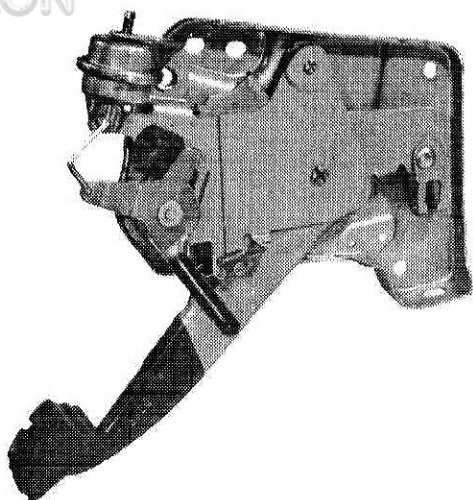
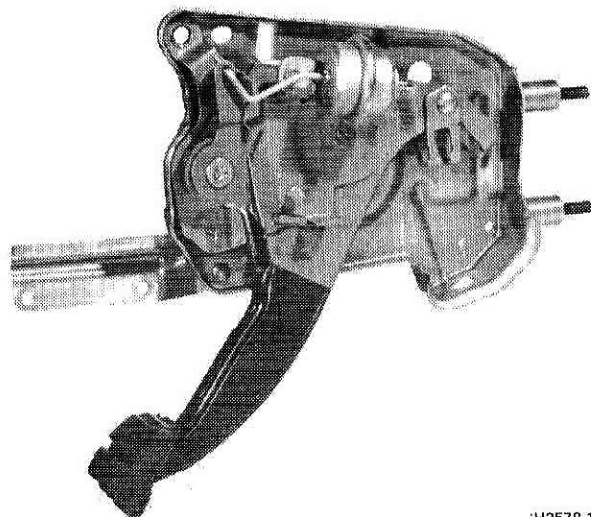




H2577-1A

FIG. 6 Parking Brake Control Assembly—Vacuum Release—Granada, Monarch, Versailles, LTD II, Cougar, Thunderbird and Mark V



H2578-1A

FIG. 7 Parking Brake Control Assembly—Vacuum Release—Lincoln Continental

DIAGNOSIS AND TESTING

VACUUM TESTS—VACUUM RELEASE PARKING BRAKES

Closely look at the operation of the brake linkage as the brake pedal is depressed. Then, check the operation of the brake linkage when the manual release lever is activated. These checks will indicate whether the manual parking brake control linkage is operating properly or requires repair or adjustment due to inability of the parking brake to hold against moderate vehicle movement. Perform tests of the parking brake system and controls after making certain the linkage and manual controls operate properly.

When testing a parking brake vacuum release system, a minimum of 10 inches of vacuum (Hg) should be available at all points where vacuum is applied. This can be checked with a gauge such as Rotunda Vacuum Tester (21-0014) or equivalent.

Failure to maintain 10 inches of vacuum (Hg) during vacuum system tests could be caused by a loose hose connection, resulting in a vacuum leak. When checking for vacuum between two points, trace the hose along the entire routing to be sure it is not crossed with another hose and connected to the wrong connection.

All of the vacuum parking brake control checks are to be performed with the engine running at idle speed.

To detect leaks in the parking brake hoses or a disconnected or improperly connected hose, listen for a hissing sound along the hose routings. **However, do not apply air pressure to the vacuum system under any circumstances, as the actuator diaphragm in the parking brake vacuum motor may be damaged.**

1. Start the engine and run it at idle speed. With the transmission shift control in neutral, depress the parking brake pedal to apply the parking brake. Move the transmission shift control to D range and observe the parking brake sector to see that the sector returns to its zero travel position as the parking brake releases. If the parking brake releases, the parking vacuum control is working properly.
2. If the parking brake does not release, test for vacuum at the vacuum line to the parking brake release vacuum motor. This can be accomplished by removing the hose from each component and attaching it to the vacuum gauge. Connect two distributor tester vacuum hose adapters together with a coupling as a connector to attach the gauge. A minimum of ten inches of vacuum is required to actuate the parking brake vacuum motor. If a minimum reading is not present when checking each of the aforementioned components, they must be replaced.

PARKING BRAKE OPERATION TEST

Check the operation of the parking brake with the vehicle on a hoist and the parking brake fully released. If there is any slack in the cables, or if the rear brakes drag when the wheels are turned, adjust as required.

On rear disc brake installations, verify that the parking brake levers on the rear calipers are fully returned to the stop by attempting to pull them rearward.

ADJUSTMENTS

PARKING BRAKE LINKAGE ADJUSTMENT

Rear Drum Brakes

1. Make sure that the parking brake is fully released.
2. Place the transmission in neutral. Raise the vehicle on an axle-type hoist.
3. Tighten the adjusting nut against the cable equalizer, to cause rear wheel brake drag. (Refer to the appropriate illustration for location of the adjusting nut.) Then, loosen the adjusting nut until the rear brakes are fully released. There should be no brake drag. If brake cables are replaced in any system having a foot-operated control assembly, stroke the parking brake control with approximately 100 lb pedal effort, then release control and repeat Step 3.
4. Lower the vehicle and check the operation of the parking brake.

Rear Disc Brake

1. Make sure that the parking brake is fully released.
2. Place transmission in neutral. Raise vehicle on an axle-lift type hoist.

3. Tighten the adjuster nut until the levers on the calipers just begin to move. Loosen the nut just enough to obtain full return to the off position. If brake cables are replaced in any system having a foot-operated control assembly, stroke the parking brake control with approximately 100 lb. pedal effort then release control and repeat Step.
4. The lever is in the off position when a 0.25 inch diameter pin can be freely inserted past the side of the lever into the 0.25 inch diameter holes in the cast iron housing.
5. Apply and release the parking brake control. Then apply and release the service brake pedal with moderate force. Check the parking brake levers on the calipers to determine if they are fully returned to the off position. **NOTE: If the 0.25 inch pin cannot be freely inserted, the cable adjustment is too tight.** Repeat adjustment procedure.

NOTE: If levers do not return to off position, parking and service brake function will be affected as mileage is accumulated.

REMOVAL AND INSTALLATION

PARKING BRAKE CONTROL ASSEMBLY

All Cars Except Pinto, Bobcat, Mustang II and Lincoln Continental

Removal

Refer to the appropriate illustration.

1. Fully release the parking brake.
2. Remove all tension from the rear cables by backing off the adjusting nut from the equalizer or adjuster. (See appropriate illustration for location of the equalizer or adjuster.)
3. Disconnect the release cable (if used) from the control assembly.
4. Disconnect the vacuum hose from the vacuum release motor, when so equipped.
5. Disconnect the wiring connector from the parking brake warning light switch.
6. Remove the three screws attaching the control assembly to the cowl side panel.
7. Remove the front cable assembly hairpin clip from the control assembly housing and disconnect the cable end fitting from the control.
8. Remove the control assembly from the vehicle.

Installation

1. Position the control assembly in the vehicle.
2. Fit the cable assembly through its mounting hole and install the retaining clip. Connect the cable end fitting to the control retainer.
3. Install the attaching screws to the cowl side bracket. Tighten the screws to 12-24 ft-lb.
4. Connect the release cable to the control assembly (if so equipped).

5. Connect the vacuum hose to the vacuum release actuator (if so equipped).
6. Connect the wiring connector to the parking brake warning light switch.
7. Check the operation of the parking brake. Adjust the parking brake as required.

Lincoln Continental

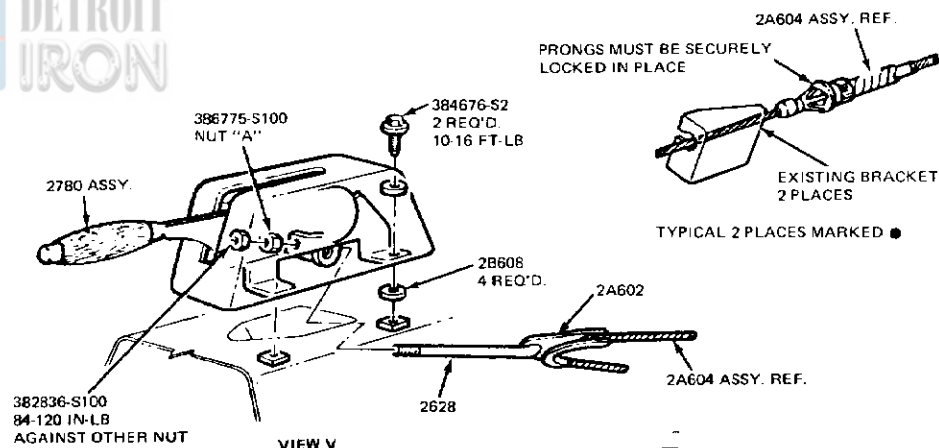
Removal

Refer to Figs. 17 and 18.

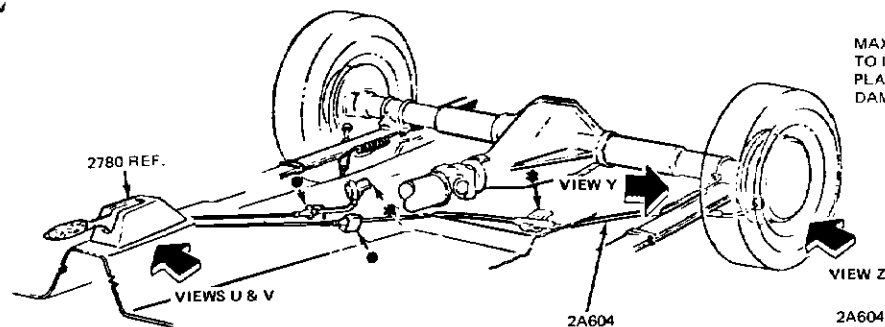
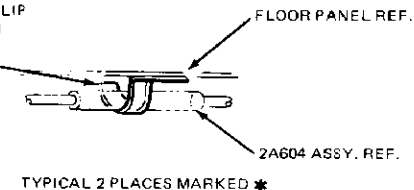
1. Fully release the parking brake and loosen cable adjustment.
2. Remove the two nuts from the control assembly mounting studs on the engine compartment side of the dash panel.
3. Working under the instrument panel, remove the screw that attaches control assembly to mounting bracket.
4. Disconnect the vacuum hose from the automatic release vacuum servo motor. Also disconnect wiring connector from parking brake warning light system.
5. Remove the hairpin clip from the cable housing at the control assembly.
6. Disconnect the control cable cylinder end from the control assembly.
7. Remove the control assembly from the vehicle.

Installation

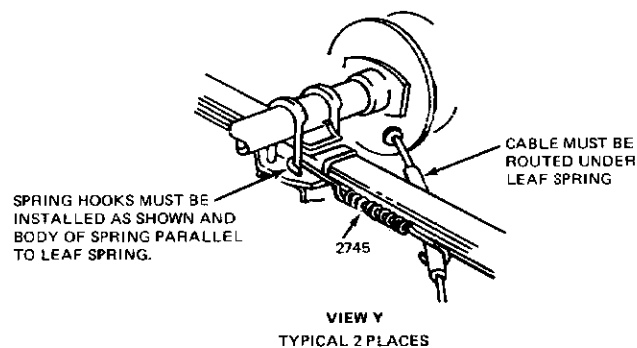
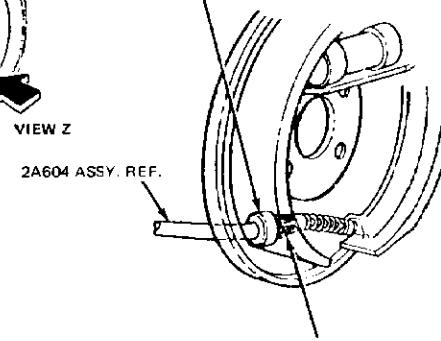
1. Connect the vacuum hose to the automatic release vacuum servo motor.
2. Install the control assembly mounting studs through the holes in the dash panel and against the body mounting bracket.



BEND END OF EXISTING CLIP AS SHOWN 2 PLACES WITH CRIMP TOOL



MAXIMUM EFFECTIVE FORCE USED TO INSERT END FITTING IN BACKING PLATE 100 LBS. TO AVOID PERMANENT DAMAGE TO CONDUIT.



H2274-2D

FIG. 8 Parking Brake System—Pinto and Bobcat Sedan and Station Wagon

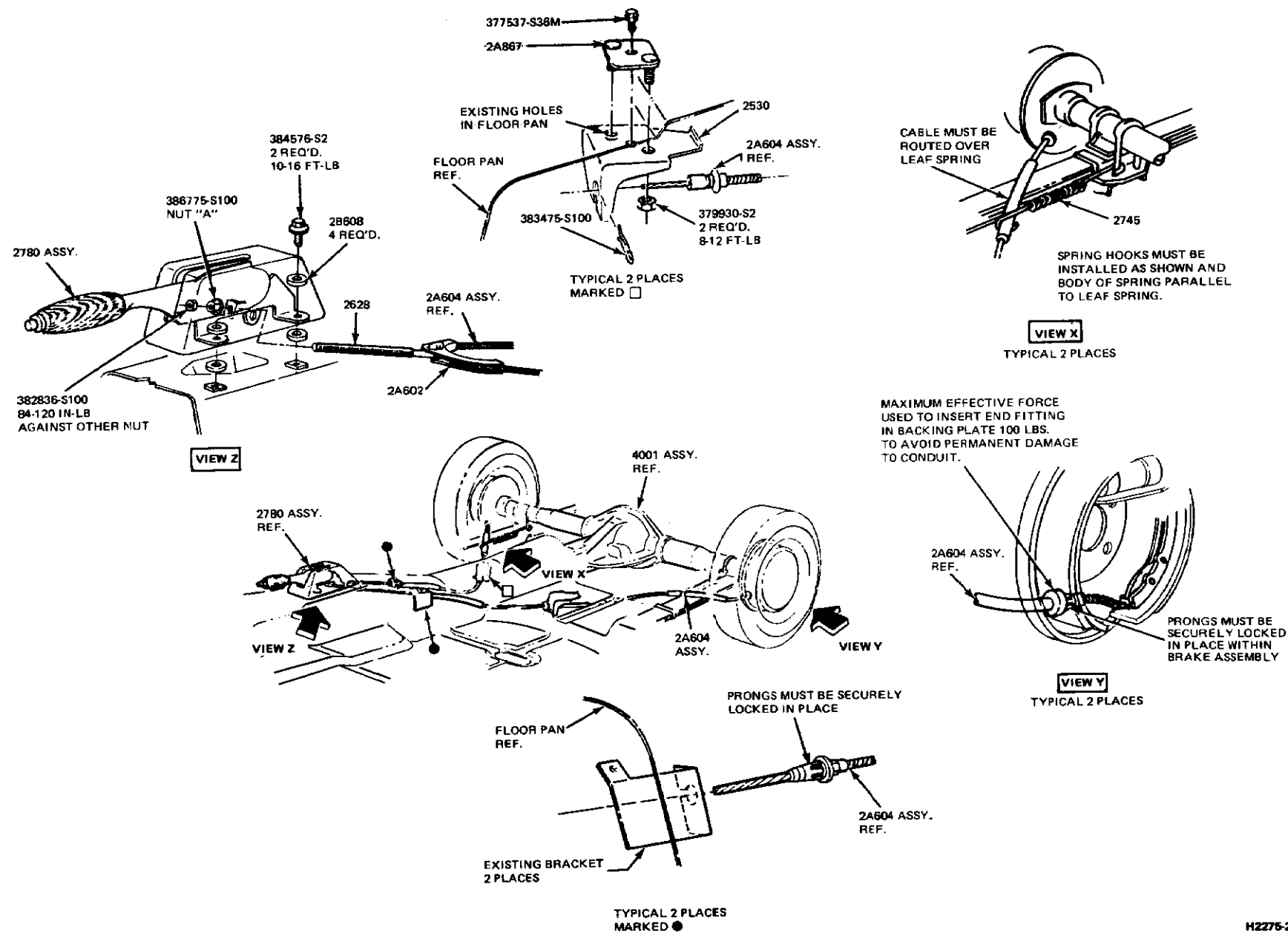


FIG. 9 Parking Brake System—Mustang II

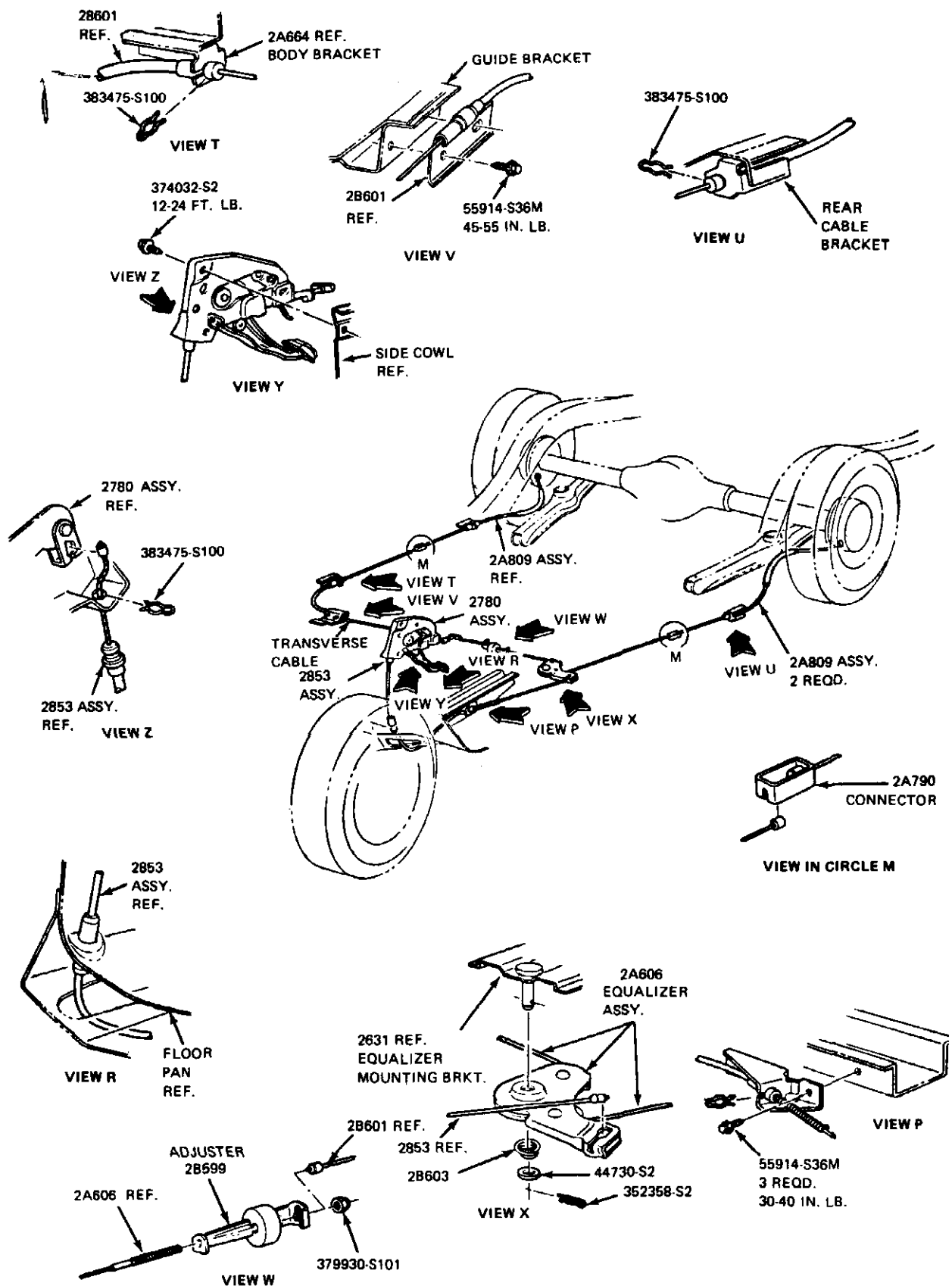
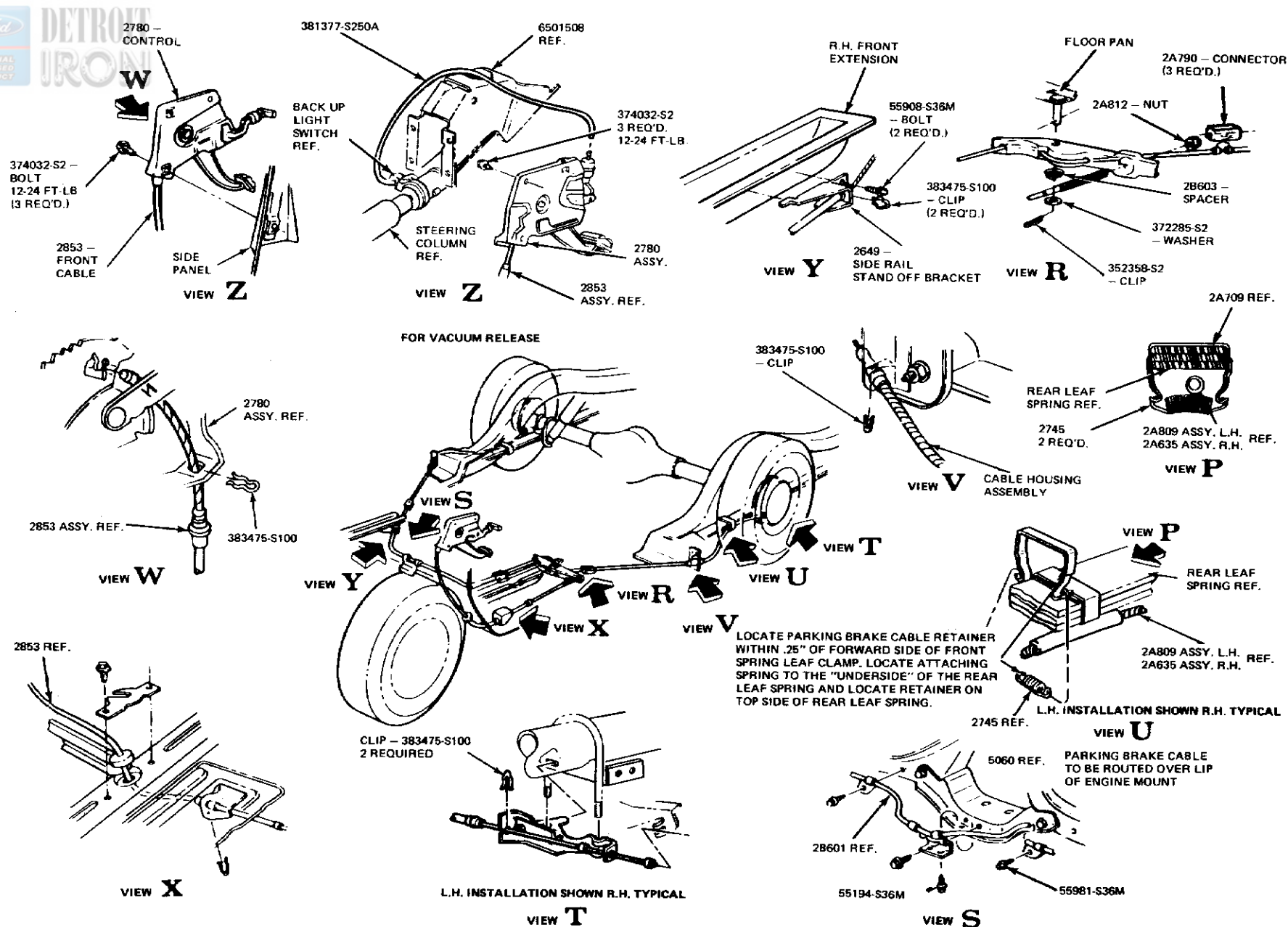


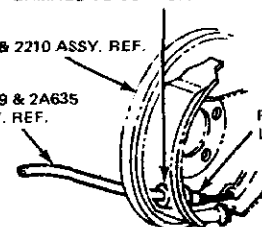
FIG. 10 Parking Brake System—Fairmont and Zephyr



H2483-2D

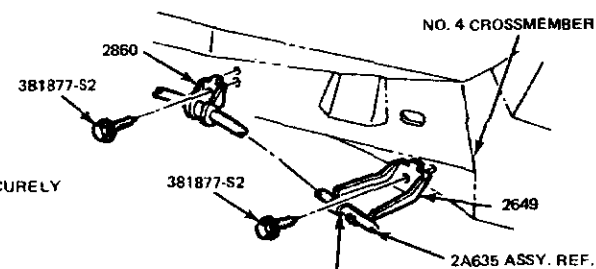
FIG. 12 Parking Brake System—Granada, Monarch and Versailles (Disc Rear Brakes)

MAXIMUM EFFECTIVE FORCE USED
TO INSERT END FITTING IN BACKING
PLATE 100 LBS. TO AVOID PERMANENT
DAMAGE TO CONDUIT



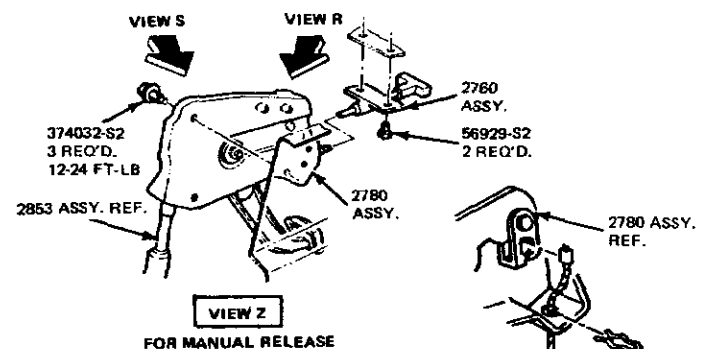
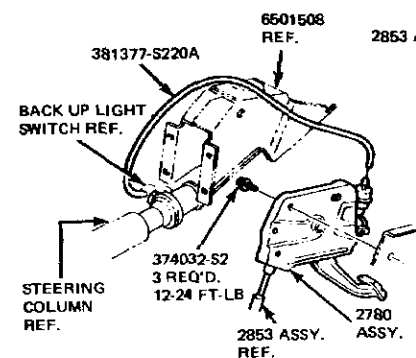
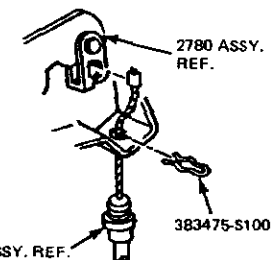
CABLE WITHIN BRAKE DRUM
L.H. SHOWN, R.H. TYPICAL

VIEW T

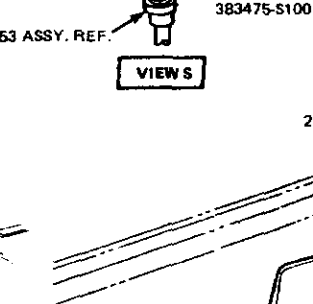


LOCATING STRIPE ON CABLE
MUST BE POSITIONED MIDWAY
BETWEEN BRACKET CABLE
RETAINER

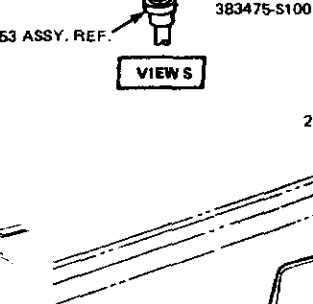
VIEW W

VIEW Z
FOR MANUAL RELEASEVIEW Z
FOR VACUUM RELEASE

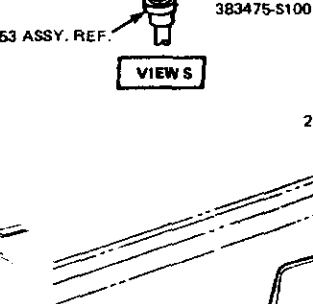
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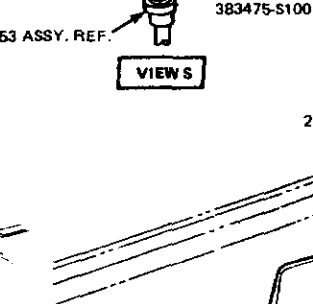
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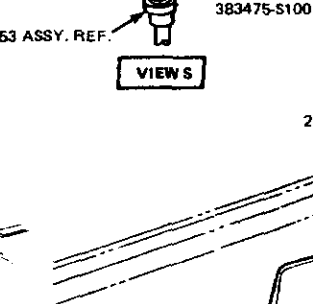
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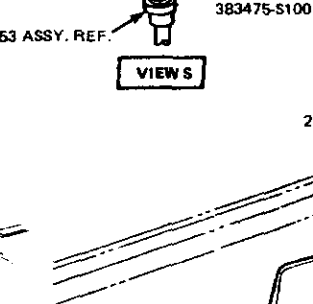
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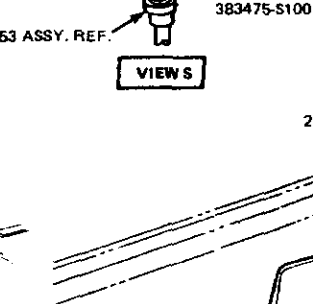
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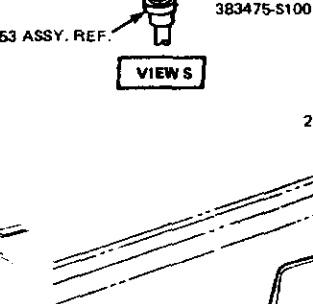
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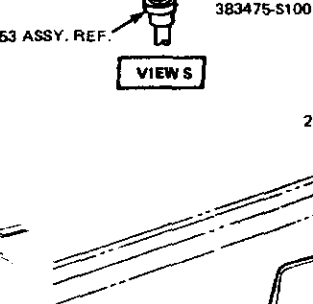
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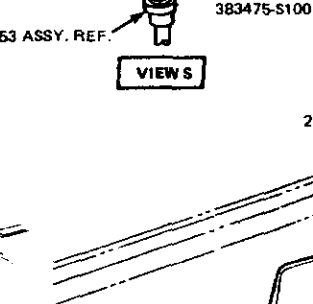
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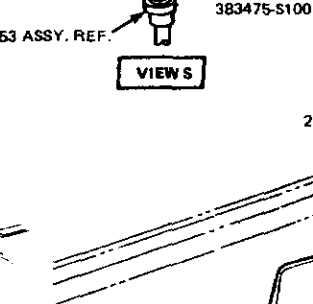
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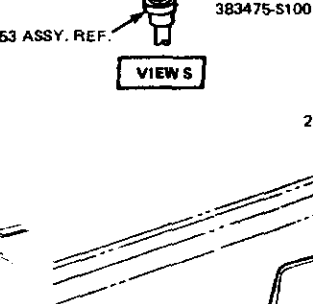
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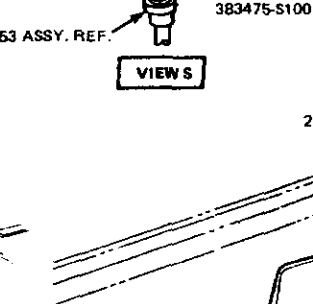
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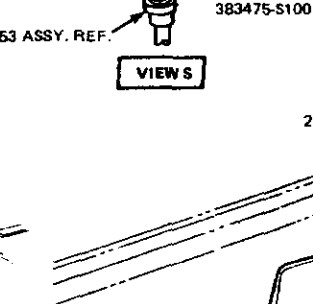
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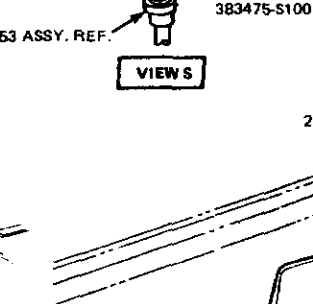
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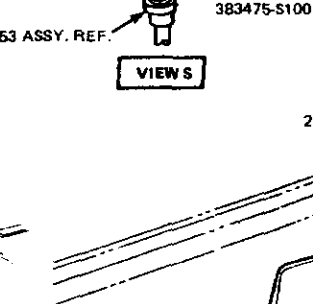
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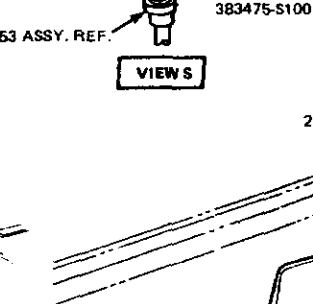
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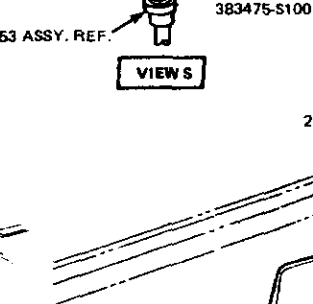
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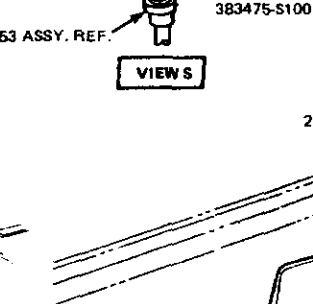
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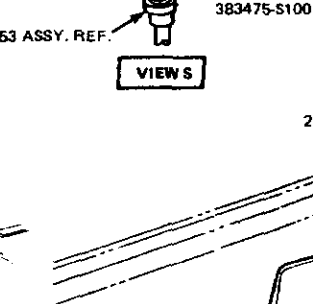
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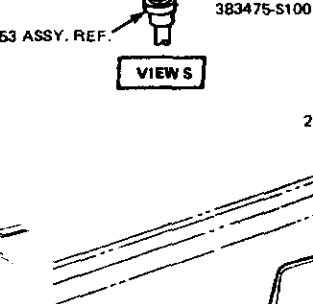
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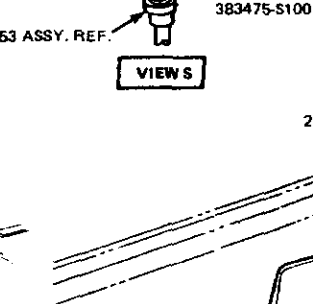
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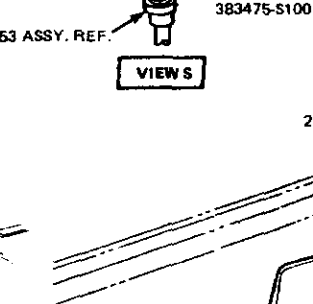
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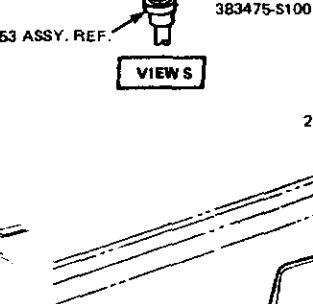
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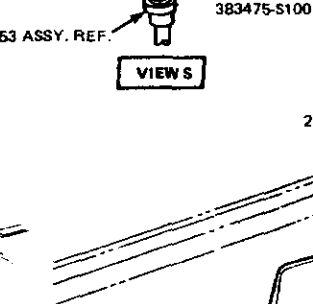
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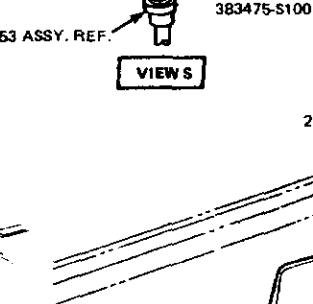
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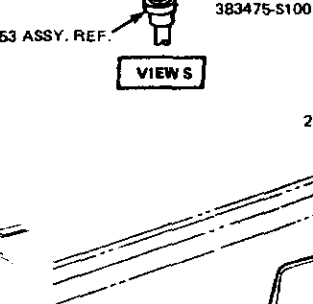
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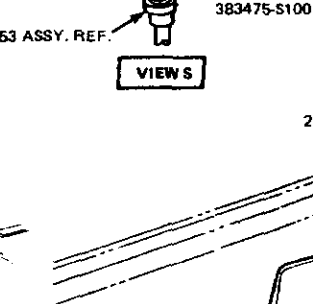
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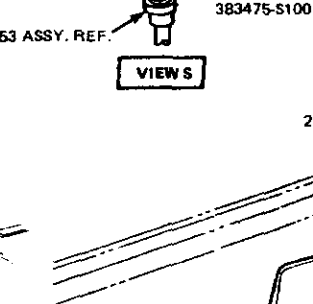
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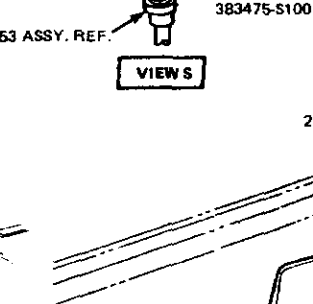
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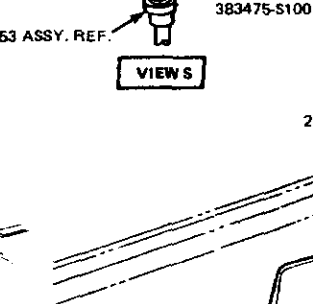
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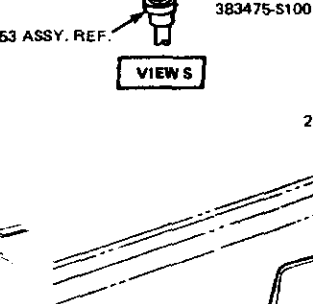
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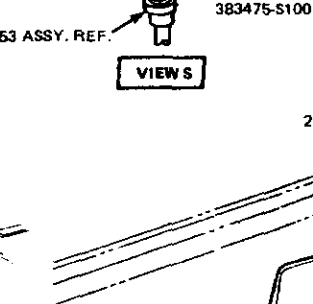
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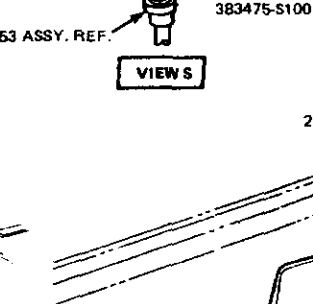
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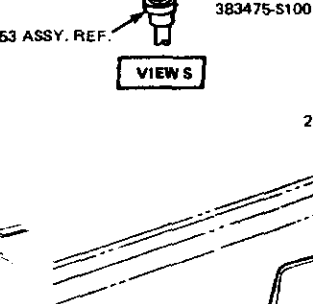
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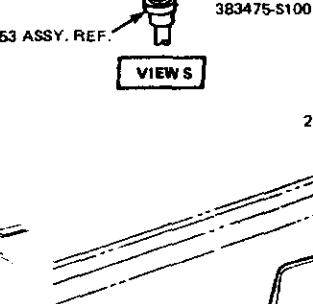
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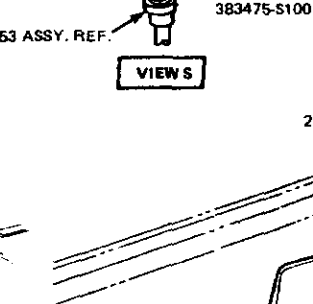
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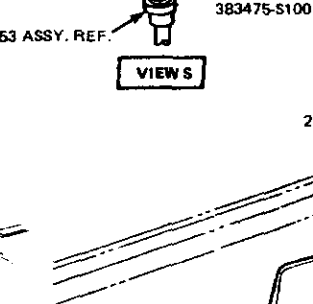
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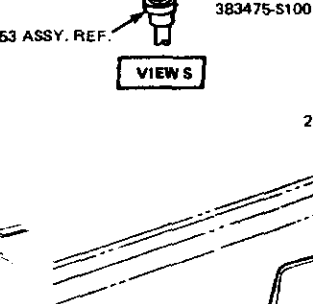
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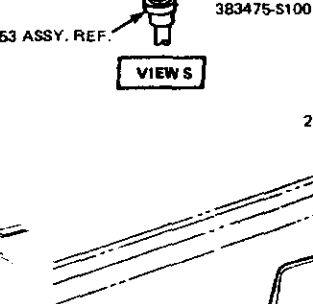
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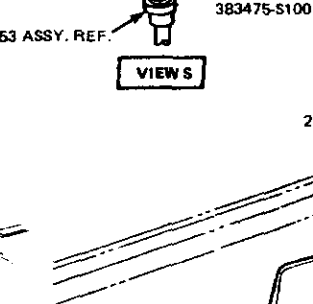
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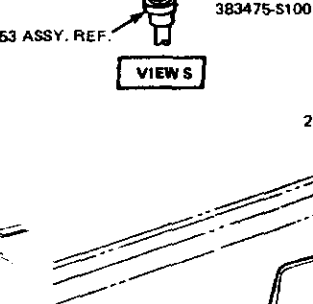
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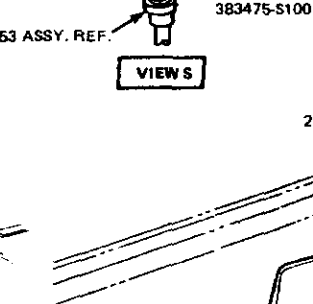
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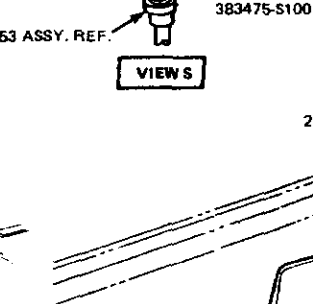
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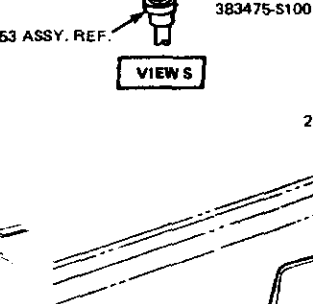
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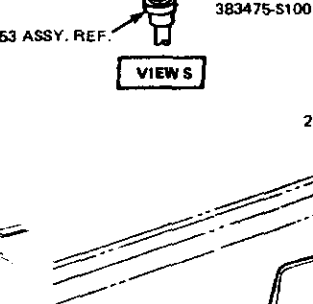
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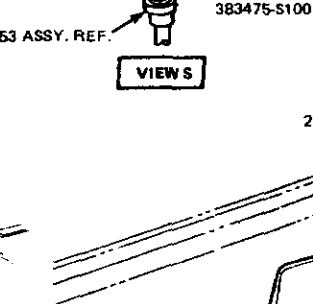
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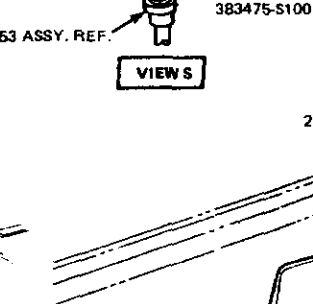
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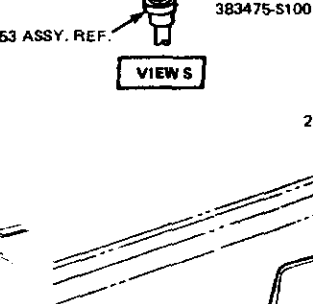
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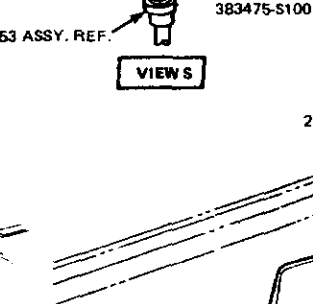
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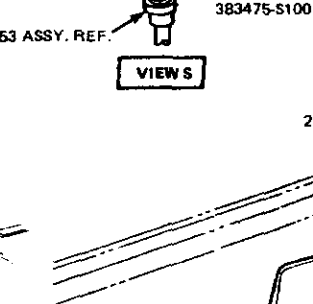
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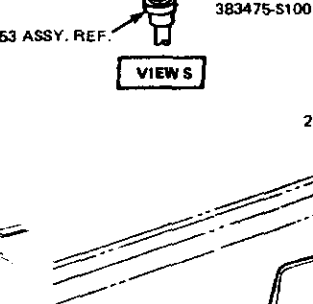
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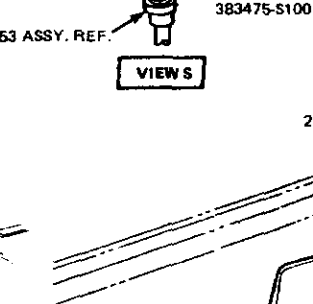
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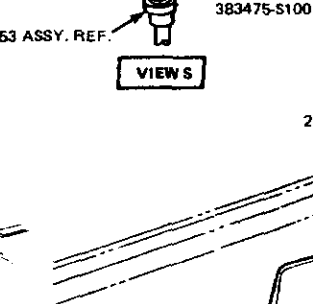
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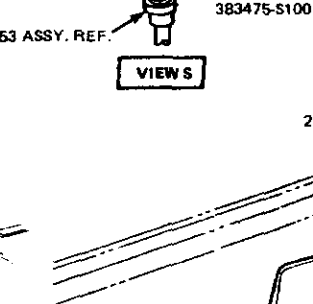
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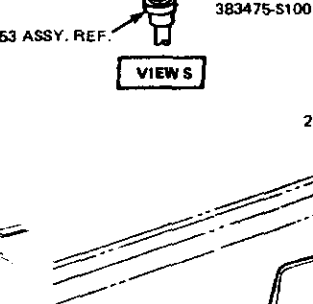
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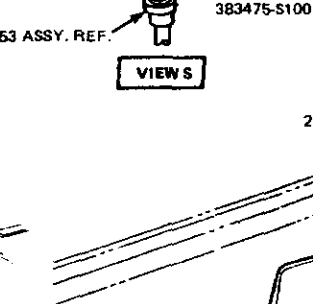
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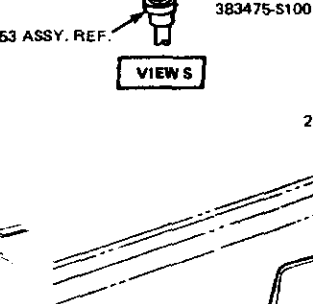
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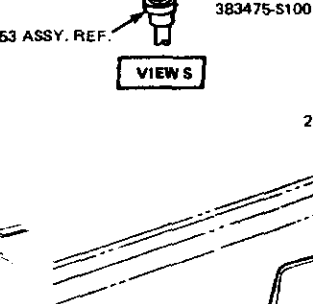
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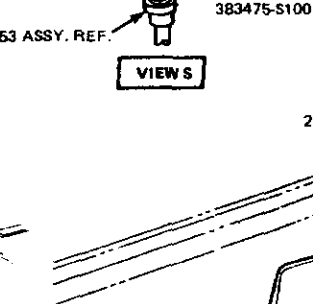
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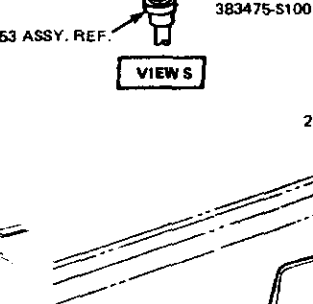
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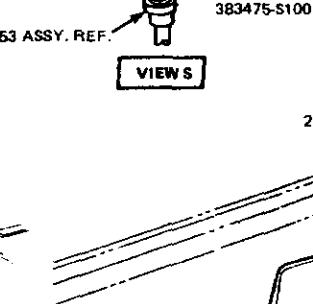
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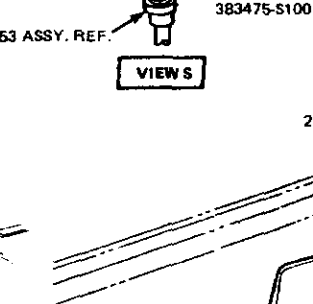
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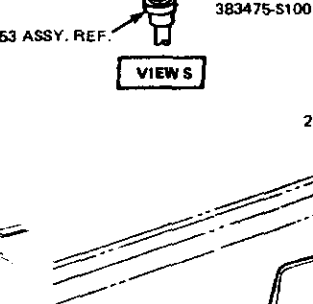
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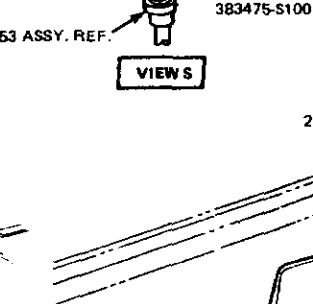
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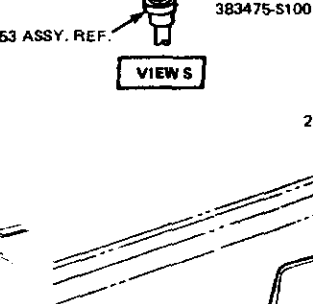
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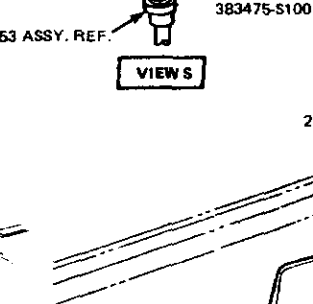
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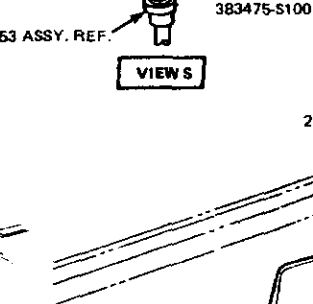
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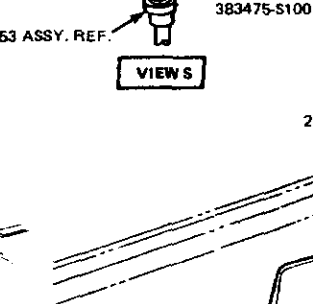
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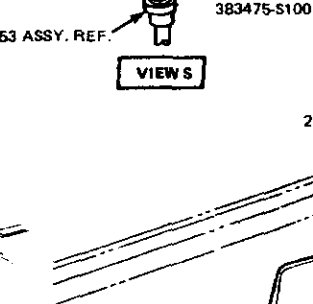
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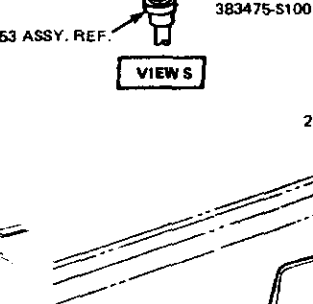
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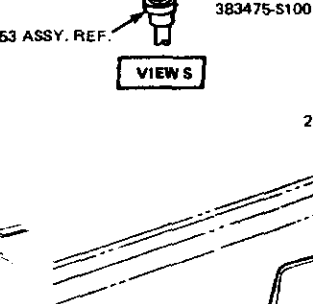
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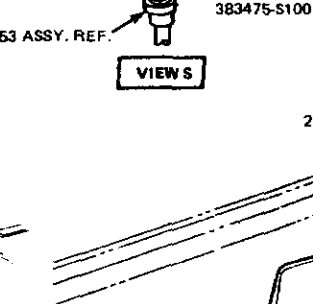
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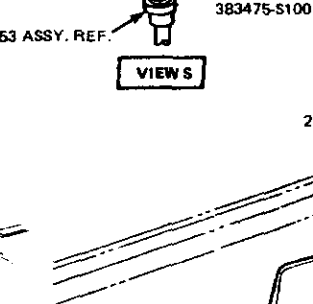
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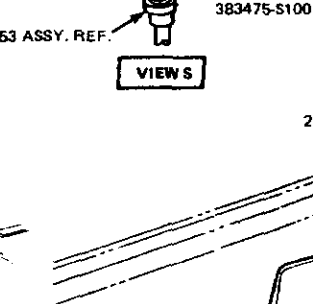
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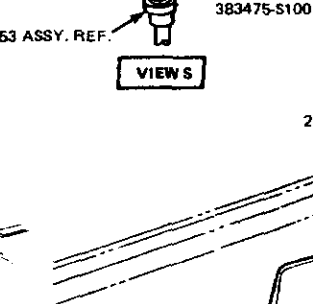
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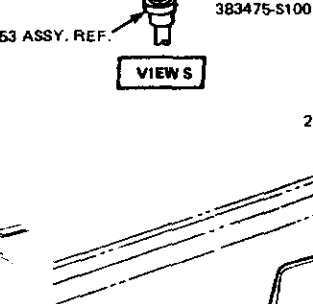
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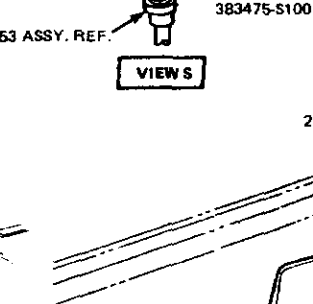
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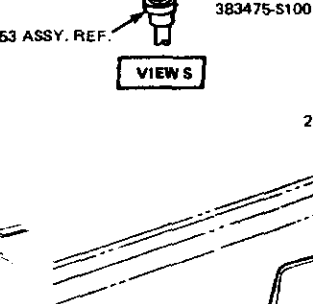
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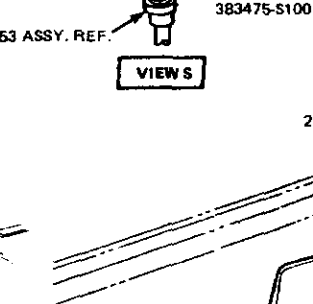
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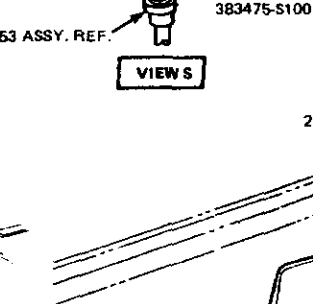
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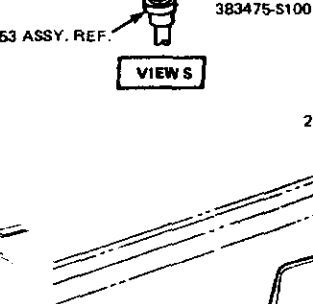
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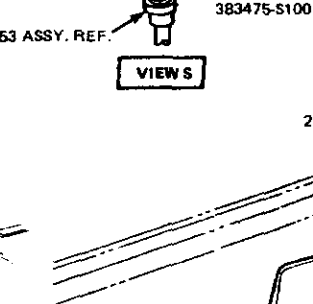
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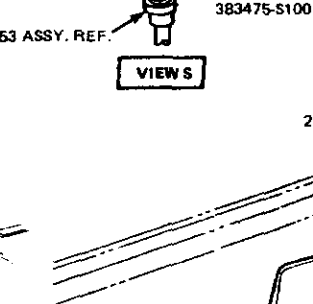
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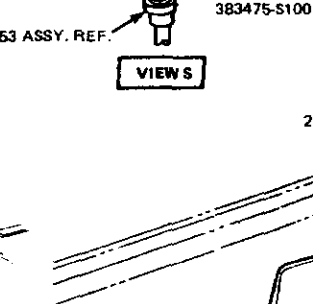
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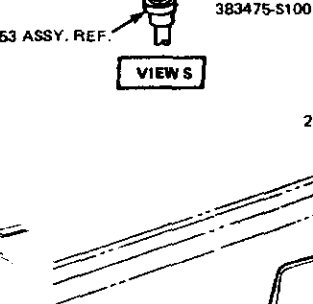
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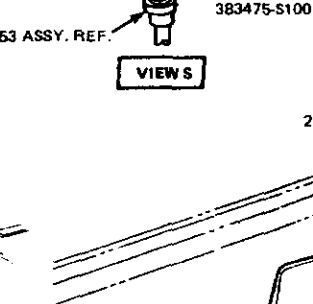
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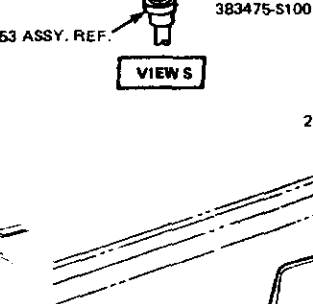
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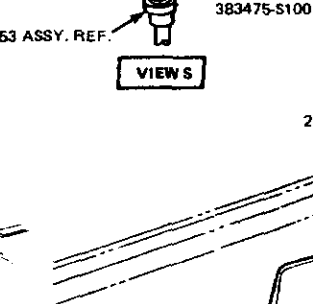
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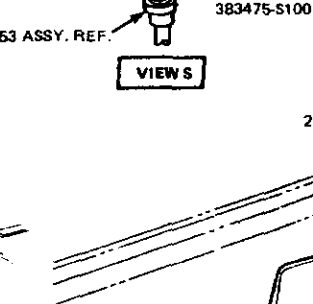
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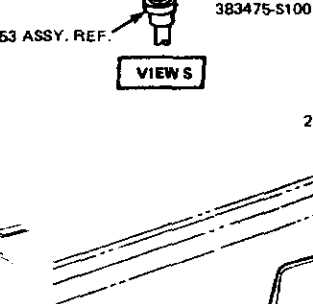
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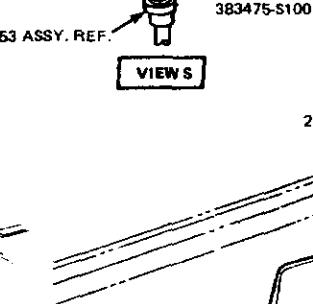
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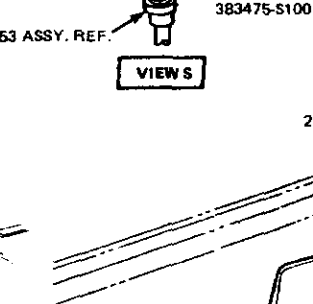
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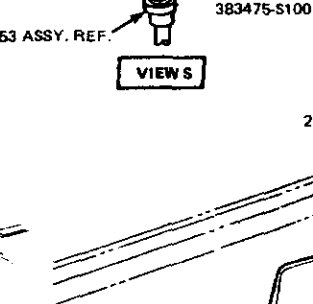
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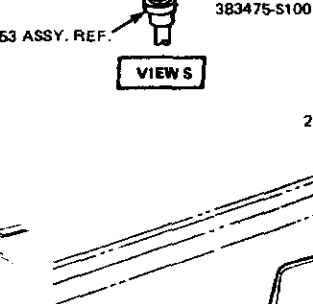
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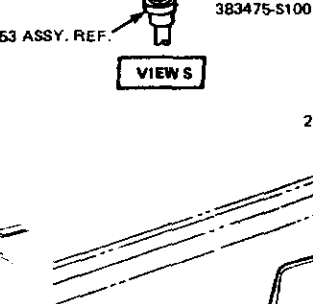
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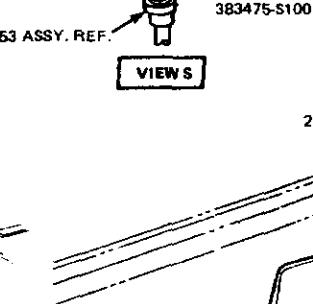
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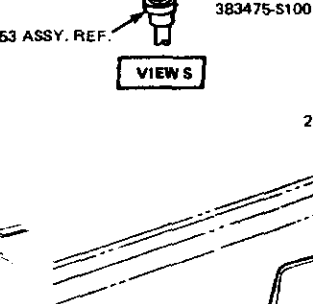
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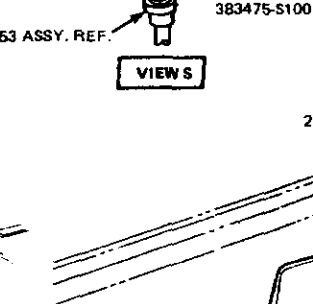
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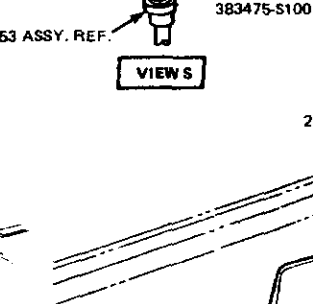
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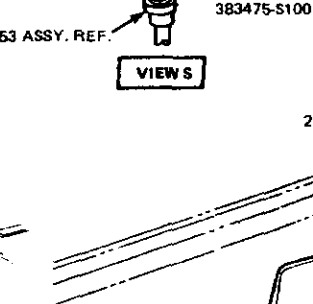
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3. Install the front cable cylindrical end in the control assembly sector cable attachment hole.
4. Install the cable hairpin clip at the control assembly. Connect wiring connector at warning light switch.
5. Install the control assembly to mounting bracket retaining bolt and torque to 12 to 18 ft-lb.
6. Install the nuts on the control assembly mounting studs on the engine side of the dash panel and torque, 10 to 20 ft-lb.
7. Check for correct operation of the parking brake system and adjust.

Pinto, Bobcat and Mustang II

Removal

1. Remove the locking and barrel adjusting nut from the equalizer rod (Figs. 8 and 9).
2. Remove the two screws that attach the control assembly to the tunnel.
3. Disconnect the brake light and ground wire from control.
4. Remove control assembly from the vehicle.

Installation

1. Position the control assembly on the tunnel, install the attaching screws and tighten, 12 to 24 ft-lb torque.
2. Connect the brake light switch and ground wire to the control.
3. Position the equalizer rod in the control assembly and install the adjusting nut and locknut.
4. Adjust the parking brake. Refer to Parking Brake Linkage Adjustment.
5. Install the locknut in back of adjusting barrel nut.

PARKING BRAKE FRONT CABLE

FORD AND MERCURY

Removal

1. Raise the vehicle on a hoist.
2. Loosen the adjusting nut at the equalizer (Figs. 14 and 15).
3. Disconnect the cable from the clevis on the multiplier lever. On rear disc brake cars, disconnect the cable coupling that is used in place of the multiplier lever.
4. Remove spring clip from clevis to remove cable end button from control.
5. Remove hairpin clip that retains the cable to the frame. Remove four screws that retain the fender apron to the frame seal and remove seal.
6. From inside the passenger compartment, remove hairpin clip that retains the cable to the parking brake control. Disconnect the cable from the control assembly.
7. Remove the cable assembly from inside the vehicle.

Installation

1. Insert cable through the provided openings, and place in the approximate installation position.
2. Install hairpin clip on cable at the frame crossmember. Install fender apron to frame seal.

3. Connect the end of cable to parking brake control. Install conduit-to-control hairpin clip and spring clip.
4. Install the front cable cylindrical end in the control assembly sector cable attachment hole. Connect the cylinder end to the multiplier lever.
5. Adjust the parking brake.
6. Lower vehicle on hoist.

LTD II, Cougar, Thunderbird, Continental Mark V, Granada and Monarch

Removal

Refer to pertinent illustration.

1. Partially raise the vehicle.
2. Remove the adjusting nut at the equalizer, and remove the equalizer from the cable.
3. Remove clip that holds the cable assembly to the frame or body bracket. Remove the screws that retain front fender apron to the frame seal and remove seal.
4. Attach a length of wire to the control cable.
5. Remove hairpin clip retaining cable assembly to the control. Disconnect the cable from the control assembly.
6. Pull the cable up through opening in dash panel, and remove the cable from the length of wire.

Installation

1. Attach control cable to the length of wire and pull cable down through the opening in the dash panel.
2. Position the upper end of the control cable to the control. Install the front cable cylindrical end in the control assembly sector cable attachment hole. Install conduit to control hairpin clip.
3. Remove the length of wire from the cable assembly and position the cable in the frame bracket. Install the retainer. Install the front fender apron to the frame seal.
4. Place the lever return spring on the cable, re-assemble the equalizer on the cable, and install the adjusting nut.
5. Adjust the parking brake.

FAIRMONT/ZEPHYR

Removal

1. Raise the vehicle on a hoist.
2. Loosen the adjusting nut at the adjuster assembly.
3. Disconnect the front cable from the equalizer lever assembly.
4. Remove the hairpin clip that retains the cable to the body bracket.
5. From inside the passenger compartment, remove the hairpin clip that retains the cable to the parking brake control. Disconnect the cable from the control assembly.
6. Remove the cable assembly from inside the vehicle.

Installation

1. Insert the cable through the provided openings in the floor pan, and place in the approximate installation position.

2. Position the upper end of the front cable to the control assembly with the cable cylindrical end through the control assembly attachment hole. Install the hairpin retaining clip.
3. Install the cable to the body bracket with hairpin clip.
4. Under the vehicle, install the cable to the equalizer lever assembly.
5. Adjust the parking brake.

PARKING BRAKE EQUALIZER TO CONTROL CABLE

Lincoln Continental

Removal

Refer to Figs. 17 and 18.

1. Fully release the parking brake.
2. Raise the vehicle.
3. Loosen the parking brake cable adjusting nut at the multiplier lever. Compress cable return spring and remove bell-shaped retainer.
4. Lower the vehicle.
5. Remove the cable housing hairpin clip, and disconnect the control cable end from the control assembly clevis.
6. Raise the vehicle.
7. Pull the cable and housing downward through the dash panel opening.
8. Remove the hairpin clip from the cable housing at the Number 3 crossmember.
9. Disconnect the cable cylinder end from the parking brake cable clevis at the multiplier lever.
10. Pull the parking brake cable forward through the holes in the Number 3 crossmember and remove the cable and housing assembly from the vehicle.

Installation

1. Push the rear end of the parking brake cable rearward through the holes in the Number 3 crossmember.
2. Connect the cable end to the parking brake cable clevis at the multiplier lever.
3. Install the hairpin clip on the cable housing at the Number 3 crossmember.
4. Push the forward end of the cable and housing upward through the dash panel opening.
5. Lower the vehicle.
6. Connect the cable end to the control assembly clevis and install the hairpin clip.
7. Raise the vehicle and compress the cable return spring and assemble the bell-shaped retainer and cable.
8. Adjust the parking brake. Refer to the Parking Brake Adjustment Procedures in this manual.
9. Lower the vehicle.
10. Check for correct operation of the parking brake.

PARKING BRAKE INTERMEDIATE CABLE

Ford, Mercury, LTD II, Cougar, Continental Mark V and Thunderbird

Removal

Refer to pertinent illustration.

1. Raise the vehicle on a hoist.
2. Remove the adjusting nut which retains the cable to the equalizer.
3. Remove the cable end from the equalizer.
4. Unhook the cable from the multiplier lever, and remove from the vehicle. On rear disc brake equipped vehicles, disconnect the cable from the coupling that replaces the multiplier lever.

Installation

1. Insert new cable end into actuator.
2. Insert cable end into equalizer and tighten the adjusting nut snug.
3. Adjust the parking brake.
4. Lower the vehicle.

PARKING BRAKE EQUALIZER-TO-REAR WHEEL CABLES

Ford and Mercury With Rear Drum Brakes

Removal

1. Raise the vehicle and loosen the equalizer nut. Disconnect the equalizer from the rear cables (Fig. 14).
2. Remove the hairpin clip that retains the L.H. cable to the suspension arm bracket. Pull the cable through the left side bracket.
3. Remove the hairpin clip that retains the R.H. cable to the suspension arm bracket. Remove the clips retaining the right cable to the frame crossmember and right hand sidemember.
4. Remove the rear wheel cover and wheel. Remove the three nuts that hold brake drum in place and remove the drum.
5. Working on the wheel side of the rear brake, remove the brake automatic adjuster spring. Compress the prongs on the parking brake cable retainer so that they can pass through the hole in the brake backing plate. Draw the cable retainer through the hole.
6. With the spring tension off the parking brake lever, lift the cable out of the slot in the lever and remove the cable through the backing plate hole.

Installation

1. Pull enough of the parking brake cable through the housing so that the end of the cable can be inserted over the slot in the parking brake lever on the rear brake shoe.
2. Pull the excess slack from the cable, and insert the cable housing into the brake backing plate access hole so that the retainer prongs expand. **The prongs must be securely locked in place.** Install the automatic brake adjuster spring.
3. Position the right-hand cable and the two retaining clips and screws on the rear crossmember. Insert the cable end through the suspension arm bracket and install the hairpin retainer. Be sure the locating stripe on the cable is midway between the retaining clips, and tighten all retaining clip screws.
4. Position the left cable, retaining clip and screw on the left lower suspension arm. Insert the cable end

through the suspension arm bracket and install the hairpin retainer.

5. Insert the ball ends of the cables into the equalizer assembly.
6. Install the rear drum(s) and tighten the three nuts that secure the drum. Install the wheel and tire and the wheel cover.
7. Adjust the parking brake cables.

Ford, Mercury, Continental Mark V and Lincoln Continental With Rear Disc Brakes

Removal

1. Raise the vehicle and remove the parking brake equalizer rod adjusting nut. Disconnect the equalizer from the rear cables (Figs. 15, 16 and 18).
2. Remove the hairpin clip that retains the cable to the suspension arm bracket. Pull the cable through the left side bracket.
3. Remove the hairpin clip that retains the cable to the suspension arm bracket. Remove the clips retaining the right cable to the No. 4 frame crossmember and right hand sidemember.
4. With the spring tension off the parking brake lever on the caliper, lift the cable out of the slot in the lever and remove the hairpin clip retaining the rear cable in the shock absorber bracket.

Installation

1. Retain the rear end of each rear axle cable in the shock absorber bracket with a hairpin clip.
2. Pull enough of the parking brake cable through the housing so that the end of the cable can be inserted over the slot in the parking brake lever on the rear caliper.
3. Position the right-hand cable and the two retaining clips and screws on the rear crossmember. Insert the cable end through the suspension arm bracket and install the hairpin retainer. Be sure the locating stripe on the cable is midway between the retaining clips, and tighten all retaining clip screws.
4. Position the left cable, retaining clip and screw on the left lower suspension arm. Insert the cable end through the suspension arm bracket and install the hairpin retainer.
5. Insert the ball end of each rear cable into the equalizer.
6. Adjust the parking brake cable system, making sure there is no wheel drag.

LTD II, Cougar, Thunderbird, Granada and Monarch (All With Rear Drum Brakes)

Removal

1. Refer to the appropriate illustration. Remove the equalizer adjusting nut and equalizer.
2. With the cables slack, disconnect the ball ends from the connector or adjuster. On Granada and Monarch vehicles, the left rear cable connects to the equalizer cable and the right rear cable connects to the transverse cable.
3. Remove the cable from the retainer hooks, if required.
4. Remove the hairpin lock retaining the cable housing to the side rail bracket or rear torque box bracket.

5. Remove the wheel cover, wheel and tire and the rear brake drum as outlined in Part 12-02.
6. Remove self-adjuster springs to allow clearance to remove cable retainer from the backing plate. Disconnect the rear end of the cable from the parking brake lever on the brake shoe. Compress the pronged retainer at the brake backing plate and pull the cable from the vehicle.
7. Slide the cable and housing out of the side rail bracket.

Installation

1. Insert the rear end of the cable through the side rail bracket or rear torque box bracket and pull the cable and housing into position.
2. Insert the rear end of the cable and housing through the hole in the backing plate from the inboard side.
3. Connect the cable to the parking brake lever on the brake shoe. Push the cable rear end through the hole on the backing plate hole until the cable retaining prongs are securely positioned in the backing plate cable hole.
4. Install the self-adjuster-springs. Position the cable housing in the side rail bracket and install the hairpin type retainer.
5. Install rear drum, wheel and tire assemblies and wheel cover as outlined in Part 12-02.
6. Position the cable retainer hooks in the underbody guide and install the connector, thus hooking the two cables together.
7. Insert the cable into the equalizer and install the equalizer and adjusting nut to the front parking brake control cable.
8. Adjust the parking brake.

Granada/Monarch/Versailles With Rear Disc Brakes (Fig. 12)

Removal

1. Completely release the parking brake.
2. Raise the vehicle on a hoist.
3. Loosen the adjusting nut on the adjusting rod until the cables are slack.
4. Remove the cable ends from the connectors. The left hand cable connects to the adjuster bracket. The right hand cable connects to the end of the transverse cable on the right side of the car.
5. Remove the cable from the rear disc caliper lever.
6. Unsnap the plastic grommet from the cable retaining bracket located at the rear spring "U"-bolt. Remove the hairpin clip holding the cable housing to this same bracket and remove the cable assembly from the bracket.
7. Remove the hairpin clip retaining the cable housing in a bracket located at the rear spring front attaching point.
8. Pull the cable assembly rearward until it is clear of the spring bracket and the retainer located on the rear spring. Remove the cable assembly from the vehicle.

Installation

1. Thread the cable assembly through the retainer on the rear spring and through the hole in the bracket

at the rear spring front attachment. Install the hairpin clip to the cable housing.

2. Attach the rear portion of the cable to the rear caliper parking brake lever.
3. Snap the plastic grommet into the cable bracket at the spring "U" bolt and place the cable housing in the forward end of the bracket. Install the hairpin clip.
4. Attach the front of the cable to the adjuster bracket on the left side or to the right connector at the end of the transverse cable as required.
5. Adjust the parking brake system as outlined in this section.
6. Lower the car.

Lincoln Continental With Rear Drum Brakes

Removal

Refer to Fig. 17.

1. Raise the vehicle.
2. Remove the parking brake adjustment nut and disconnect the rear brake cables from the equalizer.
3. Remove the left rear cable retaining clips and pull the cable through the left frame suspension arm mounting bracket.
4. Remove the retaining clip that attaches the left rear cable to the lower left trailing arm.
5. Remove the clips that retain the right rear cable to the Number 4 crossmember and at the right frame side rail.
6. Remove the rear wheel covers, and the tire and wheel assemblies. Remove the drum retaining nuts and remove the rear drums.
7. Remove the brake automatic adjuster spring.
8. Relieve the spring tension and lift the cable end from the parking brake lever.
9. Compress the parking brake cable housing retainer prongs, and pull the retainer through the backing plate hole.
10. Remove the parking brake cable from the backing plate.

Installation

1. Position the parking brake cable through the hole in the backing plate.
2. Relieve the spring tension and install the cable ball end in the parking brake lever slot. Securely seat the retainer prongs in the hole in the backing plate.
3. Install the brake automatic adjuster spring.
4. Install the brake drum and the drum retaining nuts. Install the wheel and tire assembly and wheel cover.
5. Install the clips that attach the right rear cable to the Number 4 crossmember. Install clip that retains the cable at the right frame side rail.
6. Install cable clip that attaches left rear cable to the left lower arm.
7. Position the cables through the left frame suspension arm support, and install the hairpin clips.
8. Install the cable ends in the equalizer lever.
9. Adjust the parking brakes. Refer to the Parking Brake Adjustment procedures in this manual.

10. Lower the vehicle.

Pinto, Bobcat and Mustang II with Rear Drum Brake

Removal

Refer to Figs. 8 and 9.

1. Completely release the parking brake and loosen the lock and adjusting nut.
2. Raise the vehicle.
3. Remove the rear wheel parking brake cable from the equalizer.
4. Compress the retainer prongs and pull the cable rearward through the cable brackets sufficiently to release the cable.
5. Open the ends of the floor pan cable clips and remove the cable (Pinto and Bobcat only), or remove the retaining clip that attaches the cable to the bolt on the bracket (Mustang II).
6. Remove the rear wheel covers, wheel and tire assemblies and rear brake drums.
7. Remove the self-adjuster springs and remove the cable retainers from the backing plates.
8. Disconnect the ends of the cables from the parking brake levers on the secondary brake shoes.
9. Compress the cable retainer prongs and pull the cable ends from the backing plates.
10. Remove the cable retainers on the rear springs (Pinto and Bobcat only), and remove the cable from the vehicle.

Installation

Refer to Figs. 8 and 9.

1. Insert the cable ends through the backing plates and pull into the brake assemblies until the retainer prongs are securely seated in the backing plate holes.
2. Connect the cable ends to the parking brake levers on the secondary brake shoes.
3. Install the cable retainers and the self adjuster springs on the rear brake assemblies.
4. Position the cable in the retainers on the rear suspension leaf springs (Pinto and Bobcat on top, Mustang II underneath), install the retainers spring.
5. Position the cable in the floor pan clips and bend to retain the cable securely (Pinto and Bobcat only), or in the bolt-on brackets and insert the retaining clips (Mustang II).
6. Position the cable in retainer brackets and pull the cable forward until the retainer prongs are securely seated in the bracket holes.
7. Connect the cable at the equalizer.
8. Install the rear brake drums, wheel and tire assemblies, and wheel covers.
9. Lower the vehicle.
10. Adjust the parking brake as outlined under Parking Brake Linkage Adjustment.

FAIRMONT/ZEPHYR

Removal

Refer to Fig. 10.

1. Remove the adjusting nut at the adjuster assembly.
2. With the cables slack, disconnect the rear cables from the right and left rear cable connectors. The

left hand cable connects to end of the intermediate cable. The right hand cable connects to the transverse cable.

3. If the equalizer assembly or transverse cable is to be removed, the attaching brackets should be removed at this point, along with the connection at the adjuster assembly.
4. If the rear cable(s) is to be removed, disconnect the cable(s) from the body bracket(s) at the rear of the vehicle.
5. Remove the affected wheel, tire and brake drum using existing procedures.
6. Remove the rear brake self-adjuster spring to allow clearance to remove the cable end from the parking brake lever and the pronged cable retainer from the backing plate.
7. Slide the cable out of the brake backing plate and remove cable from the vehicle.

Installation

1. Install the rear cable(s) to the body bracket with the hairpin clip.
2. Insert the rear end of the cable(s) through the hole in the backing plate and attach the cable to the parking brake lever on the brake shoe.
3. Push the cable through the hole in the backing plate until the cable retaining prongs are securely positioned on the backing plate.
4. Install the rear brake self-adjuster spring and attach the forward end of the rear cable(s) to the connector. If the equalizer assembly or transverse cable(s) have been removed they should be installed at this time and attached to the connectors at the rear cable(s) to complete the system.
5. Install the affected rear brake drum, wheel and tire assemblies per existing Shop Manual Procedures.
6. Install the adjusting nut to the adjuster assembly and adjust the parking brake.

SPECIFICATIONS

TORQUE LIMITS – GENERAL – FT.-LBS.

	Ford-Mercury Meteor	Granada/Monarch, Versailles, LTD II, Cougar, Thunderbird	Fairmont/ Zephyr	Continental Mark V	Lincoln Continental
Parking Brake Control Assembly Mounting Nuts and Cap Screws	Cap Screw 12-24	Cap Screws 12-24	Cap Screws 12-24	Cap Screws 12-24	Cap Screw 12-18 Nuts 10-20

CH1869-2H

STEERING

GROUP 13

PART TITLE	PART NO.	PART TITLE	PART NO.
General Steering Service	13-01	Power Steering Pump – Ford Model CII	13-51
Integral Power Rack & Pinion		Power Steering Pump – Saginaw	13-52
Steering Gear – Ford	13-46	Steering Columns – Conventional (Convolute	
Integral Power Rack & Pinion		Absorber Type)	13-03
Steering Gear – TRW	13-47	Steering Columns – Mini (Extruded	
Integral Power Steering Gear – Ford	13-41	Absorber Type)	13-04
Integral Power Steering Gear – Saginaw	13-42	Steering Columns – Modular I (Extruded	
Manual Steering Gear – Rack and Pinion	13-32	Absorber Type)	13-06
Manual Steering Gear – Worm and		Steering Linkage	13-20
Recirculating Ball	13-30		
Non-Integral Power Steering System – Ford	13-40		

CG2405-2B

General Steering Service

PART 13-01

Applies to All Cars

SUBJECT	PAGE	SUBJECT	PAGE
CLEANING AND INSPECTION		TESTING	
Cleaning the Power Steering Pump	01-15	Lubricant Checking Procedure	01-8
Inspection – Ford Pump	01-15	Power Steering Preliminary Tests	01-5
Inspection – Saginaw Pump	01-15	Pump Flow and Pressure Tests	01-5
Flushing the Power Steering Gear	01-14	Purging Power Steering System Of Air	01-6
Flushing the Power Steering Pump	01-14	Start-up Procedure	01-9
DIAGNOSIS	01-1	SPECIFICATIONS	01-16
REMOVAL AND INSTALLATION			
Ignition Lock Cylinder Assembly –			
All Models	01-9		

DIAGNOSIS

LOOSE STEERING

Drive vehicle and confirm condition exists. Check the following and repair as required.

Manual and Power Steering

1. Check steering linkage connections and idler arm for looseness or damage.

2. Check front wheel bearing adjustment.
3. Check steering gear adjustments.
4. Check to see if flexible coupling is fractured.
5. Check steering wheel to column shaft for looseness.

Power Steering Only

1. Check for loose cylinder rod frame bracket or improper riv-nut crimp (non-integral power steering).
2. Check control valve centering spring adjustment (non-integral power steering).
3. Check control valve length adjustment (non-integral power steering).

PULLS TO ONE SIDE

Drive vehicle and confirm condition exists. Check the following and repair as required.

1. Check tire sizes of each wheel to be sure they are the same size and type.
2. Check tire pressure.
3. Check to see if vehicle is unevenly loaded.
4. Check brake adjustment.
5. Check front wheel bearing adjustment.
6. Check for broken or sagging springs on front and/or rear suspension.
7. Check for bent rear axle housing and/or loose, worn or damaged spring, shock absorber and suspension arm attaching points.
8. Check control valve centering spring adjustment (non-integral power steering).
9. Check for sticking control valve spool bolt (non-integral power steering).
10. Check front wheel alignment.

TIRE PULL (RADIAL PLY ONLY)

1. Cross switch front tire/wheel assemblies.
2. If vehicle pulls to opposite side, cross switch front tire/wheel assemblies to the rear. Switch tire/wheel assemblies that were on the rear to same side on the front.
3. If, in Step 2, vehicle pull direction is not changed, check front suspension and front end alignment.

RETURNABILITY POOR

Drive vehicle and confirm condition exists. Check the following and repair as required.

Manual and Power Steering

1. Check tire pressure.
2. Check front wheel alignment.
3. Check steering column alignment.
4. Check for steering wheel to column interference.
5. Check steering linkage and ball joints for lack of lubrication or evidence of binding.
6. Check idler arm bushings and positioning.
7. Check steering gear adjustment.

Power Steering Only

1. Check power steering control valve for spool binding or out of adjustment (non-integral power steering).
2. Check for bent valve spool bolt (non-integral power steering).
3. Check bent cylinder rod (non-integral power steering).
4. Check for kinked return hose or tube.
5. Check for obstruction within steering gear or lines.

WANDERS TO ONE SIDE

1. Check tire sizes of each wheel to be sure they are all the same size and type.
2. Check tire pressure.
3. Check to see if vehicle is overloaded or unevenly loaded.
4. Check front wheel bearing adjustment.
5. Check steering gear adjustments.
6. Check ball stud adjustment (non-integral power steering).
7. Check control valve centering spring adjustment (non-integral power steering).
8. Check for steering gear valve binding (integral power steering).
9. Check control valve length adjustment (non integral power steering).
10. Check for broken or sagging spring.
11. Check steering linkage connections and idler arm for wear, looseness or damage.
12. Check front wheel alignment.

DIAGNOSIS GUIDE – STEERING GEAR

CONDITION	POSSIBLE CAUSE	RESOLUTION
Leakage at valve and cylinder ports. Non-integral power steering.	- Hose tube nuts not tight. - Damaged hose O-ring.	- Tighten tube nuts to specifications: Pressure Hose: 14-18 ft-lb. Return Hose: 21-30 ft-lb. Valve-to-Cylinder Hose: 15-19 ft-lb. - Replace mating hose assembly: Basic part numbers (-3A714-) (-3A719-) (-3E601-) (-3A717-) (-3A713-).
Leakage at ends of control valve casting or at ball stud boot seal. Non-integral power steering.	Leaking seals.	Install new valve body seals and reaction limiting seals (Kit No. C3AZ-3A650-B).
Leakage through control valve body or past ball plugs on bottom of control valve. Non-integral power steering.	Porous or damaged control valve casting.	Replace control valve assembly (-3A730-).
Power steering pump leaks.	- Fluid, cap and dipstick. - Poor brazing of reservoir at filler neck or return tube or damaged reservoir. - Loose or damaged hose fittings. - Leakage at pump shaft seal area. - Damaged rotor shaft. - Pump assembly. - Damaged reservoir O-ring	- Check for indications of false leakage – overfilled reservoir, improperly installed, damaged or lose cap or dipstick. - Replace reservoir. - Repair or replace. - Replace seal. - Replace. - Check for plugged seal drainback hole and/or worn shaft bushing. Partially disassemble pump and clean drain back hole. If hole is not drilled through or shaft bushing worn, replace the housing plate and bushing assembly. - Replace O-ring
	Rattle	
Steering column noise.	- Loose attachment brackets. - Looseness of ball bearings or insufficient lube. - Steering shaft insulators cracked.	- Tighten to specification. - Lube or replace bearings. - Replace or lube insulators as required.
	Squeak or Creaks	
	- Dry bushings. - Steering shaft grounding. - Socket casting rubbing against shroud or turn signal switch wiring. - Steering wheel rubbing against flange casting. - Dry shift lever grommets. - Insufficient lube on horn brush slip rings. - Upper or lower bearing sleeve out of position.	- Lube shaft seal and shift tube seal. - Align shaft. - Reposition shroud and/or reroute turn signal switch wiring. - Replace flange or steering wheel as required. - Lube grommets. - Lube slip rings. - Reposition sleeve or replace.

DIAGNOSIS GUIDE – STEERING GEAR

CONDITION	POSSIBLE CAUSE	RESOLUTION
Feedback rattle, knock in gear (Rack and Pinion Power Steering Gear).	- Loose outer ball joints. - Gear housing loose on crossmember. - Flexible coupling on column out of alignment. - Loose mounting bracket on gear housing tube. - Deteriorated shock absorbers. - Tie rod ball socket preload out of adjustment. - Loose pinion ball bearing plug or locknut. - Rack yoke bearing preload out of adjustment. - Oversize pinion shaft bushing. - Gear assembly.	- Tighten. Replace worn or broken parts. - Tighten mounting bolts to specifications. - Align as required. - Replace housing. - Replace shock absorbers. - Adjust preload to specifications. - Replace bearing if necessary. Tighten plug and locknut to specifications. - Check for broken spring. Tighten preload to specifications. - Replace housing. - Replace gear assembly.
Front end wander (Rack and Pinion Power Steering Gear).	- Loose outer ball joints. - Steering gear housing loose on crossmember. - Flexible coupling in column out of alignment. - Loose mounting bracket on gear housing tube. - Front end out of alignment. - Deteriorated shock absorbers. - Rack yoke bearing preload out of adjustment. - Rod ball socket preload out of adjustment. - Loose pinion ball bearings. - Steering gear assembly.	- Replace worn or broken parts. Tighten ball joints as required. - Tighten mounting bolts to specification. - Align as required. - Replace housing. - Adjust as required. - Replace shock absorbers. - Check spring. Adjust to specifications. - Adjust to specification. - Replace and/or tighten as required. - Remove gear and disassemble. Check for: - Loose pins in input shaft and valve assembly. - Worn pinion bushing. - Worn bushing in right side of housing. - Repair or replace parts as required.
Vibration when at static park and at low speed – immediately after filling system with power steering fluid (Rack and Pinion Power Steering Gear) only.	Air in system.	Drive vehicle slowly and cycle steering wheel stop-to-stop 40 to 50 times or until vibration stops. Do not hold wheel against the stops.
Poor returnability, sticky feel (Rack and Pinion Power Steering Gear).	- Broken gear housing, bent gear housing tube, bent or broken No. 2 crossmember. - Excessive lash in the rod ends and binding in ball joints. - Misaligned steering column. - Improper tires or wheels on car. - Front end out of alignment. - Damaged engine mounts. - Loose or broken valve housing bolts, loose pinion bearing locknut, and failed pinion bearing. - Steering gear.	- Inspect. Repair or replace damaged parts. - Adjust socket preload on tie rod ball. Replace worn or improper parts. - Align as required. - Replace with correct parts. - Adjust as required. - Inspect. Repair or replace damaged parts as required. - Repair or replace as required. - Remove gear. Disassemble, repair and replace damaged or binding parts.
Noise (Power Rack and Pinion Steering Gear).	- Grounded column causing intermittent hiss. - Low fluid in system. - Severe control valve hiss.	- Adjust column for flex coupling flatness. - Add power steering fluid and check for leakage. - Replace control valve.

TESTING

POWER STEERING—PRELIMINARY TESTS

Make the following preliminary tests before disassembling power steering:

Air Bleeding

If bubbles are present in the power steering fluid, bleed the system as follows:

1. Fill the reservoir to specification.
2. Run the engine until the fluid reaches normal operating temperature (165 degrees to 175 degrees F).
3. Turn the steering wheel all the way to the left and right several times. **Do not hold the wheel in the far left or right position.**
4. Recheck the fluid level.
5. If air is still trapped in the system, refer to the procedures covered under Purging Power Steering System of Air.

Fluid Level Check—Ford Pump

1. Run the engine until the fluid reaches normal operating temperature (165 degrees to 175 degrees F).
2. Turn the steering wheel all the way to the left and right several times. Turn off the engine.
3. Check the fluid level in the power steering reservoir. If the level is low, add Automatic Transmission Fluid C1AZ-19582-A, C or D (ESW-M2C33-F) **Do not overfill the reservoir.**

Fluid Level Check—Saginaw Pump

1. Run the engine until the fluid reaches normal operating temperature (approximately 165°-175°F).
2. Turn the steering wheel all the way to the left and right several times. Turn off the engine.
3. Check the fluid level. If the level is low, add Power Steering Fluid D5AZ-19582-A (M2C128-C) on Lincoln and Mark V, or A.T.F. C1AZ-19582-A, (ESW-M2C33-F) on Ford and Mercury, to the **COLD** mark on the dipstick.
4. Start the engine and run it at fast idle. Recheck the fluid level. Add fluid, if necessary, to reach the **COLD** mark.
5. Bleed the system by turning the steering wheel from side to side several times without hitting the stops. This will restore normal steering action.

Return the wheels to the center position and run the engine for an additional two or three minutes. Turn off the engine.

6. Road test the vehicle to be sure the steering functions normally and is free from noise.
7. Repeat Steps 1 and 2. The fluid should be at the **HOT** mark on the dipstick after the car has reached normal operating temperature.

Pump Belt Check

Replace and adjust broken, glazed, or worn pump belts. Refer to Part 13-50 for adjustment procedure.

Fluid Leak Check

1. With the engine idling, turn the steering wheel left to right several times. Check all possible leakage points.
2. Torque all loose fittings to specification. Replace damaged lines and seats.
3. Check hoses for cut tube O-rings.

Turning Effort Check

Be sure front wheels are properly aligned and tire pressures correct before checking turning effort.

1. Park vehicle on dry concrete and set the parking brake.
2. Idle the engine for two to three minutes. Turn the steering wheel to the left and right several times to warm the fluid.
3. With the engine running, attach a pull scale to the rim of the steering wheel. Measure the pull required to turn the wheel one complete revolution in each direction. See the chart at the end of this Part for acceptable measurements.

POWER STEERING PUMP FLOW AND PRESSURE TESTS

Prior to performing the pump flow and pressure test, the following checks, for conditions which could cause loss of power assist, must be performed and corrective action taken if necessary.

1. Check pump reservoir for proper fluid level.
2. Check tires for correct air pressure.
3. Check pump belt for proper tension.
4. Check pump for correct model and vehicle application.
5. Check for correct size pulleys on pump and engine.
6. Check entire system for damage, replacing parts as necessary.

If the above items are to specifications, or have been corrected, and the loss of assist still exists, test the power steering pump flow and pressure to determine whether the trouble is in the pump, power steering gear, control valve, or in the hydro-boost valve if so equipped.

TEST EQUIPMENT

1. Engine tachometer.
2. Thermometer—0° to 300°F.
3. Rotunda Flow/Pressure Analyzer.
4. Set of adapter fittings.

The test procedure used in conjunction with the Rotunda Flow/Pressure Power Steering Analyzer provides a method for checking the complete power steering system. The Rotunda Flow/Pressure Power Steering Analyzer can be used on integral or non-integral power steering systems to determine the cause of hard steering and/or lack of assist problems.

The Analyzer provides readouts for the following:

- A. System Backpressure
- B. Pump Flow

C. Steering Gear Internal Leakage**D. Power Steering Control Valve & Cylinder Internal Leakage**

The interpretation of the above readouts will determine which of the following conditions or components are the cause of the problem.

- a. Restriction in Hoses or Fittings
- b. Control Valve & Cylinder
- c. Sticking Gear Valve
- d. Inefficient Pump Cam Pack
- e. Sticking Relief Valve
- f. Binding in Suspension

TEST PROCEDURE

1. To connect the analyzer into the steering system, remove the pressure fitting from the pump and connect it into the appropriate adapter of the analyzer.
2. Thread the other adapter of the analyzer into the pump.
3. Connect the analyzer to the adapters and tighten both connections to 15 foot pounds maximum.

NOTE: The adapter on the analyzer may be switched so that the connection is made at alternate locations between the pump and gear (Fig. 1).

4. Add power steering fluid to the pump if required. Start the engine and run it for approximately (2) two minutes with the idle set at manufacturer's specifications.
5. Record the following:

A Flow (gallons/min. at $170^{\circ} \pm 5^{\circ}\text{F}$)

B Pressure (PSI at $170^{\circ} \pm 5^{\circ}\text{F}$) at idle with the gate valve fully open.

(a) If flow (A) is below two (2) gallons/min., the pump may require repair, however, at this point continue the diagnosis. Check chart on page 5 for flow and relief pressure against the model pump being tested.

(b) If pressure (B) is above 150 PSI, check hoses for restrictions and check the steering gear for poppet valve restrictions (Saginaw Gears Only), 200 PSI for hydroboost vehicles.

NOTE: On non-integral power steering, jiggle the steering wheel to insure that the spool valve is centered prior to test.

6. Partially close the gate valve to build up 625 PSI. Observe and record flow.

C (gallons/min. at $170^{\circ} \pm 5^{\circ}\text{F}$)

(a) If flow (C) drops to a level lower than the value on chart I (A), disassemble the pump and replace the cam pack. If the pressure plates are cracked or worn, replace them. Continue with the diagnosis.

7. Completely close and partially open the gate valve three times. (Do not allow the valve to remain closed for more than five (5) seconds). Observe and record pressure (D), (PSI).

(a) Check the attached chart for the pressure specification listed for the applicable pump model. If the pressure recorded (D) is 100 PSI lower than

the specification listed, replace the flow control valve in the pump.

(b) If the pressure recorded (D) is above the specification listed by more than 50 PSI, the flow control valve in the pump should be removed and cleaned or replaced.

8. Increase the engine speed from idle to approximately 1500 RPM. Observe and record flow (E) (gallons/min.).

(a) If flow (E) varies more than (1) one gallon/min. from flow (A) the flow control valve in the pump should be removed, and cleaned or replaced.

9. Check idle speed and set to specification if necessary. With the engine at idle, turn (or have someone turn) the steering wheel to the left and right stops. Record the pressure and flow at stops (F) (L.T. pressure PSI, flow gallons/min.; R.T. pressure PSI, flow gallons/min.).

(a) Pressure developed at both stops should be nearly the same as maximum pump output pressure (D). At the same time, the flow should drop below 1 gallon/min. for integral power steering and for non-integral the flow should drop below 1/2 gallon. If the pressure does not reach maximum output or the flow does not drop below 1 gallon/min. for integral and 1/2 gallon/min. for non-integral, excessive internal leakage is occurring. Remove and disassemble the steering gear on integral power steering and remove the control valve and cylinder on non-integral power steering. Replace damaged or broken parts. Pay particular attention to the rack piston and valve seals for damage.

10. Turn (or have someone turn) the steering wheel slightly in both directions and release quickly while watching the pressure gage. The needle should move from the normal backpressure reading and snap back as the wheel is released. If it comes back slowly, or sticks, the rotary valve in the steering gear is sticking on integral power steering or the control valve is sticking on non-integral power steering.

Remove, disassemble and clean the rotary valve on integral power steering and on non-integral power steering, disassemble and clean the control valve spool. If the system is severely contaminated both gear hoses, control valve, and pump must be completely disassembled and cleaned before reassembly.

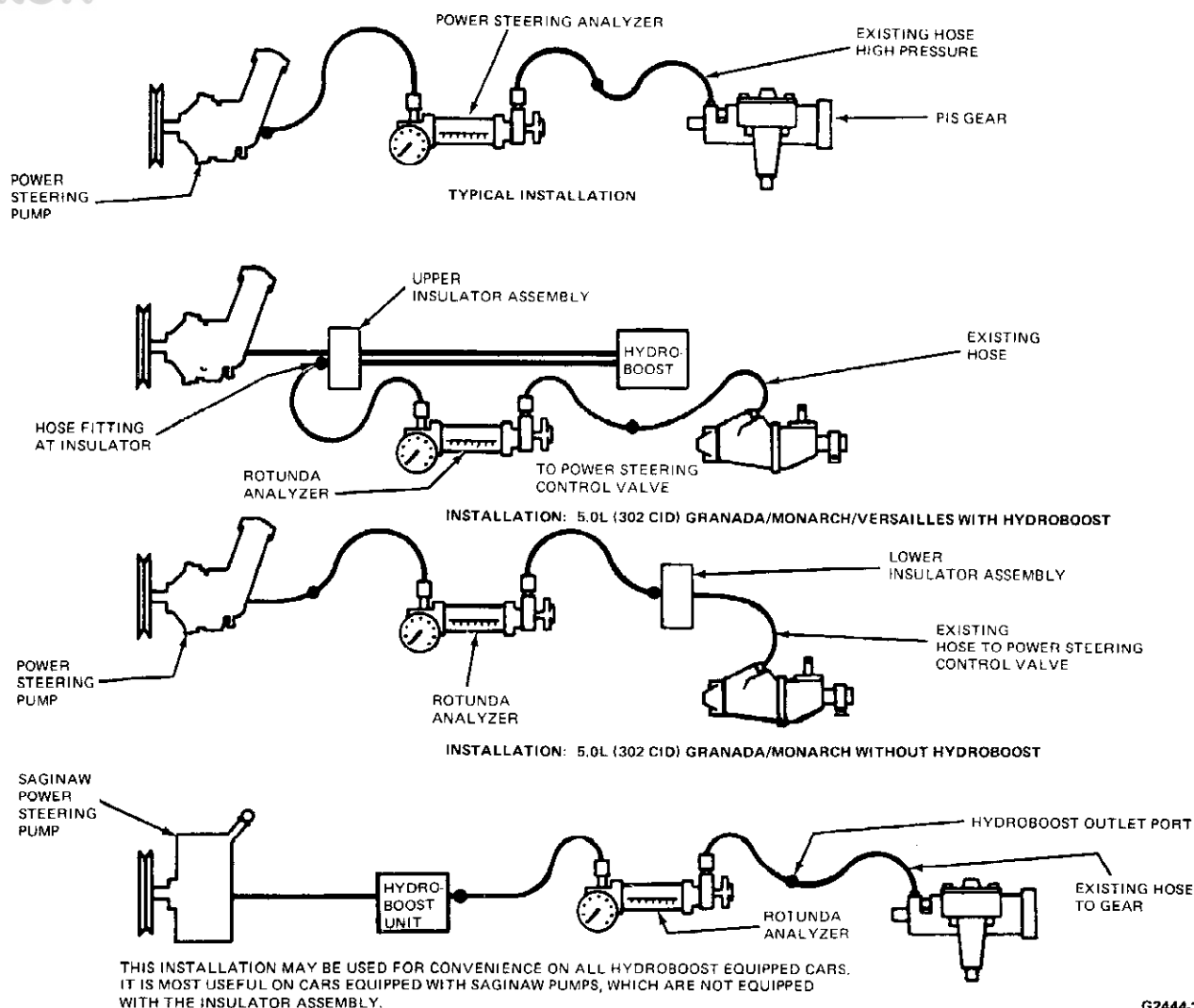
NOTE: If problem still exists, check ball joints, linkage, "etc.". (See Service Manual for Steering Diagnosis)

PURGING POWER STEERING SYSTEM OF AIR

Air trapped in the power steering system, which causes a whine-type noise between 20-45 mph on light acceleration, can be removed by using a power steering pump air evacuator assembly (DEVAC Tool) or the VACUUM FILL PROCESS.

Devac System

Fabricate a DEVAC purging tool as shown in Fig. 3 for Ford pump or as in Fig. 4 for Saginaw pump.



G2444-2A

FIG. 1 Using Power Steering Analyzer

The procedure for removing entrapped air is as follows:

1. Check the pump reservoir oil level to make certain the fluid level is correct (add fluid if low, siphon out fluid if level is above full mark).
2. Insert the rubber stopper end of the air evacuator assembly tightly into the filler tube.
3. Connect a suitable length of hose from the other end of the air evacuator to a distributor machine or air-conditioner vacuum motor. **Do Not Use Engine Vacuum.**
4. Let the engine idle for approximately 15 minutes. Turn steering wheel one full cycle every five minutes. (Do not hit the stops.) This assists in removing air trapped in the system.
5. Disconnect and remove the evacuator and reinstall the filler tube dipstick.

Vacuum Fill Process

This procedure is to be used primarily for vehicles that have hydro-boost brake systems. The method should be used whenever the pump, gear, or hydro-

boost is removed, serviced and reinstalled into the power steering hydraulic system.

A. Material Required

1. A vacuum pump with gauge, capable of pulling 25 inches of vacuum. The vacuum source could be one of the following:
 - a. Distributor test machine vacuum pump.
 - b. Vacuum motor from an air conditioning charging system.
 - c. The manifold vacuum source from another vehicle.
2. Special power steering pump cap assembly with a tee connection, shut off valves and a remote fluid reservoir (Fig. 5). The DEVAC tool (Fig. 3) can be used on Ford Pumps. For Saginaw pumps, fabricate a special cap as shown in Fig. 4.
3. List of materials required to construct a vacuum fill system (Fig. 5).

B. Preparation

1. Assemble the vacuum fill system as shown in Fig. 5.
2. Install the vacuum fill system on the vehicle. If the steering gear, pump or hydroboost have been

FORD P/S PUMPS

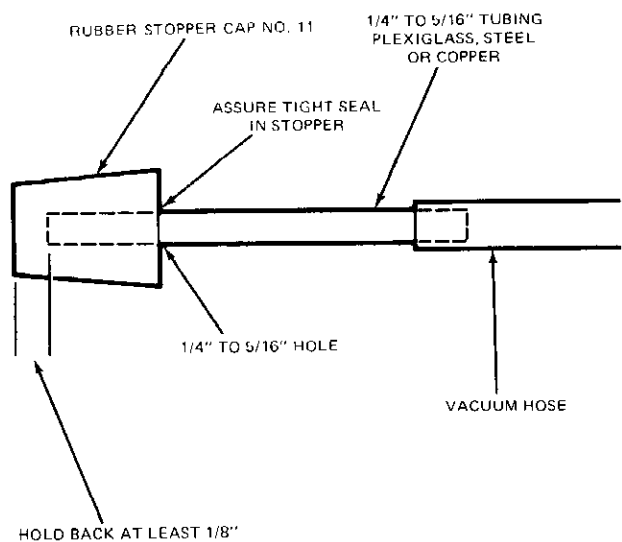
Pump Model	Min. Flow G.P.M.	Min. Relief Pressure PSI
HBC-W	1.9	1050
HBC-V	1.9	1050
HBC-U	1.9	1200
HBC-T	1.9	1300

SAGINAW P/S PUMPS

HBA-GS	2.0	1350
HBA-GR	2.0	1350
HBA-GT	2.0	1350

G2445-1A

FIG. 2 G.P.M. Flow and Pressure Chart



G2122-1B

FIG. 3 Power Steering System Purging Tool (For Ford Pump)

changed or flushed, allow old fluid to drain from the system.

3. Tighten all steering system and vacuum-fill connections.

C. Fill Procedure

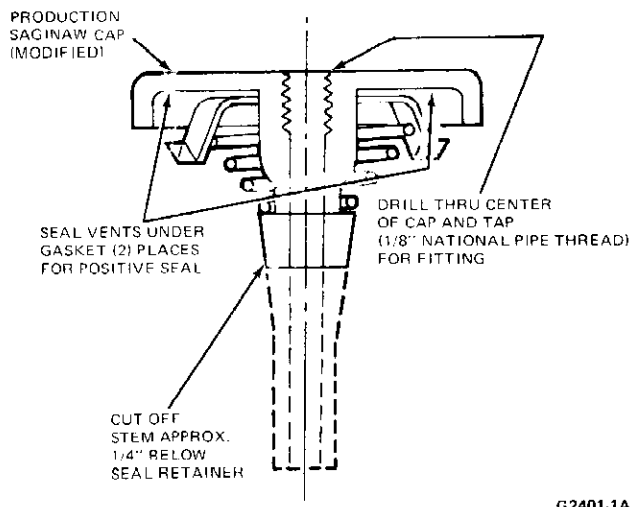
1. Close all valves.
2. Pour enough steering fluid in the remote reservoir to exceed the amount required for filling the system.
3. Open Valve No. 1 and allow the power steering fluid to bleed through the power steering pump filler cap. Close Valve No. 1 after bleeding.
4. Install the cap on the power steering pump fill neck.

5. Open Valve No. 2 and No. 3. Start the vacuum pump. Operate the pump until a gauge reading 25-30 inches of vacuum is obtained.
6. Close Valve No. 3 and shut off the vacuum pump. Watch the gauge for approximately 30 seconds; if the vacuum reading drops more than 1 inch, there is a leak in the power steering or filling system that must be corrected.
7. Restart the vacuum pump; open Valve No. 3. Operate the pump until a gauge reading of 25-30 inches is obtained.
8. Close Valve No. 2 and shut off the pump. Open Valve No. 1 to fill the steering system with fluid. The remote fill reservoir should be elevated higher than the steering pump.
9. When fluid stops draining from remote fill reservoir, close Valve No. 1 and remove cap from steering pump.
10. Adjust fluid level in pump to correct level. There will be a slight drop in the level when the engine is first started and the steering cycled.
11. Operate the engine at an idle for 15 minutes; then inspect for leaks. It will not be necessary to de-vac the system unless there is evidence of air in the steering pump which could cause noise or affect performance.

LUBRICANT CHECKING PROCEDURE

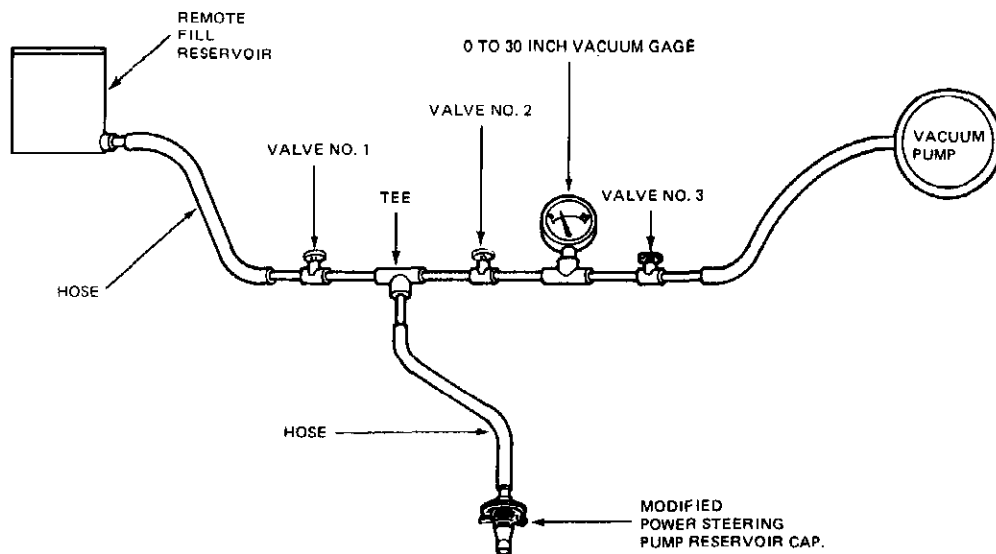
Manual Steering Gear

1. Center the steering wheel.
2. Remove the gear housing filler plug.
3. Remove the lower cover-to-housing attaching bolt.
4. With a clean punch or similar tool, remove or push inward any loose lubricant in the filler plug hole and cover-to-housing attaching bolt hole.
5. Slowly turn the steering wheel all the way to the left. The lubricant should rise within the lower cover bolt hole. Turn the steering wheel all the way to the right. The lubricant should rise in the filler plug hole.



G2401-1A

Fig. 4 - Modified Pump Reservoir Cap—Saginaw Pump



G2042-2A

Fig. 5 - Vacuum Fill System Assembled

If lubricant does not rise in both holes, add lubricant and recheck.

6. Reinstall the lower cover-to-housing attaching bolt and the filler plug.

START-UP PROCEDURE AFTER POWER STEERING PUMP OR GEAR OVERHAUL

After engine start up, follow these steps to eliminate excessive steering system noise due to air trapped in the system during repair:

1. Disconnect the coil wire.
2. Fill the reservoir.
3. Crank the engine with the starter and add fluid until the level remains constant.
4. While cranking the engine, rotate the steering wheel from stop to stop. **Front wheels must be off the floor during stop-to-stop rotation of the steering wheel.** Recheck the fluid level, and add fluid, if necessary.
5. Reconnect the coil wire.
6. Start the engine and allow it to run for several minutes.
7. Rotate the steering wheel from far left to far right.
8. Turn off the engine and recheck the fluid level. Add fluid, if necessary.

REMOVAL AND INSTALLATION

IGNITION LOCK CYLINDER ASSEMBLY

THE FOLLOWING PROCEDURE PERTAINS TO VEHICLES THAT HAVE FUNCTIONAL LOCK CYLINDERS: IGNITION KEYS ARE AVAILABLE OR THE IGNITION KEY NUMBERS ARE KNOWN AND THE PROPER KEY CAN BE MADE.

Fixed Steering Column

Removal

1. Disconnect the battery ground cable.
2. Remove the steering wheel trim pad and the steering wheel as described in Parts 13-03 and 13-04.

3. Place the gear shift in PARK (with automatic transmission or in any position with manual transmission and turn the lock cylinder with the ignition key to ON position.
4. Place 1/8 inch diameter wire pin or small drift punch in the hole located inside the column near the base of the lock cylinder housing and depress the retaining pin while pulling out on the lock cylinder to remove it from the column housing.

Installation

1. To install the lock cylinder, turn the lock cylinder to the ON position and depress the retaining pin, then insert the lock cylinder into its housing in the flange casting. Assure that the cylinder is fully seated and

aligned into the interlocking washer before turning the key to the OFF position. This action will permit the cylinder retaining pin to extend into the cylinder cast housing hole.

2. Using the ignition key rotate the lock cylinder to insure correct mechanical operation in all positions.
3. Install the steering wheel and trim pads as described in Parts 13-03 and 13-04.
4. Connect the battery ground cable.
5. Check for proper start in Park or Neutral. Also check to make certain that the start circuit cannot be actuated in the Drive and Reverse positions.

Tilt Steering Column

Removal

1. Disconnect the battery ground cable.
2. Place the gear shift in PARK position and turn the lock cylinder with the ignition key to the ON position.
3. Insert a 1/8 inch diameter wire pin or a small drift punch in the hole located on the outside of the steering column casting adjacent to the hazard flasher button (Fig. 6).
4. Depress the drift punch or wire pin and pull out on the lock cylinder to remove the lock cylinder from the steering column housing.

Installation

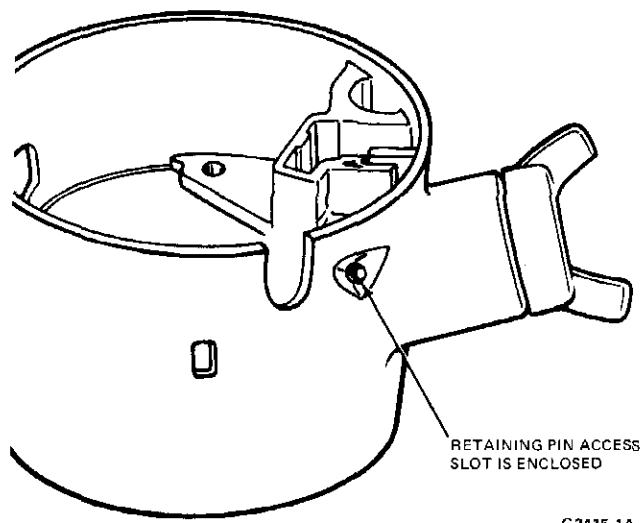
1. To install the lock cylinder, turn the lock cylinder to the ON position and depress the retaining pin, then insert the lock cylinder into its housing in the flange casting. Assure that the lock cylinder is fully seated and aligned into the interlocking washer before turning the key to the OFF position. This action will permit the cylinder retaining pin to extend into the cylinder cast housing hole.
2. Using the ignition key rotate the lock cylinder to insure correct mechanical operation in all positions.
3. Connect the battery ground cable.
4. Check for proper start in Park and Neutral. Also check to make certain that the start circuit cannot be actuated in the Drive and Reverse positions.

THE FOLLOWING PROCEDURE APPLIES TO VEHICLES WHERE THE IGNITION LOCK IS INOPERATIVE AND THE LOCK CYLINDER CANNOT BE ROTATED DUE TO A LOST OR BROKEN IGNITION KEY; THE KEY NUMBER NOT KNOWN; OR THE LOCK CYLINDER CAP IS DAMAGED AND/OR BROKEN TO THE EXTENT THAT THE LOCK CYLINDER CANNOT BE ROTATED.

Fixed Steering Column

Removal

1. Disconnect the battery ground cable.
2. Remove the steering wheel and pad assembly as described earlier in this section.
3. Remove the turn signal lever from the steering column.
4. To gain access to the ignition switch on the Granada, Monarch, Pinto, Bobcat, Mustang II, Ford,



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FIG. 6 Lock Retaining Pin Access Slot

Mercury, Lincoln Continental, Fairmont and Zephyr, remove the steering column trim shrouds from the steering column. Detach and lower the steering column assembly from the brake pedal support bracket as described earlier in this Part. To gain access to the ignition switch on the LTD II, Cougar, Ranchero, Thunderbird and Continental Mark V, remove the steering column trim shrouds and the instrument cluster as described in Part 33-50.

5. Remove the ignition switch and pin it in the LOCK position as described in Part 33-70 (Fig. 7).
6. Remove the turn signal switch from the column assembly as described in Part 13-03.
7. Remove the upper bearing snap ring and the (2) "T"-bolt retaining nuts that secure the flange casting to the outer tube. Remove the entire flange casting assembly, the upper shaft bearing, the lock cylinder assembly, the ignition switch actuator and the ignition switch actuator rod by pulling the assembly over the end of the steering column shaft (Fig. 8).
8. Replace the above assembly with a new assembly consisting of:
 - a.(1) 3511 Flange
 - b.(1) 11582 Lock Cylinder Assembly
 - c.(1) 3E717 Lock Gear, Steering Column Lock
 - d.(1) 3E700 Bearing, Steering Column Lock
 - e.(1) 3C610 Retainer, Steering Column Upper Bearing
 - f.(1) 3E723 Actuator Assembly, Steering Column Lock

NOTE: Retain the ignition switch actuating rod from the removed casting assembly and use it with the new flange casting assembly.