



Owner's Manual

Electronic Harness Controller
P/N ASM4250



Thunder Heart Performance Corporation
120 Industrial Drive
White House, TN 37188
www.thunder-heart.com

MANUAL P/N EI4250
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CONTACTING THUNDER HEART PERFORMANCE CORP.

Mailing Address.....	P.O. Box 76 White House, TN 37188
Shipping Address	120 Industrial Drive White House, TN 37188
Phone	615-672-8811
Fax.....	615-672-1353
Tech Support E-mail.....	techsupport@thunder-heart.com
Website.....	www.thunder-heart.com

CHAPTER 1 INTRODUCTION

1.1 General Information

The Electronic Harness Controller consolidates all of the electronic functions of a motorcycle (with the exception of instrumentation and engine management) into one, easy-to-hide system. The Electronic Harness Controller avoids the wiring “bird’s nest” of other systems so you spend less time wiring your bike...and more time riding!

Perfect for split tank bikes, the Electronic Harness Controller system includes a self-diagnostic electronic harness controller, un-terminated “fantail” harness, shrink tubing, and all necessary connectors, a comprehensive instruction and troubleshooting manual for a durable, professional installation.

The information included in this manual is intended to provide a guideline for installing the Electronic Harness Controller system on your motorcycle. However, each motorcycle is different. Due to the “universal” nature of this system, a certain level of technical skill is required to assure a complete, trouble-free installation.

Please read through this entire manual before attempting any part of the installation. If you are uncomfortable with the level of skill required to complete the installation of this system, either contact a Thunder Heart Performance technical specialist, or hire a professional to complete the install for you.

1.2 Special Tools Required

Most of the installation of the Micro Harness Controller can be completed with basic hand tools. However, a few special tools make the job much easier:

- A **heat gun** (such as the unit shown in Figure 1) is required to shrink the heat shrink tubing onto the harness. The heat gun makes quick work of shrinking the tubing, as it provides a broad, even source of heat. No other means of shrinking the tubing is recommended.



Figure 1 – Heat Gun

- A good-quality **wire-crimping tool** is also required. The “W” style (shown in Figure 2) can be obtained from your local RadioShack®.

The AMP style (shown in Figure 3), while considerably more expensive, will produce better results. The AMP style is recommended if you plan on wiring many bikes using the AMP connectors included with the Micro Harness Controller system.



Figure 2—"W" crimping tool (common at RadioShack®)



Figure 3—"AMP" crimping tool

- A **multi-meter** is useful for diagnosis. A common "test light" is OK, but a test light will not tell you if you have a short to ground, or a resistance problem. In other words, a pinched wire may provide enough current for the test light, but not enough to power the horn, ignition, etc. A multi-meter allows you to check current, and you can check the suspect circuit for any grounding issues.



Figure 4—Multi-Meter; useful for circuit diagnosis

1.3 Connector Assembly

The following information highlights proper assembly procedures for the AMP connectors included with the Micro Harness Controller system:

1. Strip approximately 3/16" of insulation off of the end of the wire to be terminated.

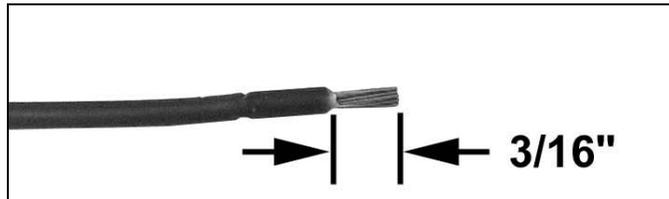


Figure 5—Proper wire strip amount

2. Clip a terminal from the supplied "tree" of terminals.
3. Using either a "W" or an "AMP" tool, crimp the terminal onto the end of the wire. The following figures show examples of "good" and "bad" crimps:

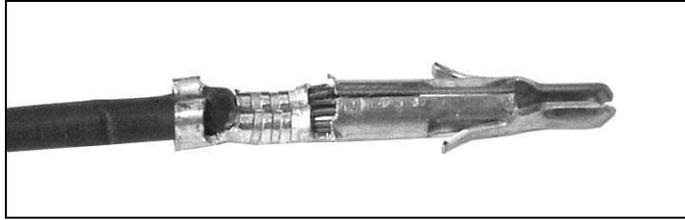


Figure 6—Good Crimp; insulation retained by outside tabs, conductor retained by inside tabs

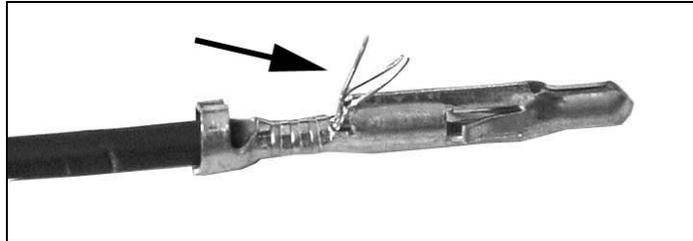


Figure 7—Bad Crimp; too much wire stripped; strands exposed outside of terminal

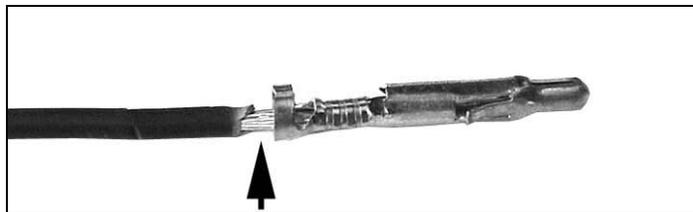


Figure 8—Bad Crimp; too much wire stripped; insulation not retained by outside tabs

4. Insert the wire through the blue seal into the connector body until you hear a “click.” Gently pull on the wire to ensure that the terminal is fully engaged in the housing.

1.4 EHC Component Overview

Throughout this manual you will be referred to the various components of the EHC system. Use the following figures to aid in component identification:



Figure 9—EHC Module Front Panel

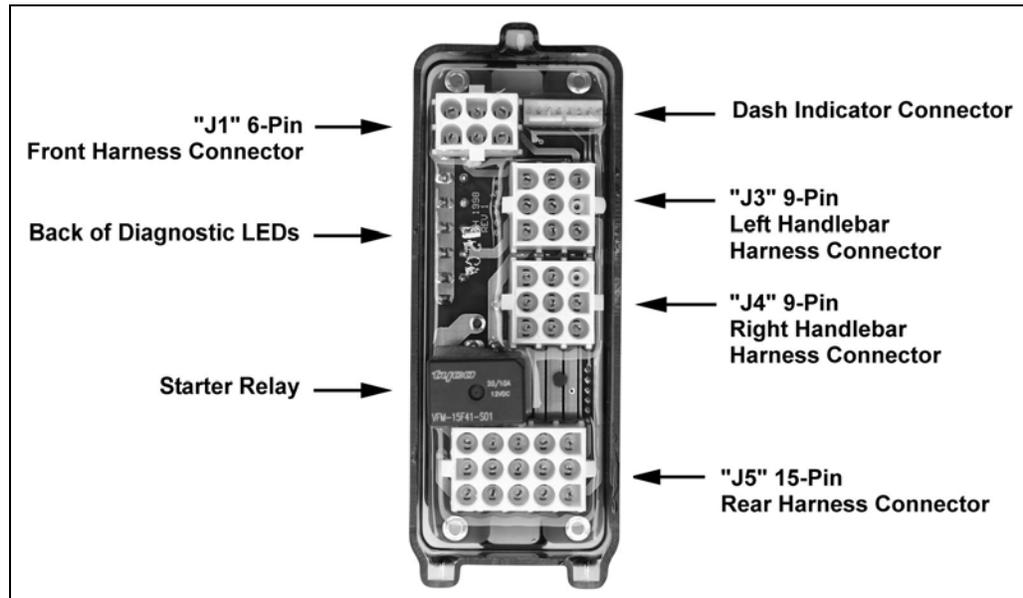


Figure 10—EHC Module Rear Panel Components

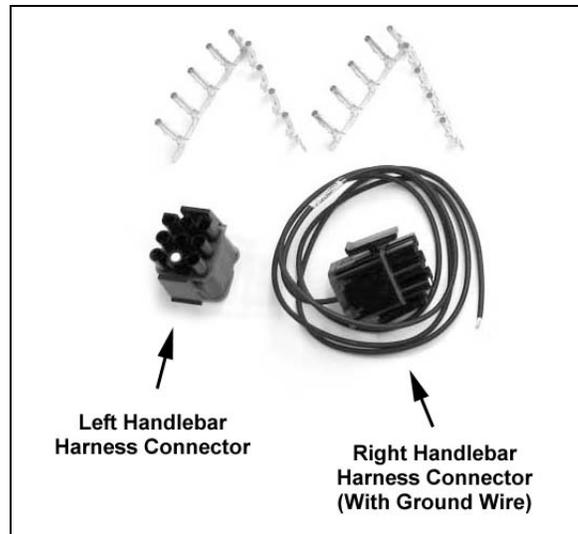


Figure 11—Handlebar Harness Connectors

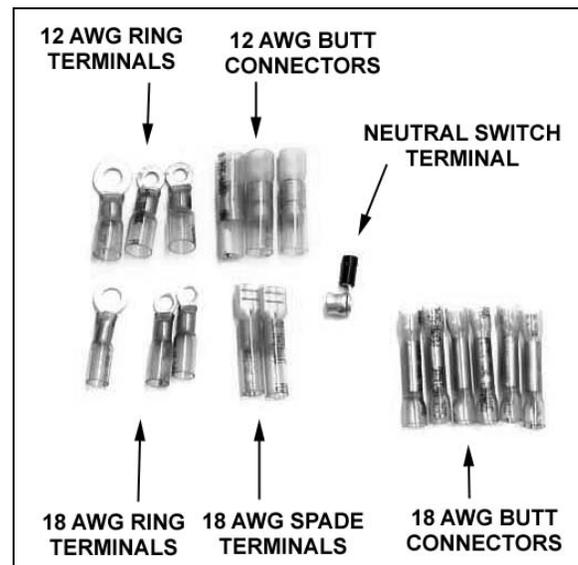


Figure 12—Included Terminals

CHAPTER 2 SYSTEM INSTALLATION

2.1 Finding a Suitable Location for the Electronic Harness Control Module

Split Tank Bikes

The Electronic Harness Controller (EHC) is designed to mount to the top frame tube between the gas tanks. The black plastic mounting base is molded to fit the tube radius and slotted to accept “zip tie” fasteners. The EHC snaps onto the mounting base via three mounting tabs so that the diagnostic instructions are visible with the dash removed.

Saddle Tank Bikes

When using a saddle tank, an alternate mounting location must be found. The most common areas are near the oil bag and under the transmission. The mounting base may not fit in these locations. Zip ties can be used to attach the EHC to its mounting location. If possible, the EHC diagnostic instructions should face in a direction that will make them visible with little or no disassembly for service. Care should be taken to keep the EHC a safe distance from the exhaust system.

*Note: Though the EHC module is moisture and vibration resistant, care should be taken in mounting the EHC so that it is not subjected to excessive amounts of vibration, heat, and moisture. **The EHC should be mounted at least four inches away from the engine to avoid radiating engine heat.***

WARNING: FAILURE TO MOUNT THE ELECTRONIC HARNESS CONTROLLER, WIRES, OR CONNECTORS AWAY FROM EXCESSIVE HEAT SOURCES (SUCH AS THE ENGINE AND EXHAUST PIPES) MAY RESULT IN FAILURE OF THE ELECTRONIC HARNESS CONTROLLER SYSTEM.

2.2 Trial Fitment of the Harness to the Bike

The following steps outline the process of trial fitting the harness to the bike. The installer may experiment with different routings to achieve the best results:

1. With the EHC mounted, plug the rear harness connector into the EHC.

Note: Each wire is labeled according to its function. Refer to the wiring tables and diagrams in APPENDIX D. "Auxiliary Power" sources can be used to power brake lights, license plate lights, etc.

2. Route each wire to its destination, but do not cut them yet. Keep wires bundled together until they need to break off to their destination. Use electrical tape to construct branch points and to temporarily attach the harness to the bike while fitting is performed. Wires not used should be terminated at the connector to prevent short circuits.

Tip: Try to minimize the number of branches from the main harnesses by combining wires that branch off closely in one larger branch, as this will make the heat shrink easier to apply later.

Tip: Remember to allow extra length for suspension movement or strain relief when locating the harness-to-bike attachment points.

WARNING TAKE CARE TO ROUTE THE HARNESS AWAY FROM SHARP EDGES OR SURFACES THAT MAY PINCH THE HARNESS. ROUTE THE HARNESS AWAY FROM SOURCES OF HIGH HEAT, SUCH AS THE ENGINE AND EXHAUST SYSTEM.

3. Start again at step 1 for the front harness and the left/right control harnesses.

Note: For 1996-2003 hand controls, see Section 2.3.

Note: The “horn” and “auxiliary power” circuits are found on both the front and rear harness connectors to allow for different mounting locations. Use the most convenient one for the horn. Both “auxiliary power” circuits may be used as needed.

4. When all the wires are routed and the harnesses are temporarily attached at their mounting points, cut the excess length from the ends of the wires, leaving them approximately 3” too long for final fitment.

2.3 H-D 1996-2003 Hand Control Connections

Starting in 1996, Harley spliced the power wires of both the left turn signal and the horn, and the right signal and the brake switches together.

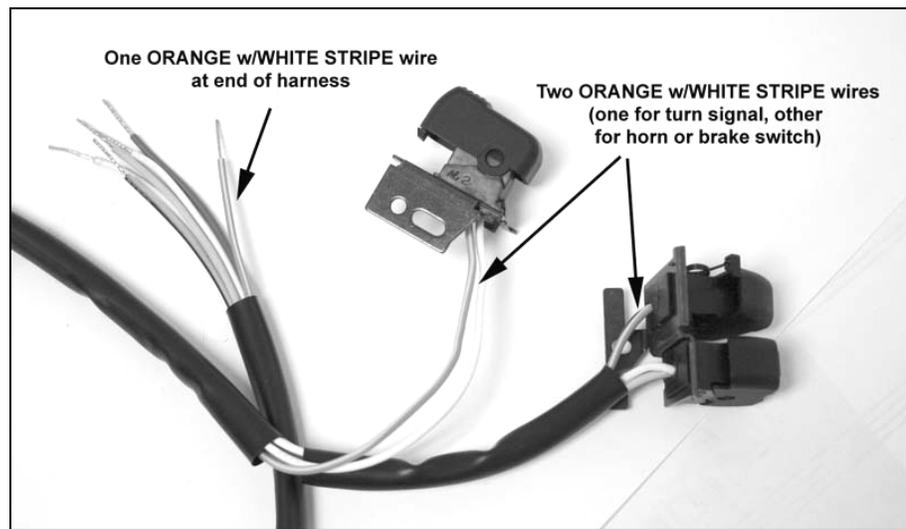


Figure 13—H-D 1996-2003 Hand Control Harness

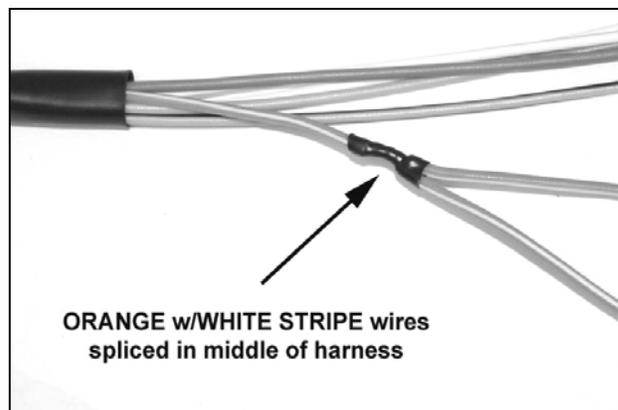


Figure 14—H-D 1996-2003 Hand Control Wire Splice

When using these hand controls, you have two options:

- Use the existing H-D harness with splice in place, and not use the “left turn signal switch power” and “right turn signal switch power”

circuits of the EHC. (Note: Diagnostic functions will not work for the left and right turn signals, as they will be powered from the Horn and Brake Light Switch circuits). See Appendix D, Wiring Tables and Diagrams.

- Remove the splice in the H-D handlebar controls harness, determine which Orange w/White Stripe wire goes to the turn signal and horn or brake switch, and wire these independently to their respective circuits on the EHC. See Appendix D, Wiring Tables and Diagrams.

2.4 Rear Lighting Options

The EHC accommodates three rear lighting configurations. Two wiring diagrams in Appendix D detail the wiring for each configuration:

- Turn signals and center brake light, with turn signals lit only when turn signal function is operating (see Figure 21)
- Turn signals only; turn signals as running lights, brake lights, and turn signals (see Figure 22)
- Turn signals and optional center brake light, with turn signals also functioning as running lights and brake lights (see Figure 22)

2.5 Harness Assembly

After the harness is trial fitted to the bike, the next steps highlight the installation of heat shrinkable tubing to the harness:

1. Remove the harness from the bike.
2. Starting from the rear harness connector at the EHC, cut a piece of heat shrink tubing long enough so that it extends about 1" past the first branch in the harness. This extra length will allow the tubing for the branches to slide into the main tubing as shown in Figure 15. This crates a smooth transition to the branches.

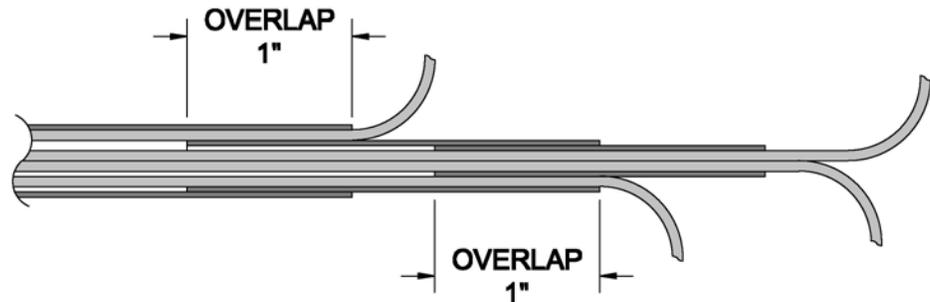


Figure 15 – Proper Heat Shrink Overlap

3. When the tubing section ends at a termination point (connector or terminal), slide a long piece into the main tubing and then cut it at the end of the wire (removing the last 1/4" or so of the wire as well).
4. With the heat shrink tubing installed, use a heat gun to shrink the tubing. Start at the EHC connector and work to the other end.

5. Start to re-fit the harness to the bike by plugging in the rear harness connector into the EHC.
6. Move along the harness and attach it to the bike where necessary.
7. Cut the ends of the harness to length (remember to allow room for movement and strain relief).
8. Strip the ends of the harness.
9. Attach the terminals to the wire ends and use a heat gun to shrink the strain reliefs.

Note: If no colored shrink tubing is attached to a terminal, use the black 1" pieces supplied with the kit.

10. Repeat the process for the other three harnesses.

CHAPTER 3 INDICATORS AND INSTRUMENTATION

Indicator Options

The EHC is designed to control LED-type dash indicators. LEDs are brighter, vibration resistant, more power efficient, usually don't need to be replaced, and are generally easier to mount on a custom bike. When a Thunder Heart Performance LED indicator panel is used (such as P/N RSE4088), simply find a suitable mounting location and plug the supplied 16" cable (72" cable is optional P/N RSE4145) into the EHC.



Figure 16—RSE4088

Speedometer Options

Thunder Heart also offers adapter harnesses for use with Dakota Digital speedometers (built-in indicators). See Appendix B, "Optional and Replacement Parts" for the correct harness for your application.

CHAPTER 4 OPERATION

4.1 Diagnostics

When the bike is first powered up, check the diagnostic LEDs on the label side of the EHC. If any of the LEDs are illuminated, the circuit whose label is next to the LED is either shorted to ground, or overloaded. This is generally due to a pinched bare wire, a faulty component, or use of components with excessive current draw (for example, too many lights on the headlight circuit).

Note: The current rating of the circuit protectors are affected by temperature, so care should be taken not to mount the EHC too close to the engine or exhaust system.

Note: Always turn the power off after an LED has been activated to reset the protection circuit.

If no LEDs are lit up, but the turn signals and dash indicators do not function properly, check that the EHC main ground wire (J4, Pin 4), has a good, solid connection to the chassis ground (such as the battery negative terminal or a paint-free boss on the frame).

4.2 Turn Signals

Table 1 – Summary of commands and the corresponding turn signal function

Command	Function
First command (left or right)	Flash 10 times, then cancel
Second command (same side)	Cancel
Second command (opposite side)	Cancel current sequence, flash opposite side 10 times, then cancel
Left and right side simultaneously	Flash all signals continuously (hazard function)
Brake switch activated	Flash rear signals 3 times, then go solid "on" for 30 seconds

APPENDIX A FREQUENTLY ASKED QUESTIONS

I can't read the pin numbers on the connectors.

Try rubbing a crayon or pencil across the back face of the connector. This will cause the numbers to stand out more clearly. Also, the number "1" terminal is designated by a rib on the side of the connector.

I am not using standard-type handlebar controls. How do I wire the "right" and "left" harness connectors?

Even if you use discrete switches instead of handlebar controls, the wiring diagram is the same. Since most of the switches are two-terminal types, the wire color on the diagram is not important. For example, if you were to reverse the horn switch terminals, the harness will still function properly.

Three-terminal switches such as the dimmer switch must be wired as shown for proper operation.

I am not using a “kill” switch. How do I wire the right handlebar harness?

You must use a “kill” switch. The kill switch is an extremely important safety device and should never be removed from the bike.

Why does my headlight work, but not the turn signals?

You may have a missing ground connection. The EHC must be grounded through the right handlebar connector using the supplied black wire to a good chassis ground.

What if I am using handlebar controls from a 1996-2003 motorcycle?

Different wire identifications were used on 1995-and-earlier motorcycles than 1996-2003 motorcycles. See Section 2.3 and Appendix D for more information.

APPENDIX B OPTIONAL AND REPLACEMENT PARTS

Table 2—EHC Optional and Replacement Parts

Component	Thunder Heart P/N	Notes
Starter Relay	RSE2206	Also available at most auto parts stores under Ford P/N F5TZ-14N089-B
EHC Module	RSE4200	
LED Indicator Panel	RSE4088	Optional
Incandescent Lamp Kit	RSE4091	Optional
16" Indicator Cable	RSE4145	Included with RSE4088
72" Indicator Cable	RSE4145	Optional
Dakota Digital Adapter Harness	ASM4145-DD	For Dakota Digital speedo P/N HLY5000
Dakota Digital Adapter Harness	ASM4145-00DD	For Dakota Digital speedo P/N HLY2000
Dakota Digital Adapter Harness	ASM HAR-HLY2001	For Dakota Digital speedo P/N HLY2001
Dakota Digital Adapter Harness	HAR3015-HD	For Dakota Digital speedo P/N HLY3015

APPENDIX C TROUBLESHOOTING

SYMPTOM	POSSIBLE CAUSE	SOLUTION
Turn signal flashes rapidly	LED Turn signal burned out or defective	Replace LED bulb assembly
	Turn signal not wired correctly	Correct wiring per instructions
	Poor connection	Fix connection

APPENDIX D WIRING TABLES AND DIAGRAMS

Table 3—Front Harness Connector Pin Assignments

PIN	FUNCTION	COLOR	AWG
1	AUXILARY POWER	RED	18
2	TURN SIGNAL, LEFT FRONT	PURPLE	18
3	LOW BEAM	YELLOW	18
4	HORN	YELLOWw/BLACK STRIPE	18
5	TURN SIGNAL, RIGHT FRONT	BROWN	18
6	HIGH BEAM	WHITE	18

Table 4—Left Handlebar Connector Pin Assignments

PIN	FUNCTION	COLOR (pre-1996)	AWG	COLOR (1996-2003)	AWG
1	LOW BEAM (FROM SWITCH)	YELLOW	18	YELLOW	18
2	HOR SWITCH POWER	ORANGE	18	ORANGEW/WHITE STRIPE	18
3	DIMMER SWITCH POWER	BLUE	18	BLUE	18
4	HIGH BEAM (FROM SWITCH)	WHITE	18	WHITE	18
5	LEFT SIGNAL POWER	GREEN	18	ORANGEW/WHITE STRIPE*	18
6	BLOCK-OFF-PIN	N/A	N/A	N/A	18
7	HORN (FROM SWITCH)	BLACK	18	YELLOWw/BLACK STRIPE	18
8	BLOCK-OFF-PIN	N/A	N/A	N/A	N/A
9	FROM LEFT SIGNAL SWITCH	VIOLET	18	WHITew/PURPLE STRIPE	18

*Not required for 1996-2003 partial diagnostic method

Table 5—Right Handlebar Connector Pin Assignments

PIN	FUNCTION	COLOR (pre-1996)	AWG	COLOR (1996-2003)	AWG
1	RIGHT SIGNAL SWITCH POWER	GREEN	18	ORANGEW/WHITE STRIPE*	18
2	BRAKE SWITCH POWER	ORANGE	18	ORANGEW/WHITE STRIPE	18
3	KILL SWITCH POWER	GREY	18	GREY	18
4	GROUND (TO CHASSIS)	BLACKw/RED STRIPE	18	BLACK	18
5	START RELAY (FROM SWITCH)	BLACKw/RED STRIPE	18	BLACKw/RED STRIPE	18
6	COIL + (FROM KILL SWITCH)	WHITew/BROWN STRIPE	18	WHITew/BLACK STRIPE	18
7	BLOCK-OFF-PIN	N/A	18	N/A	N/A
8	FROM RIGHT SIGNAL SWITCH	BROWN	18	WHITew/BROWN STRIPE	18
9	BRAKE LIGHT (FROM SWITCH)	RED	18	REDw/YELLOW STRIPE	18

*Not required for 1996-2003 partial diagnostic method

Table 6 – Rear Harness Connector Pin Assignments

PIN	FUNCTION	COLOR	AWG
1	AUXILARY POWER (3A)	RED	18
2	HORN	YELLOWw/BLACK STRIPE	18
3	BRAKE LIGHT	REDw/YELLOW STRIPE	18
4	TURN SIGNAL, RIGHT REAR	BROWN	18
5	BRAKE SWITCH	REDw/BLUE STRIPE	18
6	IGNITION SYSTEM (COIL +)	WHITEw/BLACK STRIPE	18
7	TURN SIGNAL, LEFT REAR	PURPLE	18
8	BRAKE SWITCH	ORANGE	18
9	TAIL LIGHT	BLUE	18
10	NEUTRAL SWITCH	YELLOW	18
11	OIL SWITCH	GREEN	18
12	STARTER SOLENOID	GREEN	12
13	BATTERY +	BLACK	12
14	IGNITION SWITCH	RED	12
15	IGNITION SWITCH	REDw/BLACK STRIPE	12

Figure 17—Front Harness Wiring Diagram

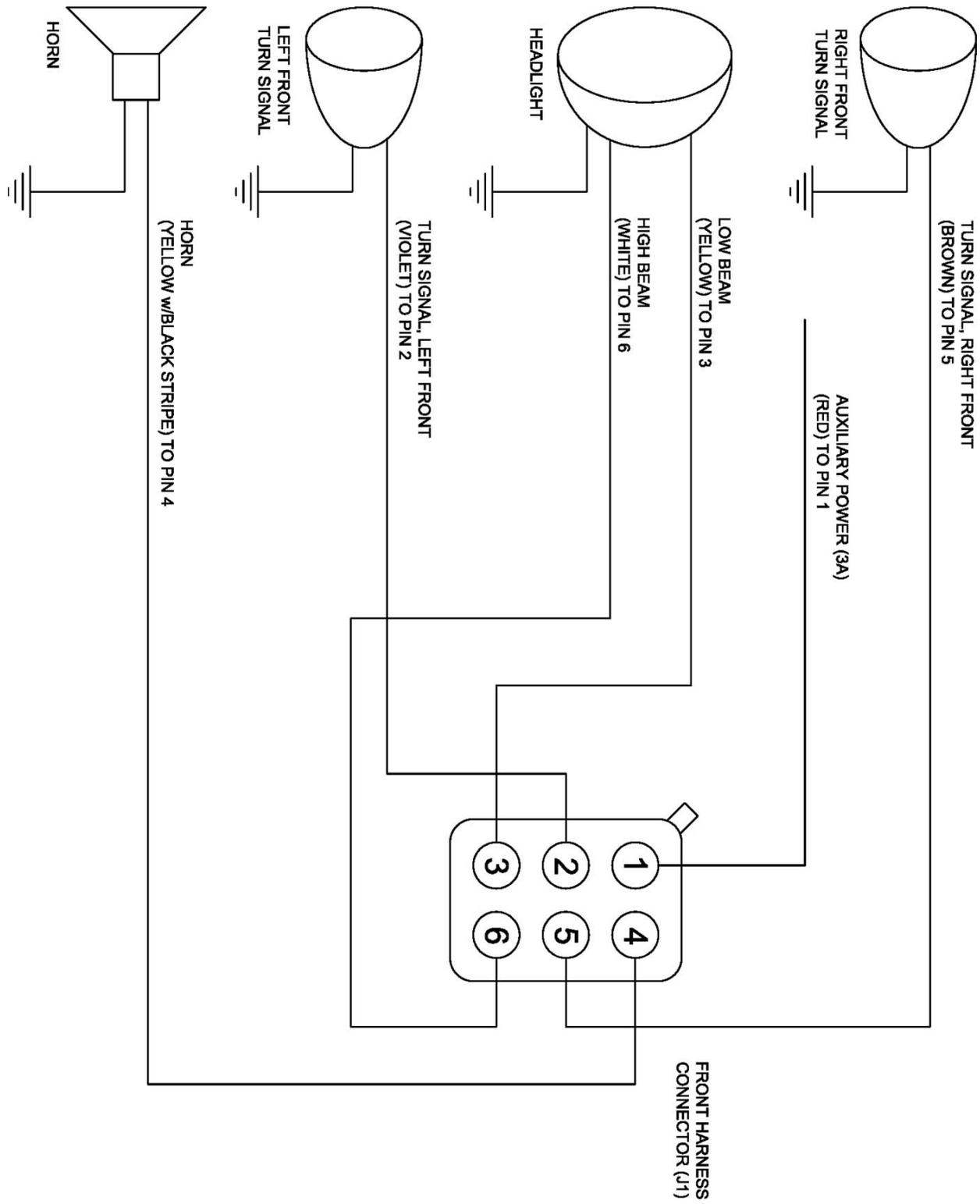


Figure 18—Pre-1996 Hand Control Wiring Diagram

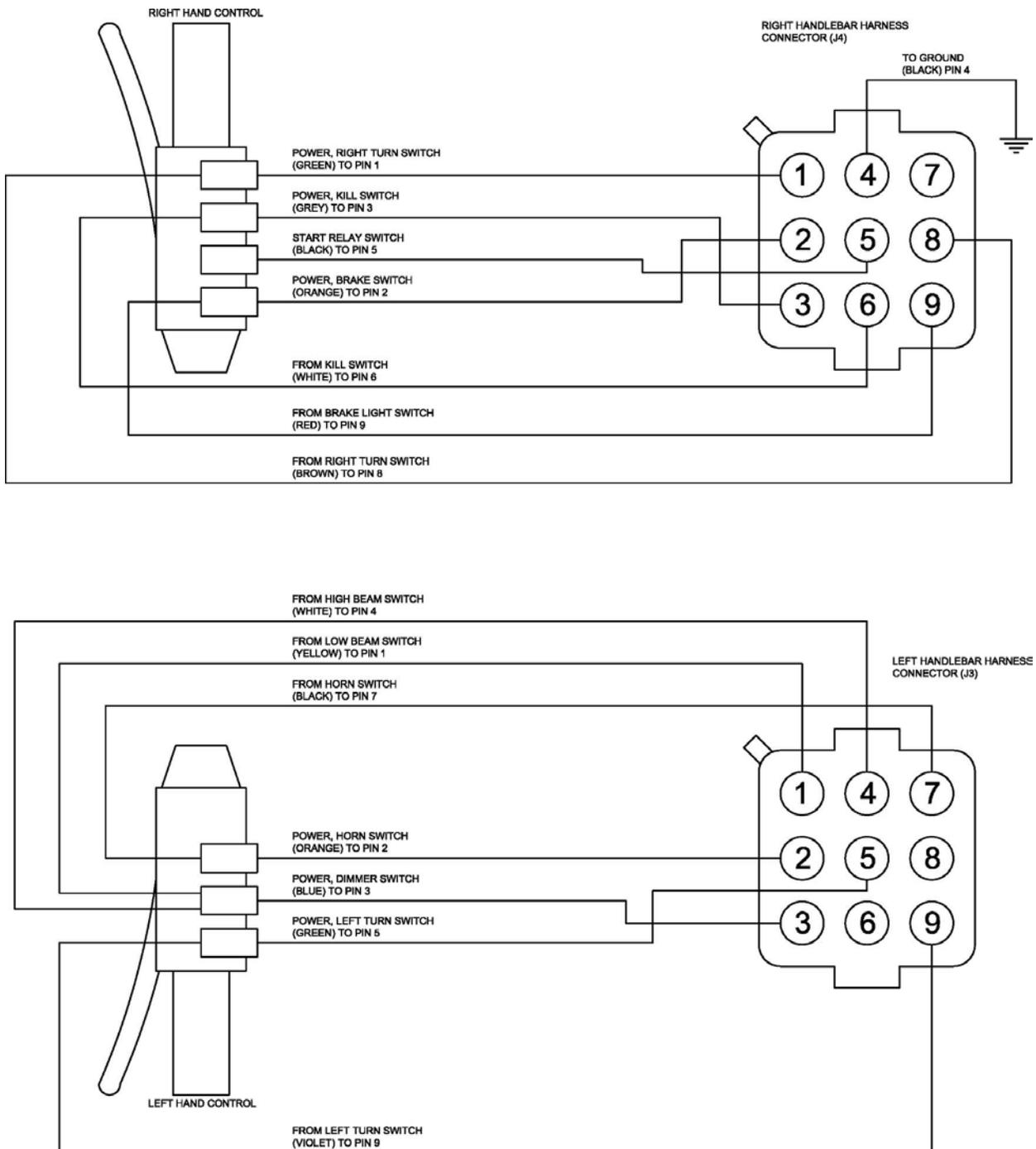


Figure 19—1996-2003 Hand Control Wiring Diagram (Partial Diagnostics)

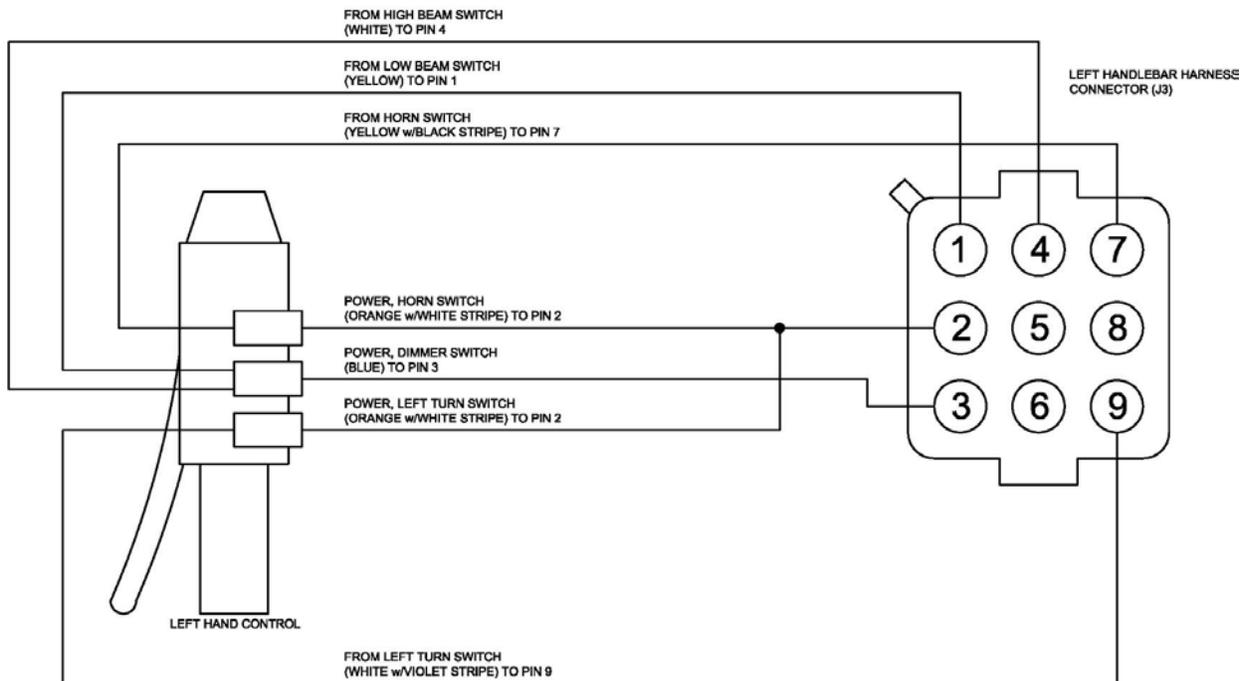
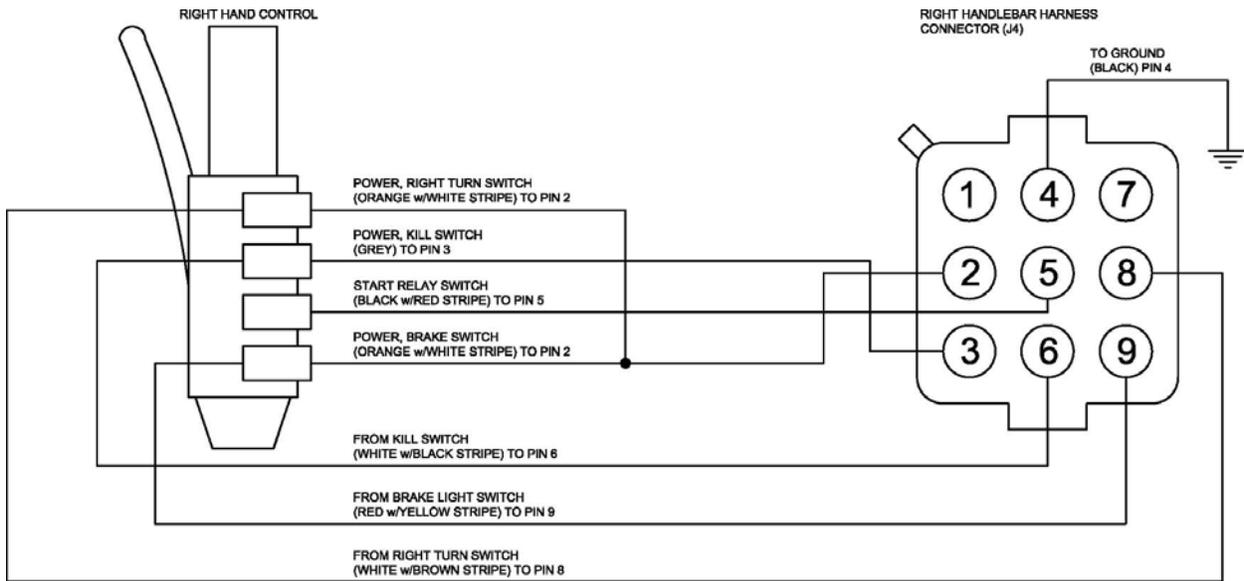


Figure 20—1996-2003 Hand Control Wiring Diagram (Full Diagnostics)

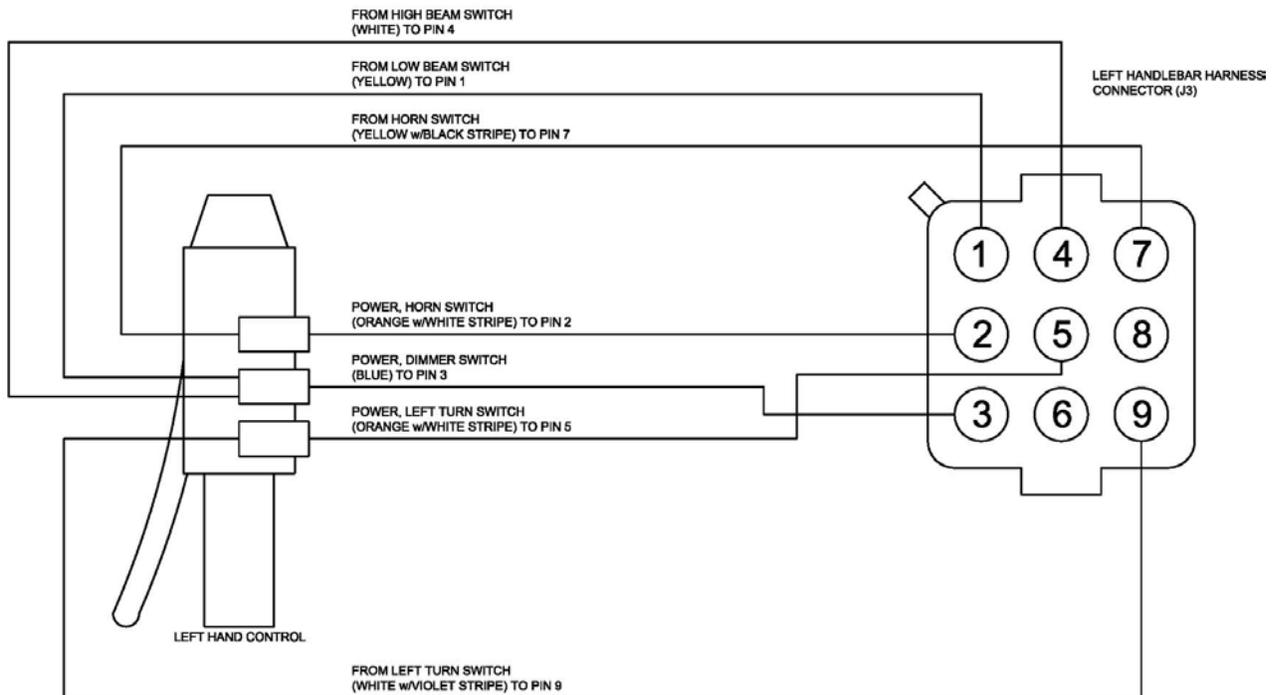
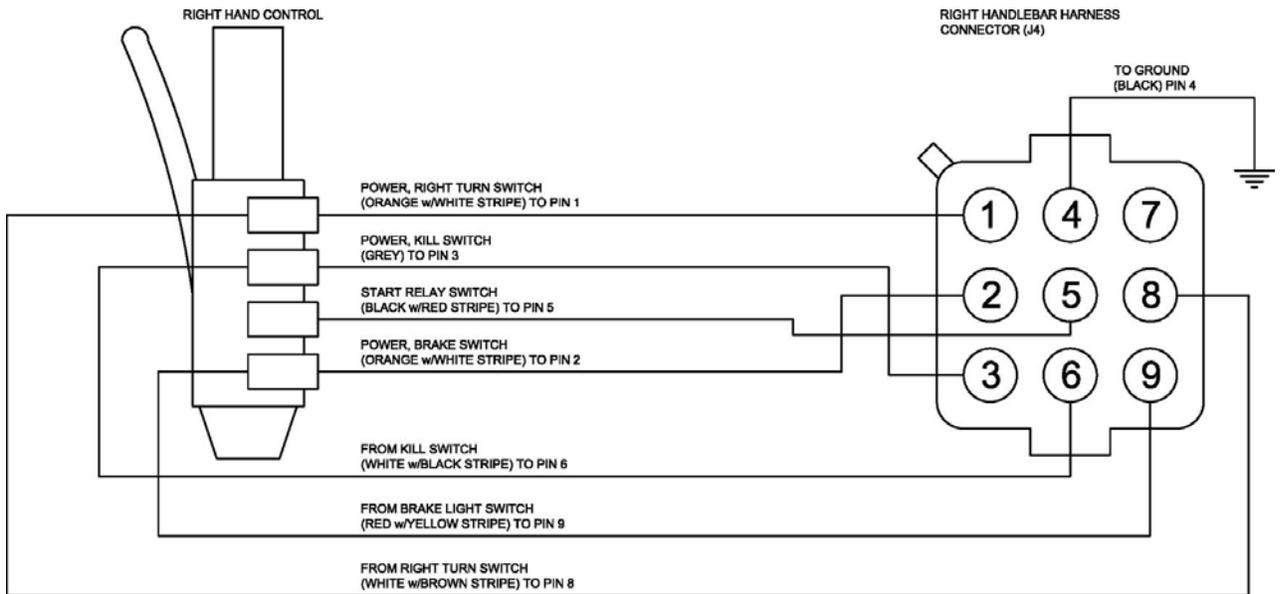


Figure 21—Rear Harness Wiring Diagram, Turn as Signals Only

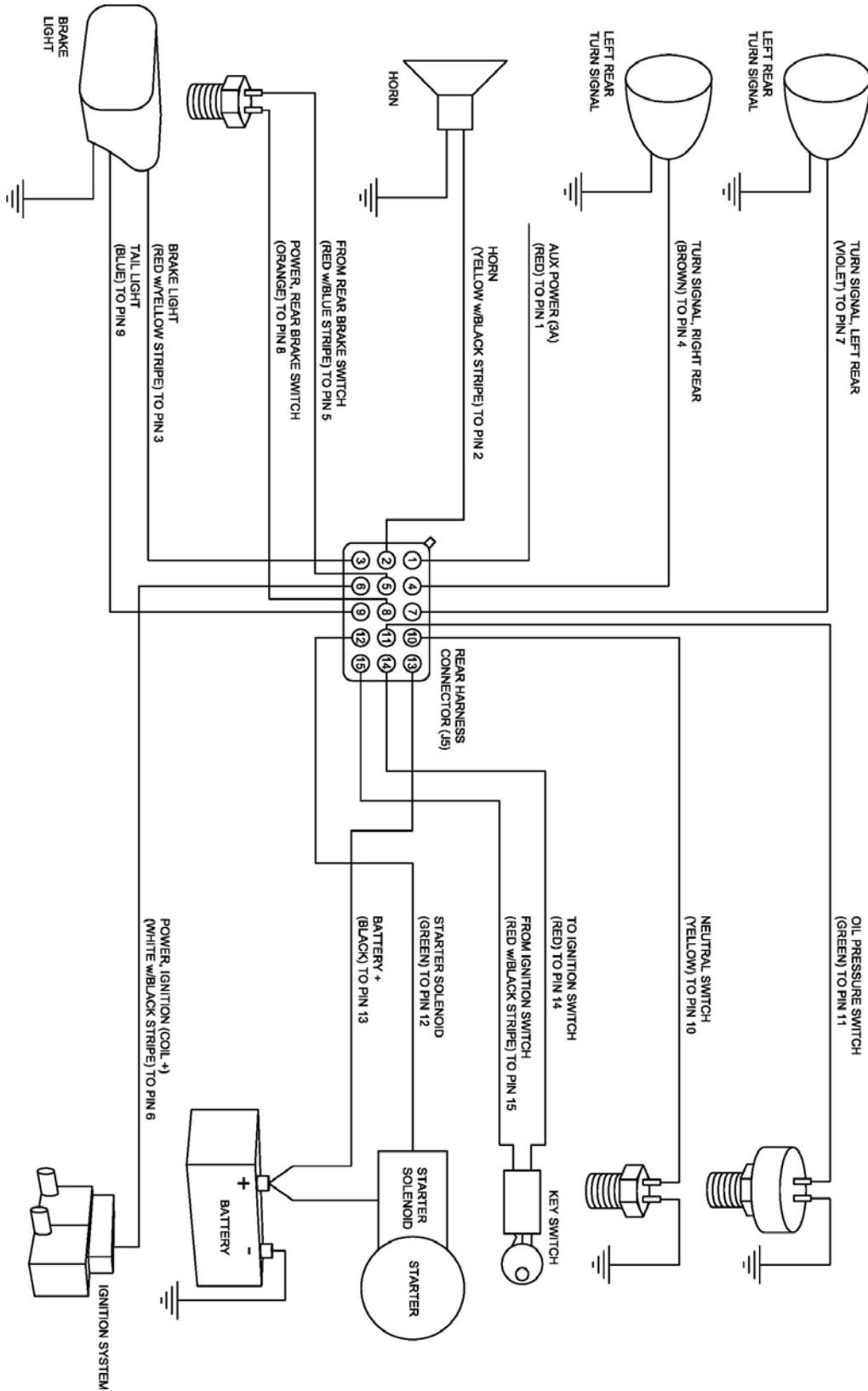


Figure 22—Rear Harness Wiring Diagram, Turn as Brake and Tail Lights

