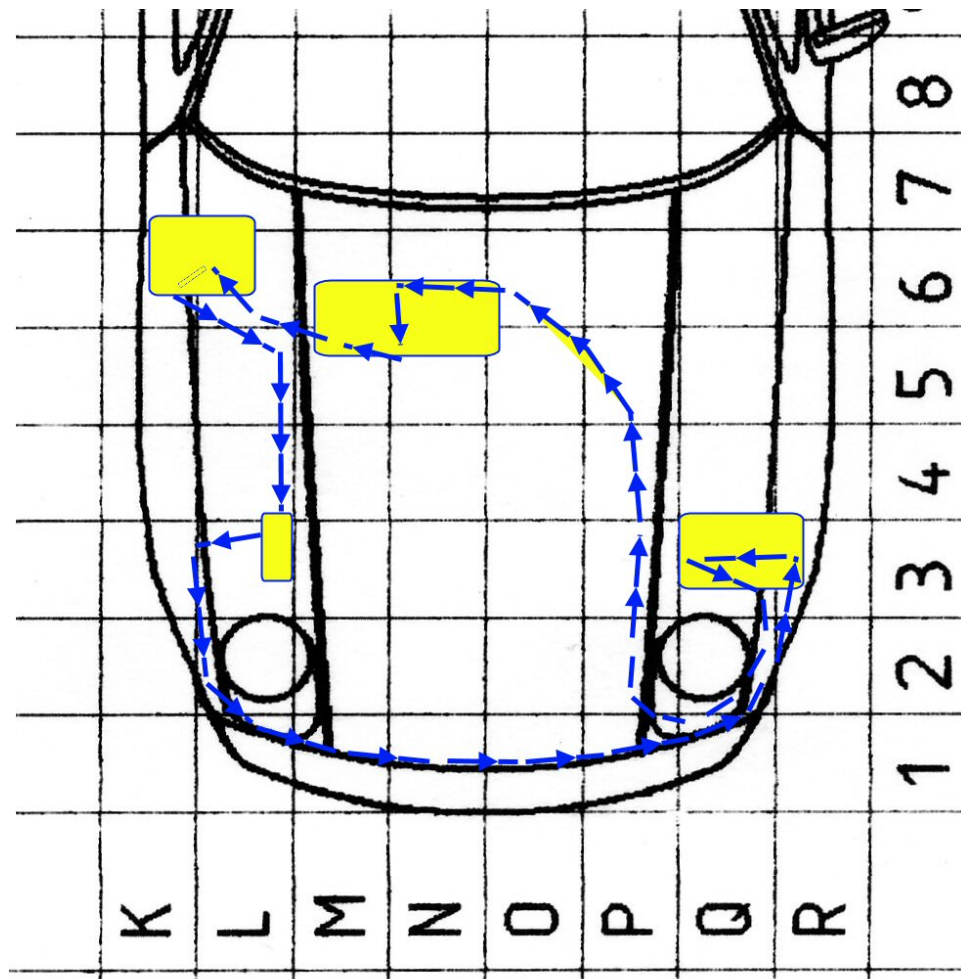




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Intercooler System Schematic



The coolant for the intercooler system is water/windshield washer solution and is stored in the windshield-washer reservoir located at K⁸ on the schematic. From there it will flow to the pump at L³. From the pump, it flows to the heat exchanger mounted just before the left front tire at position Q³. From the heat exchanger into the back of the intercooler at N⁵, then out of the intercooler and back to the reservoir.

In this process we are going to mount all the hardware first and run all the hoses last. This is deliberate and makes for a simpler installation.



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Phase 3: Installation of the Optional Intercooler System: (Stage 2 Kit Only)

Before we start installing parts for your intercooler system, let's get comfortable with the location of everything. Please take a look at pictures 90, 91 and 92. The intercooler goes on top and behind the right head. Air comes out of the intercooler and goes into the intake elbow we've already installed.



The pump for the water system for the intercooler will be installed behind the right front head light.

The heat exchanger for the intercooler system is mounted behind the left front head light.

The direction of the coolant flow in this system is optimal and has been designed to use as few running feet of hoses as possible. Hot air will enter the intercooler and cold air will exit the intercooler. The hot air will give off it's heat into the water with-in the intercooler.

The hot water leaves the intercooler through the top front port to travel into the right front inner fender well and into the top of the windshield washer reservoir. The water moves down through the windshield washer reservoir, comes out the bottom and goes over to the pump intake behind the RF headlight. The water then comes out under pressure out of the pump, goes around the front of the car and into the heat exchanger behind the LF head light. It comes out of the heat exchanger, through the engine compartment and into the bottom of the intercooler, thus completing the entire cycle.



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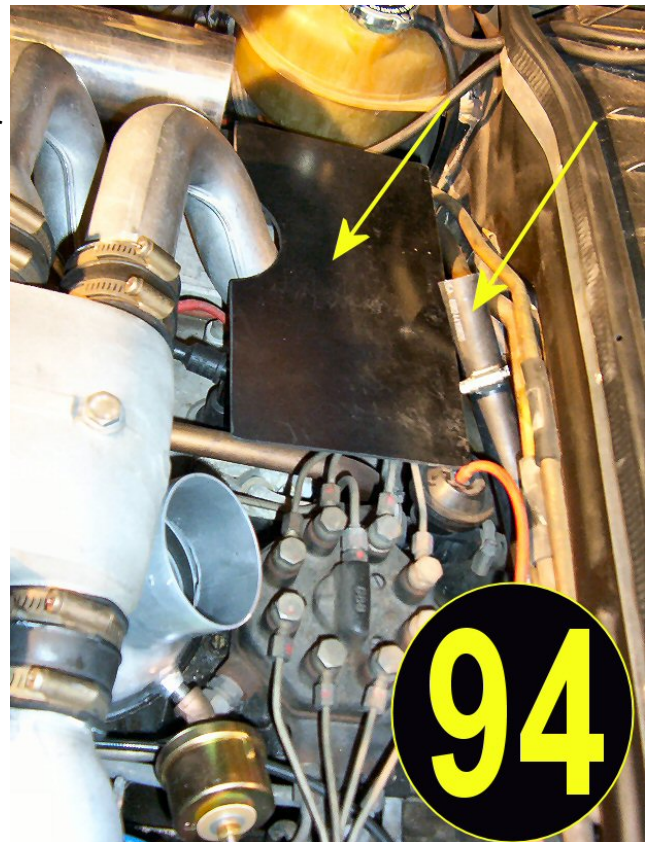
Phase 3: Installation of the Optional Intercooler System (Stage 2 Kit Only)

In this procedure we're going to install and mount all the hardware first and run all the hoses last. This is deliberate and makes for a simpler installation.

Let's start by installing the intercooler itself. The intercooler is going to sit at the back of the motor on the right bank. We don't want the intercoolers aluminum and the steel fuel lines to rub on each other causing a failure in either one, neither do we want a rattle in the engine compartment.

We have provided you with a black semi-rectangular insulative skid pad that we want you to put over top of the fuel lines. It just rests there so that the intercooler can sit on top. This is high-density poly-ethylene and it will provide a nice skid pad so that neither the fuel lines or the intercooler come into contact with each other. See Picture 94. You can test fit the intercooler now by setting it in it's spot on top of the black skid pad. Do not attach any hoses to it, just yet.

It is time to jack the car up and put it on sturdy jack stands. Remove both front tires and remove the forward and rear inner fender liner from the right front and the forward inner fender liner from the left front.





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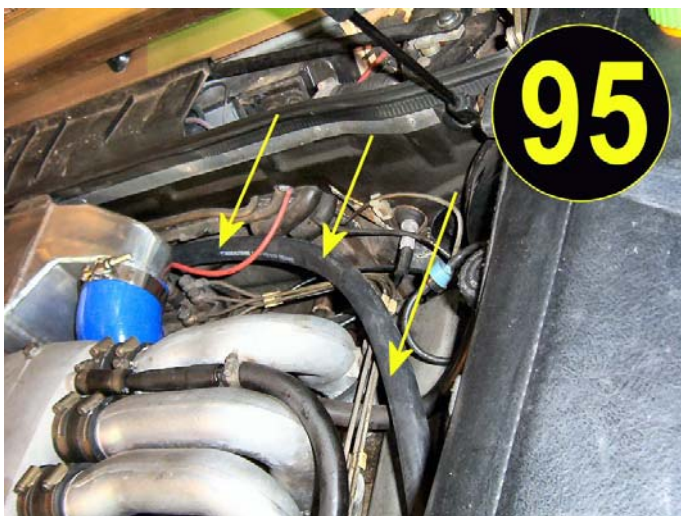
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The next step is to open a path for the intercooler hose that we're about to lay in. Go to the front of the 928 and look between the louvers in front of the car. See picture 95a. In the upper right hand corner as you look through the louvers you can see a piece of black sheet metal trim just to the side of the radiator that is put there to prevent the air from going around the radiator. It is below the bumper mount. All we have to do is bend that out of the way. This makes a very nice run for one of our intercooler water lines. The "tool" I use to bend that in is actually a broom handle. It fold the metal back the perfect amount for a 3/4" heater hose to pass through.

This small metal plate gets bent back.



Put the broom down and pick up the 9' foot long section of 3/4" heater hose provided and run it through that port, to the side of the power steering pump, among the top of the left head, over the fuel distributor and into the intercooler. See photo 95. It is important that you connect the lower intercooler water line (heater hose) to the back of the intercooler before you put the intercooler in place. See photo 96. Once the intercooler is in place, you won't easily get at that elbow to attach a hose anymore. Go ahead and clamp this with a #12 hose clamp.





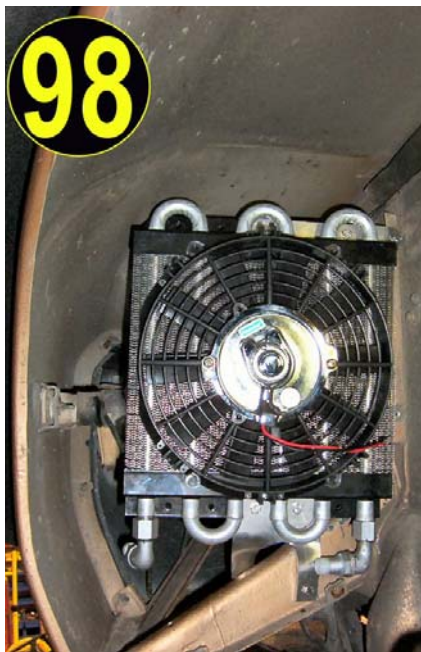
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Phase 3: Installation of the Optional Intercooler System (Stage 2 Kit Only)

MOUNTING THE HEAT EXCHANGER:

Now we're going to mount the heat exchanger in the left front fender well. As requested before, your car should be on jack stands and the front tires have been removed. The left front inner fender liner has been removed. Your fender well will look like picture 97.



Your heat exchanger and fan assembly came shipped from 928 Motorsports, LLC. with the bottom mounting bracket and upper mounting bracket already attached. The U shaped mounting bracket and the inlet and outlet for the heat exchanger are at the bottom. Place the heat exchanger assembly on top of your fender strut so that the U shaped bracket straddles it with a leg on each side. As shown in picture 98.

Since 2012, we have been using new, larger heat exchangers, so no electric fan is needed.



Remove the screw shown, slide the upper mount under it, and replace the screw.



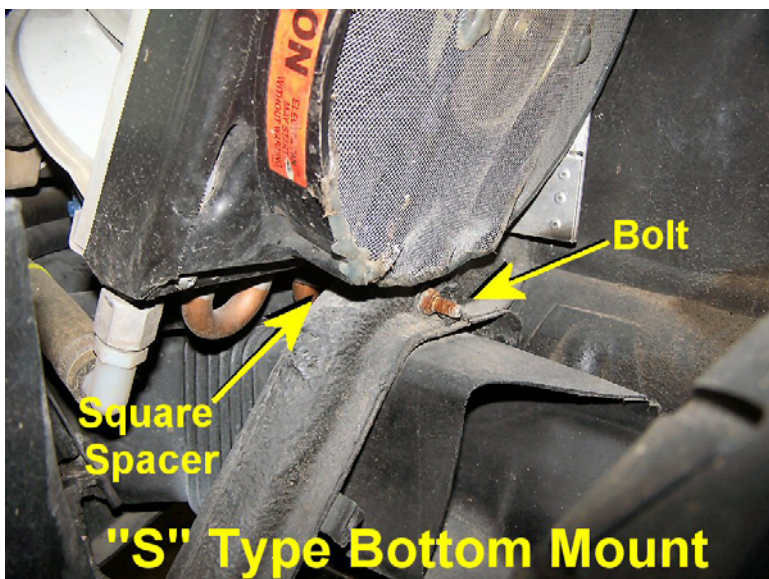
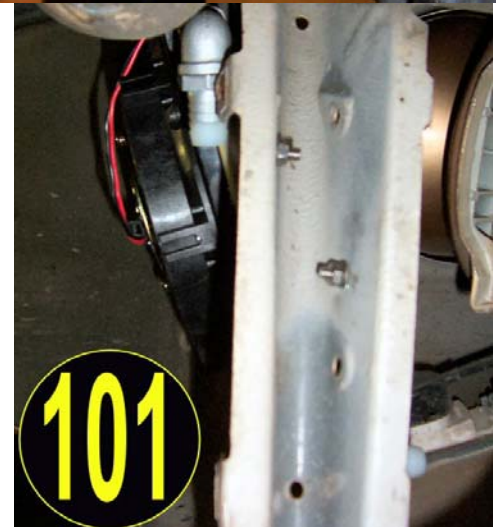
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Phase 3: Installation of the Optional Intercooler System (Stage 2 Kit Only)

Normal 928: At the bottom, you're going to use the 10 MM bolts supplied and drill two holes through your lower fender brace and the nuts go underneath as shown in pictures 100 and 101. After you have mounted the heat exchanger and electric fan unit in the left front fender with the parts supplied, tighten with two 10 MM bolts and nuts into the lower fender support.

S-Type 928: The S-type has a chin spoiler and brake cooling duct that is different than the non-S. The At the bottom, you're going to use the 10 MM bolts supplied and drill two holes through your lower fender brace and the nuts go underneath as shown in pictures 100 and 101. After you have mounted the heat exchanger and electric fan unit in the left front fender with the parts supplied, tighten with two 10 MM bolts and nuts into the lower fender support.



*Note, the heat exchanger sits in the inner fender well at an angle, not square. The outer part of the heat exchanger is farther forward than the part of the heat exchanger that is near the fender well. That is the correct positioning of the heat exchanger.

Turn the steering wheel full left and right and check for clearance.

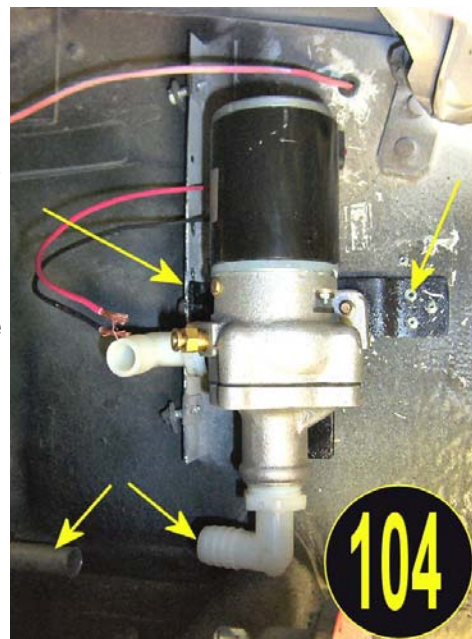


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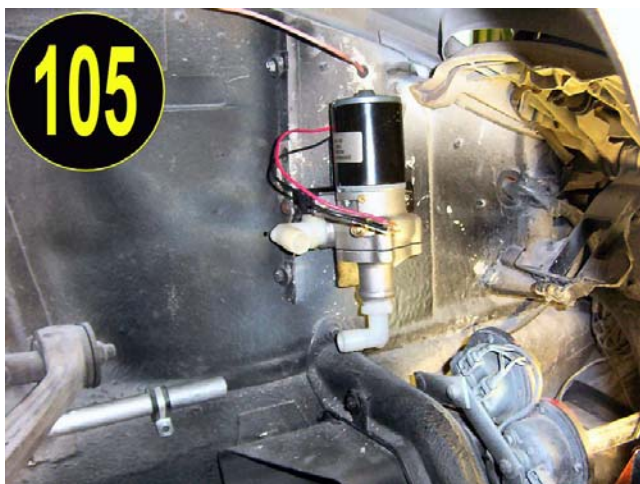
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Phase 3: Installation of the Optional Intercooler System (Stage 2 Kit Only)

Your water pump will mount vertically just behind the head lamp, as shown in picture 104 and 105. Notice that the height of the inlet elbow at the bottom of the water pump is very near the height of the water line that will be coming to it, also shown in picture 104. Position the pump on the inner fender wall as shown in picture 104 and you will need to cut a notch in the nose shaped bracket that is mounted to the inner fender of your Porsche that was holding the inner fender liner just moments ago. The notch will allow the hose nipple as shown in 104 to provide clearance for that hose nipple. Before permanently affixing the pump to the inner fender well, take your hand to the bottom of your head lamp and lift it up into the fully raised position and down making sure there is adequate clearance and that the head lamp doesn't hit the pump in that location, then you have it. Then mount the water pump to the inner fender well with the rivets provided.



***Special note!** When drilling the holes in the inner fender well for the rivets, be very careful to go no further than you need to through the metal. Directly on the other side of this location is the ignition module for the 928. It stands off the inner fender in the engine compartment about 1/4". It is on the other side of this inner fender well so be careful when you push the drill through for this water pump installation that you don't penetrate the engine bay too far. This is also the reason we're using steel rivets to affix the water pump to the inner fender well.



We don't use bolts and nuts because the other side of the fender well is not available to us, and we can't use sheet metal screws because they penetrate too far and also sheet metal screws vibrate loose over time. So these steel rivets are a good way to go. You will use two or three rivets on the right hand side of the water pump when you mount it to the fender well and you will use one or two rivets on the 90 degree L-shaped angle on the left side as shown.

The finished water pump installation can be seen in picture 105.



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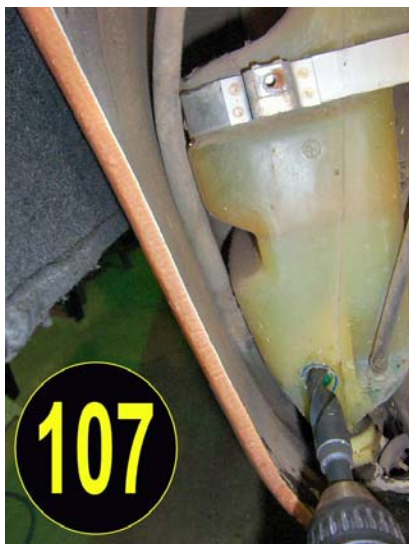
Phase 3: Installation of the Optional Intercooler System (Stage 2 Kit Only)

The next step is the modification of the windshield washer reservoir. We use the windshield washer reservoir to be the heat sink for up to 3 gallons of water so that the heat exchanger and this kit can never get what they call “thermally soaked”. That is to say, it has absorbed the maximum amount of heat or thermal energy it can.

The windshield washer reservoir will continue to perform it's role as the reservoir for the windshield washer fluid and the windshield washers will still function when we are done. The coolant we use for the supercharger kit intercooler system is common windshield washer fluid. That also helps provide the antifreeze capabilities that we want to insure that the heat exchanger never freezes.

The process we've selected for you to modify your windshield washer reservoir has two distinct advantages. 1) We don't need to have you remove the windshield washer reservoir from the car. 2) The windshield washer reservoir low fluid indicator light switch, which is a float switch located in the bottom of the plastic reservoir, is going to remain in place and continue to operate correctly with this procedure. However, we are going to drill a hole in the windshield washer reservoir for our hose nipple. If you would prefer an alternate method of installing a hose nipple in the windshield washer reservoir, please call 928 Motorsports, LLC and we will tell you how to remove the windshield washer reservoir and remove the float switch from the windshield washer reservoir and put the hose nipple there.

Toward the bottom of the windshield washer reservoir there is a flat spot facing directly forward about 2" up from the absolute bottom, and this is where we want you to drill our hole. Please see picture 106. If your reservoir has fluid in it, that's OK. Simply place a bucket under the reservoir. Your first hold should be about 1/4" in dia.



After we drilled a small pilot hole, take the proper bit for the tap you need for the fitting provided and drill out the remainder of the hole as shown in picture 107. The fluid in the windshield washer reservoir will drain down to the hole I just drilled, of course.

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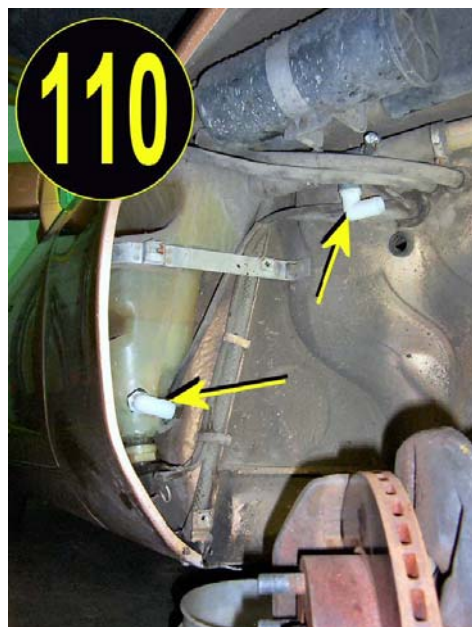
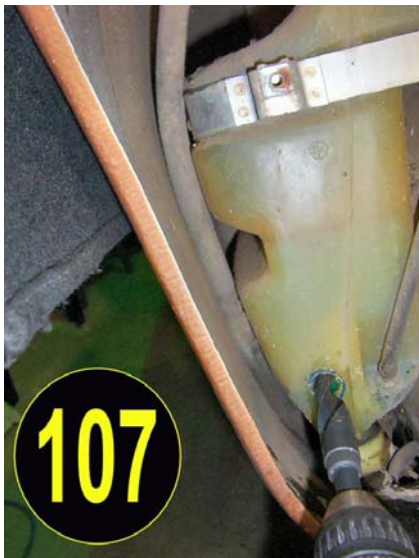


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See picture 108. Tap the hole you have just made to fit the nipple provided. Place paper towels in the hold and clean it up, making sure the hole is dry and the fluid level is a little below your tapped hole. The reason for this is because we are going to put in a nipple with epoxy adhesive, and the epoxy won't usually seal under water, so you must lower the water level in the windshield washer reservoir below this hole so that the sealant can cure.

Now coat the threads of the barbed 90 degree nipple provided with the kit with J.B. Weld epoxy provided. See picture 109. Spin in the 90 degree nipple and let it come to rest in the direction of the inner fender as shown in picture 110 so that it can cure in that position.





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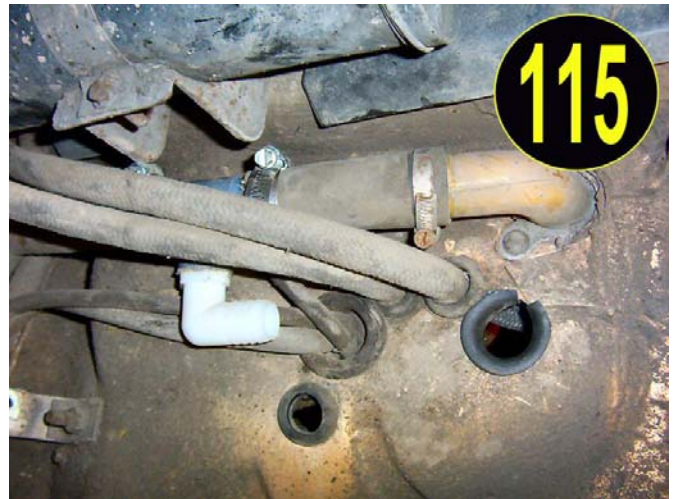
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The last piece of the windshield washer modification is to drill a 1-1/8" hole in the fender well so that we can run a hose from the engine compartment.

***Note,** the location of the hole where I have marked it in picture 113. If you have removed the exhaust gas circulation system then you can also use one of the holes previously used for the EGR system. In this case, we decided to leave the charcoal canister in front of the right front fender well intact and in place to make emissions testing easier later on. Otherwise, we could have enlarged the hole that routed hoses from the engine compartment to the charcoal canister.



We cut a 1-1/8" hole as shown in picture 113 and then rounded it with the grommet provided so that the sharp edges would not cut our new water hose. See pictures 114 and 115. We cut a 1-1/8" hole because by the time we put a grommet around it to prevent chafing, a 3/4" water line is going to run perfectly through that grommeted area.



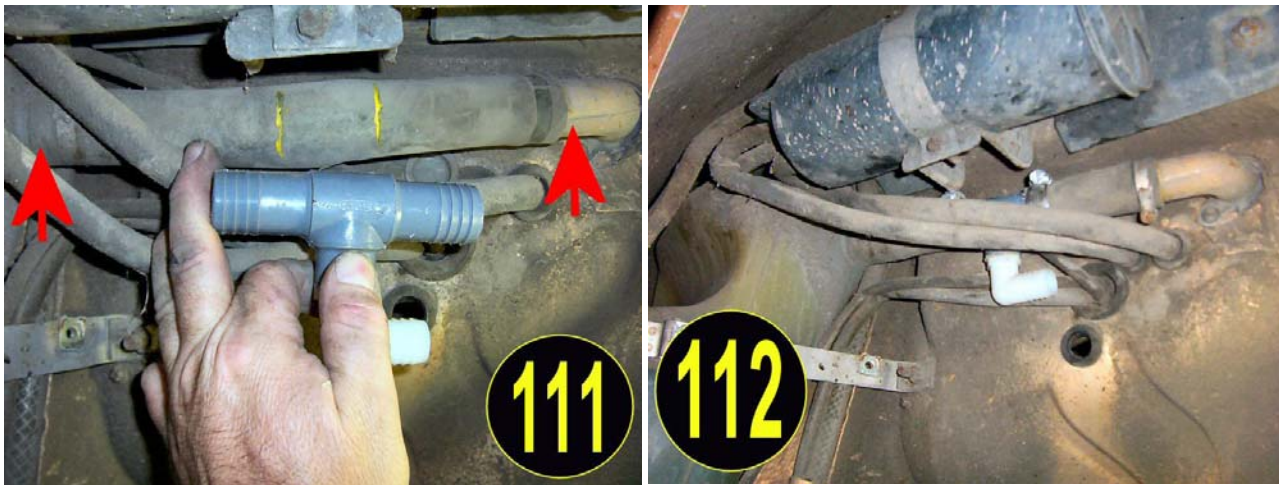


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Now locate the one inch rubber hose that leads from the filler neck for the windshield washer reservoir to the top of the windshield washer reservoir. You will cut out a 2" section, as you can see in picture 111 and 112 and insert a T supplied within your kit. Add the two clamps and put it in place. This is going to be the beginning of the return line for the intercooler. Warm water will be entering from the intercooler through this connection.

Maintenance Tip: Check that this 1" line is free from rust residue in the two places with the RED arrows in picture 111 before proceeding. If you do find rusty metal there, call 928 Motorsports for the procedure to remove it.



Your finished modification should look like picture 115.



Please locate all the remaining 3/4" heater hoses provided. Lay them out, you should find a 7' piece, a 3' section and two 1' sections. We tend to cut them long-just trim off what you do not need.



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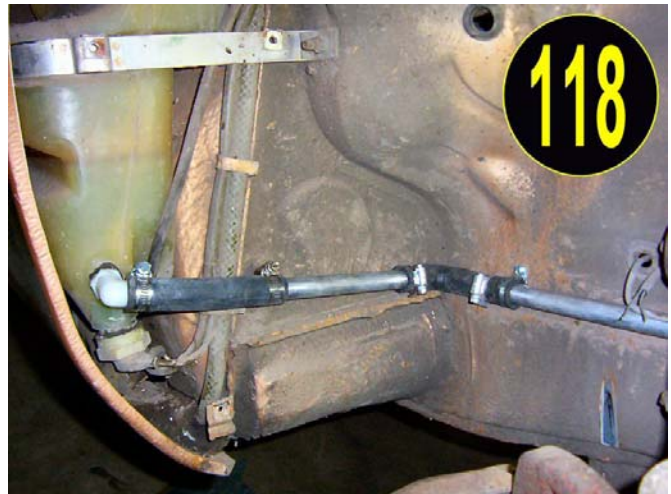
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Now we will install the metal coolant line in the right front fender well. We used metal coolant line to add durability because it is a environment where it is going to get stones and rocks thrown up. You will find in your kit a 2 foot section of aluminum tubing and you will also find a 8 inch long section of aluminum tubing. The 2 foot section goes underneath the upper A-Arm and just above the chassis in the little crease that is made in the body. See picture 116. To do this you will take your hands to the metal front brake line and give them a little lift. You will find that they will bend gently and safely out of the way, allowing you to put this tubing beneath the brake line. This is demonstrated in picture 117.



Remember, because we have the car in the air and the wheel off the car, the lower A-Arm is at its lowest most point as the caliper and brake assembly is hanging completely down. That is very unusual and will never happen again unless the car goes airborne. Under normal circumstances, the upper A frame is even further from this conduit than it is at this time.

From your kit, go get the 2-1 foot long sections of 3/4" hose and several of the #12 hose clamps, the 3 hose straps and the black rubber 3/4 90 degree pre-formed elbow. That elbow goes in the corner of the fender well, as you can see in picture 118 with two clamps around it. The small 8" section of solid aluminum tubing goes next and one of the 1' sections of the 3/4" hose continues on and connects to the elbow we installed in your windshield washer reservoir with two clamps on it. Again as shown in picture 118.

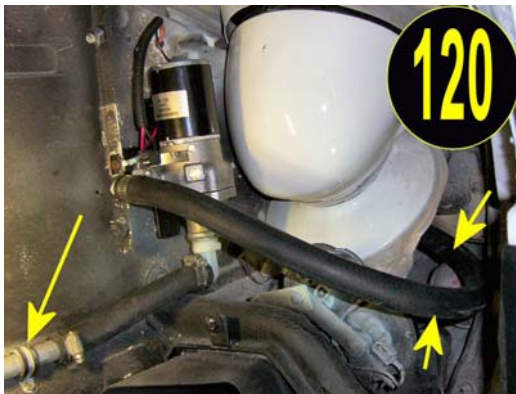




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On the other end of this metal tubing, please refer to picture 120, we have the other 1' section of 3/4" hose that comes out of the metal tube and over to the pump inlet, (which is the bottom nipple) and it gets two #12 hose clamps on it. Finally, picture 119 and 120 also show the location of the clamps that secure the aluminum rod in place so that they don't move. The sheet metal screws we want you to use are included in your kit. You can tighten all the hose clamps at this time.



Now, please take the 7' long piece of 3/4" heater hose and the long, heavy red wire supplied and fasten the ends of them together with some electrical tape (temporarily).

Starting in the right front fender, next to the water pump, we want to run that 7' hose and Red Wire from the water pump around the bottom of the head light in front of the radiator and just behind the louvers, across the entire car, behind the bumper, all the way to the left front where it sweeps out the left front bumper and around to the second nipple of the heat exchanger. Attach a #12 hose clamp on each end. You may have to trim the hose slightly if we have given you too much. Make sure that it is routed in such a way that it doesn't interfere with the headlamps going up or down. When it reaches the left side, you can break that electrical tape. We will be wiring the fan in the left front fender with that red wire in just a moment. But for now, just do the hose. Connect the hoses on both ends for this run as shown in picture 120 and 121.



Earlier in these instructions, we attached the 9' long piece of heater hose to the bottom of the intercooler as we laid the intercooler in place at the back of the motor. That hose should be running behind the motor, over the top of the bell housing, right to left, over the left cam tower, along the left cam tower, down behind the power steering pump, out the front of the motor, along the left side, between the radiator and the left side of the engine bay, and out the front of the grille. It is now time to take that and tuck in under the bumper, next to the hose coming from the right side of the car and follow along the left front bumper, around the back to the heat exchanger. It connects to the other nipple on the heat exchanger. The heat exchanger is not specific as to which end is the in-let and which end is the out-let. You can do it either way depending on your preference.



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We want to turn this to the left for this heater hose to be as large a radius as possible. A nice sweeping turn so as to avoid kinking the hose. Attach it to the heater exchanger and put another #12 clamp on it there.

Now, at the top of the motor, you will find at the front of the intercooler, there is a 3/4" hose nipple pointed towards the right front fender. This is for your 3' long section of heater hose. Please put your one end of the heater hose on there with a #12 host clamp. See picture 122. It goes over or under the aluminum inlet pipe and out the fender well through the hole with grommet that we put in place a little while ago. Through the fender well and connects to the T that you installed at the top of the windshield washer reservoir which you can see in photograph 115 (previously).

Now, it is time to follow all the hoses around the car and make sure every #12 clamp is secure and also to take the wire ties that have been provided, (the black plastic cable ties), and loom our heater hose away from anything that might chaf or cut them. In the left front fender, loom the heater hoses together as they exit the heat exchanger and around behind the left front bumper. Make sure the left front head light goes up and down correctly and does not interfere with the heater hoses. In the right front fender, you may want to use a wire tie to loom the heater hose again away from the head light as it moves up and down.





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Now, it is time to add windshield washer fluid back into the windshield washer reservoir and fill it.

If you still have your car up on jack stands in the front, it is a good idea not to town on the pump just yet, because you would be running the pump dry. Wait until you lower the front of the car. You will find with this design, a normal amount of windshield washer fluid in the reservoir will put the pump under water so that the pump cannot run dry under normal circumstances. The pump is mounted lower than the windshield washer reservoir and will always have fluid.

Also with this design, the system is self-bleeding. As the water circulates through the intercooler system, it drops into the top of the windshield washer reservoir at the top, and any air bubbles in the system are automatically vented out. The system does not have to be purged or bled.

However, on this first fill with windshield washer fluid, there will be some air trapped in the electric water pump that has to be purged. Look closely on the electric water pump that you have installed and you will find a small brass valve that you simply press in (or pull a small ring out) to bleed the air out of the pump. The air will exit, and when water exits you can let go of the valve and you have successfully bled the air out of your pump. You can now hook up jumper wires to the two electrical leads out of your water pump. Power goes to red, ground goes to black.

The fastest way to get power to this water pump is directly on the other side of the fender where it is mounts, there is a forward positive battery terminal on the inside of the right front fender. It is a very convenient place to get power. Jumper the water pump, run it, check for leaks in the entire intercooler system. When there are no leaks, it is ok to put in the inner fender liner behind the right front tire that covers the windshield washer reservoir. Once installed, the rear fender liner will look like picture 124.





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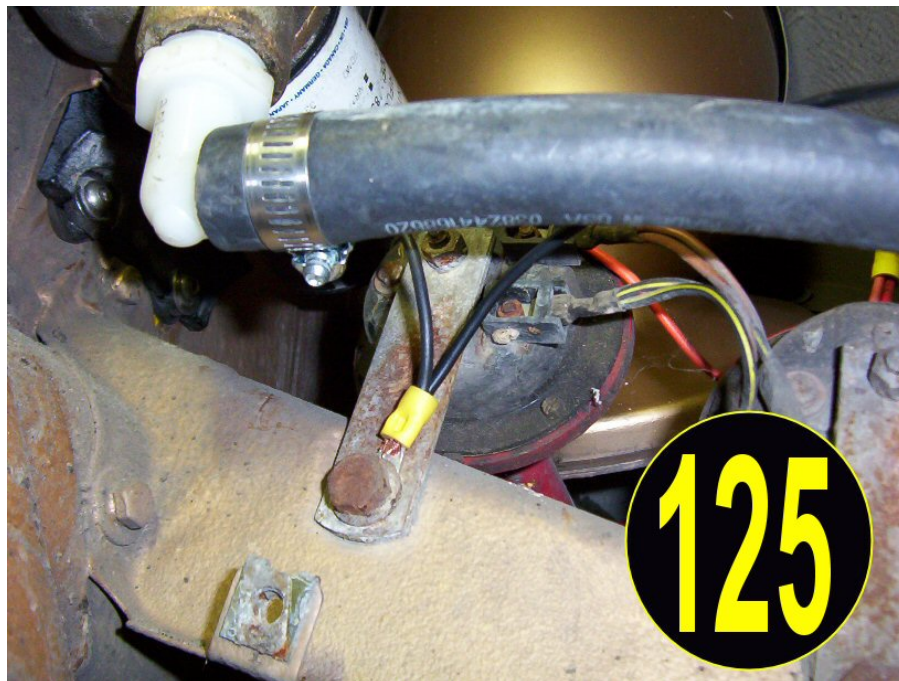
Intercooler Wiring Overview: We have to supply power to the fan in the left front fender and the pump in the right front fender. We do this by use of a 12 volt relay provided in your kit that we mount in the right front fender well above the pump. We're going to wire to that and splice into a circuit. This particular electrical system on the car has it's own independent power and doesn't stress any of the existing electronics in the car or the fuse panel.

For wiring, let's start in the left front fender for the fan assembly. The black wire out of the fan gets a circular terminal clamped onto it and it gets screwed directly into the fender wall, providing the ground. The red wire coming out of that fan assembly gets the 8 foot 12 gauge red wire crimped onto it and that we pulled the width of the car following the same path as the 3/4" heater hose. Now let's take some of the black cable ties provided and tie up that red wire that runs the width of the car as well as the 3/4" heater hose to the bottom of the grille and the bumper so that it doesn't drop down and look unsightly.

This concludes the left front fender. You can put the left front tire back on. The left front inner fender liner does not go back on.

Disconnect the battery at this time!

Of the two horns that are mounted to the right front fender support strut, loosen the 13 MM bolt on the innermost horn mount. We are going to put our ground strap for that relay and the water pump underneath that horn mount. Put the ground clamp underneath that horn bolt and tighten it back down as shown in picture 125.





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Power for the system comes from the forward positive terminal in the right front inner fender underneath the hood. Find the in-line fuse holder from your kit as shown in picture 126. Take an 11 MM wrench and remove the stud of the bolt. Then put the new wire for your relay underneath that bolt, through all the previous lines and thread the bolt back in and tighten. See picture 127.



Drill the fender to run your wire as shown in picture 128, and be sure to line the hole with the small grommet provided.





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Mount the relay high in the LF fender as shown in picture 128 with one of the sheet metal screws provided. ***Note**, It is important when you're putting these screws towards the inner fender well to mount the relay and the pump to be very away of your location on the other side so that you don't mistakenly drive screws into the ignition computer.

The relay wiring instructions are as follows:

- Attach the ground wire that goes from the bottom of the horn bracket to spade terminal number 85.
- Attach the power supply that comes from under the hood, through the 15 amp fuse holder assembly that we ran through the fender well and attach that through the relay to spade terminal number 30.
- The next wire is the red power wire that will supply power to the water pump and to the fan on the radiator. It goes to spade terminal number 87.
- You will have one spade terminal left now and that will be number 86 and that wire goes to our switching supply that turns this system on and off. The best place to tap this power as you recall in our installation of the electric fans, is the air conditioning fan supply right at the fan connector. This way the ignition switch controls the whole circuit without any draining on the battery when the switch is off and yet every time the car is running, we know absolutely that the fans are on as well as the pump and the intercooler radiator fan.