

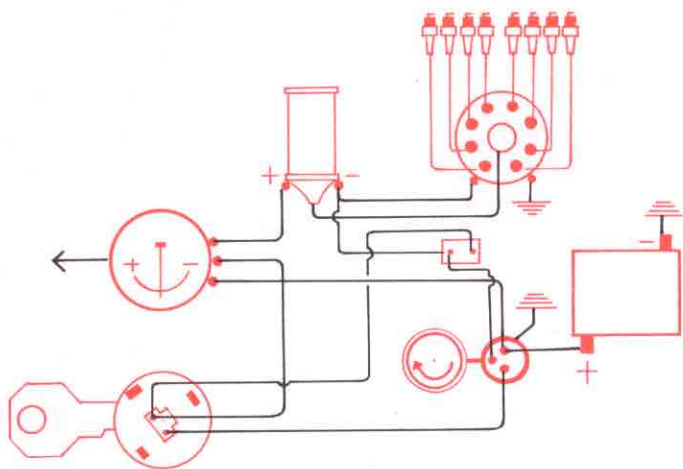
HEART OF CORVETTE

One of the least understood parts of a car is its electrical system. Top Corvette performance demands top electrical system condition.



WHY IT'S THERE

Starting the Corvette with a crank handle is a joy few owners would welcome. The ignition key makes this task much simpler, since starting is one of the basic purposes for a battery ignition system. Once the car starts, the generator charges the battery and the reserve current supplies ignition and all other electrical components.



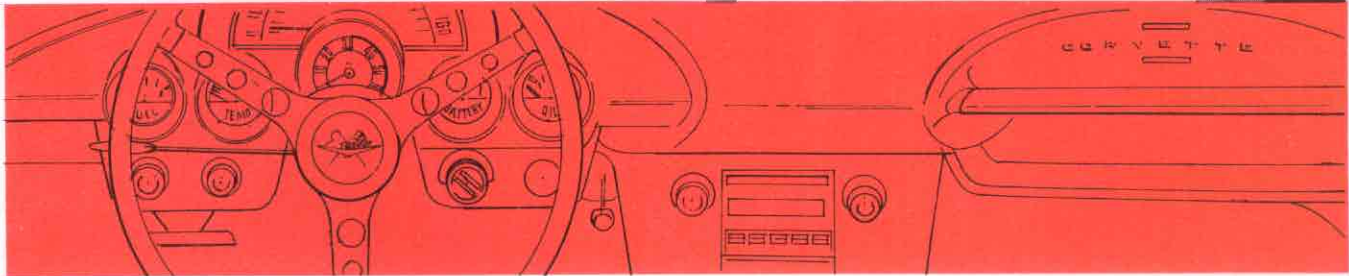
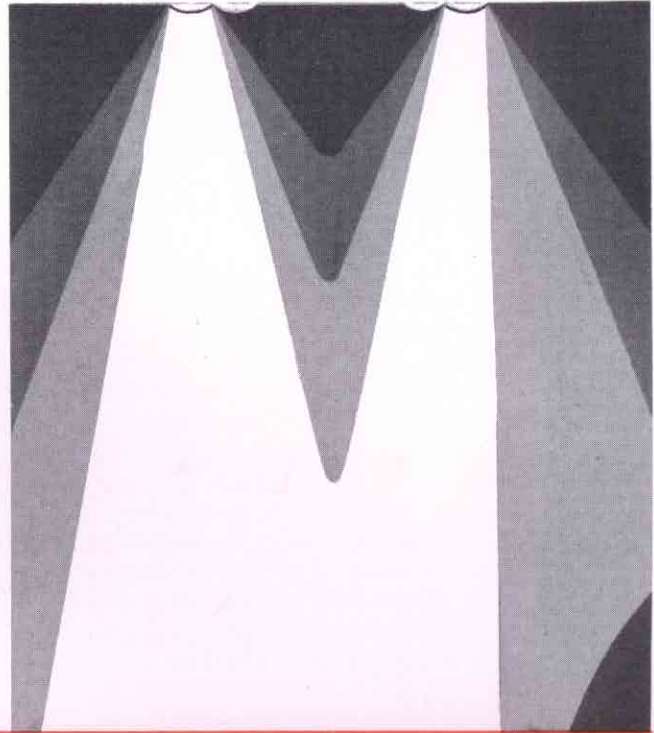
The ignition system. For starting, a battery, key starting switch, solenoid, and the starting motor operate momentarily. Corvettes are equipped with a Delco positive-shift starter that engages the starter gear before it cranks the engine for smooth, clash-free starts. The ignition—battery, coil, distributor, spark plugs, and wires—furnishes the spark to keep the engine running. A special ballast resistor, located under the hood, drops coil voltage for normal engine operation. During starting, the starter motor draws a very high amount of current from the battery. This current draw causes a voltage drop. For easier starting, the ballast resistor is bypassed allowing full battery voltage to enter the coil. After the engine starts, the key returns to "ON", and the ballast resistor is switched back in automatically.

The spark plugs are fired from the coil through the distributor cap. The lower half of the distributor contains the points, condenser, and timing advance mechanism. The action of the points opening and closing causes a high voltage to appear across the secondary winding of the coil. At the same time the rotor has connected the coil with a plug, a very high voltage—about 12,000 volts—fires the fuel charge in the cylinder. The condenser plays an important role in performance. What it does, primarily, is to prevent the coil from firing back through and burning and pitting the points. Exact condenser theory is beyond the scope of this article.

Road lights, signal lights, and interior lights are an integral part of the electrical system. Corvette's efficient 4-headlight system puts a safer pattern of light on the road on "low" beams, and an intense, far-reaching pattern on "high" beams. Parking and turn signal lights use a common wiring harness and lamps with two filaments as part of the lighting equipment. At the rear, the

lamps serve a dual purpose as taillights and as stop and direction signals. Laws in most states require that a red light stay on as long as the brakes are applied, warning following drivers of an intended stop. Further legal requirements make a license plate light necessary. Inside, the panel lights and optional courtesy lights are switch-controlled.

Lights at night. The improved four headlight system, standard on all Corvettes since 1958, replaced the two headlight system that was a compromise between low and high beams. In the two headlight system, both low- and high-beam elements can't be placed at the exact focal center of the reflector, and the high beams are favored over low. The result was less than satisfactory lighting on low beams. With the four headlight system, the outer two low beams are at the exact focal center improving the pattern and supplying a longer path of light on low beams. On high beam position, the inner lights come on, and the outer beams shift from "low" to "high". Since the inner lights are at focal center they throw the longest beam. The outer lights, also on "high" beams, but offset slightly from center-of-focus, act as "fill-in" light. Total high beam wattage available from the four light system is 150 watts—compared to 100 watts with the two headlight system. The four headlight system puts a brighter, more uniform, and more precisely aimed pattern of light on the road at night—both on low and high beams.



Instruments indicate engine performance. The fuel gauge operates from a sender unit located inside the tank. A reasonably calibrated gauge on the instrument panel indicates when it's time to fill 'er up. The "Temp" gauge operates from a sender unit located in the intake manifold water passage to a calibrated gauge on the instrument panel. The ammeter is connected in series with the ignition system and indicates a relative charge or discharge condition of the system. It does not indicate whether the battery is charged or even battery condition. It merely indicates the generator is supplying more current than the load requires, and how much. A voltage regulator prevents excessive overcharging that would damage the battery. Speedometer, odometer, tachometer, and oil pressure gauge are not electrically operated. The

clock is mechanically operated and electrically wound. Owners occasionally hear a "Thungggg" sound as the winding mechanism operates in the clock.

Other electrically operated items include 2-speed electric windshield wipers, horn, heater motor, radio, power windows, power top, courtesy lights, and emergency brake warning light. The power windows are fully electric, and the power top mechanism is a combination of an electrically driven pump and hydraulic cylinders. Owners with the power top mechanism will find it prudent to check the level of the fluid in the cylinders, keep everything clean and free of dirt and oil, and the electrical connections clean for smooth, consistent operation. Regular preventive maintenance will keep Corvette accessories operating properly.

ELECTRICAL TIPS

for top Corvette Performance

Battery—On cold winter mornings or rainy nights, it's no fun contending with a dead battery. Normally, the original equipment Delco battery should last some three years or longer. Follow these suggestions for best battery life:

- Keep it clean. Don't allow dirt to remain around the terminals. At regular intervals, it's good practice to clean the cable clamps and battery posts. This prevents dirt from causing high resistance leading to hard starting. Clean with a soda solution, and coat the terminals with grease or petroleum jelly.
- Make sure the battery hold-down bolts are tight. A loosely mounted battery might crack. The heat shield should always be installed with the battery.
- Keep the fluid in the cells up to the prescribed level, and use distilled water. Don't fill during freezing weather unless the car is driven to mix the solution. Hint: don't check the battery with an open flame. Hydrogen gas, produced by the battery, burns—*very* quickly.
- Driving a short distance can actually discharge the battery. If the charge is low, it is better to have it charged than to drive it a very short distance. When the battery is being charged, a slow charging rate is preferred to a quick or "surface" charge. Remember, a run-down battery *will* freeze.
- Be sure the fan belt is tightened to correct tension. A fan belt that's too loose will slip and not drive the generator. Too tight a fan belt will wear the generator bearings prematurely.

Ignition and its effect on performance

—Good spark plugs, points, condenser, coil and wiring keep Corvette performance tops. Normal operation will cause points and plugs to wear. Cleaning and adjusting restores the Corvette ignition to design performance. Hint: don't be fooled by "hot" coils, special spark plugs, and the like. Many of these so-called "hot performance" items are about as old as high button shoes, and will improve performance about as much. Delco coils are engineered to Corvette performance specifications, and are matched to specific engines. Correct wiring, kept

clean, correct heat range plugs and properly adjusted points will keep the Corvette engine at top efficiency and mileage. Owners are also advised against excessive timing advance—particularly on fuel injection engines. Trying to "road time" a fuel injection engine can easily cause conditions leading to total destruction. Use a timing light, dwell meter, and follow the published advance curve for each engine. If the ignition ballast resistor should burn out, the engine will start, then immediately die, because the circuit is open and no voltage reaches the coil. Replacing the unit will cure the trouble, if all else is operating properly.

Don't overload the generator—The Corvette generator has ample capacity to fully charge the battery with all factory installed accessories operating, even in cold weather, so long as the engine is operating at sufficient speed to charge and the fan belt is tight. Many owners like to add accessory lights, horns, and radio equipment for pleasure and safer driving. Before adding electrical items, determine the current drain of each. If the total current drain of all equipment plus accessories is less than the rating of the generator, it is probably safe to add the accessories. If, however, the current drain approaches 90 per cent of, or *exceeds* the generator rating stamped on the nameplate, it is best not to add the accessories, otherwise, replace the generator with a higher capacity unit. Remember, though, the voltage regulator is matched to generator output. If you change a generator to a *different* capacity, you must change the voltage regulator to match generator capacity. Check with your parts man at your dealer's to be sure. Such substitutions are not recommended by the Chevrolet Division and no warranty is issued or implied. To figure the current draw in amperes, divide the watt rating by 12 volts, (6 in early Corvettes) to determine the current rating. For instance, a 50-watt road lamp will require $\frac{50}{12}$ or 4.2 amperes to operate it fully at 12 volts.

Finally, keep all electrical contacts clean. A well cared for electrical system will operate for long periods of time with relatively little maintenance, adding fun and pleasure to Corvette driving.