WIRING DIAGRAMS

All diagrams contained in this manual are based on the latest product information available at the time of publication approval. The right is reserved to make changes at any time without notice.

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WIRING DIAGRAMS DESCRIPTION

These diagrams use a new format. The diagram is surrounded by a alpha/numeric loaction grid. All the wires at the connectors have alpha/numeric addresses showing where the other end of the wire is located according to the grid.

The connectors are shown with end-on views, with each circuit shown in the connector by circuit number.

The individual circuits at the connector are shown as a simple line in the harness.

T junctions show the branches in the harness. Splices in the harness are shown as dots with triangles around the dots. All the branches of a splice are listed at the splice.

BASIC ELECTRICAL

CIRCUITS

An electrical circuit starts from a supply of electricity and conducts the electricity back to the supply of electricity. There should be a device to open and close the circuit, and a protective device to open the circuit in case too much current flows in the circuit.

Electrical circuits can be set up as series circuits or parallel circuits. The circuits in trucks are usually parallel circuits.

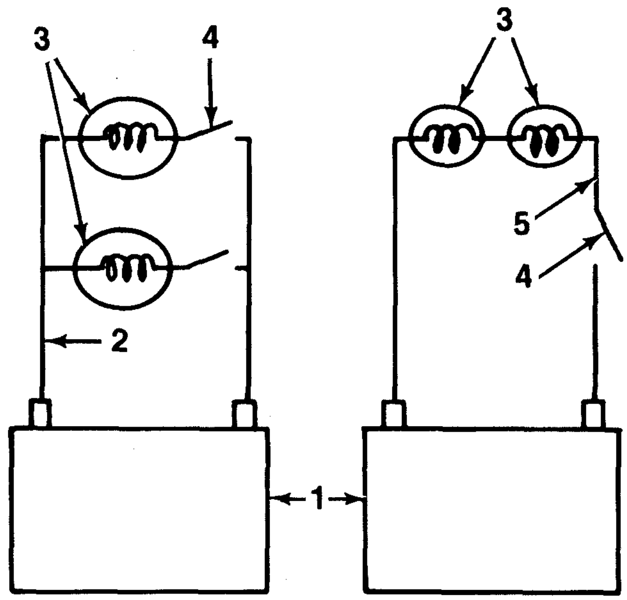
SERIES CIRCUITS (Figure 1)

In series circuits, each electrical device is connected in the circuit so that the current can only go along one path as it flows from the power supply, around the circuit and back to the power supply.

PARALLEL CIRCUITS (Figure 1)

In parallel circuits, the electrical devices are connected by parallel wires that are joined at the start of the circuit. The current divides: part of it flows into one device, part into another.

With circuits in parallel, each circuit can be switched on and off by itself since each circuit receives electricity directly from the power supply.



1. Battery
2. Parallel Circuit
3. Load
4. Switch
5. Series Circuit

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Figure 1—Basic Circuits

CIRCUIT COMPONENTS (Figure 2)

The usual circuit path starts at the power supply which is the battery/generator system. Next in the circuits is the circuit protection component which can be a fusible link, a fuse, or a circuit breaker. Then the circuit goes to the circuit controller which can be a switch or a relay. From the circuit controller the circuit goes into the circuit load. The circuit load can be one light or many lights in parallel, an electric motor or a solenoid. After the electricity has passed through the load it must return to the power supply via the ground path. The ground path can be a wire in the harness or it could be through the load housing into the body or frame, thus returning the electricity to the power supply. The body and frame are connected by flexible ground straps.

FUSIBLE LINK

A fusible link is a section of wire that is usually four gage sizes smaller than the circuit it protects. A special insulation is used that swells when heated by the wire. Fusible links are usually found in the engine compartment harnesses. The function of the fusible link is to melt open when an overload occurs, thus preventing any damage to the circuit.

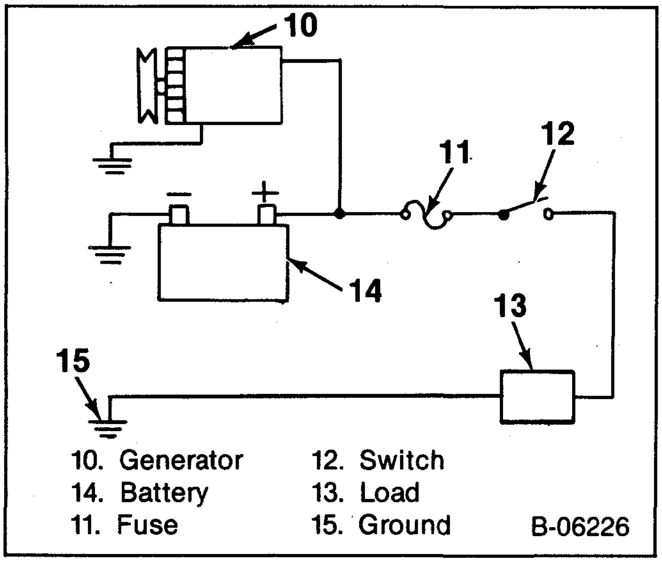


Figure 2—Circuit Components

FUSES

The most common protector in the vehicle circuit is a fuse. A fuse consists of a fine wire or strip of metal inside a glass tube or plastic housing. The strip melts and interrupts the flow of current in the circuit when there is an overload caused by an unwanted short or ground. The fuse is designed to melt before the wiring or electrical components in a circuit can be damaged. Naturally, the cause must be located and corrected before the fuse is replaced or the new fuse will also blow.

Since different circuits handle different amounts of current, fuses of various ratings are used. Fuses are rated in amperes. Be sure to replace a blown fuse with a fuse of the connecting rating.

CIRCUIT BREAKERS

Circuit breakers are another form of circuit protector. There are two types of circuit breakers; automatic reset and remote reset.

The automatic reset breaker opens when excess current heats a bimetallic strip, causing the strip to bend and open a set of contacts. Then the strip cools and closes the contacts. So the circuit breaker opens and closes until the excess current condition is corrected or the circuit is disconnected from the power supply.

The remote reset circuit breaker has a heating wire wound around the bimetallic strip. When an excess current happens, the strip heats, bends, and opens the contacts. Then a small current flows through the heating wire, keeping the strip hot and the contacts open. This type of breaker will stay open until either the power supply is disconnected from the circuit or the breaker is removed from the circuit. Then the breaker can cool and reset.

CIRCUIT CONTROLLERS

Circuit controllers consist of switches or relays. Switches are usually operated by a mechanical means such as a hand or lever. Switches are usually at the beginning of a circuit but can be used to control a ground path. For example the switch controlling the headlights is at the power end of the circuit while the door switch controlling the domelight completes the ground path.

Relays are remotely controlled switches. They are used in high current circuits and in circuits controlled by sensors.

Relays are designed so that a small current circuit will be able to control a large current circuit.

WIRING HARNESS AND WIRES

Every wire is a specific size with colored or striped insulation that is indicated on the wiring diagrams. Insulation colors help to trace circuits and to make proper connections. Abbreviations and symbols used for indicating wire insulation colors and patterns are as follows:

BLK	Black	ORG	Orange
BRN	Brown	PPL	Purple
CH	Check	TR	Tracer
CR	Cross	YEL	Yellow
GRN	Green	//	Parallel
NAT	Natural	WHT	White
LT	Light	BLU	Blue
SGL	Single	STR	Stripe
ORN	Orange	PNK	Pink
GRA	Gray	DK	Dark

Some wires are grouped and taped together or encased in a split plastic casing. This grouping of wires is called a harness. For some purposes, it is more practical to use a single wire protected by a braided tubing called a loom.

Wiring harnesses are joined by using a multiple plug and receptacle connector block, or a terminal post chassis junction block. In the instrument panel area plastic insulated blade-type connectors and screw-type terminals are used.

Each harness or wire must be held securely in place by clips or other holding devices to prevent chafing of the insulation.

WIRE SIZE

Wire size in a circuit is determined by the amount of current, the length of the circuit and the voltage drop allowed. Wire size is specified using the metric gage. The metric gage describes the wire size directly in cross section area measured in square millimeters.

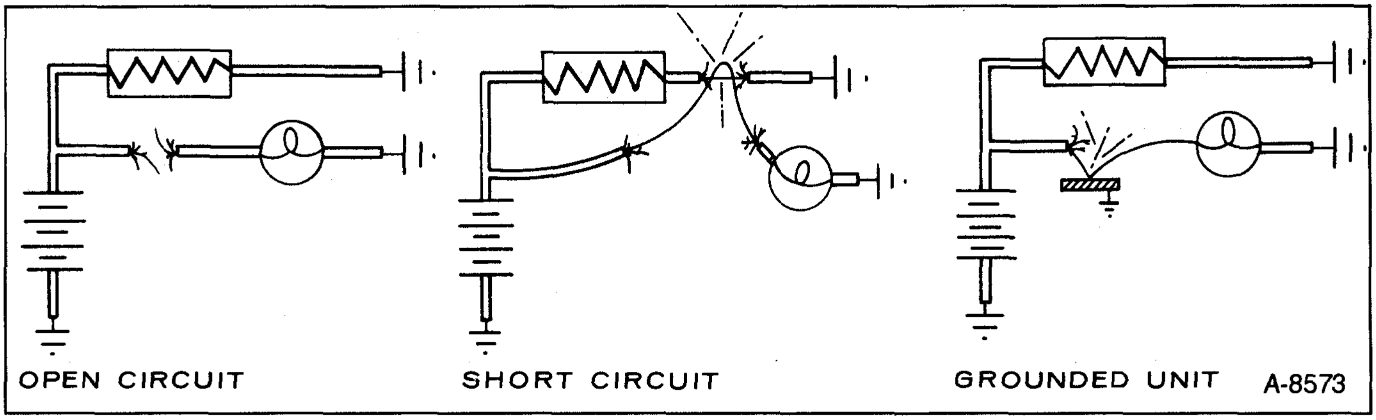


Figure 3—Circuit Malfunctions

WIRE SIZE CONVERSION TABLE

METRIC SIZE (mm)²	AWG SIZE
0.22	24
0.35	22
0.5	20
0.8	18
1.0	16
2.0	14
3.0	12
5.0	10
8.0	8
13.0	6
19.0	4
32.0	2
40.0	1
50.0	0
62.0	00

CIRCUIT MALFUNCTIONS

There are three electrical conditions that can cause a nonworking circuit; an "Open Circuit", a "Short Circuit", and a "Ground Circuit."

OPEN CIRCUIT (Figure 3)

An open circuit occurs whenever there is a break in the circuit. The break can be corrosion at the connector, a wire broken off in a device, or a wire that burned open from too much current.

SHORT CIRCUIT (Figure 3)

A short circuit happens when the current bypasses part of the normal circuit. This bypassing is usually caused by wires touching, salt water in or on a device such as a switch or a connector or solder melting and bridging conductors in a device.

GROUNDED CIRCUIT (Figure 3)

A ground circuit is like a short circuit but the current flows directly into a ground circuit that is not part of the original circuit. This may be caused by a wire rubbing against the frame or body. Sometimes a wire will break and fall against metal that is connected electrically to the ground side of the power supply. A ground circuit may also be caused by deposits of oil, dirt and moisture around connections or terminals, which provide a good path to ground.

CIRCUIT DIAGNOSIS

A clear understanding of the circuit and a wiring diagram are needed for effective diagnosis. Use a logical sequence of testing to find the trouble. Use the diagnostic tools. After the trouble is fixed, make sure the circuit works correctly.

DIAGNOSTIC TOOLS

UNPOWERED TEST LIGHT

This tool consists of a 12 volt light with leads. The ends of the leads usually have alligator clamps, but various kinds of probes, terminal spades, and special connectors are used also.

The unpowered test light is used on an open circuit. One lead of the test light is grounded and the other lead is moved around the circuit to find the open. Depending on the physical layout of the circuit, sometimes it will be easier to start at the power supply and other times it is easier to start at the circuit load or ground circuit.

POWER TEST LIGHT

This light is a pencil shaped unit with a self contained battery, a 1.5 volt light bulb, a sharp probe and a ground lead fitted with an alligator clip.

This test light is used mainly for testing components that are disconnected from the vehicle power supply. The power test light is also useful for testing suspected high resistance points in a circuit such as connectors and ground circuits that are corroded or loose.

JUMPER

The jumper is usually a long wire with alligator clamps. A version of the jumper has a fuse holder in it with a 10 Amp fuse. This will prevent damaging the circuit if the jumper is connected in the wrong way.

The jumper is used to locate opens in a circuit. One end of the jumper is attached to a power source and then the other end is attached to the load in the circuit, i.e.; light, motor. If the load works, try "jumping" to circuit points that are progressively closer to the power supply. When the circuit load stops working, the open has been located.

The jumper is also used to test components in the circuit such as connectors, switches, and suspected high resistance points.

NOTICE: The following instruments: Ammeter, Voltmeter, and Ohmmeter, each have a particular application for trouble shooting electrical circuits.

When using a ammeter or voltmeter, and the value being tested is unknown always use the highest scale first and work downward to a midscale reading whenever possible. This will avoid damage to the instrument.

Never use an ohmmeterr in a power circuit, or as a substitute for a voltmeter or ammeter as damage to the instrument will result.

AMMETER (Figure 4)

Disconnect the circuit from the power source before connecting the ammeter. The ammeter measures the amount of electrical current, amperes, moving through a conductor. The ammeter must be placed in series with the circuit being tested. Be sure that the ammeter's positive terminal is connected to the positive (battery) side of the circuit and is negative terminal to the negative (ground) side of the circuit.

OHMMETER (Figure 5)

The ohmmeter is an instrument designed to indicate resistance in ohms. It is used to test the condition of a unit disconnected from the circuit.

Ohmmeter Calibration

When the ohmmeter probes are connected together, a circuit is completed causing the meter needle to deflect. The needle should read ZERO ohms, if it does not, rotate the CAL or ADJ knob to ZERO the needle.

When the probes are held apart, the needle moves to the maximum (infinite) resistance side of the scale.

The meter is now ready for use.

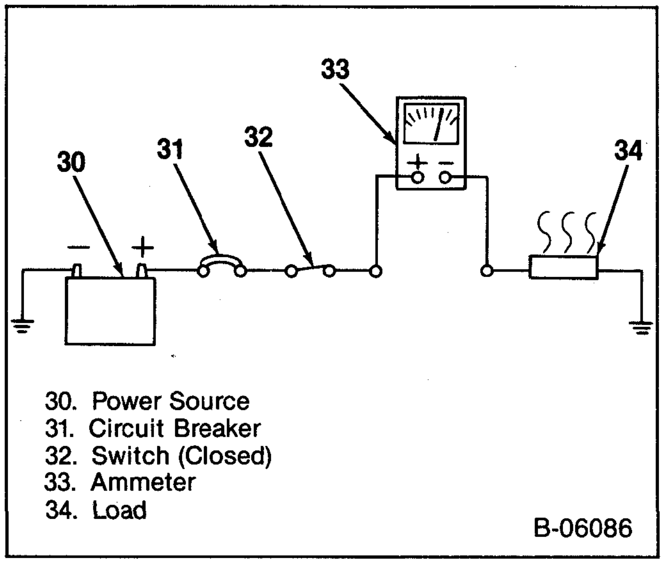


Figure 4—Ammeter Circuit

VOLTMETER (Figure 6)

The voltmeter (properly observed) will give the technician more information than the ammeter, ohmmeter and test light combined. Its application for troubleshooting here is to measure the electrical pressure (voltage) drop in a resistance circuit.

To use a voltmeter for troubleshooting an electrical problem, connect it in parallel with the existing circuit. If the voltmeter is connected in series with the circuit being tested, the nature of the circuit would be changed and the reading would have no particular value or use. Connect the meter terminals according to polarity as shown.

The dash mounted voltmeter (in the vehicle) should also be observed for monitoring proper operation of the generator battery cranking motor, and cranking circuit. In this application, battery voltage drop can be monitored while the engine is cranking; and after the

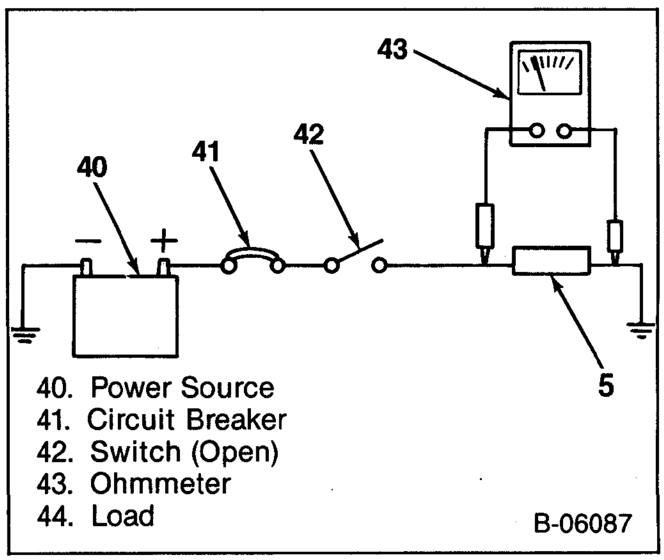
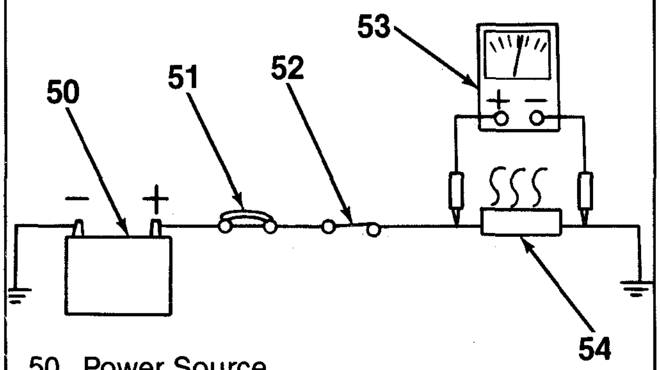


Figure 5—Ohmmeter Circuit



50. Power Source
51. Circuit Breaker
52. Switch (Closed)
53. Voltmeter
54. Load

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Figure 6—Voltmeter Circuit

engine is running, generator output voltage can be monitored. This can be a valuable first step prior to diagnosing other electrical problems.

CIRCUIT MAINTENANCE AND REPAIR

MAINTENANCE AND REPAIR

All electrical connections must be kept clean and tight. Loose or corroded connections may cause a discharged battery, difficult starting, dim lights, and possible damage to the generator and regulator. Wires must be replaced if insulation becomes burned, cracked, or deteriorated.

To splice a wire or repair one that is frayed or broken always use rosin flux solder to bond the splice and insulating tape to cover all splices or bare wires.

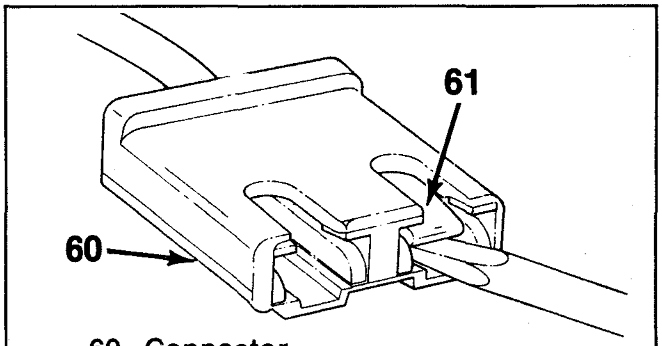
When replacing wire, it is important that the correct size wire be used as shown on applicable wiring diagrams or parts book. Each harness or wire must be held securely in place to prevent chafing or damage to the insulation due to vibration.

Never replace a wire with one of a smaller size or replace a fusible link with a wire of a larger size.

WIRING CONNECTOR TERMINAL REPLACEMENT (BLADE TYPE)

Remove or Disconnect (Figure 7)

1. Terminal lock tang.
2. Terminal (61).



60. Connector
61. Terminal

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Figure 7—Removing Terminals From The Connector

Install or Connect (Figure 8)

1. Pry up on the tang (70).
2. Terminal into the connector.

WIRING CONNECTOR TERMINAL REPLACEMENT (TWIN LOCK TYPE)

Remove or Disconnect (Figure 9)

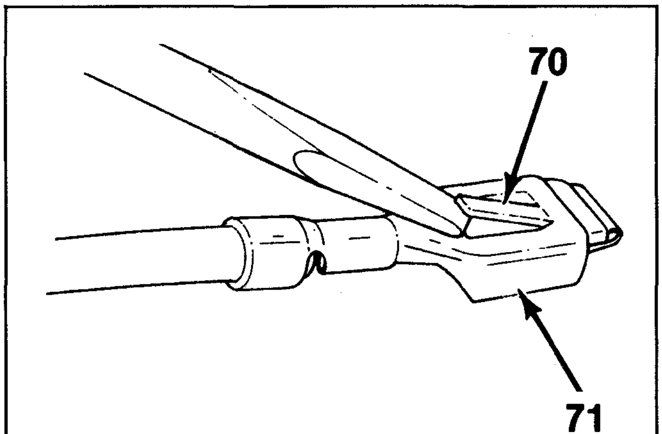
Tool Required:

J-22727 Terminal Remover

1. Connector lock tangs.
2. Terminal locks using J-22727.
3. Terminal.

Install or Connect (Figure 8)

1. Pry out the tangs.
2. Terminal into the connector.



70. Terminal Lock Tang
71. Terminal

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Figure 8—Resetting Lock Tang

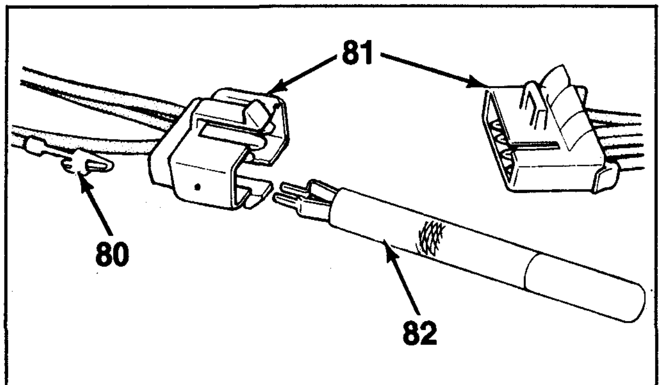


Figure 9—Twin Lock Connector Terminal

WEATHER-PACK CONNECTORS (Figure 10)

Special connectors known as Weather-Pack connectors require a special tool J-28742 for servicing. This special tool is required to remove the pin and sleeve terminals. If removal is attempted with an ordinary pick, there is a good chance that the terminal will be bent or deformed. Unlike standard blade-type terminals, these terminals cannot be straightened once they are bent.

Make sure that the connectors are properly seated and all of the sealing rings in place when connecting the leads. The hinge-type flap provides a back-up, or secondary locking feature for terminals. They are used to improve the connector reliability by retaining the terminals if the small terminal lock tangs are not positioned properly.

Molded-on-connectors require complete replacement of the connection. This means splicing a new connector assembly into the harness. Environmental connections cannot be replaced with standard connections. Instructions are provided with the Weather-Pack connector and terminal packages.

With the low current and voltage levels found in some circuits, it is important that the best possible bond at all wire splices be made by soldering the splices.

Use care when probing the connections or replacing terminals in them, it is possible to short between opposite terminals. If this happens to the wrong terminal part, it is possible that damage may be done to certain components. Always use jumper wires between connectors for circuit checking. Never probe through the Weather-Pack seals.

When diagnosing for possible open circuits, it is often difficult to locate them by sight because oxidation or terminal misalignment are hidden by the connectors. Merely wiggling a connector on a sensor or in the wiring harness may correct the open circuit condition. This should always be considered when an open circuit is indicated while troubleshooting. Intermittent problems may also be caused by oxidized or loose connections.

WEATHER-PACK TERMINAL REPLACEMENT

Remove or Disconnect (Figure 10)

Tool Required:
J-28742 Terminal Remover

1. Primary lock (121) by lifting.
2. Connector sections.
3. Secondary lock (125) by spreading the sides of the hasp, thus clearing the staples and rotating the hasp (127).
4. Terminal (131) by using J-28742 (128).
   - Snip off the old terminal assembly.
5. 5 mm (0.2 inch) of the wire insulation (130).

Clean

- Terminal barrel (124).

Install or Connect (Figure 10)

1. Terminal insulator (134) on the wire. Slide the insulator back on the wire about 8 cm (3 inches).
2. Terminal (131) on the wire.
   - Roll crimp (132) and solder the terminal.
3. Terminal insulator (134) and the roll crimp (133).
4. Terminal into the connector.
5. Secondary lock (125).
6. Connector sections until the primary lock (121) engages.

WIRING REPAIR

The wire repair is very important for the continued reliable operation of the vehicle. This repair must be done as described in the following procedures.

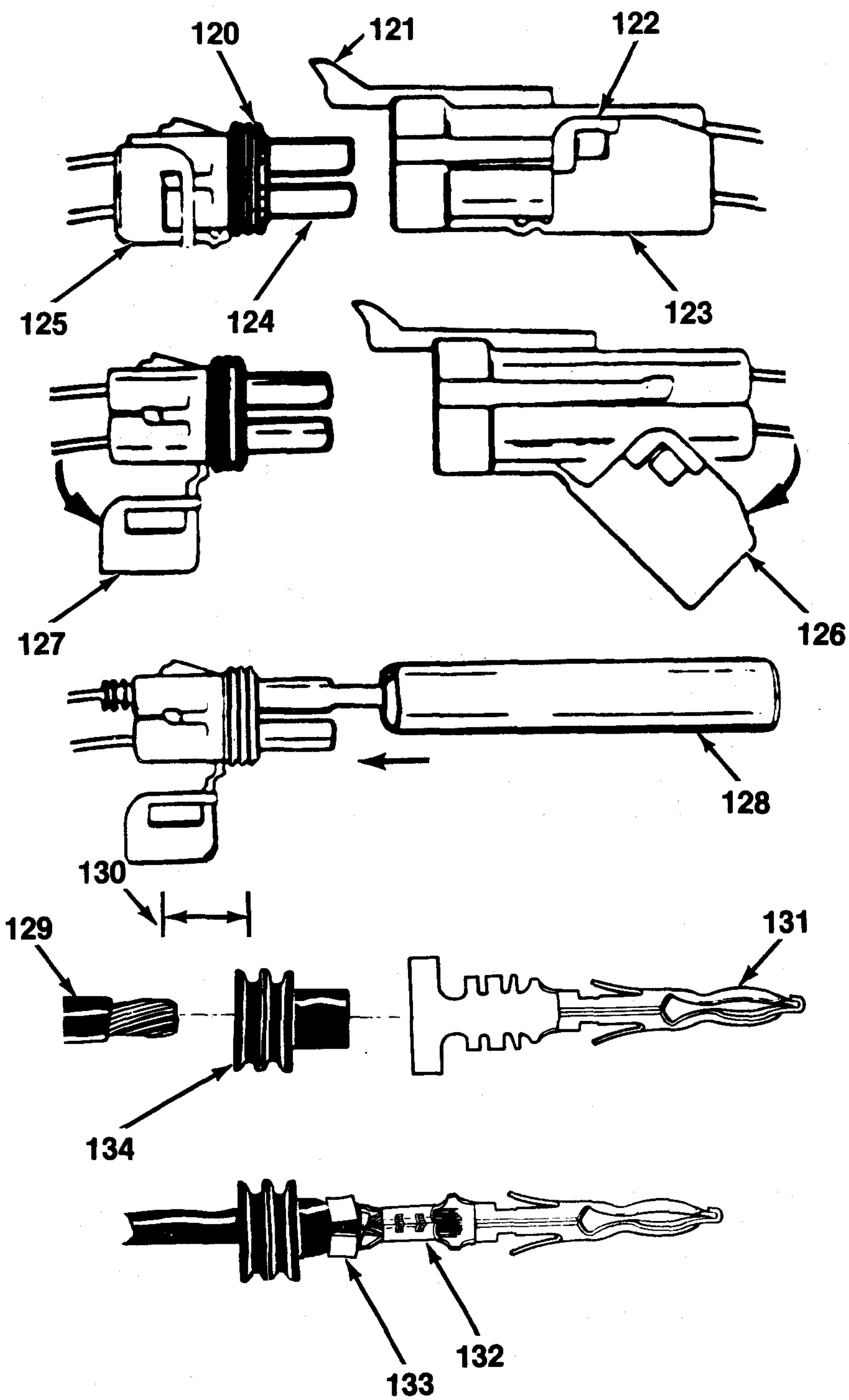
Twisted Leads (Figure 11)

Remove or Disconnect

1. Jacket (90).
2. Twisted wires (91).
3. Insulation from the wire.

Install or Connect (Figure 11)

1. Splice clip (93).
   - Crimp.
   - Solder.
2. Electrical tape wrap (94) on wires.
3. Outer electrical tape wrap (95).



120. Connector Seal
121. Primary Lock
122. Secondary Lock Staple
123. Secondary Lock
124. Terminal Barrel
125. Secondary Lock
126. Lock Opened
127. Lock Opened
128. J 28742 Terminal Remover
129. Wire
130. 5 mm (.2 inch)
131. Terminal
132. Roll Crimp
133. Roll Crimp
134. Terminal Insulator

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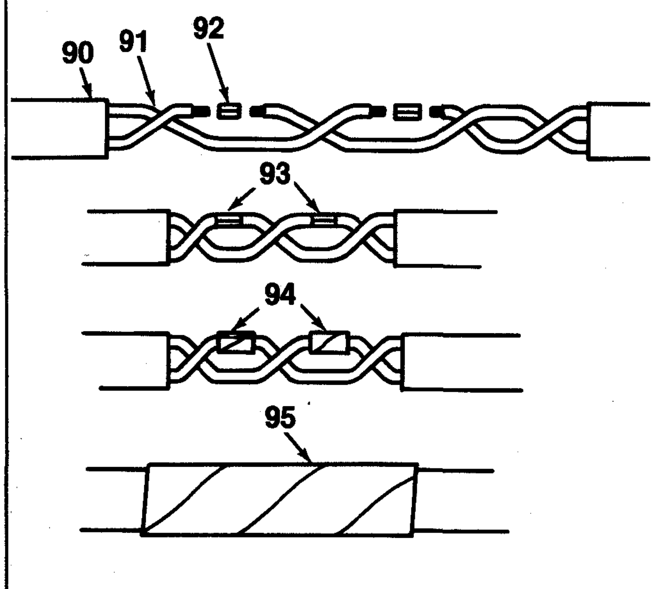
Figure 10—Weather Pack Terminals



90. Jacket
91. Twisted Wires
92. Splice Clip
93. Crimp and Solder
94. Electrical Tape Wrap
95. Outer Electrical Tape Wrap.

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Figure 11—Twisted Lead Repair

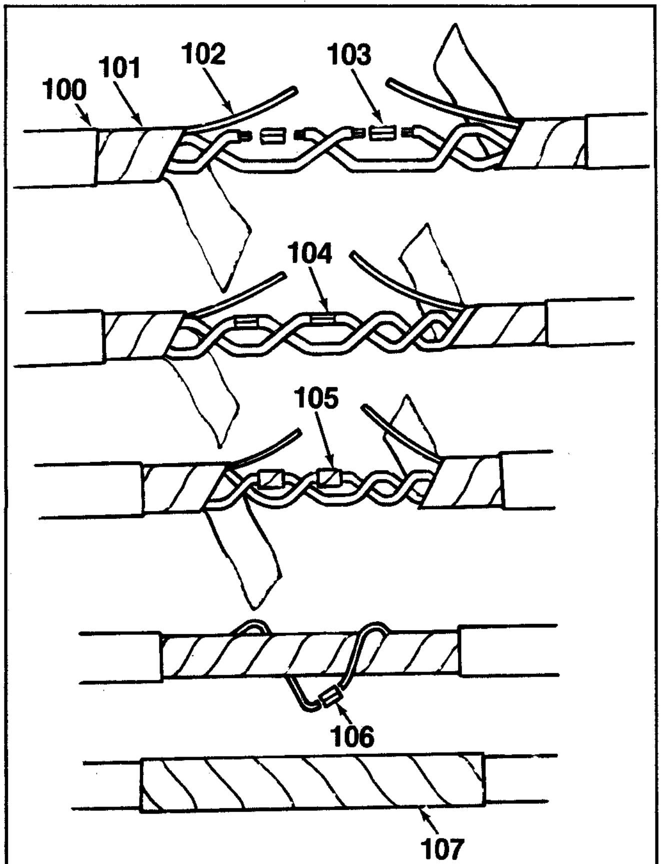
Twisted Leads/Shielded Cable

Remove or Disconnect (Figure 12)

1. Jacket (100).
2. Unwrap aluminum/mylar tape (101).
3. Drain wire (102).
4. Leads.
5. Insulation on the leads.

Install or Connect (Figure 12)

1. Splice clips (103).
2. Crimp and solder the splice clips (104).
3. Electrical tape (105) on the splices.
4. Aluminum/mylar tape by wrapping and taping.
5. Drain wire with a splice clip (106). Crimp and solder the splice clip.
6. Outer jacket electrical tape wrap (107).



100. Jacket
101. Aluminum/Mylar Tape
102. Drain Wire
103. Splice Clip
104. Crimp and Solder
105. Electrical Tape Wrap
106. Drain Wire Splice Clip, Crimped And Soldered.
107. Outer Electrical Tape Wrap.

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Figure 12—Twisted/Shield Lead Repair

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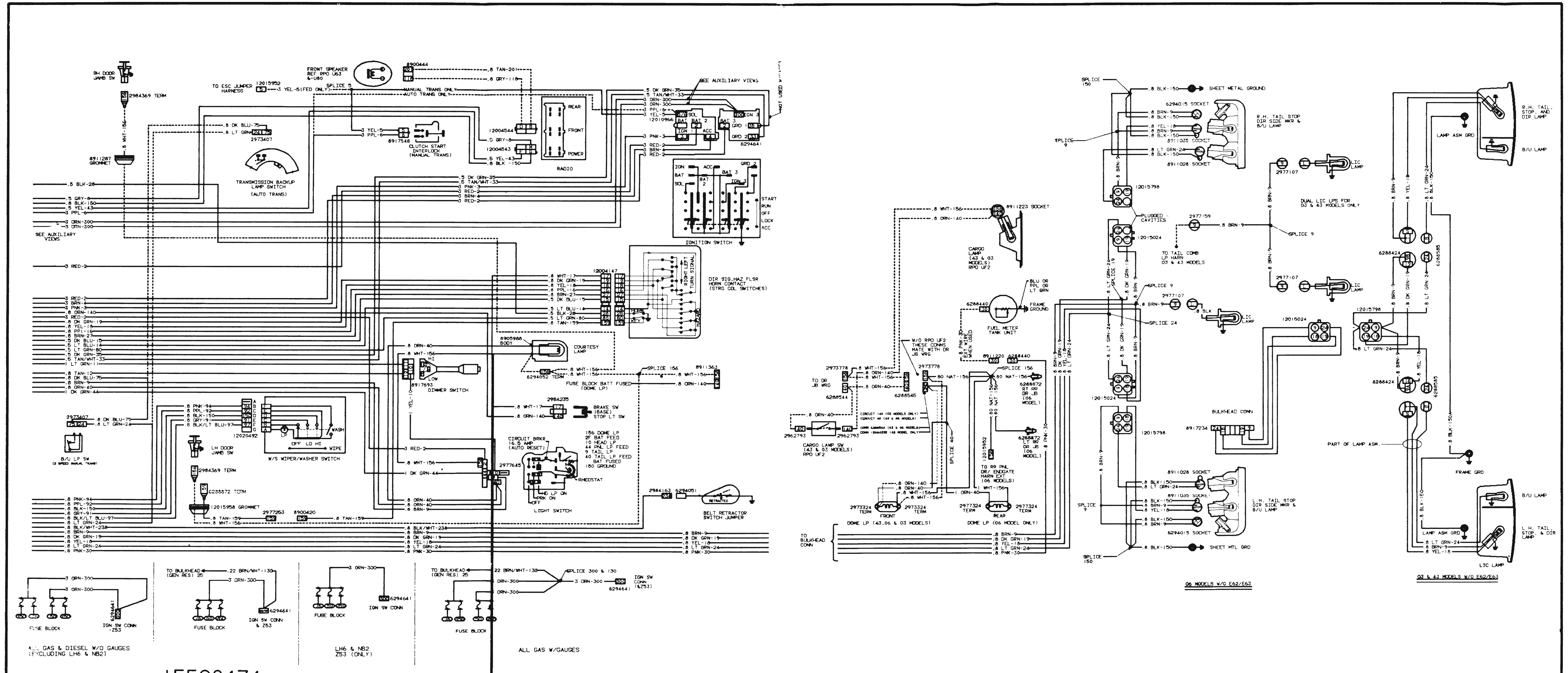

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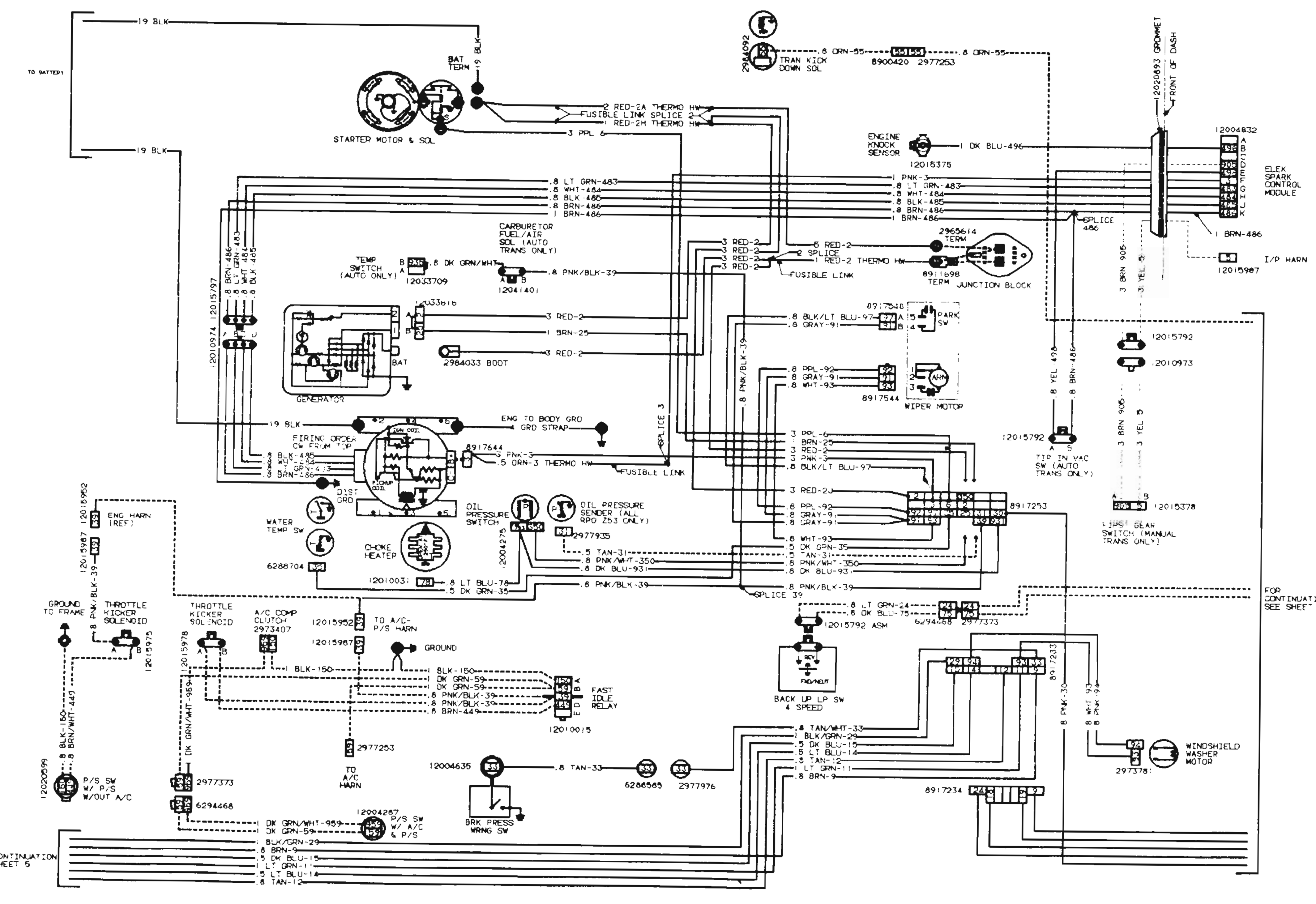
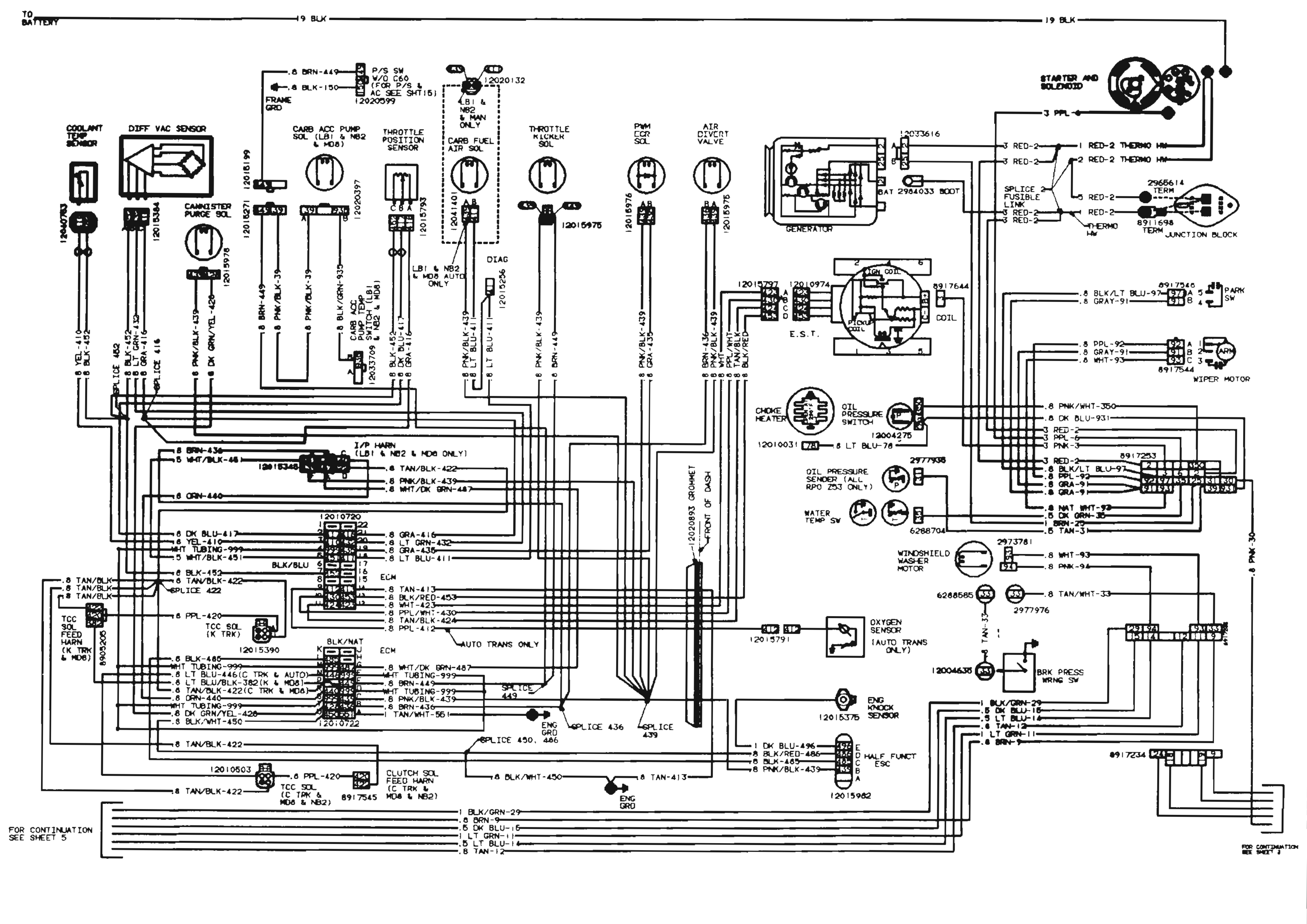
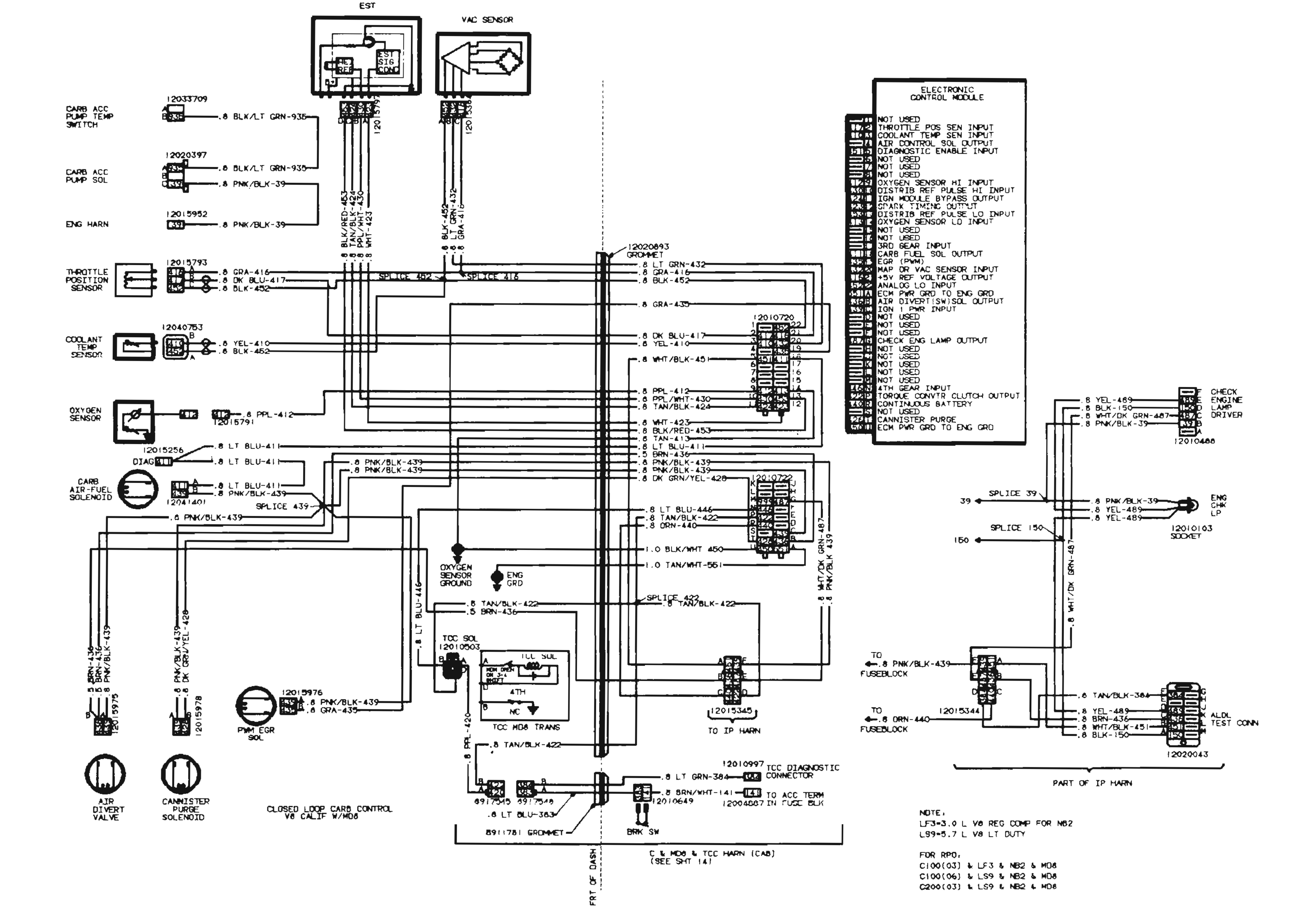


4.3 L V6 ENGINE
RPO LB1 & NA5/NA6
LIGHT DUTY TRUCK



CALIFORNIA 3C AUTO/MANUAL

LB1 V6 ENGINE
LIGHT DUTY TRUCK
LB1 & NB2



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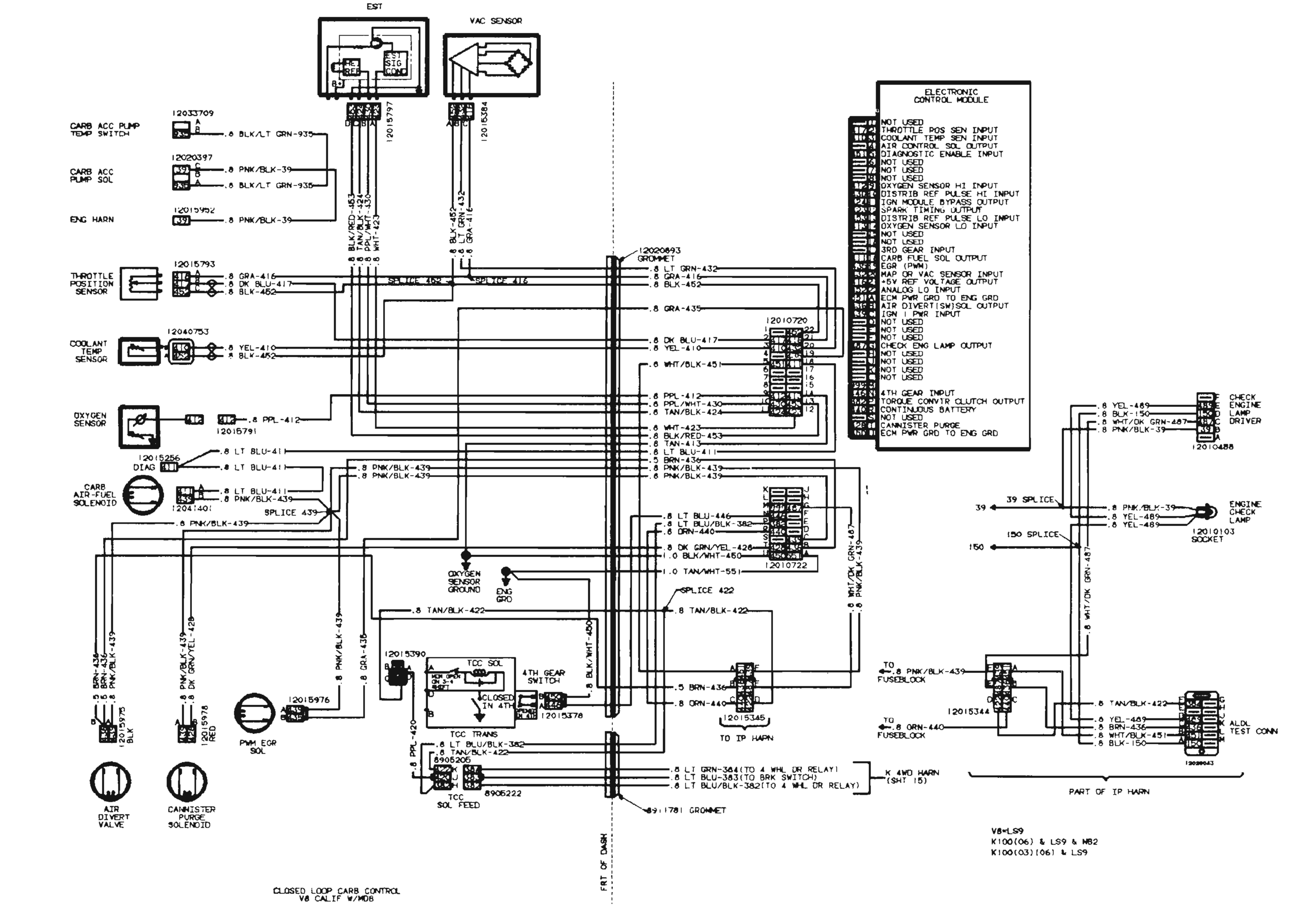

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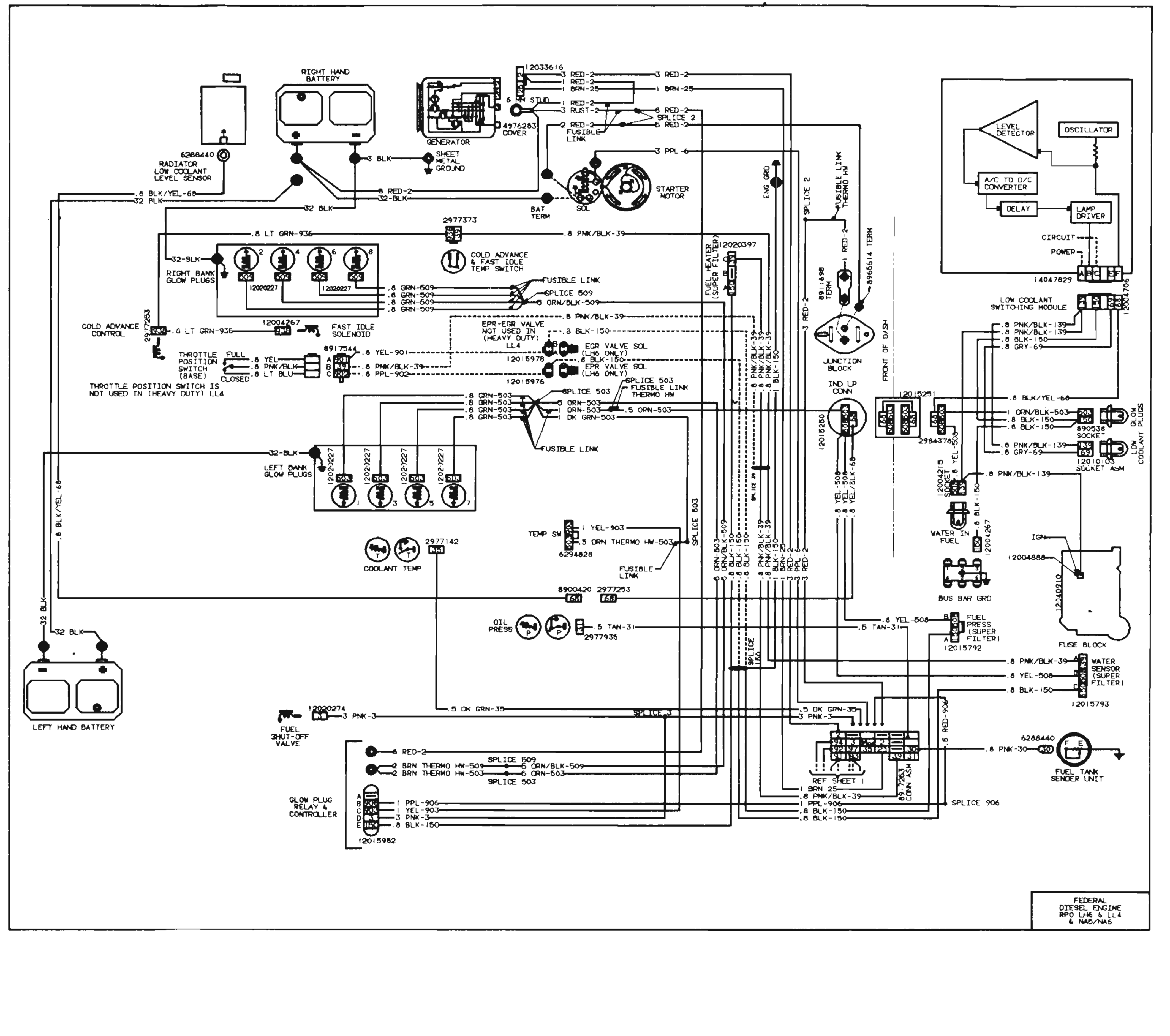
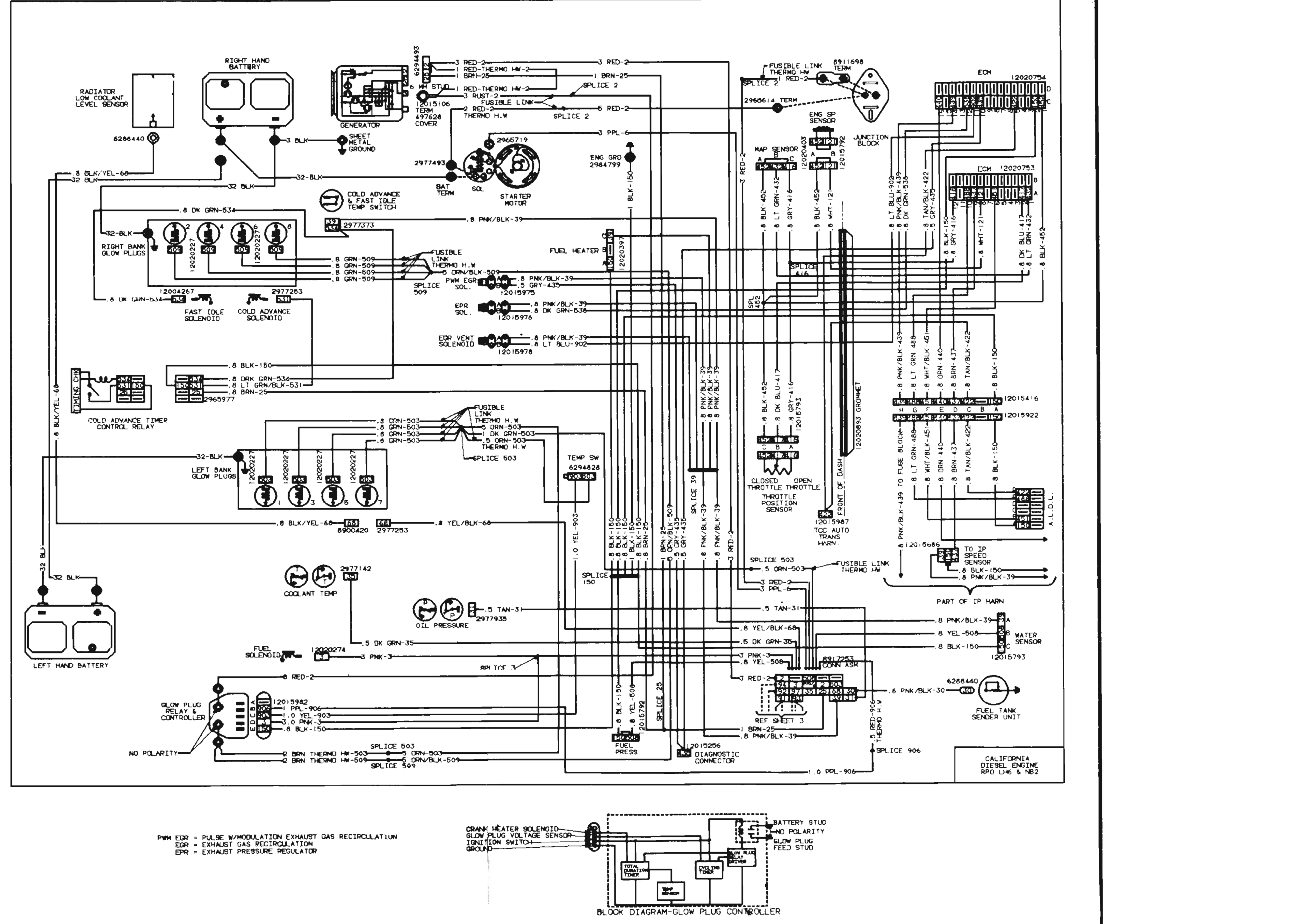
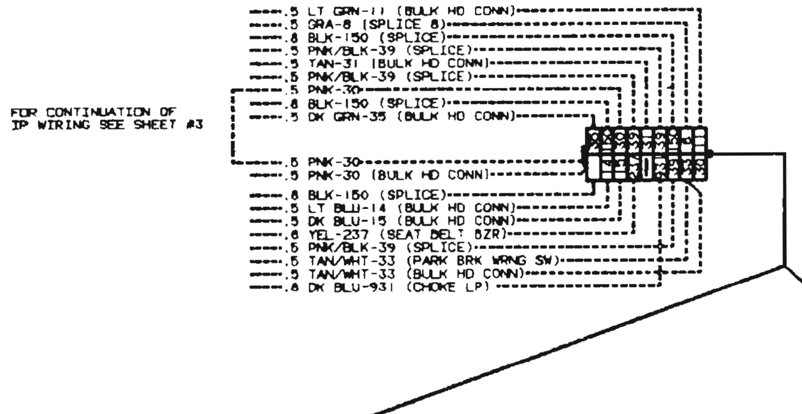
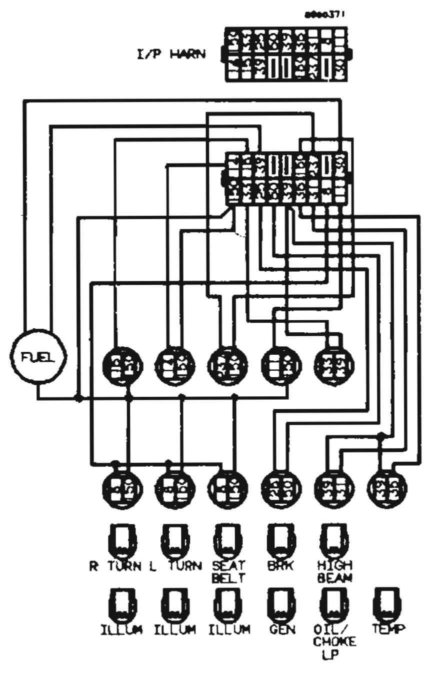
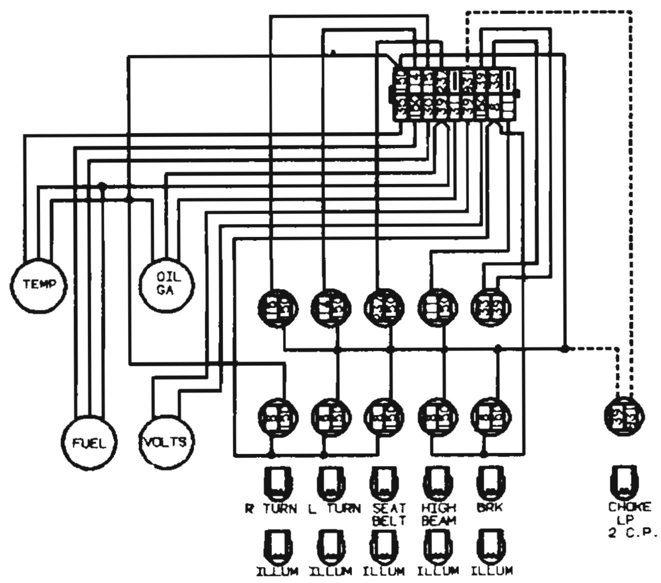




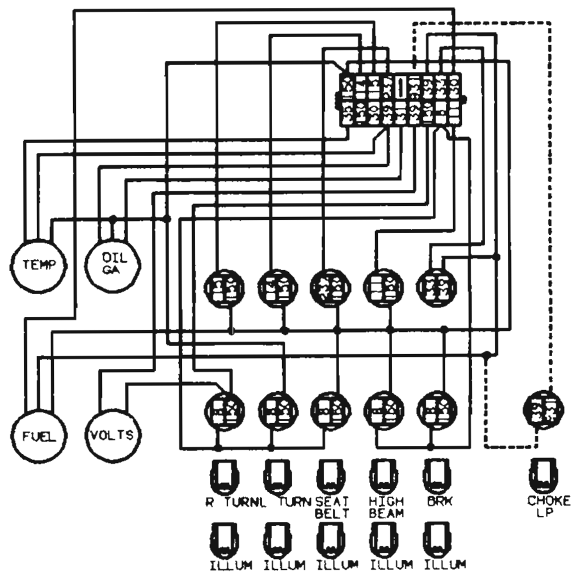




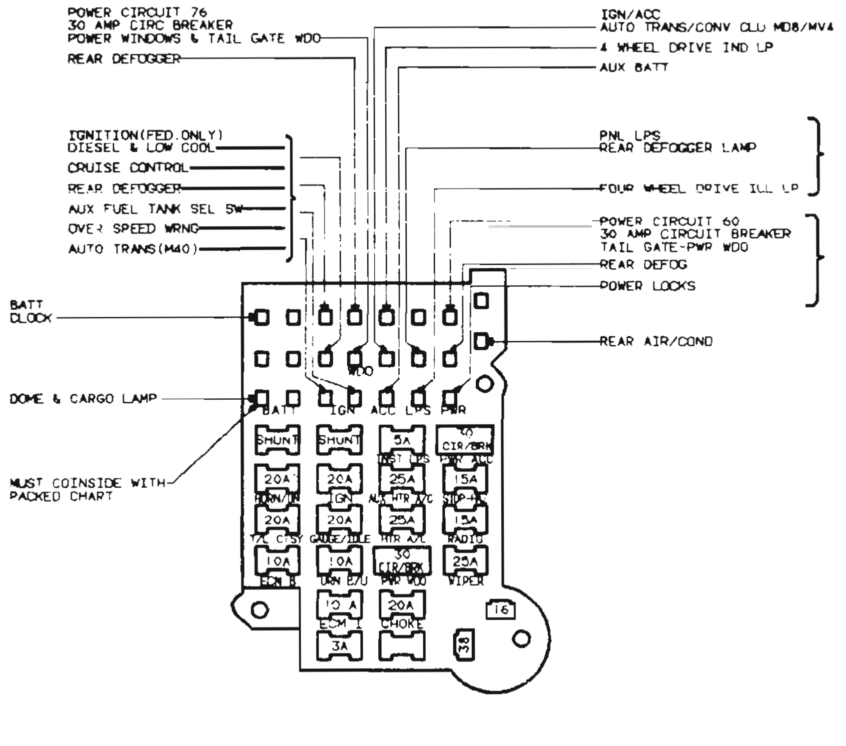
INST CLUSTER PC (BASE)



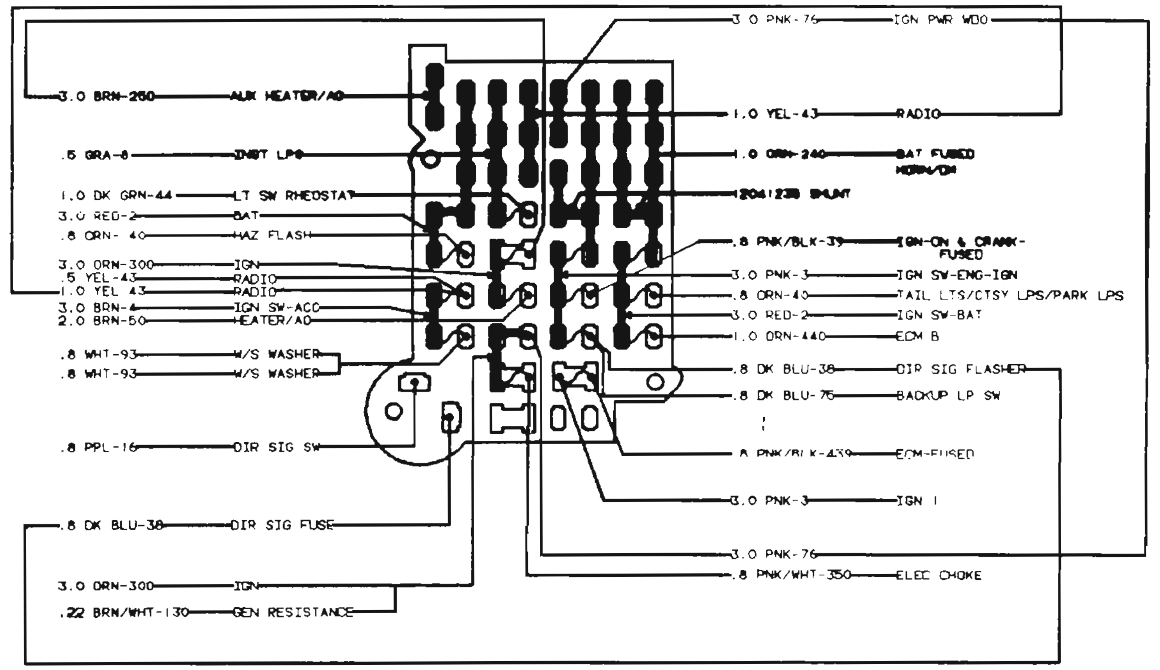
INST CLUSTER PC (GAUGES WITH TACH--SEO)



INST CLUSTER PC (GAUGES WITHOUT TACH)



12034359 BLOCK-MOLD
12040908 PRINTED BLOCK



	COLOR	MALE CONN	MULT CONN
A	NAT	12004888	12004892
B	BRN	12004867	12004893
C	BLK	12004886	12004890
D	GRN	12004885	12004952
E	RED	12004883	12004889
W	BLU	12004864	
[illegible]	ORN	12004018	
F	DK GRA	12004740	12004891

FUSES		AMP	COLOR
12004005	ND	5	TAN
12004007	ND	10	RED
12004008	ND	15	LT BLU
12004009	ND	20	YEL
12004010	ND	25	WHT
12004003	ND	3	VIOLET
12004006	ND	7.5	BROWN
12004011	ND	30	LT GRN

ND SHOWN ON 1200400

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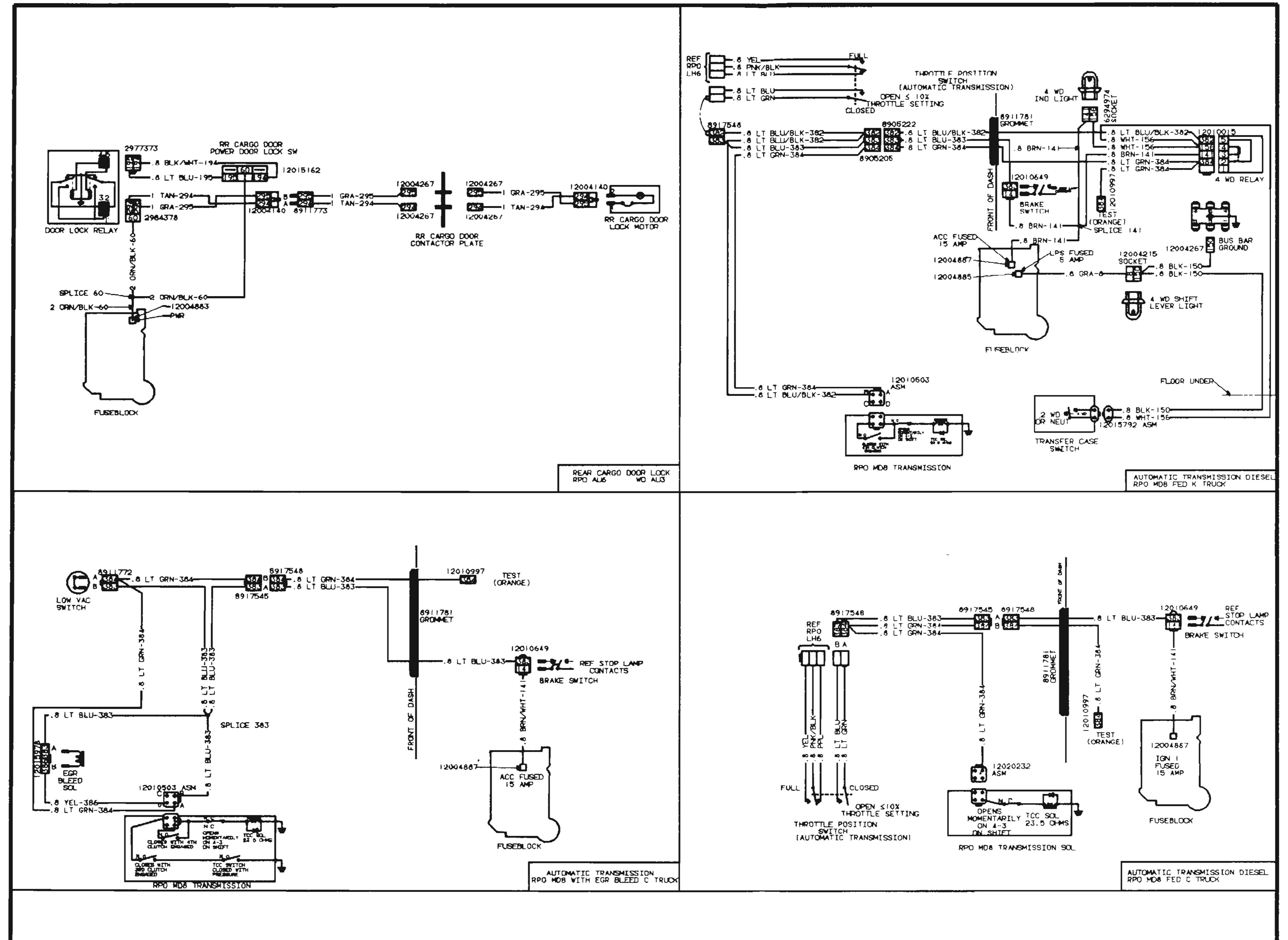

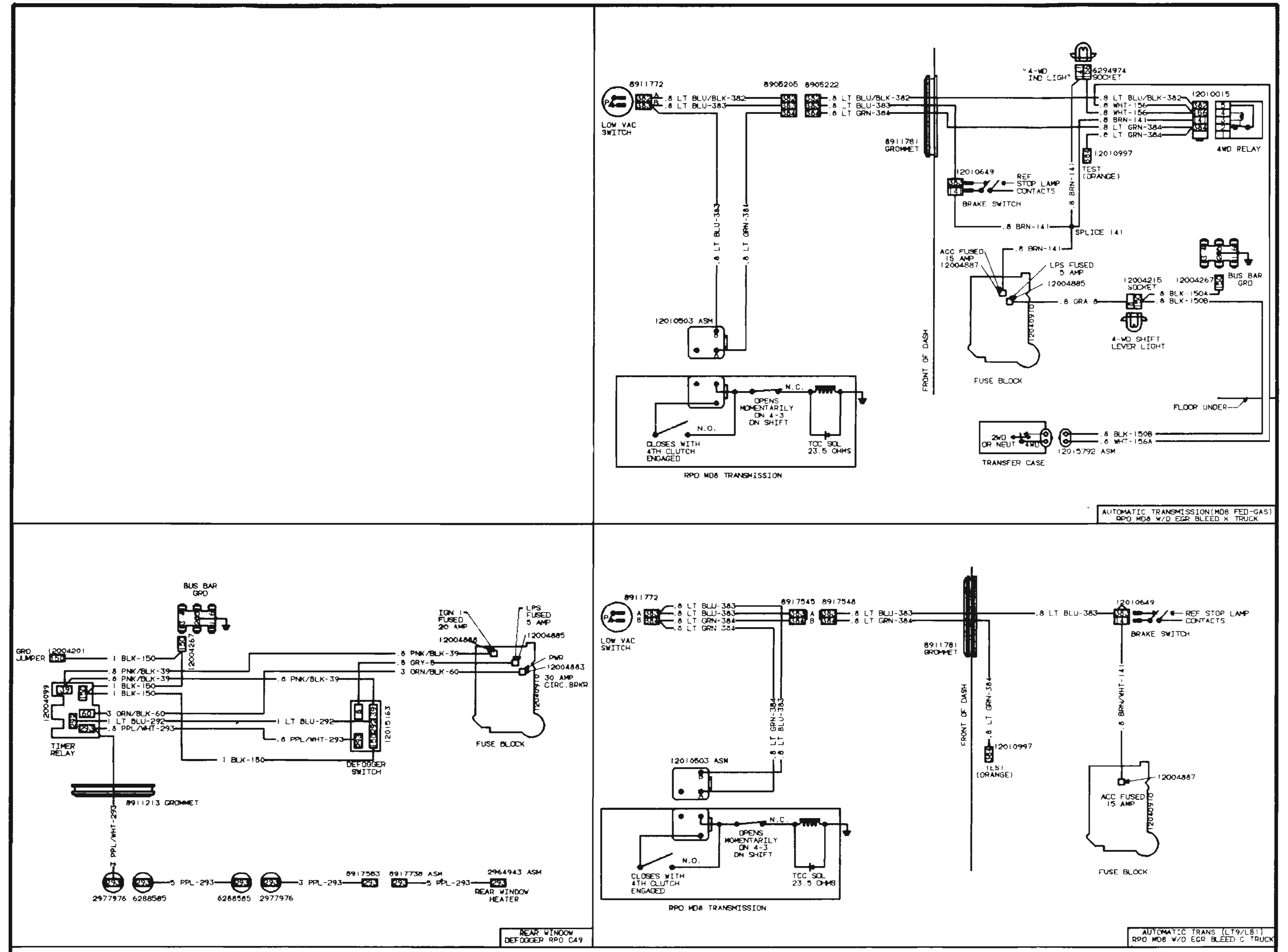

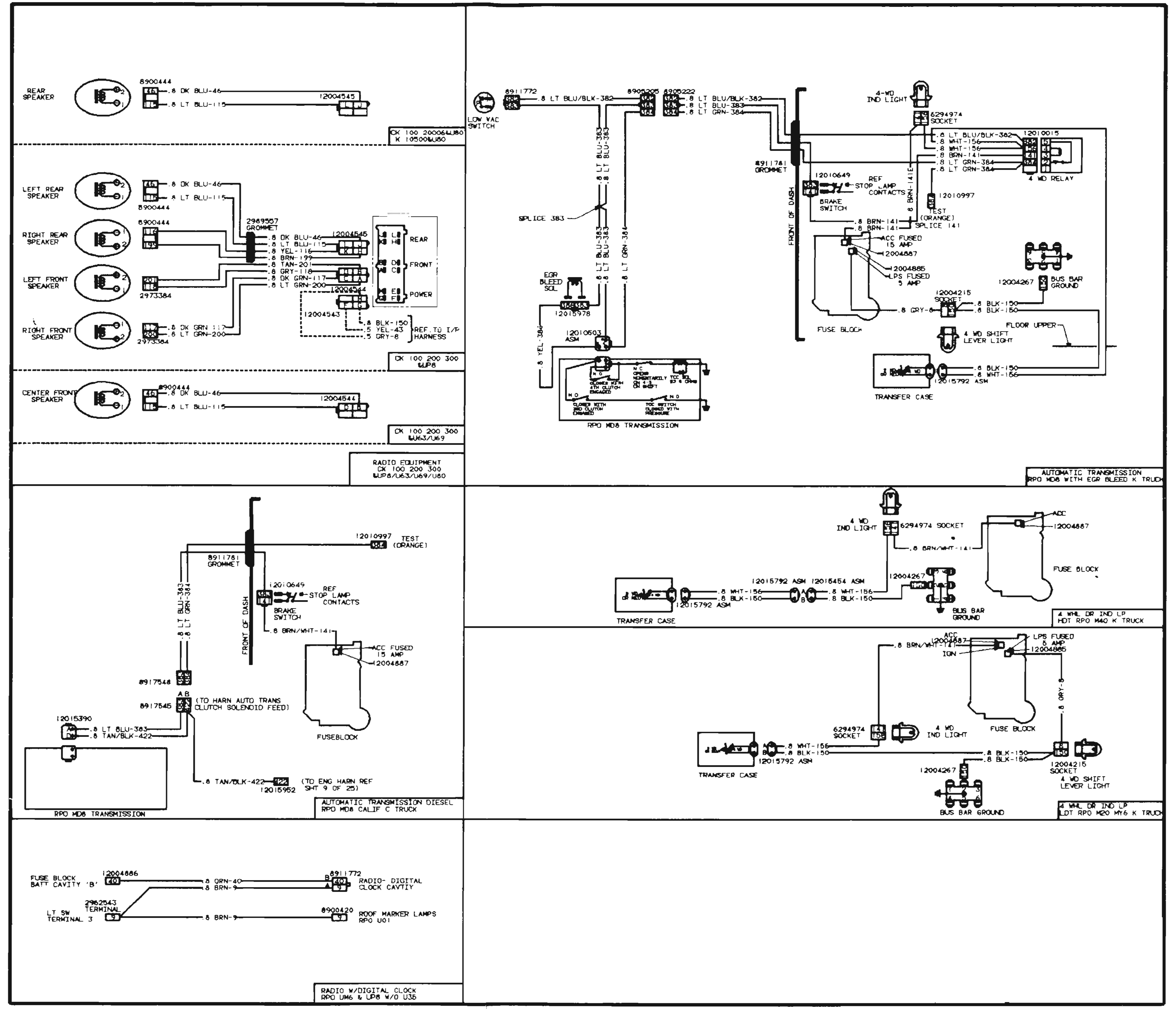

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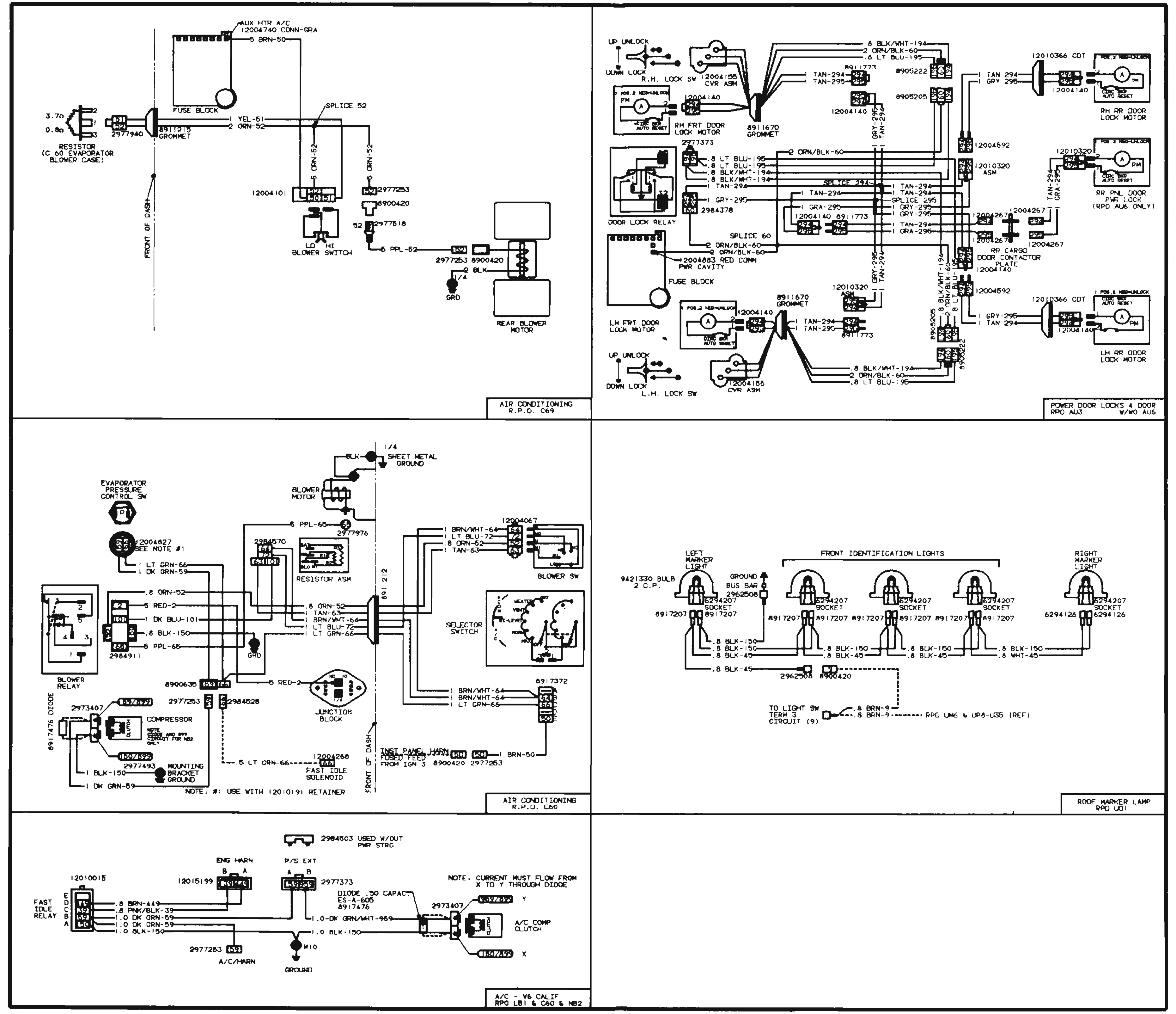
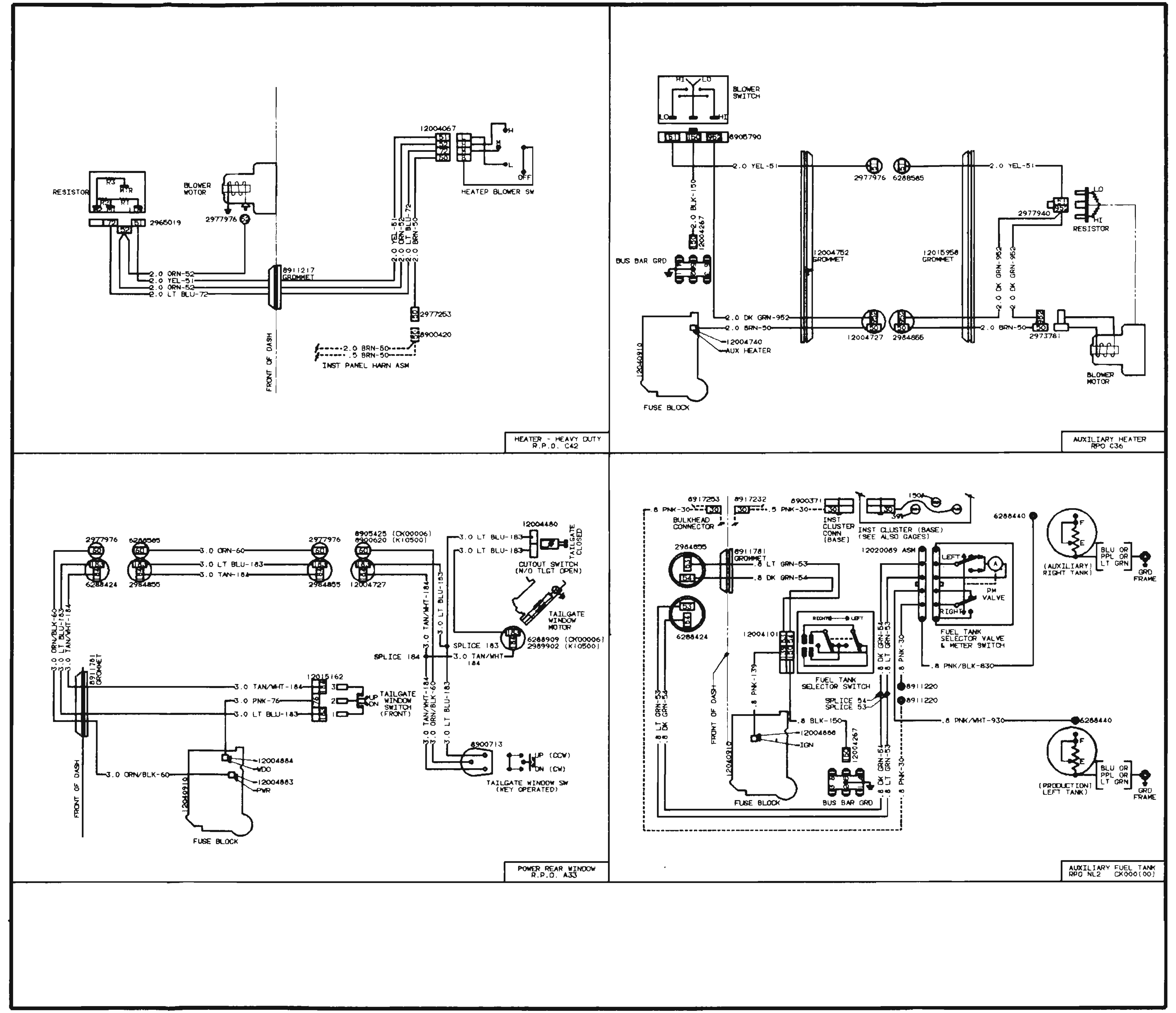
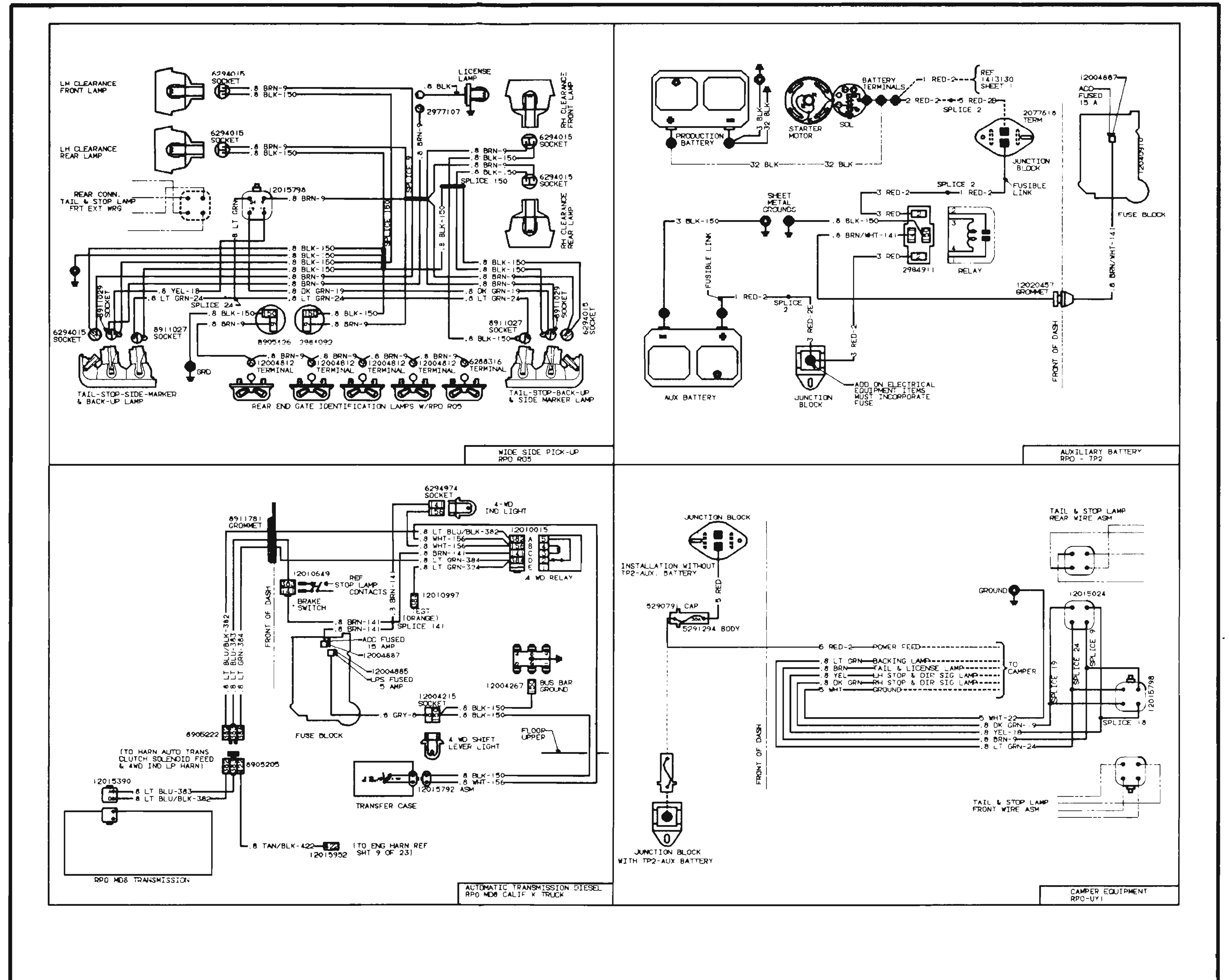
CK TRUCK PAGE 6







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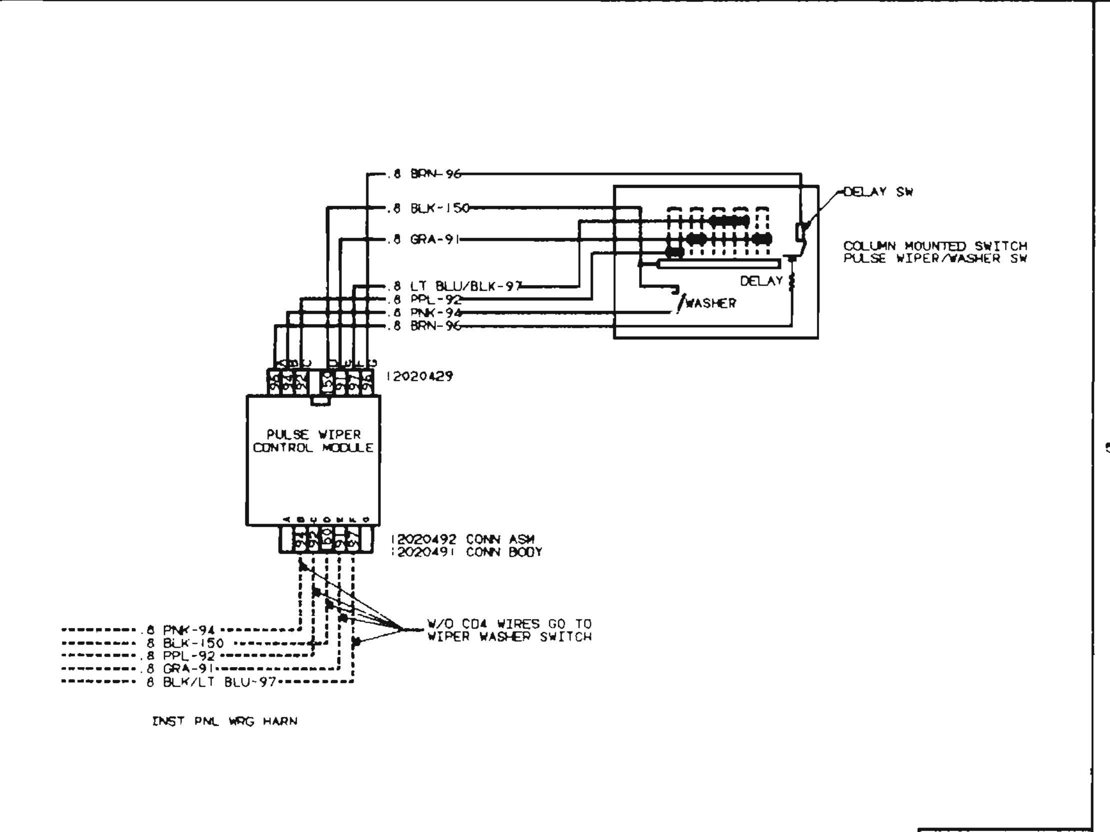
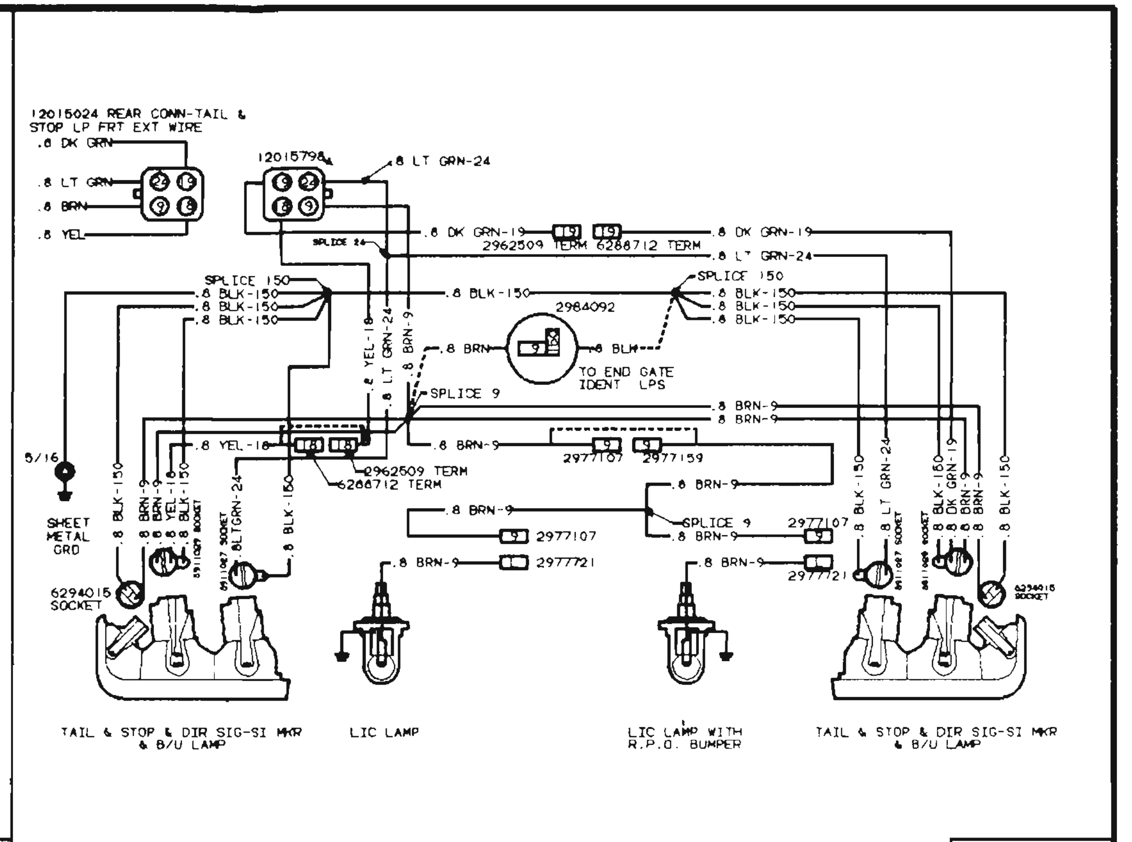
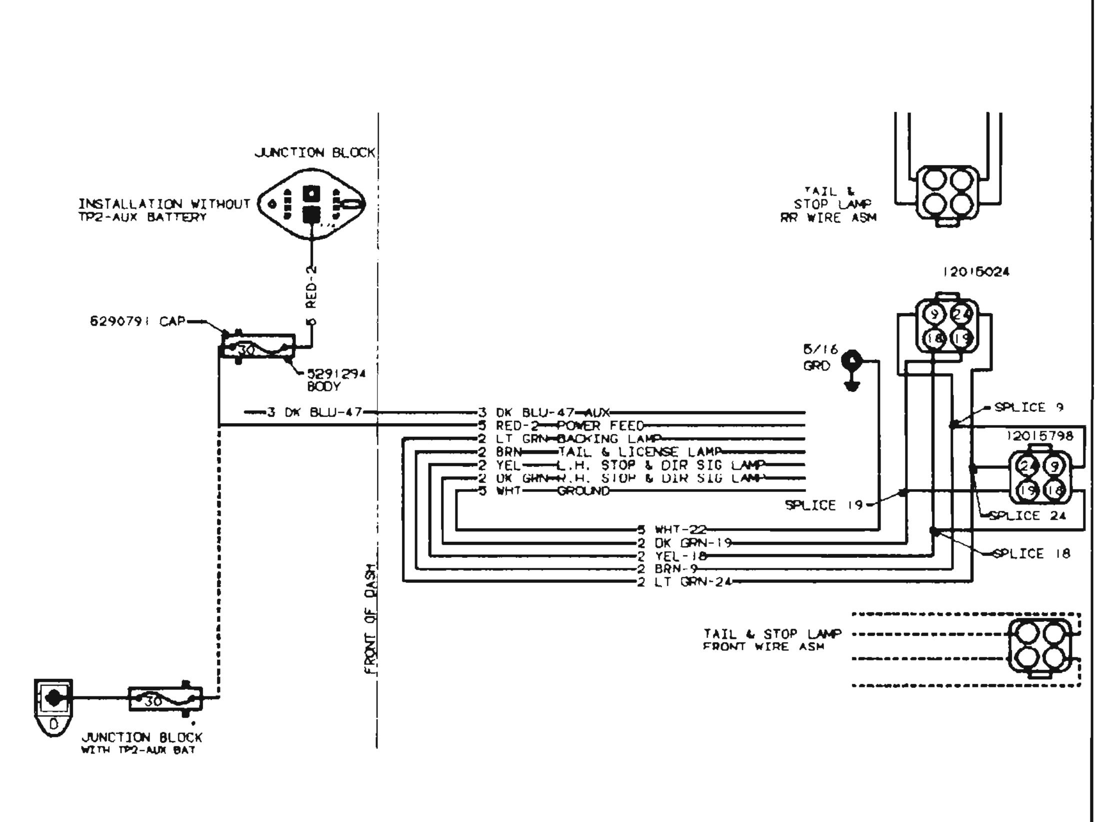
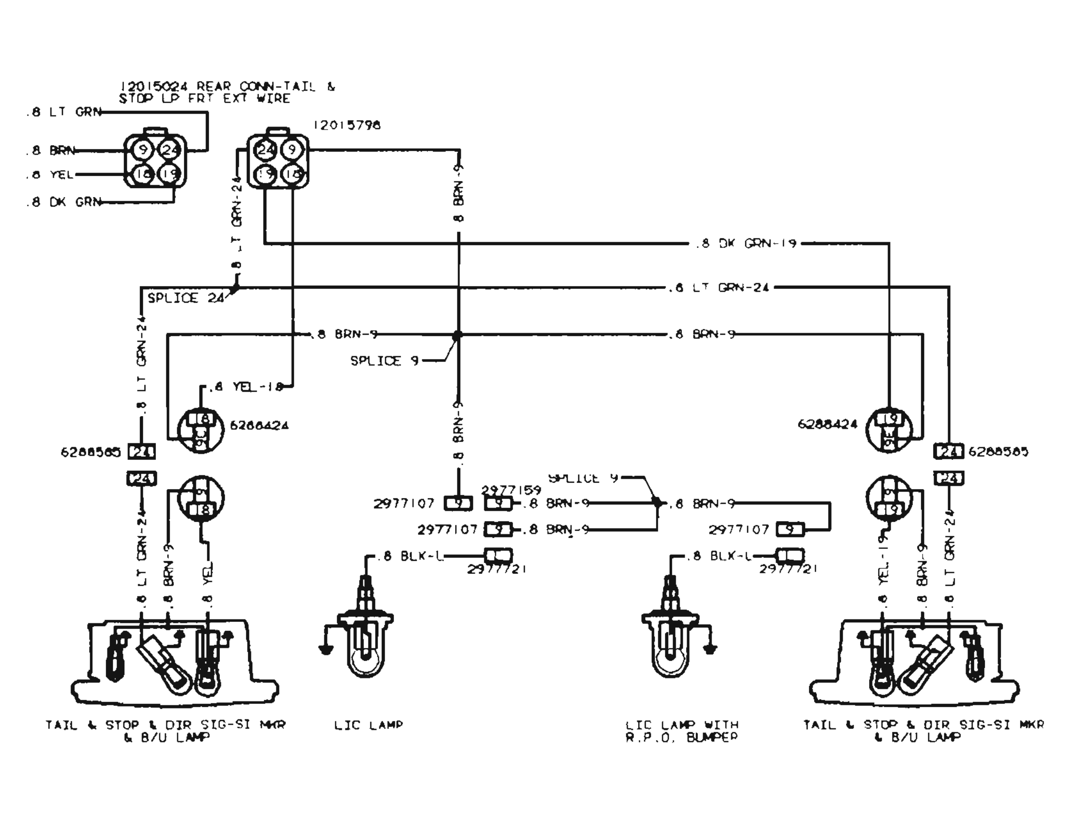

PULSE WIPER SYSTEM R.P.O. CD4


FLEETSIDE PICKUP R.P.O. E63


HEAVYDUTY TRAILER R.P.O. UY7


STEPSIDE PICKUP R.P.O. E62

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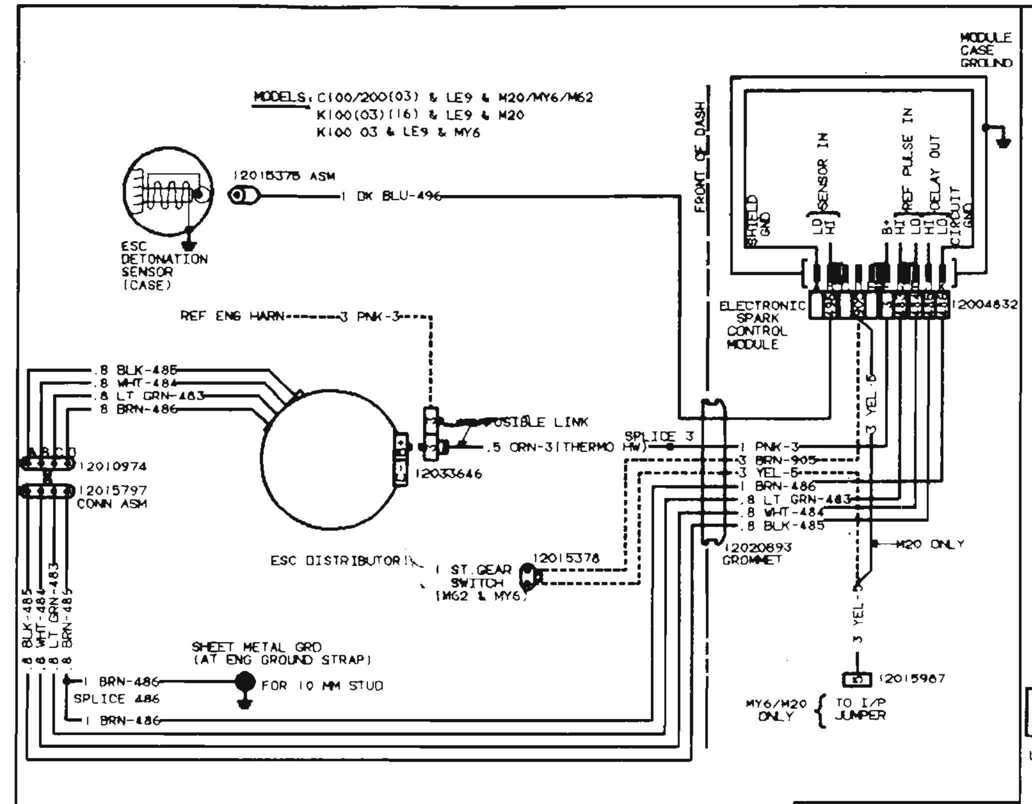
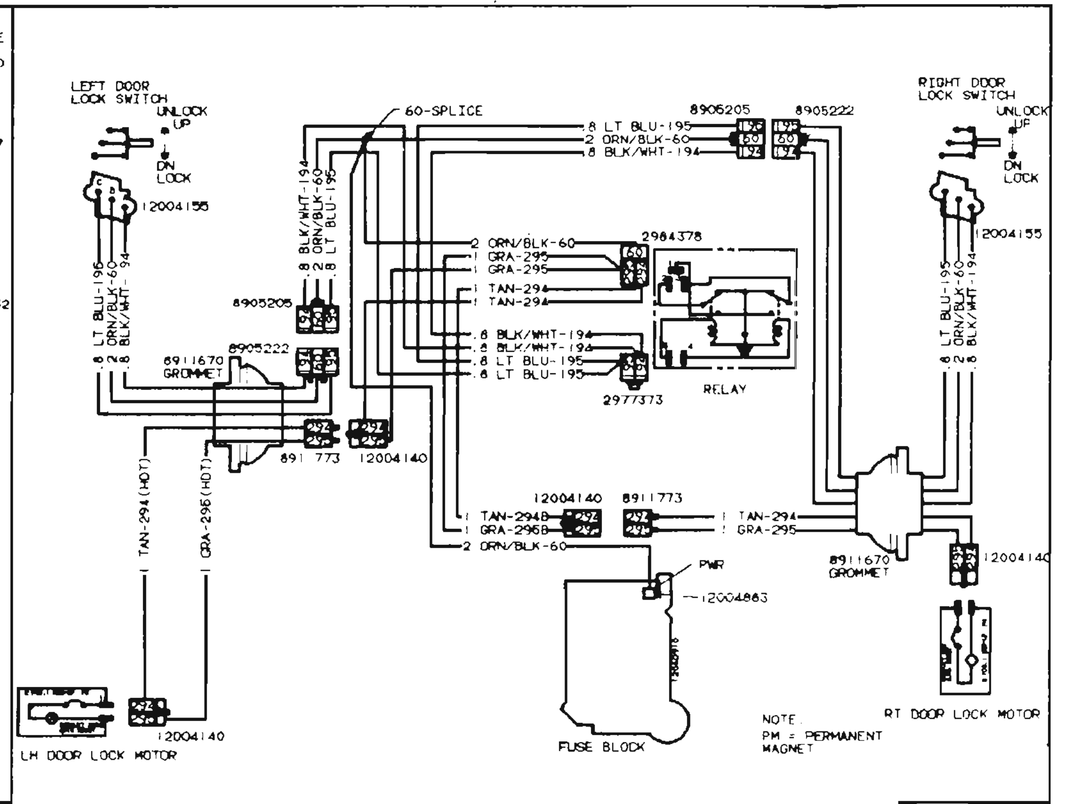
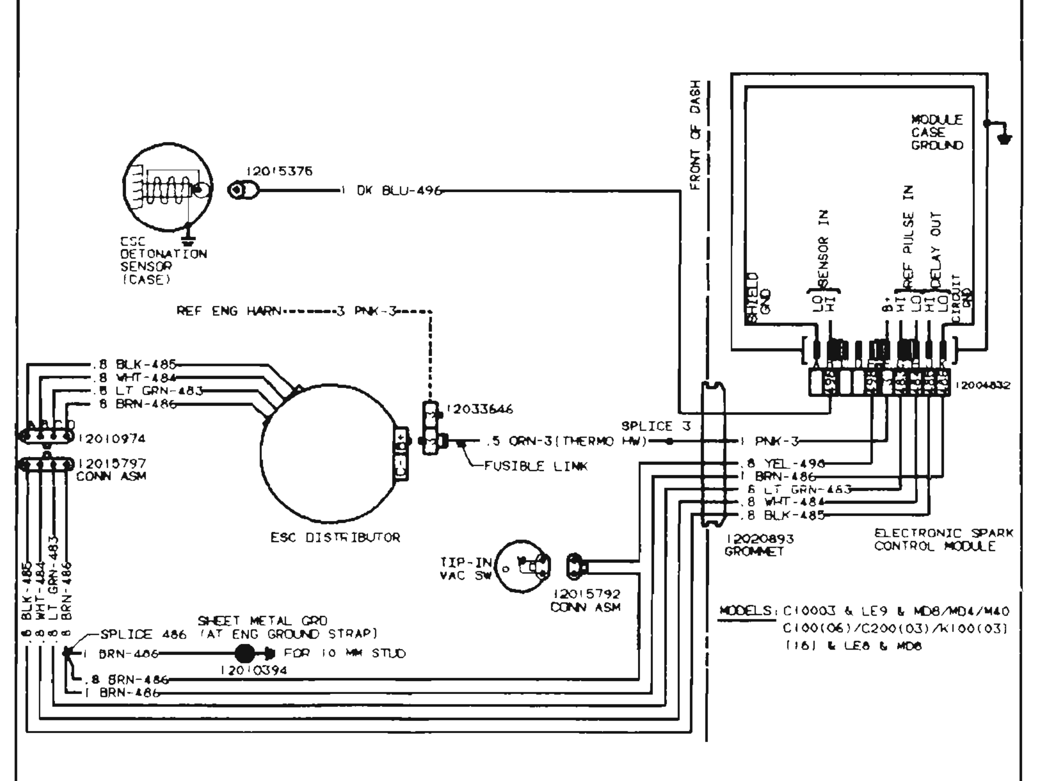
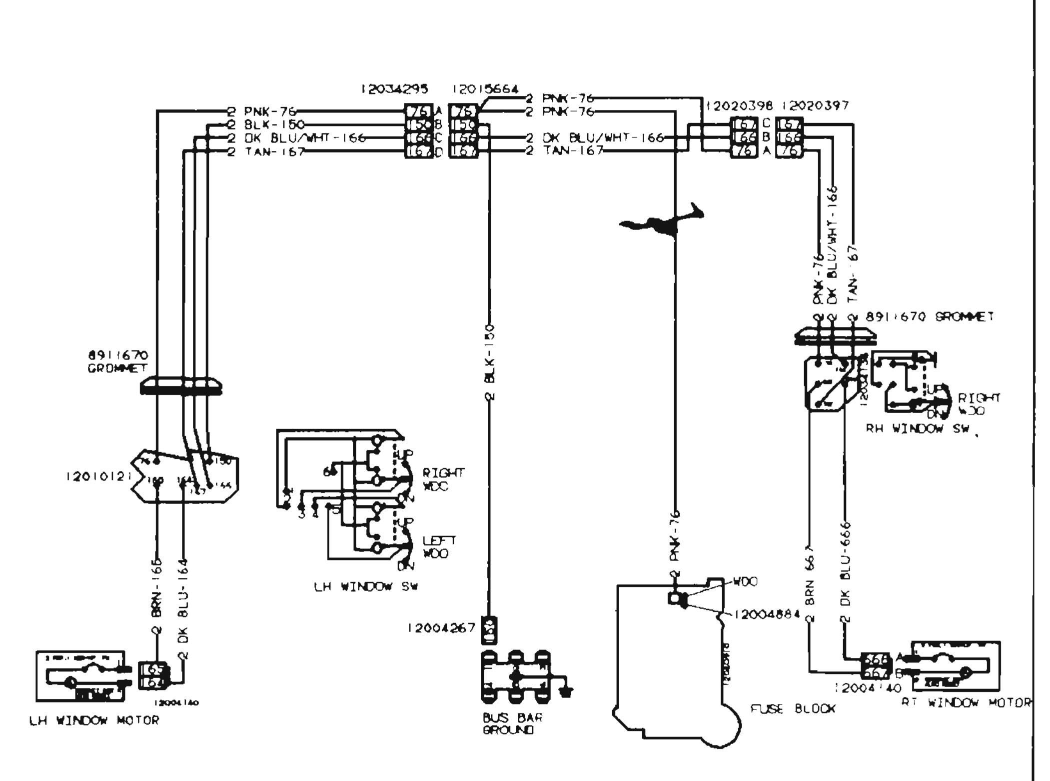
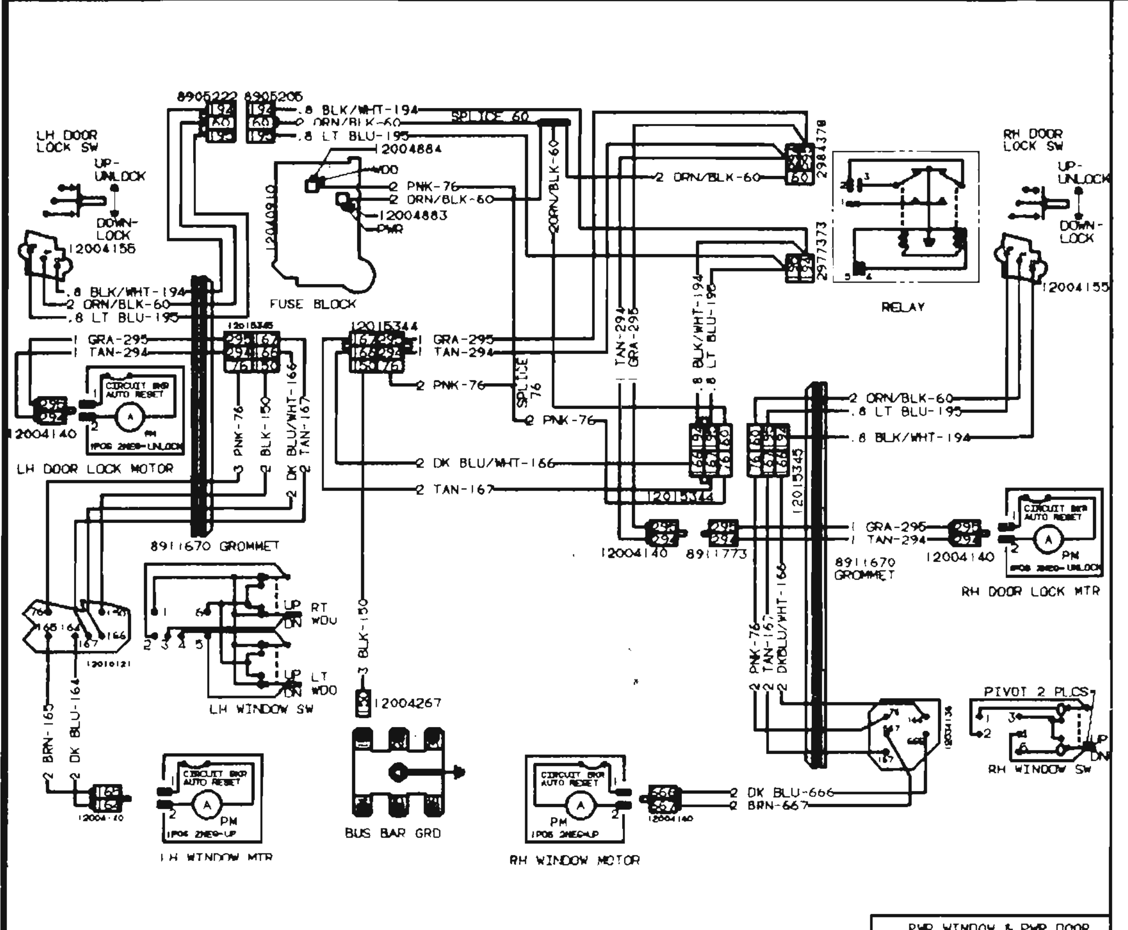
CK TRUCK PAGE 8

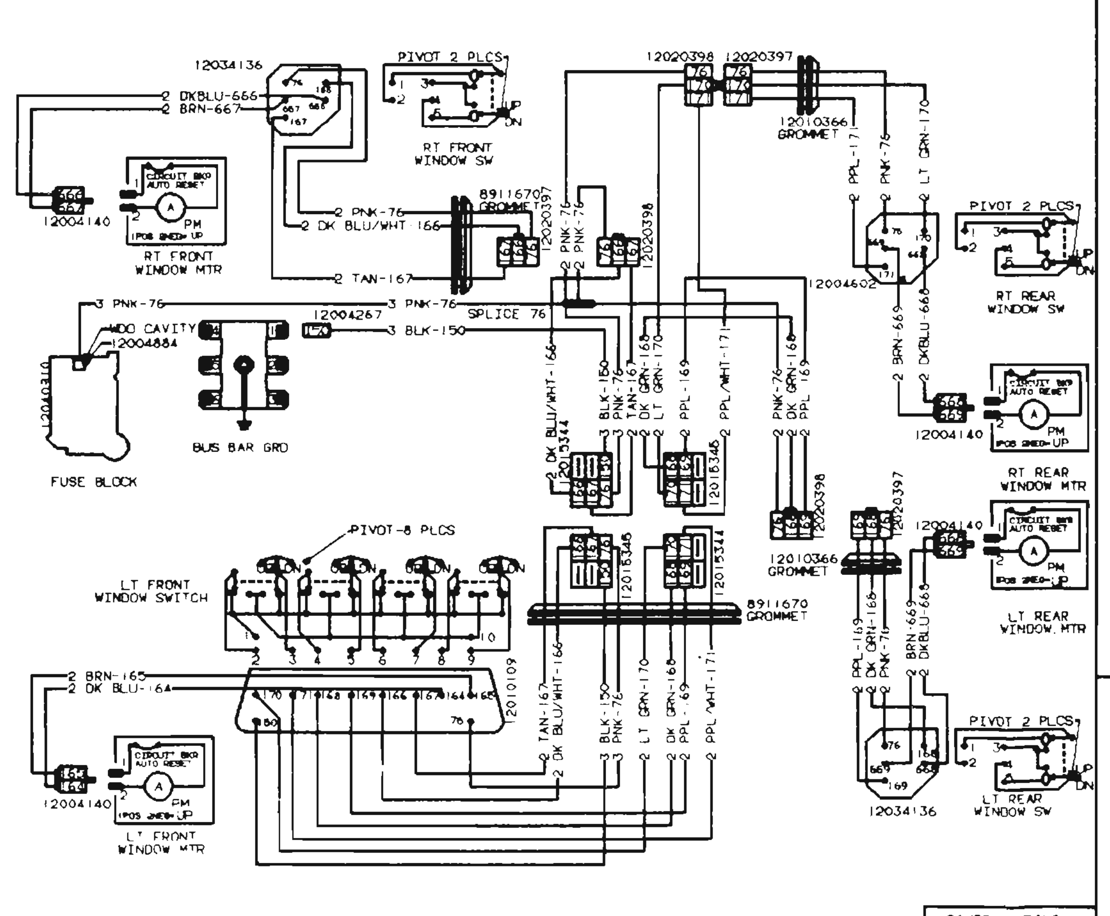

ELECTRONIC SPARK CONTROL WITH RPO LE9-MANUAL TRANS

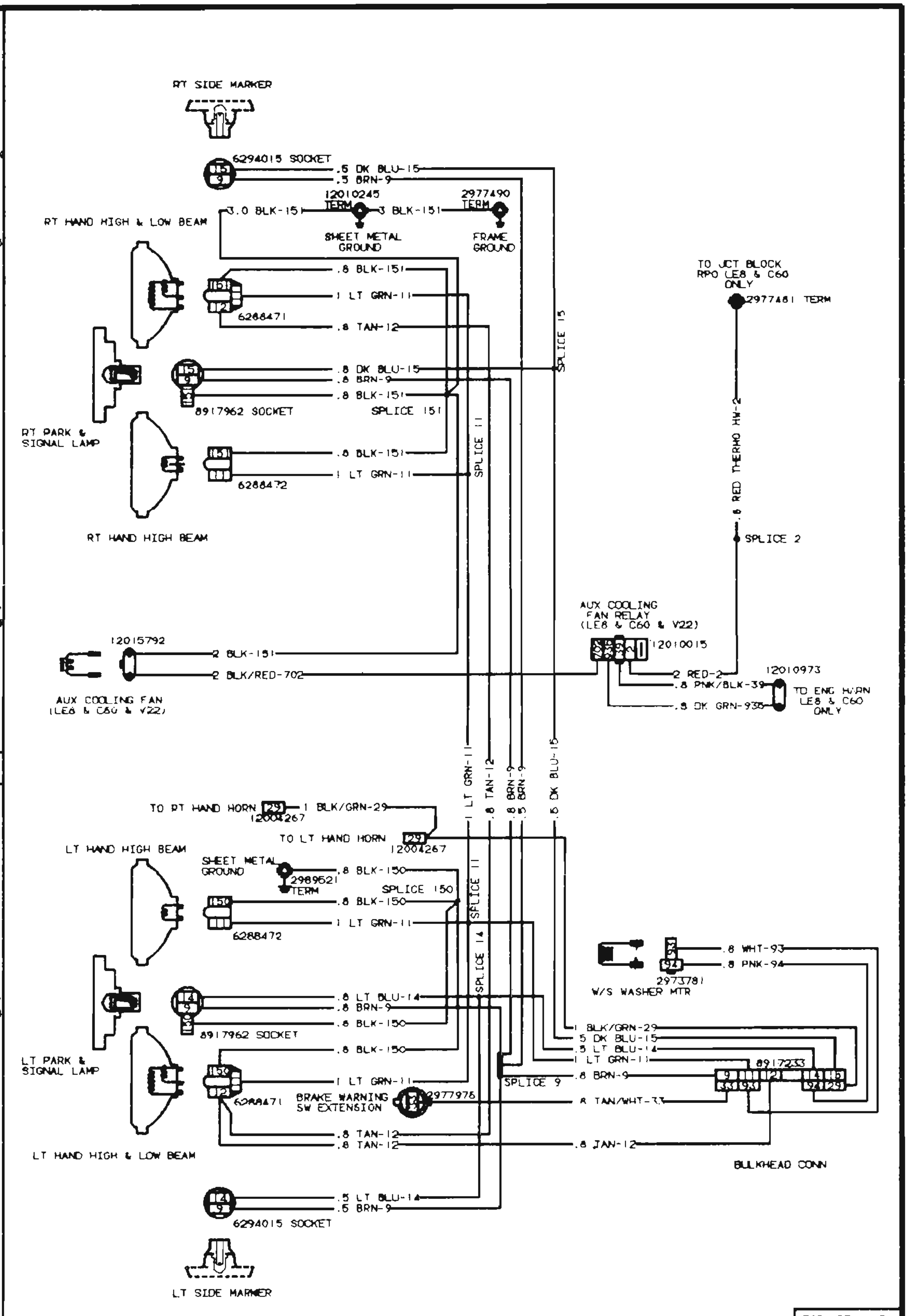

POWER DOOR LOCKS (2 DOOR) RPO AU3


ELECTRONIC SPARK CONTROL WITH RPO LE9-AUTO TRANS

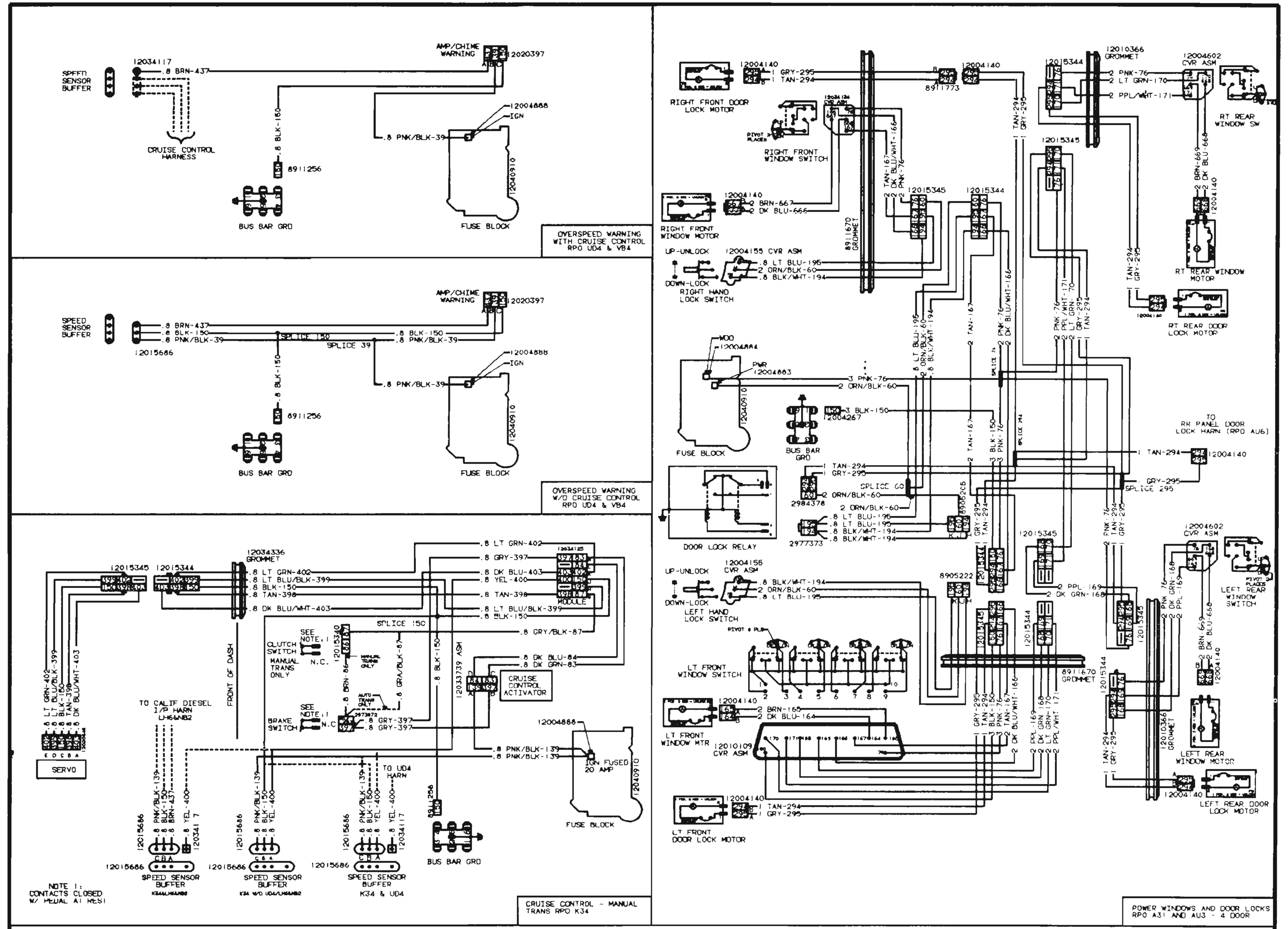

POWER WINDOWS RPO A31 TWO DOOR


PWR WINDOW & PWR DOOR LOCKS RPO A31 & AU3 2-DOOR


POWER WINDOWS RPO A31 FOUR-DOOR


FORWARD LAMP RPO V22

ELECTRICAL	
SERIES	
CC-CK 1-2-300	TC-TK 1-2 300
BODY STYLE- ALL	
TX005562	SHEET 20 OF 23



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ELECTRICAL	
SERIES	
CC-CK 1-2-300	TC-TK 1-2-300
BODY STYLE- ALL	
TX005562	SHEET 21 OF 23