

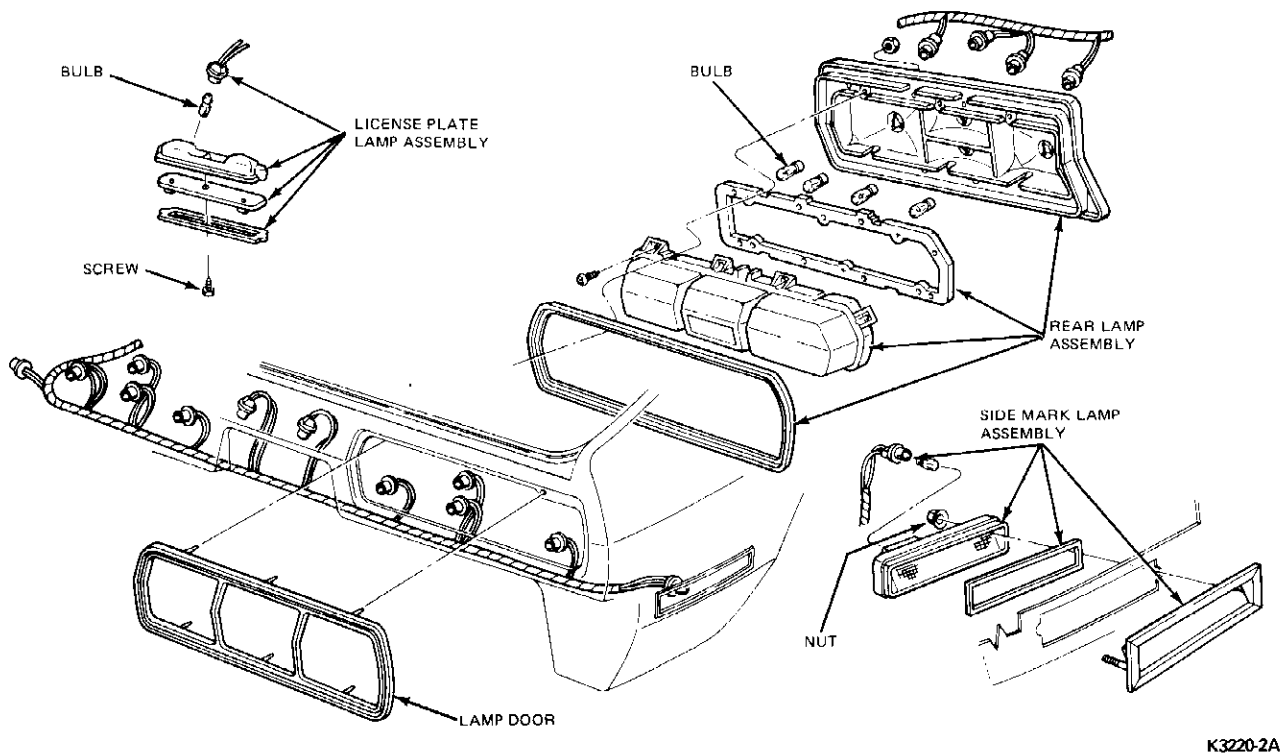


FIG. 16 Rear Lamp Installation—Mustang II

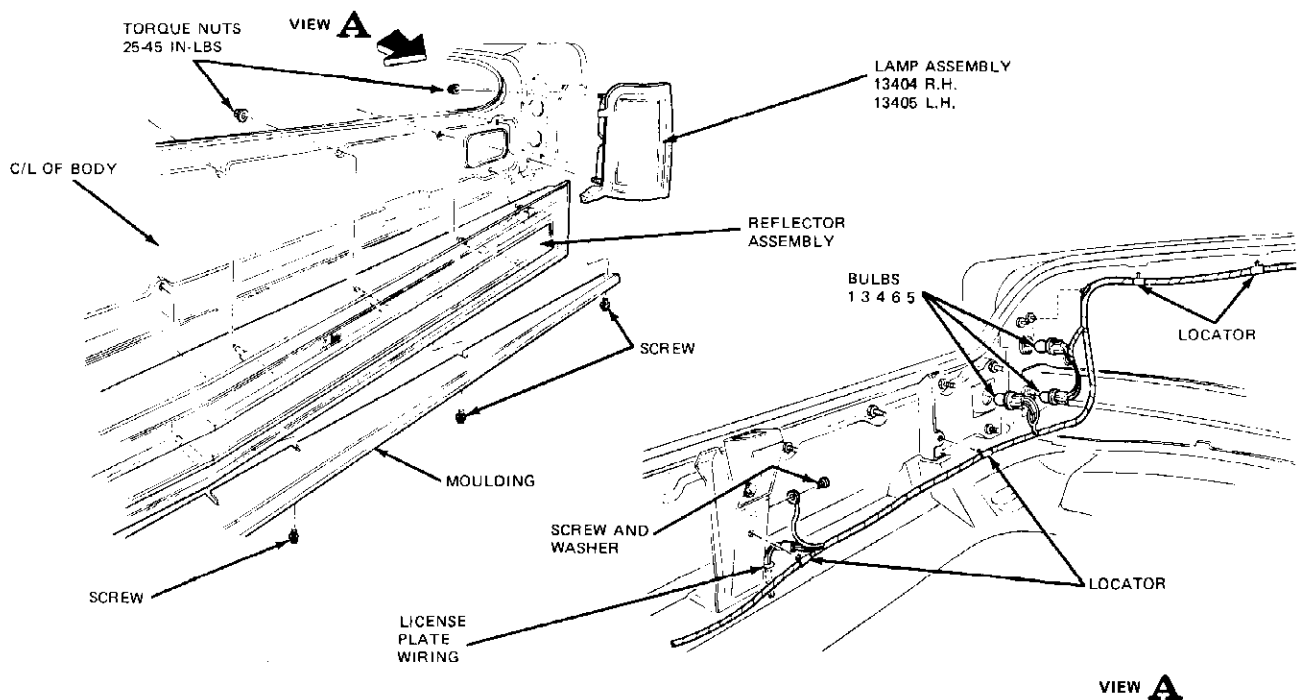


FIG. 17 Rear Lamp Installation—Lincoln Continental

STOP LAMP SWITCH

All Except Granada, Versailles and Monarch With Vacuum-Powered Brakes

The mechanical stop lamp switch assembly is installed on the pin of the brake pedal arm, so that it straddles the master cylinder push rod (Fig. 22). The switch assembly is a slip fit on the pedal arm pin, and thus, the switch assembly moves with the pedal arm whenever the brake pedal is depressed.

The brake pedal arm pin and plastic bushing has a designed-in clearance with the eye of the master cylinder push rod (Fig. 21). Because of this clearance, whenever the brake pedal is pushed forward, the stop lamp switch contacts moving with the pedal arm are actually pushed against the end of the master cylinder push rod through the switch actuating pin. It is this movement of the switch with respect to the actuating pin and master cylinder push rod that closes the switch contacts, completing the circuit to the stop lamps.

When the brake pedal is released, the spring in the stop lamp switch returns the actuating pin to its normal position and the circuit to the stop lamp opens.

1. Disconnect the wire harness at the connector from the switch.
2. Remove the hairpin retainer, slide the stop lamp switch, the push rod and the nylon washers and bushing away from the pedal, and remove the switch (Fig. 22).
3. Position the switch, push rod, and bushing and washers on the brake pedal pin, as shown in Fig. 22 and install the hairpin retainer.
4. Assemble the wire harness connector to the switch and install the wires in the retaining clip (Fig. 22).

Granada, Versailles and Monarch with Vacuum-Powered Brakes

Removal

1. Disconnect the negative battery cable.
2. Disconnect the stoplamp switch wire connector from the switch.
3. **IMPORTANT**—Loosen the brake booster nuts at the pedal support approximately 1/4 inch so booster is free to move eliminating binding during switch removal.
4. Remove the hairpin retainer and outer nylon washer from the pedal pin. Slide the stoplamp switch off the brake pedal pin just far enough for the outer arm to clear the pin. Then remove the switch.

Installation

1. Position the new stoplamp switch so that it straddles the push rod, with the slot on the pedal pin and the switch outer frame hole just clearing the pin. Slide the switch upward onto the pin and push rod. Slide the assembly inboard toward the brake pedal arm.
2. Install the outer nylon washer and the hairpin retainer.
3. Tighten the booster attaching nuts to specification.
4. Connect the stoplamp switch wire connector to the switch. Connect the negative battery cable.
5. Check the stoplamps for proper operation.

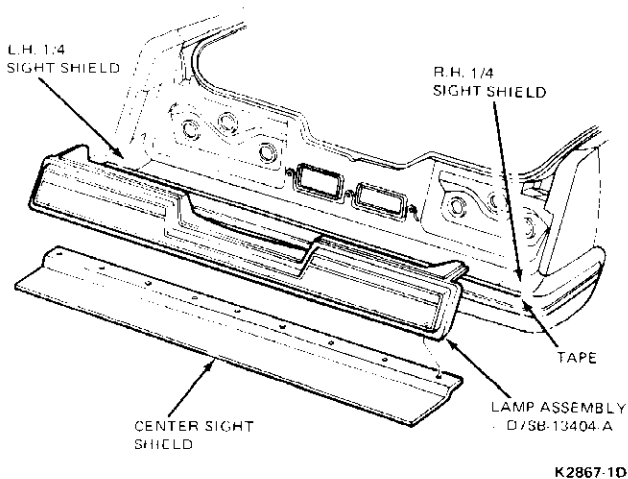


FIG. 18 Rear Lamp Installation—Thunderbird

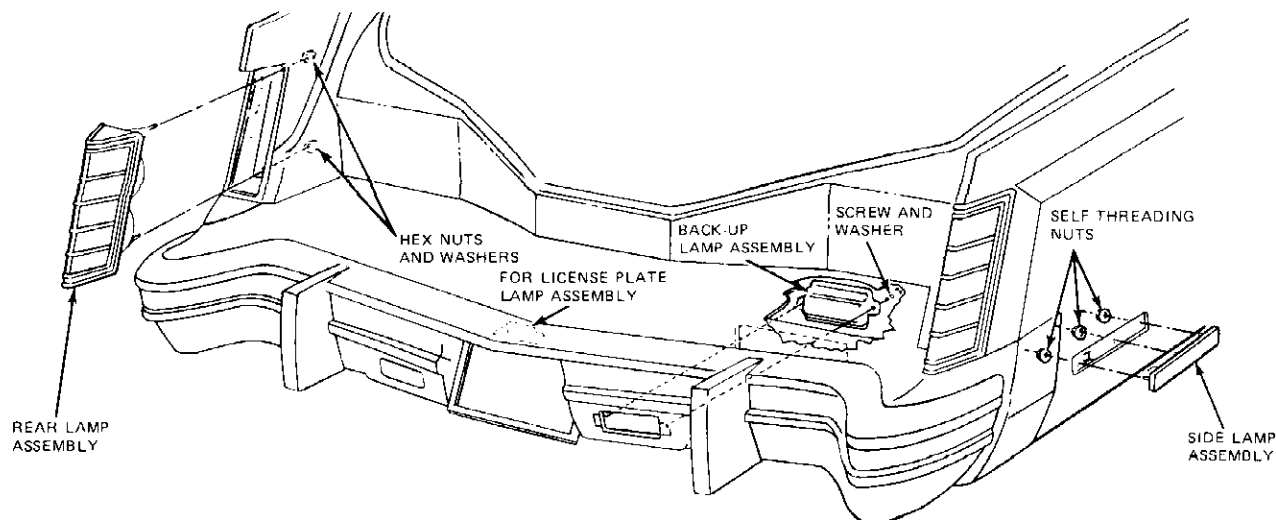
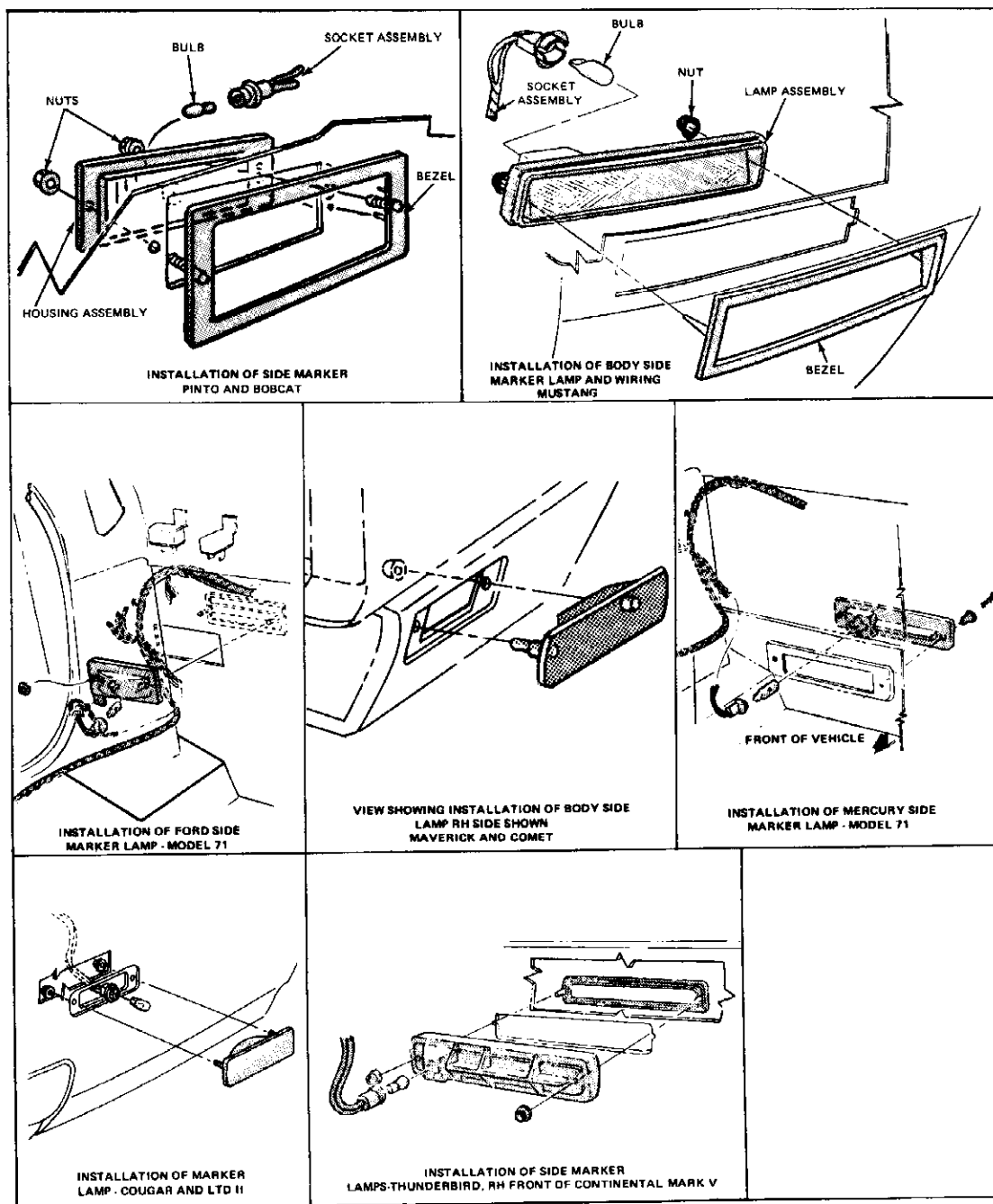


FIG. 19 Rear Lamp Installation—Continental Mark V



K23B6-G

FIG. 20 Rear Marker Lamp Installation

LICENSE PLATE LAMP

All Except Ford and Mercury Station Wagon

To replace the license lamp assembly, remove the two lamp body retaining screws and remove the lamp assembly. Remove the socket and the bulb, from the back of the lamp body.

Station Wagon—Except Ford and Mercury

The lamp can be rotated in the wrong direction which will force the locking tab out of its retaining notch and possibly break it. The license lamp lens and bezel can be removed, for bulb replacement, by turning the lens counterclockwise. By turning the lamp body seven-eighths (7/8) of a turn clockwise, the lamp body can be removed from the rear body.

BACK UP LAMPS

Ford—Except Station Wagons

The back-up lamp is located on each end of the deck lid applique. The bulb can be replaced from inside the luggage compartment by removing socket from lamp housing.

To replace the rear reflector or back-up lens, first remove the attaching nuts from the underside of the deck lid and remove rear applique from vehicle. Remove the back-up body and lens assembly from applique by removing the four attaching nuts. The lens cannot be replaced by itself. It must be serviced as a lens and body assembly.

Mercury—Except Station Wagons

To service bulbs, loosen luggage compartment trim cover. Remove socket from lamp body (part of cover assembly). To service back-up lamp components, proceed as above. Remove both rear lamp assemblies as outlined in this Part. Remove twelve (12) nut and washer assemblies from cover retaining studs. Pull cover rearward. Remove four (4) screws attaching the lamp assembly to the cover. For installation, reverse above procedure, using new nut and washer assemblies to provide adequate seal.

Fairmont and Zephyr—Station Wagons

To replace the back-up lamp assembly, remove the screws that retain the license lamp unit to the tailgate. These screws are accessible from the interior side of the tailgate panel. Separate the module from the vehicle. From the back side of the unit, remove the screws that retain the back-up lamp assembly to the unit.

Incorporated In Rear Lamp Assembly

To replace a bulb, follow procedures outlined under Rear Lamps.

BACK-UP LAMP SWITCH

Before replacing a back-up lamp switch, be sure to check the condition of the lamp bulbs.

Since all back-up lamp switches are operated by the transmission selector lever, replacement procedures differ according to mounting location of the selector lever and type of transmission used.

Floor Or Console Mounted—Automatic Transmission

Vehicles equipped with a floor or console-mounted automatic transmission still have a neutral start switch. On these vehicles, the back-up lamp switch is an integral part of the neutral start switch. For adjustment and removal and installation procedures, refer to Group 17.

Column Mounted With Automatic Transmission

1. Disconnect the back-up lamp switch wires at the plug connector. On vehicles so equipped, disconnect the two parking brake release vacuum hoses.
2. Remove the two screws, securing the back-up lamp switch to the steering column and lift the switch from the column.

On vehicles other than LTD II, Cougar, Thunderbird and Continental Mark V, check the column to be sure that the metal switch actuator is secured to the shift tube and that it is seated as far forward against the shift tube bearing as is possible. Also check for a broken or damaged actuator.

3. Before installing a new switch to the column, check to see that the drive position gauge is inserted in the drive pinning hole. If the pin is missing, align the two holes at the drive pinning hole on top of the switch and install a No. 43 drill or 0.092-0.093 inch gauge pin.
4. While holding the selector lever against the stop in the drive detent position, place the switch on the column and install the two attaching screws.
5. Remove the gauge pin (or No. 43 drill if used).
6. Connect the switch wires to the plug connector and connect the two parking brake release vacuum hoses.

Column-Mounted—Manual Transmission

The switch is mounted at the lower end of the steering column, but does not require pinning in any position.

Remove the wire retaining clip (one screw) from the brake pedal support extension. Disengage the switch wiring from the clip and disconnect at the plug connector. Remove the switch from the steering column (two retaining screws).

When installing the switch, route the wiring from behind the back face of the clip and around through the clip jaws, and then mount the clip and wiring to the brake pedal support extension.

Floor Mounted—Manual Transmission

3-Speed Fairmont, Zephyr, Versailles, Granada and Monarch

Place the shift control lever in neutral and raise the vehicle on a hoist. Disconnect the switch lead wires at the connector, and remove the switch and bracket assembly (one retaining bolt) from the selector lever support bracket. Install a new switch, bracket and wiring assembly to the support bracket and connect the

wires. Make sure switch is inside shift mechanism boot and that reverse shift lever directly activates switch plunger.

4-Speed—Pinto, Bobcat and Mustang II

Place the shift control lever in neutral and raise the vehicle on a hoist. Disconnect the electrical connector from the switch. Unscrew switch from the transmission extension. Screw in new switch by hand and torque to a maximum of 5 ft-lbs. Connect electrical connector to the new switch.

COACH LAMP

Lincoln Continental and Versailles

A coach lamp is mounted on the center pillar of the Lincoln Continental and Versailles.

To replace the lamp bulb, first remove the screw at the bottom (and top on half-vinyl roof) of the bezel. Remove bezel from pillar retainer clip by pulling at top of bezel (full vinyl roof). Remove lamp assembly from pillar and twist socket one-third ($1/3$) turn counterclockwise to remove it from the housing. Pull out lamp bulb.

REAR LAMP WIRING—FLAT FLEXIBLE

Open Circuit Conditions—Fairmont, Zephyr, LTD II and Cougar

1. Locate the open circuit.
2. Disconnect the negative battery cable from the battery.
3. Cut the plastic covering along the flat wire edges $1/2$ -inch back from each side of the open circuit.
4. Obtain 4 inches of 18-gauge stranded wire and strip $1/4$ -inch of insulation from each end.
5. Crimp a repair terminal on each end of the 4-inch wire. Crimp the female portion of repair terminal onto flat wire strip with Tool No. D7AB-17025-AA. Tape each repair terminal with electric tape.
6. Press jumper wire firmly against the wire harness. Cover with 3 layers of tape.
7. Reconnect negative battery cable and test lamps.

Separated Round Wire Weld Junction

1. Crimp repair terminal on end of round wire lead which separated from flat wire.
2. Cut plastic covering on flat wire edges 2 inches on each side of point of separation.
3. Place flat wire in service terminal and crimp firmly.
4. Follow Open Circuit Conditions steps above.

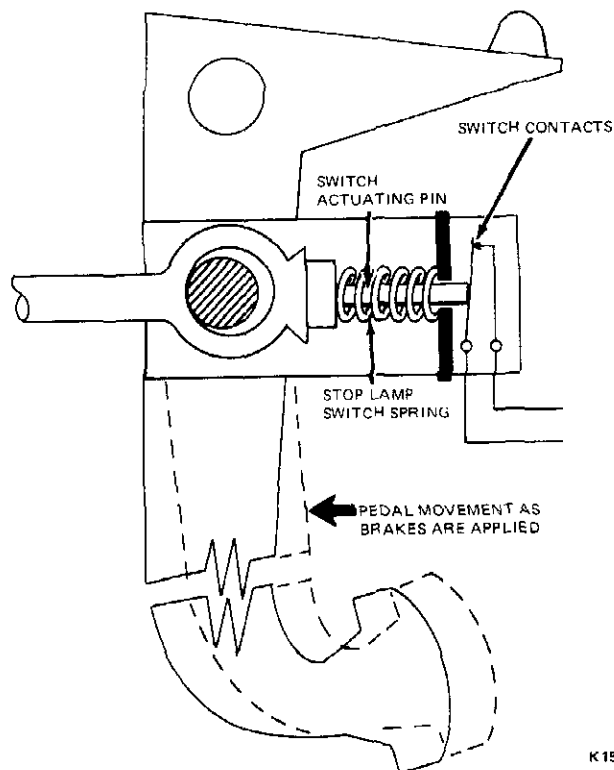
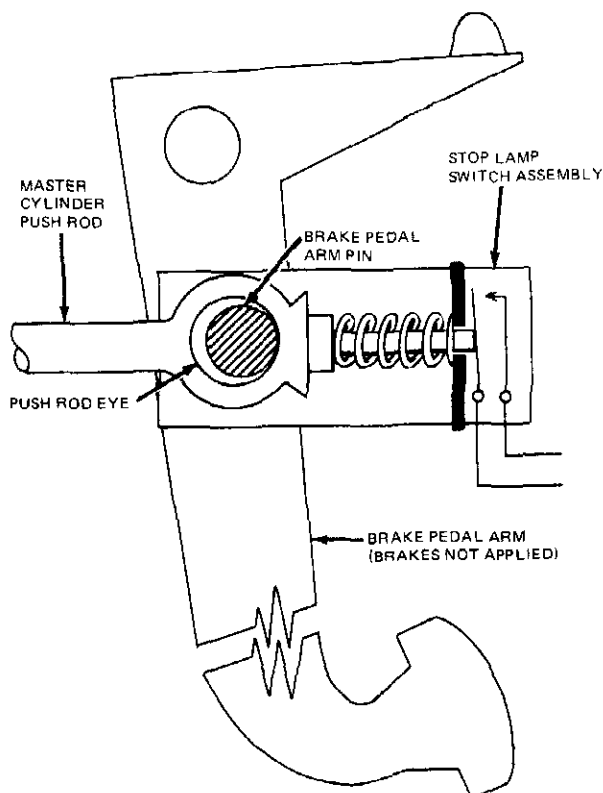
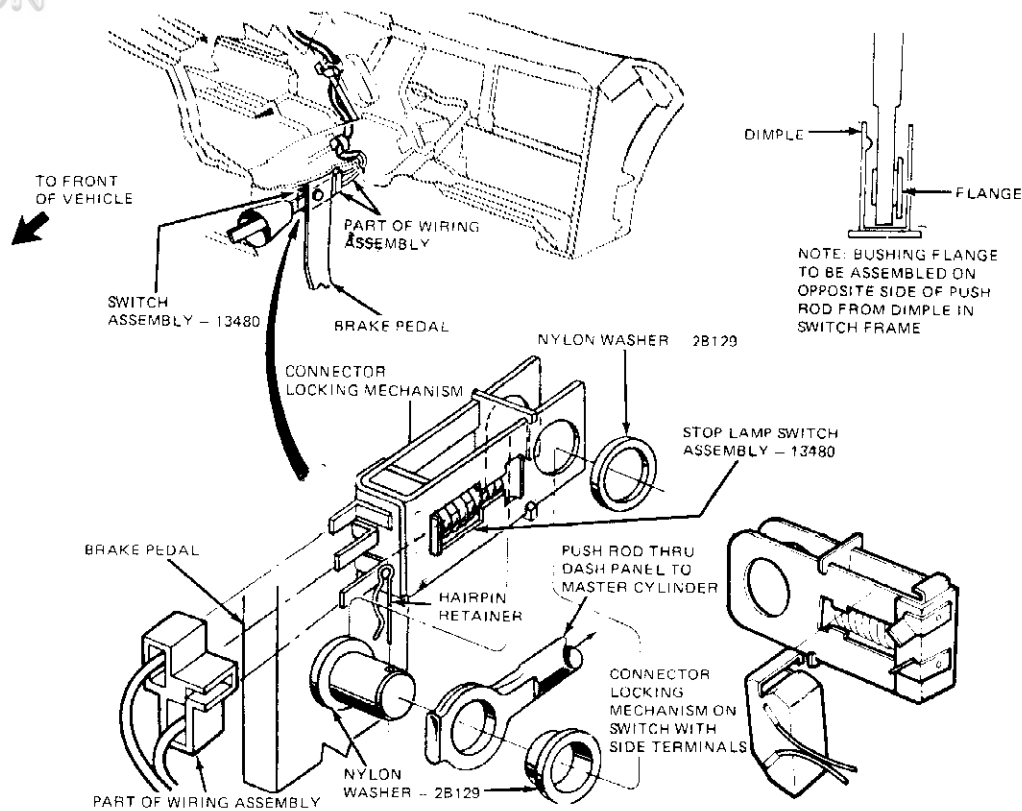


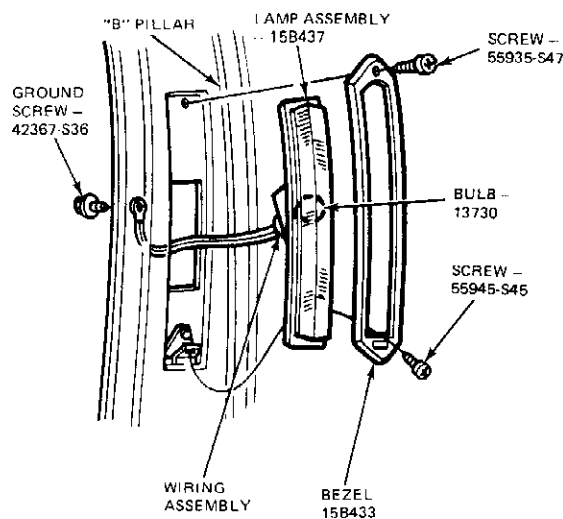
FIG. 21 Mechanical Stop Lamp Switch Operation

K1582-2C



K1157-2F

FIG. 22 Typical Stop Lamp Switch Installation



K3221-1B

FIG. 23 Coach Lamp—Versailles

Turn Signal and Hazard Flasher		PART 32-40	
Applies to All Models			
SUBJECT	PAGE	SUBJECT	PAGE
DESCRIPTION AND OPERATION	40-1	REMOVAL AND INSTALLATION (Cont'd.)	
REMOVAL AND INSTALLATION		Turn Signal/Hazard Flasher	
Flasher Units	40-1	Switch and Wire Assembly	40-2

CK3373-2B

DESCRIPTION AND OPERATION

TURN SIGNAL AND HAZARD FLASHER SYSTEM

ALL VEHICLES

The turn signal and hazard flasher switches are integral parts of the same switch assembly mounted on the steering column hub.

The turn signal switch lever is on the left side of the upper steering column hub. The hazard flasher switch knob is located on the right or lower side of the upper steering column hub.

To operate the turn signals, the ignition switch must be in either the ACC or ON position. To indicate a normal full turn, move the turn signal switch lever to the second stop position for the turn desired. The lever will remain in position without manual effort until the turn is completed, at which time the steering wheel will automatically cancel the turn signals.

The hazard flasher system is operated independently of the ignition switch. All turn signal lights can be made to flash at the same time by pulling out the actuating knob of the hazard flasher switch located on the side of the steering column. Flashing is discontinued when the brake pedal is depressed.

Two flasher units are used. One unit is used in the turn signal circuit, and the other for the hazard flasher system. Refer to the Wiring and Vacuum Diagrams Manual, Form 7795P-78.

The turn signal system also has a lane change feature. To operate the lane change system, move and hold the turn signal lever to the first stop position when changing lanes. When the lane maneuver is completed, release the lever and it will return to the OFF position.

REMOVAL AND INSTALLATION

FLASHER UNITS

Refer to Fig. 1, for the flasher locations and the various types of flasher mounting.

SLOT MOUNTED FLASHERS

To remove this type of flasher, reach under the instrument panel, disconnect the wiring plug, and rotate

the unit 90 degrees counterclockwise to disengage it from the mounting slot. To install, lock the flasher in place by inserting the tab in the slot and rotating 90 degrees clockwise. Reconnect the wiring plug.

TURN SIGNAL/HAZARD FLASHER SWITCH AND WIRE ASSEMBLY

Removal

1. Remove the retaining screw from the underside of each steering wheel spoke, and lift off the pad horn switch/trim cover and medallion as an assembly. Disconnect the horn switch wires from the terminals on all except stalk-mounted horn switch.
2. Remove the steering wheel retaining nut and, using Tool 3600AA or equivalent, remove the steering wheel from the shaft.

3. Remove the turn signal switch lever by unscrewing it from the steering column.
4. Remove the shroud from under the steering column.
5. Disconnect the steering column wiring connector plugs from the bracket as shown in Fig. 2, and remove the screws that secure the switch assembly to the column.
6. On all vehicles with a tilt column, remove the wires and terminals from the steering column wiring connector plug with a very small screwdriver and/or paper clip (Fig. 3). **Record the color code and location of each wire before removing it from the connector plug.**

A hole provided in the flange casting, on fixed columns, makes it unnecessary to separate the wires from the connector plug. The plug with wires

Vehicle Line	Type of Mounting	Turn Signal Flasher Location	Hazard Flasher Location
Ford, Mercury, Lincoln Continental	Fuse Panel	Left Hand Sheet Metal End of Instrument Panel	Located in Fuse Panel L.H. Toe Board
Mustang	On Fuse Panel	Fuse Panel	Fuse Panel
Fairmont	Tab and Slot Tape	Instrument Panel Bracket Above Glove Box	Instrument Panel Bracket Above Glove Box
Zephyr	Tab and Slot Tape	Same as Fairmont	Same as Fairmont
Pinto	Tab and Slot	Behind Fuse Panel	Behind Fuse Panel
LTD II, Cougar, Thunderbird, and Continental Mark V	On Fuse Panel	Mark V: Center of Instr. Panel Others: On Fuse Panel	On Fuse Panel
Granada, Monarch, Versailles	Tab and Slot Tape	Instrument Panel Lower Flange – Right of Steering Column	Taped to 14401 Harness Between Instrument Panel and Steering Column Connections

CK2451-2H

FIG. 1 Flasher Unit Locations

installed can be guided through the hole. With a tilt column however, the bracketry and narrow clearances at the lower end of the column require separation of the wires from the plug.

7. Remove the plastic cover sleeve from the wiring harness and remove the switch and wires from the top of the tilt column.
8. **Transfer the ground brush located in the turn signal switch cancelling cam to the new switch assembly on vehicles equipped with speed control.**

Installation

1. Route the wires through the top of the column, so that they come out below the flange casting, and secure the switch to the column with the retaining screws.
2. If the wires were separated from the connector plugs, install the plastic cover sleeve over the wiring harness and press the wire terminals into their correct location in the plug.
3. Connect the plugs to their mating plugs at the lower end of the column (Fig. 2).
4. Install all retaining clips, shrouds and covers that were removed and install the turn signal switch lever.
5. Install the steering wheel and retaining nut and torque to specifications.
6. Connect the horn switch wires and install the pad, horn switch/trim cover and medallion as an assembly to the steering wheel. Install the retaining screws.

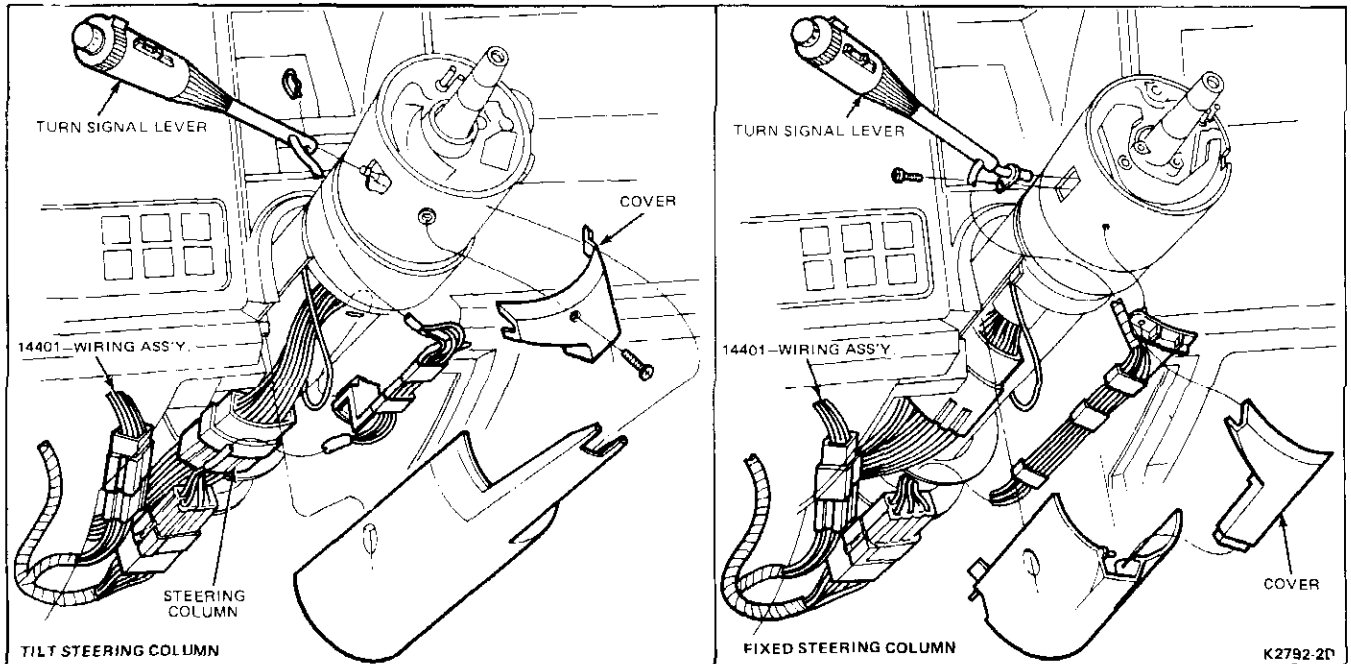
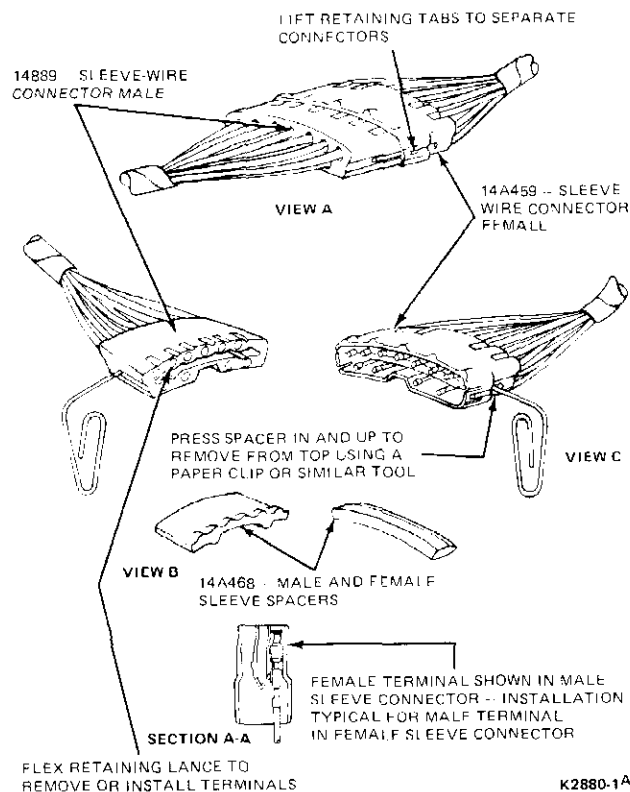


FIG. 2 Column Wire Connectors (Typical)



K2880-1A

FIG. 3 Wire Terminal Removal

Interior Lamps

PART
32-60

Applies to All Models

SUBJECT	PAGE	SUBJECT	PAGE
DESCRIPTION AND OPERATION		REMOVAL AND INSTALLATION (Cont'd.)	
Dome and Map Lamp Combination	60-1	Dome Lamp	60-2
REMOVAL AND INSTALLATION		Dome Lamp Switch	60-3
Cargo Lamps	60-3	Glove Compartment Lamp	60-4
Courtesy Lamp	60-2	Map Lamp and Switch	60-3
Courtesy and Map Lamp		Reading Lamp Rear	60-3
Combination	60-3	Transmission Control	
Dome and Map Lamp Combination	60-2	Selector Lamp	60-4

CK3374-2B

DESCRIPTION AND OPERATION

DOMES AND MAP LAMP COMBINATION

All Except Pinto, Bobcat, Mustang II, Fairmont and Zephyr

The two map lamps are located on each side of the dome-map lamp housing (Fig. 1). The map lamps are operated independently of the dome lamp by two switches located at each map lamp housing. The dome lamp is actuated by turning the headlamp switch control knob fully counterclockwise. The dome lamp also illuminates when the doors are opened, or by the switch in the pillar.

Pinto, Bobcat, Mustang II, Fairmont and Zephyr

The courtesy and map lamps on Pinto, Bobcat, Mustang II, Fairmont and Zephyr are located on the ceiling between the visors. The lamp usually retains the inboard ends of the visor on Pinto, Bobcat and Mustang II. The visor ends are not retained on Fairmont and Zephyr. The dome lamp is actuated by turning the headlamp switch control knob fully counterclockwise. The dome lamp also illuminates when the doors are opened (switch in pillar) and when the rear door on a three door model is opened (switch in latch assembly). NOTE: Rear door switch is optional. The map lamp is housed separately above the courtesy lamp, and is turned on when pulled down from the stowed position (Fig. 2).

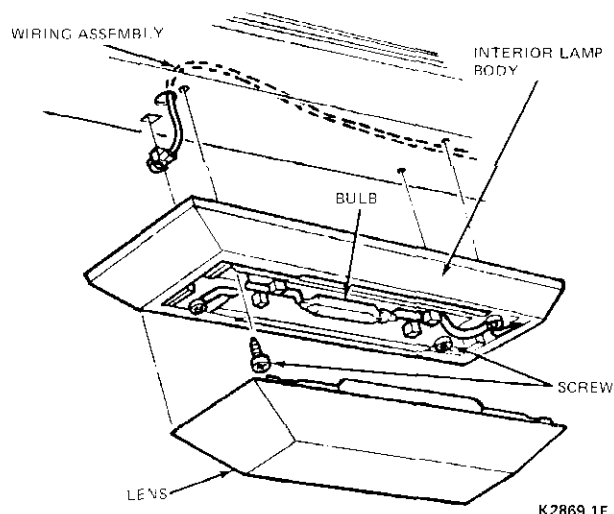


FIG. 1 Dome and Map Lamp Combination – Except Pinto, Bobcat, Mustang II, Fairmont and Zephyr

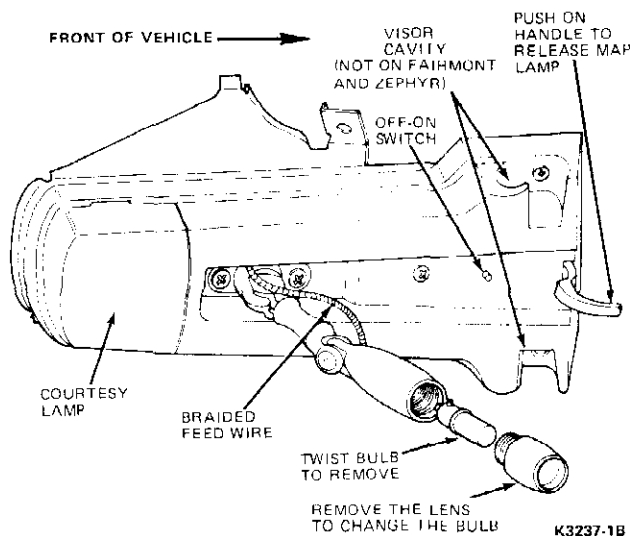


FIG. 2 Door Courtesy and Map Lamps—Pinto, Bobcat and Mustang II

REMOVAL AND INSTALLATION

DOME AND MAP LAMP COMBINATION

Ceiling Mounted—Except Pinto, Bobcat, Mustang II, Fairmont and Zephyr

Carefully pry the dome lamp lens, at the corners from the housing (Fig. 1). Remove the two screws retaining the map lamp lens housing to the lamp base and remove the bulbs. To remove the lamp base, remove the four retaining screws.

DOME LAMP—FAIRMONT AND ZEPHYR

The dome lamp assembly must be removed from its mounting to replace lamp bulb. Using your fingers, pull down on the left-hand side of the dome lamp assembly. Using a pair of long-nose pliers or equivalent, slide the bulb out of its socket. Be careful not to break the bulb; wear eye protection. See Fig. 3.

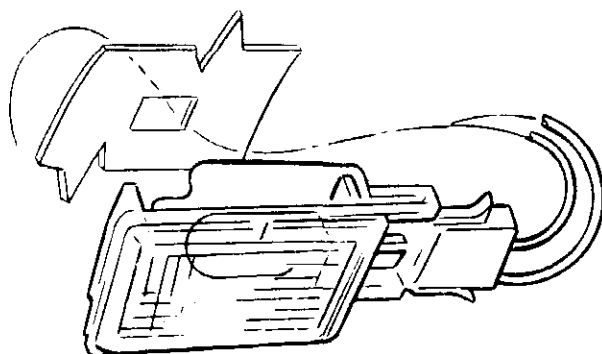


FIG. 3 Dome Lamp—Fairmont and Zephyr

DOME LAMP—PINTO, BOBCAT AND MUSTANG II

To replace the bulb, carefully pry the dome lamp lens from the housing. The entire lamp assembly may be removed by removing the two attaching screws as shown in Fig. 4.

COURTESY LAMP

Door Mounted—Continental Mark V Only

To service the bulb(s), pry out the white lens at the ends, and then remove the bulb(s).

To remove the door-mounted courtesy lamp, first remove the door trim panel as outlined in Group 45. Then, remove the two lamp retaining nuts from the rear side of the panel and remove the courtesy lamp assembly.

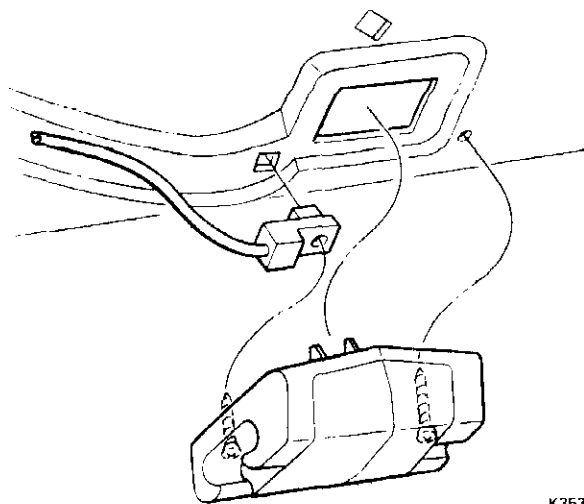


FIG. 4 Dome Lamp—Pinto, Bobcat and Mustang II

COURTESY AND MAP LAMP COMBINATION

Ceiling Mounted—Pinto, Bobcat, Mustang II, Fairmont and Zephyr

To remove map lamp, push retainer forward. To remove bulb first remove lens by unscrewing it from the barrel; then push bulb in and turn counterclockwise. To remove courtesy lamp, first remove lens by squeezing in at sides and pulling down. Pull courtesy lamp bulb out of its retainer.

Instrument Panel Mounted—Continental Mark V, LTD II, Cougar, Mustang II, Fairmont and Zephyr

Front compartment foot well courtesy lamps are mounted on the lower flange at both ends of the instrument panel. The bulbs are accessible from under the instrument panel for replacement without removing other parts.

READING LAMP REAR

Lincoln Continental and Continental Mark V

Rear seat lamps are mounted in the rear pillar trim panels and controlled by switches on trim panel. To replace a bulb, remove the lens from the lamp assembly. To remove the lamp assembly, remove the upper trim panel (Group 45), remove the two retaining nuts, disconnect the wiring connector and remove the lamp.

CARGO LAMPS—FORD, MERCURY, PINTO AND BOBCAT STATION WAGON

To replace bulb, remove the two screws that retain the lens to the lamp body. See Fig. 5.

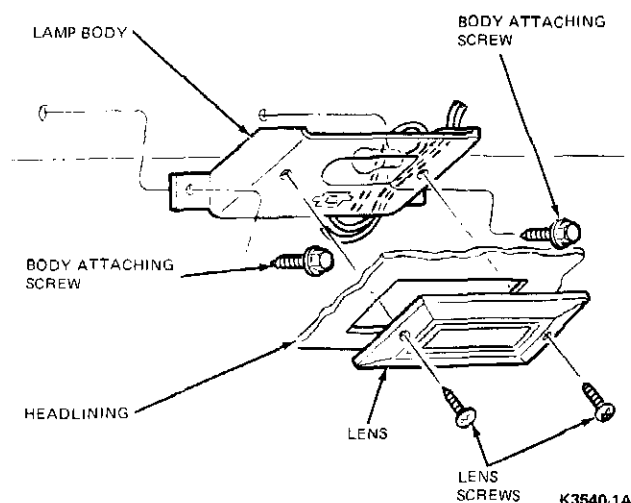


FIG. 5 Cargo Lamp—Ford and Mercury Station Wagon Shown (Pinto and Bobcat Similar)

CARGO LAMPS—FAIRMONT AND ZEPHYR STATION WAGON

To service the lamp bulb, remove the lens by inserting a small blade screwdriver between the end of the lens and lamp body and carefully pry the lens out of the

body (see Fig. 6). Using a pair of long-nosed pliers, slide the bulb out of its socket. Be careful not to grip the bulb tightly; it could break. Wear eye protection.

MAP LAMP AND SWITCH

Lincoln Continental

The map lamp mounted in the center of the instrument panel pad is accessible for service by removing the three retaining screws from the map lamp assembly. To change the bulb, lower the lens from the lamp body after removing the two retaining screws and replace the bulb in the socket. Then position the lens to the lamp body, and install the screws.

To replace the switch, remove the three retaining screws in the trim plate and pull the assembly down far enough to gain access to the map lamp switch. Remove the map lamp lens attaching screws and remove the lens; then, remove the bulb. Disengage the bulb retaining clips from the map lamp body. Remove the switch attaching screws (two), disconnect the bullet connector (black wire) and remove the switch assembly. Install the new switch into position, connect the bullet connector and install the attaching screws. Snap the bulb retaining clips into position and install the bulb. Install the map lamp lens. Position the trim plate to the instrument panel and install the attaching screws.

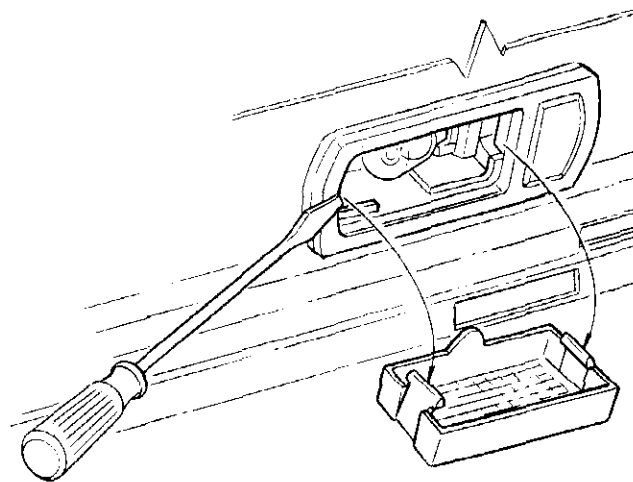


FIG. 6 Cargo Lamp—Fairmont and Zephyr Station Wagon

DOMELAMP SWITCH

Pinto, Bobcat and Mustang II

Unscrew the hex sleeve nut from the pillar, extract the switch and pull the wiring connector off the switch.

The new switch is locked onto the (14401) wiring connector by one of three tabs positioned 120 degrees apart on the switch. If, when the switch is disconnected from the wiring connector, the engaged locking tab breaks off, the switch must be rotated 120 degrees to engage a new tab. If all three tabs have been broken, the switch must be replaced.

To install the switch in the pillar, pull the wiring connector and wiring through the switch mounting hole

in the pillar and connect the switch to the connector (Fig. 7). Then, twist the wiring and switch six turns *counterclockwise*, push the wiring and connector back through the mounting hole and screw the switch into the pillar until it is seated. Close and open the door to assure that the courtesy lamp and ignition key warning buzzer systems are operating properly.

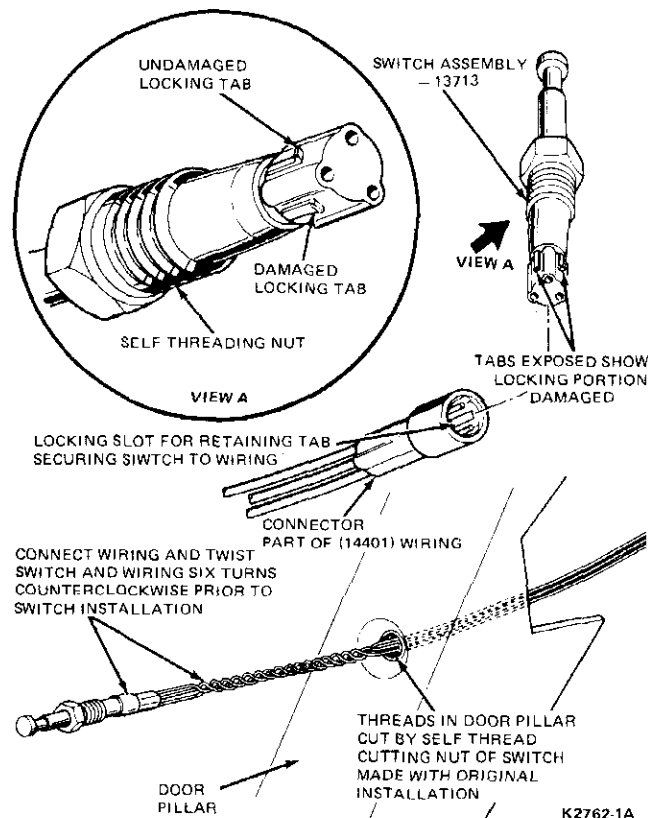


FIG. 7 Dome Lamp Switch—Pinto, Bobcat and Mustang II

TRANSMISSION CONTROL SELECTOR LAMP

Floor Mounted

1. Remove the four retaining screws from the selector lever cover and dial indicator on the floor.

2. Lift the lever cover assembly and replace the bulb.
3. Position the cover to the floor and install the four cover retaining screws.

Console Mounted

1. Remove the finish panel from the console.
2. Remove the quadrant bezel.
3. *Position the selector lever in the "1" position and remove the lamp socket and bulb from its retainer.*
4. Replace the bulb and install the socket in the retainer.
5. Install the quadrant bezel.
6. Position the finish panel and install the retaining screws.

Instrument Panel Mounted

On Ford and Mercury vehicles, the lamp is mounted on the instrument panel. The lamp can be replaced from behind the panel.

Steering Column Mounted—Fixed Column

For access to the lamp bulb remove the horn switch assembly (one retaining screw at underside of each steering wheel spoke) and the steering wheel (Tool 3600AA). Remove the turn signal switch lever (unscrew). Remove the three retaining screws and lift the turn signal switch out of the way. Do not disconnect or remove the switch and wiring. Remove the lamp bulb from the flange casting.

GLOVE COMPARTMENT LAMP

Ford and Mercury

The glove compartment lamp is mounted in the trim board above the compartment bin. To remove the lamp assembly, pry the front tabs down with a flat-bladed screwdriver. To install, place lamp assembly in position and push up on front tabs. To replace bulb, push out with thumb and finger.

Illuminated Entry

PART
32-80

All Except Pinto, Bobcat, Mustang II, Fairmont and Zephyr

SUBJECT	PAGE	SUBJECT	PAGE
DESCRIPTION	80-1	DIAGNOSIS	80-2
		REMOVAL AND INSTALLATION	80-4

DESCRIPTION

The illuminated entry system is intended to assist vehicle entry during the hours of darkness by providing illumination of the door lock cylinder, so it may be easily located for key insertion. The vehicle interior will also be illuminated by the courtesy lamps. The system is available on Ford, Mercury, Lincoln Continental, Continental Mark V, Thunderbird, LTD II, Cougar, Ranchero, Granada, Monarch, Versailles and Mustang II.

Activation of the system is accomplished by raising the outside door handle, or on the Lincoln, by pushing the door handle button, as if to open the door.

This action momentarily closes a switch mounted on the door latch mechanism, which completes the ground circuit of the electronic module and switches the system on. The vehicle interior lights turn on, and both front door lock cylinders are illuminated by a ring of light around the area where the key enters. This illumination will remain on for approximately 25 seconds, then automatically turn off. During this 25 second period, the system can be manually deactivated by turning the ignition switch to either "run" or "acc" position.

The system will be activated every time the outside front door handles are operated, whether the vehicle is locked or not. Opening the doors from the inside of the vehicle will not activate the system.

If the outside door handle is held up indefinitely so that the latch switch is continuously closed, the system will operate as normal and turn off after 25 seconds. At the completion of this cycle, if the door handle is still in the raised position, the system will remain off, and it will be impossible to activate the system from the other front door handle until the raised handle is returned to its normal position. This function is built into the logic circuitry of the system to prevent battery discharge, should the outside door handle be intentionally propped up or become jammed in any way.

The system consists of 3 main components: the electronic module, the illuminated door lock cylinder, and the door latch switch, plus the wiring harness (see Fig. 1).

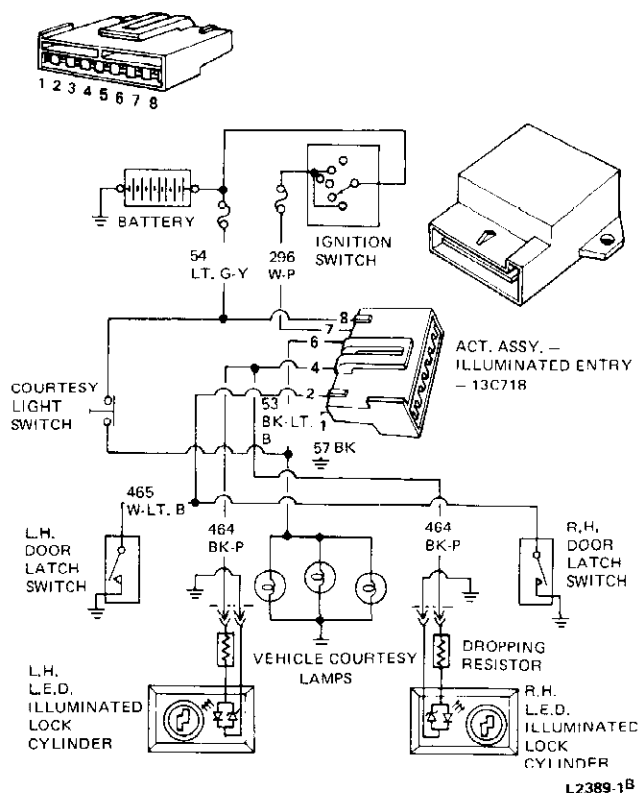


FIG. 1 Illuminated Entry Wiring Schematic

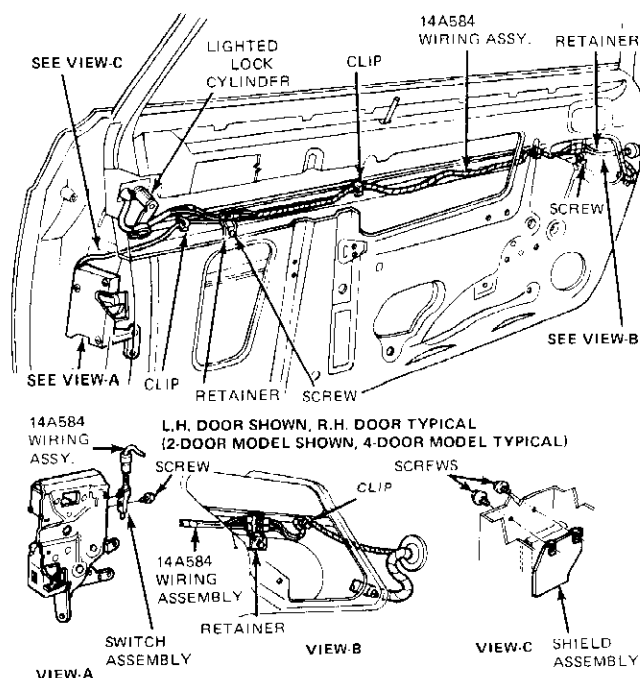
The module is mounted behind the instrument panel in the vicinity of the glove box and can be serviced from beneath, or from the front of the instrument panel on all carlines except Granada/Monarch/Versailles. On these carlines the crash pad must be removed to gain access to the module. A mounting bracket is used on Ford, Mercury, Granada/Monarch/Versailles and Mustang. On all other carlines the module is attached directly to the instrument panel.

Housed within the module is a printed circuit board, the logic circuitry, and a relay to switch B+ to the various circuits. The normal operating voltage is 9 to 16 volts, but the unit will withstand voltage up to 24 volts for a period of 15 minutes. It cannot be damaged by reverse voltages and is unaffected by vehicle transients.

The door lock cylinder is unique to this system. It is rectangular in shape and common to all illuminated entry vehicles. A light-emitting diode (L.E.D.) provides the light source to a lens system built into the cylinder. Normal operating voltage for the L.E.D. is 3 volts. A resistor built into the harness protects the L.E.D., and is important when checking the lock cylinder illumination that 12 volts is applied only to the connector terminals. If the resistor is by-passed and 12 volts is applied to the wires between the resistor and the lock cylinder by the use of needle type probes, the L.E.D. will be instantly destroyed. Correct polarity must be observed by applying B+ to the red wire; otherwise, the L.E.D. will not light. If leads are reversed, however, no damage will be done to the assembly.

The lens system built into the cylinder is made of Acrylic Resin with a highly polished lustrous surface, and will retain its fine appearance if given proper care. A mild soap and water solution is all that is usually required to keep the lens in its original condition. Should the lens become contaminated with oil or grease, clean with approved solvents such as hexane, dry cleaning naphtha, kerosene or methanol. Since these solvents are flammable as well as toxic, use with adequate ventilation and away from open flames. Solvents such as benzene, gasoline, acetone, carbon tetrachloride or denatured alcohol should **never** be used, as they will soften and deteriorate the lens surface causing a permanent loss in light output.

The latch switch is a grounding type leaf switch and is attached to the latch mechanism by one screw (see Fig. 2).



L2392-1B

FIG. 2 Illuminated Entry System (Typical)

DIAGNOSIS

QUICK CHECKS

1. Verify that courtesy lamp circuit is working properly. If not, check fuse.
2. With the ignition switch in "accessory" or "run" position, verify that other systems which share the same accessory fuse are functional. If not, check fuse.
3. If any of the above systems are not working properly, repair the inoperative circuit and then re-check the operation of the illuminated entry system before proceeding with the following complete check-out procedure.

ILLUMINATED ENTRY SYSTEM CHECK-OUT PROCEDURE

1. Terminal numbers referred to in the following procedure relate to the wiring connector attached

- to the illuminated entry actuator assembly. The terminals are numbered from left to right (when the connector is held as shown).
2. Any malfunctions diagnosed in Steps 4 and 5 in the charts below could be located in either front door.
3. When necessary to trace and/or repair the various circuits, refer to the respective vehicle wiring diagrams.
4. Check system fuses (2) before proceeding.

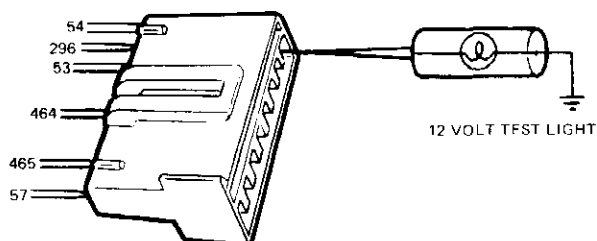
AFTER TESTING

If all of the preceding tests check out okay and the illuminated entry system is still malfunctioning, the actuator assembly is the cause of the problem and must be replaced.

OPERATION

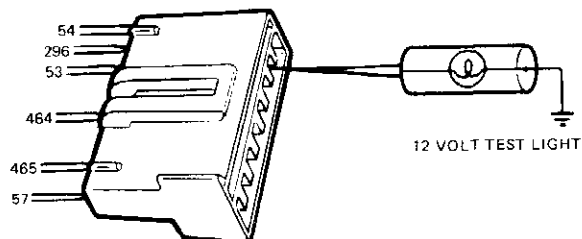
RESULT

Step 1 -- Connect a 12 volt test light between Terminal No. 8 and a good ground



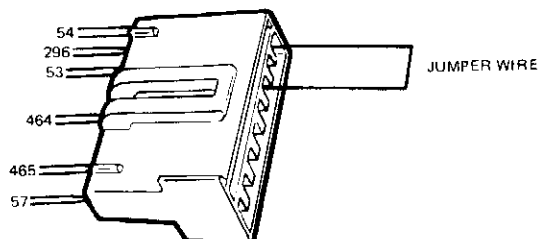
Whether ignition is "On" or "Off," the test light should glow. If not, trace circuit 54 (light green with yellow stripe) back to fuse panel and repair.

Step 2 -- Connect a 12 volt test light between Terminal No. 7 and a good ground.



The test light should glow when the ignition switch is in ACCY or RUN and go out when the switch is turned to "Off" or "Lock." If not, trace circuit 296 (white with purple stripe) back to fuse panel and repair.

Step 3 -- Connect a jumper wire between Terminals No. 6 and 8.



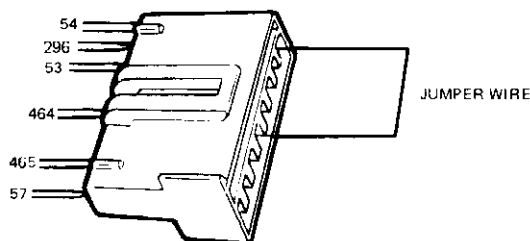
With vehicle doors closed, interior courtesy lights should be on. If not, trace circuit 53 (black with light blue stripe) and repair.

CL2390-2A

OPERATION

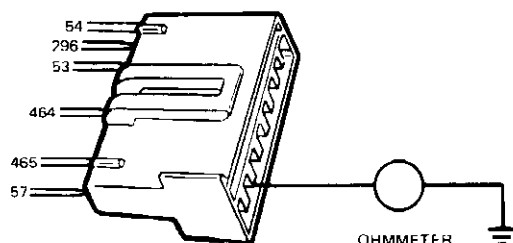
RESULT

Step 4 -- Connect a jumper wire between Terminals No. 4 and 8.



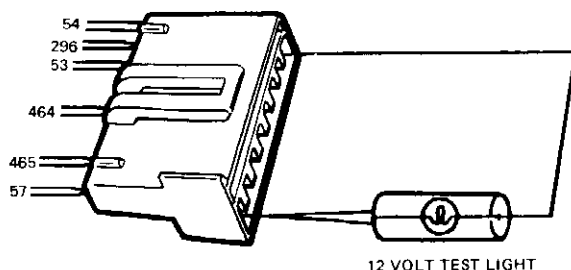
Both door lock cylinders should be illuminated. If not, trace circuit 464 (black with pink stripe) back to lock cylinder and check continuity between connector terminal at lock cylinder pigtail and the module connector to verify the wiring is good. If wiring is good, check pigtail resistor value using a needle probe and ohmmeter. Should read 135 to 198 ohms. If not, replace pigtail with service part. If yes, replace lock cyl. assy.

Step 5 -- Connect an ohmmeter between Terminal No. 2 and a good ground.



The ohmmeter should show over 10,000 ohms (open). Then, operate each outside door handle in turn, ohmmeter should show not more than 50 ohms (closed). If either readings are incorrect, then trace circuit 465 (white with light blue stripe) back to latch switches and repair.
Note: When operating door handle, hold in raised position.

Step 6 -- Connect a 12 volt test light between Terminal No. 1 and Terminal No. 8.



The test light should glow. If not, trace circuit 57 (black) back to ground and repair.

CL2391-2B

REMOVAL AND INSTALLATION

See Fig. 2 for removal and installation and electrical disconnect points.

INSTRUMENTS, CLUSTERS AND CONTROLS

**GROUP
33**

PART TITLE	PART NO.	PART TITLE	PART NO.
CHARGE INDICATOR – AMMETER	33-11	OIL PRESSURE INDICATOR – GAUGE	33-31
CHARGE INDICATOR – LAMP	33-10	OIL PRESSURE INDICATOR – LAMP	33-30
CLOCK	33-05	SPEEDOMETER	33-01
FUEL ECONOMY INDICATING SYSTEMS ...	33-60	TACHOMETER	33-03
FUEL INDICATING SYSTEM	33-20	TEMPERATURE INDICATOR	33-40
IGNITION SWITCH	33-70		
INSTRUMENT CLUSTER AND PRINTED CONTROL	33-50		

CK3375-2B

Speedometer

**PART
33-01**

Applies to All Models

SUBJECT	PAGE	SUBJECT	PAGE
DESCRIPTION AND OPERATION	01-1	MAJOR REPAIR OPERATIONS	
TESTING	01-2	Cable Core and Casing	01-13
REMOVAL AND INSTALLATION		Drive and Driven Gears	01-13
Speedometer Cables	01-4	Speedometer System Noisy	01-13
Speedometer Core	01-4	SPECIFICATIONS	01-13
Speedometer Core and Casing	01-4		
Speedometer Head	01-2		

CK3376-2B

DESCRIPTION AND OPERATION

SPEEDOMETER SYSTEM

The speedometer is connected to the output shaft of the transmission by means of a flexible shaft (core), and a drive gear located inside the transmission. The core drives the speedometer which registers speed in miles per hour and also drives an odometer which records distance traveled in miles and tenths of a mile.

The core or flexible shaft is housed in a flexible casing.

TESTING

SPEEDOMETER

The Ford car master parts catalog and the Lincoln Mercury parts and accessories catalog show the proper speedometer-transmission gears to use for various rear

axle and tire size combinations. The correct gears must be used to comply with Federal law.

REMOVAL AND INSTALLATION

SPEEDOMETER HEAD

Federal law requires that the odometer in any replacement speedometer must register the same mileage as that registered in the removed speedometer.

FORD, MERCURY AND LINCOLN CONTINENTAL

Removal

1. Disconnect the battery ground cable.
2. Remove the instrument cluster as outlined in Part 33-50. Disconnect speedometer cable (Fig. 1).
3. Remove the 5 screws which attach the lens, and mask to the cluster and remove the lens and mask (Fig. 8, Part 33-50).

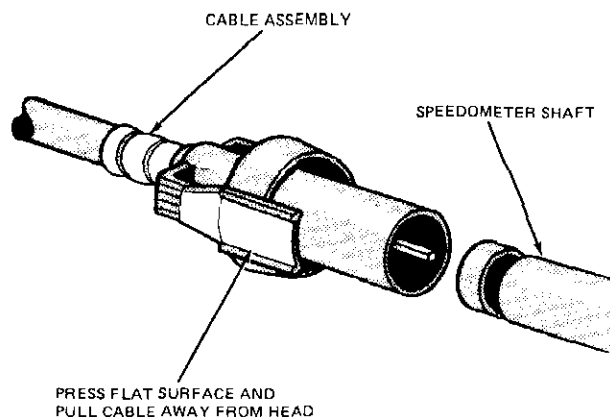


FIG. 1 Speedometer Cable Quick Connect

4. Remove the two screws attaching the speedometer head assembly to the cluster and remove the speedometer.

Installation

1. Position the speedometer head assembly to the cluster and install the two retaining screws. If speedometer assembly is being re-installed, apply a 3/16" ball of silicone damping grease in the drive hole of the speedometer head.
2. Position the mask and lens to the cluster and install the five attaching screws.
3. Install the cluster as outlined in Part 33-50. Connect speedometer cable to speedometer head.
4. Connect the battery ground cable and check speedometer operation.

MUSTANG II

Removal

1. Disconnect the battery ground cable.
2. Remove the instrument cluster as outlined in Part 33-50. Disconnect speedometer cable (Fig. 1).
3. Remove the six screws that retain the mask and lens to the backplate and remove the mask and lens.
4. Remove the two speedometer head assembly retaining screws and remove the speedometer.

Installation

1. Position the speedometer head assembly to the backplate and install the two retaining screws. If speedometer assembly is being re-installed, apply a 3/16" ball of silicone damping grease in the drive hole of the speedometer head.
2. Position the mask and lens to the backplate and install the six attaching screws.
3. Install the instrument cluster as outlined in Part 33-50. Connect the speedometer cable.
4. Connect the battery ground cable and check the operation of the speedometer.

LTD II, Thunderbird and Cougar—Standard Cluster

Removal

1. Disconnect the battery ground cable.
2. Remove the instrument cluster assembly as outlined in Part 33-50. Disconnect the speedometer cable (Fig. 1).
3. Remove the six screws that retain the back plate to the cluster mask.
4. Remove the two screws that retain the speedometer head assembly and remove the speedometer.

Installation

1. To install, position the speedometer to the cluster back plate and install the two retaining screws. If speedometer assembly is being reinstalled, apply a 3/16" ball of silicone damping grease in the drive hole of the speedometer head.
2. Install the mask retaining screws and install the cluster assembly as outlined in Part 33-50. Connect speedometer cable.
3. Connect the battery ground cable and check the operation of the speedometer.

LTD II, Thunderbird and Cougar XR-7—Performance Cluster

Removal

1. Disconnect the battery ground cable.

2. Remove the instrument cluster assembly as outlined in Part 33-50. Remove the clock knob and speedometer cable (Fig. 1).
3. Remove the six screws that retain the mask and lens assembly to the back plate and remove the mask.
4. Remove the two speedometer head assembly retaining screws and remove the speedometer.

Installation

1. To install, position the speedometer head assembly to the back plate and install the two retaining screws. If speedometer assembly is being reinstalled, apply a 3/16" ball of silicone damping grease in the drive hole of the speedometer head.
2. Install the mask retaining screws, the clock knob, and install the instrument cluster assembly as outlined in Part 33-50. Connect speedometer cable.
3. Connect the battery ground cable and check the operation of the speedometer.

Fairmont and Zephyr

Removal

1. Disconnect the battery ground cable.
2. Remove the instrument cluster assembly as outlined in Part 33-50. Disconnect speedometer cable (Fig. 1).
3. From the rear side of the cluster, remove the four retaining screws and separate the cluster housing from the front cover housing. Note that the two lower screws also retain the metal brackets that engage the slot in the instrument panel.
4. Remove the two speedometer retaining screws and remove the speedometer.

Installation

1. Position the speedometer in the backplate and install the two retaining screws. If the speedometer assembly is being reinstalled, apply a 3/16" ball of silicone damping grease in the drive hole of the speedometer head.
2. Install the four backplate to front cover retaining screws.
3. Install the instrument cluster assembly as outlined in Part 33-50. and check the operation of the speedometer. Connect speedometer cable.
4. Connect the battery ground cable and check speedometer operation.

Pinto and Bobcat

Removal

1. Disconnect the battery ground cable.
2. Remove cluster assembly as outlined in Part 33-50. Disconnect speedometer cable (Fig. 1).
3. From the rear side of the cluster, remove the four retaining screws, and separate the cluster front housing from the back plate. Note that the two lower screws also retain the metal brackets that engage the slot in the instrument panel.
4. Remove the two speedometer retaining screws and remove the speedometer head assembly.

Installation

1. Position the speedometer head assembly in the back plate and install the two retaining screws. If

the speedometer assembly is being reinstalled, apply a 3/16" ball of silicone damping grease in the drive hole of the speedometer head.

2. Position the cluster backplate to the front housing and install the four retaining screws.
3. Install cluster assembly as outlined in Part 33-50. Connect speedometer cable.
4. Connect battery ground cable.

Continental Mark V

Removal

1. Disconnect the battery ground cable.
2. Remove the instrument cluster assembly as outlined in Part 33-50. Disconnect speedometer cable (Fig. 9).
3. Remove the clock knob.
4. Remove the six screws that retain the cluster mask assembly to the back plate and remove mask assembly.
5. Remove the two speedometer head retaining screws and remove the speedometer.

Installation

1. Position the speedometer head to the cluster back plate and install the two retaining screws. If the speedometer assembly is being reinstalled, apply a 3/16" ball of silicone damping grease in the drive hole of the speedometer head.
2. Place the mask assembly over the two locator pins on the back plate and install the six screws that retain the cluster mask assembly to the back plate.
3. Install the clock knob and retaining screw.
4. Install the cluster assembly as outlined in Part 33-50. Connect speedometer cable.
5. Connect the battery ground cable and check the operation of the speedometer.

GRANADA, MONARCH AND VERSAILLES

Removal

1. Disconnect the battery ground cable.
2. Remove the instrument cluster as outlined in Part 33-50. Disconnect speedometer cable (Fig. 1).
3. From the front side of the cluster remove the 5 retaining screws and separate the cluster back plate from the mask and lens assembly.
4. Remove the 2 speedometer attaching screws and remove the speedometer.

Installation

1. Position the speedometer in the back plate and install the 2 attaching screws. If the speedometer assembly is being re-installed, apply a 3/16-in ball of silicone damping grease to the drive hole of the speedometer head.
2. Place the mask assembly over the two locator pins on the back plate. Install the 5 back plate to mask and lens assembly attaching screws.
3. Install the instrument cluster, connect the battery ground cable and check the operation of the speedometer.

SPEEDOMETER CORE

Removal

1. Disconnect the speedometer cable (core and casing assembly) from the speedometer head (Fig. 1).
2. Pull the speedometer core out of the upper end of the casing. Models with speed sensor (Figs. 3, 4, 8, 9 and 10) have upper and lower cable.
3. If the core is broken, raise the vehicle on a hoist and remove the bolt retaining the speedometer cable mounting clip to the transmission.
4. Remove the shaft and driven gear from the transmission (Fig. 2). Remove the driven gear retainer, and remove the driven gear and shaft from the cable.

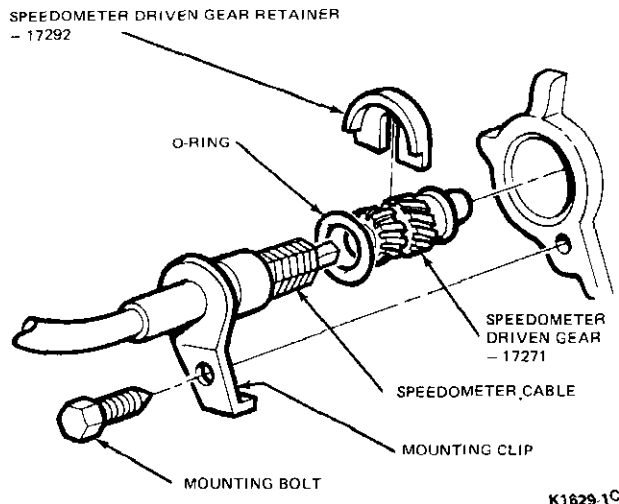


FIG. 2 Speedometer Cable to Transmission Mounting

5. Remove the lower part of the core (if it is broken) from the lower end of the casing.

Installation

1. Position the driven gear to the casing and install the gear retainer. Install the driven gear and casing in the transmission, and install the retaining bolt. Lower the vehicle.
2. Determine the exact length of the old core and cut the new core following instructions included in the

core kit. (Do not cut from the squared end of the core.) Remove any burrs or frayed edges.

3. Install the tip on the core, making certain to seat the core in the bottom of the tip.
4. Place the core and tip in a crimping die, and place the die on a solid surface and strike it squarely with a hammer to crimp it.
5. Remove the crimping die.
6. Lubricate the core with cable lubricant D2AZ-19581-A or equivalent (do not over lubricate). Install the core (square end first) into the upper end of the casing and push it all the way through to the transmission. When the cable is nearly seated, twist it slightly to make sure that the squared end is engaged in the speedometer driven gear at the transmission.
7. When reinstalling speedometer assembly, apply a 3/16 inch diameter ball of silicone damping grease in the drive hole of the speedometer head.
8. Connect the cable assembly to the speedometer, being sure to eliminate any kinks in the housing and shaft. Check the operation of the speedometer.

SPEEDOMETER CORE AND CASING

Disconnect the speedometer cable from the speedometer head and push the cable and grommet through the opening in the floor pan or dash panel. Raise the car on a hoist and disengage the cable from all retaining clips. Disconnect the cable from the transmission (Fig. 2). Remove driven gear and connect the new cable to the driven gear and the transmission. Engage the new cable in the retaining clips at the marker tapes on the cable housing and route it through the opening in the floor pan or dash panel. Push the grommet in place. Lower the vehicle. When reinstalling speedometer assembly, apply a 3/16 inch diameter ball of silicone damping grease in the drive hole of the speedometer head, and connect the cable to the head.

SPEEDOMETER CABLES

All Models

Because of the increasing complexity of speedometer cable assemblies, and the importance of proper routing during installation, typical systems are shown here in Figs. 3 to 10. Installation and routing instructions are shown on each illustration.

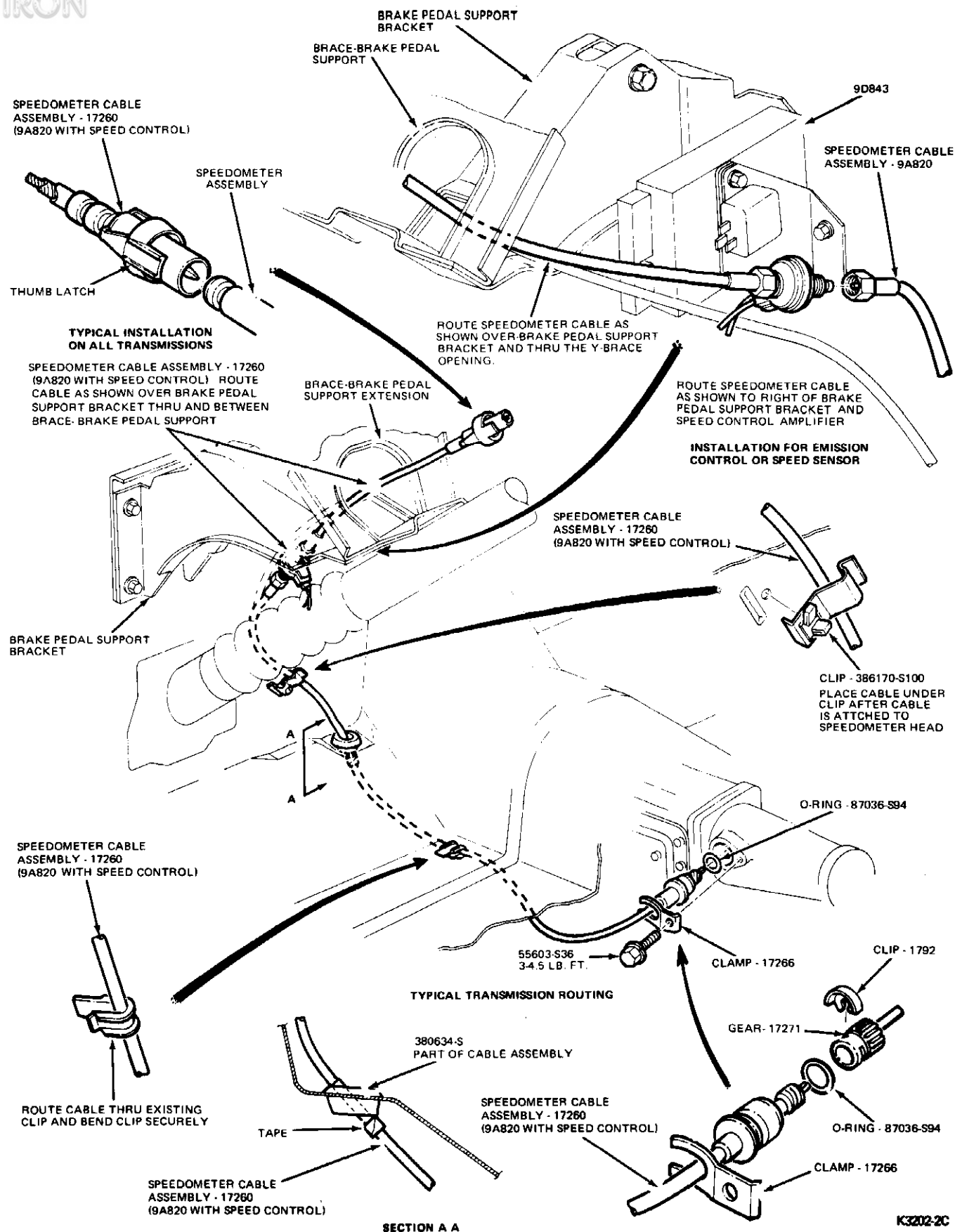


FIG. 3 Speedometer Cable—Ford, Mercury and Lincoln Continental

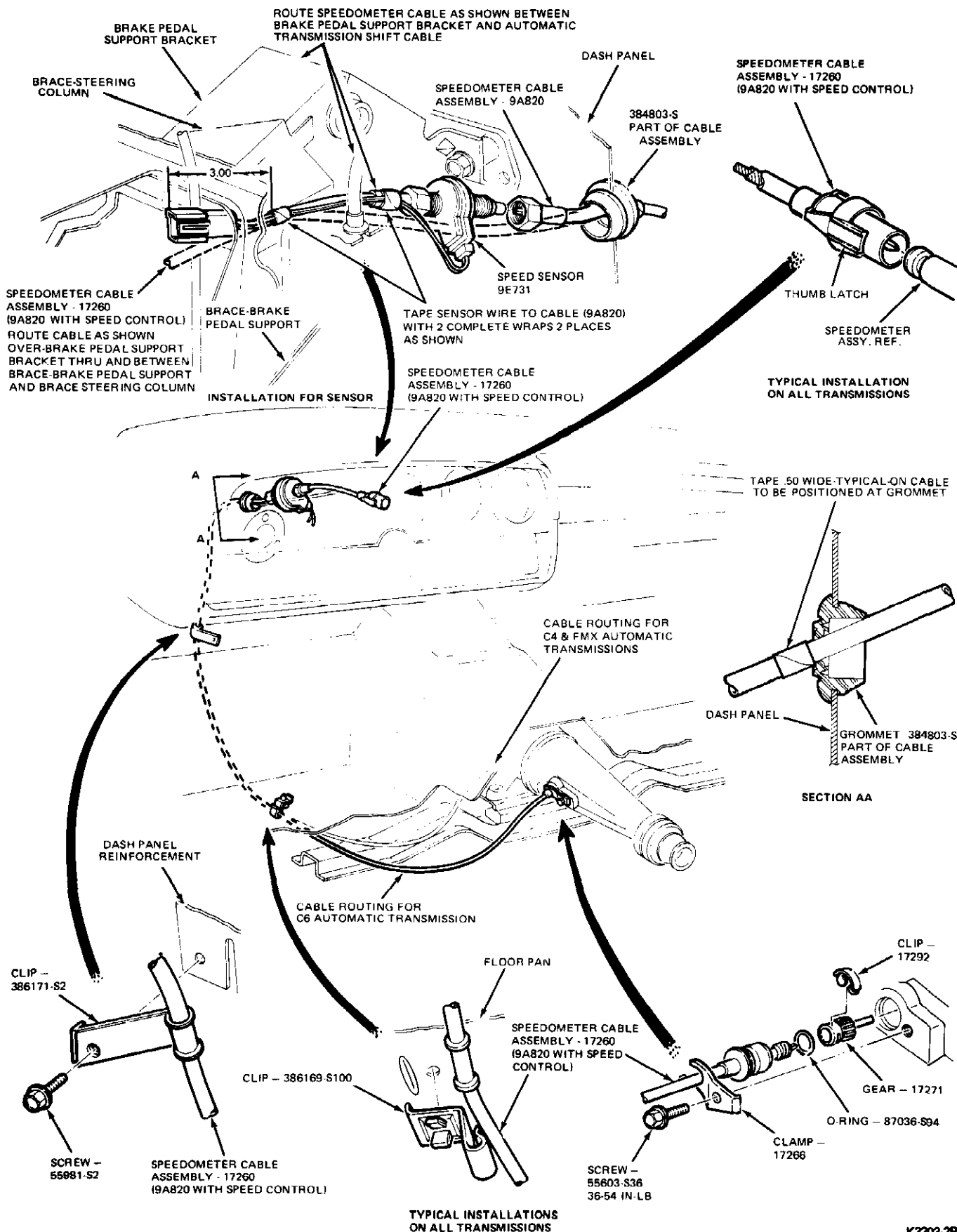
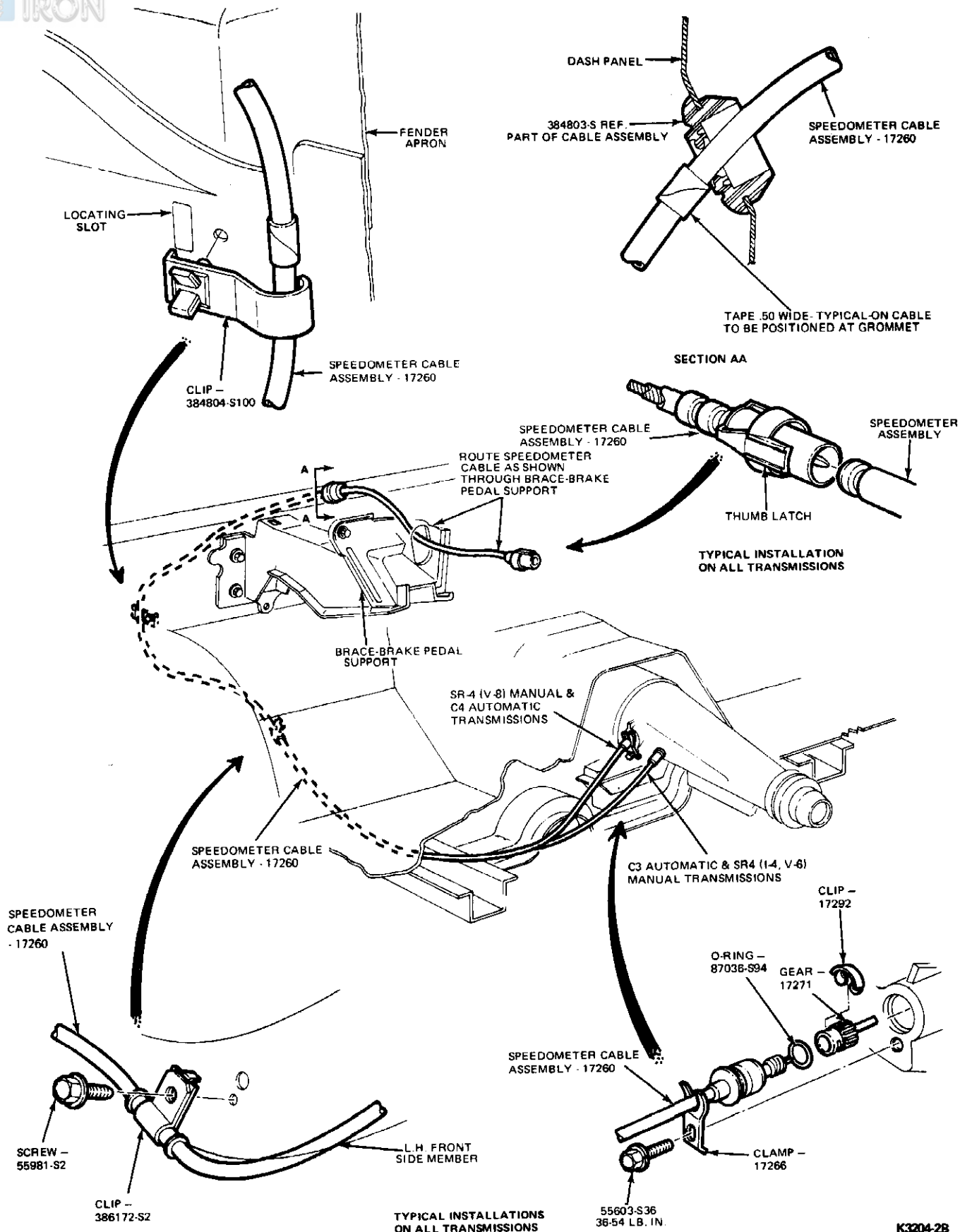


FIG. 4 Speedometer Cable—LTD II, Thunderbird and Cougar

K3203-2B



K3204-28

FIG. 5 Speedometer Cable—Mustang II

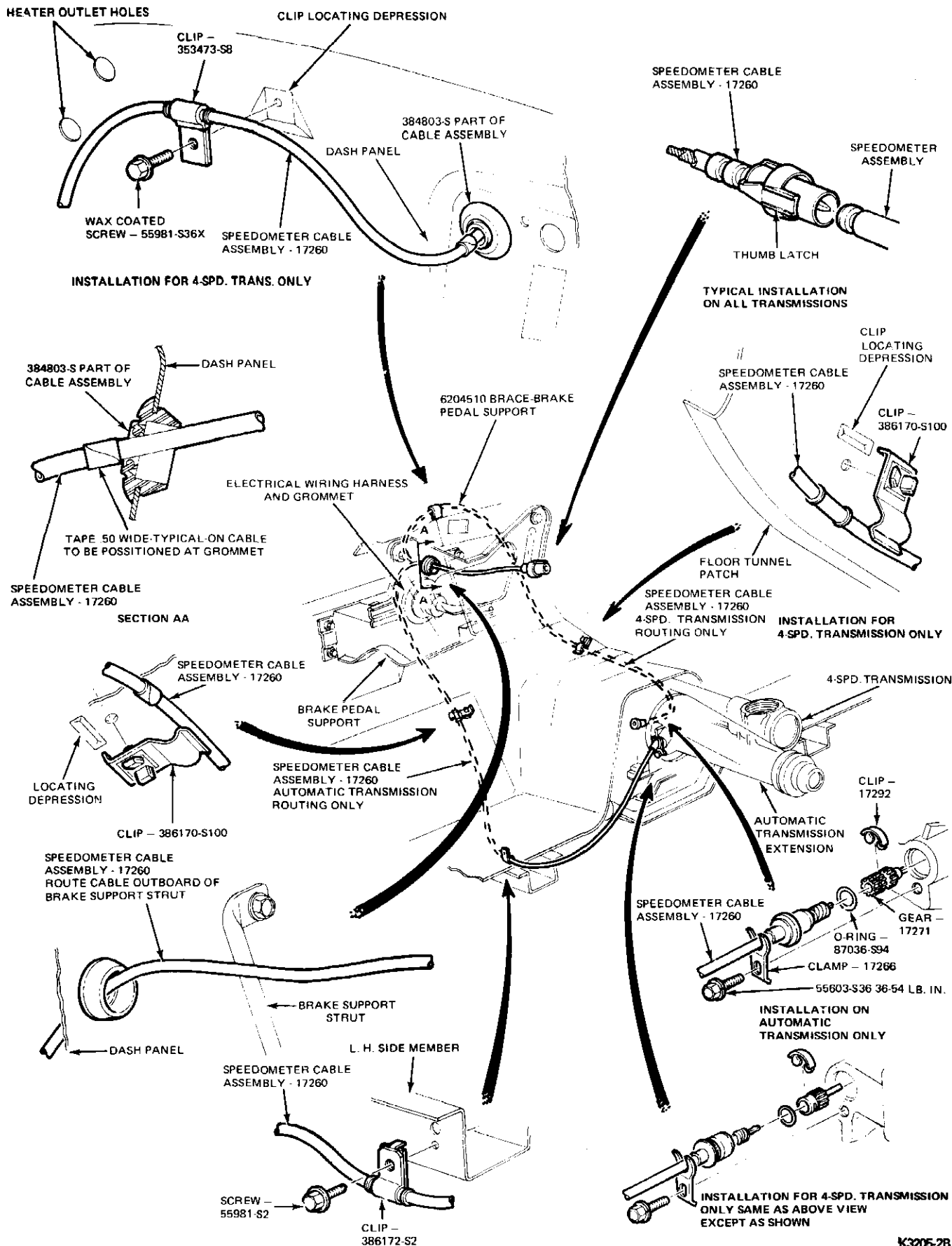


FIG. 6 Speedometer Cable—Pinto and Bobcat

K3205-2B

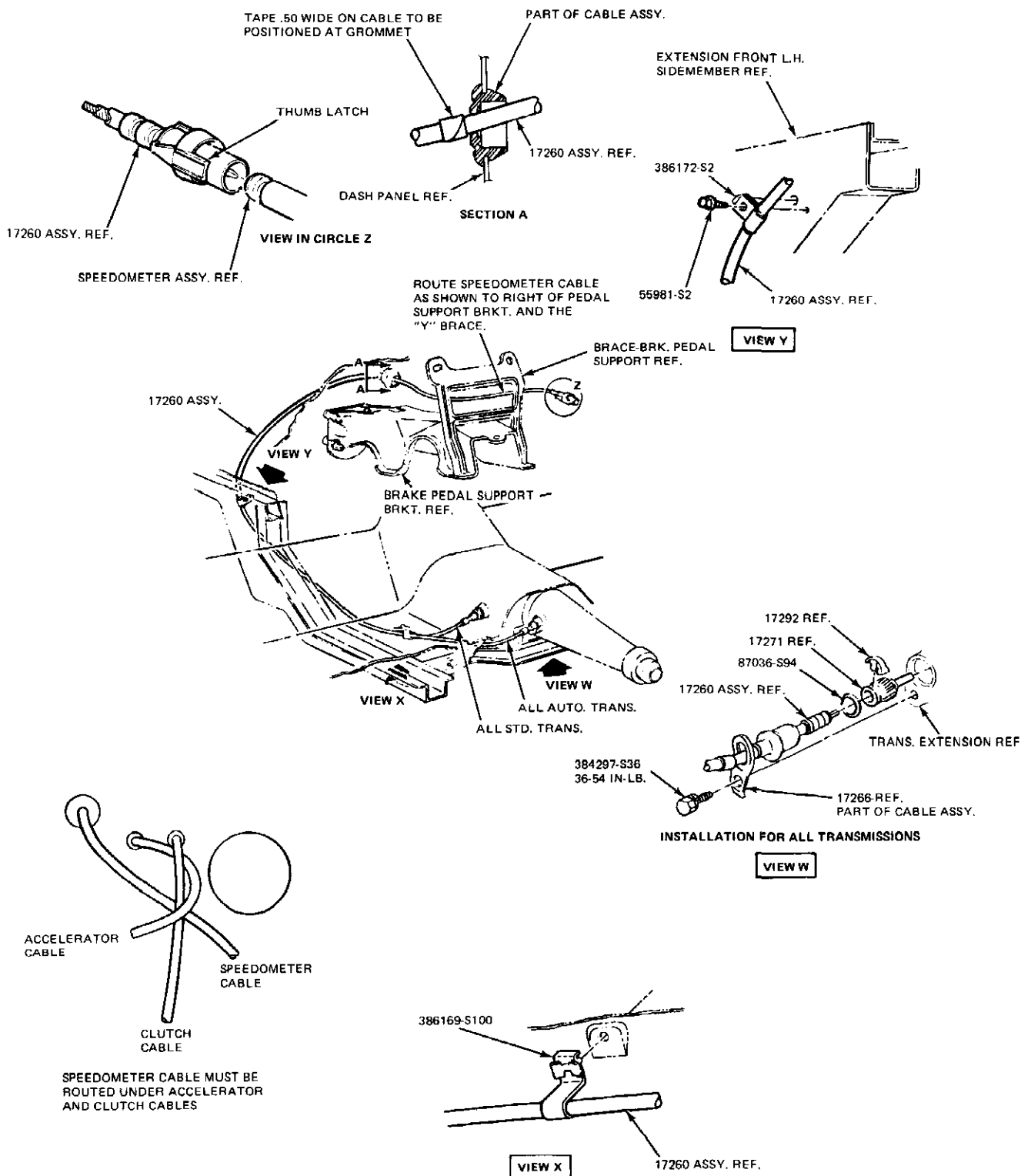


FIG. 7 Speedometer Cable—Fairmont and Zephyr

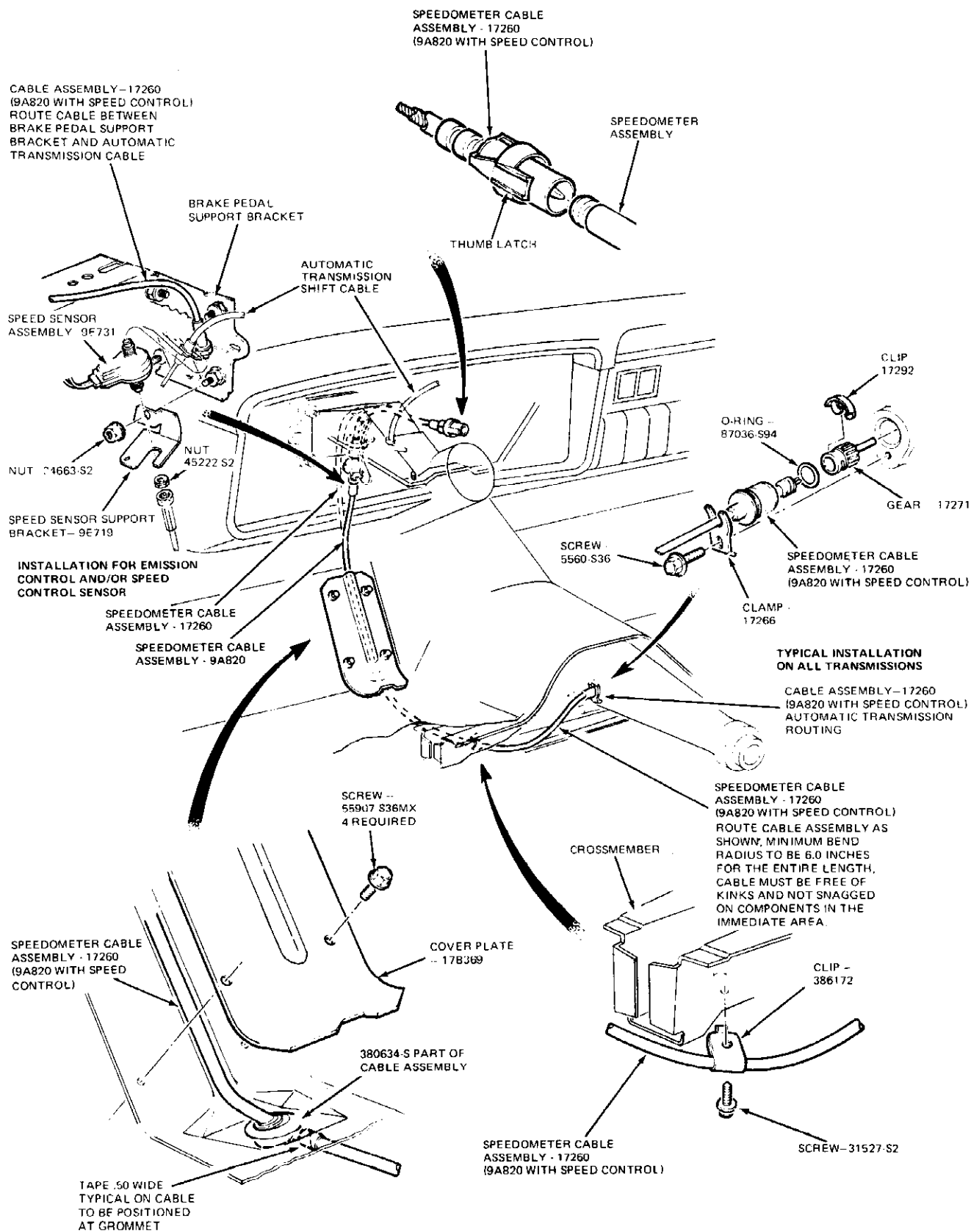
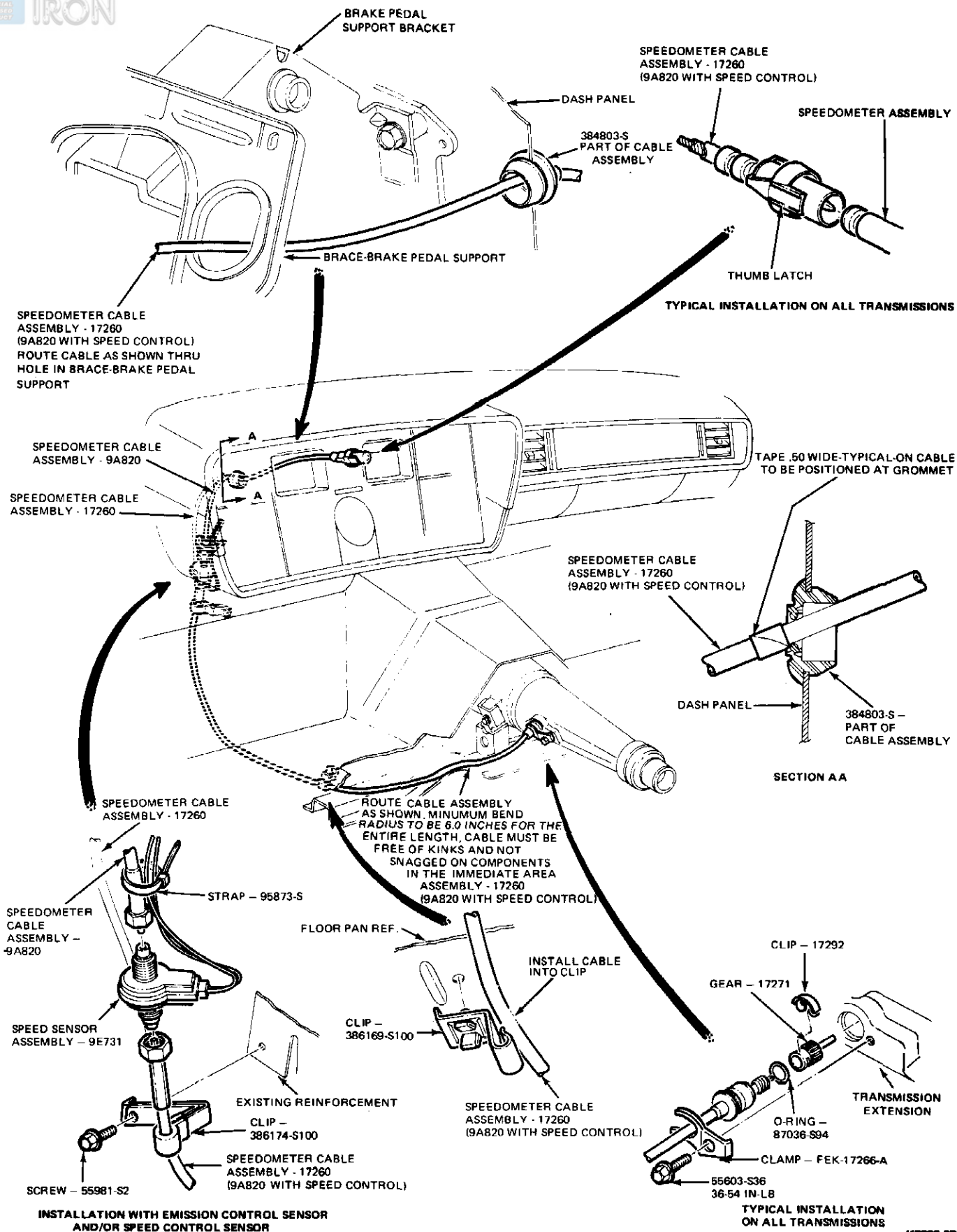


FIG. 8 Speedometer Cable—Granada, Monarch and Versailles



K3208-28

FIG. 9 Speedometer Cable—Continental Mark V

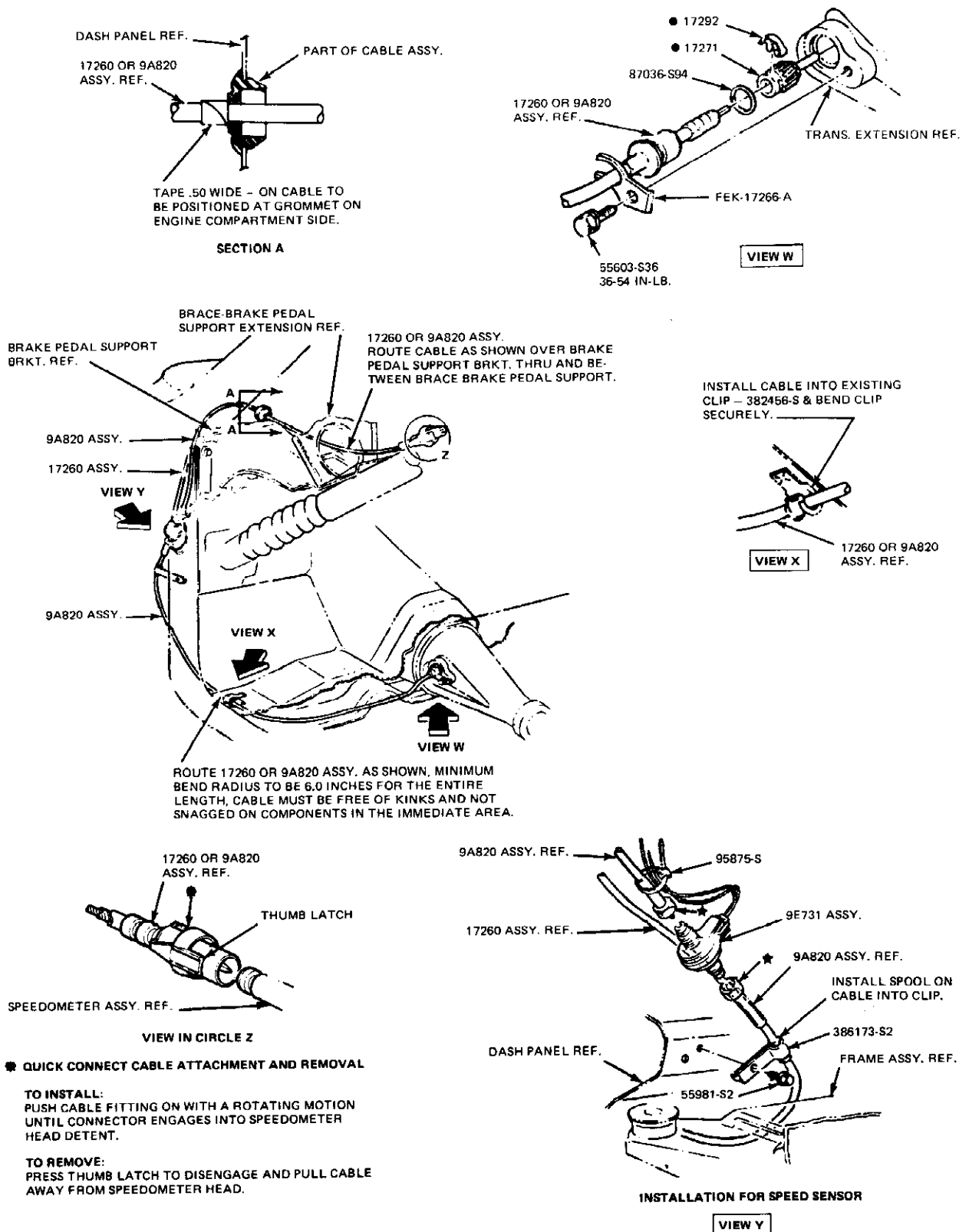


FIG. 10 Speedometer Cable—Lincoln Continental

K3536-2A

MAJOR REPAIR OPERATIONS

SPEEDOMETER SYSTEM NOISY

Applying heavy amounts of lube to the cable core will only stop the noise temporarily unless the actual source of noise is found and corrected. If the speed sensor or speedometer head are replaced, be sure that the square drive holes contain a sufficient amount of silicone damping grease. If not, apply a 3/16-inch diameter ball of this damping grease into the drive holes as required.

DAMAGED CABLE CORE AND CASING

1. To check for a kinked cable core, remove the core, clean it with solvent and wipe it dry. Lay the core out straight on a flat surface and roll it back and forth. Any kinks or damage will be seen. Then take an end in each hand, allowing the core to hang in approximately a 9 to 12 inch loop. Rotate both ends to be sure that the core turns evenly.
2. Routing of the cable casing is particularly important where the cable leaves the speedometer head. The optimum routing would provide that the cable and housing take virtually no change of direction for at least a length of 5 inches from the speedometer head.
3. When installing a new cable (core and casing) it is necessary that extra care be taken to see that the new assembly is guided and routed properly to eliminate any kinks.

4. Proper lubrication of the cable core is accomplished by a light application of damping grease after the cable has been wiped clean. A light film is all that is required.
5. Before connecting the cable assembly to the speedometer head, apply a 3/16 inch diameter ball of silicone damping grease to the drive hole of the speedometer head.

DAMAGED DRIVE AND DRIVEN GEARS

1. A scored, nicked or gauged driven gear is usually indicative of a damaged drive gear on those vehicles that have the drive gear integral with the transmission output shaft. The output shaft should be carefully inspected for imperfections and replaced if necessary.
2. A driven gear with two or three adjoining teeth badly scored is indicative of improper assembly procedure. The gear should be inserted in the transmission while simultaneously turning the drive shaft. This will insure initial gear engagement and prevent gear damage. **Force should never be used.**
3. Whenever a drive gear is replaced, a new driven gear should also be installed, regardless of its apparent condition.

SPECIFICATIONS

Transmission Mounting Clip Bolt Torque 3 - 4-1/2 Ft-Lbs

SPEEDOMETER CALIBRATION TOLERANCE SPECIFICATIONS

Vehicle	30 MPH Actual Speed	60 MPH Actual Speed	Odometer Measure Over Actual 10 Mile Distance
All	29-33 MPH	59-66 MPH	9.6 - 10.4 Miles

CK2457-2C

Tachometer		PART 33-03	
Applies to Bobcat, Pinto, Thunderbird, LTD II, Cougar XR-7 and Mustang II			
SUBJECT	PAGE	SUBJECT	PAGE
DESCRIPTION AND OPERATION	03-1	TESTING	03-3
DIAGNOSING	03-2	REMOVAL AND INSTALLATION	03-3

CK3377-2B

DESCRIPTION AND OPERATION

The tachometer is an electrically operated instrument which indicates engine speed in Revolutions Per Minute (R.P.M.).

The tachometer is usually mounted in the instrument cluster assembly. A typical wiring diagram is shown in Fig. 1.

2). This assembly is an electronic device that divides the 8-cylinder ignition pulses to the tachometer by two, which allows the 4-cylinder tachometer to be used for the 8-cylinder application.

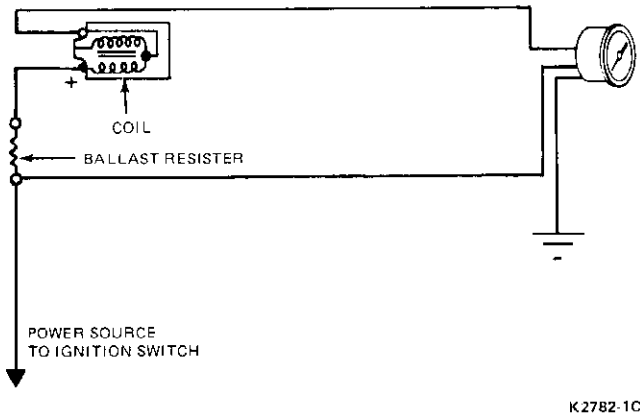


FIG. 1 Tachometer Wiring Diagram—Typical—Except 6 and 8-Cylinder Mustang II

The tachometer used for Mustang II equipped with the 5.0L (302 CID) V-8 engine is equipped with a tachometer signal control assembly mounted on the rear of the tachometer assembly (Fig.

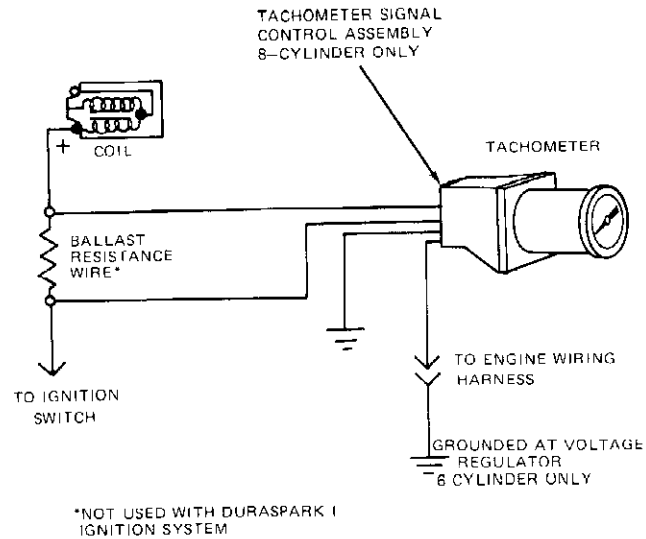
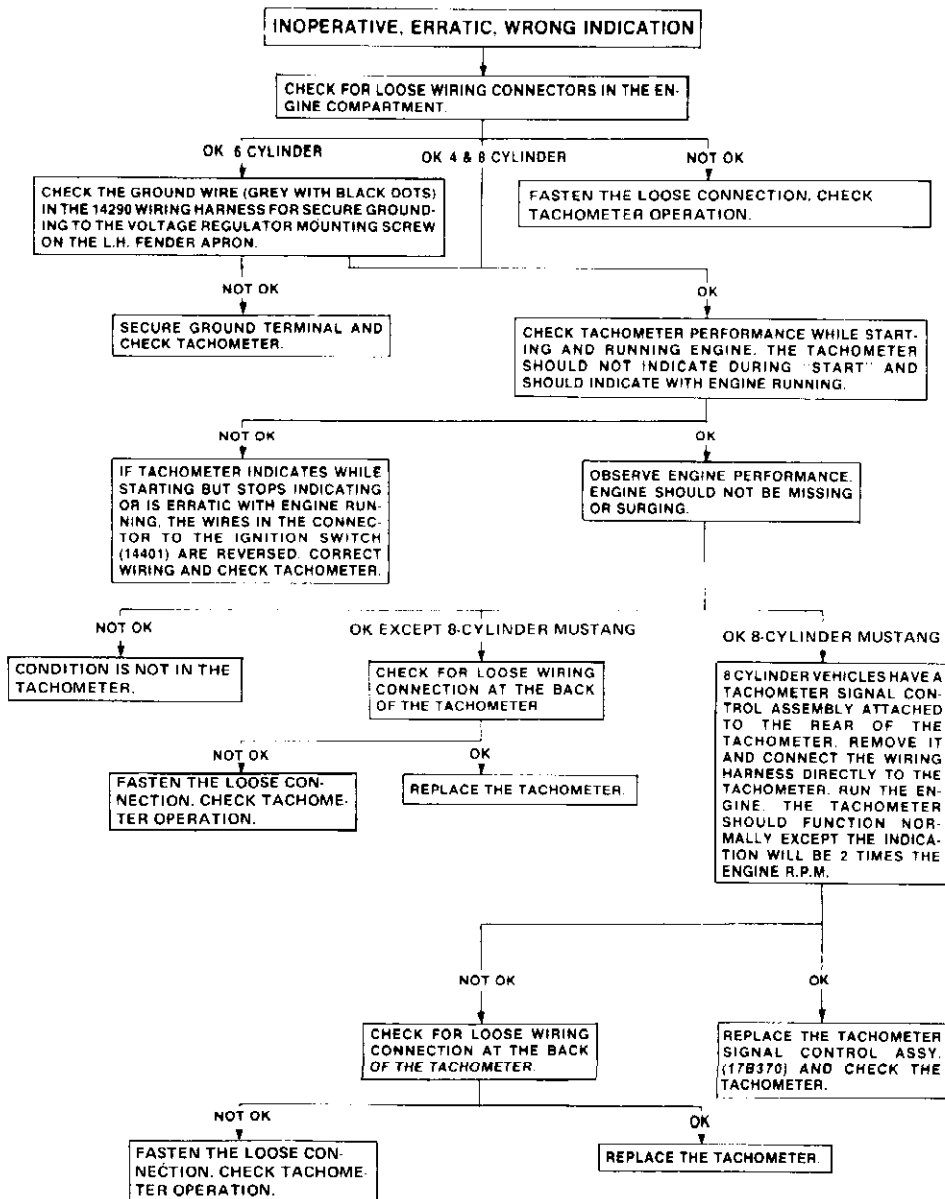


FIG. 2 Tachometer Wiring Diagram—Mustang II

DIAGNOSING

DIAGNOSTIC PROCEDURE — TACHOMETER THUNDERBIRD, LTD II, COUGAR XR-7, MUSTANG II, PINTO AND BOBCAT



CK3398-2B

TESTING

To test for an inoperative tachometer signal control assembly (Mustang II, with 5.0L [302 CID V-8]) remove the assembly as outlined in this Part. Connect the wiring harness connector directly to the tachometer. Start the engine. The tachometer should function normally, except that

the pointer indication will be twice the actual RPM. If not, the tachometer or wiring harness must be serviced.

If a Mustang II tachometer indicates approximately 50% higher than normal, the problem may be a loose ground connector terminal lug in the 157 circuit.

REMOVAL AND INSTALLATION

LTD II, Cougar XR-7 and Thunderbird

Removal

1. Disconnect the battery ground cable.
2. Remove the instrument cluster assembly as outlined in Part 33-50. Remove the clock knob and nut.
3. Remove the six screws retaining the cluster mask to the cluster back plate and remove the mask.
4. Disconnect the tachometer connector from the instrument cluster harness connector.
5. Remove the three tachometer retaining screws and remove the tachometer.

Installation

1. Position the tachometer to the cluster back plate and install the three retaining screws.
2. Connect the tachometer lead at the connector to the instrument cluster harness connector.
3. Position the cluster mask to the back plate and install the six retaining screws. Install the clock knob and nut.
4. Install the cluster assembly as outlined in Part 33-50, and connect the battery ground cable.

Mustang II

Removal

1. Disconnect the battery ground cable.
2. Remove the instrument cluster as outlined in Part 33-50.
3. If equipped with a tachometer signal control assembly (8-cylinder engine) disconnect the assembly from the rear of the tachometer assembly by removing one attaching screw and pulling the control assembly free from the tachometer electrical terminals.
4. Remove the six (6) screws attaching the mask and lens to the cluster backplate and remove the mask and lens.

5. Remove the three (3) screws attaching the tachometer to the cluster backplate and remove the tachometer.

6. Carefully remove the hi-beam jewel from the rear of the tachometer dial.

Installation

1. Carefully install the hi-beam jewel over the jewel indexing pins, until the jewel becomes flush with the rear face of the tachometer dial.
2. Position the tachometer to the cluster backplate and install the three attaching screws.
3. Position the lens and mask to the cluster backplate and install the six (6) attaching screws.
4. Connect the tachometer signal control assembly (if 8-cylinder engine) to the rear of the tachometer and install the attaching screw.
5. Install the instrument cluster.
6. Connect the battery ground cable and check the operation of the tachometer.

Pinto and Bobcat

Removal

1. Disconnect the battery ground cable.
2. Remove the instrument cluster assembly as outlined in Part 33-50.
3. Remove the four screws retaining the cluster mask to the cluster back plate and remove the mask.
4. Remove the three tachometer retaining screws and remove the tachometer.

Installation

1. Position the tachometer to the cluster back plate and install the three retaining screws.
2. Position the cluster mask to the back plate and install the four retaining screws.
3. Install the cluster assembly as outlined in Part 33-50.
4. Connect the battery ground cable.

Clock

PART
33-05

SUBJECT	PAGE	SUBJECT	PAGE
ADJUSTMENTS		ADJUSTMENTS (Cont'd.)	
Digital Clock	05-1	Quartz Electric Calendar	05-1
Electric Wind Clock	05-1	REMOVAL AND INSTALLATION	05-1

CK3378-2B

ADJUSTMENT

ELECTRIC WIND

If the clock runs slow or fast, merely reset the clock to the proper time. This action adjusts the clock automatically. Turning the knob clockwise will cause the clock to run faster. Turning the knob counterclockwise will cause the clock to run slower.

DIGITAL

No adjustment on time keeping accuracy is required.

QUARTZ ELECTRIC CALENDAR

No timekeeping accuracy adjustment is required to set the time. Pull out the set knob and turn it clockwise

to advance the time, or turn counterclockwise to set back the time.

The calendar feature displays the day of the week (with AM and PM distinction) and the date of the month. The date display advances from 1 to 31 positions; this will require setting adjustments at the end of the month for those months with less than 31 days.

The calendar feature can be adjusted with the set knob in the normal (rest) position. The day feature should be set first (if required) by turning the set knob counterclockwise (approximately 1/4 turn). Next, set the date feature by turning the set knob clockwise (approximately 1/4 turn). The calendar feature can only be advanced.

REMOVAL AND INSTALLATION

ELECTRIC WIND AND DIGITAL

Ford and Mercury

Removal

1. Disconnect the battery ground cable.
2. Remove the radio control knobs. Remove the two screws retaining the right hand instrument panel applique and remove the applique.
3. Remove the screws retaining the clock to the instrument panel.
4. Disconnect the clock lead and bulb sockets, and remove the clock.

Installation

1. Connect the clock lead and bulbs.
2. Position the clock to the instrument panel and install the retaining screws.
3. Position the right hand instrument panel applique to the instrument panel and install the two retaining screws. Install the two radio control knobs.
4. Connect the battery ground cable and set the clock.

LTD II, Cougar, Thunderbird and Ranchero—
Standard Cluster. (Fig. 1)

Removal

1. Disconnect the battery ground cable.
2. Remove seven screws attaching the cluster trim panel and remove the trim panel.
3. Remove three screws retaining the clock to the cluster and panel and remove the clock.
4. Remove the two light sockets from the rear of the clock and disconnect the clock lead at the connector.

Installation

1. Install the two light sockets and connect the clock lead at the connector.
2. Position the clock to the cluster and install the three retaining screws.
3. Install the seven screws attaching the cluster trim panel.
4. Connect the battery ground cable and set the clock.



K3433-1A

FIG. 1 Quartz Electric Calendar Clock—LTD II, Cougar, Thunderbird and Ranchero

LTD II, Cougar XR-7, Thunderbird and Ranchero—Performance Cluster

Removal

1. Disconnect the battery ground cable.
2. Remove the instrument cluster as outlined in Part 33-50.
3. Remove the clock knob and nut.
4. Remove the six screws attaching the lens and mask assembly to the cluster backplate and remove the lens and mask assembly.
5. Disconnect the clock lead, remove the two clock retaining screws and remove the clock.

Installation

1. Position the clock to the cluster backplate, install the two retaining screws and connect the clock lead.
2. Position the lens and mask assembly to the cluster backplate and install the six retaining screws.
3. Install the clock knob and nut.
4. Install the cluster assembly as outlined in Part 33-50.
5. Connect the battery ground cable and set the clock.

Lincoln Continental

Removal

1. Disconnect battery ground cable.
2. Remove the radio control knobs. Remove the two screws retaining the right-hand instrument panel applique and remove the applique.
3. Remove the screws retaining the clock to the instrument panel.
4. Disconnect the clock lead and bulb socket and remove the clock.

Installation

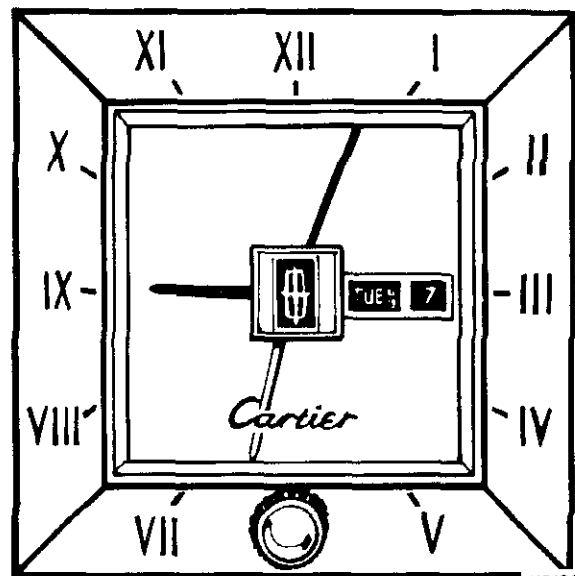
1. Connect the clock lead and bulb.
2. Position the clock to the instrument panel and install the retaining screws.

3. Position the right-hand instrument panel applique to the instrument panel and install the retaining screws. Install the two radio control knobs.
4. Connect battery ground cable and set the clock.

Continental Mark V (Fig. 2)

Removal

1. Disconnect the battery ground cable.
2. Remove the cluster assembly as outlined in Part 33-50.
3. Remove the clock, nut and knob and bezel.
4. Remove the six screws attaching the lens and mask assembly to the cluster backplate. Remove the mask and lens assembly.
5. Remove the two nuts retaining the printed circuit to the rear of the clock.
6. Remove the three screws attaching the clock to the cluster backplate and remove the clock.



K3434-1A

FIG. 2 Quartz Electric Calendar Clock—Continental Mark V

Installation

1. Position the clock to the backplate and install the three retaining screws.
2. Position the printed circuit to the clock and install the two retaining nuts.
3. Position the lens and mask assembly to the cluster backplate and install the six attaching screws.
4. Install the clock knob and nut.
5. Install the cluster assembly as outlined in Part 33-50.
6. Connect the battery ground cable and set the clock.

Mustang II

Removal

1. Disconnect the battery ground cable.
2. Remove three upper retaining screws for the right-hand instrument panel applique and remove the applique by unsnapping three lower retaining fingers.
3. Remove the three screws retaining the clock to the instrument panel.

4. Disconnect the clock lead and bulb socket, and remove the clock.

Installation

1. Connect the clock lead and bulb socket.
2. Position the clock to the instrument panel and install the three retaining screws.
3. Install the right hand applique by snapping in the three lower retaining fingers into the panel and installing the upper three retaining screws.
4. Connect the battery ground cable and set the clock.

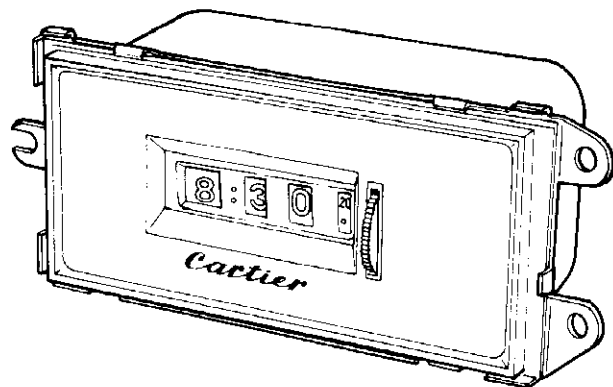
Monarch and Granada (Fig. 3)

Removal

1. Disconnect the battery ground cable.
2. Remove the glove compartment liner attaching screws and remove the glove compartment liner.
3. Remove the two outboard screws attaching the clock to the instrument trim panel.
4. Loosen the inboard trim panel attaching screw sufficiently to slip the clock out without removing the attaching screw.
5. Remove the clock from the trim panel opening.
6. Disconnect the clock power lead and bulb socket and remove the clock assembly.

Installation

1. Connect the clock power lead and bulb socket to the clock assembly.



K2630-1B

FIG. 3 Digital Clock—Mustang II, Monarch, Granada—Typical

2. Slip clock into position behind the instrument trim panel.
3. Install the two outboard attaching screws and tighten all attaching screws.
4. Position glove compartment liner and install and tighten the attaching screws.
5. Connect battery ground cable and check the clock for proper operation.

Charge Indicator -- Lamp

PART
33-10

Applies to All Models

SUBJECT	PAGE	SUBJECT	PAGE
DESCRIPTION AND OPERATION	10-1	REMOVAL AND INSTALLATION	10-1
TESTING	10-1		

CK3379-2B

DESCRIPTION AND OPERATION

A red alternator charge indicator lamp is used on vehicles not equipped with an ammeter. This lamp glows when the field relay fails to close.

When the ignition switch contacts are closed (switch turned on) battery current flows through the charge indicator light and the parallel resistor, and through the regulator to the field, and the lamp comes on.

Vehicles with the new electronic regulator have a 500 ohm resistor. On all others the resistor is 15 ohm.

When the alternator builds up enough voltage to close the field relay the charge indicator lamp goes out.

TESTING

To test the charge indicator lamp, turn the ignition switch to the RUN position with the engine stopped. The lamp should come on. If it does not, the bulb is burned out, or the wiring to the lamp is broken.

Systems with electro-mechanical and transistorized regulators (15 ohm resistor) only.

An open resistor wire in the alternator charging system wiring harness will usually cause the charge indicator lamp to stay on until the engine speed is increased to about two thousand rpm. This effect will be noticed each time the engine is started. In some cases the lamp will not go out at all.

The charge indicator lamp may be tested with the use of a test light containing a trade number 67 or 1155 bulb.

Disconnect the regulator plug from the regulator. Turn the ignition switch to RUN position. Touch one test probe from the test light to the regulator plug terminal and the other to the regulator base. The test light will come on if the circuit is in proper working order. If the 15 ohm resistor or circuit is open, the indicator lamp will operate at full brightness and the test light will be out.

REMOVAL AND INSTALLATION

On some vehicles it is necessary to remove the instrument cluster to gain access to the indicator bulb. These procedures are outlined in Part 33-50. On Thunderbird and Continental Mark V remove the instrument cluster trim panel as outlined in Part 33-50.

To remove the indicator bulb, turn the bulb and socket assembly 1/4 turn counterclockwise and remove. To install, position the new bulb and socket assembly to the printed circuit and turn it clockwise 1/4 turn.

Charge Indicator -- Ammeter

PART
33-11

Applies to Mustang II, Cougar, LTD II, Thunderbird, Ranchero, Pinto and Bobcat

SUBJECT	PAGE	SUBJECT	PAGE
DESCRIPTION AND OPERATION	11-1	REMOVAL AND INSTALLATION	11-1
TESTING	11-1		

CK3380-2B

DESCRIPTION AND OPERATION

The gauge is a shunt-type ammeter which senses the direction and rate of flow of electrical current to or from the battery to indicate whether the battery is being charged or discharged. The charge indicator is non-adjustable, and should be replaced if found to be inoperative.

TESTING

The following test should be conducted to check if the ammeter is operational. Turn the headlamps on with the engine off. The meter pointer should move toward the "D" or discharge scale.

If no movement of the needle is observed, inspect as follows:

SYSTEMS WITHOUT A PRINTED CIRCUIT, CHECK:

1. The rear of the meter housing for loose connections.
2. If connections are good, remove connections and check wiring for an open circuit.
3. If connections are good and wiring is not open, replace the ammeter.

If the meter moves toward the "C" or charge scale when the headlamps are turned on and the

engine is off, the wire connections from the battery are reversed at the ammeter. This condition is most likely to occur in an ammeter system that uses a wiring harness instead of a printed circuit.

SYSTEMS WITH A PRINTED CIRCUIT, CHECK:

1. The rear of the meter to insure nuts are secured properly to the printed circuit.
2. If nuts are secured properly, check to insure the multiple connector is making proper contact to the printed circuit.
3. If connector is making proper contact, remove connector from printed circuit and check wiring for an open circuit.
4. If connections are good and wiring is not open, replace the ammeter.

REMOVAL AND INSTALLATION

THUNDERBIRD, RANCHERO, COUGAR AND LTD II—PERFORMANCE CLUSTER

Removal

1. Disconnect the battery ground cable.
2. Remove the instrument cluster, as outlined in Part 33-50. Remove the clock knob and nut.
3. Remove the six screws attaching the lens and mask assembly to the cluster backplate and remove the mask and lens assembly.
4. Remove the wires from the back of the gauge.
5. Remove the two gauge retaining nuts and remove the gauge.

Installation

1. Position the gauge to the cluster backplate and install the two retaining nuts.
2. Install the two wire connectors to the back of the gauge.
3. Position the lens and mask assembly to the cluster backplate and install the six retaining screws. Install the clock knob and nut.
4. Install the instrument cluster, as outlined in Part 33-50.
5. Connect the battery ground cable and check the operation of the gauge.

MUSTANG

Removal

1. Disconnect the battery ground cable.
2. Remove the instrument cluster assembly, as outlined in *Part 33-50*.
3. Remove the six screws that retain the mask and lens to the cluster backplate and remove the mask and lens.
4. Remove the two gauge retaining nuts and remove the gauge.

Installation

1. Position the gauge to the cluster backplate and install the two retaining nuts.
2. Position the lens and mask to the cluster backplate and install the six retaining screws.
3. Install the instrument cluster assembly, as outlined in *Part 33-50*.
4. Connect the battery ground cable and check the operation of the gauge.

PINTO AND BOBCAT (YOUTH OPTION)

Removal

1. Disconnect the battery ground cable.
2. Remove the cluster as outlined in *Part 33-50*.
3. From the rear side of the cluster, remove the three retaining screws and separate the cluster from the backplate.
4. Remove the gauge terminal insulator.
5. Remove the two gauge retaining nuts and remove the gauge.

Installation

1. Position the gauge in the backplate and install the two retaining nuts.
2. *Install gauge terminal insulator.*
3. Position the cluster mask to the backplate and install the three retaining screws.
4. Install the cluster assembly as outlined in *Part 33-50*.
5. Connect the battery ground cable and check the operation of the gauge.

Fuel Indicating System

PART
33-20

Applies to All Models

SUBJECT	PAGE	SUBJECT	PAGE
GENERAL INFORMATION	20-1	TESTING	
DESCRIPTION AND OPERATION		Electronic Low Fuel Level	
Electronic Low Fuel Level		Warning Switch	20-4
Warning System	20-2	Fuel Gauge and IVR	20-3
Fuel Filters	20-2	Fuel Sender Unit	20-4
Fuel Indicator Gauge	20-2	Preliminary Checks	20-3
Fuel Level Indicating System	20-2	REMOVAL AND INSTALLATION	
Fuel Sending Unit	20-2	Fuel Gauge	20-6
Instrument Voltage Regulator		Fuel Sending Unit	20-6
(IVR)	20-2	Low Fuel Level Warning Switch	20-6

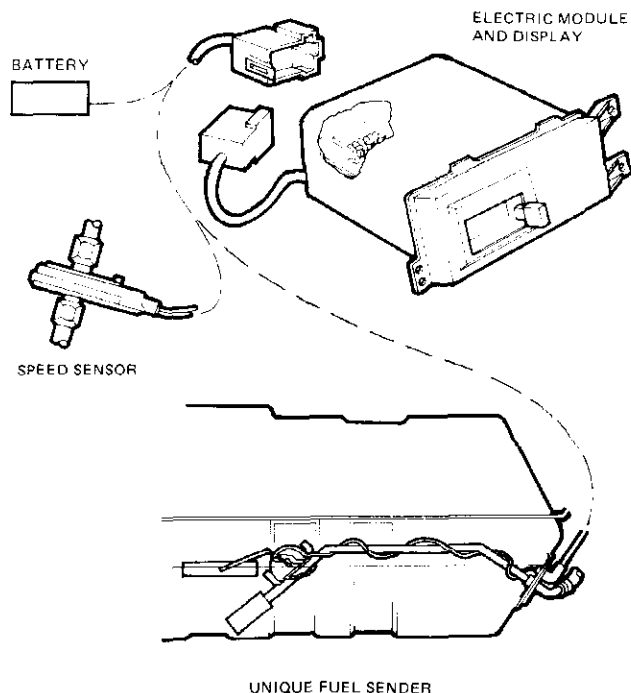
CK3381-2B

GENERAL INFORMATION

An auxiliary fuel tank is available on Mustang II vehicles (required on Mustang II equipped with V-8 engine).

Because the auxiliary tank empties into the main tank, it is normal for the fuel gauge to indicate FULL until the additional capacity of the auxiliary tank is used.

There is also an optional miles-to-empty electronic module for Continental Mark V. After the command switch to the right of the display is activated, the display will show the predicted miles that may be driven on the remaining fuel. If the remaining miles-to-empty is 50 or less, the display will automatically turn on and remain on until more fuel is added. The MTE module is attached to the instrument panel with three screws and two locator pins. Service of the module or its illumination bulb can be accomplished after removal of the cluster trim cover. See Fig. 1.



K3542-1A

FIG. 1 Miles-to-Empty Fuel Indication System

DESCRIPTION AND OPERATION

FUEL LEVEL INDICATING SYSTEM

The fuel level indicating system is a bimetal-resistance type system and consists of an instrument voltage regulator, fuel indicator gauge mounted in the instrument cluster, and a sender unit located in the fuel tank (Fig. 2).

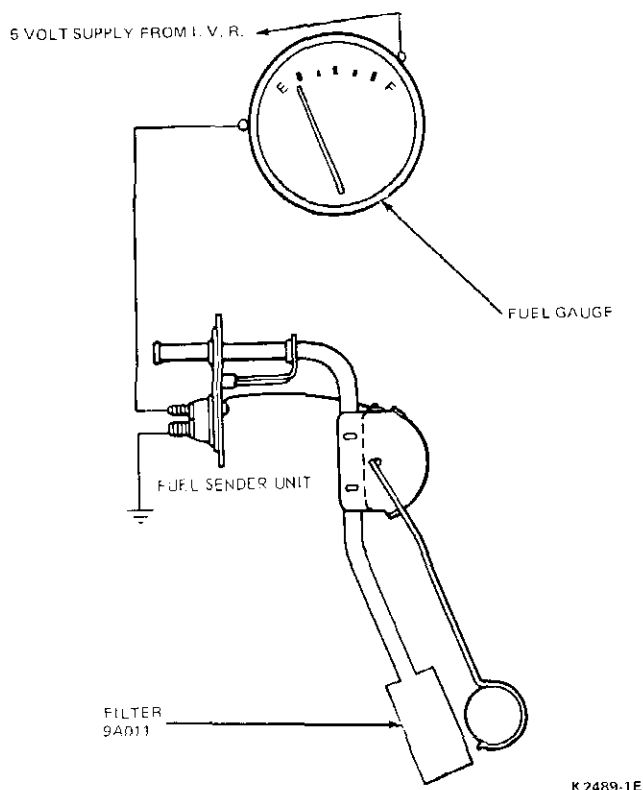


FIG. 2 Fuel Level Indicating System

INSTRUMENT VOLTAGE REGULATOR (IVR)

The instrument voltage regulator (IVR) used with the fuel indicator gauge, controls and maintains an average pulsating value of 5.0 volts at the gauge terminals. To prevent the (IVR) from causing radio interference, a radio suppression choke is connected in series between the printed circuit and the instrument voltage regulator (where specified).

FUEL INDICATOR GAUGE

The fuel indicator gauge pointer is attached to a wire wound bimetal strip, which when heated by the flow of current controlled by the fuel sender unit, produces the appropriate level indication. When the current is low, there is little heating effect and the pointer moves a short distance. As the current increases, it produces a greater heating effect, causing the pointer to move a greater distance.

FUEL SENDING UNIT

The fuel sending unit consists of a variable resistor controlled by the level of an attached float in the fuel tank. When the fuel level is low, resistance in the sender

is high and allows only a low current to flow through the indicator gauge windings causing the pointer to move a short distance. When the fuel level is high, the resistance in the sender is low and allows a higher current flow causing the indicator pointer to move a greater distance.

FUEL FILTERS

Two fuel tank filters are used to eliminate the need of replacing the entire fuel sender assembly. One of these filters is 1-7/8" long and is fitted to a 5/16" fuel sender tube. The other filter is 2-3/4" long and is fitted to a 3/8" fuel sender tube. The filters are not interchangeable and each type must be hand pressed onto the fuel sender outlet tube until it bottoms.

ELECTRONIC LOW FUEL LEVEL WARNING SWITCH SYSTEM

Continental Mark V, Granada, Monarch and Versailles

The electronic low fuel warning system is standard equipment on Continental Mark V and optional on Granada, Monarch and Versailles.

The Electronic Low Fuel Level Warning Switch is an electronic sensing and switch device which CANNOT BE CALIBRATED without specialized calibration equipment.

The system consists of an electronic low fuel level warning switch (Fig. 3) and a low fuel level indicator lamp located on the instrument panel. Granada, Monarch and Versailles models have the indicator lamp and switch located in the console. Continental Mark V has the switch and indicator lamp located on the instrument panel. The warning switch is controlled by the difference in voltage potential between the two terminals of the fuel gauge. When the fuel tank is less than 1/4 full, the contacts within the warning switch are closed to make the low fuel level indicator lamp glow. The system also has a prove-out feature to check lamp operation when the ignition switch is turned ON.

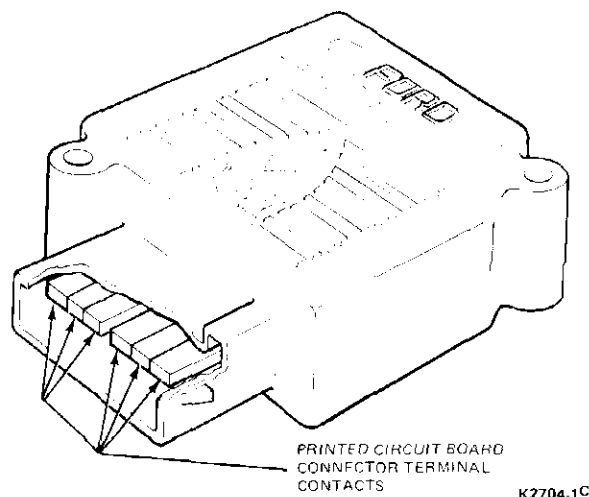


FIG. 3 Electronic Low Fuel Level Warning Switch

TESTING

PRELIMINARY CHECKS

1. Visually inspect fuel tank for damage. A fuel tank that is collapsed or distorted from its normal shape will seriously affect the fuel indicating system operation.
2. A vehicle may be encountered where the fuel tank does not fill completely. This will result in the fuel gauge not reaching the full mark. Check by shaking the vehicle after the first fuel "blow back" or pump nozzle cutoff and then slowly metering fuel into the tank with the shut-off nozzle withdrawn to the edge of the filler neck. If the fuel gauge reaches full after this procedure, the tank will not fill because of the fuel tank or filling practices and will not be corrected by replacement of the Fuel Indicating System components.

FUEL GAUGE AND INSTRUMENT VOLTAGE REGULATOR (IVR)

Operational Test

Follow the instructions printed on the case of the Bimetal Gauge System Tester No. (21-0015) or equivalent. If a tester is not available, use the following procedure.

Disconnect the wiring connector from the terminals at the fuel sender unit. Check the terminals for possible corrosion or undercoating and clean if necessary. Connect the lead of a 12-volt test light, or the positive lead of a volt meter (20-volt scale) to the gauge lead that was disconnected from the fuel sender unit. Connect the other test lead to a suitable ground. With the ignition switch in the ON position, a flashing light or fluctuating voltage will indicate that the instrument voltage regulator is operating and that the gauge indicator circuit is not interrupted.

If a pulsating voltage is shown but the gauge was not accurate before the check, perform the calibration test.

If the light does not blink after a few seconds, or the voltage reading is steady check IV ground. If okay, replace the IVR. If a pulsating voltage or flashing light is shown, move the ground lead of the test light or voltmeter to the ground lead of the wiring connector. If the pulsating voltage or flashing light is still shown, proceed to the calibration test. If not, trace and repair the open circuit in the ground wire of the wiring harness. **Do not ground or spark either terminal of the instrument voltage regulator. This will burn out the dash wiring harness or damage the instrument voltage regulator or both.** If no voltage is indicated by the voltmeter or the test light stays off; check for an open circuit across the IVR terminals, the indicator gauge windings, or the printed circuit.

Calibration Test

When the instrument voltage regulator or the fuel gauge is suspected of being out of calibration (having a fluctuating movement or a high or low reading), both the fuel gauge and the instrument voltage regulator must be tested simultaneously. This test is done on the vehicle.

The required test equipment consists of a Bimetal System Tester No. 21-0015 or equivalent, a pair of 10 ohm and 73 ohm resistors or another fuel sender of known quality.

If the test is performed with the resistors, disconnect the wiring connector at the sender unit, connect the resistor between the gauge lead and a suitable ground, and turn on the ignition switch. With the 10 ohm resistor, the gauge should read on or above the **FULL** mark. With the 73 ohm resistor, the gauge should read on or below empty mark.

If the test is performed with a fuel sender of known quality, use the following procedure: Disconnect the wiring connector from the sender and connect it to the test sender. Connect sender housing to vehicle ground on single terminal units. Turn the ignition switch to the ON position. Move the float rod against the FULL stop position (away from the fuel filter). The gauge should read **on or above the full (F) mark**. With the float rod against the EMPTY stop (toward the fuel filter), the gauge should read **on or below the empty (E) mark**.

If the fuel gauge performs as indicated, perform the fuel sender unit test(s).

If the gauge does not perform as indicated, replace the instrument voltage regulator and re-test to determine if the gauge is causing the trouble. If the gauge now reads correctly, the trouble has been the instrument voltage regulator and is now eliminated. If the gauge is still out of calibration, replace the gauge and reinstall the old IVR.

Inoperative Fuel Gauge—Ford and Mercury

If the fuel gauge indicator will not move off "empty", the resistor wire that provides the circuit feed to the instrument voltage regulator and fuel gauge may be broken at its termination or along its length. An "open" I.V.R. resistor feed wire can be tested and, if necessary, corrected by repairing or replacing the "open" wire as outlined below:

1. Remove the cluster assembly. Refer to Part 33-50.
2. Locate circuit No. 297A (black-lt. green hash) in cluster connector.
3. Turn the ignition switch to the accessory position and test for a voltage on circuit No. 297A.
4. If the test on circuit No. 297A indicated an open circuit, locate the other end of circuit No. 297A.

Circuit No. 297A starts at the back of the fuse panel and ends at the cluster connector.

5. Visually inspect both ends of the resistor wire for an open condition. If an open condition is observed, repair. If the wire appears O.K., connect an ohmmeter to both ends of the resistor wire. The ohmmeter should indicate 8 to 9 ohms of resistance. If the ohmmeter indicates more than 10 ohms, repair or replace the resistor wire.

Fuel Gauge Bench Test

To test the fuel gauge coil windings, remove the gauge. Connect the gauge terminals to an ohmmeter and read the gauge coil winding resistance. An upward movement of the needle from 10

toward 14 ohms is normal because the current increases the temperature of the gauge coil windings. If the ohmmeter reads below 10 ohms or above 14 ohms, replace the gauge.

FUEL SENDER UNIT

In Vehicle Test

1. Inspect fuel tank for distortion or damage.

NOTE: If the fuel tank is distorted or damaged, it must be repaired or replaced before further testing. Refer to Bench Test procedure if fuel sender is removed from fuel tank.

2. Connect one lead of a Rotunda 21-0005 ohmmeter or equivalent to the ground terminal of the fuel sender connector (metal housing on single terminal units), the other lead to the variable resistor terminal. Refer to Fig. 5 for terminal connector application.

The ohmmeter should read between 8 and 86 ohms:

If the fuel sender resistance is above 86 ohms or below 8 ohms, the fuel sender must be replaced.

3. Fill the fuel tank to capacity. Refer to item No. 2 of Preliminary Checks. The ohmmeter reading should be between 8 and 12 ohms resistance:

If the FULL fuel tank fuel sender resistance reading is below 8 ohms or above 12 ohms, the fuel sender unit must be replaced.

4. Use the Rotunda Gasoline Tanker (37-0002) or equivalent and drain all of the fuel from the fuel tank. Observe the ohmmeter reading while the fuel tank is being drained. The resistance should increase smoothly without jumping or hesitating.

If the resistance reading jumps or hesitates, replace the fuel sender unit.

5. When the fuel tank is empty, the ohmmeter reading should be between 60 and 86 ohms resistance:

If the EMPTY fuel tank fuel sender resistance reading is below 60 ohms or above 86 ohms, the fuel sender unit must be replaced.

6. If the results of the previous steps are OK and an erroneous fuel indication still exists, it is necessary to perform the Instrument Voltage Regulator (IVR) and Fuel Gauge Calibration Tests.

Bench Test (With Sender Removed from Fuel Tank)

1. Connect one lead of a Rotunda (02-0005) ohmmeter or equivalent to the ground terminal of the fuel sender connector (metal housing on single terminal units), the other lead to the variable resistor terminal. Refer to Fig. 5 for terminal connector application. The ohmmeter should read between 60 and 86 ohms when the float rod is against the EMPTY stop (closest to the fuel filter):

If the EMPTY fuel tank fuel sender resistance reading is below 60 ohms or above 86 ohms, the fuel sender unit must be replaced.

2. Observe the ohmmeter reading while slowly moving the float between the EMPTY and FULL float rod stops. The resistance increase or decrease should be smooth without jumping or hesitation. The ohmmeter should read between 8 and 86 ohms:

If the fuel sender resistance goes above 86 ohms or below 8 ohms, the fuel sender must be replaced.

If the resistance reading jumps or hesitates while slowly moving the float rod, the fuel sender must be replaced.

3. Move the float rod to the FULL stop position (furthest away from fuel filter). The ohmmeter should read between 8 and 12 ohms resistance:

If the ohmmeter reading is below 8 ohms or above 12 ohms resistance, the fuel sender must be replaced.

4. Before installing a fuel sender unit, the wire harness connector should be connected to the fuel sender unit and the float rod moved from the EMPTY to FULL stops to check the fuel gauge readings:

If Steps 1, 2, and 3 of this procedure are OK and the fuel gauge does not indicate properly as shown in Fig. 3, perform the Instrument Voltage Regulator (IVR) Operational Test and the Fuel Gauge Calibration Test.

NOTE: Check the float before reinstalling a fuel sender unit in the fuel tank. Be sure the float rod is not bent and that the float is not:

- a. Filled with fuel
- b. Badly distorted
- c. Loose on float rod

Check the fuel sender locating tabs. Be sure the tabs are not bent allowing the sender unit to rotate on the gasket surface as the locking ring is installed.

ELECTRONIC LOW FUEL LEVEL WARNING SWITCH SYSTEM

Continental Mark V, Granada, Monarch and Versailles

Low Fuel Indicator Light Circuit

When the ignition switch is turned ON, the lamp should glow for less than (one minute). If the lamp does not glow, test the bulb and/or perform the low fuel warning switch circuit test described below.

Low Fuel Warning Switch Circuit

Improper operation of the low fuel warning switch will be apparent when the indicator lamp remains **ON** continually with more than 1/4 tank of fuel or if the indicator lamp remains **OFF** when the tank is empty. If either condition exists, disconnect the wiring connector attached to the low fuel warning switch. With the ignition **ON**, test the terminal connector positions of the wiring harness connector shown in Fig. 5 as follows:

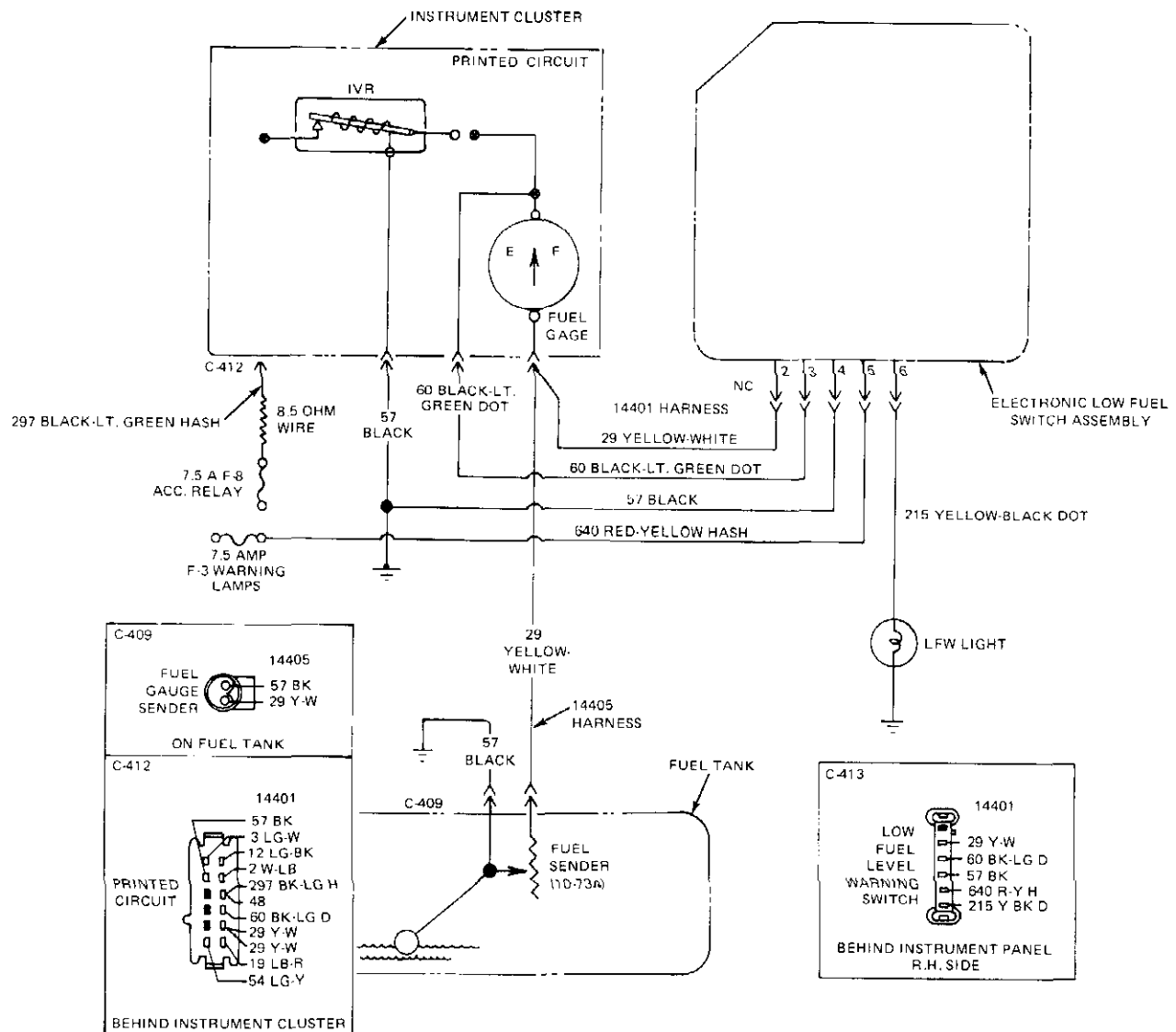
Position 1—**Blank**—no terminal

Position 2—Connect a self-powered test light between terminal and ground. Test light should blink.

Position 3—Connect test light between terminal and ground. Test light should blink and be brighter than Position 2.

Position 4—Connect test light between terminal and positive battery terminal. Test light should glow and remain ON.

Position 5—Connect test light between terminal and ground. Test light should glow and remain ON.



K3167-2B

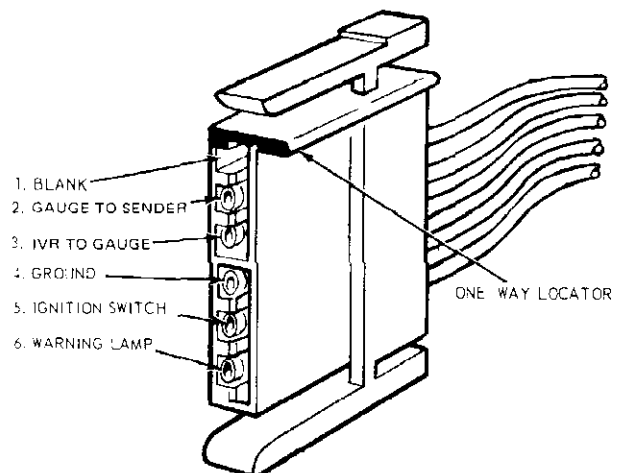
FIG. 4 Electronic Low Fuel Level Warning System Schematic—Granada, Monarch, Versailles and Continental Mark V

Position 6—Connect a jumper wire between terminal and battery positive terminal. Warning lamp on instrument panel should glow and remain ON.

If any of the above tests are unsatisfactory: trace the particular wire for an open circuit and repair as required. If all the tests show satisfactory, perform the Fuel Gauge and IVR Calibration Test and repair the system or replace defective components as required. If the Fuel Gauge and IVR Calibration Test is OK, replace the Low Fuel Level Warning Switch and recheck the system for proper operation.

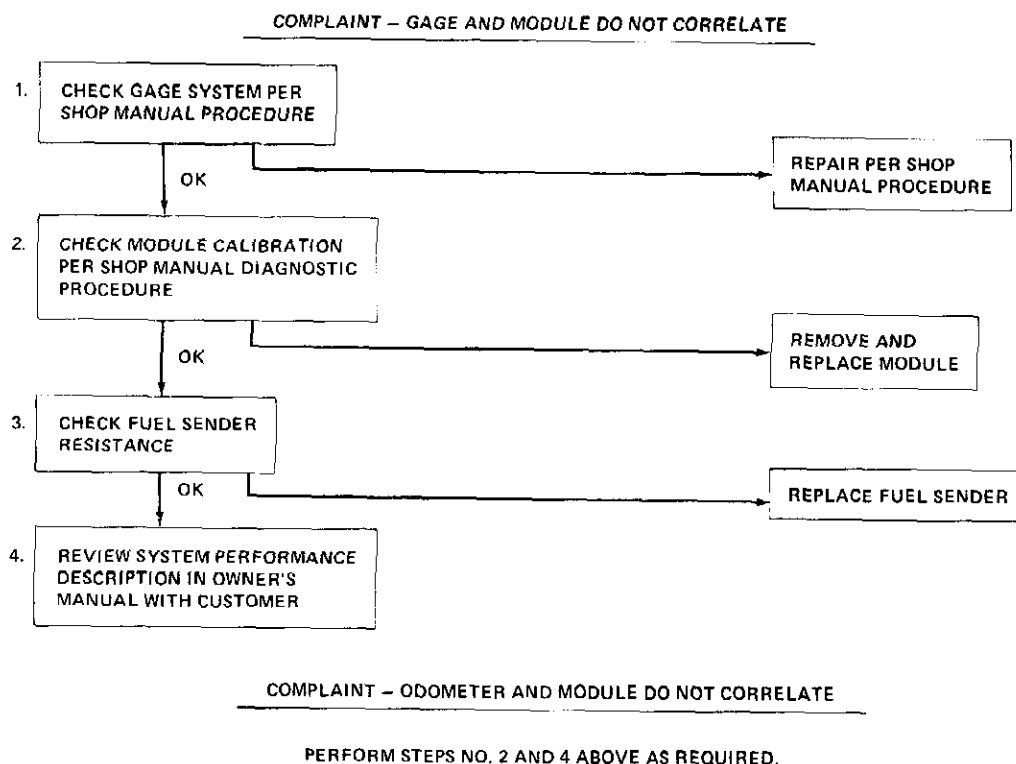
Miles-To-Empty Module

For a service flow chart on the Continental Mark V, refer to the Chart in Fig. 6.



K2705-1B

FIG. 5 Electronic Low Fuel Level Warning Switch Connector Terminals



K3543-2A

FIG. 6 Miles-to-Empty Service Flow Chart

REMOVAL AND INSTALLATION

FUEL SENDING UNIT

1. Remove the fuel from the fuel tank.
2. Remove any dirt that has accumulated around the sending unit so that it will not enter the tank or connections.
3. Disconnect the wiring connector from the fuel sender.
4. Loosen the hose clamp and disconnect the tank line at the sending unit.
5. Turn the sending unit locking ring counterclockwise and remove the locking ring, sending unit and mounting gasket.
6. Clean the fuel gauge sending unit mounting surface at the fuel tank.
7. Position a new mounting gasket and the sending unit on the fuel tank and secure it by rotating the locking ring against the stop.
8. Connect the fuel tank line and wiring connector.
9. Fill the tank.
10. Check the fuel gauge operation and check for fuel leaks.

2. Remove the two switch attaching screws, the connector plug and remove switch.

Installation

1. Position the new switch assembly, install the two switch attaching screws and connector plug.
2. Install the panel and the four attaching screws.
3. Verify correct operation of the low fuel warning system.

Granada, Monarch and Versailles (See Fig. 7)

Removal

1. Open console glove box door located between the front seats.
2. Remove the two switch attaching screws, the connector plug and remove switch.

Installation

1. Attach connector plug, position the new switch assembly and install the two switch mounting screws.
2. Verify correct operation of low fuel warning system.

FUEL GAUGE

Ford, Mercury and Lincoln Continental

Removal

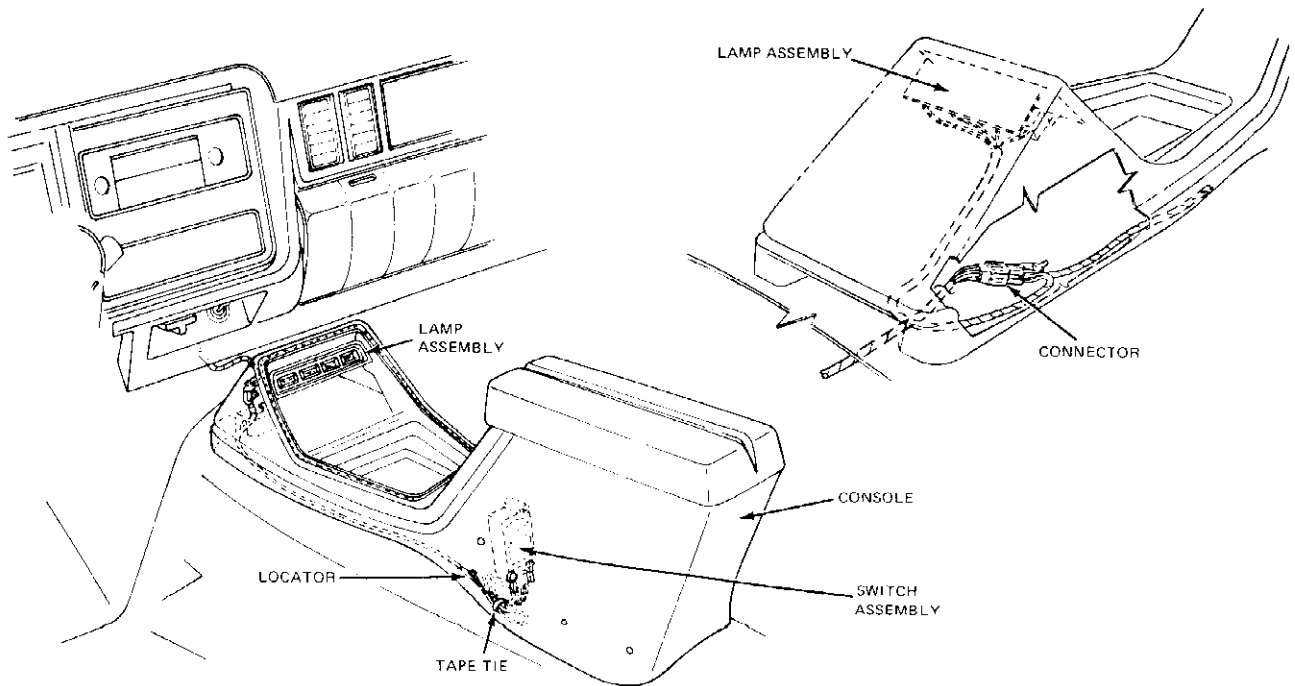
1. Disconnect the battery ground cable.
2. Remove the instrument cluster as outlined in Part 33-50.

LOW FUEL LEVEL WARNING SWITCH

CONTINENTAL MARK V

Removal

1. Remove four screws in applique panel above glove box and remove panel.



K3355 2B

FIG. 7 Floor Console Warning Indicator Panel—Granada, Monarch and Versailles

3. Remove the mask and lens from the cluster, (five screws).
4. Remove the speedometer assembly (two screws).
5. Remove the fuel gauge (two retaining nuts).

Installation

1. Position the gauge to the cluster and install the retaining nuts.
2. Install the speedometer assembly.
3. Install the mask and lens to the cluster (5 screws).
4. Install the cluster as outlined in Part 33-50.
5. Connect the battery ground cable and check the gauge operation.

Mustang II

Removal

1. Disconnect the battery ground cable.
2. Remove the instrument cluster assembly, as outlined in Part 33-50.
3. Remove the six screws that retain the mask and lens to the cluster backplate and remove the mask and lens.
4. Remove the two gauge retaining nuts and remove the gauge.

Installation

1. Position the gauge to the cluster backplate and install the two retaining nuts.
2. Position the lens and mask to the cluster backplate and install the six retaining screws.
3. Install the instrument cluster assembly as outlined in Part 33-50.

4. Connect the battery ground cable and check the operation of the gauge.

Thunderbird, Cougar and LTD II—Standard Cluster

Removal

1. Disconnect the battery ground cable.
2. Remove the instrument cluster, as outlined in Part 33-50.
3. Remove the six screws attaching the cluster backplate to the mask and lens assembly.
4. Remove the two outer dial attaching screws.
5. Remove the two gauge retaining nuts from the rear of the cluster backplate and remove the gauge.

Installation

1. Position the gauge to the cluster backplate and install the two retaining nuts.
2. Install the two outer dial attaching screws.
3. Install the lens and mask assembly to the cluster (six retaining screws).
4. Install the instrument cluster, as outlined in Part 33-50.
5. Connect the battery ground cable and check the operation of the gauge.

Thunderbird, Cougar XR-7 and LTD II—Performance Cluster

Removal

1. Disconnect the battery ground cable.
2. Remove the instrument cluster, as outlined in Part 33-50. Remove the clock knob and nut.

3. Remove the mask and lens assembly (six retaining screws) from the cluster backplate.
4. Remove the two nuts retaining the gauge to the cluster and remove the gauge.

Installation

1. Position the gauge to the cluster back and install the two retaining nuts.
2. Position the mask and lens assembly to the cluster and install the six retaining screws. Install the clock knob and nut.
3. Install the cluster, as outlined in Part 33-50.
4. Connect the battery ground cable and check the operation of the gauge.

Fairmont and Zephyr

Removal

1. Disconnect the battery ground cable.
2. Remove the instrument cluster as outlined in Part 33-50.
3. From the front side of the cluster, remove the four retaining screws and separate the cluster mask and lens assembly from the backplate. Note that these screws also retain the cluster lens to mask.
4. Remove the two gauge retaining nuts from the rear side of the cluster. Withdraw the gauge from the front side of the backplate.

Installation

1. To install, position the gauge to the cluster backplate and install the two retaining nuts from the rear side.
2. Position the cluster backplate to the mask and lens assembly and install retaining screws.
3. Install the cluster assembly, as outlined in Part 33-50.
4. Connect the battery ground cable and check the operation of the gauge.

Pinto and Bobcat (Base)

Removal

1. Disconnect the battery ground cable.
2. Remove the cluster, as outlined in Part 33-50.
3. From the rear side of the cluster, remove the four retaining screws, and separate the cluster front housing from the backplate. Note that the two lower screws also retain the metal brackets that engage the instrument panel.
4. Remove the two fuel gauge retaining nuts and remove the fuel gauge.

Installation

1. Position the fuel gauge in the backplate and install the two retaining nuts.
2. Position the cluster front housing to the backplate and install the four retaining screws.
3. Install the cluster assembly, as outlined in Part 33-50.
4. Connect the battery ground cable and check the operation of the gauge.

Pinto and Bobcat (Youth Option)

Removal

1. Disconnect the battery ground cable.
2. Remove the cluster as outlined in Part 33-50.
3. From the rear of the cluster, remove three retaining screws and separate the cluster from the backplate.
4. Remove the two fuel gauge retaining nuts.

Installation

1. Position the full gauge in the backplate and install the two retaining nuts.
2. Position the cluster mask to the backplate and install the three retaining screws.
3. Install the cluster assembly as outlined in Part 33-50.
4. Connect the battery ground cable and check the operation of the gauge.

Continental Mark V

Removal

1. Disconnect the battery ground cable.
2. Remove the instrument cluster, as outlined in Part 33-50.
3. Remove the clock knob and nut.
4. Remove the mask and lens assembly (six retaining screws).
5. Remove the two gauge retaining nuts and remove the gauge.

Installation

1. Position the gauge to the cluster and install the two gauge retaining nuts.
2. Install the lens and mask assembly (six retaining screws).
3. Install the clock knob and nut.
4. Install the instrument cluster, as outlined in Part 33-50.
5. Connect the battery ground cable and check the operation of the gauge.

Monarch, Granada and Versailles

Removal

1. Disconnect the battery ground cable.
2. Remove the instrument cluster as outlined in Part 33-50.
3. Remove the mask and lens assembly (five (5) attaching screws).
4. Remove the two (2) gauge attaching nuts and remove the gauge.

Installation

1. Position the gauge to the cluster and install the two (2) attaching nuts.
2. Install the mask and lens assembly (five (5) attaching screws).
3. Install the instrument cluster as outlined in Part 33-50.
4. Connect the battery ground cable and check the operation of the fuel gauge.

Oil Pressure Indicator -- Lamp

PART
33-30

Applies to All Models

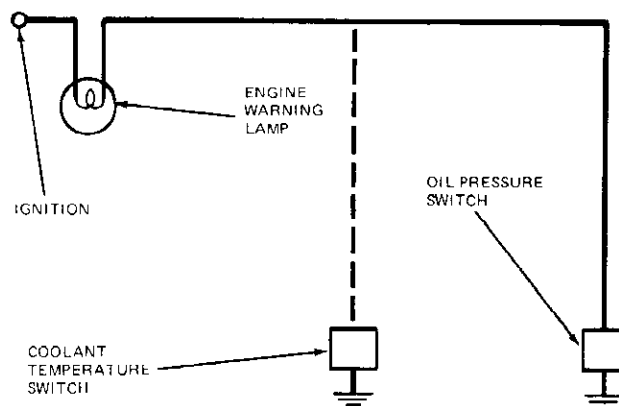
SUBJECT	PAGE	SUBJECT	PAGE
DESCRIPTION AND OPERATION	30-1	REMOVAL AND INSTALLATION	30-2
TESTING	30-1		

CK3382-2B

DESCRIPTION AND OPERATION

A red indicator lamp glows when the oil pressure is below a prescribed value. The lamp should come on when the ignition switch is first turned to the run position. The indicator lamp should go out within a few seconds after the engine starts, indicating that the oil pressure has reached a prescribed value.

The lamp is connected between the oil pressure switch unit (mounted on the engine) and the coil terminal of the ignition switch (Fig. 1).



K1591-1E

FIG. 1 Oil Pressure Indicator—Lamp System

TESTING

To test the indicator lamp, turn on the ignition switch. Do not start the engine. The lamp should come on. Start the engine. The lamp should go out, indicating that the oil pressure has built up to a prescribed value.

To test the oil pressure switch on the engine, turn the ignition switch on, but do not start the engine. The indicator lamp should come on. If the indicator lamp does not come on, remove the wire from the switch terminal and connect the wire to ground. If the lamp now comes on, the oil pressure switch is inoperative, or not properly sealed to the engine. If the lamp does not come on, the warning lamp is burned out or the system

wiring is open-circuited. **NOTE:** There is only one indicator lamp serving both the oil pressure switch and the temperature switch on some car models. These combined systems are identified by the word "engine" on the warning lamp. Models with separate oil pressure and temperature warning systems have separately labeled warning lamps. For combined warning system, disconnect the temperature switch wire before testing the oil pressure indicating system. Be sure to use Teflon tape (D0AZ-19554-C or equivalent) or electrically conductive sealer C3AZ-19554-B or equivalent on all oil pressure switches which do not have white tape on the mounting threads.



REMOVAL AND INSTALLATION

SWITCH UNIT

The oil pressure switch units are mounted in different ways and locations. Figs. 2, 3, 4 and 5 are typical examples.

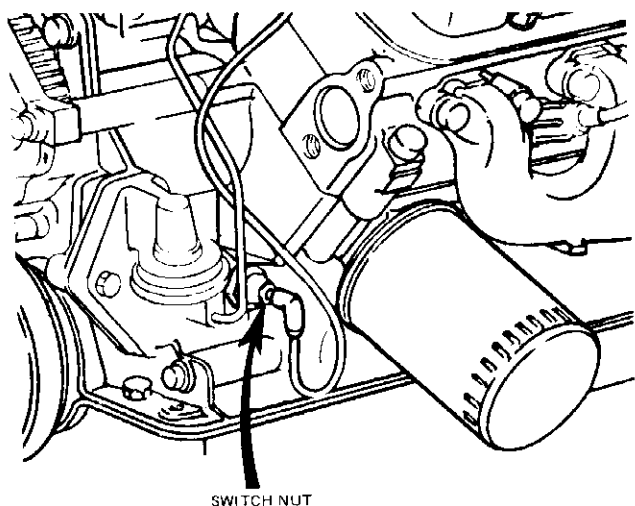


FIG. 2 Oil Pressure Switch—Typical 8-Cylinder

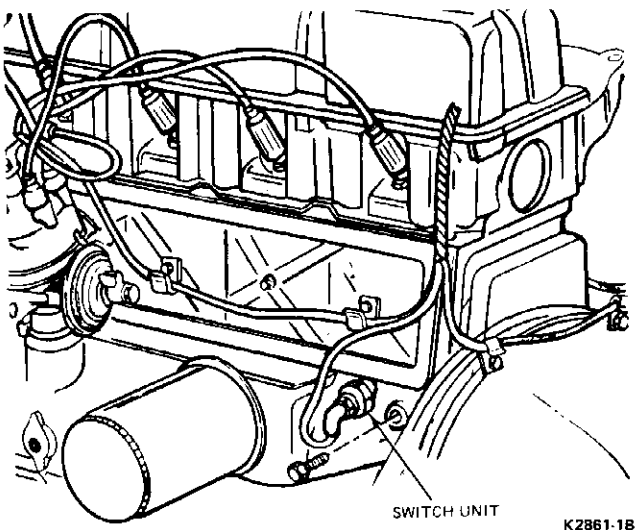


FIG. 3 Oil Pressure Switch—3.3/4.1L (200/250 CID) Engine

To remove the switch unit, disconnect the wire at the unit terminal and unscrew the unit from its mounting. Install the new switch unit, tighten to 8-18 ft.-lbs. of torque. Connect the wire to the unit terminal, and check the operation of the unit. Be sure to use Teflon tape (D0AZ-19554-C) or equivalent or electrically conductive water resistant sealer C3AZ-19554-B or equivalent on the threads of the unit. The pressure switch type unit used with the indicator lamp system is not interchangeable with the variable resistance-type unit,

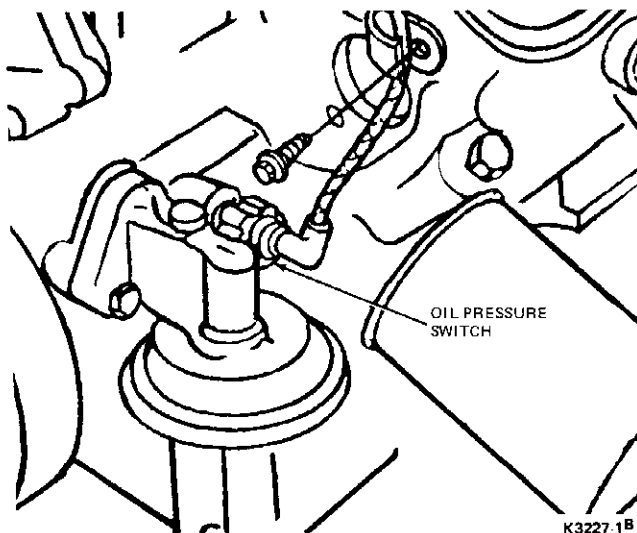


FIG. 4 Oil Pressure Switch—5.0/5.8L (302/351 W CID) Engine

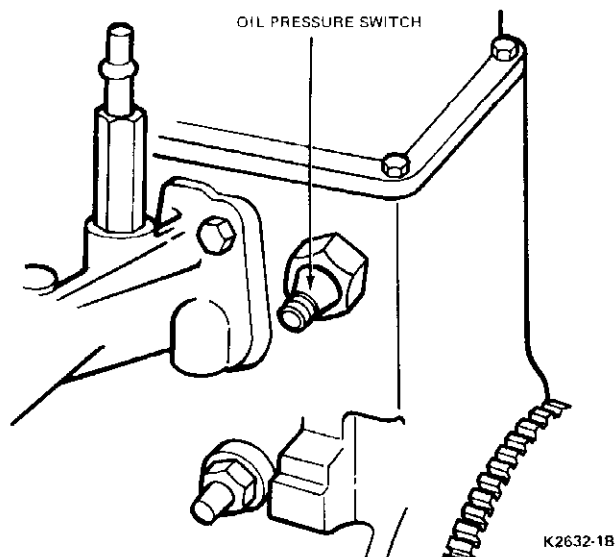


FIG. 5 Oil Pressure Switch—2.3L Engine

called a sender, used with gauge system. Refer to the Ford car master parts catalog and the Lincoln Mercury parts and accessories catalog for proper parts usage. Installation of the wrong part unit can result in an inoperative oil pressure indicating system and a damaged sender unit or gauge.

INDICATOR LAMP

On some vehicles it is necessary to remove the instrument cluster to gain access to the indicator bulb. These procedures are outlined in Part 33-50. On Thunderbird and Continental Mark V remove the instrument panel trim cover as outlined in Part 33-50.

To remove the indicator bulb, turn the bulb and socket assembly 1/4 turn counterclockwise and remove. To install, position the new bulb and socket assembly to the printed circuit and turn it clockwise 1/4 turn.

Oil Pressure Indicator -- Gauge

PART
33-31

Applies to Cougar XR-7, LTD II, and Thunderbird

SUBJECT	PAGE	SUBJECT	PAGE
DESCRIPTION AND OPERATION	31-1	TESTING (Cont'd.)	
TESTING		Sending Unit Test	31-1
Calibration Test	31-1	REMOVAL AND INSTALLATION	
Gauge Bench Test	31-1	Oil Pressure Gauge	31-2
Gauge and IVR Test	31-1	Sending Unit	31-2

CK3383-2B

DESCRIPTION AND OPERATION

The oil pressure gauge indicating system consists of the instrument voltage regulator, an oil pressure indicating gauge and an oil pressure sending unit, all connected in series. The sending unit consists of a diaphragm, a contact and a variable resistor. The oil pressure causes the diaphragm to move the contact on the variable resistor thus controlling the flow of current through the gauge.

When the oil pressure is low, the resistance of the sending unit is high, thus restricting the flow of current through the gauge which moves the pointer only a short distance. As the oil pressure increases, the resistance of the sending unit decreases causing a proportionately increased flow of current and movement of the pointer.

TESTING

OIL PRESSURE GAUGE AND INSTRUMENT VOLTAGE REGULATOR (IVR)

The instrument voltage regulator (IVR) used with the oil pressure gauge indicating system also supplies a common regulated voltage for the fuel level indicating system and temperature gauge indicating system (when applicable). Therefore, the IVR can only be defective if the fuel and temperature gauge exhibit similar problems (fluctuating movement or a high or low reading). If this is the case, refer to Part 33-20 and perform the fuel gauge and instrument voltage regulator operational test before proceeding with the oil gauge calibration test.

If customer complains of erratic and/or high oil pressure indication, check engine to body ground strap. The strap screws must be properly torqued.

CALIBRATION TEST

If only the oil gauge is inoperative or appears to be out of calibration, a calibration test can be conducted on the vehicle oil gauge system.

Sender Unit Test

Disconnect the wiring at the sender unit and measure the resistance between the sender's terminal stud and housing with an ohmmeter. If the ohmmeter reads below 50-ohms or above 90-ohms with the engine not running, the sender is damaged and should be replaced.

Gauge Test

The required test equipment consists of a 22-ohm resistor and a 73-ohm resistor.

Disconnect the wiring connector at the sender unit, connect one of the resistors between the lead wire terminal and ground, and turn the ignition switch to the ON or ACC position. With the 22-ohm resistor, the gauge should indicate a mid-scale reading. With the 73-ohm resistor, the gauge should read at the "L" graduation mark. Without any resistor (open circuit) the gauge reading should be the same as with the ignition switch in the OFF position.

If the gauge pointer does not move and stays below the "L" mark, check for an open circuit in the wiring assembly, the gauge windings, or the instrument cluster printed circuit. If the gauge pointer moves without any resistor connected, check for a short circuit in the lead to the sender unit. If the gauge reads out of calibration, the gauge is damaged and must be replaced.

ENGINE OIL PRESSURE CHECK

Remove the oil pressure sender unit and temporarily attach a mechanical oil pressure gauge in its place. Operate the engine to determine the oil pressure. If the oil pressure indicated on the mechanical gauge is between 7-70 psi, the instrument cluster gauge should indicate within the normal band.

GAUGE BENCH TEST FOR OPEN WINDINGS

To test an oil gauge for open windings, remove the gauge from the vehicle. Connect the gauge to an ohmmeter and read the resistance. An upward movement of the needle from 10 toward 14 ohms is

normal, because the current increases the temperature of the gauge coil (windings). If the ohmmeter reads below 10 ohms or above 14 ohms, replace the gauge.

REMOVAL AND INSTALLATION

SENDING UNIT

The sending unit (pressure switch) used with the warning indicator lamp system is not interchangeable with the sending unit used with the gauge system. Refer to the Ford car master parts catalog and the Lincoln Mercury parts and accessories catalog for proper parts usage. Misuse of the sending units can result in inoperative oil pressure indicating systems and damaged sending units or gauges. The oil pressure sending units are mounted in different ways and locations. Figs. 1 and 2 are typical examples.

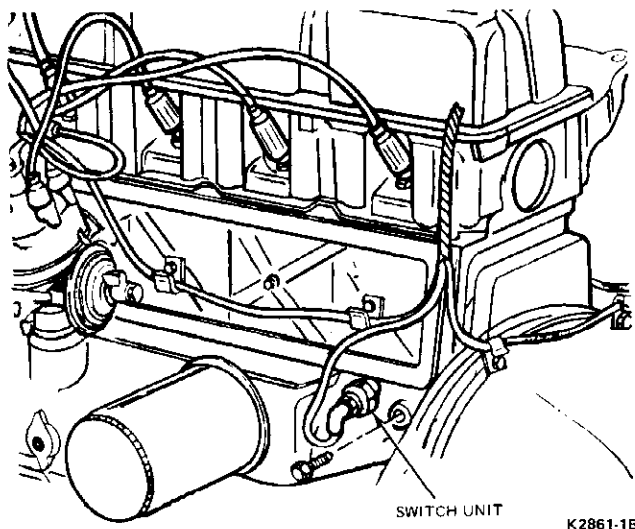


FIG. 1 Oil Pressure Switch—3.3/4.1L (200/250 CID) Engines

To replace the unit, disconnect the wire from the terminal. Remove the unit from the engine. Apply Teflon tape (D0AZ-19554-C) or equivalent or conductive sealer C3AZ-19554-B or equivalent to the threads of the new unit and install the unit. Tighten to 8-18 ft-lb torque. Connect the wire to the terminal and check the operation of the unit.

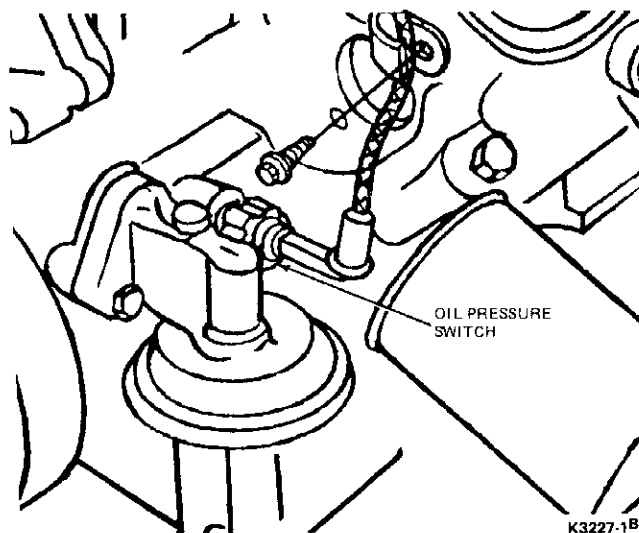


FIG. 2 Oil Pressure Sending Unit—5.0/5.8L (302/351 W CID)

OIL PRESSURE GAUGE

Removal

1. Disconnect the battery ground cable.
2. Remove the instrument cluster as outlined in Part 33-50.
3. Remove the clock knob and nuts.
4. Remove the six screws attaching the lens and mask assembly to the cluster backplate and remove the mask and lens assembly.
5. Remove the two gauge retaining nuts and remove the gauge.

Installation

1. Position the gauge to the cluster backplate and install the two retaining nuts.
2. Position the lens and mask assembly to the cluster backplate and install the six retaining screws.
3. Install the clock knob and nut.
4. Install the instrument cluster as outlined in Part 33-50
5. Connect the battery ground cable and check the operation of the gauge.

Temperature Indicator

PART
33-40

Applies to All Models

SUBJECT	PAGE	SUBJECT	PAGE
DESCRIPTION AND OPERATION		Calibration Test	40-2
Automatic Temperature		Gauge Bench Test	40-2
Control System	40-1	Gauge System	40-2
Temperature Gauge System	40-1	Indicator Lamp	40-2
Temperature Indicator			
Lamp System	40-1	REMOVAL AND INSTALLATION	
TESTING		Indicator Lamp	40-4
Automatic Temperature Control	40-3	Sending Unit or Switch	40-3
		Temperature Gauge	40-3

CK3384-2B

DESCRIPTION AND OPERATION

TEMPERATURE GAUGE SYSTEM

The temperature gauge indicating system consists of a sending unit mounted in the engine block (2.3L, 5.8L [351M CID], 6.6L [400 CID]), in the cylinder head (3.3/4.1L [200/250 CID]) or intake manifold (5.0L [302 CID], 5.8L [351W], 7.5L [460 CID]) and a temperature gauge mounted on the instrument panel. When the engine temperature is low, the resistance of the sending unit is high, thus restricting the flow of current through the gauge which moves the pointer only a short distance. As the temperature of the engine increases, the resistance of the sending unit decreases causing a proportionately increased flow of current and movement of the pointer.

The engine temperature indicating system design is based on the company standard requirements for engine cooling systems. It is possible, under certain driving conditions, such as heavy traffic, or stop-and-go driving in hot weather, for the gauge pointer to read at the very top of the normal band with the coolant temperature within specifications.

TEMPERATURE INDICATOR LAMP SYSTEM

The temperature indicating system provides the driver with an indication of engine coolant operating temperature by means of an indicator lamp. This system consists of a temperature switch unit mounted in the engine block, intake manifold or engine head, lead wires and a temperature indicator lamp mounted in the instrument cluster.

The lamp is covered by a lens imprinted with the letters TEMP or ENGINE. With the lamp off, the lens appears blank.

Should the temperature of the engine coolant reach approximately 249 degrees F, the TEMP (or ENGINE) red indicator lamp will glow, indicating that the engine is overheated.

This indicating lamp is controlled by the temperature switch. The temperature switch has a temperature-sensitive bi-metallic arm which completes the circuit through the switch to the engine ground. With the ignition in the START position, the TEMP (or ENGINE) red light should glow even though the engine is cold, thus proving that the lamp bulb is operable. A set of contacts in the ignition switch (normally open) completes the proving circuit to ground in the start position.

AUTOMATIC TEMPERATURE CONTROL SYSTEM

The Automatic Temperature Control (A.T.C.) sender has two terminals and replaces the gauge sender or indicator lamp switch in those vehicles equipped with the A.T.C. system. The extra terminal disables the heater blower motor until the engine coolant warms up. This second terminal is marked either "R" in the gauge system or "C" in the indicator lamp system. It provides a ground for a relay in the A.T.C. control circuit until the coolant reaches 115°F or above. At that time the bi-metal arm opens the contact releasing the relay and allowing the blower to operate.

TESTING

GAUGE SYSTEM

During the test procedure, do not apply 12 volts directly to the temperature sender terminal at any time. This voltage will damage the temperature sender unit.

Verify that the engine to body ground strap is secure. A poor ground can cause a high temperature gauge indication. Idle the engine until the thermostat opens and the coolant temperature stabilizes. The temperature gauge pointer should indicate in the lower half of the normal band. If the coolant temperature does not stabilize, check the cooling system for proper function. If the gauge pointer indicates above the lower half of the normal band, test the IVR and temperature gauge circuit with Rotunda Gauge Tester WRE500-70A or 21-0015 or with a test light or voltmeter using the following procedure.

Disconnect the gauge lead from the terminal at the sender unit. Connect the lead of a 12-volt test light or the positive lead of a volt meter (20-volt scale) to the gauge lead that was disconnected from the sender unit. Connect the other test lead to a suitable ground. With the ignition switch in the ON or ACC position, a flashing lamp or fluctuating voltage will indicate that the instrument voltage regulator is operating and that the gauge circuit is not interrupted.

If a pulsating voltage is shown but the gauge is not accurate, perform the calibration test below.

If the lamp stays on or the voltage reading is steady, check the IVR ground. If good, replace the instrument voltage regulator (IVR).

If no voltage is indicated by the voltmeter or test lamp, check for an open circuit in the IVR, the gauge windings or the printed circuit. Do not ground or spark either terminal of the IVR. This will burn out the dash wiring harness or the IVR and/or printed circuit.

CALIBRATION TEST

When the IVR or one of the gauges (oil, temperature, fuel) is suspected of being out of calibration, having a fluctuating movement or a high or low reading, both the gauge and the instrument voltage regulator must be tested simultaneously. This test is done on the vehicle.

Test the IVR and temperature gauge with Rotunda Gauge Tester WRE500-70A or 21-0015 or with a 10-ohm resistor for high calibration and a 73-ohm resistor for low calibration using the following procedure:

Disconnect the lead from the gauge at the sender unit, connect the resistor between the gauge lead and ground (Fig. 1), and turn on the ignition switch. With the 10-ohm resistor, read within 1/2-pointer width on either side of the gauge pointer should indicate more than one-pointer width away from either side of the graduation. With the 73-ohm resistor, the side of the gauge pointer should indicate more than one-pointer width away from on either side of the "C" (low side) graduation.

If the gauge pointer indicates within calibration, replace the temperature sender. If the gauge pointer indicates out of calibration, replace the IVR and retest.

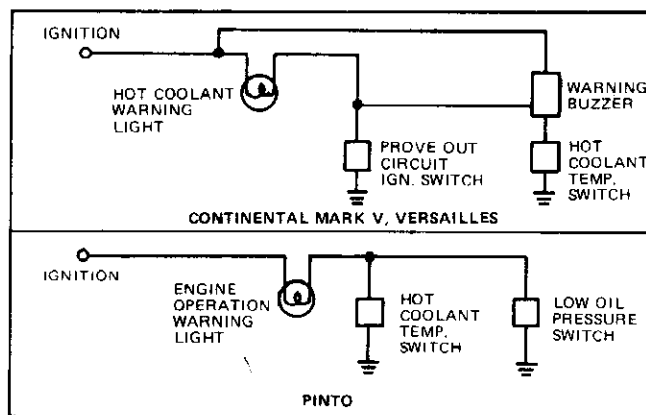
If the gauge pointer still indicates out of calibration, replace the temperature gauge.

GAUGE BENCH TEST FOR OPEN WINDINGS

To test the gauge for open windings, remove the gauge from the vehicle. Connect the gauge to an ohmmeter and read the resistance. An upward movement of the needle from 10 toward 14 ohms is normal because the current increases the temperature of the gauge coil (windings). If the ohmmeter reads below 10 ohms or above 14 ohms, replace the gauge.

INDICATOR LAMP SYSTEM

During the test procedure, do not apply 12 volts directly to the temperature switch terminal at any time. This voltage will damage the temperature switch unit. NOTE: There is only one indicator lamp for the oil pressure switch and the temperature switch on some car lines (Fig. 1). Disconnect the oil pressure switch wire before testing the temperature indicating lamp system.



L1849-1E

FIG. 1 Engine Coolant Warning System

Perform the test only if the engine temperature is less than 249 degrees F. If the red lamp stays on with the ignition switch turned to the ON position, an inoperative temperature sending switch is indicated. Remove the connector from the temperature (sending unit) switch; the lamp should go out. Connect a ohmmeter from the temperature switch terminal to the engine. There should be an open circuit (infinite ohms). If the meter reads zero ohms replace the switch (temperature sending unit). If the lamp is off when the ignition switch is in the ON position, turn the switch to the start position and the prove-out circuit should light the bulb. If the bulb does not glow, the bulb or the prove-out circuit is defective. Remove the bulb and check the bulb for continuity. If the ohmmeter indicates an open circuit (infinite ohms), replace the bulb and again turn the ignition switch to the start position to light the bulb with the prove-out circuit. If the bulb still does not light, check the wire continuity from the temperature sending switch to the light bulb and then to the ignition switch. Repair any breaks in the circuit.

This should complete the prove-out circuit, so that the bulb will light when the ignition switch is again turned to the start position.

AUTOMATIC TEMPERATURE CONTROL SYSTEM

During the test procedure do not apply 12 volts directly across the "R" or "C" terminal at any time as this will damage the A.T.C. sending unit. Remove the harness from the "R" or "C" terminal to the engine.

When the engine is cold (less than 125 degrees F.) the meter should read zero ohms. But, if the meter shows an open circuit (infinite ohms) replace the A.T.C. unit as this condition would allow the blower to move cold air. In cool weather with the selector lever in the automatic position and the temperature lever in the full heat position removing the connector should de-energize the relay and energize the blower. A shorting wire placed between the wiring harness connector ("R" or "C" only) and the engine should energize the relay and turn off the blower. NOTE - grounding of the other connection "I" in the wiring harness connector of a gauge system may cause damage.

REMOVAL AND INSTALLATION

SENDING UNIT OR SWITCH

The sending unit (temperature switch) used with the warning indicator lamp system is not interchangeable with the sending unit used with the gauge system. Refer to the Ford car master parts catalog and the Lincoln Mercury parts and accessories catalog for proper parts usage.

Misuse of the sending units will result in inoperative temperature indicating systems and damaged sending units or gauges.

1. Disconnect the temperature sending unit wire from the sending unit.
2. Prepare the new temperature sending unit for installation by applying Teflon tape (D0AZ-19554-C) or equivalent or a small amount of conductive water resistant sealer C3AZ-19554-B or equivalent, to the threads.
3. Drain coolant and remove the temperature sending unit from the engine and install the new temperature sending unit.
4. Connect the wire to the temperature sending unit.
5. Refill coolant system and start the engine and check the sending unit operation.

TEMPERATURE GAUGE

MUSTANG II

Removal

1. Disconnect the battery ground cable.
2. Remove the instrument cluster as outlined in Part 33-50.
3. Remove the six screws that retain the mask and lens to the cluster backplate and remove the mask and lens.
4. Remove the two gauge retaining nuts and remove the gauge.

Installation

1. Position the gauge to the cluster backplate and install the two retaining nuts.
2. Position the mask and lens to the cluster backplate and install the six retaining screws.
3. Install the cluster assembly as outlined in Part 33-50.

4. Connect the battery ground cable and check the operation of the gauge.

THUNDERBIRD, COUGAR, LTD II, PINTO AND BOBCAT—STANDARD CLUSTER

Removal

1. Disconnect the battery ground cable.
2. Remove the instrument cluster as outlined in Part 33-50.
3. Remove the six screws attaching the lens and mask assembly to the cluster backplate and remove the lens and mask assembly.
4. Remove the outer dial (two screws).
5. Remove the two gauge retaining nuts and remove the gauge.

Installation

1. Position the gauge to the cluster backplate and install the two retaining nuts.
2. Install the outer dial (two screws).
3. Position the mask and lens assembly to the cluster backplate and install the six retaining screws.
4. Install the cluster as outlined in Part 33-50.
5. Connect the battery ground cable and check the operation of the gauge.

THUNDERBIRD, COUGAR XR-7, LTD II, PINTO AND BOBCAT—PERFORMANCE CLUSTER

Removal

1. Disconnect the battery ground cable.
2. Remove the instrument cluster as outlined in Part 33-50.
3. Remove the clock knob and nut.
4. Remove the six screws attaching the lens and mask assembly to the cluster backplate and remove the mask and lens assembly.
5. Remove the two gauge retaining nuts and remove the gauge.

Installation

1. Position the gauge to the cluster backplate and install the two retaining nuts.
2. Position the lens and mask assembly to the cluster backplate and install the six retaining screws.
3. Install the clock knob and nut.

4. Install the instrument cluster as outlined in Part 33-50.
5. Connect the battery ground cable and check the operation of the gauge.

INDICATOR LAMP

FORD, MERCURY, LINCOLN CONTINENTAL

1. Remove the two instrument cluster trim cover screws and pull the trim cover rearward to gain access to the bulb.
2. Remove the bulb by turning the socket counterclockwise.
3. Install a new bulb and turn the socket clockwise.
4. Position the instrument cluster trim cover and install the two retaining screws.

FAIRMONT, ZEPHYR, GRANADA, MONARCH AND VERSAILLES

Removal

1. Disconnect the battery ground cable.

2. Remove the instrument cluster as outlined in Part 33-50.
3. Remove the bulb and socket by turning counterclockwise.

Installation

1. Install a new bulb into the socket and turn clockwise.
2. Install the instrument cluster as outlined in Part 33-50.
3. Connect the battery ground cable.

PINTO AND BOBCAT

Reach up behind the instrument panel and turn the bulb and socket assembly counterclockwise. To install, position the bulb and socket assembly into the receptacle and turn it clockwise.

CONTINENTAL MARK V

Remove the instrument cluster trim panel as outlined in Part 33-50, to gain access to the indicator bulb.

Instrument Cluster and Printed Circuit

**PART
33-50**

Applies to All Models

SUBJECT	PAGE	SUBJECT	PAGE
DESCRIPTION		REMOVAL AND INSTALLATION	
Cluster Assembly	50-2	Cluster Assembly	50-9
Transmission Selector		Cluster Illumination and/or	
Indicator Adjustments	50-1	Illuminator Bulbs	50-14
DIAGNOSIS	50-4	Instrument Voltage Regulator	50-16
TESTING	50-8	Printed Circuit	50-14

CK3385-2B

DESCRIPTION

TRANSMISSION SELECTOR INDICATOR

NOTE: Refer to Part 17-01 for floor-mounted selector levers.

Ford, Mercury, Lincoln Continental and Continental Mark V

Removal

1. Disconnect the battery ground cable.
2. Remove the two lower steering column cover attaching screws and remove the lower cover.
3. Remove the two instrument cluster trim cover attaching screws and remove the trim cover.
4. Reach behind the cluster and disconnect the cluster feed plug from its receptacle.
5. Disconnect the speedometer cable.
6. Unsnap and remove the steering column shroud cover.
7. Remove the screw attaching the transmission indicator (PRND21) cable bracket to the steering column. Detach the cable loop from the pin on the steering column.
8. Remove the four cluster attaching screws and remove the cluster assembly.
9. Remove the two screws attaching the lens and mask and the screws attaching the transmission indicator assembly to the cluster and remove the transmission indicator (Fig. 3).

Installation and Adjustments

1. Install the transmission indicator and install the two screws attaching the transmission indicator and

install the screws attaching the lens and mask to the cluster.

2. Position the cluster to the instrument panel making sure the PRND21 cable is routed properly on the right side of the steering column between the brake pedal support and the instrument panel reinforcement and install the four attaching screws.
3. Position the transmission indicator (PRND21) cable to the steering column and adjust the transmission selector indicator (PRND21) pointer as follows:
 - a. Place the transmission selector lever on the steering column in the "P" position.
 - b. Place the loop on the indicator cable assembly over the retainer pin on the socket casting.
 - c. Shift the selector into the "1" position ("S" on lo-gear lockout columns) and secure the cable bracket with the screw. Do not tighten.
 - d. Shift the selector into the "D" position. Adjust the slotted bracket on the column so the entire width of the pointer falls within the letter "D".
 - e. Tighten the bracket screw (min. 20 in-lbs).
 - f. Position the indicator cable into the tab of the column shroud retainer.
 - g. When properly adjusted, the entire width of the pointer must fall within the width of the letter "D" and must only touch the remaining letters or numerals when viewed parallel to the centerline of the steering column.
4. Reach under the instrument panel and align the speedometer cable connector with the speedometer adapter and push the speedometer cable on the speedometer with a twisting motion until the catch is engaged.

5. Push the instrument cluster feed plug into its receptacle.
6. Position the instrument cluster trim cover and install the two attaching screws.
7. Position the lower steering column cover and install the two attaching screws. Position the lower steering column shroud cover around the steering column.
8. Connect the battery ground cable and check the operation of the instruments.

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Removal

For Steering Column—Mounted Selector:

1. Remove screws retaining the lower cluster applique cover below the steering column.
2. Remove the steering column shroud.
3. Reach under the instrument panel and depress the button on the side of the headlamp switch while withdrawing the headlamp switch control knob and shaft assembly.
4. Remove the threaded headlamp switch bezel.
5. Remove four screws retaining the cluster front cover (Fig. 1).
6. Insert a right angle standard tip screwdriver along the edges of the finish panel withdrawing the studs in sequence gradually around the periphery of the panel (Fig. 1).
7. Remove the cluster front cover.
8. Remove one screw attaching the PRND21 control cable bracket to the steering column. Detach the cable loop from the pin on the steering column.
9. Remove the two screws attaching the PRND21 assembly to the cluster mask and remove the assembly from the cluster.

Installation and Adjustments

1. Re-position the PRND21 assembly to the cluster and install the two attaching screws.
2. Place the loop on the PRND21 cable assembly over the retainer pin on the socket casting. Place the cable bracket in the "T" slot in the column and secure the bracket to the column outer tube with one screw.
3. Shift column selector lever into the "D" position. Loosen the bracket screw and slide bracket until the pointer aligns with the letter "D". Tighten the bracket screw to 20-30 in-lbs torque. The entire width of the pointer must fall within the width of the letter "D", when viewed parallel to the centerline of the steering column from the drivers position. The pointer must also touch all other indicator letters when selector lever is placed in each shift position.
4. Align the cluster front cover studs with the retainers and push the cover on gradually around the periphery of the cover.
5. Install the four front cover retaining screws.
6. Install the headlamp switch bezel and knob and shaft assembly.

CLUSTER ASSEMBLY

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Removal

1. Disconnect the battery ground cable.
2. Remove screws retaining the lower cluster applique cover below the steering column.
3. Remove the steering column shroud.
4. Reach under the instrument panel and depress the button on the side of the headlamp switch while withdrawing the headlamp switch control knob and shaft assembly.
5. Remove the threaded headlamp switch bezel.
6. Remove four (4) screws retaining the cluster front cover (Fig. 1).
7. Insert a right angle standard tip screwdriver along the edges of the finish panel withdrawing the studs in sequence gradually around the periphery of the panel (Fig. 1).
8. Remove the cluster front cover. If vehicle is equipped with a manual transmission, go to Step 10. If not, perform Step 9.
9. Remove one screw attaching the PRND21 control cable bracket to the steering column. Detach the cable loop from the pin on the steering column.
10. Reach under the instrument panel and disconnect the speedometer cable connector.
11. Remove four (4) screws retaining the cluster to the instrument panel.
12. Pull the cluster away from the instrument panel; disconnect the cluster feed plug from its receptacle in the printed circuit (Fig. 2) Disconnect wires from the fuel gauge studs if vehicle is equipped with optional low fuel warning lamp.
13. Remove the cluster from the instrument panel.

Installation

1. Apply a 3/16 inch ball of silicone damping grease in the drive hole of the speedometer head. **NOTE: If vehicle is equipped with a manual transmission or a floor-mounted automatic transmission selector, proceed to Step 8.**
2. With the cluster lens pointing downward, move the cluster toward the cluster opening in the instrument panel.
3. Connect the instrument cluster multiple connector to the printed circuit. If vehicle is equipped with low fuel warning lamp, connect red and black wires from low fuel warning lamp to fuel gauge studs. Red wire connects to stud identified by word "red" on printed circuit.
4. Position the cluster to the instrument panel.
5. Install the four (4) cluster retaining screws. If vehicle is equipped with a manual transmission or a floor-mounted automatic transmission proceed to Step 8.
6. Place the loop on the PRND21 cable assembly over the retainer pin on the socket casting. Place the column mounting bracket in the "T" slot in the column and secure the bracket to the column outer tube with one screw.