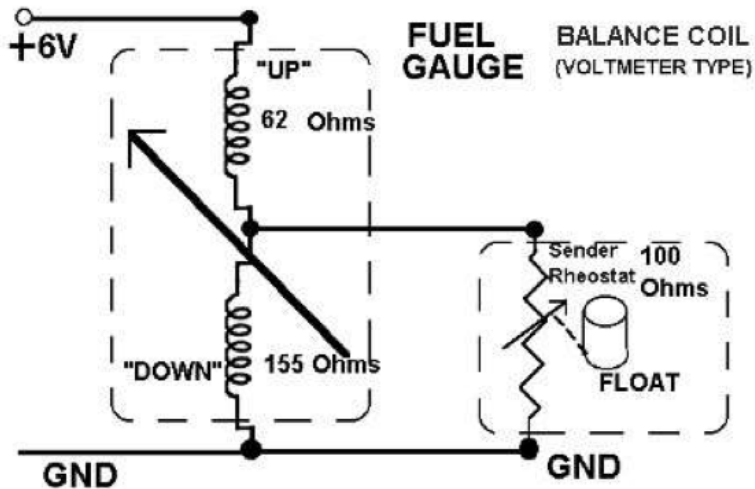


BALANCE COIL GAUGE

A meter movement, like that in a voltmeter or ammeter is used to detect the current from the sending unit rheostat. A small permanent magnet sets up a field which interacts with magnetism produced by coil windings inside the meter. A voltmeter usually only has one such winding; our fuel gauge has 2 windings as shown schematically below.



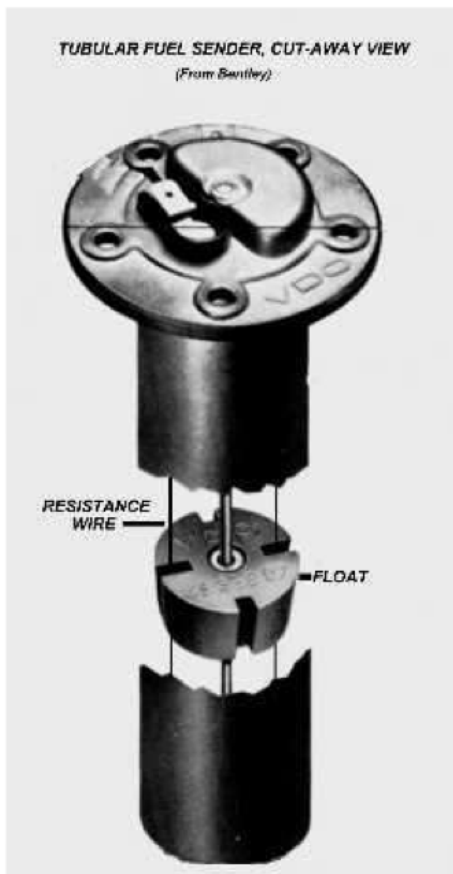
J.M. 2003

NOTE: Resistance values shown are for 6V gauges

The coil winding resistances and sender resistance are set so that when the float is at the bottom of its travel, the magnetism from one coil perfectly balances out the other.

Now, as the float moves upward, resistance decreases and more current is pulled through the "UP" coil. At the same time, current is "robbed" away from the "DOWN" coil. The net effect is to cause the needle to move upscale.

No voltage regulation is required with this type of gauge because of the cancelling effect of the 2 coils. For example, a rise in input voltage will cause more current to flow in the "UP" coil, but it will also cause more current in the "DOWN" coil. The 2 cancel each other. This gauge is quite stable over a reasonable voltage swing.



This tubular sender is the type commonly used with the balance-coil gauge. The 2 thin wires are made of resistance material wire. As the float moves up and down, it makes contact between the 2 wires. Upward movement means less resistance in the circuit.

DAMPING This gauge is not inherently damped since it has no thermal mass to rely on. Without damping of some kind, the needle would fluctuate wildly as the car rounded corners and fuel sloshed about. To overcome this, small holes are drilled in the outer tube. If tank level suddenly changes, it takes several seconds for the fuel to flow in and out of the holes and for the float to respond.

TESTING THE GAUGE Often it is hard to determine whether the gauge or the sender is the cause of problems. Do these 2 easy tests:

Pull the wire off the sender. The gauge should go to **EMPTY**.

Take the sender wire and ground it (Ground it to chassis, not the tank). The gauge should go to **FULL**.

If it passes both these tests, the gauge is good and any problems are in the sender.

NOTE: Later senders have 2 wires; one is the wire to the gauge, the other is a ground wire. On these senders, ground is always Brown; the sender wire may be either Black or Yellow (or even Green). Make sure that the Brown wire actually goes to a grounding stab somewhere on the