

FAST 928 Supercharger Installation Instructions



Overview: This supercharger kit was designed for the 32-valve 928 cars, from 1985-1995, though should fit the earlier '80-84 US cars with little modification, and will fit the '84-'86 euro efi cars with no modifications. **Warning:** Different pulleys will be needed for the earlier cars ('80-'84) to prevent the supercharger kits from making too much boost on the lower horsepower'd cars. Vortech will assist you with proper pulley and FMU selecting (see back of manual)

Warranty: All products manufactured by our facility will have a three year warranty limited to the quality and performance of each product. Products evident of misuse or improper installation will not be warranted. Individual pieces damaged during installation can be purchased separately if necessary. Each kit is designed to deliver between 4 and 5 pounds of positive manifold pressure (boost) on a stock 928 motor. We have determined that with a mechanically sound 928, following the instructions set forth below, that it is possible to gain 100+ hp from adding this supercharger kit. Extensive research, field testing, compression and leak-down tests, and dyno-testing have left us confident that the 928's motor, chasis, transmission, and clutch (only the '86.5 928 clutch was tested with this kit so far...) are strong enough to compliment this supercharger kit.

Disclaimer: There is go guarantee of any sort this this kit will produce more power from your car than your car does as a stock production vehicle. This kit cannot be guaranteed to perform on your car as it did on ours because of deviations between cars,

engine condition, fuel delivery, installation differences, typical age and mileage of the vehicles, final tuning, routine maintenance, and overall driving performed between owners. We will do our best to support your efforts in achieving a well-tuned, higher horsepower 928.

Tool Notice: This supercharger kit requires the basic metric tools for installation, including sockets and wrenches. You will also need a torque wrench, jack-stands, jack, and shop rags, 2 quarts of motor oil (shop rags to catch fuel from rails when upgrading fuel system).

Recommended accompanying items: It is highly recommended that your car already have a performance exhaust system installed, consisting of a minimum of a cat-back exhaust upgrade. Such systems can be readily purchased from FAST. Low restriction exhaust systems permit heat to exit the motor faster, hence cooler running conditions.

Basic Minimum Standards to verify before installing this kit: Your car must be set to, and/or meet the following standards:

Recent timing belt, properly tensioned, verifying proper cam timing (i.e., all three ticks line up properly. Poor performance often yields cam sprockets not timed properly to crank. Consult your manual if you're in doubt.

No vacuum leaks of any sort. Check all vacuum connections and re-line if necessary, do not cut corners on this! Use zip-ties for all hard-line to soft-line connections. Check all rubber hoses in and around the intake manifold for wear, splits, and hardness, and replace accordingly.

Replace all old rubber fuel hoses in the engine bay with OEM Porsche parts. These hoses are relatively inexpensive, and are the main contributor to engine fires in 928's.

Remove aftermarket computer chips and replace with stock units before running car with supercharger. If your stock chips are lost, then connect the white male-end and female-end wires to each other (at your factory engine computers), this will reduce your ignition timing an additional 3 degrees for safety. (Our test car ran flawlessly with Autoauthority's chips installed all summer with the supercharger kit, but we don't recommend it since chips on a supercharged car is a performance no-no.)

Run only the highest octane fuel you can buy at the pumps for detonation prevention. We recommend 93 octane if available.

Your car's oxygen sensor must be working properly for accurate fuel metering. Have it checked or replaced by Porsche if in doubt.

The spark plugs recommended for this kit are NGK BKR6EK, found at most auto parts stores. They are also the factory plugs for the 1995 BMW M3's. We recommend this plug for it's design, heat range, and ease of reading. (Bosch +4's are not designed for boosted engines).

Parts list: Parts needed for this kit are on the back cover of this manual. Small deviations in brands may be necessary for different areas of the country. Feel free to ask us for advice if necessary.

Read all instructions prior to installation of this kit, it will greatly increase your familiarity and confidence.

Section 1, Pre-installation, -Fuel injector upgrade to 30lbs.

5.5 hours labor est.

-Adj. Fuel pressure regulator installation and tuning

-Computer safety check valve

-Install Vortech FMU (optional, not supplied with kit)

-Install and tune Air/fuel ratio gauge

-Replace spark plugs

(NOTE: 2V 928 motor'd cars will use stock injectors (get them balanced and blueprinted through RC Engineering (CA) and a Vortech FMU (optional). Call Vortech for proper FMU calibrating using the last page of this manual for proper calibration. European spec 928's will need a higher ratio FMU since these cars make more horsepower than US-spec cars)

Install the fuel pressure gauge at the end of your fuel rail by using the supplied drilled/tapped factory nut. Note general torque requirements when removing the end-nut. You will need teflon tape around both the threads on the fuel rail & gauge before installing gauge. Note that at idle the stock 1983-1986 928's fuel pressure will sit near 30psi, '87+ cars will sit at approx. 43psi. These displays on your gauge let you know it's working properly. CALL US/EMAIL US IF NOT! **1985-on cars:** Install 30lb injectors via Porsche manual (if necessary). This is a simple remove-what's-necessary to pull the fuel rail off and replace injectors (with new seals also), then replace. We don't feel a manual will be necessary since there are not any hidden problems associated with R&R'ing the fuel injectors. Make sure you use new fuel injector-to-manifold seals (o-rings), lightly lubed, see part numbers on parts sheet. At the same time, install and tune the adj. fuel pressure regulator, setting your idling fuel pressure approx. 28psi at idle (use the fuel pressure gauge at the end of your fuel rail for measuring & setting, and with all vacuum lines connected & in place (including the fuel pressure regulator), **be sure to check your stock fuel pressure at idle with the fuel pressure gauge before you remove your stock injectors to ensure your gauge is accurate.** All 32V 928's should aim for about 28psi at idle, will all vacuum lines connected, all 2V 928's should see 30psi at idle on stock, **BALANCED injectors.**

Swap in your spark plugs during this time. They are pre-gapped, and only require a small amount of anti-seize (about the same amount as a small pea, evenly spread on the threads). Observe the lessor torquing requirements (20 ft-lbs) of spark plugs in aluminum cylinder heads.

At the same time as installing the fuel injectors and such, the fuel line coming out of the new fuel pressure regulator needs to be routed over towards the driver's side firewall to install the new FMU there. If you haven't done so yet, fill out the Vortech confirmation form at the back of this manual and fax it to Vortech for proper FMU

matching/calibrating. We recommend 8:1 for a safely-rich calibration. Install your Vortech with the vacuum nipple-side of the disc facing upwards, and run the fuel lines from the new adj. fuel pressure regulator, to the Vortech FMU, then from the FMU to the steel return line that your stock fuel pressure regulator was originally linked to, which goes to the fuel cooler. Use AN barbed fittings to connect FMU to standard 3/8" efi fuel hose. Make sure the FMU gets a vacuum line to it also. Use proper 3/8" diameter "FUEL INJECTION HOSE", NOT "FUEL LINE" to connect the regulator to the FMU, and then back to the steel return line. Use appropriate hose clamps and verify for leaks in both cold and warm running conditions. The purpose of the FMU is to supply extra fuel pressure (hence more fuel) only when boost is present in the intake manifold. It will not affect your tuning under normal, non-supercharged or not on throttle conditions. FMU's have designated fuel IN/OUT labels on them, make sure your lines are correctly located. Mount FMU to firewall, possibly utilizing one of the existing bolts as to not drill any new holes.

All 928's have breather and re-breather hoses. These hoses are larger diameter hoses that path a way for throttle body air to mix with crankcase and valve cover air (vapor) for emissions. To supercharge any car, you must change the routing of these hoses. This can be done one of two ways.

ONE: install one-way check-valves into the NON-valve-cover breather hoses (1/2" dia) somewhere where they will fit, location is not important as long as they are installed so that the pressurized air from the intake manifold or throttle body does not pass through and pressurize the crankcase. Make sure the valves are not installed backwards (updated 10/10/00). For all valvecover breather hoses, sever the hoses in a place where a small K&N breather filter (part # 62-1100) can be installed on the end of the hose still attached to the valve cover, and block/plug the other end of the hose connecting to the intake manifold or throttle body. Location of this filter is not important since oil will not make it to the filter, just vapor. These can even be placed under the intake manifold if necessary.

TWO: If not using or not wanting to use the K&N breathers, run new valvecover breather lines to the end of the new air filter, drill appropriate holes in the chrome cap of the K&N and push hose in just enough to secure from the other side with epoxy. These hoses can be "heater" hoses at a typical parts store, Porsche brand is non-important. Observe the diameter of each hose though.

For fine tuning of your mixture, install air/fuel ratio gauge off your O2 sensor. Air fuel gauge has three wires, power, ground, and signal. On the 928, the O2 also has the same three wires. The O2 wires feed up through the body just left of the fuse box wooden cover. Pull back carpets at fuse box, flip up wooden cover, and find three wires coming up through tunnel: a black and a white sharing one connection point for both ends, and a large, shielded wire that carries the actual signal from the O2 to the brain. The gray wire on your O2 gauge is the wire which receives the O2 signal. Connect all three wires, either temporarily or permanent, depending on your preference. Never cut the actual O2 signal wire, even with a good junction, voltage leakage could cause bad signals to the gauge.

While you're down there, take the small, one-way plastic check valve and install it just in front of your factory computer, to keep boosted air from entering your computer via the vacuum line (IF YOUR COMPUTER HAS ONE). You will need a 2" piece of 1/8" vacuum tubing to connect from the computer to your check valve, then the factory tubing connects to the other end of the check valve. Note the direction for which air can pass through the valve, you should

not be able to blow air into the computer, only draw air through that line.

Air can be sucked away from the computer (this allows normal vacuum signals to the computer, but keeps boosted air from possibly damaging the computer). You may want to have the boost and air/fuel ratio gauges permanently installed where your ashtray sits. A professional stereo install shop can do this if you want, I recommend it since the gauges are fairly easy to see from this location. You can take your boost measurements for your gauge from the vacuum line that feeds your computer (remember the check valve?) Just tee it off the vacuum line AFTER your check valve (on the engine side) so that you don't check-valve yourself from getting any boost readings to your gauge.

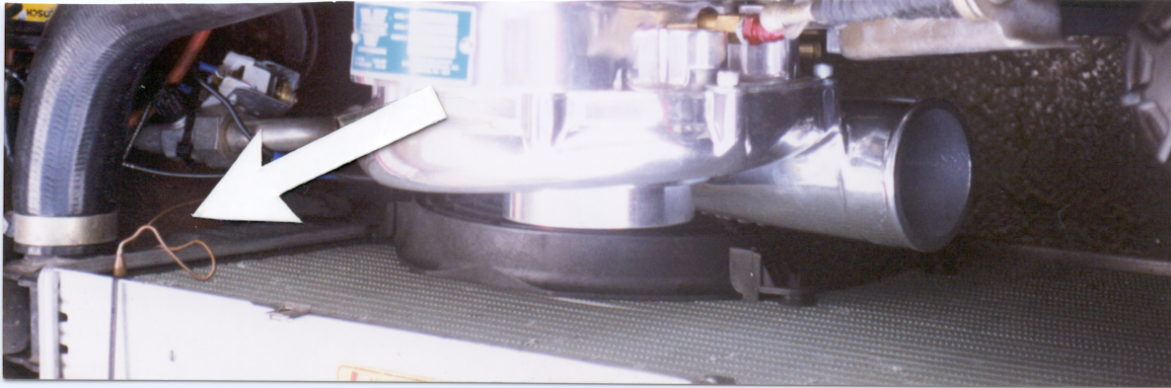
Reading the air/fuel gauge is easy. Once your car is warmed up (45 seconds for the O2 to warm up), the gauge will fluctuate up and down at idle, and light driving from full lean, to near ideal (according to the gauge). The more the throttle is pressed, the faster the gauge will fluctuate, still from full lean to near ideal (or higher). This is the computer correcting the air/fuel ratio as the car is being driven (closed-loop reading). When the pedal is fully mashed, the gauge will show a constant mixture (open loop reading, i.e, full throttle map only). What you want to see on the gauge at full throttle is all bars lit on the gauge except the three top-most (full rich) bars: the two top red bars and the first yellow bar underneath it. Ideal air fuel (14.7:1) is only for optimum air/fuel emissions, not for power. If your gauge indicates less than what is directed above, your mixture is too lean and fuel pressure must be increased. Approx. ½ turn of the adjusting screw on the fuel pressure gauge will reflect a bar on your air/fuel gauge. Increase or decrease your fuel pressure to increase or decrease the richness of your mixture. This is a simple, direct correlation adjustment. Keep in mind you are tuning your car for the supercharger, but this adjustment has to be made before the charger is added to your car.

Drive your car and test your mixture before installing supercharger. **You can only test air/fuel on full throttle runs**, all the way to redline. If you **immediately don't** see a fairly rich mixture on full throttle, let off the gas and make an adjustment towards rich. Do not run full throttle tests to redline unless you have at least one yellow bar above the "ideal" green ones lit, or else you risk damaging your motor by running too lean.

Section 2, Pre-installation: Electric fan upgrade & fan shroud removal **2 hours install est.**

Remove your upper and lower radiator shrouds (with the electric fans if S4 and above), OR, for a mechanically (belt) driven fan, remove radiator shrouding, removed air-pump/fan belt, remove 3, 13mm bolts which hold fan to water pump and remove the assembly.

Position the new electric fan in the absolute lower, passenger's side corner of your radiator and affix (**see photo**). Install the adj. t-stat following the instructions on the t-stat box and set the adj. knob to approx. mid-low range on the scale. (You may also install the copper temperature probe to the radiator by **gently** prying a larger hole in the fins near the end-cap of the radiator, where space for such probe is more abundant).



For constant power to this fan (fan will run after the car is shut off until temperature lowers), connect positive power wire to the jump screw on the passenger's side, in front of the motor. Let car idle monitoring your temperature gauge, dial in the adjustment of your fan t-stat to switch the fan on when your temperature reads just before the first 1/3 bar on your gauge. Watch your car idle and drive your car under normal conditions, adjusting the t-stat as necessary to keep the car cool (at or less than the 1/3 mark under normal driving conditions, including non-sustained stops in traffic).

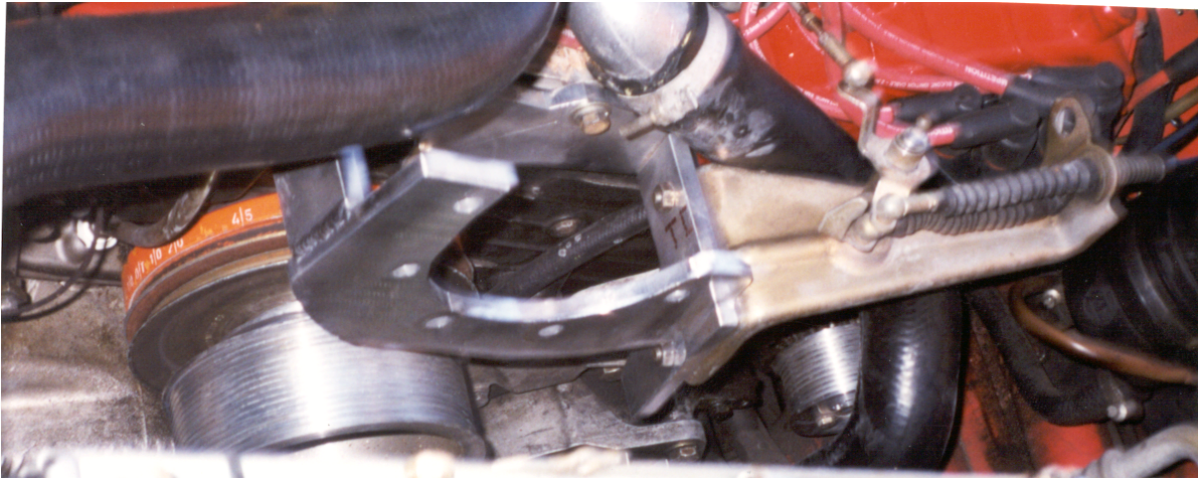
With your voltage rod (or voltage meter), and your car running and warm, determine which wire of the 4 on the junction to your front auxiliary fan is switched positive. Disconnect the wire on the same side of the switched wire's side. Disconnect both wires across the path as the switched wire. Remove the remaining wire (which is next to the switched wire) from its existing post, and place it opposite of the switched wire. By doing this, your auxiliary fan will now turn on with your ignition, and run until the car is turned off. Test this by starting your car (or at least turning your key until all your dash lights light up, you should easily hear/see your condenser fan running at this point. If your are confused by the explanation on how to do this, don't worry, just try all 4 wires, one to the other, until all have been mated to the other until the fan comes on. Verify it goes off with the key off, and come on with the key on. You won't damage anything by trying all 4 wires this way, all you're doing is bypassing the thermostat switch for that fan.

Section 3, Pre-installation: Pulley installations (both), Oil supply and return

2.0 hours labor est.

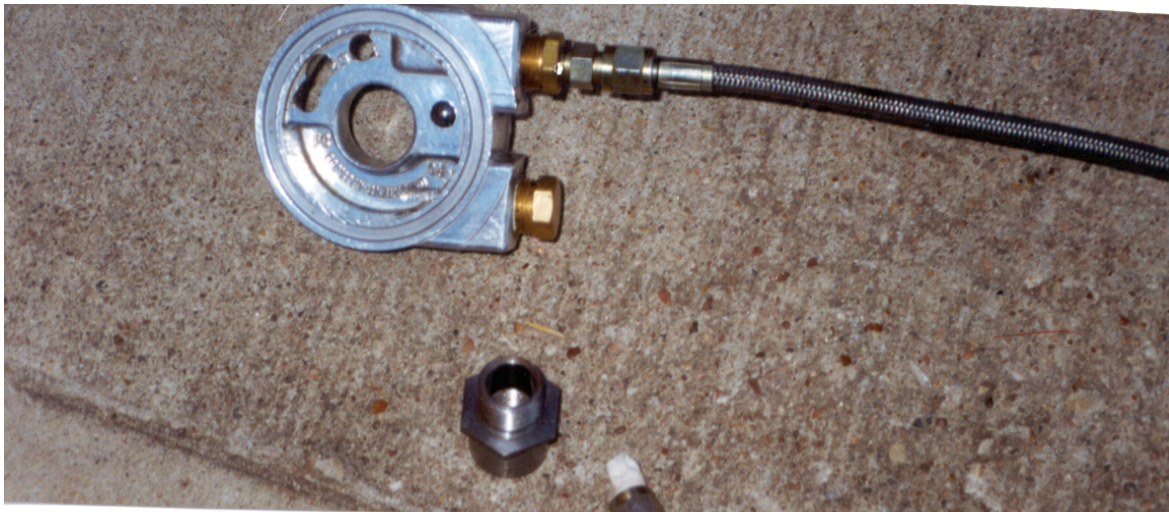
Open your hood and **loosen** the three 10mm bolts on your power steering pulley, but don't remove. Jack your car up in front and secure with jack stands. Loosen all belts and remove all belts. Remove power steering pulley and replace with new one supplied and lightly tighten. As a preventative measure, replace your 10 water pump bolts with the high-grade bolts before bolting bracket to waterpump. With a breaker bar, loosen and remove crank bolt, pulley's, but not the harmonic dampener. With a medium file, exactly fit the new crank pulley onto the end of the crank shaft by filing out the hole on the new crank pulley until it barely fits over the end of the crank. The pulley's inner diameter is slightly smaller than the crank's end to ensure a snug fit. Notice that the 6 dowels protruding from the back of the new pulley fit nicely into the recesses of the

harmonic dampener. Once the pulley is on, you'll notice that the pulley can be twisted just a little clockwise, or counter. Twist the pulley counter-clockwise until the free-play is eliminated. Tighten to Porsche specs (see manual!). Install existing A/C belt, new blower belt which also runs power steering (just slip in approx. in place, it will be loose until the blower is installed), and new alternator belt. Tighten A/C and alternator belts.(photo) Tighten the power steering pulley fully once the belt tension is correct. Notice the relocated position of the throttle linkage arm for the '85-'86 cars only.



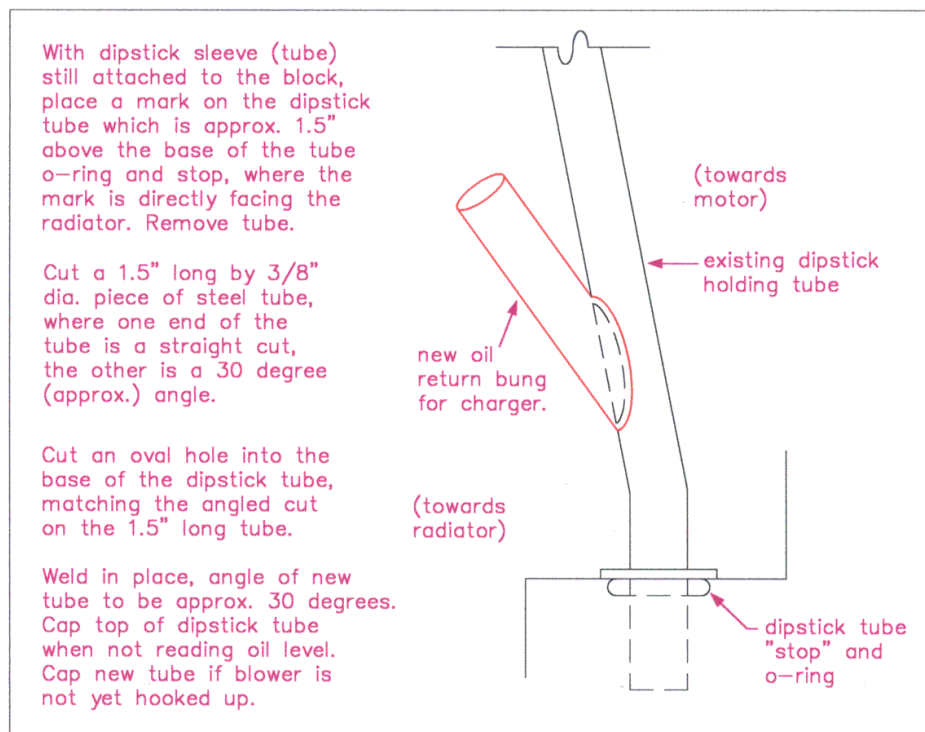
Your oil-adapter from Perma-cool is **not ready to be installed on your car**. You must first drill the relief holes on your adapter. Notice the location of the holes drilled into the flat surface area of this adapter via our photo. Orient your adapter **precisely** as per the photograph and drill the holes as they appear in the photo (notice the relief ball “piston” showing in the center of the adapter). Using a 1/4” drill bit, drill 5 holes close together on the flat surface, not letting the holes bleed together as they did on ours. Secure the oil line fittings to the adapter as photographed. One hole (check the photo carefully!) gets the 3/8” to -3AN adapter for which the 3’ oil line screws onto. The other hole gets the 3/8” block plug. Use teflon sealant/tape on all threads and tighten well.

Remove old oil filter, and fix new adapter to oil filter location (photo) **Ok, now that you’ve done this, read the directions again on this to verify.**



You may have to remove one of the oil pan bolts to affix snugly and flat. Your oil pan gasket should not leak with one bolt missing/trimmed unless it was already leaking in the area. The o-ring gasket on the adapter should be towards the motor, not towards you. Bolt the adapter in place with the hollow adapting nut (male on one end, female on the other) and torque lightly as you would when torquing a new oil filter. Route the other end of the 3' line up behind the power steering reservoir, ensuring that it won't bind on any belts. Install new oil filter, don't forget to fill it with oil first. Lower car. This stainless line now has a low-volume, high-pressure oil source to feed the blower. Test that oil is coming out of the line by squirting oil into your oil filler as the car idles, **but with two people, one to start the car and verify oil pressure, the second to hold the oil line as mentioned below. If you do not have oil pressure within 5 seconds shut car off; the adapter has been installed incorrectly, remove and verify per photo.** You need approx. 1 cup of oil out the line in no LESS than 11 seconds at idle. If you have more oil than that, drill another hole in the adapter (your discretion) and re-try. Remove your oil cap and point the end of the stainless line into the filler, start car, and you should see a mild squirting of oil out of this line. If you are not planning on installing the supercharger at this moment, use the suggested -3AN plug to block the oil from escaping out of this line until you are ready to install the supercharger. Use teflon tape/sealant.

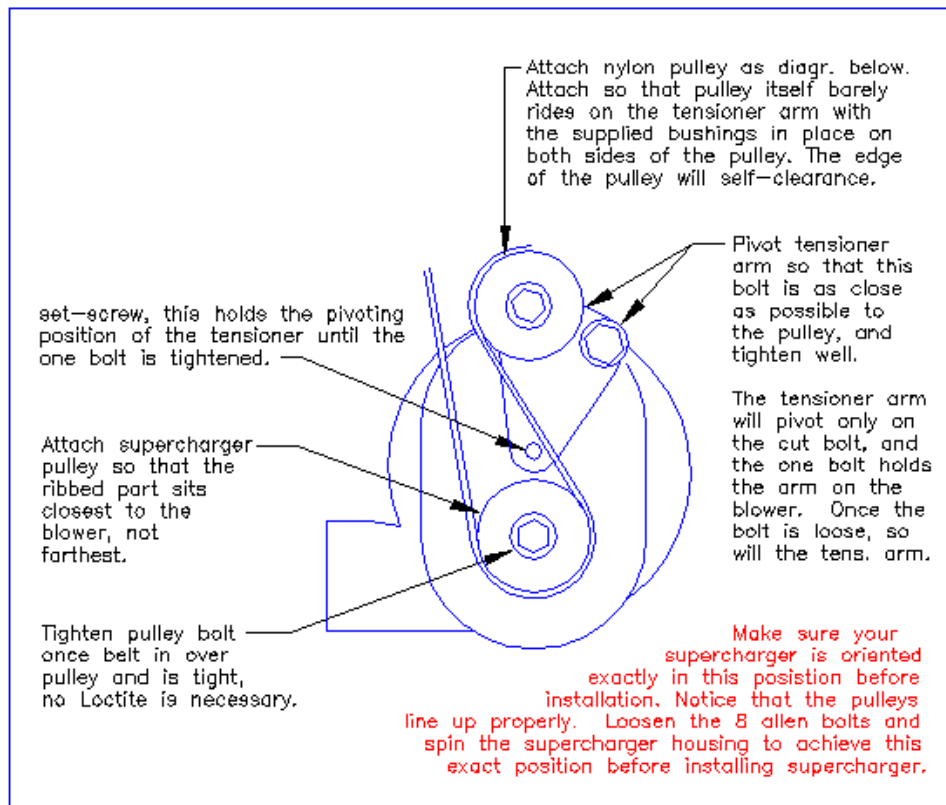
You will have to have your dipstick tube modified to also serve as your oil return bung, noting the oil bung now attached at the bottom of the dipstick (see diagram). We will have new dipsticks machined eventually but for now you must modify your own. The securing tab on your dipstick on the '87 and newer cars needs to be removed since it will be in the way of the bracket, unless you can swivel the tab out of the way. Your dipstick sleeve will not come out of your oil pan with the bung and oil return line secured to it, there is enough pressure to hold this in reliably. This tab can be cut off with a hacksaw.



but you will still need a machinist to weld the bung. **Cut the end of the dipstick off so that only 1/4" or so of dipstick protrudes past the stop and o-ring into the oil pan.**

The supplied oil line slides over the bung and is clamped in place, where the other end of the line attaches to the fitting on the underside of the supercharger, clamped. Make sure that once all the belts are in place, your oil return line has ample clearance between the belts. You may need to let the natural curling of the line help guide the line around the belts to prevent contact. Use zip-ties if you feel they are needed to secure the line from hitting the belts during engine operation. We do recommend you keep your dipstick at home or in your trunk instead of installed in the tube, this allows more oil flow back into the sump which may promote longer blower oil seal life. Cap the end of the tube if the dipstick is not inserted (use a typical vacuum sealing "nut" found in all Autoparts stores where the vacuum tees and such are kept). **DOT NOT DRILL & TAP THE OVAL PLATE IN THE FRONT OF YOUR OIL PAN, WE TRIED IT, DON'T DO IT.**

Section 4. Pre-installation: Sunerchærger check nrocedures.



Your supercharger was shipped bare and needs assembly, refer to diagram. You will need a 3/4" long set screw for the center of the supercharger pivot point (under the sticker). The tensioner will pivot loosely and very sloppy until the positioning bolt is tight, then the pivoting bolt just serves as a base point. Reassemble the tensioner exactly as diagrammed. It will rub a little & will self-clearance shortly after start-up. Bolt down tensioner per diagram.

The air intake pipe (Vortech part number) needs to be slipped on the entrance of the blower, but not tightened (make sure the clamp is over the end, and loose, to be tightened once the supercharger is bolted down. Remove the protective oil passage covers if applicable from the oil inlet and outlet fittings, and ensure the fittings are lightly torqued and have ample teflon sealant.

Helpful photos for assembling your supercharger and tensioner:



(As per photo above, use only the tensioner parts as shown in order as shown)



(Loosen the 6 allen screws and banana washers and rotate blower housing to match photo above, replace screws and banana washers when complete)

Before bolting up supercharger bracket, replace (one at a time) all your waterpump bolts with Grade 8 bolts, as a safeguard.



(Assembled supercharger, pulley, and tensioner, with uncorrected center pivot bolt penetrating white sticker, it should be a set-screw instead



(Cut inlet elbow exactly as shown, notice that the 1" dia. Bung has been cut off, this hold needs to be patched/plastic welded) before installation.)

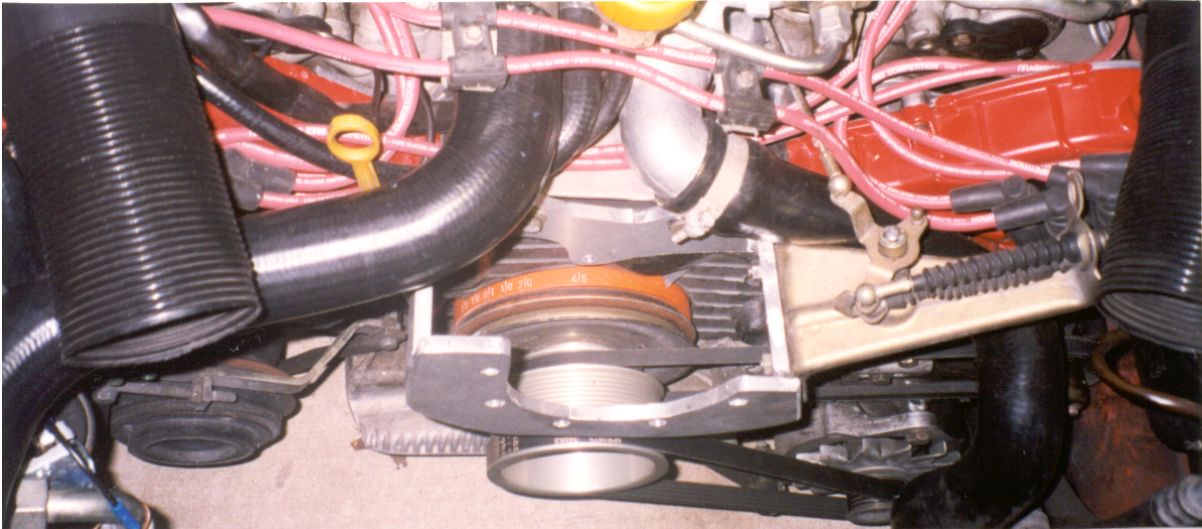
Section 5, Supercharger installation

45 minutes labor est.

Using Grade 8 bolts, replace all of your waterpump bolts [(7) 25mm & (5) 20mm], removing and replacing one at a time, using anti-seize in the process. Bolt supercharger bracket to the front of your waterpump **(photo)**, using Grade 8 bolts, tighten as per Porsche specs for mechanical fan bolt tightening. If your car is a '85-86 car, then use two of the holes supplied in the side bar of your bracket to affix your throttle linkage arm to. You can loosen and lengthen your throttle shaft arm by the threaded ends. Adjust this arm so that there's no pre-tension on the throttle. You may have to SLIGHTLY bend the shaft to clear the driver's

cylinder head (intake port, cylinder #5). Use appropriate bolts

to secure the throttle arm to the bracket. S4 cars and newer, or 2V 928s will not use these two extra holes in the side plates of the bracket.



slip blower assembly into bracket (**photo**), removing your upper radiator grommets will help you achieve the leverage necessary

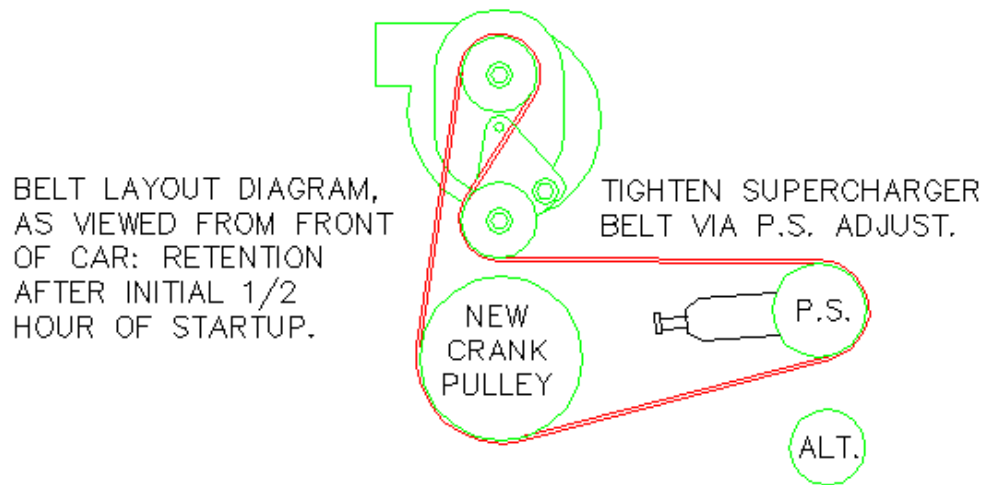


and bolt in place with the bolts and lock washers as listed in the parts list. Connect oil return hose from underside of blower (accessible from top of car, on passengers' side) and clamp in place. Route oil return line around belts and into position and secure to dipstick dowel at base, & clamp.

Verify your oil supply! We haven't arrived at putting the belt on the supercharger, so we're assuming you haven't done so. Take it off if you have. Take the loose oil supply line that will feed the supercharger and unscrew your engine's oil cap. Have someone start car while the line is held to squirt oil into the oil filler neck. Upon verification of immediate proper engine oil pressure, and oil squirting from the oil line, turn car off & replace oil line to supercharger and replace cap to filler neck. You are checking to verify that oil is happily squirting out of the new stainless supply line (volume is not important, it due to the size of the line, the oil will not "squirt" very far. Now connect oil line to the supercharger.

Start your car and let it idle for 20 minutes or until relatively warm. Your supercharger should not be connected/spinning via belt, but you will be supplying oil to it. Check for leaks and tighten clamps if necessary. Notice that the hot oil is making the supercharger hot, this is good. Turn car off once hot.

Your air intake pipe should have a few inches of pivoting play; rotate until about ¼" from radiator seam (top, pivoted towards the driver's headlight), and secure with clamp. Install air filter to end of pipe, only the very edge of this filter will slide on end of pipe, and clamp. Verify hood clearance, and lower if necessary.



Route the supercharger belt over/around the new power steering pulley (letting the belt rest on only the grooves closest to the power steering pump). Continue routing the belt underneath the supercharger tensioner, and up over the supercharger pulley (diagram)

And back around the crank pulley (NOTE: this kit is not equipped to keep your vehicles air pump in circulation. Its removal is certainly not necessary whatsoever, but if you must retain using your air pump for emission reasons, let us know and for a \$100 fee, we will get you a new air pump pulley made to accommodate your supercharger kit.)

You may have to loosened the power steering adjustment bolt almost all the way to get the belt on. The belt goes over the pilot (pivot) bolt exposed on the back side center of the blower. The pilot bolt will let you rest the belt over it while it's properly positioned over the power steering pulley (that's partially why the bolt is longer than necessary). The belt will ride on the crank pulley on the groves closest to the harmonic dampener.

Tighten the belt to average belt-tension specs. Verify vertical alignment of belt, both via instructions, and by sight. Tighten three bolts on power steering pulley if you have not already. Do this with tension on the belt only.

Install the alternator belt, letting the belt rest on the crank pulley (the outer most grooves) and the alternator pulley (the inner-most grooves, closest to the alternator). NOTE: IF YOU START YOUR CAR WITH NO ALTERNATOR BELT ATTACHED, YOU WILL GET ALL SORTS OF DASH LIT WARNINGS, DON'T LET THIS SCARE YOU.

Start car and monitor both belts. You will hear your supercharger flowing now. (notice how much ungodly air comes out of the supercharger, Wow!) Your belts should all be riding in the grooves suggested, without any vertical twisting, i.e., the belt should not have to stretch sideways (unnaturally) to reach the next pulley. If you think a belt needs to be moved over a groove or two for better alignment, try it. Let motor idle for about 15 minutes or so during verification. Turn motor off and check tension for all belts, the supercharger/power steering belt will probably need a little tightening.

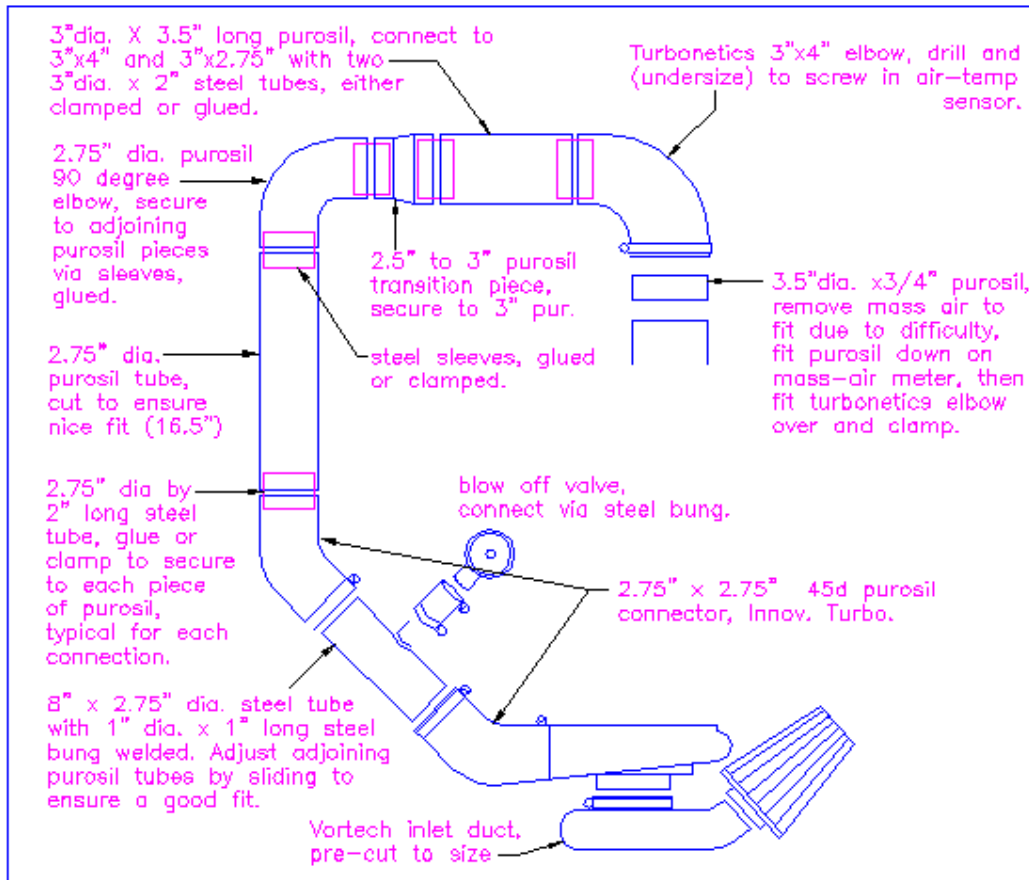
Section 6, Supercharger Plumbing

You will need to assemble your supercharger plumbing from the pieces of purosil listed in the parts list from Innovative Turbo Systems. You will also need some typical 2.5" and 3" exhaust tubing, cut in 2" lengths, as referenced by the diagram following. Properly clamp all pieces to the steel "couplers" so that the purosil overlaps the coupler by 1" each side (hence the 2" length for the coupler). You shouldn't see any steel tubing once everything's installed/clamped properly. You may need to trim the larger 90 degree turbonetics elbow down on the large side to snugly fit over the 3.5" purosil spacer.

You will need to affix (get welded) a ~1" diameter 1" long bung in the center of the 8-inche-ish long piece of exhaust pipe, this is there to affix the blow off valve for your system (refer plumbing diagram).

On the larger Turbonetics 90 degree elbow, you will need to drill a hole for the air temp sensor to fit. Drill where the rubber is thick, using a drill bit roughly 1/8" smaller than necessary, so that when the sensor is screwed in by hand without tapping, it will seal well without leaking. Verify your hole before drilling to allow the wiring harness to connect without the sensor being out of reach.

We recommend clamping all the purosil pieces to the steel adapters using standard radiator clamps, though we feel the installation will look better if the clamps are anodized black, or if the plumbing is assembled upside-down so that the adjusting screws cannot be seen from above. This will create a very clean look.



Connect all supercharger air plumbing as diagrammed **(or as per photo)**

When doing so, connect the supplied blow-off valve (BOV) to the pipe tee and clamp.

Tee in to your existing vacuum system with supplied tee and vacuum line and connect to the nipple on the BOV (refer supplied vacuum diagrams in back of this manual).

Make sure to amply clamp all plumbing items. Notice that the longer piece of Purosil (connection tubing) runs under the strut bar to prevent rattling.

Before securing the 90 degree 3"x4" nitrile elbow to the mass air meter, remove mass air meter from throttle body housing. Referencing the diagram, drill a hole roughly half the size needed in the nitrile elbow and press in and screw (to tap) with the air-temp sensor so that it screws into the rubber side of the elbow, snugly.

Slip on 3/4" x 3.5" dia Purosil onto lip of mass air meter (opposite side of throttle body lip). Now slip nitrile 3"x4" elbow (the 4" end) over the Purosil 3/4" piece just inserted, and clamp in place, taking account where the nitrile "points". Clean contacting surfaces of both with an oil-free cleaner (gas, Simple Green, thinner, etc.) and silicon-sealant swab both surfaces and re-insert mass-air meter. Do this when the motor is cold to prevent pre-setting of the silicone.

Siliconing (sealant, not lubricant) will keep the mass air meter from popping out of position during hard driving. Let silicon dry overnight before driving car. Using the back of your fuel rail hard-line on the passenger's side of the car, secure a stainless

around the plumbing to the back of the rail to prevent deforming of the plumbing when in boost **if necessary** during tuning. Secure tightly, this is the easiest place for boost to deform the plumbing and leak. Reconnect connector to temp-sensor to it's harness plug.

Section 7, Testing and Tuning

2 hours check time

Start your car and look and check the following:

- Supercharger is getting oil (see "testing of new oil line" above)

- Supercharger is spinning and air is flowing

- BOV should be spilling air out it's exit

- Belts should have proper looking alignment. If a belt looks like it's not riding on the right ribs, it will probably throw itself and cause a mess. Adjust if necessary.

- All plumbing connections are tight (air leaks, whether plumbing or vacuum lines, will cause the idle to stumble around a little at idle)

- Crank pulley bolt is tight

- Powersteering pulley bolts are tight

- Fans are running as per instructions.

- Oil is not leaking from oil lines.

- All dampeners, fuel pressure regulator, FMU, and BOV all have vacuum lines connected

- Fuel pressure is at 29psi or so at idle

Your car should: Idle as if the supercharger is not connected at all

- Idle fairly quiet with the hood shut.

- Get the same gas mileage as it did without the charger

- Read almost full rich instantly when the throttle is pressed

Get a couple of pounds of boost at 2000rpm or so, gradually working up to 5psi or so at full throttle (which ever boost level is selected).

Drive your car and test for FUEL (air/fuel ratio gauge) power, oil leaks, air leaks, belt tension and positioning, adjust as necessary.

Verify against too little fuel, too much fuel, and detonation by the following methods: Drive the car under normal conditions and check for normal operating ranges according to your air-fuel ratio gauge. Adjust if necessary to achieve the ideal (as referenced previously) air/fuel mixture, not under boosted conditions. When you give it gas (enough to cause boosted pressure, i.e., no vacuum, and boost), ensure that your air/fuel gauge is indicating rich or almost fully rich at all times.

Once determining that all's well with normal driving, give it a full throttle run in 2nd gear (on a straight, safe road if possible to correct from excessive wheelspin) and verify that you have enough fuel, and that your making 4 or 5psi (whichever you've selected). If your not making enough fuel, verify that your FMU is properly connected. If it is properly connected you should have more than enough fuel. Call Vortech if air/fuel gauge indicates lean (or email us). Do not drive the car if your gauge does not indicate an almost rich to full rich condition. If your gauge does indicate full rich, call Vortech and verify your FMU calibration.

If all appears correct on your gauge, and your car is hauling ass as expected in 2nd gear, stop your car and check two spark plugs for their readings. You want to see dark brown to medium brown condition. You may see black if your running full rich. Check two spark plugs and do not clean before re-inserting them into the motor.

Now drive the car and run the rpm's up in third gear to verify fuel. Listen to any noises which may indicate detonation: such as misfiring, broken glass sounds, metal banging, loud "pinging" etc. If detected, verify fuel (watch this gauge at all times of tuning), check your plugs to see if they're grey or white (and very clean), this indicates detonation. If your car is detonating but you're getting an almost fully rich condition displayed on your gauge, remove and check your computer to verify that you have stock chips installed. If you do, take them out and replace with factory chips. If your chips are stock, then connect the two single white wires next to the computers to retard your ignition timing 3 degrees. Retest car to ensure detonation is absent.

WE'VE NEVER ENCOUNTERED DETONATION AT ANY TIME. THESE INSTRUCTIONS ARE COMMONLY FOLLOWED FOR CARS WHICH DO EXPERIENCE DETONATION DUE TO TURBO/SUPERCHARGING. YOU SHOULDN'T HAVE THIS PROBLEM, BUT THE INSTRUCTIONS ENSURE THAT YOU KNOW HOW TO DETECT AND PREVENT IT.

Once third gear appears fine, pull over and check two plugs again. You must see at least medium brown coloration to the plugs to ensure enough fuel. Contact Vortech if not for re-calibration of your FMU. Do the same for forth gear, and fifth if you like. Always check your temperature gauge to ensure proper running conditions, and adj. thermostat if necessary to reduce engine temperatures. Check your car periodically for proper belt wear.

It is recommended that you find some 1/8" to 3/16" thick ABS black plastic and make a 8"x8" shield to secure to the backside of the radiator to prevent hot air from hitting the air filter. Also make a piece that fits into the top of the radiator to prevent radiant heat from heating the air passing over the top of the radiator.

Detonation is the ignition of the air/fuel mixture in a non-planned/timed manner. It will destroy your motor if not quickly detected and further prevented. Your spark plugs will tell you if your car is detonating by showing a white/gray color, and possibly missing or rounded pieces. Audibly, you'll hear broken glass/mis-firing, un-smoothness, etc; basic noises that tell you something's amiss in your motor. If you are uncertain if detonation is present under throttle, consult a local professional, such as a Porsche-mechanic. If detonation is detected and you have after-market chips in your car try the following things in order, whereas *set fuel pressure* is the pressure you're currently running with the 30lb injectors, tuned with the air/fuel gauge according to the manuals. Do the following items, one at a time, and re-check your car for detonation each time. Once your car is no longer detonating, you'll know you're on the edge of detonating, so perform the next step as well for further prevention. Be sure to check your spark plugs (one or two) each time to confirm the lean/hot

condition: they're be a white/gray color to the spark plug grounding straps (the metal that bends towards the center electrode). Replace any damaged plugs before continuing testing.

1. Increase fuel pressure 2psi over set and re-check (for detonation).
2. Increase fuel pressure 4 psi over set and re-check.
- 3 With set fuel pressure, plug in pig-tail wires at computer for 3 degrees retard under load and high rpm.
4. Increase fuel pressure 2psi over set, and connect pig-tail wires.
5. Increase fuel pressure 4psi over set, and connect pig-tail wires.
6. Remove chips, keep fuel pressure to set, leave pig-tail wires unconnected.

If still detonating,

7. Increase fuel pressure 2psi over set, and re-check.
8. Increase fuel pressure 4psi over set, and re-check.
9. With fuel pressure at set, plug in pig-tail wires, and re-check.
10. Set fuel pressure 2psi over set, plug in pig-tail wires.

If you're still detonating, obtain an additional boost gauge and confirm that you're getting no more than 5psi at full throttle. This system is designed so that 3-4psi are nominal, and 5psi is reached at approx. 5600-6400rpm or so (peak engine hp and rpm efficiency).