PIAGGIO

TRAINING SUPPORT MANUAL

- X9 500

This booklet provides information additional to that contained within the Engine and Chassis Service Station Manuals.

It is designed to clarify working procedures on the X9 500, but the SSM should be referred to when working on this machine as the primary source of information.

Contents

GENERAL FEATURES

The new Piaggio X9 500 cc is an almost unique Maxi scooter. It is one of first scooters in the world (and the very first in Europe) to fit a 500 cc engine.

The high-level technological content, performance and potential for use make this revolutionary product the first of a new generation of touring two-wheelers. In addition, the X9 500 cc is the only maxi scooter in this capacity class to be equipped with electronic fuel Injection.

Aesthetically, the scooter does not depart much from the previous model X9 250 cc, the only apparent differences being the new headlights, which give the vehicle's front view a more pronounced motorcycle look, and the transparent turn indicators.

The running gear has been redesigned. A dual-cradle high-tensile steel trellis tubular frame with reinforcements in the engine mount and steering head tube areas offers a high resistance to bending and twisting that provides for high performance levels while ensuring safe and accurate handling.

The braking system features two 260 mm discs at the front and one 240 mm disc at the back. The all-wheel braking allows for a powerful and reliable braking action.

The 14-inch wheels and the wide tubeless tyres, combined with the new geometry of the front fork and of the dual rear shock absorber, ensure excellent road holding.

For this maxi scooter Piaggio has designed an all-new engine termed MASTER **(Multivalve Advanced Super Torque Engine Range).**

This power plant provides outstanding performance on out-of-town and motorway routes while ensuring excellent drivability in urban use. It is equipped with an integrated electronic injection-ignition system, liquid cooling, and a four-valve single overhead camshaft timing system.

The riding comfort is increased by a countershaft which considerably dampens vibration from the chassis.

The engine has a power of about 40 cv at 7,250 rpm, which allows the vehicle to attain a top speed of 160 kmh.

A torque of 40 Nm at 5,500 rpm, combined with a continuous type transmission, allows for a level of acceleration, responsiveness and flexibility previously inconceivable on scooters of this type.

The electronic injection control system meets present and future anti pollution regulations, and anticipates future legislation (eg the Kyoto agreements).

The X9 500 cc offers the rider and passenger a high level of protection and comfort. It also provides excellent load capacity and a wide range of accessories.

The vehicle features a highly sophisticated instrumentation including a convenient, easy-to-consult digital section. This includes a trip computer with a digital dial, warning lights providing information on all vehicle functions, a readout showing current ambient temperature, scheduled maintenance requirements and any malfunction.

The analogue section consists of an elliptical dial enclosing four circular instruments: a fuel gauge, a dual-scale (kmh-mph) speedometer, a tachometer, and a coolant temperature indicator.

The X9 500 cc is also equipped with an electro-hydraulic stand, a 45-litre luggage compartment under the saddle, an air damper for keeping the saddle open, a courtesy light, and a 12 V socket with a lighter-type connection.

Lastly, the vehicle is protected by an electronic anti theft system of the Immobiliser type. The system consists of a decoder, a master key and slave keys, an aerial, and a dual function LED (deterrent flashing plus system diagnostic flashing)

ENGINE FEATURES

Bronze bearing supported, non-overhaulable crankshaft.

Non-overhaulable main bearings.

Crankshaft and crankcase classified into two categories according to their diameters. The mating must be observed in case of partial overhauling.

Nikasil coated, aluminium cylinder.

As with other engines in the Piaggio range, in order to ensure a correct compression ratio, three base gaskets are available. To determine which gasket is required, one has to measure the indentation/projection of the piston using a DTI fitted in the specially designed support (020475Y).

GASKET 827813 0.4 ± 0.05

GASKET 827814 0.6 ± 0.05

GASKET 827815 0.8 ± 0.05

The measurement must be taken with the cylinder in place without a base gasket.

From piston indentation -0.185 to piston indentation -0.10	0.4 gasket
From piston indentation -0.10 to piston projection +0.10	0.6 gasket
From piston projection +0.10 to piston projection +0.185	0.8 gasket

Non-overhaulable head

Valve gear timing:

Alignment between flywheel reference mark and flywheel cover (TDC), and alignment between speed sensor reference mark and cylinder head reference mark.

Lubrication by trochoidal pump, oil filter and pressure by-pass. The lubricating pressure is high for the line components and low for the valve gear.

The recommended engine oil is Selenia 4Tech SAE 5W/40. Alternatively use a synthetic 5W/40 four stroke engine oil that exceeds API specification SJ.

ENGINE SPECIFICATIONS		
ENGINE TYPE	Single cylinder, 4 stroke, petrol powered	
DISPLACEMENT	460cc	
STROKE	69mm	
BORE	92mm	
MAX POWER (KW/RPM)	29/7,500	
MAX TORQUE (NM/RPM)	40/5,500	
COMPRESSION RATIO	10.5:1	
ENGINE IDLE SPEED	1,350 – 1,450	
VALVE GEAR	SOHC, chain driven, automatic decompressor, integrated speed sensor	
NUMBER OF VALVES	4	
VALVE CLEARANCES (COLD)	INTAKE	0.15 mm
	EXHAUST	0.15 mm
ENGINE BALANCING	By gear driven countershaft	
LUBRICATION SYSTEM	SYSTEM	High pressure (crankcase only), low pressure for valve gear
	OIL PUMP TYPE	Trochoidal
	OIL PUMP DRIVE	Gear
	OIL FILTER	Filter cartridge, antidrain and over pressure by-pass
	CAPACITY	1,900cc from empty, 1,700cc with filter replacement, 1,400cc without filter replacement
	LUBRICATION PRESSURE	4 Bar
	MINIMUM ALLOWABLE PRESSURE	0.4-0.6 bar
	OIL TYPE AND GRADE	Selenia Hi scooter 4 Tech SAE 5W/40
	PRESSURE REGULATION	By-pass
REAR HUB	CAPACITY/TYPE	200/250cc Tutela Zc 90
COOLING SYSTEM	COOLING METHOD	Liquid cooling with two way circuit
	PUMP TYPE	Centrifugal
	PUMP DRIVE	By countershaft
	THERMOSTAT TYPE	Two way wax thermostat
	ELECTRIC FAN	Operated by control unit
	CAPACITY	
AIR FILTER	Dry paper filter, Check and clean every 6,000km, replace every 12,000km	

FUEL SYSTEM	FUEL TANK CAPACITY		14l
	FUEL PUMP TYPE		Low absorption electric pump on support placed in tank, operated by control unit (12V) equipped with over pressure relief valve (5 bar)
	FUEL FILTER		Integrated in pump support
	PRESSURE REGULATOR		Integrated in pump support
	FEED PRESSURE		3 bar
	TYHROTTLE BODY		Magneti Marelli 38 CS1, mounting Throttle Position Sensor, air temperature sensor and stepper motor for idle control
	ELECTRIC INJECTOR		Single jet Pico Marelli injector (WP048) mounted in manifold
	CO ADJUSTMENT VALUE		1.25% ± 0.25%
IGNITION SYSTEM	TYPE		Electronic, engine management
	HT COIL		Inductive coil
	SPARK ADVANCE		Regulated by Control Unit according to RPM and throttle angle
	SPARK PLUG	TYPE	Champion RG6YC
		GAP	0.7 – 1.1 mm

Notes on Engine Overhaul

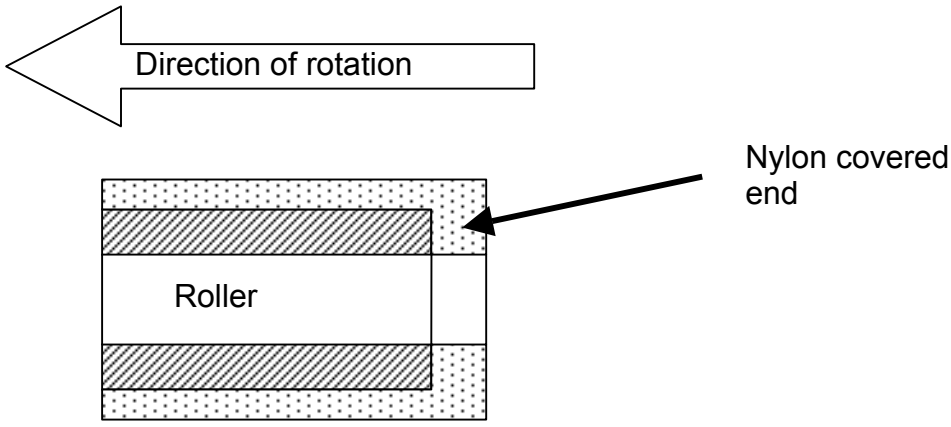
To adjust the valve clearances it is **NOT** necessary to remove the engine from the frame. Follow the following sequence:

1. Ensure the vehicle is securely mounted on the centre stand
2. Remove rear and under fairings
3. Undo lower left cam cover bolt
4. Disconnect both rear suspension units
5. Lift the engine unit rear end as far as it will go and securely support it in this position
6. Remove the RH footboard support
7. Remove the remaining cam cover screws
8. Twist the cam cover free of the engine compartment

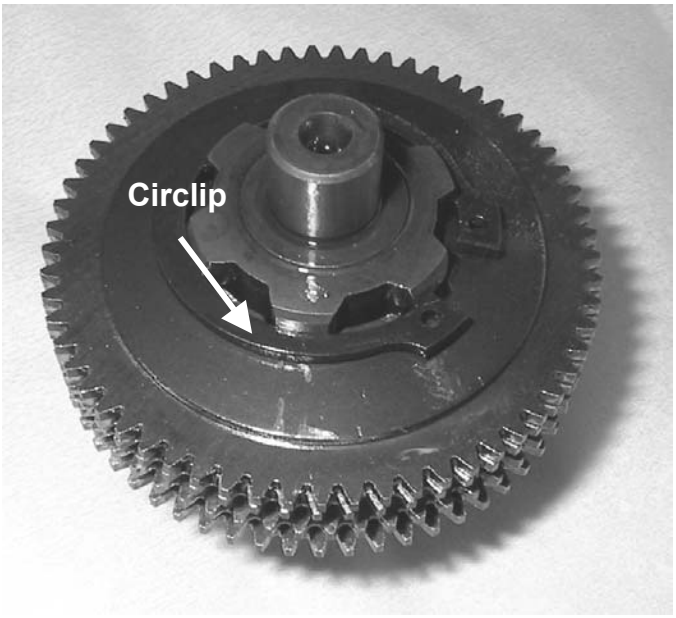
When checking the engine and final drive oil levels, the dip stick should be screwed all the way in to the casing to take the reading, rather than simply being rested on the top of the dipstick entry.

CVT drive belt is directional and should be fitted accordingly

Variator rollers are also directional, the nylon sleeve covering one end of the steel inner. This nylon covered end should cushion the roller from the drive of the variator, see diagram.



The variator rollers should be fitted dry, this encourages them to roll rather than slide and reduces the flattening wear on the rollers.



The starter motor intermediate gear is a limited slip gear. The unit is available under a single part number and should **not** be disassembled by removing the circlip.

Fuel Injection

EMS System

The fuel injection system sends the fuel required for engine operation into the inlet manifold. An electric injector sends the fuel, and the electronic control unit governs the injection. The injection time is determined by the throttle opening angle (detected by the related sensor (TPS)) and by the engine speed (measured by the speed sensor located on the camshaft). The injection is then compensated by other parameters transmitted to the control unit by their related sensors (air pressure, engine temperature, air temperature). The system consists of three main subsystems:

Inlet system: Provides the air required for combustion.

It includes the intake manifold on which the injector is fitted, the throttle body (complete with the throttle position and air temperature sensors), and an air box with a filter.

Fuel system: Supplies the fuel needed for combustion to the injector at constant pressure.

This fuel is maintained at a fixed pressure that the EMS Control unit takes as a fixed value.

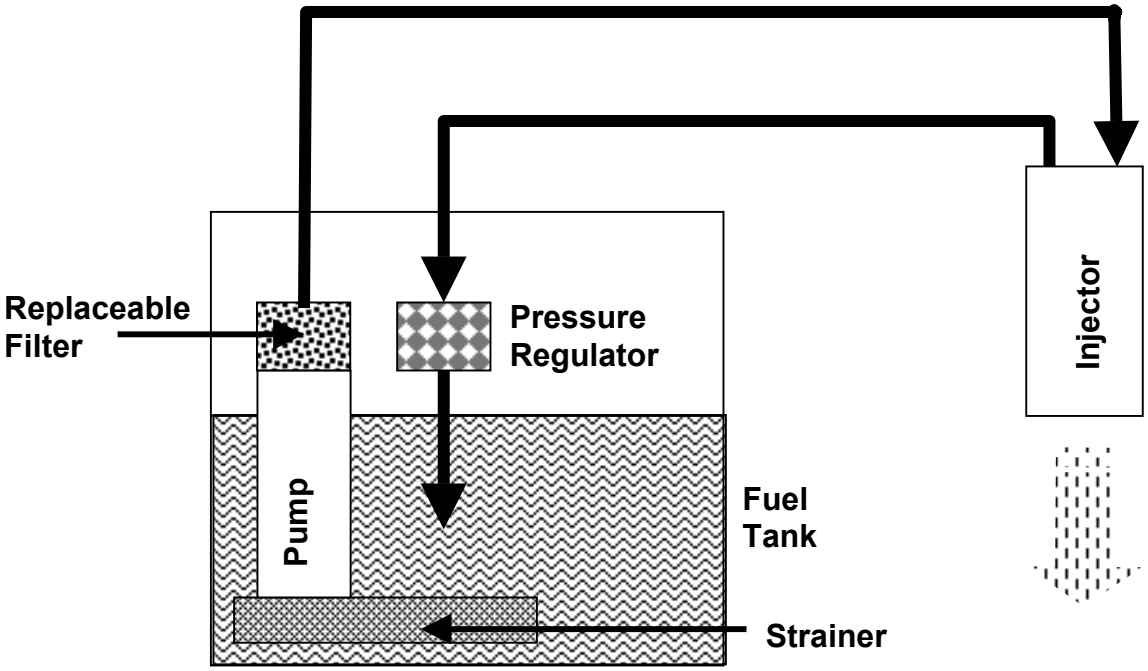
Control system: Calculates the optimal injection time by processing the signals that the electronic control unit receives from the different sensors.

The control system relies on the control unit to determine the injector opening time - and consequently the quantity of fuel supplied - based on the signal it receives from the throttle sensor and the engine speed compensated by the signals sent by the other sensors. The control unit ensures suitable control in all riding and engine operating conditions. The control system also governs the ignition through the control unit, which also determines the spark advance by processing all the signals corning from the different sensors.

Precautions

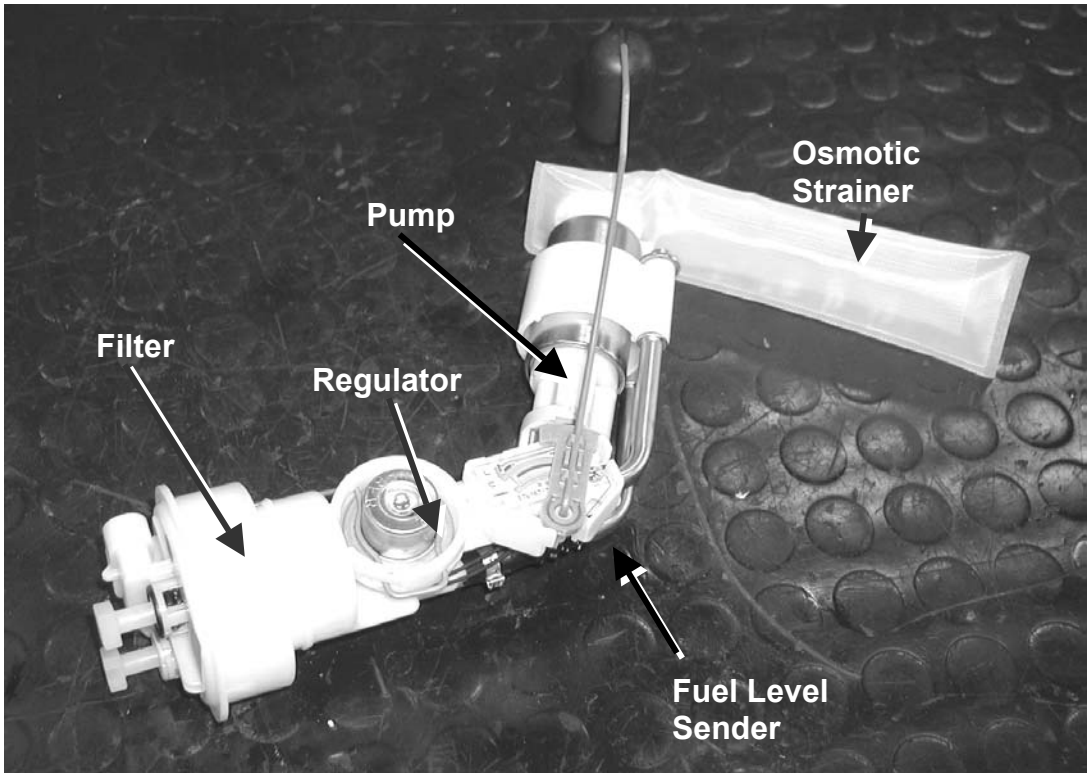
1. Before proceeding with any repairs concerning the fuel injection system, check for the presence of registered anomalies. Do not disconnect the battery prior to checking the anomaly.
2. The supply system is pressurised at 300 Kpa (3 BAR). Before disconnecting the quick-connection of a supply system tube, cheek that no open flames are present and do not smoke. Act with caution to avoid spraying into the eyes.
3. During repairs on electrical components, the battery should remain connected only in cases of necessity.
4. When carrying out functional controls, ensure that the battery voltage is more than 12V
5. Before attempting to restart the engine, ensure that the tank holds at least two litres of petrol. Failure to ensure this is the case could damage the fuel pump.
6. If a long period of inactivity is foreseen for the vehicle, fill the fuel tank to more than half-full. This guarantees that the pump will remain immersed in the petrol.
7. When washing the vehicle do not spray electrical components and cables with pressurised water.
8. When ignition irregularities are revealed, begin controls by checking the battery and fuel injection system.
9. Before disconnecting the EMS control unit connector, carry out the following operations in the order given: - Set the ignition switch to "OFF" - Disconnect the battery. Failure to respect this regulation may damage the control unit.
10. When mounting the battery take care to not invert the polarity.
11. So as not to cause damage, disconnect and reconnect the EMS system connectors only if it proves necessary. Before reconnecting, verify that the connections are not wet.
12. During electrical tests do not forcefully insert the tester prods into the connectors. Do not take measurements which are not foreseen by the manual.
13. At the end of each control carried out with the diagnosis tester, remember to protect the system connector with the appropriate cap. Failure to respect this regulation could damage the EMS control unit.
14. Before reconnecting the supply system quick-connections, verify that the terminals are perfectly clean.
15. **Do not turn the ignition on with the fuel pipes disconnected. The unregulated fuel pressure might rupture part of the fuel system.**

Fuel System



Fuel is drawn through the osmotic strainer by the fuel pump and passed through the filter to the injector. A return line brings fuel back to the tank and the regulator. The pump pressurises to a maximum of **5- 6Bar**, the regulator maintains the pressure to **3Bar**. The EMS CONTROL UNIT always assumes that the pressure in the fuel is at 3 Bar and therefore the opening time of the injector controls mixture accurately.

The fuel filter is checked and replaced as a part of the service schedule, the entire assembly is available as one unit (minus the pump and regulator).



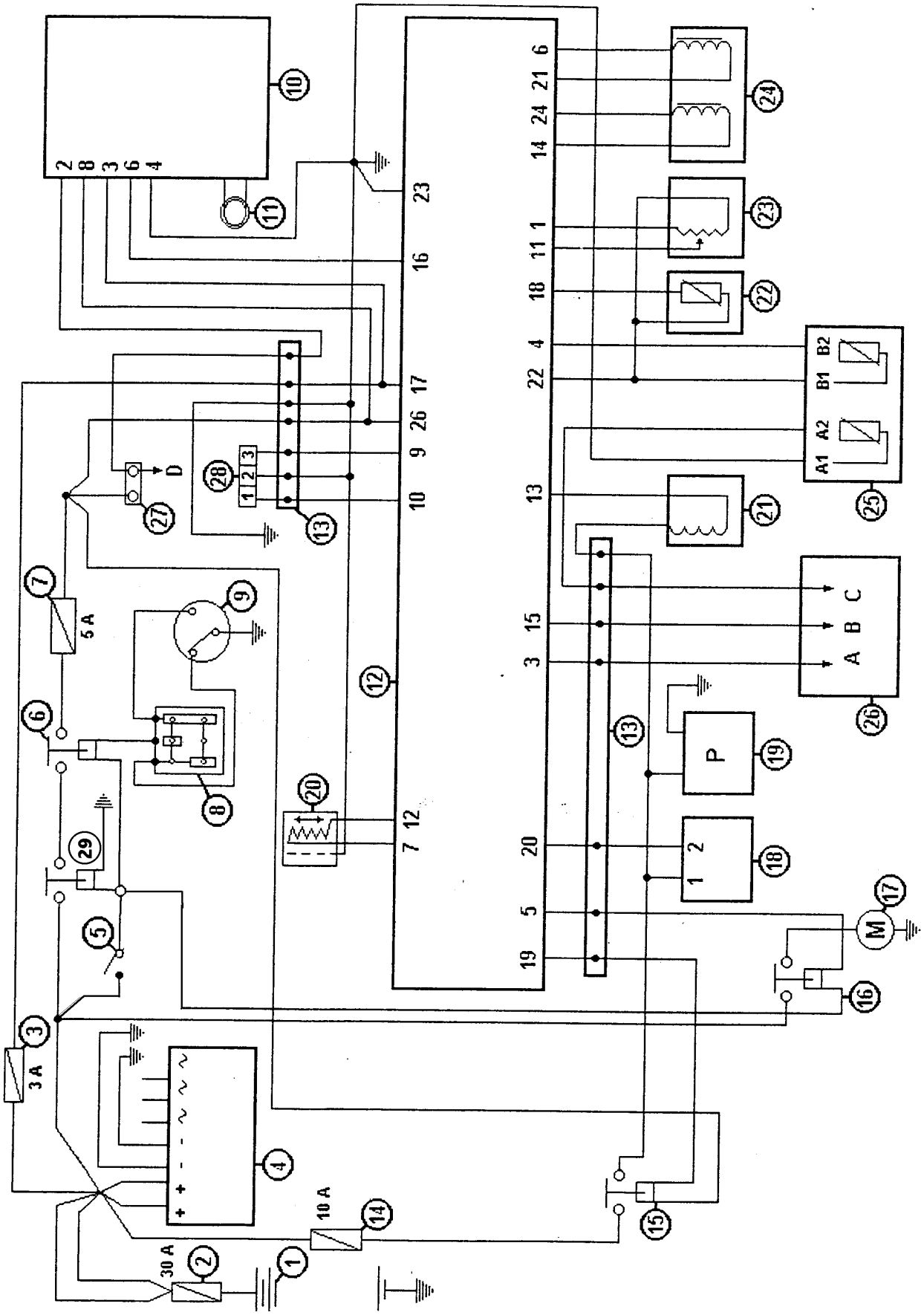
The Control System

This is the process of deciding how much fuel will be required to achieve the optimum ratio, ie how much time to open the injector for.

The EMS Control Unit receives information from the sensors and uses its own memory to determine injector opening times. It then sends a pulse to the injector to open it, the duration of the pulse is the net result of EMS Control Unit operation.

The two principal pieces of information required by the EMS Control Unit to determine injector opening times are **engine speed** and **throttle opening**. Other information used to modify the injector opening times are engine temperature, atmospheric pressure, inlet air temperature.

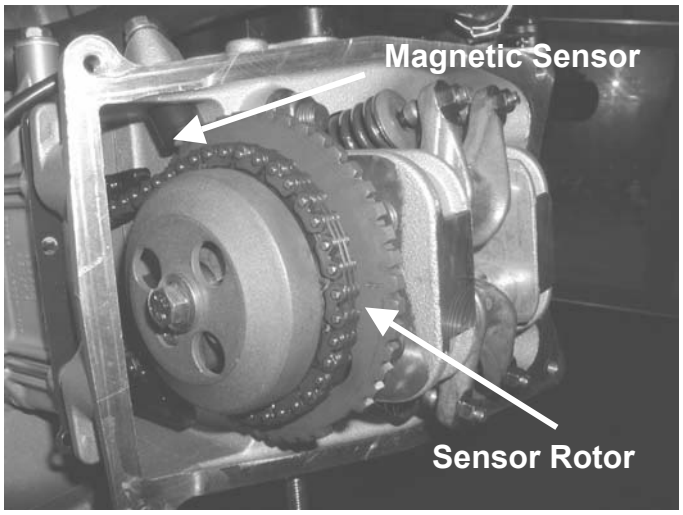
INJECTION SYSTEM DIAGRAM

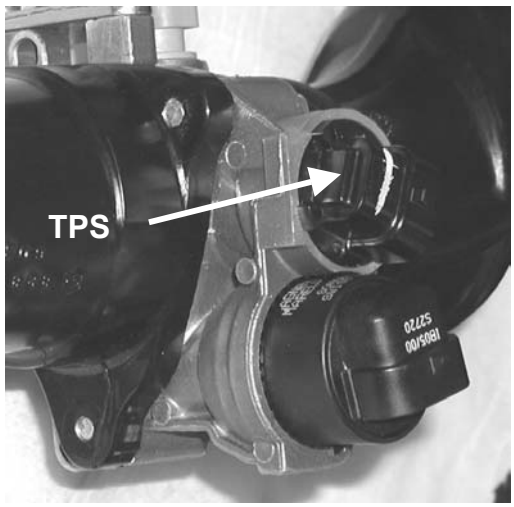


1. Battery
2. Starting relay switch fuse (30 a)
3. Fixed power supply fuse (3 a)
4. Regulator-rectifier
5. Ignition switch
6. Engine stop relay switch
7. Sub-panel power supply fuse (5 a)
8. Engine stop switch
9. Stand switch
10. Decoder
11. Aerial
12. EMS control unit
13. Connector (vehicle with injection)
14. Injector, fuel pump, HT coil, power supply fuse(10a)
15. Injector, fuel pump, HT coil, power supply relay switch
16. Electric fan control relay switch
17. Electric fan
18. HT coil
19. Fuel pump
20. RPM-timing sensor
21. Injector
22. Air temperature sensor
23. Throttle position sensor
24. Stepper motor
25. Coolant temperature sensor
26. Digital instrument
27. immobiliser diagnostic connector
28. EMS Diagnostic connection
29. System relay switch

Primary Sensors

Engine speed and position (required for correct ignition timing) are determined by a magnetic pick-up next to a specially shaped rotor on the camshaft.





As each tooth passes the sensor a pulse is generated in the pulse coil and received by the EMS Control Unit. There are two teeth missing from the rotor, these allow the EMS Control Unit to identify TDC.

A Throttle position Sensor (TPS) is located on the throttle spindle. As the throttle is opened the TPS's resistance increases. The EMS Control Unit sends a signal voltage (5V) to the TPS and calculate throttle opening by reading the amount of returning voltage.

Note: If either of these sensors fail the system will not run.

Note: The Diagnostic Tool for the Fuel Injection refers to cam sensor faults as *engine synchronisation* faults.

Other Sensors

The EMS Control Unit calculates optimum ignition timing, injection timing and duration from these two sensors information. Three compensation sensors are used to make fine adjustments to these settings.

An ambient pressure sensor is located within the EMS Control Unit, ,An Air Temperature sensor is located in the throttle body unit and a Coolant Temperature sensor is located in the cylinder head.

The pressure sensor is an integral part of the EMS Control Unit.

The temperature sensors are NTC chips (Negative Temperature Coefficient), this means that their resistance decreases as temperature rises.

Sensor Name	Pin number	Type
THROTTLE POSITION SENSOR (TPS)	**1(+) 11**	**Variable resistor (potentiometer)**
ENGINE SPEED	**7 and 12**	**Inductance Coil**
PRESSURE SENSOR	EMS unit	Variable resistor (Piezo)
COOLANT TEMP	4(+) 22 (-)	NTC Chip (Thermistor)
AIR TEMP	18(+) 22 (-)	NTC Chip (Thermistor

Variable resistor sensors - The control unit sends a 5V signal to the sensor and determines the resistance of the unit from that, calculating adjustments accordingly.

Inductance coil sensor – A small AC waveform is generated in the coil and fed into the control unit.

Actuators

The EMS Control Unit controls the operation of a number of actuators.

Injector
HT Coil
Fan
Stepper motor
Warning Light

The Stepper Motor controls an airway that bypasses the throttle, this allows the engine to idle with the throttle closed. It opens in a number of steps from 0 (closed) to 20 (fully open).

The Diagnosis Tester

The EMS system diagnostic instrument communicates with the electronic control unit through a connector which is exposed by opening the spark plug door (left-hand side panel).

The hand-held instrument comes with a cable interface (to be attached to the above-mentioned connector) and two feeder cables, one with a lighter socket and the other with terminals to be connected to a 12V battery. The instrument is protected against possible inversion of polarity.

The main functions of the device are the EMS system diagnostics, the verification of certain parameters and the carrying out of some adjustments.

The instrument is activated every time it is powered up (it has no on/off button). It consists of a function DISPLAY and the following keys:

ESC key

OK key

UP key

DOWN key

TAB key

The **ESC** key is used to exit the function or menu currently displayed (with the exception of the main menu).

The **OK** button is used to confirm the selected function

The **UP** and **DOWN** keys are used to move up and down the menus

The **TAB** key is used to move through the menu functions

Every time a key is pressed, the instrument beeps to acknowledge the keystroke.

The DISPLAY can show 6 lines at a time. Below the six lines, the function number is shown in relation to the page (for example, 1/7 means that the first function is activated of the seven that make up that menu).

When turned on, the instrument displays the Piaggio logo.

Pressing any key brings up a page containing information on the type of control unit for which the instrument has been designed.

Pressing any other key, or waiting for 5 seconds, calls up the main menu.

The UP and DOWN keys are used to browse through the menu. The OK key is pressed to enter a given submenu after it has been highlighted.

Once in the submenu, the desired function can be selected and activated by pressing OK.

The main menu consists of:

PARAMETERS

IMMOBILISER

ERRORS

ERROR CANCELLING

ACTIVE DIAGNOSES

CO ADJUSTMENT

TPS RESETTING

ECU INFORMATION

To enter a submenu, browse through the main menu using the **UP** and **DOWN** keys. For example, pressing the **OK** key after highlighting ACTIVE DIAGNOSES makes it possible to test the functions of the following components:

FUEL PUMP

HV COIL

WARNING LAMP

TACHOMETER

INJECTOR

ELECTRIC FAN

STEPPER MOTOR

After completing the diagnosis of a component, the instrument informs whether or not the part is in working order.

The Idle CO Setup

In order to maintain running efficiency the trimmer setting of the EMS CONTROL UNIT must be set. This procedure is outlined in the manual, however it is recommended that the CO setting be checked every service to allow for running changes as the engine requirements change during its life.

The Carbon Monoxide (CO) content of the exhaust gas reflects mixture and can be used to check trimmer setting is correct.
Because the accessible part of the exhaust is so short it is necessary to make an extension in which to place the probe of the gas analyser, in this way it will not pick up fresh air drawn back into the exhaust by exhaust pulses.

Because the exhaust is fitted with a catalytic converter it is necessary to use an infra-red gas analyser.

The CO content of the exhaust gas measured at the tailpipe should be 1 – 1.5%

This reading can only be checked after ensuring the spark plug, air filter, intake and exhaust seals, valve adjustment, fuel filter and fuel pressure are in good order.

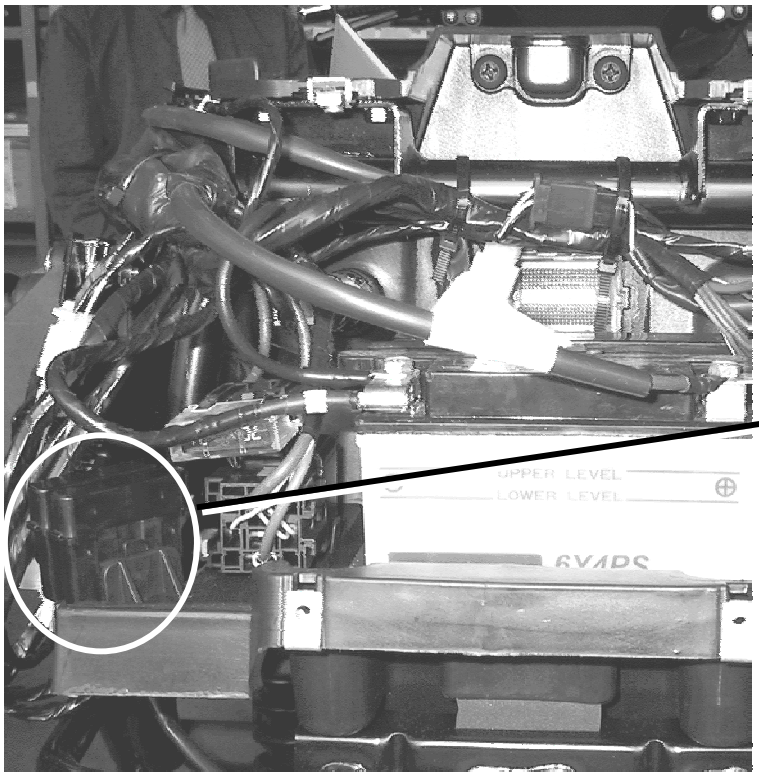
Also, the system should be checked for faults using the **Diagnosis Tester** and any faults rectified.

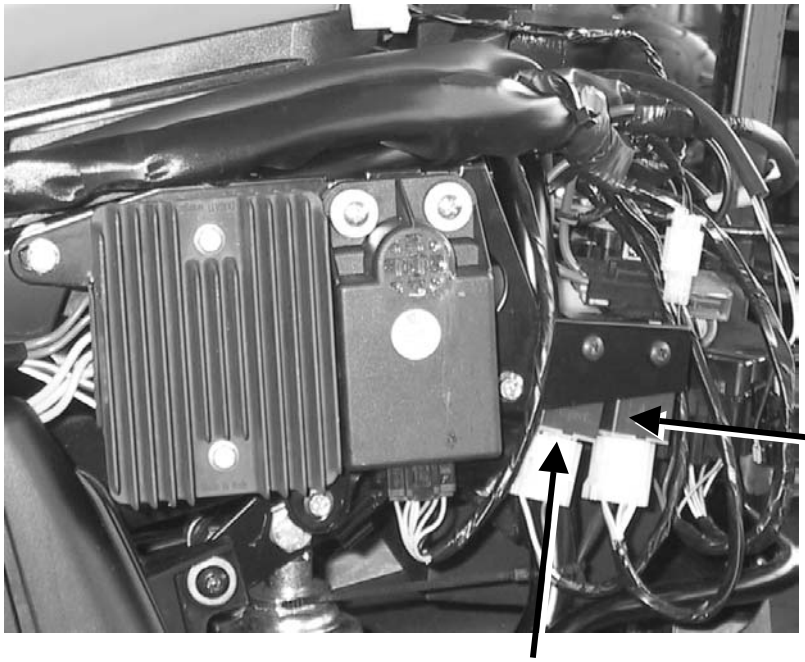
Insert the gas analyser probe into the exhaust extension tube attached to the exhaust. Run the engine up to 70ºC. Read the CO reading on the gas analyser.

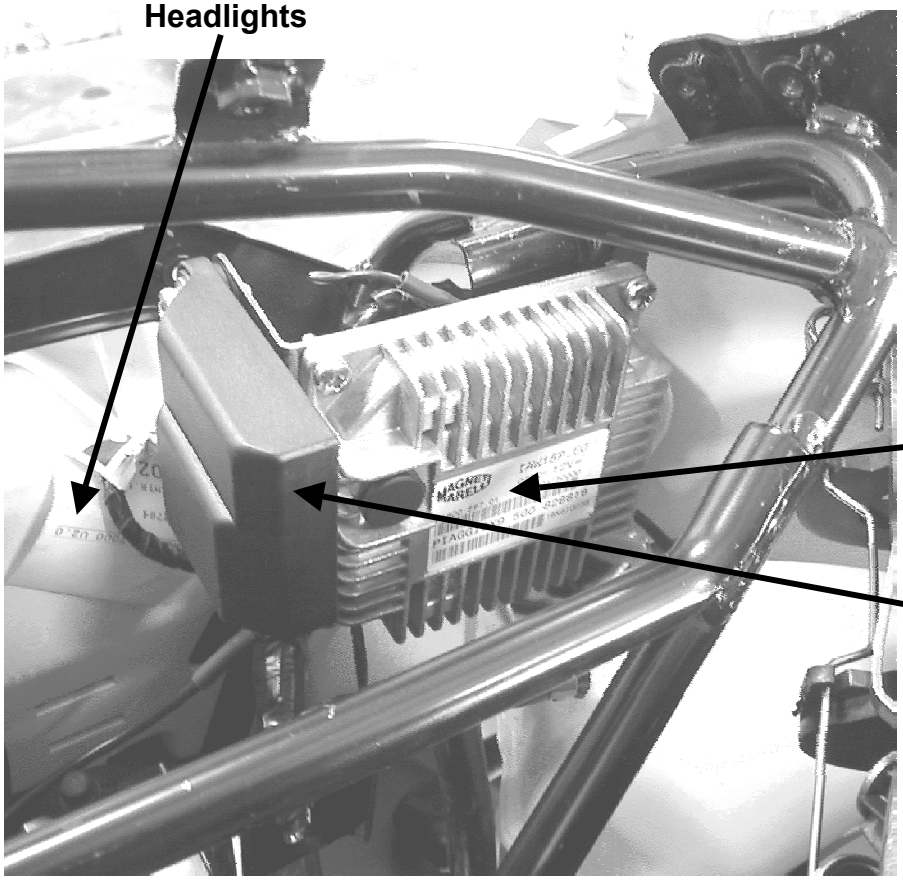
If the reading is out of tolerance, adjust using the Diagnosis tester. (CO ADJUSTMENT is on the main menu)

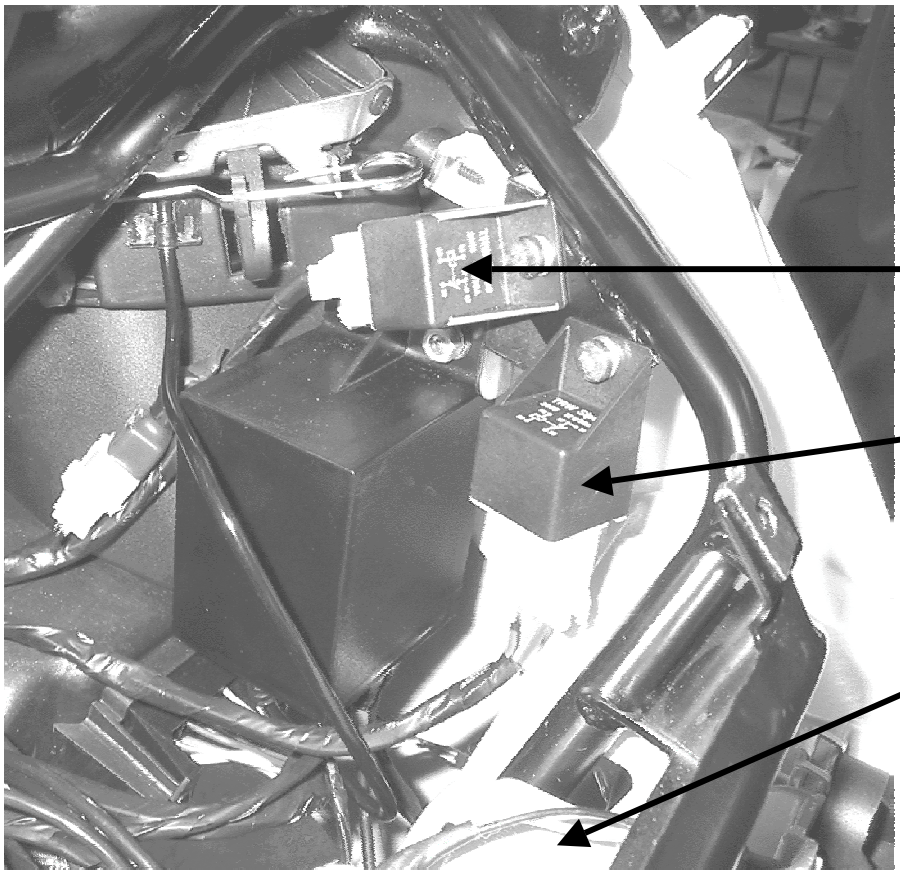
Rich running engines will have a high CO reading, Weak running ones a low CO reading.

Location Of Fuel Injection Components

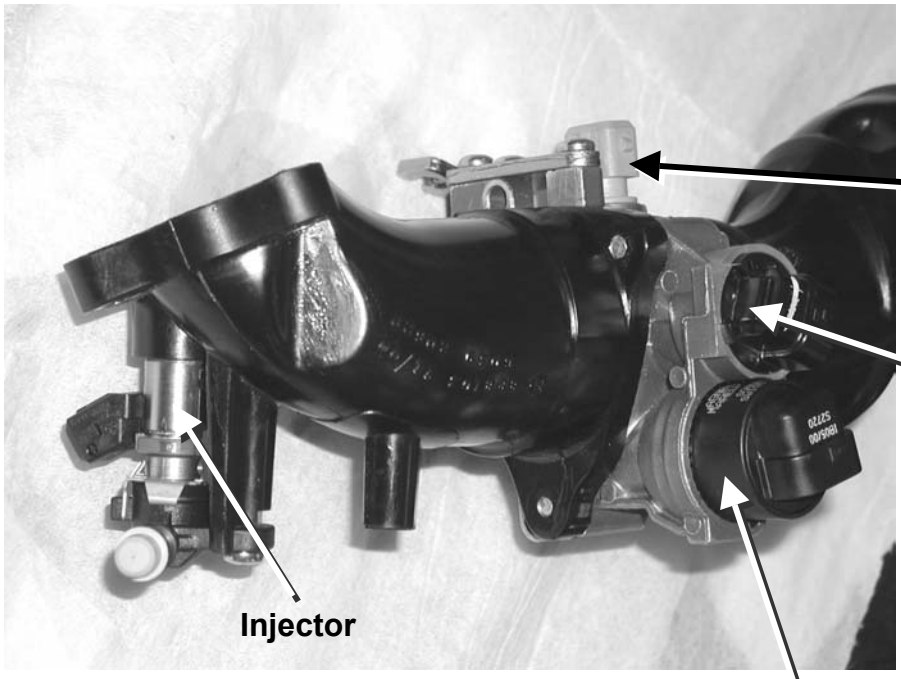





Headlights
EMS Control Unit (ECU)
Decoder


Fan Relay
Ignition System Relay
Headlights

Coolant Temperature Sensor



Air Temperature Sensor

TPS

Injector

Stepper Motor

Troubleshooting Tips

Understanding the operation of the system is vital to ensure effective troubleshooting.

Troubleshooting is greatly assisted by the Diagnosis Tester, storing old problems and informing of current ones, but it is not able to detect every problem. The SSM has detailed and clear methods for fault finding and these should be consulted should a problem arise.

Some possible Fuel Injection problems:.

Symptom	Possible Fault
WEAK MIXTURE SYMPTOMS	Low fuel pressure
	Compensation sensor malfunction
	Air leak
RICH MIXTURE SYMPTOMS	High fuel pressure (regulator inoperative)
	Compensation sensor malfunction
	Air system blockage
ENGINE STOPS RUNNING AT IDLE AND/OR POOR LOW RPM RESPONSE	Incorrect trimmer CO setup
	Low fuel pressure (regulator/pump/filter)
TRIMMER ADJUSTMENT DIFFICULT TO SET	Air leak
	Low fuel pressure (regulator/pump/filter)
HIGH IDLE RPM	Throttle position not set correctly
	Air leak

Ignition Immobiliser

For a full explanation of the immobiliser system please refer to SERVICE STATION MANUAL, (SSM) Engine section beginning at chapter 9 page 16. The system is very similar to that used on other Piaggio, Vespa and Gilera machines but there are subtle differences in operation, fault finding and component replacement.

The vehicle is supplied with two keys. Red MASTER key and black SERVICE key. Additional service keys are obtainable but it is not possible to duplicate the master key.

Testing.

- Normally do not use the master key for testing.
- The diagnostic test socket is on the left-hand side and will be found when the spark plug inspection panel is removed.
- Testing can be done by using the instrument panel mounted LED or the test box.
- If the system is working normally the LED will be flashing steadily when the ignition is off and it will stop flashing when the ignition is on.
- If the vehicle has not been used for 48 hours the light will stop flashing to save the battery. It is restored by turning the ignition on and off.
- If the immobiliser system is faulty, when the ignition is switched on there will be a series of flashes. The flashes hold a key to the fault.

Self test function using the SERVICE key.
Turn on ignition;

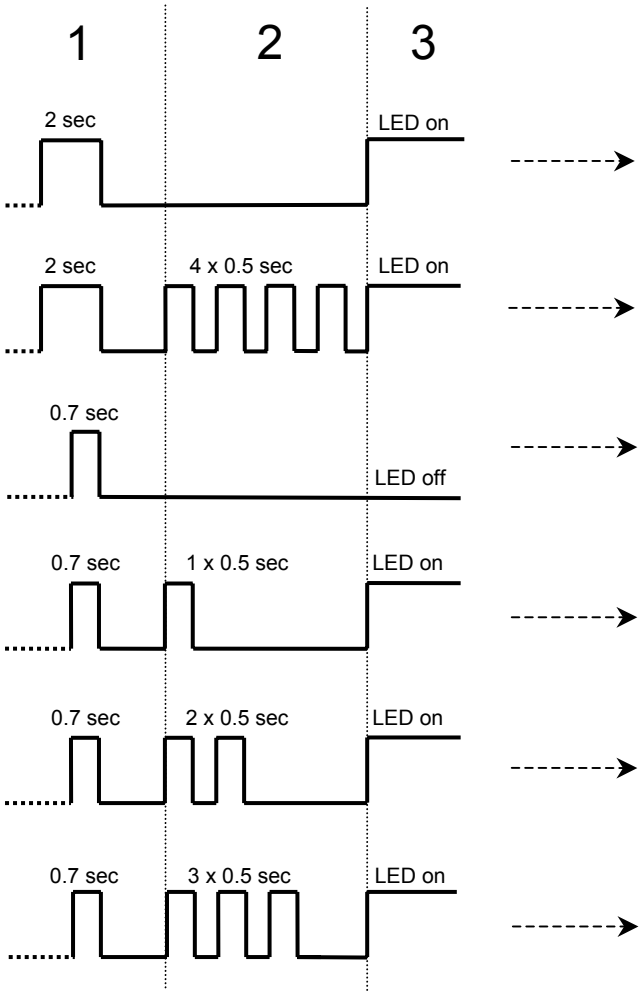
1. The first flash will be long (2 seconds) or short (0.7 second).
2. 2 second pause.
3. Next is a series of short (0.5 second) flashes (if there is a fault).
   1 flash = System is not programmed. (SSM 9-17)
   2 flash = No transponder detected. Fault with Key or antenna. (SSM 9-21)
   3 flash = Transponder detected but not recognised. (SSM 9-22)
   4 flash = Decoder is not programmed. (SSM 9-23)
4. The last thing to notice is whether the LED finally remains on or off.
   OFF = Ignition is possible.
   ON = Ignition is not possible.

Note that if the system is not programmed the LED indicator will not be flashing with ignition off but it will perform the test function when the ignition is turned on.

If the MASTER key is used.
When the ignition is turned on you will see a long flash followed by a series of short flashes, one flash for each service key that is programmed.
There can be a maximum of seven (7) service keys programmed at the same time.

Note that you can not just programme an additional key to add it to those already programmed. If you start the programming sequence all the existing service keys will be forgotten. You must re-programme all the service keys.

LED Blink Codes



	System not programmed. Ignition not possible.
	Immobiliser not programmed. ECU is programmed. Ignition not possible.
✓	System functioning normally.
	System is not programmed. Ignition not possible.
	System is programmed. Key transponder is not detected. Ignition not possible.
	System is programmed. Key is detected but not recognised Ignition not possible.

If the LED fails to light; first check the top fuse (7.5amp) in the fuse holder in the under seat compartment.
Refer to SSM 9-23 for full details.

Keys
The machine is supplied with two keys. One large RED and One smaller BLACK.
The RED key is the master and should be kept safely at home. Only use it for programming.
The BLACK key is the key that should be used day to day and for fault finding / testing.
If you require a new BLACK key this can be ordered from Fowlers and then programmed as follows:

Programming New Keys. (SSM 9-18)
It's an easy process but timing is very important.
RED key in and turn on for two seconds, turn off and remove
BLACK key in and turn on for two seconds, turn off and remove
RED key in and turn on for two seconds, turn off and remove

A quicker easier alternative is to obtain a key from any automotive locksmith. The same system is common on cars, locksmiths will have the blanks and the equipment to identify the chip in your key.
They will cut a key and then fit the correct type of chip into it. This chip will have been "cloned" from your original so you will not need to programme this new key.
The "code card" supplied with the vehicle is only to identify the correct mechanical code of the key it can not help if all the keys a lost.
If all keys are lost the only solution is to replace the ECU, Immobiliser and the locks. A new lock set comes with a RED and a BLACK key.

Batteries

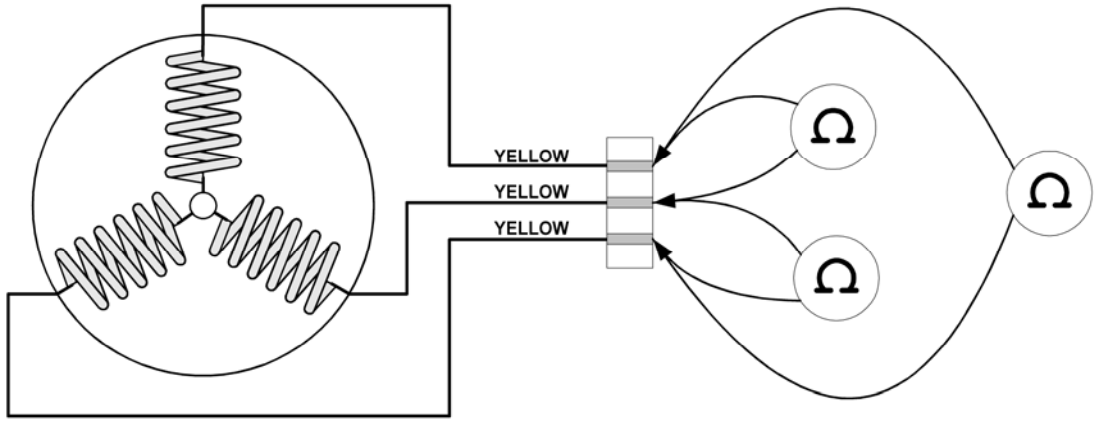
Some X9s may be delivered with **Maintenance Free Batteries**, These require special attention to ensure a long service life.

- ✓ Follow the instructions in the service manual carefully
- ✓ Never use normal electrolyte to fill a new MF battery, only that provided with the battery.
- ✓ Use a suitable battery charger that will not overcharge it (eg Optimate)

Charging System

The X9 500 uses a three phase charging system to ensure there is enough voltage available to the engine management system at all engine speeds.

To test the resistance of the windings, disconnect with the engine off and test between each terminal as follows:



The results should be 0.2 – 1.0Ω

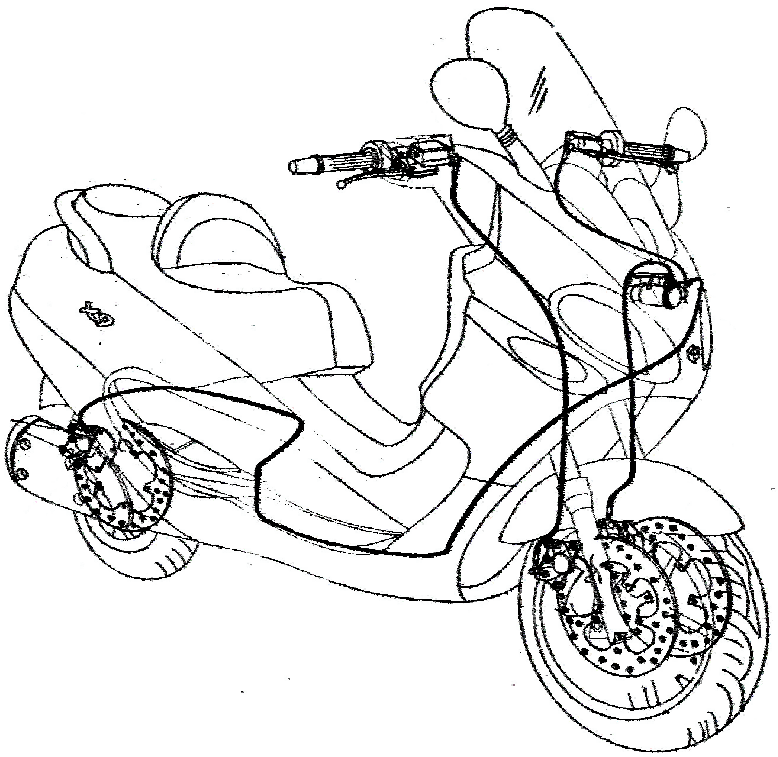
Also check the insulation of the stator by connecting a multimeter to it's highest resistance scale and testing between one of the terminals and earth. There should be NO continuity.

Braking System

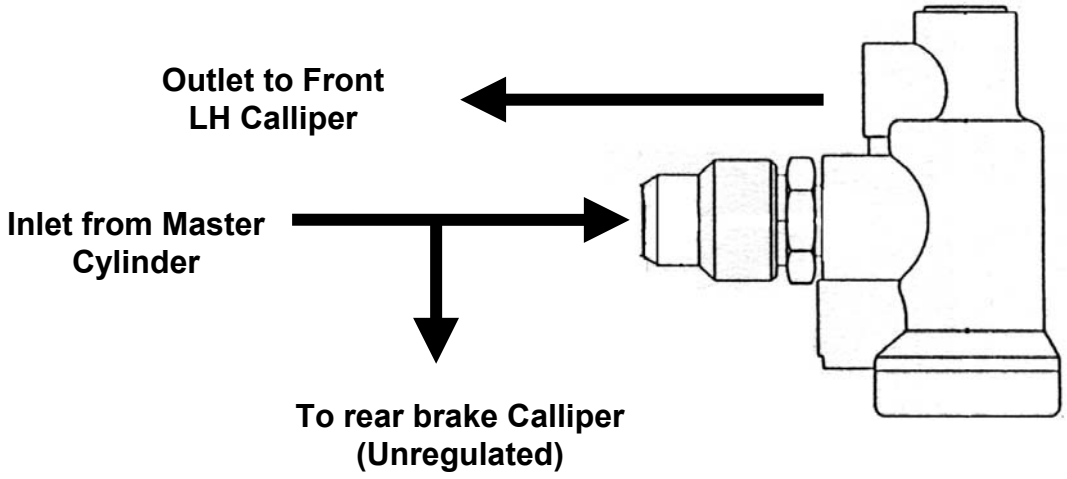
The X9 500 is equipped with linked brakes.

The operation of the right brake lever actuates the front wheel, right hand calliper.

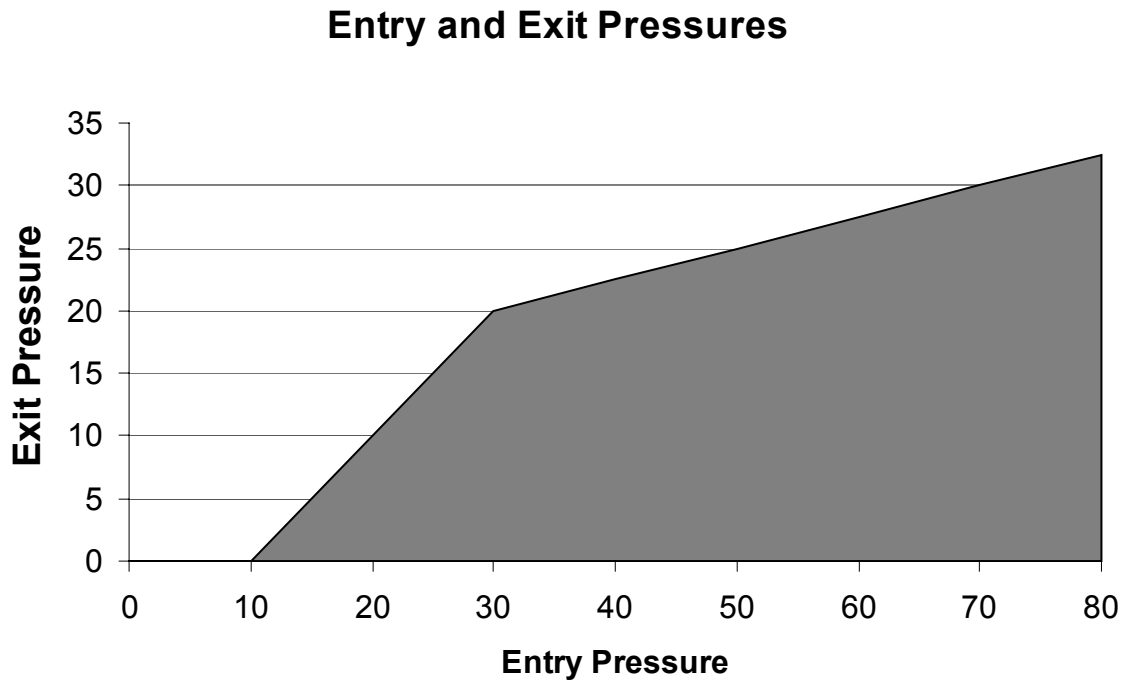
Operation of the left brake lever actuates the rear calliper and also the front left hand calliper via a regulator valve.



The regulator valve is located behind the front central fairing. It is a non-service item.



The valve regulates the pressure applied to the front left calliper. The amount of pressure applied is as follows:



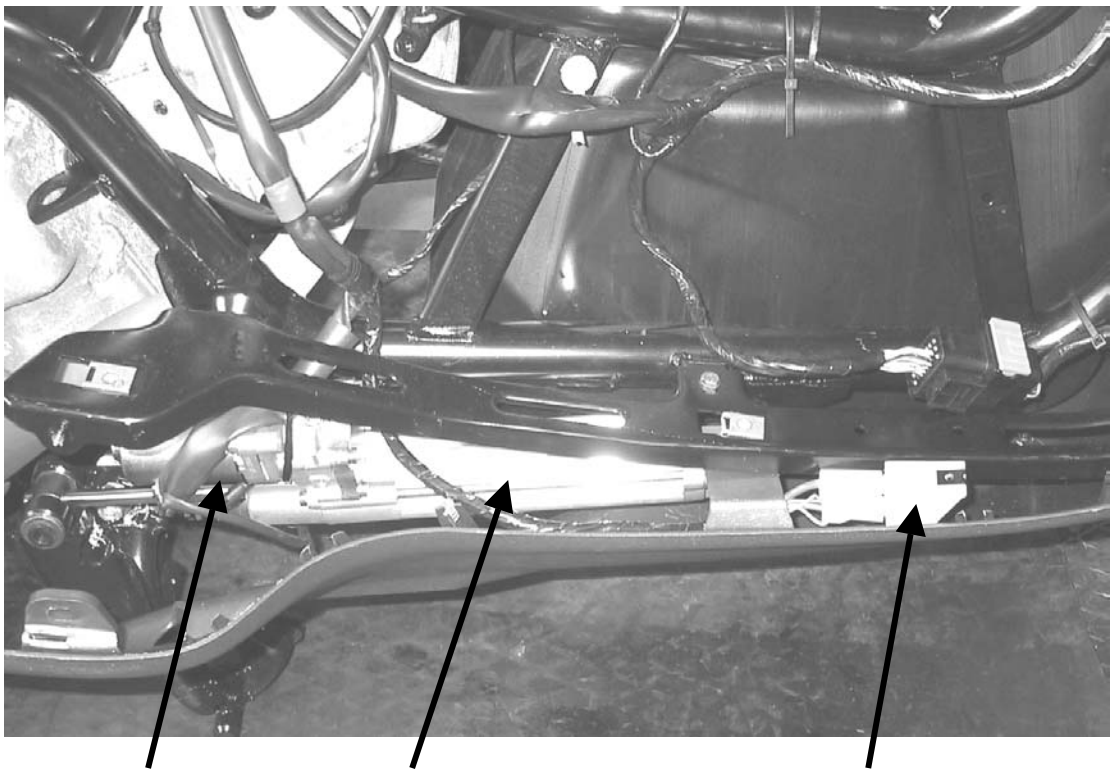
Centre Stand

The X9 500 is equipped with a centre stand which can be deployed using a handlebar switch, rather that having to physically lift the machine up.

The stand will only operate when the machine is stationary and the stand has not been operated in the last 2 minutes.

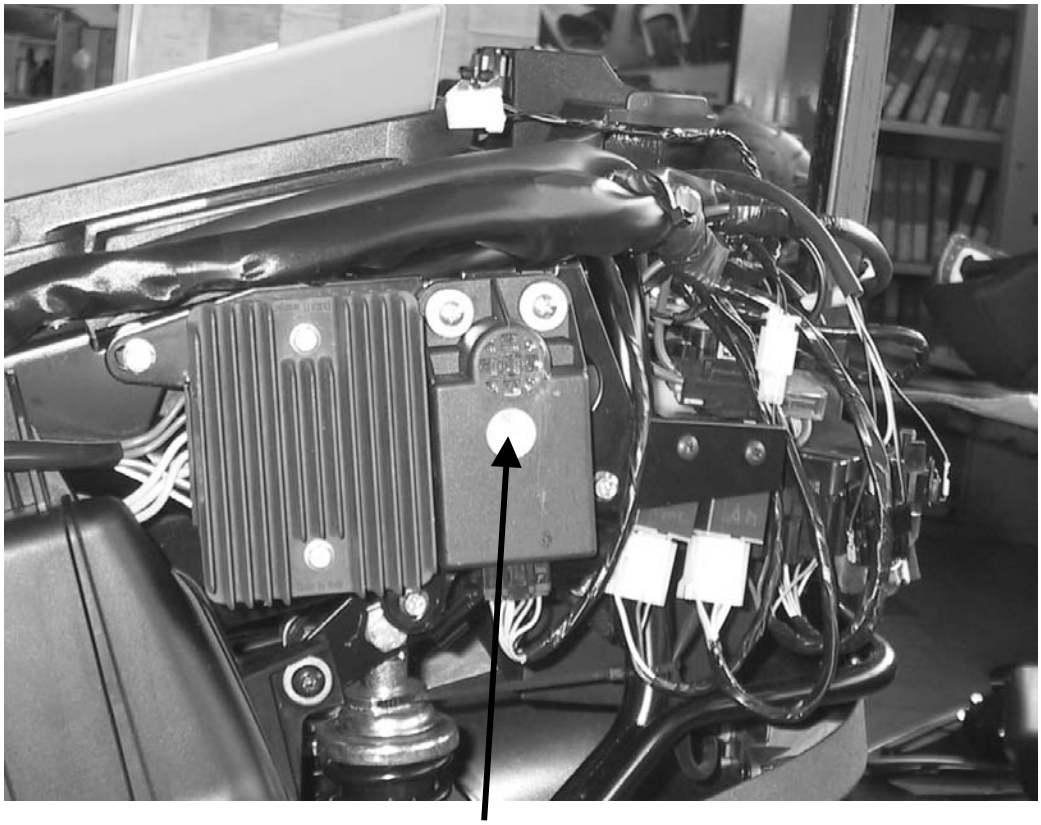
The Control Unit checks that there is no signal from the wheel speed sensor (phonic wheel) to ensure operation is not possible when the vehicle is moving.

There are two switches attached to the centre stand, one on the left (down verification) and one on the right (up verification) of the assembly.

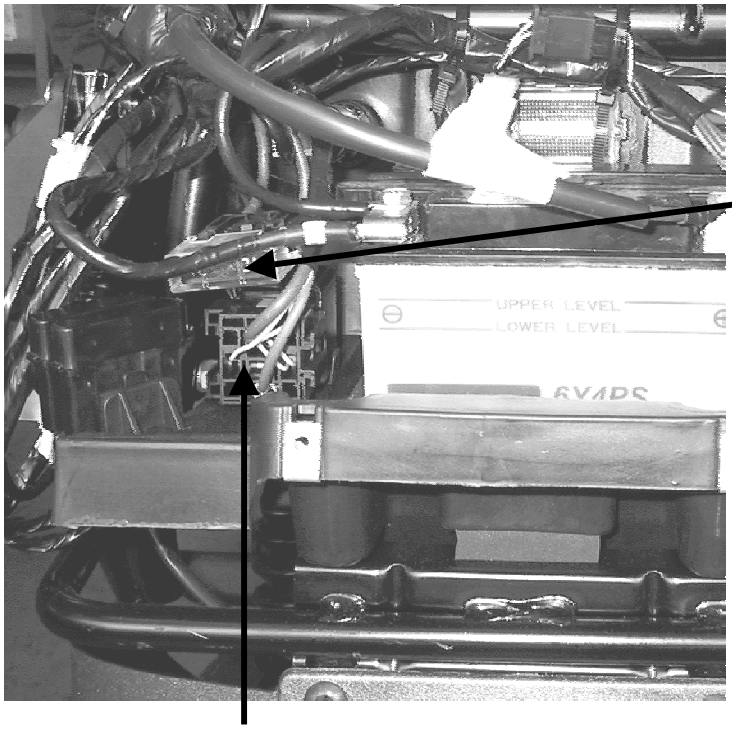


Motor **Hydraulic Pump** **Second Pump Relay**

Pressing the yellow button on the right handlebar operates the centre stand pump which actuates an hydraulic arm that lowers the stand. The pump continues to lift the stand until the stand actuates the left hand switch that tells the unit to stop. The stand completes its movement by gravity.



Centre Stand Control Unit and Buzzer



Centre stand pump fuse

Centre stand pump relay