



Wire Harness Installation Instructions

For Installing:

Part #50003 – Race Car Kit
(Includes 50002 Race Car Harness/21 Circuit
& 8 Switch Roll Bar Mount Panel)

Part #50002 – Race Car Harness/21 Circuit

Manual #90555

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If you have any questions concerning the installation of this product, feel free to call **Painless Performance Products'** tech line at 1-800-423-9696. Calls are answered from 8am to 5pm central time, Monday thru Thursday, 8am-4:30pm Friday, except holidays.

Here we have provided you with accurate instructions for the installation of this product. However, if you have comments/suggestions concerning these instructions, please call or email us (our contact information can be found at the top of this page or online at **www.painlessperformance.com**). We sincerely appreciate your business.

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Installation Manual: **90555**

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1.0 INTRODUCTION

You have purchased what we at Perfect Performance Products, Inc. believe to be the most up-to-date and easiest-to-install automotive racing wire harness or accessory on the market. It is designed for easy installation, even if you have no electrical experience.

The 50002 fuse block can be easily attached to any under-dash location. There is enough length to the wire at all engine, dash, and trunk locations to complete the installation without splicing. The fuse block, voltmeter, fuel gauge, oil pressure gauge, temperature gauge, turn signal lights, dimmer switch, and dash lights are all pre-wired, allowing for easy hookup. The proper fuses and flashers have been pre-installed in the fuse block. In addition, all wires are color-coded. This will help you identify the different circuits during installation and later on if additions to the overall system are necessary.

PPPI Wire Harness Kits are designed to be used in vehicles with a General Motors-keyed steering column, or other steering columns depending on the kit purchased. All wire is TXL (cross-linked polyethylene), 600 volt, 125° C. Standard automotive wire is GPT, 300 volt, 80° C with PVC insulation.

The **50003 21-circuit Racing Wire Harness Kit** has been designed with three major groups incorporated into it:

ENGINE/HEADLIGHT GROUP	Includes high beam, low beam, park, right turn, left turn, electric fan, water pump, horn, starter solenoid and battery feed, alternator and alternator excitor wire, distributor, water temperature, and oil pressure.
REAR LIGHT GROUP	Includes tail lights, left and right turn signals, brake light, fuel sender, and dome light and electric fuel pump.
ACCESSORY GROUP	Includes wires to connect tail and headlamps, ignition, fuel pumps, water pump, cooling fan, and an accessory.

2.0 ABOUT THESE INSTRUCTIONS

These instructions provide information for the installation of the 50002 21-circuit Racing Application Wire Harness Kit and the 8-circuit Switch Panel. The contents of these instructions are divided into major **Sections**, as follows:

- 1.0 Introduction
- 2.0 About These Instructions
- 3.0 Tools Needed
- 4.0 Pre-Installation and Harness Routing Guidelines
- 5.0 General Installation Instructions
- 6.0 50003 Racing application harness connections
- 7.0 Eight Switch Panel Connections
- 8.0 50002 to other than Switch Panel Connections

Sections are further divided into **Paragraphs** and Steps. Throughout, the **Figure** numbers refer to illustrations and the **Table** numbers refer to information in table form. These are located in or near the sections or paragraphs to which they correspond. Always pay special and careful attention to any *Notes*, especially those in the Tables, and any text marked **CAUTION**.

3.0 TOOLS NEEDED

In addition to your regular tools, you will need the following tools:

1. Crimping tool for insulated terminals
(*Note: Use a quality tool to avoid over-crimping.*)
2. Crimping tool designed for rolled crimps. Needed for Section 7. (*Note: See picture at right*)
3. Wire stripper
4. Continuity tester (Test light or ohmmeter)
5. Electric drill
6. 1-1/4" Hole saw
7. Small (10 amp or less) battery charger



Figure 3.1 Rolling crimper. (Radio Shack P/N 64-2983 or equivalent.)

4.0 PRE-INSTALLATION & HARNESS ROUTING GUIDELINES

The installation of your wire harness kit consists mainly of two parts:

- The physical routing, positioning, and securing of the wire harness, wire groups, and individual wires.
- The proper electrical connection of the individual circuits.

These two major tasks are not separate steps, but are integrated together. That is, you will route some wires and make some connections, route some more wire and make some more connections. We cannot tell you how to physically route the harness in your automobile. The routing depends a great deal upon the particular make of automobile and to what extent you want to secure and conceal the harness. We do offer some general guidelines and routing practices starting in **Paragraph 4.2**, GENERAL installation instructions in **Section 5.0**, and precise instructions concerning the electrical connections you will have to make at the beginning in **Section 6.0**. To help you begin thinking through the installation of your wire harness, read the following sections:

4.1 Familiarize yourself with the harness by locating each of the harness sections in the following list.

4.1.1 The eleven SECTIONS of the 50003 21-circuit Racing Application Wire Harness Kit are listed immediately following. For complete information concerning the individual circuits and wires that make up these harness SECTIONS, see **Section 6.3**.

ACCESSORY SECTION SWITCHES
ACCESSORY SECTION B+
DIMMER SWITCH SECTION
ENGINE SECTION
ENGINE SECTION A
HEADLIGHT SECTION A

HEADLIGHT SECTION B
IGNITION SWITCH SECTION
INSTRUMENT PANEL SECTION
TAIL SECTION
TURN SIGNAL SECTION

4.2 Decide where and how the Fuse Block or Switch Panel will be mounted. PPPI Wire Harness Kits are designed for the fuse block to be mounted on the driver's side, under the dash.

4.3 Decide which of the following circuits you will be using in your system and where the harness groups or wires will be routed:

Emergency Flashers	_____
Horn	_____
Dome Lights	_____
Lights	_____
Wipers	_____
Electric Fuel Pump(s)	_____
Electric Cooling Fan	_____
Turn Signals	_____
Radio (Ign. switched B+)	_____
Gauges	_____
Accessories	_____

- 4.4 A good exercise is to lay out the wire harness on the floor beside your automobile and identify all the SECTIONS.
- 4.5 You will want to route the harness through and around open areas. Inside edges provide extra protection from hazards and also provide places for tie wraps, clips and other support.
- 4.6 Route the harness away from sharp edges, exhaust pipes, and hood, trunk and door hinges.
- 4.7 Plan where harness supports will be located. Use a support every 12 inches unless the harness routes under the floor carpet.
- 4.8 Allow enough slack in the harness at places where movement could possibly occur (body to frame, frame to engine, etc.).
- 4.9 At wire ends, don't depend on the terminals to support the harness. The weight of the harness could cause terminals to disconnect.
- 4.10 The wires should be bundled into harness groups. Use nylon ties, poly split loom, or tape.

5.0 GENERAL INSTALLATION INSTRUCTIONS

5.1 GROUNDING THE AUTOMOBILE

A perfectly and beautifully wired automobile will nevertheless have problems if everything is not properly grounded. Don't go to the careful effort of installing a quality wire harness only to neglect proper grounding.

Note: PPPI Wire Harness Kits include no ground wire except the black wire from the Switch Panel. You must supply ground wire (14-16 gauge) for all other circuits.

- 5.1.1 Connect a Ground Strap or Cable from the Negative Battery terminal to the automobile chassis frame.
- 5.1.2 Connect a Ground Strap from the Engine to the chassis. **DO NOT RELY UPON THE MOTOR MOUNTS TO MAKE THIS CONNECTION.**
- 5.1.3 Connect a Ground Strap from the Engine to the Body.
- 5.1.4 If you have a fiberglass body you should install terminal blocks to ground all your gauges, lights, and accessories. The terminal blocks work as remote grounding sources. Painless Performance offers the fiberglass body ground kit part number #40026 to make easy work of installing remote grounding sources.

5.2 ROUGH INSTALLATION

CAUTION: DISCONNECT THE POWER FROM YOUR VEHICLE BY REMOVING THE NEGATIVE BATTERY TERMINAL FROM THE BATTERY.

Note: Your kit comes equipped with a fusible link. This safety device is designed to go between wire #816 and the battery source for overall harness protection.

Note: Make no wire connections or permanent mounting of any kind at this time!

- 5.2.1 Position the Fuse Block and/or Switch Panel in their intended locations.
- 5.2.2 Drill a 1-1/4" (1.25") hole near the fuse block for engine and headlight group wires to pass through (ENGINE SECTION, ENGINE SECTION A, and HEADLIGHT SECTION A).
- 5.2.3 Install the firewall grommet. Route engine and headlight group wires through the grommet and position the harness groups in the areas decided upon in **Paragraphs 4.3 and 4.4.**
- 5.2.4 Route dash group INSTRUMENT PANEL SECTION upward to rear of dash and temporarily tie in place.
- 5.2.5 Position rear group (TAIL SECTION), on floor pan area decided upon in **Paragraphs 4.3 and 4.4.**
- 5.2.6 Route the ACCESSORY SECTION SWITCHES, ACCESSORY SECTION B+, HEADLIGHT SECTION B and IGNITION SWITCH SECTION wires towards the switch panel if you are using one. If you are not using a switch panel, route these sections of wires towards the factory switch locations.

5.3 HARNESS ATTACHMENT

Note: Harness routing and shaping should be a time-consuming task. Taking your time will enhance the beauty of your installation. Please be patient and TAKE YOUR TIME!

5.3.1 Permanently mount the fuse block.

5.3.2 Mold harness groups to the contour of floor pan, firewall, fender panels, and any other area where wires or harness groups are routed. Remember to route the harness away from sharp edges, exhaust pipes, hood, trunk and door hinges, etc.

5.3.3 Attach harness groups to your automobile with clips or ties starting at the fuse block and working toward the rubber grommet for the front groups and along the floor pan for the rear group. The dash wires should be routed out of the way of any under-dash obstacles, such as the cowl vent, radio, etc.

Note: Do not tighten tie wraps and mounting devices at this time. Make all harness attachments LOOSELY.

5.3.4 When used every 1-1/2" or so on the visible areas of the harness, the plastic wire ties make a very attractive assembly. A tie installed in other areas every 6" or so will hold the wires in place nicely.

5.4 TERMINAL INSTALLATION AND MAKING CONNECTIONS

Note: In the following steps you will be making the circuit connections. Before you start, you should carefully read Sections 6.0 through 7, and continually refer to the wire connection indexes, DOUBLE-CHECKING your routing and length calculations before cutting any wires and making connections. Give special attention to Turn Signal and Ignition Switch connections. These can be somewhat confusing.

5.4.1 Have all needed tools and connectors handy.

5.4.2 Select the correct size terminal for the wire and stud application.

5.4.3 Determine the correct wire length and cut the wire. Remember to allow enough slack in the harness and wires at places where movement could possibly occur, such as automobile body to frame, frame to engine, etc. Double check your calculations.

5.4.4 Strip insulation away from wire. Strip only enough necessary for the type of terminal lug you are using.

Note: In the following step, make sure that the terminal is crimped with the proper die in the crimping tool. An improper crimp will NOT make a good connection. DO NOT OVER-CRIMP!

5.4.5 Crimp the terminal onto the wire.

5.4.6 Connecting the harness throughout the groups is a repeating process. Make sure that each wire is FIRST properly routed and THEN attach. **DO NOT ATTACH THE WIRE FIRST AND THEN ROUTE AFTERWARD.**

5.4.7 When all wires are attached, tighten the mounts and ties to secure harness permanently.

5.5 TESTING THE SYSTEM

5.5.1 Use a small (10 amp or less) battery charger to power up the vehicle for circuit testing. If there is a problem anywhere, the battery charger's low amperage and internal circuit breaker will provide circuit protection. Connect the battery charger's NEGATIVE output to the automobile chassis or engine block and its POSITIVE output to the automobile's positive battery terminal.

CAUTION: IF YOU HAVE NOT YET DISCONNECTED THE BATTERY FROM THE AUTOMOBILE, DO SO NOW! DO NOT CONNECT THE BATTERY CHARGER WITH THE BATTERY CONNECTED. YOU WILL SIMPLY DEFEAT THE PURPOSE OF USING THE CHARGER.

5.5.2 Individually turn on each light, ignition, wiper circuit, etc, and check for proper operation.

5.5.3 When all circuits check out THEN attach the battery cable to the battery for vehicle operation.

6.0 50003 21-circuit RACING APPLICATION WIRE HARNESS KIT

6.1 CONTENTS OF THE 50003/50002 WIRE HARNESS KIT

Take inventory to see that you have everything you're supposed to have in this kit. If anything is missing, go to the dealer where you obtained the kit or contact Perfect Performance Products, Inc. at (817) 244-6212. The 50003/50002 Wire Harness Kit should contain the following items:

- The Main Wire Harness, with the Fuse Block wired in and fuses installed
- (8) switch panel, connectors and terminals (These will not be included in P/N 50002)
- Firewall grommet
- 1 Package of nylon tie wraps
- 2 GM turn signal connectors (See **Figure 6.5**)
- 2 GM ignition switch connectors (See **Figure 6.5**)
- Parts box, containing the **60amp MIDI fuse holder**, a GM alternator connector, terminals, splices
- Race Car Wire Harness Installation Instructions P/N 90555 (This booklet)

6.2 50003/50002 GENERAL CIRCUIT CONNECTIONS

If you have not already done so, read **Sections 4.0** and **5.0** of these instructions and think through the installation of the harness kit before securing or cutting any wires.

6.2.1 Early GM Alternator (before 1969) - External Regulator. See **Figure 6.1**.

*Note: Your Alternator may not appear exactly as represented in the **Figures**, but the circuits are wired the same.*

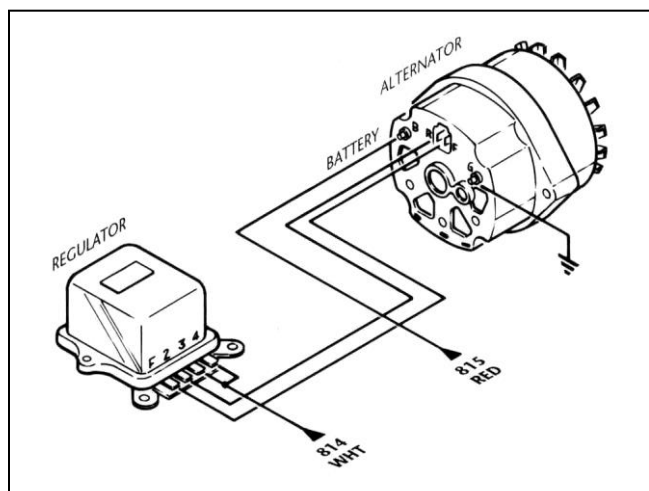


Figure 6.1 Early GM alternator with external regulator.

- With a short 16-gauge jumper wire, connect Voltage Regulator terminals 3 & 4 together. Connect ENGINE SECTION wire #814 (wht) to Voltage Regulator terminal 3 or 4.
- Connect ENGINE SECTION wire #815 (red) to the Alternator Output lug (Bat).
- Connect a 14-gauge wire from voltage-regulator terminal 2 to Alternator terminal R. Connect a 14-gauge wire from Voltage Regulator terminal F to Alternator terminal F.
- Connect a 16-gauge ground wire from the Alternator Ground lug (G) to chassis ground.

6.2.2 Late GM Alternator (after 1972) Internal Regulator. See **Figure 6.2**.

- Connect ENGINE SECTION wire #814 (wht) to alternator terminal #1. Connect ENGINE SECTION wire #815 (red) to the alternator output lug (Bat).
- Connect a short 14-gauge jumper wire from alternator terminal #2 to the alternator output lug (Bat).
- A connector and terminal spades for late GM Alternators are included in the parts box.

6.2.3 GM One-Wire Alternator.

- Connect ENGINE SECTION wire #815 (red) to the Alternator Output lug (Bat).
- Insulate and stow ENGINE SECTION wire #814 (wht). Do not install jumper wire. No wires are connected to alternator terminals 1 & 2.
- When using a 1-wire alternator you must use a voltmeter or ammeter. A warning light cannot be wired in.

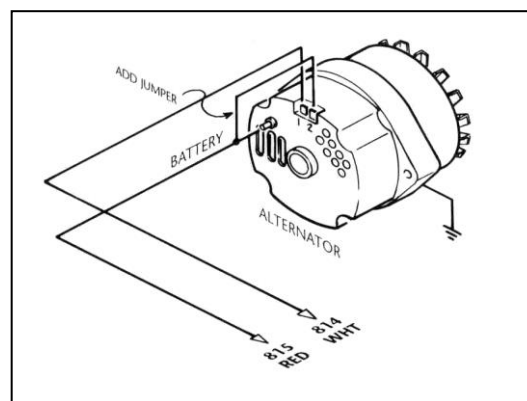


Figure 6.2 Late GM alternators with internal regulator

6.2.4 GM Ignition (Start/Run) System. See Figure 6.4.

Note: If you are going to install an ammeter, see Section 6.2.6 first.

- A. After you have routed the wires from the fuse panel to the starter solenoid, attach the 60amp MIDI fuse holder onto the end of ENGINE SECTION (single) 10 gauge red wire #816 with a crimping tool. This fuse connects to the #816 and serves as a fuse to protect the entire harness.
DO NOT OMIT IT!
- B. Connect wire #816, with MIDI fuse already installed, to the starter solenoid battery terminal. This is the same lug that the large red cable from the battery is normally connected to.
- C. Connect ENGINE SECTION A wire #819 purple to the starter solenoid start (S) terminal.
- D. If you are using the ballast resistor, mount it away from other wiring or hoses. The ballast resistor gets very hot during operation. Connect ENGINE SECTION A wire #820 pink to one end of the ballast resistor. Connect the other end of the ballast resistor to the ignition coil POSITIVE (+) terminal with 14-gauge wire (you may have enough pink wire left over to accomplish this). If you are not using a ballast resistor, connect wire #820 pink directly to the ignition coil POSITIVE (+) terminal.

Note: Older model vehicles ('55 -'59) used ballast resistors. From about '59 to about '74 resistor wire was used, and from about '74 on HEI electronic ignition has been employed.

- E. The ignition coil NEGATIVE (-) terminal is connected to the distributor. Also connect ENGINE SECTION A wire #823 (purple/white) to the ignition coil NEGATIVE (-) terminal. This is the tachometer source. If you are not using a tachometer, insulate and stow wire #823.
- F. A 14-gauge wire connected from the starter solenoid ignition (I) terminal to the ignition coil side of the ballast resistor is optional. This wire (the dashed line in **Figure 6.4**) serves as a ballast resistor bypass during engine starting. However, if the starter solenoid shorts out, which is not unusual, the engine will stop running and will not restart as long as this wire is connected. You may therefore choose to omit it. If you are not using a ballast resistor, leave the starter solenoid ignition (I) terminal unconnected and do not install the bypass wire.
- G. When using an HEI Distributor connect wire #820 (pink) to the BAT B+ terminal of the distributor. If a Tachometer is used, wire #823 (purple/white) is connected to the TACH terminal. The cap of the HEI distributor will be labeled as such.

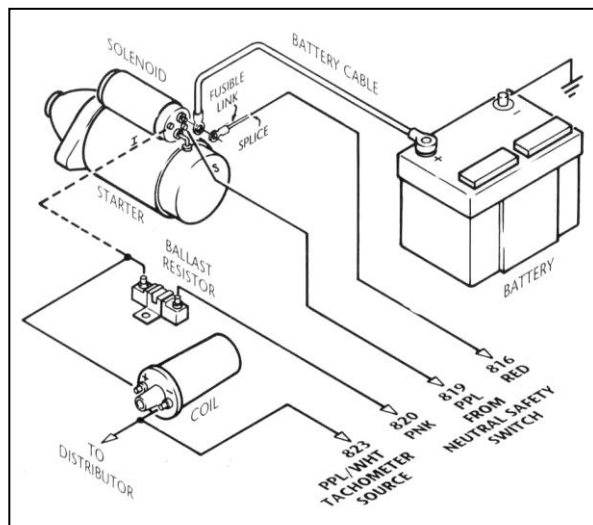


Figure 6.4 GM ignition system

6.2.5 GM Ignition and Turn Signal Connectors. See Table 6.1 and Figure 6.5.

- A. There are two different turn signal plugs for GM tilt columns. The difference is in the length of the male plug that is mounted ON THE COLUMN. One plug is 4-1/4" (4.25") long and the other is 3-7/8" (3.875"). This is a mere 3/8" (0.375") difference, so measure the plug carefully. This kit has included female connectors to mate with either size column-mounted plug. See **Figure 6.5** to determine which connector is correct for your vehicle.
The TURN SIGNAL SECTION wires have already been terminated for you. Choose the proper connector and install the contacts according to **Table 6.1** and **Figure 6.5**.
Note: The contacts will only insert into the connectors ONE WAY, as shown in Figure 6.5. Make certain you are inserting the wires into the CORRECT LOCATIONS as the contacts are difficult if not impossible to remove once inserted.
- D. The harness does not support seat belt buzzers or key alarms.
- E. To supply power to a throttle body or tuned port fuel injection use ENGINE SECTION A wire #820 (pink) as the fused ignition power source.

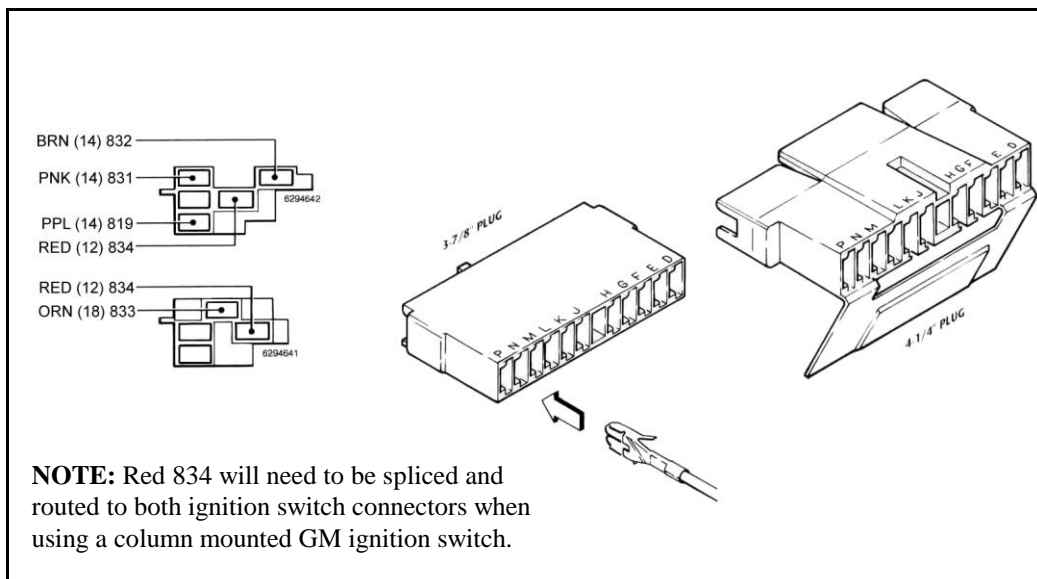


Figure 6.5 GM Ignition and Turn Signal Connectors

Designation	Wire No.	Color	Turn Signal Connector
Turn Signal Section			
Horn	853	Blk	G
LF Turn Signal	826	Lt. Blu	H
RF Turn Signal	825	Blu	J
Hazard Flasher	851	Brn	K
Turn Flasher	852	Ppl	L
LR Turn Signal	849	Ylw	M
RR Turn Signal	848	Grn	N
Stop Lamp Switch	818	Wht	P
Ignition Switch Section (This section only applicable when not using the switch panel)			
Ign. Start	819	Ppl	
Ign. Coil	831	Pnk	
Acc. Fuse Block	832	Brn	
Ign. Switch B+	833	Orn	
Battery B+	834	Red	
Ground	861	Blk	

Table 6.1 GM Ignition and Turn Signal Wiring

6.2.6 Connecting an Ammeter and the Fusible Link. See Figure 6.6.

- The ammeter must be connected **IN SERIES** onto the **ENGINE SECTION** (single) 10-gauge red wire #816 that routes from the fuse panel to the starter solenoid on GM vehicles (**Section 6.2.4**) and from the fuse panel to the starter relay on Ford and Mopar.
- The overall physical length of this circuit should be as short as possible still allowing the slack needed. You may have to cut or add length to wire #816. **USE ONLY 10 gauge wire** for this.
- Route wire #816 (from the Fuse Panel) and connect to the ammeter **NEGATIVE** terminal. To complete the installation, follow **ONE** of the next three paragraphs, as appropriate.

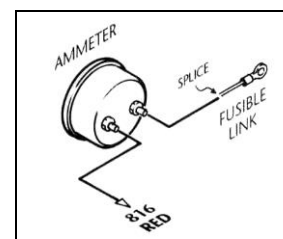


Figure 6.6 Ammeter and fusible link

- If you are using a GM starter, route the remainder of wire #816 from the ammeter **POSITIVE** terminal to the starter solenoid battery (B+) terminal. This is the terminal the battery cable is connected to. Splice the Fusible Link or Maxi fuse (**Figure 6.3**) onto the end of wire #816 and connect to the Starter Solenoid Battery (B+) terminal.

- E. If you are using a Ford starter with a starter relay, route the remainder of wire #816 from the ammeter POSITIVE terminal to the starter relay battery (B+) terminal. This is the terminal the battery cable is connected to. Splice the Fusible Link or Maxi fuse (**Figure 6.3**) onto the end of wire #816 and connect to the Starter Relay Battery (B+) terminal.
- F. If you are using a Mopar starter with a starter relay, route the remainder of wire #816 from the ammeter POSITIVE terminal to the starter relay battery (B+) terminal, and from this terminal to the Starter Solenoid Battery (B+) terminal. This is the terminal the battery cable is connected to. Splice the Fusible Link or Maxi fuse (**Figure 6.3**) onto the end of wire #816 and connect to the Starter Solenoid Battery (B+) terminal.

CAUTION: BOTH AMMETER TERMINALS MUST ABSOLUTELY BE ISOLATED FROM GROUND. IF EITHER AMMETER TERMINAL COMES IN CONTACT WITH GROUND, A HARNESS FIRE IS INEVITABLE. USE EXTREME CARE AND DILIGENCE IN CONNECTING AMMETERS.

CAUTION: BE SURE YOUR AMMETER'S CURRENT (AMPS) RATING EXCEEDS THE CURRENT OUTPUT OF YOUR ALTERNATOR. PERFECT PERFORMANCE PRODUCTS, INC. DOES NOT RECOMMEND USING ANY AMMETER RATED AT LESS THAN 65 AMPS. DO NOT USE AN AMMETER WITH ANY HIGH-OUTPUT ALTERNATOR (MORE THAN 65 AMPS).

6.2.7 Interior Lighting. See Figure 6.7.

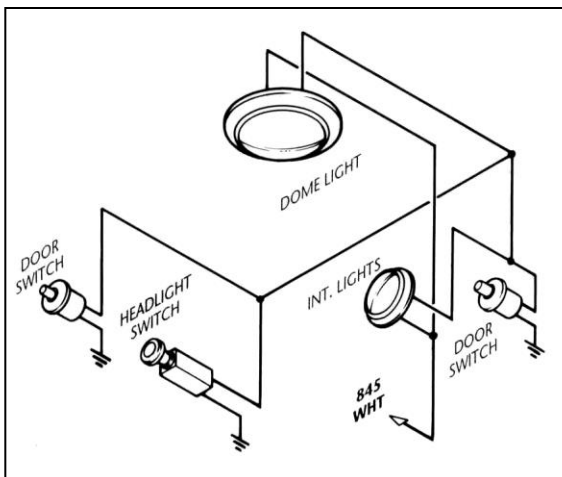


Figure 6.7 Interior Lighting

- A. Interior lights are switched through the door switches and the dash-mounted headlight switch, which is usually rotated counter-clockwise to activate. These switches apply ground to the circuit. 12V (B+) is continually present at the light bulbs.
- B. You should leave your existing interior light wiring intact. The 50002 harness supplies only the 12V (B+) to the circuit via TAIL SECTION wire #845 white.
- C. Locate the existing 12V feed wire and connect it to TAIL SECTION wire #845 white.

6.2.8 HEADLIGHT SECTION A. See Figure 6.8.

- A. Connect HEADLIGHT SECTION A wire #824 green to the Horn's hot terminal. TURN SIGNAL SECTION wire #853 black was connected in the turn signal connector section of these instructions. The horn relay is pre-wired into the fuse panel.

- B. Connect HEADLIGHT SECTION A #808 light green and #809 tan to BOTH head-lamps. These are the high and low beam wires. Connect the black wires of the headlamp connectors to chassis ground. You should have enough wire to accomplish this. Should you need to pass these wires through a fender well, use grommets. Don't forget to thread the grommets onto the wires BEFORE you connect them.

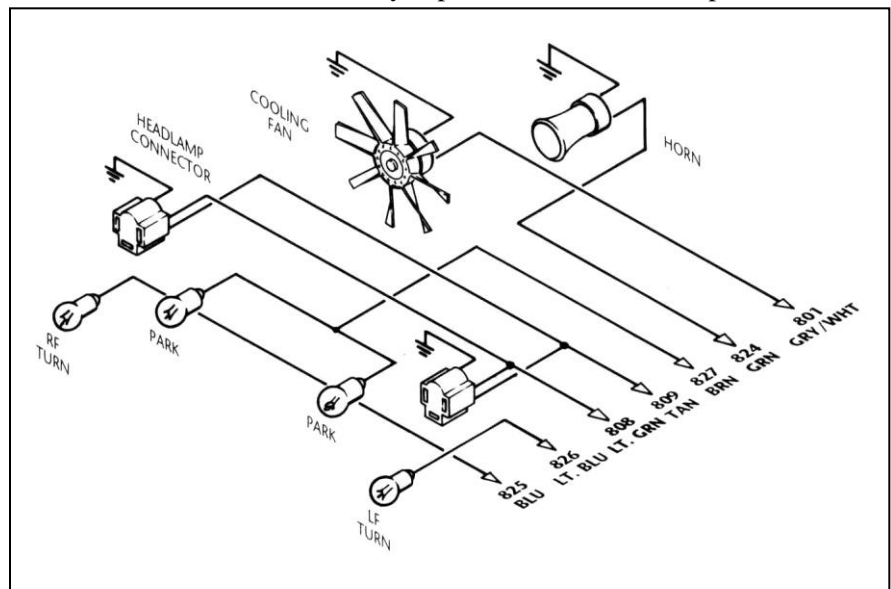


Figure 6.8 HEADLIGHT SECTION A Wiring

- C. Connect HEADLIGHT SECTION A wire #827 brown to ALL front Park Lights. Connect HEADLIGHT SECTION A wire #825 blue to the right front turn signal. Connect wire #826 light blue to the LEFT FRONT turn signal. **Note:** Don't confuse Park Lights with Turn Signals.

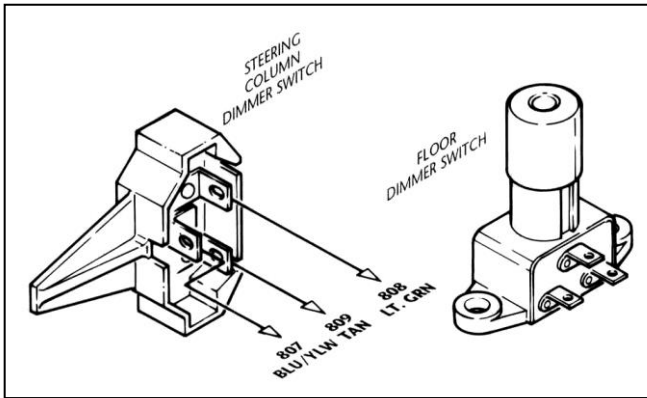


Figure 6.9 Dimmer Switches (Push Button Style – Painless Part #80150)

- D. Painless Performance suggests using an electric fan relay when using an electric cooling fan setup. Painless Performance offers the 30101 Electric Fan Relay kit. Connect HEADLIGHT SECTION #801 grey/white to the Electric Fan Relay activation wire.
- E. Connect DIMMER SWITCH SECTION wires #807, #808, and #809 to your floor-mounted Dimmer Switch or column-mounted Dimmer Switch.

6.2.9 Instrument Panel Wiring

- A. Connect the wires of the INSTRUMENT PANEL SECTION as indicated in Table 6.3. Insulate and stow any wires you do not use.
- B. Connect a jumper wire from wire #835 red/white to all gauges' B+ terminals. Connect a jumper wire from wire #830 brown to all gauges' instrument lighting terminals. Connect a jumper wire to all gauges' ground terminals and connect this to a chassis ground.

6.2.10 Brake Light Switch

- A. Connect ENGINE SECTION A wires #817 orange and #818 white to the brake light switch.
- B. The third brake light wire is pre-connected on the switch end. Connect TAIL SECTION wire #850 orange to the third brake light if applicable.

6.3 WIRE CONNECTION INDEX (CONNECTING 50002 TO SWITCH PANEL)

In each section, connect the wire as identified by its wire color and wire number, to the appropriate item in the CONNECT TO column. Pay close attention to any **Notes** in this section as identified by a small raised number. Table 6.3 is divided into sections that correspond to the sections of the 50002 wire harness. For example ACCESSORY SECTION SWITCHES refers to the wires in the harness labeled as accessory section switches. The Index is divided vertically into six columns: COLOR, GAUGE, NUMBER, CONNECT TO, COMES FROM, and FROM SECTION. The columns labeled COME FROM and FROM SECTION are for your reference only. The items in these columns tell you where each wire originates (COMES FROM) and from which section (FROM SECTION) of the harness. The column labeled NUMBER contains an 800-series number that is used to identify various wires in the wiring diagrams that are a part of these instructions. Each wire is labeled with its specific number every 12 inches. Many of the wire numbers occur twice in this index. This is because you will be connecting both ends of these particular wire segments. However, some wire segments are pre-connected at one end. For instance, all wires originating from the fuse block and certain other wires such as those originating from the horn relay, the dimmer switch, and the instrument panel section. These pre-connected wires are identified by an asterisk (*) in the COMES FROM column.

Headlight/Dome.....	25
Emergency Flashers/Stop.....	15
Turn Signals/Wiper.....	15
Gauges/Radio.....	10
Horn/Accy. B+.....	20
Electric Cooling Fan.....	20
Electric Fuel Pump(s).....	20
Coil.....	30
Electric Water Pump.....	10
Ignition Accessory (Center).....	15
Ignition Accessory (Lower Right).....	20

Table 6.2 Fuse Requirements

For use when connecting 50002 harness to switch panel.

Color	Ga.	No.	Connect To:	Comes From:	From Section:
ACCESSORY SECTION SWITCHES					
Gry/Wh ¹	14	801	Cooling Fan Switch ⁵	Cooling Fan	Headlight Section A
Blue ²	14	862	Water Pump Switch ⁵	Water Pump	Engine Section
Ylw/Wh	14	847	Fuel Pump #1 Switch ⁵	Fuel Pump #1	Tail Section
Green	14	863	Fuel Pump #2 Switch ⁵	Fuel Pump #2	Tail Section
ACCESSORY SECTION B+					
Blue	16	805	Wiper Switch B+ Input	Fuse Block*	
Gry/Red	14	806	Cooling Fan Switch B+ ⁵	Fuse Block*	
Blue/Red	14	864	Water Pump Switch B+ ⁵	Fuse Block*	
Ylw/Red	14	861	Fuel Pump #1 Switch B+ ⁵	Fuse Block*	
Ppl/Wh	14	865	Optional Accessory B+	Fuse Block*	
Tan	14	866	Optional Accessory B+	Fuse Block*	
ENGINE SECTION					
White	14	814	Alternator Excitor	Fuse Block*	
Red	10	815	Alternator B+	Fuse Block*	
Blue	14	862	Water Pump B+	Water Pump Switch	Accy. Section Switches
Red	10	816	Battery at Str. Solenoid B+	Fuse Block*	
ENGINE SECTION A					
Orange ³	16	817	Brake Switch B+	Fuse Block*	
White	16	818	Brake Switch	Turn Signal Switch	Turn Signal Section
Purple	12	819	Starter Solenoid	Ignition Switch Start	Ign. Switch Section
Pink	14	820	Coil B+	Fuse Block*	
Lt.Gr	18	821	Temp. Sending Unit	Temp. Gauge	Instrument Panel Section
Lt.Blu/Blk	18	822	Oil Pressure Sending Unit	Oil Pressure Gauge	Instrument Panel Section
Ppl/Wh	18	823	Tachometer Source	Tachometer	Instrument Panel Section
HEADLIGHT SECTION A					
Green	14	824	Horn B+	Horn Relay*	(Fuse Block)
Blue	18	825	Right Front Turn Signal	Turn Signal Switch	Turn Signal Section
Lt.Blue	18	826	Left Front Turn Signal	Turn Signal Switch	Turn Signal Section
Brown	18	827	Parking Lights	Headlight Switch	Headlight Section B
Lt.Gr	14	808	High Beam	Dimmer Switch	Dimmer Switch Section
Tan	14	809	Low Beam	Dimmer Switch	Dimmer Switch Section
Gry/Wh	14	801	Cooling Fan	Fan Switch	Accy. Section Switches
HEADLIGHT SECTION B					
Red/Blk	12	828	Headlight Switch B+ ⁵	Fuse Block*	
Blu/Ylw	14	807	Headlight Switch ⁵	Dimmer Switch	Dimmer Switch Section
Brown	14	829	Headlight Switch ⁵	Tail Lights	Tail Section
Brown	18	827	Headlight Switch ⁵	Parking Lights	Headlight Section A
Brown	18	830	Headlight Switch ⁵	Instr. Panel Lighting	Instrument Panel Section
DIMMER SWITCH SECTION					
Blu/Ylw	14	807	Dimmer Switch	Headlight Switch	Headlight Section B
Lt.Gr	14	808	Dimmer Switch	High Beam	Headlight Section A
Tan	14	809	Dimmer Switch	Low Beam	Headlight Section A

Table 6.3 50002 Wire Connection Index, 1 of 2

For use when connecting 50002 harness to switch panel.

Color	Ga.	No.	Connect To:	Comes From:	From Section:
IGNITION SWITCH SECTION					
Pink	14	831	Ignition Switch Coil B+ ⁵	Fuse Block*	
Brown	18	832	Ignition Switch Accy. B+ ⁵	Accy. Power Relay*	(Fuse Block)
Orange	18	833	Ignition Switch Accy. B+ ⁵	Fuse Block*	
Red	10	834	Ignition Switch B+ ⁵	Fuse Block*	
Purple ⁴	12	819	Ignition Switch Start ⁵	Starter Solenoid	Engine Section A
Black	14	860	Ground ⁵	Fuse Block Mounting Bolt	
INSTRUMENT PANEL SECTION					
Red/Wht	18	835	Radio & Gauges B+	Fuse Block*	
Green	18	836	High Beam Indicator	Dimmer Switch*	Dimmer Switch Section
Lt.Blue	18	837	Left Turn Indicator	Left Front Turn Signal*	Turn Signal Section
Blue	18	838	Right Turn Indicator	Right Front Turn Signal*	Turn Signal Section
Brown	18	830	Instr. Panel Lighting	Headlight Switch	Headlight Section B
Pink	18	839	Fuel Gauge	Fuel Sending Unit	Tail Section
Lt.Grn	18	821	Temperature Gauge	Temp. Sending Unit	Engine Section A
Lt.Blu/Blk	18	822	Oil Pressure Gauge	Oil Pres. Sending Unit	Engine Section A
Ppl/Wht	18	823	Tachometer	Tachometer Source	Engine Section A
TAIL SECTION					
White	14	845	Dome Lights B+	Fuse Block*	
Green	18	848	Right Rear Turn Signal	Turn Signal Switch	Turn Signal Section
Ylw/Wht	14	847	Fuel Pump #1 B+	Fuel Pump #1 Switch	Accy. Section Switches
Green	14	863	Fuel Pump #2 B+	Fuel Pump #2 Switch	Accy. Section Switches
Yellow	18	849	Left Rear Turn Signal	Turn Signal Switch	Turn Signal Section
Pink	18	839	Fuel Sending Unit	Fuel Gauge	Instr. Panel Section
Brown	14	829	Tail Lights	Headlight Switch	Headlight Section B
Orange	18	850	Third Brake Light	Turn Signal Switch*	Turn Signal Section
TURN SIGNAL SECTION					
Brown	14	851	Emergency Flasher Switch B+	Emergency Flasher*	Fuse Block
Purple	14	852	Turn Signal Switch Flasher B+	Turn Flasher*	Fuse Block
Black	18	853	Horn Switch Ground	Horn Relay*	Fuse Block
Green	18	848	Turn Signal Switch	Right Rear Turn Signal	Tail Section
Yellow	18	849	Turn Signal Switch	Left Rear Turn Signal	Tail Section
Blue	18	825	Turn Signal Switch	Right Front Turn Signal	Headlight Section A
White	16	818	Turn Signal Switch	Brake Switch	Engine Section A
Lt.Blu	18	826	Turn Signal Switch	Left Front Turn Signal	Headlight Section A

NOTES:

1. 2-color wires: 2nd color (stripe) may not be intense color. Observe two-color wires closely.
2. Wire has identification tag.
3. B+ power from fuse block to brake switch. Third brake light B+ is taken from the turn signal switch.
4. This wire is cut and spade lugs have been installed so that your existing neutral safety switch circuit can be wired into your harness. The neutral safety switch is located at the base of General Motors and Ford steering columns and in Mopar transmissions. Do not attempt to defeat your automobile's neutral safety switch. If your automobile does not have a neutral safety switch, please install one.
5. These wires are connected to the Switch Panel. See section 7.0.

Table 6.3 50002 Wire Connection Index, 2 of 2

7.0 SWITCH PANEL INSTALLATION AND CONNECTIONS (Refer to figure 7.1 & 7.2)

If you have not already done so, read sections 4.0 and 5.0 of these instructions and think through the installation of the harness kit before securing or cutting any wires.

Note: See figure 7.1 for the correct method of terminal insertion into the connectors.

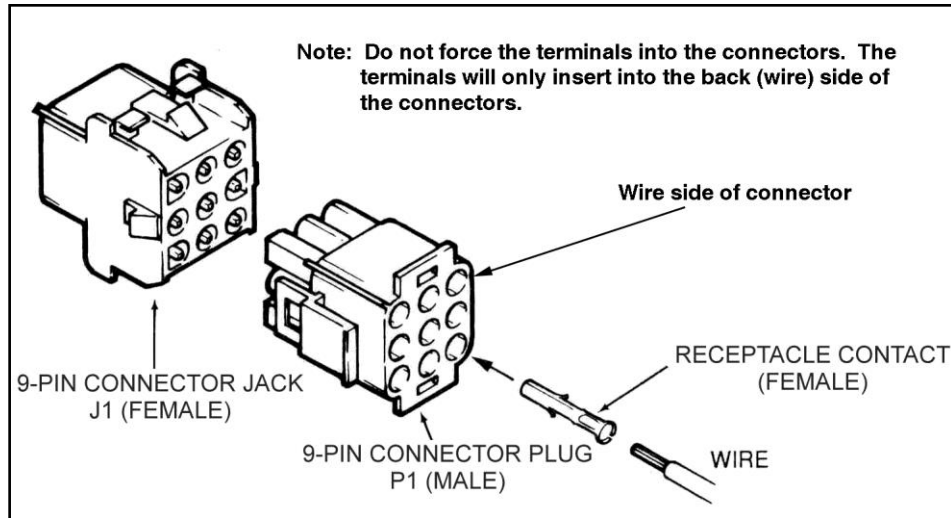


Figure 7.1 terminal insertions into connector method

7.1 Dash mounting the switch panel.

- A. Mount the Switch Panel in the desired location by drilling holes in the dash to suit your needs. When dash mounting this switch panel you will not use the provided switch panel rear cover. Four (4) mounting screws are provided. Be sure you have threaded the wires through any holes and grommets before installing the connectors. The electrical contacts are almost impossible to remove without damage once they have been inserted into the connector body.
- B. Insert the eight (8) wires pre-terminated with the socket style terminals into one of the white, nine (9) way, pin (male) connectors. See connector **P-2** in figure 7-2 for the correct wire insertion position.
- C. Insert the eight (8) wires pre-terminated with the pin style terminals into one of the white, nine (9) way, socket (female) connectors. See connector **S-1** in figure 7-2 for the correct wire insertion position.
- D. Locate the harness wires listed in figure 7-2 that are needed for connectors **S-2** and **P-1**. Be sure you have threaded the wires through any holes and grommets before installing the terminals onto the wires and inserting them into the connectors. The electrical contacts are almost impossible to remove without damage once they have been inserted into the connector body. Using a good wire stripper, strip all wires to be terminated by 3/16." Use the proper crimping tool to avoid terminal damage.

Installation of the provided **pin terminals** for the wires listed for connector **S-2** is as follows. There are two sizes of pin terminals provided in this kit. Crimp one of the large (10-12 gauge) pin terminals onto wire #819 Purple. Crimp all three brown #827, #829 and #830 wires into **ONE** of the large (10-12 gauge) pin terminals. Crimp the smaller size pin terminals onto the remaining wires for connector **S-2**. **NOTICE:** We have provided you with two extra pin terminals of each size just in case any become damaged during installation. Insert these eight wires into connector **S-2**. See connector **S-2** in figure 7-2 for correct wire insertion position

Installation of the provided **socket terminals** for the wires listed for connector **P-1** is as follows. Crimp one of the large (10-12 gauge) socket terminals onto wire #834 Red. Crimp one of the large (10-12 gauge) socket terminals onto wire #828 Red/Bk. Crimp the smaller size socket terminals onto the remaining wires for connector **P-1**. **NOTICE:** We have provided you with two extra socket terminals of each size just in case any become damaged during installation. Insert these eight wires into connector **P-1**. See connector **P-1** in figure 7-2 for correct wire insertion position.

- E. Connect the Switch Panel to the main harness and perform an operational check. Refer to section 5.5.

7.2 Roll bar mounting the switch panel.

- A. Mount the switch box in the desired location. Bolts or heavy screws are recommended when doing this.

Note: The box is pre-punched to allow the switch panel wires to exit from any chosen side. The rubber grommet is provided to protect the wires as they exit from the box. Cap plugs are included to plug the remaining unused holes for a finished look.

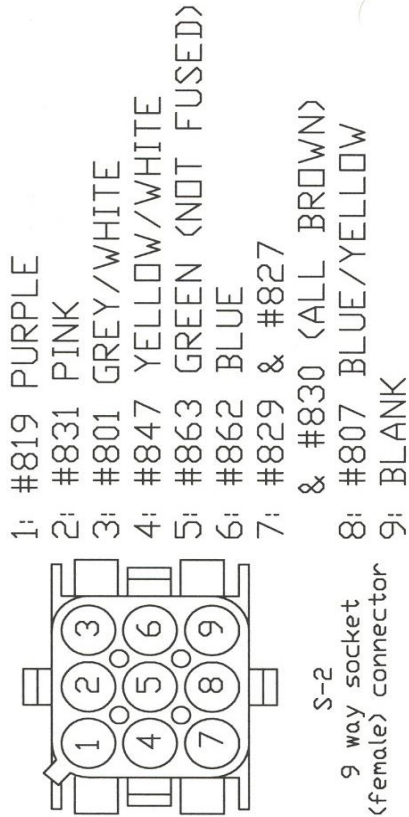
- B. Attach the switch panel to the box with the four (4) screws provided, routing the wires through the grommet and out the desired hole. Be sure you have threaded the wires through any holes and grommets before installing the connectors. The electrical contacts are almost impossible to remove without damage once they have been inserted into the connector body.
- C. Insert the eight (8) wires pre-terminated with the socket style terminals into one of the white, nine (9) way, pin (male) connectors. See connector **P-2** in figure 7-2 for the correct wire insertion position.
- D. Insert the eight (8) wires pre-terminated with the pin style terminals into one of the white, nine (9) way, socket (female) connectors. See connector **S-1** in figure 7-2 for the correct wire insertion position.
- E. Locate the harness wires listed in figure 7-2 that are needed for connectors **S-2** and **P-1**. Be sure you have threaded the wires through any holes and grommets before installing the terminals onto the wires and inserting them into the connectors. The electrical contacts are almost impossible to remove without damage once they have been inserted into the connector body. Using a good wire stripper, strip all wires to be terminated by 3/16.” Use the proper crimping tool to avoid terminal damage.

Installation of the provided **pin terminals** for the wires listed for connector **S-2** is as follows. There are two sizes of pin terminals provided in this kit. Crimp one of the large (10-12 gauge) pin terminals onto wire #819 Purple. Crimp all three brown #827, #829 and #830 wires into **ONE** of the large (10-12 gauge) pin terminals. Crimp the smaller size pin terminals onto the remaining wires for connector **S-2**. **NOTICE:** We have provided you with two extra pin terminals of each size just incase any become damaged during installation. Insert these eight wires into connector **S-2**. See connector **S-2** in figure 7-2 for correct wire insertion position. Installation of the provided **socket terminals** for the wires listed for connector **P-1** is as follows. Crimp one of the large (10-12 gauge) socket terminals onto wire #834 Red. Crimp one of the large (10-12 gauge) socket terminals onto wire #828 Red/Bk. Crimp the smaller size socket terminals onto the remaining wires for connector **P-1**. **NOTICE:** We have provided you with two extra socket terminals of each size just incase any become damaged during installation. Insert these eight wires into connector **P-1**. See connector **P-1** in figure 7-2 for correct wire insertion position.

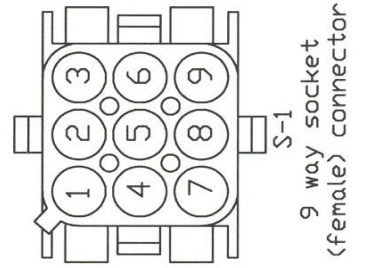
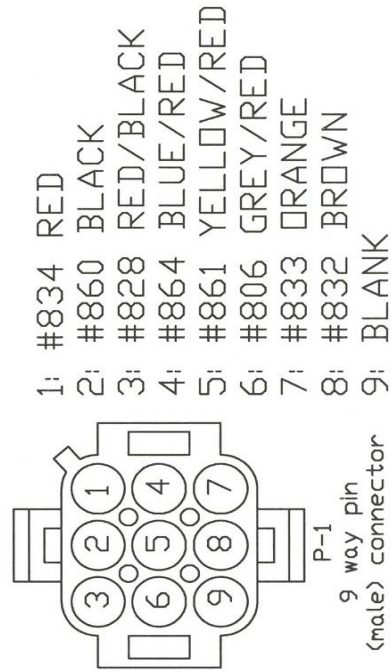
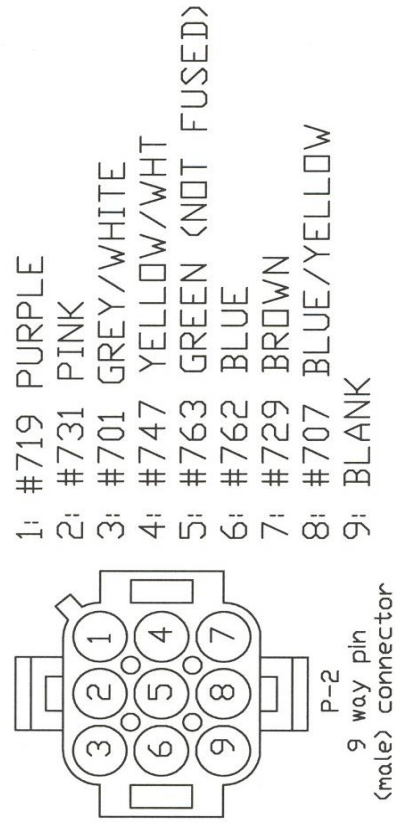
- F. Connect the Switch Panel to the main harness and perform an operational check. Refer to section 5.5.

View is from wire side of connector.

50003
Harness



Switch Panel



NOTE: Wire numbers in this column are for reference only. Switch panel wires are not printed.

Figure 7.2 50002 harness to switch panel connector chart

8.0 WIRE CONNECTION INDEX (CONNECTING 50002 TO OTHER THAN SWITCH PANEL)

In each section, connect the wire as identified by its wire color and wire number, to the appropriate item in the CONNECT TO column. Pay close attention to any **Notes** in this section as identified by a small raised number.

Table 8.1 is divided into sections that correspond to the sections of the 50002 wire harness. For example ACCESSORY SECTION SWITCHES refers to the wires in the harness labeled as accessory section switches. The Index is divided vertically into six columns: COLOR, GAUGE, NUMBER, CONNECT TO, COMES FROM, and FROM SECTION. The columns labeled COME FROM and FROM SECTION are for your reference only. The items in these columns tell you where each wire originates (COMES FROM) and from which section (FROM SECTION) of the harness. The column labeled NUMBER contains an 800-series number that is used to identify various wires in the wiring diagrams that are a part of these instructions. Each wire is labeled with its specific number every 12 inches.

Many of the wire numbers occur twice in this index. This is because you will be connecting both ends of these particular wire segments. However, some wire segments are pre-connected at one end. For instance, all wires originating from the fuse block and certain other wires such as those originating from the horn relay, the dimmer switch, and the instrument panel section. These pre-connected wires are identified by an asterisk (*) in the COMES FROM column.

For use when connecting 50002 harness to OTHER than switch panel.

Color	Ga.	No.	Connect To:	Comes From:	From Section:
ACCESSORY SECTION SWITCHES					
Gry/Wht ¹	14	801	Cooling Fan Switch Output	Cooling Fan	Headlight Section A
Blue ²	14	862	Water Pump Switch Output	Water Pump	Engine Section
Ylw/Wht	14	847	Fuel Pump #1 Switch Output	Fuel Pump #1	Tail Section
Green ⁵	14	863	Fuel Pump #2 Switch Output	Fuel Pump #2	Tail Section
ACCESSORY SECTION B+					
Blue	16	805	Wiper Switch B+ Input	Fuse Block*	
Gry/Red	14	806	Cooling Fan Switch B+ Input	Fuse Block*	
Blue/Red	14	864	Water Pump Switch B+ Input	Fuse Block*	
Ylw/Red	14	861	Fuel Pump #1 Switch B+ Input	Fuse Block*	
Ppl/Wht	14	865	Accessory Switch B+ Input	Fuse Block*	
Tan	14	866	Accessory Switch B+ Input	Fuse Block*	
ENGINE SECTION					
White	14	814	Alternator Exciter	Fuse Block*	
Red	10	815	Alternator B+	Fuse Block*	
Blue	14	862	Water Pump B+	Water Pump Switch	Accy. Section Switches
Red	10	816	Battery at Start Solenoid B+	Fuse Block*	
ENGINE SECTION A					
Orange ³	16	817	Brake Switch B+	Fuse Block*	
White	16	818	Brake Switch	Turn Signal Switch	Turn Signal Section
Purple	12	819	Starter Solenoid	Ignition Switch Start	Ign. Switch Section
Pink	14	820	Coil B+	Fuse Block*	
Lt.Grn	18	821	Temp. Sending Unit	Temp. Gauge	Inst. Panel Section
Lt.Blu/Blk	18	822	Oil Pressure Sending Unit	Oil Pressure Gauge	Inst. Panel Section
Ppl/Wht	18	823	Tachometer Source	Tachometer	Inst. Panel Section
HEADLIGHT SECTION A					
Green	14	824	Horn B+	Horn Relay*	(Fuse Block)
Blue	18	825	Right Front Turn Signal	Turn Signal Switch	Turn Signal Section
Lt.Blue	18	826	Left Front Turn Signal	Turn Signal Switch	Turn Signal Section
Brown	18	827	Parking Lights	Headlight Switch	Headlight Section B
Lt.Grn	14	808	High Beam	Dimmer Switch	Dimmer Switch Section
Tan	14	809	Low Beam	Dimmer Switch	Dimmer Switch Section
Gry/Wht	14	801	Cooling Fan B+ Input	Fan Switch	Accy. Section Switches
HEADLIGHT SECTION B					
Red/Blk	12	828	Headlight Switch B+ Input	Fuse Block*	
Blu/Ylw	14	807	Headlight Switch Output	Dimmer Switch	Dimmer Switch Section
Brown	14	829	Headlight Switch Output	Tail Lights	Tail Section
Brown	18	827	Headlight Switch Output	Parking Lights	Headlight Section A
Brown	18	830	Headlight Switch Output	Instr. Panel Lighting	Instr. Panel Section
DIMMER SWITCH SECTION					
Blu/Ylw	14	807	Dimmer Switch Input	Headlight Switch	Headlight Section B
Lt.Grn	14	808	Dimmer Switch Output	High Beam	Headlight Section A
Tan	14	809	Dimmer Switch Output	Low Beam	Headlight Section A

Table 8.1 50002 Wire Connection Index, 1 of 2

For use when connecting 50002 harness to OTHER than switch panel

Color	Ga.	No.	Connect To:	Comes From:	From Section:
IGNITION SWITCH SECTION					
Pink	14	831	Ignition Switch Coil B+	Fuse Block*	
Brown	18	832	Ignition Switch Accy. B+	Accy. Power Relay*	(Fuse Block)
Orange	18	833	Ignition Switch Accy. B+	Fuse Block*	
Red	10	834	Ignition Switch B+	Fuse Block*	
Purple ⁴	12	819	Ignition Switch Start	Starter Solenoid	Engine Section A
Black	14	860	Ground	Fuse Block Mounting Bolt	

INSTRUMENT PANEL SECTION

Red/Wht	18	835	Radio & Gauges B+	Fuse Block*	
Green	18	836	High Beam Indicator	Dimmer Switch*	Dimmer Switch Section
Lt.Blue	18	837	Left Turn Indicator	Left Front Turn Signal*	Turn Signal Section
Blue	18	838	Right Turn Indicator	Right Front Turn Signal*	Turn Signal Section
Brown	18	830	Instrument Panel Lighting	Headlight Switch	Headlight Section B
Pink	18	839	Fuel Gauge	Fuel Sending Unit	Tail Section
Lt.Grn	18	821	Temperature Gauge	Temp. Sending Unit	Engine Section A
Lt.Blu/Blk	18	822	Oil Pressure Gauge	Oil Pres. Sending Unit	Engine Section A
Ppl/Wht	18	823	Tachometer	Tachometer Source	Engine Section A

TAIL SECTION

White	14	845	Dome Lights B+	Fuse Block*	
Green	18	848	Right Rear Turn Signal	Turn Signal Switch	Turn Signal Section
Ylw/Wht	14	847	Fuel Pump #1 B+ Input	Fuel Pump #1 Switch	Accy. Section Switches
Green	14	863	Fuel Pump #2 B+ Input	Fuel Pump #2 Switch	Accy. Section Switches
Yellow	18	849	Left Rear Turn Signal	Turn Signal Switch	Turn Signal Section
Pink	18	839	Fuel Sending Unit	Fuel Gauge	Instr. Panel Section
Brown	14	829	Tail Lights	Headlight Switch	Headlight Section B
Orange	18	850	Third Brake Light	Turn Signal Switch*	Turn Signal Section

TURN SIGNAL SECTION

Brown	14	851	Emergency Flasher Switch B+	Emergency Flasher*	Fuse Block
Purple	14	852	Turn Signal Switch Flasher B+	Turn Flasher*	Fuse Block
Black	18	853	Horn Switch Ground	Horn Relay*	Fuse Block
Green	18	848	Turn Signal Switch	Right Rear Turn Signal	Tail Section
Yellow	18	849	Turn Signal Switch	Left Rear Turn Signal	Tail Section
Blue	18	825	Turn Signal Switch	Right Front Turn Signal	Headlight Section A
White	16	818	Turn Signal Switch	Brake Switch	Engine Section A
Lt.Blu	18	826	Turn Signal Switch	Left Front Turn Signal	Headlight Section A

NOTES:

1. 2-color wires: 2nd color (stripe) may not be intense color. Observe two-color wires closely.
2. Wire has identification tag.
3. B+ power from fuse block to brake switch. Third brake light B+ is taken from the turn signal switch.
4. This wire is cut and spade lugs have been installed so that your existing neutral safety switch circuit can be wired into your harness. The neutral safety switch is located at the base of General Motors and Ford steering columns and in Mopar transmissions. Do not attempt to defeat your automobile's neutral safety switch. If your automobile does not have a neutral safety switch, please install one.
5. This wire is the fuel pump #2 power wire which runs to the tail section. The harness does not provide a fused power wire for a fuel pump #2 switch.

Table 8.1 50002 Wire Connection Index, 2 of 2

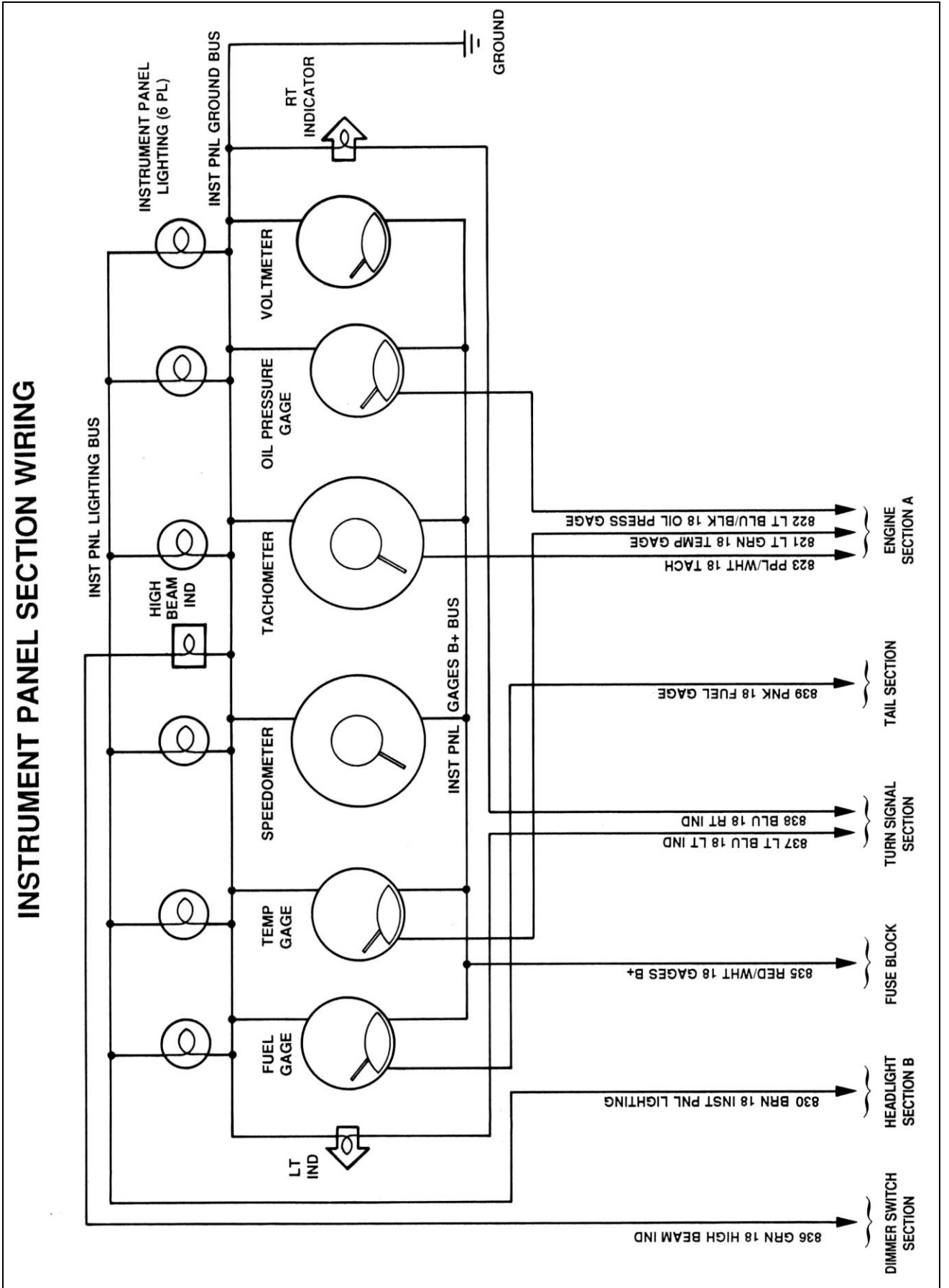


Figure 8.1 50002 Instrument Panel Connections

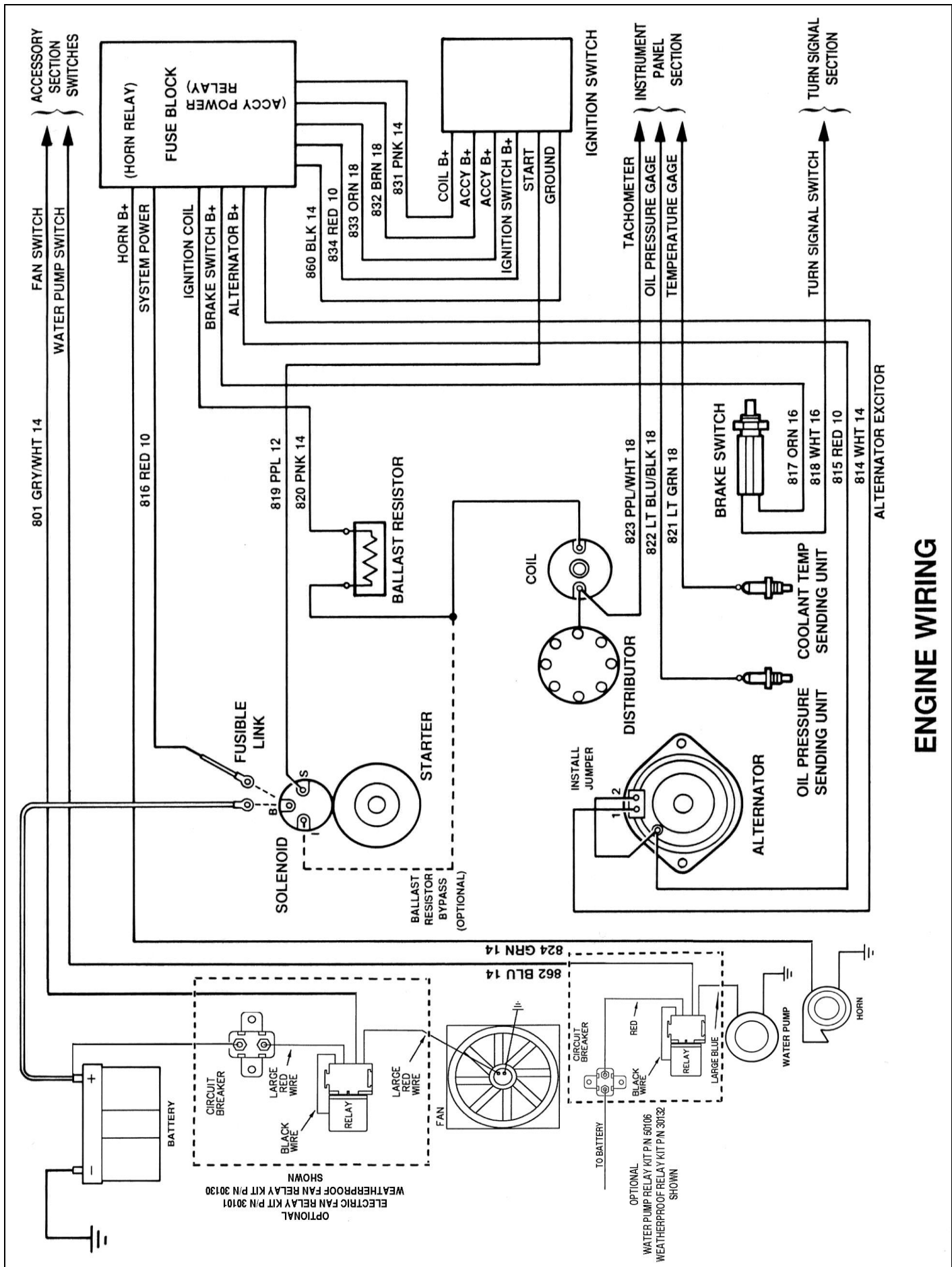


Figure 8.2 50002 engine section connections

9.0 OPTIONAL RELAY KITS AND ACCESSORIES

<u>ACCESSORY</u>	<u>PAINLESS STANDARD RELAY KIT</u>	<u>PAINLESS WEATHERPROOF RELAY KIT</u>
Electric Cooling Fan	#30101	#30130
Electric Fuel Pump	#50102	#30131
Electric Water Pump	#50106	#30132
High Amp Alternator	#50105	
Shutdown Relay Kit		
<u>POWERBRAID WIRE WRAP</u>		
Protect and clean up any harness installation with our new braided wire wrap. Laterally split design closes around wire bundle without the need for additional taping or fasteners. Available in black only.		
Powerbraid Wire Wrap	#70901	1/4" Diameter, 20 ft.
	#70902	1/2" Diameter, 10 ft.
	#70903	3/4" Diameter, 6 ft.
	#70904	1 1/2" Diameter, 4 ft.

Figure 9.1 Optional relay kits and accessories

Painless Performance Products, LLC **Limited Warranty and Return Policy**

Chassis harnesses, fuel injection harnesses, and Trail Rocker units are covered under a lifetime warranty.

All other products manufactured and/or sold by Painless Performance are warranted to the original purchaser to be free from defects in material and workmanship under normal use. Painless Performance will repair or replace defective products without charge during the first 12 months from the purchase date. No products will be considered for warranty without a copy of the purchase receipt showing the sellers name, address, and date of purchase. You must return the product to the dealer you purchased it from to initiate warranty procedures.