924 Garage ***" ... the best handling Porsche in stock form.", J. Pasha, Excellence***

924 Garage FAQ

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[Up] [References] [Models History Porsche 924 Garage] [Parts Porsche 924] [924 Garage Links]
[924 Garage Downloads] [924 Registry] [Tech Section 924 Garage] [Wallpaper]
[924 Garage FAQ] [Projects] [Racing] [931 Turbo]

Introduction:

Welcome to the 924 Garage FAQ. This FAQ is designed to answer most of the commonly asked questions that arise about 924's on the discussion boards and mailing lists. However, it is and will always be a work-in-progress, so please write the webmeister with any corrections or additions. In addition to this FAQ, there is also the 924 Garage Technical Section with even more information and pictures. There is also the general 944 FAQ at http://www.ConnActivity.com/~kgross/944faq.html which answers some of these questions, in addition to some more general questions about the 924/944 series.

Enjoy!

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Index:

What parts from other cars can I use on my 924?

The definitive list is located on this website at:

http://www.924.org/parts/parts.htm

O2 Sensor Operation

I have a 1982 924 and soldered a shielded 'pig tail' at the K-Jetronic control box under the dash so I could hook up a Digital Voltmeter to monitor the O2 Sensor voltage. after warm up the voltage was .75mV at idle but would vary wildly from .05 to .8 volts going down the road. After my little road trip, the voltage would also vary wildly at idle also. Am I wrong to check the sensor voltage in parallel while connected to the control unit?? Any other reason why it would have such erratic readings?

The O2 sensor allows the frequency valve to adjust the fuel level as the air/fuel mixture changes. It's normal for it to be constantly changing. 0.75mV at idle sounds right. So, varying readings of .5V to .8V sounds right also. At worst, rich rather than lean.

Check out the tech section, there's a link for Bosch Injection theory -

http://www.students.tut.fi/~hezekiel/bosch.htm

Quoting it:

"What the voltage tells:

The range is typically from 0mV to 900mV. The voltage rises as mixture gets richer. The "funny" thing is the voltage leaps from, say, 250mV to 650mV very rapidly at air/fuel ratio 1. It's not the best for fuel economy nor performance, but it's the range where cat-equipped cars try to keep the mixture. So, you'll most likely to operate just "rich" or "lean". Of course 900mV means loads of black smoke from the exhaust and 750mV is better reading at WOT for an every-day car. On the other hand, the system can be tuned to indicate 0-200mV at moderate cruise and coast.

Monitoring the voltage is most easily done with a common electronics voltmeter, but it's hard to look at during driving especially in the night-time and refresh rates might be inadequate. Everybody I know uses an led bar, whose instructions can be found here. BTW: Please don't take the voltage readings as absolute truths. Lambdas are slightly different from each other but the scale they use is the same. I tweak, therefore I am :)"

The references aren't specifically about Porsches but the voltages stated are pretty much the same as I've seen stated for 911's. Concept is the same.

How should the radiator fans operate, or why don't my radiator fans come on?

With the key 'on' and the AC switch 'on' both fans should run full speed.

In order to provide power to the fans after the ignition is switched off, an additional circuit exists with a large resistor (to limit the fan speed and therefore the draw on the battery). If the resistor is bad it will only affect the operation of one fan at low speed with the key off. So, if the fans are not running at all it is not the resistor (though it may still be bad).

The first question is to establish if the temp switch in the radiator is working. The switch is located in the upper left corner of the radiator. Remove the two wires from the switch. If the fans come on when the two wires are touched together (at any temperature), but not when the engine is hot, then the switch is bad. The Haynes manual also lists a procedure for heating the switch up and checking it's operating point, but this is the simplest method and does not require removal of the switch.

Again, if not even one fan comes on with the wires touching together and the ignition off, the resistor mentioned above is bad. On early cars it is a large rectangular object mounted above the radiator, near the temp switch. On later cars (78-onward), it is a round-shaped object mounted behind the driver's side of the dash to the firewall. In either case, it's made of a ceramic material and has two wires going through it. Check for an open circuit using an ohmmeter/multimeter. If no open circuit, check for a break in the wiring or a short.

If the fan(s) will not go on with the ignition on, or only one fan operates at a low speed (as with the ignition off), then the ignition-on supply to them is suspect. Using the wiring diagram in the Haynes manual appropriate to your car, trace the circuit back from the switch to determine where the break or short is. The way the circuit is designed is that power (+12VDC) comes into the fans either directly from the battery through a fuse and the large resistor, or through a relay (switched by the ignition) and then a fuse, then to the temperature switch, and then to ground. Thus, one side of the temp switch should always be grounded, and the other side of the temp switch should always have power. If the resistor is out, that side of the switch should still have voltage with the ignition on. If not, check the relay (and fuse) and wiring to and from the relay.

CIS Testing/Diagnosis

The two best source manuals for the testing, diagnosis, and repair of the CIS (fuel injection) system in the

924, also referred to as a K-Jetronic, are the Haynes manual for the 924 and "How to Understand, Service, and Modify Bosch Fuel Injection & Engine Management" by Charles O. Probst, SAE. The Haynes manual gives a basic understanding of how the system on the 924 works, as well as all the basic information necessary to troubleshoot and repair the system. However, it's a bit sketchy, so using it to troubleshoot and repair the system requires a lot of blind faith. The Probst book is the complete, in-depth bible of Bosch FI systems. It includes, as the title would suggest, not just information on the K-Jet-based systems, but also L-Jetronic and Motronic, Bosch's electronic fuel and engine management systems.

The Probst manual is published by Robert Bentley, Cambridge, MA, USA (http://www.bentleypublishers.com). The majority of the information in the book is taken directly from Bosch's publications on the subject. This means the information is completely accurate; however, despite your expectations, it's also very readable! If you intend to play with fuel-injected cars, this is the manual to have – Porsche or not. The information applies to any Bosch FI car, even Alfas.

Because of the depth of information, getting the Probst book and reading it thoroughly is highly recommended, because doing so will give a much better understanding of how the fuel injection system works, which will prepare you for the task of diagnosing/troubleshooting/fixing the problem in your car.

The strongest point of the K-Jet system is that it runs pretty well without any electrical function beyond the fuel pump. If all hydraulic-related components are in working order, the engine should pretty much start and run when cold. Disadvantages are that it is very sensitive to dirt and other contamination of the fuel. This is one reason why 924's seem to like being driven regularly – regular driving prevents any contaminants from settling in the system and having a chance to create a problem.

OK, so enough of all this praise of the stupid thing, tell me how to fix it! My car won't run right, I don't think it's so hot!

Trust me, the system is very reliable once in proper working order. Only when the components are worn out, or the electrical system is a mess, can the car be unreliable.

So, you must start with the basics first. In addition to making sure all the electrical components are in good working order (a trip to the Tune-Up section of this FAQ would be advised), the air and fuel filter should be replaced – the service interval on the fuel filter is 15000 miles – and the system must be checked for vacuum leaks. The CIS system is very intolerant of vacuum leaks, large or small, so check every little last piece of hose and plumbing, and replace anything that threatens a leak. A piece of extra vacuum hose stuck in the ear can help to locate vacuum leaks. Of particular concern are the two large rubber boots, referred to as the FI boots, that are on the throttle body and fuel distributor. These get dried out and crack over time, creating leaks. The only solution is to replace them.

It's also a good idea to a) make sure the fuel pump is working, and delivering fuel to the engine compartment, and b) not about to die – not making a lot of noise. See the Fuel Pump section of this FAQ for more detail.

Next the engine wiring harness should be inspected for damage. This is what supplies power to all the electrical components of the injection system, except for the fuel pump. Look for any obvious breaks or damage. Make sure all components are plugged in, particularly the cold-start valve, the thermo-time switch (located at the back of the head, under the water elbow – hard to get to, but critical for a good cold-start), the auxiliary air valve, and the control pressure regulator, also known as the warm-up regulator. Instructions for checking out all of these except the control pressure regulator can be found in

the Cold-Start section of this FAQ, as they relate primarily to starting the car when cold; we'll only deal with the control pressure regulator in this section.

Next is to check out all the fuel lines. If necessary, clean off where any joints/connections are made with some brake cleaner, run the engine (or just the fuel pump, if the engine won't run) and look for leaks. If the engine will run, squirt some water onto the backs of the fuel injectors at the head – this will check for leaks of the o-rings that seal the injectors into the head. If the engine bogs down or stumbles, you can tell there is an air leak on that injector.

So, on to the injectors. The o-rings that hold them in should be replaced unless that was done recently, as they dry out and leak air (see above). The injectors should all, one by one, be pulled out of the head and checked for spray pattern. They are hard to pull out, especially when the o-rings are old and stiff. Replace those o-rings! The factory makes a tool that is designed to pull the injectors out, but they can be pulled out without damage if care is taken – just don't pry on the injector line, it's not designed to take the load and will snap and have to be replaced. One option is to use a pair of vice-grips clamped onto the top of the injector and pull straight up.

Once the injector is out of the head, activate the fuel pump and watch the injector spray pattern, directing the fuel into a fuel-proof container like a glass jar. The injectors should all have an even cone-shaped spray pattern – if any injectors show any unevenness, lopsidedness, spray fuel all off to the side, or continue to dribble fuel out after the pump is shut off, they should be replaced or cleaned by a shop that cleans fuel injectors. The unevenness will cause rough running and loss of power; if the injector dribbles out fuel after pump shut-off, the loss of pressure will cause hot-start problems. They are designed to shut off fuel delivery below about 30psi. Reinstall the injectors in the head with new o-rings (and new injectors where appropriate).

Check the fuel distributor plate/metering arm for free motion by removing the air filter and gently but firmly lifting it from below through its range of motion. If the arm sticks anywhere, this could be a problem. Center the plate with an even gap of 0.10mm or 0.004in all around – loosen the center bolt to adjust if necessary.

Finally, the fuel pressure regulation will need to be checked. For now, I will leave this up to the Haynes manual and Probst's book to describe; I will only mention here that it does require the proper gauge and fittings to check as described in the manuals. Also be aware that the gauge required must go up to 100psi, as the test pressures can go up nearly that high (much higher than electronic fuel injection systems), as well as being rated for use with fuel.

What should I do to tune-up my car?

> Tuning up the engine can be split into two sections, electrical and fuel injection. The latter consists of ve
> properly. After all electrical issues are sorted out, and a new fuel and air filter are installed (which shoul
> idle speed is set and the idle mixture is set. If the CIS is not all working properly, or if the engine will sti
> with all the electrical tune-up items, you need to work through the CIS testing/diagnosis section above.

First on the list of electrical items is to start with new spark plugs, wires, distributor cap, and rotor. Plug
they can be cleaned either by sandblasting or by heating till red-hot with a propane torch to burn off dep
relatively new – spray WD40 or CRC into a rag and wipe/scrub the wires individually until clean – or re
otherwise damaged. Cap should be clean and free of any cracks or scarring, inside and out. Any cracks c
the spark to literally leak away from the intended wires. Pretty cool to watch at night, but kinda hurts th
damaged cap, or clean a good one inside and out with brake cleaner (leaves no residue, unlike WD40, w
Replace the rotor also, as a set with the cap.

The ignition coil should also be checked. The resistance of the windings should be checked per the Hayn
be removed, cleaned off (use brake cleaner on the top to avoid residue, again). Remove all corrosion fro
and from the wire connectors that screw onto those terminals. Visually inspect the outside of the coil for
the clamp that holds the coil can crack the coil body and destroy the coil. If the car is fitted with ballast r
the contacts on those and their wire terminals also. Reinstall the ignition coil – carefully!

Battery, ground, and starter cables should also be new, as they corrode and break over time, resulting in
problems. Fortunately, these are sufficiently generic parts that they can be purchased from any local autc
mail-order parts are an unnecessary expense. Replace the battery ground strap – it grounds to the wall o
in which the battery sits, just by the battery. Make sure to clean the stud, nut, and star washer when repl
bite into the metal of the strap and nut to make a good contact. Any corrosion here can make it incredib
cleaning and reassembling, protect these contacts from the elements with a liberal application of vaseline
applies to the battery terminals themselves.

The next ground strap of concern is the engine ground strap. Again, this should be replaced, as they die
the firewall (right at the ignition coil mounting) and the rear-most stud of the intake manifold. Again, wh
the contacts at either end with a wire brush and project with vaseline. Some owners have also added a s
engine side (intake manifold stud) to the battery grounding location: not a bad idea, easily done, and can
grounds. Just buy a grounding cable from your parts store, about 3 foot long, with ring terminals at each

One more ground strap to take care of, and it's the hardest to reach. This is the grounding strap for the a
back of the alternator to the block. Clean/replace this if you're having charging problems; usually it's no

The cable to the starter should be clean with clean contacts. In particular, there is a white nylon 3-pin cc
on the firewall. This connector can become flaky, giving intermittent contact and causing starting/chargi
removed from either side of the connector with the flat end of a hairpin (stuck in the face of the connect
cleaning. While they are out of the connector make sure that they make a good hard contact on each oth
female ends a little tighter to improve the contact – they get worn out and loose over time.

The ignition timing should then be set using a timing light, as per the specs in the Haynes manual or und

> Finally, one more thing to check – the connector to the ignition box. On some cars, the connections can intermittent ignition faults. The ignition control box is an alloy box located on the front of the left front v wiggle the connector to it, and tap the box with a screwdriver handle. If the engine misses or stumbles, s broken solder joints in the ignition box, respectively. If the problem is caused by wiggling the connector, use the same method described above, with the hairpin, to remove and clean the contacts. If the problen itself, then it might need to be opened up and all the solder joints re-flowed (heated with a soldering iron Fortunately, the latter is not too common.
>
> Once all these electrical matters are taken care of, the rubber boots in the intake system (one on the thro distributor unit) should be checked to ensure that they are clean, in good condition, no cracks or other da clamped. The CIS system will not tolerate air leaks. RTV Silicone is not capable of sealing/repairing the damaged. Expensive maybe, but money well spent. Similarly, check for any other vacuum leaks.

Why won't my car start when it's warmed up, even though it starts fine when it's cold?

This is a common problem on 924's. The first thing to do is make sure that the car is running and tuned properly. Go through the tune-up section above, to make sure all the basics are covered. Secondly, make sure that it's only a hot-start problem, not when the car is cold. Cold-start problems are different, with different solutions (cold-start FAQ section).

If none of these fix the problem, chances are you do have the "hot-start' problem. This is caused by fuel pressure not being retained at a high-enough pressure after engine shutdown. It is characterized by an engine that will restart within, but not after, about 15 minutes of engine shutdown. To fix this problem, go to the Technical Section under Fuel System.

Fuel pump issues: Why does my car have two fuel pumps? Is my fuel pump bad?

One symptom of a bad pump, broken hose, and/or clogged screen is engine misses at high power under severe cornering at progressively higher fuel quantities. A good system will run on a track all the way to 'empty' without problem. If the problem is not tied to cornering or gas level, there’s a possibility of simply a clogged fuel filter. The fuel filter is located in the engine compartment near the air filter; the pump is bolted to the rear fender behind the right rear wheel. Later cars have an additional fuel pump inside the tank.

This was part of the continuous improvement to correct fuel supply inadequacies. The in-tank pump is low pressure and simply provides a pressure 'head' to the high pressure pump. This is common practice, for example, in aircraft turbine engines that use high pressure (HP) pumps which rely on the fuel for lubrication of the HP pump. Exactly the case in the 924.

Before replacing the fuel pump, however, consider replacing the fuel pump relay and fuse. These are much less expensive, and are also subject to deterioration too. Just check to make sure you can feel the relay “click” as it closes the contacts when the engine is switched to start. You can also use a voltmeter at the fuel pump contacts to check for power back there – a break in the wiring is possible, though unlikely.

Anyone with in-tank pumps should take the time to pull the unit for inspection. The pump is connected to the fitting by a short section of 'hose'. After all these years you may find the hose is cracked from vibration. If so the system is essentially gravity feed to the HP pump intake. A separated hose leaves the pump connected to the tank fitting by only the 2 electrical wires, so remove the unit carefully.

On the inlet side of the submerged pump is a fine mesh screen. It also, has been in there for some 20 years and WILL be at least partially clogged. 'Slosh' it in clean fuel and use a SOFT toothbrush to dislodge the crud. You do not want to force crud into the screen where it will eventually make its way to the expensive main HP pump.

With the pump assembly DRY of GASOLINE!! Hook it up to a 12 volt battery. Use wires long enough that any spark will be removed from the pump! If it spins (makes noise is the technical term) then it works. For more detailed testing of the fuel pump, to check on how well the pump is performing or how likely it is do fail, see the Technical Section about the Fuel Delivery System.

What kills the pump(s) is bad quality gas, crud in the gas tank, or repeatedly running the tank dry/nearly dry. These pumps rely on the gas to cool the motor, so they can quickly overheat and seize if run dry. The pump element is a roller pump design. The original Bosch pumps used and still use metal roller elements. Consult the Haynes manual for a diagram of what this looks like. What it means to you is that there are very close tolerances in the pump element that do not tolerate dirt. If they get dirty, they will jam. Similarly, if they sit with watery fuel, the water will corrode the pump elements and cause them to stick. Pierburg, a subsidiary of Hella, makes a better pump - they have plastic roller elements which can tolerate the dirt, and won't corrode in water. This also supports the recommendation that you drive your car regularly! If you keep passing fuel through the system, water in your fuel will not have time to settle and cause corrosion, and dirt build-up will be kept to a minimum. See the Technical Section on Fuel Pumps for more info and part numbers.

If you have an early '77 924, and are shocked by the cost of the replacement fuel pump!!! Read the Technical Section on Fuel Pumps for information about how to update to a later-style pump for a fraction of the cost of the old style.

What bolt pattern does the 924 use/What other cars can I use wheels from?

The normal 5 bolt pattern for most Porsche cars is 5 x 128mm. The 4-bolt cars use a 4 x 108mm pattern. More info on wheel offsets and sizes can be found in the Technical Section.

Here is a list of other (non-Porsche) cars which use the same 4x108mm pattern (from http://www.mr2.com/TEXT/WheelBoltPatterns.txt). However, wheel offsets are likely not exactly what is needed for the 924, so exercise caution.

They list the 4 x 108mm pattern as being used by:

Alfa Romeo (exc. Alfetta)

Ford - Fairmont '78-'86

- Mustang 4-bolt patterns '74-'93

- T-Bird '80-'88

- Pinto '71-'80

- Fiesta '78-'85

- Escort all (RWD and FWD)

- Cortina all

- Taurus, Tempo, EXP to '89

- German-built Capri I, II, III '69-'8?

Mercury - Capri '71-'88

- Cougar '79-'88

- Merkur, Topaz, Lynx '80-'89

- Zephyr '78-'86

Plymouth Cricket

Porsche - 924 '77-'84

Sunbeam - Tiger, Alpine '65-'70

My speedometer/odometer is bouncing/not working. Why?

The speedo is mechanically driven off of the front left wheel; a cable is driven by the dust cap on the front left hub, passes through the spindle, and up to the speedometer. On later cars this cable is actually in two pieces, one to a box which is used to count miles, to trip a light which warns the driver to replace the O2 sensor. The second half then goes from this box to the speedometer. This box is a stainless steel unit under the dash – just follow the speedo cable.

It is common for the cables to rust and/or break, particularly if the cable housing is broken. If the speedo itself is not working, check that each segment is free turning (but not broken). Sometimes a bouncing speedometer can benefit from lubricating the cable; if it is not possible to remove the cable from its housing to clean and grease by hand, then pour some ATF down into the cable and let it drip through. However, the best thing is to replace the damaged cable with a new one.

If the odometer is not working, it is possible that an internal plastic gear has popped loose. For details on how to fix this, check out the 944 FAQ at: http://www.ConnActivity.com/~kgross/944faq.html

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My 924 Turbo/931 is backfiring/running rough – How can I fix it?

My 81 924 turbo is kicking back and backfiring. I've noticed that when I turn the key to the "on" position my tachometer starts to flip around. I also am getting spark out of the ignition coil in the "on" position. Is my ignition control unit on the blink? If so, is it mounted on the drivers side wheel well, just in back of the headlight? Just wanting to make sure!

I had the same problem. Turned out to be a loose connection on the digital control unit directly behind the center console under the heater box.

One of the main differences between '80 and '81 turbos is the ignition system. The '80 model has a system similar in operation to the earlier non-turbos in that it uses a distributor that has flyweights and a vacuum actuator to control the timing. The '81 uses a sensor on the flywheel to determine instantaneous engine speed and crank position. The signal from the sensor, along with intake manifold pressure, is sent to the DIC control unit under the heater. The control unit then digitally determines the proper ignition timing and fires the coil. It sort of freaked me out when I went to set the timing for the first time and was not familiar with the system. The tune-up spec sticker on the fender well gives a value for the timing so I went to set it, but moving the distributor had no effect. The Haynes manual also mentions another ignition control unit (there are two for this car) that is in the same place as the earlier cars, on the drivers side fender well behind the headlight. I would check all the connections to both ignition units and the coil, as they can get dirty or corroded or both.

Electrical Problems

I have all kinds of non-serious but annoying electrical problems. When I turn on the turn signals, sometimes the seat belt light comes on. The windshield wipers come on on their own for one swipe at random, and my gauges read high, especially when the A/C is turned on. The temp gauge, for instance, jumps up and down 20% or so as I turn the switch on and off. The gas gauge reads high sometimes, and the temp gauge flickers, especially when I hit bumps.

Behind the dash, just behind the fuse box, all of the grounds for just about everything connect to the body in this little ring of connectors welded to the underside of the sheet metal under the wiper motor. If you are on your back, with your head against the clutch pedal (I've spent many an hour in this position, not fun), look straight up behind the fuse box and you will see what I'm talking about. Actually, you may need to remove the fuse box from its holder so you can get a better look. Don't undo any wires, just remove the screw holding the fuse box in the holder and push the whole thing forward, after disconnecting the battery. Anyway, the point of the story is that the ground connections at this ring tend to get loose or dirty/rusted.

Every time I've had an electrical problem of the sort you speak of, it has been one of these grounds causing it. I've had problems with the plug on the back of the temp/gas gauge getting loose also. The

motor ground connects to the frame at the coil mount. I added another from one of the bolts on the drivers side (left) engine mount bracket to one of the bolts holding the steering rack. This made a huge difference in starter cranking ability.

The thing that helped my electrical problems the most was the addition of a ground cable running from the chassis connection for the negative battery cable, to the engine block. I read about this somewhere, and it worked. I just ran a 2 ft length of black battery cable from the connector to the front of the head on my turbo, where there were a couple of unused bolt holes. Also, if you haven't replaced the uninsulated negative cable, do so, using a good insulated replacement.

Transmission swaps:

931/924:

Different shaft sizes are used through the torque tube and input shaft: The flywheel is a different diameter, as is the clutch too. Likewise, the bellhousing, starter, transaxle (25 mm on 931, 20 mm on 924). In order to swap a transmission from a 931 into a 924 or vice versa, all of these components (and possibly more) will need to be changed.

Snailshell:

Swapping the snailshell transmission into a non-snailshell-equipped car is much more complicated than simply swapping between the 4-speed and 5-speed Audi transmissions. This is because the snailshell transmission mounts to the torsion bar carrier. See the Technical Section – Transaxle for pictures. The shift linkage is also different. It’s easier and less expensive to procure an Audi-based replacement.

The shifter on my ’79 924/80 931 is very sloppy/Snailshell shifter bushing replacement

There is one main wear point, beyond all others; certainly the bushings up at the shifter itself can wear, but they're easy to get to (just pull up the shifter boot). The worst is the part of the linkage over the transmission.

The way the linkage works is that there's actually two rods, but only one, the left one, is actually connected to the selector rod coming out of the transmission. The right shift rod is only a guide tube of sorts. This guide tube has one guide bushing at each end.

Likewise, up at the front end of the actual selector rod, under the shift lever, there are 4 identical bushings, PN 999 924 002 04. On my linkage, however, I found the bushings at the rear of the selector rod to be the main point of wear. Unfortunately, access to them is virtually impossible without removing the transmission, which is why it pays to check the bushings at the shifter first.

The rear of the linkage is set up just like a universal joint. There is an aluminum casting which slides onto the selector rod coming out of the transmission, secured to it by a conical bolt (straight bolt with a conical end, available from the dealer if necessary). Once the bolt is fully removed, the casting slides forward off the transmission selector shaft. A pin secures the casting on the selector shaft coming from the gearshift lever. This pin is pressed through the end of the shaft in an interference fit, with one each of the suspect bushings on each side. The pin is tapped out with a hammer and drift, all the way through. After removing the casting, you can easily see the grey plastic bushings.

How can I upgrade my brakes/convert to the 5-lug brakes? What parts will I need?

The 4-wheel vented disc brakes that came standard on the 944 were first offered on the 924 as an option, known by the option code M471. This means that they are a bolt-on upgrade for 924's that were delivered with the original brake system of solid front rotors, drums in the rear. Distinguishing the two is easy without crawling under the car, as the disc/drum setup has 4-bolt wheels, whereas the disc/disc setup has 5-lug wheels.

So, converting to the 5-lug setup is really just a matter of unbolting the old components and bolting on the new ones. The hardest part is making sure you have the right parts.

First on the list is all the parts that should be replaced anyway, as they wear out and are likely already gone on the incoming parts. The wheel bearings, brake pads, brake hoses should be replaced. The brake discs should at least be turned, or replaced if too thin.

Parts that will need to be obtained from a donor car – either a 5-lug 924 or a 944 – are the brake master cylinder and booster, front discs, calipers, hubs, and spindles, and rear calipers, discs, hubs, and brake backing plates. Additionally, the hard lines that bolt up to the rear calipers should be obtained, though they can be bent from new line if necessary. For street cars, all parking brake hardware including both parking brake cables must be obtained also.

The front spindle/steering knuckle is different, and must be replaced as a unit with the hub and caliper, but the strut and the A-arm is the same, except for early 924's (77 and earlier) which use a smaller balljoint. However, the later balljoint with the larger shaft can be swapped in without replacing the A-arm, as the balljoints are replaceable.

In the rear, less work is necessary. The backing plate which supports the caliper bolts on in place of the backing plate of the old drum brakes. The new hub which supports the disc slides on in place of the drum. However, it is adviseable, while the assembly is apart, to repack or replace the rear wheel bearings as mentioned above.

Finally, care should be exercised in the selection of the brake master cylinder. The 924 brake circuit has an X-split (diagonal corners of the car connected on the same circuits), whereas the 944 has a TT-split (front and rear on different circuits). If a 944 M/C is used, the brake lines will need to be re-routed to have the proper proportioning of the brakes front-to-rear.

First-time buyer's advice

I am planning on buying a Porsche 924 because I love the car - but I don't know much about the car. For example, what should I look out for?Are there certain weaknesses to the car that I should know about?

1. Worn camshaft. Listen for 'ticking' noise from top of engine.

2. Bad clutch disk. Test if there is a lot of drivetrain backlash when going from acceleration to deceleration or vice versa.

3. Bad engine mounts. Check engine for excessive vibration at idle.

4. Cracked driver's seat.

5. Cracked dashboard.

6. Bad bearings in clutch, transaxle or gearbox. Listen for grinding sounds in neutral that stop when you press down the clutch.

7. Odometer not working. Very common - can the car's mileage be trusted?

Even if in good condition, a 20 year-old car will probably need some repairs. Yes if the car is in good conditions it is worth, but some parts are more expensive than others: shock absorbers, exhaust, brakes (master cylinder), head gasket (the car will have probably more than 80kmi), clutch, and other item. You can have lots of fun with the 924, more with 931 (924 turbo) but more maintenance and costs. Despite this some 924 owners would prefer, after a few times, a 931.

You can also check:

http://www.multimania.com/toussain/924site/presframefr.html

http://www.986.org/944FAQs/ (First-Time Buyer Questions)

HOW TO BUY A NEAR PERFECT PORSCHE 924

(http://home.wxs.nl/~wengelsm/924corner.html)

My dashboard is cracked? What can I do to fix or replace it?

The most inexpensive solution is a dash cover from any of the mail order parts houses that sell parts for the 924/944 series. The most expensive thing to do is to replace it outright – replacement dashes cost just under $1000USD. A company in California, Just Dashes, can recover your dash if you remove it and ship it to them. Finally, the cheapest solution is to just live with it – most 924's and 944's have this problem!

Where is that gas smell coming from? When I fill car up at the gas station it smells like gas until I burn off about a quarter tank. Why?

The fuel filler hose goes from the top of the gas tank to the filler cap by way of the passenger compartment. It's only separated from the passenger compartment by carpet and a plastic cover. Over time the hoses can become cracked, or the hoses can become loose. Pull back the carpet in the trunk and check the clamps for tightness. If no luck, then replace the hoses. Be sure to use hose that is rated for gas and oil.

My engine starts, then stalls…

If this happens when warm, try checking the control pressure regulator. This sets the proper fuel pressure, and create a problem. If the problem only exists when the engine is cold, look in the *cold starting problems section* of this FAQ. Otherwise, see the *CIS tuning/diagnosis section* of this FAQ and go through all steps to ensure that all CIS components are properly functioning. Also ensure that the ignition components are new and in good condition, and that the ignition and timing are properly set.

924/931/944/951/350 Engine swaps, or how can I make my 924 blindingly fast???

For information on installing a V8, don't post on the lists or discussion board, just check out the link below:

www.renegadehybrids.com

What about installing a 944 engine in a 924? It's cheaper to buy a 944 or a 931.

Finally, some words from a lister:

The topic of engine swaps seems to come up here ALL the time. It seems that most people want to do the swap because they feel that the 924 engine isn't powerful enough and doesn't have much potential per dollar spent as far as modifications. This is certainly true. A set of high compression pistons, a camshaft, head porting, and a header will probably cost upwards of $1200 if you do the work yourself. And on top of that you'll be lucky to get 160hp out of it. While 160hp in a 924 is reasonably quick, most people don't want to spend the value of their car in modifications and still get kicked around by Acura Integras. And sure, you can throw out of back seats and all the carpet and insulation and interior trim, but if it's not a racecar, you're really compromising the utility of the car. And maybe being a little ricey in the process.

The Chevy 350 swap is a popular topic of discussion. Hey, who doesn't want a really fast 924? But the cost of the kit, without engine or cooling system upgrades or brake upgrades (unless you already did a 944 swap or have the front/rear discs as an option), is around $2000. Figure around $500 for a complete (all accessories, etc) Chevy V8, $200 or more in custom exhaust work, all the necessary cooling accessories, etc., and you're talking about almost $3000. And that is for a carbureted Chevy V8. Sure, it'll make tons of power, but the swap will cost you around twice the value of the car! Sure, the parts are cheaper to replace when they break, but considering the initial investment, it hardly seems worth it. And on top of that it will destroy the balance of the car and throw off all the handling characteristics. And the added weight over the front wheels will make the car VERY difficult to steer at low speeds.

Of course, you could do a different swap, like a 944 engine, a 928 V8, or an Audi turbo engine. But unless you do your own metal fabrication, it's still likely to be a very expensive swap. Add to that the difficulty of wiring up a different fuel injection system, running fuel lines, and working out all the quirks of the swap, and you're still out a lot of money and time. And in this case parts will be more expensive than stock 924 parts.

As I see it, the only reasonable thing to do if you're unhappy with the amount of power the 924 has is to sell it, and buy something faster. I wanted a faster car and didn't want to have to sell a kidney to make it fast enough for me, so I got the best of both worlds and got a 931. I really like the look of the 924 in modified form (newer rims, spoiler), love the handling, and am satisfied with the part prices. I didn't want to get a 944 (part prices ridiculously expensive, only 150hp and hard to upgrade) although I really like their look too. I didn't have much money to spend either. The Nissan 300zx Turbo and other 80's Japanese sports cars looked too old and felt too plasticky for me. The 931 was a good choice for me, good power output stock, 924 handling characteristics, better brakes, etc. They are rare cars also, which I like (944's are everywhere around here). And they have great upgrade potential (Patrick's 931 is a great example of this).

You can pick up a very nice 931 here in the US for around $2000, and get a nearly perfect one for $3000. Consider selling your 924 for ~$1500, and you're talking about $1500 spent vs. $3000 for a Chevy 350 swap. Spend the extra $1500 on Koni's, newer wheels/tires, a boost controller and an intercooler, and you can have a 225+hp daily driver with great handling and reliability. Plus you get to tell people that you drive a Porsche Turbo :)

Jon '81 931 '80 924

Where can I buy Euro bumpers for my 924?

Check out the following links:

http://www.v-zweeden.com/ned.htm

http://www.clubautosport.co.uk/index.htm

http://www.ianseuroparts.com/used_parts.htm

http://www.hdrogers.com/europarts.html

My power windows move too slowly – how can they be made faster?

Clean the contacts on the switches (on the inside door panel, both driver's side and passenger side switches). If this doesn't help, try cleaning and greasing the window guides.

My power windows don't move at all!

Check the fuse on the power window relay (as well as the relay itself for the windows). The relay should be located up under the dash (but not on the main fuse/relay board) near the steering column. Also clean the contacts on the switches as noted above - the current for the passenger window passes through the driver's side switch, so check them all.

Can I switch out my 85mph speedometer with a faster one?

Yes – the gauges push out towards the driver from behind, and different scale speedometers are interchangeable.

The 85-mph speedometers were mandated by the US federal government in the early 80's in an effort to get people to drive slower and conserve fuel. It is for the same reason that the national speed limit was set at 55mph. However, this regulatory goal may or may not have something to do with the US government giving large amounts of money to the Chrysler Corporation to produce K-cars.

Can I fit the 85.5-onward (oval-style) 944 dash in my 924?

No. The internal structure of the body, as well as the HVAC system, is incompatible with the later style

dash. Either look into buying a dash cover from one of the mail-order parts suppliers, or have the dash recovered.

Where is the warm-up regulator/control pressure regulator located?

The control pressure regulator, or warm-up regulator, is located at the back of the intake manifold. It's difficult to see it without removing the coil. It's about 2x2x3 inches and has two fuel lines and an electrical connector going to it. It's difficult to remove, due to the location. It's held on with two allen bolts, 5mm size.

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931 Oil Line bolt torques

(from the 924.org discussion board)

OK let's start from the top. First, there are four banjo bolts that are associated with the oil filter mounting block. One holds the oil filter mounting block to the engine block and is torqued to 43 ft lb. From there, the book is a little unclear as to the torques for the various lines. The two banjo bolts that hold the lines going to and from the oil cooler have 22 or 24 mm heads. The single banjo bolt in the line going to the turbo has a 19 mm head just as you said. The book gives a torque of 41 ft lb for "oil line banjo bolts-to-filter mount".

Then it gives a torque of 61 ft lb for the "oil feed line-to-filter mount". I have no idea what line they are talking about, especially after step 33 of "turbocharger removal and installation" again says "Torque all banjo bolts holding oil lines to the oil filter mounting block to 41 ft lb". The big oil drain lines get torqued to 61 ft lb and it would not surpriseme if Haynes has a typo regarding something here. Now, being the cautious mechanic that I am, knowing that banjo bolts are typically weaker than regular bolts and realizing that the filter mount is aluminum with heli-coil inserts, I personally wouldn't torque any of the banjo bolts past 41 ft lbs. If they leak, especially the two big ones going to the cooler, I might increase the torque in 5 lb increments until they stop leaking. The only problem is that if someone has previously over torqued the bolts, the housing could be damaged to the point that no matter how much torque you put on the bolts, the thing still leaks. This was the case in my car when I first got it. The heli-coils had actually been partially pulled out of the filter mount and I had to buy another one (a good used one, of course). I agree that the book is very vague on this subject, but if you use the lower torques first (with new sealing washers), you should be fine.

My car won't start/won't run when it's cold!

There's a few things that need to be working properly, in addition to the basic CIS function described above, in order for the engine to start easily and smoothly when cold. In addition to the engine being tuned properly (ignition as well as the CIS), and all ground cables replaced and in good condition (a very common starting problem), the cold start valve and auxiliary air regulator must function properly.

The aux air regulator (or aux air valve) is simply a throttle bypass that heats up and closes over time. It is

bolted to the intake manifold behind the throttle body, with one end connected to the rubber intake boot, and the other connected to the intake manifold by another hose. An electrical connection is above the hoses. Check the Haynes manual for more detail.

When cold, it simply allows more air around the throttle plate, allowing the engine to run, just like holding the pedal down. If this is working properly, the engine should idle properly immediately after starting without touching the gas pedal. In fact, if all the stuff in this section is working properly and the engine is tuned properly (on a stock car), you should simply be able to reach in the window of a dead cold car (even well below freezing temperatures) and crank and start the car.

So, how do you tell if the aux air valve is working? Well, usually when you work on your car, the temps will be relatively decent, and the valve will be mostly closed anyway. To ensure that it opens properly when cold, you should remove it and stick in the freezer (after putting it in a plastic bag!). After an hour, it should be at least halfway open – this can be established just by looking through the ports where the air hoses attach.

Then you need to make sure it is getting power to warm up; it's closed by a thermally-sensitive bimetallic strip (a strip of two metals with different thermal expansion rates, which causes the strip to bend in one direction or another as a function of temperature) which pushes the valve closed. The bimetallic strip is heated by a resistive wire that it's wrapped in; it can also be heated by the warmth of the engine it's bolted to! Usually the latter method works fine, so usually the only problem will be getting power to it. Using a voltmeter, confirm that it's getting +12 Volts DC (VDC) across the terminals of the connector when the ignition is switched on.

If not, there may well be (and often is) a problem with the engine wiring harness; no big deal, easily fixed by rewiring. The power is on the same circuit (on most 924's) as the fuel pump. If +12VDC is not measured, check the voltage and resistance on either pin of the connector to ground; one pin (which supplies power) should have +12VDC to the engine block/intake manifold when the ignition is on, and the other should have zero or under 0.10 Ohms resistance to the block or intake manifold. If there is too much resistance to ground, check the grounds at the rear of the intake manifold; if no power, check a) that there is +12VDC on the center pin of the round, white nylon, 7-pin connector (on the vehicle side of the connector) at the firewall next to the ignition coil, and b) that there is little to no resistance from this pin (on the engine side of the connector) to one of the pins on the aux air valve connector.

If the center pin of the round connector is not getting power, then there is a break in the wiring between it and the fusebox. If there is substantial resistance or no continuity between the two connectors (the round connector and the aux air valve connector), then there's a good chance of damage to or a break in the wiring between them.

In both cases it will be possible to splice in a new piece of wire; make sure it is large enough (at least 14-16 Gauge wire, in this case) to handle the current, and that any wiring splices are protected from weather, preferably by shrink-wrap insulation (vinyl wiring tape will crack in the cold, and allow water in at any temperature – shrink-wrap can be bought at most any electrical supply store or hardware store), and also preferably that the wiring splices are soldered. Under no circumstance should the wiring simply be twisted together and wrapped with tape! The goal is to make the car more reliable, not less!!! The connection will either vibrate apart or become corroded. Always use new wire, too – wiring insulation can break down over time due to light, ozone, and temperature. Using old wire will be no better than twisting wires together.

The wire to heat the bimetallic strip must also be checked to ensure that it has not broken internally. This can be confirmed by measuring the resistance of the wire, which is to say check the resistance across the pins of the connector on the aux air valve. This resistance should be on the order of 5-10 Ohms. If not, there's a likely break.

If all this checks out, there may be a problem with the cold start valve (CSV). The CSV could fail in one of two ways. Either the CSV itself is bad, or it is not being controlled properly. The CSV is bolted into the back of the intake manifold, and has one fuel line going to it, and one fuel-injector type connector (same as the aux air valve). It is controlled (given power to open and spray fuel into the intake) by the thermo-time switch, which, as it's name implies, will close and allow power for a set amount of time depending on what temperature it is.

To clarify how it works, the CSV shoots a spray of fuel into the intake for a period of time at engine start. If it is working properly, and the cold-start problem lies elsewhere, then the engine will fire right after cranking but not stay running the first few times. However, if the engine does not fire right up when cold, you can suspect a problem with the cold-start valve.

The thermo-time switch is very inconveniently located at the back of the head, and has a 3-pin connector. One of those three pins is grounded, one goes to the cold start valve, and the other goes to power – the same center pin of the round 7-pin connector on the firewall. Therefore, check to make sure that one pin goes to (has nearly zero resistance to) ground, one goes to one pin of the cold start valve, and one pin has little to no resistance to that center pin of the round connector. The other pin of the cold start valve should also be grounded.

The resistance of the CSV itself can also be checked – Haynes should have a spec for this, probably in the range of 5-10 Ohms. Look for an open circuit or a short, mainly. Haynes describes how to test the thermo-time switch – if you haven't found a break or short in the wiring, and the cold-start valve checks out, follow the procedure to test the switch.

Final notes would be a reminder that tuning problems when hot will be made much worse when the engine's cold. Cover the basics first – grounding problems, ignition timing/parts, and basic fuel injection tuning.

Where can I get the fixed headlight conversion/plexiglass headlight covers like the Carrera GTR?

To find out where to buy them, have a look at:

GT RACING - http://www.gt-racing.com/

INFINITE FIBERWORKS CO. -

http://www.allporsche.com/Acc.htm

Keep in mind that headlight buckets must also be replaced, and rectangular headlights must also be bought. This conversion is not exactly bolt-in.

Why does my engine/car shake so much at idle?

Worn engine mounts can cause a lot of vibration from the engine to come through to the passenger compartment while stopped/at idle. The right side mount is very often broken; it's a sort of spring, but proximity to the hot exhaust manifold can cause the spring to die. The left side mount is rubber, and doesn't break free, but the rubber will lose its strength over time and be too soft to damp the engine vibrations. Another sign of weak mounts is that the engine can easily be moved side-to-side by hand when turned off. Look at the Technical Section for more info and pictures.

Headlight motor problems

Check to make sure the relay, located on the side of the motor where the harness plugs in, is good. See if it clicks when the lights are switched on; if not, it may need to be replaced. The headlight switch itself could also be bad/have corroded contacts; these can be helped out with some contact cleaner.

If neither of these fix the problem, and the linkage is clean and in good operating order, then suspect the contacts at the connector from the vehicle harness to the motor. These contacts fail to make good contact over time, or the wires break. If none of the pins contact, obviously the motor will not work. If only some of them contact, the motor can act erratically, cycling continuously or intermittently. One way to check this (the easiest) is to wiggle both the plug itself and the individual pins while trying the switch on and off. If they are found to be the source of the problem, the pins can be replaced from an electronics supply house. However, the crimping required for these pins means the use of special, expensive tools. It may also be possible to tease the female side of the connector closed enough to make a better contact.

One final note is to make sure again that the headlights have room to raise and lower. A previously repaired frontal impact could leave internal sheetmetal damage that could interfere with the operation of the lights over time.

Sunroof component breakage

Breakage of parts of the sunroof latch mechanism is common, as they are only plastic. Fortunately, in addition to replacements from other scrapped cars, new parts can be obtained at a slightly higher cost from most of the usual mail-order houses. Specifically to the hinges, more durable replacements made out of aluminum can be obtained as well.

Water leaks

Battery box/tray under windshield: Rust through due to acid buildup and blockage of drains. Clean drains to ensure proper flow, and repair any rust through by welding in new metal and repainting.

Sunroof: Overflow due to blocked drain tubes. Seal can be replaced, but is expensive – first try using compressed air to blow the tubes clean. They exit from each corner of the roof, but are easier to blow out from the bottom; the rear tubes exit from the trunk area behind the rear wheels, and the front tubes exit inside the fender at the base of the windshield, each corner (accessed through the engine compartment). Just remove the sunroof, stick a compressed air nozzle in the bottom end of the tube and blow. This should resolve all sunroof leakage problems.

Rear hatch: Leakage here can be caused by one or both of two things. Number one is the rubber seal that goes all around the hatch; like all rubber, it's not good for much after 20 years. The other less promising prospect is that the rear hatch itself is coming apart. The glue that bonds the thin aluminum frame of the hatch to the glass can separate over the years of abuse, resulting in a source of leaks and noise. See the Technical Section for more info on how to re-glue the glass, or replace with a good hatch.

My door handles are stiff… how can I fix them?

The door lock mechanism needs lubrication. The best thing is to remove the lock mechanism as well as the handle from the door, soak down with WD40 to free everything up, and grease thoroughly with white lithium grease. This does require removal of the inner door panel. The door handle should also (preferably) be taken apart and cleaned and lubed with lock graphite – after the handle itself is removed from the door, access to the guts of the lock cylinder is easy.

However, that's a real time consuming task, especially when it's 20 below! So, if you want to put it off till the spring, use spray graphite in the lock cylinder (best is to use it regularly, once a year, as part of your winterizing routine), and hose the lock mechanism on the back of the door with WD40, open and close a number of times till everything frees up.

The disadvantage to just hosing down with WD40, and why it's recommended to disassemble and grease, is that the WD40 won't stay in place so well after a few months. However, it'll do a good job of freeing everything up, and will work for a little while. One better but more expensive option is HHS2000 from

Wurth (available from http://www.CareCareSpecialties.com) which will free up the mechanism, but provide a more durable lubrication. In either case, a proper disassembly and greasing in the warm weather should follow.

My car starts, but won't stay running./My car won't turn over.

The ignition switch can and will die, after time. If the car dies (like the ignition was turned off) immediately after the ignition switch is released to the "Run" position, but runs fine while in the "Start" position, suspect a bad ignition switch. Likewise, if the dash lights all come on, and if the car can be push-started, but won't even turn over when the ignition switch is turned to the "Crank" position, the ignition switch could be bad.

The best way to check this is to hotwire the car, bypassing the ignition switch. Go to the Technical Section - Bodywork for details on how to hotwire the car, and for instructions on how to remove and replace the switch.

However, if the car runs the same after hotwiring, then the problem is elsewhere. If the car does not crank, make sure the battery is good and charged, and make sure all grounds are clean and good. If the engine starts but does not stay running, you should be looking above at the section on Tune-Ups, and at the section on when the engine starts but stalls.

What options did my car come with?

The simplest way, once you have the option codes, is to look at the 924/944 FAQ (scroll down to the bottom) and look over the list. The option codes may be found on a sticker in the spare tire well in the trunk of the car. Then again, they may not be!

Another list of option codes, including some less-common ones, comes from Adrian Streather on the 911 list:

Here is a list of some interesting options. The numbers without a letter in front are the M option series and can apply to all or just one of the various versions of Porsches, 911, 924, 928, 944, 968. I have not attempted to work out which ones are specific to one only model. This is just a list of interesting and maybe unknown option numbers. I sent it to the Tavern so it gets to at least some of the 924, 928 etc people, I hope,

Ciao,
Adrian
911C4
944

024 Version for Greece
027 Version for California
030 Sport Group
031 Sport shock absorbers

034 Version for Italy
061 Version for Great Britain
062 Mud flap, rear (series equipment for Sweden)
062 Version for Sweden
113 Version for Canada
119 Version for Spain
124 Version for France
124 Yellow light (series equipment for France)
126 Stickers in French
130 Labelling in English
153 Engine parts belonging to a stipulated assembly for type 951
187 Asymmetric head lights
193 Version for Japan
197 Higher amperage battery
215 Version for Saudi Arabia
220 Locking differential
221 Porsche-locking differential
225 Version for Belgium
241 Shorter shifting travel
243 Shorter gear shift lever
258 Heating for outside mirror
261 Passenger side mirror - electric - plain
262 Outside mirror for passenger side, plain, manual
277 Version for Switzerland
302 Type designated on rear end
323 Sticker, without ESE-Regulations
325 Version for South Africa
346 Standard colour rims (silver)
347 Platinum anodized wheels
348 Forged wheels - Grand Prix White
393 Forged wheel 8J/9Jx16
394 Disk wheel, telephone styling 8J/9Jx16 Cast - Magnesium
395 Light metal wheels - forged
396 Disk wheel, telephone styling 8Jx15 rear
400 Pressure cast wheels
401 Light metal wheels
402 50 year anniversary car 1982
403 Pressure cast 17" wheels
405 Level control system
406 50 year anniversary car 1982
407 18-inch polished wheels
412 External oil cooler
414 Transmission oil cooler
415 Wider rear track
426 Special model World Champion 1976 1978
429 Special model "Sebring"
432 Sports steering wheel, leather 363mm (4 spokes)
439 Special model "Weissach" 1980
443 Tinted front and side glass, heated windshield

450 Light metal wheels
456 Sport shock absorbers and stabilizers
458 16" alloy wheels
462 Sekuriflex windshield
462 Special model "Weissach" 1982
463 Lateral glasses tinted, (Series Equipment for Australia)
467 Drivers side mirror, convex
470 Without spoilers, in conjunction with turbo look
471 Integrated rear spoiler
471 Sport group 1
472 Turbo with standard chassis 1980
473 With spoilers
474 Sport shock absorbers
475 License plate fastening (Series equipment Austria, Finland, Australia)
476 Brake pad with abrasive pad
479 Version for Australia
483 Right hand drive
485 Forged wheels - gold metallic
488 Stickers in German
489 Symbols and insignia in German
491 Turbo look
492 H4 headlights for left hand traffic
498 Without rear model designation
499 Version for West Germany
528 Passenger side mirror convex
529 Outside mirror - passenger side, convex, manual
553 Version for USA
560 Detachable roof
562 Airbag driver's side
563 Airbag passenger's side
567 Windshield green graduated tint
568 Tinted windshield and side glass
570 High output air conditioner
595 Rear spoiler painted to match body
596 Spoiler painted matte black
597 Heavy duty battery and starter
598 Insignia "16 ventiler"
602 Third brake light "High mount"
621 Differing parts for engine 924S
622 Differing parts for cars with 2 V-Engine
637 Sport Group
639 928 GT
666 Without lacquer preservation and chrome preservation
684 1 piece rear seat
685 Divided rear seat
701 Car-version Slant Nose
719 Special reconstruction
756 Special model 924S USA 1988
757 Special model 944 1988

758 Special model 944 Turbo 1988
900 Tourist delivery
912 Vehicle without identification plate
925 Version for high altitude areas in the US
C00 Eurospec emissions
C02 Equipped with catalytic converter
C03 California type car
R01 Touring Package (not Available w/Airbags)
R74 Touring Package