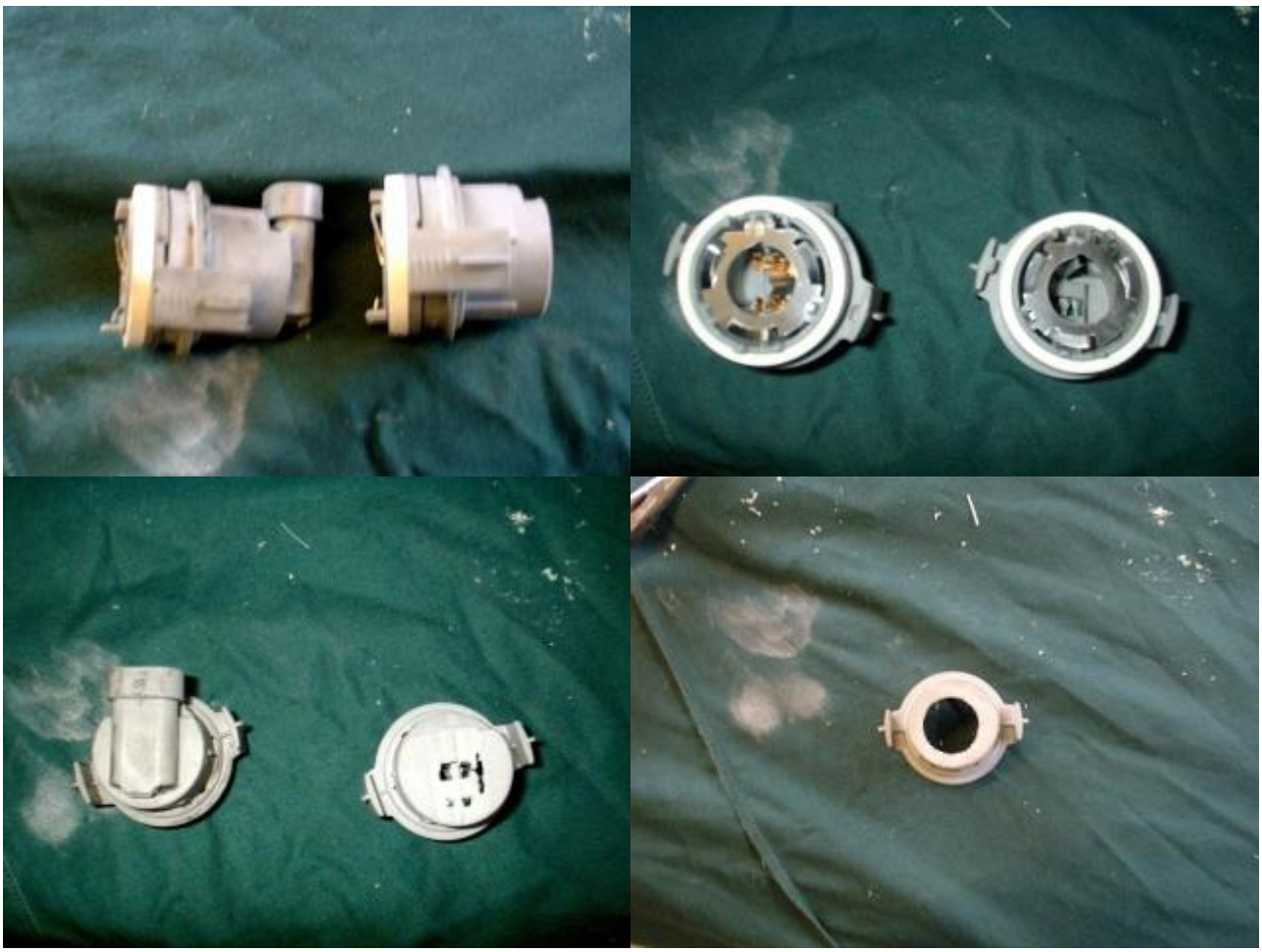
E46 HID Install

(First a disclaimer: www.e36coupe.com and I cannot be held responsible for anyone attempting to fit aftermarket HID kits to their cars, this guide is for reference only and is not intended for general use)

Right now that is out of the way, I have split the install into three parts:

Part 1: Lamp-holder Modification.
Part 2: Installation into Headlight Body.
Part 3: Bi-Xenon Modification.

Part 1: Lamp-holder Modification.



I advise buying two new holders from the dealers to modify so the standard halogen lamp can easily be put back into the headlight, price per lamp-holder is approx £5.00.

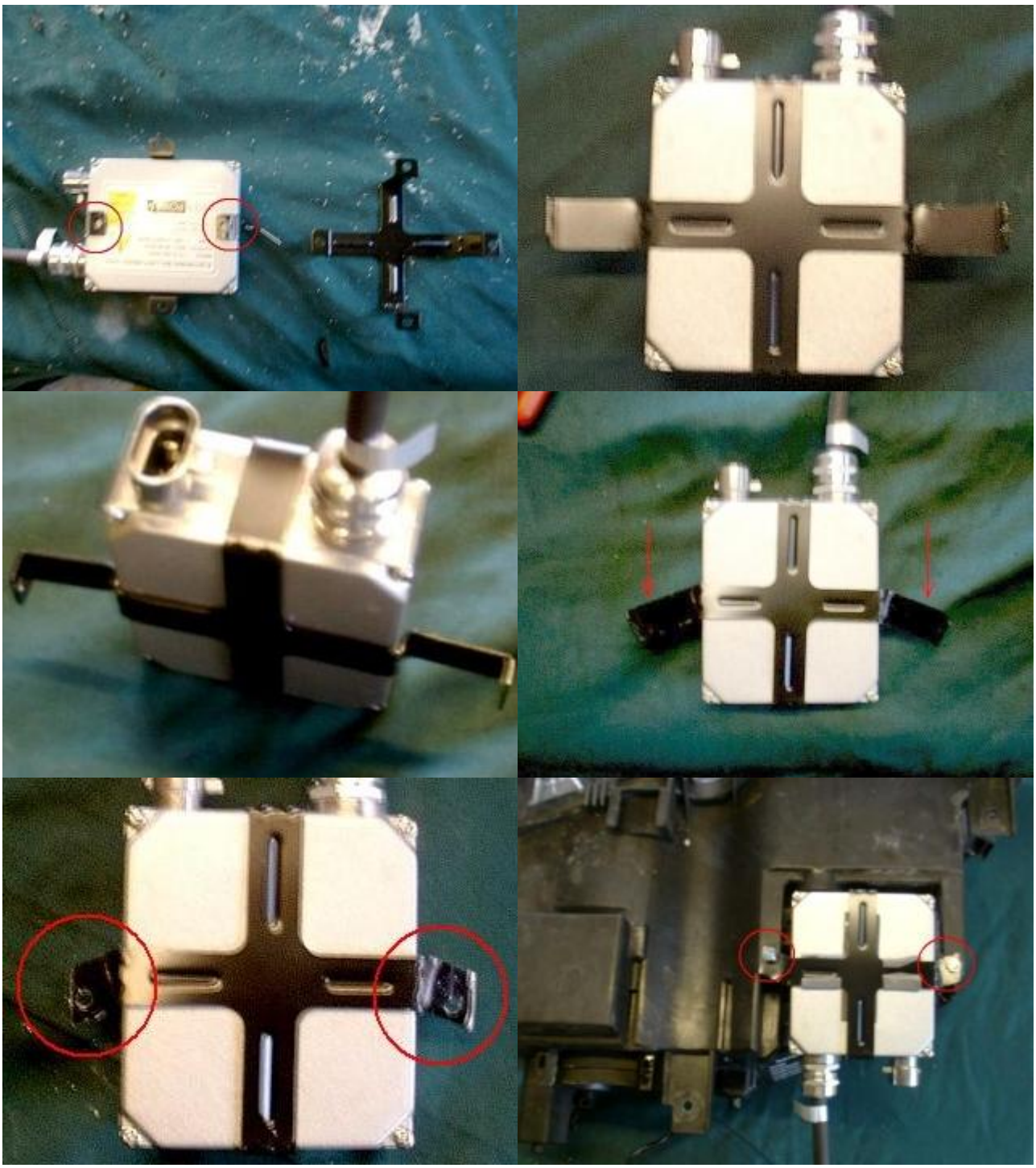
In the first set of pictures above, the standard lamp-holder is on the left, modified on the right. The holder takes an H7 bulb, but has a HB4 standard socket on top. Carefully, cut the socket off flush with the back (carefully work on the lamp-holder as it is made from a brittle high temperature plastic).

You will see the female connectors in the lamp-holder for the H7 bulb and the plastic supports for them pull off the metal ring and remove these with a Dremmel, or I used a pair of long-nosed pliers to snap out the connectors and supports. Take care not to remove the bulb retaining ring supports.
Now drill a 22mm hole in the back of the modified lamp-holder and de-burr the edges of all cuts.

The HID kit I purchased came with a 12v connection ‘loop back’ side to the lamp, but the ballast 12v supply plug used the HB4 connection, as is on the wiring loom. On the E46 this was not required, so snip off the spade connectors and pull out the two wire loom. Save this piece as you may need it later to extend the lighting loom if it won’t stretch to reach the ballast. As you can see the H7 HID lamp base will sit in the headlight housing, but how is it held in there? Read on….
Cut the lamp-holder bulb retaining ring and slide it over the two high voltage cable cores.

I had to trim the inner of the grommet to get this through the lamp-holder front to back. Carefully feed the bulb and wires through and pull the grommet out of the back, push the grommet lip back in and around so it seals around the back of the holder, now carefully pull on the wires at the back feeding the HID bulb and base into place. Clip the metal bulb ring back into the lamp-holder. Make sure the bulb tab sits squarely between the two pins on the lamp-holder; there should be enough pressure from the grommet to hold the base in position.

Part 2: Installation into Headlight Body and Wiring Issues.



Part 2 is much kit dependent as the ballast brackets differ from kit to kit. With the type I purchased, I bent the back-front fixing tabs of the ballast bracket around the ballast to clamp it in there. Next bend the left-right tabs back towards the ballast base, pictures 2 and 3 above show this. Now bend them at an angle.

This bracket/ballast assembly should now sit snugly in the OEM place for the ballast on the headlight body (all headlights have these ballast fixings whether Xenon or not). Drill 2 x 4mm holes and cut the tabs off neatly. Use 2 x 4mm nuts bolts and shake-proof washers to bolt it onto the underside of the headlight, I used 4 little pieces of 3M tape to cushion and stick the ballast in modified bracket to be extra secure . Other kit's brackets may or may not adapt so easily.

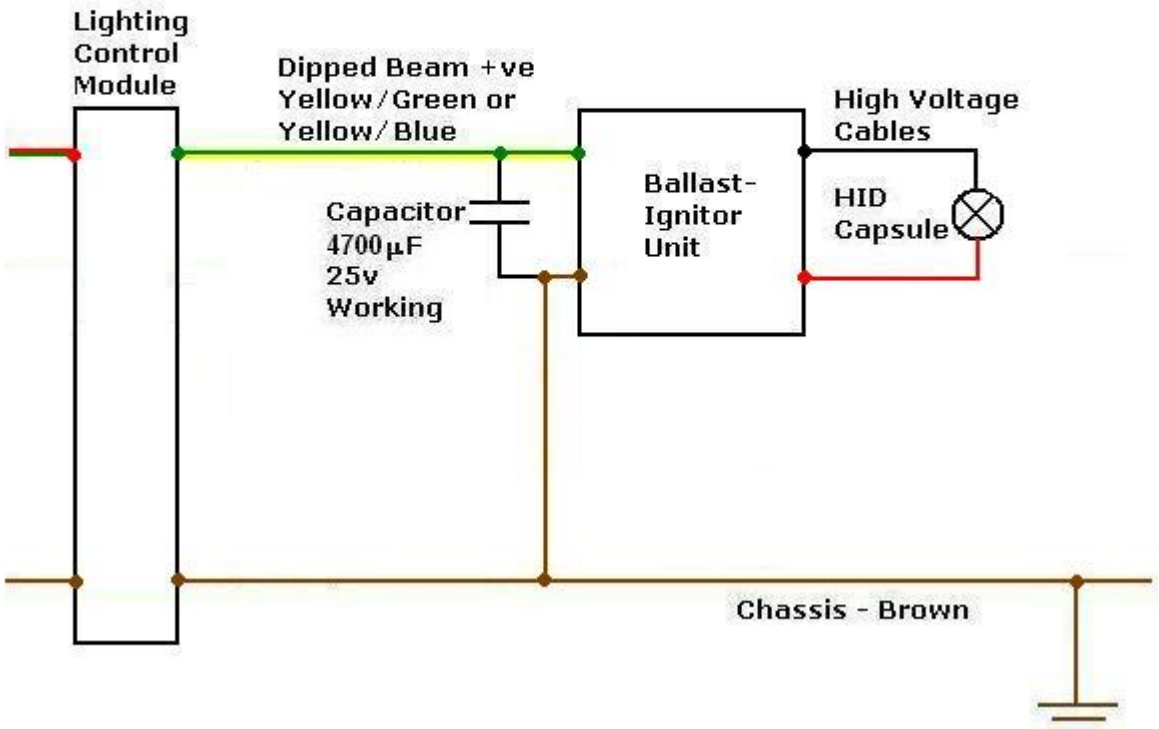
Turn the headlight the right way up, you should have something like the above. Fit the modified lamp-holder and HID bulb into the headlight low beam and plug the two high voltage wires together.

I have omitted removal and re-fitting of the headlight as all workshop manuals deal with this.

Now if the low-beam loom won't reach the ballast plug, you can use that saved wire that was snipped off during the lamp-holder modification to extend the car loom. Refit the headlight assembly back into the car and plug in all connectors – high and low beam, side/parking lights (or CCFLS etc), and levelling motors. A tight fit, plugs are almost up against the air filter on the passenger's side and washer bottle on the driver's side, but they do fit, and neatly tucked away there.

That's it all done. Or is it????.....

The kit claimed to cover all bulb failure warnings on the E46 or any other later car models, but I had intermittent problems with the check control when the engine was running. I noticed that when the bulbs were lit I sometimes had bulb failure and pulsing of the brightness of the bulbs. I measured between 13 and 13.2v on the meter. The relay/resistor fix that is talked about on many forums did not work in my case, so after many trials/errors I came up with this:



I spliced a 4700 Microfarad 25v working electrolytic capacitor (cost about £2.00 from an electronics store) across the supply to the ballast (low beam of the loom), make sure it is wired correctly +ve and –ve, it is polarised. This did not work at the LCM side in the dash, only across the loom near to the ballast, in the engine bay.

Repeat for the other side. Have the headlight's beam adjusted now at your local garage.

All fixed, done and dusted. Enjoy the finished job:

On the left standard halogen and on the right H7 HID 6000K, both sides with 7000K CCFL Angels.

Thanks to all who have helped with this install (you know who you are!).

JohnW. 17/02/2006.

Part 3: Bi-Xenon Modification Below.

Part 3: Bi-Xenon Modification (pre-facelift E46).

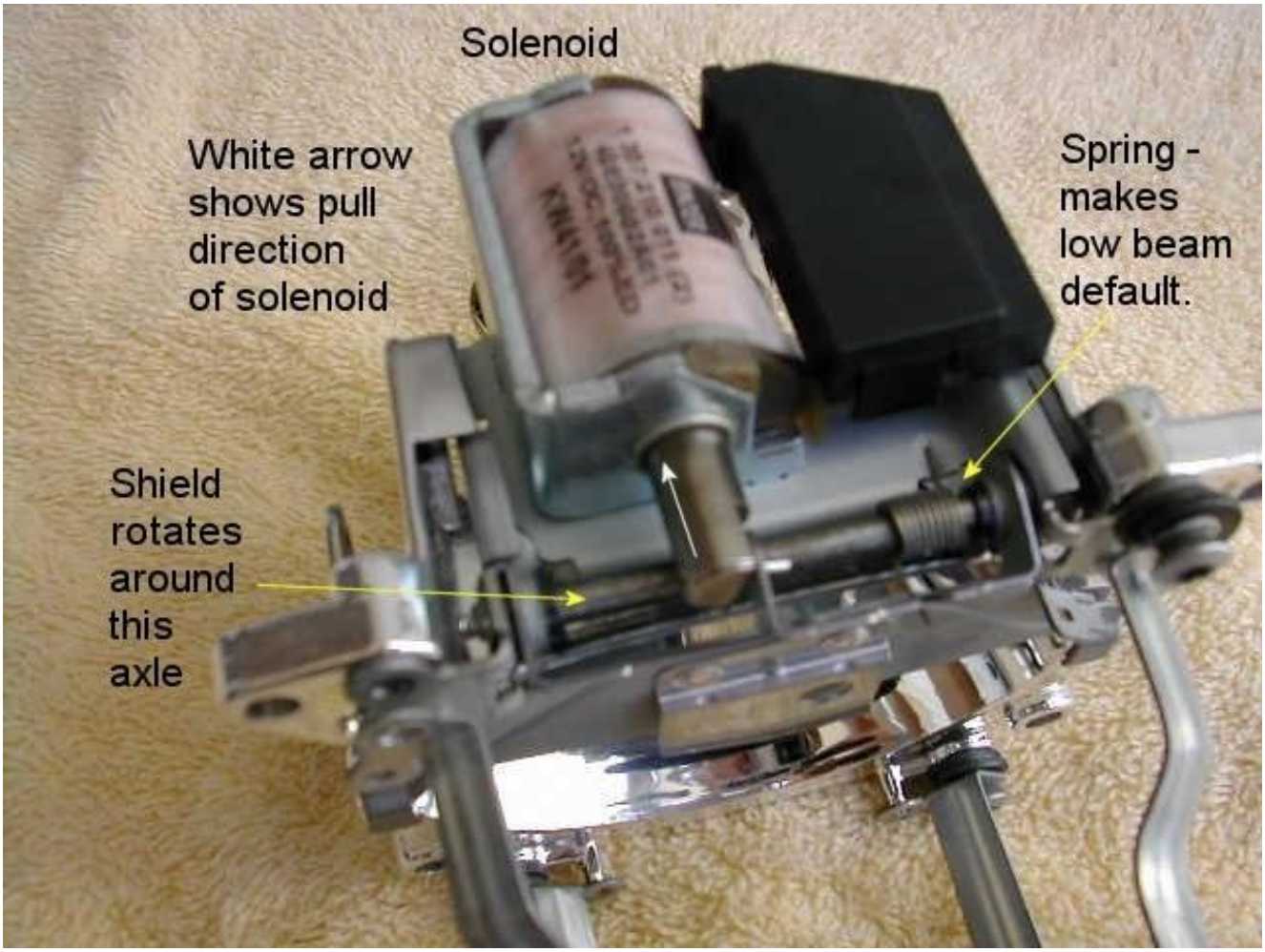
1. Unhappy about low beam cut-off and possible problem glare with the HID kit fitted in standard reflector headlight housings?
2. Not pleased with the lighting ‘throw’ the new HID kit is giving in the reflector headlight housings?
3. Don’t want to fit a second HID kit for high-beam Xenon lights?

If you can answer ‘Yes’ to one or more of the above, there is a solution, rather than going full out for the OEM BMW complete Xenon install.

You will need:

1. A pair of E46 Bi-Xenon headlight units, with or without any ballast or ignitor installed. You can generally pick these up used for about £200-£300 a set from scrap yards or on-line sources.
2. A pair of D2S bulbs of your colour output choice e.g. 5000K, 6000K, 7000K etc.
3. If they are not fitted in the headlamps. A pair of D2S bulb connectors, about £15 on-line.
4. 2 x in-line fuse-holders and 2A fuses.
5. A roll of silicone self-amalgamating or self-fusing tape. £5 at B&Q.

To explain the bi-xenon principle in the E46 headlights, refer to the picture above. It is of the bi-xenon system removed from the headlight. To the back left is the bulb-holder in the reflector. Centre is a shield, normally held vertical with a spring; this is what gives the xenon projectors the crisp cut-off line on dipped beam.
There is a solenoid behind this, normally controlled through the headlight LCM and BMW ballast, this is operated when high-beam is selected; the solenoid pushes the shield down to allow the full effect of the HID lamp through the lens on the right (in other words high-beam). When high-beam is de-selected, the voltage to the solenoid is cut and the shield springs back.

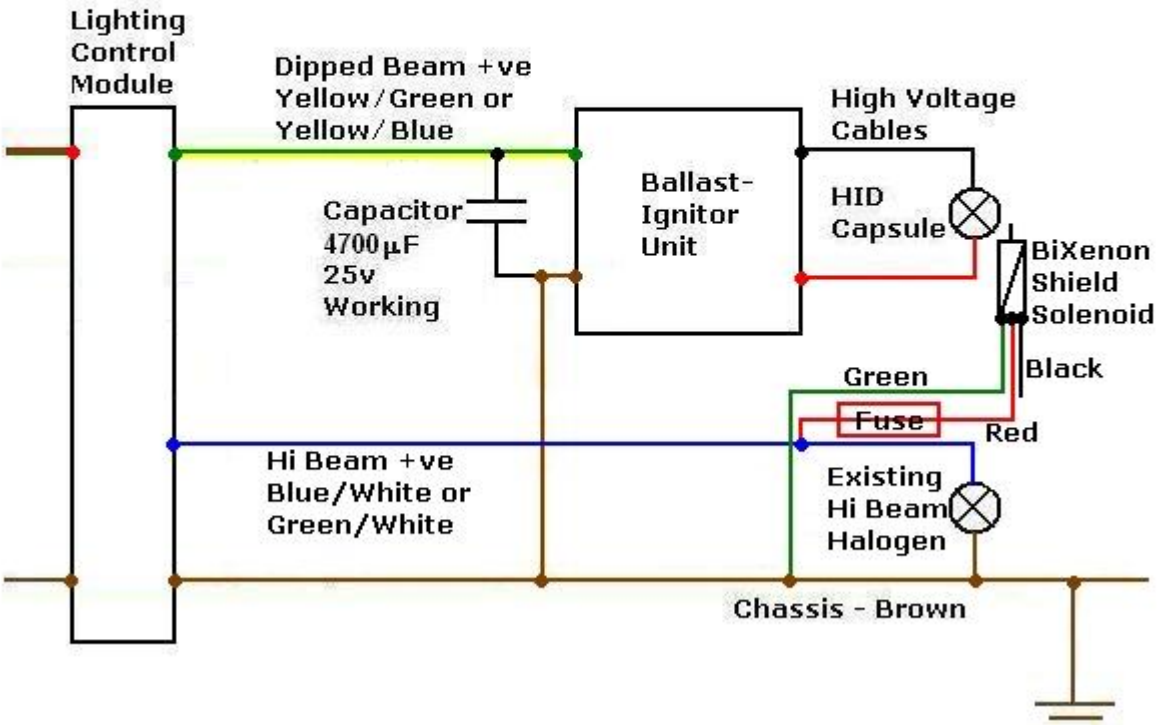


As you can see in the picture above, it is an intricate piece of engineering. How do we get this to work with the aftermarket kits?

Working with the headlight units removed, they are physically as near as identical to the non-Xenon headlight body, so you install the ballast in exactly the same way as in Part 2. The D2S bulbs fit the bulb-holders.

You now need the two D2S connectors and HV lead sets. They are sometimes left just cut off in the headlight, but if not you will need to buy two from an on-line source etc. As you are using the new D2S bulbs, you will need the leads with plugs from the original H7 based bulbs in the kit, so cut these off the kit bulbs. Remember that these will have 23000 volts across them at start up, so you need to make good soldered joints here; solder the D2S connectors and leads to the kit leads, make sure polarity is correct – red or white to the inside pin of the D2S connector, black to the outside. Wrap these two joints VERY well in the self-fusing tape, at least three or four layers of the silicone tape required.

The back covers on the Bi-Xenon units are much like the plastic caps on the E36 headlights. I cut a 20mm hole in the back of each and fitted 20mm closed grommets, cut just enough out of the grommets to pass the plugs out through the back of the caps. Fit the connector to the bulb, clip the cap back on and plug in the two high voltage leads to the ballast leads, same as in Part 2. This is the high voltage side completed.



On the back of the solenoid there is a mini circuit board with a three pin socket and plug. Again the lead may just be cut off and left inside, but if not then the original wiring colours from the plug left to right are Green, Red and Black. I traced and tested this wiring to find that Green is to the Chassis/Earth -ve, Red and Black are both 12v +ve.

So applying 12v across Green and Red (or Black) drops the shield for high-beam. The solenoid operated slightly quicker on the Red wire (I assume the two separate switch wires are normally used for high-beam and 'flash'?), so I extended the Green and Red wires out through the headlight body, near to the high-beam halogen side and through a small hole made in the rubber boot; out of the housing I wrapped all in insulation tape to make a neat loom. With the Green use crimp connectors to connect onto the brown of the high-beam, close to the bulb plug. Red I passed through a 2 amp in-line fuse to protect the solenoid, and then crimp connectors to the +ve of the high-beam (either Blue/White or Green/White), again close to the bulb plug.

So now when the high-beam is switched on, the solenoid drops the shield and you get both Xenon and Halogen High-beam, all as per OEM operation.

Finally replace the headlight units back in the car connecting all plugs, same as Part 2 with the addition of the high-beam solenoid connectors to the high-beam halogen side. Have both headlights aligned at your local garage.

Job is now completed, except for a couple of gratuitous pictures to show off the new Bi-Xenon install (taken in the rain BTW).

Thanks to all who helped again.

JohnW. 18/02/2006.

Dipped beam.

Sunglasses required for High Beam.