

# HID Light Conversion

Written By Rhys for Team MudRhino



It all started innocently one afternoon whilst discussing vehicle modifications that Tom and I decided to go on a renovation spree and modify our existing roof lights with HID's. By the time evening came, Tom had managed to convert his entire set of Bosch Compass lights with HID's.



For those of you who have little or no idea what 'HID' stands for, it's an abbreviation for *High Intensity Discharge*, and is the term utilised to describe a reasonably new breed of lighting that surpasses standard old fashioned halogen lighting in almost every single conceivable aspect.

In short HID lights do not have a filament like standard lights, instead they use a capsule of glass filled with a highly pressurized mixture of xenon gas, mercury, metal halides (sodium), and other gases. Inside the tube is a pair of tungsten-tipped electrodes placed a few millimetres apart. Electrical energy (12-volts) is sent to a high-voltage transformer (containing the "starter" as well as the ballast module), which steps up the voltage to nearly 1,000 volts. The high voltage is sent to the electrodes inside the bulb, which causes an arc, igniting the gases inside the bulb. As the gases burn, a temperature of nearly 4,000 degrees is attained within the tube. After the initial start-up, the lights require on average less than 3 amps of energy to maintain their output. In other words, once these babies are on, they produce a hell of a lot of light, and only consume a small portion of the energy required by Halogens, and more closely approximating the colour temperature of natural daylight. Additionally, a HID lamp will last, on average, 3 to 5 times as long as a halogen bulb. In normal use, your HID bulb should last beyond one thousand ignitions.

Anyhow, whilst Tom was busy modifying his 'Compasses', I set about converting my larger Hella 'Rallye 4000's', which are designed to be high definition pencil beams, but in time I will get around to also converting my Hella broad beams, hopefully providing me with enough light output to light planet earth 24 hours a day and eliminating darkness in every part of the known universe...

Okay, so to start things off, I'll provide a list and some technical details of things you will need when doing the swap. It should be noted though, that based on the spontaneity of the event, I only had a few tools on hand and made the best use of them that I could.

**Required Tools:** *A set of Allen keys, pointy nosed pliers, and scalpel (Stanley knife).*

Hah! How easy is that? Granted, this collection of tools was specific to my lights, but you get the general idea of what's required – perhaps a set of screw drivers, and even a 15 or 25 mm hole saw depending on your specific lights.

Now just to clarify one thing, when we are speaking about HID lights, we are talking about a system, not just the globe. The globe itself is not called a HID globe; it's actually a Xenon globe that is being used in the HID system.

So you ask - what the flying Feroza is a HID system? That's simple; it's a setup consisting of several main parts. Firstly you have the Ballast, secondly the Xenon globe, and that's pretty much it... Sounds complicated huh?

Okay, now that we have a basic understanding of the system, I'll start to show the pictures. Here is what a standard HID kit looks like in the box.



Those two black boxes with the big zappy spark symbol on them are the Ballasts. In the middle, carefully packed in their own little protective cases (that look somewhat like medicine bottles) for protection from 'Ze Germans' are the Xenon globes. The rest of the items in the box are the wires and plugs you'll be using to attach everything together.

Anyway, moving on to the first step.

### **Step 1: Removing the globes**

You need to get your lights in a suitable position so that you can begin by replacing the globes. That's the best way of describing it.

First of all I had to remove the front alloy ring that holds the lens in in place. This is a specific step to the Hella Rallye 4000's – chances are you wont have to do this on other lights.





Once I had done this, I had to pull the lens and reflector out. Being the lens and reflector were one piece and just sitting there, all I had to do was find something to pry the back casing off.

Here you can see the standard Halogen (H1) globe fitted to the light.



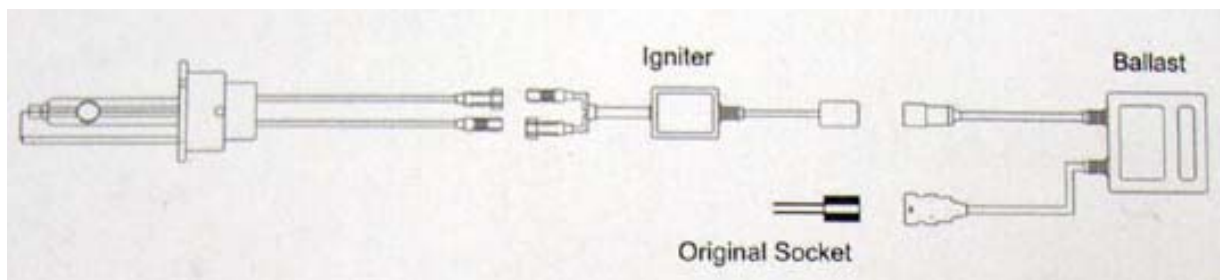
It was then a matter of removing the H1 globe that was basically held in place by a locked spring retainer type clip. A word of advice, try and be mindful of how the retainer clip fits into your light, as I have noticed that unless you put them back in exactly the same way they will never close again. So then I removed the clip, and gently removed the globe. Remember; don't touch the globe with your fingers as finger prints may shorten the life-expectancy of the globe... but then again, if your never going to use them again, and more than likely you'll toss them in the bin – then who really cares?



At this stage, you need to piss off any existing wires that the old system was running, unless of course you want them for something else, or perhaps you plan on possibly converting your lights back to normal at some stage. Me? I didn't need them, so I just tore them out.

## Step 2: The HID system and wiring guide

Now this is where things get a little fiddly. The HID wire harness comes with a number connectors, wires and plugs. The plugs are for connecting the Xenon globes to, the wires are for connecting the globe to the ballasts, and the larger black and red wires are for connecting to your 12 volt power source. Most kits should supply you with a manual or diagram that will provide you with specific details as to what each part of your set up is for, but if you were not provided with one, we have included one for your convenience below.



You will also notice a rubber grommet connected to the wiring. This grommet is for blocking off any holes you may make in the spotlight housing whilst passing your cables and plugs through so that your lights will remain somewhat water resistant. If you don't want to cut a huge hole into your casings to fit the entire light globe and plugs through, you could always just make a smaller hole or use the one that is on the lights already and cut the wires to the plugs, pass them through, and then solder the wires back up again. I used the standard hole that came with the lights, so I didn't require the grommet and cut it carefully away. If you chose to do what I did, just be careful not to start slicing the wires.

Additionally, some ballasts are more susceptible to heat than others. For this reason it is suggested that you mount the ballast somewhere that will allow for good heat dissipation, and away from the engine or other heat producing sources. Additionally, some ballasts are not water resistant, and therefore should be mounted somewhere where water will not get at them.

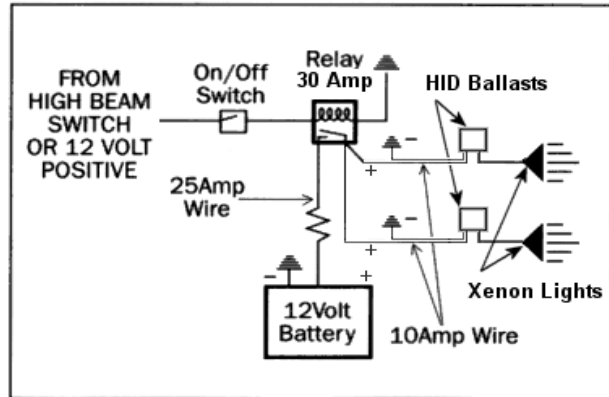
## Step 3: Fitting the globe

Okay, it's the home stretch! All that is now left to do is simply fit the new H1 Xenon globe into the housing. Now before we go any further – I can not stress enough that you should never touch a Xenon globe (or any halogen globe for that matter) with your bare fingers as this will shorten its life. I will spare you the technical background on this matter – but I will say that touching the glass on these globes with bare



hands leaves oil residue behind on the glass, and over time this oil will lead to the quality of light diminishing, or worse still - cracking.

Now when fitting the globe to the hosing, you may need to modify the base slightly (trimming). I was rather lucky as my light went straight into the fitting with no modification required – though the retaining clip needed to be bent slightly to fit the wiring which now had 2 wires, not 1 as it originally had.



#### Step 4: Testing and comparing

Well, that's about all there really is to modifying a light to fit a HID system. All that's left to do now is put the light back together, and place it onto the vehicle (I'm sure you don't really need pictures for this bit). Then all you need to do is test the lights and see how they work.



We now know that they work fine, but how do they compare to the halogens that I tossed out? Well, I guess the facts speak for themselves. This lights produce a cleaner light, with better contrast, and they illuminate the road much further.



## Important things to keeping mind

There are a number of things worth keeping in mind when it comes to HID lights:

1. Xenon bulbs last considerably longer than standard halogen bulbs, but like everything, they do have a limited life span too. There are actually several characteristics worth noting that indicate that a bulb is approaching the end of its lifespan, just so you won't panic and think something is actually wrong with your setup. When the light is near its use by date, it will begin to dim, producing less and less light and can at times cut in and out like a faulty florescent household light. Visual signs include blackening at the ends of the arc tube and electrode tip deterioration.
2. Depending on where you live and the laws pertaining to your state, installing HID lights into a vehicle not originally equipped with them from factory can technically be illegal. You should enquire with your local traffic authority before considering such a conversion.
3. Although it produces 5% of its output when first ignited, the HID light requires a few seconds (usually 15-20) to come up to full output. Also, if power to the lamp is lost or turned off, the arc tube must cool to a given temperature before the arc can be re-struck and light produced.

Well that's about it. I hope this guide is somewhat helpful in assisting you with your own project, and remember – above all else, don't be afraid to experiment. Now you will have to excuse me as I have another set of lights to modify.

*Rhys*

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