Expert Answers to your Tech Questions
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Summertime Blues

I have a 2012 (997) Carrera S Cabriolet. I am having a bizarre problem that my local dealer cannot figure out and would love your help. I purchased the car in February of 2012 and all was great. However, when the summer months came, I began having trouble with occasional stalling of the engine.

The circumstances are as follows: I drive the car to operating temperature; I then stop for a brief period of time, maybe 30 minutes to an hour. At this time the car has the "heat soak." Then when I get back in the car, I start it up and when I push in the clutch to coast to a stop sign, the engine will stall. It starts up again without any problem, but this has become very annoying.

When the weather got cool in the fall and winter the problem completely went away. However, this summer the problem recurred again. Seems to only happen when it is warm outside. Otherwise the car runs brilliantly.

At times it can be difficult to diagnose potentially complex and/or rare problems with limited information, so it is helpful to provide as much in the way of details about the circumstances and or conditions leading up to and after the problem takes place. This is not intended as a criticism but rather it can often help in finding the source of an issue. In your case we would ask if this problem occurs intermittently or every time you drive the car, and does the engine stall once (as mentioned) or multiple times following a restart. Also, what area do you reside in and what gasoline are you using. Sometimes issues like those you described can be the result of multiple conditions that are present simultaneously and result in the single symptom you are experiencing.

We would first recommend the car's basic operating parameters be checked. The Engine's Electronic Control Unit (ECU) should be interrogated for any faults. Keep in mind that some faults must repeat multiple times before actually illuminating the Check Engine Light. We would suggest performing some other standard tests like checking the low and high fuel pressures. The low fuel pressure is checked as normal with a pressure gauge. The high fuel pressure system can be very dangerous to work on and should only be serviced by a qualified technician; the high fuel pressure system must only be checked with a scan tool to determine if the pressures are within specification. It should also be determined if the ECU is applying any fuel adaption values, which would mean that something is making the engine run richer or leaner than nor-

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mal. We suspect that the dealer did these things, but just in case, confirm they did.

You've utilized the wording "heat soak," which is generally an issue for older cars. This term is used to describe a condition that takes place when the engine is shut off and the temperature in the engine rises because the normal cooling systems provided by the flow of oil, coolant and air are no longer taking place. This excessive heat will then pass through to everything connected to and around the engine and would sometimes cause problems for a hot restart.

Beginning with the 1997 986 Boxster and then later in the 996 Carrera, Porsche equipped the cars with an engine compartment blower fan that operates when the temperature is high. This fan can activate and run when the engine is operating or switched off. Also, the radiators are equipped with fans that can operate to reduce coolant temperature when the engine is running or switched off. If these fan systems are functioning properly, any heat buildup should be adequately controlled through the extraction of this hot air. The operation of these systems should also be confirmed.

We would suggest, if it has not already been done, that an engine throttle body adaption be performed. The throttle body reports its position, closed/fully open or anywhere in between, to the engine ECU at all times. On your car the throttle body adaptation must be set manually; it is not performed the same as any of the previous models, and some technicians forget this fact and do not properly perform this adaption procedure.

Many areas of the U.S. utilize summer and winter blends of gasoline, and you may or may not be in an area where this takes place, but because you mentioned the stalling only happens when it is warm outside, we thought it's worth mentioning. Summer-blend fuels are typically formulated to burn slightly cleaner and thus provide better fuel mileage and produce

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lower emissions than the winter-blend counterpart. Summer-blend fuels are also made to be more stable with the higher ambient temperatures experienced during the summer months. Over the last few years, in some areas there has been a shortage in the availability of summer-grade fuels due to fewer production facilities being on line to meet the heavy demand. We have heard that some cities and counties have relaxed their requirements for the summer-blend fuels, and this could have had an effect on summer engine performance. Winter-blend fuels have more butane in the fuel mixtures, but higher levels of butane do not work as well at elevated temperatures. This may not be the source of your issue, but we have heard from other technicians around the country about some odd running issues tied to gasoline. At the very least, use a premium grade top-tier fuel

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from a major brand energy company in your Porsche. We tend to recommend Chevron and Shell fuels due to their excellent additive packages. Stay away from the bargain-priced fuels, as this can be a recipe for problems.

We believe that your stalling issue will be found, though it may be related to seemingly unrelated factors. Hopefully the technician can duplicate the problem.

Old Problem; New Victims

I purchased a used 2008 Cayenne Turbo about one and a half years ago from a Mercedes dealer, and it now has just less than 66,000 miles on the odometer. The only thing I have done since purchasing it was to change the oil, brake and coolant fluids almost a year ago.

About a week ago after driving it to work I thought I smelled coolant. I checked around the engine compartment and under the car and could see nothing, but a few days later something broke big time. I was stopped at a traffic light and then suddenly there was smoke coming from everywhere around the front of the car. I shut off the engine, and as I opened the door I could smell coolant, and then I realized what I thought was smoke was actually steam, and there was coolant everywhere. I had the car towed to the mechanic who previously worked on it, and he called yesterday and told me that a coolant pipe had separated from the coolant distributor manifold on the back side of the engine. At first I thought he meant that hose came off the coolant pipe, but he said no, the hose was still connected to the pipe; the pipe separated from the manifold.

I love driving the Cayenne Turbo but...have you ever heard of this before?

Unfortunately, we have. We wrote a "Tech Forum" article in the December 2010 issue of *Excellence* (#188) where we discussed some of the problems seen on the Cayenne, and the coolant

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crossover manifold was specifically mentioned for the 2008 and later Cayenne models with a V8 engine. The next issue of *Excellence* "Tech Forum" in February, 2011 (issue 189) also covered the problem in detail as it related to the same failure scenario taking place on Porsche's 996 and 997 GT3 and Turbo model sports cars.

All versions of the M46 six-cylinder engine in the Panamera and M48 V8 engines used in the 2008 through 2012 Cayenne and 2010 through 2012 Panamera have a cast aluminum coolant manifold, part number 948.106.061.04, attached to the back side of the engine. An extruded aluminum pipe extends out from the cast manifold and serves as the attachment point for a rubber hose. The extruded aluminum pipe fits into the manifold and is held in place by glue or a bonding agent. The failure point is between the cast man-

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ifold and the extruded aluminum pipe, caused when the glue or bonding agent fails and allows the extruded aluminum pipe to separate from the cast manifold while the engine is running. When this separation occurs, the hot and pressurized coolant will explode out of the manifold at high velocity and in significant volume. The effect will be immediate—with no warning and likely no sign of a problem prior to the failure. You did notice a coolant smell prior to the failure, but this could have been from another source. If slippery coolant gets onto the tires in sufficient quantity, then car control issues could possibly result.

We do not know exactly why the bonding agent fails, but a few thoughts come to mind. It seems possible that inconsistencies in the quantity and/or quality of the bonding agent applied during the manufacturing process could vary. A poorly bonded connection of a newly manufactured part may pass all quality control inspections, but over time (possibly years) of enduring the high heat and pressure cycles of engine operation may cause the part to fail prematurely.

Cars with cooling system issues which go unresolved for periods of time could potentially cause or contribute to this problem. Coolant leaks are problematic not just because of the liquid volume loss but also from air intrusion into the cooling system. This can cause the engine to run warmer than its normal operating temperature range, which in turn also increases the pressure within the system.

The coolant reservoir is a common failure point for these cars. As the reservoir ages, the material becomes brittle and cracks, causing leaks. The front coolant radiators are also a place to watch for any leaks and, very important, should be kept clean, as dirt and road debris can collect in them and cause cooling efficiency to drop. Also, if the radiator fan and or coolant pump is not operating prop-

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erly this can cause higher cooling system operating temperatures and pressure.

Periodically renewing the coolant is an important part of servicing your car. The coolant has a PH factor that will turn acidic over time when exposed to aluminum. It should also be mentioned that when flushing the cooling system it is critically important to bleed as much air out of the system as possible. Coolant flushes should be done every two to three years. Additionally, when filling or topping off your cooling system only use the factory-brand coolant and distilled water. This is best done when the system is cold, such as first thing in the morning.

The point here is to keep the cooling system operating at its maximum efficiency. Higher than normal operating temperatures and pressures over time can take a toll on the engine and cooling system.

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In respect to the bonding agent for the coolant manifold, this may accelerate the time to failure regardless of the root cause.

It is likely best to remove the engine and transmission from the Cayenne to remove the manifold from the engine. With the engine out of the car, the repair can proceed quickly. The engine and transmission should be separated and the torque converter seal replaced—typically, heavy coolant leakage around the torque converter is a bad thing. Replace the seal so that you are not replacing a real expensive transmission later, once it runs dry of its lubricating oil. Below we have outlined a number of repair scenarios; the cost can vary somewhat, but we like a permanent fix to the problem.

Option 1: TIG welding the original extruded aluminum pipe into the cast aluminum manifold may be your best option as it provides a permanent repair. Prior to the TIG welding process, the bonding agent should be removed from the parts. If this is a preventive repair, the extruded aluminum pipe must first be removed from the manifold. This involves using a MAP gas torch to heat the cast aluminum manifold near, but not on, the connection point with the aluminum pipe until the bonding agent starts to ooze out of the connection. It is important that the heat being applied to the aluminum pipe not be excessive, as it can distort the pipe and render it useless. With the bonding agent softened, the extruded aluminum pipe can then be removed; be careful not to damage it. Both the pipe and manifold can then be cleaned with a wire brush to remove any residual bonding agent. Be careful to not remove too much aluminum material from these components.

A high-quality aluminum hose fitting, with correct outside and inside dimensions, can be used or substituted for a damaged extruded aluminum pipe. The parts are then reassembled and TIG-welded at the joint between the pipe and manifold. Utilize a professional

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welder experienced in TIG-welding light gauge aluminum pipe to thick cast aluminum.

Option #2: Re-glue the extruded pipe back into the cast manifold without removing the manifold and while the engine remains in the car. This can be a good choice to repair a single-point failure where a quick and inexpensive fix is needed and a longer term preventive repair is not your interest. Use only a high-quality epoxy-type bonding agent that is designed for high temperature and pressure, is corrosion resistant, and will not be affected by automotive coolant.

Option 3: Tap threads into the cast manifold and install a screw-in hose connection fitting—but it must seal very well. Basically there are two different types of threads used for fittings, tapered (pipe) and straight. In this case it is not recommended to utilize tapered threads because of the load

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placed on the brittle cast-aluminum manifold by an installed fitting. It is possible to tap straight threads into the cast aluminum manifolds, but there is no sufficient means to seal the threaded insert without significant machining. Because of these reasons, we feel this is not a practical option.

Option 4: Pin the extruded aluminum pipes into the cast manifolds. A hole is drilled through the cast manifold and the extruded aluminum pipe, the hole is tapped with threads, and a screw is installed with a thread sealer. This will only prevent the extruded pipe from coming out; however, we are concerned about any coolant leakage from the additional hole over time.

Option 5: Replace the old faulty manifold with a new factory piece. This will keep the vehicle completely original, however it is somewhat likely that the new manifold will suffer the same failure in time.

This is still a relatively rare problem for Cayenne owners, and we have not yet heard of a similar failure on a Panamera, but as you've discovered, the potential is there. Most of the failures occurring on the 996 and 997 GT3 or Turbo models were taking place on cars with a history of track use. In our opinion, TIG-welding the pipe into the manifold is the best repair because it is permanent. Work with your mechanic and decide which approach works best for you.

Boxster Chassis

I'm planning a 996 3.4L engine swap for my 1997 Boxster. I've heard from several places that the 1997-8 Boxster chassis is the weakest of all the 986 chassis. Where did Porsche add the additional reinforcements in 1999 and 2003? Could this bracing be accomplished by seam-welding strategic parts of my 1997 car's unibody? Alternately, can the later model chassis reinforcements be retrofitted to my early car?

I'd kind of like to keep and build my 1997 car for sentimental reasons (I also like that it does not have E-Gas, and I've collected

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most of the parts already), but if there is no way that my '97 will ever be able to handle 300 hp, a ROW M030 suspension and 18-in. wheels, I might have to get a newer car to start with.

Rather than rely on what you've heard, we would suggest that you refer to Porsche's introductory books that are published for each new model year (MY). Also, the Technical Service Bulletins (TSB) are released throughout the model year when factory changes or recommended updates are made. Both of these documents have been published for all Boxster models. According to Porsche's information, significant upgrades were made to the Boxster chassis for MY 1998, and only minor changes were made for MY 2000 in response to additional weight and performance.

The areas where the 1998 changes were made include the

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following metal panel modifications:

- The wheelwell spring strut mounts;
- the engine compartment lower bulkhead;
- the rear wall crossmember;
- reinforcement for the rear axle mount area.

In addition, Porsche was specific about the running gear: "18 inch wheels are not permitted unless these reinforcements have been fitted."

Relative to your project, you may be aware of the Boxster Spec. Racing Series which was formed a few years ago specifically for the 1997-99 MY 986 Boxsters. Many performance and race-car builders prepared cars for this series, including Patrick Motorsports in Phoenix, Arizona and Pierce Motorsports in Torrance, California.

We would suggest that you work with someone that has significant experience in the area of Boxster chassis preparation, and to visually evaluate your car to determine the specific modifications needed for your particular project. This evaluation should also include determining if any previous chassis accident damage exists. If accident damage is still present, the chassis could be weakened in that area, and if needed it should be repaired and reinforced before moving forward.

We believe that the goals you have outlined for your 1997 Boxster should be attainable if you approach the project from the standpoint of sound engineering provided from a professional with the proper knowledge and experience. While many people with the best intentions may be willing to share their knowledge and understanding of what Porsche did, it is your responsibility to ensure that the project is executed in a proper and safe manner. Best of luck.

Buying a First-Gen Boxster

I'm looking to buy a used Boxster (1998-1999) but am concerned about all the water pump and related problems. Should the dealership be able to show me the water pump, or is it too much work

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involved to get to it? It has beer suggested that I pay for an oi change before buying so I can see what the oil coming out looks like Any other suggestions?

To inspect the important part of the coolant water pump, you would have to remove it to see the condition of the plastic impeller blades. To remove the coolant pump requires a substantial amount of labor. If you get to the point where the coolant pump is off the engine, you might as well replace it.

The purpose of replacing the water pump is to keep the impeller blades from breaking off and entering the cylinder head coolant passages. If one or more of the water pump impellers enter the cylinder heads, they can get stuck in the smaller coolant passages and impede or completely block the coolant flow through that area, thus creating a localized hot spot

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that if not found and cleared can cause the cylinder head to crack at that location. A cracked head then usually results in an intermix issue where engine oil is in the cooling system.

We recommend that you look at the August 2012 issue (#202) of *Excellence* and the "Tech Forum" article devoted to the M96 water pump issues and the resulting problems. Many owners tend to let the water pumps operate until they fail, and with regard to the M96 engine, this is not a good idea because of the potential for serious collateral engine damage.

As for the engine oil, we are mainly concerned with the condition of the engine oil filter and what the engine oil pan (sump plate) looks like. The main reason to inspect both of these is to look for metal, plastic and/or rubber debris. If debris is found, then your Pre-Purchase Inspection (PPI) needs to go to a higher level to ensure that serious engine damage has not already taken place—or it might be a better idea to move on to a different car.

The issue with the Intermediate Shaft Bearing (IMS) is not going away on any 1997 through 2008 models 9X6 or 9X7. It is best that you understand this potential problem before you buy a car with an IMS bearing in it.

Other suggestions: Pick up a copy of our annual Porsche Buyer's Guide, which provides lots of info you'll need. Also get your hands on the three-part series we did in "Tech Forum" on the Pre-Purchase Inspection. We feel that there is a lot of information there relative to what is important to know about your next Porsche before you sign the check to buy it.

See the issues of *Excellence* for December 2012 (#206), February 2013 (#207) and April 2013 (#208). Giving these articles a good review prior to your involvement in the PPI process will give you a clearer perspective on what is important for you, areas to focus on and what you should be asking.

Good Luck and Happy Hunting.