

APP or Accelerator Pedal Position sensor

This information is from Mike McGee known as OregonJag on Jaguarforums.com

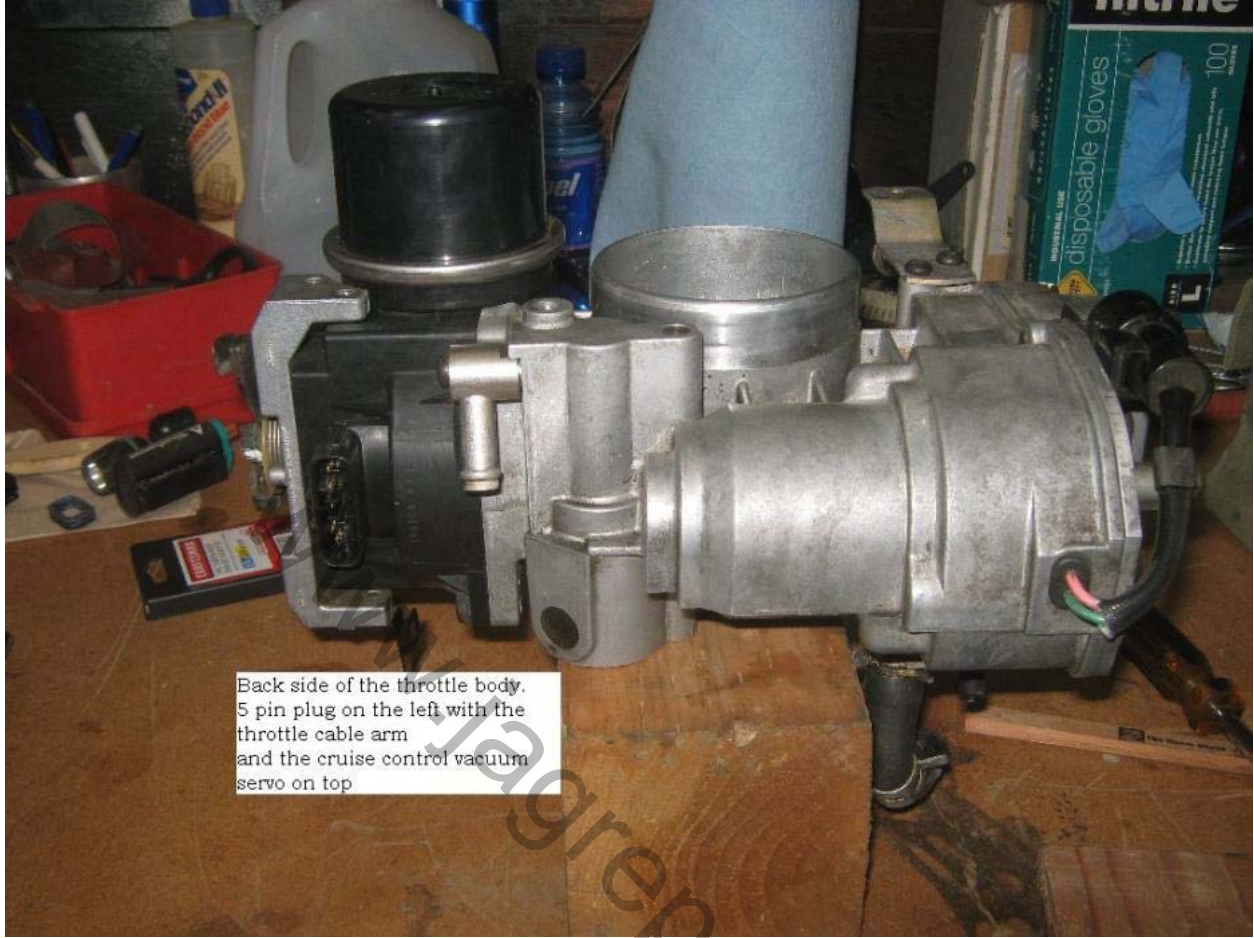
I thought I would share what seems so far to be a successful repair to my '97 throttle body APP. There tends to be a lot of traffic on this forum regarding problems with the TB and my [car](#) was not immune to them. This turned into quite an epistle so I've broken it up into entries of symptoms, removal and testing, alleged repair and results.

The APP or Accelerator Pedal Position sensor is part of the throttle body. Other [cars](#) it is called a TPS or throttle position sensor. On these it is much more complex.

Let me repeat that this is for a '97 and I have no idea if this is useful for other years with the 4.0 engine. The TBs on the 4.2 and supercharged cars are surely different and may not be a problem to begin with. My VIN number ends in 016878 putting it late in the model year. As far as I know this is the original throttle body for the car.

Mike

www.jagreparepair.com



Back side of the throttle body.
5 pin plug on the left with the
throttle cable arm
and the cruise control vacuum
servo on top

Jagrepair.com



I don't know what this end does.
Resistance measurements on these pins
don't change with throttle position,
or temperature
So I didn't feel the need to take it apart.

www.jagrepair.com



Symptoms

Start the car cold and it would operate almost fine. Occasional engine fault light when the accelerator pedal was released to idle. Cruise control would work normally.

Typically warming up and hitting the freeway it would also be normal but after 50 miles the engine fault light could be brought on by easing it back to idle. Cruise control would drop out over bumps in the road.

Once fully warmed, stopping the car and letting it heat soak for a half hour then starting off again it would be at its worse. Engine fault light most of the time that transitioned into the poor performance message and finally the check engine light would latch on. The car would still run and was manageable on the freeway. The TB would cool down after about 40 miles and the engine fault light would go away, the cruise control would mostly work again, and the car would drive almost normal.

The car was acting like there was a loose wire or bad connection on the APP (accelerator pedal position) sensor. All the trouble was associated with idle position or near idle. The Check Engine code was P1227 when it showed up. A code listing I found indicated the APP was at fault.

Next testing and exploring...

I removed the TB and ran a set of measurements using an ohm meter on all combinations of the five pins on the driver's side (LHD) of the unit. Setting the throttle plate in four different positions including idle I got a set of measurements that had a good pattern to them. As expected, cold, it didn't look bad.

To simulate the heat soak condition I waited until Diana left for the barn and put the TB in the oven. 200 degrees and 1.5 hours the TB casting was up to 200 using the temp probe on my multi meter. I took the TB back on the bench (using gloves) and took another set of measurements. Ah-ha! The circuit on the top and bottom pins of the five pin plug was completely open from the bottom end of the throttle's range and was barely readable at wide open. As the TB cooled down the measurements improved.

Next, digging in...

Removed the APP sensor case from the throttle body and opened it up. More complex than I expected but staring at the circuits and seeing where the top and bottom pins lead you can see where the problem would be located. Using a magnifying glass to stare at the pieces I could see that the six tiny brushes were showing their 15 years and 145k miles of wear. It was a fair guess that one of the brushes was not making contact when the TB was hot and barely making contact when cold. Using my finger and lightly touching the brushes revealed one was particularly weak.

My "fix" was simply to bend the weak brush up a bit taller so it would have more contact force on the resistor tracks that make up the position sensors. Not seeing anything else that might be a problem I cleaned the assembly with tuner cleaner and reassembled.



APP - Accelerator
Pedal Position
sensor removed.
If you could just buy this
part...

repair.com



This puzzle will keep you occupied for a while...

www.jagrepair.com

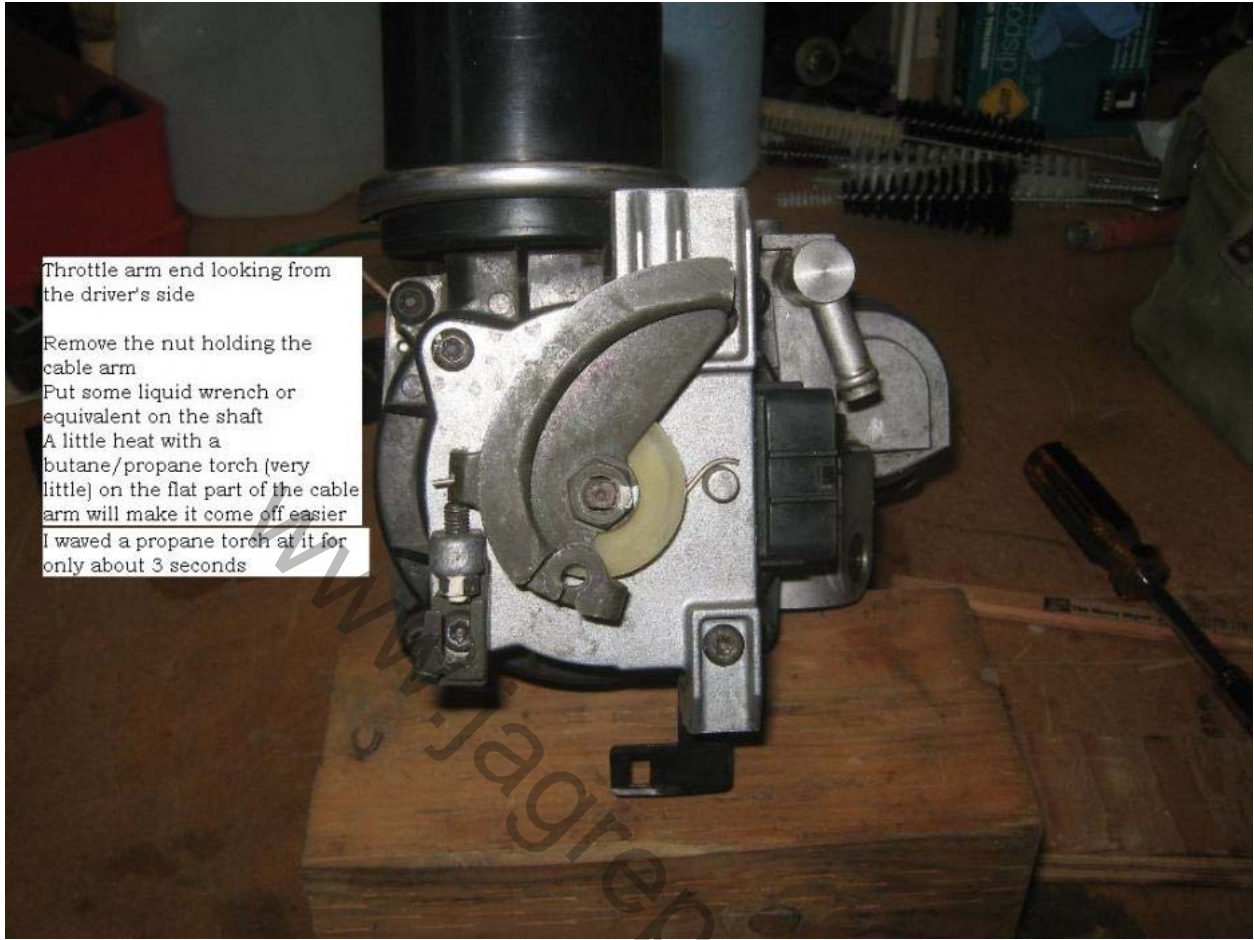


Note how many spring coils you have on the throttle arm before you disassemble it.

engrepair.com

Throttle arm end looking from the driver's side

Remove the nut holding the cable arm
Put some liquid wrench or equivalent on the shaft
A little heat with a butane/propane torch (very little) on the flat part of the cable arm will make it come off easier
I waved a propane torch at it for only about 3 seconds

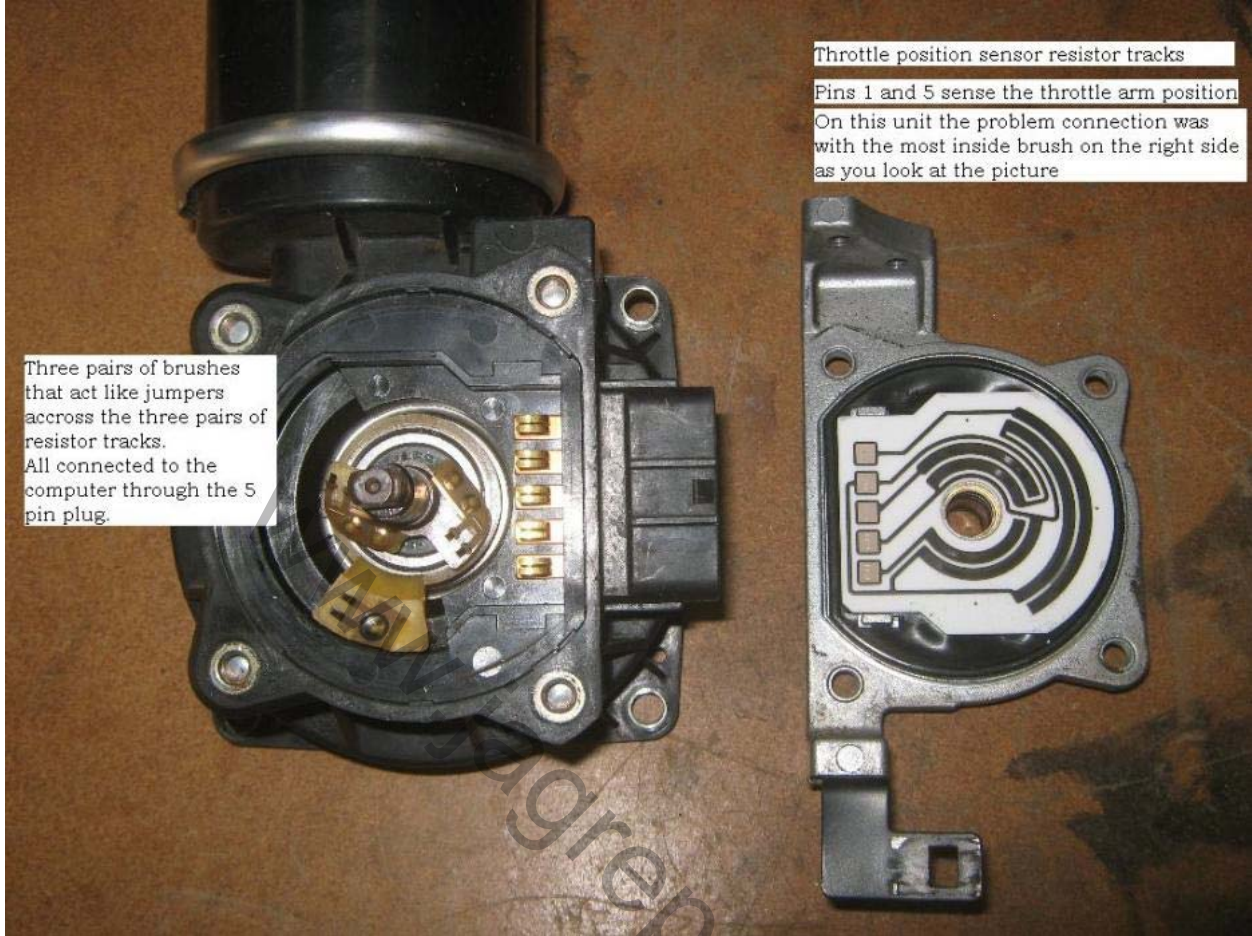


www.jagreparepair.com



Make sure you get that spring back in the right way.

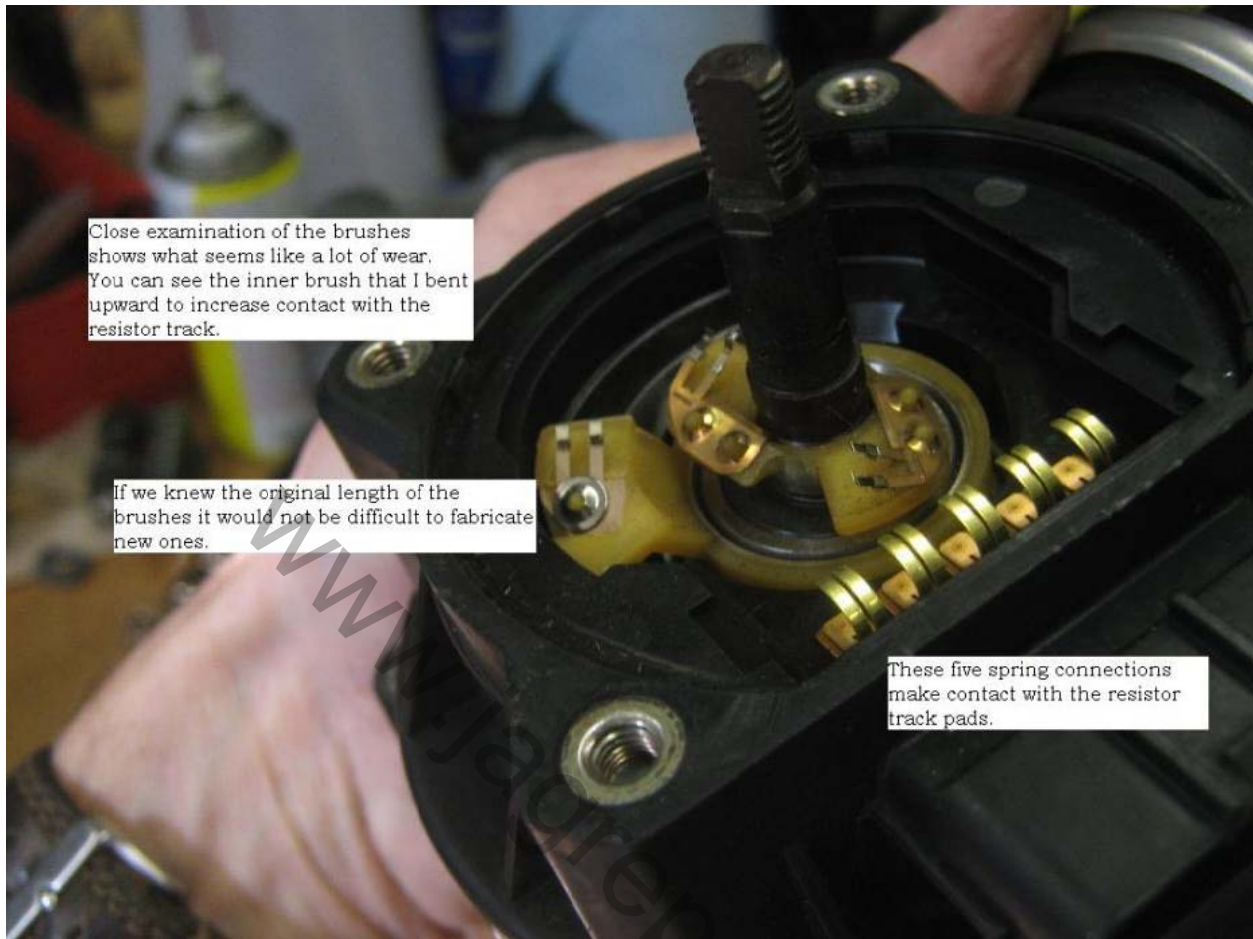
www.jagrepair.com



Three pairs of brushes that act like jumpers across the three pairs of resistor tracks. All connected to the computer through the 5 pin plug.

Throttle position sensor resistor tracks
Pins 1 and 5 sense the throttle arm position
On this unit the problem connection was with the most inside brush on the right side as you look at the picture

imgrepair.com



Results

Started the car and it scared me with an engine fault right off the bat. I had actually forgotten to plug the five-pin connector back into the TB. That's what I get for eating dinner after reassembly. 🤦

Plugged it in and gave the engine bay another thorough check then started the car. Ran great, let it

warm up and still seemed fine. 🛋️

Took it out for a lap around the block, then two then a few, then a few miles. Twenty miles later it was still acting like a normal car so I parked it for some heat soak. Started it a half hour later and no faults or hiccups. Another few miles and it still ran fine. Ran it around the next day then put it on the road for the week.

700 miles later I've almost forgotten how bad it was acting. Even on the roughest parts of the freeway where it would ALWAYS drop the cruise control it is rock solid. I haven't seen an engine fault light since I started it fully assembled. 🤖

Normally I won't drive this car unless I can see it thoroughly warmed up; at least 15 miles round trip.

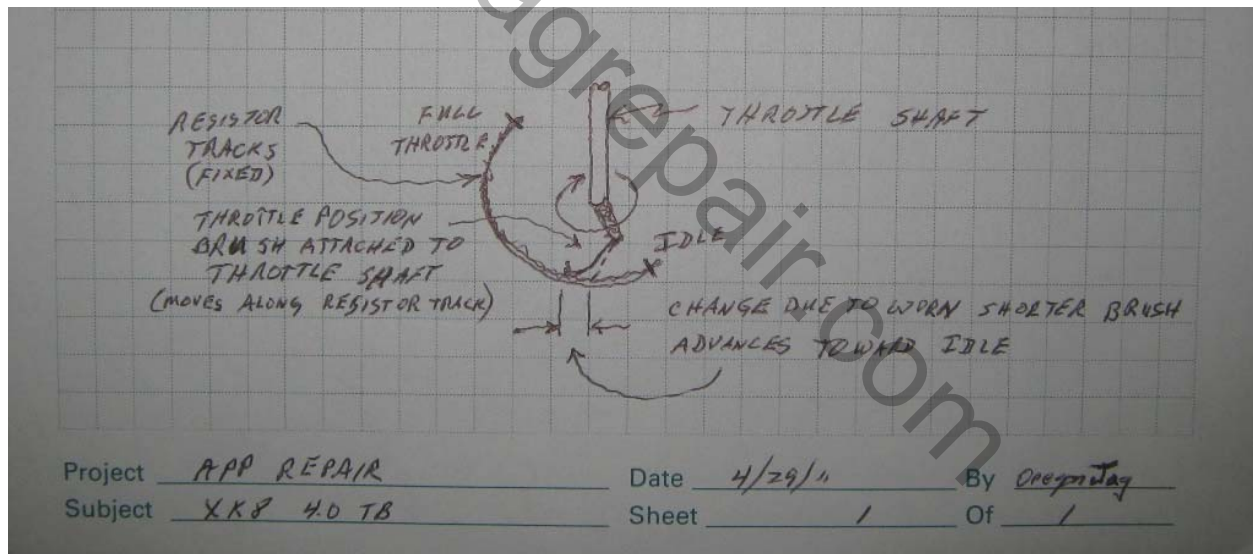
Had a grocery run to do today and just couldn't see using anything else in the driveway. 🤖 The car so far is running great. Knocking on wood, we'll see how long my fix lasts. I'll try to remember to post reports every few thousand miles. It gets about 600 miles a week.

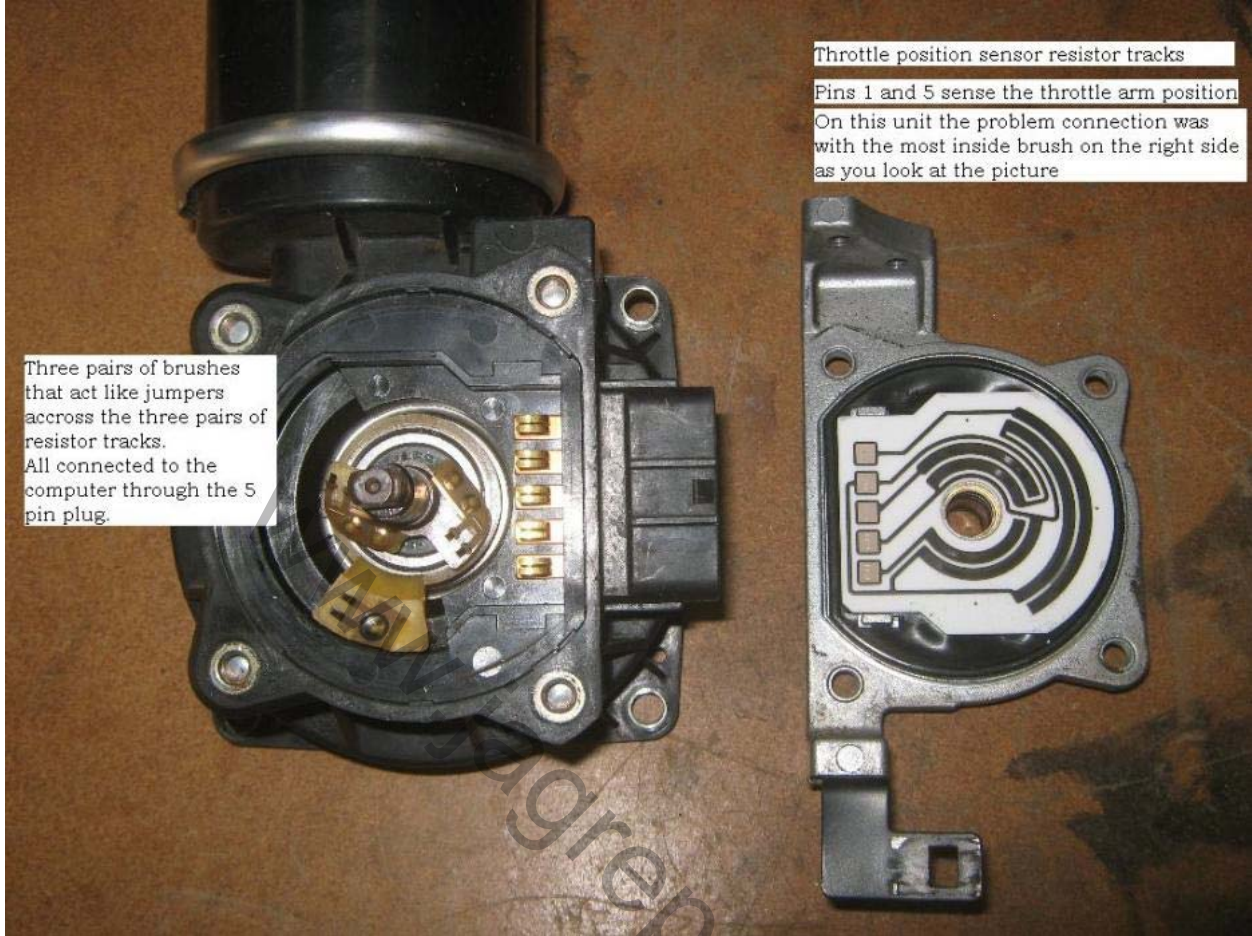
Blue skies,
Mike

More speculation on brush length

From the first test I find the throttle has a small dead zone from idle position. It seems the throttle plate has to move a small amount from idle before any response in the engine, then it's a small jump. This is noticeable both in the accelerator pedal and when the cruise control picks up the throttle after coming off a downhill stretch.

I suspect the worn brushes in the APP sensor have actually changed their "calibration". The contact point on the resistor tracks has advanced towards the idle position as the brush gets shorter due to wear. See the attached sketch. This change over time may have put the brush out of range on the resistor track. It would be nice to know what the original length of the brushes was.

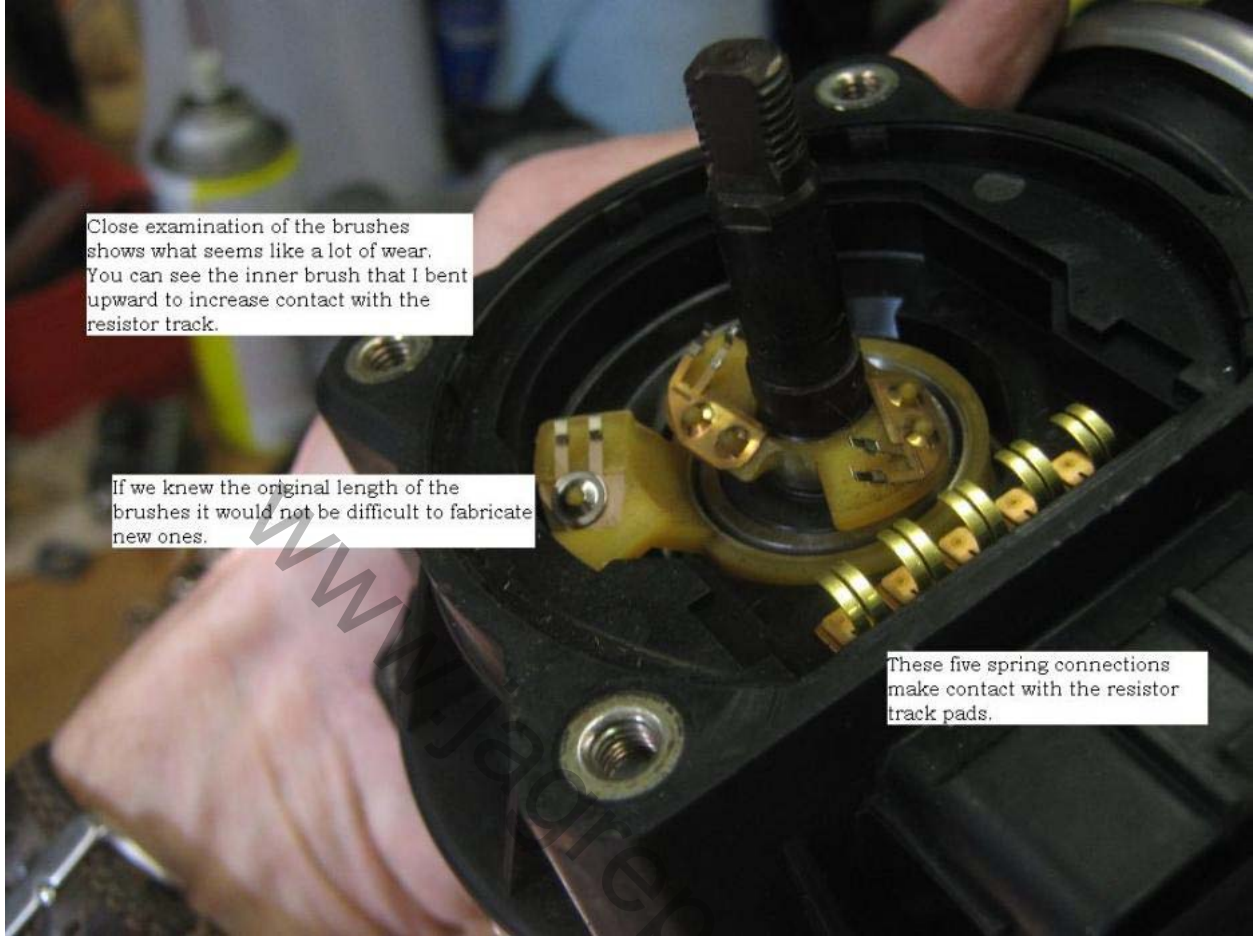




Three pairs of brushes that act like jumpers across the three pairs of resistor tracks. All connected to the computer through the 5 pin plug.

Throttle position sensor resistor tracks
Pins 1 and 5 sense the throttle arm position
On this unit the problem connection was with the most inside brush on the right side as you look at the picture

imgrepair.com



Close examination of the brushes shows what seems like a lot of wear. You can see the inner brush that I bent upward to increase contact with the resistor track.

If we knew the original length of the brushes it would not be difficult to fabricate new ones.

These five spring connections make contact with the resistor track pads.

www.repair.com