Daves volvo page

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Prancing Moose designs and images are protected by U. Copyright and owned by Dave Barton. These images may not be used without permission. Special Chrome Prancing Moose Edition. Special Slanted Body Emblems. Alternator Idler Pulley Project. Understanding how the Prancing Moose came into being. Most courses allowed us to drive the cars by ourselves as many times as we wanted. Lots of good fun. One of the courses was a special slalom, where a professional driver would take a carload of folks in the new SUV, accelerate quickly to about 60 mph, and while keeping his foot firmly planted on the gas This maneuver simulated the sudden high-speed avoidance of an obstacle in the road, such as a moose of course. Volvo was calling this course the "Moose Avoidance Test. Many other tall vehicles would have certainly become unstable and possibly lost control, spun out or even rolled over during such an extreme maneuver, but Volvo's DSTC took over the throttle and brakes and kept the big SUV in perfect form without a hint of trouble. Even with the driver's foot to the floor, we could feel how the DSTC aggressively controlled the throttle and all four brakes, each brake independently, to keep the vehicle straight and stable. The result was the vehicle exiting the course, still at 60 mph plus, with perfect composure. This stuck in my mind as a remarkable event and something no other SUV at the time would dare try without a full roll cage and everyone in helmets. It was sporting a shield sticker with a moose profile on its fender. That sticker got a lot of smiles from the crowd. I instantly thought of designing the Prancing Moose as a parody of the Ferrari prancing horse and it then found its way onto my Volvo wagon for the next show I attended. The response to those stickers from attendees was a big surprise. Photos were turning up in web pages and magazines all over. People tracked me down and I began receiving many requests for that sticker and other style later , so I began making a few. I never expected it would become so popular or something others would want , but it did. Now I have more styles than I can count, many based on suggestions or requests. So if you have a sense of humor, I think these stickers are a requirement. If you no longer smile as much while driving, adding one to your car will fix that. Prancing Moose stickers are turning up on many cars, trucks, motorcycles, helmets, and even buses! Thank you for visiting. Contact Us. Prancing Moose Stickers. Volvo Stickers. New Items. Other Car Stickers. Steering Wheel Labels. Cool Volvo Products. Volvo Wire Harnesses. Conversion Harnesses. Volvo Relays. Coil Repair Harnesses. Adj Voltage Regulators. Horn Buttons. Volvo Gauge Faces. Group A Racing. Fuel Pump Relay Mods. Harness Crimping Page. Classic Auto Air AC. Limited Slip Read Ends. Yoshifab Catch Can Install. Side Marker Lights. Gentex Mirror Upgrade. Yoshifab Drain Tube Install. Modified Favorites. SoCal Salvage Yards. Unleaded Racing Fuel. B26FT Stroker. Dave's Spec Page. Volvo Meet Photo Albums. Vacuum Diagrams. Favorite Links. Cadillac 4-Note Horn Install. Electric Fan Diagrams. Tropical Fan Clutches. Texas Volvo Meets and Events. R-Sport Apparel. Prancing Moose Apparel. Mojave Road Trail Page. Ordering Instructions. Online Payments. I sincerely believe the AC in these cars was designed with only northern European climate in mind. They were almost always a disappointment for U. In older s pre the AC systems were just not up to the task. They were improved in when a different system was designed. Image below of pre AC, showing small AC drier on passenger right fender. So then later Air Conditioning is better? These systems were a different design. The and later evaporator box under the dash was a different design as well and reportedly had a larger, more efficient evaporator coil. From the system changed to Orifice Tube type, but retained R12 refrigerant as in previous years. The models were changed to use Ra refrigerant. A few other components orifice tube, sensors, new condenser and new high and low pressure service valves were also reportedly changed or updated for to accommodate the new Ra refrigerant. More general information about AC systems can be found in the next section below. If you want to learn more about AC systems, then this information will help. So this means that if you're repairing or making any new hoses, you'll need fittings with standard or SAE thread , not metric. There is ONE exception. The one year only used an AC accumulator with metric thread. I don't have all the answers, but I know one of the most misunderstood things are the pressure switches sensors. There are TWO pressure switches in the system. It's a low pressure switch or pressostat that is designed to read internal refrigerant pressure in the evaporator which immediately follows the accumulator. This switch controls compressor cycling and is designed to cut power to the compressor clutch when pressure in the evaporator drops below It then allows the compressor to come back on when pressure in the evaporator exceeds It does this because when pressure in the evaporator drops below 23 PSI, the evaporator can get cold enough to freeze the coils and any moisture or humidity on the outside of the coils will begin to form ice. This has less of an effect if you're in a dry climate. A sub-freezing evaporator coil may sound like a GOOD thing, but when it gets TOO cold it freezes up and ice will disrupt air flow through it and will cause poor AC cooling. Also, a sub-freezing coil will begin freezing on the inside if there is any traces of moisture in with your refrigerant. There shouldn't be any, but if the system is opened, then air can enter and air contains

moisture. This is a good reason behind vacuuming the system before installing refrigerant. The other switch is a sensor in the high-pressure line between the condenser and accumulator. This high pressure switch turns the condenser fan ON when pressure increases to over a certain level. These systems all use a mechanical pressure relief valve on the compressor to vent gas in the event of an over-pressure situation. Depending on the manufacturer of the compressor, this "safety" valve will release pressure if it exceeds approximately 31 to 37 bar to psi. If you have one of these cars and experience a vent release on a hot day, check your condenser fan. A failed condenser fan can easily cause pressures to spike high enough to vent refrigerant. Refrigerant Service Valves. Michael reported exceptional results with 36 degree vent temps at idle on 90 degree highly humid days. His success was enough to inspire me to make future plans for a similar installation. I don't think I would have ever considered such an installation if Michael hadn't done it first and I would have stayed in Volvo AC hell. Here are a few pics Michael sent me showing some details of his installation:. The shape of the aftermarket AC box is very different from the original AC box. In this photo, you can see that Michael has added some of his own metal bracketry for mounting the new box under his dash. Also the sheet metal brackets at the very top are the same brackets in your that hold the original AC box in the car just under the windshield cowl. Classic Auto Air has several versions and sizes of AC boxes. This is one of their all electronic boxes. An electronic box like this one eliminates the cable and vacuum controls originally found in a So this means your vents and temp controls are done electronically and all those original vacuum buttons and cable controls go away. Here's a front view of the new air box in Michael's dash. There are some compromises or trade-offs with this system. As you can see in these pics, the new AC box is a bit wider than an original box, so part of it can be seen extending into the passenger footwell. This is a small trade-off that I would be willing to accept. Michael reported that his installation did not require any modification of the rear of the dash or glove box. Michael believed fitting that larger box would have probably required cutting into the glove box. This means there is no outside fresh air setting for this system. It will only recirculate air inside the cabin. So if you really need fresh air using this system, you'll need to open your lower kick-panel vent or crack a window. That original fresh air hole under the cowl will need to be closed off and sealed to keep the weather out of your car. As you can see here, the old original slide controls and vacuum push buttons are gone in Michael's car. In their place is a new electronic control panel with knobs. Try not to be confused when you browse Classic Auto Air's webpage. They also show setups using CABLE controls, but they fail to explain very well why they show both setups. Basically the cable controls they offer are designed for classic cars where the owner wants to retain the original look of vintage cable controls. Classic Auto Air Installation in my Classic Auto Air's webpage and catalog is mainly focused on tailored kits for vintage domestic cars and a some targeted vintage foreign cars. There is a small page on universal AC kits, but I found it to sadly be light on real usable info for anyone looking at this as a fully custom installation like I was. They could improve things by adding more info about full custom or non-standard installations. I had to hunt through different places in their pages to find useful info. I hope they begin adding more photos, explanations and more general info for custom stuff. These custom units can be found by clicking on their Universal AC Systems link. Aside from the awesome information I got from Michael Yount, I learned the most by thoroughly reading the Classic Auto Air installation instructions where the illustration diagram above came from. There were not many photos of this unit in their site, so I have included some here. Here are some more views of the mounting braces. This is where the fresh air vent was located. I have closed it off and sealed it. Not because I hate fresh air. It's because the new AC box isn't designed to accommodate a fresh air vent and if I didn't seal it, I would have water coming in when it rained, which would be bad. I began by cutting a rigid piece of plastic to the precise shape of the hole. It helped to make this piece out of cardboard first. Then after I had the size just right, I transfer the shape to the plastic or you can use metal or whatever material you decide to use. Then I applied a generous bead of 3M black Super Weatherstrip Adhesive around the edge and installed it. Then I further sealed the opening with some Dynamat. As Michael did, I used those brackets as top mounts to secure the new AC box. If you think you really must have the top defrost and bottom heat vents controlled independently , there's a larger AC unit from Classic Auto Air called the "Custom Colder" unit, shown at left. It's their largest unit and it will do these vents independently. As mentioned earlier, this larger unit is 24 inches wide, 10 inches tall and 8. That comes to 3. This larger unit might fit still just fine in a dash, except it would add ANOTHER 3 inches of airbox width that you could see under the dash in the passenger footwell. Before my installation, I did not seriously consider any Vintage Air systems for this project, but I believe they also have large AC units that are capable of controlling upper and lower vents independently. At the firewall, the TOP hose always comes from the cylinder head. It feeds hot coolant to the heater core when heat is

needed. The BOTTOM hose is considered to be the return hose and returns coolant to the water pump metal pipe that begins behind the engine and goes to the back of the water pump. The hoses come into the cabin through the original firewall location just to the right of the gas pedal. Classic Auto Air's instructions show it being installed in the engine bay, but I wanted it behind the dash instead. Any little thing you can do to eliminate rattles in a is well worth the effort in my opinion. Here's an image from Classic Auto Air's catalog. It shows a number of duct adapters. They sent me a few different adapters with my order that they thought would come in handy. Some did. Below I've detailed what I used and what I didn't use. Strangely, these were NOT shown in their catalog. They are similar to PN in their catalog. The adapters I got were listed on my invoice as PN I ordered the below hose parts from coldhose. It's an expensive tool I bought years ago when I began doing my own AC work. Since there is now a less expensive option for DIY AC mechanics, I recommend the Mastercool manual hose crimper if you decide crimping is for you. Or you can go to a hose shop and have your hoses custom made. You can expect to pay quite a bit, so buying your own tools makes sense to me if you might be doing this more than once in a lifetime. These alternatives do not use the crimping methods shown above and do not need any expensive tools. So this means that if you're repairing or making any hoses, you'll need fittings with standard or SAE thread , not metric. The drier is connected using 6 hose fittings shown in the photo. One is straight and one is 90 degrees. The hose coming from the condenser to this drier begins at the condenser with a 90 degree fitting not shown. It's identical to the 90 degree fitting in this photo, except it does not have a high side discharge port. This 90 degree fitting in this photo has the high side discharge port, which is useful for hooking up to your AC gauge manifold high side hose. The hose going from the straight 6 fitting on the drier in this photo goes to the firewall and then to the new AC box. All fittings shown are aluminum. Steel fittings are available if you prefer that. I did NOT discuss the hose from the compressor to the condenser, which calso be seen here. This is because I used the existing hose I installed back when I installed that new condenser. Then a length of 8 barrier hose, PN BH8. All fittings are aluminum. Below items were ordered from coldhose. When you pull the dash and an original AC box out of a , the spaghetti mess of wires can be overwhelming. In many of these photos you can see pieces of yellow electrical tape with marker writing wrapped around some wires. As I began this disassembly I marked every wire or connector with tape and a description of where it went or where it came from. It was time consuming, but well worth the effort. Trying to find all those wire locations later without this info would not be very much fun. Also it's helpful to grab your cell phone and snap some photos of this stuff as you go. That may help out later and you'll have some nice photos to impress your Prius driving friends at parties. My engine management system is here. The covers for the distribution blocks are not available. I made them custom because I wanted some protection for the hot leads. I then painted them black and added labels. That PVC sheeting may be formed easily with some heat from a hair drier or heat gun and is easily trimmed with scissors. If you try this, make a cover out of cardboard first so you have a good template. Buttoning Things Up. I already had some black parts I began collecting a few years back. They were looking a bit old so I cleaned them thoroughly and renewed them with some fresh black paint. It's a really nice finish for dash parts. Some sheet metal shears performed very well. Observations and Results. The air turbine in this new AC unit is smaller than those in original Volvo air boxes. That was easy to see since the new unit is more compact than the Volvo box. I can't offer a more precise quantification. If this is a deal breaker for you, then you should keep your original system. Ra Classic Auto Air specifies to use Ra. I've never been a fan of Ra. It was never as efficient as R But I did give it a good try for a number of weeks. Running at highway speeds did bring the vent temps down a few degrees to as low as 46 degrees. This did offer reasonably comfortable driving, but it was NOT making me smile. I decided I spent too much money to not get a smile out of this! Ra I've been a fan of Duracool for a number of years. Read their FAQ section. It produces significantly lower head pressures than Ra. The Duracool equivalent is 10 ounces. Yes, 10 ounces. Here's a chart below showing exact conversions also found in the Duracool site FAQ section. A bit more generic info about Duracool. Duracool can be purchased in any quantity without a fluorocarbon HVAC license so can Ra, except in large cannisters. All lubricants. It's also compatible with all elastomers used in refrigeration O-ring seals, hose linings, etc. Duracool is non-toxic as opposed to Ra , it does not negatively affect the environment or ozone as opposed to Ra , and it doesn't produce deadly phospene gas if exposed to a flame as opposed to Ra. Duracool isn't illegal to buy or to put in your car some people think it is and Dupont would like it to be. It's just hard to find an AC shop who will install Duracool or do any work on a car with Duracool. This is partly because most AC technicians have paid good money for their fluorocarbon licenses and they want to keep the business as proprietary as they can. Also they consider anything but the standard Dupont designed

refrigerants to be "contaminants" to their pristine equipment if they hook up to your Duracool infected car. For these reasons, Duracool servicing may make more sense for do-it-yourself AC work only. There are people who actually consider themselves to be intelligent who will be promptly tell you your car will explode in a ball of flames if you use a hydrocarbon refrigerant. They forget that they are driving around with 15 to 20 gallons of highly volatile gasoline, which is pumped through hoses under high pressure. And they worry about a few ounces of hydrocarbon gas. I hope these people never move into a house using propane or natural gas. If you read the MSDS information for Ra, you will find something like this: "RA is not flammable at ambient temperatures and atmospheric pressure, however, this material will become combustible when mixed with air under pressure and exposed to strong ignition sources. Here an information video from Duracool. This temperature was recorded at idle in my garage with the fan on the lowest setting. Increasing the fan speed tends to bring this vent temperature up a few degrees because more warm air is being pushed through the evaporator. The old wasn't too far behind that. This is awesome cooling compared to before! Yes, this makes me smile. Dave's Classic Auto Air Installation. Dash Wiring Clean-up. Can I convert my old to have more modern AC? Yes you can. It offers an explanation of the heater and AC systems offered in models from All AC systems in models from used R12a refrigerant with a Thermal Expansion Valve TXV to control and release pressurized refrigerant into the under-dash evaporator. An orifice tube performs the same function of controlling and releasing pressurized refrigerant into the evaporator under the dash. From this system used R12 refrigerant. The models were changed to Ra refrigerant and some components were changed orifice tube, sensors, new condenser and new high and low pressure service valves to accommodate the new refrigerant. Also, models received compressors with a temperature switch , which is designed to cut power if the compressor overheats typically due to a leak. For , this valve will be configured for R An adapter fitting may be used to convert it for Ra filling. For models, this fitting will be configured for Ra. Not all will have these. Some will have blocking plugs in those ports or no ports at all. As previously mentioned it was later banned in the U. It is commonly believed that thermal expansion valves TXVs used in these cars were specifically adjusted by the factory or by the TXV manufacturer for use with R12 and then later TXV cars using Ra had valves that were set or adjusted differently. The adjustment method on a TXV used in a Volvo is illustrated below. An Allen wrench is inserted into the inlet port and there's a set screw that is turned. There are many opinions on what these adjustments need to be for different refrigerants and so far none of it is very definitive. A discussion thread on setting these valves is posted below. Over the years I have done a lot of experiments on my AC. Some have responded fairly well, but none would seem to work like a real modern AC system is supposed to. I built this hose below, which had a fitting for a small 1 lb. The small fitting is an R12 fitting, since at that time my car still had original R12 fittings. This custom hose used simple pneumatic air hose with fuel injection hose clamps. A propane bottle will typically have a maximum pressure of PSI. This can happen when the outer surface of the evaporator drops below freezing. If enough ice forms on the evaporator, it would eventually block the flow of air going through. Another type of freeze-up can occur if there is moisture INSIDE your system and if the evaporator dips below freezing. The internal moisture can freeze as it enters the evaporator and then temporarily block the flow of refrigerant. If this occurs, then a symptom would likely be reduced pressure in your low side between evaporator and compressor. The reduced pressure can even become a vacuum if the blockage is severe. This is something my self-taught amateur understanding did not consider years ago during my propane experiments. There could also have been some moisture in the propane I was buying. Propane is not made for AC systems, so I suppose it's possible the refining standards might not have removed all moisture. If you have done your own Volvo AC upgrades or if you're planning to do something like this , please email me. I'd like to hear about it. Also, if you have any suggestions to improve the information in this page, please email. This is what began my conversion from a skeptic to a believer that real AC in a was possible. With the old airbox area gutted, here's a view of Michael's car with the new AC box sitting under the dash. PN June info u pda te : Consi dering the steep price increase noted above, you might also explore Vintage Air. When I began this project, there was NOT much detailed info available about the difference s between the two systems. One difference I'm now aware of in Vintage Air systems is larger dash duct outlets on the unit: 2. I don't know if this makes a difference, but I suspect it does. So you may run the air dumps OR use normal duct hose from those outlets to your lower heat vents if you like. The heater air dumps simplify things if you decide not to run duct hoses. When using heater air dumps, the heat will simply be pushed down and out below the dash through whatever openings exist. This works just fine in a , so my installation uses these simple heater dumps instead of long hoses. It's controlled by the ECU in combination with the temperature control knob. It's designed to allow metered amounts of water for precise

heat mixing. There's an orange label showing which end goes toward the heater core and a green label showing which end goes to the water pump. They make no sense for a Volvo with a Volvo engine. I chose this black anodized knob set in a horizontal configuration. You'll need to hunt through their site to find their PDF catalog and separate price list. They offer Sanden rotary compressors also if you need one. I didn't buy one from them though. This style was originally equipped in s beginning in My had been changed to a new rotary style compressor back in by the previous owner. You can buy one from Classic Auto Air or Coldhose. They come in many different sizes. If you're wondering what a Parallel Flow Condenser is, it's basically a newer and better design than the original style condensers our s came with. A pusher fan is recommended to get better air flow when you're stopped or at low speeds. Mounting the new Classic AC Box. I began fabricating some mounting braces similar to those shown in Michael Yount's photos. My technique was a little different from Michael's, so you can compare and choose the style you like. The new AC box comes with some mounting points with U-nuts on the backside. Basically I made some braces to make the box sit about 2 to 2. I originally wanted it to be closer to the firewall, but the heater hoses coming in through the original location were in the way. The kit came with some clear drain tube for the condensation drain on the bottom, but it wasn't very flexible and tended to kink in a turn. So I used some silicone tubing I had on hand that blue hose in the pic. It can be found in most hardware stores. I chose aluminum because it's so much easier to work with than steel. Thread pitch is metric: M6 x 1mm. These are made for a panel thickness of 0. These are pretty much identical to the typical metric bolts with a 10 mm hex head that you'll find in your I pushed the unit as far to the left side as possible and it is actually resting up against the driver's side right center kick panel. I trimmed some of the plastic off the top of this kick panel to clear the actuator motor and thermostat, which extends a little past and above the kick panel, but it high enough to not be visible after installation. I also bolted in a small steel bracket to the transmission hump below the new AC unit for a lower mounting point. It can be seen in a different photo further below. That bolt hole was one of the lower mounting points for the original AC box. At all mounting points I used zipties to secure the new AC unit. It's mounted pretty firmly and all of the vent duct outlets seemed to have adequate clearance from obstructions. The original drain hole was in a difficult position for my preference, although it appears from Michael's photos he used it in his installation. I decided to move the drain grommet to the other hole as shown here, trading grommet locations. This was a suggestion by Michael Yount. I found it helped provide more clearance for duct hoses. If you're confused about how I swapped the heater dumps to the center outlets, this would be a good time to tell you this unit does not independently select defrost or heater vents. It sends air through both lower heat and upper defrost ducts equally whenever upper or lower vents are selected, so it really doesn't matter which outlets are used for upper defrost versus lower heat. You can add this to the trade-offs mentioned earlier. This was a small disappointment when I found out, but I got over it. Would another 3 inches of airbox width under there be too much??? It's hard to say. There are no critical clearance issues here. There seems to be plenty of space. It's used as a central location for all the dash grounds instead of mounting them to different bolts all over the dash like Volvo did. This is part of a wiring cleanup project that was badly needed. As mentioned above, the AC unit is positioned as far to the left side as possible and is resting against the driver's side kick panel. It can't be moved more to the left without moving past the driver's side kick panel and interfering with your accelerator foot. It also has some Dynaliner foam that I stuck to the bottom and sides to isolate it from vibration or rattling. The tubing fits the oval ducts snugly. I contemplated for a while how to adapt this tubing to the Volvo original front dash and top defrost vents. I didn't need to worry about the lower heater vents, since I was using heater air dumps instead of duct hose there. Also you may have noticed the original Volvo heater ducts going to the rear floor going under the carpet and under the front seats were removed when I was applying Dynamat. Those are gone permanently. These are defrost vents shown in the catalog image as PN These are shown in the catalog pic above. He attached them under his dash using screws through the dash top. I decided to go a different route using the original defrost vents that you'll see below. I trimmed a bunch of plastic off each of the original Volvo defrost ducts and then fitted a PN adapter using some screws. I angled the hose inlet toward the incoming duct hose, so the duct hose fit nicely. These were then mounted to the underside of the dash using the original rubber nubbs. The square end fits onto the back of the Volvo vent. I stuck some inside the first inch of the Volvo tube. Nice snug fit. They're close together and the original adapter spreads them far apart. Not the best match. Then I decided NOT to use it. These parts seemed to fit a little better. Then I cut open the thin plastic box so the center divider was gone. This view is through the hole for the main gauge cluster. Here's the driver's side defrost vent being held in place using the original rubber nubs. Fits pretty well. The left side looks pretty much the same. Alternatives for Building AC Hoses

without Difficult Crimps There are some interesting alternatives available that you may want to know about. The one I bought was made by Uro. You should get a drier that comes with the low-pressure cut-off switch shown on top. This switch is wired into the AC compressor power circuit and if the pressure drops too low because you have a leak the power to the compressor will be interrupted. This drier also has the over-pressure relief valve on top, closer to the fender in the above photo. This valve is optional, but it was original on an early Having one of those is up to you. I believe most later rotary AC compressors have a built in over-pressure valve. Early compressors did not have that. There are some aftermarket driers that don't come with either one of these items, so shop wisely if you want them included. The drier has a desiccant inside, which absorbs moisture to keep it out of your refrigerant. A drier can eventually become saturated with moisture and it will no longer work to remove moisture from your system. If the drier is or has been stored without a good seal, then ambient moisture can saturate the desiccant and render it useless. The 90 degree fitting on the right gets crimped to the 6 hose coming from the drier. I made it this way so I could have a quick 90 degree bend at the firewall instead of the typical hose coming out over the exhaust manifold and then turning. The 90 degree fitting on the left side connects to the high-side inlet on the new Classic Auto Air unit. The small hose is the same as the one shown above. It's the high pressure hose coming from the condenser and drier on the right fender. This hose is shown below in more detail. The 90 degree female fitting on the left side goes to the AC unit. The 90 degree female fitting on the right side goes through the firewall and then turns left to the 10 hose going to the compressor. It connects to a Male Insert o-ring fitting before heading toward the compressor. Something to keep in mind when trying to figure out how to order fittings : A female o-ring fitting always fits a male INSERT o-ring fitting. I chose a 45 degree fitting for that male insert o-ring fitting. I did that because my original plan to have a straight fitting there made the AC hose a bit too close to the valve cover. That could make removing the valve cover more difficult. It has a low-side port for charging. Universal Drier Bracket. Not Shown in photos above hose from Compressor to Condenser. Cleaning Up the Dash Wiring When you pull the dash and an original AC box out of a , the spaghetti mess of wires can be overwhelming. I don't understand why Volvo engineers thought hiding the relays deep inside the dash behind the vents was a good idea. Now I have placed these relays behind the inner passenger side kick panel. Some wires needed to be extended on the relay connectors to reach this location. There are 6 of them here. Only 5 relays for now, but there is an extra socket for one more relay if needed. This allows me to have one central location for all the dash grounds found in that center dash area. There is one big fat cable connecting this block to one ring terminal bolted to a convenient dash bolt instead of a bunch of ring terminals connected to different dash bolts all over the dash like Volvo did. I found I had some glove box interference. The back left corner of the glove box was touching a refrigerant fitting and it was preventing the glove box from going all the way in. I solved this by trimming a small part off the back left corner of the glove box and then everything fit again. Moving the new AC unit closer to the firewall would probably have solved this glove box problem, but for my installation it was not possible because the heater hoses coming through the driver's side firewall near the accelerator pedal interfered and kept the AC unit from being pushed farther forward. Moving m AC box closer to the firewall was not possible unless I moved it more to the right side, away from the heater hoses, but that would have exposed more of the AC box to the passenger footwell. Place vacuum on the system for minutes to eliminate all moisture. Vacuum is best at inches Hg. I used an electric vacuum pump. It's a good investment if you are doing your own AC work. Classic Auto Air says Ra is required. Substitutes are not recommended. I don't always follow rules. You'll see in my observations and results below. Recommended charge: 24 ounces of Ra. That's 24 maximum. Do not overcharge. Classic Auto Air says it's better to slightly undercharge rather than overcharge. High side pressure is generally expected to be about to PSI. I got To speed things up, a good trick is to place the can in warm water. Not too hot. If it's too hot to touch, it's too hot. This trick raises the pressure in the can so it flows a little faster. It took about 15 minutes for the first can. Ra Low: 26 PSI. High: PSI. Here are the final pressure readings after installing just under 24 ounces. Ra Low: 27 PSI. My system developed a leak somewhere that allowed the refrigerant to leak down in 24 hours. That's a pretty fast leak. It makes you doubt the parts you spent a fortune on, your tools and your sanity. I could see the UV dye leaking up through the threads on this firewall fitting. One must be more careful when coupling these fitting together. Internet sources suggest a bad o-ring causes most leaks in AC systems. Observations and Results The air turbine in this new AC unit is smaller than those in original Volvo air boxes. If you have done an AC upgrade to your Volvo or if you're thinking of doing something like this in a Volvo any Volvo , please email me. I'd like to hear all about it. Contact Us. Prancing Moose Stickers. Volvo Stickers. New Items. Other Car Stickers. Steering Wheel Labels. Cool Volvo Products. Volvo Wire Harnesses.

Conversion Harnesses. Volvo Relays. Coil Repair Harnesses. Adj Voltage Regulators. Horn Buttons. Volvo Gauge Faces. Group A Racing. Fuel Pump Relay Mods. Harness Crimping Page. Classic Auto Air AC. Limited Slip Read Ends. Yoshifab Catch Can Install. Side Marker Lights. Gentex Mirror Upgrade. Yoshifab Drain Tube Install. Modified Favorites. SoCal Salvage Yards. Unleaded Racing Fuel. B26FT Stroker. Dave's Spec Page. Volvo Meet Photo Albums. Vacuum Diagrams. Favorite Links. Cadillac 4-Note Horn Install. Electric Fan Diagrams. Tropical Fan Clutches. Texas Volvo Meets and Events. R-Sport Apparel. Prancing Moose Apparel. Mojave Road Trail Page. Ordering Instructions. Online Payments. External Adjustable Regulator Kit. Non-assembled ends would permit you to trim a harness to your preferred length if needed and then you would crimp the final connector terminal ends yourself. Click Here for Fixes. External Adjustable Regulator Only. It's an all-in-one part and can be adjusted up to an approximate maximum of A typical adjustment range for this unit when a static bench test is performed is about This regulator will work in a also, but access to the adjustment screw might be difficult since the alternator is mounted low and forward of the exhaust manifold. This regulator is not recommended for a Turbo, since it will be very difficult to make adjustments. This internal regulator can be installed in your alternator in place of your original Bosch or Bosch-type regulator. Factory set for Internal Regulator, non-adjustable. Fixed If you DON'T need an adjustable regulator, this will be the one you need. Fits 28 mm type slip ring only. These are factory set for It's for the same reason why you will never get If you did, you would not be looking for a better regulator here. This regulator, however, will offer an improvement over a factory regulator. Different cars can have different levels of improvement according to the condition of your charging system and connections and the amperage rating of your alternator. An 80 or amp alternator will always perform better under load than a smaller 55 amp type. My car was a good test bed for this regulator and the improvement was dramatic. Your own results may vary. Customer Comment: "Just wanted to thank you for the regulator and let you know it's working very well. I'm quite impressed with how well made it is, and how easily the voltage is adjusted. The dashpot is very smooth and linear in how it varies the voltage. This is not something that car alternator manufacturers want to talk about. The reason is that automotive alternators are specifically engineered so that they reduce output when they get hot. This is because heat is an enemy to an alternator and it can be a common reason for failure. Engineering them to reduce output when they get hot is the answer to that. So there's really not much else you can do with a standard automotive alternator if it's getting hot and dropping voltage. Volvo did add a thin heat shield for the Turbo. It probably helped a little. This is not as big a problem in cars where the alternator is on the NON-exhaust side, like in the Volvo or Will an adjustable regulator make my alternator always hold voltage at My alternator output seems to drop at times, especially with several things on at one time, like high-beams and air conditioning, or when HOT. Answer: An adjustable regulator will raise your voltage initial set-point. A stock Bosch regulator usually has a factory set-point of about Rarely will you actually see that much voltage with a stock Bosch regulator. If you see And it will usually drop considerably under load and even more when hot. An alternator that has a smaller amp rating such as 55 amps will not hold a certain voltage set-point as well as one with 70, 80, amps or higher when more load is added. So the answer is that even with an adjustable regulator, voltage will likely still drop with load and heat. The benefit of setting your own higher initial set-point is that it will allow your charging system to begin at a higher level. This will allow it to handle loads better to some degree. For example, when my '84 Turbo had the original 55 amp alternator, the stock regulator usually had an output of about With the adjustable regulator, I was able to set it for A larger alternator from a later car with 80 or amp capacity will usually improve the voltage drop caused by load. For BEST access to the rear of the alternator in a Volvo , you should remove the alternator from the car. If you have a car with the alternator in a better position where you have lots of room to work behind it, such as a Volvo , then it will be easier to install while the alternator remains in the car. If you are not confident in your abilities with this type of installation, I recommend you have someone with experience help or have a professional install it for you. It's possible to permanently damage the regulator when installing if you don't know what you're doing click here to see damage photo near bottom of page. It's the black box thing also below left photo. It's attached by two screws sometimes slotted, sometimes Phillips If you are working on a Turbo , you will definitely need to remove the alternator, since it will be impossible to get in behind it while it's still mounted in place. It looks like an aftermarket type. I have also securely mounted the external regulator the silver metal box near the radiator fan. You can see the harness connecting the two components. It really couldn't be much simpler. The regulator can be mounted anywhere under your hood within the 30 inch reach of the harness or elsewhere if you request a longer harness. Total installation time was about 45 minutes, but a first-timer might be longer. You should use a real voltage meter hooked

up at the battery to see what you are setting it at. Please don't rely on your in-dash volt gauge, unless you have verified its accuracy. They are not always accurate. Do yourself a favor and buy an inexpensive digital meter to accurately measure your voltage at the battery. R egulators offered here are designated as A Circuit or B C ircuit. Another good explanation of how a Dash Warning Light works. After the initial shot of voltage the alternator generating electricity process should be self sustaining from then until the car is shut off. Why is the dash charge lamp lit when you first turn the key to "ON"? Turning the key to "ON" provides power to the other side of the bulb and the bulb then lights. If you are unsure, you may ground this circuit. If you get a significant voltage rise up to 16V when bridging these two circuits, the alternator is charging pretty darn well and should normally be consider HEALTHY. This could be made from an old bad internal regulator unit. Just make sure the brushes are still in good shape. Replacing Worn Brushes on Regulators The most common symptom of worn brushes on any regulator will be drops in voltage while driving. It may be intermittent at first and you may notice the radio or other devices turning off or flickering. This condition will eventually drain your battery and your car will stop running. If you occasionally remove your voltage regulator to inspect the brushes, they will generally be considered worn out if one or both protrude less than 5 mm from the housing. Brushes on a new regulator will typically protrude 10 mm or more. Do you suspect you might need a new battery or have you been experiencing dead or weak battery problems? Before going further, watch this video on battery testing. I bought one of these testers and now I even test a brand new battery to make sure it's putting out close to what it's supposed to. A Few Customer Comments:. External Adjustable Regulator Kits. These are complete kits for any common Bosch 28mm slip ring Alternator external fan type of course. I recommend a limit of about If you're using a lessor battery, keep output under Wiring and Pinout Information:. Access to the back of the alternator for adjustments can be difficult pretty much impossible with a Turbo. So getting a remote regulator makes good sense. Also, if there is a hot exhaust manifold or turbo close to the alternator in your car, mounting a remote regulator a further distance away from that heat will result in more consistent voltage readings. Scroll down to the installation tips to see a demonstration of how I installed this kit in one of my own Volvos. Click Here. This particular type fits those with 28mm slip rings ONLY. Most external fan Bosch alternators have 28mm slip rings. If needed for a special order, etc. Separate Shipping for Brush Assembly not needed if you have already selected shipping for an above kit. This particular type fits those with 28mm slip rings or 32mm slip rings. Much of this information was compiled with the help of customers who have verified the correct fitment of these regulators over more than 20 years. If you have a regulator or alternator part number that you think should fit, but does not match these numbers, or one that fits and I need to add it to this list, please email me. No bad reports have been found since These adjustable regulators will do wonders for most Volvo , , or series charging systems and those from many other cars with Bosch external fan alternators. It permits you to set your voltage instead of relying on the preset voltage found usually too low in most older cars with Bosch alternators. I first began using these regulators in my Volvos more than 30 years ago. Prior to installing one of these, I would typically find that my alternator would supply lower than optimum voltage output. On a good day I could see I found this could bring voltage output down to Then I could see voltage at idle dip below 12 volts when using a load, such as using headlights and the heater blower fan. I had frequent occasions when voltage dropped so low that my stereo would cut out. If you don't have at least a good charging voltage minimum of When I began using an external mounted adjustable regulator on my Turbo, I began to see an improvement. I tried mounting the regulator further away from my hot exhaust manifold and turbo. A voltage regulator can be negatively affected by ambient heat. So a cooler running regulator can mean better alternator efficiency. After first installing this kit in my Turbo, I set the no-load voltage to I was soon amazed to find that my headlights were brighter, my electric primary cooling fan was running faster, and my stereo amplifier worked perfectly for the very first time. Frequently Asked Question:. The first order of business when installing this item: disconnect the negative side of your battery. You will be playing near the big red 12 volt positive cable on the rear of your alternator and you don't want any surprise ZAPS to occur. Don't forget to remove the pin on this brush assembly before installation so the brushes will extend as needed. The pin is only there for shipping and storage to protect the brushes. NOTE: During these procedures it is best not to handle the brushes with your greasy hands as you can contaminate them and reduce their efficiency. It turns out that rain or water when washing the car will pour through the space between the hood and fender and the regulator will be repeatedly soaked with water. The regulator is fully potted and waterproof, however I have found that corrosion on the contacts can begin quickly when this occurs repeatedly and that corrosion will eventually interfere with the signals to and from the regulator. A typical symptom of this corrosion will be unwanted fluctuating voltage. The brushes are there to make electrical

contact with the slip rings inside your alternator. Sometimes is takes running the car for a few minutes before those contacts wear in and begin working perfectly. Scroll down for more info on this. The very first thing I can recommend if you are having charge issues or low voltage, check your ground cables at the alternator and battery. I have seen people forget to reconnect alternator grounds and I have experienced broken and loose ground cables before. They can drive you nuts. Often it's a simplest things when problems like this come up. Check the alternator belt, and belt tension mechanism. Alternators with slipping or loose belts won't charge correctly. Reading should be very small. Test 2: Positive Battery Cable Resistance Test With your car running it's ideal to place your test probes before starting the car to avoid sticking your hands in the belts, etc. You may need wire extensions to reach both. Any voltage reading greater than 0. Anything less than 0. Any reading greater than 0. A measurement less than 0. If the reading is greater than 0. Be sure to use the sharp point of the electrode to dig into the aluminum body of the alternator because the surface will be oxidized and not very conductive, and may give a false reading. Any measurement greater than 0. Measurements less than 0. If more than 0. Repeat the test also for the alternator aluminum body to engine metal. If all the tests are passed, but issues still follow, the issue lies somewhere more obscure. If the above connections are good, and still you aren't charging, it is possible there is a less than optimum contact between the NEW brushes and your OLD alternator slip rings. When I first discovered this I was quite puzzled, but as it turned out the friction end of the brushes just needed some time to wear in to establish good electrical connections with the old, worn slip rings. So it would seem one cure would be to continue running the engine until the voltage regulator starts working This has worked for some customers. Fluctuating Voltage at Idle. Lights Pulsing or "Flickering". This test may be performed on any internal or external regulator adjustable or non-adjustable and it will tell you what the voltage the regulator is set to. It will help you determine how well your alternator is charging. In case of a problem, this procedure can help you decide if the alternator is at fault or if the regulator is at fault. This test is standard procedure in older shop manuals. Part Number Listings Click Here. Installation Tips. Internal NON-Adjustable Failures to Charge - Troubleshooting. Marine Applications. These regulators are made for Bosch External Fan alternators. Here are some photos of typical Bosch external fan alternators. The one of the left of each photo is a 55 amp. The one on the right in each photo is a amp type. A Few Customer Comments: "I finally have appropriate alternator output voltage. My car has never had enough voltage from its charging system. I installed your regulator, and was thrilled by the results. My Autronic SM2 engine management system is much happier. It idles noticeably better now, and I expect longer battery life as well. Thank you for an excellent product. Thank you for your fast service. First thing I noticed was that both cockpit voltmeters were off by about a volt or more. Knowing the voltage at the battery terminals is a great relief. Both regulators tuned to Thanks for making these fabulous products available. It is awsome!!! Your site is on my favorites now, thanks for the good communication and quick shipping!!! Volvo , C. Super easy to install and the results are awesome.. I was only getting about I was looking for adjustable voltage regulators and found your website, I ordered 1 of each - external and internal.. Before, with the old BOSCH regulator my car would run horribly with all the electric accessories running. You may choose a harness with finished connector ends or with one or both ends unassembled. Unassembled ends would permit you to trim the harness to your preferred length if needed and then assemble the final connector crimp terminals yourself. This is on my '90 Volvo turbo with a long history of killing batteries and voltage regulators, I imagine due to heat and the cheap voltage regulators on the rebuilt alternators I've been using. Anyway, this is something I should have done a long time ago. In thirteen years, I have never seen this car make more than 14 volts at idle under the very best of circumstances - and usually not for very long. It has been just under miles since the install and I'm still making I've checked it hot and cold, before I start out and after a long day of mixed driving - even mid trip. Great product, good quality, fast shipping and a great price. I've admired your services and products for a long time and you live up to your reputation, count me as a very satisfied customer. Other than that, it just seems to idle a little smoother. The only thing I had to adjust for was that the plastic of the new voltage regulator was slightly larger in size than the stock Porsche part, so I got out my dremel and a carbide cutter and it only took a few seconds to shave it down. After that, the screw holes lined up just fine. I've got it set at I'm pleased with this part, and have let other owners know it's worth it. This regulator corresponds to the following Volvo Part Numbers: BMW and Bosch PNs for BMW: , , , , , , , , , , , , , , , , , , BOSCH part numbers that fit or correspond to this 28 mm slip ring regulator Alternator and regulator numbers below. Saab , , Saab 99 "80 with Bosch and alternator not models with SEV alternator , Turbo and non-turbo "94 with Bosch , , , , , , alternator not '94 and later with the newer internal fan alternator , "94 with Bosch , , , , alternator. Hopefully this will help, but feel free to ask if you don't see yours.

Just Vanagons. No other VWs. I'm not that familiar with Vanagons, but there were some issues reported with about 6 different Vanagons over several years up to about when using adjustable regulators. When this has occurred, re-installing the old regulator seemed to correct it. Some have suggested it might have been a vibration issue with some engines or possibly some weaker springs on the regulator brushes. No definite source or better explanation for this strange behavior was ever found until the problems mysteriously vanished in So please keep this in mind if you intend to use any of these internal or external regulators in a Vanagon. Strange, huh? If you use these regulators on a Vanagon, please email me with your experience. Michael C. External adjustable regulator kit installed. He has a volt gauge and has been monitoring for plus miles with no issues. Richie reports: "Saw your Vanagon warning. I've been running one in my '84 Vanagon for about 6 years now. Never had a problem with it over thousands of miles and it charges my starting and house battery no problem at I wonder what's going on with the others? Anyways, thanks for a great product. Danny S. Thanks for the great product. Paul T. He reported on first start-up his DMM read only 12 volts at the battery not charging and his alternator light was on. Turning the adjustment screw wouldn't change voltage. He turned it off and double checked that the brush housing was seated correctly and connections were good, checking harness continuity, etc. Then he thought, "Hey, maybe the regulator case needs to be grounded. Started it up and it began working. And the voltage adjustment worked also. He set it to about After he removed the jumper wire it continued working and has since. He chalked it up to Vanagon weirdness. He thought maybe the brushes needed more than a few minutes to wear in. His on-board volt meter reads He says: "IDK, van seems to run really great now. Still absolutely amazed that less than 2 volt increase actually makes an audible and tactile difference in engine operation. A 32mm Slip Ring Alternator is pretty uncommon. These Voltage Regulator Part Numbers are for 32mm applications. Advantages of an Adjustable Voltage Regulator. CAUTION: Since some Bosch alternators produce less voltage at idle than at an RPM above idle, you might find it harder to adjust your voltage output set-point consistently, depending on your idle speed and alternator output. In this case, you might try doing voltage output tests with the engine idle increased slightly to between rpm, where voltage output should be more stable. Here a video showing a typical replacement of a Bosch style voltage regulator. After reconnecting the battery, I started the car and checked the voltage measuring it at the battery with a volt meter. The factory preset voltage for this adjustable regulator seemed to be around 14 volts. I like it a little higher, so I used a small flat screwdriver to turn the voltage up to The screw is very sensitive, so move slowly. Also, do not force the screw past its limit as you will damage the regulator. Thanks for making such a nice product. I thought you might be interested to see a clean and simple installation of the remote adjuster in my Volvo photos at right. It kind of even looks stock! Just thought I'd share, since it worked out so well Thanks again. Installation is easier in most cars if the alternator is removed. The voltage adjusting screw can be seen in the back of this adjustable regulator. This means direction of current through the brushes and alternator rotor is reversed. In most cases, when starting the engine right after installing a regulator that reverses the current, the magnetic field will reverse on its own and your alternator will begin charging just fine. But once in a while, the current required to do this isn't strong enough to overcome the existing polarity that has been set in place in one direction for years. Flashing the Field isn't all that mysterious. Alternator rebuilding shops do this routinely to fresh rebuilds all the time. This can be 12 volts directly from your battery using any piece of wire. Please note the car should not be running when doing this, but the alternator does need to be fully installed and properly grounded! After this procedure, reconnect the brush holder back to normal and start the car. Flashing the Field in simple steps: 1. Turn the car off. Disconnect the three wires from the external brush assembly. Take a piece of wire and touch the DF spade to battery positive for just a moment. Plug the three wires back in. Start the car. Lights Pulsing or "Flickering" When an old alternator wears and degrades, it normally does so in stages. An alternator produces power by rotating three plates across a winding of copper wires. These plates can degrade and DIODES can slowly fail one at a time and then one or more plates may reduce the power output. This makes power output vary as the alternator spins and it can cause a strobe or flicker effect. Testing the output regularly at the battery with a voltage tester while the car is running can give indications that things are changing or wearing out. Most automotive parts stores will test alternators and batteries for free, because they want to sell parts to the owner, but keep in mind many stores have limited test equipment and limited employee knowledge , so often a bad alternator can be diagnosed as good and vice-versa. An alternator generates AC current. A rectifier is a device in an alternator which converts AC current to DC. When a rectifier fails, it allows AC ripple voltage to enter the vehicles electrical system, which can cause the lights to flicker. This test is done by connecting the DMM to the battery while the engine is running. For

best results, people who know more that I do will recommended using a multimeter that has true RMS Root Mean Square built into the meter. It should not show any voltage if the DC is blocked. Testing at idle can usually be fine. In some cases you may need to increase your idle to approximately 1, rpm, which will ensure your alternator is ramping up and charging. If your DMM reads more than 0. In this test the mechanic explains that if the AC voltage reading is more than 0. NOTE: He may be reading the meter incorrectly and he may mean 0. Electrical Parts such as these special regulators are delicate and do not hold up well to abuse. Otherwise, if you force the crud out of it and destroy it, please don't write me and tell me it simply "fell apart" on its own like this customer did. Please put your claw hammers away before installing one of these. The below video will help you determine the heath of your alternator power and ground connections. Is your dash charge warning light working correctly? Here's a quick and simple test. Turn the key on. Does the battery lamp light up? Do the parking brake, brake failure and bulb failure lamps come on too? The battery lamp is good. Now you can concentrate on other areas. The below video is quite long, but excellent. At it gets into explaining and testing a dash charge lamp circuit. As a Bosch alternator begins to spin up, it needs to have that initial excitation charge coming through the dash lamp, which "boots" the alternator into charging. This transition causes the dash lamp to stop functioning because you now have 12 volts DC standing on both sides of the lamp, thereby the lamp receives no current. It doesn't seem to work that way. Here are some simplified diagrams BELOW that will explain how a regulator may be hooked up for static bench testing. You should follow the above video and these hook up examples below if you want to test a regulator. This is how I test a regulator if a customer returns one for testing. Such returns are almost never defective and this test will show it. If you are having trouble, I strongly urge you to look harder and do not be too quick to blame the regulator. These can be be found fairly inexpensively as used items on eBay or other places. This one is an old-school analog type. Most available now will have digital displays. You might check out the following for tips on diagnosing a bad alternator On occasion I get questions from customers who ask about using an adjustable regulator for a marine alternator. I don't know a lot about marine alternators, but I'm always happy to help if I can and I'm alwa ys willing to learn. So I will be adding relevant marine applications or topics here when I find them. I hope this helps. If you can help with this topic or have suggestions, please email. He needed an alternator to produce a specific voltage range While he could have searched for an expensive computer controlled regulator, he wanted something simple. He achieved it using one of the internal voltage regulators offered here. Most people don't know that automotive alternators are designed to reduce output as ambient temperatures increase. This is designed into car alternators so that they can better survive high under-hood temperatures long eno

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ugh to live past the initial warranty period. Typical marine alternators are NOT designed this way , since most marine engine rooms are not nearly as hot as a car. Contact Us. Prancing Moose Stickers. Volvo Stickers. New Items. Other Car Stickers. Steering Wheel Labels. Cool Volvo Products. Volvo Wire Harnesses. Conversion Harnesses. Volvo Relays. Coil Repair Harnesses. Adj Voltage Regulators. Horn Buttons. Volvo Gauge Faces. Group A Racing. Fuel Pump Relay Mods. Harness Crimping Page. Classic Auto Air AC. Limited Slip Read Ends. Yoshifab Catch Can Install. Side Marker Lights. Gentex Mirror Upgrade. Yoshifab Drain Tube Install. Modified Favorites. SoCal Salvage Yards. Unleaded Racing Fuel. B26FT Stroker. Dave's Spec Page. Volvo Meet Photo Albums. Vacuum Diagrams. Favorite Links. Cadillac 4-Note Horn Install. Electric Fan Diagrams. Tropical Fan Clutches. Texas Volvo Meets and Events. R-Sport Apparel. Prancing Moose Apparel. Mojave Road Trail Page. Ordering Instructions. Online Payments.