fast times
the newsletter of **Bavarian Autosport**
fall 2005

Join the cause: help us stamp out “rock ‘n’ roll” in BMWs!

It is generally acknowledged that BMWs are among the best-handling cars on earth. But that doesn’t mean their handling cannot be improved. Every year, in an effort to take their Bimmers to the next level, thousands of BMW enthusiasts install sport shock absorbers, sport lowering springs and plus-size wheels with ultra high performance tires. Yet the product that perhaps provides the most dramatic improvement in handling is not nearly as popular as those already mentioned. That product is sway bars (also known as anti-roll bars).

Sway Bars 101

Almost all BMWs already have some sort of sway bar set-up on them, but just as there are upgrades for shock absorbers, springs and tires, there are upgrades for sway bars. Here’s a brief explanation of what sway bars are, what they do and how upgrading them can make a huge difference in the way your BMW bites into the corners, handles lane changes and evasive maneuvers, and maintains traction.

When you take a corner in your BMW, or swerve sharply to avoid a pothole or debris, centrifugal force moves the weight of the car toward the outside, away from the turn. (It has a tendency to move the driver and passengers in that direction, too, affectionately known as the “Scrambler” effect, in honor of the famous carnival ride of the same name.) Turn sharply to the right and the weight shifts to the left.

This transfer of weight compresses the springs on the outside of your BMW, while the pressure on the springs on the inside is reduced. In very simple terms, sway bars make a stiffer connection between the suspension components on the left and right sides so that the compression can be distributed more evenly across the entire front or rear suspension. For example, let’s say taking a sharp turn on a country road at 45mph in a stock BMW increases compression on the left side by 20% (a made-up number). With an upgraded set of sway bars installed on your BMW, some of that compression would be transferred back to the right side; the compression on the left side might be limited to a 14% increase (again, a made-up number) so the difference between the two sides is smaller. It’s as if you suddenly put bigger springs on the outside of your BMW. The result is a more level turn with less body roll, giving you greater control and safety.

A second benefit of having sway bars on your BMW is that they limit the amount of camber change that occurs in hard cornering. Camber is the term for how much a wheel leans in or out at the top when viewed from the front or rear of the car. Negative camber means the top of the wheel/tire unit is leaning inward, towards the car. Positive camber mean the top is leaning outward, away from the car. (For more on camber and caster, see the Winter 2005 issue of *Fast* Times, available as a PDF download at www.BavAuto.com/newsletter.) As you take a hard turn and the weight of the car shifts to the outside, the camber of the outside wheels becomes more positive, causing the inside of the tires to lose traction. (The tire can even roll onto its sidewall a bit. Not a good development.) Installing a sway bar

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BAVARIAN autosport
PRODUCTS FOR BMW ENTHUSIASTS

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Sway bars *continued from page 1*

upgrade on your BMW helps prevent this, keeping more of the tire tread in contact with the ground.

There's actually a lot more to sway bars than we have room to explain here. Racers and autocrossers spend hours testing different size bars in the front and rear to dial in the precise handling characteristics for their cars. (E.g. if the car understeers, they'll decrease the size of the front bar size and/or increase the size of the rear bar.) For most BMW enthusiasts, though, an adjustable sway bar kit like the ones we use is all you need. It provides plenty of additional stiffness to give your Bimmer a significant boost in balance, grip and control. And because these kits are adjustable, you can tweak them to suit your BMW. For example, an 01 330ci may exhibit more understeer in hard cornering than an 01 325i because of its heavier engine. And even though both of these cars use the same sway bar kit, the adjustability makes the kit work for either.

Thanks to H-Sport sway bars, this Cooper S is able to run the autocross course faster than a stock Cooper S.

Installation of a sway bar kit is not complicated, but requires some experience. (We give it 3 wrenches.) An experienced mechanic can accomplish it in an afternoon. But you certainly don't need to be an experienced mechanic to appreciate the change it makes in the way your BMW handles. One drive and you'll be searching out the curviest roads you can find. And if that's not enough incentive to get you to install a set, we'll take 10% off sway bar kits by Eibach and Racing Dynamics and 15% off H-Sport kits *(see Product Focus at right)*. Don't delay – sale prices are good only until October 31st.

Product Focus: H-Sport Sway Bar (Anti-roll) Kits

John Hotchkis' 2004 330ci.

H-Sport, a division of California-based Hotchkis Performance, was created to satisfy the suspension needs of European automotive enthusiasts. H-Sport recognized their desire for high-quality suspension pieces that further enhance the already amazing handling characteristics of their BMWs. John and Mark Hotchkis' extensive motorsport background allowed them to develop products for the street that incorporate the latest motorsports design techniques.

Their sway bars, for example, are tubular (hollow) steel instead of solid, providing the rigid strength BMWs need without adding a lot of weight. All design work is done in-house using the latest CAD technology. But before any component is allowed to become an H-Sport product, the prototype undergoes intensive evaluation on both street machines and racecars under various conditions, including:

- slalom testing,
- skid pad testing,
- braking and acceleration,
- off-road/uneven road surfaces,
- standard highway/freeway use.

At press time, H-Sport had sway bar kits for 3 series 99 thru 05, Z4 and Mini. (More applications are planned.) Each kit includes: front and rear powdercoated, tubular (hollow) bars; rear end links; polyurethane bushings; bushing brackets; and zerk fittings for easy lube. Here are the specs:

For 3 series 99 thru 05:
Front: 30.2mm dia.; 3 adjustments (stiffness increase over stock = +31%, +51%, +77%)
Rear: 25.4mm dia, 2 adjustments (stiffness increase = +138%, +171%)

For Z4:
Front: 28.5mm dia.; 3 adjustments (stiffness increase = +19%, +38% +61%)
Rear: 24mm dia.; 2 adjustments (stiffness increase: +59%, +86%)

Street kit for Mini (3/02 on):
Front: 27mm dia.; 2 adjustments (stiffness increase, Cooper S = +16%, +27%)
Rear: 19mm dia.; 3 adjustments (stiffness increase, Cooper S = +54%, +88%, +128%)

Competition kit For Mini (3/02 on):
Front: 27mm dia.; 2 adjustments (stiffness increase, Cooper S = +16%, +27%)
Rear: 25mm dia.; 3 adjustments (stiffness increase, Cooper S = +226%, +294%, +383%)

Improvements on 04 330ci:

600ft. slalom:

Stock 330ci	65.3mph
330ci w/H-Sport	68.4mph
(Stock M3 = 68.3mph)	

200ft skid pad:

Stock 330ci	.85g
330ci w/H-Sport	.91g
(Stock M3 = .87g)	

Let's clear up a muddy issue...

Sometime it seems as if the world is on a mission to ruin your BMW's carpeting: You step in some mud, or a discarded piece of chewing gum, or a spot of grease at the gas station, or a pile of salt-laden slush... And no matter how hard you try to clean off your shoes, some of the grunge makes its way onto your carpet or custom plush mats. This is why protective rubber mats are so popular.

But for some BMW owners, the thought of putting a black, tan or gray rubber mat into their Bimmer's beautiful interior just doesn't sit well. If you're one of those people, we have a new option for you. Our custom-fit Hex-O-Mats are now available in clear! This innovation allows you to protect your carpeting and/or plush mats while letting their colors show through (an especially welcome development for BMWs with interior colors that don't match up with black, tan or gray). And like all our Hex-O-Mats, they come with a lifetime warranty. Need further encouragement to give them a try? Right now, all our Hex-O-Mats are on sale, including the trunk and cargo mats (which are also custom cut for a perfect fit). Regularly $49.95–99.95, they're now just $44.95–89.95. (Are we clear on this? Good.)

Very simple installation. Relatively simple; your BMW may need to be raised.

from our tech team

ask "bavarian otto"

Over 200 years of BMW experience is just a phone call or e-mail away.

If you add up all the years the enthusiasts at Bavarian Autosport have been working on BMWs – and helping people like you work on theirs – it totals well over 200 years. That's a lot of BMW knowledge. And it's yours for the asking. Have a BMW question? Ask that savvy old BMW enthusiast, "Bavarian Otto" – just call 800.535.2002 or e-mail Otto@BavAuto.com.

The en-Gauge-ment is off!

Dear Bavarian Otto,

I have a question on my 1989 325i. Until recently. my gauges were all working just fine. Then my tach started jumping around and working intermittently. The next time I drove the car it was working perfectly, then the next time it didn't work at all. I've also noticed that the MPG gauge below the tach doesn't seem to work all the time, either. Are they related? And what, if anything, can I do about them?

Tony

Otto replies:

Your tachometer is controlled by the printed circuit board (PC board) in the instrument cluster. The PC board also controls the temp, fuel and MPG gauges. When the batteries on the board start to fail, any number of symptoms can appear in one or all the gauges. On your model, the board installs horizontally inside the cluster along the bottom, behind the oil and inspection lights. A new board for your 325i costs $174.95. (You get a $60 core refund when you send the old one back.) Of course, you could have some other fault, but this is the most likely culprit... especially if your oil change and service interval lights will not reset as well. The Bentley repair manual has full instructions on changing the board.

[Ed. note: See related article on page 7...]

I hesitate to ask, but I hesitate...

Dear Bavarian Otto,

I have just recently begun having trouble when I accelerate in my 87 325i. I lose power momentarily and then it comes back a second later. I changed all of the spark plugs, thinking that maybe one was out, but that wasn't the problem. I think that it has to do with the fuel filter or pump. What do you think the problem is and how can I fix it? Please help me ASAP, before I have to walk to school! Thanks.

Nick

Otto replies:

While it can't hurt to replace your fuel filter, this isn't likely to be the cause of your problem. A stumble during acceleration can be caused by a failing oxygen sensor. If you have no apparent vacuum leaks and the car is idling and driving fine otherwise, that's what I would try first. A new oxygen sensor is $119.95 for your model, and these are typically only good for about 60,000 miles. If you don't have records showing it has been changed, it's a pretty safe bet it is failing. We also have a special oxygen sensor removal socket for $18.95 that makes the job a bit easier.

D-I-Y or P-A-Y?

Dear Bavarian Otto,

My 2000 328i has 76,000 miles and is in need of some upkeep. The dealer wants to charge me $3,000 for all the work it needs. I really enjoy my car and do not want to get rid of it due to high maintenance costs. Please help.

Paul

Otto replies:

Most maintenance on your BMW can be done at home, by you, with a Bentley manual, a code reader and a decent set of tools. With these you can perform brake jobs, tune-ups, read and diagnose fault codes when the check engine light is on, and more. And you would certainly save yourself quite a bit of money by servicing the car yourself. (Not to mention the self-satisfaction of knowing you did the work.) Here's a link to past issues of our Fast Times newsletters, which contain multiple DIY articles: www.BavAuto.com/newsletter. You should also feel free to call us 800.535.2002 if need more assistance or guidance in any of these areas.

(s)No(w) way, André.

Dear Bavarian Otto,

I am trying to find a set of wheels to mount winter tires on, but am confused about what will fit my 2001 530i with sport package. I assume that the wheels from all E39 chassis BMWs (5 series 97 thru 03) will fit, but I am wondering if wheels from other models will also fit. I heard that 7 series wheels will fit. Is that correct? Thanks for your help.

André

Otto replies:

Your 530i actually has the same size brakes as a 540i, so no, not just any E39 wheel will fit. You could use a 16 inch or 17 inch, but a 15 inch would be too small. Also, E39 models use a slightly larger hub bore in the center of the wheel than all other BMW models. Because of this, wheels from other models will not work on your E39. We do offer a nice winter wheel/tire package featuring 17" M contour replica wheels with Nokian Hakkapeliitta snow tires that will fit perfectly. They come mounted and balanced, ready to put on the car and go.

[Ed. note: Winter wheel/tire packages purchased by October 31 come with a free Bavarian Autosport seasonal wheel cover – a $25 value. See page 8...]

Bavarian Profile

Dan Frigulietti

Customer Service Manager Dan Frigulietti (pronounced "Frij–u–LET–ee"), has been into cars and motorcycles since he was a kid. After high school, he joined the Air Force and worked the flight line as a C-130 mechanic. Upon graduating from the University of New Hampshire, Dan joined Bavarian Autosport in June of 1991 as a Sales/Customer Service Rep. Over the years he has owned a slew of BMWs (79 323i, 86 325es, 94 525i, 96 328i) as well as some other imports (Miata, RX7, a couple of GTIs) and a bunch of pickups (to haul his mountain bikes). His favorite BMW thus far was the Euro spec 323i which had a Schrick cam, Eibach springs, Bilstein shocks and Yokohama tires. "It was a great car to work on, well-balanced and had character. I had a lot of fun with it – time trials, driver's schools, even an ice race," says Fridge, (his nickname around the office). He is currently searching for his next BMW (a GS, oil head motorcycle) and has plans to someday ride it through Alaska. (Grizzlies take note!)

How easy is this?!

do-it-yourself

Have you flushed lately? 🔧🔧

One of the most overlooked, preventative maintenance tasks for BMWs is a periodic flushing and replacement of the brake fluid. (We addressed this in the Summer 2004 issue of *Fast* Times, but we talk to so many customers who are unaware of the importance of this procedure, we felt we should reiterate the point.) The failure of most brake system components can be traced to the effects of water in the fluid. Most common is corrosion of the metal cylinder bores and pistons in the calipers and cylinders. The problem of water in the system is exasperated by the peculiar property of the brake fluid to be hygroscopic (attracts moisture). The moisture will eventually build in solution with the brake fluid and begin to corrode metal parts and degrade rubber hoses. The best defense against moisture induced brake system failures is to flush and replace the brake fluid at reasonable intervals. For BMWs, we recommend an annual brake fluid flush. The flushing procedure is similar to the bleeding procedure (removing air from the system), except that you bleed enough fluid from each caliper (and the clutch slave cylinder) to remove all of the old fluid and replace it with fresh new fluid. With the proper tools (listed below), flushing can be a relatively simple one-person job.

- Bavarian Autosport Brake Pressure Bleeder
- Bavarian Autosport Brake Bleeder Catch Bottle
- Proper equipment to safely raise and support each corner of vehicle and remove the wheels.
- 2 liters, high quality DOT-4 Brake Fluid. (ATE fluid has a lower hygroscopic property than standard DOT-4 fluid, and it comes in blue and gold to make fluid changes easier to see.)
- Box-end or flare-nut wrench for bleeder valves

1. *Safely raise and support the BMW and remove the wheels. You can raise the entire vehicle, one end at a time or one corner at a time. If you are not raising the entire vehicle, keep in mind that the bleeding sequence will be; right-rear, left-rear, right-front, left-front.*

2. *Use a vacuum pump or "turkey baster" to remove the old fluid from the fluid reservoir. Fill the reservoir with fresh DOT-4 fluid.*

3. *Attach the Pressure Bleeder cap adapter (with hose) to the fluid reservoir. Fill the Pressure Bleeder bottle with 1 liter of fresh DOT-4 fluid and screw the bottle to the pump cap (see Fig. 1). Pump the Pressure Bleeder to about 20psi. NOTE: If the vehicle has a manual transmission, you may wish to place a hose clamp on the clutch fluid hose where it attaches to the nipple on the side of the fluid reservoir.*

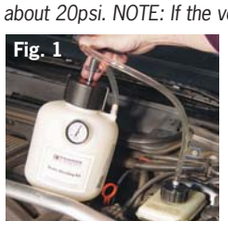


Fig. 1

4. *Begin with the right rear caliper (then the left-rear, right-front and left-front, in that order). Remove the rubber dust cap from the bleeder valve on the caliper. Fit your box-end or flare-nut wrench over the bleeder valve and attach the hose from the Bleeder Catch Bottle to the bleeder valve. Don't forget to use the looped cable to hang the bottle (see Fig. 2).*


Fig. 2

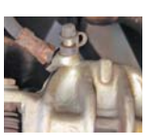
5. *Open the bleeder valve (using the wrench). Fluid should start flowing through the bleeder and hose, into the Bleeder Catch Bottle (right). WARNING: Never allow the fluid the level in the reservoir get too low; this could allow air to enter the master cylinder. Keep an eye on the fluid level in the Pressure Bleeder, as well. NOTE: Without specialized BMW service equipment, fluid that is held in the AST/ABS pumps (behind the operating solenoids) will not be flushed. This is of no consequence on annual flushes, as this small amount of old fluid will be mixed with the new fluid.*

6. *When you see fresh fluid in the hose from the bleeder, close the bleeder valve. Replace the rubber dust cap.*

7. *Double-check the fluid and pressure in the Bleeder and the fluid in the reservoir; add fluid or pressure as required. Go to the next caliper.*

8. *Once all calipers are done, on cars with manual transmissions, bleed the clutch slave cylinder. Then slowly open the cap on the Pressure Bleeder to release the pressure, then remove the adapter cap and hose from the vehicle fluid reservoir. Adjust the fluid level in the reservoir as required, replace the cap and then all that's left is to replace the wheels and lower the car.*

Final notes: *Replace any missing or damaged rubber bleeder dust caps (right). These caps are vital to keeping dirt and moisture out of the bleeder valves. Also, if any of the valves themselves are in poor shape (e.g. rusty, rounded -off edges, etc.) install replacement valves to prevent problems during the next flushing.*

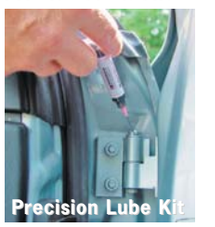


Fixes for common problems:

Here are two new solutions to problems that Otto addresses on a daily basis:


DeoxIT

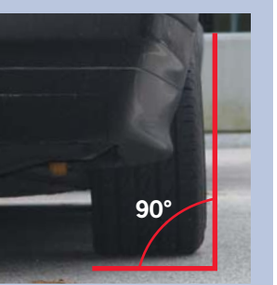
DeoxIT – One of the most common issues is erroneous "bulb out" warnings from the check-control system when all bulbs are good and working. This false warning can be due to small levels (invisible to the naked eye) of oxidation on the bulb or socket contact. DeoxIT dissolves this oxidation, enhancing electrical contacts. Works on any electrical connection!


Precision Lube Kit

Precision Lube Kit – Sticky sunroof tracks, noisy door hinges, stubborn hood latches, squeaky clutch pedals... Otto hears about them every day. This kit is a set of syringe applicators filled with useful lubricants: moly/lithium (sunroof tracks, latches), silicone (urethane bushings), synthetic oil (pivot bushings, hinges) and anti-seize (spark plugs, rotor bolts).

Tech Update: Adjustable Camber Kits

Our Winter 2005 issue of Fast Times featured an article explaining the "ins and outs" (pun intended) of camber and caster – how they affect handling and tire wear, especially on lowered BMWs. (If you didn't see the original article, or can't find your copy of the Winter 2005 issue of Fast Times, you can download it at www.BavAuto.com/newsletter.) The sidebar to that article talked about our adjustable camber kits and how they work in concert with a sport suspension to improve handling and reduce tire wear.



Negative camber: the wheel and tire tilt in at the top.

Evidently, this topic is of deep interest to a lot of BMW owners. As we write this piece in August, we are still receiving calls and e-mails referring to the article from last January. One of the most frequently asked questions is, "How much adjustment do your camber kits provide?" We had intended to include that data in the article, but in our rush to get the newsletter out, we omitted it. We include it below as an addendum. And since some of you may have been hesitant to buy a kit last winter because you didn't have this data, we'll put them on sale again at 10% off, but only until October 31st.

Additional degrees over stock adjustments (negative & positive) provided by Bavarian Autosport adjustable camber kits

Applications	At Stock Height	If lowered 1.5"
Front kits for most 3 series 84 thru 91, 5 series 9/76 thru 96, 6 series thru 89 and 7 series 88 thru 95	1.53°	1.64°
Front kits for most 3 series 92 on, 5 series 97 on, 6 series 04 on, 7 series 95 thru 01, Z3, Z4 and Z8	3.12°	3.37°
Rear kits for most 5 series 82 thru 96, 6 series 5/82 thru 89 and some 7 series thru 94	1.75°	1.75°
Rear kits for 5 series 97 on, 6 series 04 on, 7 series 02 on and Z8	2.00°	2.00°
Rear kit for most models 66 thru 82, 3 series thru 91 and Z3	0.75°	0.75°
Rear kit for 3 series 92 on and Z4	1.00°	1.00°

🔧 Very simple installation. 🔧🔧 Relatively simple; your BMW may need to be raised.

Service interval PC board replacement. 🔧🔧

Gauges have a mind of their own?

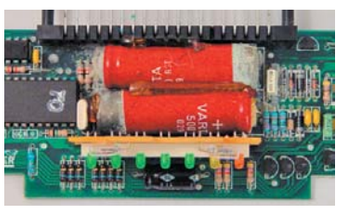
Do some, or all, of the gauges on your 80s or early 90s BMW seem to have a mind of their own? You may have an intermittently operating engine temperature gauge, fuel gauge, tachometer or even the speedometer. While there could be a number of causes, by far, the most common is a faulty service interval PC board *(below right)*.

BMWs from the early 80s through the early 90s are equipped with a service interval and oil change reminder system that, typically, entails a series of green, yellow and red lights at the bottom-center of the instrument cluster. (Later models actually spell out the reminders in the LCD display.) This system keeps track of vehicle mileage and other parameters and calculates an interval for recommended preventative maintenance and oil changes. These systems use Nickel-Cadmium (NiCad) rechargeable batteries (mounted to the PC board) to hold the memory when the vehicle's ignition is turned off. They also control the function of many gauges. With age, these batteries begin to fail and eventually will no longer hold a charge and the service interval and oil change lights, after being reset, will come on much too soon the next time. (At this point, the gauges may not be affected.) Eventually, the lights will not reset at all. As time goes on, the batteries start to leak their corrosive contents onto the PC board and various gauges can begin to malfunction, often in a completely random manner. Many owners tend to just ignore all this, probably because they have been quoted a high repair price or they don't know how relatively simple it is to correct the problem.

Does your PC board need to be replaced?

Do you have one or more intermittent, or non-functioning gauges? Are your service interval lights on? Can they be reset? If they can be reset, do they stay reset for an appropriate time for the next oil change or service interval, or do they come back on too soon? Perhaps you have no service lights at all.

If you do have inoperative gauges and the service interval lights seem to not be working properly, you likely need to replace the service interval PC board. This is not terribly difficult and you can save a bundle by replacing the board yourself. The service interval PC board is housed within the vehicle's instrument cluster. The steps to remove the cluster vary for the different BMW models, but the removal is relatively easy for most models. Here we replace the PC board on a 90 325i:



1. ***Steering wheel removal.*** *On some models, the instrument cluster can be removed without removing the steering wheel, but removing the wheel makes it much easier.*


Figure 1

Non-airbag cars: *Pry the center emblem from the wheel and remove the 22mm nut and washer (figure 1). Use a marker to mark the relationship of the wheel to the splined shaft. Insert the ignition key and turn it to the first position to unlock the wheel. Pull the wheel off.*
Airbag cars: *Care must be taken when working on or around the airbag. Never place your body directly in front of the airbag unit. Remove the negative battery terminal. Wait 10 minutes. Remove the lower steering column plastic trim cover. Unplug the orange SRS connector. Remove the Torx screws that secure the airbag to the steering wheel (on the front side of the wheel); support the airbag while removing the screws. Pull airbag unit from the wheel and disconnect the orange harness from the rear of the airbag unit. Place the unit in a safe place, away from your work area, with the pad facing upward. Finish removing the steering wheel as described for non-airbag cars.*

2. ***Remove the lower dashboard cover*** *(figure 2). Airbag cars have an outer cover plus an inner knee bolster, which must be removed.*

3. *The plastic trim below the instrument cluster must be removed. Reach up behind the panel and unscrew the left and right side*


Figure 2

knurled nuts (figure 3). Push the bottom of the cluster toward the front of the car and pull the plastic trim panel toward you and up, to remove it (figure 4).


Figure 3


Figure 3


Figure 4

4. *Remove the six Phillips head screws securing the cluster trim surround to the underside of the dash hood (two screws) and the bottom of the cluster (four screws) (figure 5) and pull the trim surround from the dash (figure 6).*

5. *Remove the two Phillips head screws securing the cluster to the underside of the dash hood. Pull the top of the cluster toward you, while pushing in at the bottom (use the two brackets that the screws were in, to pull the*


Figure 5


Figure 6

top of the cluster. This can take a moderate pulling force, but be cautious as well), to remove the cluster (figure 7). Once the cluster is pulled free, unplug all of the electrical connections (making note of the locations of the plugs) and take the cluster to your workbench.


Figure 7

6. *Remove the rear housing from the lens/bezel assembly by removing the Phillips head screws around the perimeter of the rear of the housing (this particular model has nine screws – figure 8). Release any plastic clips that may also be present.*

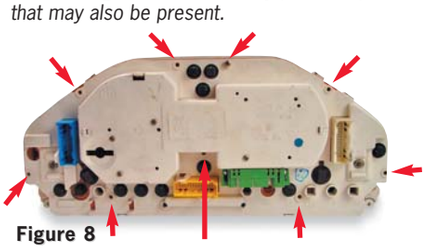


Figure 8

7. *At this point, the actual location and removal of the service interval PC board will vary for different models. (All 3 series 84 through 91 will be similar to what is shown here.) The PC board is mounted in the lower part of the lens/bezel assembly (figure 9a). Gently pull/pry the PC board from the lens/bezel assembly (figure 9b).*


Figure 9a

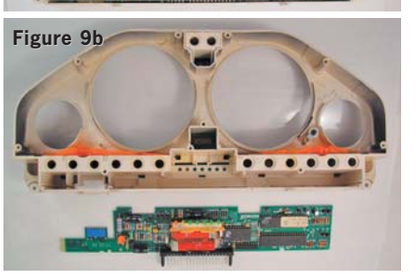


Figure 9b

8. *Install the new service interval PC board and reinstall everything in reverse order.*

9. *On airbag cars, remember to keep your body parts away from the front of the airbag unit until installation is complete and finalized.* ***When making final attachment of the negative battery cable, stay away from the airbag unit.***

10. *You will need to charge the new PC board batteries by driving for a couple of longer trips. Once the batteries are sufficiently charged, the gauges should function normally again and the service interval and oil change lights can be reset using our reset tool.*