



“New” TR6 Air Conditioning Design/Installation

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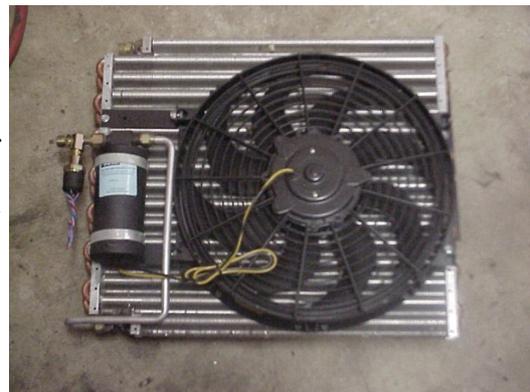
The following instructions describe the installation of a modern Air Conditioning system (A/C) into the Triumph TR6/TR250. This uses the latest HFC 134a refrigerant.

Apologies: I have repeatedly committed to publishing an article describing my A/C installation process to a large number of folks, usually stating that I'd have it available “next week”. Well, its late, 100 weeks late, but done.

Background: This article is the result of 4 years of effort to find a reliable, efficient means of cooling the TR6 so as to enable the car to be used for daily transportation. I initially purchased a TR6 to use for daily transportation while my house was being built, thereby eliminating my “debt” and increasing my ability to “borrow” for the construction. My plan was to purchase another new car as soon as the home and financing were complete. I was having so much fun spending my \$500 per month “new car payment” on TR6 parts that this never happened. I see most folks driving some new car to work and for errands, while the TR6 sits... use it, you won't hurt the car! With the installation of modern tires, a sound system, and an electronic ignition conversion and the aged TR6 becomes a great car for the 90's. The lack of A/C, though, is a major limitation in the lower half of the US. (I live in Austin, TX where it has hit 104 degrees each day for 3 weeks)

Vintage Air: I have heard lot of folks follow my initial reasoning and assume a company with a name including “vintage” would of course be interested in British sports cars... forget this idea. Several years ago I made an appointment and visited this company for an A/C retrofit consultation. After looking at the TR6, the only suggestion was “impossible, buy a truck”. I reference Vintage Air as a vendor only due to their location nearby and my ability to visit, measure parts, etc. These guys are interested in American iron, hot rods, etc., so don't look to them for any help.

Vintage Air did provide a couple of words of wisdom... “after you spend the time, money, and energy to install a custom A/C, anything short of ice cold air at the push of a button is unacceptable”. Its expensive and time consuming to install an A/C, don't compromise! A lot of my initial problems were due to not believing the above statement... read it again, my fourth TR6 A/C installation does this. Install it per my plan and remember this is my fourth installation, I've already tried most every path you could possibly think of. Do it “my” way first and THEN try to improve it!



TR6 OEM A/C Units - Dealer installed I initially investigated using the dealer installed A/C. There appears to be 4 different versions sold during the 70-80 years for the TR6 (yes, the dealer would retrofit the early cars, hence you'll see a mis-match of styles and car years). Several items bothered me:

1. Old style R-12 Freon, fittings, etc. are all old style
2. York compressor, this 25lb vibrating brute sucked 10 HP
3. Holes cut in the firewall, usually 2 - 2" holes and 1 - 5" hole
4. Pulley 6" forward of the crankshaft bearing - poor design (not to mention the closer fan position resulting in damaged "red" fans and radiators)
5. underdash box protruding into the knee area on both sides
6. compressor bracket mounted to 2 right front head bolts...

Not to mention the usual price of \$300 - \$400 for a mostly complete unit... likely insert another \$500 to fix/repair it so you have a working 25 year old A/C unit running R-12... I even found photos of a 1968 TR250 with a vent device attached to the top of the dash hooked via a hose in the ashtray hole.

The 1972 TR6 supplied a 2 groove water pump pulley to attach the A/C.

A 1976 version interested me most as they changed the two dash vents to a non-restrictive design, removed the lower vents, capped the vents out of the heater, and used the dash vents for the A/C via a 2.5" hose to each side. This unit did not cut the 5" hole in the footbox top either. I added a third vent in the middle to supply massive cold air to the face/chest region and implemented this with new 134a A/C components for \$738.00 from Vintage Air and \$200 in custom pieces purchased locally.

TR6 A/C Installation - Condensor

- **Vintage Air 32006-VUF (\$179)** - Condensor/electric/dryer package - 55 Chevy (this VA kit fits, but not the same as 55 Chevy) (note this has a blower fan without shroud so normal airflow can continue. This is used for A/C only, but could be used as a fan replacement if the tempature switch controlled it, see Cambridge Motorsports lower SS radiator tube with boss for temp switch)
- **Vintage Air 24676-VUS (\$51)** - Trinary function switch

First, tape cardboard over both sides of the exposed core... this will save alot of blood spill, bent fins, and scared paint as the following sequence will like take 3 or 4 tries to get everything to fit properly.



See photos, the brackets are reversed with holes punched for the TR6 radiator studs, dryer tubes rearranged per photos, and the dryer moved upwards one hole to clear TR6 horn. Done properly, the original radiator shroud can be inserted to hide this entire assembly. You want the

condensor as close to the radiator as possible so the electric fan will cool both. Tie-wrap and spacers as required.

The stock horns are a problem, I pulled the rear bracket bolt and rotated the horn 15 degrees upwards so the bracket sits on top of the bolt and tightened the bolt with a large washer to clamp it in this position. An oil cooler would require an offset bracket to move it forward and up a couple of inches.

Loosen the radiator side supports and flip rearwards, temporarily flip the fuel cannister assembly rearwards and install the condenser assembly with one bracket installed completely and the other side held on by the bottom screw only. You should be able to move this side piece vertical over the stud and re-insert the top bracket screw.

See the photos for proper routing of the dryer to compressor tubes, the trinary switch attached to the evaporator side under the compressor, near the fenderwell. To escape the exhaust heat, we are going to route the pipes/hoses via the right wheelwell and protect these with pipe covering and tape.

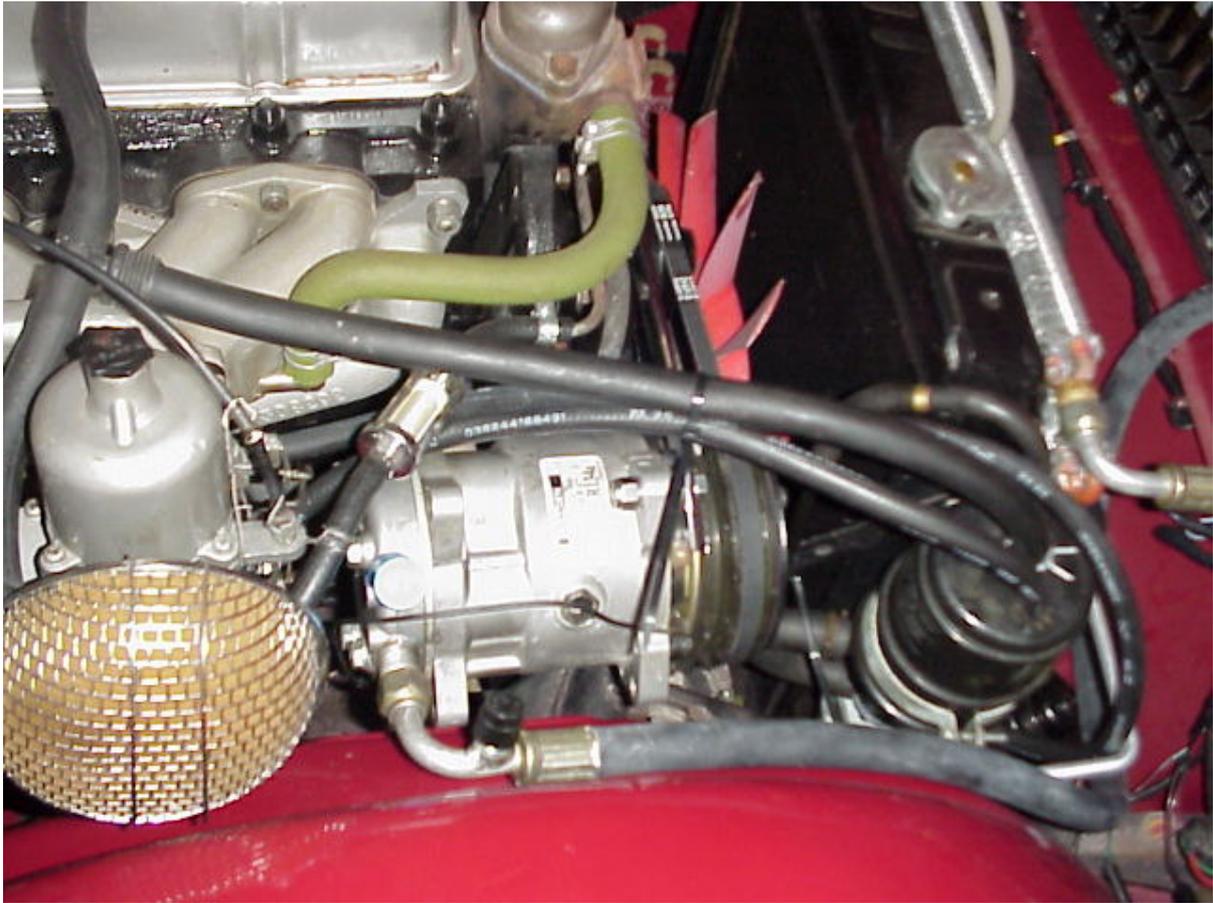


TR6 A/C Installation - Compressor

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- **Vintage Air Sanden 508 04808-VUA (\$199)** - Compressor for HFC 134a, dual pulley, standard outlets on rear top. Chrome Alternator Bracket - Pep Boys had this generic piece, only the straight portion used, 10x1x1/8, holes 8.75" apart 3/16" would work, I used a 1/4" longer water pump bolt, make certain an measure the hole depth, etc. so you don't bottom out.
- **Belt 15270** - Pep Boys 27" smaller 3/8" belt
- **Water Pump 75/76 TR6** - this is the standard replacement pump with air pump pulley, using this you cannot operate the air pump. Note: the 72 TR6's came with a double groove pulley, this will operate the compressor at the ideal speed. If you can find one of these, have it pressed onto a new pump or rebuild the old one (Hemmings), you'll need a longer belt and it will fit the rear groove on the compressor.

Note: Ideally, we would have a 3 groove pulley, if you'll notice the 75/76 pulley, the 2nd groove is in position 3, leaving room for a 2nd groove the same as the 1st in the 2nd position. If this pulley were available, the A/C compressor would run at the ideal speed and the smaller air pump pulley could be used for its intended purpose.

- **Custom bracket** - I have made these out of angle iron and attached them to the engine mounting and the hole in the lower front cover plate.



Using the custom bracket, mount the compressor, the photos show the position, note the fuel canister can be reinstalled (OEM dealer version did not allow this due to the huge

York compressor), and the normal radiator support bracket re-used (OEM dealer used a curved bracket). The hoses exit to the right, the smaller one going to the upper condenser connection with a 90 degree fitting at both ends. Allow enough length to set the shroud back into place, i.e. it goes to the horn area and back up inside the shroud.

The generic bracket's straight section was used with the slight start of the curve cut to fit the compressor hole. Note both ends much fit flush, quite a bit of fitting and filing is necessary as neither end is easy to fit. Take your time, get this solid and straight and shimmed out to fit both areas and align the belt, see photos. The hole spacing is exactly 8.75". The additional load from this compressor is so little that I did not re-adjust the idle speed, difficult to believe, but true, modern technology wins again.



Continued next month (after the rest gets figured out!)

Webmaster's note: *The preceding article was written several years ago. The continuation never appeared in print, but Roger has recently provided some additional comments to bring this to a more satisfactory conclusion.*

Some interesting aspects of A/C on the TR6:

1. Most folks do not think about sealing the cockpit. when these cars were new they were sealed. The firewall and the trans tunnel are the biggest issues, but the top to side window fit is also important. The engine bay contains hot pressurized air and it will find a way into the cockpit, especially the hot exhaust areas. A couple of 1/4" holes and you're never going to get the A/C to work... in fact closing up these holes may make the A/C unnecessary in the first place! (like trying to A/C a room with the window open, except this time you've got HOT air blowing in)
2. Most folks contacting me about A/C have a car that they can't drive... or is in such poor shape that any added complexity is just asking for the leaking radiator to blow up the already oil smoking engine... when the car starts winning concours events and you'll drive it to TRF and back over the weekend.... then A/C might be appropriate. (TRF is 1300 miles one way and has several events per year.)
3. Don't believe I ever seen a TR6 with the original A/C that is operational... in other words the folks that are lucky enough to have a car that came with this dealer installed option... sort of a statement in itself. In their honor, though, if you ask about the A/C, they all say "its really great, got to have it, awesome"... when is the last time it worked is a more difficult question.

If I did it again, the underhood would stay the same, I'd run HARD lines back from the right lower radiator area, UNDER the right inner fender, inside of the tire... then through that removable panel/gravel shield into the footbox from the side. Remove the glovebox and fab a custom enclosure for the fan/evaporator with the controls behind the glovebox door and a row of 1" tall vents just under the right side only. These will give better flow to the driver's face and

chest than any other approach. Do not touch the heater/defroster system. Oh, you only need a recirculating setup, you'll have plenty of outside air anyhow!

A/C Vent Design - this subject was a HUGE learning experience for me as I was convinced I could "add" A/C vents into the cockpit utilizing the existing vent holes and lines. Good A/C requires massive amounts of cold air to be blown into the face and chest region of the driver (do we even care about the 2nd person?). Look at modern cars, there are four 2 1/2" ducts under the dash feeding 4" x 6" vents up high. Now look at the TR6, look into the vents, wow maybe a 1" hole. Even if modernized these you'll have two 1 1/2" holes, the left one does a darn good job of freezing the left knuckle and steering wheel, the right one is worthless. Not to mention minimum space to run 2 1/2" ducts without kinking and the total mess it makes for servicing the rest.

Trying to revamp the heater/defroster to do the job is even a worse mistake, remember all the cables, wiring, hot water lines and minimum ductwork. Its a very awkward place and location to work with, forget it.

The aftermarket vendors of the day used the area under the dash. A few attached to the existing ducts, I fail to see this point, see comments above. Best idea is 4 of those very low vents tucked under the right crash pad. If a custom enclosure is made you can get a fantastic flow without any ductwork. Make it a recirculating air only as with the top leakage you won't need any outside air. Re-cooling the inside air gives you the coldest air possible and you'll need it! So, a custom box under the dash with the evaporator and fan and switches, likely only need a 2 speed fan, in fact just "high" might be all you'll ever use. I looked at some of the Spal 7" fans vs. the usual squirrel cage model as they seemed to fit the dash area better.

I suggested using hard lines due to my experience renting very bottom of the line rental cars. If you'll look at those A/C's you'll see the smallest, lightest, and cheapest setups. The hard lines are much smaller than the huge rubber R134a lines. Just use short rubber ones at the engine as that's the only place that moves with respect to the rest. Insulation over these lines where possible, grommets through the metal, see those cheapo rental cars for ideas! Believe its possible to run the lines from the lower right radiator area via the right wheelwell (might want some hard plastic wrap here), through the little removable gravel shield and into the side of the footbox, thus eliminating clutter and confusion in the engine bay (one of the big downsides of A/C is the complexity it adds to servicing your car's engine), and not having to blow visible holes in the firewall.

Have fun.

Roger