

## INSTALLING YOUR " RUNTZ" DASH GAUGE VOLTAGE REDUCER (4/ 02)

Runtz dash gauge voltage regulators are designed for **negative ground applications** only! **DO NOT USE** with a positive ground electrical system!!

**INSTALLATION** - There are two studs on the back of each electrical dash gauge. One is connected to the battery one is connected to the sender. The Runtz should be installed on the **BATTERY** terminal.

**1)** Your first job is to locate the **BATTERY** stud on the back of the gauge. As a simple reminder...the battery stud wire will always receive power via the ignition switch and therefore will be connected to the ignition switch in some way.

**2)** Now that you have located the correct stud, you need to **disconnect the positive cable from the battery**...so you do not receive an electrical shock while working under the dash.

**3)** Remove the **BATTERY** wire from the back of your dash gauge. Place the enclosed "extra" star washer (located on the stud of the Runtz) onto the battery stud bottom nut. Now, place the Runtz voltage drop onto the battery stud and secure using the original top nut. **DO NOT** over tighten.

**CAUTION**...Be sure than when the Runtz is installed on the back of the gauge the **"screw head"** of the Runtz **DOES NOT** touch the metal **backside** of the instrument housing. **Note** - If the bottom nut is missing from the battery stud, use flat washers to raise the Runtz up above the metal housing.

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**CAUTION - One "RUNTZ voltage regulator is required per electrical gauge!**

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**NOTE** - Some early dash gauges were wired together in series via a copper metal strip, (Flathead Fords for example). You will need to **SEPARATE** the gauges, by providing a **separate battery wire** to each gauge from the main battery wire. This will allow each dash gauge to function separately, and allow your Runtz to provide extremely accurate dash gauge readings.

**REMEMBER** - Runtz voltage drops are **NOT** to be used with amp gauges...which are not voltage sensitive anyway, or tachometers. Runtz's are designed for dash gauges only.

**4)** Next connect the original battery wire from the electrical gauge to the stud on the Runtz voltage regulator. Secure with the fastening nut provided, and again, **DO NOT over tighten**.

**5)** Your final step is to slide the terminal end of the **black ground wire**, under the head of one of the dash gauge mounting bolts. This will insure your Runtz is properly grounded. With that done...all that is left is to re-connect the battery and you are done!! Your dash gauge is now protected from excessive voltage.

**Tech Tip** - In most all applications it works best to **power the dash gauges directly from the battery**. You can do that by **connecting a 10ga wire from the positive post of the battery to the ignition switch**. This will protect your Runtz and any other solid -state accessories from damage caused by the voltage spike that occurs when the contact points inside of the starter solenoid are closed during engine cranking. Installing a accessory panel powered by the battery is also a good idea. Besides protecting solid-state accessories it

## **GAS GAUGE PROBLEMS...**

If you understand how a gas gauge is supposed to work, then finding your problem will be much easier. Here is how most (AC) type electric gas gauges work. Two parts make up the fuel gauge system, the dash gauge, and the gas tank sender, located at the gas tank. Power to the dash gauge is received from the "switched" side of the ignition switch which means the dash gauge works ONLY when the ignition switch is in the ON position. There is a small counter weight located on the needle of the gauge which returns the gauge needle to the EMPTY position when the ignition key is in the off position.

With the ignition key in the ON position current flows from the ignition switch thru the small operating coil (located on the back of the dash gauge), on to a "CHOKE" coil. From there the current travels to a common terminal between the two coils. After the current reaches the common terminal between the coils the current travels back thru the operating coils, and then on to ground. At the same time current is also sent to the tank sender where current travels thru the sender unit and on to ground.

When the tank is empty the float will be near the bottom of the tank so most of the current is sent directly to the tank sender where it passes on to ground. As more fuel is placed in the tank the float is raised and more current is sent to the operating coil of the dash gauge causing the needle to move closer to the full mark. It is electrical friction (resistance) from the gas tank sender that guides the current to either the tank sender or the dash gauge.

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**1) The most common cause of fuel gauge trouble is a poor ground especially at the tank sender.** Make sure all wiring connections are tight, and free of dirt and corrosion. A poor ground or loose connection to a fuel gauge system is just like loose or dirty battery cables to your starting system.

**2) If your gauge needle remains on EMPTY** when the ignition key is turned on and gas tank is partially full, battery current is NOT reaching the gauge. Connect a jumper wire between ignition switch and dash gauge. If gauge works, replace defective wiring between switch and gauge.

**3) If dash gauge NEEDLE remains in ONE POSITION** as ignition switch is turned off and on, either the dash gauge or the tank sender is defective. Ground the gas tank sender terminal using a jumper wire, if dash gauge shows empty, gas tank sender is defective. If the dash gauge needle does not move, replace dash gauge.

**4) If dash gauge reads EMPTY or LOWER** than it should, check for defective wiring between the dash gauge and the tank sender unit. Also check for poor ground.

**5) If dash gauge reads, EMPTY** when the tank is actually half full the wiring between the dash gauge and the tank sender is defective or the dash gauge is defective. Disconnect the wire at the gas tank sender terminal, if gauge still reads empty, the dash gauge is defective.

**6) If dash gauge reads, FULL** when tank is known to be only half full the wiring between the tank or the sender is bad. Ground the gas tank sender terminal using a jumper wire, if the dash gauge still shows full there is bad wiring between the dash gauge and the tank sender. If the dash gauge goes to empty, the gas tank sender is defective.

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