

Ford DOHC 170° Stant thermostat DIY

The 170° thermostat is a popular addition to any modified Mustang Cobra or Ford product with the DOHC engine. There is no off-the-shelf part that fits the 54mm housing, but I had been selling a reasonably-priced modified version for years with the mounting flange machined down to fit (there are plenty of details at www.terminator-cobra.com on the *Cooling* page). As an option, anyone can actually assemble their own for around \$20 and just a few minutes of time using OE-quality components.

First, you need to purchase two Stant thermostats, easily identified by their white, blue & yellow box (MUST be Stant for this to work - no exception!). They are the stock 14138, which is the 180° replacement, along with the 14147 which is the Subaru-spec 170° model. The 14147 is not a direct fit since its flange has a 56mm diameter, but the parts will be easily swapped in to the 54mm housing of the 14138. For reference, the 14138 and its brass "foot" is shown on the left, with the 14147 on the right (not to scale):



Getting Started

Once you have both, your goal is to remove the "heat motors", which are the central discs, and transplant the 170° in to the 180° housing. Simple! They are also easy to tell apart since the one you will save has "170" stamped in to the bottom, as can be seen in this picture. Also note the very small notch on the flange (at the top in the photo) - more on that later.



Step 1: Remove the brass "foot" and its spring from the 14138, and extract the heat motor from the 14147. Since the 14147 housing is not saved, it can simply be cut along the side struts with snips, which also releases the main spring. You will be doing some bending and pulling of the metal when working with both, so be sure to wear some gloves! In order for the heat motor and piston to drop out, there are also two very small tabs at the peak that need to be bent back, but that is easily accomplished with a small screwdriver. The spring in the 14147 can be saved to use with the same heat motor if you are particular, but it is the same in the 14138 and will not matter if they get mixed up.

To remove the foot and spring from the 14138, simply pull. There might be a bit of twisting also involved, but they come out without much hassle. If its upper tabs get slightly "tweaked", they are soft brass and easily adjusted. The internal spring also has a larger outer diameter on the bottom, so if it pops out, be sure to set it back in correctly. Here you can see the foot/spring removed, along with the cut 14147 housing and the extracted heat motor. The picture on the right also shows a close-up of the small metal tabs that hold the top of the piston in place (don't worry if the piston slides out since it will simply push back in). Set the foot/spring, and disc/piston along with the main spring aside.



Step 2: In order to make use of the 14138 housing, the main spring needs to be removed first. Using needle-nose pliers, maneuver the bottom coil so it can be pulled clear of the housing edge. It's a tight fit, so a slight bit of force will be needed to turn the spring (not to worry if you beat it up since you still have the other). Use a small screwdriver to get the first coil lifted up and clear. From here, it can be rotated gradually with the pliers to begin feeding it out as shown in the second picture. The third picture below shows the spring clear of the housing - with the now loosely fitting heat motor. Note that the upper coil has a larger diameter than the lower.



Step 3: The heat motor now needs to come out of the housing so it can be discarded and replaced with the 170° part. Here's where some slight bending comes in to play, so again, have some gloves on to avoid any cuts. Start with the small tabs at the top, which also need to be pried back slightly to release the piston (shown further up on this page). One you have that done, the piston can be pulled free which allows the disc to drop.

Next, the lower section of the frame needs to be bent back slightly to allow enough room for the disc to be removed and replaced. Having the piston out makes this much easier, but you'll have to experiment with however much bending is necessary to clear the edges of the disc. Start with the side tabs right below the rim of the housing: bend one back on each side

so the lower edge of the frame can be leaned in the same direction. This allows the disc to drop out and takes some stress away from the press fit of the lower strut in to the upper frame. The middle picture below shows this clearly (with the heat motor already removed for clarity). You'll need to have a firm grip on the thermostat body in order to bend the lower strut back, but it will move without too much force. The first picture shows a side view of the lower frame angled back to give you an idea of the clearance needed. Once you remove the piston, it is then relatively easy for the disc to drop out.



Step 4: Put it all back together in reverse order! With the frame empty, slip the 170° disc back in (briefly remove the piston to make this easier), then push it up in to the top of the frame. The small tabs that hold the piston can then be squeezed back together now. Next, begin "tweaking" the lower frame back so the bottom edge is relatively parallel to the large diameter of the upper housing. At this time also adjust the two small tabs of the upper struts so they closely match the opposite un-bent sides. Not to worry if it's not perfect, you'll come back to it in a moment.



Next, feed the main spring in by rotating it back in the housing after lifting the first coil over the bottom edge of the frame. Don't forget, the larger diameter coil will be at the top! Once you have the spring in place, ensure it is rotated enough so the last coil sits securely inside the lower edge. With the spring snug, use your needle-nose pliers to make any adjustments to the lower strut, especially so the upper tabs are not bowed out. A little trial-and-error will come in to play here, but it is relatively easy to get everything lined back up. Finally, snap the brass foot with its spring back in to place (again, the larger lower coil sits inside the bottom). The photo above right shows the final product with any adjustments to the frame made so it looks good as new!

There you have it. From start to finish, it should only take about 15 minutes to convert the two in to one. For anyone with basic mechanical skills, the price of this project is well worth it over purchasing the same modified product for three times the price. As an alternative, if you are really advanced, the 56mm housing of the Subaru thermostat can simply be machined down to a 54mm diameter, which then involves just adding the brass foot and spring. When I sold these myself, I had a machine shop do exactly this, but it did add to the cost since I always had to run 50 at a time. With the DIY method, anyone can build just one whenever needed.

A couple last thoughts, and going back to the notch on the heat motor as mentioned on the first page: it will not matter where it ends up. Once you do install the thermostat, that notch becomes a natural air bleed, so install it with the notch up (I always marked mine with a red dot so it could be easily identified). For reference, here is a picture showing this completed thermostat, and the notch colored, this time from the back side to make it easier to see.



Finally, don't forget the o-ring! These are easily acquired at most auto parts stores (Stant 25282, or NAPA 1093 for example), or if you have access to suppliers that sell them in bulk, the generic spec is AS568-225. Once you install your new thermostat, also be sure to adjust the fan settings to take advantage of it. Those specs can also be found on my site.

With the insanity of 2020 (and beyond?), I may not get back to selling these, but this document should help anyone tackle this themselves. As long as Stant keeps producing the models needed for this project, it will be simple to put one together as needed. Even better, for the low cost, build two and keep one as a spare!

Any questions at all, feel free to shoot me a note: joe@terminator-cobra.com