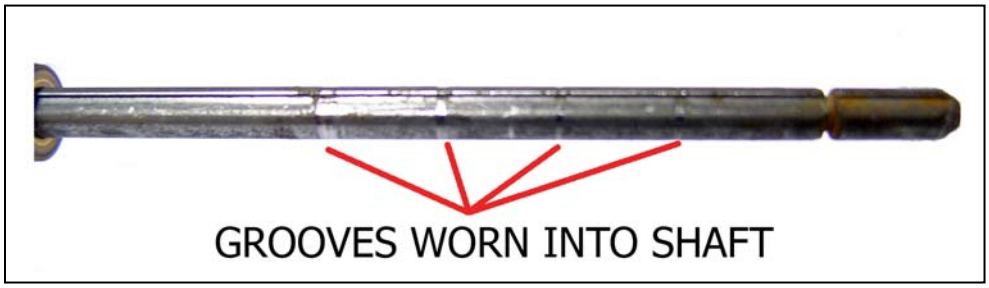
TRIP ODOMETER REPAIR – ANALOG DASH

Buick Regals built between 1984 and 1987 were fitted with analog dash displays, 85MPH, as a standard dash setup. The analog dash cluster utilized a mechanical cable-driven speedometer, odometer and trip odometer with an integrated reset button. The trip odometer is ordinarily reset to all zeroes with the button, and will accumulate trip mileage until it is reset again.

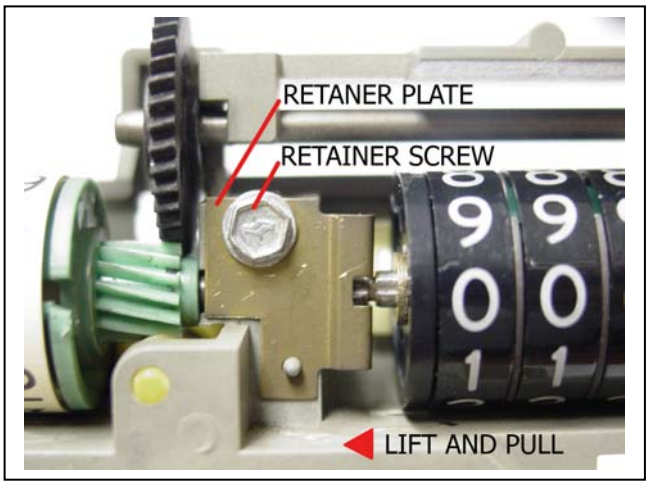
Over years of usage and mileage accumulation, a fault develops where the trip odometer to fail to reset to all zeroes. This is a common problem with higher mileage cars. To fix the problem, the trip odometer needs to be removed from the dash cluster and serviced. The following procedure shows how to repair the fault and make the odometer work normally.

Part of the problem with the trip odometer relates to factory design; most of the internal parts in the odometer assembly are plain, un-plated steel. The steel pawl springs inserted between the wheels tend to rust due to moisture in the air, causing excessive wear to the grooved reset shaft, which is also un-plated steel. The wear is seen in the form of four radial grooves into the grooved reset shaft, causing the pawl springs to jump over the reset groove in the shaft, preventing the digit wheels from parking in the ZERO position once the reset knob is pressed.

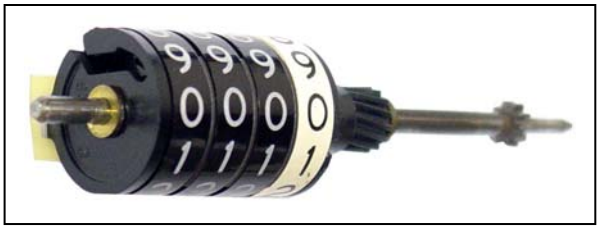
Trip odometer reset shaft with number wheels removed. Note the damage caused by excessive wear.



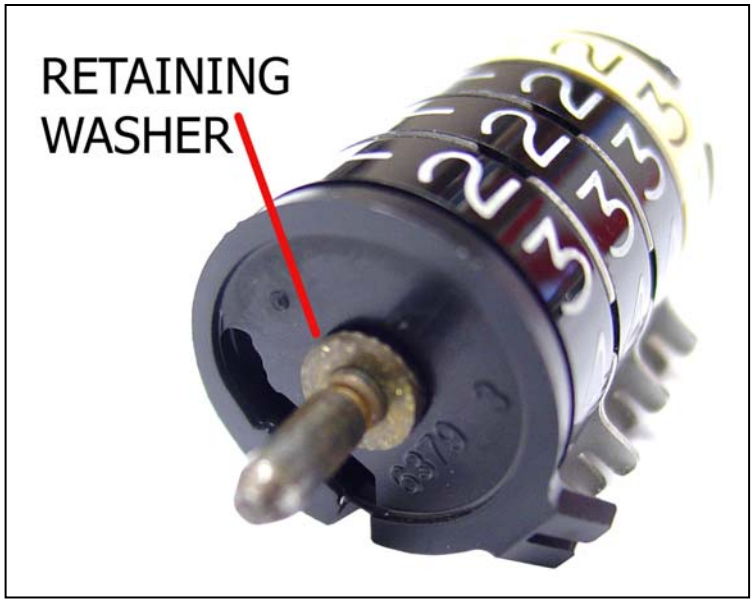
The trip odometer will be disassembled and repaired. First, remove the speedometer cluster from the vehicle, and remove the faceplate from the mechanism to reveal the speedometer and trip odometer. You will notice a small screw that holds the trip odometer in place, along with a brass retaining plate. Remove this screw and carefully remove the retaining plate. Carefully slide the trip odometer movement to the left while lifting the assembly up and away from its frame. The odometer movement can then be inspected and disassembled. You can now remove the seal and take the assembly apart.



Use extreme care when removing the plastic seal. This is very fragile and can break easily! Lift it away from the assembly evenly and slowly.



Once the trip odometer is removed, the brass retaining washer on the end must be removed. This washer is used to hold the number wheel assembly together and is press-fit onto the end of the shaft. To remove this washer, you must gently pry under the washer to lift one end, then wiggle the washer to loosen it. Use a miniature pair of fine jaw pliers to gently wiggle and loosen the washer to remove it from the shaft.



Loosen the retaining washer enough to grip it with a pair of pliers, then slide it off the end of the shaft.

Very carefully remove each part of the assembly, being extra careful to keep the order in which the parts are assembled. The metal plate between each number wheel has a small gear placed into a slot on the plate. This gear must be kept in its original place and can't be reversed on the plate, so take note as to how the gear is positioned on the plate.

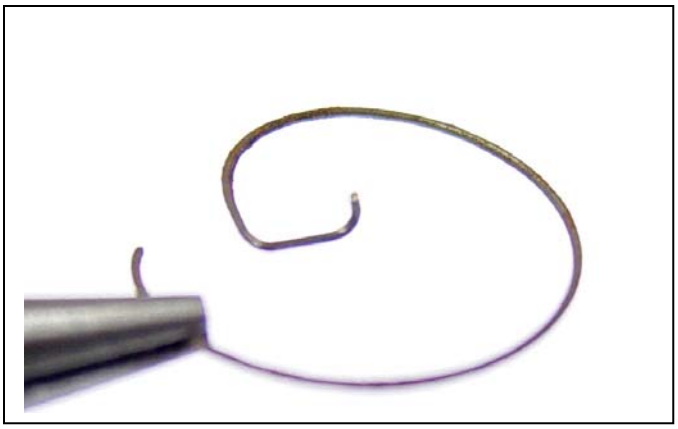
Note that the gear on each plate is suspended within the groove by a small flat spring. The gear has regular teeth on one end, and interrupted teeth on the other end. Be sure the gear stays in the plate as seen here.

Carefully remove each number wheel and spacer plate, and keep them in the same sequence that they were originally.

Observe the number wheels. Each wheel has an elliptical spring inside it. The end of the spring has a pawl that drops into the inside center bore of the wheel, which contacts the grooved shaft. This pawl acts as a one-way clutch that enables the shaft to rotate counter-clockwise freely and lock the wheel when the shaft is rotated clock-wise. Occasionally, the pawl loses its spring contact with the shaft. When this happens, the wheel does not lock into the zero position when the reset button is pressed, causing the wheels to be out of sequence. This pawl contact, in addition to the wear on the shaft, is the reason the trip odometer fails.

The object of the repair outlined here is to re-position the contact area on the shaft and re-align the contact point of the spring pawl. Remove the spring from the number wheel and inspect it. Note that the contact area of the spring tends to be slightly crooked once it's installed into the wheel. By gently bending the pawl area, you can re-align the end of it, providing better contact to the grooved shaft.

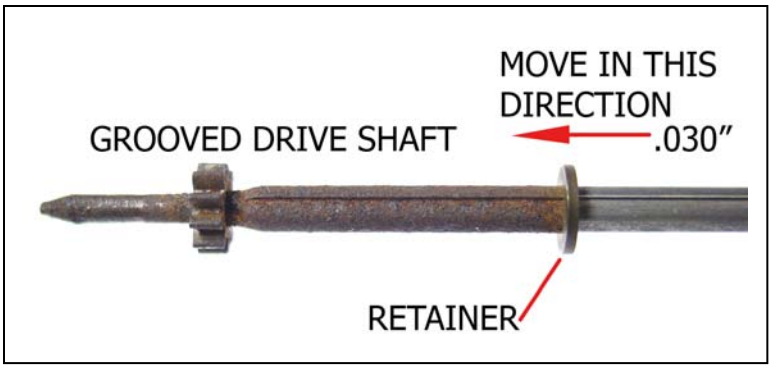
The end of the spring is curved upward and this is the area that contacts the grooved part of the shaft. This is what keeps the number wheels at zero when they are rotated by pushing the reset button.



Each of the wheels must be inspected to see that the pawl end of the spring is engaging adequately into the inside bore of the wheel. If the engagement is adequate, the wheel will rotate freely in one direction, and lock at the groove in the other direction. After verifying that the springs are going to engage correctly, insert each spring back into its original position.

Next, we are going to reposition the inside retainer washer on the shaft. What we want to do is move the retainer washer about 1/32" or .030" further down the shaft. The effect of this is to move the contact area of the pawl away from the original worn out area, to give it a new spot on the shaft to contact. One reason the wheels don't reset properly has to do with the wear on the grooved shaft, and the other reason is the pawl spring losing its tension and/or wearing slightly.

To move the retainer, use pliers to wiggle it slightly to loosen it on the shaft. Be very careful to do this a little at a time, since you are most likely moving it to a rusty part of the shaft and you don't want to loosen it too much – it must be tight against the shaft once it's repositioned. If the retainer is too loose, it can slip and cause misalignment of the number wheels.



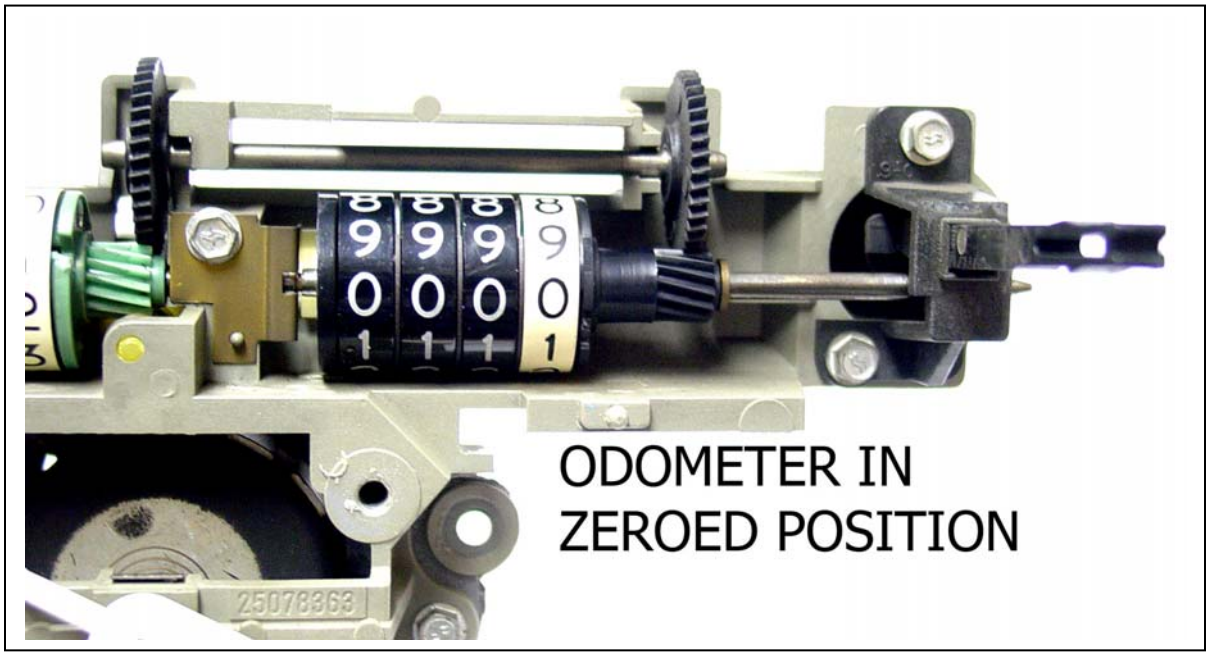
Now that the inside retainer is relocated, you can re-assemble the trip odometer. Starting with the gear plate, carefully slide each wheel back onto the shaft in the order in which it was originally. Each wheel should be seated and equally spaced. Be sure the metal plate and gear are in their proper position inside each wheel. After the assembly is complete, insert the outer retaining washer over the end of the shaft. You can use a pair of side cutters as shown to stake the washer in its place, to prevent it from coming loose.

Once the number wheels are in place, you need to lay the assembly on the table and rotate the grooved shaft. It should rotate freely in the counter-clockwise direction. Now, when you rotate it clockwise, you will be able to align the number wheels and once they align with the same numbers in a row, they are aligned. You need to hold the seal plates in alignment while you are rotating the assembly.

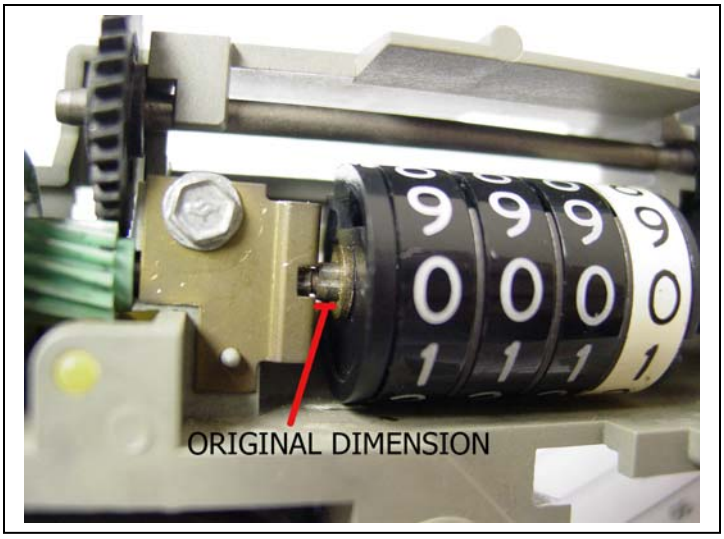
Now that the numbers are all in alignment, place the seal carefully onto the alignment tangs the same way they were originally. Be sure the zeroes are all on the opposite end of the alignment tangs. Referring to the illustration, rotate the shaft clockwise until it stops. Now, drop the trip odometer assembly into place back in its frame, sliding the gear into the reset button assembly first. Be sure the zeroes are at the top and the alignment tangs are seated properly into the groove at the bottom of the frame. Do not force the assembly into its location as you might break the seal if it is not done carefully.

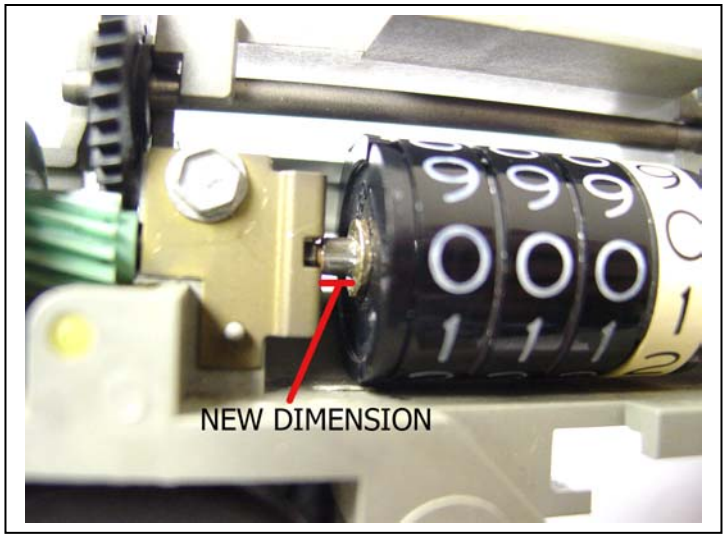
After the trip odometer is positioned, install the brass plate and retainer screw. Now you can press the reset button fully. The numbers should all rotate together and stop at zero when the button is fully pressed. If they don't stop at zero, repeat the procedure above, being sure to insert the gear into the reset button only

when the shaft is rotated clockwise fully until there is no free play in the shaft. When the reset button is parked, the shaft will be tightly in the clockwise position and the number wheels will all show zeroes at the top of the frame.



Now that once the retainer is repositioned, the trip odometer wheels will be slightly moved to the right. However, it will still be fully visible in the window cut into the dash faceplate. The difference in alignment is the 1/32" shift on the position of the locking washer stop.





When the repair is done properly, the trip odometer will reset to zero with one full push of the reset knob. Since the factory parts wear out due to poor design, you can probably expect the same thing to happen every 50,000 miles or so, but performing this repair will definitely buy you some time. Incidentally, these parts are not available from the factory, so repair is really the only option.