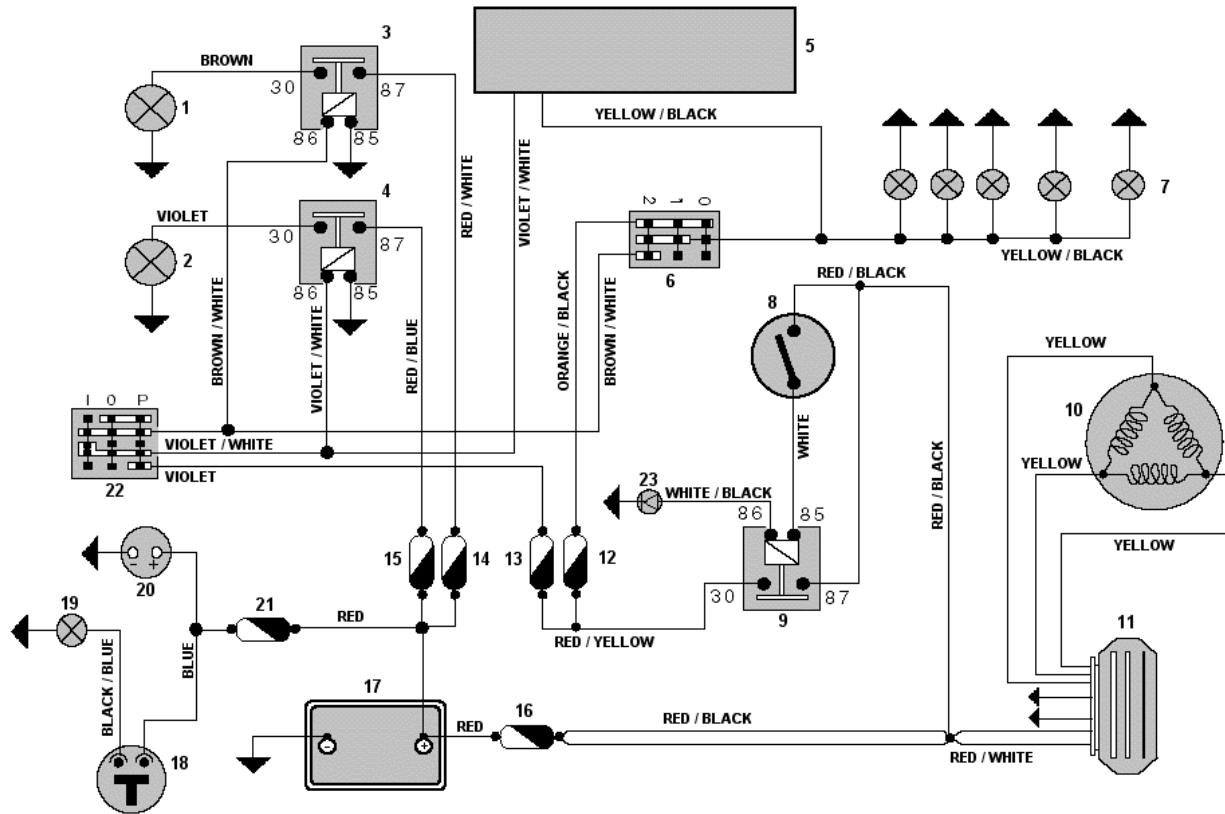
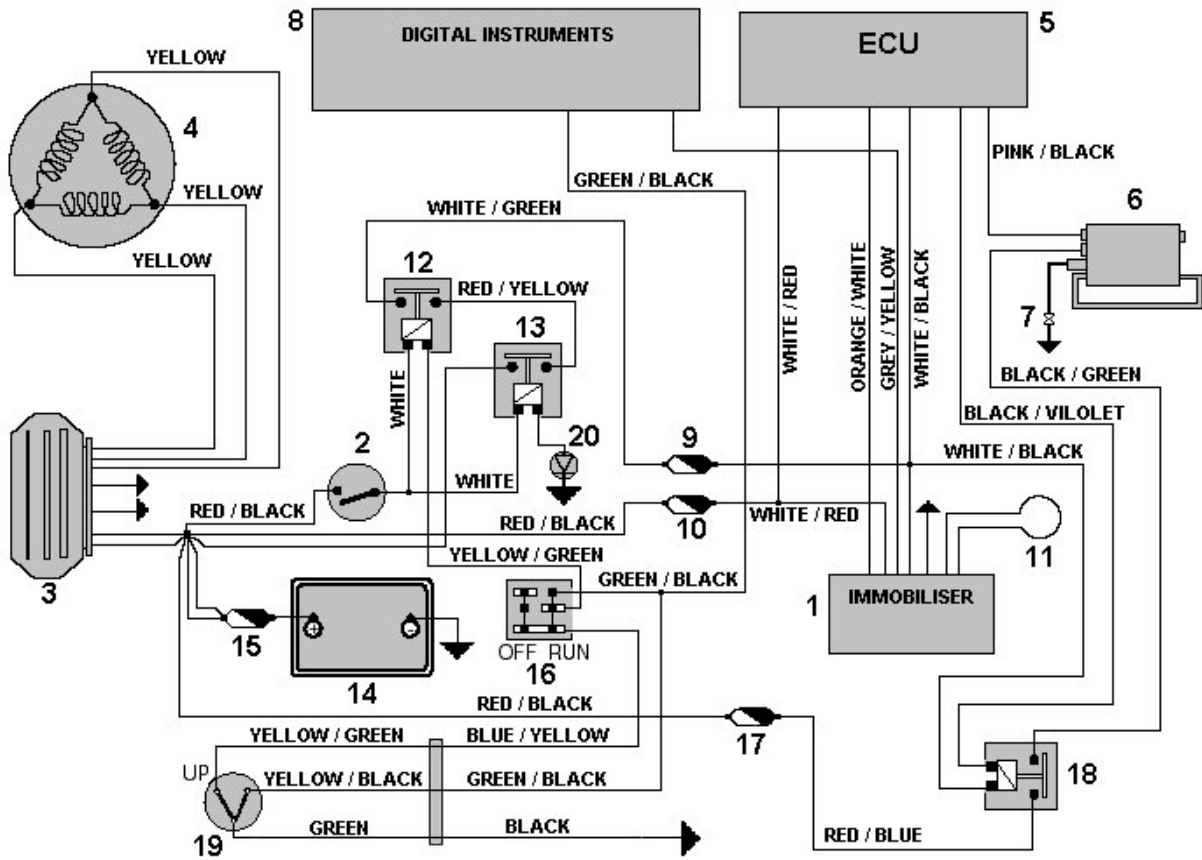


Lights section



1	12v - 55w LOW BEAM BULB	12	7.5 AMP FUSE
2	12v - 55w HIGH BEAM BULB	13	15 AMP FUSE
3	LOW BEAM RELAY	14	7.5 AMP FUSE
4	HIGH BEAM RELAY	15	7.5 AMP FUSE
5	DIGITAL INSTRUMENTS	16	30 AMP FUSE
6	LIGHTS SWITCH	17	12V - 14 Ah BATTERY
7	2x12V-5W FRONT PARKING LIGHT BULB 2X12V-5W REAR PARKING LIGHT BULB 1X12V-5W NUMBER PLATE LIGHT BULB	18	HELMET COMPARTMENT LIGHT SWITCH
8	IGNITION SWITCH	19	12V - 5W HELMET COMPARTMENT BULB
9	MAIN POWER RELAY	20	12V - 180 AMP SOCKET
10	3 PHASE AC GENERATOR	21	15 AMP FUSE
11	RECTIFIER / REGULATOR	22	LIGHTS HIGH / LOW SELECTOR SWITCH
		23	2A DIODE

Ignition section

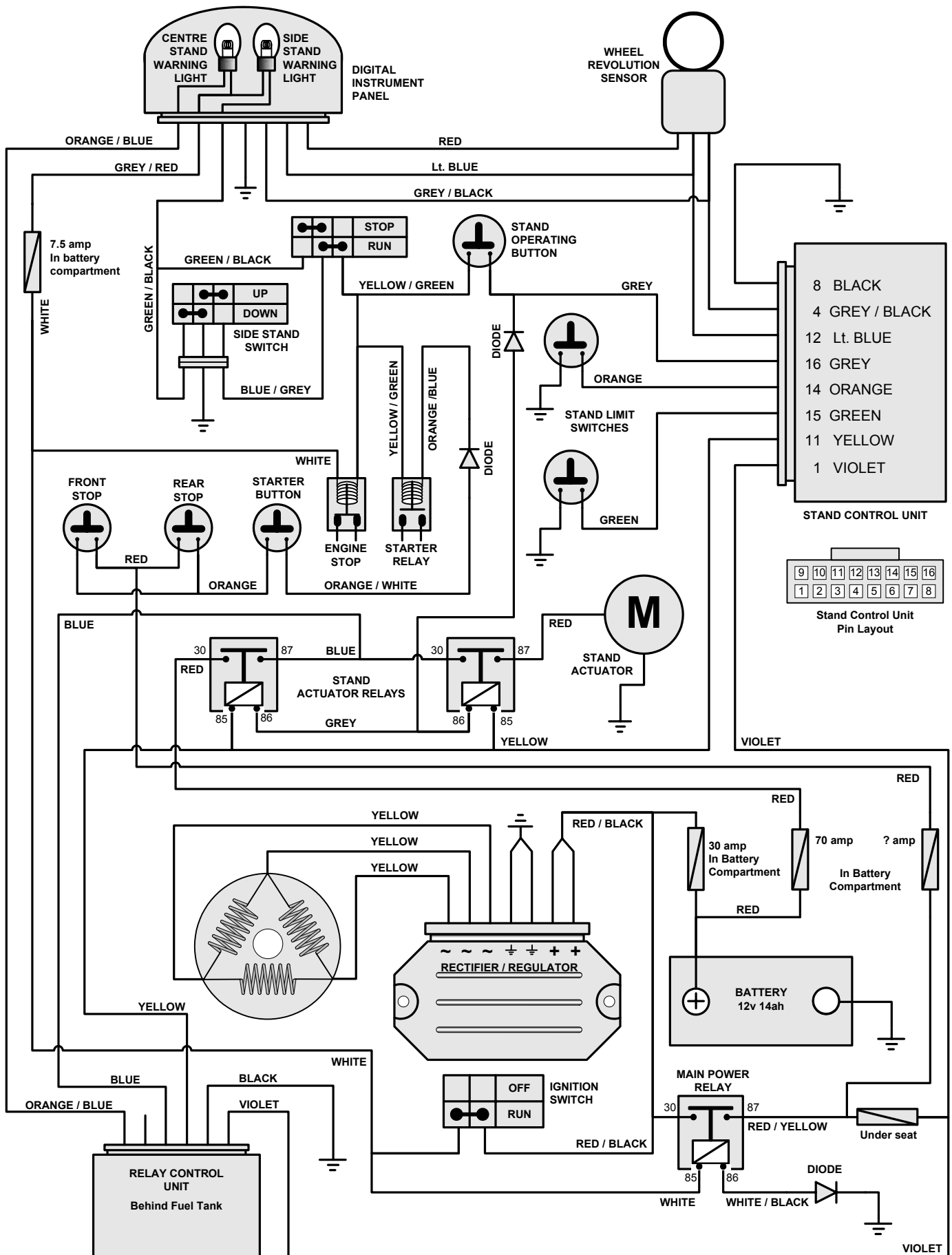


1	IMMOBILISER DECODER	11	IMMOBILISER AERIAL
2	IGNITION SWITCH	12	ENGINE STOP RELAY
3	RECTIFIER / REGULATOR	13	MAIN RELAY
4	375w THREE PHASE GENERATOR	14	12v - 14 ah BATTERY
5	ELECTRONIC CONTROL UNIT	15	30 amp MAIN FUSE
6	HT COIL	16	ENGINE STOP SWITCH
7	SPARK PLUG	17	10 amp FUSE
8	DIGITAL INSTRUMENT PANEL	18	RELAY FOR ECU
9	5 amp FUSE	19	SIDE STAND SWITCH
10	3 amp FUSE	20	DIODE

X9 500 Stand Circuit

Piaggio Ltd.

30/01/2006



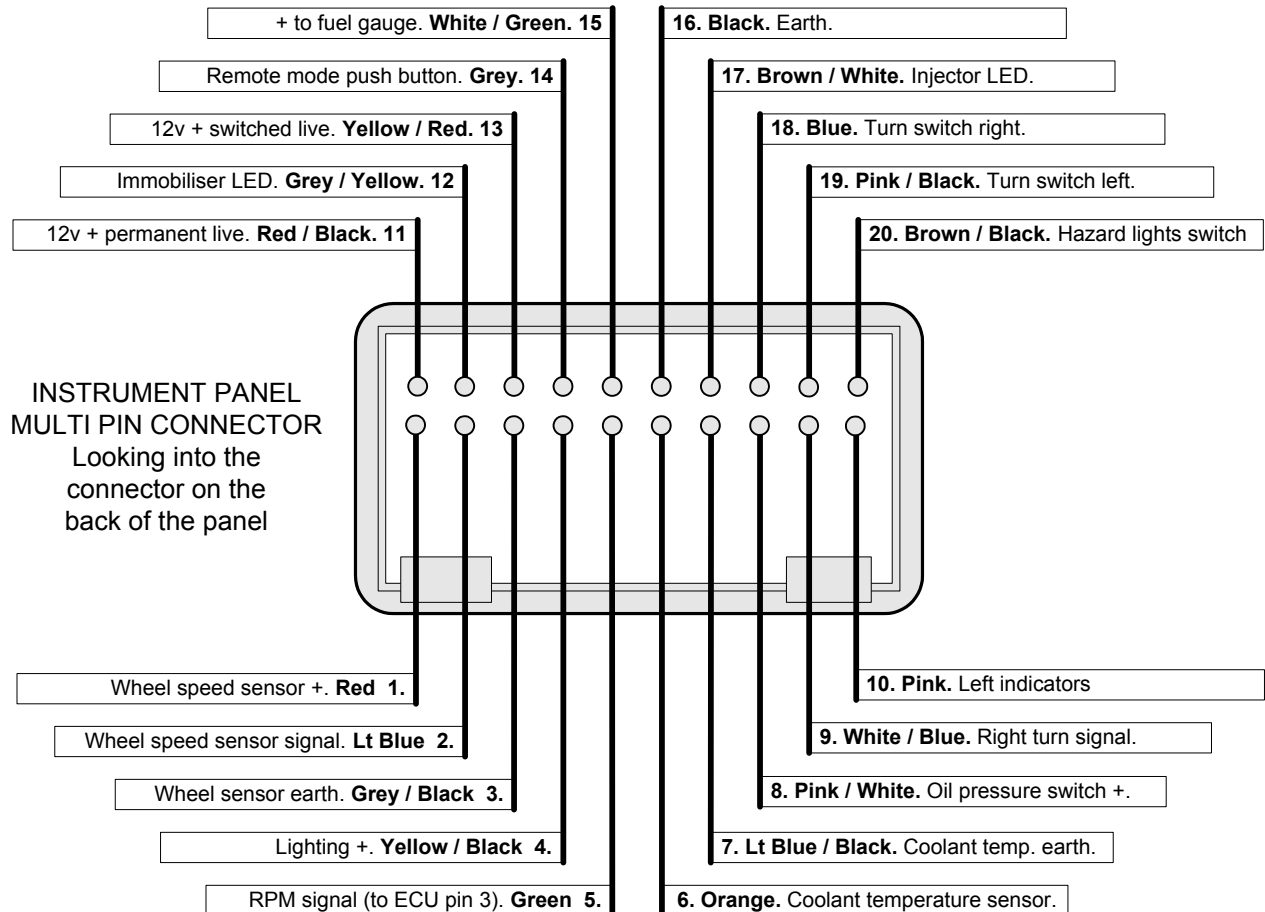
There are two DIODES situated under the front cover above the headlight unit. They are together in black heat shrink tubing
There is a single DIODE in the grey wire.

Nexus 500 Instrument connection

Piaggio Ltd

30/01/2006

You may find an incorrect wiring diagram, with wiring that does not match the vehicle.
This diagram should match the vehicle.



Oil Pressure.

Live feed to switch. Switch shorts to earth to light the bulb.

Fuel Gauge.

Live feed to unit in tank. The tank unit shorts it to earth via a variable resistor.
If the gauge is not working.

Un-plug the instruments put a meter between white / green and black.

Low resistance = full tank. High resistance = empty tank.

This has checked the wiring and tank unit.

Tech Tips. #1 / 2004

1. H@K and GSM fork oil.

Front forks on H@K and GSM need 200cc of 10W fork oil in each leg.

Ref. Mario

2. B 125 Transmission Cover.

It is possible to remove the transmission cover from a B 125 with the engine in the frame. Oh yes it is, say Garozzo M/C of Sidcup.

Remove the cover screws and clutch shaft centre nut as usual. It is now possible to get the cover out far enough to remove the clutch drum. Once the clutch drum is removed it is possible to remove the cover.

Ref. Garozzo M/C

3. X9 500 Tappet adjustment.

It is possible to check / adjust the tappets on an X9 500 with the engine in the frame.

- ❑ Remove r/h foot board / body work.
- ❑ Remove the foot board mounting frame (3 x 6mm bolts)
- ❑ Place a bar or piece of wood under the rear wheel.
- ❑ Take out the top mounting bolt from the right hand rear shock absorber. Then push it forward, pull to one side slightly and pull it as far back as possible.
- ❑ Take out the bottom mounting bolt from the left-hand rear shock absorber. Then push it back as far as possible.
- ❑ You can now raise the rear of the engine high enough to allow access to the rocker box cover and then the tappets. Use a length of wood under the rear tyre as a lever to raise the engine and then block the engine securely.

Ref. Adam

4. 50cc Indicators.

If you find a fairly new 50cc with indicators that flash normally with engine off but become fast or erratic when the engine is running you should also find that a non-resistor plug cap is fitted.

Fitting a resistor cap should cure the problem.

Please note that they do not all have this problem so do not change the cap unless you have the fault.

Ref. Tech Support

5. Pure jet fault code.

The diagnostic fault code list in the service station manual includes G50 P0250. This code should be G50P0251.

Ref. Mario

6. 2004 Colour Codes.

New colours for 2004 and their associated last two digits of the painted item part numbers.

Colour	Code	Part No.	Colour	Code	Part No.
Blue Imperial	204/A	D9	Grey Excalibur	738/A	F2
Red Karcade	811/A	RF	Blue Aurora	422	AA
Grey Cashemere	546	EC	Yellow Lightspeed	908/A	GH
Yellow Cameo	524	BG	Grey Ghiaccio	715/A	BB

Ref. Tech Support

Tech Tips. #2 / 2004

1. 125 leader engine. Poor pick up.

If you find that a scooter with a 125 Leader engine is reluctant to accelerate from stand still particularly when it has not warmed up fully.

Check the tappets, they are probably slightly tight.

Tappets should be inlet: 0.10mm. exhaust: 0.15mm.

Ref. Practical experience

2. X9 250 Evolution. Belt change.

Please note that the drive belt should be changed at 18000km and not 12000km as stated in the Service Schedule. Also the Secondary Air System should be cleaned at 18000km.

Ref: NT12/03

3. DNA 125 / 180. Checking the Tappets.

It is possible to check the tappets without spending a lot of time removing the engine.

- You will be removing one of the engine mounting bolts so first you must find a suitable support to go under the bike in front of the engine (something like a milk crate).
- With the bike supported and the centre stand down remove the lower rear shock absorber bolt.
- Remove the engine mounting bolt that is accessible. Only one of them can be removed.
- Carefully pull the engine backward and twist it slightly as you go. Watch the wires and pipes to make sure nothing is getting caught. The first pipe that will pull tight is one of the small black rubber cooling pipes.
- You will be able to pull and turn the engine far enough to give good access to the rock box bolts. Once the bolts are out it is easy to remove the cover and check the tappets.
- Inlet:- 0.10 mm. Exhaust:- 0.15 mm.

Practical experience.

4. Runner Purejet. Cutting out / loosing power.

We have had a report from BMG Scooters that if the rear suspension of a Runner Purejet is fully compressed it is possible for the Throttle Position Sensor plug to hit the bottom of the helmet compartment. The plug does not come out but if the connection is lost the engine will revert to idle speed and the throttle will not respond. Please let us know if you have experienced this problem.

BMG.

5. Purejet. Using cheap 2 stroke oil.

The owner's handbook and Service Station Manual say that fully synthetic oil must be used.

If cheap oil is used more carbon is produced in the combustion chamber. Specks of carbon on the head of the injector valve and the carbon on the cylinder head can disrupt the dispersal of fuel enough to make the engine run very badly. Also cheap oil will not give such good lubrication.

These engines have proved to be very reliable when they are used correctly but remember that they are running on a very weak fuel mixture and very little oil to make them clean burning and incredibly economic.

Please take time to explain the importance of using fully synthetic oil to your customers.

Practical experience.

Tech Tips. #3 / 2004

1. Leader drive belts.

Please note the correct service periods for drive belts on ALL Leader engined vehicles.

6000 km or 12 months. (2nd) service. Check the belt.

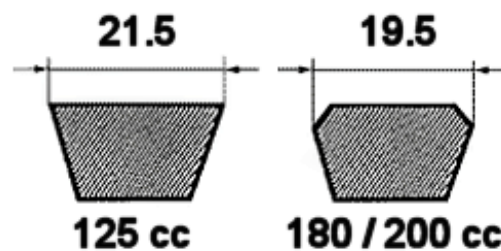
12000 km or 24 months. (3rd) service. Change the belt.

Then continue the cycle, i.e. 18000 - check, 24000 - change etc.

When checking the belt, look for any signs of damage or fraying. Also measure the width at the widest part as explained in the service station manual.

Minimum width for 180 & 200 - 19.5 mm

Minimum width for all 125 ----- 21.5 mm



2. Leader crankshaft / cases dimensions.

Be aware that the current Leader crankshaft is different to earlier versions.

Original crankshafts had a thrust washer on the out side of both crank webs.

The current version has these washers built in.

If you fit a new crank to old cases all you need to do is discard the washers.

The internal width of the cases has never changed and the overall crank width will be the same.

3. Check Tappets. Particularly 125 Leader engine.

If you have a four stroke that is reluctant to pull away until it is fully hot. One of your first checks should be the tappet clearances. Tight tappets will cause this problem.

All Leader engines: 0.10 mm inlet. 0.15 mm exhaust

All Master engines : 0.15 mm inlet. 0.15 mm exhaust

All Quasar engines: 0.10 mm inlet. 0.15 mm exhaust

Pre Leader : 0.15 mm inlet. 0.15 mm exhaust

50 cc 4 stroke : 0.10 mm inlet. 0.15 mm exhaust

Set with engine
COLD

4. X9 125 Digital instrument panel.

Please note that the digital instrument panel 582142 is **not** interchangeable with 584462.

582142 has been re-introduced and should be used for non Evo X9 125.

584462 should be used for the X9 125 evo.

Tech Tips # 4. September 2005

1. Always Change Variator Nuts.

The nut retaining the variator should always be changed if removed!

The service station manuals advise changing them and for a very good reason.

The nut is tightened to a high a high torque and subjected to big changes of temperature and high forces so it will deteriorate.

You should remove the variator at service to check the condition of the rollers so I would advise keeping a stock of nuts readily available in the workshop so there is no excuse for not fitting a new one!

If the variator comes loose you are unlikely to get the repair authorised under warranty!

And if the variator comes loose it will damage the crankshaft so it is a big job.

2. Grease Rear Wheel Spindles.

Several models now have the rear wheel spindle supported on both sides of the wheel.

It is worth removing the out rigger on the right side to grease the shaft where it passes through the bearing this will prevent it seizing in the bearing. Could can save you a lot of grief latter.

3. GTS coolant bleed nipple torque.

The coolant bleed nipple on the GTS 250 engine will leak if over tightened. Once it starts leaking (because the casing has been distorted) you can not stop it.

Torque it to the recommended 3Nm and no more! 3Nm is not much, if you do not have a torque wrench that can measure this you should tighten it not much more than finger tight.

4. Immobiliser loses it's program.

Normally it is not possible for an immobiliser to loose it's programming but if you have a vehicle that was running but now is showing a non programmed unit the cause could be extreme electrical interference caused by a faulty plug cap or HT lead.

Fit a new resistor plug cap (at least 5000 ohms) and plug lead before trying to reprogram the unit.

5. De-restricting 50's

As you should know, Piaggio do not recommend de-restricting a 50 for any reason but we know that they do get de-restricted and if you are going to do it we would sooner that you did it correctly to avoid any problems.

If you do de-restrict please be aware of the legal implications and make your customer aware!

Normal de-restriction on current twist and go 50's is:

Remove the spacer from the variator (don't forget to use a new nut, see above)

Remove the resonator pipe (or pipes) from the exhaust pipe.

Fit a larger main jet, about + 4 sizes.

In addition, it is worth fitting lighter rollers and blanking off the secondary air system.

The roller weight has no affect on top speed but initial acceleration will not be very good with the heavier rollers because it will get into high gear too quickly.

Original rollers on most current 50's are 6.4 gr. CM1102025.

Replace these with 5,3 gr (orange) rollers CM11020035.

The secondary air system has nothing to do with performance but the reed valve may fail on the higher power engine because the pulses it is subjected too are much greater, blank it off to improve long term reliability.

We are aware that the NRG Power DT (air cooled) does not go much faster when de-restricted. We don't know why at the moment. Italy is investigating.

Tech Tips #5

Walbro CV carburetors on four stroke engines.

The carburettor fitted to many of Piaggio's four stroke engines is made by Walbro. This has a black plastic arm on the side that is moved by a cam on the throttle cable fitting. The arm operates the accelerator pump that injects extra petrol as the throttle comes off idle to help the engine pick up crisply.

If the arm's pivot becomes corroded the arm may stick and then the pump will not operate.

Lack of the accelerator pump will show up as a reluctance to rev up quickly and a possibility of cutting out if the throttle is opened rapidly.

It is worth spraying this pivot with lubricant at ever service.

500cc engines. CO value.

The CO values for 500cc Master engines should be taken when the engine has just reached it's normal operating temperature.

If you take the reading at the tail pipe:

0.6% - 0.7%

Attach an 18 inch length of hose to the outlet and ensure that the probe is as far into the silencer as possible to get an accurate reading.

If you take the reading from the exhaust pipe take off point:

1.25% \pm 0.25%

Note. If the figure at the tail pipe is not about half that at the exhaust pipe this indicates a blocked catalytic converter.

X9 500 Drive Belt.

During the X9 500s life the transmission has been modified.

Current engines have a longer drive belt because of changes to the transmission components.

Make sure you fit the correct belt.

827826 = older short belt

832738 = new longer belt

The belt changed at about the time the Evo was launched but you will find pre Evo vehicles with the long belt.

Note. It is possible to fit a long belt to a short belt engine but if you do, it will ride further up the pulleys and will rub on the casing, eventually with catastrophic results!

50cc 4 Stroke.

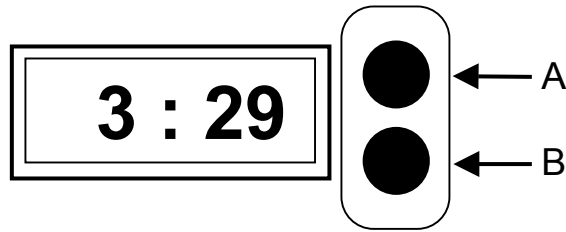
If you find a 50cc 4 stroke engine that feels slow at full throttle but is better at three quarter throttle it needs a larger main jet.

Original jet is # 75

#78 main jet part number: CM142103

SETTING THE CLOCK.

Any Piaggio / Vespa / Gilera scooter with a two button clock.



The clock should be displaying the hours and minutes with the two dots flashing.

- ❑ Press button A once and the month and day will be displayed for about five seconds.
- ❑ Press and release button B once and the clock will alternately display the day and month and then the hour and minute etc.
- ❑ Press and hold button B and you can set the month by pressing button A repeatedly until the correct month is displayed. Release button B
- ❑ Press and hold button B again and you can set the day by pressing button A repeatedly until the correct day is displayed. Release button B
- ❑ Press and hold button B again and you can set the hours by pressing button A repeatedly until the correct hour is displayed. Release button B
- ❑ Press and hold button B again and you can set the minutes by pressing button A repeatedly until the correct minutes are displayed. Release button B
- ❑ Press and release button B again and it will return the display to the normal hours and minutes.
- ❑ To return to the normal display at any time repeatedly press button B until the normal display is shown.

LEADER / QUASAR Engine Special Tool

Current LEADER engines have a modified cam chain cover. Early engines had a cast aluminium cover retained by three screws.

Current engines have a pressed metal cover, which is a push fit (QUASAR engines all have this system).

The two seals are bonded to this cover.





The cover should be changed every time it is removed.

A special tool (020622Y) must be used when removing and fitting the cover.

The later cover can be fitted to early engines without modification.

If you fit a new variator to an early engine you will have to fit the new type cover.

Below is the explanation of how to use the tool taken from the on line Service Station Manual.

<p>- Remove the transmission cover and the complete driving pulley</p> 	
<p>- Install the base of the specific tool on the oil guard, using the supplied screws</p> <p>Specific equipment and tools: transmission-side oil guard punch: 020622Y</p>	
<p>-Screw the threaded bar on the base of the tool and remove the oil guard</p>	

INTERESTING FAULT FINDING.

Here are a couple of recent cases that were solved quickly because the mechanic adopted a logical approach to fault finding.

FUEL GAUGE PROBLEM

Details: The fuel gauge is working but always shows a full tank when the ignition is on.

Unplug the tank unit and the gauge falls to empty (no circuit).

Facts: Power goes to the clocks and then to the tank unit, which then shorts it to earth via a variable resistor.

You check the tank unit; high resistance (100 ohms) = low fuel level.

Low resistance (3 ohms) = high fuel level. Unit is OK.

You try a new tank unit anyway but there is no difference.

You short the gauge to tank wire (normally green / white) to earth, gauge goes to full.

You have done the obvious checks, it all looks OK.

So why is it not behaving correctly?

The clue is the resistance. The system needs high resistance to show low fuel level.

If there is corrosion or water in a connector or in the instruments then there can be a leak to earth so the resistance is reduced and the gauge shows a higher fuel level.

The solution is to check block connectors, particularly the one on the back of the instrument panel. If they are clean and dry then you need to change the instrument panel.

FOUR STROKE, RELUCTANT TO PICK UP.

Details: The engine always starts and idles sweetly,

But it is reluctant to pick up particularly when cold.

Once it does pick up it seems to run OK.

Facts: It is not a choke problem.

The choke defaults to being on and the engine starts easily so the choke must be working.

If you blocked the choke jet you would be unlikely to start a cold engine.

It is not a spark problem because the engine starts easily and it does not cut out when the throttle is opened, it just does not want to accelerate.

Red Herring: It could be running weak.

Probably not, because it will maintain high rpm once you can get it to pick up,

Check for low fuel level in the carburettor just in case.

Attach a length of clear plastic tube to the carburettor drain and turn it up the side of the carburettor. Open the drain screw and observe the height of the fuel in the tube

(it is the same as in the float bowl). It should be near the top of the float bowl, maybe 4-5mm below the joint where the float bowl attaches to the carburettor body.

The solution: Check the tappets.

You should find a tight tappet.

Correct tappet settings:

50 4t:- 0.10 in, 0.15 ex.

Leader:- 0.10 in, 0.15 ex.

125 Pre Leader:- 0.15 in, 0.15 ex.

Quasar:- 0.10 in, 0.15 ex.

Master:- 0.15 in, 0.15 ex.

Coguar 125:- 0.10 in, 0.10 ex.