

Ex Libris

The cover illustration shows retrofitted rear headrests at the top, and their installation in progress at the bottom.



The E34 Factory Options Retrofit Guide

Marcus Corbin

E34 Factory Options Guide

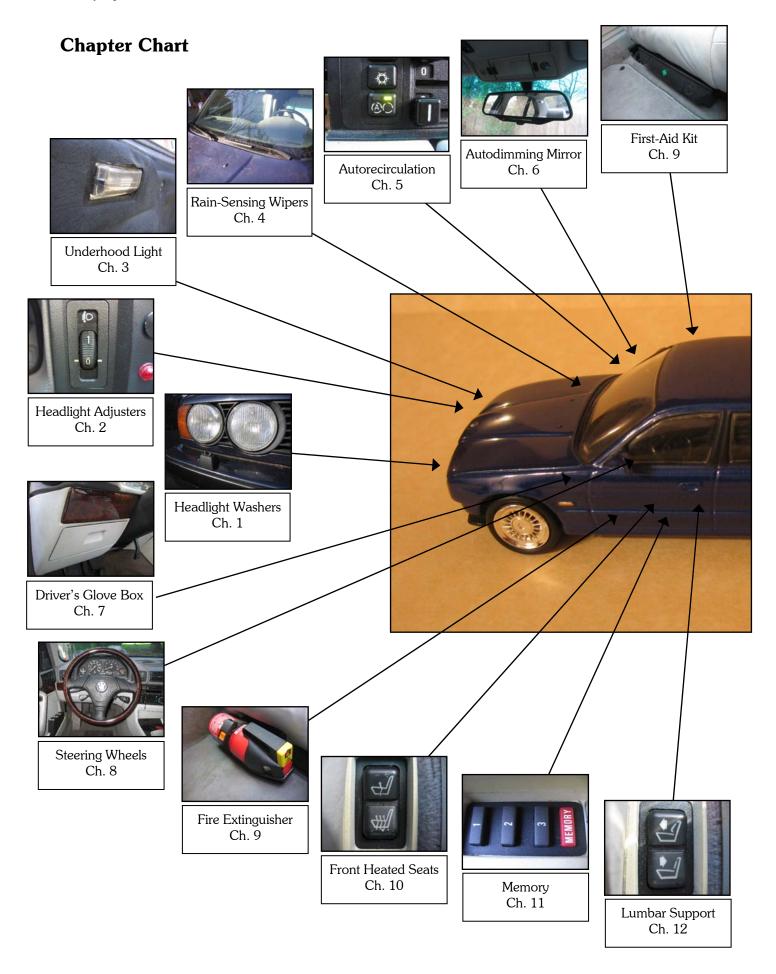
The author gratefully dedicates this book to Caroline and Russell, who generously gave him the precious time needed to create it.

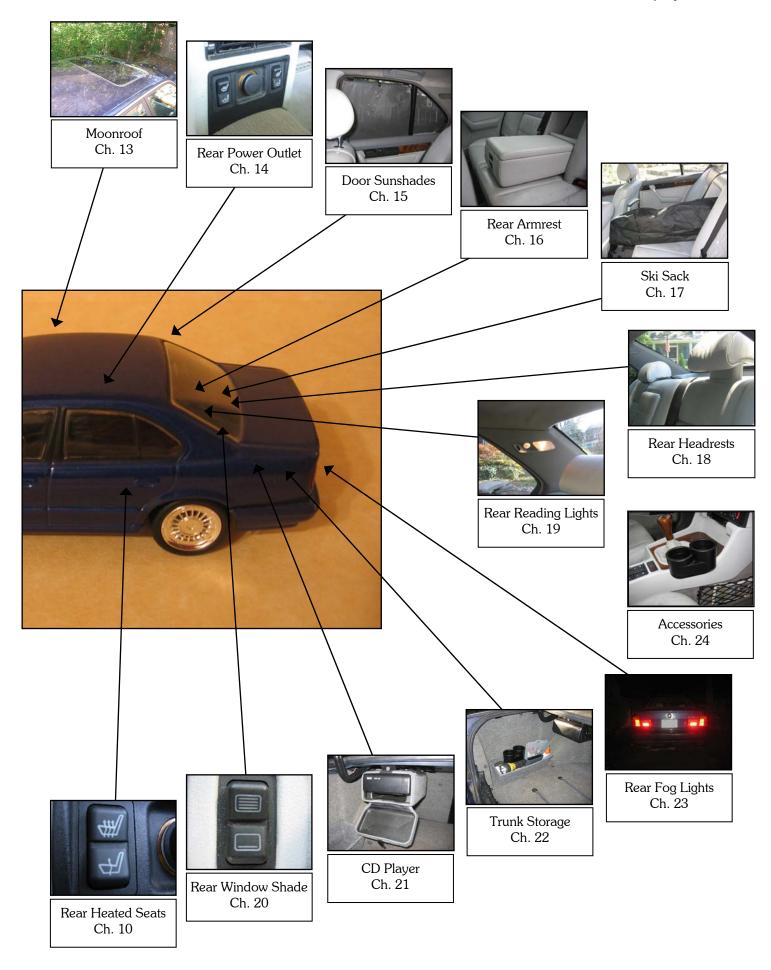
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E34 Factory Options Guide

Foreword

Apart from being an extraordinary vehicle in terms of its engine, handling, styling, and reliability, the Bavarian Motor Works's E34 was designed with a large array of special options – including, at the pinnacle of any extra features list, an independent gasoline-burning heating system, separate from the engine, to warm up the car engine and interior before driving in winter! U.S.-specification vehicles tended to have a lot of luxury features as standard, compared with their European counterparts (e.g., leather, power everything, air conditioning, large engines); but, on the other hand, many of the car's special options, including some very simple ones that would have been easy to include on U.S. vehicles, were available from the factory only on European-specification cars. However, the factory prepared excellent illustrated installation and retrofitting instructions for many of the options, and, in combination with parts procured new or used from Europe, the options can often be easily installed in U.S. vehicles. Frequently, these cars are pre-wired for the accessories, and mounting holes et cetera are often pre-cut, pre-stamped, pre-drilled, or pre-threaded, so installation isn't too hard for people who aren't professional mechanics.

This guide shows the best of the factory special options and how to install them, supplementing the factory instructions when they exist with photographs and additional guidance and tips.

The procedures illustrated in this guide were performed on a 1992 E34 535i sedan, U.S.-specification, with manual transmission, *lazurblau*² exterior, and *silbergrau hell* (light silver gray) interior. The procedures, parts, and part numbers may or may not apply to other years, versions, and colors of the E34. In the guide, references to what the car is equipped with (for example, pre-wiring), et cetera, usually apply to U.S. versions. Note that where parts come in different colors, if part numbers are shown they are usually for the *silbergrau hell* interior. Part numbers are not-infrequently superseded, so check for the latest numbers before ordering. New-part prices are usually approximate prices from discount sources, not the dealer prices.

I recommend reading-around in the guide, because several retrofits cover similar territory (and can profitably be done at the same time), so additional illustration and snippets of information can be gathered by browsing.

Although the information in the guide is believed to be accurate, it may or may not be correct, so use any information here completely at your own risk. The plethora of variations attributable to the different series, country models, equipment packages, years, and so on can in particular lead to inaccuracies. Check all part numbers for yourself. Please contact the author if you believe something is in error or have comments, shadetreebmr@verizon.net. Similarly, nothing in here is intended to encourage or legitimize violating any vehicle laws. Check the laws applicable to the country and district where you live.

On all these procedures, put your brain into action – take a pause as you're working to re-examine what you're doing and see if you've forgotten something, or can use a different approach or different tools to achieve the desired result, especially when something isn't working or coming easily. In particular, if you're having difficulty reaching a part, or getting it off, stop and think about how else you could do it, for example by taking off some other part to increase access. Go slowly. Think about safety.

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Big thanks go to "gunnar525" in Germany, whose superb Website showed me that many of these things were possible to do in the first place; Whit Lowell; and the many others who shared their knowledge. Thanks also in particular to the very helpful folks at Foreign Car Parts and B&M automotive recycling facilities; BMA parts; and Tischer BMW / GetBMWparts.com, for helping me to locate and track down often obscure, mainly-Europe parts.

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 $^{^1}$ References to "European" models in the text may include other non-U.S. models, e.g., Japanese, Australian, South African.

² Apparently from lazurite, a sometimes dark-blue mineral, not to be confused with lazulite or azurite. "Azure" is related.

E34 Factory Options Guide

Introduction: What Makes the E34 Such a Special Luxury Car?

The E34 is special among the luxury cars of its day for the wide range of useful features and options, minor and major, that come together to form a harmonious concerto of complementary systems. The brilliance of the car's chassis and engine are covered extensively elsewhere, but the car's features and options make the process of using a vehicle to go places safer and more convenient, and hence more of a pleasure. The thoughtfulness of a lot of these features is impressive, as is the effort and cost put into to making them available – given that they might not make as much money for the company as other simpler, high-volume, more-standard features. All the options did not come on all the cars, of course, and several options were not made available in the United States, but the factory took the extra steps of making retrofitting easy by providing comprehensive installation instructions, and by making the parts readily available.

The main features that make driving and operating the E34 such a pleasure are described below, grouped under these categories:

- Convenience
- Cockpit
- Seating
- Interior
- Trunk
- Safety & Security
- Touring.³

Convenience

Lighted keys, wallet key, valet key

Key has an integral light.

The lighted key is very handy for seeing where to insert the key at night without scratching the paint. The lightweight and smaller plastic wallet key is a good way to banish forever locking oneself out of the car. (Sidenote: cars after 1/95 do have the security chip embedded even in the plastic wallet key.) The valet key allows others to drive the car but not access the trunk or glove box.

Heated door lock

Activate by holding up the driver's door handle for a few seconds.

A good solution to the simple but frustrating problem of being locked out of one's car by a little bit of frozen water.

Windows and sunroof close from outside

Allows the windows and sunroof to be closed from the outside when locking the driver's door.

A nifty feature that avoids the need to go back into the car and turn on the ignition when one forgets to close all the windows and sunroof. It works by holding the key in the full lock position for a few seconds.

Automatic wiper speed adjustment

Adjustment of wiper intervals according to road speed.

If the wipers are on normal speed, they will switch to intermittent when the car comes to a stop, to accommodate the fewer raindrops collecting on the windshield. A neat feature that reduces the need to keep adjusting the wiper position.

Programmable intermittent wiper interval

A nice option to avoid the problems of a fixed intermittent wiping interval: wipers squeaking across a dry windshield when the interval is too short and it is barely raining, or the windshield not getting cleared when

³ "Touring" was the name for the E34/2 "station wagon" or "estate" version of the car.

the interval is too long. The feature may not have appeared on many, or U.S., models, but is mentioned in technical manuals.

Wiper pressure variable with vehicle speed

A lever mechanism pushes the wiper blades harder against the windshield at higher speeds.

This might not be the most useful feature at less-than-Autobahn speeds, but I haven't seen it in use. The different feature of a fixed "wing" that helps hold down the driver's wiper blade may provide some measure of similar benefit at far less complexity.

Intensive windshield cleaning system

Sprays separate, stronger cleaner on the windshield. (Intensivreinigung)

Perhaps useful to get those glued-on bug smears off the windscreen. The system uses a separate smaller tank to hold the intensive cleaning fluid. A special wiper stalk is used.

Rearview mirror parking adjust

Right rearview mirror tilts down automatically when in reverse.

This clever but simple-to-implement feature is very useful to avoid scraping the wheel rims on curbs when parallel parking. The feature may be deactivated by setting the power mirror adjustment selector switch to the passenger position.

Parked-car ventilation system

When parked in the sun, the heater / air conditioning blower fan can be set to turn on automatically while the car is locked and the engine is off. (Standlüftung)

The system pulls in (relatively) cooler air from outside and forces out the hot air from the interior. Very handy for those hot summer days when cars act like ovens.

Parked-car independent heating system

An ingenious system that uses a small gasoline-burning furnace to warm coolant, and a pump to circulate the coolant through the engine and passenger compartment, warming them up before you get in the car. (Standheizung)

Not available in the United States, perhaps for liability reasons, but of course can be retrofitted using the extensive, but clear, installation instructions.

Headlight/fog-light washers

High-pressure sprays that clean the lenses. (Scheinwerferreinigungsanlage, SRA – "light-thrower-cleaning-system"!)

The system has nozzles that mount above and below the bumper to spray the lenses. It uses high-pressure fluid rather than wipers for its cleaning action.

Underhood light

A light mounted in the hood that comes on automatically when the hood is open and the parking lights or headlights are on. (Motorraumbeleuchtung – "motor-room-lighting")

This was on the early cars, then disappeared, then reappeared on at least one later year. It can be retrofitted, although some new wiring will need to be added. The numerous convenience lights on the car are worth noting: engine room light, four individual map lights, trunk lights, key lights, vanity mirror lights, and glove-box flashlight. The interior lights can be turned on by lifting the door handle, without opening the door. They also come on automatically at night after taking the key out of the ignition, nowadays a fairly common feature.

Floor mat clips

Neat integrated studs in the carpeting that fit into locking holes in the mats.

These are nice to avoid the irritating repositioning of other floor mats that seem to constantly creep out of position, and work better than the infirmly-attached clips in some other cars.

Cockpit

Leather steering wheel, with power telescoping adjustment

Electric adjustment was a very late option in the United States, though it seems to have been available in Europe at least as early as 1992.4

Leather or wood gearshift knobs

A variety of attractive knob designs are available from the factory.

Automatically-dimming rearview mirror

Dims inside rearview mirror to reduce glare at night. (Automatisch abblendbarer Innenspiegel)

Many cars are pre-wired for this option, and all that needs to be done is plugging the vehicle's wire connector into the new electrochromic mirror. There are two or three different wire connector types, however.

Stratified heating/fresh air

The temperature system can be set to provide warm air to feet, cool to the face.

This is useful for staying alert with cool air on the face, while keeping the rest of the body warm.

Individual front map lights

On the headliner near the rearview mirror in many cars is a light console, with the main front interior light plus one map light each for the driver and passenger. All three can be set individually to "on," "automatic control," or "off." The map lights are small beams so are useful for reading without blinding the driver with the main interior light.

Driver's glovebox

Yes, a nifty second glovebox was available in Europe, to the left of the steering wheel. It is quite a bit smaller than the main glovebox. The stock installation of the storage box requires removal of the knee safety bolster, so don't put in the box if you're going to be in an accident where your knees hit the lower dash.

Coin tray

A special insert into the door map pockets was available to hold coins at-the-ready for toll booths, etc.

Instrumentation and warnings

The masterful Check Control system and the on-board computer (OBC) set this car apart from many even luxury vehicles of its day with their many useful functions, both for long trips and for safety monitoring. Of particular note for convenience: the systems alert you to inadvertently leaving the lights on, the parking brake on, or the key in the ignition, and to various low fluid levels and worn-out brake pads. Of particular note for safety: the systems cleverly let you know about burned-out bulbs, low brake pressure, and open doors while driving.

Check Control shows the following comprehensive information on a display in the instrument cluster:

• Low-fluid warnings:

- brake fluid
- engine oil
- engine oil-level sensor problem
- coolant
- power steering fluid
- washer fluid.

Other fluid warnings:

- brake pressure low
- oil pressure low
- coolant temperature high.

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⁴ An early European sales brochure noted, "In order to guarantee perfect airbag [operation], the steering wheel is not adjustable for reach." 8 11 05 09 20 (2/88).

• Burned-out-bulb warnings:

- brake lights
- tail lights
- parking lights
- headlight low beams
- fog lights
- license plate lights.

Other warnings:

- brake pads worn out
- brake light circuit fault
- door open while moving
- trunk open while moving
- parking brake on while moving
- headlights on when driver's door is opened
- key in ignition when driver's door is opened
- suspension leveling fault or overload (when equipped)
- automatic transmission fault (when equipped)
- Check Control system problem.

On-board computer

This full-featured trip computer calculates and shows several types of information. The readouts can also be displayed in the instrument cluster, in a programmable order and selection. The information includes:

• Outside temperature display

Also usefully chimes when near-freezing temperatures are reached.

Clock

12- or 24-hour display. Can be set to chime just before the hour – for example to remind you to listen to the news on the radio.

• Trip information:

- average mph
- distance to destination
- estimated arrival time (based on average mph)
- range (based on average fuel consumption)
- fuel consumption (two separate time spans are available)
- timer.

A warning can be set for reaching a pre-selected speed

A tone sounds each time the speed is reached. Useful to let you know when you're going a lot faster than this quiet autobahn-vehicle is leading you to believe

Other displays:

Fuel consumption gauge

Not to be confused with the average fuel consumption readout on the OBC, this gauge shows instantaneous mpg.

• Service-needed indicator

Shows when to get service, according not just to mileage but also to usage patterns.

Seating

Seat and mirror memory

Three sets of positions for front seats and outside rearview mirrors are programmable. (Switches are on outboard side of seats, aft of the seat position switches.)

An invaluable feature if more than one driver uses the car.

Power front seat-base height and angle

Front and rear of the seat bottom can be raised and lowered independently, allowing tilt angle adjustment. (Switches on outboard side of seats towards front.)

An unusual and welcome feature is the ability to adjust the slope of the front seat bases. Switches are an intuitive design echoing the shape of the seats.

Power front headrests

Electric height adjustment. (Switch is incorporated in the seatback angle switch.) Angle of headrests (i.e., tipped forward/back) can also be changed manually.

Front seat heating

Two-stage electric heating. (Switches on inboard side of seat base.) (Sitzheizung)

Automatically-adjusting seatbelt height

Upper seatbelt location points move up or down b-pillar as seat is raised and lowered. Helps avoid seatbelt chafing on the seat occupant.

Power lumbar supports

Mechanical (rather than pneumatic) lumbar supports for front seats, electronically adjustable. (Switch on inboard side of seat, aft of seat-heating switches.) (Lordosenstütze)

Does not seem to have been supplied in the United States on E34s, but easily retrofittable.

Power thigh support⁵

Front center segment of seat base can be extended forward. (Switch on outboard side of seat, aft of seat memory switches.)

I can't imagine why this is useful, but perhaps long-distance autobahn jockeys find it a boon. Extremely rare in the United States, perhaps only found on M5s.

Rear seat heating

(Switches are at rear of front center console.)

Only found on M5s in the United States, and not always then.

Rear power headrests

With power version, headrests lower automatically if rear seats are occupied. (Manual-adjust switches are on front corners of the seat base, on the side.)

Another M5 option. Interestingly, manual headrests were standard on U.S. E32s (same parts as E34, except for early-on), and a few of those had power.

Outboard rear seatbelt latches

Fixed latches towards the outside of the car, adjacent to the doors, rather than toward the centerline of the car. This unusual (watch people trying to find the seatbelt!) but innovative setup allows the belts to be latched with one hand since the latch receptacle is fixed in place. More importantly, the arrangement helps prevent passengers from colliding with each other in a side-impact accident.

⁵ This is one thing that determines the designation "Sports seat." Sports seats have the adjustable thigh bolster, and are extremely rare in the United States. By far the most common seat in the United States is the mid-line seat, that is, the seat on which the seams in the center of the seat base run left to right; in contrast, the basic seat (sometimes in cloth or vinyl on a few U.S. 525i models, particularly those without wood trim) has the seams on the seat base running in narrower strips front to back.

Interior

One-touch window operation⁶

One-touch (switch needs only to be pressed briefly, not held down to go all the way up or down) front windows, one-touch down rear windows.

The absence of one-touch up on rear windows is presumably to reduce the chance of a child getting caught in an automatically-rising window.

Individual temperature control for driver and front passenger

Separate temperature dials for front occupants. Driver's control overrides passenger's when driver's is set to full cool or full heat.

A wonderful innovation to suppress marital squabbling over the interior temperature!

Microfilter for interior air

These cars had the rare feature of a filter for the air breathed by the occupants of the vehicle. Quite nice for blocking everything from diesel soot to allergens.

Automatic recirculation control

(Automatische Umluftcontrol – AUC)

This system detects pollution in outside air and automatically closes the outside air vents. It briefly shuts off after several minutes to allow some fresh air in. It can also be manually overridden.

Automatically-illuminating interior lights

Now common on cars; less so when the E34 was introduced.

Lighted vanity mirrors with sliding covers

Lights are actually located in the headliner not the visors; activated by lowering the sun visor and sliding the mirror cover back.

Leather seats and door paneling

Leather also on steering wheel, handbrake handle and gaiter, and gearshift knob and gaiter. Large center area of door panels were nicely covered in "gathered" leather in the final E34 year, 1995. The center console (front and rear sections) may have also been available in leather, an extremely rare option.

Wood trim

1989 models often did not have wood; next models used bubinga wood; 1993 and later models used walnut. Pieces include two for each of the doors, two each for the driver's and passenger's dash areas, and a large one for the gearshift lever surround.

The bubinga was a rich, slightly reddish, straight-grained African wood. The late models went back to the more traditional, but gorgeous, burled (knot-produced swirls) walnut.

Weather-band radio

Radio tunes to NOAA weather-broadcast frequencies at the push of a button ("WB").

Provides the capability to hear the weather forecast without having to listen to a commercial radio station with endless advertisements, using the government's weather broadcasts. Now if only the commercial radio stations' suppression of a similar, desperately-needed system for free traffic broadcasts could be prevented

Front passenger-footwell storage net

An add-on accessory, useful for handy storage of various items.

CD changer with cover

Trunk-mounted CD changers using 6-pack (and a few 10-pack) magazines, from Alpine and Pioneer. A nice trunk-trim-matching cover was originally available.

⁶ Later models applied the feature to more of the windows, and added up-applicability as well as down. Reportedly the extended features can be retrofitted by swapping in a late-model Central Control module.

Moonroof

Glass sunroof, a bolt-in replacement for the steel sunroof panel, fits in the standard sunroof mechanism. Headliner panel was the same, with the subtraction of a few parts and the addition of a handle. Extremely rare now, the glass sunroof was made by Saratoga Tops, which no longer makes sunroofs.

Refrigerator in rear armrest

Small refrigerator mounts in place of rear center armrest. Fold-down table with cupholders included. A clever installation, and the mark of a real luxury vehicle. Probably easier and cheaper now to just use factory add-on unit that plugs into a cigar lighter / power outlet socket, but nothing can match the neat built-in design of this feature.

Air vents for rear passenger area

Rear footwell vents for warm or cool air; console vents for cool air.

Unfortunately, the vents at the rear of the center console only provide cool air, but they may be closed when desired.

Rear reading lights

Individually-switched reading lights in addition to the main rear interior lights.

Very useful for allowing rear passengers to read in the car at night without blinding the driver. The U.S. E34 versions did not come with this feature, but the wiring was present and a simple exchange of the light console for one with the additional reading lights accomplishes the installation.

Rear armrest with storage area

Lid opens up to access storage area within the armrest.

The rear armrest is quite large so it is an obvious place to add a fair amount of convenient storage space. Strangely, the armrest with storage was not supplied on U.S. cars, though again it can be exchanged, bearing in mind that a change in the mounting system was made early on.

Integrated rear door sunshades

Manual sunshades with two sections, one that pulls up out of the interior of the door, and one that pulls back from the vertical window divider. (Sonnenschutzrollo hinten seitlich)

A beautiful installation avoiding the need for unsightly suction-cup shades. Handy to keep up the spirits of rear seat passengers on long trips in the sun.

Rear window sunshade

Power or manual. (Sonnenschutzrollo Heckscheibe)

Nice for rear passengers and sometimes for the driver on occasions when blinding sunlight is streaming in through the rear window. The shade integrates into a special rear parcel shelf. The manual shade attaches to hooks on the roof, the power one is controlled by a switch at the top rear of the center console.

Trunk

Ski sack

Fitted behind the fold-down armrest for the rear seat. Armrest is removed with a quick-release mechanism when using ski sack.

Allows skis or other long objects, such as lumber, to be carried in the car.

Trunk storage

Available are bins, net, securing straps, and rubber mat.

The bins are attached over lugs and can be easily taken out. The securing straps are elastic rubber, and help things stop sliding around even when the items are just put on top of them. The rubber mat has a substantial lip and is useful for carrying wet or muddy items.

Velour carpet

A European M5 option. Much nicer than the somewhat rough, but stain-hiding, standard material.

Tool kit

In an integrated fold-down tray on the underside of the trunk lid.

This wonderful carry-over from the golden age of motoring can be quite useful for those occasions when you've left your own tool roll out of the car. Includes three open-ended wrenches, adjustable pliers, reversible slot/phillips screwdriver, spark plug socket, and space for the European-supplied warning triangle.

Rear fold-down seat

Has the usual split feature.

Surprisingly rare given that inexpensive cars often have this feature now. There were some allusions on the Web to a greater level of squeaks and creaks in the car with this feature, which would be understandable given that it deletes the substantial sheet-metal bulwark behind the rear seats.

Safety & Security

Fog lights

Front and rear.

The front fog lights were standard, but unfortunately the rears were not available in the United States. The wiring and light control module that controls the rear fog and other exterior lights is different for European/U.S. models, but a retrofit with some wiring added is possible.

Heated outside rearview mirrors

Needed for safer driving in foggy or damp conditions.

Wide-angle outside rearview mirrors

These special mirrors angle a small section of the glass so that it covers more of the blind spot.

Heated windshield-washer jets

A nice touch, helps prevent loss of the windshield- washing function in freezing weather.

Glovebox flashlight

Small flashlight plugs into recharging socket behind glovebox door.

Another special feature. An accessory wire is also available that adapts the recharging plug for all the electronic gadgets that plug into a normal cigar-lighter-style socket.

Vehicle immobilization with code

Operated through the push of a few buttons on the on-board computer.

A simple way to make it harder to steal the car. The beauty of this is its ease of activation, though forgetting the code can be a problem!

Vehicle immobilization

A correct key must be used or the car will not start. (Elektronischewegsperresystem)

Cars built 1/95 and later have the EWS II system ("drive-away protection") that prevents the car from being started unless the correct key is used. When the key is turned the EWS module energizes a ring around the ignition lock, which in turn (wirelessly!) charges up a transponder inside the key, cleverly avoiding the need for a battery in the key. Numerous i.d. numbers, rolling codes, and passwords flow backwards and forwards between the key, transmitter/receiver module, EWS module, and DME, all in an instant, before the car will start. The key needs to be registered to the EWS (only ten can be registered, including the four that came with the car) using BMW diagnostic-computer programming.

Full-size spare wheel

No dorky-looking 50-mph doughnut here.

Accident response

After a crash, hazard lights, headlights, and interior lights come on, and doors unlock. Some innovative thinking to come up with those safety actions.

Double locking

Car may be locked so that doors only open with a key, even from the inside.

Designed to prevent a thief breaking a window and quickly opening a door using the inside handle. A thief would have to crawl in through the window to get inside, which one would think would be a useful additional deterrent.

First-aid kit

Installs in bracket under the front passenger's seat.

A well-stocked kit including a variety of bandages, dressings, scissors, etc., with instructions. The large kit that is neatly installed underneath the seat was not supplied in the United States, although a smaller, unmounted kit was available.

Fire extinguisher

Installs on a bracket at front of driver's seat.

Talk about being ready! Early versions using halon gas are no longer produced, unfortunately, because of the environmental destruction caused by halon. Powder versions work well but can make the area they're sprayed a serious mess.

Headlight-beam adjusting

Switch is to left of fog-light switch. (Leuchtweitenregulierung – LWR)

Designed for Europe, to adjust for trailer pulling or other loading that tilts the car and hence the headlight beams up.

Touring

Dual sunroof

The large sunroof is composed of two adjacent panels that move in a variety of directions, giving the rear seat passengers their own access to the sky.

Opening hatch window

The window on the rear hatch can be opened, allowing access to the rear luggage area without opening the whole hatch. The window has a retracting washer and a wiper.

Luggage area

The luggage area features a retractable cover that can be used to conceal items; dedicated lighting; and lashing points to stop cargo sliding around. A net partition was also available that divided the luggage area from the seating area.

Self-leveling

The rear wheels have a hydraulic height-adjustment system to compensate for heavy loads in the cargo area.

Summary of the Major E34 Options

The **bold** entries below are covered in this guide. The asterisk indicates the retrofits that have factory installation instructions (EBA) that I know of. Some other retrofits not marked likely have them also.

Interior

Driver's glovebox

Alternative steering wheels*
Alternative gearshift lever knobs
Lighted gearshift lever*
First-aid kit
Fire extinguisher*
Rear door sunshades*
Rear armrest with compartment
Fold-down split rear seat8

Ski sack*

Rear independently-switched reading lights*

Rear window manual sunshade*

Rear window power sunshade*

Rear door oddments bins

Trunk bins*
Trunk mat
Trunk net

Trunk velour carpeting

Luggage-area cover (Touring)

Seating

Heated front seats*
Memory front seats, mirrors, and steering column
Lumbar supports*
Thigh supports9
Heated rear seats
Rear seat headrests*
Rear seat power headrests

Electrical Systems

Headlight / fog-light washers*
Headlight-beam adjustment*
Underhood light
Intensive windshield- cleaning system*
Pressure-adjusting wipers

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⁷ This is a nifty option that is usually pre-wired. The top of the knob has an illuminated manual gear pattern. Personally, I didn't retrofit it since the levers I saw didn't come in wood, plus they have an M (BMW Motorsport) logo, but my car isn't an M5.

⁸ Found on the Touring, but not on U.S. sedans. Retrofitting would involve reconstructing the bodywork around the bulkhead between the rear seats and the trunk.

⁹ Only available as part of the quite different "Sport" seats. As noted, I couldn't see what significant benefit this gives. The *provision* of the capability has a useful advantage for installing the memory on the vehicle, however: until late, the cars did not have the power telescoping steering column, hence the early memory control module did not include a memory feature for the steering column. But it did include a socket for the thigh support, which is normally unused. So if one is retrofitting the power steering column, it is possible that one could rig up a harness to the thigh support socket to work the steering column. The potentiometers that go on the various motors (and that one might need to add to the power steering motor) for memory are similar, although different ones need to be set for different ranges of motion, per the Technical Reference Manuals.

Parked heating system*10 Parked ventilation system¹¹

Automatic air recirculation control

Automatic air conditioning*12

Interior alarm sensor*

Autodimming rearview mirror* Electric steering-column adjustment

Navigation system*¹³ Mobile telephone* Refrigerator*14 Supplementary battery*15

CD changer* CD changer cover

Rear fog lights

Park distance control*16

Exterior

Bodywork add-ons such as air dams, side skirts, rear spoiler*

Moonroof

Dual sunroof (Touring) Roof rack and carriers*

Wide-angle outside rearview mirrors*

Shadowline exterior trim¹⁷ Mudguards

Mechanical Systems

Automatic Stability Control+Traction Limited-slip differential **Electronic Damping Control** Self-leveling Trailer hitch*18

Usually Standard in the United States

Front fog lights* Servotronic power steering Heated windshield washer nozzles* Air conditioning*

¹⁰ This is the king of all the retrofits, the most one could ever do. Since it is a mini second engine, it involves the electronic, fuel, cooling, and exhaust systems. There are long factory installation instructions for several vehicles (including E32 and E36). I decided not to do the retrofit because the mini engine is supposed to be run once a month to keep it in good shape.

¹¹ I have not seen factory installation instructions for this retrofit, but someone has done it as described on the Web.

¹² Seems to be rare in the United States on E34s, though it was standard on the E32s. Control panel has temperature dials that rotate around a vertical axis rather than a horizontal one. Retrofit would be extremely complex for minimal advantage.

¹³ A very rare, late option. It has been retrofitted by someone on the Web. Nifty, but aftermarket GPS units are so much more flexible and convenient.

¹⁴ A very cool retrofit, pun intended, but since it goes in the rear armrest space, one would lose the valuable rear-armrest storage, and the ski sack (see those retrofits in this guide).

¹⁵ The car could be equipped with a second battery, which was mainly for the parked heating system. The second battery went in the trunk. Look for it in the Second Edition of this guide.

¹⁶ This is one retrorfit I did not initially go for, since it yells out "I don't know how to park." Nevertheless, on the basis of completeness, look for it in the Second Edition.

¹⁷ This substituted black trim for the normal chrome around the windows. An appealing, modern look.

¹⁸ This was available in Europe, where trailer use, particularly for campers, seems much more common. For some reason, perhaps liability, or brand image, the factory didn't make the feature available in the United States. The hitch itself is different between Europe and the United States, so some fabrication or welding would be needed to hook up U.S. trailers. Trailer light harnesses and control modules were available for the European installation. Perhaps in the Second Edition

Wood trim*19

Front independently-switched map lights*

Cruise control*

Leather steering wheel

Airbag(s)

Alarm*

Power sunroof

Heated outside rearview mirrors

Remote central locking

Lights-on warning*

Full on-board computer

Outside-temperature display*

Check Control system

Power windows*

Leather seats (and door panels, seatbelt gaiters for late models; some 525s came with cloth)*

Power seats, including seat base tilt and power headrests*

Front seat armrests*

Power locks

Third brake light*

Other Accessories

Sunroof air deflector

Front passenger-footwell storage net*

Front console storage tray

Coin tray

Cassette and CD holders

Dual cupholder*

Umbrella holder*

Auxiliary fuel canister*20

¹⁹ In the United States, the 1989 models usually came without wood trim. The 1990–91 models featured African bubinga wood, then came the more common burled walnut. Some front dash pieces might be slightly different between European and U.S. models.

²⁰ This was designed to fit neatly inside the spare wheel.

Summary

Project Profiles

Pick Your Projects

The table below lists the main projects in this guide, in approximate rank order for various criteria. These are subjective and approximate, based on particular experiences and personal views, so use as a rough guide. The individual profile is repeated at the beginning of each chapter.

Coolness	Utility	Difficulty	Time	Cost
8888	9-x 9-x 9-x		0000	ទី ទី ទី
Rear Window Shade	Rear Fog Lights	Seat/Mirror Memory	Heated Seats	Heated Seats
Rear Door Shades	Seat/Mirror Memory	Rear Door Shades	Seat/Mirror Memory	Driver's Glove Box
Fire Ext. & First-Aid Kit	Rain-Sensing Wipers	Head/Fog-Light Washers		Moonroof
Rear Armrest	Rear Headrests	Rear Window Shade	Rear Headrests (power)	
Moonroof	Rear Reading Lights	Rear Headrests (power) Rear Fog Lights	Head/Fog-Light Washers Rear Fog Lights	
\$\$\$	9-x 9-x 9-x	man rog Lights	\$\$\$	តំ
Rear Headrests	Rear Door Shades	Heated Seats	Rain-Sensing Wipers	Rear Door Shades
Head/Fog-Light Washers	Rear Armrest	Steering Wheels/Column		Seat/Mirror Memory
Seat/Mirror Memory	Fire Ext. & First-Aid Kit	Rain-Sensing Wipers	Underhood Light	Rear Window Shade
Driver's Glove Box	Heated Seats	Underhood Light	Rear Power Outlet	Trunk Storage (all)
Lumbar Supports	CD Player and Cover	Rear Power Outlet	Steering Wheels/Column	Rear Headrests (power)
Steering Wheels/Column	Rear Power Outlet	Headlight Adjusters		Head/Fog-Light Washers
Automatic Recirculation		mm.		Lumbar Supports
\$\$	9-1 9-1		6	ទី ទី
Rain-Sensing Wipers	Driver's Glove Box	Driver's Glove Box	Ski Sack	Fire Ext. & First-Aid Kit
Underhood Light	Ski Sack	Rear Armrest	Rear Headrests (manual)	0 0
Rear Reading Lights	Lumbar Supports	Automatic Recirculation	Driver's Glove Box	CD Player and Cover
Autodimming Mirror	Underhood Light Trunk Storage	Rear Headrests (manual)		Rear Armrest
Rear Fog Lights Heated Seats	Trunk Storage	Lumbar Supports Fire Extinguisher	Lumbar Supports Rear Armrest	Steering Wheels/Column Automatic Recirculation
Headlight Adjusters		File Extinguisher	Headlight Adjusters	Headlight Adjusters
Ticadiigiti Adjusters			Automatic Recirculation	ricadiigiit Adjusters
\$	9—		®	Ğ
Ski Sack	Head/Fog-Light Washers	Ski Sack	Moonroof	Autodimming Mirror
Rear Power Outlet	Rear Window Shade	Moonroof	Autodimming Mirror	Ski Sack
CD Player and Cover	Moonroof	Autodimming Mirror	Rear Reading Lights	Rain-Sensing Wipers
Trunk Storage	Autodimming Mirror	Rear Reading Lights	CD Player and Cover	Rear Headrests (manual)
	Steering Wheels/Column	CD Player and Cover	Trunk Storage	Rear Power Outlet
	Headlight Adjusters	Trunk Storage		Underhood Light
	Automatic Recirculation	First-Aid Kit		Rear Reading Lights

Key:

Coolness ພໍພໍພໍ ພໍພໍພໍ ພໍພໍພໍ ພໍພໍ	Cool and quite rare Pretty neat, luxurious Nifty, and not too common Nice, not particularly unique	Time & & & & & & & & & & & & & & & &	20–30 hours 8–19 hours 3–7 hours 1–2 hours
Utility	Particularly high safety or convenience value Quite useful Handy to have for specific uses Nice to have for other reasons, but not especially needed	Cost (based or s s s s s s s s s s s s s s s s s s	the cheapest option) \$400 and up \$200–400 \$100–200 Less than \$100
Difficulty	Complex fittings, non-factory elements, lots of wiring Can involve some wiring, wire splicing; upholstery work Can include drilling, cutting, disassembly Pretty-much bolt-on		

1. Headlight, Fog-Light, and Intensive Washers

For your next off-road rally . . .

The headlight/fog-light washers²¹ were probably not offered on U.S. E34 models, although they seem to have been on Canadian ones, presumably to take care of northern winter muck. They were offered on U.S. E32s. Many but not all of the E32 parts were shared with the E34s. Be careful, because there were quite a few different variations of fluid tanks (with some E32s even having three tanks – headlight washer, intensive windshield cleaning, and regular systems) among various E32s as well as among Euro E34 models. The headlight washers operate automatically every fifth operation of the windshield washers, when the headlights are on.

Project Profile

Coolness: 🔌 🕹 🕹

Time:

Cost: s s s

The intensive cleaning system sends a shot of intensive-cleaning washer fluid from a separate tank onto the windshield (not the headlights) before the regular fluid is sprayed and wiping begins. There have been suggestions that the intensive-cleaning washer fluid sold in the United States is not the same – and is not as effective – as the one sold in Germany. I have not confirmed this, but anyway, as of 2008, it appears that the intensive fluid is no longer available in the United States. The system is operated by pushing a special wiper stalk inwards along its axis (regular stalks used this motion for a telephone feature). The intensive stalks are usually marked by an "S" rather than a telephone pictogram.



A headlight and intensive wash system – fluid hoses, tanks, wiper stalk, heated windshield nozzles, fog-light nozzles, control module, and headlight nozzles. Note that these tanks are not for the E34.

Parts

Name	Details	Number	Part no.	Price
Headlight and fog-light washing				
Fluid container	one of several types; unusually, this one goes on the <i>left</i> of the engine compartment; get the correct one for your engine/model (see EBA)	1	61 67 1 384 263	\$63
Strainer for water container			61 66 1 365 848	\$3
Base (pad) for tank			16 11 1 180 163	<\$1
Fillister head self- tapping screw, for tank	4.8x16-z2	2	07 11 9 907 975	<\$1
Expanding nut	ST 4.8	2	63 17 1 367 868	<\$1
Control module	red, goes in the forward relay box in the engine compartment, left side		61 35 1 389 002	\$48
Pump for SRA	this is different than the windshield/intensive pump		61 67 1 382 085	\$65

²¹ Hereafter let's just call them headlight washers.

E34 Factory Options (Guide			Chapter 1
Gasket, for pump			61 67 1 378 631	\$1
Connector			61 67 1 378 630	\$5
Gasket for above		2	64 50 8 390 601	\$1
Distribution piece			61 67 1 378 627	\$4
Valve		4	61 67 1 378 629	\$13
Distribution piece	Y shape	2	61 67 1 378 625	\$4
Spray nozzle left	for headlights		61 67 1 384 961	\$54
Spray nozzle right			61 67 1 384 962	\$54
Spacer ring		2	61 67 1 389 557	<\$1
Hex nut		4	61 67 1 378 633	<\$1
Hose line	d=10mm		61 67 1 379 530	\$9
Spray nozzle	for fog lights	2	61 67 1 378 616	\$14
Spacer ring		2	61 67 1 384 959	<\$1
Hose clamp		4	61 67 1 389 041	\$1
Leveling switch	probably not needed, depending on tank; some cars, at least, have no warning for low fluid in the headlight tank, which potentially can be a problem for the pump if the fluid runs out		61 31 1 388 578	\$30
Rubber grommet			61 31 1 369 343	\$3
Hose clamp	large, C shape		61 67 1 389 530	\$4
Covering left	trim behind left headlights		51 71 1 946 437	\$9
Intensive cleaning	-		,	
Heated spray nozzles	there are also unheated ones; the connector changed from round to square during the series run	2	61 66 8 350 355	\$26
Washer switch/stalk, with intensive, airbag	there are several kinds depending on airbag/non-airbag, Touring/non-Touring		61 31 8 350 699	\$102
Relay	grey half-size option blue regular-size option		61 36 1 393 415 61 31 1 378 786	~\$10
Washer pump			61 66 1 380 068	\$41
Gasket for above			61 66 1 365 657	
Hose line	d=4.6mm		61 66 1 357 388	\$4
Distribution piece	T-shape		61 66 1 355 939	\$1
Hose clamp	15.5–18.0mm		16 13 1 179 065	
Total (new):				~\$650
Total (used):				~\$200

Einbauanleitungen (factory installation instructions)

Headlight cleaning system with intensive windscreen cleaner, 12/88, 01 29 9 782 112

Supplement on headlight and intensive windshield cleaning system, 10/89, 01 29 9 783 019 (has numerous updates to the original EBA)

Headlight-Cleaning System with Intensive-Cleaning System for Models with Basic Module, 5/93, 01 29 9 787

Headlight Cleaning System with Intensive Cleaning System for Cars Fitted with Central-locking System (ZV) Module, 12/93, 01 29 9 787 287 (most U.S. models)

Headlight Cleaning System, 8/94, 01 29 9 788 808

Installation

The installation has quite a few steps, since it involves mounting of tanks, pumps, hoses, nozzles, control module, wires, and stalk switch – for a variety of different models. Several EBA cover the installation for different models and configurations. Fortunately, most U.S. models seem to be pre-wired for the headlight washers, and at least some are partly pre-wired for the intensive-cleaning system; "fortunately," because adding the wiring – which pretty much needs the factory supplemental harness – as covered in most of the EBA, makes the job quite a bit more lengthy.

You can tell whether your car has the headlight washer pre-wiring by looking in the smaller relay box forward of the larger, main fuse/relay box, on the left of the engine bay. Look at the foremost relay base, that has no relay on it, and see whether there are wires coming to it on the underside, and contacts visible from the top in

the relay contact slots; if so, you're pre-wired. Given that the factory went to all the trouble of pre-wiring the car, you really have to put in the system, don't you think?

Headlight Washers

The steps are:

- 1. Remove and disassemble bumper
- 2. Install nozzles
- 3. Install hoses
- 4. Install tank
- 5. Reinstall bumper
- 6. Install module

Step 1. - Remove and disassemble bumper



Disconnect the battery at the right rear footwell.

Remove the license plate and its bracket by unscrewing the screws.



Lever out the black plastic side bumper strips, starting from near the license plate. Once the clips on the front side are free, just slide the whole strip directly forward about a half inch, then the hook-shaped clips on the side should be free and you can pull the strip out to the side.



Unbolt the bumper. (It was a very tight fit to get the bumper back on those bolts during re-installation – it looked like the bolts wouldn't fit into their holes, but they did, with some force and maneuvering. Try levering the bumper over the bolts with a screwdriver, if necessary.)



Pull the trim inside the wheel well clear of the bumper ends on the sides.



Separate the fog-light connector, and twist out the outside-temperature sender from its socket.

Temperature sensor and connector are the yellow objects.



Lift off the bumper (it's not as heavy as the EBA implies when it suggests using two people).

The black plastic brace on the inner side of the bumper shown here slides over ...



... this bracket on the bodywork.



If you have them, take out the foam air guides at the left and right inside the bumper. (A small piece will be trimmed from one of these later to make room for the hoses.)

My car only had this one of the two foam air guides on each side (between the bumper bracket and the a/c pipes. If your car has the one to be pulled out of the bumper, when in place and the bumper is mounted, it would come forward from the top half of the air guide shown here.



Take the protective strips off the top of the bumper (see picture later of removed bumper cover).

Remove one of the fog lights. The EBA says both, but you really only need to remove one in order to get the metal bumper carrier out of the bumper cover.



Remove rectangular trims next to the fog lights by sliding in the spring-loaded tabs. The trims are likely to be stuck in place by grime.



Remove the center trim by pushing in the plastic rivet pins (don't damage them, so that they can be re-used) and levering out the retaining lugs.

Flat punch pushing out center pins of plastic rivets, allowing the rivets to be removed.



Flat lugs at top of center trim – push them out from the back.



Lugs at bottom of center trim and grill. There are also three at the top of the grill portion (right side in this picture) that are hard to see here.



Put a pen through the pre-cut holes for the fog-light nozzles in the bottom side of the bumper, and mark the center of the hole on the inside of the plastic bumper cover (since there are angles and drawing a circle would be difficult).

Pre-cut fog-light nozzle hole on the lower side of the carrier is near the vertical bar in this picture, and has a notch. Mark the middle of the hole on the inside of the plastic bumper cover. Note two plastic rivets on the front of the metal bumper carrier that come out in the next step — they are the small black plastic projections in the picture.



Remove the plastic rivet pins along the front and bottom sides of the bumper carrier, from the inside. Careful not to mash a pin if it's tight.

One of the plastic rivets along the bottom side of the carrier is shown in the center of the picture. The head that these rivets have is partly pulled up here.



Remove the metal bumper carrier from the plastic bumper cover.

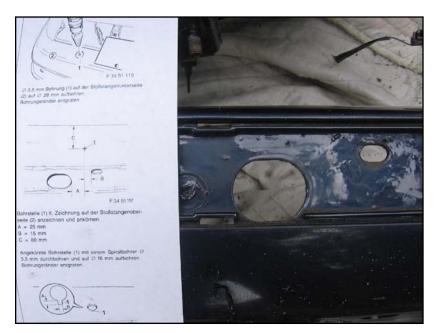
Bumper cover with bumper carrier, right fog light, trim plates, center trim and grill, and license carrier removed. The strips on the top rear edge of the bumper cover are partially removed. (Notice the poor working conditions in the absence of a big enough garage. I highly recommend doing these procedures in a comfortable-sized garage to avoid the frustrations of rain, snow, fingernumbing cold, pouring-sweat heat, and swarming mosquitoes!)



Step 2. – Install nozzles

Drill a small marker hole from the inside of the bumper cover to the outside, where you earlier marked the center of the fog-light nozzle holes. Then use that marker hole to drill the 28mm fog-light nozzle holes in the bumper from the outside. Don't drill the fog-light or headlight holes on the wrong (top/bottom) side of the bumper, they're different sizes – triple check everything before you drill; the fog-light hole is, unexpectedly, the bigger hole. The hole does not need to be exactly 28mm if you can't find that drill size (stereo installations seem to use that size somewhat) - a little bigger should be okav.

Right underside of the bumper showing the large fog-light-nozzle hole already cut, and hole saw with pilot bit.



Here's an important note on the EBA instructions: most of them give dimensions on where to cut the 16mm hole for the top, headlight nozzles. But on my car these dimensions were slightly off and required me to cut the nozzle washer to get the nozzle to fit on.

EBA page with dimensions shown next to their reference holes, left side of the bumper. In my case these were **not** applicable.

Instead, in my case, I believe the text in an EBA supplement applied: "Note in the case of more recent bumpers, mark the half-moon-shaped²² cut-out [that is] on the topside of the bumper carrier bar from the inside [i.e., mark the outline of the cut-out in the metal onto the underside of the upper part of the plastic bumper cover] and punch-mark the center point on the top side of the bumper." Since it seems hard to "punch-mark the center point on the top side of the bumper cover" when the outline mark is on the underside, line up the nozzle assembly on the underside with the outline, and mark the center point of where the shaft would come through.



Then drill a pilot hole through from underside to top side, as for the fognozzle hole, and drill the 16mm hole from top side to underside (using a hole saw with a pilot bit, I found no need for the 3.5mm pilot hole described in the EBA).

Right top side of bumper with 16mm hole for headlight nozzles already drilled.

Metric-sized hole saw was from Morse.

²² I'd say it's more like a circle missing a smaller half-moon shape.



Cut the notches for the lug on the headlight nozzles – 5mm out from the circular hole, 3mm wide. The first one I did painfully slowly with the mini-file seen in the picture. The second one I did in 8 seconds with a reciprocating saw – cut very carefully if you do the second method!

Note that the notch you make for the headlight nozzles points forward; the pre-cut notch for the fog-light nozzles points rearward.



Install headlight nozzles in the top holes – left and right nozzles are different.²³ Put the lug in the notch you cut earlier. Use the metal, not plastic, nuts.



This is the headlight nozzle assembly with beveled plastic washer.

Headlight nozzle installed, viewed from inside the bumper. Here's the "circle with a half moon missing"—shaped hole. You can see the slight misplacement of the hole cut in the blue bumper cover (to avoid, see above), requiring cuts in the beveled plastic washer to get the nozzle to fit. The nut holds the washer and nozzle to the bumper cover, not to the metal bumper carrier.

²³ Note, when the EBA says at this point, fig. F34 61 003, to "install the front bumper" it means install the bumper cover on the bumper carrier, not the whole bumper assembly on the car!



Beveled washer cut to fit along the edge of the bumper carrier pre-cut hole. You shouldn't need to do this if you use the revised method described in the text earlier, for later cars.



Install the fog-light nozzles in the bottom holes. Lug into notch again. Use the plastic, not metal, nuts.



Fog-light nozzle installed. It is secured to the metal bumper carrier, not the plastic bumper cover. Note the hose holder that will be clipped into the nearby square hole, in the next step.

Step 3. - Install hoses

If applicable (early cars), replace the wire holder on the bumper carrier with new hose/wire holders, and insert the wires into the space between where the hoses go.

If you are not using already-joined hose assemblies from a donor car, put together your hoses, junction pieces, and valves, and secure with the special squeeze clamps or screw hose clamps, according to the EBA and pictures below. The squeeze clamps close with a special kind of pliers, similar to Oetiker clamp pliers, that pull a hook end of the band clamp over a flange in the other end of the band.

If you are using donor hoses, I recommend replacing the valve pieces at the end of the hoses, as they are not expensive and some of mine were stuck shut. If you do need to detach hoses for this or other reasons, the original factory hose clamps can be easily loosened by sliding the mating ends to one side of each other, rather than trying to lever the hook end over the top of the flange. That way they don't get damaged much in removal, and can be re-used. Use glycerine to lubricate the inside of the tubes when inserting new valves. Glycerine is often available in drug stores as a hand lotion.



Clip the white distribution block into its hole on the left side (for the 535i – many other variants use the right side; reverse things as necessary) of the bumper carrier. Coat the valves with glycerine and insert them into the nozzles. Insert hoses into the hose holders, and into the c-shaped plastic brace if not already done.

Left-side hoses attached, with distributor block in background, and a hose holder in foreground.



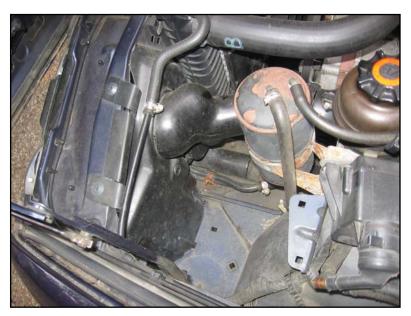
Right-side hoses attached, with cshaped hose brace visible at right behind the metal bar.



Step 4. - Install tank

Turn the relevant two clips at the top 90° and take out the trim behind the left headlights (it is to be replaced with a new one).

New trim on right, with space for washer fluid tank.



Take off the alternator-cooling air duct and remove the charcoal filter canister for access.

Alternator air duct is to the left of the charcoal filter canister in the picture. Plastic nuts for the tank go in the square holes in the flange at right.



Attach the foam pad on the back side of the tank.

Don't forget to release the headlight washer pump wires from their clip on the side of the engine bay before you put in the tank.

This is the bottom side of the tank, it will be flipped over for installation.

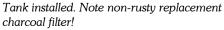


If not using an already-assembled system, connect hoses to the tank pump and the connector for the distribution block. Put a hose holder around the hoses 200mm from the connector. In the case of the 535i, run the top pump hose forward to the **top** distribution block port. Other models can run to the bottom port.

Lower end of the tank with hoses coming forward to bumper area. In my case the hoses were bent around when attaching to the distribution block so the prongs faced to the left of the car. Note outside temperature sensor to the left in the picture, and the tank locating tab sticking through its slot.



Insert the plastic nuts into the square holes in their flange near where the top of the tank goes. Insert the tank into the locating slot at the bottom, and screw it down.





Attach wire connector to pump.

Grey wire connector attached to top of pump – view is looking down the front of the tank.





Step 5. – Reinstall bumper

Reattach the outside-temperature sensor. Reassemble the bumper. If you have the air duct foam pieces, cut off the flap where the hoses need to go, and re-install the pieces. Prop the left side of the bumper up. Connect the hoses from the tank to the distribution block, using glycerine, ensuring there are two o-rings on each tube prong, and following the installation direction listed in the EBA. For my 535i, the hoses did a big u-turn and the top pump hose connected to the top distribution block port. View of tank hose alignment from above,

with the bumper still detached.

Bolt on the bumper (torque is 48 N-m) and attach its trims.

View of the tank hoses and distribution block, looking up and forward at the left side of the bumper, from underneath. Here the bumper is attached to the car.

Step 6. – Install module

Put the control module into the empty relay base in the front fuse box.

Fingers crossed, give the system a test - should come on with every fifth windscreen wash application with headlights / fog lights on!²⁴

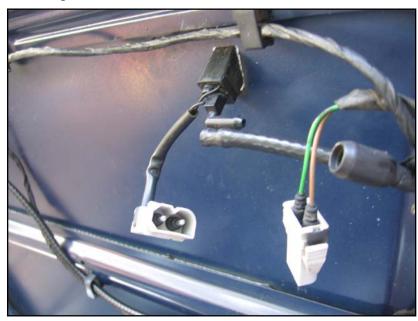
²⁴ Note that the EBA says that certain models – sounds like the more basic ones not supplied to the United States – may need a software upgrade at the dealer for the basic central control module.

Intensive-Cleaning System

For the intensive cleaning, the steps are:

- 1. Install hoses and windshield nozzles
- 2. Install tank
- 3. Run wiring
- 4. Change stalk switch
- 5. Install relay

Step 1. - Install hoses and windshield nozzles



Remove the insulating material from the underside of the hood – plastic screw rivets. (See underhood light chapter.)

Disconnect the old hoses and connectors from the windshield washer nozzles. To get off the old hose clamps easily, lever the top end to the side across the other end, rather than over the top.



Remove the nozzles from the hood.

Squeeze the tab visible at the bottom of the nozzle and pull the nozzle toward the bottom of the picture to release it from the hood.



Attach both the old hoses and the new intensive-cleaning system hoses to the new nozzles using hose clamps.

Intensive nozzle with dual hoses and electrical connector attached. Note clip the electrical connector fits in.



Remove the air filter box, in order to be able to remove the plastic trim behind the right headlights. When lifting out the box, be aware that the rubber mounts underneath might fall off the box onto the ground or the engine-bay pan.

Turn the clips at the top of the plastic trim behind the headlights a quarter turn and remove the trim.

Loosen, don't remove, the nut on the air filter box toward the bottom of the picture, and loosen the duct clamp at left.



Lay out and secure the new hoses in the existing hose holders on the hood. Run the hose down through the hole in the horizontal sheet metal in front of the radiator, toward the tank.



Secure the hose under the sheetmetal at the top front of the engine bay, using the existing wire and hose straps.

View behind the right headlights.



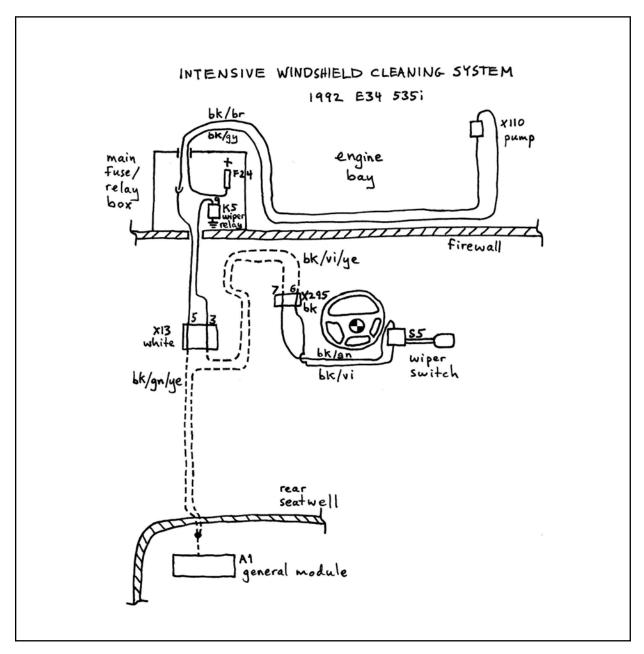
Run the hose to the intensive pump, clamp it on, and insert the pump into the tank through its grommet.



Step 2. – Install tankSlide the intensive cleaner tank onto the regular washer fluid tank.

Step 3. - Run wiring

The diagram below shows one way to make the intensive washer system circuit.



This shows the wiring as I installed it on my car, similar but not identical to the factory installation. The dotted lines show wires for the factory installation that were already on my car.

Wire color abbreviations used in this guide:

bk – black

bu – blue

wi - white

vi – violet

gy – gray

gn - green

rd – red

ye – yellow

or - orange

br – brown



Starting with the power end of the circuit, open up the main fuse and relay box (hereafter, "front fuse box") in the engine bay.

There are five very small Torx® T10 screws to come out. You'll need a long, thin-shaft Torx screwdriver. Be careful not to strip the screws as they can be stiff, and there would be almost no way to open up the box without damaging it if a screw were stripped.



Unbolt the hood guide and move it out of the way.



Socket wrench unbolting the rear bolt on the hood guide.

Lift off the middle section of the front fuse box that holds the relays and fuses. It's an awkward maneuver to bring it out, there's little clearance and the wires restrict things. Then turn the section over so that you can access the release catches for the fuse-holding section. The catches need to be pushed back at each end, and the section pushed out downward.

Fuse-holder row is to the rear in this picture.

I chose to get power for the intensive pump from fuse 24, which is used in the factory set up, and is the power source for the regular windscreen washer pump too. To take out fuse 24, push out the white contact-locking bar from one end. Then look at the colors of the wires going to the F24 slot, you'll want to release the wire and contact that is downstream of the fuse – in my case the appropriate wire was **bk/vi**.²⁵



Look at the top of the fuse slot and locate the square holes on either side of the middle of the correct contact. Then push a fuse contact—releasing special tool, or more likely, if you don't have it, micro-screwdrivers, down the holes to move inwards the slightly-bent tabs that hold in the contact. When both tabs are moved, they will clear the flanges on the holder and the contact can slide out.

The fuse-holder row, with the white release bar pulled out part of the way. Note the straightened paper clip that will be used to push in one of the contact release tabs, and the mini-screwdriver for the other tab.

When the wire and contact are out, cut off the old contact, we'll replace it with a new contact crimped onto two wires.

Oddly for my car – since it had some of the intensive system wiring, had the headlight washer wiring, and had pretty much all the other optional accessory wiring, and since a lot of 525s seem to have the intensive wiring over to the pump – my car did not have that wiring. The engine bay, where the wires run to the pump, is a wet area, so wiring that is waterproof from the front fuse box up to and including the pump connector is needed. I procured a waterproof connector and pair of wires that were actually for a right-mounted headlight-washer tank from a 525i donor car. These ran all the way around the engine bay rear to the small front relay box forward of the main front fuse box, so would also reach well into the front fuse box in my installation. E32s would sometimes have such wires, and wiring to the regular windshield washer pump should also work.



I re-wrapped the pair of wires in friction tape, which took quite a while, but was worth it for the stock look. Plug the connector onto the pump and run the wires from the intensive tank around the back of the engine bay to the front of the fuse box.

Remove this cover (note the two plastic screw clips, one on its post, one off) at the right rear of the engine bay, and run the taped wires (visible in the picture) under it, zip tying it along the other wiring harnesses.

²⁵ Check the wiring diagrams (Electronic Troubleshooting Manual) for your model.



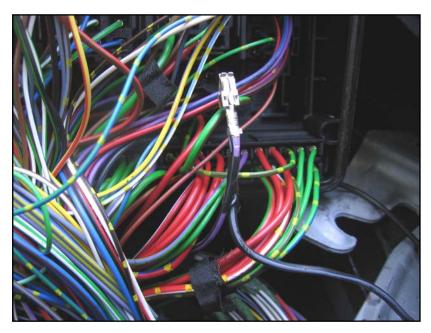
Remove the nuts holding on the coolant expansion tank, then the nuts holding on the metal wire channel underneath it. Zip tie the wires to the channel, as the existing harnesses are.



Pull off the tight cover to the auxiliary coolant pump at the left rear of the engine bay, and continue to zip tie the harness.



Finally, loosen the cover on the front fuse box wire-entry hole and put the harness into the box, and then through the grommets into the inner chamber. A cable strap holds the big harness by the strut tower (not present in this picture); if it or others break, replacement cable straps are 61 13 1 389 024 or 61 13 1 373 565 (shorter).



Now take the positive lead of your two added wires (check the wiring diagrams for your donor car or look for the +/- signs on the connector on the pump), **bk/gy** in my case, and crimp it, along with the **bk/vi** wire from F24, to a new fuse contact. For information on crimping, and the factory wirecontact system, see Appendix II.

Bk/gy wire on right crimped, along with **bk/vi** wire in center, to a new fuse contact.

Insert the contact into the F24 slot making sure it clicks into place, slide the white retaining bar back in, and restore the fuse. Put the fuse-holder row back in the larger holder.

Next, connect the other lead from the pump to connector **X13** in the driver footwell. Start by removing all the under-dash and footwell trims (see chapter on driver's glove box).



Find where the wires go from the very bottom of the front fuse box through the firewall into the underdash area.

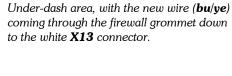
This view is looking down at the bottom rear of the front fuse box, underneath the middle fuse/relay-holding section. There are three groups of wires here: the red ones at the top of the picture are the hot leads, all connected to studs on the back wall; the harnesses at the bottom (going into the friction tape at left) are spliced together according to their color; the middle group (with many yellow-banded wires) is the one that goes through the hole to the underdash area.



Ease a new wire through the hole into the under-dash area.



Pull the wire through and down to **X13**, a large white connector clipped to the lower left side of the footwell.

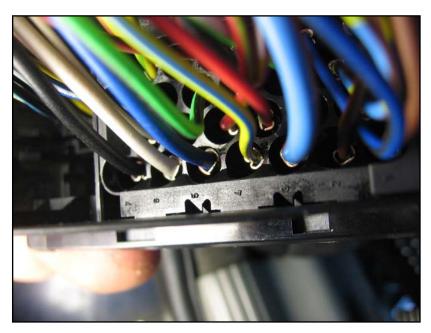




Now splice the wire from the pump to the front fuse box end of the new wire, or use a single-pin connector as I did, which works better than a butt connector if the wire sizes are different.

Bk/br wire from the pump loops around and joins the new **bu/ye** wire using a black single-pin connector.

Unclip the **X13** connector and separate the two halves by levering out the sliding portion at one end.



Look carefully at the top half, at the face of the connector where the wires go in. There will be four tiny tabs around the edge of the inner portion of the connector, holding the inner portion in a particular position. In this position, the inner portion locks the contacts in, so to release or insert a contact, the inner portion must be slid over to the side very slightly – its tabs must move to the other side of the outer-portion tabs. To do so, lever out the outer portion gently, and with your third hand move the inner portion over.

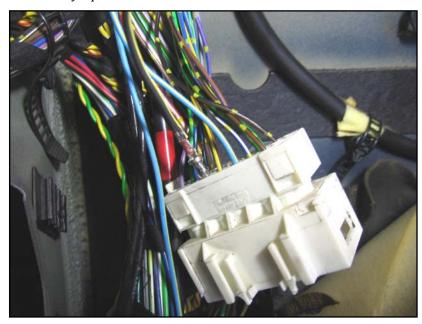
An example of the tabs holding an inner portion of a connector in the pinlocking position (of course this example is not the white **X13** connector).

Alternatively, the inner portion can be pulled out of the outer portion entirely, but that takes a lot of fingers to move different release tabs, and is not the official method.



Once the inner portion is moved slightly, crimp on a contact and insert the wire into the pin 5 hole.

New **bu/ye** wire inserted into **X13/5**. Note, the curved and grooved right end of the connector is the part you pull out to separate the two halves; it is now pushed back in.



The circuit then runs to the wiper switch stalk and back to **X13**. On my car the wiring to and from the switch was already in place, even though the car did not have the intensive-wash feature. So the next wire needed is from **X13/3** back out to the front fuse box, where it joins the wiper relay. Follow a similar procedure to go through the firewall as for the last wire.

Contact crimped on new wire (**bk/ye**) being inserted in **X13/3** (look just right of the red tape). It should mate up with a pre-existing **bk/vi/ye** wire on the other side of the connector when the halves are joined.

The intensive-cleaning system uses a slightly different wiper relay. My car had a mini-relay (half the normal width) for its wiper relay; many other versions of the E32 and E34 use a normal-size relay. Check the Electronic Troubleshooting Manual (ETM – see Appendix III) relay-position diagrams to find out which yours has, and substitute an intensive-system relay of the appropriate size. If needed, you can convert from one size to the other by taking the contacts out of one size of relay holder and putting them in the other, and then using a different hole in the front fuse box. There are usually blanks in one or more slots in the relay holder where you can put a new relay.



The mini-relay holder used a smaller contact in the relevant slot, for which I did not find the part number, so I just used a junkyard contact with wire attached from another mini-relay holder. After releasing the contact from its original donor relay base (tricky to get out again, you could just carefully cut the base to free the contact without damage), I attached a single-pin connector at the other end, and inserted the contact into the relay base on my car. Make sure you put the contact into the slot for the correct one of the two mini-relays on the base, pin 9.

 $^{^{26}}$ My explorations of cars and ETMs suggest that for the E32 only the 1991 model used the mini-relay.



Attach the other half of the single-pin connector to the wire brought forward from **X13**, and connect the halves.



Re-insert the relay base into the front fuse box holder, from the bottom.

Carefully put the front fuse box back together, making sure no wires are pinched between the sections, and that the edges seal properly. Insert the new intensive wiper mini-relay.

The 5-pin intensive relay is the grey halfsize relay. On some models it is on the right side of that relay base, or a full-size dark blue relay is used there or in another slot. Note the blanking plugs, which can be removed if a slot is needed for a full-size relay.

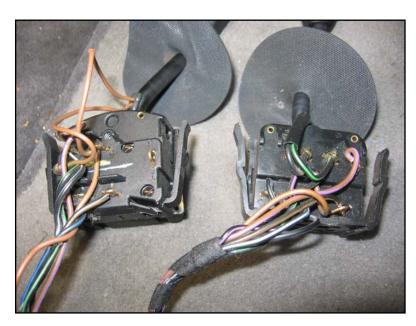
Put on the fuse box lid. Re-install the hood guide, making sure the hood switch and release cable are seated properly on it. Adjust the rear of the guide under its bolt so that it goes in the same position it used to be – look for the bolt washer mark on the guide.

Step 4. - Change stalk switch

The intensive system has its own wiper switch stalk (and there are different ones for Tourings). It would be fairly easy to modify a regular (U.S. telephone-wired) switch if needed, making use of the telephone circuit wires.



The intensive pump is activated by pushing the end of the lever inwards, and the relevant wires are the ones coming out of the stalk itself (see picture). On the regular switch, one of the brown stalk wires already goes to an appropriate **bk/gn** wire (leading to a single-pin connector near **X295**); the other brown wire might need a new dedicated wire to duplicate the **bk/vi** wire of the intensive switch – check the telephone wiring diagrams.



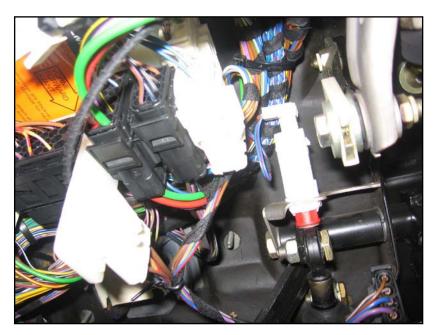
Regular switch on the left, intensive on the right.



Remove the steering column trims (see chapter on rear fog lights).

Then un-zip-tie the harnesses along the steering column, and free the one for the wiper switch.

Three zip-ties removed from wire channel. They can be reused if desired. Note the single-pin white connector at the bottom left of the picture. That is where the **bk/gn** wire from the switch goes on some telephone-wired cars, rather than to pin 7 on **X295**.



Disconnect the harness at **X295** under the dash.

Connector **X295** (8-pin, black): rightmost of the two black connectors in this picture.



Squeeze the tabs to release the wiper switch and stalk.

View looking down at the top right of the steering column.

Insert the new switch, route the harness, zip tie everything, and plug in the harness at **X295**.

Put everything in the footwell and front fuse box back together.

Step 5. - Install relay

Insert the relay in the appropriate slot in the front fuse box.

Fill the intensive tank with factory Intensive Cleaner, if you can find it, or some other appropriate fluid.

Now get ready for a fancy show. Test the headlight/fog-light washers by turning on the car (so you don't drain the battery), the headlights, and the fog lights. Then turn on the windscreen washer a few times, spaced apart a few seconds, and turn off and on the lights if needed. If everything is put together correctly, sooner or later the control module will turn on the headlight/fog-light washers – the headlight washers will come on together first, then fog-light washers, then each again in turn.

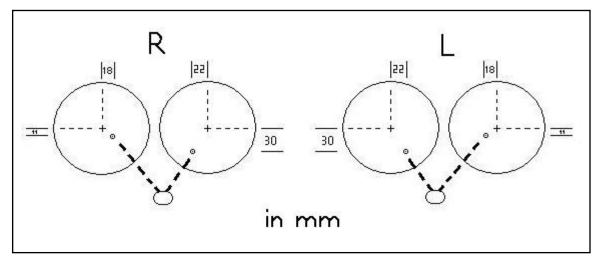


The headlight washers in action.

There's a special tool (a Waschdüseneinstellschlüssel! – washer-nozzle-adjusting-key, see special tool appendix) that allows alignment of the headlight nozzles, which are hard to move otherwise. If you got a used headlight washing system from a donor car you're probably in luck and they are correct already.

But where do you actually aim them? You came to the right source for the tip: in some of the EBA for headlight washer installations on the E32 (e.g., 01 29 9 781 825 or 01 29 9 786 007), there is a diagram with specifications for the aim points.

Unfortunately, in the EBA illustration there's a disconnect between the drawing and the written specification. It looks like the key might have become mixed up. The diagram below is my own, and it assumes that the EBA drawing is right and the key is mislabeled. If you think the drawing is wrong and the key is right, just reverse the low-beam/high-beam specs.



Possible aiming points for headlight washer jets.

Next test the intensive cleaning system: when you push in the wiper stalk along its axis, first the intensive pump should come on, then the wipers, then the regular pump should spray regular washer fluid. Presto, cleaner glass

2. Headlight-Beam Adjusters and Headlights

Got a heavy load?

In Europe, headlight-beam adjusters are sometimes required to lower the headlight beams when a heavy load in the trunk tilts them up excessively, potentially blinding oncoming drivers. Small motors behind the headlight assemblies tilt the low-beam headlights up and down slightly, to one of three positions. The adjusting switch goes to the left of the fog-light switch.

The headlight-beam adjusters can be added to non-European headlight assemblies, but while you're at it you could switch to the superior European headlights with adjusters already on, where legal (I believe the superior headlights are not legal in the United States for on-road use). The description below covers both procedures.

Project Profile Coolness: ♦ Utility: Difficulty: □□□ Time: \$\text{\ti}\text{\texi\text{\text{\text{\text{\texit{\texi\texi{\texi\texi{\text{\texi\texi{\text{\texi\texi{\texi{\texi{\ti

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Cost:

Parts

Name	Details	Number	Part no.	Price
Headlight adjusting motors	only came on European versions; from 9/91	2	67 16 8 355 148	220
Headlight harness connectors	yellow, 2-pin – for European low beams white, 2-pin – for European high beams gray, 2-pin – for European "city lights" – may not be needed for adjusting motors, 3-pin ideally, get all the above included with used assemblies	2 2 2 2	61 13 1 378 403 61 13 1 378 401 61 13 1 378 406 61 13 1 378 955	1 1 1 1
Headlight adjusting switch	ideally, get included with used assemblies	1	61 31 8 351 269	38
Adjusting screws, sockets	D. adjuster (manual) B. intermed piece-pivot, 9/89+ (plastic, for Bosch) B. intermed piece (knurled non-adjusting bolt, for Hella) A. "knurled" bolt [not really knurled, has long plastic turner] rubber bushing (actually, plastic) rubber bushing (possibly needed instead of 2 of the above)	4 4 2 12 2	63 12 1 378 368 63 12 1 394 252 63 12 1 378 339 61 12 1 388 027 63 12 1 378 369 63 12 1 386 616	6 4 7 5 2 2
Headlight vertical aim control	C. motors; -9/91 9/91- (later versions reportedly better weatherproofed)	2 2 2 2	67 16 8 351 878 63 12 1 391 435 67 16 8 355 148 67 16 8 355 728	
Total cost (new):				\$350

Positions of headlight-poisitioning bolts listed above, as viewed from the driver's seat (black circles represent the headlights):



"A" and top-row "D" bolts adjust left-right aiming, "C" and bottom-row "D" bolts adjust up-down aiming. C is the motor rod, when the motors are installed; the rods are still set manually, the switch provides a fixed adjustment from the standard setting. For setting, C and D have phillips screwdriver slots in the end of the bolts accessible through the grills, A has a plastic extension, turnable by hand or flat screwdriver, accessed through the engine bay.

Einbauanleitung

Headlight Beam Throw Adjustment, 783 621, 1/90 Headlight Vertical Aim Control, 787 538, 2/93

Installation

Steps are as follows:

- 1. Remove grills
- 2. Remove headlight rear covers and headlight assemblies
- 3. Replace locating bolts
- 4. Install motors
- 5. Make and lav harness
- 6. Install switch
- 7. Reinstall headlights and align

Step 1. - Remove grills

Remove the wide center grill / trim piece. Start with the single screw-clip that goes through the sheet metal on top. Then, using a very long-bladed screwdriver, push down a release tab near the ends of the long trim piece while pulling out the end slightly. The screwdriver goes through a hole in the side grill plastic at the front top ledge of the engine bay, and through a small hole in the sheet metal below.



It's difficult to get the screwdriver in the right place at the bottom through the small hole, unless you pull off the headlight rear trim, and look for the small round hole on the sheet metal. It is very hard to spot the hole, the headlight assemblies are in the way, but it is possible from certain angles. Guide the tip of the screwdriver through that hole.

In this picture the screwdriver is in place but not at final angle to go through the small lower hole. The grill has been removed and pulled forward slightly to show the black plastic locking tab that the screwdriver pushes downwards.

If you lever off the outside of the trim with a screwdriver, cover the screwdriver so it doesn't scratch. Be careful, there's a black plastic tab that is part of the plastic grill, and it can get broken off. Don't lever hard or the long grill piece might bend.



With the ends of the center grill loose, depress four catches near the "kidneys" in the middle of the grill. The two at the top need to be pulled up slightly; the two at the bottom pushed down (through the grill). Then you can pull off the whole center grill / trim.

Screwdriver is pointing to one of the lower release tabs and the hole the tab goes into. Upper tab is directly above it at the top of the kidney.



Next unscrew four screw clips and one sheet-metal screw, which hold on each side grill. They are accessed from the front. Be careful with the screw clips, the plastic screw heads can easily strip, requiring drilling out the screw.

Two of the eight screw clips are visible, in this case under the left high-beam headlight.



Single screw underneath the turn signal.



Step 2. – Remove headlight rear covers and headlight assemblies

Remove the plastic covers from behind the headlights by turning the two clips at the top a quarter turn.

Then, remove three screws holding on the headlight assembly from the front.



Finally, remove three screws at the outer side of the rear of the headlight assemblies. These screws are hard to reach – remove the trims behind the headlights for easier access.

Uppermost screw is out of the picture, but it is just beside the long plastic adjusting-screw handle (which is the white bar at the top right of this picture). The screws can be hard to reach and to get the screwdriver tip into the screw head – certain longer screwdrivers can work, or a phillips socket on a socket wrench, possibly in combination with a universal joint socket.



Step 3. – Replace locating bolts

The plastic parts of the various locating bolts are often split and the bolts rusted. If you want you can replace them, but in my case they actually were still functional in terms of being able to adjust the headlights manually and with the motors.

This is the left headlight plate, viewed as from the front of the car, with six new locating bolts.



Step 4. – Install motors

Test the motors by applying current per the wiring diagram. The rods should move in and out.

If you're installing motors, gently attach the plastic cylindrical adaptors to the headlight plate, then insert and twist on the motors while holding the adaptors, not the plate.

Motor is at bottom (rectangular-connector type). Note "city-light" tube and connector at top left.



A strong word of warning on old adaptors: the prongs that go into the headlight plate are *extremely* fragile, and once the prongs break, there's no way to mount them and, hence, the motors. Do not take out or insert the adaptors and motors unless you really have to or you have new adaptors available.

An old adapter with most of the prongs broken off is to the left. A new adapter is in position behind the plate on the right. The prongs of the new adapter are visible sticking up through the plate. After a while these become extremely brittle, perhaps because of headlight heat.

Step 5. - Make and lay harness

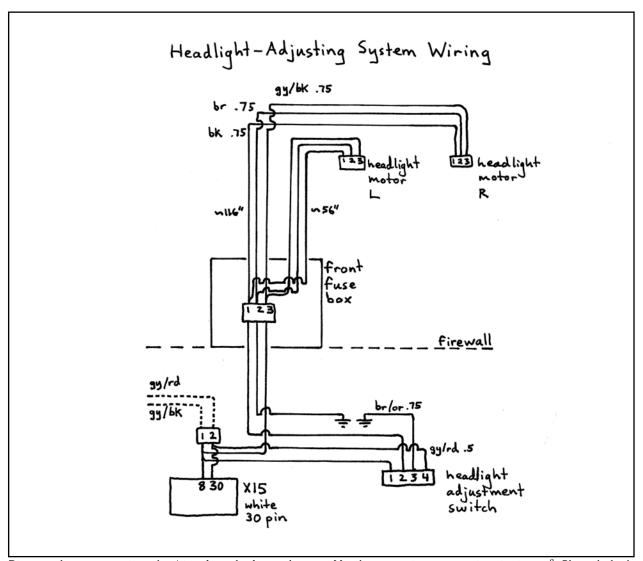


Diagram shows some wire colors/sizes from the factory harness. Numbers are wire cross-section size in mm². Short-dashed lines are existing wires.

The diagram above is for the 1992 535i, based on a European wiring diagram that showed the headlight-beam adjusters. There are various ways to design and run the wiring. I will describe one way; modify as you like.

Because certain wires need to go through tight grommets into and out of the front fuse box in the engine bay, build up the harness as you go along, starting at the front, rather than making it all then installing it.

Crimp the wire tails of three weatherproof pins for the right headlight motor connector to new wires that will lead all the way to the front fuse box.

Lay the wires along their approximate route to the fuse box, in order to cut them to length, noting that the wires have to go all the way into the waterproof area of the fuse box, down to the bottom side of the fuse box, and well into it.

Wrap the wires in fabric tape from the connector just to where they will meet up with the similar left headlight wires.

Lay the wires from the right headlight to the left side. There is a nice channel available in front of the lower part of the radiator, about an inch tall, opening toward the rear. The EBA appears to use this, or at least shows the wires running close by. The channel starts just behind and below the headlights; the center grill clips into it in the middle. Zip tie the wires using the holes along the top of the channel.

Crimp on wires for the left connector, which will also go to the fuse box.

Wrap the left- and right-side wires together with fabric tape.

Lay the harness along the existing harness up to the fuse box, and attach it using the existing wire straps. Be very careful when opening up the straps, they are very thin and can break easily after all these years.

Open up the fuse box, and unscrew the middle section – five very small (Torx T10) and very stiff screws. Be extremely careful not to strip the small screw heads, it would be exceedingly difficult to get the fuse box section off without breaking it if a screw gets stuck in place. Perhaps, upon reinstallation, use some kind of anti-sieze lubricant on the threads.

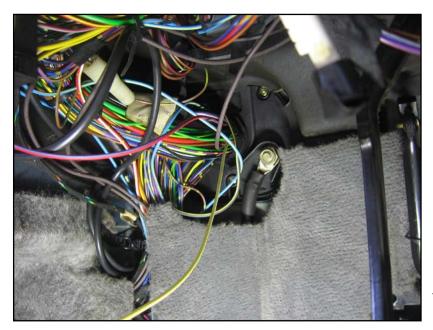
Take off the hood guide to the left of the fuse box – two 10mm bolts – after marking the position of the rear of the guide relative to its bolt. (See chapter on headlight, fog-light, and intensive washers.)



Run the harness into the waterproof area through the hole, then into the fuse box itself through its grommet.

View is looking straight down into the front fuse box. Front of car is to the left. Center section is tipped upwards, at top of picture. Thin headlight motor harness is visible in darker black fabric wrap.

Crimp each of the three pairs of similar wires (one from the left headlight, one from the right, for each pair) onto a single respective connector pin, and put the three pins into one half of a spare three-pin connector.



Remove the pedal cover in the driver's footwell and the dash trim to the lower left of the steering column (see chapter on driver's glovebox). Remove the flat circle of insulation around the large wire bundle at top left front of the footwell, if it's still there.

Upper left corner of the driver's footwell, showing the wire bundles going forward through the firewall.

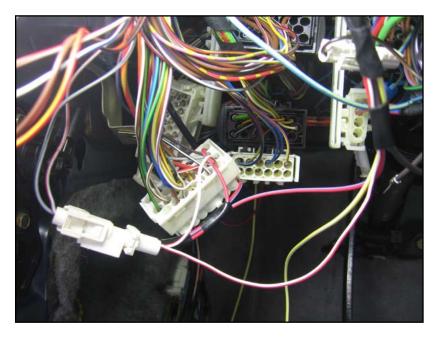
Look for the hole at the back right of the fuse box where a large wire bundle runs through the firewall into the underdash area. Run three new wires through the hole. Try easing them through by hand, but if that doesn't work, tape the end of each wire tightly to a screwdriver point, and gently ease it and the screwdriver through the hole together. Then look for the end from the footwell side, untape the wire from the screwdriver, and pull it all the way through.



Make sure you have enough wire in the footwell (especially for the wire going all the way to the switch), then cut the wires and crimp pins on their fuse-box ends. Insert the pins in the second half of the three-pin connector, and join the connector. Don't forget to slide the relevant parts of the connector halves over slightly to lock the contacts in place.

The added three-pin connector in the fuse box. Wires go through the firewall to the right, in the area towards the bottom of the picture.

If you like, you can skip the supplementary two-pin connector method shown in the wiring diagram earlier for the **X15** connections, and splice directly into new pins for those slots. Using the supplementary connector does maintain the integrity of the original wiring, and is the way the factory usually does such wiring add-ons as shown in various EBA.



Add pins to the appropriate two wires going to connector **X15**, while splicing on the additional new wires, per the wiring diagram.

Supplementary wiring harness. Wires from the switch come down from the top right of the picture. Supplementary two-pin connector is at lower left. **Rd/wi** and **rd/bu** wires are joined at pins in the added connector. New wires then lead to the disconnected half of X15 shown in the picture.

Remove the original pins from X15/8 and /30, and plug them and the other pins into one half of the supplementary connector as shown in the wiring diagram. Plug the new wires from the other half of the supplementary connector into X15/8 and /30.

Crimp ring terminals to the ground wires as in the wiring diagram; add them to the underdash ground posts.

Step 6. - Install switch

Crimp contact pins on the remaining three wires going to the switch, and insert them in the connector.

Release the instrument cluster – two small screws at the top underneath the cowl (see chapter on rear fog lights). Pull it forward as far as it will go, being careful not to scratch surfaces. You probably have just enough access to run the wires without taking the cluster out completely. Lay the appropriate wires from the underdash area behind the cluster, and up to the switch area.



Gently lever out the switch trim, which also holds the fog-light switch and maybe the alarm sensor and LED.

Push out the blanking plate for the beam adjuster switch from the rear.

Bring the connector through the switch hole, attach the connector to the switch, and insert the switch in the trim.

Reinstall the switch trim. Put back the instrument cluster.

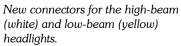
Step 7. - Reinstall headlights and align

Re-mount the headlight assemblies and grills.



If using the European headlights, new wire connectors will be needed since the European headlights use the standard factory connectors, while the U.S. headlights use completely different ones.

Insert new waterproof-pin wires in the connectors and crimp butt connectors to the other ends.





Then cut off the old headlight connectors from the vehicle wires coming to the headlights, and – always after putting on heatshrink tubing – crimp the cut wires to the free end of the butt connectors.

Heat the heatshrink tubing in place over the butt connectors. I then wrapped the joint in electrical tape.

Lower wire shows the heatshrink tubing, upper wire shows electrical tape wrap on top of the heatshrink tubing.



Finally, wrap the wires in fabric tape.

Some of the European low-beam headlights incorporate "city lights," which are a low-power light at the top of the lens, like daytime-running lights – a cheap version of the "angel eyes" headlights that for some reason are so popular now. If you live outside of the United States and have deleted the side-marker lights in the bumper (see the chapter on the underhood light, and the section on European bumper trims in the Accessories and Other Options chapter), it's especially easy to wire up these city lights.

Coincidentally, the wire lead to the bumper side marker on your car should simply be long enough to plug its male grey connector directly into the city light's female grey connector!²⁷ (... Or it may not be coincidental if the factory cleverly decided to just utilize the city-light harness for the side-marker lights that are used in the United States.) All you need to do is re-route the wire up from the bumper.



Look for the zip-ties where the foglight part of the harness splits off. Cut off and replace the zip-tie, taking up some of the slack that there is towards the fog lights, so that the city-light part of the harness will reach the city-light connector.

Left-side, view where the headlightwasher tank would normally sit. Harness comes from fender at left, dips down to where the fog-light harness splits off and goes out of view (zip-tie is just visible at front edge of the flat blue sheetmetal plate in the picture), then goes up to city-light connector (looks white but is actually grey) at the top of the picture.



On the right side, if you're using the side-marker circuit to power the underhood light, do a splice in the power wire leading to the citylight connector to power the underhood light too.

Right side, view where the windshield washer tank(s) would normally sit. If adding the underhood light, you can splice into the power wire going to the grey city-light connector at the top of the picture (see chapter on the underhood light for a picture of the splice).

²⁷ If you'd rather not move the side-marker wires, just make a wire bridge harness to go from the now-free side-marker-light connector to the city-light connector, using additional male and female connectors and short sections of waterproof-pin wire.

Plug in the connectors.



View of the left side with all connectors connected: top left, grey: city-lights; right, white: high-beam; bottom, black: headlight motor; center, yellow: low-beam.



Strangely, since the factory is so good at integrating such things, on the left side, the trim behind the headlights didn't seem to want to accommodate the city-light connector. Cut out a small hole if needed. The right side was close, but seemed okay.



City lights at top of low-beam headlights.

Have your headlights aligned professionally, or do it yourself using instructions availabe on the Internet.

Test the headlight-beam adjustment system.

Pretty cool – you're on your way to filling in all the blank switch holes on your dash and seats!

3. Underhood Light

Light up your (engine's) night

This convenient feature was included on early models from 1989 through part of 1991, then deleted, then for some reason included on the 1993 models, according to the wiring diagrams.

In the factory installation, the parking light circuit must be on for the underhood light to come on, presumably to prevent battery drain when the hood is up and hence the light would be on. The wiring harness that goes on the underside of the hood can be obtained from various junkyard E34s and E32s. It does not have a readily accessible connector attaching it to the rest of the wiring harnesses in the engine bay, so it's easiest to cut it off.

Project Profile Coolness:

Utility: HH
Difficulty: HH
Time: US

Cost:

Parts

Name	Details	Number	Part no.	Price
Underhood light switch		1	61 31 1 379 572	\$3.50
Underhood light		1	63 31 8 350 554	\$7.40
Bulb	10W	1	63 21 7 160 912	~\$1
Harness	cut wires from donor car harness – whole engine harness would cost \$100 even from a junkyard	1		~\$3
Total cost:				\$15

Note the bulb is listed as a 10W bulb, not a 5W like some of the other similar oblong bulbs in the car.

Einbauanleitung

None

Preparatory

For power, I ran a new wire from the right side-marker light connector to the hood light harness.



To plug into the vehicle side of that connector, I ran the new wire to a factory connector half that matched and replaced the side-marker-light side of that connector.

Most of the factory 2-pin waterproof connectors are designed to have incompatible shapes, often color coded (white, yellow, grey, black), presumably to avoid people incorrectly hooking up wires. We want the grey connector. The sidemarker light itself does not have the matching female²⁸ wire connector since the male harness connector plugs directly onto the lens assembly. So a spare must be obtained elsewhere.

²⁸ This connector's contact pins are male, the actual plastic connector part is female. Gender references here will be to the connector, not to the pins.



The required female grey connector, somewhat rare on the car, can be found on later-model windshield washer jet heaters on the underside of the hood, and sometimes on doors. The male connector already on the sidemarker harness is 61 13 1 378 402; the female to get from the washer jets is 61 13 1 378 406. Or just order it new! (If you are converting to non-side-marker bumper strips, you could get extras to plug up the other three connectors for the sidemarker lights that are being deleted.)

Installation

The steps are:

- 1. Remove insulation
- 2. Attach harness
- 3. Install components
- 4. Splice in the wiring

Step 1. - Remove insulation



Remove the insulation on the underside of the hood by unscrewing the plastic screw in the clips, far enough to be able to pull out the clip. There's lots of them, and the screws can be surprisingly sticky for plastic, so be careful not to strip the head. Some replacements are inferior, having even smaller screw slots. Some early cars had a better clip that is released by levering out the center pin.

The underhood insulation mat. The rectangular outline at the top center, just to the left of center, is where the underhood light goes.



The mat attaches with numerous clips. Unscrew the screw to allow the rivet to be pulled out.



Step 2. - Attach harness

Attach the wiring harness with the clips that should already be on the car for the windshield washer hoses (and sometimes for washer jet heater wiring). Follow the path shown in the pictures, and add some more clips where needed at the top.

Upper routing. The unused cylindrical connector hanging down loose is for washer nozzle heaters, it's the early style as opposed to the later rectangular one (it was part of the donor car underhood light harness used in this case).



Lower routing. Wire to the hood switch is going to the lower left.



Check the underhood insulation edge near the underhood light contact switch for a slightly indented section, which indicates where the wire to the switch is intended to lie.

Routing of the wire for the contact switch. Electrical tape added for some chafe protection.



Step 3. – Install componentsConnect the rear half of the light assembly to the wiring harness and insert it in its hole in the hood – connector to the right.

In this picture, bulb is not yet inserted.



Light ready to be inserted into its hole. Securing tab is on the left, push light assembly left to release when removing from hole.

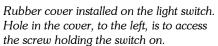


Route the switch wire into the hood and then out through the contact switch's hole (you can bring it through with a hooked pick; gently, it's a small hole). Attach the connector to the underhood light switch, and then push the assembly back through the hole. Screw in the switch with the single screw. I added a little threadlocker.

Contact switch on the far left of the picture. The small mound of sheet metal on the right is where the contact switch plunger lands when the hood is closed, turning off the underhood light.



It seems that very few cars had the nice rubber cover for the switch. Snap one up if you see it. I could not find a separate part number for it.





Step 4. - Splice in the wiring

Disconnect the car battery. Attach new wire(s) to the wiring harness, preferably in the front fuse box for weather protection, or in the hood if necessary.

Close-up of the grommet taking the wiring harness into the bodywork. In cars originally equipped with the underhood light, the underhood light wires and the heated nozzle wires are combined into one harness. The tube just to the right is for the windshield washer fluid. The thick wire on the right is the hood ground strap.

Splice in the wire(s) to a power circuit, possibly one switched by the parking light switch, as in the original installation. Wires to the right front bumper side marker do go conveniently close by. Fortunately, the side-marker bulbs are not monitored by the Check Control (the parking lights *are*), so there are no potential show-stoppers there (that is, the lack of a bulb in that circuit will not trigger a Check Control warning).

FYI, in an original '90 installation, the underhood light wires went into the harness that goes along the right side of the engine bay, across the back of it, and in through the front of the front fuse box to a splice in the fuse box, and thence through connectors and splices to the light switch.

I considered using a second switch rather than have the lights come on only when parking/headlights were on, to avoid accidental illumination. But in the end, I mimicked the original design, and plugged in to the circuit that comes on with the exterior lights. I was installing the Euro bumper trims that do not have the additional small side-marker lights, so a nearby plug became free, providing a stock-seeming wiring installation. Check your national and state laws, it may or may not be okay to not use those side-marker lights, and if not, you could just tap into the wires there while leaving them connected to the side-marker light.



To access and disconnect the sidemarker connector, remove the sidemarker light assembly, hopefully by sliding it backward in its receptacle against a spring clip at the rear until the front tabs clear the trim and the assembly can be pivoted out. Unfortunately the spring clip system does not work very well in this application, and the assemblies often have to be levered out, bending the clip. Watch out, the clips are not attached very firmly and can drop out.

Spring clip at the rear (for the front marker lights) of the light assembly.

After the light assembly is out, unplug the connector.



(If you happen to be installing headlights with "city lights," see the chapter on headlight-beam adjusters: one convenient way to wire up the city lights is to use the side-marker connector for them too. If you're doing so, modify the wiring connections described below, as appropriate.)

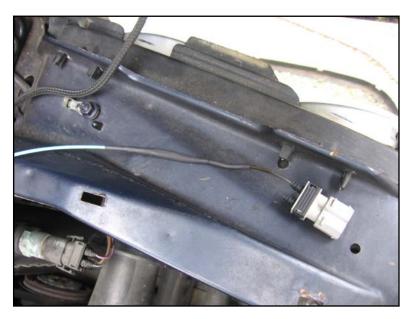
This shows the underhood light power wire (going up under the sheet metal at the top) spliced to the power wire for the city lights (grey two-pin connector). Wrap further in electrical tape and fabric tape if desired.

Now prepare the wire and female connector that will be plugged into the side-marker light male connector.



After sliding on heat-shrink tubing, crimp the wire on your female grey connector to the new wire you will lay going up to the light. (If you're clever, maybe you could find a wire of the right length with one of the waterproof contact plugs on each end, and run the wire from the light to the added grey connector, opening up the two existing connectors to replace the existing waterproof contact plugs. That way you'd avoid crimp connections in the wet underhood area.)

Factory butt connector, used to crimp two wires together.



Heat-shrink the splice. Cut off or tape up the other wire coming off the new connector. It normally serves as the ground wire, but in the case of the underhood light, ground is handled through the hood.

Note the frayed-through hood ground strap by the nut at the left of the picture. Perhaps the strap is needed for a good ground for the light. No idea why it should have worn itself out at that spot, others usually don't; a replacement is cheap.

Remove the large plastic screw towards the top of the washer fluid tank, remove the wire connectors on the pump and the level sensor (careful on the squeeze tabs, they're often brittle by now, and break off), and set the tank down, relatively out of the way. You do not need to disconnect the hose or remove the tank completely.



Wrap the new wire in friction tape and lay it along its path from the area in front of the windshield washer tank toward the centerline of the car. You can often feed the wire through existing wire straps without undoing them, but if needed you can carefully open them up to add the new wire.

This view is looking down behind the right low-beam headlight, where the windshield washer tank normally sits. The fender is to the right. The wires to the side-marker light now come up from the center of the picture, rather than going behind the sheet metal on the right to the marker, and their original connector half joins the new connector half at top right of the picture.



There are a couple of grommets to go through, for a stock look. One is buried in front of the radiator. Take off the trim panel behind the headlights (two clips turn 90°); it's much easier to take out the air filter housing first. It is very difficult to feed the new wire through the grommet in place, so pull out the grommet and slide it up its existing wire so you can reach it to push the new wire through.

Lower rubber grommet pulled out a little, to the left of the right high-beam headlight.

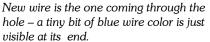


Put back the grommet.

Grommet reinstalled, with the additional wire going through it (wrapped in the new, still-dark friction tape).

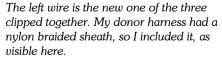


Then pull out the upper grommet and fish the new wire up through the hole.





Crimp the wire to the rest of the harness on the hood. Try to put the joint in an area that gets less wet, at a minimum under the underhood insulation mat.





Secure the wiring anywhere else needed.

This is a view behind the headlights with the existing wire strap at top center holding on the harnesses. I needed to unclip it from the sheet metal, from the top side, in order to access it to open it up.

Plug the wire you've laid going up to the hood into the existing connector originally used for the side-marker light.

Now you're done. Test the light, making sure it goes out when you push in the hood switch. The switch can be a little finicky, so if the light doesn't come on, wiggle the switch.

Wait 'til it's dark, then enjoy the illumination of your engine bay!



My camera was not even close to fancy enough to do justice to the underhood light!

4. Rain-Sensing Wipers

Another convenience

Ever been in stop-and-go traffic with on-again, off-again rain? It can be an annoying process to constantly adjust the wiper speed, and often not find just the right wiping rate. The solution? Technology. Hella made a system that runs the wipers as little or as much as is needed, by detecting the actual amount of rain on the windshield. Many newer high-end cars have such a feature installed from the factory.

Now, you may notice that this technically isn't an official "factory" retrofit and so may not deserve a place in this guide. However, there's a mitigating factor: the E34 was supposed to come with a variable intermittent wiper system. The owner's manual describes how the

š

(1)(1)(1)

Time:

Cost:

intermittent interval can be varied from 3 to 20 seconds by the driver, and the factory E34 technical reference manuals describe a slightly different system that adjusts wiper speed automatically, not just for vehicle moving / not moving, but also in several steps proportional to road speed. Since these intended features apparently did not make it into the U.S. production vehicles, the retrofit described here seems like a suitable substitute, especially as it's from an OEM supplier. If that's a stretch and doesn't convince you, well, skip these pages!

Hella has a kit for the E34 and several other BMW models, and at least one other company's retrofit is available. The Hella rain sensor is a not-too-obtrusive box, about 2"x3", that goes on the windshield, usually above the rearview mirror; a control module mounts under the dash. Few wiring modifications are needed.



This is the set I bought.

Once installed, when you put the wipers in the former "intermittent" mode, the Raintronic™ takes over and wipes whenever needed. The vehicle's "regular" and "fast" wipe modes stay the same.

Parts

Name	Details	Number	Part no.	Price
Hella Raintronic kit	used price	1	5WB 007 977-811	~\$50
Wire				\$5
Wire connectors	from donor cars			\$5
Total cost (used):				\$60

Einbauanleitungen

Mounting Instructions, Hella 460 844-03/09/00 wiring diagram, Hella 460 844-07/06/99

Installation

Steps are:

- 1. Mount the sensor
- 2. Lay the wiring
- 3. Modify the vehicle wiring
- 4. Mount the module



Step 1. - Mount the sensor

Disconnect the battery. Follow the Hella instructions closely to mount the sensor on the windshield.

Sensor is the black box to the upper right of the mirror in the picture.

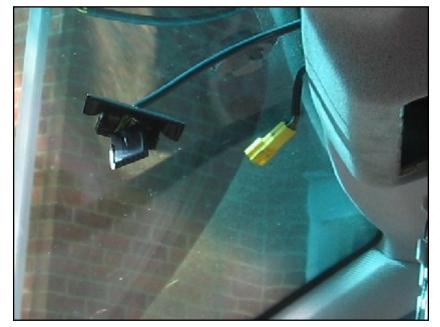


Step 2. - Lay the wiring

Remove the pedal cover and deadpedal footwell trims to access the under-dash area (see chapter on driver's glove box).

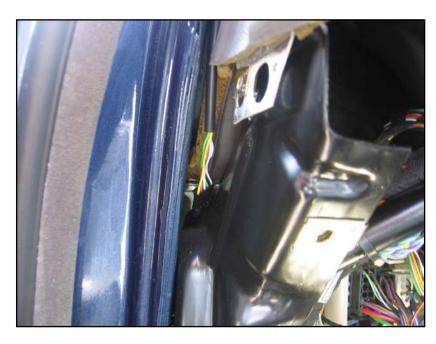
Run the Raintronic wiring harness behind the headliner from the sensor to the left side, down behind the left a-pillar, and into the upper left footwell area. The a-pillar cover simply pulls out.

This is the **right** a-pillar pulled down. You would actually take out the left side pillar. The black tabs visible at the lower left are gripped by the metal clips inserted in the a-pillar.



The harness can be slipped behind the headliner by removing the sunvisor swivel bracket and the contact bracket. Or if you're replacing the often-sagging headliner, you can zip tie the harness when the headliner is out.

Raintronic (black) and autodimming mirror (yellow) connectors peeking out from the headliner.



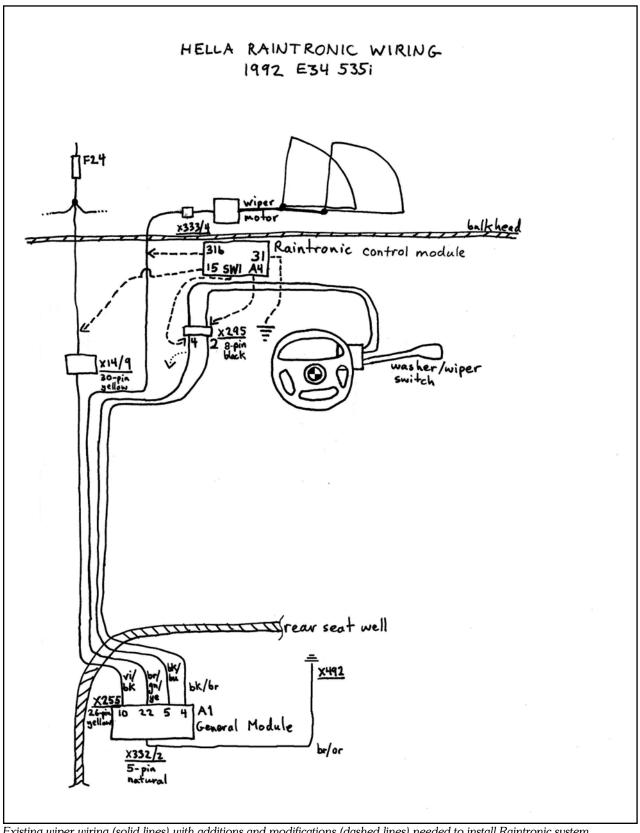
A view toward the front edge of the driver door opening. In the middle of the picture are the wires and black connector that plug into the Raintronic control module, routed down the side of the dash. Wires will of course be pulled further under the dash for attachment to the module.

Plug in the connectors to the sensor and the control module.

Step 3. - Modify the vehicle wiring

The Hella wiring sheet has three diagrams for the E34. Check for which is yours according to whether your car has the A1 or A28 module for the wipers, and according to the wire colors. Note that for the A1 (General Module) installation, the **X332/2** ground connection color should be **br/or**, not **br**, at least for a '92 535i.

The diagram below shows the approximate locations of the wires, connectors, and devices in the car, and where to attach the Raintronic connections.



Existing wiper wiring (solid lines) with additions and modifications (dashed lines) needed to install Raintronic system.

The terminals for the control module handle the following functions, according to the instructions:

positive power supply (from fuse 24 in my particular car, not from the radio as the instructions say)

31 ground

31b limit switch in wiper motor

SW1 "trip-on" signal

A4 Raintronic output signal

The Raintronic control module's terminal blades are arranged in a standard pattern, and the module will plug into a factory relay holder (e.g., 61 13 1 389 113 or -111) if desired.



Unfortunately the large white connector carrier at top left of the driver's footwell only has the attachment points for wire connectors, not the ones for relay holders. (There are adapters on the car that will allow a wire connector or fuse holder to be put on the relay attachment point, but not vice versa, that I've found.) Use hookand-loop material to stick the relay holder or the control module to the side of the white connector carrier, the SRS module, or a similar spot.

Unfortunately, the nice space shown here between the two carrier piers won't work for attaching the module because the gong sticks up into it when the pedal cover panel is re-installed.

If using a donor factory relay base, take out the existing contacts by depressing the securing tabs on the contacts from the top with the special tool or micro-screwdrivers. Then with the contact tabs still depressed, use other micro-screwdrivers from the underside to depress locking tabs on the relay base, while gently pulling out the contact. It's a little tricky and would be easier with five hands.

As you make up each wire below, crimp on a new contact (e.g., "double leaf spring contacts," 61 13 1 370 691, -692, or -693) and fit the contact in the appropriate relay base position. The module shows the terminal numbers on its side; match up those terminals with the pattern on the relay base. If using the relay base that comes with the Raintronic set, crimp on standard push-on wire connectors rather than the factory type.

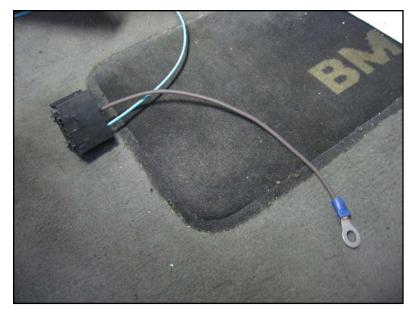
Wire lengths will depend on where the module is to be located. In my case I needed roughly these lengths:

Terminal	Approximate wire length
15	28"
31	8"
31b	18"
SW1	10"
A4	16"



Wire 1. Splice a wire from the Raintronic control module terminal 15 to the **vi/sw** .5 mm² wire already going to **X14/9**, or merge and crimp the wires at a new pin connector in the 9 slot. I did the former. (On a '92 the existing wire brings power from fuse 24 to the general module, **X255/10**, under the rear seat.)

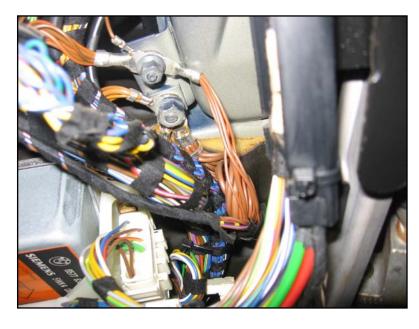
Wires spliced together using an aftermarket twist connector. **X14** is the large yellow connector.



Wire 2.

The Raintronic calls for sharing a ground wire on the General Module as the module's ground too – I'm not sure why since the General Module is all the way back under the rear seat. There are nearer ground points in the under-dash area that would seem to serve as well, unless there are some special electronic considerations at play. Run a new **br** wire from the module terminal 31 to one of the ground points, crimp on a ring-terminal connector, and bolt it to the ground point.

Ground wire attached to relay base.

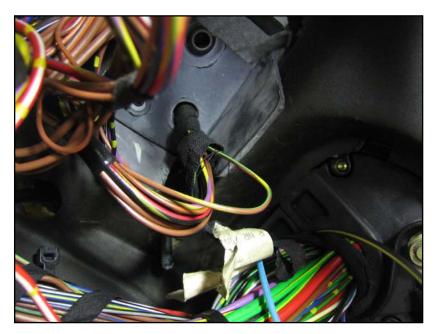


Some ground points underneath left dash.

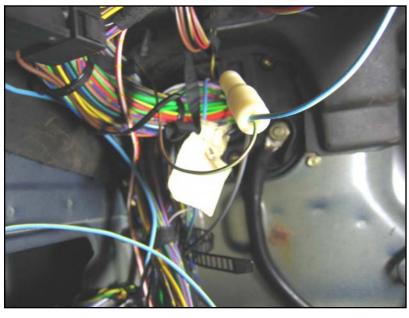


Wire 3. Splice a wire from the Raintronic module terminal 31b to the **br/gn/ye** wire already going to the wiper limit switch in the wiper motor. There are no junction connectors for this wire in the under-dash area, the wire goes directly from the General Module to the wiper motor, so splice in to the **br/gn/ye** at a place like this.

The grey rectangular rubber piece in the center of the picture is the grommet for the wire harness branch going to the wiper motor in the plenum at the rear of the engine bay. The needed br/gn/ye wire is part of the small bundle visible in the picture going through the grommet.



Close-up of the **br/gn/ye** wire pulled out for access. (The yellow stripe is in a spiral around the wire, rather than in bands.)

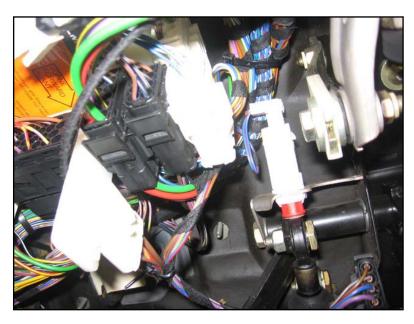


New wire spliced onto **br/gr/ye** wire using an aftermarket connector.



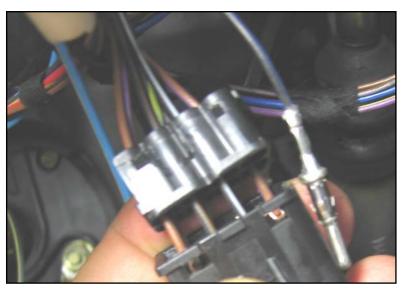
In theory one could crimp on the extra wire at a new pin on the wiper connector, **X333/4**, out in the plenum, but that would be tricky since the pins at the wiper connector are waterproofed.

A view into the wiper plenum at the rear of the engine bay. This shot is looking past where the front fuse box would be, on the left. The view is toward the right rear of the car. Visible here is the other side of the grommet shown in the previous picture. The wire bundle goes through the accordion section of the grommet to **X333** at the top of the picture.

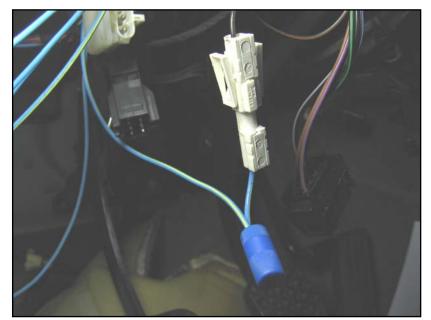


Wire 4. Disconnect the two halves of connector **X295**.

Connector **X295** (8-pin, black) is the one sandwiched between the black and white connectors in this picture of the under-dash area.

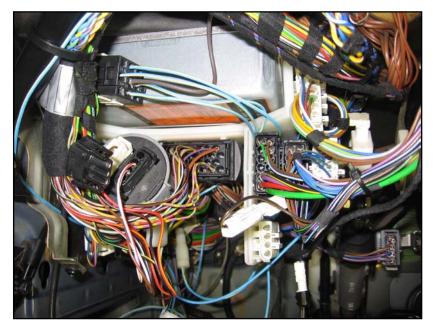


Remove and tape off the **bk/bu** wire contact coming to **X295/4** from the rear of the car to the forward half (as the connector sits in the car) of the connector. (As with contact removals/insertions from most of the larger connectors, slide the inner portion sideways past the locking tabs, then use the special contact-removal tool to free and push out the contact.) Then insert a contact on the new wire from the Raintronic module terminal SW1 into the vacant pin 4 slot. New pin ready to go into **X295**. The inner part of **X295**, which locks in the pins, has been taken out in this case, but it's better just to slide it slightly sideways past the tabs that you see where the wires go in.



Wire 5. Splice or merge the Raintronic terminal A4 wire to the **bk/br** wire already going from **X295/2** to the wiper stalk. Keep the original wire functional, don't take its connectors out or cut it.

I used a single-pin connector and an aftermarket twist connector. No need to use the aftermarket connector, I did it for other reasons.



Step 4. – Mount the moduleAttach the module using hook-and-loop material or other methods.

Raintronic control module attached to rear of airbag module (at upper left of the picture).

There, you're done. Fire up the car, spray some water on the windshield with a garden hose, and test the system. Look forward to some low-hassle driving in light rain!

5. Automatic Air Recirculating Control

Breathe easy

This is another system that does not seem to have been available on U.S. E34s, though it apparently was on E32s and 8-series coupés. The system uses a pollutant sensor mounted at the front of the engine bay to automatically close the vents that let in outside air, when pollutants are detected.

The system could be set to automatically recirculate air (LED next to the "A" in the circle on the left illuminated), or set to manually recirculate air (LED next to the circle on the right illuminated), or set to off, that is, fresh air vents open (no LEDs illuminated).

Project Profile Coolness: 🍑 🔊 Utility: 🛏 Difficulty: 🕮 Time: 😘 😘 Cost: 🄞 🐧

Parts

Name	Details	Number	Part no.	Price
Control module		1	61 35 1 390 352	
Bracket		1	61 31 1 389 004	
Wire harness	for IHKA (automatic a/c), IHKR 3, ^a up to 9/91 for IHKA (automatic a/c), IHKR 3, ^a 9/91 onwards for IHKR 2; up to 9/91 for IHKR 2; 9/91 onwards	1	61 12 1 390 207 61 12 8 359 140 61 12 8 351 211 61 12 1 359 141	
Cable holder	clips for harness in wheel well	5	64 11 1 364 073	
Sensor	early type ? late type ?	1	64 11 1 390 325 64 11 6 924 755 64 11 8 391 470 64 11 6 917 001	\$228 \$78
Bracket for sensor	bracket hex bolt with washer M5x12-Z1 flat washer 5.3 Touring bracket adapter for Touring bracket	1	64 11 8 390 598 07 11 9 915 002 07 11 9 936 416 64 11 8 390 062 64 11 8 362 939	
Control unit for heater control	the main a/c, heat, and fan control module	1	64 11 8 351 097	
Switch for heated rear window, airflow, and air conditioning	IHKR 2 and 3 IHKR 1	1	61 31 1 391 767 61 31 8 351 299	\$84
Total cost:	used price			~\$150

^aOther sources say that IHKR version 3 uses the same sensor as IHKR 2, which seems to correspond better with the switch listing, and that IHKR (i.e., version 1) uses this sensor, which is also for IHKA.

You'll need a 40mm hole saw – and a pilot bit and mandrel (the piece that holds the bit to the saw and the saw to the drill) if they're not part of the hole saw.

Einbauanleitungen

None

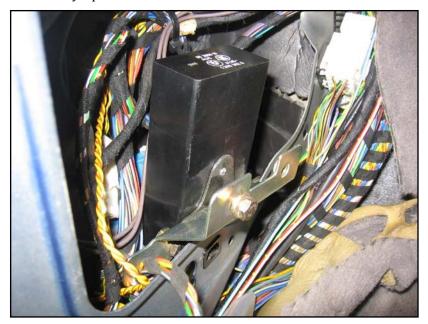
Installation

Step 1. - Take off interior trim

Remove the pedal cover (the black trim above the driver's foot pedals on the underside of the dash); the trim to the lower left of the steering column; and the deadpedal / speaker panel. See the chapter on the driver's glove box for details.

Step 2. - Mount control module

The control module goes in the cavity on the left of the footwell, which also holds a speaker, the cruise control module, and various wire harnesses.



The bracket holding the module attaches to the pre-cut holes just below the opening – unless you have a cruise control module, which gets in the way.

The holes for the two bracket bolts are visible in the sheetmetal at the bottom of the picture, one on either side of the black rectangular receptacle for the deadpedal clip.



If you have cruise, it seems that the cruise control module bracket is also designed to hold the AUC module. One side of the AUC module bracket slips into a slot in the cruise bracket behind the cruise module, and the other side needs a plastic nut on a bracket stud.

Cruise control module below, AUC module above. Bracket is held in placeby a single plastic nut at its top, which also serves as a zip-tie holder.



Step 3. – Install wiring harness

Take off the front left wheel and support the car safely. Then remove the wheel-well liner. The liner is held on by six well-rusted hex-head bolts, which fortunately screw into plastic nuts in the sheetmetal, so the bolts aren't rusted *to* anything.

Black plastic liner is the darker area at right. Three of the rusty bolts are just visible in this shot.



Once you take off the liner, you may see a bunch of decayed plant matter etc. in the nice fender rust trap. While you're here, clean it out – and do the right side of the car when you're done with this whole installation!





Now do a test punchmark from the wheel well side, in the center of where the harness hole should be cut. Then from the footwell side pull back the foam covering at the front of the cavity and feel for the punchmark. Check that the forthcoming hole will be in a good place, i.e., doesn't hit the sides of the cavity and is at a good height, ideally near where the zig-zag cut in the cavity foam is.

The beginning of the hole-saw cut shown here illustrates roughly where to put the test punchmark described above.

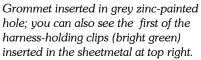


Prevent your hole saw from doing damage to the wires etc. in the cavity, for example by putting a piece of scrap metal in the way. Wear eye protection. Apologize to you car, and carefully cut the hole with your 40mm hole saw, preferably catching metal shavings with masking tape. Use a hole saw with a pilot bit. Apply pressure gently at first, and try to go in straight. The pilot bit can easily "grab" on the sheetmetal - one of mine did, and snapped. When done, de-burr the hole well, then apply several coats of zinc paint. Hole is now cut. Red shape to the left of the picture is a piece of metal to protect the wires from the hole saw.



Install the large harness grommet into the hole.

Now secure the harness around the top of the wheel well using the six clips in the pre-cut holes on the sheetmetal.





Exactly where the harness was intended to run into the engine bay was not clear. You can go low and under all the sheetmetal, or high, past the side-marker light area. The high route would seem normal, but there was a surprising amount of slack in the harness when using that route.



If you go high, run the harness forward in the area at the top of this picture, where the grey connector is (that's the side marker connector, not in its normal place). There should be another hole to put another harness-holding clip in.

However you choose to go, run the harness up to the sensor location, clipping it into the existing harness holders attached to the underside of the engine bay front top shelf. The plastic rear panel for the headlights has a pre-marked notch to cut out for the harness to pass through, in its top right corner.

The harness here is under the small coolant hose, visible at center running through the notch in the edge of the headlight rear panel. The black post towards the top left of the picture is the stud of one of the two harness-holding clips. To open and reclose the strap, it's usually easiest to take out the clip, in this case by squeezing together all of the sides of the stud and pushing it out the hole. Old straps are very fragile.



Step 4. - Attach sensor

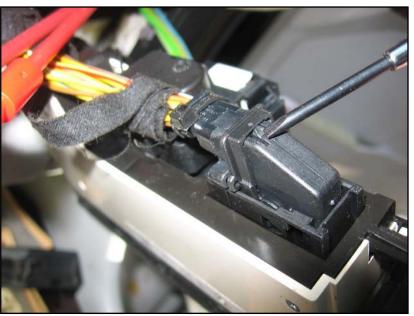
Bolt the AUC sensor to the tab on the radiator shroud – ever wonder what went there?!

Plug in the sensor wire connector by lining it up and then sliding the lock to its side, which will pull the connector firmly into place on the electrical pins.

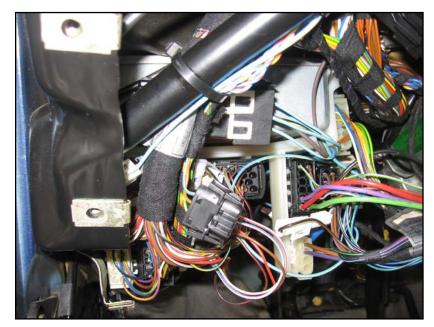


Step 5. - Replace control panel

Next, replace the heater and a/c control panel and its attached electronics. The best way is to remove the radio for access to the back of the switch on the left, then push out the switch from the rear. Alternatively (if someone has trashed your radio bolts by not using the correct pentagonal removal tool), you can pry the switch out from the front with microscrewdrivers, at some risk to the finish of the panel. Once the switch is out, feel for a small springloaded latch on the left side of the opening, half way up. Push it left at the same time as you're pulling out the left side of the panel.



Disconnect the switch connector, if not already done, then the three Bowden cables. Slide the cable knobs to the right, squeeze the tabs together (careful, the bars on the panel that hold the tabs are fragile), and pivot the cables enough to release them from their posts. Now you can rotate the panel further, and take off the two wire connectors. On the left one, you depress a small locking tab, then rotate the locking bar through 90°. The rightmost one has a sliding lock similar to the radio connector: gently lever the left side of the lock to the left with a screwdriver. As you lever, it should pull the connector up.



My car, happily, was pre-wired for AUC. The connector was zip tied to the left of the large underdash support bar. I just left it in place, but you could take it out of the zip-tie and secure it to a free spot on one of the other connectors on the main white connector carrier nearby. Run the small branch of the harness up from the footwell cavity, zip tie it as appropriate, and connect the connectors together.

If you're not prewired, you'll need to run wires to the appropriate pins on the back of the hearter and a/c control panel, per the wiring diagrams. Install the new control panel and new switch on the left.



If not already done, connect the AUC control module connector: pull up the black slide lock on the middle of the connector, plug in the connector, then slide down the lock.

This shot shows the cruise control and AUC modules in place, and the AUC wiring harness coming through the zigzag slit in the cavity foam. Part of the black grommet in the hole leading to the wheel well is just visible behind the slit

Test what you can (e.g., interior illumination lights on control panel light up, a/c switch works), then put everything back together.

The final step probably requires a visit to a shop with the MoDIC, GT1, or similar diagnostic/programming device, in order to tell the climate control module that the AUC feature is now installed, unless you have a pretty fancy laptop diagnostic/programming program. Until the reprogramming is done, the AUC button should manually activate recirculation, but not start the automatic recirculation feature.



Alright, that's it! Now, when driving along with the controls in auto mode, you should, when stuck behind that smoke-spewing industrial truck, be able to hear your vents closing, without you lifting a finger

6. Autodimming Rearview Mirror

Pre-wired, again

An inside rearview mirror that automatically dims at night is available, though was rare or nonexistent on U.S. E34s. The U.S. E32 sometimes had it. There were several versions. Wiring is usually already available in the cars, but an EBA gives wiring instructions if it is not. Some may feel that this is an unneeded gizmo, just something else that can break – but this guide is a celebration of engineering and technology, some of it unessential, much of it useful, all of it clever. This is for love, not efficiency!

There were several different part numbers for the mirrors, probably with different connectors, and later models used a mirror without the slide control of the earlier ones. Identification is made difficult because the normal BMW part number is apparently not on some of the mirrors.

Project Profile Coolness: 🌢 🕹 Utility: 🛏 Difficulty: 🕮 Time: 🕓 Cost: 🞳

Parts

Name	Details	Number	Part no.	Price
Interior rearview mirror with auto dip	up to 9/92	1	51 16 1 948 156	\$287.93
Interior rearview mirror with auto dip	9/90–9/92 (old number)	1	51 16 8 141 800	
Interior rearview mirror with auto dip	9/90-9/92 (new number)	1	51 16 8 165 802	\$1,062.99
Interior mirror electrochromic	9/92-, (old)	1	51 16 8 141 176	
Interior mirror electrochromic	9/92-, (old) in conj. w/ covers, 51 16 8 251 200	1	51 16 9 134 461	
Interior mirror electrochromic	9/92-, (new) in conj. w/ covers, 51 16 8 251 200	1	51 16 8 238 066	
Interior rearview mirror with auto dip	9/92–1/94, for vehicles with infrared remote control	1	51 16 8 165 802	\$1,062.99
Total cost:	used price			~\$80

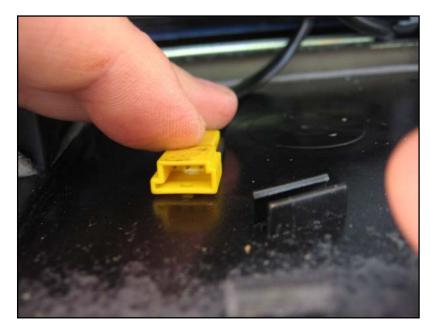
Einbauanleitungen

Automatic Dipping Rear-View Mirror, 2/91, 01 29 9 782 113 Interior Rearview Mirror with Automatic Dipping Function, 11/92, 01 29 9 786 337

Description



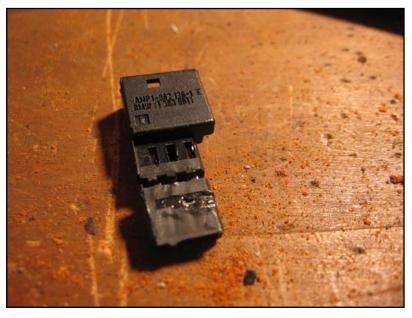
The early autodimming mirror, with slide control at the bottom.



Three-pin connector on a '92. Note the irregular shape, which does not mate with all mirror connectors.



Wire connector on a mirror. Note that this shape, including the tab, does not mate with the '92 connector on the car. For my application, I needed to cut the tab on the right side off.



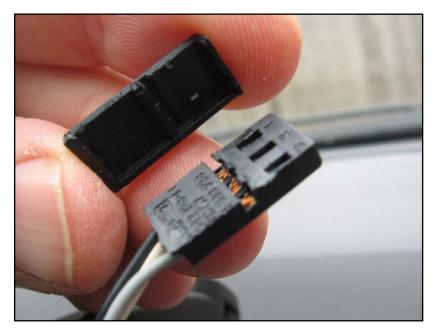
This mystery connector was attached, in my case, to the connector on the mirror shown above, but appeared to be missing some internal connector pins if it was indeed the car-side connector. I did not need it for my installation, instead trimming the mirror connector that fitted inside it to fit directly into the yellow car connector.

Later cars (E32, E36 in Europe) used a different autodimming mirror with a 10-pin connector. The mirror does not have the slide at the bottom, so is less bulky. It is identifiable by a sensor dot at the top center of the mirror glass. This mirror can also be fitted, though the wires on the vehicle side will need to be refitted into the appropriate slots on the vehicle-side connector from the donor car.

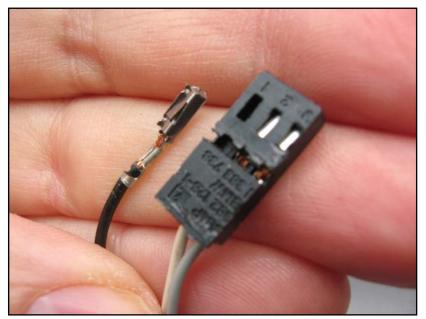
Installation

You may need to trim tabs to make the connectors fit, and possibly reorder the wires to match them up correctly. In my case, the match-up was as follows, with the original pin locations shown:

	car-side		mirror-side		
	connector		connector		
ground	brown/orange	1	white	2	
reverse signal	blue/yellow -	2	grey	3	
power	green/black	3	black	1	



If you need to reorder the pins, open up a plastic connector. This one on the mirror slid off to one side.



Depress the catch on the wire pin or socket, so that it can slide out (you might need to depress, pull, depress, and pull again to get past two catch points).

Reinsert the wires in the appropriate slots.



Twist the existing mirror to one side about 60° to release it. Do it gently. Once I accidentally took the mounting plate and a divot of windshield glass off instead of the mirror.



Remove the sunroof switch panel – several tabs at the sides and rear. Look for the tied-back harness in a plastic sheath with a three-pin, depending on the year, connector and free it.

Mirror wiring (yellow connector) tied back behind sunroof switch panel.

Take out the interior light panel just ahead of the sunroof switch panel, and put your hand into that space in order to push the harness and connector over the front lip of the headliner, down towards the mirror.

Pop off the trim cover on the stalk of the autodimming mirror at the round end, and connect the connectors.

Reattach the trim, and install the mirror.

Test using the instructions in the EBA to make sure the wire connections are correct. You can test during the day by covering the light sensor in a hole on the backside of the mirror (toward the windshield), and shining a flashlight on the sensor on the front of the mirror.



The completed installation.

Installed mirror. The wires are well hidden.

Now enjoy your night-time driving without the glare!

7. Driver's Glove Box

A European treat

This nifty little cubby hole was only available on European models. U.S. models put in an undoubtedly valuable anti-submarining knee bolster. For the stock installation, the knee bolster has to come out, though conceivably with some metal cutting and work one could install the glove box in and through the bolster itself. Using the most obvious method to do that, the glove box would still not be flush-mounted the way it is with the stock installation. So take your choice, your knees, or a neat cubby

Project Profile

Coolness: 🍪 🗞
Utility: 🖦 🖦
Difficulty: 🕮

Cost: ssss

Parts

Name	Details	Number	Part no.	Price
Glove box, driver's side	light silver gray	1	51 45 8 138 174	\$92
Trim panel, lower left	light silver gray	2	51 45 8 138 197	\$70
Fillister head self tapping screw	for attaching glove box to trim panel	4	51 43 1 874 616	<\$1
Body nut	speed nuts for above screws	4	07 12 9 925 710	<\$1
Body nut	speed nuts for attaching pedal cover to trim panels; might be needed because old ones are less thick	4	07 12 9 901 634	<\$1
Wooden strip	left side; for no-airbag models, but seems to work with airbag; walnut	1	51 45 8 155 851	~\$75
Wooden strip	right side; for no-airbag models, but seems to work with airbag; walnut	1	51 45 8 155 855	~\$75
Grommet	a plastic and metal piece to grip the left-side attaching pin of the left panel's wood trim, and the single pin on the right panel's wood trim	1?	51 45 1 938 904	<\$1
Trim panel lower left	actually is "lower right" in relation to the steering wheel – the "lower left" meaning here is in relation to the center console; light silver gray	1	51 45 8 138 213	~\$37
Trim panel, foot controls	normally this number is Euro-only, but was available on some very early U.S. cars, pre-airbag	1	51 45 1 978 935	~\$46
Total cost (new):				~\$470

Einbauanleitung

None

Description

The glovebox just clears a knee-protector attaching flange (which was not put on European cars) and the dash brace, giving it a rather odd shape inside. It does not conflict with the airbag module. The knee protector needs to be removed unless you want an inordinate amount of work; don't throw it out if you might ever want to backtrack.



View looking down past a slightly-pulled out dash trim. The back of the driver's glove box is the black shape at the bottom right of the picture. Knee-protector flange has the large speed nuts on it. Dash brace is the large round bar with the zip-ties.



Interior of glove box.



Replacement trim panels are needed for lower dash areas left and right of the steering wheel, and also a new foot pedal cover is needed. Although the U.S. and European versions of the latter are similar, they are not interchangeable since the profiles of the trim panels are different, and they meet the pedal cover panel at somewhat different angles and locations.

Pedal cover for driver's glove box is to the left. Note the angle bend in the panel.



U.S. cars have a single trim panel that covers both sides of the steering wheel, but the European cars have two (in some early cases the center console piece simply extends further to the left over the right panel area), leaving the area underneath the steering column somewhat uncovered. The European cars had a longer lower–steering column trim piece that covered the gap.

The different trim panels.



Missing area of trim isn't a bad visual gap because it's well underneath the steering wheel.



The steering column trim for driver's glove box cars extends down into the gap between the side trims. At least one such column trim did not fit on the steering column of my later car, however. Here are the different lower trims:

Lower trim that normally goes with driver's side glove box is on left; lower trim that came with my U.S., airbag, single-piece steering-column trim car is on right.



Since the airbag came with an attendant knee-protector, which was incompatible with the driver's glove box, there may well not be a steering-column trim set that fits on an airbag wheel/column, yet is of the longer length.

The trims from the inside: attachment points, internal shape, and slip-ring area are all quite different.



Where the new left trim panel meets the left side of the dash wasn't absolutely perfect on my installation, probably because the European dash piece is different. The trim plastic was not neat along the join, but the door is normally closed over that area, and it wasn't particularly noticeable in the first place.

Note left side trim screw (under cap).



Oddly, the wood trims on the European and non-airbag panels are very slightly wider than the U.S. ones and have very slightly different shapes (mine were marked "ECE", for Economic Community of Europe, on the back).

Left-side wood trim, glove box version at the top. Note the different shapes at each end. Nice illustration of the difference between the walnut and bubinga woods.



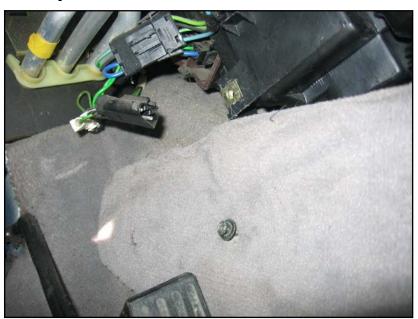
Right-side wood trim, glove box version at the top. It's hard to see in the photo, but the glove box piece has a warped shape, unlike the original. The lower piece looks bigger only because it's closer to the camera; the very slight difference in the angle on the left of each piece is real, however.

Installation

Once all the pieces are obtained, it's a fairly straightforward matter of unscrewing everything and screwing it back together. Steps are as follows:

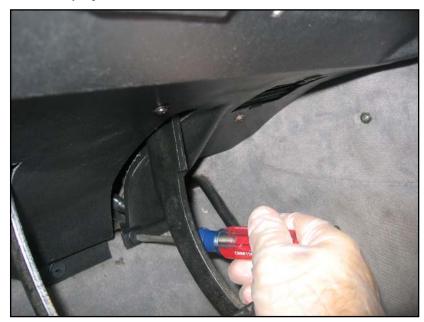
- 1. Remove lower trims
- 2. Remove upper trims
- 3. Attach glove box to panel
- 4. Prepare pedal cover
- 5. Install glove box panel and other trim

Step 1. - Remove lower trims



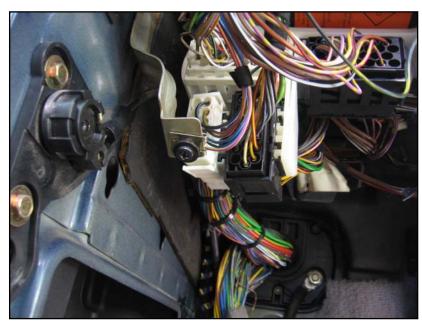
Remove the carpeting on the left side of the center console – one screw half way up, towards the back.

Screw goes in the brass-colored speed nut visible above the (dismounted) console trim.



Turn the two plastic pins at the back of the pedal cover a quarter turn.

(Yes, you noticed – this is actually the **replacement** pedal cover.)



Unscrew the screw at lower left of the pedal cover, disconnect the gong, and remove the cover.

Note, pedal cover, deadpedal trim panel, and hood release are already removed in this picture.



The gong.



Step 2. - Remove upper trims

Gently lever out the wood trim on the left side of the steering wheel – lever the trim's left side toward the rear of the car, then unhook the right side by pulling the trim to the left and back. Lever out the wood trim on the right side – there's no hook, it's held in by one pin, toward the left side. Unscrew the three screws across the top front of the panel, and the one at the left near the door jamb, after taking off its trim cap. (Also see below for some more pictures, at reinstallation.)

Screwhole for trim panel, hard to see but in the center of the picture.



Second screwhole, near steering column trim.

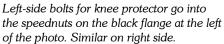


Remove small plastic trim-colored cap at side of trim, and remove screw that goes into this speednut.



Unscrew the screws on the center console and remove the right trim panel. Note which screws go where on the center console.

Unbolt the knee protector, two bolts a side.





Step 3. – Attach glove box to panel

Attach the glove box to the left side trim panel using the four screws and speed nuts. Adjusting the box's position up and down will determine how far the door opens. Slide on two speed nuts over the bottom holes, and push in the white plastic grommet from the front (upper right of the panel back, in this picture).



Step 4. - Prepare pedal cover

The pedal cover may need cutting, for example for the clutch pedal groove, the gong, and one of the round pushin plastic clips that help hold on the a/c air duct. I used a sabre saw and sharp knife to make the various cuts. The cover is marked along the appropriate cut lines. Markings for the gong on the new panel were not in the same place as on the old panel for me. Although location is inexact, do cut the length of the opening for the gong cover exactly, according to the spacing of the clips that hold it in place, since the gripping edges of the clips holding the cover in place are very narrow.

At this point, gong hole is cut, extra clip hole is drilled, but clutch pedal groove is not yet cut. Markings may just be visible next to the left vent grill and parallel to the brake pedal groove.



If needed, transfer the gong cover, air duct, and duct grill from the old panel.

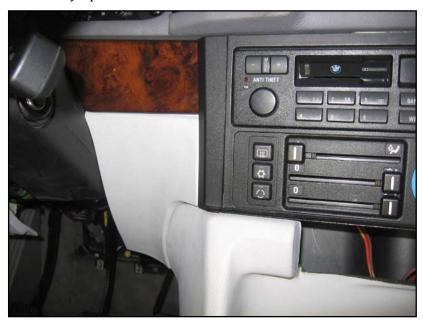


Step 5. – Install glove box panel and other trim

Screw the left trim panel to the dash – two screws at top, one at side with screw cap.



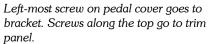
Screw on the right-side trim – one screw at top left, two screws on center console.



Push in the two wood trim pieces and the right-side black trim strip on the console.



Screw the pedal cover to the bracket at lower left, and to the brackets at the front of the footwell.





Note the console trim carpet screw at right.



Screw the pedal cover to the two trim panels – three screws along the top of the cover.

Screw on the console left-side trim carpet, resting the pedal cover's right-side hook on the trim.

New right side trim is at the top right of the picture: pedal cover is being screwed to a speed nut on the black tab coming down from the bottom of the trim. See earlier picture for two screws on left side.

Finished; enjoy deciding what things to put in the neat little cubby! It works well for sunglasses.

8. Steering Wheels and Column

Add a little individuality

The standard U.S. wheel unfortunately does not have a separate colored roundel at its center (except for 1995 models), merely a crude relief version molded into the plastic. A colored roundel would be nice, as would wood, and there are several nice wooden optional wheels available. Alas only one puts together a colored roundel, wood rim, and an airbag, until the final year of production, which introduced a new slip ring and connectors. One can retrofit the later wheel and its slip ring by splicing the few relevant airbag and horn wires – but since this is a vital safety item, do so at your own risk.

Project Profile Coolness: 🍑 🔊 Utility: 🛏 Difficulty: 🕮 🕮 Time: 😘 😘 Cost: 🄞 🐧 +

Later cars had the option of electric adjustment of the steering wheel for reach (i.e., along the axis of the steering column, as opposed to "tilt"), which would be tied in to the memory system when present. The powered steering column feature was operated with a dedicated lever on the left side of the column, below the turn signal lever. Retrofitting electric adjustment can be done by installing a late steering column and its bracket, which is not as difficult as might be imagined.

Parts

Name	Details	Part no.	Price
A. Standard, 4-spoke airbag	7/90–9/93 9/93–4/94 M Technic with enlarged grips and colored stitching two-tone	32 34 1 159 786 32 34 1 162 806 32 34 2 276 935 32 34 2 276 937	
B. Sport II, 3-spoke, old style	rim airbag mounting parts set (bolts, springs, airbag light cover) retrofit kit steering column without airbag	32 34 9 402 812 32 34 1 161 008 32 34 9 066 892 32 34 9 402 514 32 31 9 402 535 32 33 1 160 675	\$19 \$257
	no airbag; Woodline Blackline	82 21 9 401 672 82 21 9 401 673	
with integral airbag system	leather	32 34 1 161 982	\$474 ^d used: \$100
C. New standard, 4-spoke	airbag; colored roundel 5/94; leather plastic wood	32 34 1 162 110 32 34 1 091 872° 82 21 9 404 484	\$441 ^a \$446 \$725
D. Sport II/III, 3-spoke, new style	leather walnut mahogany	32 34 1 162 097 82 21 9 404 837 82 21 9 404 486	\$474 ^b
Steering column	1995; bracket and wiring included; used price		\$200
Total (used)			\$300-500

^a Airbag \$950; slip ring \$160.

Einbauanleitung

- (A) Sports steering wheel, BMW M Technic (new version), 2/89, 01 29 9 782 140
- (B) Conversion of the standard steering wheel Airbag I to sports steering wheel Airbag II, 2/94, $01\ 29\ 9\ 788\ 357$
- (B) BMW "Woodline" and "Blackline" Sports Steering Wheels, 6/92, 01 29 9 786 948
- (B) Sports Steering Wheel with Airbag II, 4/94, 01 29 9 788 348
- (D) Conversion of the standard steering wheel (4-spoke) to sport wheel (3 spoke) (E34 after 5/94), 1/95, $01\ 29\ 9\ 789\ 119$

^b Airbag \$605; slip ring \$160.

^c Airbag up to 5/94 listed (32 34 1 093 305) and different one listed still available (32 34 1 094 445).

^d Electronic control (inside wheel) \$290; slip ring \$80.

Description

Column mounting changed around 9/90: earlier wheels used a nut to attach the wheel, and the steering column spline was smaller; later wheels used a bolt for the wheel, and the spline was larger. Note that the bolts are supposed to be one-time use, and that some wheels use different contact "slip rings." Refer to the EBA for some useful information on selected swaps.



A. This is the standard rim up to '95 (there were actually a few very early U.S. '89s that didn't have this wheel, nor did they have an airbag at all). There was an exceptionally rare version of this wheel with a nice wood rim, and the wheel was also available in versions with colored leather rims, plus there was an M-version with thicker-rim palm grips in the 2 and 10 o'clock positions.



B. Pictured is the attractive wheel with integral airbag system that was meant for cars without a vehicle airbag system. The airbag control system is contained within the wheel rather than having sensors and module elsewhere in the car. Note the red light panel towards the bottom, in the vertical spoke, which says "AIR BAG" (it goes out after startup). This installation requires a different, earlier steering column, which is covered in the EBA; the column switch is not too hard. The wheel design was more commonly available with a leather rather than wood rim, with or without airbag. It was also available in a pair of versions (Blackline and Woodline) that were very similar but had a "bolt head"-theme center hub and no airbag.



C. This is the 1995 (5/94+) new standard design with a nice colored roundel (shown in an E36 here). Notice that the accent ridges line up along the center of the spokes, as opposed to the earlier design where the ridge along the top of the airbag lined up with the bottom of the upper spokes. The wheel also came in some beautiful wood-rim versions.



D. Here is the 1995 3-spoke design, also found on some M3s. It too came in a rare wood-rim version. It fits on the '95 models; earlier models need modification of wiring. Note that some later wheels (on various '99+ models) look just like this but use an incompatible airbag, with a dual-stage system. The connector on the back of the later units is a yellow 4-pin type, rather than the earlier orange 2-pin type.

Installation

Any changes to the steering column, wheel, and airbag system could potentially interfere with their proper safety operation, so make any modifications at your own risk. It's best to have a qualified shop do the work.

Always disconnect the battery before doing anything in the steering wheel area so your airbag is less likely to go off inadvertently. Relatedly, let residual electricity dissipate for half an hour after disconnecting the battery, before taking off the airbag or steering wheel or disconnecting the instrument cluster. If you don't, you might turn on your supplemental restraint system warning light in the instrument cluster, which is very difficult to turn off for these years of vehicle without the dealer-only diagnostic system (the relatively inexpensive aftermarket maintenance-light-reset gizmos usually don't work for the early years).

If you're doing only the wheel, or the power column, adjust the following procedures as appropriate.

Step 1. - Obtain donor column

Find a donor car with the late, powered steering column. Note: get one that has a key, for purposes of removing the ignition lock (and not having the wheel lock in place while you're installing). Move the wheel all the way out from the dash if there's a battery in the donor car. Disconnect the battery.



Take off the airbag – two T30 captive bolts at the back of the wheel.

Standard socket fits in the hole with some difficulty, so a thin Torx screwdriver of the appropriate size is recommended. There's also not a lot of clearance, so bring a short one if you can.



Disconnect the airbag and horn connectors.

Horn connector is the one under a red plastic cover at top center of picture.

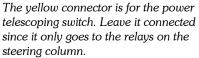
Take off the steering wheel by removing the bolt.

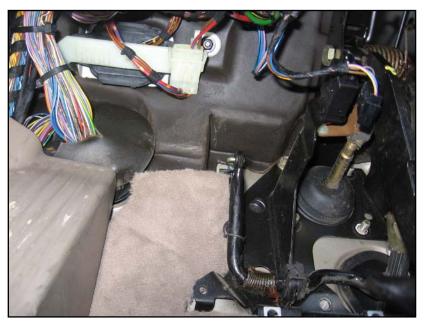
Remove two trim panels – one that constitutes the lower part of the dash and the other in the footwell called the pedal cover (see chapter on driver's glove box).

Unclip the lower black trim on the steering column – usually one expanding screw-clip underneath, then it just pulls off the top black trim; it attaches to the top trim tightly.

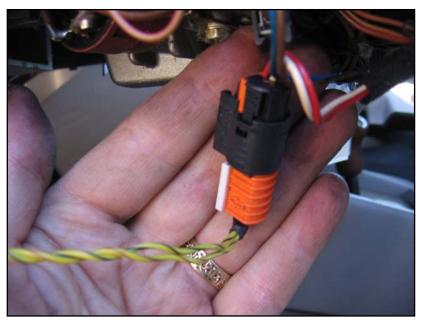


Follow the wire harnesses from the steering column and disconnect them from their various nearby connectors.





The wires for the steering column adjustment sometimes go to the pictured white connector holder on the firewall. The holder was not present on my '92, but the studs for it were (the connector was attached to a different holder). If not prewired, you can take the wires from this connector all the way to the rear relay holder where they go through a dedicated fuse, F41. Or, just tap into an underdash wire. At bottom right of the picture is the pedal bracket, referred to later, with its four mounting studs in a square pattern. The top left stud still has its partly-hidden nut on. At the very bottom of the picture, you can see the empty bolt hole for the single pedal bracket bolt.



The airbag connector is usually orange; depending on how you plan to wire it up, take both sides of the connector and quite a bit of the wire coming out to the vehicle.



Now tackle the difficult shear bolt – the bolt whose hexagon head deliberately twists off during installation so that it cannot easily be removed. The bolt is located at the back of the steering column bracket, above the pedals. You can try to get it out by hammering a chisel at the conical head with enough of an angle to turn the bolt. I found this didn't work despite some very hard hammering. There is not much room to maneuver. Better is to cut a screwdriver slot in the conical head – with a hand hacksaw at a slow pace or, preferably, with a powered tool.

View is looking up, front of car to right.



Since I did not have power at the yard and was having difficulty hacksawing, I used another method: I simply undid the pedal bracket, to which the steering column bracket is attached, and removed them together (see earlier picture for the five nuts and bolts); also remove the clip holding on the brake pushrod clevis pin, and release the accelerator. Back home, it took but a few moments to cut a slot with a Dremel[®] tool, and loosen the bolt, turning very hard with a large screwdriver.

Picture shows pedal bracket, steering column (at right), old shear bolt with washer and spacer, new bolt with head still on, and a Dremel cutting tool.

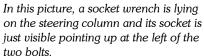


Take off the pair of bolts toward the front of the steering column bracket.

Relevant bolt in upper right of picture is marked with yellow paint. Note the steering-column-adjusting motor (without a memory potentiometer on the end) in the center of the picture.



If you're removing the pedal bracket too, pull down the steering column slightly and access two remaining bolts.





If the donor is an automatic, cut the shift interlock cable that is screwed in near the ignition lock.

Now remove the steering column, possibly with the pedal bracket too. I found the column came right apart at the large taper nut inside the footwell. (Note that many have found that tightening the nut slightly – not too much – can remove looseness in the steering.)

Nut is at the bottom center of the picture; cable is to right. Nut did not need loosening in my case. Note also, to the immediate left of the steering column shaft, the clip holding on the brake pedal pushrod's clevis pin.



Technically, the EBA takes the column apart at the universal joint in the engine bay between the firewall and the steering rack, but the connection there was very tight and I found that method unnecessary. But to release the joint, undo the clamp bolt, and perhaps try to pry open the clamp a bit if needed to free up the splines.

Now that you have your goodies, return to base! Take a key that goes with the steering column, and maybe the wheel including slipring, and airbag.

View is looking straight down, near the brake cylinder, at the universal joint in the engine bay (socket is on the joint).

Step 2. - Remove existing column

Take the non-powered column out of your car, following the procedure for the donor car. Disconnect the battery for half an hour before taking off the airbag or steering wheel or you might set your supplemental restraint system warning light on. Turn the steering wheel so it is centered, for purposes of installing the new one straight.



Because of the difficulty in getting good angles with the rotary cutting tool, I couldn't get a clean screwdriver slot cut into the shear bolt head and the screwdriver kept sliping out. Try adding a 90° adapter to the rotary tool and come up from below, holding the tool body vertically, below the bolt. But if cutting a slot doesn't work, I recommend cutting two parallel edges on the shear nut that you can grip with a pair of pliers. Then, for access, undo the four nuts holding on the rubber disk on the steering column shaft. Grip hard and turn forcefully with a large pair of pliers.

Visible bolts held on the rubber disk.



The arm in the picture, and its pair on the other side, also attach the non-power steering column. Their long pin bolt presented a problem: the a/c stepper moter firmly blocked its egress. No visible way to remove the motor, so the solution was to pull the sleeve that the bolt goes through and that is inside the pedal bracket, as far to the left as possible, moving insulation padding at the left out of the way. Then, and only then, the bolt could be angled out just far enough to clear the stepper motor to the right.

Step 3. – Transfer slip ring, lock, airbag connector, special stalks, keyhole trim

If you're installing a new wheel, transfer the slip ring from the donor column to the new wheel.



Take off the donor airbag if any, remove the wheel from the column, then undo three T10 Torx screws on the back of the wheel, and another one holding on a blue wire on the front of the wheel.

Transfer the lock cylinder from the old to the new column. Freeing the lock cylinders can be very fiddly and frustrating, but the following process worked for me. When a pin is inserted correctly in the tiny hole in the ring around the key slot, with the key in the lock, it depresses a tab on the outside of the lock cylinder that normally rests in a groove in the cylinder housing, allowing the cylinder to slide out. So:

- 1. Unfold the outside leg of a large paper clip (factory specifies a 1.2mm width wire) so it's at a 90° angle to the rest of the clip. Grind a 45° bevel on the outside edge of the end of the clip.
- 2. Before turning the key fully to the accessory position (45°) , not 60° , insert the end of the clip in the small hole next to the key slot, with the bevel at top of hole and the rest of the clip pointed down (when the column is still in the car). While putting light pressure on the clip, turn the key until the clip clearly slips further in than the $\frac{1}{4}$ " or so it could go before. That should accord with the accessory position for the key, roughly.
- 3. Now push in the clip while rotating the clip 90° up (i.e., counterclockwise), then, importantly, crank it back down and up again two or more times. Another cylinder I had only worked when I rotated the clip all the way around a few times. I'm guessing the bevel allowed some kind of screw action to force the pin in with the rotation. Keep pulling out lightly on the key to pull out the cylinder, once the lock tab is depressed.



The airbag connectors were different between my '92 and the '95. Proceed at your own risk since this is an important safety item, but I took the old wheel-side connector and attached it on the end of the new vehicle-side connector wires. I slipped the wire contacts out of the existing connector using the special contact-removal tool, crimped new contacts on the end of the donor connector wires, and inserted the newly-crimped contacts into the existing connector.

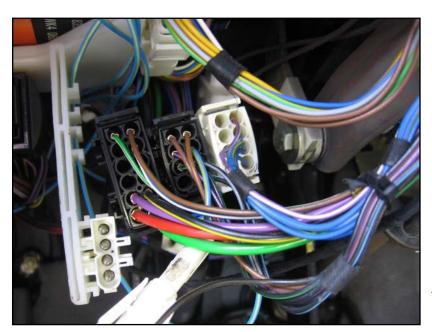
The small copper piece to the right is a "bridge" between the two wires that came out of the old connector and is not needed in this application, but could be left in.

Transfer any special column switches (e.g., the wiper switch with intensive wash you might have installed following the chapter in this guide) to the new column. Zip tie the harnesses along the wire channel.

If you're putting in a '95 column, the lower black plastic column trim will have a notch next to the keyhole trim for the Driveaway Protection System (EWS) wiring, so you may want to use your original column trims if they fit and you don't have EWS. Mine fit, after I cut out the pre-marked slot for the column-adjusting stalk. Get the circular trim that goes around the key hole from the old car – the one for the EWS won't snap on to the old key cylinder – and put it on with the column trims.

Step. 4 - Install new column

Install the new column, preferably using a normal M8 bolt rather than a shear bolt. You never want to have to wrestle with a shear bolt there again. If the wheel is already on, line it up straight, with the wheels straight too.



Connect the wire connectors. When I began to examine how to put the connector holder from the donor car on, I spotted the same kind of connector already nearby, unused. Lo and behold, my car was prewired for the power steering column adjusting! I was surprised because I believe no U.S. E34s came with it until the 1995 model year.

Prewired connector for the power adjustment is the white 4-pin connector at the bottom of the pier on the holder. Four other connectors for the steering column are also visible (fifth connector, for the airbag, is on the steering column itself).

If you're not pre-wired, attach the holder from the donor car or just use a free connector docking station. For the power wire of the telescoping column, either lay the wire from the donor car all the way back through F41 on the rear relay holder and splice to a nearby hot, red wire in the bundle back there, or splice into an appropriate underdash wire like the similar-color one going to the driver power seat motors. (The latter might not be so good if you're applying memory to the column and the memory system activates the column adjustment motor and seat adjustment motors simultaneously.) Attach the ground wire ring terminal to the ground post nearby on the underside of the dash.

If you're installing a memory version of the column adjustment, add the voltage regulator / potentiometer on the end of the motor if necessary, and run wiring or connect to, as necessary, the substituting sport seat thigh-support port on the memory control module under the driver's seat (see memory chapter).

If you're putting on a new wheel, or transfering your old one, you can mount it now. Use a new bolt with the specified torque. Connect the wires on the back of the airbag, and bolt it on.

Put back the trims on the steering column, and the dash and pedal trims.

Now test. Reconnect the battery while staying well clear of the airbag. Turn on the ignition, again it's probably a good idea to stay away from the airbag. Make sure the SRS light on the dash goes out after a moment. If not, you'll need to get it reset if you didn't let circuits discharge sufficiently after disconnecting the battery, or there may be a bigger problem. Test the power adjustment, all the switches and stalks, and don't forget the horn.



A burled-walnut three-spoke wheel. You won't see many '92 E34s with that lower left stalk for power column adjustment!

There, that's it. The power adjusting is a feature you may not use much unless you share your car with a driver of different dimensions, but it's one more nifty factory retrofit under your belt!

9. Fire Extinguisher and First-Aid Kit

Neat installations on the front seats

The fire extinguisher holder attaches to the front of the driver's seat, and the first-aid kit slides underneath the passenger seat. The fire extinguisher originally came in halon and powder versions; the halon is no longer available since halon depletes atmospheric ozone and contributes to global warming. Older extinguishers can be found, used. The powder extinguishers work by melting onto hot surfaces – suffocating the fire but leaving a gooey mess.

The extinguishers are heavy, so they add a bit of weight to the car. Note in the picture below that there is plenty of clearance for the driver's legs, at least for a six-footer's legs.



The first-aid kit contents, from Holthaus Medical in this case, include:

1	adhesive tape roll	500 x 2.5 (cm)
1	dressing	50 x 6
3	dressings	10 x 6
3	bandage packages	10 x 8
1	bandage package	12 x 10
3	bandages	60 x 40
1	bandage	80 x 60
6	compresses	10 x 10
3	gauze bandages	6 x 4
6	gauze bandages	8 x 4
2	triangular bandages	136 x 96 x 96
4	PVC gloves	large
1	pair of first-aid scissors	
12	safety pins	
1	piece of chalk	

instruction booklet

1

The piece of chalk is reportedly to write down license plate numbers on the street! Ingenious.

(First-Aid Kit)

The instruction booklet in this case was from the German Red Cross, 20 pages long, in German, English, and French, apparently designed for driver's license applicants. It has useful basic instructions and pictures.

Parts

Name	Details	Number	Part no.	Price
Fire extinguisher	Set, including mounting parts; used price	1	72 60 0 000 335	\$95
Fire extinguisher holder	A shell that attaches to the bracket	1	72 60 1 945 556	\$47
Mounting parts set	Includes bracket, spacers, bolts	1	72 60 1 975 682	\$18
First-aid kit	Used price	1	52 10 1 928 751 82 12 9 401 430	\$40
Clip	For first-aid kit	1	52 10 1 945 440	\$2
Total (used) cost:				\$140

Einbauanleitung

Fire extinguisher, 2/88, 01 29 9 781 460 (also includes helpful instructions on using extinguishers, such as the need to spray judiciously – the halon and powder extinguishers only last roughly 8 and 12 seconds, respectively!)

Fire Extinguisher

The fire extinguisher is a simple bolt on, but does require a little seat-leather cutting.

I found no need to take out the seat as the EBA calls for – it might be marginally easier to do the install with the seat out, but it was not worth the hassle. Ideally do the install while the seat is out for some other reason, or simply raise up the seat.



The installation kit. The bracket is facedown, showing the rear side with the tabs that go in the seat. The two spacers are not needed for standard seat installation. The kit comes with two M6x20 bolts, and four M6x16 bolts; some of the bolts are not needed, depending on the type of seat.



This is looking up from underneath the front of the seat, which is toward the top of the photo. The tab with fixed nut on the extinguisher bracket fits up into the rectangular hole shown, and the bracket bolt goes through the circular hole just visible under the leather at the top right in the photo. Note the hook that holds on the leather, to the top left in the photo.

If you really didn't want to cut your leather, it appears to be possible (deviating from the EBA instructions) to install the bracket on the seat *behind* the leather, rather than make the incisions to mount the bracket on top of and through the leather. A very short spacer might be useful. The seat leather would need to be unhooked to screw in the bolts underneath the leather, and would have to be left partially unhooked. Either way that part of the seat is hard to see, so even if one cut the leather and took off the extinguisher later, there would not be glaring holes.



To make the incisions for the bracket and bolts, you can feel for the respective holes in the seat metal through or underneath the leather, then make a small cut and widen it in the appropriate direction. A probe or scribe can be used to locate the circular bolt holes, too.

Bolt holes, with bracket slots just visible underneath.



The M6x16 bolt was a little short to begin threading, so I used the M6x20s. The bolt on the left seemed to only just clear the motor behind it in the seat.

When the bracket is on, bolt the shell that cradles the extinguisher to the bracket.

The extinguisher holder bolted on to the bracket.



The completed fire extinguisher installation.

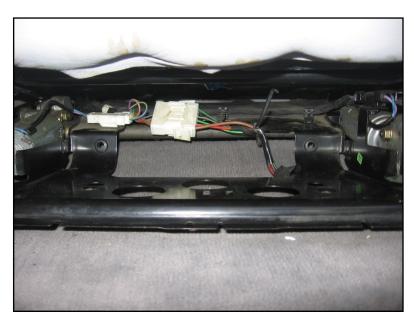


First-Aid Kit

Box exterior.



The contents.



The first-aid kit slides into a neat space under the passenger's seat.

Note the two locating holes at the back of the bay, into which two pins on the kit slide.



A single plastic clip is needed to hold the kit in place on the underseat bracket.

Underside of the first-aid kit showing the clip that holds it in place. The tab at the left is pulled up to release the latch going into the clip.



The clip secured to the seat bracket.



The first-aid kit installed.

10. Heated Seats, Front and Rear

Nice treat for winter

The easier way to get these for the front is to take the whole seat or seat cover with heating out of a junkyard car! Alternatively, the front heating elements are not too expensive to buy or difficult to fit, because the wiring loom is normally present (shared with the lumbar-support wiring). The only tricky part is removing and replacing the seat leather from its underlying foam or supporting mat.

This chapter also shows you how to replace worn-out seat covers, even if for some reason you don't want to add heating. Many of the original E34 seats, particularly the driver's seat and its upper left side bolster by the door, are worn and cracked now, because although the leather was of

Project Profile

Coolness:
Utility:
Difficulty:
Time:
Cost:
SS S S S

high quality and quite tough, few owners seem to have treated them with the essential leather preservative and conditioner. If you find leather in good condition in a junkyard, it can be transferred fairly easily, and best of all the usually less-used passenger's side fits perfectly on the driver's side (one cut in a hidden area of the leather may be needed for a switch).

Rear seat heating was only available in the M5, but is retrofittable to the non-M5 seat because the seats are similar (except perhaps for the special seat on some M5s, which has a fixed center console taking up the middle area). The rear installation requires two wiring harnesses, one of which is quite expensive, but the two harnesses also permit adding power to the rear headrests, so that makes the expenditure more worthwhile.

Parts

Name	Details	Number	Part no.	Price
Front				
Seat heater element, for seat base, front	leather seat	2	64 11 8 391 234	\$71
Seat heater element, for seatback, front	leather seat	2	64 11 8 391 235	\$71
Wiring loom, front	in seat; probably already installed; 9/90–9/93	2	61 12 8 350 203	~\$75
Switch, front	switch and connector, changed 9/90	2	61 31 1 390 888	\$113
Covering cap	In case lumbar switch is not installed. (Fills the adjacent hole that is uncovered when the blanking cover [52 10 8 140 443 – light silver gray] is removed to uncover the heating switch hole.)	2	52 10 8 140 449 (light silver gray)	\$2
Clamp	"hog rings" to attach seat cover to seat		52 10 1 945 543	\$0.05
Rear		J.		
Rear seat heater element, seat base	Left and right	1 ea.	64 11 1 391 795 and -796	\$75
Rear seat heater element, seatback	Left and right	1 ea.	64 11 1 391 797 and -798	\$75
Switch, for rear heating	changed 9/90	2	61 31 1 374 221	\$49
Wiring harness, power supply		1	61 12 8 355 184	~\$70
Wiring	Smaller harness for underside of seat base	1	61 12 1 382 636	~\$160
Total cost (new):				\$982
Total cost (used and new):	used front seats; new rear elements and harnesses	,		~\$560

Einbauanleitung

Seat Heating, 6/95, 01 29 9 789 415 (front seats)

Leather trim, 9/95, 01 29 9 789 357 (doesn't cover seat heating, but shows how to remove and replace seat covers)

Front Seats



When seats come from the factory with heating, the elements are permanently attached, sandwiched between the leather and a sewn-on fleece and cloth layer. Fortunately the replacement elements are made to fit without having to sew them in.

Replacement heating element, this one for the seatback. Bottom of the element is to the left. The orange strip covers one of the adhesive sections. The element for the seat base is almost the same size, but not quite, and its wire is placed toward the side.



The leather seat covers have thin metal rods, in cloth sleeves that are sewn to the leather at the seams along the side and transversely.

At the top of the picture, notice the sleeves with the metal rods (you can also just see the hooked end of one of the lateral rods. Nearby in the picture there is also an opened-up hog ring still wrapped around a rod; it used to be also attached to a parallel rod within the foam below, along the groove, not quite visible here.



The seat base has two rods going left-toright along the seams, and the seatback has one. The rods are clipped with hog rings to matching rods inside the seat foam (for the seat base) or to the underlying support mat (for the seatback – the mat is made of glued-together strands of some kind of fibers). Whereas the originallyequipped elements go under these rods, the new elements go between and partly over these rods.

In the center of the picture you can just see the lines of the two parallel rods – the lower one in the foam, and the upper one on the leather cover. Hog rings clip the two together at the gaps in the foam such as the one here.



The inside of the seatback cover, showing the long sleeves along the seams that hold the rods for the hog rings.



The seatback with the cover removed showing the fiber support mat in the center.

Installation

Steps are:

- 1. Remove seat
- 2. Remove covers
- 3. Install the elements
- 4. Reinstall the covers

Step 1. Remove seat

Disconnect the battery.

See steps in the chapter on seat memory for seat removal. Also remove the seatback rear trim panel. Separate the seatback from the seat base.

You do not need to remove the lumbar support, nor the seat rail, unlike what the EBA says.



Step 2. Remove covers

Take off the large plastic side trim pieces on the lower sides of the seat base. They are held on by two small Torx® screws, T25, and two plastic push-clips. The access holes for these screws may be just a little too small for some Torx sockets, so a thinner Torx screwdriver may be needed, or a Torx bit.

Small holes for Torx screws on seat-base side trim.



The clips are surprisingly tight, and break easily – try to squeeze them from the inside as you're prying from the outside.

The plastic push-clip on the seat side trim, underneath the seat (black disk toward the center of the picture).



Push-clip on rear of trim – you can squeeze from the inside as shown while prying out from the front.



The clips are fairly tough, but may break, so perhaps get some extras beforehand. Replacement number is 52 10 1 873 544. Half of this one has broken off.



Gently pop off the seat position switch knobs, and unscrew the one, or two, screws holding the switch to the trim.



Just one screw, larger than the E34's two, used in this case.

Push out the memory and lumbar switches from underneath, and disconnect the wires.

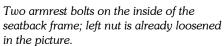


If they're not out already, pull off the headrests. They are on tightly, so pull firmly and get ready for a sudden release when they pop off. The picture shows what holds them on.

How the headrests are attached: the knobs on the end of the chrome headrest bars are held by the black plastic sockets on the headrest drive mechanism.



Remove the armrests by taking off two nuts inside the seatback frame.





Remove the leather covers from the seat base and from the seatback by stretching the leather off the metal prongs on the seat metal. (Careful, some of the prongs are sharp.) A few prongs may be bent down, and may need to be bent up to ease the leather removal.

Bent-over leather-attaching prong.



The seat foam can be left on the seat frame, although it might make it marginally easier while you're learning how to attach the hog rings to be able to bend back the foam while it is off the frame. If so, the seat base side bolster foam may have some rubbery glue holding it onto the frame – peel the foam back carefully so it stays intact, and re-glue it if desired when reassembling.

Glue patches are visible on the black seat frame with some yellow foam bits still stuck to them.



Fold back the left thigh section of leather, giving access to the hog rings and rods that hold the cover to the foam. Use pliers to bend open the hog rings along the left side of the seat and then along the two lateral seams (or cut the rings, but they seem quite flexible and strong, so can be re-used). You don't necessarily need to disconnect the right-side rod of the cover for heating element installation, but bear in mind there are hog rings at the ends of the lateral rods that are very close to the right-side rod. Note the locations of the rings, for reinstallation purposes – but it's pretty obvious, there are holes in the foam where they go.



At the ends of the lateral rods there are short strips of cloth that are glued to the foam and need to be released.

Similarly detach the left-side and lateral rods of the seatback cover.

Hog ring on seatback, barely visible, attached directly to the seat support mat rather than to a rod. Note the cloth tab that was glued to the seat foam.



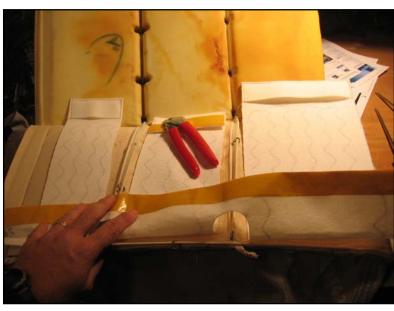
Step 3. Install the elements

Flip the seat base cover upside down, then cut slits in the fleece 5 mm in from the left seam.

There's some lack of clarity about which way up the heating mats go, and hence where the adhesive attaches, but it seems, based on inspection of other examples, that the side of the heating mats with slightly thicker material goes toward the leather. (Look at the wires inside the mat – on one side you can see the wires more clearly. This is the thinner material side, which goes toward the foam.)



Push in the strips of the element into the appropriate sections of the cover, using a ruler in the convenient end pockets of the strips. The fleece can be loosely stuck to the underside of the leather, so clear a path first.



The adhesive sections of the elements, covered with orange peel-off strips, will be folded over at the ends of the cover sleeves and attached to the inside of the fleece. The EBA does not call for slits to be cut in the far end of the fleece in order for those adhesive sections to come out and be stuck on to the foam, rather than be stuck on the inside of the fleece sleeve, but it seems you could do it that way.

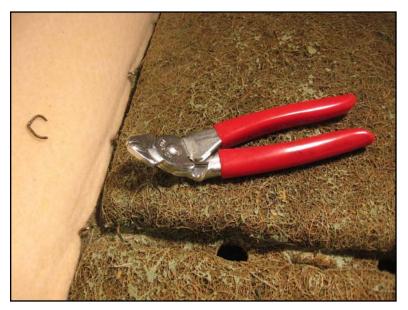
Element on top of the cover sleeves, showing how it will lie inside the sleeves.



Take off the adhesive-covering strips at the ends of the element inside the sleeves and attach to the fleece.

Similarly install the seatback element in its cover.

The element inserted, showing how it is folded over. Note that, because of which way the element was inserted, in this case the long adhesive strip will be attached to the seat foam (or better you could fold it over once again and stick it to the outside of the fleece).



Step 4. Reinstall the covers

Reattach the seat base cover to the rods in the seat using new or re-used hog rings. A pair of hog ring pliers (a cheap, serviceable one can be found for \$30) is highly recommended for closing the rings, but not absolutely essential. Certainly worth the money. The hog ring pliers have recesses in the tips that hold the ring while it's being closed.

It's hard to get one's hands in between the foam and cover to close up the rings, but it only takes a little practice and trial-and-error to get the hang of it.

Hog ring pliers and an original hog ring.



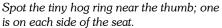
Once the lateral rods are secured except for the end hog ring, and not the left-side fore-and-aft rod, take off the adhesive cover strip and attach the element to the foam. Then re-attach the left-side rod.

Stretch the cover back over the rest of the foam, and then over the seat base. Reattach it over the frame prongs, remembering to bring the element wires out under the seat.

Don't forget to tuck through and reattach the flap of the leather cover at the seat base corners, shown attached in the picture. Use a hog ring at the corner of the seat's wire/fiber lattice.

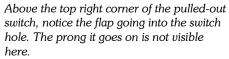


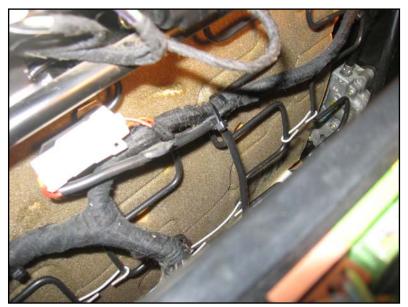
There may be a couple of hog rings to attach at the rear, holding the cover directly to the foam.





Note that the flap of leather near the seat-adjusting switch goes into the seat frame across the top of the switch hole, and hooks onto a prong pointing inwards.





Connect the seat base heating element wire, and zip tie it close by:

Zip-tie for seat base heating element wire. The white connector is the heating element connector. View is looking toward rear of seat base.

This is a good time to preserve and clean the leather, for example with Leatherique's Rejuvenator and Cleaner. Regular treatment is needed or the seat leather will crack and deteriorate.



The seat-heating switch goes on the side of the seat, near the center console in a little bay that is normally covered by a blanking plug when there are no heated seats or lumbar support. The switch is forward of the switch for adjusting the lumbar support. If you don't have, or are not putting in, the lumbar support (go ahead and do it!), you'll need a cover for the lumbar switch hole, which will now be exposed in the bay shared with the seat heater switch. See "covering cap" in the parts list earlier.

Hole where the seat-heating switch goes. Lumbar support switch is shown, aft of the vacant hole.

Liberate the appropriate tied-back branch of the seat harness, push it up through the switch hole, connect the switch, then push the switch back down into place in the hole.

Reinstall:

- lumbar switch, if applicable,
- large plastic lower side-trim pieces, screwing on the seat-adjusting switch and attaching the knobs,
- armrest.
- fire extinguisher bracket if applicable, and
- seatback rear trim panel, including two screws with trim caps at the bottom sides.



Somewhere along the way a piece got dislodged for me. If it happens to you too, this is where one of them goes on the side.

The piece in question is the c-shaped black plastic part in the middle of the picture. It just snaps on.

Reinstall the seat base in the car, then attach the seatback by holding down the levers while sliding the seatback down over the arms on the seat base. Slide in the headrest. Connect and zip tie wires as appropriate.



This is where the main white seat-tovehicle connector, **X275**, is zip tied underneath the seat, toward the rear (nonmemory only).



Zip-ties for lumbar (top red circle) wires and for harness coming up from the seat base (bottom circle). Find similar locations if using a different seatback frame. Note the white tape around the harness by the lower zip-tie. The factory usually uses these white tape markings on the black harnesses to show where a zip-tie or other holder goes.



Zip-tie for the seatback harness on the left side.

That's it! Next time in winter, bask in the glow of seat heating

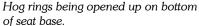
Rear Seat Installation

Disconnect battery.



Take rear seat base and seatback off (see chapter on rear headrests).

Take seat covers off by opening up the hog rings, as for the front seats.





Unlike the seat heating elements for the front seats, the rear elements I ordered did not come with a cut-out to go around the hog rings on the lateral metal rods. The heating wires, however, were clearly placed away from the rods and rings, so I cut slits that allowed most of the rings to be attached.

Note that the hog rings do not need to be removed from the metal rod on the left in this picture (right side on the seat). See also the pre-cut notches that line up with the metal rods, and the tape covering the adhesive at the front of the seat. There were also two adhesive areas at the rear of the mat.



As for the front seats, cut slits in the fleece on the undersides of the covers, and slide in the elements. You may need to cut another small hole for the wires, which come out at the front end. Stick adhesive areas to the covers, then reinstall the covers.

Seatback cover folded back from the seat foam, showing elements inserted between fleece and leather on the cover. Part of the element is tucked into the groove in the foam along the side of the seat



There was an unused square hole on the left side of the seat base, so I ran the wire lead from the cover, between the hard shell of the seat base and the seat foam, and out the hole. Possibly that might help the lead not getting pinched where the seat rests on the footwell wall. There wasn't a similar hole on the right underside, so if desired one would need to be cut.

The left seat base heating element wire lead comes out of the square hole at the right of the picture, then connects to the bridging wire, and finally at the left to the seat base harness. Front of the seat base is at the top of the picture.

In my case the wire lead was about six inches too short to connect with the harness that is attached to the bottom of the seat base (going to the headrest switches too). I made a simple bridging harness, using spare matching white 2-pin connectors (this shows the value of picking up extras of connectors and the like when you go to junkyards, you never know when you might need something!).

The 2-pin connector halves for the seatback elements were white on the vehicle harness, but black on the elements. The connectors are color-coded according to shape, and one color will not fit with another. So, using the special contact-release tool, and after sliding the inner portion sideways to release the contacts, I simply switched one of the two colors of connectors to match the other, again using spare junkyard connectors.

If not already done, install the heater switches in the panel on the rear of the front console (see chapter on rear power outlet) and run the wires (part of the main headrest supplementary harness) to them. Install a relay if not done already (see discussion of installing the main supplementary harness in the rear headrest chapter).

Reinstall seatback and seat base.

Connect the battery, start the car, and test the heaters.

Congratulations, you've got just about the only E34 in the nation with rear seat heating!

11. Memory Seats, Mirrors, and Steering Column

In Case You're Crazy Enough to Share Your Gem

It's wonderfully convenient to have seat/mirror/steering wheel memory if you regularly share your car with a spouse or, God forbid, offspring – if you don't all have nearly identical dimensions. Of course, for those of us doing a bunch of the retrofits in this guide, it doesn't matter whether or not the items will actually be used or needed, that's usually not why we're doing them. Even if you don't share the driver's seat, though, there's another use for the memory: on long drives, moving the seat to different positions can improve comfort. Storing settings with slightly different positions and rotating among them on long drives can help prevent aches.

Although Internet postings often say this is too much trouble to be worth doing, if you're up to some solid work it is actually not that bad at all, in my view, especially if your car is at least partly pre-wired for memory (it probably is if you have Check Control). If you're pre-wired, little splicing of wires is required, only adding supplementary harnesses, re-routing, and adding some new wires with crimped connectors. Assess carefully your skill and resources for this job, don't be put off by Internet rumors.

All the U.S. E34 standard seats with lateral seams seem to be pre-wired for lumbar supports and heating, but not for memory. In my case – 535i – the main vehicle harness that came to the driver's seat was pre-wired with all the necessary leads. In the doors, a few substitute wires need to be laid. Needed in all cases is a supplementary harness – of which there were several variations depending on production date, control module version, motorized steering column, airbag, and seat type – which goes between the vehicle harness, the seat, and the mirrors (and sometimes the steering column).

Because the various seat motors for memory have potentiometers added on (the motors themselves are the same for memory/non-memory) in order to report seat positions to the control module, it is easiest to get at least the seat base, as a whole, from a junkyard rather than trying to modify an existing non-memory seat by adding on potentiometers or switching the motor assemblies.

Parts

Name	Details	Number	Part no.	Price
Driver's seat with memory	Seat heater switches and connectors changed in 9/90; used price	1		\$200
Driver's outside rearview mirror	Mirror shape changed in 9/92, this is the earlier version; used price	1	51 16 8 181 599	\$75
Passenger's outside rearview mirror	Mirror shape changed in 9/92, this is the earlier version; used price	1	51 16 8 181 618	\$75
Mirror switch	Used price	1	61 13 1 380 150	\$10
Supplementary wiring loom	This one is for pre-9/93 cars with electric steering column and early seat-heating switches; at least 13 other versions exist; get the loom included with the a donor seat	1	61 12 8 359 168	~\$50
Memory control module	This one is the early one; changed in 9/93; get the loom included with the seat	1	61 35 1 388 561	\$100
Total cost:				\$360

Einbauanleitung

None

Donor Parts

E32 and E34 seats generally share the same seat components, including base rails and base frame, so finding a match is easier than it would be otherwise – you can take the leather covers off your existing seat and put them on a junkyard donor seat if needed. Some early E32s did have a different backrest whose shape was so similar that you can't tell it's different until you see the leather doesn't *quite* fit right. As I found out. So I

transferred its memory headrest motor to my old seatback, on which the leather, obviously, fit). Sometimes differences in feel or width between E32 and E34 seats have been mentioned, but these may be attributable to different seat wear, or the revision in seat leather in 1993, because in most cases the part numbers are identical.

Spend some time checking the wiring diagrams for the donor car and your own car to make sure there are no incompatibilities. The wiring on the seat itself is obviously quite different, but usually the pinouts at the interface for all that wiring to the car – at white connector **X275** – are the same, so things should work without much rewiring at all. In my installation, one small difference was that the seat wiring brought voltage to the seat side of **X275/6** (for passenger and rear seat heating relays) and there was a wire on the vehicle side of that pin that I didn't know the function of, so to be safe I disconnected the seat-side pin. Similarly, **X275/5** was used in my donor seat (to unload the seat heaters while starting the car), but there was no wire on the vehicle side of **X275/5** in my E34, so no pin removal was needed.

From the donor car, get the:

- seat, including control module,
- mirrors (if E34 donor),
- mirror switch in the driver's door,
- supplementary wiring loom,
- door looms (or just the wires connecting the mirrors, mirror switch, and small door wire connector in the door, plus the wires leading to pins 1, 2, and 18 of the large door connector).

Obtaining wiring from the same or similar production date range is helpful for an easier retrofit. Note the production month and year of the donor car when you get the parts, for reference to the wiring diagrams. While you're at it, get a seat with seat heating too, if possible, and hence bypass the whole front seat heating retrofit described in another chapter.²⁹

Confusingly, the supplementary harness, which plugs into the main incoming harness (from the vehicle to the seat; white 12-pin connector), also has some branches that go back out to the vehicle – to the mirrors, a ground, and optionally the steering column. The whole supplementary harness, including these branches, should be obtained from the donor car. Also include the wiring harnesses from the driver's and passenger's doors.

The following description covers removal of donor parts from an E32. Steps will include:

- 1. Remove the seat
- 2. Disconnect the supplementary harness
- 3. Remove the mirror harness
- 4. Get mirrors
- 5. Prepare the door harness
- 6. Prepare the seat

Step 1. - Remove the seat

Note that you can take the backrest off the seat base before pulling the whole seat out of the car. The seat is quite heavy, so taking off the backrest cuts the load in half and makes things much more maneuverable. You don't want to injure your rotator cuff, trust me. A wire harness coming from the base up to the backrest has to be disconnected. Note where the zip-ties go.

Take off the seatback trim by unscrewing the two screws at the bottom sides, gently sliding it upwards a little, then pulling the trim's bottom end outwards. (See chapter on lumbar supports for pictures of the relevant attaching clips.)

²⁹ Note that early (before 9/90) heating switches did not have auto-shutoff incorporated into the switches, and instead an unloader relay would cut off the seat heaters during startup. If you use a pre-9/90 heated seat in a later car, the unloader relay is likely not there, and if the seat heaters are switched on they might be drawing on the battery during startup.



To get the seatback off, use adjustable groove joint (also known as "water pump") pliers to pull down the spring-loaded levers. The right-side one is shown in the picture (grip the lever and the frame below it, squeeze them together). There is one lever on each side – lift one side a little then release the other lever and lift that side, but don't twist things out of shape. Someone suggested it's easier if you disconnect the spring first, but it's usually not necessary.

The release lever is the hard-to-spot small black horizontal tab on top of the black wire sleeve, between the grey lumbar motor and its white spring.



Seatback release lever being released with adjustable joint pliers. Lever can be tight, and can snap back.



Move the seat forward so the seat bolts at the rear of the seat rails are exposed. If you're lucky, your donor car still has power (make sure there's a fuse in F16 or F18); if not, the factory thoughtfully put in a power-failure backup capability: the front-back movement motor can be turned manually.

Seat nut is on the rear of the seat rail. Note cutout in top of rail for socket access.

Look at the slide motor, on the right side under the seat, oriented fore-aft. In the center of the front end is a hole with a white plastic piece that when turned will, almost imperceptibly, move the seat. Unfortunately the hole is some unusual type of socket, and some might not have grooves at all. One appears to be similar to a Torx® socket, but has eight spline grooves rather than six. It is probably a European "double square" socket. There's probably a factory special tool for it, but a screwdriver of the right width (4mm) can work in a pinch – and in fact is what the factory repair manual calls for. Be careful, you don't want to strip the plastic nut. It takes an awful lot of rotations to move the seat substantially, so be prepared for some slow-and-steady work, and check to make sure that you are in fact moving the seat in the correct direction.

If the hole does not have any grooves, some can still be turned by jamming in the right size (smallish but not too small) screwdriver. A long-shafted screwdriver helps.

Once the seat is forward enough, use an E14 external Torx socket ("external Torx" splines are on the outside of the bolt head, not the inside) to remove the two bolts at the back of the seat rails.



Look on the left underside of the seat for a thin bare wire running back to an articulated metal piece at the rear of the seat base. If the donor car is soon to depart this world and be recycled, just cut the wire; otherwise you can disconnect it: the wire is held in place with a pin that can be pulled out of the metal piece at the rear.

The connector is just above the coins in this picture. Here, the pin has been swiveled about 45° anticlockwise; it needs to go another 45° or so for the flange to clear the connector, allowing the pin to come out. Check your donor car for coins, for good luck!



Swivel a little flange attached to the end of the pin so that its "u" shape clears the larger metal piece. This allows the pin to come out, along its axis, freeing the wire. The evil part is that there's a tiny flap of metal holding the u-shaped flange in place, on the inside where it's extremely difficult to see and reach. Here, however, you see a picture of the flap (hopefully that tip makes this guide worth the price of admission all by itself – saved you 25 minutes of wrestling!). The flap must be lifted over the adjacent metal to rotate the u-shaped flange and pin; try sticking a micro screwdriver up from underneath. It's tricky to get the connector off, since there's not much room.

Look for the tiny flap that is notched and angled out of the flat surface on the pin flange – the flap must be eased up to allow the flange to swivel out, as it is in the picture, and hence to release the pin.



Unbolt the seatbelt Torx bolt, again F14



Refer to the shape of the hooks on the car floorpan that hold the front of the seat in place, shown in the picture, so you can get an idea of how the seat needs to be moved to get it off.

Note that the seat needs to be tilted up at the back only a little bit to slide it off the hooks, maybe 8–10 inches. I found it easiest to sit on the back seat and push the lower back of the seat with my feet gently, alternating sides a bit, and also wiggling it forward. Be careful not to bang the seat around, one seat I took out possibly too roughly had "seat rock" afterwards.

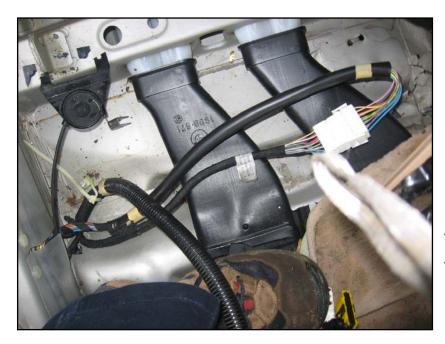
Front seat hook.



Step 2. – Disconnect the supplementary harness

I was at first stumped because the main connector in the E34 from the vehicle to the seat (**X275**, **wi** 12-pin), which the supplementary harness connects to for memory seats, was not visible in the donor E32 (in my non-memory E34 it was clipped to the underside of the seat).

E34 main connector from the vehicle (**X275**, white, 12-pin) on a non-memory car. Some of the wires here are for memory features even though the car did not have memory.



But in the memory E32, **X275** was underneath the carpet and the rear-footwell air ducts. The memory supplementary harness was plugged in there.

Main seat connector, **X275**, on floorpan underneath carpet. Supplementary harness branches go from it up to the seat through the corrugated flexible hose, and separately to the vehicle through wire channels along the sill at left.



Supplementary-harness to vehicle-harness connector was actually located underneath the air ducts, as shown here (just visible behind the yellow connector), not on top as in the earlier picture. Note the connectors that go up to the seat, at right in the picture (top three plug into control module; lower one in bottom right corner of picture plugs into another harness on the seat). Also note the white zip-tie wire holder on a stud at left, with a useful, all-too-rare release tab!

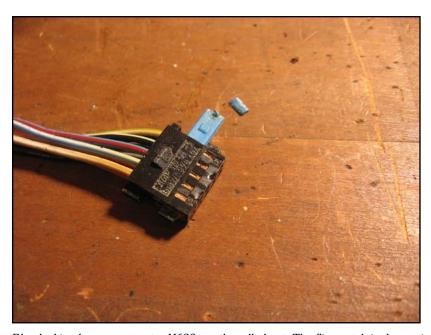
Check for any zip-ties under the seat for the supplementary harness and its flexible tube, and record their locations and how the supplementary harness lies, when you disconnect it.

Loosen the sill wire channels, and free the harness branch that goes forward to the footwell. If the donor car has an electrically-adjustable steering wheel, free the branch of the harness that goes to the steering column harness connector.



Remove the footwell left-side plastic trim (trim cover over the pedals, carpet along the transmission tunnel, and hood release lever need to be removed first) to access the door connector. Lift up the sliding bar on one end of the large connector, which will disconnect it from the other half – similar to the radio connector, but thankfully not nearly as tight. You may need to push the connector out of its hole in the door-frame sheet metal (remove plastic plate with two screws) in order to see and move the slide lock.

Door connector removed from front door jamb. Vehicle-side of small connector X622 is at bottom of connector holder.



Only the small connector within the larger connector holder is needed. There's a tricky lock on the connector that I didn't unlock because I couldn't figure it out at the time, but you might want to do if possible: flip up the small bright blue flap on the side, then gently pull (or better, pry with a pick) the blue bar it is part of all the way out of the connector. The flap is too thin and the bar may be very tight, so pulling on the flap is likely to just tear it off. Instead, try pushing sharp pick tools from either side into the end of the bar, and then levering out the bar. The larger housing doesn't need to be preserved, so you could just break it to get out the small connector.

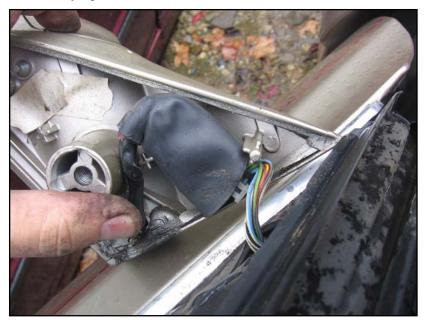
Blue locking bar on connector X622, partly pulled out. The flip-up tab is shown, in this case it has already torn off.

Put the blue bar back in, since it serves to lock the contacts in place.

Step 3. - Remove the mirror harness

It is a tight squeeze to get the harness out of the door on the E32, since it's largely behind the inner door sheet metal. Take off the door panel – it's widely covered elsewhere, but in summary, pry off two wood trims, unbolt two bolts behind them; pry off edge of door panel, which is held in with numerous white clips; unscrew door lock knob; disengage panel from metal clips at the top of the panel along the window; lift panel slightly to free center clip, then pull out and off; unhook door handle cable; and disconnect mirror switch (keep it, you'll need it for your memory mirrors).

Take off the screw for the speaker grill at the lower front of the door window and remove the grill. Take off another screw for the speaker trim and move the trim out of the way. Then unscrew the mirror bolt (6mm allen wrench); hold the mirror while doing so.



Disconnect the wire harness at the mirror. Look for either a black gummy plug or a grayish styrofoam-like plug, or both, which keep water out, around the wires going into the door, and remove them. Push the mirror harness down into the door.

Looking straight down from above the mirror. Grey connector is just visible peeking out of the right side of the rubber cover. Waterproofing plug is out of sight in the door, further down the wires, to the right.



Put your hand in the space along the bottom of the inside of the door, and feel for the wiring coming in from the door connector. (Watch out for sharp edges, such as the clips and bottom of the window track.) What you'll actually feel on the E32 is a plastic 3-sided box, about 4 inches tall, 1 inch wide, and 6 inches long, through which a similar-shaped rubber sheath around the wires passes. The front ends of the box and the sheath are what you see at the front of the door. At the rear end of the box is a white clip.

Note that front end of box with rollers is broken off, here. A dirty day at the yard!



Unbolt the clip from the sheet metal.

Clip is mounted behind this sheet metal. Bolt goes through the bolt hole right next to it in the picture.



Then pry up both the bottom ends of the clip to ease it up off the box.



The box has two halves that clip together along the long dimension; see if you can separate them, and then see if you can push/pull a half out the front of the door. If either is negative, you'll probably have to break the box: I didn't see an easy way for the larger connectors from inside the door to get past the fixed roller bars at the front of the box (in which the rubber sheath normally rolls as the door is opened and closed). The E34 does not use this box or the sheath.

Left roller shown, there's another matching one on the right side of the box.



Once the box pathway is clear, disconnect the harness from the various holders on the inside of the door; if you can figure out how to get the wire out of the holders, fine (one on top of the clip you can see by peering into the door; two others flip open; a couple you can push out of the sheet metal from the outside of the door), otherwise break off the holders by pulling/prying them or the harness itself.

One white clip (on top of the "roller box") that you can see by looking in the door.



Another clip, on the bottom of the door, two zip-ties on it.



Disconnect the connectors by the door handle (three), door lock actuator, and regulator, and navigate their wires past the inner door obstructions so they can be pulled out of the front of the door.

Remove the clip on the rear end of the rubber sheath (or pinch it in the middle), and pull the sheath and the harness out the front of the door.





Cut open the rubber casing at the door connectors to liberate the wires. Keep the woven fabric sleeve on the needed wires by cutting the unneeded ones and sliding them out of it.

Whew – hard work. Take a break, drink an iced tea if it's summer, otherwise perhaps a toasted almond.

Step 4. - Get mirrors

The E32 mirrors are, sadly, oh-so-very-slightly different than the E34 ones, which makes it difficult because E34 memory mirrors are quite rare, whereas all E32s I've seen had memory. No, the memory mechanism inside an E32 mirror cannot *easily* be transferred to an E34 mirror because it seems to be attached by melting studs of the mirror plastic over the mechanism base plate. Best bet is to find E34 memory mirrors in the European used market. For about \$100–150, the mirrors can be repainted to match your car, which opens up the options further.

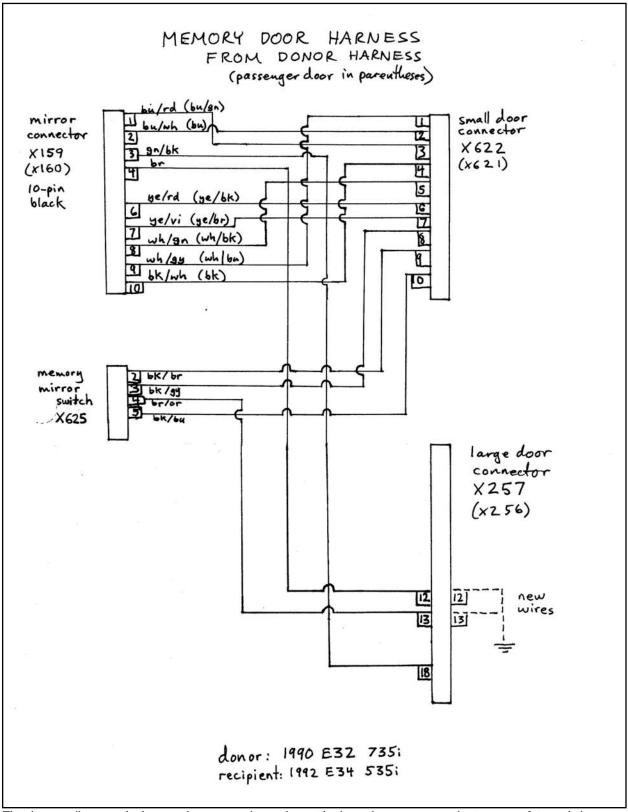
Note that if you're repainting donor mirrors and hence need to take off the mirror glass, the direction that you move a screwdriver to lever open the release ring is "opposite" for the left and right mirrors – to unlock the release ring on the left mirror, pivot the screwdriver handle left, away from the door; to unlock the ring on the right mirror, pivot the screwdriver also left, towards the door. The factory and non-factory manuals I used failed to clarify this.

Step 5. - Prepare the door harness

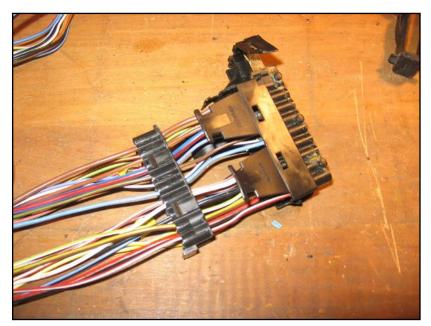
The new harness from the donor car can be simply added alongside the existing harness in the door, but only a few wires from it are needed, so you can make a new, reduced donor harness. Back at the lab, separate the wires needed, starting by unwrapping or carefully cutting through the friction tape. The friction tape usually leaves behind a sticky black goo everywhere – clean it up with adhesive remover before you get any on your leather seats.

On my donor harness, ground wires for the door heater, door handle switch, and window limit switch were spliced to the memory wires. One could keep these branches of the wires on the harness, and swap their connectors with the ones on the appropriate connectors on the car. But I found it easier to just keep the branches of those wires that we need (i.e., going to the mirror connector and the mirror adjustment switch), and run them to unused pin holes on the door connector.

Examine the wiring diagram that follows to see an example of what we need to have.



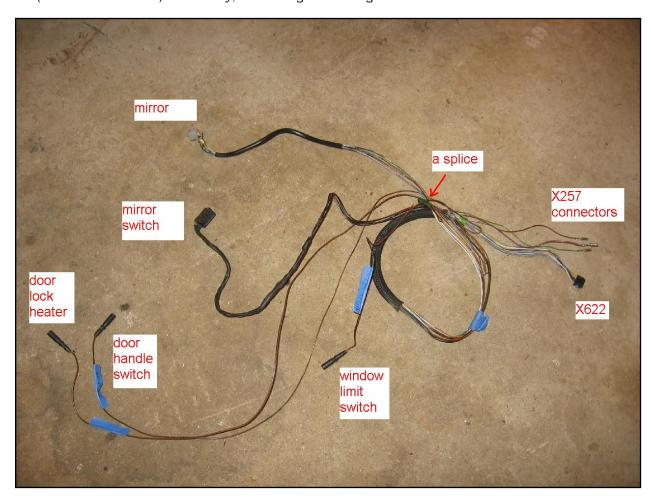
This diagram illustrates the harness that you need to end up with, depending on your production years. It is made by removing the unneeded wires and connectors from the donor car's door harness. The wires to **X257/12** and /13 will have other wires spliced to them; these other wires can be cut off. The harness will be installed alongside the existing harness in the non-memory door.



Now, as describer earlier in this guide, slide the inner part of the connector a tiny bit past the locking tabs to unlock the contacts. It is possible to take the inner part out completely, as shown in the picture, but this is not desirable or easier.

The picture shows the inner part of the connector clearly.

Once the center piece is slid sideways, use the factory contact release tool to take out the wire sockets from their slots. Take out the small connector from the larger door connector housing, prying out the blue locking tab (see earlier discussion) if necessary, or breaking the housing.



A completed abridged driver door harness in approximate relative positions, with connections labeled. The three door ground branches with single-pin connectors are not needed unless you wish to swap their connectors in for the originals. Blue tape is my labeling.



Perform a similar operation for the passenger door harness. The passenger harness has fewer splices, and the relevant wires can be liberated without any wire cutting.

The desired right-side door memory mirror harness, after separation from the full door harness. **Gn/bk** and **br** wires that don't go into the small door connector at left, but rather go into the larger door connector that is not pictured, are for the mirror heater.

Step 6. - Prepare the seat

If necessary for a color match or for wear, transfer leather seat covers, headrest, and side trims from the old seats to the donor seats.

If your new seatback is different (e.g., an early E32 one) and your old (or newly-acquired, in-the-right-color) leather covers don't fit it, and hence you want to use your old seatback, transfer the memory headrest motor with potentiometers to the old seatback. Strangely, although the early E32 seat that I obtained used exactly the same headrest raising/lowering mechanism as the later seats, its facing was reversed. This positions the headrest-post-attaching sockets an inch or so differently on the earlier seats, to line up with the headrests posts that were located (by the frame) in a correspondingly slightly different position than on the later seats. Since I was using the later seatback, but needed the memory equipment from my earlier donor, I left the later headrest *mechanism* in place and just brought over the early memory *motor* and drive cable, without the mechanism. (I looked into the possibility of transfering just the potentiometer, from the early motor to the later motor, but it was easier to do the whole memory motor.)

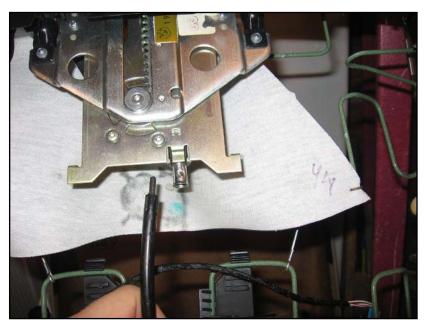


Headrest motor with potentiometer (black device at the top). The motor itself is the same for memory or non-memory; memory simply adds the potentiometer.

If you're bringing over the headrest mechanism, it unbolts with a single screw under the leather at the top of the frame.



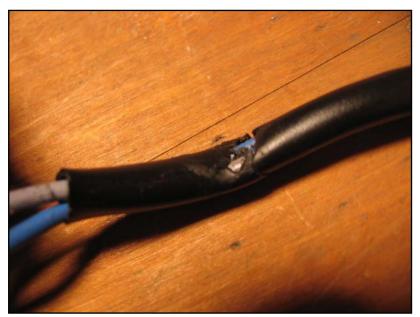
The headrest motor simply unbolts from the side frame.



Headrest motor on the right side of the backrest frame.

The drive cable disengagement from the headrest raising/lowering mechanism is not straightforward. The cable's plastic sheath is held in only by teeth on the metal receptacle/cylinder where it terminates. If possible, try to bend the teeth on the cylinder at the raising/lowering mechanism end up from the plastic cable with a jeweler's screwdriver inside the cylinder - without damaging the cable or cylinder! Either way, heat the sheath/cylinder with a hair dryer until the plastic is soft, then pull it firmly out. Or potentially you could destroy the cylinder to free the sheath and cable.

Picture shows headrest drive cable.

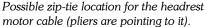


Do the same for the original motor/drive, and bolt in the replacement motor and heat/insert the cable drive.

Note that something had been chafing the memory headrest motor wires in my case – inspect and wrap the wires and sheath if necessary.



Clip on the connector holder, very gently (the thin lattice-wire-gripping tabs can be extremely brittle), and zip tie the cable to one of the lattice wires.





Because the potentiometer on the memory motor makes the top of the motor sit higher, it was contacting a spring on the frame in my case. I slid the spring higher on the lattice, and put some tape on to avoid potential squeaks. Consider other, more-durable solutions, too.

Tape added to avoid potential squeaks.



My donor seat used a relay, bolted to the seatback frame (like the headrest motor but on the other side) that needs to be transferred along with the seatback harness. Unbolt its bracket (and put the bolts back in the bracket for now, so you remember which ones they are).

White relay, partially hidden behind left side of seatback frame, and its two bracket bolts.

Plug the seat switches (memory, seat movement, heating, lumbar, and – very rarely – thigh support) into the new trims.

If you have a fire extinguisher (see chapter in this guide), install it too. You might want to cut holes in the leather for the bracket now, but actually install it later so that it doesn't get in the way while testing the new seat in the car.

Installation

Steps will include:

- 1. Preparation
- 2. Lay supplementary wiring
- 3. Install mirror wiring
- 4. Install seat

Step 1. – Preparation

Disconnect battery.

In your recipient car, remove:

- the left and right door sill covers;
- old seat and mirrors, as above;
- footwell trims, as above (see chapter on driver's glovebox);
- and front door panels.

Be very careful not to scratch trim, paint, or anything, with the seat rails etc. as you take out the old seat.



Left front door sill trim – lever it up gently, right next to the clips, with a large screwdriver.



Deadpedal / speaker cover trim, all one piece.



Hood release handle coming off – 7mm nut.

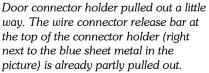


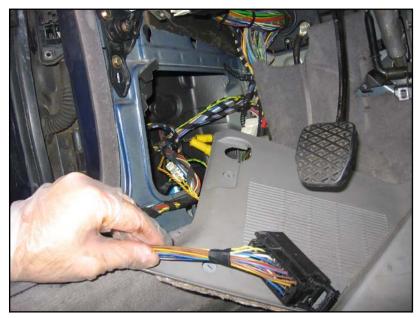
Detach the door connector from the door jamb by unscrewing the trim holding the rubber tube and grommet. You will probably be taking off the door (in order to reinstall the connectors easily – see the discussion further on). If so you might want to do it first, it's much easier to unscrew the connector trim bolts with the door off.

Door connector has two 7mm bolts. The top one may need to be reached with a normal combination wrench with an angled head, or perhaps a swivel socket – the straight socket shown above did not have enough room to get in.



Pull the door connector holder toward the outside of the car, and separate the two halves by levering up the end slide.





Move the inner half of the connector into the footwell, for access to it.

Similarly access the right door connector.

Inner part of the door connector has been pulled out of the cavity in the inside sheet metal. Supplementary harness branch for the door mirror will be run along the harness going to this connector.



Step 2. – Lay supplementary wiring

Lay the supplementary harness (possibly still attached to the seat base) from the main seat connector (white 12-pin), now put under the air ducts and carpet, to the left sill.

Supplementary harness attached to vehicle seat connector and installed under footwell air ducts. Front of the vehicle is to the left of the picture.



Gently pry out center pins (some may be stiff) and then remove plastic rivets to open up wire channels.



Lay the appropriate branch of the harness forward to the left door connector (shorter branch to **bk** 10-pin) and to the steering column (if an appropriate white connector is included on the harness for the optional electrically-adjustable steering column).

Supplementary harness running forward in channel (untaped section will be routed forward into cavity in sheet metal at top left).

Zip tie the harness in the cavity or elsewhere, if desired.

If one obtains an E34 small connector alone, one could move the pins from the E32 harness to the E34 connector rather than cutting the E32 connector to get it to fit in the larger holder. The E32 connector (door side) part number is 1 378 928 (for early and late examples that I found), and the attached male-male converter is 1 378 992, but I could not find the E34 part numbers (they may not be available from the factory anymore anyway, so a donor vehicle would be the only option).



Next, remove the wire channel covers along the rear door sill and rear seat (see chapter on rear headrests).



Slide out rear footwell air vent covers in order to be able to lift up the rear carpet more easily.

The clips visible in the picture have a couple of sharp teeth that hold on the vent trim.

If you have the electrically-adjustable steering wheel, connect the portion of the harness that goes to the steering column harness connector.

Run the other, longer branches of the harness backward along the sill, then along the front of the rear seat bench in the wire channels toward the right sill (see chapter on rear power outlet). Thence run the single ground wire through the hole at the base of the rear seat bench wall by the battery, and up to one of the ground posts on the back side of the wall (just to the right of the battery). Don't forget to attach this single small ground wire; when I finished the whole job after a long gap, I couldn't figure out why the memory system wasn't working, until I rememberd this unattached ground.

Run the black-taped connector branch forward in the sill wire channels to the right door connector, and put the plug in a slot.

Step 3. - Install mirror wiring

It's much easier to work with the E34 door than it was with the E32 donor because the wiring is largely on the outside of the inner door sheetmetal!



Lay the cut-down donor memory-door harness along the original door harness.

Existing, non-memory, front portion of the door harness. Note connector for mirror switch (white, in upper center of picture), connector for mirror (black, upper right), and the spot where the original harness goes into the door toward the door connector (lower right). The memory mirror connector is usually in the mirror rather than on the door. (Also note the round black plastic bushing just above the mirror switch connector – that is where a hidden door panel screw goes.)



Begin by taking off the door panel and the weatherproofing sheet. Panel removal is covered in numerous sources, but steps involve removing door lock knob, cap and screw behind handle, mirror switch, and angled Phillips or Torx® screw buried behind the mirror switch hole (see above); releasing from the clamps along window; and unhooking the Bowden cable.

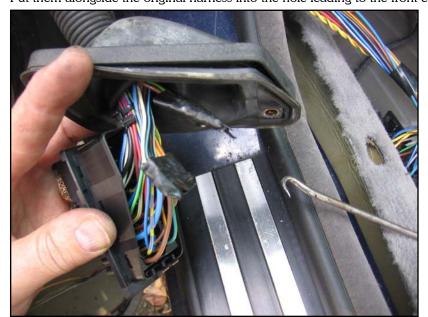
Try not to scratch the switch or damage the leather when prying out the mirror switch. It is held in firmly by metalcovered plastic flanges at top and bottom, visible in the picture.



Now pull off the grommet at the door end of the rubber tube for the door harness connector.

Integral grommet on door end of rubber tube.

Insert the appropriate end of our supplementary door harness, including the three loose wires, into the door. Put them alongside the original harness into the hole leading to the front edge of the door and thence to the



rubber tube. Pull the wires out of the front edge of the door. Tape up the ends to make the passage smoother, then carefully pull the wires through the rubber grommet. It's a tight fit, but can be done. Pull the main larger group of wires with their rectangular connector through first, then the smaller ones, together or individually. A hooked pick can help in this whole process.

Two taped-up sets of wires pulled through the rubber grommet. The hooked pick at right was used to encourage them through, along with pushing from the rear, and kneading the tube over the wires and connector. Be very careful with a pick, it could tear both wires and tube.

Using the special contact release tool, remove the gn/bk wire from pin hole 18 on the outside connector holder, X257/18,³⁰ and tape it up. As usual, you'll need to slide the inner part of the connector to the side slightly, to free the pin.



Insert the loose wire of the same **gn/bk** colors from the supplementary door harness (that we just brought through the rubber tube) into hole 18 and make sure the connector pin (female) snaps into place.³¹

New wires from the memory door harness ready to be inserted into the outside half of the door connector.

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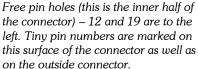
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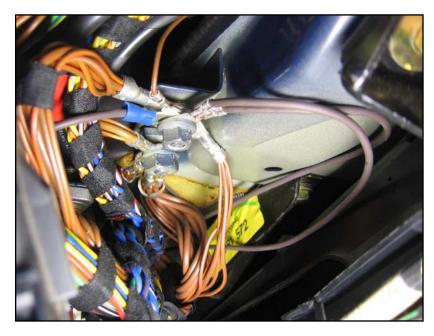
³⁰ Connector and wire listing format is: wire connector number / pin number, primary wire color / secondary wire color; wire cross section in mm²; sometimes number of connector pins; connector color.

³¹ Note that the wiring diagrams show a 2.5 mm wire upstream of this connector for memory E34s, and only a 1.5 mm wire for non-memory ones. That would seem to indicate a larger wire was needed for this circuit (that section only leads to the memory mirror heaters), but this is belied because in both memory and non-memory vehicles the wire leading into this connector is down to 1.0 mm. So using the existing car wiring doesn't appear to be a problem.



Now insert the **br/or** (mirror position switch) and **br** (mirror heater) ground wires into any free pin holes. I used holes 12 and 19.





Make up new ground wires with crimped-on contacts and ring terminals, and insert them in the matching slots of the inside connector. Run the wire(s) to a ground under the dash and connect them to the post with crimped-on ring terminals.

Mirror ground wires (darker brown) attached to the ground post with ring terminals, along with existing ground wires (lighter, orangy-brown).

Now for the tricky part. It was exceedingly difficult to get the door connector halves back together while ensuring the small connector halves within it mated and stayed connected. This was because the outer portion or shell of the *non-memory* connector does not come with the normal locking mechanism to hold the small connectors in place while the outer shell and large connector were pushed together – unlike the outer shell on the memory-E32 that I got the memory wires from. (The connectors used with *memory from the factory* should have a bright blue locking piece that slides in from the side, on at least the inner half. You can see the holes in the shell where the locking piece slides in. If you can find that piece or what its part number is, good job.) The best solution is probably to find the outer shell and connectors from an E34 with memory, because they would have locking tabs to hold the small connector in place (the E32 shell is quite different than the E34's, so it won't work). Part numbers for many of the large wiring connectors are not easy to find on the ETK, so a donor car may be the only option, though not a great one since memory E34s are so rare.

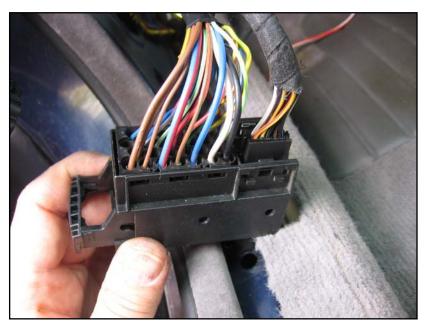
If you get the right connector, you would need to correctly transfer the pins from existing connector on the car to the new connector. If you cannot obtain the shell/connectors from an E34 with memory, do one of the following methods to mate the connector halves.

Although it seems like it would be more work, in fact the second-best option (after obtaining the right parts) also avoids the tricky part of the reinstall. This is to take off the door! It's surprisingly easy, and does not need door re-aligning. The main thing is to be very careful lifting off the door and moving it around so you don't scratch the paint on it or the car.

Undo the bolts on one end of each hinge pin. Knock out the door brake pin (some models have a securing clip too).



Prepare a safe place to lay the door so that the connector will easily reach its mounting hole on the body. I put it flat on an adjustable-height workshop stool, being careful afterwards not to knock it off. Then lift off the door – although it may seem stuck in the hinges, it can come off suddenly, so don't let it hit the bodywork when it does. And the door is quite heavy, so be ready for its weight.



Test-fit the small connectors in the outer connector shells in order to see how far in they need to be to mate with each other, after trimming the "tongues" on the sides of the connectors as necessary to get them to fit into the grooves on the shell.

Test-fitting of small connector in one of the outer shell slots.



Pull the inside connector out through the bodywork hole, mate up the two connectors, and then look and feel in the back of each one to make sure the small connectors are fully seated with each other. The key is to test operation before putting everything back together.

Once you have a working mirror, put the rubber and its brace back over the outer connector portion and carefully insert the mated connectors in the mounting hole, making sure you don't jostle the inner connectors and don't separate them by accident. Test operation again once the connectors are mounted.

If for some reason you'd rather not take off the door, you can attempt mating up everything without doing so. Try, using a bracing finger on the back of each small connector (reaching a hand far into the cavity in the footwell sheet metal for the inside connector), to mate up the shells and two connectors.



You might get lucky after several tries; if you fail, try this: take the male-male pin connector piece off the inner harness small connector, and put it on the outer small connector.

Male-male converter piece taken off inner small connector; put on outer small connector, at left in the picture.

Then insert the outer connector in position in the hole in the door frame. With the inner small harness still through the inner connector, reach inside the footwell cavity and mate the small connector to the male-male converter piece, making sure with your other hand that the outer connector doesn't slip backwards. Finally, bring up the inner connector and maneuver it around until it slips over the inner small connector and then mates with the outer larger-connector pins. It might take a lot of patience, but they should eventually mate up in position.



Success: this shot from inside the footwell cavity shows the inner small connector (with wires wrapped in electrical tape), large connector (at top), and outer shell in position and all mated to their outer counterparts.



Zip tie the harness along the other footwell cavity wires.

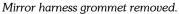
Memory harness, in black friction tape, zip tied in place.

Re-secure the rubber hose and grommet to the door jamb and the door front edge.

Now back to the supplementary harness on the door: re-wrap the branches with friction tape, as desired. To reproduce the factory method, start from the connectors and work inwards. The nylon braided hose can usefully go around the wires by the hole into the door panel, where it could help against chafing.



Take off the old mirror. First ease out the grommet, at the top front of the door panel, that holds the mirror harness, and push the harness through it.





Pop off the screw cover and take out the screw holding the door speaker grill and speaker.



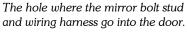
Take off the screw holding on the speaker trim to gain good access to the single bolt holding on the mirror. Unbolt the mirror (6mm allen wrench) while holding it from the outside.

Thread the harness out of door, and remove the non-memory mirror.

Speaker trim moved out of the way. Its screw (a different one than the grill screw) goes into the speed nut visible in the picture. Mirror bolt and washer are towards the bottom right.

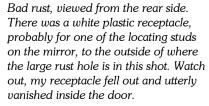


Warning, graphic content coming up, shield your children's eyes! I found bad rust behind the mirror, on an otherwise perfect door.





Apparently the three pieces of foam packing in the door and mirror don't do much to keep out water – and may even form a water trap, given the extent of rust I saw.





Lift away the door weatherstrip and foam packing pieces to see the full extent of any damage.

You might want to consider putting on some caulking or sealer when reinstalling the mirror.

This view is looking down from the top of the door frame. Aaaaagh! The rusted area looks wet in this picture because it has just been treated with a rust converter.

Insert the new harness through the old rubber door-panel grommet (put the grommet flaps toward the interior of the door, that is, toward the outside of the car); it's possible you might need to take off the connector, put the wires through the grommet, and reattach it on the other side.

Then thread the harness up through the door panel and out the hole to the outside of the door, and connect to the memory mirror connector. Using your three hands, put the rubber covers in place on the connector while holding the mirror to prevent it banging anything. As you've noticed, the non-memory mirror harness connects on the door panel inside the car; the memory harness connects next to the mirrors. Making sure the wires, packing, and studs all don't impede the mirror seating, bolt on the memory mirror.

Now zip tie the supplementary harness to the door panel, using the old harness's clips and its attachment points as a guide. Check the back of the removed door panel to see where it might conflict with your routing



of the supplementary harness, and test fit the panel as necessary. Make sure the new wires will not ever stray in the path of the toothed regulator section visible in the picture, or other moving window parts. Run the window up and down, while being ready to halt it quickly if needed, to see the wide area the toothed piece and other parts travel in.

Front portion of the memory harness attached alongside the non-memory harness (which stays in place since it has several non-mirror door functions).



Various different routings or attaching points can be used, the version shown is just one possibility.

Rear portion of the new harness, newlywrapped in friction tape. Not all of the wires in the part that goes to the back and then loops forward are needed, so they could be cut off if desired. Note reuse of existing harness clips.

Plug in the grommet on the door interior surface for the harness going up to the mirror. Reattach the speaker/trim and door panel, remembering to attach the door handle cable first.



Put carpet, trims, weatherstripping, door panels (inserting new mirror switch on driver's side), connectors, etc., back into place.

Repeat the above steps as appropriate to install the mirror harness in the passenger-side door.

Wiring harness run forward along rightside door sills, into passenger footwell, and then into bodywork cavity.



Mirror harness connectors scrunched into their cut-out in the mirror foam spacer on the passenger side.



New tape-wrapped mirror harness coming down along the existing passenger-side door harness, looping around underneath the window motor to take up slack, and heading forward out the front of the door.

Step 4. – Install seat

Place the seat in the car – it's usually easiest to put in just the seat base first and add the seat back afterwards. Unplug any pins as necessary at the main vehicle—seat interface (connector **X275**). On my installation I unplugged **X275**/6 and taped it up.

Test operation with the seat in the car but not bolted down, in case you have some troubleshooting to do. Plug the supplementary harness into the **X275** connector and slide them under the air ducts below the carpet.



Connect the four supplementary harness connectors to their partners on the seat and memory module, if they were separated before.

Connect **X626**, the black connector toward the rear of the seat base, to its matching connector on the supplementary harness (secure the appropriate half to the holder on the seat base first). Half of **X626** is visible toward the middle of this picture.



Connect the other three connectors on the supplementary harness to these slots at the rear underside of the memory control module.

Test the seat operation. Note that you should not push at all hard on the seat memory switch buttons, since some people have had trouble with the underlying circuit board getting dislodged inside the switch assembly.

When everything works, bolt in the seat (32 ft-lb) and seatbelt (35 ft-lb) with the E14 bolts.



Attach the seatback. Plug in and zip tie the seatback connectors and harness once the seat is assembled in the car (see seat heating chapter for some zip-tie locations).

Seatback harness attached to headrest potentiometer (tiny blue connector at upper right), headrest motor (white connector, right), lumbar motor (black connector, right), seatback heater element (white connector, left), and relay (behind leather at upper left). Unused connector (lower of the two white ones to left) may be for rear passenger picnic table illumination!

Wow, that was a pretty big job. Fabulous work!

Play with it to your heart's content.

12. Adjustable Lumbar Support

Another excellent plug-and-play retrofit

This option was not generally available on U.S. E34s, perhaps it appeared on the M5 and the late 540i Sport. It is, however, an easy and nifty retrofit, particularly since it appears that the wiring loom is in place already if the seats are electric or heated. For those of us who enjoy good lower-back support, this device can help noticeably on long drives.

The switches (to adjust the support out and in) are tucked away in recesses on the side of the seat near the handbrake, aft of the heated seat switch.

The option is available for the front passenger seat too.

Parts

Name	Details	Number	Part no.	Price
Lumbar support		2	52 10 8 102 291	\$196
Switch	For lumbar support; bulbs are often burned out	2	61 31 1 378 381	\$38
Wiring harness	Probably only needed for manual, non-heated seats	2	61 12 8 350 203	\$73
Total cost (new):				\$468
Total cost (used):				\$200

Einbauanleitung

Lumbar Support, 8/92, 01 29 9 781 298

Installation

The steps are:

- 1. Remove seatback rear trim
- 2. Install lumbar support
- 3. Connect harness
- 4. Install switch
- 5. Re-attach trim

In contrast to what the EBA says, I did not find it necessary to remove the seat from the car; I had little difficulty performing the steps with the seat in place. The EBA says to remove the seat, probably in order to remove the side trim of the seat and install the lumbar switch, but I was able to install the switch without removing the side trim.

Given the choice, you may not want to remove the seat, because when I did for another project, I created a little seatback rock that was not there before. Alternatively, if you're installing memory or seat heating, the seat base and seatback come out anyway.

Step 1. – Remove seatback rear trim

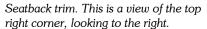
The following pictures show the clips that hold on the seatback trim.



Seatback trim. This is a view of the bottom right corner, looking to the right. Pull the trim up and out at the bottom to lift the spring clip shown off the edge it grips.



The clips shown in the picture hold the top of the trim in place. Once the bottom of the whole trim is out, push down slightly on the panel, so these top clips clear the seat frame. Be careful not to rip any of the clips off the panel, they're not strongly attached.





Step 2. – Install lumbar support assembly

Unhook the leather at the sides of the seat, toward the bottom. The picture shows the rear of the seat with the trim off, prior to installation of the adjustable lumbar support. The fixed lumbar support is the green zigzag rod. The higher, connected, white connector on the black clip just below the headrest motor is for the electric headrest. The lower, unconnected, white connector is for the seatback heating. The black unconnected one is for the lumbar support.

Inside the rear seatback.



Remove the two clips holding the green zigzag rod to the wrapped wire lattice (see picture). The clips were very strong and needed quite a bit of force to be pried off. The EBA doesn't say it anywhere, but in a factory-installed lumbar support, the clips attach the rod to the lattice too, just as for the fixed wire support. If desired they could be re-crimped on for this lumbar installation.

A clip pried off the fixed lumbar rod.



The picture shows a close-up of the bracket that supports the right side of the adjustable lumbar support. Remove the green rod by loosening the metal flanges holding it in at left and right, and cut the wire tie visible in the picture.

Lower right, inside the seatback.

Insert the large pin on the right of the lumbar bracket into the pre-existing hole in the seatback frame, and insert the locating lug on the left. The EBA text makes the left-side installation sound more complicated than it is in some cases – on my car I didn't need to move whatever lever it was talking about.

The part number for the securing $Torx^{\oplus}$ screw is not readily identified, but extensive digging elsewhere was rewarded with a listing of 52 10 1 954 098.

Step 3. - Install wiring

Note that your (U.S.) car will likely have the lumbar wiring in place, assuming the seats are not manual seats, even if you do not have seat heating.

Connect the black 2-pin connector of the seatback harness to the matching connector from the lumbar mechanism and slide both onto the dual connector holder.

Step 4. - Install switch

Find the blue switch connector on the switch harness underneath the seat base, detach it, and maneuver it up to a position near the switch hole in the trim on the side of the seat. It's tight between the seat side trim and the seat rails and mechanism, of course, but not too tight, even for my large hands. Pop out the plastic blanking piece that covers the switch hole, from underneath or by pulling up with a pick. Then from above the seat, fish up the connector through the switch hole, connect it to the lumbar support switch, and press-fit the switch back into its locating hole.



Lumbar switch on side of seat; view is looking down.

Step 5. - Re-attach trim

Put the trim back on and screw in the screws.

Finito. Test the operation of the support, not forgetting to turn on the exterior lights and check that both sides of the switch are illuminated – my brand new switch from the factory had one of the two bulbs out, reportedly the bulbs often are non-functional.

Enjoy a more comfortable seat!

13. Moonroof

A very rare option indeed . . .

A few of the early E34s had a moonroof (a glass sunroof) as a factory option. The company that made the moonroof panels, HBI Saratoga Tops, is no longer making moonroofs. If you ever see a panel, snap it up. The only marking seems to be "824222." It's a drop-in replacement for the steel panel.

The same frame/cloth assembly is used both for the separate sunshade panel of the moonroof and for the attached bottom panel of the metal sunroof. The moonroof version of the panel has a pull handle on its lower side and a black cover on the top side, and omits a couple of pieces on

Project Profile Coolness: 🌢 🕹 🕹

Cost: sssssss

top needed for the motorized movement of the metal sunroof version. So if your moonroof omitted the sunshade, in a pinch you can use your old sunroof piece. In lieu of the pull handle, try wiring on a pull tab made from a short piece of woven nylon, for example from a luggage shoulder strap.



Moonroof from the inside. Note this pull handle is the "other" color (tan) rather than the proper matching gray.

Parts

Name	Details	Number	Part no.	Price
Moonroof	get sliding sunshade too; used price	1	52 10 8 102 291	\$400-600

Einbauanleitung

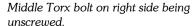
None

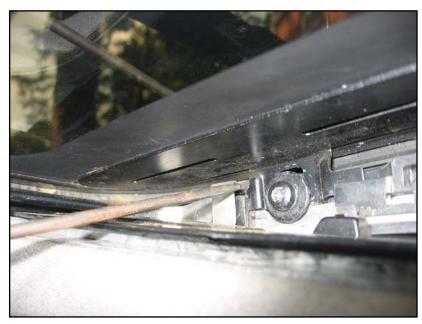
Installation

Slide the sunroof two-thirds of the way back so that you can stick your head part way up through the sunroof opening. Look backwards at the front edge of the sunroof. Spot two black plastic clips that grip pins, one near each side of the sunroof. Release the clips from the pins by spreading the clip arms out. Slide the shade back.



Move the sunroof forward again. Unscrew the three bolts (T25 Torx) now visible on each side.





Look for a metal clip in the sunroof well, toward the front on each side, going over a tab on the sunroof.
Use a pick or other tool to pull the top of one of the clips in slightly, toward the center of the car, while pushing the sunroof up over it.
Without letting the sunroof fall back down, do the same on the other side.

A pick pulling the clip inward slightly to allow removal of sunroof. (Picture actually shows the moonroof, but sunroof is the same.)



Lift out sunroof – be careful, it's heavy, and the sharp metal tabs for the screws will scratch the roof if they touch it.

You might want to renew the sun/moonroof sliding pieces to avoid any rattles developing the way they did for me (the glass roof is probably heavier than the original metal sunroof). There's a plastic slider at the front and two felt/rubber sliders at the rear on each side. To reach them, you take off the plate covering the cable tracks.

An oval front sliding piece, off its tab.



Double brown felt/rubber rear sliding pieces, in place.



Slide in the sunshade through the sunroof opening, toward the front, then slide it back into the headliner out of the way.

Install the new moonroof, tightening the Torx screws with the moonroof in a position such that it is 1 mm lower than the plane of the roof at the front and 1 mm higher than the plane of the roof at the rear.

Moonroof from the outside.

It's as easy as that.

Enjoy gazing at the moon through your very rare moonroof (hopefully not too much while driving).

14. Rear Power Outlet

Strangely absent

If the wiring is present, this is an easy plug-and-play installation. In my case the wiring was not present, even though the car had many other extra wiring harnesses. If the wiring is not present, minor splicing and running of wires is needed. The outlet and the trim plate it goes in were used on some E32s.

Note that if you have kids, dummy plugs are available that can replace the lighter element itself, for safety.

Project Profile Coolness:

Parts

Name	Details	Number	Part no.	Price
Cover	New trim plate that holds socket	1	51 16 1 928 708	\$7
Plug	Fills holes for seat heater switches in trim plate	2	64 11 1 368 498	\$4
Power outlet socket	(-1/91)	1	61 34 1 367 690	\$8
Power outlet socket	(1/91–)	1	61 34 8 350 958	\$8
Lighter element		1	61 34 1 375 967	\$16
Clamping bush for lighter	Holds on bulb socket	1	61 34 1 362 968	\$8
Bulb socket		1	64 11 1 366 170	\$2
Bulb	1.2W	1	63 21 7 167 000	\$2
Wiring	Get from donor car			
Total cost (new):				\$55
Total cost (used):				\$15

Einbauanleitung

None

Description

The rear power outlet / cigar lighter, and even the underlying wiring, seems rare in U.S. E34s, perhaps never installed from the factory in anything but the early years. The wiring may be obtained from a donor E32. Use the wire connector removal tool (see Accessories and Other Options chapter) on the donor car to release a wire in the driver's footwell connector.



The four wires are (1) socket power wire (rd/wi/ye) (at bottom left in picture below), which leads to a connector in the driver's footwell, via the left door sill wire channels rather than the transmission tunnel, (2) socket ground (**br**) (bottom right), (3) lighting power (**gy/bk**) (top left), leading to a splice with several other **gy/bk** lighting power wires near the front left corner of the rear seatwell, and (4) lighting ground (**br**, thinner) (top right), which on some E32 donors winds its way to a ground inside the right rear seatwell.

Wiring for the rear power outlet.

Installation

Start by disconnecting the battery – the power outlet circuit is always hot!

Take out the panel at the rear of the center console and take off the center console (see electric rear sunshade chapter).

Remove the door sill covers for the left doors and also the right rear door, lift up the carpet, and remove the wire channels in the rear passenger footwells and along the left door sills.



Lay the wiring harness alongside the large existing wiring loom.

Harness in left rear footwell. Note, outlet power wire (**rd/wi/ye**) in the picture is only temporarily laid into the rear seatwell, it ultimately goes forward along the sill to the driver's footwell.



Right-side harness – the thin and looped brown wire.

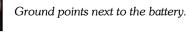


On the right side, the ground wire from a donor E32 may go forward into the wire channel along the right rear passenger door sill to a dead-end splice, then double back to the ground point in the right rear seatwell.

View looking down at right door sill, just forward of the rear seatwell. Note ground wire going into and out of white plastic wire channel along sill.



The ground point used here is on the inside front wall of the seatwell, next to the battery. Other ground points are nearby.

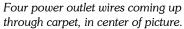




Pull back the carpet over the transmission tunnel, and unscrew the thick wire channel that lies along the top.

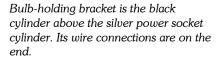


Insert the four wires under the carpet and out through the hole. Then reinstall the console and the wire channel.





Connect the wires to the socket on the back side of the console pop-out trim panel. Remount the panel.



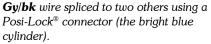


Connect the other end of the smaller ground wire to a ground of your choice.

Brown ground wire (center of the picture) crimped to a ring terminal and attached to a ground post next to the battery.



Splice the other end of the lighting power wire to one of the other small **gy/bk** wires along the left door sill (that color wire is usually an interior illumination wire; check it before using it – 12V at the end of your wire when the light switch is on).





Finally, run the socket power wire forward along the door sill through the wire channels to the driver's footwell. Remove the relevant trims to access the appropriate connector – pedal cover, lower dash trim (see driver's glovebox chapter) and deadpedal. Careful with the deadpedal, they often crack slightly at the bottom where the pedal surface meets the side panel. The quarter-turn plastic screws of the deadpedal go into plastic bushings on the sheet metal; put the bushings back if any fall out.

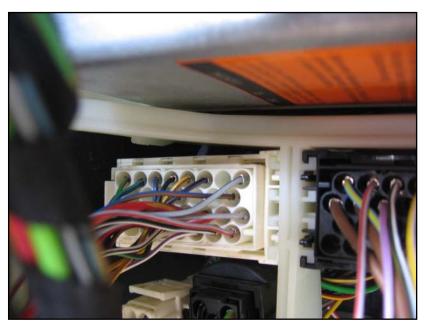
Main power wire running forward.



The connector that the wire normally runs to is not in the speaker cavity in the sheetmetal or high up, but behind the floor carpeting in the front corner of the footwell. It is connector **X14** (yellow, 30-pin in a '92).

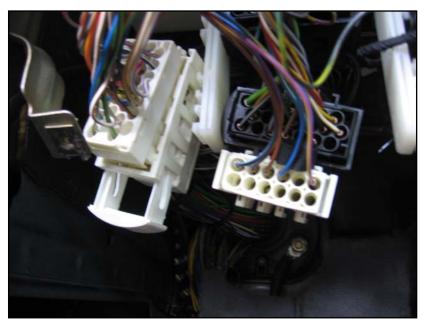
Connector **X14** in the left footwell. The connector normally lies underneath most of the other wire bundles that are visible; it has been moved forward for access, in this picture.

If you're in luck – and you probably won't be on a U.S. car – there will be another rd/wi/ye wire on the other half (front-of-the-car, fuse-box side) of the connector. That wire is spliced, in the front fuse box, onto a wire of the same colors that goes to the front power socket. So if you don't have the rd/wi/ye wire coming out of the front-of-the-car side of your X14 connector, you can connect the wire you've brought forward to the circuit that goes to the front power socket – my wire had enough length to reach, anyway. Check the wiring diagrams to see what is being described.



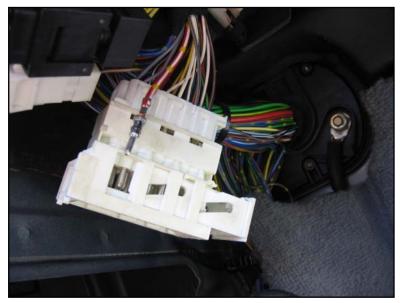
The front-outlet circuit goes through connector **X15** (white, 30-pin) on the bottom left of the under-dash connector dock, a little above **X14**.

X15, higher up than **X14**, under the dash. On the right of the connector see the two catch levers that need to be moved to release the connector, which pulls out toward the front of the car. It might be easier to pull the connector off the bracket after having disconnected the halves.



Free the connector from the dock by moving the small catch levers, then separate the two halves by pulling or levering out the slider, which will push on internal tabs to separate the halves.

The slider that separates the connector halves has been levered out. (The visible black and white connectors have been moved out of place, they normally attach where **X15** is in the picture.)

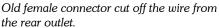


Next release the inner section of the connector, which locks the pins in place (as described before, for example in the disassembly of the donor door-mirror harness in the seat memory chapter, slide the inner section slightly sideways past the tabs). There should be a **rd/wi/ye** wire going into pin 20 at the front-of-the-car side of the connector, and a rd/gn/ye wire coming out of the other side that goes to the front power outlet socket. The pin numbers are shown in the ETM and are usually marked (very small raised numbers) on the mating face or rear face of the connector. Take out pin 20 from the front side.

Pin 20 extracted from the connector. (Note that in this picture the inner portion of the connector has been removed from the outer portion – it's better just to slide it sideways.)



Crimp the two same-color wires together on a new larger male connector pin, 61 13 1 376 195.





Insert the new pin into the correct pin hole until it clicks into place.

Two **rd**/**wi**/**ye** wires crimped together (also wrapped in electrical tape) and inserted in the connector.

Alternatively you could just splice those wires together away from the connector, but I think the merge at the pin is a neater, more original-looking installation.

You could also run the wire from the rear to **X14**, as in the factory layout, and then run a new wire from that **X14/19** pin to the **X15/20** pin – and you would need to do so if your wire from the rear isn't long enough to reach **X15**. Similarly, if you do happen to have the **rd/wi/ye** wire coming out of the front side of **X14** in your car, you would simply insert the wire you brought forward from the rear power outlet into pin **X14/19**.

Connect everything back up, and test the rear socket.

Voilà! Enjoy your rear-seat passengers' new access to power. 32



Note BMW dummy plug in place of the death-stick igniter.

 $^{^{\}rm 32}$ The manual says to use devices only up to 200 Watts, for the front socket alone.

15. Rear Door Sunshades

One of my favorites; not too hard

Some European E34s were fitted with factory sunshades that were integrated wonderfully with the door panels. The larger shade is recessed into the top of the door panel, and the "quarter shade" is recessed into a new trim for the small pillar between the main and quarter windows.

The shades can be fairly easily retrofitted, with only two drawbacks: cost of the parts, and that – for a perfect installation – a slightly different and nearly unobtainable or prohibitively expensive door panel (or the top strip of the panel) is required. The good news is that, with a little internal cutting, and relocation of the door lock knob, the regular panels will work quite well.

Project Profile

Coolness: 🐧 🖒 🜢

Cost: s s s

Parts

Name	Details	Number	Part no.	Price
Sunblind	for main window	1 ea.	51 16 1 973 681 and -682	\$89
Hook	for main blind	4	51 16 1 973 901	\$2
Cover	for hooks above	4	51 16 1 973 905	\$2
Clamp	for chrome trim strip	8	51 21 8 107 857	\$1
Screws	for shade roller	8		
Body nut	speed nut for roller	8	07 12 9 925 708?	~\$1
Sunblind	for quarter window	1 ea.	51 16 8 102 455 and -456	\$94
Hook	for quarter blind	2	51 16 1 946 206	\$1
Cover	for hooks above	2	51 16 1 964 319	\$2
Screw	for hooks above	2	51 16 1 948 970 or 07 11 9 907 939 or #8 x 1/2" sheet metal screw	<\$1
Support	for quarter blind, lower	2	51 42 1 969 335	\$2
Support	for quarter blind, upper	1 ea.	51 16 1 978 155 and -156	\$2
Square nut	to hold quarter blind top	2	07 11 9 921 412	<\$1
Screw	for quarter blind top	2	M4, short, 5mm or so	<\$1
Cover	for screw above	1 ea.	51 16 8 117 743 and -744	~\$1
Lever	for door lock knob	1 ea.	51 22 8 102 965 and -966	\$1
Total cost:				\$390

Note: Optionally, if you don't want to cut the holes in the existing black window-surround trim, new trim with pre-cut holes is available, 51 34 8 138 881 and -882, \$56 ea.

Einbauanleitung

Rear side window roller blind, 1/90, 01 29 9 783 611

Installation

Some special tools are useful for this project:

A very sharp hobby knife for cutting the door panel fiberboard

A reciprocating saw can speed up certain fiberboard cuts

A circular saw is handy for cutting the slots for the speed nuts holding the roller

The steps include:

- 1. Remove door panel
- 2. Remove chrome trim strip and replace clips
- 3. Remove window-surround trim; cut holes for hooks; refit

- 4. Attach quarter-blind brackets; reinstall chrome strip
- 5. Cut slot for roller and screw/nut holes in door panel
- 6. Cut backing off door panel near slot; fold and glue
- 7. Attach roller to door panel
- 8. Cut hole for door lock knob; fill old hole
- 9. Replace existing lever for door lock knob
- 10. Attach quarter blind
- 11. Attach hooks for both blinds
- 12. Reinstall door panel

Step 1. - Remove door panel

Take off the panel that covers the inside of the door. Be careful removing the parallelogram-shaped plug that covers the screw in the door pull, they are somewhat tight and if your screwdriver slips they scratch easily.



Scratchable screw cover in door pull. Note one of three retaining ridges.



Screwhole behind door-opening handle (screw has been removed).



Screwhole behind ashtray.



The door lock lever knob unscrews.



At the top of the door panel, a vertical flap of the underlying fiberboard fits into clips underneath the chrome strip. To remove the door panel, first ease the top of the panel and these flaps out of the clips, pulling slightly in towards the center of the car and then upwards.

Clips that hold the chrome trim strip, door panel top, and shade in place.



Closeup of a clip.



Gently lever the window switch out, then disconnect the connector.



Window switch connector, shown with the door panel already off. Note also the black plastic door panel main clip below it. Remove it, and reattach it to door panel before reinstalling the panel.

With a putty spreader, or better yet two, lever out the clips that hold the edge of panel to the door. The clips are in pretty tight, and will give a loud pop when they come out. Try to lever out right next to the clips, so the clips and their backing plates don't get pulled off the panel fiberboard (they are just glued on).

Now reach behind the panel and swivel out the Bowden cable for the door-handle lever.

Door-handle lever Bowden cable.



Step 2. – Remove chrome trim strip and replace clips

Note ridge on the blue sheet metal below the raised-up clip and chrome trim strip. When in place, the clip grips the ridge tightly.



Lever gently. Raise the clips evenly or the trim can bend, especially where it's thinner, by the c-pillar.



Compare the old and new clips and note how the new ones are intended to hold a somewhat deeper vertical strip, which is now going to be the side of the roller, soon to be located where the door fiberboard and its vertical strip will be cut away.

Comparison of special (left) and standard (right) trim clips. Note the greater depth of the one on the left.

Step 3. - Remove window-surround trim; cut holes for hooks; refit

Be careful removing the black trim strip! It is on quite tightly at the curves in the window, and can snap if pulled in the wrong way. There is nothing special holding it on, just its C-shaped cross-section. I suggest starting from the front, wiggling it off firmly but very slowly.



The EBA includes templates for marking the holes to be cut in the trim. You can print them out. Although they were close, I found them to be slightly off when I printed them out myself, even after adjusting for the different size of European and U.S. pages. (Note that you can order new trim pieces with the holes already cut; probably not worth it for \$50 each, but it's your choice!) So before you cut the holes in the trim, check the marks against the screwholes predrilled in the doors.

Trim, with hole cut to access screwhole for hook in door metal.

Step 4. - Attach quarter-blind brackets; reinstall chrome strip

Note that the screws for the quarter blind supports are, nicely, already on the car (in the case of my car, at least).

Unscrew them and use them to install the brackets.



Preinstalled screws to hold on the quarter shade. Middle screw is not used, top one is hard to see in this picture, it is above the barely-visible drilled hole toward the top of the door.



Lower bracket for quarter shade.



Upper bracket. Note hole in black trim for main-shade bracket screws, to upper right.

I struggled mightily to find the mystery trim strip shown in EBA picture F34 51195. Never found the part number, wasn't in the ETK that I could see, perhaps it only came in the retrofit kit. Happily, but strangely, it doesn't seem to be important, certainly it's not needed for the shades to function.

Step 5. - Cut slot for roller and screw/nut holes in door panel

The regular door panel seems to be virtually identical to the one for the sunblinds. The only differences I could detect were that the latter has a projected area that sticks into the cabin a wee bit for the slightly different location of the door lock lever (which now has to bypass the rolled-up sunblind), and it has slots/holes cut for the roller-attaching screws. The regular panel has the same raised portions where those slots/holes go, which helps in making this way of installing the panels feasible.



Put the main roller in place, and mark where to cut away a long slot for the shade to come through near the top of the door panel. The cut must be made without cutting into the topmost layer of the door panel (see more on the topmost layer, below). The fiberboard can be cut carefully with a reciprocating saw, or more safely and much more slowly with a sharp hobby knife. The fiberboard cuts relatively easily with a knife but requires numerous passes.

Fiberboard of door panel cut away to make room for shade.



The slots for the speed nuts can be nicely cut with a circular saw. The slots should ideally be cut where the bottom of the speed nuts will lie, which depends on where the screw for the speed nuts goes, which, in turn, depends on where the shade itself lies. I lined up the shade evenly with the top of the adjacent fiberboard horizontal section. Align the saw carefully, and don't slip.

Slots cut for speed nuts, and speed nuts installed.

Step 6. - Cut backing off door panel near slot; fold and glue

The door panel includes two layers at the top, both of which need a slot cut in them for the roller. The topmost layer has outer decorative plastic on top of the fiberboard. The layer seems to be glued onto the underneath layer only at each end. If it comes off, some of these cuts are easier, and it can be glued back on later.

If you managed to obtain just the top layer of the door panel – the piece with the appropriate projection for the door lock knob – you would now take off the original piece and glue on your new one.

If not, do some more cutting: I very carefully sliced between the plastic and fiberboard with a sharp knife, then cut off only the fiberboard, allowing the plastic to be folded over and glued underneath, making a neater-looking installation. Use a metal sheet or something between the fiberboard and plastic when cutting the fiberboard away so you don't accidentally cut through the plastic covering too. I used superglue to attach the folded-underplastic – seems to be holding so far. I used a row of large binder clips to hold the plastic in place while the glue was setting.



Cover plastic on top of fiberboard; both plastic and fiberboard lie atop the main fiberboard door panel.



Covering (grey material to the left) carefully cut away from fiberboard (next strip to the right), and fiberboard removed.

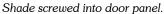


First clamping clips in place.



Step 7. – Attach roller to door panel

Use the screws that came with the roller to attach the roller to the speed nuts on the door panel.

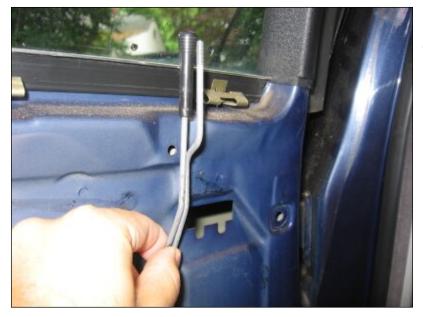




Step 8. – Cut hole for door lock knob; fill old hole

Assuming you're using regular door panels not the special shade ones, a new hole must be cut for the door lock knob, a half inch further toward the middle of the car than the old hole. This is a bit tricky since the panel is curved there – go slowly and think in 3-D. If desired, the cut-out piece of plastic and fiberboard can be fitted nicely into the old hole. Otherwise fill or cover the old hole using some other method.

New door lock lever hole, with divot used to cover old hole.



Step 9. – Replace existing lever for door lock knob

Comparison of old (with knob) and new door lock levers.

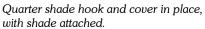


Step 10. - Attach quarter blind

Upper screwhole for quarter shade. View is looking up, toward rear of door. A matching plastic piece will cover the hole.



Step 11. – Attach hooks for both blinds





Predrilled holes for main shade fronthook screw and alignment lug (i.e., not for two screws).



One of two hooks attached, cover not yet in place.



Step 12. – Reinstall door panelDon't forget to take the black center clip off the door and put it on the panel before reinstalling the panel.

Both shades, installed and deployed.

Finished!

If you didn't use the factory sunshade door panels, well done for your craftsmanship in adapting the non-sunshade ones. If you did, still a fairly big job!

Your kids and other rear-seat passengers will appreciate the shades on long, sunny trips.

16. Rear Armrest with Storage

Another storage spot

In the United States, armrests with compartments did not come on the E34s, apart from the whole fixed-console construct in the M5s that had the two-rear-passenger seat. Again, the E32s come to our rescue: they usually had one of two storage-bin armrest designs.

The stowage in the rear armrest is particularly useful since the E34 rear doors normally do not have storage bins on them.³³

Although the ski sack can be used with the armrest in place, it's probably better to remove the armrest, which these designs make easy. In one case, there is a quick-release mechanism on the armrest bracket that releases the armrest from the seat. That mechanism has latches that slide into braces on

armrest from the seat. That mechanism has latches that slide into braces on the seatback.

Project Profile

Coolness: In the second sec

In the other case, the armrest can be pulled out of its *bracket*, which is bolted to the seatback and stays in place.

Parts

Name	Details	Number	Part no.	Price
Whole armrest and bracket	used price	1		~\$100
attaching hardware	bolts, nuts, washers, split lock washers, spacers; M6 or M5 size			\$10
Sample armrest part numbers				
Armrest, upper, leather one-button type	Euro M5 9/91- ; E32: 12/90- ; silver gray	1	52 20 8 141 686	\$508
Armrest, upper, leather; one-button type	530i, 540i; 9/92– ;	1	52 20 8 162 914	\$353
Armrest, upper, leather; two- button type	E32, 9/90–; usually gray, not light silver gray	1	52 20 1 951 593	\$508
Armrest, upper, leather; two- button type	E32, 9/90–12/90	1	52 20 8 143 723	\$503
Bracket (quick-release type)	E32, -12/90	1	52 30 1 951 191	\$38
Oddments trays	for rear doors	1 ea.	51 16 8 150 953 and -954	\$88
Body nut	"5mm"	4	51 41 8 108 117	<\$1
Total (used) cost:				\$110

Einbauanleitung

None

Description

There were two main kinds of storage armrests used on the E32 applicable to the E34.

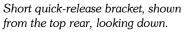
³³ In theory, there actually were small rear door bins for the E34, but I have never, ever seen one. The only way I found out about them was by poring over the parts catalog. There, they have the fun part name "oddments trays" and are simply bolted onto the door panel. Needless to say, the parts are no longer available from the factory, if they ever were.



Armrest from later cars is on left; from earlier cars, on right.



Cars up to about 12/90 build date used the early-type of armrest. This was held in by a quick-release bracket similar to that used for the E34 ski-sack armrest (see that chapter), but this bracket is much shorter, so the brackets aren't exchangeable without modification of the seatback.



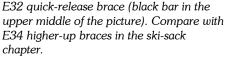


The early-type armrest was distinguishable by having *two* release buttons on the front of the armrest, one to open the lid (top button) and one to allow the armrest to be raised and lowered (bottom button). It is possible this armrest design was replaced because klutzes were pulling up or down the armrest without pushing the release button, breaking the mechanism or bending the mounting bracket.

Two buttons on the front of the early-type armrest.



The quick-release latches on the armrest bracket hold on to braces on the seatback. On E32s, the braces were usually welded to the seatback; on the E34 the braces were screwed higher up into pre-threaded holes in the seatback.





On the late-type (12/90+) armrest, the bracket bolts to two flanges on the seatback, very near to the flanges holding the seatback to the rear bulkhead. (These flanges should not be confused: the armrest flanges are higher than the seatback flanges, and are flush with the plane of the seatback, whereas the seatback flanges are at an angle.) The flanges used to attach this bracket were welded to the E32 seatback, and don't show up on the E34 seatback - although on my E34 there was a raised portion of the seatback frame apparently indicating where the bracket would go. Armrest bracket bolted, from the rear, to seatback flange. Lower black plastic nut holds seatback to bulkhead using another flange on the seatback.



Shown here is one of the side pins that pop out of the bracket when taking out the late-type armrest. The armrest pin simply pulls out past some springs in the bracket.

Pin on the side of the armrest that snaps into bracket.



The late-type armrest is also distinguishable by having only one release button on its front. That button releases the compartment lid; unlike for the first armrest, there is no button to lock the armrest in place, up or down.

The button/latch is actually attached to the

Installation

Either type of armrest can be used for the E34, but they both require minor modifications to the seatback. The early type needs a pair of the factory braces bolted to the seatback, the late type needs a pair of hardware-store plates bolted on.

In my case the early-type armrest, which I preferred, was exceedingly rare in my car's light silver grey color. You may or may not be able to get your preferred type in the right color. I obtained both types (see picture earlier). Check the ETK to find which years your color was available, although in my case it didn't appear to be quite right, as far as the colors went.

To install, take out the rear seatback (see rear headrest chapter). Put the armrest and bracket in place on the seatback in order to mark cuts and drill holes. Cut the leather on the back of the seatback frame; make a flap so that either the factory braces or hardware-store plates, as appropriate, can be bolted flush to the frame metal. Line up the braces or plates, and mark the drill hole locations on the back of the frame. Take out the armrest and bracket again, and drill bolt holes for the braces or plates. Then bolt on the respective pieces.³⁴



Early-Type Armrest

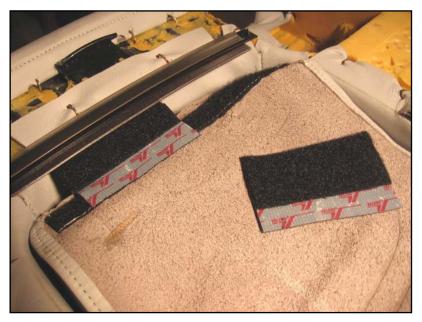
The screw-in braces used for the E34 armrest are somewhat longer than the welded-on braces used in some E32s, so they push the top of the armrest forward a bit in the raised position. A solution is to use spacers – backing plates, washers, or the like – between the braces and the back of the seatback frame, to move the braces back about 3/8" relative to the frame. (The braces will then push the bottom of the seatback forward a bit relative to the bulkhead behind the seatback, but not an unworkable amount.) Brace bolted onto seatback frame, with early-type armrest bracket in place. There are spacers underneath the brace plate, not visible from this angle.

³⁴ In the original installation, the braces screw into threads tapped into the seatback frame and into reinforcement metal welded behind the frame: threads now tapped only in the thin frame metal are probably not enough to secure the braces.

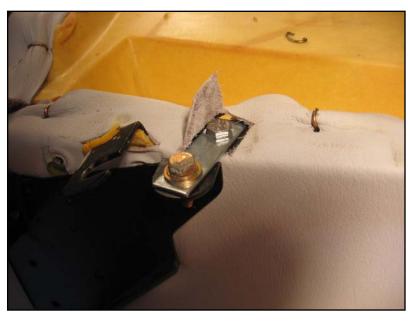


In the case of the early type of armrest, the quick-release armrest bracket just pops into place, using spring-loaded latches holding on to the braces.

View of the back of the seatback (out of the car), with early-type armrest and bracket in place. Note the tabs at the bottom of the bracket, which fit into slots in the seatback frame.



There's another wrinkle to the earlytype E32 armrest installation – but also there's an easy solution. The large leather flap that covers the ski sack area when the armrest is in the down position appears to be not quite long enough to reach the E34 hook-and-loop attaching material at the top of the armrest hole. I simply made a hook-and-loop "extension" by sticking some new hook-sided material back-to-back with some new loop-sided material. This bridges the gap - the backrest frame's hook material sticks to the extension's loop side, and the extension's hook side sticks to the armrest flap's loop material.



Late-Type Armrest

Bolt the bracket to the hardwarestore plates you have already attached to the seatback, using the threaded holes on the bracket and the M6 bolts with washers that came with it.

Plate bolted onto seatback frame, with late-type armrest bracket bolted to the plate. Original bracket bolt is the gold-colored one to the lower left. Hardware-store bolt (M6 or M5 size) is the steel-colored one to the upper right. Hardware-store bracing plate is a substitute for the welded-on plate that appears in factory E32 installations.

Now that you've completed this retrofit, enjoy your rear-seat luxurious ambiance, and the handy extra storage space.

17. Ski Sack

Lumber, anyone?

This add-on is useful not just for skis, of course, but for 2x4s, tall CD towers, etc., etc., that are too long for the passenger compartment. The armrest and the ski sack itself can be taken out and put back in easily. Junkyard U.S. E32s seem to have them not too infrequently. The sack has a zipper along part of it, so that things that are even longer than the sack + trunk can be carried, though they might start to interfere with gearshift and handbrake.

Project Profile

Coolness:
Utility:
Difficulty:
Time:
Utility:
Utili

Cost:

Parts

Name	Details	Number	Part no.	Price
Ski bag	goes through rear seatback	1	72 60 1 969 209	\$186
Cover	the ski-sack plastic frame	1	72601964519	~\$16
Bracket	quick-release bracket for armrest	1	52 20 1 978 002	\$29
Bow	the braces that the latches on the armrest bracket hold on to	2	52 20 1 978 009	\$9
Countersunk head screw	M6x12	4	52 10 1 817 063	<\$1
Trunk partition trim panel	can also just cut the old one; two pieces in the new set	1	51 47 8 181 478	~\$80
Total cost (new):				\$331
Total cost (used):				\$70

Einbauanleitung

Ski Bag, 12/97, 01 29 9 787 597

Installation

The basic process is:

- 1. Remove rear seat base, seatback, and armrest
- 2. Remove bulkhead insulation and sheet-metal panel
- 3. Remove trunk trim paneling, cut to size or install new panels
- 4. Attach frame to ski sack and install on bulkhead
- 5. Attach guick-release bracket latches on seatback
- 6. Attach armrest to new bracket and install

Step 1. Remove rear seat base, seatback, and armrest

See headrest chapter for notes on taking out the seat.



Step 2. Remove bulkhead insulation and sheet-metal panel

The insulation on the passenger-compartment side of the trunk bulkhead is pre-marked for cutting. The insulation can actually be separated along the perforations by hand, but a knife makes a neater cut, particularly in the foam underneath the top layer (although using a knife has the drawback of possibly putting cut marks in the paint underneath, so be careful).

View of the top of the armrest cavity, showing perforated cut line. Hook-andloop at the top holds on the leather flap.



The aperture for the ski sack passthrough from the trunk is pre-cut in the bulkhead sheet metal. The EBA says knock the panel out with a flat chisel, but apparently the designers cleverly (and at extra cost!) put dimples in the sheet metal from the passenger side at all the appropriate break points, allowing a pin punch to be located properly. Using the pin punch produced far superior results for me - the sheet metal tabs sheared cleanly sometimes with one blow, whereas a flat punch almost didn't work at all and marred the bulkhead metal more.

Pass-through panel, viewed from the trunk.



The EBA calls for painting any bare metal with zinc-based anti-corrosion paint. Spray cans of it are available to the regular consumer at hardware stores and online – a little can be sprayed in a cup to liquefy it, then painted on with a brush if that's easier.

Pass-through panel from the passenger compartment. You just might be able to see the dimples. Note the two white plastic plugs at the bottom. The plug for the round hole (for the ski sack box release button) is already out.



Step 3. Remove trunk trim paneling, cut to size or install new panels

The trunk paneling is held on by the bizarre plastic nuts shown in the photo. I thought maybe there was a special service tool designed to fit the opening, but the EBA specifically says to use a screwdriver.

Huh? A stud nut for a "tridriver"?



In my case I cut the existing trunk paneling rather than buy the separate pieces new. Note that the cut-out area is not centered left-right on the paneling, i.e., it is not exactly in the middle of the piece. I marked the location of the pass-through hole on the back of the paneling while it was in place, then took it off again, lined up the ski sack in its frame on the paneling, and marked the cut lines. Make sure to mark and cut so that the ski-sack frame will *overlap* the panel edges; don't mark to the outside edge of the frame.

One of the cut portions of the trunk paneling.



Step 4. Attach frame to ski sack and install on bulkhead

The ski sack frame snaps together over the ski sack.

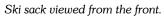
Ski sack frame: side facing up in the picture goes toward ski sack, side facing down goes toward trunk. Top is to the left.



At the top, make sure the tabs on the frame go into the right slots of the ski sack assembly – if you're forcing it, try the other slots.



Insert the ski sack into the passthrough opening.





Rest the bottom tabs over the edge of the sheet metal and snap the top clips into place. The top clips did not go on easily in my case, but checking the alignment from the passenger compartment side and pushing and pulling firmly did it without breaking anything.

Bottom tabs over the edge of the sheet metal. Note that the fourth clip, on the right, is still behind the sheet metal, not yet over the metal the way it should be.



Top clips over the sheet metal, at the very top of the picture.



Step 5. Attach quick-release bracket latches to seatback

The new armrest bracket has springloaded latches that hold braces on the seatback.



The bolt holes for the braces are precut, and the leather is somewhat so, as seen in the picture, but additional snips were needed in the leather for the latch plates to lie flush against the seatback metal.

Bolt holes and pre-cut leather along the side of the armrest hole in the seatback.

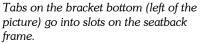


Brace screwed into place on the seatback, viewed from the front, through the armrest hole.



Step 6. Attach armrest to new bracket and install

New quick-release bracket.





The EBA says that the armrest is attached to the old bracket with a bolt, but in my case it was a one-way toothed spring clip, which was somewhat hard to get off. Lever it up gingerly, perhaps with a pick under the teeth, and preferably buy replacement clips ahead of time in case of breakage.

Close-up of the clip holding the peg on the armrest to the new bracket.



The armrest and armrest bracket latched in place.



Close-up of bracket in place with latch (out of view on back of bracket) engaged over brace on seatback.



The finished product!

Armrest removed and ski sack extended into passenger compartment.



Note the two round magnets at the bottom of the ski sack cover, which stick to the ceiling of the trunk when the cover is open.

Happy skiing!

18. Rear Headrests

An almost-essential add-on!

Some European E34s were fitted with rear seat headrests. I've never heard of a U.S. E34 with them from the factory, but the good news is that the identical parts were used on U.S. E32s (the earliest E32s used an incompatible design). To me, the E34, and most other modern cars, look unbalanced without the rear headrests – not to mention the danger that the glaring omission poses to the necks of rear seat occupants in a high-speed rear-end collision.

Some of the E32 headrests were motorized, which makes a particularly fun retrofit. The installation descriptions below first cover the non-powered, then the powered, versions.

Holes are pre-cut in the sheet metal and seat foam for the headrest brackets and attaching screws, so the non-powered job is pretty easy.

The installation does involve cutting a couple of slits in the leather on the rear seat's seatbacks, so this is a "one-way" retrofit.

Parts

Name	Details	Number	Part no.	Price
Non-powered				
Rear headrest	get from a junkyard; used price with covers and brackets	2	52 20 8 148 402	\$20
Cover	goes up inside headrest; light silver gray	2	52 20 8 116 401	\$17
Cover	goes between headrest itself and seat top; light silver gray	2	52 20 8 116 422	\$15
Cover	rests on top of seat; light silver gray	2	52 20 8 116 434	\$11
Guide	bracket to hold headrest	1 ea.	52 20 8 102 717 and -718	\$21
Screw	attaches bracket to speednut/bulkhead	6	07 11 9 916 939	<\$1
Speed nut	goes on trunk bulkhead behind seatback	2	07 12 9 925 735	<\$1
Total (used) cost:				\$50
Powered				
Motor		2	52 20 8 181 160	~\$160
Control module		1	61 31 1 378 639	~\$100
Switch		2	61 13 1 379 078	~\$36
Switch trim	light silver grey	2	52 20 8 140 438	~\$10
Seatbelt latch	has a switch for headrest operation	1 ea.	72 11 8 107 607 and -608	~\$38
Wiring	wiring harness this alternative harness from e32s works, though seat heating connectors might need changing	1 1	61 12 8 355 184 8 350 728	~\$72
Wiring	smaller harness for underside of seat base	1	61 12 1 382 636	~\$160
Relay	yellow	1	61 31 1 378 301	~\$10
Additional cost to power (new):				\$830
Additional cost to power (used):				\$200

Einbauanleitung

Rear head restraints for BMW 5 Series (E34), 8/90, 01 29 9 783 899 (covers non-powered only)

Manual Headrests

Installation

Steps include:

- 1. Remove rear seat base
- 2. Detach rear seatback
- 3. Remove insulation, punch out bulkhead holes, and install speed nuts
- 4. Attach headrest brackets
- 5. Re-attach seatback, insert trim pieces and headrests

Step 1. - Remove rear seat base

Remove the rear seat bottom. It needs to come off only to access the seatback nuts. Simply pull straight up, very hard if necessary, on the front of the seat, at the middle of the left seat portion and the middle of the right seat portion.



There are some strong steel bar springs that hold the seat down, and the pulling must pinch the springs inward to let them pass through the slots they're in. The accompanying picture shows the two brackets holding the springs – the springs stick out left and right from the brackets.

Securing springs are in the tabs sticking out a couple of inches from the bottom of the seat (in this picture they're now pointing toward the front headrests).



To remove the seatback, start by unscrewing the nuts behind the center armrest.

A black plastic stud nut securing the backrest is in the middle of the picture (to the right of the black push-button). The armrest has been removed in this picture.



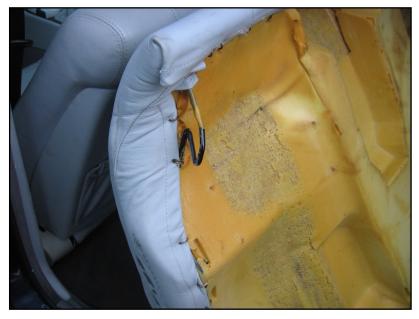
Then remove the nuts at the side of the backrest.

View is looking down, toward the left rear of the car – notice the outboard seatbelt socket with red pushbutton at the right. Wrench is holding down the insulation flap that normally covers the stud nut, and is pointing toward the nut.



Step 2. – Detach rear seatbackDetach the seatbelt covers.

In the picture you can see the teeth on tabs sticking up, on both sides of the center hole, that hold the covers in place. Note that these covers can crack fairly easily, perhaps because of their frequent exposure to the sun.



Bring the seatback up and forward, lifting the side and center retaining bars over the metal bulkhead behind the seatback. The seatbelts can stay in place.

The bent bars on the sides of the seatback hook over an edge on the bulkhead behind the seat. Note at top right the cutout in the foam – that's where a bracket for the headrest will fit when the bracket is attached to the rear bulkhead.



This shows how the brackets lie in the seatback foam once they are attached to the bulkhead and the seatback is put back in place.



The short black metal flange, close to the top of the seatback, hooks over the metal bulkhead behind the seat.



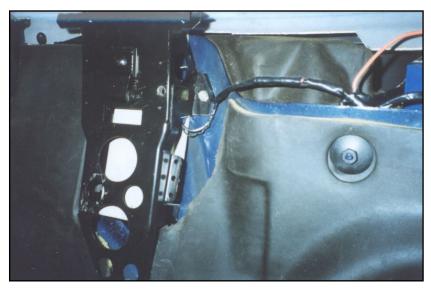
Step 3. – Remove insulation, punch out bulkhead holes, and install speed nuts

Remove several bits of the insulation that is attached to the bulkhead. Cut along the perforations in order to access the three holes – two for the screws and one for the speed nut – for each bracket. (It's not clear why a speed nut was used in one case but not the other two.) Punch out the rectangles, and insert the speed nuts so that their screwholes match up with the screwholes in the sheet metal.

Right side of the bulkhead behind the seatback. In this picture the rectangle to be punched out is next to, and in this view to the upper right of another rectangle in which you just might see the round screwhole. Seatbelt reel is at top of picture.



Left-side mounting area showing the speed nut (silver rectangle) in place for the lower bracket screw.



Step 4. – Attach headrest brackets

The one complexity in this installation was the presence of an electronics box where one of the brackets goes. I believe the box was for the factory mobile phone, so, in the likely event you don't use that phone, the box can be removed. If you want to leave it, the bracket fit over the box pretty well, but a little bending of metal had to be done.

Left headrest bracket attached to the bulkhead on top of the mobile phone module. One of the attaching screws is visible to the right of the bracket.



While you're at it, remove the cell phone battery – lots of unneeded weight!



Right bracket in place.



Put the seatback in place and carefully locate where to make cuts in the leather for the headrest's flat shaft and a trim plastic screw on either side. Hold the lower trim piece where it will be inserted and mark the leather. You can also feel for the metal bracket slot and holes at the top of the seat through the leather. Do this all very carefully because if you cut in the wrong place, it will show. Cut small holes/slits at first, and keep checking them as you expand them.

The trim piece in front covers the leather on top of the seat. The long black plastic "screws" have teeth on them that engage with the bracket when inserted and rotated 90°.

Step 5. – Re-attach seatback, insert trim pieces and headrests.

Re-secure the seatback, and install the lower trim cover plates, turning the black-plastic slotted heads to lock the trim in place. Put the remaining two trim pieces in place on each headrest, and slide the headrests down firmly.

Done, wunderbar! See the end of the chapter for a picture of the final product.

Power Headrests

Description

Adding power to the rear headrests is not too complicated, everything is bolt-in – assuming the underlying wiring is present. There appears to be no EBA on electric rear headrests, although there is one on the manual ones

To find out if the underlying wiring is present, look underneath the rear seat base, on the front wall of the seatwell, to the right front of the rear fuse box. Hopefully there is a white four-pin connector there, (**X337** on an E32) piggybacked on top of a black six-pin connector (the latter is for the electric sunshade).



Vehicle wiring for the headrests terminates at the white 4-pin connector in the middle of the picture.

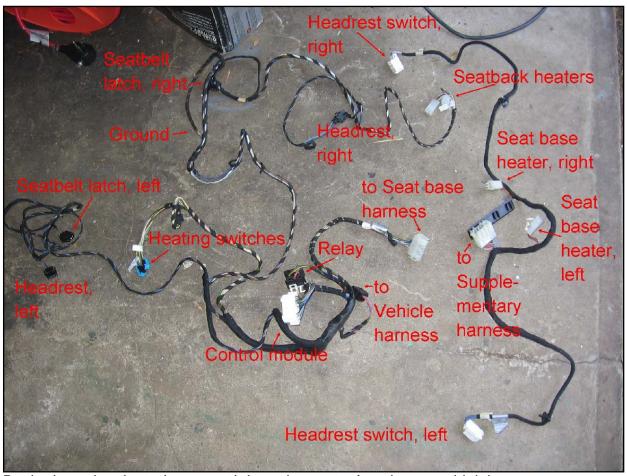
The headrest supplementary wiring harness, which connects the power headrest system components to each other, attaches to this underlying wiring. If the underlying wiring is not present, consult the factory wiring diagrams (including E32 ones) to install appropriate new wiring – only three wires come to the connector, so not too much is involved.

The following need to be added to power the manual headrests:

- motors,
- control module,
- relav.
- replacement seatbelt latches (somewhat optional),
- switches, and
- wiring harnesses.

The seatbelt latches have an internal switch that indicates to the control module whether a seat is occupied (i.e., seatbelt is latched), and if so the module automatically raises the headrest; when a seat is unoccupied, the control module lowers the headrest – to improve the driver's rear view.

The two wiring harnesses are illustrated in the next picture. The shorter one, on the right, is attached to the bottom of the seat base.



Rear headrest and seat-heating harnesses, with the attachment points for each connector labeled.

Note that the illustration of the E34 layout and connectors in the ETK appears to be a modification of the E32 illustration, and does not give an entirely accurate picture of the E34 setup. If you're getting parts from a donor E32, bear in mind that there were two wiring set-ups on the E32, one for the (-iL) cars with individually-adjustable rear seats, and one for those with the fixed one-piece bench (-iL or -i). (Yes, the -iLs had so much room in the rear that the seatbacks could be reclined and the seat bases moved forward!)



The switches for the E32 rear reclining seats included a headrest raise/lower function that would adjust the headrest height and override the automatic control. They were on the front corners of the seat base. The E34 switch is in a similar location, but of course only includes the manual headrest raise/lower function.

E32 switches for individually-adjustable rear seats. Headrest switch is to the right in this view. This set-up never appears on the E34 – not enough room to slide the rear seat forward! (Seat base in this picture is raised up out of its normal position.)

Switches for the headrests on the E34 go to a similar location at the front corners of the rear seat base cushion, on a small trim plate.³⁵

The system requires a relay; unfortunately I could not confirm which part number it is. In certain E32 setups, the relay is a yellow one, part number 61 31 1 378 301. One source lists 61 36 1 389 105. I used a Bosch orange relay with a standard basic relay circuit, Bosch part number 033 201 4458.

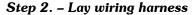
Installation

The steps are:

- 1. Take off seat base and seatback
- 2. Lay wiring harness
- 3. Install switches
- 4. Attach motors and brackets
- 5. Replace seatbelt latches
- 6. Affix relay holder
- 7. Install control module connector
- 8. Make connections
- 9. Reinstall seatback, headrests, seat base

Step 1. - Take off seat base and seatback

See earlier in this chapter. Disconnect the battery.





Lift up rear passenger footwell carpet to access the wire channels. The carpet can usually be slid out from under the sill trims and b-pillar trims, but if desired the trims can be removed first. Lever them out firmly. Removing the front seats can help to pull back the carpet more easily, but it is not necessary. If removed, the seat bolt torque is 44 N-m, for reinstallation.

Sill trim underside, showing the clips.

³⁵ Potentially the switches could also be placed in the rear end of the center console, above the driveshaft tunnel and below the console vents (wiring length may need to be adjusted). A substitute trim plate for the rear of the console (originally available for the E32 or M5) neatly holds two switches (left and right controls – plus a rear power outlet; see that chapter), so either the rear electric headrest controls or the rear seat heater switches can be installed there. But it might be useful to have the electric seat heater switches in the intended center console spot, such that their illumination reminds the occupants the heaters are on, so best to locate the headrest switches there only if there is no seat heating. If the old console trim plate had the alarm LED and glass breakage sensor in it, it's best to relocate them forward to the alternate (and superior) position on the dash using the extension wires in the relevant kit (see the section in the Other Options chapter).



Remove the battery negative-disconnect covers (did you know that's what that was for – you don't need to take off the rear seat base to disconnect the battery!).

Battery-disconnect covers in right rear footwell.



Take out the white and black plastic rivets, and take off the wire channel covers in the footwell. In my case, the pins in the white rivets could be levered out, carefully, without too much difficulty, but some of the black ones were impossible. Even mangling some of the pins in trying to lever or pull them out did not loosen them, and after an hour's work I had to remove the battery and (literally) hammer the pins out from inside the seatwell – frustrating that such a simple piece could work so poorly. When I reinstalled new pins, I cut substantial portions of the pin shafts away to reduce the diameter so the pins wouldn't bind so much. Two plastic rivets are at top edge of wire channels (center and upper left of the picture.



Upper plastic rivet. Pin is pulled out part way to release rivet.



Thick wire-securing pins at front top left and right of seatwell pull out of rubber grommets.



Lay wiring harness alongside the large existing wiring loom covered by the channels, and lay the relevant branches up towards the headrest brackets, past the seatbelt latches.

Harness in left-side footwell, looking toward transmission tunnel.



Harness in right-side footwell.



Carefully maneuver the connectors that go to the vehicle harness, seat-base harness, control module, relay, and the ground wire terminal through the small hole at the bottom of the seatwell front wall, near the transmission tunnel.

Wire access hole from left footwell to the area under the rear seat base.

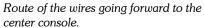


Take off the rear portion of the center console between the front seats (see chapter on electric sunshade). Pull back the carpet over the transmission tunnel, and unscrew the thick wire channel cover that lies along the top.

Wire cover along transmission tunnel.



Slide the section of the wiring harness leading to the seat-heating switches underneath the carpet, alongside the other wires, forward to the center console.



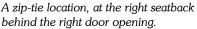


If installing the electric rear sunshade, also insert the wire leading to its switch along the same path. (Now is also a good time to put in the rear console power outlet wiring, which goes along the same route.) Then reinstall the console and the thick wire channel cover. Connect the wires to the electric headrest switch in its tray on the top of the console, and to the seat-heating switches and power-outlet socket on the back side of the console pop-out panel. Re-mount the console and panel.

Three harnesses installed along transmission tunnel: seat-heating switches (left), rear power outlet (four wires at center), and electric shade (right).



Zip tie everything once all the alignment and spacing is checked.





Step 3. – Install switches

Look for the rectangular access holes in the stiff black shell on the bottom of the seat base, near the front corners.



Look down into the holes and you will be able to see a corresponding hole in the same black shell along the side of the seat. Use a probe to indicate where the latter hole is, roughly, then cut out a matching hole in both the leather and the foam underneath it.

Cut a small hole to start, then expand it. Check the angles being cut through the thick foam, since there's some distance between the leather and the hole in the shell that the trim will clip on to.



Install the switch trim piece, latching its hook ridges over the stiff black seat material – hook one side over, then gently but firmly push the trim sideways until the other side can be inserted. Don't break the trim. It's a tight fit, which is good so that the trim doesn't pop out later on.



Run the switch connector on the seat base harness out to the access holes, attaching the harness by pressing the wire- and connector-holding clips into the matching pre-cut holes on the underside of the seat base.



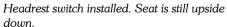
Clip that holds zip-tie, which in turn secures harness.



Finally, connect the connector to the rear headrest switch and install the switch into the trim piece. I found it easiest to install the switch first, then maneuver the connector into position through the access hole and lever it on.



The solid white arrow on the switch points up when the seat is in the car. ³⁶





Step 4. – Install motors and brackets

Bolt the motors to the headrest brackets, and attach the brackets to the bulkhead. Note the brackets are different, left and right.

Headrest motors; at right, installed on bracket.

³⁶ That is, according to brochure photographs, consistency with the window switches, and my installation. However, a German owner's manual shows one with the solid white arrow pointing down – was switch rocker itself upside-down?



Be very careful, don't overtighten the sheet metal screws when installing the brackets to the bulkhead, the bolt holes strip very easily! If a bolt hole does strip, it should be possible to rescue the situation by using a speed nut – as is already done for the lowest of the three holes – after cutting an insertion hole for it.



Once the bolts are in, clip on the motor wires using a clip on the side of the bracket.



Motor connector-securing clip.

Step 5. - Replace seatbelt latches

The new latches have a wire connector on the bottom. Note that some E32 latches are very similar, and will just fit, but not too well, and will push forward on the seat base more.

New latch is on the right. Note the black wire connector on the right one.



Torque is 48 N-m / 35 lb-ft.

Order of latch-attaching parts. Note the dimple on the spacer plate that goes in the hole on the flange attached to the latch.



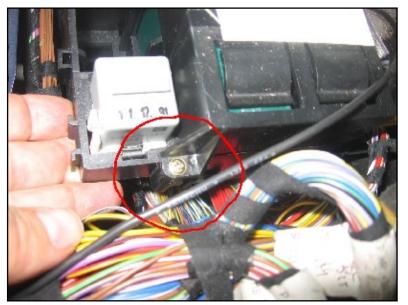
Step 6. - Affix relay holder

Slide the relay holder onto a rear fusebox station. If it's not already used, there is a convenient one on the right side of the box, toward the front.

Step 7. – Install control module connector

Unscrew nut holding the rear fuse box in, on the rear side of the box, and unlatch the two latches at the top front.

Looking down on rear relay / rear fuse box, front of car is to the right. Nut is in center of picture.



Unscrew the three screws holding on the top, lifting out the box slightly to access the left screw.

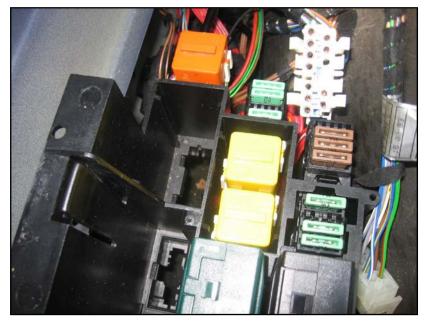
Front left screw.



Front right screw.

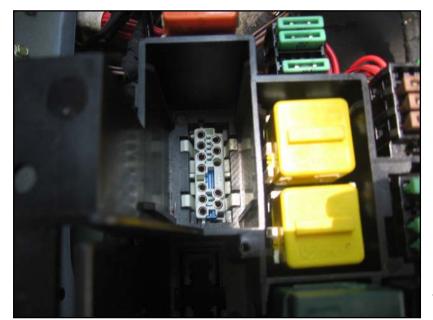


Rear screw.

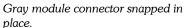


The control module goes under the front right slot, as the module is facing in the car.

Front of the car is to the left in the picture, so correct slot is below the orange relay. (FYI, on some E32s, at least, the next slot down in the picture is for the Park Distance Control module, and the next one after that, just out of the picture, is for the early infrared remote locking module.)



Snap in the wire connector underneath the box, pointing up.

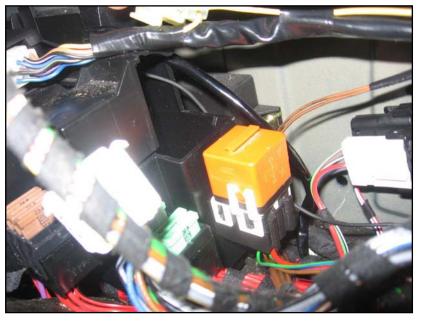




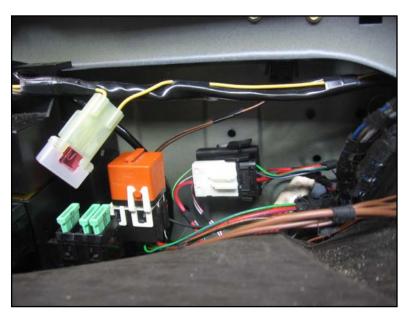
Step 8. - Make connections

Connect the wiring connectors on the harness to the:

- headrest motors,
- seatbelt latches,



• relay,

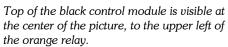


• vehicle harness,

Note that a black connector is plugged into a white connector here, presumably since the supplementary harness was not technically for this particular specification of car. Normally the factory uses matching colors for each connection.



• control module,





and connect the ground wire to a suitable ground terminal stud;

Ground terminals in the rear seatwell, on the left side of the transmission tunnel. Others are available.



• finally, connect the main harness to the seat base harness.

Hookup battery power and test operation. The system should work as follows: When you turn the ignition on, the headrests should rise if their respective seatbelts are fastened. If not, they should stay (or move) down. Using the switch on the front corner of the seat should override the automatic positioning and allow the headrest to be put in any desired position. Normally the headrests will go down when you turn off the ignition.

Connector on the harness attached to the underside of the seat base.



Step 9. – Reinstall seatback, headrests, seat base

Attach trims for seatbelt latches, reinstall seatback, push on seatbelt trims on top of seatback, insert headrests (don't push down too hard), and reinstall seat base (don't forget to put the center lap belt latch on top first).



Then ... you're done! Congratulations, that was a big job.

Motorized headrests – adjusted with the manual switch to maximum height on car's left, and to minimum on car's right.

19. Rear Reading Lights

Another simple and rewarding retrofit

Most of the U.S. E34s came with a basic rear interior light on the c-pillars that could not be switched on independently of the other interior lights. This creates a real problem when rear seat passengers try to read at night, because the whole interior has to be lit up. This is distracting for the driver, particularly because of the front interior light by the rearview mirror, and upsets night vision.

The factory, however, made another rear interior light unit that has a separately-switched true reading light. No doubt the accounting or marketing department made the case, but one would have thought that the cost of carrying separate parts would outweigh the small savings of

omitting a second light and a couple of contacts (the wiring for both bulb circuits in the dual unit appears to be in all of the U.S. cars, whether or not they have the dual light unit installed), and would outweigh the benefit of creating model separation from the E32, which had the dual lights, given what a relatively minor matter it is.

Anyway, this lacuna is easily remedied with purchase of the appropriate dual-light units. The one trick is that there were at least three different wiring connectors on the assemblies: a single white connector up to 7/89 (perhaps European models only), two white connectors up to 9/91, and a single rectangular black connector after 9/91.



Early, mid, and late dual rear interior light units showing the different wiring connectors.

Note that there's a retrofit EBA for the front separately-switched reading light panel, too, but U.S. cars always had it already.

Parts

Name	Details	Number	Part no.	Price
Interior rear lights with reading lamp	this part number fits the last of the three different connectors	1 ea.	63 31 8 355 037 and -038 (light silver gray)	\$44
	used cost		(3 3 - 7)	\$5
Total (used) cost:				\$10

Einbauanleitung

Reading lamp, 12/89, 01 29 9 783 023 (rear lights)



Reading light is the circular one.

Installation

The installation is plug-and-play. Pull off the weatherstrip around the door opening near the c-pillar trim panels. The weatherstrip is on tightly, but there's no glue.



Take off the c-pillar panels by pulling straight out at the corners, in order to slide the tabs on the panel out of clamping clips in the pillar.

The left c-pillar panel and the back of the rear reading light. At the top center of the photo can be discerned one of the flat black tabs that are gripped, by metal clips in the c-pillar itself, to hold the panel on.

Disconnect the old light's wire connector and remove it from the panel. Install and connect the new light. Reinstall the c-pillar panels.

Enjoy happy passengers and glare-free driving.

20. Rear Window Sunshade

Not too necessary, but cool . . .

This came in two versions, manual and electric. For the electric one, a potential problem with stripping gears has been noted on the internet. At the end of this chapter is a special supplement showing how to fix the problem. The installation description here covers the electric version. The manual installation is similar, but obviously a lot simpler, and is covered in its own EBA.

The electric shade switch goes on the little tray at the rear of the center console, between the front seatbacks, slightly reducing the size of the tray.

Project Profile

Coolness: 6 6 6

Difficulty: PPP

Utility:

Parts

Name	Details	Number	Part no.	Price
Electric sun blind supplementary set	includes supplementary wire harness	1	51 46 9 060 596	\$562.50
Wiring, sun blind	on the basis of the ETK picture, this number is for the adapter harness – only used if car is not pre-wired	1	61 12 9 402 134	
Parcel shelf	with third brake light	1	51 46 8 137 884 (light silver gray)	\$159
Switch covering	goes on top rear of center console	1	51 16 8 138 420	\$51.09
Circlip	for switch covering	2	72 16 1 858 017	< \$1
Total cost (new):				\$774
Total cost (used):				\$280

Einbauanleitung

Electric Roller Sun Blind for Rear Window, 4/93, 01 29 9 783 611 Installation Instructions for Roller Sun Blind, 11/92, 01 29 9 786 640 (manual)

Electric Shade Installation



Note that a small second, adapter wire loom may be needed if the car does not have the appropriate vehicle wiring already installed. If the wiring is already installed, part of it will be underneath the rear seat base, on the front wall of the seatwell, to the right front of the rear fuse box. Look for a black sixpin connector, **X269**, probably behind a white four-pin connector (the latter is for rear seat heating/headrests).

Black connector where vehicle wiring for the sunshade terminates, on front wall of rear seatwell. (Supplementary harness has already been connected; white connector for rear seat headrests and heating has been unclipped.)

Even if the underlying vehicle wiring is not present, the EBA gives instructions on how to modify the existing wiring so the supplementary harnesses can be attached. That modification is easiest if the full accessory kit

from the factory is available, since it has the second supplementary harness with the appropriate connectors and jumper wires included.

Overview

The steps are as follows:

- 1. Take seat base and seatback off
- 2. Take off rear center console
- 3. Move door seal and take c-pillar trims off
- 4. Take parcel shelf off, and transfer speaker covers and center seatbelt holder
- 5. Lay shade wiring
- 6. Cut holes for shade switch; install cover, console, and switch
- 7. Snap metal brackets into parcel shelf
- 8. Plug in control module connectors, and mount module
- 9. Slide shade into shelf, and attach wiring
- 10. Install shelf
- 11. Connect shade wiring, attach ground, and add fuse
- 12. Test shade and measure its location per EBA



Step 1. – Take seat base and seatback off

See chapter on rear headrests. Disconnect battery.

Step 2. – Take off rear center console

Pull out the power outlet plate firmly from the bottom.



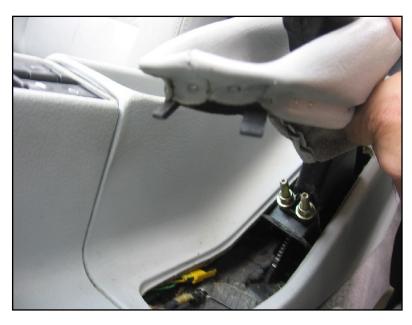
Note large tabs at the bottom of the plate. These need to be popped over a lip to release the plate.



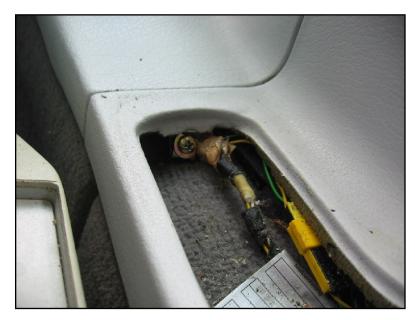
Screws behind rear power outlet plate. Regular screwdriver won't reach them well.



Push rear of handbrake gaiter assembly forward gently, and up, to release this catch.



These two tabs hold the gaiter on at the front.



 ${\it Rear console screw underneath the gaiter}.$



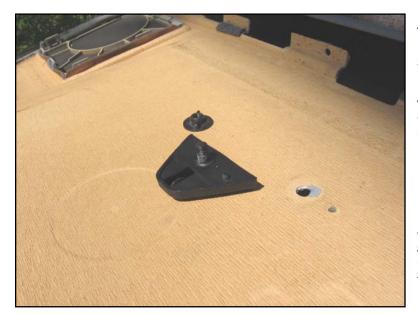
Rear console screw cap in storage bin. Could also use a pick to pull it off.



Screw that is underneath the cap.



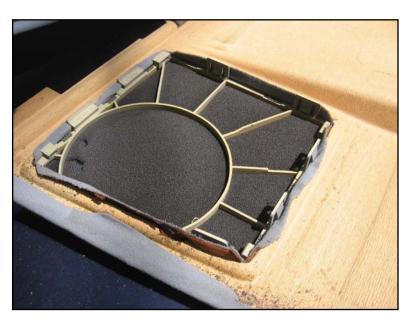
Rear console released. Slide out large securing tabs, for example the hard-to-see one on the console's lower right edge.



Step 3. – Move door seal out of the way, and take c-pillar trims offSee chapter on rear reading lights.

Step 4. – Take parcel shelf off, and transfer speaker covers and center seatbelt holder

Seatbelt holder is held on by a hard-tograsp plastic wingnut. It is shown here removed and lying on the underside of the shelf.



Speaker cover in place. After this much "sunbathing" over the years, the foam crumbles to the touch.



Lugs that hold speaker covers in place.

Step 5. - Lay shade wiring

Note that the wiring from the vehicle wiring connection comes out through a small low hole on the right side of the front wall of the left rear seatwell, rather than through the plastic wire channels all the way at the left side of the car. The wiring then runs forward atop the transmission tunnel and also along the right seatwell.

Step 6. - Cut holes for shade switch; install cover, console, and switch



Drill holes for the studs of the add-on switch plate, which serves as the new storage tray.



This is the underneath of the rear console. The tan rectangular area within the black plastic (to the lower right of the oval air vent in the picture) is where the cut-out hole for the sunshade switch goes, so it's easiest to cut through from this side. As with many items, BMW designed the console prepared for accessory installation.



The switch cut-out viewed from the top. The pre-cut hole in the underlying plastic doesn't actually go as far towards the rear as the cut dimensions in the EBA show. You don't want, or need, to cut as far as the EBA says, so just cut to the edge of the plastic hole. The partial cut line that is not too visible in the picture was cut from the top before I realized the plastic hole was pre-cut underneath.



Install the trim plate using the spring clip washers. Reinstall the console, bringing the switch wire up through the switch hole. Connect the wiring to the switch, and then install the switch.

The switch and switch plate test-installed in the old bay.



Step 7. – Snap metal brackets into parcel shelf

These were extremely tight, I ended up knocking them in with a hammer. When installed in the car, the bracket will go with the two prongs up and the one prong down, so make sure you put them in correctly – getting them out would be even harder than getting them in.



On the old parcel shelf, the center clips were different than the outer clips; on the new parcel shelf, all four of the clips were the same.

New shelf for sunblind is to upper left, showing two of the brackets (one just below the black motor, the other at the top center of the picture). Note slightly different shape (and length) of center brackets on old shelf at lower right.

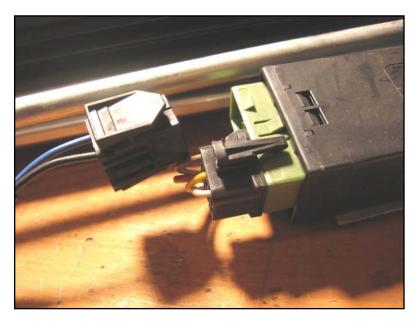


With the parcel shelf off, if appropriate take the opportunity to cut away the perforated hole for a child-seat-tether bracket, whose bolt goes in the threaded bolt hole.



The two center clips attach to flanges on the third-brake-light housing.

Flange on third-brake-light housing that secures one of the center shelf brackets.



Step 8. – Plug in control module connectors, and mount module



Step 9. – Slide shade into shelf and attach wiring

Do not overtighten the nuts on the fixed shade bolts! Two of my bolts loosened in their shelf mountings, even with only moderate tightening, rendering them useless.

Sliding in the shade.



The gold-colored brace towards the center of the picture is one of three that position the rear of the parcel shelf relative to the shade mechanism.

A rare note here: the EBA didn't match up with the parts I had. The EBA calls for the shade to be located 300mm from the front edge of the shelf. This was not possible with my shade given the length of the bolt slots on the shade. The closest I could get at first was about 305mm.

Nor did the slots allow use of the method mentioned in the EBA to change the angle of the shade. There seemed to have been an intention to use the front-to-back location of the shade to raise/lower the back of the shade, by means of an angled portion of the shade metal (you probably have to look at it to see how that geometry works). Thus raising/lowering the back of the shade would in theory obtain the correct shade angle and shade contact point on the rear window when the shade was extended. But it's not clear how the nuts were supposed to be tightened onto the resulting non-flat shade surface.

I drilled out longer slots to get the shade closer to the specified 300mm, but in that position the shade was too far forward in the car, and the retracting arms caught the shade material against the front of the shade slot, stalling the motor. Locating the shade further back pretty much solved that problem, but my shade did not contact the window when the top of the shade is 10–15cm from the side as specified. Note that there appears to be a mistranslation in the EBA; the English version implies 10–15 cm from the top edge of the window, but from the top side of the window makes more sense. Since I couldn't adjust the angle, my shade rested just off the window when opened, rather than touching it. But it didn't bang about when driving.



Shade bolted down along its front side.



Shade in place.



Shade harness zip tied at three points. Per EBA, tape goes to the left.



Step 10. - Install shelf

Pay attention to your hand cleanliness while installing the shelf, the area underneath the shelf can be quite dusty and dirty, and you can sully the shelf top if using your hand to push in the shelf along the top.

Step 11. – Connect the shade wiring, attach ground, and add fuse

Note that the white 4-pin connector on the supplementary harness (the harness that goes between the wiring on the shade and the vehicle wiring harness) connects to the similar white connector on the wiring of the shade itself, not to the white 4-pin connector (for the rear headrests / seat heating)

that happens to lie atop the black 6-pin connector (for the shade) near the rear fuse box.

Step 12. - Test shade and measure its location per EBA



Connect the battery (run the engine if you move the shade more than a couple times so as to not run down the battery) and give it a whirl. See where and whether the shade contacts the glass, per the EBA (see above regarding the 10–15 cm specification). Note the rubber wheels on the end of the shade that let the shade roll along the window (make sure you have them!).

Shade installed; in lowered position.



Shade in raised position.

Reinstall c-pillar trims, door seal seatback, and seat base.

An awesome add-on, very satisfying!

Bonus: Electric Shade Repair

Unfortunately, the design or material of the gear train was faulty, and the sunshades can all too often strip a gearwheel. But fortunately, repair is possible; it is easy with an aftermarket part; and is only a little harder with refurbishment of the original part. The problem is common enough that copies of the troubled gear were sold on eBay.de, made out of steel rather than the original aluminum, and also a write-up is available on the web showing how to alter the original gear to make it work (using undamaged sections of the gearwheel's circumference that are not initially in use).



Repair is as follows.

Gently lever the toothed washers off the pins connecting the crank arms and the shade arm pivots.



Unscrew the bolt holding the crank arm wheel (2.5mm allen) and remove the wheel and crank arms.



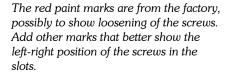
Disconnect the motor wire connector from the control unit.



Remove the wire tie.



For reinstallation purposes, mark the edges of the three phillips screws holding the motor to the shade frame; unscrew the screws; and remove the motor. (You actually can leave the motor in place on the shade frame if you like, but it makes things marginally more accessible to take it off.)





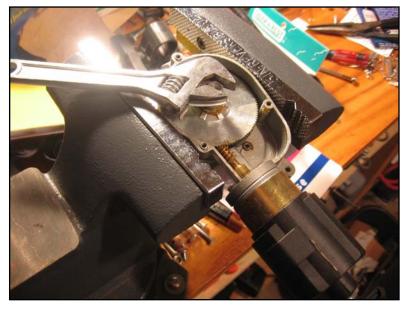
Remove the spring stop bolt (3mm allen) on the end of the circular gearbox (the spring shouldn't uncoil yet, it and the gearwheel are prevented from turning by the rest of the gears in the geartrain).



The gearspring in the gearbox is under tension and is fairly strong, so wear eye protection, and in the next step hold down the main wheel and the spring underneath it so that they don't fly up: remove the three bolts (2.5mm allen) while holding on the cover of the gearbox, and gently lever off the cover while holding the main gear in place.

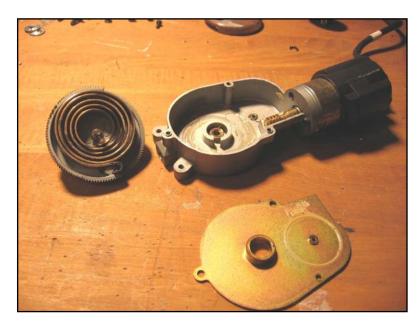


Inside the gearbox. Normally keep a hand on the large gear in case it wants to fly out. Note the spring, visible through the round hole in the large gear (shiny steel-colored). You may want to mark the rotational positions of the gears, it could be useful for reassembly, though I did not need it. Also note the axle pin in the smaller brown gear – it is nicely lubricated and can fall out.



Put the gearbox in a vise, put a ring wrench or adjustable wrench on the hex shaft of the main gearwheel and put a little pressure on the shaft clockwise to release the gear pressure on the smaller brown intermediate gear, and lever/wiggle up the intermediate gear, gently. It resisted coming out in my case, but may try to pop out in an uncontrolled way. Then let the wrench and spring unwind slowly anticlockwise.

It's probably hard to do, but don't crush the gearbox in the vise, there's very little clearance between the gear and the casing.



Large and small gearwheels removed.



If using a new gear, transfer the axle pin to the new one.

Gear axle pin being transferred out of old gear (shown) to new one.

Transfer the spring, making sure to preserve the spring's correct orientation. It can easily be installed upside-down. (Ask me how I know.) If so, you'll probably know it when the assembled shade is operated and extends slowly and only part way, because the motor is fighting the spring, and then retracts double-speed, because the motor is getting an abnormal boost from the spring. Through my own experience, I believe the otherwise superb instructions and helpful drawing at the evansweb.info website are actually incorrect when it comes to the orientation of the spring. It is easy to get the orientation wrong because for some reason the gear design has a neat notch for the spring on *both* sides of the spring stop.

Think through everything as you're doing it, to see how things move and interact. The descriptions here can be hard to follow without seeing the parts in front of you. It should be clearer once you do have them.



The correct orientation of the spring in my case is shown in the picture: the spring should *compress* when the wheel rotates *clockwise* when looking down on the wheel in its gearbox.

Original wheel on the right, aftermarket substitute on left.

It's helpful for a later step to mark on the top (hex-bolt-side) of the gearwheel where the cut-out portion of the teeth are.

If refashioning the old gear rather than using a replacement one, do so according to the instructions at evansweb.info.

Reinstall everything.

Getting the new gear and spring in place in the gearbox is a little difficult because of the spring's positioning. Try moving/squeezing the spring through the hole in the gear when the wheel is in the gearbox and ready to slide into final position.

Once the wheel is in place, use a wrench on the hex axle again to rotate it clockwise until the cut-away portion of the teeth clears the stop-screw location, hold it there and screw in the stop screw. For your reference, note that this end stop position is actually close to the extended position of the shade and gearwheel. The wheel will rotate further clockwise up to, or close to, the other end stop in order to be in the retracted position.

Reinstall the smaller brown gear, lining up the various teeth and the rack and pinion, then put on the gearbox cover. Be careful with the three small allen-head bolts, one of mine was stripped.

Getting the smaller gear axle pin to line up with its socket in the gearbox cover when putting on the cover can also be a little tricky – it can help to move the main gear around a bit at the same time, or nudge the pin into place with a thin screwdriver while pushing down on the cover.

Reinstall the motor on the shade frame.



Re-zip-tie the motor wires. Note white marking, where zip-tie goes.

Because of the relative positions of the various end stops, crank arms, and crank arm wheel, I found it a little difficult to mount up the crank arms on their pivot pins. The following is one unobvious way to do it: before putting the crank arm wheel on the hex axle, put the crank arms on the pivot pins – the crank wheel should be above/near, but not on, the hex axle end; then manually pull the shade roughly half way up; apply battery power to the motor leads, rotating the still-free hex axle (still not mated into the crank wheel) clockwise; then place the crank wheel on the hex axle end and slowly rotate the hex axle end either direction until the hex socket on the crank wheel and the hex axle line up and the crank wheel falls into place. Be careful not to short your battery/ground leads while applying power to the motor wires. Screw in the countersunk allen head bolt.

I used a little Würth Sebasto 2000[®] lube in the channels at the top of the shade where the sliding arms go. Don't get it on the shade material itself, or put so much that it later drips onto the material. The shade should now extend quietly, smoothly, and moderately quickly up and down.

Presto, all done!

21. CD Player and Cover

Plug-and-play, with a few version complications

Many U.S. models are pre-wired for the CD player – if so there should be a black token indicating such, attached to the carpeting on the right side of the trunk.

Project Profile Coolness: Utility: Difficulty: Cost: Cost:

Parts

Name	Details	Number	Part no.	Price
CD changer	Pioneer CDX-M91ZBM or CDX-M83ZBM Alpine TR-1600 or TR-1008 used price	1	82 11 1 467 700 82 11 1 468 014	\$811 \$557 ~\$100
Mounting parts set		1	65 12 9 059 415	\$26
Cover, CD changer – Pioneer	a nice fabric case that matches the trunk trim fabric; used price; probably no longer available new	1	82 11 1 468 239	\$85
Cover kit – Pioneer		1	82 11 1 468 761	
Cover, CD changer – Alpine		1	82 11 1 466 580	
CD magazine, 6-CD – Pioneer	holds 6 CDs		65 12 8 355 885	\$10
Total (used) cost:				\$120

Einbauanleitung

None

Installation

The headunit-to-CD-player cable comes through the right side of the bulkhead at the front of the trunk, and lies behind the trunk trim. The CD player usually mounts to the left ceiling of the trunk (or potentially on the left side wall of the trunk, particularly for the M5). In my case the changer was attached in a curiously complicated arrangement using no less than three mounting plates.

The CD connectors changed over time, so not all changers are compatible with all head units or vehicle models. According to a reliable source, after early '91 both trunk CD players – either from Alpine or from Pioneer – are compatible with either head unit (Pioneer KE-83ZBM or Alpine CM5908). Before that, however, the player and head unit must match manufacturers. The Pioneer CD player is distinguished by a magazine door that folds down, whereas the Alpine unit's door slides to the side. The manufacturer and version of the head unit is discoverable on the unit display by pressing the "-" (the Mode minus key) and "PROG" buttons simultaneously.

Note that a variety of different official factory radios from this era, including some later 1990s ones, can be swapped in. The connector is usually the same. Some models only issued to Europe will also work. I switched in a model that has the handy RDS feature (text display of station / song name, etc.). That installation was plug-and-play.

Once the CD player is bolted in place as shown below, connect the wire connectors, load some CD's in the magazine (upside-down for some magazines), and the player should be ready-to-go.



The Pioneer CDX-M90 changer attached to the left ceiling of the trunk. Note the three mounting plates: the greenish one on the changer, a black one in the middle secured in part by the prominent bolt in the picture, and a top black one along the trunk ceiling.



Wide tab at center rear of the top plate fits into a slot on the uppermost plate that is shown in a picture below.



Three plates again; topmost one bolts to the ceiling of the trunk.



Plate held on by three brass-colored bolts in pre-threaded holes. Wire-holding clips go in the tab sticking down at the back.



Door flips down, so this is a Pioneer. Six-disc magazine is visible inside the changer.

The Optional Cover

Nifty fabric covers were available for the units, significantly improving the look and neatness of the trunk. Different ones are needed for Pioneer and Alpine since the changers themselves are different shapes. The covers are no longer available as separate order pieces. They are moderately, but not exceptionally, rare in the used marketplace now.



Cover installed on CD changer.



Cover opens by pulling on the hookand-loop strap.



The rear of the cover is held on by the elastic strap visible in the picture. It simply goes over the top of the changer/plate and attaches with a hookand-loop patch. Note the CD magazine sitting in the tray at the bottom of the cover. Two magazines will fit in the tray. Perhaps the long hole visible in the bottom of the cover is meant for sticking in a finger to fishing out a magazine from the back of the tray when the cover is installed.

22. Trunk Storage Bins, Tray, Straps, Net, and Mat

Organizers and holders

A variety of storing, securing, and protecting accessories are available for the trunk area.

Project Profile Coolness: Utility: Time: Cost: Cost:

Parts

Name	Details	Number	Part no.	Price
Trunk storage	bins	1–2	82 11 9 413 199	\$49
Support tape	rubber straps to hold down items in the trunk; fit into the socket holes in trunk carpeting	2	51 47 8 136 450	\$4
Trunk room net	attaches to the pop-up rings on the trunk floor	1	51 47 2 263 168	\$46
Trunk floor net	judging by the picture in the parts catalog, this one fits into some kind of slots – but the parts catalog is sometimes inexact, using pictures from a different model	1	51 47 2 237 812	\$115
Trunk rubber mat	has a lip to contain water and mud	1	82 11 9 413 394	\$88
	WeatherTech custom aftermarket version	1	40032	\$110
Trunk nonskid mat	no lip	1	82 12 9 413 180	\$33
Wheel well tray	goes inside the spare wheel	1	71 11 1 092 276	\$13
Total cost:				\$226

Einbauanleitung

Stowage box, 1/89, 01 29 9 782 127

Bins

The trunk storage bins are containers with 3–4"-tall sides similar to the permanent one at the right rear of the trunk. They fit over included rails that secure to the side carpet, and can be taken on and off as needed. The EBA shows a couple of locations for them, including at the left rear of the trunk and up against the front panel.



Trunk bin in one of two suggested mounting locations.

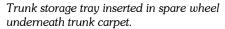


The bin is shown here dismounted from its attaching rail. The flap on the bin slips behind the rail – look closely for the rectangular cutout on the bin that goes over the screws on the rail. Bin may be thus removed completely if extra space in the trunk is needed.



Tray

BMW supplies a nifty tray that fits in the spare wheel well, making use of otherwise wasted space. The wheel is turned outside-face down, but it shouldn't get scratched because it rests on the tire not the rim.





Close up of the spare wheel holder held in place with a wing nut, viewed through the center of the storage tray. At top right is the wheel center-cap remover, which doubles as a trunk-floor support when it is put on the spare tire bolt.



Straps

Trunk tie-down straps – "support tape."



Net





Close up of trunk net stanchion and hook.



Mats

This trunk mat is useful for muddy and really wet stuff, since it has a high lip. The mat is custom molded to the E34 trunk. This particular one is not a factory product, the factory one is no longer available, but it is so close to the original that it may have been the OEM-supplied item.

WeatherTech® rubber mat.

23. Rear Fog Lights

Ought to be on the car

These are required in some parts of Europe where fog is extremely thick more often than in the United States. They are very useful even in the United States, particular in highway rain, when cars and trucks kick up a lot of spray. Too bad that, unlike for many options, the wiring is not already present. The U.S. light control module (LKM) does not seem to have the required internal circuitry, either, so the installation here sets up a separate circuit, in part.

Project Profile

Coolness: 🜢 🕏

Utility: ---Difficulty: Difficulty: Difficulty: Difficulty

Time: UUUU

Cost: 5 5

Parts

Name	Details	Number	Part no.	Price
Switch	for rear (and front) fog lights	1	61 31 8 351 238	\$26
Rear lights in trunk lid	European light clusters with holes for fog lights (used)	1 ea.	63 21 1 384 011 and -012	\$20
Bulb socket	same as backup and brake bulb sockets	2	63 21 8 355 883	\$5
Bulb	same as backup, brake, blinker bulbs; 21W	2	63 21 7 160 790	\$3
Instrument cluster bulb	1.2W	1	62 13 1 383 311	\$1
Fuse	with inline holder; 5 amp., 2 amp. optional			\$5
Wire	18 ga., 24 ga.			\$15
Wire connectors	white 1-pin connector, for male pin (female shell), (used price) white 1-pin connector, for female pin (black, blue connectors also available)	2 2	61 13 1 378 466 61 13 1 378 461	\$1 \$1
Wire contacts	(depending on wire sizes used): wire contact, round, female, 0.5–1.0 mm wire contact, round, male, 0.5–1.5 mm wire contact, round, female, 1.0–2.5 mm wire contact, small square, female relay contacts ring terminal 0.35–1 mm ring terminal 2.5–6 mm	2 2 3 1 4 1	61 13 1 376 202 61 13 1 376 191 61 13 1 376 204 61 13 1 370 691 61 13 8 353 763 61 13 1 388 431	~\$10
Relay	e.g., diode relay	1	61 36 1 391 397	\$15
Total cost (new and used):				\$130

Einbauanleitung

None

Preparations

The U.S. assemblies have the right shape for the fog lights, but, unusually, are not pre-cut for the lights, nor pre-wired.



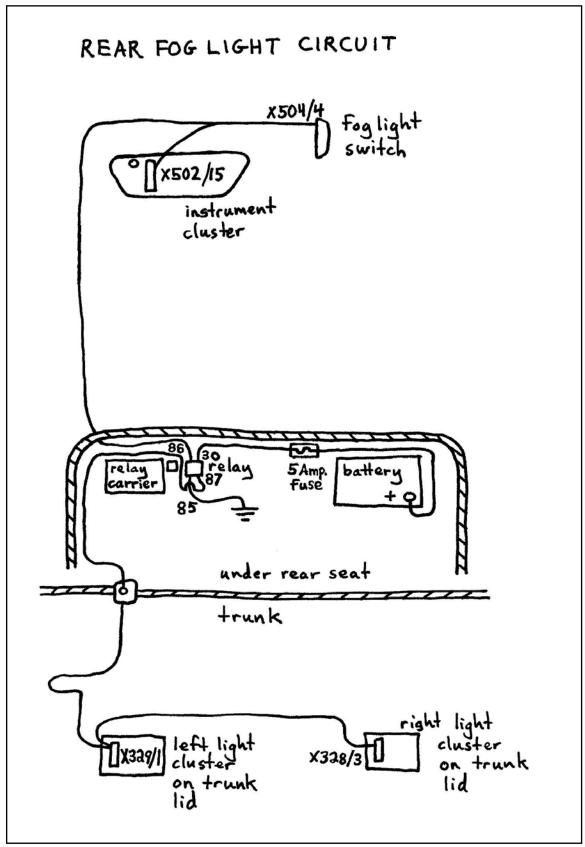
European version for fog lights at top. On the U.S. version, note the fog-light area, which has the raised surface for the bulb holder, but no pre-cut hole (or even cut lines).

At first I was planning to alter my existing inner taillight assemblies to accept the fog lights, but it looked quite challenging to cut the required shape neatly in the tough plastic, so I decided to just obtain used assemblies from Europe. I highly recommend doing so, since they're cheap, and the installation will be "stock." But if you want, you can try altering U.S. ones – cut holes in the appropriate locations on the back of the lenses for the fog bulb holders, similar to the other existing holes, and from a junkyard get some of the rigid wires with their contacts that slide onto the back of the lens assemblies; cut and splice the wires to mimic the Euro wiring, including the common ground. If your European light assembly didn't come with them, or you're making your own, also pick up some bulb holders – same as the reverse light or brake light ones.

Since this is not the factory installation, there is no official relay specified, but various ones from the factory should work. The simplest relay circuit is all that is needed. You can often check the relay circuit by looking on the side of the relay, where a circuit diagram is sometimes embossed or printed. It has been suggested to use a relay with a diode to prevent backward current flow and arcing, so you could look for a relay with a circuit diagram showing a diode triangle on the appropriate wire.

Installation

The next diagram shows the circuit to be installed, using some existing wire connectors, but also running some new wires.



A non-factory rear fog-light circuit.

Disconnect the battery, take out the rear seat base and seatback. If not done already for some other job, open up the plastic wire channels that run along the front and rear door sills on the left side of the car (see chapter on memory seats or rear power outlet). Remove the pedal cover, lower dash-trim left panel around the steering column, and dead pedal to access the under-dash wiring (see chapter on driver's glove box).



Wood trim removal: gently pry out the left side with a screwdriver inserted behind. Right side brace slides out when trim is pulled out to the left and forward.

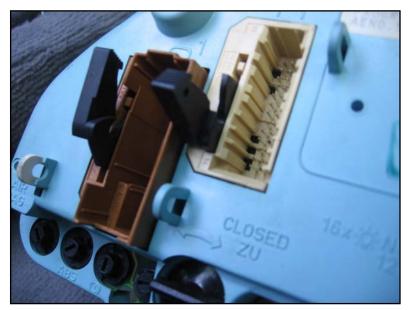


Take off the upper steering column cover – one screw-clip on the top, locking pins connecting to the bottom half, and one screw-clip on underneath. This helps for removing the cluster completely. The upper and lower halves are quite tightly connected together: pull firmly but carefully so as to not break the locking pins.

Looking down at the top of the steering column. Instrument cluster is to the left.



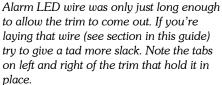
Screw-clip on the lower steering column cover.



When the battery has been disconnected for half an hour, remove the instrument cluster. (If you don't wait for the half hour you might set your airbag warning light on, which most nonfactory reset tools will not reset. You do not need to remove the steering wheel, but cover it and the column with a towel to avoid scratches.) Unscrew two screws underneath the top lip upwards. Reach behind the cluster and gently wiggle down the locking levers on the four wire connectors. That should ease the connectors partly off the pins. Locking levers on two connectors. In the picture, the left lever is pushed down in the position it would normally only be in when the connector was in place.



Gently lever out the fog-light-switch trim, remove the old switch by pushing it out the front of the trim, and disconnect the connector.





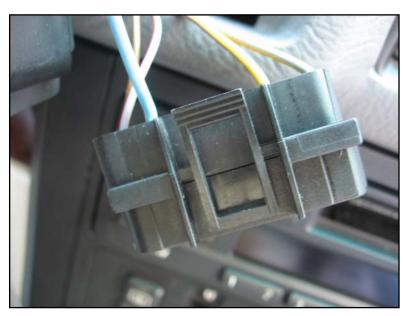
Front-only fog-light switch on the left, frontand-rear switch on the right with the extra pin (number 4).



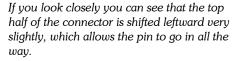
Feed a wire (I used 1 mm²) up the left side of the footwell, and up behind where the instrument cluster normally sits, toward the switch location. Bring the wire out through the switch hole. Leave slack for now, until the next few steps are done.

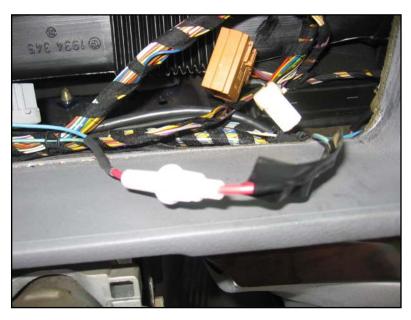
Crimp a female contact on the end of the wire near the switch, and insert the wire into connector slot 4.

New pin going into fog-light switch connector. Pin numbers are marked on the connector (not visible here).



Again potentially saving you some puzzlement, for this connector, you need to slide half of the connector – this time look for top/bottom sections rather than inner/outer sections – to the side for the new contact to go in.





Slide the connector half back over, plug in the connector, and reinstall the switch and trim in the dash.

The instructions on BMWE34.net put a 2 amp. fuse in this wire, downstream of the switch. I'm not sure why, since the circuit is fused already on the other, positive side of the switch. Perhaps it's to protect against reverse current flow through a broken relay, but it is not factory practice, and there's a 5 amp. fuse between the battery and the relay. Use of a diode relay can also help prevent reverse currents. I did not put in this fuse, but the picture shows what the in-line fuse holder set up might look like.



Now prepare the wire going to the "rear fog light on" information light on the instrument cluster. This short wire will go from the back of the instrument cluster to the main wire that leads rearwards to the rear fuse box (see earlier diagram of circuit).

Double-check which small pin on the back of the instrument cluster leads to the rear fog-light warning light. As you're looking at the back of the cluster, the appropriate connector socket is the one furthest to the right – 26-pin, white, matching the outside of the plug.



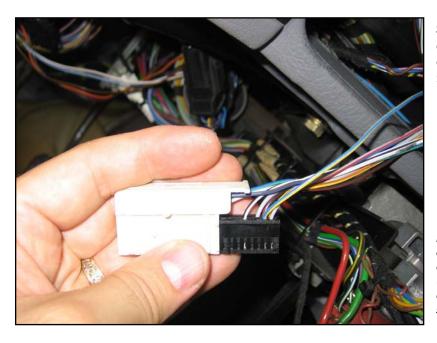
Use an ohmmeter to check for continuity with the right side (when looking at the cluster from the back) of the empty bulb socket for the rear fog warning light. Mine was pin **X502/15**, which was the second pin from the bottom on the left side of the connector socket, looking at the back of the cluster.

The rear fog-light bulb socket is the fourth from the right along the bottom row. There are pictograms or words labeling each bulb socket.

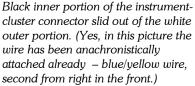


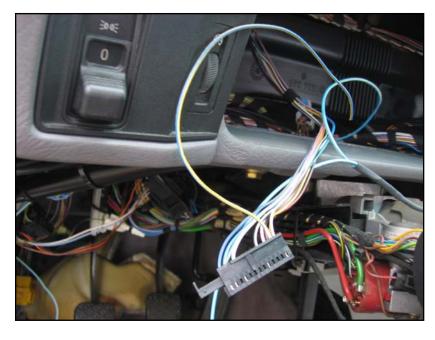
Nip off the zip-tie on the connector.

The zip-tie is the black band around the tab at the right end of the connector.



Slide out the inner portion of the connector. You might need to ease open the sides of the outer portion in order to free the inner portion.





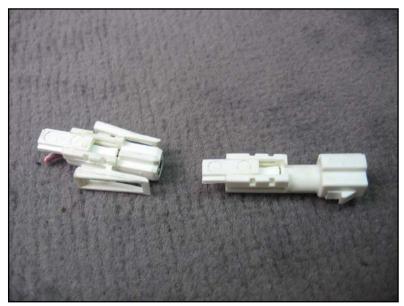
Look closely at both narrow ends of the black inner connector, and you'll see the ends of a contact locking bar. Push it out from the obvious end (don't pull it out by its tab, the tab may just break off).

Instrument cluster connector with contact locking bar pulled out.

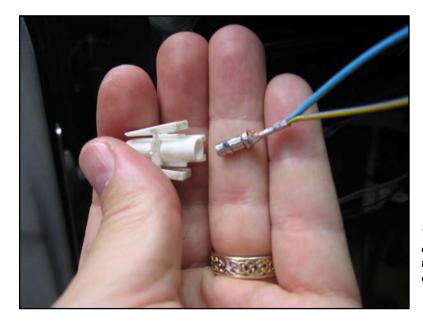
I could not find what the part number is for a new small square contact to fit in this connector. The contacts are not one of the common two types: the common ones don't have a cutout in the side of the contacts where the locking bar on this connector needs to slide. The easiest thing to do is just to get the same or a similar connector with contacts and attached wires from a junkyard donor car. When you do, cut the wires well away from the connector so you have long strands to work with. Open up the donor connector, slide out the locking bar, push in an individual contact's locking tab (gently, they're delicate), and ease the contact and its wire out.

Insert the contact in the appropriate slot of the connector in the car, making sure the tab locks it into place. You might get some resistance, in which case try gently angling the contact to different sides until it slips past the obstruction. Slide in the locking bar.

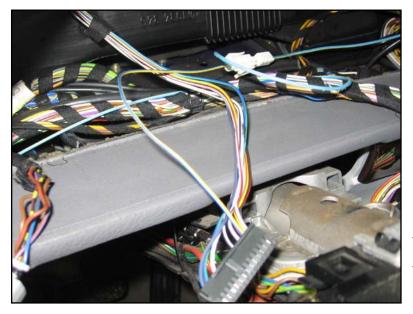
Crimp the contact's wire and the main wire going back to the rear relay holder to a butt joiner or a single-pin connector, and join them to the wire coming from the fog-light switch. (Or, if you are putting in an inline fuse holder, crimp the contact's wire and the main wire to the other end of that fuse holder.)



Single-pin connector halves. Note the portions of the connectors that are slid out, which releases the tab underneath holding in the contact. You also have to use the normal connector release tool simultaneously in order to get the contact out. (The connector on the right would face the other way to actually attach to the connector on the left.)



Wire from the instrument cluster connector crimped, along with the wire going back to the rear relay holder, to an appropriate contact.



Make the "short" wire from the contact long enough so that if the instrument cluster needs to be removed in the future there is enough slack to pull the cluster out far enough to easily unplug the connectors at the back of the cluster.

Behind-dash wiring completed: fog-switch wire comes into the picture from top right; wire going to the rear of the car comes in from the left, loops around to the right in this picture, and meets the wire coming up from the instrument cluster connector at the white single-pin connector.

Slide the black inner connector back into its white outer shell, and put a new zip-tie where the old one was around the tab on the outer shell.

Put a 1.2 watt bulb in the socket on the back of the instrument cluster. Don't touch the glass with your fingers. Reinstall the cluster in the dash.

Lay the main wire to the sill wire channel, and zip tie all the new wires under the dash as needed. Run the wire along the door sill channels to the rear seatwell, through the hole at the bottom of the seatwell wall near the transmission tunnel, and over to where you will attach your relay to the rear fuse box under the rear seat.

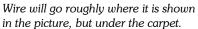
Refer to the diagram earlier showing the relay connections.

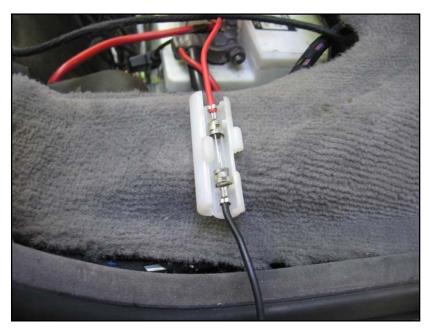
Crimp a relay contact to the end of the wire, and insert it into a factory relay connector, terminal 86 slot. (You might need to check the relay itself to see what the terminal numbers are and hence the appropriate slot.)

Crimp a contact to one end of a short ground wire, and insert it in the terminal 85 slot. Crimp a ring terminal on the other end of the wire and attach it at the nearby ground post.



Run a 1 mm² or larger wire from the battery positive post through an in-line fuse holder to the relay connector and crimp on a contact. Strangely, my car came with such a wire and fuse holder already attached to the positive cable, probably aftermarket.





Run the wire from the battery over the front of the seatwell wall under the carpet, as the other wires do, and follow them along the wire channel covers, over the transmission tunnel, and through the "porthole" into the rear fuse box area.

Put a 5 amp. fuse in the holder.

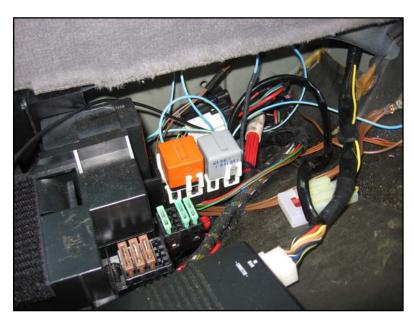
Put the contact in the terminal 30 slot.

In-line fuse holder opened up to show glass cylindrical fuse.

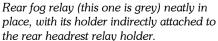


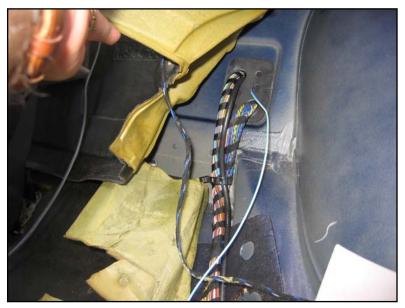
Crimp a relay contact onto a long wire that will go to the left rear light cluster (measure how long and cut to that length) and insert it into the terminal 87 slot on the relay connector.

Completed relay-holder wiring. I preferred to use the same color wires for the rear fog lights rather than switch to traditional brown for the ground. Beware: I accidentally broke off one of the two ground posts at this location, since the nut was seized onto the post. (Tip: if you have such a tight nut, to avoid breaking it off you could cut a shallow slot in the end of the post, put in a screwdriver, and brace the post with the screwdriver while turning the nut.)



Insert the relay into the relay connector, and slide the holder onto a slot on the rear fuse box or other relay holder.





Run the long wire back along the other harnesses, through the trunk bulkhead grommet, and to the left inner light assembly on the trunk lid, as follows.

With the rear seatback off, look for the front side of the grommet under the insulation. Use an awl to make a hole, then push the long wire from the relay a little way through to the trunk.

The wiring going into the trunk behind the rear seatback well is to the right in this picture. Rear fog wire can be inserted into the existing harness holders, such as the strap visible in the picture, before putting it through the grommet.

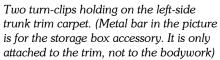


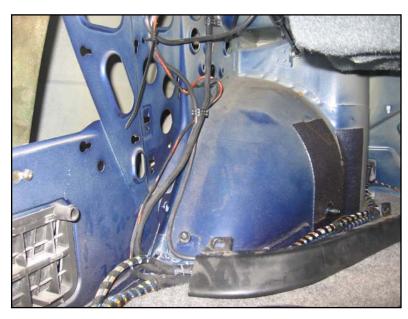
Remove the insulation panel on the trunk side of the bulkhead with a screwdriver in the plastic nuts with the odd-shaped holes (see chapter on ski sack).

Two nuts for a three-pronged screwdriver! (A regular screwdriver will work.)



Remove the left-side trunk carpet after turning the two clips.





Remove the wire channel along the left front of the trunk floor by unscrewing the two plastic nuts.

Wire channel unscrewed. The left plastic nut has been put back on its stud.



Now you can see where the harnesses come into the trunk through the rubber grommet in the bulkhead.



Carefully unclip the wire channel that goes along the curved trunk-lid arm.



Tabs on wire channel pop out; watch out, one of mine was broken off.



While you're there, check the condition of the wiring where it bends around the hinge: there are quite a few reports of chafing or splits in this area, leading to wiring short circuits and electrical anomalies.

A view looking up toward the top of the trunk. The trunk lid hinge is at the very top of the picture, attached to the damper, and the relevant wire harness is visible to its right.



Take off the trunk lid trim to access the light assemblies. There are four turn-release clips at the bottom edge (i.e., when the trunk lid is down) of the lid, and all the rest just pull out.

Plastic turn clip at bottom edge of the trunk lid trim, just to the right of a lid rubber stop. Turn one-quarter turn, then look behind the trim to see how to maneuver the clip out the rest of the way.



Majority of the clips are these difficult press-clips. It's hard to get them out without damaging them. One trick is to pull them and the surrounding trim material out far enough to slip a screwdriver behind the material and into the slots in the prong of the clip, then pry out gently from there—the teeth will be slightly damaged, but not too much. Clips at the bottom right of the trim material, when the trunk lid is up, should not need to be removed at all.



Note micro screwdriver at bottom of picture.



The tool box and the four screws along its bottom edge do not need to be removed to allow access to the wiring path, though the box needs to be opened up. Note existing harness, held in by a white clip and wrapped in black friction tape, at left of the trunk lid.

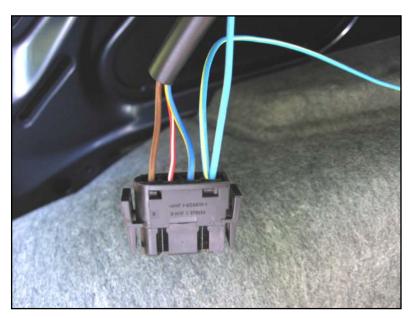


Lay the wire to the light assemblies, inserting it in the existing harness clips or using zip-ties, leaving slack by the hinge as needed.

Blue/yellow wire is zip tied and run through existing harness holders.



Note the black harness clip near where the wire harness goes in the trunk-lid hole. The additional wire can be inserted into such clips.



Unplug the wire connector on the light assembly. Crimp both the long wire coming back from the relay and an additional wire to a female contact. The additional wire will provide a parallel circuit to the other fog light, and needs to be of corresponding length.

Unlock the wire connector by sliding the inner portion to the side. Insert the contact into the connector's free slot (**X329/1**).

Double-wire contact in place, in rightmost



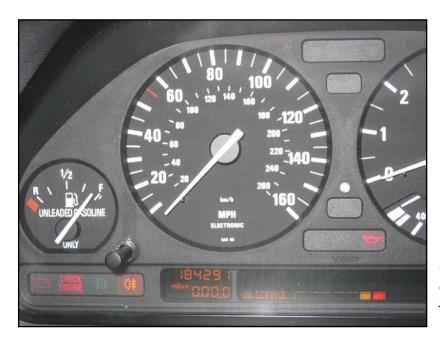
Crimp another contact to the end of the additional wire, secure it along the existing harness (there are access holes to reach inside the trunk lid shell), and insert it in the right-side connector (**X328/3**). The new light assemblies will handle ground through a pre-existing common ground.

Insert the fog-light bulb holders, including the bulbs, into their holes on the clusters, if needed. Replace the light assemblies on the trunk with the new fog light ones – two nuts inside the trunk lid.

Plug in the connectors.

Replace all the wire channel covers and trim pieces, including the steering column trims, if not already done.

Ausgezeichnet! You're done with a beautiful install. Now pretend it's a dark and foggy night. Turn on your rear fogs (don't forget to turn on the parking lights) ...



The rear-fog-light warning light is the orange one, to the right of the green front-fog-light warning light.



Fog-light switch illumination at night.



... walk back, and be dazzled!

Now enjoy not having tailgaters running into you on rainy days.

24. Accessories and Other Options

Some Useful Things.

Following are a variety of nifty factory accessories, add-ons, and parts.

License Plate Screw Caps Fog-Light Covers European Bumper Trims Tire Valve Caps Fuses

Wide-angle Rearview Mirror Glove Box Flashlight Glove Box Power Adapter Glove Box Dampers

Tape Cleaner

Power Socket Dummy Plug

Keychain

Front Passenger Storage Net

Cupholder Gear Knobs Coin Tray

Cassette Holder, Door Cassette Holder, Console Wood Handbrake Handle Alarm LED Relocation Warning Triangle Universal First-Aid Kit Tool-Kit Cloths Bulb Kit

Trunk Floor Support

License Plate Screw Caps



Name	Details	Number	Part no.	Price
Protective cap	for license plate bolts	8	51 18 1 813 017	\$1
Fillister head bolt	for license plate, has ridge to secure caps	8	51 18 1 835 719	\$1

The license screw caps add a finishing-trim look to often-unsightly and rusted license-plate bolt heads. A few colors are available. The caps may start to crack after a few years, so get extras.

Fog-Light Covers

Name	Details	Number	Part no.	Price
Fog light covers	clear stick-on plastic to reduce the common occurrence of stones cracking fog-light lenses	1	82 11 0 008 643	\$19

European Bumper Trims



A U.S.-spec bumper trim (for the car's front right) is at the rear; European-spec is to the fore. Front of the trims are to the right.

Name	Details	Number	Part no.	Price
Rubber strip	front left; up to 3/94	1	51 11 1 944 177	\$25
Rubber strip	front right; up to 3/94	1	51 11 1 944 178	\$25
Rubber strip	rear left; up to 3/94	1	51 11 1 944 185	\$25
Rubber strip	rear right; up to 3/94	1	51 11 1 944 186	\$25

Though regulations are often strict in Europe, the authorities there did not see the need to have additional lighting on the side of these vehicles, in addition to the light that already comes from the corner light assemblies, unlike in the United States. So European bumpers do not have the U.S. supplementary lighting in the trims. Although the supplementaries do have a nice effect at night, the look of the car is more smooth and classic without the lights. Check your national and local laws to see whether you must have the side marker lights.

The bumper trims are removed by first taking out the side marker light assemblies (see chapter on underhood light). Then the trims are slid straight forwards a little bit, in the case of the front ones, and backwards in the case of the rear ones. Finally they are pulled out to the side.



Note the hook on the tab on the side of the trim (bottom right of the picture). Several of these hooks on the trim along the side of the car need to be slid forward in their slots, then the trim can be pulled out laterally. The trims are often crusted in place with dirt, and hard to slide. Note the wires and hole in the sheet metal for the light assembly, at the bottom right of the picture.

Tire Valve Caps



Name	Details	Number	Part no.	Price
Caps	For tire valves	1 set	36 11 0 009 838	\$13

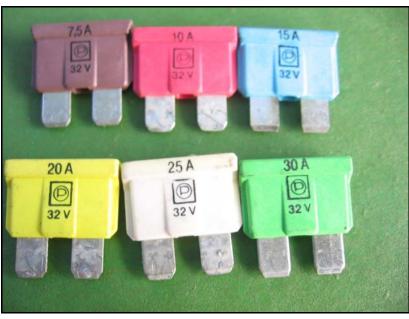
The tire valve caps with factory logo are a nice touch, and add one more location to put the attractive roundel design on the car.

Wheel Locks

Name	Details	Number	Part no.	Price
Set wheel locks	has about 10 different key adaptors	1	36 13 6 786 419	\$30
Set wheel locks	has more combinations	1	36 13 6 782 984	\$51

The wheel locks use one special bolt per wheel; the bolt requires a matching adaptor in order to be turned. The adaptor fits over the bolt into the matching pattern, and has the required hex head on the other end.

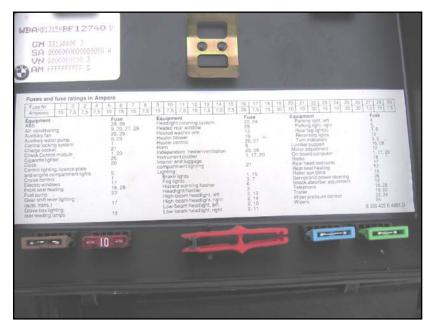
Fuses



Name	Details	Number	Part no.	Price
Fuses	the clever kind that BMW uses: blown fuse wires are visible through top without having to pull the fuse out!		61 13 1 370 987 - 7.5A 61 13 1 386 627 - 10A 61 13 1 372 626 - 15A 61 13 1 386 848 - 20A 61 13 1 372 627 - 25A 61 13 1 372 628 - 30A	<\$1
Fuse clip	the fuse and relay puller	1	61 13 1 379 583	\$1



Why didn't anyone else think of this? The yellow fuse illustrates how the fuse allows easy checking without having to pull the fuse out to look at it from the side.



While you're at it, if they're missing don't forget to get the convenient official fuse puller, and spare fuses, and put them in the appropriate spots on the underside of the front fuse box cover.

This is the underside of the front fuse box in the engine bay, with holders for the fuse puller and spare fuses. Note the temporary non-factory fuse at left that does not allow instantaneous checking of the fuse.

Wide-Angle Rearview Mirror



Name	Details	Number	Part no.	Price
Wide-angle mirror glass	heated; driver's side; up to 9/92	1	51 16 1 938 065	\$100
Wide-angle mirror glass	left side; up to 9/92	1	51 16 1 938 091	\$45

The wide-angle mirror has two sections, with a small outer portion angled outwards more to reduce any blind spot. The border between the two sections is barely visible as a thin line at the left of the mirror in the picture above.

Glove Box Flashlight



Name	Details	Number	Part no.	Price
Flashlight	plugs into a charger behind glove box door	1	82 11 9 413 147	\$22

Probably standard in new U.S.-specification cars, the rechargeable glovebox flashlight is by now sometimes missing.

Glove Box Power Adapter



Name	Details	Number	Part no.	Price
Glove box power adapter	similar to a cigar-lighter socket	1	82 11 0 004 075	\$8

This accessory has a cigar-lighter-style socket plug for powering various things. It plugs in where the flashlight does, behind the glove box door.

It is convenient since one doesn't have to leave the ashtray open for access to the cigar lighter / power socket there, nor have whatever is using that power socket stick out. With this adapter, the accessory can be left in the glovebox (or even outside of it because the glovebox door can safely be closed over the protected wire).



Power adapter plugs into flashlight-charging socket behind glove-box door. Note the clear reinforcing plastic on the cord that helps protect the wire when the glovebox door is closed over it.

Glove Box Damper

Name	Details	Number	Part no.	Price
Absorber	plugs into a charger behind glove box door	1	51 16 2 236 464	\$30
clip, washer	clip attaches bottom end to glove box stud, over rubber washer	1		
bolt, spacer	bolt attaches top end through metal spacer to flange	1		
plastic washer	c-shaped double washer goes on metal spacer	1	51 23 1 906 523	<\$1

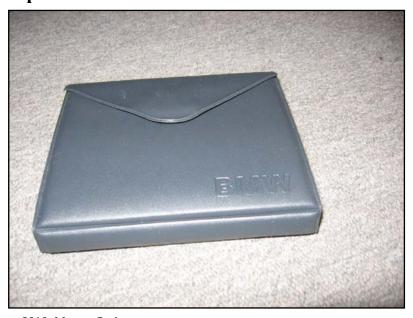
Most of the E34s are equipped with perfectly functional but unluxurious straps to hold the glove box when it's open. Late models with airbag, however, sometimes replaced at least one of the straps with a small damper strut. An M5 EBA (01 29 9 783 026) specifically describes a damper strut on the left and the normal strap on the right, so that's probably the correct set-up. A strut will go on the right, after cutting away a bit of the glovebox to make it fit, but clearance didn't seem to be full, and the glovebox closed rather stiffly.

The strut attaches to the same locations as the strap. Use the metal clip that held on the bottom of the strap for the bottom of the damper too. Obtain hardware store bolts, spacers, lock washers, and nuts as necessary to fashion a new attachment at the top. I used something that worked like a rivet, but the ends screw together.



This is where the top of the left damper attached on an E32 donor car. The bushing appeared to be riveted on, so I used something similar from the hardware store.

Tape Cleaner





Name	Details	Number	Part no.	Price
Tape cleaning kit	for cassette player, has BMW logo, used price	1	65 12 1 467 935	\$20

Power-Socket Dummy Plug



Name	Details	Number	Part no.	Price
Plug		1	51 16 8 222 183	\$5

This replaces cigar-lighter heating elements – useful to ward off a child burn, particularly for the rear seat area.

Keychain



Name	Details	Number	Part no.	Price
Key fob BMW emblem	my favorite key chain, a lovely enamel, vintage-lettered roundel	1	80 56 0 307 811	\$29

Front Passenger Storage Net



Flexible storage net in the passenger footwell.

Name	Details	Number	Part no.	Price
Parcel net	for front passenger, side of center console	1	51 47 2 261407	\$16
Fixing element	screw locks for above	4	51 47 2 263 062	<\$1
Total cost:				\$17

This simple add-on is quite convenient for storing flat things. Best of all, it doesn't take up any room when it is not in use. It is screwed onto the carpeting on the side of the center console, in the passenger footwell. Einbauanleitung: $01\ 29\ 9\ 782\ 127,\ 1/89.$

Cupholder





The cupholder viewed from the bottom: it fits over the edge of the console.

Name	Details	Number	Part no.	Price
Dual cupholder	fits over the side of the center console	1	82 11 1 468 721	\$21

This cupholder was designed specifically for the E32 and E34.

Gear Knobs



This one is in dark burled walnut.

Name	Details	Number	Part no.	Price
Gearshift knob	burled walnut	1	25 11 1 222 702	\$80
Gearshift knob	bubinga	1	25 11 1 221 675	\$80
Gearshift knob	birds-eye maple, grey	1	25 11 2 227 372	\$80
Gearshift knob	myrtle	1	25 11 1 434 497	\$80
Gearshift knob	aluminum	1	82 23 9 405 686	\$80
Gearshift knob	aluminum and leather	1	82 23 9 405 688	\$80
Illuminated shift knob	Has M logo and nifty illumination of the shift pattern on the top of the knob; this number is for the kit, including a harness	1	25 11 2 231 561	\$110

The listing just gives a few samples of the options. Most knobs from the factory of this era and even later are interchangeable, so the wide variety of knobs from other models provides candidates for installation too. The knobs simply pull off, although they are on very tightly – so much so that one has to be careful not to bang into something, including one's face, when the knob finally breaks free from the shaft.

Coin Tray



Coin holder. It can mount in either door. Note, although the color of the holder is closer to the color of the interior trim than it appears in the pictures, it does not come in a perfect match.

Name	Details	Number	Part no.	Price
Coin tray	fits in front door storage bin		51 41 8 138 777 (gray)	\$22

Cassette Holder, Door



Cassette storage box. A red dot (barely visible on furthest tray in the picture) appears when a cassette is in the tray. Tray releases by pushing on the light gray button.

Name	Details	Number	Part no.	Price
Cassette holder	fits in front door storage bin	2	51 16 1 964 319 (light gray)	\$39

This holder has six pop-up slots for cassettes. It just stores just the cassettes, not their boxes.

Cassette Holder, Console



Goes nicely with the wood handbrake handle.

Name	Details	Number	Part no.	Price
Cassette box		1	65 14 8 350 579 (light silver gray)	
Cassette box	with wood cover; used price	1		\$120
Wood cover	'91?	1 1	82 25 9 402 677 82 25 9 401 884	

Cassette box kit		1	65 14 9 433 022 (light silver gray)	\$39
Connection cable		1	61 12 1 379 863	\$16
Bulb	1.2W		63 21 7 167 000	\$2
Screw	fillister-head self-tapping ST4.2x16-ABW	1	07 11 9 906 749	<\$1
Flat washer		1	65 14 1 374 485	<\$1

This console cassette holder was available with a nice wood cover besides the normal colors. It has lighting in the individual cassette trays, and connects to pre-wiring under the console.

The holder goes in the long cubby hole at the rear of the center console, parallel to the handbrake. Unfortunately it seems to require cutting the console if the lighting is to be used. A wire pigtail goes from the rear of the holder to a 2-pin connector underneath the console. If you don't want to mar the console, you could cut the tabs off the holder at the rear, and take off the bottom light-carrier portion of the holder, so that the holder will simply rest in the cubby hole. The front tab seems to pop over a special knob screwed in where a screw normally is at the inside front of the cubby hole, but I haven't been able to find the part number for the knob.

Wood Handbrake Handle



Name	Details	Number	Part no.	Price
Handbrake grip	burled walnut, used price	1	82 25 9 402 861	\$25

To take off the old handle, the gaiter needs to come off, since its zip-tie also holds the leather grip. Take out the base of the gaiter (see the chapter on rear sunshade installation) and pull the gaiter up, inside-out. Clip off the zip-tie that is also holding the leather handbrake grip.

Then slide the old grip off the metal handbrake lever. It's on tightly, and there may be some glue too. Zip tie the gaiter again, this time only over the lever. Then stick on an adhesive-backed foam spacer that your new wood handle might have come with, and coax the new handle into place.

Alarm LED Relocation



Alarm LED relocated from rear of center console using wiring kit (microphone is not yet in place just above the LED).

Name	Details	Number	Part no.	Price
Cable extension	kit to relocate alarm LED	1	82 11 1 467 013	\$23

The blinking warning LED for the alarm (and the glass-breakage sensor) seem usually to be installed in the rear end of the center console. The installation instructions also list another location, in the dash, however. The problem with the rear location is that you don't see the blinking light when you're standing at the front door to unlock the car, and if you forget that the alarm happens to be on, opening the door will set it off, at least for my '92 alarm system. This only happens because of one of the few design peccadilloes of the car: unlike for many more-recent models, using the key in the door lock to unlock the car does not turn off the alarm.

Relocating the LED and sensor to the dash requires the extension cable that you run along door sills (or unofficially along the center console) and up toward the fog-light switch.

Warning Triangle



Partially-folded warning triangle, showing how the legs fold up.



The white peg at the top of the inner material clips the two raised triangle sides together.

Name	Details	Number	Part no.	Price
Warning triangle	the one specifically made to fit in the trunk tool box; no longer available from the factory; used price	1	71 60 1 179 041	\$32
Warning triangle	does not have the BMW logo on it, is not the Euro-spec one specifically made to fit in the trunk tool box	1	82 11 1 466 578	\$21

What's that long rectangular hole for in your trunk tool kit? For the Euro-spec warning triangle, which I have never seen in the United States. According to one report of unknown accuracy, the Department of Transportation wouldn't certify it because it wouldn't stand up to gale force winds. Whatever the case, it has long metal legs at its base, so it is extremely sturdy. The U.S.-spec triangle does not fit in the tool kit.



 ${\it Warning\ triangle\ in\ its\ home}.$

Universal First-Aid Kit





Name	Details	Number	Part no.	Price
First-aid kit	does have BMW logo	1	82 11 1 469 062	\$21

Not to be confused with the Euro-spec under-seat first-aid kit, for which, see the relevant chapter.

Tool-Kit Cloths



Name	Details	Number	Part no.	Price
Polishing cloth	for tool kit; three in a pack; several colors available	1	51 91 0 148 456 (blue)	\$22

Bulb Kit



The fuses and the top two bulbs in the picture were not in the original kit, but sockets were in place under the cover sheet to hold them. Other spare locations to hold bulbs are also visible.



Name	Details	Number	Part no.	Price
Lamp set	box to hold spare bulbs	1	63 12 6 927 497	\$16

Trunk Floor Support



Name	Details	Number	Part no.	Price
Spare wheel pad	14mm high	1	51 47 1 904 726	\$2
Spare wheel pad	13mm high	1	51 47 1 904 728	\$2

These pads support the trunk carpet over the spare wheel well. They go on the wheel hold-down bolt in the center of the well. They're listed here since they often seem to be missing by now, although the cars with the basketweave wheels probably use the hexagonal wheel center cap—removing attachment instead. Although not essential, since the carpet backing is pretty stiff, they do help with heavier loads.

Appendix I: Special Tools

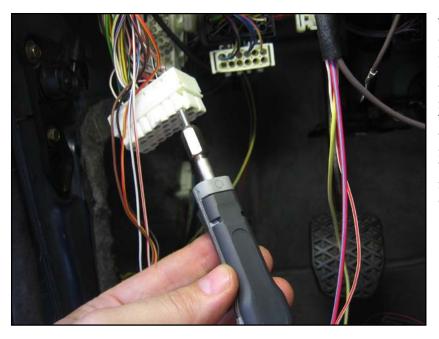
Wire-Contact-Removing Tool



The light-gray plastic part slides up over the end of the tool when it's not in use, to protect the tool tip.

Name	Details	Number	Part no.	Price
Press-out tool	For releasing wire connectors from their plugs	1	88 88 6 611 132	\$44

An invaluable tool anytime that taking individual wire contacts out of their connector plugs is needed, such as in several of these chapters and in EBA procedures when a vehicle is not pre-wired for the accessory.



The tip of the tool is a hollow cylinder; it slides over the catches on the side of the wire contact that hold the contact in its socket, so that the catches will pass by the retaining flange in the socket. Then, as you keep pushing on the tool, a plunger inside the tip comes forward and pushes the contact back out of its socket so it can be removed from the holder. A neat operation.

Note that, as well as the contacts being secured in their connectors, many of the connectors have an additional locking mechanism. Often it is to slide one section of the connector to the side relative to another section, past small locking tabs. Those mechanisms do not need a special tool.

Relay-Contact-Removing Tool



Name	Details	Number	Part no.	Price
Ejector	for releasing relay or fuse contacts from their holders	1	83 30 0 492 711	\$76

This tool is similar to the previous one. It frees the catches that hold wire contacts into relay holders or fuse slots. It is used less often than the previous tool, but is useful for a couple of procedures in this guide. The contacts can alternatively be released by using multiple jewelers screwdrivers coming in from multiple directions, but this tool makes the job much easier.

Headlight-Washer Adjustment Tool



Name	Details	Number	Part no.	Price
Nozzle adjustment tool	for aligning the spray jets of the headlight washers	1	83 30 0 490 502	\$51

This prongs on the end of this tool fit into slots on the headlight washer nozzles, allowing the jets to be moved, as one does for the windshield washer jets.

The kink in the tool appears to be a useful improvement that allows you to test the jets' aim point without having to take the tool in and out of the nozzle each time you activate the washer to see where the spray hits.

Friction Tape



Name	Details	Number	Part no.	Price
Fabric-tape		1	61 13 6 902 588	\$1

This is the kind of tape used to wrap wires in exposed areas like the engine bay.

Valve Tool



Middle of tool is a spring that allows tensioning of the adjusting cam without turning it, by applying just the right amount of pressure.

Name	Details	Number	Part no.	Price
Valve adjusting tool	nifty spring tool to adjust valve clearances on M30 engine	1	88 88 6 113 070	\$19

Appendix II: Wiring – Factory Contact System

Several of the retrofits in this guide involve adding new wires to existing wire connectors, or splicing a new wire to existing wires. Fortunately this is made easy and neat by the factory wire contact and connector system. The 2.5 mm round-contact system uses contacts that, at their pin/socket end, have standard-size male/female connectors, and at their wire end have varying-size crimp sections. So, wires of different sizes can easily be connected together through the common pin/socket.

The contacts also have a standard outside shape and diameter for fitting into a variety of different connectors – the plastic shells that connect a group of wires together, ranging from 1-pin to at least 30-pin connectors. The contacts are locked in to the connectors in two ways: the connector has one of several locking mechanisms, and the contacts have locking tabs. The connector locks are released in several different ways, usually by sliding an inner shell sideways a very small amount in relation to the outer shell. Look for a few small teeth holding the shells in place – to slide the shells, they have to be opened up enough to let the teeth pass each other. Then the special contact-release tool is slipped over the contact and depresses the tiny tabs, so that the contact can slip past the flange on the connector. See the previous appendix for more on the special tool.

Wires can be crimped onto a contact with the use of special crimping pliers. These pliers have a "w"-shaped slot that curves the tangs of the contact over and down on top, separately, of both the plastic wire sheath and the stripped end of the wire. The factory pliers cost hundreds of dollars. A professional nonfactory pair can cost maybe \$100-150, and would usually have replaceable crimping jaws. A pair without replaceable jaws that produces an acceptable, but not quite professional, crimp can be had for \$30-40, but are quite hard to find. They are *not* the common crimpers / wire cutters that don't have the distinctive "w"-shaped slots and that are mainly meant for crimping "insulated" contacts.

To merge a new wire onto an existing wire, an existing or new connector can be used. With an existing connector, take out one of the relevant contacts using the release methods above, cut off the old contact, and crimp both the old wire and a new wire into a new contact, usually with a larger wire-end size to accommodate the two wires. Then insert the contact into the old connector hole, lock it into place, and join up the two connector halves again.

To use a new connector, cut the original wire and add new contacts to each end of the cut. When crimping on one of the new contacts, add in the new wire. Then insert the contacts in new connector halfs, and connect them.

Alternatively, wires can be spliced together using a factory butt contact, covered with heat-shrink tubing rather than a connector. This is probably better for wet and dirty areas, since the water/dirt-resistant contacts (see below) can't always be applied in ways that eliminate the need for a non-connector splice. The butt contacts are a single piece of metal rather than a male/female pair, and have a wire crimped on either end (see chapter on the underhood light for an example).

Some of the very-low-current connectors use tiny square contacts rather than the larger 2.5 mm round-contact system. Similar principles apply as above, with different connectors and release mechanisms, but crimping is more difficult since the contacts are so miniscule. In such cases it's usually easier to splice the wires together rather than try to add new contacts (see the chapter on rear foolights for an example).

Factory fuses have a similar type of contact, that is released by a different tool (see Appendix I), though there are sometimes extra locking pins that the tool doesn't reach.

Wire-Contact Part Numbers

The contacts in the table below are found all over the car.

The round, larger contacts are by far the most common and can be readily removed and replaced in the connectors using the contact-removal tool described above. They have a common pin-end size (2.5 mm) that connects to the opposite-gender contact, but different wire-end sizes to match the wire or wires being crimped on.

The square, very small contacts are found in a few connectors.

Wire Contacts					
Shape	M/F	Wire already crimped on	Wire size, mm ²	Name	Number
ROUND					
	F		0.4-0.75	cable socket round	61 13 1 373 820
	66		0.5-1.0	rundsteckh	61 13 1 376 202
	"		1.0-2.5	rundsteckh	61 13 1 376 204
	"		2.5-4.0	rundsteckh	61 13 1 376 206
	M		0.4-0.75	circular connector	61 12 1 373 819
	"		0.5–1.5	rundsteckkontakt	61 13 1 376 191
	"		1.0–2.5	rundsteckkontakt	61 13 1 376 193
	"		2.5-4.0		61 13 1 376 195
	F	у	0.5–1.0		61 13 0 007 449
	"	у	1.0–2.5		61 13 0 007 450
	М	у	0.5–1.0		61 13 0 007 452
	"	у	1.0–2.5		61 13 0 007 453
waterproof	F	У	0.5–1.0	rundsteckh	61 13 0 007 441
•	"	у	1.0-2.5		61 13 0 007 442
L-shape	"	у	0.5–1.0		61 13 0 007 445
L-shape	"	у	1.0-2.5		61 13 0 007 446
	М	У	0.5-1.0	rundsteckkontakt	61 13 0 007 443
	"	у	1.0-2.5		61 13 0 007 444
		у			61 13 1 382 248
bent	F		1.5–2.5	connector	61 13 1 376 224
	"	У	0.5-1.0		61 13 0 007 470
	"	у	1.0-2.5		61 13 0 007 472
	"		1.5–2.5		61 13 1 376 224
SQUARE					
AMP (with flange)	F		0.2-0.5	bushing contact	61 13 0 005 197
,	"		0.75		61 13 0 006 663
	M		0.2-0.5		61 13 0 005 198
	"		0.75		61 13 0 006 664
Siemens (no flange)	F		0.2-0.5		61 13 0 005 201
,	"	у	0.5-0.75		61 13 0 008 998
FUSE CONTACTS					
			0.5–1.0	double leaf spring contact	61 13 1 370 691
			1.5–2.5		61 13 1 370 692
			2.5-4.0		61 13 1 370 693
BUTT JOINERS					
			0.2-0.5		61 13 8 353 746
			0.75–1.0		61 13 8 353 747
			1.5–2.5		61 13 8 353 748
CABLE TERMINALS	[ring ter	minals]			
			0.35-1.0	cable terminal A6	61 13 8 353 763
			2.5-6.0		61 13 1 388 431
			6.0–10.0		61 13 1 388 865
			10.0–16.0		61 13 1 382 548

Approximate Wire-Size Conversion

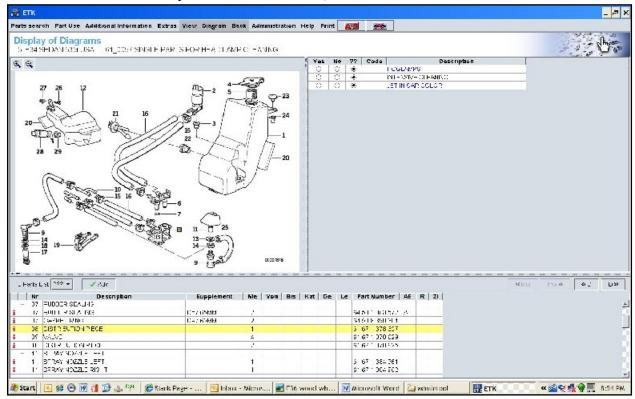
 $20 \text{ ga.} = 0.5 \text{ mm}^2$ 18 = 0.75

16 = 1.5 (1.3, more exactly) 14 = 2.5 (2.0, more exactly) 12 = 4.0 (3.3, more exactly) 10 = (5.3 exactly)

Appendix III: Manuals and Reference Sources

Electronic Parts Catalog (ETK)

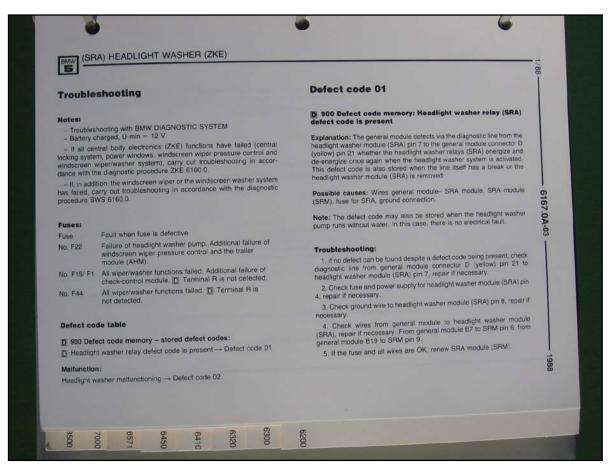
This CD-based catalog is extremely useful for finding part numbers, prices, and availability, discovering accessories, seeing what parts look like, and finding what parts are used and what other vehicles they appear on. Disks are available on eBay. Also known as the ETK, from the German initials. See also realoem.com.

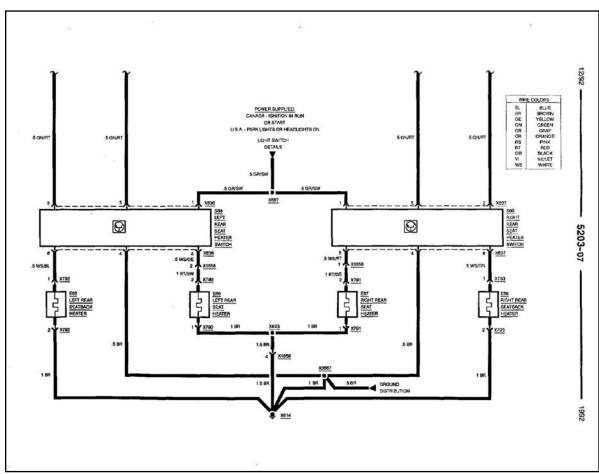


Electrical Troubleshooting Manual (ETM)

One volume contains the vehicles' invaluable wiring diagrams. The other has troubleshooting procedures, usually for use with the prohibitively-expensive factory diagnostic equipment. The wiring diagrams have essential information for the retrofits described in this guide involving wiring, particularly to check differences between model years and between the E32 and E34. The comprehensive diagrams show wire colors, connector pin numbers, and fuse, relay, module, component, splice, and connector locations. Some have a useful brief guide to circuit-fault-finding with an ohmmeter. Sometimes the Europe-only retrofits only show up in the European editions of the manuals. The wiring diagrams can be obtained as electronic files.

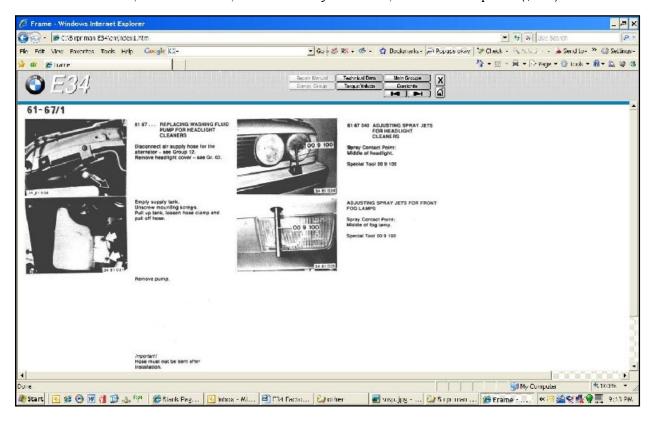






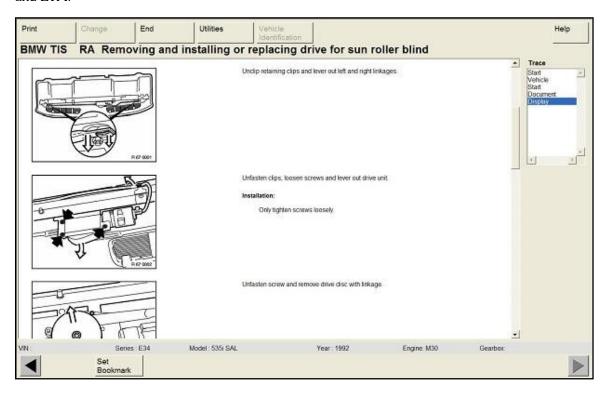
Factory Service Manual

There was indeed a true factory service manual. They are very hard to come by as second-hand hardcopies, especially originals. They have good illustrations and most procedures laid out in clear steps. The manual is available new on CD, as shown below, from the factory distributor, centrallettershop.com (\$150).



Technical Information System (TIS)

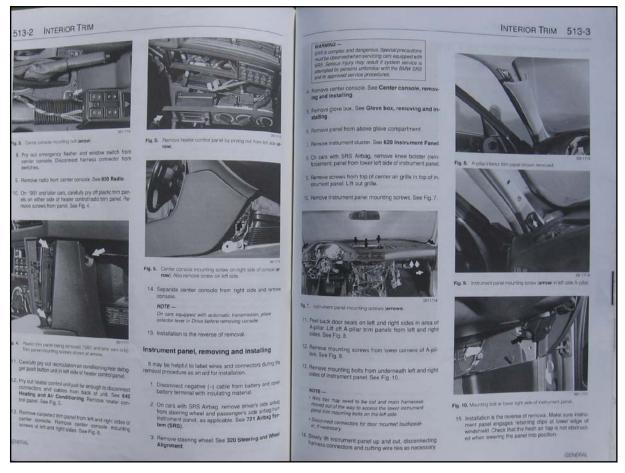
This includes information on torque specs, special service procedures, technical specs, special tools, and the like – but does not include the real service manual. It is found on CD, often as part of a set including the ETK and ETM.



Bentley Publishers Service Manual

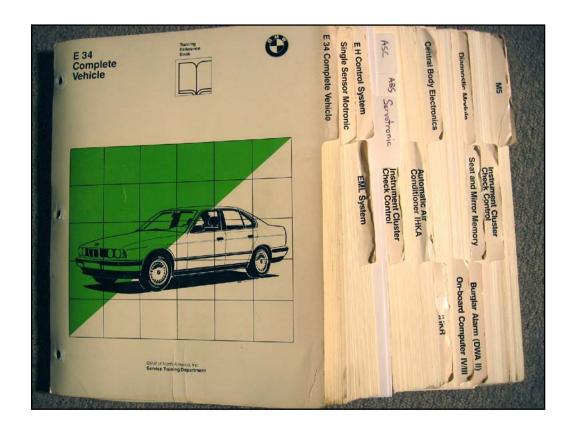
A very useful independent repair manual. Available new from the publishers. Not especially cheap, used, usually \$60 or more.

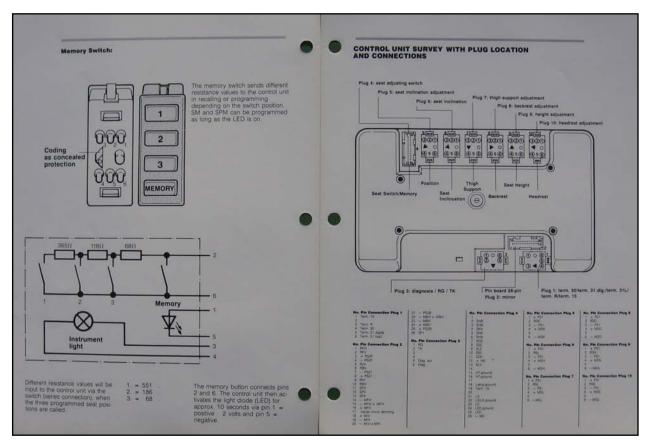




Technical Reference Manuals

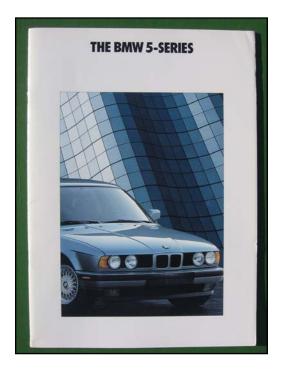
The factory produced an excellent series of documents describing the technical features of vehicles, including the E34 (some were really for the E32, but they shared the relevant system). They were only supplied within the company, for training courses, and they are also very rare now.





Sales Brochures

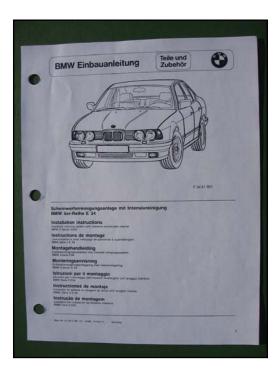
The usual glossy brochures were produced, covering different models, paint & upholstery, and accessories, by year. They are useful to see what equipment was on which years, in case you want to upgrade or alter (for example changing the interior wood). They are readily available from used automobile literature sources.

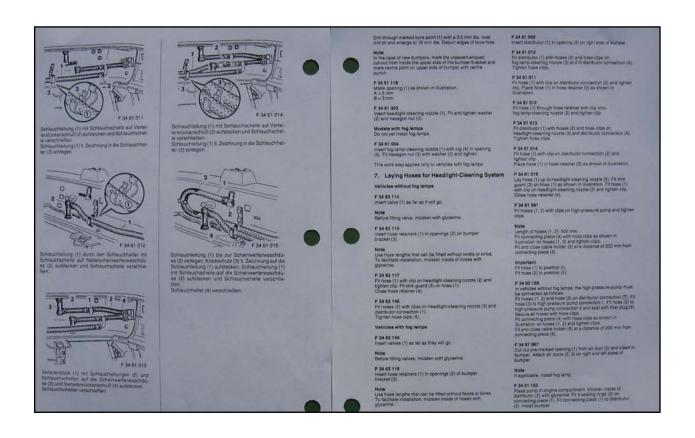




Installation Instructions (Einbauanleitungen)

These are the factory's very useful retrofitting instructions for several of the options described in this guide. They have clear drawings for each step, and the German text is translated into multiple languages at the end of each booklet. See the next appendix for a list of the numerous topics covered.





Appendix IV: Factory Einbauanleitungen (EBA) – Installation Instructions

These superb installation instructions are very useful for many of these retrofits. They are clearly illustrated, and have instructions in numerous languages. Some dealers have said they can't order them, but they are sometimes available on the Internet.

410 725

There are many more for the E32, which can be useful too.

All these part numbers begin with "01 29 9."

E34 Einbauanleitungen

Ski carrier

Park distance control Installation kit for rear trailer support Third bicycle mounting fixture	415 412 415 470 415 494
Trailer loading ramp Umbrella holder Bicycle rack for AHK – rear fog light shutoff	416 396 416 497 416 927
Retrofit kit, slipstream deflector	750 862
Sports steering wheel Retrofit kit, cassette box Heated spray nozzle, with intensive cleaning Tandem interior mirror	780 044 780 815 780 819 780 829
Wide angle mirror Lumbar support Center armrest Mounting parts set for fire extinguisher Mono- system / stereo system 4-ohm Retrofit kit, cassette box Radio Bavaria C exclusive 4-ohm – HiFi system Installing set, cruise control Mono- system / stereo system 4-ohm Retrofit kit, window lifts, electric, rear Interior light and reading light, front Retrofit kit, M rear apron aerodynamic package Retrofit kit, M door sill trim Retrofit kit, M rear spoiler, aerodynamic package	781 194 781 298 781 422 781 460 781 511 781 514 781 518 781 663 781 665 781 666 781 820 781 831 781 832 781 837
Radio Bavaria C Business Headlight washers with intensive cleaner Interior rearview mirror with auto dip Coolbox Luggage compartment box Sports steering wheel, M-Technik Reserve fuel tank, 9L Set, wood strips dashboard, E34 cockpit Retrofit kit, shift knob, leather, illuminated M-Sport Set, mud flaps, rear Set, mud flaps, front Trunk room net Wide angle mirror	782 034 782 112 782 113 782 124 782 127 782 140 782 142 782 152 782 164 782 189 782 190 782 198 782 537

Radio Bavaria C Business Radio Mexico electronic CR safety Radio Bavaria C Radio Bavaria C electronic / exclusive 4-ohm	782 742 782 745 782746 782 749
Storing partition [tray for front center console] Rear interior lights with reading light – early models Roller sun blind, rear, manual Ignition harness with Marten repeller Rear side window roller blind Retrofit kit, automatic antenna Retrofit kit, alt. Power siren ESS Installing set, rear spoiler Installing set, spoiler front Installing set, rear apron Set, side-skirts Radio Bavaria C II & C Reverse II Installing set, amplifier windshield antenna Additional turn indicator lamp, side panel Set, mounting parts headrest rear	783 001 783 023 783 024 783 600 783 611 783 623 783 624 783 684 783 685 783 686 783 687 783 714 783 736 783 767 783 899
Ultrasonic-module DWA Lights-on warning retrofit M Technik gearshift lever knob cover Retrofit kit, shift knob, leather, illuminated M-Sport Tilt-alarm sending unit	784 738 784 779 784 812 784 818 784 938
Auxiliary heater, M5 Installing set, spoiler front Installing set, rear spoiler Set, side-skirts Installing set, rear apron	785 060 785 090 785 091 785 092 785 093
Sports steering wheel Universal protective rear seat cover Installation kit, alarm system Ultrasonic-module ESS Ultrasonic-module ESS – installation kit alarm system Retrofit kit, loudspeaker, front, performance Set, mounting parts, performance Kit, interior mirror with dim, automatic ZB Sitzheiz E34/32 Conversion kit, stereo 1 to stereo 2 Conversion kit, HiFi 1 to HiFi 2 Bavaria C Professional RDS, retrofit kit, CD-changer trunk trim panel Retrofit kit, M door sill trim, aerodynamic package Retrofit kit, M rear spoiler, aerodynamic package Sports steering wheel M-Technik Roller sun blind, rear, manual; rear window shelf Installation kit, alarm system Sports steering wheel, Woodline and Blackline Heated spray nozzle	786 158 786 198 786 200 786 221 786 206 786 244 786 246 786 337 786 359 786 417 786 418 786 506 786 609 786 638 786 640 786 655 786 948 786 656
Electronic speed control Coolbag Sports steering wheel Installation kit, alarm system II Installation kit, alarm system II	787 105 787 128 787 284 787 300 787 310

Einbauanleitungen	E34 Factory Options Guide
C:L-1 -:- F24/20	707 970
Sitzheiz E34/32 Lumbar "electric power cable left"	787 378 787 388
Headlight aim control	787 538 787 538
Roller sun blind, rear window, electric	787 547 787 547
Installing set, ski sack	787 597
Ski bag	787 598
Sports steering wheel, Woodline & Blackline	787 649
Retrofit kit, M front spoiler, aerodynamic package	787 745
Retrofit kit, M rear apron, aerodynamic package	787 746
Installation kit, Sports steering wheel II	787 969
Lumbar support, wiring	788 029
Installation kit, Sports steering wheel II	788 129
Multiple start interruption system II	788 235
Steering wheel rim II, leather, for airbag, 9/90–4/94	788 347
Installation kit, Sports steering wheel II	788 348
Steering wheel rim II, leather, for airbag, 9/90–4/94	788 357
Installing set, air conditioning, R-12	788 367 788 400
Multiple start interruption system II Multiple start interruption system II	788 409 788 419
Multiple start interruption va. I sys. II-III	788 429
Retrofit kit, M front spoiler	788 443
Surfboard rack, Profil 2000	788 462
Safety kit for roof rack	788 465
Installation kit, alarm system I	788 469
Installation kit, alarm system II	788 470
Installation kit, alarm system I	788 479
Multiple start interruption system II	788 488
Multiple start interruption system II	788 489
Sound modul system, E32 / E34 ECE	788 699
Towing hitch, electronic parts Front/rear white turn indicator	788 727 788 729
Headlight cleaning system	788 808
Standard ski/snowboard holder	788 828
Installing set, air conditioning R-134a	788 835
Burl walnut handbrake grip	788 919
Adhesive films for on-glass antenna	789 048
Universal support, Profil 2000	789 055
Sound modul system, E32 / E34 ECE	789 085
Retrofit kit, rear antenna, singleband	789 115
Steering wheel, 4-spoke to Sport wheel 3-spoke, from 5/94	789 119
Telephone console	789 128
Hands-free telephone facility Installation kit, alarm system III; system II	789 135 789 156
Adapter, roof, Boxenlift – universal lift	789 130 789 169
Installation kit, alarm system s. III	789 223
Installation kit, leather covers	789 357
Bicycle lift	789 359
Front seat heating	789 415
Rack support, Profil 2000	789 469
Window lifts, electric, front and rear	789 555
Installation kit, third brake light	789 565
Ski/snowboard set	789 627
Installation kit, alarm system III	789 664 780 846
Lock for snowboard	789 846 780 876
Luggage basket for roof	789 876 790 11 <i>4</i>
Sound modul system, E32 / E34 ECE	790 114

Hands-free telephone facility – changeover module	790 139
Bicycle rack for AHK	790 309
Bicycle lift set 2	790 409
Adapter, roof, Boxenlift	790 458
Ultrasonic-module DWA	790 787

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The E34 Factory Options Retrofit Guide

This DIY-er guide shows how to retrofit the various factory options to the E34, many of which are rare or available originally only on cars supplied outside the United States. The guide covers most of the two dozen options available for the E34, from the integral sunshades to the headlight washers and seat memory, and takes the reader step by step through the retrofits, describing the parts needed, tools to use, wiring to be done, and installation steps to be followed.



The guide features full-color photographs illustrating the retrofit steps and showing useful views of how the cars are put together. The text comprehensively covers the steps based on actual retrofits, provides tips not covered in factory instructions, part numbers, and descriptions of factory and other useful reference materials.

The retrofits can all be done by a hobbyist without mechanic's training. Where modifications to wiring are needed (the cars are often pre-wired), the text explains how to do so. Parts for the retrofits are usually readily available from commercial or second-hand sources, or even new from the factory. The guide provides "project profiles" that rate each retrofit's coolness, utility, difficulty, cost, and installation time, so the reader can pick and choose which options to add and when.

Also included are descriptions of many fun or useful accessories requiring minimal installation that are available for these vehicles.

The introduction to the book provides a comprehensive description of the special features – optional or not – that made these cars such outstanding luxury vehicles, on top of their reliability, solidity, performance, and beauty.