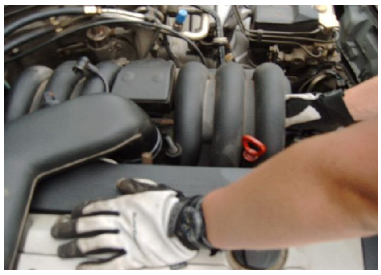
M104 Electronic Throttle Actuator Removal, Insulation Inspection and Rewiring Guide by G. Culler

My son and I recently had to rewire the ETA on my 1994 E320 and were not able to find a good tutorial specific to this unit. There are a few references on the web pertaining to M119 ETA's (http://v12uberalles.com/throttle_actuator_rewire.htm is the best one) and we drew heavily from this source in this work. What follows is a guide to how we made this repair and what worked for us. We make no guarantees that this procedure will work for you. This worked for us but your mileage may vary.

You will need:

Flat screwdriver
Torx security bits (with center holes)
18,20,22 ga wire, several feet of each
Wire labels or permanent markers
Metric Allen wrenches
1/4" drive metric socket set
1/8" heat shrink tubing
Self amalgamating electrical tape or quality PVC electrical tape
Soldering iron (at least 30 watt)

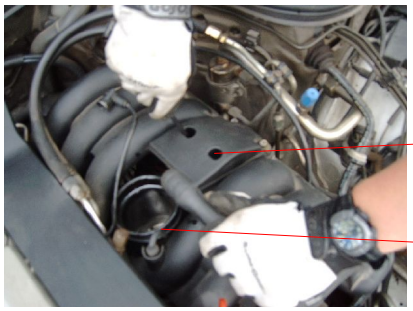
Remove duct work from the air cleaner to the TA connection boot



In order to remove the crossover pipe, the hose clamp on top of the ETA connection boot must be loosened. It can be accessed by reaching in under the intake manifold from the front with a flat screwdriver.

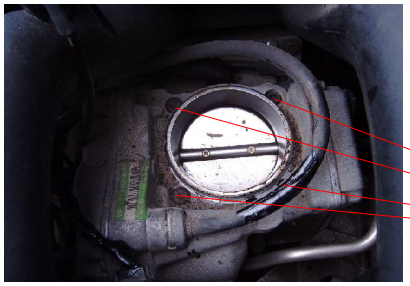
Now the crossover tube can be removed. Remember to disconnect the intake air temp sensor prior to removal of the crossover tube.

Next, remove the air resonance valve by removing the four Allen screws. Two will be under rubber plugs, simply pull the plugs out to access the screws. Unplug the harness connector very carefully as they can become brittle with age



Now loosen the bottom clamp on the bottom of the ETA boot and remove the boot. You may have to pry on it, wiggle it until you discover the correct combination of four letter words to get it to come loose.

Next, remove the four bolts holding the ETA to the intake manifold



Now disconnect the main wiring harness and remove the two 10mm nuts attaching the ETA harness to the engine.

Now slide the unbolted and unplugged ETA towards the front of the engine and unhook the throttle return spring.

Next unclip the ball connector on the throttle linkage. The connection should release with a firm straight pull.

With everything disconnected, you can slide the ETA towards the front of the engine and maneuver it out through the hole opened up when the air resonance valve was removed.

Now, clean up the ETA with carb cleaner or throttle body cleaner inside and out.

Cut a slit ~2-3” long in the sheathing covering the wires. Open the slit to inspect the insulation on the wires. If there is any evidence of cracking or flaking, you will need to rewire the unit.

Plastic filler cords

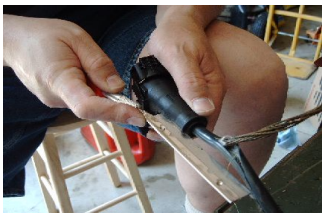
If your insulation inspection shows cracked or missing insulation, silt the rubber sheath from the wiring harness connector up to about 1”-2” from the ETA body. Cut the sheath completely away from the connector, taking care not to cut any of the wires inside yet. Inside the sheath you will find eleven wires and several plastic filler cords. Go ahead and pull the fillers out, their removal will allow the replacement of the other wires to proceed easier.

Using a #20 Torx bit with a center hole, remove the 4 bolts holding the cover on the end where the wire bundle enters the ETA. Once the 4 screws are removed, the cover can be pried off with a thin flat blade screwdriver. Note there is an anti tamper post that will break as the cover is removed. Don't worry as this repair will constitute tampering.

Remove the two screws holding the circuit board in place and gently pull the circuit board out while pushing the wires through the sheath to create enough room to solder in the new wires

The next step involves cutting open the harness connector. We used a razor saw followed by a utility knife, but it can be done with a utility knife alone. Cut along the mold parting lines on the sides and for the top, cut between the 1 and 4 in the first three digits of the molded in part number. Once the cuts are

completed, the cut section can be pried loose.




Unfortunately, the pin holding portion of this connector does not seem to be removable, so the new wires will have to be soldered to the old ones.

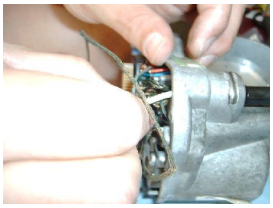
Pick one wire and one wire only and cut it a few inches from the connector.

It is advisable to run a length of heat shrink tubing along the old wire down into the pin recess in the connector to eliminate any possibility of a short circuit inside the connector housing. It is easier to get the heat shrink tubing into the pin recess if the end is preshrunk for about 1/4" prior to placing it over the wire.

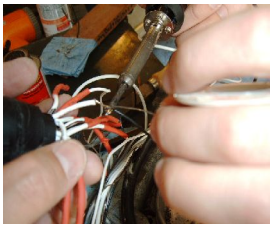
1/8" heat shrink tubing pushed into the pin recess then shrunk in place.

Match the conductor size of the wire you just cut with the closest conductor size in your replacement set. The bulk of the wires in the ETA are 22 gauge, but two appear to be 18 and three seem to be 20 ga.

On the actuator end, carefully determine which wire you just cut by pulling gently on each wire at the circuit board. When you are certain of the correct wire, unsolder it from the circuit board and remove it from the wire bundle. Pass the replacement wire through the hole in the ETA body and solder it to the board in place of the wire you just removed.



Place a section of heat shrink tubing on the new wire and splice the other end of the wire to the repaired wire at the connector end, solder and shrink the tubing. Label each end of the wire with a label, a series of dots or stripes, etc so you can tell them apart if necessary at some later date. If you can cross reference your identification marks to the original wire color code so much the better.



Repeat until all of the wires have been replaced and labeled.

Finish the job by wrapping the repaired ETA wire bundle with self amalgamating tape or high quality PVC electrical tape. Self amalgamating means that it will bond to itself over time making one continuous rubber tube. Cheap PVC tape gets slimy with age, but good quality PVC tape is not as bad.

Reinstall on the car with a new gasket and enjoy!