	18	BATTERY POWER

Dashboard

SWITCHING UNITS

1. Press the "Mode"-button to switch to the battery voltage display.
2. Turn off the ignition.
3. Turn on the ignition and simultaneously press the "RESET" - Button 10 times in succession.
4. The displayed units on the speedometer will change automatically after this setting.

INDEX OF TOPICS

Exhaust assy. Removal

EXHAUST SILENCER REMOVAL

- Park the vehicle on its centre stand.

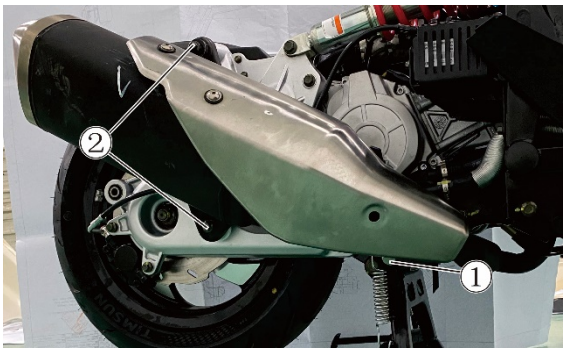
CAUTION

ALLOW ENGINE AND EXHAUST SILENCER TO COOL OFF COMPLETELY.

CAUTION

EACH TIME THE EXHAUST SYSTEM IS REMOVED, REPLACE THE CONNECTING INTERNAL GRAPHITE SLEEVE OF THE SILENCER TO THE EXHAUST PIPE.

- Loosen the clamp ① fixing the exhaust silencer to the manifold.
- Undo and remove the two fixing screws ②.
- Remove the exhaust silencer.



Locking torques (N*m)

M10 screw fixing screw silencer clamp to exhaust manifold 17 (12.58 lbf ft) M8 screw fixing silencer to plate 25 (18.5 lbf ft)

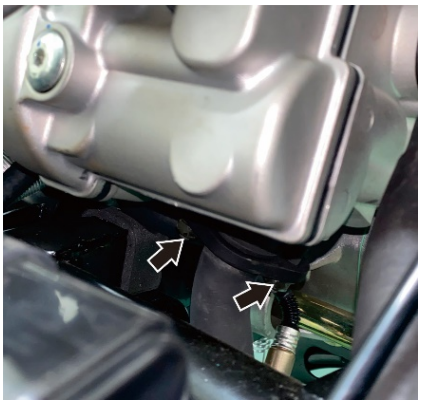
EXHAUST SYSTEM REMOVAL

- Park the vehicle on its centre stand.
- Remove the engine inspection cover.
- Disconnect the lambda probe connector.

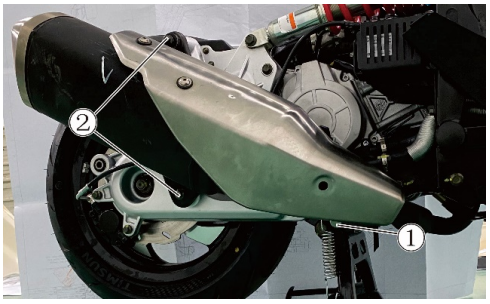
CAUTION

ALLOW ENGINE AND EXHAUST SILENCER TO COOL OFF COMPLETELY.

- Unscrew and remove the two nuts on the head exhaust stud bolts.
- Retrieve the washers.



- Undo and remove the three fixing screws ②.
- Remove the exhaust system.



Locking torques (N*m)

M8 screw fixing silencer to plate 25 (18.5 lbf ft)

Removal of the engine from the vehicle

Before removing the engine from the chassis, wash it and cut off coolant supply.

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.

CAUTION

MARK THE CABLES, SLEEVES, PIPES, ETC. TO AVOID INCORRECT REFITTING.

The procedure to remove the engine from the chassis is described below sequentially:

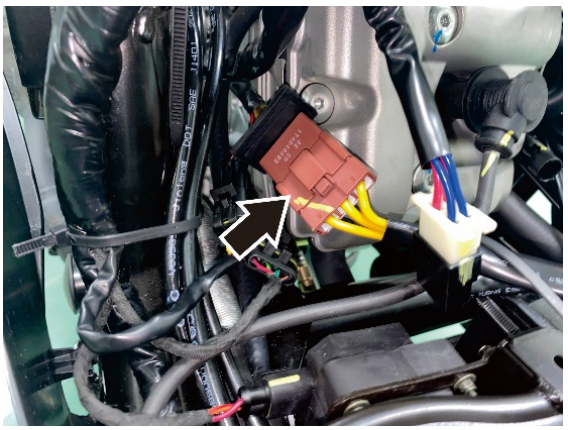
- Remove the exhaust silencer.
- Remove the air filter box.
- Remove the helmet compartment.
- Remove the throttle body but keep it connected to the throttle grip cables.
- Drain off the cooling system.
- Remove the rear brake calliper releasing the cable grommet pipes on the engine.

- Disconnect the starter motor connections.

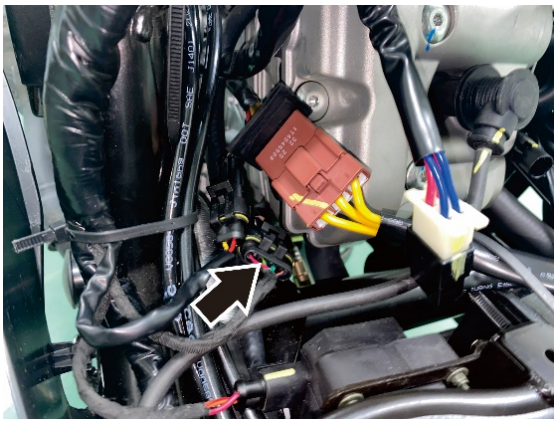
- Disconnect the water temperature sensor connector.

- Disconnect the oil pressure sensor connector.

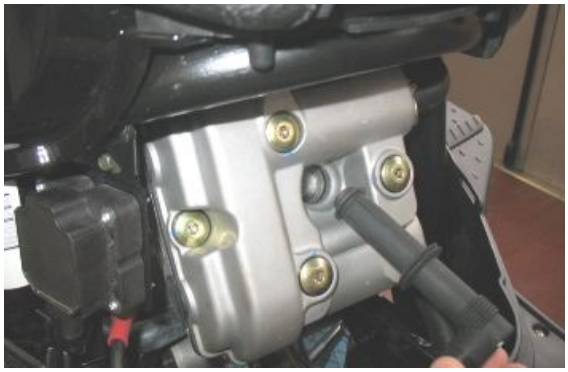
- Disconnect the connectors of the fly- wheel pick up and voltage regulator.



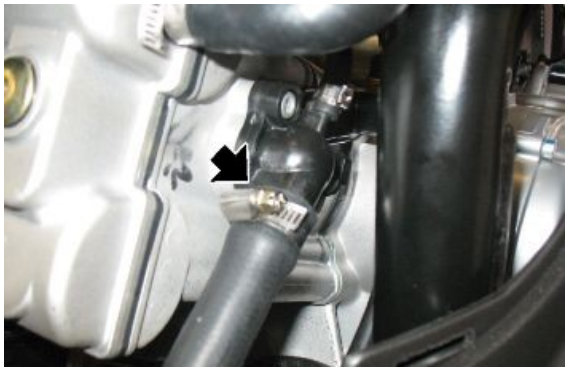
- Disconnect the lambda probe connector.



- Disconnect the spark plug tube.

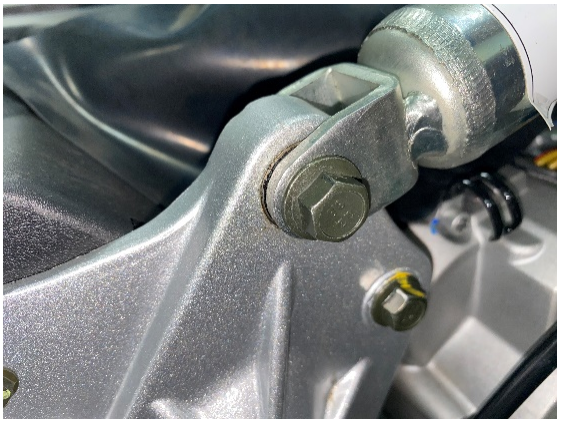


- Loosen the clamp and disconnect the pipe from the thermostatic valve.

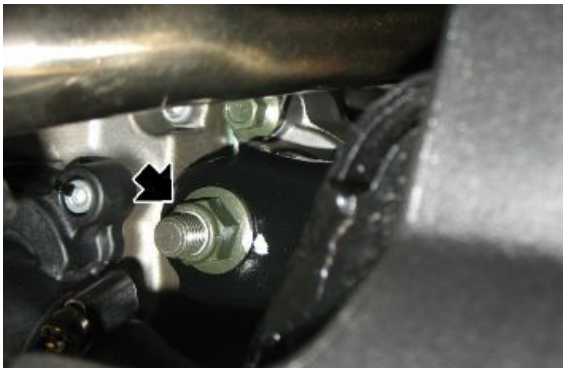


- Loosen the clamp and disconnect the bleed pipe from the thermostatic valve to the radiator.
- Release the pipes and cable harnesses of any fastening clamp to the chassis.
- Fasten the belts to the chassis rear section.
- Lift the hoist arm until the belts are taut.

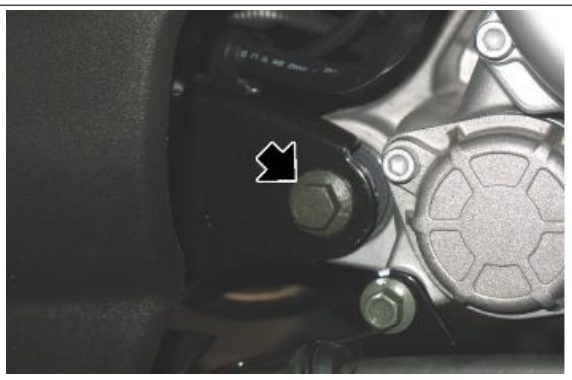
- Undo and remove the shock absorber lower fixing screw and collect the nut.



- Operating on the right side, undo and remove the engine fixing nut.



- Operating on the left side, slide off the engine pin and collect the spacers.
- Slide off the chassis from the engine.
- The engine remains on the bearing resting on the rear wheel and centre stand.



- To refit the engine, carry out the removal steps but in reverse order.

INDEX OF TOPICS

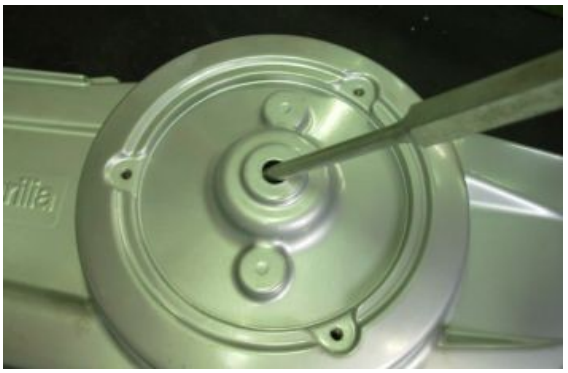
This section describes the operations to be carried out on the engine and the tools required.

Automatic transmission

Transmission cover

- Remove the air duct.
- Undo and remove the twelve external screws of the cover.
- Remove the transmission cover.

- Remove the bushing from the supporting bearing of the driven pulley shaft on the transmission cover by placing a screwdriver in the slot on the transmission cover.

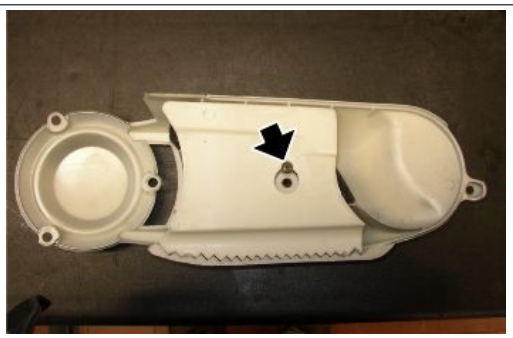


Air duct

- Unscrew and remove the two screws (1).
- Undo and remove the three screws ②.
- Remove the air duct.

Air duct filter

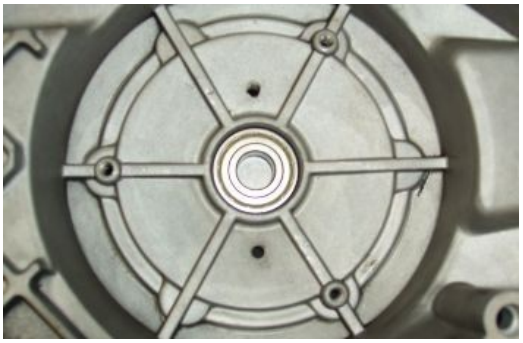
- Remove the air duct.
- Undo and remove the screw of the air-box cover.



- Remove the air-box cover.
- Remove the air filter.
- Proceed to clean or replace the air filter.

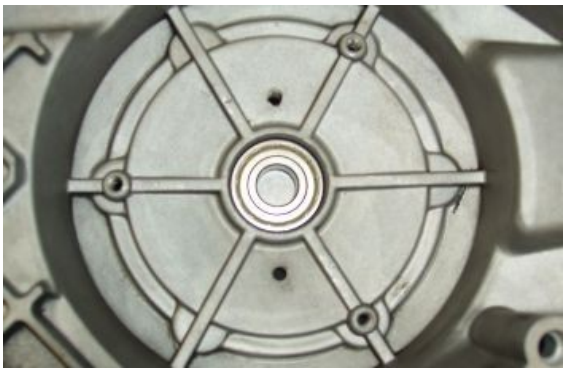
Removing the driven pulley shaft bearing

- Remove the transmission cover.
- Remove the bearing using the specific extractor.



Refitting the driven pulley shaft bearing

- Slightly heat the crankcase from the inside so as not to damage the coated surface.
- Insert the bearing in its housing.



CAUTION

REST THE COVER ON A SUITABLE SURFACE TO AVOID DAMAGING THE COVER COAT.

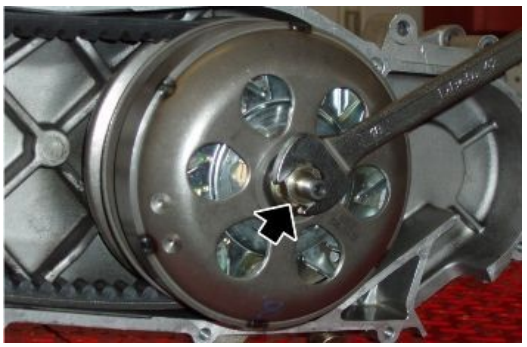
NOTE

ALWAYS REPLACE THE BEARING WITH A NEW ONE AT EVERY REFIT

Removing the driven pulley

- Remove the transmission cover.
- Remove the fixed driving half-pulley.

- Lock the clutch bell with a calliper spanner.
- Unscrew and remove the clutch nut.
- Remove the clutch bell.



- Remove the driven pulley and the driving belt.

CAUTION

CLEAN THE CLUTCH BELL AS INDICATED IN THE SCHEDULED MAINTENANCE TABLE.

Inspecting the clutch drum

- Make sure that the clutch bell is not worn or damaged.
- Measure the clutch bell inside diameter.

Characteristic

Clutch bell max. value

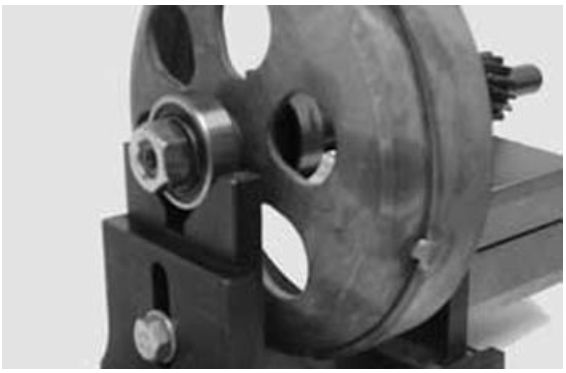
Max. value: Ø 135 mm

Clutch bell standard value

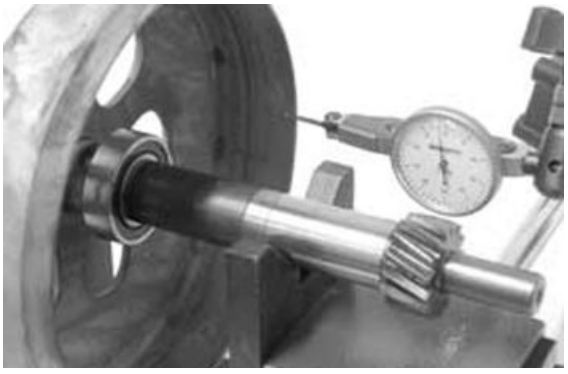
Standard value: Ø 134 to 134.2 mm

Checking the bell working surface eccentricity

- Fit the bell on a driven pulley shaft with 2 bearings (inside diameter: 15 and 17 mm).
- Lock with the original spacer and nut.
- Place the bell/shaft assembly on the support to check the crankshaft alignment.



- Using a dial gauge and the magnetic base, measure the bell eccentricity.
- Repeat the measurement at 3 positions (Central, internal, external).
- In case of faults, replace the bell.



Characteristic

clutch bell check: Limit eccentricity.

Admissible limit eccentricity: 0.15 mm

Inspecting the clutch

- Check the thickness of the clutch mass friction material.
- The masses must not show traces of lubricants; otherwise, check the driven pulley unit seals.

NOTE

UPON RUNNING-IN, THE MASSES MUST EXHIBIT A CENTRAL FAYING SURFACE AND MUST NOT BE DIFFERENT FROM ONE ANOTHER.
VARIOUS CONDITIONS CAN CAUSE THE CLUTCH TO TEAR.

CAUTION

DO NOT OPEN THE MASSES USING TOOLS TO PREVENT A VARIATION IN THE RETURN SPRING LOAD.

Characteristic

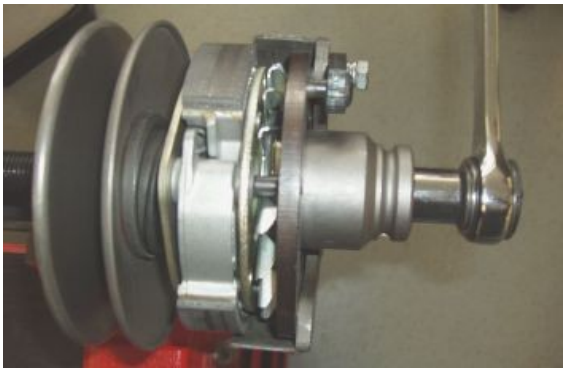
Check minimum thickness

1mm

Removing the clutch

Fit the special driven pulley spring compressor tool:

- Fit the driven pulley assembly on the tool by inserting the three pins in the ventilation holes in the ground holder support.
- Make sure that the clutch is perfectly inserted into the adapter ring before proceeding to tighten the clutch nut.



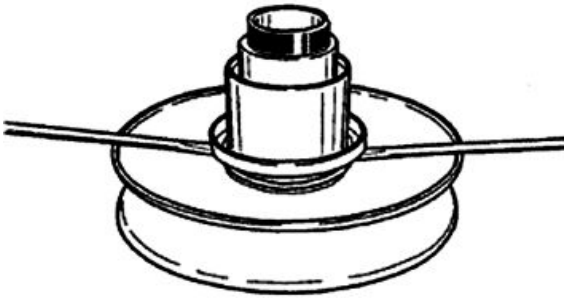
- Use the special multipurpose wrench to remove the nut fixing the clutch.
- Disassemble the driven pulley into its components (Clutch and spring with plastic fitting).

CAUTION

THE TOOL MUST BE FIRMLY FIXED IN THE VICE AND THE CENTRAL SCREW MUST TOUCH THE TOOL. EXCESSIVE TORQUE MAY DEFORM THE SPECIFIC TOOL.

Pin retaining collar

- Remove the collar with the aid of 2 screwdrivers.
- Remove the 3 guide pins and the movable half-pulley.

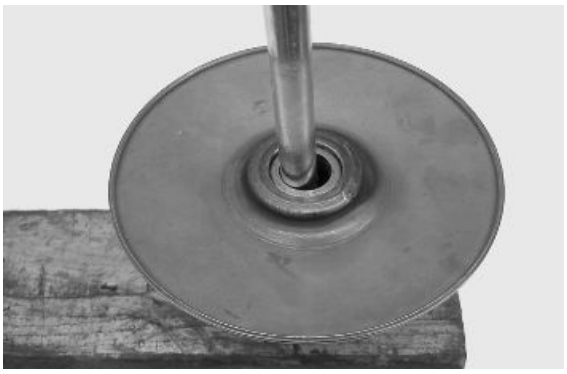


Removing the driven half-pulley bearing

- Remove the retainer ring using two flat blade screwdrivers.
- Using a hammer and pin, knock the ball bearing out as shown in the figure.
- Remove the bearing and the rollers with the specific extractor.

NOTE

REST THE HALF-PULLEY ON A WOODEN SURFACE TO AVOID DAMAGING ITS THREADED BUSHING. ALSO DO THIS UPON REMOVAL.



Inspecting the driven fixed half-pulley

- Measure the inside diameter of the pulley bushing.

Characteristic

Minimum diameter admitted

Ø40.96 mm

Standard diameter

Ø40.965 mm

Inspecting the driven sliding half-pulley

- Remove the 2 inner sealing rings and the 2 O- rings.
- Measure the inside diameter of the movable half-pulley bushing.

Characteristic

Minimum diameter allowed:

Ø41.08 mm

Standard diameter

Ø41.035 mm

Refitting the driven half-pulley bearing

- Fit the new roller bearing using the specific punch, fit the bearing with the label facing outward and insert it completely up to the punch stop on the half-pulley.

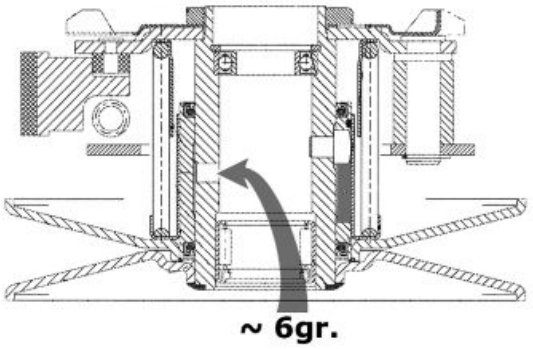
NOTE

REST THE HALF-PULLEY ON A WOODEN SURFACE TO AVOID DAMAGING ITS THREADED BUSHING. ALSO DO THIS UPON REMOVAL.

- To assemble the new ball bearing, insert it fully down in its seat with the specific punch and finally fit the seeger ring.

Refitting the driven pulley

- Check that the faying surfaces of the 2 half-pul- leys and the belt do not show any signs of wear, scoring or grease.
- Insert the new oil seals and O-rings on the movable half-pulley.
- Fit the half-pulley on the bushing with the appropriate protection sheath.
- Make sure the pins and collar are not worn, refit the pins and the collar.



- Using a curved-spout grease gun, lubricate the driven pulley unit with approximately 6 g of grease. Apply the grease through one of the holes in the bushing until grease comes out through the hole on the opposite side. This procedure is necessary to prevent the presence of grease beyond the O-rings.

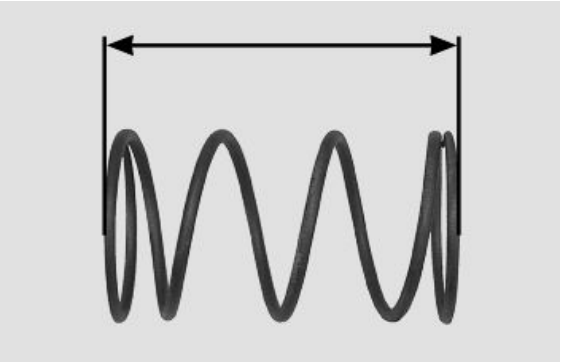
Recommended products

AGIP GREASE SM2 Lithium grease with molybdenum for bearings and other points needing lubrication

NLGI 2

Inspecting the clutch spring

- Measure the length of the movable driven half-pulley spring, when unloaded.



Characteristic

Standard length:

(125 cm³) 112.7 mm

(200 cm³) 122.7 mm

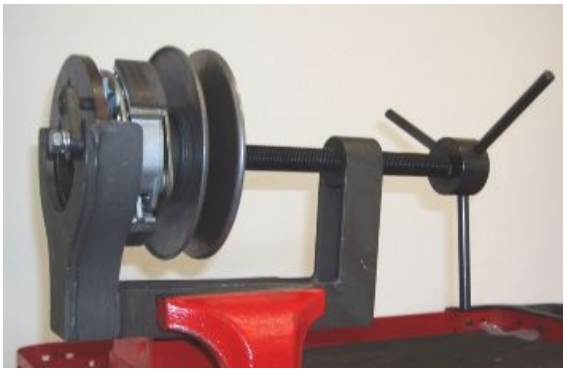
Limit after use:

(125 cm³) 108 mm

(200 cm³) 118 mm

Refitting the clutch

- Assemble the spring, clutch and driven pulley.
- Fit the clutch body on the appropriate tool with the adaptor.
- Insert the lever pin in the hole of the adaptor ring.
- Tighten the fixing nut to the prescribed torque.

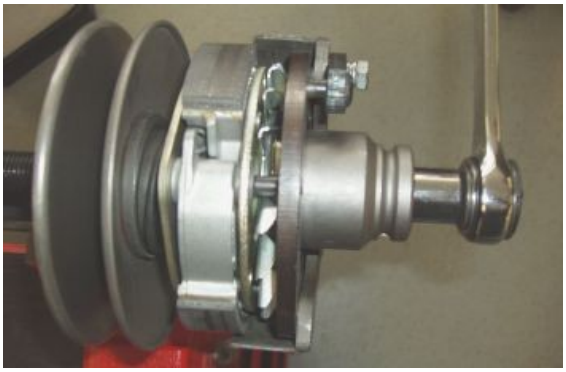


NOTE

WHEN PRELOADING THE SPRING, BE CAREFUL NOT TO DAMAGE THE PLASTIC STOP OF THE SPRING AND THE BUSHING THREADING.

NOTE

FOR DESIGN REASONS, THE NUT IS SLIGHTLY ASYMMETRIC; THE FLATTEST SURFACE SHOULD BE MOUNTED CONTACTING THE CLUTCH.



Locking torques (N*m)

Rear CVT pulley fixing flanged nut - M12x1 (1)
60 Nm (44.25 lbf ft) - Loctite 243

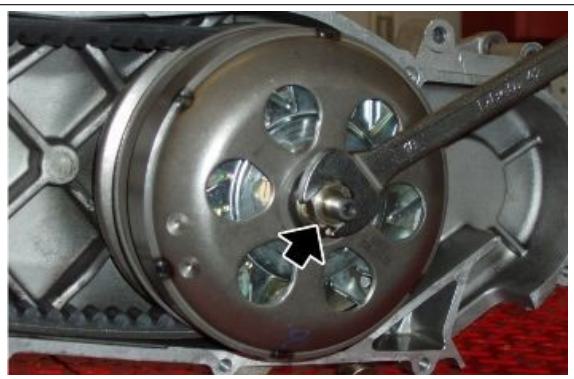
Refitting the driven pulley

- Place the driven pulley assembly in its position.
- Open the driven pulley and insert the belt according to the correct direction of rotation.
- Fit the driven pulley plus the belt in their position.

- Fit the clutch bell.
- Lock the clutch bell.
- Tighten the clutch nut.

Locking torques (N*m)

Rear CVT pulley fixing flanged nut - M12x1 (1)
60 Nm (44.25 lbf ft) - Loctite 243



Drive-belt

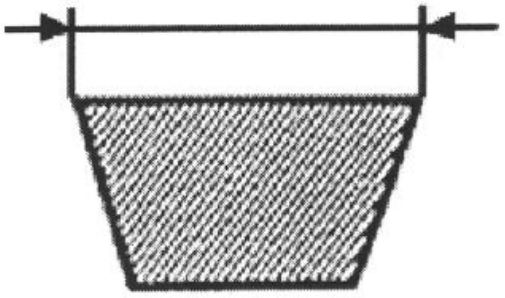
- Make sure that the driving belt is not damaged.
- Check belt for correct width.

Characteristic

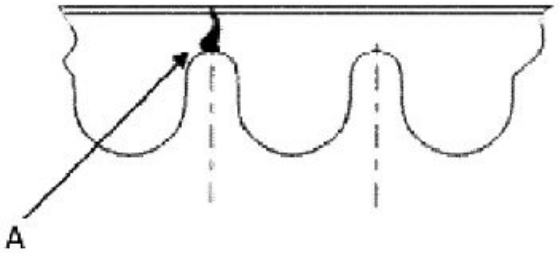
Driving belt width (125 - 200)

- minimum: 21.0 mm (0.827 in)

- standard: 22.0 +/- 0.2 mm (0.8661 +/- 0.0079 in)

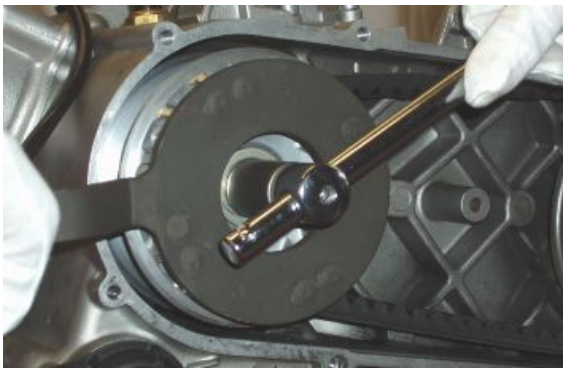


During the wear checks foreseen in the scheduled maintenance services, check that the rim bottom of the toothing does not show signs of incisions or cracking (see figure): the rim bottom of the tooth must not have incisions or cracking; if it does, change the belt.



Removing the driving pulley

- Remove the transmission cover.
- Unscrew the fixing nut with the specific tool.



- Remove the fixing nut and collect the washer.

- Remove the fixed driving half-pulley.

- Remove the spacer.

125 cm³ 1.5 mm

200 cm³ 1.8 mm

- Detach the driving belt.
- Remove the bushing.

- Remove the movable half-pulley, take care that the free rollers fitted on it do not come off.

- Remove the support plate and the rel- ative guide sliders.

- Remove the spacer.

Inspecting the rollers case

- Check that the internal bushing shown in the figure is not abnormally worn and measure its inside diameter.
- Measure the outside diameter of the pulley sliding bushing shown in the figure.
- Check that the rollers are not damaged or worn.
- Check that the guide sliders for the roller contrast plate are not worn.
- Check that the roller housings or the surfaces in contact with the belt on both half-pulleys are not worn.
- Check that fixed driving pulley does not show signs of abnormal wear on the grooved edge and on the surface in contact with the belt.

CAUTION

DO NOT LUBRICATE OR CLEAN SINTERED BUSHINGS

Characteristic

Movable pulley bushing (125 - 200)

- maximum diameter: 26.121 mm (1.028 in)

- standard diameter: 26.000 (+0/0.121) mm (0.8661 (+0/+ 0.0047 in))

Pulley sliding bushing (125 - 200)

- minimum diameter: 25.95 mm (1.022 in)

- standard diameter: 26.00 (-0.02/-0.041) mm (1.0236 (-0.0008/ + 0.0016 in))

VARIABLE SPEED ROLLER

- minimum diameter (125): 18.50 mm (0.73 in)

- minimum diameter (200): 20.1 mm (0.79 in)
- standard diameter (125): 19.0 +/- 0.1 mm (0.748 +/- 0.004 in)
- standard diameter (200): 20.6 +/- 0.1 mm (0.811 +/- 0.004 in)

Refitting the driving pulley

- Install the spacer.

- Preassemble the movable half-pulley with the roller contrast plate by placing the rollers in their housings with the larger support surface touching the pulley according to the direction of rotation.
- Check that the roller contact plate does not show flaws or is damaged on the grooved edge.
- Fit the entire bushing assembly on the crank-shaft.
- Fit the driven pulley/Clutch/belt assembly to the engine.

- Fit the driving belt.
- Install the spacer.

- Fit the fixed driving half-pulley.

WHEN FITTING THE FIXED DRIVING HALF-PULLEY, IT MUST BE TOTALLY FREE SO THAT IT IS NOT INCORRECTLY TAUTENED.

- Fit the washer and tighten the nut.

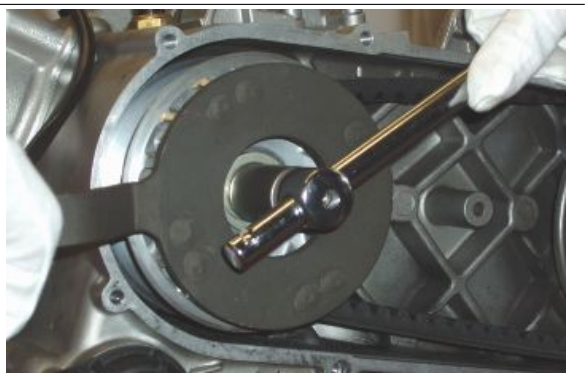
CAUTION

CHECK THAT THE WASHER IS ADEQUATELY FITTED BEFORE TIGHTENING THE NUT.

NOTE

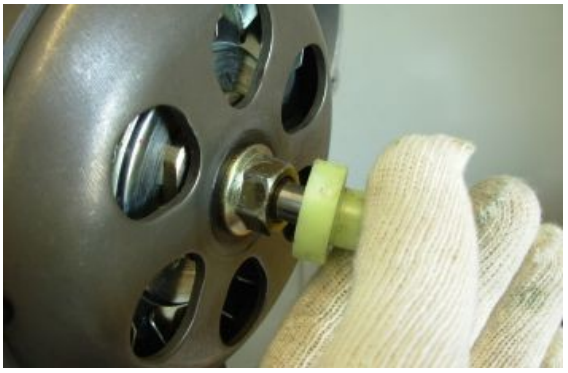
REPLACE THE NUT WITH A NEW ONE AT EVERY REFIT

- Prevent fixed driving half-pulley rotation using the specific tool. Tighten the fixing nut to the prescribed torque.



Refitting the transmission cover

- Fit the bushing to the shaft and add the nut hexagon.



- Fit the transmission cover and press it until it stops.
- Operating diagonally, tighten the cover external screws (11 screws for 200 cm³ - 12 screws for 125 cm³).
- Fit the air duct.

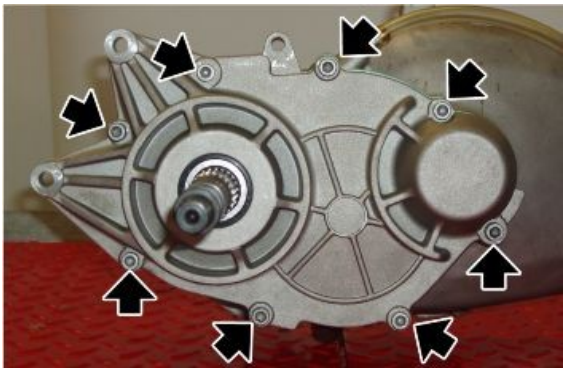
Locking torques (N*m)

CVT cover EI fixing screws - M6x35 **10 Nm (7.38 lbf ft)**

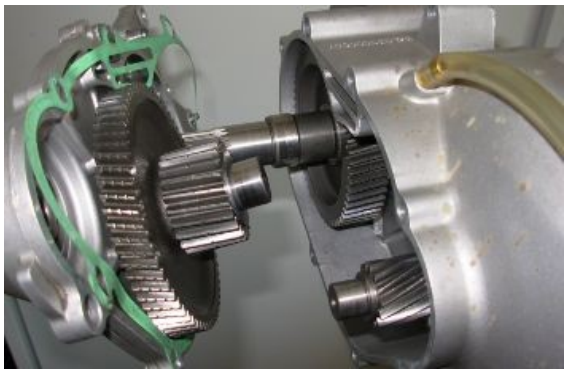
End gear

Removing the hub cover

- Drain the rear hub oil through the oil drainage plug located at the bottom of the crankcase.
- Remove the eight screws shown in the
- figure.



- Remove the hub cover and the rele- vant gasket.



Removing the wheel axle

- Remove the hub cover.
- Remove the intermediate gear.

- Remove the two shim washers from the intermediate gear.

- Remove the wheel axle with the gear.

- Extract the driven pulley shaft from the bearing.

See also

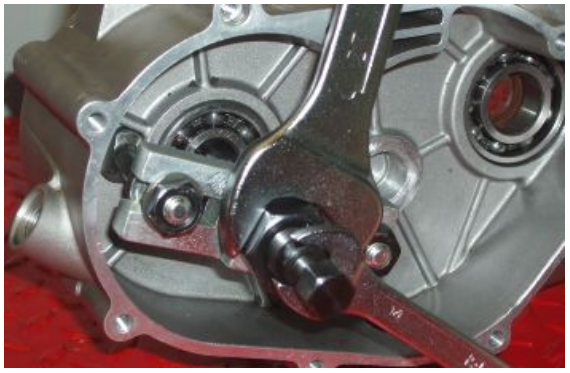
Removing the hub cover

Removing the hub bearings

- Check the status of the bearings being examined (wear, clearance and noise).

Removing the wheel axle bearings

- Warm up the crankcase.
- Remove the bearing using the specific extractor.

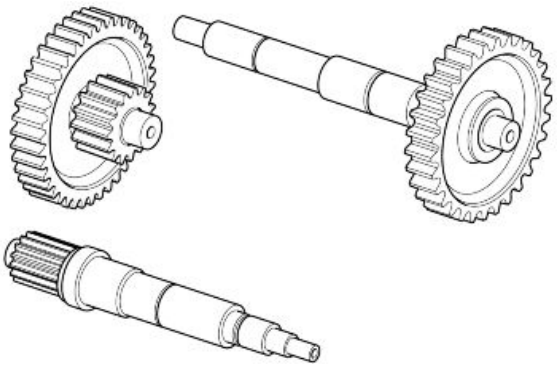


Removing the driven pulley shaft bearing

- Remove the driven pulley shaft.
- Remove the oil seal using a screwdriv- er; working from inside the bearing and being careful not to damage the hous- ing, make it come out on the belt trans- mission side.
- Remove the bearing using the specific extractor.

Inspecting the hub shaft

- Check the three shafts for wear or distortions on the toothed surfaces, on the bearing housings and the oil seal positions.
- In faults are found, replace the damaged parts.



Inspecting the hub cover

- Check that the coupling surfaces are not dented or distorted.
- Check the capacity of both the bearings and the wheel oil seal.
- In case of faults, replace the damaged parts.

Refitting the driven pulley shaft bearing

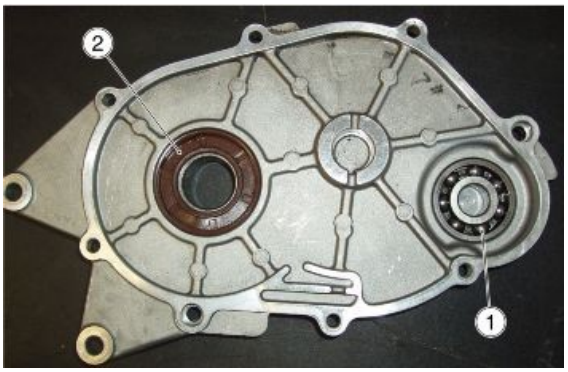
- Heat the parts with the specific heat gun.
- Refit the bearing using the specific tool.
- Fit a new oil seal on the transmission side of the belt, using the specific tool.
- Insert the driven pulley shaft.

Refitting the wheel axle bearing

- Heat up the crankcase using the thermal gun.
- Place the wheel axle bearing on the crankcase and fit it correctly using the specific tool.

Refitting the hub cover bearings

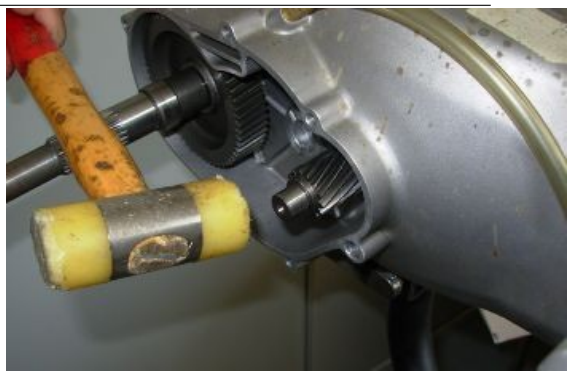
- In order to fit the hub housing bearings, the parts must be heated with the specific heat gun.
- Fit the bearing in its position ① on the cover of the hub housing on the driven pulley shaft, using the specific tool.



- Fit the bearing in its position ② on the cover of the hub housing on the driven pulley shaft, using the specific tool.
- Fit a new oil seal in the position ②, using the specific tool.

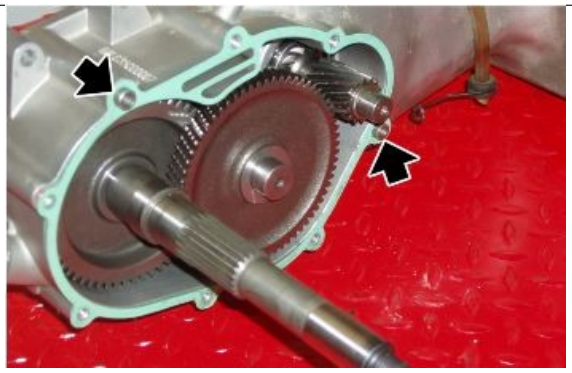
Refitting the hub bearings

- Assemble the 3 shafts in the engine crankcase as shown in the figure.



Refitting the ub cover

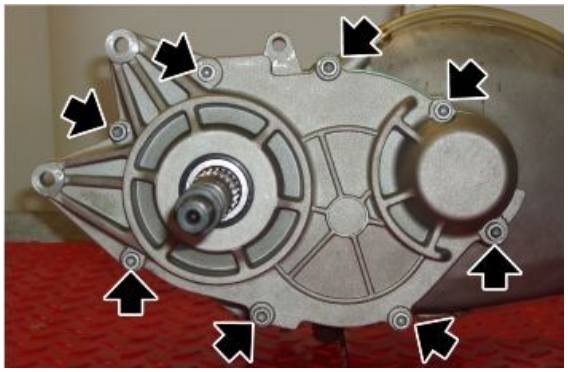
- Fit a new gasket.
- Check that the two alignment dowels are adequately positioned.
- Place the hub cover.



- Tighten the eight screws operating diagonally.
- Fill with hub oil.

Locking torques (N*m)

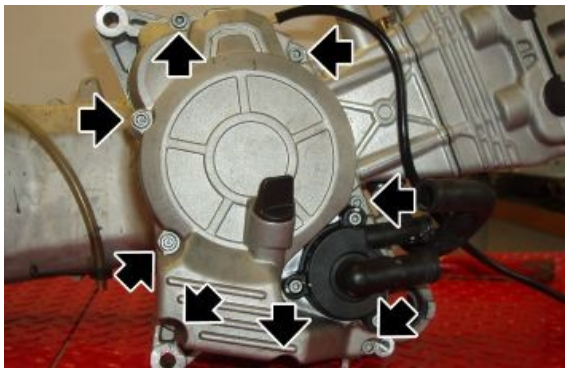
Transmission cover El fixing screws - M6x30 (8) 10 Nm (7.38 lbf ft)



Flywheel cover

Removing the hub cover

- Detach the water pipe.
- Undo and remove the eight screws.



- Remove the flywheel cover.

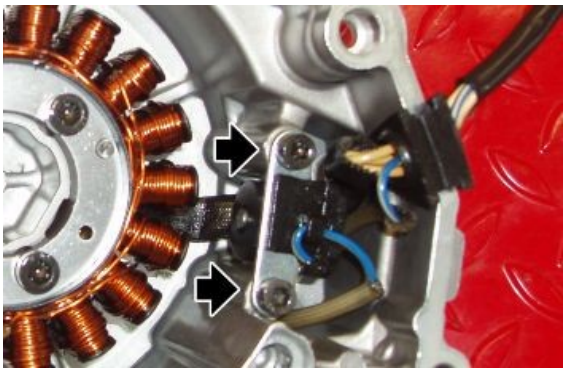
- Remove the gasket.

WARNING

UPON REFITTING, REPLACE THE GASKET WITH A NEW ONE OF SIMILAR TYPE. FOLLOW THE REMOVAL STEPS BUT IN REVERSE ORDER.

Removing the stator

- Remove the flywheel cover.
- Undo and remove the two pick-up screws.



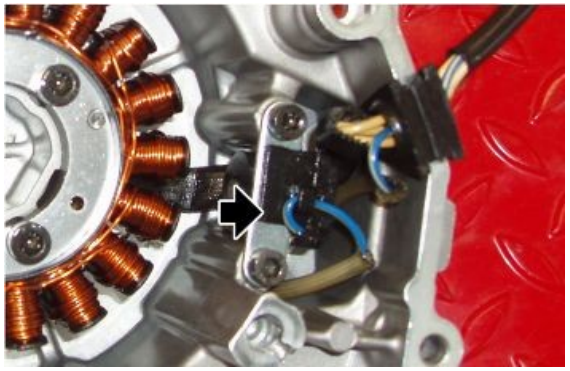
- Undo and remove the three screws fixing the stator and remove it together with the wiring.

See also

Removing the hub cover

Refitting the stator

- Install the stator following the removal steps but in reverse order.
- Place the pick-up cable as indicated.



WARNING

FIT THE PICK-UP FIXING PLATE WITH THE SENSOR FACING THE STATOR.

- Refit the stator and the flywheel carry- ing out the removal steps but in reverse order; tighten the retainers to the speci- fied torque.

Locking torques (N*m)

Stator EI fixing screws - M6x25 (3) 10 Nm (7.38 lbf ft) - Loctite 243

See also

Removing the hub cover

Refitting the flywheel cover

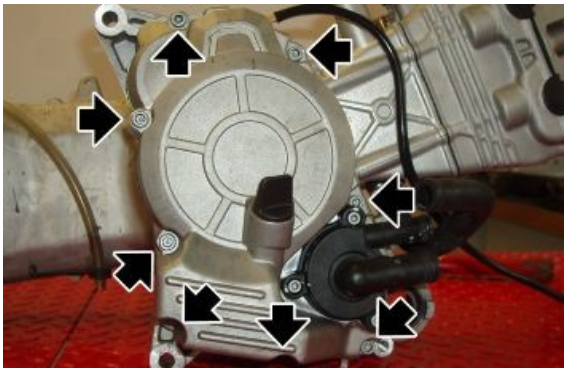
- Place the oil pump shaft in the direction indicated by the reference arrow ofthe internal plate.

- Place the water pump shaft with its grooves facing the reference point on the cover.

- Refit the cover on the engine taking care the centring pins are adequately positioned.

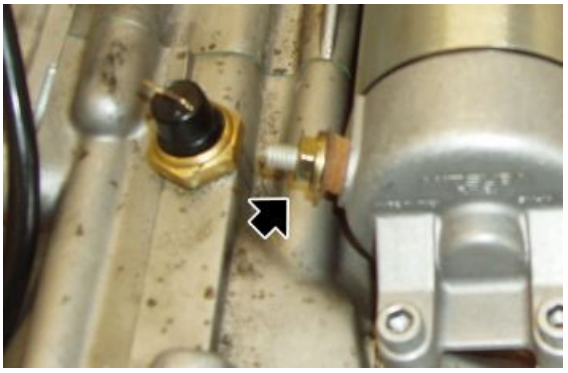
Locking torques (N*m)

Ignition cover fixing screws - M6x110 (5) 11 Nm (8.11 lbf ft) **Ignition cover fixing screws - M6x140 (1)** 11 Nm (8.11 lbf ft) **Ignition cover fixing screws - M6x170 (1)** 11 Nm (8.11 lbf ft) **Ignition cover EI screws - M6x25 (1)** 11 Nm (8.11 lbf ft)

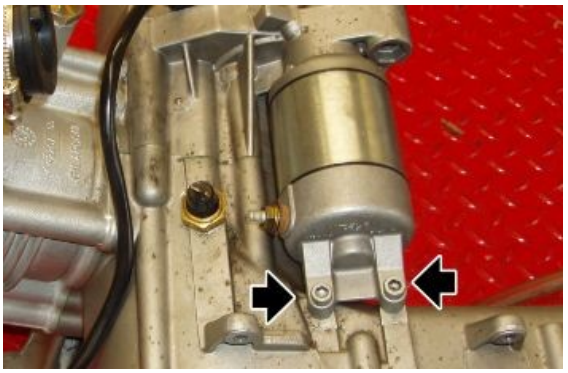


Removing the starter motor

- Unscrew and remove the nut.
- Remove the power cable.



- Unscrew and remove the two screws.

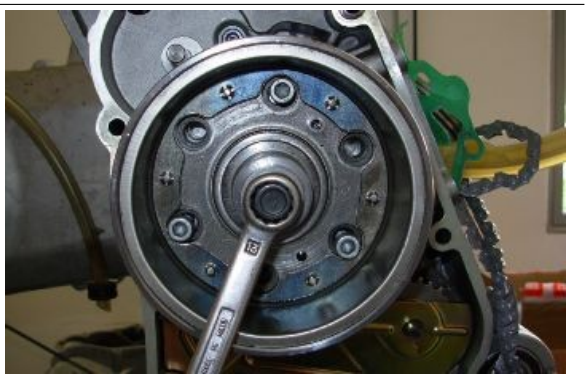


- Remove the starter motor by sliding it off from one side.

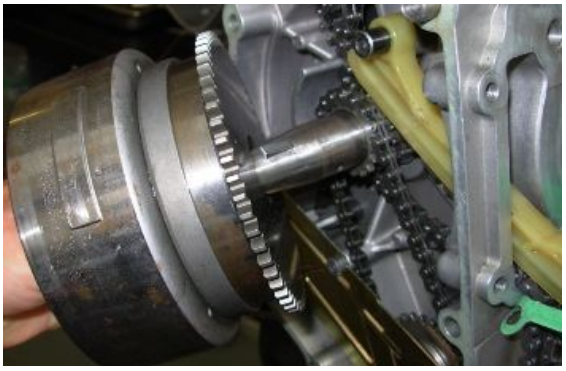
Removing the flywheel magneto

- Remove the flywheel cover.
- Lock the crankshaft with the specific special tool.

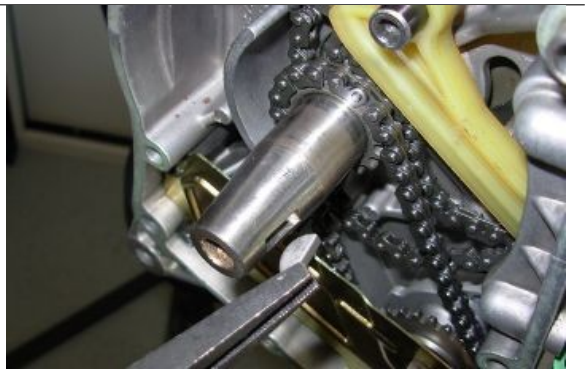
- Undo and remove the screw.
- Collect the washer.



- Extract the flywheel using the specific tool.



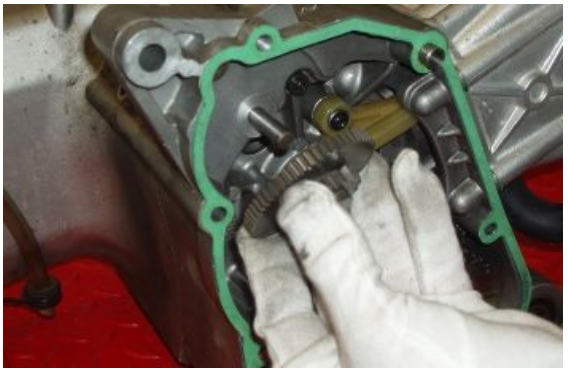
- Remove the cotter.



Intermediate gear

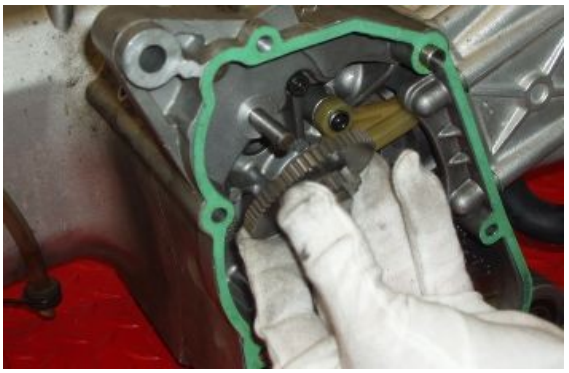
FITTING

- Fit the intermediate gear.



REMOVAL

- Remove the flywheel, the cotter and the freewheel.
- Slide off the intermediate gear.

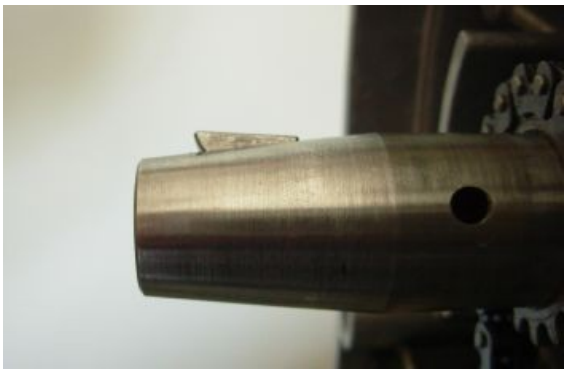


See also

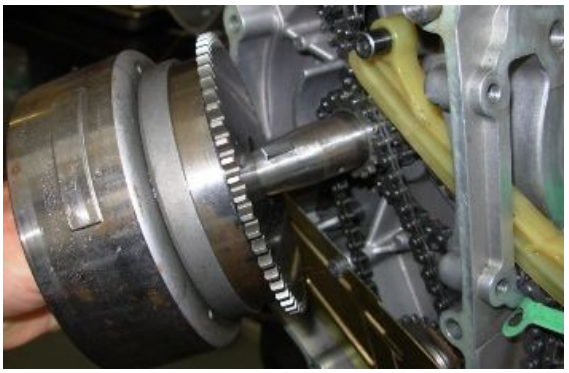
Removing the flywheel magneto

Refitting the free wheel

- Fit the cotter in its seat, be careful to position it as indicated in the photo-graph.

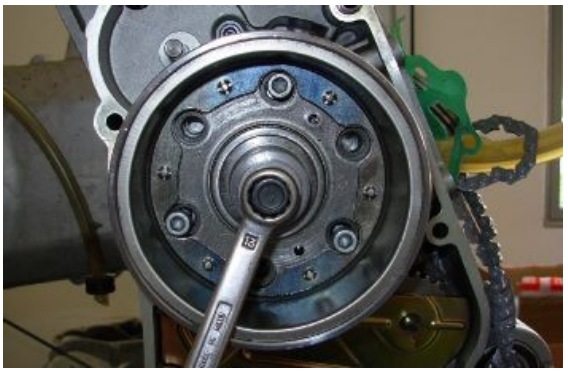


- Fit the gear plus the pre-assembled freewheel, carefully check the coupling with the crankshaft by means of the cotter.



Refitting the flywheel magneto

- Fit the flywheel paying attention to insert the cotter adequately.
- Lock the flywheel nut to the prescribed torque.

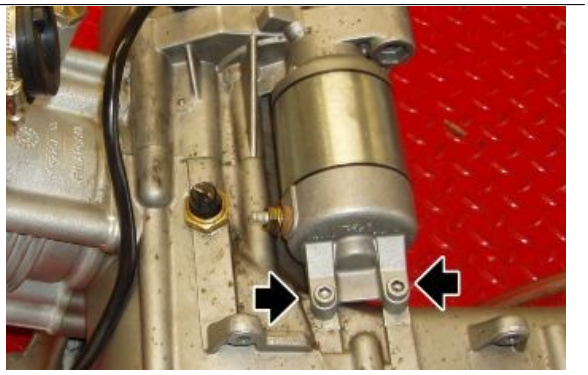


Locking torques (N*m)

Rotor TEF fixing screw - M8x25 (1) 25 Nm (18.44 lbf ft) - Loctite 243

Refitting the starter motor

- If the O-ring is damaged, fit a new one on the starter motor and lubricate it.
- Fit the starter motor on the crankcase and tighten the 2 screws.



CAUTION

ADEQUATELY COUPLE THE MOTOR GEAR WITH THE STARTER DOUBLE GEAR.

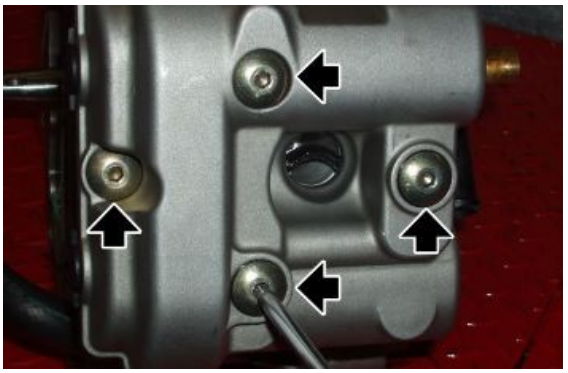
Locking torques (N*m)

Starter motor EI fixing screws - M6x25 (2) 10 Nm (7.38 lbf ft)

Cylinder assy. and timing system

Removing the rocker-arms cover

- Undo and remove the four screws.
- Remove the tappet cover.



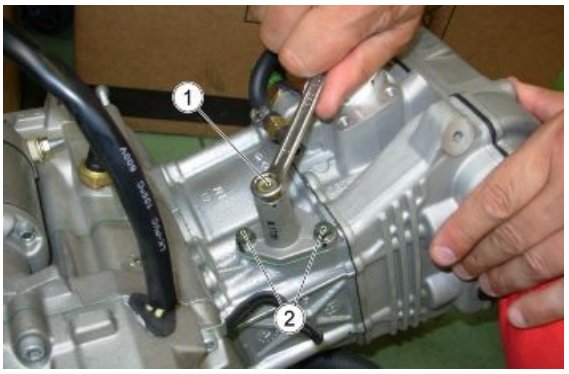
Removing the timing system drive

- Remove the tappet cover.
- Remove the flywheel.
- Rotate the crankshaft until the front cylinder piston reaches the top dead centre (TDC).
- Undo and remove the screw on the crankcase and screw the specific tool to prevent crankshaft rotation.

- Get two Ø 6.3 mm (0.25 in) pins.
- Place the pins in their positions on the overhead camshafts.

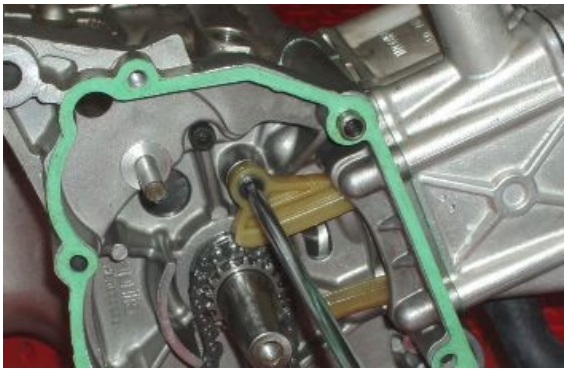
- Undo and remove the screw ①

  and collect the spring.
- Remove the screws (2) and take out the chain tensioner with relevant gasket.



- Remove the internal plate.
- Remove the oil pump and the relevant chain.
- Unscrew and remove the screw.
- Remove the tensioner slider.
- Remove the timing chain.

IT IS ADVISABLE TO MARK THE CHAIN IN ORDER TO ENSURE THAT THE DIRECTION OF ROTATION IS MAINTAINED.



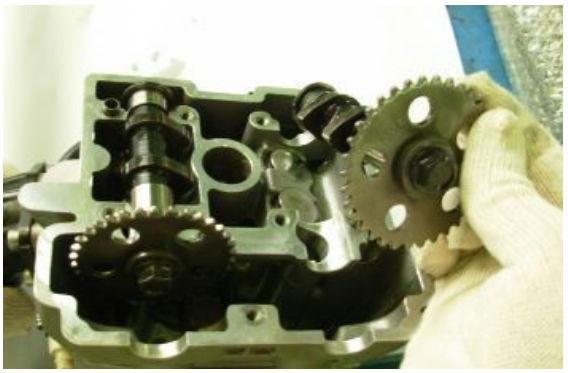
See also

Removing the rocker-arms cover
Removing the flywheel magneto

Removing the cam shaft

- Remove the timing system control.
- Remove the chain tensioner.
- Undo and remove the eight screws.
- Remove the cam tower cap.

- Remove both camshafts.

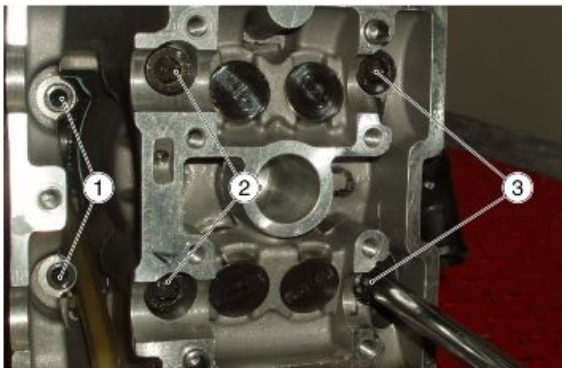


See also

Removing the timing system drive

Removing the cylinder head

- Remove the camshafts.
- Undo and remove the two side screws ①.
- Loosen the screws ②- ③ operating di-
- agonally.
- Undo and remove both central short screws ② and collect the washers.
- Undo and remove both central long
- screws ③ and collect the washers.



- Remove the head.
- Collect the lower chain slider.

See also

Removing the cam shaft

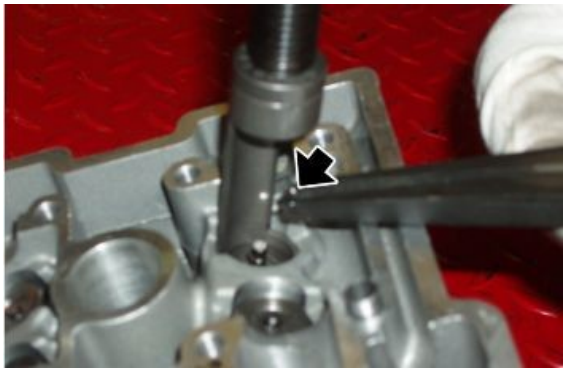
Removing the valves

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

- Remove the valve bucket tappets.

- Compress the valve spring using the specific tool.

- Remove both cotter pins.



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

- Remove the valves.

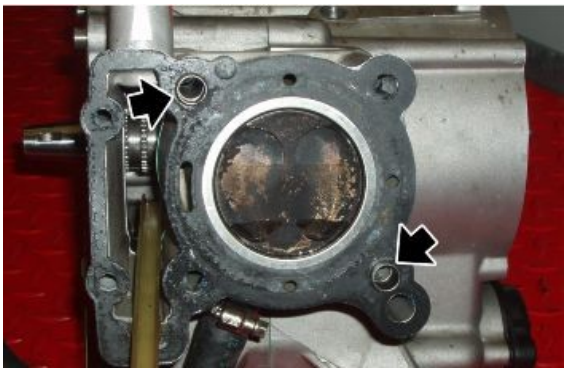
- Remove the oil seals with a pair of pliers.

See also

Removing the cylinder head

Removing the cylinder - piston assy.

- Remove the head.
- Remove the water delivery sleeve.
- Remove the two dowels and the gasket between the cylinder and the head.



- Slide off the cylinder.
- Remove the gasket between the cylin- der and the crankcase.

CAUTION

TO AVOID DAMAGING THE PISTON, KEEP IT FIRM WHILE REMOVING THE CYLINDER.

- Remove the retainer rings from the pin.

- Slide off the pin.
- Remove the piston.
- Remove the three piston rings.

See also

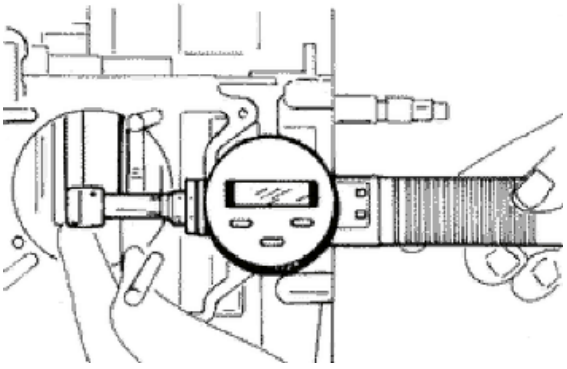
Removing the cylinder head

Inspecting the small end

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

NOTE

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



Characteristic

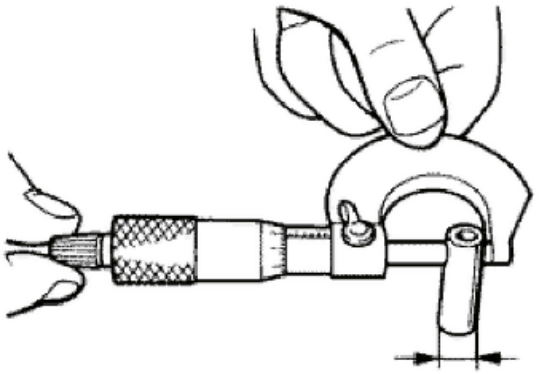
Connecting rod small end (125 - 200)

Maximum diameter: 15.023 mm (0.591 in)

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

Inspecting the wrist pin

- Check the pin outside diameter.



Characteristic

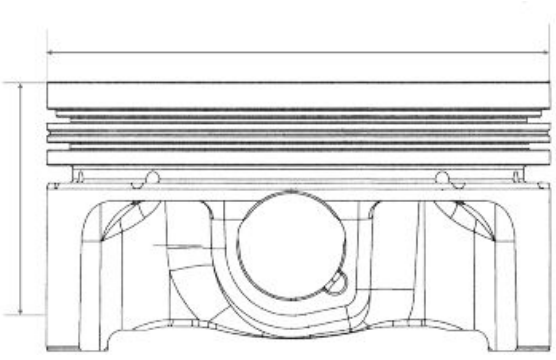
Pin (125 - 200)

Minimum diameter: 14.995 mm (0.590 in)

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

Inspecting the piston

- Measure the pin seat diameter on the piston.
- Calculate the pin - piston coupling clearance.
- Measure the piston outside diameter, perpendicular to the pin axis.
- Take the measurement at 6 mm (0.24 in) from the base, at the position shown in the figure.
- Carefully clean the sealing rings housings.
- Measure the sealing rings - grooves coupling clearance using suitable sensors, as shown in the diagram
- If clearances measured exceed the limits specified in the table, the piston should be replaced by a new one.



NOTE

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

Characteristic

Piston / cylinder (125/200)

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

Maximum piston / cylinder coupling clearance after use (125/200)

- top ring: 0.075 mm (0.0029 in)
- middle ring: 0.065 mm (0.0025 in)
- oil scraper: 0.25 mm (0.0098 in)

Standard piston / cylinder coupling clearance (125/200)

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

Inspecting the cylinder

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

CAUTION

THE MARKING IS LOCATED ON THE PISTON CROWN.

Characteristic

Maximum run-out allowed:

0.05 mm

CYLINDER - PISTON COUPLING CLEARANCE 125 CM³

Coupling categories with cast-iron cylinder

NAME	ABBREVIATION	CYLINDER		PISTON		FITTING CLEARANCE	
		min	max	min	max	min	max
Cylinder/Piston	M	58,010	58,017	57,963	57,970	0,040	0,054
Cylinder/Piston	N	58,017	58,024	57,970	57,977	0,040	0,054
Cylinder/Piston	O	58,024	58,031	57,977	57,984	0,040	0,054
Cylinder/Piston	P	58,031	58,038	57,984	57,991	0,040	0,054

CYLINDER - PISTON COUPLING CLEARANCE 200 CM³

Coupling categories with cast-iron cylinder

NAME	ABBREVIATION	CYLINDER		PISTON		FITTING CLEARANCE	
		min	max	min	max	min	max
Cylinder/Piston	M	63,010	63,017	62,958	62,965	0,045	0,059
Cylinder/Piston	N	63,017	63,024	62,965	62,972	0,045	0,059
Cylinder/Piston	O	63,024	63,031	62,972	62,979	0,045	0,059
Cylinder/Piston	P	63,031	63,038	62,979	62,986	0,045	0,059

Inspecting the piston rings

SEALING RINGS (125 / 200)

Specification	Desc./Quantity
Compression ring (top)	0.2 / 0.35 mm (0.0079 / 0.014 in)
Compression ring (middle)	0.2 / 0.35 mm (0.0079 / 0.014 in)
Oil scraper ring	0.2 / 0.7 mm (0.0079 / 0.027 in)
Top ring maximum value	0.45 mm (0.18 in)
Middle ring maximum value	0.45 mm (0.18 in)

Removing the piston

- Install piston and pin onto the connecting rod, with the piston arrow aligned facing the exhaust.
- Fit the pin retainer ring on the appropriate tool.

- With the opening in the position indicated on the tool, set the retainer ring into position with the punch.
- Fit the pin stop ring using the plug as shown in the figure.

NOTE

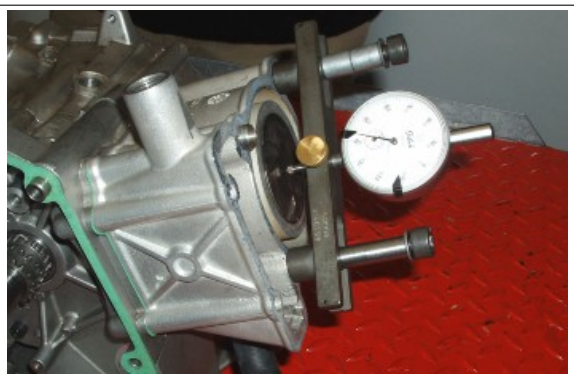
THE TOOL FOR INSTALLING THE RETAINER RINGS MUST BE USED MANUALLY.

CAUTION

USING A MALLET TO SET THE RINGS IN POSITION MAY DAMAGE THE RING SEATS.

Choosing the gasket

- Temporarily, fit the piston to the cylinder, without base or head gasket.
- Fit a dial gauge on the specific tool.
- Zero set the dial gauge on the cylinder top surface and fit it on the two adjacent stud bolts.
- Remove the dial gauge and refit it on the two stud bolts on the opposite angles. Now measure again.



- Rotate the crankshaft up to the TDC(the reversal point of the dial gauge rotation).
- Lock the crankshaft at TDC using the specific tool.
- Calculate the difference between the two measurements: using the chart below, identify the thickness of the cylinder base gasket to be used upon refitting. By correctly identifying the cylinder base gasket thickness, an adequate compression ratio can be maintained
- Remove the specific tool and the cylInder.

Characteristic

Compression ratio (125)

12: 1

Compression ratio (200)

11.6: 1

BASE GASKET SELECTION (125)

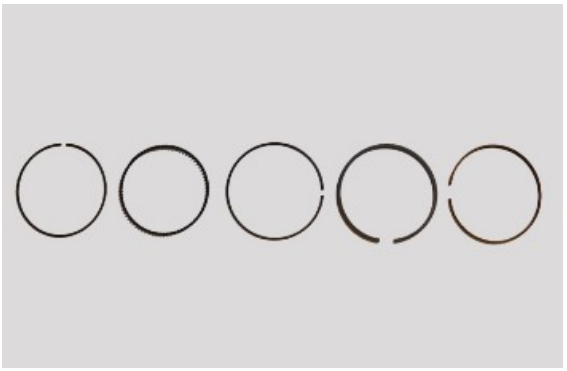
Specification	Desc./Quantity
Size measured: (1.05) - (1.20) mm ((0.041) - (0.047) in)	Gasket: 0.3 mm (0.012 in)
Size measured: (1.20) - (140) mm ((0.047) - (0.055) in)	Gasket: 0.4 mm (0.016 in)
Size measured: (1.40) - (1.55) mm ((0.055) - (0.061) in)	Gasket: 0.5 mm (0.019 in)

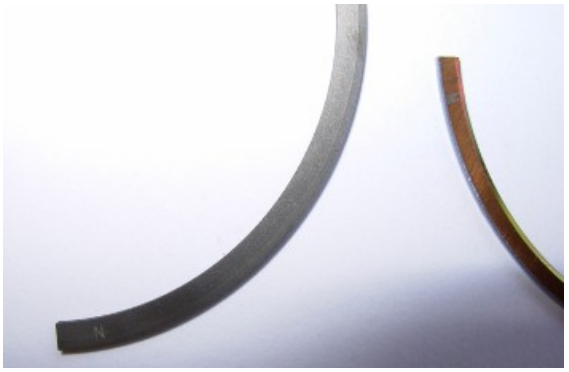
BASE GASKET SELECTION (200)

Specification	Desc./Quantity
Size measured: (-1.35) - (-1.20) mm ((-0.053) - (-0.047) in)	Gasket: 0.3 mm (0.012 in)
Size measured: (-1.20) - (-1.00) mm ((-0.047) - (-0.039) in)	Gasket: 0.4 mm (0.016 in)
Size measured: (-1.00) - (-0.85) mm ((-0.039) - (-0.033) in)	Gasket: 0.5 mm (0.019 in)

Refitting the piston rings

- Place the oil scraper spring on the piston.
- Fit the oil scraper ring keeping the gap opposed to the spring union.
- Fit the middle piston ring with the identification letter T facing the piston crown. In any case, the tapered side of the ring must be facing opposite the piston crown.
- Fit the top piston ring with the identification letter T facing the piston crown.
- Offset the piston ring gaps on the three rings by 90º as shown in the figure.
- Lubricate the components with engine oil.





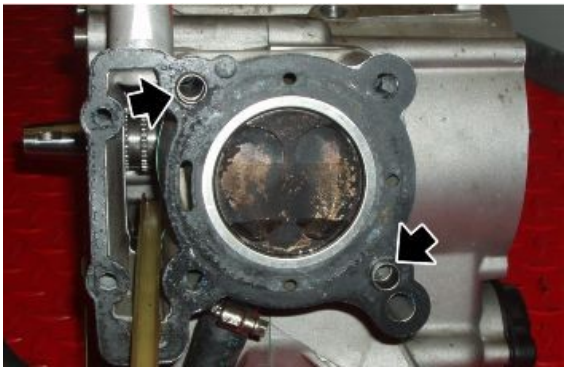
Refitting the cylinder

- Fit a new cylinder base gasket of the chosen thickness.
- Refit the cylinder as indicated in the figure.

NOTE

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

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

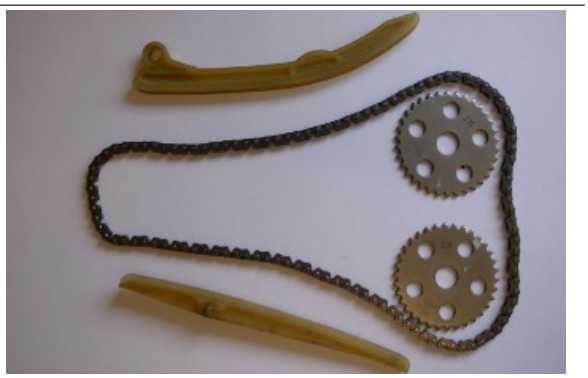


Inspecting the cylinder head

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

Inspecting the timing system components

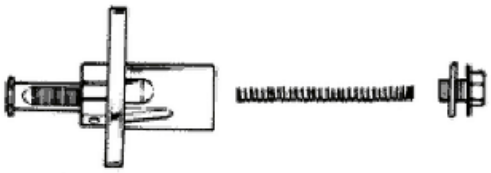
- Check that the guide slider and the tensioner pad are not excessively worn.
- Check that the chain assembly, the camshaft driving pulleys and the sprocket wheel are not worn.
- Replace the parts if signs of wear are found.



CHAIN TENSIONER

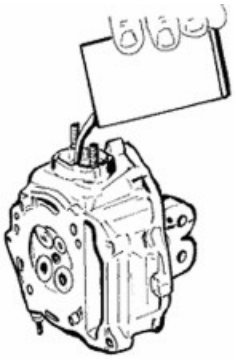
- Remove the central screw with the washer and the tensioner spring.

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

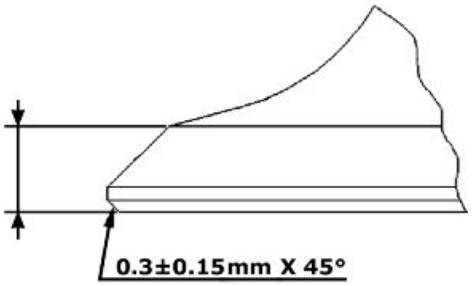


Inspecting the valve sealings

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



- Measure the sealing surface width on the valve seats.



VALVE SEALING SURFACE

Specification	Desc./Quantity
Intake valve - sealing surface (125)	2.30 +/- 0.15 mm (0.0905 +/- 0.0059 in)
Intake valve - sealing surface (200)	1.97 +/- 0.15 mm (1.0776 +/- 0.0059 in)
Exhaust valve - sealing surface (125/200)	2.95 +/- 0.15 mm (0.1161 +/- 0.0059 in)
Valve chamfering (all valves)	0.2 +/- 0.1 mm x 45° (0.0079 +/- 0.0039 in x 45°)

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

Characteristic

Intake guide - standard diameter

4.012 mm (0.1579 in)

Intake guide: Wear limit

4.020 mm (0.1582 in)

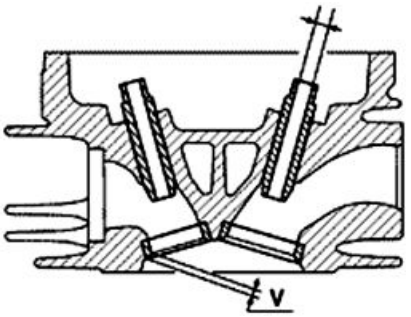
Discharge guide - standard diameter

4.012 mm (0.1579 in)

Discharge guide: Wear limit

4.020 mm (0.1582 in)

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



Characteristic

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

- Intake (125): 1.6 mm (0.0630 in)
- Exhaust (125): 1.8 mm (0.0708 in)
- Intake (200): 1.6 mm (0.0630 in)
- Exhaust (200): 2.0 mm (0.0787 in)

Inspecting the valves

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

CAUTION

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

Characteristic

Minimum diameter allowed - Intake

3.96 mm (0.1559 in)

Minimum diameter allowed - Exhaust:

3.95 mm (0.1555 in)

Standard clearance - Intake:

0.015/0.042 mm (0.00059/ 0.0016 in)

Standard clearance - Exhaust:

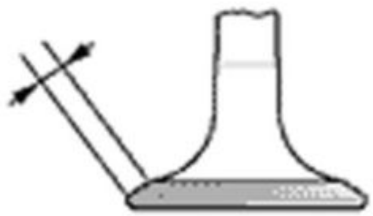
0.025/0.052 mm (0.00098/ 0.00204 in)

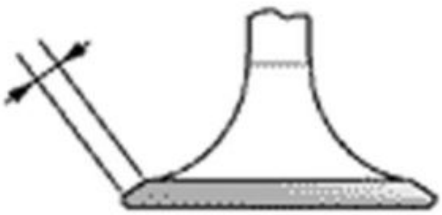
Maximum clearance admitted - Intake:

0.060 mm (0.0023 in)

Maximum clearance admitted - Exhaust:

0.070 mm (0.0027 in)

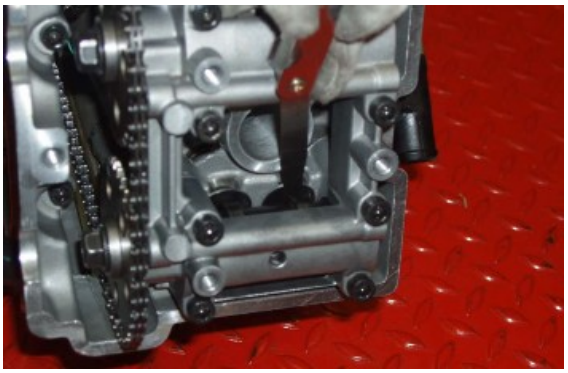




- Remove the head cover.
- Cause the engine to reach the top dead centre and lock it at that position using the specific tool.

- **NOTE**
- **FOR AN EASY REFIT, MARK TWO REFERENCES ON THE TIMING CHAIN AND THE GEARS OF THE TIMING SYSTEM IN THE COUPLING AREA.**

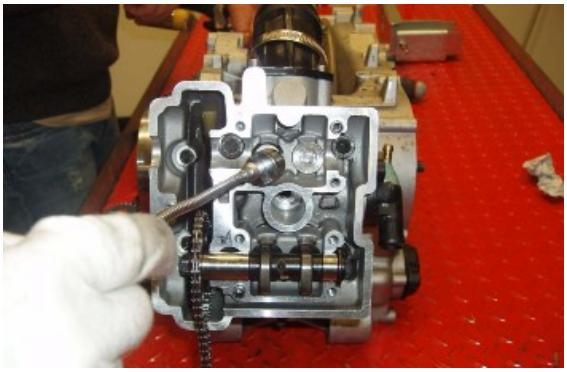
- Use a feeler gauge to check clearance on the four valves.
- If the values measured differ from the values specified, record the difference between MAXIMUM ALLOWED CLEARANCE e CLEARANCE MEASURED.



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

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

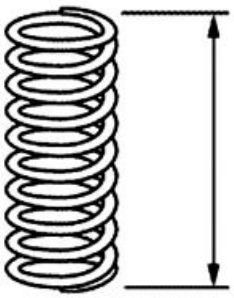
- Remove the bucket tappet of the valve in question and read the calibration value for that bowl, found inside the bucket tappet itself.
- Replace the bucket tappet with new one of a size suitable to restore the correct clearance.



- Fit the camshaft, the gears and the chain in their correct positions, using the references marked when these parts were removed.
- Fit the cam tower and tighten the eight screws to the prescribed torque.
- Fit the chain tensioner.
- Use two Ø 6.3 mm (0.248 in) timing pins to check the camshafts are correctly timed.
- Check for correct valve clearance.
- Fit the head cover.

Inspecting the springs and half-cones

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



Characteristic

Valve spring length:

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

Refitting the valves

- Lubricate the valve guides with engine oil.
- Place the two oil seals on the head using a punch.

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

Inspecting the cam shaft

- Check the camshaft bearings for signs of abnormal wear.

Characteristic

Standard diameter - Bearing A

19.980 - 19.959 mm (0.7866 - 0.7858 in)

Minimum diameter allowed - Bearing A

19.95 mm (0.7854 in)

Intake cam height (125/200)

31.488 mm (1.23968 in)

Exhaust cam height (125/200)

30.864 mm (1.21511 in)

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

Characteristic

Maximum axial clearance allowed:

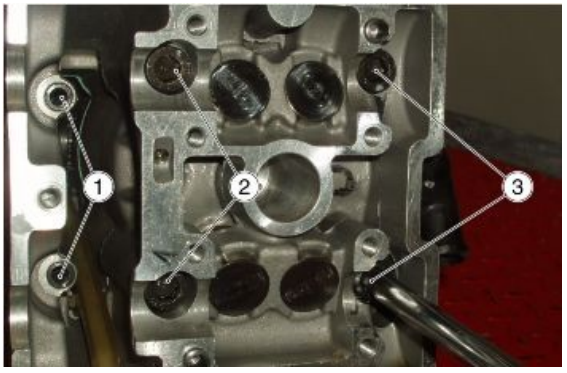
0.4 mm (0.0157 in)

Refitting the head and timing system components

- Screw the specific tool so that the crankshaft does not rotate at TDC.

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

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



NOTE

BEFORE INSTALLING THE HEAD, MAKE SURE THAT THE LUBRICATION CHANNEL IS CLEAN AS WELL AS THE REST OF THE ASSEMBLY; USE A JET OF COMPRESSED AIR FOR CLEANING.

- Tighten the four central screws ② - ③ crosswise.

Locking torques (N*m)

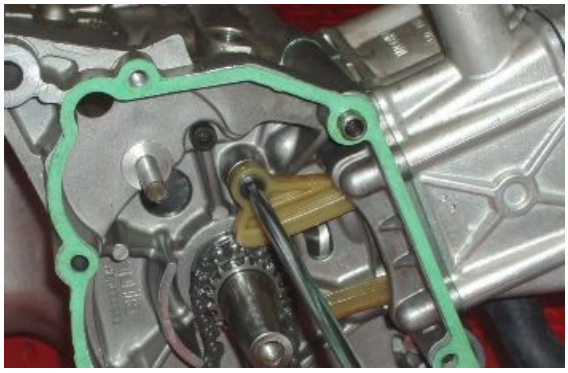
Head El fixing screws - M8x166 (4) 25 Nm + 90° (18.44 lbf ft + 90°)

- Lastly, tighten the two side screws (1).

Locking torques (N*m)

Head El fixing screws (chain side) - M6x130 (2) 11 Nm (8.11 lbf ft)

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



Locking torques (N*m)

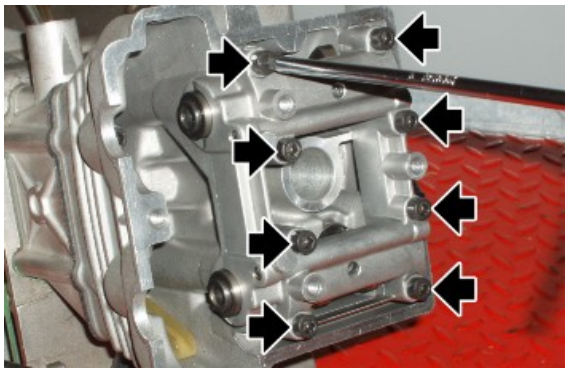
Chain tensioner guide slider El fixing screws - M6 (1) 10 Nm (7.38 lbf ft) - Loctite 243

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

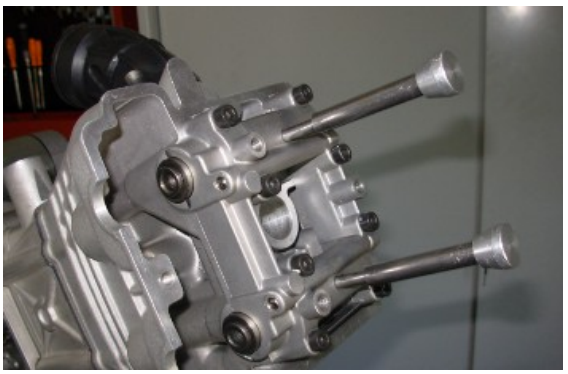
WARNING

POSITION THE CAMS OF BOTH SHAFTS FACING OUT- WARDS.

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



- Get two Ø 6.3 mm (0.25 in) pins.
- Place the pins in their positions on the overhead camshafts.

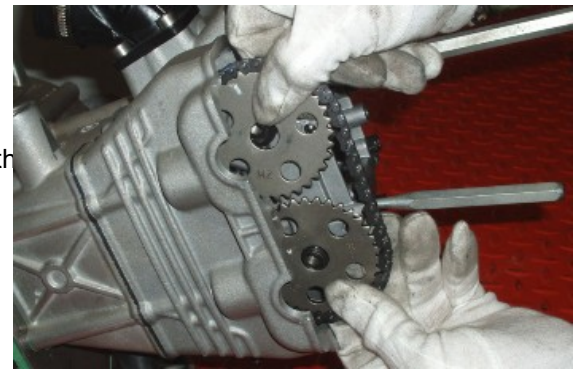


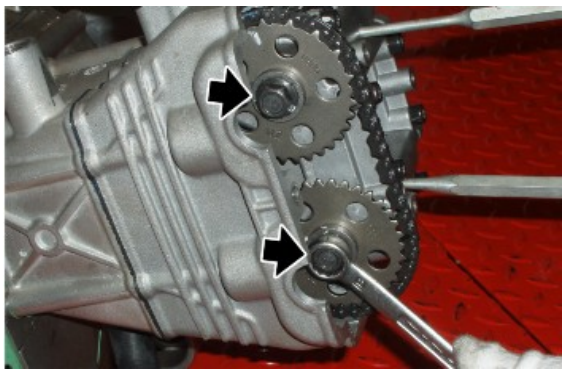
- Tighten the eight screws of the cam tower cap crosswise.

Locking torques (N*m)

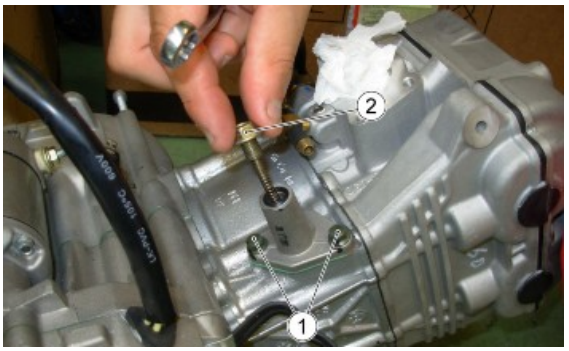
Camshaft support El fixing screws - M6x40 (8) 10 Nm (7.38 lbf ft)

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





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



Locking torques (N*m)

Chain tensioner retainer - M6x16 (2) 12 Nm (8.85 lbf ft) Chain tensioning cover - M8 (1) 6 Nm (4.43 lbf ft)

- Tighten the screws fixing the camshaft gears to the prescribed torque.

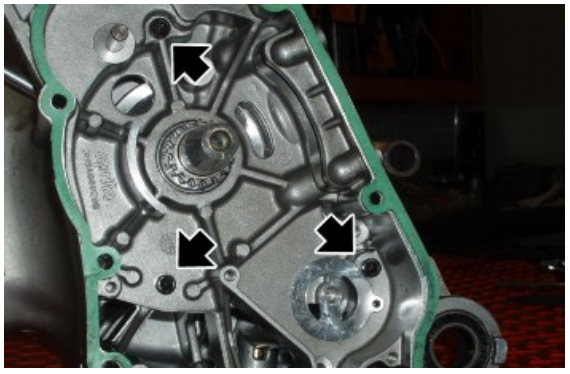
- Remove the pins on the camshafts.
- Remove the special crankshaft locking tool.
- Tighten the screw on the crankcase.
- Check the valve clearance and adjust it if required.
- Refit the tappet cover.

Crankcase - crankshaft

Splitting the crankcase halves

- Before opening the crankcase, drain out all engine oil, remove the driving pulley, the starter motor, the flywheel, the freewheel and the intermediate gear.
- Remove the thermal group.
- Remove the oil pump.

- Unscrew and remove the three screws.



- Separate the crankcase halves by giving short taps with a rubber hammer.

CAUTION

PAY ATTENTION THAT THE TOOTHING OF BOTH THE TIMING CHAIN GEARS AND THE OIL PUMP GEARS DO NOT DAMAGE THE BUSHING.

Removing the crankshaft

- Slide off the crankshaft from the fly-wheel side by giving short taps with a rubber hammer.

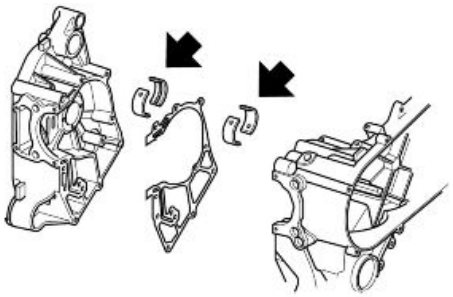
See also

Removing the flywheel magneto

Intermediate gear

Removing the crankshaft bearings

- Remove the main bushing oil seal.
- Using the suitable special tool, remove the main bushings.



Refitting the crankshaft bearings

- Using the suitable tool, fit the new bushings on both crankcase halves.

Use bushings:

- blue

This coupling almost always meets the diametral clearance specifications

It should be checked that the diametral clearance is between 0.02 - 0.06 mm for both sides.

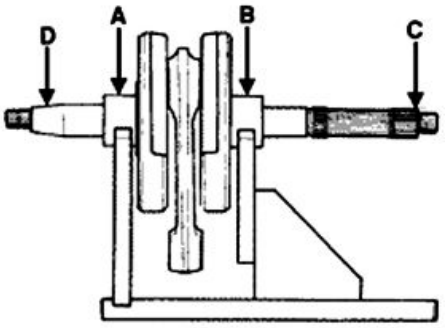
If this condition is not fulfilled, the bushing should be replaced with another of a different thickness.

These are the thickness for the half-bearings:

- red type: 2.005 - 2.010

- blue type: 2.010 - 2.015
yellow type: 2.015 - 2.020

Inspecting the crankshaft alignment



- Install the crankshaft on the support and measure the misalignment at the two points indicated in the figure.
- Check that the crankshaft cone, the tab fitting, the oil seal flow, the knurling and the threaded tangs are in good working order.
- In case of failure, replace the crankshaft.
- The crankshaft spare part has a sole code (there are no different types to select from).
- It should be checked that the diametral clearance is between 0.02 mm (0.00079 in) and 0.06 mm (0.0024 in) for both sides.
- If this condition is not fulfilled, the half-bearings should be replaced.

The big end bushings cannot be replaced. Therefore, the connecting rod cannot be replaced either. When cleaning the crankshaft, be very careful that no impurities get in through the shaft lubrication hole.
In order to prevent damaging the connecting rod bushings, do not attempt cleaning the lubrication duct with compressed air.

- The wrong installation of a buffer can seriously affect the bushing lubrication pressure.

- **NOTE**

CRANKCASE BEARINGS ARE NOT GRINDABLE.

Characteristic

Maximum off-line allowed:

A = 0.01 mm

B = 0.01 mm
C = 0.10 mm
D = 0.06 mm

Inspecting the crankcase halves

- Before checking the crankcase halves, thoroughly clean all the surfaces and the oil pipes.
- For the crankcase half on the transmission side, take particular care when handling the housing and hoses for the oil pump, the duct with the by-pass valve and the main bushings.
- As already described in the lubrication chapter, it is especially important that the by-pass valve housing shows no wear that may impair the proper sealing of the lubrication pressure adjustment ball.
- <DIV class=CNT_SUMMARY title="Testo Breve (<4000 car.)">Check that the surfaces are free from dents or deformations, with special attention to both the crankcase coupling and the cylinder-crankcase surfaces.
- <DIV class=CNT_SUMMARY title="Testo Breve (<4000 car.)">Defects in the crankcase coupling gasket or the surfaces indicated in the figure can cause a drop in the oil pressure and affect the lubrication pressure for the main bushings and the connecting rod.
- <DIV class=CNT_SUMMARY title="Testo Breve (<4000 car.)">Check that the surfaces that limit crankshaft axial clearance show no signs of wear. To measure and check sizes follow the procedure described previously for checking crankshaft axial clearance and dimensions.

Inspecting the crankshaft plain bearings

- In order to correctly lubricate the bushings, it is necessary to have both optimal lubricating pressure and a good oil flow rate; this implies that the bushings must be positioned correctly so as not to obstruct the oil supply ducts.
- The main bushings comprise two half-bearings. The two half-bearings for the left crankcase bushing (variator side) are plain with holes. The two half-bearings for the right crankcase bushing (flywheel side) have holes and a central groove.
- The oil supplying channel section is also influenced by the depth to which the bushings are driven compared with the crankshaft axial clearance of the limiting surface.

CAUTION

THE MAIN BUSHINGS SHOULD BE FITTED WITH THE COUPLING AREA FOR BOTH HALF-BUSHINGS PARALLEL TO THE CYLINDER SUPPORTING SURFACE AND WITH THE HOLES OF THE LUBRICATION GROOVE PERFECTLY CENTRED.

- Measure the bushings diameter at the 3 positions indicated in the figure.
- Bushings are divided into 3 categories according to their thickness.

RED TYPE: 2.005 - 2.010

BLUE TYPE: 2.010 - 2.015

YELLOW TYPE: 2.015 - 2.020

NOTE

DO NOT TAKE THE MEASUREMENT ON THE TWO HALF-SHELLS COUPLING SURFACE SINCE THE ENDS ARE RELIEVED TO ALLOW BENDING DURING THE DRIVING OPERATION.

特征

Characteristic

Ideal lubrication pressure

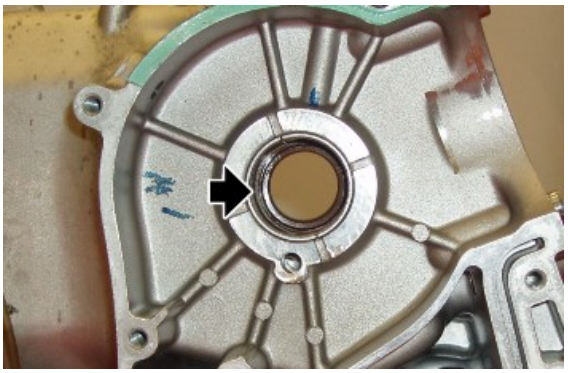
4 atm

Driving depth

0.5 +/-0.1 mm from internal stop

Refitting the crankshaft

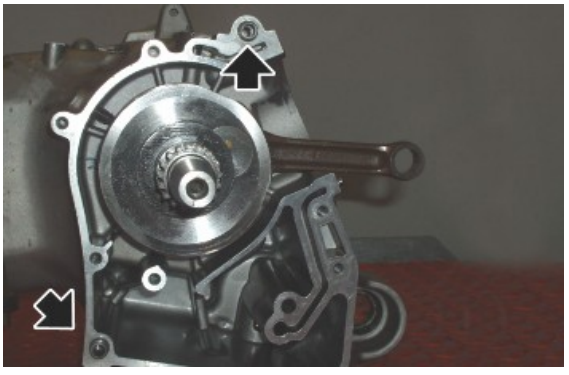
- Using the suitable special tool, fit the main bushings.
- Fit the new oil seal using a commercially available punch.



- Fit the crankshaft operating from the variator side.

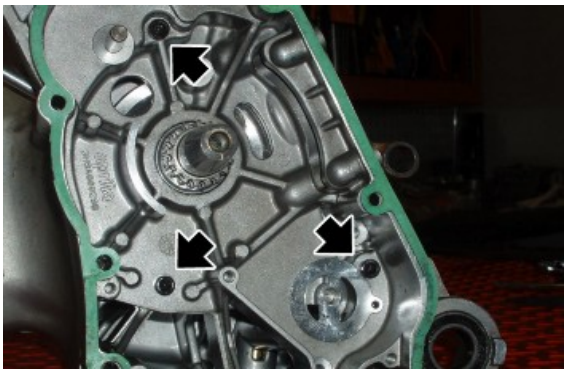
Refitting the crankcase halves

- Fit the crankshaft.
- Place the two dowels and a new gasket between both crankcase halves.



- Place the crankshaft half by giving short taps with a rubber hammer.

- Tighten the three screws to the pre- scribed torque.
- Trim the gasket protruding from the cyl- inder plane.



Locking torques (N*m)

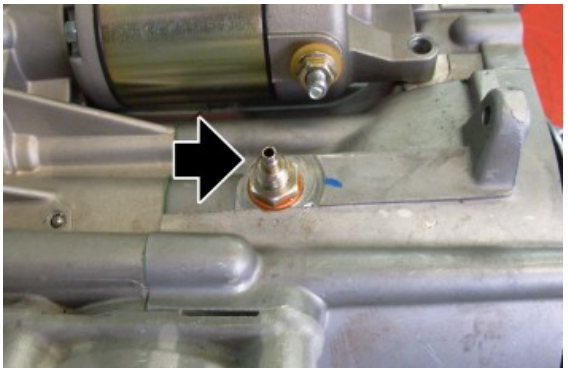
Crankcase EI fixing screws - M6x70 (1) **11 Nm (8.11 lbf ft)** **Crankcase EI fixing screws - M6x50 (2)** **11 Nm (8.11 lbf ft)**

See also

Refitting the crankshaft

Oil pressure check

- Disconnect the electrical connection of the mini- mum oil pressure switch and then remove the switch.
- Check that the oil pressure reading is 1.8 atm minimum with engine idling at 1700 +/- 100 rpm and oil at the required temperature (wait for at least one electric ventilation).
- Check that the oil pressure reading is between 3.5 and 6.5 atm with engine idling at 6000 rpm and oil at the required temperature.
- Remove the specific tools on the engine once the measurement is complete. Refit the oil pressure switch and washer, tightening it to the prescribed torque, and fit the flywheel cover.
- If oil pressure reading are not within the specified limits, check in the following order: the oil filter, the oil by-pass valve, the oil pump and the crankshaft seals.



NOTE

THIS CHECK MUST BE CARRIED OUT WITH OIL AT THE CORRECT LEVEL AND WITH AN OIL FILTER IN GOOD CONDITION.

Characteristic

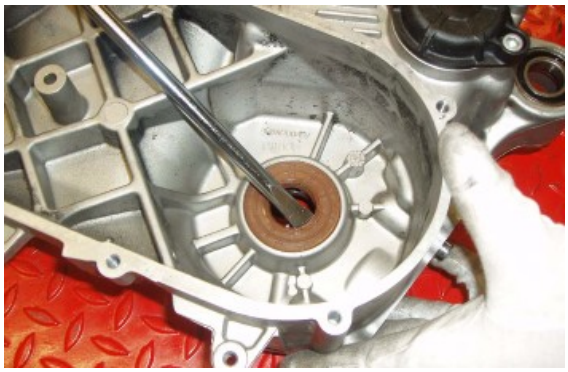
Oil pressure

Minimum pressure admitted at 6000 rpm: 3.5 atm.

Crankshaft oil seals

Removal

- Remove the crankshaft.
- Remove the main bushing oil seal working from the transmission side.



CAUTION

BE CAREFUL NOT TO DAMAGE THE SEAT OF THE MAIN BUSHING OIL SEAL.

Refitting

- Thoroughly clean the seat of the oil seal.
- Fit the new main bushing oil seal using a commercially available punch of suitable size.

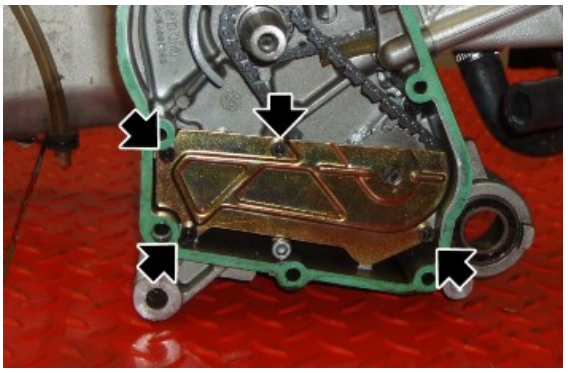
CAUTION

PREPARE THE NEW OIL SEAL BY LUBRICATING ITS SEALING LIP. DO NOT LUBRICATE THE KEYING SURFACE ON THE ENGINE CRANKCASE.

Oil pump

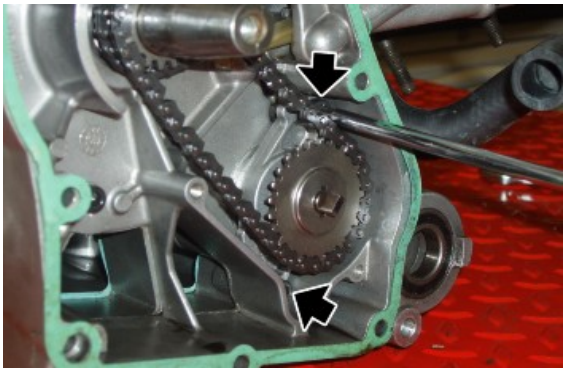
Removal

- Drain the engine oil.
- Remove the flywheel cover.
- Remove the flywheel.
- Undo and remove the four screws and remove the plate.



- Unscrew and remove the two screws.
- Slide off the gears, the oil pump and the chain.

IT IS ADVISABLE TO MARK THE CHAIN IN ORDER TO ENSURE THAT THE DIRECTION OF ROTATION IS MAINTAINED.



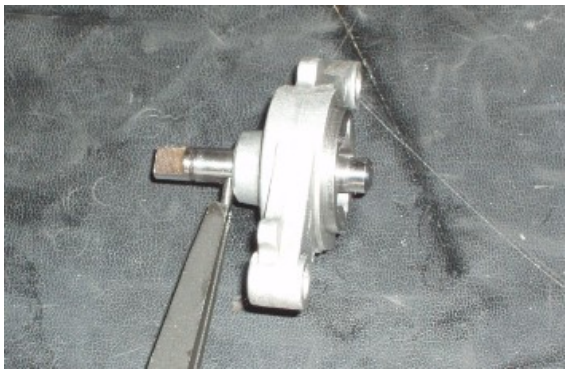
See also

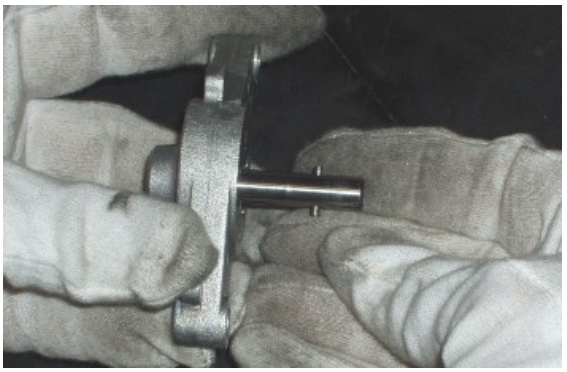
Removing the flywheel magneto

Inspection

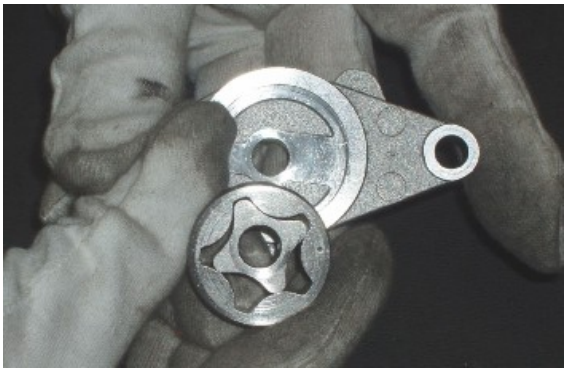
- Remove the oil pump.
- Remove the seeger ring and slide off the gears from the oil pump.

- Remove the external driving pin from the oil pump shaft.
- Detach the shaft and remove the sec-
- ond external driving pin as well.





- Take out the shaft and collect the components.

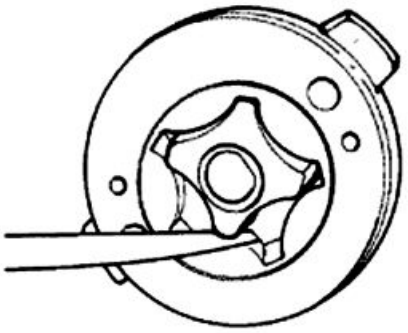


- Measure distance between rotors with a feeler gauge at the position shown in the picture.

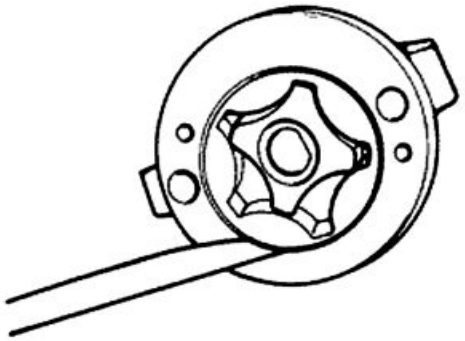
Characteristic

Limit clearance allowed:

0.12 mm



Measure the distance between the outer rotor and the pump body.

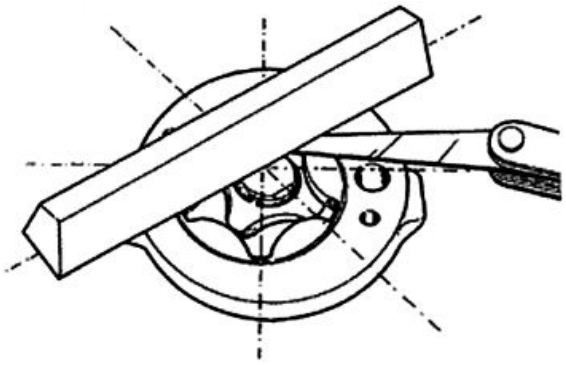


Characteristic

limit clearance allowed:

0.18 mm

Check the rotor axial clearance using a trued bar as reference plane, as shown in the figure.



Characteristic

Limit value allowed:

0.09 mm

See also

Removal

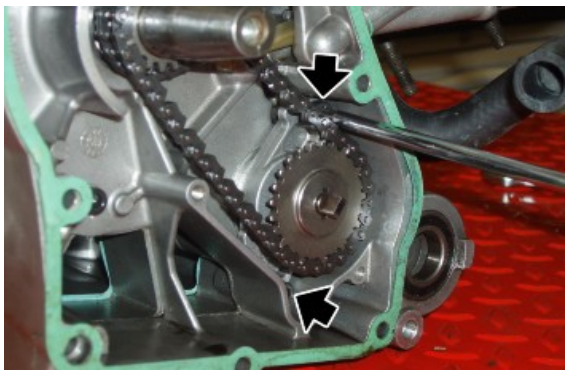
Refitting

- Preassemble the entire oil unit, the chain (observing the direction of rotation marked when fitting) and the crankshaft driving gear.
- Insert the oil pump spindle in its position and fit the oil pump in its housing.
- Tighten the two screws with Loctite 243.

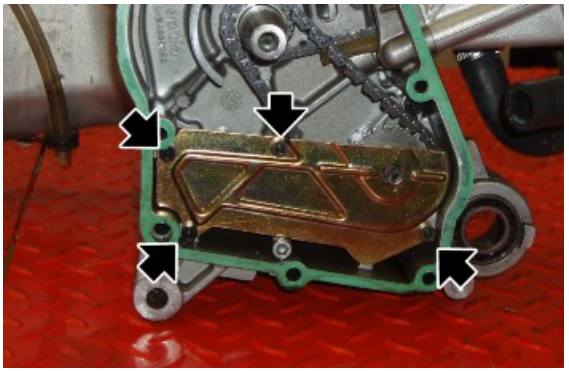
Locking torques (N*m)

Oil pump housing EI fixing screws - M6x25 (2)

10 Nm (7.38 lbf ft) - Loctite 243



- Place the plate and tighten the four screws with Loctite 243
- Fit the flywheel and tighten the nut with Loctite 243
- Refit the flywheel cover.



Locking torques (N*m)

Oil pump plate El screws - M5x12 (4) 6 Nm (4.42 lbf ft) - Loctite 243

INDEX OF TOPICS

MIU injection system

This is an integrated ignition and injection system.

Injection is indirect in the manifold through an electro-injector.

Injection and ignition are timed on the 4-stroke cycle using a tone wheel keyed onto the crankshaft (24-2 teeth) and a reluctant variation (pick-up) sensor.

Carburetion and ignition are managed on the basis of the engine revs and throttle valve opening. Further corrections are made according to the following parameters:

- Coolant temperature
- Intake air temperature
- Lambda probe value

The system implements an idle supply correction with cold engine through a Stepper motor on a by-pass circuit of the throttle valve. The electronic control unit manages the Stepper motor and the injector opening time, thereby ensuring idle steadiness and proper carburetion.

In all conditions of use, carburetion is controlled by modifying the injector opening time.

Fuel delivery pressure is kept constant based on the ambient pressure.

The **fuel supply circuit** consists of:

- Fuel pump
- Fuel filter
- Injector
- Pressure regulator

Pump, filter and regulator are placed into the fuel tank using a single support.

The injector is connected by two pipes provided with fast-release fittings. This results in a continuous circulation, thereby avoiding the risk of fuel boiling. The pressure regulator is at the end of the circuit.

The fuel pump is controlled by the MIU control unit; therefore the vehicle's safety is enhanced.

The **ignition circuit** consists of:

- HV coil
- HV cable
- Shielded cap
- MIU control unit
- Spark plug

The MIU control unit manages the ignition with the best advance ensuring 4-stroke timing (ignition only in the compression stroke) at the same time.

The MIU injection-ignition system controls engine functions by means of a pre-set program.

Should any input signals fail, an acceptable working order of the engine is ensured to allow the user to reach a service station.

Obviously, this cannot happen when the rev counter signal is missing, or when the failure concerns the control circuits:

- Fuel pump

- HV coil
- Injector

Precautions

Troubleshooting tips

1 A failure of the MIU system is more likely to be due to the connections rather than the components. Before searching the MIU system for failures, check:

A: Power supply

a. Battery voltage

b. Blown fuse

c. Solenoids

d. Connectors

B: Chassis ground connection

C: Fuel system

a. Broken fuel pump

b. Dirty fuel filter

D: Ignition system

a. Faulty spark plug

b. Broken coil

c. Broken shielded cap

E: Intake circuit

a. Dirty air filter

b. Clogged by-pass circuit

c. Faulty stepper motor

F: Others

a. Not correctly adjusted timing system

b. Not correct idle carburetion

c. Not correctly reset throttle valve position sensor

2 MIU system failure may be caused by loose connectors. Make sure that all connections are properly implemented.

Check the connectors as follows:

A check that the terminals are not bent.

B check that the connectors have been properly connected.

C see whether the malfunction can be fixed by slightly shaking the connector.

3 Check the entire system carefully before replacing the MIU control unit. If the fault is still present after the MIU control unit is replaced, install the original control unit again and check whether the fault occurs again.

4 Use a multimeter with an internal resistance over 10 K W /V when troubleshooting. Instruments that are not suitable may damage the MIU control unit. Instruments must be used with definitions over 0.1 V and 0.5 W , the precision must be greater than 2%.

Troubleshooting procedure

Engine does not start

ENGINE DOES NOT START EVEN IF PULLED

Possible Cause	Operation
Faults detected by self-diagnosis	Pump relay HV coil Injector Engine speed timing sensor
Fuel system	Fuel present in the tank Fuel pump activation Fuel pressure (low) Injector flow (low)
Power to the spark plug	Spark plug Shielded cap HV Coil (secondary insulation)
Parameter reliability	Coolant temperature Distribution timing adjustment - injection start Intake air temperature

Starting difficulties

ENGINE START-UP PROBLEMS

Possible Cause	Operation
Faults detected by self-diagnosis	Pump relay HV coil Injector Engine speed timing sensor Air temperature Coolant temperature
Start-up speed	Starter motor and solenoid BATTERY Ground connections
Power to the spark plug	Spark plug Shielded cap HV coil Engine speed timing sensor Ignition advance
Fuel system	Fuel pressure (low) Injector flow (low) Injector seal (poor)

Possible Cause	Operation
Correctness of the parameters	Coolant temperature Intake air temperature Stepper throttle valve position (steps and actual opening) Cleaning the auxiliary air pipe and air filter efficiency throttle valve

Engine stops at idle

ENGINE DOES NOT HOLD IDLING/ IDLING IS UNSTABLE/ IDLING TOO LOW

Possible Cause	Operation

Faults detected by self-diagnosis	Pump relay HV coil Injector Engine speed timing sensor Air temperature Coolant temperature
Ignition efficiency	Spark plug Ignition timing
Correctness of the parameters	Throttle valve position sensor Stepper Coolant temperature sensor Intake air temperature sensor
Intake system cleaning	Air filter Diffuser and throttle valve Supplementary air pipe and Stepper
Intake system seal (seepage)	Intake manifold - head Throttle body - manifold Intake sleeve Filter housing
Fuel system (low pressure)	Fuel pump Pressure regulator Fuel filter Injector flow

Engine does not rev down

ENGINE DOES NOT RETURN TO IDLING/IDLING TOO HIGH

Possible Cause	Operation
Faults detected by self-diagnosis	Pump relay HV coil Injector Engine speed timing sensor Air temperature Coolant temperature
Ignition efficiency	Ignition timing
Correctness of the parameters	Throttle valve position sensor Stepper Coolant temperature sensor Intake air temperature sensor
Intake system seal (seepage)	Intake manifold - head Throttle body - manifold Intake sleeve Filter housing
Fuel system (low pressure)	Fuel pump Pressure regulator Fuel filter Injector flow

Exhaust backfires in deceleration

EXHAUST BACKFIRING WHEN DECELERATING

Possible Cause	Operation
Faults detected by self-diagnosis	Pump relay HV coil Injector Engine speed timing sensor Air temperature Coolant temperature Lambda Probe
Correctness of the parameters	Throttle valve position sensor Stepper Coolant temperature sensor Intake air temperature sensor
Intake system seal (seepage)	Intake manifold - head Throttle body - manifold Intake sleeve Filter housing
Fuel system (low pressure)	Fuel pump Pressure regulator Fuel filter Injector flow
Exhaust system seal (seepage)	Manifold - head Manifold - silencer Silencer welding

Engine revs irregularly

REGULAR ENGINE PROGRESS WITH VALVE SLIGHTLY OPEN

Possible Cause	Operation
Intake system cleaning	Air filter Diffuser and throttle valve Supplementary air pipe and Stepper
Intake system seal	Intake sleeve Filter housing
Ignition system	Spark plug wear check
Parameter reliability	Throttle valve position signal Coolant temperature signal Intake air temperature signal Ignition advance
TPS reset successful	TPS reset successful
Faults detected by self-diagnosis	Pump relay HV coil Injector Engine speed timing sensor Air temperature Coolant temperature Lambda Probe

Poor performance at full throttle

POOR ENGINE PERFORMANCE AT FULL POWER/ IRREGULAR ENGINE PROGRESS ON ACCELERATION

Possible Cause	Operation
Faults detected by self-diagnosis	Pump relay HV coil Injector Engine speed timing sensor Air temperature Coolant temperature

Possible Cause	Operation
	Lambda Probe
Power to spark plug	Spark plug Shielded cap HV Cable HV Coil
Intake system	Air filter Filter housing (seal) Intake sleeve (seal)
Parameter reliability	Throttle valve position signal Coolant temperature signal Intake air temperature signal Ignition advance
Fuel system	Fuel level in the tank Fuel pressure Fuel filter Injector flow

Engine knocking

PRESENCE OF KNOCKING (COMBUSTION SHOCKS)

Possible Cause	Operation
Faults detected by self-diagnosis	Pump relay HV coil Injector Engine speed timing sensor Air temperature Coolant temperature Lambda Probe
Ignition efficiency	Spark plug
Parameter reliability	Throttle valve position signal Coolant temperature signal Intake air temperature signal Ignition advance
Intake system seal	Intake sleeve Filter housing
TPS reset successful	TPS reset successful
Fuel system	Fuel pressure Fuel filter Injector flow Fuel quality
Selecting the thickness for the cylinder base gasket	Selecting the thickness for the cylinder base gasket

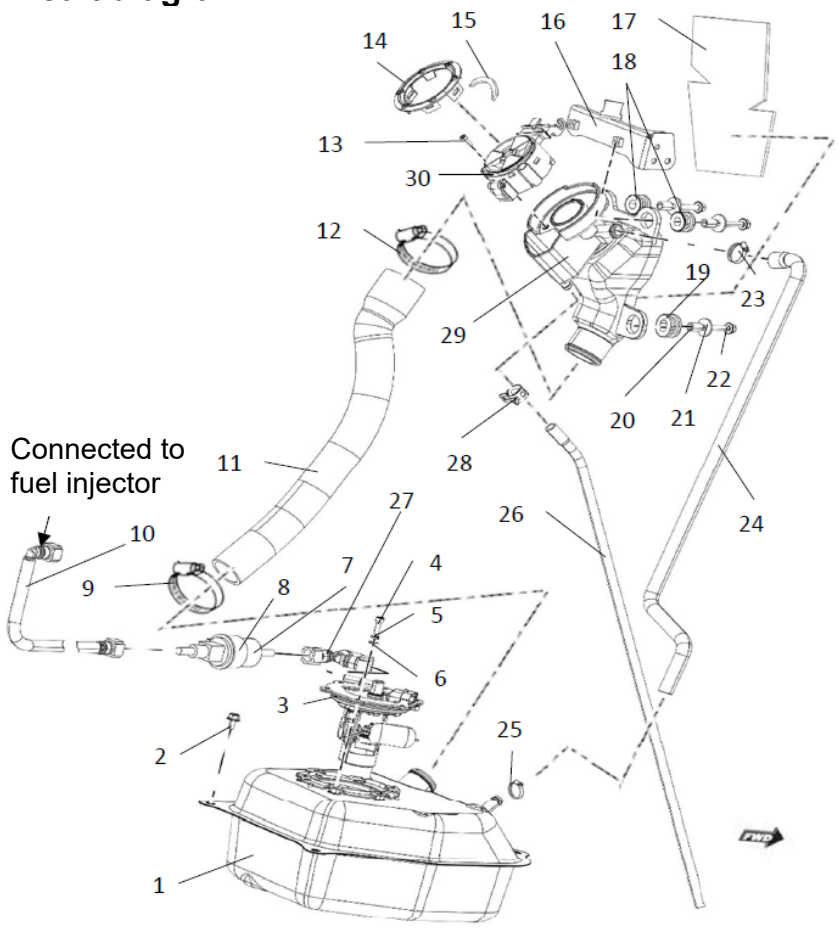
Fuel supply system

The fuel system circuit includes the electric pump, the filter, the pressure regulator, electro-injector and pipes.

The electrical pump is located in the tank from which the fuel is pumped and sent to the injector through the filter.

The pressure is controlled by the pressure regulator situated in the pump assembly in the tank.

Circuit diagram



key:

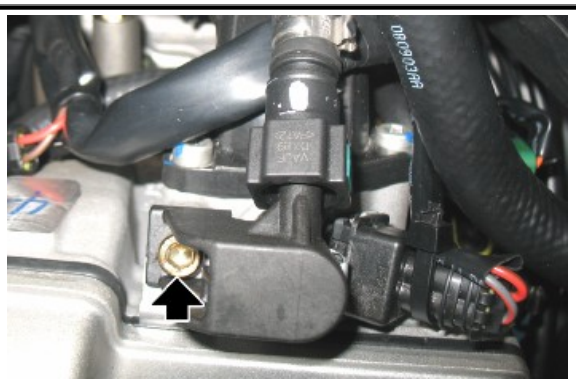
1. Fuel tank assembly 16. Fuel filler bracket
2. Bolt 17. Insulation pad
3. Fuel pump assembly 18. Install cushion rubber on the fuel filler opening
4. Screw 19. Install cushion rubber under the oil filler
5. Spring washer 20. Oil filler cushion rubber bushing
6. Flat washer 21. Extra large washer
7. Fuel filter 22. Bolt
8. Fixing rubber sleeve 23. Clamp
9. Clamp 24. Return pipe
10. Fuel pipe II 25. Clamp
11. Big fuel pipe 26. Spill pipe
12. Clamp 27. Fuel pipe I
13. Screw 28. Clamp
14. Fuel tank cover decorative ring 29. Fuel filler oil pot assembly
15. Fuel tank cap decorative ring rubber gasket 30. Fuel tank cap lock

Removing the injector

- Remove the helmet compartment.

- Disconnect the fast-release fitting of the fuel.
- Disconnect the fuel injector connector.

- Undo and remove the screw.

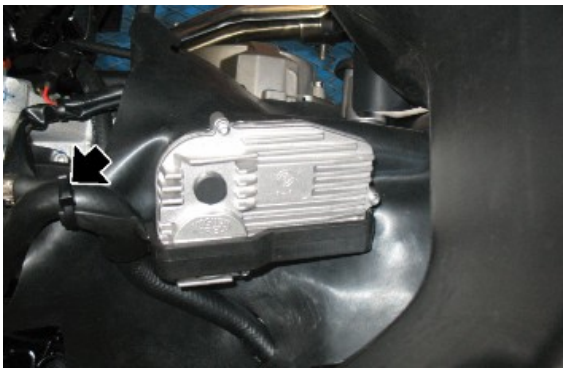


Refitting the injector

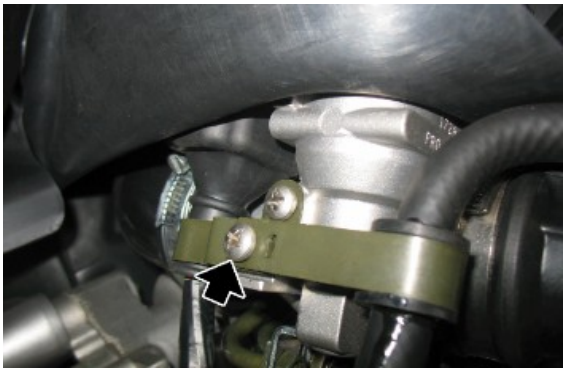
For refitting, follow the operations in reverse order observing the tightening torque.

Removing the butterfly valve

- Remove the helmet compartment.
- Cut the clamp.
- Release the control unit fixing lever.



- Undo and remove the cable grommet fixing screw.
- Open the cable grommet fins.

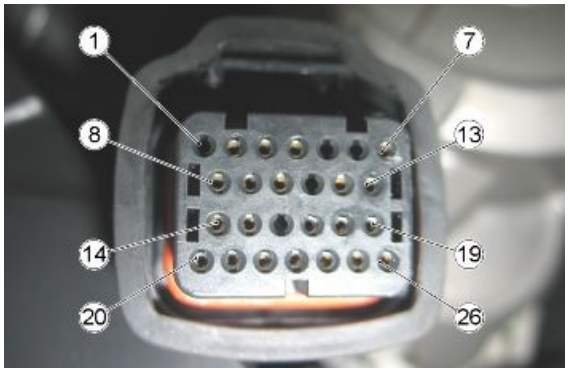


- Disconnect the fast-release fitting of the fuel.
- Disconnect the fuel injector connector.

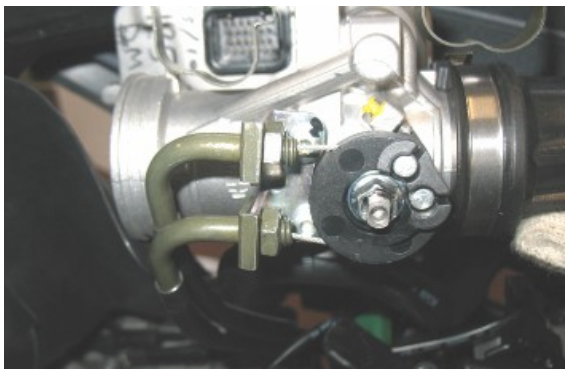
- Undo and remove the three screws fixing the manifold to the cylinder head.

- Loosen the clamp fixing the throttle body manifold to the air filter box.

- Remove the MIU control unit connector

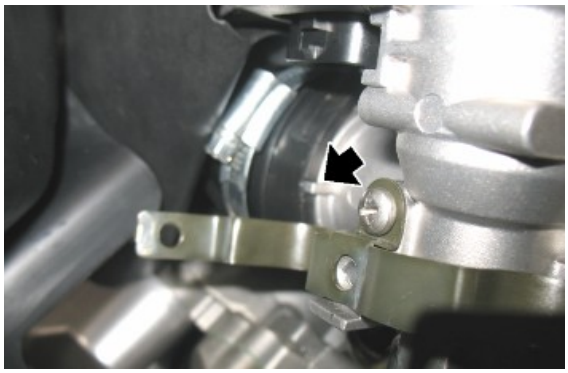


- Disconnect the throttle grip cables from the throttle body.
- Remove the throttle body.



Refitting the butterfly valve

To refit, carry out the removal operations but in reverse order, making sure to correctly fit the sleeve seat in the throttle body fin, as shown in the photograph.



Fuel pump and filter check

FUEL PUMP REMOVAL

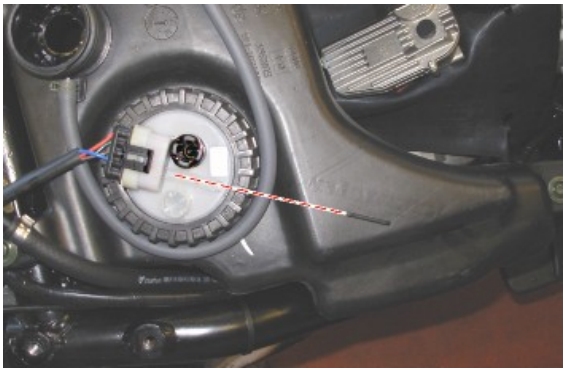
- Remove the helmet compartment.
- Disconnect the fuel pump connector.

- Disconnect the fuel pipe.

- Unscrew the ring nut.
- Remove the fuel pump together with rubber gasket from the tank.

FUEL PUMP INSTALLATION

- Insert the fuel pump together with plastic gasket in the tank.
- Align the reference on the pump with the one on the fuel tank.

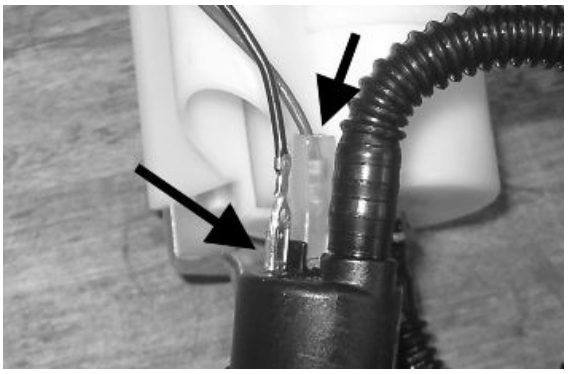


WRONG POSITIONING OF THE FUEL PUMP MAY CAUSE THE BLOCK OF THE FUEL LEVEL SENSOR.

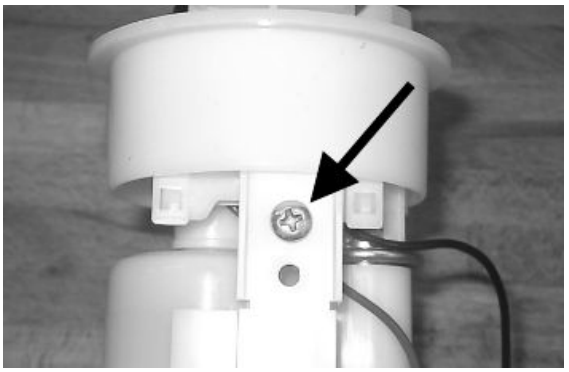
- Tighten the ring nut of the fuel pump.
- Connect fuel pump pipe and connector.

Fuel filter check

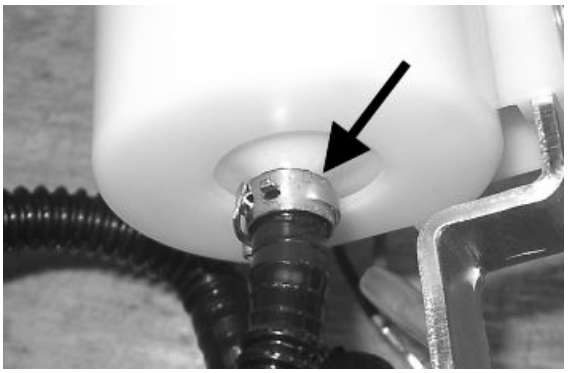
Disconnect the terminals of the electrical pump

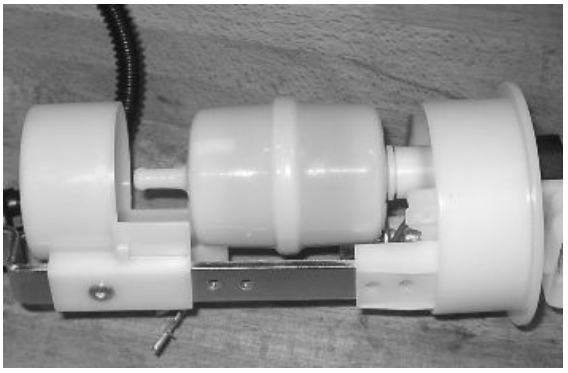
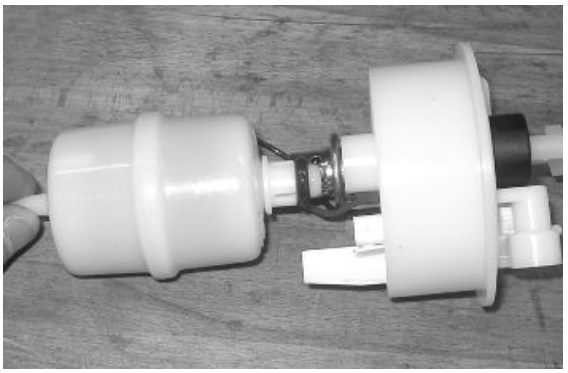


Remove the screw indicated in the photograph



Remove the clamp fixing the piping to the filter shown in the photograph

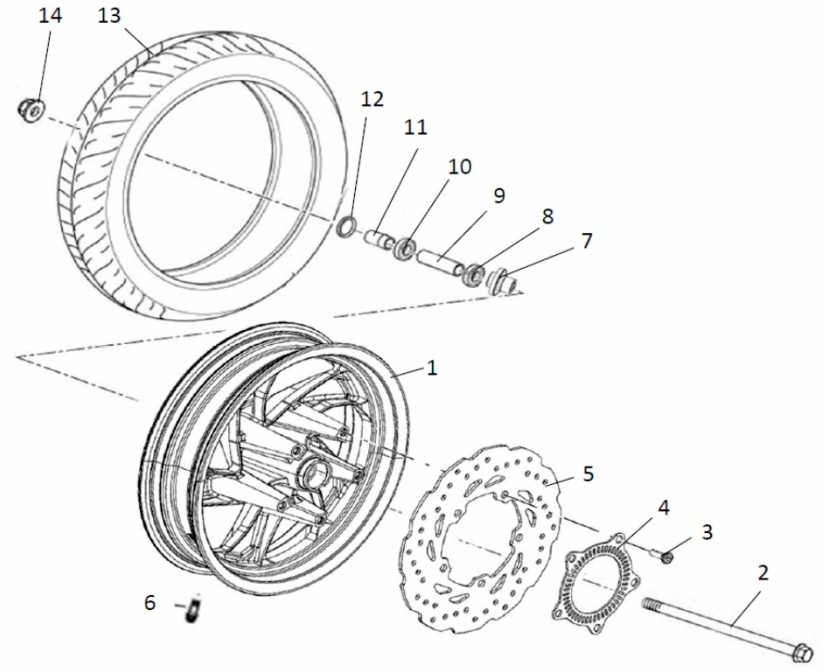


Separate the lower part of the pump support as shown in the photograph.	
Remove the filter from the pump support	

INDEX OF TOPICS

Front

Removing the front wheel



Parts:

1. Front wheel

2. Front wheel axle

3. Front brake disc bolt

4. Front ring gear

5. Front brake disc

6. Valve stem

7. Front left wheel liner

8. Left bearing

9. Front wheel intermediate bushing

10. Right bearing

11. Front wheel right shim

12. Right sealing ring

13. Front tire

14. Nut

CAUTION

FIT A SUPPORT DEVICE UNDER THE VEHICLE, SO AS TO MAKE THE FRONT WHEEL MOVE FREELY, AND TO KEEP THE VEHICLE SAFE WHEN IT IS FALLING.

Support the vehicle with the centre stand.

- Place a support under the chassis.
- Unscrew the pin locking screw.

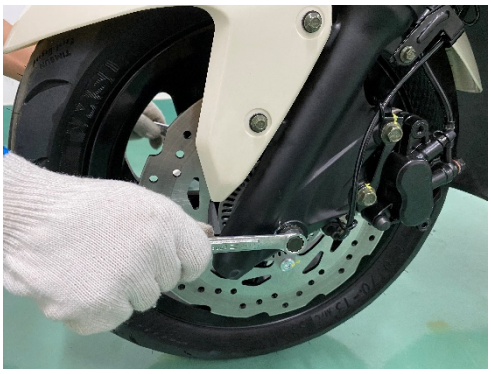
CAUTION

UPON REMOVING/REFITTING, DO NOT DAMAGE THE BRAKE HOSES, DISCS AND PADS.

CAUTION

DO NOT PRESS ON THE BRAKE AFTER REMOVING THE WHEEL. OTHERWISE, THE CALIPER PLUNGER MAY DETACH FROM ITS VALVE SEAT, RESULTING IN BRAKE FLUID LEAKAGE.

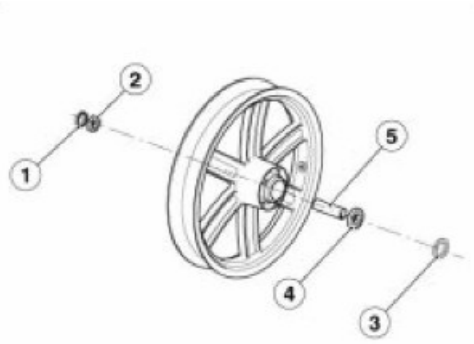
- Unscrew and remove the wheel axle.
- Remove the wheel carefully.
- Collect the shims.



Front hub overhaul

- Remove the front wheel.
- Clean the two sides of the hub with a cloth.
- Remove the right oil seal ①.
- Remove the right bearing ② with a suitable removal tool.
- Remove the left oil seal ③.
- Remove the left bearing ④ with a suitable removal tool.

  Carry out a thorough check for all the parts.
- Collect the internal shim ⑤.
- Clean the inside of the hub thoroughly.
- Clean all the parts with clean detergent.



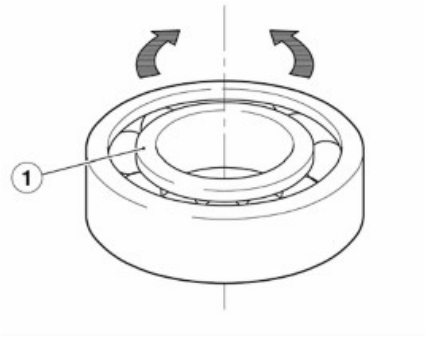
CAUTION

WHEN REINSTALLING, USE A CUSHION PAD WITH SAME DIAMETER OF THE OUTER RING OF THE BEARING ON THE OUTER RING OF THE BEARING TO INSERT THE BEARING. DO NOT HIT THE BALLS AND/OR INNER RING. MAKE SURE THAT THE FOLLOWING COMPENENTS ARE FITTED PERFECTLY:

- THE LEFT BEARING ④ ON THE HUB;
- THE SHIM ⑤ ON THE LEFT BEARING ④;
- THE RIGHT BEARING ② ON THE SHIM ⑤.

BEARINGS

Manually rotate the internal ring ① which must turn smoothly, without obstacles and/or noise. There must be no axial clearance. The bearings with these problems must be replaced.



CAUTION

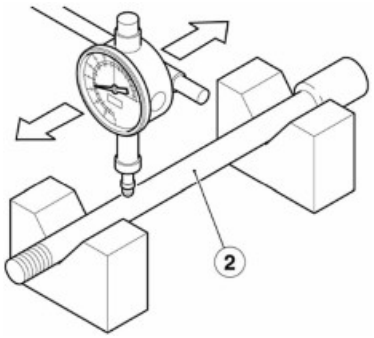
CHECK WHETHER ALL THE PARTS ARE IN GOOD CONDITIONS, SPECIALLY THE ONES BELOW.

SHIMS

Check whether the shims are in good conditions; replace them if there are signs of damage or excessive wear for them.

WHEEL AXLE

Check the eccentricity of the wheel axle ② using a dial gauge. Replace the axle ② if the eccentricity exceeds the limit value.



Performance parameter

Maximum eccentricity:

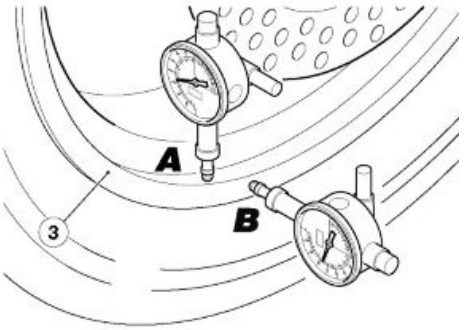
0.25 mm

WHEEL RIM

Check whether the radial eccentricity “A” and axial eccentricity “B” of the wheel rim ③ exceed the limit values using a dial gauge.

Eccentricity is usually caused by bearing wear or damage.

Replace the wheel rim ③ if the value is not within the specified range after the bearing is replaced,



Performance parameter

Maximum radial and axial eccentricity: 2mm

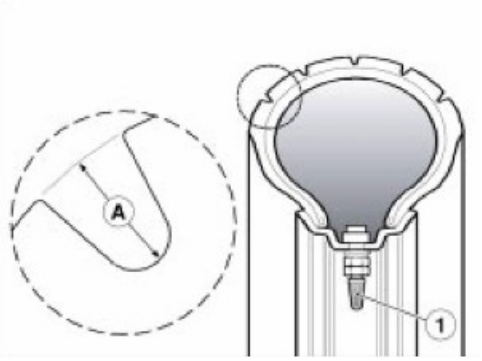
Check the tire conditions.

CAUTION

CHECK WHETHER THE TYRE IS WORN. BADLY WORN TYRES CAN DAMAGE THE TRACTION AND THE VEHICLE HANDLING PERFORMANCE. IF THE DIAMETER OF WORN TYRE TREAD IS GREATER THAN 5 MM, REPLACE THE TYRE. THE VEHICLE FEATURE WEAR INDICATOR HAS BEEN HOMOLOGOUS IN TERMS OF SOME TYRE TYPES.

CHECK WHETHER THE CHARGING VALVE ① HAS ITS BAYONET SET IN ORDER, IN ORDER TO AVOID ACCIDENTALLY WORN-OUT TYRE.

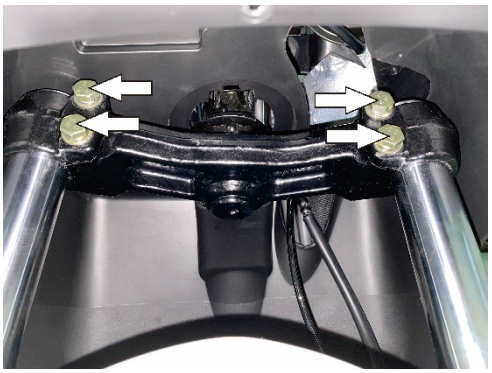
CHECK THE BALANCE OF THE WHEEL AFTER A TYRE IS MENDED.



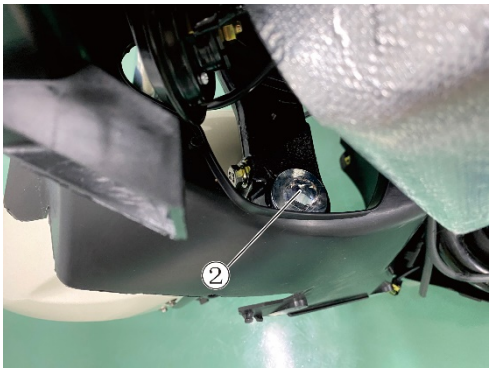
Front fork

Removal

- Fix the front part of the vehicle with a belt and a hoist.
- Remove the front wheel.
- Unscrew the two upper screws fixing the fork lever.



- Remove the upper retainer ②.
- Remove from below.



Steering bearing

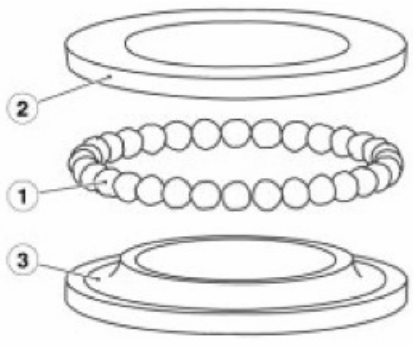
Check whether the ball contact area ① on the rotating seat ② and the fixed seat ③ is damaged or worn. Replace the whole bearing if necessary.

CAUTION

CHECK WHETHER THE COMPONENTS ARE IN GOOD CONDITIONS.

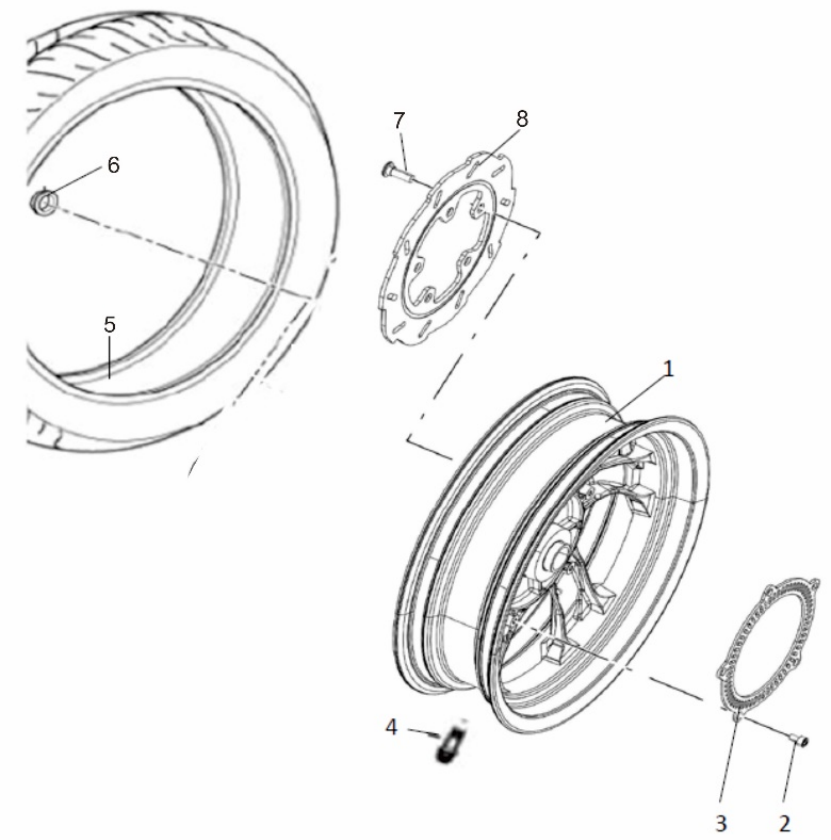
CAUTION

APPLY GREASE TO THE BALL CONTACT AREAS ON SEATS ② AND ③.



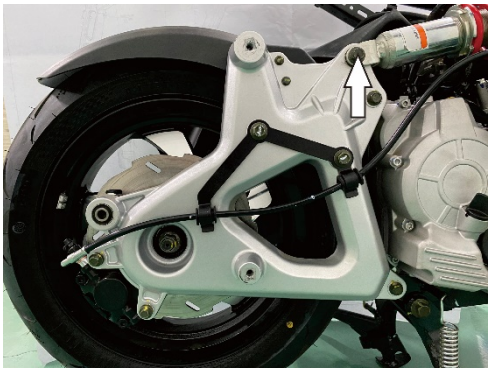
Rear

Removing the rear wheel



Parts:

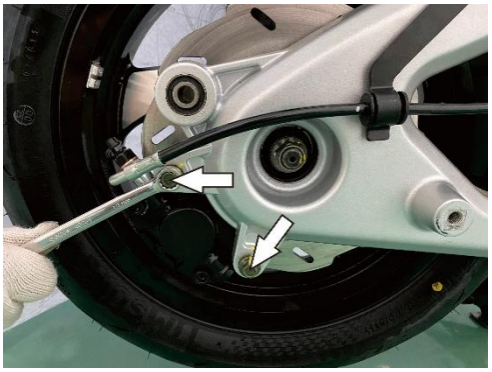
1. Rear wheel
2. Bolt
3. Rear ring gear
4. Valve stem
5. Rear tire
6. Nut
7. Bolt
8. Rear brake disc



The procedures for removing the rear wheel is as follows:

- Remove the silencer.
- Remove the rear brake caliper.

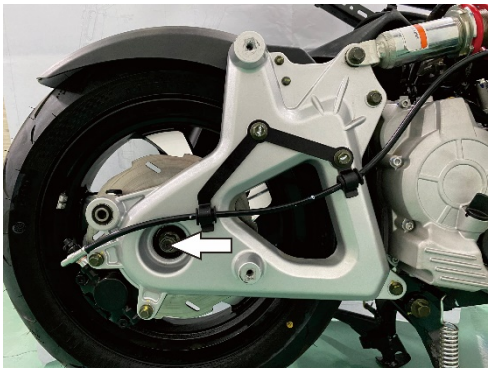
- Unscrew and remove the bolt fixing the right shock absorber, and then collect the nuts.



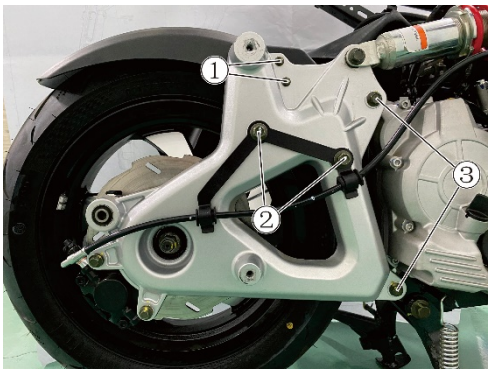
- Operate the rear brake with the help of another operator; unscrew and remove the rear nut fixing the plate, and collect the shims.

- Locking torques (N*m)

M14 fixing nut for rear wheel 110 (81.4 lbf ft)



- Unscrew and remove the bolts ①, ② and ③ fixing the plate, and collect the nuts and the washers.
- Remove the right suspension plate.
- Collect the wheel shims.
- Remove the entire rear wheel and the brake disc.



CAUTION

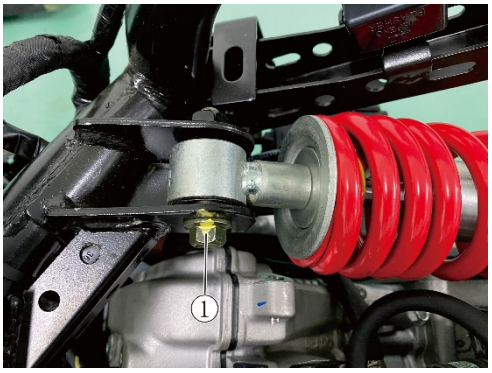
DO NOT PRESS ON THE BRAKE AFTER REMOVING THE WHEEL. OTHERWISE, THE CALIPER PLUNGER MAY DETACH FROM ITS VALVE SEAT, RESULTING IN BRAKE FLUID LEAKAGE.

Shock absorbers

Rear suspension check

Check whether there is any leakage for the shock absorber. Check whether all the elements are tightened and the rear suspension joints are operated correctly.

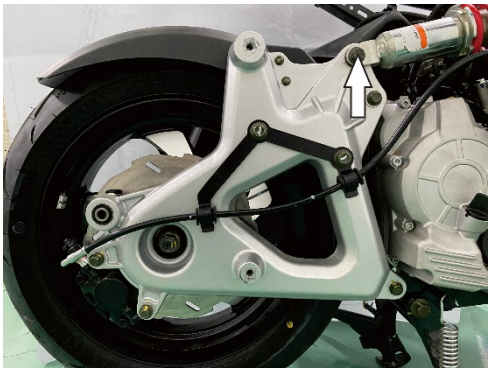
Removal



Follow the procedures below to remove the shock absorber:

- Remove the tail fairings.
- Operate from both sides of the vehicle to unscrew the upper screw ① fixing the shock absorber.

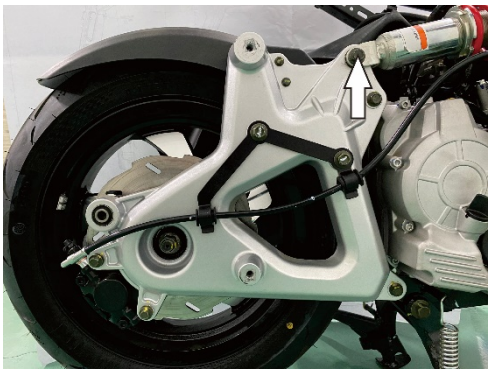
Locking torques (N*m)
M10 bolt fixing rear shock absorber 50 (37 lbf ft)



- Operate from the right side of the vehicle to unscrew the lower screw fixing the shock absorber.
- Remove the shock absorber.

Locking torques (N*m)
M10 bolt fixing rear shock absorber 50 (37 lbf ft)

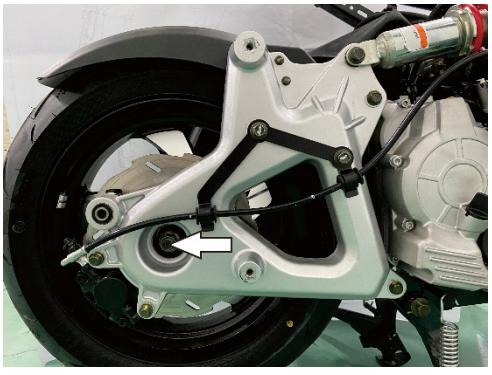
Exhaust bracket



- Follow the procedures below to remove the silencer plate:

- Remove the silencer.
- Operate from the right side of the vehicle to unscrew the lower screw fixing the shock absorber

Locking torques (N*m)
M10 bolt fixing rear shock absorber 50 (37 lbf ft)



- Operate the rear brake with the help of another operator; unscrew and remove the rear nut fixing the plate, and collect the shims.

- **Locking torques (N*m)**
M14 fixing nut for rear wheel 110 (81.4 lbf ft）

- Unscrew and remove the bolts ①,②, ③ fixing the plate and collect the nuts and the washers.
- Remove the right suspension plate.

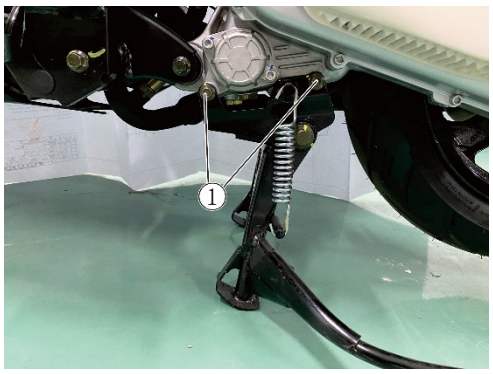
Centre stand

CAUTION

LET THE ENGINE AND EXHAUST SILENCER COOL OFF.
MAKE SURE THAT THE VIHICLE IS SAFE AND DOES NOT HAVE SIDE STAND.

Follow the procedures below to remove the centre stand and its support:

- Make sure that the vehicle is still supported, without the help of the centre stand.
- Unscrew and remove the two screws ① from both sides.
- Remove the centre stand and its support.

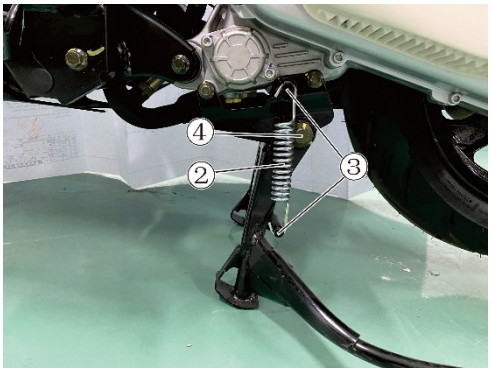


Locking torques (N*m)

M8 screw fixing screw stand support of engine 25 (18.5 lbf ft）

Follow the procedures below to remove the centre stand from its support:

- Make sure that the vehicle is still supported, without the help of the centre stand.
- Remove the spring linking pins ③ on both sides of the springs ② .
- Unscrew and remove the screw ④ on both sides.
- Remove the stand.



Locking torques (N*m)

M10 screw fixing stand to stand support 50 (37 lbf ft)

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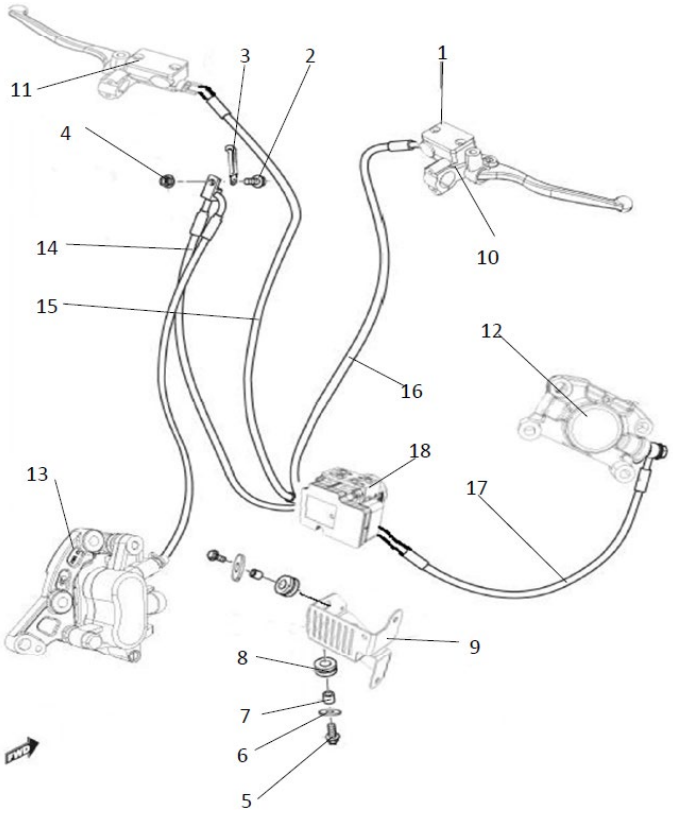


Parts:

1. Front / rear brake system assembly
2. Bolt
3. Wire clamp
4. Nut
5. Bolt
6. Shim
7. Bushing
8. Cushion
9. ABS unit support
10. Front brake main pump
11. Rear brake master pump
12. Rear brake caliper assembly
13. Front brake caliper assembly
14. Brake oil pipe
15. Brake oil pipe
16. Brake oil pipe
17. Brake oil pipe
18. ABS unit

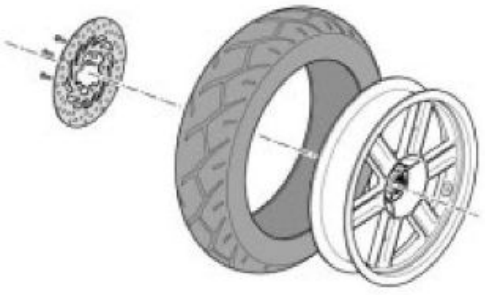
Rear brake disc

Removal

- Remove the rear wheel.
- Unscrew and remove the brake disc bolts.
- Remove the brake disc.

CAUTION

UPON REINSTALLING, APPLY THE RECOMMENDED PRODUCT TO THE BRAKE DISC BOLT THREADS.



Check

- Visually check the surface of the brake disc. Replace the brake disc if it is scratched or damaged.
- Check the brake disc for wear by measuring the minimum thickness at different points with a dial gauge. Replace the brake disc if the minimum thickness (even at a single point of the brake disc) is less than the minimum value.

CAUTION

THE BRAKE DISC MUST BE MOUNTED ON THE WHEEL FOR OPERATION.

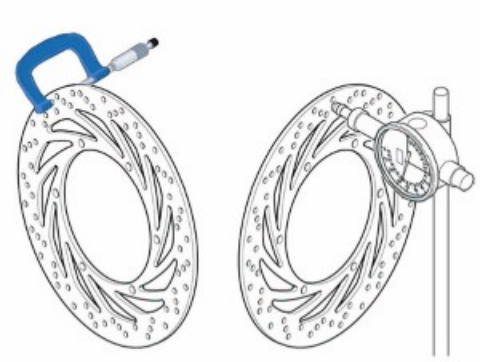
Performance diameter

Minimum value for brake disc thickness: 3.6mm

- Check whether the vibration of the disc exceeds the tolerance; place the disc if its vibration exceeds the tolerance.

Performance parameter

Vibration tolerance of brake disc: 0.3 mm



Front brake disc

Removal

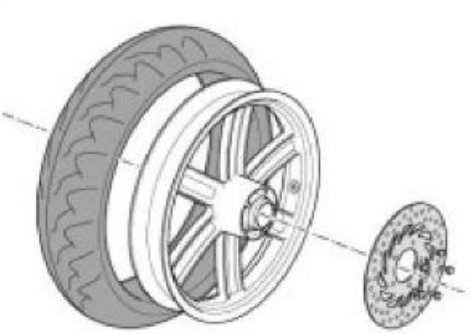
- Remove the front wheel.
- Unscrew and remove the brake disc bolts.
- Remove the brake disc.

NOTE

TIGHTEN ALL THE BOLTS BY MANUAL OPERATION.

CAUTION

UPON REINSTALLING, APPLY THE RECOMMENDED PRODUCT TO THE BRAKE DISC BOLT THREADS.



Check

- Visually check the surface of the brake disc. Replace the brake disc if it is scratched or damaged.
- Check the brake disc for wear by measuring the minimum thickness at different points with a dial gauge. Replace the brake disc if the minimum thickness (even at a single point of the brake disc) is less than the minimum value.

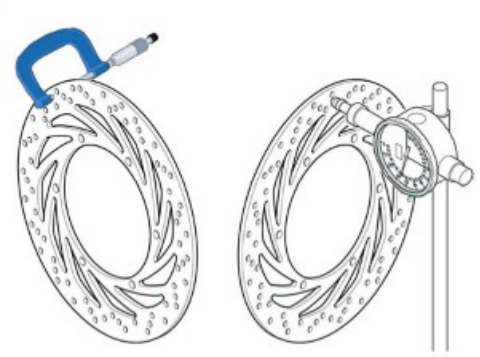
CAUTION

THE BRAKE DISC MUST BE MOUNTED ON THE WHEEL FOR OPERATION

Performance parameter

Minimum value for brake disc thickness：3.6 mm

- Check whether the vibration of the disc exceeds the tolerance; place the disc if its vibration exceeds the tolerance.



Performance parameter

Brake disc oscillation tolerance：0.3 mm

Front brake pads

Removal

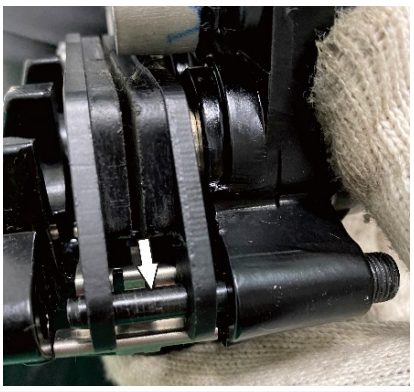
- Unscrew the two bolts ① and remove the front brake caliper.

Locking torques (N*m)

M10 bolt fixing front brake caliper 50 (37 lbf ft)

- Unscrew and remove the thread cap ②.

- Unscrew and remove the brake pad check pin.
- Remove the brake pads.



CAUTION

DO NOT OPERATE THE BRAKE HANDLE AFTER REMOVING THE BRAKE PADS. OTHERWISE, THE CALIPER PLUNGER MAY DETACH FROM ITS PLUNGER HOLE, RESULTING IN BRAKE FLUID LEAKAGE.

CAUTION

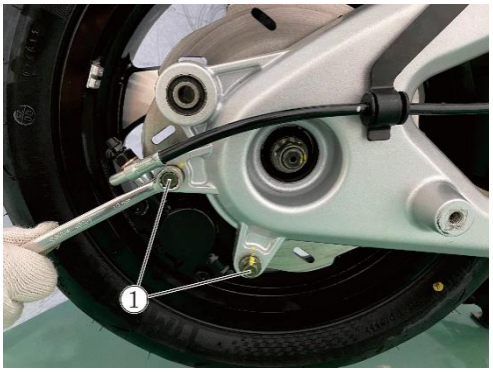
ALWAYS REPLACE THE TWO BRAKE PADS AND MAKE SURE THAT THEY ARE CORRECTLY PLACED INTO THEIR SLOTS.

Follow the reverse steps to refit it.

Rear brake pads

Removal

- Unscrew the two bolts ① and remove the rear brake caliper.

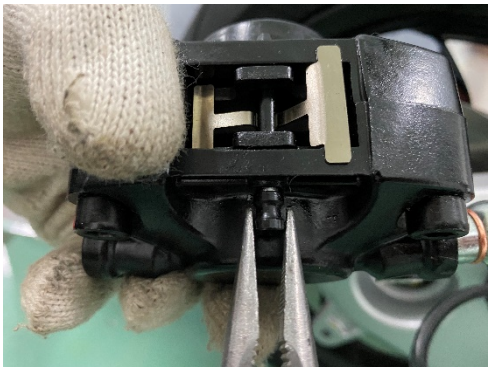


Locking torques (N*m)

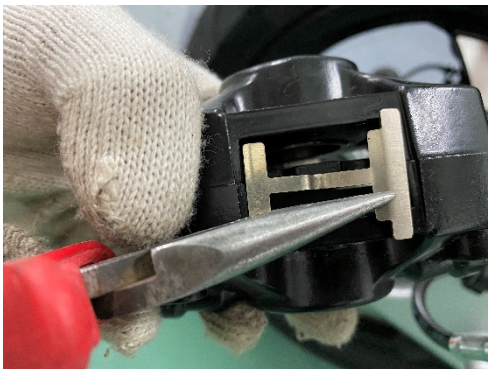
M8 screw fixing rear brake caliper 25 (18.5 lbf ft)

- Remove the snap ring.

- Let the pin slide down.



- Remove the spring.



CAUTION

THE ARROW STAMPED ON THE SPRING MUST ALWAYS BE TURNED IN THE RIDING DIRECTION.

- Let the brake pads slide down.
- Insert two new brake pads.
- Fit the spring.
- Re-install the pin.
- Insert the snap ring.

CAUTION

DO NOT OPERATE THE BRAKE HANDLE AFTER REMOVING THE BRAKE PADS. OTHERWISE, THE CALIPER PLUNGER MAY DETACH FROM ITS PLUNGER HOLE, RESULTING IN BRAKE FLUID LEAKAGE.

CAUTION

ALWAYS REPLACE THE TWO BRAKE PADS AND MAKE SURE THAT THEY ARE CORRECTLY PLACED INTO THEIR SLOTS.

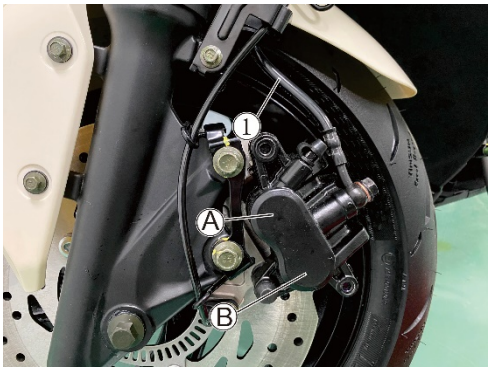
Braking system exhaust

Rear brake

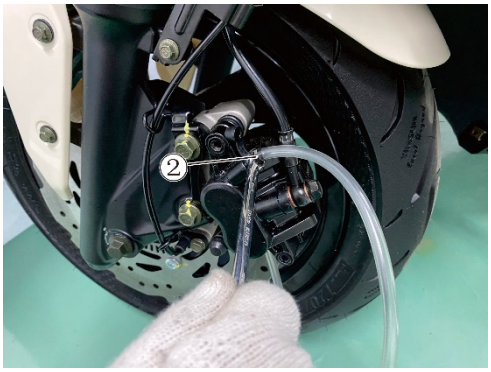
CAUTION

IN VIEW OF THE HARM TO THE VEHICLE AND PASSENGERS, IT IS ABSOLUTELY NECESSARY TO PRESSURIZE THE HYDRAULIC CIRCUIT WITH AIR AFTER READJUSTING THE BRAKING DEVICE AND RESTORING THE BRAKING SYSTEM TO NORMAL SERVICE CONDITIONS.

Operate the right brake lever to apply pressure on the plunger "A" and "B" of the front brake caliper through the brake pipe ①.



Front brake



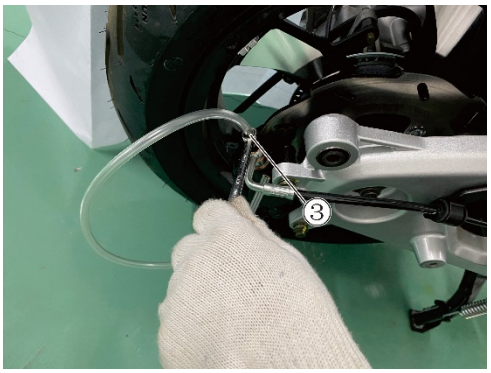
- Remove the rubber protecting coverof the exhaust valve ②.
- Insert a transparent plastic pipe into the exhaust valve ② of the front brake caliper to vent and insert the other end of this pipe into a container to collect the brake fluid.
- Quickly press the front brake handle for several times and then press it hard.
- Unscrew the exhaust valve for 1/4 turn to let the brake fluid flow into the container. This will release the tension on the brake handle and will pull it to the end of stroke.
- Repeat the operation until the brake fluid drains into the container without bubbles.

NOTE

WHEN TOPPING UP THE HYDRAULIC SYSTEM, FILL THE REQUIRED AMOUNT OF BRAKE FLUID INTO THE RESERVOIR. CHECK WHETHER THERE IS ALWAYS BRAKE FLUID IN THE RESERVOIR IN THE PROCESS OF OPERATION.

- Tighten the exhaust valve and remove the transparent pipe.
- Top up the reservoir until the correct brake fluid level is reached.
- Re-install the rubber protecting cover.

Rear brake



- Remove the rubber protecting coverof the exhaust valve ③.
- Insert a transparent plastic pipe into the exhaust valve ③ of the rear brake caliper and insert the other end of this pipe into a container to collect the brake fluid.
- Quickly press the rear brake handle for several times and then press it hard.

- Unscrew the exhaust valve for 1/4 turn to let the brake fluid flow into the container. This will release the tension on the brake handle and will pull it to the end of stroke.
- Repeat the operation until the brake fluid drains into the container without bubbles

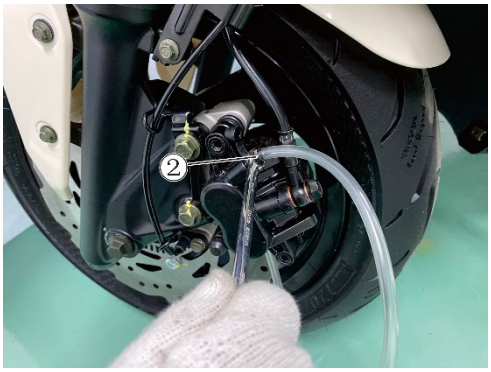
NOTE

WHEN TOPPING UP THE HYDRAULIC SYSTEM, FILL THE REQUIRED AMOUNT OF BRAKE FLUID INTO THE RESERVOIR. CHECK WHETHER THERE IS ALWAYS BRAKE FLUID IN THE RESERVOIR IN THE PROCESS OF OPERATION.

- Tighten the exhaust valve and remove the transparent pipe.
- Top up the reservoir until the correct brake fluid level is reached.
- Re-install the rubber protecting cover.

Brake fluid replacement

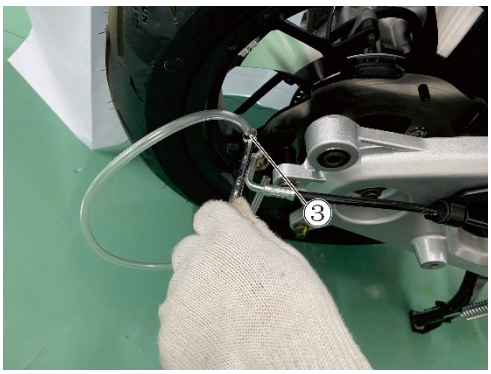
- Remove the rubber protecting cover.
- Insert a transparent plastic pipe into the exhaust valve ②of the caliper and insert the other end of this pipe into a container to collect the brake fluid.
- Unscrew the exhaust valve ② for about one turn.



NOTE

CHECK WHETHER THERE IS ALWAYS BRAKE FLUID IN THE RESERVOIR IN THE PROCESS OF OPERATION. OTHERWISE, THE AIR MUST BE BLOWN OUT AT THE END OF THE OPERATION.

- Check whether the brake fluid flows out of the reservoir, and close the exhaust valve ③ before draining the reservoir.
- Top up the reservoir.
- Unscrew the exhaust valve ③ for about half a turn again.



- Check the brake fluid from the pipe. When the brake fluid changes colour (from dark to light), tighten the exhaust valve ③ and remove the transparent plastic pipe.
- Re-install the rubber protecting cover.
- Top up the reservoir with the brake fluid to the correct level.

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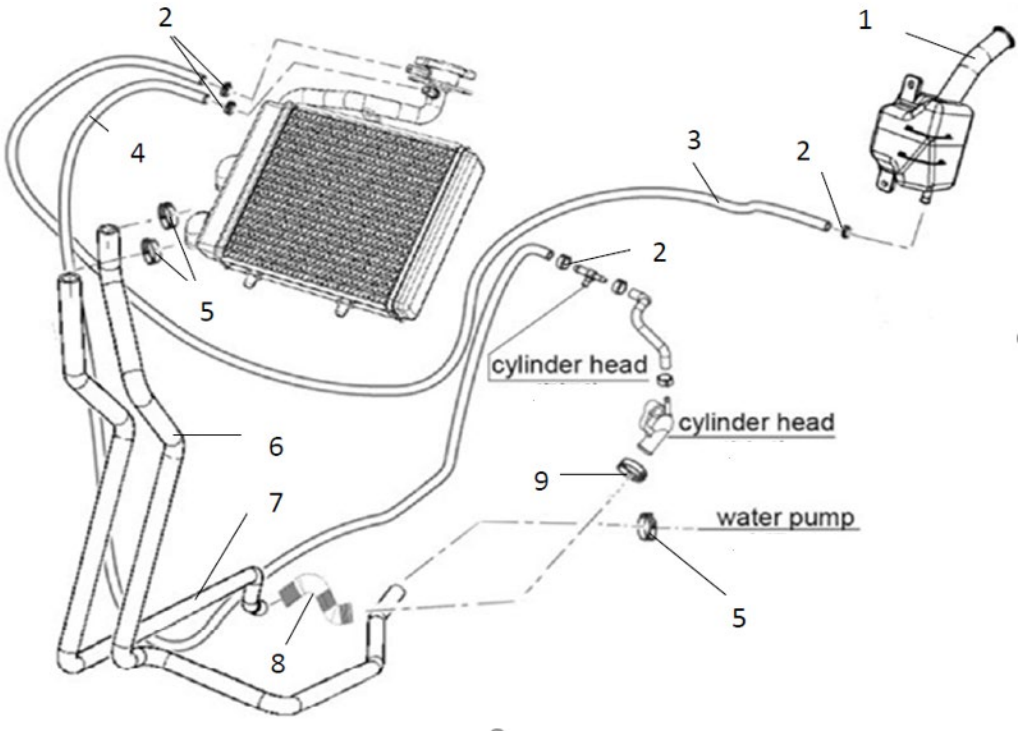
Schematic diagram



Parts:

1. Expansion tank

2. Pipe clamp

3. Water inlet pipe of expansion tank

4. Engine exhaust pipe

5. Pipe clamp

6. Rubber water inlet pipe

7. Rubber water outlet pipe

8. Aluminum foil sheath

9. Pipe clamp

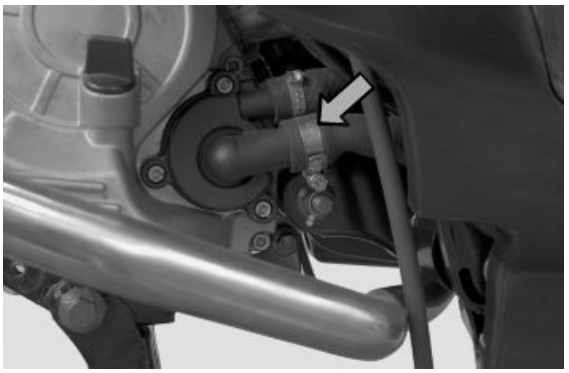
Coolant replacement

Draining

NOTE

USE A CONTAINER OF ADEQUATE CAPACITY TO COLLECT THE COOLANT THAT MAY LEAK IN THE PROCESS OF OPERATION.

- Loosen the pipe clamp.
- Pull out the water pipe.
- Drain the coolant.



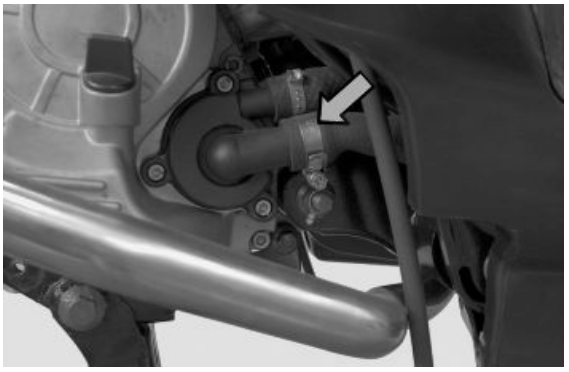
NOTE

REMOVE THE EXPANSION TANK COVER TO FACILITATE COOLANT DRAINAGE.

WARNING

THE PIPELINE SHALL BE DISCONNECTED TOTALLY., AND THE FRONT WHEEL SHALL BE LIFTED AT LEAST 55 CM OFF THE GROUND.

Top-up



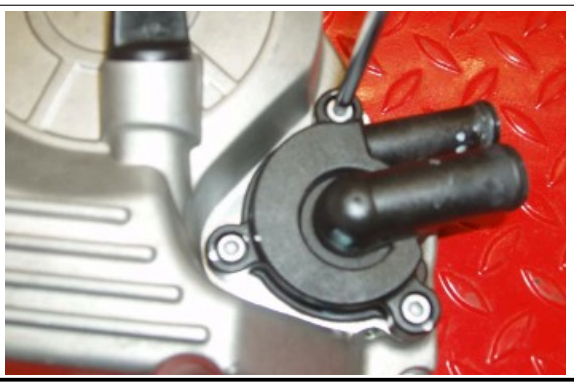
- Re-install the coolant pipeline and tighten it with a clamp.
- Top up the expansion tank with coolant until the fluid level reaches the MAX of the reference mark.
- Top up the radiator with coolant until it is full and close the snap-on cover.
- Start the vehicle and let the engine idle until the fan switches on.
- Turn off the engine and let it cool off for 12 hours.
- Check the fluid level of the expansion tank and the radiator; top up to the correct fluid level if required.
- Re-install the front shield.

Locking torques (N*m)

Coolant pipe clamp 3 (2.22 lbf ft)

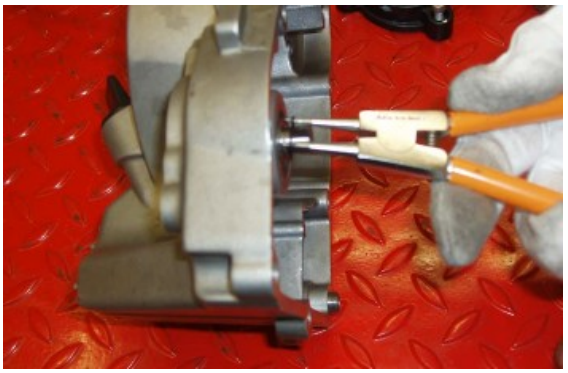
Water pump overhaul

Removal

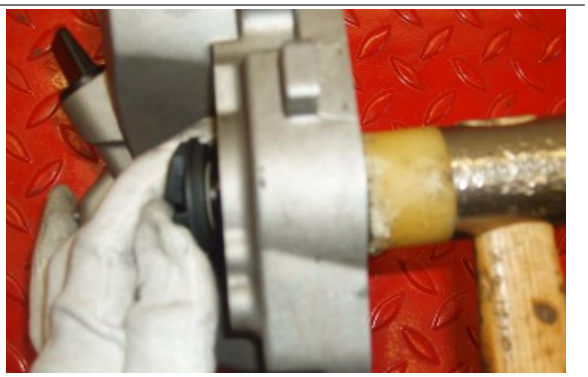


- Before removing the water pump, empty the cooling system, drain the engine oil and remove the crankcase cover on flywheel side.
- Unscrew and remove the three screws and remove the water pump cover.

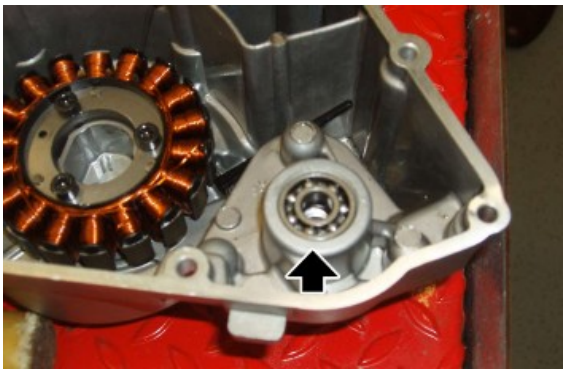
- Remove the snap ring from the inside of the flywheel cover.



- Remove the shaft and rotor of the water pump using a rubber hammer from one side of the inside of the flywheel cover.



- Remove the water pump bearing using a bearing puller from the inside of the flywheel cover.
- Remove the oil seal without getting the valve seat damaged from the inside of the flywheel cover.



Check

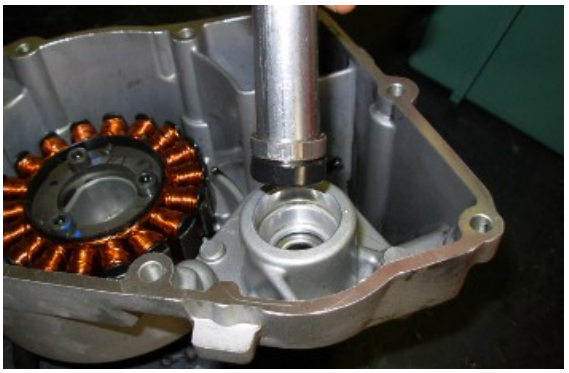
Components check: check whether the water pump housing cover, water pump housing, rotor and seal are damaged or excessively worn. Replace them if they are damaged or excessively worn. Check whether the water inlet pipe and water outlet pipe are not damaged or excessively worn. Replace them if they are damaged or excessively worn.

Shim check: Check whether the O-ring is in good conditions; replace it if it is damaged or worn.

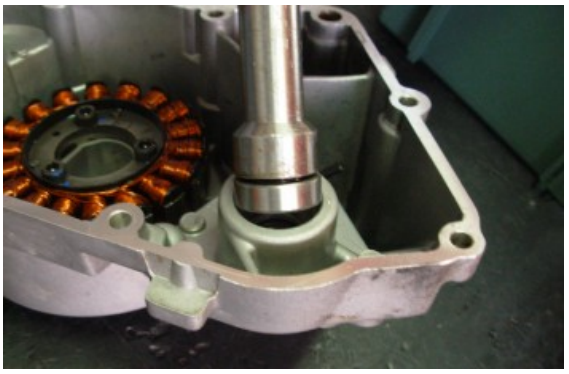
Bearing check: rotate the internal ring by manual operation which must be turned smoothly without obstacles and/or noise. There must be no axial clearance. Replace the bearing with these problems

Re-installation

- Fit the oil seal using a special tool from the inside of the flywheel cover.



- Fit the bearing using a special tool from the inside of the flywheel cover.



- Fit the contact seal using a special tool from the inside of the flywheel cover.

- Fit the shaft and rotor of the water pump from the outside of the flywheel cover after a small amount of Loctite 603 is applied on the inner rail of the bearing inner track.

CAUTION

MAKE SURE THAT THERE IS NO CONTACT BETWEEN LOCTITE 603 AND THE BEARING BALLS.

- Lock each element with a safety ring from the inside of the flywheel cover.
- Fit the water pump cover and tighten the 3 screws with a torque of 6 Nm.

Next

Double check carefully.
Re-install the flywheel cover.

INDEX OF TOPICS

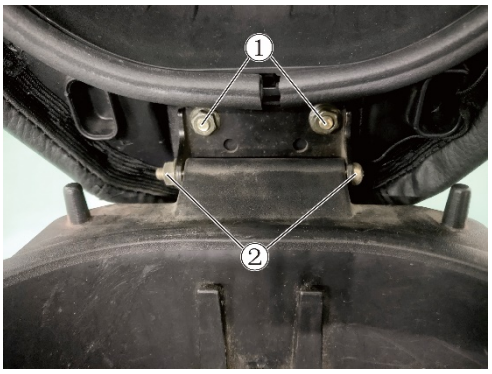
CHASSIS	CHAS

Seat

It is necessary to open the saddle before removing it.

Insert the key into the key lock and turn it clockwise until a click is heard.

- Open the saddle.
- Unscrew the two nuts ①。
- Unscrew the screw ②.
- Remove the saddle.



Locking torques (N*m)

M6 nut fixing saddle hinge to saddle 6 (4.44 lbf ft) Fixing screw 4 of saddle to saddle hinge M6.

Follow the procedures below to remove the hinge from the saddle:

- Remove the saddle.
- Remove the cotter pin ③ and let the pin slide down.

Rear rack

- Unscrew and remove the four screws ①.
- Remove the luggage rack.

CAUTION

HOLD THE LUGGAGE RACK WHILE UNSCREWING THE SCREWS.

Locking torques (N*m)

Fixing screw 25 of rear passenger grab handle M8 (18.5 lbf ft)

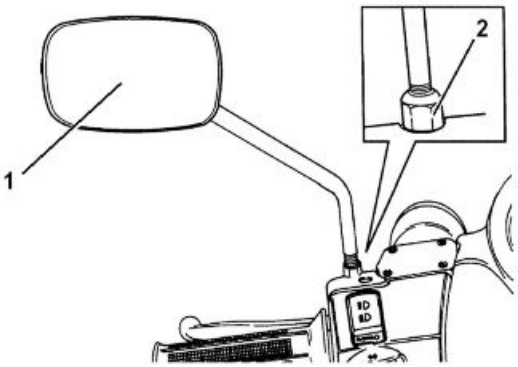
Driving mirrors

Support the vehicle with the centre stand.

NOTE

THE REAR-VIEW MIRRORS ARE CONSIDERED TO BE: RIGHT (LEFT REAR-VIEW MIRROR); LEFT (RIGHT REAR-VIEW MIRROR).

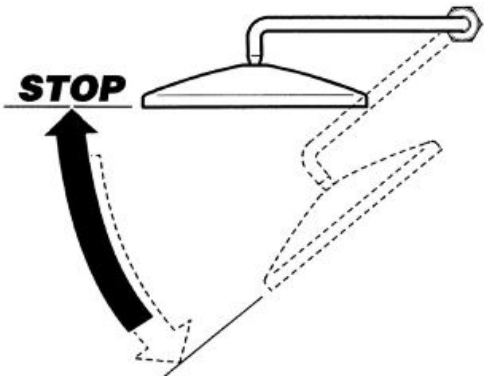
In case of accidental collision, the rear-view mirror will turn inwards, reducing the vehicle width. In order to turn the rear-view mirror back to the original position, turn it in the opposite direction as far as it will go; If necessary, unscrew or tighten the nut ②.



Unscrew and remove the rear-view mirror ① (counterclockwise for the left rear-view mirror, clockwise for the right one).

CAUTION

HOLD THE REAR-VIEW MIRROR ① TO PREVENT IT FROM FALLING BY ACCIDENT.



When re-installing the bulb:

Screw the rear-view mirror ① at least three turns (clockwise for the left rear-view mirror, counterclockwise for the right one).

Adjust the rear-view mirror ① in order to achieve the best view angle.

Lock the rear-view mirror ① at position acting on the lock nut ② (clockwise for the left nut, counterclockwise for the right one).

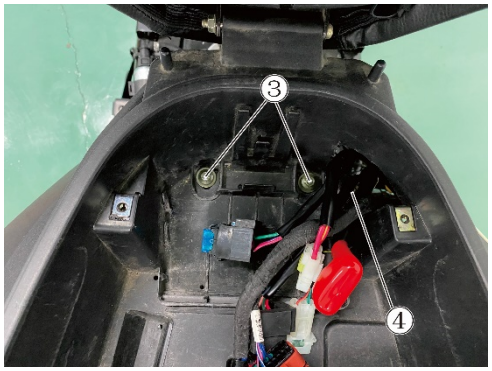
NOTE

THE RIGHT LOCK NUT HAS A SCORING TO DISTINGUISH IT FROM THE LEFT ONE.

Helmet case

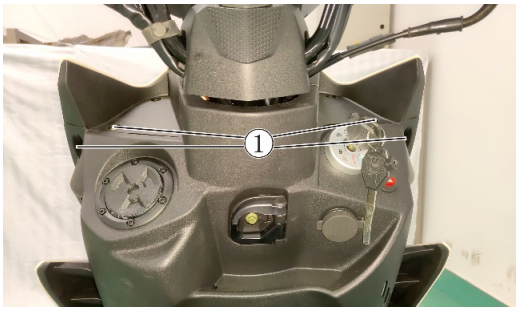
- Open the saddle.
- Remove the rear luggage rack.
- Remove the center protecting cover.

- Unscrew and remove the two screws ① and the two screws ②.
- Remove the two screws ③。
- Pull out wire harness ④.
- Remove the helmet case.

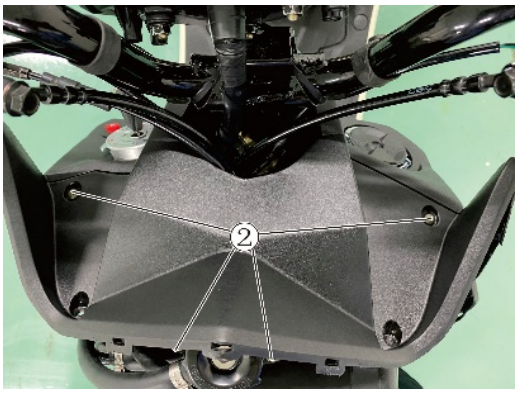


Water-cooled radiator cover

- Unscrew and remove the four screws ①.



- Unscrew and remove the four screws ②.
- Remove the water-cooled radiator cover.



CAUTION

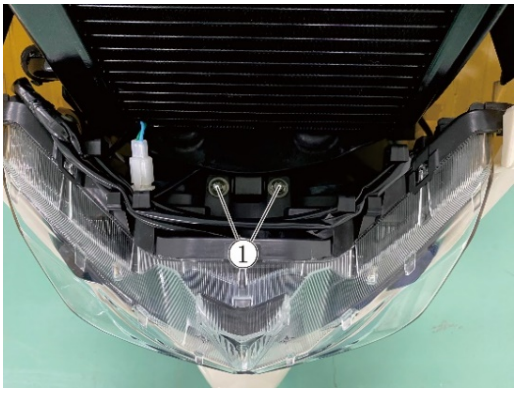
BE CAREFUL TO OPERATE.
DO NOT DAMAGE THE LOWER FIXING TABS AND/OR THEIR CORRESPONDING SLOTS.
HANDLE THE PLASTIC AND PAINTED COMPONENTS WITH CARE. DO NOT SCRATCH OR SPOIL THEM.

NOTE

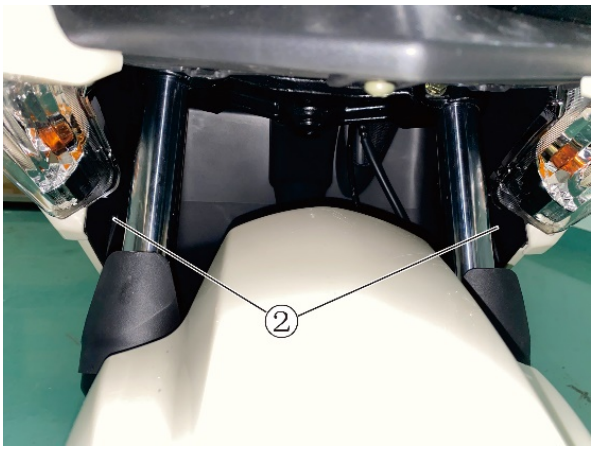
UPON RE-INSTALLING, INSERT THE FITTING TABS INTO THEIR SLOTS CORRECTLY.

Headlight assembly

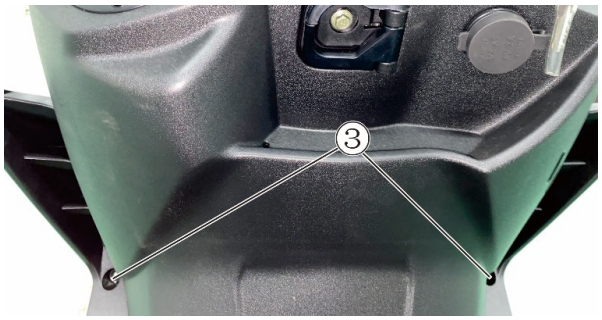
- Remove the dashboard.
- Unscrew and remove the two screws ①.



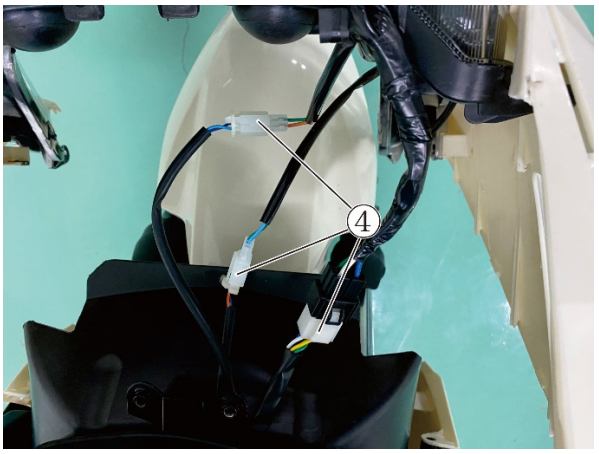
- Remove the screws ② on both sides.



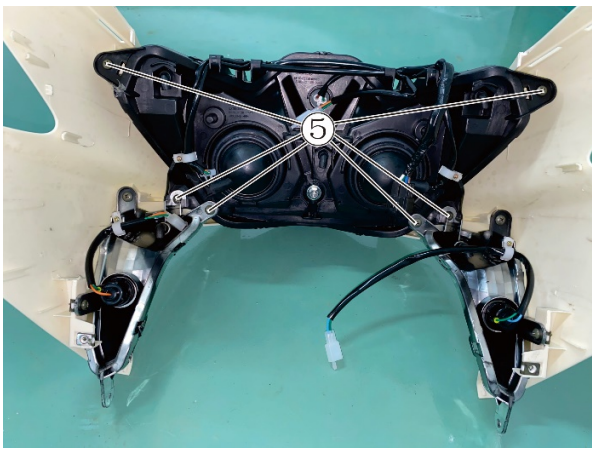
- Remove the screws ③ on both sides.

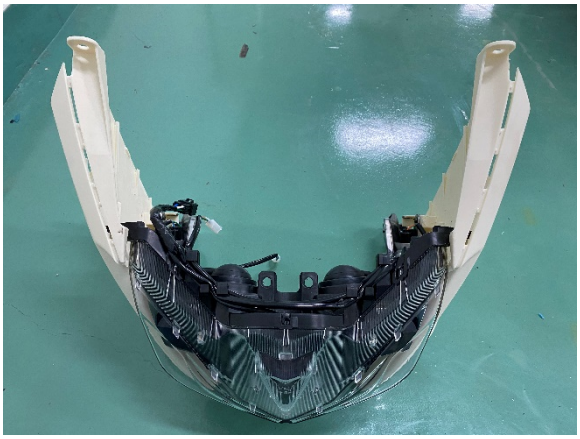


- Remove the plug ④.



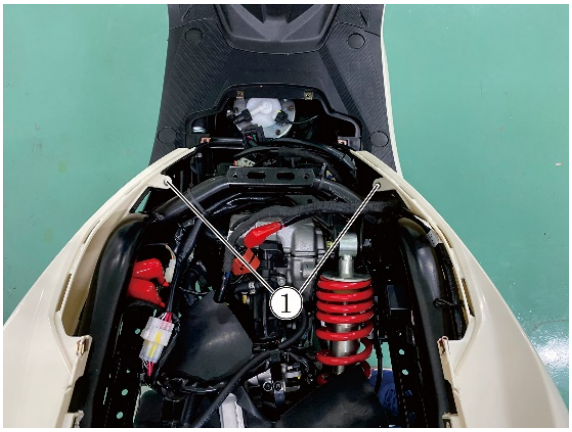
- Remove the screws ⑤ on both sides.



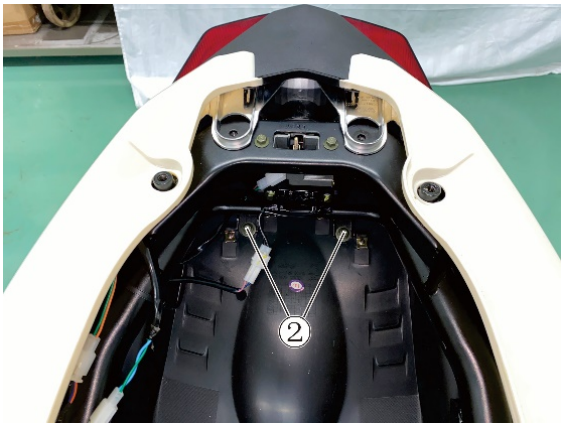


Rear protecting jacket

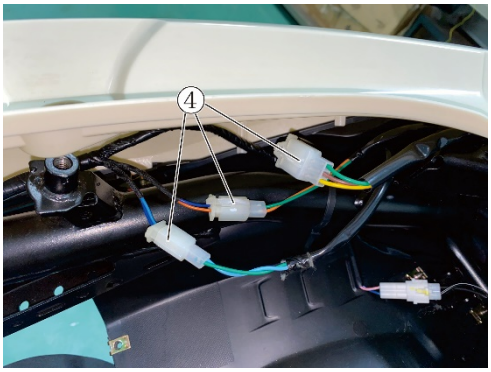
- Support the vehicle with the centre stand.
- Remove the rear luggage rack.
- Remove the helmet case.
- Unscrew and remove the screws ① from both sides



- Unscrew and remove the two screws ② on the vehicle.



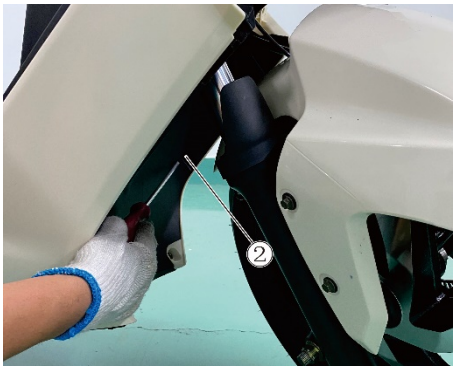
- Disconnect the taillight connector ③ and the connector of the rear indicator arrow ④.
- Remove the taillight cover, taillight and rear mudguard.

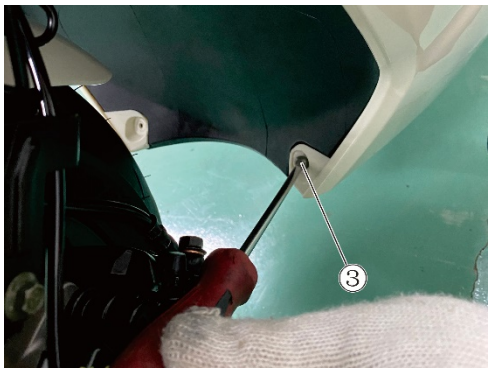


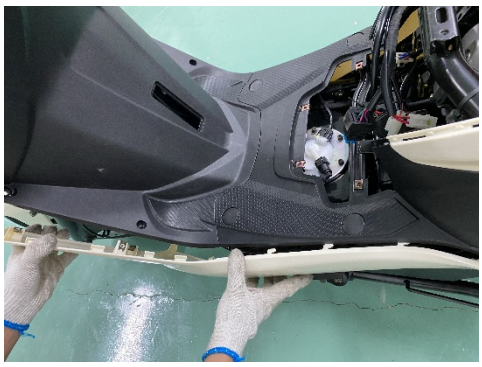
Side strips

Follow the procedures below to remove the front fairing:

- Remove the screws ①, ② and ③ from both sides.







- Pull a side strip forward to remove it.
- Remove the other side strip in same way.

CAUTION

BE CAREFUL TO OPERATE.
DO NOT DAMAGE THE LOWER FIXING TABS AND/OR THEIR CORRESPONDING SLOTS HANDLE THE PLASTIC AND PAINTED COMPONENTS WITH CARE, DO NOT SCRATCH OR SPOIL THEM.

NOTE

UPON RE-INSTALLING, INSERT THE FITTING TABS INTO THEIR SLOTS CORRECTLY.

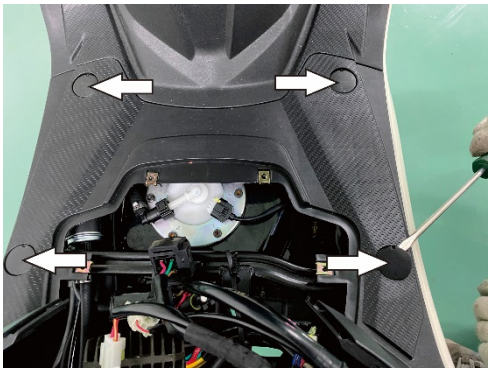
Foot pedal

Follow the procedures below to remove the foot pedal:

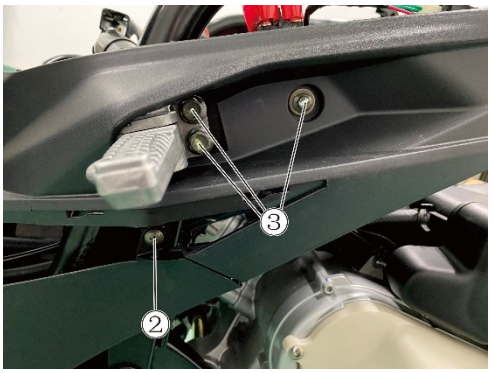
NOTE

THE FOLLOWING OPERATIONS INVOLVE ONE SIDE OF THE VEHICLE, BUT THESE OPERATIONS ARE APPLICABLE TO BOTH SIDES.

- Remove the spark plug inspection cover.
- Remove the rubber plug.
- Unscrew and remove the screws ① on both sides.



- Unscrew and remove the two screws ② and the six screws ③ on both sides of the vehicle.
- Remove the foot pedal.



Front inner leg shield

Follow the procedures below to remove the rear plate of the leg shield:

- Remove the front fairing.
- Unscrew and remove the center screw ①.

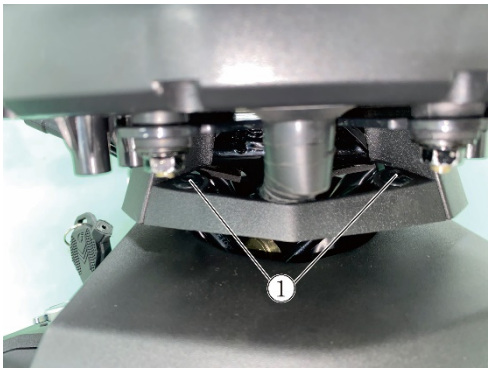
- Remove the screws of the electric lock cover.

- Remove the oil tank cover from its inside.

- Remove the rear plate of the leg shield.

Dashboard

- Lift the bayonet pin① to remove the cover using a screwdriver.



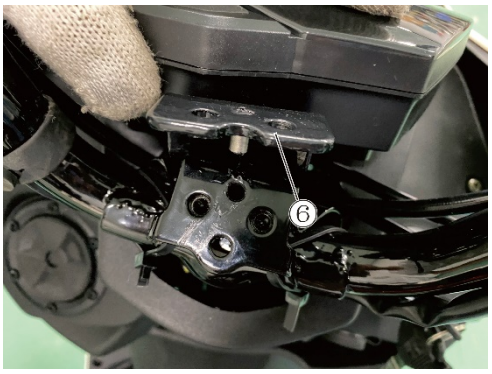
- Remove the upper frame ②.

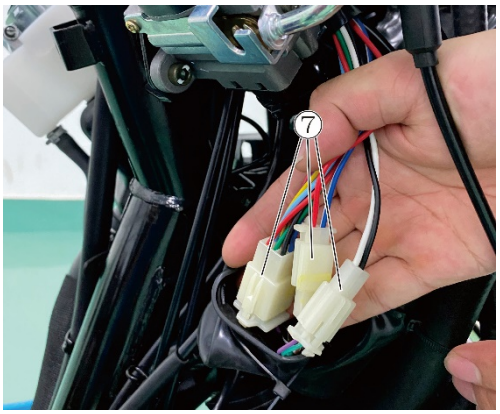
- Remove the cover ③.

- Remove the two screws ④.

- Remove the cover ⑤.

- Remove the dashboard bracket ⑥.
- Disconnect the plug ⑦.



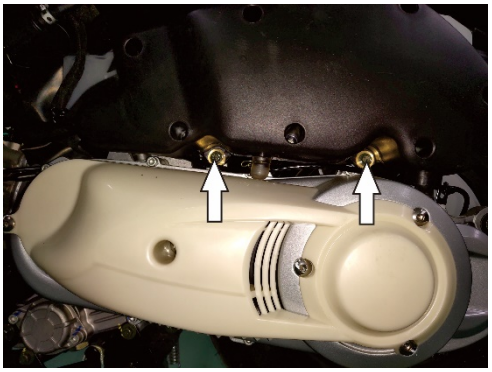


Air filter

- Unscrew and remove the fixing screw from the left side and collect the washers.

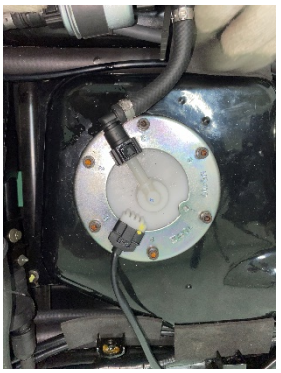
- Loosen the clamp that secures the throttle body manifold to the air filter box

- Remove the air filter box and disconnect the oil vapor recovery pipe.
- Remove the air filter box.

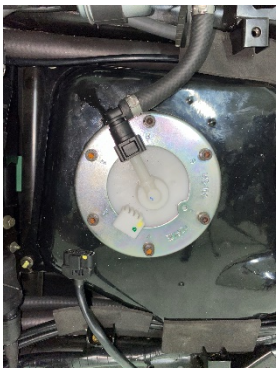


Fuel tank

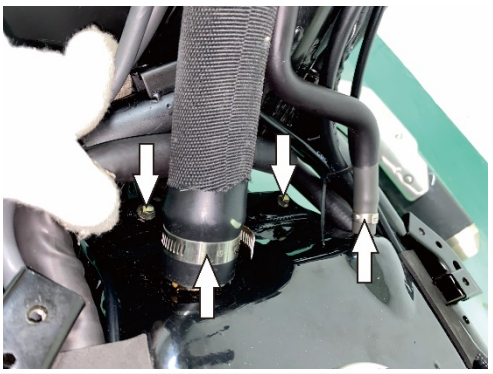
- Remove the foot pedal.
- Disconnect the fuel pump connection plug.



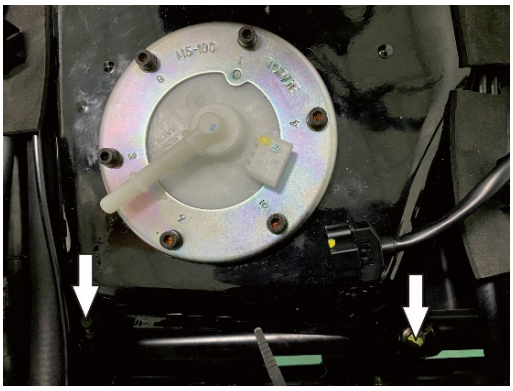
- Disconnect the fuel pipe.



- Loosen the clamp and disconnect the fuel pipe.
- Remove the two screws on the upper part of the fuel tank.



- Unscrew and remove the two fixing screws on the lower part of the fuel tank and collect the shims.

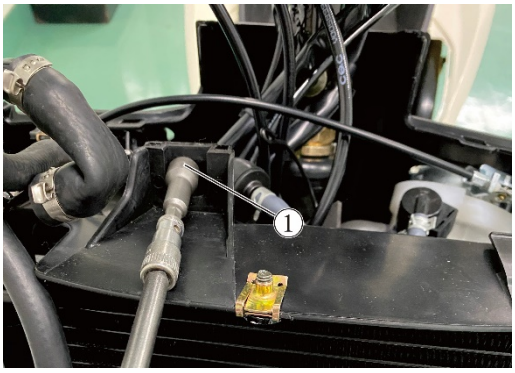


- Remove the fuel tank.

Radiator fan

Follow the procedures below to remve the Radiator:

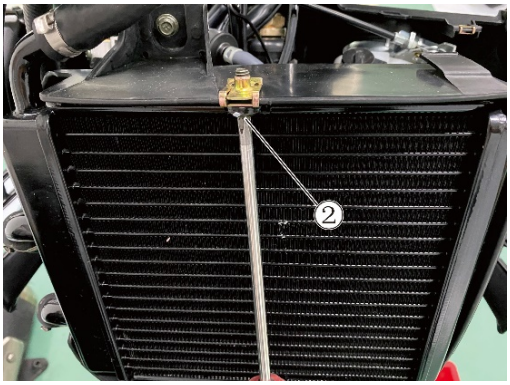
- Empty the cooling system (see coolant replacement).
- Disconnect the pipeline on the radiator.



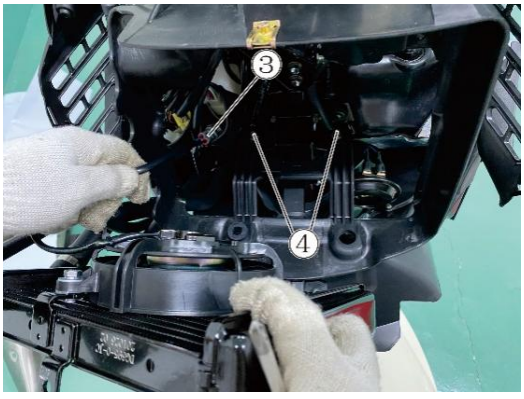
- Unscrew and remove the screws ① and ② that secure the radiator.

Locking torques (N * m)

M6 screw fixing radiator 6 (on the plastic) (4.44 lbf ft)



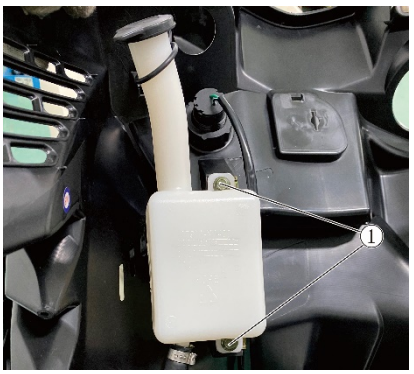
- Remove the cooling fan plug ③.
- Remove the two screws ④.



- Remove the radiator with the expansion tank.

Expansion tank

- Empty the cooling system (see coolant replacement).
- Remove the front fairing.
- Remove the rear plate of the leg shield.
- Unscrew and remove the two screws ①.
- Release the expansion tank from the pipeline.



Locking torques (N * m)

M6 screw fixing expansion tank 4 (2.69 lbf ft)

INDEX OF TOPICS

Carry out the listed checks before delivering the motorcycle.

CAUTION

HANDLE FUEL WITH CARE.

Appearance inspection

- Paintwork
- Installation of plastic parts
- Scratches
- Dirt

Tightening torques inspection

- Safety fasteners:
- Front and rear suspension unit
- Front and rear brake calliper retainer unit
- Front and rear wheel unit
- Engine
- Chassis retainers
- Steering assembly
- Plastic parts
- Fixing screws

Electrical system

- Main switch
- Headlights: high-beam lights, low-beam lights, taillights (front and rear) and their warning lights
- Headlight adjustment according to current regulations
- Front and rear stop light switches and their bulbs
- Direction indicators lamps and their warning lights
- Dashboard lights
- Dashboard: fuel and temperature indicators (if any)
- Dashboard warning lights
- Horn
- Electric starter
- Turning off the engine via emergency stop switch and side stand
- Saddle electric opening switch (if any)
- Through the diagnostic tool, check whether there is the latest mapping version in the control

unit. if necessary, program the control unit again: please visit the technical service website for available upgrades and details regarding the operation.

CAUTION

IN ORDER TO ENSURE OPTIMAL PERFORMANCE, THE BATTERY MUST BE CHARGED BEFORE USE. CHARGE THE BATTERY WITH A SMALL CURRENT FOR THE FIRST TIME.

CAUTION

FOR THE BATTERY INSTALLATION, INSTALL THE POSITIVE ELECTRODE AT FIRST AND THEN INSTALL THE NEGATIVE ELECTRODE. FOR THE BATTERY REMOVAL, OPERATE IN A REVERSE ORDER.

CAUTION

THE BATTERY IS TOXIC AND MAY CAUSE SERVER BURNS. AS THE BATTERY CONTAINS SULFURIC ACID, DO NOT CONTACT WITH EYES, SKIN AND CLOTHING.
IN CASE OF CONTACT WITH YOUR EYES OR SKIN, RINSE THE EYES OR SKIN WITH ABUNDANT WATER FOR 15 MINS, AND SEE A DOCTOR IMMEDIATELY.
IF IT IS SWALLOWED ACCIDENTLY, DRINK PLENTY OF WATER OR VEGETABLE OIL IMMEDIATELY, AND SEE A DOCTOR IMMEDIATELY.
THE BATTERY PRODUCES EXPLOSIVE GAS, SO KEEP IT AWAY FROM FLAMES, SPARKS OR CIGARETTES. KEEP THE ROOM VENTILATION WHEN CHARGING IN A ROOM. PROTECT YOUR EYES NEAR THE BATTERY.
KEEP OUT OF THE REACH OF CHILDREN.

CAUTION

DO NOT USE A FUSE WITH A CAPACITY GREATER THAN THE RECOMMENDED CAPACITY. USING A FUSE WITH IMAPPROPRIATE RATING VALUE MAY CAUSE SERIOUS DAMAGE TO THE VEHICLE AND EVEN CAUSE A FIRE.

Levels check

- Hydraulic braking system fluid level
- Hub oil level
- Engine coolant level (if any)
- Engine oil level
- Mixer oil level (if any)

Riding test

- Cold start
- Dashboard 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 any)
- Minimum holding (turning the handlebar)
- Uniform steering
- Possible leakages
- Radiator electric fan operation (if any)

Functional inspection

- Hydraulic braking system
- Brake levers stroke
- Clutch - Check whether the operation is correct
- Engine - Check whether the regular operation is correct and whether there is any abnormal noise.
- Other
- Documentation check:
- Chassis and engine numbers check
- Supplied tools check
- License plate accessories
- Locks checking
- Tyre pressure check
- Installation of rear-view mirror and any possible accessories

DO NOT EXCEED THE RECOMMENDED INFLATION PRESSURES, AS TYRES MAY BURST.

CAUTION

CHECK AND ADJUST TYRE PRESSURE WITH A TYRE PRESSURE GAUGE AT AMBIENT TEMPERATURE.