



Xenon Headlight Conversion

Converting a late-model BMW to Xenon lighting is a simple plug-in job, but what about older cars? We find a kit that does the job.

Shifting down the outside lane in a world of your own and suddenly from behind you see bright white lights with an intermittent blue flicker. Instinctively, your heart skips a beat, you switch off the cruise control, drift into the second lane and resign yourself to the fact that, unless they're with in half an hour of the end of their shift, you're about to see some even bluer lights and quite a bit of hard shoulder.

As the car pulls alongside, you look across in anticipation of the usual patronising gesture, only to see some marketing director type in a new 7-Series, making his way unconsciously home to the Berkshire burbs. His car has a Xenon lighting system, the most significant technological advance in automobile lighting since tungsten bulbs gave way to halogen. But what exactly is Xenon lighting and how does it differ from the conventional halogen headlamp?

We got in touch with CA Automotive (01252 792572), expert in the field of white light, which was not only able to blind us with the necessary science, but also to demonstrate the process of converting halogen headlamps to Xenon. We first need

to familiarise ourselves with a bit of jargon, though, in order to appreciate the benefits of such an upgrade.

The same system is also referred to as HID (High Intensity Discharge) lighting. The obvious advantage is that it's much brighter than halogen, but to effectively measure brightness, and other inherent qualities of light, bulb boffins use recognised units such as Candela, Lumen and Kelvin. Candela (from the word candle) is a measure of light intensity, concerned in particular with spread and reach. Lumen is the unit used for calculating luminous flux (the bundling of the light) and Kelvins indicate thermodynamic temperature or colour temperature (whiteness).

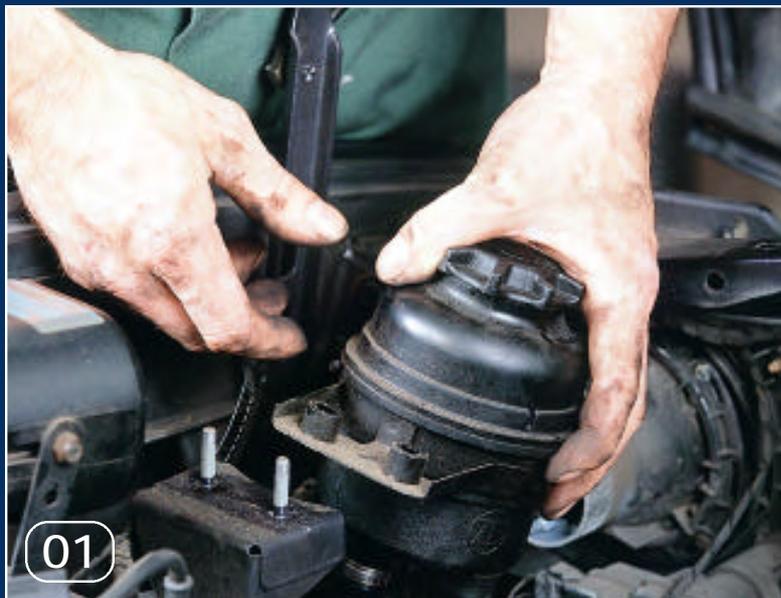
The table below outlines the benefits: CA Automotive supplies and fits — if required — the Target UltraVision Xenon conversion.

If you're a competent DIY mechanic you shouldn't have any problems, although Roy at CA Automotive will happily assist with any technical enquiries over the phone. Kits are available for high beam conversions as well, but Roy is quick to point out that great care must be taken if you fit them, because they will seriously dazzle oncoming traffic.

The guinea pig vehicle is our 1996 model E34 520i. The conversion is basically the same for most BMW models, although the removal of certain components to provide the necessary access may vary. Guiding us carefully through the step-by-step procedure of installation is auto electrical expert, Giles. He works for Chesterfield-based Auto Select, which acts as fitter on behalf of CA Automotive for its more northern-based customers.

	HALOGEN H1	XENON H1	SUNLIGHT
Wattage (W)	55	35	N/A
Candela (CD)	67,500	202,500	infinite
Lumen (Lm)	1500	3200	8400
Kelvin (K)	3200	4100	6000
Light Colour	yellow/white	pure white	N/A
Lifetime	400 hours	3200 hours	hmmm...

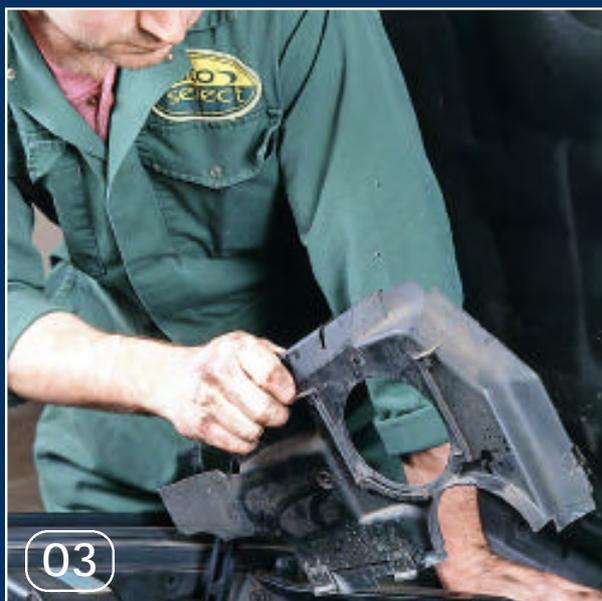
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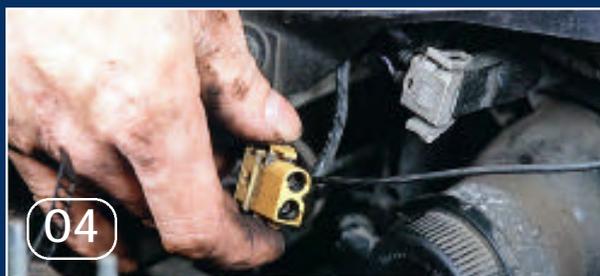
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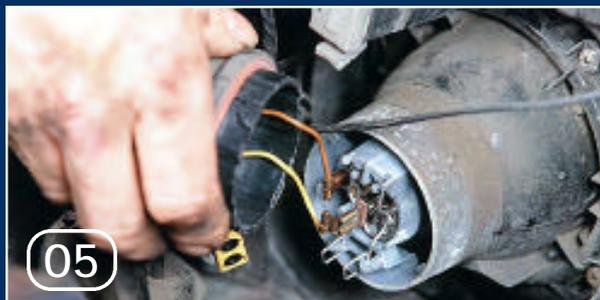
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SAFETY

The first rule of working on cars and using tools of any kind is don't take risks:

- If you're using power tools, protective gear is essential.
- Never work under a car without supporting it using axle stands first.
- When cars catch fire, they burn fast. Always have a fire extinguisher to hand.
- If you're not completely confident in your own ability to complete any task safely, don't even start it. Leave it to the experts.

The advice and guidelines given in Total BMW magazine are given in good faith and neither Total BMW nor A&S Publishing can take any responsibility for injuries sustained while carrying out the described tasks and procedures, or any consequences arising therefrom.

1 Starting with the nearside lamp on Nick's E34, the power steering fluid reservoir needs to be loosened. It isn't necessary to disconnect the hoses and spill fluid everywhere, though. Removing the two 10 mm bolts and tucking the reservoir as far out of the way as possible is sufficient to gain access.

2 The airbox is in the way too. There's a coolant temperature sender which needs undoing first, then the 10 mm fastening bolts which locate the box on the inner wing can be removed, along with the induction hose to the air flow meter. Then the entire assembly can be lifted out of the way.

3 Next, remove the plastic cover from the back of the light. There are two screws on top of the cover which need just a quarter of a turn to release them.

4 Disconnect the two-pin electrical connector from the back of the light unit (it's obviously the outer of the two lights that we're referring to here, as we're only concerned with the low-beam conversion)...



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5 ... and pull off the round black/grey cover that you've just unplugged. You can now see the base of the standard halogen bulb. Unclip it from its mounting and discard it.

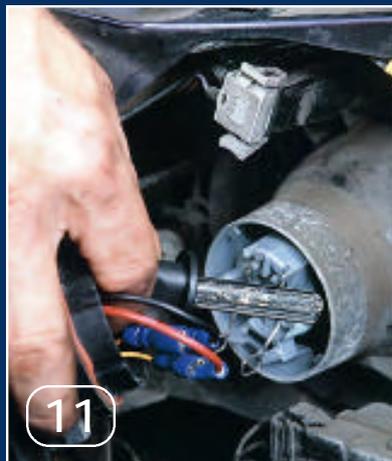
6 The round plastic cover/connector is retained for the conversion and here's where you need to adapt it to suit: using a drill with a 25 mm hole cutter attachment, find the exact centre of the cover and then cut it out. Use a decent bit and let the drill do the work. Take care not to apply too much downward pressure which could crack the cover/connector.

7 Take one of the Xenon bulbs from the Target UltraVision kit. Remove the plastic cover from the glass of the bulb (take care, as Xenon bulbs are extremely expensive to replace, although they aren't particularly affected by skin contact, unlike halogens). Here you see the bulb with its integral cable tree. The insulated connectors at the bottom of the picture will be wired, in circuit, to the remaining components in the kit, but pay particular attention for now, to the two wires with male spade ends protruding from the bulb-side of the insulating grommet.

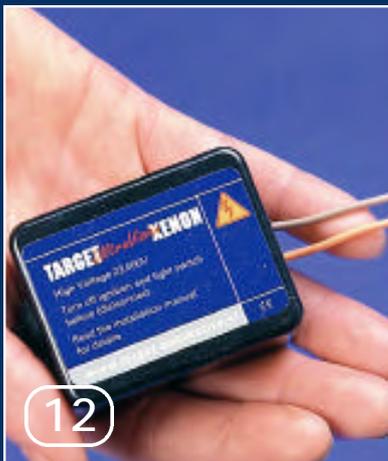
8 Giles is now feeding the Xenon bulb and cables through the cover/connector from the rear. The bulb obviously has to be on the inside, but note also that the two spade-ended wires do as well, while the insulating grommet and aftermarket plugs and connectors are left protruding from the rear.

9 The spade-ended wires connect up to female terminals — which are part of the car's original wiring harness — on the inside of the now modified cover/connector. The red wire is of course live and the black, earth. This is how the conversion taps into the existing 12V power supply.

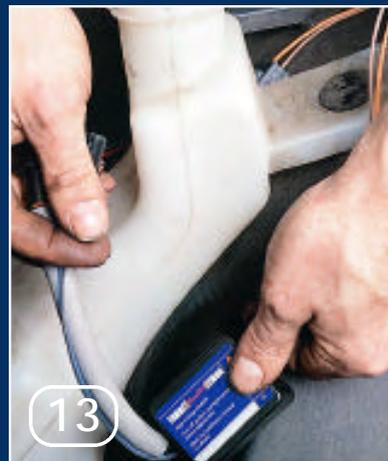
10 Here you can see the electrical plug fitting, which is now connected up to the Xenon bulb via the two spade-ended wires. Giles is pulling the slack in the wires out through the back of the cover/connector and fitting the grommet for a watertight seal.



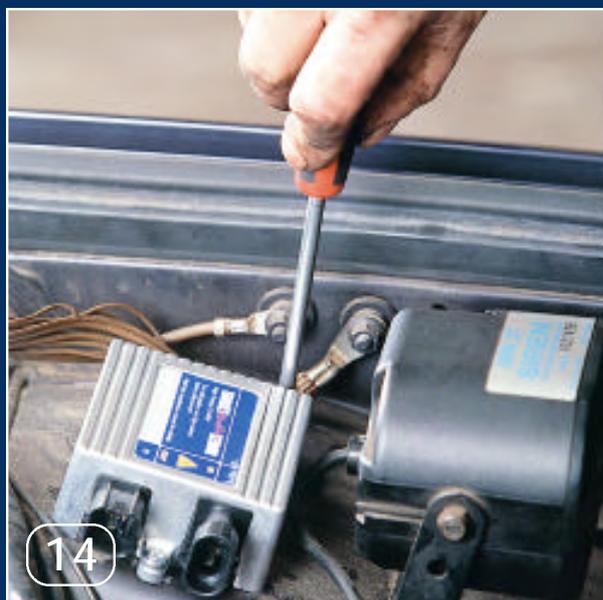
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What It Costs

Target Ultravision Xenon low beam conversion kit	£525
Dual beam kit	£800

11 The Xenon bulb has the same shaped metal base as the halogen item that it replaces. Because of this, it fits straight into the light unit and is secured using the standard retaining clip. Fit the bulb, replace the cover/connector and reconnect the standard electrics.

12 Now we need to fit the igniter and the high voltage converter. Unlike the halogen bulb, with a filament, the Xenon bulb is filled with gas (Xenon gas, as you've probably figured out for yourself by now). Xenon gas remains inert until it's charged with something in the region of 24,000V, and this is why you need an igniter.

13 This is the igniter control box — 12V go in and 24,000 come out the other side (hence the thick insulation around the wire on the left of the box). This amount of current is only used to activate the Xenon, after which time the light source can be maintained with a much lower voltage (approx 400V). It doesn't really matter which way up or around you choose to mount the igniter, but keep it as far from other sources of heat (ie, exhaust manifold, turbo etc) as possible. Do not shorten or lengthen any of the wires between the igniter and the bulb. Their precise length determines their resistance, so that even as little as an inch either way will vary the output by several thousand volts. The back of the igniter has a self-adhesive pad which will adequately secure it to any painted surface, as long as it's clean and dry.

14 This is the high voltage converter or ballast box, which provides the lower current needed to run the lights once the igniter's done its job. Too big for sticky pads, the box is secured using the three lugs about its perimeter. Offer it up into a suitable position where all the lugs can be used to locate it securely. Use a punch or rivet to mark where to drill. As with the igniter, it must be kept cool. Nuts and pan head bolts are the ideal fix, but if you're going to use self-tappers with the converter mounted on the inner wing, beware that the points of the screws will protrude towards your tyres. Use any screws longer than 0.75 inches and you'll need to jack up the car, remove the front wheels and grind off the points of the screws.

15 The wires and plugs provided to connect up the bulbs, igniters and ballast boxes are designed so that they cannot be incorrectly routed. Take your time and don't force anything. If you've carried out all the steps correctly then you should now have Xenon-powered, high intensity discharge headlights. They take a moment to warm up so don't expect instant miracles, but you should see an immediate improvement when you compare them to your old high beams. New bulbs require hours of use before they achieve their peak thermodynamic efficiency, or in other words, they continue to burn more and more white for the first few weeks.

Contact

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