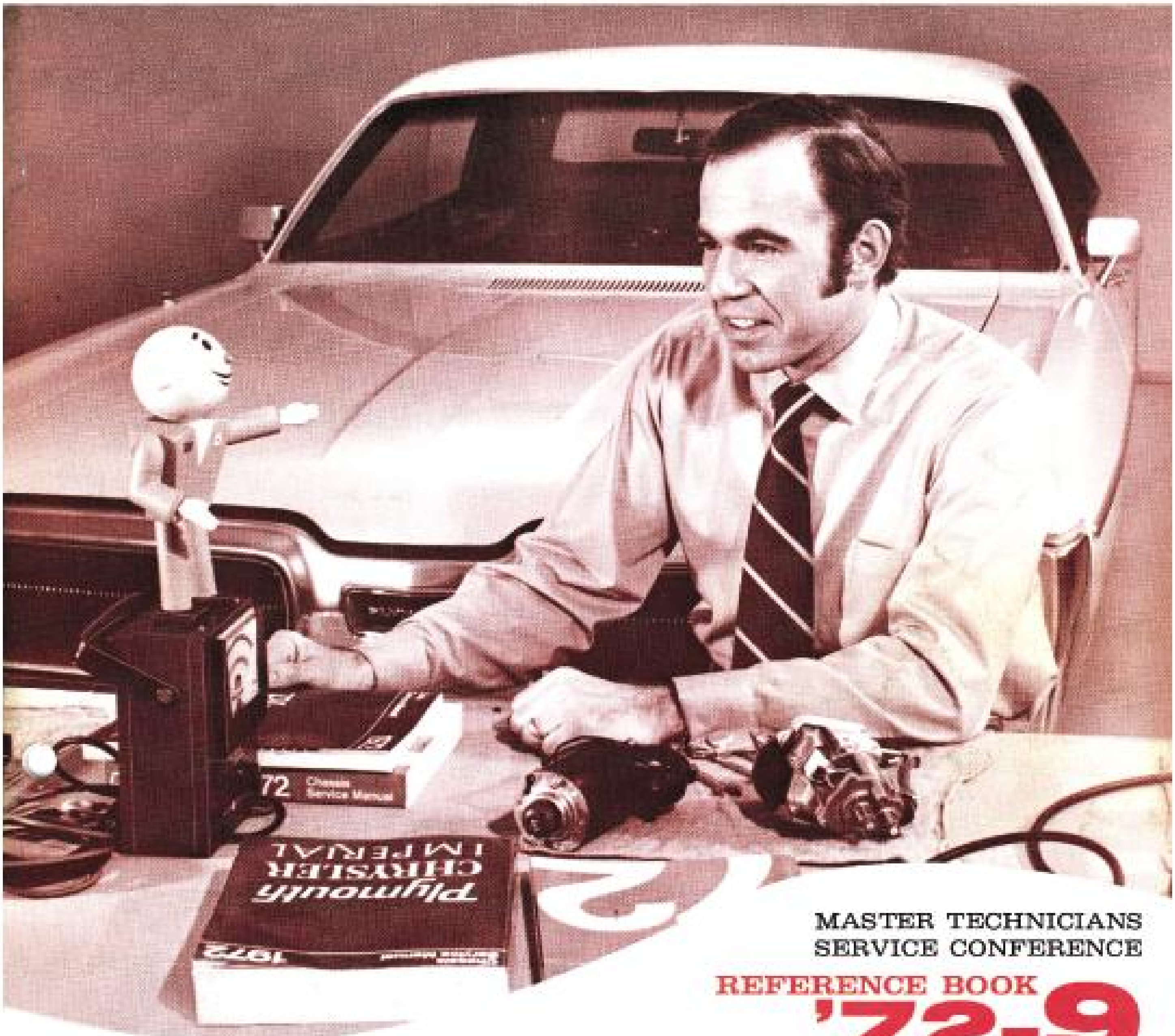


MASTER TECHNICIANS
SERVICE CONFERENCE

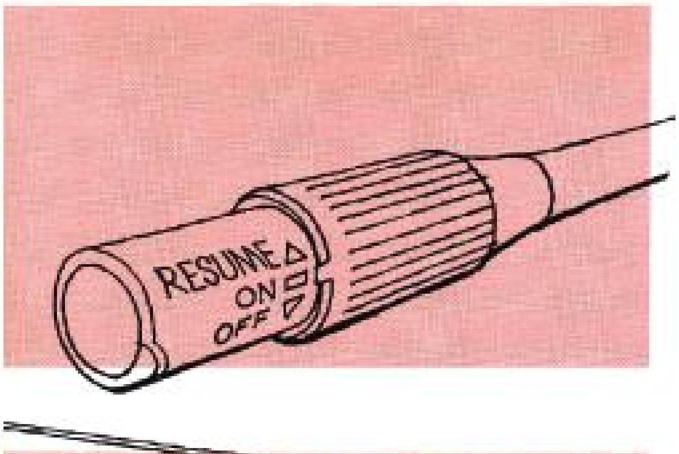
REFERENCE BOOK
'72-9

SPEED CONTROL & CONCEALED HEADLIGHTS

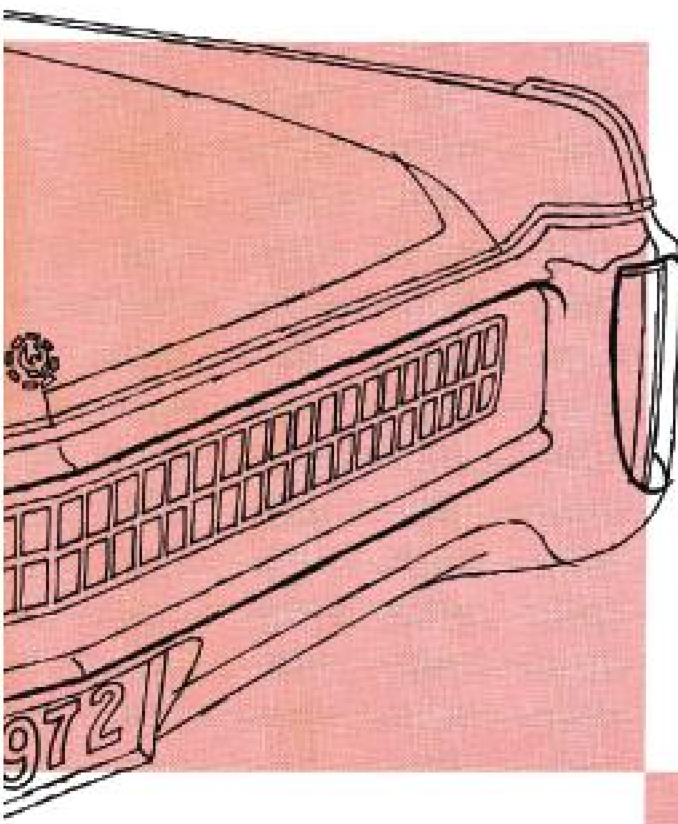
PLYMOUTH · DODGE · CHRYSLER · IMPERIAL · DODGE TRUCK

CHRYSLER
MOTORS CORPORATION

Things you never knew 'til now



Did you ever wonder how the speed-control system works? Chances are you never would be able to figure it out for yourself. Since the servo unit is serviced as an assembly, you probably have had no reason to disassemble one of them. Even if you did take the servo apart, the odds against understanding the internal and external circuitry are rather great. In other words, about the only way you'll understand how the speed-control system works is to have someone explain it to you. That's exactly what Tech has done in the first section of this Reference Book.



The operation of the concealed headlights is easier to figure out. There's nothing difficult about understanding how a reversing electric motor is used to open and close a pair of headlight doors. However, understanding the operation of the limit switches built into the motor and the circuitry through the concealed headlight relay is a bit more of a challenge. So, Tech has devoted the second section of this book to explaining the mechanical and electrical operation of concealed headlights.

Tech is sure that you will find both systems covered in this month's Reference Book interesting as well as useful. Understanding how a system is supposed to work is half the diagnosis battle. If you know what is supposed to happen when the system is working correctly, it's a lot easier to figure out the probable cause of trouble when it starts acting up.

TABLE OF CONTENTS

THE SPEED-CONTROL SYSTEM

The present speed-control system has been an increasingly popular option on some models of Chrysler Corporation's cars and trucks. Since you are going to be seeing and servicing more of these units from now on, this seems to be a good time to explain how the system works and what goes on inside the speed control unit. Although the servo is presently serviced only as a complete assembly, understanding how it works will help you diagnose and correct any problems that may develop.

Introduction to the System

The speed-control system consists of several units. The driver's controls are built into the turn-signal lever. The heart of the system is the servo assembly. The speedometer cable provides speed input and a carburetor cable connects the servo to the carburetor throttle. A separate switch, built into the stoplight switch assembly, completes the system.

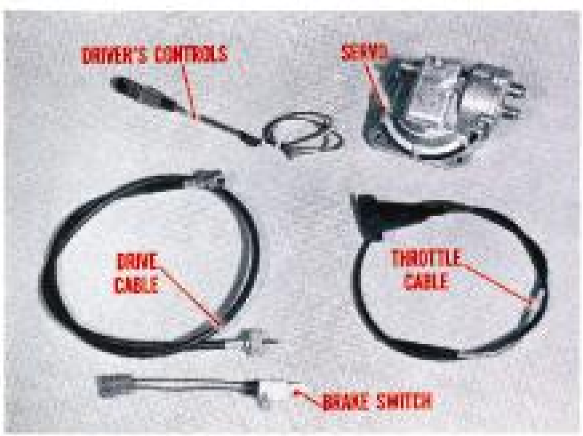


Fig. 1—Speed-control system components

THE TRANSMISSION GIVES THE ORDERS

The servo unit is connected by a speedometer cable to the speedometer drive at the transmission. Thus car speed provides the system with the speed signal required to cause the system to react to changes in vehicle speed. The servo unit also functions as a

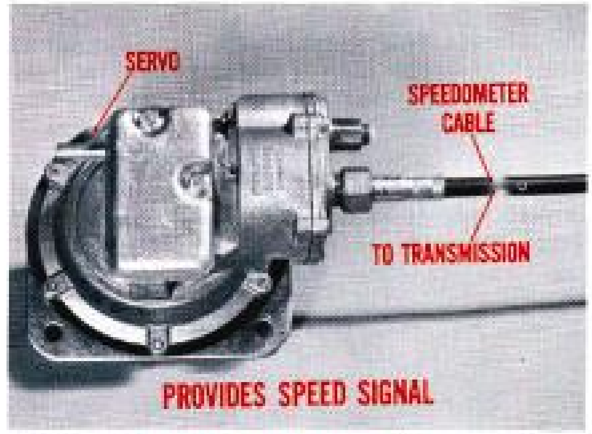


Fig. 2—The servo is connected to the transmission

transfer case so that a second speedometer cable can be connected from the servo unit to the speedometer head. The transfer gear in the servo unit provides a practical means of adapting the speed-control system to any vehicle but does not enter into the operation of the speed-control system in any way. Therefore, it will not be shown in the simplified illustrations used to explain the operation of the servo.

VACUUM PROVIDES THE MUSCLE

A vacuum hose connects the servo to manifold

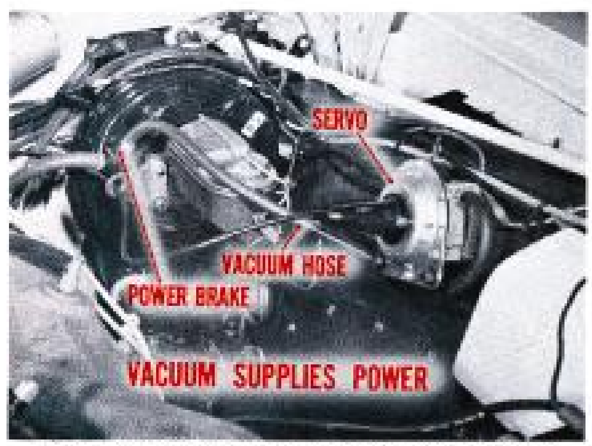


Fig. 3—Manifold vacuum advances carburetor throttle

vacuum. This connection is actually made at the power brake booster. Engine, or intake manifold vacuum, supplies the system with the power required to advance the carburetor throttle when more power is called for to maintain selected vehicle speed. A flexible throttle cable linkage connects the servo to the carburetor throttle lever.

THE DRIVER IS THE BOSS

The combination speed control and turn-signal lever contains the electric switches the driver uses to operate the system. The control ring is used to turn the system "ON" and "OFF" as well as to order the vehicle to "RESUME" speed after the brakes have been applied. The speed-set button is used to lock the system into the speed selected by the driver.

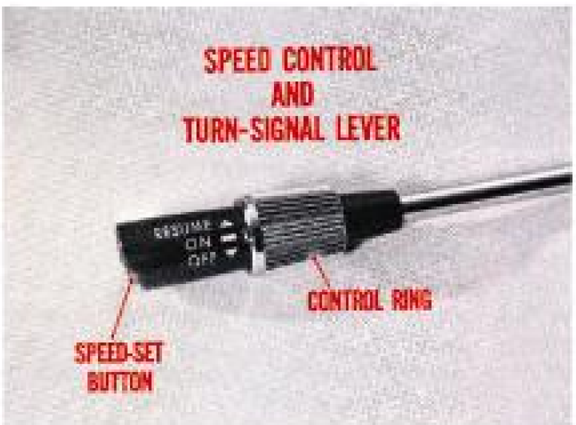


Fig. 4—Turn-signal lever contains the control switches

THE FOOT BRAKE HAS VETO POWER

A combination stoplight and brake release switch is

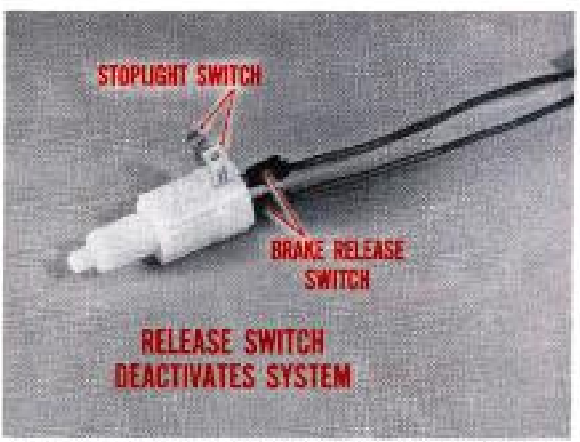


Fig. 5—Combination stop light and brake release switch

connected to one of the solenoids in the servo. The brake release switch circuit deactivates the speed control system when the driver pushes on the brake pedal. This is an important safety feature which immediately restores to the driver complete control of vehicle speed. As you will see later, this is accomplished without "erasing" the "memory" of the speed previously selected by the driver. This feature allows the system to resume the speed previously selected by turning the control ring to the "RESUME" position and then releasing it.

Understanding the Servo and the Circuits

So far we have provided a quick orientation to the parts that are easily seen. But, in order to understand how the system works, it is necessary to know what goes on inside the servo assembly.

CONSIDER THE SERVO DIAPHRAGM

When intake manifold vacuum is applied to the servo diaphragm, it pulls on the cable connected to the carburetor throttle. That's how engine vacuum supplies the force needed to open the throttle and maintain car speed. Next, a device is needed to control the amount of vacuum pulling on the diaphragm so that the throttle won't be advanced when it should be retarded . . . and vice versa.

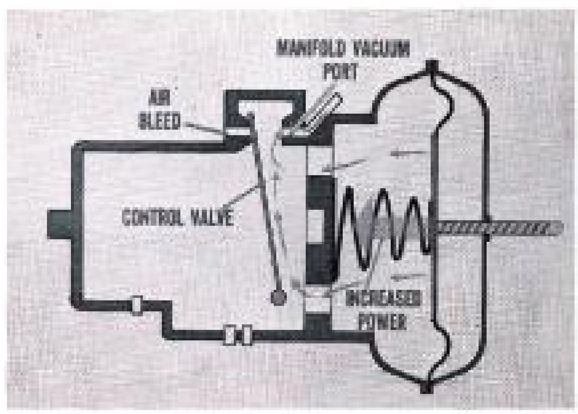


Fig. 6—Vacuum control valve closes air bleed

Vacuum is controlled by an air bleed, a vacuum control valve and an intake manifold vacuum port. Figure 6 illustrates the condition in which the valve is shutting off the air bleed so that manifold vacuum is exerting maximum pull on the diaphragm. This advances the throttle and provides the increased engine power needed to maintain car speed under a load condition.

SOMETIMES THE AIR BLEED IS OPEN

Figure 7 represents a condition where the air bleed is open to atmosphere. The valve has moved over and manifold vacuum is shut off. Opening the air bleed dumps the vacuum so there is no pull on the diaphragm and the throttle return spring moves the throttle toward the closed position.

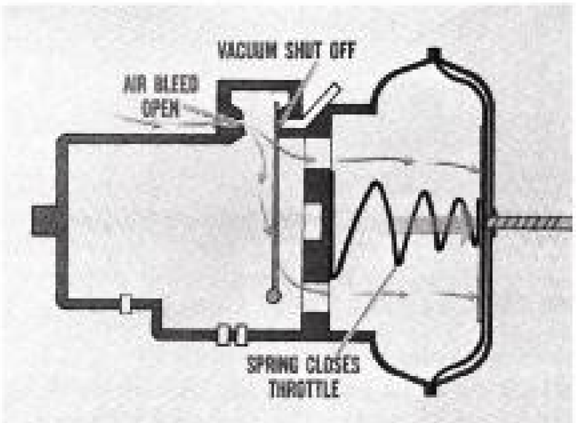


Fig. 7—Vacuum control valve closes vacuum port

Under level road-load conditions, the valve simply modulates the vacuum applied to the diaphragm. That is, it is positioned between the air bleed and the manifold vacuum port. If a little more power is needed to maintain speed, the valve is moved closer to the air bleed. The valve moves closer to the vacuum port to prevent overspeeding.

A GOVERNOR REACTS TO CAR SPEED

A flyweight governor is used to control the position of the vacuum valve. The governor is driven by the speedometer cable. As the flyweights are turned faster, centrifugal force moves them outward.

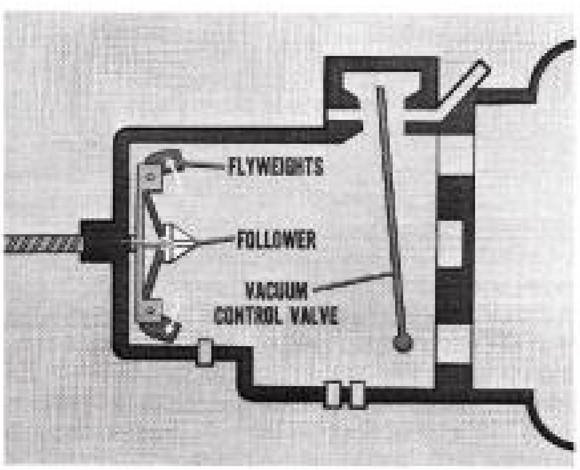


Fig. 8—Flyweight governor driven by speedometer cable

As car speed increases, a follower at the center of the governor is pushed outward by the flyweights . . . to the right in Figure 8. All that is now needed is a way of connecting the governor to the vacuum control valve so that car speed will determine the position of the valve.

THE GOVERNOR MOVES THE CORE OF AN ELECTROMAGNET

The governor follower pushes against the core of an electromagnetic locking coil. This core extends through coil and the vacuum control valve *but is not attached to either of them.* The other end of the core pushes against a governor spring so that the core is balanced between the push of the governor and the resistance of the spring.

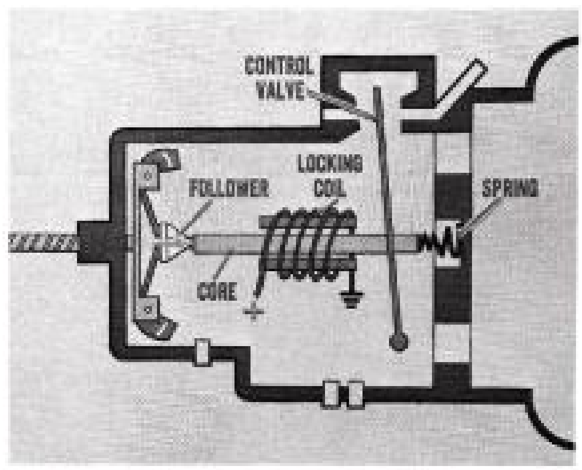


Fig. 9—Core of electromagnet not connected to valve

For every car speed, the governor positions the core in a definite position with respect to the vacuum valve. In other words, as long as the system is not turned on, the core moves to the right as car speed increases . . . to the left as speed decreases as illustrated in Fig. 9.

CONNECTING THE CORE TO THE VALVE

The armature of the electromagnet is connected to the control valve by a pivot device. Figure 10 shows the relationship of the armature to the valve. The locking coil has not been energized so the armature is in the released position and the core of the magnet is still free to float or move through the valve without affecting valve position.

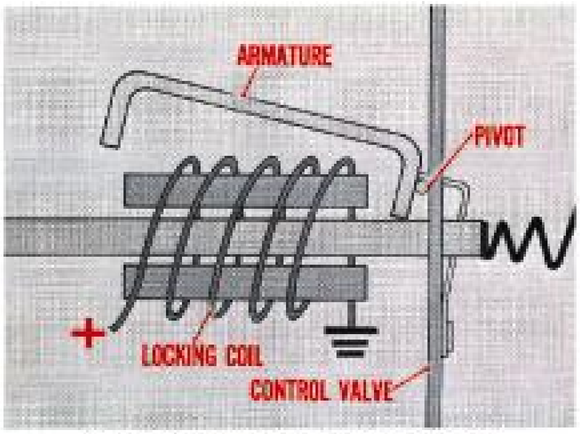


Fig. 10—Armature in the released position

WHEN THE LOCKING COIL IS ENERGIZED

When the locking coil is energized, the magnetic field pulls the armature down against the core. In this position the armature locks the core and valve together.

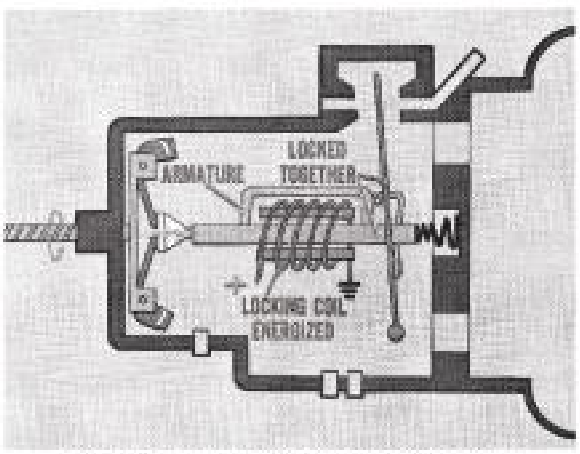


Fig. 11—Armature in the "locked-in" position

The servo is now "locked-in" to the speed selected by the driver. Since the core and vacuum valve are locked together, the governor now controls the position of the valve to maintain selected car speed.

IF THE CAR SLOWS DOWN

If car speed is reduced, the governor backs off and the governor spring pushes the core armature and vacuum valve to the left . . . ever so slightly. The valve is positioned against or much closer to the air bleed and away from the vacuum port. This results in more pull on the diaphragm and the throttle is

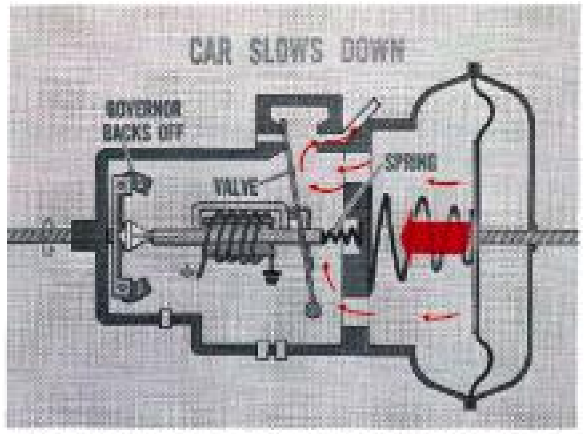


Fig. 12—Vacuum pull on diaphragm maintains car speed

opened enough to maintain the speed selected by the driver.

IF THE CAR SPEEDS UP

If the car trys to overspeed on a downgrade, the governor pushes the valve away from the air bleed and against the vacuum port. As a result, there is little or no pull on the diaphragm and the throttle return spring moves the throttle toward the closed position.

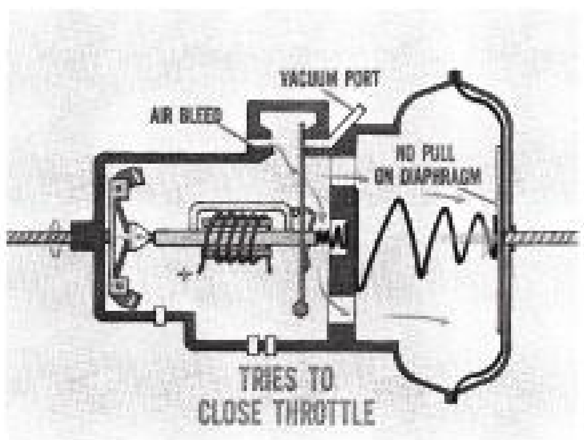


Fig. 13—Throttle return spring retards throttle

APPLYING BRAKES DUMPS THE VACUUM

A solenoid-operated brake release valve is built into the vacuum chamber of the servo. This is a spring-loaded valve. The spring holds the valve in the *open* position. The open valve uncovers a large air bleed port. With this port open, manifold vacuum is dumped and there is no pull on the diaphragm or the throttle.

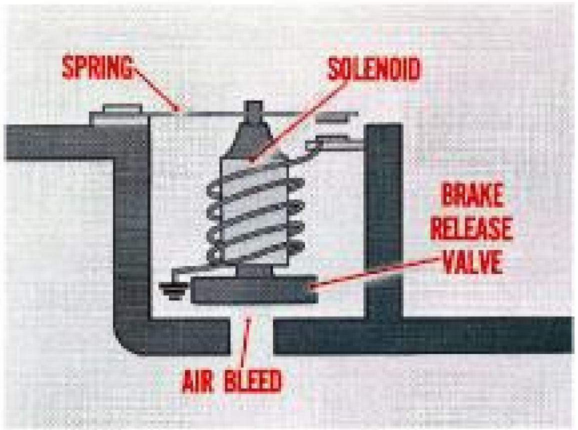


Fig. 14—Brake release valve controls air bleed port

HOLDING COIL CLOSES AIR BLEED PORT

When the brake valve holding coil is energized, the valve is pulled downward against spring pressure, closing the air bleed port. The air bleed port must be closed before the system can take over to control car speed.

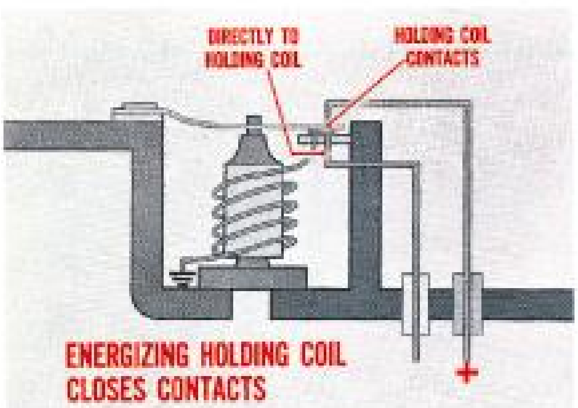


Fig. 15—Two feed connections to holding coil

There are two electrical feed connections to the holding coil. One feed goes directly to the coil. The other circuit is connected through a set of holding coil contacts. Those contacts are open when the valve is open. They are automatically closed by energizing the holding coil and closing the brake release valve. Once the holding coil contacts are closed, they provide the holding circuit that keeps the holding coil energized and the brake release valve closed.

THE BRAKE RELEASE SWITCH

The brake release switch does not release the brakes . . . it does deactivate the speed-control system when the brakes are applied. The brake release switch, built into the stoplight switch, is connected in series with the holding coil contacts and the holding coil. The brake release switch remains closed as long as the brake pedal is in the released position.

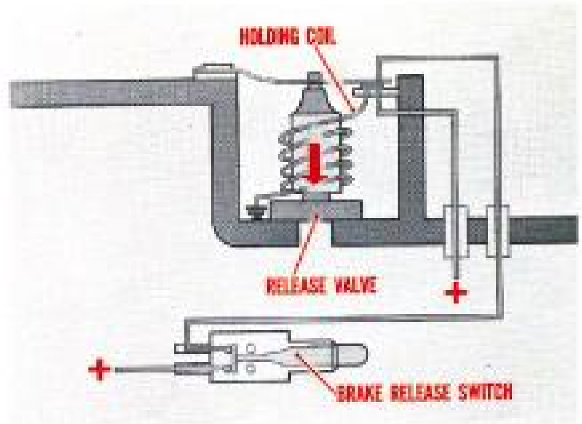


Fig. 16—Brake release switch is normally closed

Stepping on the brakes opens the brake release switch contacts. This opens the circuit to the brake holding coil. The brake release valve spring opens the holding coil contacts and the brake release valve. Vacuum is immediately dumped from the servo vacuum chamber and there is no longer any pull on the diaphragm or the throttle cable.

Understanding the Operating Circuits

As you can see, the armature *locking coil* and the brake release valve *holding coil* control the operation of the servo assembly. Next, let's consider the external operating switches which control the circuits which feed these two coils. These switches are part of the turn-signal lever assembly.

In the illustrations which follow, these switches are represented schematically rather than realistically. So, don't take a turn-signal assembly apart and expect the switches to look like the ones in our schematic wiring diagrams.

SPEED CONTROL RING IN "ON" POSITION

Turning the speed control ring to the "ON" position completes a circuit to locking coil. The locking coil is energized and the armature locks the core and vacuum valve together. At the same time,

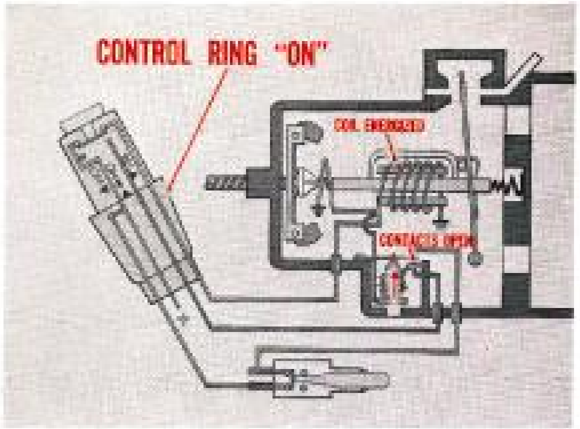


Fig. 17—Control ring turned from "OFF" to "ON"

a circuit is also completed to one of the holding coil contacts. However, since the holding coil contacts are open, there is no circuit to the holding coil and the brake release valve remains open.

SPEED-SET BUTTON PUSHED IN

Pushing the speed-set button in even momentarily closes a circuit which energizes the *holding coil*. The pull of the holding coil closes the brake release valve and this in turn closes the holding coil contacts. In other words, this establishes a separate feed circuit to the *holding coil*.

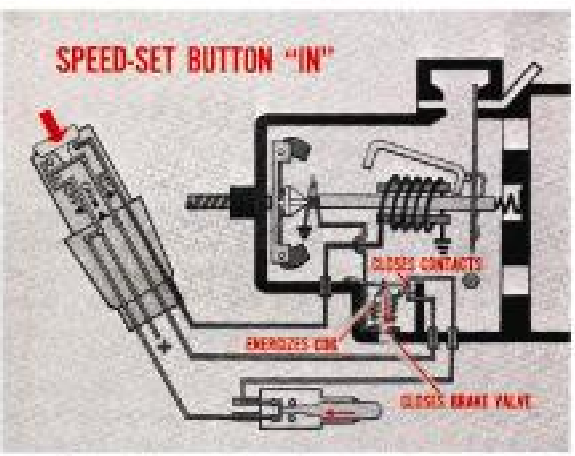


Fig. 18—Holding coil energized . . . valve closed

Pushing the speed-set button also interrupts the circuit to the armature *locking coil*. This causes the armature to release the core so that the governor can push it into the correct position for the speed selected. So now the vacuum chamber is closed and a definite control speed has been selected.

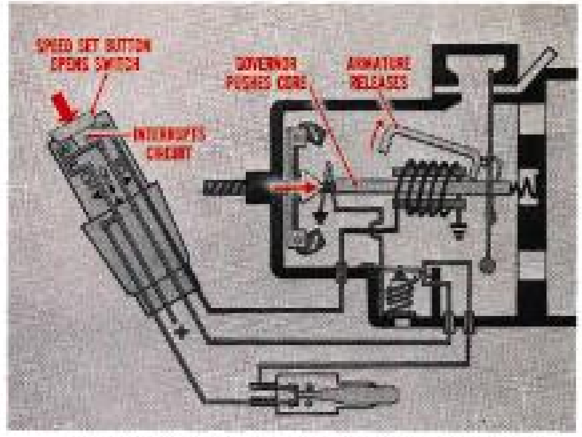


Fig. 19—Armature releases the core of the magnet

SPEED-SET BUTTON RELEASED

To select a speed, the driver pushes the speed-set button in and then immediately releases it. When the speed-set button is released, the circuit to the *locking coil* is closed and the coil is again energized. The armature is pulled down against the core and the system is locked in at the speed selected.

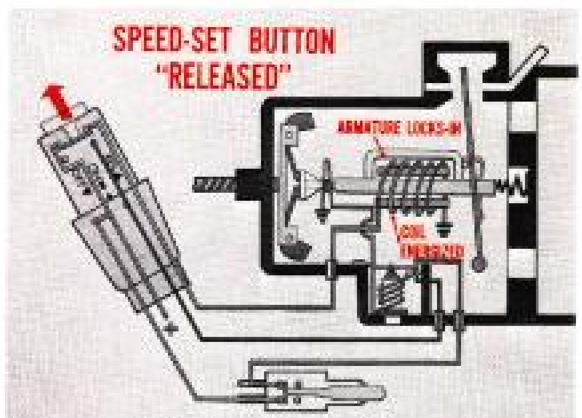


Fig. 20—Releasing the button establishes speed control

Releasing the speed-set button interrupts the direct circuit to the brake release valve *holding coil*. However, the closed holding coil contacts maintain a circuit to the holding coil so it is still energized and the brake release valve remains closed. The governor and the vacuum valve take over to maintain vehicle speed.

SOMETIMES THE ARMATURE NUDGES THE CORE

Some owners have discovered that speed can sometimes be increased a few miles an hour by simply

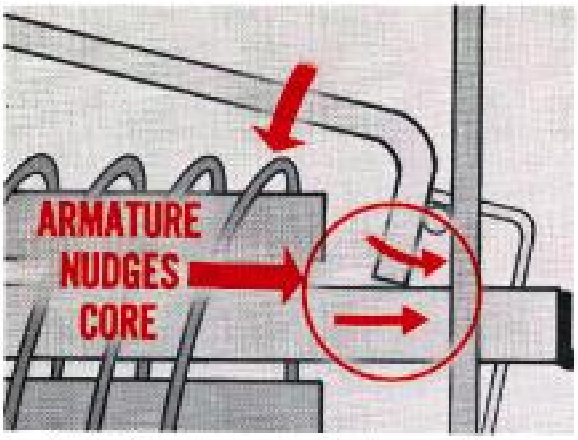


Fig. 21—Armature movement causes a speed increase

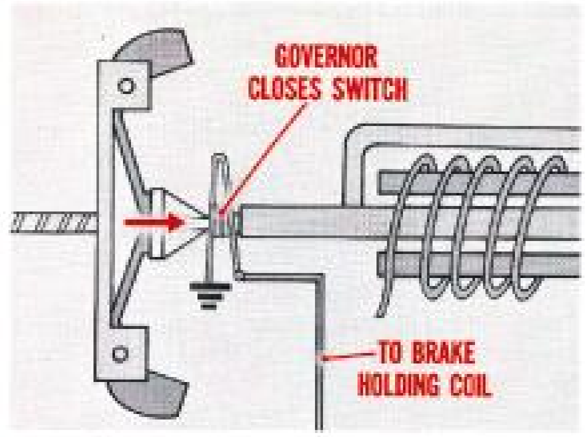


Fig. 22—Ground switch closed by governor

tapping and then releasing the speed-set button. Whether or not this occurs depends upon the tolerances between the armature and the core. In other words, it is not a design feature and it may occur on some models but not on others. But let us explain what happens when tapping the speed-set button does cause a slight speed increase.

The speed increase is caused by the up and down movement of the armature. When the speed-set button is pushed, the armature moves upward releasing the core. When the set button is released, the armature is pulled down against the core again. The end of the armature nearest the vacuum valve nudges the core to the right before it locks the core and the valve together. This establishes a new core position and results in a slight increase in the controlled speed.

On all cars the driver can establish a lower controlled speed without touching the brake or the accelerator. All he has to do is hold the speed-set button in until the car slows down to the desired speed and release the button. When the button is released, the armature will lock the system in at the lower speed.

LOW-SPEED LOCKOUT SWITCH

The ground for the brake release valve holding coil is through a ground switch that is built into the servo and controlled by the governor. The switch actually fits between the governor follower and the core of the locking coil.

The ground switch remains open until the vehicle is moving approximately 30 m.p.h. At this speed governor movement closes the switch, completing the ground circuit for the holding coil. In other words, the holding coil cannot be energized and the brake release valve cannot be closed at low speeds. This is a safety feature which prevents the system from locking in at slow traffic speeds.

The present low-speed switch is of the snap-action type. It "snaps" closed at about 30 m.p.h. However, if vehicle speed drops below 30 m.p.h., the switch does not open immediately. Under severe grade or load conditions this allows the system to retain control as speed drops off. In other words, the lock-in speed is higher than the lock-out speed. This feature insures smoother speed control in the low-speed range.

THE "RESUME" SPEED CIRCUITS

The resume-speed feature lets the driver order the control unit to take the car back up to the previously selected speed after he has stepped on and

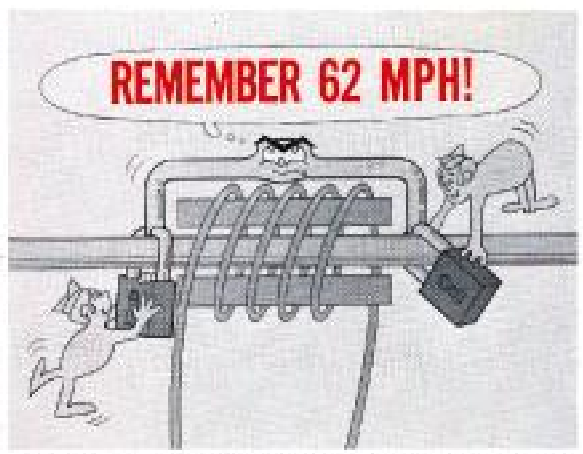


Fig. 23—Applying brakes does not erase speed "memory"

then released the brakes. Applying the brakes opens the circuit to the brake release valve holding coil. The spring opens the valve. This dumps the vacuum from the servo chamber, the throttle closes and the car slows down. Stepping on the brakes does *not* interrupt the circuit to the *locking coil* and the armature remains locked to the core. The core stays put and "remembers" the speed selected when the brakes are applied.

Turning the control ring to the RESUME position completes a circuit to the *holding coil*. This circuit energizes the *holding coil*, the brake release valve is pulled into the closed position and the holding coil contacts are closed.

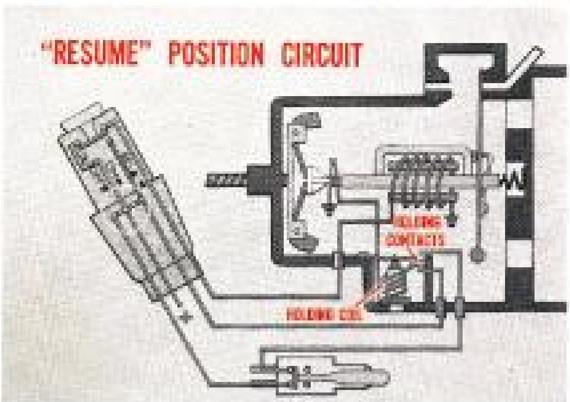


Fig. 24—Resume circuit energizes the holding coil

When the RESUME ring is released, the direct circuit to the holding coil is interrupted. However, the circuit through the brake release switch and holding coil contacts keeps the holding coil energized and the brake release valve closed.

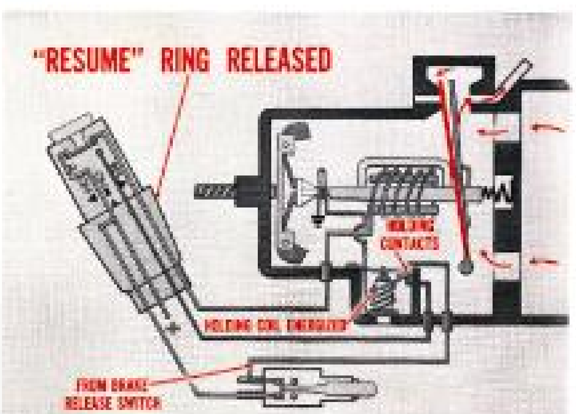


Fig. 25—Vacuum advances throttle to selected speed

As soon as the brake air bleed is closed, manifold vacuum takes over and advances the throttle so that the car accelerates to the previously selected speed. When this speed is obtained, the system "remembers" and the governor controls the valve to modulate vacuum applied to the diaphragm to maintain the speed selected.

Service and Adjustments

There are only three speed-control adjustments but each of these adjustments is essential to the proper operation of the system. Adjustments, diagnosis and circuit troubleshooting are covered in the Service Manuals. However, service adjustments are repeated here so that they will be readily available to you when working on a speed-control-equipped car.

SERVO LOCK-IN SPEED ADJUSTMENT

The lock-in screw adjustment controls the accuracy of the speed-control unit. This screw must never be adjusted indiscriminately and it must be recognized that several things other than the lock-in screw can cause erratic speed control. For example, poor engine performance, an abnormally heavy load such as a big trailer or the incorrect adjustment of the throttle control cable.

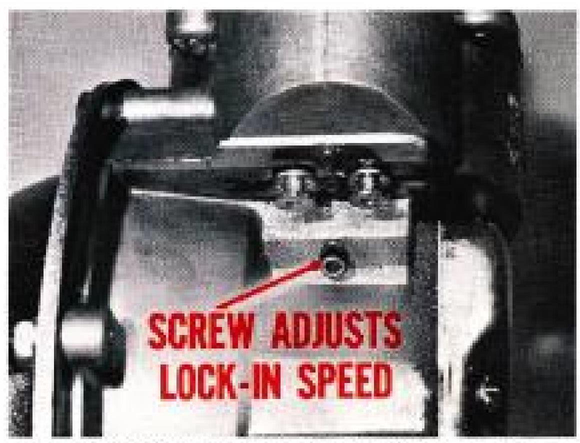


Fig. 26—Screw adjusts accuracy of lock-in speed

If speed sags (drops more than 2 or 3 m.p.h. from speed selected) and none of the foregoing contributing causes exist, the lock-in screw should be turned counterclockwise to correct the condition. If there is a distinct pull-up (speed increase of more than 2 or 3 m.p.h.), turn the lock-in screw clockwise. Each quarter turn of the screw in either direction will change the lock-in speed approximately one m.p.h.

CAUTION: The lock-in screw must not be turned more than 2 turns in either direction. Turning the screw more than 2 turns may damage the servo unit. If the lock-in screw is loose and does not hold its adjustment, use a small prick punch to stake the servo housing adjacent to the screw to insure a snug fit.

HANDS OFF THOSE TINY SCREWS

There are two very small set screws quite close to the larger lock-in screw. These screws are used in production to calibrate the low-speed switch. After being properly adjusted at the factory, they are sealed . . . usually with a red compound. *These screws must not be adjusted in service, so keep hands off!*

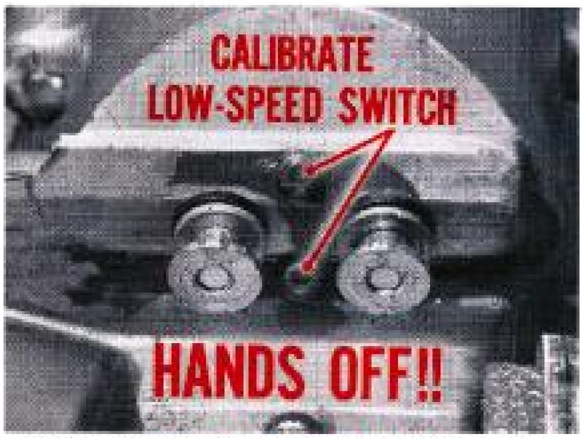


Fig. 27—Do not adjust these sealed calibration screws

SPEED-CONTROL THROTTLE CABLE ADJUSTMENT

At curb idle there should be 1/16" free play between the eye of the speed-control throttle cable and the throttle lever pin. Lack of free play will keep the throttle from returning to idle. Too much free play will cause inaccurate lock-in and erratic speed control.

Loosen the speed-control cable clamp bolt. Insert a 1/16" gauge between the forward end of the elongated cable eye and the throttle lever pin. With the choke in the fully open position and the carburetor at curb idle, pull the speed-control throttle cable rearward until all free play is removed. Do this carefully so that free play is removed without moving the throttle lever from the curb idle position.

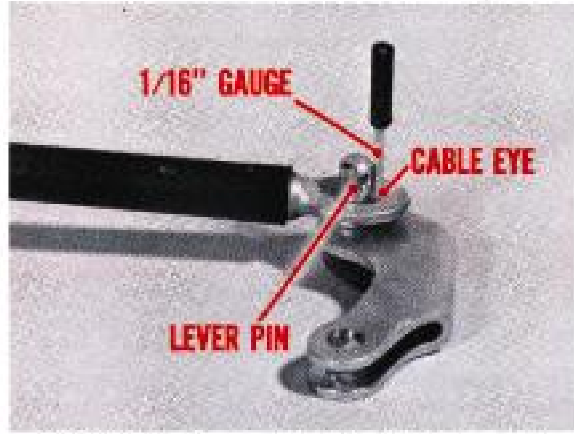


Fig. 28—Correct control cable free play is important

Tighten the throttle cable clamp bolt to 45 inch-pounds.

STOPLIGHT AND BRAKE RELEASE SWITCH ADJUSTMENT

The third adjustment is at the combination stoplight and brake release switch. This switch must be positioned so that less than 1/2" of brake pedal movement will turn the control system off.

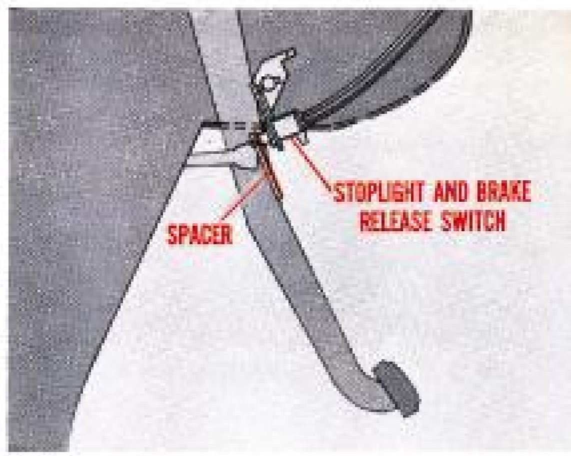


Fig. 29—Stop light and brake release switch adjustment

Correct brake release switch adjustment is determined by establishing the correct spacing between the end of the brake master cylinder push rod and the plunger on the end of the stoplight switch when the brake pedal is in the fully released position. This is illustrated in Figure 29. To adjust the switch, loosen the switch bracket. Insert a .110" spacer between the switch plunger and the brake push rod. Position the switch against the plunger with the pedal in the free or "brake release" position and the stoplight switch plunger fully depressed. Do not pull the brake pedal rearward when making this adjustment. Tighten the switch bracket to maintain this spacing. On light trucks, the correct spacing is .140" rather than .110".

CONCEALED HEADLIGHTS

The Service Manuals provide good coverage on diagnosing and servicing concealed headlights. However, it is not the purpose of the Service Manuals to provide training or fundamentals. A good working knowledge of the motor, the limit switches, the relay and the electrical circuits is very helpful to the mechanic who has to service concealed headlights. In this section Tech explains the components and the circuits.

A QUICK LOOK AT THE HARDWARE

A single electric motor provides the power to open and close both headlamp doors. The motor is mechanically connected to the hinged headlamp doors by a rectangular torsion bar. The series-wound motor has two separate field windings. Armature rotation is clockwise when current is fed through one of the windings . . . rotation is counterclockwise when the other winding is energized.

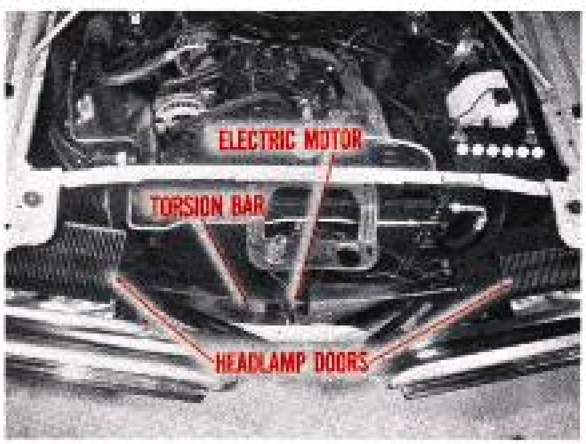


Fig. 30—Electric motor controls headlamp doors

WORM GEAR DRIVE AND SWITCH PLATE

A worm gear on the upper end of the armature shaft drives a large pinion gear. The torsion bar

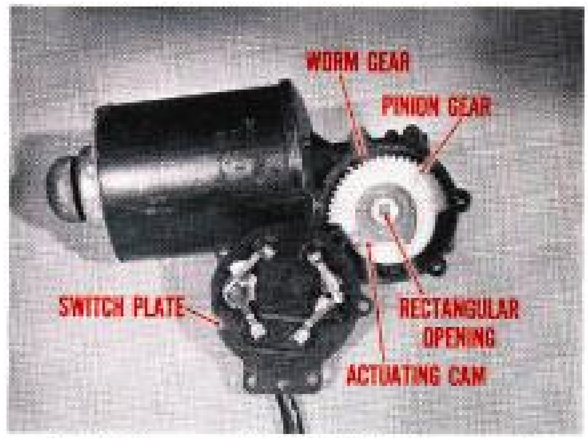


Fig. 31—Worm gear drive and switch plate assembly

extends through the rectangular opening in the hub of the gear to provide the mechanical drive connection for the headlight doors. The switch plate is the cover for the gear case. A plastic cam, attached to the hub of the drive gear, actuates the limit switches built into the switch plate.

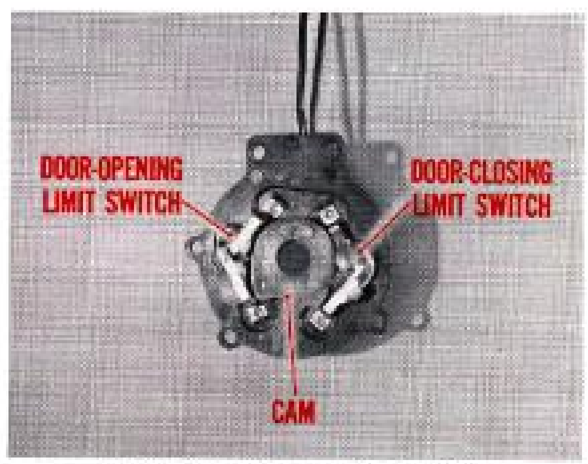


Fig. 32—Actuating cam and limit switches

ACTUATING CAM AND LIMIT SWITCHES

When the switch plate is attached to the gear case, the actuating cam is positioned between the two limit switches. This is shown in Figure 32. There are actually three cams involved in the operation of the switches. The actuating cam is attached to the hub of the drive gear. It actuates one cam at the door-closing limit switch and another cam at the door-opening limit switch.

When the headlights are turned off, the motor closes the headlight doors. The circuit is through the door-closing switch. When the doors reach the fully open position, the actuating cam opens the door-closing limit switch. This cuts off the feed to the motor and it stops with the doors in the closed position.

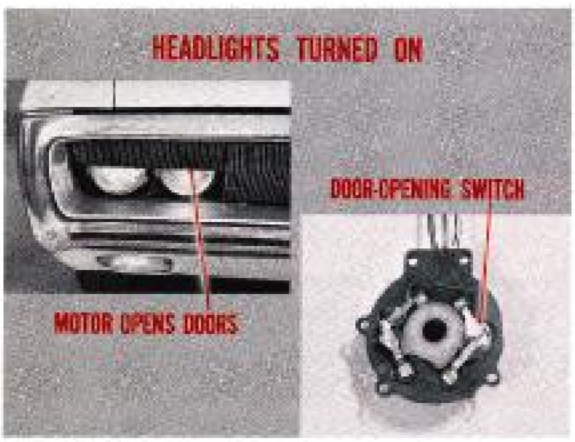


Fig. 33—Turning lights on opens headlamp doors

When the lights are turned on again, the motor rotates in the opposite direction to open the doors. The circuit is now through door-opening limit switch. When the doors reach the fully open position, the actuating cam opens the door-opening switch and this stops the motor with the doors in the fully open position.

CONCEALED HEADLIGHT CIRCUIT COMPONENTS

The electrical units involved are the headlight switch, the ignition switch, a circuit breaker, a relay and the motor with built-in limit switches. The operation of the system is probably slightly different than anything you are familiar with. For instance, the relay actually functions as a switch rather than an "ON" or "OFF" relay. The easiest way to explain the circuit is to break it down into the different branches of the circuit.

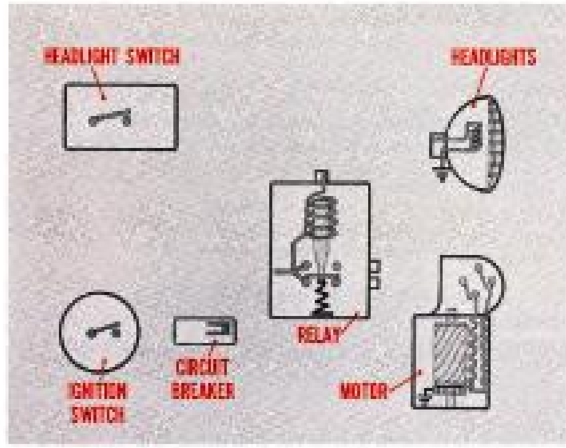


Fig. 34—Concealed headlight system circuit components

IGNITION "ON" AND HEADLIGHTS "OFF"

When the ignition is on and the headlights are turned off, the circuit is from the ignition switch, through the circuit breaker and to the relay. At the relay the circuit branches into two parallel circuits. One branch goes through the relay operating coil and then to ground through the headlamp filament. However, the resistance of the relay coil is very high so there isn't enough current flow in this branch of the circuit to light the headlights . . . just enough to energize the relay coil.

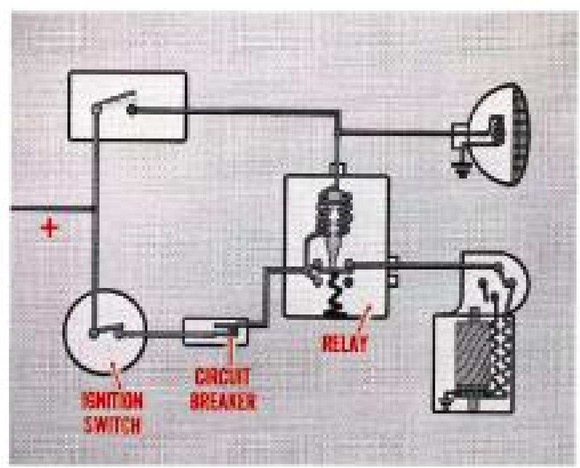


Fig. 35—Relay coil energized, headlights "OFF"

Energizing the relay coil closes the "door close" contacts in the relay. Closing these contacts provides a feed circuit to the door-closing limit switch of the motor. As was pointed out earlier, this energizes the field winding which causes the doors to close.

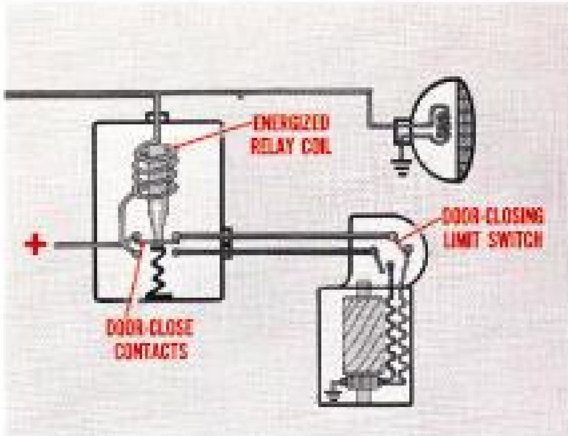


Fig. 36—Doors "park" in the closed position

When the doors reach the fully closed position, one lobe of the actuating cam *opens* the "door-closing" limit switch. At the same time, the other lobe of the actuating cam *closes* the "door opening" limit switch. However, since the feed circuit to this switch is already open at the relay, the doors stop in the fully closed position.

IGNITION "ON" AND HEADLIGHTS "ON"

Turning the headlights on completes a circuit through the headlight switch and to the upper end of the relay coil. Since the other end of the coil is connected to the ignition circuit, both ends are connected to battery positive so there is no current flow through the coil and the relay is not energized.

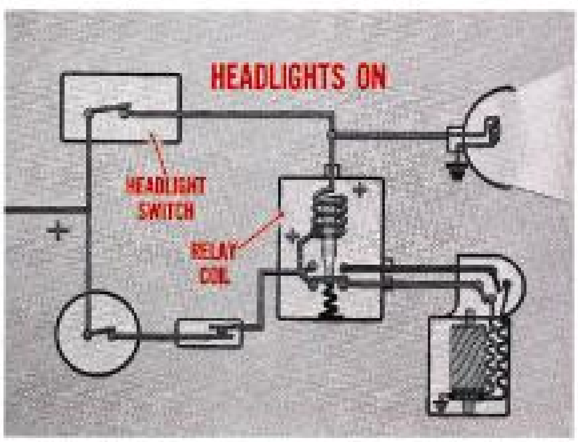


Fig. 37—Ignition and headlights "ON", doors open

So, with both ignition and headlights turned on, a spring pulls the relay plunger down completing a circuit through the "door open" contacts of the relay. This circuit feeds the door-opening limit switch in the motor. Since this limit switch is closed, the field winding which causes the headlight doors to open is energized. When the doors reach the fully open position, the actuating cam opens the door-opening limit switch and closes the door-closing limit switch.

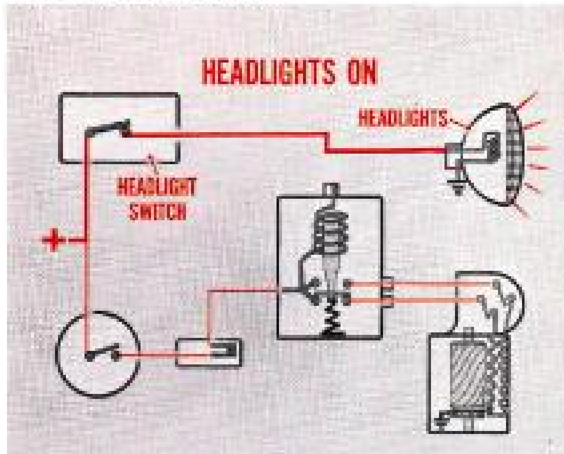


Fig. 38—Circuit from headlight switch to headlamps

Of course the headlights are on because there is now a direct circuit from the headlight switch to the headlamps.

IGNITION SWITCH TRICKS

If the owner wants to clean the headlights, all he has to do is turn both ignition and headlights on. Then, turn the ignition off *before* he turns the headlights off. In this way the doors will remain open with headlights off.

Owners should know that it is possible to have headlights on and the doors closed. If someone, a child for example, turns the headlights on when the ignition is off the headlights will come on but the doors will remain closed. This could result in a run down battery. However, the taillights will be visible and should provide a warning that the headlights are on.

NEW HEADLIGHT-DOOR STOPS

New impact-absorbing rubber headlight-door stops have been released for production and service. The new, as well as the old type stops, are shown in Figure 39. The new stops really do an excellent job of minimizing the noise associated with the opening and closing of the headlight doors.

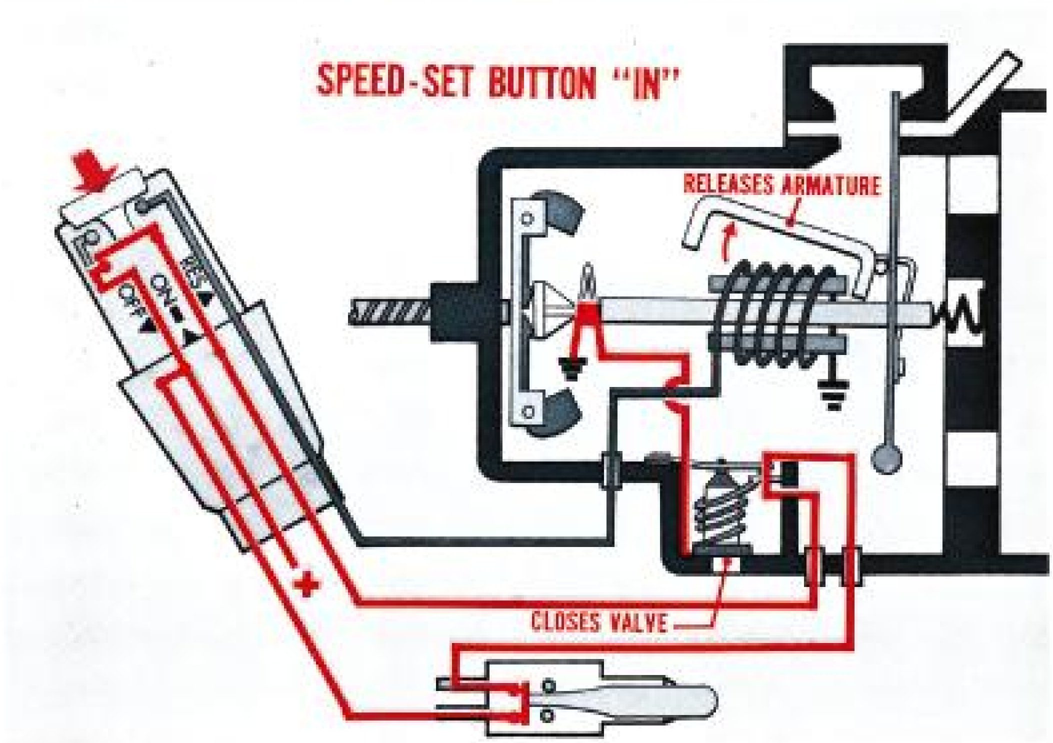
Fig. 39—New bumpers reduce door operating noise

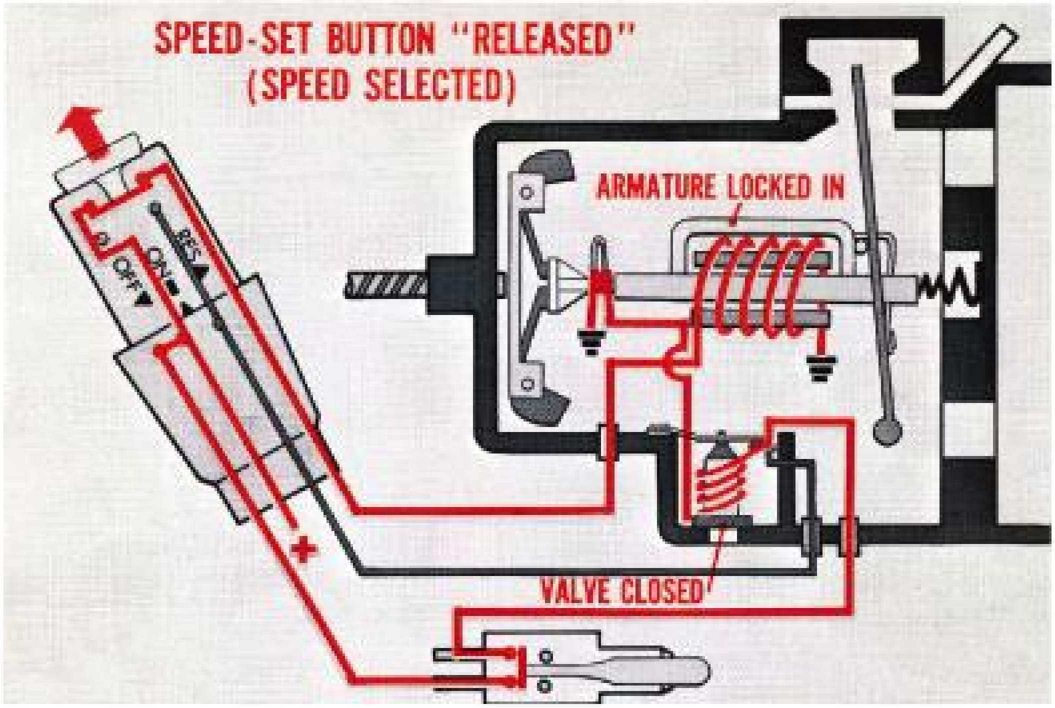
FOUR DIFFERENT ACTUATING CAMS

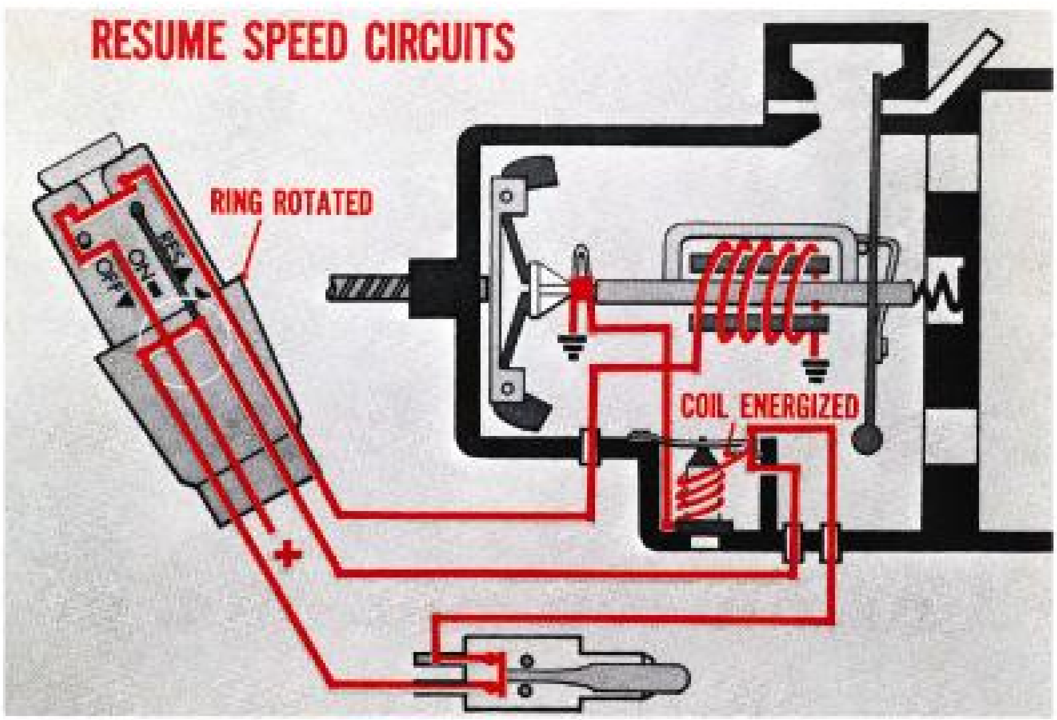
Headlight-door assemblies and service repair packages are *not* interchangeable. That's because the total travel required to open and close the headlight doors is not the same for all models. As a result, four different actuating cams have been used. Correct actuating cam application is as follows:

RED . . . . Used for Plymouth and Charger models.
BLACK or GREEN . . Used for Dodge Monaco models.
WHITE . . . . Used for Imperial models.

SPEED CONTROL SCHEMATIC CIRCUIT DIAGRAMS




SPEED-SET BUTTON "RELEASED"
(SPEED SELECTED)
ARMATURE LOCKED IN
RES
ON
OFF
VALVE CLOSED
+


RESUME SPEED CIRCUITS
RING ROTATED
RES
ON
OFF
COIL ENERGIZED
+

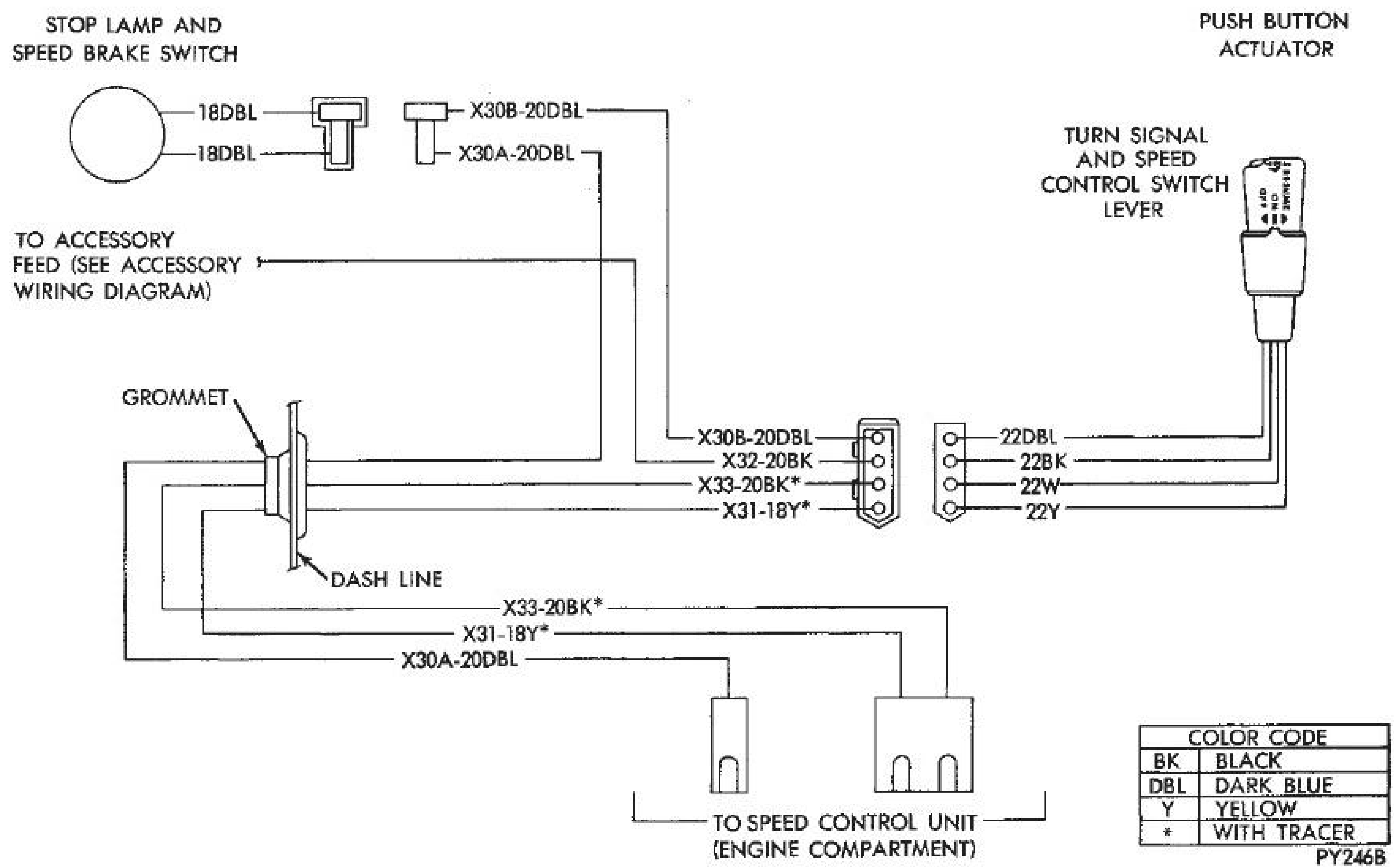


Fig. 7—Speed Control Wiring Diagram