



Installation Instructions

ANTILOCK SYSTEMS USING THE EC-15 CONTROLLER

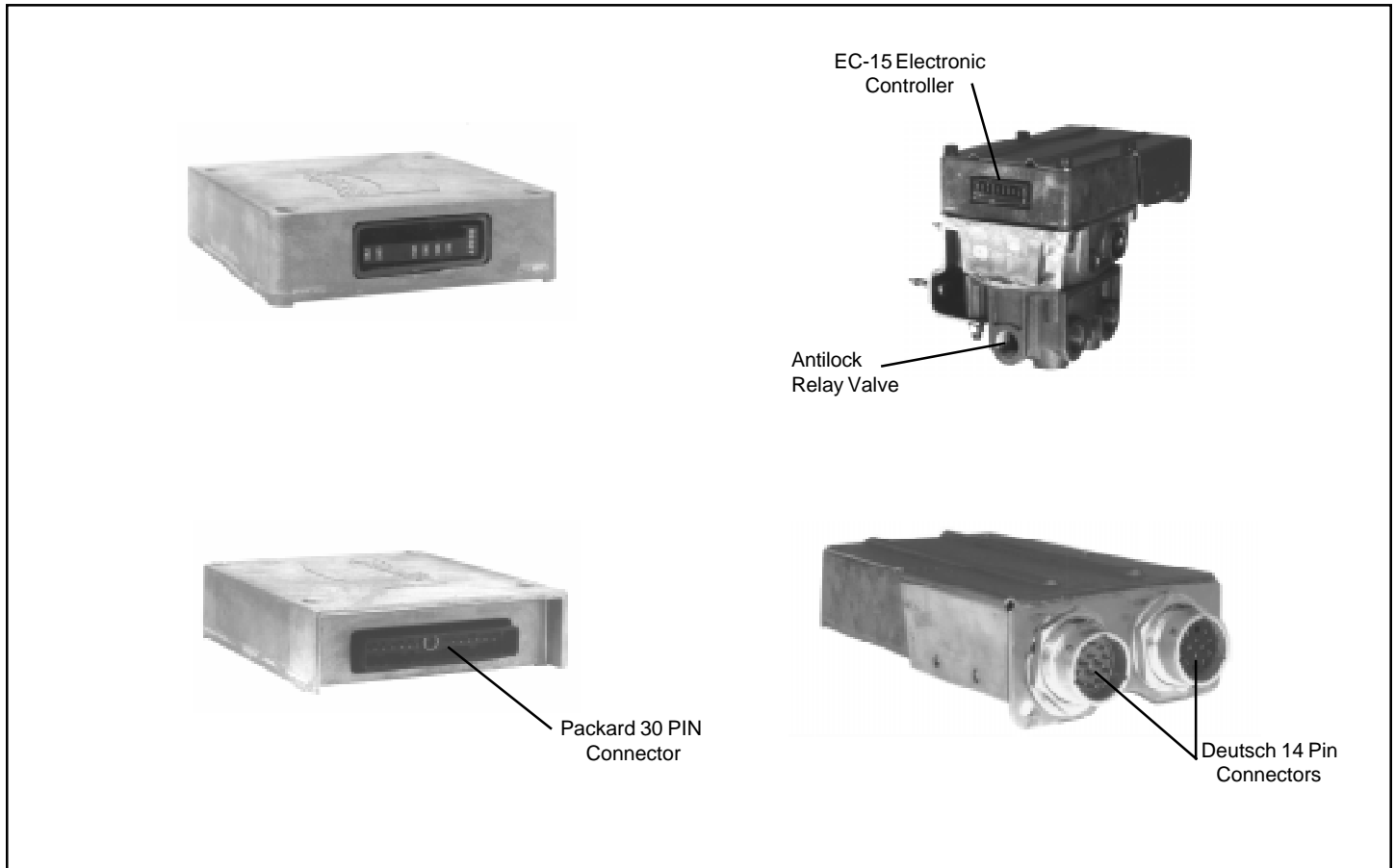


Figure 1 EC-15 Controller and CR-15 Controller Relay

DIAGNOSING AND LOCATING A SYSTEM PROBLEM

GENERAL

The EC-15 contains self test and diagnostic circuitry that continuously checks for proper operation of the entire antilock system including wiring continuity. A dash lamp, controlled by the EC-15, advises the driver of the condition of the entire antilock system. The condition of specific antilock components is provided to the mechanic by a series of labeled, Light Emitting Diodes (LED's) displayed through a "window" in the EC-15 housing. No special tools or equipment are needed to read or interpret the EC-15 diagnostics window. It should be noted that the EC-15 diagnostics display is separate from the antilock condition lamp on the dash. With this separation, the driver is aware of any problems that occur but is not confused by the diagnostic information.

A special feature of the EC-15 controller is the failure latching and diagnostic system. Intermittent problems, particularly in the wheel speed sensing area can be difficult to diagnose. When the controller senses an erroneous condition, whether in the controller electronics, the modulator or wheel speed sensing areas, it stores the condition in non-volatile memory, disables the antilock function, illuminates the dash mounted antilock condition lamp and the appropriate diagnostic LEDs on the EC-15.

The failure condition is truly stored and is not cleared by loss of power to the EC-15. The LEDs will re-light when power is restored and remain illuminated until the failure is corrected. After the actual problem is corrected,

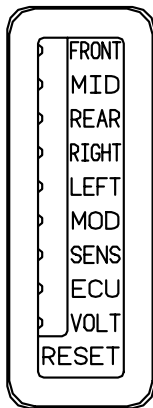
maintenance personnel can clear or reset the EC-15 diagnostics by passing a small magnet over the RESET point in the diagnostics window.

DIAGNOSTIC LEDs

There are nine LEDs plus a magnetically actuated reset switch in the EC-15 diagnostic window. The first five LEDs locate a problem to a specific area of the vehicle while the last four indicate the problem component or its wiring. The LEDs are software driven and are either ON or OFF depending upon their monitor function. (Note: Right and left, front and rear are determined from the driver’s seat. Left front is therefore the corner closest to the driver.)

LED o FRONT	Red LED
LED o MID	Red LED (SEE NOTE BELOW)
LED o REAR	Red LED
LED o RIGHT	Red LED
LED o LEFT	Red LED
LED o MOD	Red LED
LED o SENS	Red LED
LED o ECU	Red LED
LED o VOLT	Green LED
___ RESET	No LED

NOTE: The MID LED shown in the chart above is not used in the diagnostic process for the EC-15 however it will light when a magnet is placed on the RESET switch in the diagnostic window.



EC-15 DIAGNOSTIC WINDOW

“FRONT” LED

This Red LED illuminates and latches ON in order to indicate the location of a problem component or its wiring. It will light in conjunction with either the RIGHT or LEFT LED and the MOD or SENS LED.

“MID” LED

This Red LED is not used in troubleshooting the EC-15 and should light only when a magnet is held on the RESET switch.

“REAR” LED

This Red LED illuminates and latches ON in order to indicate the location of a problem component or its wiring. It will light in conjunction with either the RIGHT or LEFT LED and the MOD or SENS LED.

“RIGHT” LED

This Red LED illuminates and latches ON in order to indicate the location of a problem component or its wiring. It will light in conjunction with either the FRONT or REAR LED and the MOD or SENS LED.

“LEFT” LED

This Red LED illuminates and latches ON in order to indicate the location of a problem component or its wiring. It will light in conjunction with either the FRONT or REAR LED and the MOD or SENS LED.

“MOD” LED

This Red LED illuminates and latches ON to indicate a permanent or intermittent open or short circuit in the solenoids of one of the four modulators or the wiring connecting it to the system.

“SENS” LED

This Red LED illuminates and latches ON to indicate permanent or intermittent failure. The failures indicated are; open or shorted wheel speed sensor, open or shorted wheel speed sensor wiring, wheel speed signal not present or does not conform to design criteria.

“ECU” LED

This Red LED, when illuminated, indicates that the controller itself has failed. It is latched ON for all EC-15 failures except low voltage. For voltages less than 9VDC, the LED illuminates to indicate the controller is inoperative, however when the voltage again exceeds 9VDC the LED will go OUT by itself.

“VOLT” LED

This Green LED illuminates and remains ON during vehicle operation to indicate that vehicle power is reaching the controller. If vehicle power is out of range for proper operation (below 10 vdc or above 17 vdc) this LED will flash until power is brought into range.

“RESET”

Beneath the RESET area of the window display is a magnetically sensitive switch that is used to reset the diagnostic system. The device will respond to a magnet which has strength sufficient to lift a three (3) ounce weight. Holding a magnet against the RESET will cause all LEDs to light during the time the magnet is against it.

WIRE HARNESS CONNECTOR (TO EC-15)

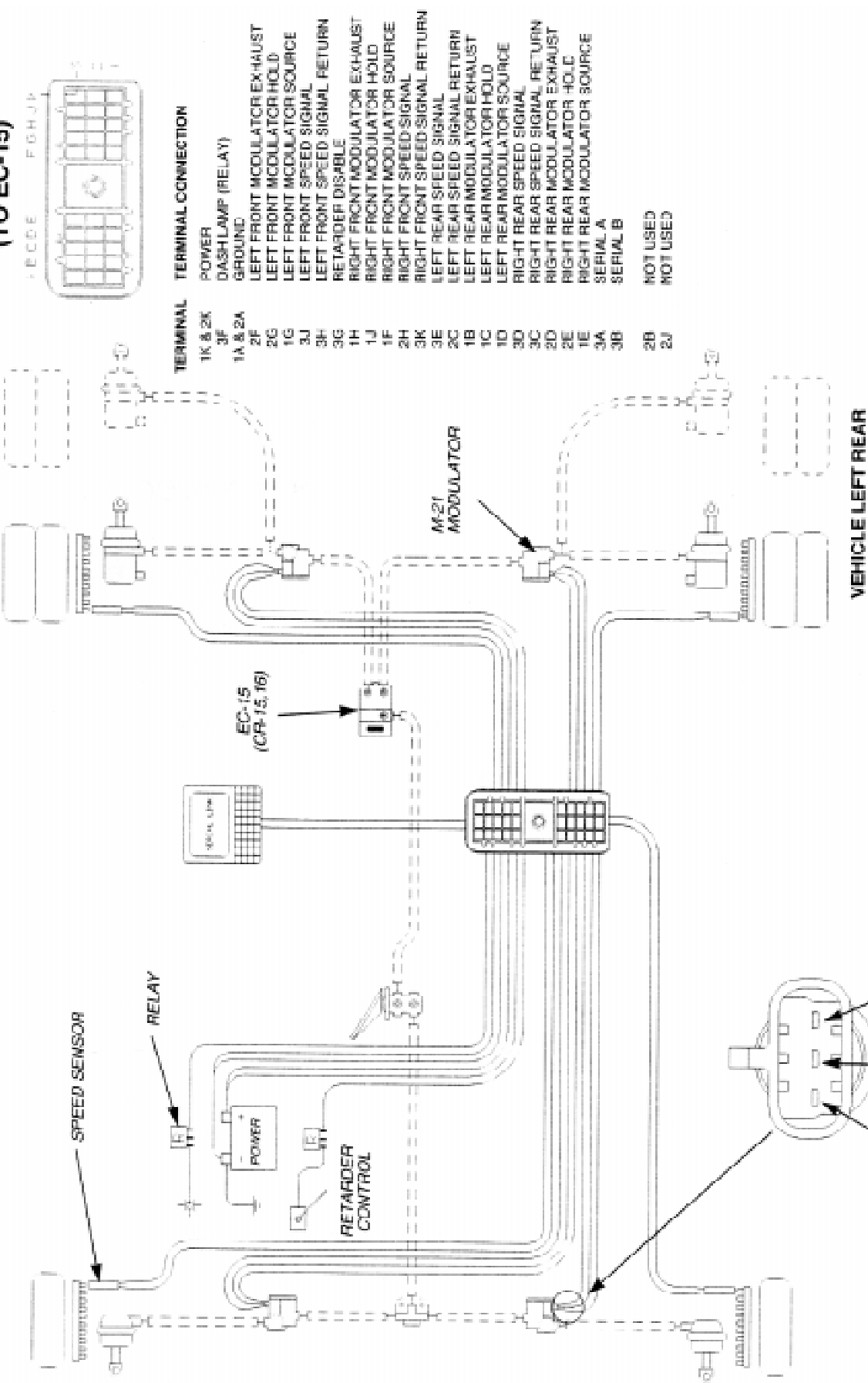
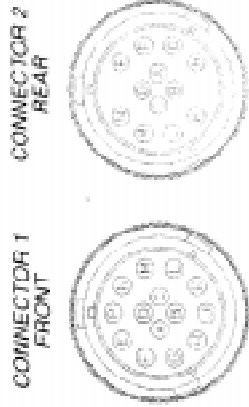


Figure 2 Wiring Schematic For EC-15 With Packard Connector

WIRE HARNESS CONNECTORS (TO EC-15)



TERMINAL	TERMINAL CONNECTION
1J	POWER
1K	DASH LAMP (RELAY)
1P	GROUND
1N	LEFT FRONT MODULATOR EXHAUST
1E	LEFT FRONT MODULATOR HOLD
1M	LEFT FRONT MODULATOR SOURCE
1F	LEFT FRONT SPEED SIGNAL
1G	LEFT FRONT SPEED SIGNAL RETURN
1B	RETARDER DISABLE
1C	RIGHT FRONT MODULATOR EXHAUST
1A	RIGHT FRONT MODULATOR HOLD
1D	RIGHT FRONT MODULATOR SOURCE
1H	RIGHT FRONT SPEED SIGNAL
1L	RIGHT FRONT SPEED SIGNAL RETURN
2K	LEFT REAR SPEED SIGNAL
2G	LEFT REAR SPEED SIGNAL RETURN
2A	LEFT REAR MODULATOR EXHAUST
2C	LEFT REAR MODULATOR HOLD
2D	LEFT REAR MODULATOR SOURCE
2M	RIGHT REAR SPEED SIGNAL
2L	RIGHT REAR SPEED SIGNAL RETURN
2E	RIGHT REAR MODULATOR EXHAUST
2N	RIGHT REAR MODULATOR HOLD
2F	RIGHT REAR MODULATOR SOURCE
2B	SERIAL A
2H	SERIAL B

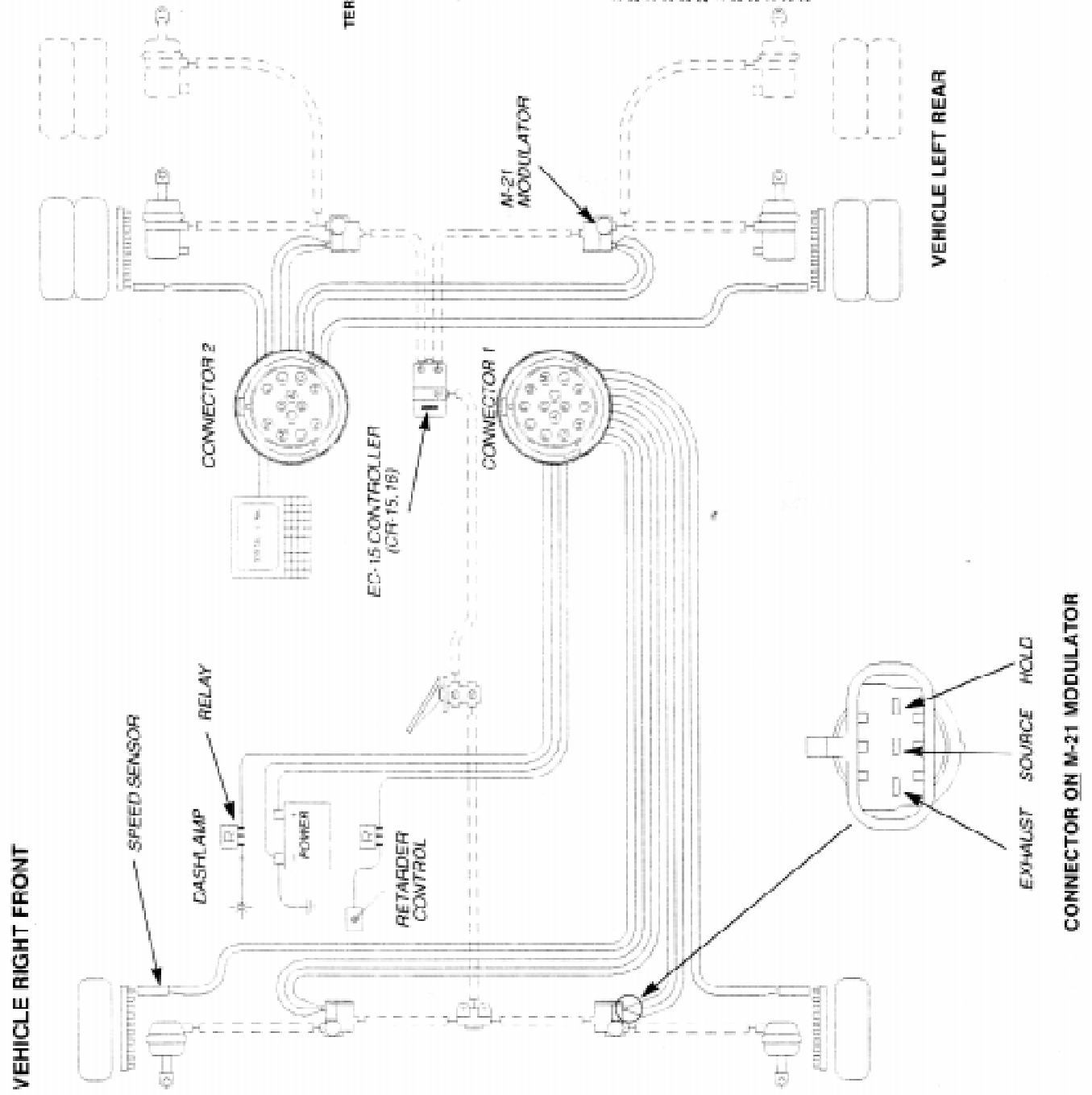


Figure 3 Wiring Schematic For EC-15 With Deutsch Connectors

TROUBLESHOOTING

GENERAL

While the EC-15 diagnostic display locates a specific problem area, it is still necessary to confirm whether the problem resides in the component itself or the wiring. Basically the troubleshooting procedure that follows is devoted to narrowing the problem to either the wiring or a specific antilock component.

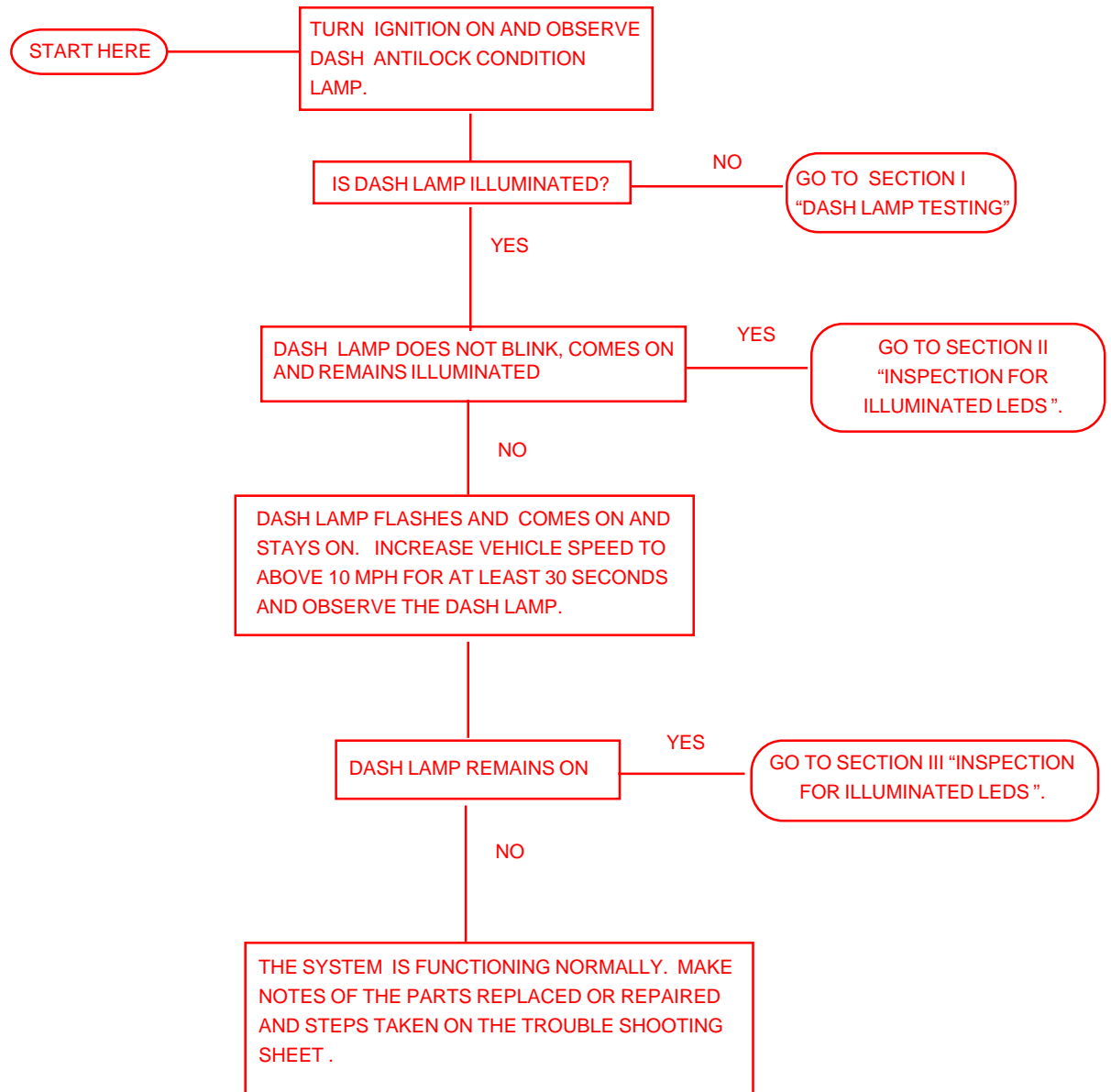
It should be noted however that ALL TROUBLESHOOTING BEGINS BY OBSERVING THE ANTILOCK CONDITION LAMP ON THE DASH. All troubleshooting should begin by first performing the "Initial Start-up Procedure" and following the directions contained in it.

IMPORTANT - TROUBLESHOOTING TIPS

1. All troubleshooting begins by observing the AntiLock condition lamp on the dash. Troubleshooting should begin by first performing the "Initial Start-up Procedure" and following the directions contained in it.
2. The troubleshooting technician should record all findings and the action taken during the troubleshooting process.
3. No voltage or resistance tests are performed into the EC-15. All voltage and resistance tests are performed by beginning at the wire harness half of the connector and moving AWAY from the EC-15 toward an antilock system component (Modulator, Wheel Speed Sensor, etc.)

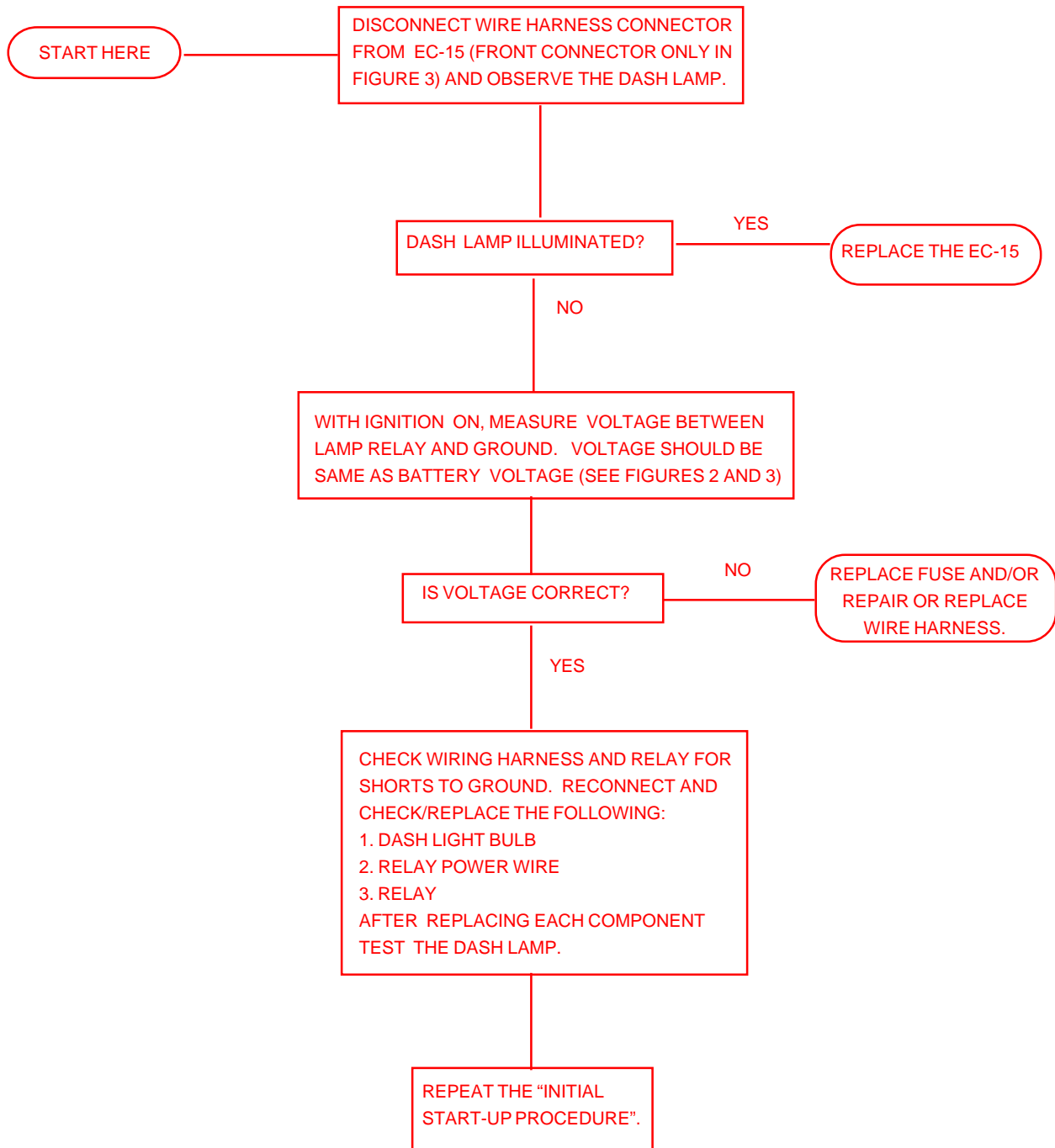
TROUBLESHOOTING

INITIAL START-UP PROCEDURE



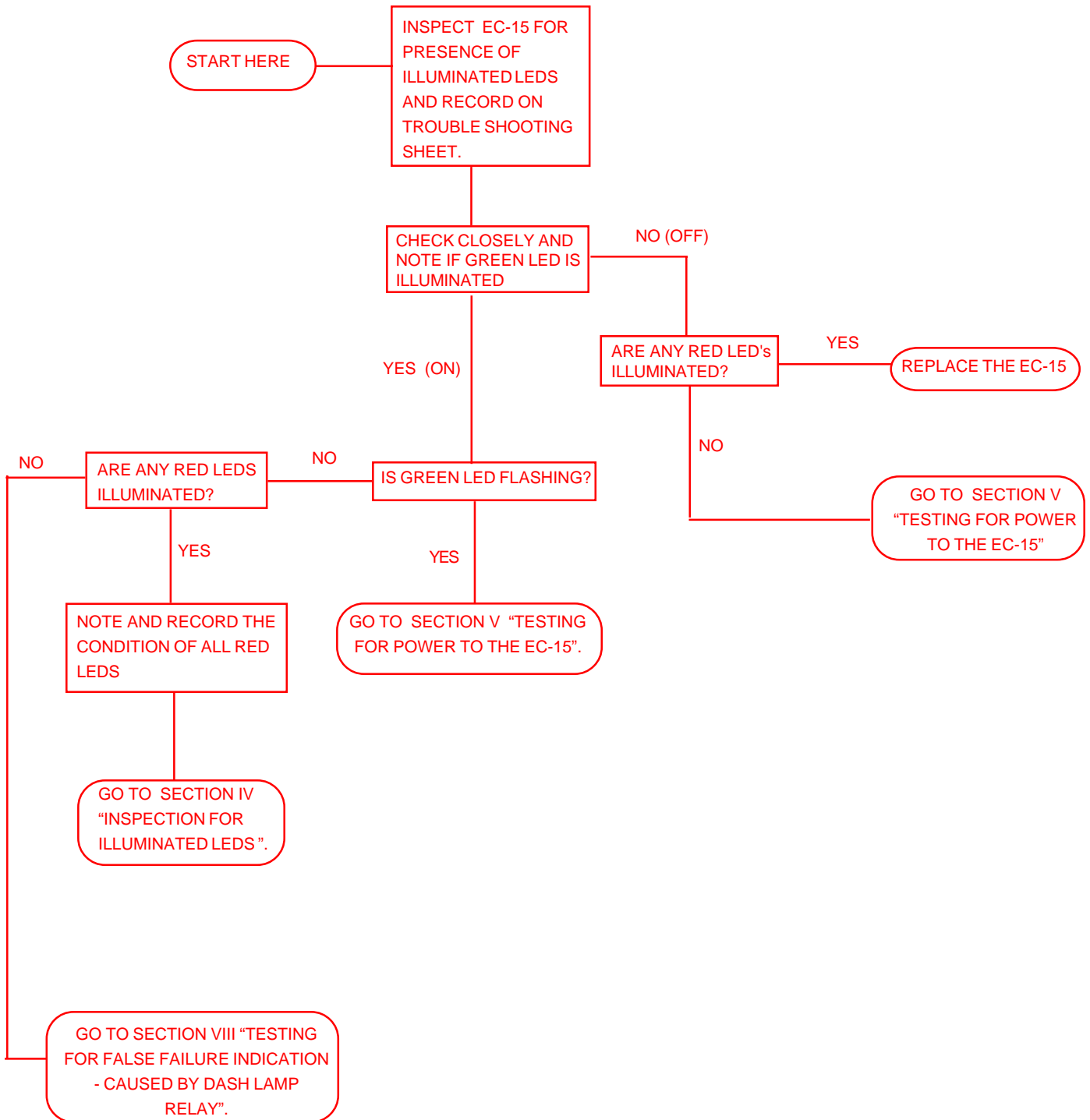
TROUBLESHOOTING

SECTION I - DASH LAMP TESTING



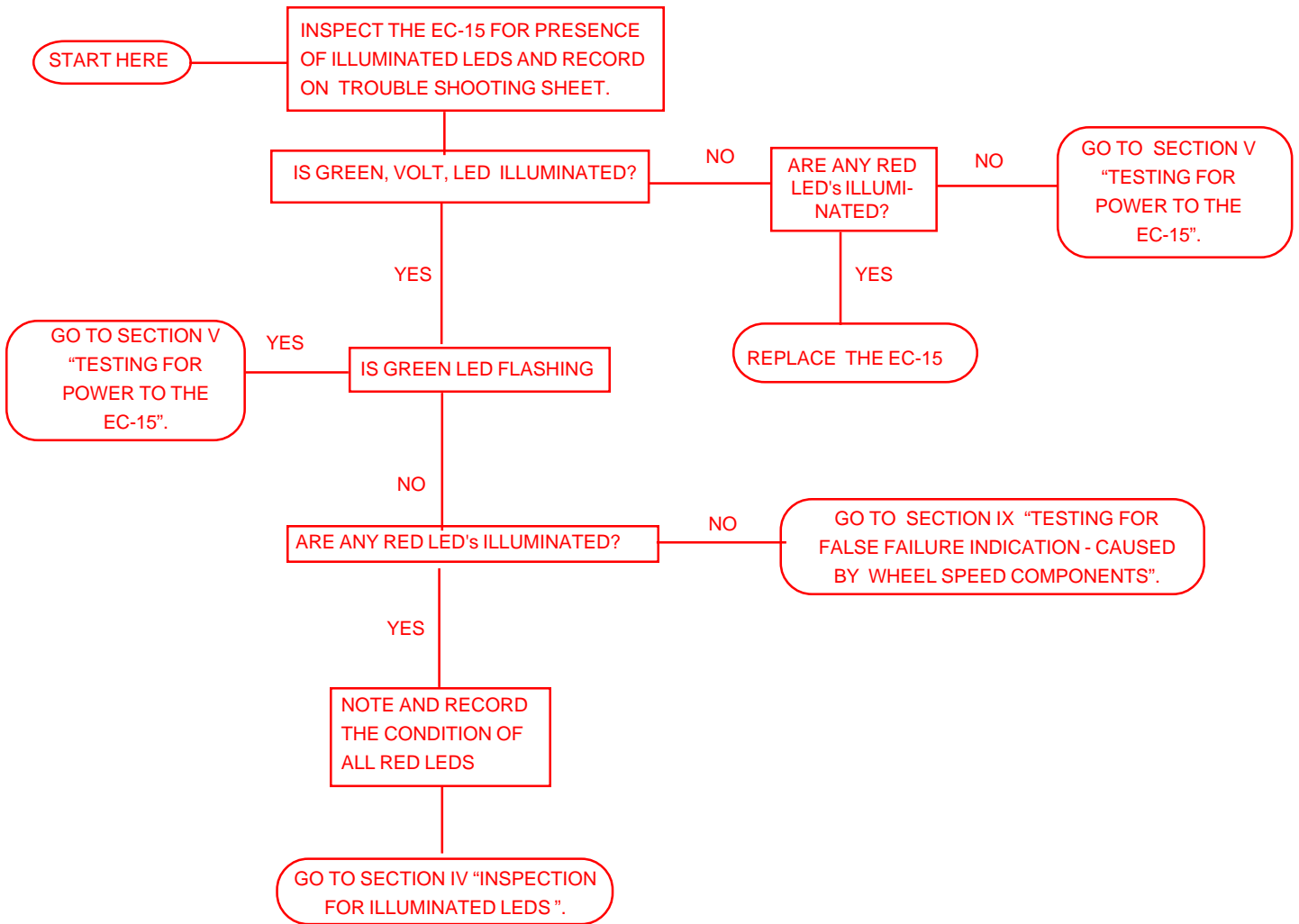
TROUBLE SHOOTING

SECTION II - INSPECTION FOR ILLUMINATED LEDS



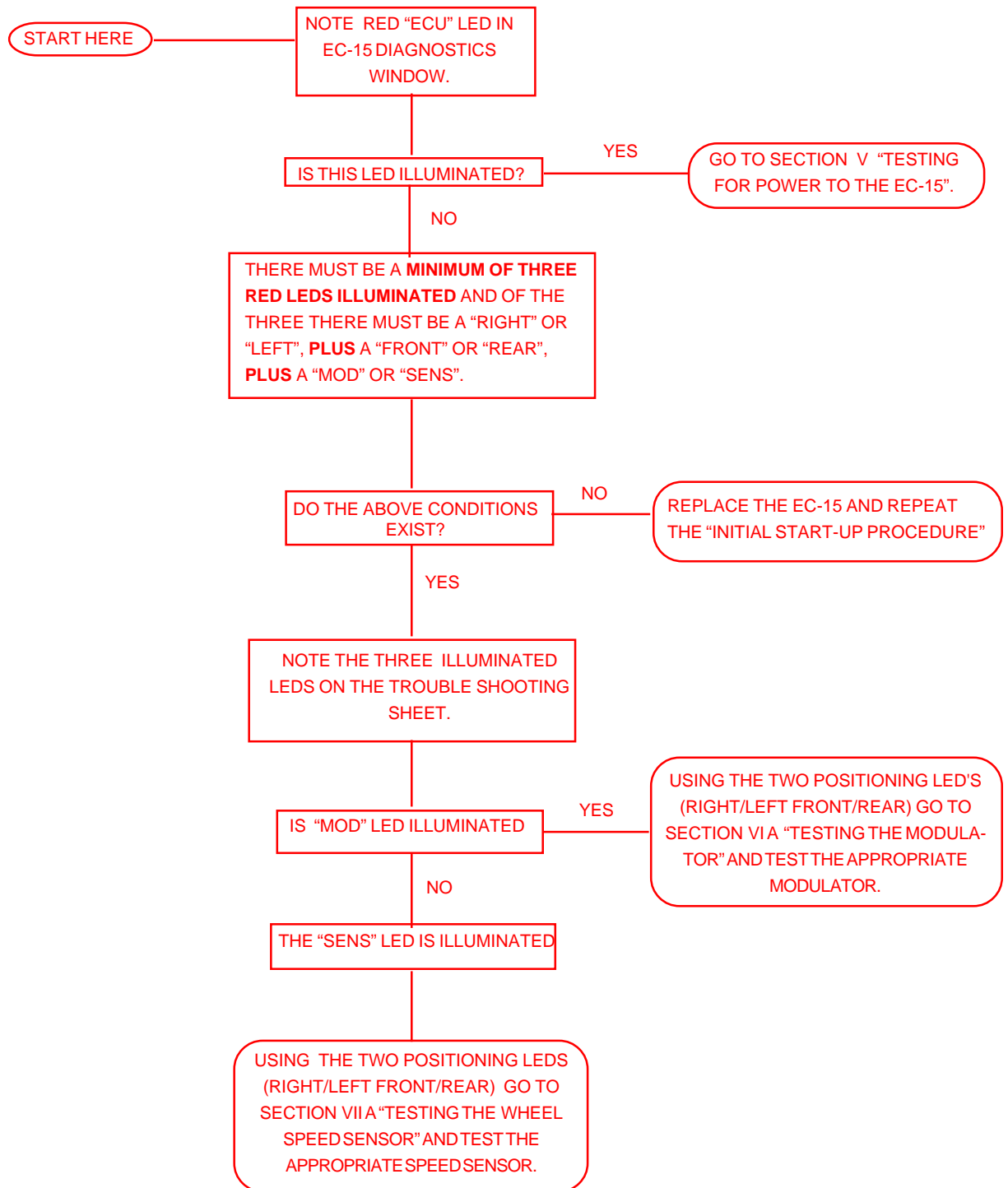
TROUBLESHOOTING

SECTION III - INSPECTION FOR ILLUMINATED LED's



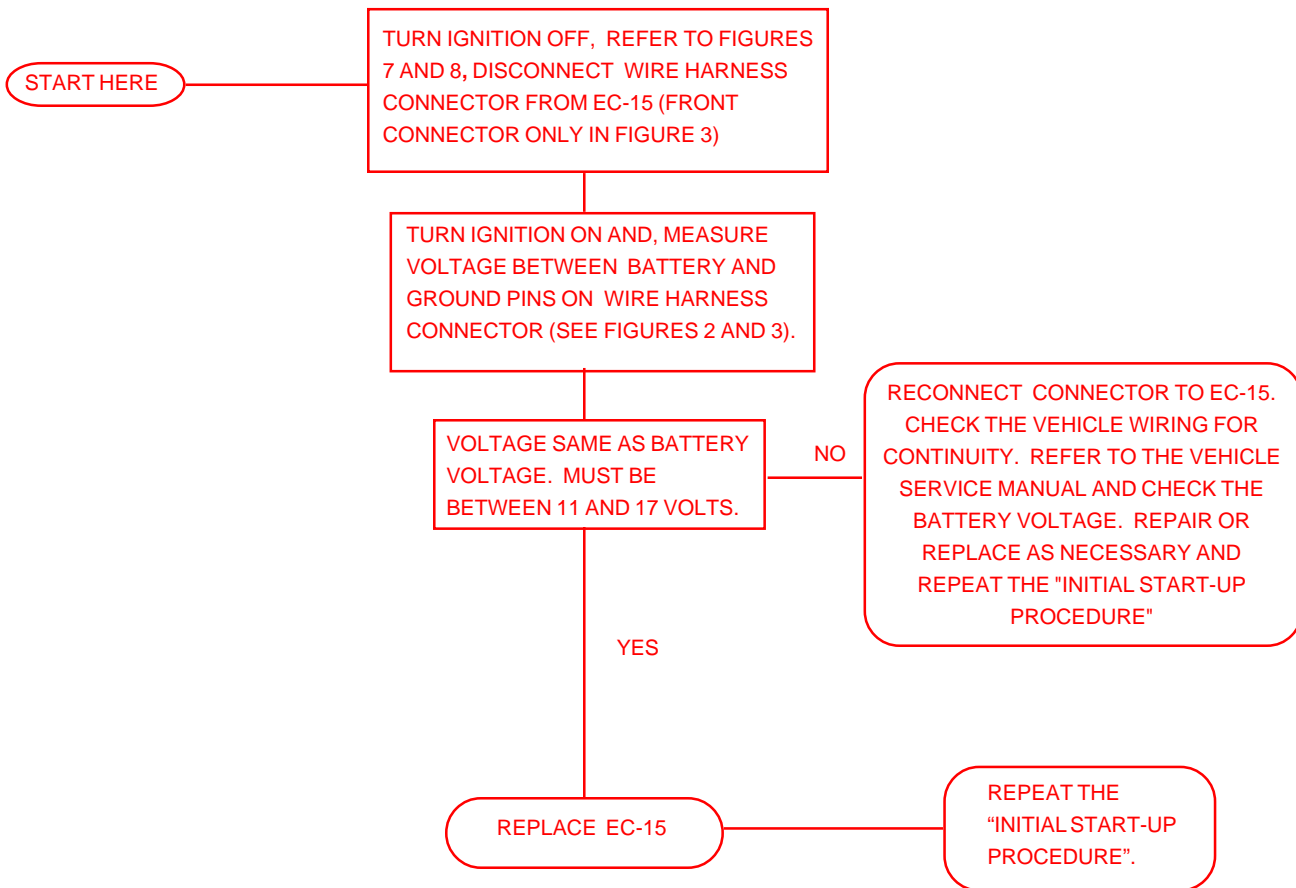
TROUBLESHOOTING

SECTION IV - INSPECTION FOR ILLUMINATED LEDS



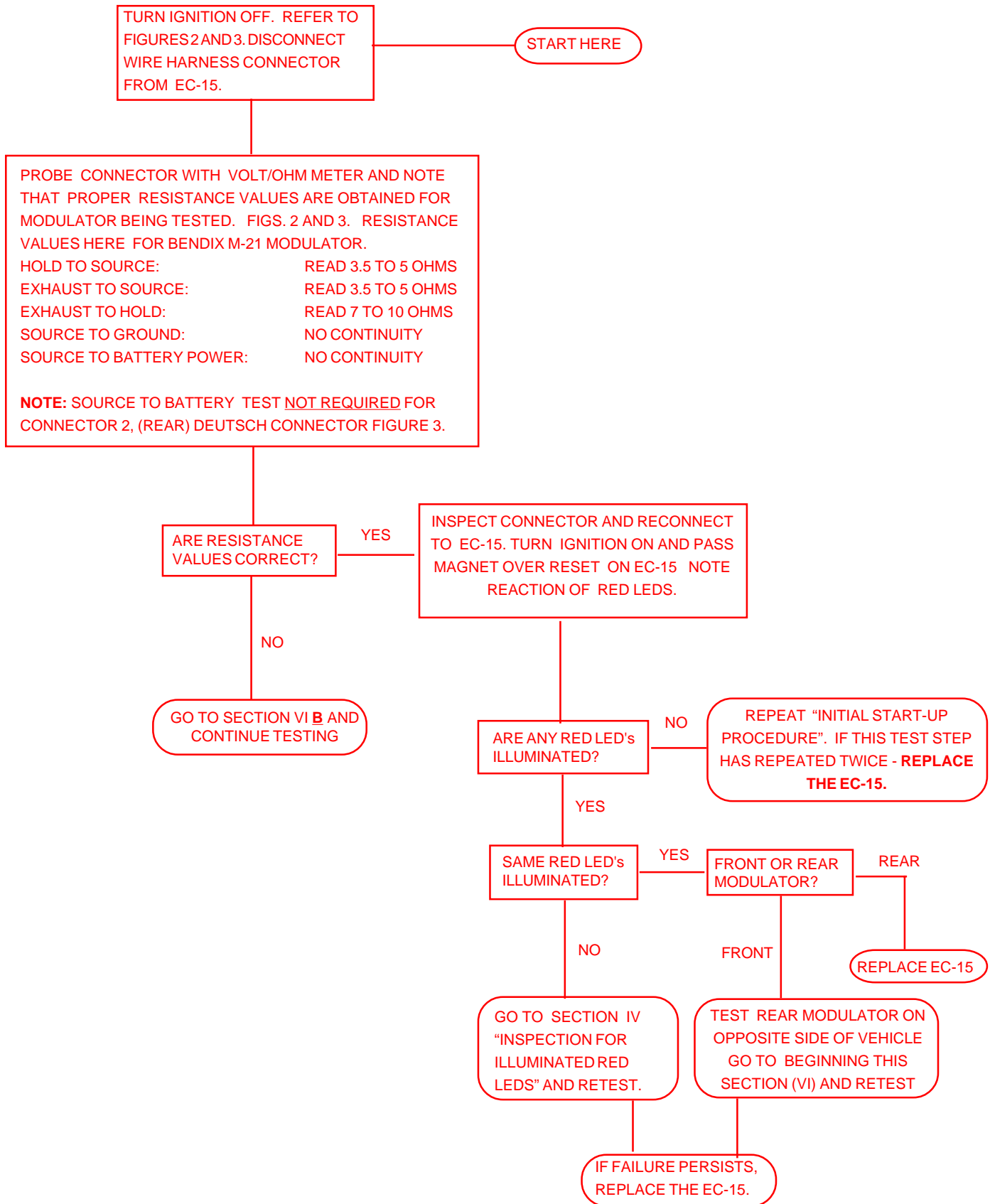
TROUBLESHOOTING

SECTION V - TESTING FOR POWER TO THE EC-15



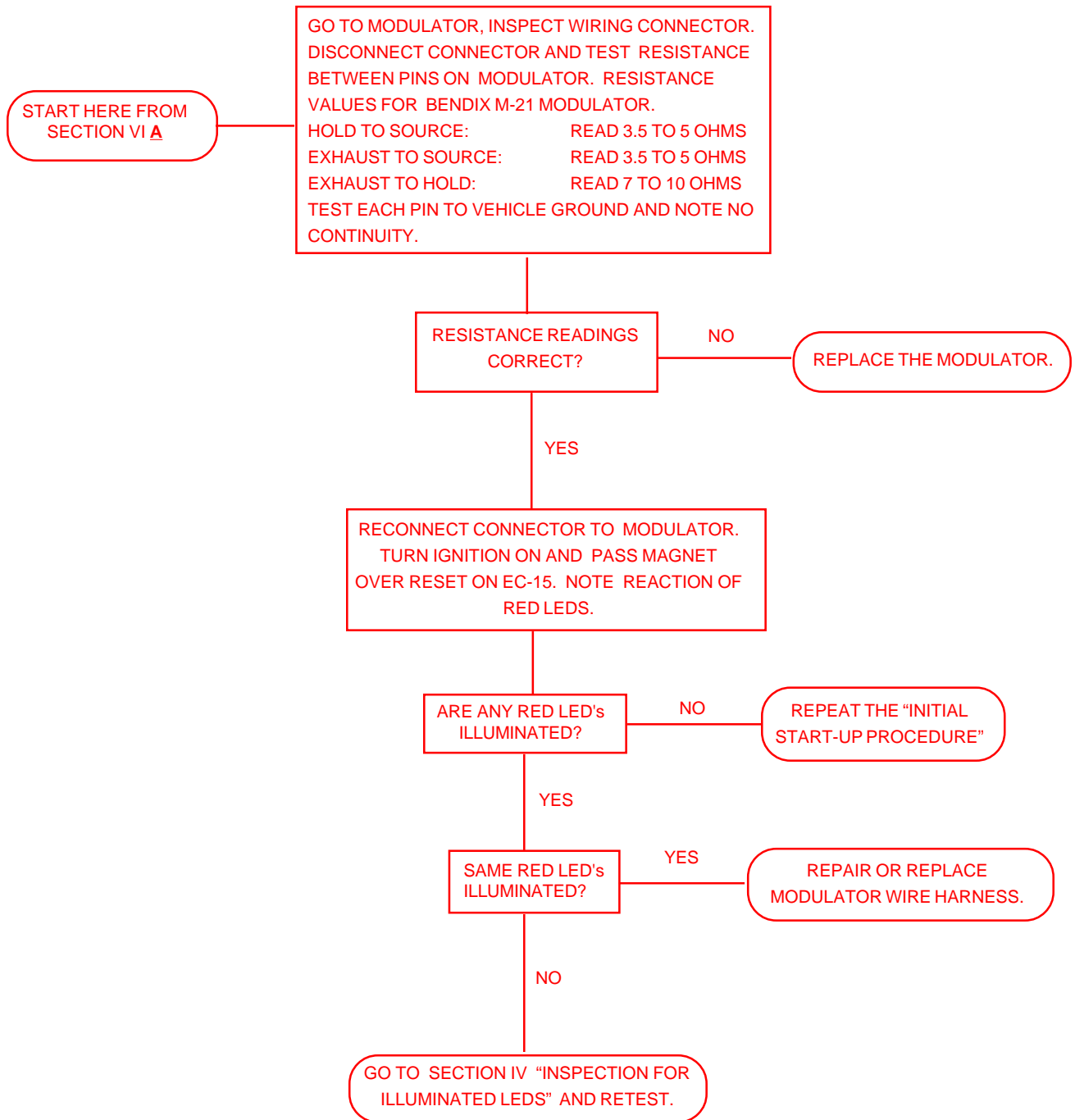
TROUBLESHOOTING

SECTION VI A - TESTING THE MODULATOR



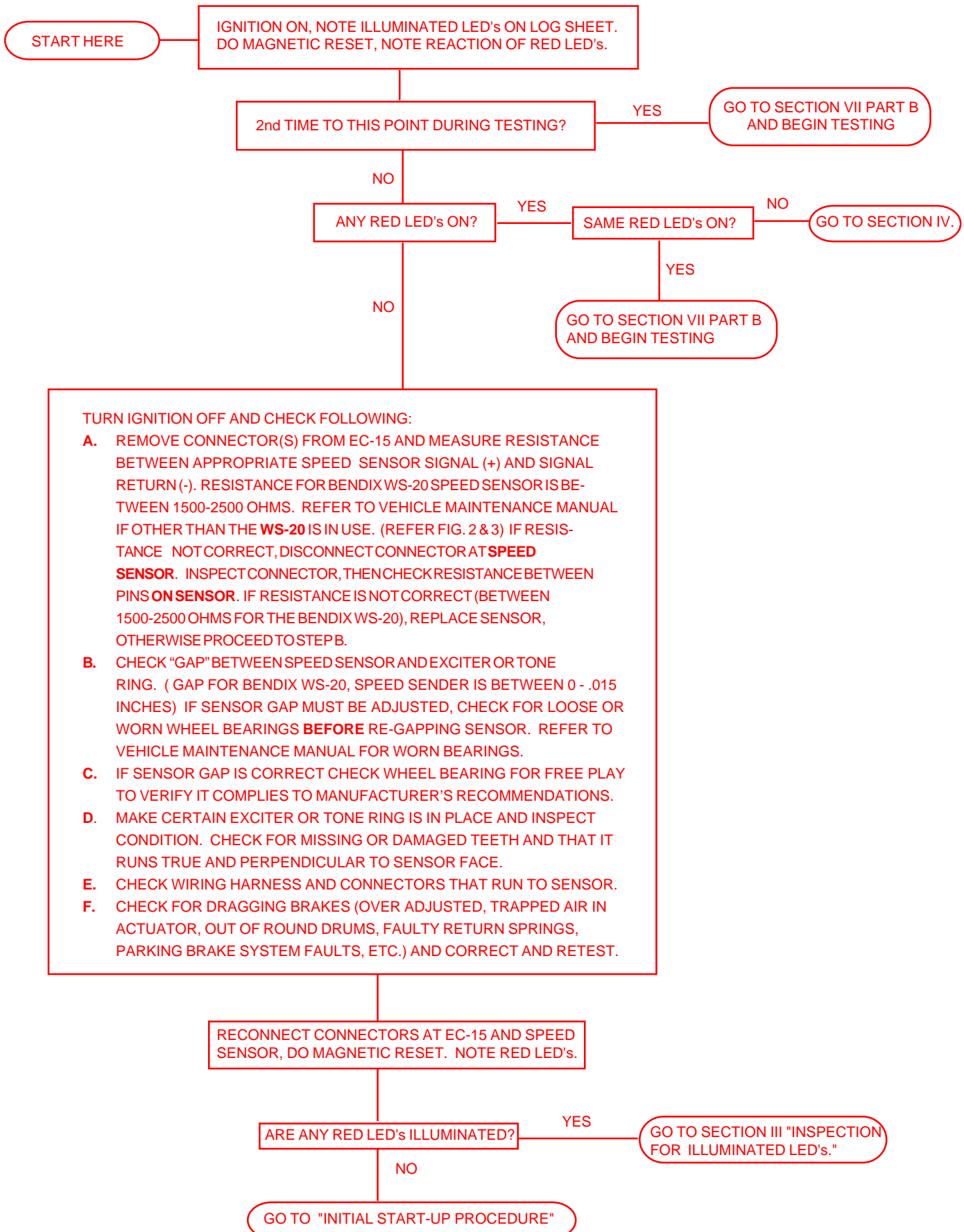
TROUBLESHOOTING

SECTION VI B - TESTING THE MODULATOR



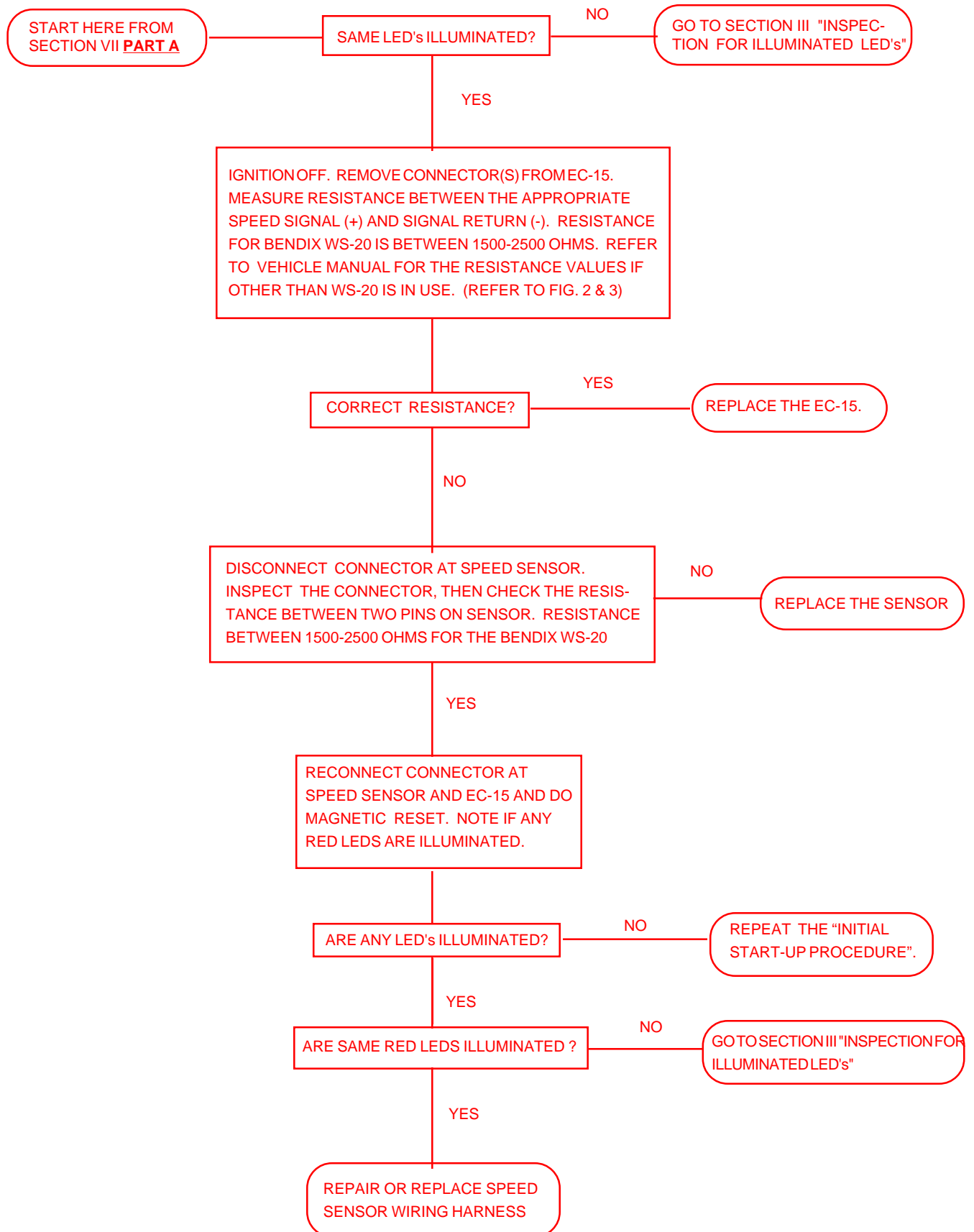
TROUBLESHOOTING

SECTION VII PART A - TESTING THE WHEEL SPEED SENSOR



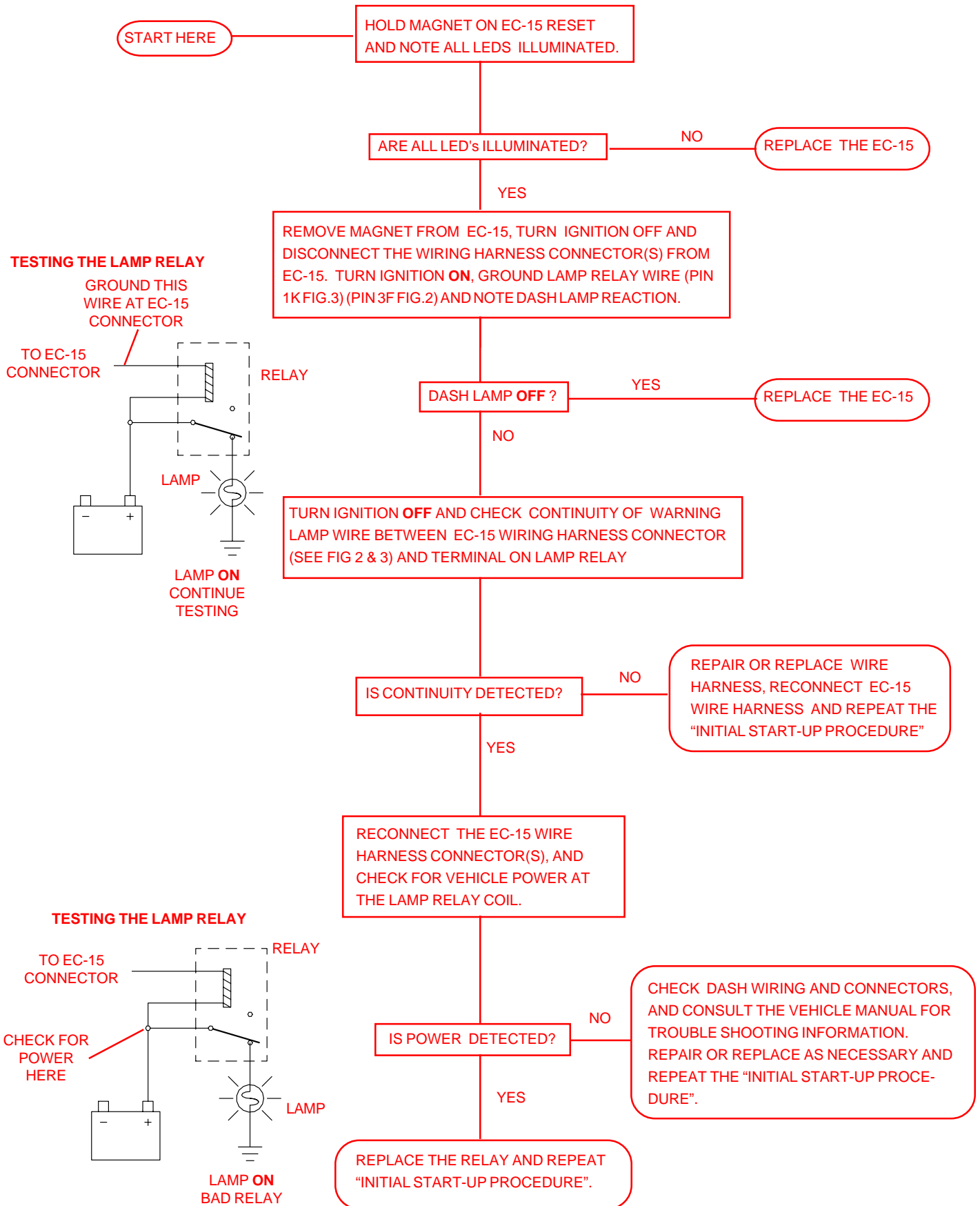
TROUBLESHOOTING

SECTION VII PART B - TESTING THE WHEEL SPEED SENSOR



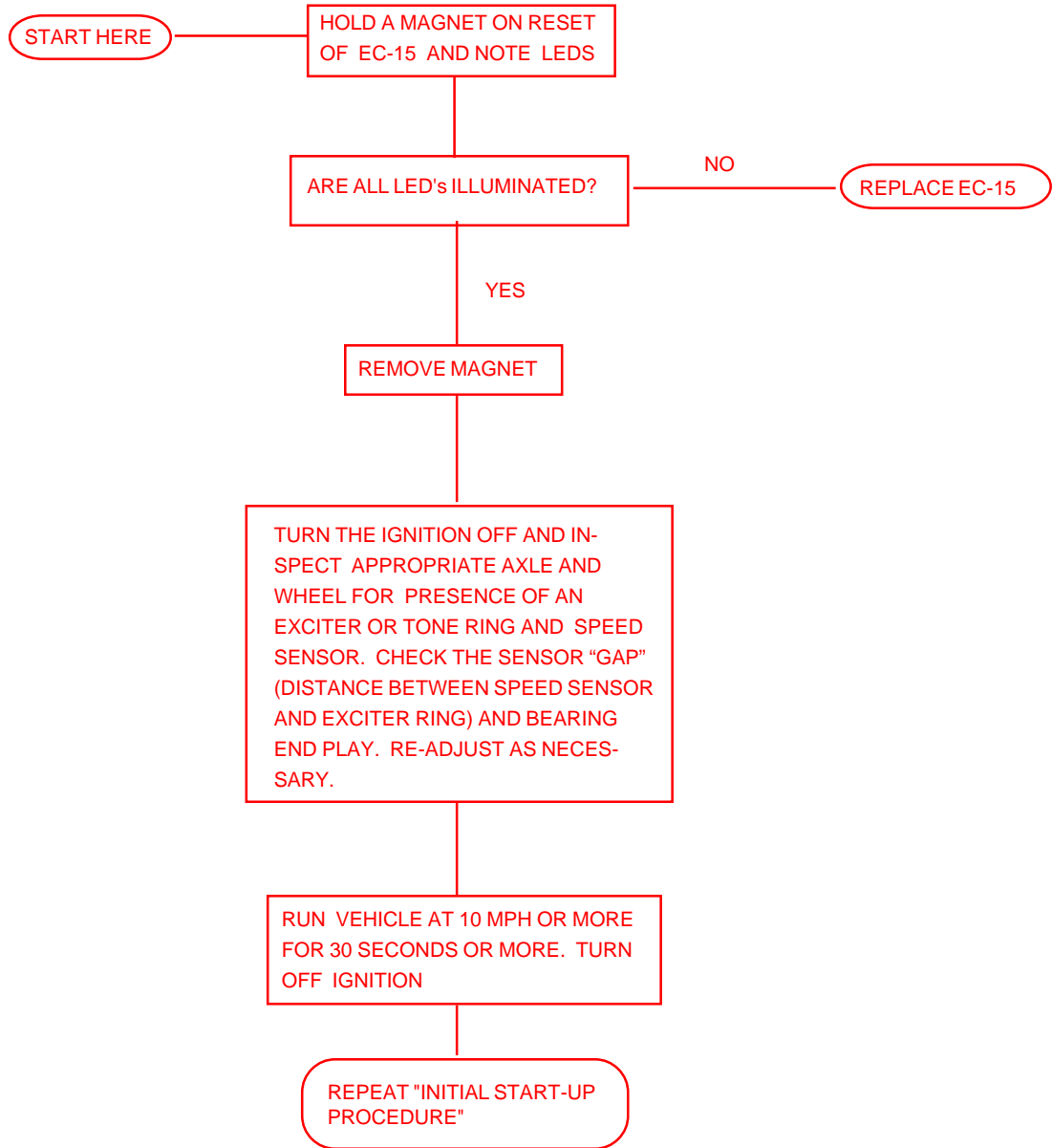
TROUBLESHOOTING

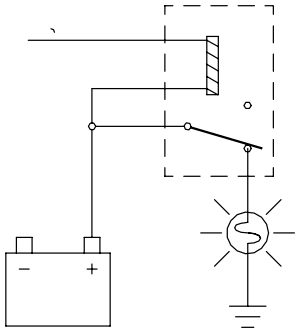
SECTION VIII - TESTING FOR FALSE INDICATION CAUSED BY DASH LIGHT RELAY



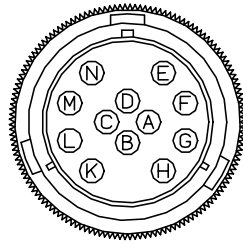
TROUBLESHOOTING

SECTION IX - TESTING FOR FALSE INDICATION CAUSED BY WHEEL SPEED COMPONENTS

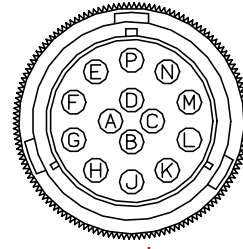




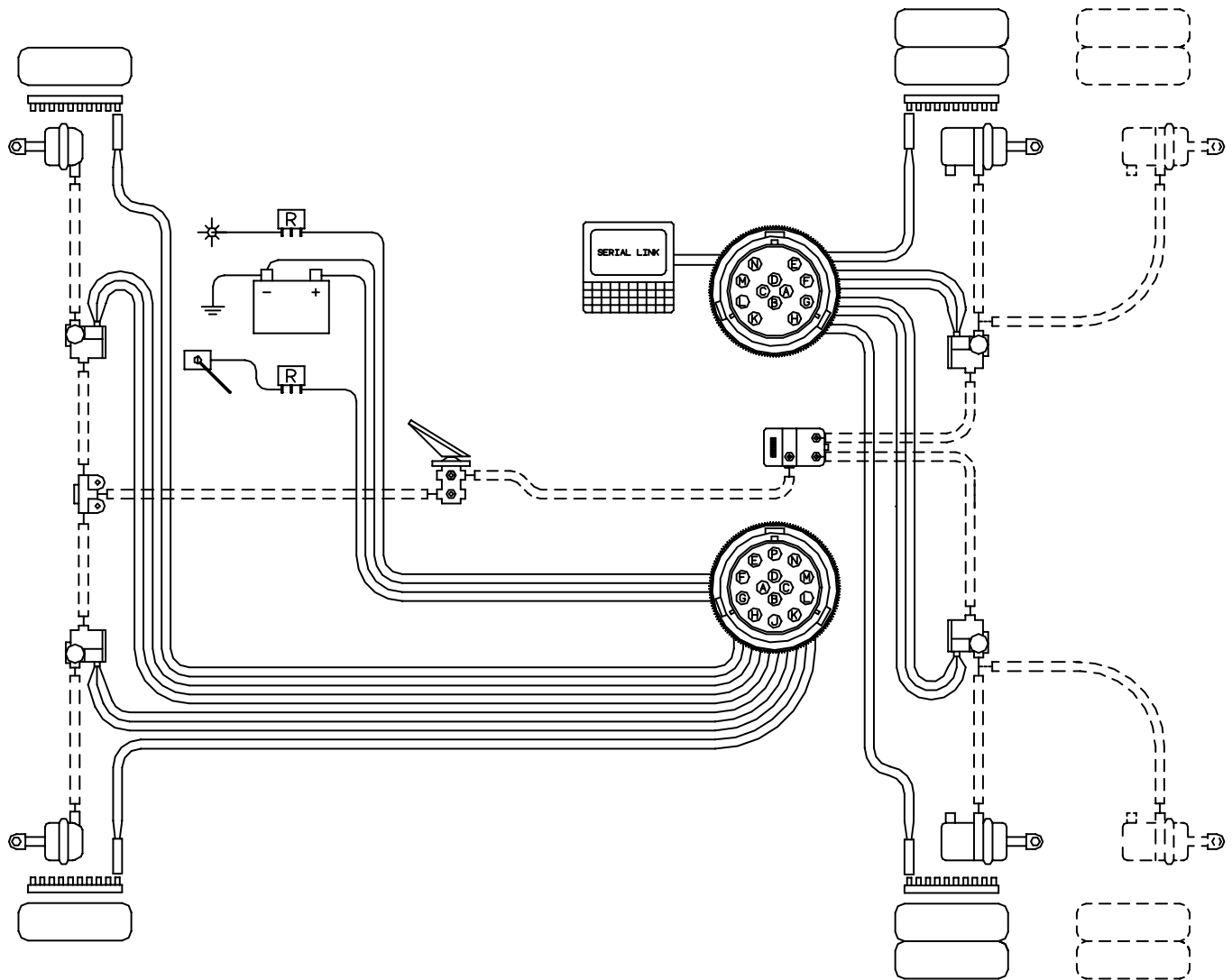
FILE: RELAY.PLT
USE ON PAGE 16



FILE: REARCONN.PLT
USE ON PAGE 4, FIG 3



FILE: FRNTCONN.PLT
USE ON PAGE 4, FIG 3



FILE: FIG7SYS.PLT
USE ON PAGE 4, FIG 3

