SERVICE STATION MANUAL

854184

SPORTCITY ONE 125

SERVICE STATION MANUAL

SPORTCITY ONE 125

SERVICE STATION MANUAL
SPORTCITY ONE 125

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

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

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

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

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

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

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

INDEX OF TOPICS

INDEX OF TOPICS

Safety rules

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

FUEL USED TO POWER INTERNAL COMBUSTION ENGINES IS HIGHLY FLAMMABLE AND CAN BECOME EXPLOSIVE UNDER SPECIFIC CONDITIONS. IT IS THEREFORE RECOMMENDED TO CARRY OUT REFUELLING AND MAINTENANCE OPERATIONS IN A WELL VENTILATED AREA WITH THE ENGINE OFF. DO NOT SMOKE WHILE REFUELLING OR WHEN CLOSE TO FUEL VAPOURS, AVOID CONTACT WITH NAKED FLAMES, SPARKS OR ANY OTHER SOURCE THAT MAY CAUSE FUEL TO CATCH FIRE 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.

COOLANT

The coolant contains ethylene glycol which, under certain conditions, can become flammable. When it burns, ethylene glycol produces invisible flames which, however, can cause burns.

CAUTION

MAKE SURE NOT TO POUR THE COOLANT ON HOT ENGINE OR EXHAUST SYSTEM COMPONENTS; IT MAY CATCH FIRE PRODUCING INVISIBLE FLAMES. WHEN CARRYING OUT MAINTENANCE OPERATIONS, IT IS ADVISABLE TO WEAR LATEX GLOVES. EVEN IF IT IS TOXIC, THE COOLANT HAS A SWEET FLAVOUR WHICH MAKES IT VERY ATTRACTIVE TO ANIMALS. NEVER LEAVE THE COOLANT IN OPEN CONTAINERS IN AREAS ACCESSIBLE TO ANIMALS AS THEY MAY DRINK IT.

CAUTION

KEEP OUT OF THE REACH OF CHILDREN.

CAUTION

DO NOT REMOVE THE RADIATOR CAP WHEN THE ENGINE IS STILL HOT. THE COOLANT IS UNDER PRESSURE AND MAY CAUSE BURNS.

HYDROGEN GAS AND BATTERY ELECTROLYTE

CAUTION

HYDROGEN GAS AND BATTERY ELECTROLYTE
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.

GENERAL PRECAUTIONS AND INFORMATION

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

CAUTION

THE USE OF NAKED FLAMES IS FORBIDDEN FOR ANY KIND 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 ANY OTHER SCOOTER PARTS WITH YOUR MOUTH: SCOOTER COMPONENTS ARE NOT EDIBLE, ON THE CONTRARY SOME OF THEM ARE HARMFUL AND EVEN TOXIC. UNLESS OTHERWISE INDICATED, REFIT THE UNITS FOLLOWING REMOVAL OPERATIONS BUT IN REVERSE ORDER. THE POSSIBLE OVERLAPPING OF OPERATIONS REFERRED TO IN THE OTHER CHAPTERS MUST BE CARRIED OUT LOGICALLY, AVOIDING ANY UNNECESSARY REMOVAL OF COMPONENTS. DO NOT POLISH MATT-PAINTED SURFACES WITH POLISHING PASTE. NEVER USE FUEL AS SOLVENT FOR CLEANING THE SCOOTER. 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 BATTERY NEGATIVE LEAD (-) IF YOU INTEND TO CARRY OUT ELECTRICAL WELDING WORK. WHEN TWO OR MORE PEOPLE WORK AT THE SAME TIME, MAKE SURE ALL SAFETY MEASURES ARE OBSERVED EACH OF THEM.

BEFORE REMOVING COMPONENTS

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

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 BE ABLE TO ROTATE FREELY, WITHOUT JAMMING AND/OR NOISE, OTHERWISE THEY NEED REPLACING.

- Use only ORIGINAL aprilia SPARE PARTS.
- Comply with lubricant and consumables usage guidelines.
- Lubricate parts (whenever possible) before reassembling them.
- When tightening nuts and screws, start from the ones with the largest section or from the internal ones, moving diagonally. Tighten nuts and screws in successive steps before applying the tightening torque.
- Always replace self-locking nuts, washers, sealing rings, circlips, O-rings, split pins and screws with new ones if their tread is damaged.
- When fitting bearings, make sure to lubricate them well.
- Check that each component is fitted correctly.
- After a repair or routine maintenance procedure, carry out pre-ride checks and test the vehicle on private grounds or in an area with low traffic density.
- Clean all junction surfaces, oil guard rims and washers before refitting them. Smear a light layer of lithium-based grease on the oil guard rims. Reassemble the oil guards 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

TO DISCONNECT THE TWO CONNECTORS, DO NOT PULL 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.
- Make sure that the cables are correctly linked to the connector's internal terminal ends.

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).

CAUTION

TIGHTENING TORQUE
DO NOT FORGET THAT TIGHTENING TORQUES FOR ALL FIXING ELEMENTS ON WHEELS, BRAKES, WHEEL BOLTS AND ANY 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 REFIT 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.

Vehicle identification

Quote the chassis number when purchasing spare parts.

NOTE

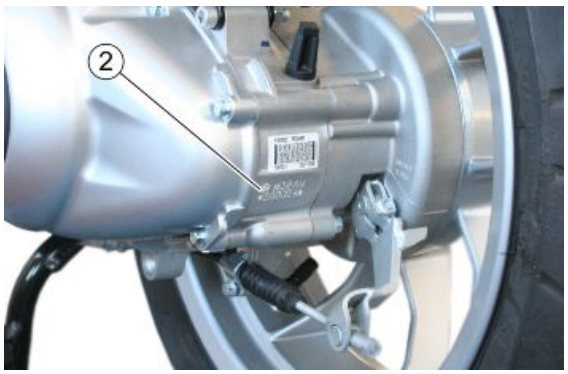
DO NOT OBLITERATE OR ALTER THE VEHICLE IDENTIFICATION NUMBERS. DOING SO IS CONSIDERED AN OFFENCE IN ALL COUNTRIES. FURTHERMORE, ALTERING THE IDENTIFICATION NUMBERS INVALIDATES THE WARRANTY.

Chassis number

The chassis number is marked on the chassis central steel tube. Remove the cover «**1**» to read it.

Engine number

The engine number «**2**» is marked near the lower support of the rear shock absorber.



Dimensions and mass

WEIGHT AND DIMENSIONS

Specification	Desc./Quantity
Max. length	1.950 mm

Specification	Desc./Quantity
Max. width (to brake levers)	740 mm
Max. height (to the rear-view mirrors)	1.270 mm
Saddle height	775 mm
Wheelbase	1.358 mm
Minimum ground clearance	125 mm
Kerb weight in running order	126 kg
Vehicle max load (rider + passenger + luggage)	286 kg

Engine

ENGINE

Specification	Desc./Quantity
Engine model	M8AM
Type	Horizontal single-cylinder
Valve quantity	2
Cylinder quantity	1
Overall engine capacity	124 cm³
Bore / stroke	57.0 mm / 48.6 mm
Compression ratio	10.6 ± 0.5 : 1
Start-up	electric
Engine revs at idle speed	1,700 ± 100 rpm
Clutch	Centrifugal
Gear	automatic
Lubrication system	Wet sump with pump
Cooling	Forced air circulation cooling
Valve clearance	Inlet 0.10 / Outlet 0.15
Maximum power	7.0 kW at 8,000 rpm
Maximum torque	10.04 Nm at 7,000 rpm
SUPPLY	By carburettor and with automatic petrol vacuum-operated cock.
Standard carburettor	KEIHIN CVK 26
Fuel	Premium unleaded premium (4 stars) petrol, DIN 51607, with minimum octane rating of 95 (NORM) and 85 (NOMM)
Ignition type	CDI / inductive
Ignition advance	Variable from 0° to 30°
Spark plug	CHAMPION RG6YC
Alternative spark plug	NGK CR7EB
Spark plug electrode gap	0.6 mm

Transmission

TRANSMISSION

Specification	Desc./Quantity
Variator	continuous, automatic
Primary drive	V-belt
Secondary	Gear reduction unit in oil bath
Engine/wheel total ratio	1: 11.24
Minimum ratio for continuos transmission	2.701: 1
Maximum ratio for continuos transmission	0.809: 1

Capacities

CAPACITY

Specification	Desc./Quantity
Fuel (reserve included)	7 l
Fuel reserve	1.5 l
Engine oil (Engine oil change and engine filter replacement)	1.100 cm³
Transmission oil	200 cm³

Specification	Desc./Quantity
Depth of fork oil level from the rim - without spring - fork included	85 mm
Seats	2

Electrical system

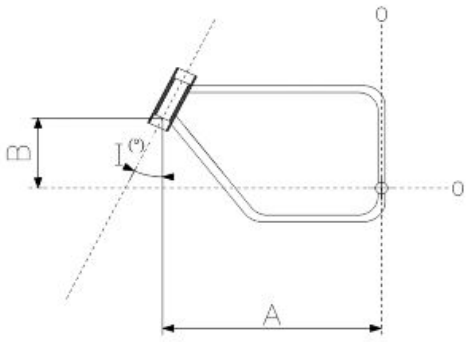
ELECTRICAL SYSTEM

Specification	Desc./Quantity
Battery	12V - 9 Ah
Fuse	20 - 7.5 - 15 Ah
(Permanent magnet) Generator	175 W

BULBS AND WARNING LIGHTS

	Specification	Desc./Quantity
1	Low-beam bulb	12 V - 35 W (Halogen) H8
2	High-beam bulb	12 V - 35 W (Halogen) H8
3	Tail light bulb	12V - 3W
4	Front turn indicator bulbs	12 V - 21 W (Halogen) H21W
5	Rear turn indicator bulbs	12V - 16W
6	Rear position light /stop light bulb	12V - 5/21W
7	License plate light bulb	12V - 5W
8	Instrument panel light bulbs	12V - 1.2W
9	Oil pressure warning light	12V - 1.2W
10	Turn indicator warning light	12V - 1.2W
11	High-beam warning light	12V - 1.2W

Frame and suspensions



CHASSIS AND SUSPENSIONS

Specification	Desc./Quantity
Chassis type	High strength steel tube chassis with reinforcements.
Steering inclination angle	28.5°
Trail	90 mm
A	522 mm
B	416 mm
Front suspension	Hydraulic action telescopic fork
Front suspension travel	86 mm
Rear suspension	Hydraulic single shock absorber with preloading adjustable to four positions
Rear suspension travel	84 mm

Brakes

BRAKES

Specification	Desc./Quantity
Front brake	Ø 220-mm disc brake with hydraulic transmission
Rear brake	Ø 140-mm drum brake with mechanic transmission

Wheels and tyres

WHEEL RIM

Specification	Desc./Quantity
Rims	alloy
Front wheel	3.00 x 14"
Rear wheel	3.50 x 14"

TYRES

Specification	Desc./Quantity
Front tyre	120/70 - 14" 52K Tubeless
Rear tyre	120/70 - 14" 52K Tubeless
Front tyre standard inflation pressure	180 kPa (1.8 bar)
Rear tyre standard inflation pressure	200 kPa (2.0 bar)
Front tyre standard inflation pressure with passenger	190 kPa (1.9 bar)
Rear tyre standard inflation pressure with passenger	220 kPa (2.2 bar)

Tightening Torques

FRAME ASSEMBLY

Name	Torque in Nm
License plate holder support fixing screw	10

ENGINE LINK ROD UNIT

Name	Torque in Nm
Nut fixing the chassis-side swinging arm and the engine-side swinging arm	42.5
Engine-side swinging arm retaining nut	42.5
Chassis-side swinging arm retaining nut	52.5
Buffer plate to chassis retaining nut	40

STAND UNIT

Name	Torque in Nm
Central stand to chassis fixing screw	42.5

FRONT SUSPENSION

Name	Torque in Nm
Stems-plate fixing screw	40
Stems-sleeve fixing screw	30
Wheel pin hub fixing screw	10
Upper ring nut	37.5
Lower ring nut	13

REAR SUSPENSION UNIT

Name	Torque in Nm
Nut fixing shock absorber bracket on engine	22.5
Upper part of the shock absorber retaining nut	22.5
Lower part of the shock absorber retaining nut	42.5

ENGINE UNIT

Name	Torque in Nm
Air cleaner cover fixing screw	3
Air cleaner and mudguard fixing screw	10
Rear brake lever transmission fixing screw	10
Throttle control to engine transmission fixing screw	10
Clutch assembly lock-nut on driven pulley	55 ÷ 60
Driven pulley shaft nut	40 ÷ 44
Crankshaft pulley nut	18 ÷ 20 + 90°
Transmission cover screws	11 ÷ 13
hub cover screws	24 - 26
Pick-up screws	3 ÷ 4
Stator screws	3 ÷ 4
Flywheel nut	52 ÷ 58
Starter motor screws	11 ÷ 13
Head-cylinder stud bolt nuts:	6 ÷ 7 +135° +90° upon first assembly; upon refitting, tighten again at 6 ÷ 7 90° +90°
Rocking lever axle and camshaft bearing screw	3 ÷ 4
Chain tensioner pad screw	5 ÷ 7
Camshaft pulley screw	12 ÷ 14
Head cover screw	8 ÷ 10
Timing chain tensioner screw	8 ÷ 10
Timing chain tensioner central screw	5 ÷ 6
Spark plug	12 ÷ 14
Intake manifold screw	7 ÷ 9
Crankcase halves union screws:	8 ÷ 10
Engine oil pre-filter cap:	25 ÷ 28
Timing chain/oil pump compartment cover screws	4 ÷ 5
Central screw	12 ÷ 14
Cover screws	0.7 ÷ 0.9
Oil pump screws	5 ÷ 6
Oil sump screws	8 ÷ 10

EXHAUST SYSTEM UNIT

Name	Torque in Nm
Silencer protection fixing screw	6
Muffler plate-engine fixing screw	25.5
Nut fixing exhaust manifold to engine	15
Silencer clamp to exhaust manifold fixing screw	25.5

FRONT WHEEL UNIT

Name	Torque in Nm
Brake disc fixing screw	9
Wheel pin to fork fixing nut	46.5
Front brake cable guide on plate fixing screw	6
Odometer cable guide on plate fixing screw	6

REAR WHEEL UNIT

Name	Torque in Nm
Rear wheel to hub fixing nut	115

BRAKING SYSTEM UNIT

Name	Torque in Nm
Left control lever fixing screw	8
Left lever fixing screw	8
Brake pump to handlebar fixing screw	8.05
Front brake calliper to fork fixing screw	25.5
Brake pipe to calliper fixing screw	21.5
Brake pipe to brake pump fixing screw	18
Brake pad locking screws	15 ÷ 20
Rear brake adjustment nut	5

HANDLEBAR UNIT

Name	Torque in Nm
Handlebar to headstock fixing nut	52.5
Throttle control fixing screw	3.5
Opening throttle control transmission fixing nut	3.5
Mirror fixing screw	25

ELECTRICAL SYSTEM UNIT

Name	Torque in Nm
Horn fixing screw	10
Voltage regulator fixing screw	10
Control unit fixing screw	10
Coil fixing screw	5
Start-up relay fixing screw	10

LIGHTS AND INSTRUMENT PANEL UNIT

Name	Torque in Nm
Front headlamp fixing screw	3
Rear light fixing screw	6
Rear light fixing screw	3
Nut fixing license plate lamp	3
Instrument panel fixing screw	3

FUEL TANK UNIT

Name	Torque in Nm
Fuel tank to chassis lateral fixing screw	10
Fuel tank to chassis rear fixing screw	10

SADDLE UNIT

Name	Torque in Nm
Saddle plate fixing nut	10

BODYWORK UNIT

Name	Torque in Nm
Helmet compartment fixing screw	6
Helmet compartment fixing screw	3
Passenger handgrip profiles fixing screw	3
Passenger handgrip fixing screw	20.5
Battery cover fixing screw	6
Front head fixing screw	6
Front head fixing screw	3
Rear head fixing screw	3
Front wheel well fixing screw	6
Front wheel well fixing screw	3
Front mudguard fixing screw	6
Mats kit fixing screw	6
Mats kit fixing screw	3
Footrest fixing screw	6
Shield upper lock fixing screw	6
Lid hinge fixing screw	3
Internal shield fixing screw	6
Internal shield fixing screw	3
Under-footrest fixing screw	6
Central lock fixing screw	3
Right side lock to right passenger footrest fixing screw	3
Left side lock to left passenger footrest fixing screw	3
Right fairing right passenger footrest fixing screw	6
Left fairing left passenger footrest fixing screw	6
Right and left fairings to headlamp support fixing screw	3
Pre-assembled tail section to vehicle fixing screw	6
Inspection cover fixing screw	6
Mudflap fixing screw	6

Name	Torque in Nm
Bag hook fixing screw	3
Rear mudguard fixing screw	6

LABELS / TRANSFER UNIT

Name	Torque in Nm
License plate fixing nut	6

Overhaul data

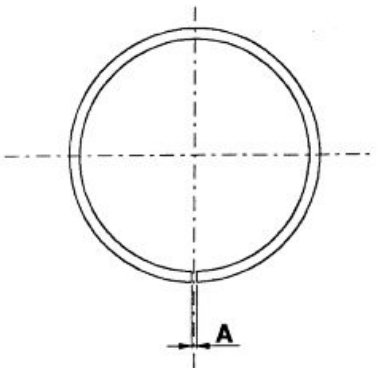
Assembly clearances

Cylinder - piston assy.

COUPLING BETWEEN PISTON AND CAST IRON CYLINDER (125)

Name	Initials	Cylinder	Piston	Play on fitting
Coupling	M	56.997 ÷ 57.004	56.944 ÷ 56.951	0.046 - 0.060
Coupling	N	57.004 ÷ 57.011	56.951 ÷ 56.958	0.046 - 0.060
Coupling	O	57.011 ÷ 57.018	56.958 ÷ 56.965	0.046 - 0.060
Coupling	P	57.018 ÷ 57.025	56.965 ÷ 56.972	0.046 - 0.060
Coupling 1st oversize	M1	57.197 ÷ 57.204	57.144 ÷ 57.151	0.046 - 0.060
Coupling 1st oversize	N1	57.204 ÷ 57.211	57.151 ÷ 57.158	0.046 - 0.060
Coupling 1st oversize	O1	57.211 ÷ 57.218	57.158 ÷ 57.165	0.046 - 0.060
Coupling 1st oversize	P1	57.218 ÷ 57.225	57.165 ÷ 57.172	0.046 - 0.060
Coupling 2nd oversize	M2	57.397 ÷ 57.404	57.344 ÷ 57.351	0.046 - 0.060
Coupling 2nd oversize	N2	57.404 ÷ 57.411	57.351 ÷ 57.358	0.046 - 0.060
Coupling 2nd oversize	O2	57.411 ÷ 57.418	57.358 ÷ 57.365	0.046 - 0.060
Coupling 2nd oversize	P2	57.418 ÷ 57.425	57.365 ÷ 57.372	0.046 - 0.060
Coupling 3rd oversize	M3	57.597 ÷ 57.604	57.544 ÷ 57.551	0.046 - 0.060
Coupling 3rd oversize	N3	57.604 ÷ 57.611	57.551 ÷ 57.558	0.046 - 0.060
Coupling 3rd oversize	O3	57.611 ÷ 57.618	57.558 ÷ 57.565	0.046 - 0.060
Coupling 3rd oversize	P3	57.618 ÷ 57.625	57.565 ÷ 57.572	0.046 - 0.060

Piston rings



SEALING RINGS (125)

Name	Description	Dimensions	Initials	Quantity
Compression ring		57 x 1	A	0.15 ÷ 0.30
Oil scraper ring		57x1	A	0.10 ÷ 0.30
Oil scraper ring		57x2.5	A	0.10 ÷ 0.35
Compression ring 1st Oversize		57.2 x 1	A	0.15 ÷ 0.30

Name	Description	Dimensions	Initials	Quantity
Oil scraper ring 1st oversize		57.2x1	A	0.10 ÷ 0.30
Oil scraper ring 1st oversize		57.2x2.5	A	0.10 ÷ 0.35
Compression ring 2nd oversize		57.4x1	A	0.15 ÷ 0.30
Oil scraper ring 2nd oversize		57.4x1	A	0.10 ÷ 0.30
Oil scraper ring 2nd oversize		57.4x2.5	A	0.10 ÷ 0.35
Compression ring 3rd oversize		57.6x1	A	0.15 ÷ 0.30
Oil scraper ring 3rd oversize		57.6x1	A	0.10 ÷ 0.30
Oil scraper ring 3rd oversize		57.6x2.5	A	0.10 ÷ 0.35

Maximum clearance after use: 1 mm

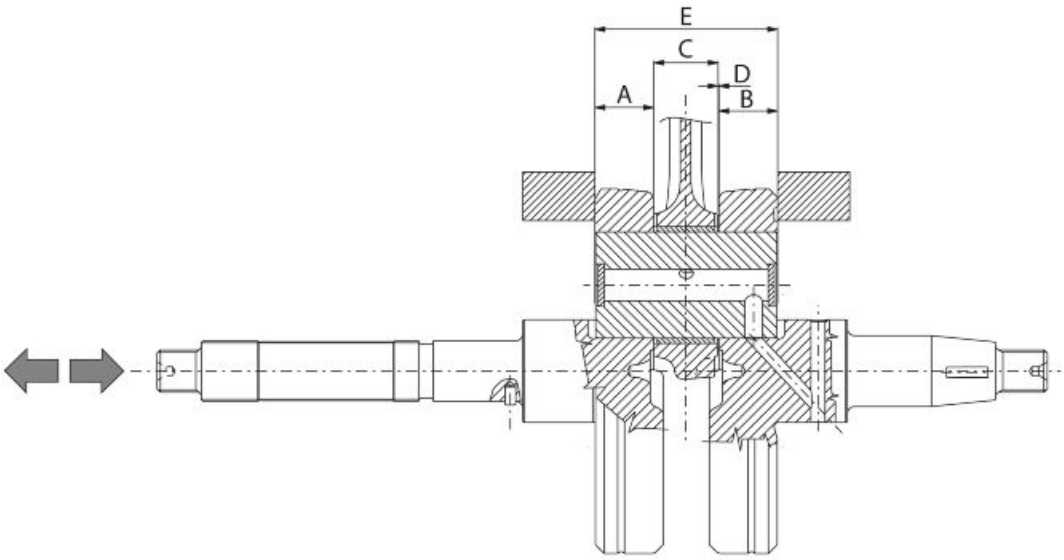
Crankcase - crankshaft - connecting rod

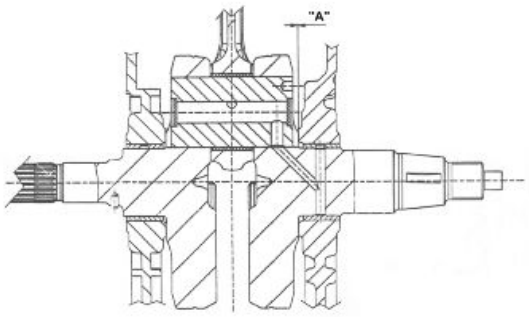
AXIAL CLEARANCE BETWEEN CRANKSHAFT AND CONNECTING ROD (125)

Name	Description	Dimensions	Initials	Quantity
Half shaft, transmission side		16.6 +0-0.05	A	D = 0.20 ÷ 0.50
Half shaft, flywheel side		16.6 +0-0.05	B	D = 0.20 ÷ 0.50
Connecting rod with PP		18 -0,10 -0,15	C	0.20 ÷ 0.50
Crankpin width		51,400	E	

AXIAL CLEARANCE BETWEEN CRANKSHAFT AND CRANKSHAFT HALF-BEARINGS (125)

Name	Description	Dimensions	Initials	Quantity
Crankshaft			Class 1	28.998 ÷ 29.004
Crankshaft			Class 2	29.004 ÷ 29.010
Crankcase			Class 1	32.953 ÷ 32.959
Crankcase			Class 2	32.959 ÷ 32.965
Crankshaft half-bearings			B Type - blue	1.973 ÷ 1.976
Crankshaft half-bearings			C Type - yellow	1.976 ÷ 1.979
Crankshaft half-bearings			E Type - green	1.979 ÷ 1.982
Crankshaft type 1- Crankcase type 1			E - E	
Crankshaft type 1 - Crankcase type 2			C - C	
Crankshaft type 2 - Crankcase type 1			C - C	
Crankshaft type 2 - Crankcase type 2			B - B	





Characteristic

Crankshaft/crankcase axial clearance «A»:

0.15 ÷ 0.40

Slot packing system

SHIMMING SYSTEM

Measure taken	Gasket thickness
0 ÷ 0.1	0.8 ± 0.05
0.1 ÷ 0.3	0.6 ± 0.05
0.3 ÷ 0.4	0.4 ± 0.05

Characteristic

Compression ratio

10.6 ± 0.5 **:** 1

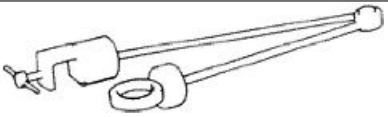
Products

RECOMMENDED PRODUCTS TABLE

Product	Description	Specifications
AGIP CITY HI TEC 4T	Engine oil	SAE 5W/40, API SL, ACEA A3, JASO MA
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 FILTER OIL	Oil for air filter sponge	-

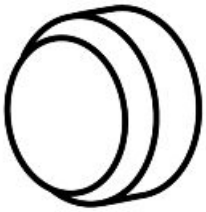
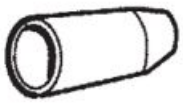
INDEX OF TOPICS

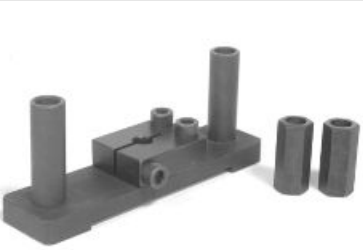
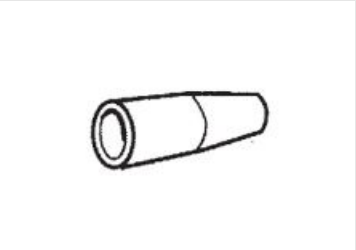
TOOLS

Stores code	Description	
020423Y	Driven pulley lock wrench	
001467Y009	Bell for OD 42-mm bearings	
001467Y013	Calliper to extract 15-mm diameter bearings	
008564Y	Flywheel extractor	
020074Y	Support base for checking crankshaft alignment	
020150Y	Air heater support	

Stores code	Description	
020151Y	Air heater	
020262Y	Crankcase splitting strip	
020263Y	Sheath for fitting the driven pulley	
020306Y	Punch for fitting the valve sealing rings	
020335Y	Dial gauge magnetic support	

Stores code	Description	
020357Y	32 x 35 mm adaptor	
020359Y	42 x 47-mm adaptor	
020360Y	Adaptor 52x54 mm	
020363Y	20 mm guide for oil seal	
020364Y	25-mm Guide	
020368Y	driving pulley lock wrench	

Stores code	Description	
020375Y	28x30 mm punch	
020376Y	Adapter handle	
020382Y	Tool for removing valve cotters fitted with part 012	
020382Y011	adaptor for valve removing tool	
020412Y	15-mm Oil seal guide	
020424Y	Punch for fitting driven pulley roller casing	

Stores code	Description	
020425Y	Shaft oil seal punch	
020426Y	Piston fitting fork	
020427Y	Piston fitting ring	
020428Y	Support to check piston position	
020431Y	Valve oil seal extractor	
020439Y	17-mm guide for oil seal	

Stores code	Description	
020565Y	Flywheel lock calliper spanner	

INDEX OF TOPICS

Maintenance chart

ROUTINE MAINTENANCE TABLE

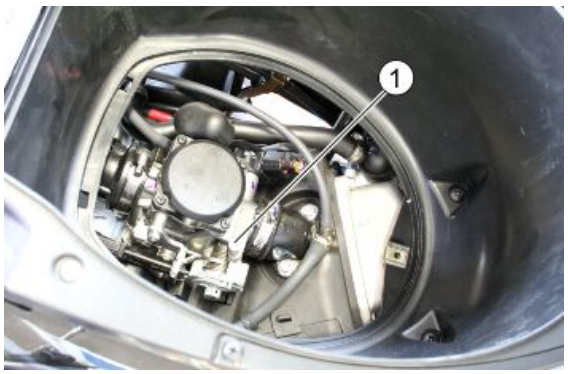
I: INSPECT AND CLEAN, ADJUST, LUBRICATE OR REPLACE IF NECESSARY
C: CLEAN, R: REPLACE, A: ADJUST, L: LUBRICATE
** Check level every 3,000 km*
*** Replace every 2 years*

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 locks	I		I		I		I		I		I
Spark plug		I	R	I	R	I	R	I	R	I	R
driving belt		I	R	I	R	I	R	I	R	I	R
Throttle control	A		A		A		A		A		A
Air filter		C	C	C	C	C	C	C	C	C	C
SAS filter			C		C		C		C		C
Oil mesh filter	C	C	C	C	C	C	C	C	C	C	C
Engine oil filter	R	R	R	R	R	R	R	R	R	R	R
Valve clearance		A		A			A			A	
Electrical system and battery	I	I	I	I	I	I	I	I	I	I	I
Cooling system					C				C		
Brake control levers	L		L		L		L		L		L
Brake fluid **	I	I	I	I	I	I	I	I	I	I	I
Engine oil*	R	R	R	R	R	R	R	R	R	R	R
Hub oil	R	I	I	I	R	I	I	I	R	I	I
Headlight aiming adjustment			A		A		A		A		A
Brake pads	I	I	I	I	I	I	I	I	I	I	I
Sliding blocks / Variable speed rollers		I	R	I	R	I	R	I	R	I	R
Tyre pressure and wear	I	I	I	I	I	I	I	I	I	I	I
Vehicle road test	I	I	I	I	I	I	I	I	I	I	I
Idle speed	A		A		A		A		A		A
Odometer gear			L		L		L		L		L
Suspensions			I		I		I		I		I
Steering	I		I		I		I		I		I
Transmissions			L		L		L		L		L

Carburettor

Check idle speed according to the indications in the maintenance table. To reach the set screw:

- Remove the inspection cover from the inside of the helmet compartment.



CAUTION

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

- Operate on the screw «1» until the pre-set idle speed is obtained.

Characteristic

Engine revs at idle speed

1,700 ± 100 rpm

Spark plug

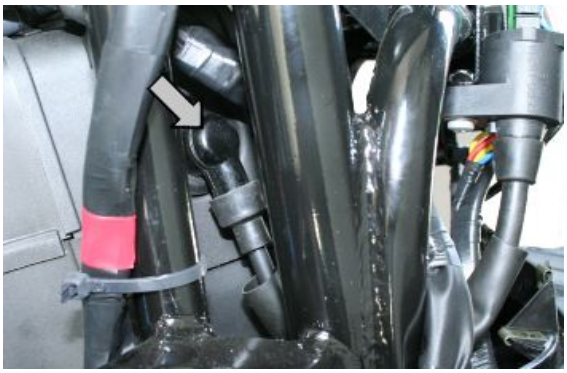
Check the spark plug according to the indications in the maintenance table. To reach it:

- Remove the side fairings.

CAUTION

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

- Disconnect the cap.
- Clean off any trace of dirt from the spark plug base by blowing compressed air.



- Unscrew the spark plug and remove it from its seat, making sure no dust or dirt gets into the cylinder.
- Check that spark plug electrode and central porcelain insulator do not have carbon deposits or corrosion; if necessary, remove them.
- Use a thickness gauge to check the electrode gap and, if necessary, adjust it.
- Make sure the washer is in good conditions.
- Fit the washer and then finger tighten the spark plug.
- Tighten to the specified torque.

Characteristic

Spark plug electrode gap

0.7 mm

Locking torques (N*m)

Spark plug 12 ÷ 14

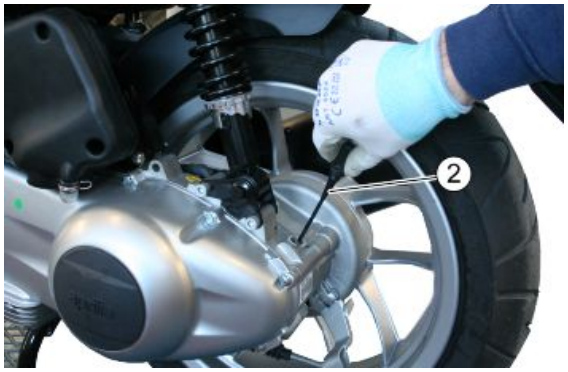
Hub oil

Check

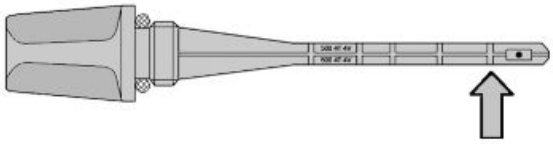
NOTE

USE RECOMMENDED OIL ONLY. REFER TO THE RECOMMENDED PRODUCTS TABLE.

- Ride some kilometres until reaching the regular operating temperature; then, stop the engine.
- Rest the scooter on its stand.
- Remove the tap-dipstick «2» and clean it with a cloth.
- Reinsert the tap-dipstick «2» into its tube and then pull it out again to check the oil level.



- The oil level is correct if it reaches the indicated mark.



CAUTION

RIDING THE VEHICLE WITH INSUFFICIENT LUBRICATION OR CONTAMINATED OR NOT RECOMMENDED LUBRICANTS ACCELERATES THE WEAR AND TEAR OF MOVING PARTS AND CAN CAUSE IRRETRIEVABLE DAMAGE.

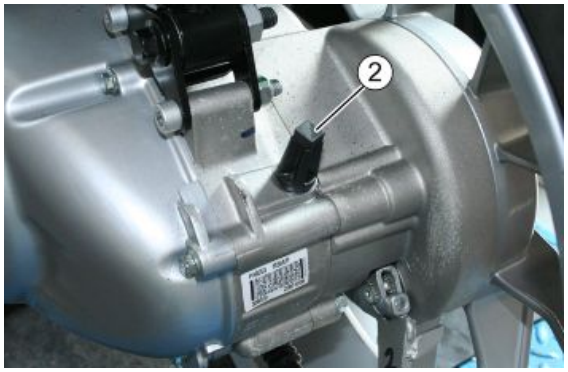
Replacement

CAUTION

WAIT SOME MINUTES UNTIL THE ENGINE AND THE EXHAUST SYSTEM ARE COLD.

To ensure long-lasting and optimal scooter performance, change oil following the frequency indicated in the scheduled maintenance tables.
For change:

- Ride a few kilometres until the regular working temperature is reached, then stop the engine.
- Park the vehicle on its centre stand.
- Place a container with 200 cm³ minimum capacity under the drainage plug «1».
- Unscrew the filler cap «2» and the oil drainage plug «1».



- Let the oil drain off completely from the crankcase.
- Tighten the drainage plug «1» and pour 200 cm³ of the recommended oil.
- Check the hub oil level.
- Tighten the filler cap «2».

CAUTION

SCREW THE FILLER CAP AND THE DRAINAGE PLUG TIGHTLY AND MAKE SURE THAT OIL DOES NOT SEEP THROUGH.
CHECK REGULARLY THAT THERE ARE NO LEAKS IN THE CRANKCASE COVER GASKET.
RIDING THE VEHICLE WITH INSUFFICIENT LUBRICATION OR CONTAMINATED OR NOT RECOMMENDED LUBRICANTS ACCELERATES THE WEAR AND TEAR OF MOVING PARTS AND CAN CAUSE IRRETRIEVABLE DAMAGE.

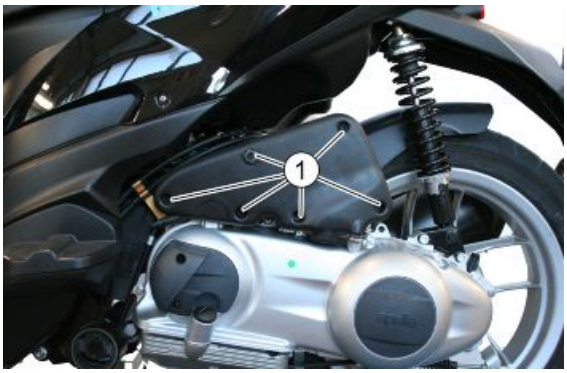
Air filter

CAUTION

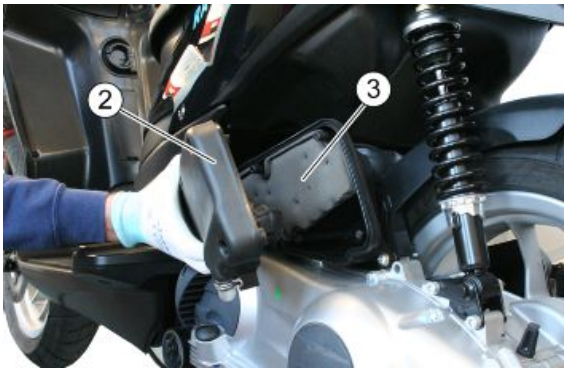
CLEAN AND CHECK THE AIR FILTER CONDITIONS MONTHLY OR FOLLOWING THE INDICATIONS IN THE SCHEDULED MAINTENANCE TABLES. THIS WILL DEPEND ON USE CONDITIONS.
IF THE SCOOTER IS USED ON DUSTY OR WET ROADS, CLEAN AND CHANGE THE FILTER MORE FREQUENTLY.

Removing the air filter

- Rest the scooter on its centre stand.
- Undo and remove the six screws «1».



- Slide off the air filter cover «2».
- Slide off the filtering element «3».



Cleaning

CAUTION

DO NOT USE PETROL OR FLAMMABLE SOLVENTS TO CLEAN THE FILTERING ELEMENT TO AVOID RISK OF FIRE OR EXPLOSION.

- Wash the filtering element «3» with clean non-inflammable or high-volatility solvents and let it dry thoroughly.
- Apply a specific filter oil over all the surface.

Engine oil

Replacement

NOTE

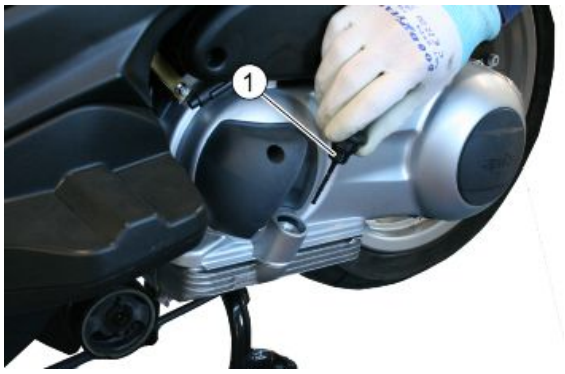
USE RECOMMENDED OIL ONLY. REFER TO THE RECOMMENDED PRODUCTS TABLE.

NOTE

PARK THE VEHICLE ON SAFE AND LEVEL GROUND.

- Park the vehicle on firm and level ground.
- Rest the vehicle on its centre stand.

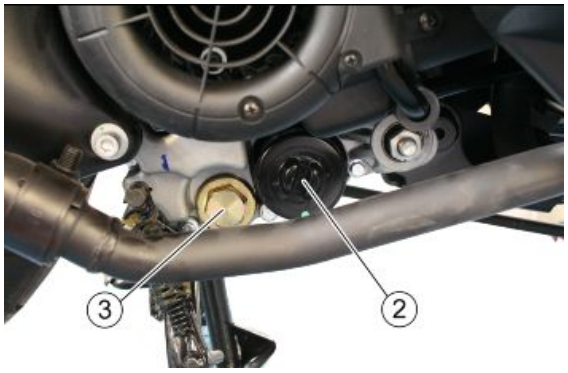
- Unscrew and take out the measuring tap-dipstick «1».



- Place a container to collect the oil under the engine oil filter.
- Unscrew and remove the engine oil cartridge filter «2».

CAUTION

USED OIL CONTAINS SUBSTANCES THAT ARE HARMFUL TO THE ENVIRONMENT. DISPOSE OF USED OIL ACCORDING TO THE REGULATIONS IN FORCE.



- Unscrew and remove the oil drainage plug «3» and drain off the engine oil.
- Fit a new oil cartridge filter «2» and lubricate the filter sealing O-rings with oil.
- Screw and tighten the engine oil drainage plug «3».
- Pour approx. 1000 cm³ (61 cu.in) of engine oil through the fill opening.

- Screw and tighten the cap-dipstick «1».
- Start the engine and let it run for several minutes. Stop the engine and let it cool down.
- Check the engine oil level.

Check

NOTE

USE RECOMMENDED OIL ONLY. REFER TO THE RECOMMENDED PRODUCTS TABLE.

NOTE

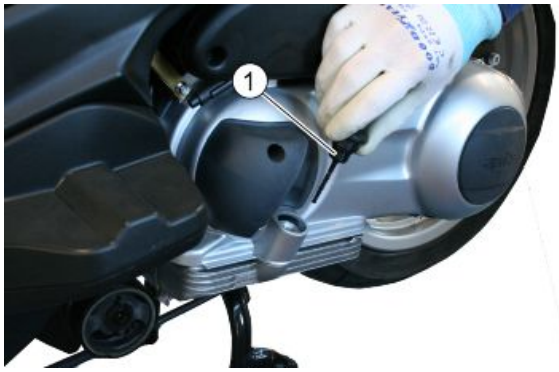
PARK THE VEHICLE ON SAFE AND LEVEL GROUND.

- Rest the vehicle on its centre stand.

CAUTION

WAIT SOME MINUTES UNTIL THE ENGINE AND THE EXHAUST SYSTEM ARE COLD.

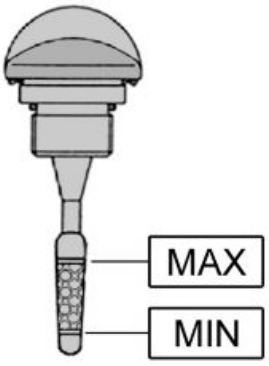
- Stop the engine and let it cool off so that the oil in the crankcase flows down and cools as well.



NOTE

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

- Unscrew and pull out the measuring cap-dipstick «1».
- Clean the area in contact with oil with a clean cloth.
- Screw the cap-dipstick «1» fully into its tube.
- Remove the tap-dipstick «1» again and read the level the oil reaches on the dipstick:



MAX = maximum level;

MIN = minimum level.

- The level is correct when it is close to the «MAX» level marked on the measuring dipstick.

CAUTION

IN ORDER TO AVOID DAMAGING THE ENGINE, OIL LEVEL MUST NEVER EXCEED THE «MAX» MARK OR FALL BELOW THE «MIN» MARK.

- Top-up if required.

TOP-UP

Do not exceed the «**MAX**» mark level when topping-up engine oil.

- Pour a small quantity of oil through the tube and wait about one minute so that the oil flows evenly into the crankcase.
- Check the oil level and top up, if required.
- Top up with small quantities of oil, until the recommended level is reached.
- Once this operation is finished, screw and tighten the cap-dipstick «1».

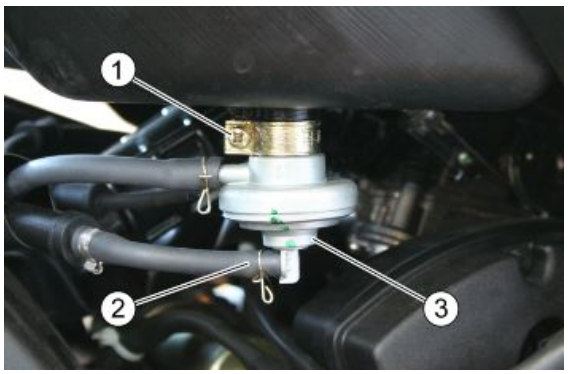
CAUTION

RIDING THE VEHICLE WITH INSUFFICIENT LUBRICATION OR CONTAMINATED OR NOT RECOMMENDED LUBRICANTS ACCELERATES THE WEAR AND TEAR OF MOVING PARTS AND CAN CAUSE IRRETRIEVABLE DAMAGE.

Fuel filter

Cleaning the fuel filter

- Empty the fuel tank.
- Unscrew the clamp «1».
- Remove the pipe «2».
- Slide off the petrol flange «3».



- Unscrew the filter «4» from the flange «3».

NOTE

BLOW THE FILTER WITH COMPRESSED AIR AND REFIT.

Transmissions

Check that the throttle grip works correctly

CAUTION

DO NOT USE THE SCOOTER IF THE THROTTLE GRIP CABLE IS DAMAGED, TWISTED OR COILED. THIS MAY INTERFERE WITH THE THROTTLE GRIP NORMAL OPERATION.
THE THROTTLE GRIP MAY GET LOCKED AND THIS MAY RESULT IN LOSS OF VEHICLE CONTROL.

Make sure the front fork rotation does not press the throttle grip and engage gears. Furthermore, make sure that the throttle grip goes back to idle position smoothly and automatically when released.

If this does not occur:

NOTE

USED THE SPECIFIC LUBRICANT AVAILABLE IN THE MARKET TO LUBRICATE THE COMPONENTS.

Check the position and lubrication of the following components:

- throttle grip cable sheath;
- throttle grip regulator «2»;
- cable terminals;
- throttle grip.

Check the throttle grip adjustment.

NOTE

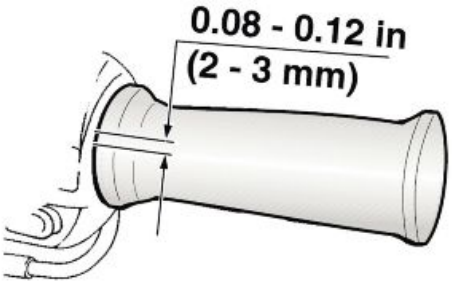
APPLY A GOOD QUANTITY OF SCOOTER CABLE GREASE TO LUBRICATE THE THROTTLE GRIP SYSTEM COMPONENTS.

Throttle grip adjustment

NOTE

BEFORE CARRYING OUT ANY TYPE OF OPERATIONS, MAKE SURE THE THROTTLE GRIP WORKS PROPERLY.

The throttle grip cable backslash must be between 2 - 3 mm (0.08 - 0.12 in), measured at the throttle trim, as shown in the figure.



To adjust the cable:

- Rest the scooter on its centre stand.
- Loosen clamping nut «1».
- Turn regulator «2» so as to restore the specified value.
- After adjusting, tighten the closing nut «1» and check backlash again.

CAUTION

AFTER ADJUSTING THE THROTTLE GRIP, TURN THE HANDLEBAR FULLY TO THE LEFT AND THEN FULLY TO THE RIGHT WITH THE ENGINE AT IDLE SPEED.
CHECK THAT THE NOISE PRODUCED WITH THE ENGINE AT IDLE DOES NOT CHANGE WHILE CARRYING OUT THESE OPERATIONS. ALSO CHECK THAT THE THROTTLE GRIP CLOSES SMOOTHLY AND TOTALLY WHEN RELEASED.

Braking system

CAUTION

CONSIDERING THE DANGER FOR VEHICLE AND RIDER, IT IS STRICTLY NECESSARY, AFTER REFITTING BRAKES AND RESTORING THE BREAKING SYSTEM TO THE REGULAR USE CONDITIONS, THAT THE HYDRAULIC CIRCUIT BE AIR PURGED.

Level check

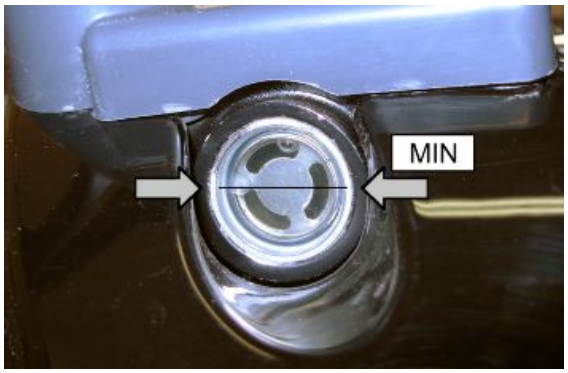
NOTE

CARRY OUT THESE OPERATIONS ONLY WITH THE VEHICLE ON A FLAT AND STABLE SURFACE, SUCH AS A GARAGE CONCRETE FLOOR.

- Rest the vehicle on its centre stand.

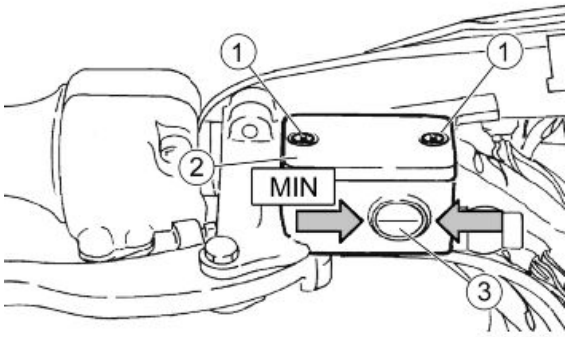
MIN = minimum level.

- Turn the handlebar so that the fluid in the brake fluid reservoir is parallel to the «MIN» reference mark.
- Make sure that the fluid level in the reservoir is above the «MIN» reference mark.



Top-up

- Remove the mirror and the pump cover.



CAUTION

TO REMOVE THE TWO SCREWS «1» THAT FIX THE RESERVOIR COVER «2», TURN THE HANDLEBAR SO THAT THE FLUID INSIDE THE BRAKE FLUID RESERVOIR IS PARALLEL TO «MIN» REFERENCE MARK. IF THIS PROCEDURE IS NOT CARRIED OUT, THE BRAKE FLUID WILL SPILL OUT OF THE RESERVOIR.

- Turn the handlebar so that the fluid in the brake fluid reservoir is parallel to the «MIN» reference mark.
- Undo the two screws «1».
- Remove cover «2».
- Remove cover guide «4».

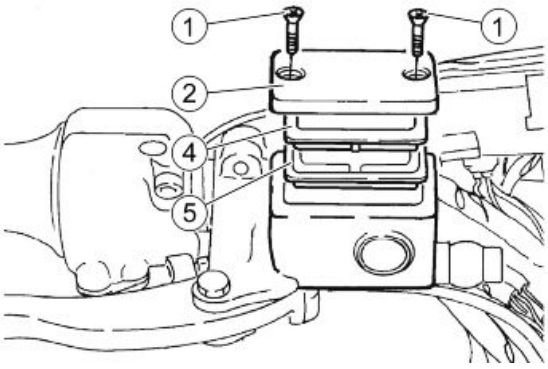
WARNING

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

CAUTION

TO AVOID SPILLING BRAKE FLUID WHILE TOPPING-UP, KEEP THE FLUID LEVEL IN THE RESERVOIR PARALLEL TO THE RESERVOIR EDGE AND DO NOT SHAKE THE VEHICLE.

- Remove the gasket «5».



NOTE

TO REACH THE MAXIMUM LEVEL, TOP-UP UNTIL COVERING THE SIGHT GLASS COMPLETELY BUT LEAVE A 5-6 MM (0.20-0.23 IN) MARGIN FROM THE RESERVOIR EDGE.

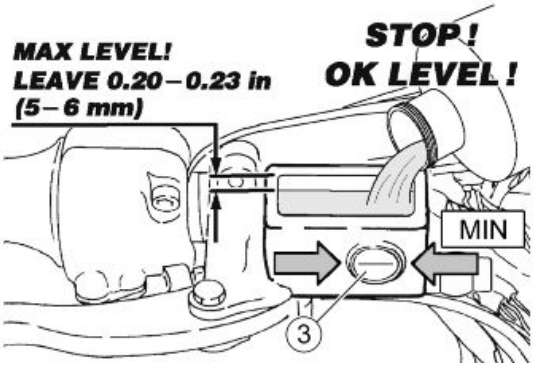
CAUTION

DO NOT EXCEED THE "MAX" LEVEL REFERENCE MARK WHEN TOPPING-UP. TOP-UP TO THE "MAX" LEVEL REFERENCE MARK ONLY WHEN NEW PADS ARE FITTED.

WARNING

NEVER FILL THE RESERVOIR UP TO THE 'MAX'' LEVEL REFERENCE MARK IF THE PADS ARE WORN; THIS WOULD CAUSE THE FLUID TO LEAK OUT FROM THE RESERVOIR WHEN THE NEW PADS ARE FITTED. USE RECOMMENDED PRODUCT ONLY. NEVER REUSE OLD BRAKE FLUID.

- Top-up the reservoir with brake fluid up to the "MAX" level.
- Refit gasket «5» correctly in its position.
- Refit cover guide «4» correctly in its position.
- Refit cover «2».
- Insert and tighten the two screws «1».
- Refit the front handlebar cover.



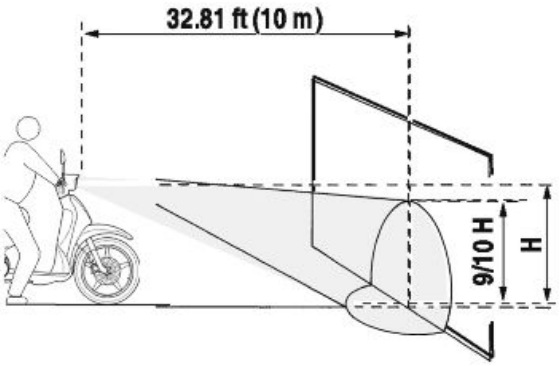
CAUTION

AFTER CARRYING OUT BRAKE MAINTENANCE, ALWAYS CHECK THAT BRAKES OPERATE PROPERLY. EXCESSIVE BRAKE LEVER CLEARANCE OR POOR BRAKING PERFORMANCE MAY INDICATE THAT CIRCUIT NEEDS PURGING. THIS MAY ALSO BE DUE TO ANY OTHER PROBLEM IN THE BRAKING SYSTEM.

Headlight adjustment

CAUTION

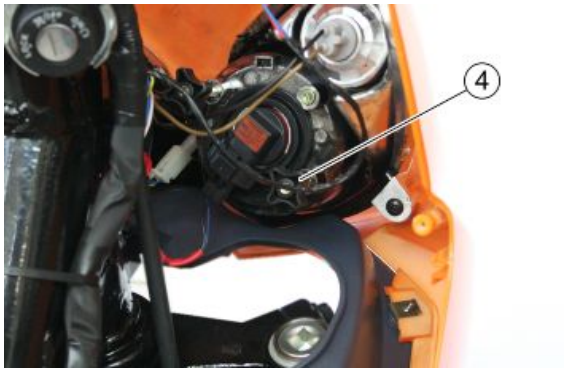
NEVER USE THE SCOOTER IF THE HEADLAMPS DO NOT WORK PROPERLY.
NEVER USE THE SCOOTER IF THE HEADLAMPS ARE NOT CORRECTLY ADJUSTED; YOU MAY DAZZLE THE VEHICLE RIDING TOWARDS YOUR DIRECTION. THIS MAY ALSO REDUCE THE POSSIBILITY OF SEEING AN OBSTACLE AHEAD OF YOU ON THE ROAD WHEN RIDING AT NIGHT.
IT IS ALWAYS ADVISABLE TO REDUCE SPEED WHEN RIDING AT NIGHT SO AS TO HAVE ENOUGH TIME TO AVOID POTENTIAL OBSTACLES AND TO ADAPT YOURSELF TO LOW VISIBILITY CONDITIONS RESULTING FROM DARKNESS.



NOTE

THE PROCEDURE DESCRIBED HEREIN COMPLIES WITH THE ITALIAN STANDARDS REGARDING MAXIMUM HEIGHT OF THE LIGHT BEAM.
IF THE SCOOTER IS USED IN OTHER COUNTRIES, NATIONAL REGULATIONS MUST BE OBSERVED.

- For a quick check of the correct direction of the front light beams, place the vehicle ten metres from a vertical wall and make sure the ground is level.
- Turn on the low-beam light, sit on the vehicle and check that the light beam projected to the wall is a little below the



headlight horizontal straight line (about 9/10 of the total height).

To adjust the light beam:

- Park the vehicle on its centre stand on safe and level ground.
- Hold the knob «4» operating inside the wheel well.

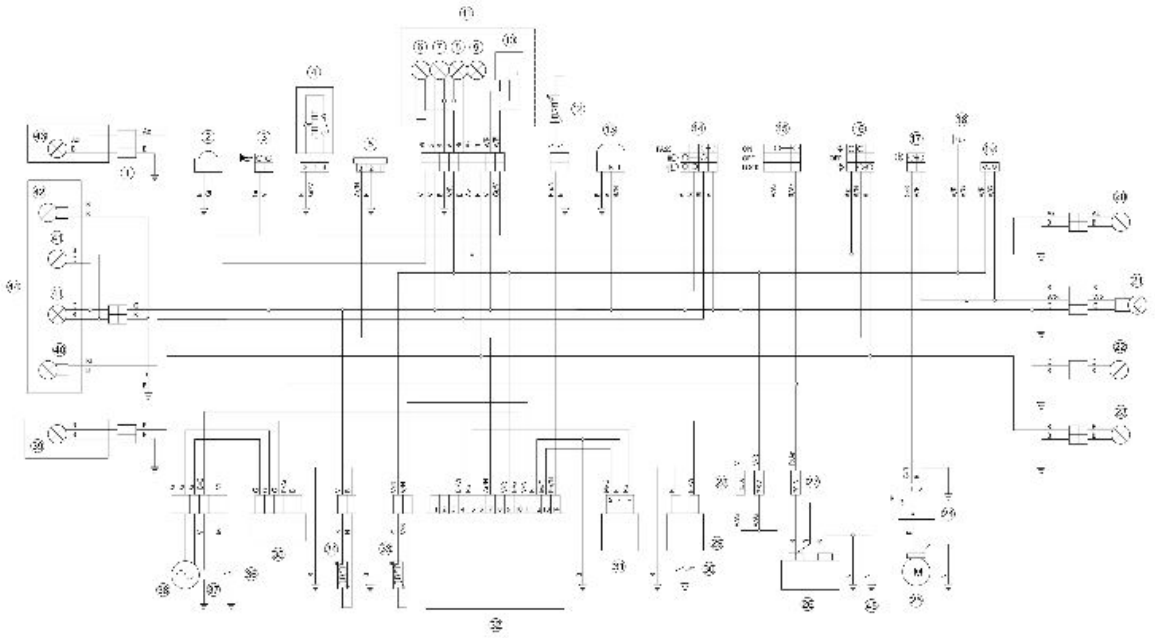
SCREW it (clockwise) to raise the light beam.

UNSCREW it (anticlockwise) to lower the light beam.

NOTE

IN COMPLIANCE WITH LOCAL LEGISLATION, SPECIFIC PROCEDURES MUST BE FOLLOWED WHEN ALIGNING THE LIGHTS.

INDEX OF TOPICS



KEY

1. Multiple connectors

2. Horn

3. Horn button

4. Fuel level probe

5. Diagnosis

6. Oil level warning light

7. Instrument panel lighting bulbs

8. High-beam warning light

9. Turn indicator warning light

10. Fuel level instrument

11. Instrument panel

12. NTC temperature sensor

13. Blinker

14. Low-beam/High-beam/Passing switch

15. Key switch

16. Turn indicators switch

17. Starter button

18. Front stop switch

19. Rear stop switch

20. Rear left turn indicator

21. Rear light

22. License plate light

23. Rear right turn indicator

24. Start-up relay

25. Starter motor

26. Battery

27. Main fuse

28. Auxiliary fuses

29. Coil

30. Spark plug

31. Throttle sensor

32. CDI control unit

33. Automatic starter

34. PTC heater

35. Regulator

36. Oil pressure sensor

37. Pick-up

38. Generator

39. Front right turn indicator

40. High-beam light

41. Front position light

42. Low-beam light

43. Front left turn indicator

44. Front headlamp

45. Ground point on chassis

CABLE COLOURS

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

Components arrangement

1. Instrument panel

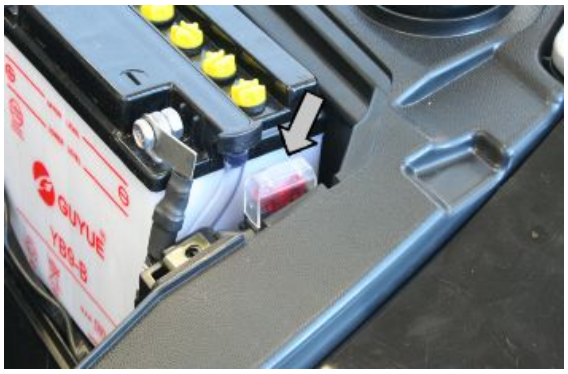
- To reach the connector, remove the front handlebar cover.

2. Battery

- To reach it, remove the appropriate cover placed under the saddle.

3. Main fuse

- Remove the battery cover to reach it.

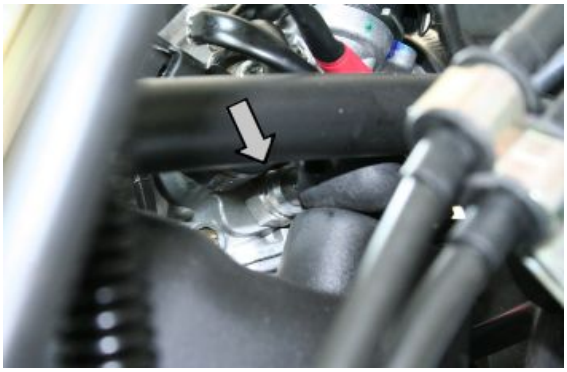


4. Starter motor

- Remove the helmet compartment to reach it.

5. Temperature sensor

- Remove the helmet compartment to reach it.



6. Voltage regulator

- Remove the rear central cover to reach it.

Characteristic

Battery recharging voltage:

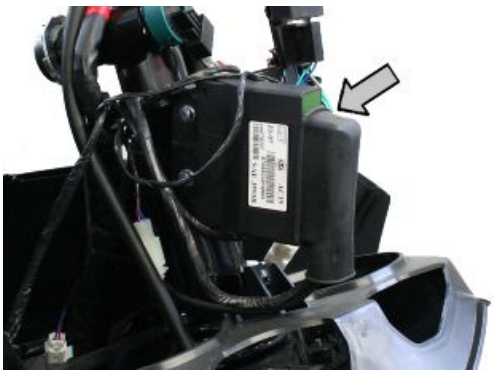
13 ÷ 14.5 V at 4000 rpm

7. Auxiliary fuses

- To reach them, open the front glove compartment.

8. Control unit

- To reach it, remove the legshield.



9. Key switch

- To reach it, remove the legshield.

10. Throttle valve position sensor

- To reach it, remove the inspection compartment placed in the helmet compartment.

11. Turn indicators

- To reach them, remove the legshield.

12. Horn

- Remove the shield back plate to reach it.

13. Coil

- Remove the rear central cover to reach it.

Characteristic

Coil primary resistance value:

~ 0.5 Ω

Coil secondary resistance value:

3000 ± 300 Ω

14. Pick-Up/Current generator/Oil pressure sensor

- The connector is placed under the vehicle right fairing.

Characteristic

Pick-up resistance value:

~ 130 Ω

Generator phases resistance values:

1 ± 1 Ω

Generated current:

13A at 6000 rpm

15. Automatic starter

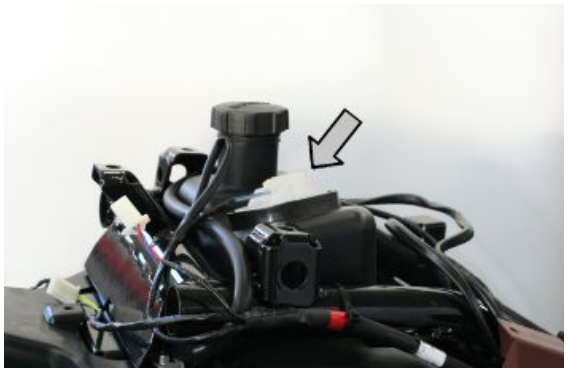
- To reach the connector, remove the right side fairing.

16. Start-up remote control switch

- Remove the right side fairing to reach it.

17. Fuel level probe

- Placed on the fuel tank.



Characteristic

Resistance value with empty tank

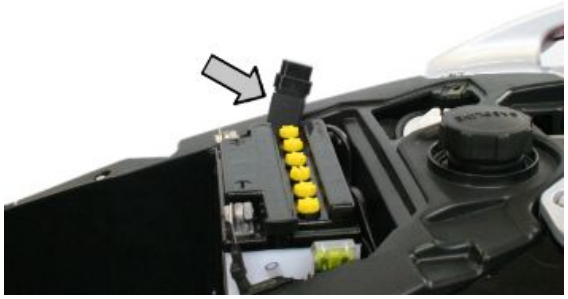
~ 101 Ω

Resistance value with full tank

~ 7.4 Ω

18. Diagnostics socket

- Remove the battery cover to reach it.



Ground points

Ground point on chassis

- Remove the rear central cover to reach it.

Ground point on engine

- Remove the helmet compartment to reach it.

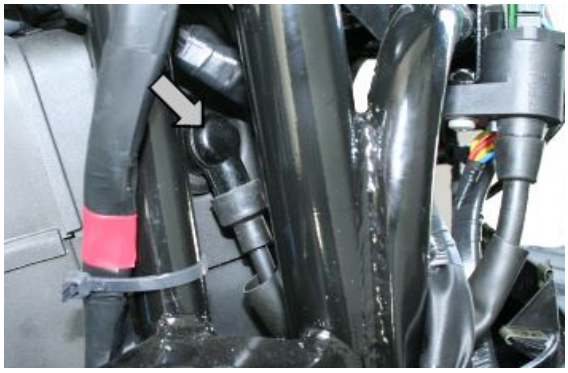
Checks and inspections

Ignition circuit

CAUTION

THE CONTINUITY TEST SHOULD BE PERFORMED WITH THE RELATIVE CONNECTORS DISCONNECTED.

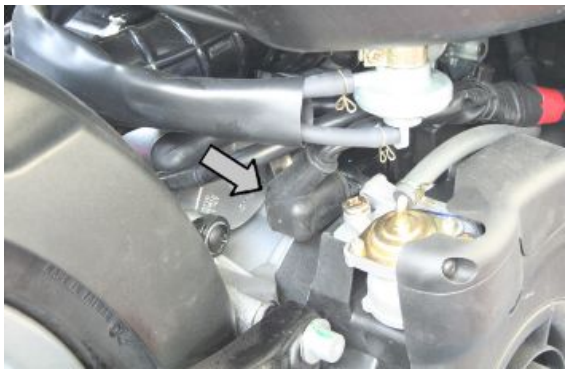
Check spark plug for correct conditions, clean it and remove deposits. Replace it, if necessary.



Pick-Up Check

- With engine off disconnect the control unit connector.
- Measure the resistance present between terminals No. 10 (Blue-Yellow cable) and No. 12 (Blue cable).
- If the value measured is incorrect, repeat the check directly on the component.

- Disconnect the Pick-Up connector and measure the resistance between the pin corresponding to the Blue-Yellow cable of the wiring and the ground connection on the engine.
- If the value measured is correct, check wiring continuity.



Characteristic

Pick-up resistance value:

~ 130 Ω

Coil primary check:

- Disconnect the connector of the control unit.
- Measure the resistance present between terminals No. 4 (White-Purple cable) and No. 12 (Blue cable).
- If the measured value is incorrect, repeat the check between the positive and negative terminals of the coil.
- If a correct value is measured, check wiring continuity.

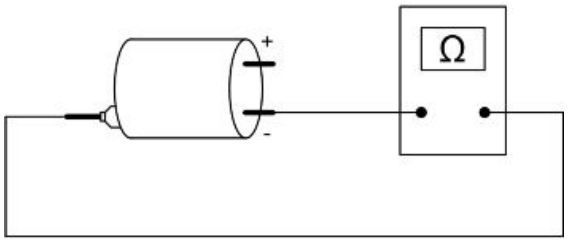
Characteristic

Coil primary resistance value:

~ 0.5 Ω

Coil secondary check

- Disconnect the spark plug cap from the coil cable and measure the resistance between the cable end and the coil negative terminal.



Characteristic

Coil secondary resistance value:

3000 ± 300 Ω

Battery recharge circuit

With engine running at high revs, measure the voltage present at the battery poles.

Characteristic

Battery recharging voltage:

13 ÷ 14.5 V at 4000 rpm

Stator check

- Disconnect the connector from the voltage regulator and check if there is continuity between a yellow cable and the other two cables.
- Check that all yellow cables are insulated from the ground connection.

Characteristic

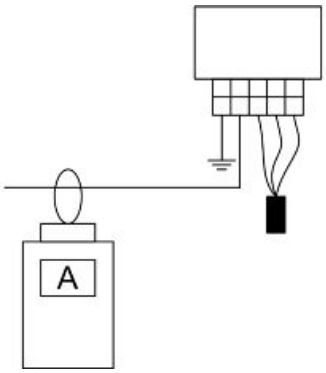
Generator phases resistance values:

1 ± 1 Ω

- If non-conforming values are measured, repeat the checks directly on the stator. If a correct value is measured, check wiring continuity.

Recharge system voltage check

- Connect the ammeter induction clamp to the voltage regulator positive terminal (Red-Orange).
- Measure the battery voltage and turning on the vehicle lights, with engine off, wait for the voltage to set at about 12 V.
- Start the engine and measure the current generated by the system with lights on and a high running engine.



Characteristic

Generated current:

13A at 6000 rpm

Start up system check

CAUTION

THE CONTINUITY TEST SHOULD BE PERFORMED WITH THE RELATIVE CONNECTORS DISCONNECTED.

- Check continuity of the Green-Red cable between the 7.5A fuse B and stop buttons.
- Check the stop buttons contacts.
- Check continuity between the starter button Green-Red cable and the stop button Green-Yellow cables.
- Check the starter button contacts.
- Check continuity between the Yellow-Red cable between the starter button and the start-up remote control switch.
- Check the start-up remote control switch.
- Check continuity of the Red cable between remote control and the battery and between the remote control and the starter motor.
- Check that the starter motor is earthed.

Horn control

CAUTION

THE CONTINUITY TEST SHOULD BE PERFORMED WITH THE RELATIVE CONNECTORS DISCONNECTED.

- Check continuity of the Green cable which connects the horn button to 15A fuse C .
- Check that the horn switch works properly.
- Check continuity of the Grey cable which connects the switch to the horn.

Turn signals system check

CAUTION

THE CONTINUITY TEST SHOULD BE PERFORMED WITH THE RELATIVE CONNECTORS DISCONNECTED.

- Check that bulb operates properly.
- Check continuity of the Green cable which connects turn indicators to the 15A fuse C .
- With key switch set to «ON» check if there is intermittent voltage between the Blue-Black cable and the turn indicators blinker Blue cable.
- Check continuity of the Blue-Black cable between the turn indicators blinker and the turn indicators switch.
- Check that the turn indicator switch works properly.
- Check continuity of the Red and Blue cables which connect the switch to the bulbs.

level indicators

CAUTION

THE CONTINUITY TEST SHOULD BE PERFORMED WITH THE RELATIVE CONNECTORS DISCONNECTED.

- Check continuity of the Green cable which connects the instrument panel to the 15A fuse C.
- Check continuity of the Grey-Green cable which connects the instrument panel to the probe checking fuel level.
- Measure resistance present between the Grey-Green cable and the Blue cable of the fuel level probe by moving the arm with the float to different positions.
- If the values measured are correct but the instrument panel value displayed is incorrect, check wiring continuity.

Characteristic

Resistance value with empty tank

~ 101 Ω

Resistance value with full tank

~ 7.4 Ω

Lights list

BULBS AND WARNING LIGHTS

	Specification	Desc./Quantity
1	Low-beam bulb	12 V - 35 W (Halogen) H8
2	High-beam bulb	12 V - 35 W (Halogen) H8
3	Tail light bulb	12V - 3W
4	Front turn indicator bulbs	12 V - 21 W (Halogen) H21W
5	Rear turn indicator bulbs	12V - 16W
6	Rear position light /stop light bulb	12V - 5/21W
7	License plate light bulb	12V - 5W
8	Instrument panel light bulbs	12V - 1.2W
9	Oil pressure warning light	12V - 1.2W
10	Turn indicator warning light	12V - 1.2W
11	High-beam warning light	12V - 1.2W

CAUTION

THE CONTINUITY TEST SHOULD BE PERFORMED WITH THE RELATIVE CONNECTORS DISCONNECTED.

Check tail lights and panel lightning

- Check that bulb operates properly.
- Check continuity between the Green cable of 15A fuse C and the Yellow cables of the tail lights bulbs.
- Also check continuity of the Green cable of the instrument panel connector.

- High/low-beam light check
- Check that bulb operates properly.
- Check continuity of the Green cable between 15A fuse C and light switch.
- Check that the light switch operate properly.
- Check continuity of the Black cable between the light switch and the low-beam bulb.
- Check continuity of the White cable between the light switch and the high-beam bulb.

Fuses

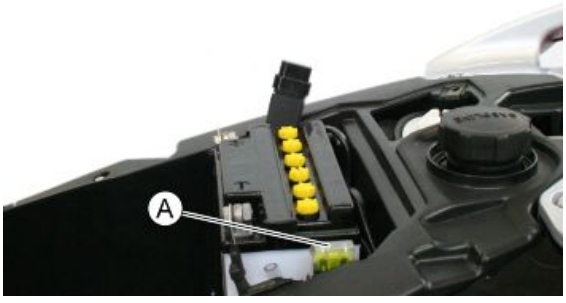
CAUTION

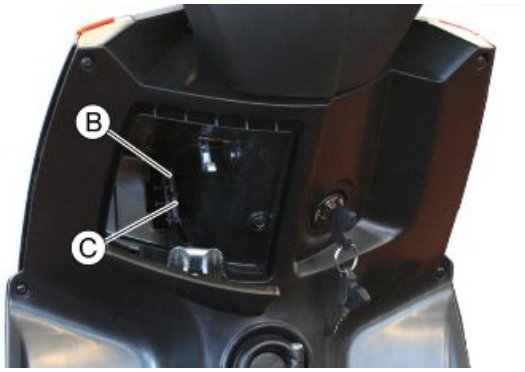
DO NOT REPAIR FAULTY FUSES.
USE RECOMMENDED FUSES ONLY. USING FUSES OF UNSUITABLE CAPACITY MAY SERIOUSLY DAMAGE THE ELECTRICAL SYSTEM OR CAUSE A SHORT CIRCUIT, WHICH MAY TOTALLY DESTROY YOUR SCOOTER AS WELL AS INJURE YOU.

The vehicle has one fuse located in the battery compartment and two fuses located in the front glove compartment.

FUSE CHART

	Specification	Desc./Quantity
1	Fuse A	**Capacity:** 20 A **Protected circuits:** Recharge circuit, oil pressure sensor, oil pressure warning light .
2	Fuse B	**Capacity:** 7.5 A **Protected circuits:** Start-up circuit, starter motor, stop light bulb, ECU power supply.
3	Fuse C	**Capacity:** 15 A **Protected circuits:** Rear light bulb, license plate light bulb, turn indicator bulb, turn indicator warning light, fuel gauge, instrument panel lighting bulb, horn, low-beam bulb, high-beam bulb, high-beam warning light.





Sealed battery

Commissioning sealed batteries

If the scooter is provided with a sealed battery, the only maintenance required is to check if it is charged and to recharge it, if necessary. These operations should be carried out before delivering the vehicle, and on a six-month basis while the vehicle is stored in open circuit. Besides upon pre-delivery, it is therefore necessary to check the battery charge and recharge it, if required, before storing the scooter and afterwards every 6 months.

INSTRUCTIONS FOR BATTERY REFRESH AFTER OPEN CIRCUIT STORAGE

1. **Voltage check**
2.
   - Before installing the battery on the vehicle, check the open circuit voltage with a standard tester.
   - If voltage is over 12.60V, the battery can be installed without any refresh.
   - If voltage is below 12.60 V, a renewal recharge is required as explained in 2).
3. **Constant-voltage battery charge mode**
4.
   - Constant voltage charge equal to 14.40÷14.70V
   - Initial charge current equal to 0.3÷0.5 of the battery rated capacity
   - Charge time:
   - 10 to 12 h recommended Minimum 6 h Maximum 24 h
5. **Constant-current battery charge mode**
6.
   - Charge current equal to 1/10 of the battery rated capacity

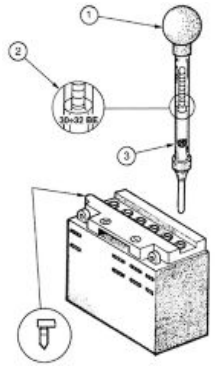
Dry-charge battery

WARNING

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

IF ACCIDENTALLY SWALLOWED, IMMEDIATELY DRINK LARGE QUANTITIES OF WATER OR MILK, FOLLOWED BY MAGNESIUM MILK, BEATEN EGG OR VEGETABLE OIL. SEEK MEDICAL ATTENTION IMMEDIATELY.
BATTERIES PRODUCE EXPLOSIVE GASES; KEEP CLEAR OF NAKED FLAMES, SPARKS OR CIGARETTES; VENTILATE THE AREA WHEN RECHARGING INDOORS.
ALWAYS WEAR EYE PROTECTION WHEN WORKING IN THE PROXIMITY OF BATTERIES.
KEEP OUT OF THE REACH OF CHILDREN

- Remove the short closed tube and the caps, then pour sulphuric acid into the cells, using the type specified for batteries, with a specific gravity of 1.26, corresponding to 30° Bé, at a minimum temperature of 15°C until the upper level is reached.
- Leave to rest for at least 2 hours, then restore the level with sulphuric acid.
- Within the following 24 hours, recharge with the specific battery charger at a density of about 1/10 of the battery nominal capacity and until the acid density is about 1.27, corresponding to 31º Bé, and these values are stabilised.
- Once the charge is complete, level the acid (by adding distilled water). Close and clean carefully.
- Once the above operations have been performed, install the battery on the vehicle ensuring that it is connected properly.



1 Hold the tube upright

2 Inspect visually

3 The float must be freed

Electrolyte level check

The electrolyte level must be checked frequently and must reach the upper level. Only use distilled water to restore this level. If it is necessary to add water too frequently, check the vehicle electrical system: the battery works overcharged and is subject to quick wear.

Charge status check

After topping-up the electrolyte level, check its density using an appropriate densitometer.

With the battery charged, a density of 30÷32 Bé, corresponding to a specific weight of 1.26÷1.28, must be at a minimum temperature of 15° C.

A density reading below 20° Bé indicates that the battery is completely flat and must therefore be recharged..

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

The battery runs down completely in about three months. Should the battery be fitted on a vehicle, be careful not to invert the connections, keeping in mind that the (**black**) earth wire marked (-) is connected to the - **negative** terminal whereas the other two **red** wires marked (+) are connected to the + **positive** terminal.

Battery recharge

WARNING

BEFORE RECHARGING THE BATTERY, REMOVE THE CAPS OF EACH CELL. KEEP NAKED FLAMES OR SPARKS AWAY FROM THE BATTERY WHILE CHARGING.

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

Normal bench charging must be performed using the special battery charger, setting the battery charge selector to the type of battery that requires recharging (that is, at a current equal to 1/10 of the battery rated capacity). Connections to the power supply source must be implemented by connecting corresponding poles (+ to + and - to -).

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

CAUTION

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

CAUTION

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

CAUTION

TO ENSURE MAXIMUM PERFORMANCE, THE BATTERY MUST BE CHARGED BEFORE USE. INADEQUATE CHARGING OF THE BATTERY BEFORE BEING PUT INTO OPERATION SHORTENS BATTERY LIFE.

INDEX OF TOPICS

Exhaust assy. Removal

- Rest the vehicle on its centre stand.
- Undo and remove the two screws «1» fixing the muffler to the engine.

CAUTION

BEFORE CARRYING OUT THE FOLLOWING OPERATIONS, LET THE ENGINE AND THE MUFFLER TO COOL OFF AT AMBIENT TEMPERATURE TO AVOID POTENTIAL BURNS.

Locking torques (N*m)

Nut fixing exhaust manifold to engine 15

- Undo and remove the screws «2».
- Remove the muffler.

NOTE

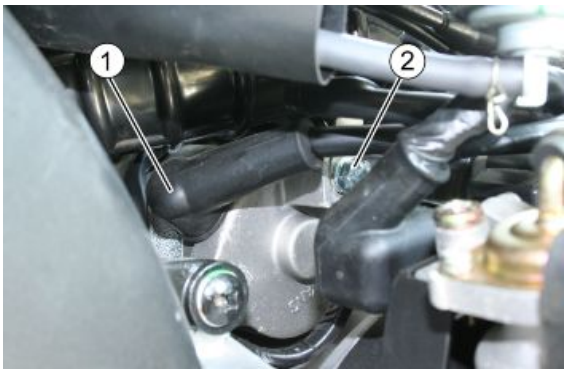
UPON REFITTING, REPLACE THE GASKET BETWEEN THE EXHAUST MANIFOLD AND THE MUFFLER WITH A NEW ONE.

Locking torques (N*m)

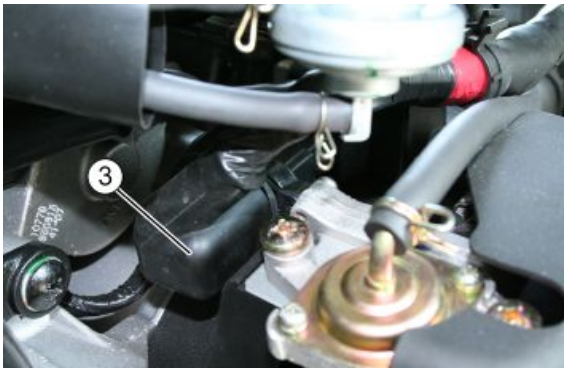
Muffler plate-engine fixing screw 25.5

Removal of the engine from the vehicle

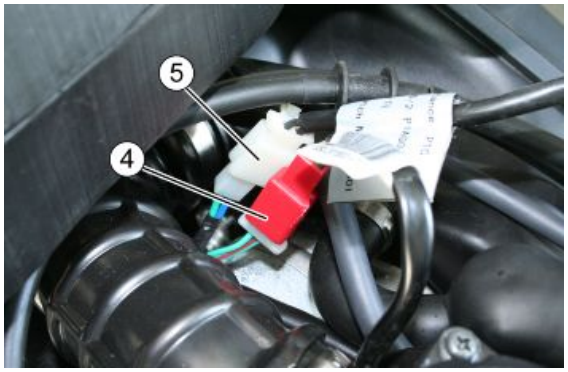
- Rest the vehicle on its centre stand.
- Remove the side fairings.
- Take out the spark plug tube.
- Disconnect the starter motor power connector «1» and the ground lead «2».



- Disconnect the generator connector «3».



- Disconnect the connector of the automatic starter «4» and the connector of the temperature sensor «5» and release the wiring.



- Remove the low-pressure pipe «6» from the cylinder head.

- Disconnect the carburettor pipe «7» from the carburettor.

- Remove the throttle grip transmission from the carburettor by acting on the appropriate set screws and release the transmission from the engine.

- Unscrew the rear brake set screw «8» and the two screws «9» and free the engine from the rear brake transmission.

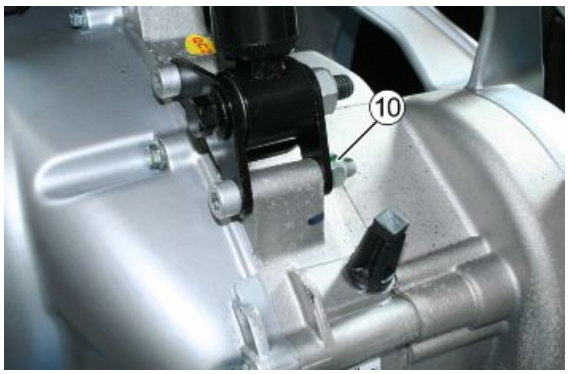
Locking torques (N*m)

Rear brake adjustment nut 5

CAUTION

SUPPORT THE SCOOTER FIRMLY.

- Undo the shock absorber lower screw «10» with washer.



Locking torques (N*m)

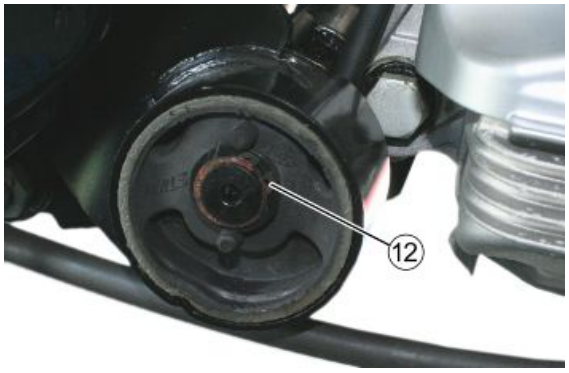
Lower part of the shock absorber retaining nut 42.5

- Undo the two screws «11»

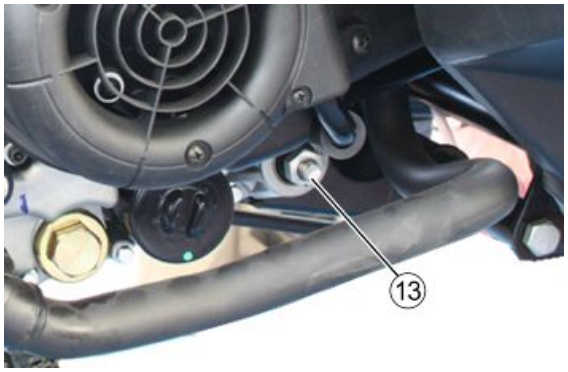
Locking torques (N*m)

Buffer plate to chassis retaining nut 40

- Remove the Seeger ring «12».
- Remove the plate.



- Undo and remove the engine-rod fulcrum nut «13».
- Operating on the chassis, lift the vehicle rear part.
- Completely slide off the engine-rod fulcrum pin.
- Slide off the engine towards the back.



Locking torques (N*m)

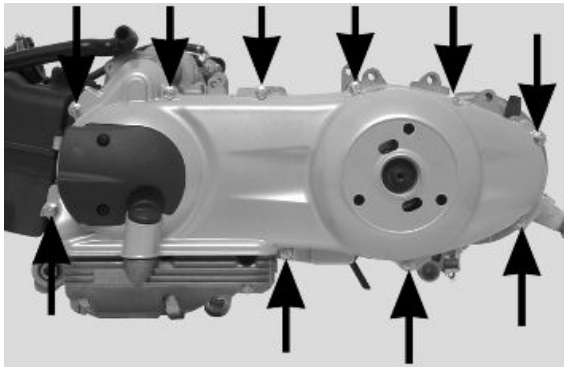
Engine-side swinging arm retaining nut **42.5**

INDEX OF TOPICS

Automatic transmission

Transmission cover

- To remove the transmission cover it is necessary to remove the rear plastic cover first by inserting a screwdriver in the corresponding slotted holes.
Using the clutch bell lock wrench, remove the driven pulley axle locking nut and recover the washer.
- Remove the cap/dipstick from the engine oil filling hole.
- Remove the 10 screws and the earth cable fastened under one of them.
- Remove the transmission cover. If this operation is performed directly on the vehicle, it is necessary to remove the cooling air coupling and the three air filter housing retainers.

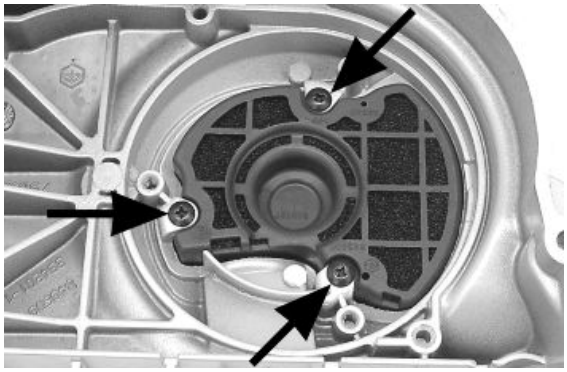


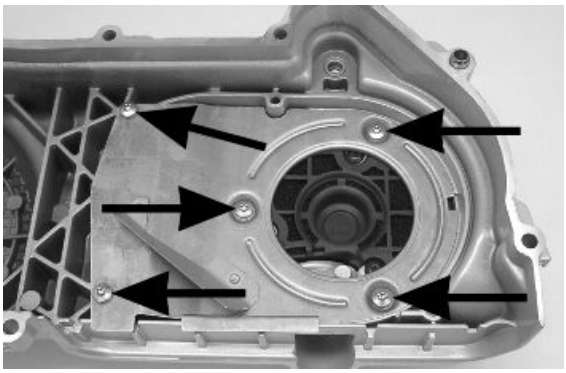
Specific tooling

020423Y Driven pulley lock wrench

Air duct

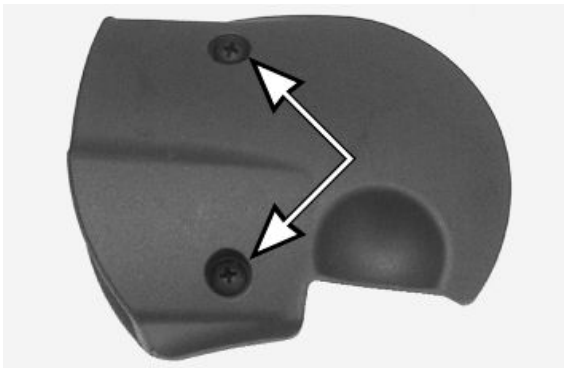
- Unscrew the Torx screws fixing the air manifold bulkhead and remove the bulkhead.
- Remove the 3 screws, then take out the manifold as well as the filter.





Air duct filter

- Unscrew the 2 fixing screws and slide off the filter.
- Clean with water and milid soap.



Removing the driven pulley shaft bearing

- Remove the clip from the inside of the cover.
- Use the specific tools to remove the bearing from the crankcase.

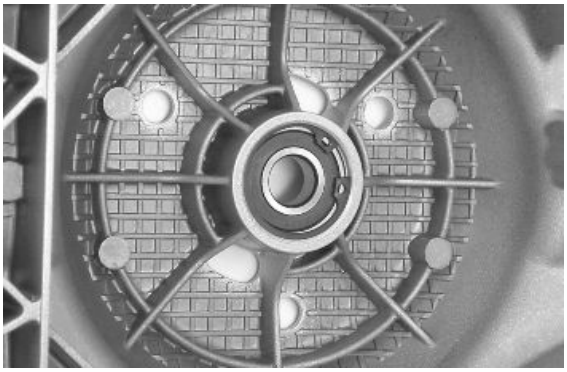
CAUTION

USE AN APPROPRIATE REST SURFACE TO AVOID DAMAGING THE COVER PAINT.

Specific tooling

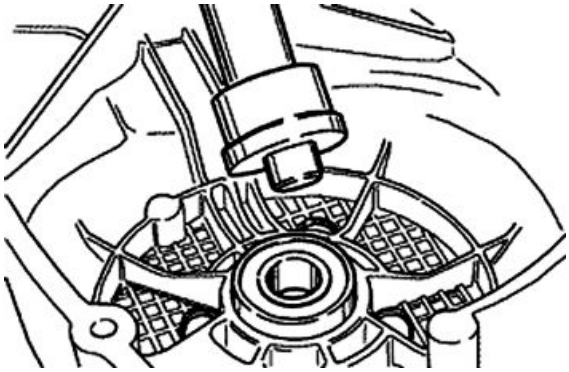
020376Y Adaptor handle

020375Y 28 x 30 mm adaptor



Refitting the driven pulley shaft bearing

- Heat up the crankcase inside with the hot air gun.
- Insert the bearing in its housing, refit the Seeger ring.



NOTE

ALWAYS REPLACE THE BEARING WITH A NEW ONE UPON REFITTING.

Specific tooling

020151Y Air heater

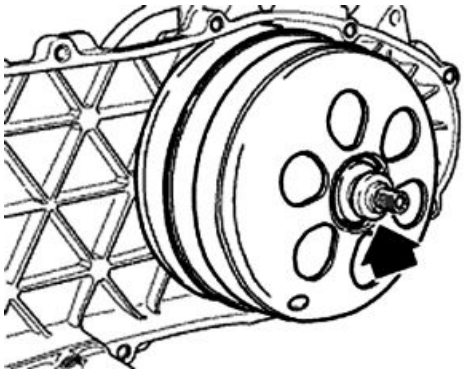
020376Y Adaptor handle

020357Y 32 x 35 mm adaptor

020412Y 15 mm guide

Removing the driven pulley

- Remove the spacer, the clutch bell and the whole driven pulley unit.



NOTE

THE UNIT CAN ALSO BE REMOVED WITH THE DRIVING PULLEY MOUNTED.

Inspecting the clutch drum

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

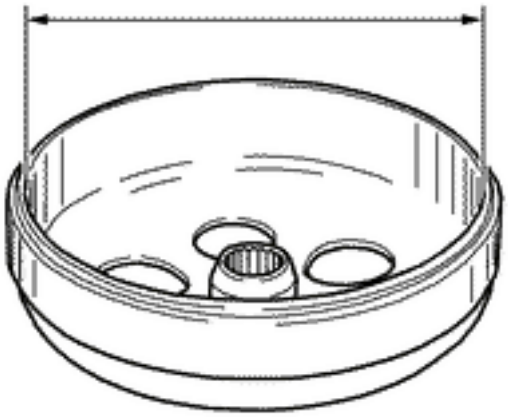
Characteristic

Max. value clutch bell

Max. value: Ø 134.5 mm

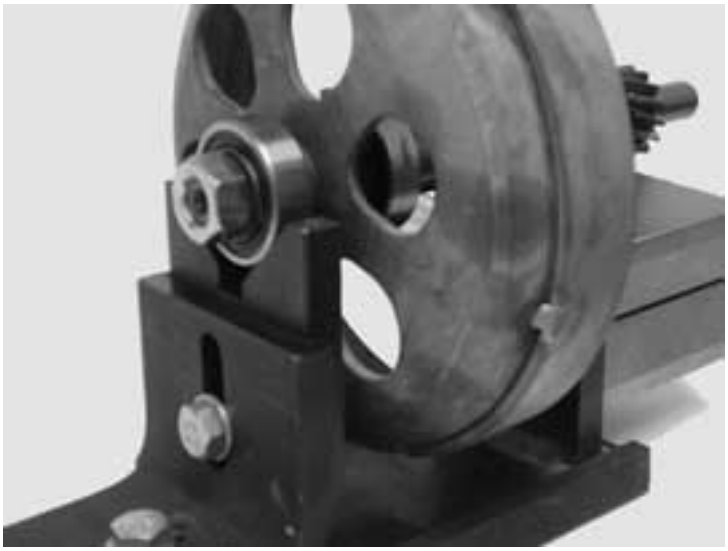
Clutch bell standard value

Standard value: Ø 134 - 134.2 mm



Checking the bell working surface eccentricity

- Install the bell on a driven pulley shaft using 2 bearings (inner 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 feeler pin gauge and the magnetic base, measure the bell eccentricity.
- Repeat the measurement in 3 positions (Central, internal, external).
- If faults are found, replace the bell.

Specific tooling

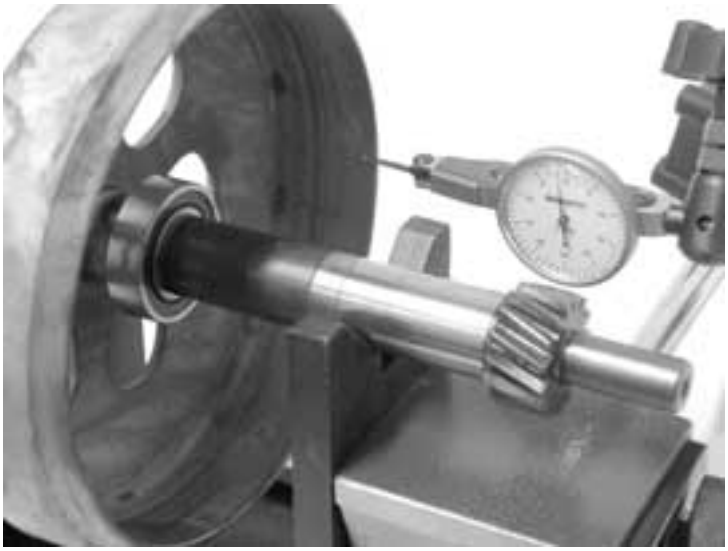
020074Y Support base for checking crankshaft alignment

020335Y Magnetic support for dial gauge

Characteristic

clutch bell inspection: 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 CONTACT 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

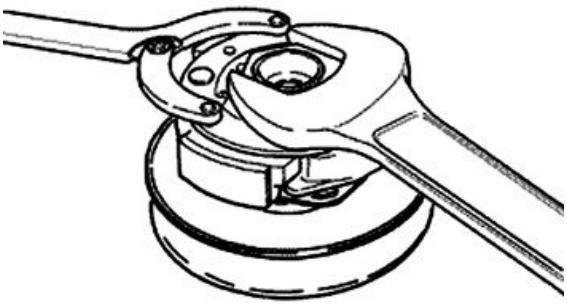
1 mm

Removing the clutch

- By means of a calliper spanner, block the clutch assembly rotation. - With a 46 mm spanner remove the clutch lock nut. - Remove the clutch and the spring.

CAUTION

UPON REMOVING THE CLUTCH ASSEMBLY LOCK NUT, PAY ATTENTION TO KEEP THE ASSEMBLY IN ITS SEAT SO THAT IT DOES NOT COME OUT DUE TO THE SPRING THRUST

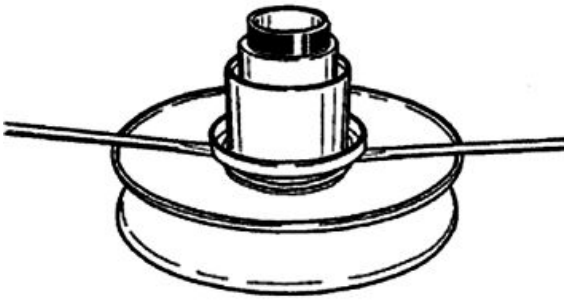


Specific tooling

020565Y Flywheel lock calliper spanner

Pin retaining collar

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

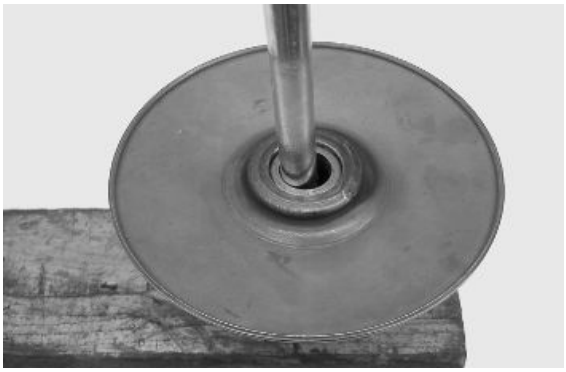


Removing the driven half-pulley bearing

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

NOTE

REST THE HALF-PULLEY ON A WOOD SURFACE TO AVOID DAMAGING THE THREADED RINGLET OF THE DRIVEN PULLEY UPON REMOVING IT.



Specific tooling

020375Y 28 x 30 mm adaptor

020376Y Adaptor handle

020439Y 17 mm guide

Inspecting the driven fixed half-pulley

- Measure the external diameter of the pulley bushing.

Characteristic

Minimum diameter permitted

Ø 40.96 mm

Standard diameter

Ø 40.965 mm

Inspecting the driven sliding half-pulley

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

Characteristic

Minimum admissible diameter

Ø 41.08 mm

Standard diameter

Ø 41.035 mm

Refitting the driven half-pulley bearing

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

NOTE

REST THE HALF-PULLEY ON A WOOD SURFACE TO AVOID DAMAGING THE THREADED RINGLET OF THE DRIVEN PULLEY UPON REMOVING IT.

Specific tooling

020424Y Driven pulley roller casing fitting punch

- To assemble the new ball bearing insert it completely down in its housing with the specific punch and finally assemble the Seeger ring.

Specific tooling

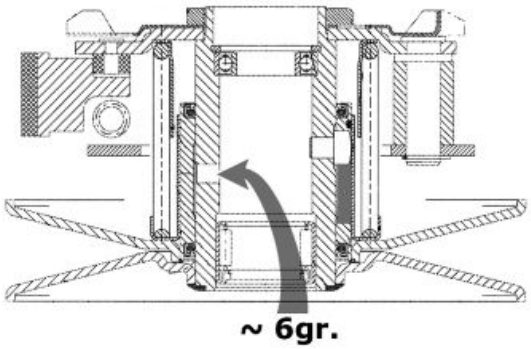
020375Y 28 x 30 mm adaptor

020376Y Adaptor handle

020439Y 17 mm guide

Refitting the driven pulley

- Check that the faying surfaces between the 2 half-pulleys and the belt do not show any signs of wear, scoring and grease.
- Insert the new oil seals and O-rings on the movable half-pulley.
- Assemble the half-pulley on the ringlet with the appropriate protection sheath.
- Make sure the pins and collar are not worn, reassemble the pins and collar.
- Use a greaser with a curved spout to lubricate the driven pulley unit with around 6 g of grease. This operation must be done through one of the holes inside the bushing until grease comes out of the opposite hole. This operation is necessary to avoid the presence of grease beyond the O-rings.



Specific tooling

020263Y Sheath for driven pulley fitting

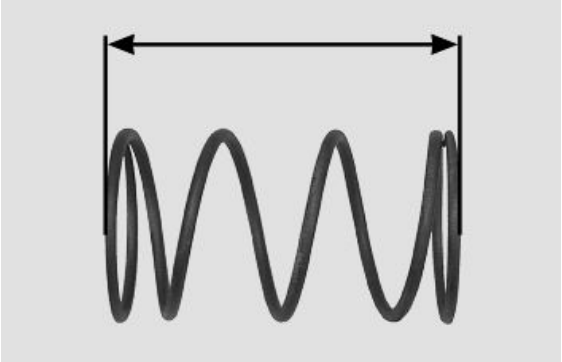
Recommended products

AGIP GREASE SM 2 Grease for the tone wheel revolving ring

Soap-based lithium grease containing NLGI 2 Molybdenum disulphide; ISO-L-XBCHB2, DIN KF2K-20

Inspecting the clutch spring

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



Characteristic

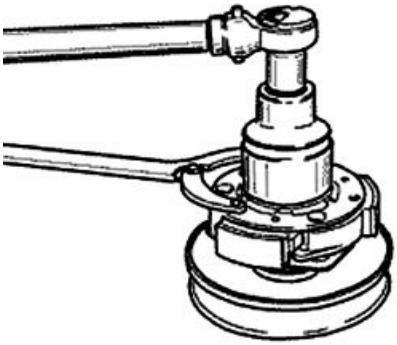
Standard length:

106 mm

Refitting the clutch

Versione 125

- Refit the clutch assembly following the removal operations but in reverse order, use the calliper spanner and lock the nut to the prescribed torque.



CAUTION

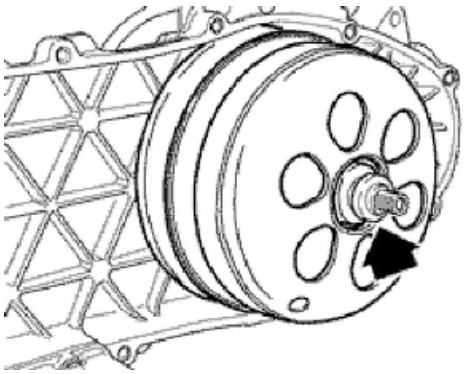
USE A BOX-SPANNER WITH SMALL CHAMFER SO AS NOT TO DAMAGE THE CLUTCH NUT. UPON FITTING THE CLUTCH ASSEMBLY LOCK NUT, MAKE SURE THE ASSEMBLY IS WELL SECURED IN IT SEAT UNTIL SOME SCREW THREADS HOLD IT IN PLACE.

Locking torques (N*m)

Locking torque **55 ÷ 60 Nm**

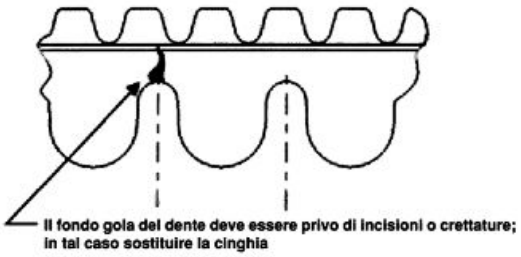
Refitting the driven pulley

- Reassemble the clutch bell and spacer.



Drive-belt

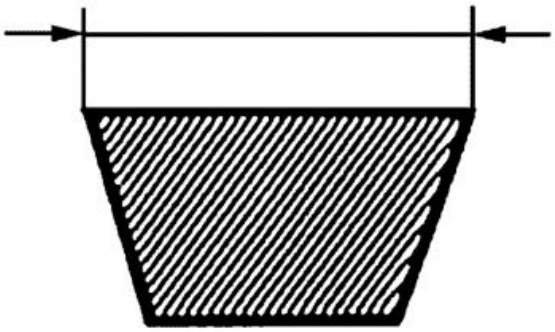
During the wear checks foreseen in the scheduled maintenance, check that the rim bottom of the toothing does not show signs of incisions or cracks (see figure): the rim bottom of the tooth must not have incisions or cracks; if it does, change the belt.



- Check that the driving belt is not damaged.
- Check the width of the belt.

BELT SIZE

Specification	Desc./Quantity
Minimum width	21.5 mm
Standard width	22.5 ± 0.2 mm

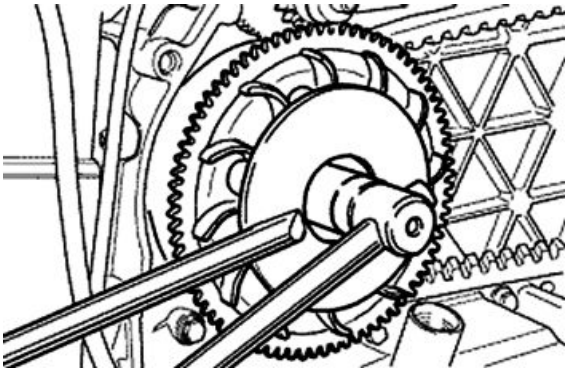


Removing the driving pulley

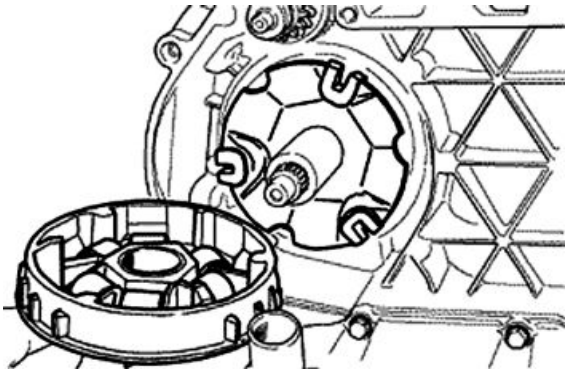
- Lock the driving pulley with the specific tool as shown in the figure. - Disassemble the central nut and the Belleville washer, remove the drive and the 2 washers. - Remove the stationary half pulley and the steel washer.

Specific tooling

020368Y driving pulley lock wrench



- Remove the belt and slide the movable half-pulley with the relevant bush, taking care of the falling free assembled rollers.
- Remove the return rollers plate with the relative guide pads.



Inspecting the rollers case

- Check that the internal bushing is not abnormally worn and measure inner diameter.

NOTE

DO NOT LUBRICATE OR CLEAN THE BUSHING.

BUSHING ROLLER CONTAINER

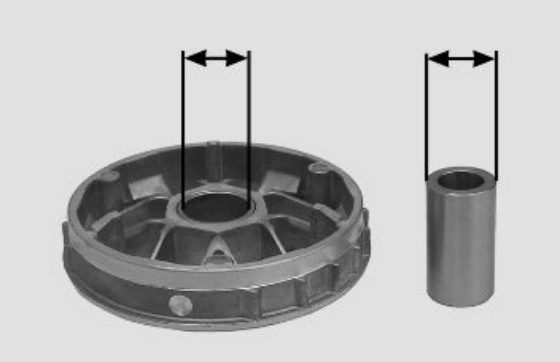
Specification	Desc./Quantity
Maximum allowable diameter	Ø 26.121 mm
Standard diameter	Ø 26+0 +0.021 mm

BUSH SLIDE PULLEY

Specification	Desc./Quantity
Minimum diameter permitted	Ø 25.950 mm
Standard diameter	Ø 26-0.020 -0.041 mm

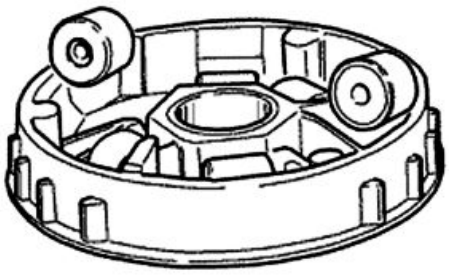
VARIABLE SPEED ROLLERS

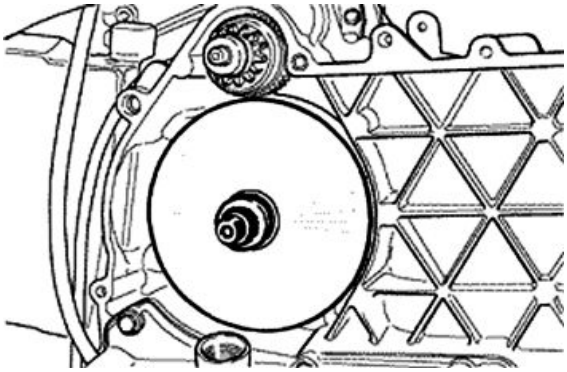
Specification	Desc./Quantity
Minimum diameter permitted	Ø 18.5 mm
Standard diameter	Ø 26±0.1 mm



- Check the guide shoes for the variator back-plate are not worn.
- Check there is no wear in the roller housing, and the surfaces in contact with the belt on either of the pulley halves.

- Pre-assemble the movable half-pulley with the roller contrast plate by placing the rollers as shown in the figure, that is, during insertion, the closed side should be on the left side of the pulley thrust.
- Mount the complete bushing unit on the driving shaft.

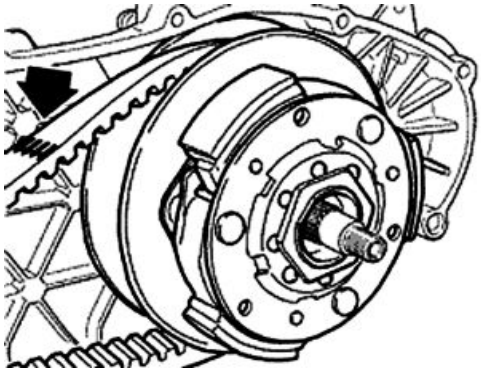




- Open the rear pulley and insert the belt observing the correct direction of rotation.

WARNING

IT IS MOST IMPORTANT THAT WHEN FITTING THE FRONT PULLEY UNIT, THE BELT IS FREE INSIDE SO AS TO AVOID A WRONG TIGHTENING OF THE DRIVING HALF-PULLEY.



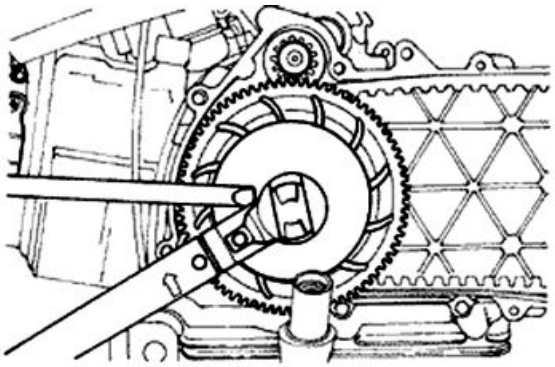
Refitting the driving pulley

- Reassemble the parts of the unit (internal lining, fixed half-pulley, external lining, drive and nut), spread threadlock on the thread and screw the nut to the prescribed torque.

-Avoid the half-pulley rotation using a calliper spanner

NOTE

REPLACE THE NUT WITH A NEW ONE AT EVERY REFIT



Specific tooling

020368Y driving pulley lock wrench

Recommended products

Loctite 243 Medium-strength threadlock

Loctite 243 medium-strength threadlock

Locking torques (N*m)

Locking torque 75 ÷ 83

Refitting the transmission cover

- Check the presence of the 2 centring dowels and the correct installation of the sealing gasket for the oil sump on the transmission cover.
- Replace the cover tightening the 10 screws at the specified torque.
- Refit the oil loading cap/bar.
- refit the steel washer and the driven pulley nut.
- Tighten the nut to the prescribed torque using the lock wrench and the torque wrench tools.
- Replace the plastic cover.

Specific tooling

020423Y Driven pulley lock wrench

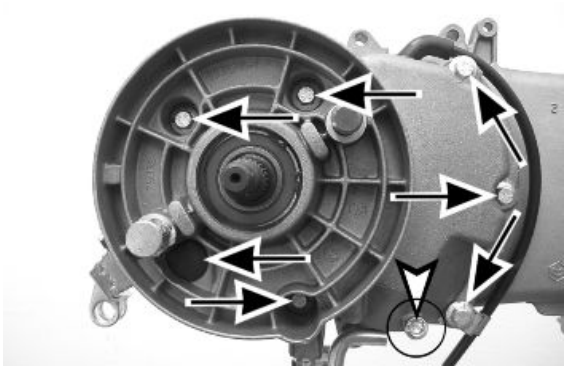
Locking torques (N*m)

Transmission cover screws 11 ÷ 13 Driven pulley shaft nut 54 ÷ 60

End gear

Removing the hub cover

- Empty the rear hub through the oil drainage tap located inside the hub cover
- Remove the brake shoe and relevant spring
- Remove the 7 flanged screws as shown in the figure.
- Remove the rubber cover and the brake pad lever sliding unscrewing the relevant retaining screw to reach the rear of the cover
- Take off the hub cover and relevant gaskets



Removing the wheel axle

Remove the intermediate gear and the complete hub cover.

Removing the hub bearings

- Check the state of the bearings being examined (wear, clearance and noisiness). If faults are detected, do the following.
- Use the specific bearing extractor to remove the three 15 mm bearings (2 in the crankcase and 1 in the hub cover).

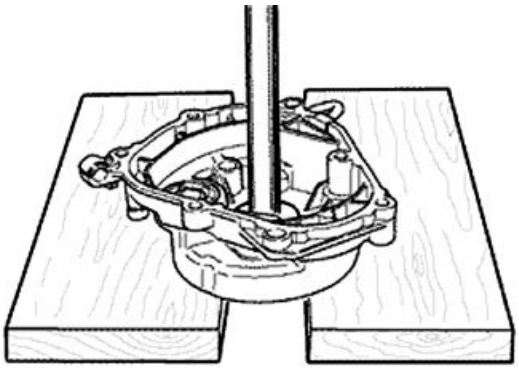
Specific tooling

001467Y009 Bell for OD 42-mm bearings

001467Y013 Calliper to extract 15-mm diameter bearings

Removing the wheel axle bearings

- Take out the clip on the outside of the gearbox cover.
- Remove the bearing with the adequate tools adequately supporting the hub cover, as shown in the figure.

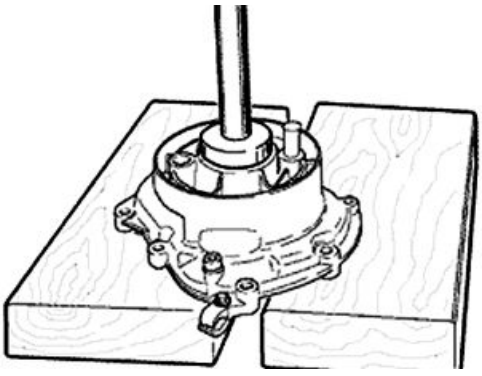


Specific tooling

020376Y Adaptor handle

020364Y 25-mm guide

With the appropriate tools, remove the oil seal as shown in the figure.



Specific tooling

020376Y Adaptor handle

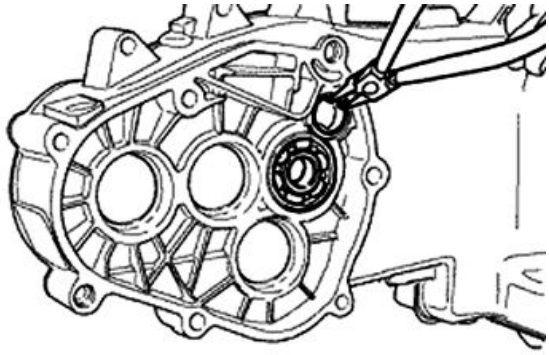
020359Y 42x47-mm adaptor

Removing the driven pulley shaft bearing

If it is necessary to remove the driven pulley shaft, from the relevant bearing and oil seal, remove driven pulley.

- Extract the driven pulley shaft from its bearing.
- Remove the oil guard using a screwdriver, working from inside the bearing and being careful not to damage the housing, make it come out of the belt transmission side.
- Remove the seeger ring shown in the figure

With the sectional punch, remove the driven pulley shaft bearing.



Specific tooling

020376Y Adaptor handle

020375Y 28 x 30 mm adaptor

020363Y 20 mm guide

See also

Inspecting the hub shaft

- Check the three shafts for wear or distortion of the toothed surfaces, the bearing housings, and the oil seal housings.
- In case of anomalies, replace the damaged components.

Inspecting the hub cover

- Check that the fitting surface is not dented or distorted. - Check the capacity of the bearings and the brake camshaft. - If faults are found, replace the hub cover.

Refitting the driven pulley shaft bearing

- Heat up the parts using the specific heat gun

Specific tooling

020150Y Air heater support

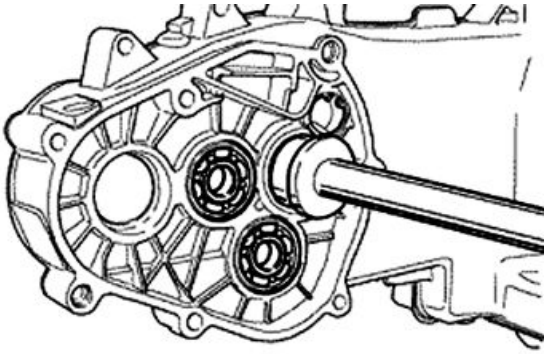
020151Y Air heater

- Reassemble the driven pulley axle bearing positioning it with ball bearing in view from the inside of the hub cover using the adequate tools

Specific tooling

020376Y Adaptor handle

- Refit the Seeger ring with the opening facing the bearing as shown in the figure and fit a new oil guard flush with the crankcase.



Refitting the wheel axle bearing

- Heat up the parts using the specific heat gun

Specific tooling

020151Y Air heater

020150Y Air heater support

-The wheel axle bearing on the cover, should be assembled with the specific tools

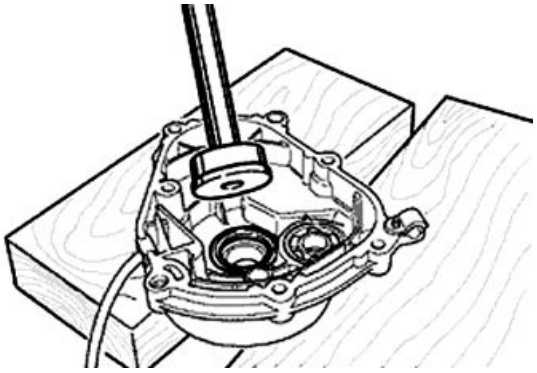
Specific tooling

020364Y 25-mm guide

020360Y Adaptor 52 x 55 mm

020376Y Adaptor handle

- Assemble the Seeger ring.
- Assemble the oil seal flush with the internal surface as shown in the figure to the hub using the adequate tools and with the seal lip towards the inside of the hub.



Specific tooling

020376Y Adaptor handle

020360Y Adaptor 52 x 55 mm

Refitting the hub cover bearings

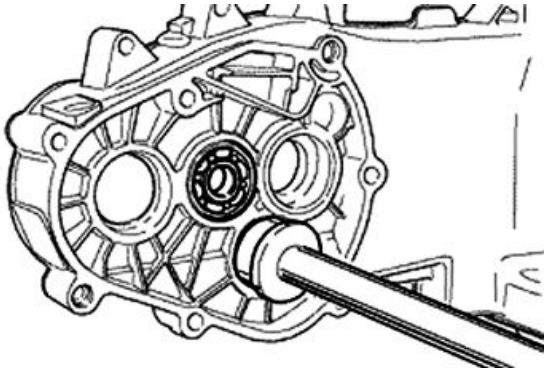
- For the fitting of the hub box bearings the engine crankcase and the cover must be heated with the specific heat gun.

Specific tooling

020150Y Air heater support

020151Y Air heater

- The three 15 mm bearings must be fitted using the appropriate tools.

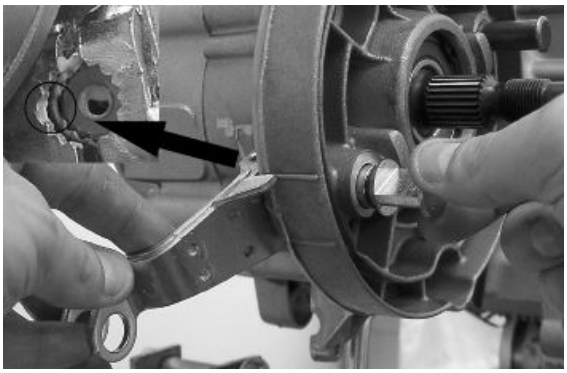


Refitting the hub bearings

- Insert the cover prepared in the crankcase taking care of inserting the gear of the pulley shaft on the intermediary gear.

Refitting the ub cover

- Fit a new gasket together with the centring dowels.
- Fit the gearbox cover, making sure the breather pipe is in the correct position.
- Screw the 7 screws to the specified torque, positioning the support plate of the pipe in the position shown in the figure.
- Remove the control pin of the shoe taking care so as the long tooth coincides with the groove on the control lever.



Locking torques (N*m)

Locking torque **24 ÷ 27**

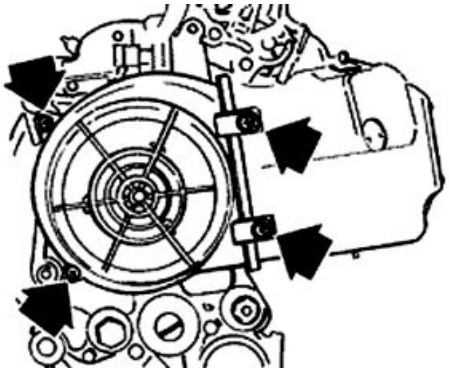
Flywheel cover

Cooling hood

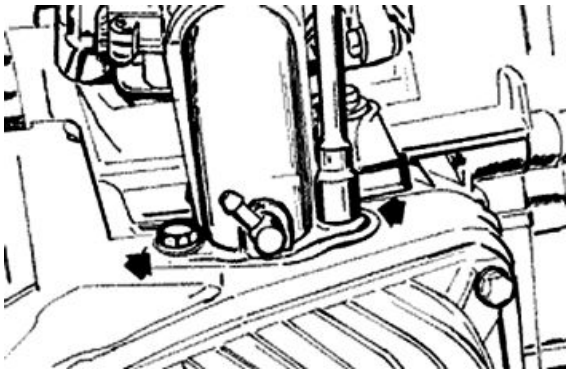
-Remove the housing acting on the 4 retaining screws.

CAUTION

DURING REMOVAL SLIDE THE HOUSING CONNECTOR ON THE HOUSING.



- Loosen the clamp and remove the carburettor from the manifold.
-Remove the complete manifold acting on the 2 retainers as shown in the figure.
- Remove the 2 self threading screws, left and right and the lateral base retaining screw on the crank-case base.
- Take off the housings.
- Remove the gasket seal of the housing on the head.



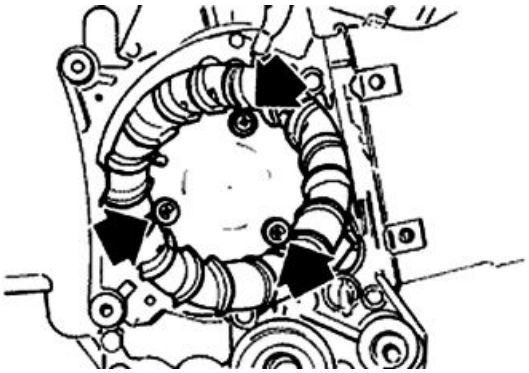
NOTE

IF THE FLYWHEEL HOUSING IS NOT REMOVED, IT IS ALSO NECESSARY TO REMOVE THE TWO KNOB SCREWS.

On the vehicles equipped with the engines mentioned if they are losing a full circle at full gas, we suggest to intervene on the vacuum socket inserting on the inlet manifold widening the hole from 0.4 mm to 1.5 mm. Remember that such operation must have performed on a disassembled manifold which must be cleaned afterwards.

Cooling fan

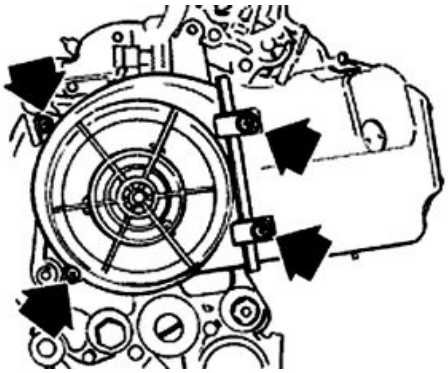
- Remove the cooling fan by acting on the three fixings indicated in the figure.



- Refit the parts in reverse order of the removal operation.
- Make sure that there are spacers with the two rear retainers of the housing.
- The long spacers should be in a high position.

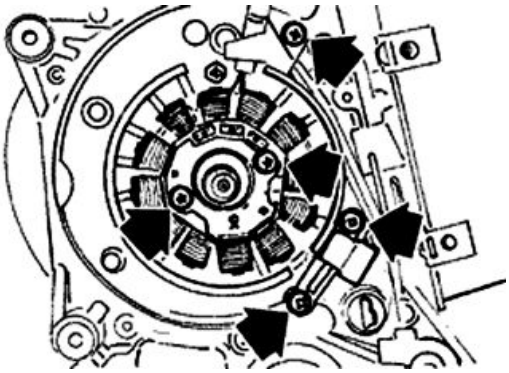
CAUTION

TAKE CARE TO CORRECTLY POSITION THE FLYWHEEL CONNECTOR.



Removing the stator

- Remove the electric terminal of the minimum oil pressure switch.
- Remove the two Pick-Up screws and the one for the wiring harness bracket as well as the two stator fixing screws shown in the figure.
- Remove the stator and its wiring.



Refitting the stator

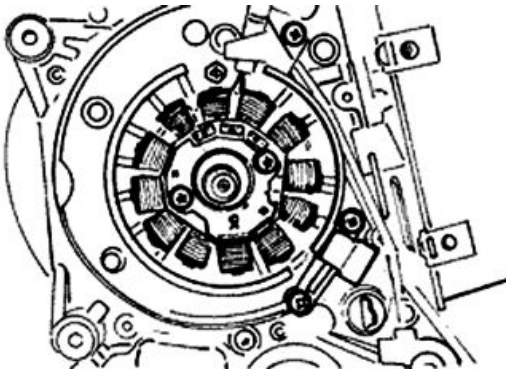
- Refit the stator and flywheel carrying out the removal procedure in reverse, tightening the retainers to the specified torque.
- Place the cable harness as shown in the figure.

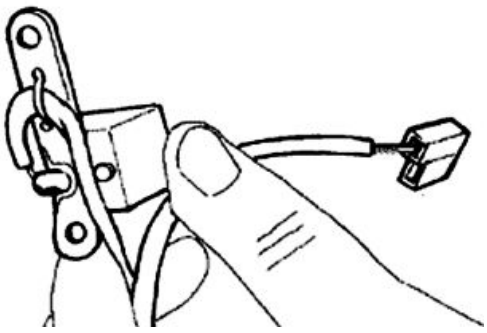
NOTE

THE PICK-UP WIRE SHOULD BE POSITIONED BETWEEN THE UPPER SCREW AND THE REFERENCE PIN AS SHOWN IN THE DETAIL DRAWING.

Locking torques (N*m)

Stator screw 3 ÷ 4

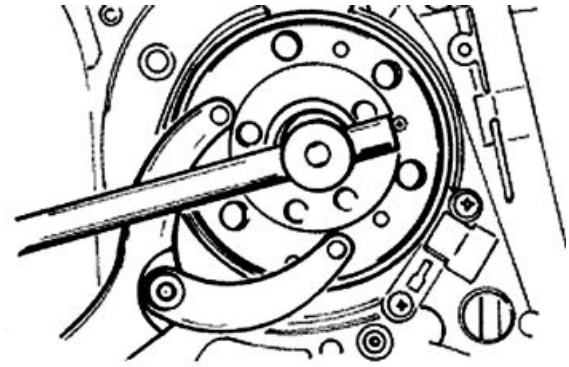




Flywheel and starting

Removing the flywheel magneto

- Lock the rotation of the flywheel using the calliper spanner.
- Remove the nut.



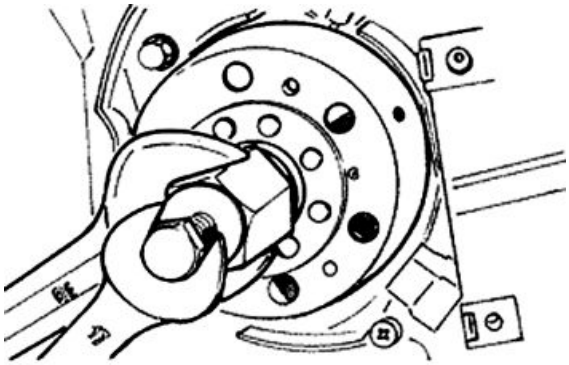
CAUTION

THE USE OF A CALLIPER SPANNER OTHER THAN THE ONE SUPPLIED COULD DAMAGE THE STATOR COILS

Specific tooling

020565Y Flywheel lock calliper spanner

- Extract the flywheel with the extractor.



Specific tooling

008564Y Flywheel extractor

Inspecting the flywheel components

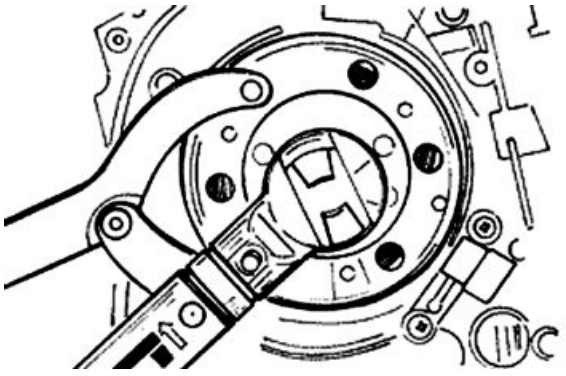
- Check the integrity of the internal plastic parts of the flywheel and the Pick-Up control plate.

Refitting the flywheel magneto

- Fit the flywheel being careful to insert the key properly.
- Lock the flywheel nut to the prescribed torque
- Check that the Pick-Up air gap is between 0.34 ÷ 0.76 mm.

The air gap cannot be modified when assembling the Pick-Up.

Different values result from deformations visible on the Pick-Up support.

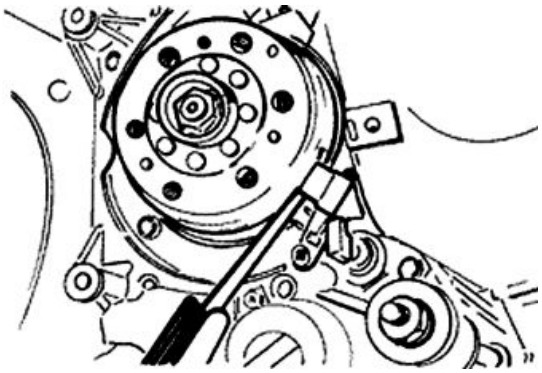


NOTE

A VARIATION IN THE AIR GAP DISTANCE MODIFIES THE IGNITION SYSTEM IDLE SPEED

Locking torques (N*m)

Flywheel nut **52 ÷ 58**

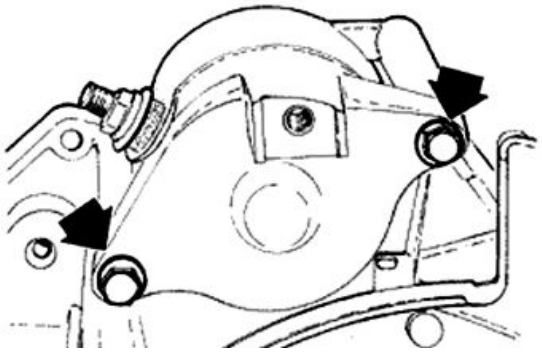


Refitting the starter motor

- Fit a new O-ring on the starter and lubricate it.
- Fit the starter on the crankcase, locking the two screws to the prescribed torque.

NOTE

REFIT THE REMAINING PARTS AS DESCRIBED IN THE CYLINDER HEAD, TIMING, LUBRICATION, FLYWHEEL AND TRANSMISSION CHAPTERS.



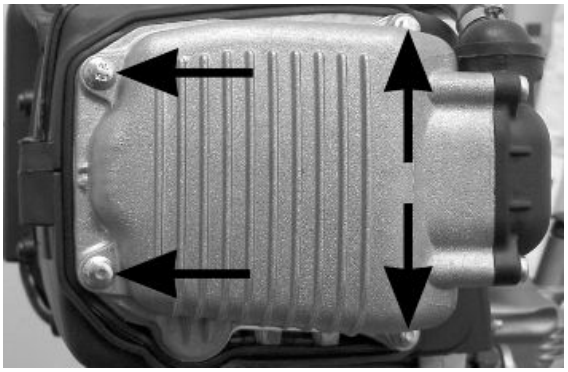
Locking torques (N*m)

Starter motor screws **11 ÷ 13**

Cylinder assy. and timing system

Removing the timing system drive

- Remove the parts listed below first: transmission cover, belt driving pulley, oil pump pulley cover and pinion separator washer.
- Remove the tappet cover.
- Remove the central screw fastener and the automatic valve-lifter retaining cover, as shown in the figure.
- Remove the return spring of the automatic valve lifter assembly and the automatic valve lifter assembly and its end of stroke washer.
- Loosen the central screw on the tensioner first.
- Remove the two fixings shown in the figure.
- Remove the tensioner with its gasket.



- Remove the internal hex screw and the counter-weight shown in the figure.
- Remove the camshaft command pulley and its washer.
- Remove the command sprocket wheel and the timing chain.
- Remove the screws indicated in the figure, the spacer bar and the tensioner pad.

The chain tensioning pad must be removed from the transmission side. As regards the lower chain guide pad, it may only be removed after the head has been removed.

NOTE

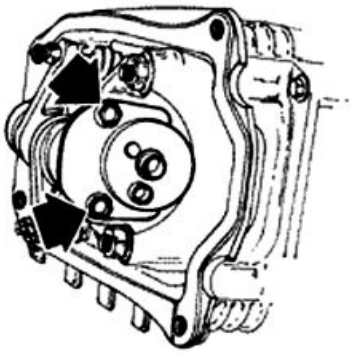
IT IS ADVISABLE TO MARK THE CHAIN IN ORDER TO ENSURE THAT THE INITIAL DIRECTION OF ROTATION IS MAINTAINED.

See also

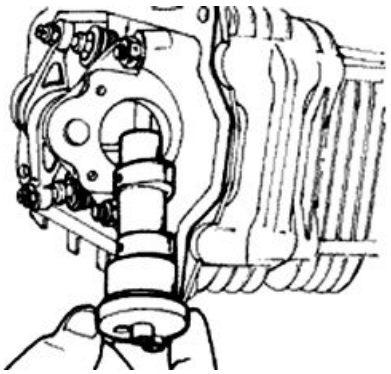
Electric fan

Removing the cam shaft

- Remove the two screws and the cam shaft retainer shown in the diagram.



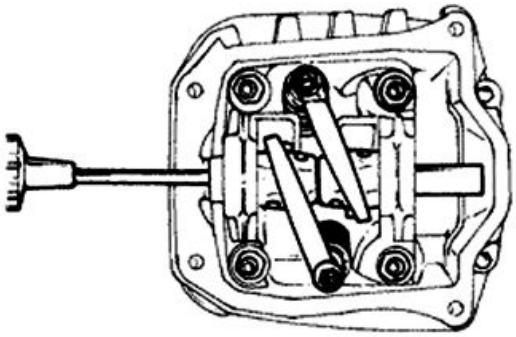
- Remove the cam shaft.



- Remove the pin of the rocking levers from the flywheel side holes.
- Remove the rocking levers and the elastic washer.

NOTE

MARK THE ROCKING LEVERS ASSEMBLE POSITION, SO AS TO AVOID THE INVERSION OF INLET WITH THE OUTLET.

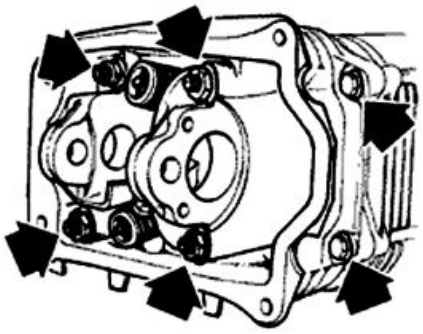


Removing the cylinder head

- Remove the spark plug.
- Remove the 2 side fixings shown in the figure.
- Loosen the 4 head-cylinder fastening nuts in two or three stages and in criss-cross fashion.
- Remove the head, the two centring dowels and the gasket.

NOTE

IN CASE OF NEED, THE HEAD MAY BE REMOVED WITH THE CAMSHAFT, PINS, ROCKING LEVERS AND FIXING BRACKET. THE HEAD CAN ALSO BE REMOVED WITHOUT REMOVING THE CHAIN AND THE DRIVING SHAFT CHAIN TIGHTENER.



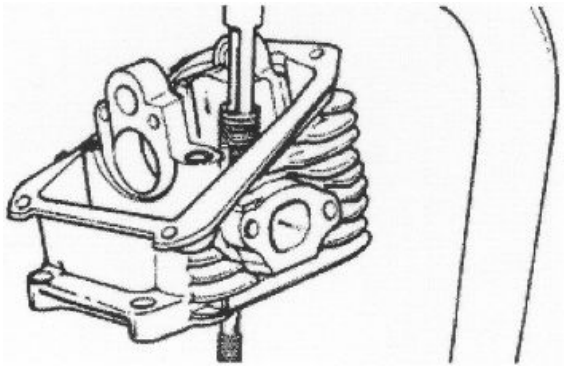
Removing the valves

- Using the specific tool fitted with the element shown in the figure, remove the cotters, the plates and the spring between the valves.

Specific tooling

020382Y Tool for removing valve cotters fitted with part 012

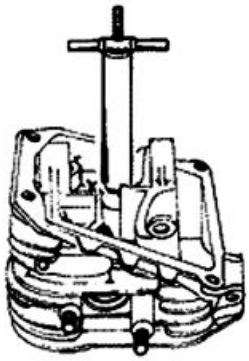
020382Y011 adapter for valve removal tool



- Remove the oil seals with the appropriate tool.
- Remove the lower spring supports.

Specific tooling

020431Y Valve oil seal extractor

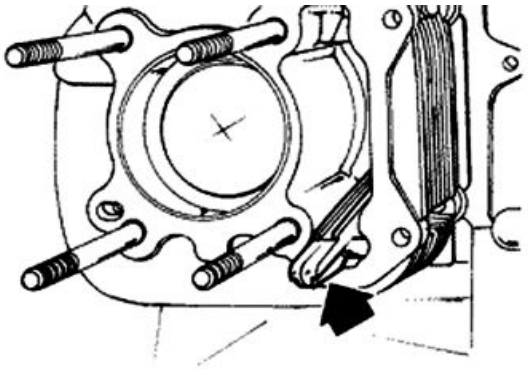


Removing the cylinder - piston assy.

- Remove the chain guide pad.
- Remove the cylinder base gasket.

CAUTION

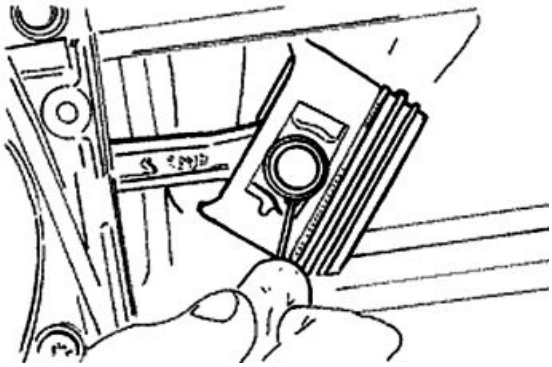
TO AVOID DAMAGING THE PISTON, SUPPORT IT WHILE REMOVING THE CYLINDER.



- Remove the two stop rings, the wrist pin and the piston.
- Remove the 3 piston rings from the piston.

NOTE

BE CAREFUL NOT TO DAMAGE THE PISTON RINGS DURING REMOVAL.



Inspecting the small end

- Measure the internal diameter of the small end using an internal micrometer.

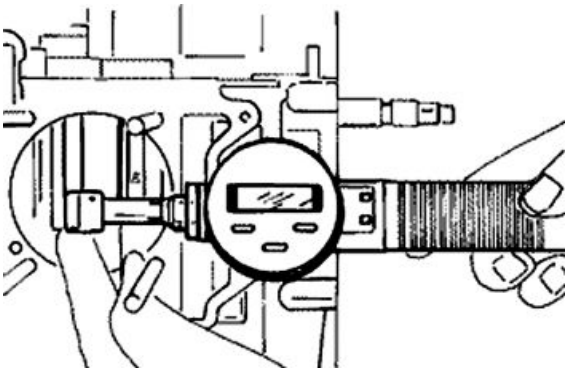
NOTE

IF THE DIAMETER OF THE 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

Rod small end check-up: Maximum diameter

15.030 mm

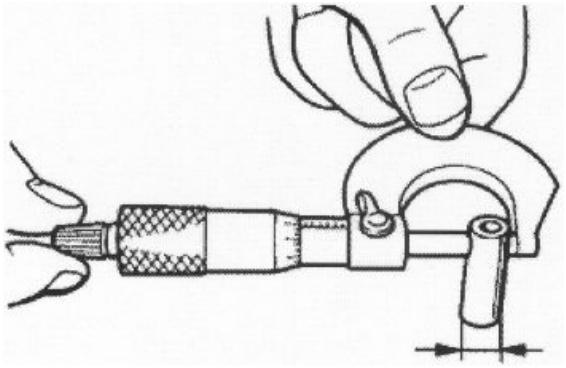


Rod small end check-up: Standard diameter

15 +0.015+0.025 mm

Inspecting the wrist pin

- Check the outer diameter of the gudgeon pin.



Characteristic

Standard pin diameter

14.996 ÷ 15 mm

Minimum diameter permitted

Ø 14.994 mm

- Calculate the piston pin coupling clearance.

NOTE

THE PIN HOUSINGS HAVE 2 LUBRICATION CHANNELS. FOR THIS REASON MEASUREMENT OF THE DIAMETER MUST BE CARRIED OUT ACCORDING TO THE AXIS OF THE PISTON.

Characteristic

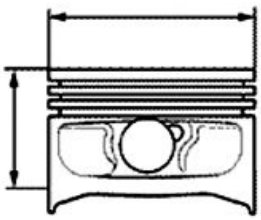
Piston pin bore - standard diameter

Ø 15+0.001 +0.006

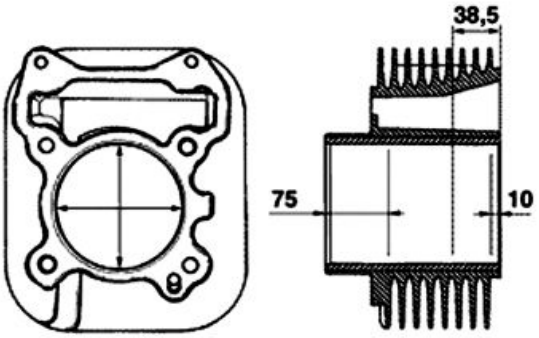
- Measure the outside diameter of the piston, perpendicular to the gudgeon pin axis.
- Measure 36.5 mm from the piston crown's shown in the figure.

NOTE

THE PIN HOUSINGS HAVE 2 LUBRICATION CHANNELS. FOR THIS REASON MEASUREMENT OF THE DIAMETER MUST BE CARRIED OUT ACCORDING TO THE AXIS OF THE PISTON.



- Using a bore meter, measure the inner cylinder 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.
- Pistons and cylinders are classified into categories based on their diameter. The coupling is carried out in pairs (A-A, B-B, C-C, D-D).

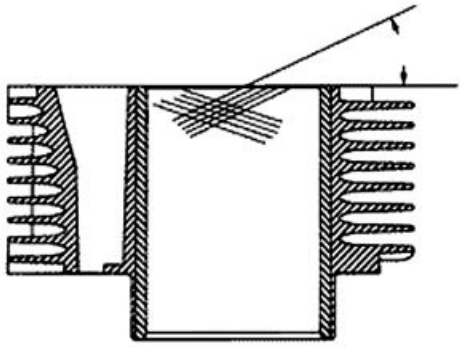


Characteristic

Maximum allowable run-out:

0.05 mm

- The cylinder rectifying operation should be carried out with a surfacing that respects the original angle.
- The cylinder surface roughness should be 0.9 micron.
- This is indispensable for a good seating of the sealing rings, which in turn minimises oil consumption and guarantees optimum performance.
- The pistons are oversized due to cylinder rectification and are subdivided into three categories 1st, 2nd, 3rd with 0.2-0.4-0.6 mm oversize. They are also classified into 4 categories A-A, B-B, C-C, D-D.



Inspecting the piston

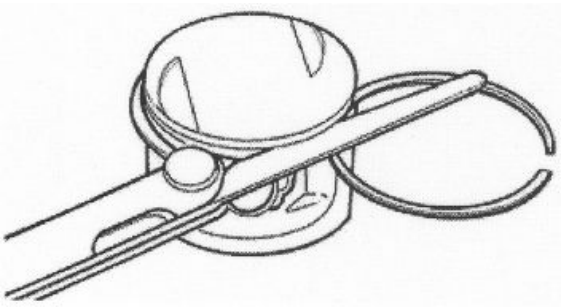
- Carefully clean the seal housings.
- Measure the coupling clearance between the seal rings and the grooves using suitable sensors, as shown in the diagram.
- If the clearance is greater than that indicated in the table, replace the piston.

STANDARD COUPLING CLEARANCE

Name	Description	Dimensions	Initials	Quantity
Top piston ring		0.025 ÷ 0.070		
Middle piston ring		0.015 ÷ 0.060		
oil scraper		0.015 ÷ 0.060		

MAXIMUM ADMITTED CLEARANCE AFTER USE

Name	Description	Dimensions	Initials	Quantity
Top piston ring		0.080 mm		
Middle piston ring		0.070 mm		
oil scraper		0.070 mm		



Inspecting the piston rings

NOTE

TO MEASURE WEAR LIMITS AND COUPLING CLEARANCES, SEE THE SPECIFICATIONS CHAPTER.

See also

Interventions rules

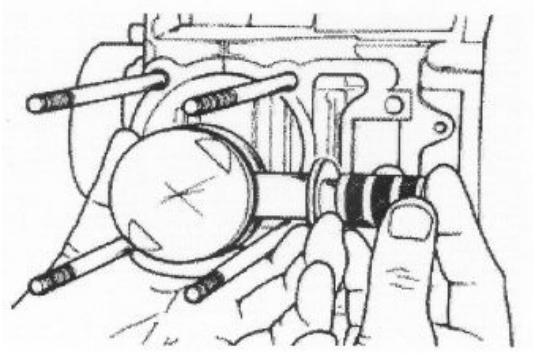
Removing the piston

- Install piston and wrist pin onto the connecting rod, aligning the piston arrow the arrow facing towards the exhaust.
- Fit the pin stop ring onto the appropriate tool.

Specific tooling

020430Y Pin lock fitting tool

- With the opening in position indicated on the tool, take stop ring in the closed position using the punch.
- Fit the wrist pin stop using the plug as shown in the figure



NOTE

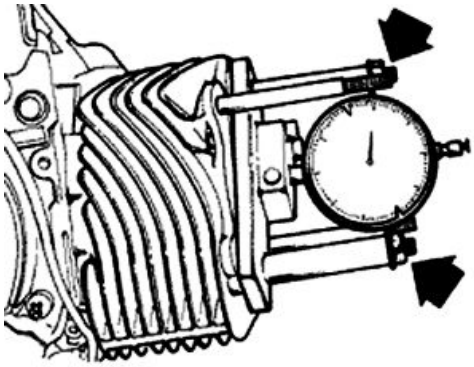
THE TOOL FOR INSTALLING THE STOP RINGS MUST BE USED MANUALLY.

CAUTION

USING A HAMMER TO POSITION THE RINGS CAN DAMAGE THE LOCKING HOUSING.

Choosing the gasket

- Provisionally fit the piston into the cylinder, without any base gasket.
- Assemble a dial gauge on the specific tool.
- Set the dial gauge to zero at a contrast plane with an average preload, for example 5 mm. Keeping the zero setting position, fit the tool on the cylinder and lock it with 2 nuts, as shown in the figure.
- Rotate the crankshaft up to the TDC (the inversion point of the dial gauge rotation)



- Calculate the difference between the two measurements.
- By means of the table, see the SPECIFICATIONS chapter, identify the cylinder base gasket thickness to be used upon refitting. Correctly identify the cylinder base gasket thickness to keep the correct compression ratio.
- Remove the special tool and the cylinder.

Specific tooling

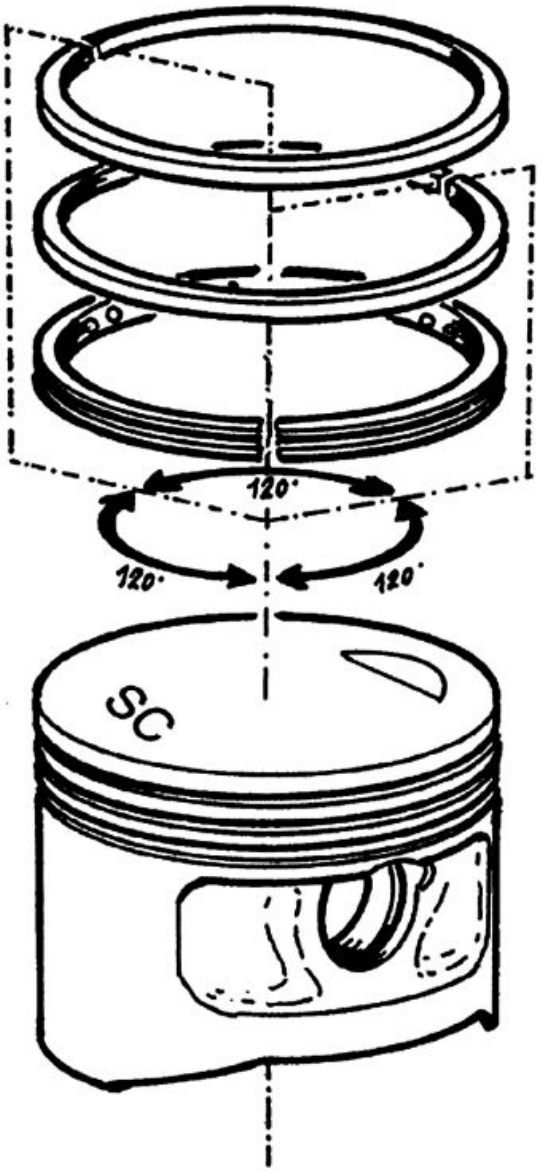
020428Y Support to check piston position

Refitting the piston rings

- Place the oil scraper spring on the piston.
- Refit the oil scraper ring with the join of spring ends on the opposite side from the ring gap and the word 'TOP' towards the crown of the piston. The tapered side of the middle piston ring should always be facing away from the crown of the piston.
- Fit the middle piston ring with the identification letter facing the crown of the piston. In any case, the step must be facing opposite the piston top.
- Fit the top piston ring with the word 'top' or the reference mark facing the crown of the piston.
- Offset the piston ring gaps on the three rings by 120° to each other as shown in the figure.
- Lubricate the components with engine oil.

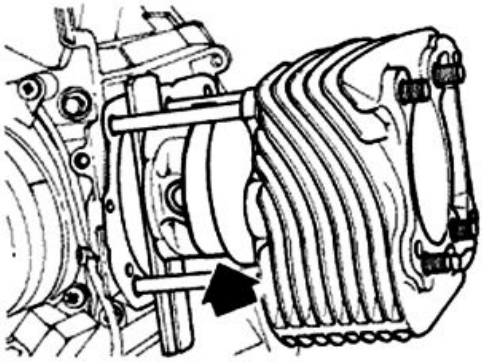
NOTE

SO AS TO OBTAIN THE BEST CONFIGURATION THE 2 SEALING RINGS ARE MADE WITH A CONTACT CONICAL CYLINDER SECTION.



Refitting the cylinder

- Insert the cylinder base gasket with the thickness determined above.
- Using the fork support and the piston ring retaining band, refit the cylinder as shown in the figure.



NOTE

BEFORE FITTING THE CYLINDER, CAREFULLY BLOW OUT THE LUBRICATION DUCT AND OIL THE CYLINDER BARREL.

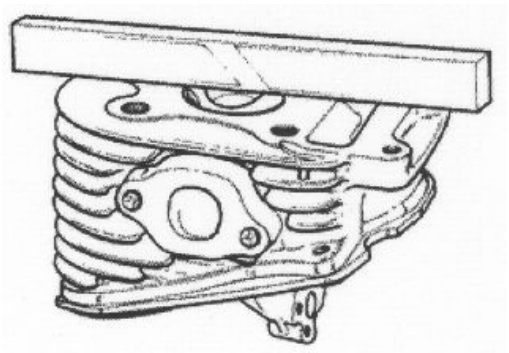
Specific tooling

020426Y Piston fitting fork

020427Y Piston fitting band

Inspecting the cylinder head

- Using a trued bar check that the cylinder head surface is not worn or distorted.
- Check that the camshaft and rocking lever pin bearings show no signs of wear.
- Check that the cylinder head cover surface, the intake manifold and the exhaust manifold are not worn.



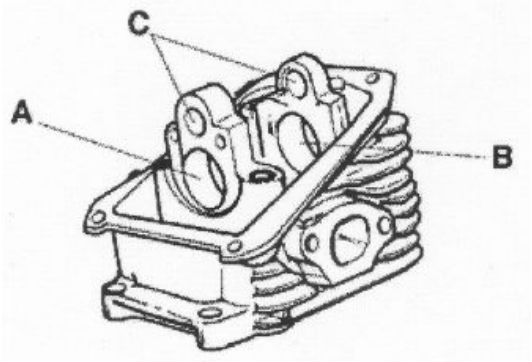
Characteristic

Maximum admitted unevenness: Head check

0.05 mm

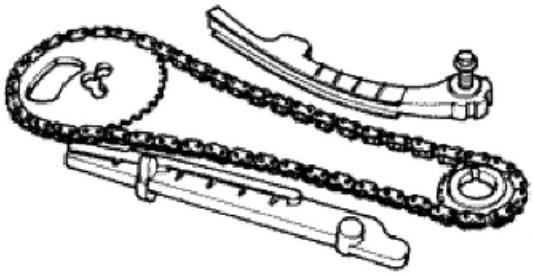
STANDARD DIAMETER

Specification	Desc./Quantity
Standard diameter	A Ø 32.5 ÷ 32.525
Standard diameter	B Ø 20 ÷ 20.021
Standard diameter	C Ø 12 ÷ 12.018

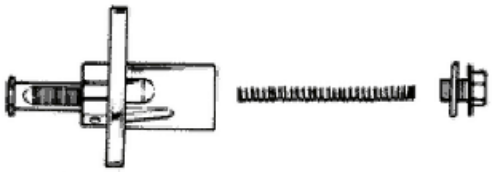


Inspecting the timing system components

- Check that the guide shoe and the tensioner shoe are not worn out.
- Ensure that the camshaft drive pulley, the chain assembly and the sprocket wheel are not worn.
- If sings of wear are found, replace the parts. if the chain, pinion or pulley are worn, replace the whole assembly.



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

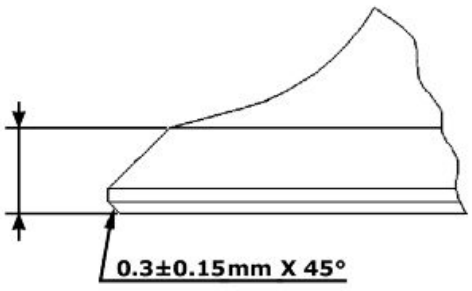


Inspecting the valve sealings

- Measure the width of the sealing surface on the valve seats.

VALVE SEAL SURFACE

Specification	Desc./Quantity
Inlet valve - seal surface	2.4 ÷ 2.8 mm
Outlet valve - seal surface	2.2 ÷ 2.6 mm



Inspecting the valve housings

- Remove any carbon formation from the valve guides.
- Measure the inside diameter of each valve guide.
- Take the measurement at three different heights in the rocker arm push direction.

Characteristic

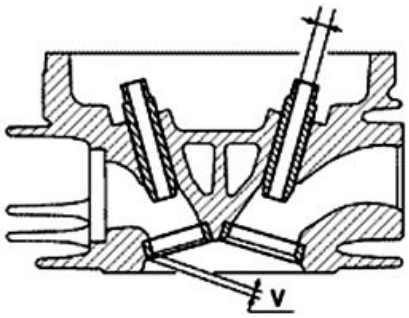
Standard drainage guide diameter

5.012 mm

Standard inlet guide diameter

5.012 mm

- If the width of the impression on the valve seat or the diameter of the valve guide exceed the specified limits, replace the cylinder head.
- Check width of the impression on the valve seat «**V**»



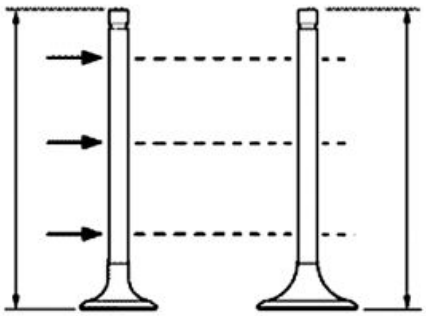
Characteristic

Wear limits:

Max. 1.6 mm.

Inspecting the valves

- Measure the diameter of the valve stems in the three positions indicated in the diagram.
- Calculate the clearance between valve and valve guide.



Characteristic

Minimum diameter admitted - Inlet:

4.96 mm

Minimum diameter admitted - Outlet:

4.95 mm

Standard clearance - Inlet:

0.013 ÷ 0.040 mm

Standard clearance - Outlet:

0.025 ÷ 0.052 mm

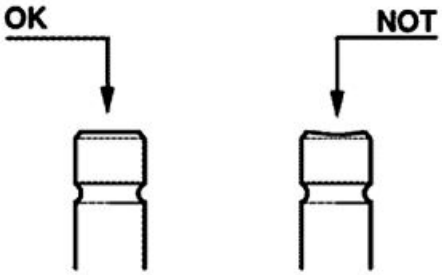
Maximum clearance admitted- Inlet:

0.062 mm

Maximum clearance admitted - Outlet:

0.072 mm

- Check that there are no signs of wear on the contact surface with the articulated register terminal.
- If the sealing surface on the valves is wider than the specified limit, damaged in one or more points or curved, replace the valve with a new one.



Characteristic

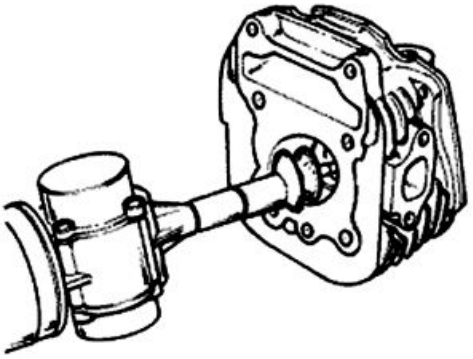
Standard valve length - Inlet:

80.6 mm

Valve standard length: drainage

79.6 mm

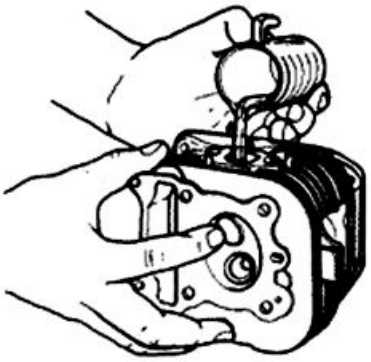
- If the checks above give no failures, you can use the same valves. For best sealing results, it is advisable to grind the valves. Grind the valves gently with a fine-grained lapping compound. During grinding, keep the cylinder head in a horizontal position. This will prevent the lapping compound residues from penetrating between the valve stem/guide coupling.



CAUTION

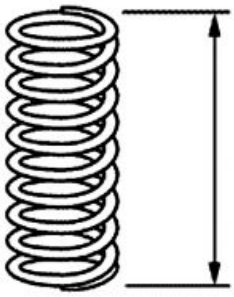
TO AVOID SCORING THE CONTACT SURFACE, DO NOT KEEP ROTATING THE VALVE WHEN NO LAPPING COMPOUND IS LEFT. CAREFULLY WASH THE CYLINDER HEAD AND THE VALVES WITH A SUITABLE PRODUCT FOR THE TYPE OF LAPPING COMPOUND BEING USED.

- Insert the valves into the cylinder head.
- Test the 2 valves alternatively.
- The test is carried out by filling the manifold with petrol and checking that the head does not ooze through the valves when these are just pressed with the fingers.



Inspecting the springs and half-cones

- Check that the upper spring caps and the cotter halves show no signs of abnormal wear.
- Check the length clearance of the springs.



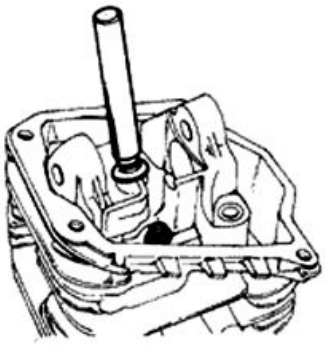
Characteristic

Valve spring length

33.9 ÷ 34.4 mm

Refitting the valves

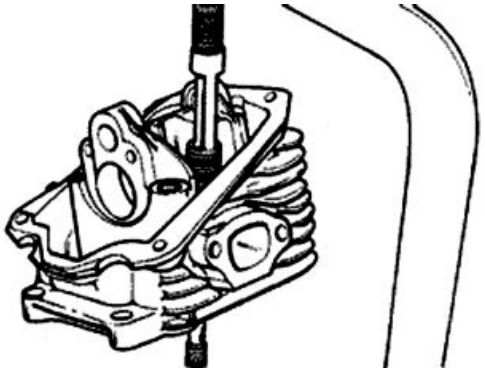
- Lubricate the valve guides with engine oil.
- Place the lower plates of the valve spring on the head.
- Use the punch to fit the 2 sealing rings one at a time.



Specific tooling

020306Y Punch for assembling valve seal rings

- Fit the valves, the springs and the spring retaining caps. Using the appropriate tool with adapter 11, compress the springs and insert the cotters in their seats.



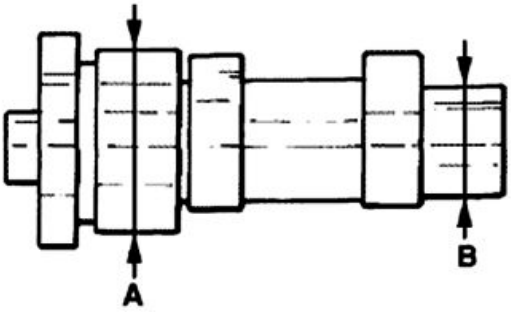
Specific tooling

020382Y Tool for removing valve cotters fitted with part 012

020382Y011 adapter for valve removal tool

Inspecting the cam shaft

- Inspect the cam shaft for signs of abnormal wear on the cams.



Characteristic

Standard diameter Bearing A

Ø: 32.5 mm -0.025 -0.050 mm

Standard diameter Bearing B

20 -0.020 -0.041 mm

Minimum admitted diameter bearing A

Ø: 32.440 mm

Minimum admitted diameter bearing B

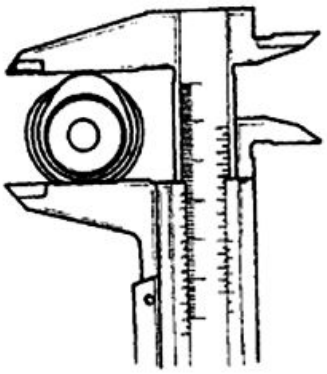
Ø: 19.950 mm

Inlet cam height

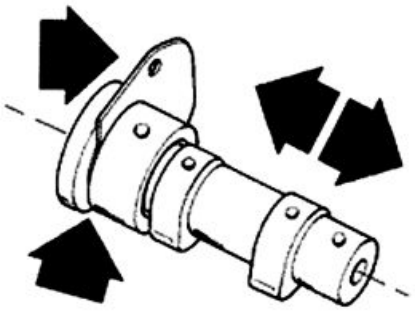
27.512 mm

Outlet cam height

27.212 mm



- Check there is no wear on the cam shaft retaining plate and its associated groove on the cam shaft.
- If any of the above dimensions are outside the specified limits, or there are signs of excessive wear, replace the defective components with new ones.

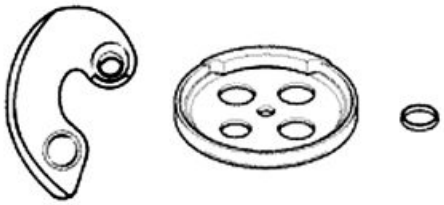


Characteristic

Maximum axial clearance admitted

0.42 mm

- Check there are no signs of wear on the automatic valve-lifter cam, or the end-of stroke roller, or the rubber buffer on the automatic valve-lifter retaining cover.
- Check that the valve lifting spring has not yielded.
- Replace any defective or worn components.

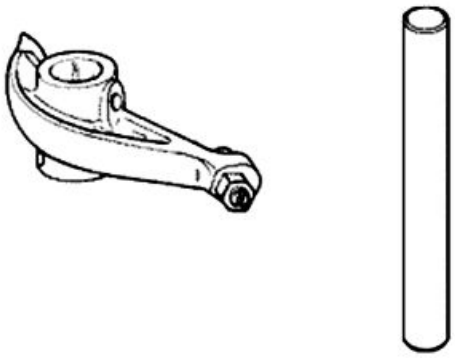


- Check there are no signs of scoring or wear on the rocking lever bolt.

Check there are no signs of wear on the pad from contact with the cam and on the jointed adjustment plate.

- Measure the internal diameter of each rocking lever.

-Check that the elastic washer dedicated to the axle clearance of the rocking levers is not worn. -



In case of anomalies, replace the damaged components.

Characteristic

Minimum diameter permitted

Ø 11.970 mm

Maximum diameter admitted

Ø 12.030 mm

Refitting the head and timing system components

- Fit the timing chain guide pad.
- Insert the head and cylinder centring dowels, fit the head gasket and the head on the cylinder.
-Screw the nuts and lock them in a crossed sequence and in 2 or 3 stages to the specific torque.

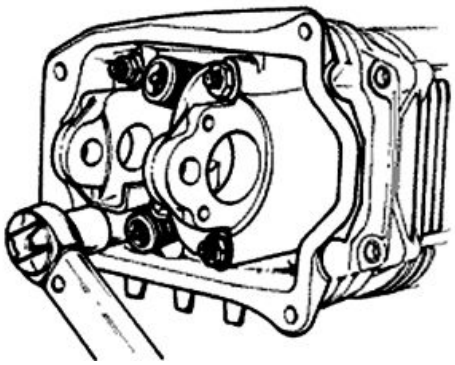
Locking torques (N*m)

Locking torque 28 ÷ 30

- Fit the two screws on the outside of the timing chain side and tighten them to the specified torque.

NOTE

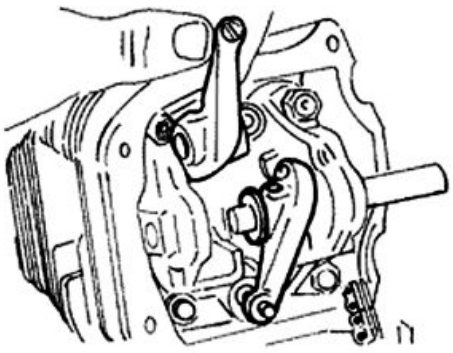
BEFORE INSTALLING THE HEAD, MAKE SURE THAT THE LUBRICATION CHANNEL IS CLEAN USING A COMPRESSED AIR JET.



Locking torques (N*m)

Locking torque 11 ÷ 13

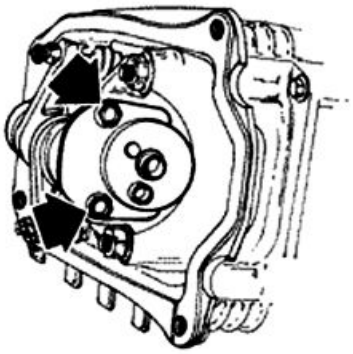
- Fit the timing chain sprocket wheel on the crankshaft, with the chamfer facing the insertion side.
- Loop the timing chain around the sprocket on the crankshaft.
- Fit the tensioner pad by the cylinder head.
- Fit the spacer and the screw fastener.
- Fit the pin, the outlet rocking lever, the spring washer and the inlet rocking lever.
- Lubricate the 2 rocking levers through the holes at the top.
- Lubricate the 2 bearings and insert the camshaft in the cylinder head with the cams opposing the rocking levers.



- Insert the retention plate and tighten the two screws shown in the figure to the prescribed torque.

Locking torques (N*m)

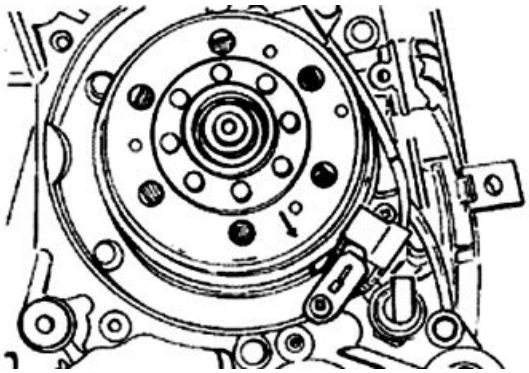
Locking torque **4 ÷ 6**

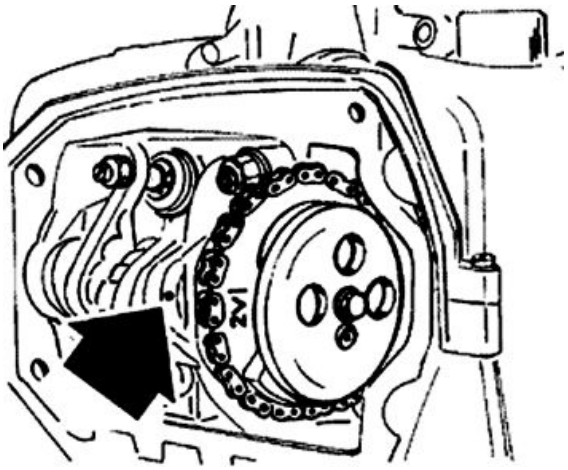


- Refit the spacer on the cam shaft.
- Rotate the engine so that the piston is at top dead centre, using the reference marks on the flywheel and the crankcase.
- While doing so, fit the chain onto the control camshaft pulley and keep the reference 2V in correspondence with the reference mark on the head.
- Fit the pulley onto the camshaft.
- Assemble the counterweight with the corresponding fixing screw and tighten to the specified torque.

Locking torques (N*m)

Locking torque **7 ÷ 8.5**

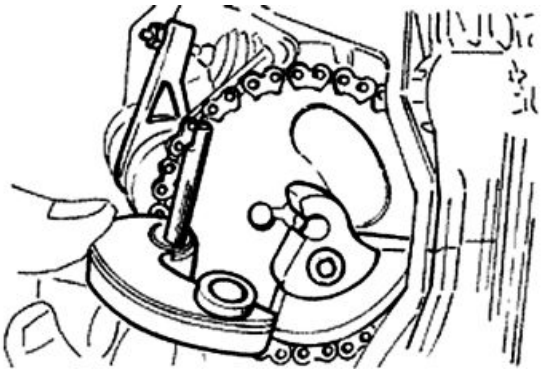




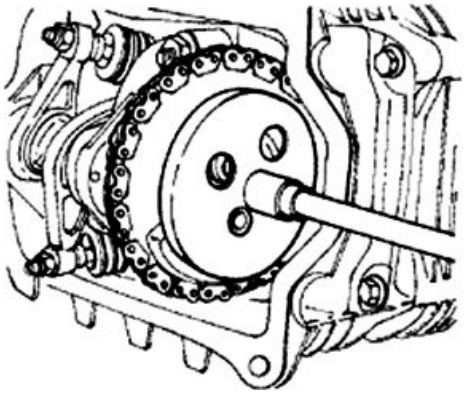
-Fit the end-stop ring on the automatic valve-lifter cam and fit the automatic valve-lifter cam to the cam shaft.
- Fit the automatic valve-lifter return spring.
- During this operation the spring must be loaded approximately 180°.

NOTE

GREASE THE END STOP RING TO PREVENT IT COMING OUT AND FALLING INTO THE ENGINE.



- Fit the automatic valve-lifter retaining dish, using the counterweight screw fastener as a reference.
- Tighten the clamping screw to the prescribed torque.



Locking torques (N*m)

Locking torque **12 - 14**

- Set the tensioner cursor in the rest position.
- Fit the chain tensioner on the cylinder, using a new gasket, and tight the two screws to the prescribed torque.

Locking torques (N*m)

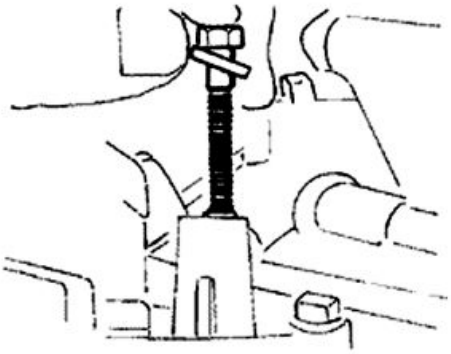
Locking torque 11 ÷ 13

- Insert the chain tensioning screw, together with the spring and washer, tightening it to the prescribed torque.

Locking torques (N*m)

Locking torque 5 - 6

- Adjust the valve clearance.
- Fit the spark plug



Characteristic

Spark plug

Champion RG6YC

Electric characteristic

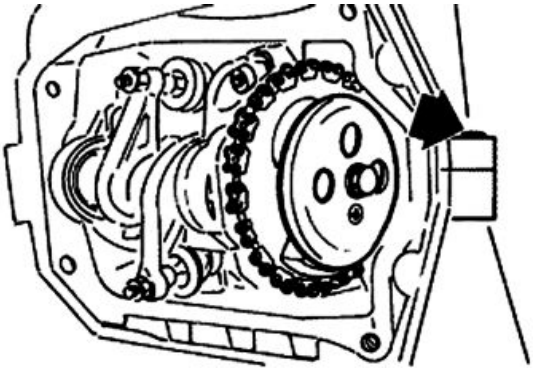
Electrode gap

0.8 mm

Locking torques (N*m)

Locking torque **12 - 14**

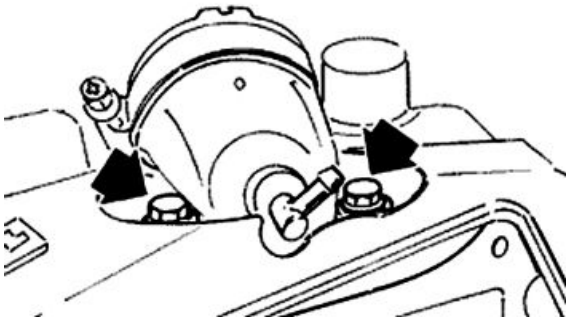
- Assemble the casing sealing gasket on the head. On the fitting direction, use the supplements on the timing side as reference.
- Assemble the screw fixing the housing to the crankcase to the specified torque and the 2 self-threading screws joining the half-shells.
- Take care that the gasket is well inserted in its housing during the assembly stage.
- Place the spark plug access cap.



Locking torques (N*m)

Locking torque **3 ÷ 4**

- Fit the inlet manifold and lock the 2 screws to the specified torque.
- Fit the carburettor onto the inlet manifold and lock the clamp



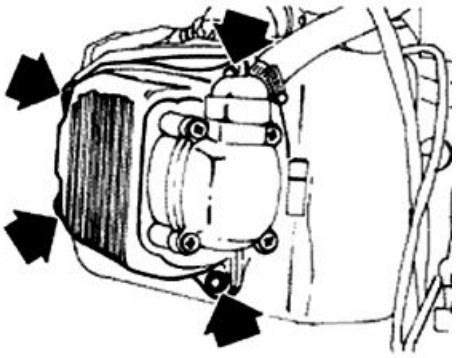
NOTE

FIT THE CARBURETTOR THROUGH THE SUPPLEMENT ON THE MANIFOLD.

Locking torques (N*m)

Locking torque **11 ÷ 13**

- Refit the cylinder head cover, tightening the 4 clamping screws to the prescribed torque.
- Refit the fan and the housing.
- Reassemble the oil pump control, the chain compartment cover, the by-pass and the oil sump as described in the lubrication chapter.
- Reassemble the driving pulley, the belt and the transmission cover as described in the transmission chapter.

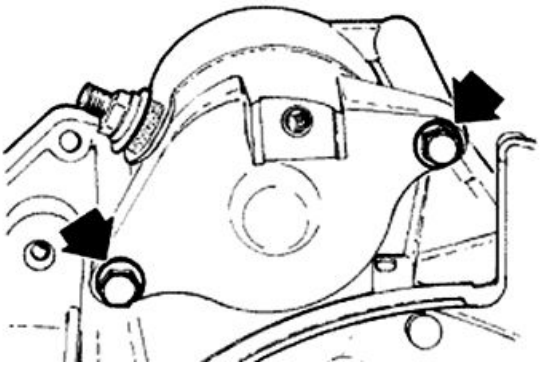


Locking torques (N*m)

Locking torque **11 ÷ 13**

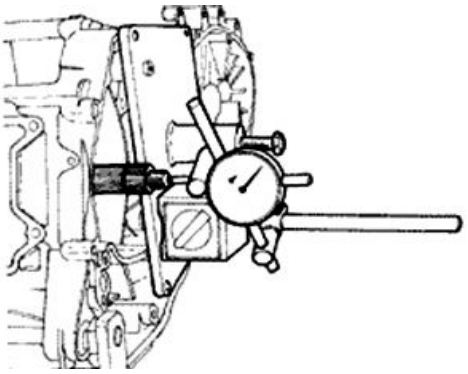
Crankcase - crankshaft

- Precautionary remove the following units: transmission cover, driving pulley, driven pulley and belt, rear hub cover, gears, bearings and oil seals as described in the transmission chapter.
- Remove the oil sump, the by-pass, the chain compartment cover and the oil pump as in the lubrication chapter.
- Remove the flywheel cover, the fan, the flywheel and the stator as described in the magneto flywheel chapter.
- Remove the oil filter and the oil pressure bulb.
- Remove the cylinder-piston-head unit as described in the cylinder head timing system chapter.



- Remove the 2 retainers indicated in the figure and the starter motor.

- Before opening the crankcase, it is advisable to check the axial clearance of the crankshaft. To do this, use a plate and a support with specific tool dial gauge.



Specific tooling

020262Y Crankcase splitting strip

020335Y Magnetic support for dial gauge

Characteristic

Standard clearance

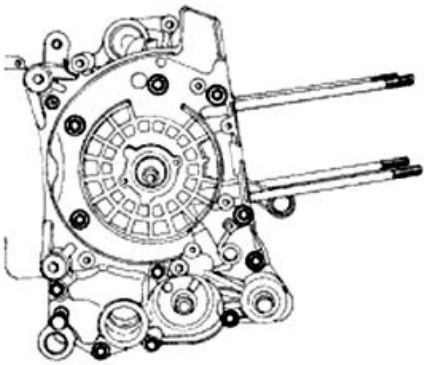
0.15 ÷ 0.40 mm

Splitting the crankcase halves

Remove the 11 coupling screws to the crankcase.

- Separate the crankcase while keeping the crankshaft in one of the two halves of the crankcase.

Remove the crankshaft.

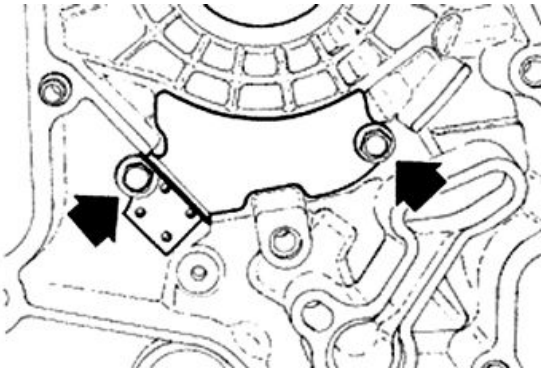


CAUTION

IF YOU FAIL TO DO THIS, THE CRANKSHAFT MIGHT ACCIDENTALLY FALL.

- Remove the coupling gasket of the crankcase halves.

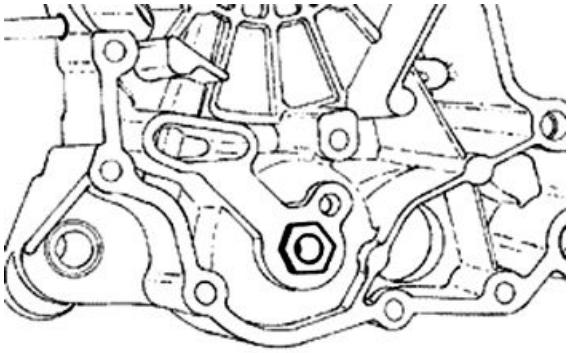
- Remove the two screws and the internal cover shown in the diagram.



CAUTION

WHILE OPENING THE CRANKCASES AND REMOVING THE DRIVING SHAFT, CHECK THAT THE THREADED SHAFT ENDS DO NOT INTERFERE WITH THE MAIN BUSHINGS. FAILURE TO OBSERVE THIS PRECAUTION CAN DAMAGE THE MAIN BUSHINGS.

- Remove the oil guard on the flywheel side.
- Remove the oil filter fitting shown in the diagram

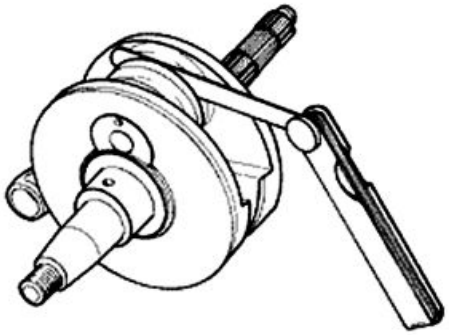


- Check the axial clearance on the connecting rod.

Characteristic

Standard clearance

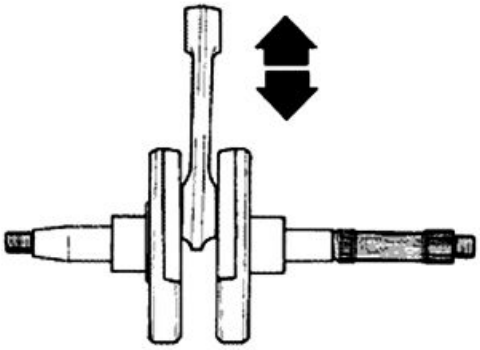
0.20 ÷ 0.50 mm



- Check the radial clearance on the connecting rod.
-Check the surfaces that limit the axial free-play are not scored and measure the width of the crankshaft between these surfaces, as shown in the diagram.

CAUTION

BE CAREFUL NOT TO LET THE MEASUREMENT BE AFFECTED BY THE UNIONS WITH THE CRANKSHAFT ENDS.



Characteristic

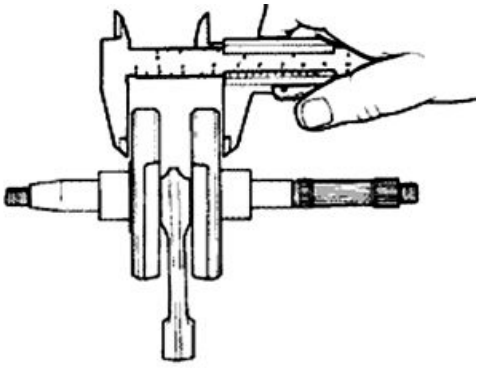
Standard clearance

0.036 ÷ 0.054 mm

- If the axial clearance between crankshaft and crankcase is exceeding and the crankshaft does not have any defect, the problem must be due to either excessive wear or wrong machining on the crankcase.

CAUTION

THE CRANKSHAFT CAN BE REUSED WHEN THE WIDTH IS WITHIN THE STANDARD VALUES AND THE SURFACES SHOW NO SIGNS OF SCORING.



Characteristic

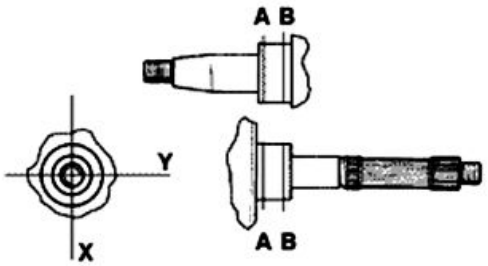
Distance between the shoulders

55.67 ÷ 55.85 mm

- Check the diameters of both the bearings of the crankshaft in accordance with the axes and surfaces shown in the figure. The half-shafts are classified in two categories Cat. 1 and Cat. 2 as shown the chart below.

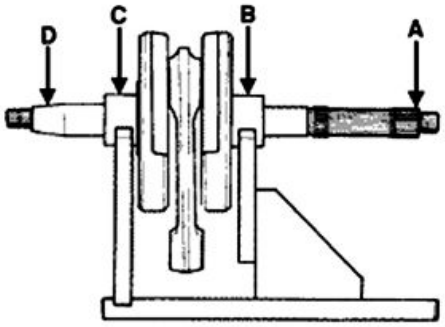
STANDARD DIAMETER

Specification	Desc./Quantity
Class 1	28.998 ÷ 29.004
Class 2	28.004 ÷ 29.010



Inspecting the crankshaft alignment

To install the drive shaft on the support and to measure the misalignment in the 4 points indicated in figure.



- Check that the driving shaft cone, the tab seat, the oil seal capacity, the toothed gear and the threaded tangs are in good working order.
- In case of failures, replace the crankshaft.

The connecting rod head bushings cannot be replaced. For the same reason, the connecting rod may not be replaced and, when cleaning the crankshaft, be very careful that no impurities get in through the shaft's lubrication holes.

In order to prevent damaging the connecting rod bushings, do not attempt cleaning the lubrication duct with compressed air.

- Make sure that the 2 caps on the crankpin are properly fitted.
- A wrong installation of a cap can seriously affect the bushing lubrication pressure.

NOTE

THE MAIN BEARINGS ARE NOT GRINDABLE

Specific tooling

020074Y Support base for checking crankshaft alignment

Characteristic

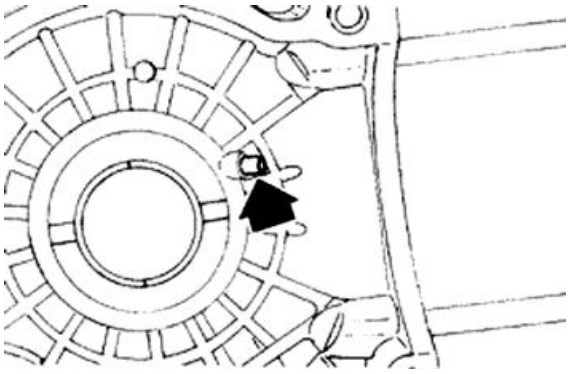
Off-line maximum admitted

A = 0.15 mm

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

Inspecting the crankcase halves

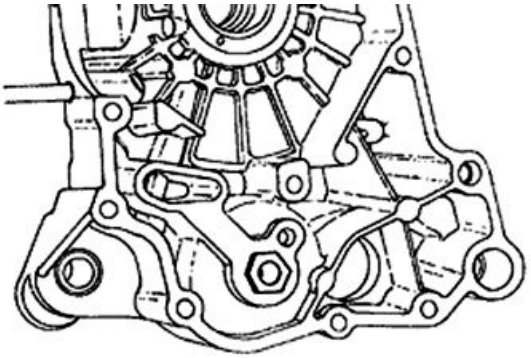
- Before proceeding to check the crankcase halves, thoroughly clean the all surfaces and oil ducts.
- On the transmission side crankcase half, take particular care cleaning the housing and oil ducts for the following components: the oil pump, the oil by-pass valve, the main bushings and the cooling jet on the transmission side (see diagram).
- Take particular care, also, that there are no signs wear in the oil by-pass valve housing (see Chapter Lubrication), as this could prevent a good seal in the valve, which regulates the oil pressure.



NOTE

THE JET IS FED THROUGH THE MAIN BUSHINGS. PROPER OPERATION OF THIS COMPONENT IMPROVES THE PISTON TOP COOLING. CLOGGING HAS EFFECTS THAT ARE DIFFICULT TO DETECT (PISTON TEMPERATURE INCREASE). FAILURE OR LEAK CAN CONSIDERABLY DECREASE THE MAIN BUSHING AND CONNECTING ROD LUBRICATION PRESSURE.

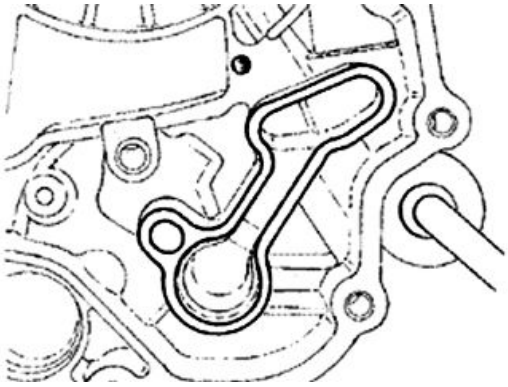
- On the flywheel side crankcase half, take particular care cleaning the oil ducts for the main bushings, the oil duct for the jet that lubricates the cylinder head and the oil drainage duct at the flywheel side oil seal.

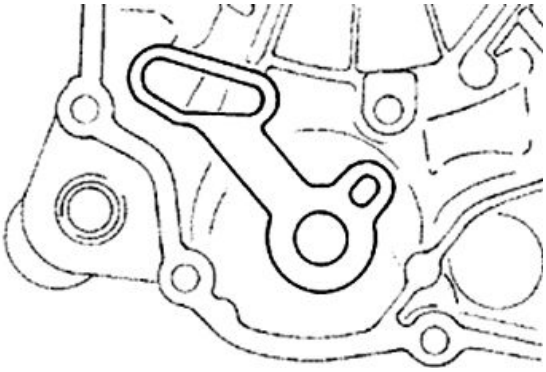


NOTE

THE HEAD LUBRICATION CHANNEL IS PROVIDED WITH A SHUTTER JET; THIS GIVES A "LOW PRESSURE" HEAD LUBRICATION; THIS CHOICE WAS MADE TO REDUCE THE OIL TEMPERATURE IN THE SUMP. THE JET CLOGGING IMPAIRS THE HEAD LUBRICATION AND THE TIMING MECHANISMS. A JET FAILURE CAUSES A DECREASE OF THE MAIN BUSHING AND CONNECTING ROD LUBRICATION PRESSURE.

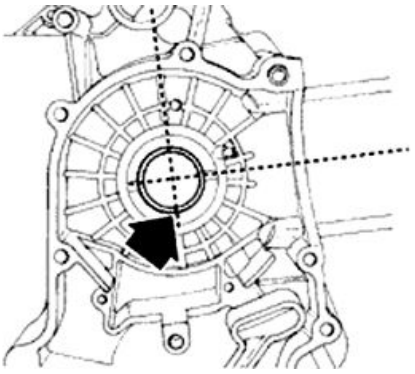
- Inspect the mating surfaces on the crankcase halves for scratches or deformation, taking particular with the surfaces that mate with the cylinder and the mating surfaces between the crankcase halves.
- Defects in the crankcase coupling gasket or the surfaces indicated in the figure can cause a drop in the oil pressure and affect the lubricating pressure for the main bushings and the connecting rod.
- Check the main bearing seats that limit axial clearance in the crankshaft show no signs of wear. The dimension between these seats is measured by way of the procedure described previously for measuring the crankshaft axial clearance and dimensions.





Inspecting the crankshaft plain bearings

- To obtain a good bushing lubrication it is necessary to have both an optimal lubricating pressure (4 bar) and a good oil flow rate; the bushings must be correctly positioned so as not to obstruct the oil supply channels.
- The main bushings are comprised of two half-bearings, one containing holes and channels for lubrication and the other solid.
- The solid half-bearing is intended to stand the thrusts caused by combustion, and for this reason it is arranged opposed the cylinder.
- To prevent shutters in the oil feeding channels, the matching surface of the two half-bearings must be perfectly orthogonal to the cylinder axis, as shown in the figure.
- The oil supply channel section is also affected by the bushings driving depth compared with the crankshaft axial clearance of the limiting surface.



NOTE

TO KEEP THIS POSITION OF THE BUSHINGS ON THE CRANKCASE, FITTING IS FORCED ON STEEL RINGS INSERTED IN THE CASTING OF BOTH CRANKCASE HALVES.

Characteristic

Standard driving depth

1.35 ÷ 1.6

- Check the inside diameter of the main bushings in the three directions indicated in the diagram.
- Repeat the measurements for the other bushing half. see diagram.
- The standard bushing diameter after driving is variable on the basis of a coupling selection.
- The bushing housings in the crankcase are classified into 2 categories - Cat. 1 and Cat. 2 - just like those for the crankshaft.

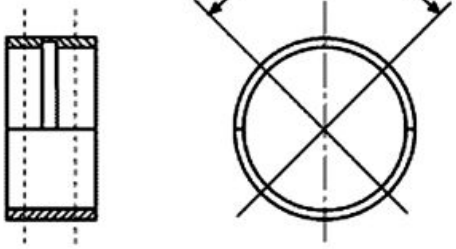
3 - The main bushings are subdivided into 3 thickness categories; see the table below:

NOTE

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

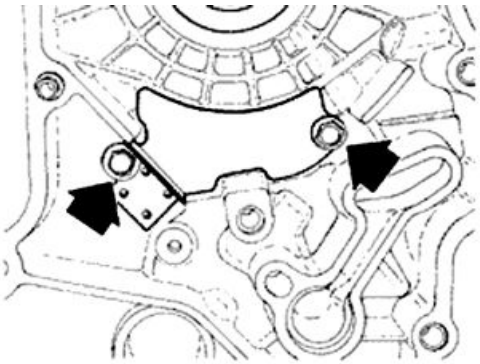
MAIN BEARINGS

Specification	Desc./Quantity
B	Blue
C	Yellow
E	Green



Refitting the crankcase halves

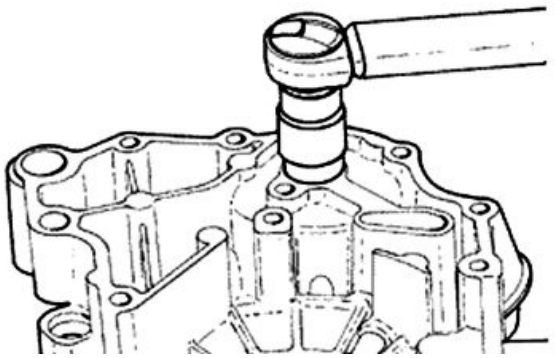
- Fit the internal bulkhead by locking the two screws to the prescribed torque.



Locking torques (N*m)

Locking torque **4 ÷ 6**

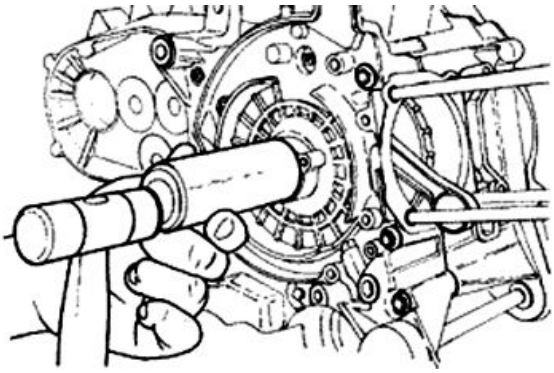
- Fit the oil filter joint and tighten it to the prescribed torque.
- Place a new gasket on one of the crankcase halves, preferably on the transmission side, together with the locating dowels.



Locking torques (N*m)

Locking torque 27 ÷ 33

- Lubricate the main bushings and insert the crankshaft in the transmission side crankcase half.
- Reassemble the two crankcase halves.
- Fit the 11 screws and tighten them to the prescribed torque.



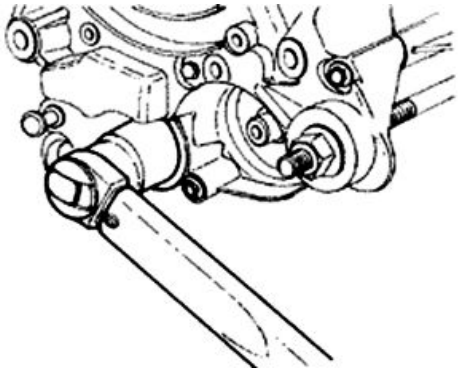
NOTE

WHEN FITTING THE HALF CASING AND THE CRANKSHAFT, TAKE CARE NO TO DAMAGE THE SHAFT THREADED TANGS.

Locking torques (N*m)

Locking torque 11 ÷ 13

- Lubricate the flywheel oil seal.
- Use the appropriate tool to assemble the oil seal.
- Fit a new O-ring on the pre-filter and lubricate it.
- Insert the pre-filter on the engine with its corresponding cover to the specific torque.



NOTE

REMOVE ANY EXCESS FROM THE CRANKCASE COUPLING GASKET ON THE CYLINDER PLANE, TO ENSURE BETTER SEALING PERFORMANCE.

NOTE

FAILURE TO USE THE SPECIFIC TOOL CAN RESULT IN AN INCORRECT DEPTH POSITION AND AS A CONSEQUENCE IN INADEQUATE OIL SEALING.

Specific tooling

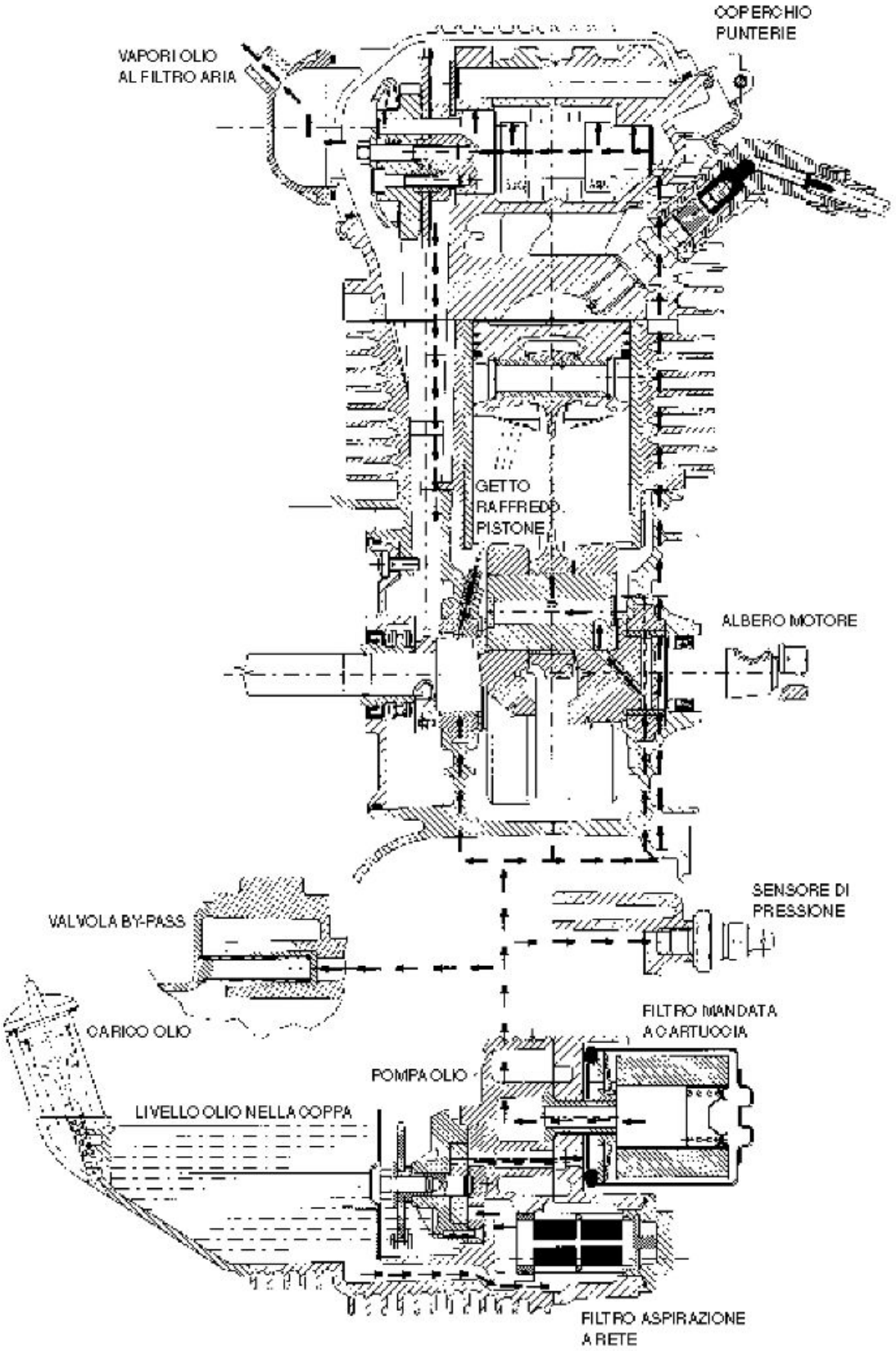
020425Y Punch for flywheel-side oil seal

Locking torques (N*m)

Locking torque 24 ÷ 30

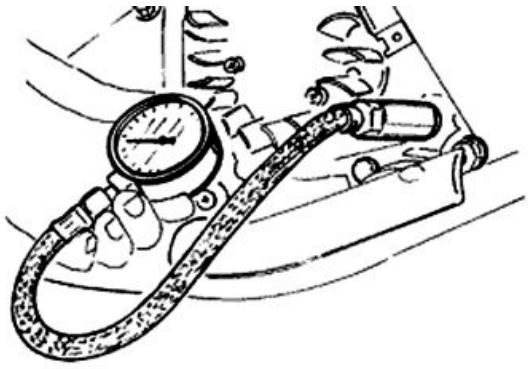
Lubrication

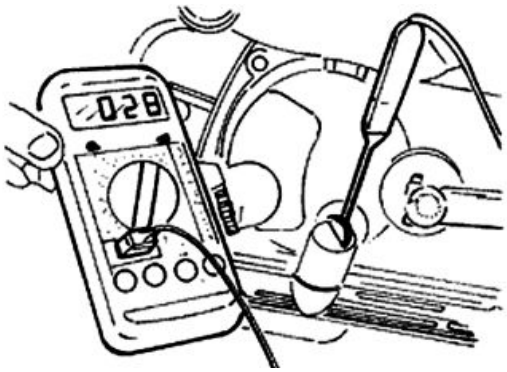
Conceptual diagrams



Oil pressure check

- After removing the cover protections as described in the "Flywheel" chapter, disconnect the electrical connexion of the minimum oil pressure switch and then remove the switch.
- With the engine idling at 1650 rpm and the oil temperature at ~90°C, check that the oil pressure is between 0.5 ÷ 1.2 atm.
- With the engine idling at 6000 rpm and the oil temperature at ~90°C, check that the oil pressure is between 3.2 ÷ 4.2 atm.
- Remove the appropriate tools once the measurement is complete, refit the oil pressure switch and washer, tightening it to the prescribed torque and fit the fan cover.
- If the oil pressure is outside the specified limits, in the following order, check: the oil filter, the oil by-pass valve, the oil pump and the crankshaft seals.





NOTE

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

Characteristic

Minimum pressure admitted

3.2 atm.

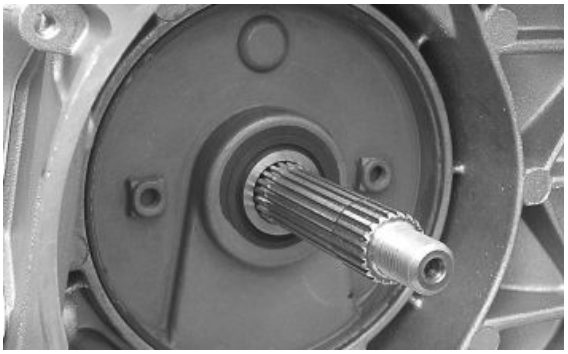
Locking torques (N*m)

Locking torque **12 ÷ 14 (also valid for the control connector).**

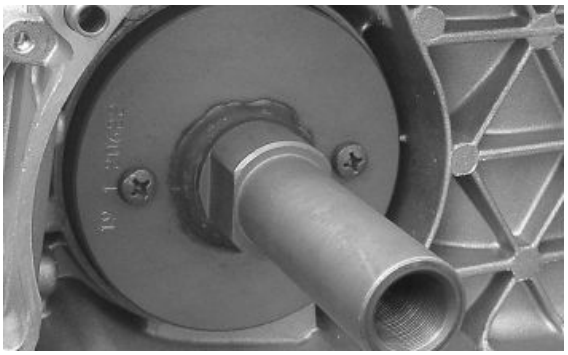
Crankshaft oil seals

Removal

- First remove the transmission cover and the complete driving pulley



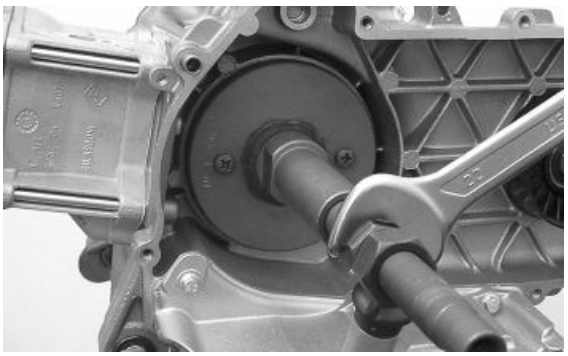
- Install the base of the appropriate tool on the oil guard using the screws provided.



- Screw the threaded bar onto the base of the tool and extract the oil guard.

Specific tooling

020622Y Transmission-side oil guard punch



Refitting

- Prepare the new oil guard, lubricating the sealing lip. Warning: do not lubricate the surface for keying onto the engine crankcase.

CAUTION

DO NOT LUBRICATE THE SURFACE FOR KEYING ONTO THE ENGINE CRANKCASE.

- Preassemble the oil seal with the appropriate tool, positioning the screws
- Place the sheath over the crankshaft

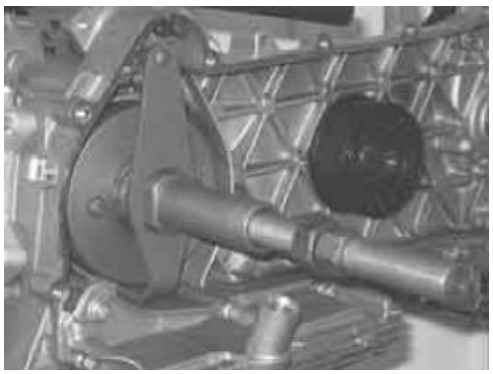
- Insert the tool with the oil seal on the crankshaft until it comes into contact with the crankcase

CAUTION

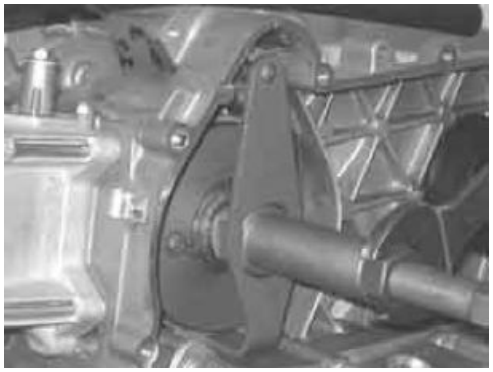
ORIENT THE OIL GUARD BY POSITIONING THE CHAIN HOUSING CHANNEL FACING DOWNWARDS. WHEN THE POSITION IS REACHED, DO NOT RETRACT THE OIL GUARD. FAILURE TO COMPLY WITH THIS RULE CAN CAUSE A WRONG POSITIONING OF THE OIL GUARD SHEATH.

- Orientate the oil guard by inserting the bracket which is part of the specific tool.

- Tighten the threaded bar onto the crankshaft as far as it will go.



- Use the nut to move the base of the tool until you can see end of the oil seal driving stroke



- Remove all of the tool components following the procedure in reverse order

CAUTION

FAILURE TO COMPLY WITH THIS ASSEMBLY PROCEDURE CAN SERIOUSLY DAMAGE THE ENGINE DUE TO THE WRONG TENSIONING OF THE OIL PUMP CONTROL CHAIN.

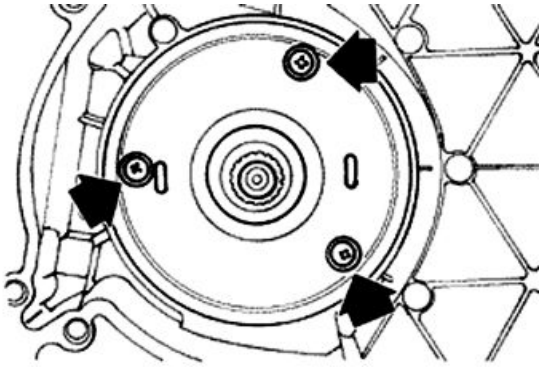
Oil pump

Removal

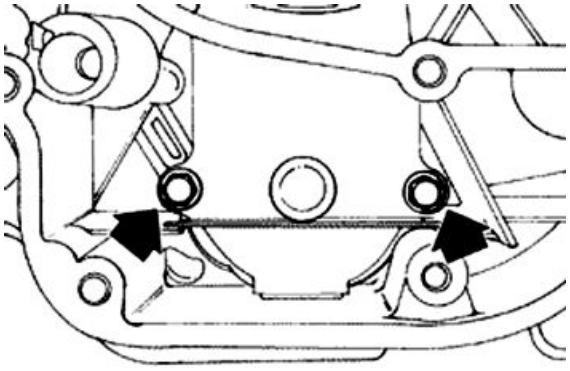
- Remove the chain cover acting on the 3 retaining screws as shown in the figure and the relevant copper washer.
- Extract the cover using the appropriate appendages.

NOTE

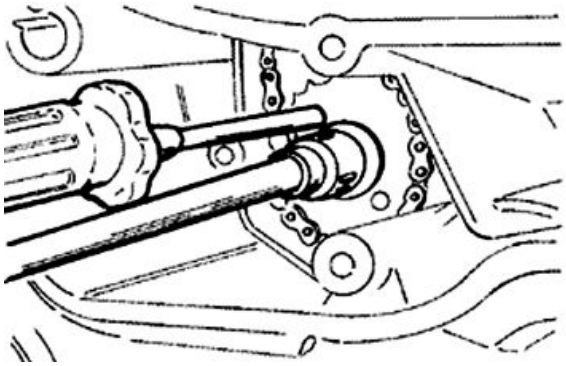
WITH THE AIM OF AVOIDING DAMAGING THE APPENDAGES PRACTICE A RUN PARALLEL TO CRANKSHAFT.



- Remove the cover of the pump control pulley using the two retainers, as shown in the figure.
- Block the rotation of the oil pump control pulley using a screwdriver inserted through one of its two holes.

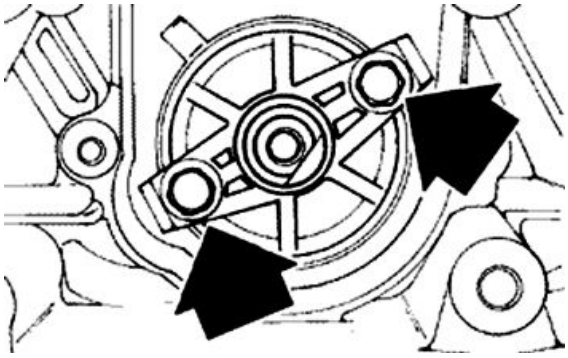


- Remove the central screw with Belleville washer, as shown in the diagram.
- Remove the chain with the pulley.
- Remove the crankshaft control pinion.



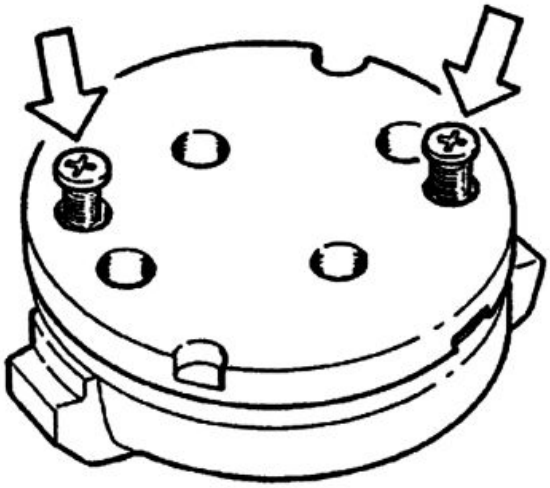
- Remove the oil pump acting on the 2 retainers as shown in the figure.
- Remove the oil pump seal.

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



Inspection

- Remove the two screws and the oil pump cover.
- Remove the clip retaining the innermost rotor.
- Remove and wash the rotors thoroughly with petrol and compressed air.
- Reassemble the rotors in the pump body, keeping the two reference marks visible Replace the clip.

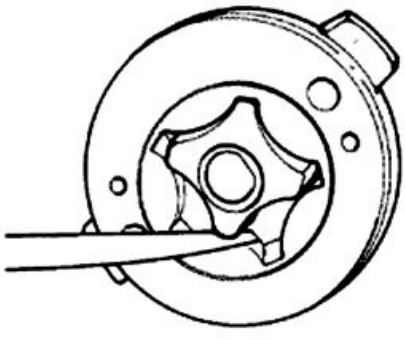


- Using a thickness gauge, check the distance between the rotors in the position shown in the figure.

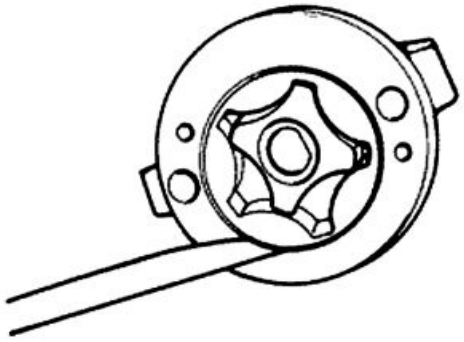
Characteristic

Maximum clearance admitted

0.12 mm



Measure the distance between the outer rotor and the pump body; see figure.

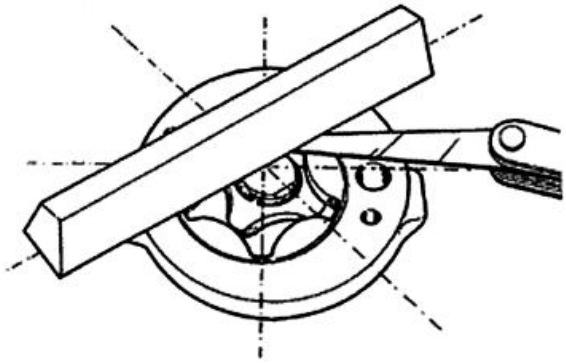


Characteristic

Admissible limit clearance:

0.20 mm

Check the axial clearance of the rotors with a trued bar as reference, as shown in the figure.



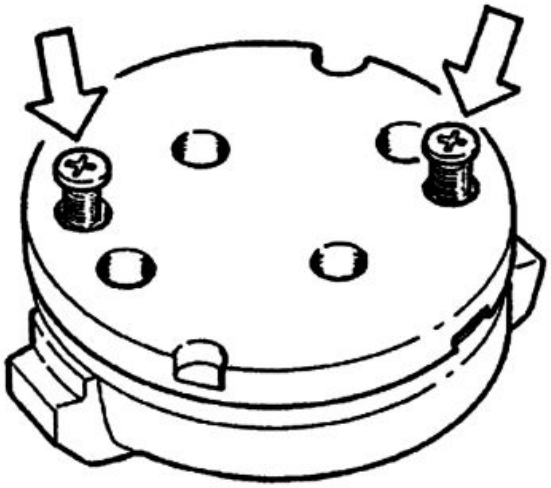
Characteristic

Limit values admitted:

0.09 mm

Refitting

- Check there are no signs of wear on the oil pump shaft or body.
- Check there are no signs of scoring or wear on the oil pump cover.
- If you detect non-conforming measurements or scoring, replace the faulty parts or the assembly.
- Fit the pulley to the pump, the central screw to the specified torque and the belleville washer.
-Fit the oil pump cover, by tightening the two screws to the prescribed torque.



NOTE

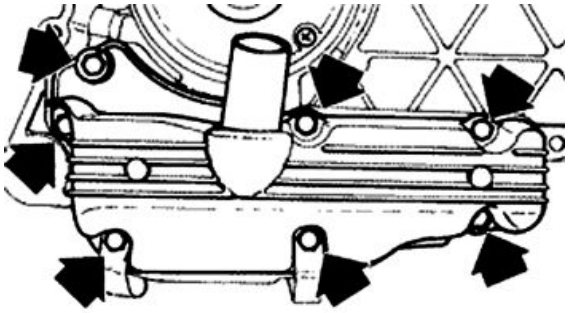
FIT THE BELLEVILLE WASHER SO THAT ITS OUTER (CURVED) RIM TOUCHES THE PULLEY.

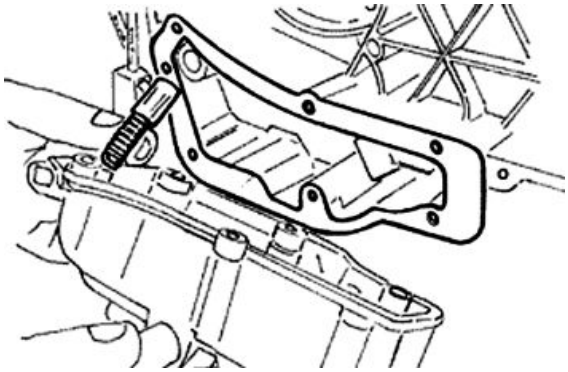
Locking torques (N*m)

Central screw **12 ÷ 14 Nm** **Cover screws** **0.7 ÷ 0.9 Nm**

Removing the oil sump

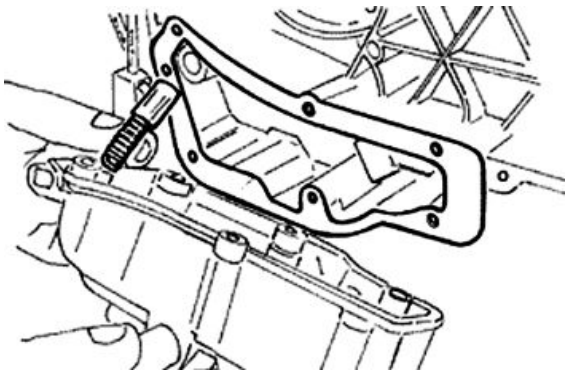
- Remove the oil filler plug, the transmission cover, the complete drive pulley assembly with belt and the sprocket wheel, as described in the Transmission chapter.
- Drain the oil from the sump as described above.
- Remove the 7 screws indicated in the figure and the 2 rear brake transmission fixing brackets.
- Remove the spring, the by-pass piston and the gasket shown in the second image.





Inspecting the by-pass valve

- Check the unloaded spring length.
- Check that the small piston is not scored.
- Ensure that it slides freely on the crankcase and that it guarantees a good seal.
- If not, eliminate any impurities or replace defective parts.

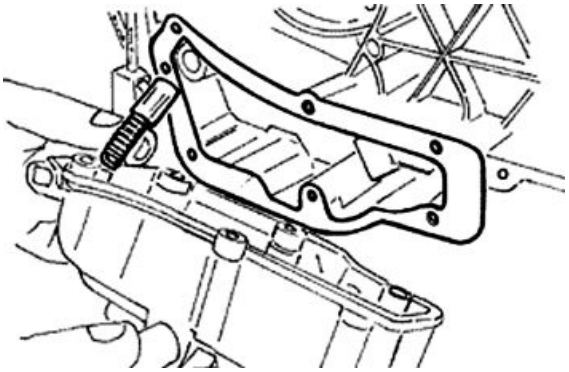


Characteristic

By-pass check up: Standard length

54.2 mm

Refitting the oil sump

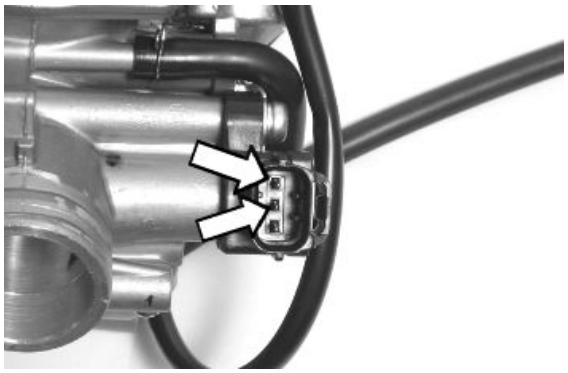


- Refit the by-pass valve plunger in its housing.
- Insert the pressure-regulating spring.
- Fit a new sump seal.
- Refit the sump, taking care to locate the spring in the appropriate recess machined into the inside of the sump.
- Refit the rear brake transmission support brackets and the screws in the reverse order from which they were removed.
- Tighten the screws to the prescribed torque.
- Refit the drive pulley assembly, the drive belt, the sprocket wheel and the transmission cover, as described in the "Transmissions" chapter.
- **When testing the lubrication system, refer to the "Crankcase and Crankshaft" chapter, regarding lubrication of the crankshaft and connecting rod**

Locking torques (N*m)

Locking torque **11 ÷ 13**

Fuel supply

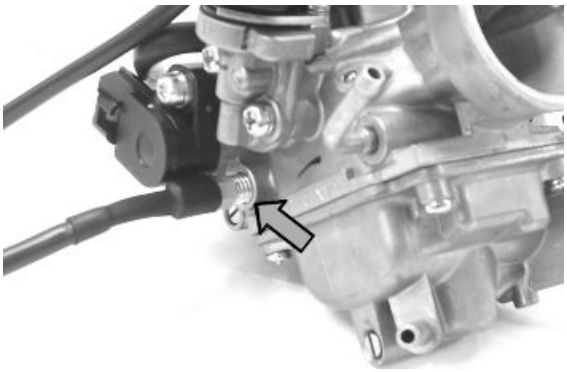


With the multimeter, check if the potentiometer is working correctly by placing the probes on both contactors indicated in the photograph .
With throttle valve completely closed, the resistance value should be approx. 1.3 kOhm.
With throttle valve completely open, the resistance value should be approx. 4.05 kOhm.

Removing the carburettor

- To detach the carburettor from the engine, it is necessary to move the air filter and remove the throttle control transmission, the automatic starter connection, the clamps anchoring the carburettor to the filter housing and to the inlet manifold, the air delivery pipe to the diaphragm, the heater, the intake fitting and the TPS cable.

- Remove the heater



- Remove the protection, the bracket and the starter acting on the screw shown in the figure.

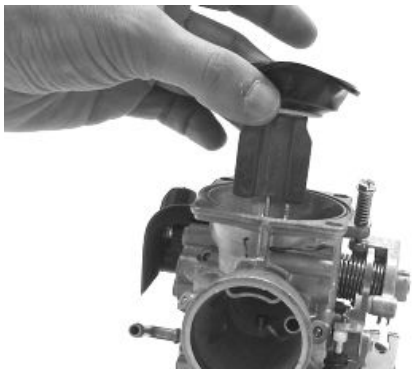
- Remove the 2 screws and the starter support with the gasket.

- Remove the 4 fixing screws shown in the figure and the vacuum chamber cover.

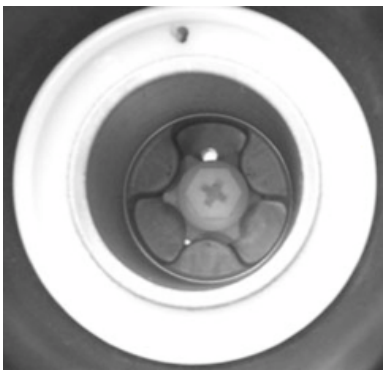
WARNING

DURING THE REMOVAL OF THE CARBURETTOR COVER TAKE SPECIAL CARE NOT TO RELEASE THE SPRING ACCIDENTALLY.

- Remove the vacuum valve together with the diaphragm.



- Unscrew the bayonet joint 1/8 of a turn and remove, take out the spring and vacuum valve needle



- Remove the 4 screws indicated in the figure.

- Remove the chamber with the accelerating pump, its control and gasket.

- Remove the oil pump seal.
- Remove the intake and outlet valves of the intake pump from the tank

NOTE

CAUTION, THE ACCELERATION PUMP VALVES ARE MADE UP OF NOZZLES, SPRING AND BALL.

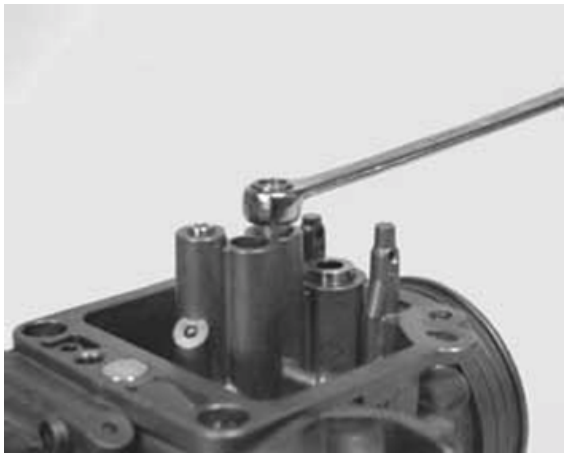
NOTE

AVOID REMOVING THE PISTON OF THE PUMP AND ITS CONTROL.

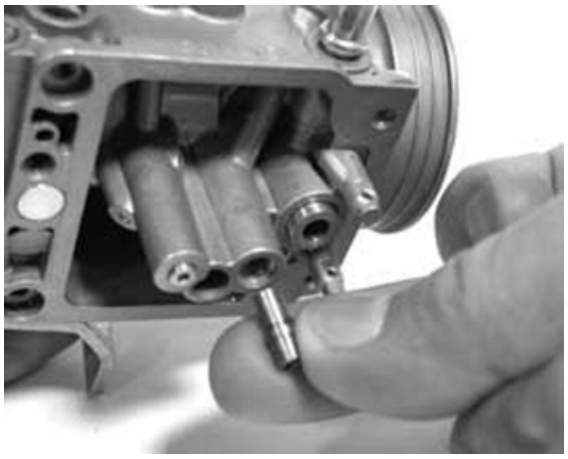
Adequately support the carburettor and using a rod and hammer remove the float pin acting from the throttle control side.

- Remove the float and the plunger.
- Remove the maximum nozzle

-Remove the maximum nozzle.



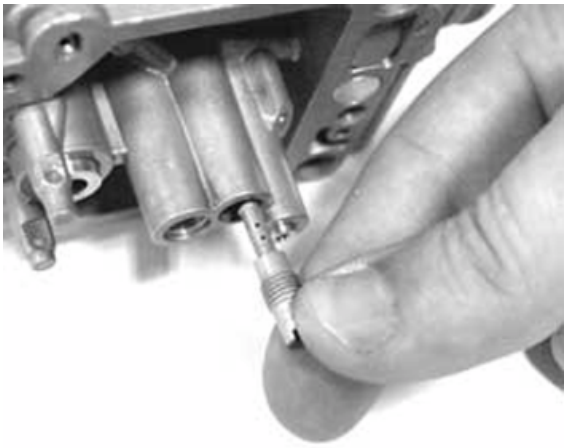
-Remove diffuser.



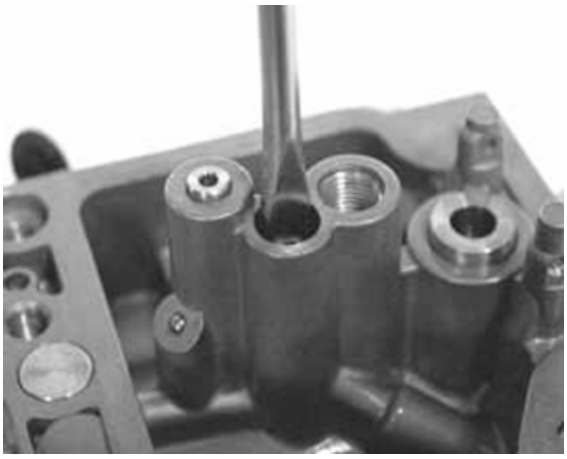
- Remove the sprayer.

NOTE

WHEN CLEANING THE CARBURETTOR BODY REMOVE THE SPRAYER TO AVOID LOSING PARTS. IF THE SPRAYER IS FORCED IN ITS HOUSING DO NOT ATTEMPT TO REMOVE IT AS THIS WILL ONLY DAMAGE IT.



-Remove the minimum nozzle.



- Remove the minimum flow set screw and the spring.

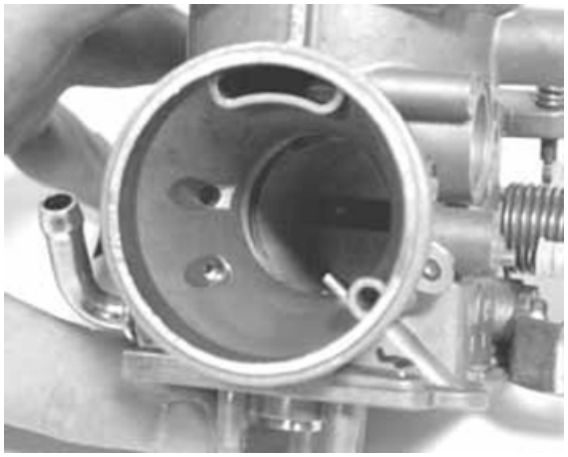
CAUTION

DO NOT ATTEMPT REMOVING PARTS EMBEDDED IN THE CARBURETTOR BODY SUCH AS: FUEL SUPPLY PIPE, PLUNGER HOUSING, STARTER NOZZLE, PIT COVER FOR PROGRESSIONS AND INLET NOZZLE, MINIMUM AND MAXIMUM AIR GAUGE, THROTTLE VALVE CONTROL SHAFT. DO NOT REMOVE THROTTLE-SHAFT CONNECTION SCREWS. THE FIXING SCREWS ARE CAULKED AFTER ASSEMBLY AND THEIR REMOVAL DAMAGES THE SHAFT.

Refitting the carburettor

- Before refitting, wash the carburettor body accurately with petrol and compressed air.
- Pay special attention to the fuel supply pipe and the plunger seat.

- For maximum circuit, check the air adjustment is correct as shown in the figure.



- For the minimum circuit, make sure the following points are properly cleaned: air gauging, outlet section controlled by flow screw, progression holes near the throttle valve.

- For the starter circuit, blow the connection pipe properly with the jet. This is necessary because the nozzle support hides other inaccessible internal calibrations.
- Blow the intake nozzle properly.

NOTE

THE ACCELERATION NOZZLE OUTLET IS EXTREMELY SMALL AND IS ORIENTED TO THE THROTTLE VALVE. NOZZLE INCORRECT ORIENTATION RESULTS IN INADEQUATE SPRAYING.

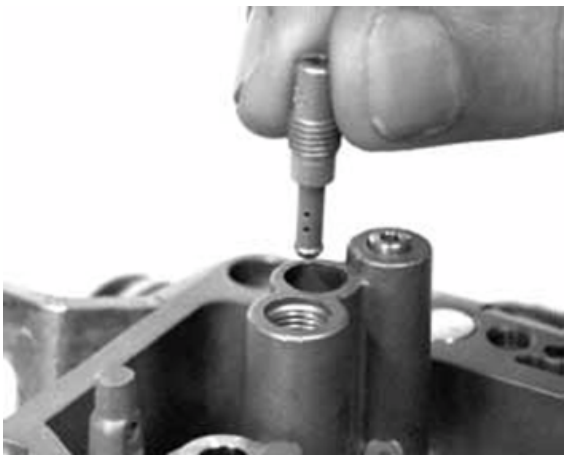
- Check that there are 5 closing ball joints for the operating pipes on the carburettor body.

- Check that the coupling surfaces, the tank and the diaphragm are not dented.
-Check that the depression valve housing pipe is not scratched.
- Check that the throttle valve and the shaft do not show abnormal wear.
- Check that the plunger seat does not show abnormal wear.
- Replace the carburettor in case of irregularities.
- Check that the return spring of the accelerating pump rocking lever is not deformed by over-stretching.

NOTE

TO AVOID DAMAGES, DO NOT INTRODUCE METAL OBJECTS IN THE ADJUSTED SECTIONS.

- Wash and blow the minimum nozzle properly and reassemble it.



- Properly wash and blow the components of the sprayer maximum circuit, the diffuser and the nozzle.
- Introduce the sprayer in the carburettor body with the shortest cylindrical part directed to the diffuser.
- Assemble the diffuser making sure the sprayer is being adequately inserted and lock it.
-Assemble the maximum nozzle.

- Check that the tapered pin does not show signs of wear on the sealing surfaces of the shock absorber pin and the return clamp.
- Replace the rod if worn out.

- Check that the float is not worn on the pin housing or on the contact plate with the plunger and that there are no fuel infiltration.
- Replace it in case of anomalies.

- Introduce the float with the rod on the fuel feeding tube side.

NOTE

INTRODUCE THE RETURN SPRING ON THE FLOAT PLATE ADEQUATELY

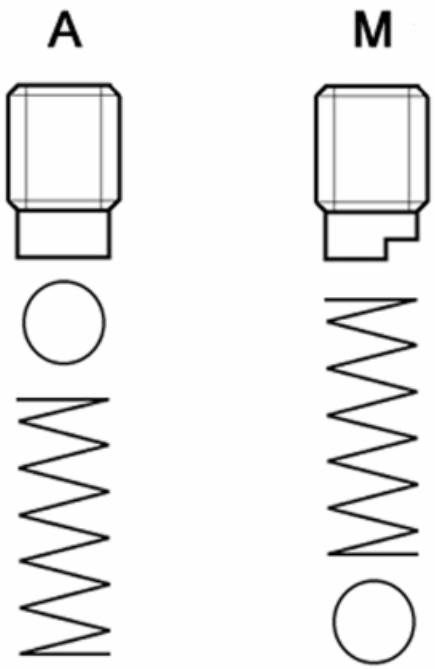
- Remove the drainage screw from the tank, wash and blow it properly and make sure the acceleration pump pipes are clean.
- Operate the acceleration pump piston repeatedly and blow with compressed air.
- Reassemble the acceleration pump valves following this order:

INTAKE VALVE (A)

- Spring
- Ball
- Nozzle

IN VALVE (M)

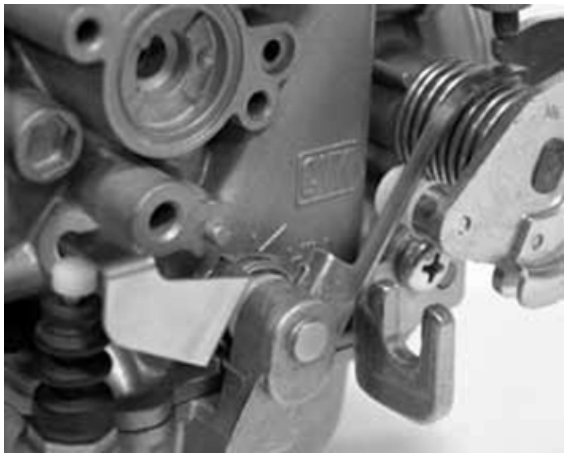
- Ball
- Spring
- Nozzle



NOTE

THE IN VALVE NOZZLE, CORRESPONDING TO THE ACCELERATION PUMP, IS MILLED.

-Check the screw tightness introducing a small amount of fuel in the tank.
- Assemble a new gasket on the tank.
- Assemble the tank on the carburettor body fastening the 4 screws.
- Check that the control roller is free to rotate in its own seat.



NOTE

MAKE SURE THE TANK GASKET IS CORRECTLY INTRODUCED

NOTE

AVOID DEFORMING THE ACCELERATION PUMP CONTROL ROCKING LEVER.

- Wash and blow the flow screw properly.
- Check that screw is not deformed and/or rusty.
- Assemble the spring on the screw.
- Screw the flow screw on the carburettor body.

- The screw final position should be determined by an exhaust fume analysis.
- Adjust the carburettor by turning the screw twice from the close position.

Level check

- Place the carburettor inclined as shown in the figure.

- Check that the float reference is parallel to the tank coupling surface
- If different positions are detected, change the plunger control metal plate direction to obtain the position described above.

Inspecting the valve and needle

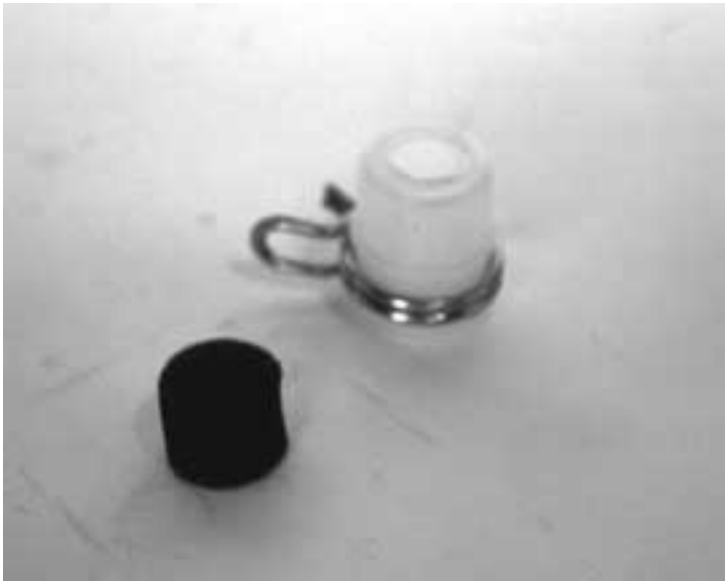
- Check that the tapered pin of the vacuum valve does not show wear.
- Check that the depression valve does not show threads on the external surfaces.
- Check that the vacuum intake hole is not clogged.
- Check that the diaphragm is not damaged or has hardened, otherwise replacement the whole valve.
- Insert the tapered pin into the vacuum valve housing.
- Reassemble the vacuum valve on the carburettor body taking care that the tapered pin is inserted into the sprayer.

NOTE

THE VALVE CAN BE INSERTED IN ONLY ONE POSSIBLE POSITION.

- Reassemble the spring with the pin lock.
- Remove the cover of the vacuum chamber being careful to correctly insert the spring in its place on the cover.
- Tighten the screws.

- Wash and blow dry the filter sponge of the ambient pressure intake.



- Reassemble the filter with its clamp.

- Wash and blow dry the starter support.

Assemble a new gasket on the carburettor body and tighten the 2 fixing screws.

Inspecting the automatic choke device

- Check that the automatic starter piston is not deformed or rusty.
- Check that the piston slides freely from the seat to the support.
- Check that the piston sealing gasket is not deformed.
- The starter must be more or less functional depending on the ambient temperature.
- Measure the protrusion of the piston as shown in the figure and check its corresponding value.
- Make sure that the starter is adjusted for the ambient temperature.
- The starter should disconnect progressively by means of electric heating.
- Check the starter resistance when adjusted to the ambient temperature.

With a 12V battery power the automatic starter and check that the piston protrudes as much as possible.

- The correct warm up time depends on the ambient temperature.
- If protrusion, resistance or timing values are different from the ones prescribed, replace the starter.
- Assemble the starter to the carburettor being careful to position the O-Ring correctly, insert the plate with the machined side contacting the starter, tighten the fixing screws.
- Position the starter as shown in the figure.
- Assemble the protection casing.

NOTE

TO CARRY OUT THIS CHECK PAY SPECIAL ATTENTION NOT TO GENERATE SHORT CIRCUITS USE A CABLE SECTION WITH A TERMINAL SUITABLE TO BE CONNECTED TO THE STARTER.

Characteristic

Starter pin travel

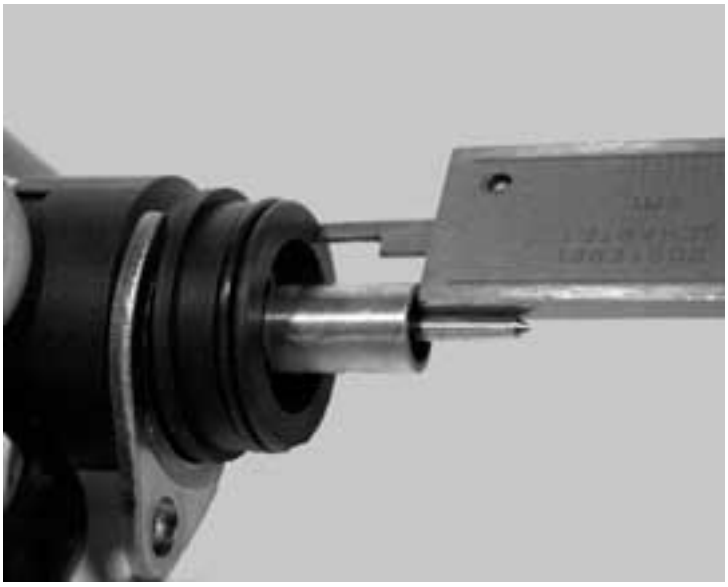
10 mm (at 24°)

Starter resistance

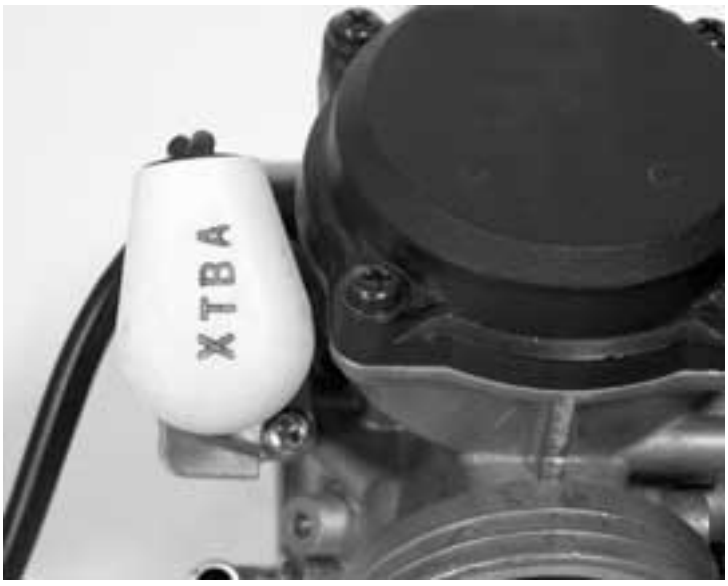
20 Ohm (at 24°)

Check the automatic starter: Keihin maximum time

5 min

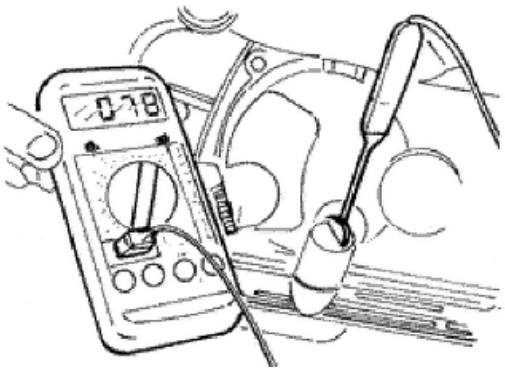


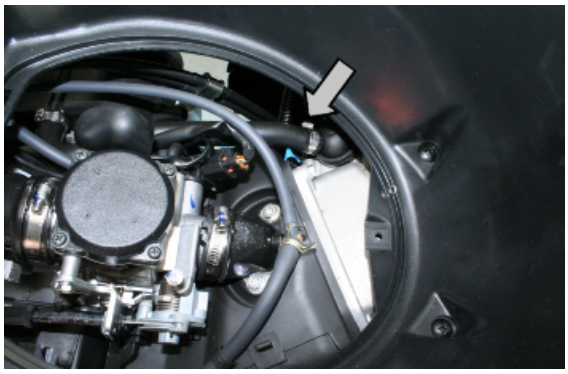

AUTOMOTIVE METER
21.7


XTBA

Adjusting the idle

- The engine does not require frequent idle speed adjustments, but it is essential to strictly follow certain rules when adjusting the idle speed.
- Before adjusting the carburettor make sure that the lubrication requirements and valve clearance are met, timing is respected, the spark plug is in optimum conditions, the air filter is clean and sealed, and the exhaust system is sealed.
- Warm up the engine letting it run at 50 Km/h for at least 5 minutes.
- Connect the multimeter thermometer (020331y) to the sump, using a cap with oil expressly prepared for probes.
- Start the engine and before adjusting idle speed, make sure that the oil temperature is between 70÷80 °C
- Using the rpm indicator or any other instrument (020332y), adjust the idle screw to obtain 1600 rpm ÷ 1700 rpm.





NOTE

THE WASTED SPARK IGNITION SYSTEM OFFERS REMARKABLE POWER. READINGS MAY NOT BE ACCURATE IF INADEQUATE RPM INDICATORS ARE USED. CORRECT COUPLING OF THE RPM INDICATOR WILL BE INDICATED WHEN IT CAN ALSO READ RPM OVER 6000 ÷ 8000

INDEX OF TOPICS

Front

Removing the front wheel

CAUTION

WHEN REMOVING OR REFITTING THE WHEEL, PAY SPECIAL ATTENTION NOT TO DAMAGE THE BRAKE CABLE, THE DISCS AND THE PADS. BEFORE CARRYING OUT THE FOLLOWING OPERATIONS, COOL DOWN THE ENGINE AND THE MUFFLER TO AMBIENT TEMPERATURE TO AVOID POSSIBLE BURNS.

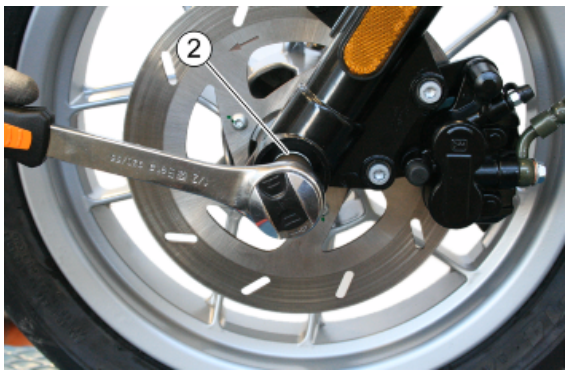
- Rest the vehicle on its centre stand.
- Place a support under the vehicle so that the wheel can move freely and the vehicle does not fall.

CAUTION

MAKE SURE THE SCOOTER IS STABLE AND FIRM. IF IT FALLS, IT MAY INJURY YOU OR OTHER PEOPLE, DAMAGE THE VEHICLE ITSELF OR ANY ADJACENT OBJECTS.

- Loosen the two locking screws of the wheel axle «1».

- Loosen the wheel axle fixing screw «2».
- Slide off the axle and remove the wheel.



CAUTION

NEVER TOUCH THE FRONT BRAKE LEVER ONCE THE FRONT WHEEL IS REMOVED. DOING SO MAY CAUSE THE CALLIPER PLUNGERS TO COME OUT AND THE BRAKE FLUID TO SEEP THROUGH.

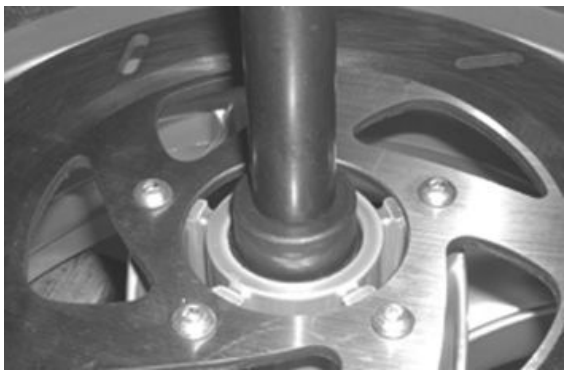
Front wheel hub overhaul

WHEEL BEARINGS

- Remove the front wheel.
- Keep the wheel level by means of two wooden wedges.
- With the appropriate pliers and tool remove the wheel bearing on the side the odometer detects movement.

- Slide off the internal spacer.
- Use appropriate handle, adaptor and guide to extract the bearing and the spacer bushing on the brake disc side; insert handle on the side the odometer detects movement.

- Check that the bearings do not show flaws or jamming. Otherwise, replace them.
- Check that the internal spacer does not show abnormal wear. Otherwise, replace it.



- With a hot air gun heat the seat of the bearing on the brake calliper side.
- With an appropriate tool refit the bearing on the brake disc side.
- Insert the spacer bushing on the brake disc side.

- With a hot air gun heat the seat of the bearing on the side the odometer detects movement.
- Insert the internal spacer with the centring ring facing the brake disc side.
- Use an appropriate tool to insert the bearing on the odometer movement detector side.

Specific tooling

001467Y009 Bell for 42 mm outside diameter bearings

001467Y014 Pliers to extract Ø15 mm bearings

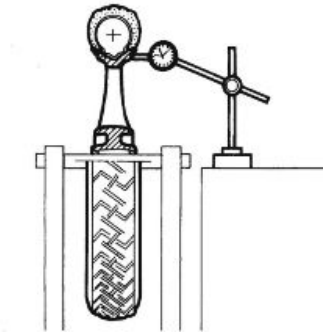
020357Y 32 x 35 mm adaptor

020376Y Adapter handle

020412Y 15 mm guide

020456Y Ø24 mm adaptor

WHEEL RIM INSPECTION



- Make sure that the rim is not deformed or cracked. Replace it if necessary.
- Check wheel eccentricity. If tolerance limits are exceeded, check the rim and the bearings. If necessary, replace the wheel.

Characteristic

Eccentricity limits:

Vertical: 2 mm (0.07874 in)

Horizontal: 2 mm (0.07874 in)

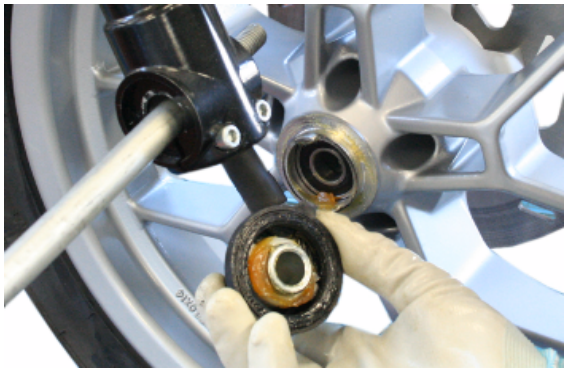
- Check the wheel balance.
- Check wheel on the wheel balancer and turn it several times, paying attention to its position when it stops. If the wheel is steadily balanced, it will not always stop at the same point. If it always stops at the same point, the wheel is not balanced and must be balanced. Place weights on the lightest part of the wheel so that it does not stop any more at a particular point after being turned several times.

Refitting the front wheel

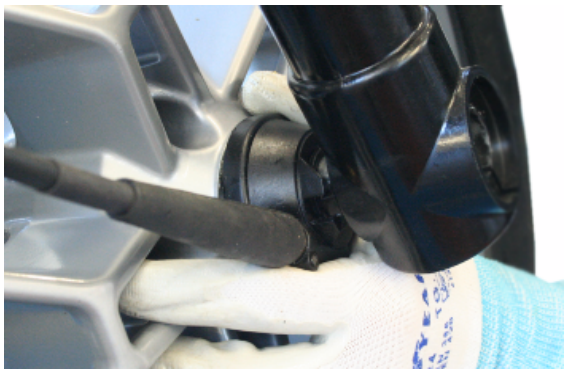
CAUTION

WHEN REMOVING OR REFITTING THE WHEEL, PAY SPECIAL ATTENTION NOT TO DAMAGE THE BRAKE CABLE, THE DISCS AND THE PADS. BEFORE CARRYING OUT THE FOLLOWING OPERATIONS, COOL DOWN THE ENGINE AND THE MUFFLER TO AMBIENT TEMPERATURE TO AVOID POSSIBLE BURNS.

- Apply a thin layer of lubricating grease inside the speedometer transmission, in the external seats of the wheel hub and on the wheel axle.



- Place the speedometer transmission on the front wheel
- Place the wheel between the fork rods by inserting correctly the odometer transmission in the housing on the fork rod.



- Insert the fork shaft and screw the nut «1» to the prescribed torque.

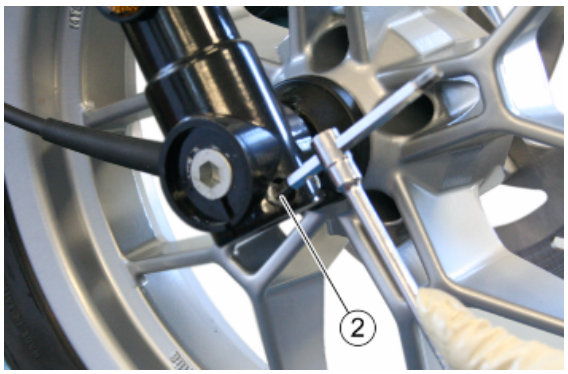
Locking torques (N*m)

Wheel pin to fork fixing nut 46.5

- Tighten the two locking «2» screws of the wheel axle.

Locking torques (N*m)

Wheel pin hub fixing screw 10



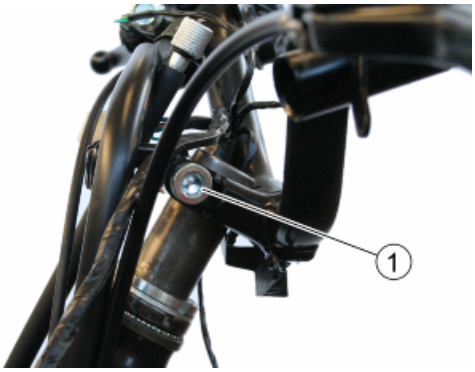
Handlebar

Removal

NOTE

IF THE HANDLEBAR IS REMOVED TO TAKE OUT THE FORK, IT IS NOT NECESSARY TO REMOVE THE BRAKE TRANSMISSION AND THE SUPPLY CABLES OF THE STOP BUTTONS.

- Remove the front and rear handlebar covers.
- Disconnect the brakes transmission and the supply cables of the stop buttons.
- Unscrew the nut «1» and collect the washer.

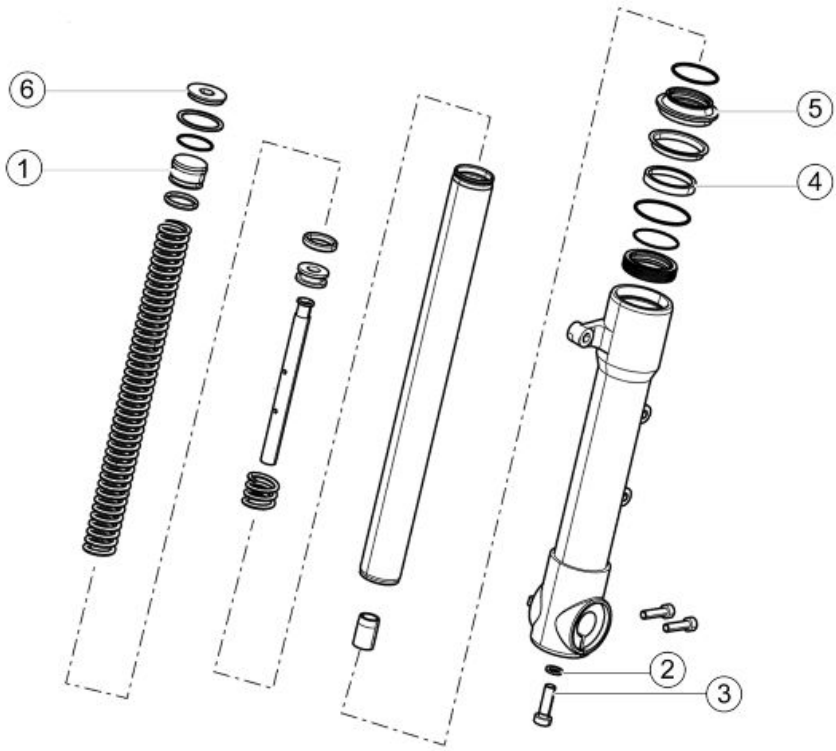


- To refit, carry out the removal operations but in reverse order and tighten the screw «1» to the prescribed torque.

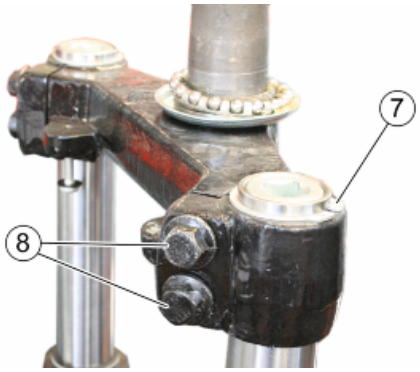
Locking torques (N*m)

Handlebar to headstock fixing nut 52.5

Front fork



REMOVAL



- Remove circlip «7», and the two screws «8» and slide off the stem.
- Undo screw «6».
- Remove the components including the spring.
- Drain the oil into a collecting container.
- Undo screw «3», remove the stem and the pumping member.

SERVICE

Stem

- Check the sliding surface for scorings and/or scratches.
- If the scorings are deep, replace the stem.

Sleeve

- Check that it is not damaged and/or cracked.
- If there are signs of excessive wear or damage, replace the affected component.
- Replace oil seal «4» and the dust guard «5» and fit it once you have lubricated its seat.
- Replace the O-ring on cap «1»
- Replace sealing washer «2»

FITTING

- Refit the stem and the pumping member and tighten screw «3» with its washer «2».
- Pour the recommended quantity of specific oil into the stem unit.
- Insert the spring and components.
- Undo screw «6».

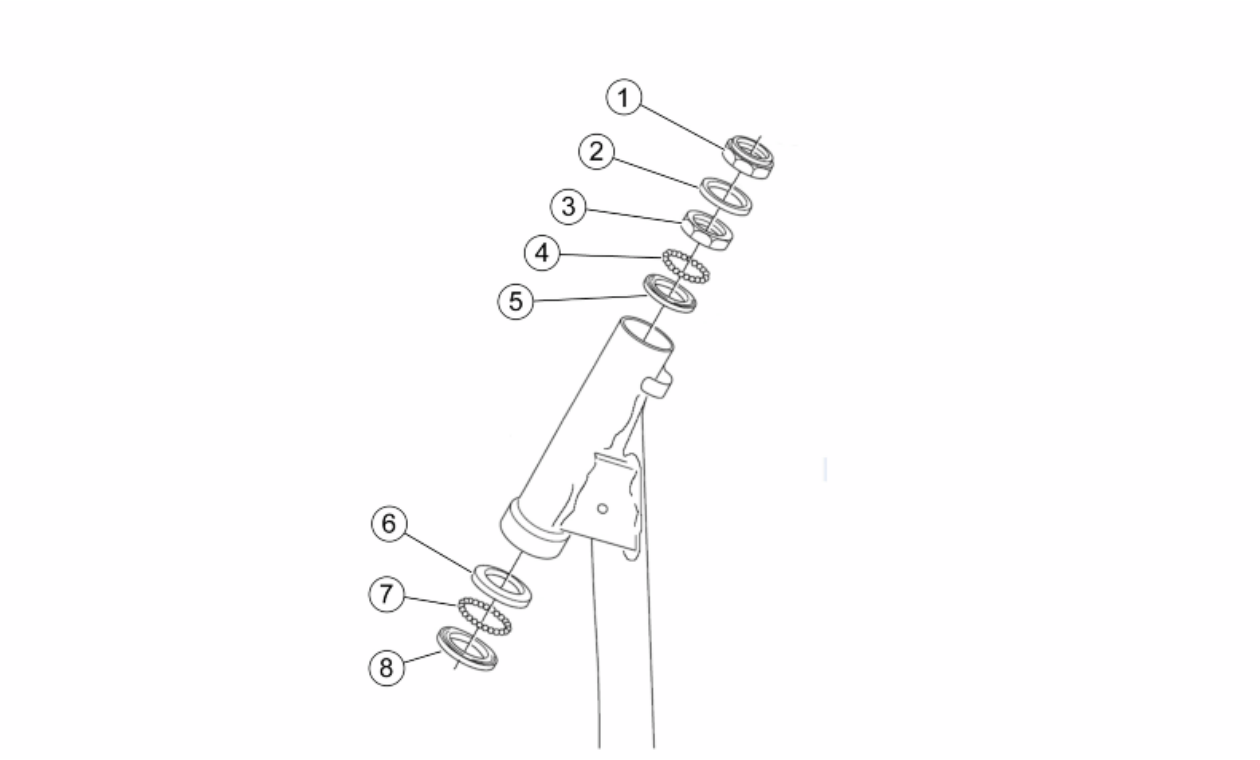
Characteristic

Depth of fork oil level from the rim - without spring - fork included

85 mm

Steering column

Removal

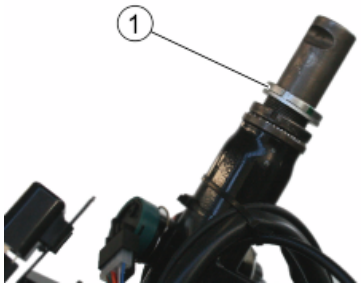


- Rest the vehicle on its centre stand.
- Place a support under the vehicle so that the wheel can move freely and the vehicle does not fall.

CAUTION

MAKE SURE THE SCOOTER IS STABLE AND FIRM.

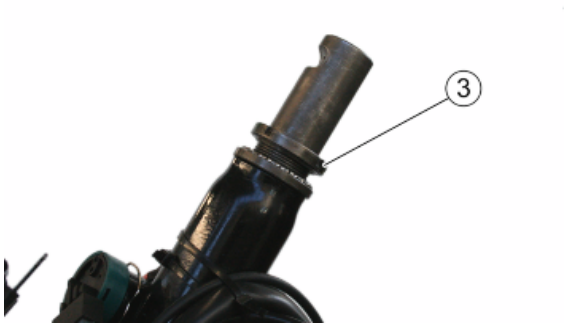
- Remove the handlebar.
- Remove the front brake calliper.
- Release the fork from the odometer cable and from the front brake calliper pipe.
- Loosen the tightening ring nut «1» and collect the shim washer «2».



Locking torques (N*m)

Upper ring nut 37.5

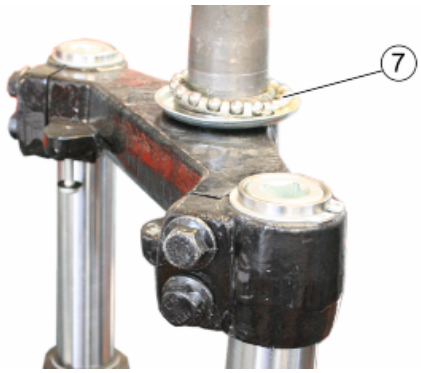
- Remove the upper ring «3» of the upper bearing.
- Slide the fork and collect the cage with the balls of the upper bearing.



Locking torques (N*m)

Lower ring nut 13

- Remove the balls retainer «7» of the lower bearing from the steering tube .



- Insert a punch inside the steering tube housing on the chassis and take out the bearing seats on the chassis «5» e «6» by tapping with a hammer.
- Carefully wash the bearings components.
- Check wear status of the upper rings «2» and «6» and of the lower rings «5» and «8» of the bearings.
- To refit, carry out the removal operations but in reverse order:
- Appropriately lubricate the bearings with recommended products.

Steering bearing

Checking bearing clearance

To check the steering, it is necessary to:

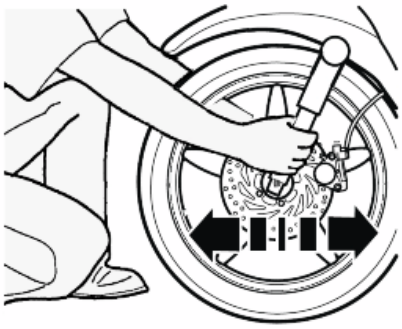
- Park the vehicle on its centre stand.
- Place the support under the scooter with a soft cloth between them so that the front wheel can move freely and the scooter does not fall.

CAUTION

MAKE SURE THE SCOOTER IS STABLE AND FIRM.

NOTE

WHEN CARRYING OUT THIS OPERATION, PAY ATTENTION NOT TO MISTAKE THE CENTRE STAND CLEARANCE WITH THAT OF THE FORK. REPEAT THIS TEST SEVERAL TIMES BEFORE DECIDING IF THE FORK HAS TO BE ADJUSTED.



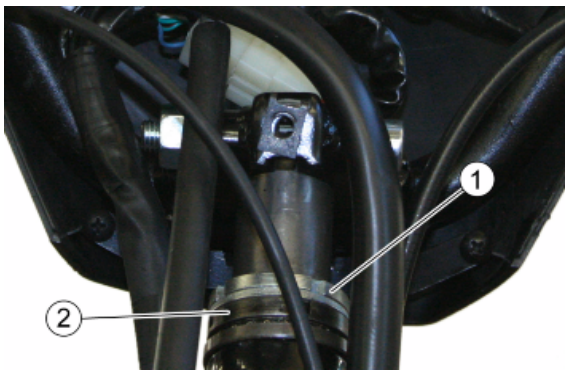
- Hold the fork sleeves and pull the fork forwards and backwards, with the steering in forward position.
- There should be no clearance, neither forwards nor backwards. If there is some clearance, the fork bearings must be adjusted.

Adjusting bearing clearance

- Remove the shield and the shield back plate.
- Loosen the tightening nut «1» using an adequate open wrench.

CAUTION

DO NOT TIGHTEN THE ADJUSTMENT NUT «2» TOO MUCH BECAUSE IT MAY DAMAGE THE STEERING BEARINGS.



- Tighten the adjustment nut «2» until the the bearing clearance is completely eliminated.
- Check clearance as described above. Make sure the front fork can move all long its stroke, from left to right or vice versa, rotating freely and smoothly.
- Keep the adjustment nut «2» into position using an adequate wrench and tighten the tightening nut «1». Check bearing clearance again after tightening the nut to make sure the adjustment is still correct.

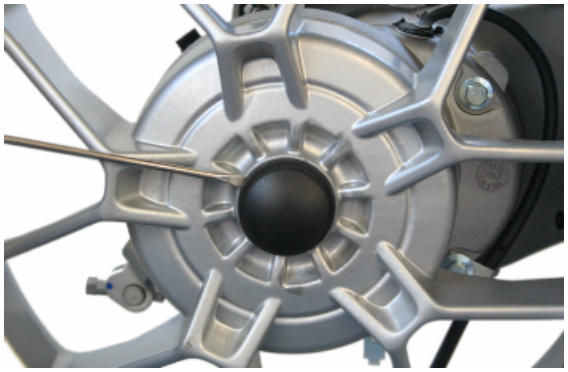
Locking torques (N*m)

Lower ring nut 13 Upper ring nut 37.5

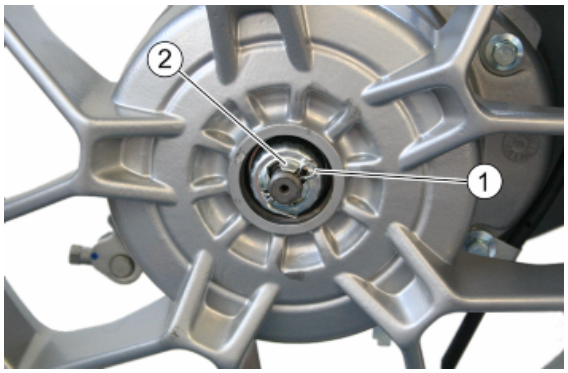
Rear

Removing the rear wheel

- Rest the vehicle on its centre stand.
- Remove the muffler.
- Use a screwdriver to remove the plastic cap.



- Remove the split pin «1» and the cap «2».



- Pull the rear brake and keep it pulled with a clamp.
- Unscrew the wheel fixing nut and collect the washer.
- Take out the wheel from its housing.

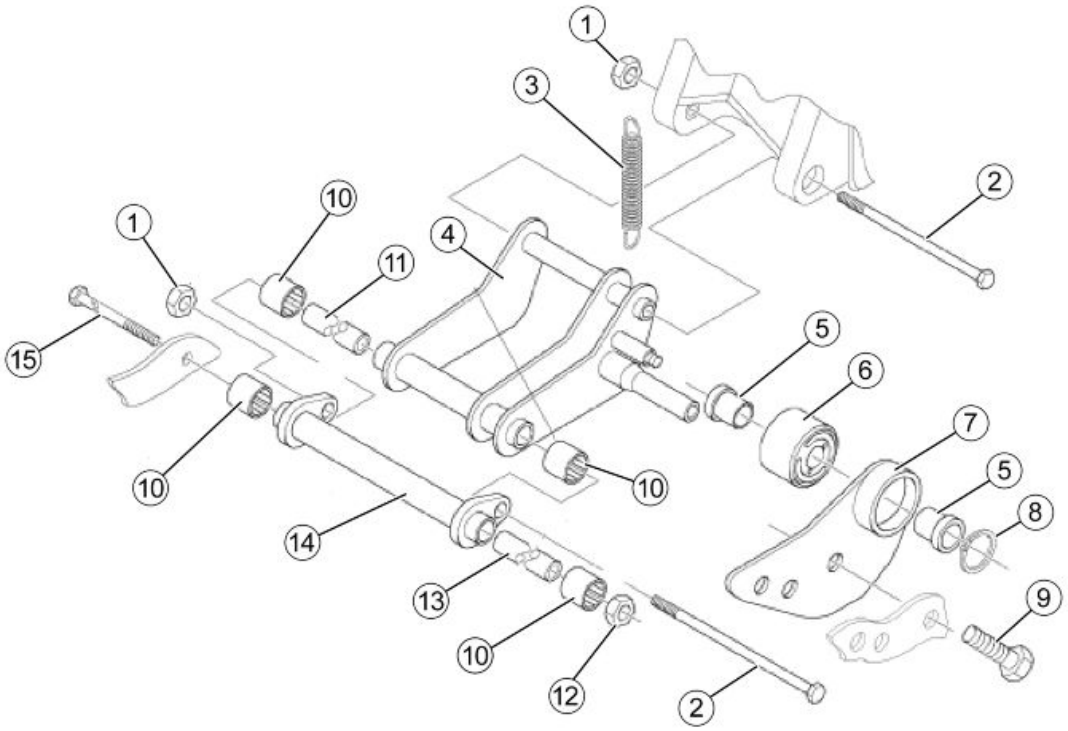
- To refit, carry out the removal operations but in reverse order, be careful to use a new split pin.

Locking torques (N*m)

Rear wheel to hub fixing nut 115

Swing-arm

Removal

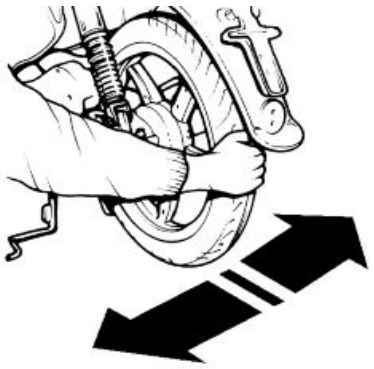


1. Nut
2. Screw
3. Spring
4. Rod engine attachment
5. Bushing
6. Buffer
7. Bracket
8. Seeger ring
9. Hexagonal screw
10. Needle bearing
11. Spacer
12. Nut
13. Spacer
14. Rod chassis attachment
15. Screw

Overhaul

Periodically check the pin, fulcrum, engine and bearings clearance. To carry out these operations, proceed as follows:

- Park the vehicle on its centre stand.
- Hold the wheel firmly and try to move it perpendicularly into the stroke direction.
- If there is any clearance, check all the retainers that connect the support.



Shock absorbers

Removal

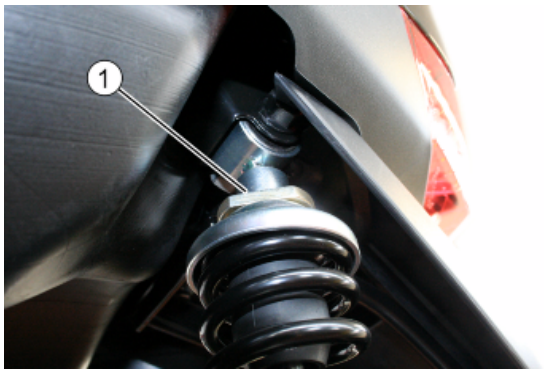
CAUTION

HOLD THE REAR PART OF THE FRAME.

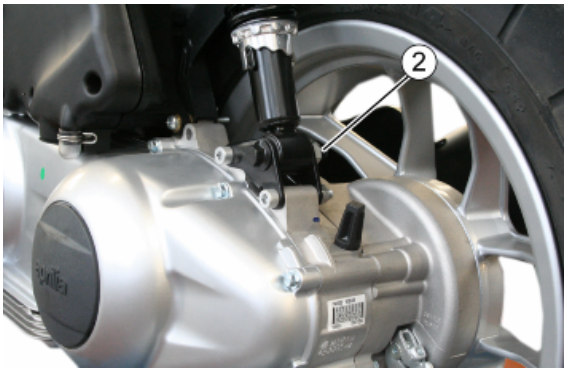
CAUTION

PLACE A SUPPORT OF SUITABLE THICKNESS UNDER THE REAR WHEEL TO PREVENT THE ENGINE FROM FALLING.

- Rest the vehicle on its centre stand.
- Remove the tail section and unscrew nut «1» fixing the shock absorber to the chassis.



- Unscrew nut «2» fixing the shock absorber to the engine.



- Follow the removal operations in reverse order for the fitting, screwing the nuts to the prescribed torque.

Locking torques (N*m)

Upper part of the shock absorber retaining nut 22.5 Lower part of the shock absorber retaining nut 42.5

Centre-stand

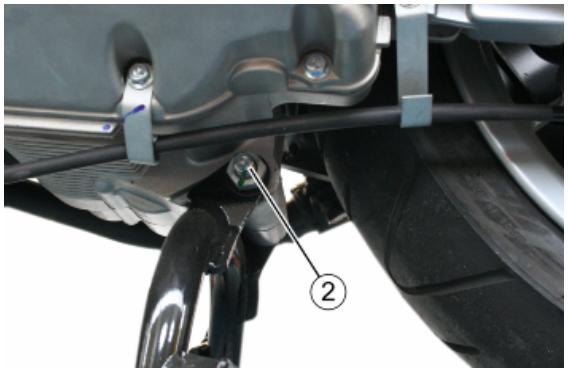
- Rest the vehicle on its centre stand.
- Place a support under the vehicle so that it does not fall after the centre stand is removed.

CAUTION

MAKE SURE THE SCOOTER IS STABLE AND FIRM. IF IT FALLS, IT MAY INJURY YOU OR OTHER PEOPLE, DAMAGE THE VEHICLE ITSELF OR ANY ADJACENT OBJECTS.

- Remove the two springs «1».

- Unscrew the nut «2» and slide off the pin.



- To refit, carry out the removal operations but in reverse order and tighten the nut to the prescribed torque.

Locking torques (N*m)

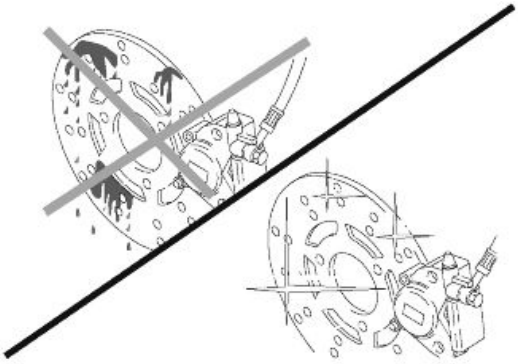
Central stand to chassis fixing screw 42.5

INDEX OF TOPICS

Interventions rules

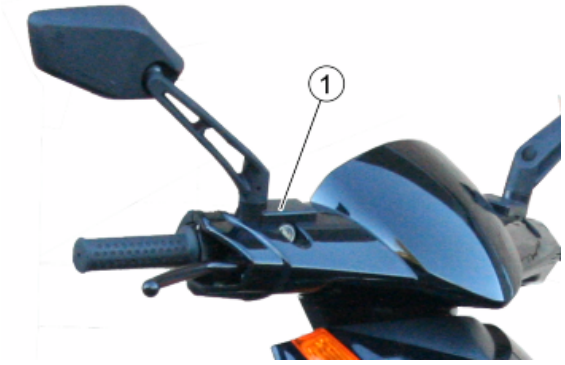
When pads are worn, the brake fluid level in the reservoir decreases to automatically compensate pad wear.

The front brake fluid reservoir «**1**» is located on the end section to the right of the handlebar next to the front brake lever.



CAUTION

NEVER USE THE SCOOTER IF THERE IS A FLUID LEAK ON ANY SYSTEM PART.



CAUTION

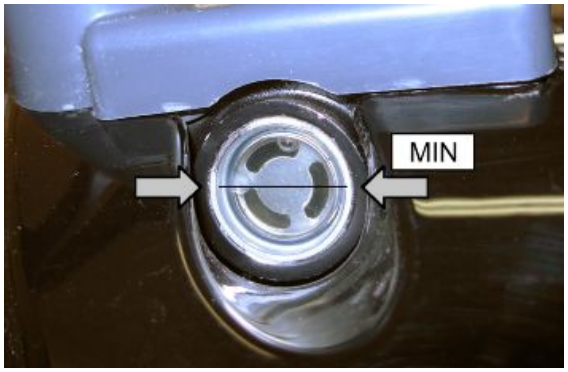
WHEN PADS ARE WORN, THE BRAKE FLUID LEVEL DECREASES PROGRESSIVELY TO COMPENSATE PAD WEAR.

If the fluid does not reach the **'MIN'** reference mark:

- Check brake pads for wear.

If there is no need to replace any pads/discs, check the braking system to determine the cause of the problem, by checking:

- the brake pipe condition. Mainly check if there are broken or cracked areas;
- the connections are properly tightened;
- the connections may exhibit leaks;
- the calliper and the reservoir may exhibit leaks;



- the bleed screw may exhibit leaks. If dripping is detected, tighten to the appropriate tightening torque;
- the fuel tank caps for possible leaks and the gaskets conditions.

After repairing the brake:

- Check and bleed the system.
- Top up the reservoir with an appropriate brake fluid.

Front brake calliper

Removal

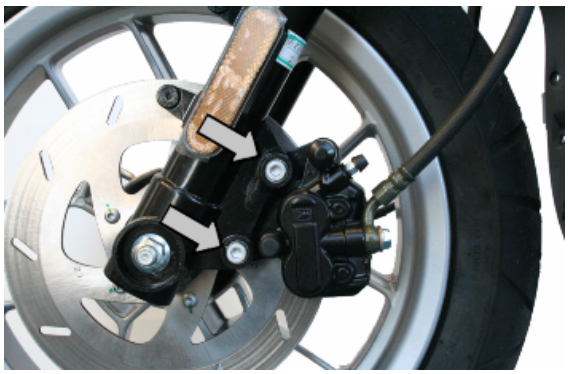
CAUTION

THE OPERATIONS REFER TO ONLY ONE BRAKE CALLIPER, BUT APPLY TO BOTH CALLIPERS.

- Undo the two screws indicated and remove the brake calliper.

NOTE

SHOULD IT BE NECESSARY TO REPLACE THE CALLIPER, FIRST LOOSEN THE JOINT CONNECTING THE PIPE TO THE BRAKE CALLIPER.



Refitting

- To fit, follow the removal steps but in reverse order, and tighten the locking screws to the prescribed torque using the recommended product.

Recommended products

Loctite 243 Medium strength threadlock

-

Locking torques (N*m)

Front brake calliper fixing screw 25

- If the calliper is disconnected from the brake pipe:

CAUTION

ALWAYS USE NEW GASKET WASHERS FOR THE BRAKE PIPE JOINT.

CAUTION

ONCE REFITTING IS FINISHED, BLEED THE SYSTEM.

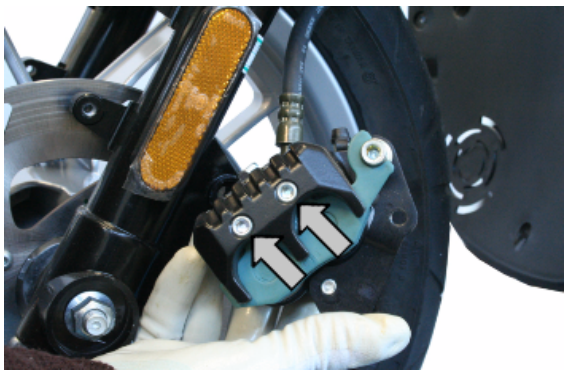
Locking torques (N*m)

Brake fluid pipe-calliper fitting 20 ÷ 25

Front brake pads

Removal

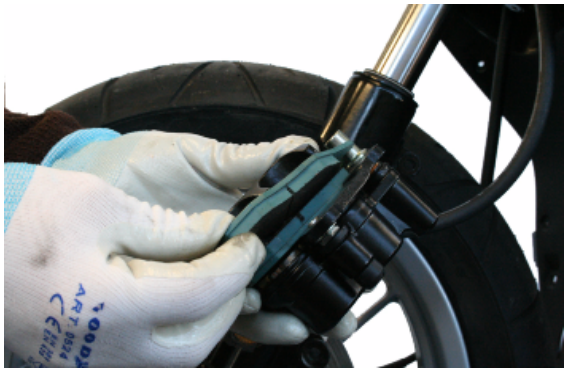
- Remove the brake calliper.
- Undo the two screws indicated.



- Remove the brake pads.

CAUTION

AFTER REMOVING THE PADS, DO NOT OPERATE THE BRAKE CONTROL LEVER; OTHERWISE, THE CALLIPER PLUNGER COULD GO OUT OF ITS SEAT RESULTING IN BRAKE FLUID LEAKAGE.

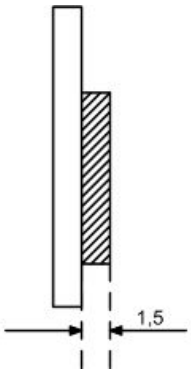


- Check friction material for appropriate thickness. If thinner than the minimum value, replace it.

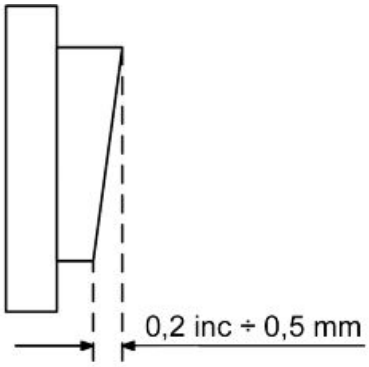
Characteristic

Friction material minimum thickness

1.5



- In case of uneven wear, replace the brake pads when the friction material thickness difference is 0.5 mm.



CAUTION

ALWAYS REPLACE BOTH PADS AND MAKE SURE THEY ARE CORRECTLY POSITIONED INSIDE THE CALLIPER.

Refitting

- To refit, carry out the removal operations but in reverse order and tighten the locking screws to the prescribed torque.

Locking torques (N*m)

Brake pad locking screws 15 ÷ 20

Fill - Bleeding the braking system

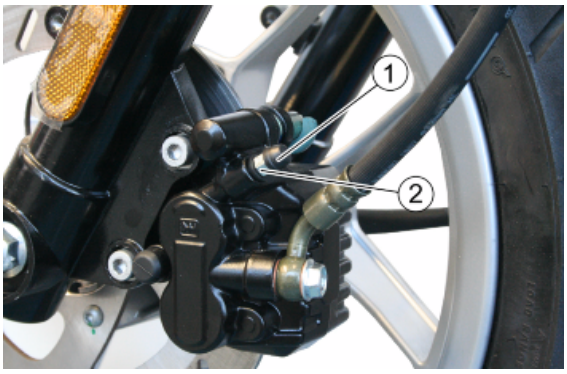
NOTE

IF THERE IS AIR IN THE HYDRAULIC SYSTEM, THE WATER WILL ABSORB MOST OF THE POWER OF THE BRAKE MAIN CYLINDER AND THEREFORE, IT WILL REDUCE THE CALLIPER PERFORMANCE WHEN BRAKING. THE PRESENCE OF AIR IS SIGNALLED BY THE 'SPONGINESS' OF THE BRAKE CONTROL AND POOR BRAKING EFFICIENCY.

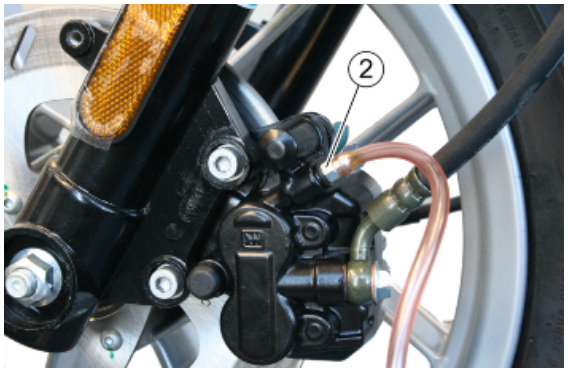
CAUTION

CONSIDERING THE DANGER POSED FOR VEHICLE AND RIDER, IT IS STRICTLY NECESSARY TO BLEED THE HYDRAULIC SYSTEM AFTER REFITTING BRAKES AND CARRYING OUT REGULAR MAINTENANCE OPERATIONS.

- Remove the protection cap «1» from the bleeder spout «2».



- Connect a transparent pipe to the bleeder «2».



CAUTION

DO NOT DIRT THE PADS OR THE DISC WITH BRAKE FLUID.

- Keep the free part of the glass tube in a clean container.
- Pull the brake lever slowly «5» all along its stroke two or three times, then keep it pulled to the fullest.

CAUTION

LOOSEN THE BLEED PLUG SPOUT «2» AND CHECK THE RESERVOIR BRAKE FLUID LEVEL «6». DO NOT EMPTY THE RESERVOIR COMPLETELY SINCE THIS MAY FURTHER CAUSE AIR TO ENTER THE BRAKING SYSTEM.

- Loosen the bleed plug spout «2» and check if there are bubbles in the glass tube.

CAUTION

BEFORE RELEASING THE BRAKE LEVER «5», CLOSE THE BLEED PLUG «2» TO PREVENT WATER FROM ENTERING THE BRAKE SYSTEM.

- When the brake fluid that comes out is homogeneous, without bubbles, it means air has successfully been eliminated from the system. Close the bleed plug «2» accurately, and tighten it correctly.

NOTE

REPEAT THE LAST TWO OPERATIONS UNTIL THE BUBBLES ARE TOTALLY ELIMINATED.

- Refit the protection cap «1» on the bleed plug spout «2».
- Check the brake fluid level.

CAUTION

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

CAUTION

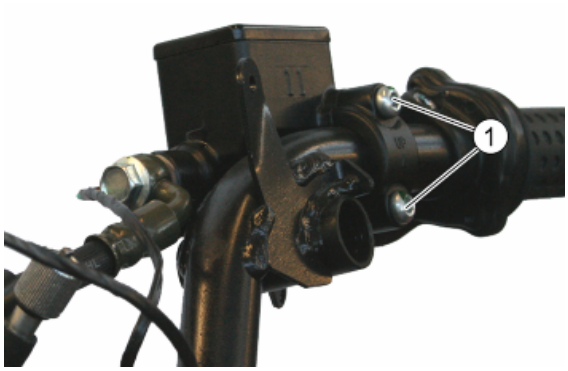
PAY ATTENTION TO THE DISC AND THE FRICTION MATERIAL MAKING SURE THEY ARE NOT DIRTY OR GREASED, SPECIALLY AFTER MAINTENANCE OPERATIONS OR INSPECTION.

Front brake pump

Removal

- Remove the front and rear handlebar covers.
- Remove the brake pipes and the contacts of the stop light switch.

- Undo the two screws «1».



To refit, carry out the removal operations but in reverse order and tighten the screws to the prescribed torque.

ONCE REFITTING IS FINISHED, BLEED THE SYSTEM.

Locking torques (N*m)

Brake pump to handlebar fixing screw 8.05 Brake pipe to brake pump fixing screw 18

Rear drum brake

- Remove the rear wheel.
- Hold the lower shoe and slide it with the upper one.

For fitting:

- First assembly two shoes and the springs then place them on the pin and on the cam.

To replace the transmission:

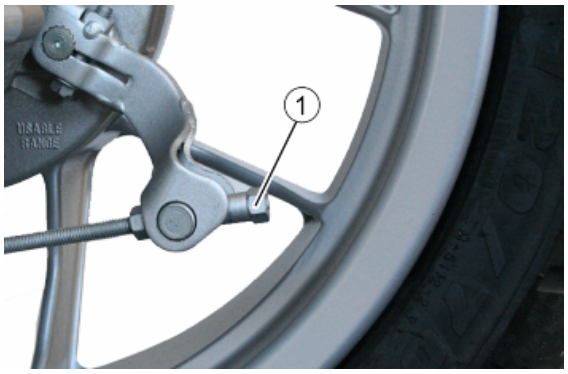
- Remove the front handlebar cover.
- Loosen the brake set screw
- Release the transmission from its clamps to the engine and from its clamps to the chassis.
- Adjust the drum brake activation point.

Locking torques (N*m)

Rear brake adjustment nut 5

To adjust the drum brake:

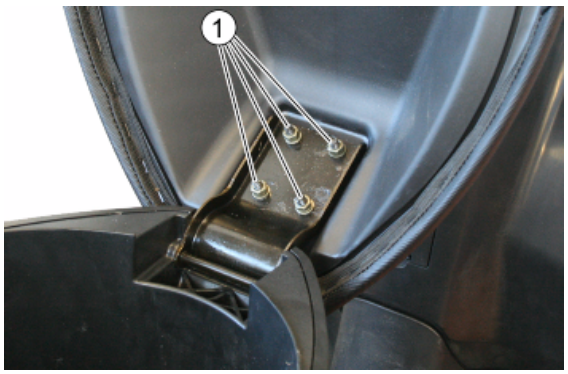
- Unscrew the lock nut.
- Adjust the activation point of the rear drum brake by acting on the set screw. 1
- With the brake lever released, the wheel should rotate freely.



INDEX OF TOPICS

Seat

- Remove the four screws «1» shown in figure and collect the washers.



Locking torques (N*m)

Saddle plate fixing nut 10

Rear rack

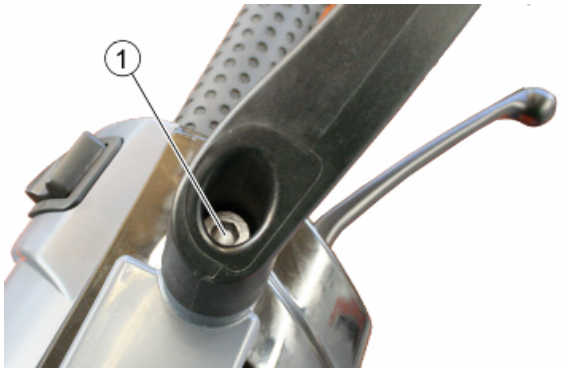
- Remove the three screws «1» shown in figure and collect the washers.

Locking torques (N*m)

Passenger handgrip fixing screw 20.5

Driving mirrors

- Undo the screw «1» and remove the rear view mirror.
- Collect the cover and spacer.

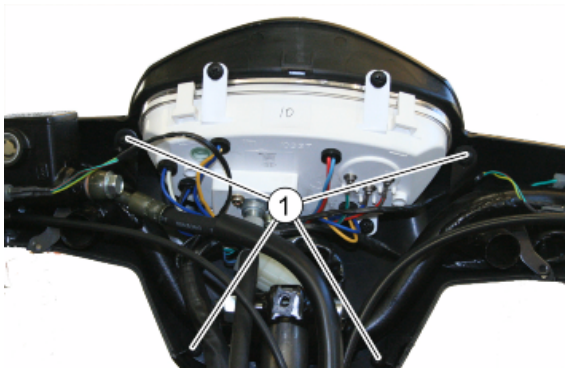


Locking torques (N*m)

Mirror fixing screw 25

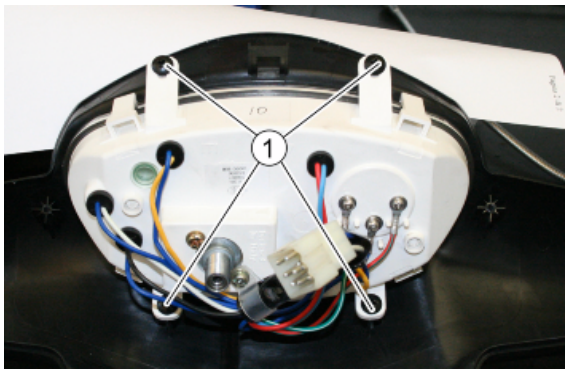
Rear handlebar cover

- Remove the mirrors.
- Remove the front handlebar cover.
- Undo the four screws «1» and release it from the connector and from the odometer cable.



Instrument panel

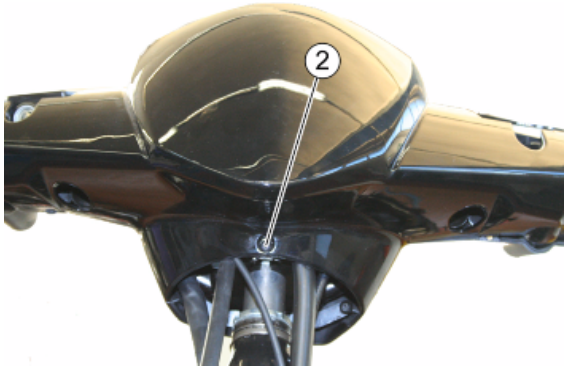
- Remove the front handlebar cover.
- Undo the four screws «1».



Front handlebar cover

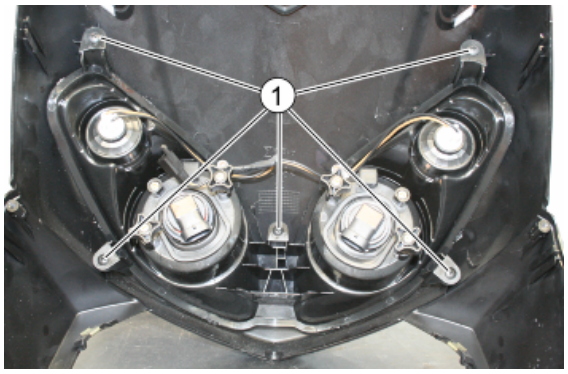
- Remove the rear-view mirrors.
- Undo the two screws «1».

- Undo the screw «2».



Headlight assy.

- Remove the legshield.
- Undo the five screws «1».

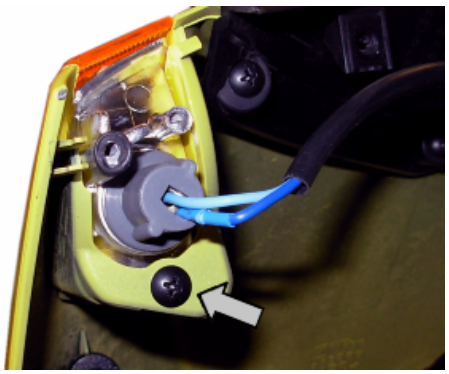


Front turn indicators:

- Remove the legshield.
- Undo the indicated screw.

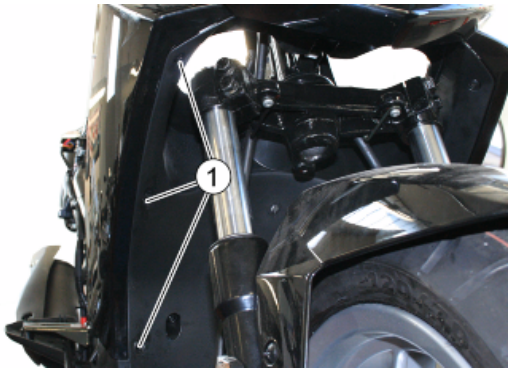
To replace the bulb:

- Slide off the rubber bulb holder.
- Hold the bulb, press it and turn it anti-clockwise.

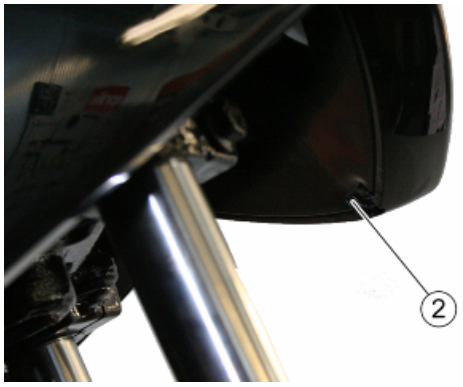


Legshield

- Remove the shield back plate.
- Working from the front wheel well internal side, undo the three screws «1» from both sides of the vehicle.



- Working from the front wheel well internal side, undo the screw «2».

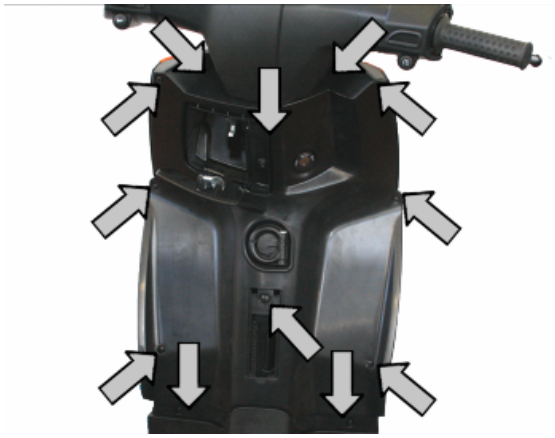


Knee-guard

- Undo the twelve screws indicated and remove the shield back plate.
- Before fitting the shield back plate, remove the footrest fixing screws in order to insert the two plastic parts.

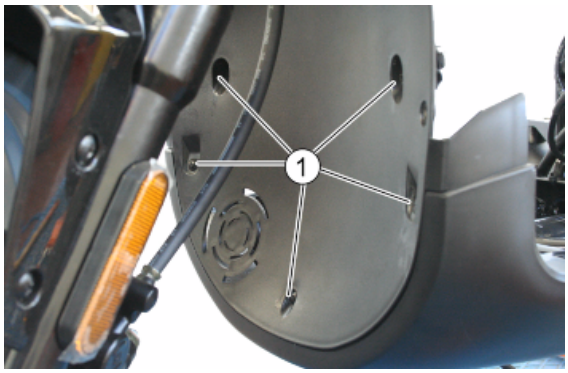
NOTE

UPON FITTING, REMEMBER TO CONNECT THE FRONT TOP BOX OPENING TRANSMISSION.

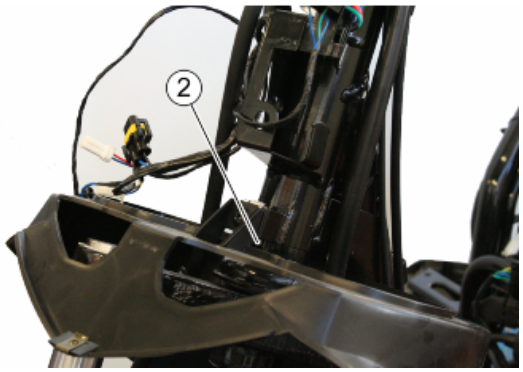


Front wheel housing

- Remove the legshield.
- Remove the front mudguard.
- Remove the front wheel.
- Undo the five screws «1».

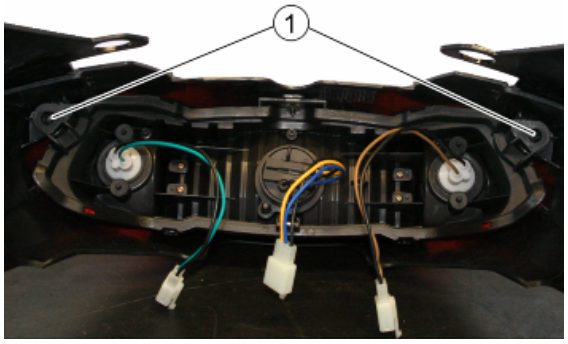


- Undo the screw «2».

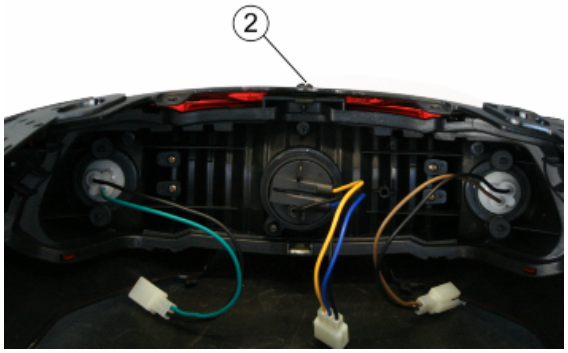


Taillight assy.

- Remove the luggage rack.
- Remove the side fairings.
- Undo the two screws «1» and remove the rear light unit from the side fairings.

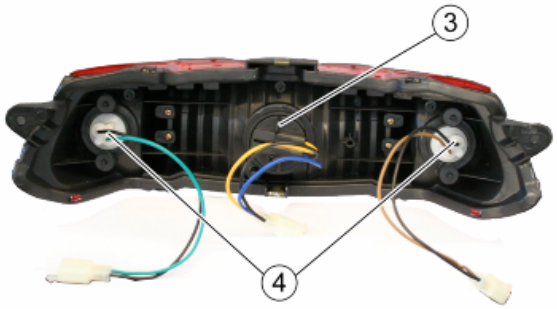


- Undo the screw «2» and remove the taillight fairing.



Inside the rear light unit there are:

- One position light/stop light bulb «3».
- Two turn indicator bulbs «4».



To replace the tail/stop bulb:

- Hold the bulb holder, turn it anticlockwise and slide it off.

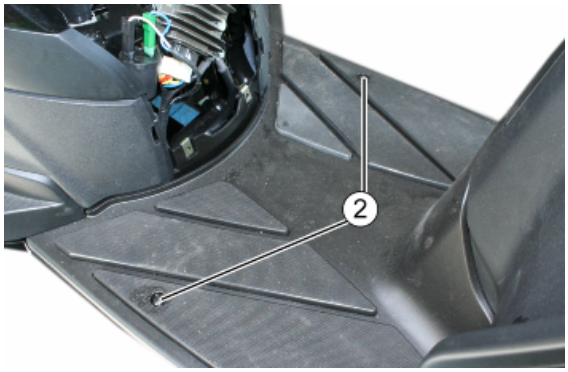
- Hold the bulb, press it and turn it anticlockwise.

To replace the turn indicator bulbs:

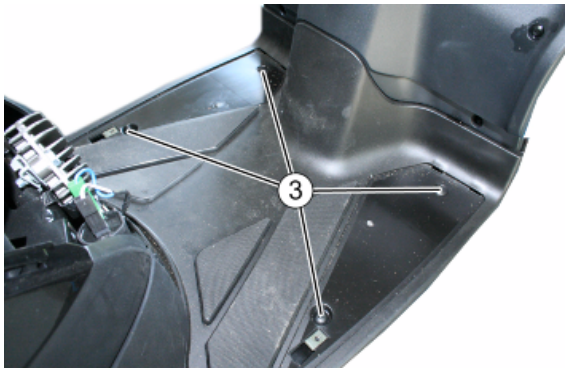
- Hold the rubber bulb holder, turn it anticlockwise and slide it off.
- Hold the bulb and slide it off.

Footrest

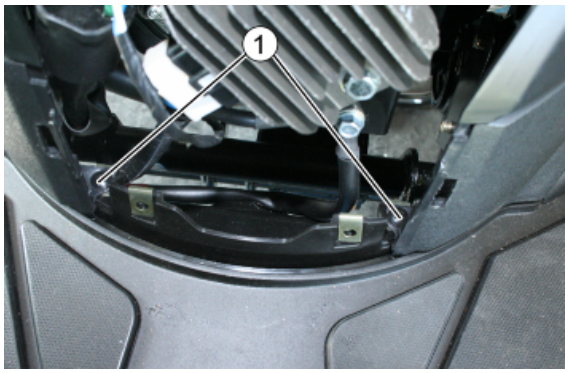
- Undo the screw «2» and remove the protection.



- Undo the four screws «3».

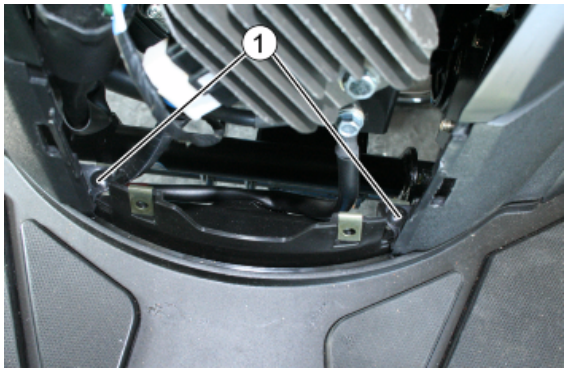


- Remove the front knee-guard panel.
- Remove the rear central cover.
- Remove the two screws «1».

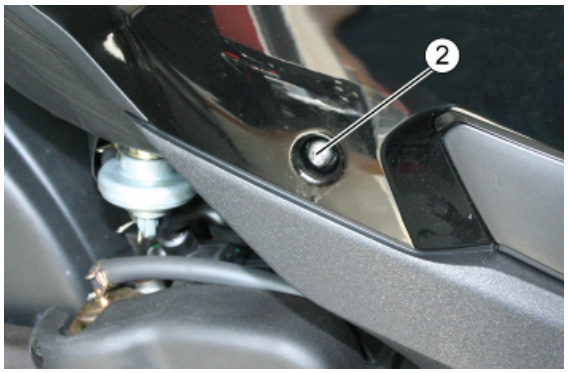


Side fairings

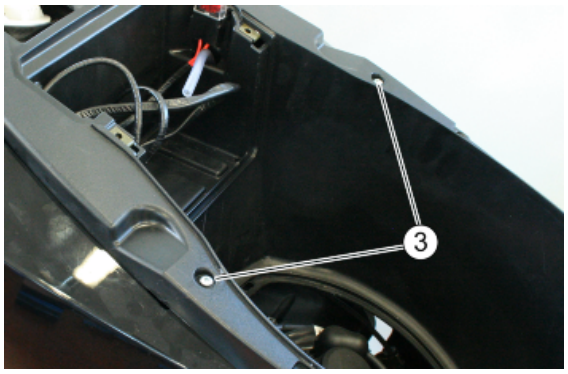
- Remove the luggage rack.
- Remove the rear central cover.
- Undo the two screws «1».



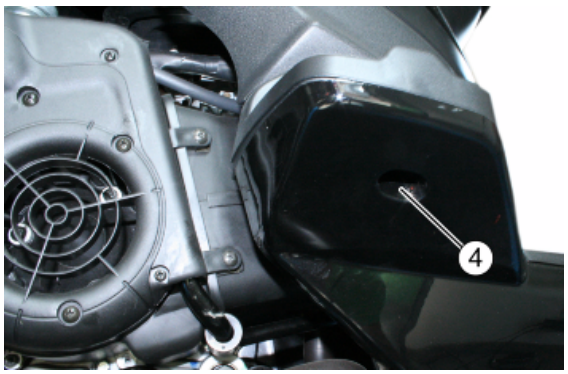
- Undo the side screw «2» from both sides of the vehicle.



- Undo the two screws «3».
- Release the helmet compartment from the cable harnesses.

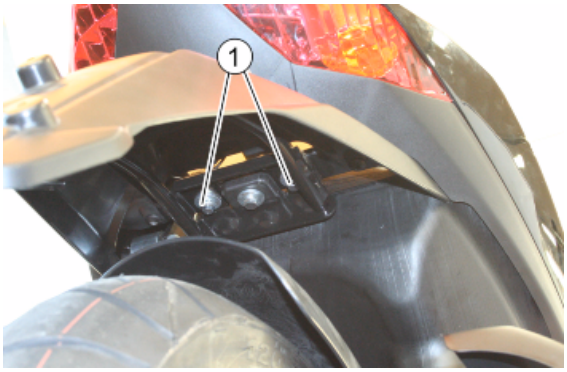


- From both sides of the vehicle undo the screw «4» placed under the footrest.
- Remove the two fairings together with the rear light unit.
- Release it from the rear light unit cable harnesses.



License plate holder

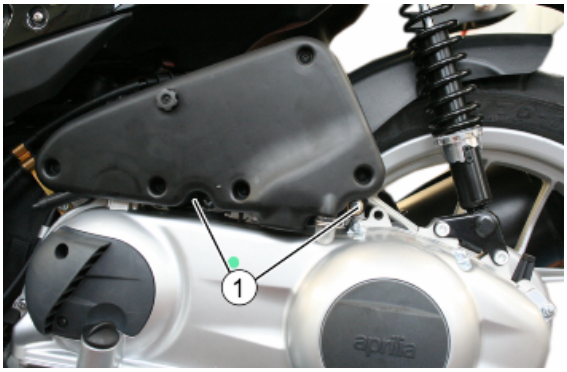
- Undo the two screws «1».



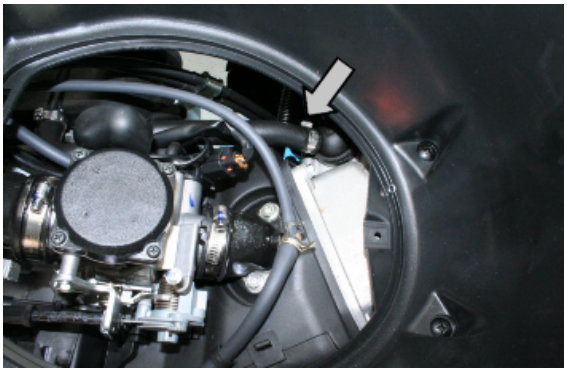
- Undo the two screws indicated.

Air filter

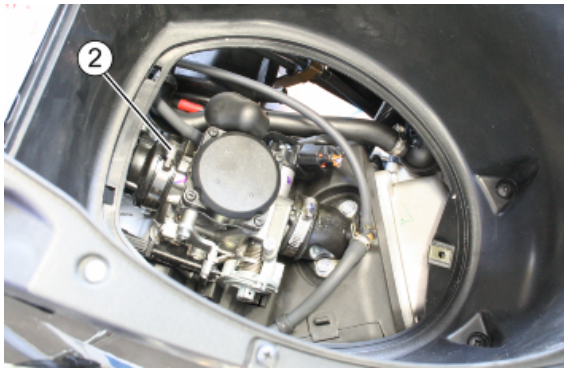
- Remove the rear central cover.
- Undo the two screws «1».



- Disconnect the vapour recovery pipe.

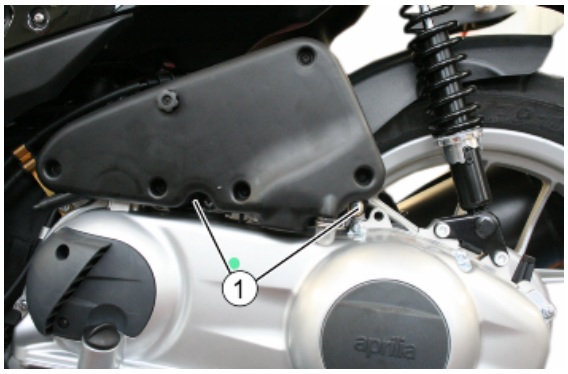


- Remove the inspection latch from inside the helmet compartment.
- Loosen the clamp «2».

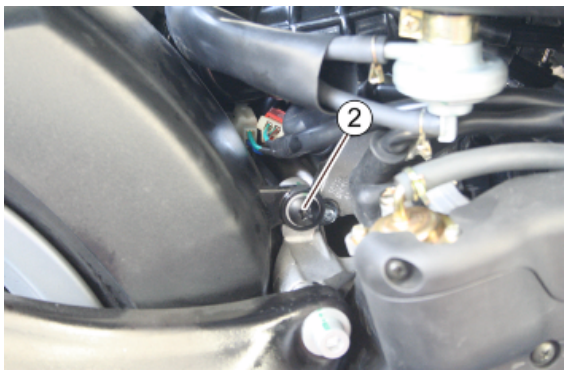


Rear mudguard

- Undo the two screws «1».

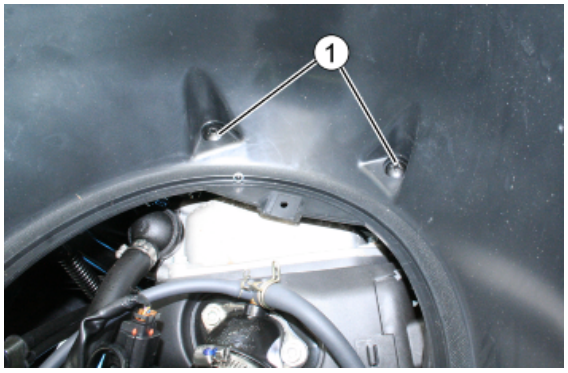


- Undo the screw «2».

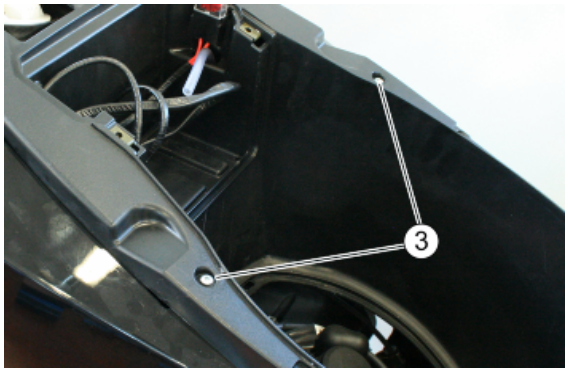


Helmet bay

- Remove the saddle.
- Remove the luggage rack.
- Remove the rear central cover.
- Remove the side fairings.
- Undo the two screws «1» placed inside the helmet compartment.
- Remove the battery cover and the battery.

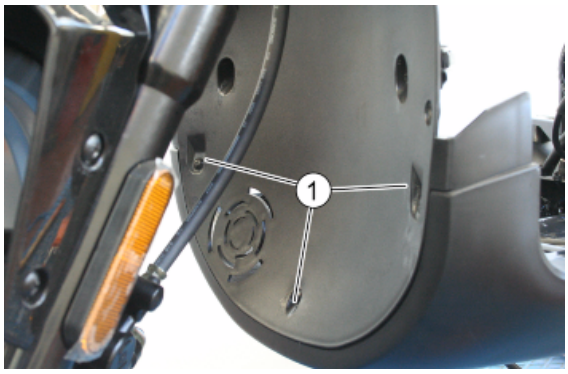


- Undo the two screws «3».
- Release the helmet compartment from the cable harnesses.

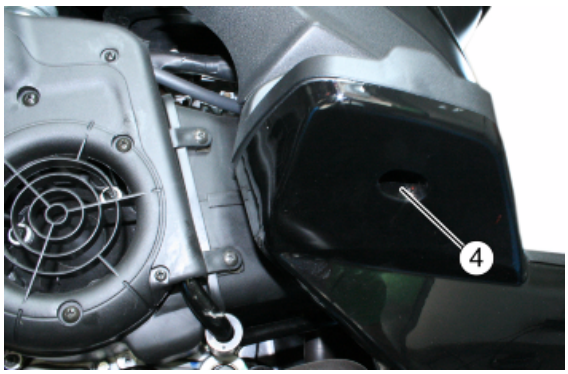


spoiler

- Remove the footrest.
- Undo the three screws «1».

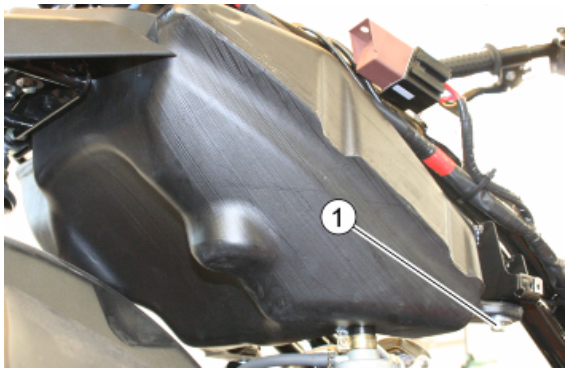


- From both sides of the vehicle undo the screw «4» placed under the footrest.
- Remove the two fairings together with the rear light unit.
- Release it from the rear light unit cable harnesses.



Fuel tank

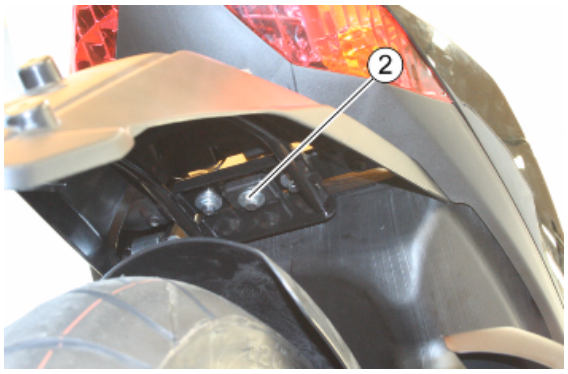
- Remove the saddle.
- Remove the luggage rack.
- Remove the rear central cover.
- Remove the side fairings.
- Remove the helmet compartment.
- Operating from both sides of the vehicle, undo the two screws «1».



Locking torques (N*m)

Fuel tank to chassis lateral fixing screw 10

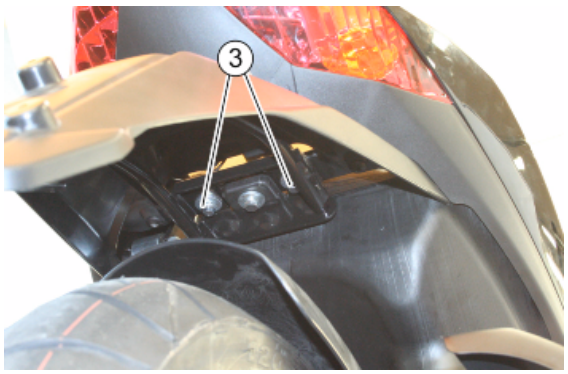
- Undo the screw «2».



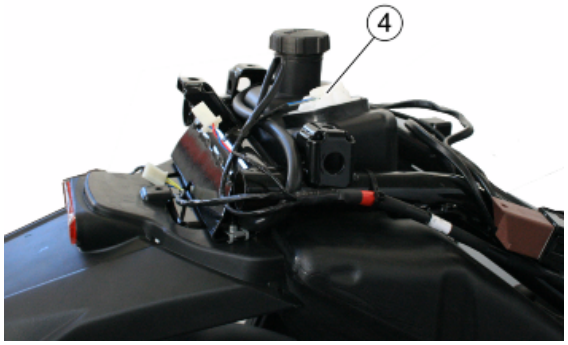
Locking torques (N*m)

Fuel tank to chassis rear fixing screw 10

- Loosen the two screws «3» placed inside the rear wheel well.

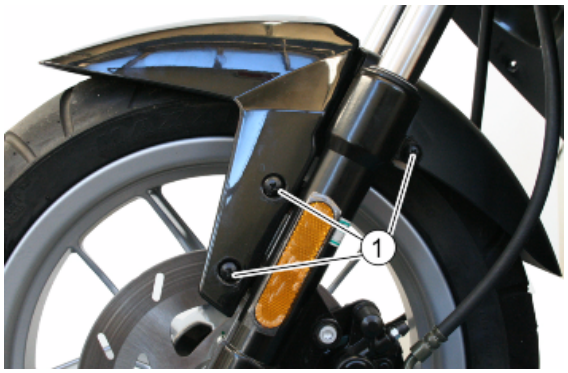


- Disconnect the connector of the fuel probe «4» and release the tank from the pipes.



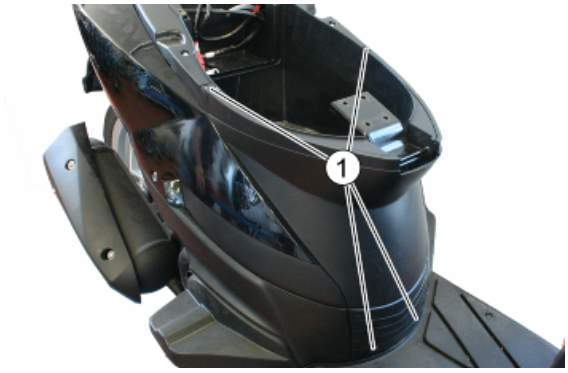
Front mudguard

- Operating from both sides of the vehicle, undo the three screws «1».



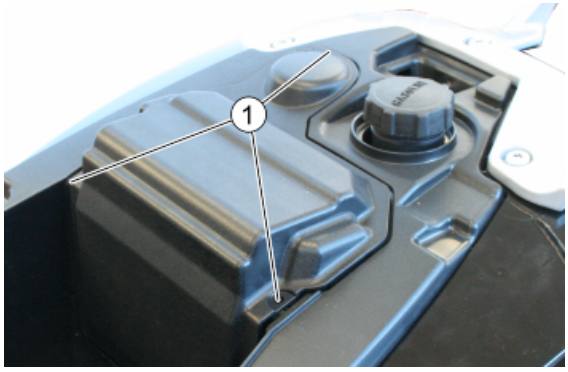
Rear central cover

- Remove the saddle.
- Undo the four screws «1» and remove the cover by sliding it upwards so as to detach the locking tabs.

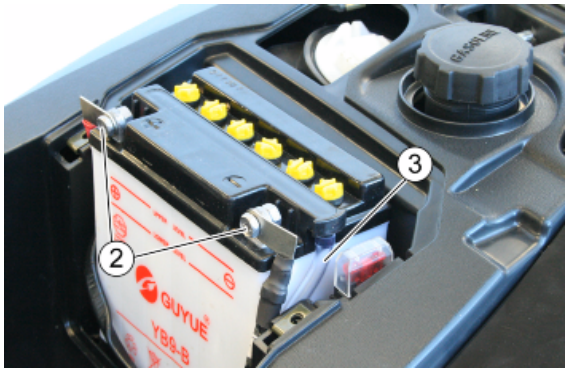


Battery

- Remove the three screws «1 and remove the battery cover.



- Disconnect the negative and positive cables «2»
- Slide off the breather pipe «3»



INDEX OF TOPICS

Carry out the listed checks before delivering the vehicle.

WARNING

BE EXTREMELY CAUTIOUS WHEN HANDLING FUEL.

Aesthetic inspection

- Paintwork
- Fitting of Plastic Parts
- Scratches
- Dirt

Tightening torques inspection

- Safety locks:

front and rear suspension unit

front and rear brake calliper retainer unit

front and rear wheel unit

engine - chassis retainers

steering assembly

- Plastic parts fixing screws

Electrical system

- Main switch
- Headlamps: high-beam lights, low-beam lights, tail lights (front and rear) and relevant warning lights
- Headlight adjustment according to regulations in force
- Front and rear brake light buttons and relevant bulb
- Turn indicators and relevant warning lights
- Instrument panel lights
- Instrument panel: fuel and temperature indicator (if present)
- Instrument panel warning lights
- Horn
- Electric start-up
- Engine stop via emergency stop switch and side stand
- Saddle electric opening switch (if present)

- Through the diagnosis instrument, check that the last mapping version is present in the control unit/s and, if necessary, program the control unit/s again: consult the technical service website to know about available updates and operation details.

CAUTION

TO ENSURE MAXIMUM PERFORMANCE, THE BATTERY MUST BE CHARGED BEFORE USE. INADEQUATE CHARGING OF THE BATTERY WITH A LOW LEVEL OF ELECTROLYTE BEFORE IT IS FIRST USED SHORTENS BATTERY LIFE.

CAUTION

UPON INSTALLING THE BATTERY, ATTACH THE POSITIVE LEAD FIRST AND THEN THE NEGATIVE ONE, AND PERFORM THE REVERSE OPERATION UPON REMOVAL.

WARNING

THE BATTERY ELECTROLYTE IS POISONOUS AS IT MAY CAUSE SERIOUS BURNS. IT CONTAINS SULPHURIC ACID. AVOID CONTACT WITH YOUR EYES, SKIN AND CLOTHING.
IN CASE OF CONTACT WITH YOUR EYES OR SKIN, WASH WITH ABUNDANT WATER FOR APPROX. 15 MIN. AND SEEK IMMEDIATE MEDICAL ATTENTION.
IF ACCIDENTALLY SWALLOWED, IMMEDIATELY DRINK LARGE QUANTITIES OF WATER OR VEGETABLE OIL. SEEK IMMEDIATE MEDICAL ATTENTION.
BATTERIES PRODUCE EXPLOSIVE GASES; KEEP CLEAR OF NAKED FLAMES, SPARKS OR CIGARETTES. VENTILATE THE AREA WHEN RECHARGING INDOORS. ALWAYS WEAR EYE PROTECTION WHEN WORKING IN THE PROXIMITY OF BATTERIES.
KEEP OUT OF THE REACH OF CHILDREN.

CAUTION

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

Levels check

- Hydraulic braking system fluid level
- Rear hub oil level
- Engine coolant level (if present)
- Engine oil level
- Mixer oil level (if present)

Road test

- Cold start
- Instrument panel operation
- Response to throttle control
- Stability when accelerating and braking

- Front and rear brake efficiency
- Front and rear suspension efficiency
- Abnormal noise

Static test

Static check after test drive:

- Restarting when warmed up
- Starter operation (if present)
- Minimum holding (turning the handlebar)
- Uniform turning of the steering
- Possible leaks
- Radiator electric fan operation (if present)

Functional inspection

- Hydraulic braking system
- Brake levers stroke
- Clutch - Check for correct operation
- Engine - Check for correct general operation and absence of abnormal noise
- Other
- Documentation check:
- Chassis and engine numbers check
- Supplied tools check
- License plate fitting
- Lock checking
- Tyre pressure checking
- Installation of mirrors and possible accessories

NEVER EXCEED THE RECOMMENDED INFLATION PRESSURES AS TYRES MAY BURST.

CAUTION

CHECK AND ADJUST TYRE PRESSURE WITH TYRES AT AMBIENT TEMPERATURE.

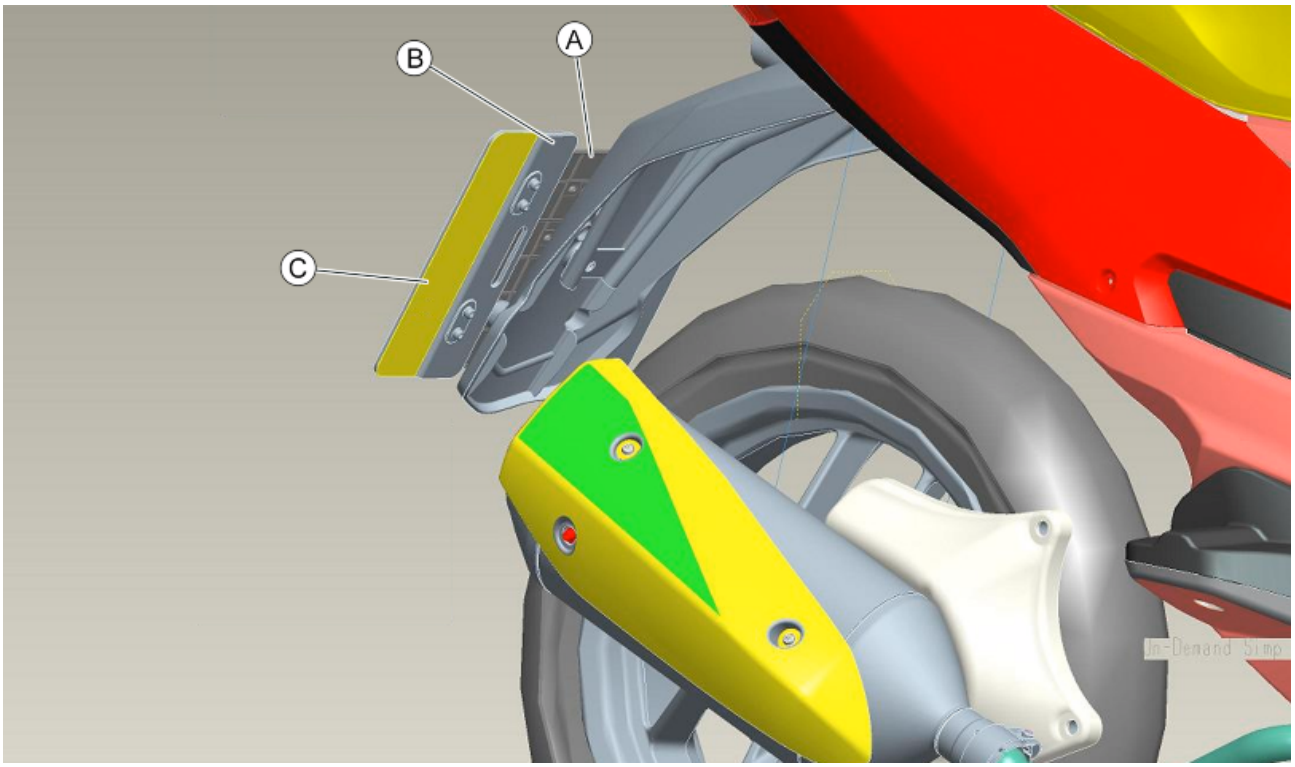
Specific operations for the vehicle

License plate side extension fitting:

- Apply heat protection transfer to the license plate side extension.

CAUTION

FITTING THE HEAT PROTECTION TRANSFER IS ESSENTIAL TO PROTECT THE LICENSE PLATE SIDE EXTENSION AGAINST MUFFLER WARM GASES.



A. License plate Italy

B. License plate side extension - Germany

C. Heat guard adhesive to be added to the side extension

W

Warning lights: