

Vespa would like to thank you

for choosing one of its products. We have prepared this booklet to help you to get the very best from your scooter. Please read it carefully before riding the scooter for the first time. It contains information, tips and precautions for using your scooter. It also describes features, details and devices to assure you that you have made the right choice. We believe that if you follow our suggestions, you will soon get to know your new vehicle and it will serve you well for a long time to come. This booklet forms an integral part of the scooter; should the scooter be sold, it must be transferred to the new owner.

Vespa GTS 250



The instructions given in this booklet are intended to provide a clear, simple guide to using your scooter; details are also given of routine maintenance procedures and regular checks that should be carried out on the vehicle at an **Authorised PIAGGIO Dealer or Service Centre**. The booklet also contains instructions for simple repairs. Any operations not specifically described in this booklet require the use of special tools and/or particular technical knowledge: to carry out these operations refer to any **authorised PIAGGIO Dealer or Service Centre**.



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.

The signs that you see on this page are very important. They are used to highlight those parts of the booklet that should be read with particular care. As you can see, each sign consists of a different graphic symbol, making it quick and easy to locate the various topics.

INDEX

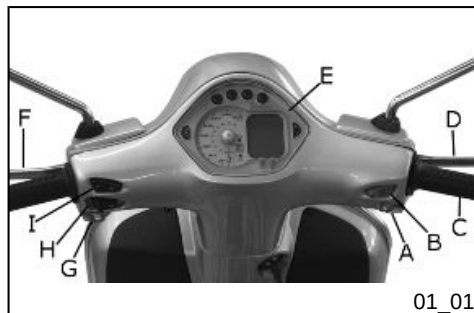
VEHICLE.....	7	Stand.....	34
Dashboard.....	8	Automatic transmission.....	34
Analogue instrument panel.....	8	Safe driving.....	35
Clock.....	10	Rear rack.....	37
Digital lcd display.....	10	MAINTENANCE.....	39
Setting the total and trip odometers.....	11	Engine oil level.....	40
Key switch.....	11	Engine oil level check.....	40
Locking the steering wheel.....	11	Engine oil top-up.....	40
Releasing the steering wheel.....	12	Warning light (insufficient oil pressure).....	41
Switch direction indicators.....	12	Engine oil change.....	41
Horn button.....	13	Hub oil level.....	43
Light switch.....	13	Tyres.....	45
Start-up button.....	14	Spark plug dismantlement.....	46
Engine stop button.....	14	Removing the air filter.....	47
The immobilizer system.....	14	Cooling fluid level.....	48
Keys.....	15	Checking the brake oil level.....	50
Immobilizerdevice enabled indicator led.....	16	Battery.....	51
Operation.....	17	Use of a new battery.....	52
Programming the immobilizer system.....	18	Long periods of inactivity.....	53
Accessing the fuel tank.....	20	Fuses.....	54
Opening the saddle.....	21	Front light group.....	59
Identification.....	21	Headlight adjustment.....	61
Rear top box opening.....	22	Front direction indicators.....	61
USE.....	25	Rear optical unit.....	62
Checks.....	26	Rear turn indicators.....	62
Refuelling.....	26	Rear-view mirrors.....	63
Tyre pressure.....	29	Front and rear disc brake.....	63
Shock absorbers adjustment.....	30	Puncture.....	64
Running in.....	31	Periods of inactivity.....	65
Starting up the engine.....	31	Cleaning the vehicle.....	65
Precautions.....	32	TECHNICAL DATA.....	71
Difficult start up.....	33	Kit equipment.....	76
Stopping the engine.....	33	SPARE PARTS AND ACCESSORIES.....	77

Warnings.....	78
PROGRAMMED MAINTENANCE.....	81
Scheduled maintenance table.....	82

Vespa GTS 250



Chap. 01
Vehicle

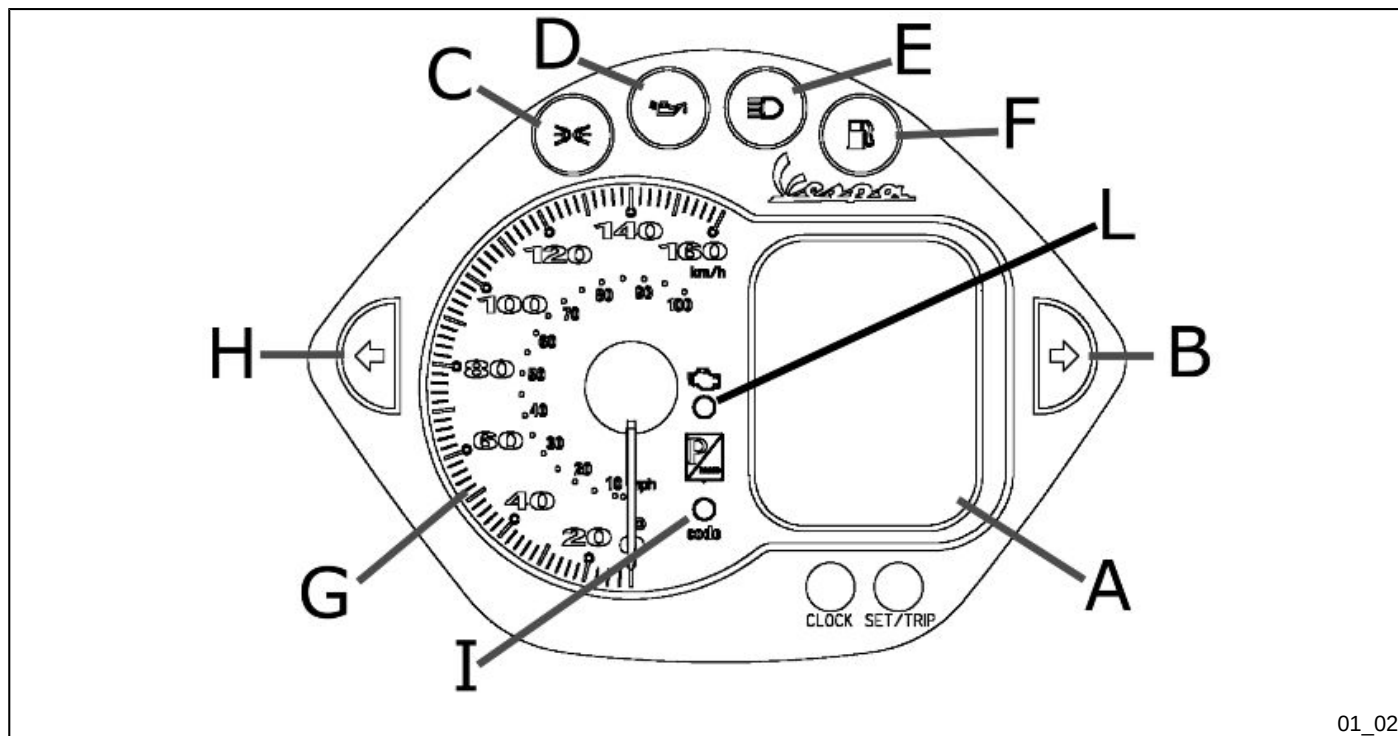


Dashboard (01_01)

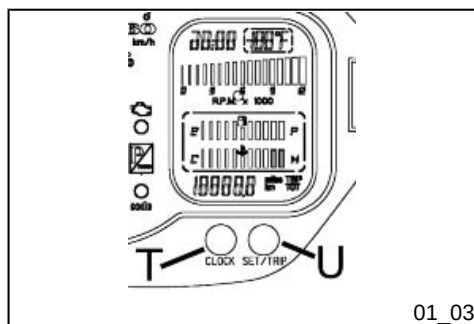
- A = Starter button
- B = Engine block Run-Off switch
- C = Throttle control
- D = Front brake lever
- E = Instrument panel
- F = Rear brake control lever
- G = Horn button
- H = Turn indicator switch
- I = Light switch

Analogue instrument panel (01_02)

- A = Digital dashboard
- B = Rhs turn signal indicator light
- C = Headlights indicator light
- D = Low-oil pressure warning light
- E = High-beam indicator light
- F = Low-fuel warning light
- G = Speedometer
- H = Lhs turn signal indicator light
- I = Antitheft LED (immobilizer)
- L = Engine management and injection diagnostics light

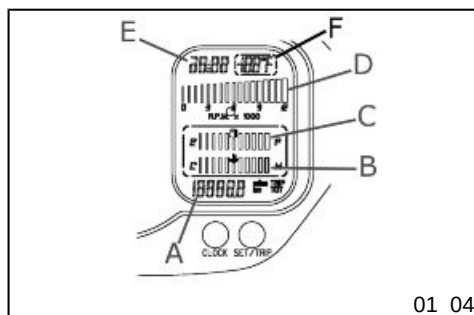


01_02



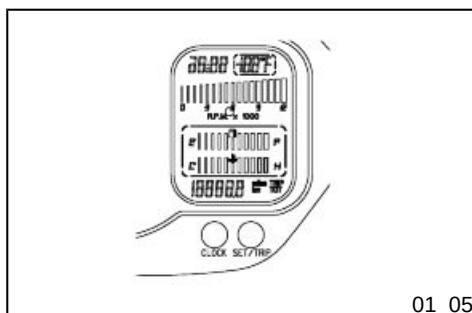
Clock (01_03)

Located on the instrument panel, it displays hours and minutes with 1 to 24 hour time. Besides hours and minutes, month and day can also be displayed with the «T» button. In order to adjust the above mentioned functions, operate button «U».



Digital lcd display (01_04)

- A = Odometer
- B = Coolant temperature gauge
- C = Fuel level gauge
- D = Tachometer
- E = Digital clock
- F = External temperature indicator



01_05

Setting the total and trip odometers (01_05)

The «TRIP» button displays the total and partial kilometres covered when pressed repeatedly for less than 1 second. It resets the trip odometer when pushed more than 3 seconds. Push the «TRIP» button again to return to total odometer value.



01_06

Key switch (01_06)

LOCK = ignition disabled, extractable key, mechanical antitheft device enabled.

OFF = ignition disabled, extractable key, mechanical antitheft device disabled.

ON = Ready to ignition position, non-extractable key, mechanical antitheft device disabled, lights on.

Locking the steering wheel

Turn the handlebar to the left (as far as it will go), turn the key to «**LOCK**» and remove the key.

CAUTION



DO NOT TURN THE KEY TO «LOCK» OR «OFF» WHILE RIDING.

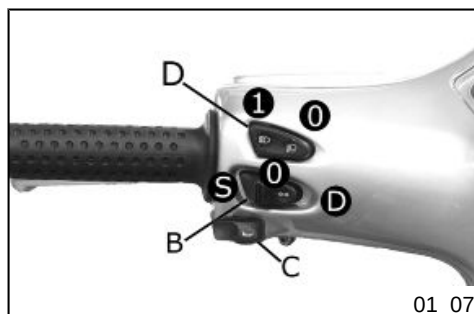
Releasing the steering wheel

Reinsert the key and turn it to «OFF».

CAUTION



DO NOT TURN THE KEY TO «LOCK» OR «OFF» WHILE RIDING.

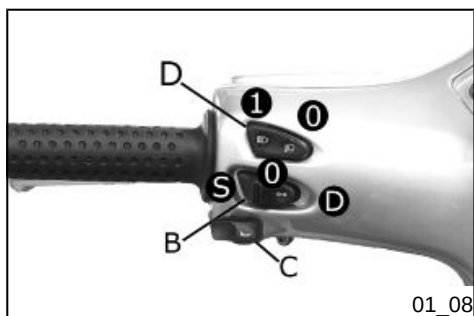


Switch direction indicators (01_07)

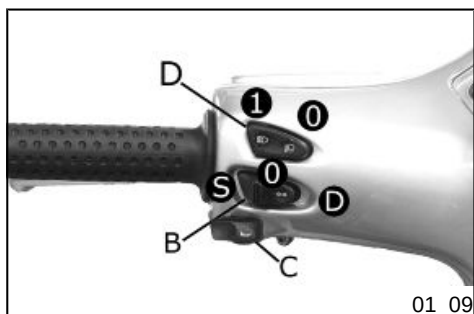
Lever towards "S" = Left turn indicator is switched on;

Lever towards "D" = Right turn indicator is switched on;

The lever returns automatically to position "0" and the turn indicator "B" remains on; press the lever to turn them off.

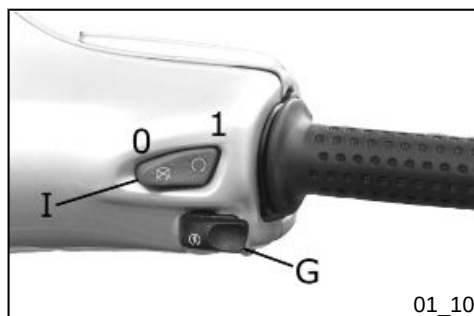
**Horn button (01_08)**

Push the «C» button to sound the horn.

**Light switch (01_09)**

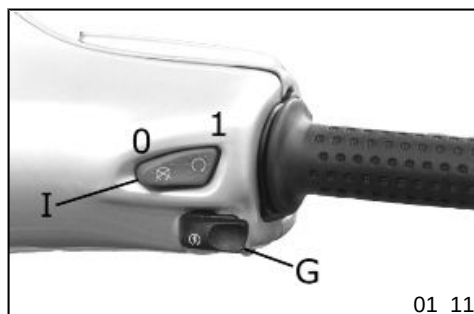
0 = Low beam and side light

1 = High beam and side light



Start-up button (01_10)

Starter button "G"



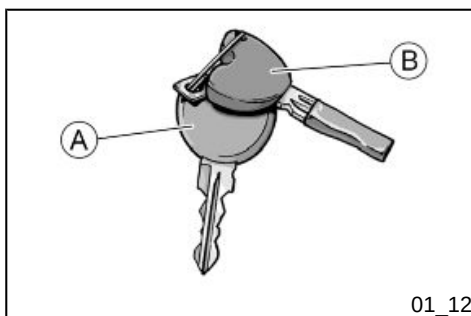
Engine stop button (01_11)

0 = OFF

1 = RUN

The immobilizer system

In order to enhance theft protection, the scooter is equipped with a «**PIAGGIO IMMOBILIZER**» electronic engine locking device that is activated automatically when the starter key is removed. Upon start-up, the «**PIAGGIO IMMOBILIZER**» system checks the starter key, and only if this key is recognised will the immobilizer system allow the scooter to be started.



01_12

Keys (01_12, 01_13, 01_14)

Two types of keys come with the vehicle.

The red-handgrip key "A" is the **"MASTER"** key.

Only a single copy of this key is supplied, which is necessary to program all your other keys and for your dealer to perform some maintenance operations. For this reason it is advised that it be used only in exceptional circumstances.

The blue key «B» (single copy supplied) is used for normal operations such as:

- engine start up
- glove-box opening

Together with the two keys, you will be given a CODE CARD bearing the same code imprinted onto the two keys.

WARNING



LOSING THE RED KEY PREVENTS ANY REPAIRS OF THE 'PIAGGIO IMMOBILIZER' SYSTEM AND THE ENGINE CONTROL UNIT.

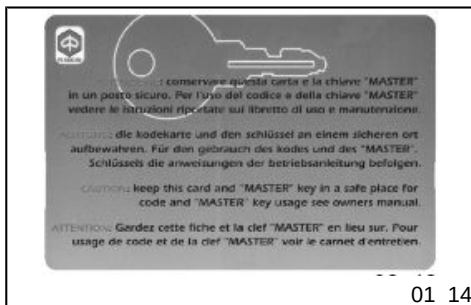
WARNING



KEEP THE 'CODE CARD' AND THE RED HANDGRIP KEY IN A SAFE PLACE (NOT ON YOUR VEHICLE).



01_13



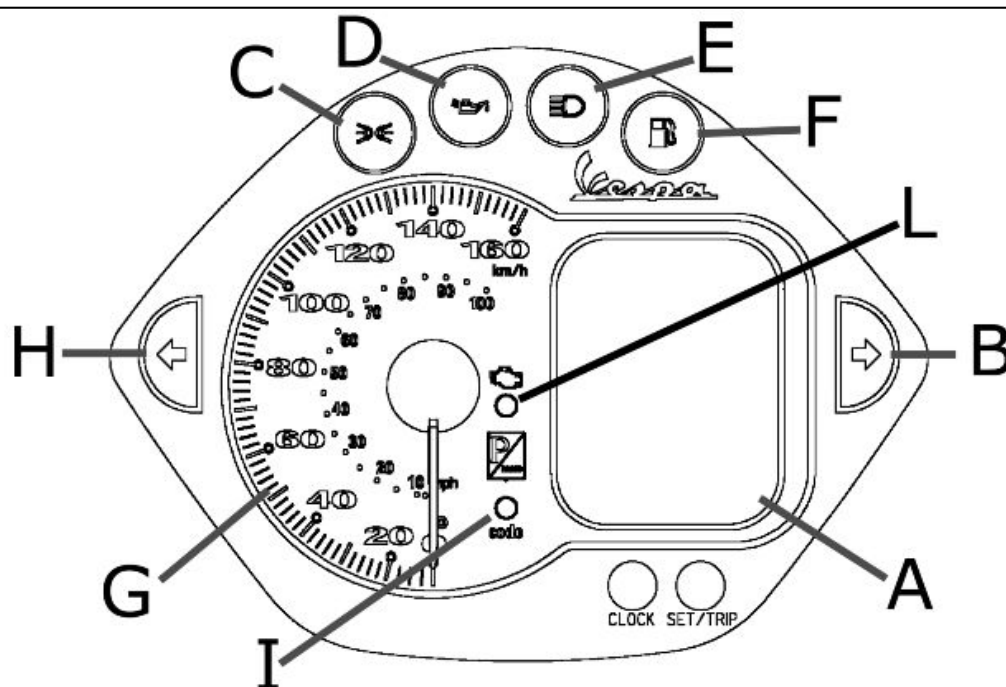
01_14

Immobilizerdevice enabled indicator led (01_15)

The operation of the «**PIAGGIO IMMOBILIZER**» system is signalled by a blinking indicator light, «I» (see the «Analogue dashboard» section).

To prevent the battery from discharging, the indicator led automatically shuts down after 48 hours of uninterrupted operation.

In the event of a malfunction to the system, the indicator led provides diagnostic information to your **Authorised Piaggio Service Centre** through its blinking patterns.



01_15

Operation

Every time the starter key is removed in the "OFF" or "LOCK" position, the safety system activates the immobilizer system. Turning the key to "ON" disables the engine lock, provided that the safety system recognises the code transmitted by the key. If the code is not recognised, turn the key first to "OFF" and then to "ON"; if the lock cannot be disabled, try with the other key supplied (red-coloured). If the engine cannot

be started, contact an **Authorised Piaggio Service Centre**, which is provided with the electronic equipment required to detect and repair the system.

When additional keys are required, please note that data storage (up to 7 keys max.) must be done on all keys, both new ones and existing ones.

Take your scooter to an **Authorised Piaggio Service Centre** carrying with you the red-handgrip key and all the blue keys in your possession.

The codes of keys not submitted for the new storage procedure are deleted from the memory. Any lost keys will therefore not be enabled to start the engine.

WARNING



EACH KEY HAS ITS OWN AND UNIQUE CODE, WHICH MUST BE STORED BY THE SYSTEM CONTROL UNIT.

VIOLENT SHOCKS MAY AFFECT THE ELECTRONIC COMPONENTS OF THE KEY.

IF OWNERSHIP OF THE VEHICLE IS TRANSFERRED, THE RED-HANDGRIP KEY (AS WELL AS THE OTHER KEYS) AND THE "CODE CARD" MUST ALSO BE TRANSFERRED TO THE NEW OWNER.

Programming the immobilizer system

Below is described the procedure to follow for programming the **PIAGGIO IMMOBILIZER** system and/or for storing other key codes. The programming procedure should be carried out with the engine stop switch set to «**RUN**».

Procedure start - red key

Insert the red-handgrip key in the switch key (in "**OFF**" position) and turn it to "**ON**". After 1 - 3 seconds, turn the key to "**OFF**" again and pull it out.

Intermediate step - blu key

Within ten seconds after pulling out the red key, insert the black key and promptly turn it to «**ON**». After 1-3 seconds, turn the key to "**OFF**" again and pull it out.

In this way, a maximum of 3 blue keys can be programmed by repeating the above procedure and keeping the indicated times.

Final step - red key

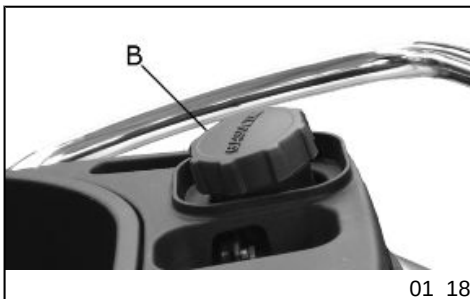
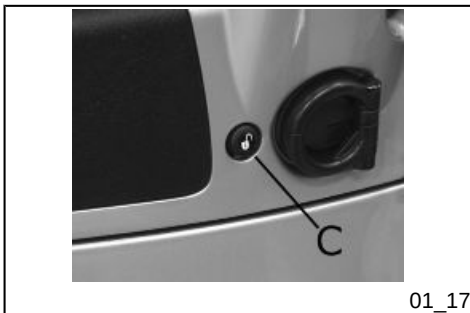
After pulling out the last blue key, insert the red key again and turn it to "**ON**" (this operation should be performed within 10 seconds of pulling out the previous key). Leave it in this position for 1 to 3 seconds and return it to the «**OFF**» position.

Proper programming check

Insert the red key disabling the transponder (i.e., tilt the key cap by 90°) and turn the key to "**ON**". Perform the engine start-up operation. Ensure that the engine does not start. Insert the blue key and repeat the start-up operation. Check that engine starts.

WARNING

SHOULD THE ENGINE START WITH THE RED KEY (WITH TRANSPONDER OFF), OR IN THE EVENT OF WRONG OPERATION DURING PROGRAMMING, REPEAT THE PROCEDURE FROM THE BEGINNING.



Accessing the fuel tank (01_16, 01_17, 01_18)

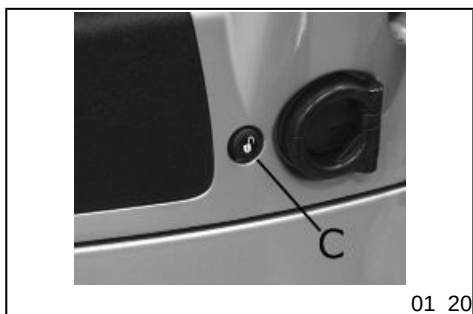
With the key set to «OFF» or «ON», or with engine on, it is possible to electrically open the saddle by pressing the button «C». If the saddle opening system does not work, operate the emergency lever «A». Then, unscrew cap «B» and the fuel tank can be reached.



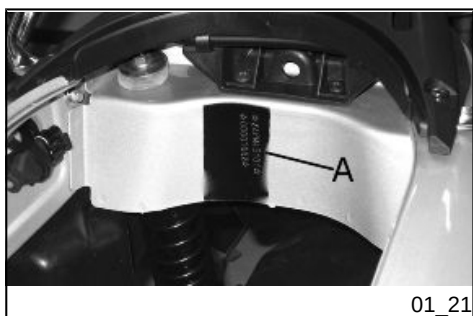
01_19

Opening the saddle (01_19, 01_20)

With the key set to «OFF» or «ON», or with engine on, it is possible to electrically open the saddle by pressing button «C». If the electric opening does not work, use the emergency lever "A". When the key is set to «LOCK» the saddle cannot be opened.



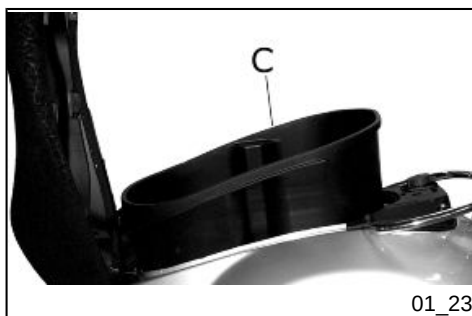
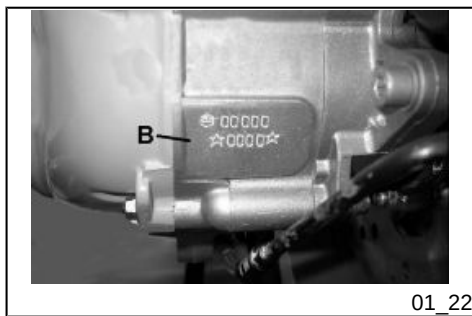
01_20



01_21

Identification (01_21, 01_22, 01_23)

The identification registration numbers consist of a prefix followed by a number stamped on both the chassis «A» and the engine «B». These numbers must always be indicated on spare parts requests. To read the chassis number, lift the saddle and remove the helmet compartment «C». We recommend checking that the chassis registration number stamped on the vehicle corresponds with that on the vehicle documentation.

**CAUTION**

BE REMINDED THAT ALTERING IDENTIFICATION REGISTRATION NUMBERS CAN LEAD TO SERIOUS PENAL SANCTIONS (IMPOUNDING OF THE VEHICLE, ETC.).

Rear top box opening (01_24)

Insert the key into the switch and press down until the glove compartment opens. If the switch is set to "LOCK", turn the key to "OFF" or "ON" before pressing it down.

Vespa GTS 250

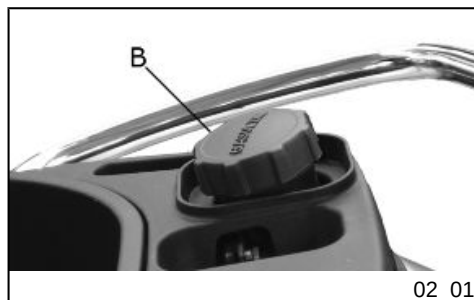


Chap. 02
Use

Checks

Before using the vehicle, check:

1. There is enough fuel in the fuel tank.
2. The correct fluid level for front and rear brakes.
3. That tyres are properly inflated.
4. The correct functioning of tail lights, headlamp, turn indicators, stop light and license plate light.
5. The correct functioning of front and rear brakes.
6. The oil level in the gearcase.
7. The engine oil level.
8. The coolant level.



02_01

Refuelling (02_01, 02_02)

Fuel: lift the seat and remove the filler cap «B». Recommended fuel: Unleaded petrol; 95 octane min. The low-fuel warning light «F» goes on when the fuel level reaches the reserve mark.

WARNING



SWITCH OFF THE ENGINE BEFORE REFUELLING WITH PETROL.

PETROL IS HIGHLY INFLAMMABLE.

DO NOT SMOKE AND KEEP OPEN FLAMES AT A DISTANCE: FIRE HAZARD.

DO NOT INHALE FUEL FUMES.

DO NOT ALLOW PETROL TO COME INTO CONTACT WITH HOT ENGINE OR ANY PLASTIC PARTS.

CAUTION



PETROL DAMAGES THE PLASTIC PARTS OF THE BODYWORK.

CAUTION



USING OILS OTHER THAN THOSE RECOMMENDED CAN SHORTEN THE LIFE OF THE ENGINE.

CAUTION

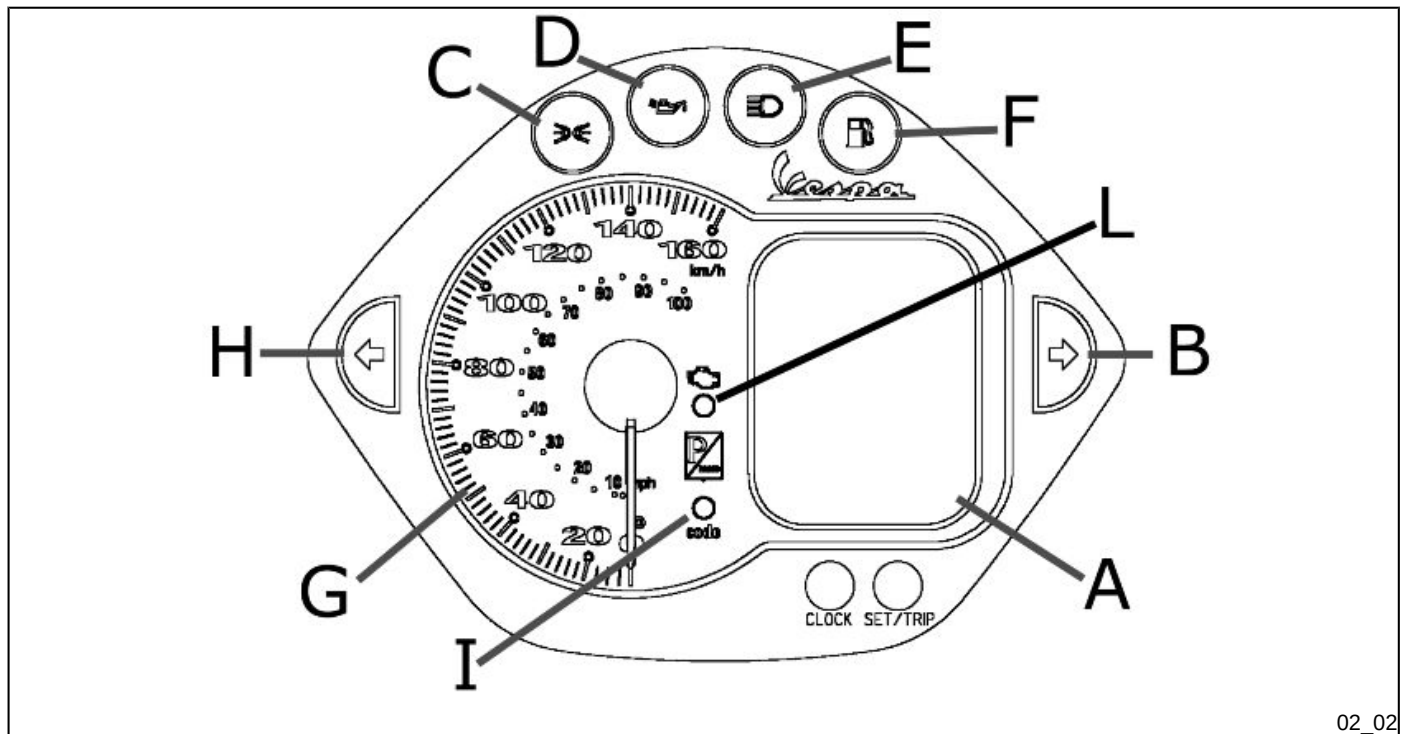


DO NOT USE THE VEHICLE TO THE COMPLETE EXHAUSTION OF THE FUEL; IN THE EVENT THAT THIS SHOULD OCCUR, DO NOT ATTEMPT TO START THE ENGINE. TURN THE KEY SWITCH TO OFF AND TOP-UP THE TANK AS SOON AS POSSIBLE. FAILURE TO FOLLOW THESE GUIDELINES COULD DAMAGE THE FUEL PUMP AND/OR THE CATALYTIC CONVERTER.

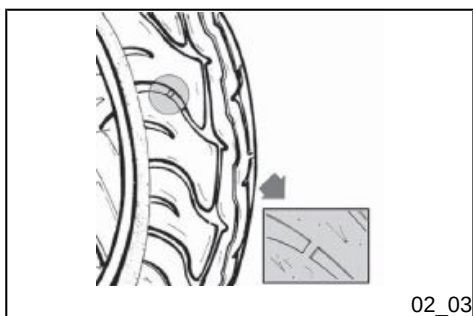
Characteristic

Fuel tank capacity

~ 9.2 litres



02_02



02_03

Tyre pressure (02_03)

Check the tyre pressure and wear periodically (roughly every 500 km). The tyres are equipped with wear indicators; the tyres should be replaced as soon as these indicators become visible on the tyre tread. Also check that tyres do not show cuts on the sides or irregular tread wear; if this occurs, go to an authorised workshop or at least a workshop equipped to perform the replacement.

CAUTION



TYRE PRESSURE SHOULD BE CHECKED WHEN TYRES ARE COLD. INCORRECT TYRE PRESSURE CAUSES ABNORMAL TYRE WEAR AND MAKES RIDING DANGEROUS.

TYRES MUST BE REPLACED WHEN THE TREAD REACHES THE WEAR LIMITS SET FORTH BY LAW.

Characteristic

Front tyre pressure

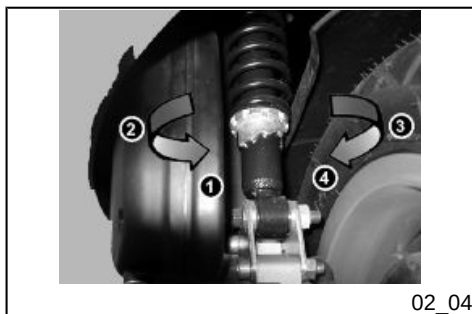
1.8 bar

Rear tyre pressure

2 bar

Rear tyre pressure - driver and passenger

2.2 bar



Shock absorbers adjustment (02_04)

The preloading of the springs can be adjusted to 4 positions using the ring nut located in the lower part of the shock absorbers and the specific spanner supplied.

Position 1: minimum preload: driver only

Position 2 medium preloading: driver only

Position 3 medium preloading: rider and passenger

Position 4: maximum preloading: driver, passenger, and luggage.

In order to carry out this operation you will need to use the specific spanner in the kit.

CAUTION



RIDING THE VEHICLE WITH THE SPRING PRELOADING NOT CORRECTLY SET FOR THE RIDER AND POSSIBLE PASSENGER, COULD REDUCE THE COMFORT OF THE RIDE AND THE PRECISION OF THE STEERING.

WARNING



WE RECOMMEND WEARING GLOVES WHILE CARRYING OUT THIS OPERATION IN ORDER TO AVOID INJURIES.

WARNING



WE STRONGLY RECOMMEND NOT TO ADJUST BOTH SHOCK ABSORBERS WITH DIFFERENT PRELOADING



02_05

Running in (02_05)

WARNING



DURING THE FIRST 1000 KM DO NOT RIDE THE VEHICLE OVER 80% OF ITS MAXIMUM SPEED. AVOID TWISTING THE THROTTLE GRIP FULLY OR KEEPING A CONSTANT SPEED ALONG LONG SECTIONS OF ROAD. AFTER THE FIRST 1000 KM, GRADUALLY INCREASE SPEED UNTIL REACHING THE MAXIMUM PERFORMANCE.



02_06

Starting up the engine (02_06, 02_07)

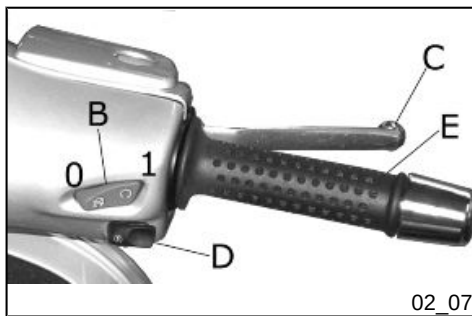
To start the engine it is necessary, before pressing the starter button, to pull and keep pulled the front or rear brake lever, which activates the appropriate switch allowing start-up.

1. Rest the vehicle on its centre-stand, ensuring the rear wheel is not touching the ground.
2. Maintain the throttle grip «E» completely untwisted.
3. Insert the key into the ignition switch «A» and turn to position «ON».
4. Make sure that switch «B» "0-1" is set to "1".
5. Pull lever «C» of the front or rear brake and then activate the starter button «D».

WARNING



THE AUTOMATIC TRANSMISSION MAKES THE REAR WHEEL TURN EVEN WHEN THE THROTTLE IS SLIGHTLY TWISTED. RELEASE THE BRAKE CAREFULLY AFTER STARTING, AND THEN ACCELERATE GRADUALLY.



CAUTION



DO NOT START-UP THE ENGINE IN CLOSED AREAS BECAUSE EXHAUST GASES ARE TOXIC.

Precautions

CAUTION



NEVER STRESS THE ENGINE AT LOW TEMPERATURES IN ORDER TO AVOID POSSIBLE DAMAGE. BE CAREFUL NEVER TO EXCEED THE MAXIMUM SPEED WHILE RUNNING DOWNHILL, IN ORDER TO AVOID DAMAGING THE ENGINE. IN ANY CASE, IN ORDER TO PRESERVE THE ENGINE FROM PROLONGED EXCESSIVE REVOLUTIONS, THE REVOLUTION LIMITER WILL BE ACTIVATED IF THE ENGINE SPEED EXCEEDS THE ESTABLISHED THRESHOLD.

WARNING



AFTER A LONG DISTANCE COVERED AT THE MAXIMUM SPEED, DO NOT STOP THE ENGINE IMMEDIATELY, BUT LET IT RUN AT IDLE FOR A FEW SECONDS.

Difficult start up

In the rare case of flooding the engine, to facilitate start-up, it is possible to try to put the vehicle into action with the gas hand grip partially or completely open. It is however necessary, once the engine is started, to take your vehicle to an **Authorised Service Centre** to determine the cause of this problem and to re-establish the vehicle proper functioning.

Stopping the engine (02_08, 02_09)

Fully untwist the throttle grip and then turn the switch key «A» to «OFF» (extractable key), or turn the switch «B» to «0».

CAUTION



DUE TO THE HIGH TEMPERATURES THE CATALYTIC CONVERTER CAN REACH, ALWAYS TAKE CARE, WHEN PARKING THE SCOOTER, THAT THE EXHAUST DOES NOT COME INTO CONTACT WITH FLAMMABLE MATERIALS, TO AVOID SERIOUS BURNS.

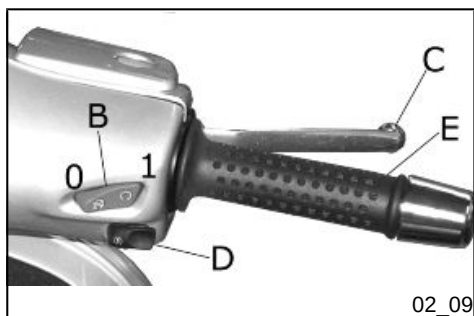
CAUTION



DO NOT SWITCH OFF THE ENGINE WHILE THE VEHICLE IS MOVING. UNBURNED FUEL COULD ENTER THE CATALYTIC CONVERTER AND BURN, CAUSING IT TO OVERHEAT AND POSSIBLY DESTROYING IT.



02_08

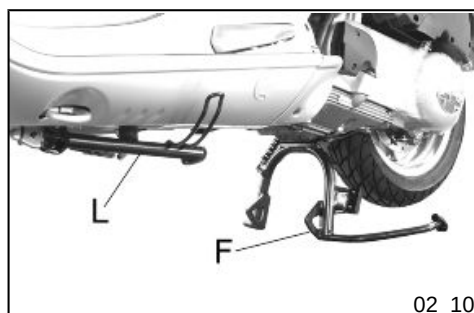


02_09

Stand (02_10)

CENTRE STAND

Push with your foot on the centre stand's fork «F» while lifting the vehicle backward, holding onto the handlebar.



02_10

SIDE STAND

With your foot push the projection of the stand «L » in order to open it and at the same time lean the vehicle on you.



02_11

Automatic transmission (02_11, 02_12)

To ensure simple, pleasurable riding, the vehicle is equipped with automatic transmission with regulator and centrifugal clutch. The system is designed to provide the best performance (acceleration and consumption) while riding on both flat roads and uphill.

If you have to stop on an uphill slope (traffic lights, traffic jam, etc.) **use only the brake to keep the vehicle still, leaving the engine running at idle speed. Using the engine to keep the vehicle still can cause the clutch to overheat, due to the friction of the clutch mechanism itself against the clutch bell.**

It is therefore recommended to avoid conditions of prolonged clutch slippage (other than those previously indicated) like driving uphill fully laden on steep slopes or starting off with driver and passenger at slopes with steepness greater than 25%.

Observe the following precautions if the clutch overheats:



02_12

1. Do not continue riding in such conditions.
2. Let the clutch cool down with the engine at idle speed for a few minutes.

Safe driving (02_13, 02_14)

WARNING



SOME SIMPLE TIPS ARE PROVIDED BELOW THAT WILL ENABLE YOU TO USE YOUR SCOOTER ON A DAILY BASIS IN GREATER SAFETY AND WITH MORE PEACE OF MIND.

<



02_13

Your ability and your knowledge of the vehicle form the basis of safe riding. We recommend trying out the vehicle in traffic-free zones to get to know your vehicle completely.

ALWAYS DRIVE WITHIN YOUR LIMITS

1. Before riding off, remember to put on your helmet and fasten it correctly.
2. Reduce speed and ride cautiously on uneven roads.
3. Remember that after riding on a long stretch of wet road without using the brakes, the braking effect is initially lower. Given these conditions, it is a good idea to operate the brakes from time to time.



4. Do not brake hard on a wet surface, on dirt tracks or on any slippery road surface.
5. If you have to brake, use both brakes in order to divide the braking action between both wheels.
6. Avoid starting off by mounting the scooter while it is still resting on its stand. In any case, the rear wheel should not be turning when it comes into contact with the ground, in order to avoid abrupt departures.
7. If the vehicle is used on roads covered with sand, mud, snow mixed with salt, etc., clean the brake disc frequently with mild detergent in order to prevent abrasive substances from building up within the holes, which can result in early wear of the brake pads.
8. Any elaboration that modifies the vehicle's performances, such as tampering with original structural parts is strictly forbidden by law, and renders the vehicle not conforming to the approved type and therefore dangerous to ride.

CAUTION

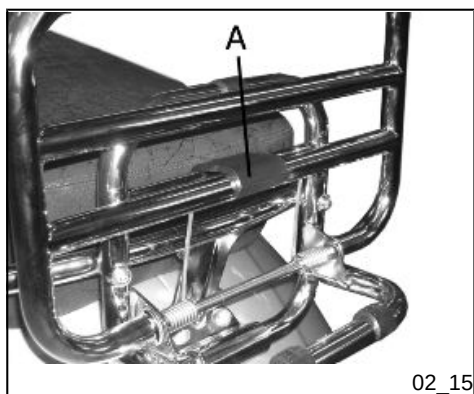


DO NOT FORGET THAT DRIVING IN A STATE OF DRUNKENNESS, OR WHEN UNDER THE EFFECT OF DRUGS OR CERTAIN MEDICINES, CAN BE EXTREMELY DANGEROUS FOR ONESELF AND FOR OTHERS.

CAUTION



ANY CHANGES TO THE VEHICLE PERFORMANCE AS WELL AS ALTERATIONS TO ORIGINAL STRUCTURAL PARTS IS STRICTLY FORBIDDEN BY LAW, AND RENDERS THE VEHICLE NO LONGER CONFORMING TO THE APPROVED TYPE AND DANGEROUS FOR RIDING.



Rear rack (02_15)

When riding without packages on the luggage racks, set the corresponding retainer latch "A" as shown in the photograph.

WARNING



Maximum admissible load: 6 kg

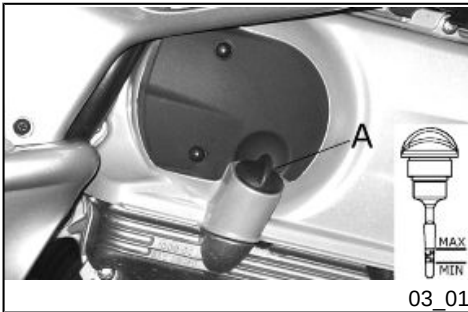
Vespa GTS 250



Chap. 03
Maintenance

Engine oil level

In 4T engines, engine oil is used to lubricate the distribution elements, main bearings and thermal group. **An insufficient quantity of oil can cause serious damage to the engine itself.** In all four-stroke engines, a loss of efficiency in oil performance and consumption should be considered normal. Consumption can particularly reflect the conditions of use (i.e. when driving at "full acceleration" all the time, oil consumption increases). The replacement frequencies provided for by the maintenance programme are defined, depending on the total contents of oil in the engine and average consumption measured following standardised methods. **In order to prevent any problems, we recommend checking oil level more frequently than indicated in the Scheduled Maintenance table or before setting off on long journeys. The vehicle is, however, equipped with an oil pressure warning light on the instrument panel.**



Engine oil level check (03_01)

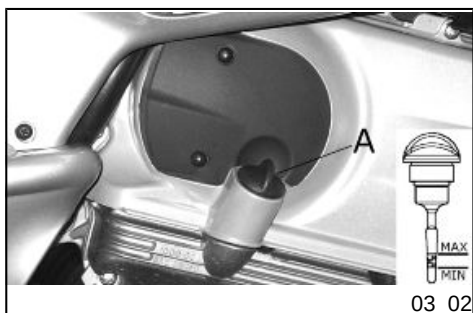
Every time the scooter is used, a visual check should be made on the level of the engine oil when the engine is cold. The oil level should be somewhere between the **MAX** and **MIN** index marks on the level bar; the check must be made with the scooter upright, resting on the centre stand. If the check is carried out after the vehicle has been used, and therefore with a hot engine, the level line will be lower; in order to carry out a correct check, wait at least 10 minutes after the engine has been stopped so as to get the correct level.

Engine oil top-up

Any topping up with oil must be carried out after the oil level check by adding oil, but **never exceeding the MAX level.** The topping up of the level between **MIN** and **MAX** requires approx. **200 cc** of oil. Every 5000 km, however, the engine oil level should be checked and topped up, if necessary, at an **Authorised Piaggio Service Centre.**

Warning light (insufficient oil pressure)

The vehicle is equipped with a warning light that lights up when the key is turned to the «ON». However, this light should switch off once the engine has been started. **If the light comes on while braking, at idle speed or while turning a corner, it is necessary to check the oil level and top it up if required. If after having topped-up the oil, the warning light still comes on while braking, at idle speed or while turning a corner, it will be necessary to take your vehicle to an Authorised Service Centre.**



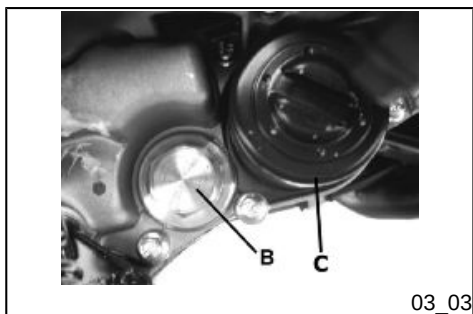
Engine oil change (03_02, 03_03)

The oil and cartridge filter "C" must be changed after 1,000 km and every 10,000 km at an **authorised Piaggio service centre**. The engine should be emptied by draining the oil from the drainage cap "B" of the gauze filter on the flywheel side. In order to facilitate the oil drainage, loosen the cap/dipstick. Since a certain quantity of oil remains in the circuit still, the top-up should be carried out with around 600 ÷ 650 cc of oil from cap "A". Then start up the scooter, leave it running for a few minutes and switch it off: after five minutes, check the level and if necessary top up **without exceeding the MAX. level**. The cartridge filter must be replaced at every oil change. For top up and change, use new oil of the recommended type.

WARNING



RUNNING THE ENGINE WITH INSUFFICIENT LUBRICATION OR WITH INADEQUATE LUBRICANTS ACCELERATES THE WEAR AND TEAR OF THE MOVING PARTS AND CAN CAUSE IRRETRIEVABLE DAMAGE.



WARNING

EXCESSIVE OIL LEVEL AT TOP-UPS CAN LEAD TO SCALE FORMATION AND VEHICLE MALFUNCTION.

CAUTION

USED OILS CONTAIN SUBSTANCES HARMFUL TO THE ENVIRONMENT. FOR OIL CHANGE, CONTACT AN AUTHORISED PIAGGIO SERVICE CENTRE, AS THEY ARE EQUIPPED TO DISPOSE OF USED OILS IN AN ENVIRONMENTALLY FRIENDLY AND LEGAL WAY.

CAUTION

USING OILS OTHER THAN THOSE RECOMMENDED CAN SHORTEN THE LIFE OF THE ENGINE.

Recommended products

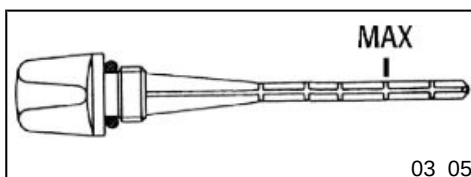
AGIP CITY HI TEC 4T

Engine oil

SAE 5W-40, API SL, ACEA A3, JASO MA Synthetic oil



03_04



03_05

Hub oil level (03_04, 03_05)

Check the oil in the rear hub. To check the rear hub oil level, proceed as follows:

- 1) Park the scooter on level ground and rest it on its stand.
- 2) Unscrew dipstick «A», wipe it clean with a cloth, reinsert it and **tighten completely**.
- 3) Pull out the dipstick and check that the oil level is above the first notch from the bottom.
- 4) Reinsert the dipstick and ensure that it is tightened correctly.

N.B.

THE NOTCHES ON THE HUB OIL LEVEL DIPSTICK, EXCEPT THE ONE INDICATING THE MAX LEVEL, REFER TO OTHER MODELS BY THE MANUFACTURER AND HAVE NO SPECIFIC FUNCTION FOR THIS MODEL.

CAUTION



RIDING THE VEHICLE WITH INSUFFICIENT HUB LUBRICATION OR WITH CONTAMINATED OR IMPROPER LUBRICANTS ACCELERATES THE WEAR AND TEAR OF THE MOVING PARTS AND CAN CAUSE SERIOUS DAMAGE.

CAUTION



USED OIL CAN HARM THE ENVIRONMENT. COLLECTION AND DISPOSAL SHOULD BE CARRIED OUT IN COMPLIANCE WITH CURRENT REGULATIONS.

CAUTION



AN EXCESSIVE QUANTITY OF OIL CAN LEAD TO SPILL OVER, WHICH MAY CAUSE THE ENGINE AND THE WHEEL TO GET DIRTY.

CAUTION

WHEN REPLACING THE HUB OIL DO NOT LET THE OIL COME INTO CONTACT WITH THE REAR BRAKE DISC.

CAUTION

FOR OIL REPLACEMENT, CONTACT ANY AUTHORISED SERVICE CENTRE AS THEY ARE EQUIPPED TO DISPOSE OF USED OILS IN AN ENVIRONMENTALLY FRIENDLY AND LEGAL WAY.

Recommended products

AGIP ROTRA 80W-90

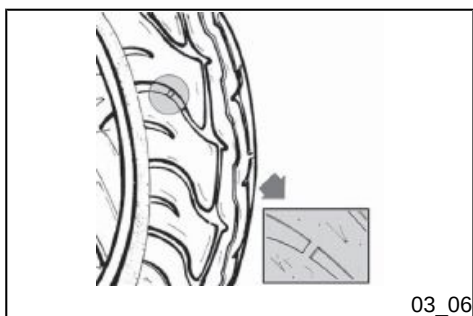
Rear hub oil

SAE 80W/90 Oil that exceeds the requirements of API GL3 specifications

Characteristic

Rear hub oil

250 cc



Tyres (03_06)

Check tyre pressure periodically (about every 500 km). Tyres feature wear indicators; replace tyres as soon as these indicators become visible on the tyre tread. Also check that the tyres do not show signs of splitting at the side or irregular tread wear; if this occurs, go to an authorised workshop or at least to a workshop equipped to perform the replacement.

CAUTION



TYRE PRESSURE SHOULD BE CHECKED WHEN TYRES ARE COLD. INCORRECT TYRE PRESSURE CAUSES ABNORMAL TYRE WEAR AND MAKES RIDING DANGEROUS.

TYRES MUST BE REPLACED WHEN THE TREAD REACHES THE WEAR LIMITS SET FORTH BY LAW.

Characteristic

Front tyre pressure

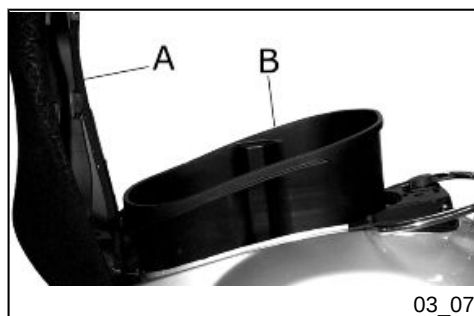
1.8 bar

Rear tyre pressure

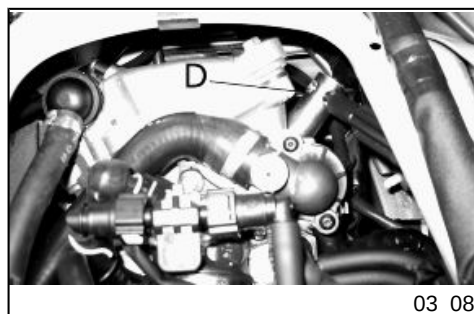
2 bar

Rear tyre pressure - driver and passenger

2.2 bar



03_07



03_08

Spark plug dismantlement (03_07, 03_08)

Proceed as follows:

1. lift the saddle «A»
2. lift the helmet compartment «B» and reach into the spark plug with your hand;
3. disconnect cap of the spark plug HV wire;
4. unscrew the spark plug using the spark plug spanners «D» supplied;
5. When refitting, place the spark plug in the hole at the due inclination and screw it by hand until it is finger tight;
6. use the box-spanner«D» supplied only for locking;
7. place cap fully over the spark plug.

WARNING



THE SPARK PLUG MUST BE REMOVED WHEN THE ENGINE IS COLD. THE SPARK PLUG MUST BE REPLACED EVERY 20,000 KM. USE OF ELECTRONIC CONTROL UNITS OR ELECTRONIC IGNITIONS DIFFERING FROM THOSE RECOMMENDED CAN SERIOUSLY DAMAGE THE ENGINE.

CAUTION

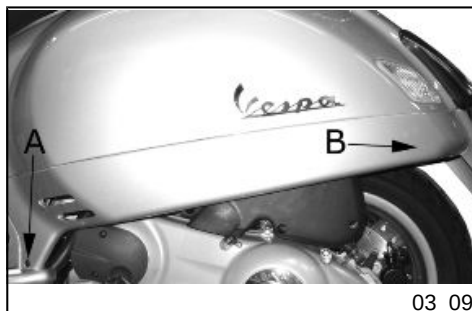


THE USE OF SPARK PLUGS OTHER THAN THOSE RECOMMENDED OR A SHIELDLESS SPARK PLUG CAP COULD CAUSE DISTURBANCES TO THE SYSTEM.

Characteristic

Recommended spark plug

Champion RG 4 PHP



Removing the air filter (03_09, 03_10, 03_11, 03_12)

Proceed as follows:

1. unscrew the fixing screw «A».
2. unscrew the nut «B» under the body.
3. remove the left side fairing.
4. remove the helmet compartment;
5. unscrew the fixing screws «C» that can be reached once the helmet compartment has been removed;
6. Unscrew the screws «D» and remove the air filter cover.

Remove the filtering element and clean it with water and shampoo; then dry it with a clean cloth and short blasts of compressed air. Finally, immerse it in a mixture of 50% oil of the recommended type and 50% petrol. Then gently squeeze the filter element between your hands, allow it to drip and then refit it. Oil or water deposits in the filter housing can be cleaned off by removing the two rubber caps «E».

CAUTION



IF THE VEHICLE IS USED ON DUSTY ROADS, IT IS NECESSARY TO SERVICE THE AIR FILTER MORE OFTEN TO AVOID DAMAGING THE ENGINE.

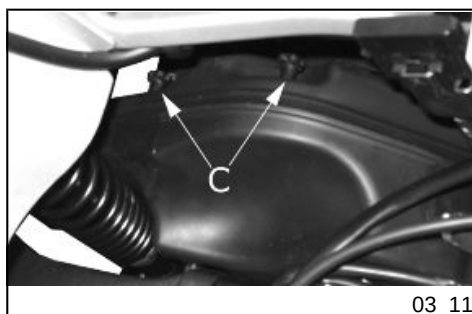
CAUTION

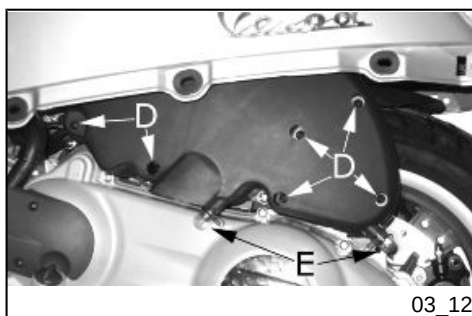


IN ORDER NOT TO DAMAGE THE VEHICLE PLASTIC COVERS CONTACT AN AUTHORISED SERVICE CENTRE TO HAVE THE AIR FILTER CLEANED.

Recommended products

AGIP FILTER OIL





Oil for air filter sponge

Mineral oil with specific additives for increased adhesiveness



Cooling fluid level (03_13, 03_14)

Engine cooling is carried out by a forced-circulation coolant system; the cooling system holds about 2.100 ÷ 2.150 l of coolant- a mixture of 50% de-ionised water and 50% ethylene-glycol antifreeze solution and corrosion inhibitors. Recommended coolant, supplied with already mixed and ready for use fluid. For proper functioning of the engine, the coolant temperature needle should be within the middle zone of the scale between the 5th and 8th bar. If the needle points at the 10th bar, the instrument bars lit at that moment start flashing. Stop the engine, let it cool down and check the fluid level; if the level is OK, take your scooter to an **Authorised Piaggio Service Centre**. If when using your scooter at a low gear the coolant temperature exceeds the above values, shut off the engine and let it cool down. Then check the coolant level. If level is OK, take your scooter to an **Authorised Piaggio Service Centre**. The fluid level must be checked every 10,000 kilometres with a cold engine, in the way shown below:



- Place the scooter in a vertical position on the stand.
- Unscrew the fixing screw «A» and remove the cover.
- Check the fluid level according to the two marks- MIN and MAX «B» on the reservoir
- Top up, if necessary, if the fluid level is below the MIN level on the scale inside the expansion tank. The fluid level must always be between MIN and MAX level

If the fluid is near the minimum level, top-up only when the engine is cold. If it is necessary to top up the coolant frequently, or if the expansion tank is completely dry, you should look for the cause in the cooling system. Have the cooling system checked at an **Authorised Piaggio Service Centre**. Coolant must be changed every 2 years at an **Authorised Piaggio Service Centre**.

WARNING



TO AVOID THE RISK OF SCALDING, DO NOT UNSCREW THE EXPANSION TANK COVER WHILE THE ENGINE IS STILL HOT.

WARNING



IN ORDER TO AVOID HARMFUL FLUID LEAKS WHILE RIDING, IT IS IMPORTANT TO MAKE SURE THAT THE LEVEL NEVER EXCEEDS THE MAXIMUM VALUE.

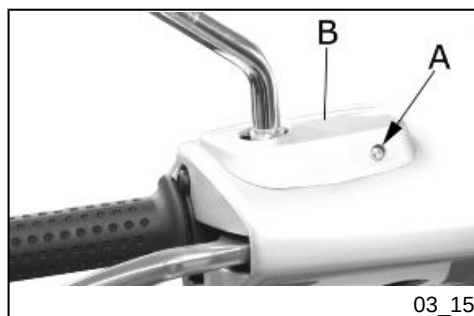
IN ORDER TO GUARANTEE THE PROPER FUNCTION OF THE ENGINE, IT IS NECESSARY TO KEEP THE RADIATOR GRILLE CLEAN.

Recommended products

AGIP PERMANENT SPEZIAL

coolant

Monoethylene glycol-based antifreeze fluid, CUNA NC 956-16

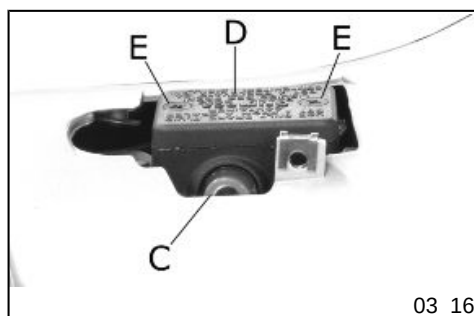


Checking the brake oil level (03_15, 03_16)

The brake reservoirs are located on top of the pumps, underneath the handlebar cover (front on the rhs and rear on the left). The procedures for the inspection of the brake fluid level for the front and rear brakes are identical.

Proceed as follows:

1. rest the vehicle on its centre-stand with the handlebars perfectly horizontal;
2. loosen screw «A» and remove cover «B»;
3. remove both riding mirrors;
4. check the brake fluid level through the sight hole, «C».



The brake fluid level inside the reservoirs will decrease as the brake pads start wearing out. Should the level appear to be below the minimum mark, please contact your nearest in order to carry out a thorough inspection of the braking system. Proceed as follows:

remove the reservoir cap, «D», by loosening the two screws, «E»; hence top-up using the recommended fluid only, and without exceeding the max mark.

Under normal weather conditions, the brake fluid must be replaced every 2 years. This operation must be carried out by trained personnel; it is therefore necessary to contact an **Authorised PIAGGIO Service Station**

WARNING



ONLY USE DOT 4 CLASS BRAKE FLUIDS. COOLING SYSTEM FLUIDS ARE HIGHLY CORROSIVE. MAKE SURE THAT IT DOES NOT COME INTO CONTACT WITH THE PAINTWORK

.

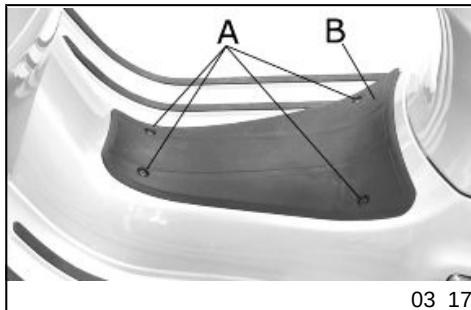
CAUTION

AVOID CONTACT OF BRAKE FLUID WITH EYES, SKIN, AND CLOTHING. IN CASE OF CONTACT, RINSE WITH WATER. THE BRAKING CIRCUIT FLUID IS HYGROSCOPIC, THAT IS, IT ABSORBS HUMIDITY FROM THE SURROUNDING AIR. IF THE HUMIDITY IN THE BRAKING FLUID EXCEEDS A CERTAIN VALUE, IT WILL LEAD TO INEFFICIENT BRAKING. NEVER USE BRAKING FLUID KEPT IN CONTAINERS THAT HAVE ALREADY BEEN OPENED, OR PARTIALLY USED.

Recommended products**AGIP BRAKE 4**

Brake fluid

FMVSS DOT 4 Synthetic fluid



03_17

Battery (03_17, 03_18, 03_19)

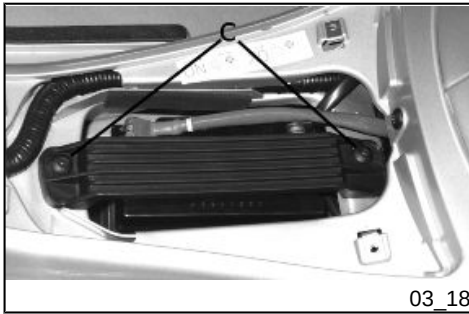
To reach the battery **D**, proceed as follows:

1. rest the scooter on its centre stand;
2. unscrew the 4 screws «**A**», remove the footrest «**B**».
3. remove the two battery fixing screws «**C**».

The battery is the electrical device that requires the most frequent inspections and diligent maintenance. The main points of maintenance to be observed are as follows:

CAUTION

IN ORDER TO AVOID DAMAGING THE ELECTRICAL SYSTEM, NEVER DISCONNECT THE WIRING WHILE THE ENGINE IS RUNNING. DO NOT TIP THE SCOOT-



03_18



03_19

ER TOO MUCH IN ORDER TO AVOID DANGEROUS LEAKAGE OF BATTERY ELECTROLYTE

CAUTION



ELECTROLYTE CONTAINS SULPHURIC ACID: AVOID CONTACT WITH EYES, SKIN AND CLOTHES. IN THE CASE OF ACCIDENTAL CONTACT, RINSE WITH ABUNDANT OF WATER AND CONSULT A DOCTOR.

WARNING



SPENT BATTERIES ARE HARMFUL FOR THE ENVIRONMENT. COLLECTION AND DISPOSAL SHOULD BE CARRIED OUT IN COMPLIANCE WITH CURRENT REGULATIONS.

Electric characteristic

Battery

12V - 12 Ah

Use of a new battery

Ensure that the terminals are connected correctly and check voltage.

CAUTION



DO NOT REVERSE THE POLARITY: RISK OF SHORT CIRCUIT AND DAMAGE TO THE ELECTRICAL SYSTEM.

WARNING

SPENT BATTERIES ARE HARMFUL FOR THE ENVIRONMENT. COLLECTION AND DISPOSAL SHOULD BE CARRIED OUT IN COMPLIANCE WITH CURRENT REGULATIONS.

Long periods of inactivity

Battery performance will decrease if the vehicle is not used for a long time. This is the result of the natural phenomenon of battery discharging plus residual absorption by vehicle components with constant power consumption. Poor battery performance may also be due to environmental conditions and the cleanness of the poles. In order to avoid difficult starts and/or irreversible damage to the battery, follow any of these steps:

- **At least once a month** start the engine and run it slightly above idle speed for 10-15 minutes. This keeps all the engine components, as well as the battery, in good working order.
- Take your vehicle to a garage (as indicated in the "Vehicle not used for extended periods" section) to have the battery removed. Have the battery cleaned, charged fully and stored in a dry, ventilated place. Recharge **at least once every two months**.

N.B.

THE BATTERY MUST BE CHARGED WITH A CURRENT EQUAL TO 1/10 OF THE RATED CAPACITY OF THE BATTERY AND FOR NOT LONGER THAN 10 HOURS. CONTACT AN AUTHORISED SERVICE CENTRE TO CARRY OUT THIS OPERATION SAFELY. WHEN REFITTING THE BATTERY MAKE SURE THE LEADS ARE CORRECTLY CONNECTED TO THE TERMINALS.

WARNING

DO NOT DISCONNECT THE BATTERY CABLES WITH THE ENGINE RUNNING, THIS CAN CAUSE PERMANENT DAMAGE TO THE VEHICLE ELECTRONIC CONTROL UNIT.

WARNING

SPENT BATTERIES ARE HARMFUL FOR THE ENVIRONMENT. COLLECTION AND DISPOSAL SHOULD BE CARRIED OUT IN COMPLIANCE WITH CURRENT REGULATIONS.

Fuses (03_20, 03_21, 03_22, 03_23, 03_24, 03_25)

The electrical system is equipped with:

1. six protection fuses «**A**» located in the glove compartment to the left
2. two fuses «**B**» located under the helmet compartment under the saddle hinge latch.
3. two fuses «**C**» located under the helmet compartment on the side fairing.

The chart shows the position and characteristics of the fuses in the vehicle.

CAUTION

BEFORE REPLACING A BLOWN FUSE, FIND AND SOLVE THE FAILURE THAT CAUSED IT TO BLOW. NEVER TRY TO REPLACE THE FUSE WITH ANY OTHER MATERIAL (E.G., A PIECE OF ELECTRIC WIRE).

CAUTION

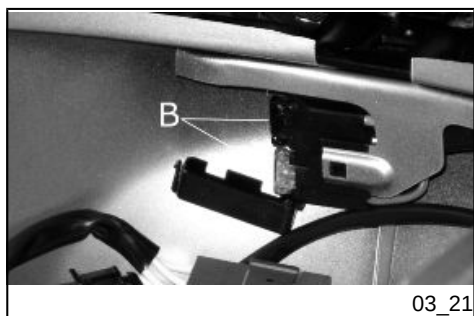
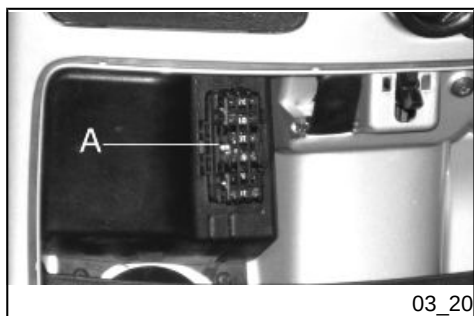
MODIFICATIONS OR REPAIRS TO THE ELECTRICAL SYSTEM, PERFORMED INCORRECTLY OR WITHOUT STRICT ATTENTION TO THE TECHNICAL SPECIFICATIONS OF THE SYSTEM, CAN CAUSE ERRORS IN FUNCTIONING AND RISK OF FIRE.

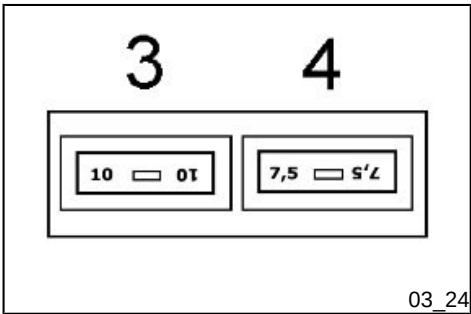
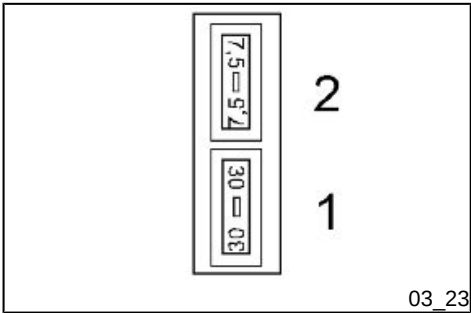
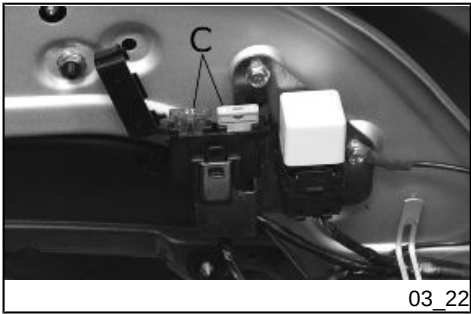
FUSES

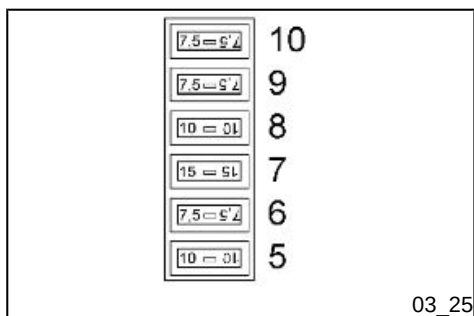
General	Position on fuse box: 1 Fuse: 30A Protected circuits: General
Ignition ECU	Fuse box arrangement: 2 Fuse capacity: 7,5 A Protected circuits: Ignition ECU
Injection loads relay	Fuse box arrangement: 3 Fuse capacity: 10 A Protected circuits: Injection loads relay
Injection ECU	Fuse box arrangement: 4 Fuse capacity: 7,5 A Protected circuits: Injection ECU

Dashboard lighting, intercom and anti-theft device pre-wiring	Fuse box arrangement: 5 Fuse capacity: 10 A Protected circuits: Dashboard lighting, intercom and anti-theft device pre-wiring
High and low-beam lights, horn	Fuse box arrangement: 6 Fuse capacity: 7,5 A Protected circuits: High and low-beam lights, horn
High and low-beam lights, electric seat opening	Fuse box arrangement: 7 Fuse capacity: 15 A Protected circuits: High and low-beam lights, electric seat opening
Dashboard Fuel supply, intercom and anti-theft device pre-wiring	Fuse box arrangement: 8 Fuse capacity: 10 A Protected circuits: Dashboard Fuel supply, intercom and anti-theft device pre-wiring
Starter motor, stop light	Fuse box arrangement: 9 Fuse capacity: 7,5 A Protected circuits: Starter motor, stop light
Front and rear side lights, dashboard lighting	Fuse box arrangement: 10 Fuse capacity: 7,5 A

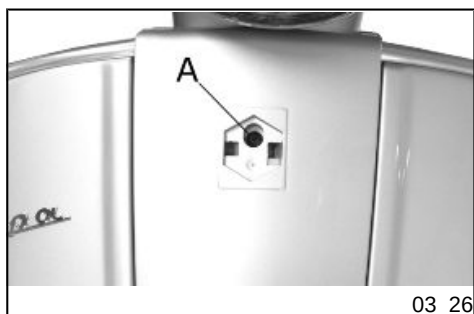
Protected circuits: Front and rear side lights, dashboard lighting



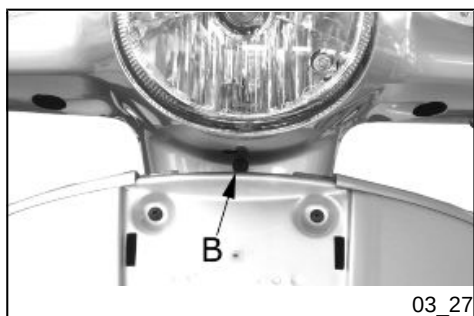




03_25



03_26



03_27

Front light group (03_26, 03_27, 03_28, 03_29, 03_30)

To remove the headlight assembly, proceed as follows:

- 1: remove the riding mirrors.
- 2: remove screw «A» from the front grille.
- 3: remove the front handlebar cover fixing screw, «B».
- 4: remove the rear handlebar cover fixing screw, «C».
- 5: Detach the front handlebar cover.

This provides access to the light bulbs. Turn the ring nut and extract the high/low-beam light bulb, «D». To replace the side light bulb, extract the rubber socket from within its housing. Upon refitting, repeat these operations backwards.

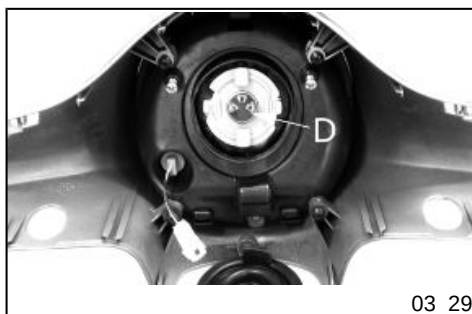
WARNING



THE TWIN-FILAMENT (HIGH-BEAM AND LOW-BEAM) BULB IS HALOGEN: DO NOT TOUCH THE BULB WITH YOUR FINGERS TO AVOID COMPROMISING ITS FUNCTIONING



03_28



03_29



03_30

N.B.

IF MISTING IS NOTICED ON THE INSIDE OF THE HEADLAMP GLASS, THIS DOES NOT INDICATE A FAULT AND IS RELATED TO THE HUMIDITY AND/OR TO LOW TEMPERATURES.

THE PHENOMENON SHOULD QUICKLY DISAPPEAR WHEN THE LIGHT IS SWITCHED ON.

THE PRESENCE OF DROPS OF WATER, ON THE OTHER HAND, COULD INDICATE THAT WATER IS INFILTRATING. CONTACT THE PIAGGIO AFTER-SALES SERVICE NETWORK.

Electric characteristic**Bulbs**

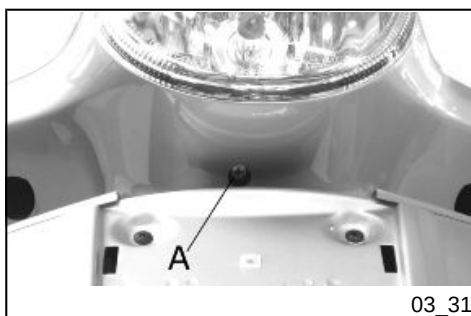
1 bulb, 12V/55-60W, for high- and low-beam lights

2 bulbs, 12V/5W, for taillights

To remove the tail light on the shield, proceed as follows:

- 1: Remove the screw «A» of the front shield grille.
- 2: Rotate the front shield grille.

To replace the tail light, pull out the rubber lamp holder from its fitting. To reassemble, repeat the operation in the reverse order.



03_31

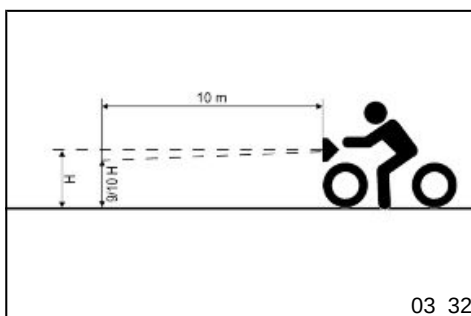
Headlight adjustment (03_31, 03_32)

Proceed as follows:

1. Place the vehicle in running order and with the tyres inflated to the prescribed pressure, on a flat surface 10 m away from a white screen situated in a shaded area, making sure that the longitudinal axis of the scooter is perpendicular to the screen;
2. Turn on the headlight and check that the borderline of the projected light beam on the screen is not lower than 9/10 of the distance from the ground to the centre of vehicle headlamp and higher than 7/10;
3. If otherwise, adjust the right headlight with screw «A».

N.B.

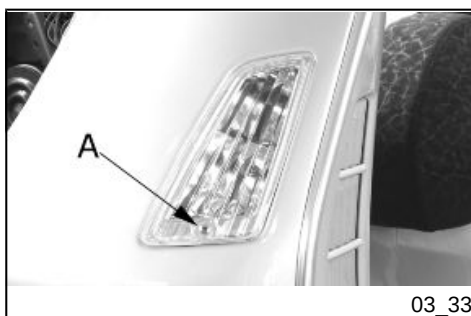
THE ABOVE PROCEDURE COMPLIES WITH THE EUROPEAN STANDARDS REGARDING MAXIMUM AND MINIMUM HEIGHT OF LIGHT BEAMS. REFER TO THE STATUTORY REGULATIONS IN FORCE IN EVERY COUNTRY WHERE THE vehicle IS USED.



03_32

Front direction indicators (03_33)

To replace the front turn indicator bulbs, remove the tail light taking out the retaining screw "A", remove the bulb holder from its fitting; gently turn the bulb around 30° and remove it. Follow the process in reverse order to refit.



03_33



03_34

Rear optical unit (03_34)

Remove screw «A» to remove the rear headlight assembly.

Access to taillight bulbs, stop light bulb and license plate bulb.

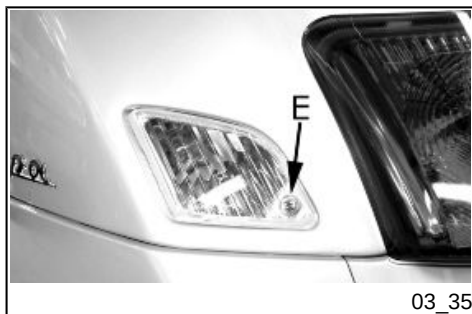
To reassemble, repeat the operation in the reverse order.

N.B.

IF MISTING IS NOTICED ON THE INSIDE OF THE HEADLAMP GLASS, THIS DOES NOT INDICATE A FAULT AND IS RELATED TO THE HUMIDITY AND/OR TO LOW TEMPERATURES.

THE PHENOMENON SHOULD QUICKLY DISAPPEAR WHEN THE LIGHT IS SWITCHED ON.

THE PRESENCE OF DROPS OF WATER, ON THE OTHER HAND, COULD INDICATE THAT WATER IS INFILTRATING. CONTACT THE PIAGGIO AFTER-SALES SERVICE NETWORK.



03_35

Rear turn indicators (03_35)

To gain access to the turn indicator bulbs, remove the fastening screws «E».

The bulbs have a bayonet coupling, to remove them press gently and twist anticlockwise about 30°. To refit follow the same steps but in reverse order.

Rear-view mirrors

Adjust the mirrors by applying slight pressure to the side of the mirror to move it to the desired position.

Front and rear disc brake (03_36, 03_37)

The brake disc and pad wear is automatically compensated, therefore it has no effect on the functioning of the front and rear brakes. For this reason it is not necessary to adjust the brakes. An excessively elastic brake lever stroke may indicate the presence of air in the braking circuit or a failure in the braking system. In this case, mainly due to the importance of brakes to guarantee safe riding conditions, the vehicle should be taken to an **Authorised Service Centre or Dealer**.

CAUTION



THE BRAKING ACTION SHOULD BEGIN AFTER ABOUT 1/3 OF THE BRAKE LEVER STROKE.

CAUTION



HAVE THE BRAKE PADS CHECKED BY THE DEALER ACCORDING TO THE CHECKS SPECIFIED IN THE SCHEDULED MAINTENANCE TABLE. HOWEVER, IN THE EVENT OF NOISES COMING FROM THE FRONT AND/OR REAR BRAKE SYSTEM DURING OPERATION, IT IS ADVISABLE TO HAVE THE BRAKE SYSTEM CHECKED BY A PIAGGIO DEALER OR AUTHORISED SERVICE CENTRE. AFTER REPLACING THE BRAKE PADS, DO NOT USE THE SCOOTER BEFORE HAVING USED THE BRAKE LEVER SEVERAL TIMES IN ORDER TO ALLOW THE PISTONS TO SETTLE AND THE LEVER STROKE TO BE SET TO THE CORRECT POSITION.



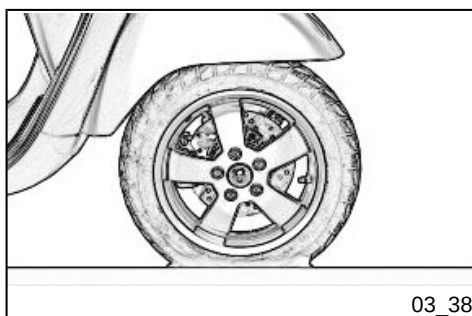
03_36



03_37

CAUTION

THE PRESENCE OF SAND, MUD, SNOW MIXED WITH SALT, ETC. ON THE ROAD, CAN DRASTICALLY REDUCE THE DURATION OF THE BRAKE PADS. IN ORDER TO AVOID THIS, WE RECOMMEND WASHING THE VEHICLE FREQUENTLY WHEN RIDING IN THESE ROAD CONDITIONS.



03_38

Puncture (03_38)

The vehicle is equipped with Tubeless tyres (without inner tube). In the event of a puncture, contrary to the situation with a tyre with inner tube, the tyre deflates more slowly, resulting in a greater steering safety. In the event of a puncture, it is admissible to make an emergency repair using an "inflate and repair" spray can. For a final repair, take your vehicle to an **Authorised Service Centre or Dealer**. The replacement of a tyre involves removing the wheel in question. Take your vehicle to an **Authorised Service Centre or Dealer** for these operations.

CAUTION

TO USE THE "INFLATE AND REPAIR" SPRAY PROPERLY FOLLOW THE INSTRUCTIONS ON THE PACKAGING.

WARNING

THE WHEELS FITTED WITH TYRES SHOULD ALWAYS BE BALANCED. RIDING THE VEHICLE WITH VERY LOW TYRE PRESSURE OR WITH INCORRECTLY BALANCED TYRES CAN LEAD TO DANGEROUS STEERING VIBRATIONS.



03_39

Periods of inactivity (03_39)

We recommend carrying out the following operations:

1. Clean the scooter thoroughly and then cover it with a canvas;
2. With the engine off and the piston in the bottom dead centre position, remove the spark plug, and pour into its hole 1 to 2 cc of the recommended oil. Operate the starter button 1-2 times for roughly 1 second to turn the engine over slowly, then insert the spark plug again;
3. Ensure that the **fuel tank is at least half full (in order to ensure the total immersion of the fuel pump)**; spread antirust grease on the unpainted metal parts; keep the wheels lifted above the ground by resting the chassis on two wooden wedges;
4. As regards the battery, follow the instructions in the "Battery" section.

Recommended products

AGIP CITY HI TEC 4T

Oil to lubricate flexible transmissions (throttle control)

Oil for 4-stroke engines



03_40

Cleaning the vehicle (03_40)

Use a low pressure water jet in order to soften the dirt and mud deposited on painted surfaces. Once softened, mud and dirt must be removed with a soft sponge for bodywork soaked with water and shampoo (2-4% of shampoo in water). Then rinse abundantly with water, and dry with a shammy cloth. Any polishing with silicon wax must always be preceded by washing

WARNING

IF THE SCOOTER IS USED ON DUSTY ROADS IT IS NECESSARY TO SERVICE THE TRANSMISSION COVER FILTER SPONGE MORE FREQUENTLY.

CAUTION

DETERGENTS CAN POLLUTE WATER. THE VEHICLE MUST BE WASHED AT A WASH STATION EQUIPPED WITH A SPECIAL WATER PURIFICATION SYSTEM.

WARNING

THE USE OF A HIGH-PRESSURE WATER JET IS STRONGLY DISCOURAGED FOR ANY ENGINE CLEANING OPERATION; HOWEVER, IF NO OTHER MEANS ARE AVAILABLE, IT IS THEN NECESSARY TO:

- ONLY USE FAN SPRAY JETS.
- DO NOT PLACE THE WATER JET NOZZLE CLOSER THAN 60 CM.
- DO NOT USE WATER AT TEMPERATURES OVER 40°C.
- DO NOT USE HIGH-PRESSURE WATER JETS.
- DO NOT STEAM WASH.
- DO NOT DIRECT THE JET STRAIGHT TO THE WIRING AND SLOT DIFFUSER ON THE TRANSMISSION COVER.

WARNING

NEVER WASH THE SCOOTER IN DIRECT SUNLIGHT, ESPECIALLY DURING SUMMER WHEN THE BODYWORK IS STILL HOT, AS THE SHAMPOO CAN DAMAGE THE PAINTWORK IF IT DRIES BEFORE BEING RINSED OFF. NEVER USE

CLOTHS SOAKED IN PETROL, DIESEL OIL OR KEROSENE FOR CLEANING THE PAINTED OR PLASTIC SURFACES SO AS NOT TO DAMAGE THE LUSTRE FINISH OR ALTER THE MECHANICAL PROPERTIES.

STARTING FAILURE

Emergency switch in «OFF»	Set the switch back to «ON»
Fuse blown	Replace the blown fuse and have the vehicle checked by an Authorised Service Centre.

IGNITION PROBLEM

Faulty spark plug	Contact an Authorised Service Centre.
Faulty ignition / injection control unit.	Contact an Authorised Service Centre.
Faulty coil. Due to the presence of high voltage, this check should only be carried out by an expert.	Contact an Authorised Service Centre.

LACK OF COMPRESSION

Loose spark plug.	Screw in the spark plug tightly
Cylinder head loose, piston gas rings worn.	Contact an Authorised Service Centre .
Valve stuck	Contact an Authorised Service Centre .

HIGH CONSUMPTION AND LOW PERFORMANCE

Air filter blocked or dirty.	Clean with water and shampoo and impregnate with petrol and specific oil (section «Removing the air filter»)
------------------------------	--

INSUFFICIENT BRAKING

Greasy disc. Worn pads. Faulty braking system. Presence of air in the front and rear brake circuit.	Contact an Authorised Service Centre .
---	---

INEFFICIENT SUSPENSIONS

Shock absorber fault, oil leak, end buffer damaged; shock absorber preloading incorrectly set	Contact an Authorised Service Centre .
---	---

IRREGULAR AUTOMATIC TRANSMISSION

Variator rollers and/or driving belt damaged	Contact an Authorised Service Centre .
--	---

Vespa GTS 250



Chap. 04
Technical data

TECHNICAL DATA

Engine	Single-cylinder, four-stroke
Bore x stroke	72 x 60 mm
Cubic capacity	244.29 cm ³
Compression ratio	10.5 - 11.5 : 1
Ignition advance (before TDC)	variable (integrated into the ignition system)
Spark plug	CHAMPION RG 4 PHP
Max. speed	120 km/h
Valve clearance	intake: 0.10 mm discharge: 0.15 mm
Overall width	755 mm
Overall length	1930 mm
Wheelbase	1370 mm
Overall height	1170 mm
Fuel supply	throttle valve dia. 32 mm and single injector
Exhaust muffler	absorption-type exhaust muffler with catalytic converter.
Electronic ignition	inductive, high efficiency integrated with the injection system, with variable timing and separate HV coil.

Lubrication	Engine lubrication with lobe pump (inside crankcase) controlled by a chain with double filter: mesh and paper.
Cooling	Forced fluid circulation, with engine driven pump; 3-way thermostat to pump intake.
Transmission	Automatic expandable pulley variator with torque server, V belt, automatic centrifugal dry clutch, gear reduction unit and transmission compartment with forced air circulation cooling.
Front brake	Ø 220 disc brake with hydraulic control activated by handlebar right lever.
Rear brake	disc brake, diameter 220 mm, with hydraulic servo operated from the handlebar with the left-hand lever.
Front wheel	Alloy rims: 12" x 3.00"
Rear wheel	Alloy rims: 12" x 3.00"
Front tyre	120/70-12", without inner tube
Rear tyre	Without air chamber: 130/70-12"
Front suspension	Single arm suspension (cantilever wheel) fitted with a dual-chamber hydraulic shock absorber with coaxial spring.
Rear suspension	single arm with two double-acting hydraulic shock absorbers and preloading adjustment in 4 positions.

Chassis	Stamped plate supporting body.
Kerb weight	151 ± 5 kg
Maximum admitted weight	~ 340 kg
Petrol tank	~ 9.2 l (approximate value)
Reserve	2÷2.5 l (approximate value)
Engine oil	Capacity: 1.3 l (dry) ; 1.2 l (when changing oil and filter)
Rear hub oil	Capacity approximately 250 cc
Cooling system	Capacity: ~ 2.100 ÷ 2.150 l



04_01

Kit equipment

One box-spanner for spark plugs; one twin screwdriver; one special spanner for adjusting the rear shock absorber. The tools are arranged in the front case.

Vespa GTS 250



Chap. 05
Spare parts and
accessories



Warnings (05_01)

WARNING



TO PREVENT ACCIDENTS AND TO GUARANTEE PROPER STABILITY, PERFORMANCE AND SAFETY, RIDE THE VEHICLE VERY CAREFULLY WHEN IT IS FITTED WITH ACCESSORIES OR WITH UNUSUAL LOADS.

WARNING



IT IS ALSO RECOMMENDED THAT "ORIGINAL PIAGGIO SPARE PARTS" BE USED, AS THESE ARE THE ONLY ONES OFFERING YOU THE SAME QUALITY GUARANTEE AS THOSE INITIALLY FITTED ON THE SCOOTER. THE USE OF NON-ORIGINAL SPARE PARTS RENDERS THE WARRANTY VOID.

WARNING



PIAGGIO MARKETS ITS OWN LINE OF ACCESSORIES THAT ARE RECOGNISED AND GUARANTEED FOR USE. IT IS THEREFORE ESSENTIAL, IN ORDER TO CHOOSE AND MOUNT THE ACCESSORIES CORRECTLY, TO CONTACT AN AUTHORISED DEALER OR SERVICE CENTRE. THE USE OF NON-ORIGINAL ACCESSORIES MAY AFFECT THE STABILITY AND OPERATION OF YOUR VEHICLE AND REDUCE SAFETY LEVELS WITH POTENTIAL RISKS FOR THE RIDER.

WARNING

NEVER RIDE THE SCOOTER EQUIPPED WITH ACCESSORIES (TOP BOX AND/OR WINDSHIELD) AT A SPEED HIGHER THAN 100 km/h.

THE SCOOTER CAN BE RIDDEN AT A HIGHER SPEED WITHOUT THE ACCESSORIES MENTIONED BEFORE WITHIN THE LIMITS ESTABLISHED BY LAW.

IF THERE SHOULD BE NON-PIAGGIO ACCESSORIES INSTALLED, OR AN ABNORMAL LOAD, OR IF THE SCOOTER IS NOT IN A GENERALLY GOOD CONDITION, OR WHENEVER WEATHER CONDITIONS DEMAND IT, SPEED SHOULD BE REDUCED FURTHER.

WARNING

BE EXTREMELY CAREFUL WHEN INSTALLING AND REMOVING THE MECHANICAL ANTI-THEFT DEVICE ON THE VEHICLE (U-SHAPED PADLOCK, DISK BLOCK, ETC.).

MAINLY NEAR THE BRAKE PIPES, TRANSMISSIONS AND/OR ELECTRIC CABLES, AN INCORRECT INSTALLATION OR REMOVAL OF THE ANTI-THEFT DEVICE AS WELL AS LEAVING IT ON BEFORE STARTING THE VEHICLE CAN SERIOUSLY DAMAGE ITS COMPONENTS, COMPROMISE THE CORRECT FUNCTIONING OF THE VEHICLE AND USERS' SAFETY.

Vespa GTS 250



Chap. 06
Programmed
maintenance



06_01

Scheduled maintenance table (06_01)

Adequate maintenance is fundamental to ensuring long-lasting, optimum operation and performance of your vehicle.

To this end, a series of checks and maintenance operations (at the owner's expense) have been suggested, which are included in the summary table on the following page. Any minor faults should be reported without delay to an **Authorised Service Centre or Dealer** without waiting until the next scheduled service to solve it.

All scheduled maintenance services must be carried out at the specified intervals, even if the stated mileage has not yet been reached. Punctual scooter servicing is essential to ensure your warranty remains valid. For any further information concerning Warranty procedures and "Scheduled Maintenance", please refer to the "Warranty Booklet".

SCHEDULED MAINTENANCE TABLE

km x 1,000	1	5	10	15	20	25	30	35	40	45	50	55	60
Safety locks	I		I				I				I		I
Spark plug			R		R		R		R		R		R
Driving belt				R			R			R			R
Throttle control	A		A		A		A		A		A		A
Air filter			C		C		C		C		C		C
Belt compartment air filter			I		I		I		I		I		I
Oil filter	R		R		R		R		R		R		R
Valve clearance					A				A				A
Electrical system and battery	I		I		I		I		I		I		I
Brake fluid *	I		I		I		I		I		I		I

km x 1,000	1	5	10	15	20	25	30	35	40	45	50	55	60
Coolant *	I		I		I		I		I		I		I
Engine oil	R	I	R	I	R	I	R	I	R	I	R	I	R
Hub oil	R		I		R		I		R		I		R
Brake pads	I	I	I	I	I	I	I	I	I	I	I	I	I
Sliding blocks / variable speed rollers			R		R		R		R		R		R
Tyre pressure and wear	I		I		I		I		I		I		I
Vehicle road test	I		I		I		I		I		I		I
Suspensions			I		I		I		I		I		I
Steering	A		A		A		A		A		A		A

I: CHECK AND CLEAN, ADJUST, LUBRICATE OR REPLACE IF NECESSARY.

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

* Replace every 2 years

RECOMMENDED PRODUCTS TABLE

Product	Description	Specifications
AGIP ROTRA 80W-90	Rear hub oil	SAE 80W/90 Oil that exceeds the requirements of API GL3 specifications
AGIP CITY HI TEC 4T	Oil to lubricate flexible transmissions (throttle control)	Oil for 4-stroke engines
AGIP FILTER OIL	Oil for air filter sponge	Mineral oil with specific additives for increased adhesiveness

Product	Description	Specifications
AGIP GP 330	Grease for brake levers, throttle	White calcium complex soap-based spray grease with NLGI 2; ISO-L-XBCIB2
AGIP CITY HI TEC 4T	Engine oil	SAE 5W-40, API SL, ACEA A3, JASO MA Synthetic oil
AGIP BRAKE 4	Brake fluid	FMVSS DOT 4 Synthetic fluid
AGIP PERMANENT SPEZIAL	coolant	Monoethylene glycol-based antifreeze fluid, CUNA NC 956-16

TABLE OF CONTENTS

A

Air filter: 47

B

Battery: 51, 52

Brake: 50, 63

C

Clock: 10

D

Disc brake: 63

Display: 10

E

Engine oil: 40, 41

Engine stop: 14

F

Fuel: 20

Fuses: 54

H

Headlight: 61

Horn: 13

Hub oil: 43

I

Identification: 21

Immobilizer: 14, 18

Instrument panel: 8

K

Key switch: 11

Keys: 15

L

Light switch: 13

M

Maintenance: 39, 81, 82

Mirrors: 63

S

Saddle: 21

Scheduled maintenance: 82

Shock absorbers: 30

Spark plug: 46

Stand: 34

Start-up: 14

T

Tank: 20

Technical Data: 71

Top box: 22

Transmission: 34

Turn indicators: 62

Tyre pressure: 29

Tyres: 45



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

Not all versions/models shown in this publication are available in all countries. The availability of single versions should be checked at the official Piaggio sales network.

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PIAGGIO & C. S.p.A. - After-Sales

V.le Rinaldo Piaggio, 23 - 56025 PONTEDERA (PI)



WORKSHOP MANUAL

633577



Vespa GTS 250 I.E.



WORKSHOP MANUAL

Vespa GTS 250 I.E.

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PIAGGIO & C. S.p.A. - After-Sales

V.le Rinaldo Piaggio, 23 - 56025 PONTEDERA (Pi)

WORKSHOP MANUAL

Vespa GTS 250 I.E.

This workshop manual has been drawn up by Piaggio & C. Spa to be used by the workshops of Piaggio-Gilera dealers. This manual is addressed to Piaggio service mechanics who are supposed to have a basic knowledge of mechanics principles and of vehicle fixing techniques and procedures. Any important changes made to the vehicles or to specific fixing operations will be promptly reported by updates to this manual. Nevertheless, no fixing work can be satisfactory if the necessary equipment and tools are unavailable. It is therefore advisable to read the sections of this manual relating to specific tools, along with the specific tool catalogue.

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

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

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



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



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



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



INDEX OF TOPICS

CHARACTERISTICS

CHAR

TOOLING

TOOL

MAINTENANCE

MAIN

TROUBLESHOOTING

TROUBL

ELECTRICAL SYSTEM

ELE SYS

ENGINE FROM VEHICLE

ENG VE

ENGINE

ENG

INJECTION

INJEC

SUSPENSIONS

SUSP

BRAKING SYSTEM

BRAK SYS

COOLING SYSTEM

COOL SYS

CHASSIS

CHAS

PRE-DELIVERY

PRE DE

TIME

TIME

INDEX OF TOPICS

CHARACTERISTICS

CHAR

This section describes the general specifications of the vehicle.

Rules

This section describes general safety rules for any maintenance operations performed on the scooter.

Safety rules

- If work can only be done on the vehicle with the engine running, make sure that the premises are well ventilated, using special extractors if necessary; never let the engine run in an enclosed area. Exhaust fumes are toxic.
 - The battery electrolyte contains sulphuric acid. Protect your eyes, clothes and skin. Sulphuric acid is highly corrosive; in the event of contact with your eyes or skin, rinse thoroughly with abundant water and seek immediate medical attention.
 - The battery produces hydrogen, a gas that can be highly explosive. Do not smoke and avoid sparks or flames near the battery, especially when charging it.
 - Fuel is highly flammable and it can be explosive given some conditions. Do not smoke in the working area, and avoid open flames or sparks.
 - Clean the brake pads in a well ventilated area, directing the jet of compressed air in such a way that you do not breathe in the dust produced by the wear of the friction material. Even though the latter contains no asbestos, inhaling dust is harmful.
-

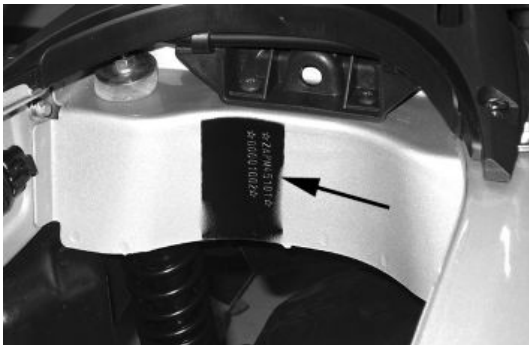
Maintenance rules

- Use original PIAGGIO spare parts and lubricants recommended by the Manufacturer. Non-original or non-conforming spares may damage the vehicle.
 - Use only the appropriate tools designed for this vehicle.
 - Always use new gaskets, sealing rings and split pins upon reassembly.
 - After removal, clean the components using non-flammable or low flash-point solvent. Lubricate all the work surfaces except the tapered couplings before refitting.
 - After refitting, make sure that all the components have been installed correctly and work properly.
 - For removal, overhaul and refit operations use only tools with metric measures. Metric bolts, nuts and screws are not interchangeable with coupling members with English measurement. Using unsuitable coupling members and tools may damage the scooter.
 - When carrying out maintenance operations on the scooter that involve the electrical system, make sure the electrical connections have been made properly, particularly the ground and battery connections.
-

Vehicle identification

Chassis prefix: ZAPM45100000 ÷ 1001

Engine prefix: M451M ÷ 1001



Dimensions and mass

DIMENSIONS AND MASS

Specification	Desc./Quantity
Total loadless weight	151 ± 5 kg
Width (to hand grips)	755 mm
Length	1930 mm
Wheel base	1370 mm
Saddle height	800 mm



Engine

DATA

Specification	Desc./Quantity
Type	single-cylinder, four-stroke and four liquid-cooled valves
Timing system	single overhead camshaft chain driven on the left-hand side, three-arm rocking levers set up with threaded set screw
Bore	72 mm
Stroke	60 mm
Cubic capacity	249.29 mm
Compression ratio	10.5 ÷ 11.5
Idle speed	1650 ± 50 rpm
Air filter	sponge, impregnated with mixture (50% petrol and 50% oil)
Starting system	electric starter motor with freewheel
Lubrication	with lobe pump (inside the crankcase) chain-driven and double filter: mesh and paper
Fuel supply	by electronic injection with electric fuel pump
Max. speed	120 km/h
valve clearance	intake: 0.10 mm - discharge: 0.15 mm

Transmission

TRANSMISSION

Specification	Desc./Quantity
Transmission	Automatic expandable pulley variator with torque server, V belt, automatic clutch, gear reduction unit and transmission housing with forced air circulation cooling

Capacities

CAPACITY

Specification	Desc./Quantity
Engine oil	approx. 1300 cc (recommended oil Selenia HI Scooter 4 Tech)
Fuel tank (including a ~ 2 l reserve)	~ 9.2 l
Rear hub	250 cc (recommended oil TUTELA MATRIX)
Cooling system fluid	approx. 2.100 ÷ 2.150 l PARAFLU 11FE (Diluted)

Electrical system

ELECTRICAL COMPONENTS

Specification	Desc./Quantity
Ignition/advance	Electronic, with inductive discharge and variable advance with three-dimensional mapping
Spark plug	CHAMPION RG 4 PHP
Battery	12V-12Ah

Specification	Desc./Quantity
Fuses	1: 30A - 1: 15A - 3: 10A - 4: 7,5A - 1: 3A
Generator	alternating current

Frame and suspensions

FRAME AND SUSPENSIONS

Specification	Desc./Quantity
Type	Unitised body made of stamped plate
Front suspension	Single arm suspension (cantilever wheel) fitted with a double-acting hydraulic shock absorber with coaxial spring
Front shock absorber axial travel	86.5 mm
Rear suspension	Engine with swinging fork attached to frame by means of an arm with 2 degrees of freedom Pair of double-acting hydraulic shock absorbers and coaxial springs with preloading adjustment in 4 positions.
Rear shock absorber axial travel	89.5 mm

Brakes

BRAKES

Specification	Desc./Quantity
Front	Ø 220 disc brake and floating calliper with Ø 25 mm twin plungers and hydraulic control (lever on the far right end of the handlebar)
Rear	Ø 220 disc brake and calliper with two Ø 30 mm counteracting plungers and hydraulic control (lever on the far left end of the handlebar)

Wheels and tyres

WHEELS AND TYRES

Specification	Desc./Quantity
Front wheels - light alloy rims	3.00x12
Rear wheels - light alloy rims	3.00x12
Front tyres	120/70-12" Tubeless
Rear tyres	130/70-12" Tubeless

TYRE PRESSURE

Specification	Desc./Quantity
Front tyre pressure (when cold)	1.8 bar
Rear tyre pressure (when cold)	2 bar
Tyre pressure (when cold) with passenger	2.2 bar

N.B.

CHECK AND ADJUST TYRE PRESSURE WITH TYRES AT AMBIENT TEMPERATURE. REGULATE PRESSURE ACCORDING TO THE WEIGHT OF THE RIDER AND ACCESSORIES

Tightening Torques

GRUPPO STERZO

Name	Torque in Nm
Upper steering ring nut	35 ÷ 40
Lower steering ring nut	12 - 14
Handlebar fixing screw	45 ÷ 50 (The two screws must be tightened to the prescribed torque after having done so with the rear wheel axle nut. Safety locks: see «Pre-delivery Operations»)
Fixing screws for handlebar control assembly U-bolts	7 ÷ 10

FRAME ASSEMBLY

Name	Torque in Nm
Engine-swinging arm bolt	64 - 72
swinging arm bolt - body shell	76 ÷ 83
Engine and vehicle side swinging arm junction bolt	33 ÷ 41
Bolt of the Silent block support plate	42 ÷ 52
Centre stand bolt	32 ÷ 40
Side stand fixing bolt	35 ÷ 40

SOSPENSIONE ANTERIORE

Name	Torque in Nm
Screw fixing the shock absorber to the shock absorber - calliper attachment plate	20 ÷ 27
Wheel axle nut	74 ÷ 88
Wheel screw	20 ÷ 25
Screw fixing rear mudguard to steering shock absorber upper clamp	5 ÷ 6.5
	20 ÷ 30

FRENO ANTERIORE

Name	Torque in Nm
Brake fluid pump - hose fitting	20 ÷ 25
Brake fluid tube- calliper fitting	19 ÷ 24
Vite serraggio pinza alla piastra attacco ammortizzatore - pinza freno	24 ÷ 27
Disc tightening screw	6 (Apply LOCTITE 242 threadlock, medium strength)
Oil bleed screw	12 - 16
Pad fastening pin	19.6 ÷ 24.5
Viti vaschetta pompa freno	1,5 ÷ 2

REAR SUSPENSION

Name	Torque in Nm
Retainer for left shock absorber to crankcase support plate	20 ÷ 25
Shock absorber upper fitting	20 ÷ 25
Shock absorber lower fitting	33 ÷ 41
Rear wheel shaft	104 ÷ 126
Screw fixing wheel to hub	20 ÷ 25
Screws for muffler - shock absorber support arm on engine	20 ÷ 25 (The two screws must be tightened to the prescribed torque after having done so with the

Name	Torque in Nm
	rear wheel axle nut. Safety locks: see «Pre-delivery Operations»)

FRENO POSTERIORE

Name	Torque in Nm
Brake fluid pump - hose fitting	20 ÷ 25
Brake fluid pipe-calliper fitting	20 ÷ 25
Rear disc tightening bolt	11 ÷ 13
Oil bleed screw	12÷16
Calliper to engine tightening screw	20 ÷ 25
Viti vaschetta pompa freno	1,5 ÷ 2
Vite accoppiamento pinza	30 ÷ 33 Nm

MUFFLER

Name	Torque in Nm
Muffler heat guard fixing screw	4 ÷ 5
Screw for fixing muffler to the support arm	20 ÷ 25
Lambda probe clamp on exhaust manifold	40 ÷ 50
Exhaust manifold-muffler joint clamp	12 ÷ 13
Manifold - muffler diaphragm tightening clamp	16 ÷ 18

LUBRICATION

Name	Torque in Nm
Hub oil drainage plug	15 ÷ 17
Oil filter on crankcase fitting	27 ÷ 33
Engine oil drainage plug/mesh filter	24 ÷ 30
Oil filter	4 ÷ 6
Oil pump cover screws	7 ÷ 9
Screws fixing oil pump to the crankcase	5 - 6
Oil pump control crown screw	10 ÷ 14
Oil pump cover plate screws	4 ÷ 6
Oil sump screws	10 ÷ 14
Minimum oil pressure sensor	12 ÷ 14

CYLINDER HEAD

Name	Torque in Nm
Spark plug	12 ÷ 14
Head cover screws	6 ÷ 7
Nuts fixing head to cylinder	7±1 + 10±1 + 270°
Head fixing side screws	11 ÷ 12 Nm
Starter ground screw	7 ÷ 8.5
Tappet set screw lock nut	6 ÷ 8
Inlet manifold screws	11 ÷ 13
Timing chain tensioner slider screw	10 ÷ 14
Start-up counterweight support screw	11 ÷ 15
Timing chain tensioner support screw	11 ÷ 13
Timing chain tensioner central screw	5 - 6
Camshaft retention plate screw	4 ÷ 6

TRANSMISSION

Name	Torque in Nm
Belt support roller screw	11 ÷ 13

Name	Torque in Nm
Clutch unit nut on driven pulley	45 ÷ 50
Drive pulley nut	75 ÷ 83
Transmission cover screws	11 ÷ 13
Driven pulley shaft nut	54 ÷ 60
Rear hub cap screws	24 ÷ 27

FLYWHEEL

Name	Torque in Nm
Flywheel cover screw	11 ÷ 13
Stator assembly screws	3 - 4 (Apply LOCTITE 242 medium-strength threadlock)
Flywheel nut	94 - 102 Nm
Pick-Up clamping screws	3 ÷ 4
Screw fixing freewheel to flywheel	13 - 15

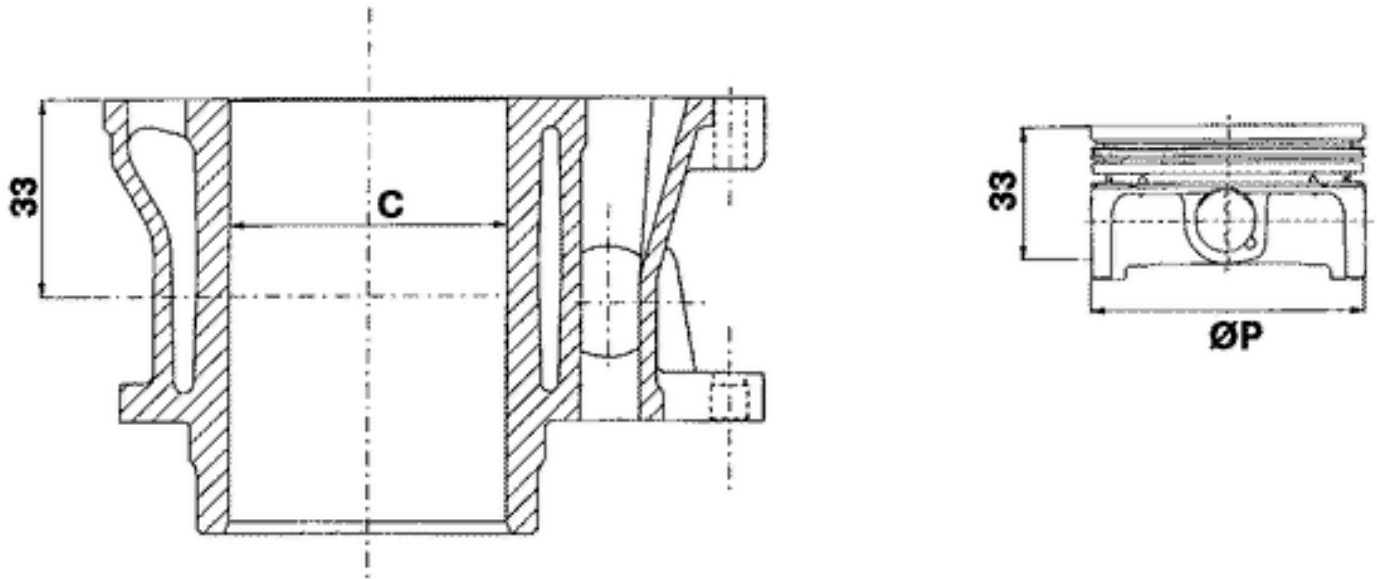
CRANKCASE AND CRANKSHAFT

Name	Torque in Nm
Internal engine crankcase bulkhead (transmission-side half shaft) screws	4 ÷ 6
Engine-crankcase coupling screws	11 ÷ 13
Starter screws	11 ÷ 13
Crankcase timing cover screws	3.5 - 4.5 (Apply LOCTITE 242 medium-strength threadlock)

COOLING

Name	Torque in Nm
Water pump rotor cover	3 ÷ 4
Thermostat cover screws	3 ÷ 4
Bleed screw:	3

Overhaul data**Assembly clearances**

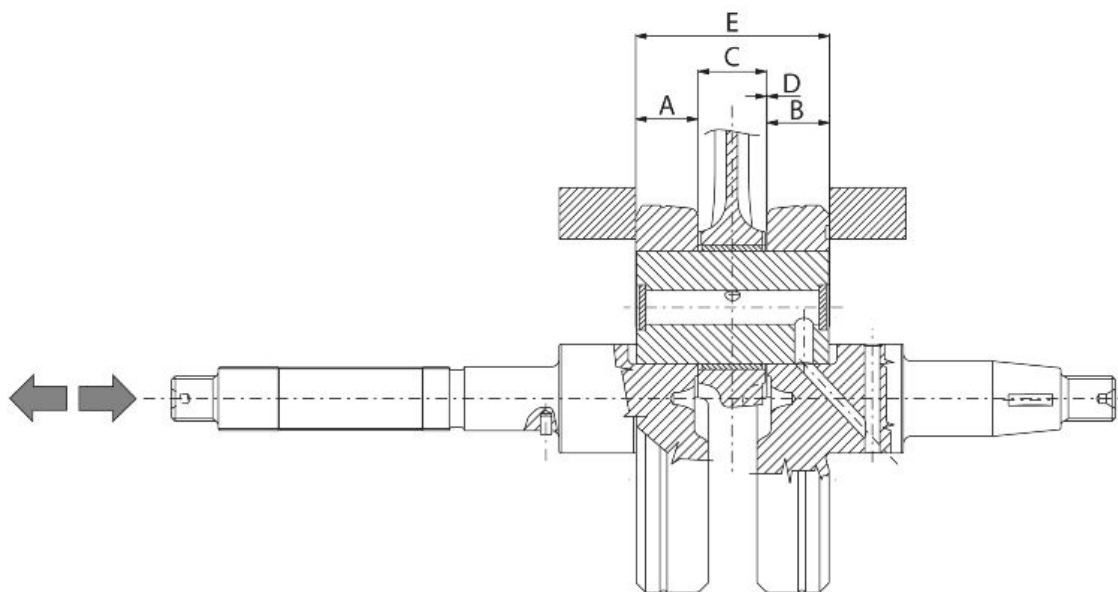
Cylinder - piston assy.**ENGINE COUPLING CATEGORY**

Name	Initials	Cylinder	Piston	Play on fitting
Cylinder	M	72.01 ÷ 72.017	71.953 ÷ 71.960	0.050 - 0.064
Cylinder	N	72.017 ÷ 72.024	71.960 ÷ 71.967	0.050 - 0.064
Piston	O	72.024 ÷ 72.031	71.967 ÷ 71.974	0.050 - 0.064
Piston	P	72.031 ÷ 72.038	71.974 ÷ 71.981	0.050 - 0.064

Crankcase - crankshaft - connecting rod**CRANKSHAFT**

Titolo	Durata/Valore	Testo Breve (< 4000 car.)	Indirizzo Immagine
Crankshaft		Crankshaft to crankcase axial clearance	

Crankshaft to crankcase axial clearance



CRANKSHAFT/ CRANKCASE AXIAL CLEARANCE

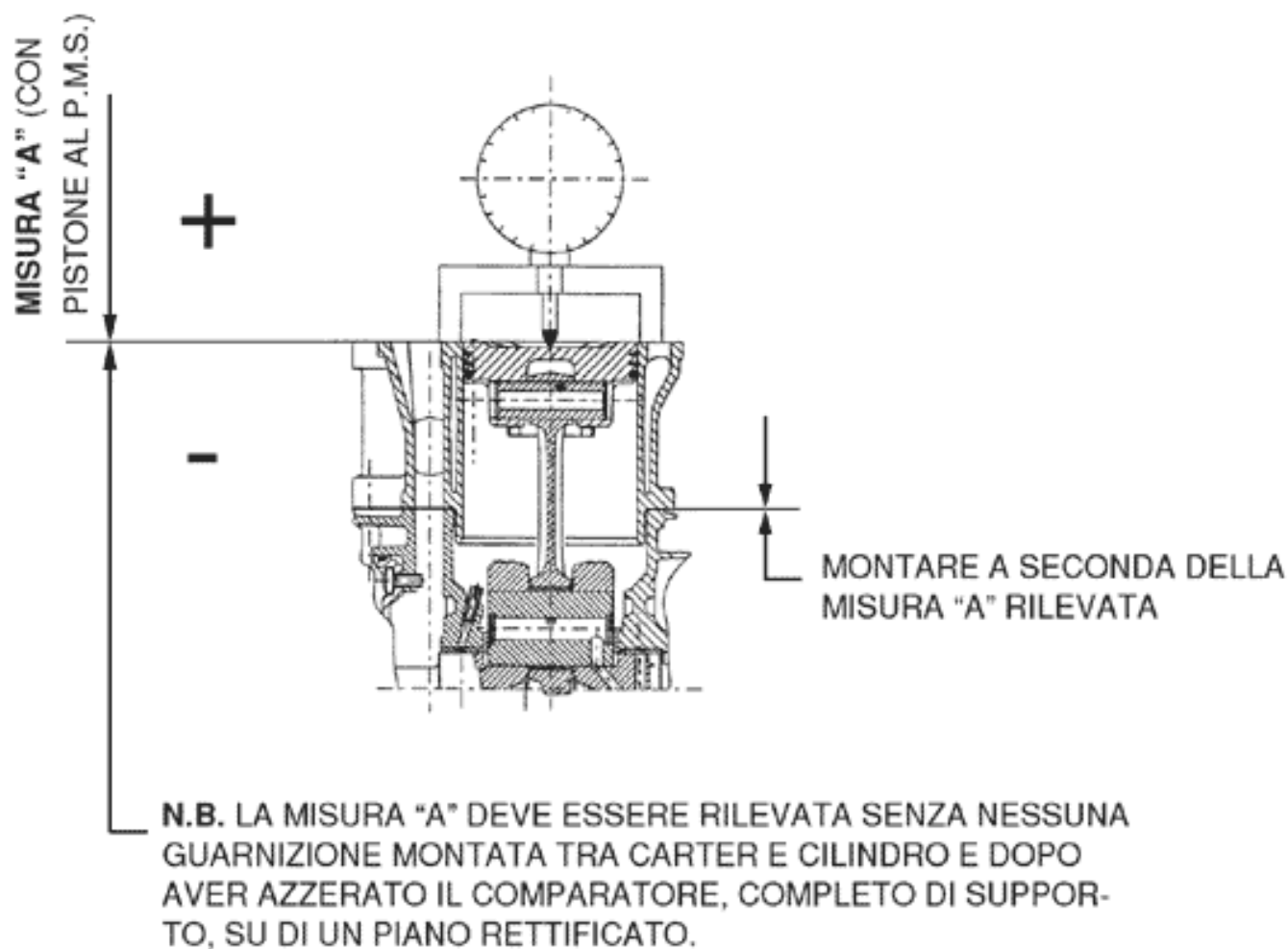
Name	Description	Dimensions	Initials	Quantity
Half-shaft, trans- mission side		16.6 +0-0.05	A	D = 0.20 - 0.50
Flywheel side half- shaft		16.6 +0-0.05	B	D = 0.20 - 0.50
Connecting rod		18 -0.10 -0.15	C	D = 0.20 - 0.50
Spacer tool		51.4 +0.05	E	D = 0.20 - 0.50

Slot packing system

Characteristic

Compression ratio

10.5 ÷ 11.5 : 1



Measurement "A" to be taken is a value of piston re-entry, it indicates by how much the plane formed by the piston crown falls below the plane formed by the top of the cylinder. The further the piston falls inside the cylinder, the less the base gasket to be applied (to recover the compression ratio) and vice versa.

N.B.
MEASUREMENT "A" MUST BE TAKEN WITHOUT ANY GASKET FITTED BETWEEN THE CRANK-CASE AND CYLINDER AND AFTER RESETTING THE GAUGE, EQUIPPED WITH A SUPPORT, ON A GROUND PLANE

ENGINE 250 SHIMMING

Name	Measure A	Thickness
shimming	3.70 - 3.60	0.4 ± 0.05
shimming	3.60 - 3.40	0.6 ± 0.05
shimming	3.40 - 3.30	0.8 ± 0.05

Products

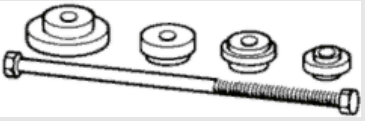
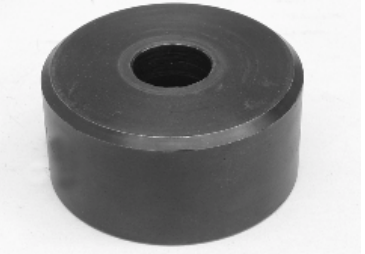
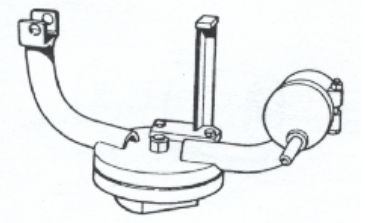
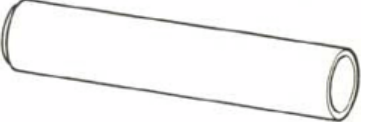
RECOMMENDED PRODUCTS TABLE

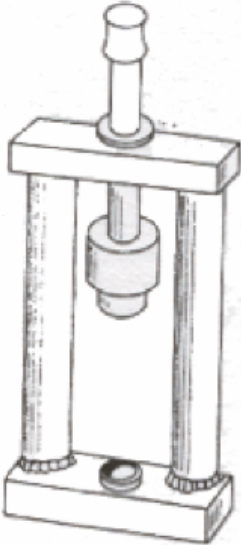
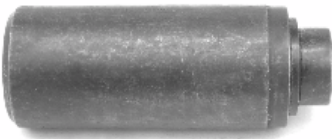
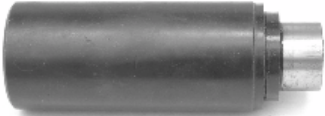
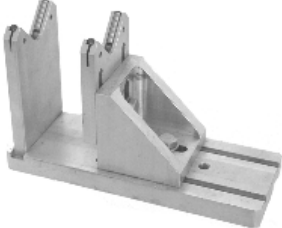
Product	Description	Specifications
AGIP ROTRA 80W-90	Rear hub oil	SAE 80W/90 Oil that exceeds the requirements of API GL3 specifications
AGIP CITY HI TEC 4T	Oil to lubricate flexible transmissions (throttle control)	Oil for 4-stroke engines
AGIP FILTER OIL	Oil for air filter sponge	Mineral oil with specific additives for increased adhesiveness
AGIP GP 330	Grease for brake levers, throttle	White calcium complex soap-based spray grease with NLGI 2; ISO-L-XBCIB2
AGIP CITY HI TEC 4T	Engine oil	SAE 5W-40, API SL, ACEA A3, JASO MA Synthetic oil
AGIP BRAKE 4	Brake fluid	FMVSS DOT 4 Synthetic fluid
SPECIAL AGIP PERMANENT fluid	coolant	Monoethylene glycol-based anti-freeze fluid, CUNA NC 956-16

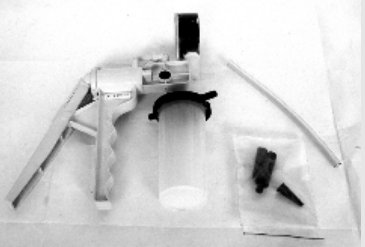
INDEX OF TOPICS

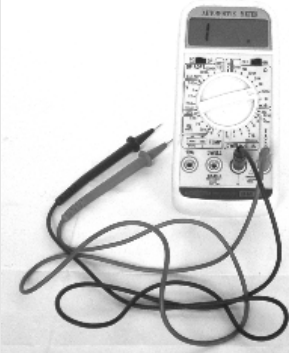
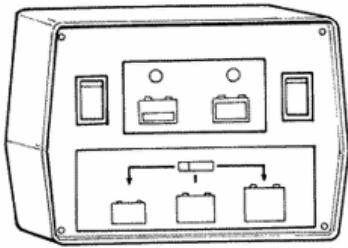
TOOLING

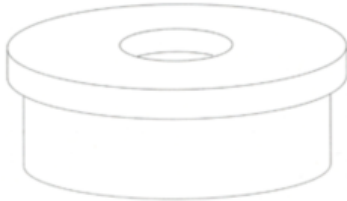
TOOL

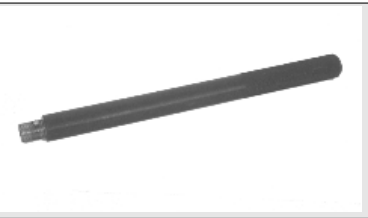
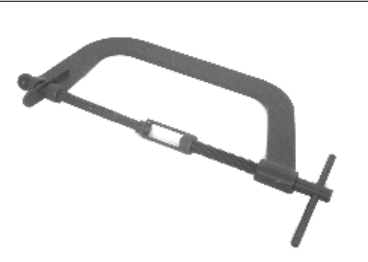
APPROPRIATE TOOL		
Stores code	Description	
001330Y	Tool for fitting steering seats	
001467Y017	Bell for bearings, outside Ø 39 mm	
001467Y014	Extraction pliers for Ø 15 mm bearings	
005095Y	Engine support	
002465Y	Pliers for circlips	
006029Y	Punch for fitting fifth wheel seat on steering tube	
020004Y	Punch for removing fifth wheels from the headstock	

Stores code	Description	
020021Y	Front suspension service tool	
020036Y	Punch	
020038Y	Punch	
020055Y	Wrench for steering tube ring nut	
020074Y	Support base for checking crankshaft alignment	
020150Y	Air heater support	

Stores code	Description	
020151Y	Air heater	
020193Y	Oil pressure gauge	
020262Y	Crankcase splitting strip	
020263Y	Sheath for driven pulley fitting	
020306Y	Punch for assembling valve seal rings	
020329Y	Mity-Vac vacuum operated pump	

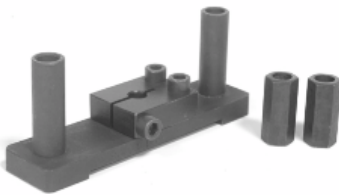
Stores code	Description	
020330Y	Stroboscopic light for timing control	
020331Y	Digital multimeter	
020332Y	Digital rev counter	
020333Y	Single battery charger	
020334Y	Multiple battery charger	

Stores code	Description	
020335Y	Magnetic support for dial gauge	
020357Y	32 x 35 mm adaptor	
020359Y	42 x 47 mm adaptor	
020360Y	52 x 55 mm adaptor	
020363Y	20 mm guide	
020364Y	25 mm guide	

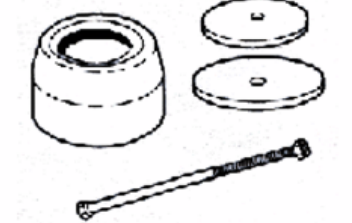
Stores code	Description	
020365Y	22 mm guide	
020375Y	28 x 30 mm adaptor	
020376Y	Adaptor handle	
020382Y	Valve cotters equipped with part 012 removal tool	
020382Y011	adapter for valve removal tool	

Stores code	Description	
020393Y	Piston fitting band	
020412Y	15 mm guide	
020423Y	driven pulley lock wrench	
020424Y	Driven pulley roller casing fitting punch	
020426Y	Piston fitting fork	

Stores code	Description	
020431Y	Valve oil seal extractor	
020434Y	Oil pressure control fitting	
020441Y	26 x 28 mm adaptor	
020444Y	Tool for fitting/ removing the driven pulley clutch	
020456Y	Ø 24 mm adaptor	
020477Y	37 mm adaptor	

Stores code	Description	
020483Y	30 mm guide	
020489Y	Hub cover support stud bolt set	
494929Y	Exhaust fumes analyser	
020428Y	Piston position check support	
020460Y	Scooter diagnosis and tester	
020621Y	H.V. cable extraction adapter	

Stores code	Description	
020481Y	Control unit interface wiring	
001467Y035	Bearing housing outside diameter 47 mm	
020626Y	Driving pulley lock wrench	
001467Y013	Pliers to extract ø 15 mm bearings	
020627Y	Flywheel lock wrench	
020467Y	Flywheel extractor	

Stores code	Description	
020454Y	Tool for fitting piston pin stops (200 - 250)	
020622Y	Transmission-side oil guard punch	
020480Y	Petrol pressure check set	
020244Y	15 mm diameter punch	
020115Y	Ø 18 punch	
020271Y	Tool for removing-fitting silent bloc	

Stores code	Description	
020638Y	250 I. E. ENGINE - ABS SOFTWARE	
020469Y	Reprogramming kit for scooter diagnosis tester	

INDEX OF TOPICS

MAINTENANCE

MAIN

Maintenance chart

EVERY 2 YEARS

60'

Action

Coolant - change
Brake fluid - change

AFTER 1,000 KM

60'

Action

Safety locks - check
Throttle lever - adjustment
Engine oil - change
Electrical system and battery - check
Coolant level - check
Brake fluid level - check
Engine oil - replacement
Brake pads - check condition and wear
Tyre pressure and wear - check
Vehicle and brake test - road test
Hub oil - change
Steering - check

AFTER 5,000 KM; 25,000 KM; 35,000 KM; 55,000 KM; 65,000 KM

10'

Action

Engine oil - level check/top-up
Brake pads - check condition and wear

AT 10,000 KM 50,000 KM 70,000 KM

100'

Action

Safety locks - check
Throttle lever - adjustment
Air filter - clean
Air filter belt compartment - check
Engine oil - change
Electrical system and battery - check
Coolant level - check
Brake fluid level - check
Engine oil - replacement
Brake pads - check condition and wear
Sliding block / variable speed rollers - change
Tyre pressure and wear - check
Vehicle and brake test - road test
Hub oil - check
Suspensions - check
Steering - check

AT 15,000 KM 45,000 KM 75,000 KM

45'

Action

Engine oil - level check/top-up

Brake pads - check condition and wear

Driving belt - replacement

AT 20,000 KM; 40,000 KM; 80,000 KM

150'

Action

Spark plug - replacement

Throttle lever - adjustment

Air filter - clean

Air filter belt compartment - check

Engine oil - change

Valve clearance - check

Electrical system and battery - check

Coolant level - check

Brake fluid level - check

Engine oil - replacement

Brake pads - check condition and wear

Sliding block / variable speed rollers - change

Tyre pressure and wear - check

Vehicle and brake test - road test

Hub oil - change

Suspensions - check

Steering - check

30,000 KM

140'

Action

Safety locks - check

Driving belt - replacement

Throttle lever - adjustment

Air filter - cleaning

Air filter belt compartment - check

Engine oil - change

Electrical system and battery - check

Coolant level - check

Brake fluid level - check

Engine oil - replacement

Brake pads - check condition and wear

Sliding block / variable speed rollers - change

Tyre pressure and wear - check

Vehicle and brake test - road test

Hub oil - check

Suspensions - check

Steering - check

60,000 KM

190'

Action

Spark plug - replacement

Driving belt - replacement

Throttle lever - adjustment

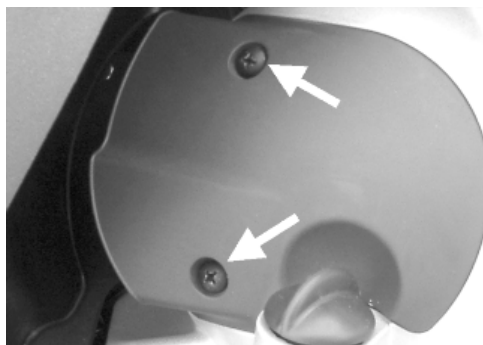
Action
Air filter - cleaning
Air filter belt compartment - check
Engine oil - change
Valve clearance - check
Electrical system and battery - check
Coolant level - check
Brake fluid level - check
Engine oil - replacement
Brake pads - check condition and wear
Sliding block / variable speed rollers - change
Tyre pressure and wear - check
Vehicle and brake test - road test
Hub oil - change
Suspensions - check
Steering - check

Checking the spark advance

The ignition advance is determined electronically on the basis of parameters known by the control unit. For this reason it is not possible to declare the reference values based on the engine rpm. The ignition timing value is detectable any time using the diagnostic tester. It is possible to check whether the ignition advance determined by the system does in fact correspond with the value actually activated on the engine, by means of the stroboscopic light.

Proceed as follows:

- Remove the spark plug.
- Remove the plastic cover on the flywheel cover shown in the photograph.
- Remove the transmission compartment air intake cover shown in the photograph.
- Rotate the driving pulley fan using a screwdriver until the reference marks between the flywheel and flywheel cover coincide as shown in the photograph.
- Bring the reference mark onto the transmission side between the fan and the transmission cover as shown in the photograph.
- Refit the spark plug.



- Refit the plastic cap on the flywheel cover.
- Adjust the spark gap to the contact position (no reference mark visible) and install it on engine between the spark plug and spark plug cap
- Connect the induction calliper on the spark gap cable respecting the proper polarity (the arrow on the calliper must be pointing at the spark plug).
- Connect the diagnostic tester.
- Start the engine.
- Select the menu on the "parameter" function.
- Select the stroboscopic light command in the traditional four-stroke engine position (1 spark 2 revs).
- Check that the real values of rpm and ignition advance match those measured using the diagnostic tester.

If the values do not correspond, check:

- distribution timing
- revolution-timing sensor
- Injection control unit

Specific tooling

020460Y Scooter diagnosis and tester

020330Y Stroboscopic light for timing control

020621Y H.V. cable extraction adapter



Spark plug

- Rest the scooter on its stand
- Open the saddle and take out the helmet compartment
- Disconnect spark plug HV wire hood;
- Unscrew the spark plug using the wrench supplied;
- Check the conditions of the spark plug, make sure the insulation is intact, that the electrodes are not excessively worn or grimy, the conditions of the washer, and measure the distance between the electrodes using the appropriate feeler gauge.



- Adjust the distance if necessary by bending the side electrode very carefully. In case of anomaly (as described before) replace the spark plug with another of the recommended type;
- Fit the spark plug with the correct inclination and manually screw it all the way down, then use the special spanner to tighten it.
- Insert the cap onto the spark plug and proceed with the reassembly operations.

CAUTION

THE SPARK PLUG MUST BE REMOVED WHEN THE MOTOR IS COLD. THE SPARK PLUG MUST BE REPLACED EVERY 20,000 KM. THE USE OF NON CONFORMING ELECTRONIC IGNITION CONTROL UNITS OR SPARK PLUGS OTHER THAN THOSE PRESCRIBED CAN SERIOUSLY DAMAGE THE ENGINE.

Characteristic**Electrode gap**

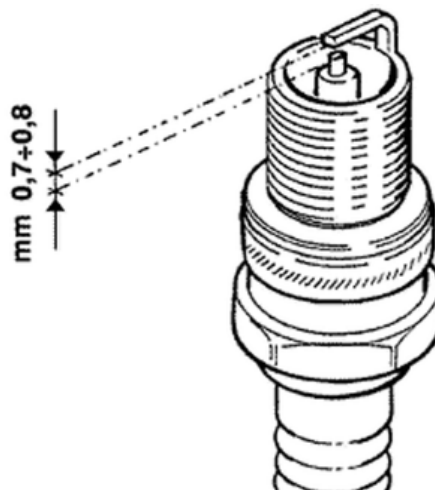
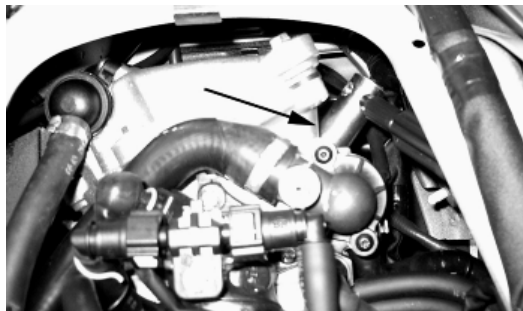
0.7-0.8 mm

Electric characteristic**Spark plug**

CHAMPION RG4 PHP

Locking torques (N*m)

Spark plug 12 ÷ 14

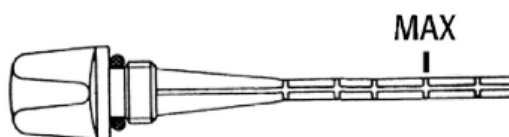


Hub oil

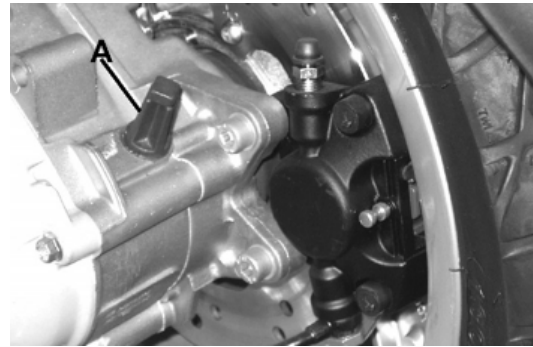
Check

- Park the vehicle on its centre stand on flat ground;
- Remove the oil dipstick «A», dry it with a clean cloth and put it back into its hole **tightening it completely**;

Remove the dipstick and check that the oil level is slightly over the second notch starting from the lower end; if the level is under the MAX. mark, it needs to be filled with the right amount of hub oil.



- Screw up the oil dipstick again and make sure it is locked properly into place.



Replacement

- Remove the oil cap «A».
- Unscrew the oil drainage cap "B" and drain out all the oil.
- Screw in the drainage cap again and fill the hub with the prescribed oil.

Recommended products

AGIP ROTRA 80W-90 Rear hub oil

SAE 80W/90 Oil that exceeds the requirements of API GL3 specifications

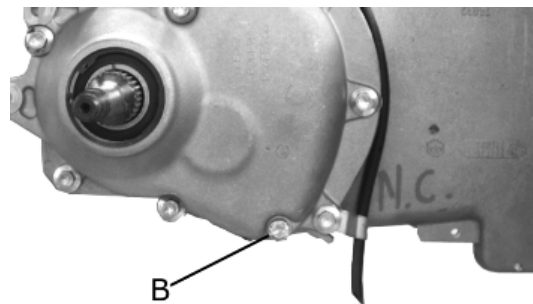
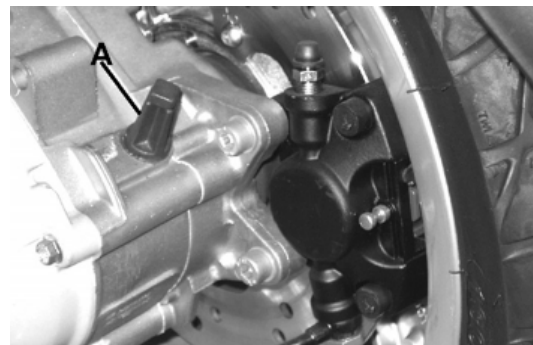
Characteristic

Rear hub oil

Capacity approximately 250 cc

Locking torques (N*m)

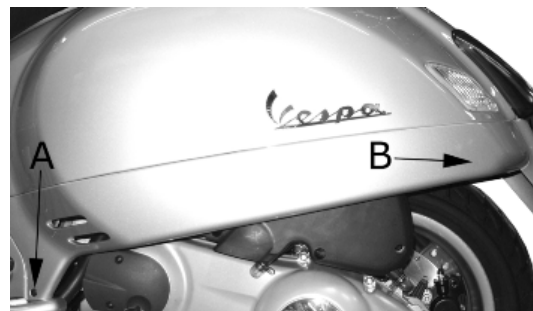
Hub oil drainage screw $15 \div 17$ Nm



Air filter

Proceed as follows:

1. unscrew the fixing screw «A».
2. unscrew the nut «B» under the body.
3. remove the left side fairing.
4. remove the helmet compartment;
5. unscrew the fixing screws «C» that can be reached once the helmet compartment has been removed;



6. Unscrew the screws «D» and remove the air filter cover.

Remove the filtering element and clean it with water and shampoo; then dry it with a clean cloth and short blasts of compressed air. Finally, immerse it in a mixture of 50% oil of the recommended type and 50% petrol. Then gently squeeze the filter element between your hands, allow it to drip and then refit it. Oil or water deposits in the filter housing can be cleaned off by removing the two rubber caps «E».

CAUTION

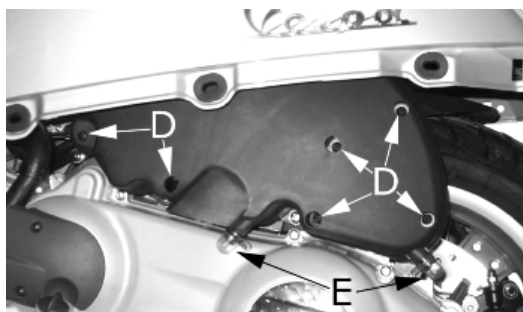
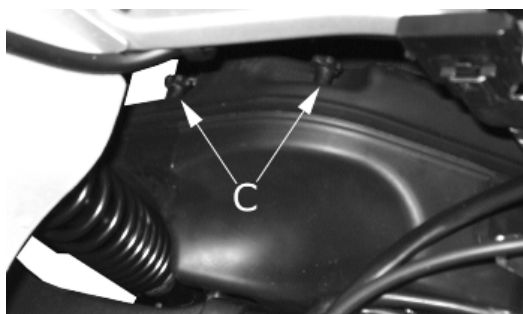


IF THE VEHICLE IS USED ON DUSTY ROADS IT IS NECESSARY TO CARRY OUT MAINTENANCE CONTROLS OF THE AIR FILTER TO AVOID DAMAGING THE ENGINE.

Recommended products

AGIP FILTER OIL Oil for air filter sponge

Mineral oil with specific additives for increased adhesiveness



Engine oil

In 4T engines, the engine oil is used to lubricate the distribution elements, the bench bearings and the thermal group. **An insufficient quantity of oil can cause serious damage to the engine.**

In all 4T engines, the deterioration of the oil characteristics, or a certain consumption should be considered normal, especially if during the run-in period. Consumption levels in particular can be influenced by the conditions of use (e.g.: oil consumption increases when driving at "full throttle").

Replacement

At 1,000 km and after every 10,000 km, the oil and the filter must be changed. The engine must be drained by running off the oil from drainage cap "B" of the flywheel side gauze pre-filter; furthermore to facilitate oil drainage, loosen the cap/dipstick "A". Once all the oil has drained through the drainage hole, unscrew the oil cartridge filter "C" and remove it.

Make sure the pre-filter and discharge tap O-rings are in good condition.

Lubricate them and refit the gauze filter and oil drainage tap, screwing them up to the specified torque.

Refit the new cartridge filter being careful to lubricate the O-ring before fitting it.

Change the engine oil.

Since a certain quantity of oil still remains in the circuit, oil must be filled from cap "A". Then start up the scooter, leave it running for a few minutes and switch it off: after five minutes check the level and if necessary top up without exceeding the **MAX** level. The cartridge filter must be replaced every time the oil is changed. Use new oil of the recommended type for topping up and changing purposes.

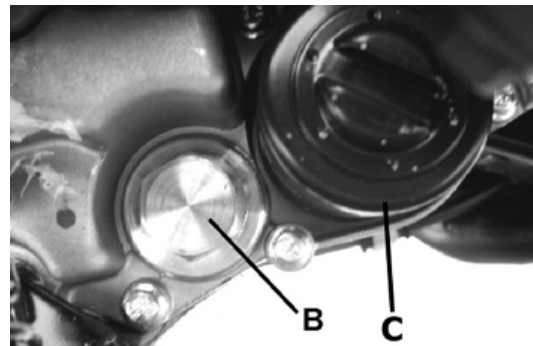
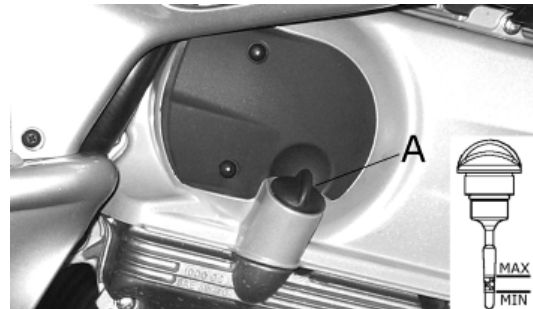
N.B.

THE ENGINE MUST BE HOT WHEN THE OIL IS CHANGED.

Recommended products

AGIP CITY HI TEC 4T Engine oil

SAE 5W-40 Synthetic oil that exceed the requirements of API SL, ACEA A3, JASO MA specifications



Check

This operation must be carried out with the engine cold and following the procedure below:

1. Place the vehicle on its centre stand and on flat ground.
2. Undo cap/dipstick "A", dry it off with a clean cloth and replace it, **screwing down completely**.
3. Remove the cap/dipstick again and check that the level is between the min and max. marks; top up if necessary.

The MAX level mark indicates a quantity of around 1300 cc of engine oil. If the check is carried out after the vehicle has been used, and therefore with a hot engine, the level line will be lower; in order to carry out a correct check it is necessary to wait at least 10 minutes after the engine has been stopped, so as to get the correct level.

Oil top up

The oil should be topped up after having checked the level and in any case by adding oil **without ever exceeding the MAX. level**.

Restoration of the level from **MIN** to **MAX** requires approximately **200 cc**.



Engine oil filter

The cartridge filter must be replaced every time the oil is changed. Use new oil of the recommended type for topping up and changing purposes.

Make sure the pre-filter and discharge tap O-rings are in good condition. Lubricate them and refit the mesh filter and oil drainage plug, screwing them up to the specified torque. Refit the new cartridge filter being careful to lubricate the O-ring before the fitting. Change the engine oil.

Recommended products

AGIP CITY HI TEC 4T Engine oil

SAE 5W-40 Synthetic oil that exceed the requirements of API SL, ACEA A3, JASO MA specifications

Oil pressure warning light

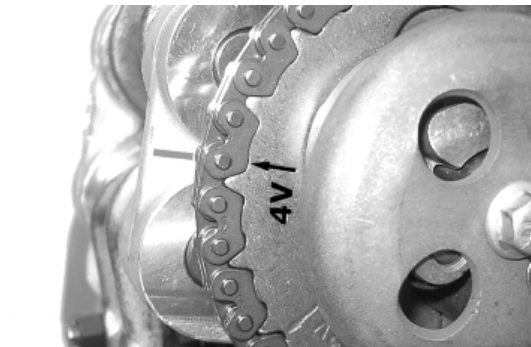
The vehicle is equipped with a warning light on the instrument panel that lights up when the key is turned to the "ON" position. However, this light should switch off once the engine has been started.

If the light turns on during braking, at idling speed or while turning a corner, it is necessary to check the oil level and the lubrication system.

Checking the ignition timing

- Remove the plastic cap on the flywheel cover
- Turn the flywheel until the reference mark «T» on the rotor matches the reference mark on the flywheel cover as shown in the figure (TDC). Make sure that the 4V reference point on the camshaft control pulley is aligned with the reference point on the head as shown in the second figure. If the reference is opposite the indicator on the head, turn the crankshaft once more.

For the use of this reference mark, remove the spark plug and turn the engine in the direction that is the reverse of the normal direction using a caliper spanner applied to the camshaft command pulley casing.



Cooling system

Introduction of the engine coolant.

The fluid level must be checked every 10,000 kilometres with a cold engine, in the way shown below: Place the scooter on its centre stand and on flat ground.

- Undo the screw shown in the figure and remove the expansion tank cap on RHS.
- Top up if the fluid level is near or below the MIN level edge. The liquid level must always be between the MIN and MAX level.
- The coolant consists of an ethylene glycol and corrosion inhibitor based 50% demineralised water- antifreeze solution mix.

CAUTION

DO NOT EXCEED THE MAX. LEVEL WHEN FILLING SO AS TO AVOID THE COOLANT ESCAPING FROM THE EXPANSION TANK WHEN THE vehicle IS IN USE.



Braking system

Level check

The brake fluid tanks for the front and rear brakes are located on the pumps under the handlebar cover. Proceed as follows:

- Remove the brake pump cover
- Rest the vehicle on its centre stand with the handlebars perfectly horizontal;
- Check the fluid level through the sight glass as shown in the figure. A certain lowering of the level is caused by wear on the pads.



Top-up

- Position the vehicle on a flat surface and on the centre stand
- Remove the brake pump cover as indicated in the photo



Check the brake fluid level through the sight glass on the pump as shown in the photograph

- If the level is below the minimum, fill using the two screws shown in the figure



- Remove the gasket and fill with DOT 4 until the spyglass is completely covered

For refitting purposes carry out the operations in the reverse order from the removal operation and respect the tightening torque of the tank cover screws.

CAUTION

MAKE SURE THE BRAKE FLUID DOES NOT GET INTO YOUR EYES OR ON YOUR SKIN OR CLOTHES. IF THIS HAPPENS ACCIDENTALLY, WASH WITH WATER.

CAUTION

THE BRAKING CIRCUIT FLUID IS HIGHLY CORROSIVE. THEREFORE, WHEN TOPPING IT UP, AVOID LETTING IT COME INTO CONTACT WITH THE PAINTED PARTS OF THE VEHICLE. THE BRAKING CIRCUIT FLUID IS HYGROSCOPIC, WHICH MEANS THAT IT ABSORBS MOISTURE FROM THE SURROUNDING AIR. IF MOISTURE CONTAINED IN THE BRAKE FLUID EXCEEDS A CERTAIN VALUE, THIS WILL RESULT IN INEFFICIENT BRAKING.

CAUTION

NEVER USE BRAKE FLUID COMING FROM OPEN OR PARTIALLY USED CONTAINERS. UNDER NORMAL CLIMATIC CONDITIONS, BRAKE FLUID MUST BE CHANGED EVERY 20,000 KM OR ANYWAY EVERY 2 YEARS.

Locking torques (N*m)

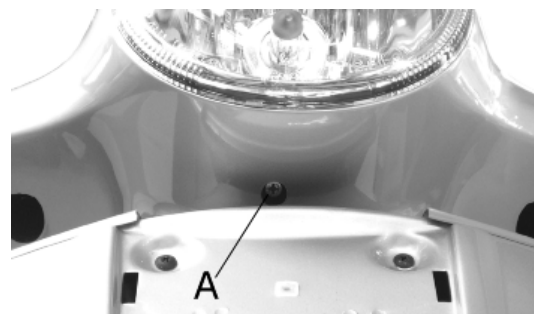
Brake pump reservoir screws $15 \div 20$



Headlight adjustment

Proceed as follows:

1. Place the vehicle in running order and with the tyres inflated to the prescribed pressure, on a flat surface 10 m away from a white screen situated in a shaded area, making sure that the longitudinal axis of the scooter is perpendicular to the screen;
2. Turn on the headlight and check that the borderline of the projected light beam on the screen is not lower than 9/10 of the distance from the ground to the centre of vehicle headlamp and higher than 7/10;



3. If otherwise, adjust the right headlight with screw

«A».

N.B.

THE ABOVE PROCEDURE COMPLIES WITH THE EUROPEAN STANDARDS REGARDING MAXIMUM AND MINIMUM HEIGHT OF LIGHT BEAMS. REFER TO THE STATUTORY REGULATIONS IN FORCE IN EVERY COUNTRY WHERE THE vehicle IS USED.

INDEX OF TOPICS

TROUBLESHOOTING

TROUBL

This section makes it possible to find the solutions to use in troubleshooting.

For each breakdown, a list of the possible causes and respective interventions is given.

Engine

Excessive oil consumption/Exhaust smoke

EXCESSIVE CONSUMPTION

Possible Cause	Operation
Wrong valve adjustment	Adjust the valve clearance properly
Overheated valves	Remove the head and the valves, grind or replace the valves
Missshapen/worn valve seats	Replace the head assembly
Worn cylinder, Worn or broken piston rings	Replace the piston cylinder assembly or piston rings
Worn or broken piston rings or piston rings that have not been fitted properly	Replace the piston cylinder unit or just the piston rings
Oil leaks from the couplings or from the gaskets	Check and replace the gaskets or restore the coupling seal
Worn valve oil guard	Replace the valve oil guard
Worn valve guides	Check and replace the head unit if required

Insufficient lubrication pressure

POOR LUBRICATION PRESSURE

Possible Cause	Operation
By-Pass remains open	Check the By-Pass and replace if required. Carefully clean the By-Pass area.
Oil pump with excessive clearance	Perform the dimensional checks on the oil pump components
Oil filter too dirty	Replace the cartridge filter
Oil level too low	Restore the level using the recommended oil type (Selenia HI Scooter 4 Tech)

Transmission and brakes

Clutch grabbing or performing inadequately

IRREGULAR CLUTCH PERFORMANCE OR SLIPPAGE

Possible Cause	Operation
Faulty clutch	Check that there is no grease on the masses. Check that the clutch mass contact surface with the casing is mainly in the centre with equivalent characteristics on the three masses. Check that the clutch casing is not scored or worn in an anomalous way

Insufficient braking

INEFFICIENT BRAKING SYSTEM

Possible Cause	Operation
Inefficient braking system	Check the pad wear (1.5 min). Check that the brake discs are not worn, scored or warped. Check the correct level of fluid in the pumps and replace brake fluid if necessary. Check there is no air in the circuits; if necessary, bleed the air. Check that the front brake calliper moves in axis with the disc.
Fluid leakage in hydraulic braking system	Failing elastic fittings, plunger or brake pump seals, replace
Brake disc slack or distorted	Check the brake disc screws are locked; measure the axial shift of the disc with a dial gauge and with wheel mounted on the scooter.

Brakes overheating

BRAKES OVERHEATING

Possible Cause	Operation
Defective sliding of pistons	Check calliper and replace any damaged part.
Brake disc slack or distorted	Check the brake disc screws are locked; use a dial gauge and a wheel mounted on the vehicle to measure the axial shift of the disc.
Clogged compensation holes on the pump	Clean carefully and blast with compressed air
Re-inflated or glued rubber gaskets	Replace gaskets.

Steering and suspensions

Heavy steering

STEERING HARDENING

Possible Cause	Operation
Steering hardening	Check the tightening of the top and bottom ring nuts. If irregularities continue in turning the steering even after making the above adjustments, check the seats in which the ball bearings rotate: if they are recessed or if the balls are squashed, replace them.

Excessive steering play

EXCESSIVE STEERING CLEARANCE

Possible Cause	Operation
Torque not conforming	Check the tightening of the top and bottom ring nuts. If irregularities continue in turning the steering even after making the above adjustments, check the seats in which the ball bearings rotate:

Possible Cause	Operation
	if they are recessed or if the balls are squashed, replace them.

Noisy suspension

NOISY SUSPENSION

Possible Cause	Operation
Malfunctions in the suspension system	If the front suspension is noisy, check: the efficiency of the front shock absorbers; the condition of the ball bearings and relevant lock-nuts, the limit switch rubber buffers and the movement bushings. In conclusion, check the tightening torque of the wheel hub, the brake calliper, the shock absorber disk in the attachment to the hub and the steering tube.

Suspension oil leakage

OIL LEAKAGE FROM SUSPENSION

Possible Cause	Operation
Seal fault or breakage	Replace the shock absorber Check the condition of wear of the steering covers and the adjustments.

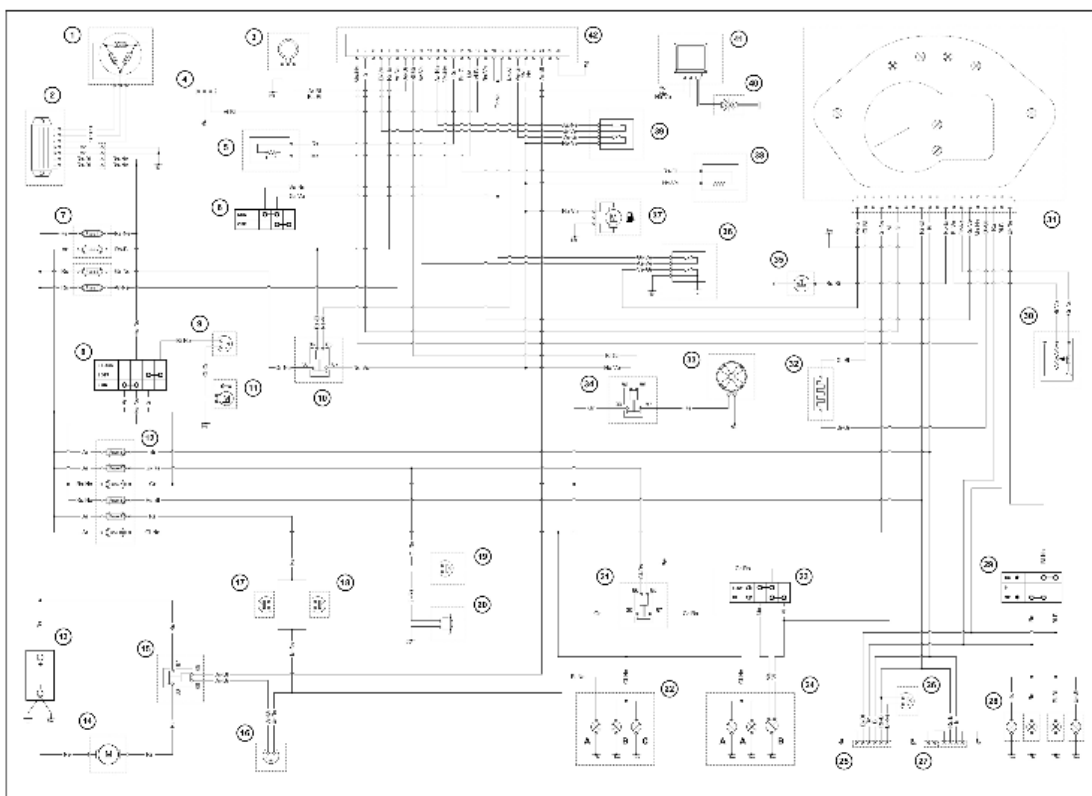
INDEX OF TOPICS

ELECTRICAL SYSTEM

ELE SYS

Lo schema sottostante è valido per i telai dal numero ZAPM4510000001007 al ZAPM4510000001578.

Per i telai successivi consultare la pagina 2.



ELECTRICAL SYSTEM

	Specification	Desc./Quantity
1	Flywheel magneto	
2	Voltage regulator	
3	Immobilizer aerial	
4	Diagnostic socket	
5	Engine rpm sensor	
6	Engine stop switch	
7	N° 2 fuse boxes in under helmet compartment	
8	Ignition key-switch	
9	Saddle opening button	
10	Injection load remote control	
11	Saddle opening actuator	
12	Glove compartment fuse box	
13	Battery	12V - 12 Ah
14	Starter motor	
15	Starter remote control	
16	Starter button	
17	Rear stop light switch	
18	Stop switch on front brake	
19	Horn button	
20	Horn	
21	Headlight remote control switch	

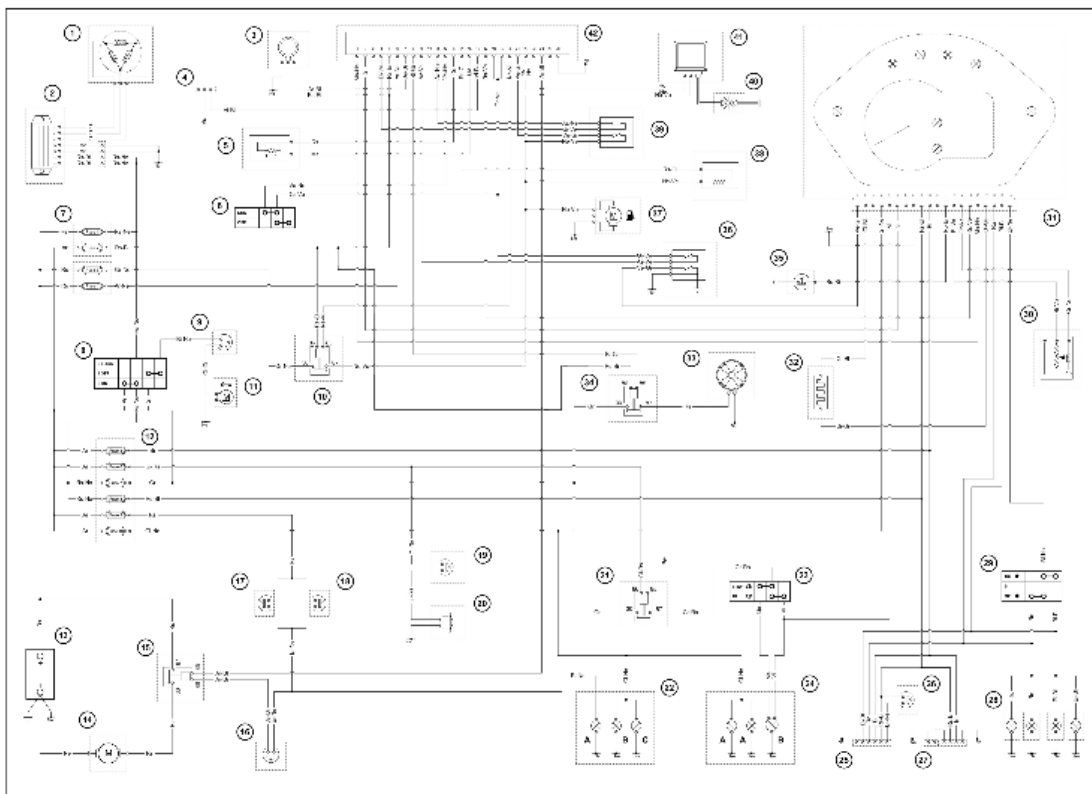
	Specification	Desc./Quantity
22	Rear Headlights	A Stop light B Parking light C License plate light
23	Light switch	
24	Front Headlights	A Parking light B High beam/low beam
25	Anti-theft alarm fitting	
26	helmet compartment button prewiring	
27	Intercom fitting	
28	Turn indicator bulbs	
29	Turn signal switch	
30	Fuel level sender	
31	Instrument panel	
32	Outside temperature sensor	
33	Electric fan	
34	Electric fan remote control switch	
35	Oil pressure sensor	
36	Engine temperature sensor	
37	Fuel pump	
38	Fuel injector	
39	Lambda sensor	
40	Spark plug	
41	H.V. coil	
42	Electronic injection control unit	

Key

Ar: Orange **Az:** Sky blue **Bi:** White **Bl:** Blue **Gi:** Yellow **Gr:** Grey

Ma: Brown **Ne:** Black **Ro:** Pink **Rs:** Red **Ve:** Green **Vi:** Purple

Schema valido dal numero di telaio ZAPM4510000001579 in poi.



ELECTRICAL SYSTEM

	Specification	Desc./Quantity
1	Flywheel magneto	
2	Voltage regulator	
3	Immobilizer aerial	
4	Diagnostic socket	
5	Engine rpm sensor	
6	Engine stop switch	
7	N° 2 fuse boxes in under helmet compartment	
8	Ignition key-switch	
9	Saddle opening button	
10	Injection load remote control	
11	Saddle opening actuator	
12	Glove compartment fuse box	
13	Battery	12V - 12 Ah
14	Starter motor	
15	Starter remote control	
16	Starter button	
17	Rear stop light switch	
18	Stop switch on front brake	
19	Horn button	
20	Horn	
21	Headlight remote control switch	
22	Rear Headlights	A Stop light B Parking light C License plate light

	Specification	Desc./Quantity
23	Light switch	
24	Front Headlights	A Parking light B High beam/low beam
25	Anti-theft alarm fitting	
26	helmet compartment button prewiring	
27	Intercom fitting	
28	Turn indicator bulbs	
29	Turn signal switch	
30	Fuel level sender	
31	Instrument panel	
32	Outside temperature sensor	
33	Electric fan	
34	Electric fan remote control switch	
35	Oil pressure sensor	
36	Engine temperature sensor	
37	Fuel pump	
38	Fuel injector	
39	Lambda sensor	
40	Spark plug	
41	H.V. coil	
42	Electronic injection control unit	

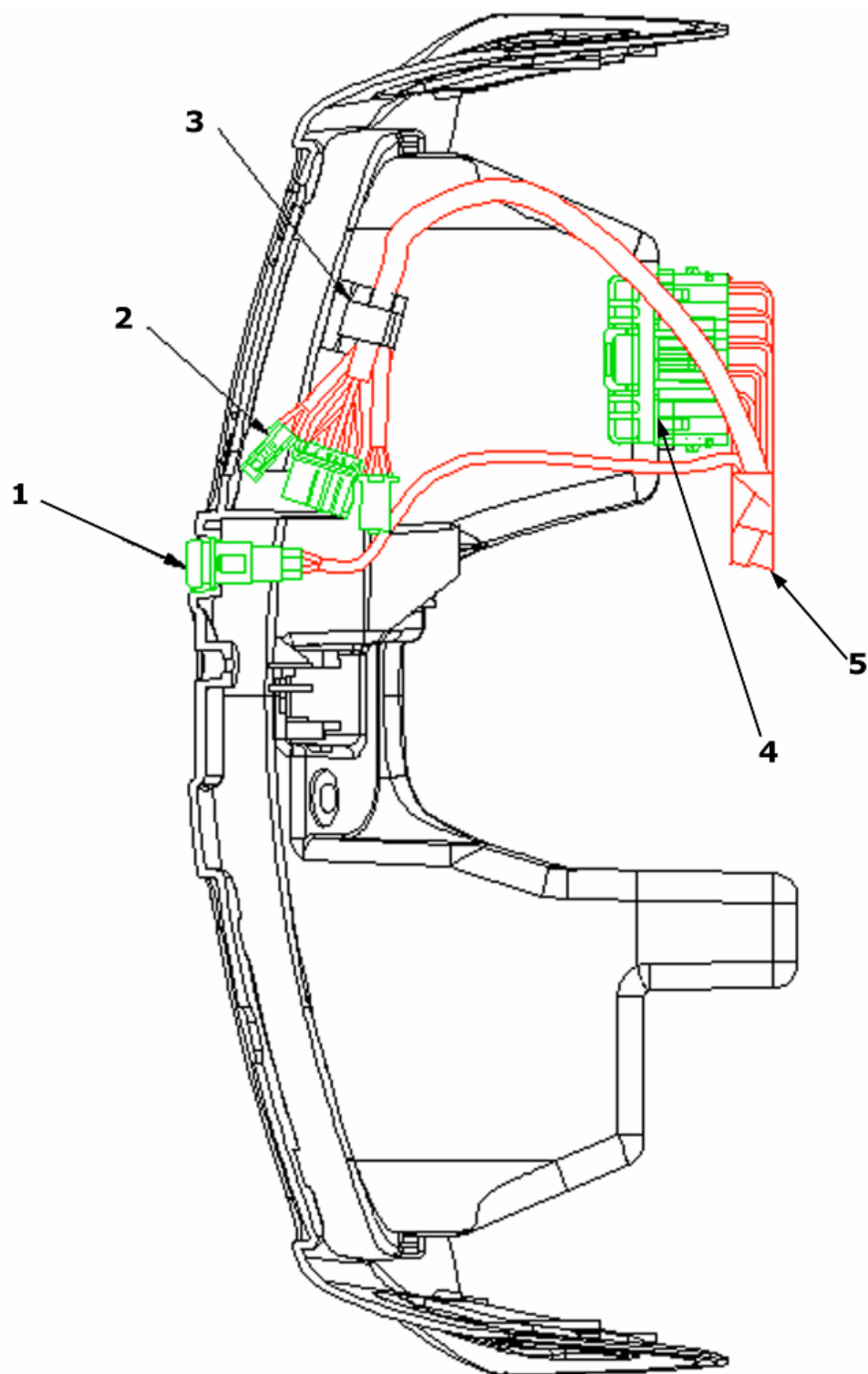
Key

Ar: Orange **Az:** Sky blue **Bi:** White **Bl:** Blue **Gi:** Yellow **Gr:** Grey

Ma: Brown **Ne:** Black **Ro:** Pink **Rs:** Red **Ve:** Green **Vi:** Purple

Electrical system installation

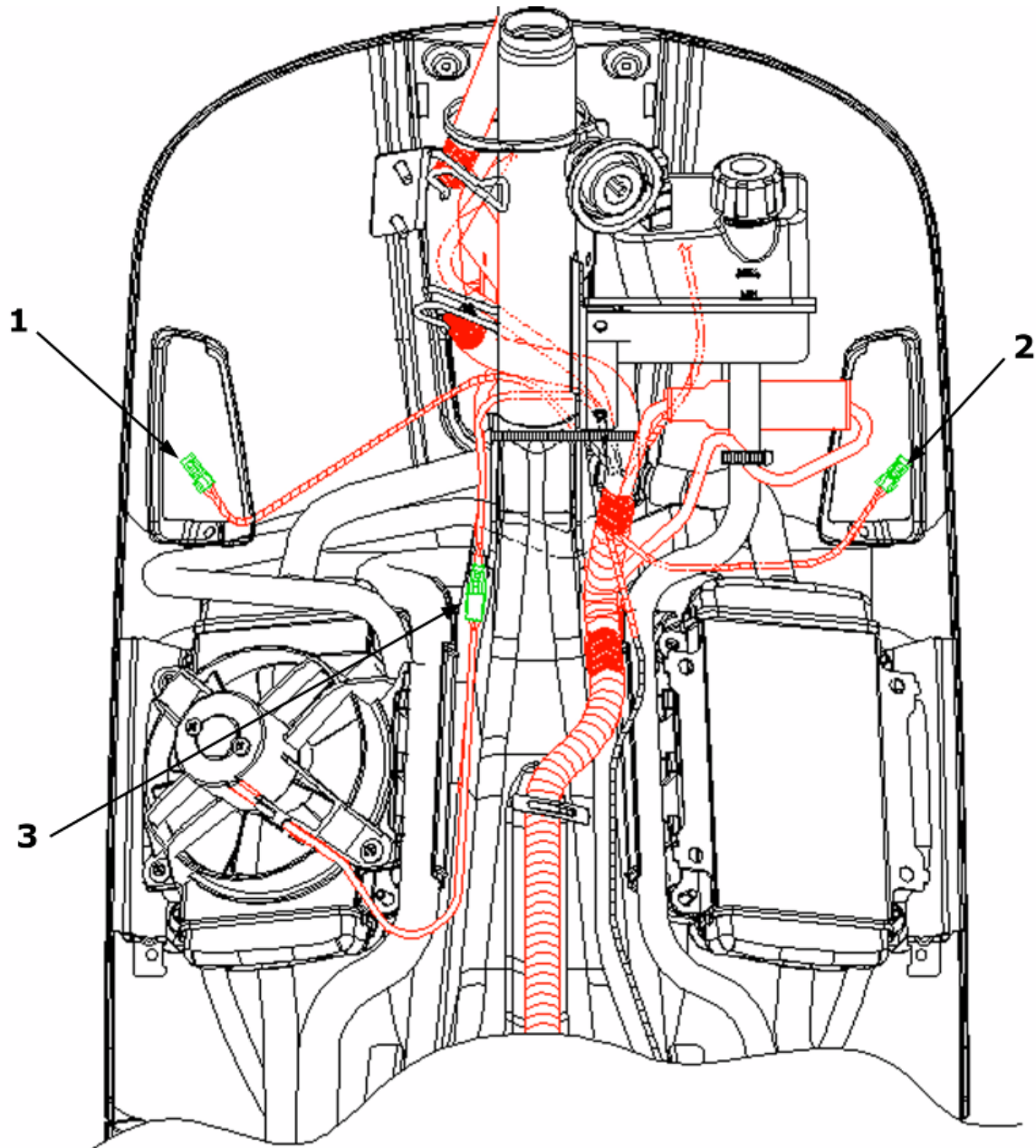
Front side



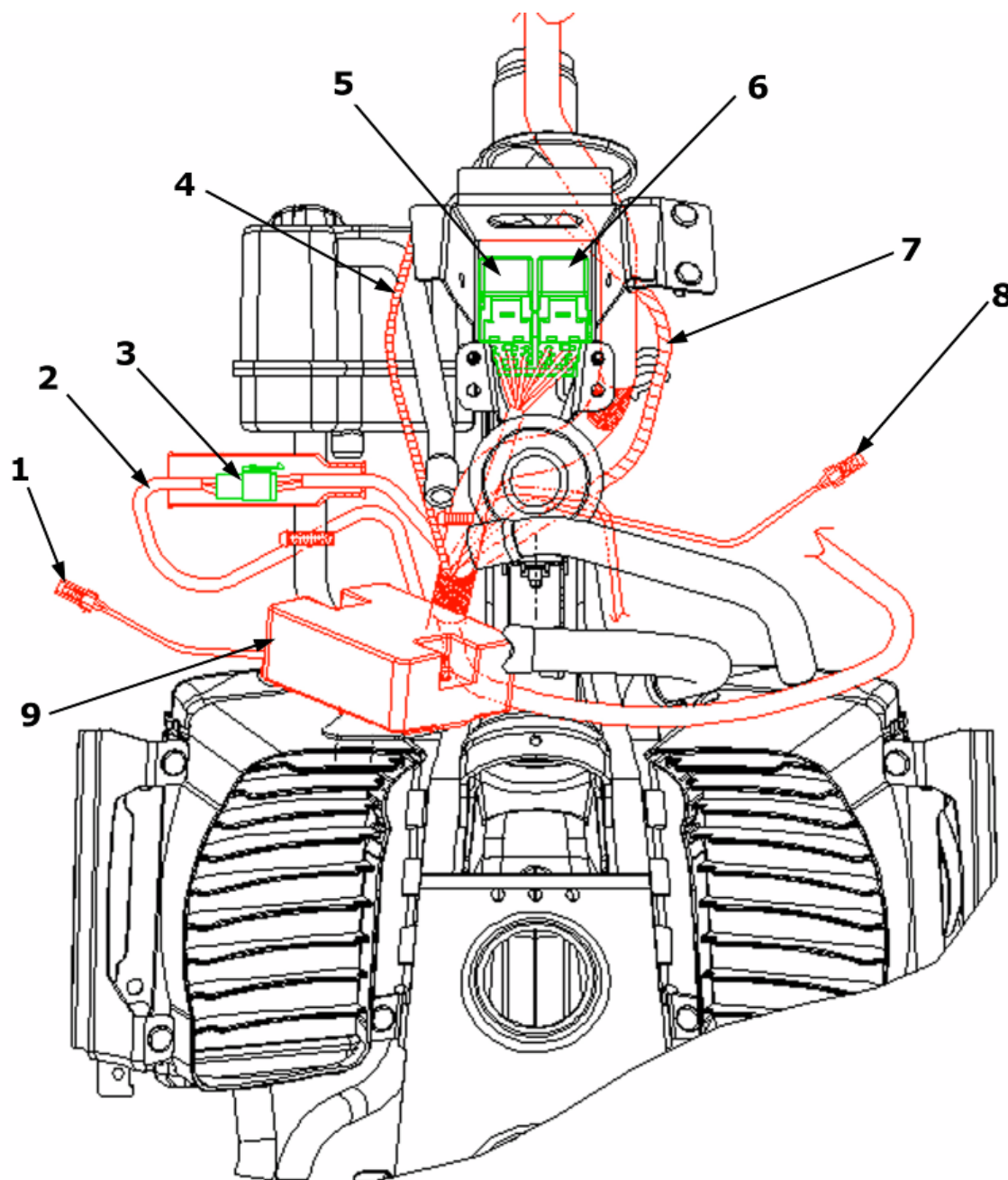
1. Saddle opening switch

2. Wirings

3. Insert in clamp
4. Fuse box
5. From the wire unit

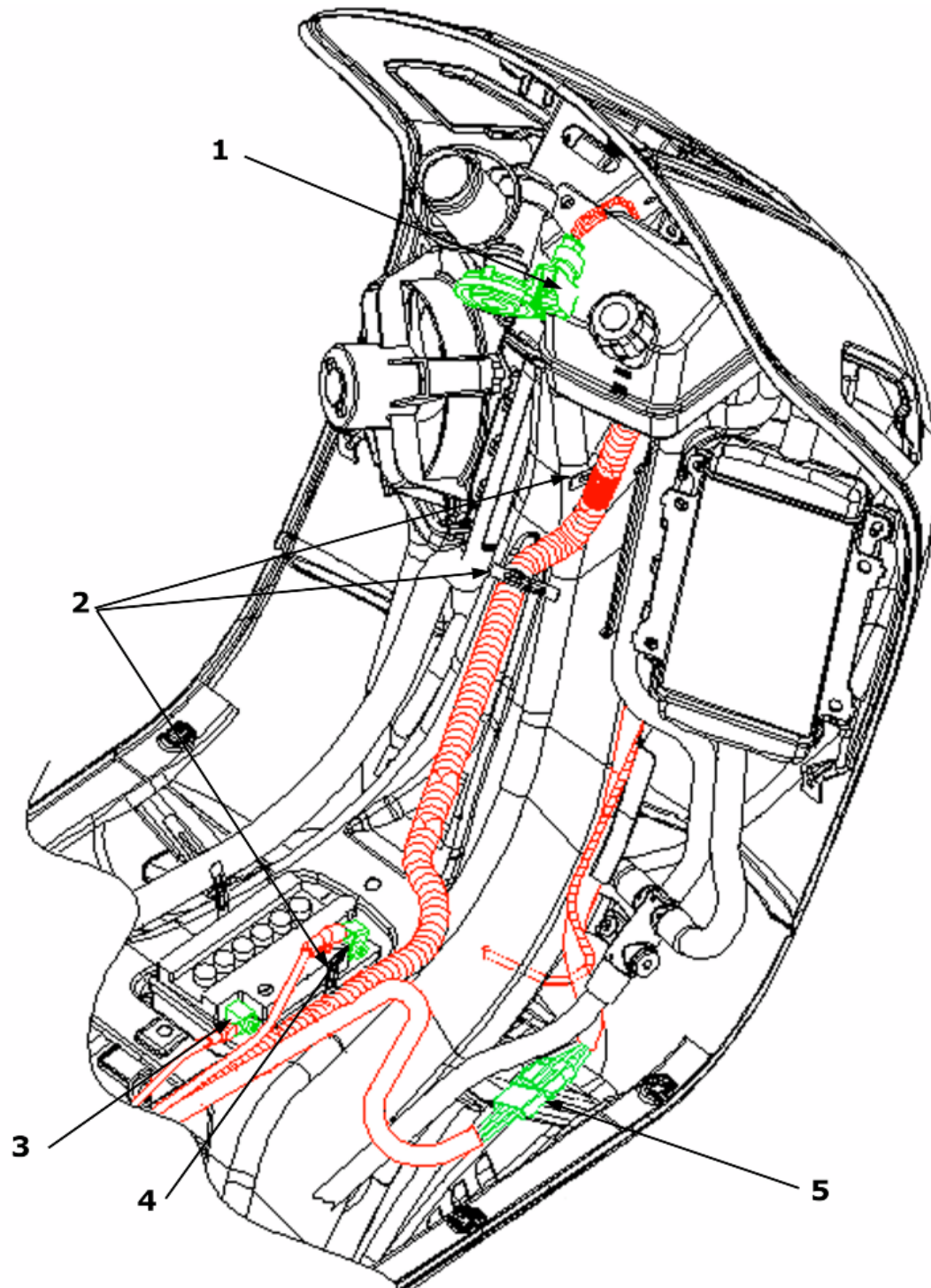


1. Front left turn indicator connector
2. Front right turn indicator connector
3. Electrical fan connector



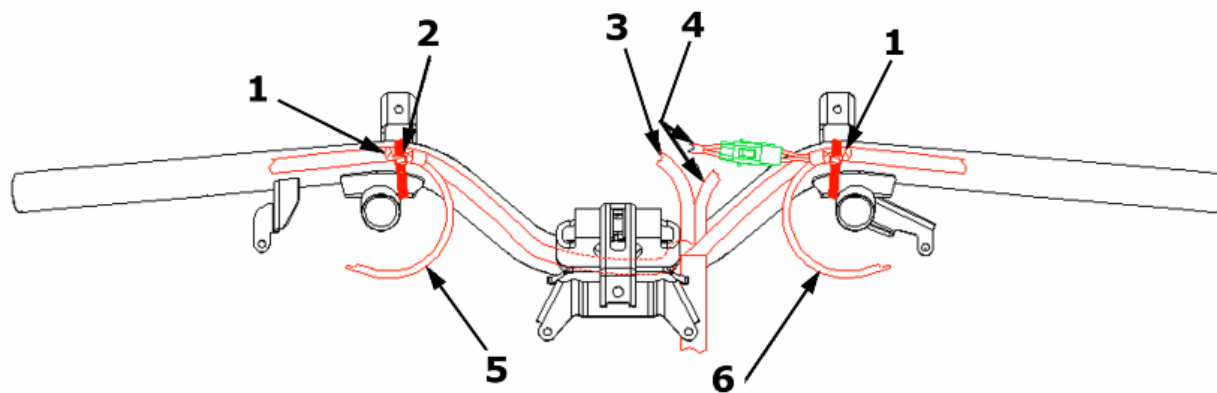
1. Right turn indicator connector
2. From regulator
3. Wire unit - regulator connexion
4. To the immobilizer aerial
5. Light remote control
6. Electric fan starter
7. To key switch
8. Left turn indicator connector

9. Voltage regulator

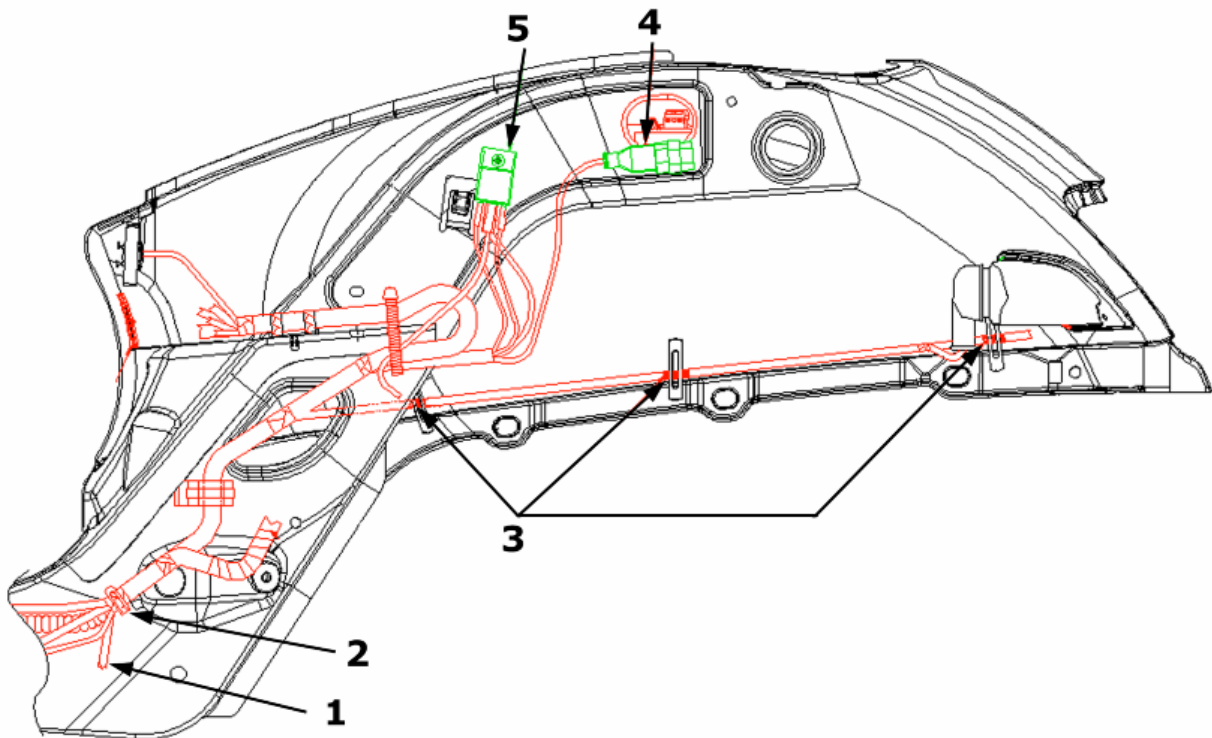


1. Immobilizer aerial
2. Foldable clamp to hold cables
3. Battery negative terminal

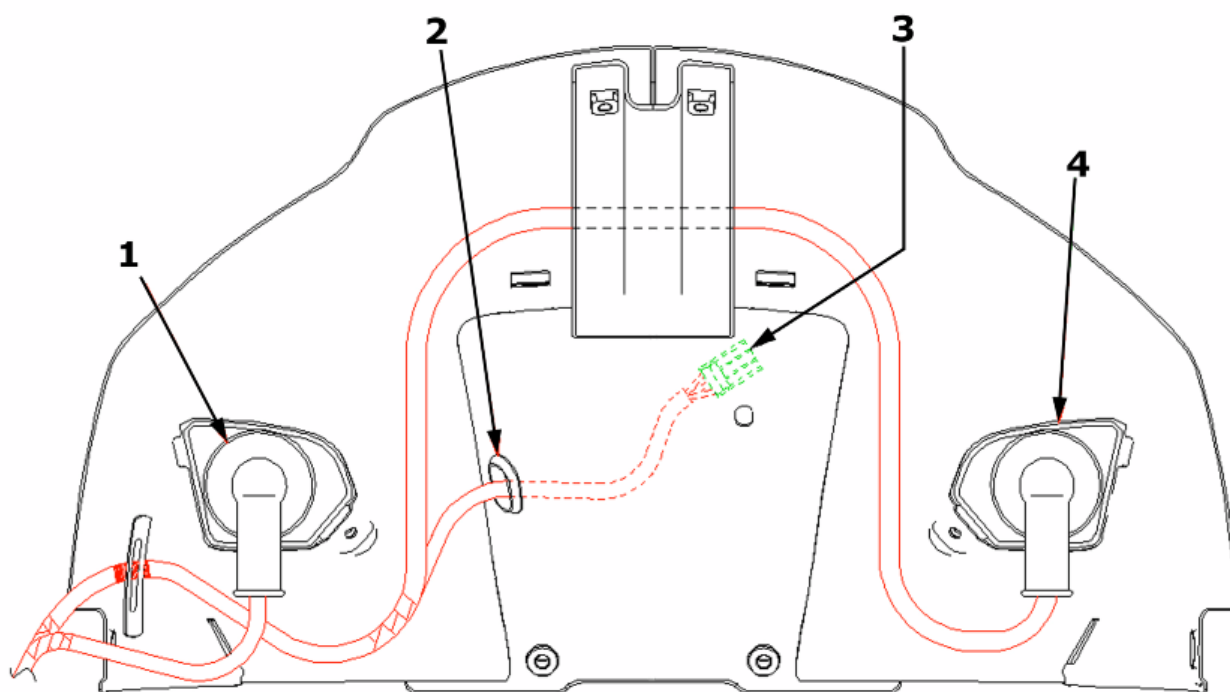
4. Battery positive terminal
5. Flywheel - regulator connexion



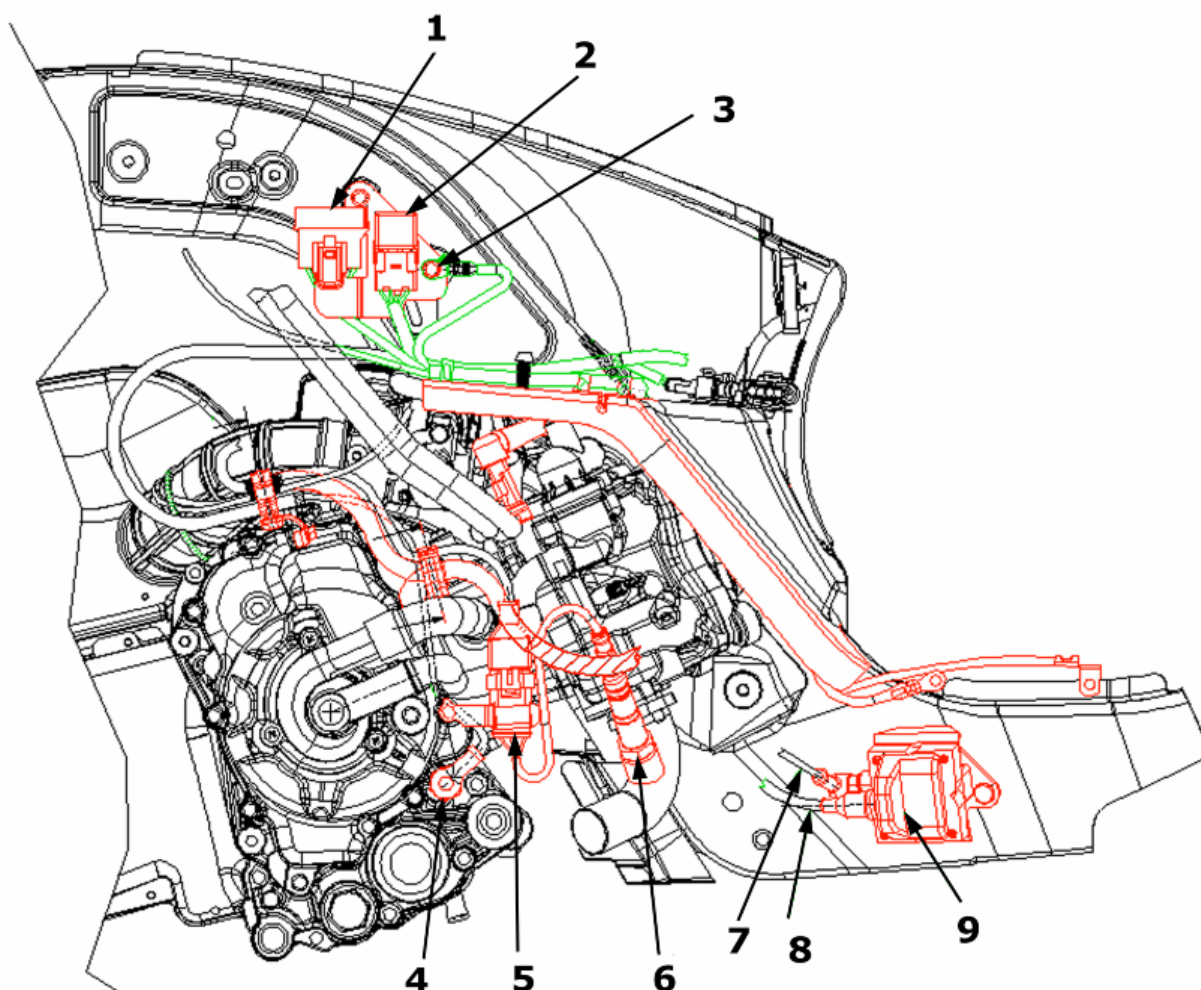
1. Red sheathing
2. Clamp
3. To headlight
4. To instrument
5. To stop switch
6. To stop switch

Back side

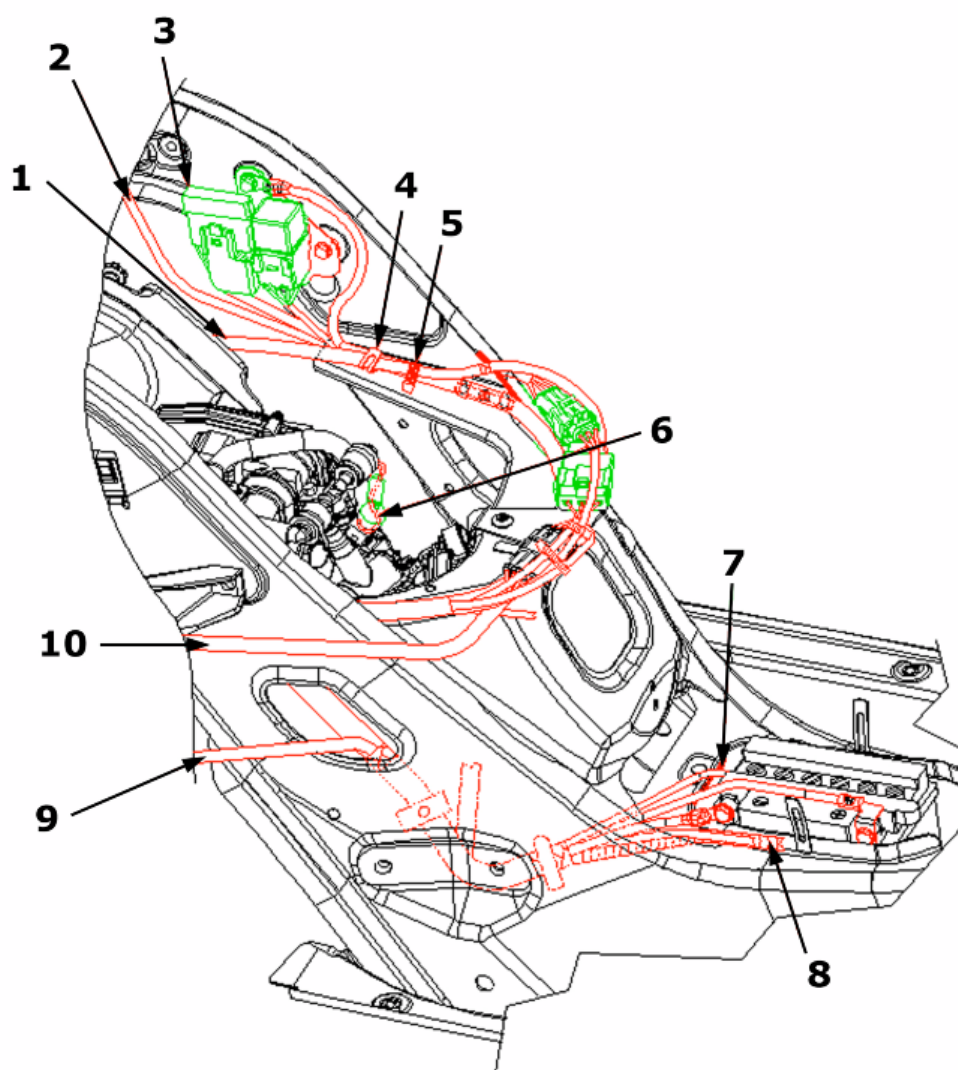
1. To HV coil
2. Foldable clamp
3. Foldable clamps to hold the red sheathing
4. Diagnostic socket
5. Starter remote control



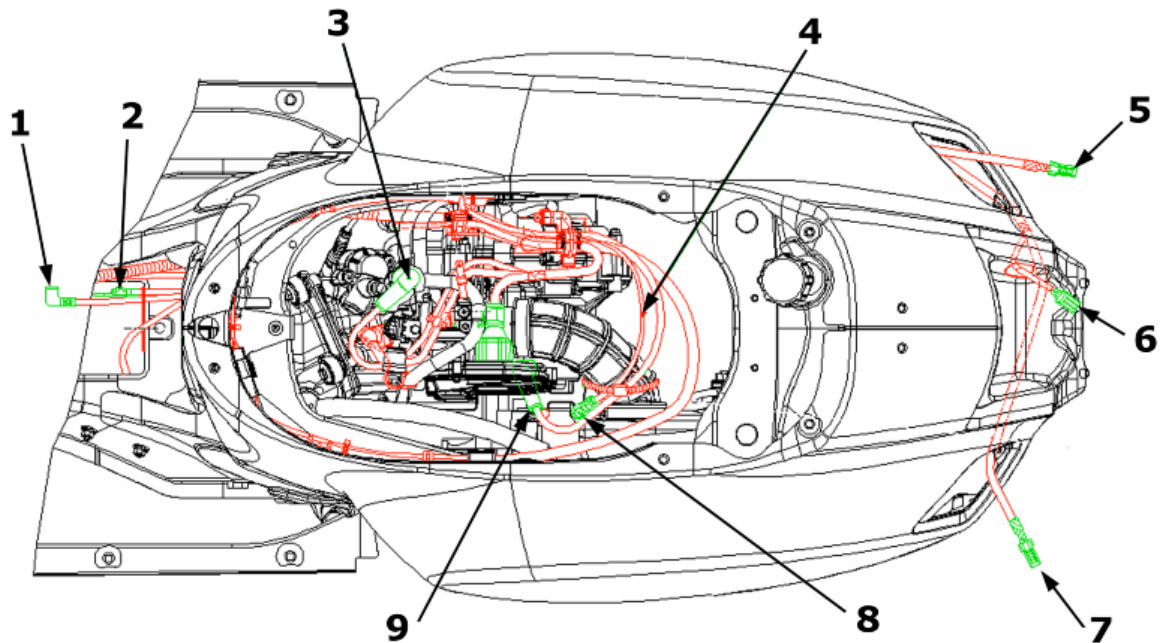
1. Right rear turn indicator
2. Cableguide
3. To rear light
4. Rear left turn indicator



1. Fuse box
2. Remote control switch
3. Ground lead clamping to chassis
4. Oil pressure sensor
5. Lambda probe connector
6. Lambda probe
7. To wire unit
8. To the spark plug
9. H.V. coil



1. To flywheel
2. To saddle opening actuator
3. Fuse box
4. Foldable clamp to hold cables
5. Clamp
6. Injector connector
7. To HV coil
8. To front wire unit
9. To rear turn indicators
10. To fuel gauge and fuel tank

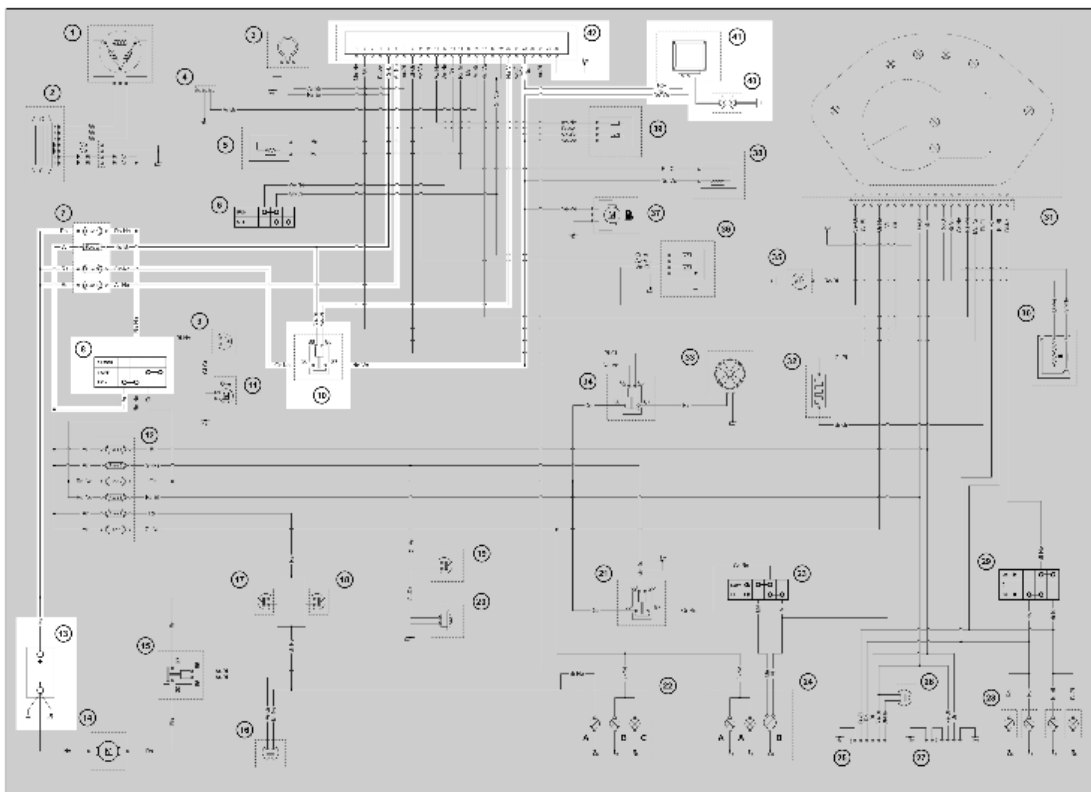


1. Battery positive terminal
2. Battery negative terminal
3. Thermistor
4. Starter motor ground lead
5. Right turn indicator connector
6. Rear headlight assembly connector
7. Left turn indicator connector
8. Starter motor ground lead clamping
9. Starter motor positive terminal

Conceptual diagrams

Ignition

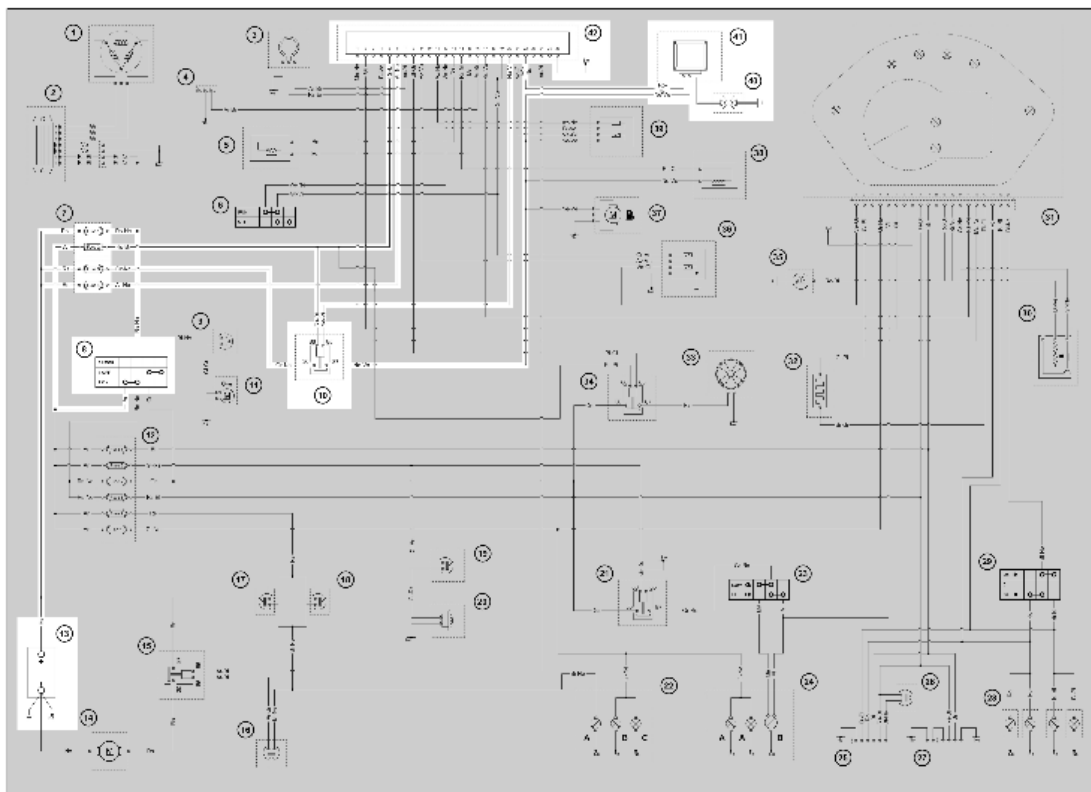
Lo schema sottostante è valido per i telai dal numero ZAPM4510000001007 al ZAPM4510000001578.
Per i telai successivi consultare la pagina 2.



IGNITION

- 7. N° 2 fuse boxes in under helmet compartment
- 8. Key switch
- 10. Injection charge contactor
- 13. Battery
- 40. Spark plug
- 41. High voltage coil
- 42. electronic injection cpu

Schema valido dal numero di telaio ZAPM4510000001579 in poi.

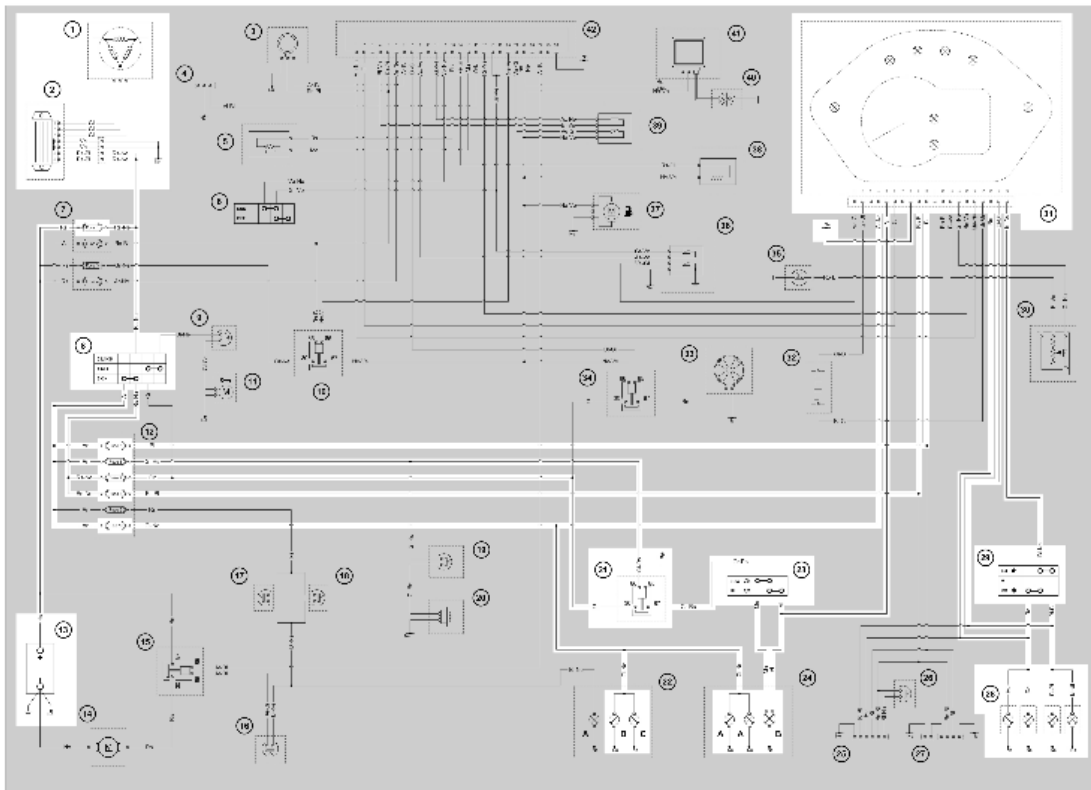


IGNITION

- 7. N° 2 fuse boxes in under helmet compartment
- 8. Key switch
- 10. Injection charge contactor
- 13. Battery
- 40. Spark plug
- 41. High voltage coil
- 42. electronic injection cpu

Headlights and automatic starter section

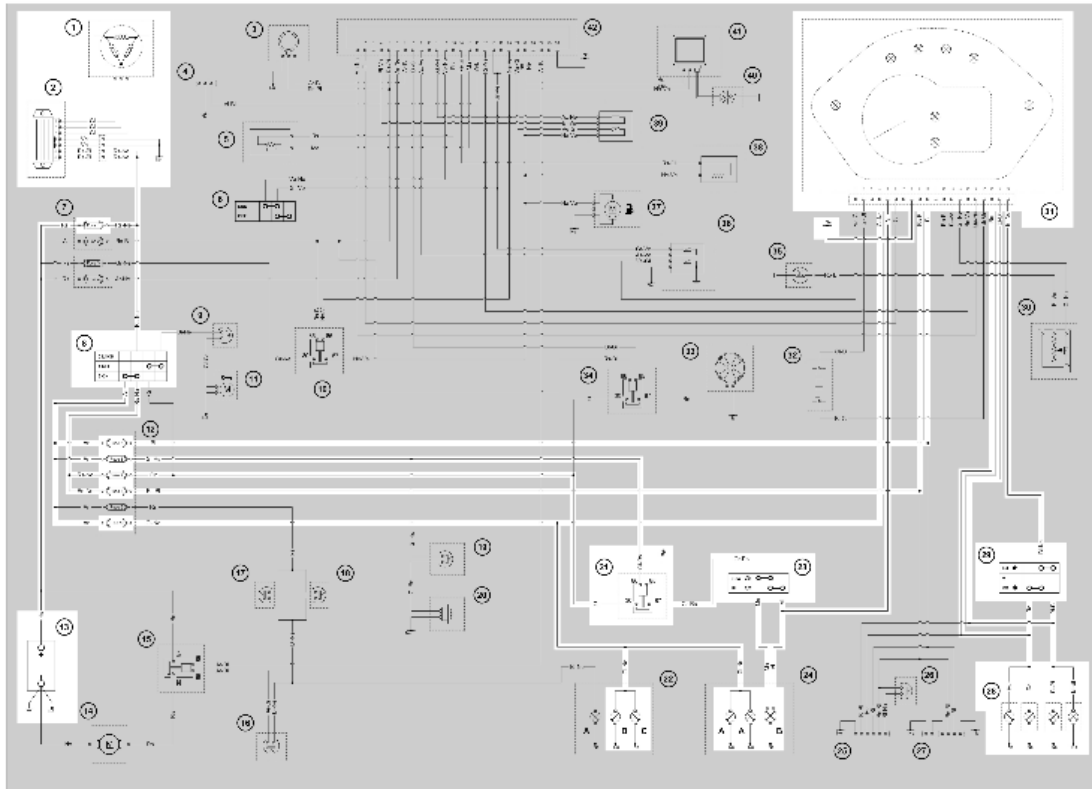
Lo schema sottostante è valido per i telai dal numero ZAPM4510000001007 al ZAPM4510000001578.
Per i telai successivi consultare la pagina 2.



LIGHTS AND TURN INDICATORS

1. Magneto
2. Voltage regulator
7. N° 2 fuse boxes in under helmet compartment
8. Key switch
12. Glove compartment fuse box
13. Battery
21. Light contactor
22. Rear lights
 - A Stop light
 - B Parking light
 - C License plate light
23. High/low beam selector
24. Headlights
 - A Parking light
 - B High beam/low beam
28. Turn indicator bulbs
29. Turn indicator switch
31. Instrument panel

Schema valido dal numero di telaio ZAPM4510000001579 in poi.



LIGHTS AND TURN INDICATORS

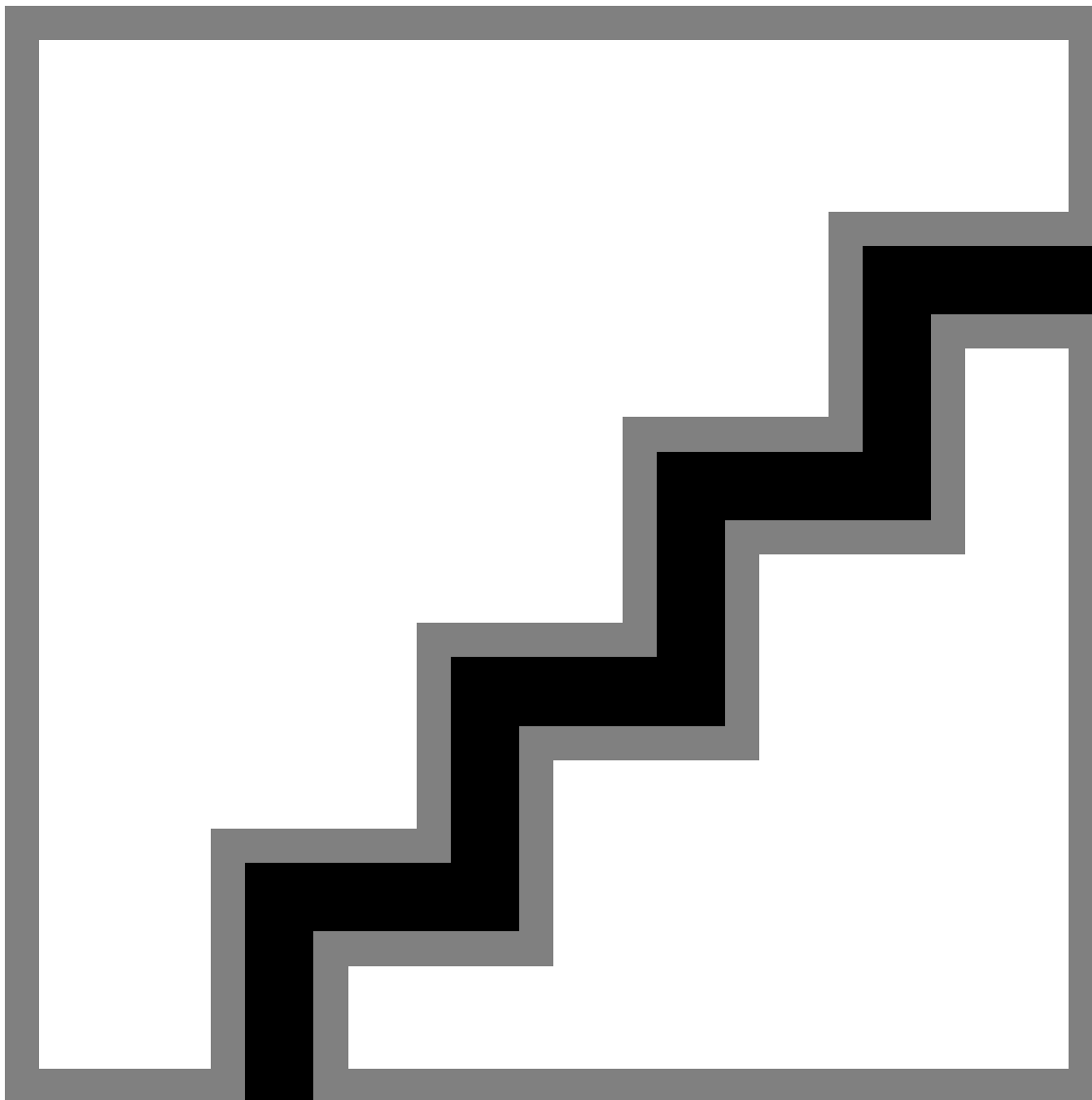
- 1. Magneto
- 2. Voltage regulator
- 7. N° 2 fuse boxes in under helmet compartment
- 8. Key switch
- 12. Glove compartment fuse box
- 13. Battery
- 21. Light contactor
- 22. Rear lights
 - A Stop light
 - B Parking light
 - C License plate light
- 23. High/low beam selector
- 24. Headlights
 - A Parking light
 - B High beam/low beam
- 28. Turn indicator bulbs
- 29. Turn indicator switch

31. Instrument panel

Battery recharge and starting

Lo schema sottostante è valido per i telai dal numero ZAPM4510000001007 al ZAPM4510000001578.

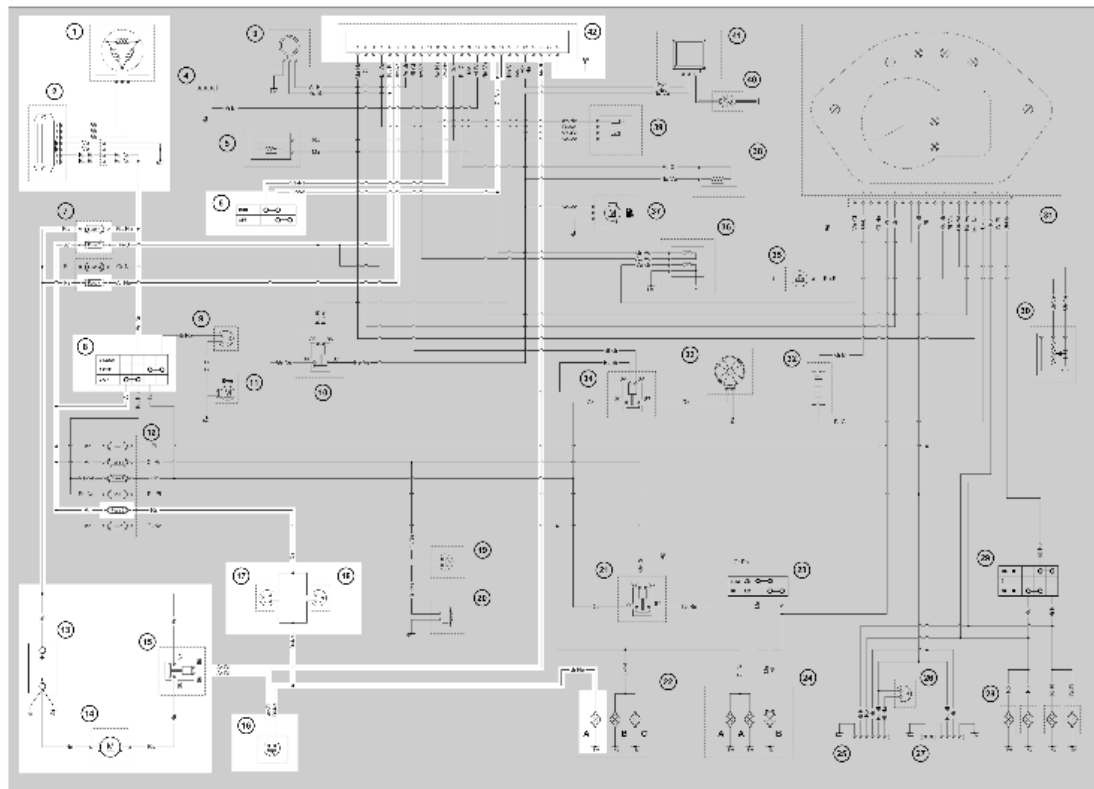
Per i telai successivi consultare la pagina 2.

**BATTERY CHARGER AND STARTING**

- 1. Magneto
- 2. Voltage regulator
- 6. Engine stop switch
- 7. N° 2 fuse boxes in under helmet compartment
- 8. Key switch
- 12. Glove compartment fuse box

- 13. Battery
- 14. Starter motor
- 15. Starter contactor
- 16. Starter button
- 17. Rear brake stop button
- 18. Front brake stop button
- 22. Headlights
- A Stop light
- B Parking light
- C License plate light
- 42. Electronic injection cpu

Schema valido dal numero di telaio ZAPM4510000001579 in poi.



BATTERY CHARGER AND STARTING

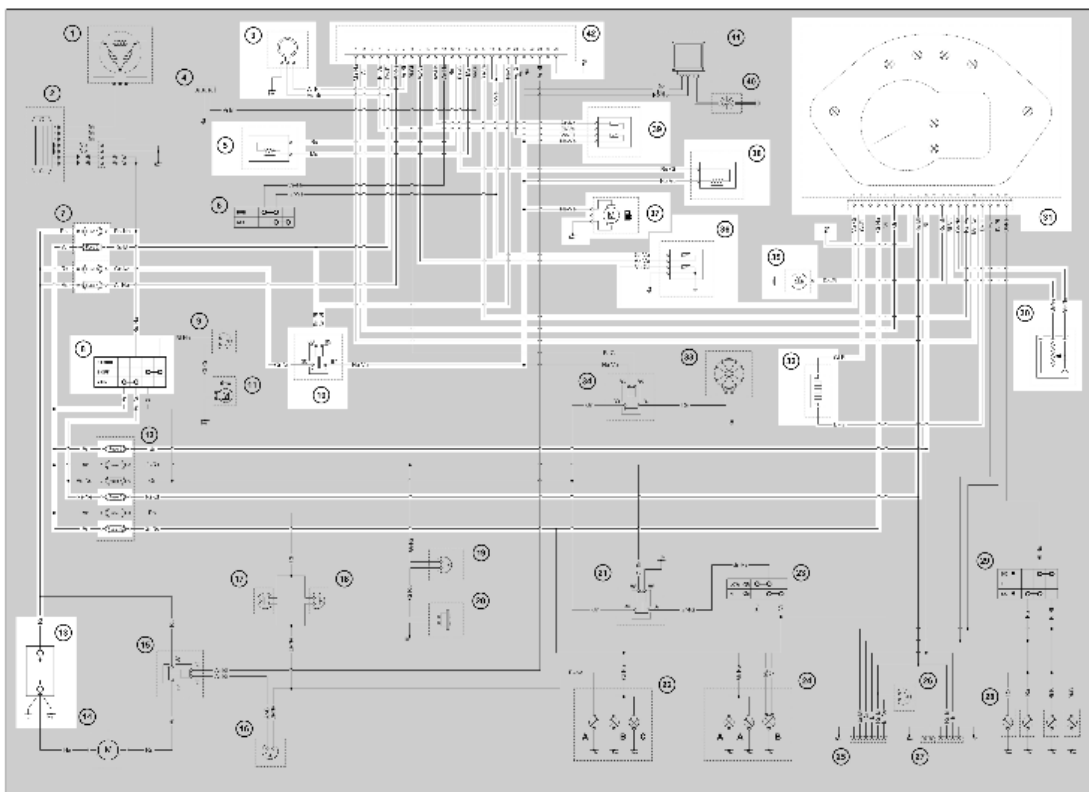
- 1. Magneto
- 2. Voltage regulator
- 6. Engine stop switch
- 7. N° 2 fuse boxes in under helmet compartment
- 8. Key switch
- 12. Glove compartment fuse box

- 13. Battery
- 14. Starter motor
- 15. Starter contactor
- 16. Starter button
- 17. Rear brake stop button
- 18. Front brake stop button
- 22. Headlights
- A Stop light
- B Parking light
- C License plate light
- 42. Electronic injection cpu

Level indicators and enable signals section

Lo schema sottostante è valido per i telai dal numero ZAPM4510000001007 al ZAPM4510000001578.

Per i telai successivi consultare la pagina 2.

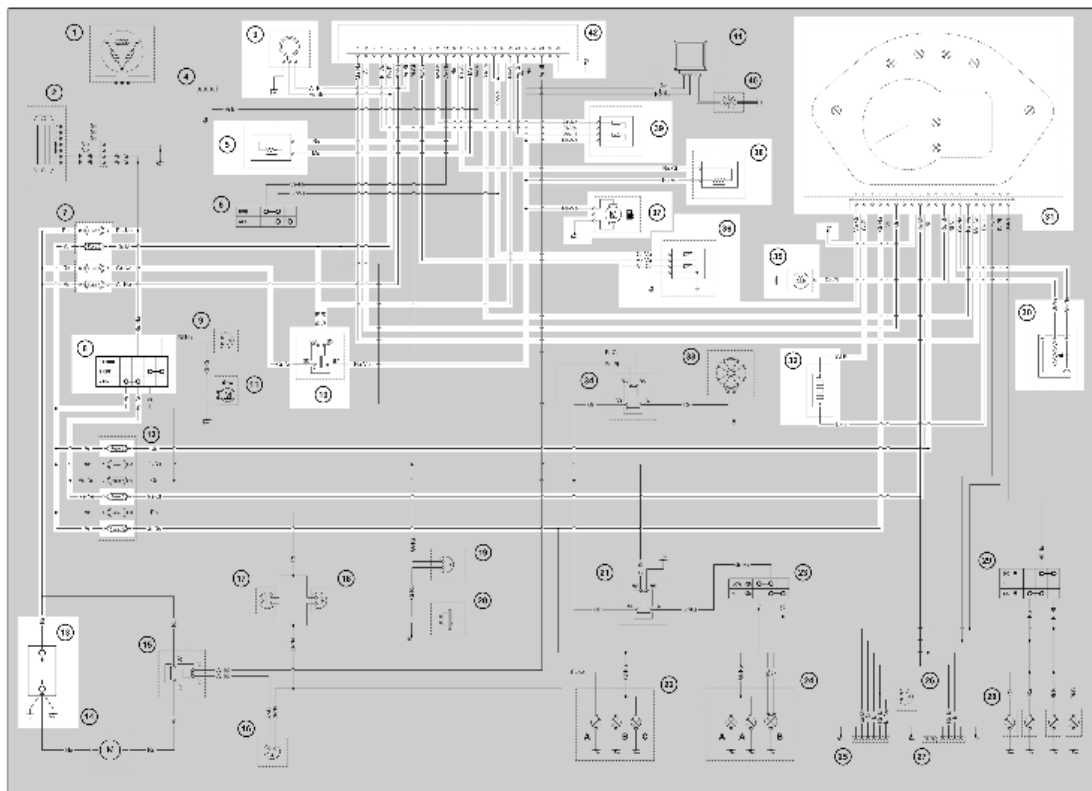


CONSENSUSES AND LEVEL INDICATORS

- 3. Immobilizer antenna
- 5. Engine rpm sensor
- 7. N° 2 fuses boxes in under helmet compartment
- 8. Key switch

- 10. Injection charge contactor
- 12. Glove compartment fuse box
- 13. Battery
- 30. Fuel level transmitter
- 31. Instrument panel
- 32. External temperature sensor
- 35. Oil pressure sensor
- 36. Engine temperature sensor
- 37. Fuel pump
- 38. Petrol injector
- 39. Lambda sensor
- 42. Electronic injection cpu

Schema valido dal numero di telaio ZAPM4510000001579 in poi.



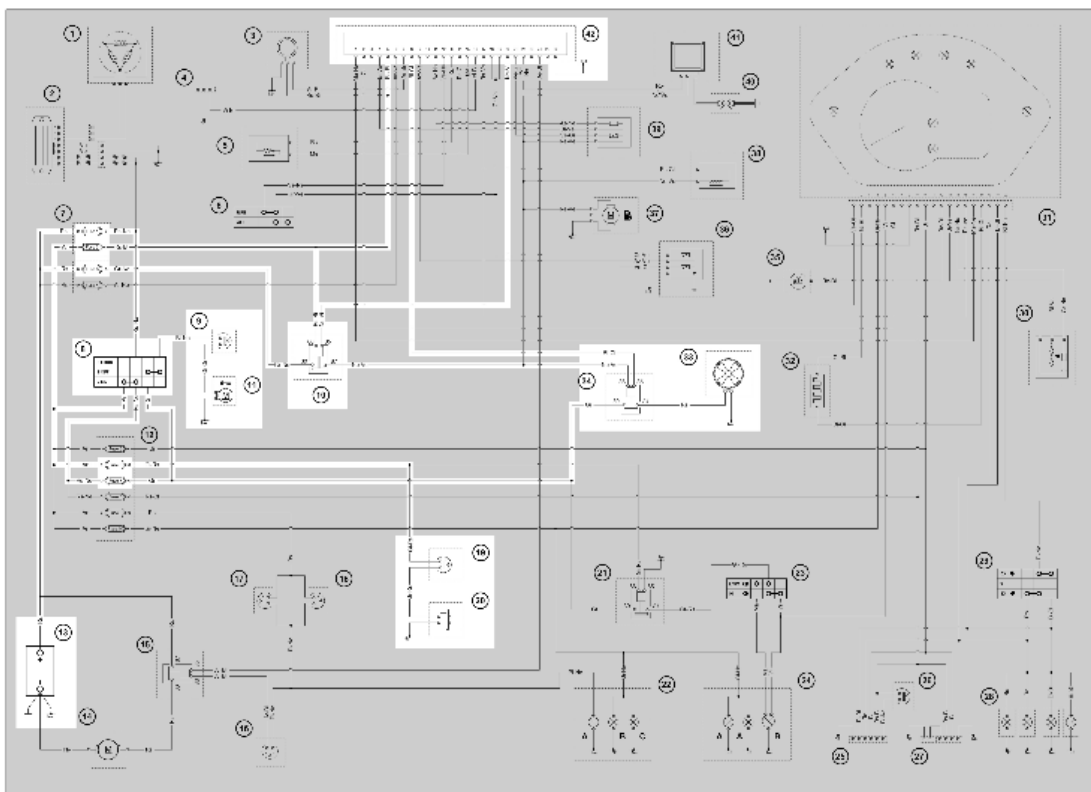
CONSENSUSES AND LEVEL INDICATORS

- 3. Immobilizer antenna
- 5. Engine rpm sensor
- 7. N° 2 fuses boxes in under helmet compartment
- 8. Key switch
- 10. Injection charge contactor

- 12. Glove compartment fuse box
- 13. Battery
- 30. Fuel level transmitter
- 31. Instrument panel
- 32. External temperature sensor
- 35. Oil pressure sensor
- 36. Engine temperature sensor
- 37. Fuel pump
- 38. Petrol injector
- 39. Lambda sensor
- 42. Electronic injection cpu

Turn signal lights

Lo schema sottostante è valido per i telai dal numero ZAPM4510000001007 al ZAPM4510000001578.
Per i telai successivi consultare la pagina 2.

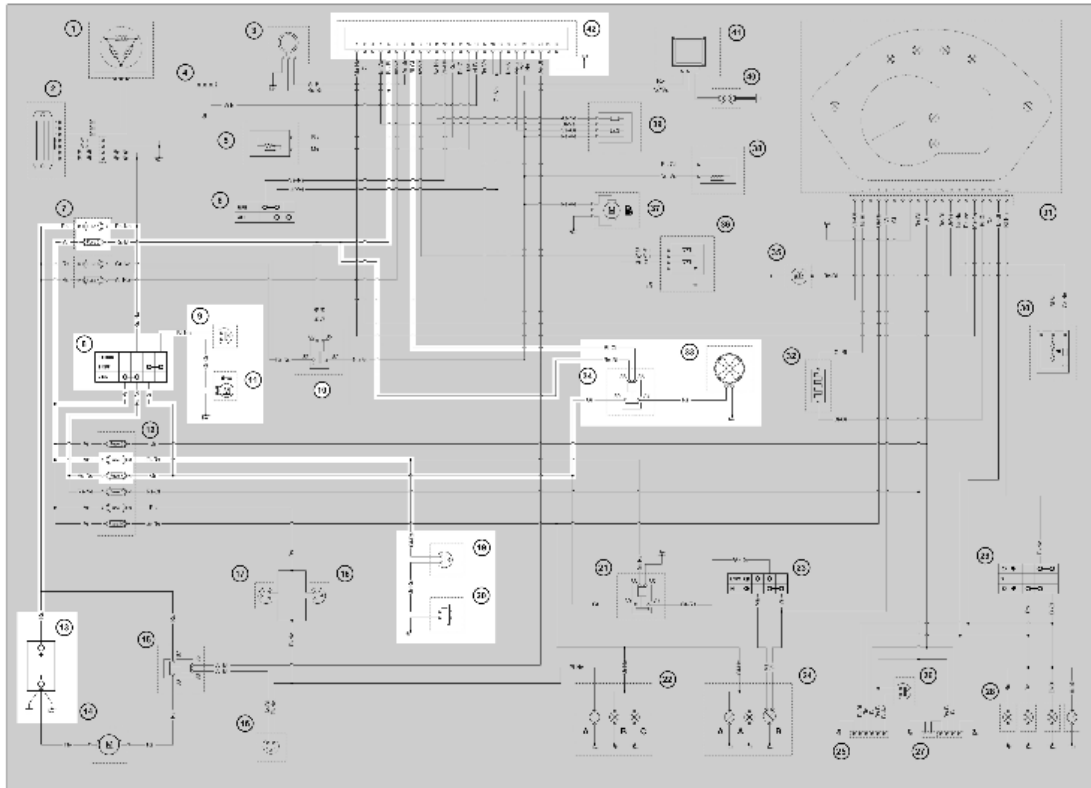


DEVICES AND HORN

- 7. N° 2 fuse boxes in under helmet compartment
- 8. Key switch 9. Saddle open button
- 10. Injection charge contactor
- 11. Actuator for saddle opening

- 13. Battery
- 19. Horn button
- 20. Horn
- 33. Electric fan for ventilator
- 34. Electric fan contactor
- 42. Electronic injection cpu

Schema valido dal numero di telaio ZAPM4510000001579 in poi.



DEVICES AND HORN

- 7. N° 2 fuse boxes in under helmet compartment
- 8. Key switch 9. Saddle open button
- 10. Injection charge contactor
- 11. Actuator for saddle opening
- 13. Battery
- 19. Horn button
- 20. Horn
- 33. Electric fan for ventilator
- 34. Electric fan contactor
- 42. Electronic injection cpu

Checks and inspections

This section is devoted to the checks on the electrical system components.

Immobiliser

The electronic ignition system is controlled by the control unit with the integrated Immobilizer system. The immobilizer is an anti-theft system that allows the scooter to be operated only when it is started with coded keys recognised by the control unit. The code is integrated in a transponder in the key block. This allows the driver clear operation without having to do anything other than just turning the key. The Immobiliser system consists of the following components:

- Control unit
- Immobilizer aerial
- master and service keys with built-in transponder
- H.V. coil
- Diagnostic LED

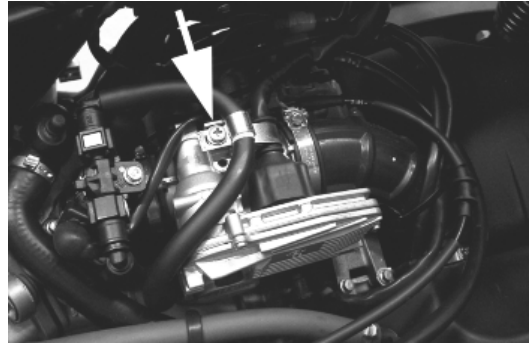
The diagnostic LED also works as a deterring blinker. This function is activated every time the ignition switch is turned to the "OFF" position, or the emergency stop switch is turned to the "OFF" position. It remains activated for 48 hours in order not to affect the battery charge.

When the key switch is turned to "ON", it interrupts the function of the immobiliser lamp and a start enable lamp comes "ON".

The duration of the flash depends on the programming of the electronic control unit

If the LED is off regardless of the position of the ignition-key switch and/or the instrument panel is not initiated, check:

- there is battery voltage
- that fuse 1 and fuse 8 are in good condition.

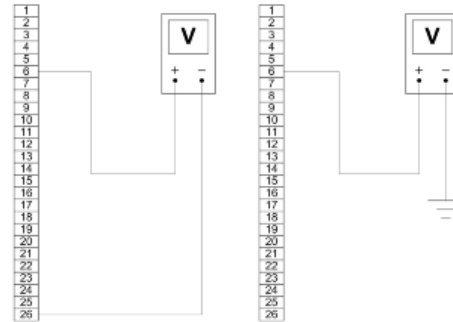


- there is power to the control unit as specified below:

Remove the connector support bracket shown in the photograph and disconnect the connector from the control unit. Check the following conditions:

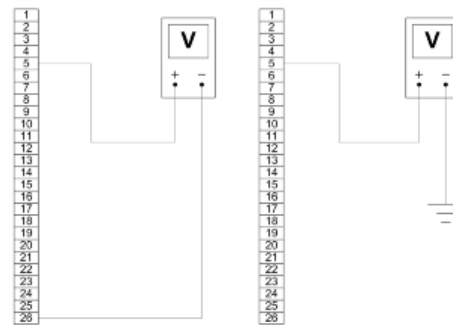
With the key switch set to OFF:

- there is battery voltage between terminals 6-26 and terminal 6-frame earth (fixed power supply). If there is no voltage check that fuse 4 and its cable are in working order.



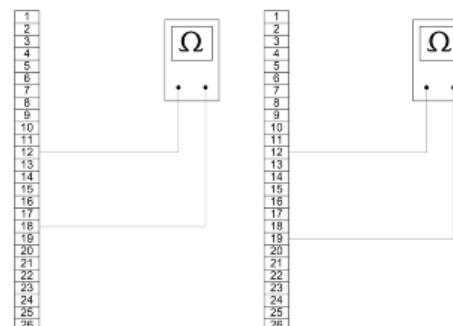
With the key switch set to ON:

- there is battery voltage between terminals 5-26 and terminal 5-frame earth (fixed power supply). If there is no voltage, check the key switch contacts, that fuse 2 and its cable are in working order.

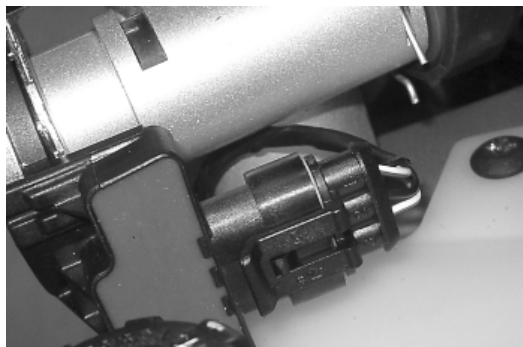


- There is continuity between terminals 12-18 and 12-19 with the emergency cut-out switch in the RUN position. If there is no continuity, check the contacts of the latter.

If no faults are found, replace the control unit.



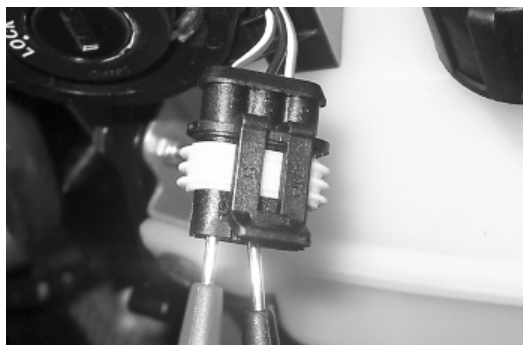
After removing the shield back plate, remove the electrical connection from the aerial as shown in the photograph



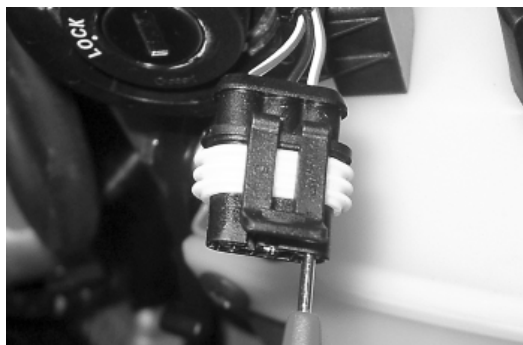
Remove the protective base from the connector.



With the ignition key switch at ON check there is battery voltage between the Red-White and Black cables



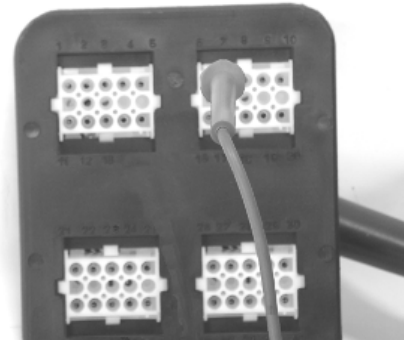
With MIU connector disconnected check the continuity between the Orange-White cable and pin 7 of the interface wiring .



Specific tooling

020481Y Control unit interface wiring

020331Y Digital multimeter



Virgin circuit

When the ignition system is not encrypted, any key will start the engine but limited to 2000 rpm. The keys can only be recognised if the control unit has been programmed properly.

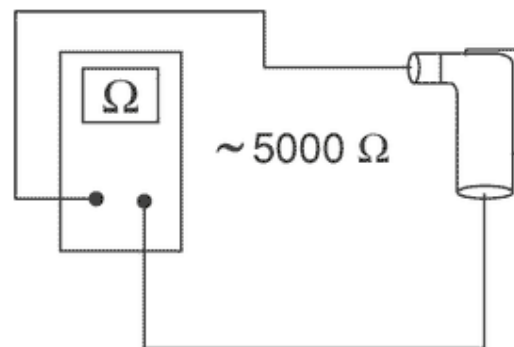
The data storage procedure for a previously unprogrammed control unit provides for the recognition of the red key (master key) as the first key to be stored to memory: this becomes particularly important because it is the only key that enables the control unit to be wiped clean and reprogrammed for the memorisation of the service keys.

The master and service keys must be used to code the system as follows:

- Insert the Master key, turn it to «ON» and keep this position for two seconds (lower and upper limits 1 to 3 seconds).
- Insert the blue key and set to «ON» for 2 seconds.
- If you have copies of the key, repeat the operation with each key.
- Insert the MASTER key again and turn it to "ON" for 2 seconds.

The maximum time to change keys is 10 seconds. A maximum of 7 service keys (blue) can be programmed at one time.

It is essential to adhere to the times and the procedure. If you do not, start again from the beginning.



Once the system has been programmed, master key transponder, decoder and control unit are strictly matched.

With this link established, it is now possible to encode new service keys, in the event of losses, replacements, etc.

Each new programming deletes the previous one so, in order to add or eliminate keys, you must repeat the procedure using all the keys you intend to keep using.

If a service key should become un-coded, the efficiency of the high voltage circuit shielding must be thoroughly inspected: In any case it is advisable to use resistive spark plugs.

Characteristic

Shielded cap resistance

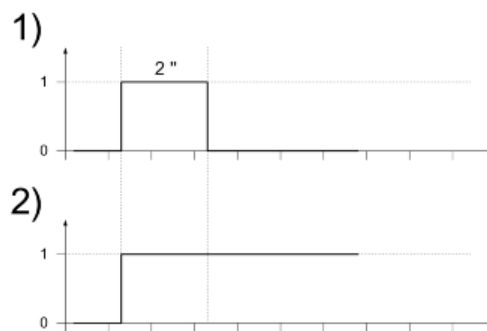
~ 5000 Ω .

Diagnostic codes

The immobiliser system is tested each time the ignition-key switch is turned from OFF to ON. During this diagnosis phase a number of control unit statuses can be seen and various light codes displayed. Regardless of the code transmitted, if at the end of the diagnosis the led remains off permanently, the ignition is enabled. If, however, the led remains on permanently, it means the ignition is inhibited:

1. Previously unused control unit - key inserted: a single 2 second flash is displayed, after which the LED remains off permanently. The keys can be stored to memory, the vehicle can be started but with a limitation imposed on the number of revs.

2. Previously unused control unit - transponder absent or cannot be used: The LED is per-



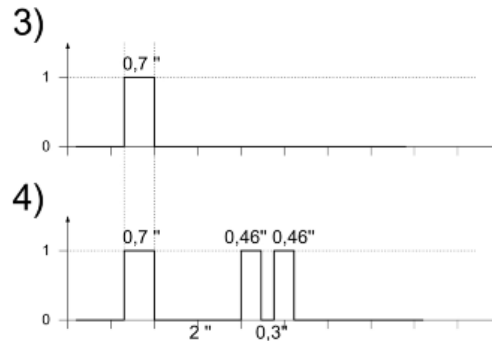
manently ON; in this condition, no operations are possible, including starting of the vehicle.

3. Programmed control unit - the service key in (normal condition of use): a single 0.7 second flash is displayed, after which the LED remains off permanently. The engine can be started.

4. Programmed control unit - Master key in: a 0.7 sec. flash is displayed followed by the LED remaining off for 2 sec. and then by short 0.46 sec. flashes the same number of times as there are keys stored in the memory including the Master key. When the diagnosis has been completed, the LED remains permanently OFF. The engine can be started.

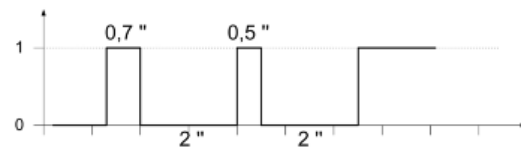
5. Programmed control unit - fault detected: a light code is displayed according to the fault detected, after which the LED remains on permanently. The engine cannot be started. The codes that can be transmitted are:

- Code 1 flash
- 2 flash code
- 3 flash code



Diagnostic code - 1 flash

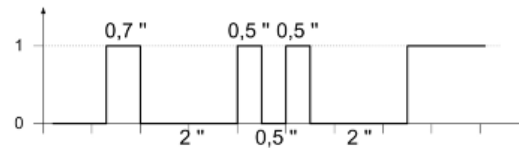
The one-flash code indicates a system where the serial line is not present or is not detected. Check the Immobiliser aerial wiring and change it if necessary.



Diagnostic code - 2 flashes

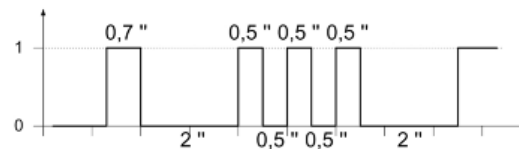
Two-flash code shows a system where the control unit does not show the transponder signal. This might depend on the inefficiency of the immobiliser aerial or the transponder.

Turn the switch to ON using several keys: if the code is repeated even with the Master key, check the aerial wiring and change it if necessary. If this is not the case, replace the defective key and/or reprogram the control unit. Replace the control unit if the problem continues.



Diagnostic code - 3 flashes

The three-flash code indicates a system where the control unit does not recognise the key. Turn the switch to ON using several keys: if the error code is repeated even with the Master key, replace the control unit. If this is not the case, perform a re-programming.



Battery recharge circuit

The recharge system is provided with a three phase alternator with permanent flywheel.

The alternator is directly connected to the voltage regulator.

This, in its turn, is connected directly to the ground and the battery positive terminal passing through the 30A protective fuse.

The three- phase generator provides good recharge power and at low revs a good compromise is achieved between generated power and idle stability.

Stator check

Stator winding check-up

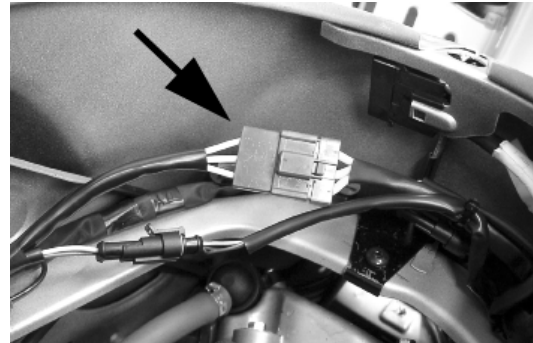
WARNING

THE CHECK-UP CAN BE MADE WITH THE STATOR PROPERLY INSTALLED.

- 1) Lift the saddle and remove the helmet compartment.
- 2) Disconnect the connector between stator and regulator with the three yellow cables as shown in the photograph.
- 3) Measure the resistance between each of the yellow terminals and the other two.

Electric characteristic**Resistance:**0.2 - 1 Ω

- 4) Check that there is insulation between the each yellow cable and the earth.
- 5) If values that are wrong are noted, replace the stator.



Recharge system voltage check**Look for any leakage**

- 1) Access the battery by removing the cover in the footrest.
- 2) Check that the battery does not show signs of losing fluid before checking the output voltage.
- 3) Turn the ignition key to position OFF, connect the terminals of the tester between the negative pole (-) of the battery and the black cable and only then disconnect the black cable from the negative pole (-) of the battery.
- 4) With ignition key still at OFF, the reading detected by the amperometer must be ≤ 0.5 mA.

Check the charging current**WARNING**

BEFORE CARRYING OUT THE CHECK, MAKE SURE THAT THE BATTERY IS IN GOOD WORKING ORDER.

- 1) Place the vehicle on its centre stand
- 2) With the battery correctly connected to the circuit, place the tester terminals between the battery terminals..
- 3) Start the engine, ensure that the lights are all out, increase the engine speed and at the same time measure the voltage.

Electric characteristic

Voltage ranging between 14.0 and 15.0V at 5000 rpm.

Maximum current output check.

- With engine off and panel set to "ON" turn on the lights and let the battery voltage set to 12V.
- Connect ammeter pliers to the 2 recharge positive poles in output from the regulator.
- Keep the lights on and start the engine, bring it to normal speed and read the values on the ammeter.

With an efficient battery a value must be detected: $> 20A$

VOLTAGE REGULATOR/RECTIFIER

Specification	Desc./Quantity
Type	Non-adjustable three-phase transistor
Voltage	14 ÷ 15V at 5000 rpm with lights off

Turn signals system check

The turn indicator circuit is powered from the instrument panel. In the case it does not work, it is necessary to:

1. check light bulb efficiency,
2. check fuse No. 8 efficiency
3. with the key switch set to ON and without disconnecting the instrument panel connector, check frequently for voltage between terminal 20 and the ground lead.
 - If voltage is detected, check if there is also voltage in the turn indicator switch. If it is powered, replace the switch; otherwise, check the cable connecting the switch and the instrument panel.
 - If there is no voltage, disconnect the connector and check if there is voltage between terminals 9-8 and terminal 9-ground lead (check the fixed terminal from the battery) and between terminals 10-8 and terminal 10-ground (check live positive lead). If there is no voltage there, check the circuit wires. If there is, replace the instrument panel.

Fuses

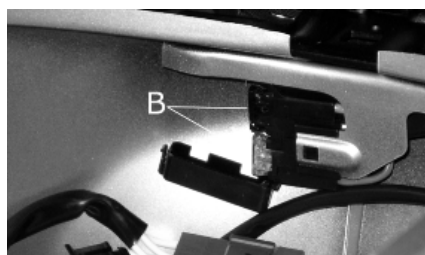
The electrical system is equipped with:

1. six protection fuses «A» placed inside the glove box to the right
2. two fuses «B» located under the helmet compartment below the saddle hinge latch.
3. two fuses «B» located under the helmet compartment on the left fairing.

The chart shows the position and characteristics of the fuses in the vehicle.

CAUTION

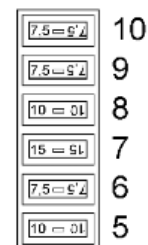
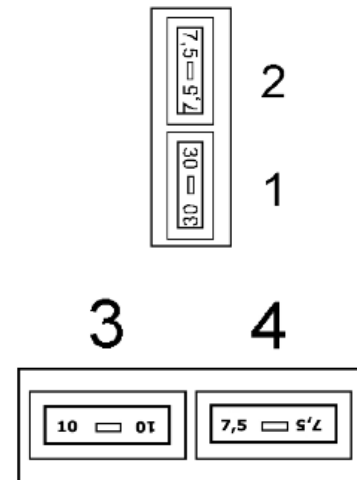
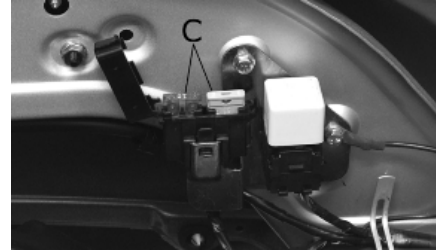
BEFORE REPLACING THE BLOWN FUSE, SEARCH AND ELIMINATE THE BREAKDOWN THAT HAS LED TO THE BLOW OUT. NEVER TRY TO REPLACE A BLOWN FUSE WITH A FUSE OF A DIFFERENT RATING THAN THAT SPECIFIED OR USING OTHER MATERI-



AL (FOR EXAMPLE, A PIECE OF ELECTRICAL WIRE).

FUSES

	Specification	Desc./Quantity
1	General	Position on fuse box: 1 Fuse: 30A Protected circuits: General
2	Ignition ECU	Fuse box arrangement: 2 Fuse capacity: 7,5 A Protected circuits: Ignition ECU
3	Injection loads relay	Fuse box arrangement: 3 Fuse capacity: 10 A Protected circuits: Injection loads relay
4	Injection ECU	Fuse box arrangement: 4 Fuse capacity: 7,5 A Protected circuits: Injection ECU
5	Dashboard lighting, intercom and anti-theft device pre-wiring	Fuse box arrangement: 5 Fuse capacity: 10 A Protected circuits: Dashboard lighting, intercom and anti-theft device pre-wiring
6	High and low-beam lights, horn	Fuse box arrangement: 6 Fuse capacity: 7,5 A Protected circuits: High and low-beam lights, horn
7	High and low-beam lights, electric seat opening	Fuse box arrangement: 7 Fuse capacity: 15 A Protected circuits: High and low-beam lights, electric seat opening
8	Dashboard Fuel supply, intercom and anti-theft device pre-wiring	Fuse box arrangement: 8 Fuse capacity: 10 A Protected circuits: Dashboard Fuel supply, intercom and anti-theft device pre-wiring
9	Starter motor, stop light	Fuse box arrangement: 9

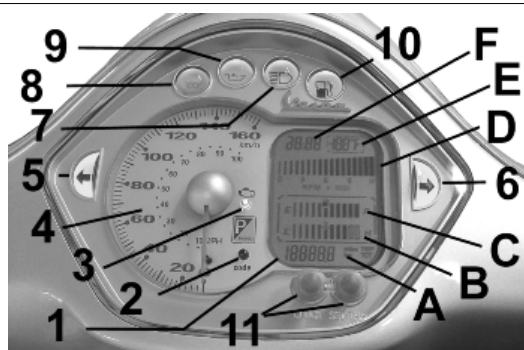


Specification	Desc./Quantity
	Fuse capacity: 7,5 A Protected circuits: Starter motor, stop light
10 Front and rear side lights, dashboard lighting	Fuse box arrangement: 10 Fuse capacity: 7,5 A Protected circuits: Front and rear side lights, dashboard lighting

Dashboard

1. Digital instrument panel

- A. odometer
- B. coolant temperature indicator
- C. fuel level indicator
- D. rpm counter
- E. external temperature indicator
- F. digital clock



2. Immobilizer led

3. Engine run lamp and injection fault indication

4. Speedometer

5. Left turn indicator lamp

6. Right turn indicator lamp

7. High beam lamp

8. Light lamp

9. Oil pressure warning lamp

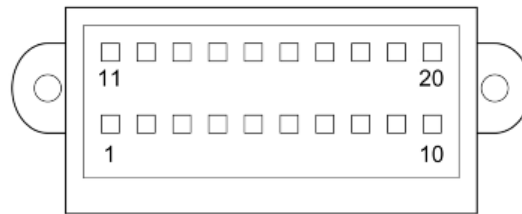
10. Fuel reserve warning lamp

11. Clock setting buttons

INSTRUMENT PANEL CONNECTOR

Specification	Desc./Quantity
1. Engine water temperature	
2. External temperature positive	
3. "K" line not connected	
4. Panel lighting	
5. High beam indicator lamp	
6. Engine rpms (injection)	
7. Engine rpms	
8. Instrument earth	
9. Battery positive	
10. Key positive	
11. ABS lamp	
12. Oil pressure warning lamp	

Specification	Desc./Quantity
13. Petrol level indicator positive	
14. Petrol level indicator negative	
15. Immobilizer lamp	
16. Injection lamp	
17. External temperature negative	
18. Left turn indicator lamp	
19. Right turn indicator lamp	
20. Turn indicator power	



Sealed battery

If the vehicle is provided with a sealed battery, the only maintenance required is the check of its charge and recharging, 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 vehicle and afterwards every six months.

INSTRUCTIONS FOR THE RENEWAL RECHARGE AFTER OPEN-CIRCUIT STORAGE

1) Voltage check up

Before installing the battery on the vehicle, check the open circuit voltage with a normal tester.

- If voltage exceeds 12.60 V, the battery can be installed without any renewal recharge.
- If voltage is below 12.60 V, a renewal recharge is required as explained in 2).

2) Constant voltage battery charge mode

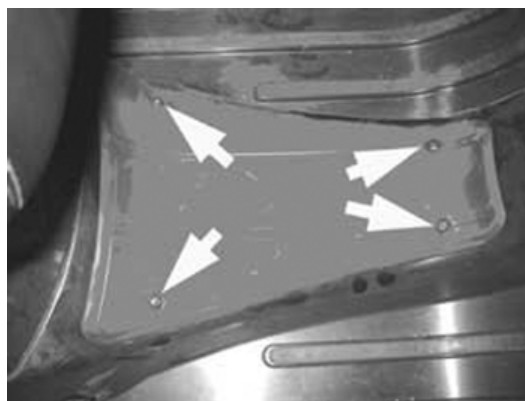
- Constant voltage charge equal to 14.40 ÷ 14.70V
- Initial charge voltage equal to 0.3 ÷ 0.5 for nominal Capacity
- Charge time:
10 to 12 h recommended
Minimum 6 h
Maximum 24 h

3) Constant current battery charge mode

- Charge current equal to 1/10 of the battery rated capacity
- Charge time: Maximum 5 h

Battery installation

- Remove the battery cover after undoing the 4 screws shown in the photograph.



- Remove the strap fastening the battery



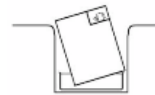
- Insert the battery breather pipe through the hole shown in the photograph.



- Fit the battery as shown in the photograph.

N.B.

IN ORDER TO FIT THE CABLES ON THE BATTERY TERMINALS CORRECTLY, REST THE LOWER END OF THE TERMINAL SIDE OF THE BATTERY ON THE EDGE OF THE BATTERY WELL.



- Using the screwdriver, tighten up the battery terminal cables as far as they will go, placing the special Grover washer between the screw head and the cable terminal.

N.B.

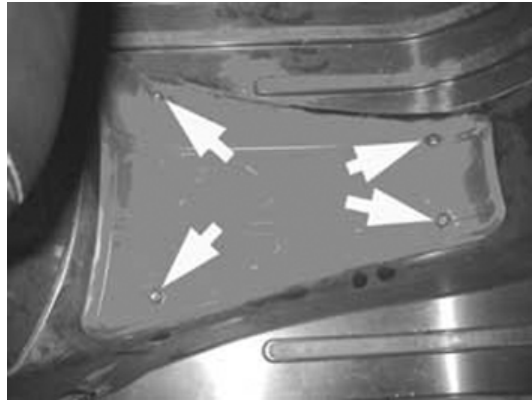
DO NOT USE WRENCHES TO TIGHTEN UP THE SCREWS FOR FIXING THE TERMINALS TO THE BATTERY TERMINALS



- Mount permanently the battery in the battery chamber
- Refit the strap fastening the battery



-
- Refit the battery cover



Connectors

INDEX OF TOPICS

ENGINE FROM VEHICLE

ENG VE

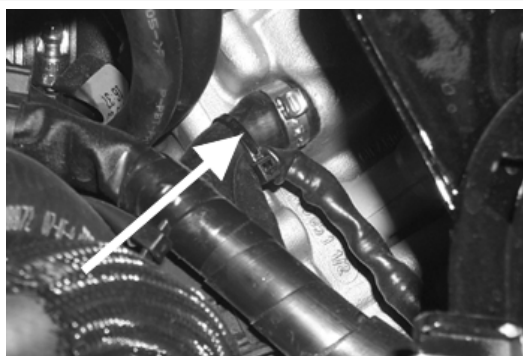
This section describes the operations to be carried out when removing the engine from the vehicle.

Exhaust assy. Removal

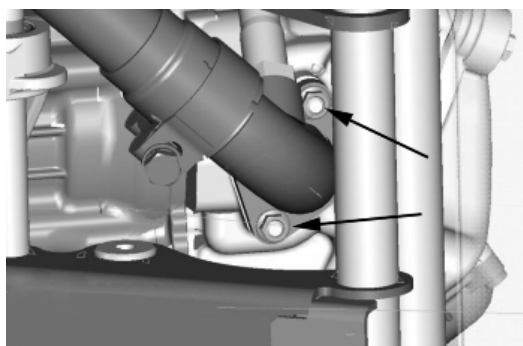
- Remove the right and left fairings and the spoiler terminals.
- Remove the Lambda probe from its support and disconnect it.



Remove the clamp holding the lambda probe cable to the coolant pipe indicated in the photograph



- Undo the two exhaust manifold fixings on the head. To undo the nuts fixing the muffler flange to the head properly, you must use a jointed wrench that enables you to get at the right nut as well, according to the direction of travel, that is difficult to get at with a traditional straight wrench.



- Undo the three screws fixing the muffler to the support arm.
- Remove the full muffler unit.



Remove the lambda probe from the manifold.



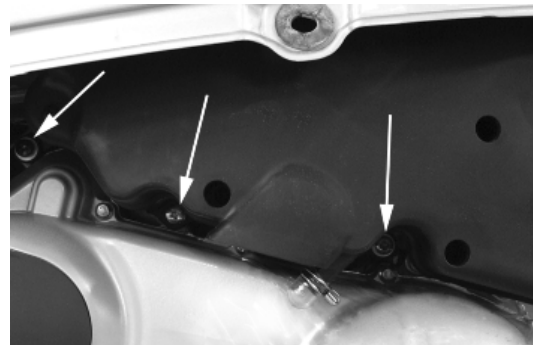
CAUTION: SHOULD IT BE NECESSARY TO REMOVE ONLY THE MUFFLER TIP, ALWAYS REPLACE THE GRAPHITE GASKET BETWEEN STUB AND TIP.

Removal of the engine from the vehicle

- Disconnect the battery
- Remove the helmet compartment
- Remove the side fairings and the spoiler terminals.

Remove the full muffler assembly.

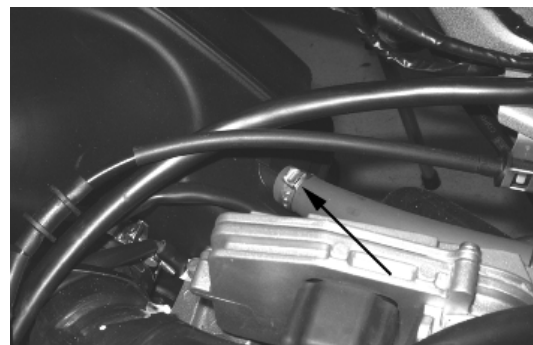
- Remove the air cleaner housing by unscrewing the 3 screws indicated in the photograph.



CAUTION

THIS OPERATION MUST BE CARRIED OUT WHEN THE ENGINE IS COLD.

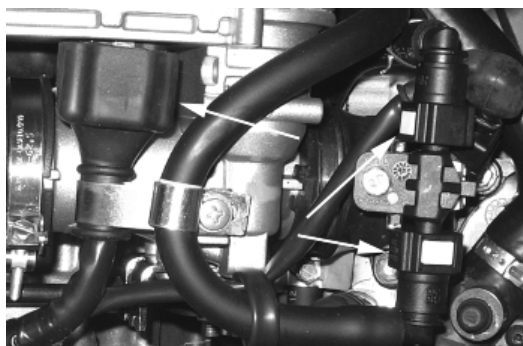
- Remove the clamp off the blow-by pipe and take the pipe out.
- Remove the clamp indicated in the photograph and disconnect the bellows connected to throttle body.



- Remove the coolant inlet pipe to the motor as indicated in the photograph.



- Disconnect the fuel delivery and return pipes from the injector by removing the screw locking the retaining clip.
- Disconnect the injector wiring and the throttle body control unit wiring.



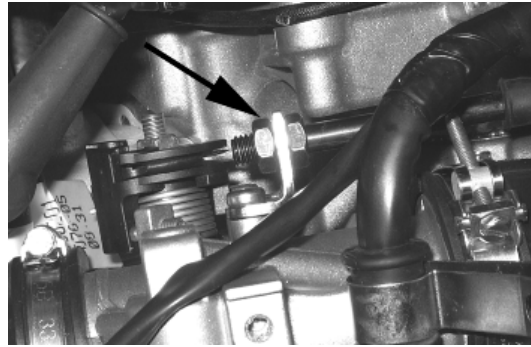
- Remove the coolant outlet pipe from the motor as indicated.



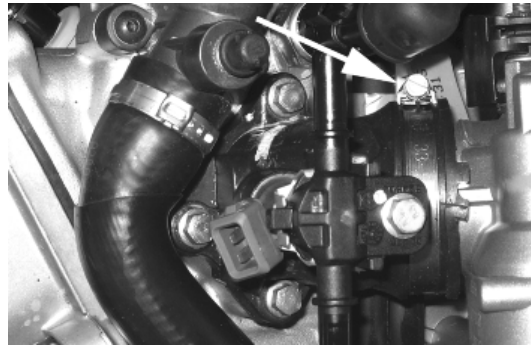
- Remove the spark plug caps.
- Remove the coolant temperature sensor connector indicated in the photo.



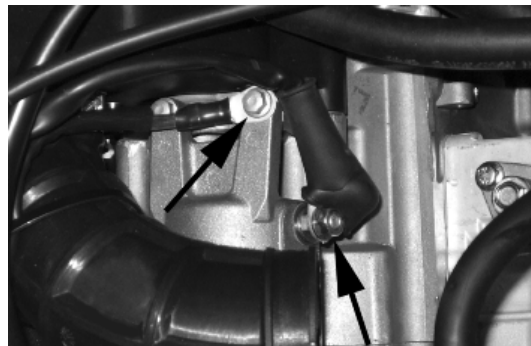
- Remove the throttle cable from the throttle body by undoing the nut shown in the photo.



- Loosen the clamp indicated in the photograph and remove the throttle body.



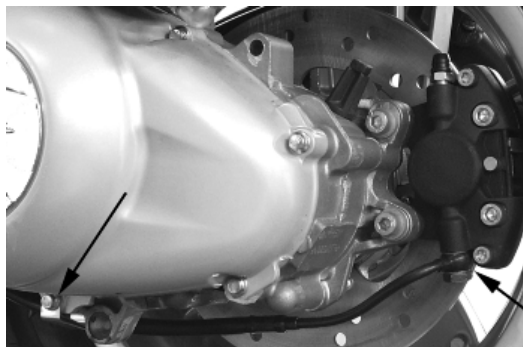
- Remove the positive and negative wiring from the starter motor as shown in the photo.



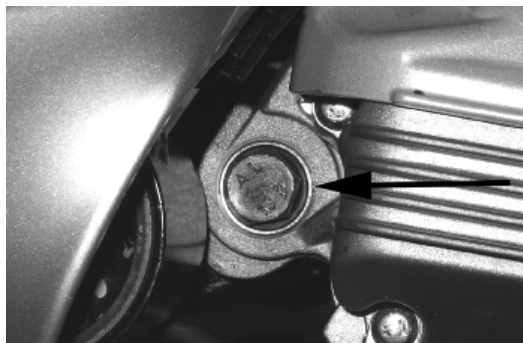
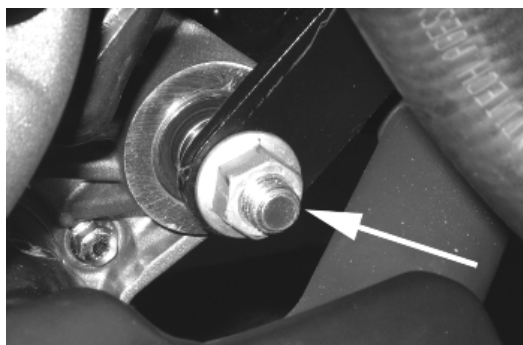
- Disconnect the connectors from the flywheel wiring as shown in the photo.
- Remove the cable from the retaining clip on the flywheel cover.



- Remove the rear shock absorbers.
- Remove the hydraulic piping from the rear caliper by undoing the screw indicated in the photograph. Afterwards remove the retainers fixing the piping to the engine crankcase, indicated in the photograph.



- Use a jack to support the vehicle properly. Remove the engine-swinging arm fixing pin by undoing the nut and the head of the pin as shown in the photograph.
- The engine is now free.



When refitting the engine to the scooter, carry out the operations in reverse order from that adopted when removing it and respect the tightening torque shown in the Characteristics Chapter.

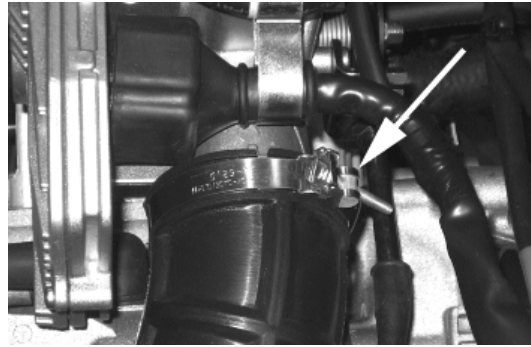
Check that with valve in abutment against the register there is a small clearance.

- Check the engine oil level and if necessary top it up with the recommended type.

- Fill the cooling circuit and rear brake circuit.

- Check the functioning of the accelerator and the electrical devices.

- Be specially careful with the clamp fixing the throttle body to the purifier bellows, which must be positioned as shown in the photograph.



CAUTION

PAY PARTICULAR ATTENTION TO POSITIONING THE THROTTLE COMMAND TRANSMISSION PROPERLY.

INDEX OF TOPICS

ENGINE

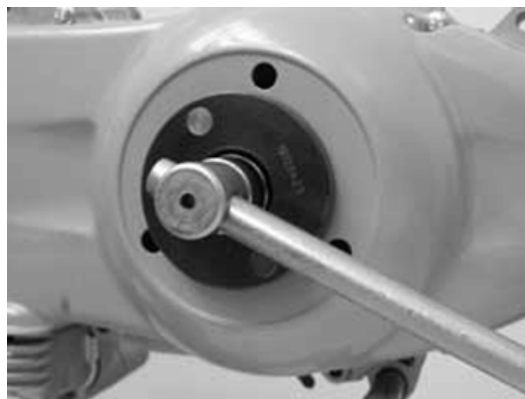
ENG

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

Automatic transmission

Transmission cover

- To remove the transmission cover it is necessary to remove the plastic cover first, by inserting a screwdriver in the slotted holes. Using the clutch bell lock wrench shown in the figure, remove the driven pulley shaft locking nut and washer.



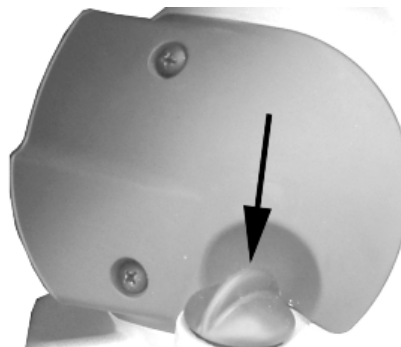
Specific tooling

020423Y driven pulley lock wrench

- Remove the cap/dipstick from the engine oil filling hole.
- Remove the ten screws.
- Remove the transmission cover.

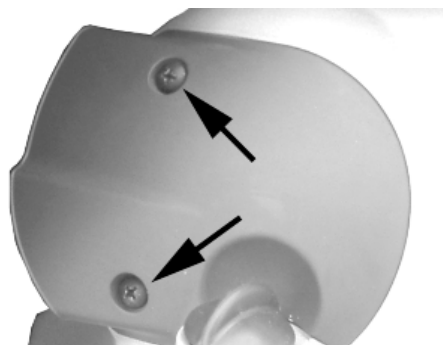
N.B.

WHEN YOU ARE REMOVING THE TRANSMISSION COVER YOU MUST BE CAREFUL NOT TO DROP THE CLUTCH BELL.

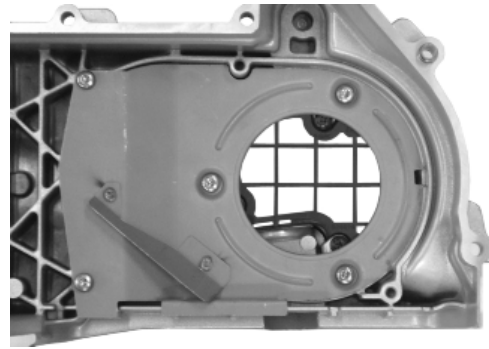


Air duct

- Remove the transmission compartment air intake cover shown in the photograph.



- Remove the five screws on two different levels as well as the small casing.



Removing the driven pulley shaft bearing

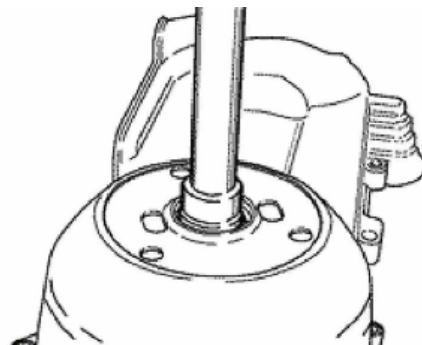
- Remove the clip from the inside of the cover.
- Remove the bearing from the crankcase by means of:

Specific tooling

020376Y Adaptor handle

020375Y 28 x 30 mm adaptor

020412Y 15 mm guide



Refitting the driven pulley shaft bearing

- Slightly heat the crankcase from the inside so as not to damage the painted surface.
- Insert the bearing in its seat.
- Refit the seeger ring.

CAUTION

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

N.B.

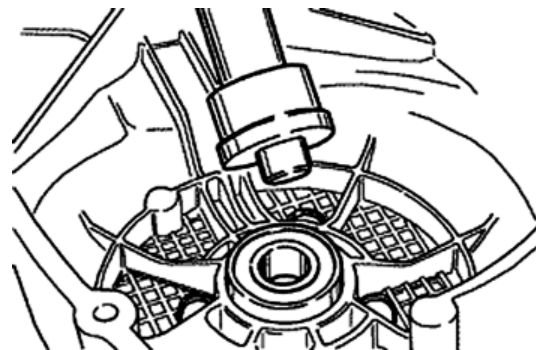
ALWAYS REPLACE THE BEARING WITH A NEW ONE UPON REFITTING.

Specific tooling

020376Y Adaptor handle

020357Y 32 x 35 mm adaptor

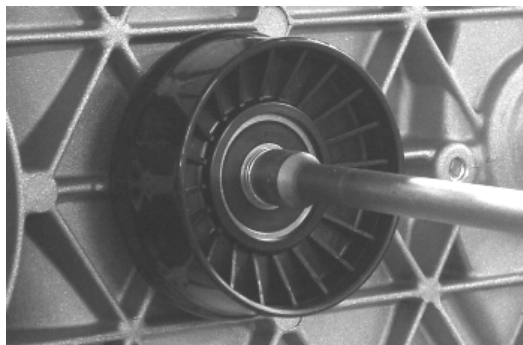
020412Y 15 mm guide



Baffle roller

Plastic roller

- Check that the roller does not show signs of wear and that it turns freely.
- Remove the special clamping screws as indicated in the photograph



- Check the outer diameter of the roller does not have defects that could jeopardise belt functioning
- For refitting, place the roller with the belt containment edge on the engine crankcase side
- Tighten the wrench to the prescribed torque.



Locking torques (N*m)

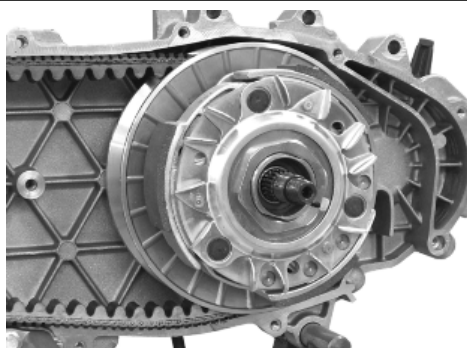
Anti-flapping roller 12 - 16

Removing the driven pulley

- Remove the clutch bell housing and the driven pulley assembly.

N.B.

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



Inspecting the clutch drum

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

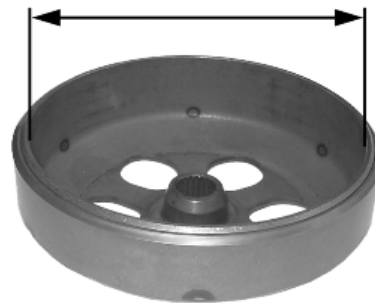
Characteristic

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

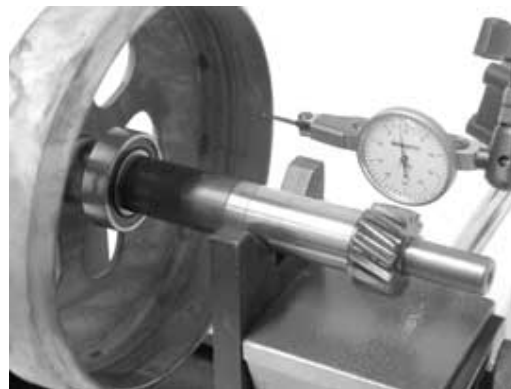
020074Y Support base for checking crankshaft alignment

020335Y Magnetic support for dial gauge

Characteristic

clutch bell inspection: Limit eccentricity.

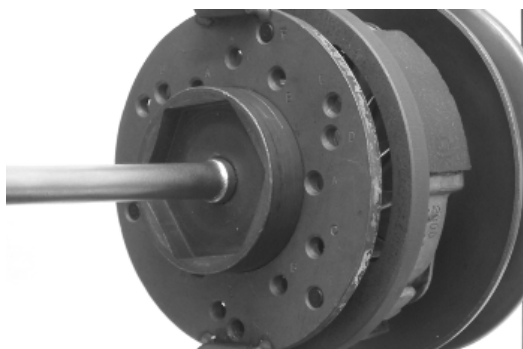
Admissible limit eccentricity: 0.15 mm



Removing the clutch

Fit the driven pulley spring compressor specific tool with medium length pins in position «C» screwed from the tool internal side.

- Introduce the adapter ring 11 with the chamfering facing the inside of the tool.
- Fit the driven pulley unit on the tool with the insertion of the 3 pins in the ventilation holes in the mass holder support.
- Make sure that the clutch is perfectly inserted into the adapter ring before proceeding to loosen/tighten the clutch nut.
- Use the special 46x55 wrench component 9 to remove the nut fixing the clutch in place.
- Dismantle the driven pulley components (Clutch and spring with its plastic holder)



CAUTION

THE TOOL MUST BE FIRMLY FIXED IN THE CLAMP AND THE CENTRAL SCREW MUST BE BROUGHT INTO CONTACT WITH THE TOOL. EXCESSIVE TORQUE CAN CAUSE THE SPECIFIC TOOL TO BUCKLE.

Specific tooling

020444Y011 adapter ring

020444Y009 Wrench 46 x 55

020444Y Tool for fitting/ removing the driven pulley clutch

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.

N.B.

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

Pin retaining collar

- Simultaneously turn and pull the collar manually to remove it.

N.B.

USE TWO SCREWDRIVERS IF YOU HAVE DIFFICULTY.

N.B.

BE CAREFUL NOT TO PUSH THE SCREW DRIVERS IN TOO FAR TO AVOID DAMAGE THAT COULD ENDANGER THE O-RING SEAL.



- Remove the four torque server pins and pull the pulley halves apart.



Removing the driven half-pulley bearing

- Check there are no signs of wear and/or noise; - Replace with a new one if there are.
- Remove the retaining ring using two flat blade screwdrivers.
- Support the pulley bushing adequately from the threaded side using a wooden surface.
- Using a hammer and pin, knock the ball bearing out as shown in the figure.



- Support the pulley properly using the bell as shown in the figure.

Specific tooling

001467Y035 Bearing housing outside diameter 47 mm



- Remove the roller bearing using the modular punch.

Specific tooling

020376Y Adaptor handle

020456Y Ø 24 mm adaptor

020363Y 20 mm guide

Inspecting the driven fixed half-pulley

Version 250

- Measure the outer diameter of the pulley bushing.
- Check the contact surface with the belt to make sure there are no flaws.
- Check the riveted joints are functional.
- Check the evenness of the belt contact surface.

Characteristic**Half-pulley minimum diameter**

Minimum admissible diameter Ø 40.96 mm

Half-pulley standard diameter

Standard diameter: Ø 40.985 mm

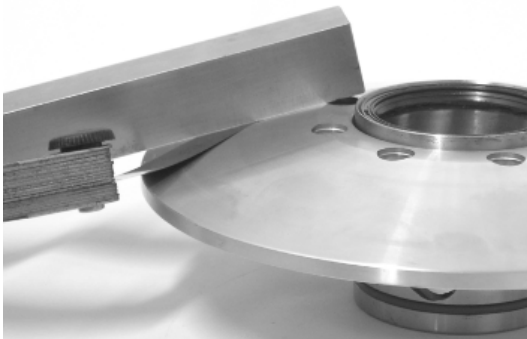
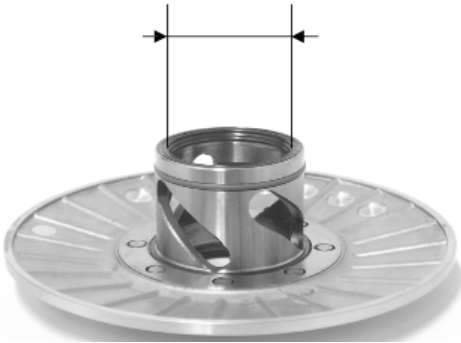
Wear limit

0.3 mm



Inspecting the driven sliding half-pulley

- Remove the two internal grommets and the two O-rings.
- Measure the movable half-pulley bushing inside diameter.
- Check the contact surface with the belt to make sure there are no flaws.
- Check the riveted joints are functional.
- Check the evenness of the belt contact surface.



MOVABLE DRIVEN PULLEY HALF DIMENSIONS

Specification	Desc./Quantity
Wear limit	0.3 mm
standard diameter	Diameter 41.000 - 41.035 mm
maximum allowable diameter	Ø 41.08 mm

Refitting the driven half-pulley bearing

- Support the pulley bushing adequately from the threaded side using a wooden surface.
 - Fit a new roller sleeve as in the figure.
 - For the fitting of the new ball bearing, follow the example in the figure using a modular punch.
- Fit the retention ring

WARNING

N.B.

FIT THE BALL BEARING WITH THE VISIBLE SHIELD

Specific tooling

020376Y Adaptor handle

020375Y 28 x 30 mm adaptor

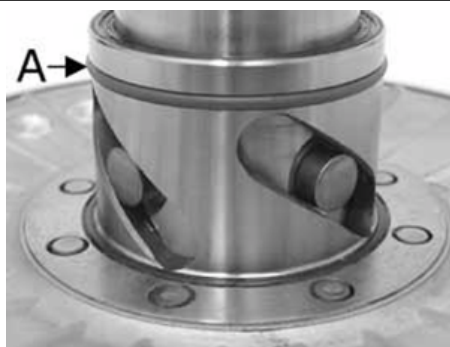
020424Y Driven pulley roller casing fitting punch





Refitting the driven pulley

- Insert the new oil guards and O-rings on the movable half-pulley.
- Lightly grease the O-rings «A» shown in the figure.
- Fit the half-pulley over the bushing using the specific tool.
- Check that the pins are not worn and proceed to refitting them in their slots.
- Refit the torque server closing collar.
- Using a curved-spout grease gun, lubricate the driven pulley unit with approximately 6 gr. of grease. Apply the grease through one of the holes in the bushing until it comes out through the hole on the opposite side. This operation is necessary to avoid the presence of grease beyond the O-rings.



N.B.

THE TORQUE SERVER CAN BE GREASED WHETHER WITH BEARINGS FITTED OR WHEN THEY ARE BEING REPLACED; UNDERTAKING THE OPERATION WHEN THE BEARINGS ARE BEING SERVICED MIGHT BE EASIER.

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 length of the spring, while it is relaxed.

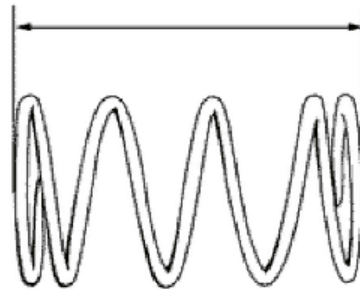
Characteristic

Standard length

123 mm

Acceptable limit after use:

118 mm



Refitting the clutch

- Support the driven pulley spring compressor appropriate tool with the control screw in vertical axis.
- Arrange the tool with the medium length pins screwed in position "C" on the inside.
- Introduce the adapter ring 11 with the chamfering facing upwards.
- Insert the clutch on the adapter ring.
- Lubricate the end of the spring that abuts against the servo-system closing collar.
- Insert the spring with its plastic holder in contact with the clutch.
- Insert the driving belt into the pulley unit according to their direction of rotation.
- Insert the pulley unit with the belt into the tool.
- Slightly preload the spring.
- Make sure that the clutch is perfectly inserted into the adapter ring before proceeding to tighten the clutch nut.
- Place the tool in the clamp with the control screw on the horizontal axis.
- Fully preload the spring.



- Apply the clutch fixing nut and tighten it to the prescribed torque using the special 46x55 wrench.
- Loosen the tool clamp and insert the belt according to its direction of rotation.
- Lock the driven pulley again using the specific tool.
- Preload the clutch return spring with a traction/rotation combined action and place the belt in the smaller diameter rolling position.
- Remove the driven pulley /belt unit from the tool.

N.B.

DURING THE SPRING PRELOADING PHASE, BE CAREFUL NOT TO DAMAGE THE PLASTIC SPRING STOP AND THE BUSHING THREADING.

N.B.

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

Specific tooling

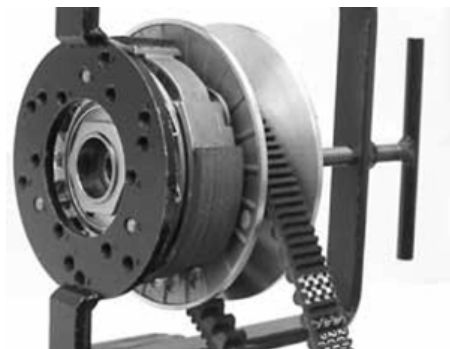
020444Y Tool for fitting/ removing the driven pulley clutch

020444Y011 adapter ring

020444Y009 Wrench 46 x 55

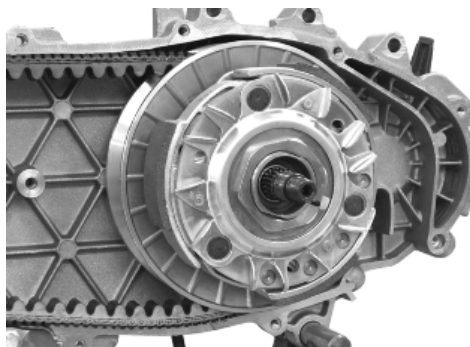
Locking torques (N*m)

Clutch unit nut on driven pulley 45 ÷ 50



Refitting the driven pulley

- Refit the clutch bell.



Drive-belt

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

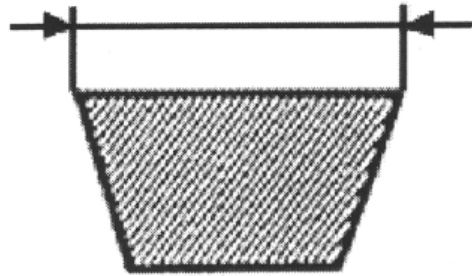
Characteristic

250 4T Transmission belt/minimum width

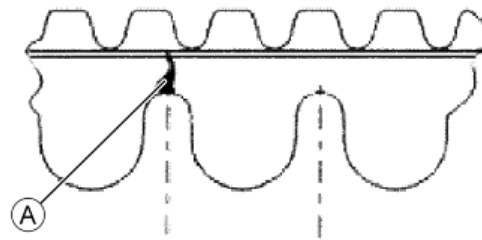
19.5 mm

250 4T Transmission belt/standard width

21.3 ± 0.2 mm



During the wear checks in the scheduled servicing programme, you are advised to check the rim bottom of the toothing does not show signs of incisions or cracking (see figure): The rim bottom of the tooth must not have incisions or cracking; if it does, change the belt.

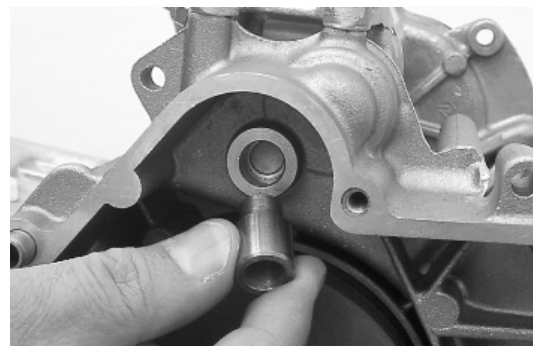


Removing the driving pulley

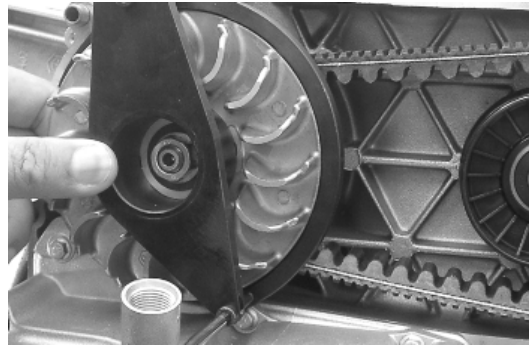
- Turn the crankshaft until the ropes of the pulley are on a horizontal axis



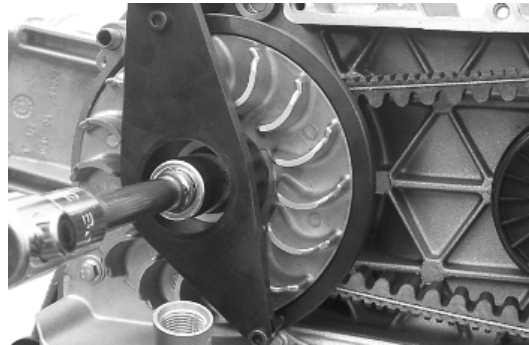
- Insert the adaptor sleeve of the appropriate tool in the hole shown in the photograph



- Insert the tool in the hollows and apply the retention ring
- Bring in the ring's clamping screws while keeping the tool to support the pulley

Specific tooling**020626Y Driving pulley lock wrench**

- Remove the fixing nut and the washer
- Remove the stationary drive pulley half.

**Inspecting the rollers case**

- Check that the internal bushing shown in the figure is not abnormally worn and measure inner diameter A.
- Measure outer diameter B of the pulley sliding bushing shown in the figure.
- Check that the rollers are not damaged or worn.
- Check the guide shoes for the variator back-plate are not worn.
- Check the wear of the roller housings and of the belt contact surfaces on both pulley halves.
- Check that stationary driving pulley does not show signs of abnormal wear on the grooved edge and on the surface in contact with the belt.
- Check that the O-ring is not pushed out of shape.

CAUTION**DO NOT LUBRICATE OR CLEAN SINTERED BUSHINGS****Characteristic****Movable driving half-pulley bushing: Standard Diameter**

26.000 - 26.021 mm

Movable driving half-pulley bushing: Maximum allowable diameter

26.12 mm

Sliding bushing: Standard Diameter

Ø 25.959 ÷ 25.98 mm

Sliding bushing: Minimum admissible diameter

Ø 25.95 mm

Roller: Standard Diameter

Diameter 20.5 - 20.7 mm

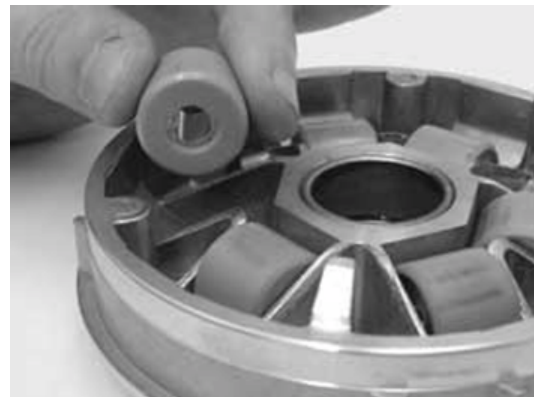
Roller: Minimum diameter permitted

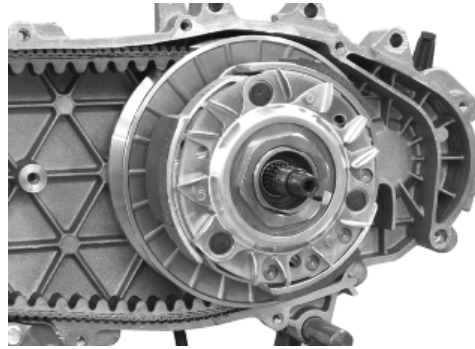
Ø 20 mm



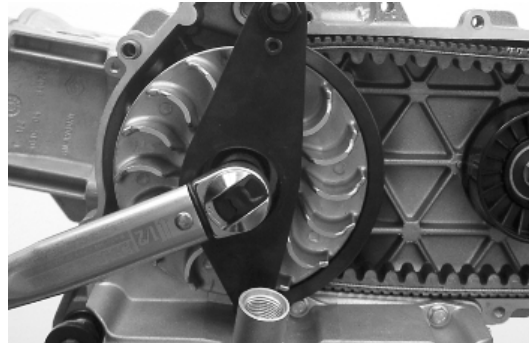
Refitting the driving pulley

- Preassemble the movable half-pulley with the roller contrast plate by putting the rollers in their housings with the larger support surface touching the pulley according to the direction of rotation.
- Check that the roller contact plate does not have flaws and is not damaged on the grooved edge.
- Mount the complete bushing unit on the driving shaft.
- Fit the driven pulley/Clutch/belt unit on the engine.



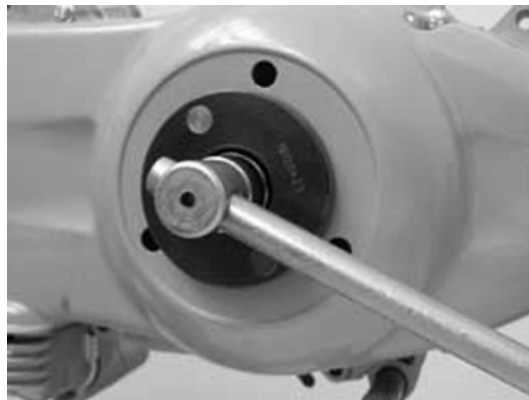


- Fit the steel shim in contact with the bushing and the stationary drive pulley.
- Install the appropriate tool as described in the removal phase.
- Tighten the nut with washer to the prescribed torque.

Specific tooling**020626Y Driving pulley lock wrench****Locking torques (N*m)****Drive pulley nut 75 ÷ 83**

Refitting the transmission cover

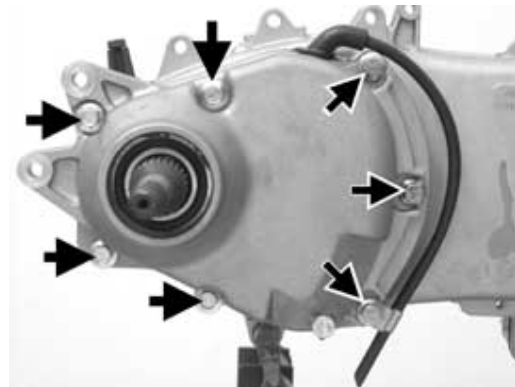
- Check the presence of the 2 centring dowels and the correct installation of the sealing gasket for the oil sump on the transmission cover.
- Replace the cover tightening the 10 screws at the specified torque.
- Refit the oil loading cap/bar.
- refit the steel washer and the driven pulley nut.
- Tighten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

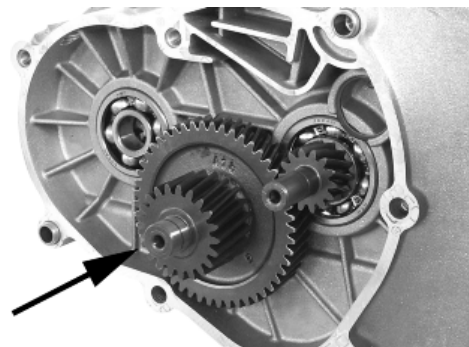
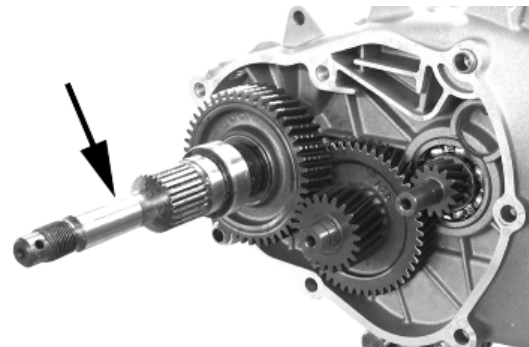
Removing the hub cover

- Empty the rear hub through the oil drainage plug.
- Remove the 7 flanged screws indicated in the figure.
- Remove the hub cover and its gasket.



Removing the wheel axle

- Remove the wheel axis complete with gear.
- Remove the intermediate gear.



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

001467Y013 Pliers to extract $\varnothing$ 15 mm bearings



Removing the wheel axle bearings

- Take out the clip on the outside of the gearbox cover.
 - Support the hub cover and expel the bearing.
- By means of the appropriate tools, remove the oil guard as in the figure.

Specific tooling

020376Y Adaptor handle

020477Y 37 mm adaptor

020483Y 30 mm guide

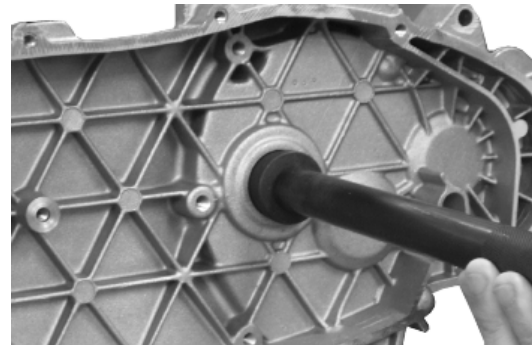
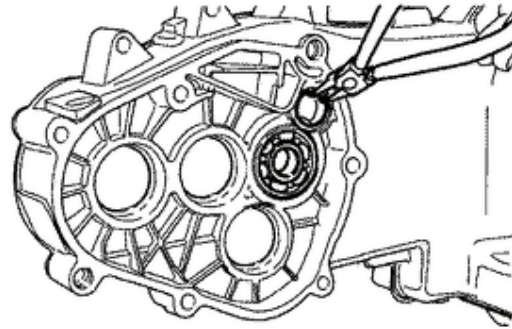
020359Y 42 x 47 mm adaptor

020489Y Hub cover support stud bolt set



Removing the driven pulley shaft bearing

- As you need to remove the driven pulley shaft, its bearing and oil guard, remove the transmission cover as described above.
- 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
- Remove the driven pulley shaft bearing using the modular punch.



Specific tooling

020376Y Adaptor handle

020375Y 28 x 30 mm adaptor

020363Y 20 mm guide

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 bearing bearings.
 - In case of anomalies, replace the damaged components.
-

Refitting the wheel axle bearing

- Support the hub cover on a wooden surface.
- Heat the cover crankcase with the special heat gun.
- Fit the wheel shaft bearing with a modular punch as shown in the figure.
- Fit the Seeger ring.
- Fit the oil guard with seal lip towards the inside of the hub and place it flush with the internal surface by means of the appropriate tool used from the 52 mm side.

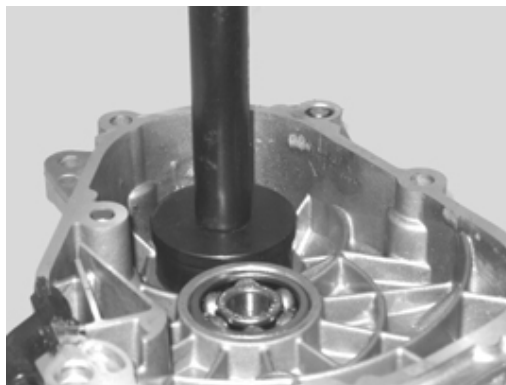
The 52 mm side of the adapter must be turned towards the bearing.

Specific tooling

020376Y Adaptor handle

020360Y 52 x 55 mm adaptor

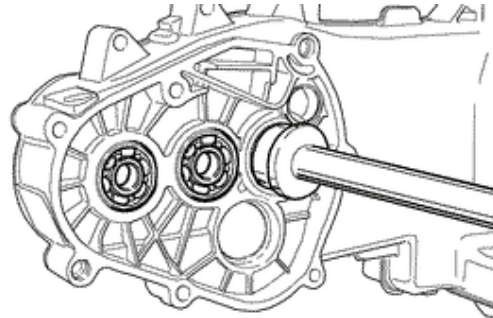
020483Y 30 mm guide



Refitting the hub cover bearings

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

- The three 15 mm bearings must be fitted using the appropriate tools.
- The 42 mm side of the adapter must be turned towards the bearing.



Specific tooling

020150Y Air heater support

020151Y Air heater

020376Y Adaptor handle

020359Y 42 x 47 mm adaptor

020412Y 15 mm guide



N.B.

TO FIT THE BEARING ON THE COVER, SUPPORT THE COVER WITH THE STUD BOLT SET.

- Refit the driven pulley shaft bearing with a modular punch as shown in the figure.

N.B.

IF THE BEARING HAS AN ASYMMETRICAL BALL RETAINER, PLACE IT SO THAT THE BALLS ARE VISIBLE FROM THE HUB INNER SIDE.

Specific tooling

020376Y Adaptor handle

020359Y 42 x 47 mm adaptor

020363Y 20 mm guide



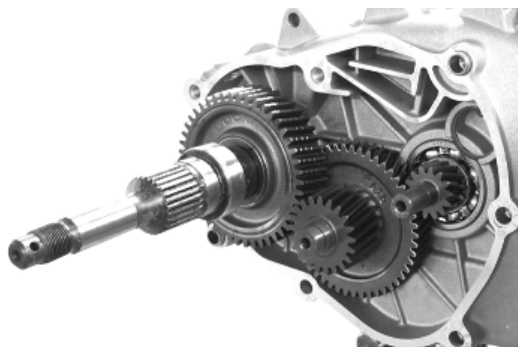
N.B.

WHEN FITTING THE BEARINGS ON THE ENGINE CRANKCASE, SUPPORT THE CRANKCASE PREFERABLY ON A SURFACE TO ALLOW THE BEARINGS TO BE DRIVEN VERTICALLY.

- Refit the seeger ring with the opening facing the bearing and fit a new oil guard flush with the crankcase from the pulley side.

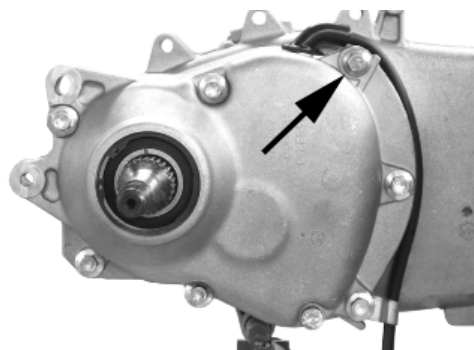
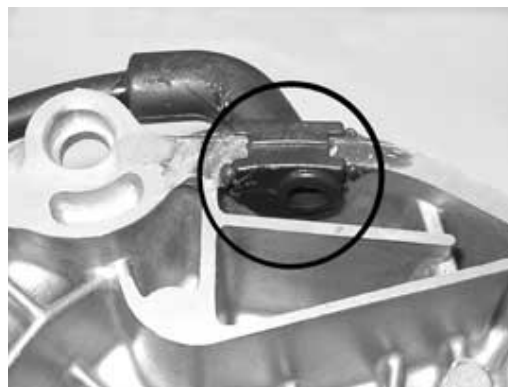
Refitting the hub bearings

- Install the three shafts in the engine crankcase as shown in the figure.



Refitting the ub cover

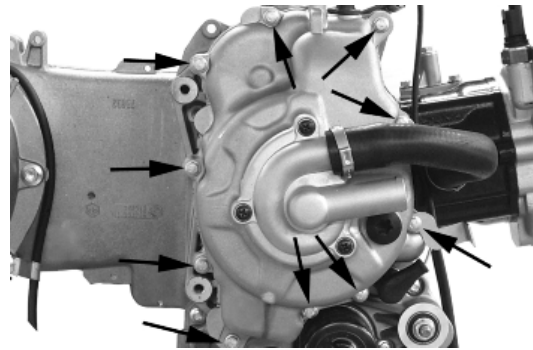
- Fit a new gasket together with the centring dowels.
- Seal the gasket of the breather pipe using black silicone sealant.
- Fit the gearbox cover, making sure the breather pipe is in the correct position.
- Position the shorter screw that can also be recognised from the different colour as shown in the figure.
- Fix the breather tube support by means of the lower screw.
- Fit the remaining screws and tighten the seven screws to the prescribed torque.



Flywheel cover

Removing the hub cover

- Remove the clip fixing the hose to the cylinder.
- Remove the ten fixings
- Remove the flywheel cover.



Removing the stator

- Remove the two pickup screws and the screw holding the wiring support and the three stator clamping 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.

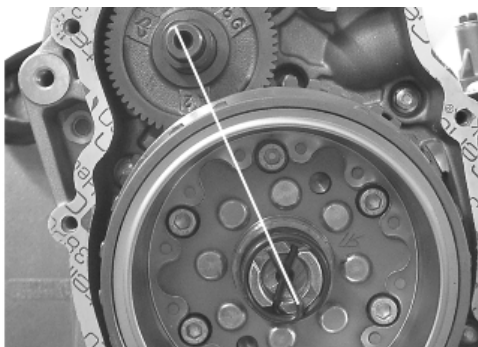
Locking torques (N*m)

Stator assembly screws (°) 3 ÷ 4

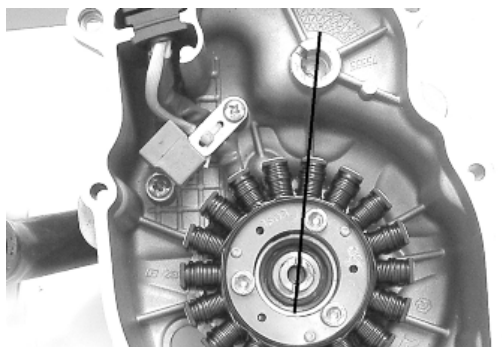


Refitting the flywheel cover

- Position the spline clip on the crankshaft and orient the end as shown in the figure.



- Orient the water pump shaft with reference to the transmission gear seat as shown in the photo.



- Refit the cover over the engine and tighten the screws to the prescribed torque.
- Carry out the steps in the reverse order from the dismantling procedure.

CAUTION

TAKE CARE TO CORRECTLY POSITION THE FLYWHEEL CONNECTOR. MAKE SURE THE CENTRING DOWELS ARE PRESENT.

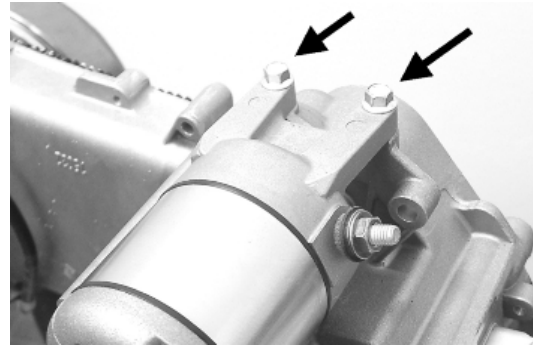
Locking torques (N*m)

Flywheel cover screws 11 - 13

Flywheel and starting

Removing the starter motor

- Remove the two screws indicated in the figure.
- Take the starter motor out of its seat

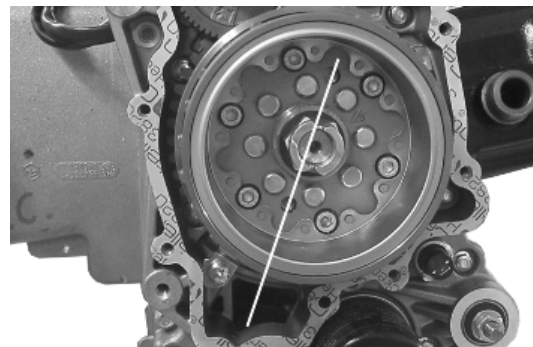


Removing the flywheel magneto

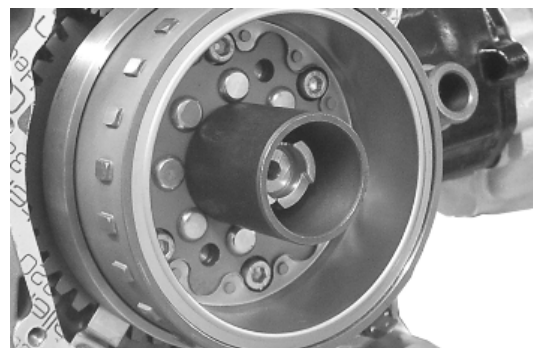
- Remove the water pump shaft and crankshaft spline clip



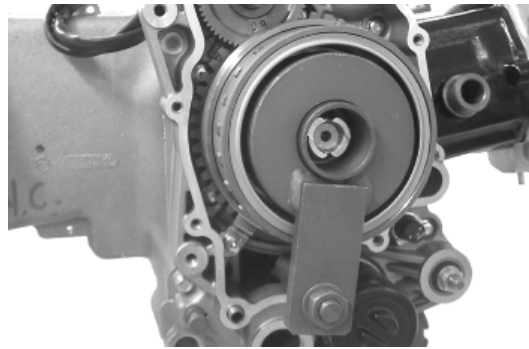
- Line up the two holes in the flywheel as shown in the photo



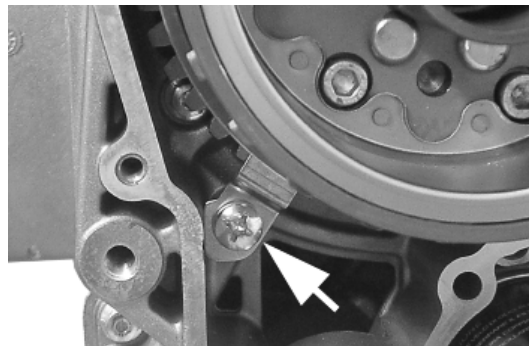
- Screw in the guide bushing that is part of the special flywheel stop tool on the flywheel as shown in the photo.



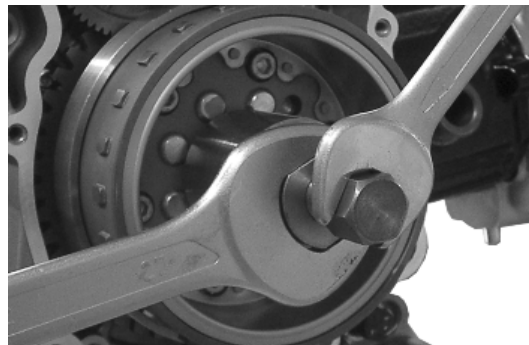
-
- Insert the special flywheel stop tool on the flywheel as shown in the photo

Specific tooling**020627Y Flywheel lock wrench**

-
- Remove the plate indicated in the photo.



-
- Remove the flywheel nut with its washer
 - Do up the flywheel nut by three or four threads so that the flywheel does not fall accidentally on extraction
 - Screw the extractor onto the flywheel and extract it as shown in the photograph

Specific tooling**020467Y 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 free wheel

S

-
- Make sure the free wheel contact surfaces are in good condition.
 - Thoroughly clean the free wheel to remove LOCTITE residue.
 - Degrease the threading of the holes in the free wheel and the clamping screws.
 - Apply the recommended product to the end of the screws.

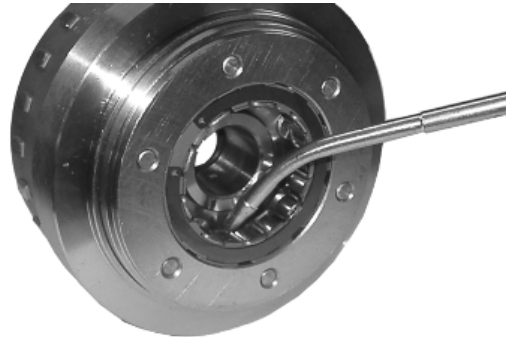
Recommended products**Loctite 243 Medium strength threadlock**

Medium Loctite 243 threadlock

- Fit the freewheel on the magneto flywheel making sure that the ground side is in contact with the flywheel itself, i.e. with wheel Seeger ring visible.
- Lock the six clamping screws in criss-cross fashion to the prescribed torque.

Locking torques (N*m)**Screw fixing freewheel to flywheel 13 - 15**

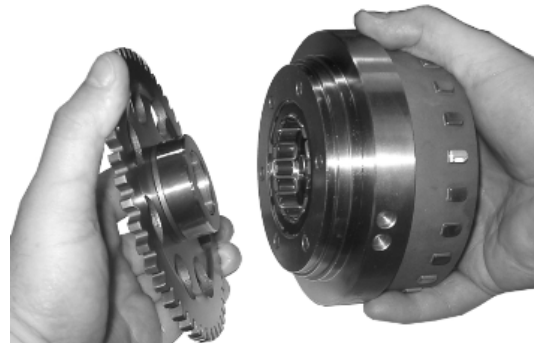
- Oil the free wheel "rollers".

**Refitting the flywheel magneto**

- Remove the freewheel retaining plate indicated in the photograph
- Remove the transmission gear and the freewheel



- Insert the free wheel on the flywheel as shown in the photo
- Then refit the flywheel with free wheel and transmission gear



- Using the special flywheel stop tool, tighten up the flywheel fixing nut to the prescribed torque
- Refit the retention plate

Specific tooling

020627Y Flywheel lock wrench

Locking torques (N*m)

Flywheel nut 94 ÷ 102

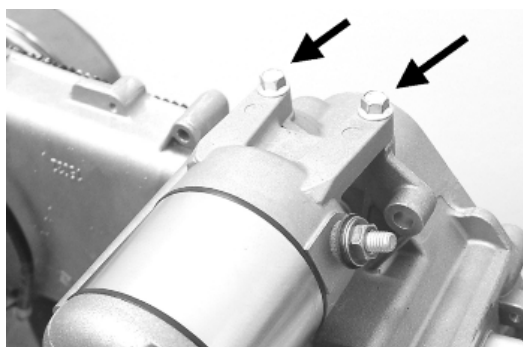


Refitting the starter motor

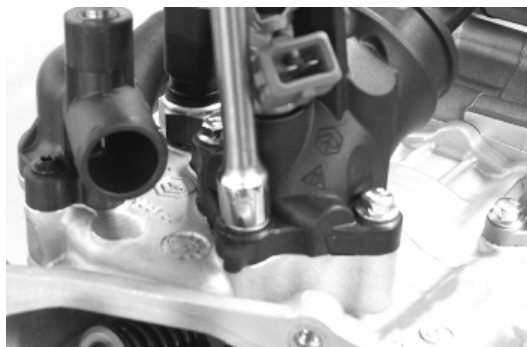
- Fit a new O-ring on the starter motor and lubricate it.
- Fit the starter on the crankcase, locking the two screws to the prescribed torque.

Locking torques (N*m)

Starter screws 11 ÷ 13



Cylinder assy. and timing system

Removing the intake manifold

- Loosen the three screws and remove the air intake manifold.
- When refitting, secure to the specified torque.

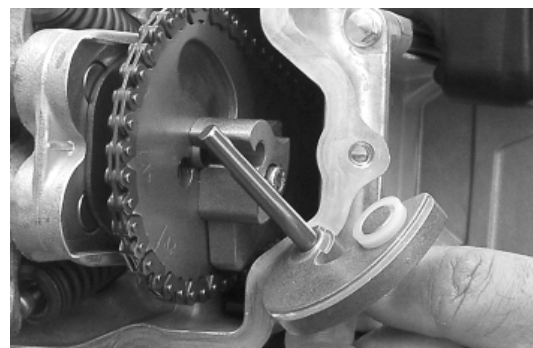
Removing the rocker-arms cover

- Remove the 5 screws indicated in the figure

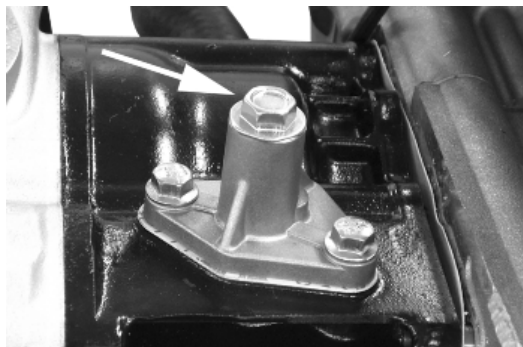


Removing the timing system drive

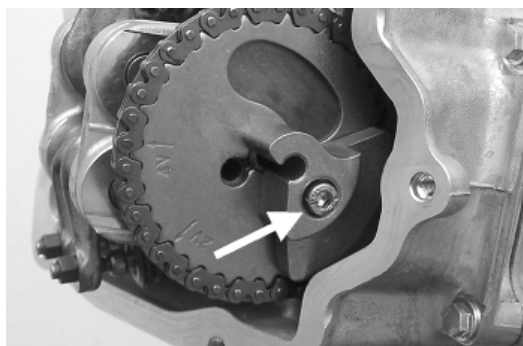
- Remove the parts listed below first: transmission cover, drive pulley with belt, oil sump with spring and by-pass piston, oil pump pulley cover, O-ring on the crankshaft and the sprocket wheel separation washer.
- Remove the tappet cover.
- Remove the central screw fastener and the automatic valve-lifter retaining cover, as shown in the figure.
- Remove the return spring of the automatic valve lifter unit and the automatic valve lifter unit 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.



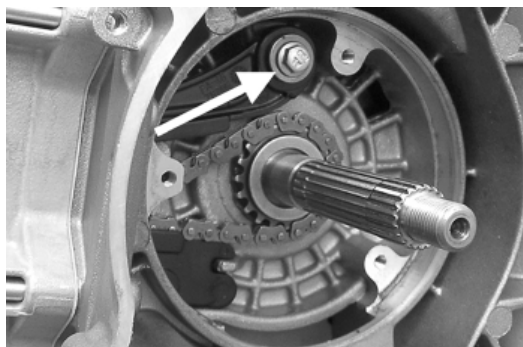
- Remove the internal hex screw and the counterweight shown in the figure.



- 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 slider.
- 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.



N.B.

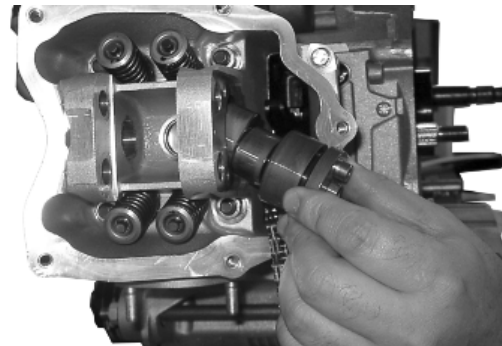
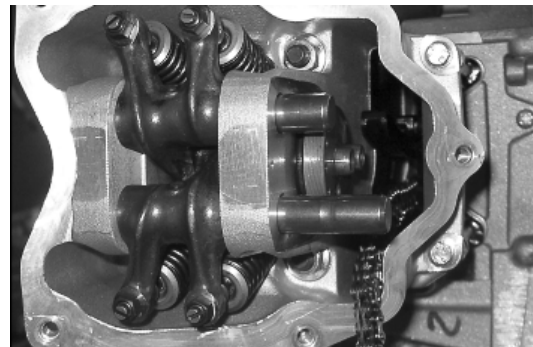
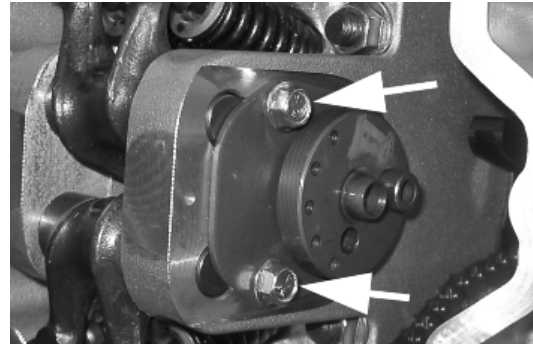
IT IS ADVISABLE TO MARK THE CHAIN IN ORDER TO ENSURE THAT THE INITIAL DIRECTION OF ROTATION IS MAINTAINED.

Removing the cam shaft

- Remove the two screws and the cam shaft retainer shown in the diagram.
- Remove the cam shaft.
- Remove the pins and the rocker arms from the flywheel side holes.

N.B.

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.

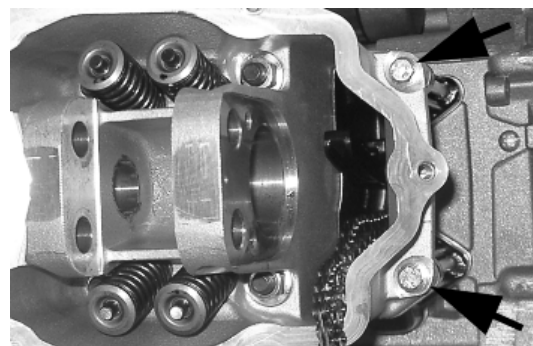


Removing the cylinder head

- 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.

N.B.

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 RE-



**MOVING THE CHAIN AND THE DRIVING
SHAFT CHAIN TIGHTENER.**

Removing the valves

- Using the appropriate tool fitted with an adapter, remove the cotters, caps, springs and valves.
- Remove the oil guards with the appropriate tool.
- Remove the lower spring supports.

CAUTION

**REPLACE THE VALVES IN SUCH A WAY AS
TO RECOGNISE THEIR ORIGINAL POSITION
ON THE HEAD.**

Specific tooling

020382Y011 adapter for valve removal tool

**020382Y Valve cotters equipped with part 012
removal tool**

020431Y Valve oil seal extractor



Removing the cylinder - piston assy.

Removing cylinder and piston

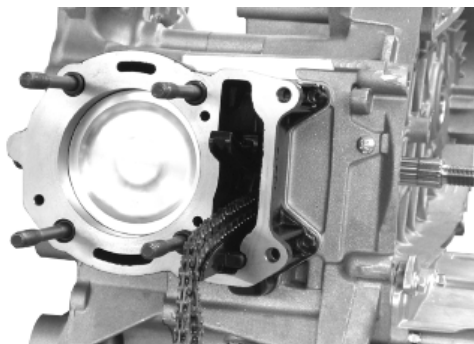
- Remove the chain guide pad.
- Remove the 4 O-rings on the stud bolts.
- Pull out the cylinder.
- Remove the cylinder base gasket.
- Remove the two stop rings, the wrist pin and the piston.
- Remove the piston seals.

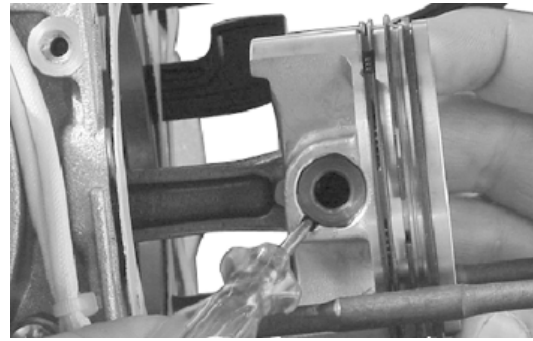
CAUTION

**TO AVOID DAMAGING THE PISTON, SUP-
PORT IT WHILE REMOVING THE CYLINDER.**

N.B.

**BE CAREFUL NOT TO DAMAGE THE SEALING
RINGS DURING REMOVAL.**





Inspecting the small end

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

N.B.

REPLACE THE CRANKSHAFT IF THE DIAMETER OF THE ROD SMALL END EXCEEDS THE STANDARD DIAMETER OR IT SHOWS SIGNS OF WEAR OR OVERHEATING.

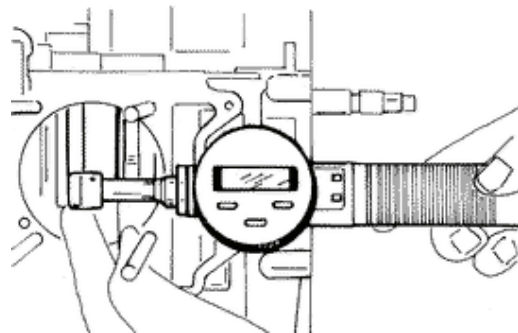
Characteristic

Checking the connecting rod small end: Maximum diameter

15.030 mm

Checking the connecting rod small end: Standard diameter

15 +0.015+0.025 mm



Inspecting the wrist pin

- Measure the outer diameter of the gudgeon pin.
- Calculate the coupling clearance between connecting rod end and pin.

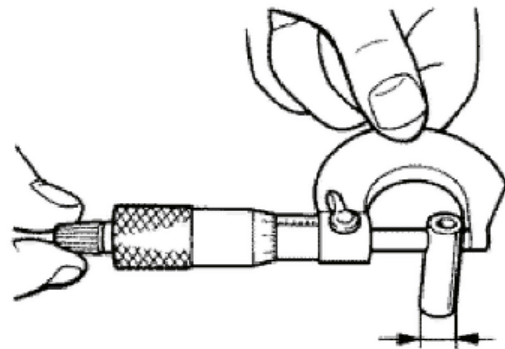
Characteristic

Pin diameter: Standard clearance

0.015 ÷ 0.029 mm

Pin diameter Standard diameter

14.996 - 15.000 mm



Inspecting the piston

- Measure the diameter of the wrist pin seat on the piston.
- Calculate the piston pin coupling clearance.
- Measure the outside diameter of the piston, perpendicular to the gudgeon pin axis.
- Take the measurement at 5 mm from the base in the position shown in the figure.
- 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.

N.B.

MEASURE THE CLEARANCE BY INSERTING THE BLADE OF THE FEELER GAUGE FROM THE SECOND SEAL SIDE.

N.B.

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

Wrist pin seat on the piston: Standard diameter

15.001 ÷ 15.006 mm

**Diameter of the wrist pin seat on the piston:
Standard clearance**

0.001 ÷ 0.010 mm

piston diameter

71.953 - 71.981 mm

Fitting clearance

Top piston ring - standard coupling clearance

0.015 - 0.06 mm **Top piston ring - maximum**

clearance allowed after use 0.07 mm **Middle**

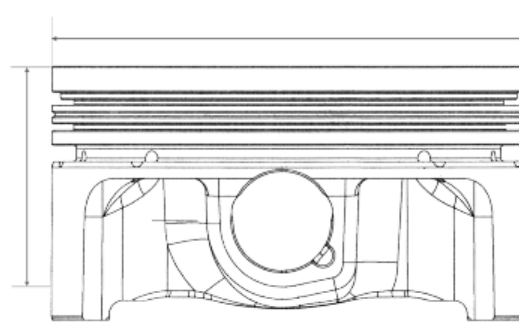
piston ring - standard coupling clearance 0.015

- 0.06 mm **Middle piston ring - maximum clear-**

ance allowed after use 0.07 mm **oil scraper ring**

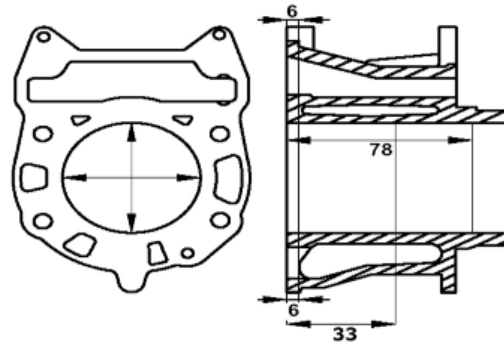
- standard coupling clearance 0.015 - 0.06 mm

**oil scraper ring - maximum clearance allowed
after use** 0.07 mm



Inspecting the cylinder

- Using a bore meter, measure the inner cylinder diameter at three different points according to the directions shown in the figure.
- Check that the head coupling surface is not worn or misshapen.
- Pistons and cylinders are classified according to diameter. The coupling must be made with those of the same type (M-M, N-N, O-O, P-P).



Characteristic

cylinder: standard diameter

71.990 - 72.018 mm (at 33 mm)

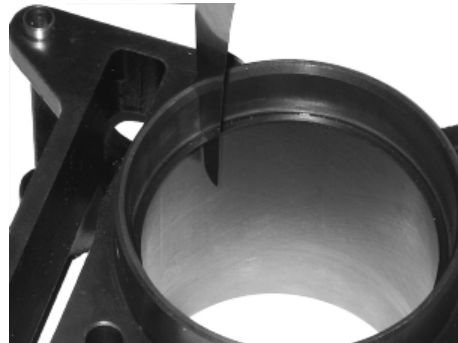
Maximum allowable run-out:

0.05 mm

Inspecting the piston rings

Sealing rings

- Alternately insert the three sealing rings into the cylinder, in the area where it retains its original diameter. Using the piston, insert the rings perpendicularly to the cylinder axis.
- Measure the opening (see figure) of the sealing rings using a feeler gauge.
- If any measurements are greater than specified, replace the piston rings.



N.B.

BEFORE REPLACING ONLY THE PISTON RINGS, ENSURE THAT THE CLEARANCE BETWEEN THE PISTON RINGS AND THE PISTON RING GROOVES, AND BETWEEN THE PISTON AND THE CYLINDER, IS AS SPECIFIED. IN ANY CASE, NEW PISTON RINGS USED IN COMBINATION WITH A USED CYLINDER MAY HAVE DIFFERENT BEDDING CONDITIONS THAN THE STANDARD.

Characteristic

Top piston ring

Standard opening: $0.15 \div 0.30$ mm

Middle piston ring

Standard opening: $0.20 \div 0.40$ mm

scraper ring

Standard opening: $0.20 \div 0.40$ mm

Removing the piston

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

- Fit the wrist pin stop ring onto the appropriate tool

- With opening in the position indicated on the tool

S = left

D= right

- Place the wrist pin stop ring into position using a punch

- Fit the wrist pin stop using the plug as shown in the figure

N.B.

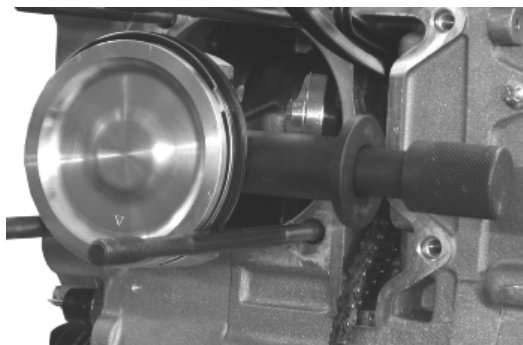
THE TOOL FOR INSTALLING THE STOP RINGS MUST BE USED MANUALLY.

CAUTION

USING A HAMMER MIGHT DAMAGE THE STOPS' HOUSING.

Specific tooling

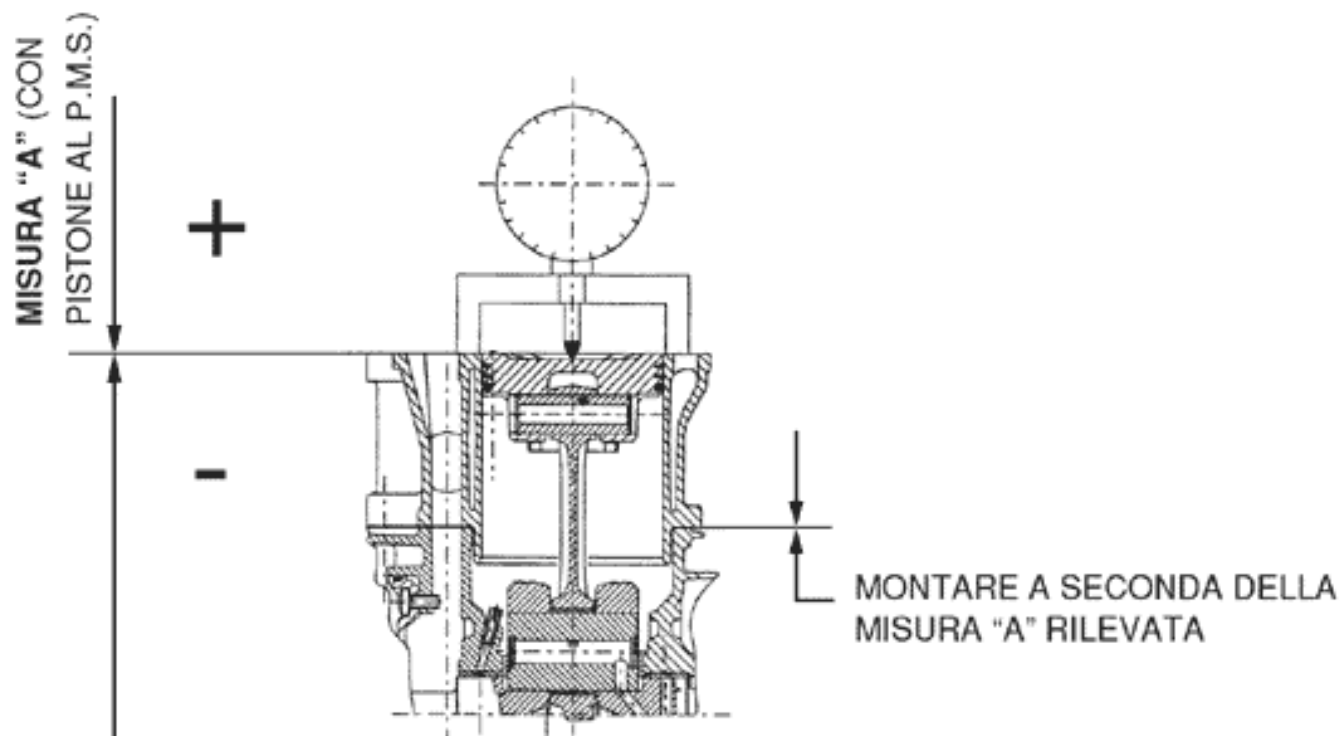
020454Y Tool for fitting piston pin stops (200 - 250)



Choosing the gasket**Characteristic**

Compression ratio 250 version

CR: $10.5 \div 11.5 : 1$



N.B. LA MISURA "A" DEVE ESSERE RILEVATA SENZA NESSUNA GUARNIZIONE MONTATA TRA CARTER E CILINDRO E DOPO AVER AZZERATO IL COMPARATORE, COMPLETO DI SUPPORTO, SU DI UN PIANO RETTIFICATO.

N.B.
MEASUREMENT "A" TO BE TAKEN IS A VALUE OF PISTON RE-ENTRY, IT INDICATES BY HOW MUCH THE PLANE FORMED BY THE PISTON CROWN FALLS BELOW THE PLANE FORMED BY THE TOP OF THE CYLINDER. THE FURTHER THE PISTON FALLS INSIDE THE CYLINDER, THE LESS THE BASE GASKET IS TO BE APPLIED (TO RECOVER THE COMPRESSION RATIO) AND VICE VERSA.

ENGINE 250 SHIMMING

Name	Measure A	Thickness
shimming	3.70 - 3.60	0.4 ± 0.05
shimming	3.60 - 3.40	0.6 ± 0.05
shimming	3.40 - 3.30	0.8 ± 0.05

Refitting the piston rings

Fitting the sealing 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 chamfered side of the oil scraper ring should always be facing the piston crown.
- 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.
- The top piston ring on the 250 engine has an L cross section.

N.B.

THE TWO PISTON RINGS ARE MADE WITH A TAPERED CYLINDRICAL CONTACT CROSS-SECTION. THIS IS TO ACHIEVE A BETTER BEDDING.



Refitting the cylinder

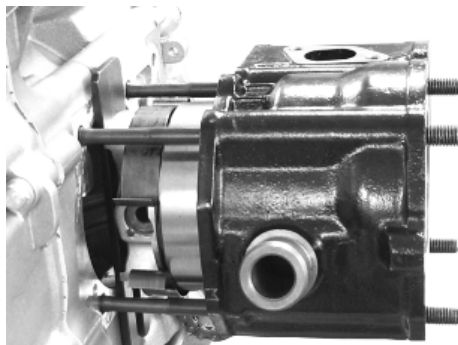
- Insert the cylinder base gasket with the thickness determined above.
- Using the fork support and the piston ring retaining band, refit the cylinder as shown in the figure.

N.B.

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

Specific tooling

020426Y Piston fitting fork



020393Y Piston fitting band

Inspecting the cylinder head

- Using a trued bar and feeler gauge check that the cylinder head surface is not worn or distorted.

Maximum allowable run-out: 0.05 mm

- Check that the camshaft and the rocker pin capacities exhibit no wear.
- Check that the cylinder head cover surface, the intake manifold and the exhaust manifold are not worn.

Characteristic**bearing «A»**

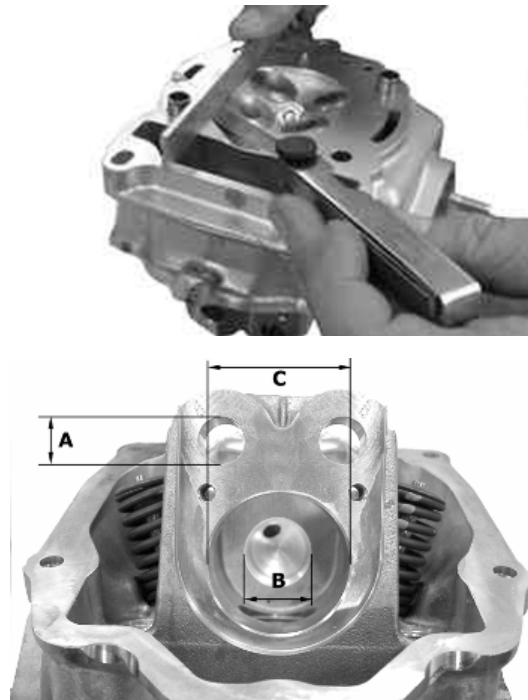
Ø 12.000 - 12.018 mm

bearing «B»

Ø 20.000 ÷ 20.021 mm

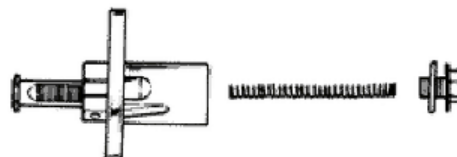
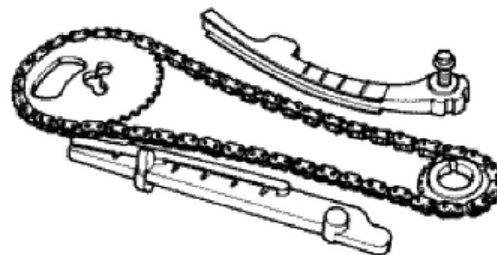
bearing «C»

Ø 37.000 - 37.025 mm



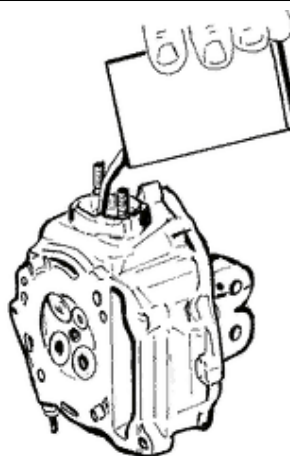
Inspecting the timing system components

- 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 you encounter wear, replace the parts or, if the chain, sprocket wheel and pulley are worn replace the whole assembly.
- Remove the centre screw with the washer and the tensioner spring. Check that the one-way mechanism is not worn.
- Check the condition of the tensioner spring.
- If examples of wear are found, replace the whole assembly.



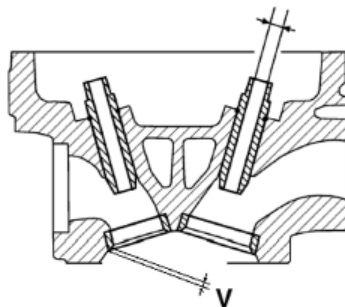
Inspecting the valve sealings

- Insert the valves into the cylinder head.
- Alternatively check the intake and exhaust valves.
- 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 valve housings

- Check the width of the imprint on the valve seat «V» wear limit max. 1.6 mm.
- 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.
- 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.



Characteristic

Valve seat wear Intake guide

limit accepted: 5.022

Valve seat wear Intake guide

Standard diameter: 5.000 ÷ 5.012 mm

Valve seat wear Exhaust guide

Accepted limit 5.022

Valve seat wear Exhaust guide

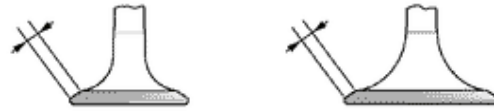
Standard diameter: 5.000 ÷ 5.012 mm

Inspecting the valves

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

Sealing surface width: After use: Intake and exhaust: 1.6 mm

- If any of the sealing surfaces on the valves is wider than the specified limit or is damaged in one or more points, or curved, replace the valve with a new one.



CAUTION

DO NOT REVERSE THE FITTING POSITIONS OF THE VALVES (RIGHT - LEFT).

Characteristic

Valve wear check Standard: Intake and exhaust:

0.99 - 1.27 mm

- Measure the diameter of the valve stems in the three positions indicated in the diagram.
- Calculate the clearance between valve and valve guide.
- Check that there are no signs of wear on the surface of contact with the articulated register terminal.
- 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 the grinding, keep the cylinder head with the valve axes in a horizontal position. This will prevent the lapping compound residues from penetrating between the valve stem and the guide (see figure).

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.

N.B.

DO NOT CHANGE THE POSITIONS THE VALVES ARE FITTED IN

Characteristic

Valve check standard length

Outlet: 94.4 mm

Valve check standard length

Inlet: 94.6 mm

Valve check Maximum admissible clearance

Outlet: 0.072 mm

Valve check Maximum admissible clearance

Inlet: 0.062 mm

Valve check standard clearance

Outlet: 0.025 ÷ 0.052 mm

Valve check standard clearance

Inlet: $0.013 \div 0.040$ mm

Valve check Minimum admissible diameter

Outlet: 4.95 mm

Valve check Minimum admissible diameter

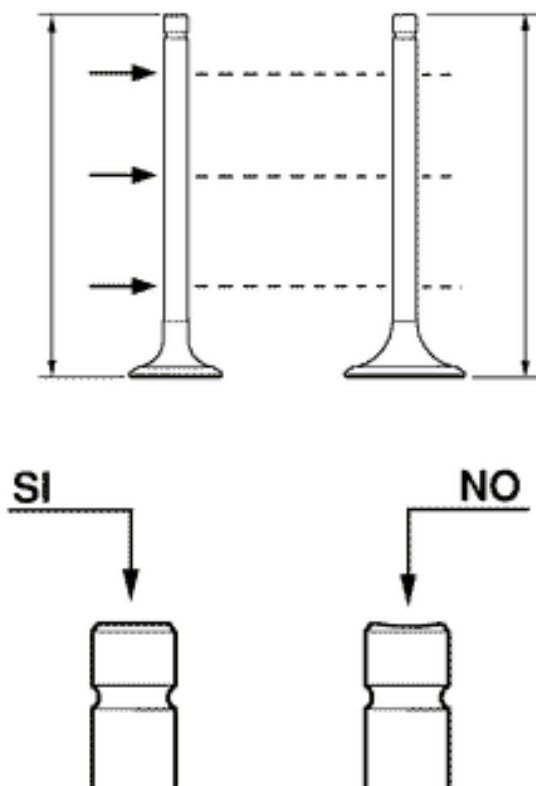
Inlet: 4.96 mm

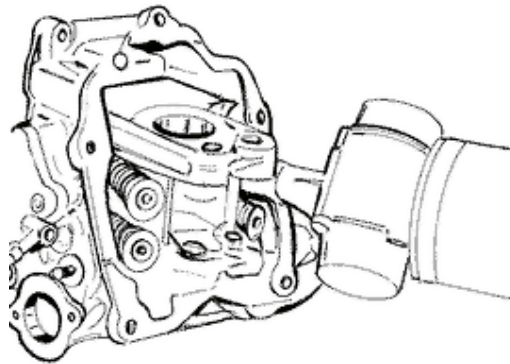
Valve check Standard diameter:

Inlet: $4.972 \div 4.987$ mm

Valve check Standard diameter:

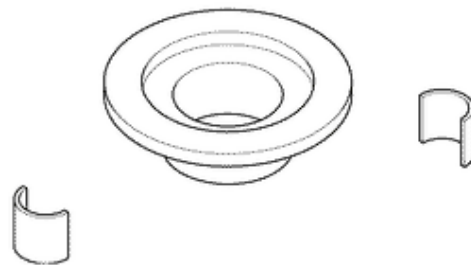
Outlet: $4.96 \div 4.975$ mm





Inspecting the springs and half-cones

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



Refitting the valves

- Lubricate the valve guides with engine oil.
- Place the valve spring supports on the head.
- Using the special punch, fit the four valve seals.
- Fit the valves, the springs and the caps. Using the appropriate tool with adapter, compress the springs and insert the cotters in their seats.

N.B.

DO NOT CHANGE THE VALVE FITTING POSITION. FIT THE VALVE SPRINGS WITH THE REFERENCE COLOUR ON COTTER SIDE (TURNS WITH GREATER PITCH).

Specific tooling

020306Y Punch for assembling valve seal rings

020382Y Valve cotters equipped with part 012 removal tool

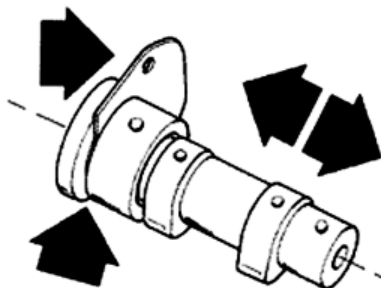
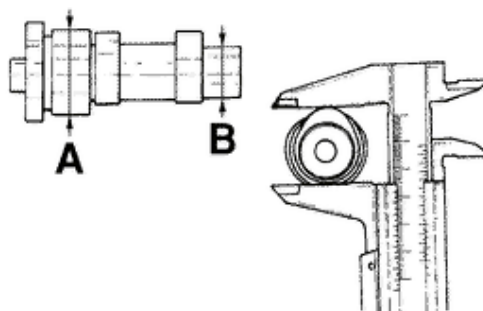
020382Y011 adapter for valve removal tool





Inspecting the cam shaft

- Inspect the cam shaft for signs of abnormal wear on the cams.
 - Check the cam height.
 - 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.
 - 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 the rocker pins do not show signs of wear or scoring.
 - Measure the internal diameter of each rocker arm.
- Check there are no signs of wear on the pad from contact with the cam and on the jointed adjustment plate.



Characteristic

Internal rocker arm diameter: Standard diameter

Diameter 12.000 - 12.011 mm

Rocker arm pin diameter: Standard diameter

Diameter 11.977 - 11.985 mm

Cam shaft check: Maximum admissible axial clearance

0.42 mm

Cam shaft check: Standard axial clearance:

0.11 - 0.41 mm

Cam shaft check: Standard height

Outlet: 29.209 mm

Cam shaft check: Standard height

Inlet: 30.285 mm

Cam shaft check: Minimum admissible diameter

Bearing B diameter: 19.950 mm

Cam shaft check: Minimum admissible diameter

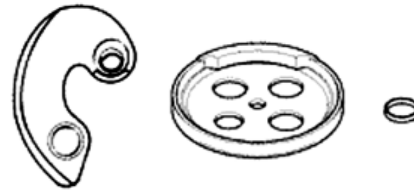
Bearing A Ø: 36.94 mm

Cam shaft check: Standard diameter

Bearing B diameter: 19.959 ÷ 19.98 mm

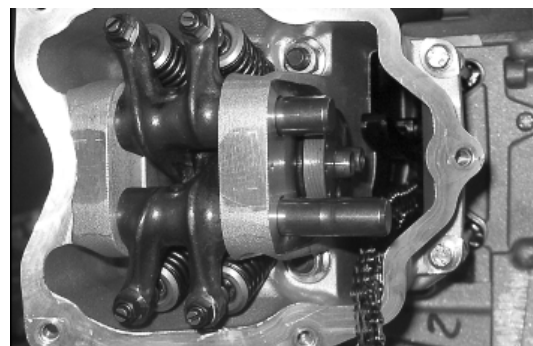
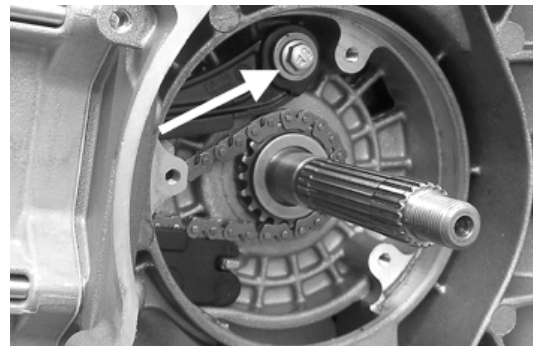
Cam shaft check: Standard diameter

Bearing A Ø: 36.95 ÷ 36.975 mm



Refitting the head and timing system components

- Refit the lower 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 chain tensioner slider from the cylinder head side.
- Fit the spacer and the screw fastener.
- Tighten the screws to the prescribed torque.
- Fit the pins and rocker arms.
- Lubricate the two rocking levers through the holes at the top.
- Lubricate the 2 bearings and insert the cam shaft in the cylinder head with the cams corresponding to the rockers.



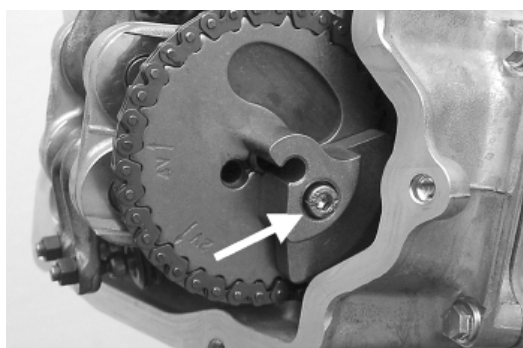
- Insert the retention plate and tighten the two screws shown in the figure to the prescribed torque.
- Refit the spacer on the cam shaft.
- Rotate the engine so that the piston is at top dead centre, using the reference marks on the flywheel and the crankcase.
- Holding this position insert the chain on the cam-shaft control pulley.
- Insert the pulley on the cam shaft while keeping the reference **4V** in correspondence with the reference mark on the head.
- Fit the counterweight and tighten the fixing screw to the prescribed torque.
- 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 by approximately 180°.
- Fit the automatic valve-lifter retaining dish, using the counterweight screw fastener as a reference.
- Tighten the clamping screw to the prescribed torque.
- 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.
- Insert the chain tensioning screw, together with the spring and washer, tightening it to the prescribed torque.
- Adjust the valve clearance.
- Fit the spark plug.

Electrode distance 0.8 mm

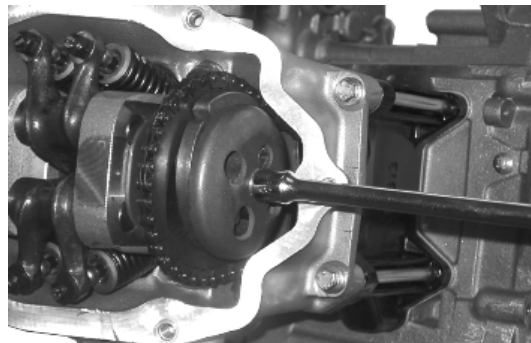
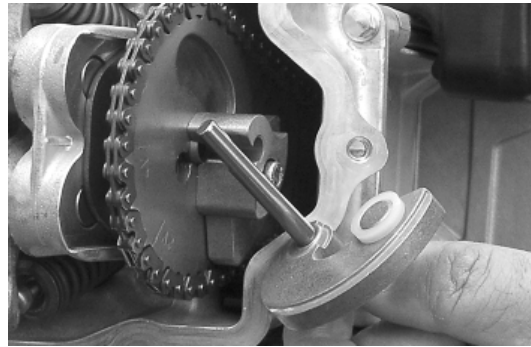
N.B.

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

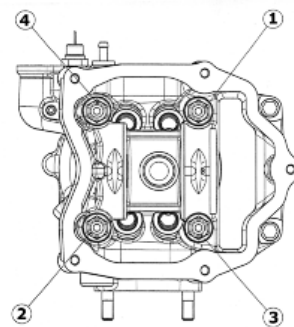
Locking torques (N*m)



Timing chain tensioner support screw 11 ÷ 13
 Spark plug 12 ÷ 14 Starter ground screw 7 ÷
 8.5 Timing chain tensioner slider screw 10 ÷
 14 Start-up counterweight support screw 11 ÷
 15 Timing chain tensioner central screw 5 - 6
 Camshaft retention plate screw 4 ÷ 6



- Fit the timing chain guide pad.
- Insert the centring dowel between the cylinder head to the cylinder, fit the cylinder head gasket and the cylinder head.
- Lubricate the stud bolt threading.
- Tighten up the nuts to an initial pre-torque of 7 ± 1 N·m
- Tighten up the nuts to a second pre-torque of 10 ± 1 N·m
- Rotate by an angle of 270°
- To carry out the operations described above, follow the tightening sequence in the figure.



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

N.B.

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

Locking torques (N*m)

Timing chain tensioner support screw $11 \div 13$



Refitting the rocker-arms cover

- Refit the cylinder head cover, tightening the 5 clamping screws to the prescribed torque.
- Make sure the gasket is positioned properly.

Locking torques (N*m)

Tapet cover screws $6 - 7 \text{ Nm}$

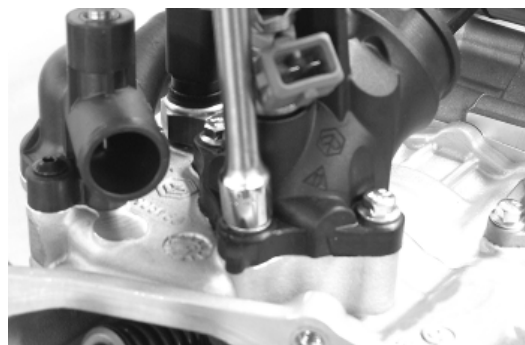


Refitting the intake manifold

Fit the intake manifold and do up the three screws.

Locking torques (N*m)

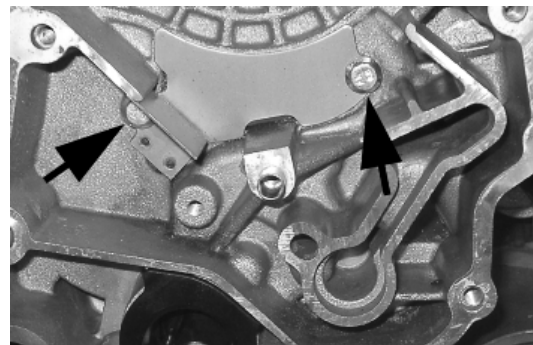
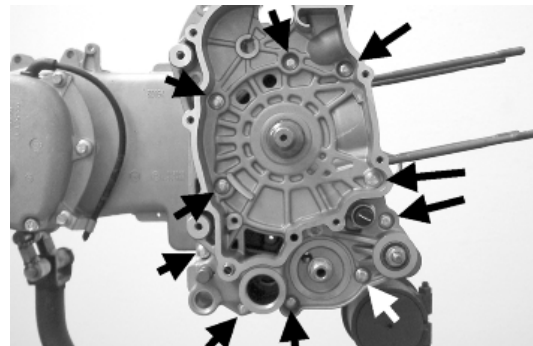
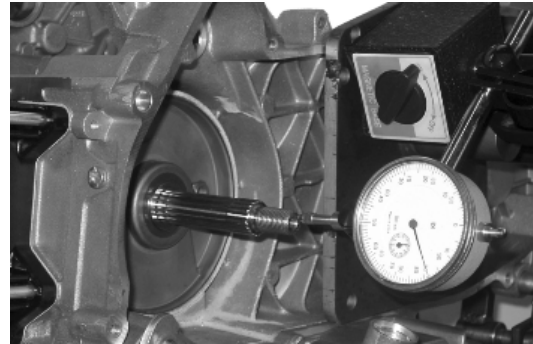
Inlet manifold screws $11 \div 13$



Crankcase - crankshaft

Splitting the crankcase halves

- 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 appropriate tool dial gauge.
- Upper clearances are an indication of wear on the surfaces of the crankshaft casing support.
- Remove the ten crankshaft coupling screws.
- Separate the crankcase while keeping the crankshaft in one of the two halves of the crankcase.
- Remove the crankshaft.
- Remove the half crankcase coupling gasket.
- Remove the two screws and the internal cover shown in the diagram.
- 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.
- 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.
- 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.
- 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.



CAUTION

THE CRANKSHAFT CAN BE REUSED WHEN THE WIDTH IS WITHIN THE STANDARD VAL-

UES AND THE SURFACES SHOW NO SIGNS OF SCORING.

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.

CAUTION

KEEP THE CRANKSHAFT IN ONE OF THE TWO HALVES OF THE CRANKCASE WHEN SEPARATING IT. IF YOU FAIL TO DO THIS, THE CRANKSHAFT MIGHT ACCIDENTALLY FALL.

N.B.

WHEN MEASURING THE WIDTH OF THE CRANKSHAFT, MAKE SURE THAT THE MEASUREMENTS ARE NOT MODIFIED BY THE RADII OF FITTINGS WITH THE CRANKSHAFT BEARINGS.

Specific tooling

020262Y Crankcase splitting strip

020335Y Magnetic support for dial gauge

Characteristic

Axial crankshaft/crankcase clearance: Standard clearance

0.15 - 0.40 mm (when cold)

**Axial connecting rod - crankshaft clearance
Standard clearance**

0.20 ÷ 0.50 mm

**Radial connecting rod - crankshaft clearance
Standard clearance**

0.036 ÷ 0.054 mm

**Width of crankshaft with integral washers:
standard measurements**

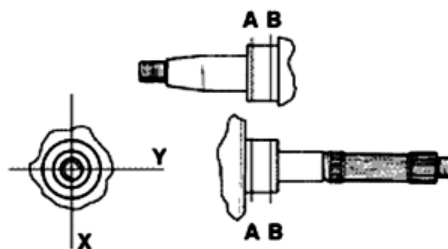
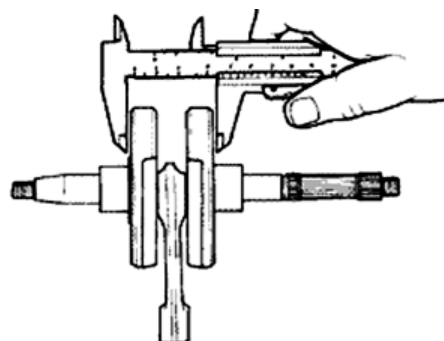
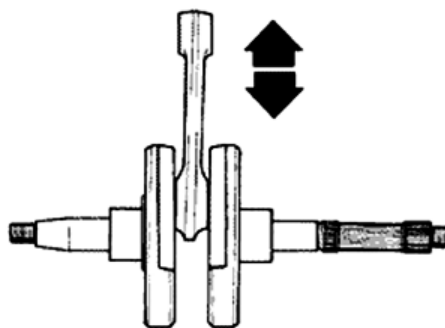
55.67 ÷ 55.85 mm

**Crankshaft bearings: Standard diameter: Cat.
1**

28.994 ÷ 29.000

**Crankshaft bearings: Standard diameter: Cat.
2**

29.000 ÷ 29.006



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 pads on the crank button are properly mounted.
- A wrong installation of a buffer can seriously affect the bushing lubrication pressure.

N.B.

THE MAIN BEARINGS ARE NOT GRINDABLE

Specific tooling

020074Y Support base for checking crankshaft alignment

Characteristic

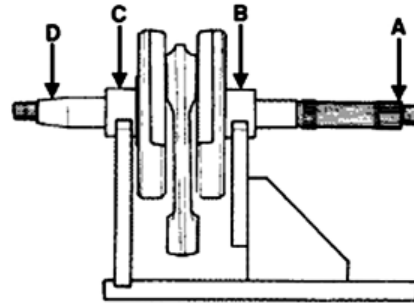
Off-line maximum admitted

A = 0.15 mm

B = 0.01 mm

C = 0.01 mm

D = 0.10 mm

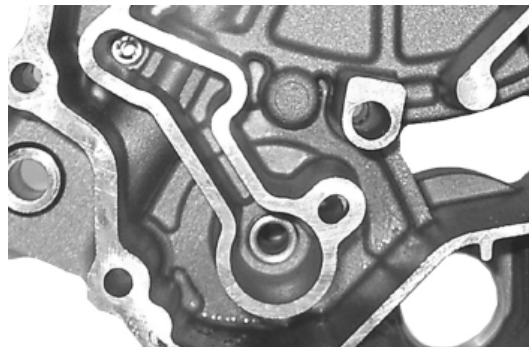
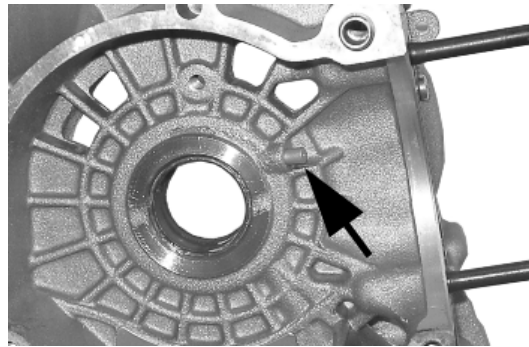


Inspecting the crankcase halves

- Before proceeding to check the crankcase halves, thoroughly clean the all surfaces and oil ducts.
- On the transmission-side crankcase half, take particular care when handling the oil pump compartment and the oil ducts, the by-pass duct, 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.
- 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.
- Inspect the coupling surfaces on the crankcase halves for scratches or deformation, taking particular care with the cylinder/crankcase surfaces and the crankcase halves surfaces.
- Defects in the crankcase coupling gasket between the crankcase halves or the mating surfaces shown in the diagram, could cause a drop in the oil pressure lubricating the main bearings and connection 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.

N.B.

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 CONSID-



ERABLY DECREASE THE MAIN BUSHING AND CONNECTING ROD LUBRICATION PRESSURE.

N.B.

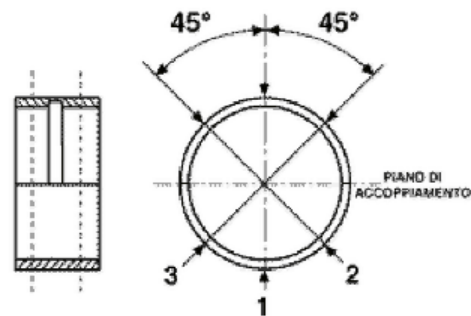
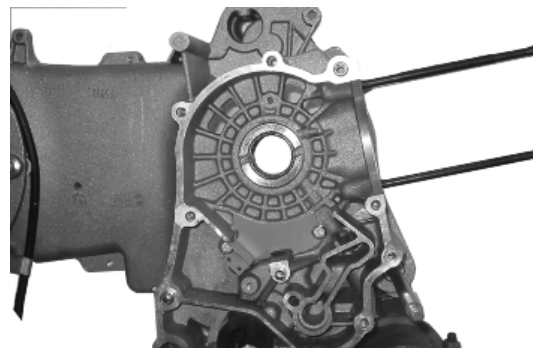
THE HEAD LUBRICATION CHANNEL IS PROVIDED WITH A SHUTTER JET; THIS GIVES A "LOW PRESSURE" HEAD LUBRICATION; THIS CHOICE WAS MADE TO REDUCE THE OIL TEMPERATURE IN THE SUMP. THE JET CLOGGING IMPAIRS THE HEAD LUBRICATION AND THE TIMING MECHANISMS. A JET FAILURE CAUSES A DECREASE OF THE MAIN BUSHING AND CONNECTING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

Inspecting the crankshaft plain bearings

- I

n order for the main bushings to be lubricated properly it is necessary to have both an outstanding lubricating pressure (3.2 bar) and a good oil flow rate, therefore it is essential for the main bushings to be positioned properly so that the oil feed channels are not choked.

- The main bushings are comprised of two half-bearings, one containing holes and channels for lubrication and the other solid.
- The solid half bearing must withstand the thrusts due to combustion and is therefore positioned opposite the cylinder.
- So as not to choke the oil feed channels it is essential for the coupling surfaces of the two half bearings to be perfectly at right-angles to the cylinder axis as shown in the figure.
- The oil feed channels cross-section is also influenced by the depth to which the bushings are driven compared with the crankshaft axial clearance containment surface.
- Check the inside diameter of the main bushings in the three directions indicated in the diagram.
- Repeat the measurement for the other half of the main bushing. see diagram.



- There are three crankcase versions: with RED main bushings, with BLUE main bushings and with YELLOW main bushings.

- There just one type of main bushing housing hole in the crankcase

The standard diameter of the main bushings after fitting is variable depending on a coupling selection.

- The bushing housings in the crankcase are available in two categories, Cat. 1 and Cat. 2, as are the crankshafts.

- The main bushings are available in three thickness categories, identified by colour markings, as shown in the table below.

TYPE		IDENTIFICATION	
A		RED	
B		BLUE	
C		YELLOW	

	Type "A"	Type "B"	Type "C"
	- RED	- BLUE	- YEL-
			LOW
Main half-bearing	1.970	1.9703	1.976
	1.973	1.976	1.979

Bush- ing cat- egory	Crank- case halves category	Internal bush- ing diameter after fitting	Possible fitting
A	1	29.025 29.040	Original
B	1	29.019 29.034	Original
	2	29.028 29.043	and spare
C	2	29.022 29.037	Original

Match the shaft with two category 1 crank webs with the category 1 crankcase (or cat. 2 with cat. 2) Furthermore a replacement crankcase cannot be matched with a crankshaft with mixed categories. The replacement crankshaft has half shafts of the same category.

Crankcase halves	Engine half shaft	Bushing
Cat. 1	Cat. 1	B
Cat. 2	Cat. 2	B
Cat. 1	Cat. 2	A
Cat. 2	Cat. 1	C

N.B.

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

N.B.

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

N.B.

CRANKCASES FOR REPLACEMENTS ARE SELECTED WITH CRANKCASE HALVES OF THE SAME CATEGORY AND ARE FITTED WITH CATEGORY B BUSHINGS (BLUE)

Characteristic

Standard driving depth

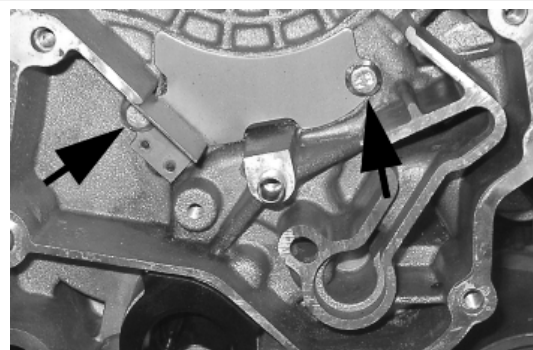
1.35 ÷ 1.6

Diameter of crankcase without bushing

32.953 ÷ 32.963

Refitting the crankcase halves

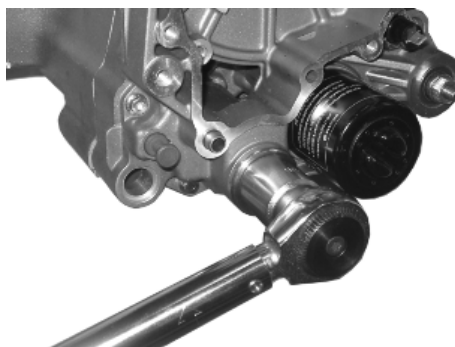
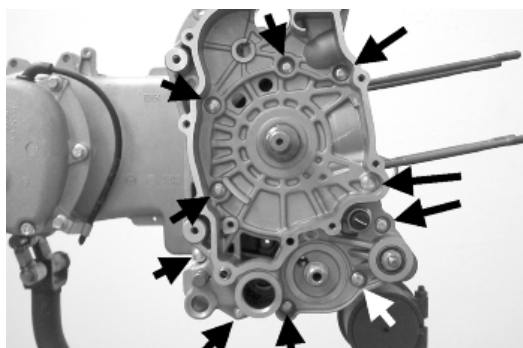
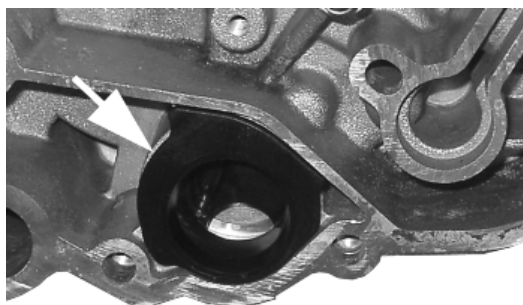
- Fit the internal bulkhead by locking the two screws to the prescribed torque.
- Fit the oil filter fitting and tighten it to the specified torque.
- Position the oil pre-filter element as shown in the photograph.
- Place a new gasket on one of the crankcase halves, preferably on the transmission side, together with the locating dowels.
- Lubricate the main bushings and insert the crankshaft in the transmission side crankcase half.
- Reassemble the two crankcase halves.



- Fit the 10 screws and tighten them to the specified torque.
- Fit a new O-ring on the pre-filter and lubricate it.
- Insert the filter on the engine with the relative cap. Tighten to the specified torque.

Locking torques (N*m)

Internal engine crankcase bulkhead (transmission-side half shaft) screws 4 ÷ 6 Engine-crankcase coupling screws 11 ÷ 13 Oil filter on crankcase fitting 27 ÷ 33 Engine oil drainage plug/mesh filter 24 ÷ 30

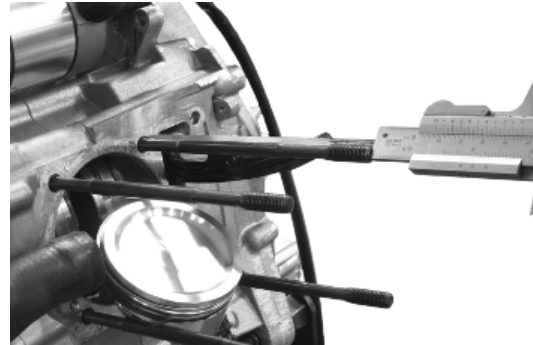


Studs

Check that the stud bolts have not worked loose from their seat in the crankcase.

Check the depth of stud bolt driving with a gauge, as indicated in the photograph. If it varies significantly from the driving depth indicated, it means that the stud bolt has yielded.

In this case, replace it.



By working on two fitted cylinder head fixing nuts, nut and lock nut, as shown in the photograph, remove the stud bolt from its seat.

Clean the threaded seat on the carter thoroughly. Refit a new stud bolt and apply the special product on the threading crankcase side.

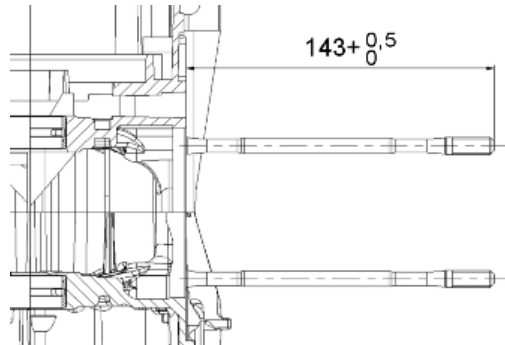
Tighten up to the depth of the driving indicated.



Recommended products

Loctite 'Quick Set' Strong 270 threadlock

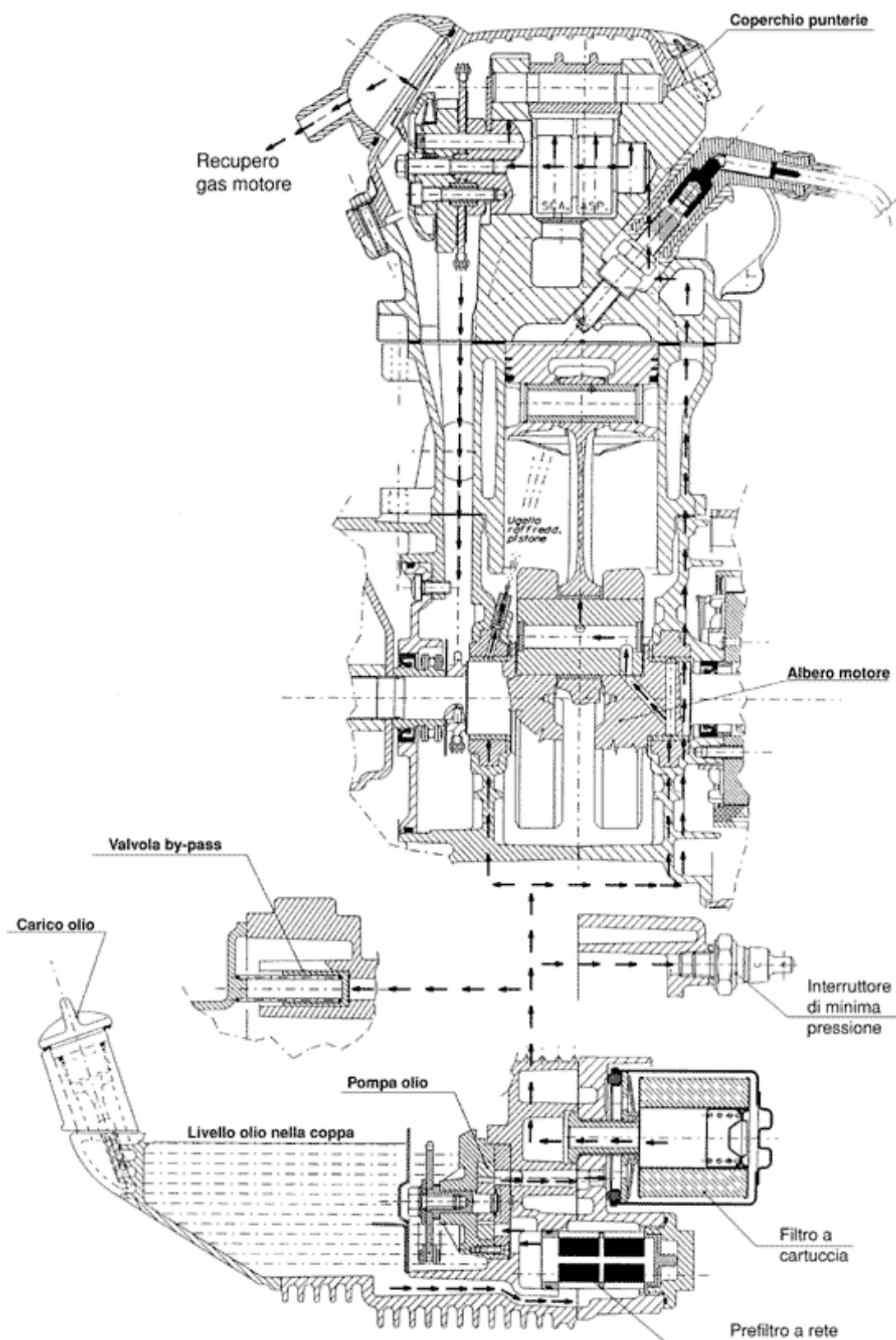
Strong 270 threadlock



Lubrication

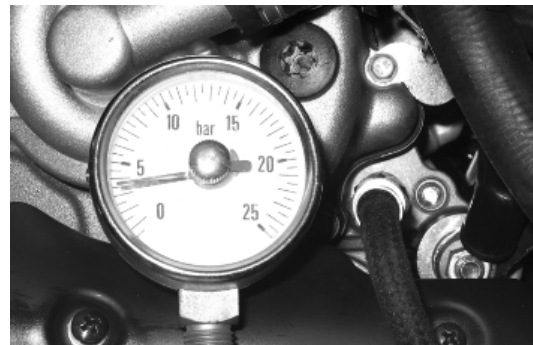
Conceptual diagrams

LUBRICATION CIRCUIT



Oil pressure check

- Remove the electrical minimum oil pressure switch connection and remove the switch.
- Check the oil pressure reading is between 0.5 and 1.2 atm with the engine idling at 1650 rpm and the oil at the required temperature (wait for at least one electric ventilation).
- Check the oil pressure is between 3.2 and 4.2 atm with the engine running at a speed 6000 rpm and the oil at the required temperature.
- Remove the appropriate tools once the measurement is complete, refit the oil pressure switch and washer, tightening it to the specified 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.



N.B.

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

Characteristic

Oil pressure

Minimum pressure admitted at 6000 rpm: 3.2 atm.

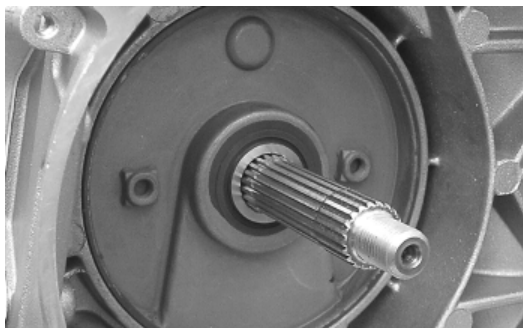
Locking torques (N*m)

Minimum oil pressure sensor 12 ÷ 14

Crankshaft oil seals

Removal

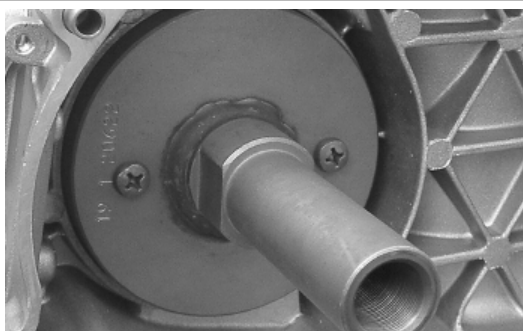
- Remove the transmission cover and the complete drive pulley beforehand



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

Specific tooling

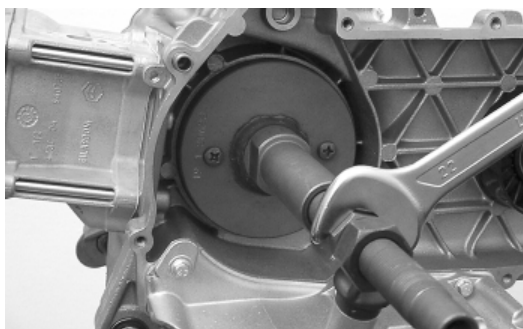
020622Y Transmission-side oil guard punch



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

Specific tooling

020622Y Transmission-side oil guard punch



Refitting

- Use a new oil guard for the refitting
- Prepare the new oil guard, lubricating the sealing lip.
- Preassemble the oil guard with the appropriate tool, positioning the screws.
- Insert the sheath over the crankshaft.
- Insert the tool with the oil seal on the crankshaft until it comes into contact with the crankcase.
- Insert the adaptor bushing of the tool in the hole on the crankcase.



- Orientate the oil guard by inserting the bracket which is part of the appropriate 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 guard driving stroke
- Remove all of the tool components following the inverse procedure

CAUTION

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

CAUTION

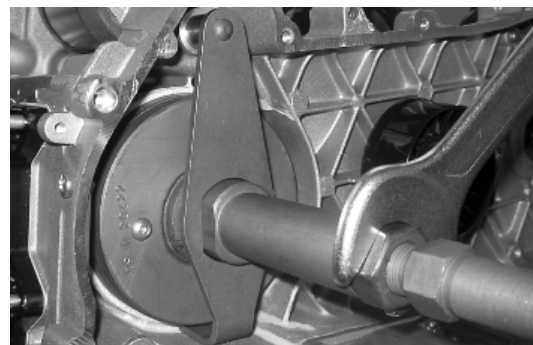
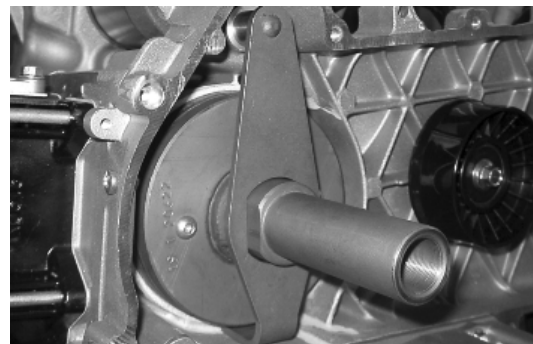
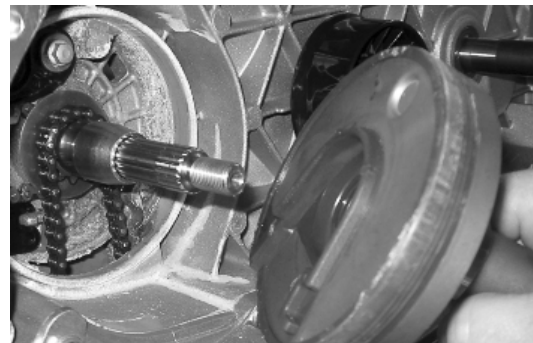
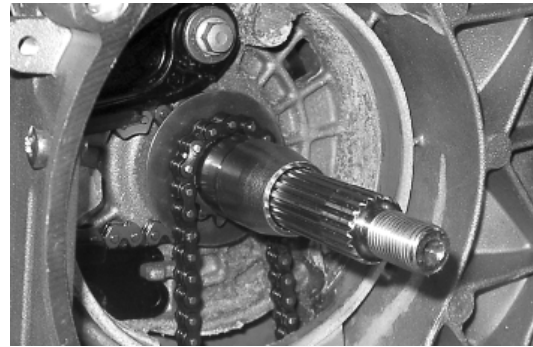
ORIENT THE OIL GUARD BY POSITIONING THE CHAIN HOUSING CHANNEL FACING DOWNWARDS. WHEN THE POSITION IS REACHED, DO NOT RETRACT THE OIL GUARD. FAILURE TO COMPLY WITH THIS RULE CAN CAUSE A WRONG POSITIONING OF THE OIL GUARD SHEATH.

CAUTION

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

Specific tooling

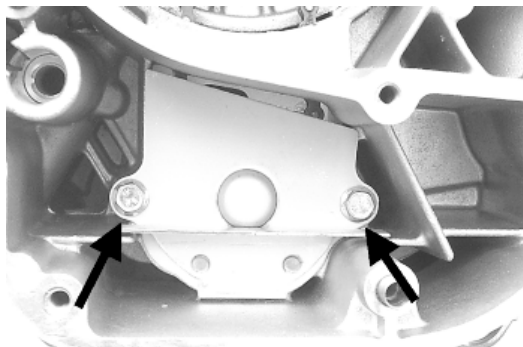
020622Y Transmission-side oil guard punch



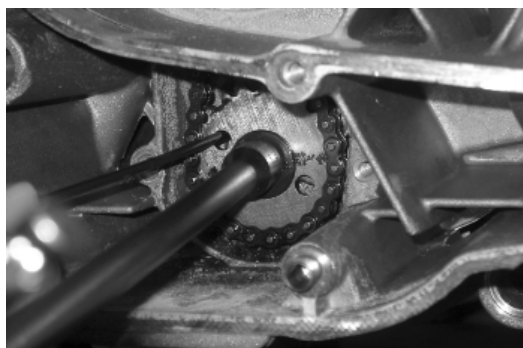
Oil pump

Removal

- Undo the two clamping screws in the figure and remove the cover over the pump control crown.



- Block the rotation of the oil pump control pulley with 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 crown.
- Remove the control sprocket with relative O-ring.
- Remove the oil pump by unscrewing the two screws in the figure.
- Remove the oil pump seal.

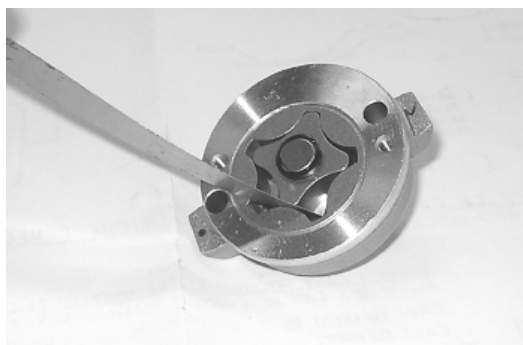


N.B.

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.
- Check the clearance between the rotors in the position shown in the diagram.



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

- Check the axial clearance of the rotors using a tried bar as shown in the figure.

Characteristic

Axial rotor clearance

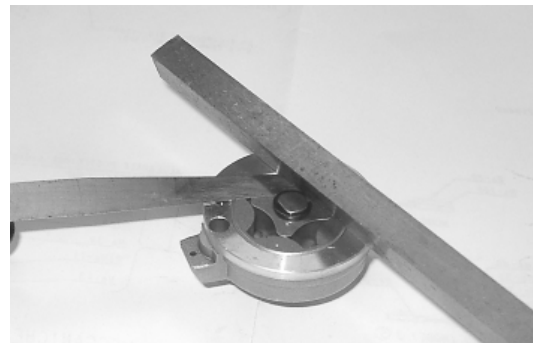
Limit values admitted: 0.09 mm

Distance between the outer rotor and the pump body

Admissible limit clearance: 0.20 mm

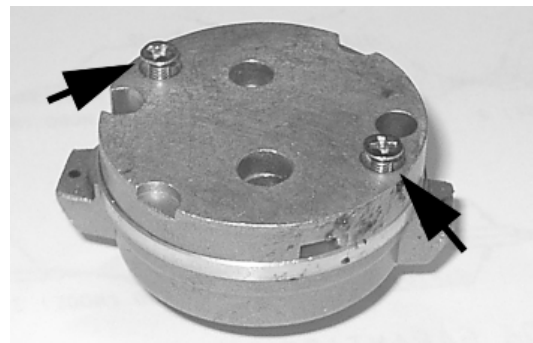
Distance between the rotors

Admissible limit clearance: 0.12 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 unit.
- Fit the pump cover in the position that permits the crankcase fixing screws to be aligned.
- Make sure the gasket is positioned properly and refit the pump on the engine crankcase. The pump can only be fitted in one position. - Tighten the screws to the prescribed torque.



- Fit the sprocket wheel with a new O-ring.
- Fit the chain.
- Fit the pulley, the central screw and the Belleville washer. Tighten to the specified torque.
- Fit the oil pump cover, by tightening the two screws to the prescribed torque.

N.B.

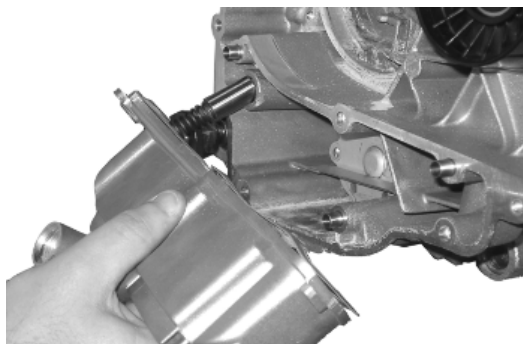
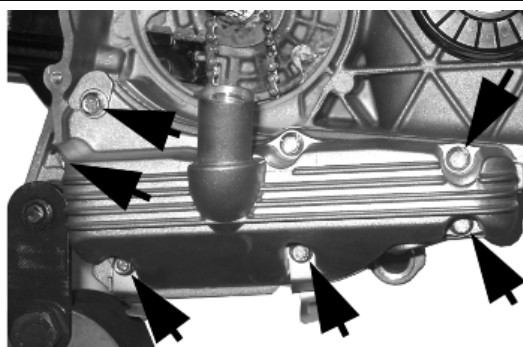
FIT THE BELLEVILLE WASHER SO THAT ITS OUTER RIM TOUCHES THE PULLEY. MAKE SURE THAT THE PUMP TURNS FREELY.

Locking torques (N*m)

**Screws fixing oil pump to the crankcase 5 - 6
Oil pump control crown screw 10 ÷ 14 Oil pump
cover screws 0.7 ÷ 0.9**

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 as described previously.
- Remove the seven screws, shown in the diagram, and the two rear brake fluid pipe fixing brackets.
- Remove the screw, the by-pass piston, the gasket and centring dowels shown in the figure.



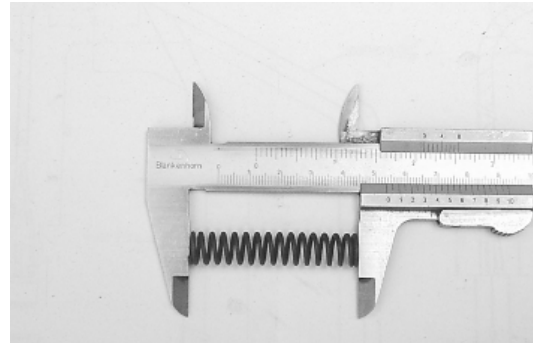
Inspecting the by-pass valve

- 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

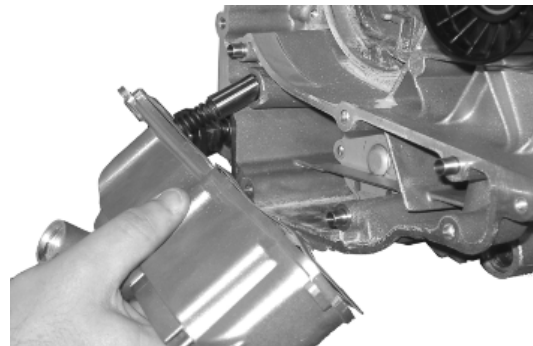
By-pass check up: Standard length

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 two centring dowels.
- Refit the sump, taking care to locate the spring in the appropriate recess machined into the inside of the sump.
- Refit the rear brake cable 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 chapter "Crankcase and Crankshaft", regarding lubrication of the crankshaft and connecting rod**



Locking torques (N*m)

Oil sump screws 10 ÷ 14

INDEX OF TOPICS

INJECTION

INJEC

MIU injection system

This vehicle is fitted with an integrated injection and ignition system.

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

The injection and ignition are timed on the four-stroke cycle by means of a tone wheel keyed on to the crankshaft (24-2 teeth) and pick-up sensor.

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

- Coolant temperature.
- Intake air temperature
- Lambda probe strength

The system implements an idle feeding correction with cold engine through a Stepper motor on a bypass circuit of the throttle valve. The control unit manages the Stepper motor and the injector opening time, thereby ensuring the idle steadiness and the proper combustion.

In all conditions of use, mixture preparation is managed by modifying the injector opening time.

The fuel supply pressure is kept constant based on the ambient pressure.

The **feed circuit** consists of:

- Fuel pump
- Fuel filter
- Injector
- Pressure regulator

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

The injector is connected by two pipes provided with quick couplings. This allows obtaining a continuous circulation, thereby avoiding the risk of fuel boiling. The pressure regulator is situated at the end of the circuit.

The fuel pump is controlled by the MIU; this ensures the scooter's safety

The **ignition circuit** consists of:

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

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

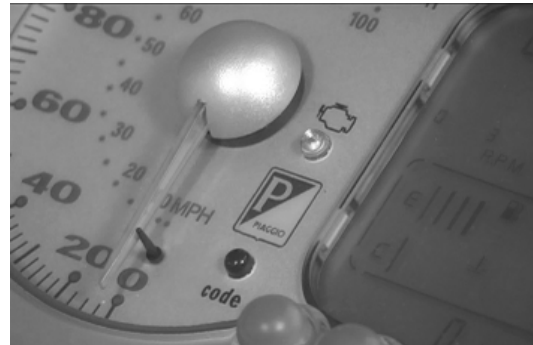
The MIU injection-ignition system controls engine functions by means of a pre-set program.

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

Of course, this cannot happen when the rev counter signal is missing, or when the failure involves the control circuits:

- Fuel pump
- HV coil
- Injector

The control unit is provided with a self-diagnosis system connected to an indicator light in the instrument panel.



Failures are detected and restored by the diagnostic tester.

In any case, when the fault is no longer present, the data storage is wiped clean after 16 cycles of use (cold start, running at normal engine temperature, stop).

The diagnostic tester is also required for adjusting the idle mixture.



Specific tooling

020460Y Scooter diagnosis and tester

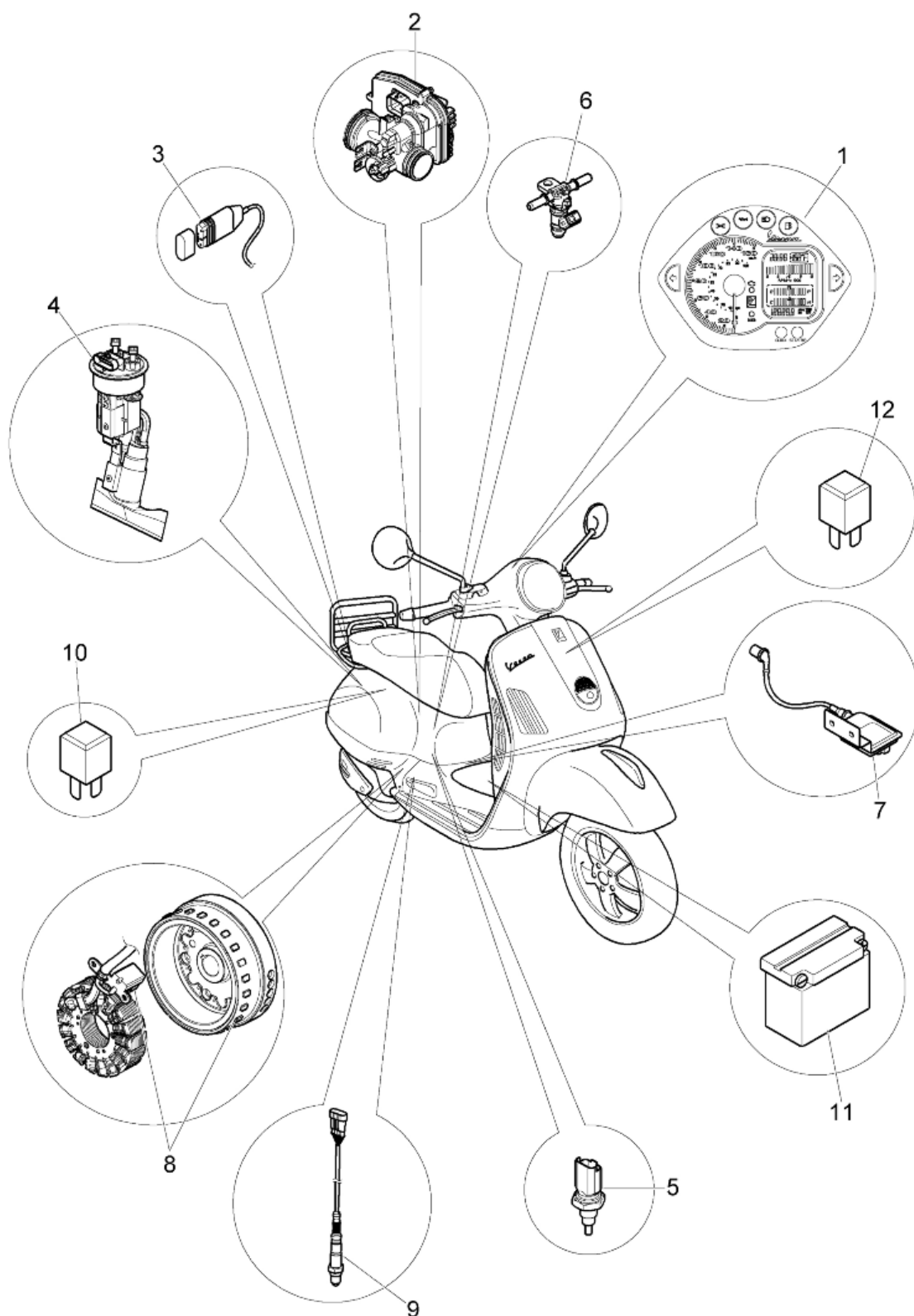
The MIU injection-ignition system carries out checks on the rpm counter and the electric fan for radiator cooling.

The MIU control unit has a decoder for the anti-theft immobiliser.

The MIU control unit is connected to a diagnostic LED on the instrument panel, that also carries out the deterrent flashing functions.



The MIU control unit power supply is furthermore controlled by the emergency switch; that is to provide further safety for the scooter.



COMPONENT TRANSPOSITION

	Specification	Desc./Quantity
1	Instrument panel	
2	Throttle body and electronic injection control unit (MIU)	
3	Diagnostics socket connector	
4	Fuel pump	
5	Water temperature sensor	
6	Fuel injector	
7	HV coil	
8	Engine rpm sensor	
9	Lambda sensor	
10	Injection load remote control	
11	Battery	12V - 12 Ah
12	Electric fan starter	

Precautions

1. Before fixing any part of the injection system, check to see if there are any registered faults. Do not disconnect the battery before checking for faults.
2. The fuel feed system is pressurised at 250 kPa (2.5 BAR). Before disconnecting the quick union of a pipe in the power supply system, check that there are no naked flames, and do not smoke. Act with caution to prevent spraying in the eyes.
3. When fixing electric components, operate with battery connected only when actually required.
4. When functional checks are performed, check that the battery voltage is more than 12V.
5. Before trying to start up, check to make sure there is at least two litres of fuel in the tank. Failure to respect this norm will damage the fuel pump.
6. If the scooter is expected to remain unused for a long time, refill the tank up to a little over half the level. This will ensure the pump will be covered by fuel.
7. When washing the vehicle, be careful with the electric components and wiring.
8. When an ignition fault is detected, start the checks from the battery and the injection system connections.
9. Before disconnecting the MIU control unit connector, perform the following steps in the order shown:
 - Set the switch to «OFF»
 - Disconnect the battery
 Failure to respect this norm may damage the control unit.
10. Do not invert the polarity when fitting the battery.
11. To avoid damage, only disconnect and reconnect the MIU system connectors if required. Before reconnecting, check that the connectors are dry.
12. When carrying out electric inspections, do not force the tester probes into the connectors. Do not take measurements not specifically foreseen by the manual.
13. At the end of every check performed with the diagnostic tester, protect the system connector with its cap. Failure to do this may damage the MIU control unit.

14. Before reconnecting the quick couplers of the power supply system, check that the terminals are perfectly clean.

Troubleshooting hints

1 A fault in the MIU system could most likely be due to the connections and not the components.

Before troubleshooting the MIU system, carry out the following checks:

A: Electrical power supply

- a. Battery voltage
- b. Blown fuse
- c. Remote controls
- d. Connectors

B: Chassis earthing

C: Fuel supply

- a. Broken fuel pump
- b. Dirty fuel filter

D: Ignition system

- a. Faulty spark plug
- b. Broken coil
- c. Broken shielded cap

E: Intake circuit

- a. Dirty air filter
- b. Dirty by-pass circuit
- c. Faulty Stepper motor

F: Other

- a. Incorrect distribution timing
- b. Wrong idle mixture
- c. Incorrect reset of the throttle valve position sensor

2 MIU system faults may be caused by loose connectors. Make sure that all connections have been correctly made.

Check the connections as follows:

A check that the terminals are not bent.

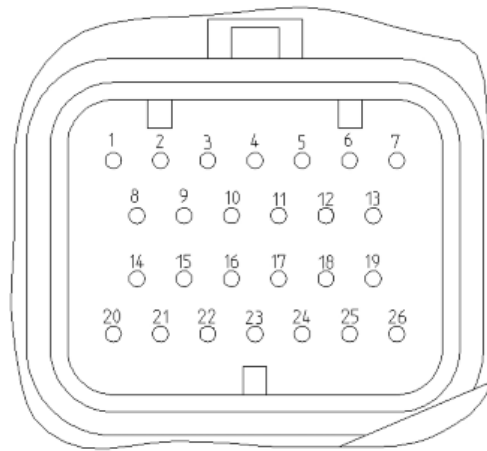
B check that the connectors have been properly connected.

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

3 Check the entire system before replacing the MIU. If the fault is fixed by replacing the MIU control unit, install the original control unit again and check if the fault occurs again.

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

Terminals setup



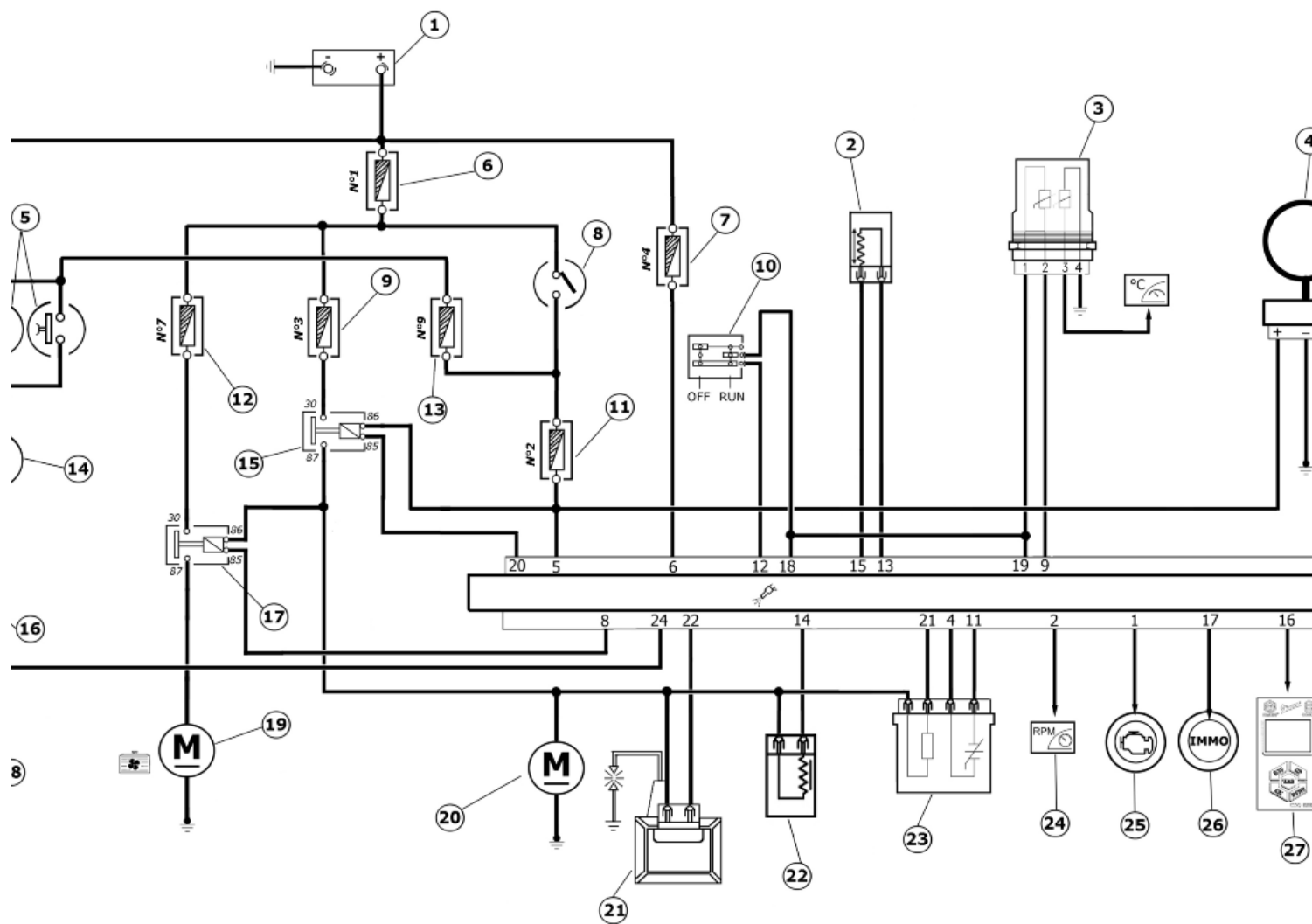
POSITIONING THE TERMINALS

	Specification	Desc./Quantity
1	Injection warning light	
2	Rpm indicator signal	
3	-	
4	- Lambda probe	
5	+ battery under permanent power supply	
6	+ Battery	
7	Immobilizer aerial	
8	Electric fan starter	
9	Water temperature sensor	
10	-	
11	+ Lambda probe	
12	Engine stop switch	
13	R.P.M. sensor (+)	
14	Fuel injector	
15	R.P.M. sensor (-)	
16	Diagnostics socket output	
17	Immobilizer LED	
18	Side stand	short circuited on pin 19
19	Earth	Connected with: water temperature sensor, engine stop, side stand.
20	Injection load remote control	
21	Lambda probe heater	
22	HV coil	
23	-	
24	Start up enabling	
25	-	
26	Ground lead	

EMS circuit diagram

Lo schema sottostante è valido per i telai dal numero ZAPM4510000001007 al ZAPM4510000001578.

Per i telai successivi consultare la pagina 2.

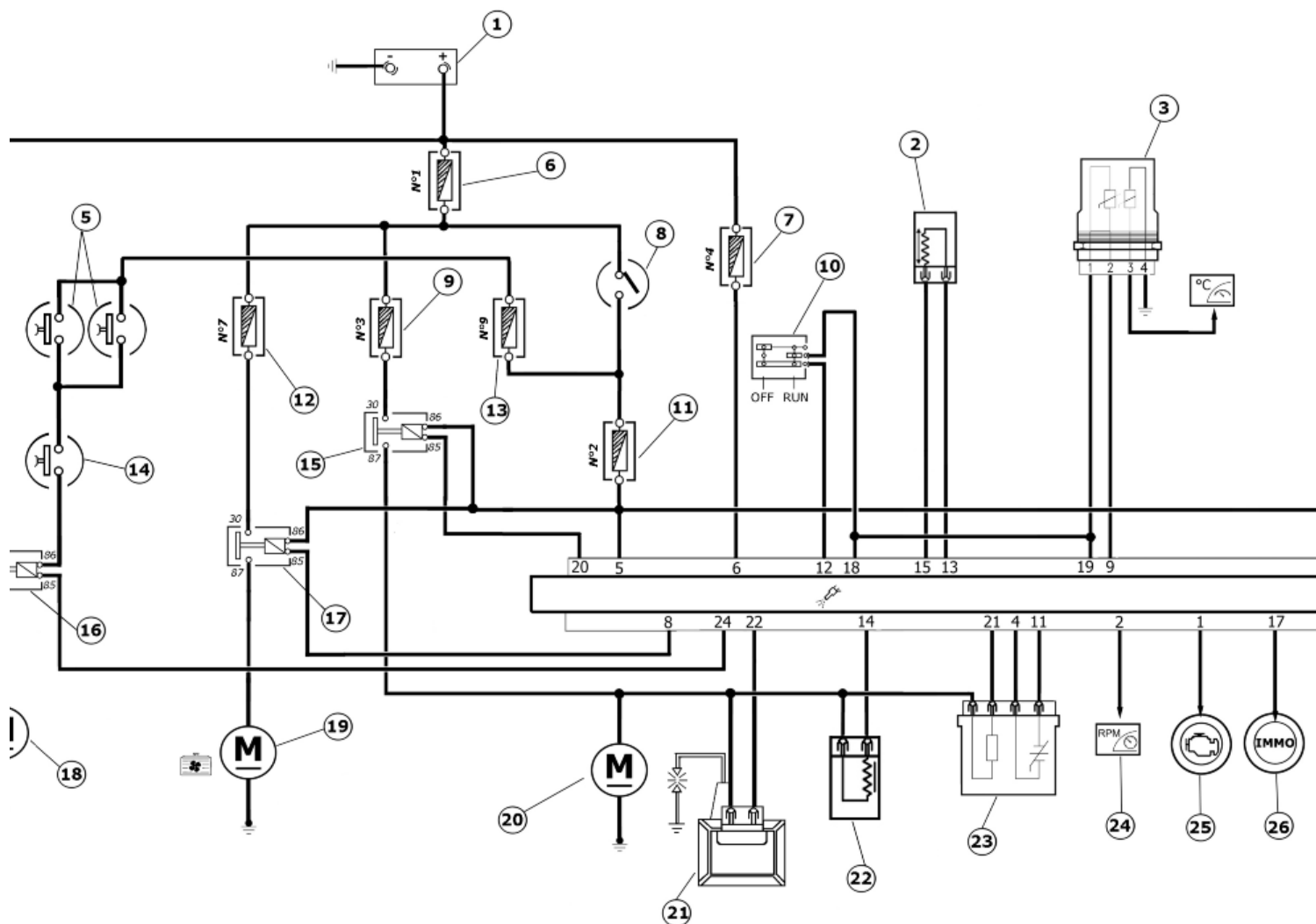


CIRCUIT DIAGRAM

	Specification	Desc./Quantity
1	Battery	12V - 12 Ah
2	Engine rpm sensor	
3	Water temperature sensor	
4	Immobilizer aerial	
5	Stop button	
6	Fuse	30 A
7	Fuse	3 A
8	Key switch contacts	
9	Fuse	10 A
10	Engine stop switch	
11	Fuse	7.5 A
12	Fuse	15A
13	Fuse	7.5 A
14	Starter button	

	Specification	Desc./Quantity
15	Injection load remote control	
16	Starter remote control	
17	Electric fan starter	
18	Starter motor	
19	Electric fan	
20	Fuel pump	
21	HV coil	
22	Fuel injector	
23	Lambda sensor	
24	Rpm indicator	
25	"WARNING" light	
26	Immobilizer LED	
27	Diagnostics socket connector	

Schema valido dal numero di telaio ZAPM4510000001579 in poi.



CIRCUIT DIAGRAM

	Specification	Desc./Quantity
1	Battery	12V - 12 Ah
2	Engine rpm sensor	
3	Water temperature sensor	
4	Immobilizer aerial	
5	Stop button	
6	Fuse	30 A
7	Fuse	3 A
8	Key switch contacts	
9	Fuse	10 A
10	Engine stop switch	
11	Fuse	7.5 A
12	Fuse	15A
13	Fuse	7.5 A
14	Starter button	
15	Injection load remote control	
16	Starter remote control	
17	Electric fan starter	
18	Starter motor	
19	Electric fan	
20	Fuel pump	
21	HV coil	
22	Fuel injector	
23	Lambda sensor	
24	Rpm indicator	
25	"WARNING" light	
26	Immobilizer LED	
27	Diagnostics socket connector	

Troubleshooting procedure**Engine does not start****ENGINE DOES NOT START IF ONLY PULLED**

Possible Cause	Operation
Immobiliser enabling signal	System not encoded System not efficient, repair according to the indications of the self-diagnosis
Presence of faults detected by the self diagnosis	Pump relay HV coil Injector revolution timing sensor
Fuel supply	Presence of fuel in the tank Activation of the fuel pump Fuel pressure (low) Injector capacity (low)
Power to the spark plug	Shielded spark-plug cap HV coil (secondary insulation)
Parameter reliability	Coolant temperature. Distribution timing - injection ignition

Possible Cause	Operation
End of compression pressure	- Intake air temperature End of compression pressure

Starting difficulties

ENGINE START-UP PROBLEMS

Possible Cause	Operation
Presence of faults detected by the self diagnosis	Pump relay HV coil Injector revolution timing sensor Air temperature Coolant temperature.
Start up engine speed	Starter motor and remote control Battery Earth connections
End of compression pressure	End of compression pressure
Power to the spark plug	Spark plug Shielded cap HV coil Phase rpm sensor - Ignition advance
Fuel supply	Fuel pressure (low) Injector capacity (low) Injector seal (poor)
Correctness of the parameters	Coolant temperature. Stepper throttle valve position intake air temperature (steps and actual opening) Cleaning of the auxiliary air pipe and air filter efficiency gas valve

Engine stops at idle

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

Possible Cause	Operation
Presence of faults detected by the self diagnosis	Pump relay HV coil Injector revolution timing sensor Air temperature Coolant temperature.
Ignition efficiency	Spark plug Ignition timing
Correctness of the parameters	Throttle valve position sensor Stepper Coolant temperature sensor Intake air temperature sensor
Intake system cleaning	Air filter Diffuser and gas sensor Supplementary air pipe Stepper
Intake system seal (infiltrations)	Intake manifold - head throttle body - manifold

Possible Cause	Operation
Fuel feed (low pressure)	Intake manifold
	Filter box
	Fuel pump
	Pressure regulator
	Fuel filter
	Injector capacity

Engine does not rev down

ENGINE DOES NOT RETURN TO THE IDLING SPEED/IDLING SPEED TOO HIGH

Possible Cause	Operation
Presence of faults detected by the self diagnosis	Pump relay
	HV coil
	Injector
	revolution timing sensor
	Air temperature
	Coolant temperature.
Ignition efficiency	Ignition timing
Correctness of the parameters	Throttle valve position sensor
	Stepper
	Coolant temperature sensor
	Intake air temperature sensor
Intake system seal (infiltrations)	Intake manifold - head
	throttle body - manifold
	Intake manifold
	Filter box
Fuel feed (low pressure)	Fuel pump
	Pressure regulator
	Fuel filter
	Injector capacity

Exhaust backfires in deceleration

EXHAUST BACKFIRES WHEN DECELERATING

Possible Cause	Operation
Presence of faults detected by the self diagnosis	Pump relay
	HV coil
	Injector
	revolution timing sensor
	Air temperature
	Coolant temperature.
	Lambda sensor
Correctness of the parameters	Throttle valve position sensor
	Stepper
	Coolant temperature sensor
	Intake air temperature sensor
Intake system seal (infiltrations)	Intake manifold - head
	throttle body - manifold
	Intake manifold
	Filter box
Fuel feed (low pressure)	Fuel pump
	Pressure regulator

Possible Cause	Operation
Exhaust system seal (infiltrations)	Fuel filter
	Injector capacity
	Manifold - cylinder head
	Manifold - muffler
	Muffler welding

Engine revs irregularly

IRREGULAR PROGRESS OF THE ENGINE WITH VALVE SLIGHTLY OPEN

Possible Cause	Operation
Intake system cleaning	Air filter
	Diffuser and gas sensor
	Supplementary air pipe Stepper
Intake system seal	Intake manifold
	Filter box
Ignition system	Spark-plug wear control
Parameter reliability	Throttle valve position signal
	coolant temperature signal
	Intake air temperature indicator
	- Ignition advance
TPS reset successful	TPS reset successful
Presence of faults detected by the self diagnosis	Pump relay
	HV coil
	Injector
	revolution timing sensor
	Air temperature
	Coolant temperature.
	Lambda sensor

Poor performance at full throttle

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

Possible Cause	Operation
Presence of faults detected by the self diagnosis	Pump relay
	HV coil
	Injector
	revolution timing sensor
	Air temperature
	Coolant temperature.
	Lambda sensor
Spark plug power supply	Spark plug
	Shielded cap
	HV Cable.
	HV coil
Intake system	Air filter
	Filter box (seal)
	Intake hose (seal)
Parameter reliability	Throttle valve position signal
	coolant temperature signal
	Intake air temperature indicator
	- Ignition advance

Possible Cause	Operation
Fuel supply	Fuel level in the tank Fuel pressure Fuel filter Injector capacity

Engine knocking

PRESENCE OF KNOCKING (OVERHEAD KNOCKING)

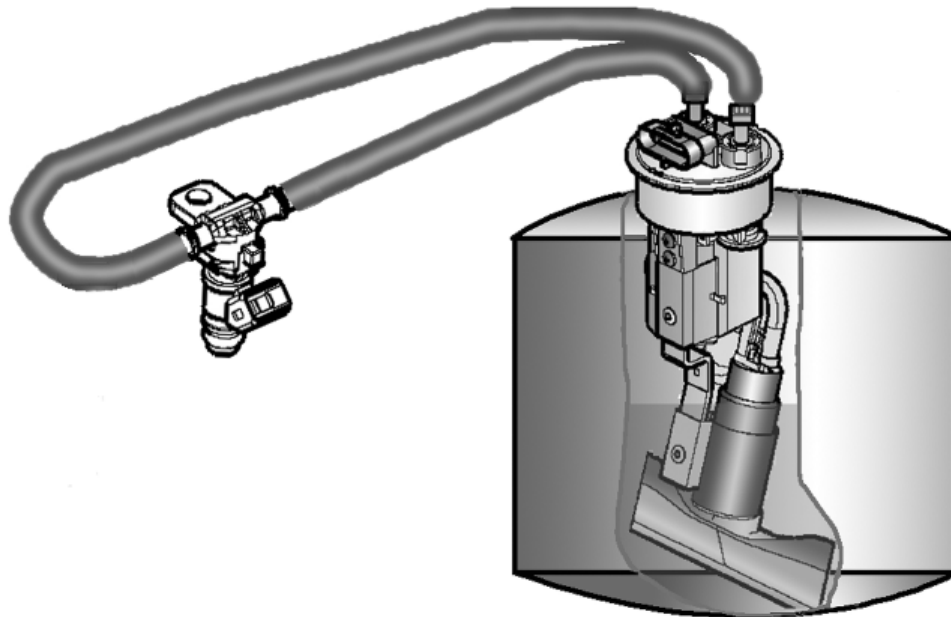
Possible Cause	Operation
Presence of faults detected by the self diagnosis	Pump relay HV coil Injector revolution timing sensor Air temperature Coolant temperature. Lambda sensor
Ignition efficiency	Spark plug
Parameter reliability	Throttle valve position signal coolant temperature signal Intake air temperature indicator - Ignition advance
Intake system seal	Intake manifold Filter box
TPS reset successful	TPS reset successful
Fuel supply	Fuel pressure Fuel filter Injector capacity Fuel quality
Selection of the cylinder base gasket thickness	Selection of the thickness of the cylinder base liner

Fuel supply system

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

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

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

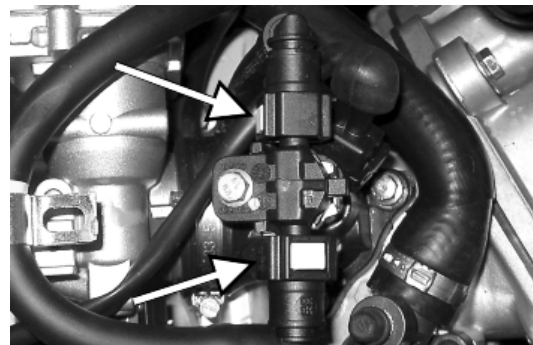


Removing the butterfly valve

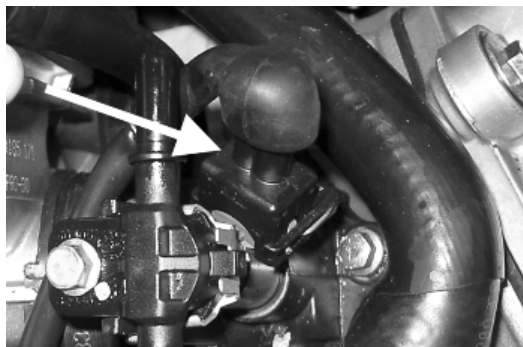
Remove the fuel piping clamping screw indicated in the figure.



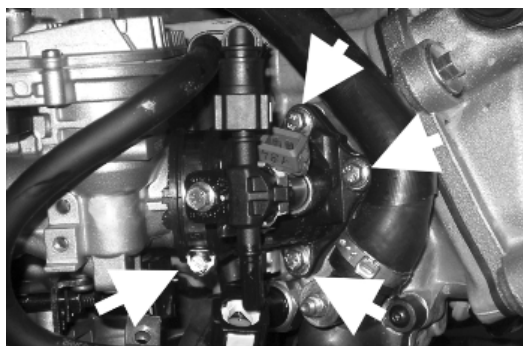
Remove the snap-on fittings from the injector support



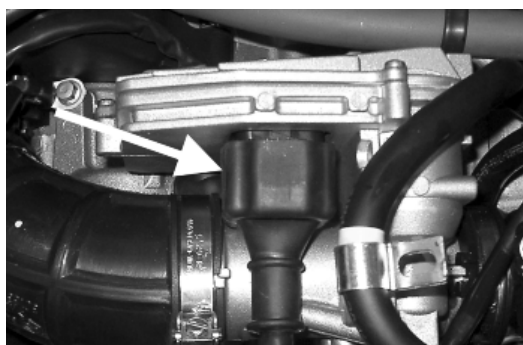
Remove the injector connector



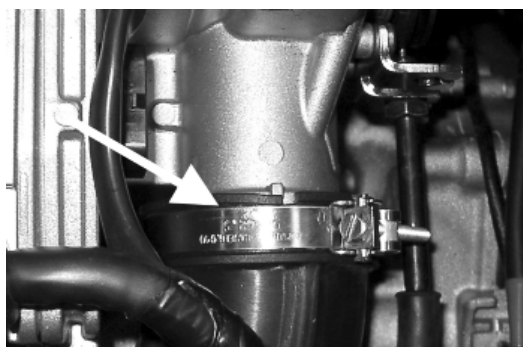
Remove the three screws fixing the manifold to the cylinder head and the clip fixing the throttle body to the manifold.



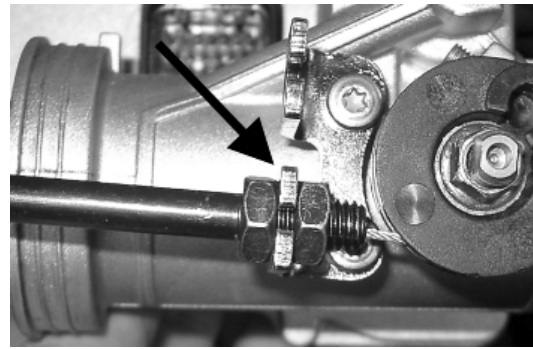
Remove the MIU connector



Remove the clip fixing the throttle body to the purifier bellows

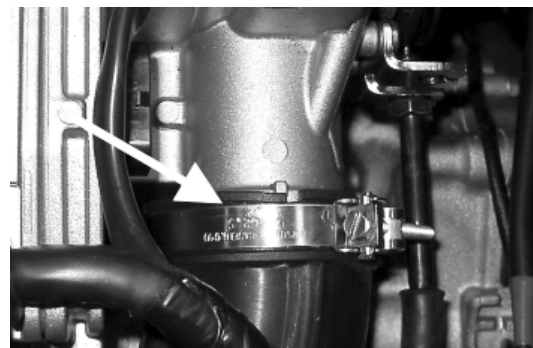


Remove the gas command fitting as indicated in the photograph



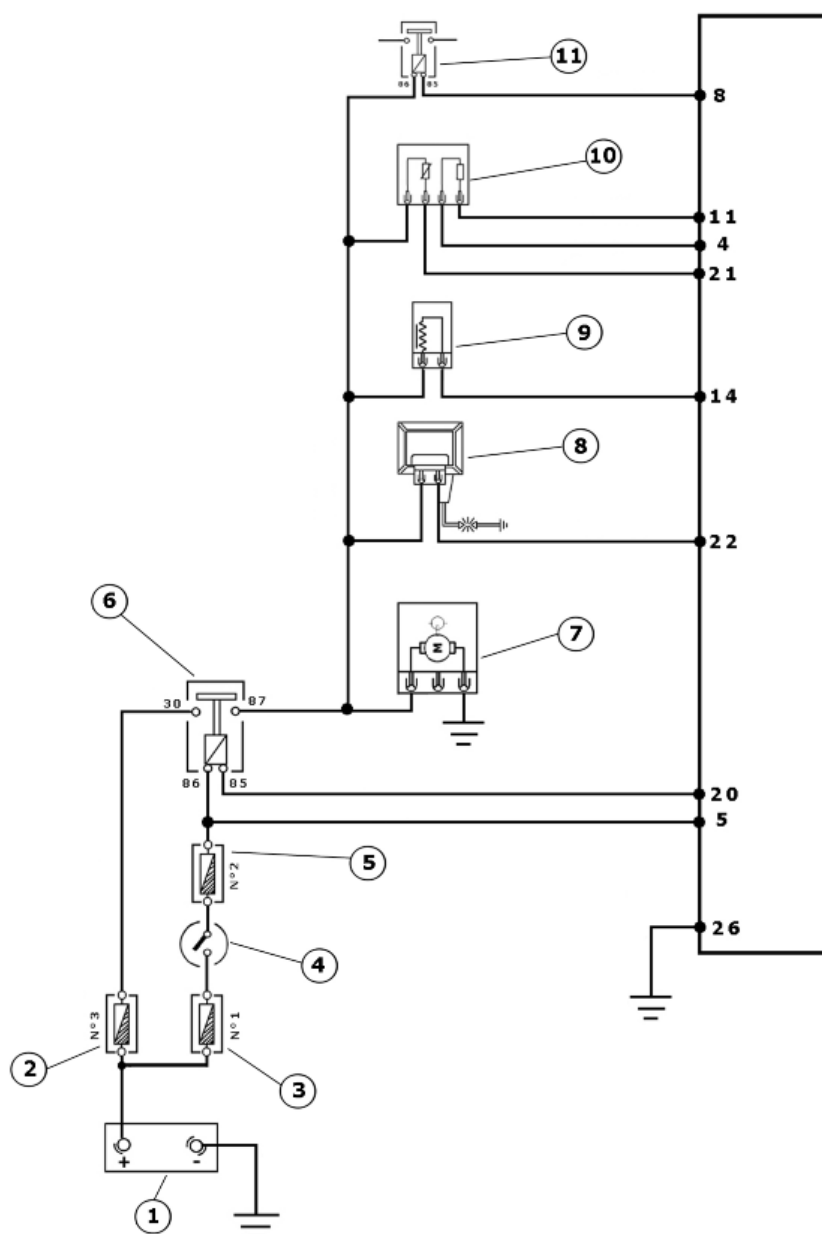
Refitting the butterfly valve

To refit, perform the operations in the reverse order from the removal operations being careful to position the clip fixing the throttle body to the air filter bellows at 45° as shown in the photograph.



Pump supply circuit

Lo schema sottostante è valido per i telai dal numero ZAPM4510000001007 al ZAPM4510000001578.
Per i telai successivi consultare la pagina 2.



COMPONENTS

	Specification	Desc./Quantity
1	Battery	12V - 12 Ah
2	Fuse	10 A
3	Fuse	30 A
4	Key switch contacts	
5	Fuse	7.5 A
6	Injection load remote control	
7	Fuel pump	
8	HV coil	
9	Fuel injector	
10	Lambda sensor	

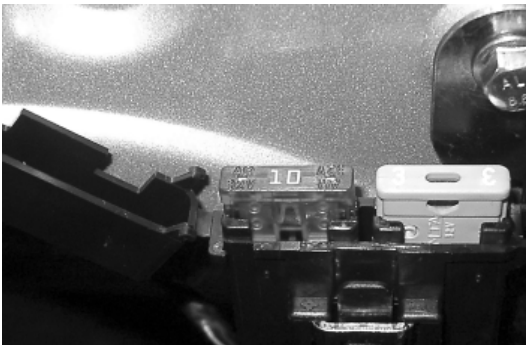
	Specification	Desc./Quantity
11	Electric fan starter	

When switched to "ON", the fuel pump starts to rotate for two seconds and then stops. When the engine starts up, in the presence of rpm timing signal the pump is continuously supplied.

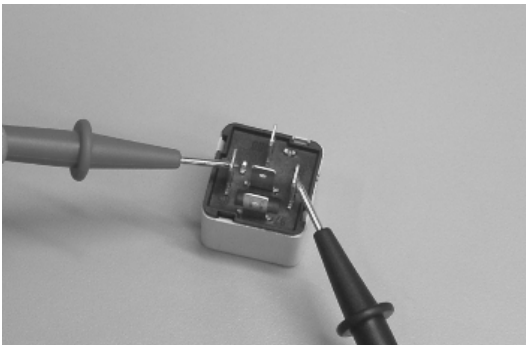
ELECTRICAL DATA

- Pump winding resistance ~ 1.5 Ohm
- Input current during normal functioning 1.4 ÷ 1.8 A
- Input current to the closed hydraulic circuit ~ 2 A (to be checked with specific tool for fuel pressure control, choking the circuit on the return pipe)

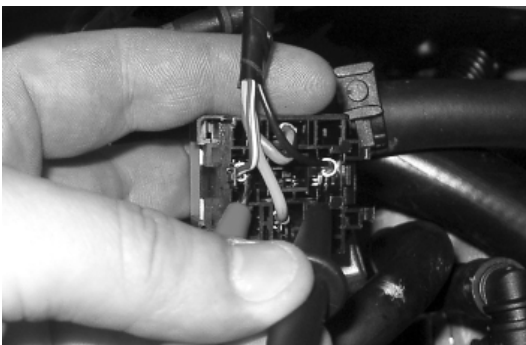
Check that the injection load 10A fuse No. 3 is in good conditions.
Check that the 7.5A fuse No. 2 for the live control unit is in good conditions.



Check the efficiency of the injection load remote control: Check the resistance of the energising coil between pins 86 and 85: 40 to 80 Ohm
Apply a voltage of 12V to pins 86 and 85; make sure that there is continuity between pins 30 and 87 of the remote control.

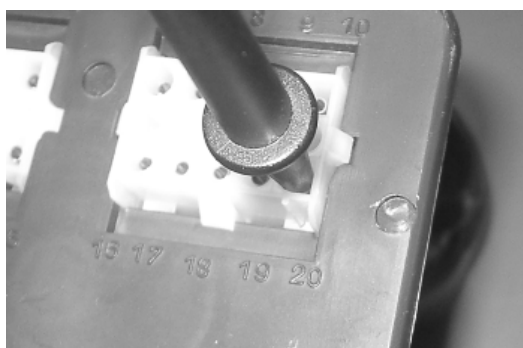
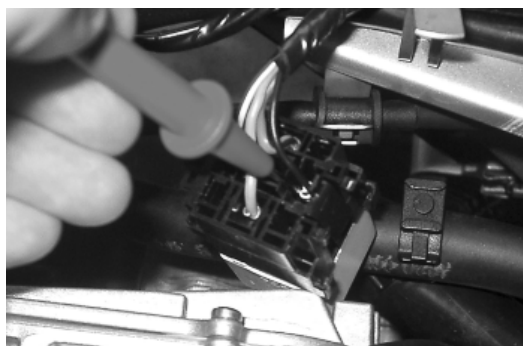
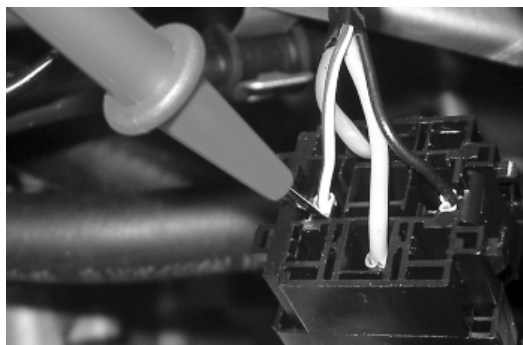


Check the power supply line of the injection load remote control energising coil: after switching to "ON", make sure there is battery voltage, for two seconds, between the Red-White cable and Black-Violet cable of the remote control base. If there is not, check the continuity of the Red-White cable between the fuse box under the saddle hinge and the remote control base and of the Black-Violet cable between pin 20 of the control unit and the remote control base.



N.B.
CONTINUITY TESTS MUST BE CARRIED OUT WITH THE COMPONENTS DISCONNECTED.

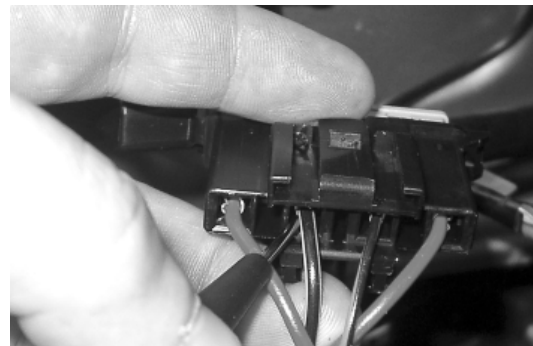
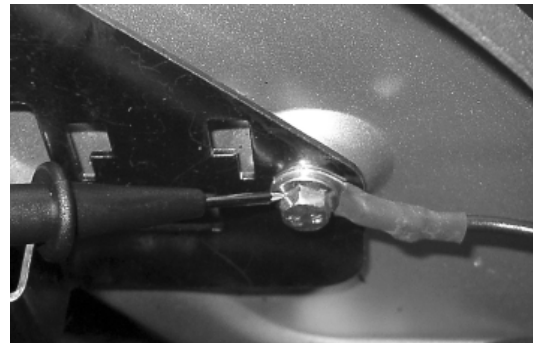
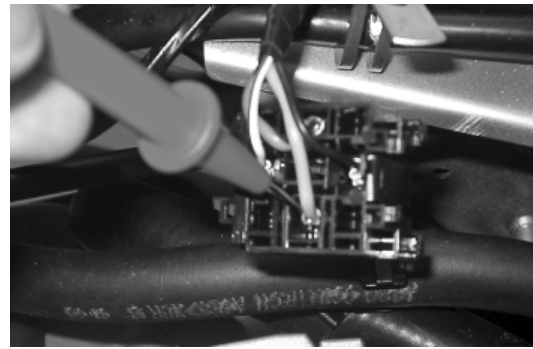
(REMOTE CONTROLS, CONTROL UNIT,
FUSES ETC.).



Check the presence of fixed voltage between the grey/black cable of the remote control base and earth. If there is none check the continuity of the grey/black cable between the fuse box (No. 3 10 A) and the remote control base.

N.B.

CONTINUITY TESTS MUST BE CARRIED OUT WITH THE COMPONENTS DISCONNECTED. (REMOTE CONTROLS, CONTROL UNIT, FUSES ETC.).

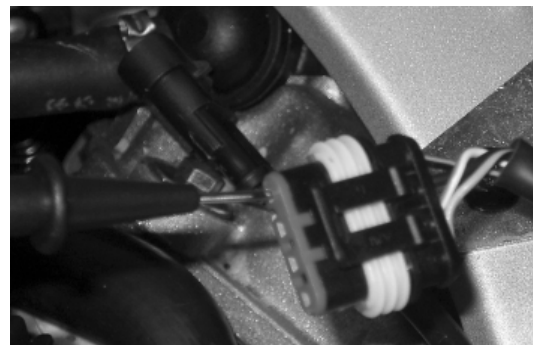


pump circuit 6

Check, on switching to "ON", that there is battery voltage, for about two seconds, to the Black-Green cable of the pump connector and earth with pump connector disconnected. Otherwise check the continuity of the Black-Grey cable between the pump connector and the base of the remote control.

Check the efficiency of the earth line of the fuel pump by measuring the continuity between the pump connector black cable, system side, and the earth.

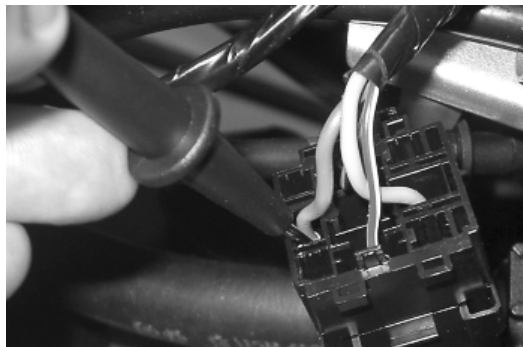
If, when switching to "ON", the pump continues to turn after two seconds of activation, check, with the



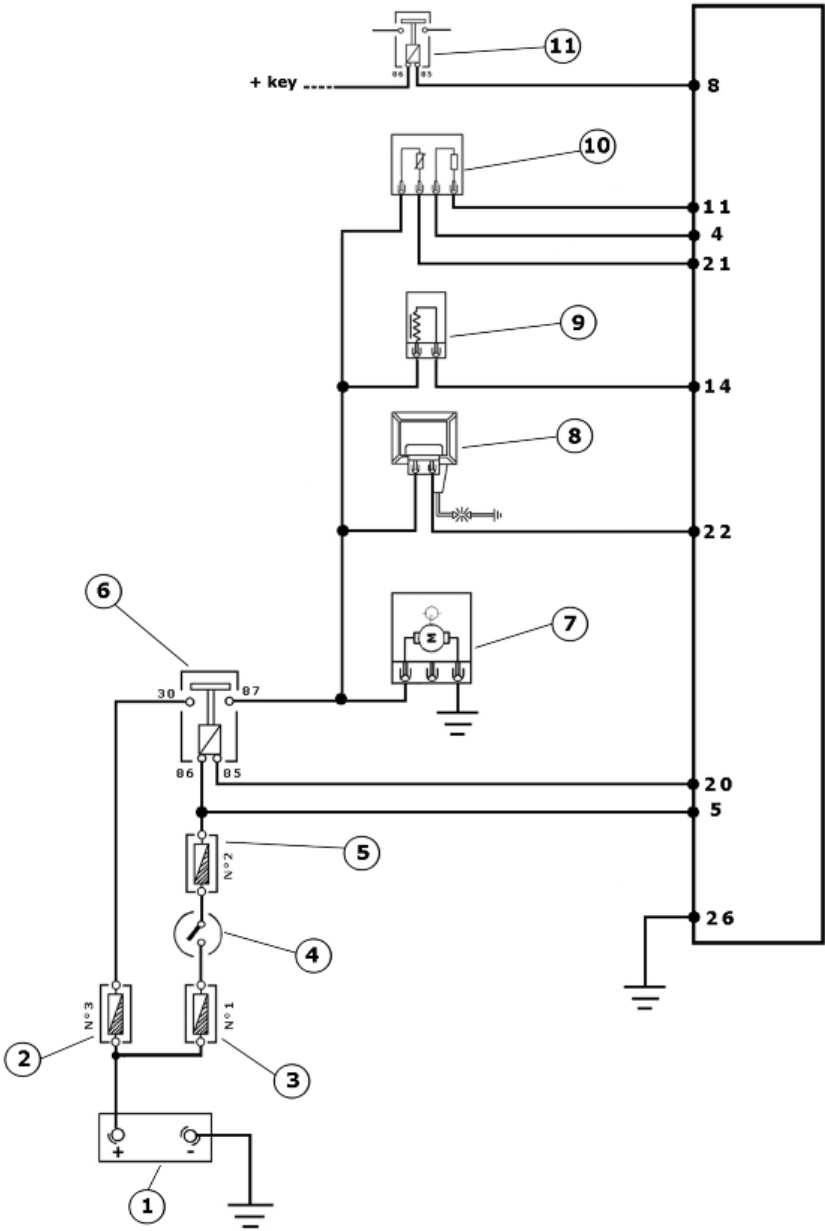
control unit disconnected and the injection load remote control disconnected, that the Black-Purple cable (pin 20 on the interface wiring) is insulated from the earth.

Specific tooling

020331Y Digital multimeter



Schema valido dal numero di telaio ZAPM4510000001579 in poi.



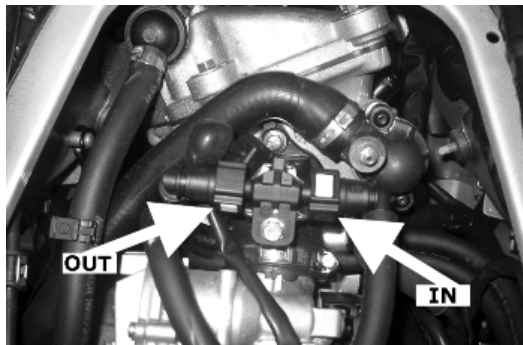
COMPONENTS

	Specification	Desc./Quantity
1	Battery	12V - 12 Ah
2	Fuse	10 A
3	Fuse	30 A
4	Key switch contacts	
5	Fuse	7.5 A
6	Injection load remote control	
7	Fuel pump	
8	HV coil	
9	Fuel injector	
10	Lambda sensor	

	Specification	Desc./Quantity
11	Electric fan starter	

Circuit leak test

Install the appropriate tool for fuel pressure control with the pipe fitted with the pressure gauge on the delivery pipe..



Check during regular functioning by placing the appropriate tool between the pump and the injector.

With the battery voltage > 12 V check that the fuel pressure is 2.5 BAR and that the input current is 1.4 to 1.8 A



With the battery voltage > 12 V, check the capacity of the pump flow rate by disconnecting from the injector the pipe equipped with the pressure gauge of the appropriate tool. Make a graded burette available with a flow rate of approximately 1 L. Rotate the pump using the active diagnosis of the palm top computer. Using a pair of long flat needle-nose pliers, choke the fuel pipe making the pressure stabilise at approx. 2.5 BAR. Check that, in fifteen seconds, the pump has a flow rate of around 110 cm³.

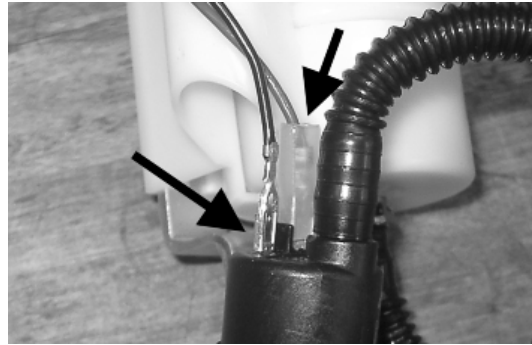


Specific tooling

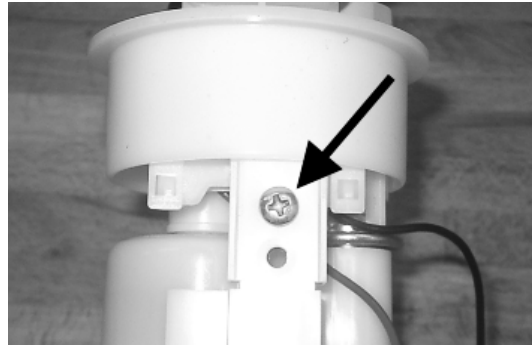
020480Y Petrol pressure check set

Fuel filter check

Disconnect the terminals from the electric pump



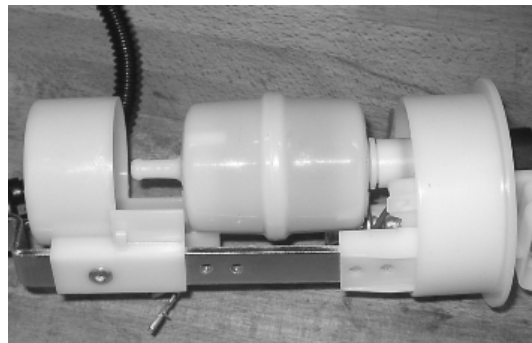
Remove the screw shown in the photograph



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



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

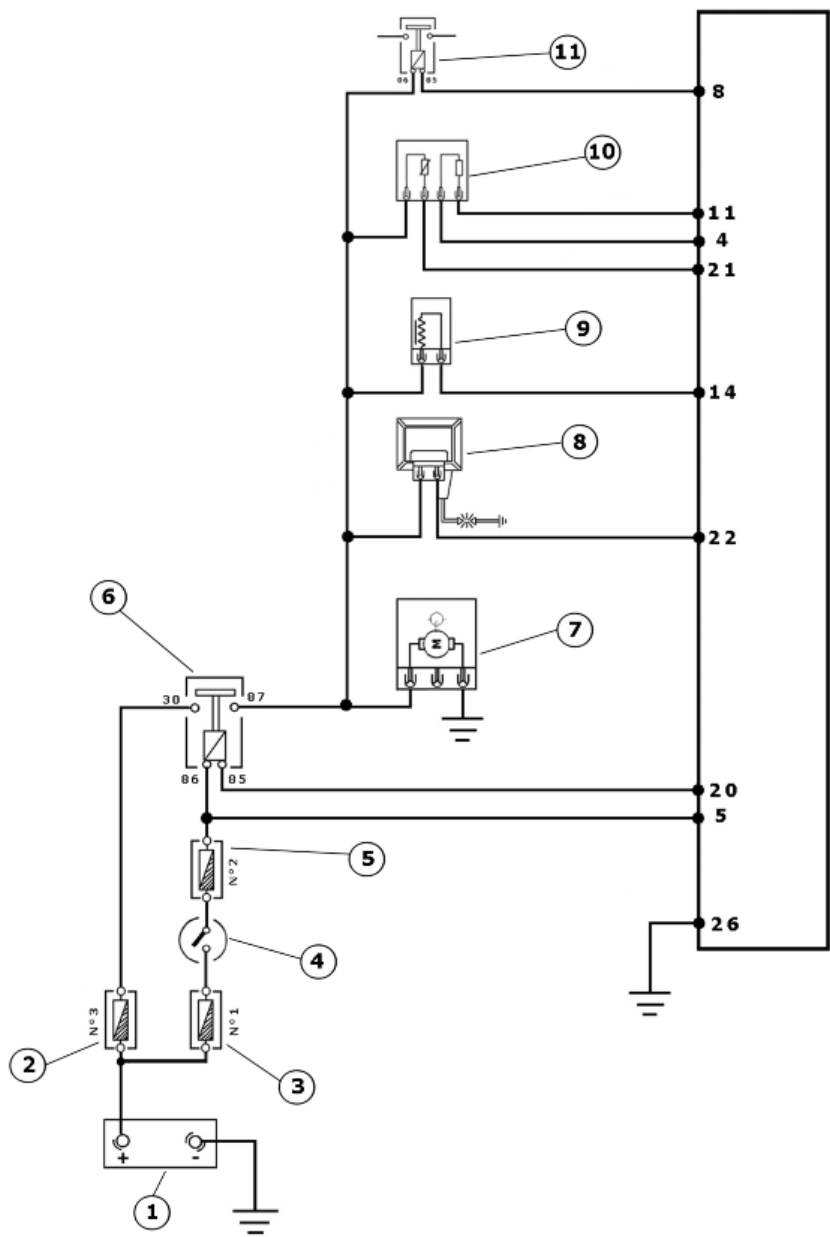


Remove the filter from the pump support



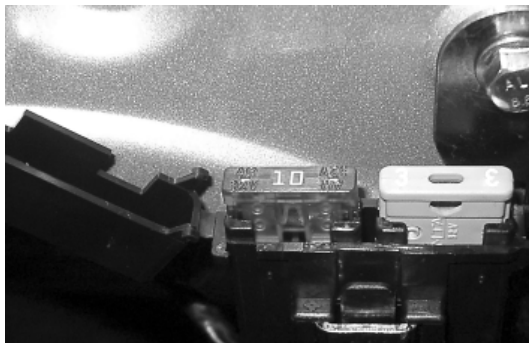
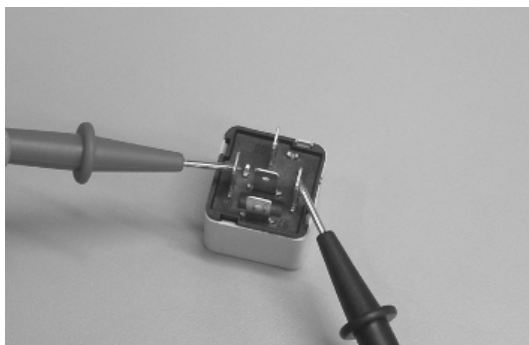
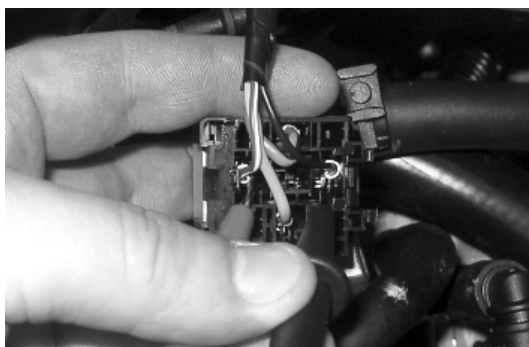
Inspecting the injector circuit

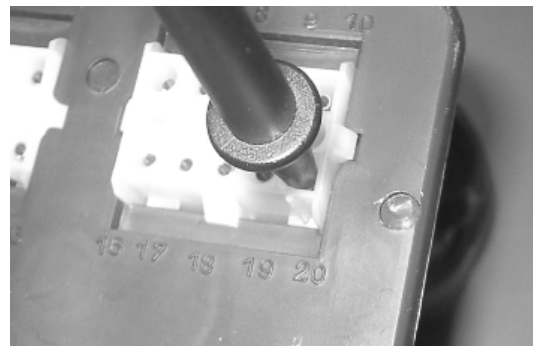
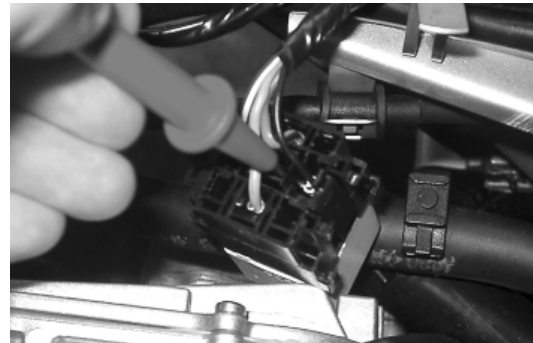
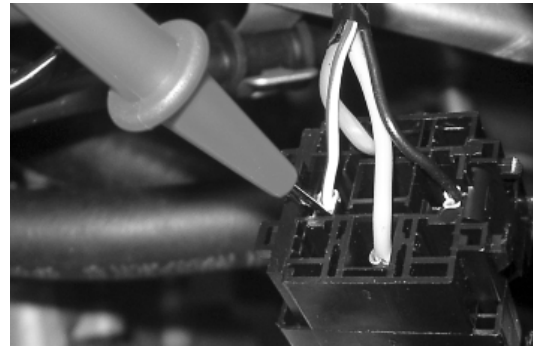
Lo schema sottostante è valido per i telai dal numero ZAPM4510000001007 al ZAPM4510000001578.
Per i telai successivi consultare la pagina 2.



COMPONENTS

	Specification	Desc./Quantity
1	Battery	12V - 12 Ah
2	Fuse	10 A
3	Fuse	30 A
4	Key switch contacts	
5	Fuse	7.5 A
6	Injection load remote control	
7	Fuel pump	
8	HV coil	
9	Fuel injector	
10	Lambda sensor	

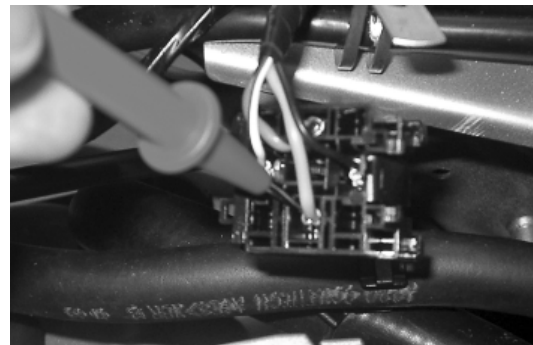
	Specification	Desc./Quantity
11	Electric fan starter	
Check the resistance at the injector ends: $14.5 \pm 5\%$ Ohm		
Check that the injection load 10A fuse No. 3 is in good conditions.		
Check that the 7.5A fuse No. 2 for the live control unit is in good conditions.		
Check the efficiency of the injection load remote control: Check the resistance of the energising coil between pins 86 and 85: 40 to 80 Ohm		
Apply a voltage of 12V to pins 86 and 85; make sure that there is continuity between pins 30 and 87 of the remote control.		
Check the power supply line of the injection load remote control energising coil: after switching to "ON", make sure there is battery voltage, for two seconds, between the Red-White cable and Black-Violet cable of the remote control base. If there is not, check the continuity of the Red-White cable between the fuse box under the saddle hinge and the remote control base and of the Black-Violet cable between pin 20 of the control unit and the remote control base.		 
N.B. CONTINUITY TESTS MUST BE CARRIED OUT WITH THE COMPONENTS DISCONNECTED. (REMOTE CONTROLS, CONTROL UNIT, FUSES ETC.).		

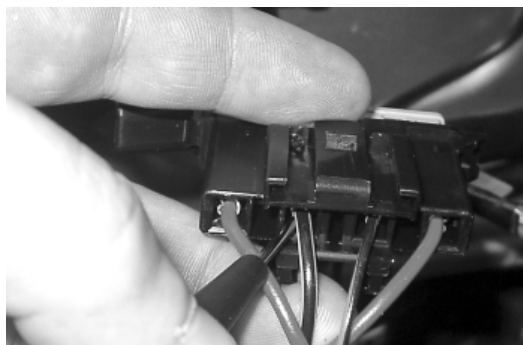
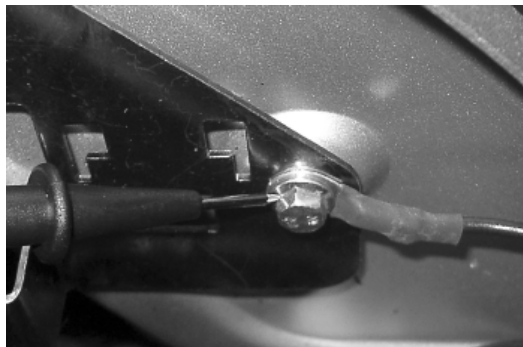


Check the presence of fixed voltage between the grey/black cable of the remote control base and earth. If there is none check the continuity of the grey/black cable between the fuse box (No. 3 10 A) and the remote control base.

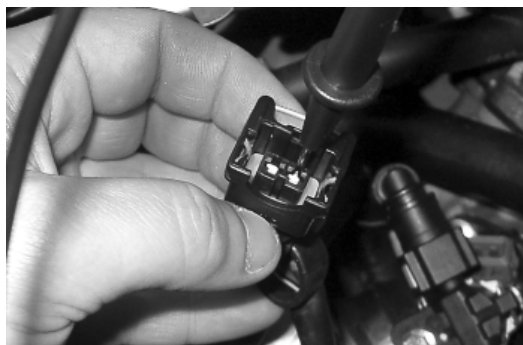
N.B.

CONTINUITY TESTS MUST BE CARRIED OUT WITH THE COMPONENTS DISCONNECTED. (REMOTE CONTROLS, CONTROL UNIT, FUSES ETC.).





With the control unit and the injector disconnected, check the continuity of the Red-Yellow cable between pin 14 of the interface wiring and the injector connector



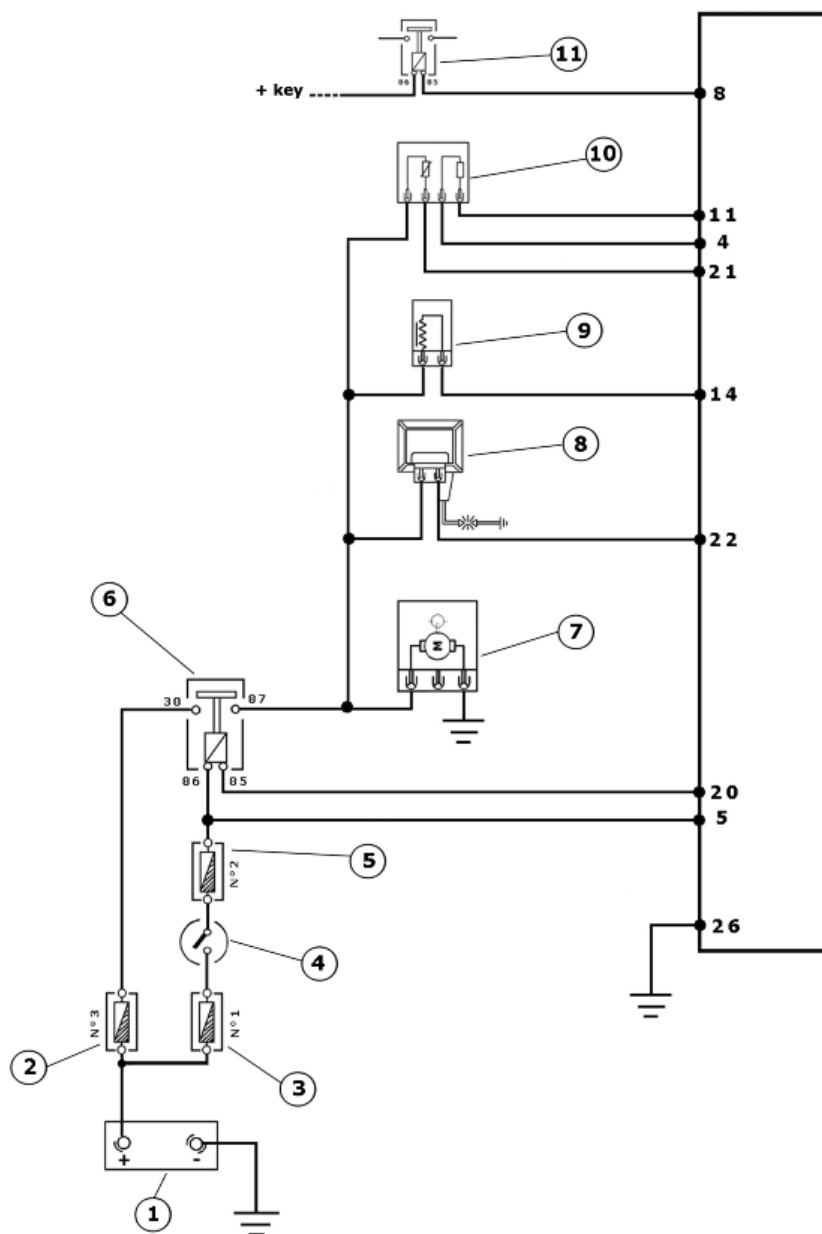
Switch to "ON" and check the presence of voltage, with injector disconnected and control unit connected, between the Black-Green cable of the injector connector and the earth



With injector disconnected and the injector load remote control disconnected, check the continuity of the Black-Green cable between the injector connector and remote control base.



Schema valido dal numero di telaio ZAPM4510000001579 in poi.



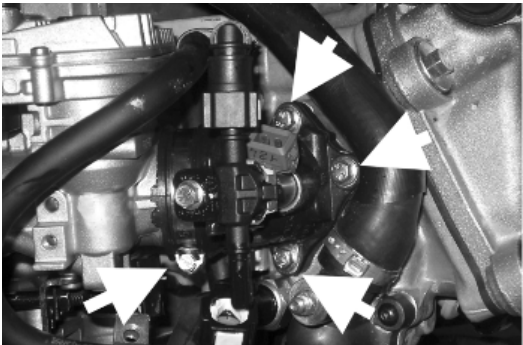
COMPONENTS

	Specification	Desc./Quantity
1	Battery	12V - 12 Ah
2	Fuse	10 A
3	Fuse	30 A
4	Key switch contacts	
5	Fuse	7.5 A
6	Injection load remote control	
7	Fuel pump	
8	HV coil	
9	Fuel injector	
10	Lambda sensor	

	Specification	Desc./Quantity
11	Electric fan starter	

Inspecting the injector hydraulics

To carry out the injector check, remove the intake manifold by removing the three clamping screws at the head and the clip connecting the control unit to the manifold.



Install the appropriate tool for the fuel pressure check and position the manifold over a container graduated by at least 100 cc. Connect the injector with the cable making up part of the supply for the injection tester. Connect the clamps of the cable to an auxiliary battery. Activate the fuel pump with the active diagnosis. Check that, in fifteen seconds, approximately 40 cc of fuel is dispensed with a regulation pressure of approximately 2.5 BAR.



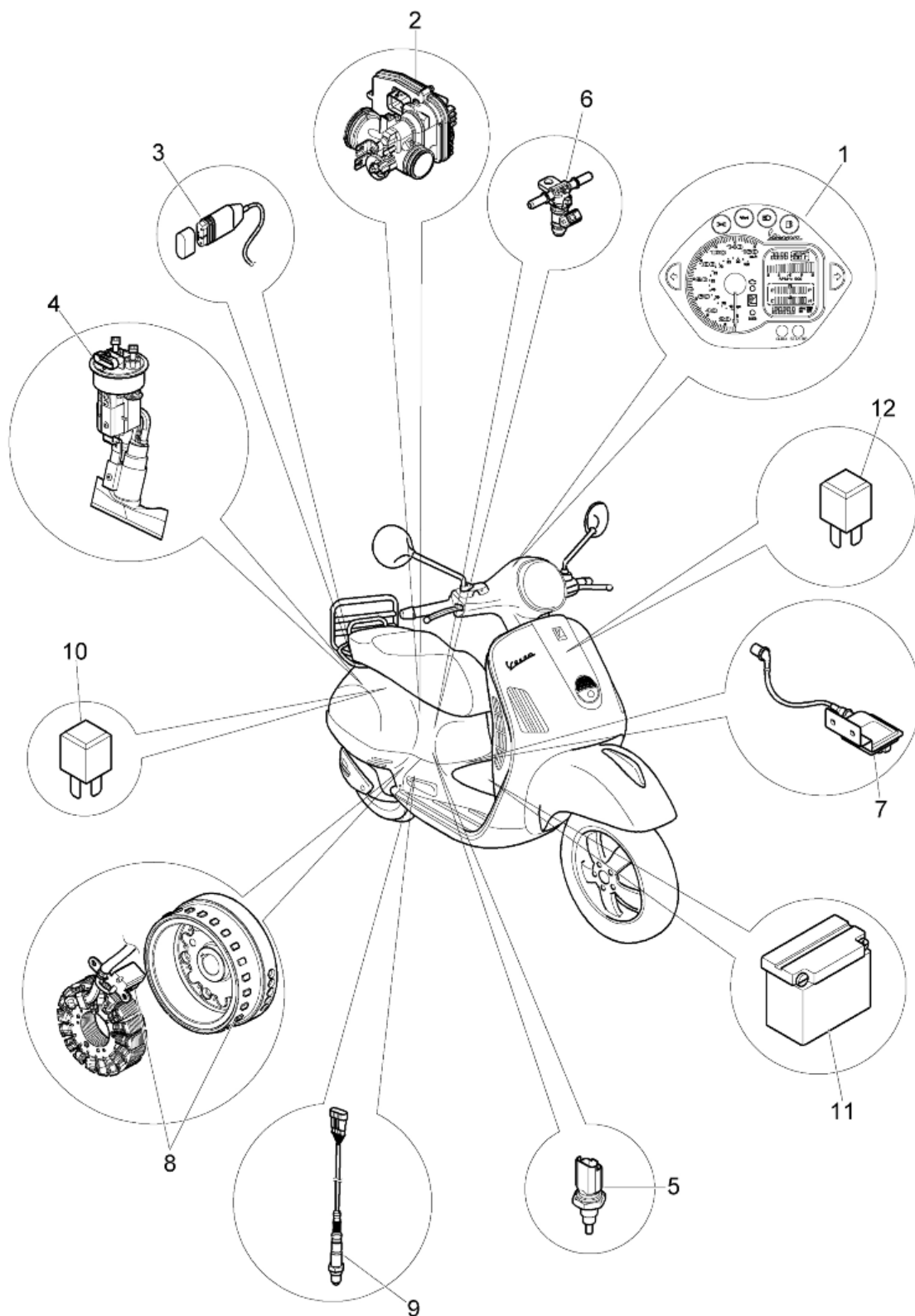
Specific tooling
020480Y Petrol pressure check set



Proceed with the injector seal test.
Dry the injector outlet with a blast of compressed air. Activate the fuel pump. Wait for one minute, making sure there are no leaks coming from the injector. Slight oozing is normal.
Value limit = 1 drop per minute



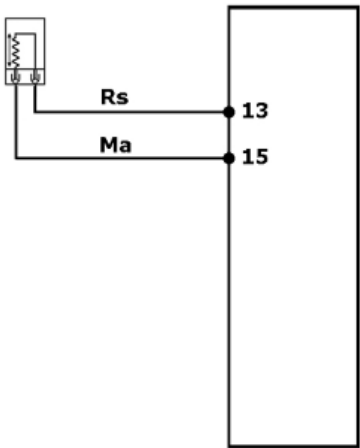
Components location



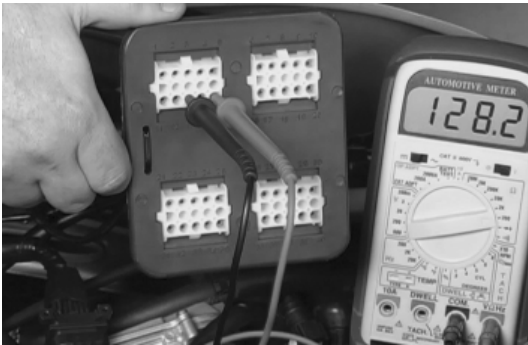
COMPONENT LAYOUT

	Specification	Desc./Quantity
1	Instrument panel	
2	Throttle body and electronic injection control unit (MIU)	
3	Diagnostic socket	
4	Fuel pump	
5	Water temperature sensor	
6	Fuel injector	
7	HV coil	
8	Flywheel - rpm timing sensor	
9	Lambda sensor	
10	Injection load remote control	
11	Battery	12V - 12 Ah
12	Electric fan starter	

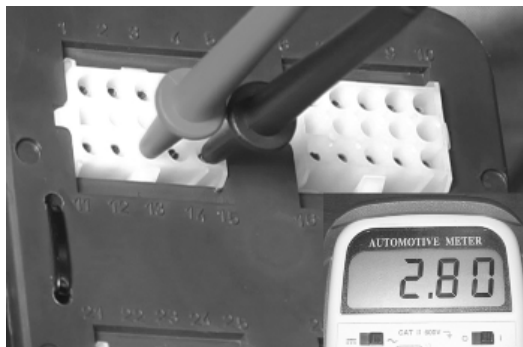
Tachometer



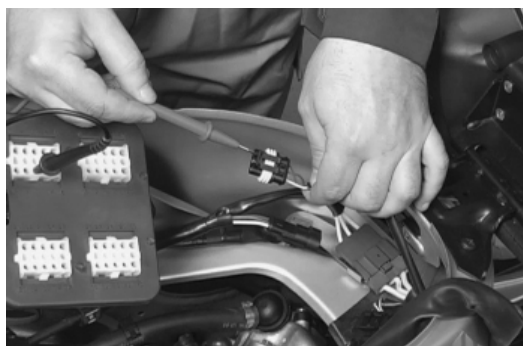
With wiring disconnected from the control unit and connected to the system, check that the sensor resistance between pins 13 - 15 is between 100 and 150 Ohm at an engine temperature of approximately 20°



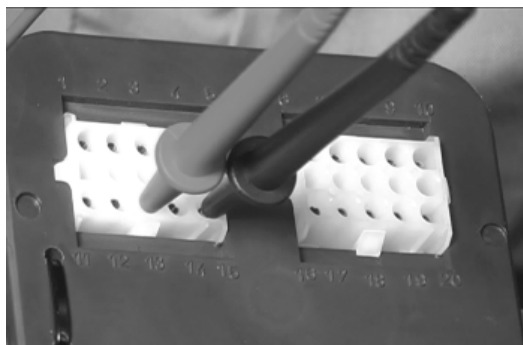
Disconnect the fuel pipe connector. Start up the engine and wait for it to stop. With the wiring connected to the control unit and system try to start up the engine and check that the voltage between pins 13 and 15 is around 2.8 V



With the interface cable harness disconnected from the control unit, check continuity between pin 13 and the red cable of the rpm sensor connector and between pin 15 and the brown cable of the rpm sensor connector



With the interface wiring disconnected from the control unit and rpm sensor connector, check that the red and brown cables (pin 13 - 15) are isolated from each other and insulated from the earth.



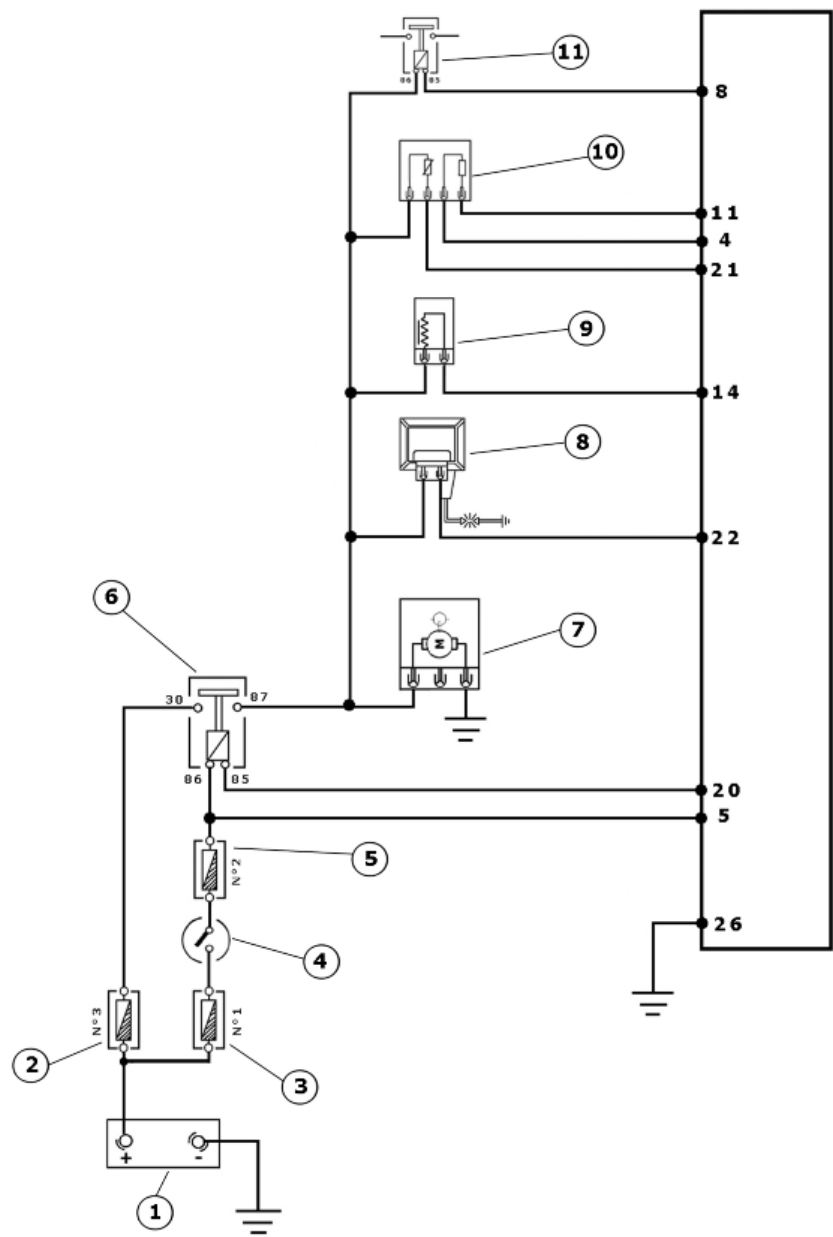
Specific tooling

020481Y Control unit interface wiring

020331Y Digital multimeter

HT coil

Lo schema sottostante è valido per i telai dal numero ZAPM4510000001007 al ZAPM4510000001578.
Per i telai successivi consultare la pagina 2.



COMPONENTS

	Specification	Desc./Quantity
1	Battery	12V - 12 Ah
2	Fuse	10 A
3	Fuse	30 A
4	Key switch contacts	
5	Fuse	7.5 A
6	Injection load remote control	
7	Fuel pump	
8	HV coil	
9	Fuel injector	
10	Lambda sensor	

	Specification	Desc./Quantity
11	Electric fan starter	

The ignition system is integrated with the injection and is of the inductive high efficiency type.

The control unit manages two important parameters:

- Ignition advance

This is optimised according to the engine rpm, to the engine load, temperature and ambient pressure

With idle engine, it is optimised to obtain the stabilisation of the speed at 1450 ± 50 R/1'.

- Magnetisation time

The coil magnetisation time is controlled by the control unit. The ignition power is increased during the engine start-up.

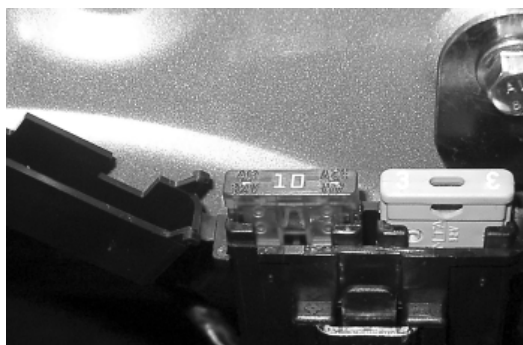
The injection system recognises the 4-stroke cycle and therefore, ignition is only controlled during compression.

Specific tooling

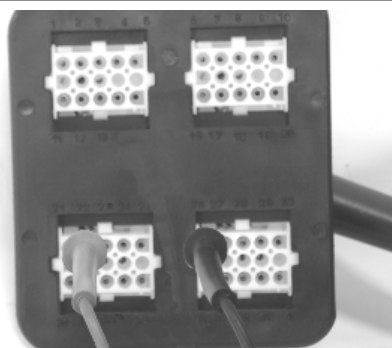
020331Y Digital multimeter

Check that the injection load 10A fuse No. 3 is in good conditions.

Check that the 7.5A fuse No. 2 for the live control unit is in good conditions.

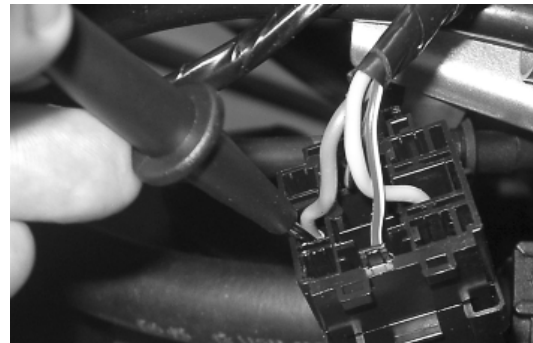
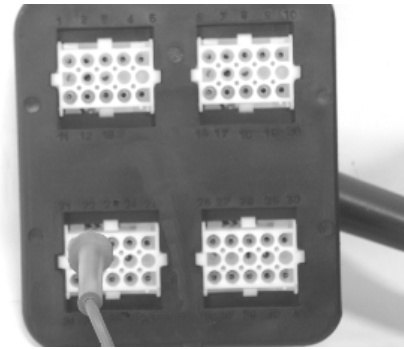


Check there is voltage between pins 22 and 26 of the interface wiring for around two seconds when switching to «ON»

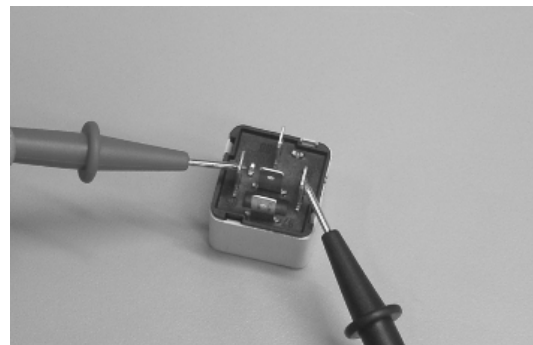


Check the resistance of the primary coil between pin 22 of the interface wiring and the green black cable of the injection load remote control base with the control unit disconnected and the remote control disconnected.

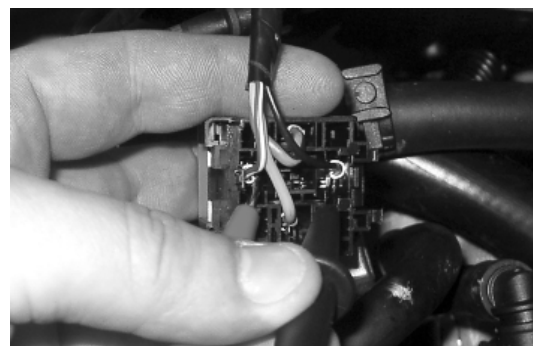
Resistance of the primary = $0.5 \pm 8\%$ Ohm



Check the efficiency of the injection load remote control: Check the resistance of the energising coil between pins 86 and 85: 40 to 80 Ohm
Apply a voltage of 12V to pins 86 and 85; make sure that there is continuity between pins 30 and 87 of the remote control.

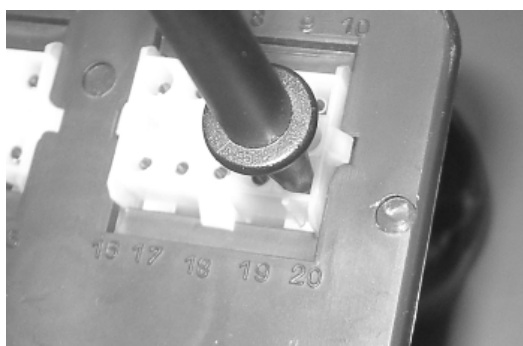
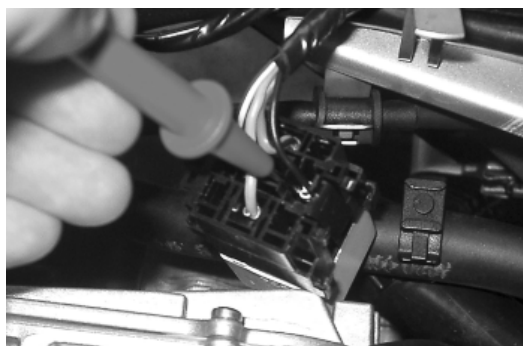
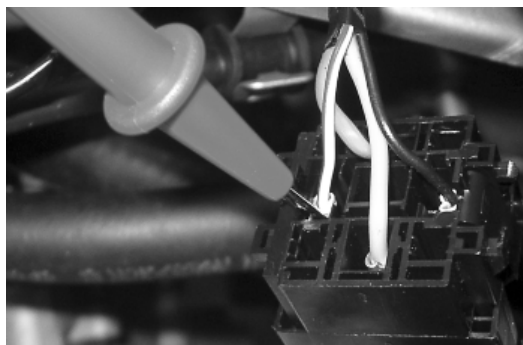


Check the power supply line of the injection load remote control energising coil: after switching to "ON", make sure there is battery voltage, for two seconds, between the Red-White cable and Black-Violet cable of the remote control base. If there is not, check the continuity of the Red-White cable between the fuse box under the saddle hinge and the remote control base and of the Black-Violet cable between pin 20 of the control unit and the remote control base.



N.B.

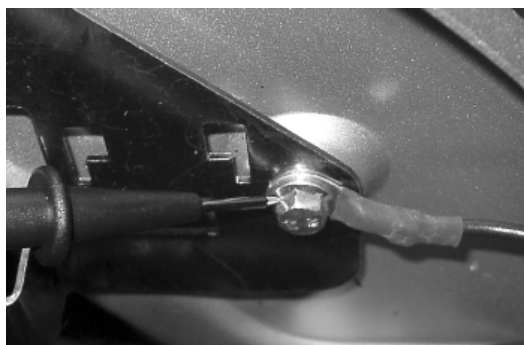
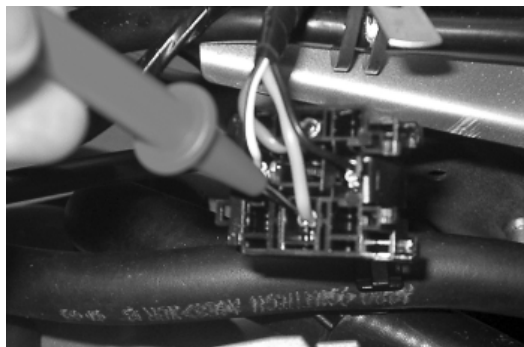
CONTINUITY TESTS MUST BE CARRIED OUT WITH THE COMPONENTS DISCONNECTED. (REMOTE CONTROLS, CONTROL UNIT, FUSES ETC.).



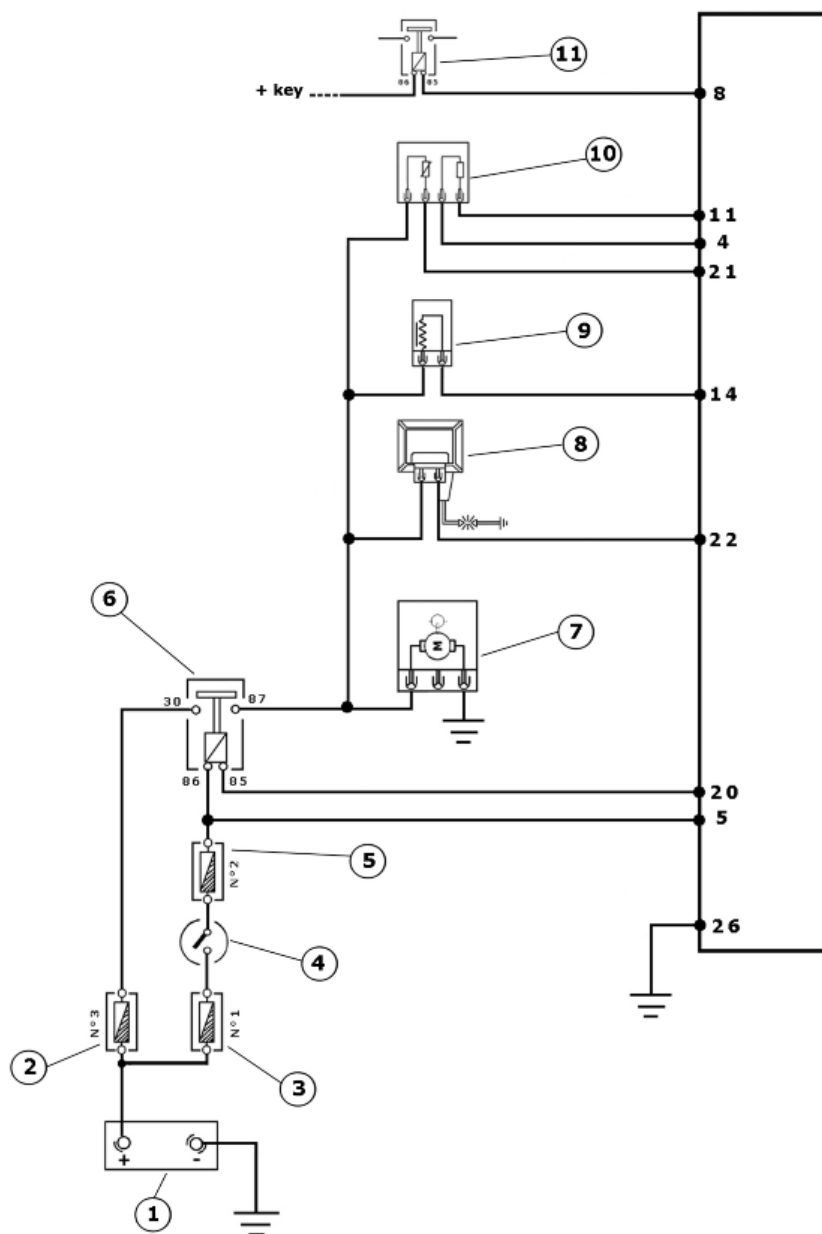
Check the presence of fixed voltage between the grey/black cable of the remote control base and earth. If there is none check the continuity of the grey/black cable between the fuse box (No. 3 10 A) and the remote control base.

N.B.

CONTINUITY TESTS MUST BE CARRIED OUT WITH THE COMPONENTS DISCONNECTED. (REMOTE CONTROLS, CONTROL UNIT, FUSES ETC.).



Schema valido dal numero di telaio ZAPM451000001579 in poi.

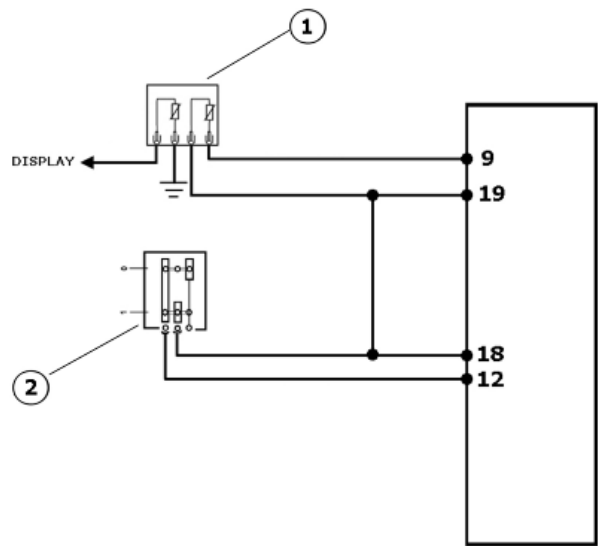


COMPONENTS

	Specification	Desc./Quantity
1	Battery	12V - 12 Ah
2	Fuse	10 A
3	Fuse	30 A
4	Key switch contacts	
5	Fuse	7.5 A
6	Injection load remote control	
7	Fuel pump	
8	HV coil	
9	Fuel injector	
10	Lambda sensor	

	Specification	Desc./Quantity
11	Electric fan starter	

Coolant temperature sensor



TEMPERATURE SENSOR 1

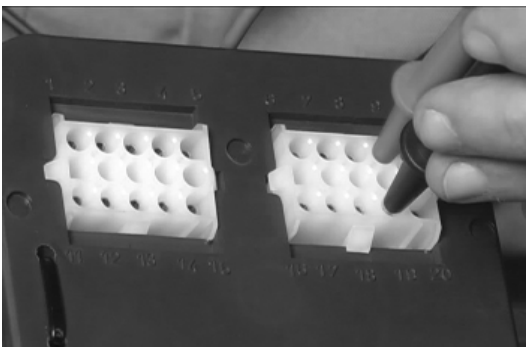
	Specification	Desc./Quantity
1	Water temperature sensor	
2	Engine stop switch	

With the control unit side connector disconnected and the coolant temperature sensor connector connected, check the resistance between pins 9 and 19, correspond with the engine temperature.

20° = 2500 ± 100 Ω

80° = 308 ± 6 Ω

With the control unit side connector disconnected and the coolant temperature connector disconnected, check the insulation between the two light blue-green and grey-green cables

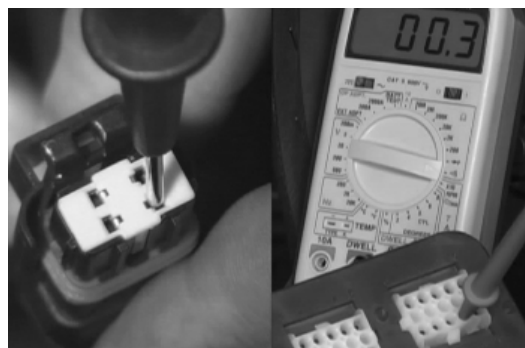


With the control unit side connector disconnected and coolant temperature sensor connector disconnected, check the continuity between pin 9 of the interface wiring and the light blue-green cable of the connector and between pin 19 of the interface wiring and the grey-green cable of the connector.

Specific tooling

020481Y Control unit interface wiring

020331Y Digital multimeter



Zeroing the throttle

Resetting the throttle valve position signal (TPS reset)

The MIU control unit is supplied with throttle valve position sensor and is pre-calibrated.

Pre-calibration entails regulating the minimum opening of the throttle valve to obtain a certain flow of air under pre-set reference conditions.

Pre-calibration ensures optimal air flow for the control of the idling.

This regulation must not be tampered with in any way whatsoever.

The injection system will complete the management of the idling through the Stepper and the variation of the ignition advance.

The throttle body after the pre-calibration has an opened valve with angle that can vary depending on the tolerances of the machining of the pipe and the valve itself.

The valve position sensor can also assume various fitting positions. For these reasons the mVs of the sensor with the valve at minimum can vary from one throttle body to another.

To obtain the optimum fuel preparation, especially at small openings of the throttle valve, it is essential to match the throttle body with the control unit following the procedure known as TPS resetting.

With this operation we inform the control unit, as the starting point, of the mV value corresponding to the pre-calibrated position.

To reset, proceed as follows.

Connect the diagnostic tester.

Turn to "ON".

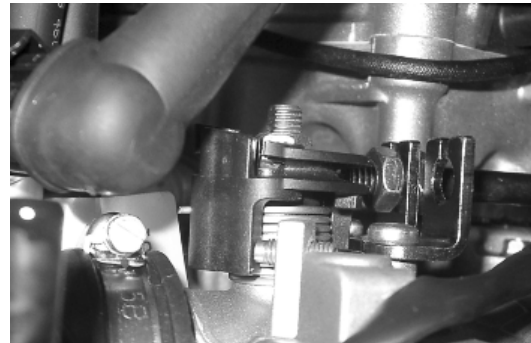
Select the functions of the diagnostic tester on
"TPS RESET".

Specific tooling

020460Y Scooter diagnosis and tester



Make sure that the throttle valve is supporting the
stop screw.



Guaranteeing that this position will be kept, give
the confirmation for the TPS reset procedure.





Reset should be performed in the following cases:

- on first fitting.
- if the injection control unit is replaced.

N.B.

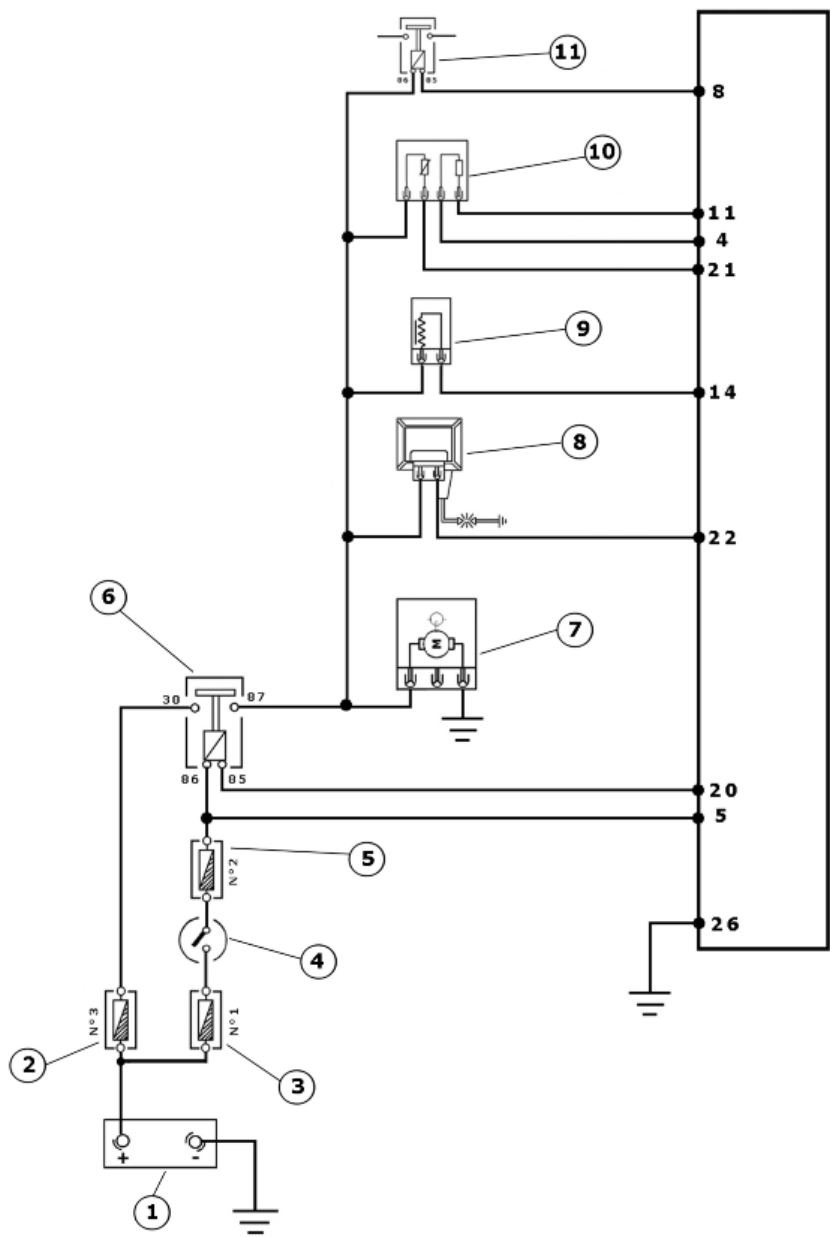
THE TPS RESETTING POSITION MUST NOT BE CARRIED OUT WITH A USED THROTTLE BODY BECAUSE POSSIBLE VALVE WEAR AND STOP WEAR FOR THE MINIMUM OPENING MAKE THE AIR FLOW DIFFERENT FROM THAT OF PRE-CALIBRATION.

Given that the TPS resetting is also done when the control unit is replaced, place the control unit - filter box bellows at 45° during the refitting operation as shown in the photograph.



Lambda probe

Lo schema sottostante è valido per i telai dal numero ZAPM4510000001007 al ZAPM4510000001578.
Per i telai successivi consultare la pagina 2.



COMPONENTS

	Specification	Desc./Quantity
1	Battery	12V - 12 Ah
2	Fuse	10 A
3	Fuse	30 A
4	Key switch contacts	
5	Fuse	7.5 A
6	Injection load remote control	
7	Fuel pump	
8	HV coil	
9	Fuel injector	
10	Lambda sensor	

	Specification	Desc./Quantity
11	Electric fan starter	

The Lambda sensor or oxygen sensor is a sensor which provides indications concerning the oxygen content in the exhaust gas. The signal generated is not of the proportional type but of the ON/OFF type, i.e. there is oxygen or there is not. The sensor is positioned on the exhaust manifold before the catalytic converter in an area where the gas temperature is always high. The temperature at which the sensor works is at least 350°C at 600°C and it has a reaction time of just 50 milliseconds. The signal generated passes from a high value to a low value with a mixture with $\lambda = 1$. Since the sensor only works at high temperatures, it has an electric preheating element inside it, controlled by the control unit, to take it quickly to the functioning state.

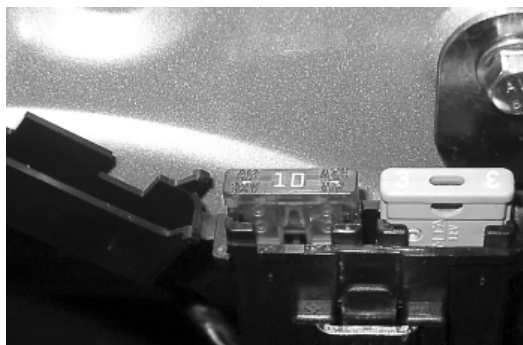
Specific tooling

020481Y Control unit interface wiring

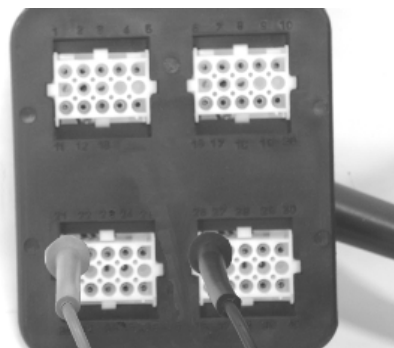
020331Y Digital multimeter

Check that the injection load 10A fuse No. 3 is in good conditions.

Check that the 7.5A fuse No. 2 for the live control unit is in good conditions.

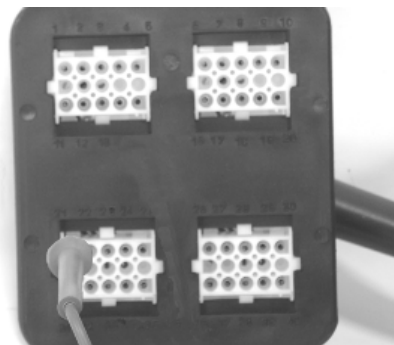


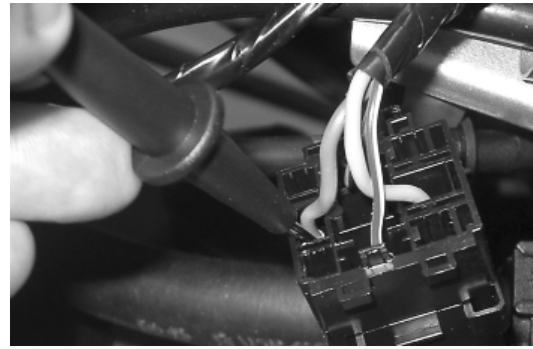
Check the presence of voltage between pins 21 and 26 of the interface wiring for around two seconds, switching to "ON"



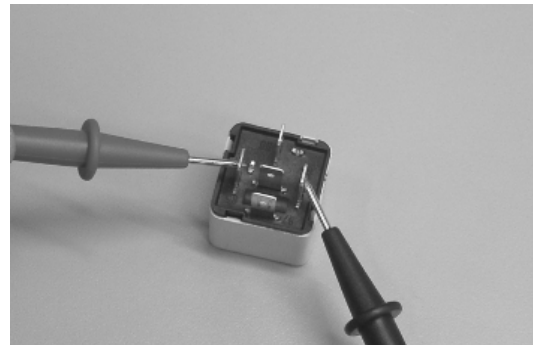
With the engine cold, check the resistance of the Lambda sensor heater between pin 21 of the interface wiring and the green black cable of the injection load remote control base with the control unit disconnected and the remote control disconnected.

Resistance of the heater at approximately 20° = 9 Ohm $\pm$ 20%





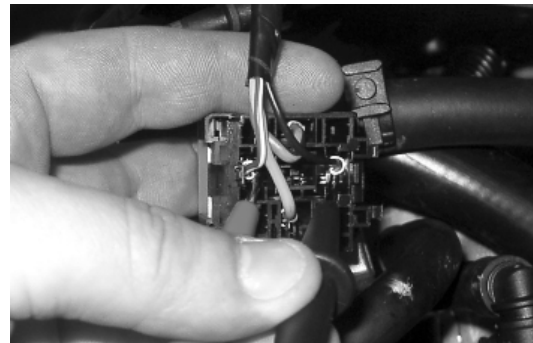
Check the efficiency of the injection load remote control: Check the resistance of the energising coil between pins 86 and 85: 40 to 80 Ohm
Apply a voltage of 12V to pins 86 and 85; make sure that there is continuity between pins 30 and 87 of the remote control.

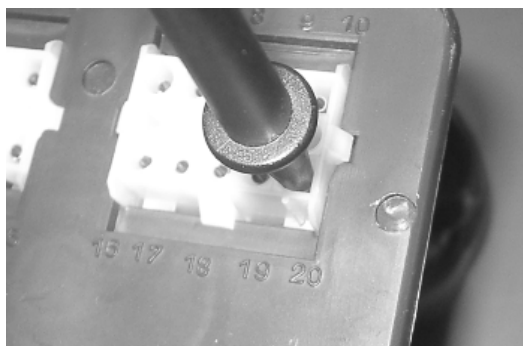
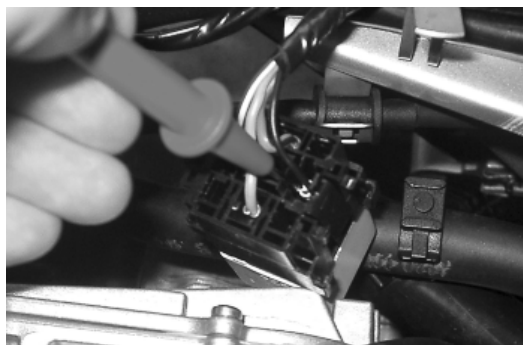
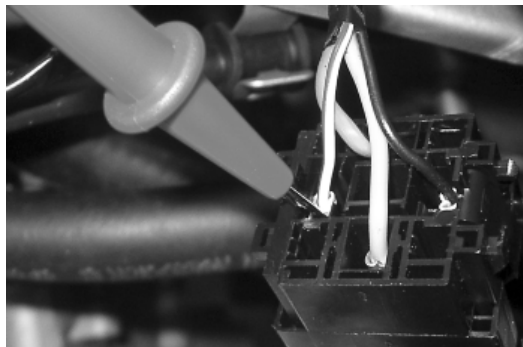


Check the power supply line of the injection load remote control energising coil: after switching to "ON", make sure there is battery voltage, for two seconds, between the Red-White cable and Black-Violet cable of the remote control base. If there is not, check the continuity of the Red-White cable between the fuse box under the saddle hinge and the remote control base and of the Black-Violet cable between pin 20 of the control unit and the remote control base.

N.B.

CONTINUITY TESTS MUST BE CARRIED OUT WITH THE COMPONENTS DISCONNECTED. (REMOTE CONTROLS, CONTROL UNIT, FUSES ETC.).

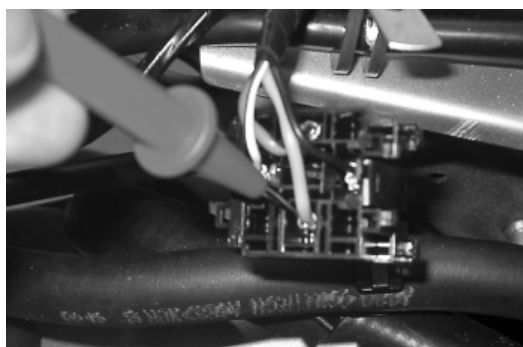


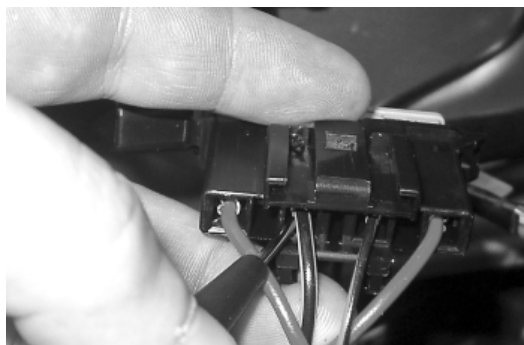
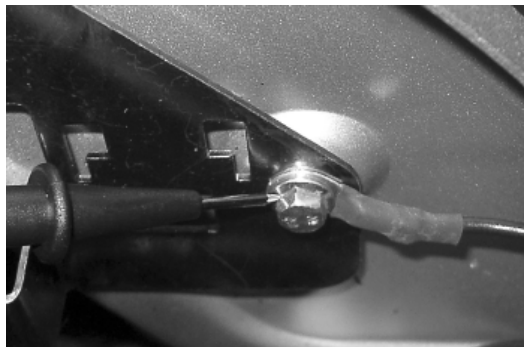


Check the presence of fixed voltage between the grey/black cable of the remote control base and earth. If there is none check the continuity of the grey/black cable between the fuse box (No. 3 10 A) and the remote control base.

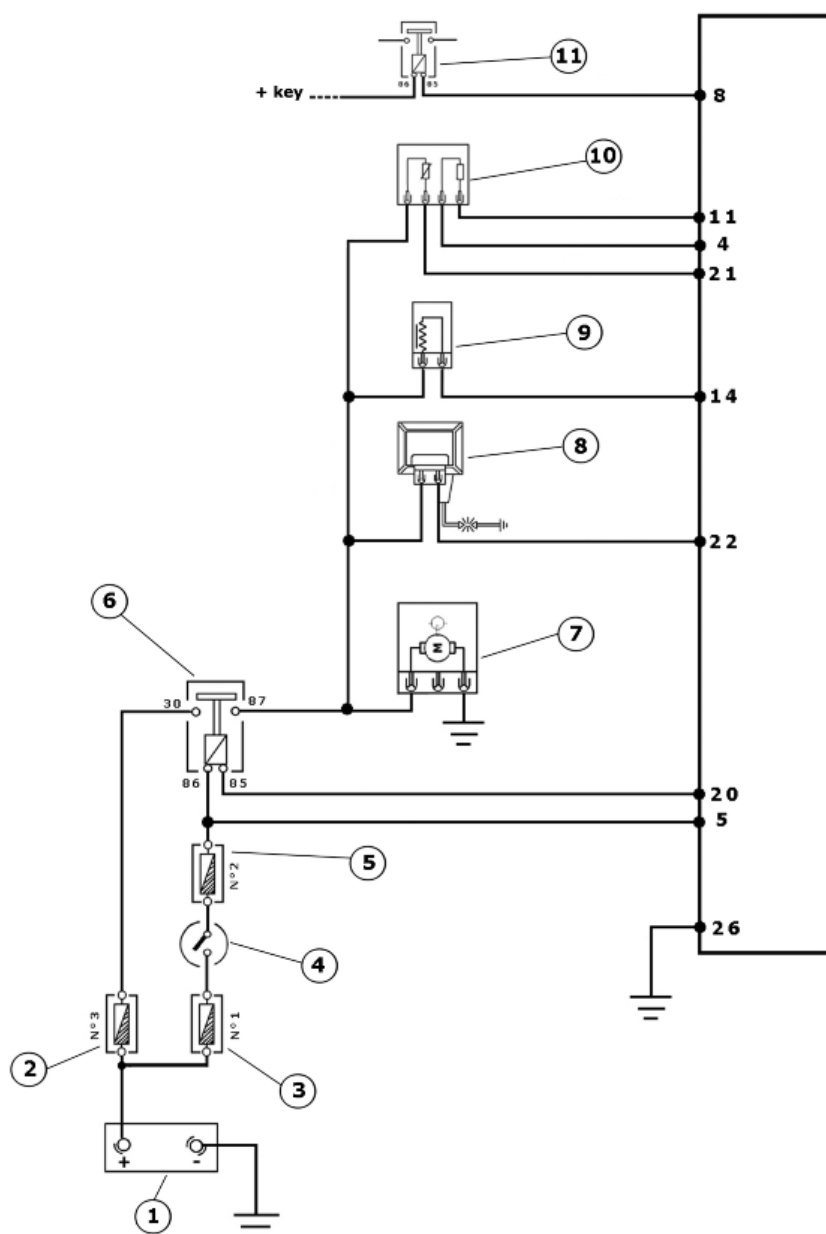
N.B.

CONTINUITY TESTS MUST BE CARRIED OUT WITH THE COMPONENTS DISCONNECTED. (REMOTE CONTROLS, CONTROL UNIT, FUSES ETC.).





Schema valido dal numero di telaio ZAPM4510000001579 in poi.



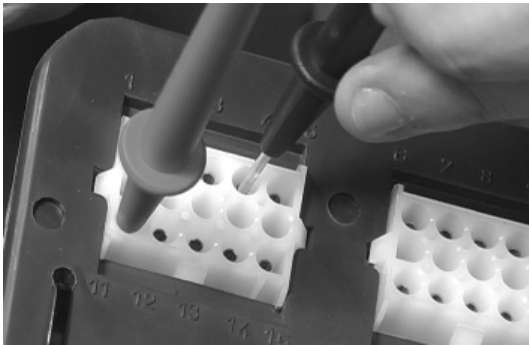
COMPONENTS

	Specification	Desc./Quantity
1	Battery	12V - 12 Ah
2	Fuse	10 A
3	Fuse	30 A
4	Key switch contacts	
5	Fuse	7.5 A
6	Injection load remote control	
7	Fuel pump	
8	HV coil	
9	Fuel injector	
10	Lambda sensor	

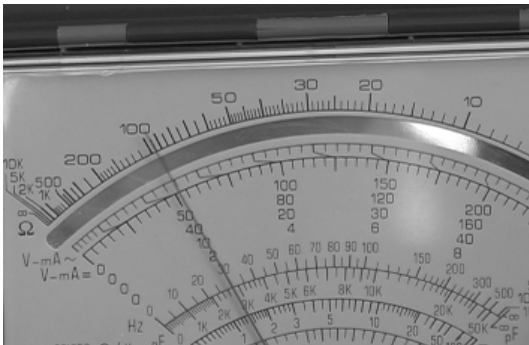
	Specification	Desc./Quantity
11	Electric fan starter	

SIGNAL CHECK

Install the electronic control unit interface wiring.
Start the engine and warm up until the electric fan switches on.
Use an analogue multimeter with a direct voltage scale measuring down to 2 V.
Place the tips of the multimeter between pins 4 (-) and 11 (+)



With the engine running at idle speed, check that the voltage oscillates between 0V and 1V
With the throttle valve completely open, the voltage is approx. 1V.
During the closing phase, the voltage is approx. 0V.
If the voltage remains constant, the sensor may be damaged. Remove the sensor and check that there are no oil or carbon deposits inside it..



INDEX OF TOPICS

SSUSPENSIONS

SUSP

This section is devoted to operations that can be carried out on the suspension.

Front

Removing the front wheel

- Remove the 5 fixing screws indicated in the photograph.

Locking torques (N*m)

Wheel fixing screw 20 ÷ 25



Front wheel hub overhaul

- Remove the ball bearing seeger ring indicated in the photograph



Extract the ball bearing using the specific tool

Specific tooling

001467Y014 Extraction pliers for Ø 15 mm bearings

001467Y017 Bell for bearings, outside Ø 39 mm



-
- Remove the oil seal on the roller bearing side using a screwdriver.



-
- Remove the roller bearing using the specific tool

Specific tooling**020376Y Adaptor handle****020456Y Ø 24 mm adaptor****020363Y 20 mm guide**

-
- Heat the roller bearing seat with a heat gun
 - Use the specific tool to introduce and push the bearing until it stops, with the shielded side facing out
 - Refit the ball bearing locking seeger ring

Specific tooling**020151Y Air heater****020376Y Adaptor handle****020359Y 42 x 47 mm adaptor****020412Y 15 mm guide**

-
- Use the specific tool to fit and push the roller casing until it stops
 - Refit the oil seal on the roller bearing side
 - Lubricate the area between the roller bearing and the ball bearing

Specific tooling**020038Y Punch****Recommended products****AGIP GREASE MU3 Grease for odometer transmission gear case**

Soap-based lithium grease with NLGI 3; ISO-L-XBCHA3, DIN K3K-20

Refitting the front wheel

- To refit, carry out the removal operations but in reverse order and comply with the specified locking torque.

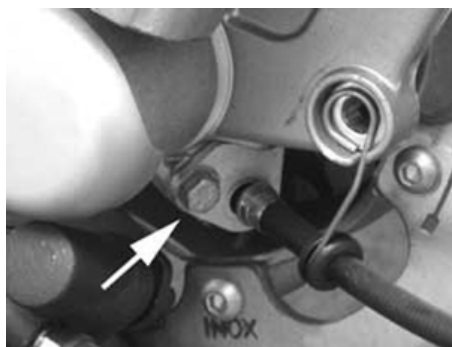
Locking torques (N*m)

Wheel fixing screw 20 ÷ 25 Wheel axle nut 74 ÷ 88

Steering column

Removal

- Remove the front wheel
- Remove the brake calliper
- Loosen the screw fixing the odometer cable plate and take out the cable.

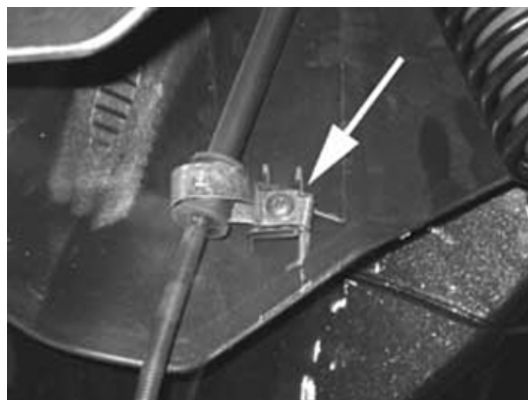


- Remove the suspension arm housing by unscrewing the three screws indicated in the photograph.





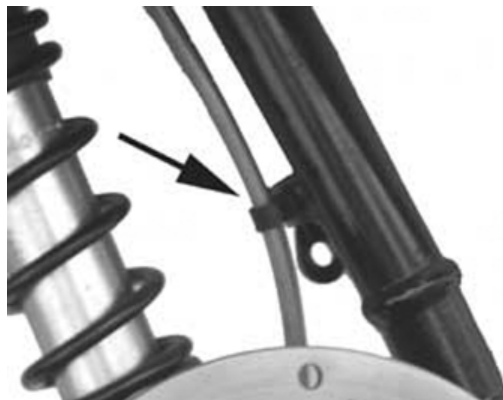
- Remove the retainer fixing the odometer cable to the mudguard indicated in the photograph



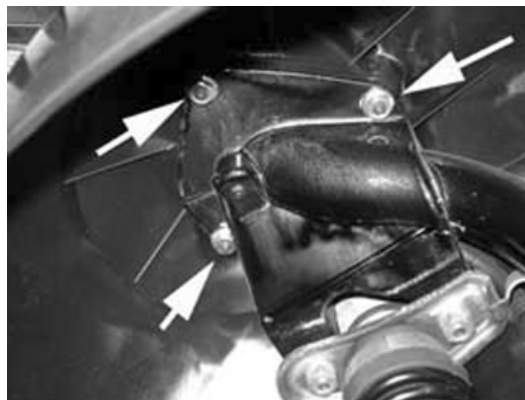
- Remove the retainer fixing the brake piping to the front shock absorber upper plate



- Remove the retainer fixing the brake piping to the suspension arm



- Pre-loosen the 3 nuts fixing the mudguard to the suspension



- Remove the rear handlebar cover.
- Remove the screw fixing the handlebar to the steering tube
- Tilt the handlebar towards the shield back plate being careful not to scratch the plastic parts



- Remove the steering tube ring nut cover



- Use a specific tool to remove the counter-ring nut, the spacer washer and the ring nut of the upper disk of the fifth wheel fitting
- Slide off the steering tube and remove permanently the mudguard from the suspension

Specific tooling

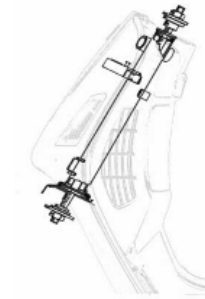
020055Y Wrench for steering tube ring nut



Overhaul

Carry out this operation only if strictly necessary and in any case remove and replace the old part with a new one.

- Remove the steering tube
- Use a special tool remove the upper disk of the fifth wheel fitting seat on the headstock by operating from the lower part of the headstock as indicated in the photograph. Afterwards remove the lower disk of the fifth wheel operating from the upper part



Specific tooling

020004Y Punch for removing fifth wheels from the headstock

- Remove the fifth wheel fitting and the dust guard on the steering tube as shown in figure, using the specific tool. Proceed giving a few taps with the mallet.



Specific tooling

020004Y Punch for removing fifth wheels from the headstock

- Refit the fifth wheel fitting and the dust guard on the steering tube until they stop, using the specific tool.

Specific tooling

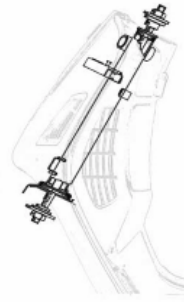
006029Y Punch for fitting fifth wheel seat on steering tube



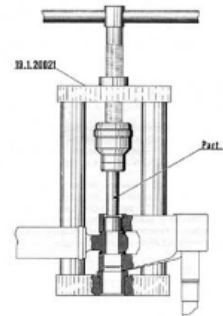
- Use the specific tool to fit the fifth wheel fitting on the headstock as indicated in the figure

Specific tooling

001330Y Tool for fitting steering seats



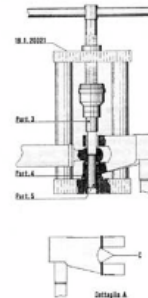
- Remove the steering tube
- Remove the attachment bracket
- Use the specific tool with the part 1 and operate the handgrip until removing temporarily the pin and the Nadella opposite the tool thrusting direction.
- To extract the second Nadella, use the tool with the part 2, instead of part 1, on opposite side to the one indicated in the figure.



Specific tooling

020021Y Front suspension service tool

- Fit the two dust guard rings "C" on the swinging hub as shown in drawing "A".
- Connect the swinging hub to the steering tube with the guiding pin, part 5.
- Use the specific tool fitted with part 3 on the stem and part 4 on the tool base.
- Lubricate the pin with Z2 grease and insert it temporarily on the swinging hub, move the tool handgrip until part 3 is fully inserted on the steering tube.
- Once the pin has been fitted, insert the two spacers part 17 slightly hitting with a mallet (see next figure).



CAUTION

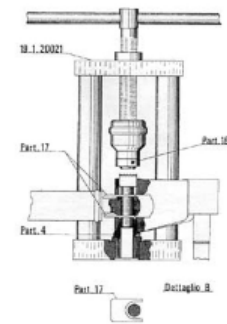
USE NEW ROLLER CASINGS, PIN, SEALING RINGS AND DUST GUARDS FOR REFITTING.

Specific tooling

020021Y Front suspension service tool

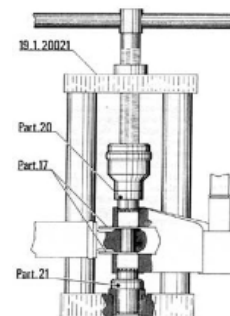
To fit sealing rings, roller casings and wedging washers proceed as follows

- Lubricate the sealing rings with mineral oil and half fill the roller casings with Z2 grease.
- Insert the seal ring on the pin and the roller bushing with wedging washers at the same time.
- Remove the specific tool and then the part 5 (guide) partially ejected in the previous assembly stage; part 4 must be always fitted.
- Replace part 3 with part 16 on the stem.
- Push, from the handgrip, the wedging washer - roller casing - seal ring unit, placing part 16 until it stops on the swinging hub
- Repeat the operation described above using the tool fitted with part 16 and part 22* instead of part 4 on the stem, on the side opposite the one shown in the figure to refit the second wedging washer - roller casing - sealing ring unit.



To position roller casings on the pin (pin end in contact with the internal bottom of the roller casings) proceed as follows:

- Use the tool with part 20 and 21 fitted to the stem as indicated in the figure.
- Push the two roller casings with the handgrip until their bottoms make contact with the pin end.
- Use the specific tool fitted with parts 3 and 4 as indicated for fitting the spin and push with the handgrip until the washer is wedged in the swinging hub.
- Remove the spacers, part 17, fill with grease the area between the steering tube and the swinging hub, and place the dust guard rings in that place.



Refitting

To refit, carry out the removal operations but in reverse order; grease the fifth wheel fittings and tighten at the specified locking torques

Locking torques (N*m)

Handlebar to steering tube 45 ÷ 50 Nm Upper steering ring nut 35 ÷ 40 Lower steering ring nut 12 - 14

Front shock absorber

Removal

- Remove the steering tube
- Remove the shock absorber lower clamps
- Remove the shock absorber upper clamps



Refitting

To refit, carry out the removal operations in reverse order, observing the prescribed tightening torques.

Locking torques (N*m)

shock absorber lower clamp 20 - 27 Nm shock absorber upper clamp 20 ÷ 30

Shock-absorber - calliper bracket

- Remove the front wheel hub with the brake disc
- Remove the front shock absorber lower clamps



- Remove the bracket locking Seeger ring
- Unscrew the bracket



- Before refitting the bracket in the wheel axle, place the O-ring as shown in the photograph so that it is correctly placed after fitting the bracket.
- Refit the washer and the Seeger ring.
- Refit the lower screws fixing the shock absorber to the bracket and tighten at the prescribed torque

**Locking torques (N*m)**

Shock absorber lower clamp 20 ÷ 27

Overhaul

- The bracket for the shock absorber -calliper attachment has two roller bearings separated one from the other as shown in the photograph



- Remove the two roller bearings from the bracket with the specific tool operating on the shock absorber attachment side as shown in the photograph

**Specific tooling**

020376Y Adaptor handle

020441Y 26 x 28 mm adaptor

020365Y 22 mm guide

- Remove the oil seal on the wheel hub side with the screwdriver as shown in the photograph



-
- Suitably hold the brake calliper - shock absorber attachment bracket
 - Fit a new oil seal and move it until it stops using the specific tool

Specific tooling**020376Y Adaptor handle****020360Y 52 x 55 mm adaptor**

-
- Assemble a new roller bearing on the shock absorber side and move it until it stops using the specific tool

Specific tooling**020036Y Punch**

-
- Suitably hold the brake calliper - shock absorber attachment bracket
 - Assemble a new roller bearing on the wheel hub side and move it until it stops using the specific tool

Specific tooling**020037Y Punch**

Rear

Removing the rear wheel

- Remove the bracket supporting the rear shock absorber and the muffler;
- Remove the rear wheel by unscrewing the 5 screws indicated in the photograph



Refitting the rear wheel

To refit, carry out the removal operations but in reverse order, observing the prescribed torques.

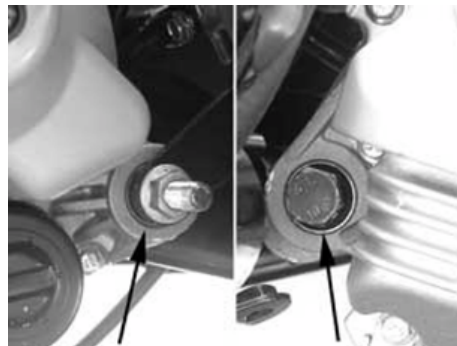
Locking torques (N*m)

Wheel fixing screws: 20 ÷ 25 Nm

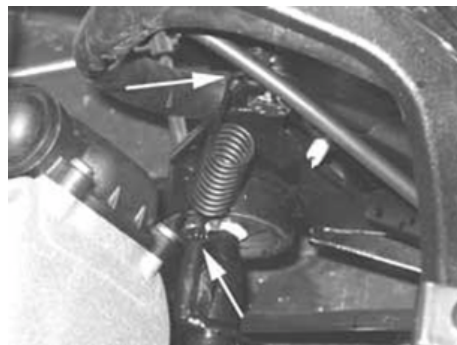
Swing-arm

Removal

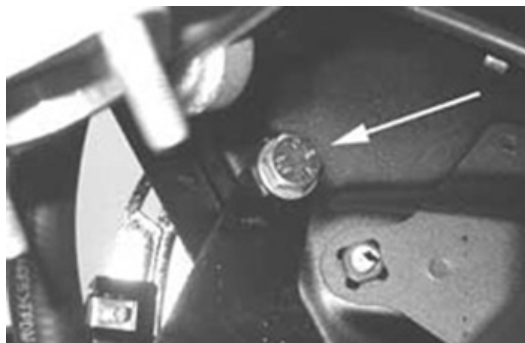
- Place the scooter on its centre stand;
- Remove the engine housing
- Remove the swinging arm/engine fitting shown in the photo
- Move the engine back



- remove the spring anchoring the swinging arm to the frame as shown in the photo



- Remove the two screws fixing the buffer support bracket to the frame



- Remove the left and right caps located under the footrest to reach the pin fixing the swinging arm to the body.
- Remove the pin. Then remove the swinging arm.



- Check the entire swinging arm assembly.
- Check all the centring bushing components and silent block rubber buffers.
- Replace the work components that cause excessive clearance on the rear suspension.



Overhaul

- Check there is no sticking in the movement of the connection of the swinging arm on the engine side to the swinging arm on the frame side.
- Check the axial clearance between the two swinging arms using a feeler gauge



Characteristic

Standard clearance

0.40 ÷ 0.60 mm

Allowable limit after use:

1.5 mm

- To check the clearance on the frame-side arm, mount the retainer using the pin fixing the swinging arm to the frame and two adaptor rings of the appropriate tool 020229Y. Alternatively use two washers with inner diameter for 12-mm pins, min. outer diameter: 30 mm: min. thickness: 4 mm.



- Check there is no sticking in the rotation.
- Check the axial clearance of the swinging arm on the frame side

Characteristic

Standard clearance

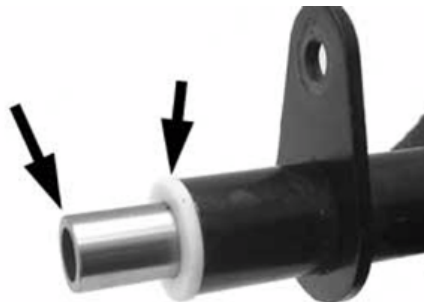
0.40 ÷ 0.60 mm

Allowable limit after use:

1.5 mm



- Separate the swinging arm on the engine side from the vehicle side arm.
- Remove the plastic bushings and the internal spacer shown in the photo.



- Using a suitable pin remove the roller casings as shown in the photographs



- Using an appropriate tool plant new roller casings, being careful to position the bearings with the O-rings facing outwards

Specific tooling

020244Y 15 mm diameter punch

020115Y Ø 18 punch

Characteristic

Length of the swinging arm tube on the engine side:

L 175.3 + 0.3 0

Length of the internal swinging arm spacer on the engine side:

L 183 + 0.3 0

Engine side swinging arm plastic bushing shim:

3.5 ± 0.05 mm

Frame side swinging arm plastic bushing shim:

3.5 ± 0.05 mm

Length of the internal swinging arm spacer on the frame side:

290 ± 0.1 mm



Length of the swinging arm tube on the frame side:

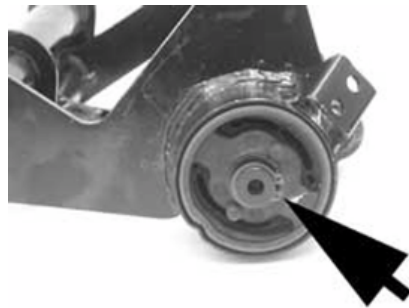
283 ± 0.1 mm

- Lubricate roller casings and the plastic bushings with grease
- Insert the spacers
- Assemble the two arms with the relative bolt in the position shown in the photograph
- Adjust the bolt as shown in the photograph
- Position the frame side swinging arm with the most protruding part pointing towards the silent block side as shown in the photograph

**Recommended products****AGIP GREASE PV2 Grease for the steering bearings, pin seats and swinging arm**

Soap-based lithium and zinc oxide grease containing NLGI 2; ISO-L-XBCIB2 of the swinging arm

-
- Make sure the silent bloc is not broken. If there is, replace it.
 - Remove the seeger ring shown in the photograph



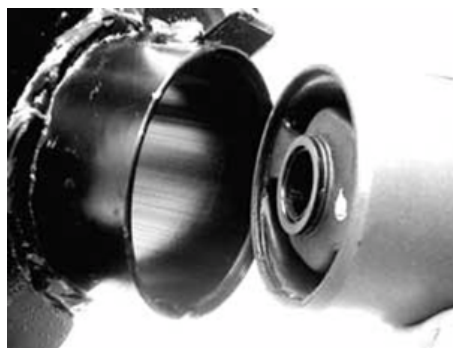
-
- Remove the full silent bloc bracket
 - Undo the silent bloc ring shown in the photograph



- Hold the full silent bloc bracket in the clamp
- Using the appropriate tool, remove the silent bloc from the bracket from the side corresponding to the inside of the vehicle. This is to guarantee the tool is centred properly on the support



- Install a new silent bloc, making sure it aligns properly with the reference tooth.
- Fit the silent blocs, making sure the chamfered part of the silent bloc matches the chamfered part of the bracket



- Using the appropriate tool, fit the silent bloc as shown in the photo



Refitting

- To refit, perform the removal operations in reverse.
- Grease the bearings and the rolling parts with the recommended grease.

-Complete the fitting by tightening the nuts on the relative bolts to the proper tightening torque.

Locking torques (N*m)

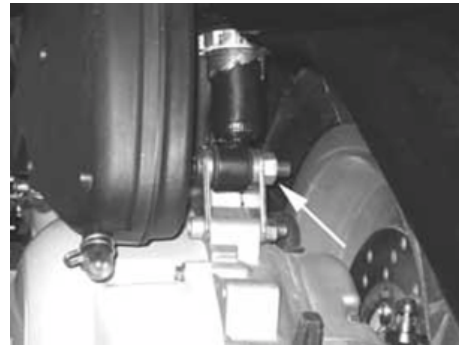
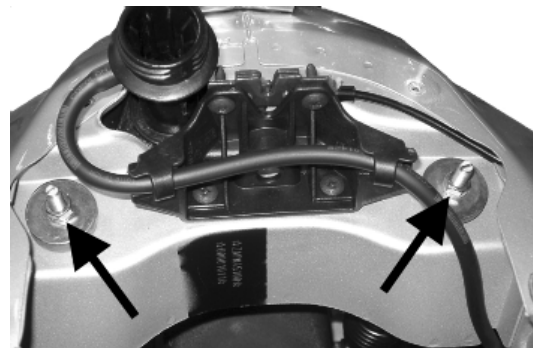
Engine and vehicle side swinging arm junction bolt $33 \div 41$ Nm Swinging arm pin - Engine 64 - 72 Body shell - Swinging arm pin: $76 \div 83$ Nm Screw fixing the silent-block support plate to the body $42 \div 52$ Nm

Shock absorbers

Removal

Proceed as follows:

- place the scooter on its centre stand;
- remove the luggage rack
- lift the engine a little with a jack so as to free the two shock absorbers;
- remove the muffler assembly;
- undo the shock absorber spring assembly clamping screw from the support fixed to the engine on the one side and from that fixed to the muffler on the other;
- undo the two upper nuts (one on each side) fixing the shock absorber spring assembly to the frame and remove the shock absorbers themselves.



Refitting

To refit, carry out the above removal operations in reverse order, observing the prescribed torques.

Locking torques (N*m)

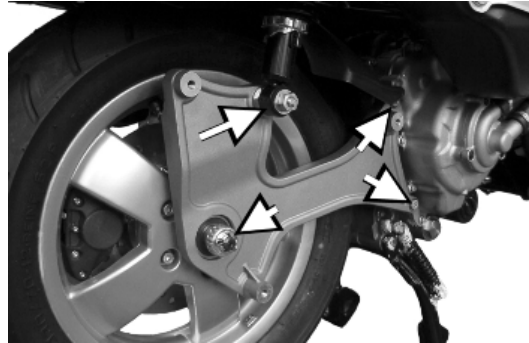
Lower shock absorber clamping screw 33 ÷ 41 Nm Upper shock absorber fixing screws 20 ÷ 25 Nm

Exhaust bracket

Removal

Remove the full muffler assembly.

- Remove the two fixing screws of the bracket to the engine crankcase
- Remove the split pin, the cover and the fixing nut of the rear wheel axle and its spacer
- Remove the shock absorber lower clamp



Refitting

- The refitting procedure is in the reverse order of the removal operation being careful to respect the torques indicated and the spacer assembly layout as shown in the photo.

Locking torques (N*m)

Bracket fixing screws to the engine crankcase: 20 ÷ 25 Nm Shock absorber lower clamp 33 ÷ 41 Wheel axle clamping 104 ÷ 126 Nm

Centre-stand

REMOVAL

- Use a jack to support the vehicle properly.
- Remove the two return springs from the centre stand.
- Undo the nut shown in the figure.
- Remove the bolt from the right side.
- Remove the centre stand.



FITTING

- On refitting tighten the nut to the specified torque.

Locking torques (N*m)

Centre stand bolt 32 ÷ 40

Side stand

REMOVAL

- Uncouple the centre stand return spring;
- Remove the screw shown in the photograph

FITTING

To refit, carry out the removal operations in reverse order and comply with the specified torque.

Locking torques (N*m)

Side stand fixing bolt $35 \div 40$



INDEX OF TOPICS

BRAKING SYSTEM

BRAK SYS

This section è is devoted to the description of the brake system components.

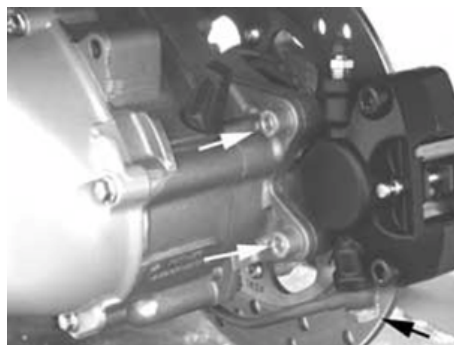
Rear brake calliper

Removal

- Remove the rear wheel.
- Remove the pad retention pin.
- Using a pin partially remove the brake pad retention pin.
- Remove the screws fixing the brake calliper to the crankcase then remove the brake calliper complete with pipe.
- Complete the extraction of the pad retention pin, the spring and the pads.

N.B.

IF IT IS NECESSARY TO REPLACE OR SERVICE THE BRAKE CALLIPER, BEFORE REMOVING THE FITTINGS FIXING THE CALLIPER TO THE SUPPORT BRACKET, FIRST LOOSEN THE OIL HOSE FITTING AFTER HAVING EMP-TIED THE SYSTEM OF THE CIRCUIT BEING EXAMINED.



Overhaul

- Remove the rear brake calliper.
- Suitably hold the brake calliper in a clamp
- Remove the two calliper coupling screws as shown in the photo
- Remove the two pistons from the calliper body with the aid of short blasts of compressed air through the brake fluid holes
- Remove the dust ring and the O-ring of each half calliper.
- Remove the O-rings in the half calliper.

N.B.

WHEN REMOVING THE O-RINGS, BE CAREFUL NOT TO SCRATCH THE HALF CALLIPER SEATS





- Check that the pistons and relevant seats exhibit no scratches.
- Wash and blow all the components carefully
- Fit the O-rings and new dust guards
- Refit the pistons in their seats being careful to lubricate with brake fluid
- Recouple the half callipers and lock the two screws at the specified torque



Locking torques (N*m)

Calliper coupling screw $30 \div 33$ Nm



Refitting

- Insert the brake pads in the calliper.
- Insert the pad fixing pin and the retention screw being careful to position the terminals of it pointing towards the bleed screw as shown in the photo.
- Insert the clip on the pad fixing pin

N.B.

FAILURE TO RESPECT THE PAD POSITIONING REQUIREMENTS WITH RESPECT TO THE DIRECTION OF ROTATION COULD INHIBIT PROPER BRAKE FUNCTION AND QUIETNESS.



- Keep the brake pads in contact with the pistons and insert the calliper in the brake disc.
- Fix the calliper to the crankcase with the two screws with elastic washer at the prescribed torque as shown in the photograph

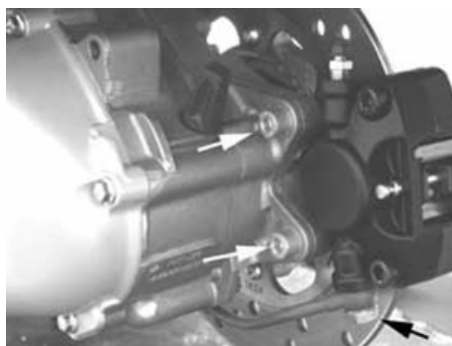


- Fix the brake pipe joint to the calliper and tighten at the prescribed torque
- Bleed the system and refit the rear wheel

Locking torques (N*m)

Brake calliper support clamping 20 ÷ 25 Nm

Brake pipe connection 20 to 25 N•m



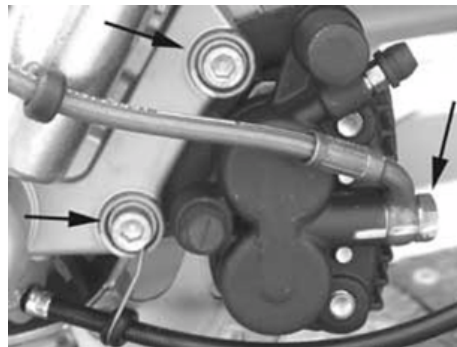
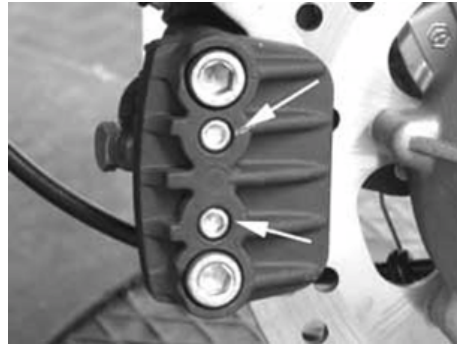
Front brake calliper

Removal

- Remove the front wheel
- Pre-loosen the two fixing pins of the brake pads
- Remove the two front brake calliper devices fastening them to the support as shown in the photograph.

N.B.

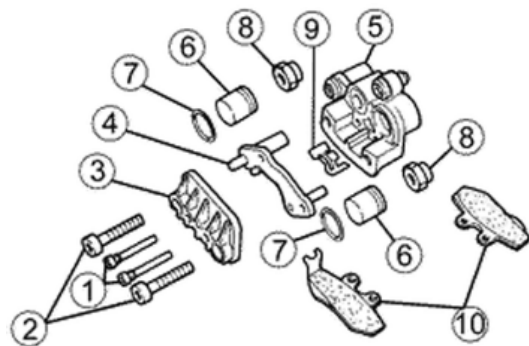
WHEN A PROCEDURE IS PLANNED INCLUDING THE SERVICE OR REPLACEMENT OF THE CALLIPER, FIRST LOOSEN THE FITTING CONNECTING THE PIPE TO THE BRAKE CALLIPER



Overhaul

Proceed as follows:

- 1) remove the two male hexagonal screws (1) and take out the two pads (10);
- 2) remove the two male hexagonal screws (2) and remove the reaction plate (3);
- 3) take out the fixed plate (4) from the guide;
- 4) remove the internal elements from the floating body (5) with the help of short blows of compressed air through the brake fluid pipe in order to facilitate the expulsion of pistons (6).
- 5) Check:
 - that the plates and the body are whole and in good condition;
 - that the cylinder and the floating body of the calliper do not show signs of scratches or erosion, otherwise replace the entire calliper;
 - that the guides of the fixed plate are not scratched or eroded, otherwise replace the entire plate;



- that the brake pad check spring works properly.

CAUTION

ALL THE INTERNAL COMPONENTS MUST BE REPLACED EVERY TIME THE CALLIPER IS SERVICED.

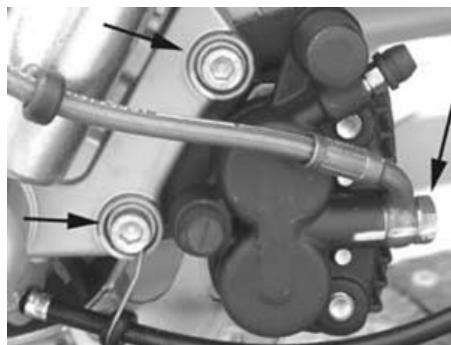
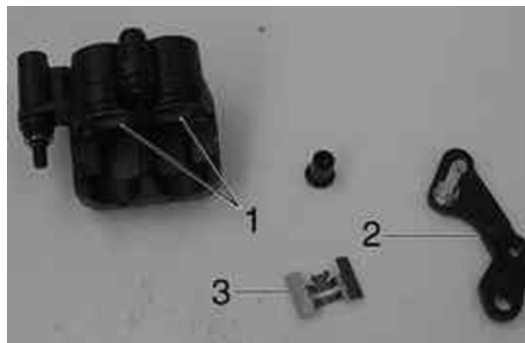
The brake pad check spring

1. pad fixing screws
2. reaction plate fixing screws
3. reaction plate
4. fixed plate
5. floating body
6. piston
7. piston sealing rings
8. guide protection rubbers
9. brake pad check spring
10. pads

Refitting

Insert the following on the front brake body:

- The sealing rings and the pistons (1).
- Refit the plate (2).
- Arrange the pad holding clamp (3).
- Refit the pads and bleed air.
- Place the calliper on the disk and lock it to the support by tightening the bolts at the prescribed torque.
- Lock the pipe joint to the calliper at the prescribed torque.
- Follow the same procedure for the rear brake calliper.

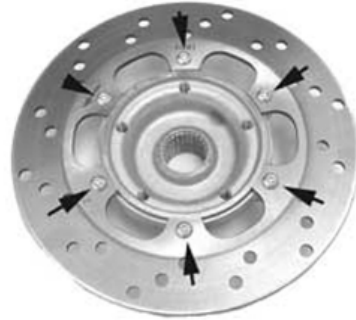
**Locking torques (N*m)**

Screws fixing the front calliper to the support: 24 ÷ 27 Screw fixing the oil connection to the calliper 19 ÷ 24

Rear brake disc

Removal

- Remove the rear brake calliper.
- Remove the brake disc and the hub from the wheel axle
- To remove the brake disc from the hub, hold the unit firmly with a vice and operate on the 5 fixing screws indicated in the photograph



Refitting

- To reassemble the brake disc on the hub, carry out the removal operations in the reverse order arranging the brake disc on the hub on the side opposite the wheel keying
- Follow the direction of rotation shown by the arrow and tighten to the prescribed torque.
- Fit the hub unit
- disc in the wheel axle

Locking torques (N*m)

Disk to the hub 11 ÷ 13 Nm

Disc Inspection

- Remove the rear brake calliper.
- Check the disc thickness with a micrometer

Characteristic

Minimum thickness allowed after use:

3.5 mm

Standard thickness:

4 +0.2-0.2 mm

- Repeat the measurement at no fewer than six points on the disc.
- Check the regular nature of the rotation of the brake disc assembly using the appropriate tool fixed onto the brake calliper as shown in the photo.
- In order to be able to anchor the appropriate tool properly use a metal plate with M8 threaded hole and fix it to one of the two rear brake calliper attachment points.
- Suitably fix the flange to the wheel axle with the original nut and spacer and a $\text{\AA}$ 17 mm bearing.

N.B.

SO AS NOT TO FALSIFY THE READING, YOU SHOULD ROTATE THE DRIVEN PULLEY AXLE IN ORDER TO ROTATE THE DISC.

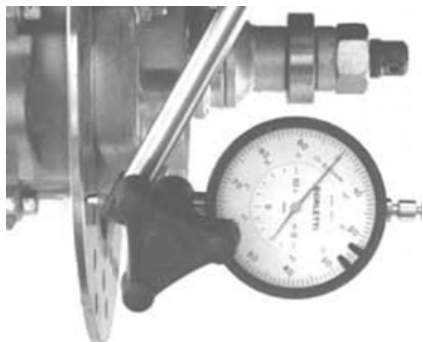
Specific tooling

020335Y Magnetic support for dial gauge

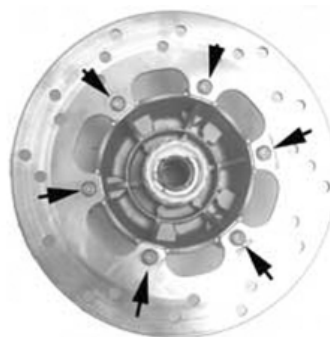
Characteristic**Max. deviation allowed:**

0.1 mm

- If you detect incorrect values, replace the disc. If the anomaly persists, replace the hub.

**Front brake disc****Removal**

- Remove the front wheel
- Remove the front brake calliper
- Remove the hub and the disc operating on the wheel axle nut
- Hold the hub and the disc firmly and remove the brake disc undoing the six screws indicated in the photograph



Refitting

- Carry out the operations in the reverse order from the removal being careful to respect the direction of disc rotation shown by the arrow printed on it
- Tighten the six screws to the specified torque.

Locking torques (N*m)

Brake disc screws: 6 +0.5 -1 Nm



Disc Inspection

- Remove the front wheel
- Use a micrometer to check the disc thickness as shown in the photograph
- Repeat the measurement in at least 6 points on the disk
- Remove the front brake calliper
- In order to secure the appropriate tool adequately use a metal plate with M8 threaded hole and fix it to one of the two front brake calliper attachment points
- Place the dial gauge on the disk outer edge
- Make the wheel hub turn and check the disk deviation



Specific tooling

020335Y Magnetic support for dial gauge

Characteristic

Standard thickness:

4 +0.2-0.2 mm

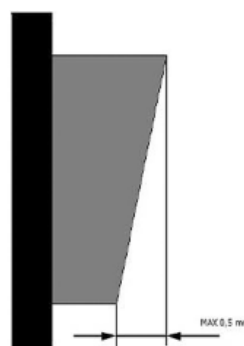
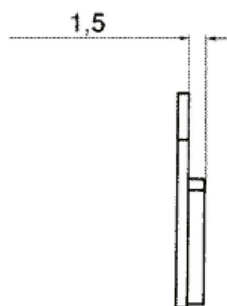
Max. deviation allowed:

0.1 mm

Front brake pads

Removal

- Remove the front wheel
- Pre-loosen the two fixing pins of the brake pads
- Remove the brake calliper
- Remove permanently the two pad fixing screws
- Check that there are no flaws or warping. If there is, replace it.
- Check the thickness of the friction material is more than 1.5 mm. If it is not, replace it
- The replacement must be made with greater residual thickness if the pad has not worn evenly. A 0.5 mm thickness difference in the residual friction material is permitted



Refitting

To fit, proceed as follows:

- Insert the two pads in the callipers.

- Screw the two pad lock pins to the correct torque, and apply the recommended product.
- Fit the calliper on its support, tightening the two screws to the prescribed torque.

N.B.

IF IT IS NOT POSSIBLE TO CORRECTLY POSITION THE CALLIPER ON THE DISC DURING FITTING, GENTLY EXPAND THE PADS.

Recommended products

Loctite 243 Medium strength threadlock

Medium Loctite 243 threadlock

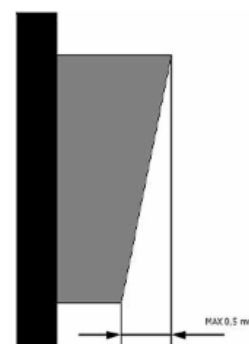
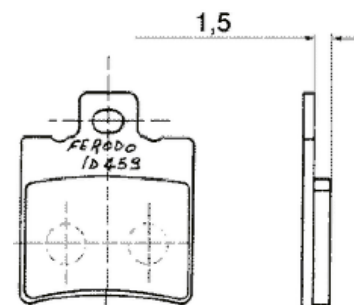
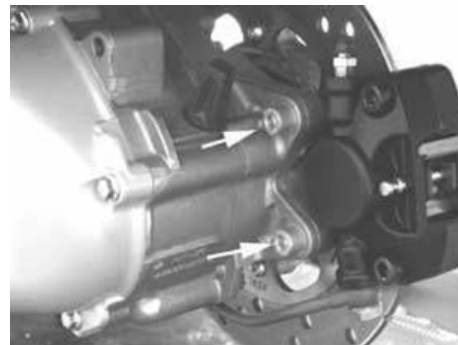
Locking torques (N*m)

Screw tightening calliper to the support 24 ÷ 27 Pad fastening pin 19.6 ÷ 24.5

Rear brake pads

Removal

- Remove the rear brake calliper.
- Remove the brake pad and check there are no faults or warping. If there is, replace it.
- Check the thickness of the friction material is more than 1.5 mm. If it is not, replace it
- The replacement must be made with greater residual thickness if the pad has not worn evenly. A 0.5 mm thickness difference in the residual friction material is permitted



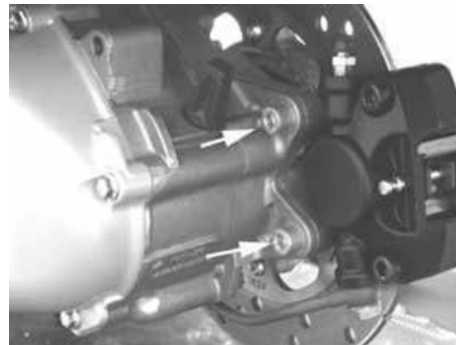
See also[Removal](#)

Refitting

- Insert the brake pads
- Insert the fixing pin being careful to position the clip with the ends towards the bleed screw as in the photo.
- Insert the clip on the pin
- Fix the rear brake calliper to the bracket and tighten the two screws to the specified torque.

**Locking torques (N*m)**

Rear brake calliper tightening screw 20 ÷ 25 Nm



Fill

Rear - combined

- Remove the rubber hood from the bleed screw.
- Insert a rubber pipe in the bleed screw to permit the brake fluid to be recovered.
- With the left-hand brake lever, load the system and bring it up to the required pressure.
- Keeping the left-hand brake lever pulled, loosen the bleed screw to permit the air in the system to escape. Then do up the bleed screw
- Repeat the operation until only brake fluid comes out of the rubber pipe.
- Remove the fluid recovery pipe and refit the rubber hood over the bleed screw.
- Top up the brake fluid to the right level in the tank.



If necessary, bleeding can be done using a special vacuum pump

N.B.

DURING THE BLEEDING OPERATIONS, MAKE SURE THE BRAKE FLUID DOES NOT COME INTO CONTACT WITH THE BODYWORK SO AS NOT TO DAMAGE IT. FURTHERMORE, DURING THE

BLEEDING OPERATIONS REGARDING THE BRAKE CALLIPERS, MAKE SURE THE BRAKE FLUID DOES NOT COME INTO CONTACT WITH THE DISC BRAKES AND WITH THE BRAKE PADS. FAILURE TO COMPLY WITH THIS NORM WILL ENDANGER THE PROPER WORKING AND EFFICIENCY OF THE BRAKE SYSTEM

Specific tooling

020329Y Mity-Vac vacuum operated pump

Locking torques (N*m)

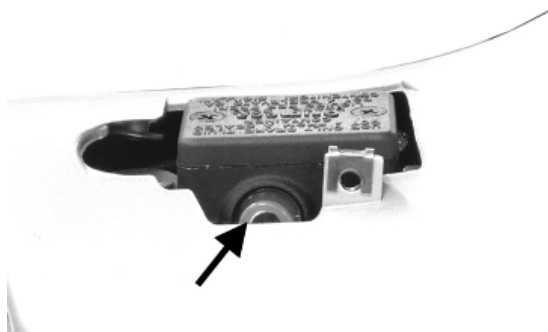
System bleed calliper fitting: 12 ÷ 16 Nm

Brake fluid level check

- Position the vehicle on a flat surface and on the centre stand
- Remove the brake pump cover as indicated in the photo



- Use the appropriate spyglass on the pump to check the level of the brake fluid, as shown in the photograph



- If the level is below the minimum, fill using the two screws shown in the figure
- Remove the gasket and fill with DOT 4 until the spyglass is completely covered

CAUTION

MAKE SURE THE BRAKE FLUID DOES NOT GET INTO YOUR EYES OR ON YOUR SKIN OR CLOTHES. IF THIS HAPPENS ACCIDENTALLY, WASH WITH WATER.

CAUTION



THE BRAKING CIRCUIT FLUID IS HIGHLY CORROSIVE. THEREFORE, WHEN TOPPING IT UP, AVOID LETTING IT COME INTO CONTACT WITH THE PAINTED PARTS OF THE VEHICLE. THE BRAKING CIRCUIT FLUID IS HYGROSCOPIC, WHICH MEANS THAT IT ABSORBS MOISTURE FROM THE SURROUNDING AIR. IF MOISTURE CONTAINED IN THE BRAKE FLUID EXCEEDS A CERTAIN VALUE, THIS WILL RESULT IN INEFFICIENT BRAKING.

CAUTION

- BRAKING CIRCUIT FLUID IS HYGROSCOPIC. IT ABSORBS HUMIDITY FROM THE SURROUNDING AIR. IF THE LEVEL OF HUMIDITY IN THE BRAKE FLUID EXCEEDS A GIVEN VALUE, BRAKING EFFICIENCY WILL BE REDUCED.

Locking torques (N*m)

Brake pump reservoir screws $1.5 \div 2$

Never use brake liquid in open or partially used containers.

Under normal climatic conditions, the fluid must be changed every 20,000 km or anyway every two years.

For refitting purposes carry out the operations in the reverse order from the removal operation and respect the tightening torque of the tank cover screws.

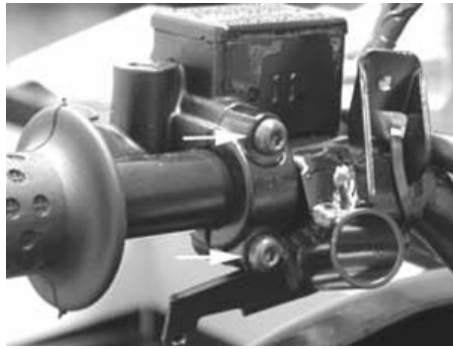
Front brake pump

Removal

- Remove the rear handlebar cover.
- Remove the two screws fixing the brake pump to the handlebar indicated in the photograph
- Remove the oil pipe joint from the pump
- Remove the connector to the stop light switch

BRAKE PUMP TECHNICAL DATA:

Specification	Desc./Quantity
Pump right piston diameter	Ø 12.7
Pump left piston diameter	Ø 11



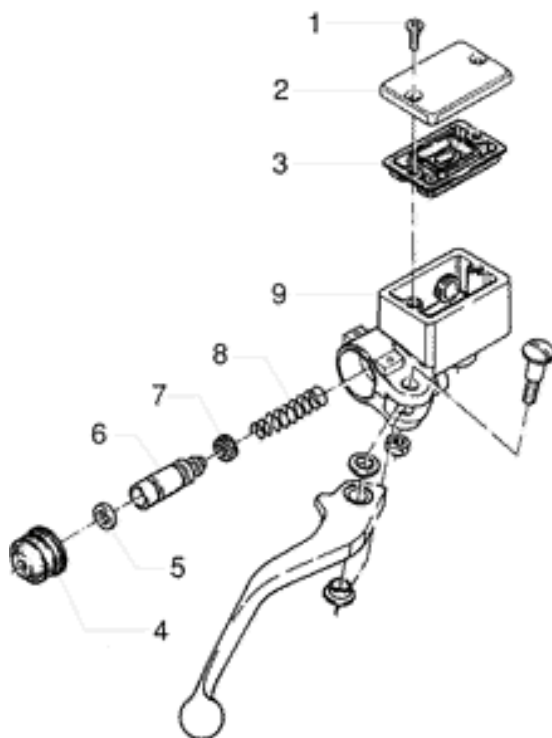
Overhaul

Proceed as follows:

- 1) Remove the brake lever by loosening the retaining screw; open the cover (2) and take out the diaphragm (3);
- 2) remove the cap (4) and take out the internal parts in order;
- 3) Check that:
 - The pump body shows no signs of internal damage or corrosion;
 - The plunger shows no sign of damage or abnormal wear;
 - The plunger return spring is in good condition.

CAUTION

ALL THE SEALS AND GASKETS MUST BE REPLACED EVERY TIME THE PUMP IS SERVICED.



1. Reservoir cap screw
2. Reservoir cap.
3. Diaphragm.
4. Bellows.
5. Sealing ring
6. Piston.
7. Gasket.
8. Spring.
9. Reservoir

Refitting

To refit, carry out the removal operations but in reverse order, observing the specified torques.

Locking torques (N*m)

Oil pipe joint to the pump: 20 - 25 Brake pump fixing screws to the handle bar: 7 ÷ 10 Nm

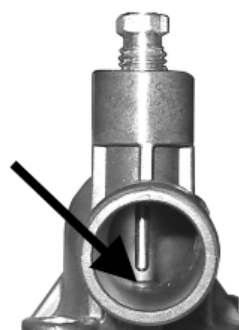
INDEX OF TOPICS

COOLING SYSTEM

COOL SYS

System bleed

- Start up the engine until the operating temperature is reached.
- Remove the rubber hood over the bleed valve
- Obtain a rubber tube that is of the right length to connect the valve to the expansion tank
- Place one end of the pipe on the bleed valve and the other in the expansion tank
- Loosen the screw by **two** turns until the communication hole is revealed with the head as shown in the photo
- Wait until only coolant comes out of the rubber pipe so as to eliminate any air bubbles inside the circuit.
- Tighten the bleed valve respecting the maximum torque.
- Bring the coolant up to the correct level inside the expansion tank



Locking torques (N*m)

Bleed screw: 3

Check

- 1) Look to see that the thermostat is not damaged.
- 2) Fill a metal container with approx. 1 litre of water.

Immerse the thermostat, and keep it in the centre of the container.

Immerse the multimeter temperature probe, and keep it close to the thermostat.

Heat up the container using the thermal gun.

Check the temperature when the thermostat starts to open:

Heat up until the thermostat is completely open.

- 3) Replace the thermostat if it is not working properly.



CAUTION

TO EXECUTE THE TEST CORRECTLY, MAKE SURE NEITHER THE THERMOSTAT NOR THE THERMOMETER TOUCHES THE CONTAINER.

Specific tooling

020331Y Digital multimeter

020151Y Air heater

Characteristic

Thermostat check: Opening start temperature

69.5 ÷ 72.5°C

INDEX OF TOPICS

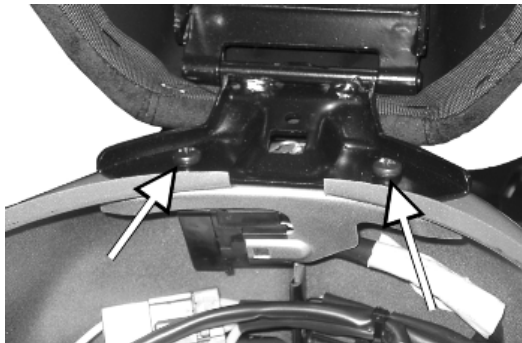
CHASSIS

CHAS

This section è is devoted to the operations that can be carried out on the vehicle's bodywork.

Seat

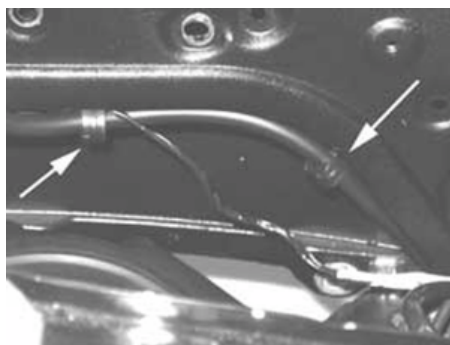
- Remove the helmet compartment
- Remove the two screws shown in the photograph
- Remove the saddle



- Remove the helmet compartment
- Remove the 2 nuts indicated in the photograph



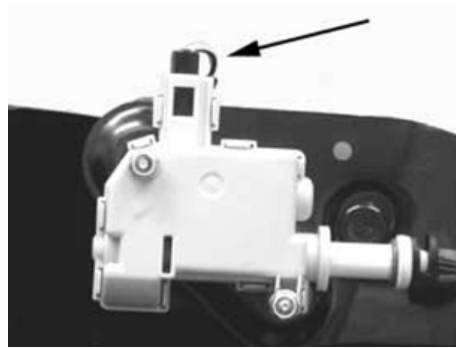
- Free the electric cables from the retaining clamps indicated in the photograph



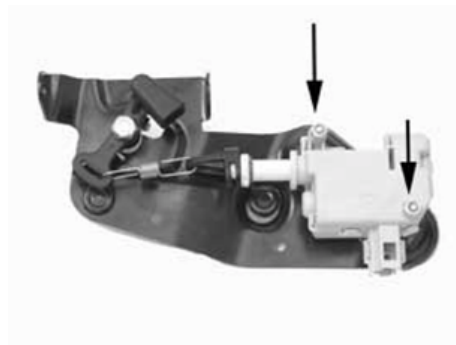
- Remove the saddle opening transmission cable
- Remove the saddle manual opening transmission cable.



- Remove the electric connector from the saddle opening actuator



- Remove the two screws shown in the photograph
- Remove the clip from the transmission
- Remove the actuator from the supporting bracket

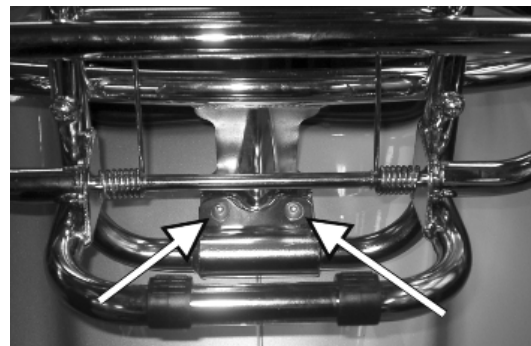


Rear rack

- Remove the helmet compartment
- Remove the 4 screws indicated in the figure

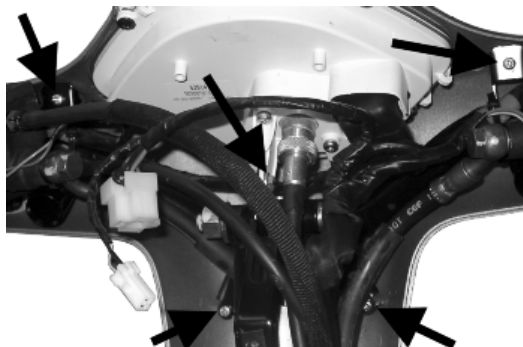


- Remove the two screws, indicated in the figure, that fix the luggage rack to the body



Rear handlebar cover

- Remove the front handlebar cover
- Loosen the 5 screws shown in the figure
- Detach the odometer cable
- Remove the rear handlebar cover after detaching the electrical wires.



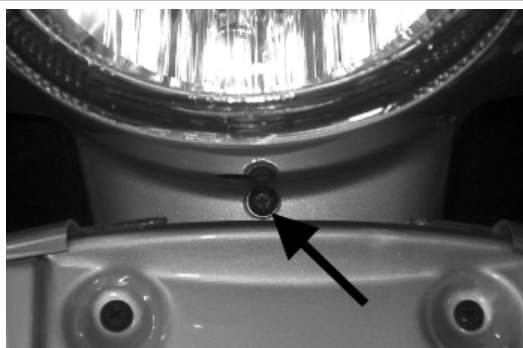
Instrument panel

- Remove the rear handlebar cover;
- Remove the four screws indicated in the figure
- Remove the instrument panel.



Front handlebar cover

- Remove the front grille
- Remove the front screw indicated in the figure



- Undo the 2 screws indicated in the figure;
- Remove the front handlebar cover
- Disconnect the front headlamp connectors



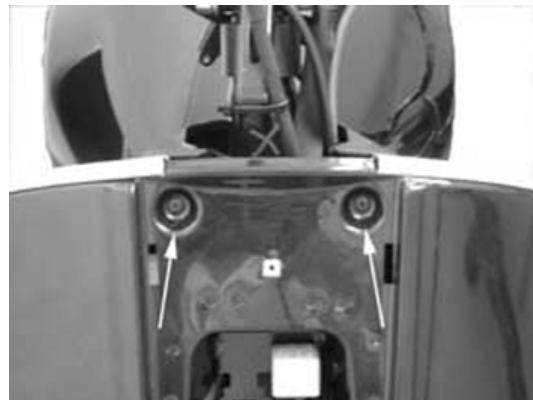
Headlight assy.

- Operate the screw indicated in the figure to remove the front turn indicator



Knee-guard

- Remove the rear handlebar cover.
- Remove the two screws indicated in the photograph and located on the shield under the grille



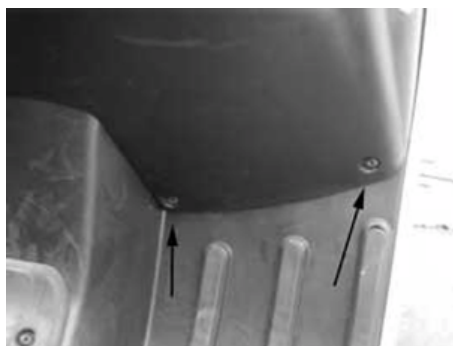
- Remove the expansion tank cover and then its cap
- Remove the central screw inside the glove-box, indicated in the photograph



-
- Remove the two screws indicated in the photograph and located below the expansion tank cover and the left cover respectively



-
- Remove the shield back plate lower screws, to the right and left side of the shield back plate, as indicated in the photograph

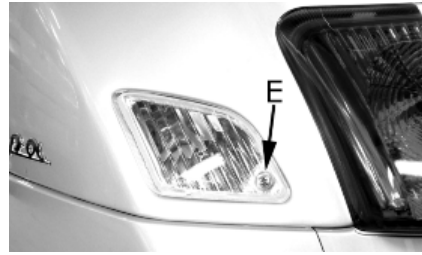


-
- Remove the electric saddle opening switch, the fuse box and the manual saddle opening cable as shown in the photograph



Taillight assy.

- Operate the screw indicated in the figure to remove the rear turn indicator



Remove screw «A» to remove the rear headlight assembly.

Access to taillight bulbs, stop light bulb and license plate bulb.

To reassemble, repeat the operation in the reverse order.



N.B.

IF MISTING IS NOTICED ON THE INSIDE OF THE HEADLAMP GLASS, THIS DOES NOT INDICATE A FAULT AND IS RELATED TO THE HUMIDITY AND/OR TO LOW TEMPERATURES. THE PHENOMENON SHOULD QUICKLY DISAPPEAR WHEN THE LIGHT IS SWITCHED ON. THE PRESENCE OF WATER DROPS, ON THE OTHER HAND, COULD INDICATE THAT WATER IS INFILTRATING. CONTACT THE PIAGGIO AFTER-SALES SERVICE NETWORK.

Footrest

- Remove the shield back plate
- Remove the battery compartment cover
- Remove the side fairings
- Remove the central screw located under the battery compartment cover as indicated in the figure



-
- Remove the passenger footrests undoing the two screws indicated in the figure



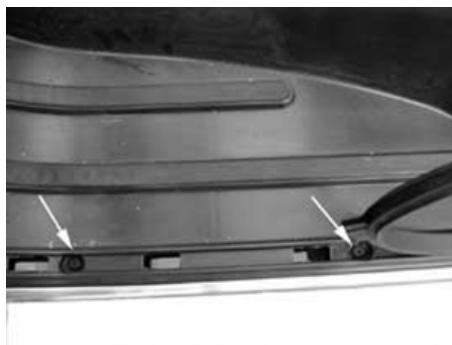
-
- Remove the right and left screws fixing the footrest indicated in the figure



-
- Remove the right and left lower covers as shown in the figure



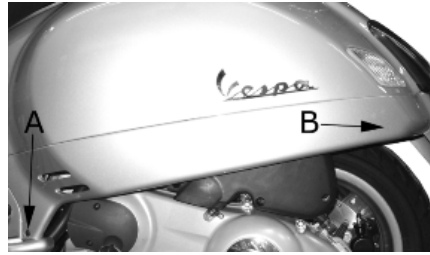
-
- Remove the screws under the non-slip rubber mat of the footrest as indicated in the photograph



Side fairings

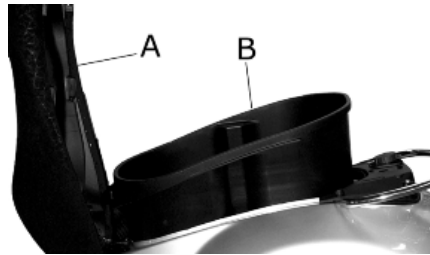
Unscrew the fixing screw "A"

Unscrew the nut "B" under the body.



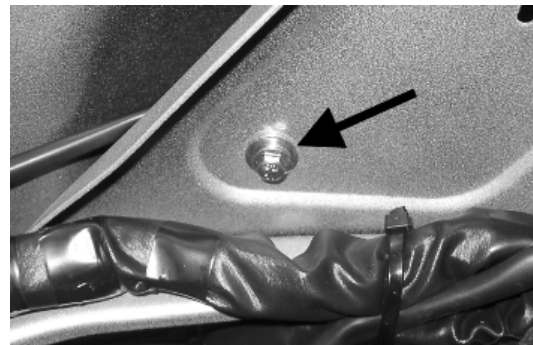
Helmet bay

- Lift the saddle and remove the helmet compartment



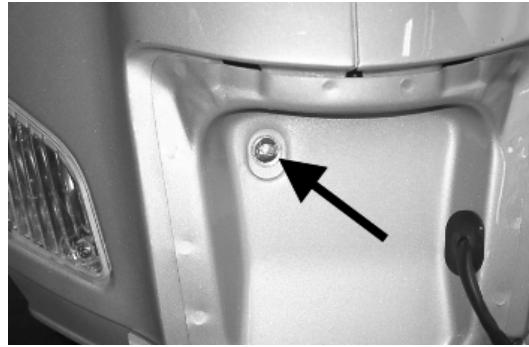
Fuel tank

- Remove the helmet compartment
- Remove the side fairings
- Remove the muffler
- Remove the luggage rack
- Remove the shock absorber upper clamps
- Remove the two screws, indicated in the figure, that fix the tank to the body



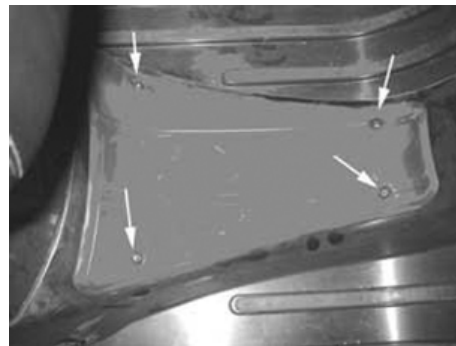
- Remove the screw indicated in the figure that fixes the tank to the body after removing the rear headlight assembly

- Remove the two turn indicators
 - Use a jack to lift the body so that there is enough space between the vehicle rear side and the engine to slide off the tank
- To refit, perform the steps in the reverse direction to disassembly



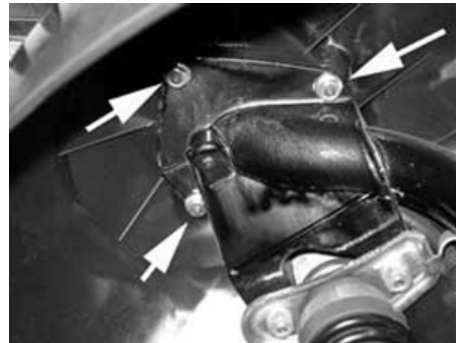
Rear central cover

- Remove the four screws indicated in the figure



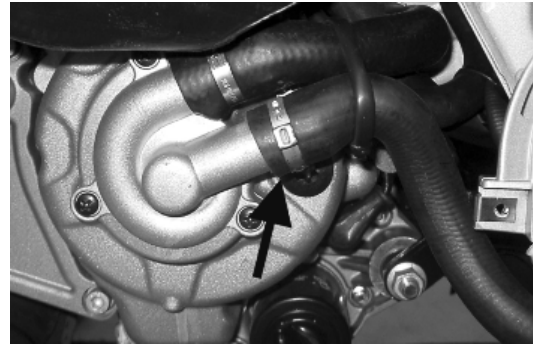
Front mudguard

- First remove the steering tube and uncouple the front brake pipes from the calliper in order to remove the front mudguard
- Remove the three mudguard-steering tube clamps indicated in the figure



Radiator fan

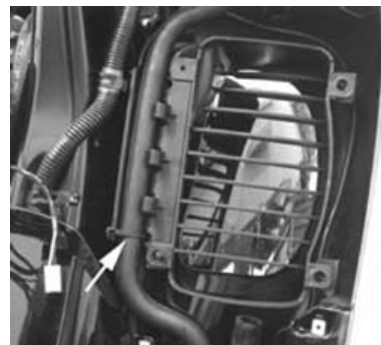
- In order to carry out any operation on the radiator unit, flow out the coolant in the coolant delivery pipe in the pump, indicated in the photograph.



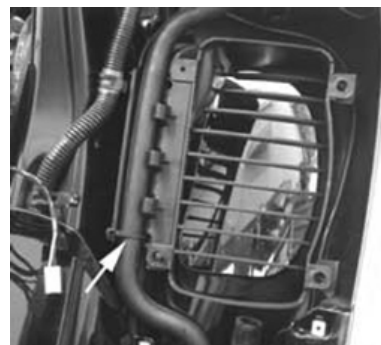
- Remove the shield back plate;
- Remove the coolant feed and return hoses from the right radiator;
- Unscrew the 4 screws fixing the radiator to the body;
- Detach the radiator



- Detach the pipe from the plastic duct by removing the plastic clip shown in the photograph. Then remove the duct.



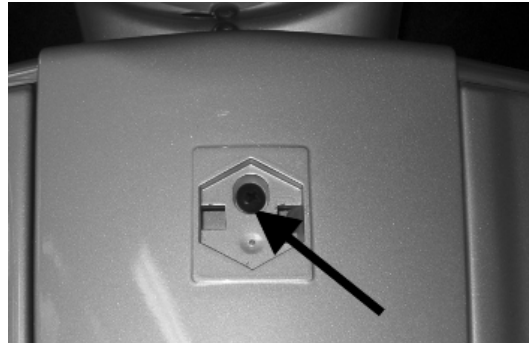
- The same procedure also applies to the left radiator for which it is necessary to remove the electrical fan first by undoing the 3 screws indicated in the photograph.



To refit, perform the removal operations but in reverse order being careful when positioning the new clips for the fluid hoses and when filling the cooling system.

Front central cover

- Remove the "PIAGGIO" clip-on badge
- Unscrew the screw indicated in the figure
- Remove the grille



INDEX OF TOPICS

PRE-DELIVERY

PRE DE

Carry out the listed tests before delivering the vehicle.

Warning- be very careful when handling fuel.

Aesthetic inspection

Appearance checks:

- Paintwork
- Fitting of plastics
- Scratches
- Dirt

Tightening torques inspection

Lock check

- Safety locks
- clamping screws

Safety locks

Rear shock absorber upper fixing

Rear shock absorber lower fixing

Lower front shock absorber fitting

Front wheel axle nut

Front wheel screws

Rear wheel screws

Front and rear wheel hub nut

Front and rear brake calliper clamping screws

Frame - swinging arm bolt *

Swinging arm bolt - Engine

Engine arm pin - Frame arm

Handlebar lock nut

Steering lower ring nut

Upper steering ring nut

Electrical system

- Main switch
- Lights: high beams, low beams, side/taillights (front and rear) and relevant warning lights
- Regulating the headlights according to the regulations currently in force
- Front and rear stop light buttons and relative light
- Turn indicators and relative telltales
- Instrument lighting
- instruments: fuel and temperature indicator

- Instrument panel lights
- Horn
- electric start up
- Engine stopping with emergency stop switch
- electric saddle opening button

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 THE LIFE OF THE BATTERY.

CAUTION

WHEN INSTALLING THE BATTERY, ATTACH THE POSITIVE LEAD FIRST AND THEN THE NEGATIVE LEAD.

WARNING

BATTERY ELECTROLYTE IS TOXIC AND IT MAY CAUSE SERIOUS BURNS. IT CONTAINS SULPHURIC ACID. AVOID CONTACT WITH EYES, SKIN AND CLOTHING.

IN CASE OF CONTACT WITH EYES OR SKIN, RINSE WITH ABUNDANT WATER FOR ABOUT 15 MINUTES AND SEEK MEDICAL ATTENTION AT ONCE.

IF IT IS SWALLOWED, IMMEDIATELY DRINK LARGE QUANTITIES OF WATER OR VEGETABLE OIL. SEEK IMMEDIATE MEDICAL ATTENTION.

THE BATTERIES PRODUCE EXPLOSIVE GAS; KEEP THEM AWAY FROM NAKED FLAMES, SPARKS AND CIGARETTES. IF THE BATTERY IS CHARGED IN A CLOSED PLACE, TAKE CARE TO ENSURE ADEQUATE VENTILATION. ALWAYS PROTECT YOUR EYES WHEN WORKING CLOSE TO 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

Level check:

- Hydraulic brake system liquid level.
 - Rear hub oil level
 - Engine coolant level
 - Engine oil level
-

Road test

Test ride

- Cold start
 - Instrument operations
 - Response to the throttle control
 - Stability on acceleration and braking
 - Rear and front brake efficiency
 - Rear and front suspension efficiency
-

- Abnormal noise

Static test

Static control after the test ride:

- Hot engine restart
- Minimum seal (turning the handlebar)
- Uniform steering rotation
- Possible losses
- electric radiator fan operation

CAUTION

CHECK AND ADJUST TYRE PRESSURE WITH TYRES AT AMBIENT TEMPERATURE.

CAUTION

NEVER EXCEED THE RECOMMENDED INFLATION PRESSURES OR TYRES MAY BURST.

Functional inspection

Functional check up:

- Hydraulic braking system: lever travel
 - Clutch: proper functioning check
 - Engine: proper general functioning and no abnormal noise check
 - Other: papers check, frame and engine number check, tools and equipment, licence plate fitting, lock check, tyre pressure check, rear-view mirror and any accessory fitting
-

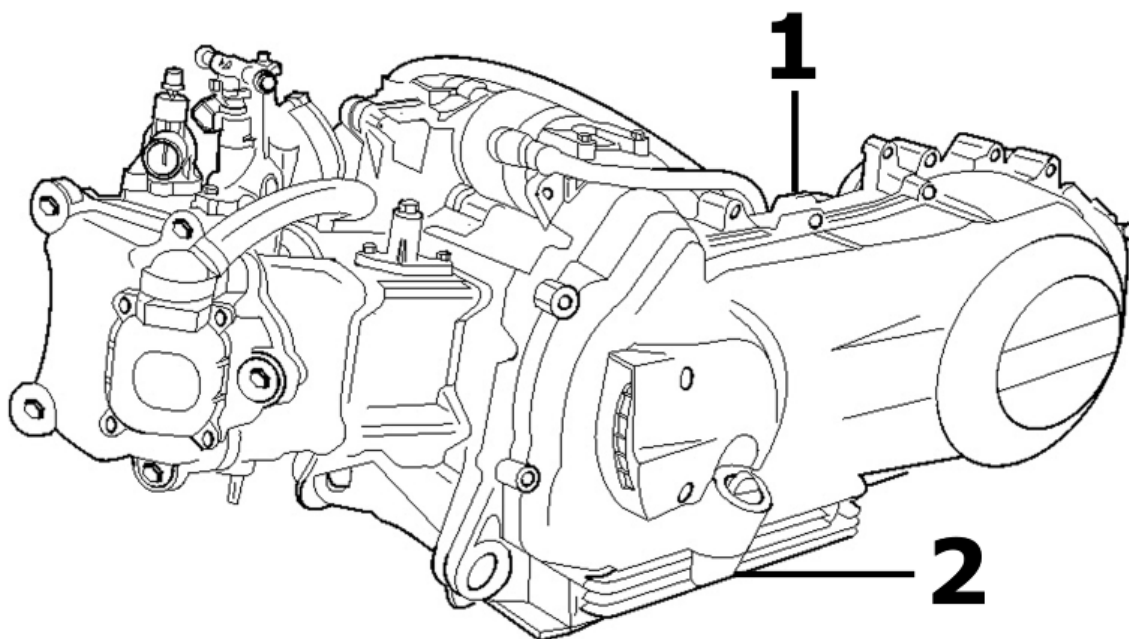
INDEX OF TOPICS

TIME	TIME
------	------

This section is devoted to the time necessary to carry out repairs.

For each operation, the description, code and time envisages are specified.

Engine



ENGINE

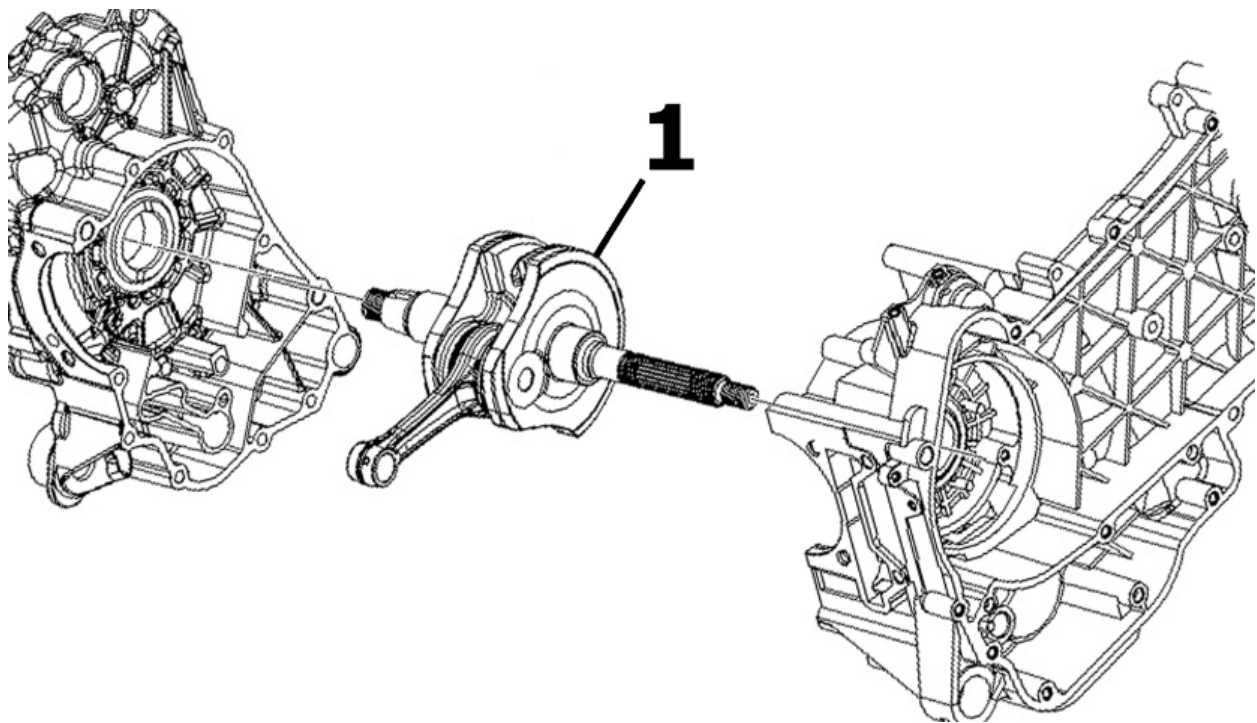
	Code	Action	Duration
1	001001	Engine from frame - Removal and refit.	
2	003064	Engine oil - change	

Crankcase

CRANKCASE

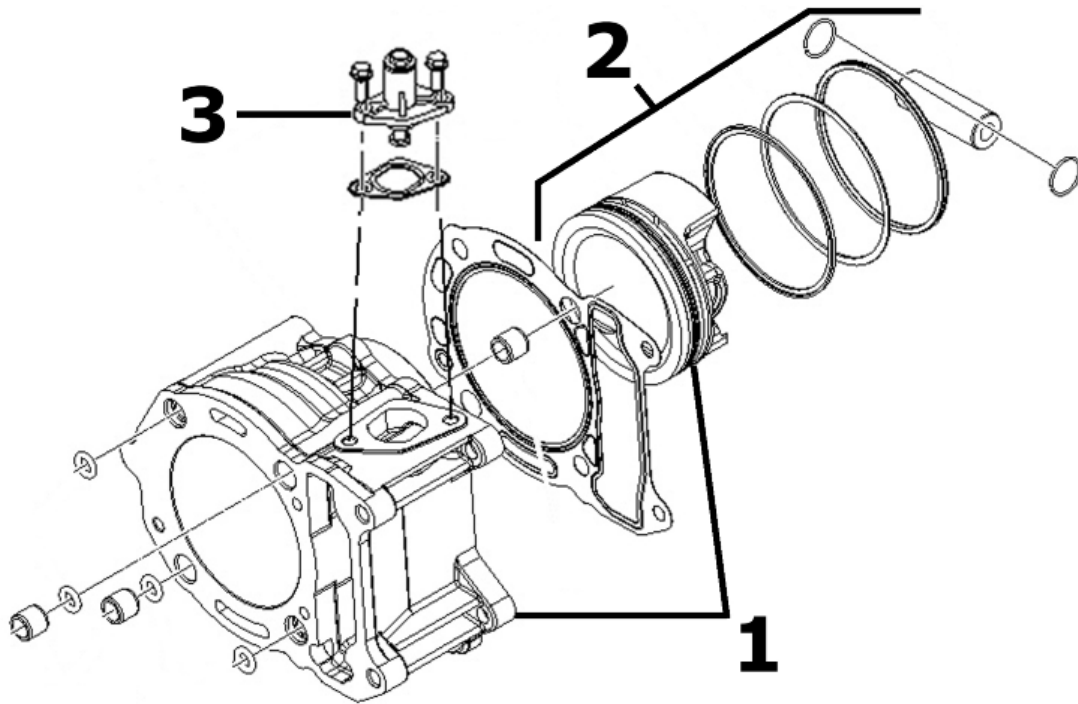
	Code	Action	Duration
1	001153	Crankcase halves gasket - Replacement	
2	001133	Engine crankcase- Replacement	

Crankshaft



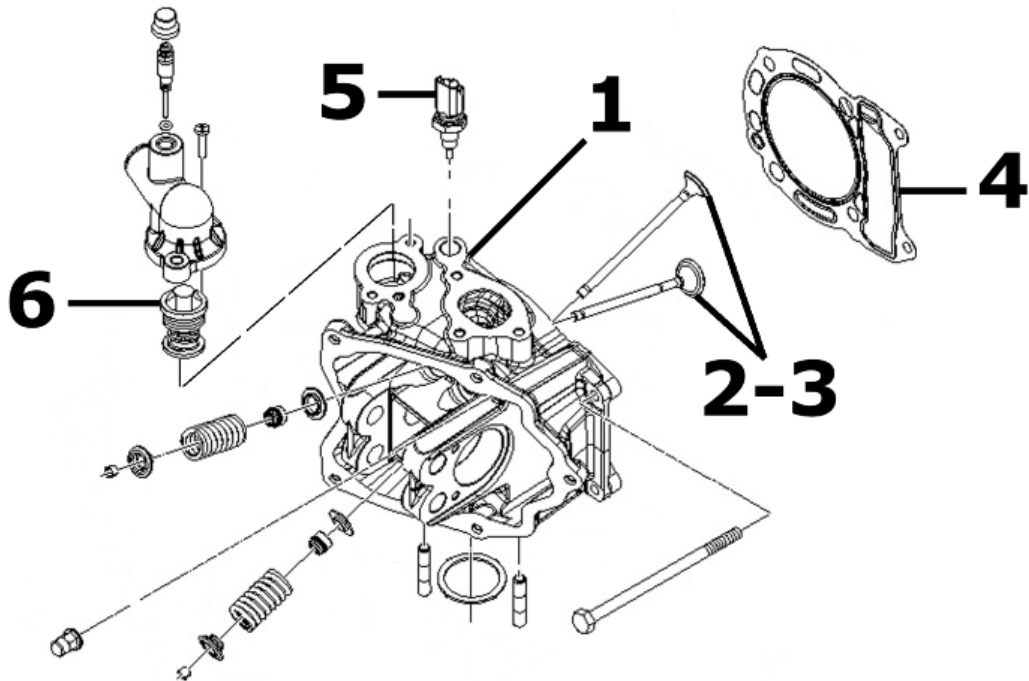
CRANKSHAFT

	Code	Action	Duration
1	001117	Crankshaft - Replacement	

Cylinder assy.**CYLINDER- PISTON**

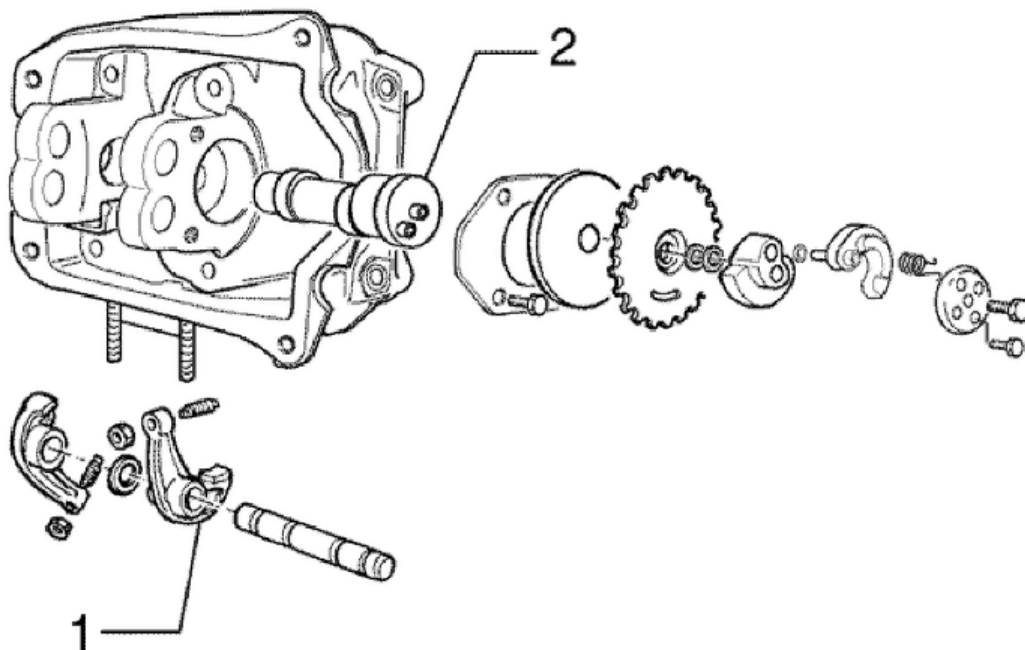
	Code	Action	Duration
1	001002	Cylinder-Piston - Replace- ment	
2	001154	Pin ring piston unit - Service	
3	001129	Chain tightener - Overhaul and replacement	

Cylinder head assy.

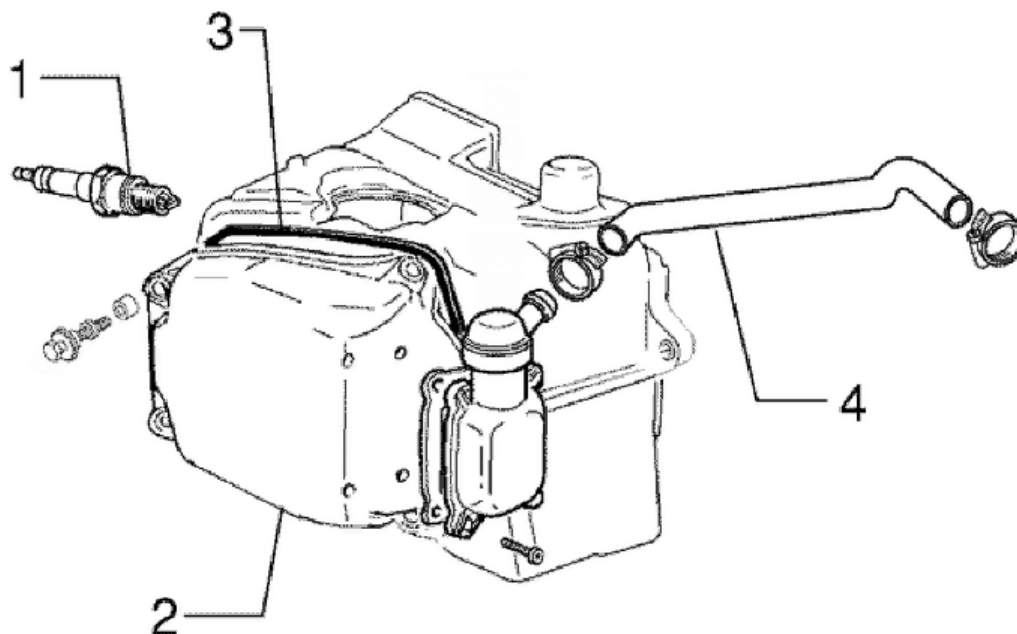


VALVE HEAD

	Code	Action	Duration
1	001126	Head - Replacement	
2	001045	Valves - Replacement	
3	001049	Valves - Adjustment	
4	001056	Head gasket - Replacement	
5	001083	Thermistor - Replacement	
6	001057	Thermostat - Replacement	

Rocker arms support assy.**CAM SHAFT**

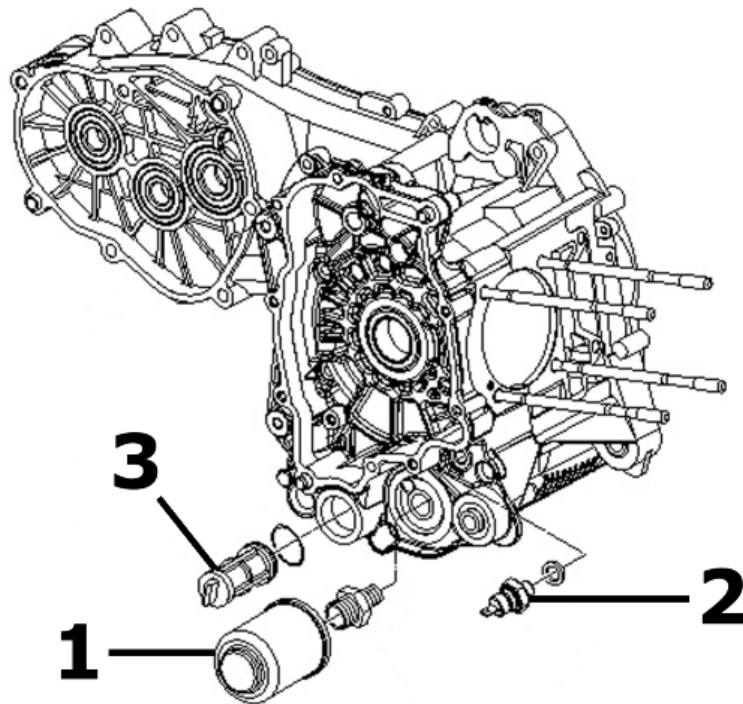
	Code	Action	Duration
1	001148	Rocking lever valve - Re- placement	
2	001044	Camshaft - Replacement	

Cylinder head cover

HEAD COVER

	Code	Action	Duration
1	001093	Spark plug - Replacement	
2	001089	Head cover - Replacement	
3	001088	Head cover gasket - Replacement	
4	001074	Oil vapour recovery pipe - Replacement	

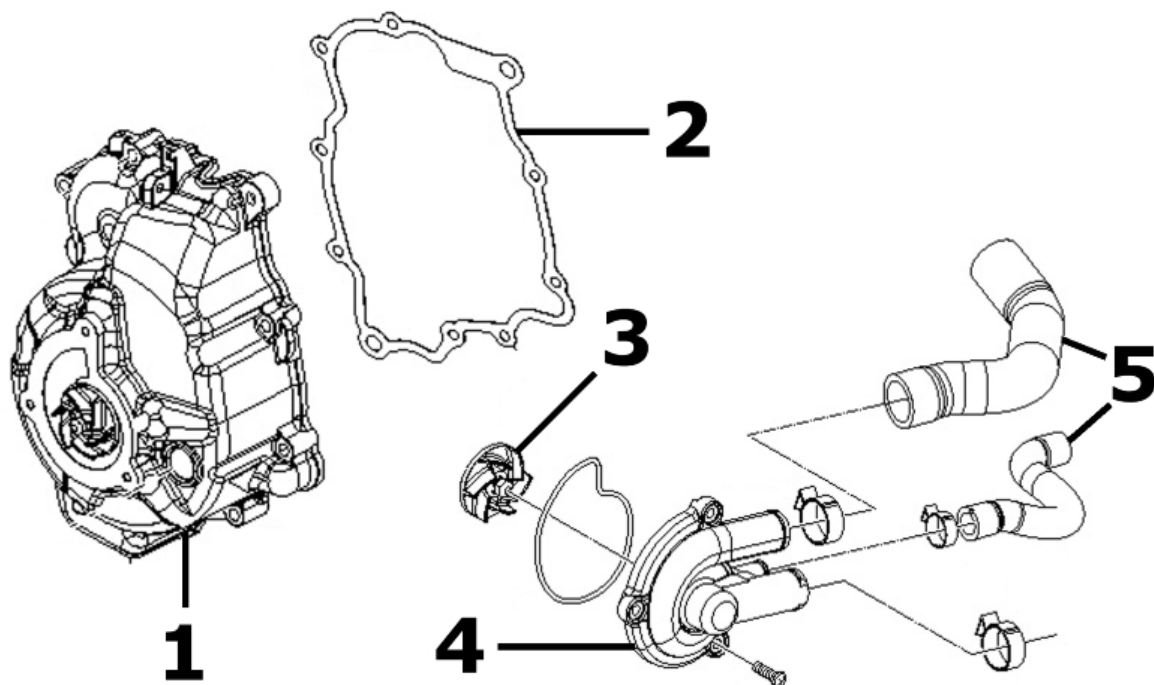
Oil filter



OIL FILTER

	Code	Action	Duration
1	001123	Oil filter -Replacement	
2	001160	Oil pressure sensor - Replacement	
3	001102	Net oil filter - Replacement / Cleaning	

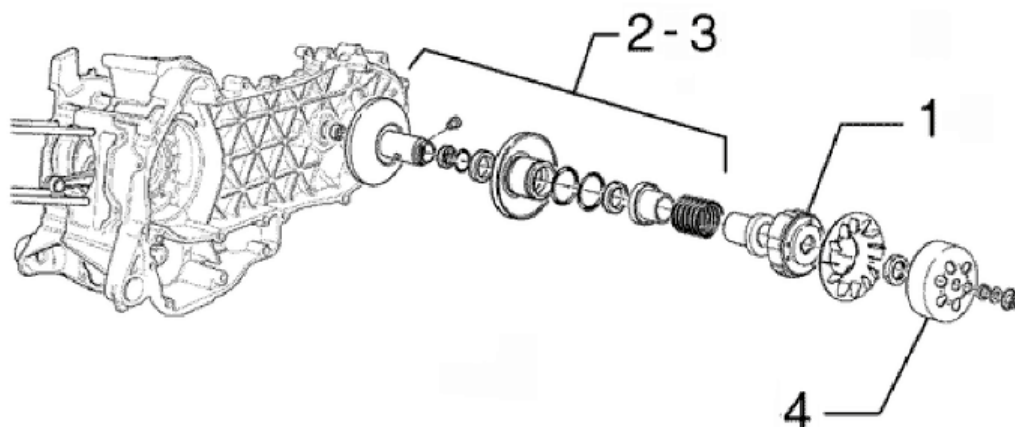
Flywheel cover



FLYWHEEL COVER

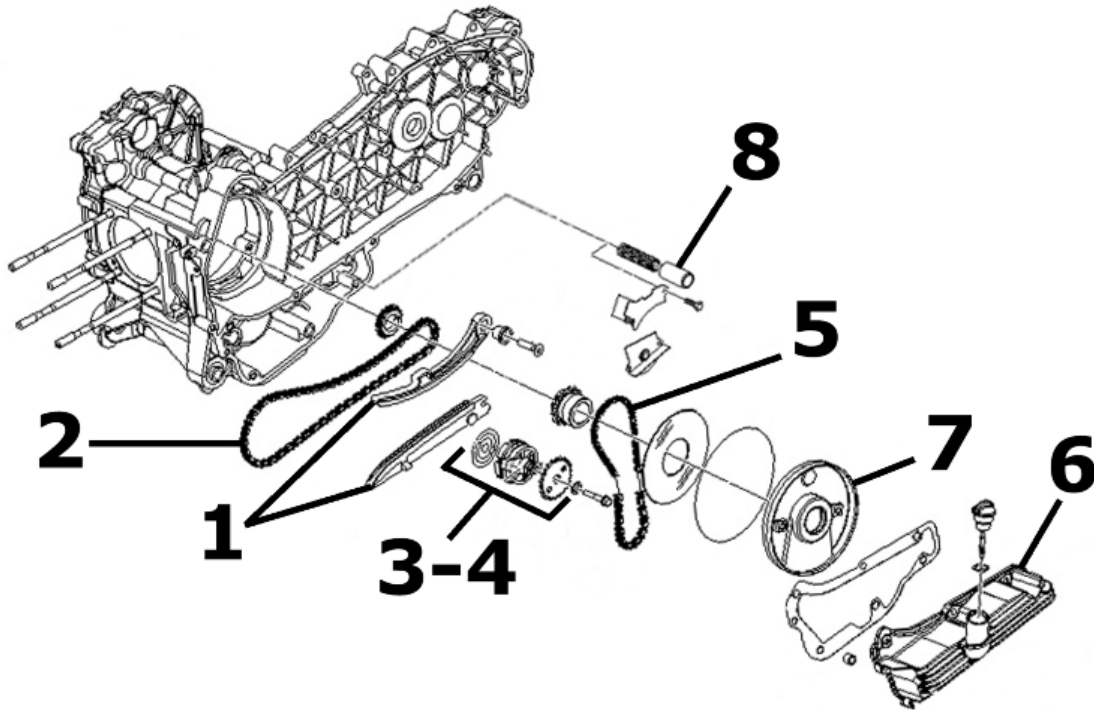
	Code	Action	Duration
1	001087	Flywheel cover - replace	
2	001150	Flywheel cover gasket - Replacement	
3	007007	Water pump rotor cover	
4	007017	Water pump cover - Replacement	
5	007003	Coolant delivery and return pipe - Replacement	

Driven pulley

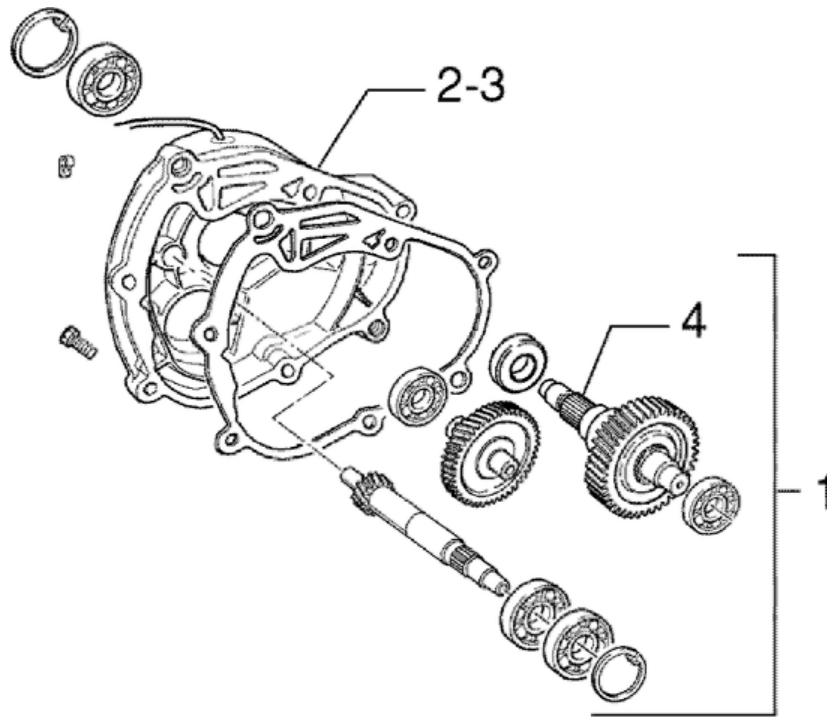


DRIVEN PULLEY

	Code	Action	Duration
1	001022	Clutch - Replacement	
2	001012	Driven pulley - Service	
3	001110	Driven pulley - Replacement	
4	001155	Clutch bell - Replacement	

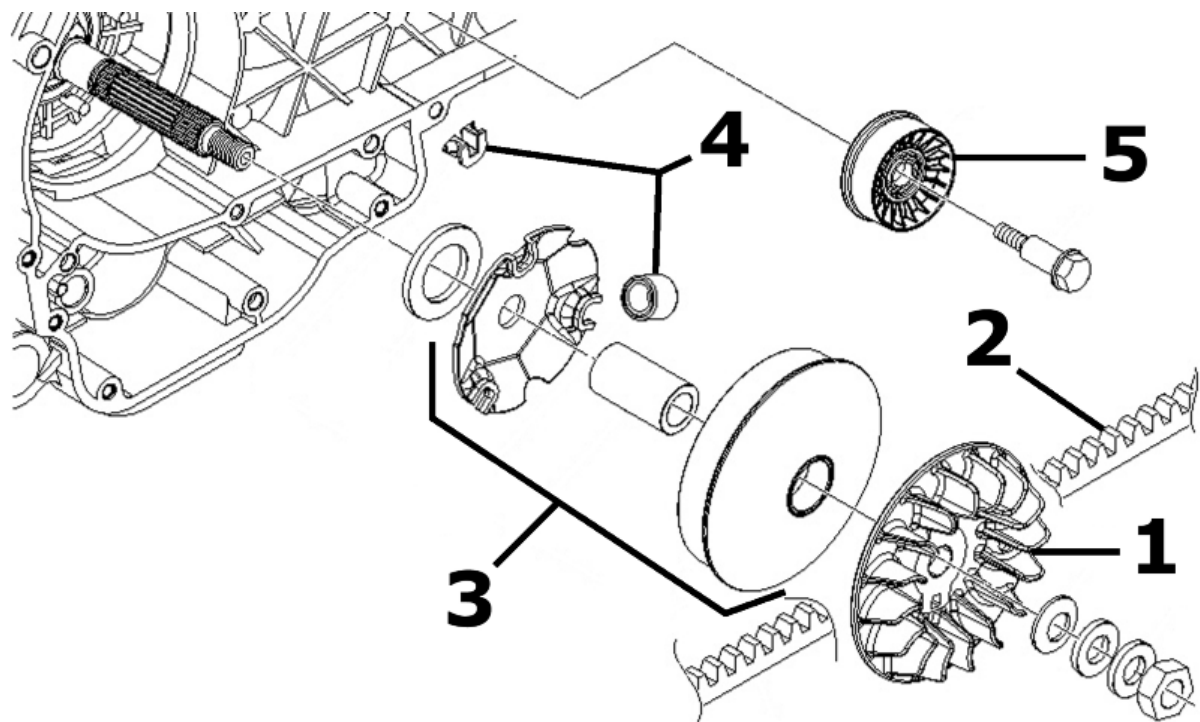
Oil pump**OIL PUMP**

	Code	Action	Duration
1	001125	Chain guide pads - Replacement	
2	001051	Belt/Timing chain - Change	
3	001042	Oil pump - Service	
4	001112	Oil pump - change	
5	001122	Oil pump chain - Replacement	
6	001130	Oil sump - Replacement	
7	001172	Chain cover flap - change	
8	001124	Lubrication by-pass - Replacement	

Final gear assy.**FINAL REDUCTION**

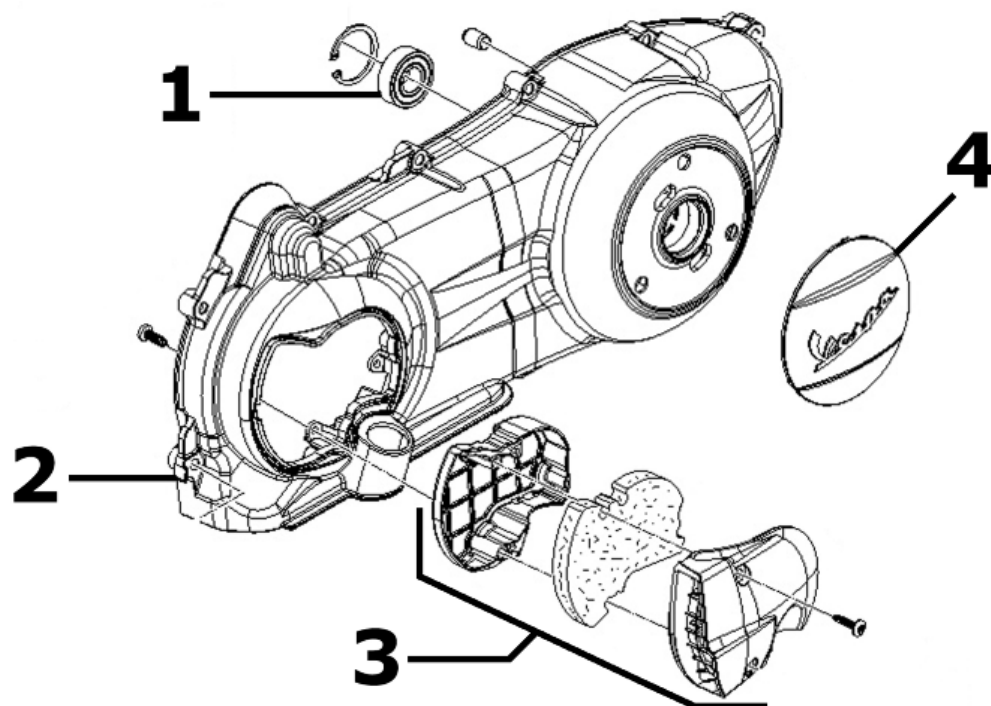
	Code	Action	Duration
1	001010	Reduction gear - Replacement	
2	003065	Gear box oil - Replacement	
3	001156	Geared reduction unit cover - Replacement	
4	004125	Rear wheel axle - Replacement	

Driving pulley



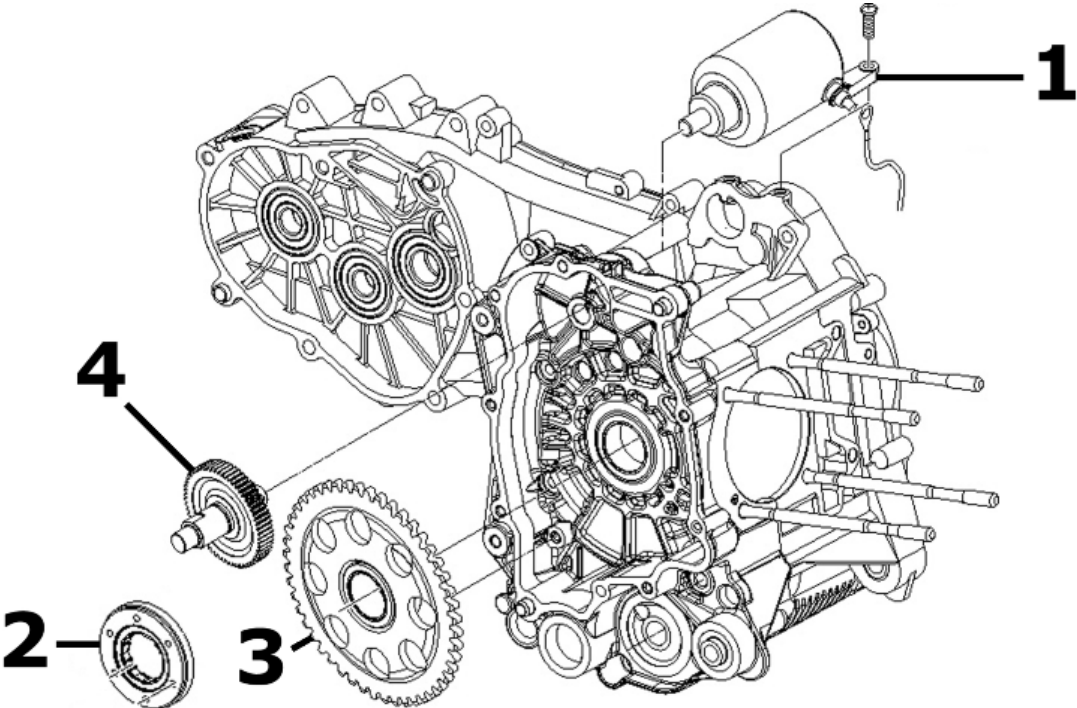
DRIVING PULLEY

	Code	Action	Duration
1	001086	Driving half-pulley - Replacement	
2	001011	Driving belt - Replacement	
3	001066	Drive pulley - Removal and refitting	
4	001177	Variator rollers / shoes - Replacement	
5	001141	Belt anti-flapping roller - Replacement	

Transmission cover**TRANSMISSION COVER**

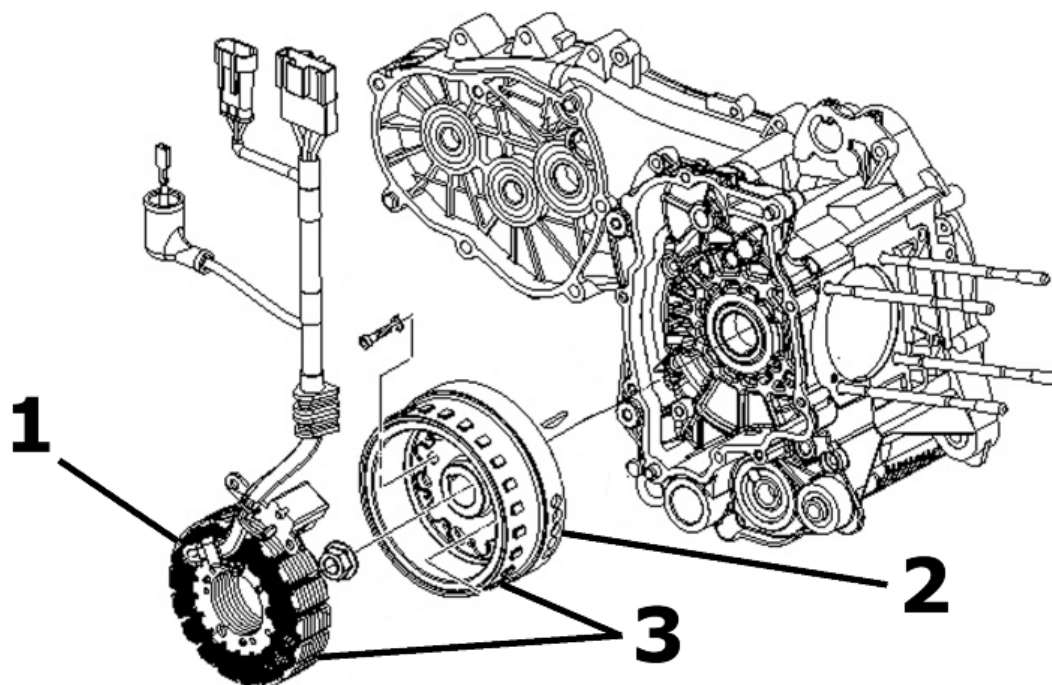
	Code	Action	Duration
1	001135	Transmission cover bearing - Replacement	
2	001096	Transmission crankcase cover - Replacement	
3	001131	Transmission air intake - Replacement	
4	001065	Transmission cover - Replacement	

Starter motor



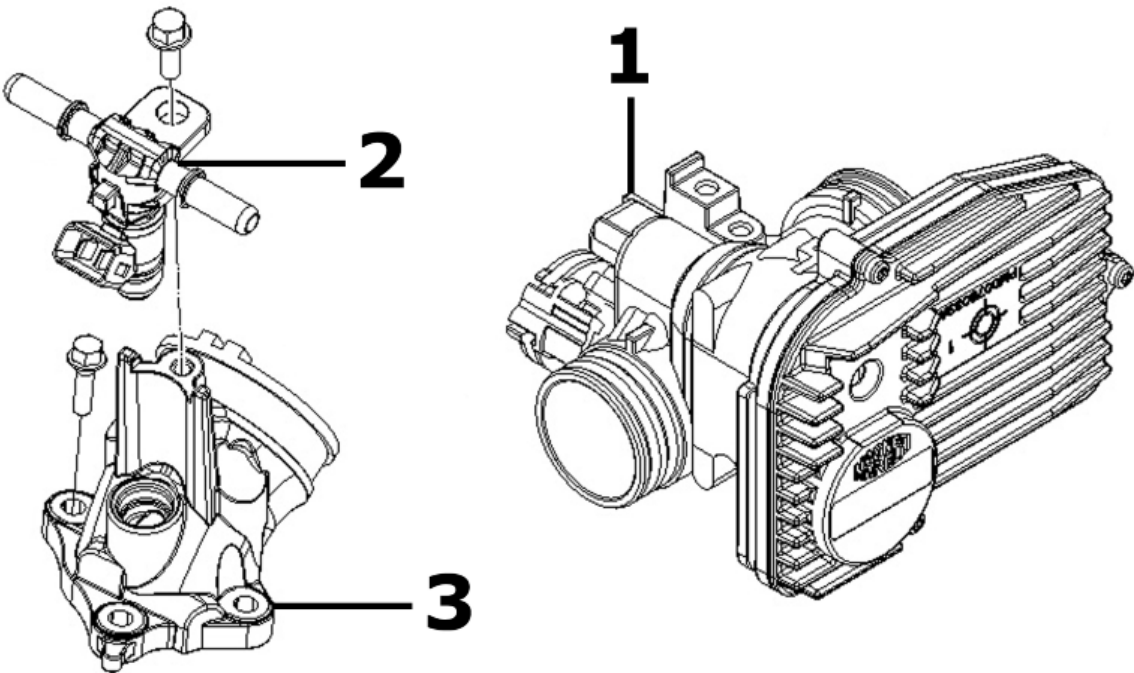
ELECTRICAL START-UP

	Code	Action	Duration
1	001020	Starter motor - Replacement	
2	001104	Start-up freewheel - Replacement	
3	001151	Start-up driven gearing - Replacement	
4	001017	Start-up pinion - Replacement	

Flywheel magneto**MAGNETO FLYWHEEL**

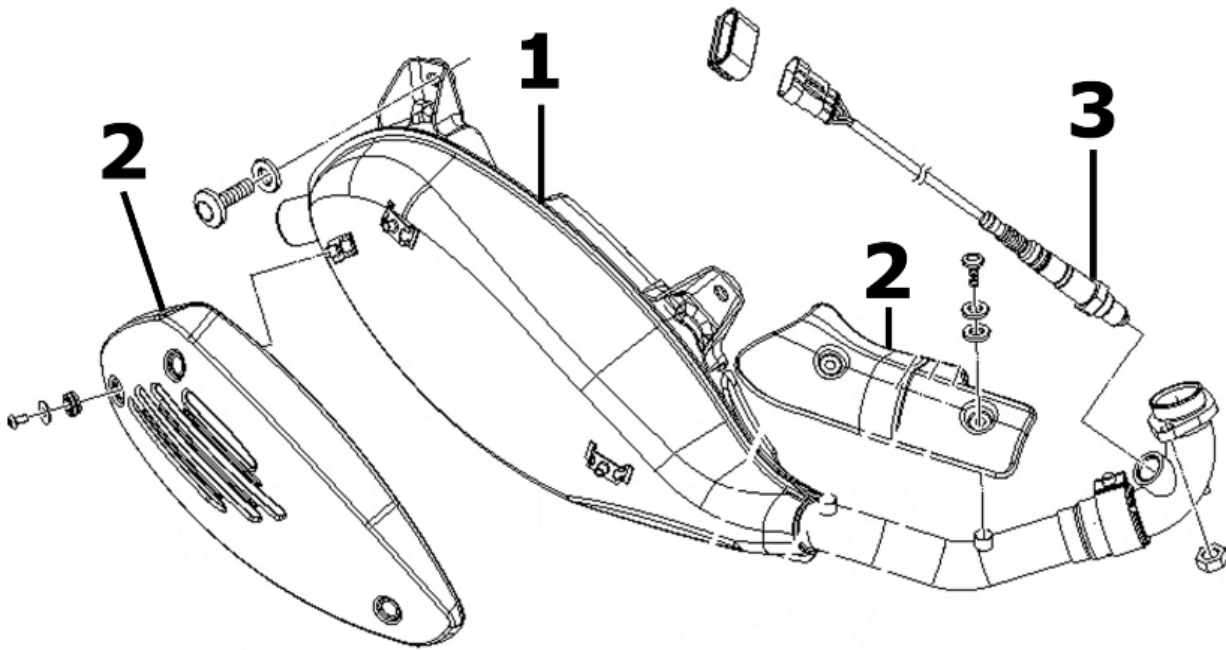
	Code	Action	Duration
1	001067	Stator - Removal and Refitting	
2	001173	Rotor - Replacement	
3	001058	Complete flywheel - Replacement	

Butterfly valve



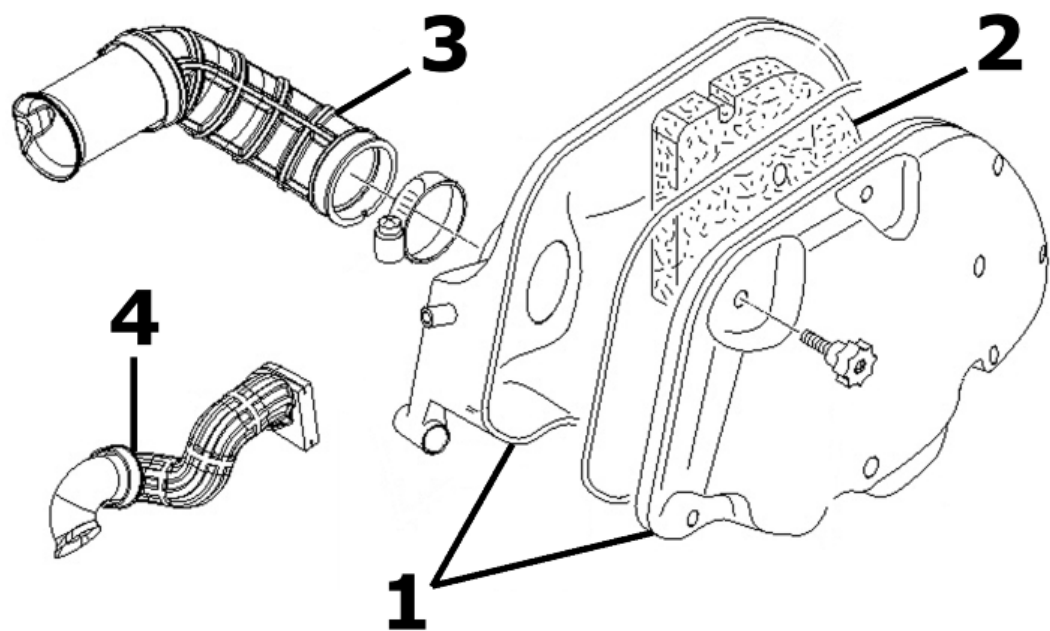
THROTTLE BODY

	Code	Action	Duration
1	001166	Throttle body - Replacement	
2	001047	Injector - Replacement	
3	001013	Intake manifold - change	

Exhaust pipe**MUFFLER**

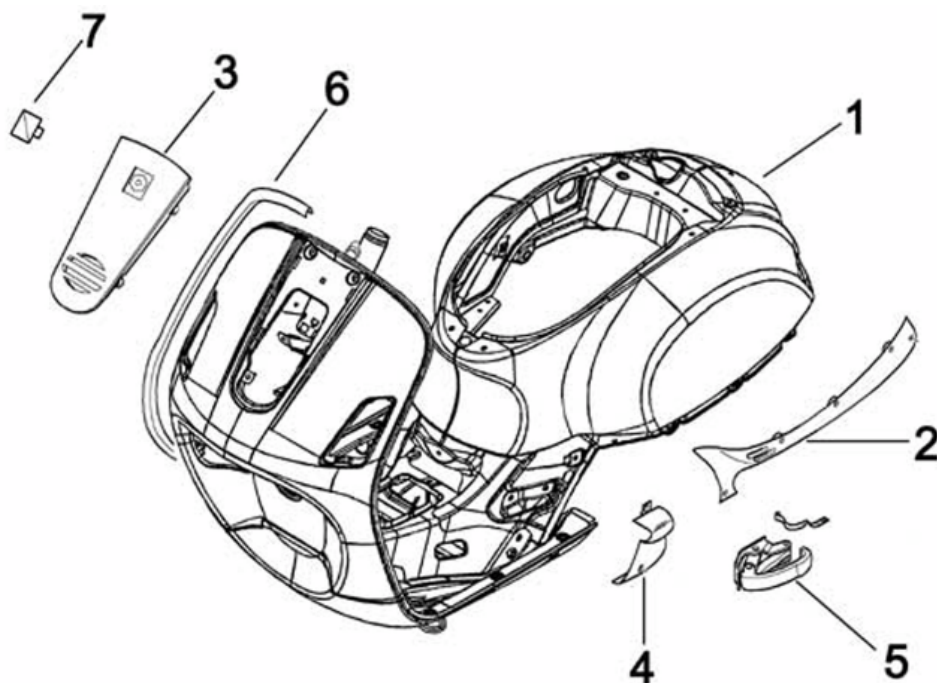
	Code	Action	Duration
1	001009	Muffler - Replacement	
2	001095	Muffler guard - Replacement	
3	005138	Lambda probe - Replacement	

Air cleaner



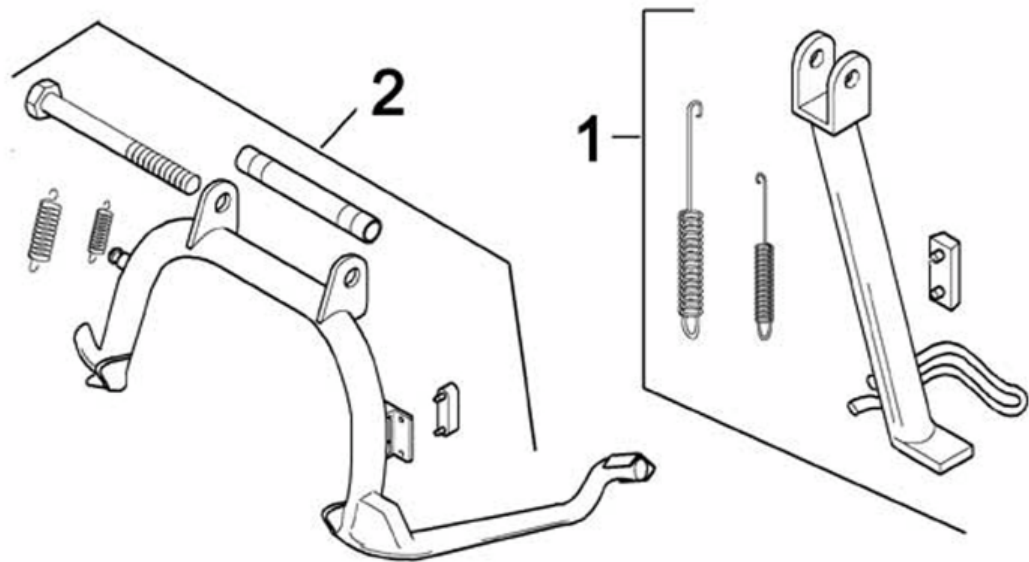
AIR CLEANER

	Code	Action	Duration
1	001015	Air filter box - Replacement	
2	001014	Air filter - Replacement / cleaning	
3	004122	Air cleaner carburettor fitting - Replacement	
4	001027	Body / air cleaner union - Replacement	

Frame**FRAME**

	Code	Action	Duration
1	004001	Chassis - Replacement	
2	004085	Fairing (1) - Replacement	
3	004149	Shield central cover - Replacement	
4	004053	Spoiler - Replacement	
5	004015	Footrest - Removal and Re-fitting	
6	004023	Shield rim - Replacement	
7	004159	Plates / Stickers - Replacement	

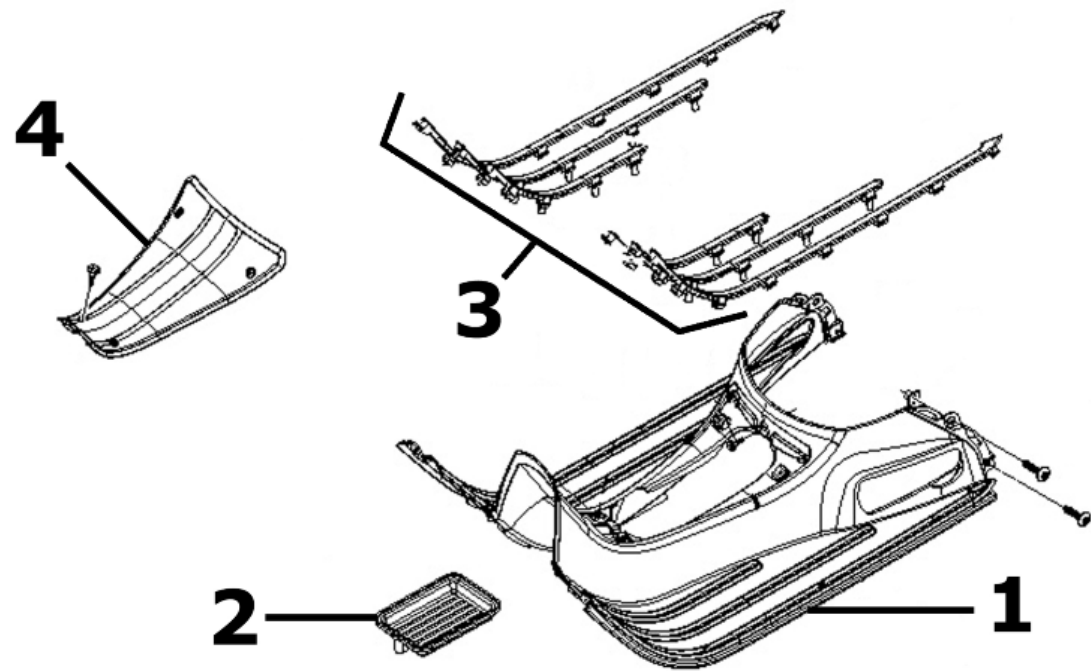
Centre-stand



STAND

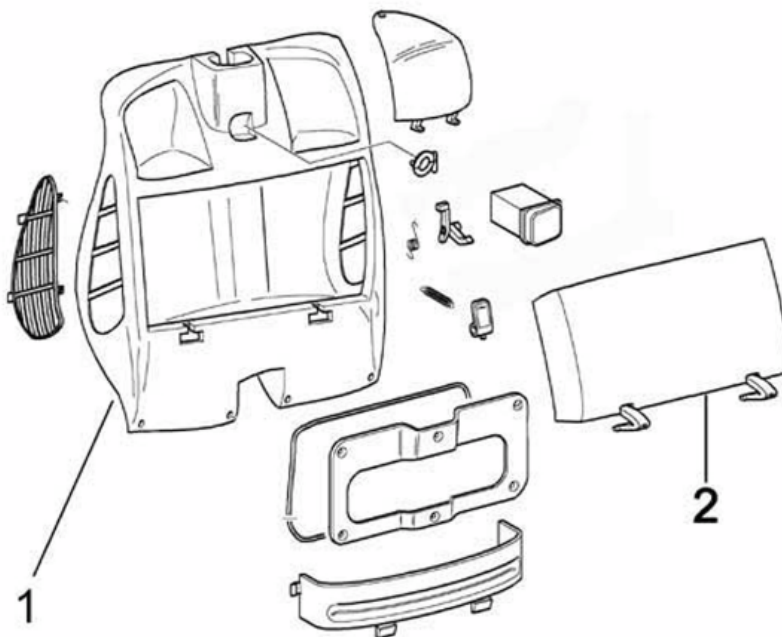
	Code	Action	Duration
1	004102	Side stand - Replacement	
2	004004	Stand - Replacement	

Footrests



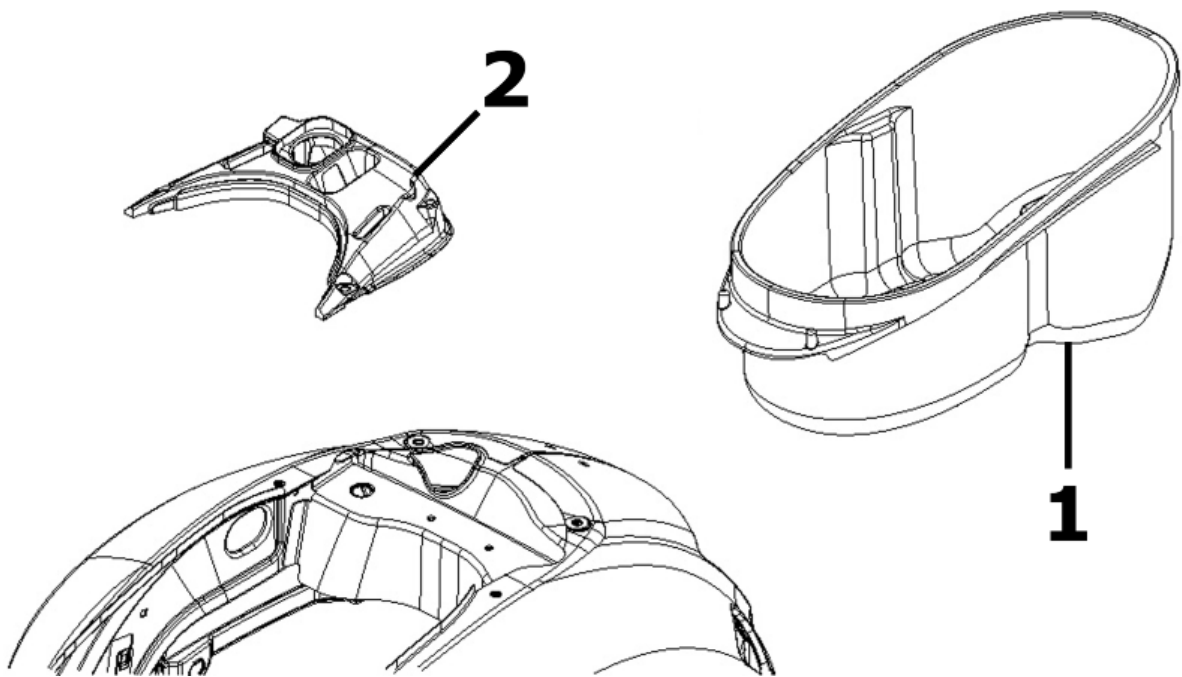
MATS AND COVERS

	Code	Action	Duration
1	004079	Footrest - replacement	
2	004071	Battery compartment - replacement	
3	004078	Front/rear footrest rubber - Replacement	
4	005046	Battery cover - change	

Rear cover**REAR SHIELD**

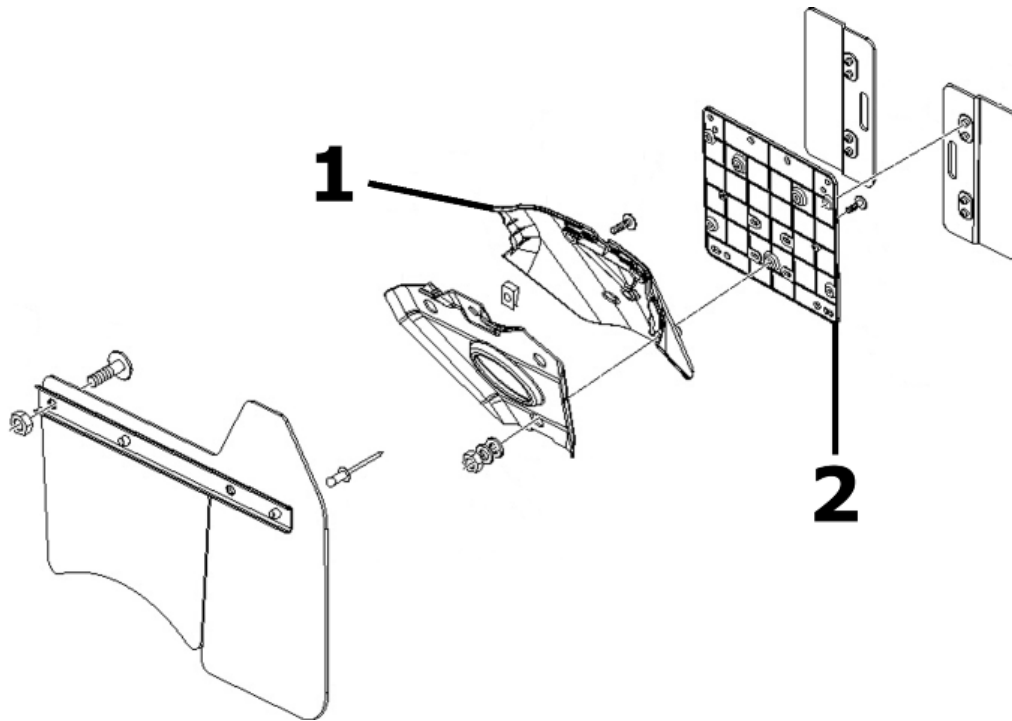
	Code	Action	Duration
1	004083	Glove box - Replacement	
2	004081	Glove box door - Replacement	

Underseat compartment



<u>UNDERSADDLE</u>			
	Code	Action	Duration
1	004016	Helmet compartment - Removal and Refitting	
2	004011	Central chassis cover - replace	

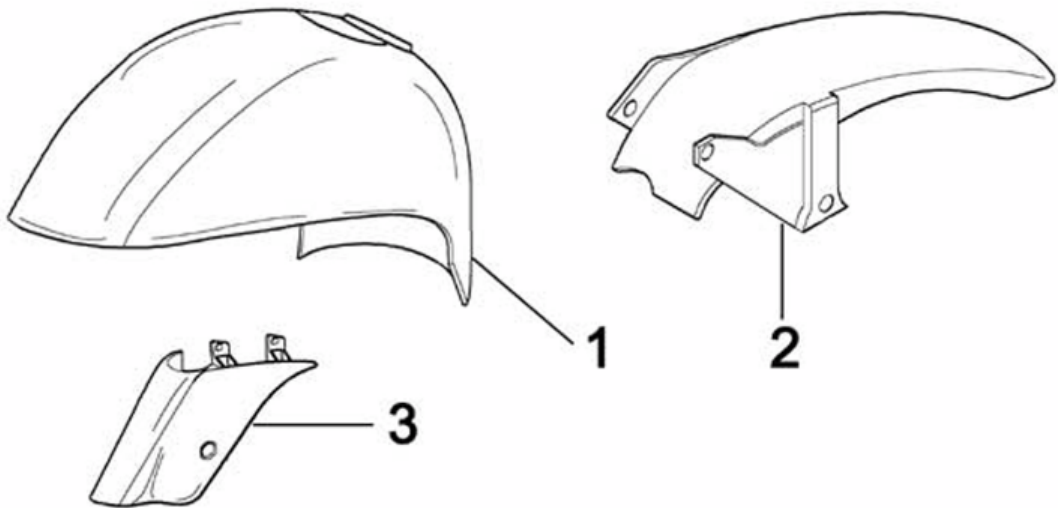
Plate holder



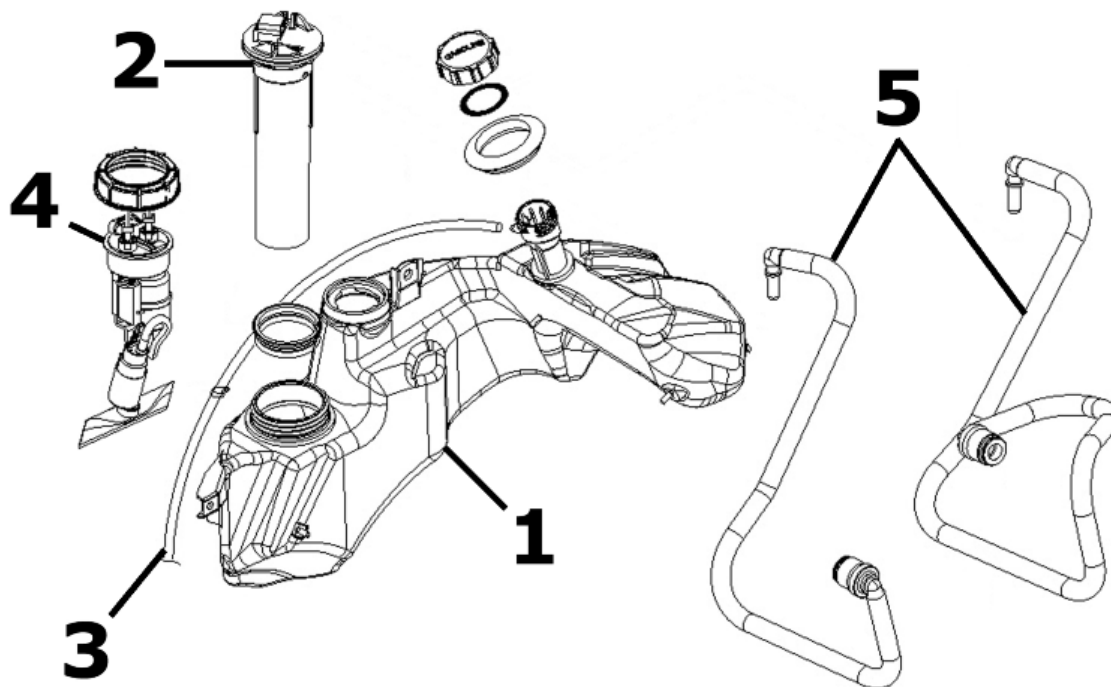
LICENCE PLATE HOLDER

	Code	Action	Duration
1	004136	License plate support - re- place	
2	005048	Licence plate holder - Re- placement	

Mudguard

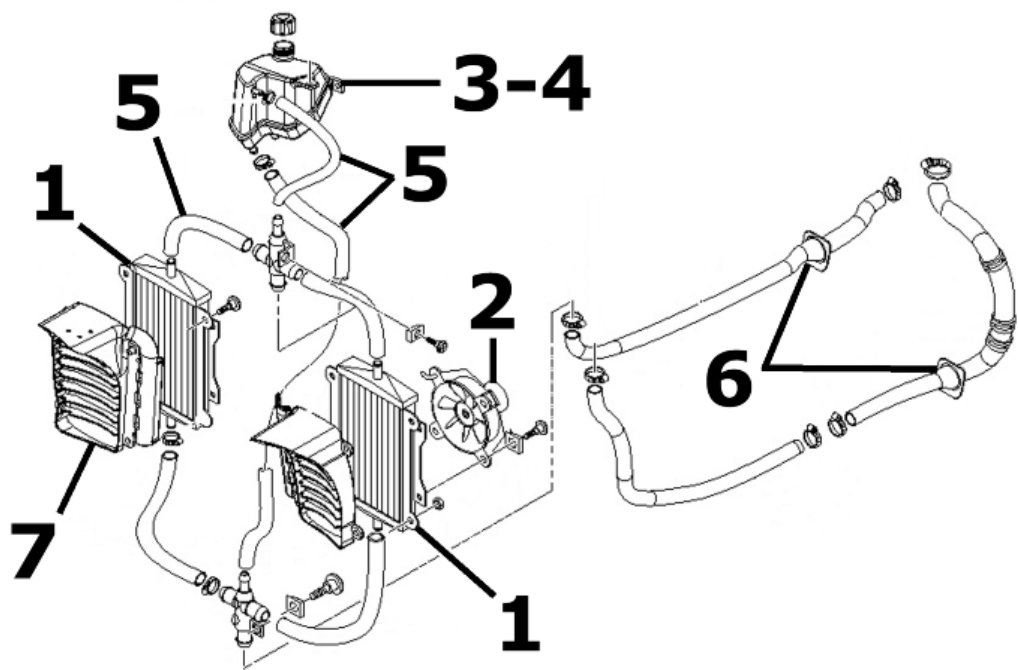


MUDGUARDS			
	Code	Action	Duration
1	004002	Front mudguard - Replacement	
2	004009	Rear mudguard - Replacement	
3	003044	Shock absorber cover - Replacement	

Fuel tank**FUEL TANK**

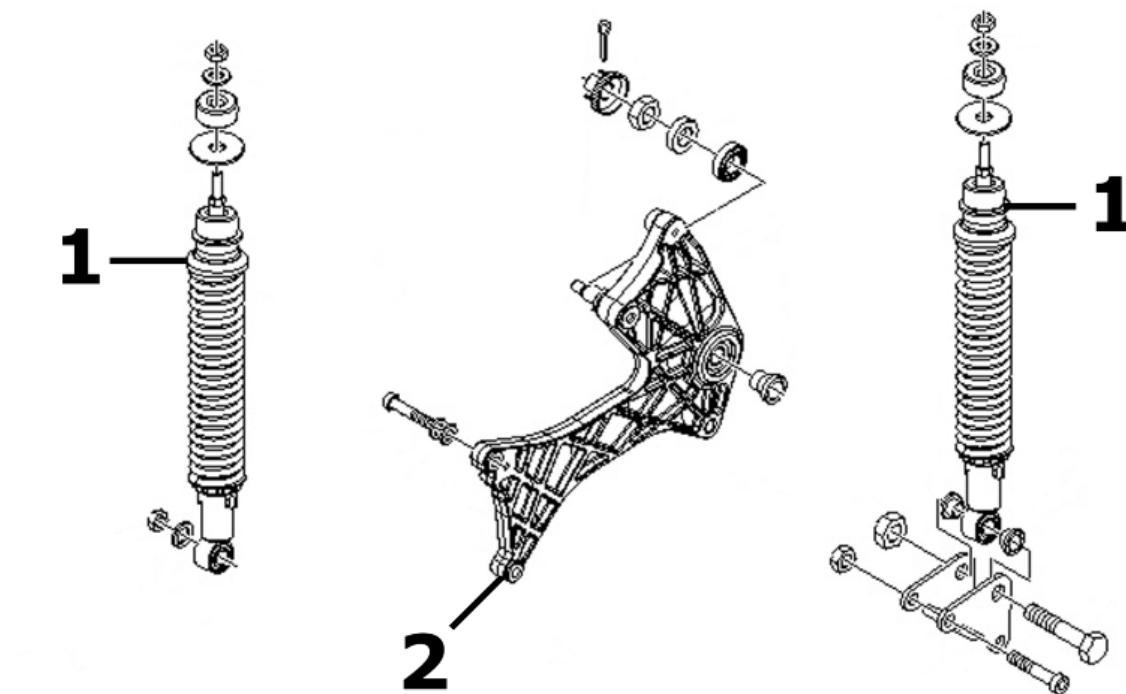
	Code	Action	Duration
1	004005	Fuel tank - Replacement	
2	005010	Tank float - Replacement	
3	004109	Fuel tank breather - change	
4	004073	Fuel pump - Replacement	
5	004137	Injector pump pipe - Replacement	

Radiator



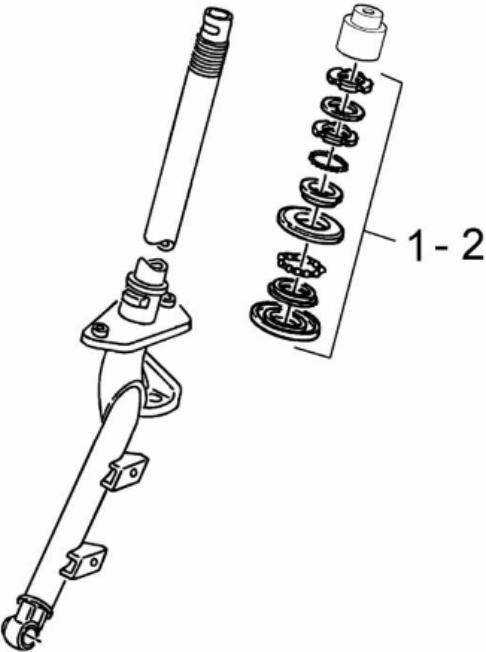
RADIATOR

	Code	Action	Duration
1	007002	Water cooler - Replacement	
2	007016	Fan complete with support - Replacement	
3	007001	Expansion tank - Replacement	
4	001052	Coolant and air bleed - Replacement	
5	007013	Expansion tank / radiator connecting hose - Replacement	
6	007003	Delivery line and coolant return - Replacement	
7	001170	Air duct - Replacement	

Rear shock-absorber**REAR SHOCK ABSORBERS**

	Code	Action	Duration
1	003007	Rear shock absorber - Removal and Refitting	
2	003077	muffler/rear shock absorber support arm - Service	

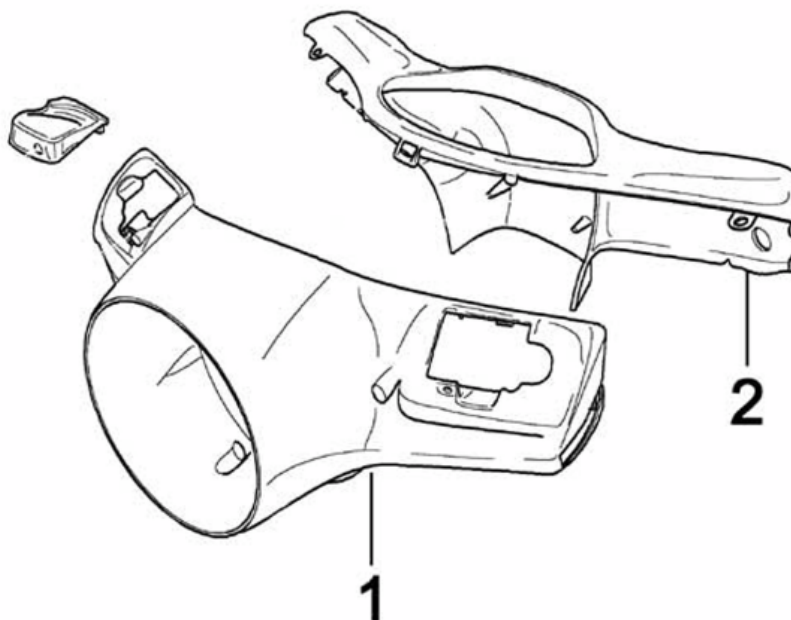
Steering column bearings



STEERING FIFTH WHEELS

	Code	Action	Duration
1	003002	Steering fifth wheel - Re- placement	
2	003073	Steering clearance - Adjust	

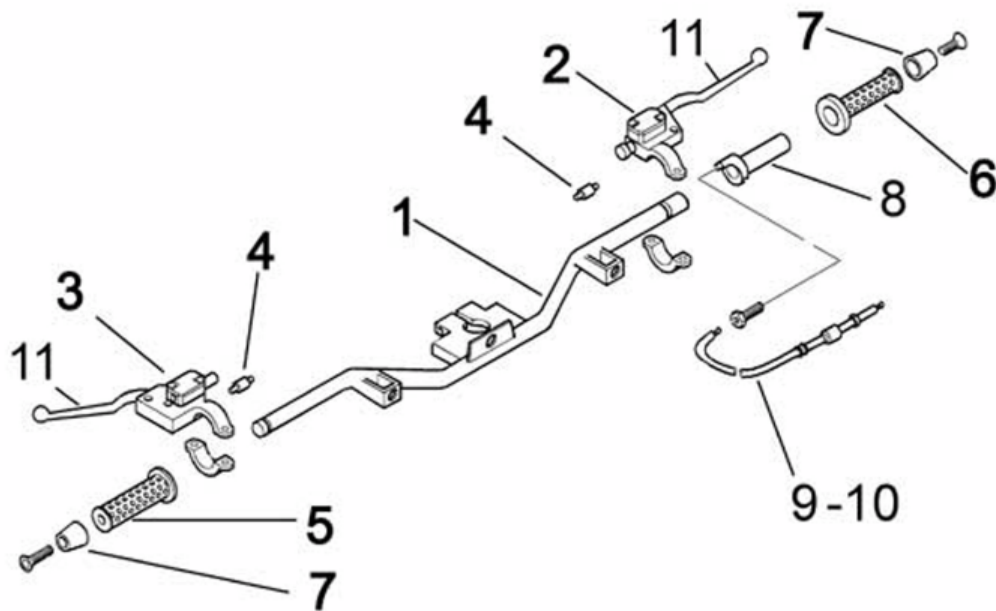
Handlebar covers



HANDLEBAR COVERS

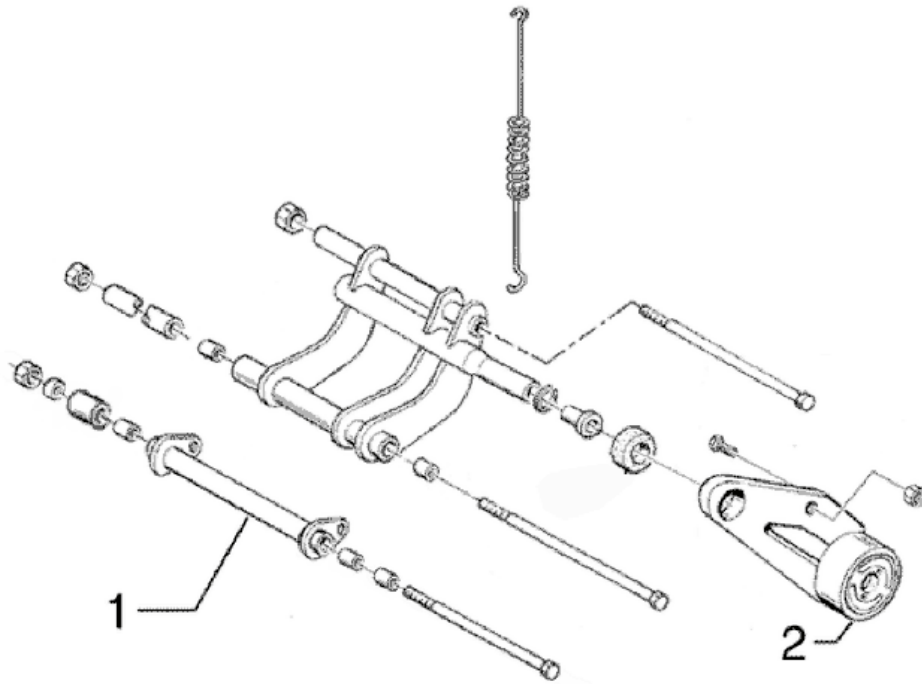
	Code	Action	Duration
1	004018	Front handlebar covers - Replacement	
2	004019	Rear handlebar covers - Replacement	

Handlebar components



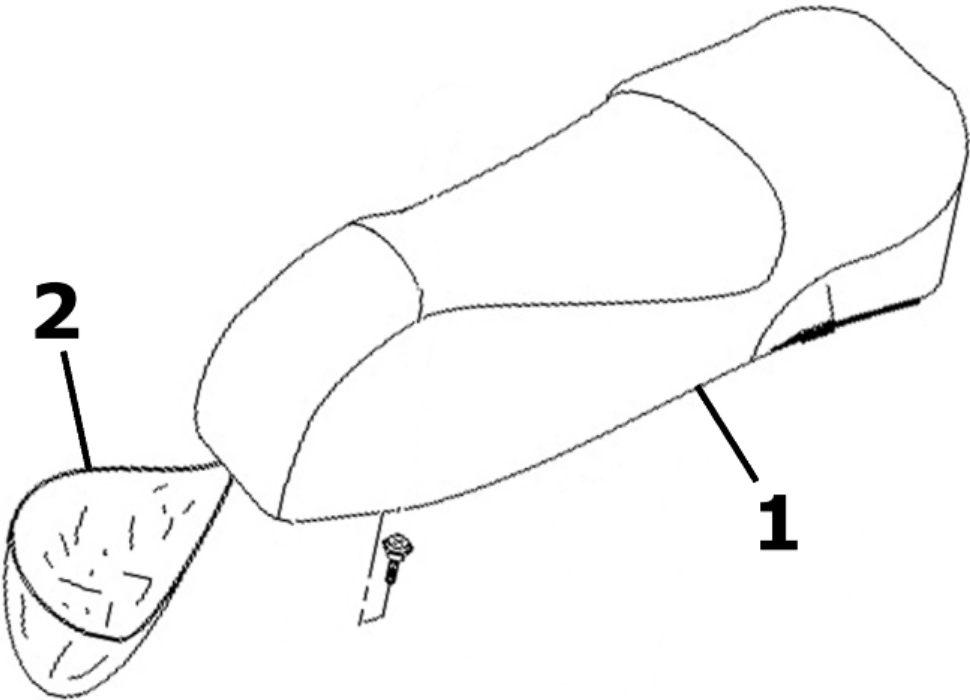
HANDLEBAR COMPONENTS

	Code	Action	Duration
1	003001	Handlebar - Removal and re-fitting	
2	002067	Rear brake pump - Replacement	
3	002024	Front brake pump - Removal and refitting	
4	005017	Stop switch - Replacement	
5	002059	Right-hand knob - change	
6	002071	Left hand grip - Replacement	
7	003059	Counterweight - Replacement	
8	002060	Throttle grip - Replacement	
9	002063	Throttle control transmission - Replacement	
10	003061	Accelerator transmission - adjust	
11	002037	Brake or clutch lever - Replacement	

Swing-arm**SWINGING ARM**

	Code	Action	Duration
1	001072	Swinging arm - Engine-chassis connection - Replacement	
2	004058	Silent block - Replacement	

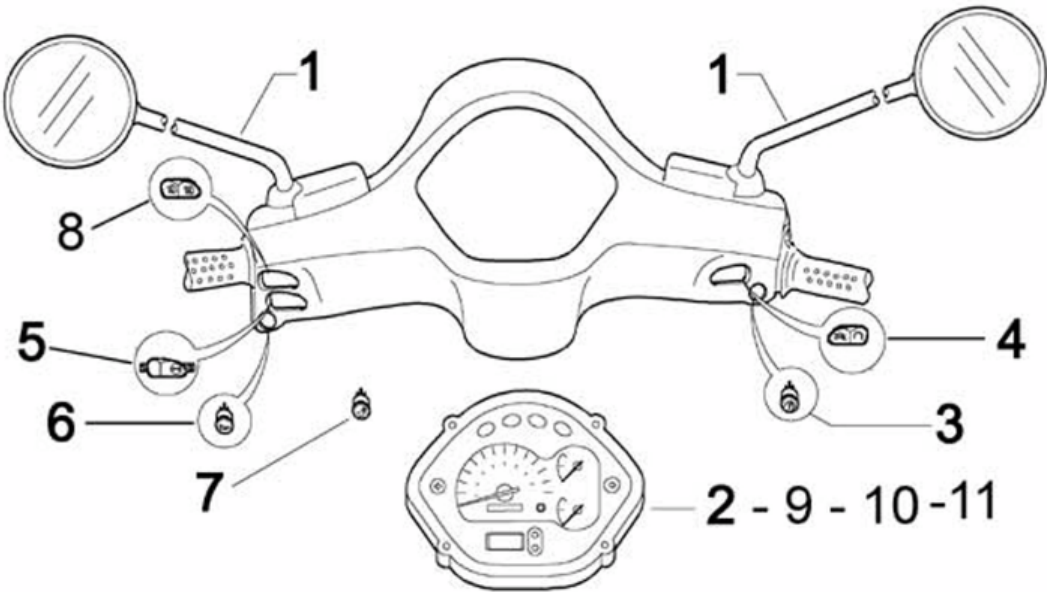
Seat



SADDLE

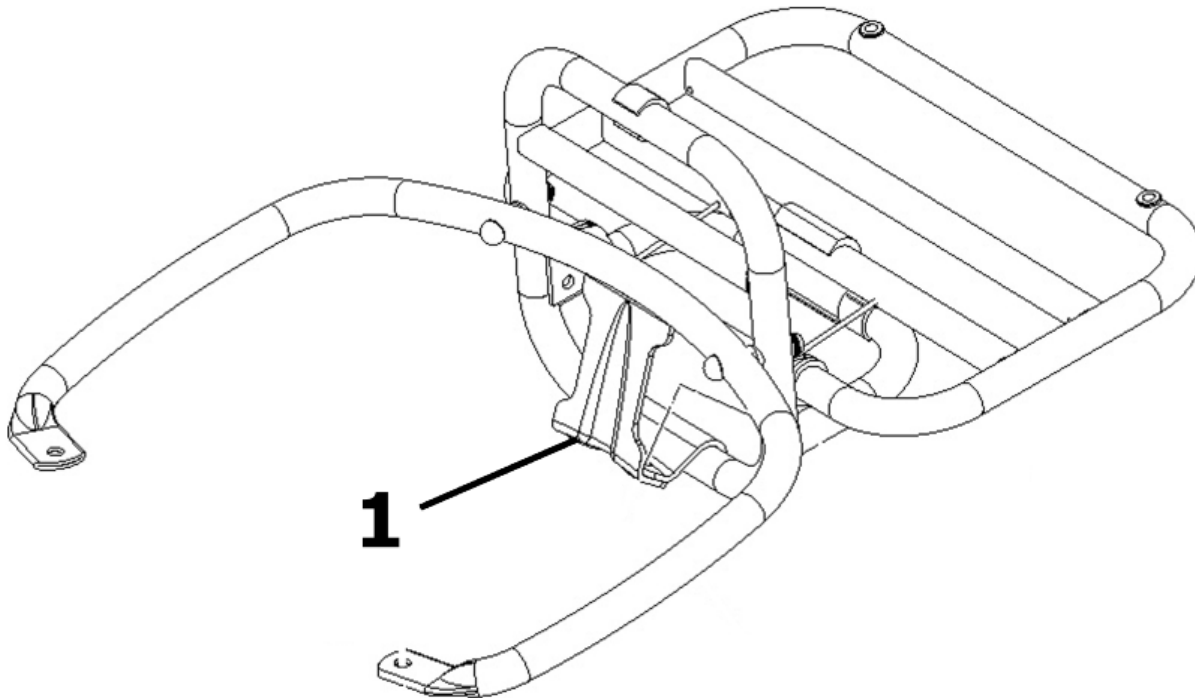
	Code	Action	Duration
1	004003	Saddle - Replacement	
2	004144	Saddle cover - Replacement	

Instrument panel



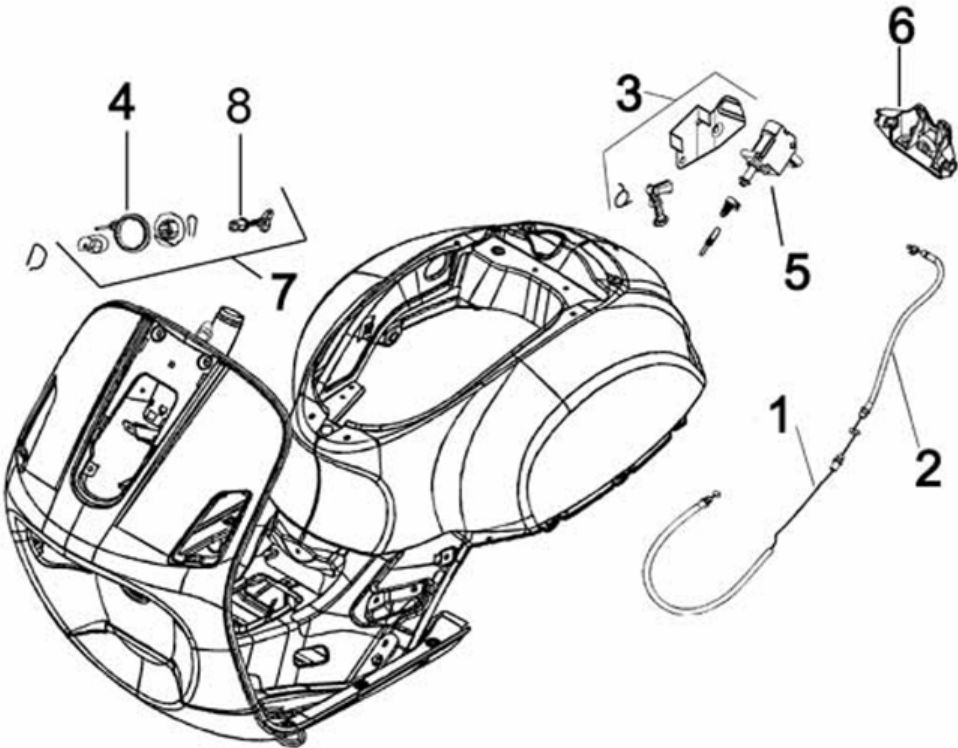
INSTRUMENT PANEL

	Code	Action	Duration
1	004066	Driving mirror - Replacement	
2	005014	Odometer - Replacement	
3	005041	Starter button - replace	
4	005077	Emergency stop switch - Replacement	
5	005006	Light switch or turn indicators - Replacement	
6	005040	Horn button - Replacement	
7	005121	Saddle opening button - Replacement	
8	005039	Headlight switch - replace	
9	005078	Odometer glass - Replacement	
10	005038	Instrument panel warning light bulbs - Replacement	
11	005076	Clock / battery - Replacement	

Rear rack**LUGGAGE RACK**

	Code	Action	Duration
1	004008	Luggage rack - Replacement	

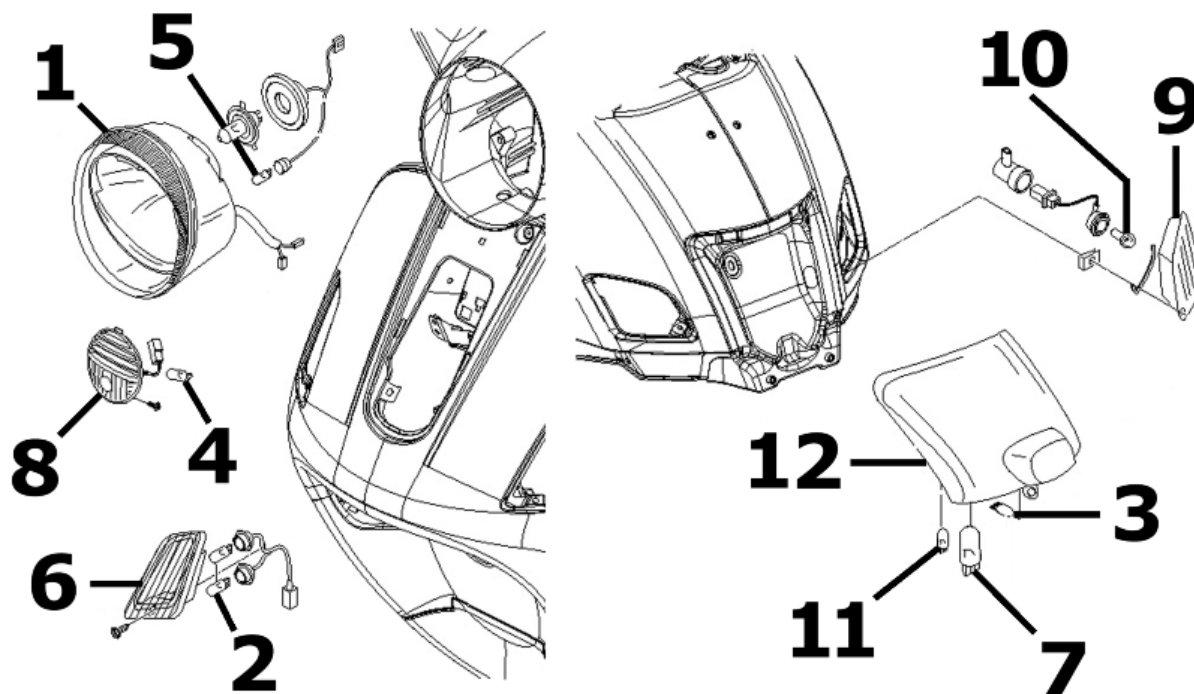
Locks



LOCKS

	Code	Action	Duration
1	002083	Saddle opening transmission - Replacement	
2	002092	Transmission splitter/ hook transmission - Replacement	
3	004158	Saddle opening splitter - Replacement	
4	005072	Immobilizer aerial - Replacement	
5	005099	Electric saddle opening device - Replacement	
6	004054	Saddle lock catch - Replacement	
7	004010	Anti-theft lock - Replacement	
8	005016	Key switch - Replacement	

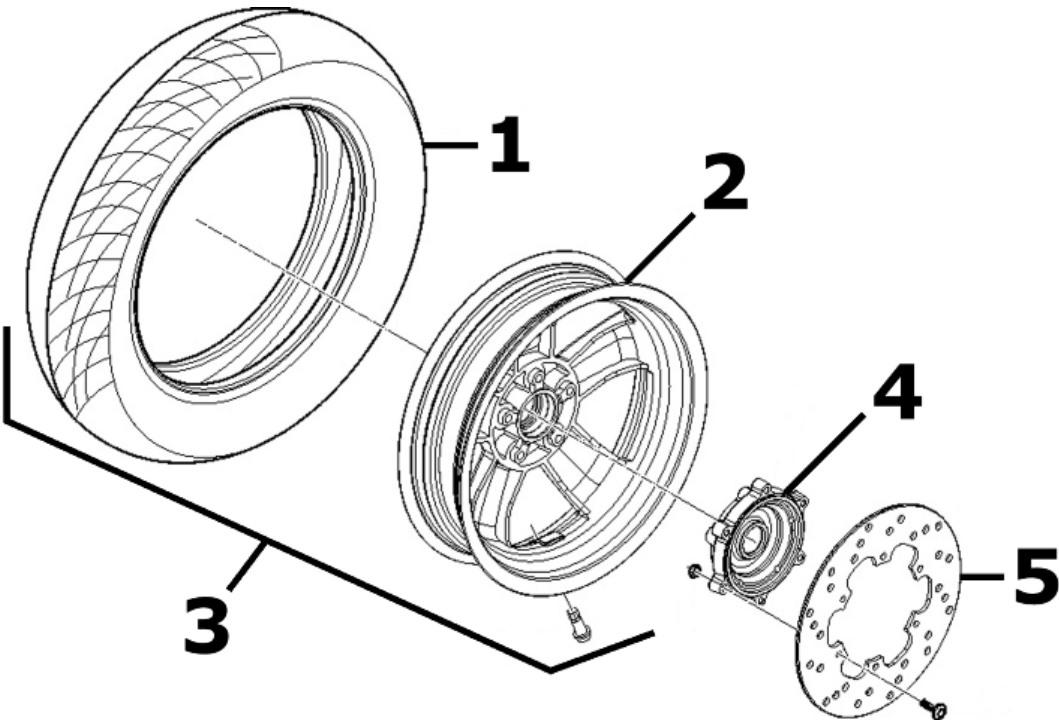
Turn signal lights



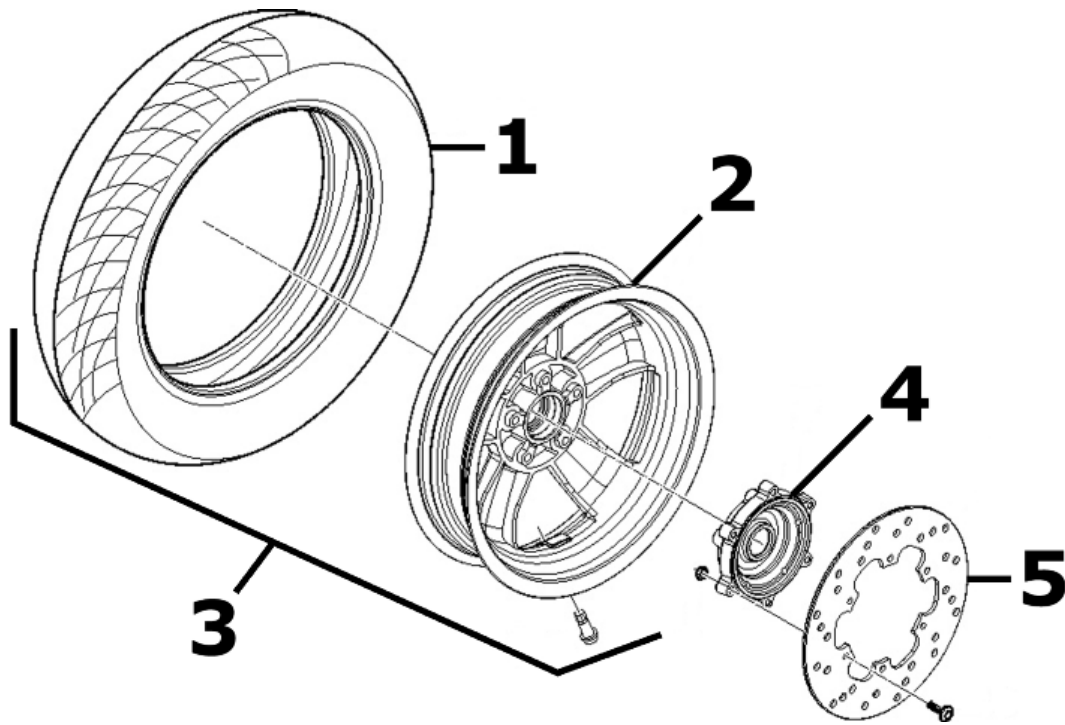
INDICATORS AND LIGHTS

	Code	Action	Duration
1	005002	Front headlamp - change	
2	005067	Front turn indicator bulb - Replacement	
3	005031	Licence plate light bulb - Replacement	
4	005139	Tail light bulb - Replacement	
5	005008	Front headlamp bulbs - Replacement	
6	005012	Front turn indicator - Replacement	
7	005090	Stop light bulb - Replacement	
8	005140	Front light - Replacement	
9	005022	Rear turn indicators - replace	
10	005068	Rear turn indicator bulb - Replacement	
11	005066	Rear light bulbs - Replacement	
12	005028	Rear light assembly glass - Replacement	

Front wheel

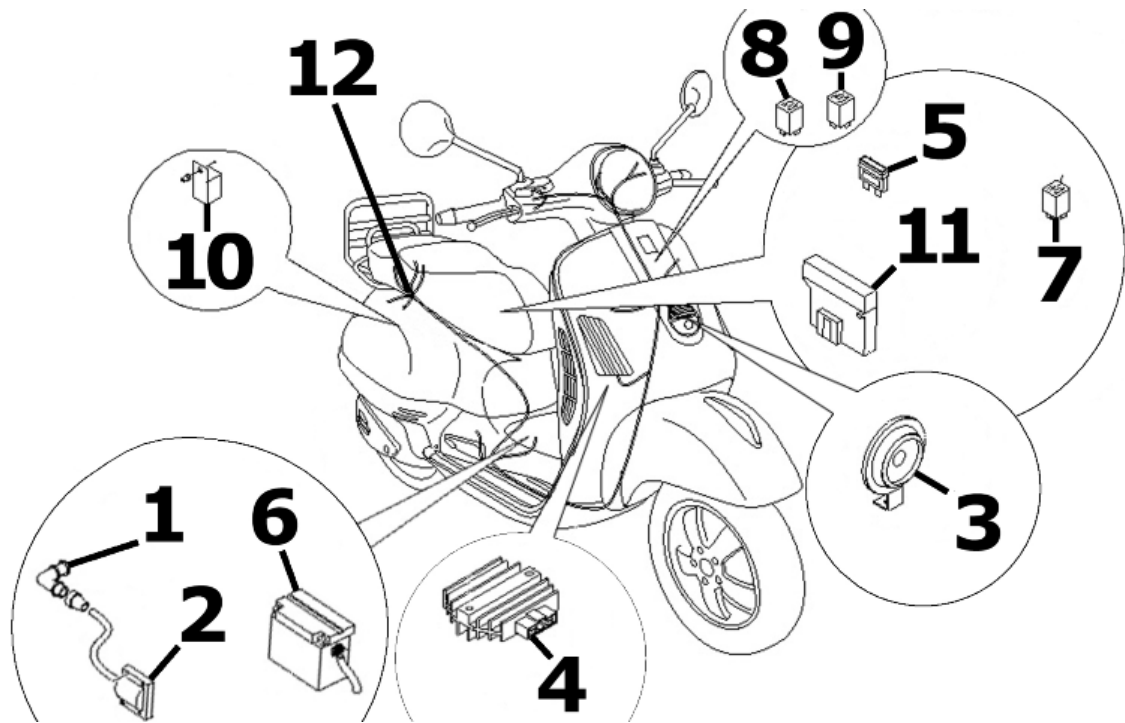


FRONT WHEEL			
	Code	Action	Duration
1	003047	Front tyre - replace	
2	003037	Front wheel rim- Replace- ment	
3	004123	Front wheel - Replacement	
4	003033	Front wheel hub- Replace- ment	
5	002041	Brake disc - Replacement	

Rear wheel**REAR WHEEL**

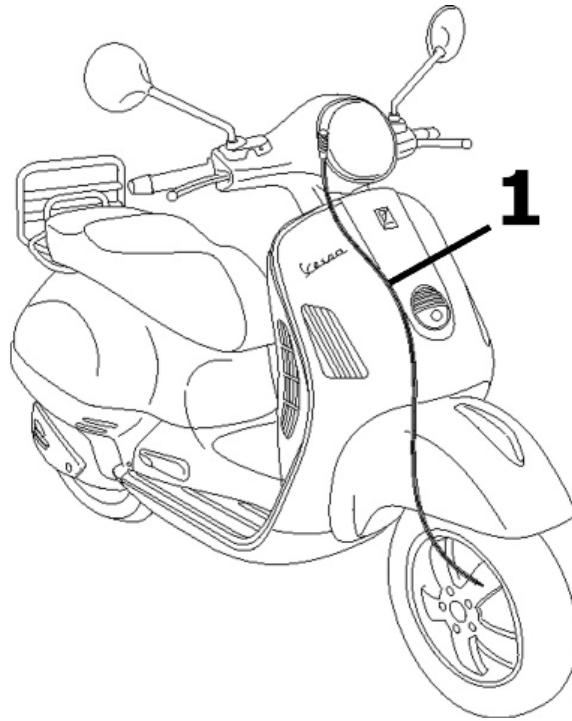
	Code	Action	Duration
1	004126	Rear wheel tyre - Replacement	
2	001071	Front wheel rim - Removal and refitting	
3	001016	Rear wheel - Replacement	
4	002028	Rear wheel hub - Replacement	
5	002070	Rear brake disc - Replacement	

Electric devices

ELECTRICAL DEVICES

	Code	Action	Duration
1	001094	Spark plug cap - Replacement	
2	001069	HV coil - replace	
3	005003	Horn - Replacement	
4	005009	Voltage regulator - replace	
5	005052	Fuse (1) - Replacement	
6	005007	Battery - Replacement	
7	005120	Control unit power supply remote control - Replacement	
8	005035	Headlight remote control - Replacement	
9	005117	Electrical fan remote control - Replacement	
10	005011	Start-up remote control switch - Replacement	
11	005054	Fuse block (1) - Replacement	
12	005001	Electrical system - Removal and refitting	

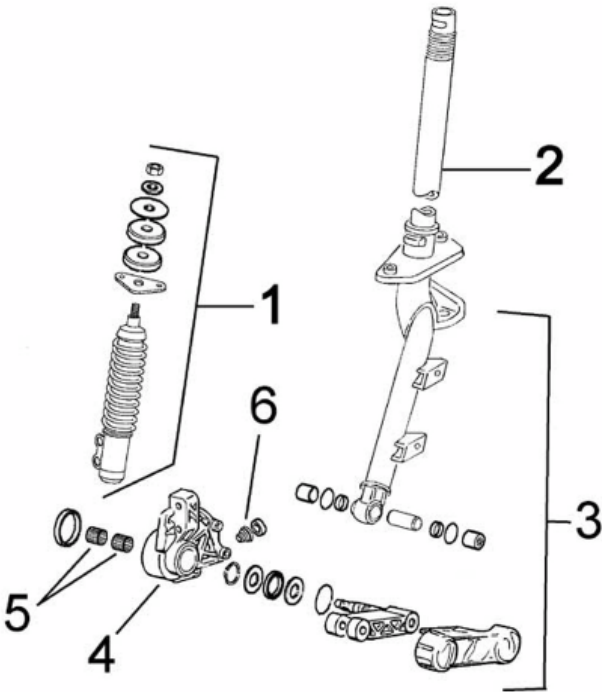
Transmissions



TRANSMISSIONS

	Code	Action	Duration
1	002051	Odometer transmission assembly - Replacement	

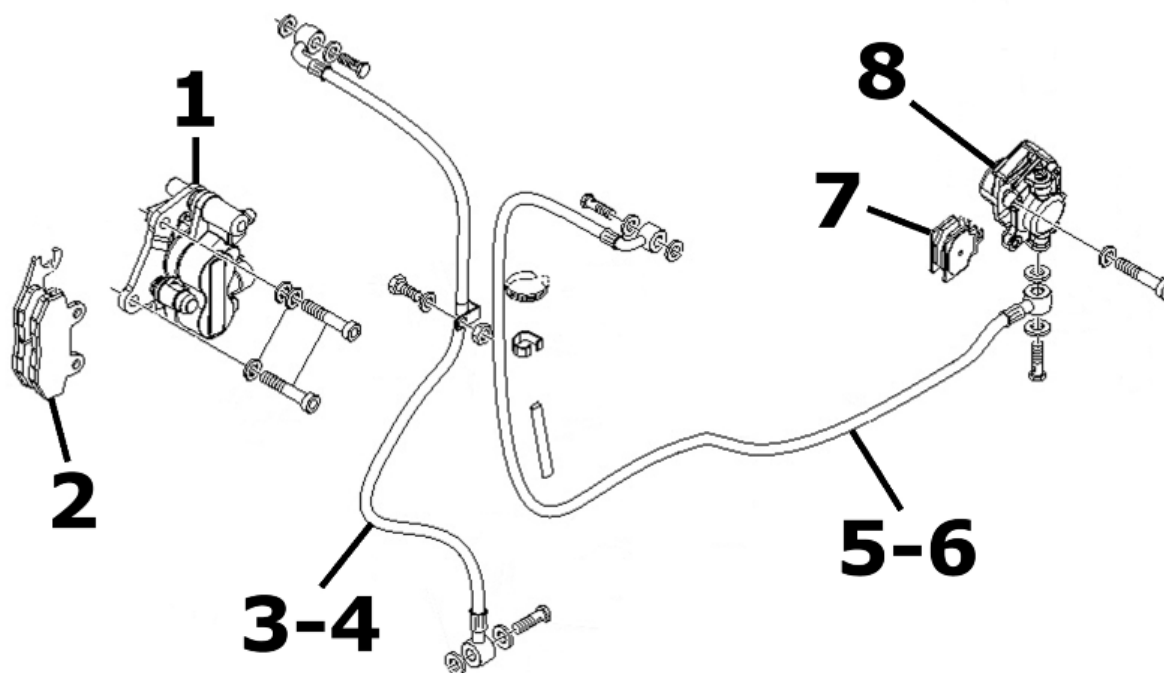
Front suspension



FRONT SUSPENSION

	Code	Action	Duration
1	003011	Front shock absorber - Removal and Refitting	
2	003045	Steering tube - Replacement	
3	003010	Front suspension - Service	
4	003035	Shock absorber support and brake calliper - Replacement	
5	003034	Front wheel hub bearing - Replacement	
6	001064	Odometer reel - Replacement	

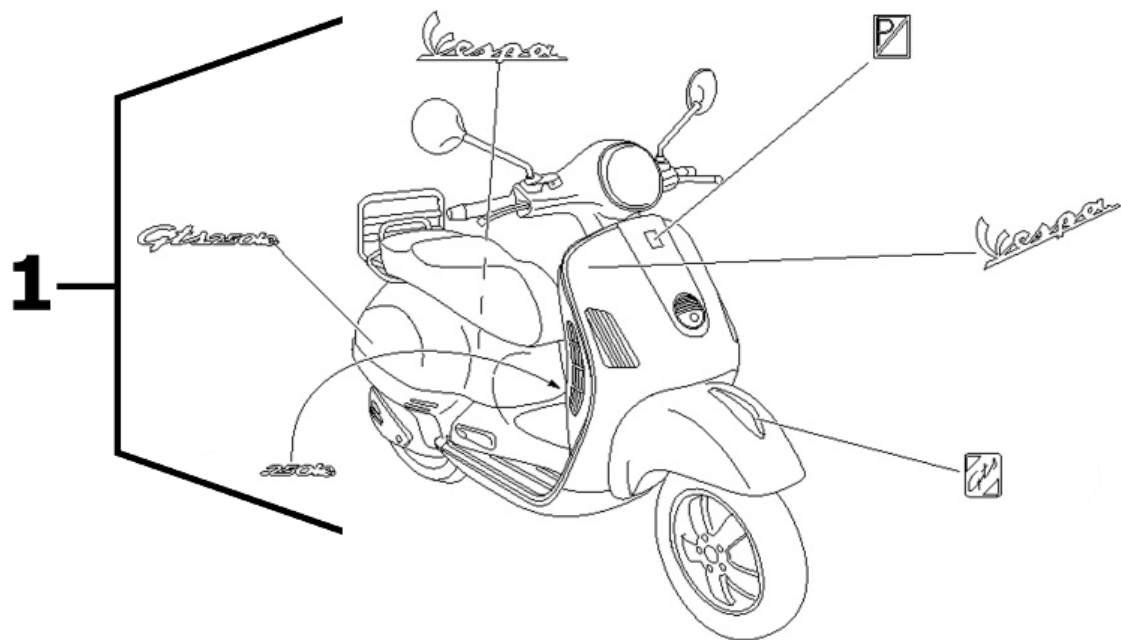
Braking system



BRAKE SYSTEM

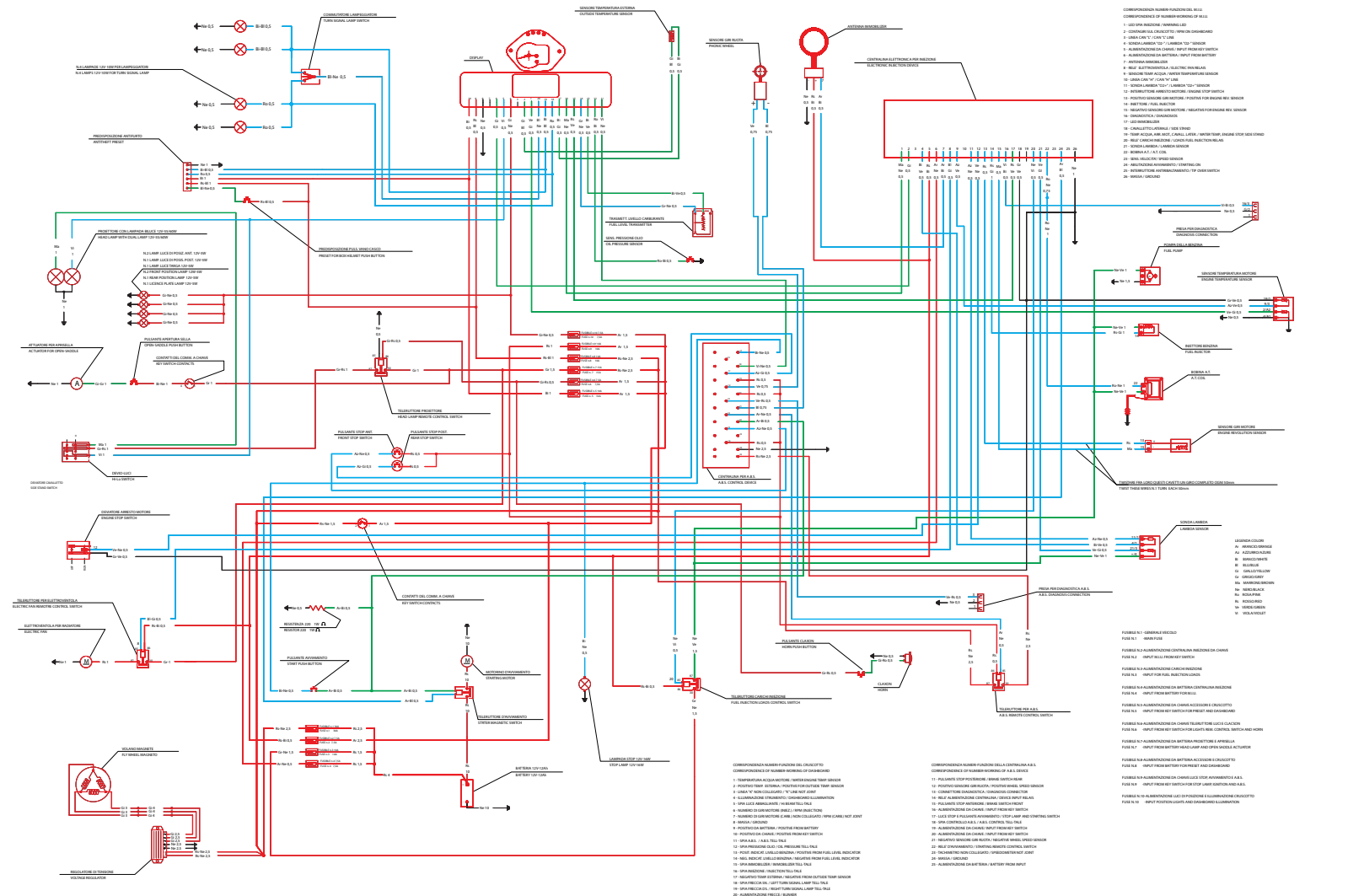
	Code	Action	Duration
1	002039	Front brake calliper - Replacement	
2	002007	Front brake pads - Replacement	
3	002021	Front brake piping - Replacement	
4	002047	Front brake fluid and air bleeding system - Replacement	
5	002020	Rear brake disc piping - Replacement	
6	002080	Rear brake oil bleeding system - Replacement	
7	002002	Rear brake pads - replace	
8	002048	Rear brake calliper - Replacement	

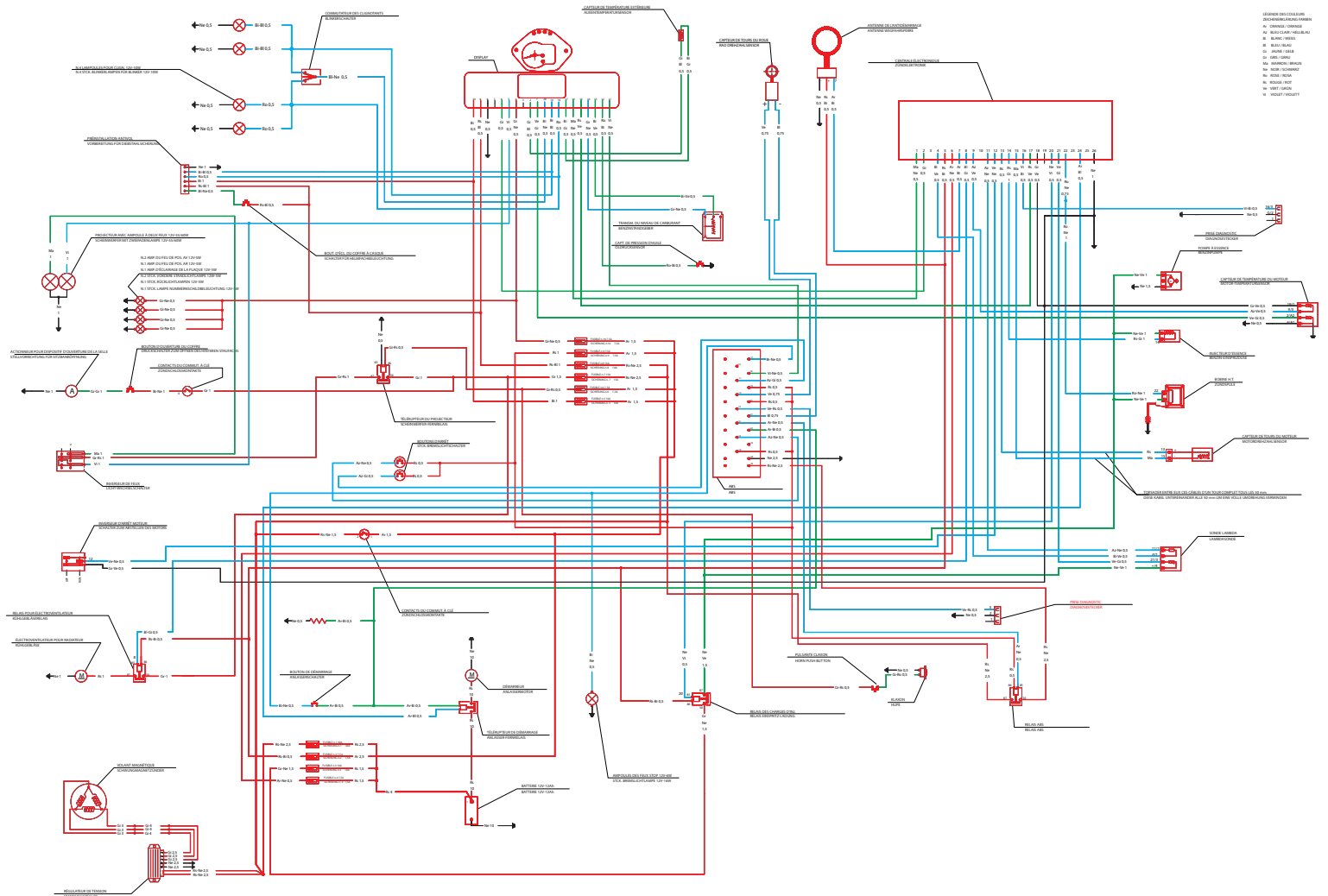
Stickers



TRANSFERS

	Code	Action	Duration
1	004159	Plates / Stickers - Replacement	









CATALOGUE OF SPARE PARTS

EVG4000I01



Vespa GTS 250 (UK)



Vespa GTS 250 (UK)

Mod. ZAPM45100

TABLE OF COLOUR ABBREVIATIONS

EVG490AI01	94-Shiny Black
EVG49AAI01	EVG49AAI01
EVG4DEAI01	222/A-Midnight
EVG4EICI01	760/A-Stardust Grey
EVG4F2CI01	738/A-Excalibur Grey
EVG4NDAI01	79/A-Graphite Black
EVG4R7AI01	894-Dragon Red
EVG4RIAI01	820/A-Vintage red

Code	Drawing No.	Loc.	Code	Drawing No.	Loc.	Code	Drawing No.	Loc.
000097	T.01.14	8	012789	T.04.02	16	020108	T.04.02	69
000674	T.01.02	2	012789	T.04.04	15	021108	T.04.04	12
003053	T.03.01	7	013763	T.02.11	11	021114	T.04.02	17
003056	T.01.26	15	013776	T.04.04	16	021210	T.04.02	20
003056	T.01.26	19	013777	T.02.13	9	030115	T.02.02	8
003058	T.05.01	14	013880	T.06.05	1	031056	T.03.02	6
006078	T.06.02	19	013880	T.02.18	2	031058	T.04.02	28
006416	T.04.01	15	014754	T.02.05	24	031091	T.01.22	5
006422	T.04.02	26	015014	T.06.05	14	031091	T.02.18	4
006635	T.01.10	10	015330	T.03.03	11	031119	T.04.02	70
006635	T.04.02	41	015727	T.02.08	3	031153	T.04.04	23
006707	T.02.15	2	016404	T.02.11	12	063435	T.01.05	5
006731	T.04.02	52	016406	T.06.04	6	071671	T.06.05	15
006966	T.02.15	4	016406	T.06.05	2	080341	T.06.05	13
006966	T.04.02	42	016406	T.02.18	3	092517	T.04.02	58
006966	T.02.08	5	016408	T.04.02	68	119219	T.04.02	53
006975	T.04.02	27	016408	T.04.04	11	123394	T.03.03	3
006976	T.06.03	4	016516	T.06.06	12	127927	T.05.01	7
008375	T.01.13	8	016627	T.04.04	9	127927	T.05.01	21
008457	T.06.02	15	016686	T.03.02	7	145298	T.05.01	11
008457	T.06.03	15	018538	T.01.06	13	145298	T.01.12	10
011109	T.04.02	1	018575	T.01.14	6	145298	T.06.06	13
012528	T.01.15	14	018575	T.01.14	9	145298	T.06.06	18
012533	T.02.15	3	018575	T.01.02	17	145298	T.02.21	39
012533	T.02.13	8	018591	T.02.11	13	145298	T.01.25	16
012533	T.01.26	16	018640	T.01.26	17	145298	T.02.20	11
012533	T.01.26	12	020003	T.06.05	10	149104	T.04.05	4
012535	T.04.02	19	020008	T.04.04	4	149104	T.05.01	23
012543	T.03.03	10	020104	T.02.11	14	149104	T.04.04	17
012554	T.06.05	9	020106	T.06.05	3	149104	T.04.02	21

Code	Drawing No.	Loc.	Code	Drawing No.	Loc.	Code	Drawing No.	Loc.
156205	T.06.06	5	223605	T.03.03	13	257134	T.05.01	10
168077	T.02.21	25	231590	T.04.02	60	257134	T.06.06	17
174085	T.04.02	22	232108	T.02.02	9	257404	T.02.21	10
174088	T.04.02	23	232108	T.04.04	5	257614	T.02.05	7
174874	T.04.02	24	232108	T.04.04	10	258146	T.01.10	7
177408	T.04.02	29	232108	T.04.01	10	258146	T.01.26	3
177414	T.04.02	30	232108	T.02.02	16	258160	T.02.18	11
177436	T.04.02	39	239388	T.01.10	11	258249	T.02.05	26
177442	T.04.02	43	239388	T.01.02	13	258249	T.02.05	36
177443	T.04.02	44	239388	T.01.02	3	258249	T.03.01	8
177445	T.04.02	31	241936	T.05.01	18	258249	T.02.06	6
177451	T.04.02	54	241936	T.02.17	2	258403	T.06.01	1
177494	T.04.02	40	241936	T.02.21	2	259166	T.01.26	14
177521	T.04.02	32	241936	T.02.07	10	259348	T.04.02	13
177609	T.04.02	18	241936	T.01.26	13	259349	T.02.05	8
177610	T.04.02	45	241937	T.03.02	5	259349	T.04.02	61
178150	T.04.04	13	250522	T.06.03	16	259349	T.04.02	14
178790	T.03.03	12	252420	T.02.05	6	259372	T.02.05	30
181746	T.06.03	7	252945	T.06.06	4	259372	T.02.05	32
181746	T.06.03	11	253327	T.06.02	2	259830	T.02.06	7
191189	T.02.02	2	253937	T.02.17	5	259832	T.02.18	10
192598	T.02.08	4	254485	T.06.04	2	260918	T.01.26	6
194423	T.04.04	18	254485	T.02.18	9	260918	T.01.22	4
198513	T.04.02	55	254485	T.02.21	9	265451	T.05.01	8
199190	T.06.04	9	254485	T.02.21	30	265451	T.05.01	22
199190	T.02.07	11	254485	T.02.21	5	266841	T.04.02	33
199190	T.02.06	4	254485	T.02.08	6	266845	T.04.01	6
199190	T.02.03	3	254485	T.02.11	4	267038	T.04.04	14
199190	T.02.05	25	254485	T.01.26	18	267115	T.03.01	9
217280	T.02.17	4	254485	T.02.06	5	267819	T.04.02	34

Code	Drawing No.	Loc.	Code	Drawing No.	Loc.	Code	Drawing No.	Loc.
267958	T.02.03	2	277916	T.01.02	26	298731	T.02.17	23
268158	T.04.04	6	277916	T.01.04	9	298838	T.02.17	10
268596	T.02.05	5	285536	T.01.11	12	298903	T.02.17	7
268596	T.03.01	12	285846	T.01.05	13	299557	T.02.01	9
268596	T.02.11	16	287913	T.01.11	2	299972	T.02.05	34
268596	T.02.05	9	288245	T.02.11	9	299972	T.02.17	13
269118	T.04.02	35	288474	T.01.15	16	319532	T.05.01	15
269755	T.01.16	13	289731	T.05.01	4	319538	T.02.15	7
270793	T.01.10	3	289731	T.06.05	4	411296	T.01.05	9
270793	T.03.02	3	289731	T.01.11	27	411311	T.01.02	4
270793	T.02.21	3	289731	T.01.10	14	414837	T.01.13	9
271147	T.04.02	46	289731	T.01.10	13	414837	T.01.11	15
271434	T.03.03	8	289731	T.02.08	7	414838	T.01.15	4
271452	T.03.03	4	290860	T.06.06	4	414838	T.02.18	5
271453	T.03.03	5	292022	T.06.02	3	414838	T.01.06	9
271477	T.04.02	59	292022	T.06.03	2	430264	T.01.10	2
271740	T.04.01	7	292022	T.06.02	7	430585	T.01.09	4
271807	T.04.01	8	292507	T.06.06	4	431065	T.01.02	25
272426	T.02.02	15	292723	T.06.02	4	431089	T.01.09	17
272750	T.04.04	31	294678	T.03.01	11	432142	T.01.02	27
272836	T.05.01	19	294723	T.06.01	2	433232	T.01.09	5
272836	T.06.03	5	294877	T.06.01	3	433800	T.06.02	18
272836	T.02.21	6	295789	T.02.02	3	434541	T.06.04	3
272836	T.02.11	5	296141	T.02.05	10	434541	T.01.11	16
272836	T.06.06	15	296456	T.02.13	2	434885	T.01.08	9
273460	T.04.04	32	296458	T.06.02	5	434947	T.02.02	4
273693	T.04.02	36	297027	T.01.05	6	435629	T.01.05	20
273754	T.02.02	10	297498	T.06.02	16	436438	T.01.05	14
274246	T.01.09	20	298581	T.02.17	6	436695	T.01.11	3
277916	T.01.11	9	298604	T.02.17	27	436788	T.02.13	6

Code	Drawing No.	Loc.	Code	Drawing No.	Loc.	Code	Drawing No.	Loc.
436947	T.01.25	12	485047	T.01.02	19	562923	T.03.03	6
463195	T.02.07	7	485080	T.01.12	12	56297R	T.04.02	2
478115	T.01.02	5	485655	T.01.02	20	56298R	T.04.02	7
478115	T.01.04	10	485703	T.01.16	14	563728	T.04.04	19
478184	T.01.04	11	485710	T.01.08	4	564053	T.04.02	37
478985	T.01.10	12	485868	T.01.11	17	564573	T.04.06	4
479132	T.01.26	4	485912	T.01.16	2	564573	T.04.02	47
479515	T.01.14	3	485912	T.01.02	8	564629	T.05.01	9
479986	T.01.11	11	486075	T.01.15	8	564629	T.01.11	28
479986	T.01.12	18	486081	T.01.02	9	564761	T.05.01	5
480853	T.01.05	21	486175	T.01.14	7	564878	T.04.01	18
482305	T.01.09	18	486324	T.01.08	10	567642	T.02.11	8
483164	T.02.01	8	486324	T.01.09	21	57313R	T.02.21	11
483226	T.01.09	9	486331	T.01.06	14	57323R	T.02.16	1
483261	T.01.09	12	486336	T.01.06	8	57333R	T.02.21	13
483711	T.01.05	15	486343	T.01.06	7	573426	T.02.17	24
483767	T.01.02	18	486363	T.01.04	4	574646	T.02.07	8
483785	T.01.02	6	486974	T.01.06	15	575249	T.02.05	27
483889	T.01.08	2	487211	T.01.16	6	575249	T.02.06	8
483914	T.01.05	16	487832	T.01.06	16	575249	T.02.08	12
483918	T.01.11	20	487833	T.01.06	17	575249	T.02.11	6
484034	T.01.02	7	487936	T.01.09	6	575249	T.02.21	31
484123	T.01.15	15	487989	T.01.07	6	575249	T.02.17	3
484123	T.01.06	11	497461	T.01.01	2	575607	T.02.05	11
484733	T.01.05	17	497462	T.01.01	3	575819	T.02.05	12
484739	T.01.06	1	56140R5	T.04.02	56	576189	T.06.04	10
484740	T.01.06	4	561433	T.04.02	62	576189	T.02.05	28
484819	T.01.06	2	56234R	T.04.04	1	576189	T.02.07	12
484819	T.01.06	5	56263R	T.04.02	57	576189	T.02.06	13
484908	T.01.04	3	56286R	T.04.02	57	576464	T.02.12	4

Code	Drawing No.	Loc.	Code	Drawing No.	Loc.	Code	Drawing No.	Loc.
576542	T.02.20	7	577395	T.02.05	29	577437	T.02.06	9
576546	T.02.20	8	577395000C	T.02.05	29	577447	T.02.05	16
577005	T.02.05	13	577395000C	T.02.05	29	577453	T.02.05	37
577128	T.02.17	14	577395000C	T.02.05	29	577454	T.02.17	22
577129	T.02.17	15	577395000C	T.02.05	29	577456	T.02.17	25
577131	T.02.17	16	577395000C	T.02.05	29	577468	T.02.05	17
577174	T.02.05	1	577395000C	T.02.05	29	577471	T.02.17	17
5771740090	T.02.05	1	577395000C	T.02.05	29	577473	T.02.07	3
5771740090	T.02.05	1	577395000C	T.02.05	29	5774730090	T.02.07	3
57717400DE	T.02.05	1	577396000C	T.02.05	31	5774730090	T.02.07	3
57717400F2	T.02.05	1	577396000C	T.02.05	31	57747300DE	T.02.07	3
57717400ND	T.02.05	1	577396000C	T.02.05	31	57747300F2	T.02.07	3
57717400R7	T.02.05	1	577396000C	T.02.05	31	57747300ND	T.02.07	3
57717400RI	T.02.05	1	577396000C	T.02.05	31	57747300R7	T.02.07	3
577175	T.02.05	2	577396000C	T.02.05	31	57747300RI	T.02.07	3
5771750090	T.02.05	2	577396000C	T.02.05	31	577474	T.02.07	4
5771750090	T.02.05	2	577396000C	T.02.05	31	5774740090	T.02.07	4
57717500DE	T.02.05	2	577399	T.02.05	14	5774740090	T.02.07	4
57717500F2	T.02.05	2	577400	T.02.05	15	57747400DE	T.02.07	4
57717500ND	T.02.05	2	577405000C	T.02.07	13	57747400EI	T.02.07	4
57717500R7	T.02.05	2	577405000C	T.02.07	13	57747400F2	T.02.07	4
57717500RI	T.02.05	2	577405000C	T.02.07	13	57747400ND	T.02.07	4
577180	T.02.06	2	577405000C	T.02.07	13	57747400R7	T.02.07	4
577181	T.02.06	3	577405000C	T.02.07	13	57747400RI	T.02.07	4
577182	T.02.06	11	577405000C	T.02.07	13	577492	T.02.13	3
577183	T.02.21	1	5774050043	T.02.07	13	577594	T.02.05	18
577187	T.02.21	16	5774050043	T.02.07	13	577620	T.02.05	35
577195	T.02.21	29	577406	T.02.06	10	577620	T.02.17	18
577201	T.02.21	18	577433	T.02.21	21	577856	T.02.05	19
577384	T.02.21	19	577436	T.02.21	12	577856000C	T.02.05	19

Code	Drawing No.	Loc.	Code	Drawing No.	Loc.	Code	Drawing No.	Loc.
577856000C	T.02.05	19	582034	T.03.03	9	584884	T.02.11	10
577856000C	T.02.05	19	582041	T.06.01	4	584970	T.06.02	8
577856000C	T.02.05	19	582298	T.02.02	11	584971	T.06.02	11
577856000C	T.02.05	19	582787	T.04.02	10	584972	T.06.03	6
577856000C	T.02.05	19	582828	T.03.03	14	584973	T.06.03	10
577856000C	T.02.05	19	582850	T.02.02	12	597149	T.04.04	7
577856000C	T.02.05	19	582851	T.02.02	13	597317	T.04.01	12
577857	T.02.05	20	582930	T.06.06	4	597374	T.04.01	13
577857000C	T.02.05	20	582951	T.06.01	5	597418	T.05.01	5
577857000C	T.02.05	20	582988	T.06.01	6	597528	T.04.04	21
577857000C	T.02.05	20	582990	T.02.17	19	597564	T.04.06	5
577857000C	T.02.05	20	583236	T.06.05	11	597565	T.04.06	6
577857000C	T.02.05	20	583527	T.06.03	8	597679	T.04.05	3
577857000C	T.02.05	20	583527	T.06.03	12	597679	T.04.06	3
577857000C	T.02.05	20	583575	T.06.01	11	597758	T.04.02	38
577857000C	T.02.05	20	583864	T.06.02	10	597856	T.05.01	3
577861	T.02.05	21	583864	T.06.02	13	597857	T.04.01	4
580160	T.05.01	12	584121	T.02.17	20	597914	T.04.01	5
580160	T.02.21	28	584344	T.01.25	14	598134	T.04.02	71
580653	T.06.06	3	584479	T.06.02	1	598143	T.04.04	3
58086R	T.06.05	18	584520	T.06.06	16	598237	T.04.01	16
58088R	T.01.13	1	584599	T.06.01	8	598277	T.04.05	2
58099R	T.06.04	11	584669	T.02.21	4	598278	T.04.06	2
58110R	T.01.14	2	584678	T.06.03	13	598615	T.04.02	63
581142	T.06.04	12	584679	T.06.03	9	598615000C	T.04.02	63
58115R	T.06.04	8	584724	T.06.06	1	598615000C	T.04.02	63
581440	T.06.06	4	584725	T.03.02	1	598615000C	T.04.02	63
581904	T.06.02	9	584726	T.06.02	6	598615000C	T.04.02	63
581904	T.06.02	12	584867	T.06.04	4	598615000C	T.04.02	63
581957	T.03.01	10	584877	T.02.11	15	598615000C	T.04.02	63

Code	Drawing No.	Loc.	Code	Drawing No.	Loc.	Code	Drawing No.	Loc.
598615000C	T.04.02	63	59967900EI	T.03.01	4	620737	T.02.18	7
598615000C	T.04.02	63	59967900F2	T.03.01	4	62110200F1	T.02.13	1
598619	T.04.05	1	59967900ND	T.03.01	4	62110200F1	T.02.13	1
598619	T.04.06	1	59967900R7	T.03.01	4	62110200F1	T.02.13	1
598654	T.04.02	48	59967900RI	T.03.01	4	62110200F1	T.02.13	1
598715	T.04.06	7	600161	T.04.01	3	62110200F2	T.02.13	1
598917	T.04.01	2	600579	T.02.08	1	62110200F2	T.02.13	1
599020	T.02.02	14	6005790090	T.02.08	1	62110200F3	T.02.13	1
599059	T.04.01	19	6005790090	T.02.08	1	62110200F3	T.02.13	1
599077	T.04.01	17	60057900DE	T.02.08	1	621137	T.02.07	1
599097	T.02.02	5	60057900EI	T.02.08	1	6211370090	T.02.07	1
599208	T.01.25	13	60057900F2	T.02.08	1	6211370090	T.02.07	1
599246	T.04.01	11	60057900ND	T.02.08	1	62113700DE	T.02.07	1
599250	T.04.01	14	60057900R7	T.02.08	1	62113700EI	T.02.07	1
599561	T.02.02	6	60057900RI	T.02.08	1	62113700F2	T.02.07	1
599593	T.04.04	27	6009605	T.04.02	51	62113700ND	T.02.07	1
599677	T.02.08	2	601031	T.04.02	50	62113700R7	T.02.07	1
599678	T.03.01	3	601288	T.03.03	7	62113700RI	T.02.07	1
5996780090	T.03.01	3	601321	T.05.02	1	621138	T.02.07	2
5996780090	T.03.01	3	601815	T.04.04	30	6211380090	T.02.07	2
59967800DE	T.03.01	3	601825	T.04.01	1	6211380090	T.02.07	2
59967800EI	T.03.01	3	601952	T.05.01	13	62113800DE	T.02.07	2
59967800F2	T.03.01	3	601978	T.02.02	1	62113800EI	T.02.07	2
59967800ND	T.03.01	3	620236	T.02.11	7	62113800F2	T.02.07	2
59967800R7	T.03.01	3	620395	T.02.01	3	62113800ND	T.02.07	2
59967800RI	T.03.01	3	620395	T.02.01	5	62113800R7	T.02.07	2
599679	T.03.01	4	620415	T.02.17	21	62113800RI	T.02.07	2
5996790090	T.03.01	4	620452	T.02.05	33	621141	T.02.09	2
5996790090	T.03.01	4	620529	T.02.12	5	621143	T.02.03	1
59967900DE	T.03.01	4	620693	T.02.05	22	6211430090	T.02.03	1

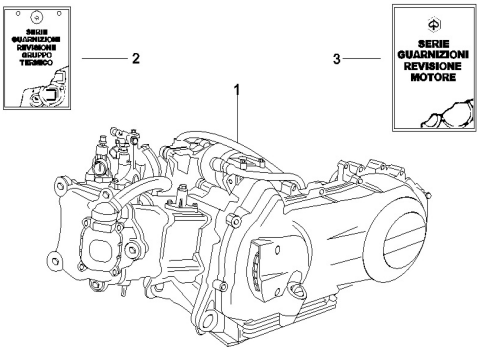
Code	Drawing No.	Loc.	Code	Drawing No.	Loc.	Code	Drawing No.	Loc.
6211430090	T.02.03	1	6228240090	T.02.11	1	62344700DE	T.03.01	2
62114300F2	T.02.03	1	62282400DE	T.02.11	1	62344700F2	T.03.01	2
62114300ND	T.02.03	1	62282400F2	T.02.11	1	62344700ND	T.03.01	2
62114300R7	T.02.03	1	62282400ND	T.02.11	1	62344700R7	T.03.01	2
6211434090	T.02.03	1	62282400R7	T.02.11	1	62344700RI	T.03.01	2
6211434090	T.02.03	1	62282400RI	T.02.11	1	623448	T.03.01	1
62114340F2	T.02.03	1	622838	T.06.05	7	6234480090	T.03.01	1
62114340ND	T.02.03	1	622839	T.02.21	17	6234480090	T.03.01	1
62114340R7	T.02.03	1	62291400R7	T.02.01	1	62344800DE	T.03.01	1
6211435090	T.02.03	1	62291400RI	T.02.01	1	62344800EI	T.03.01	1
6211435090	T.02.03	1	6229145	T.02.01	1	62344800F2	T.03.01	1
62114350DE	T.02.03	1	6229145090	T.02.01	1	62344800R7	T.03.01	1
62114350F2	T.02.03	1	6229145090	T.02.01	1	62344800RI	T.03.01	1
62114350ND	T.02.03	1	62291450DE	T.02.01	1	623536	T.03.03	1
62114350R7	T.02.03	1	62291450F2	T.02.01	1	623563	T.02.11	2
62114350RI	T.02.03	1	62291450ND	T.02.01	1	623575	T.02.07	9
621145	T.02.08	8	62291450R7	T.02.01	1	623673	T.02.21	8
621146	T.02.20	1	62291450RI	T.02.01	1	623743	T.02.20	10
621152	T.02.20	2	622948	T.01.10	15	623776	T.02.05	38
621155	T.02.09	1	623013	T.02.21	23	623920	T.02.15	6
621157	T.06.05	6	623162	T.02.18	12	623922	T.02.21	20
621365	T.02.21	27	623205	T.02.12	6	623928	T.02.06	1
621498	T.02.13	4	623317	T.02.12	1	6239280090	T.02.06	1
621581	T.02.20	9	623318	T.02.12	2	6239280090	T.02.06	1
621582	T.02.18	1	623319	T.02.12	3	62392800DE	T.02.06	1
621585	T.02.20	6	623361	T.06.05	12	62392800EI	T.02.06	1
621830	T.06.04	13	623438	T.02.21	24	62392800F2	T.02.06	1
622052	T.02.21	22	623447	T.03.01	2	62392800R7	T.02.06	1
622824	T.02.11	1	6234470090	T.03.01	2	62392800RI	T.02.06	1
6228240090	T.02.11	1	6234470090	T.03.01	2	623977	T.02.15	1

Code	Drawing No.	Loc.	Code	Drawing No.	Loc.	Code	Drawing No.	Loc.
624402	T.02.21	7	82518R	T.01.09	11	82831R	T.01.05	3
638534	T.02.17	26	82539R	T.01.02	10	828421	T.01.07	5
638536	T.06.03	3	82539R	T.04.02	10	828480	T.01.05	19
638919	T.06.03	1	82545R	T.04.04	28	828653	T.01.07	7
638934	T.06.06	2	825481	T.01.25	17	828662	T.01.12	11
6389495	T.01.22	1	825758	T.01.16	7	828717	T.01.09	7
638975	T.06.01	9	82580R	T.01.15	9	828817	T.06.05	8
638976	T.06.01	10	825952	T.01.11	21	828961	T.04.05	6
639000	T.01.05	8	82635R	T.01.15	10	829040	T.01.12	19
639026	T.06.06	14	826396	T.01.06	18	829139	T.01.06	19
639028	T.01.13	2	82649R	T.01.11	5	829201	T.01.16	4
639030	T.06.06	10	82650R	T.01.11	14	829206	T.01.16	5
639032	T.01.15	13	82659R	T.01.16	3	829529	T.01.04	5
639082	T.06.04	5	827085	T.01.02	23	829534	T.01.07	1
639180	T.01.22	8	82723R	T.01.11	22	829536	T.01.07	2
639205	T.01.07	11	827277	T.01.16	8	829593	T.01.11	8
646833	T.03.03	16	82737R	T.01.13	3	829661	T.01.02	21
646833	T.03.03	18	82782R	T.01.11	23	829785	T.01.05	18
646921	T.02.13	5	827831	T.01.26	20	830056	T.01.26	7
647078	T.05.01	25	82783R	T.01.11	6	830057	T.01.26	8
647161	T.05.01	26	82806R	T.01.14	1	830061	T.01.22	6
709047	T.04.05	5	828146	T.01.04	8	830061	T.01.02	16
709047	T.05.01	24	828147	T.01.04	8	830071	T.01.16	10
709047	T.02.01	6	828148	T.01.04	8	830248	T.01.07	3
709047	T.04.02	25	82817R	T.01.06	3	830249	T.01.07	4
709047	T.04.04	22	82817R	T.01.06	6	830486	T.01.04	6
709047	T.02.21	40	82818R	T.01.09	1	830862	T.01.16	15
709047	T.05.01	16	828210	T.06.05	16	831174	T.01.05	10
709532	T.01.22	7	828217	T.01.08	14	831322	T.01.14	4
709646	T.04.04	24	82823R	T.01.11	13	831995	T.01.26	5

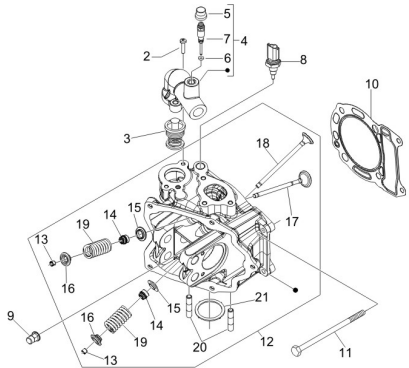
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831997	T.01.26	9	842143	T.01.16	1	844730	T.01.12	1
832130	T.01.02	22	842204	T.01.08	3	844758	T.01.26	10
833308	T.01.06	12	8423835001	T.01.03	1	8447595	T.01.12	5
833669	T.01.09	8	8423835002	T.01.03	1	844864	T.01.25	5
833673	T.01.09	13	842385	T.01.14	10	844927	T.01.25	4
833674	T.01.09	14	842388	T.01.14	11	845212	T.01.02	28
833701	T.01.02	11	842389	T.01.12	2	845604	T.01.05	4
833722	T.01.11	4	842390	T.01.12	16	845605	T.01.05	7
833989	T.01.08	13	842455	T.01.12	3	845753	T.01.05	2
834044	T.01.09	15	842595	T.01.12	4	8458245	T.01.12	17
834187	T.01.25	8	8427035	T.01.13	7	845861	T.01.02	24
834266	T.01.10	4	842870	T.01.08	5	8459375	T.01.10	9
840193	T.01.08	7	842908	T.01.25	3	846096	T.01.11	26
840332	T.01.02	12	843017	T.01.22	3	846098	T.01.11	29
840344	T.01.11	19	843028	T.01.08	6	8463425	T.01.25	1
840489	T.01.02	14	843362	T.01.05	17	846734	T.01.12	9
840504	T.01.15	5	843363	T.01.05	18	846819	T.01.11	10
840507	T.01.15	11	843517	T.01.04	1	847116	T.01.11	24
840532	T.01.13	6	8435190001	T.01.04	2	847266	T.01.26	1
840533	T.01.08	11	8435190002	T.01.04	2	847516	T.01.11	25
8409515001	T.01.02	1	8435190003	T.01.04	2	847568	T.01.05	12
8409515002	T.01.02	1	8435190004	T.01.04	2	847679	T.01.14	5
8410015	T.01.16	11	843568	T.01.15	12	847716	T.01.15	17
8410035	T.01.16	12	843963	T.01.08	8	847717	T.01.15	7
841130	T.01.12	13	844049	T.01.09	19	847718	T.01.12	8
841379	T.01.08	12	844160	T.01.15	6	847791	T.01.06	10
841774	T.01.09	16	844160	T.01.05	11	847881	T.01.22	2
841782	T.01.25	2	844352	T.01.11	1	847928	T.01.11	18
842090	T.01.10	6	844483	T.04.04	8	847929	T.01.11	7
842093	T.01.10	8	844582	T.01.02	15	847931	T.01.16	9

Code	Drawing No.	Loc.	Code	Drawing No.	Loc.
847974	T.01.25	15	CM012811	T.02.17	11
848039	T.04.04	20	CM012813	T.02.17	12
848452	T.01.25	11	CM013201	T.02.20	4
951685	T.02.13	10	CM017201	T.02.01	2
963486	T.01.04	7	CM017202	T.02.01	4
967351	T.02.02	7	CM017406	T.06.02	14
969224	T.02.20	5	CM017406	T.06.03	14
969224	T.02.08	13	CM017408	T.02.05	23
969224	T.04.02	15	CM017409	T.03.01	6
969296	T.06.06	11	CM017410	T.02.05	4
969348	T.06.05	17	CM017410	T.02.07	5
975855	T.02.01	7	CM017410	T.04.02	12
CM001424	T.02.20	3	CM017410	T.04.02	11
CM001903	T.02.21	32	CM017410	T.02.06	12
CM001904	T.01.12	14	CM017418	T.03.01	5
CM001904	T.02.21	33	CM023703	T.02.17	1
CM001904	T.01.07	8	CM025709	T.02.18	8
CM001905	T.02.21	34	CM060965	T.03.03	2
CM001907	T.02.21	35	CM067801	T.04.01	9
CM001908	T.01.12	15	CM068301	T.05.01	1
CM001908	T.02.21	14	CM071806	T.06.04	1
CM001908	T.02.21	36	CM074101	T.05.01	2
CM001915	T.02.21	37	CM074801	T.03.03	15
CM002910	T.01.26	2	CM074901	T.03.03	17
CM006307	T.02.05	3	CM121908	T.01.10	1
CM006903	T.05.01	6	CM1425505	T.01.01	1
CM006903	T.02.21	38	CM1440175	T.01.09	2
CM006903	T.06.06	6	CM144407	T.01.08	1
CM006904	T.06.06	7			
CM006906	T.06.06	8			

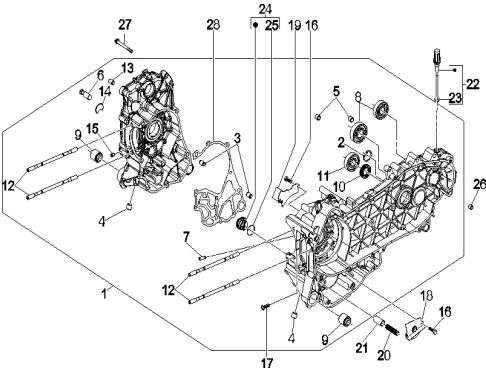
TAB. 01.01 - Engine, assembly



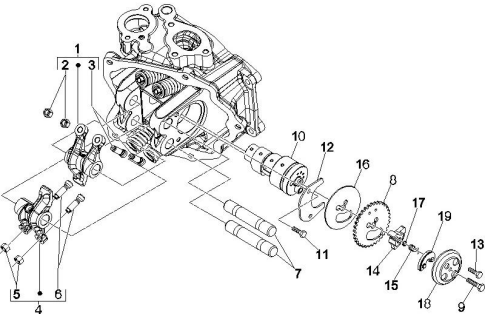
TAB. 01.05 - Head unit - Valve



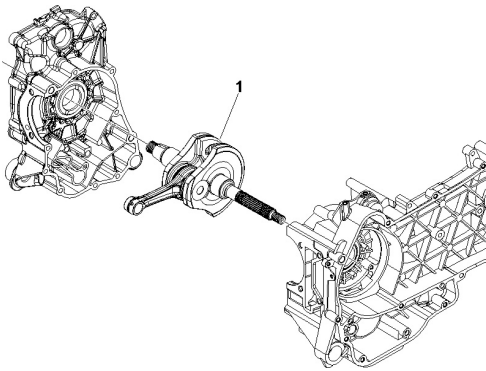
TAB. 01.02 - Crankcase



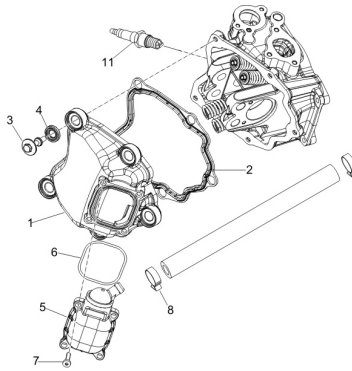
TAB. 01.06 - Rocker levers support unit



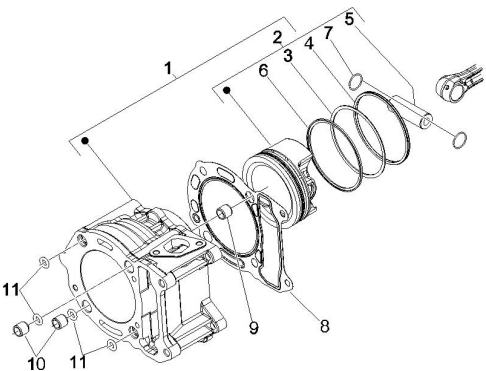
TAB. 01.03 - Crankshaft



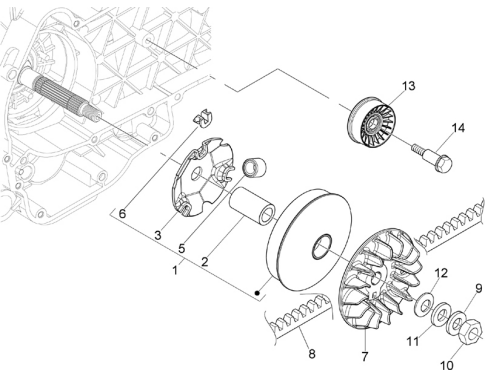
TAB. 01.07 - Cylinder head cover



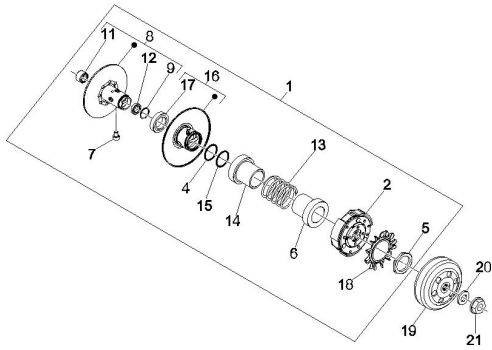
TAB. 01.04 - Cylinder-piston-rist pin unit



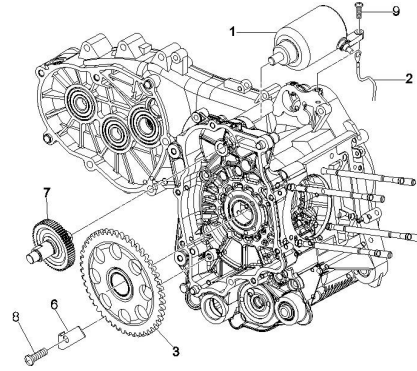
TAB. 01.08 - Driving pulley



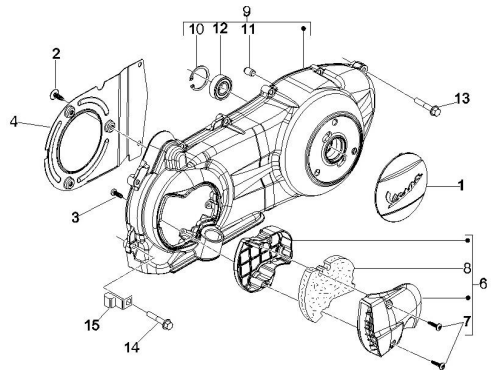
TAB. 01.09 - Driven pulley



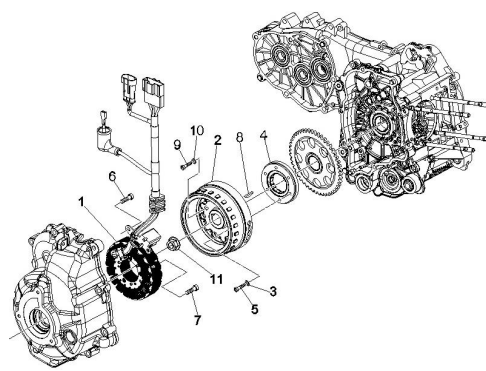
TAB. 01.13 - Stator - Electric starter



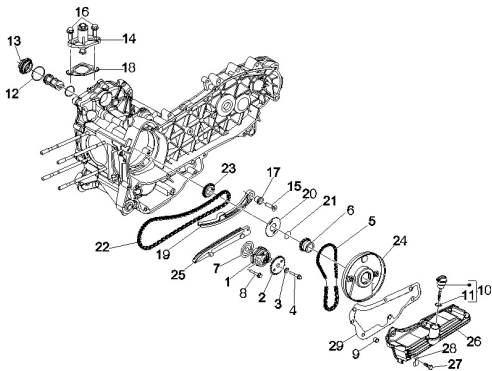
TAB. 01.10 - Crankcase cover - Crankcase cooling



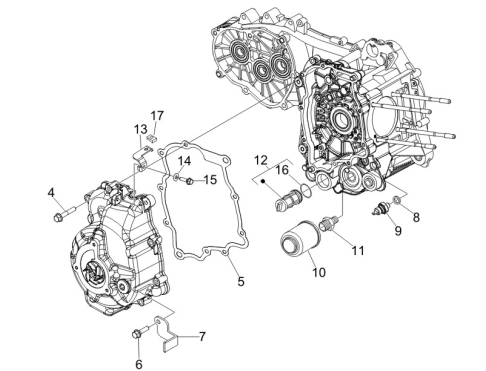
TAB. 01.14 - Flywheel magneto



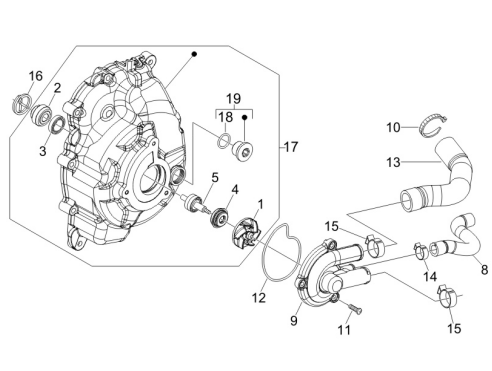
TAB. 01.11 - Oil pump



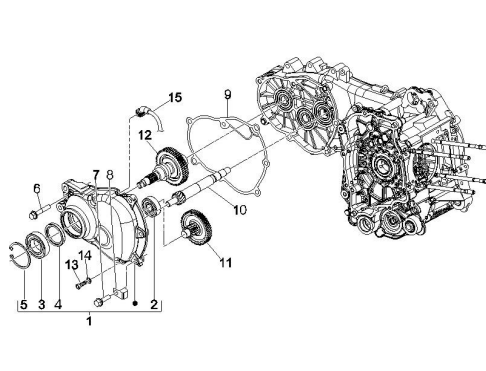
TAB. 01.15 - Flywheel magneto cover - Oil filter



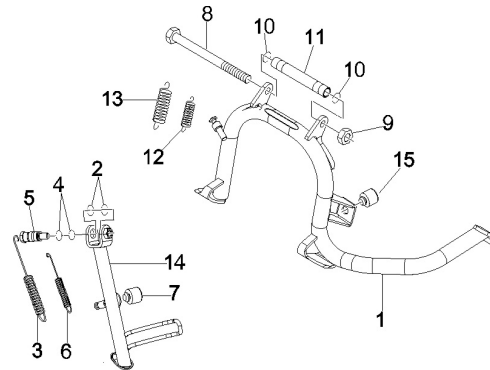
TAB. 01.12 - Cooler pump



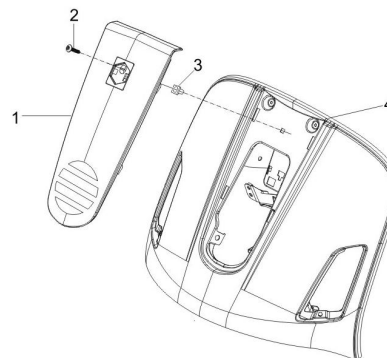
TAB. 01.16 - Reduction unit



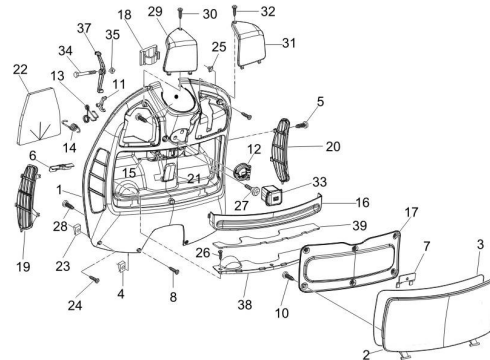
TAB. 02.02 - Stand/s



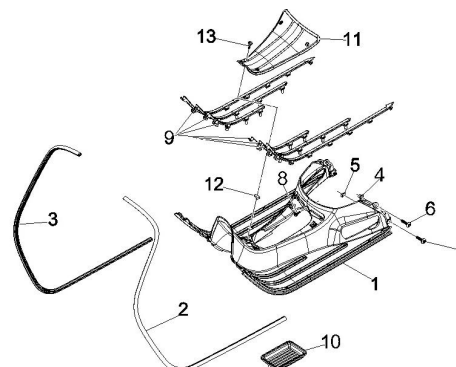
TAB. 02.03 - Front shield



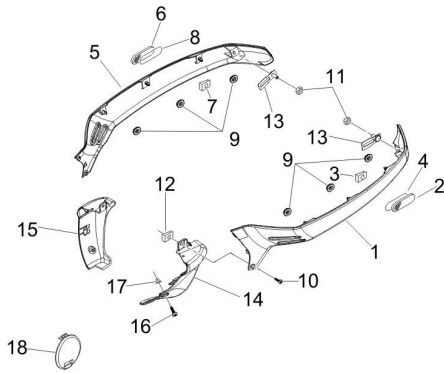
TAB. 02.05 - Front glove compartment - Counter shield



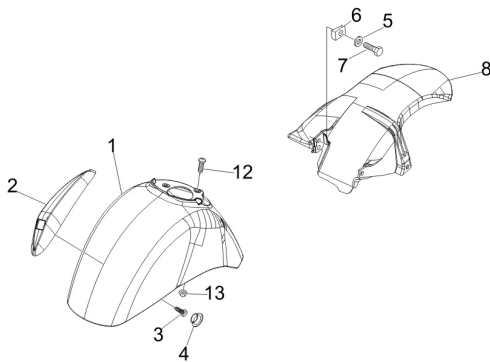
TAB. 02.06 - Central cover - Rubber mat



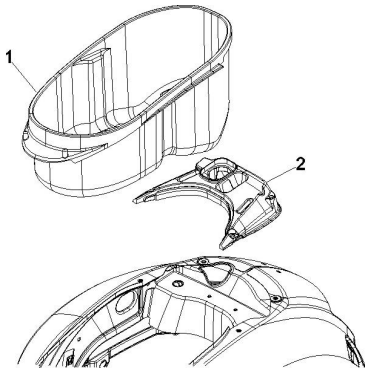
TAB. 02.07 - Side cover - Spoiler



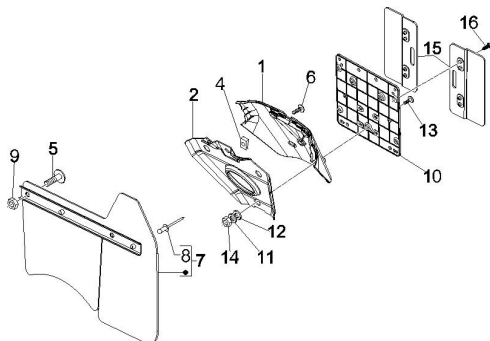
TAB. 02.08 - Wheel housing - Mudguard



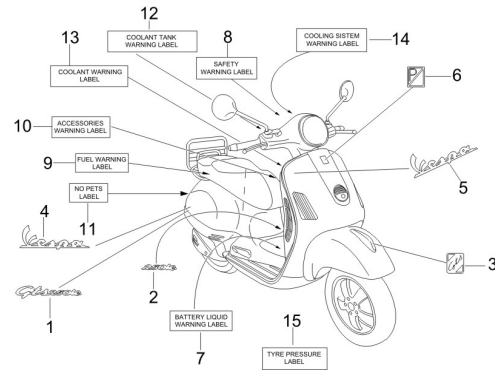
TAB. 02.09 - Helmet housing



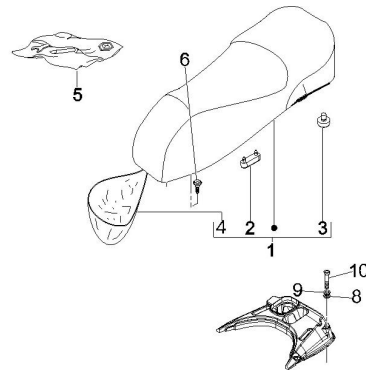
TAB. 02.11 - Rear cover - Splash guard



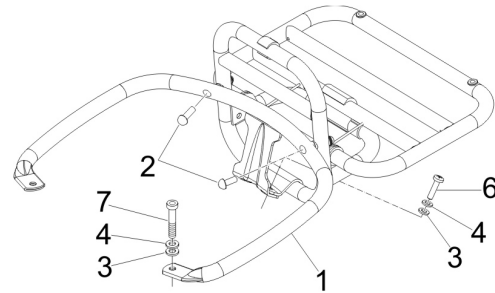
TAB. 02.12 - Plates - Emblems



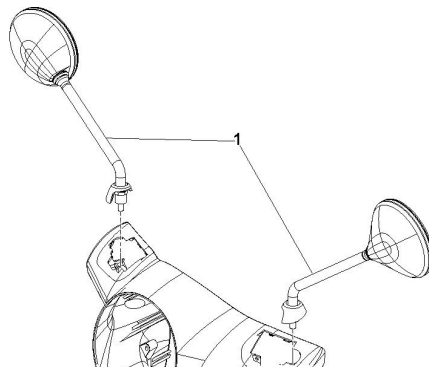
TAB. 02.13 - Saddle - Tool roll



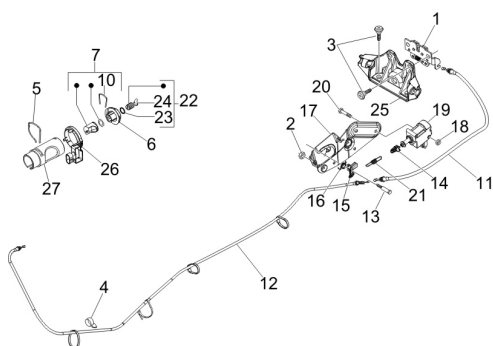
TAB. 02.15 - Rear carrier



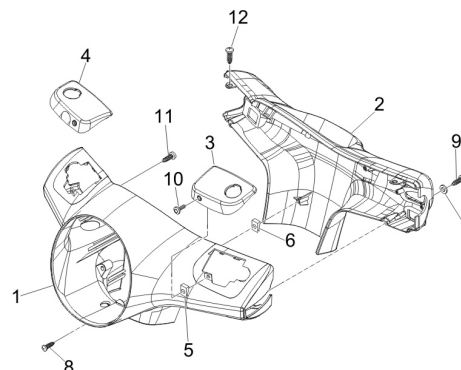
TAB. 02.16 - Driving mirror/s



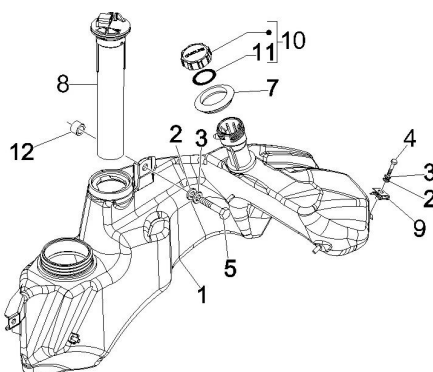
TAB. 02.17 - Locks



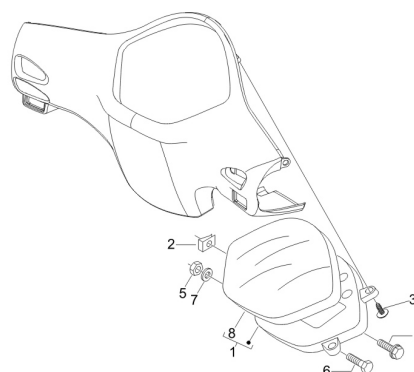
TAB. 03.01 - Handlebars coverages



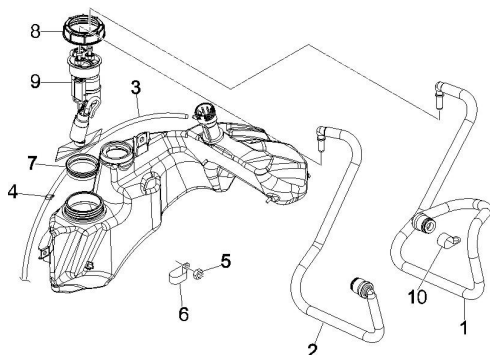
TAB. 02.18 - Fuel tank



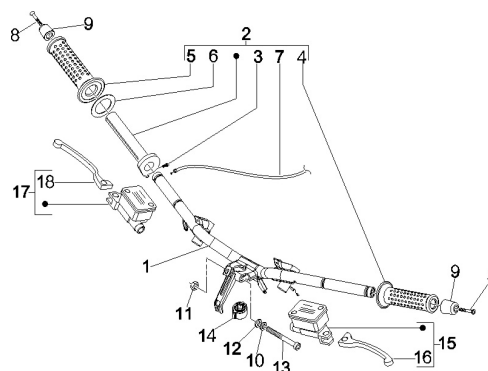
TAB. 03.02 - Meter combination



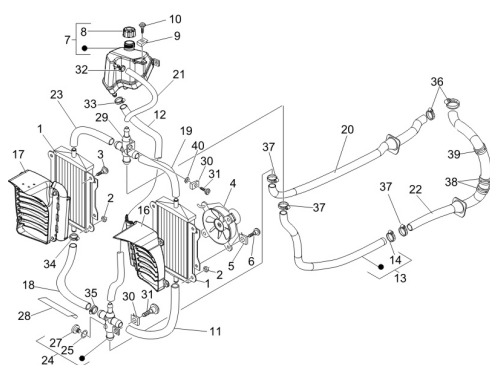
TAB. 02.20 - Supply system



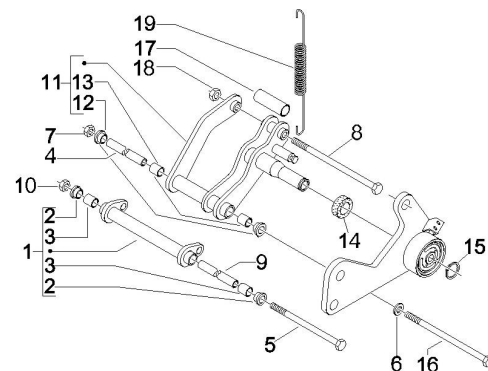
TAB. 03.03 - Handlebars - Master cil.



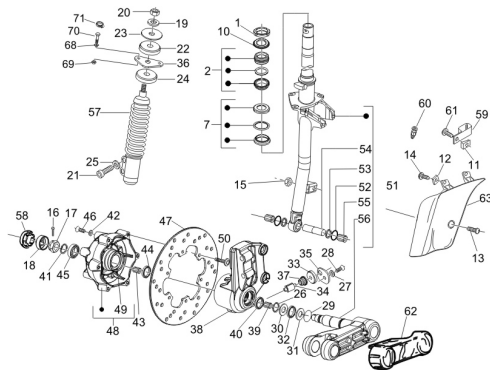
TAB. 02.21 - Cooling system



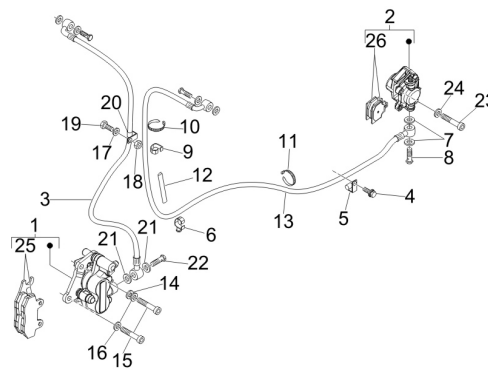
TAB. 04.01 - Swinging arm



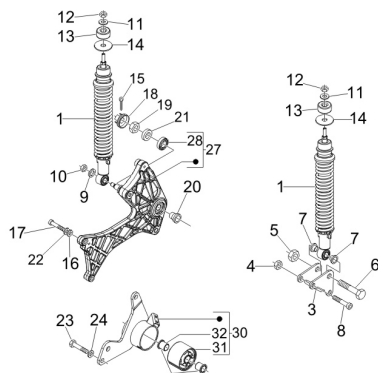
TAB. 04.02 - Fork/steering tube - Steering bearing unit



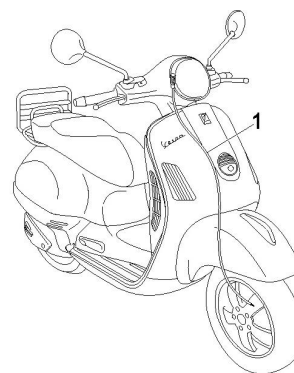
TAB. 05.01 - Brakes pipes - Calipers



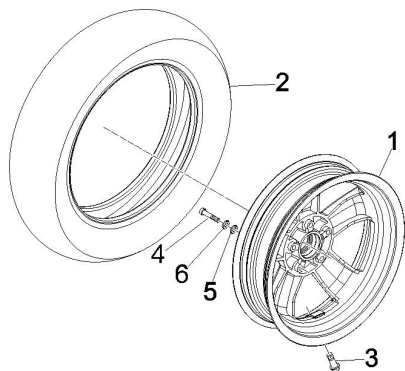
TAB. 04.04 - Rear suspension - Damper/s



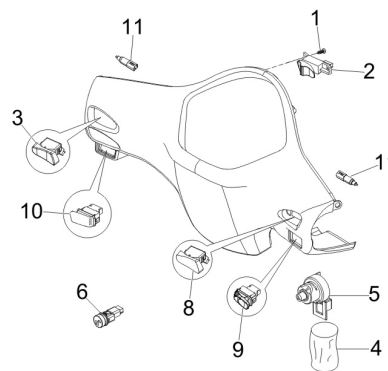
TAB. 05.02 - Transmissions



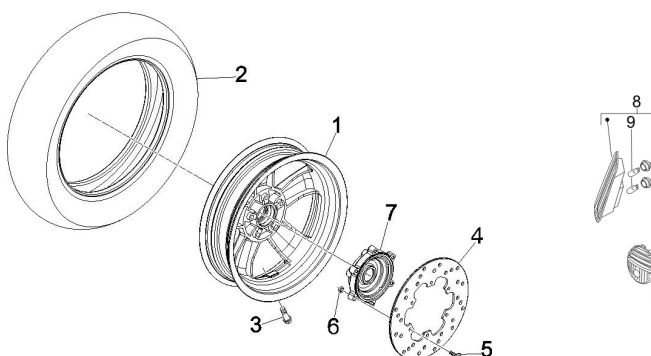
TAB. 04.05 - Front wheel



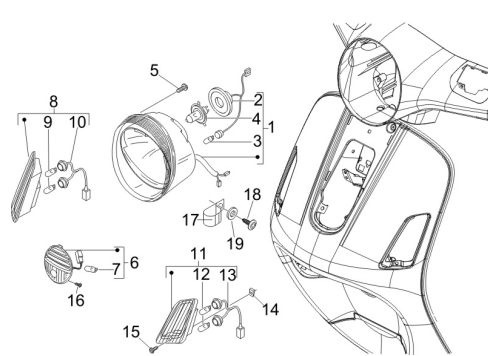
TAB. 06.01 - Selectors - Switches - Push buttons



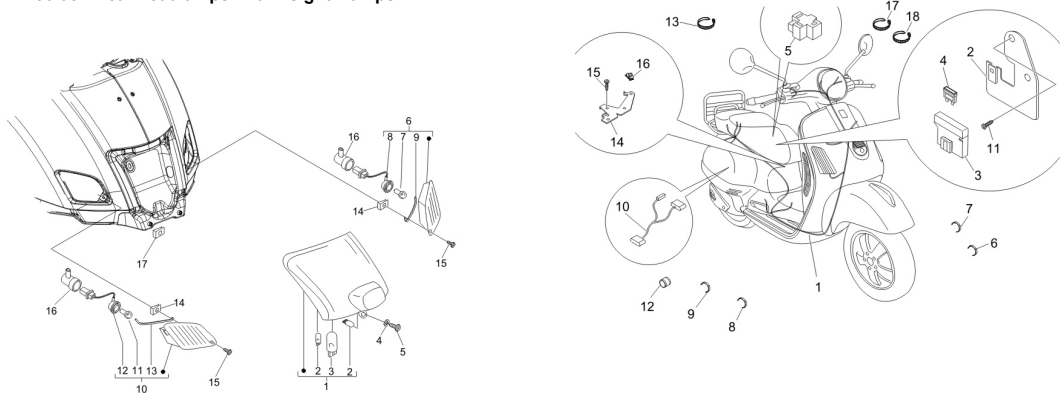
TAB. 04.06 - Rear wheel



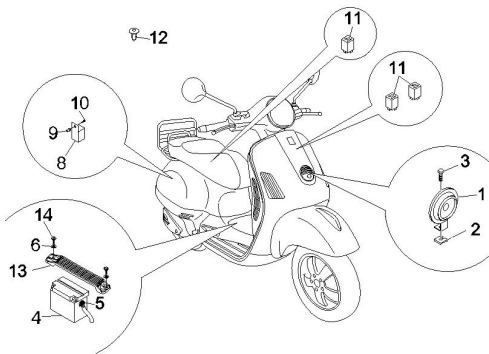
TAB. 06.02 - Front headlamps - Turn signal lamps



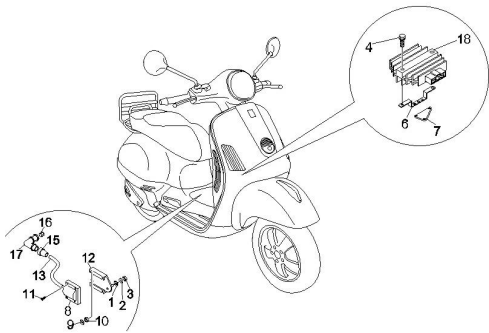
TAB. 06.03 - Rear headlamps - Turn signal lamps



TAB. 06.04 - Remote control switches - Battery - Horn



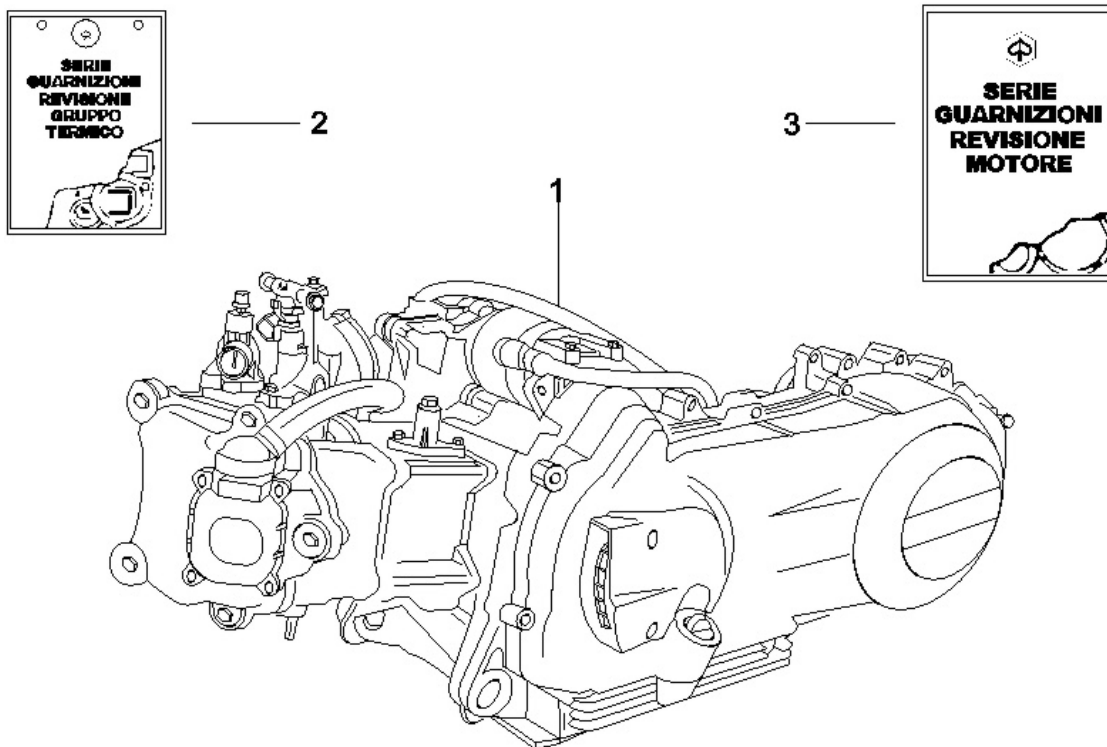
TAB. 06.05 - Voltage Regulators - Electronic Control Units (ecu) - H.T. Coil



TAB. 06.06 - Main cable harness

Frame prefix : ZAPM45100

Engine prefix : M451M

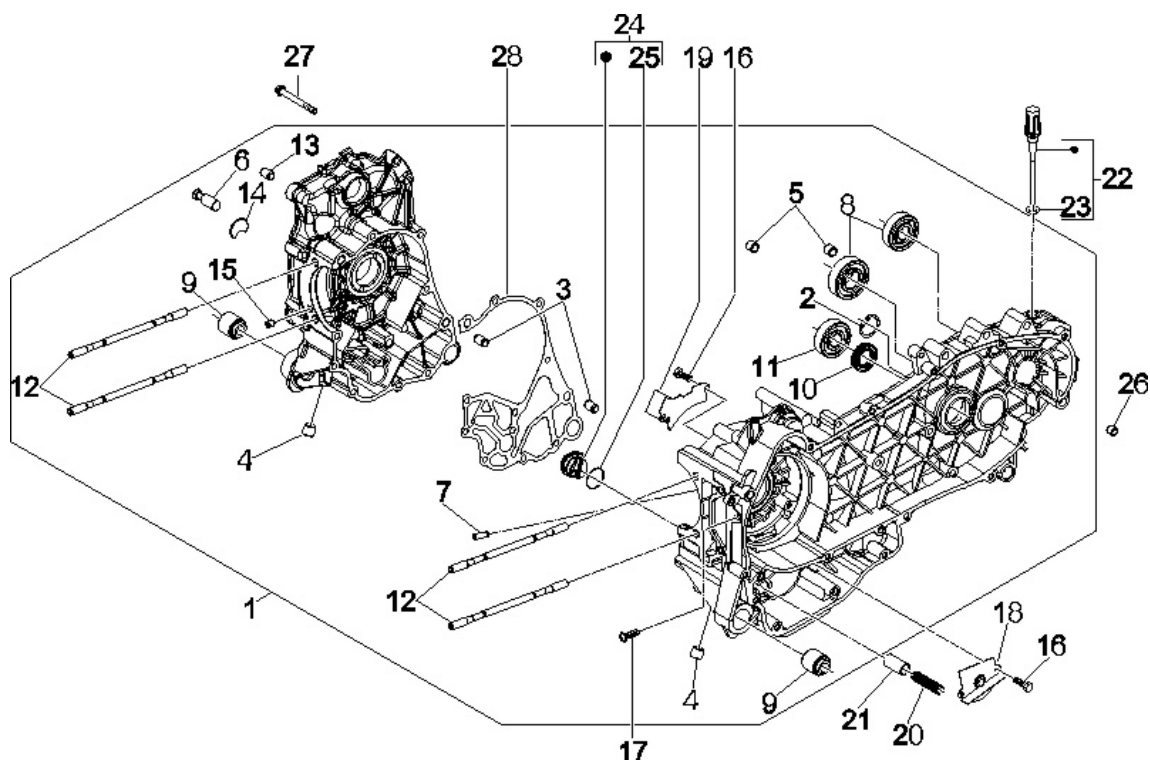


Last update : 23/02/2006

Loc.	Description	Q.ty	Vehicle colour	Drawing No.	Up to
1	engine	1		CM1425505	
2	oil seal and gask.set	1		497461	
3	oil seal and gask.set	1		497462	

Frame prefix : ZAPM45100

Engine prefix : M451M



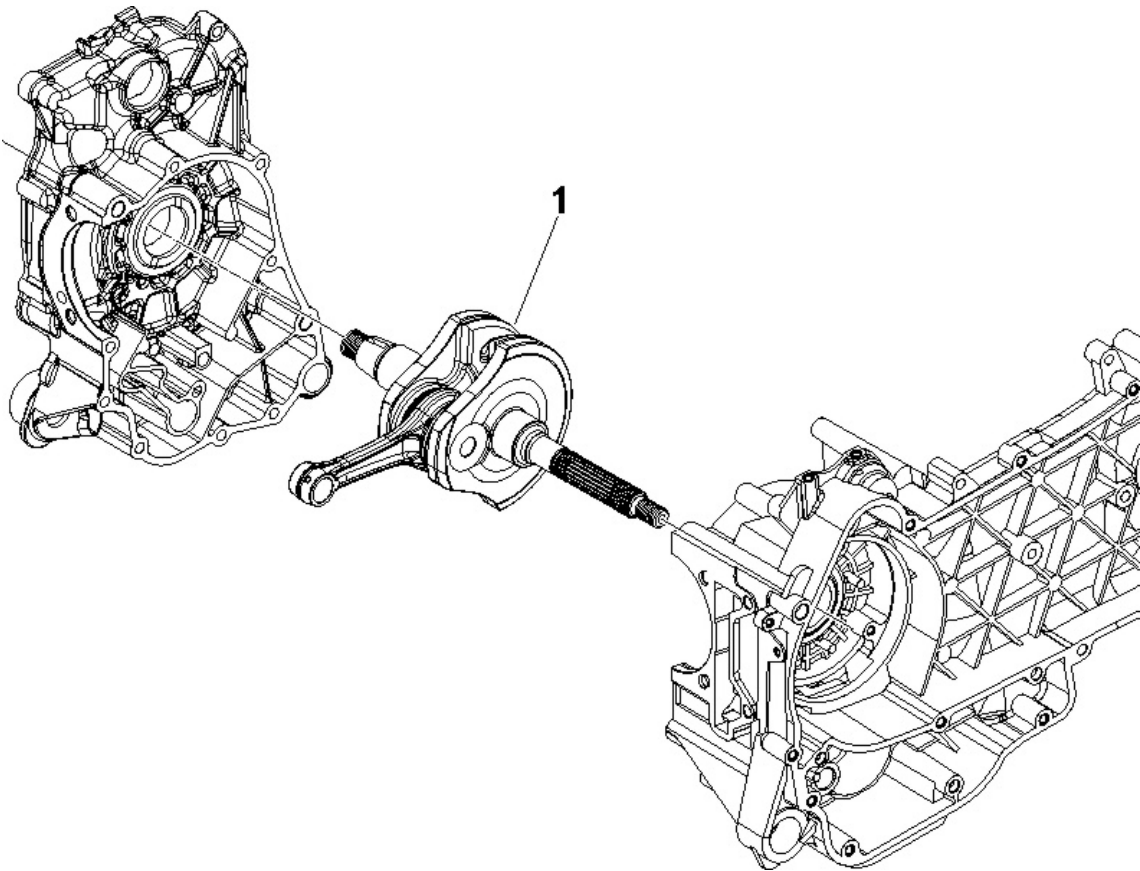
Last update : 23/02/2006

Loc.	Description	Q.ty	Vehicle colour	Drawing No.	Up to
1	crankcase assy	1		8409515001	
1	crankcase assy cat 2	1		8409515002	
2	ring for rear wheel axle (25x26,9x1,2)	1		000674	
3	pin x electrical starter motor -d9,5 h15	2		239388	
4	plug	2		411311	
5	pin vespa gt 125/200	2		478115	
6	pin vespa gt 125/200	1		483785	
7	nozzle	1		484034	
8	bearing	2		485912	
9	sil.block	2		486081	
10	gear box seal runner 180 2t m.02 u	1		82539R	
11	bearing runner 180 m.02	1		833701	
12	stud	4		840332	
13	pin x electrical starter motor -d9,5 h15	2		239388	
14	washer	1		840489	
15	nozzle for carter	1		844582	
16	franged hes.head screw(m5x16)	4		830061	
17	screw for outer h.t. coil (m5x10)	1		018575	
18	lower panel	1		483767	

Loc.	Description	Q.ty	Vehicle colour	Drawing No.	Up to
19	upper panel	1		485047	
20	spring	1		485655	
21	oil pressure valve leader 125/180 >04/02	1		829661	
22	plastic oil dipstick et4 125,mc3 m.02	1		832130	
23	packing	1		827085	
24	bracket filter insert	1		845861	
25	packing	1		431065	
26	dowel	1		277916	
27	screw	10		432142	
28	crackcase gasket for leader engine	1		845212	

Frame prefix : ZAPM45100

Engine prefix : M451M

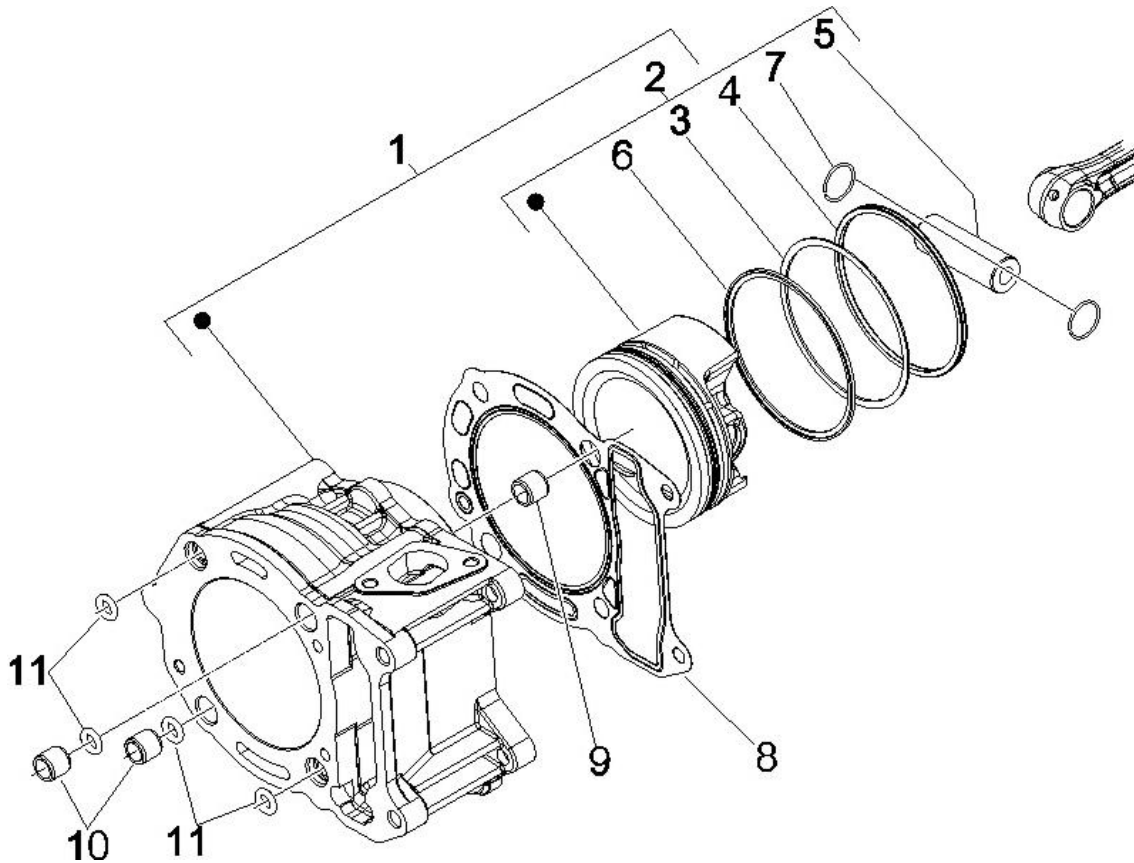


Last update : 23/02/2006

Loc.	Description	Q.ty	Vehicle colour	Drawing No.	Up to
1	crankshaft cat 1	1		8423835001	
1	crankshaft cat 2	1		8423835002	

Frame prefix : ZAPM45100

Engine prefix : M451M

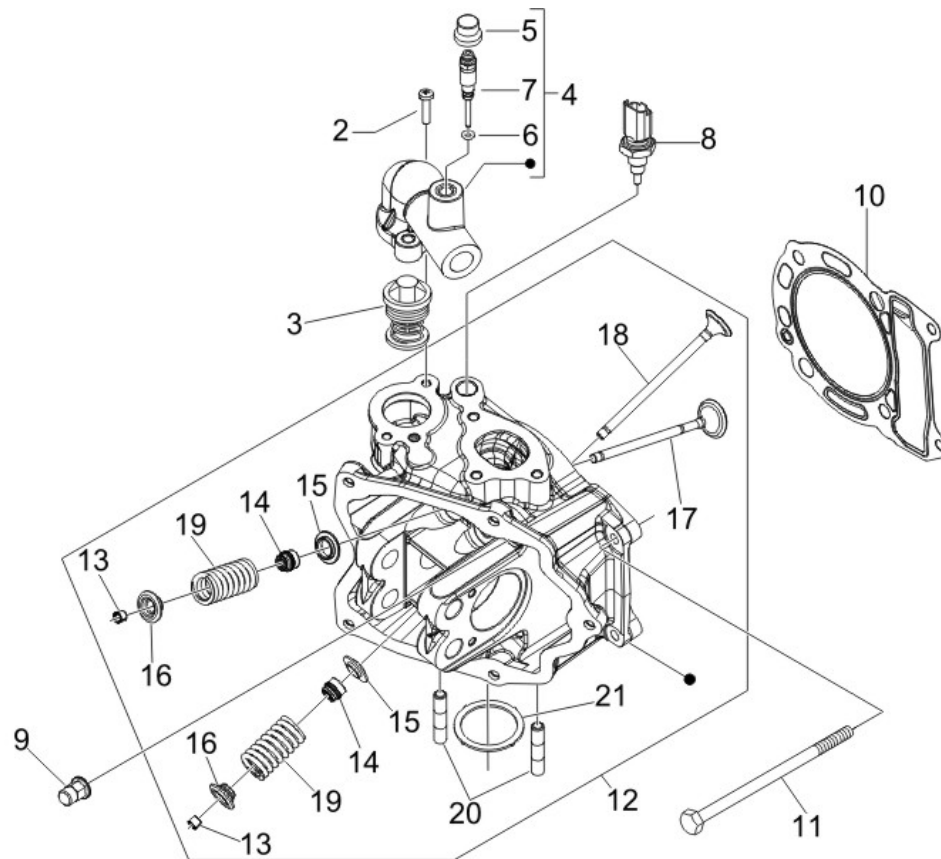


Last update : 23/02/2006

Loc.	Description	Q.ty	Vehicle colour	Drawing No.	Up to
1	cylinder assy	1		843517	
2	piston assy 4t 4v	1		8435190001	
2	piston assy 4t 4v	1		8435190003	
2	piston assy 4t 4v	1		8435190002	
2	piston assy 4t 4v	1		8435190004	
3	segment 72x1 runner 200	1		484908	
4	scraper ring 180/200 4t 4v u	1		486363	
5	piston pin 180/200 4t	1		829529	
6	oil ring	1		830486	
7	circlip for piston wrist	2		963486	
8	base gasket leader 0.4mm u	1		828146	
8	base gasket leader 0.6mm u	1		828147	
8	base gasket leader 0.8mm u	1		828148	
9	dowel	2		277916	
10	pin vespa gt 125/200	2		478115	
11	oil seal	4		478184	

Frame prefix : ZAPM45100

Engine prefix : M451M



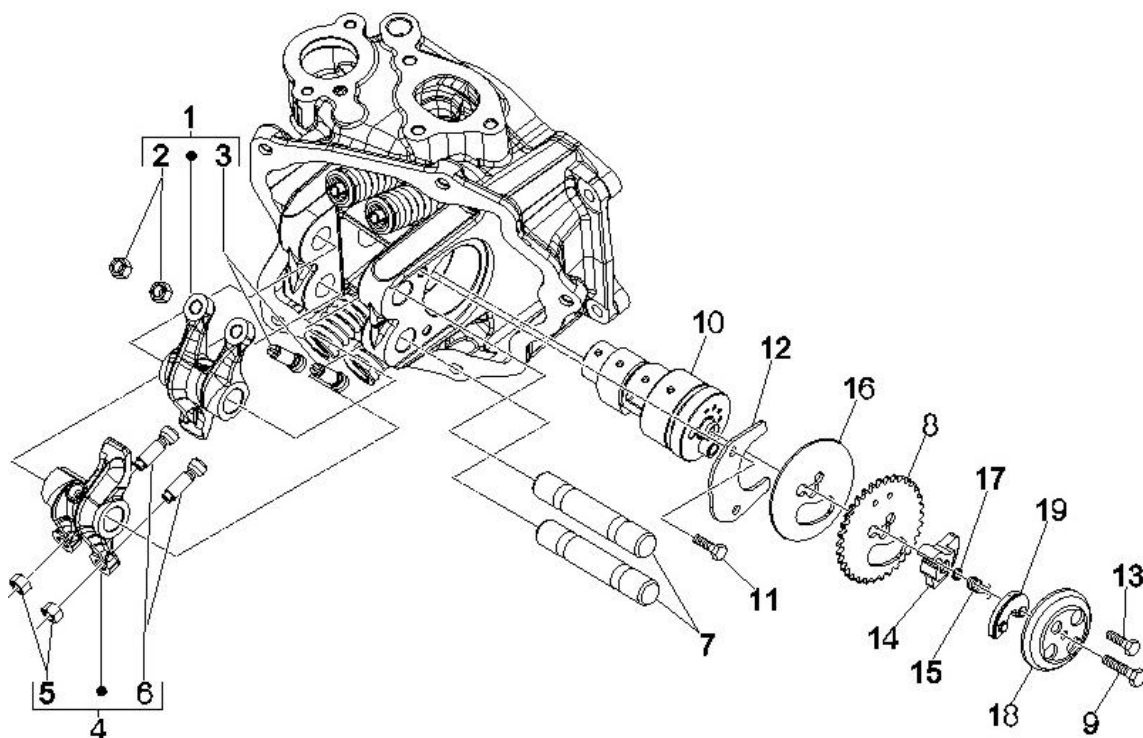
Last update : 23/02/2006

Loc.	Description	Q.ty	Vehicle colour	Drawing No.	Up to
2	screw	2		845753	
3	thermostat	1		82831R	
4	thermostat cover	1		845604	
5	cap for breather	1		063435	
6	ring	1		297027	
7	screw	1		845605	
8	water sensor	1		639000	
9	metric nut m8 x1.25	4		411296	
10	head gasket beverly	1		831174	
11	screw	2		844160	
12	cylinder head	1		847568	
13	cone half	8		285846	
14	ring sfera u	4		436438	
15	stop washer	4		483711	
16	stop washer	4		483914	
17	suction valve	2		484733	

Loc.	Description	Q.ty	Vehicle colour	Drawing No.	Up to
17	suction valve	2		843362	
18	exhaust valve	2		829785	
18	exhaust valve	2		843363	
19	valve spring	4		828480	
20	stud x cylinder head (timing chain side)	2		435629	
21	packing	1		480853	

Frame prefix : ZAPM45100

Engine prefix : M451M



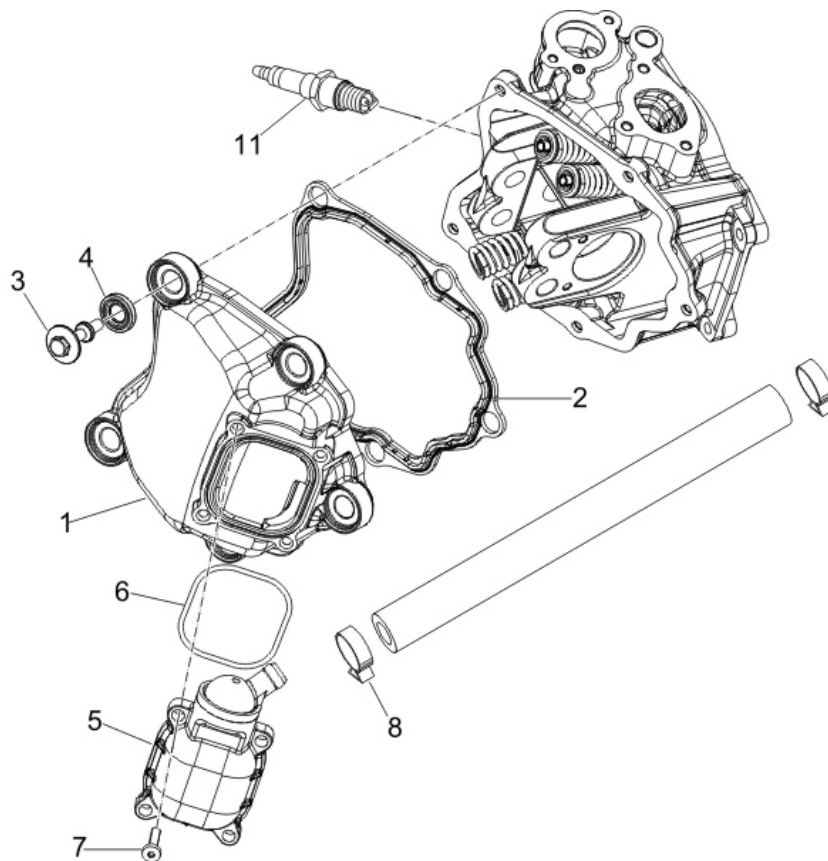
Last update : 23/02/2006

Loc.	Description	Q.ty	Vehicle colour	Drawing No.	Up to
1	inlet rocker leader 4v	1		484739	
2	nut	2		484819	
3	screw	2		82817R	
4	lever	1		484740	
5	nut	2		484819	
6	screw	2		82817R	
7	rocker arm shaft	2		486343	
8	top dist. sproket leader 125 u	1		486336	
9	screw	1		414838	
10		1		847791	
11	flywheel magneto screw et4 50cc m.02	2		484123	
12	sheet	1		833308	
13	screw for camshaft centr. weights-m5x30	1		018538	
14	counter weight	1		486331	
15	camshaft spring leader u	1		486974	
16	washer	1		487832	

Loc.	Description	Q.ty	Vehicle colour	Drawing No.	Up to
17	<i>packing for centrifugal weights</i>	1		487833	
18	<i>decompressor cover et leader</i>	1		826396	
19	<i>centrif.weights</i>	1		829139	

Frame prefix : ZAPM45100

Engine prefix : M451M

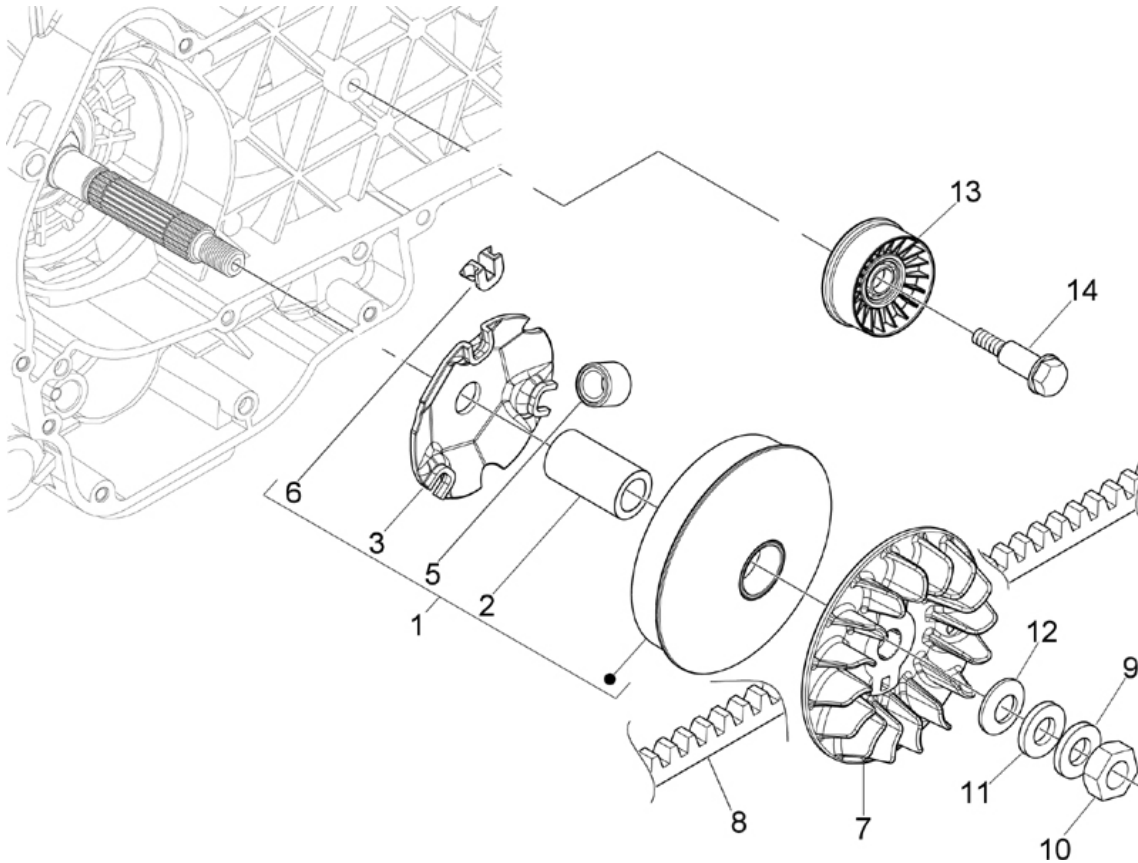


Last update : 23/02/2006

Loc.	Description	Q.ty	Vehicle colour	Drawing No.	Up to
1	cylinder head cover	1		829534	
2	cylinder head cover gasket b125	1		829536	
3	screw	5		830248	
4	buffer	5		830249	
5	breather	1		828421	
6	packing for oil drain valve cover	1		487989	
7	bolt (m5x20)	4		828653	
8	clamp for fixing fuel tap	1		CM001904	
11	spark plug	1		639205	

Frame prefix : ZAPM45100

Engine prefix : M451M

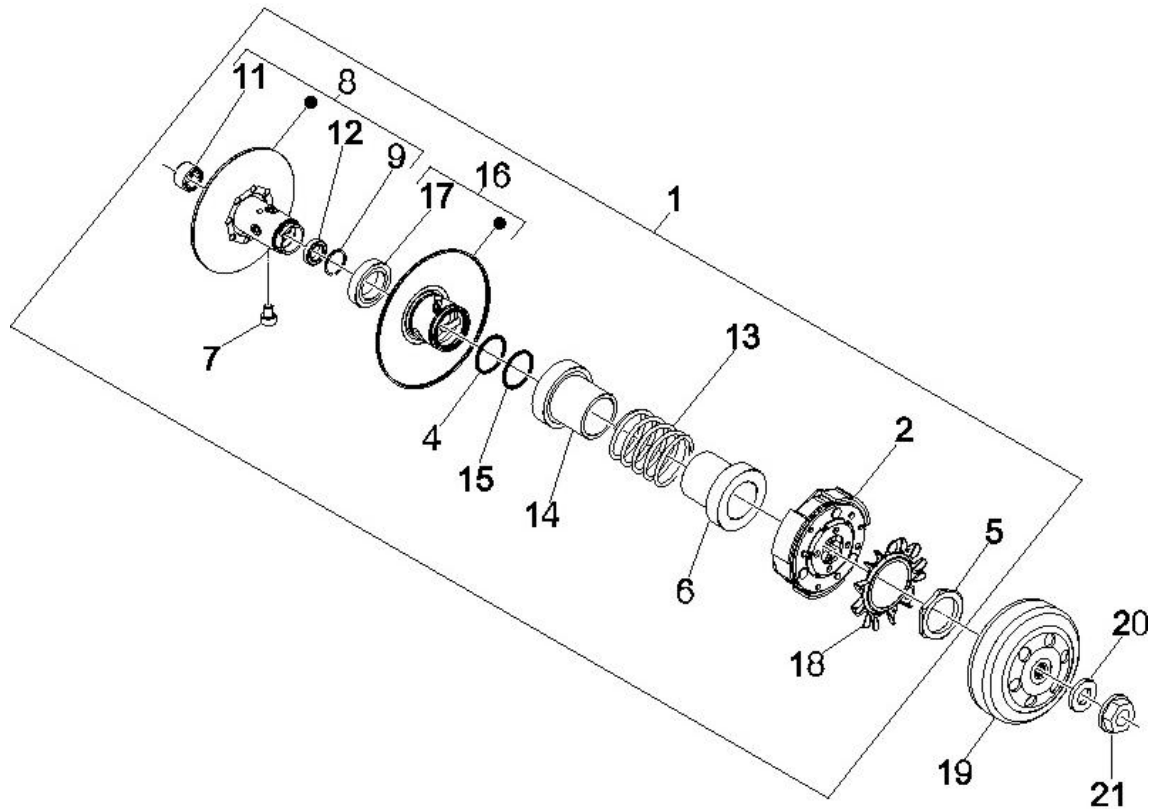


Last update : 23/02/2006

Loc.	Description	Q.ty	Vehicle colour	Drawing No.	Up to
1	inner driving 1/2 pulley	1		CM144407	
2	spacer (pulley)	1		483889	
3	fixed plate	1		842204	
4	fixed plate	1		485710	
5	roller x9 250, b250	6		842870	
6	pattino	3		843028	
7	vxr outer half pulley	1		840193	
8	drive belt	1		843963	
9	driving pulley inner washer 125/180 2t	1		434885	
10	nut	1		486324	
11	washer	1		840533	
12	cup spring	1		841379	
13	pulley	1		833989	
14	screw	1		828217	

Frame prefix : ZAPM45100

Engine prefix : M451M



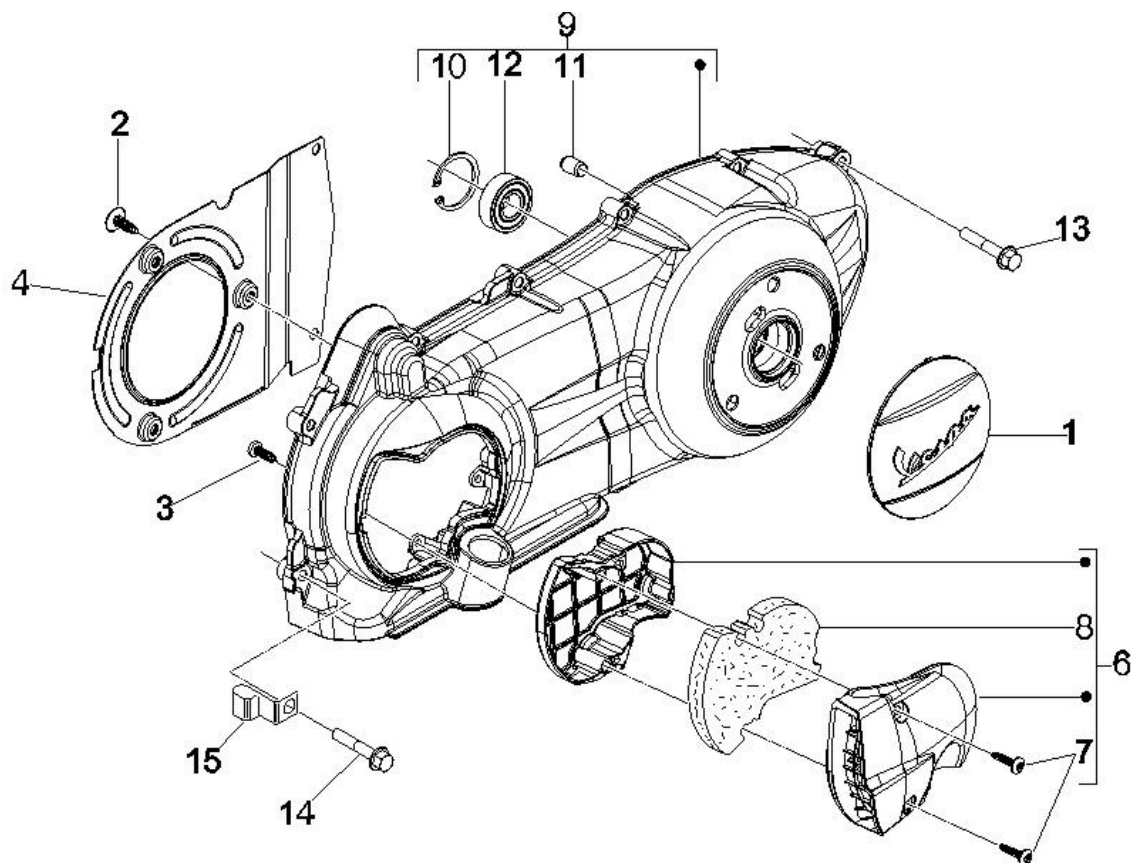
Last update : 23/02/2006

Loc.	Description	Q.ty	Vehicle colour	Drawing No.	Up to
1	driving pulley	1		82818R	
2	clutch drum	1		CM1440175	
4	packing for clutch	1		430585	
5	ring	1		433232	
6	stop washer	1		487936	
7	rr clutch pin runner 200	4		828717	
8	half pulley	1		833669	
9	ring	1		483226	
11	drawn cap x driven pulley assy.-20x29x18	1		82518R	
12	bearing runner 180 2t m.02 u	1		483261	30/06/2006
13	clutch spring vespa gt 200	1		833673	
14	stop washer	1		833674	
15	oil seal	1		834044	
16	half pulley	1		841774	
17	ring	2		431089	
18	driving pulley-cooling fan	1		482305	

Loc.	Description	Q.ty	Vehicle colour	Drawing No.	Up to
19	clutch drum	1		844049	
20	washer for clutch drum (12,1x22x1)	1		274246	
21	nut	1		486324	

Frame prefix : ZAPM45100

Engine prefix : M451M

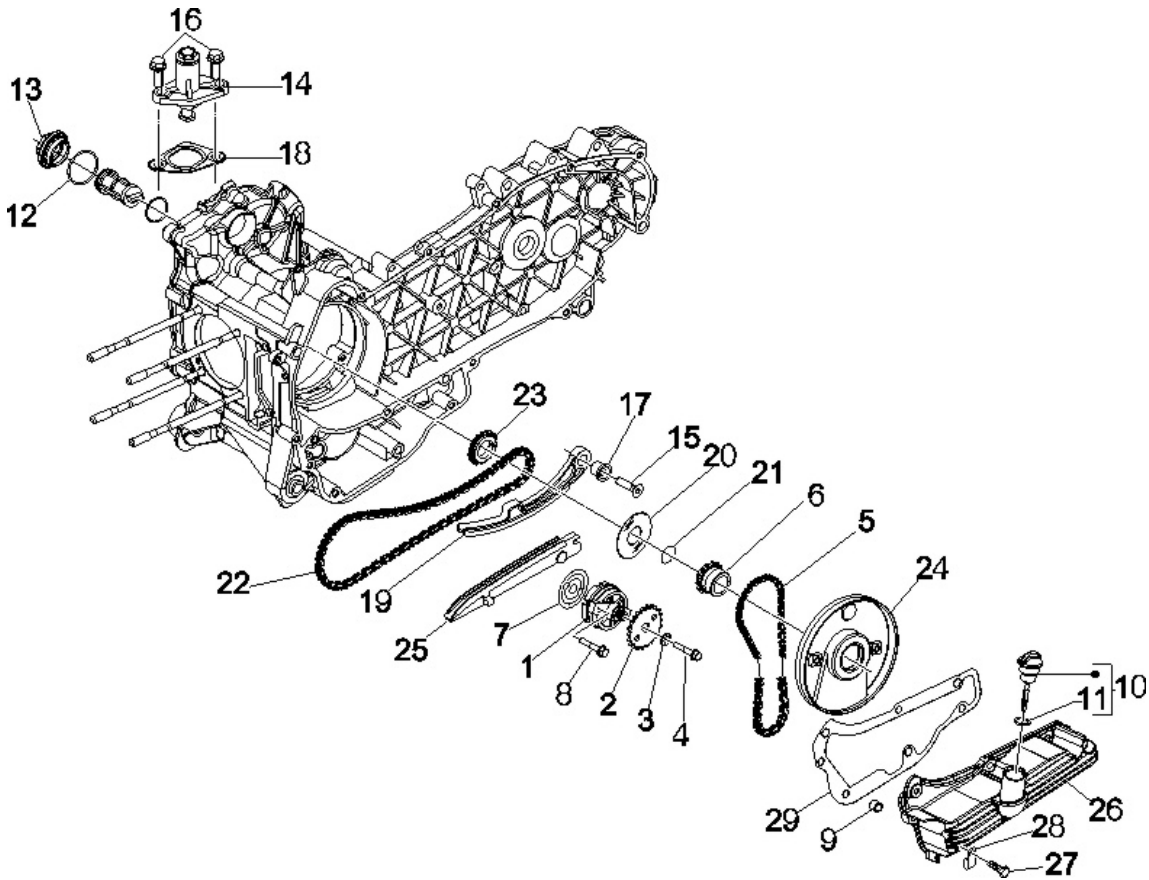


Last update : 23/02/2006

Loc.	Description	Q.ty	Vehicle colour	Drawing No.	Up to
1	transmission cover	1		CM121908	
2	screw for silencer protection (m5x10)	5		430264	
3	self tapping screw (d3,85x16)	3		270793	
4	warm air diaphragm vespa gt 200	1		834266	
6	engine cover all 125cc u	1		842090	
7	screw	2		258146	
8	air filter	1		842093	
9	crankcase cover assy	1		8459375	
10	ring runner 180 2t m.02 u	1		006635	
11	pin x electrical starter motor -d9,5 h15	2		239388	
12	spherical bearing x kickstarter-15x35x11	1		478985	
13	screw for electrical starter motor-m6x30	8		289731	
14	screw for electrical starter motor-m6x30	1		289731	
15	plate	1		622948	

Frame prefix : ZAPM45100

Engine prefix : M451M



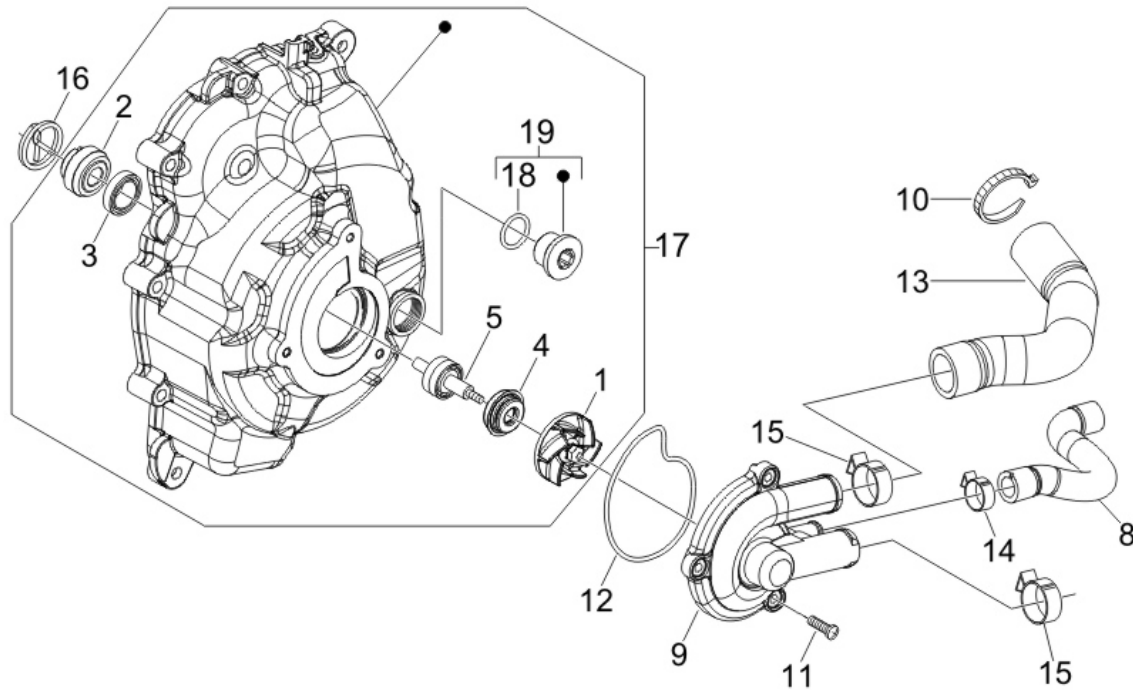
Last update : 23/02/2006

Loc.	Description	Q.ty	Vehicle colour	Drawing No.	Up to
1	oil pump	1		844352	
2	sprocket	1		287913	
3	cup spring for oil pump transmission	1		436695	
4	screw m6x14	1		833722	
5	steel chain driven of camshaft	1		82649R	
6	pinion	1		82783R	
7	packing	1		847929	
8	screw	2		829593	
9	dowel	3		277916	
10	oil plug	1		846819	
11	packing for oil pan plug (lower)	1		479986	
12	oil seal for oil filter	1		285536	
13	oil filter plug (bv-500)	1		82823R	
14	plastic composition to tension chain	1		82650R	
15	screw for electrical starter motor-m6x25	1		414837	
16	screw	2		434541	

Loc.	Description	Q.ty	Vehicle colour	Drawing No.	Up to
17	spacer	1		485868	
18	packing	1		847928	
19	distrib. chain slipper	1		840344	
20	washer	1		483918	
21	ring	1		825952	
22	distribution chain leader	1		82723R	
23	pinion bevel	1		82782R	
24	cover	1		847116	
25	distrib. chain blade	1		847516	
26	oil sump	1		846096	
27	screw for electrical starter motor-m6x30	7		289731	
28	clamp	2		564629	
29	gasket	1		846098	

Frame prefix : ZAPM45100

Engine prefix : M451M



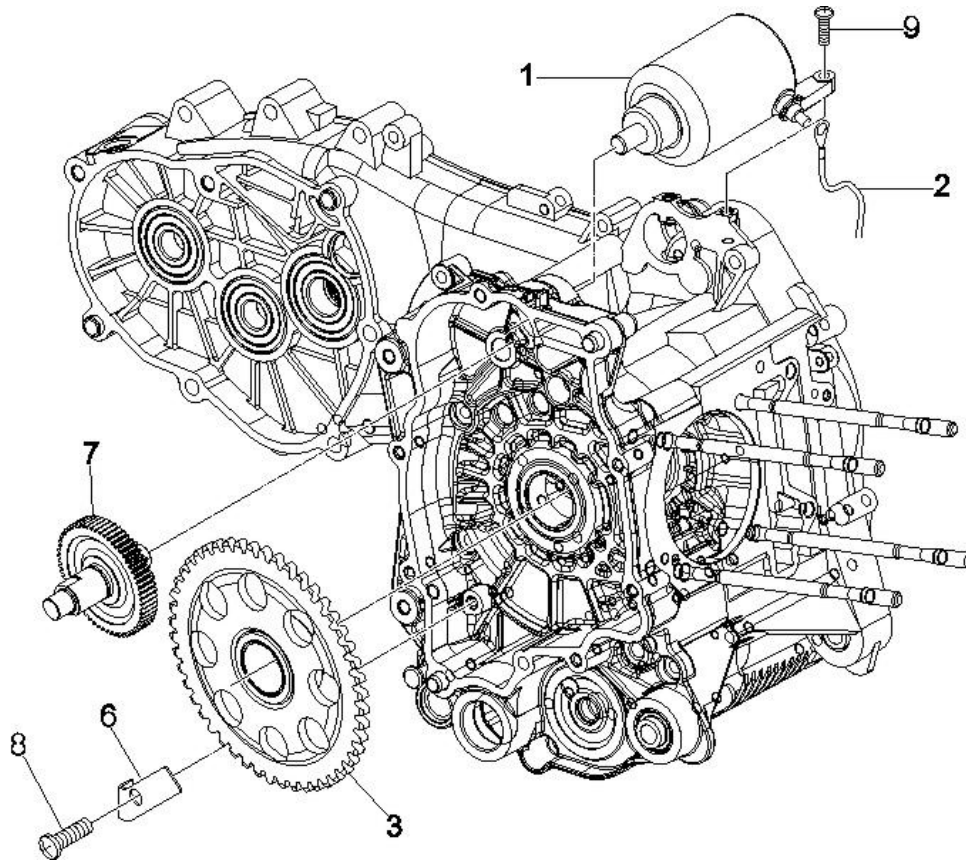
Last update : 23/02/2006

Loc.	Description	Q.ty	Vehicle colour	Drawing No.	Up to
1	rotor	1		844730	
2	coupling entrainer	1		842389	
3	ring	1		842455	
4	oil seal	1		842595	
5	pump shaft	1		8447595	
8	tube	1		847718	
9	water pump cover	1		846734	
10	metallic clip runner purejet	1		145298	
11	screw	3		828662	
12	water pump leader o-ring	1		485080	
13	tube	1		841130	
14	clamp for fixing fuel tap	1		CM001904	
15	strap	2		CM001908	
16	spring	1		842390	
17	flywheel cover assy	1		8458245	30/03/2006
18	packing for oil pan plug (lower)	1		479986	

Loc.	Description	Q.ty	Vehicle colour	Drawing No.	Up to
19	timing plug assembly	1		829040	

Frame prefix : ZAPM45100

Engine prefix : M451M

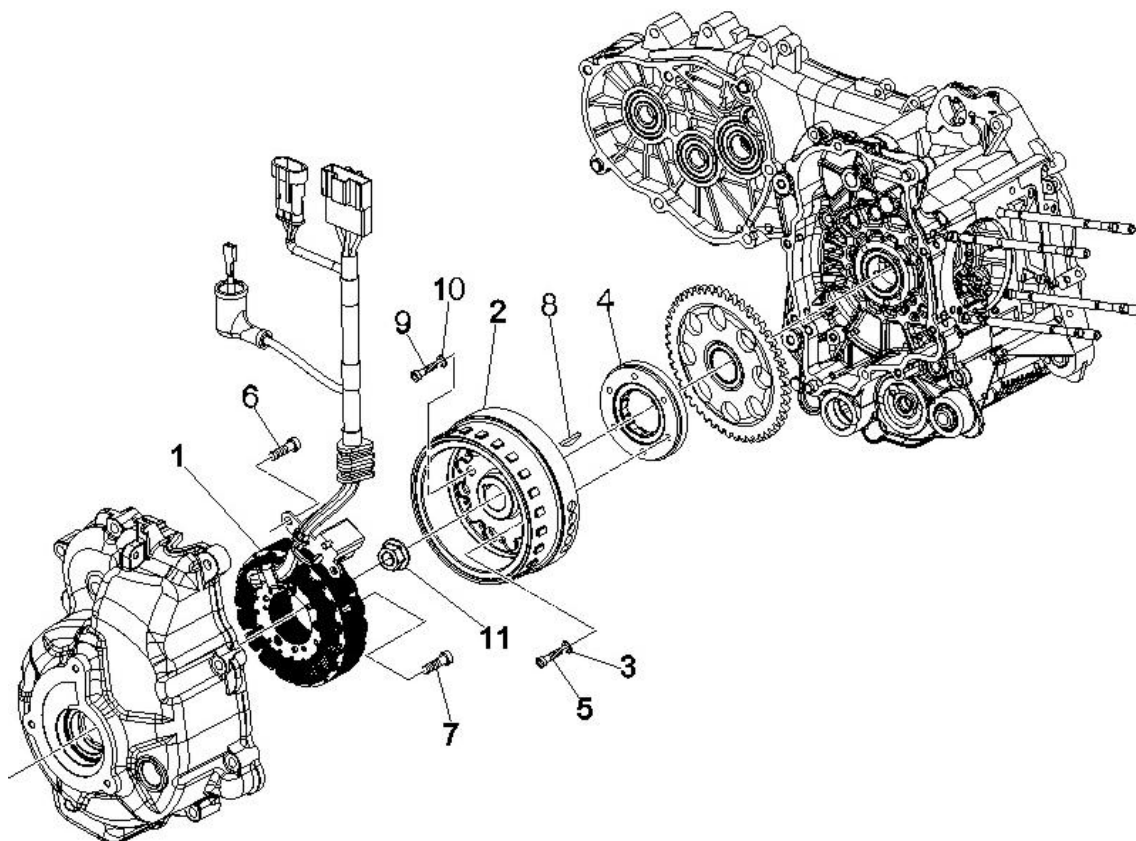


Last update : 23/02/2006

Loc.	Description	Q.ty	Vehicle colour	Drawing No.	Up to
1	starter motor	1		58088R	
2	starter engine cable	1		639028	
3	starting gear	1		82737R	
6	sheet	1		840532	
7	bendix	1		8427035	
8	screw for cylinder cooling hood (m6x14)	1		008375	
9	screw for electrical starter motor-m6x25	2		414837	

Frame prefix : ZAPM45100

Engine prefix : M451M

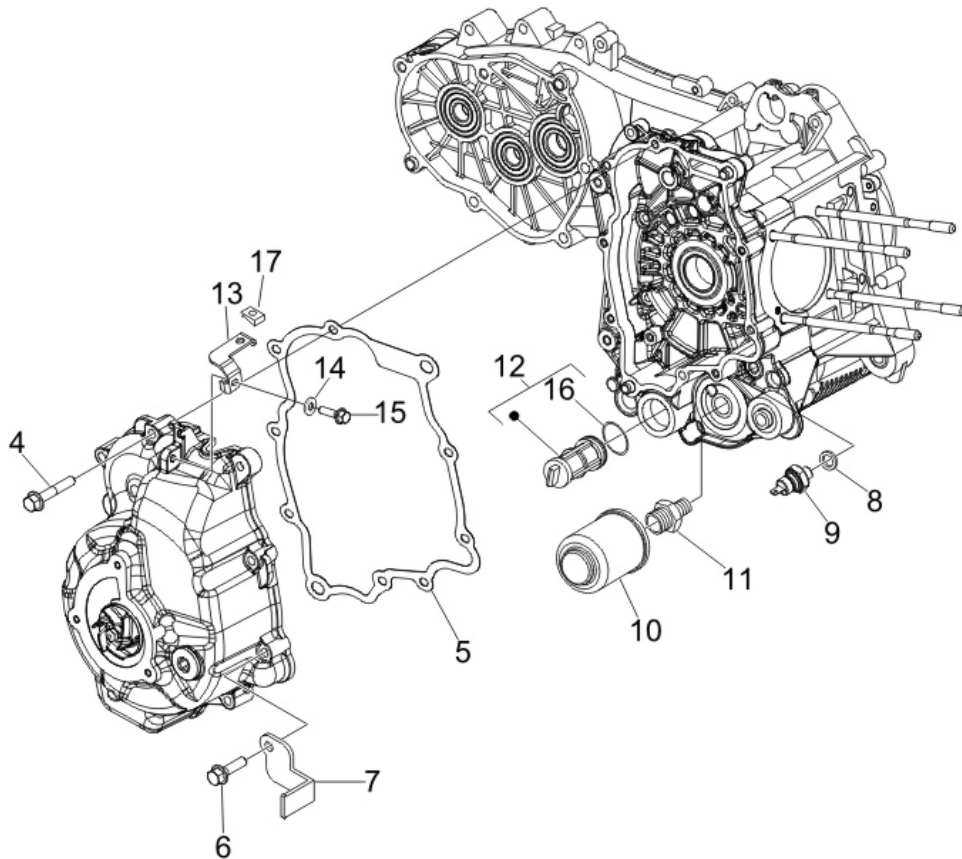


Last update : 23/02/2006

Loc.	Description	Q.ty	Vehicle colour	Drawing No.	Up to
1	flywheel magn.	1		82806R	30/03/2006
2	rotor	1		58110R	30/03/2006
3	washer 9,9x6,1x3,5	6		479515	
4	free wheel x9 500 u	1		831322	
5	screw m6x24 t.c.e.i	6		847679	
6	screw for outer h.t. coil (m5x10)	2		018575	
7	screw	3		486175	
8	key	1		000097	
9	screw for outer h.t. coil (m5x10)	2		018575	
10	washer	1		842385	
11	nut	1		842388	

Frame prefix : ZAPM45100

Engine prefix : M451M

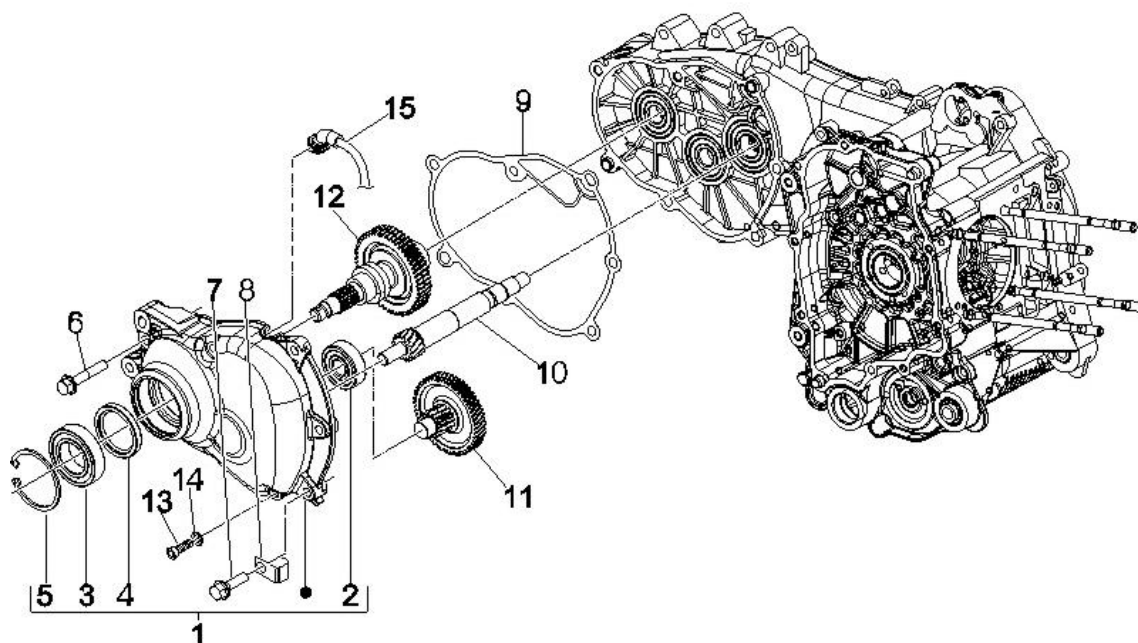


Last update : 23/02/2006

Loc.	Description	Q.ty	Vehicle colour	Drawing No.	Up to
4	screw	9		414838	
5	half crankcase gasket	1		840504	
6	screw	1		844160	
7	plate for brake transmission fixing	1		847717	
8	washer	1		486075	
9	oil temperature sensor master + leader	1		82580R	
10	oil cartridge (us version is oil filter)	1		82635R	
11	screw (oil filter)	1		840507	
12	intake oil filter	1		843568	
13	bracket	1		639032	
14	washer for h.t. coil (5,1x12,2x1,6)	1		012528	
15	flywheel magneto screw et4 50cc m.02	1		484123	
16	packing for oil filter (20,35x1,78)	1		288474	
17	plate	1		847716	

Frame prefix : ZAPM45100

Engine prefix : M451M

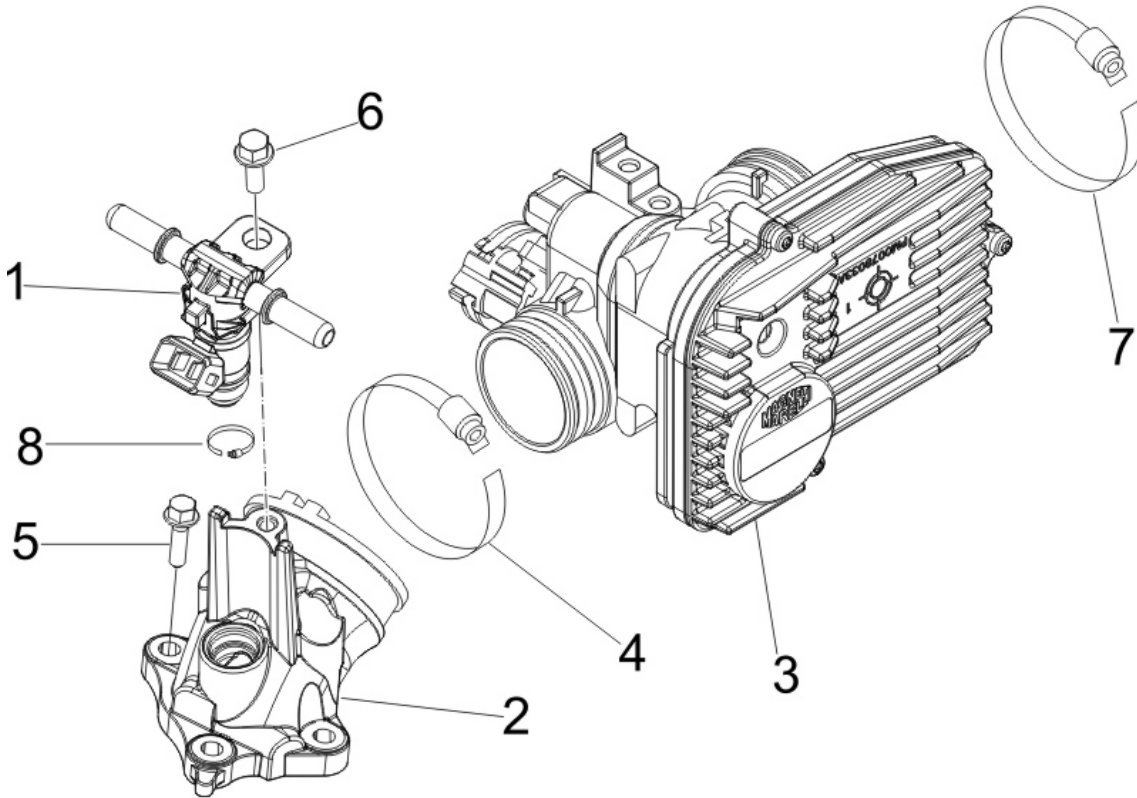


Last update : 23/02/2006

Loc.	Description	Q.ty	Vehicle colour	Drawing No.	Up to
1		1		842143	
2	bearing	1		485912	
3	radical bearing	1		82659R	
4	oil seal 38x50x7	1		829201	
5	circlip	1		829206	
6	screw for rear wheel axle (m8x45)	6		487211	
7	flanged hex.head screw (m8x40)	1		825758	
8	clamp	1		827277	
9	packing	1		847931	
10	pulley shaft	1		830071	
11	drive shaft	1		8410015	
12	wheel shaft	1		8410035	
13	screw (m8x12)	1		269755	
14	washer (brake-shoes)	1		485703	
15	breather tube b125	1		830862	

Frame prefix : ZAPM45100

Engine prefix : M451M

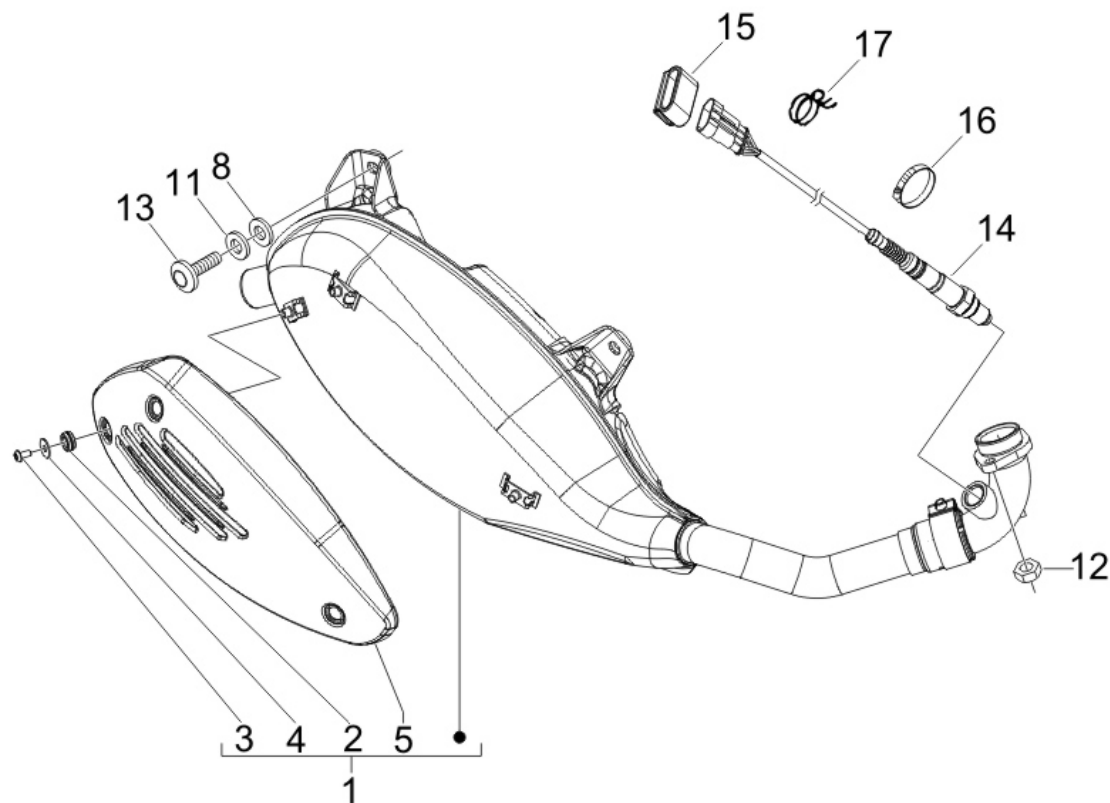


Last update : 23/02/2006

Loc.	Description	Q.ty	Vehicle colour	Drawing No.	Up to
1	bracket with iniector x9	1		6389495	
2	union pipe	1		847881	
3	plastic throttle body	1		843017	
4	clamp	1		260918	
5	hex bolt for retaining starter motor	3		031091	
6	franged hes.head screw(m5x16)	1		830061	
7	carburettot sleeve clamp run. 180 2t	1		709532	
8	spring	1		639180	

Frame prefix : ZAPM45100

Engine prefix : M451M

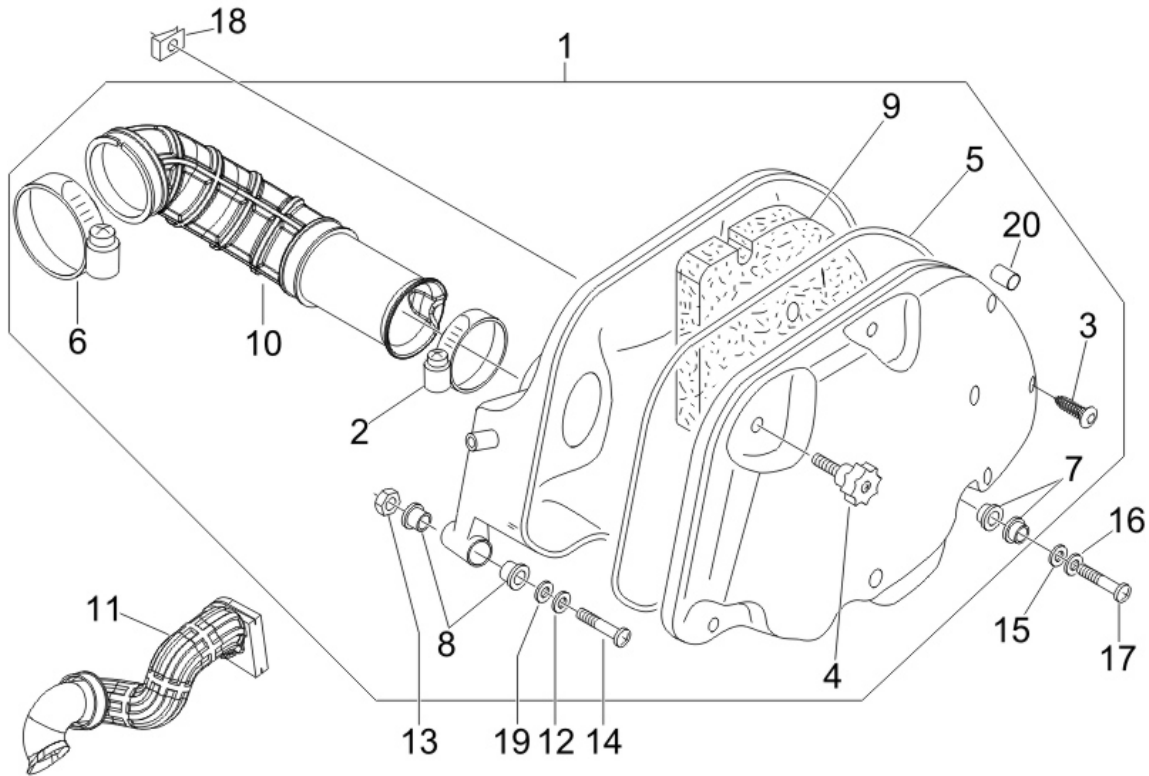


Last update : 23/02/2006

Loc.	Description	Q.ty	Vehicle colour	Drawing No.	Up to
1	silencer assy	1		8463425	
2	rubber grommet guides throt. calbe handl	3		841782	
3	screw m5x10	3		842908	
4	washer	3		844927	
5	heat shield	1		844864	
8	metric self-locking circlip	3		834187	
11	washer	3		848452	
12	nut for silencer-cylinder (m7x1;h=8)	2		436947	
13	screw m8x35 tork key	3		599208	
14	lambda probe	1		584344	
15	plate	1		847974	
16	metallic clip runner purejet	1		145298	
17	clamp	1		825481	

Frame prefix : ZAPM45100

Engine prefix : M451M



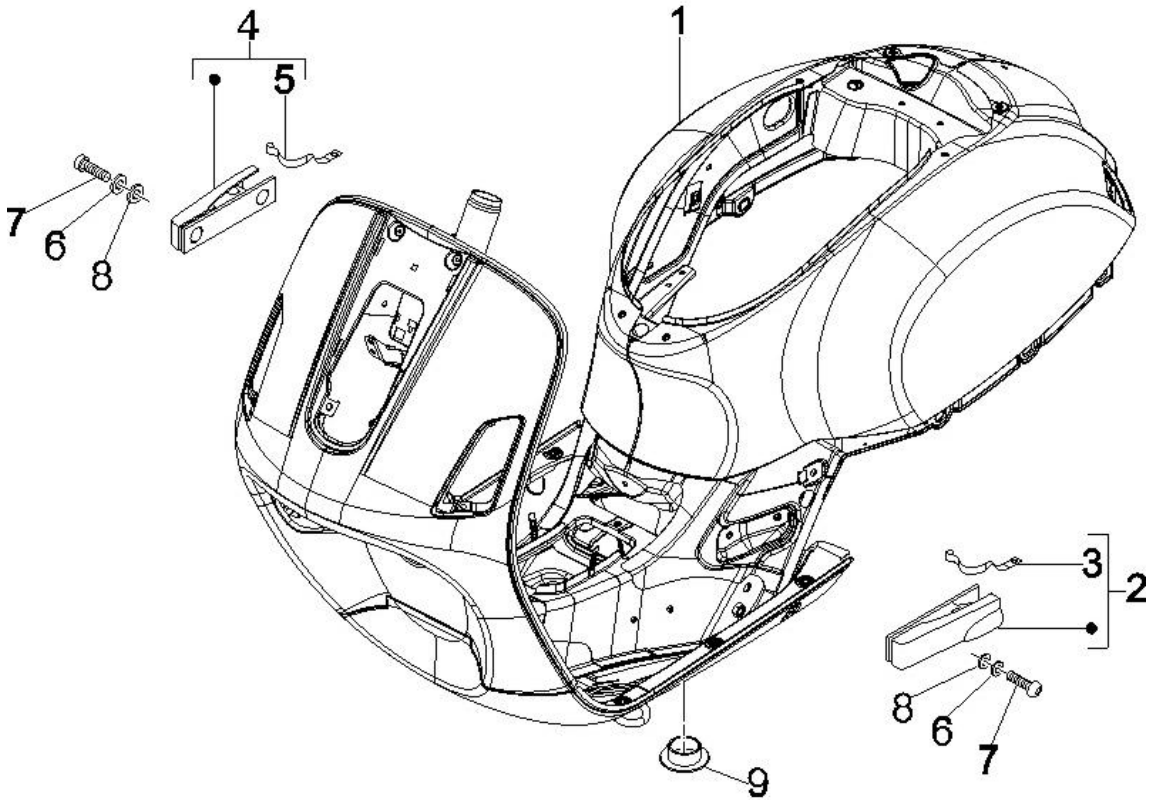
Last update : 23/02/2006

Loc.	Description	Q.ty	Vehicle colour	Drawing No.	Up to
1	air cleaner assy	1		847266	
2	hos clamp	2		CM002910	
3	screw	6		258146	
4	knob	2		479132	
5	packing	1		831995	
6	clamp	1		260918	
7	bush	4		830056	
8	bush	2		830057	
9	air filter element	1		831997	
10	airfilter-carbur. sleeve	1		844758	
12	washer for rear mudguard (6,4x11x0,5)	1		012533	
13	nut	1		241936	
14	screw	1		259166	
15	washer for starter relay (6,4x12x1)	2		003056	
16	washer for rear mudguard (6,4x11x0,5)	2		012533	
17	screw for air cleaner fitting (m6x50)	2		018640	

Loc.	Description	Q.ty	Vehicle colour	Drawing No.	Up to
18	plate	2		254485	
19	washer for starter relay (6,4x12x1)	1		003056	
20	cap	2		827831	

Frame prefix : ZAPM45100

Engine prefix : M451M



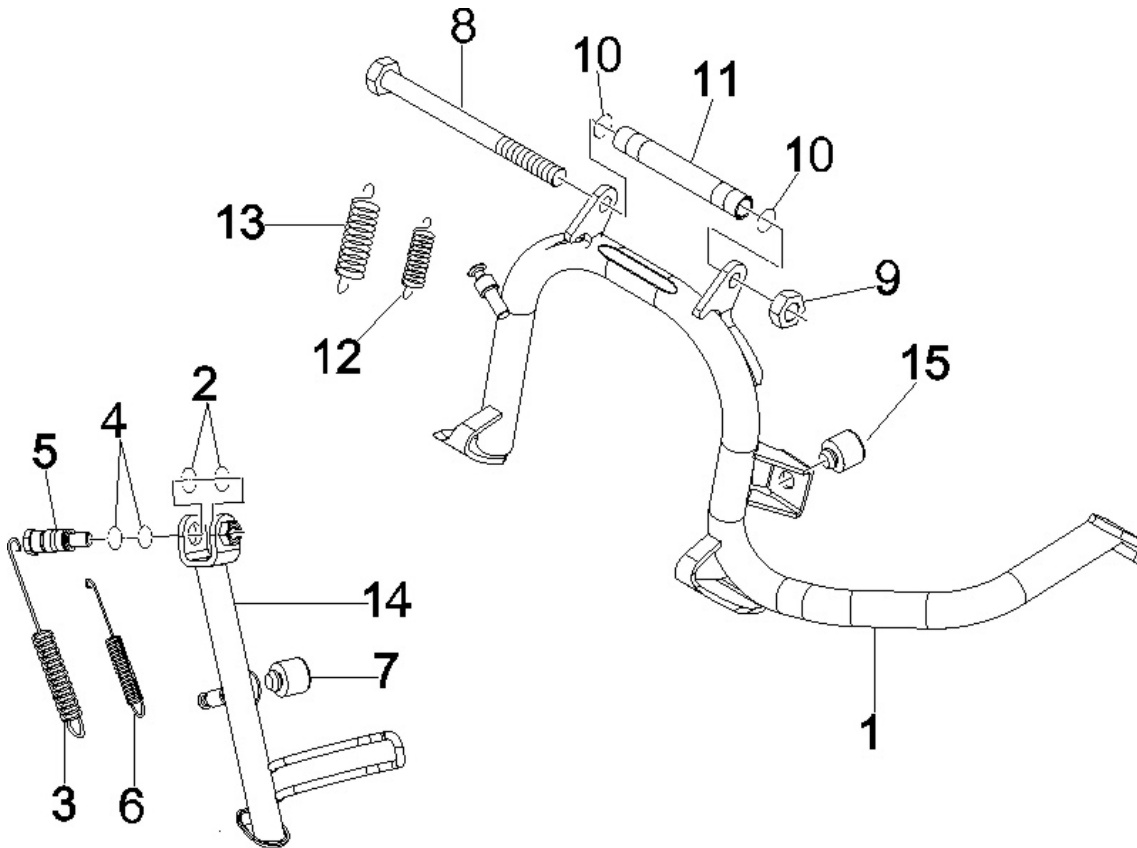
Last update : 23/02/2006

Loc.	Description	Q.ty	Vehicle colour	Drawing No.	Up to
1	frame gts	1	EVG490AI01	6229145090	
1	frame gts	1	EVG49AAI01	6229145090	
1	frame gts	1	EVG4DEAI01	62291450DE	
1	frame gts	1	EVG4F2CI01	62291450F2	
1	frame gts	1	EVG4NDAI01	62291450ND	
1	frame gts	1	EVG4R7AI01	62291400R7	
1	frame gts	1	EVG4R7AI01	62291450R7	
1	bodywork	1	EVG4RIAI01	62291400RI	
1	frame gts	1	EVG4RIAI01	62291450RI	
1	frame vespa gts unpainted	1		6229145	
2	passenger foot peg - lh	1		CM017201	
3	spring vespa gt 200	1		620395	
4	passenger foot peg - rh	1		CM017202	
5	spring vespa gt 200	1		620395	
6	washer for carburettor assy.(8,4x15x0,8)	4		709047	
7	hexagonal screw nexus	4		975855	

Loc.	Description	Q.ty	Vehicle colour	Drawing No.	Up to
8	washer x silencer-crankcase-8,1x16,5x1,5	2		483164	
9	plug	2		299557	

Frame prefix : ZAPM45100

Engine prefix : M451M

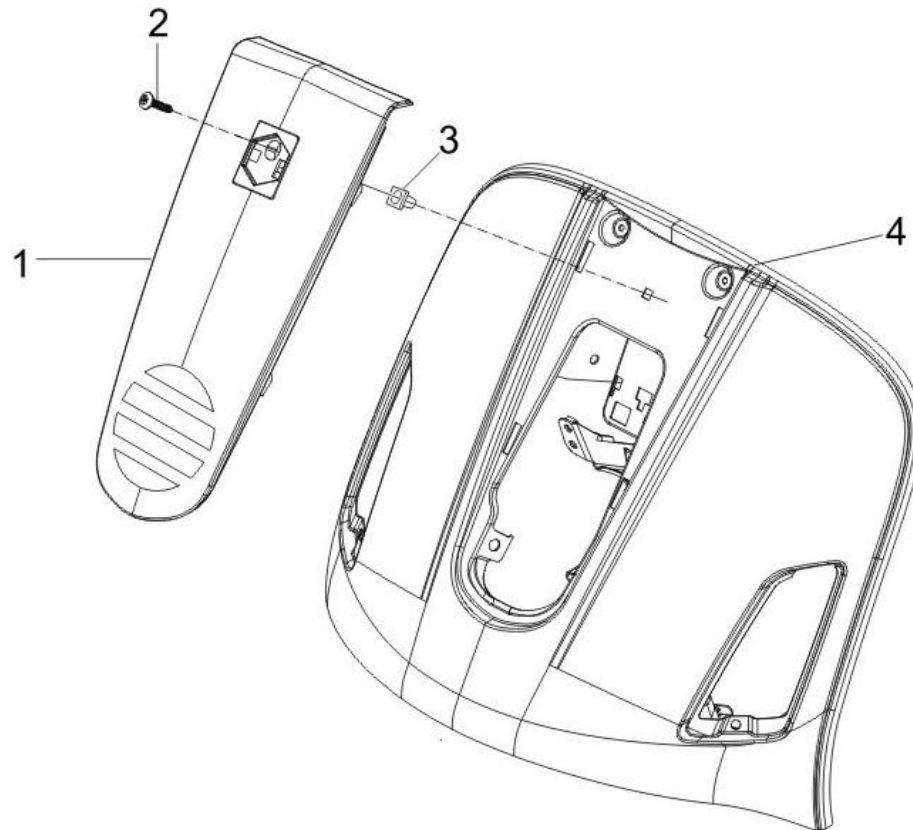


Last update : 23/02/2006

Loc.	Description	Q.ty	Vehicle colour	Drawing No.	Up to
1	vehicle center stand	1		601978	
2	packing	2		191189	
3	spring b125	1		295789	
4	ring	2		434947	
5	screw fix. l51x10	1		599097	
6		1		599561	
7	buffer for center stand	1		967351	
8	screw	1		030115	
9	nut x lower rear damper fixing -m10 h8,6	1		232108	
10	oil seal for vehicle stand pin	2		273754	
11	spacer	1		582298	
12	spring	1		582850	
13	spring ->598905	1		582851	
14	rear side stand	1		599020	
15	buffer for sidestand	1		272426	
16	nut x lower rear damper fixing -m10 h8,6	1		232108	18/07/2002

Frame prefix : ZAPM45100

Engine prefix : M451M



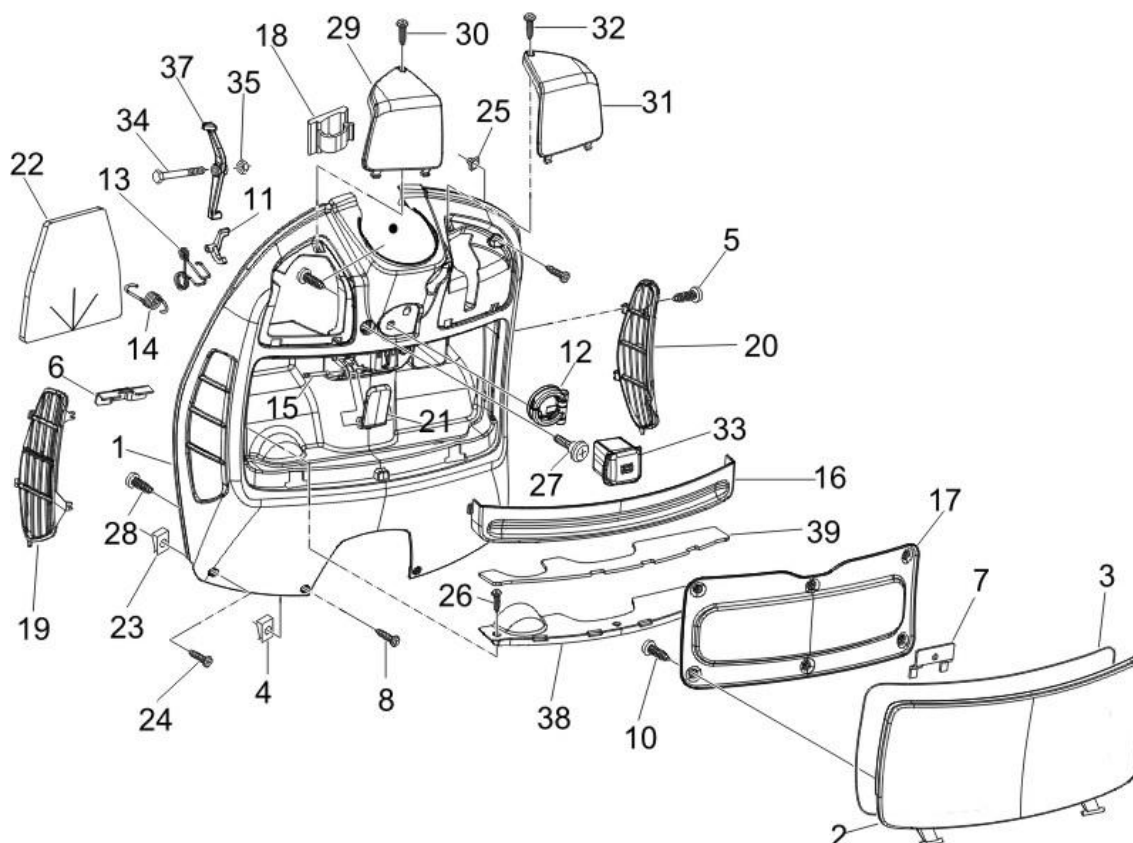
Last update : 23/02/2006

Loc.	Description	Q.ty	Vehicle colour	Drawing No.	Up to
1		1	EVG490AI01	6211430090	
1		1	EVG490AI01	6211434090	
1	horn cover	1	EVG490AI01	6211435090	
1		1	EVG49AAI01	6211430090	
1	horn cover	1	EVG49AAI01	6211435090	
1		1	EVG49AAI01	6211434090	
1	horn cover	1	EVG4DEAI01	62114350DE	
1	horn cover	1	EVG4F2CI01	62114300F2	
1		1	EVG4F2CI01	62114340F2	
1	horn cover	1	EVG4F2CI01	62114350F2	
1	horn cover	1	EVG4NDAI01	62114300ND	
1	horn cover	1	EVG4NDAI01	62114350ND	
1		1	EVG4NDAI01	62114340ND	
1	horn cover	1	EVG4R7AI01	62114300R7	
1	horn cover	1	EVG4R7AI01	62114350R7	
1		1	EVG4R7AI01	62114340R7	

Loc.	Description	Q.ty	Vehicle colour	Drawing No.	Up to
1	horn cover	1	EVG4RIA/01	62114350RI	
1	steering cover	1		621143	
2	self tapp. screw x steering cover -d5x20	1		267958	
3	plate for steering cover (2,8x4,2x10)	1		199190	

Frame prefix : ZAPM45100

Engine prefix : M451M



Last update : 23/02/2006

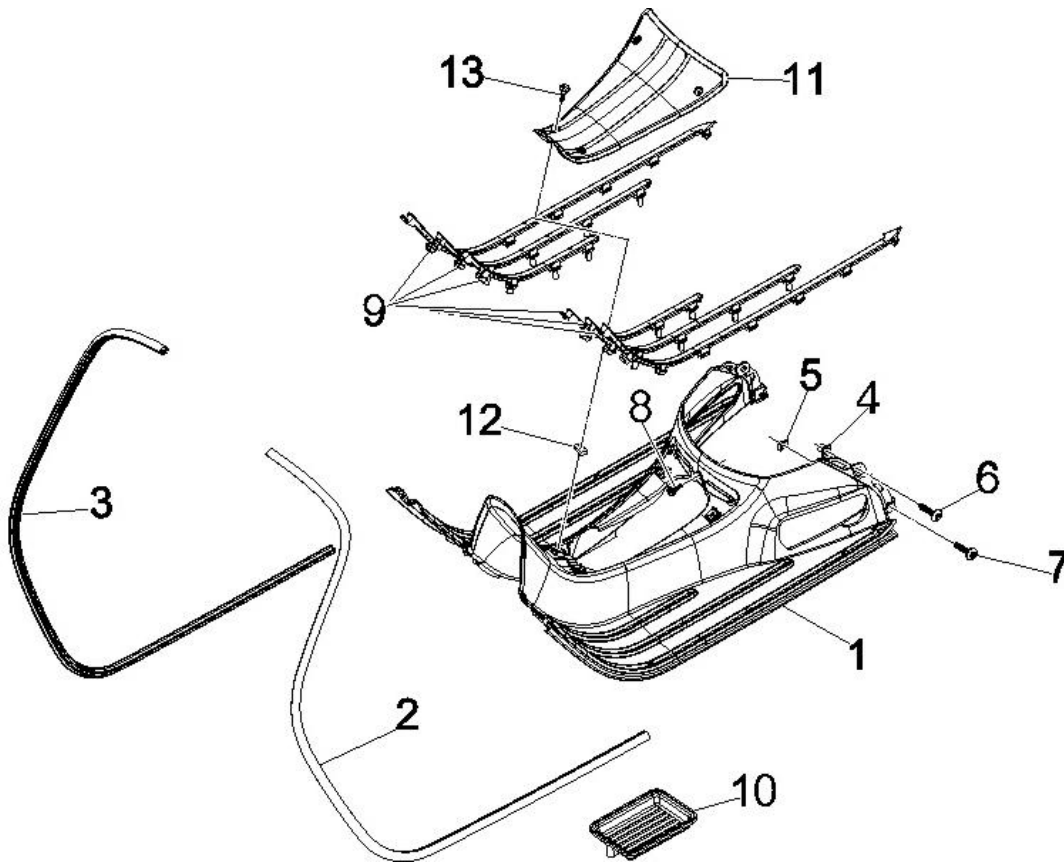
Loc.	Description	Q.ty	Vehicle colour	Drawing No.	Up to
1	<i>glovebox vespa gt black 94</i>	1	EVG490AI01	5771740090	
1	<i>glovebox vespa gt black 94</i>	1	EVG49AAI01	5771740090	
1	<i>glovebox vespa gts</i>	1	EVG4DEAI01	57717400DE	
1	<i>glovebox vespa gt excalibur 738/a</i>	1	EVG4F2CI01	57717400F2	
1	<i>glovebox vespa gt</i>	1	EVG4NDAI01	57717400ND	
1	<i>glovebox vespa gts</i>	1	EVG4R7AI01	57717400R7	
1	<i>glovebox vespa gts</i>	1	EVG4RIAI01	57717400RI	
1	<i>glovebox compartment gt unpainted</i>	1		577174	
2	<i>glove box door vespa gt black 94</i>	1	EVG490AI01	5771750090	
2	<i>glove box door vespa gt black 94</i>	1	EVG49AAI01	5771750090	
2	<i>glove box door vespa gts</i>	1	EVG4DEAI01	57717500DE	
2	<i>glove box door vespa gt excalibur 738/a</i>	1	EVG4F2CI01	57717500F2	
2	<i>glove box door vespa gt</i>	1	EVG4NDAI01	57717500ND	
2	<i>glove box door vespa gts</i>	1	EVG4R7AI01	57717500R7	
2	<i>glove box door vespa gts</i>	1	EVG4RIAI01	57717500RI	
2	<i>glove box flap</i>	1		577175	

Loc.	Description	Q.ty	Vehicle colour	Drawing No.	Up to
3	gasket for glove box door	1		CM006307	
4	plate	4		CM017410	
5	self tapping screw x front glove compart	8		268596	
6	bracket for central flap locker	1		252420	
7	bracket for front glove compartment	2		257614	
8	self tapping screw (d4,2x13)	2		259349	
9	self tapping screw x front glove compart	4		268596	
10	screw	6		296141	
11	glove box catch x9	1		575607	
12	zip cat hook	1		575819	
13	hel spring,w diam1,4n.coil2,8,ext.d13,6	1		577005	
14	spring diam.65,4 l 122,7 6 spires	1		577399	
15	pivot	1		577400	
16	rim for glove comp.	1		577447	
17	glove box tray	1		577468	
18	glove comp. spring clamp	2		577594	
19	grill ->5778560043	1	EVG490AI01	577856000C	
19	grill ->5778560043	1	EVG49AAI01	577856000C	
19	grill ->5778560043	1	EVG4DEAI01	577856000C	
19	grill ->5778560043	1	EVG4EICI01	577856000C	
19	grill ->5778560043	1	EVG4F2CI01	577856000C	
19	grill ->5778560043	1	EVG4NDAI01	577856000C	
19	grill ->5778560043	1	EVG4R7AI01	577856000C	
19	grill ->5778560043	1	EVG4RIAI01	577856000C	
19	grill -.5778560043	1		577856	
20	grill	1	EVG490AI01	577857000C	
20	grill	1	EVG49AAI01	577857000C	
20	grill	1	EVG4DEAI01	577857000C	
20	grill	1	EVG4EICI01	577857000C	
20	grill	1	EVG4F2CI01	577857000C	
20	grill	1	EVG4NDAI01	577857000C	
20	grill	1	EVG4R7AI01	577857000C	
20	grill	1	EVG4RIAI01	577857000C	
20	grill	1		577857	
21	lever vespa gt 200	1		577861	
22	sheath	2		620693	
23	clip for holding block out plate	4		CM017408	
24	screw with cross incision head	2		014754	
25	plate for steering cover (2,8x4,2x10)	2		199190	
26	screw d4,2x19	4		258249	
27	screw for fuel tank assy. (m6x22)	1		575249	
28	screw	2		576189	
29	left cover port	1	EVG490AI01	577395000C	
29	left cover port	1	EVG49AAI01	577395000C	
29	left cover port	1	EVG4DEAI01	577395000C	
29	left cover port	1	EVG4EICI01	577395000C	
29	left cover port	1	EVG4F2CI01	577395000C	
29	left cover port	1	EVG4NDAI01	577395000C	
29	left cover port	1	EVG4R7AI01	577395000C	
29	left cover port	1	EVG4RIAI01	577395000C	
29		1		577395	
30	screw x helmet compartment cover-d4,2x25	1		259372	
31	right cover port	1	EVG490AI01	577396000C	

Loc.	Description	Q.ty	Vehicle colour	Drawing No.	Up to
31	right cover port	1	EVG49AAI01	577396000C	
31	right cover port	1	EVG4DEAI01	577396000C	
31	right cover port	1	EVG4EICI01	577396000C	
31	right cover port	1	EVG4F2CI01	577396000C	
31	right cover port	1	EVG4NDAI01	577396000C	
31	right cover port	1	EVG4R7AI01	577396000C	
31	right cover port	1	EVG4RIAI01	577396000C	
32	screw x helmet compartment cover-d4,2x25	1		259372	
33	plug for tools set	1		620452	
34	screw (m4x12,5)	1		299972	
35	nut	1		577620	
36	screw d4,2x19	2		258249	
37	lock lever	1		577453	
38	surround	1		623776	

Frame prefix : ZAPM45100

Engine prefix : M451M



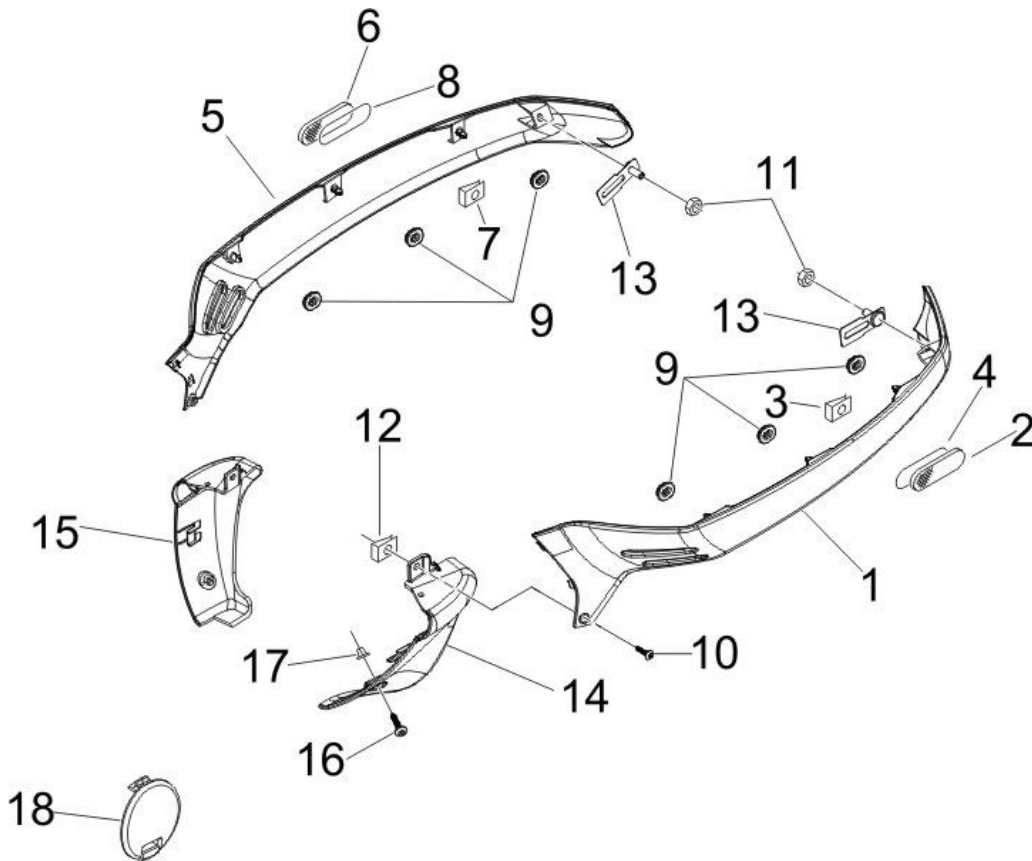
Last update : 23/02/2006

Loc.	Description	Q.ty	Vehicle colour	Drawing No.	Up to
1	floorboard	1	EVG490AI01	6239280090	
1	floorboard	1	EVG49AAI01	6239280090	
1	floorboard	1	EVG4DEAI01	62392800DE	
1	floorboard	1	EVG4EICI01	62392800EI	
1	floorboard	1	EVG4F2CI01	62392800F2	
1	floorboard	1	EVG4R7AI01	62392800R7	
1	floorboard	1	EVG4RIAI01	62392800RI	
1	footboard vespa gts unpainted	1		623928	
2	leg shield beading lh	1		577180	
3	leg shield beading rh	1		577181	
4	plate for steering cover (2,8x4,2x10)	6		199190	
5	plate	2		254485	
6	screw d4,2x19	6		258249	
7	screw m6x22	2		259830	
8	screw for fuel tank assy. (m6x22)	1		575249	
9	floorboard strip kit	1		577437	

Loc.	Description	Q.ty	Vehicle colour	Drawing No.	Up to
10	battery tray	1		577406	
11	battery cover/center mat	1		577182	
12	plate	4		CM017410	
13	screw	4		576189	

Frame prefix : ZAPM45100

Engine prefix : M451M



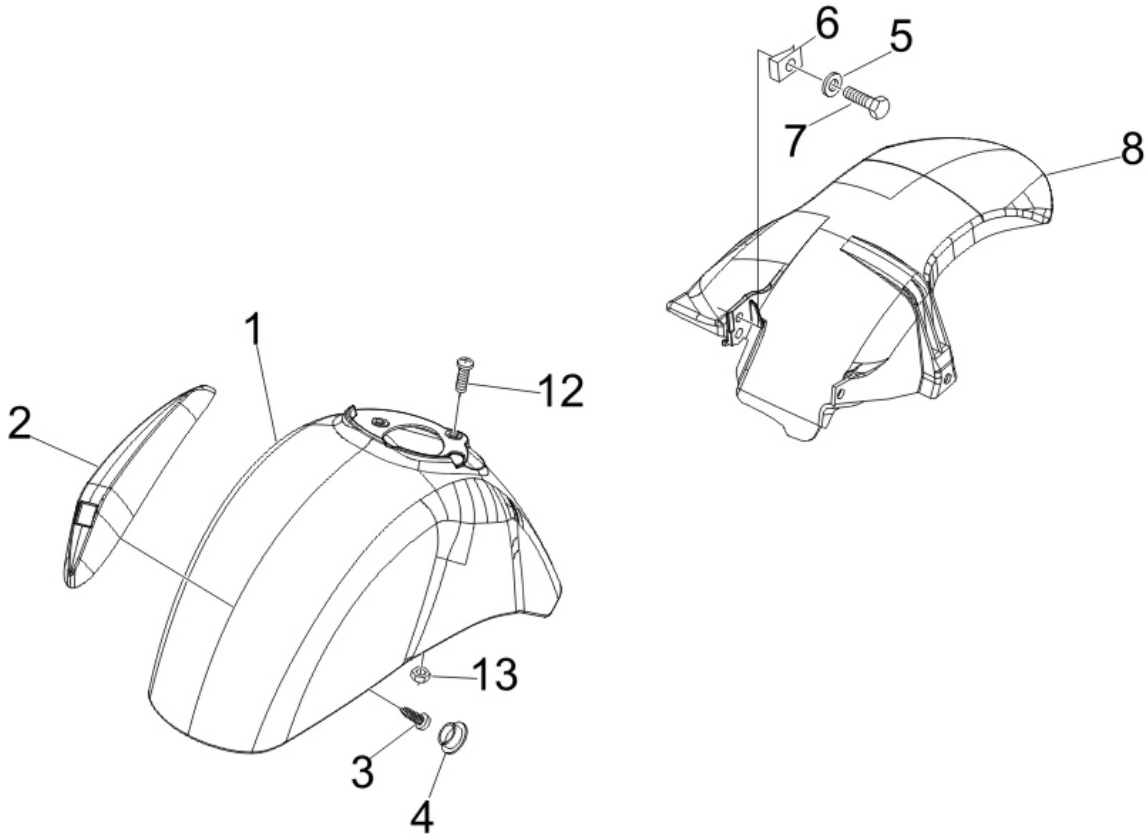
Last update : 23/02/2006

Loc.	Description	Q.ty	Vehicle colour	Drawing No.	Up to
1	side fairing/lh	1	EVG490AI01	6211370090	
1	side fairing/lh	1	EVG49AAI01	6211370090	
1	side fairing/lh	1	EVG4DEAI01	62113700DE	
1	side fairing/lh	1	EVG4EICI01	62113700EI	
1	side fairing/lh	1	EVG4F2CI01	62113700F2	
1	side fairing/lh	1	EVG4NDAI01	62113700ND	
1	side fairing/lh	1	EVG4R7AI01	62113700R7	
1	side fairing/lh	1	EVG4RIAI01	62113700RI	
1	lh side cover vespa gt unpainted	1		621137	
2	side fairing/rh	1	EVG490AI01	6211380090	
2	side fairing/rh	1	EVG49AAI01	6211380090	
2	side fairing/rh	1	EVG4DEAI01	62113800DE	
2	side fairing/rh	1	EVG4EICI01	62113800EI	
2	side fairing/rh	1	EVG4F2CI01	62113800F2	
2	side fairing/rh	1	EVG4NDAI01	62113800ND	
2	side fairing/rh	1	EVG4R7AI01	62113800R7	

Loc.	Description	Q.ty	Vehicle colour	Drawing No.	Up to
2	side fairing/rh	1	EVG4RIA01	62113800RI	
2	side fairing/rh	1		621138	
3	front el.for lh side fairing black 94	1	EVG490A01	5774730090	
3	front el.for lh side fairing black 94	1	EVG49AA01	5774730090	
3	front el.for lh side fairing	1	EVG4DEA01	57747300DE	
3	front el.for lh side fairing	1	EVG4F2CI01	57747300F2	
3	front el.for lh side fairing	1	EVG4NDA01	57747300ND	
3	front el.for lh side fairing	1	EVG4R7A01	57747300R7	
3	front el.for lh side fairing	1	EVG4RIA01	57747300RI	
3	lh terminal for spoiler gt unpainted	1		577473	
4	front el.for rh side fairing black 94	1	EVG490A01	5774740090	
4	front el.for rh side fairing black 94	1	EVG49AA01	5774740090	
4	front el.for rh side fairing	1	EVG4DEA01	57747400DE	
4		1	EVG4EIC01	57747400EI	
4	front el.for rh side fairing	1	EVG4F2CI01	57747400F2	
4	front el.for rh side fairing	1	EVG4NDA01	57747400ND	
4	front el.for rh side fairing	1	EVG4R7A01	57747400R7	
4	front el.for rh side fairing	1	EVG4RIA01	57747400RI	
4	rh terminal for spoiler gt unpainted	1		577474	
5	plate	2		CM017410	
7	buffer for fairing fitting	6		463195	
8	screw	2		574646	
9	plate and screw	2		623575	
10	nut	2		241936	
11	plate for steering cover (2,8x4,2x10)	2		199190	
12	screw	2		576189	
13	frame plug for main engine bolt-black	2	EVG490A01	577405000C	
13	frame plug for main engine bolt-black	2	EVG49AA01	577405000C	
13	frame plug for main engine bolt-black	2	EVG4DEA01	577405000C	
13	frame plug for main engine bolt-grey	2	EVG4EIC01	5774050043	
13	frame plug for main engine bolt-grey	2	EVG4F2CI01	5774050043	
13	frame plug for main engine bolt-black	2	EVG4NDA01	577405000C	
13	frame plug for main engine bolt-black	2	EVG4R7A01	577405000C	
13	frame plug for main engine bolt-black	2	EVG4RIA01	577405000C	

Frame prefix : ZAPM45100

Engine prefix : M451M



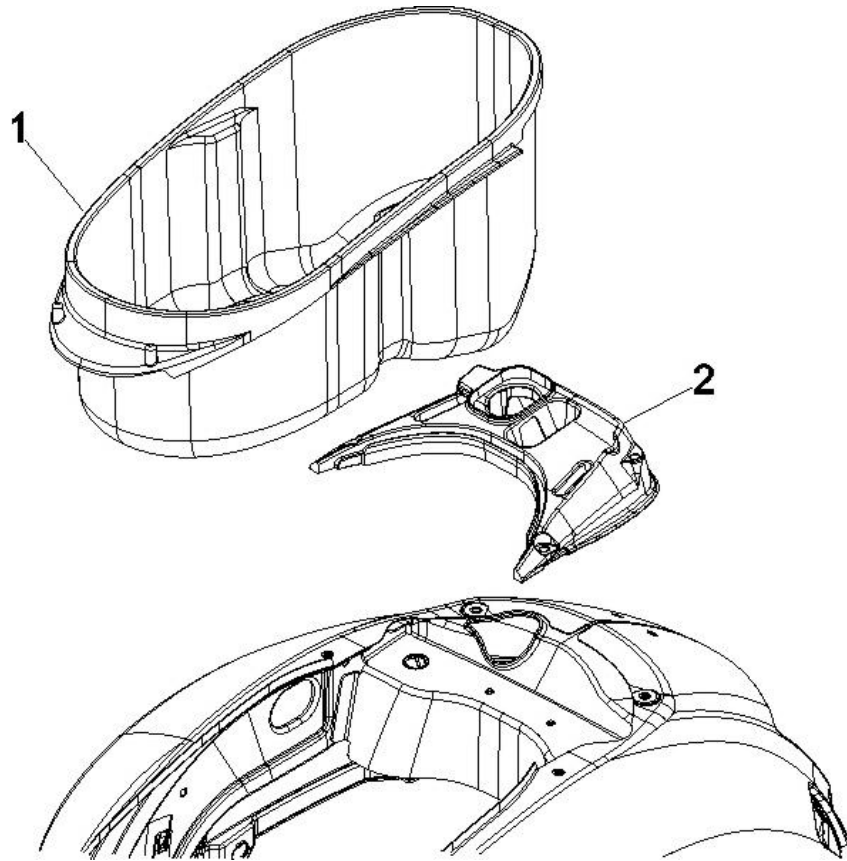
Last update : 23/02/2006

Loc.	Description	Q.ty	Vehicle colour	Drawing No.	Up to
1	ff mudguard vespa gt 125/200 black 94	1	EVG490AI01	6005790090	
1	ff mudguard vespa gt 125/200 black 94	1	EVG49AAI01	6005790090	
1	ff mudguard vespa gts	1	EVG4DEAI01	60057900DE	
1		1	EVG4EICI01	60057900EI	
1	front mudguard vespa gt excalibur 738/a	1	EVG4F2CI01	60057900F2	
1	ff mudguard vespa gt 125/200	1	EVG4NDAI01	60057900ND	
1	ff mudguard vespa gts	1	EVG4R7AI01	60057900R7	
1	ff mudguard vespa gts	1	EVG4RIAI01	60057900RI	
1	mudguard	1		600579	
2	ridge	1		599677	
3	screw	2		015727	
4	cap	2		192598	
5	washer for brake disc (5,3x20x0,5)	1		006966	
6	plate	1		254485	
7	screw for electrical starter motor-m6x30	1		289731	
8	rr mudguard runner, vespa gt	1		621145	

Loc.	Description	Q.ty	Vehicle colour	Drawing No.	Up to
12	<i>screw for fuel tank assy. (m6x22)</i>	3		575249	
13	<i>nut</i>	3		969224	

Frame prefix : ZAPM45100

Engine prefix : M451M

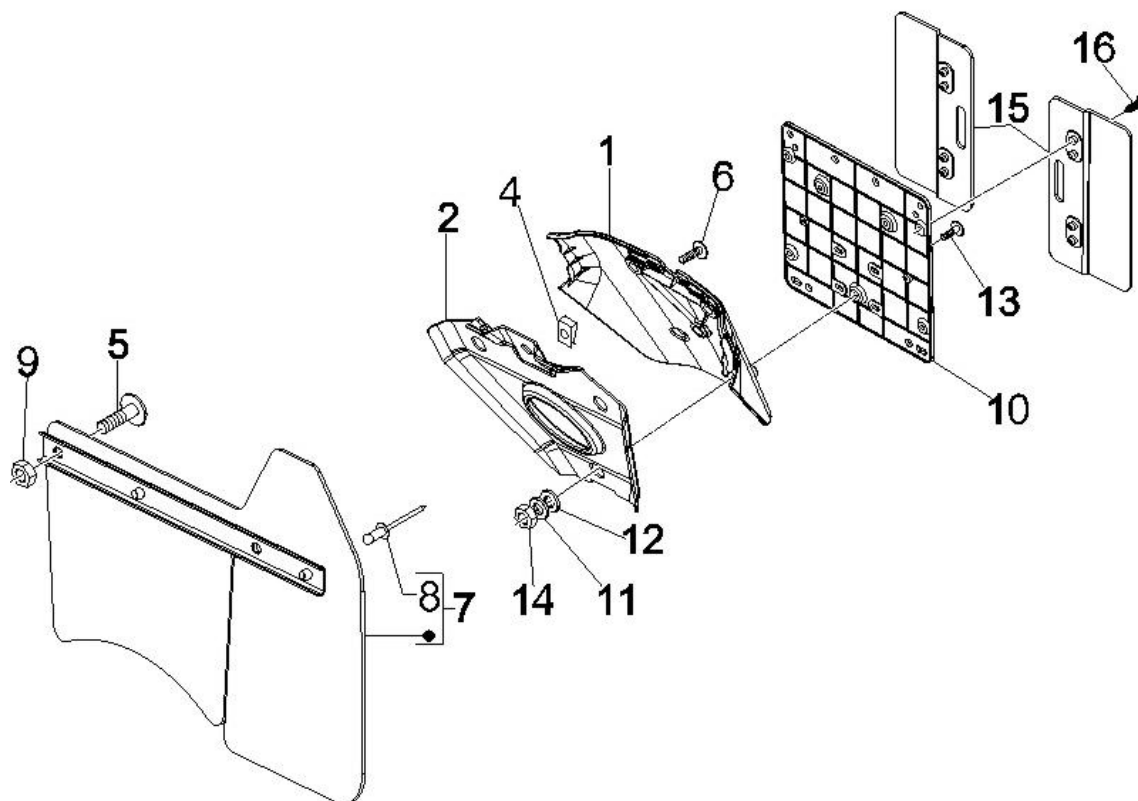


Last update : 23/02/2006

Loc.	Description	Q.ty	Vehicle colour	Drawing No.	Up to
1	helmet copartment (old 577176)	1		621155	
2	seat cover	1		621141	

Frame prefix : ZAPM45100

Engine prefix : M451M



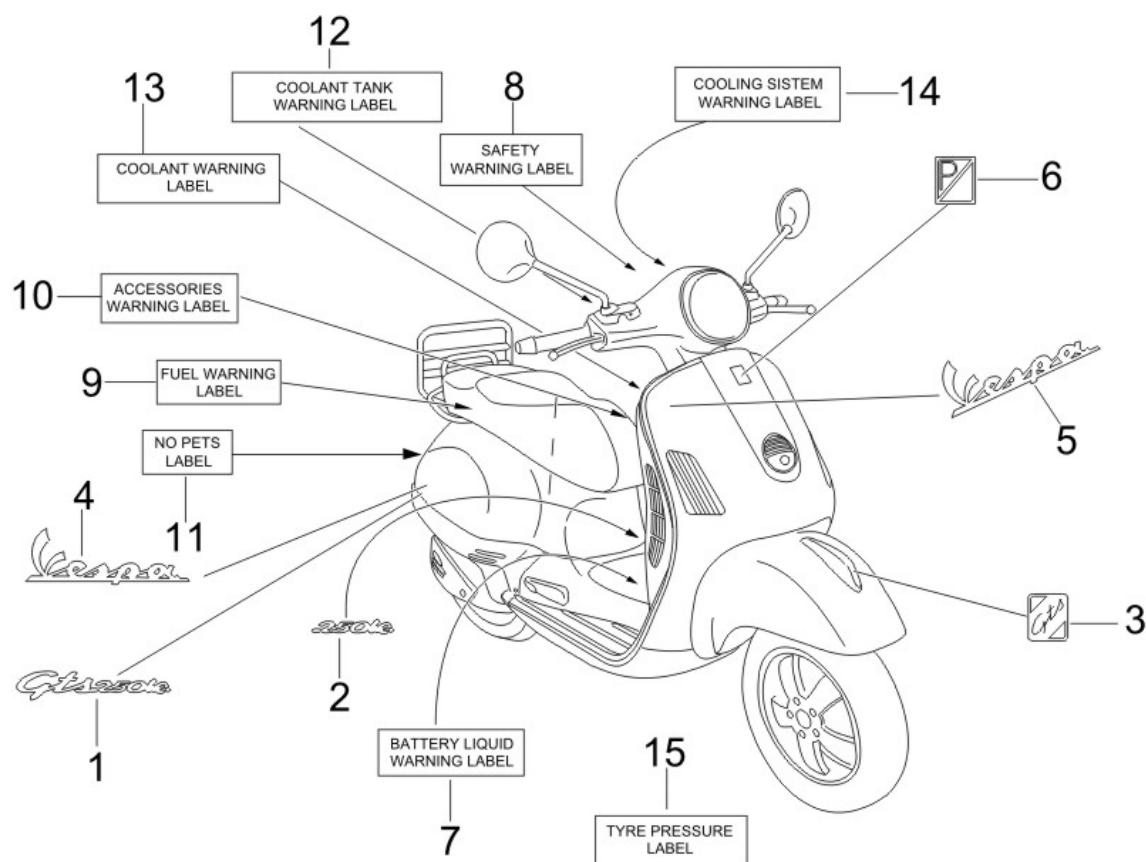
Last update : 23/02/2006

Loc.	Description	Q.ty	Vehicle colour	Drawing No.	Up to
1	rr fender/mudguard	1	EVG490AI01	6228240090	
1	rr fender/mudguard	1	EVG49AAI01	6228240090	
1	rr fender/mudguard	1	EVG4DEAI01	62282400DE	
1	rr fender/mudguard (738/a excalibur)	1	EVG4F2CI01	62282400F2	
1	rr fender/mudguard	1	EVG4NDAI01	62282400ND	
1	rr fender/mudguard	1	EVG4R7AI01	62282400R7	
1	rr fender/mudguard	1	EVG4RIAI01	62282400RI	
1	rr mudguard unpainted	1		622824	
2	bracket	1		623563	
4	plate	1		254485	
5	screw (m6x16)	2		272836	
6	screw for fuel tank assy. (m6x22)	1		575249	
7	mudguard - rear	1		620236	
8	rivet	2		567642	
9	nut for muffler assy. (m=6;h=7)	2		288245	
10	plate holder nexus	1		584884	

Loc.	Description	Q.ty	Vehicle colour	Drawing No.	Up to
11	washer for plate holder (4,2x12x1)	3		013763	
12	washer (4,2x7,2x0,9)	3		016404	
13	screw for plate holder (m4x14)	3		018591	
14	nut for number plate holder(m4x0,7 h=3,2	3		020104	
15	spacer for plate carr.	2		584877	
16	self tapping screw x front glove compart	4		268596	

Frame prefix : ZAPM45100

Engine prefix : M451M

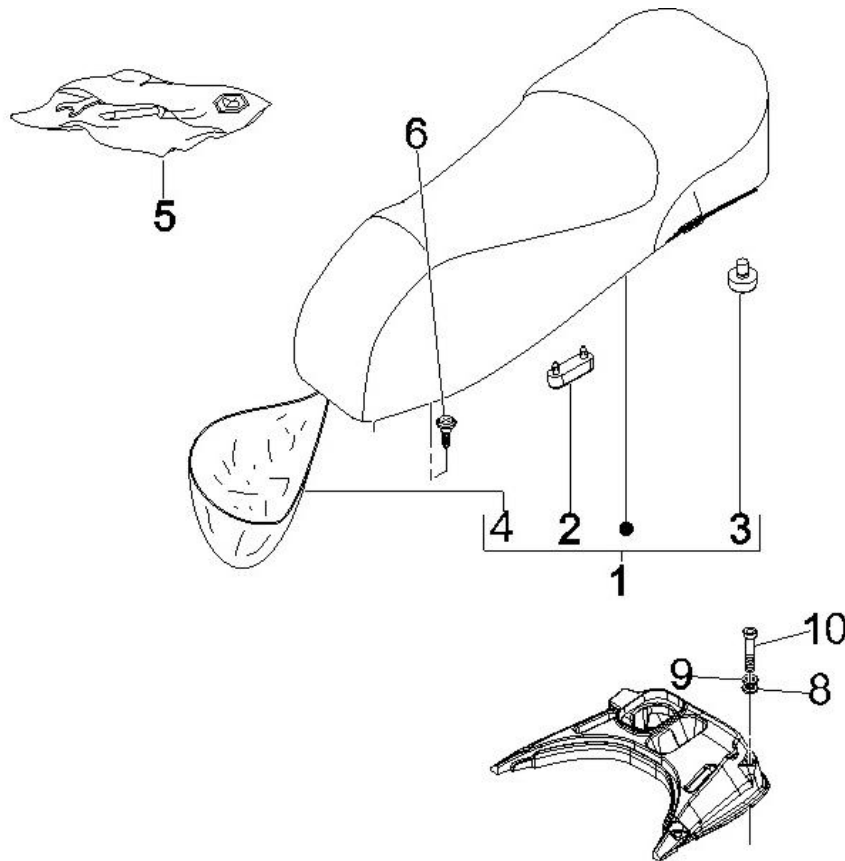


Last update : 23/02/2006

Loc.	Description	Q.ty	Vehicle colour	Drawing No.	Up to
1	nameplate	1		623317	
2	nameplate	1		623318	
3	"gts" side sticker	1		623319	
4	piaggio badge et m.02	1		576464	
5	name plate "vespa" lh side	1		620529	
6	nameplate	1		623205	

Frame prefix : ZAPM45100

Engine prefix : M451M

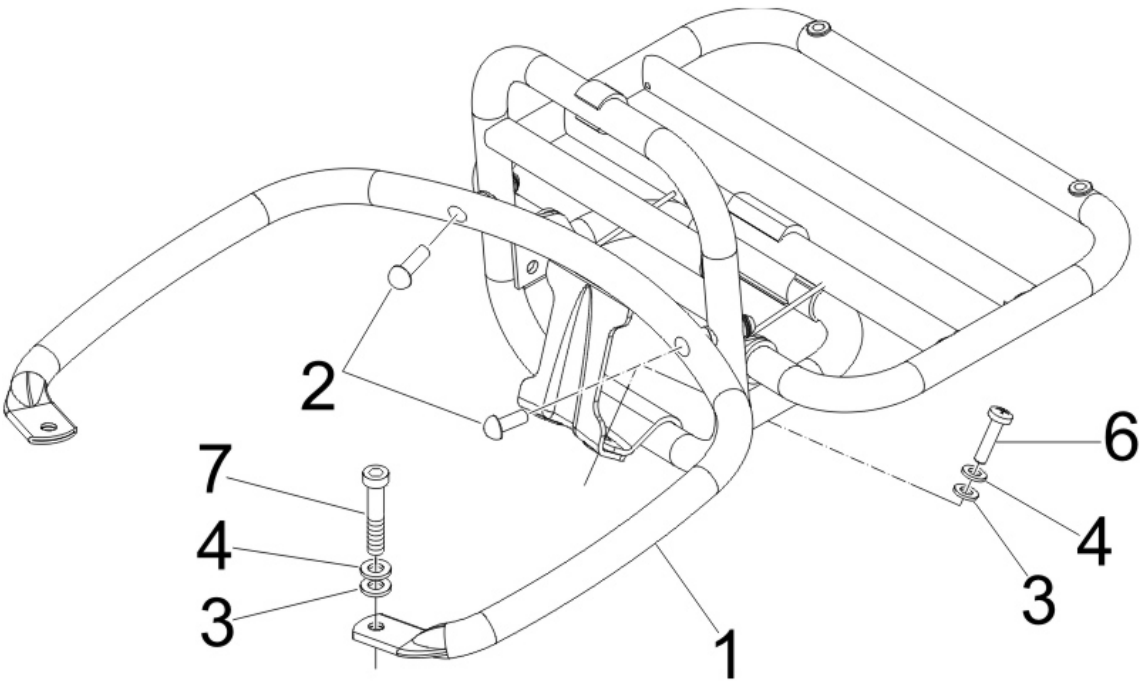


Last update : 23/02/2006

Loc.	Description	Q.ty	Vehicle colour	Drawing No.	Up to
1	saddle complete	1	EVG490AI01	62110200F2	
1	saddle complete	1	EVG49AAI01	62110200F3	
1	saddle complete	1	EVG4DEAI01	62110200F3	
1	complete saddle	1	EVG4EICI01	62110200F1	
1	complete saddle	1	EVG4F2CI01	62110200F1	
1	saddle complete	1	EVG4NDAI01	62110200F2	
1	complete saddle	1	EVG4R7AI01	62110200F1	
1	complete saddle	1	EVG4RIAI01	62110200F1	
2	buffer	2		296456	
3	buffer	2		577492	
4	cowling	1		621498	
5	tool kit	1		646921	
6	screw ->833722	2		436788	
8	washer for rear mudguard (6,4x11x0,5)	2		012533	
9	washer (6,4x13x1,5) - steering	2		013777	
10	screw	2		951685	

Frame prefix : ZAPM45100

Engine prefix : M451M

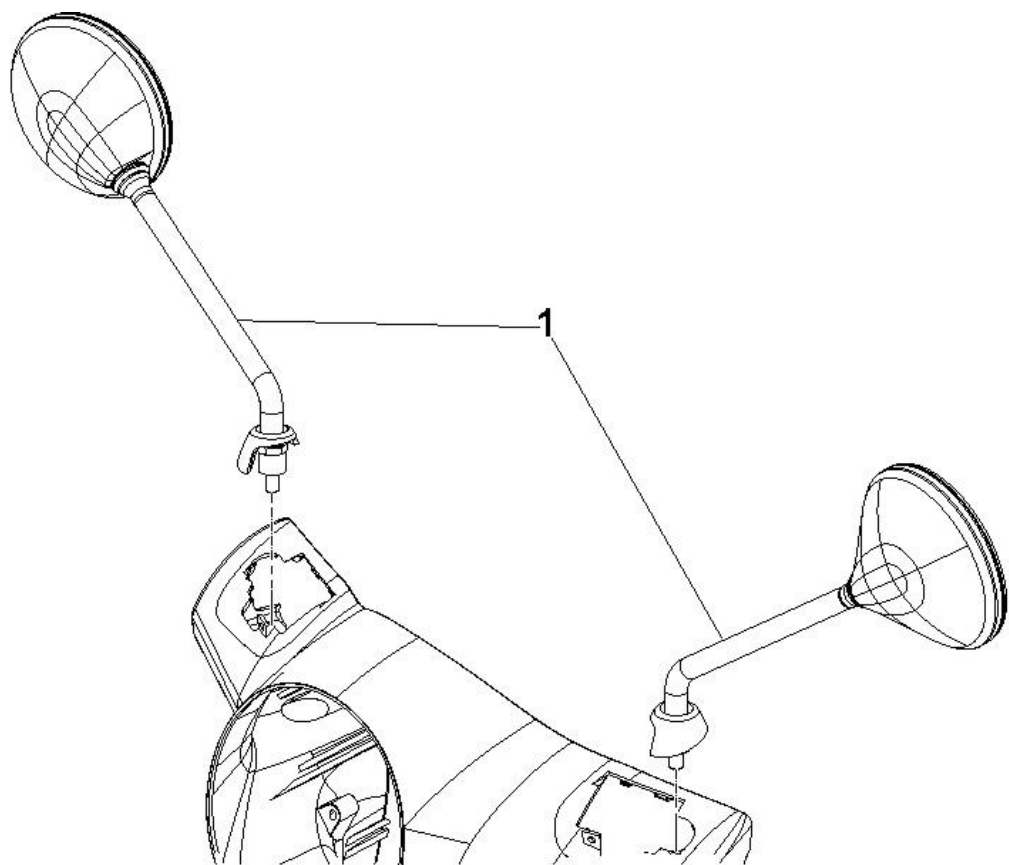


Last update : 23/02/2006

Loc.	Description	Q.ty	Vehicle colour	Drawing No.	Up to
1	rear luggage carrier	1		623977	
2	packing	2		006707	
3	washer for rear mudguard (6,4x11x0,5)	4		012533	
4	washer for brake disc (5,3x20x0,5)	2		006966	
6	screw	2		623920	
7	screw m6x30 tcei	2		319538	

Frame prefix : ZAPM45100

Engine prefix : M451M

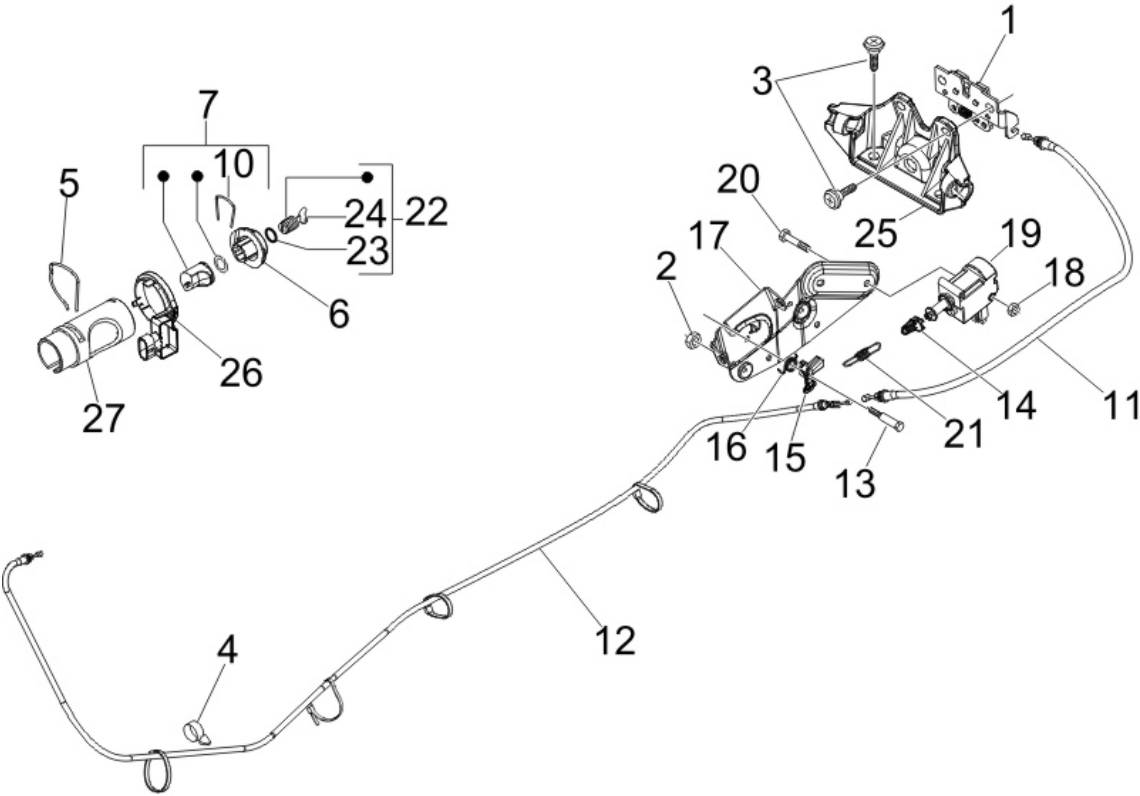


Last update : 23/02/2006

Loc.	Description	Q.ty	Vehicle colour	Drawing No.	Up to
1	mirror couple	1		57323R	

Frame prefix : ZAPM45100

Engine prefix : M451M



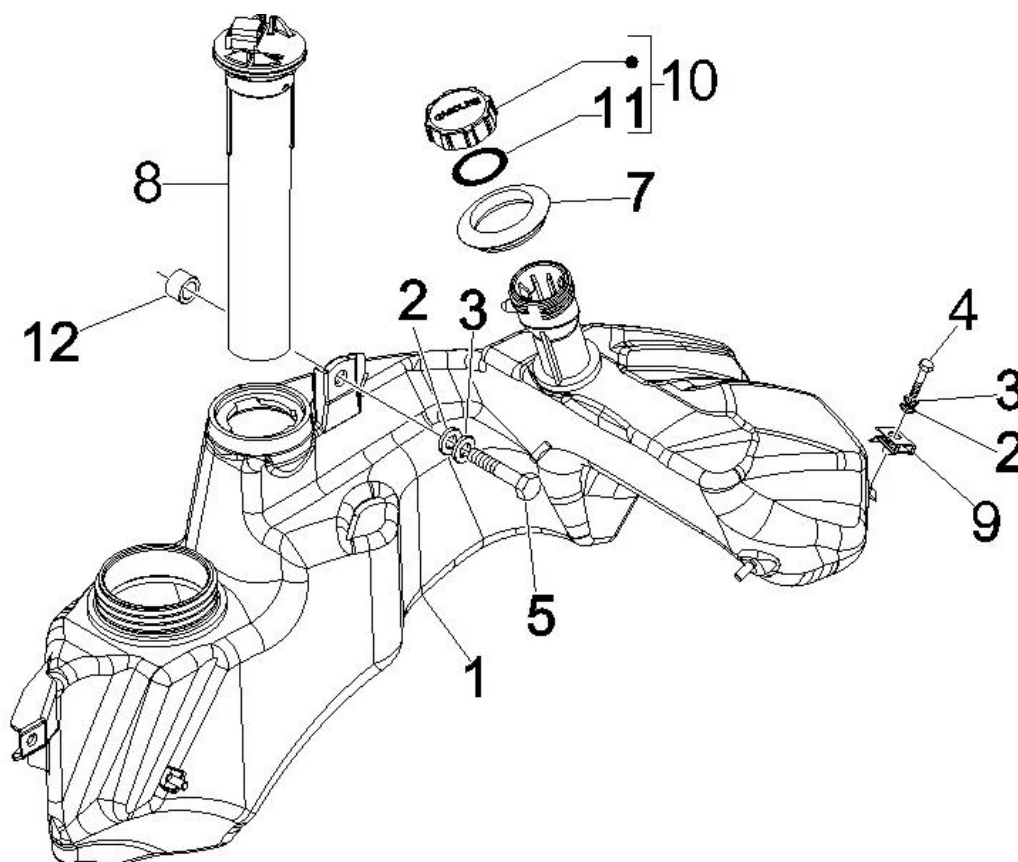
Last update : 23/02/2006

Loc.	Description	Q.ty	Vehicle colour	Drawing No.	Up to
1	lock	1		CM023703	
2	nut	2		241936	
3	screw for fuel tank assy. (m6x22)	4		575249	
4	clamp	1		217280	
5	spring for steering lock unit	1		253937	
6	lock	1		298581	
7	block lock 50 cc	1		298903	
10	spring	1		298838	
11	cable for seat latch (front)	1		CM012811	
12	cable for seat latch (rear)	1		CM012813	
13	screw (m4x12,5)	1		299972	
14	connecting joint b125	1		577128	
15	return lever b125	1		577129	
16	hel spring,w diam1n.coil4,2,ext.d13,8	1		577131	
17	plate	1		577471	
18	nut	3		577620	

Loc.	Description	Q.ty	Vehicle colour	Drawing No.	Up to
19	electroactuator	1		582990	
20	hexagonal head screw (m4x35)	2		584121	
21	spring	1		620415	
22	lock cylinder with keys	1		577454	
23	ring for body lock (14,8x21,1x2,5)	1		298731	
24	key blank for cylinder lock (et-4)	1		573426	
25	bracket for saddle	1		577456	
26	antenna for immobilizer	1		638534	
27	frame lock support runn et skip. lib	1		298604	

Frame prefix : ZAPM45100

Engine prefix : M451M

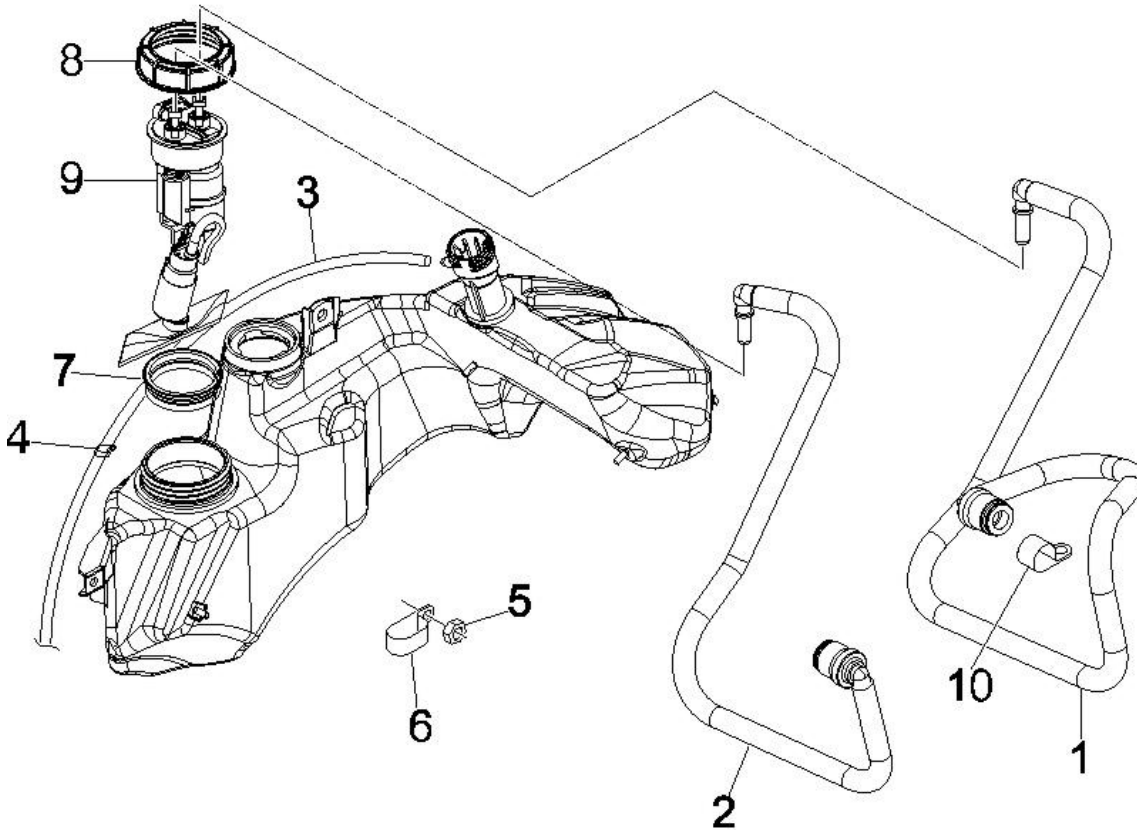


Last update : 23/02/2006

Loc.	Description	Q.ty	Vehicle colour	Drawing No.	Up to
1	fuel tank complete	1		621582	
2	plain washer x rear lugg.rack-6,5x16x1,5	3		013880	
3	washer	3		016406	
4	hex bolt for retaining starter motor	2		031091	
5	screw	1		414838	
7	o-ring for filler cap	1		620737	
8	fuel level gauge	1		CM025709	
9	plate	2		254485	
10	plug	1		259832	
11	packing for fuel tank cap	1		258160	
12	spacer	2		623162	

Frame prefix : ZAPM45100

Engine prefix : M451M

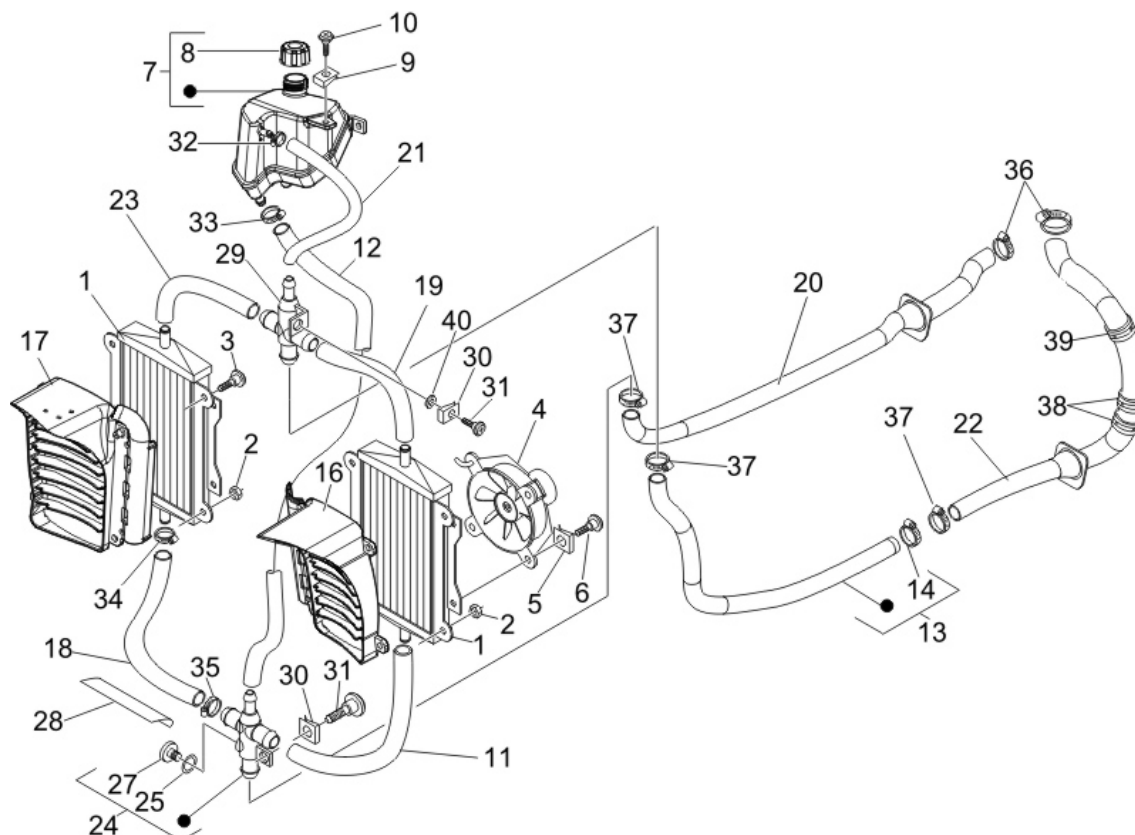


Last update : 23/02/2006

Loc.	Description	Q.ty	Vehicle colour	Drawing No.	Up to
1	fuel pipe	1		621146	
2	fuel pipe	1		621152	
3	tank pipe x9 125/500, dna, runner	1		CM001424	
4	spring	3		CM013201	
5	nut	1		969224	
6	clamp for fixing fuel tap	1		621585	
7	base gasket for fuel pump	1		576542	
8	threaded cap for fuel pump	1		576546	
9	v.gts250 electric fuel pump	1		621581	
10	clamp / brake line (bv-500)	1		623743	
11	metallic clip runner purejet	1		145298	

Frame prefix : ZAPM45100

Engine prefix : M451M



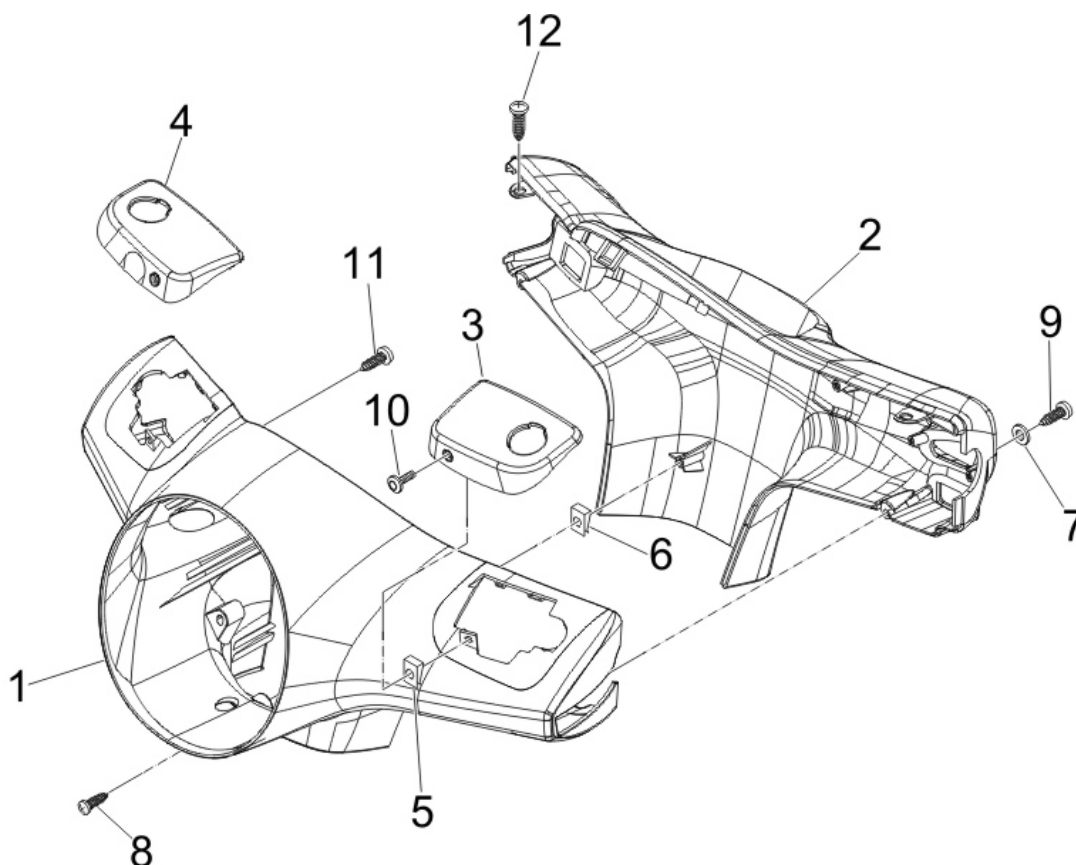
Last update : 23/02/2006

Loc.	Description	Q.ty	Vehicle colour	Drawing No.	Up to
1	radiator lh and rh	2		577183	
2	nut	6		241936	
3	self tapping screw (d3,85x16)	2		270793	
4	electric fan	1		584669	
5	plate	3		254485	
6	screw (m6x16)	3		272836	
7	coolant tank x8	1		624402	
8	filler cap	1		623673	
9	plate	1		254485	
10	screw	2		257404	
11	hose (radiator lh-lower joint)	1		57313R	
12	hose (coolant tank-lower joint)	1		577436	
13	hose (engine deliver/front)	1		57333R	
14	strap	1		CM001908	
16	air conveyor lh	1		577187	
17	air conveyor	1		622839	

Loc.	Description	Q.ty	Vehicle colour	Drawing No.	Up to
18	<i>hose (radiator rh-lower joint)</i>	1		577201	
19	<i>hose (radiator lh-upper joint)</i>	1		577384	
20	<i>hose (engine return)</i>	1		623922	
21	<i>hose (coolant tank-upper joint)</i>	1		577433	
22	<i>hose (engine deliver/rear)</i>	1		622052	
23	<i>hose (radiator rh-upper side)</i>	1		623013	
24	<i>tic switch manifold</i>	1		623438	
25	<i>packing</i>	1		168077	
27	<i>plug b500</i>	1		621365	
28	<i>protection</i>	1		580160	
29	<i>main upper joint for coolant hoses</i>	1		577195	
30	<i>plate</i>	2		254485	
31	<i>screw for fuel tank assy. (m6x22)</i>	2		575249	
32	<i>strap</i>	1		CM001903	
33	<i>clamp for fixing fuel tap</i>	3		CM001904	
34	<i>clamp</i>	4		CM001905	
35	<i>clamp radiator hose runner 180 2t m.02</i>	4		CM001907	
36	<i>strap</i>	2		CM001908	
37	<i>clamp</i>	3		CM001915	
38	<i>clip</i>	3		CM006903	
39	<i>metallic clip runner purejet</i>	5		145298	
40	<i>washer for carburettor assy. (8,4x15x0,8)</i>	1		709047	

Frame prefix : ZAPM45100

Engine prefix : M451M



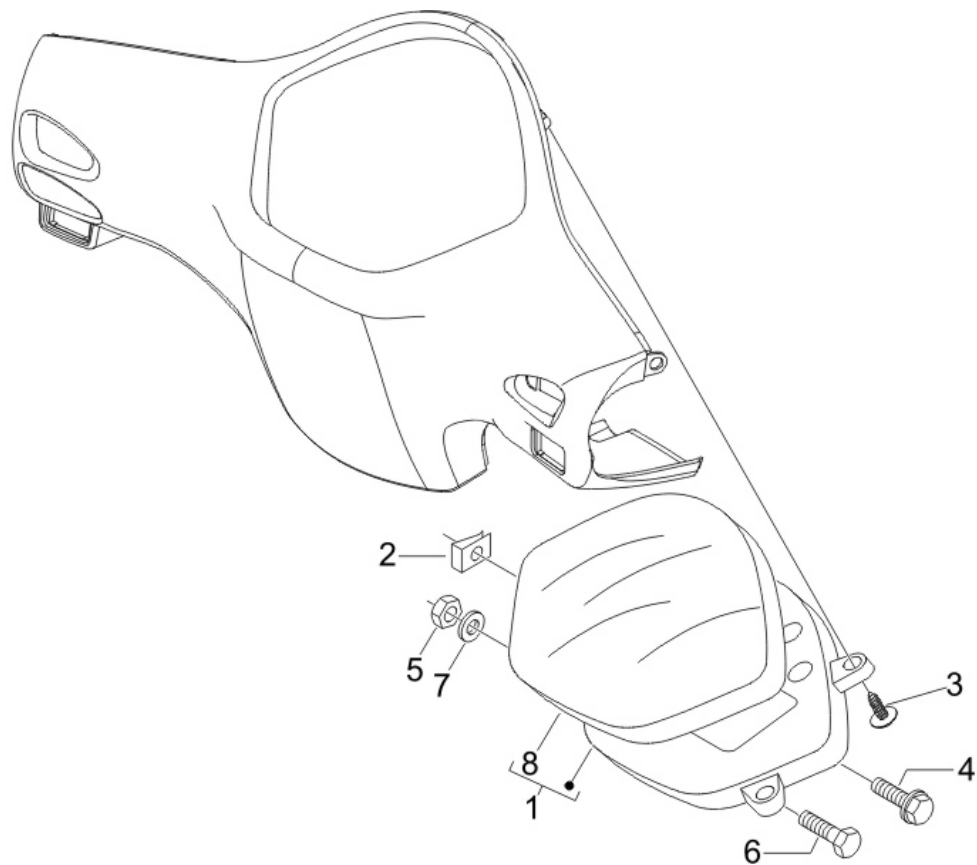
Last update : 23/02/2006

Loc.	Description	Q.ty	Vehicle colour	Drawing No.	Up to
1	front handlebars cover black 94	1	EVG490AI01	6234480090	
1	front handlebars cover black 94	1	EVG49AAI01	6234480090	
1	front handlebars cover	1	EVG4DEAI01	62344800DE	
1	front handlebars cover	1	EVG4EICI01	62344800EI	
1	front handlebars cover	1	EVG4F2CI01	62344800F2	
1	front handlebars cover	1	EVG4R7AI01	62344800R7	
1	front handlebars cover	1	EVG4RIAI01	62344800RI	
1	ff h/bar cover gts unpainted	1		623448	
2	rear handlebars cover	1	EVG490AI01	6234470090	
2	rear handlebars cover	1	EVG49AAI01	6234470090	
2	rear handlebars cover	1	EVG4DEAI01	62344700DE	
2	rear handlebars cover	1	EVG4F2CI01	62344700F2	
2	rear handlebars cover	1	EVG4NDAI01	62344700ND	
2	rear handlebars cover	1	EVG4R7AI01	62344700R7	
2	rear handlebars cover	1	EVG4RIAI01	62344700RI	
2	rr h/bar cover gts unpainted	1		623447	

Loc.	Description	Q.ty	Vehicle colour	Drawing No.	Up to
3	brake pump cover lh	1	EVG490AI01	5996780090	
3	brake pump cover lh	1	EVG49AAI01	5996780090	
3	brake pump cover lh	1	EVG4DEAI01	59967800DE	
3		1	EVG4EICI01	59967800EI	
3	brake pump cover lh	1	EVG4F2CI01	59967800F2	
3	brake pump cover lh	1	EVG4NDAI01	59967800ND	
3	brake pump cover lh	1	EVG4R7AI01	59967800R7	
3	brake pump cover lh	1	EVG4RIAI01	59967800RI	
3	pump cover	1		599678	
4	brake pump cover rh	1	EVG490AI01	5996790090	
4	brake pump cover rh	1	EVG49AAI01	5996790090	
4	brake pump cover rh	1	EVG4DEAI01	59967900DE	
4		1	EVG4EICI01	59967900EI	
4	brake pump cover rh	1	EVG4F2CI01	59967900F2	
4	brake pump cover rh	1	EVG4NDAI01	59967900ND	
4	brake pump cover rh	1	EVG4R7AI01	59967900R7	
4	brake pump cover rh	1	EVG4RIAI01	59967900RI	
4	pump cover	1		599679	
5	clip for holding block out plate	2		CM017418	
6	spring (plate)	1		CM017409	
7	washer	2		003053	
8	screw d4,2x19	1		258249	
9	screw	2		267115	
10	screw m4x12 t.b.e.i	2		581957	
11	screw tcic 3,5x16	2		294678	
12	self tapping screw x front glove compart	2		268596	

Frame prefix : ZAPM45100

Engine prefix : M451M

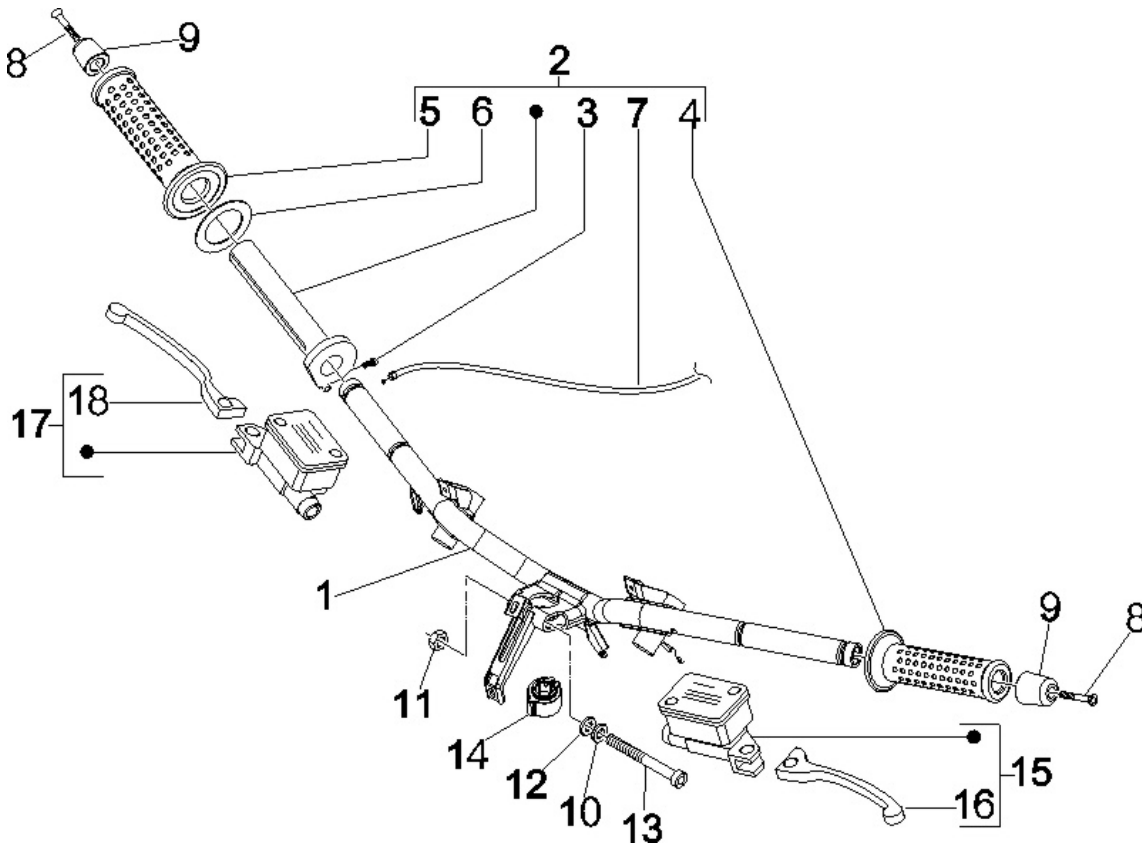


Last update : 23/02/2006

Loc.	Description	Q.ty	Vehicle colour	Drawing No.	Up to
1	instrument panel complete_km	1		584725	
3	self tapping screw (d3,85x16)	4		270793	
5	nut for h.t. coil fixing (m=5;h=5,5)	1		241937	
6	screw for outer h.t. coil (m5x12)	1		031056	
7	washer for h.t. coil (5.2 fi x 18 fe)	1		016686	

Frame prefix : ZAPM45100

Engine prefix : M451M



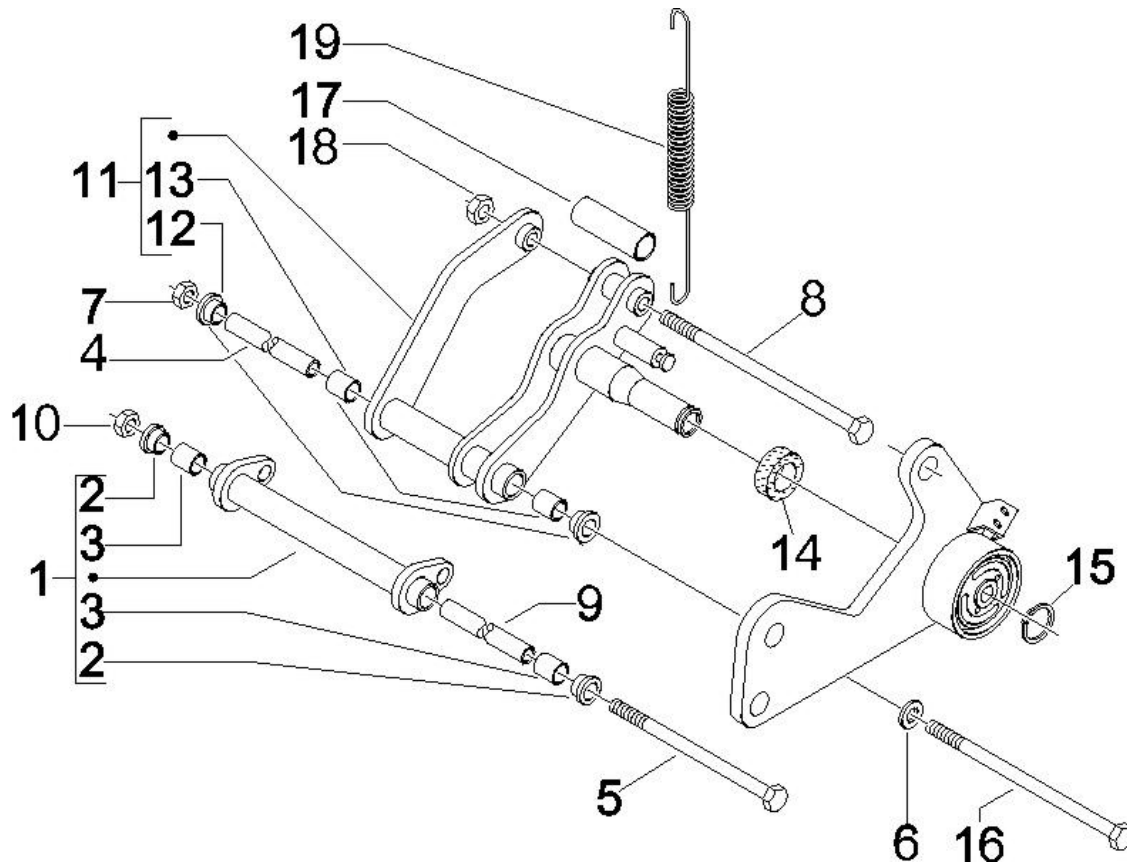
Last update : 23/02/2006

Loc.	Description	Q.ty	Vehicle colour	Drawing No.	Up to
1	handlebars	1		623536	
2	sleeve	1		CM060965	
3	screw for r.h. sleeve (m5,8x17,2)	1		123394	
4	hand grip lh	1		271452	
5	hand grip rh	1		271453	
6	washer for r.h. sleeve (27x38,3x1,2)	1		562923	
7	throttle cable	1		601288	
8	flat head screw (m6x55)	2		271434	
9	handlebar end weights	2		582034	
10	washer (10,3x17x2) **abolished**	1		012543	
11	nut for handlebar securing bolt-m10;h10	1		015330	
12	washer	1		178790	
13	bolt (shock absorber)	1		223605	
14	clamp	1		582828	
15	master cylinder brake	1		CM074801	
16	brake lever (lh-rh)	1		646833	
17	ff master cylinder	1		CM074901	

Loc.	Description	Q.ty	Vehicle colour	Drawing No.	Up to
18	brake lever (lh-rh)	1		646833	

Frame prefix : ZAPM45100

Engine prefix : M451M



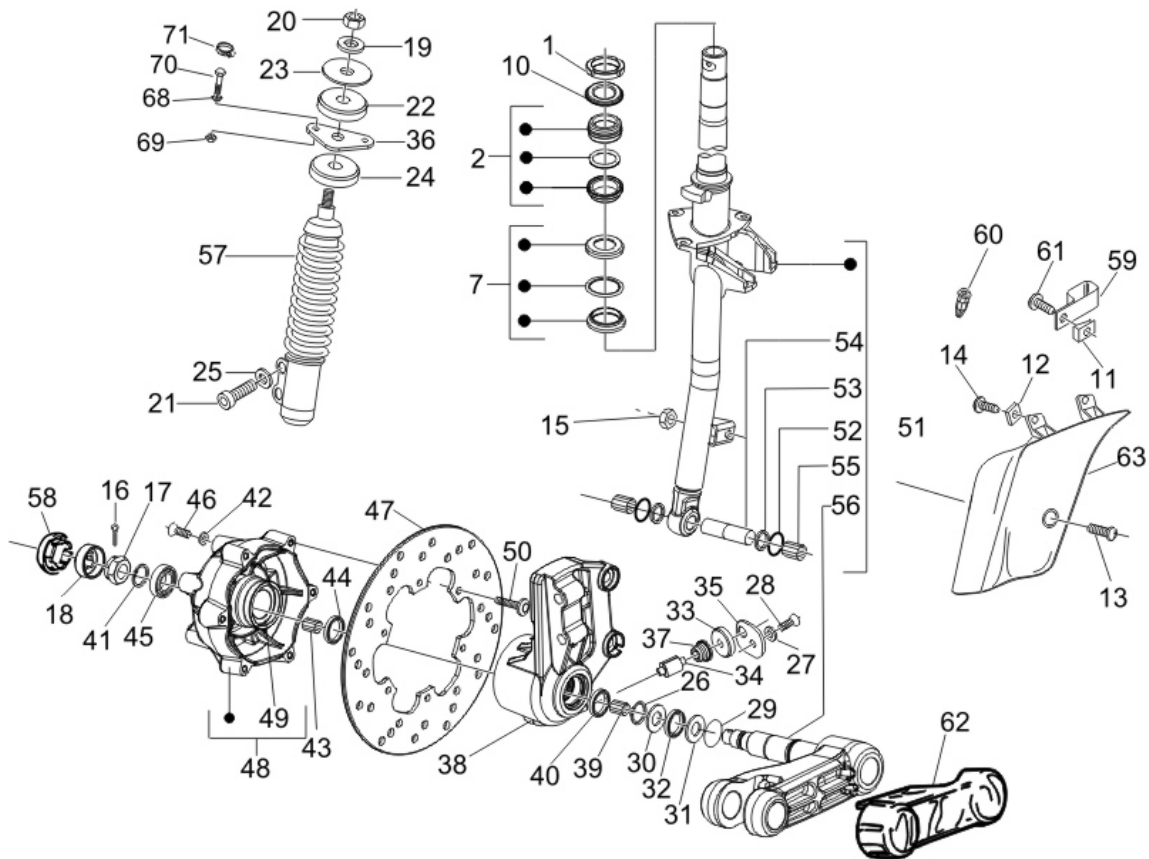
Last update : 23/02/2006

Loc.	Description	Q.ty	Vehicle colour	Drawing No.	Up to
1	swinging arm	1		601825	28/02/2006
2	bush	2		598917	
3	roller cage	2		600161	
4	spacer	1		597857	
5	hexagonal head screw	1		597914	
6	washer	1		266845	
7	nut (wheel)	1		271740	
8	bolt for swinging arm (m10x202)	1		271807	
9	spacer	1		CM067801	
10	nut x lower rear damper fixing -m10 h8,6	1		232108	
11	swinging arm	1		599246	
12	bush	2		597317	
13	swing arm bush x9 -.56127r	2		597374	
14	buffer for swing-arm unit	1		599250	
15	ring runner 180 2t	1		006416	
16	screw m10x220	1		598237	

Loc.	Description	Q.ty	Vehicle colour	Drawing No.	Up to
17	spacer	1		599077	
18	nut	1		564878	
19	spring vespa gt 200	1		599059	

Frame prefix : ZAPM45100

Engine prefix : M451M



Last update : 23/02/2006

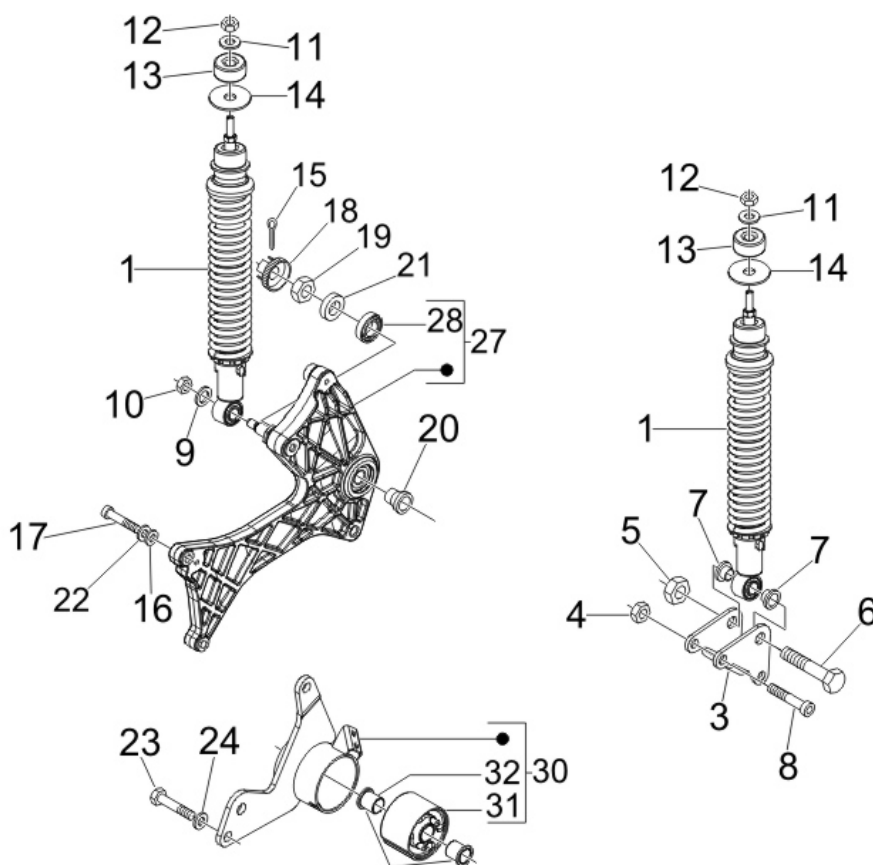
Loc.	Description	Q.ty	Vehicle colour	Drawing No.	Up to
1	ring nut	1		011109	
2	upper track	1		56297R	
7	lower track	1		56298R	
10	steering column washer et4 50/125 m.02	1		582787	
10	gear box seal runner 180 2t m.02 u	1		82539R	
11	plate	1		CM017410	
12	plate	2		CM017410	
13	screw (m6x18) with cross incision head	1		259348	
14	self tapping screw (d4,2x13)	2		259349	
15	nut	1		969224	
16	split pin for rear and front wheel axle	1		012789	
17	nut for front hub (m14x1,5 h=11)	1		021114	
18	cap for front hub	1		177609	
19	washer x rear mudguard moped-10,5x18x2,7	1		012535	
20	nut for front dumper (m10x1,25 h=6)	1		021210	
21	screw	2		149104	

Loc.	Description	Q.ty	Vehicle colour	Drawing No.	Up to
22	buffer	1		174085	
23	washer for front damper	1		174088	
24	buffer for front suspension	1		174874	
25	washer for carburettor assy.(8,4x15x0,8)	2		709047	
26	ring	1		006422	
27	caliper bracket washer (5,3x10x0,5)	1		006975	
28	bolt for caliper bracket (m5x16)	1		031058	
29	ring for front suspension arm	1		177408	
30	washer x front suspension arm-22,1x34x2	1		177414	
31	washer	1		177445	
32	ring x front suspension arm21,7x26,5x3,5	1		177521	
33	buffer for caliper bracket	1		266841	
34	pinion for caliper bracket	1		267819	
35	plate for caliper bracket	1		269118	
36	bracket for front suspension	1		273693	
37	bracket ff brake hex, et4	1		564053	
38	bracket for front steering	1		597758	
39	d.c.bearing	2		177436	
40	oil seal	1		177494	
41	ring runner 180 2t m.02 u	1		006635	
42	washer for brake disc (5,3x20x0,5)	6		006966	30/12/2070
43	d.c.bearing	1		177442	
44	oil seal	1		177443	
45	bearing	1		177610	
46	screw	6		271147	30/12/2070
47	ff brake disc lib, runner fl	1		564573	
48	hub	1		598654	
50	self tapping screw	6		601031	
51	steering column assy-(vespa gt)(old part	1		6009605	
52	packing for steering column pin	2		006731	
53	oil seal for steering column pin	2		119219	
54	piston pin	1		177451	
55	roller cage	2		198513	
56	ff suspen. arm	1		56140R5	
57	shock absorber	1		56263R	28/02/2006
57	shock absorber / x8	1		56286R	
58	plug for rear wheel fixing nut	1		092517	
59	clamp (starter motor)	1		271477	
60	clamp for cylinder hood	1		231590	
61	self tapping screw (d4,2x13)	1		259349	
62	protection for front suspension arm et	1		561433	
63	cover for front suspension	1	EVG490AI01	598615000C	
63	cover for front suspension	1	EVG49AAI01	598615000C	
63	cover for front suspension	1	EVG4DEAI01	598615000C	
63	cover for front suspension	1	EVG4EICI01	598615000C	
63	cover for front suspension	1	EVG4F2CI01	598615000C	
63	cover for front suspension	1	EVG4NDAI01	598615000C	
63	cover for front suspension	1	EVG4R7AI01	598615000C	
63	cover for front suspension	1	EVG4RIAI01	598615000C	
63	cover for front suspension	1		598615	
68	washer	2		016408	
69	nut	2		020108	
70	bolt for front damper bracket (m8x22)	2		031119	

Loc.	Description	Q.ty	Vehicle colour	Drawing No.	Up to
71	clamp	1		598134	

Frame prefix : ZAPM45100

Engine prefix : M451M



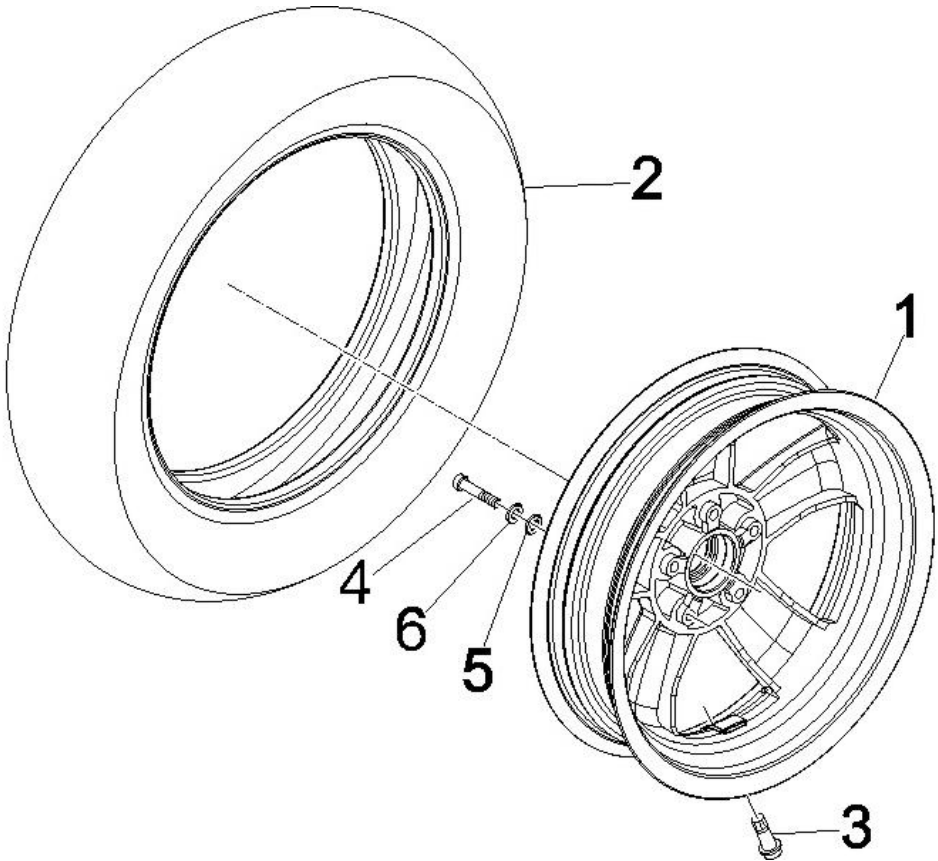
Last update : 23/02/2006

Loc.	Description	Q.ty	Vehicle colour	Drawing No.	Up to
1	shock absorber	2		56234R	
3	plate	1		598143	
4	nut	2		020008	
5	nut x lower rear damper fixing -m10 h8,6	1		232108	
6	screw	1		268158	
7	bush	2		597149	
8	screw m8x50 t.c.e.i	2		844483	
9	washer	1		016627	
10	nut x lower rear damper fixing -m10 h8,6	1		232108	
11	washer	2		016408	
12	nut for rear damper (m8x1;h=6,5)	2		021108	
13	buffer	2		178150	
14	washer for rear damper (8,2x37x1,5)	2		267038	
15	split pin for rear and front wheel axle	1		012789	
16	washer	2		013776	
17	screw	2		149104	

Loc.	Description	Q.ty	Vehicle colour	Drawing No.	Up to
18	cap for rear wheel fixing nut	1		194423	
19	nut	1		563728	
20	spacer	1		848039	
21	spacer	1		597528	
22	washer for carburettor assy.(8,4x15x0,8)	2		709047	
23	bolt for swing-arm unit	2		031153	
24	spring washer	2		709646	
27	suspension arm	1		599593	
28	bearing /radial (17 x 47 x 14) bv-500	1		82545R	
30	bracket for swing-arm unit	1		601815	
31	buffer (swinging basic structure)	1		272750	
32	bush (swinging basic structure) u	2		273460	

Frame prefix : ZAPM45100

Engine prefix : M451M

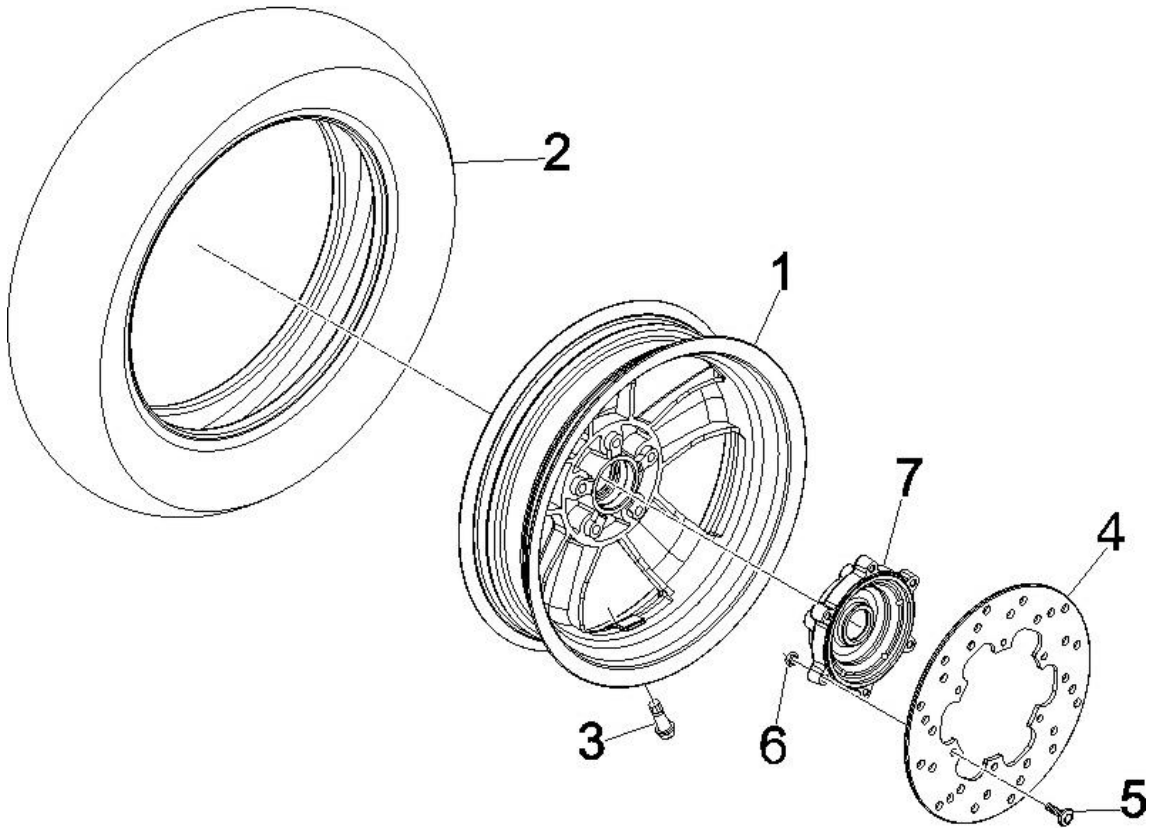


Last update : 23/02/2006

Loc.	Description	Q.ty	Vehicle colour	Drawing No.	Up to
1	wheel - front and rear	1		598619	
2	tyre 120/70-12 sava	1		598277	
3	tubeless valve (bent)	1		597679	
4	screw	5		149104	
5	washer for carburettor assy.(8,4x15x0,8)	5		709047	
6	washerb vespa gt 200	5		828961	

Frame prefix : ZAPM45100

Engine prefix : M451M

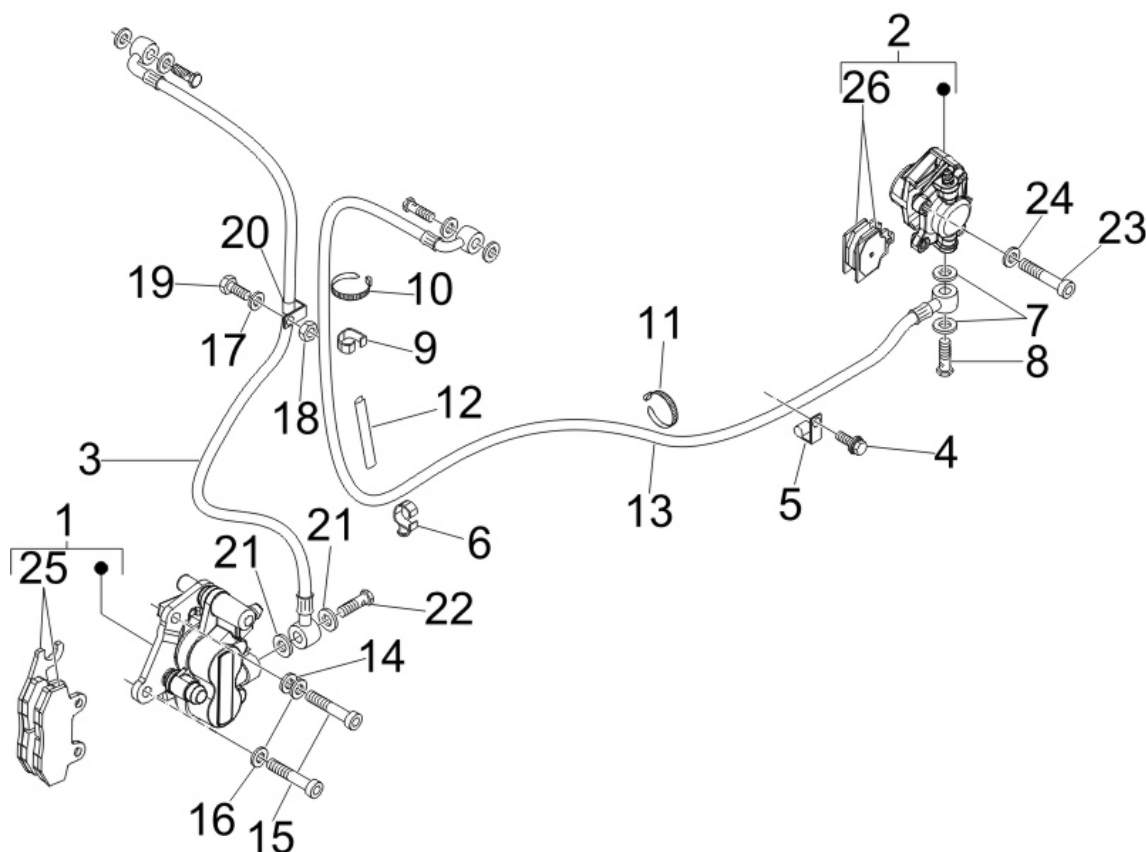


Last update : 23/02/2006

Loc.	Description	Q.ty	Vehicle colour	Drawing No.	Up to
1	wheel - front and rear	1		598619	
2	tyre 130/70-12 sava	1		598278	
3	tubeless valve (bent)	1		597679	
4	ff brake disc lib, runner fl	1		564573	
5	soked head screw (m6x30)	6		597564	
6	self locking nut b125	6		597565	
7	rear wheel hub	1		598715	

Frame prefix : ZAPM45100

Engine prefix : M451M



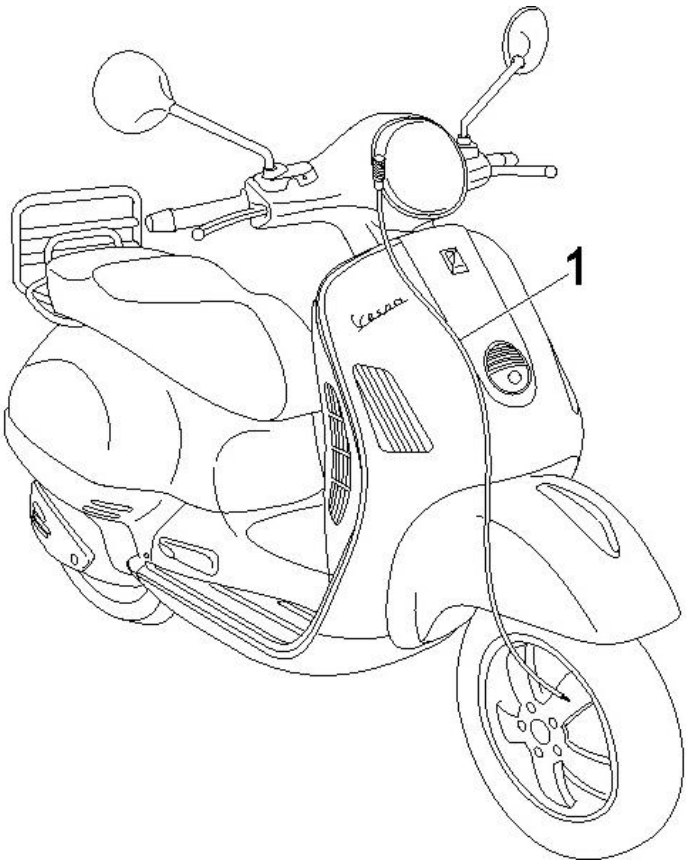
Last update : 23/02/2006

Loc.	Description	Q.ty	Vehicle colour	Drawing No.	Up to
1	rr caliper runner 200 fl, b125/200 m.02	1		CM068301	
2	rr caliper	1		CM074101	
3	pipng	1		597856	
4	screw for electrical starter motor-m6x30	1		289731	
5	clamp	1		564761	
5	clamp	1		597418	
6	clip	1		CM006903	
7	packing for brake caliper (10x14x1)	2		127927	
8	screw	1		265451	
9	clamp	1		564629	
10	retaining strap	1		257134	
11	metallic clip runner purejet	1		145298	
12	protection	1		580160	
13	rr brake piping vespa gt	1		601952	
14	washer for caliper (8,4x15x1,5)	1		003058	
15	screw m8x18 tcei	2		319532	

Loc.	Description	Q.ty	Vehicle colour	Drawing No.	Up to
16	washer for carburettor assy.(8,4x15x0,8)	2		709047	
18	nut	1		241936	
19	screw (m6x16)	1		272836	
21	packing for brake caliper (10x14x1)	2		127927	
22	screw	1		265451	
23	screw	2		149104	
24	washer for carburettor assy.(8,4x15x0,8)	2		709047	
25	brake pads b 125/200, vespa gt	1		647078	
26	brake pads kit / rear	1		647161	

Frame prefix : ZAPM45100

Engine prefix : M451M

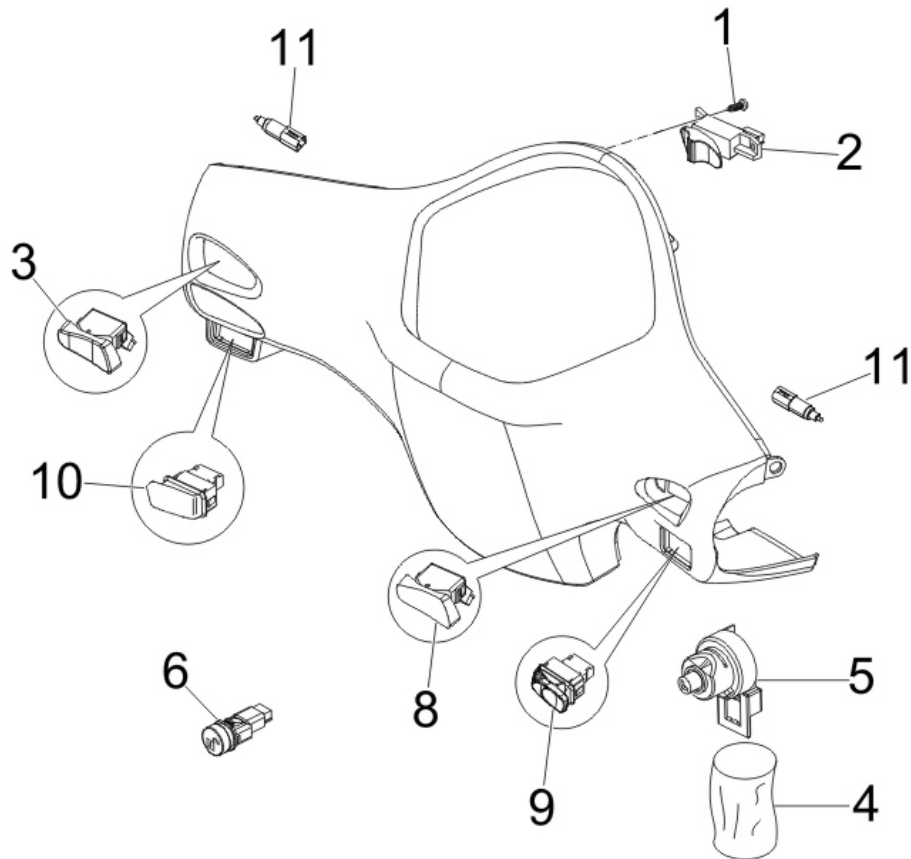


Last update : 23/02/2006

Loc.	Description	Q.ty	Vehicle colour	Drawing No.	Up to
1	speedometer cable	1		601321	

Frame prefix : ZAPM45100

Engine prefix : M451M

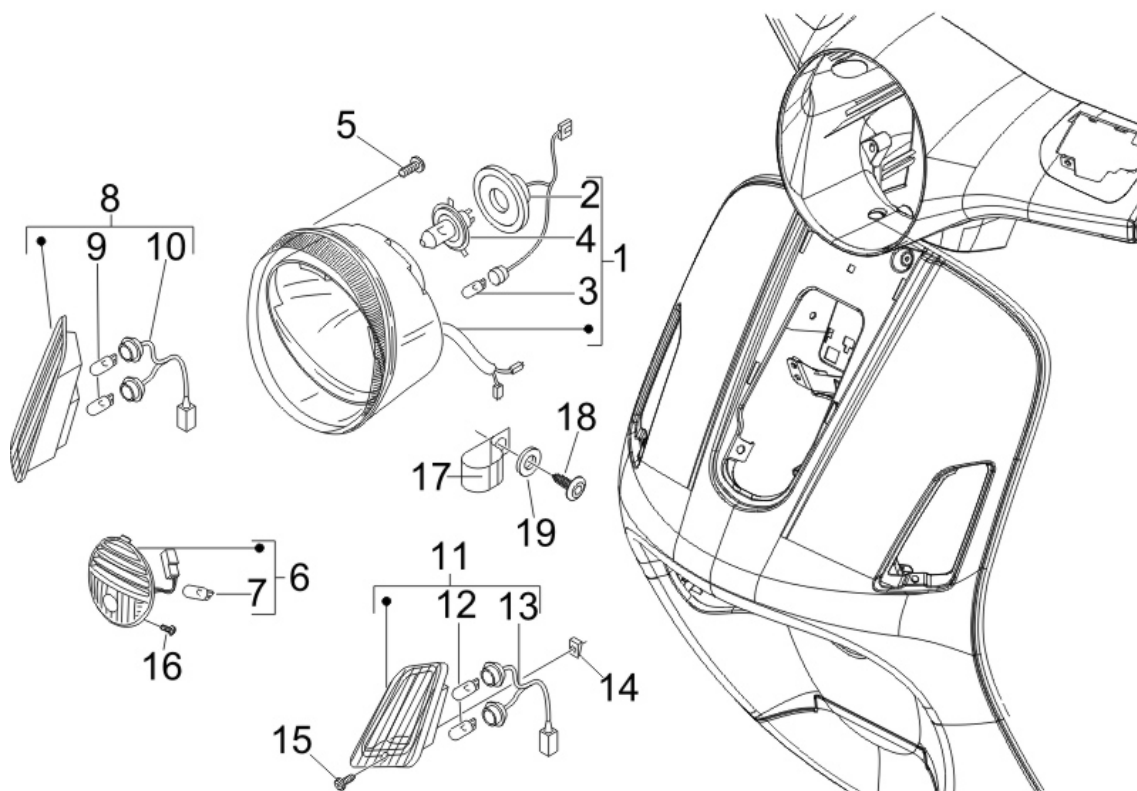


Last update : 23/02/2006

Loc.	Description	Q.ty	Vehicle colour	Drawing No.	Up to
1	self tapp.screw x turn sign.lamp switch	2		258403	
2	turn signal lamp switch	1		294723	
3	switch	1		294877	
4	kappe	1		582041	
5	key operated switch b125	1		582951	
6	saddle opening button	1		582988	
8	switch	1		584599	
9	start button	1		638975	
10	horn button	1		638976	
11	switch	2		583575	

Frame prefix : ZAPM45100

Engine prefix : M451M



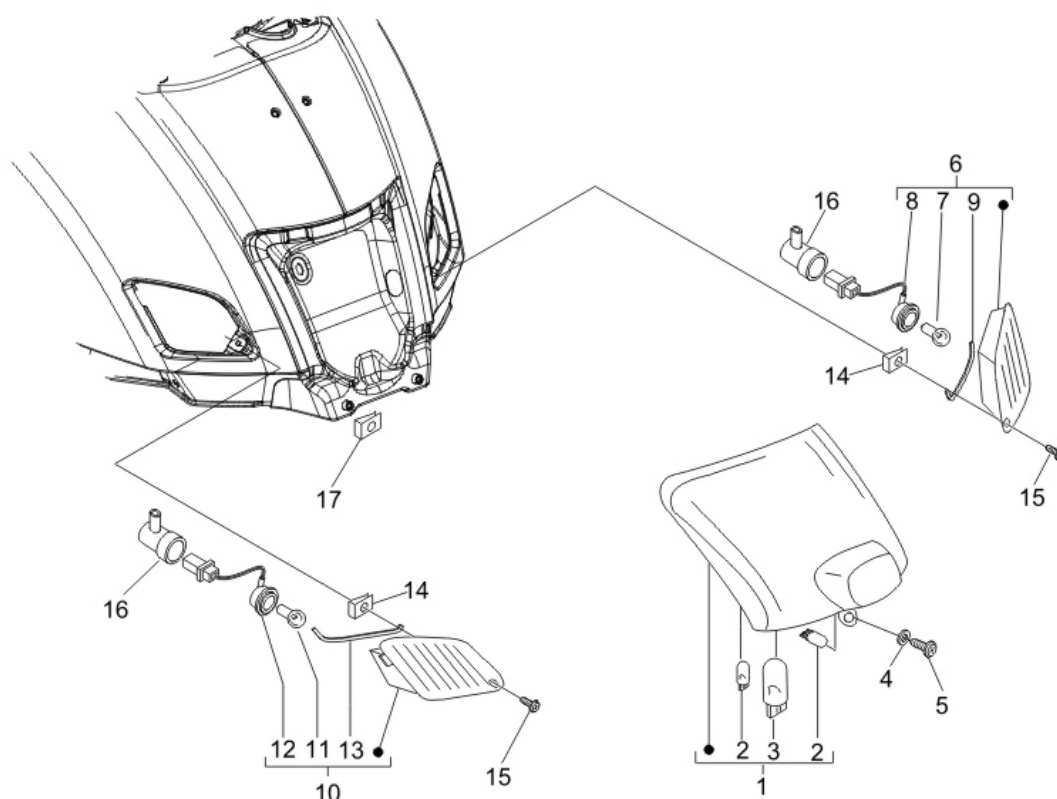
Last update : 23/02/2006

Loc.	Description	Q.ty	Vehicle colour	Drawing No.	Up to
1	headlamp assy. vespa gt 125/200	1		584479	
2	front headlight bulb holder	1		253327	
3	bulb (12v - 5w) for headlight	1		292022	
4	bulb 12v-55/60w	1		292723	
5	screw l35x4,8	4		296458	
6	ff indicator assy	1		584726	
7	bulb (12v - 5w) for headlight	1		292022	
8	rh ff indicator assy vespa gt	1		584970	01/04/2006
9	bulb	2		581904	
10	cable harness	1		583864	
11	lf ff indicator assy vespa gt	1		584971	01/04/2006
12	bulb	2		581904	
13	cable harness	1		583864	
14	plate	2		CM017406	
15	screw for handlebars (d 4,2x19)	2		008457	
16	screw (3x12)	2		297498	

Loc.	Description	Q.ty	Vehicle colour	Drawing No.	Up to
18	screw	1		433800	
19	washer	1		006078	

Frame prefix : ZAPM45100

Engine prefix : M451M

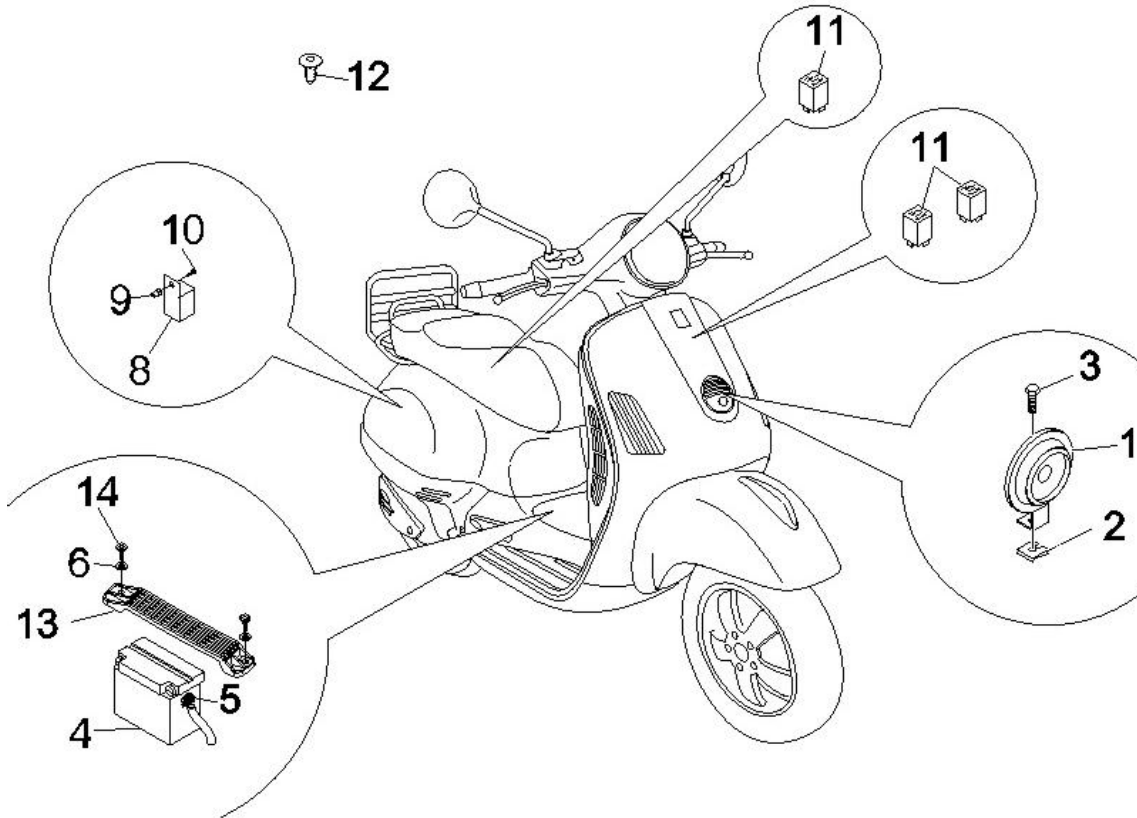


Last update : 23/02/2006

Loc.	Description	Q.ty	Vehicle colour	Drawing No.	Up to
1	tail lamp	1		638919	25/02/2006
2	bulb (12v - 5w) for headlight	2		292022	
3	12v-2,3w bulb	1		638536	
4	washer	1		006976	
5	screw (m6x16)	1		272836	
6	rh rr indicator assy vespa gt	1		584972	01/04/2006
7	bulb for turn signal lamp (12v - 10w)	1		181746	
8	bulb socket	1		583527	
9	packing for glass	1		584679	
10	lh rr indicator assy vespa gt	1		584973	01/04/2006
11	bulb for turn signal lamp (12v - 10w)	1		181746	
12	bulb socket	1		583527	
13	packing for glass	1		584678	
14	plate	2		CM017406	
15	screw for handlebars (d 4,2x19)	2		008457	
16	cap	2		250522	

Frame prefix : ZAPM45100

Engine prefix : M451M

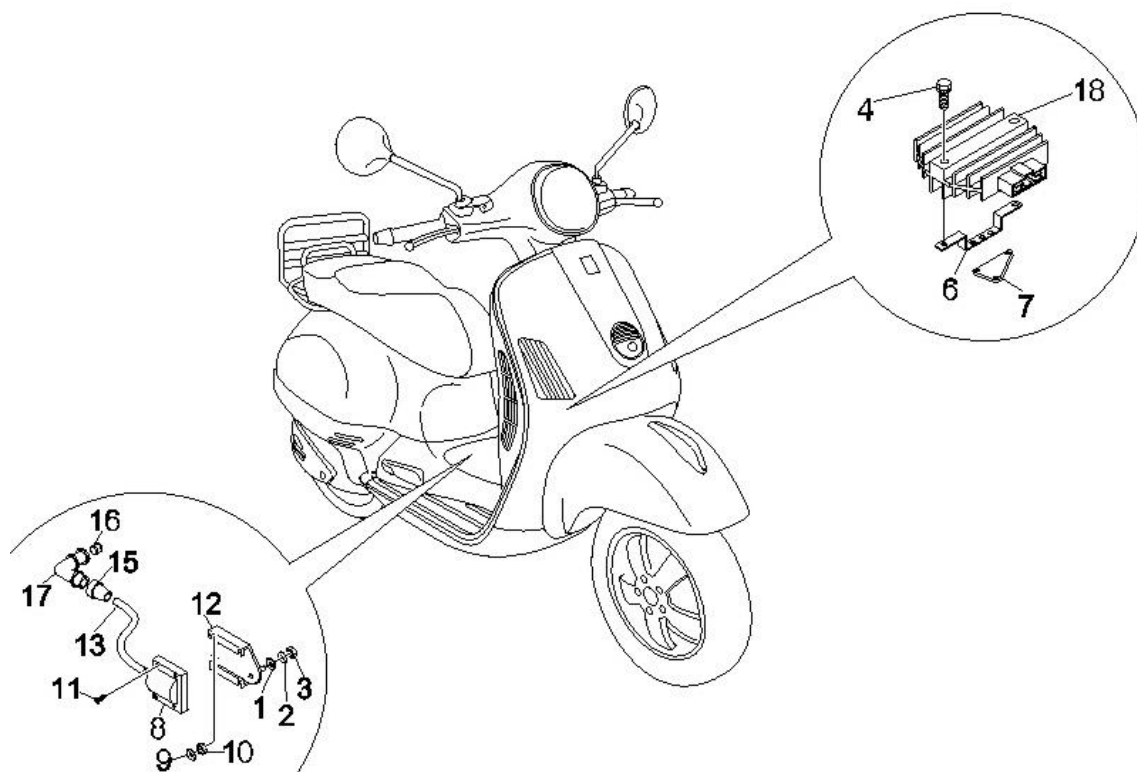


Last update : 23/02/2006

Loc.	Description	Q.ty	Vehicle colour	Drawing No.	Up to
1	horn 12v	1		CM071806	
2	plate	1		254485	
3	screw	1		434541	
4	battery 12v/12ah yuasa	1		584867	
5	clamp	1		639082	
6	washer	2		016406	
8	starting relay 12v-80amp	1		58115R	
9	plate for steering cover (2,8x4,2x10)	1		199190	
10	screw	1		576189	
11	starter relay 12v-30amp	3		58099R	
12	room temperature sensor	1		581142	
13	bracket	1		621830	

Frame prefix : ZAPM45100

Engine prefix : M451M



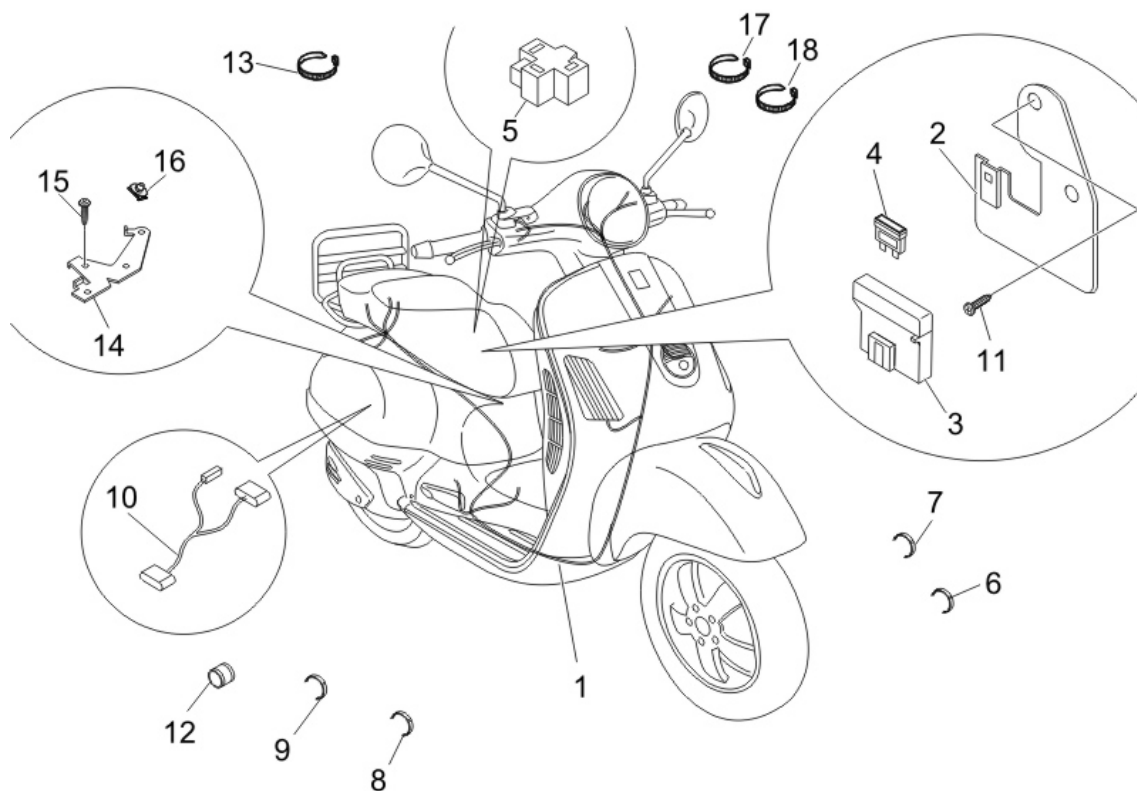
Last update : 23/02/2006

Loc.	Description	Q.ty	Vehicle colour	Drawing No.	Up to
1	plain washer x rear lugg.rack-6,5x16x1,5	2		013880	
2	washer	2		016406	
3	nut for tail lamp (m6x1; h=5)	2		020106	
4	screw for electrical starter motor-m6x30	2		289731	
6	bracket for regulator	1		621157	
7	plate	1		622838	
8	h.t. coil x-9	1		828817	
9	washer	4		012554	
10	nut	4		020003	
11	screw m3x25 cross	4		583236	
12	bracket	1		623361	
13	high-voltage cable (request by yards)	1		080341	
14		1		015014	
15	cap	1		071671	
16	clamp	1		828210	
17	plug cap et4 125 m.02	1		969348	

Loc.	Description	Q.ty	Vehicle colour	Drawing No.	Up to
18	voltage regulator	1		58086R	

Frame prefix : ZAPM45100

Engine prefix : M451M



Last update : 23/02/2006

Loc.	Description	Q.ty	Vehicle colour	Drawing No.	Up to
1	wiring loom	1		584724	30/12/2070
2	bracket	1		638934	
3	plastic fuse holder	2		580653	
4	fuse for battery (7,5a)	4		252945	
4	fuse (15a)	3		290860	
4	3a reed fuse	1		582930	
4	3a fuse	1		581440	
4	fuse	3		292507	
5	lock	1		156205	
6	clip	1		CM006903	
7	pipings betaining spring	2		CM006904	
8	pipings betaining spring	1		CM006906	
10	cable harness	1		639030	
11	bolt	1		969296	
12	grommet	1		016516	01/03/2005
13	metallic clip runner purejet	6		145298	

Loc.	Description	Q.ty	Vehicle colour	Drawing No.	Up to
14	bracket	1		639026	
15	screw (m6x16)	1		272836	
16	spring	4		584520	
17	retaining strap	3		257134	
18	metallic clip runner purejet	1		145298	

