

Basic electrical wiring for additional extras (comms/sat nav/grips etc) to your zxr1400/zx14r

I thought it may be a good idea to try and compile a list of “how to guides” to help others who keep asking for electrical help when fitting autocoms /sat navs /2 way radios, Heated grips or garments/ Aftermarket Horns etc.

This will not be a definitive list, but if it only helps a few gain enough confidence to try, then it will have been worth doing it.

I have no doubt, I will make some mistakes to this list, but hopefully most will be clear.

OK

The Object of this list is as follows

- 1 What are you trying to wire and how to achieve this without harming the bike, or yourself
- 2 To be able to do this Safely, so it works and work safely if a fault occurs, so it will blow a fuse 1st.Not the wiring or the equipment itself.
- 3 Do you want the equipment ignition switched or permanently fed?
- 4 Where to wire from for each type of equipment inc cable identification/colors etc

Wiring tips

ALWAYS wire with a cable which is large enough to carry the required current in Amps

ALWAYS fit a fuse as close to the battery/power source as possible on any wiring to be done. The fuse MUST be correctly rated, so that it will blow before the max current rating of the cable is reached. VERY IMPORTANT !

ALWAYS try to keep cables away from direct sources of heat, i.e. engine etc.

ALWAYS use a compatible method of connection, ie proper bullet/spade connectors (soldered or crimp type)

Or solder cable joints if competent enough to do so.

ALWAYS try to take the negative wire (-Ve) to the battery if possible, If this is not possible make sure the frame connection is CLEAN and has a good earth to it.

WARNING

Try not to use “Snap lock” type connectors ,In my opinion these are NOT SUITABLE for use on anything .they corrode badly over time ,due to having a high resistance joint to the cable. They do work, but not

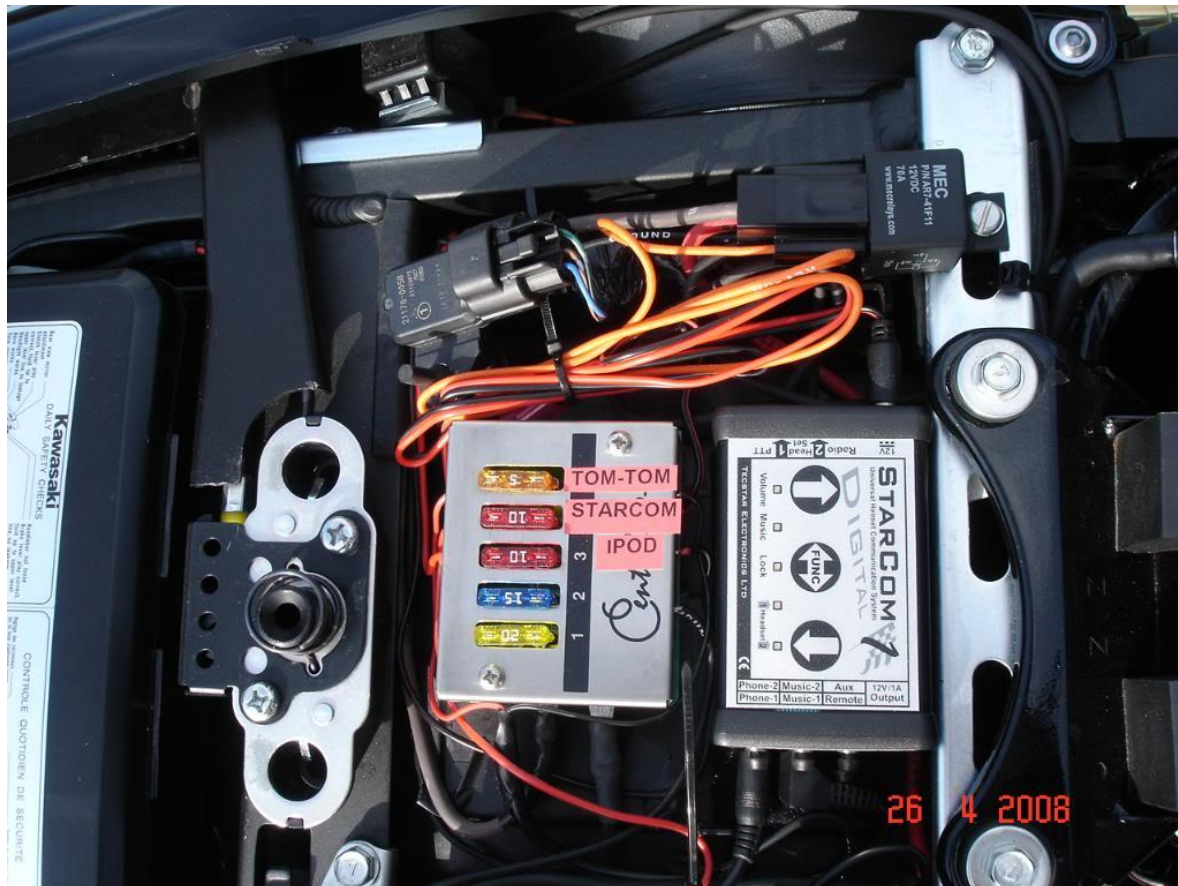
well for very long! . Always try to keep potential weak points out of your wiring (it saves a lot of work fault finding in the future).

HOW TO WIRE AN AUTOCOM/STARCOM ONTO YOUR 1400

The 1st thing to do is work out where you want to fit the unit, this will depend on if you want it under the seat or in the front fairing,

WIRING UNDERSEAT COMMS UNIT

IF mounting under the seat either in the tool box OR under the front part of the seat (there is room for most units, but not much) the unit can be adjusted for fader /vox level etc, and it is easier to get to the headset leads. This method also keeps all leads away from the engine, so reducing the chance of interference being picked up from the coil sticks and alternator.



The above photo shows a Ancillary fuse box - Centech AP-1 from Nippy Normans (an auto type fuse board.)

The Autocom/starcom unit needs a switched live and a negative to be able to work, so where do you take the cables to get them?

You need to take the negative, if possible direct to the battery, or to a good clean earthing point on the frame of the bike. And the switched live to 1 of 4 places

- 1 To a Ancillary fuse box as pic above (configured to sw output) Fused at 2.5 Amp Max
- 2 To the rear light cluster, connect the live cable (+Ve) to either the tail light RED wire or to the no plate light RED wire.
- 3 To the front sidelights, connect the live cable (+Ve) to the side lights RED cable
- 4 Under the seat on the left hand side, there is a connector block (in the rear light wiring circuit) mounted at 45 degrees (see pic below) This has 2 wires a Black/yellow and a red wire. The red wire is ignition switched (+Ve)
- 5 If using 1 of items no 2-4 above you should be ok to not install a fuse on the feed cable to the comms unit as these circuits are fused at 10 Amps and the autocom/starcom only takes approx 1 -1.5 Amp max, but to be on the safe side, fit an inline fuse of 2 Amps as close as possible to

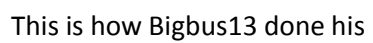
your take off point .

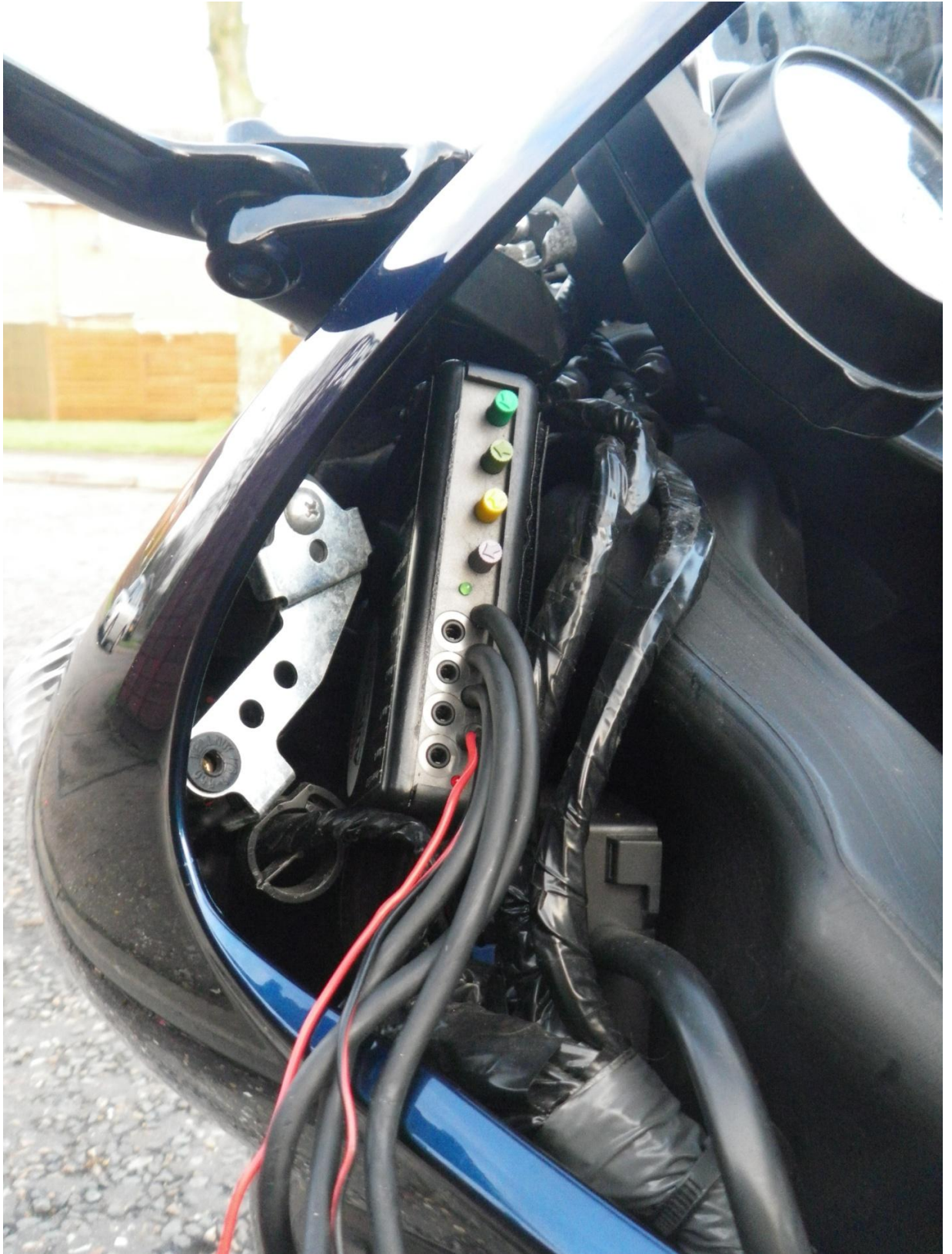


WIRING FRONT FAIRING COMMS UNIT

The advantages of fitting the comms unit in the front fairing ,are it is easier to wire up to a sat nav and 2 way radio (hidden in front R/Hand side fairing) also, BUT it needs extra headset leads to reach to under the seat to get to the 2 headsets + It`s not easy to adjust controls on autocom

The negative goes back to the battery or to a good earthed frame point.





This is where I fitted mine

FITTING HELMET HEADSETS

When fitting helmet headsets, remember that both speakers and microphones have what is known as a loud spot. This is where the speaker /mic is positioned at the spot where it works at its most efficient. For speakers, the speaker needs to be positioned so that the center of the speaker grill part is in line with your ear canal THIS IS IMPORTANT, it can take a few attempts to get right, but when done it provides clear loud sound.

The microphone then needs to be positioned so that it has its loud spot is positioned so the mic is in the center of AND just about touching your lips. This will then allow the VOX operation to work right .

WIRING A SAT NAV TO THE 1400

Ok, I think most people will fit a sat nav to the headstock or handlebars one way or another .There are 2 ways to wire this,

1 Ignition switched, Get your switched live from the sidelights RED wire and put the negative down to a good clean point on the frame or straight back to the battery -Ve Terminal .This can be done directly or via an inline 12volt outlet(marine grade) mounted in the front fairing, (various positions available), or with pull apart connectors etc. The sidelights fuse rating is 10 Amps, but it would be advisable to fit an inline fuse to the cable (rated 2-2.5 Amps)

2 Permanently live feed This can be done by taking both live and negative wires from the sat nav direct to the battery, remembering to fit an inline fuse as close as possible to the supply point, correctly rated at 2- 2.5 Amps, This can also be done directly (hard wired) OR via a 12volt outlet in the front fairing making it easily removable when parked.

NOTE

You can also get a GIVI bar mounted waterproof bag to fit a car type sat nav in (Approx £35)



Here is a pic of my set up

Sat-nav mount - RAM mount with 1" ball Part No. RAM-B-342 from gps warehouse (this is only the round ball joint that fits in the top yoke center hole)



Homemade top yoke mount (M10 Rawlbolt in top yoke)



My set up has a switched feed taken from a 12 volt outlet cable tied to the ignition switch barrel and also a audio connection lead running to my autocom in the front left fairing beside the ram air duct giving me sat nav directions AND MP3 music in one unit with phone if required. I use a Garmin car sat nav mounted in a waterproof case I got from ebay for approx £14, saving me the cost of getting a Garmin 660 etc, but it will sometimes mist up in wet weather but you still hear directions.



Garmin on RAM mount

NOTE !!! This is only for LOW POWER ITEMS

EXTRA PERMANENT (UNSWITCHED) FEED PICK UP POINT FOR SAT NAV AT FRONT OF BIKE

If you want your sat nav (ie Garmin 550/660 etc) wired for a permanent (Unswitched) feed so it is on all the time it is in its cradle, there are 3 pick up points in the front of the bike to get it from. The 1st 2 points are the 2 headlight relays behind the headlights. 1 relay has a white/blue wire, the other relay has a white/red wire. BOTH of these wires are 12v + Ve permanently ON.

The other point is left side of the front fairing. Remove the left air duct cover and there is a rubber hood that covers 2 cable connections just above the left indicator. 1 of these connectors has 2 white wires. Both these white wires are 12v +Ve. Splice into anyone of these and that's the live sorted. To get a negative (ground) look at the other connector and there is a black/yellow wire and splice into that. You now have a permanently fed supply to the sat nav cradle.



DO NOT USE FOR HEATED GRIPS ETC

RELAYS NEED TO BE EXPLAINED NEXT BEFORE ANY OTHER ITEMS TO BE WIRED ARE SHOWN

A relay is an electrically operated switch(s). Inside there are 1 (or 2) switches that operate when an electric voltage is applied to the relay, for most of the following applications below a SPST (Single Pole Single Throw a relay with 1 switch (Single Pole) that makes a connection when the relay is energized(Single Throw)) relay rated up to 30 Amps will be capable enough. There are 3 main types. BUT a SPST OR a SPDT(Single Pole Double Throw a relay with 1 switch that makes 1 connection when the relay is unpowered and a different connection when the relay is energized (Double Throw)) relay will do most of what will be needed on a 1400.

More info can be found to explain relays and how they work here

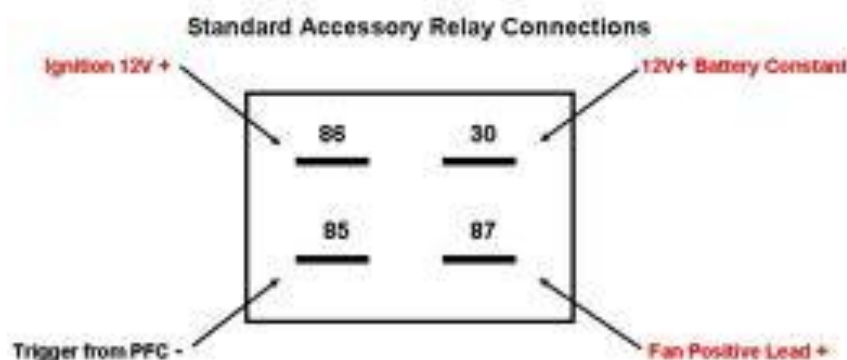
<http://www.mp3car.com/the-faq-emporium/117895-faq-relays-how-they-work-and-how-to-wire-it-up.html>

http://hobbyprojects.com/components/electromagnetic_relay.html

relay -An Electromechanical device that opens or closes contacts when a current is passed through a coil.

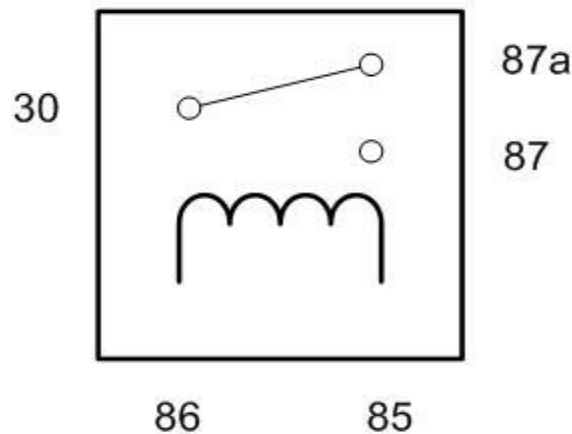
So if you put a switched feed (+Ve voltage) onto 1 side of the coil and then ground out (-Ve) the other side of the coil, the coil will switch the other relay contacts open and closed in relation to the switch(ie ignition switch)

1 A SPST relay means it is Single pole (1 switch only), single throw (1 on-off output only)This has 4 terminals



2 A SPDT relay means it is Single pole(1 switch only), Double throw (ie 2 outputs. 1 ON output while the other output is OFF)This will have 5 terminals. Shown below is a single pole double throw relay (SPDT) It has 2 relay outputs,1 ON and 1OFF (1 Normally closed and 1 normally open)

Relay Wiring Guide and Terminal Numbers



- 30 - High Power Feed (Must be Fused!)
- 85 - Relay Coil Ground
- 86 - Relay Coil Feed (Trigger Wire)
- 87 - High Power Output - Normally Open Contact
- 87a - High Power Output - Normally Closed Contact

You will need to use Terminal 87 for the output to your equipment as this is open(normally off) until a switched voltage is given to the coil (term 86).With voltage (on the coil) the sw closes so making contact between the battery +Ve (term 30) and term 87 allowing the equipment to be powered up

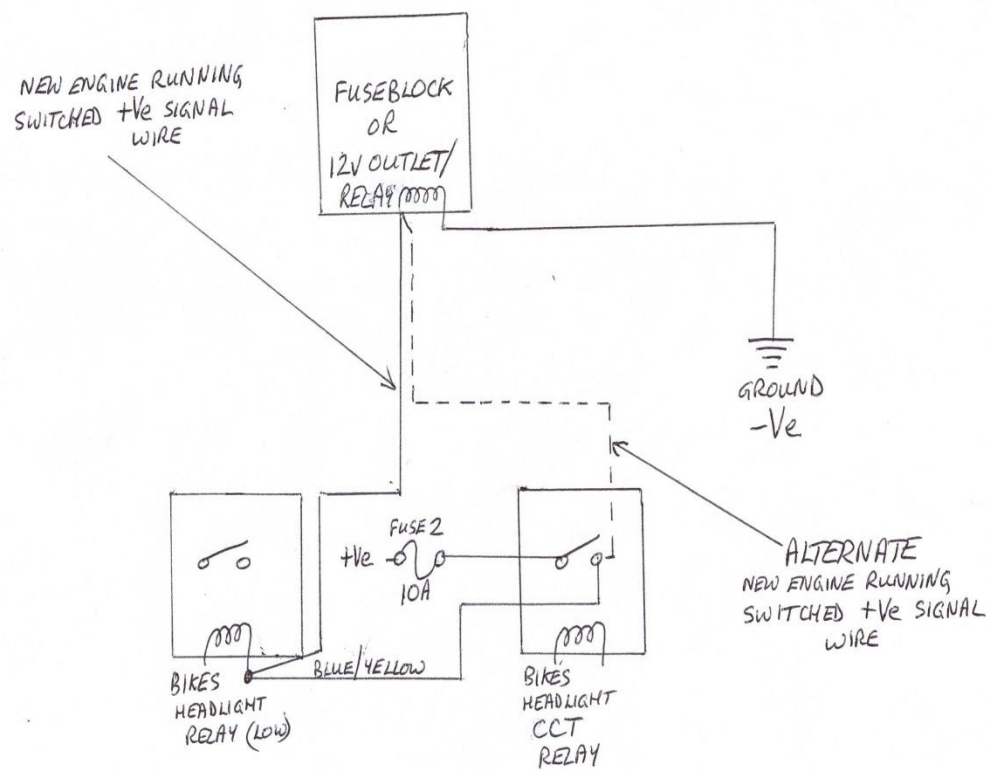
USING AN ENGINE RUNNING SWITCHED LIVE INSTEAD OF IGNITION ON SWITCHED LIVE

Another way has been suggested by Keef 256 to power the relay(or fuzeblock). Instead of wiring from the sidelights RED wire so the relay (or fuzeblock) only switch's on when the ignition is on. Is to have the

relay (or fuseblock) become live ONLY once the bike is running, so not consuming power which could be used for starting the bike. The trigger wire (switched live feed) would then need to be wired from here as below. Using the blue/yellow wire to pick up the feed to switch the coil on the relay (or fuseblock).

WIRING FOR ENGINE RUNNING SWITCHED LIVE SIGNAL WIRE

THIS IS USED TO CONTROL RELAY(COIL) 12V SWITCHED OUTLET OR FUSEBLOCK





[This pic shows the engine running signal wire pick up point for the above diagram \(blue and Yellow wire\) \(thanks to keef256\)](#)

HOW TO WIRE A 12V OUTLET

This can be done in 2 places

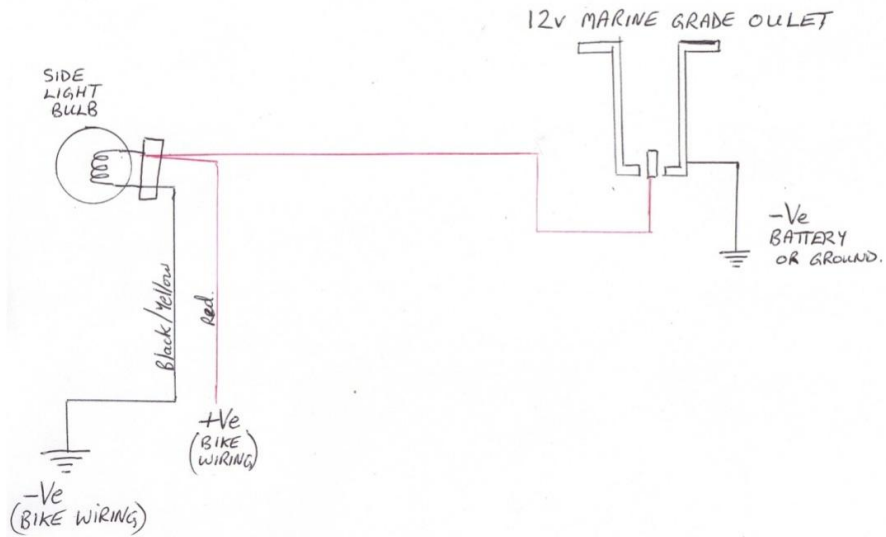
- 1 In the front Fairing (for sat navs/radar detectors/mp3 + phones etc)
- 2 Under the seat (for equipment under the seat or in a tank bag etc)

This can also be

(A) Ignition switched fed (low power items)

HOW TO WIRE A 12V OUTLET

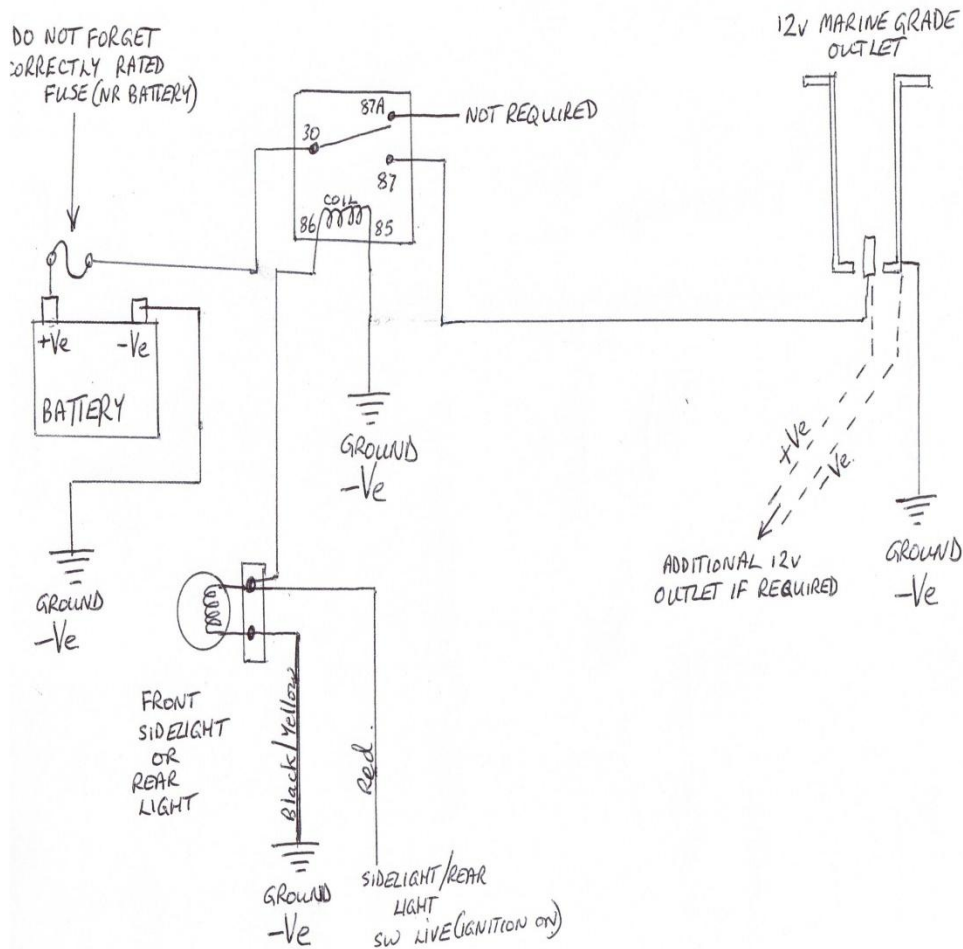
LOW POWER ITEMS ONLY. ie MAX 2 AMPS (SAT NAV PHONE ETC)



(B) Ignition switched fed via a relay (Inc High power items like heated garments/grips etc)

HOW TO WIRE A 12V OUTLET VIA RELAY

INC. HIGH POWER USE (HEATED GARMENTS ETC)



(C) Have a permanent live feed from the battery

If doing it this way, you will always have to remember to switch off OR disconnect your equipment every time you stop the bike!!!!!!!!!!!!

To wire this way, all you do is take both Positive (+Ve) and Negative (-Ve) wires straight to the battery remembering to fit a correctly rated inline fuse as close to the battery as possible.

SAT NAVS / PHONES /MP3 PLAYERS

These can be wired using the same connection points as the autocom/starcom instructions , as they are all low powered devices so therefore can make use of the sidelights/tail lights RED wire connection points to be ignition switched (+Ve).To make connection/disconnection easier ,a 12v outlet helps a lot when leaving the bike(protect them valuables)

HIGH OUTPUT HORN(S)

When using high output horns, The use of a Relay is advisable as these can take up to 15-20 Amps when in use. If you do not use a relay, then you risk burning out your horn button AND blowing the bikes horn fuse !!!!!

How to wire the horn(s)

Remove the existing 2 wires from your standard horn (black/white and brown/black).These need to be connected to a 30 Amp SPST relay (4 term) on terminals 85 (black /white) and 86 (brown/black), the cables may need to be extended to the new relay position, if so use proper cable connectors (or solder and insulate properly with heat shrink tubing) and make sure they are well insulated!!! This will then operate the relay when the horn button is pressed.

NOTE

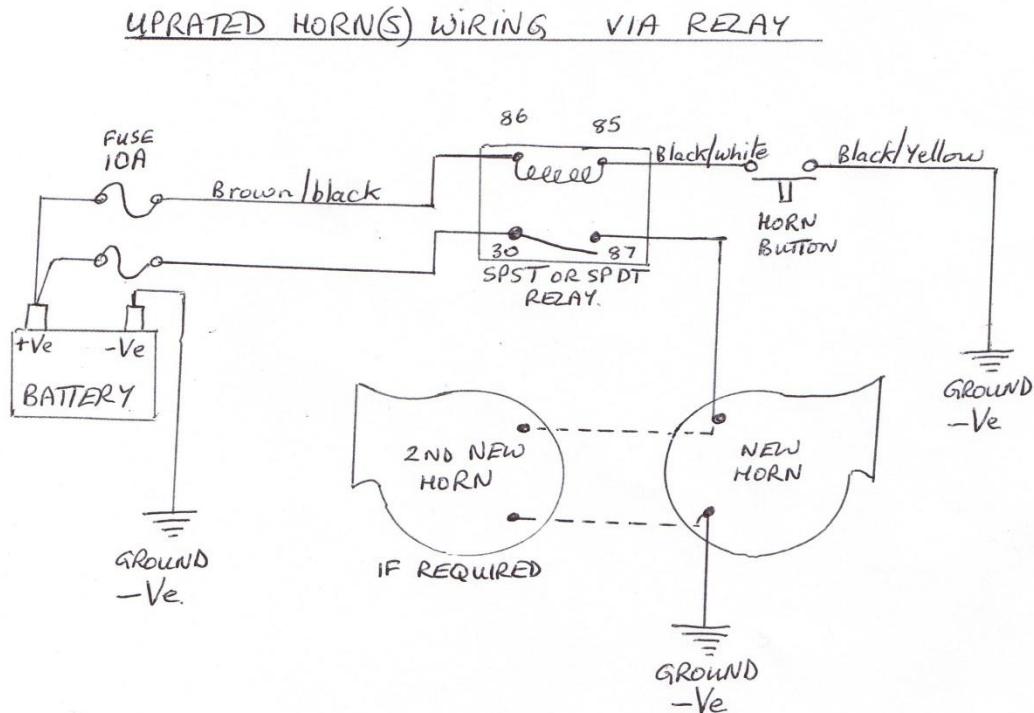
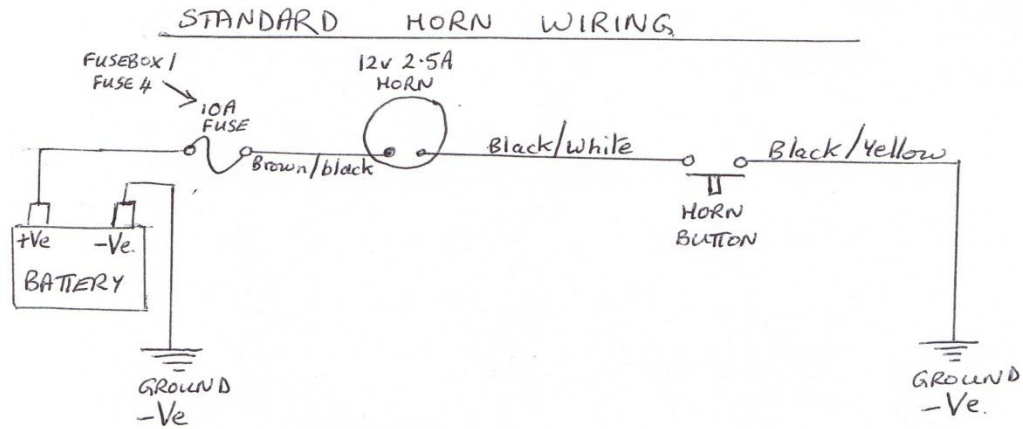
If you have a SPDT relay instead (5 Term), you will not need to use term 87a at all

Then you have got to wire the main power to the new horns via this new relay. To do this make sure these new cables are rated at 20 Amps minimum,

Take a wire from the battery to an inline fuse (rated at 20 Amps) and then onto the new relay (term 30) and then another cable from the relay (term 87) to the new horn(s).Lastly a wire from the new horn (s) to the battery negative terminal OR a GOOD CLEAN earth point.

When testing the new horn if the output (loudness) is weak and not as expected, the horn is trying to suck air instead of blowing it out so, take the 2 wires off the horn and change them to the other way round. This will reverse the action of the horn!!!

See standard and modified wiring diagram below

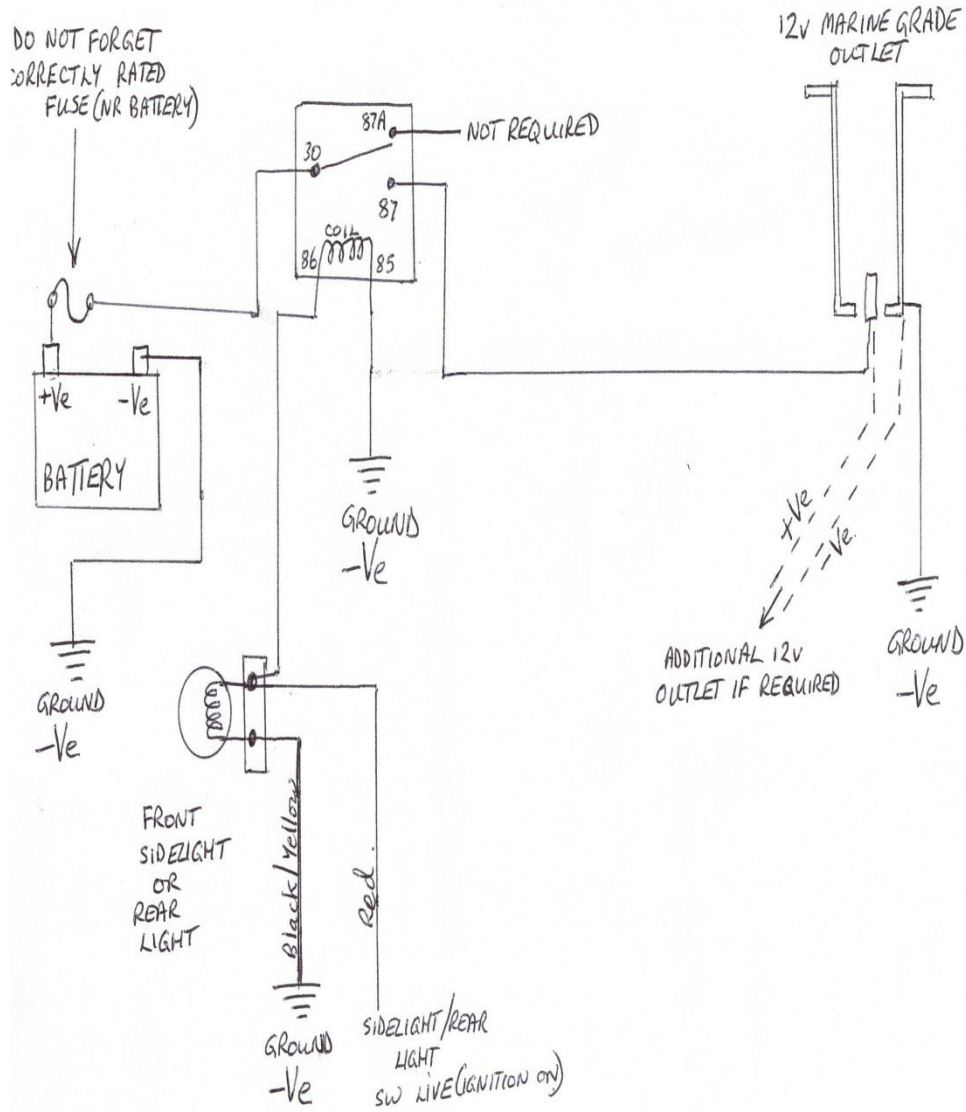


HEATED CLOTHING/GRIPS (AND OTHER H/POWER ITEMS) VIA 12 V OUTLET (IGNITION SWITCHED VIA RELAY)

This can be wired exactly the same as the diagram “12v outlet via relay” as below

HOW TO WIRE A 12V OUTLET VIA RELAY

INC HIGH POWER USE (HEATED GARMENTS ETC)



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This could also be done without using the 12 v outlet, eg If the clothing uses a different connector,

2 WAY RADIOS (BIKE 2 BIKE RADIOS)

These can be wired many ways depending on if you use autocom or starcom ,also if using an autocom “super pro AVI 300” it is possible to power the 2 way radio via output 2 on the autocom unit itself by switching the power output sw over inside the unit.

If using ANY OTHER comms unit you will then need to power the 2 way radio by batteries or by a ignition switched bike source using one of the above methods via a relay .

The radios can be used by VOX (voice operated transmission)operation .This is talk to transmit/quiet to receive ,or by using a PTT (push to talk) button on the handlebars to transmit. VOX is easiest, but if you want to talk to a pillion without everyone else hearing you both chatting away, you will then need a PTT button as this allows you to talk to a pillion without the radio going into transmit mode every time one of you speaks unless you press the PTT button to transmit on the radio.

Battery eliminators are available on ebay. Remove the battery pack on the rear of the radio and clip on the battery eliminator with lead and 12v plug already on it, plug into 12v outlet and hey presto. No need to worry about batteries going flat on that long day out.

NOTE

2 way radios/Walkie Talkies (PMR 446 radios)need particular attention as to where they are cited, and how they are wired etc, as if the antenna is vertical they will have similar range throughout the complete 360 degrees round the bike ,but if mounted flat inside, say a tank bag the antenna will become de-tuned by the metal tank, causing a reduction of range .

When using the radio flat (horizontal) this will cause the radiation pattern of the antenna to become very directional in the general direction that the antenna faces (this is a very broad general description) and very weak in the other directions.

Range is further reduced if your antenna is horizontal and your mate’s radio is vertical.

Radio waves behave differently with so many variables, that it is impossible to explain in detail here.

But generally speaking

Keep the radio vertical where possible (to increase range)

Keep the radio as high as possible (to increase range)

Keep the radio and all leads as far away from ignition sources as possible (to reduce interference)

Use the best quality radios you can afford(i.e. kenwood/icom)if possible

PMR Radios work in the UHF wave band, so are direct line of sight communication only.

The cheap 2 way radios you can buy (like kids walkie talkie ones)WILL work (if the connecting lead is available) with comms units but will NOT have the same noise reduction system inside as the quality units will have ,also the VOX unit will not have the same cut off circuitry to cut transmission noise quickly when you stop talking, They will also have only approx 0.5 Watts of power output, compared to the Kenwood TK range of radios having 4-5 Watts output with an increase in range .

NOTE

If using 2 bike powered items together, this can cause the bikes frame to act as an amplifier for interference (called a closed loop effect) .If experienced, this can only be eliminated by using the proper isolating lead from autocom/starcom OR by making one of the 2 items battery powered. This stops the interference from going round and round between the 2 items via the frame, helping considerably with noise generated by the bike itself.

I can confirm the Range with 2 Kenwood TK series radios with both antennas vertical on 2 bikes is at up to 5 miles apart over open ground but usually around the 2 mile region, apart from in cities/towns when the buildings will block the signals reducing range. Quality of speech is excellent at speeds of over 150MPH in Germany. SUPERB!

There is 1 place (Bigbus13 found this) in the front fairing to mount a radio very discreetly so its almost invisible .that is between the right hand side ram air duct and the fairing, drilling a small hole for the antenna to pop out of in the air duct cover as shown below



His (and my setup) are done via a ignition switched relay,so that both the autocoms (Duo pro AVI 300`s) and radios will only work when the ignition is switched on, We both use VOX operation only, They do take a bit of fiddling to set up properly, but once done they are excellent. Very handy for group ride outs (like getting 30+ bikes into the Forum Ace Café run in 1 group without losing any bike once or getting too split up).

HID HEADLIGHTS

There are now many types of HID kits on the market, car and bike specific ones. The bike ones usually have smaller (slim line)Ballasts that can be hidden more easily on the bike.

They also come in different color ranges i.e. 5,000K, 6,000K etc for different brightness's/color of light.

They usually are just plug and play type units, where you unplug the connector on the rear of the lights, take the standard bulb out. Fit the new bulb and then all there is left to do is fit the ballast unit (usually cable tied to the ram air duct in the front fairing) and with the 2 cables coming out of the ballast connect one to the rear of the new bulb and the other to the connector that originally was connected to the bulb (ie so the ballast is in line between the original connector and the new bulb. JOB DONE.

Please note

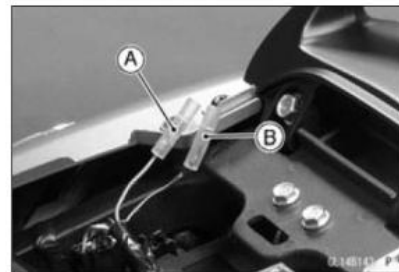
When switching HID's on for the 1st time, they may not light up straight away, THIS IS QUITE NORMAL!! DO NOT PANIC. This can (and doe`s) happen quite often with any type of light that has a ballast. Once it has lit up though it should then be fine every time.

IMPORTANT Do not use the connectors below for anything !!!!
These are for diagnosis equipment only

BRAKES 12-41

Anti-Lock Brake System (Equipped Models)

- Remove the seat (see Seat Removal in the Frame chapter).
- Ground the self-diagnosis terminal [A] (Gray) to the ground terminal [B] (Black/Yellow), using a lead.
- Turn on the ignition switch.
- Count the blinks of the light to read the service code. Keep the auxiliary lead ground until you finish reading the service code.



This write up should give you enough ideas/info to have a go at doing it yourself. The info is there, so if you cannot do it, then you probably have not looked for the answer, It is not a definitive list for everything, but should cover most requirements.

Thanks to keef256 and Bazzr for their help with this article.

scoots