CORVETTE TIPS AND TECHNIQUES

1958-1962 CORVETTE WINDSHIELD WASHER SYSTEM

The windshield washer system on these Corvettes was quite a product at the time it was introduced in the early 1950s.

Without the help of micro processors, and by an all mechanical system of vacuum, springs, check valves, links, tubing and the modern electric two speed windshield wiper motor, the process I will describe was quite successful.

The product was sold to General Motors and several other automobile manufacturers as a system. It was called the, “Coordinated Windshield Washer System” or CWWS, and it was designed and sold by Trico Corporation.

Here is how it works:

When the driver perceives the need to clean his or her windshield, and with the wipers off, it took only one touch of a button to start the entire process. The windshield wiper switch did not have to be turned on. The driver merely touched the button in the center of the wiper switch knob. With that single touch, the CWWS would first start the windshield wiper motor. Then it would start the flow of liquid to squirt from the two nozzles in coordination with the wiper movement. The squirting of the liquid would continue for several cycles of wiper movement. Then, after a pre-determined time, the washing cycle would cease, and the liquid would stop flowing.

The wipers would continue for several more swipes. This was called the “Dry cycle”. The timing of that cycle was adjustable with the turning of a small screw on the control valve. There was a small decal or label located on the top of the valve assembly that explained how to adjust the dry cycle.

After the dry cycle was complete, the CWWS would then turn off the wiper motor, and park the wiper blades at the lower edge of the windshield frame. This was all completed with the single touch of the washer button.

Today, such a complicated task could be easily achieved through the use of micro processors; but back in the 1950s, before those tiny computers were invented, the mechanical design of the CWWS was quite a remarkable achievement.

Because it is a mechanical system, it can be hampered by many simple things. Vacuum leaks in some of the hoses will cause a complete failure, or a partial failure of the system.

Having the hoses connected to the wrong nipples will certainly cause a failure to occur; and wear, breakage or contamination of the components will also cause a failure.

I have been surprised, however, at how many original valves still work when they are cleaned out and equipped with a new set of rubber hoses attached properly.

The several components are listed as follows:

The electric, two speed Trico windshield wiper motor is one of the primary parts of the system. The Coordinated valve, the valve located on the plastic lid to the washer reservoir, is another major part. It has four rubber hoses attached to it.
The Coupler, located up on the wiper motor, looks like a small tin can, similar to a 35 MM film can. It is connected to the linkage on the wiper motor slide switch where it is capable of turning on and off the electric wiper motor when it receives a vacuum signal from the main control valve. It has one small diameter hose attached to it.

The vacuum storage tank is another component. It is a metal can, similar to a one pound coffee can, with a small valve attached to it. That valve has two vacuum nipples, with rubber hoses connected them. The vacuum tank is usually mounted close to the reservoir and coordinated valve.

The wiper switch, located on the instrument panel is another component. It has the operating button on it, in the center of the wiper motor twist switch knob. This switch assembly has one small diameter vacuum hose attached to it, hidden under the dash.

There are more parts associated with the system including the bracket for the washer reservoir, the hoses, nozzles and various tie straps and rubber grommets.

The rubber hoses should be attached as follows:

The first hose is the engine vacuum source hose which is attached to the engine vacuum nipple on the one end and to the vacuum canister valve on the other. Since there are two nipples on the vacuum canister, you will need to determine which nipple receives the source hose. Fortunately, that is easy. Start with the vacuum canister valve free of any hoses, and use a spare section of vacuum hose as a means of testing. Attach the section of hose to one of the two nipples on the canister. Suck with your mouth and feel for the action of a check valve. Of the two nipples, one is an open passage into the vacuum canister, and the other one incorporates a spring loaded check valve. When you suck through the one with the check valve, you will feel the valve shudder slightly, indicating that you are attached to the one with the check valve. That is the one that must be attached to the engine vacuum source.

The next hose is the hose attached to the other nipple on the vacuum canister, the one that is open into the canister. That hose goes to the coordinated valve on the reservoir marked “Vacuum”.

Of the four hoses that are attached to the coordinated valve on the washer reservoir lid, two are larger in diameter, and two are smaller. We have already discussed one of the larger diameter hoses; the vacuum source hose. The other larger diameter hose is the “Water” hose. It is the hose that is connected to the coordinated valve nipple marked water, and travels through the firewall to a tee where it is divided into two smaller diameter hoses which deliver the liquid to the two washer nozzles.

That takes care of the two larger diameter hoses. The two small diameter hoses are attached as follows:

The hose from the small nipple marked “Control” goes through the firewall to the dash mounted wiper control switch knob. The hose marked “Coupler” goes to the small diameter device mounted on the wiper motor that I mentioned looked like a 35 MM film can. This is the hose that delivers vacuum to the coupler to turn on and off the electric wiper motor as needed. This is a simple overview of the system, and how it is connected

The following information should help as a check list to help diagnose problems with the system should it fail to work properly:

Firstly, it is important to check all of the components in the system to see that they are not damaged. The wiper motor should operate in both low and high speeds, and it should park the wiper blades when it has been turned off. The hoses must be inspected for cracks or splits and replaced as necessary before the system is operated. Of course, a check must be made to be certain that the hoses are connected properly, as outlined above.

One hint to avoid trouble is as follows:

When removing a rubber hose from the coordinated valve, you may find that it is stuck in place. Since some of the nipples on the coordinated valve are made of plastic, they are prone to break off under stress. This is a common problem. I recommend using a sharp razor blade to split the hose where it is attached, which will enable you to peel it off of the nipple with ease, thereby reducing the chance of breaking the nipple.

The operating valve, or control, on the dash is a simple valve which must hold a vacuum at all times; until the driver presses the button. Only at that time should the valve leak the vacuum in the hose attached to it. This momentary leak of vacuum in that hose is the signal that starts the system, causing it to operate through its complete cycle.

The coupler, mounted on the wiper motor, is also connected to the system with only one small diameter hose. When the control valve draws a vacuum at the coupler, it must slide the wiper motor operating switch to the on position, and hold it there throughout the entire washing and drying cycle. After the cycle is complete, the control valve stops the vacuum to the coupler, and the spring inside the coupler returns the wiper motor slide switch to the off position. Then, due to the parking linkage inside the wiper motor, and because the wiper motor has electrical power to it any time the ignition switch is in the on position, it will park the blades, ending the event.

The main part of the system, the washer reservoir with its lid containing the control valve, should be inspected, cleaned and filled prior to testing as follows:
Remove the assembly from its mounting bracket and open it for cleaning and inspection. Remove the rubber hose from the pump portion as mentioned above, using care not to break the plastic nipples. Note that the black plastic pump assembly is held together by a steel locking ring. Also, there are two arrows to show the relative positions of the two halves of the pump assembly. Having a helper hold the two sections of the pump together, carefully pry the lock ring out of its groove, which will allow the two halves to separate. Those two halves are under spring tension, and will want to push apart as soon as the lock ring has been removed, thus the need for an assistant.

Remove the two part piston assembly and spring, noting the relationship of the internal parts. Clean the parts with a good detergent, and look for any obvious damage. If it

looks good inside, reassemble the pump.
Inspect the water inlet at the lower end of the pump, looking for a fine mesh screen located inside the inlet opening. Be sure that the screen is open to allow water to flow.

During operation, a vacuum is directed from the control valve to the large diameter cylinder of the pump, causing the piston to move against the tension of a large spring. The movement of the piston, loads the spring, and simultaneously draws liquid into the smaller part of the cylinder through a one way valve, to be dispersed onto the windshield. When the large diameter vacuum piston reaches the top of the cylinder, a small signal valve is contacted, stopping the vacuum application. The spring, having been loaded by the force of the vacuum, pushes the water out of the nozzles and onto the windshield. The water cannot go back into the reservoir because of the one way valve, so it follows another open path, out of the valve, through the hoses and onto the windshield.