

# Inside the mid-year fuel gauge and sending unit

Materials included here were collected from a Corvette Forum thread regarding “damping” of the fuel-gauge needle movement of mid-year Corvette fuel gauges

Photos by Tim Welsh (Buns) and Dave Zuberer (DZVette)  
Diagrams by Tim Welsh and John Hinckley (JohnZ)



Included here are photos of the insides of a worn out (“bouncy”) fuel gauge that came out of my 1965 coupe. I cannot vouch for originality and there are no numbers or identifying marks on the components.

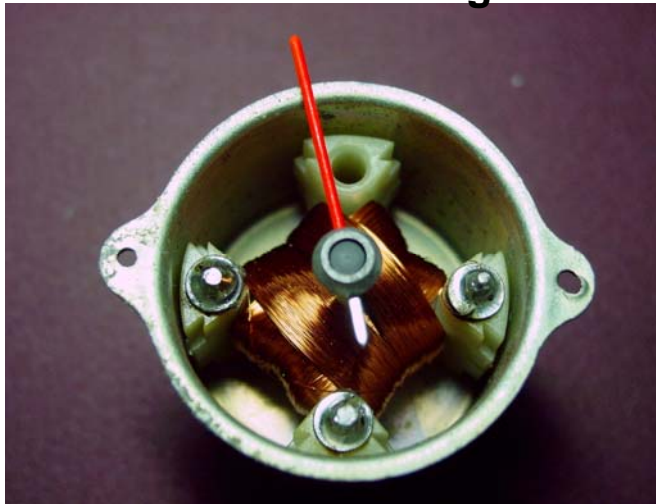
Also included are photos of the inner workings of the fuel-gauge sending unit provided by Tim Welsh (a.k.a. “Buns” from CF) as well as a diagram from John Hinckley (JohnZ) and gauge repair info from Jason Oliver.

Pictures of the O.E.M. Sending unit are from Paragon Corvette Reproductions web pages: <http://www.corvette-paragon.com/>

# Mid-year fuel gauge components



Coils in housing

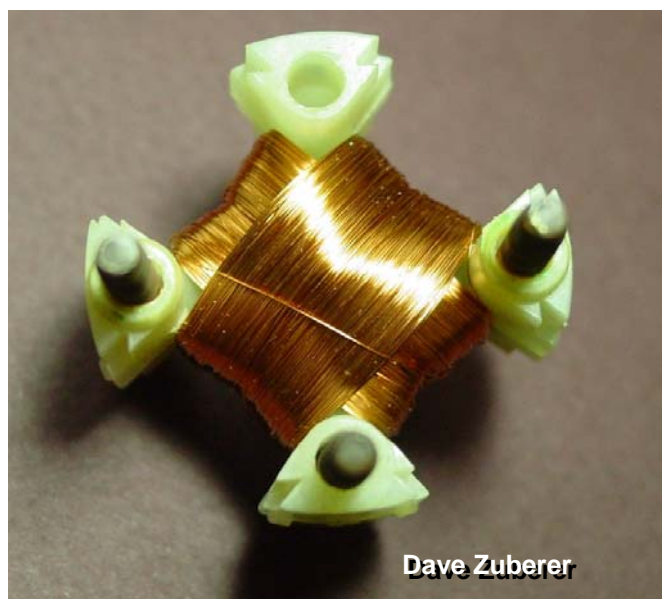
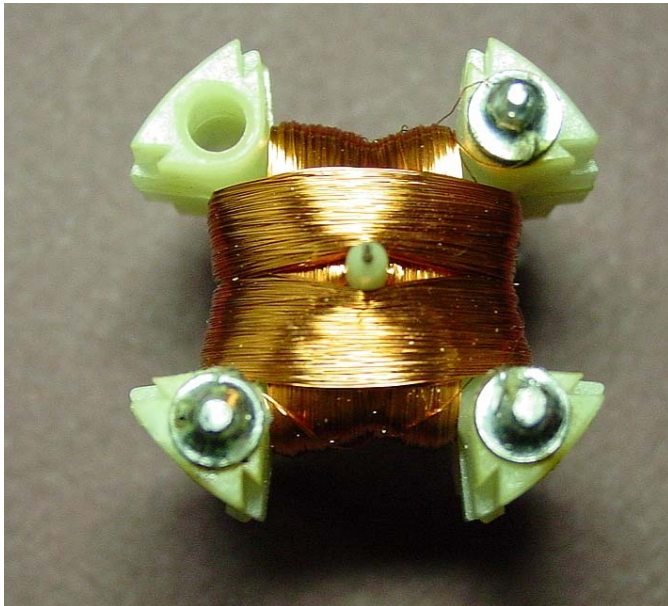


Coils and needle shaft

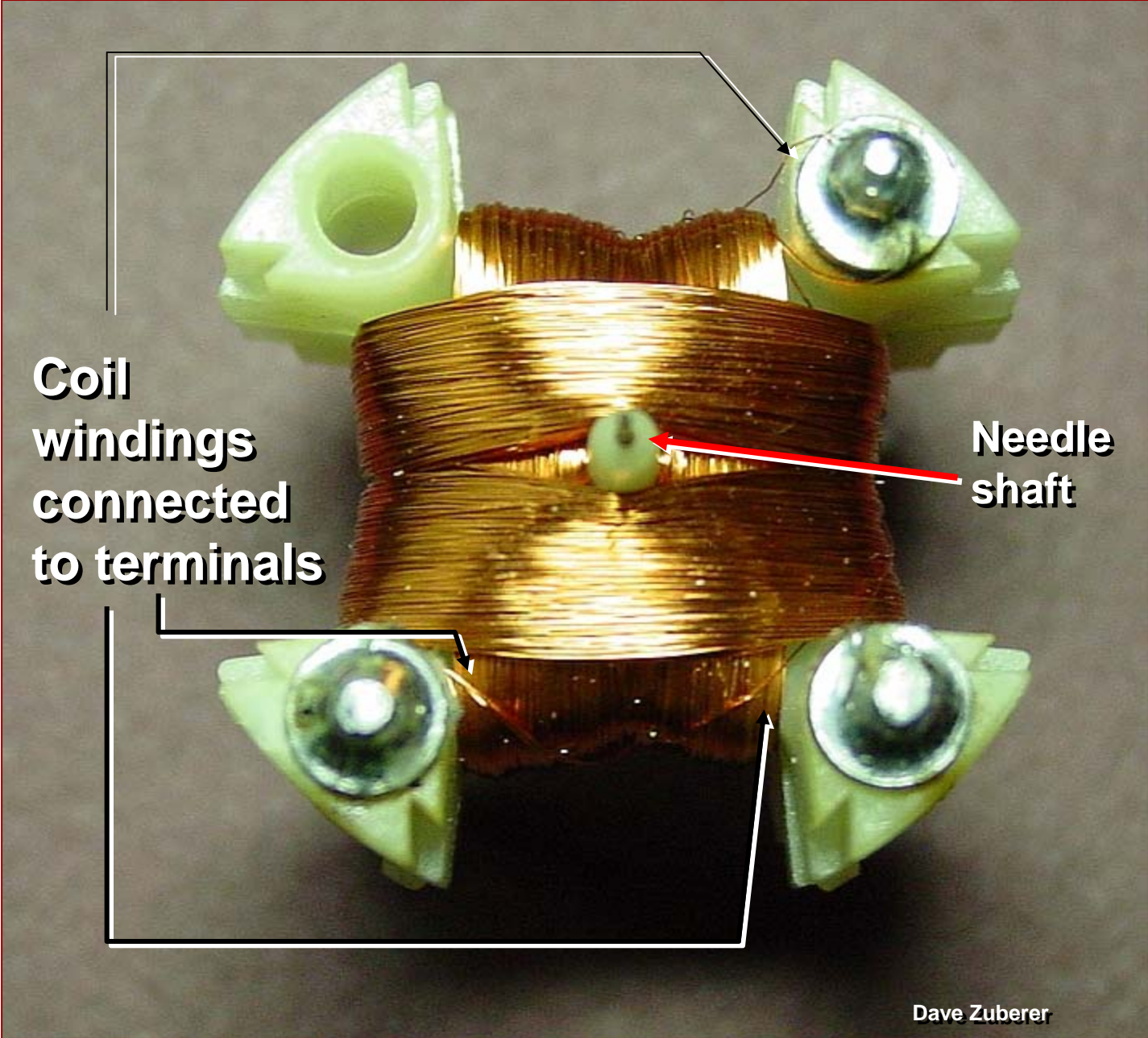
Rear of gauge housing



Underside of coils



**Close-up of the fuel gauge coils showing the connections to the terminals**



**Coil  
windings  
connected  
to terminals**

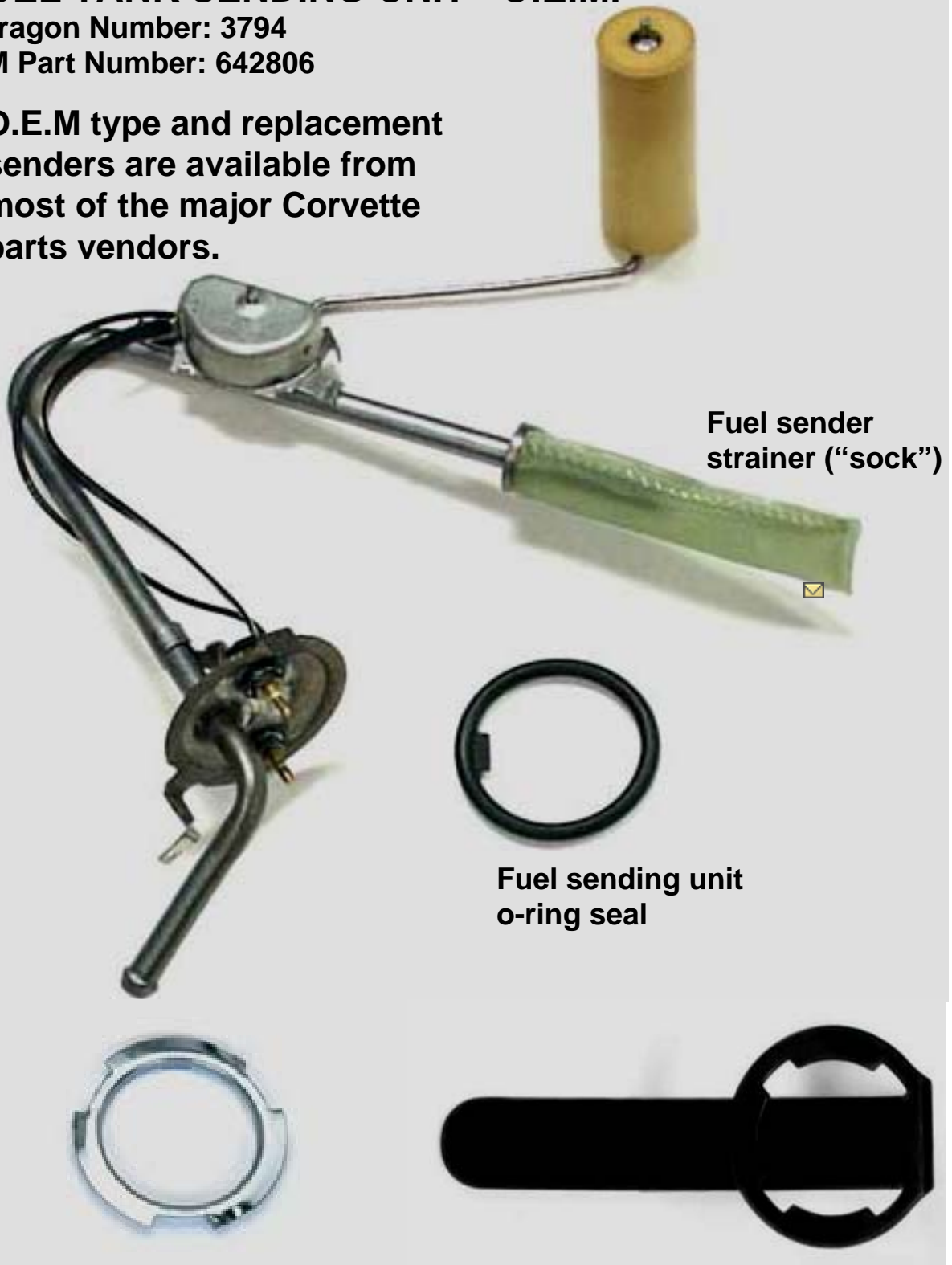
**Needle  
shaft**

# FUEL TANK SENDING UNIT - O.E.M.

Paragon Number: 3794

GM Part Number: 642806

O.E.M type and replacement senders are available from most of the major Corvette parts vendors.



Fuel sender strainer ("sock")

Fuel sending unit o-ring seal

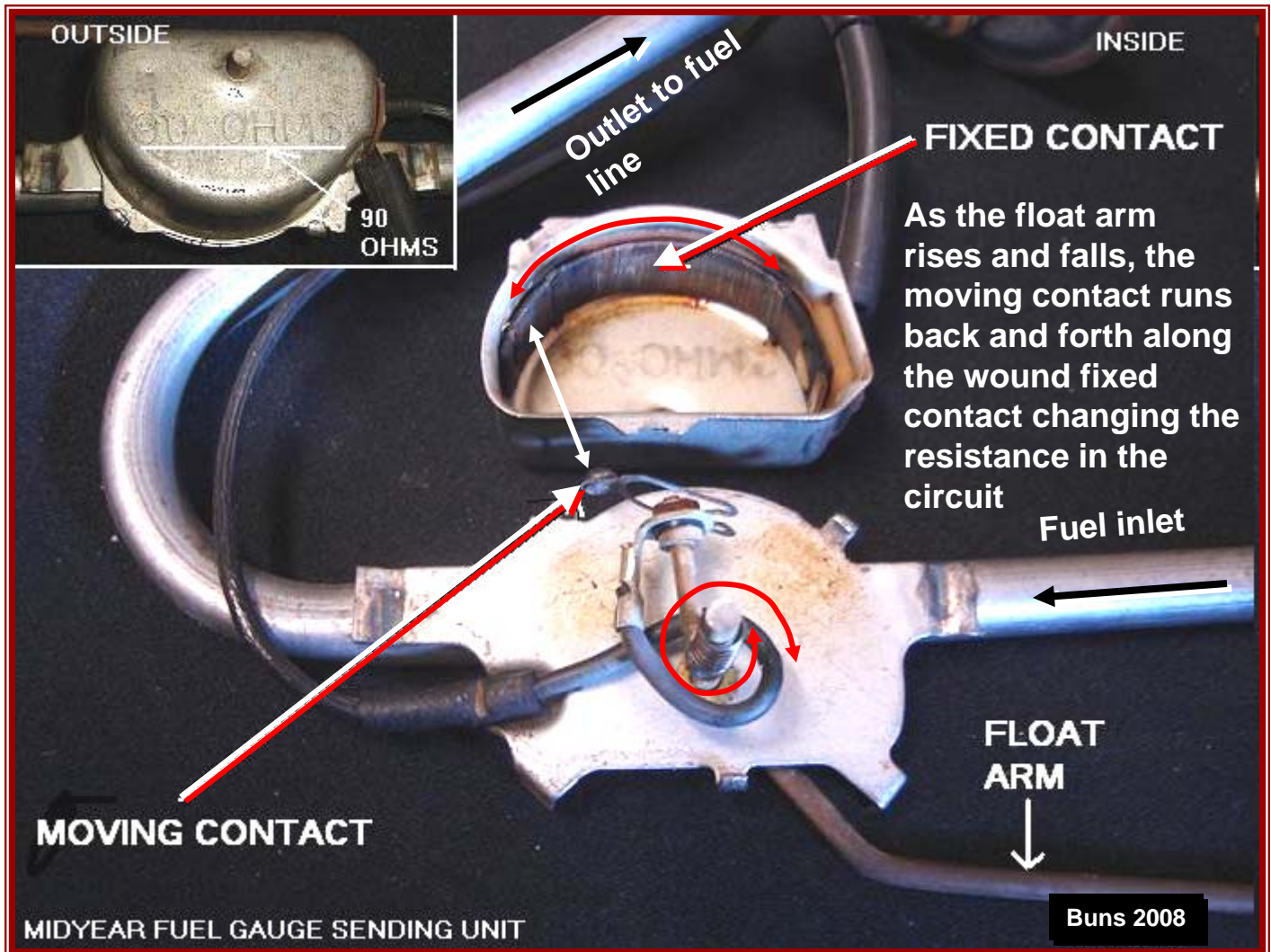
Fuel sending unit cam - Locks sender to tank flange

FUEL TANK SENDING UNIT CAM TOOL- makes installing the cam a bit easier

<http://www.corvette-paragon.com/p-358035-fuel-tank-sending-unit-oem.aspx>

# Inside the Mid-year fuel-sending unit

<http://forums.corvetteforum.com/c1-and-c2-corvettes/2199763-fuel-gauge-damping-anyone-do-it-electronically.html>

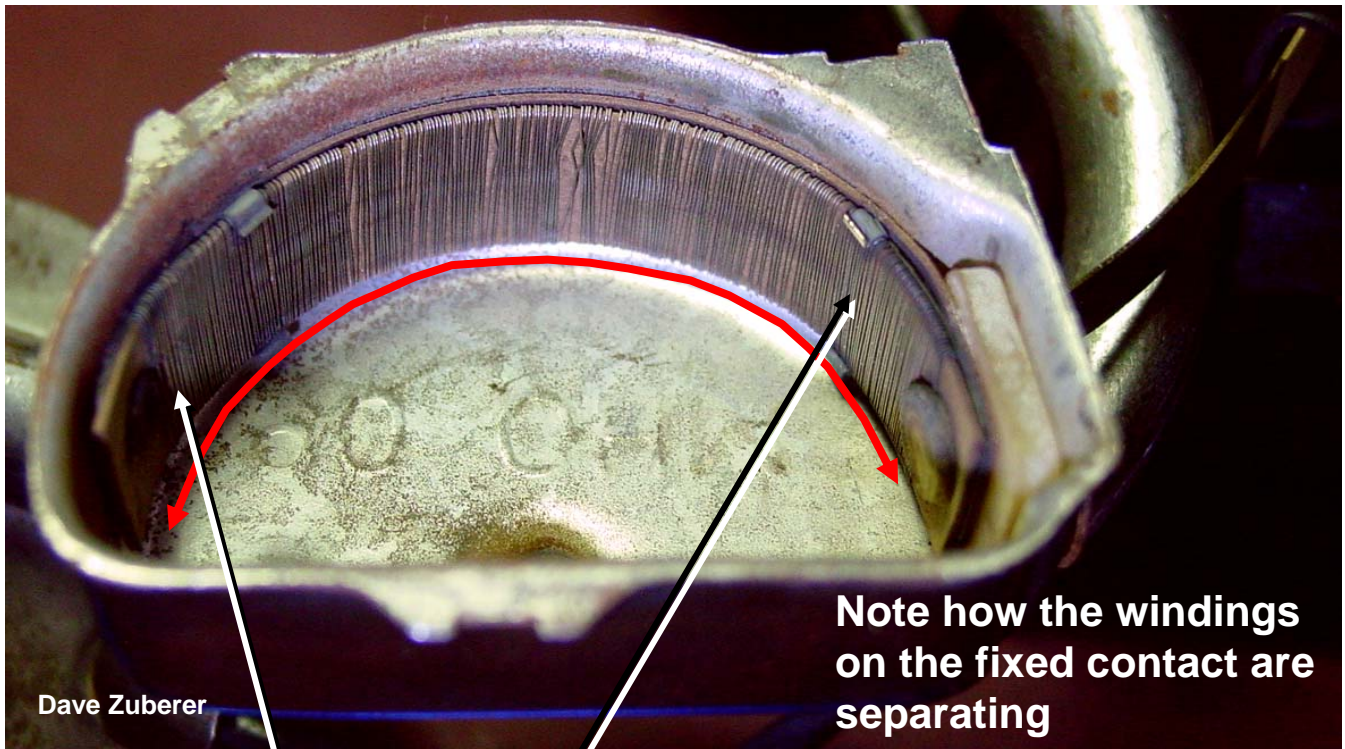


Photos by Tim Welsh

Inner workings of the fuel-sending unit. The float arm moves the “moving contact” along the wound “fixed contact” in the housing. A frequent cause of failure of the unit is a break in the fine wire of the winding of the fixed contact.

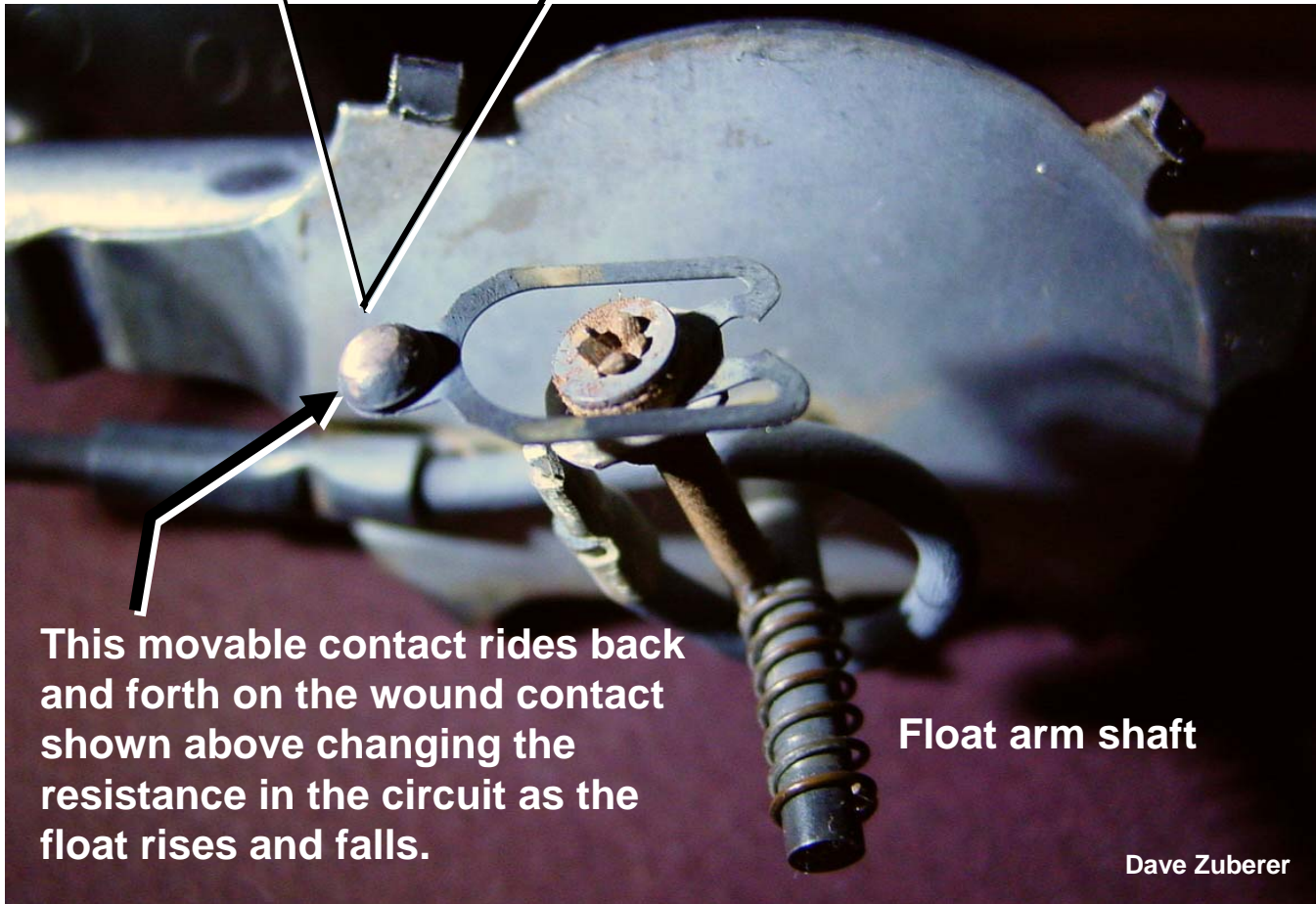
Good video of the gauge response to sending unit travel in the video at:

<http://www.youtube.com/watch?v=bUMo2XEYUo&eurl=http://forums.corvetteforum.com/c1-and-c2-corvettes/2199763-fuel-gauge-damping-anyone-do-it-electronically-2.html>



Dave Zuberer

Note how the windings on the fixed contact are separating



This movable contact rides back and forth on the wound contact shown above changing the resistance in the circuit as the float rises and falls.

Float arm shaft

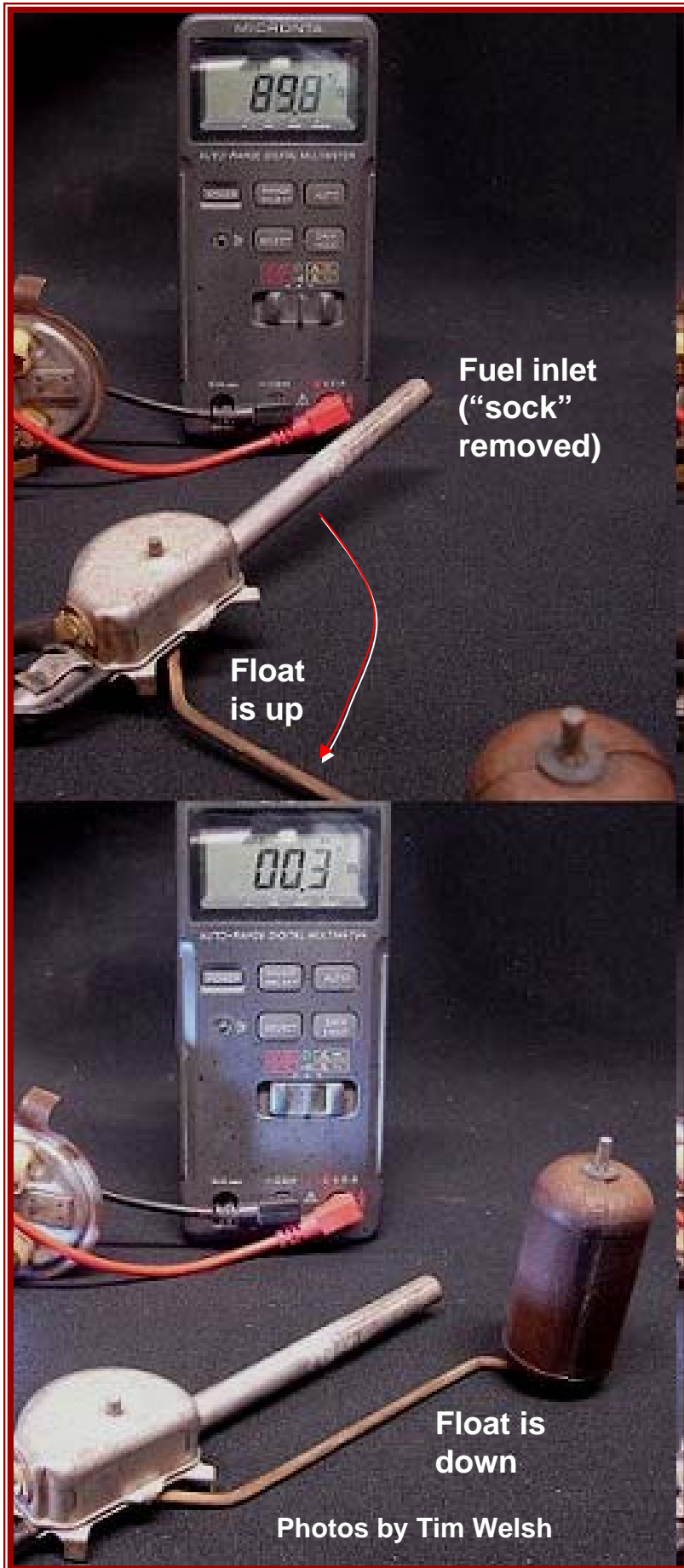
Dave Zuberer

## Mid-year fuel sending unit

With a full tank the float is up and the meter reads around 90  $\Omega$

Shown here are the resistance readings of the sending unit in its “Full” and “Empty” positions

With an empty tank the float is down and the meter drops to around 0  $\Omega$



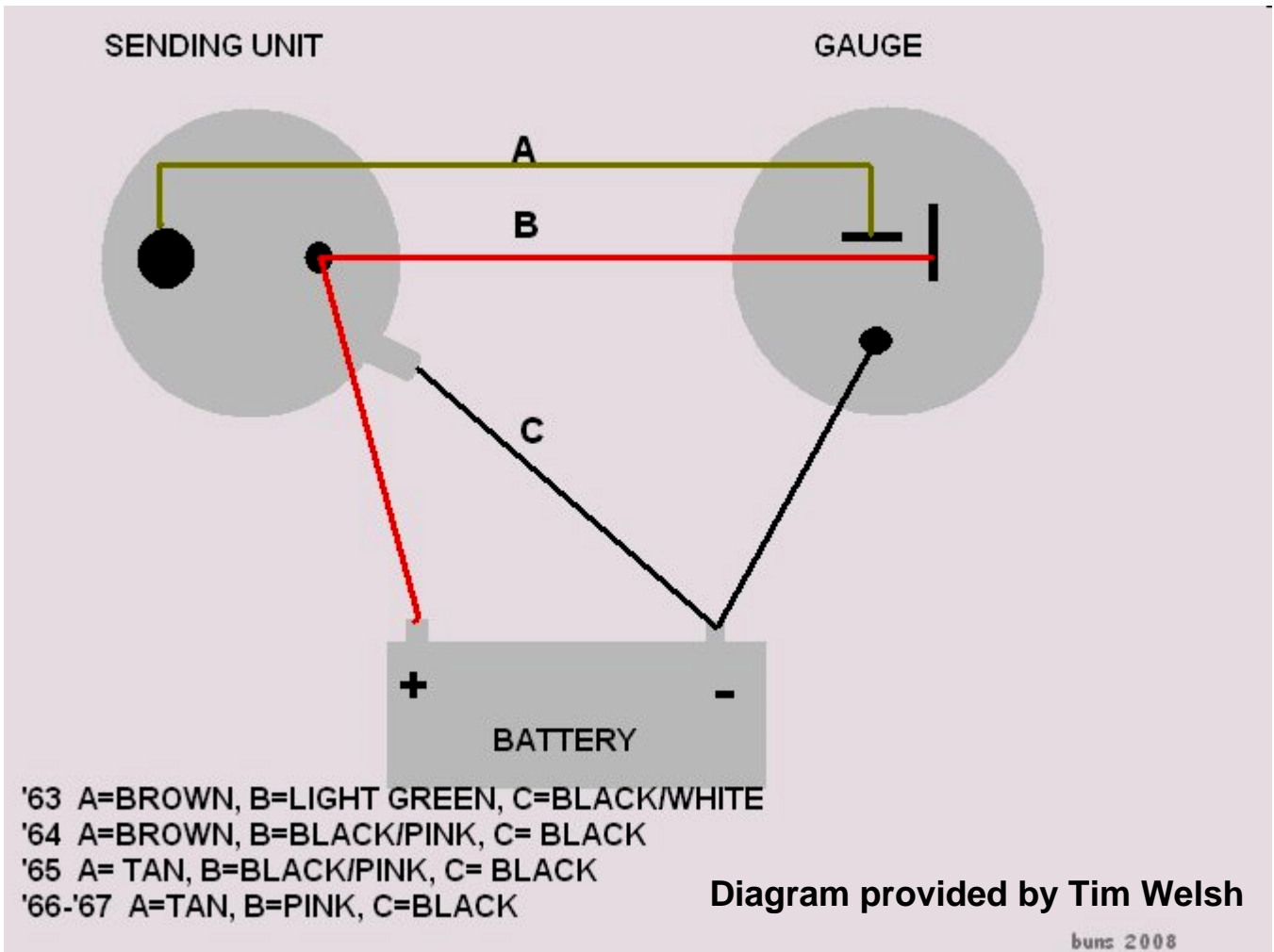
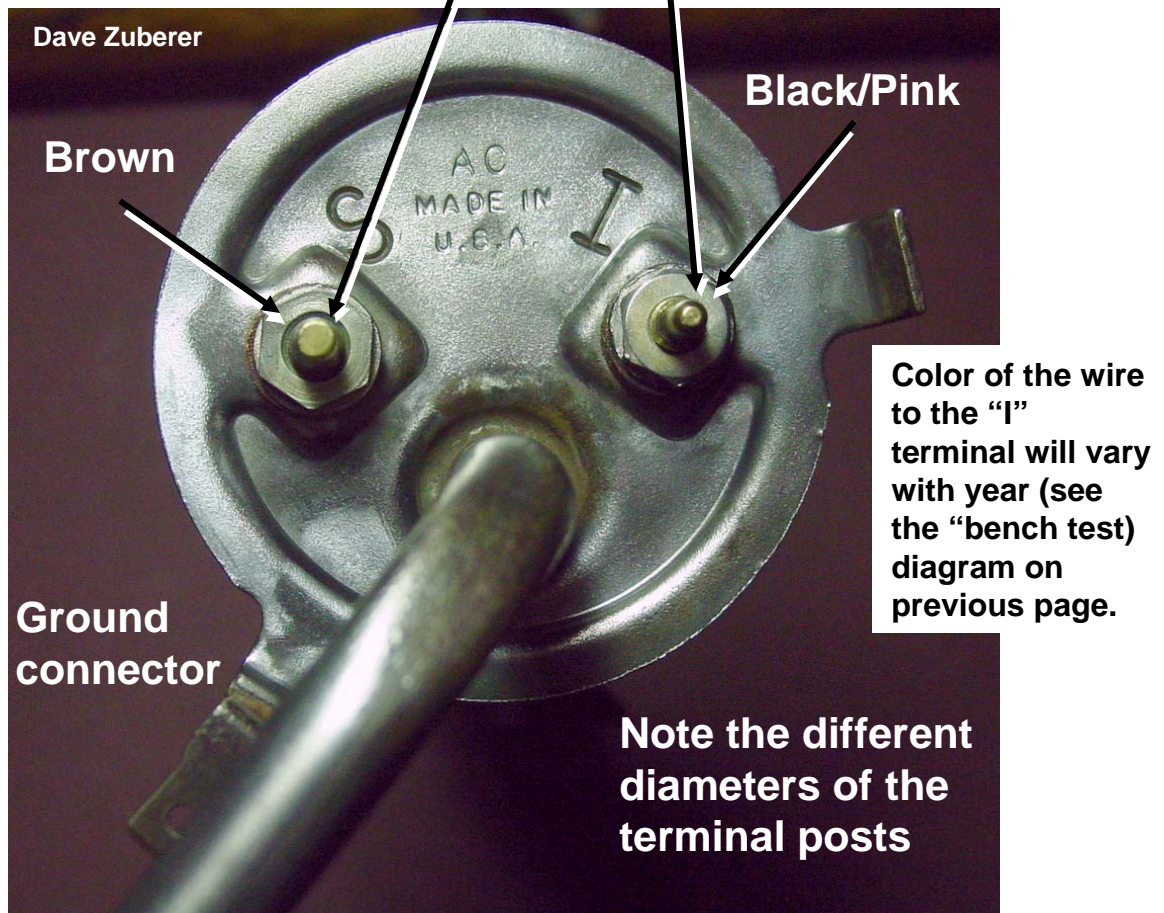
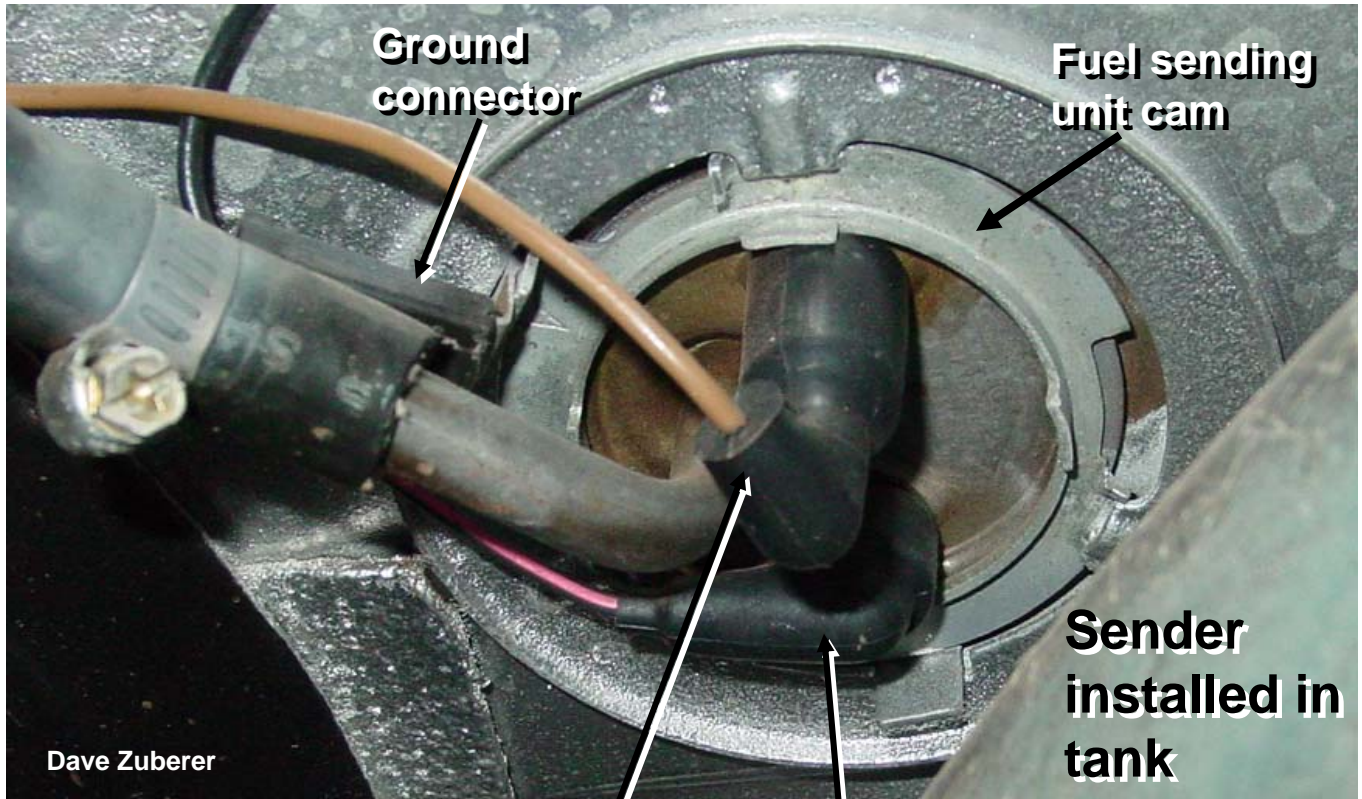
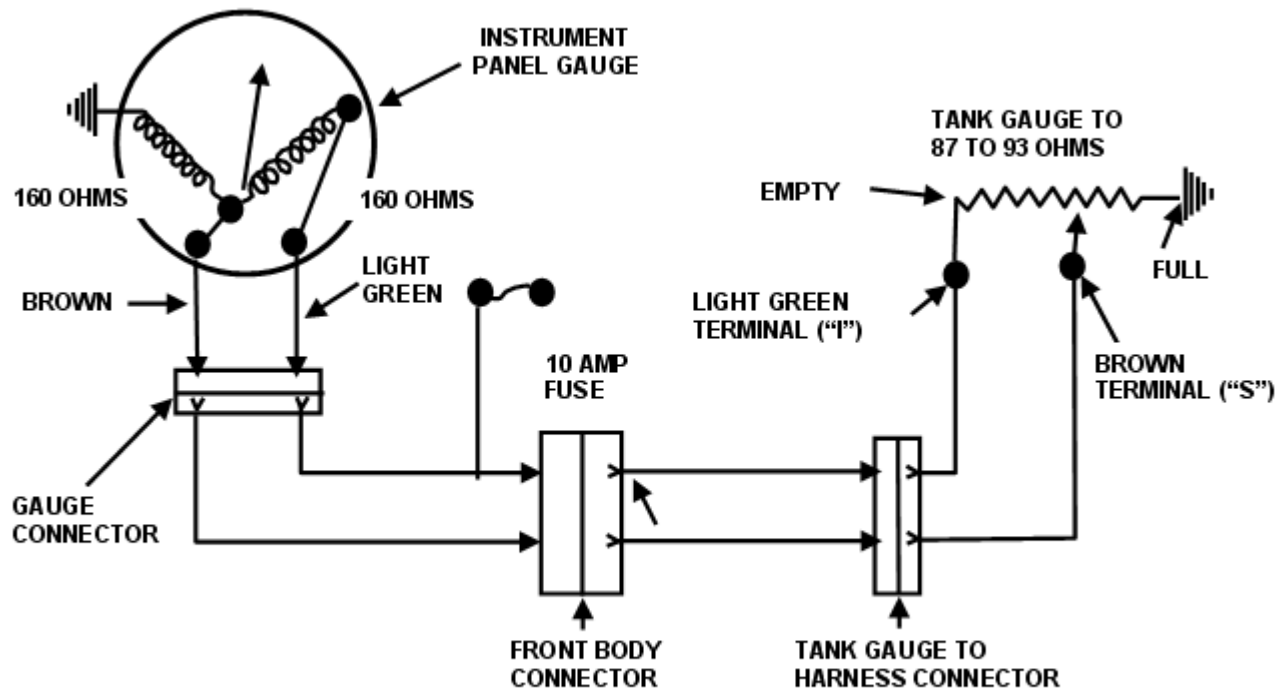


Diagram showing connections allowing you to bench test the sending unit and gauge before installing in car.





**These are the connections on my 65 coupe**



Fuel Gauge and sending unit circuit diagram from John Hinckley.

### How it works:

**The Midyear System:** However, the '63-'67 Corvette had to be different (we don't know why), and used a two-wire system with a powered sending unit and a Whetstone bridge voltage-divider circuit that fed 12 volts to the sending unit as well as to the dash gauge. This system was apparently something of an experiment, as it was only used on the '63-'67 Corvette and some mid-60's Cadillacs, and was never seen again – but, we have to deal with it.

Referring to the midyear diagram, you can see that the dash gauge has two coils with identical resistance, one of which is grounded to the case, they get current through a light green (1963), black/pink ('64-'65) or pink ('66-'67) wire from the ignition switch, and there's a brown or tan wire from the common coil connection that goes to the sending unit.

The added circuitry occurs at the tank sending unit – it not only has the brown or tan wire from the gauge, but it also gets current from the same ignition switch source through the gauge power wire, which feeds the 90-ohm variable resistance unit, which is grounded. The contact wiper attached to the float arm works against the variable resistor, but instead of being connected to ground, it feeds back to the gauge coils, creating a voltage-divider circuit with power on both sides instead of a single resistance-to-ground circuit. Operation of the float arm provides zero ohms of resistance at one extreme, and 90 ohms at the other extreme."

**Text provided by JohnZ**

## **Some points on “damping” in the gauges - Jason Oliver**

The way the dampening is done inside the gauges, fuel and battery/ammeter especially, is in the air core movement itself. The way I “fix” this is to inject a non-hardening grease/gel into the air core movement and it slows the needle “bounce” down quite a bit without messing with calibration.

There are 2 problems and the 63/64s are worse than others. One is that the sending units are “bouncy”. Surely someone has a picture of one taken apart to show how they work. Then, the 63-64 gauges (fuel and battery) are touchy. The gel I use is injected into the needle shaft and it helps a lot on the jumpy gauges. This is a GM fix that has been around for awhile; just not well advertised...same principle as liquid filled gauges (helps dampen needle bounce).