Mustang Door Lock Actuator Retrofit

Stuck with door lock actuators that don't work and don't want to pay the $50 for a new one? Tried the junkyard ones and found that they last six months and freeze up? If the answer to either one of these questions is yes, and you have some mechanical talent and a few simple hand tools, you can refit the door lock actuators with new style units for approximately $17 for one side. The additional cost is to do both sides is only about $6.00 more.

Watch for the (*): it indicates some important additional notes located at the end of this web page.

Bill of materials

Parts: Note – price parts may have changed, check with vendor for current prices

Part name	part number	Quantity	source	cost	Total
Door lock actuator	330-010	1 each	www.partsexpress.com	$3.85	$3.85 (*1)
8-32 machine screw, 3" long		1 (1 pkg)	Home Depot or ACE Hardware	$0.86	$0.86
8-32 self-locking nuts		3 (1 pkg)	Home Depot or ACE Hardware	$0.75	$0.75
1/2" square steel tube (*2)		1 each	Home Depot or ACE Hardware	$4.48	$4.48
#19 drill bit		1 each	ACE Hardware	$2.79	$2.79
Scotchlok wire splices, 18 gauge		2 each (*3)		$0.25	$0.50
1/2" rigid tubing, copper or PVC		12"		$0.40	$0.40
1/2" Nylon plug buttons	Body-Tite! #45840	1	Local auto parts	$1.58	$1.58
Fender washers, 1/4" hole (*5)		2	Home Depot or ACE Hardware	$.0.25	$0.50
Panel/trim retainers (*6)	Body-Tite! #45476	1 (1 pkg)	Local auto parts	$1.69	$1.69
				Total	$17.40

Some products are sold by the package (pkg) and may have more than the minimum number of components in a package.

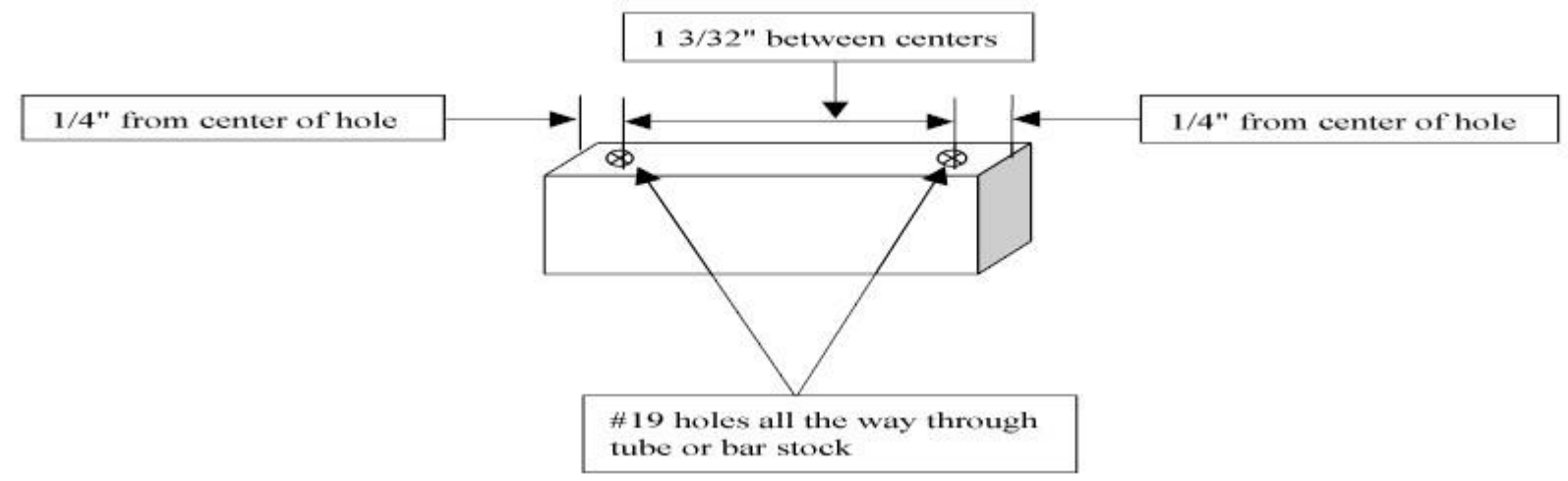
Tools:

Common 6" screwdriver		Phillips 6" #2 screwdriver
Hack saw		Drill, electric or pneumatic (air drill)
1/2" drill bit, reduced shank to fit drill chuck		11/32" box end wrench
3/8" socket, 1/4" drive		"6 steel scale or ruler
10" flat file		Bench vise
Pliers		Center Punch

Fabricate actuator link:

Start by marking the 1/2" square stock for 2 holes. The first hole center is 1/4" from the end of the stock. The next hole is 1 3/32" from the center of the first hole, then measure 1/4" more from the center of the last hole, and mark the stock for cut off. The tolerances for the center to center distances are not critical, they are + or - 1/16". The #19 drill bit is the exact size of the outside diameter of an 8-32 machine screw, so it makes a perfect fit. Drill the holes using the #19 drill bit and cut the tube at the mark. This is the linkage between the actuator and the existing lock mechanism. I recommend that you paint the linkage with rust proof primer after it is drilled and trimmed. Spray some primer inside the square tubing first, and then spray the outside. This will keep things from rusting and ruining your hard work.

Linkage block detail:



Assemble & Fit Linkage

Run the nuts down on the two of the 3" machine screws and cut them off so that they are 1 1/4" long. Examine the fit between the actuator eye and the hole in the stock, it should line up without any slack. File off the excess metal to get a perfect fit. Insert the 1 1/4" machine screw though the actuator link you just fabricated. Screw it into the plastic eye on the actuator: it should seat squarely against the shoulder formed on the actuator eye without deforming the plastic and with no slack.

The use of self-locking nuts is a must since there is not enough torque on the nuts to keep them from loosening up and falling off. Vibration and the movement between the actuator and the linkage would cause common nuts to loosen very quickly.

Next install the 8-32 self-locking nut, and tighten snugly. Install the other 8-32 x 1 1/4" machine screw in the actuator link with the head on the same side as the plastic actuator eye. Put the self-locking nut on the screw and turn it down tight against the actuator link: this is the pin that fits in the door latch arm and moves the latch from lock to unlock position. It will extend approximately 5/8" beyond the end of the nut.

Disassembly of door & old actuator:

Next comes the preparation for the actuator installation: make sure that the window glass is in the full up position. Remove the plastic plugs in the armrest to gain access to the two 3/8" hex head screws that hold the armrest on. Remove them and the two sheet metal screws: the armrest will pivot down allowing you to disconnect the wiring harness from the switches. Disconnect the wiring harnesses at the connector plugs, the plugs are polarized and are different sizes so that they will only go back on one way. Set the armrest aside, and then remove the triangle shaped trim up by the rear view mirror (1 screw). Remove the door handle latch plastic trim (1 screw), and then the screw at the bottom of the door panel by the speaker. Gently pry the door panel away from the door: there are at least 6 plastic trim posts that need to be pried loose from their mounting holes in the door sheet metal. Take note of damaged or missing trim posts and be prepared to replace them when you reinstall the door panel. Lift up and out on the bottom of the door panel, and it will come loose at the top where the metal edge fits down in the door next to the glass. Set the door panel aside along with the rest of the pieces you have removed. Carefully peel back the plastic sheet used as a splash shield, only about half of it needs to be peeled loose to gain access to the actuator area.

Click on picture to enlarge

Do not remove and discard the splash shield as it protects the door panel and upholstery from getting wet.

The actuator assembly will now be visible through the rectangular opening in the door sheet metal. Use a common screwdriver to gently pry the actuator mount open to remove the actuator. Once the actuator is loose from its mount, wiggle and jiggle it loose from the door latch mechanism and slide it out through the rectangular opening. Then disconnect the wiring at the connector plug on the bottom of the actuator. Visually inspect the rubber mount bushings in the actuator mount to insure that they are in good condition. The old actuator mount and the rubber mount bushings will be reused, and need to be in good shape for everything to fit properly.

Actuator installation, page 1

It's time to drill a few holes, so get out the drill & the #19 bit: first carefully run the drill through the mount hole closest to the actuator arm on the new actuator. This insures that the actuator will move freely (but not sloppy) on the 8-32 machine screw that it will mount on.

Then measure down 3 3/ 4" from the bottom edge of the door latch and mark, then measure in 1 1/4" in from the edge of the door and mark again.

Use a center punch to mark the intersection of the two lines and to dimple the metal to keep the drill from skating off center. Reach inside the door and turn the actuator mount so that the arms are parallel to the

ground. The reason for doing this is to keep from breaking the actuator mount when the drill bit breaks through and you are still pushing on the drill. Drill one #19 hole as a pilot or starter hole. Next chuck up the 1/2" bit, and measure the distance from the end of the chuck to 3/4" from the end of the drill bit. Take the 1/2" tubing and cut it off to the same size, slide the tubing over the drill bit. If you used copper tubing, mash the end closest to the chuck so that the tubing can't fall off. The plastic tubing (my preference) stays put without any extra effort.

This is your drill stop, and will keep the drill from pulling the entire bit into the hole and breaking the actuator mount. Do not omit this step, because if you do, you will break the actuator mount just like I did.

Actuator Installation, page 2

The purpose of this hole is to provide a way to insert the 2 1/2" long 8-32 machine screw in the actuator mount, and enable you to use a common screwdriver to tighten it up.

There is a method to avoid drilling the 1/2" hole that I haven't tried: it involves cutting the head off the 2 1/2" screw. Place the old actuator side by side with the new one, and visualize the new actuator mount screw trimmed and shimmed with nuts and washers until it is the same width as the old actuator. Trim the screw off until it is the same width as the old actuator pivot mounts. Use other washers and nuts until the amount of screw sticking out of each side is the same as the old actuator. Tighten the nuts down against the actuator and use super glue to lock them in place. Later on you will get to **try** to shoehorn the assembled actuator back into the mount. This is untested and I don't know if it will work, or how hard it is to install the new actuator assembly in the mount.

Ford strikes again:

One issue raises its ugly head here and that is that Ford used two types of mounts for the actuator assemblies. One was steel and needs no further modification. The other is plastic and is about 5/32" shorter from the center of the pivot points to the door mounting surface. The actuator assembly will not fit because the motor bottoms out on the inside surface of the door, and will not fit properly into the actuator mount .

Notice that the plastic mount allows the bottom of the actuator motor to ride on the flat surface, causing the linkage to tilt downward.

Steel Mount

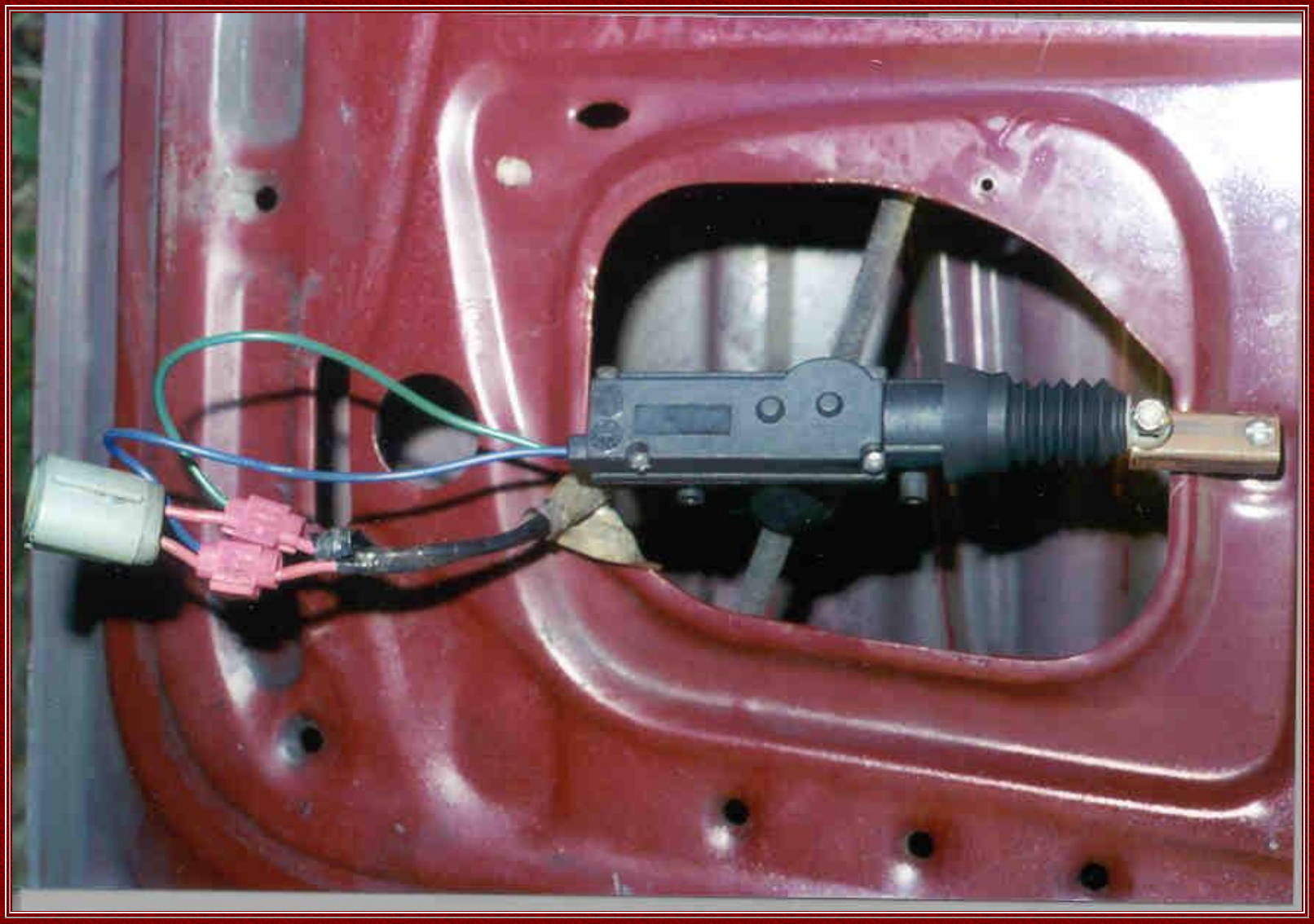
Plastic mount

Click on picture to enlarge

This requires you to drill out the 1/4" rivet, and use a 1/4" bolt to go through the door to secure the actuator mount. Then on the inside of the door, place 2 large outside diameter washers (the hardware store calls them fender washers, I call them wood washers) on the 1/4" bolt. The fender or wood washers provide enough contact area between the door surface and the bottom of the actuator mount to stabilize it. This will keep it from bending and cracking the door sheet metal

Test & connect wiring

Take the new actuator assembly with the linkage attached, and smash the crimped terminal ends flat with a hammer. Then push the green wire into the side of the wiring connector that has the black stripe on the wire (mine was pink with a back stripe, yours may be different). Push the blue wire into the other side. Reconnect the door lock switch wiring and verify that when you press U that the actuator retracts, and when you press the raised side of the switch the actuator extends. If it doesn't move, then there is a poor connection: push the mashed metal connectors into the wiring connector with a pair of pliers. Once you have verified the wiring, then cut the mashed terminal ends off the new actuator. You have two choices for the wiring: use the Scotchlok wiring splices to keep your existing connector in place, or cut the old connector off and use some other method to splice the wires together. (*4)



I chose to use Scotchloks, which allow you to mash them on with only a pair of pliers and not cut off the old connector. This is the path of maximum versatility, and if anything ever went wrong you can always fall back to using the (ugh!) stock Ford actuators.

Final Assembly & Test

Place the new actuator in the door, making sure that the 8-32 machine screw that goes through the linkage is secured with a self-locking nut. It fits into the hole in the door latch mechanism that the old actuator linkage came out of.

If you chose the alternate method that bypassed drilling the 1/2" hole, the next step is for you alone. Please remember that I have not tried this method, and cannot verify that it can be done. You get to shoehorn the actuator assembly back in the mount the same way you got the old one out.

If you chose to drill the 1/2" hole, proceed from here. Position the new actuator assembly in the actuator mount and then insert the 2 1/2" long 8-32 machine screw through the 1/2" hole in the door and into the rubber mount bushing of the actuator mount. Push it in just enough to get the actuator started on the screw, and then push (or screw) it the rest of the way through. Then put the wrench and self-locking nut on the screw and tighten with the screwdriver until the nut is snug against the actuator mount.

Check the operation of things to insure that the wiring is clear of the window as it rolls up and down, and that the actuator works smoothly.

Then spray the metal where the splash shield was with spray adhesive and stick the plastic sheet back in place. Reinstall the door panel, armrest and trim, and you are done. Use the **1/2" Nylon plug buttons to cover the hole in the door sheet metal.** There isn't a more satisfying sound in my Mustang than the sound of the THUNK the new actuators make when they lock and unlock.

* Notes:

1.) Shipping from Partsexpress is a minimum of $8.00, and it costs the same $$ to ship two actuators as it does one. The extra cost of another actuator is only $3.85, so buy two even if you only need one right now.

2.) The 1/2" square stock can be steel tube, solid steel bar, or aluminum bar. Aluminum bar would be best since it will not rust, but may be hard to find in 1/2" solid square stock. Home Depot's square steel tube is 36" long, so you will have a lot of it left over for other projects.

3.) Scotchloks are $6.50 for 50 from Partsexpress, but should only cost about 25 cents each if you can find them locally. Radio Shack has similar type splices for $1.68 for a package of 5, p/n 64-3052

4.) Radio Shack has splices that mate with the ones on the new actuator for $1.49 for a package of 5, p/n 64-3086. If you choose to use these, don't mash the existing connectors, stick a paper clip in the Ford connector to verify actuator operation.

5.) Fender washers or wood washers with a large outside diameter and are used only with plastic actuator mounts. They are an optional item and may not be needed for all installations.

6.) Panel trim retainers are another optional item: you may be able to reuse all the old ones.

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