

## RGS/PUMP MOTOR SWITCH FAILURE AND REPLACEMENT

Revised 05/08

The following writeups and pictures have been packaged to cover the diagnosis and if necessary, the replacement of a failed Rotten Green Switch - - aka the pump motor switch or RGS. Since these memos were written to send out individually in most cases, there may be some duplication in content.

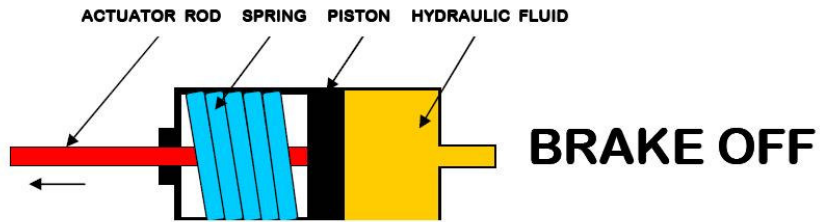
Failure of the RGS accounts for a large majority of AutoPark system malfunctions. This specific writeup is intended to address the troubleshooting and replacement of that switch. These procedures have been found to be within the capability of most owners or shadetree/DIY mechanics, who have some basic understanding of mechanical equipment, and a willingness to do some fairly straightforward “wrenching.”

Before we get into the specifics of the components, or diagnosis and repair, it may help to get some basic understanding of how AutoPark works. The following illustration describes the system in pretty simple terms. We suggest studying these diagrams with the text, so as to be able to visualize what your AutoPark is doing as you apply, or release the parking brake. Be advised that there are several different “morphs” or versions of the system and the components, but the diagrams show the basics that are common to all the AutoParks built from about 1989 thru present.

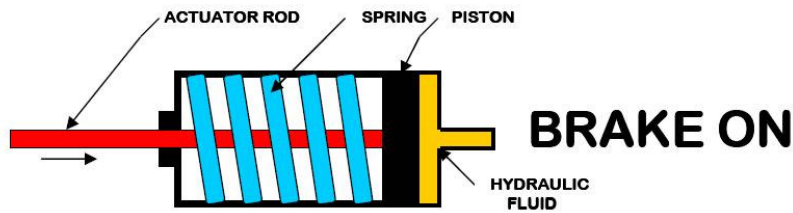
Interestingly, all the AutoParks built from 1989 up thru about 1994, were driven by pressure from the power steering pump, instead of the separate electric pump that characterizes all the later units. These earlier units were primarily an all hydraulic device and for the most part, have proven to be perhaps more reliable than the later electro-hydraulic types.

The following page illustrates the basic operation of the actuator, which is essentially the “heart” of the AutoPark system.

# AUTOPARK ACTUATOR



This drawing depicts the AutoPark actuator with hydraulic pressure applied. In this condition, the brake is **RELEASED**. The piston is forced to the left by the hydraulic fluid, and the actuator rod has relaxed the tension on the cable to the brake assembly.



This drawing depicts the AutoPark actuator with no hydraulic pressure on it. In this condition, the brake is **APPLIED**. The piston is forced to the right by the heavy spring, and the actuator rod is putting tension on a cable connected to the brake assembly.

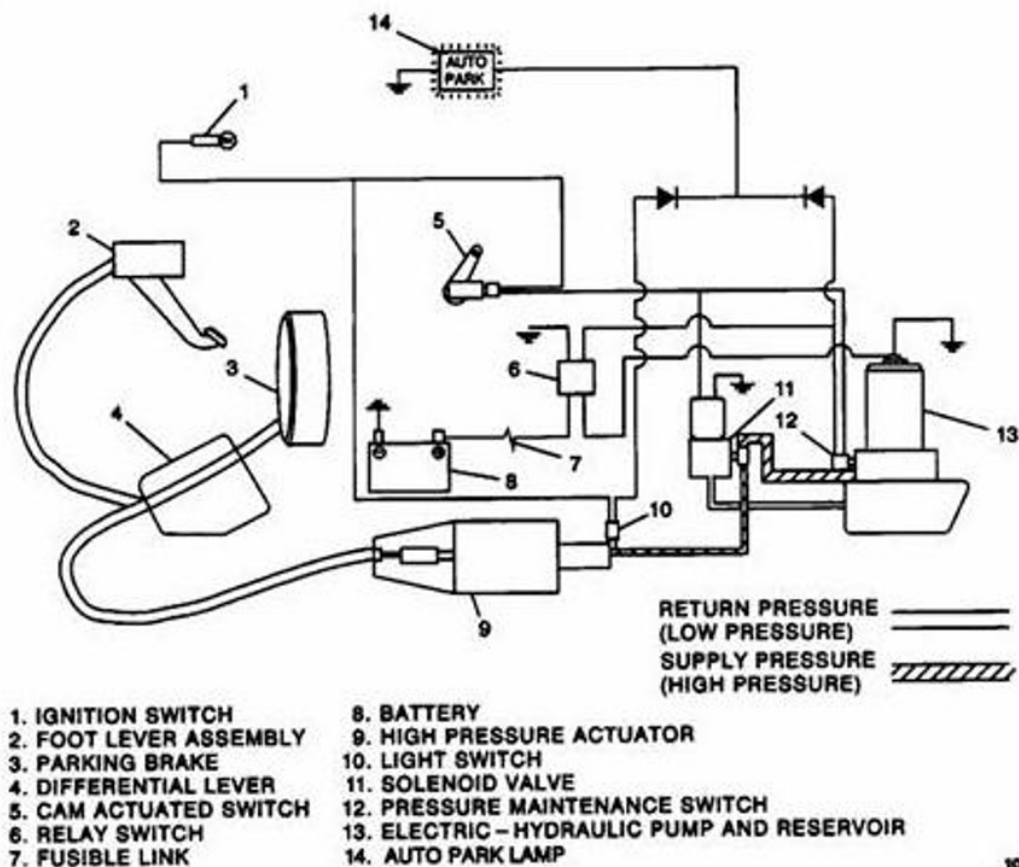
The actuator is the heart of the AutoPark system. It is a hydraulic cylinder which applies or releases a drum brake on the driveline. It is also important to remember that hydraulic pressure **RELEASES** the brake, and that lack of pressure **APPLIES** the brake. As such, **BRAKE APPLIED** is the default condition for most malfunctions of the AutoPark system.

In real life, it is of course more complicated than this. There are pumps, motors, switches and so forth. But if you understand the essentials of these illustrations, you know what makes AutoPark work in principle.

In addition to the actuator system, which is illustrated and described on the previous page, there is high pressure hydraulic pump which is motor driven, and controlled by a combination of electronic and hydraulic devices.

There are actually two somewhat differently configured systems in existence, one of them used from about 1994 to 1998, and the other from 1998 thru present.

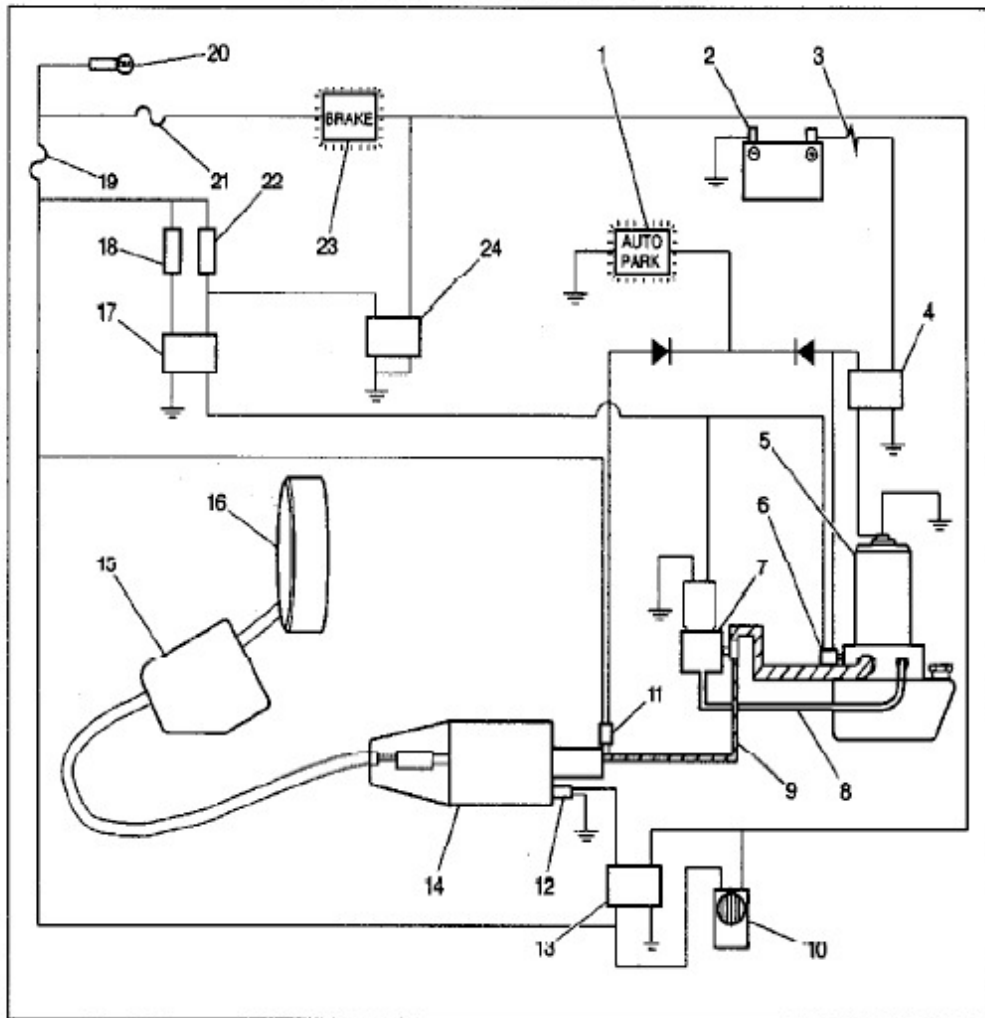
Diagrams of each system are shown below:



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3206T1

This is what we call Version II of the AutoPark system. The parking brake with this version may be applied by putting the gear shift lever in PARK, or by depressing the manual foot pedal #2.

### Electric/Auto Parking Brake Components



#### Legend

- |   |  |
|---|--|
| (1) AUTO PARK indicator lamp              | (14) Actuator assembly                             |
| (2) Battery                               | (15) Differential lever                            |
| (3) Fusible link                          | (16) Parking brake                                 |
| (4) Pump motor relay                      | (17) Park/Neutral position switch relay            |
| (5) Pump and reservoir                    | (18) Park/Neutral position and backup lamps switch |
| (6) Pump motor switch                     | (19) A/A (Auto Apply) fuse 19                      |
| (7) Solenoid valve                        | (20) Ignition switch                               |
| (8) Hydraulic return pipe (low pressure)  | (21) GAUGES fuse 8                                 |
| (9) Hydraulic supply pipe (high pressure) | (22) Pull button switch                            |
| (10) Parking brake alarm                  | (23) BRAKE indicator lamp                          |
| (11) Pressure indicator switch            | (24) Pull button relay                             |
| (12) Actuator position switch             |  |
| (13) Alarm relay                          |  |

This is the Version III system. It does NOT have the manual foot pedal, but instead has a yellow push-pull knob on the dashboard - - as well as the PARK position on the gear selector.

So what is the Rotten Green Switch, and what does it do? The RGS is an electric pressure switch, which controls the hydraulic pressure supplied to the actuator. It is designed to turn on the pump at pressures below 1200 psi, and turn the pump off when the pressure reaches 1600 psi.

This switch typically fails in two stages. In the first stage, oil under high pressure from the pump, gets inside the switch and causes the switch to lock in the ON position - - Regardless of the system pressure it then stays ON. This in turn, prevents the pump from turning off, and the system pressure goes sky high. The very high pressure at some point ruptures the switch, and oil starts trickling out past the switch terminals. Eventually, all the oil will leak out and the actuator will apply the parking brake for lack of hydraulic pressure.

Below is a picture of a new Rotten Green Switch - - as mentioned elsewhere, it is sometimes brown in color, but the function is unchanged regardless of whether it is brown or green.

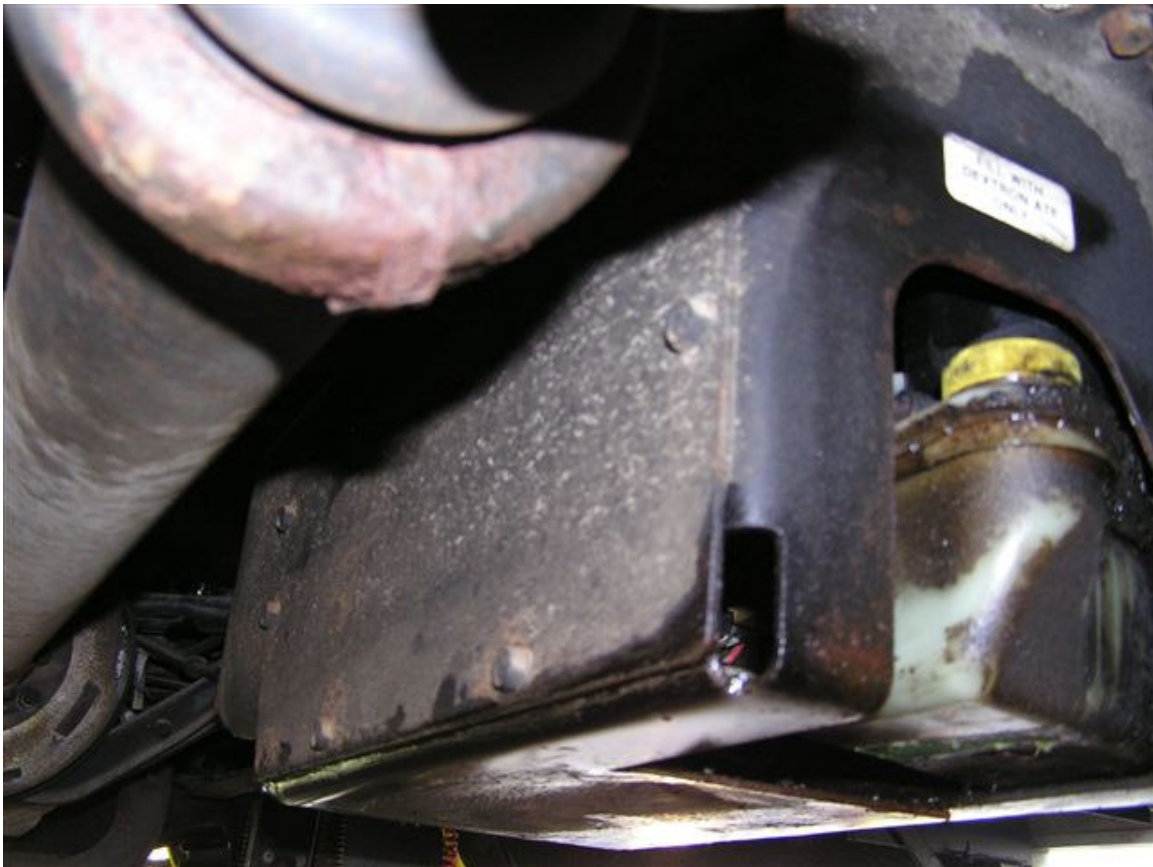


The previous pages have pretty well covered what the RGS is, how it works, and where to find it. Below, we have inserted the writeup which describes the method used for determining failure of the RGS.

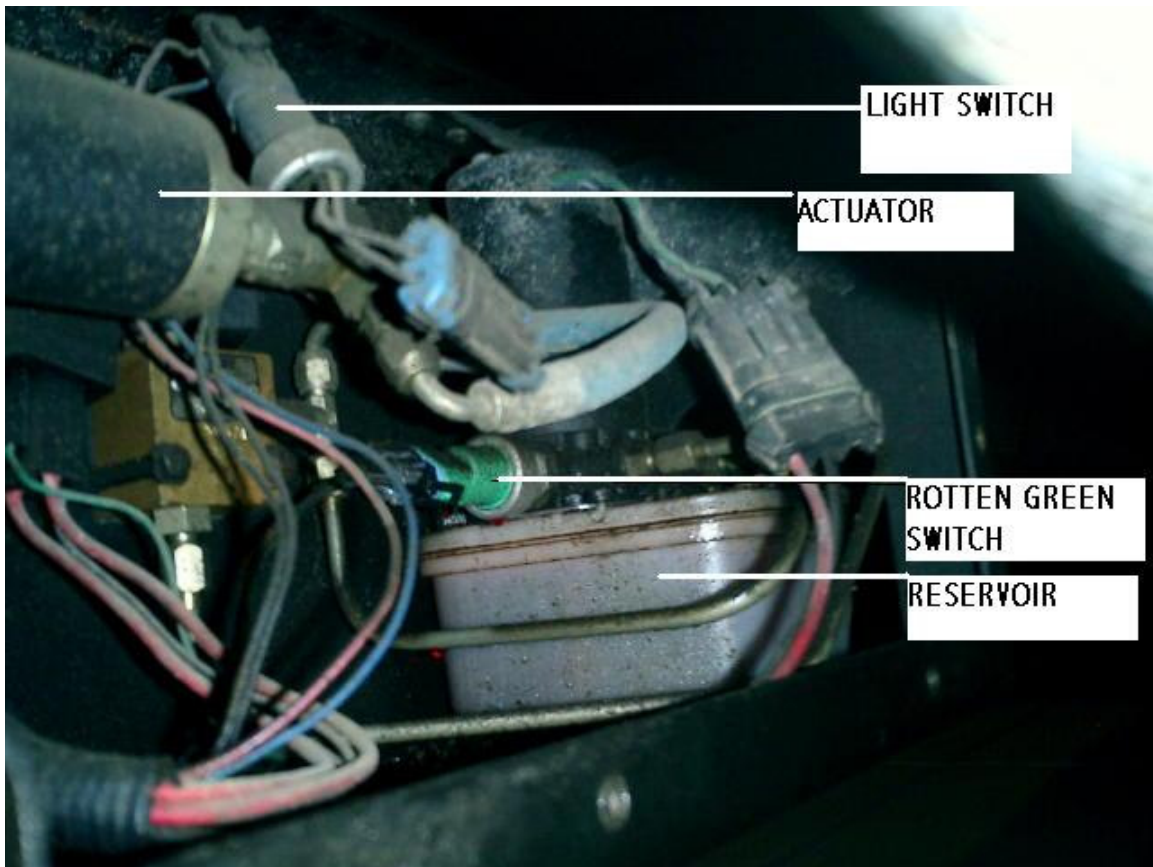
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**This is a pretty simple test to CONFIRM failure of the RGS (Rotten Green Switch). The proper name for this item is the "Pump motor Switch." Typically, units built from about 1994 thru 1998 will have this green switch, but some of the newer models may have a brown switch - - basically the same switch, just a different color.**

**Chock your wheels - - you'll be getting under the rig unless it is a 2001 or later in which case the pump/reservoir and RGS are up in the front of the coach - - driver's side by the radiator. Earlier models look on the passenger side of the tranny next to the frame rail, but slightly aft of the tranny itself. You should see the reservoir easily but will probably have to remove a sheet metal plate to see the AutoPark mechanism and the RGS. It looks like this:**

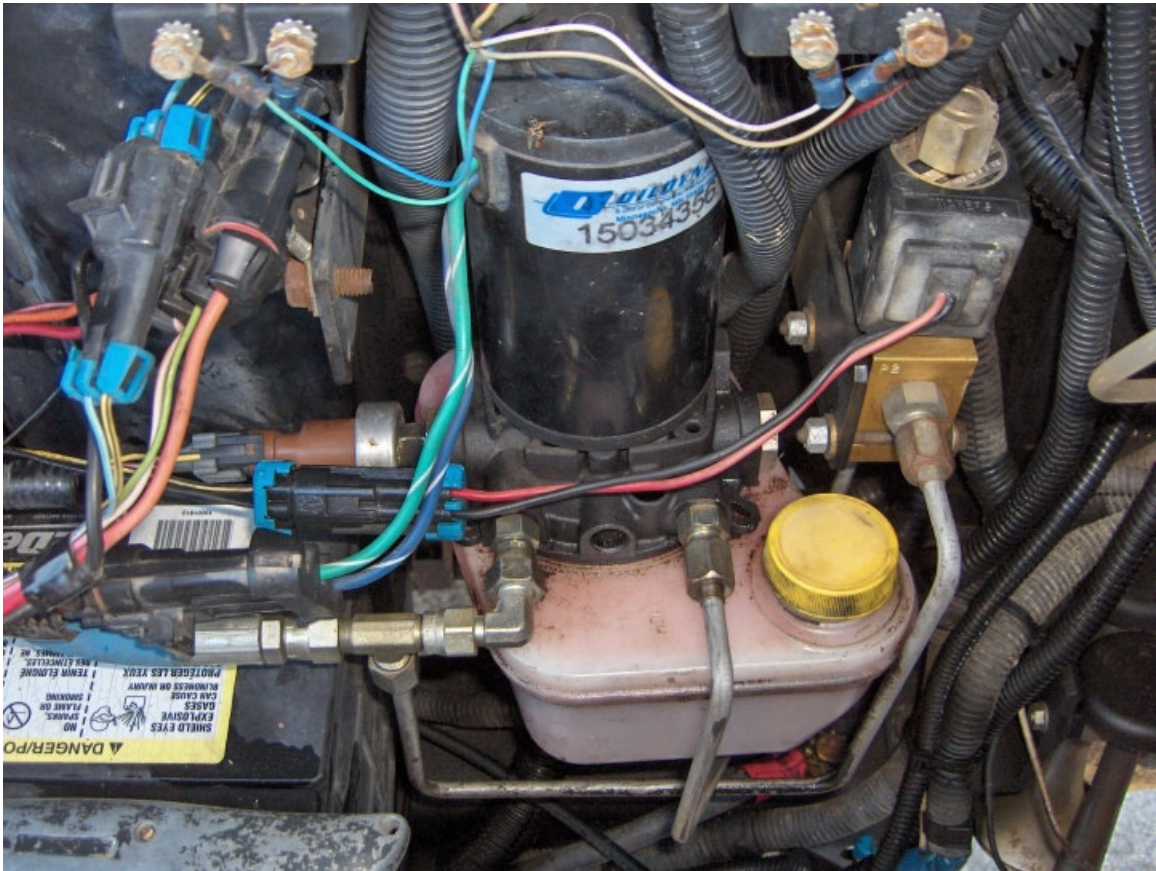


With the lid removed, the Goodie Box will look much like this inside:



This particular picture is of a 95 version. The newer units have a plastic reservoir but the general layout is much the same.

If you have the later version with the pump located up front under the utility hood, to the driver side of the radiator, it will look more like this:





Below is a picture of the less common MTE pump used in a few of the Version III AutoPark systems. It performs the same function as the Parker/Oildyne pump, but we believe the Parker to be a more reliable unit.



Notice that the newer version (of the Parker pump) has a Rotten Brown Switch instead of a Rotten Green Switch. If your pump does NOT look like the first picture, you may have the Pump/motor that is made by MTE - - (second picture). Both the Oildyne and the MTE perform the same functions.

For the test itself:

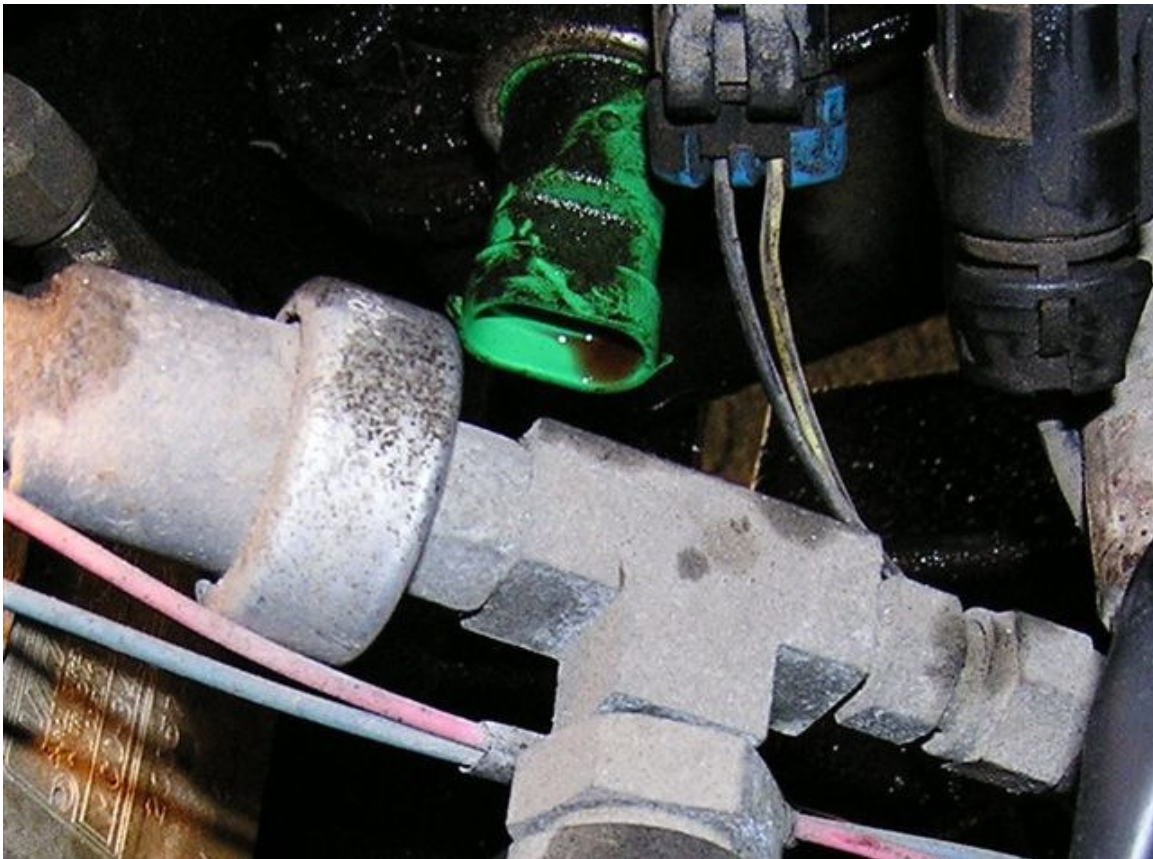
**Turn ignition on but don't start engine. Leave engine OFF for entire test.**

**On the later Version III models, make sure yellow dash button is IN while performing the test.**

**With shift selector in PARK. AutoPark lite should be ON. Contact me if not.**

**Move shift selector out of PARK. If AutoPark lite goes on and STAYS on, you may very likely have a bad RGS. A good RGS would normally run the pump AND the AutoPark lite for a few seconds and then stop - - The lite would go out when the pump stops.**

**If the AutoPark lite stays ON, and especially if the pump does not shut off, locate RGS and see if it is oily. Pull the wire connector off of the RGS, and see if there is oil inside the connector. If there is, you need check no further - - it is bad. Here is a picture of a leaking/oily RGS:**



Even if the RGS is NOT OILY, you will still want to remove the electrical connector from it. If AutoPark lite GOES OFF after disconnecting the plug on the RGS (ignition still ON), then you have confirmed that the RGS is bad.

Even with RGS disconnected, the AutoPark lite should be ON with shift selector in PARK position. A totally different switch (not the RGS) turns on the AutoPark lite when the shift lever is in PARK. That different switch is called simply "The Light Switch." We have a separate test to confirm its condition.

## ROTTEN GREEN SWITCH **INSTALLATION WARNING** -- READ CAREFULLY

This is the second generation of this particular memo. We have had only a few cases involving this issue but believe our analysis to be sound, and important enough that anyone installing a new Rotten Green Switch (pressure maintenance switch) should be advised of a potential problem.

The RGS threads into a piece that looks somewhat like a pipe reducer. We call it a "poppet valve hex reducer." For short, the PVHR. One end of the PVHR has a 3/8 24 female thread the RGS screws into. The other (male) end screws into the pump body itself -- not a pipe thread I'm told. Several people have said that they bugged the female thread in the PVHR (which accepts the RGS) in the process of installing the new RGS -- and have thus found it necessary to drill out the old threads, and re-tap the hole to something larger. Then, they made a newly threaded bushing to fit the RGS on one end, , and to fit the PVHR on the other. Sort of sounds like a Helicoil repair for those who are familiar with that process. At this point, we don't as yet know diameters or thread pitches -- just the basics of the repair.

The other potential problem in installation is as follows: This PVHR , described above as looking somewhat like a pipe reducer, retains a spring and poppet valve. Some of our forum members have reported that they were not aware of the presence of this small spring with a "button-like object" at the end of the spring *inside* this fitting -- In both cases, when they *removed* the

fitting to repair the threads, the spring fell (luckily) into their oil drip/catch pan, but they didn't know it at the time.

After installing the new RGS, and checking AutoPark function on both of these motorhomes, it was found that the AutoPark dashboard lite blinked on and off quite rapidly, and a click could be heard each time the light blinked. In both cases, this was cured when the spring/button was found in the drip pan, and properly re-installed. For those interested, the function of the poppet valve is to keep the system pressure from flowing *backwards* through the pump, after the pump stops running. Loss of the poppet or spring allows the pressure to rapidly escape back through the pump and results in the oscillation effect.

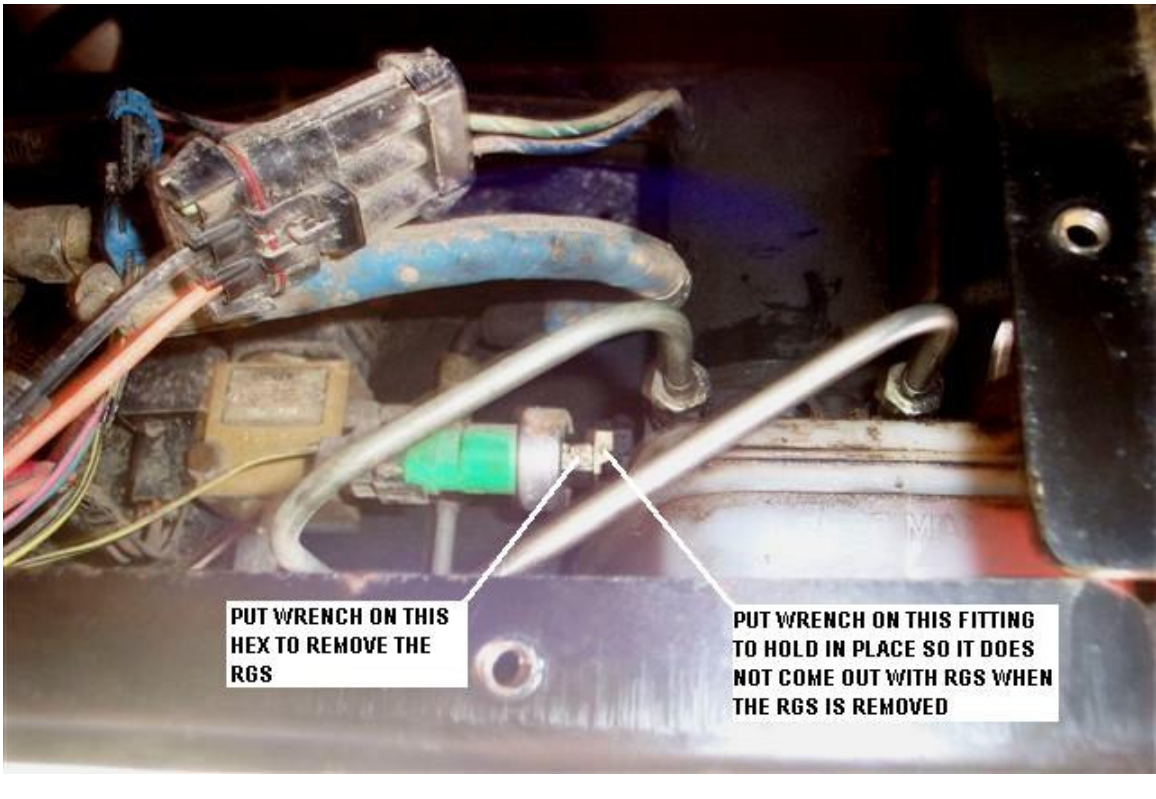
*Consequently, anyone replacing an RGS should be aware of the potential problem.* For whatever reason this hex valve fitting may be removed, the mechanic must be careful not to lose any of the parts of the poppet assembly. We do have an annotated picture of the system that shows and labels the RGS and the hex reducer. We also have (courtesy of the pump manufacturer), exploded views of the poppet assembly and corresponding part numbers, in the event someone should lose any of these pieces. The obvious way to avoid these miseries is to remove **ONLY** the RGS and **NOT** the hex reducer which retains the poppet assembly.

Anyone who encounters the rapid on/off cycling of the pump should suspect loss or malfunction of this poppet assembly. Let us know if you need further information on this subject.

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**We have attached a pair of pictures on the following page that help to explain the above problem. In the picture below, it is important to note that the shiny hex adapter is made of very soft material, and it is pretty easy to strip the threads by overtightening the RGS when threading it into the adapter.**

Z



The picture above shows the RGS installed - - screwed into the hex adapter which in turn is screwed into the pump base.

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Here is an online source for the RGS - - aka the pump motor switch. This source is reported to be a helpful place for other GM parts as well.

The GM part number is 15961566. It is stamped on the case. You can order it online at: <http://www.gm-auto-parts.com/>.

With the above part number, you should also be able to go to a decent auto parts store like NAPA or CarQuest, and have them order it on an overnite basis. They may need to know that this is a GM part number so they can do a cross-reference.

We realize that the above pages cover a lot of ground. They are a collection of several individually written memos, so they will have some duplication of content as well.

If you have any questions or comments concerning this material, please contact us.

The AutoPark Library is an all free, best effort sort of operation. We are here to help the best we can, but make no guarantees as to the accuracy of our information. If you have any doubts as to your ability to work on your own motorhome, we would advise you to seek competent help from a professional source.

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