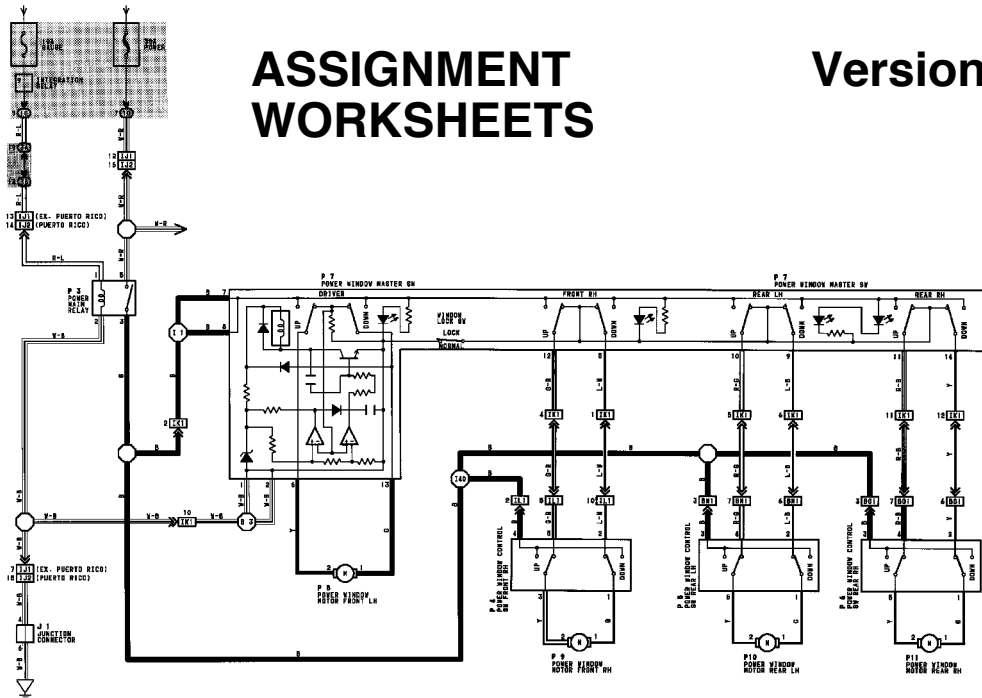


BODY ELECTRICAL

ASSIGNMENT WORKSHEETS

Version 1.8



TOYOTA ELECTRICAL WIRING DIAGRAM WORKBOOK

<http://www.autoshop101.com>

*Developed by Kevin R. Sullivan
All Rights Reserved*

TOYOTA

Table of Contents

Wiring Diagrams

1. Understanding Diagrams Page U-1

Lighting Systems

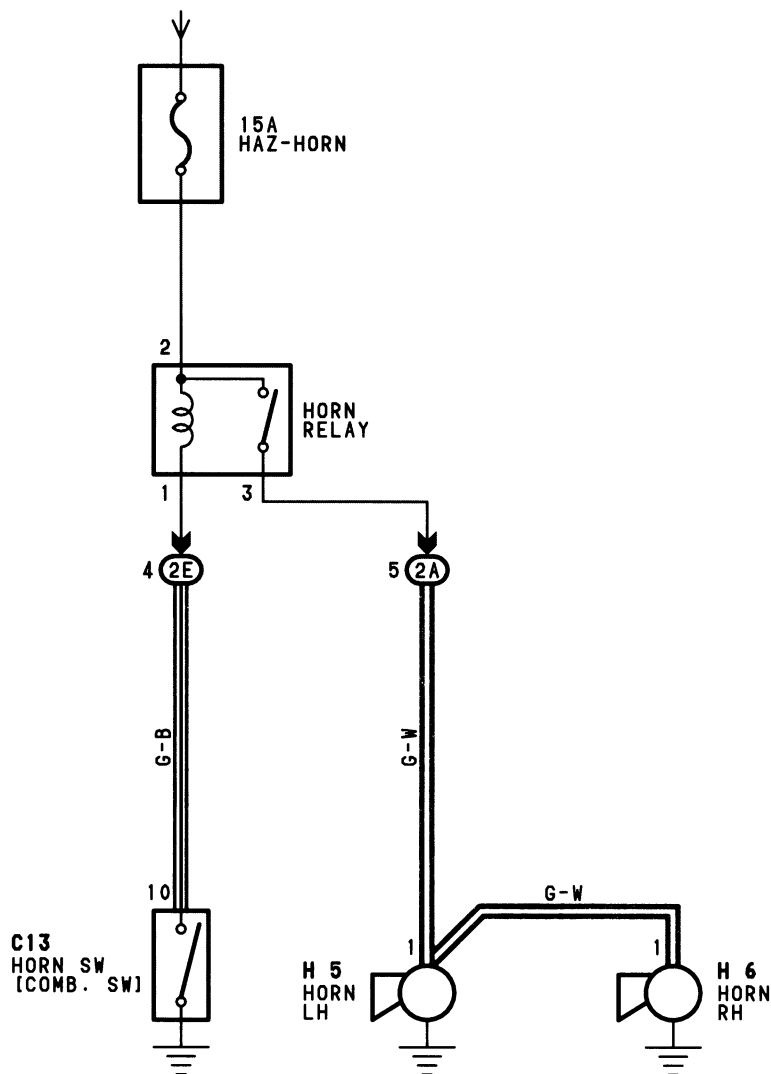
1. Headlights Page L-1
2. Turnsignals & Hazard Page L-2
3. Stop Lights Page L-3
4. Automatic Light Turn-off Page L-4
5. Daytime Running Lights Page L-5

Accessories Systems

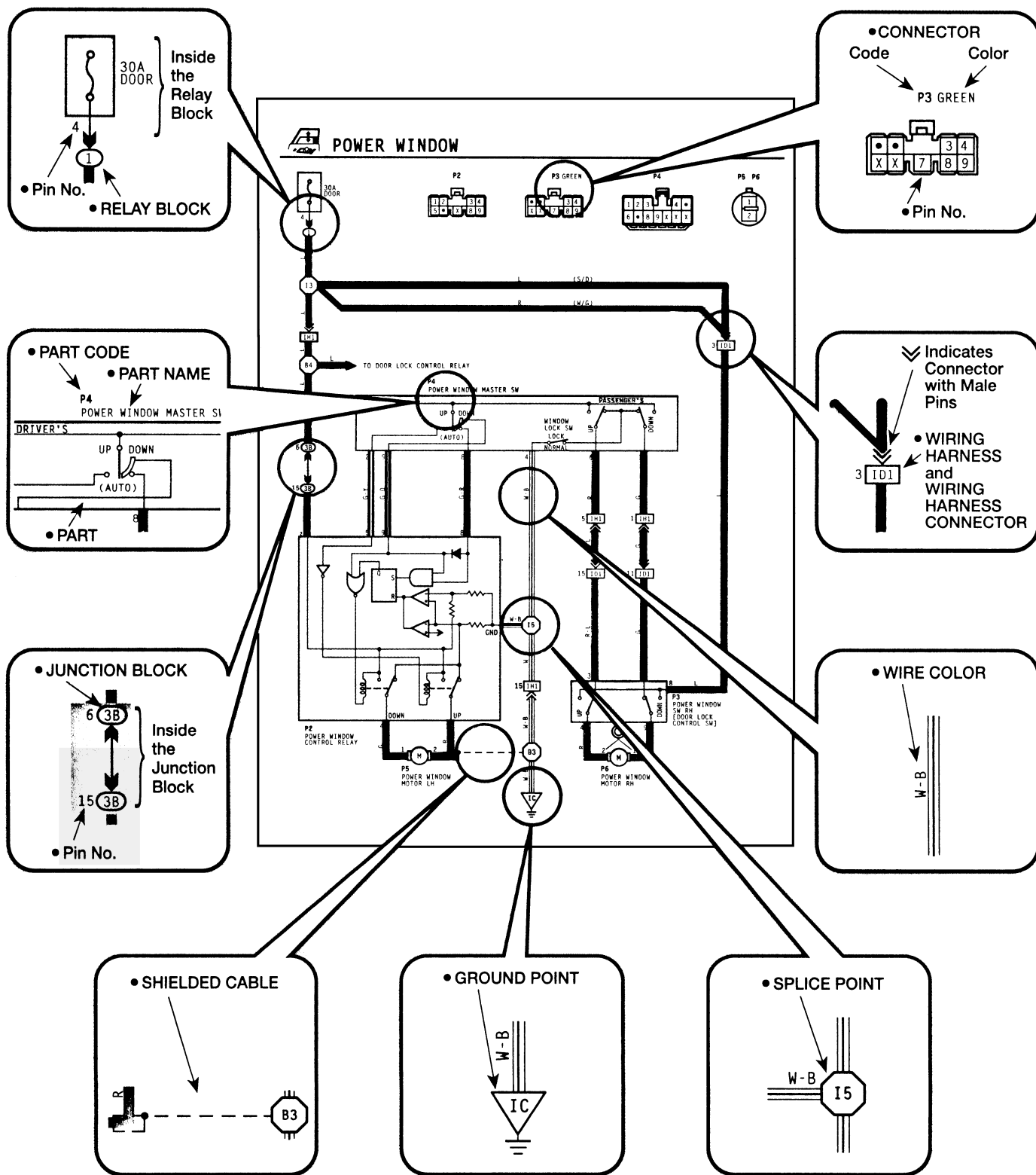
1. Rear Window Defogger Page A-1
2. Power Windows Page A-2
3. Power Mirrors Page A-3
4. Door Locks Page A-4
5. Clock & Cig Lighter Page A-5
6. Front Wiper & Washer Page A-6
7. Fan & Blower Page A-7
8. Shift Lock Page A-8

TOYOTA

Understanding Wiring Diagrams Worksheets



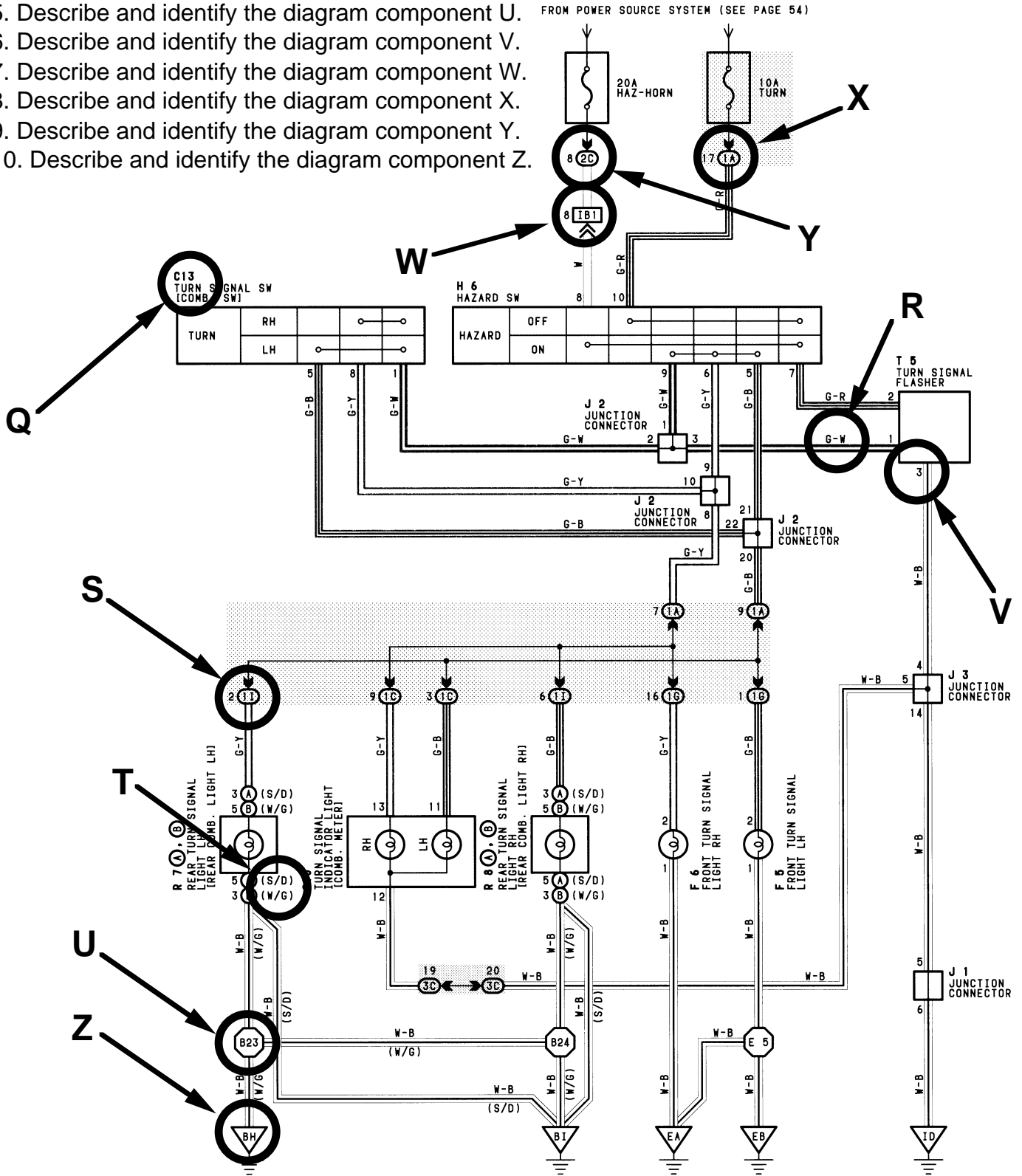
READING TOYOTA ELECTRICAL WIRING DIAGRAMS



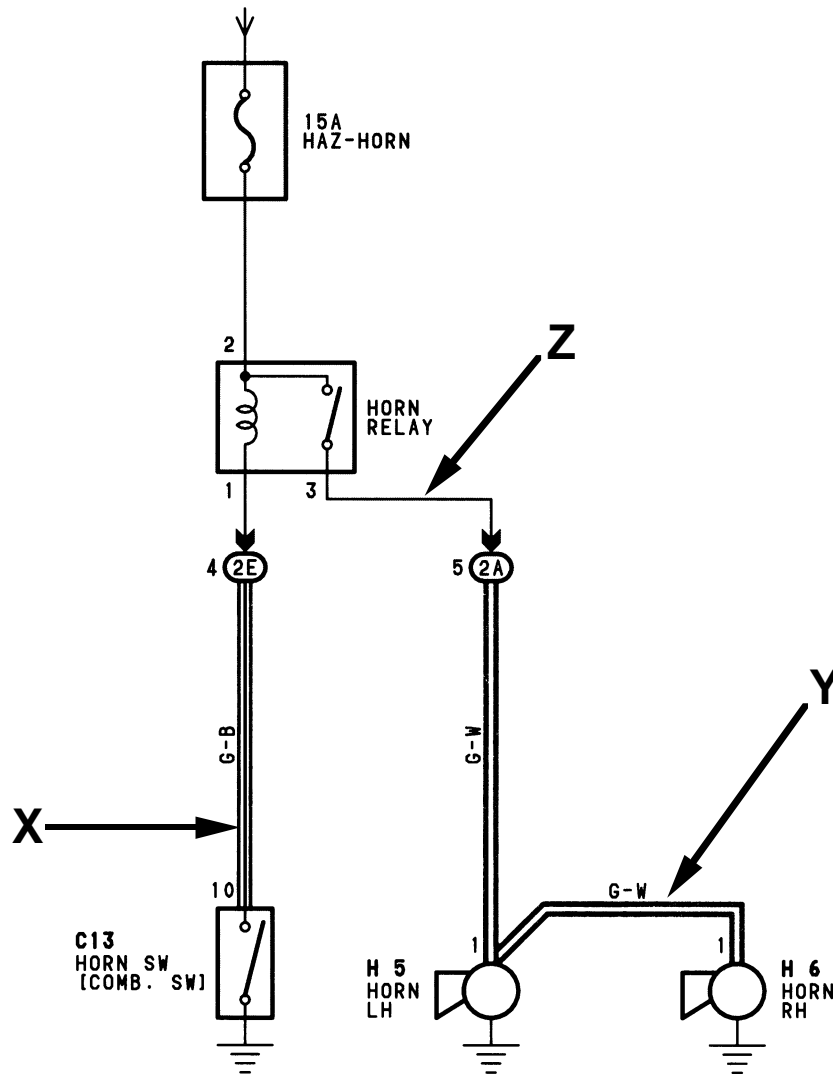
TOYOTA ELECTRICAL WIRING SYMBOLS

TERM(S)	SYMBOL(S)	TERM(S)	SYMBOL(S)	TERM(S)	SYMBOL(S)	TERM(S)	SYMBOL(S)	TERM(S)	SYMBOL(S)
BATTERY		HEADLIGHTS 1. SINGLE FILAMENT 2. DOUBLE FILAMENT		RELAY 1. NORMALLY CLOSED 2. NORMALLY OPEN		SPEAKER			
CAPACITOR (Condenser)		HORN		RELAY, DOUBLE THROW		SWITCH, MANUAL 1. NORMALLY OPEN 2. NORMALLY CLOSED			
CIGARETTE LIGHTER		IGNITION COIL		RESISTOR		SWITCH, DOUBLE THROW			
CIRCUIT BREAKER		LIGHT		RESISTOR, TAPPED		SWITCH, IGNITION			
DIODE		LED (Light Emitting Diode)		RESISTOR, VARIABLE or RHEOSTAT		SWITCH, WIPER PARK			
DIODE, ZENER		METER, ANALOG		SENSOR		TRANSISTOR			
DISTRIBUTOR, IIA		METER, DIGITAL		SENSOR, ANALOG SPEED		WIRES 1. NOT CONNECTED 2. SPliced			
FUSE, FUSIBLE LINK		MOTOR		SOLENOID					
GROUND									

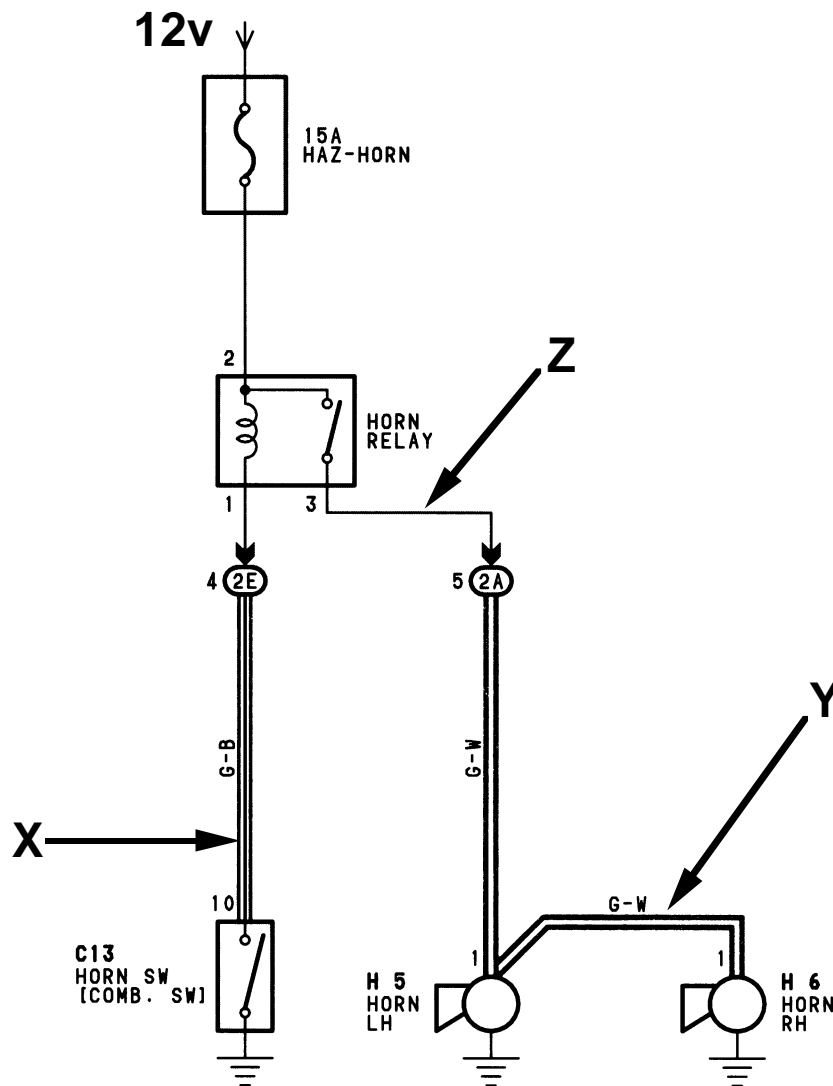
- 1. Describe the meaning of the "C13" in the diagram component Q.
- 2. Describe the meaning of the "G-W" in diagram component R.
- 3. Describe the meaning of the "2" in diagram component S.
- 4. Describe the meaning of the "S/D" in diagram component T.
- 5. Describe and identify the diagram component U.
- 6. Describe and identify the diagram component V.
- 7. Describe and identify the diagram component W.
- 8. Describe and identify the diagram component X.
- 9. Describe and identify the diagram component Y.
- 10. Describe and identify the diagram component Z.



1. Draw in GREEN the HORN CONTROL circuit from the battery to ground.
2. Draw in RED the HORN circuit from the battery to ground.
3. Draw in BLUE the part of the circuit that is common to both the control and load (horn) circuit.



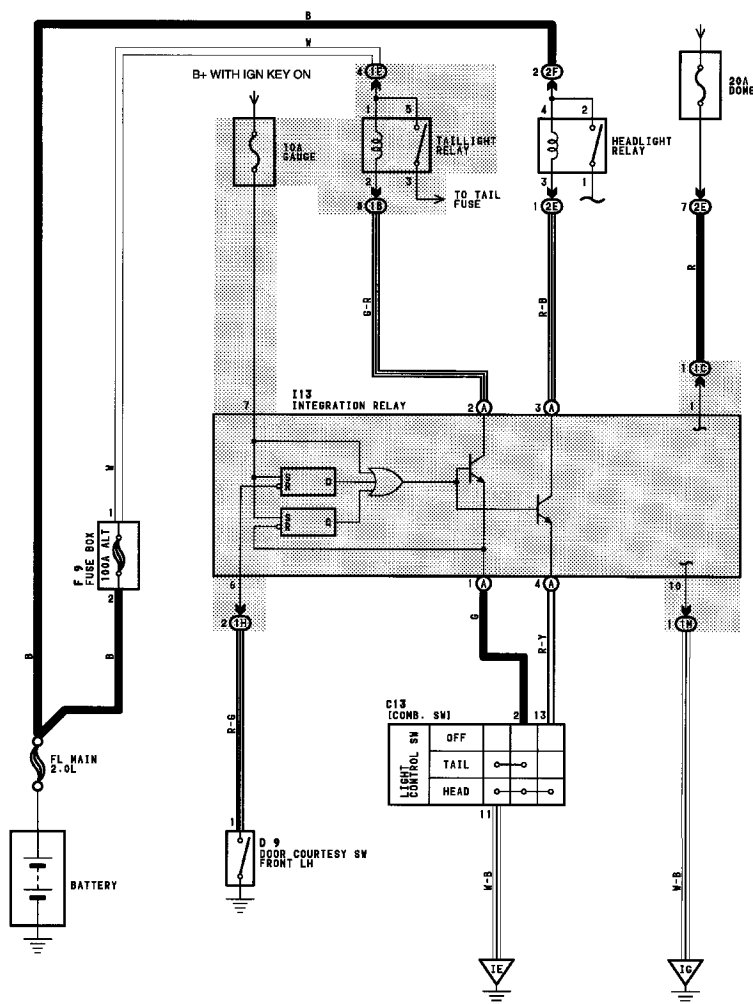
1. How will the circuit be affected if there were an open at point X.
2. How will the circuit be affected if there were an open at point Y.
3. How will the circuit be affected if there were an open at point Z.
4. If the Horn Switch is OPEN, what voltage potential (Ground, Positive, or Electrically Dead) would you expect to find at point X, Y, & Z.
5. If the Horn Switch is CLOSED, what voltage potential (Ground, Positive, or Electrically Dead) would you expect to find at point X, Y, & Z.

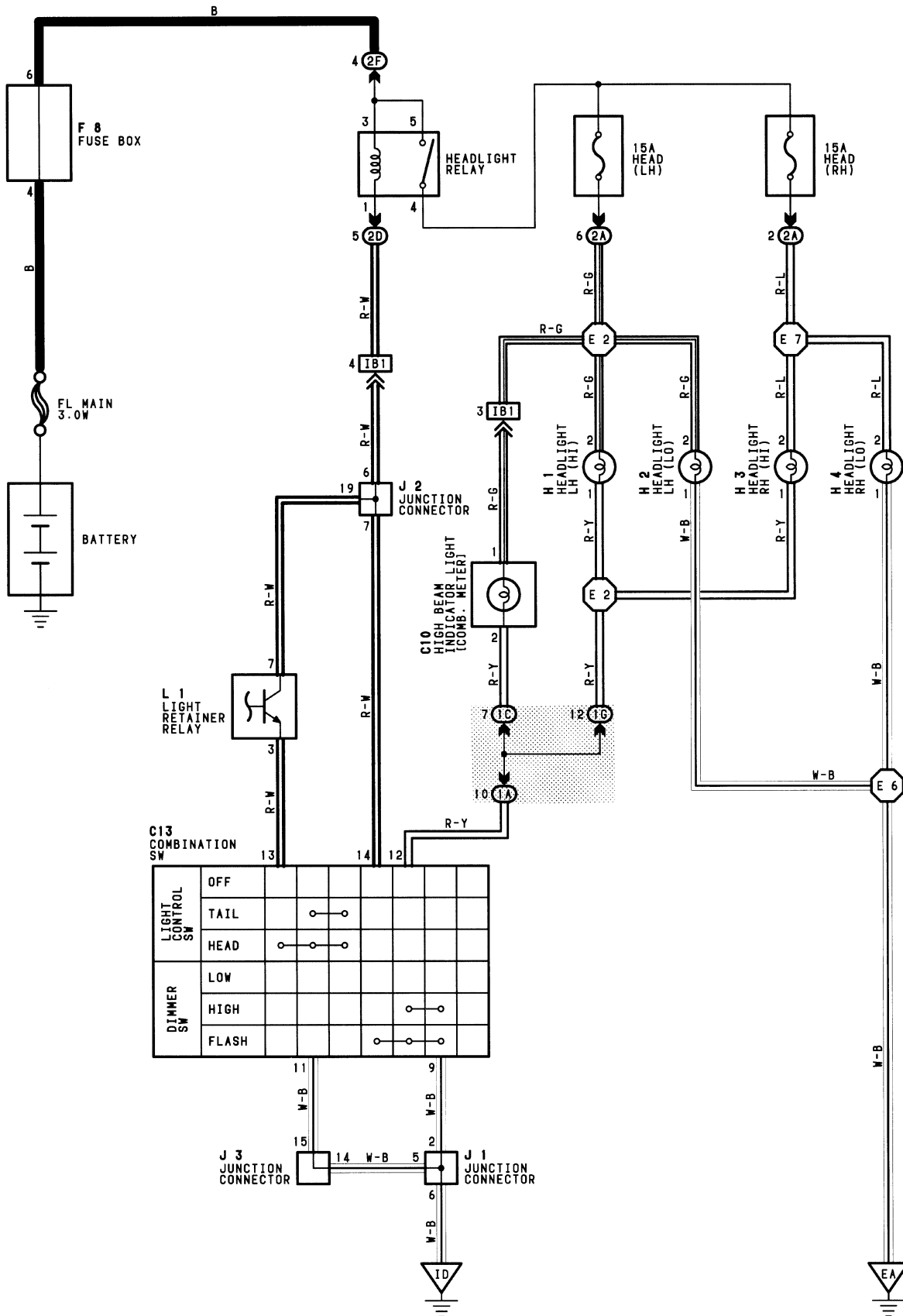


TOYOTA

Headlight

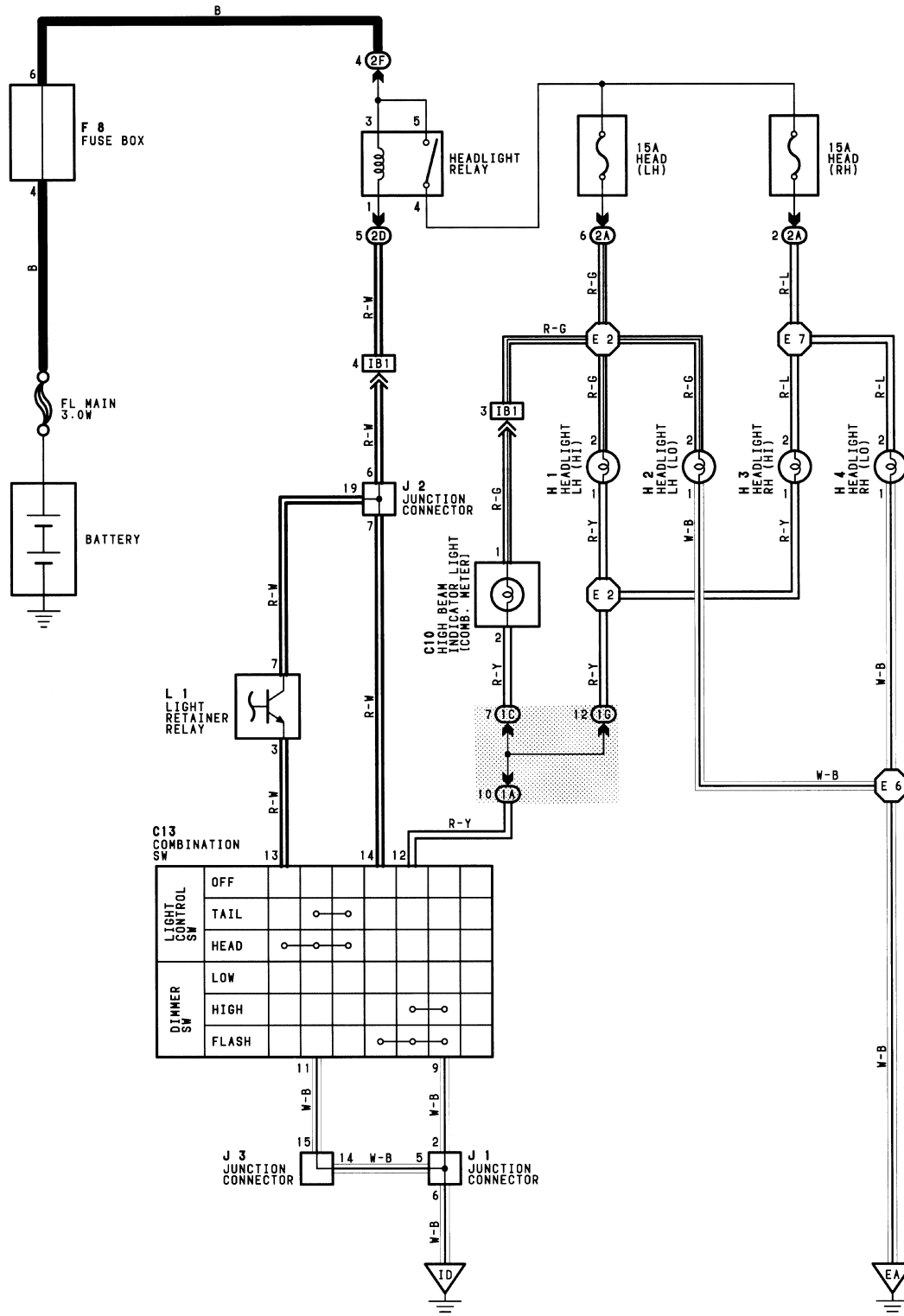
Worksheets



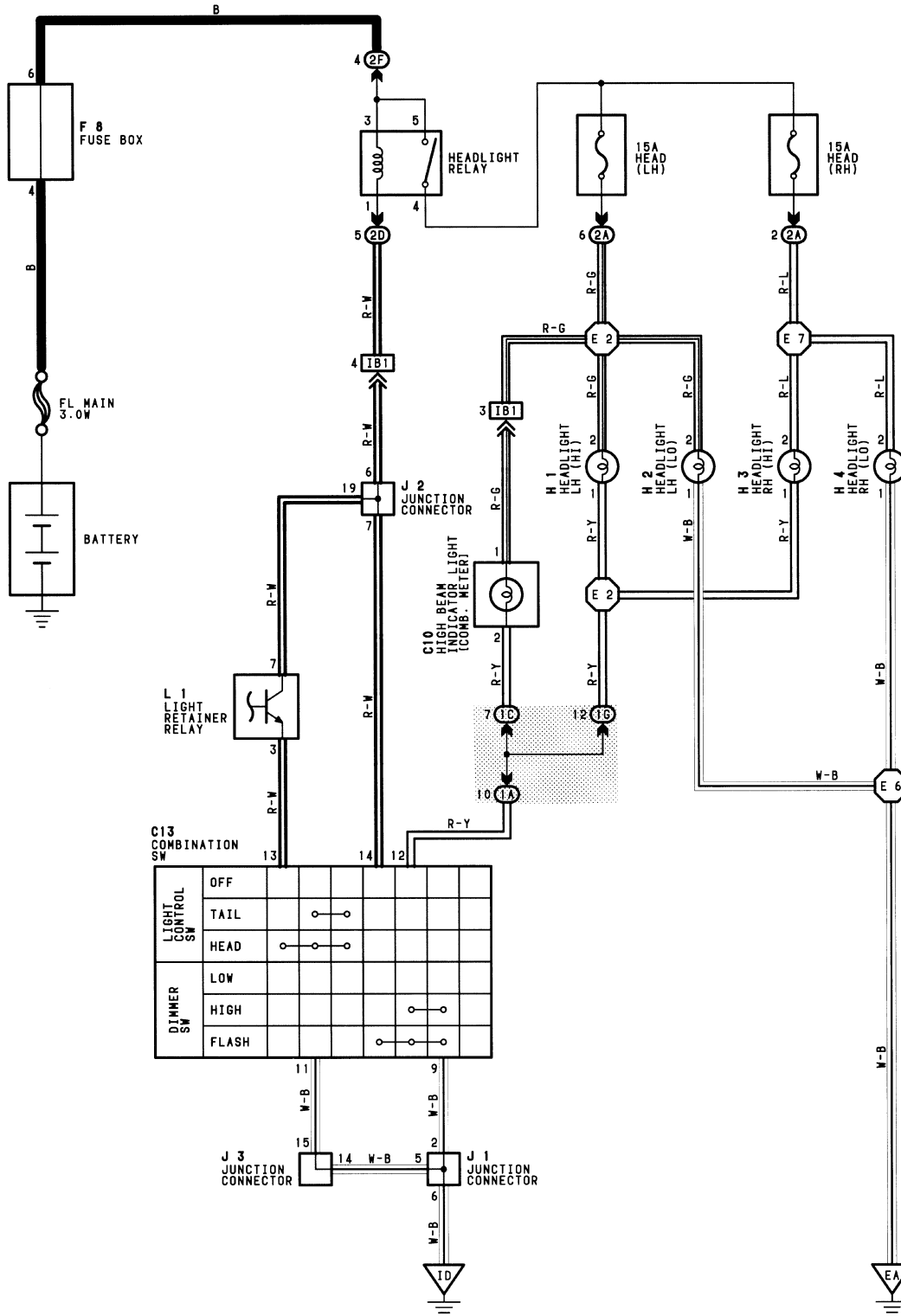


LIGHT CONTROL SW	OFF								
	TAIL								
DIMMER SW	HEAD								
	LOW								
	HIGH								
	FLASH								

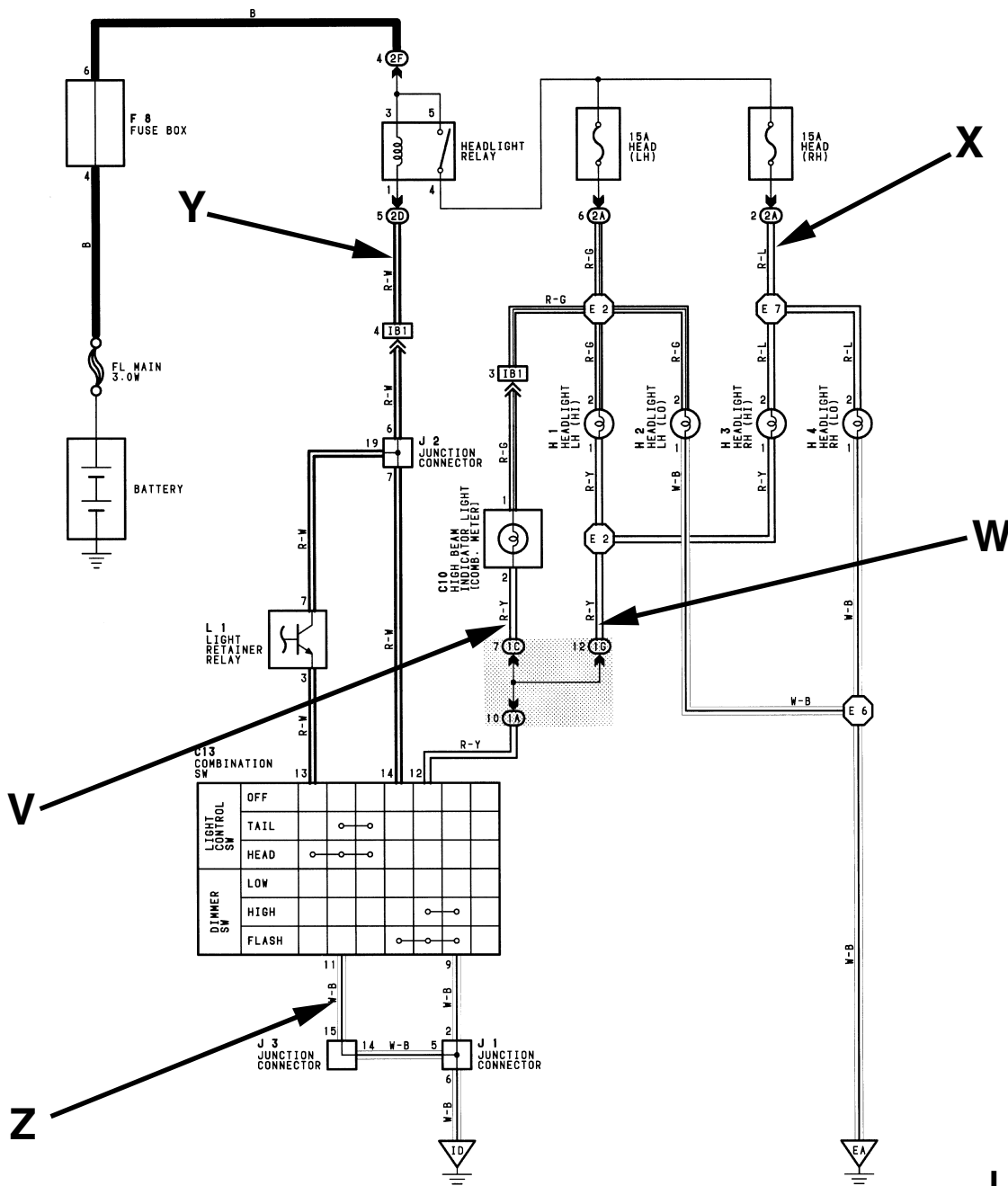
1. Draw in GREEN the HEAD LAMP CONTROL circuit from the battery to ground.
2. Draw in RED the LOW BEAM circuit from the battery to ground.
3. Draw in BLUE the HIGH BEAM circuit from the battery to ground.



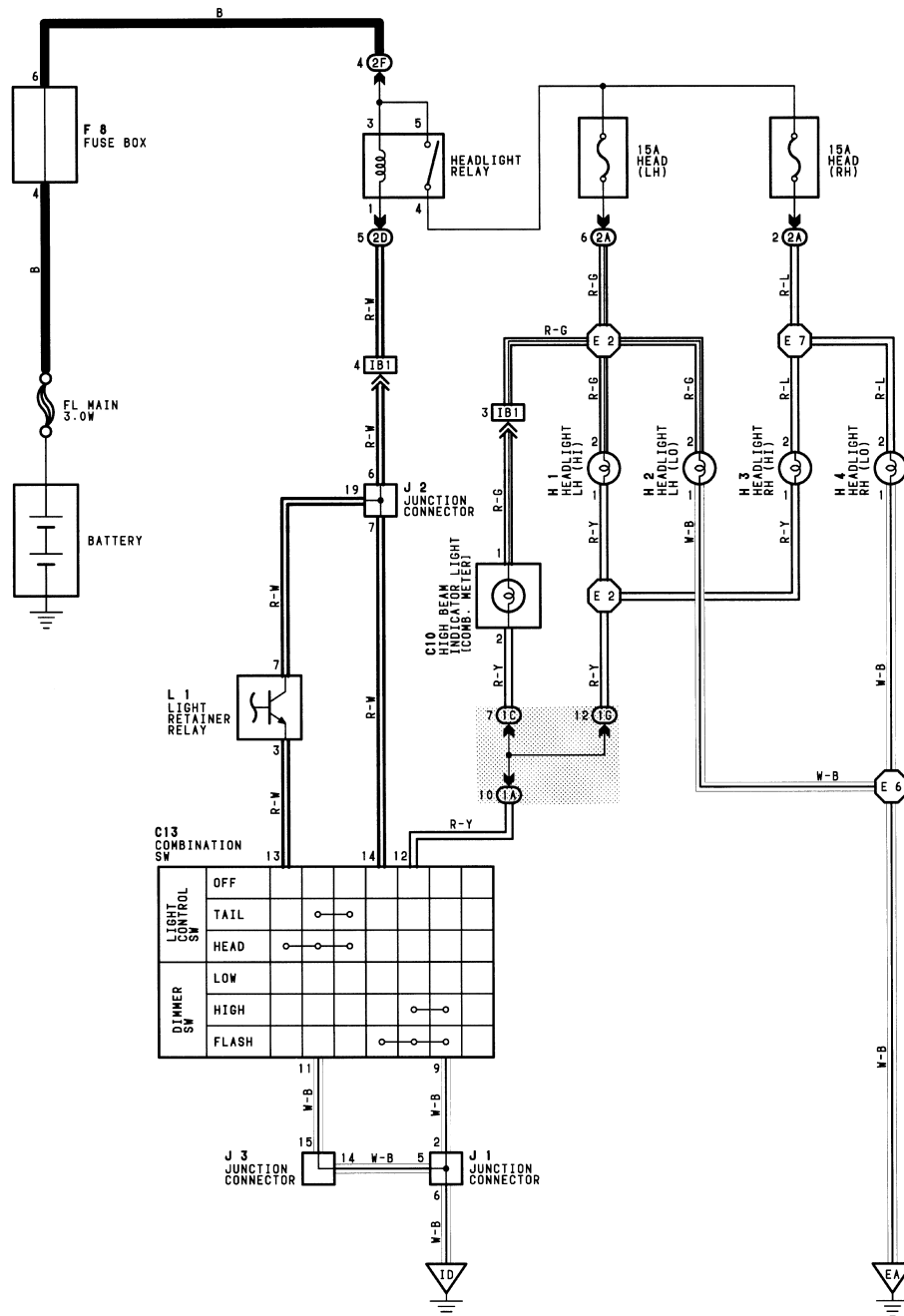
1. THE HEADLAMP SWITCH IS PLACED IN THE FLASH POSITION
2. Draw in GREEN the HEAD LAMP CONTROL circuit from the battery to ground.
3. Draw in BLUE the circuit through the headlamps in the FLASH position from the battery to ground.



1. With the Headlamp Switch in the OFF position, what voltage would you expect to find at point **V**, **W**, **X**, **Y**, & **Z**.
2. With the Headlamp Switch in the ON position, LOW BEAM position, what voltage would you expect to find at point **V**, **W**, **X**, **Y**, & **Z**.
3. With the Headlamp Switch in the ON position, HIGH BEAM position, what voltage would you expect to find at point **V**, **W**, **X**, **Y**, & **Z**.
4. How will the circuit be affected if there is an open at point **V**.
5. How will the circuit be affected if there is an open at point **W**.
6. How will the circuit be affected if there is an open at point **X**.
7. How will the circuit be affected if there is an open at point **Y**.
8. How will the circuit be affected if there is an open at point **Z**.



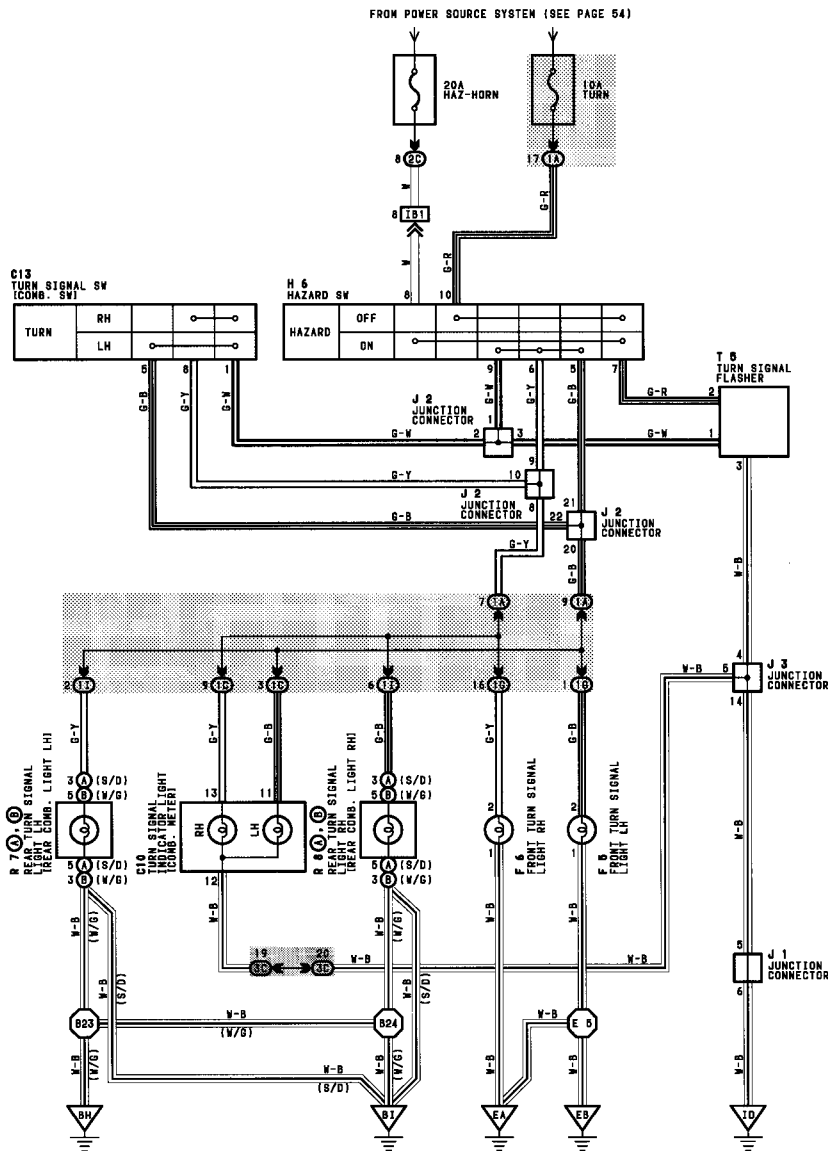
- Trace in GREEN the portion of the circuit below that you suspect could be at fault. Both LOW BEAM HEADLAMPS do not work. High Beam and Flash positions work correctly. The tail lamps function correctly.
- Trace in RED the portion of the circuit below that you suspect could be at fault. The LEFT LOW BEAM HEADLAMP does not work. All other lamps function correctly in the positions. The tail lamps function correctly.
- Trace in BLUE the portion of the circuit below that you suspect could be at fault. The RIGHT HIGH BEAM HEADLAMP does not work in any position. The tail lamps function correctly.
- Trace in ORANGE the portion of the circuit below that you suspect could be at fault. The HEADLAMPS do not work in any position including flash. The tail lamps function correctly.



TOYOTA

Turn/Hazard Lamps

Worksheets



SERVICE HINTS

T 5 TURN SIGNAL FLASHER

2-GROUND: APPROX. 12VOLTS WITH IGNITION SW ON OR HAZARD SW ON
 1-GROUND: CHANGES FROM 12 TO 0VOLTS WITH IGNITION SW ON AND TURN SIGNAL SW LEFT OR RIGHT, OR WITH HAZARD SW ON
 3-GROUND: ALWAYS CONTINUITY

○ : PARTS LOCATION

CODE	SEE PAGE	CODE	SEE PAGE	CODE	SEE PAGE
C10	30	J 1	31	R 8	A 32(S/D)
C13	30	J 2	31		B 33(W/G)
F 5	28	J 3	31	T 5	31
F 6	28	R 7	A 32(S/D)		
H 6	31		B 33(W/G)		

○ : JUNCTION BLOCK AND WIRE HARNESS CONNECTOR

CODE	SEE PAGE	JUNCTION BLOCK AND WIRE HARNESS (CONNECTOR LOCATION)
1A	20	INSTRUMENT PANEL WIRE AND J/B NO.1 (LEFT KICK PANEL)
1C		
1G	20	ENGINE ROOM MAIN WIRE AND J/B NO.1 (LEFT KICK PANEL)
1I	20	FLOOR WIRE AND J/B NO.1 (LEFT KICK PANEL)
2C	22	ENGINE ROOM MAIN WIRE AND J/B NO.2 (ENGINE COMPARTMENT LEFT)
3C	24	INSTRUMENT PANEL WIRE AND J/B NO.3 (BEHIND THE INSTRUMENT PANEL CENTER)

□ : CONNECTOR JOINING WIRE HARNESS AND WIRE HARNESS

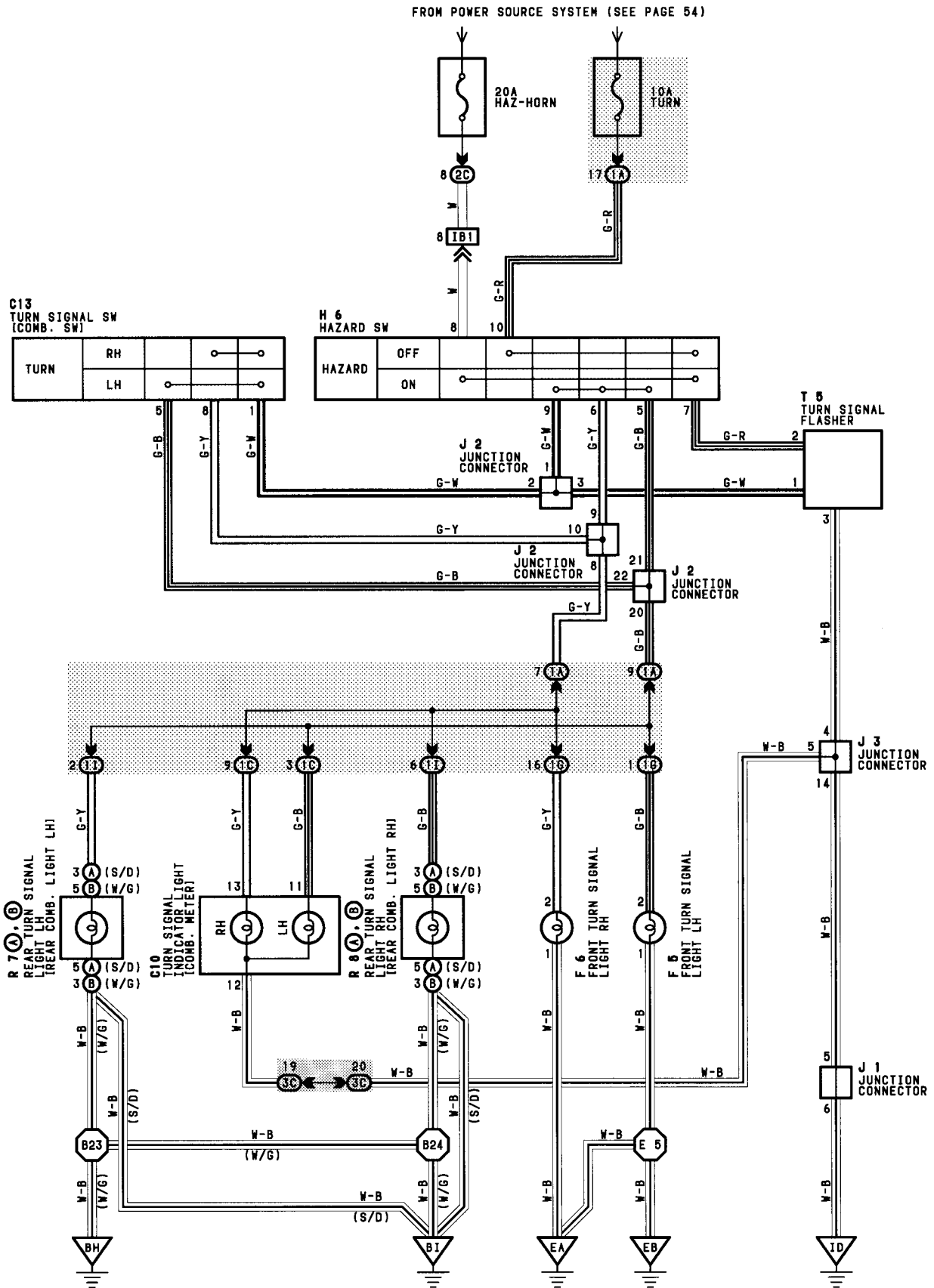
CODE	SEE PAGE	JOINING WIRE HARNESS AND WIRE HARNESS (CONNECTOR LOCATION)
IB1	36	ENGINE ROOM MAIN WIRE AND INSTRUMENT PANEL WIRE (LEFT KICK PANEL)

▽ : GROUND POINTS

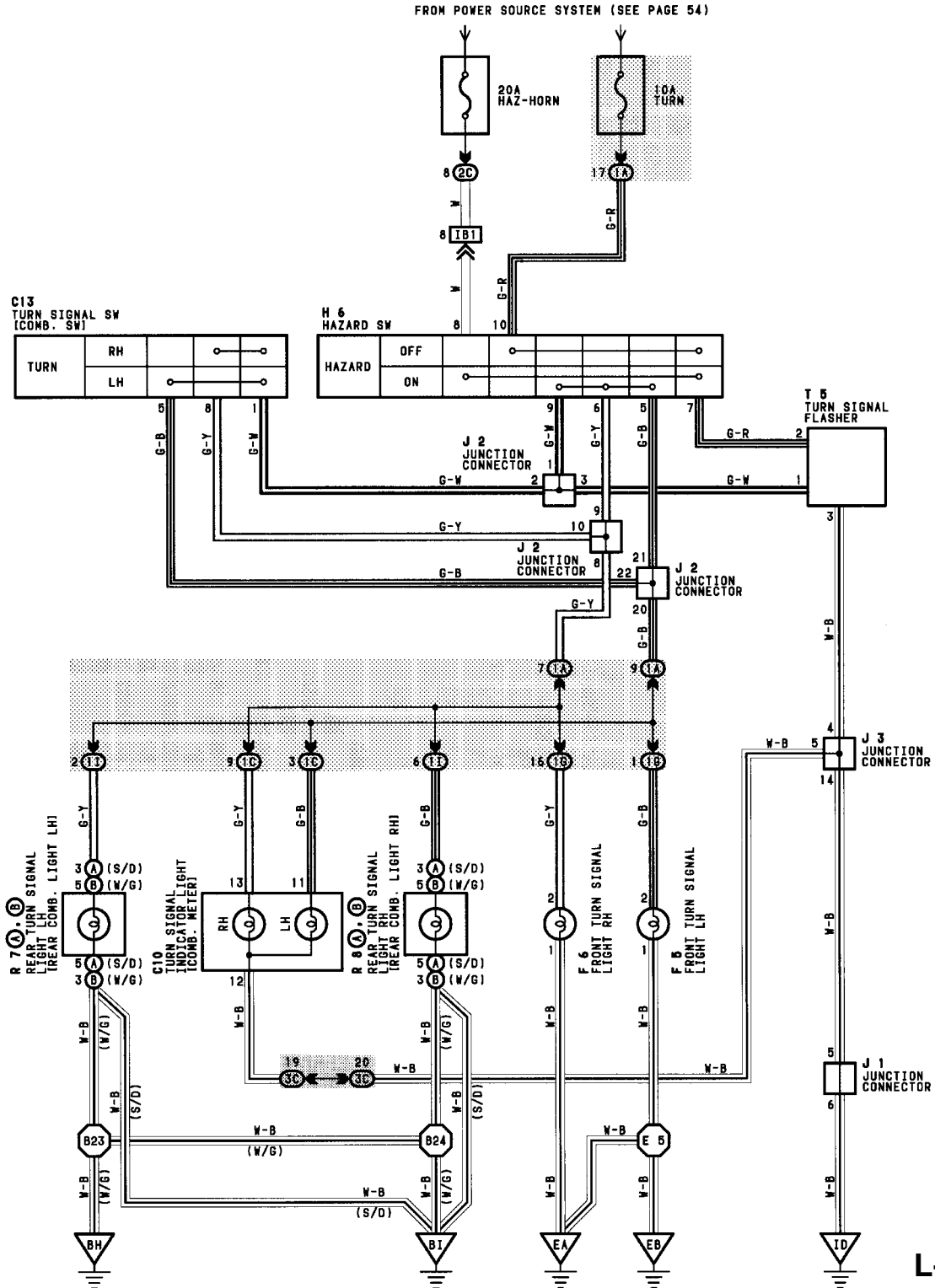
CODE	SEE PAGE	GROUND POINTS LOCATION
EA	34	FRONT RIGHT FENDER
EB	34	FRONT LEFT FENDER
ID	36	LEFT KICK PANEL
BH	42(W/G)	UNDER THE LEFT QUARTER PILLAR
BI	40(S/D)	BACK PANEL CENTER
	42(W/G)	UNDER THE RIGHT QUARTER PILLAR

○ : SPLICE POINTS

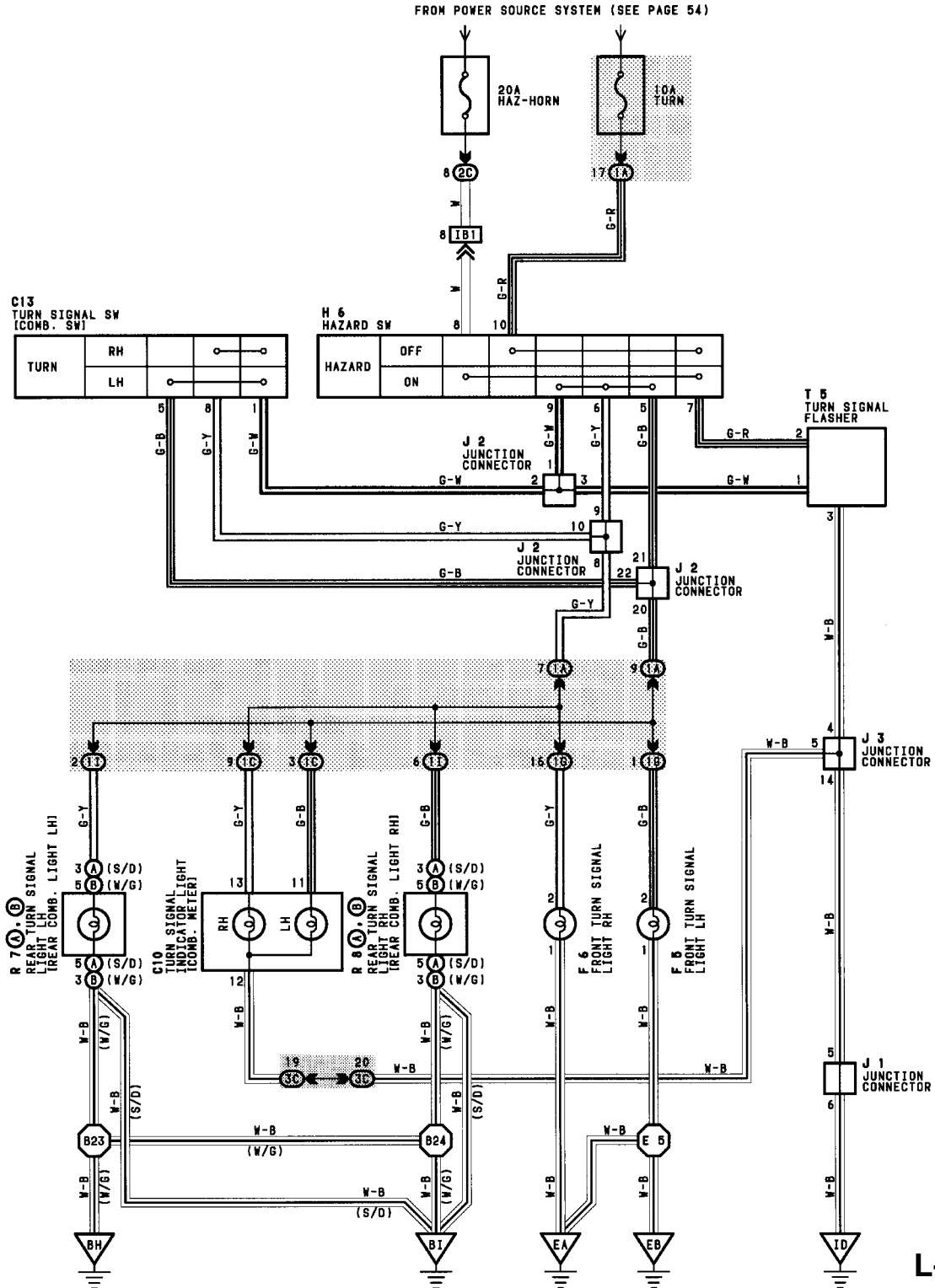
CODE	SEE PAGE	WIRE HARNESS WITH SPLICE POINTS	CODE	SEE PAGE	WIRE HARNESS WITH SPLICE POINTS
E 5	34	ENGINE ROOM MAIN WIRE	B24	42(W/G)	FLOOR WIRE
B23	42(W/G)	FLOOR WIRE			



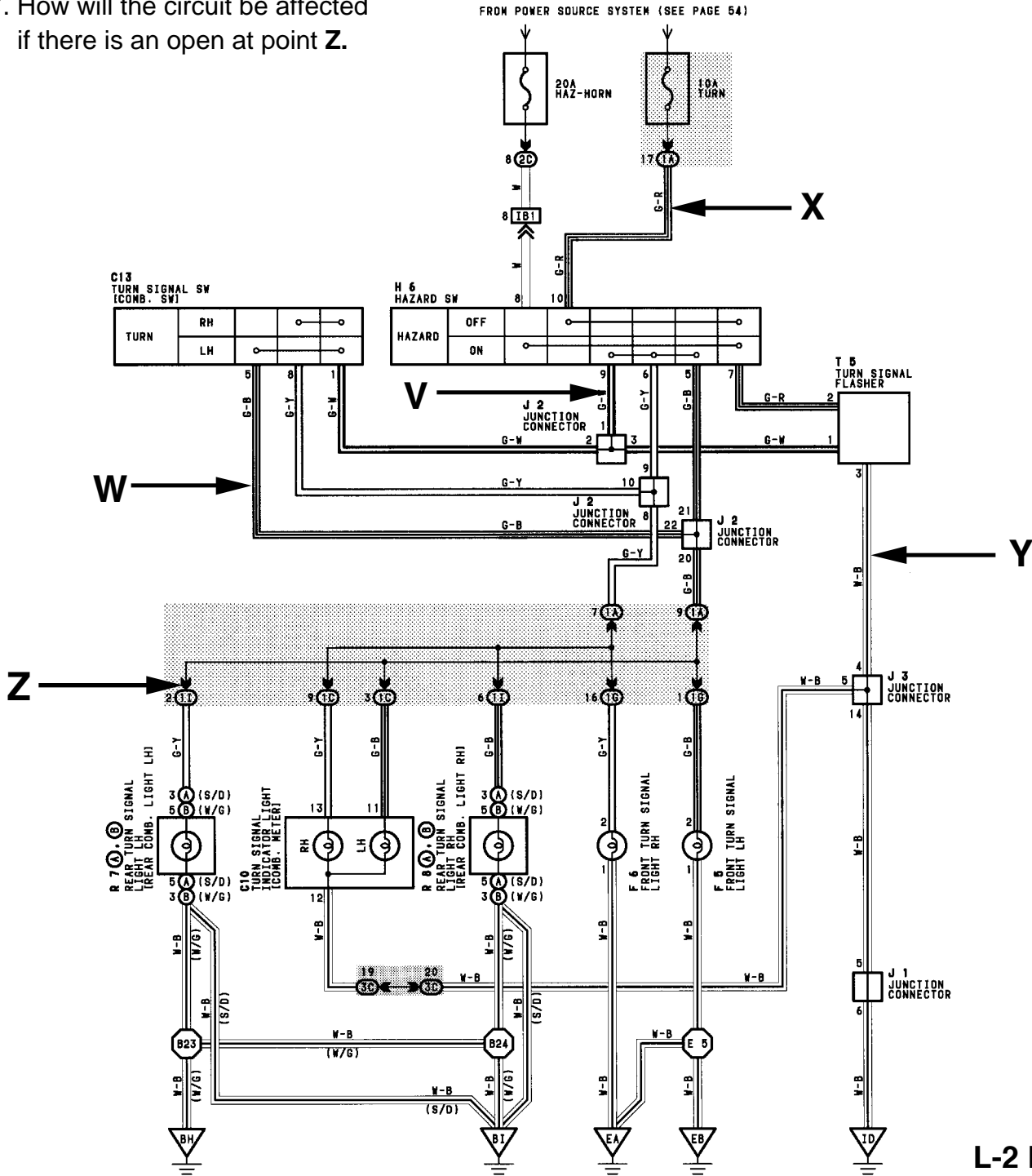
1. Draw in GREEN the RIGHT TURN LAMP circuit from the FUSE to GROUND.
2. Draw in RED the LEFT TURN LAMP circuit from the FUSE to GROUND.



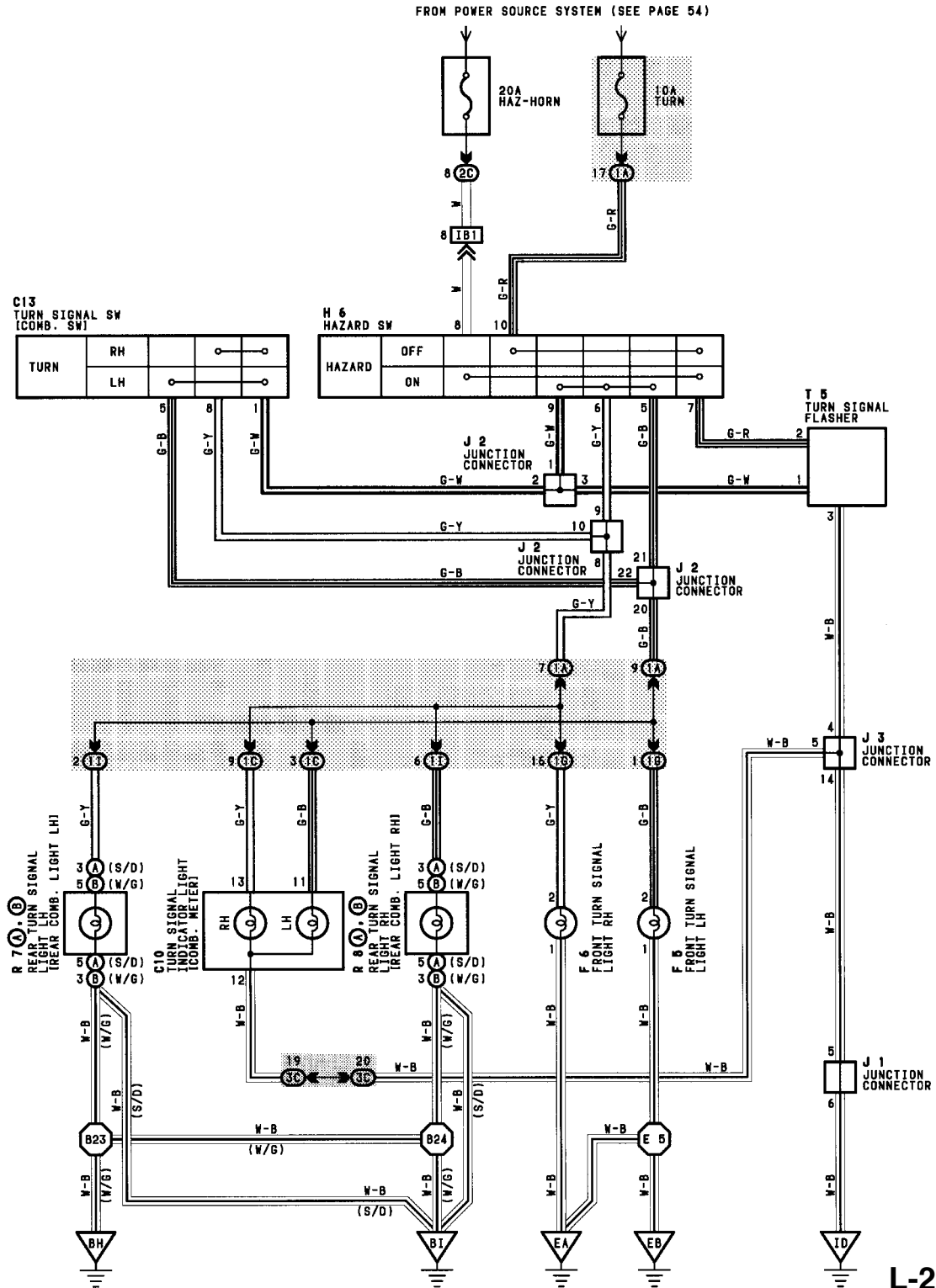
1. Draw in BLUE the HAZARD circuit from the FUSE to GROUND.



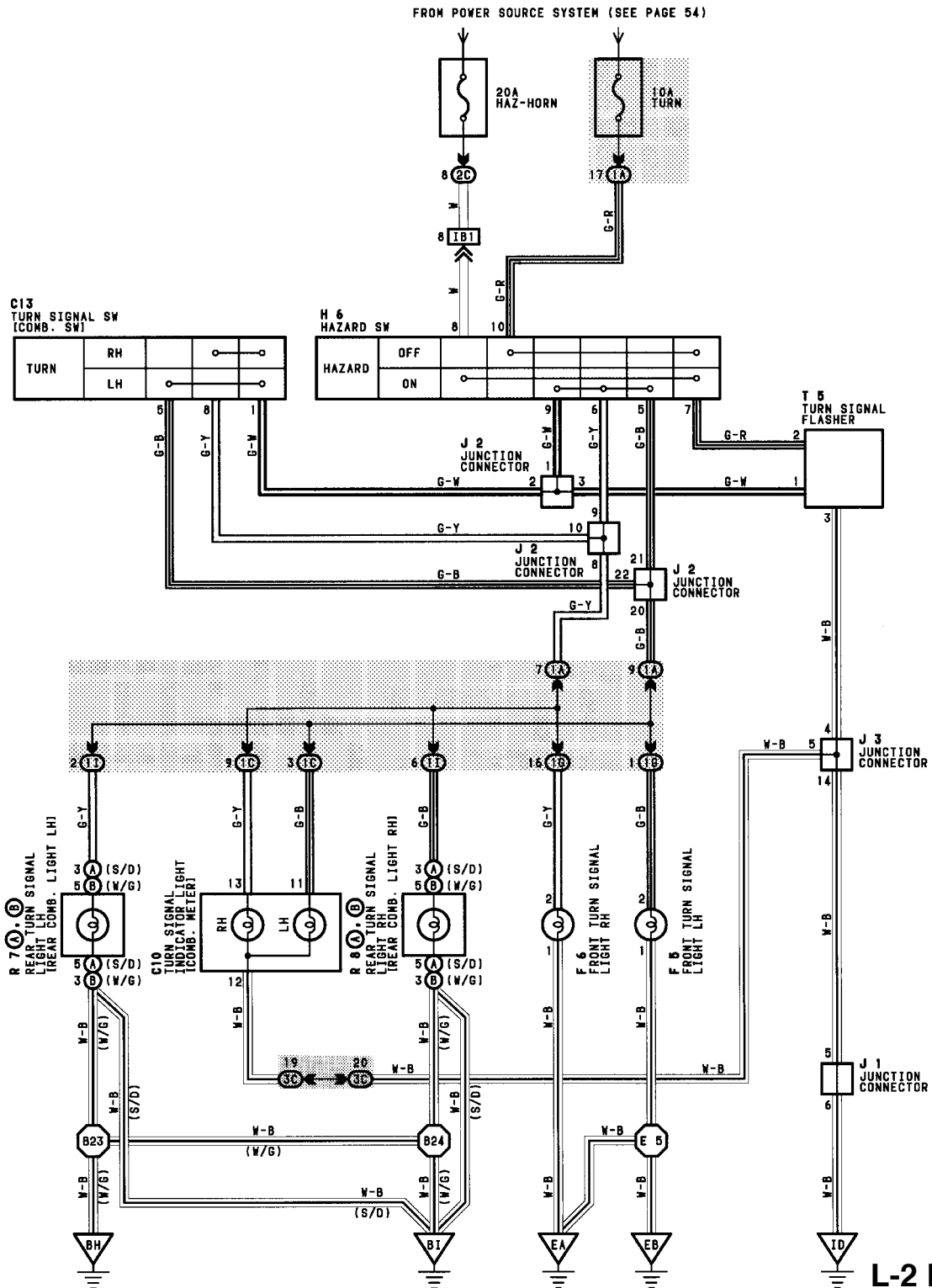
1. With the HAZARD SWITCH in the ON position, what voltage would you expect to find at point **V**, **W**, **X**, **Y**, & **Z**.
2. With the RIGHT TURN SIGNAL SWITCH in the ON position, what voltage would you expect to find at point **V**, **W**, **X**, **Y**, & **Z**.
3. How will the circuit be affected if there is an open at point **V**.
4. How will the circuit be affected if there is an open at point **W**.
5. How will the circuit be affected if there is an open at point **X**.
6. How will the circuit be affected if there is an open at point **Y**.
7. How will the circuit be affected if there is an open at point **Z**.



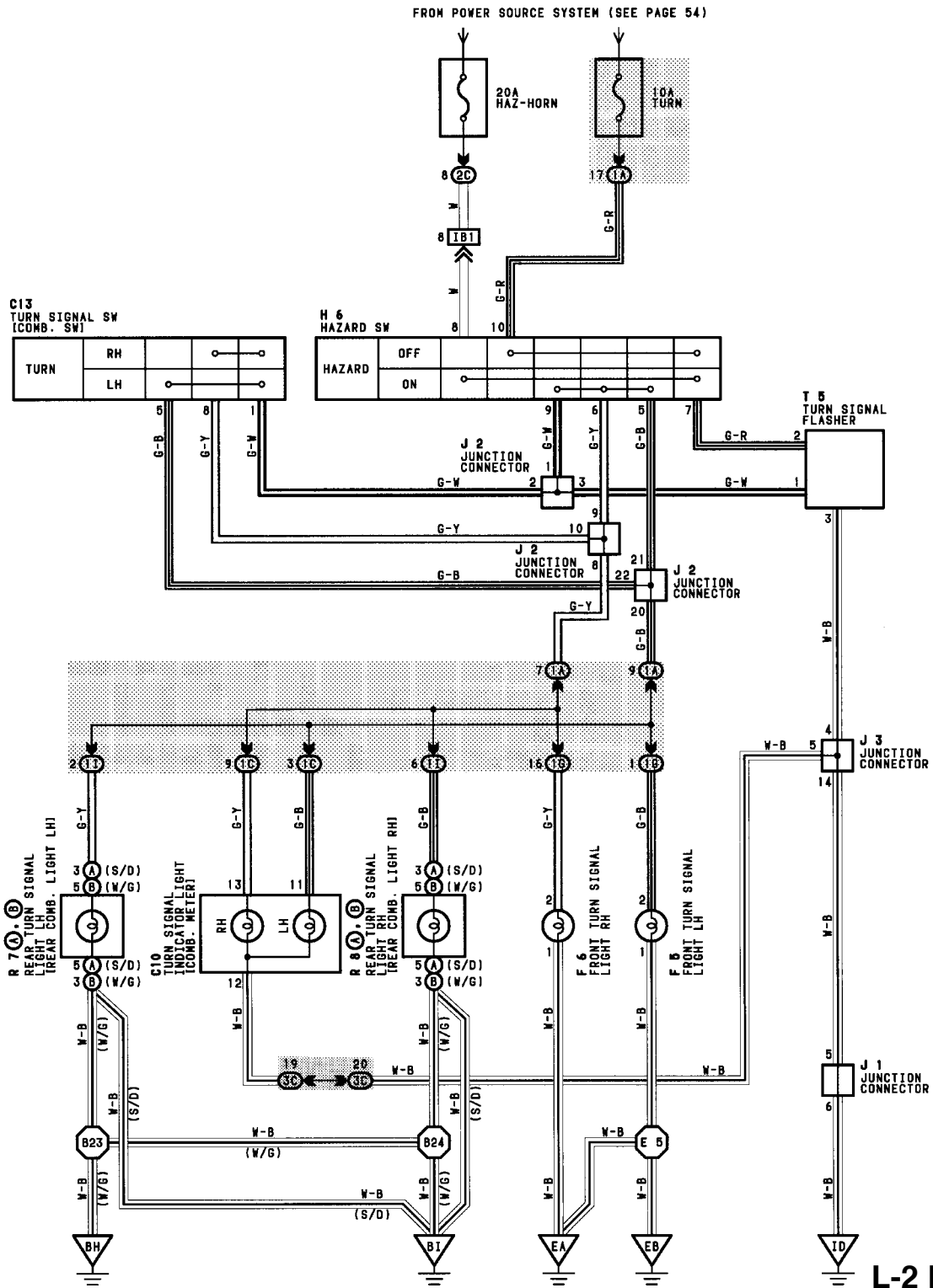
- Trace in GREEN the portion of the circuit below that you suspect could be at fault. TURN SIGNAL lamps *do not* work. The Hazard lamps function correctly.
- Trace in RED the portion of the circuit below that you suspect could be at fault. The LEFT TURN SIGNAL does not work. The Hazard lamps function normally.



- Trace in BLUE the portion of the circuit below that you suspect could be at fault. The HAZARD LAMPS do not work. The Turn Signal Lamps function normally.
- Trace in ORANGE the portion of the circuit below that you suspect could be at fault. Both the HAZARD LAMPS and the TURN SIGNAL LIGHTS do not work in any Position.



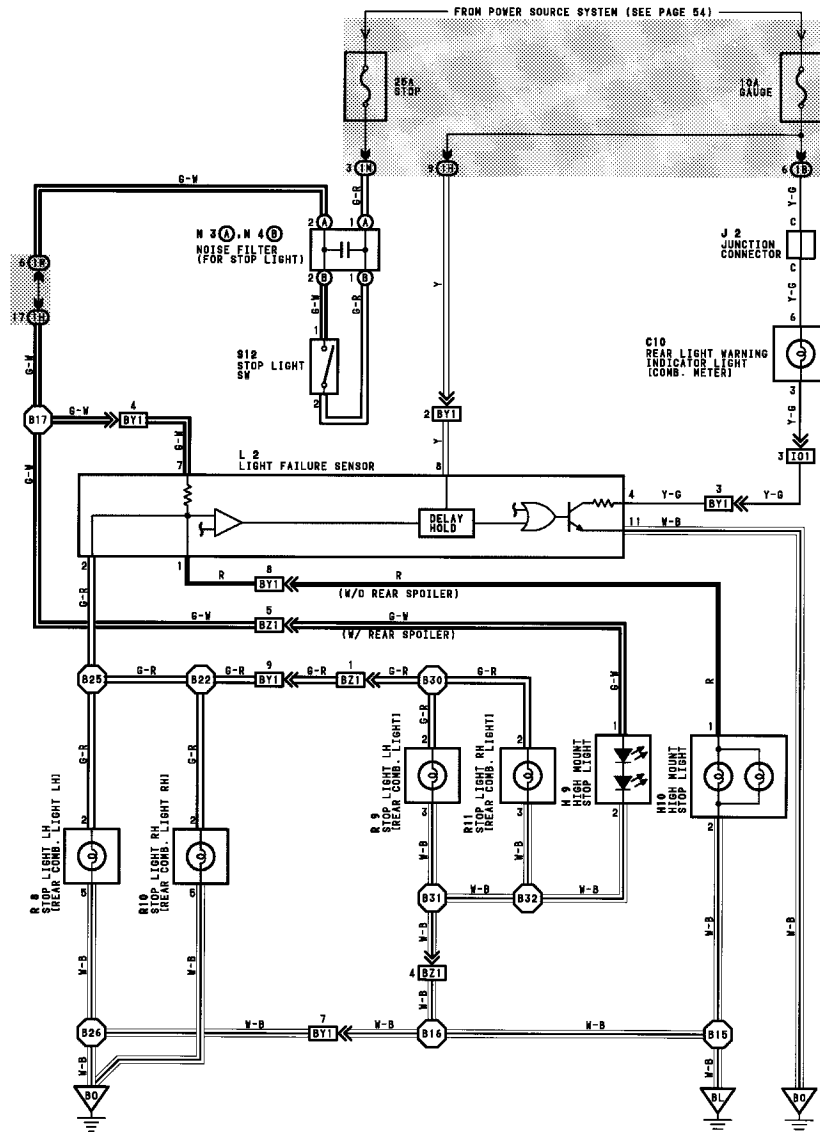
- Trace in BLUE the portion of the circuit below that you suspect could be at fault. The HAZARD LAMPS work the LEFT SIDE ONLY. The Turn Signal Lamps function normally.
- Trace in GREEN the portion of the circuit below that you suspect could be at fault. The RIGHT REAR LAMP does not work with either the HAZARD LAMPS or TURN SIGNAL LIGHTS in the ON position. The other three lamps flash.



TOYOTA

Stop Light

Worksheets



SYSTEM OUTLINE

CURRENT IS APPLIED AT ALL TIMES THROUGH A **STOP FUSE** TO **TERMINAL 2** OF THE STOP LIGHT SW.
 WHEN THE IGNITION SW IS TURNED ON, CURRENT FLOWS FROM THE **GAUGE FUSE** TO **TERMINAL 8** OF THE LIGHT FAILURE SENSOR, AND ALSO FLOWS THROUGH THE REAR LIGHT WARNING LIGHT TO **TERMINAL 4** OF THE LIGHT FAILURE SENSOR.

STOP LIGHT DISCONNECTION WARNING

WHEN THE IGNITION SW IS TURNED ON AND THE BRAKE PEDAL IS PRESSED (STOP LIGHT SW ON), IF THE STOP LIGHT CIRCUIT IS OPEN, THE CURRENT FLOWING FROM **TERMINALS 7** OF THE LIGHT FAILURE SENSOR TO **TERMINALS 1,2** CHANGES, SO THE LIGHT FAILURE SENSOR DETECTS THE DISCONNECTION AND THE WARNING CIRCUIT OF THE LIGHT FAILURE SENSOR IS ACTIVATED.
 AS A RESULT, THE CURRENT FLOWS FROM **TERMINAL 4** OF THE LIGHT FAILURE SENSOR → **TERMINAL 11** → **GROUND** AND TURNS THE REAR LIGHT WARNING LIGHT ON. BY PRESSING THE BRAKE PEDAL, THE CURRENT FLOWING TO **TERMINAL 8** OF THE LIGHT FAILURE SENSOR KEEPS THE WARNING CIRCUIT ON HOLD AND THE WARNING LIGHT ON UNTIL THE IGNITION SW IS TURNED OFF.

SERVICE HINTS

S12 STOP LIGHT SW

2-1:CLOSED WITH BRAKE PEDAL DEPRESSED

L 2 LIGHT FAILURE SENSOR

1,2,7-GROUND:APPROX. 12VOLTS WITH STOP LIGHT SW ON

4,8-GROUND:APPROX. 12VOLTS WITH IGNITION SW AT ON POSITION

11-GROUND:ALWAYS CONTINUITY

○ : PARTS LOCATION

CODE	SEE PAGE	CODE	SEE PAGE	CODE	SEE PAGE
C10	30	L 2	31	R 9	31
H 9	31	R 8	31	R10	31
H10	31	N 3	A 30	R11	31
J 2	30	N 4	B 30	S12	30

⊙ : JUNCTION BLOCK AND WIRE HARNESS CONNECTOR

CODE	SEE PAGE	JUNCTION BLOCK AND WIRE HARNESS (CONNECTOR LOCATION)
1B	20	COWL WIRE AND J/B NO.1 (INSTRUMENT PANEL LEFT)
1H	20	FLOOR NO.1 WIRE AND J/B NO.1 (INSTRUMENT PANEL LEFT)
1M	20	COWL WIRE AND J/B NO.1 (INSTRUMENT PANEL LEFT)

□ : CONNECTOR JOINING WIRE HARNESS AND WIRE HARNESS

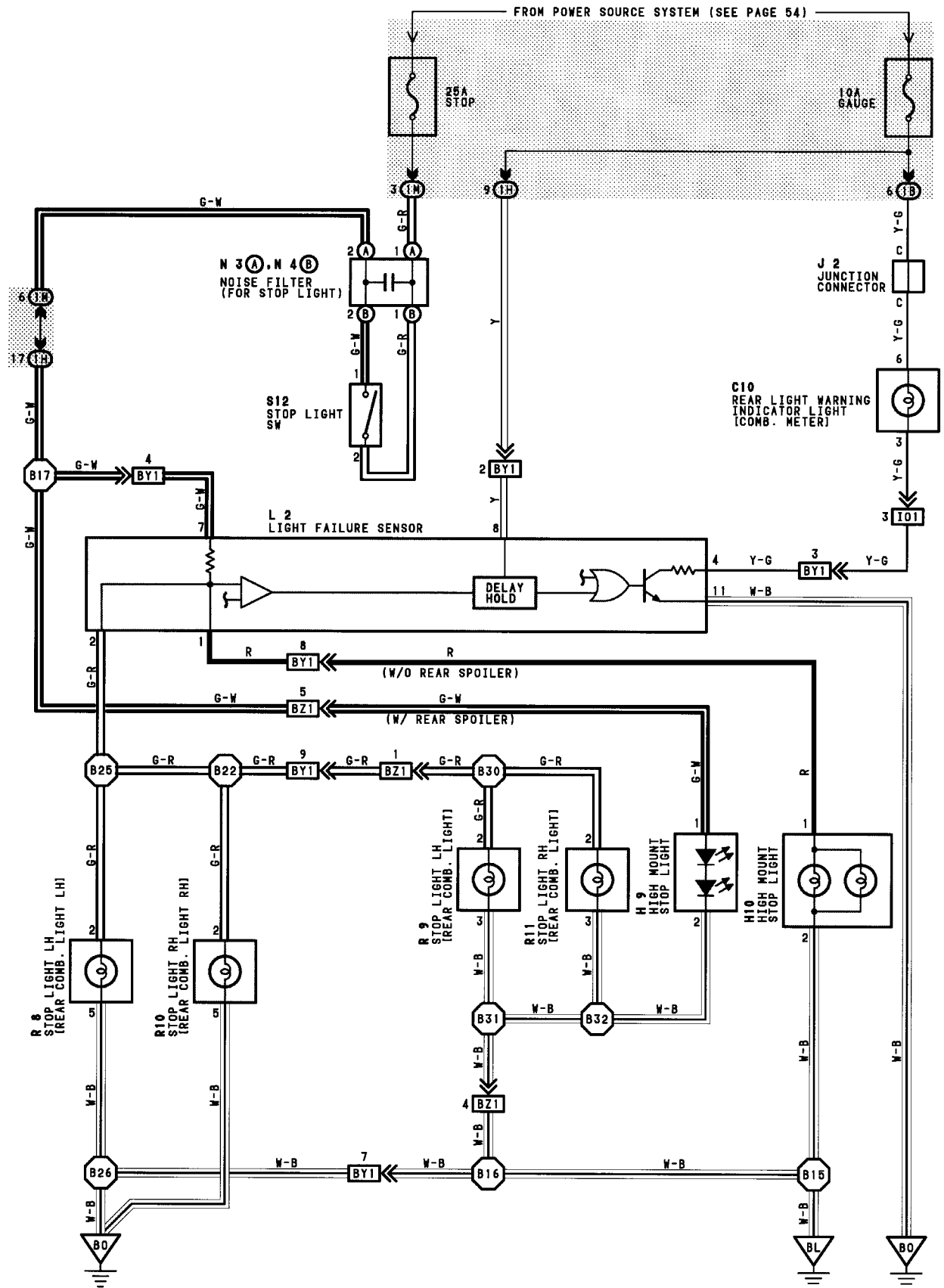
CODE	SEE PAGE	JOINING WIRE HARNESS AND WIRE HARNESS (CONNECTOR LOCATION)
IO1	38	FLOOR NO.1 WIRE AND SEAT WIRE (UNDER THE DRIVER'S SEAT)
BY1	40	LUGGAGE ROOM NO.1 WIRE AND FLOOR NO.1 WIRE (LUGGAGE COMPARTMENT LEFT)
BZ1	40	FLOOR NO.1 WIRE AND LUGGAGE ROOM NO.2 WIRE (LUGGAGE COMPARTMENT DOOR)

▽ : GROUND POINTS

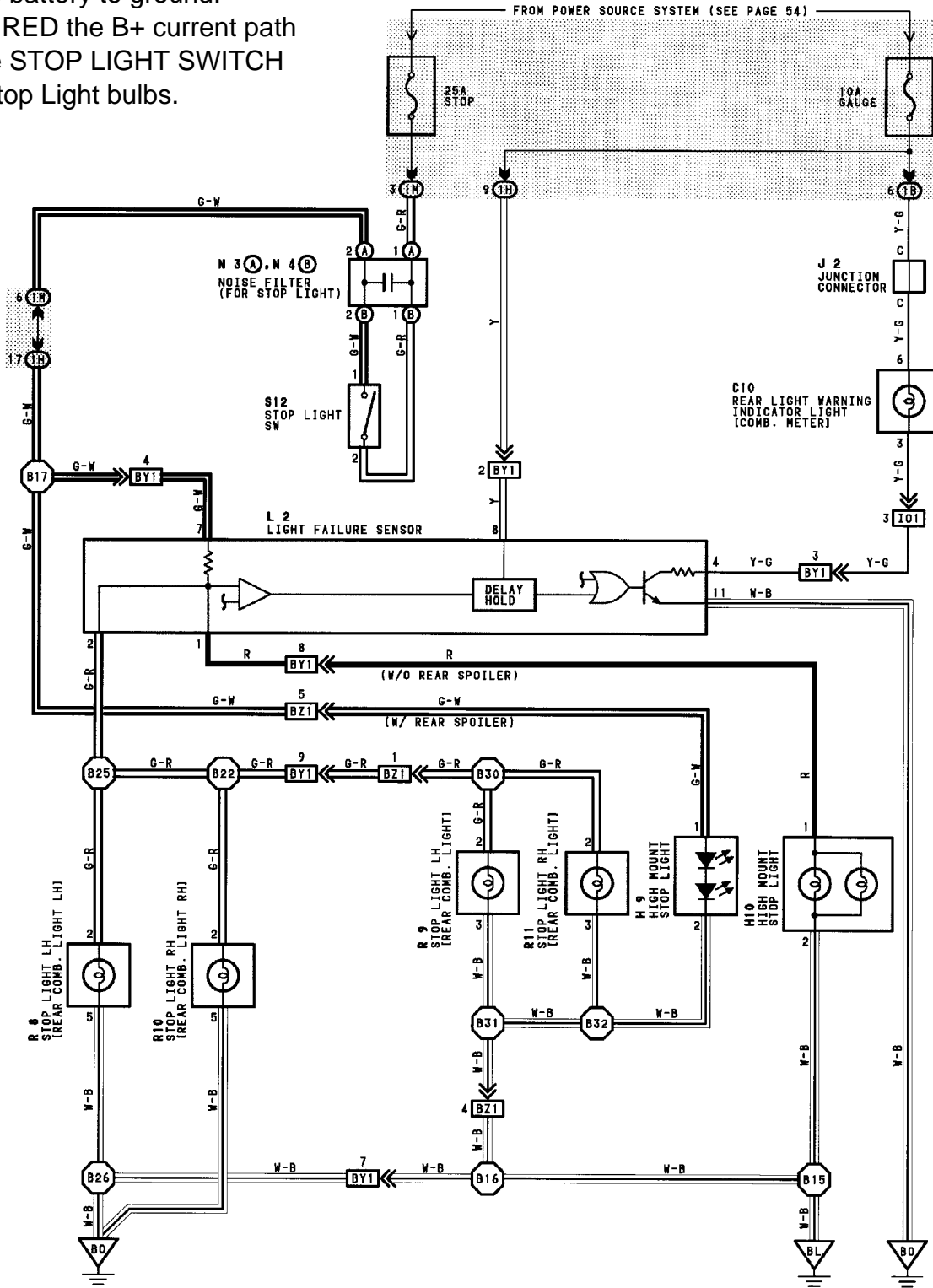
CODE	SEE PAGE	GROUND POINTS LOCATION
BL	40	UNDER THE LEFT QUARTER PILLAR
B0	40	BACK PANEL CENTER

⊘ : SPLICE POINTS

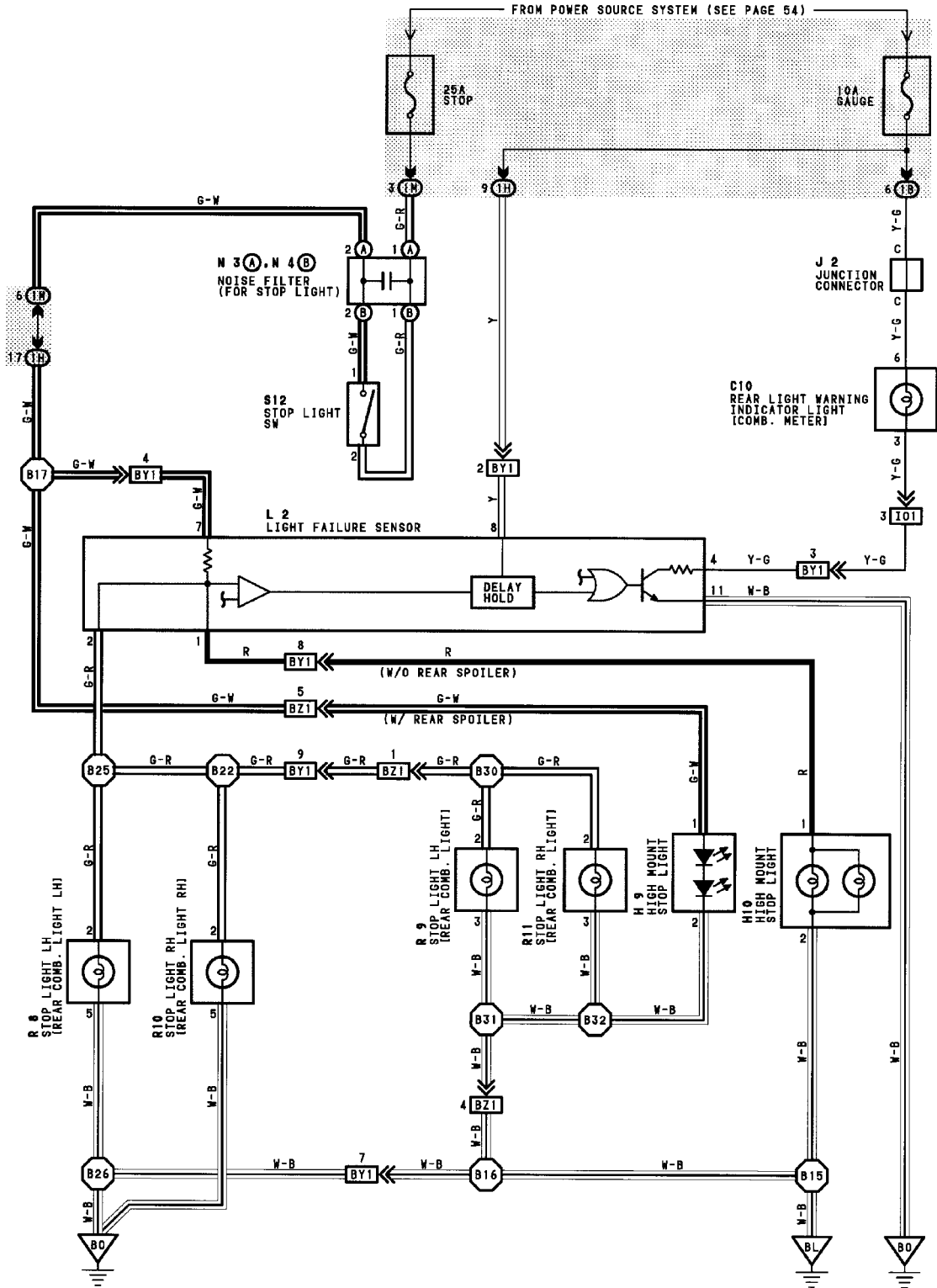
CODE	SEE PAGE	WIRE HARNESS WITH SPLICE POINTS	CODE	SEE PAGE	WIRE HARNESS WITH SPLICE POINTS
B15	40	FLOOR NO.1 WIRE	B26	40	LUGGAGE ROOM NO.1 WIRE
B16			B30		
B17			B31		
B22	40	LUGGAGE ROOM NO.1 WIRE	B32	40	LUGGAGE ROOM NO.2 WIRE
B25					



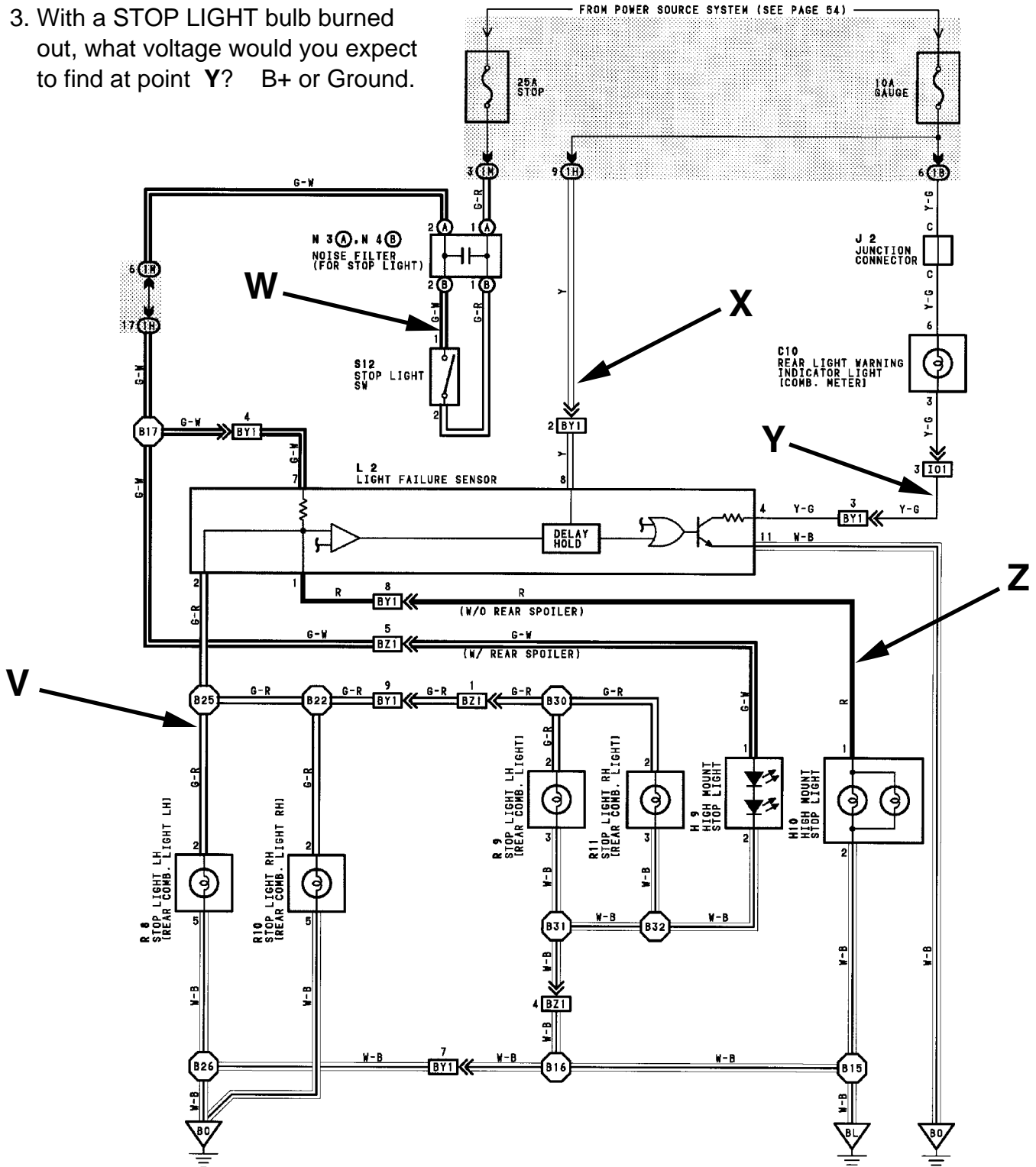
1. Identify the HIGH MOUNT STOP LAMP circuit WITHOUT a Rear Spoiler. Draw that circuit in GREEN from the battery to ground.
2. Identify the HIGH MOUNT STOP LAMP circuit WITH a Rear Spoiler. Draw that circuit in Blue from the battery to ground.
3. Draw in RED the B+ current path from the STOP LIGHT SWITCH to the Stop Light bulbs.



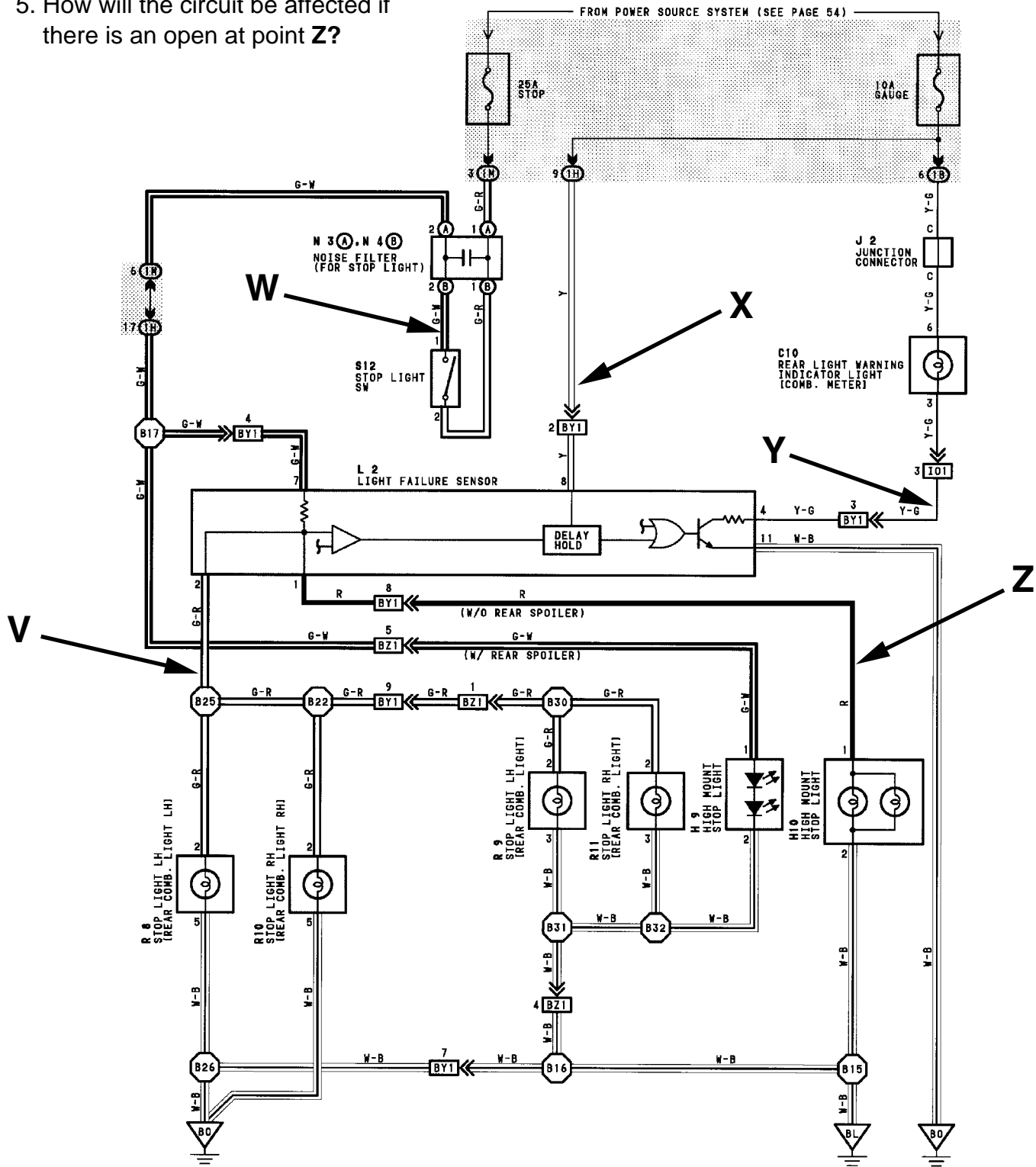
1. THE STOP LIGHT SWITCH IS PLACED IN THE CLOSED POSITION. Draw the BLUE the POSITIVE B+ SIDE of the circuit. Everything that is Positive (B+) with the Ign Key OFF.
2. THE STOP LIGHT SWITCH IS PLACED IN THE OPEN POSITION. Draw the GREEN the GROUND SIDE of the circuit. Everything that is ground (Negative) with the Ign Key OFF..



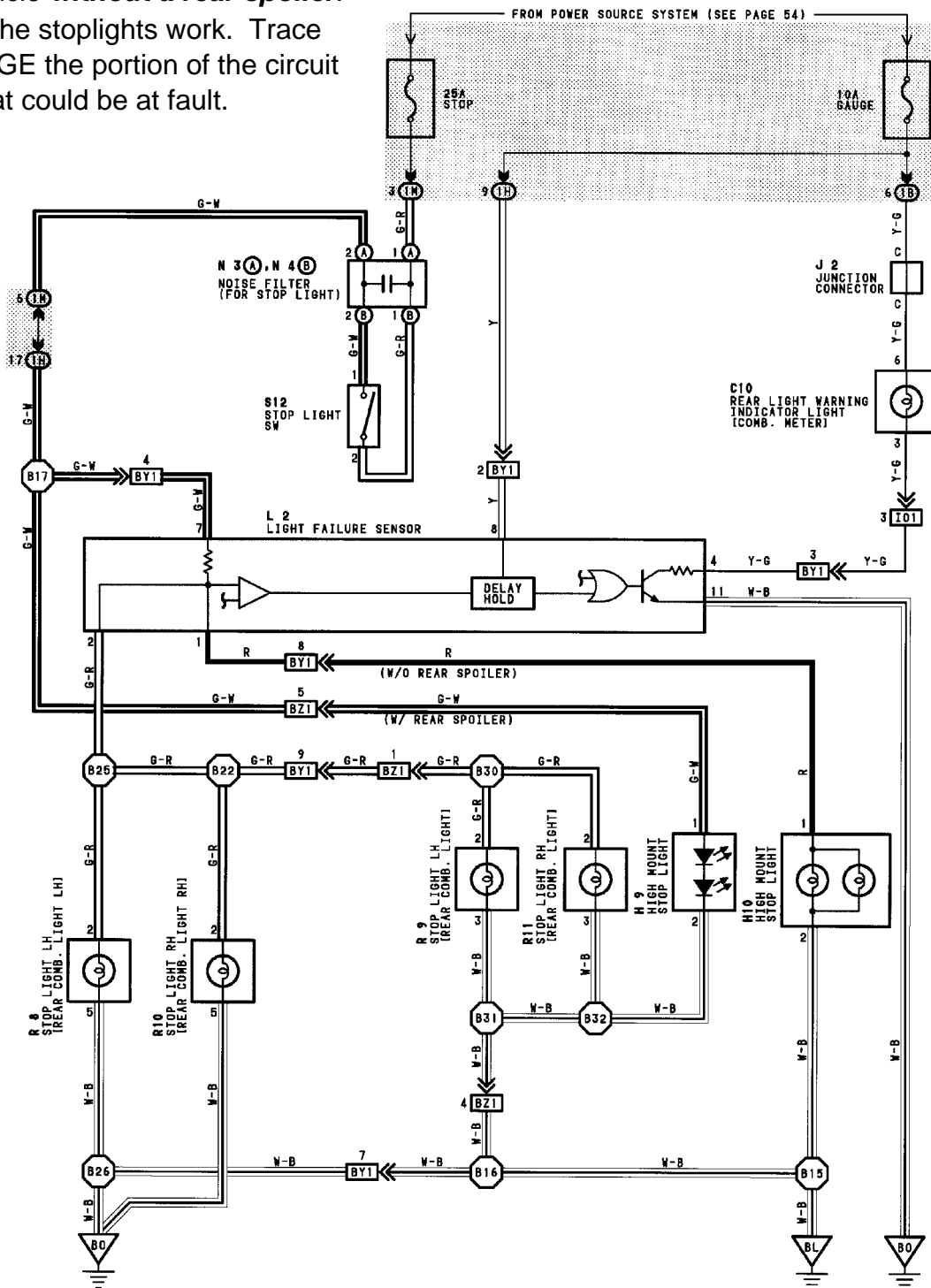
1. With the STOP LIGHT Switch in the OFF position, what voltage would you expect to find at point **V**, **W**, **X**, **Y**, & **Z**? (Note: Ignition Key is in the ON position)
2. With the STOP LIGHT Switch in the ON position, what voltage would you expect to find at point **V**, **W**, **X**, **Y**, & **Z**? (Note: Ignition Key is in the OFF position)
3. With a STOP LIGHT bulb burned out, what voltage would you expect to find at point **Y**? B+ or Ground.



1. How will the circuit be affected if there is an open at point **V**?
2. How will the circuit be affected if there is an open at point **W**?
3. How will the circuit be affected if there is an open at point **X**?
4. How will the circuit be affected if there is an open at point **Y**?
5. How will the circuit be affected if there is an open at point **Z**?

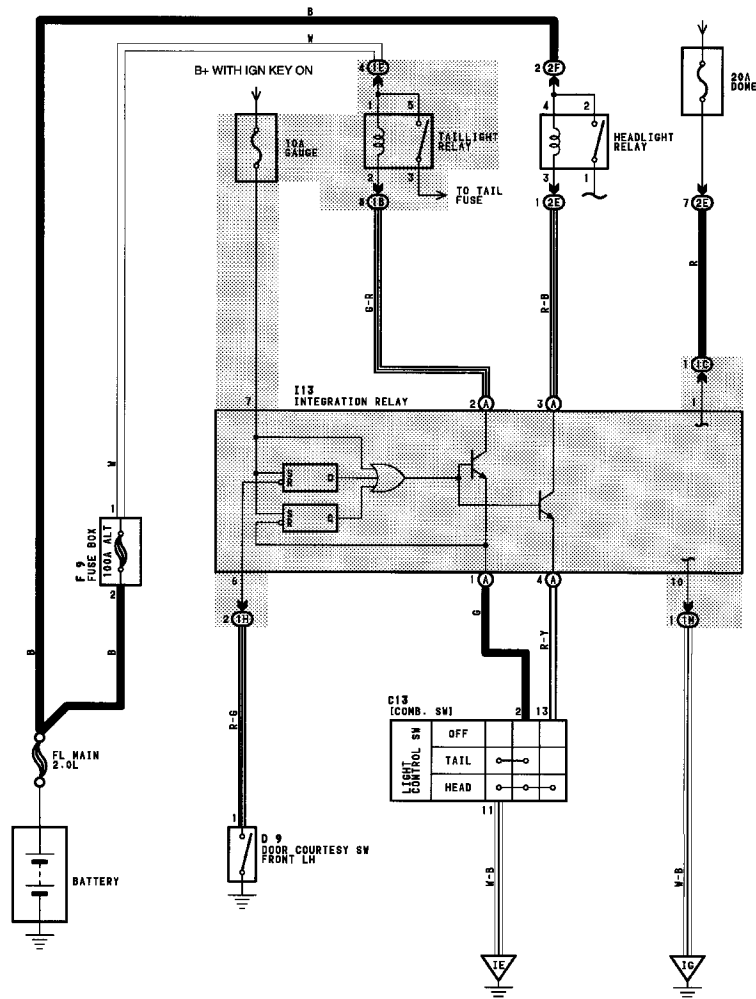


1. On a vehicle **without a rear spoiler**. The stop lights *do not* work, but the high mount stop lamp works. Trace in GREEN the portion of the circuit below that could be at fault.
2. On a vehicle **with a rear spoiler**. The high mount stop lamp *does not* work, but the stop lamps work fine. Trace in BLUE the portion of the circuit below that could be at fault.
3. On a vehicle **with a rear spoiler**. A single stoplight in burned out, but the rear warning lamp indicator doesn't light. Trace in RED the portion of the circuit that could be at fault.
4. On a vehicle **without a rear spoiler**. None of the stoplights work. Trace in ORANGE the portion of the circuit below that could be at fault.



TOYOTA

Automatic Light Turnoff Worksheets



SYSTEM OUTLINE

WITH THE IGNITION SW TURNED ON, THE CURRENT FLOWS TO **TERMINAL 7** OF THE INTEGRATION RELAY THROUGH **GAUGE FUSE**. VOLTAGE IS APPLIED AT ALL TIMES TO **TERMINAL (A) 2** OF THE INTEGRATION RELAY THROUGH THE TAILLIGHT RELAY (COIL SIDE), AND TO **TERMINAL (A) 3** THROUGH THE HEADLIGHT RELAY (COIL SIDE).

1. NORMAL LIGHTING OPERATION

(TURN TAILLIGHT ON)

WITH LIGHT CONTROL SW TURNED TO TAILLIGHT POSITION, A SIGNAL IS INPUT INTO **TERMINAL (A) 1** OF THE INTEGRATION RELAY. ACCORDING TO THIS SIGNAL, THE CURRENT FLOWING TO **TERMINAL (A) 2** OF THE RELAY FLOWS FROM **TERMINAL (A) 1** → **TERMINAL 2** OF THE LIGHT CONTROL SW → **TERMINAL 11** → TO **GROUND** AND TAILLIGHT RELAY CAUSES TAILLIGHT TO TURN ON.

(TURN HEADLIGHT ON)

WITH LIGHT CONTROL SW TURNED TO HEADLIGHT POSITION, A SIGNAL IS INPUT INTO **TERMINALS (A) 1** AND **(A) 4** OF THE INTEGRATION RELAY. ACCORDING TO THIS SIGNAL, THE CURRENT FLOWING TO **TERMINAL (A) 3** OF THE RELAY FLOWS TO **TERMINAL (A) 4** → **TERMINAL 13** OF THE LIGHT CONTROL SW → **TERMINAL 11** → TO **GROUND** IN THE HEADLIGHT CIRCUIT, AND CAUSES TAILLIGHT AND HEADLIGHT RELAY TO TURN THE LIGHT ON. THE TAILLIGHT CIRCUIT IS SAME AS ABOVE.

2. LIGHT AUTO TURN OFF OPERATION

WITH LIGHTS ON AND IGNITION SW TURNED OFF (INPUT SIGNAL GOES TO **TERMINAL 7** OF THE RELAY), WHEN DOOR ON DRIVER'S SIDE IS OPENED (INPUT SIGNAL GOES TO **TERMINAL 6** OF THE RELAY), THE RELAY OPERATES AND THE CURRENT IS CUT OFF WHICH FLOWS FROM **TERMINAL (A) 2** OF THE RELAY TO **TERMINAL (A) 1** IN TAILLIGHT CIRCUIT AND FROM **TERMINAL (A) 3** TO **TERMINAL (A) 4** IN HEADLIGHT CIRCUIT. AS A RESULT, ALL LIGHTS ARE TURNED OFF AUTOMATICALLY.

SERVICE HINTS

I13 INTEGRATION RELAY

- 7-GROUND:APPROX. 12VOLTS WITH IGNITION SW AT ON POSITION
- 1-GROUND:ALWAYS APPROX. 12VOLTS
- (A) 3-GROUND:APPROX. 12 VOLTS WITH LIGHT CONTROL SW AT OFF OR TAIL POSITION
- (A) 2-GROUND:APPROX. 12 VOLTS WITH LIGHT CONTROL SW AT OFF POSITION
- 6-GROUND:CONTINUITY WITH FRONT LH DOOR OPEN
- (A) 4-GROUND:CONTINUITY WITH LIGHT CONTROL SW AT HEAD POSITION
- (A) 1-GROUND:CONTINUITY WITH LIGHT CONTROL SW AT TAIL OR HEAD POSITION
- 10-GROUND:ALWAYS CONTINUITY

○ : PARTS LOCATION

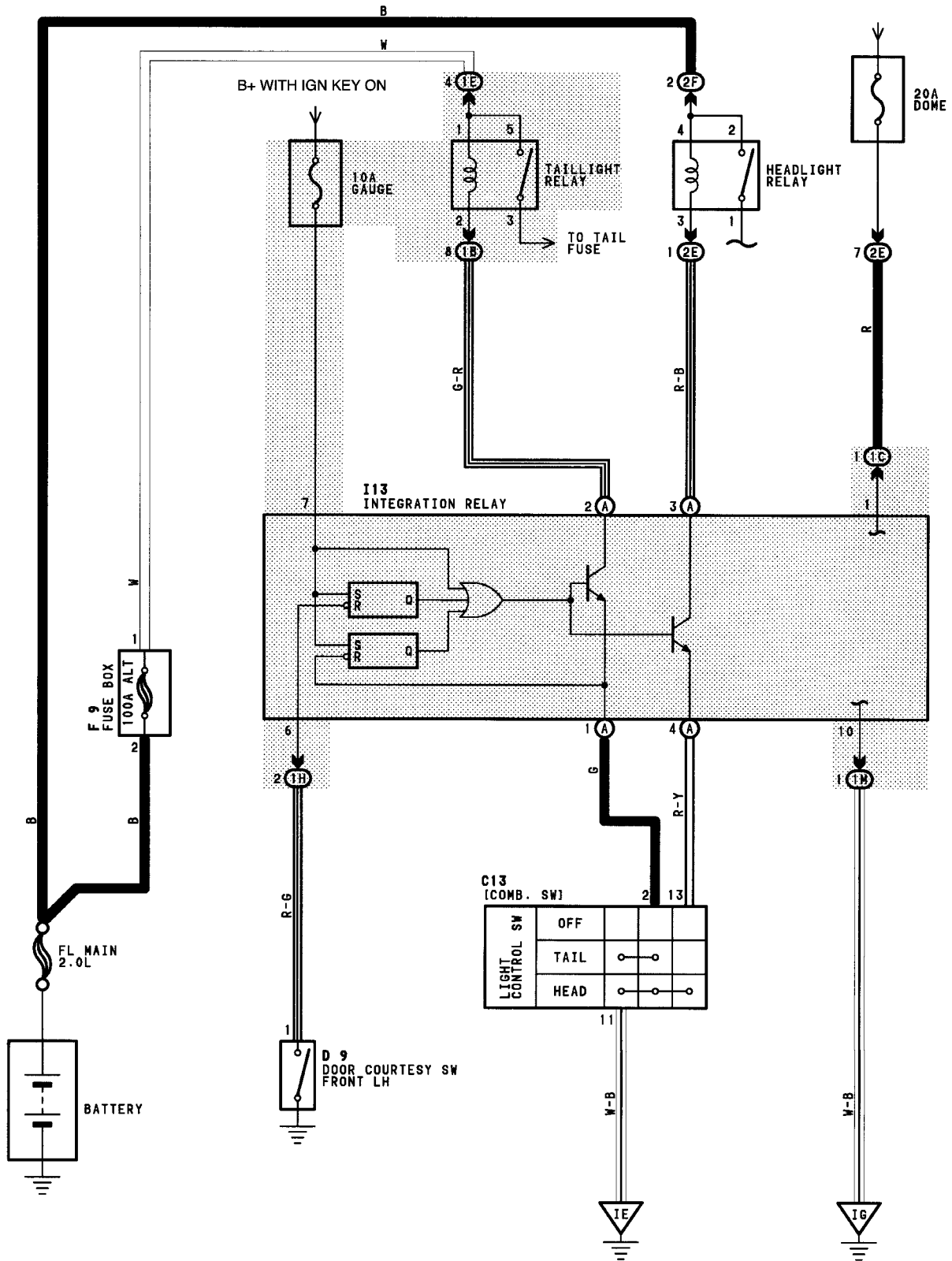
CODE	SEE PAGE	CODE	SEE PAGE	CODE	SEE PAGE
C13	30	D 9	31	I13	30
D 2	30	F 9	28(3VZ-FE),29(5S-FE)		

○ : JUNCTION BLOCK AND WIRE HARNESS CONNECTOR

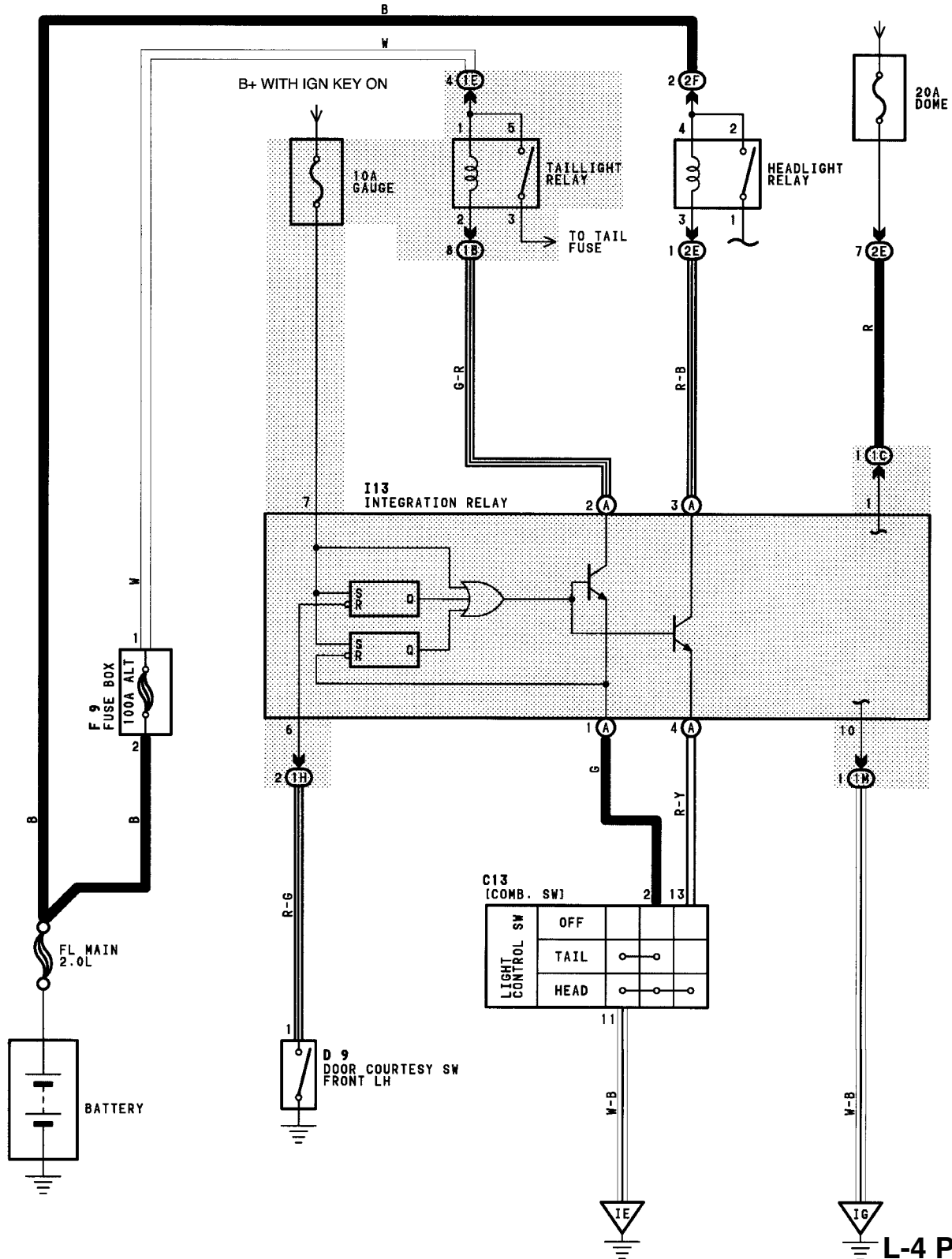
CODE	SEE PAGE	JUNCTION BLOCK AND WIRE HARNESS (CONNECTOR LOCATION)
1B	20	COWL WIRE AND J/B NO.1 (INSTRUMENT PANEL LEFT)
1C		
1E		
1H	20	FLOOR NO.1 WIRE AND J/B NO.1 (INSTRUMENT PANEL LEFT)
1M	20	COWL WIRE AND J/B NO.1 (INSTRUMENT PANEL LEFT)
2E	22	COWL WIRE AND J/B NO.2 (ENGINE COMPARTMENT LEFT)
2F	22	ENGINE WIRE AND J/B NO.2 (ENGINE COMPARTMENT LEFT)

▽ : GROUND POINTS

CODE	SEE PAGE	GROUND POINTS LOCATION
1E	36	LEFT KICK PANEL
1G	36	INSTRUMENT PANEL BRACE LH

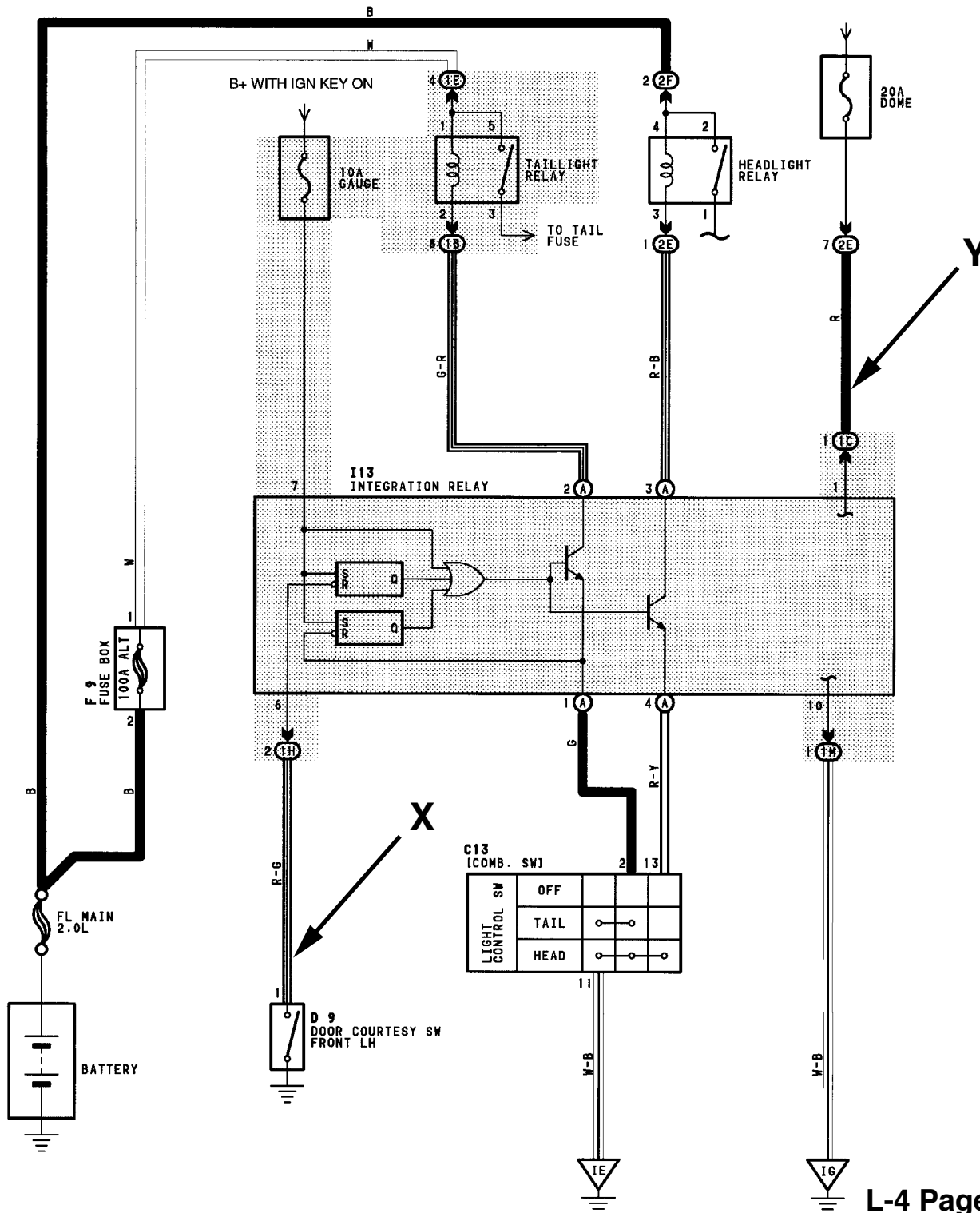


1. Draw in RED the wires that supply B+ and Ground to the Integration Relay.
2. Draw in GREEN the INPUTS which are used by the Integration Relay to control the lights.
3. Draw in BLUE the Control circuit from the battery to ground of the Headlamp Circuit.



1. How will the circuit be affected if there is an open at point **X**.

2. How will the circuit be affected if there is an open at point **Y**.



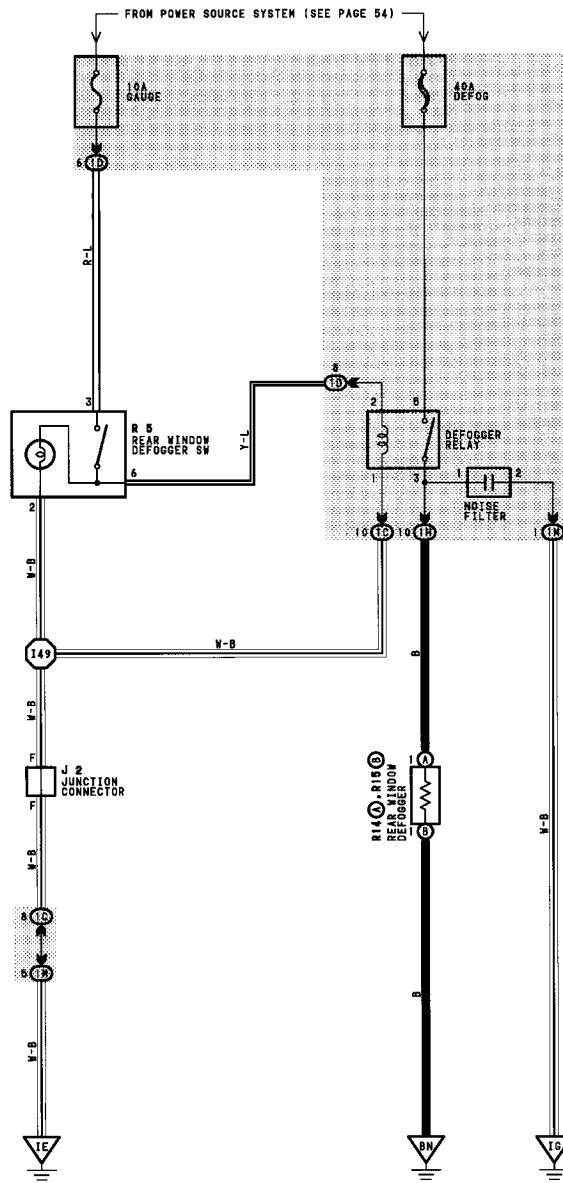
TOYOTA

Daytime Running Lamps Worksheets

Will be provided
in next release.

TOYOTA

Rear Window Defogger Worksheets



SERVICE HINTS

DEFOGGER RELAY

5-3:CLOSED WITH IGNITION SW ON, DEFOGGER SW ON

R 5 REAR WINDOW DEFOGGER SW

3-GROUND:APPROX. 12VOLTS WITH IGNITION SW AT ON POSITION

2-GROUND:ALWAYS CONTINUITY

3-6:CONTINUITY WITH DEFOGGER SW ON

○ : PARTS LOCATION

CODE	SEE PAGE	CODE	SEE PAGE	CODE	SEE PAGE
J 2	30	R14	A 31		
R 5	30	R15	B 31		

○ : JUNCTION BLOCK AND WIRE HARNESS CONNECTOR

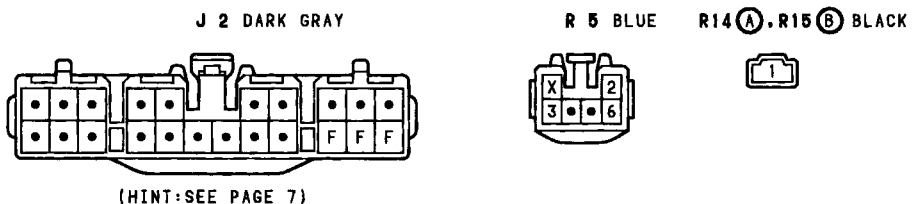
CODE	SEE PAGE	JUNCTION BLOCK AND WIRE HARNESS (CONNECTOR LOCATION)
1C	20	COWL WIRE AND J/B NO.1 (INSTRUMENT PANEL LEFT)
1D		
1H	20	FLOOR NO.1 WIRE AND J/B NO.1 (INSTRUMENT PANEL LEFT)
1M	20	COWL WIRE AND J/B NO.1 (INSTRUMENT PANEL LEFT)

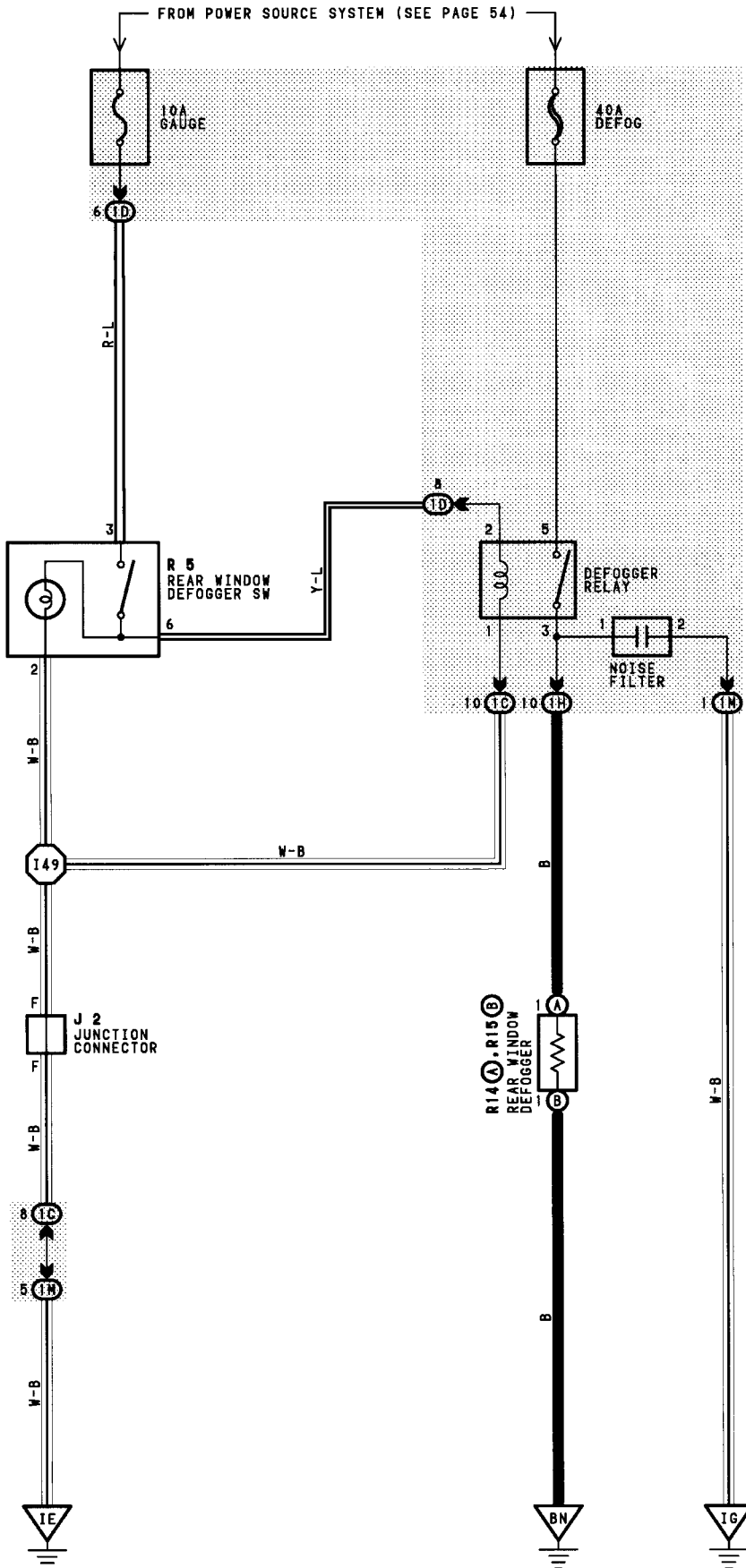
▽ : GROUND POINTS

CODE	SEE PAGE	GROUND POINTS LOCATION
1E	36	LEFT KICK PANEL
1G	36	INSTRUMENT PANEL BRACE LH
BN	40	LEFT QUARTER PILLAR

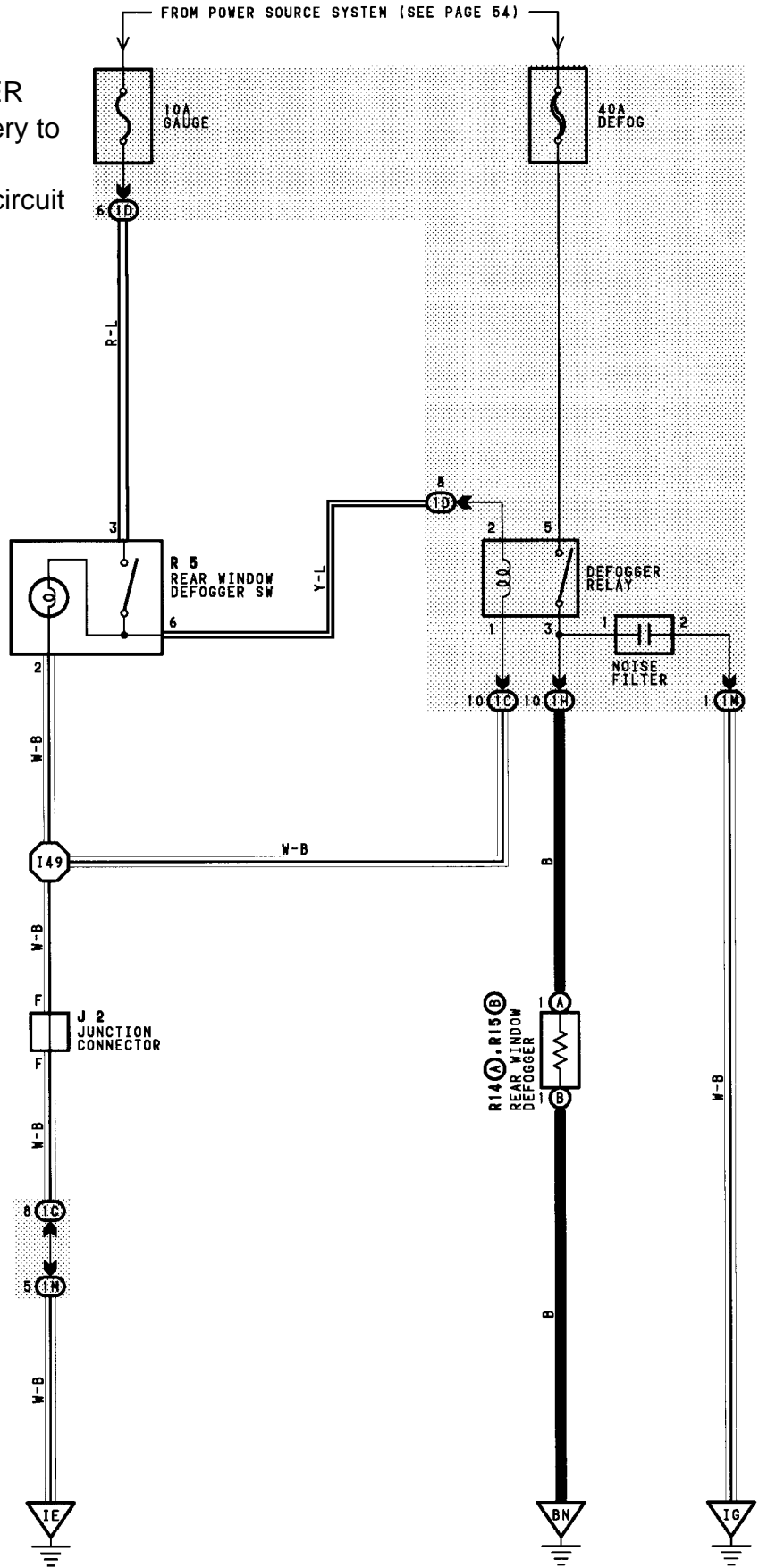
○ : SPLICE POINTS

CODE	SEE PAGE	WIRE HARNESS WITH SPLICE POINTS	CODE	SEE PAGE	WIRE HARNESS WITH SPLICE POINTS
I49	38	COWL WIRE			

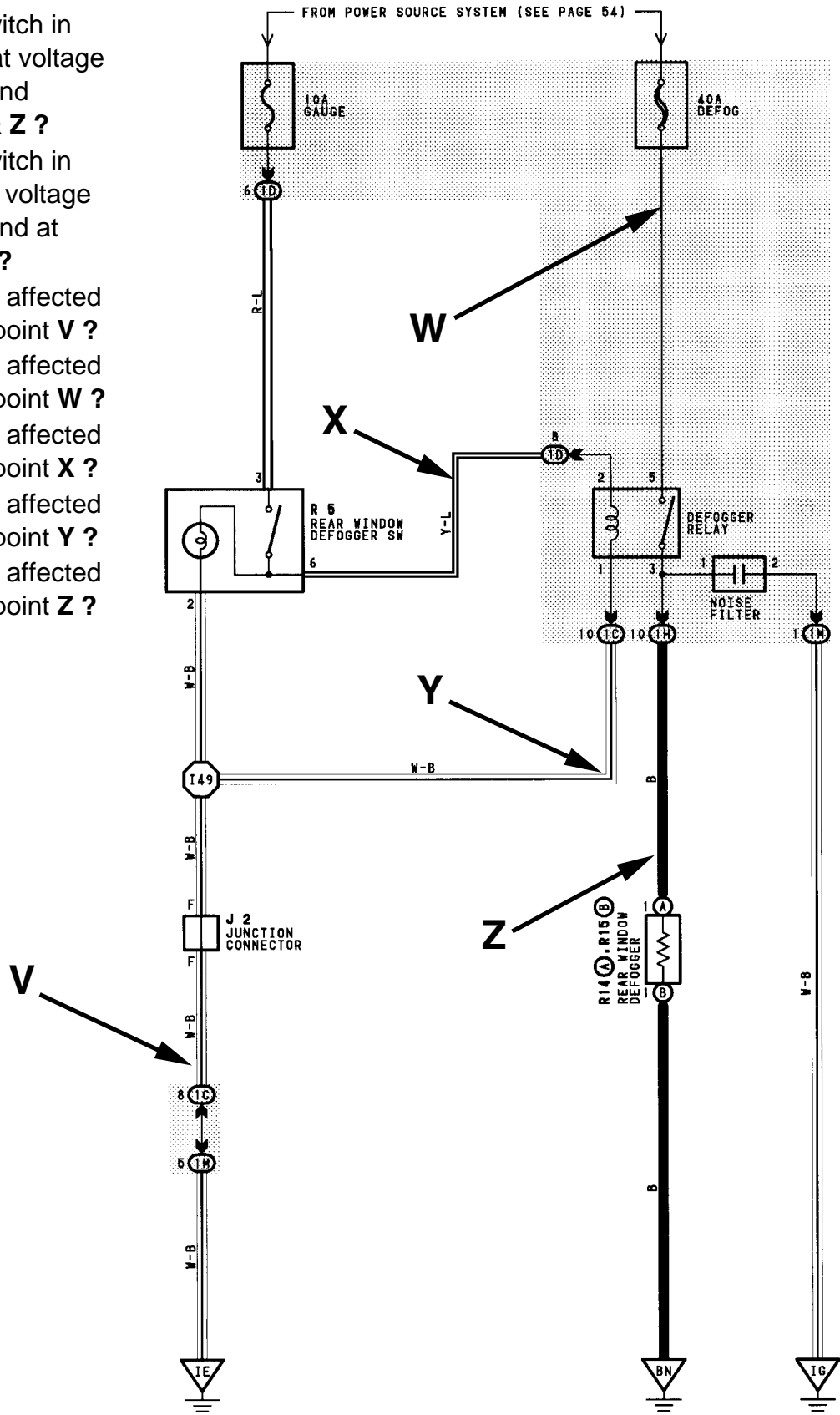




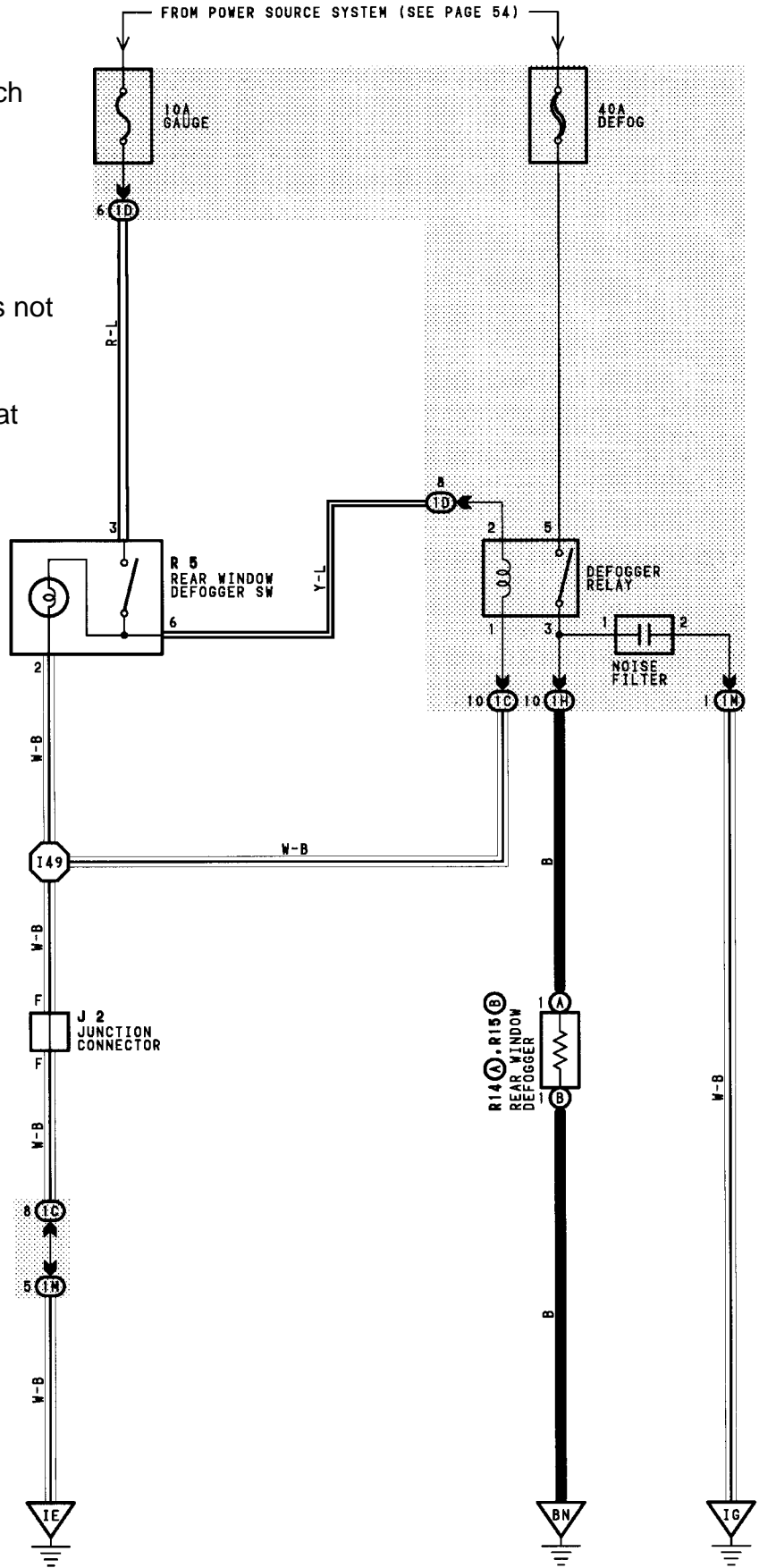
1. Draw in GREEN the DEFOGGER CONTROL circuit from the battery to ground.
2. Draw in RED the DEFOGGER circuit from the battery to ground.
3. Draw in BLUE the DEFOGGER LAMP circuit from the battery to ground.



1. With the Defogger Switch in the OFF position, what voltage would you expect to find at point **V**, **W**, **X**, **Y**, & **Z** ?
2. With the Defogger Switch in the ON position, what voltage would you expect to find at point **V**, **W**, **X**, **Y**, & **Z** ?
3. How will the circuit be affected if there is an open at point **V** ?
4. How will the circuit be affected if there is an open at point **W** ?
5. How will the circuit be affected if there is an open at point **X** ?
6. How will the circuit be affected if there is an open at point **Y** ?
7. How will the circuit be affected if there is an open at point **Z** ?



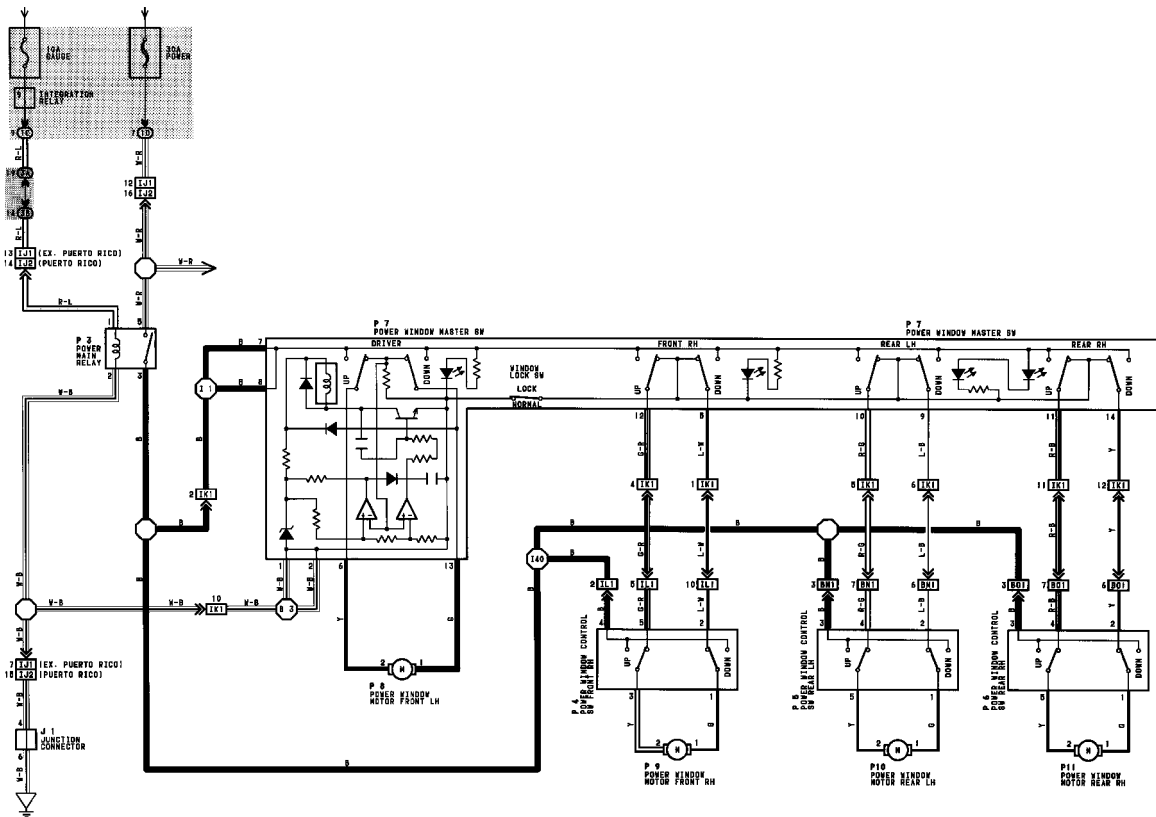
1. The rear window defroster switch lights up, but the rear window defroster does not work.
Trace in BLUE the area(s) that could be at fault.
2. The rear window defroster does not work. The defroster switch light does not light either.
Trace in GREEN the area(s) that could be at fault.



TOYOTA

Power Windows

Worksheets



SYSTEM OUTLINE

WITH THE IGNITION SW TURNED ON, CURRENT FLOWS THROUGH THE GAUGE FUSE TO TERMINAL 1 OF THE POWER MAIN RELAY → TERMINAL 3 → TO GROUND. THIS ACTIVATES THE RELAY AND THE CURRENT FLOWING TO TERMINAL 2 OF THE RELAY FROM POWER CB FLOWS TO TERMINAL 4 OF THE RELAY → TERMINAL 1 OF THE POWER WINDOW MASTER SW, AND FLOWS TO TERMINAL 5 OF THE POWER WINDOW SW.

1. MANUAL OPERATION (DRIVER'S WINDOW)

WITH THE IGNITION SW TURNED ON AND WITH THE POWER WINDOW MASTER SW (MANUAL SW) IN UP POSITION, THE CURRENT FLOWING TO TERMINAL 1 OF THE POWER WINDOW MASTER SW FLOWS TO TERMINAL 2 OF THE MASTER SW → TERMINAL 2 OF THE POWER WINDOW MOTOR → TERMINAL 1 → TERMINAL 6 OF THE MASTER SW → TERMINAL 5 → TO GROUND AND CAUSES THE POWER WINDOW MOTOR TO ROTATE IN THE UP DIRECTION. THE WINDOW ASCENDS ONLY WHILE THE SW IS BEING PUSHED.

IN DOWN OPERATION, THE FLOW OF CURRENT FROM TERMINAL 1 OF THE POWER WINDOW MASTER SW TO TERMINAL 6 OF THE MASTER SW CAUSES THE FLOW OF CURRENT FROM TERMINAL 1 OF THE MOTOR → TERMINAL 2 → TERMINAL 2 OF THE MASTER SW → TERMINAL 5 → TO GROUND, FLOWING IN THE OPPOSITE DIRECTION TO MANUAL UP OPERATION AND CAUSING THE MOTOR TO ROTATE IN REVERSE, LOWERING THE WINDOW.

2. AUTO DOWN OPERATION

WITH THE IGNITION SW ON AND WITH THE AUTO SW OF THE POWER WINDOW MASTER SW IN DOWN POSITION, CURRENT FLOWING TO TERMINAL 1 OF THE MASTER SW FLOWS TO TERMINAL 6 OF THE MASTER SW → TERMINAL 1 OF THE POWER WINDOW MOTOR → TERMINAL 2 → TERMINAL 2 OF THE MASTER SW → TERMINAL 5 → TO GROUND, CAUSING THE MOTOR TO ROTATE TOWARDS THE DOWN SIDE.

THEN, THE SOLENOID IN THE MASTER SW IS ACTIVATED AND IT LOCKS THE AUTO SW BEING PUSHED, CAUSING THE MOTOR TO CONTINUE TO ROTATE IN AUTO DOWN OPERATION.

WHEN THE WINDOW HAS COMPLETELY DESCENDED, THE CURRENT FLOW BETWEEN TERMINAL 2 OF THE MASTER SW AND TERMINAL 5 INCREASES. AS A RESULT, THE SOLENOID STOPS OPERATING, THE AUTO SW TURNS OFF AND FLOW FROM TERMINAL 1 OF THE MASTER SW TO TERMINAL 6 IS CUT OFF, STOPPING THE MOTOR SO THAT AUTO STOP OCCURS.

3. STOPPING OF AUTO DOWN AT DRIVER'S WINDOW

WHEN THE MANUAL SW (DRIVER'S) IS PUSHED TO THE UP SIDE DURING AUTO DOWN OPERATION, A GROUND CIRCUIT OPENS IN THE MASTER SW AND CURRENT DOES NOT FLOW FROM TERMINAL 2 OF THE MASTER SW → TO TERMINAL 5, SO THE MOTOR STOPS, CAUSING AUTO DOWN OPERATION TO STOP. IF THE MANUAL SW IS PUSHED CONTINUOUSLY, THE MOTOR ROTATES IN THE UP DIRECTION IN MANUAL UP OPERATION.

4. MANUAL OPERATION BY POWER WINDOW SW (PASSENGER'S WINDOW)

WITH POWER WINDOW SW (PASSENGER'S) PUSHED TO THE UP SIDE, CURRENT FLOWING FROM TERMINAL 5 OF THE POWER WINDOW SW FLOWS TO TERMINAL 4 OF THE POWER WINDOW SW → TERMINAL 1 OF THE POWER WINDOW MOTOR → TERMINAL 2 → TERMINAL 1 OF THE POWER WINDOW SW → TERMINAL 2 → TERMINAL 3 OF THE MASTER SW → TERMINAL 5 → TO GROUND AND CAUSES THE POWER WINDOW MOTOR (PASSENGER'S) TO ROTATE IN THE UP DIRECTION. UP OPERATION CONTINUES ONLY WHILE THE POWER WINDOW SW IS PUSHED TO THE UP SIDE. WHEN THE WINDOW DESCENDS, THE CURRENT FLOWING TO THE MOTOR FLOWS IN THE OPPOSITE DIRECTION, FROM TERMINAL 1 TO TERMINAL 2, AND THE MOTOR ROTATES IN REVERSE. WHEN THE WINDOW LOCK SW IS PUSHED TO THE LOCK SIDE, THE GROUND CIRCUIT TO THE PASSENGER'S WINDOW BECOMES OPEN.

AS A RESULT, EVEN IF OPEN/CLOSE OPERATION OF THE PASSENGER'S WINDOW IS TRIED, THE CURRENT FROM TERMINAL 5 OF THE POWER WINDOW MASTER SW IS NOT GROUNDED AND THE MOTOR DOES NOT ROTATE, SO THE PASSENGER'S WINDOW CAN NOT BE OPERATED AND WINDOW LOCK OCCURS.

SERVICE HINTS**Ⓢ POWER WINDOW MASTER SW**

1-GROUND: APPROX. 12VOLTS WITH IGNITION SW AT ON POSITION

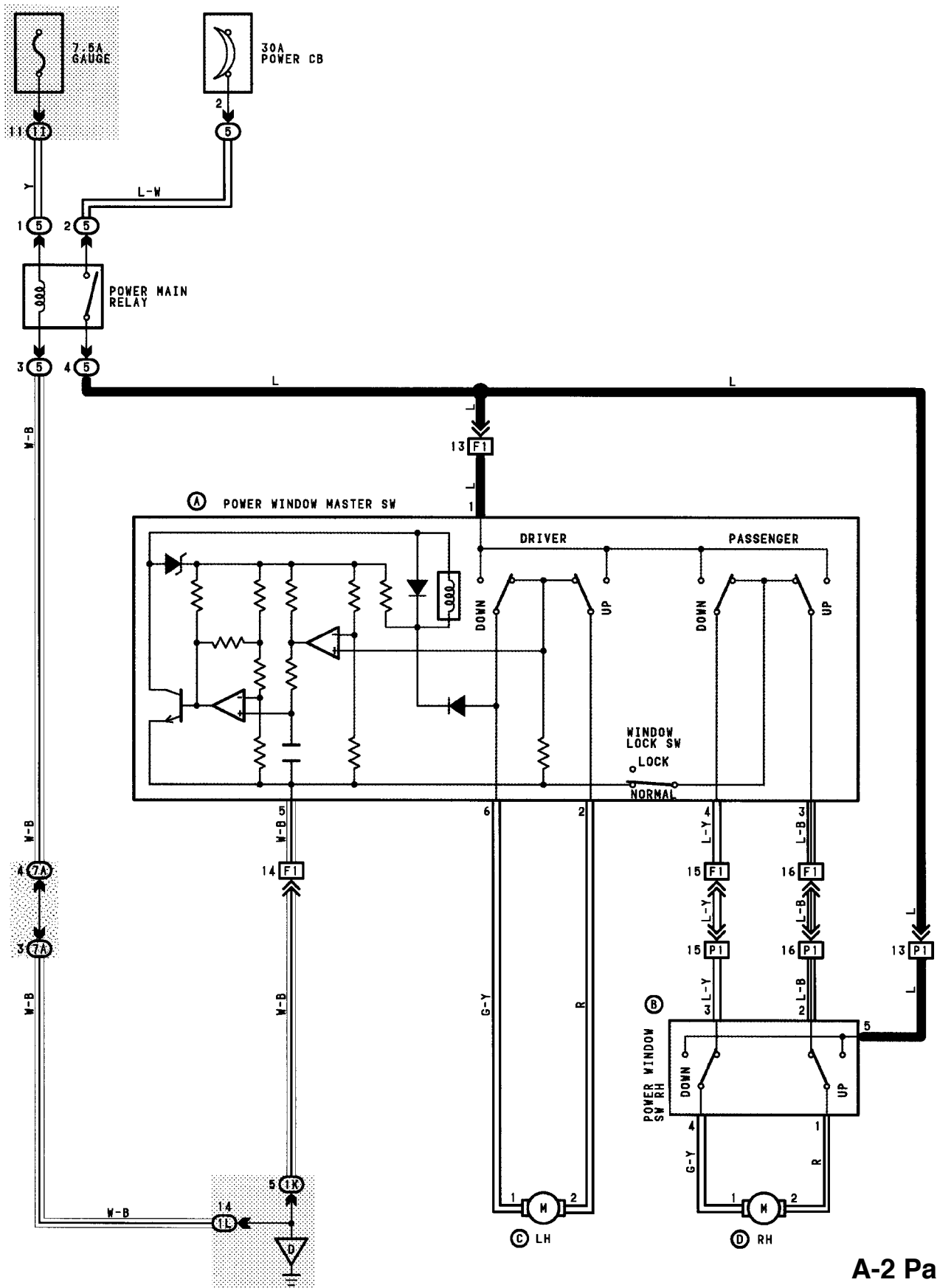
5-GROUND: ALWAYS CONTINUITY

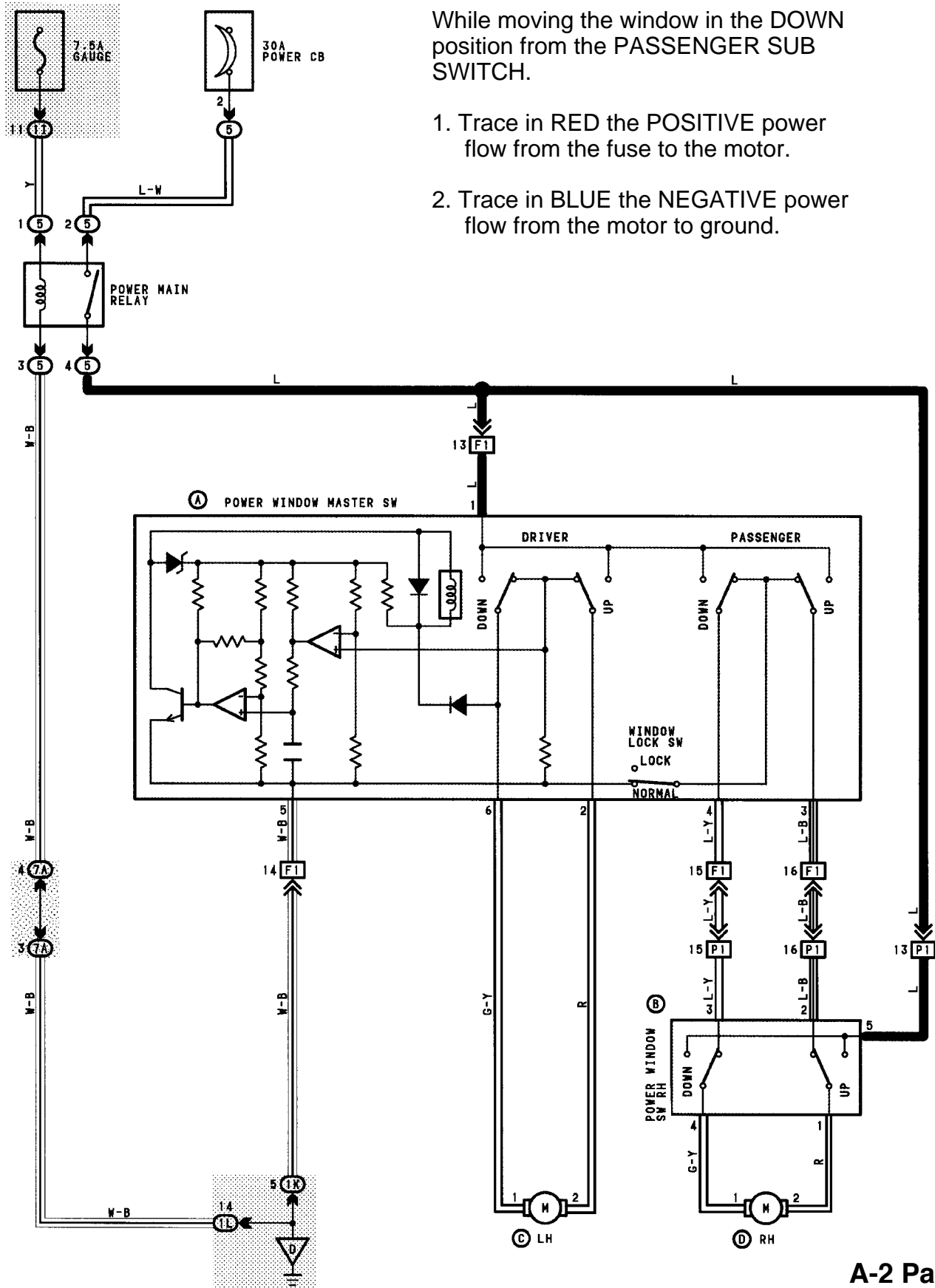
2-GROUND: APPROX. 12VOLTS WITH IGNITION SW ON AND MASTER SW (DRIVER'S WINDOW) UP

6-GROUND: APPROX. 12VOLTS WITH IGNITION SW ON AND MASTER SW (DRIVER'S WINDOW) DOWN OR DOWNAUTO

WINDOW LOCK SW

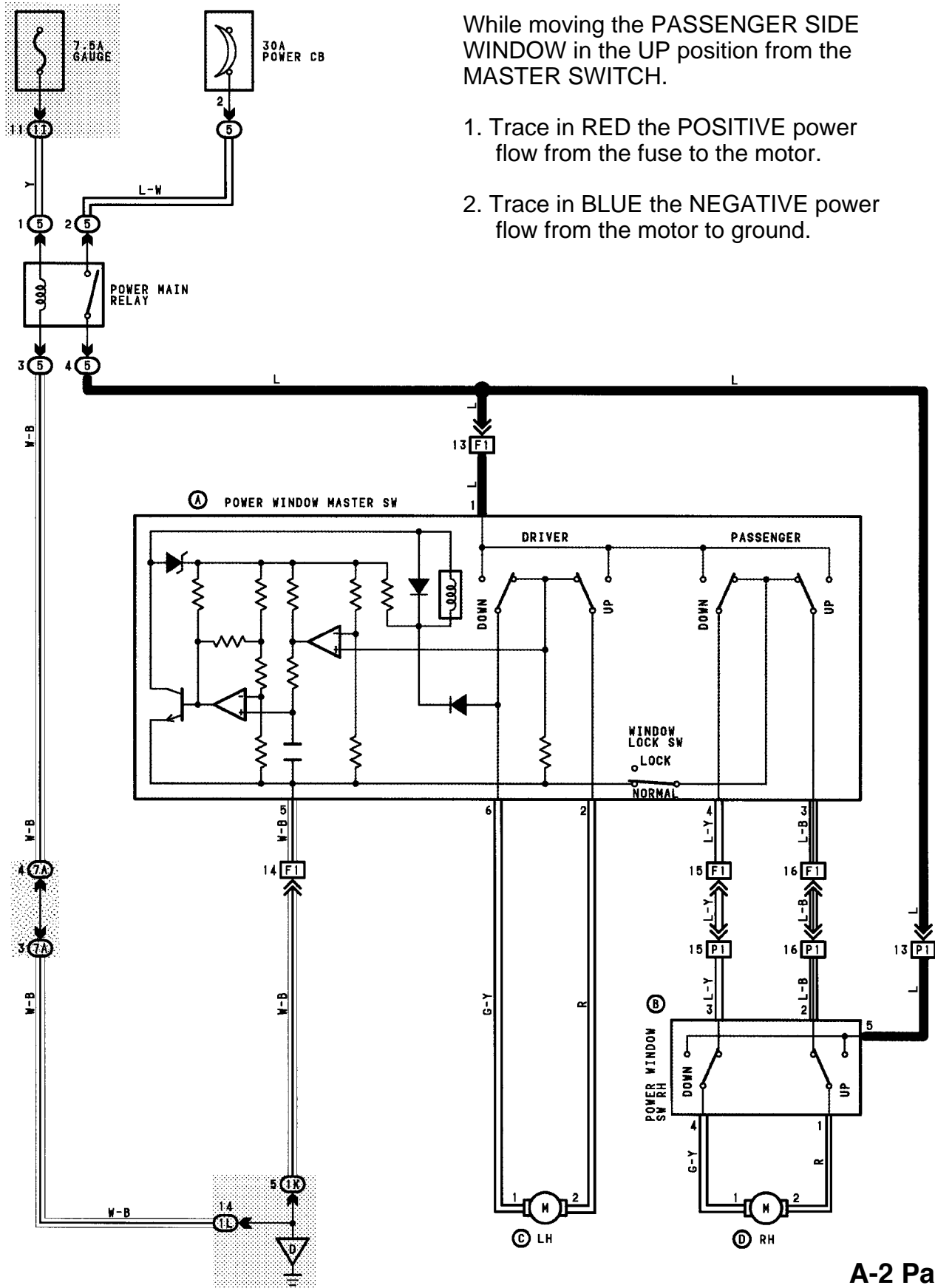
OPEN WITH WINDOW LOCK SW AT LOCK POSITION





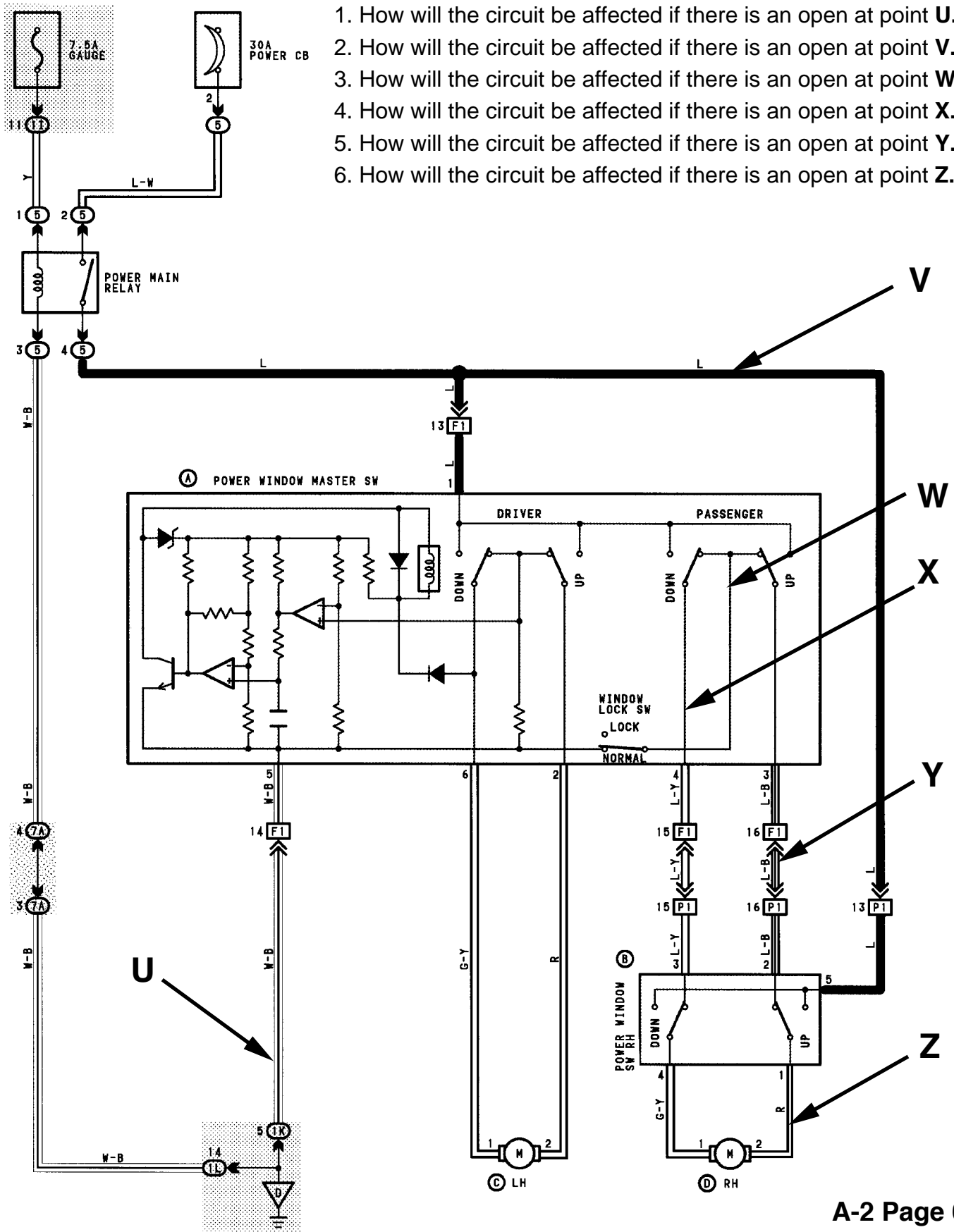
While moving the window in the DOWN position from the PASSENGER SUB SWITCH.

1. Trace in RED the POSITIVE power flow from the fuse to the motor.
2. Trace in BLUE the NEGATIVE power flow from the motor to ground.

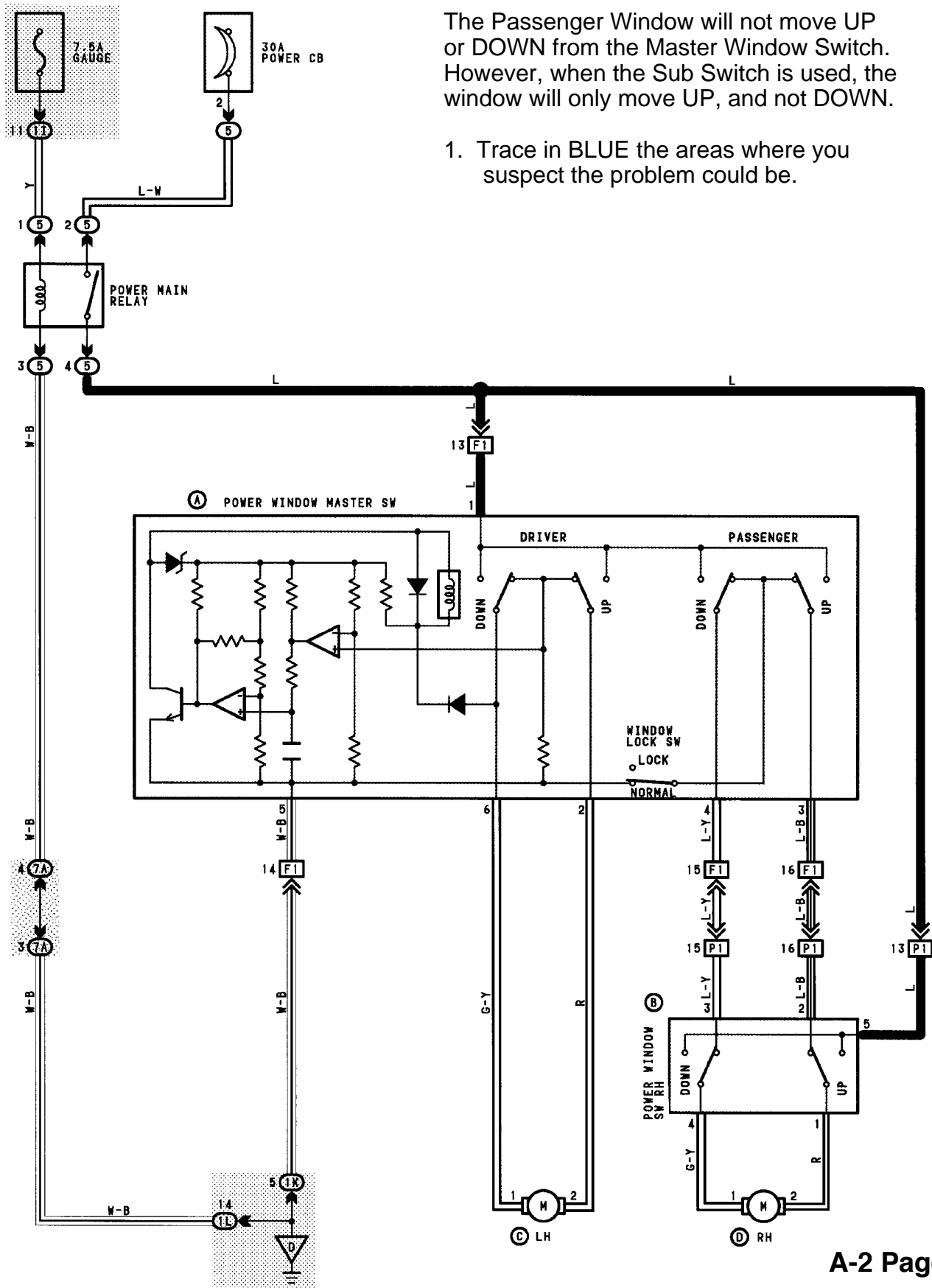


While moving the PASSENGER SIDE WINDOW in the UP position from the MASTER SWITCH.

1. Trace in RED the POSITIVE power flow from the fuse to the motor.
2. Trace in BLUE the NEGATIVE power flow from the motor to ground.



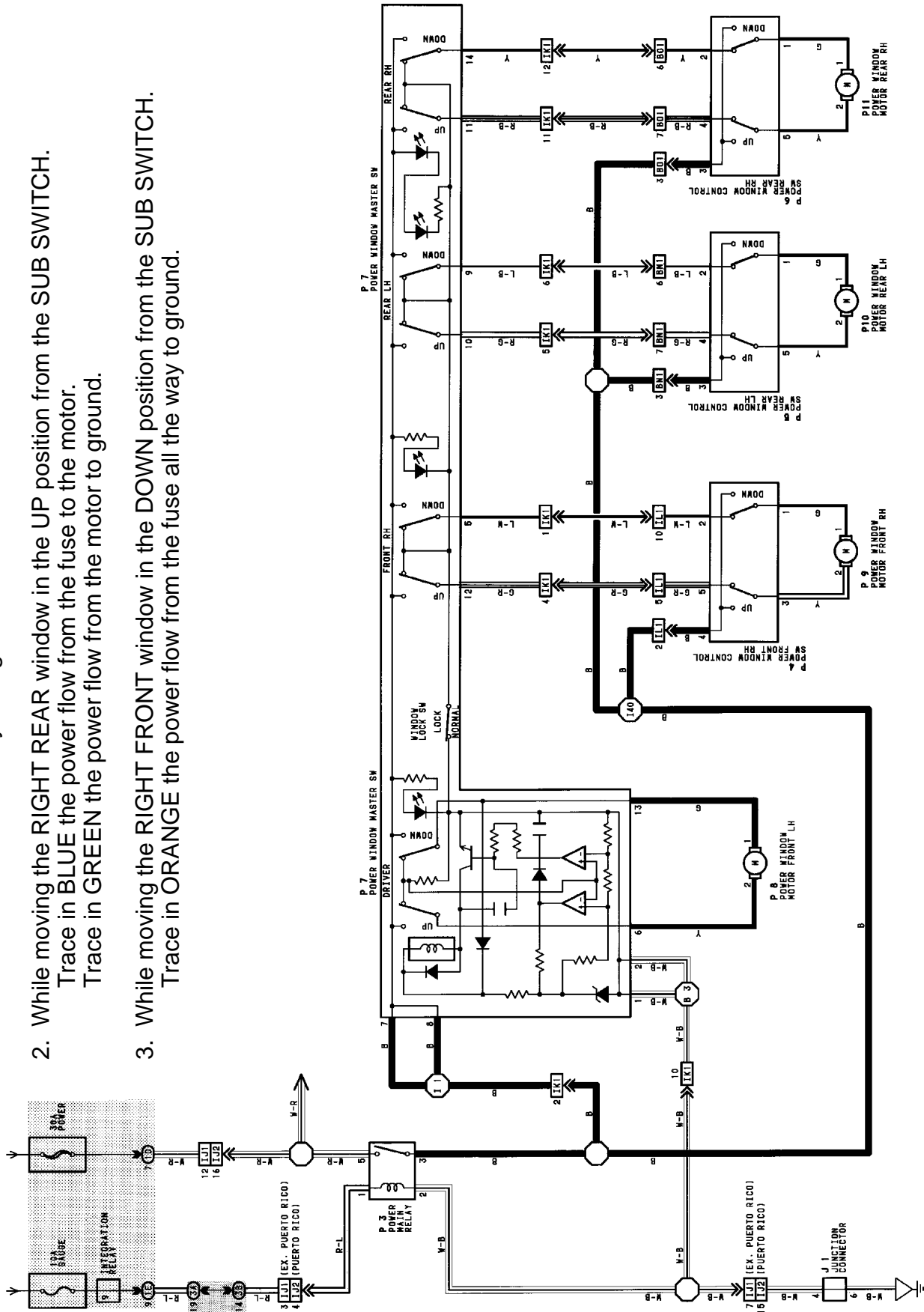
1. How will the circuit be affected if there is an open at point **U**.
2. How will the circuit be affected if there is an open at point **V**.
3. How will the circuit be affected if there is an open at point **W**.
4. How will the circuit be affected if there is an open at point **X**.
5. How will the circuit be affected if there is an open at point **Y**.
6. How will the circuit be affected if there is an open at point **Z**.



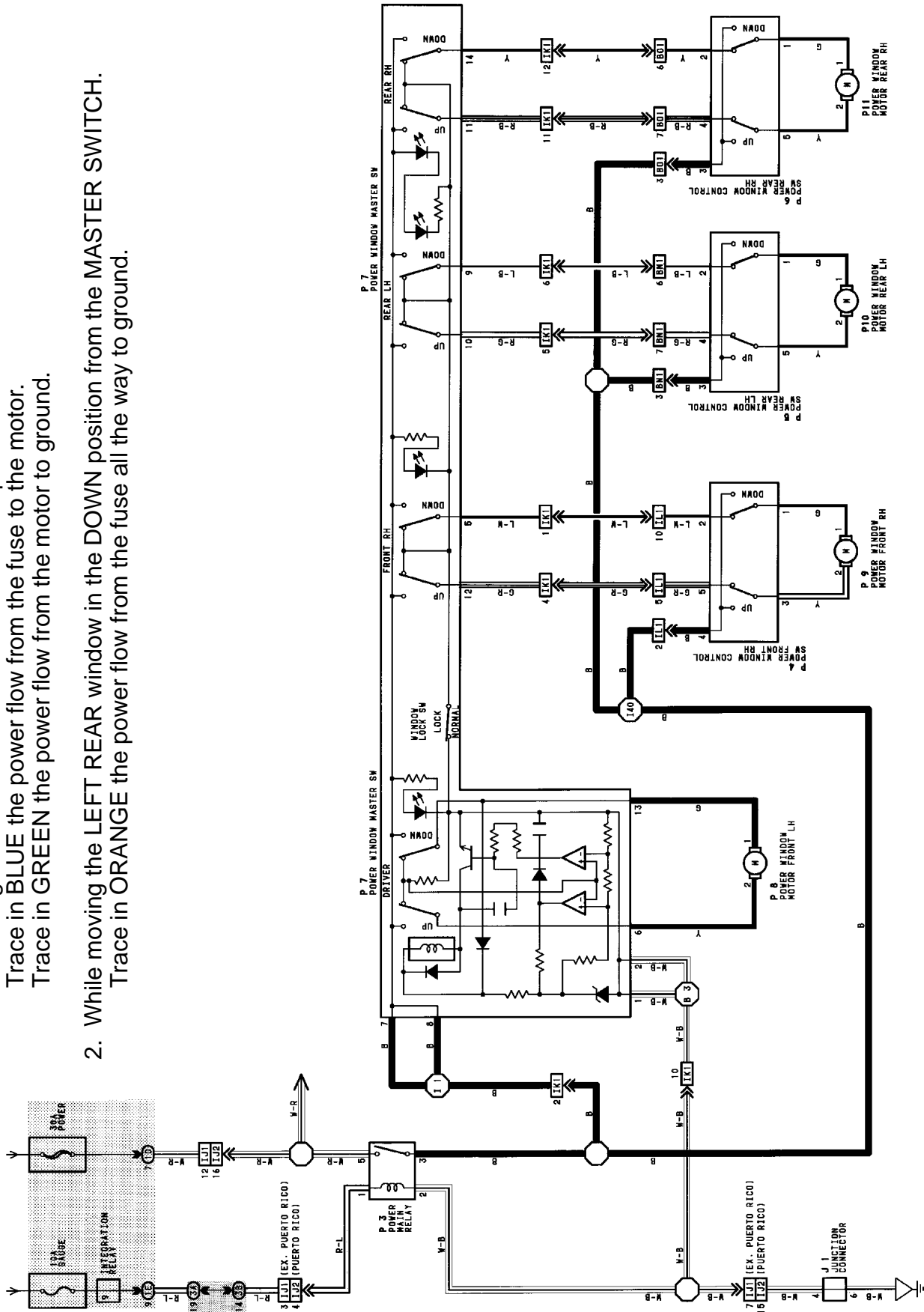
The Passenger Window will not move UP or DOWN from the Master Window Switch. However, when the Sub Switch is used, the window will only move UP, and not DOWN.

1. Trace in BLUE the areas where you suspect the problem could be.

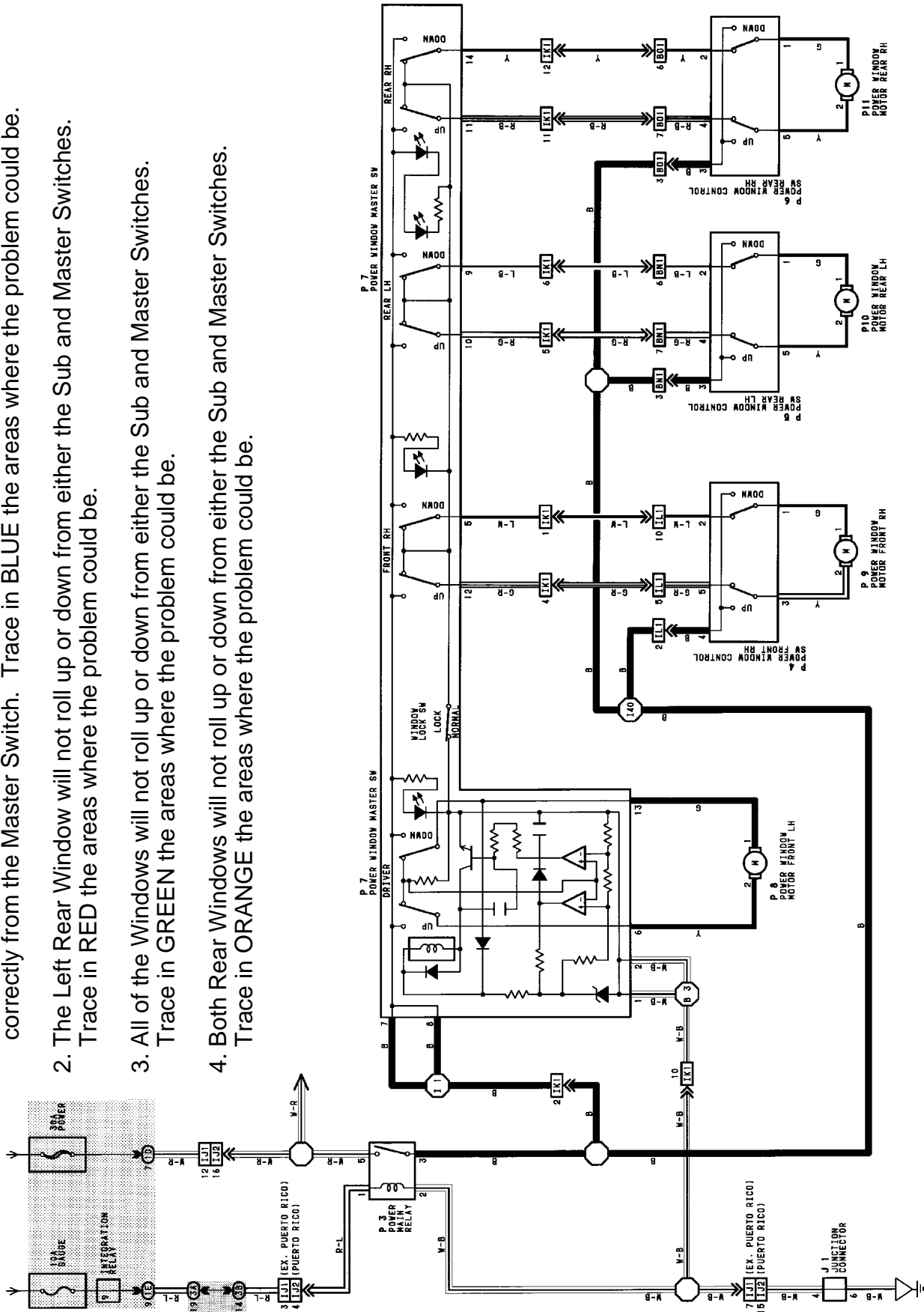
1. Trace in RED the B+ battery voltage from the fuse to each of the window SUB SWITCHES.
2. While moving the RIGHT REAR window in the UP position from the SUB SWITCH. Trace in BLUE the power flow from the fuse to the motor.
Trace in GREEN the power flow from the motor to ground.
3. While moving the RIGHT FRONT window in the DOWN position from the SUB SWITCH. Trace in ORANGE the power flow from the fuse all the way to ground.



1. While moving the RIGHT REAR window in the UP position from the MASTER SWITCH.
Trace in BLUE the power flow from the fuse to the motor.
Trace in GREEN the power flow from the motor to ground.
2. While moving the LEFT REAR window in the DOWN position from the MASTER SWITCH.
Trace in ORANGE the power flow from the fuse to ground.



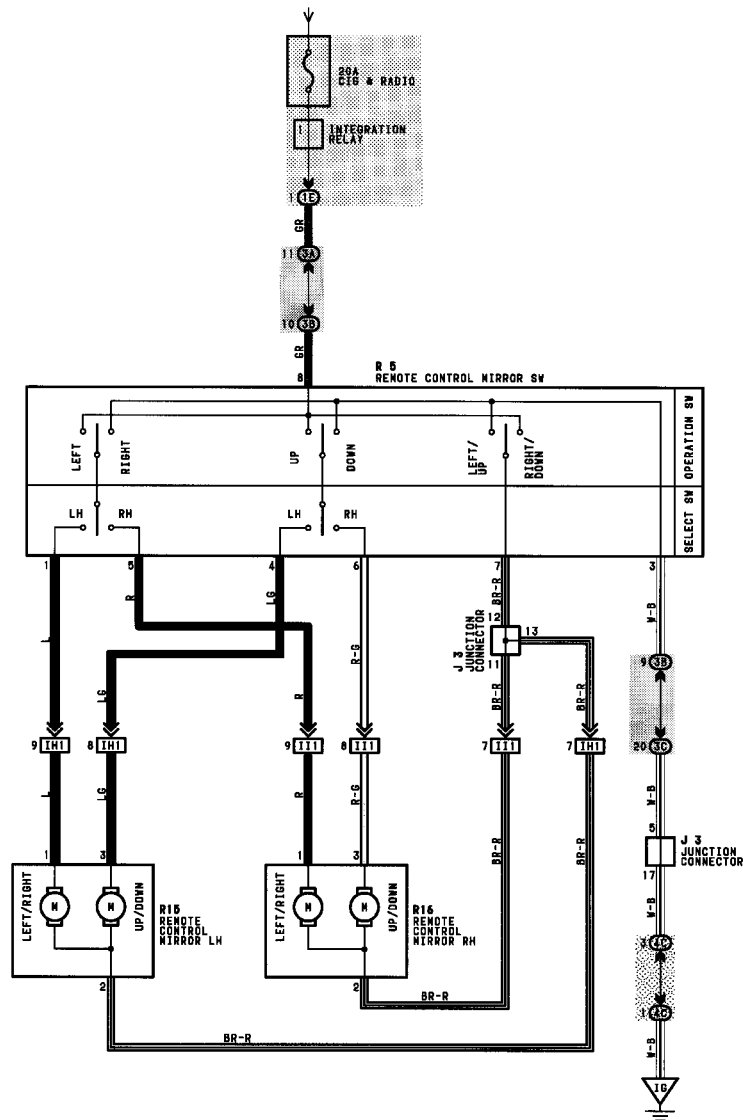
1. The Right Rear Window will not roll up or down from the Sub Switch, however the window works correctly from the Master Switch. Trace in BLUE the areas where the problem could be.
2. The Left Rear Window will not roll up or down from either the Sub and Master Switches. Trace in RED the areas where the problem could be.
3. All of the Windows will not roll up or down from either the Sub and Master Switches. Trace in GREEN the areas where the problem could be.
4. Both Rear Windows will not roll up or down from either the Sub and Master Switches. Trace in ORANGE the areas where the problem could be.



TOYOTA

Power Mirrors

Worksheets



SERVICE HINTS

R 5 REMOTE CONTROL MIRROR SW

- 8-GROUND: APPROX. 12VOLTS WITH IGNITION SW AT ACC OR ON POSITION
- 7-3: CONTINUITY WITH OPERATION SW AT UP OR LEFT POSITION
- 8-7: CONTINUITY WITH OPERATION SW AT DOWN OR RIGHT POSITION
- 3-GROUND: ALWAYS CONTINUITY

○ : PARTS LOCATION

CODE	SEE PAGE	CODE	SEE PAGE	CODE	SEE PAGE
J 3	31	R15	32(S/D), 33(W/G)		
R 5	31	R16	32(S/D), 33(W/G)		

○ : JUNCTION BLOCK AND WIRE HARNESS CONNECTOR

CODE	SEE PAGE	JUNCTION BLOCK AND WIRE HARNESS (CONNECTOR LOCATION)
1E	20	INSTRUMENT PANEL WIRE AND J/B NO.1 (LEFT KICK PANEL)
3A	24	INSTRUMENT PANEL WIRE AND J/B NO.3 (BEHIND THE INSTRUMENT PANEL CENTER)
3B		
3C		
4C	26	INSTRUMENT PANEL WIRE AND J/B NO.4 (RIGHT KICK PANEL)

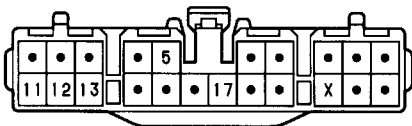
□ : CONNECTOR JOINING WIRE HARNESS AND WIRE HARNESS

CODE	SEE PAGE	JOINING WIRE HARNESS AND WIRE HARNESS (CONNECTOR LOCATION)
IH1	38	FRONT DOOR LH WIRE AND INSTRUMENT PANEL WIRE (LEFT KICK PANEL)
II1	38	FRONT DOOR RH WIRE AND INSTRUMENT PANEL WIRE (RIGHT KICK PANEL)

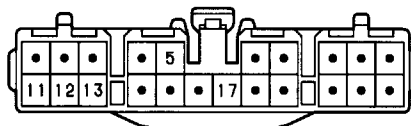
▽ : GROUND POINTS

CODE	SEE PAGE	GROUND POINTS LOCATION
I6	36	RIGHT KICK PANEL

(7A-FE USA) J 3 DARK GRAY



(7A-FE CANADA) J 3 DARK GRAY

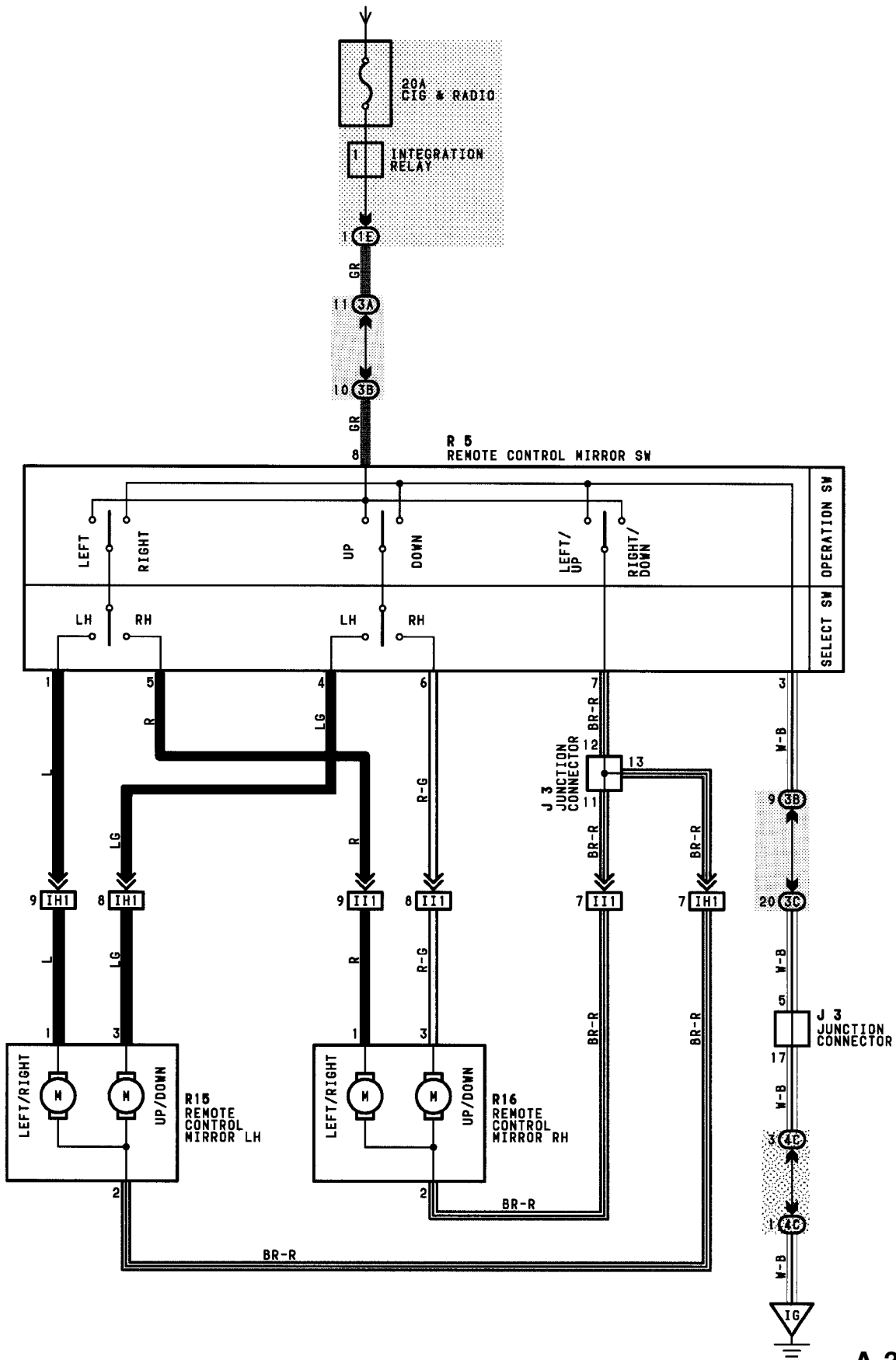


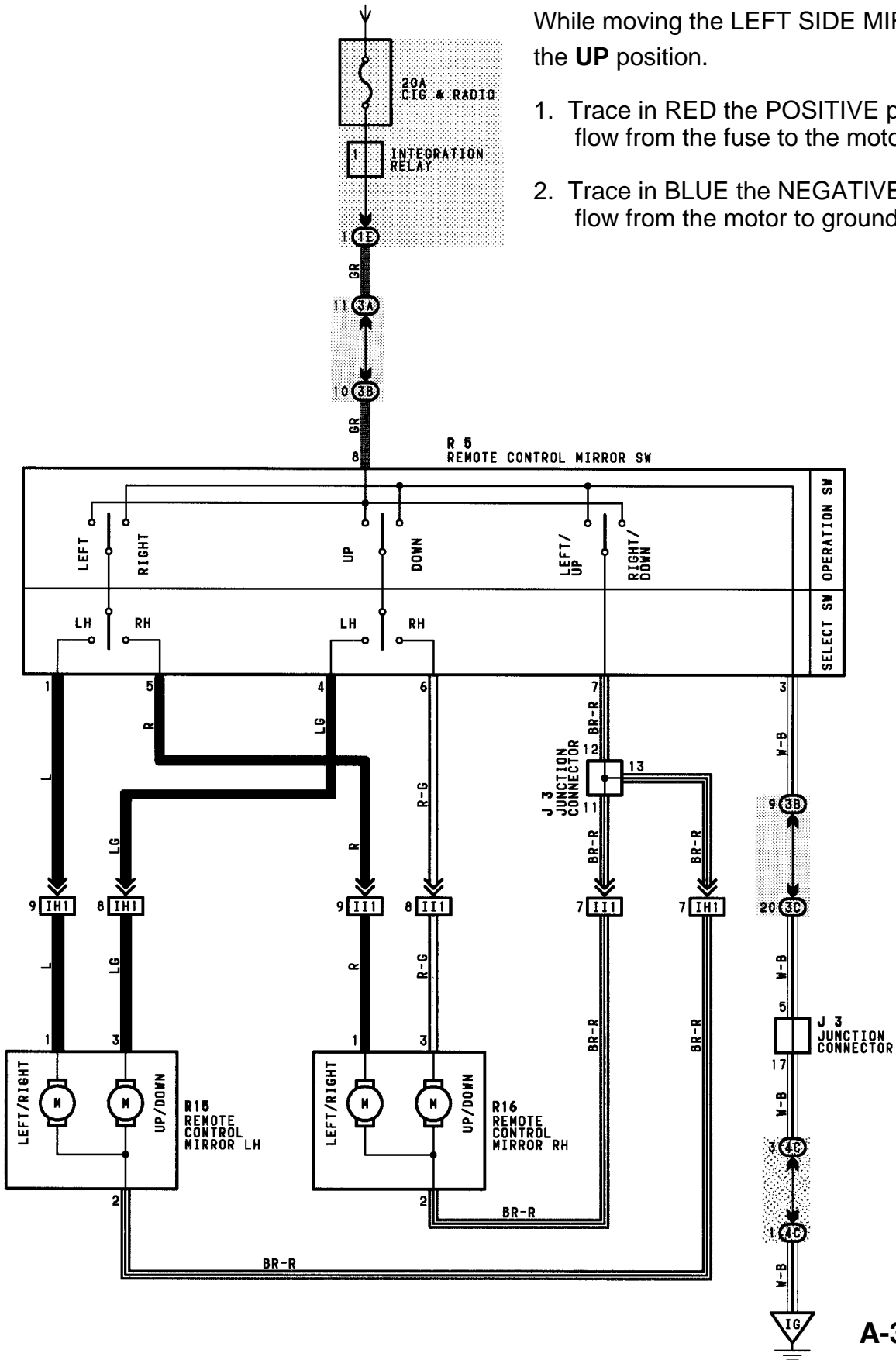
R 5



R15, R16

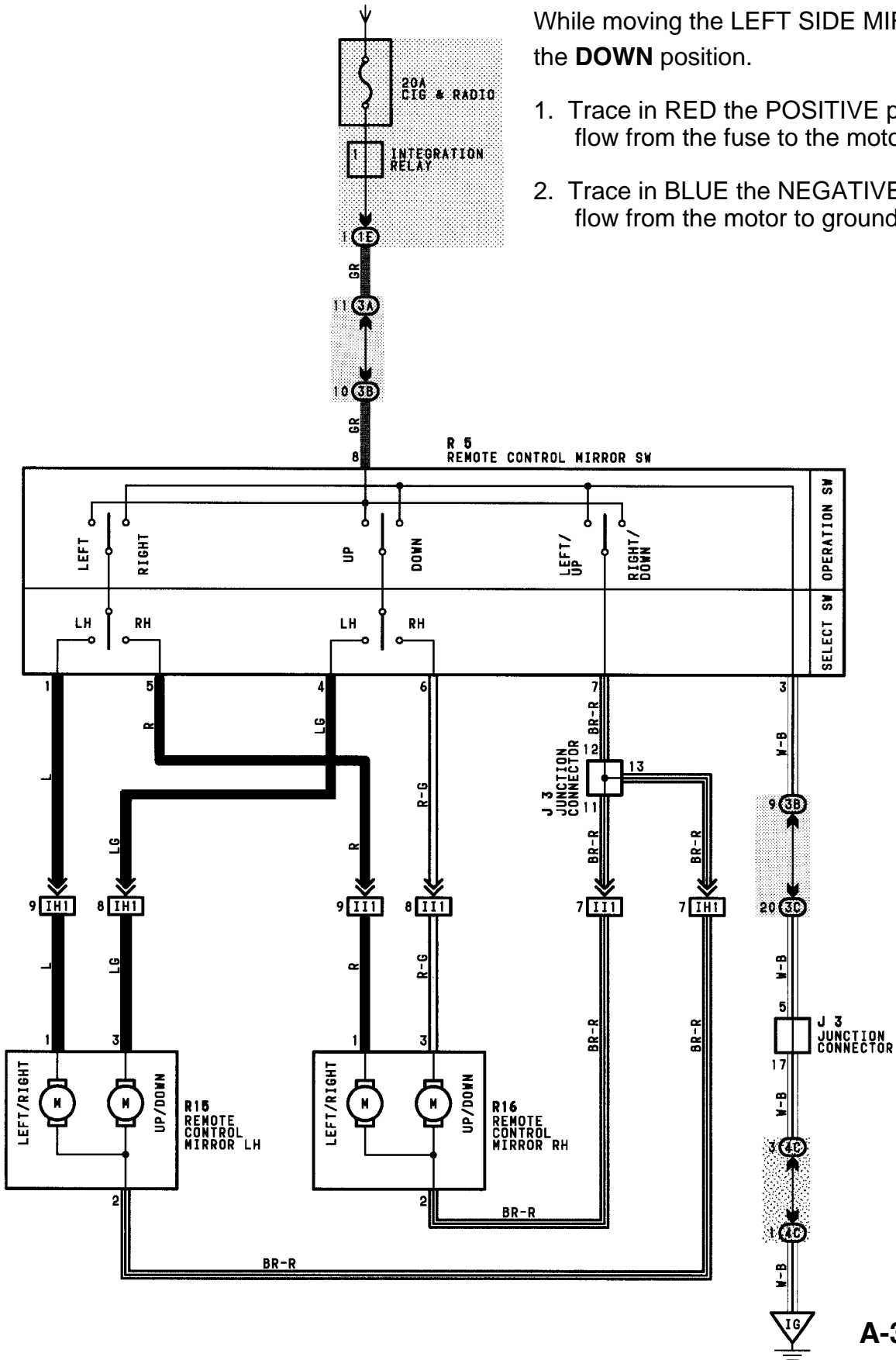






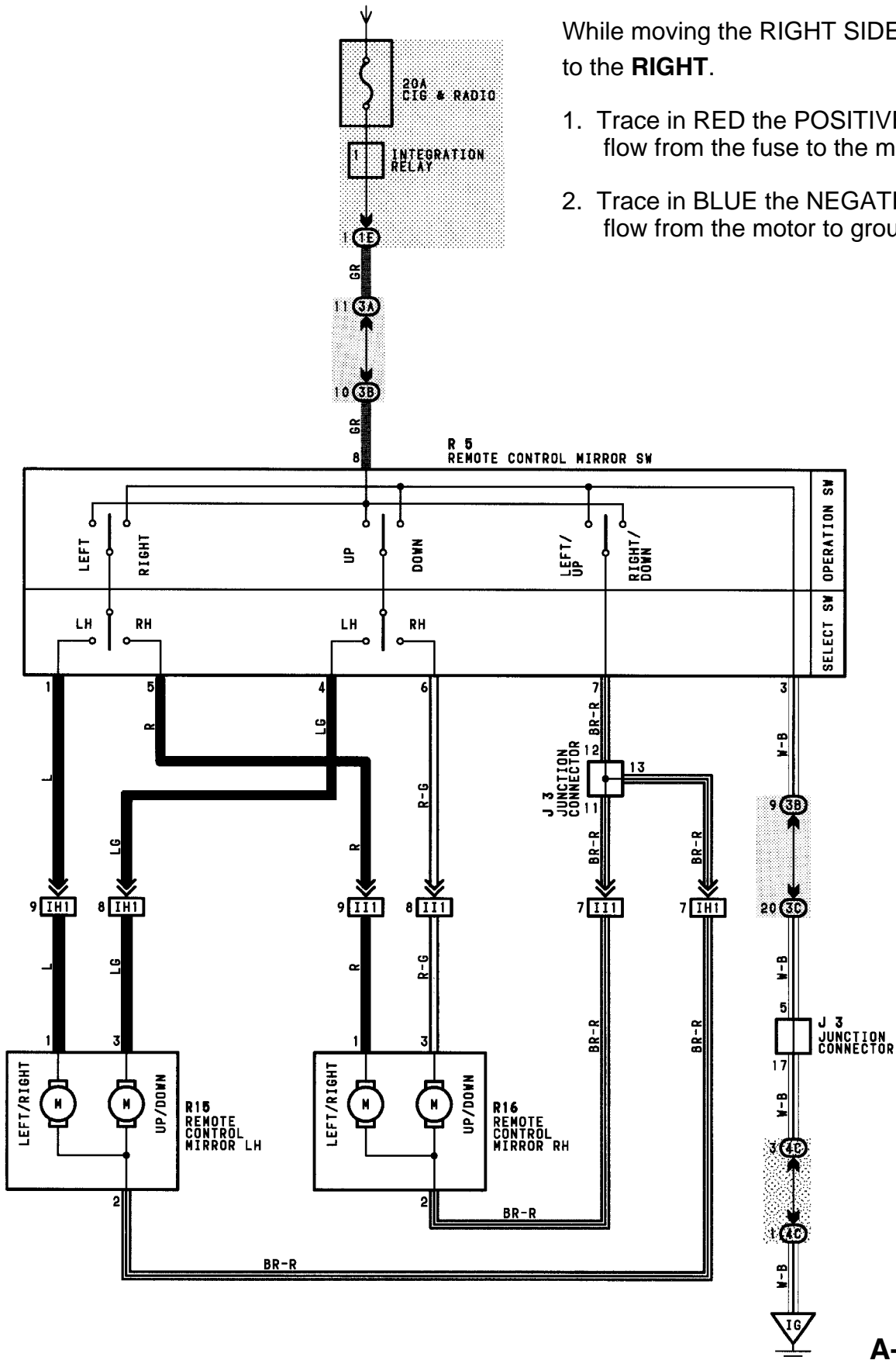
While moving the LEFT SIDE MIRROR in the **UP** position.

1. Trace in RED the POSITIVE power flow from the fuse to the motor.
2. Trace in BLUE the NEGATIVE power flow from the motor to ground.



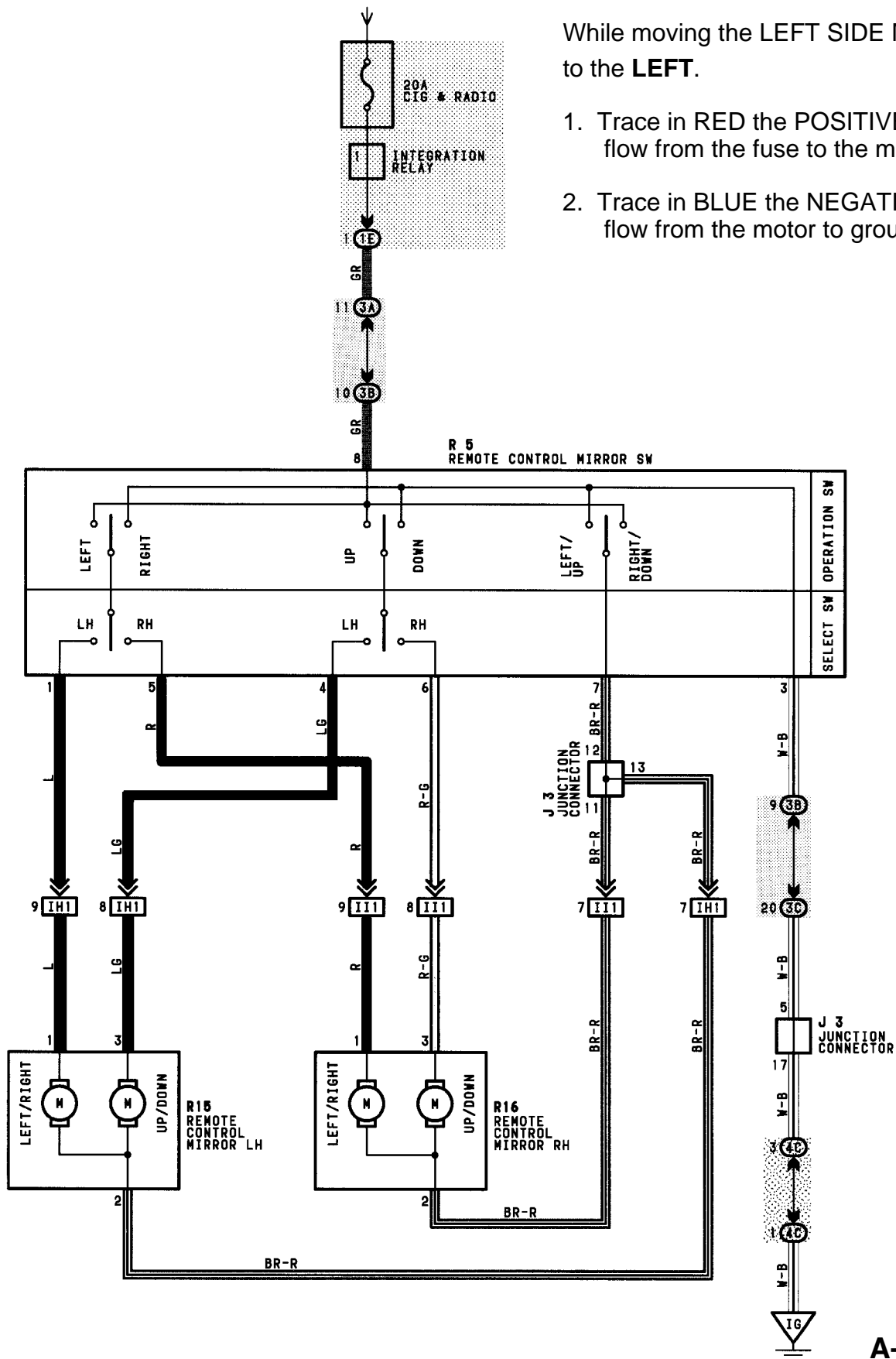
While moving the LEFT SIDE MIRROR in the **DOWN** position.

1. Trace in RED the POSITIVE power flow from the fuse to the motor.
2. Trace in BLUE the NEGATIVE power flow from the motor to ground.



While moving the RIGHT SIDE MIRROR to the **RIGHT**.

1. Trace in RED the POSITIVE power flow from the fuse to the motor.
2. Trace in BLUE the NEGATIVE power flow from the motor to ground.

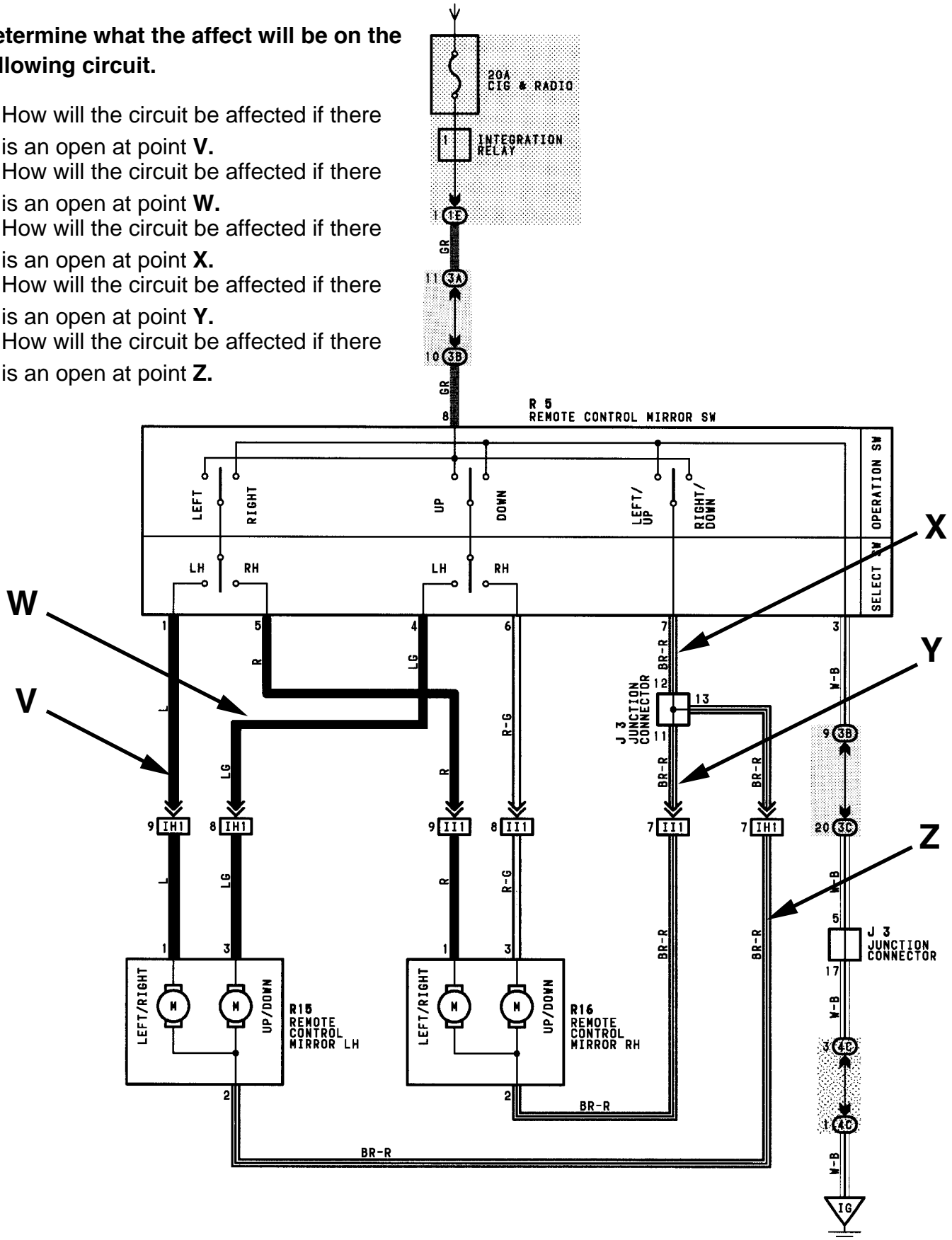


While moving the LEFT SIDE MIRROR to the **LEFT**.

1. Trace in RED the POSITIVE power flow from the fuse to the motor.
2. Trace in BLUE the NEGATIVE power flow from the motor to ground.

Determine what the affect will be on the following circuit.

1. How will the circuit be affected if there is an open at point V.
2. How will the circuit be affected if there is an open at point W.
3. How will the circuit be affected if there is an open at point X.
4. How will the circuit be affected if there is an open at point Y.
5. How will the circuit be affected if there is an open at point Z.



PROBLEM #1

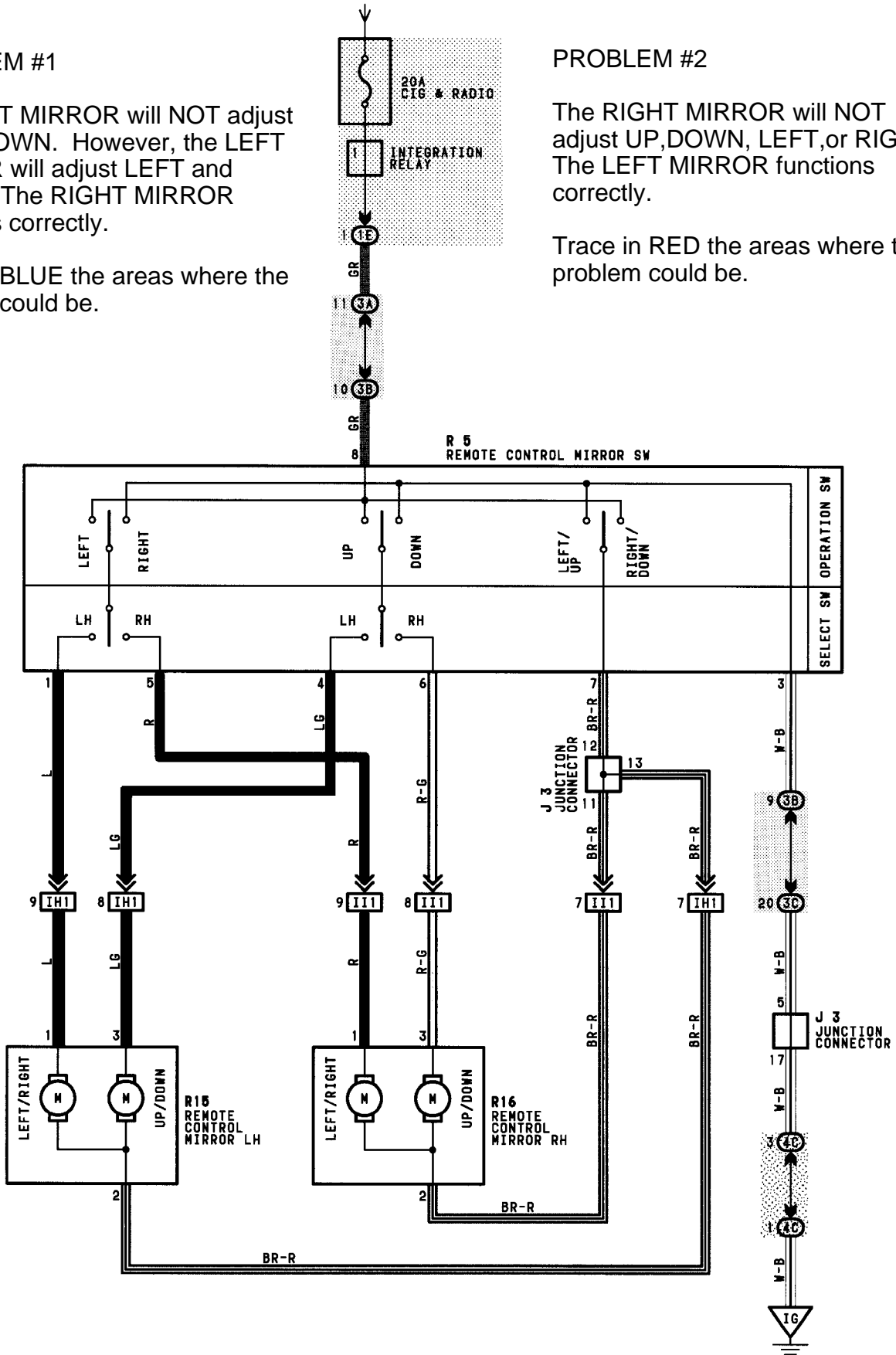
The LEFT MIRROR will NOT adjust UP or DOWN. However, the LEFT MIRROR will adjust LEFT and RIGHT. The RIGHT MIRROR functions correctly.

Trace in BLUE the areas where the problem could be.

PROBLEM #2

The RIGHT MIRROR will NOT adjust UP,DOWN, LEFT,or RIGHT. The LEFT MIRROR functions correctly.

Trace in RED the areas where the problem could be.



PROBLEM #3

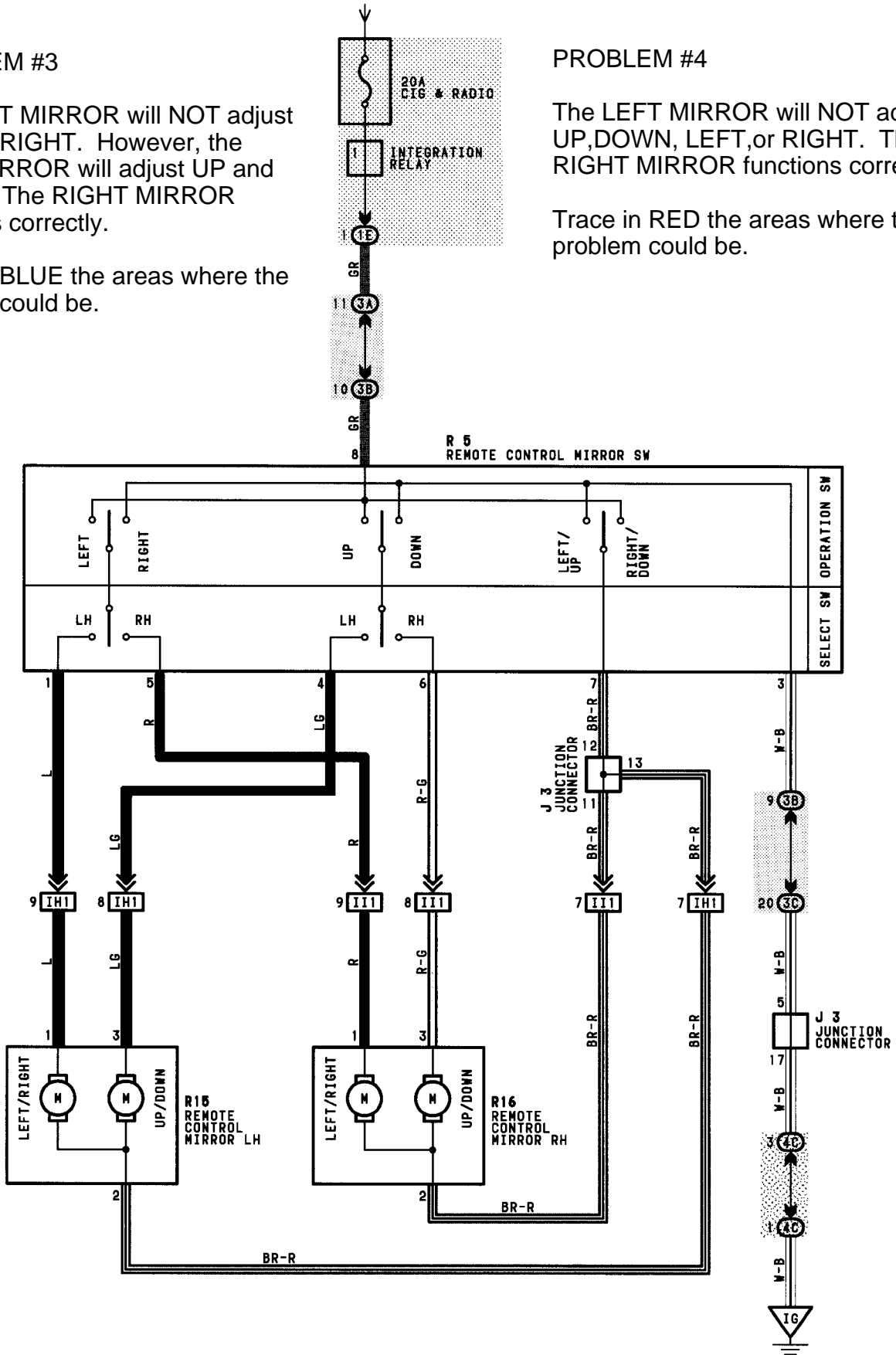
The LEFT MIRROR will NOT adjust LEFT or RIGHT. However, the LEFT MIRROR will adjust UP and DOWN. The RIGHT MIRROR functions correctly.

Trace in BLUE the areas where the problem could be.

PROBLEM #4

The LEFT MIRROR will NOT adjust UP,DOWN, LEFT,or RIGHT. The RIGHT MIRROR functions correctly.

Trace in RED the areas where the problem could be.



PROBLEM #5

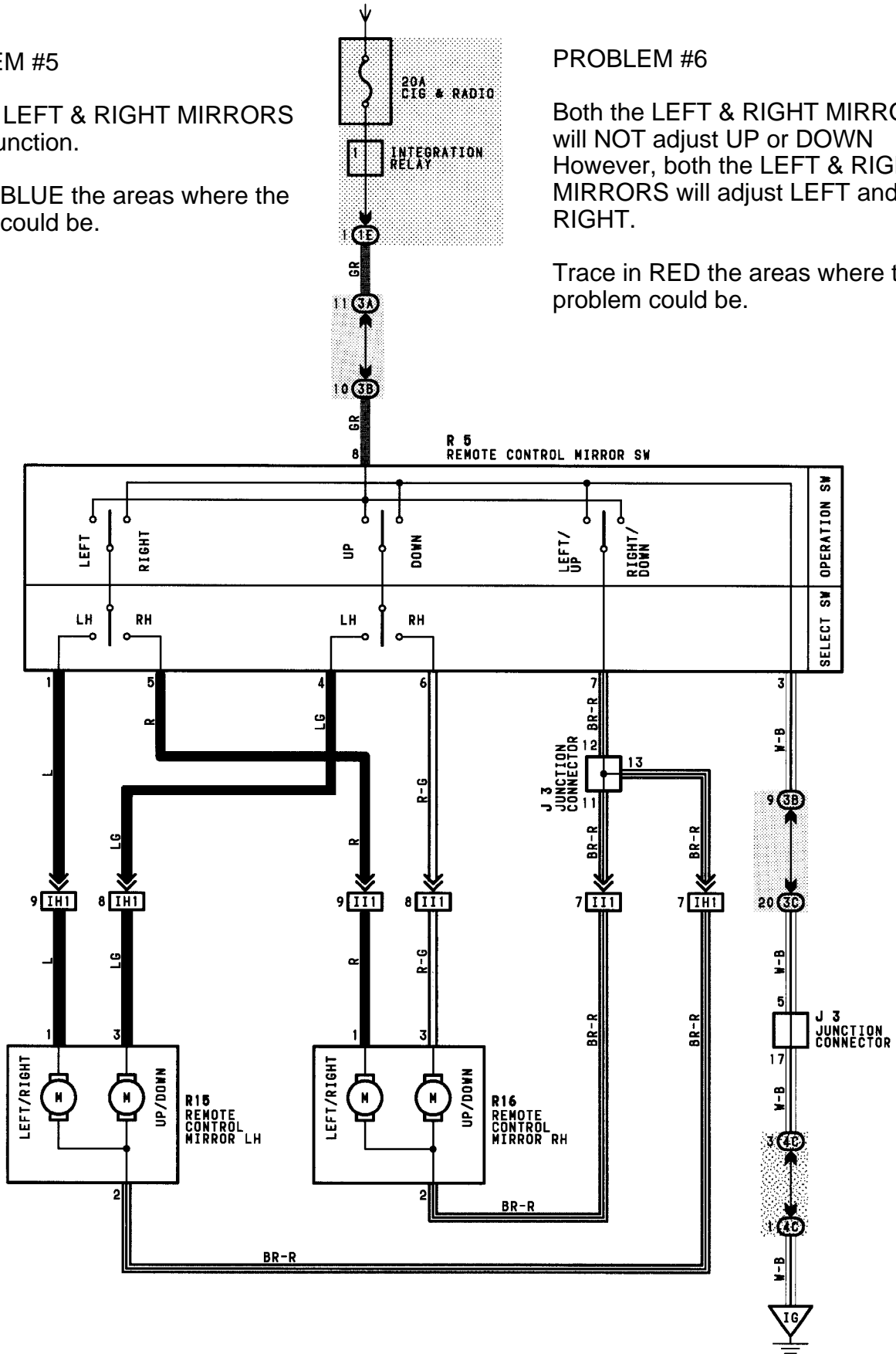
Both the LEFT & RIGHT MIRRORS will not function.

Trace in BLUE the areas where the problem could be.

PROBLEM #6

Both the LEFT & RIGHT MIRRORS will NOT adjust UP or DOWN However, both the LEFT & RIGHT MIRRORS will adjust LEFT and RIGHT.

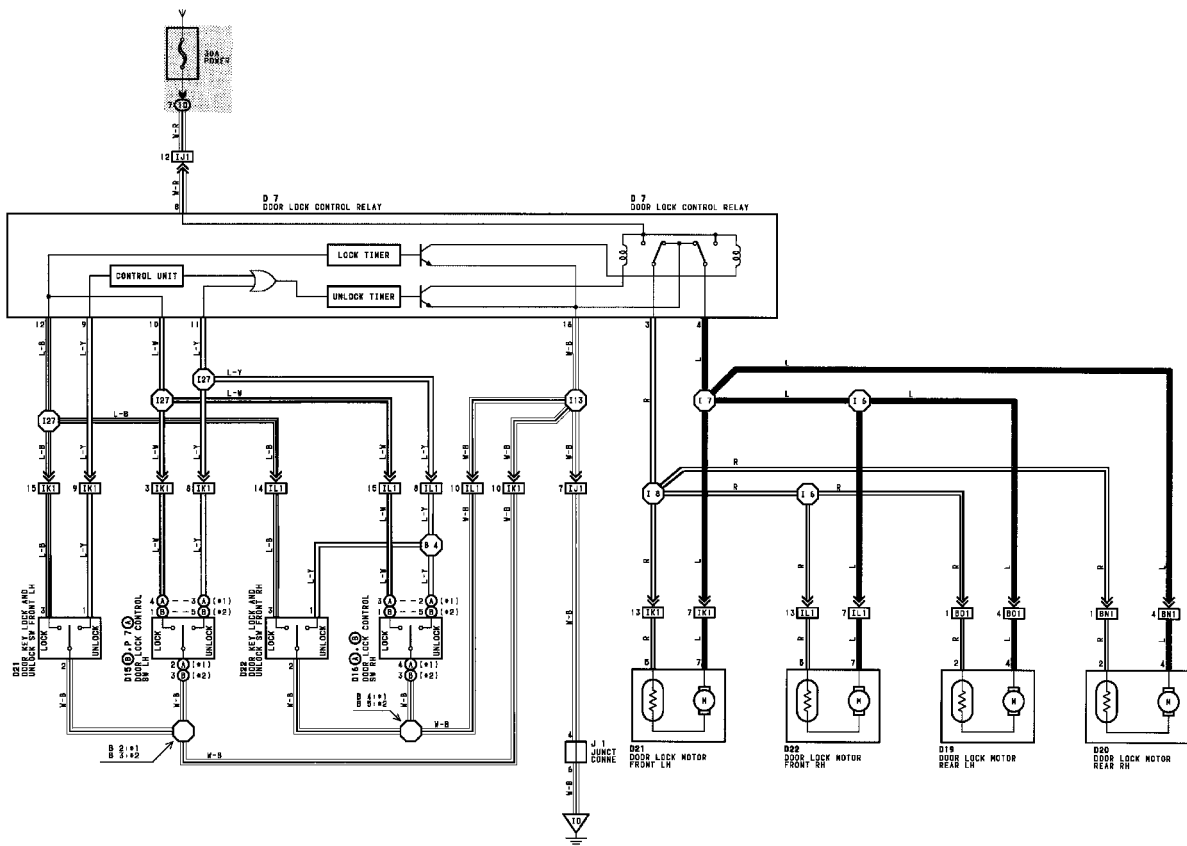
Trace in RED the areas where the problem could be.



TOYOTA

Door Locks

Worksheets



SYSTEM OUTLINE

WHEN THE IGNITION SW TURNED ON, CURRENT FLOWS THROUGH THE GAUGE FUSE TO **TERMINAL 1** OF THE POWER MAIN RELAY → **TERMINAL 2** → TO **GROUND**. THIS ACTIVATES THE RELAY AND THE CURRENT FLOWING TO **TERMINAL 5** OF THE RELAY FROM **POWER FUSE** FLOWS TO **TERMINAL 3** OF THE RELAY → **TERMINALS 7 AND 8** OF THE POWER WINDOW MASTER SW, **TERMINALS 3 AND 4** OF THE POWER WINDOW SW.

1. MANUAL OPERATION (DRIVER'S WINDOW)

WITH THE IGNITION SW TURNED ON AND WITH THE POWER WINDOW MASTER SW (MANUAL SW) IN **UP** POSITION. THE CURRENT FLOWING TO **TERMINALS 7 AND 8** OF THE POWER WINDOW MASTER SW FLOWS TO **TERMINAL 6** OF THE MASTER SW → **TERMINAL 2** OF THE POWER WINDOW MOTOR → **TERMINAL 1** → **TERMINAL 13** OF THE MASTER SW → **TERMINAL 2 OR 1** → TO **GROUND** AND CAUSES THE POWER WINDOW MOTOR TO ROTATE IN THE **UP** DIRECTION. THE WINDOW ASCENDS ONLY WHILE THE SW IS BEING PULLED. IN **DOWN** OPERATION, THE FLOW OF CURRENT FROM **TERMINALS 7 AND 8** OF THE POWER WINDOW MASTER SW TO **TERMINAL 13** OF THE MASTER SW CAUSES THE FLOW OF CURRENT FROM **TERMINAL 1** OF THE MOTOR → **TERMINAL 2** → **TERMINAL 6** OF THE MASTER SW → **TERMINAL 2 OR 1** → TO **GROUND**, FLOWING IN THE OPPOSITE DIRECTION TO **MANUAL UP** OPERATION AND CAUSING THE MOTOR TO ROTATE IN **REVERSE** LOWERING THE WINDOW.

2. AUTO DOWN OPERATION

WITH THE IGNITION SW ON AND WITH THE **AUTO SW** OF THE POWER WINDOW MASTER SW IN **DOWN** POSITION, CURRENT FLOWING TO **TERMINALS 7 AND 8** OF THE MASTER SW FLOWS TO **TERMINAL 13** OF THE MASTER SW → **TERMINAL 1** OF THE POWER WINDOW MOTOR → **TERMINAL 2** → **TERMINAL 6** OF THE MASTER SW → **TERMINAL 2** → TO **GROUND**, CAUSING THE MOTOR TO ROTATE TOWARDS THE **DOWN** SIDE THEN THE SOLENOID IN THE MASTER SW IS ACTIVATED AND IT LOCKS THE **AUTO SW** BEING PULLED, CAUSING THE MOTOR TO CONTINUE TO ROTATE IN **AUTO DOWN** OPERATION. WHEN THE WINDOW HAS COMPLETELY DESENDED, THE CURRENT FLOW BETWEEN **TERMINAL 6** OF THE MASTER SW AND **TERMINAL 2** INCREASES. AS A RESULT, THE SOLENOID STOPS OPERATING. THE **AUTO SW** TURNS OFF AND FLOW FROM **TERMINAL 7** OF THE MASTER SW TO **TERMINAL 13** IS CUT OFF, STOPPING THE MOTOR SO THAT **AUTO STOP** OCCURS.

3. STOPPING OF AUTO DOWN AT DRIVER'S WINDOW

WHEN THE **MANUAL SW (DRIVER'S)** IS PULLED TO THE **UP** SIDE DURING **AUTO DOWN** OPERATION, A **GROUND** CIRCUIT OPENS IN THE MASTER SW AND CURRENT DOES NOT FLOW FROM **TERMINAL 6** OF THE MASTER SW → TO **GROUND**, SO THE MOTOR STOPS, CAUSING **AUTO DOWN** OPERATION TO STOP. IF THE MASTER SW IS PULLED CONTINUOUSLY, THE MOTOR ROTATES IN THE **UP** DIRECTION IN **MANUAL UP** OPERATION.

4. MANUAL OPERATION BY POWER WINDOW SW (PASSENGER'S WINDOW)

WITH **POWER WINDOW SW (PASSENGER'S)** PULLED TO THE **UP** SIDE, CURRENT FLOWING FROM **TERMINAL 4** OF THE POWER WINDOW SW FLOWS TO **TERMINAL 3** OF THE POWER WINDOW SW → **TERMINAL 2** OF THE POWER WINDOW MOTOR → **TERMINAL 1** → **TERMINAL 1** OF THE POWER WINDOW SW → **TERMINAL 2** → **TERMINAL 5** OF THE MASTER SW → **TERMINAL 1 OR 2** → TO **GROUND** AND CAUSES THE POWER WINDOW MOTOR (PASSENGER'S) TO ROTATE IN THE **UP** DIRECTION. **UP** OPERATION CONTINUES ONLY WHILE THE POWER WINDOW SW IS PULLED TO THE **UP** SIDE. WHEN THE WINDOW DESENDS, THE CURRENT FLOWING TO THE MOTOR FLOWS IN THE OPPOSITE DIRECTION, FROM **TERMINAL 1** TO **TERMINAL 2**, AND THE MOTOR ROTATES IN **REVERSE**. WHEN THE WINDOW LOCK SW IS PULLED TO THE **LOCK** SIDE, THE **GROUND** CIRCUIT TO THE PASSENGER'S WINDOW BECOMES OPEN. AS A RESULT, EVEN IF **OPEN/CLOSE** OPERATION OF THE PASSENGER'S WINDOW IS TRIED, THE CURRENT FROM **TERMINALS 1 AND 2** OF THE POWER WINDOW MASTER SW IS NOT GROUNDED AND THE MOTOR DOES NOT ROTATE, SO THE PASSENGER'S WINDOW CAN NOT BE OPERATED AND **WINDOW LOCK** OCCURS. FURTHERMORE **REAR LH RH** WINDOW OPERATE THE SAME AS THE ABOVE CIRCUIT.

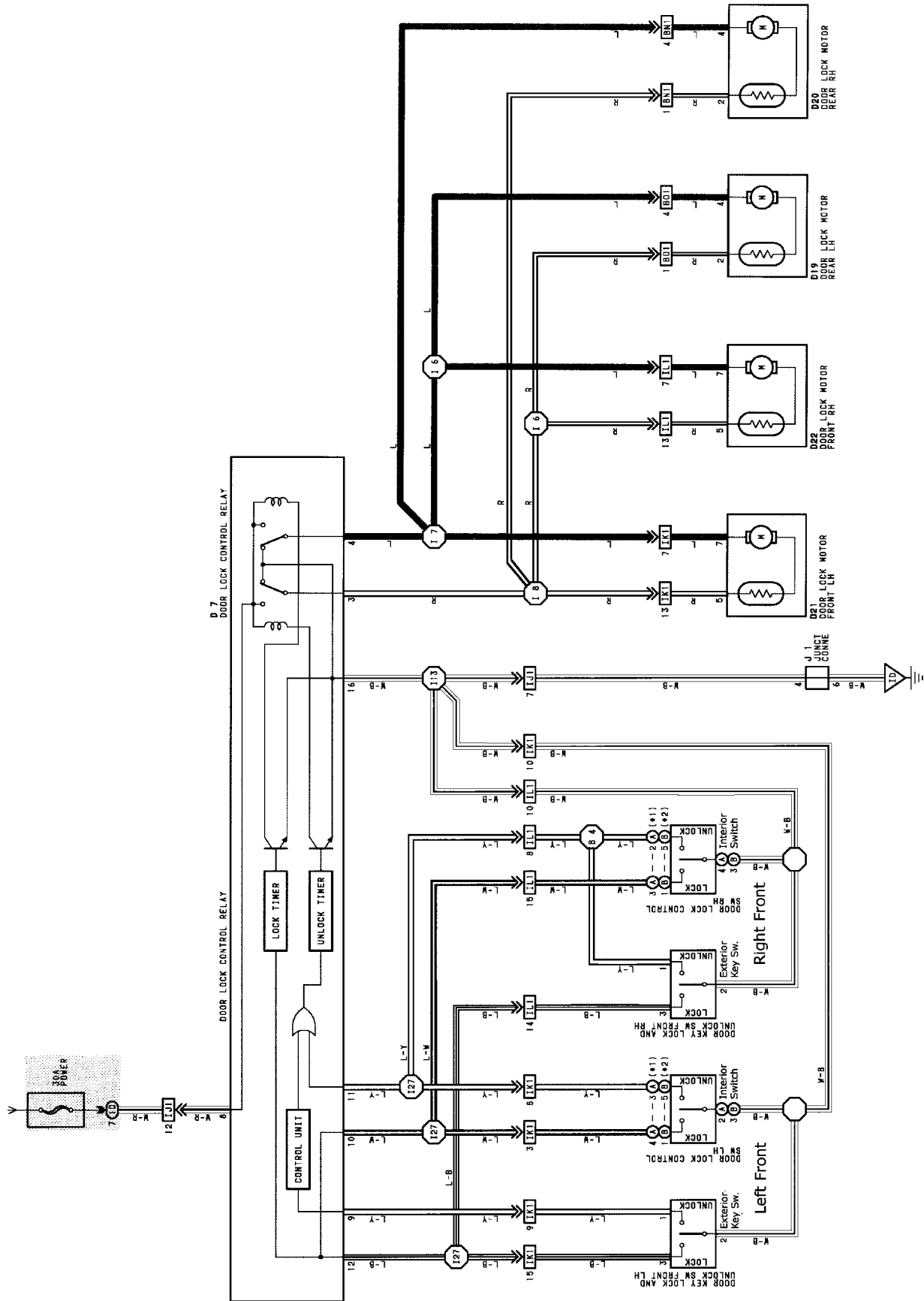
SERVICE HINTS**P 7 POWER WINDOW MASTER SW**

7, 8-GROUND: APPROX. 12VOLTS WITH IGNITION SW AT **ON** POSITION

1, 2-GROUND: ALWAYS CONTINUITY

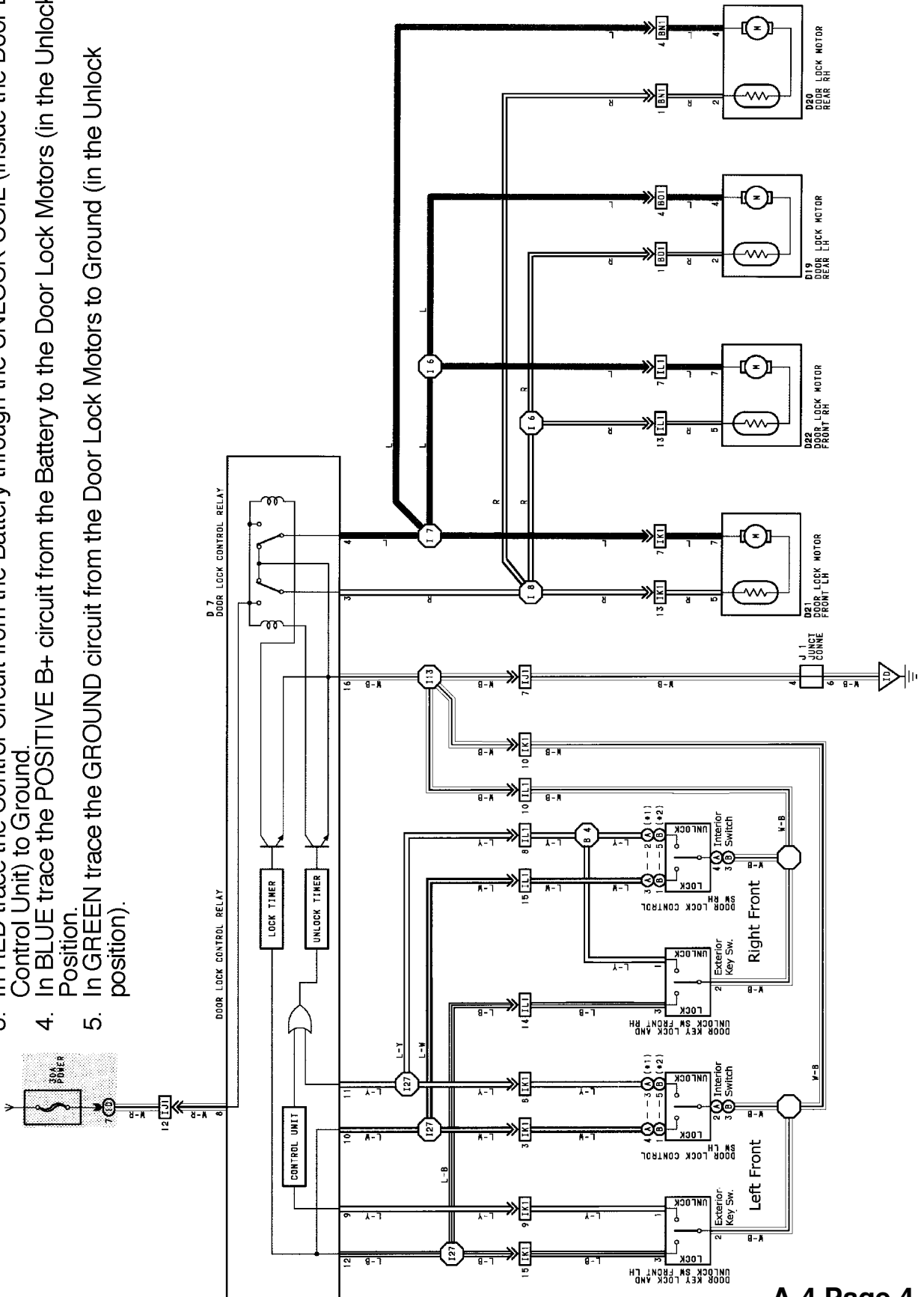
6-GROUND: APPROX. 12VOLTS WITH IGNITION SW ON AND MASTER SW (DRIVER'S WINDOW) **UP**

13-GROUND: APPROX. 12VOLTS WITH IGNITION SW ON AND MASTER SW (DRIVER'S WINDOW) AT **DOWN** OR **AUTO DOWN** POSITION



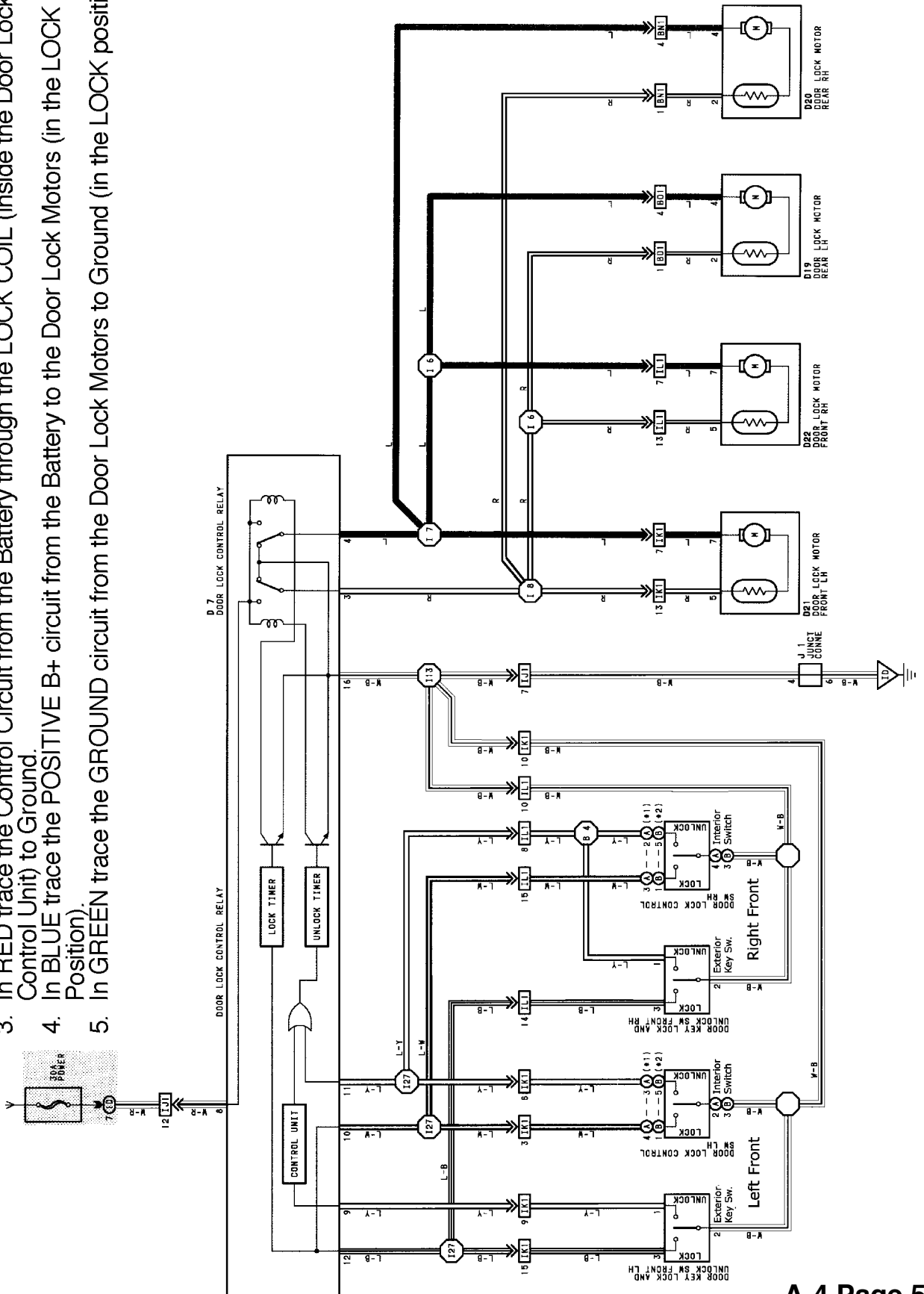
Starting from the Left Front Interior Door Lock Switch in the UNLOCK position.

1. In RED trace the (GROUND) INPUT SIGNAL from the Left Front Interior Door Lock Control Switch to the Logic Gate that is shown inside the Door Lock Control Relay Unit.
2. In ORANGE trace the OUTPUT SIGNAL from the Logic Gate through the Unlock Timer to the base of the Transistor inside the Door Lock Control Relay unit (Unlock Position).
3. In RED trace the Control Circuit from the Battery through the UNLOCK COIL (inside the Door Lock Control Unit) to Ground.
4. In BLUE trace the POSITIVE B+ circuit from the Battery to the Door Lock Motors (in the Unlock Position).
5. In GREEN trace the GROUND circuit from the Door Lock Motors to Ground (in the Unlock position).



Starting from the Right Front Interior Door Lock Switch in the LOCK position.

1. In RED trace the (GROUND) INPUT SIGNAL from the Right Interior Door Lock Control Switch to the LOCK TIMER shown inside the Door Lock Control Relay Unit.
2. In ORANGE trace the OUTPUT SIGNAL from the LOCK TIMER to the base of Transistor inside the Door Lock Control Relay unit (in the Lock Position).
3. In RED trace the Control Circuit from the Battery through the LOCK COIL (inside the Door Lock Control Unit) to Ground.
4. In BLUE trace the POSITIVE B+ circuit from the Battery to the Door Lock Motors (in the LOCK Position).
5. In GREEN trace the GROUND circuit from the Door Lock Motors to Ground (in the LOCK position)

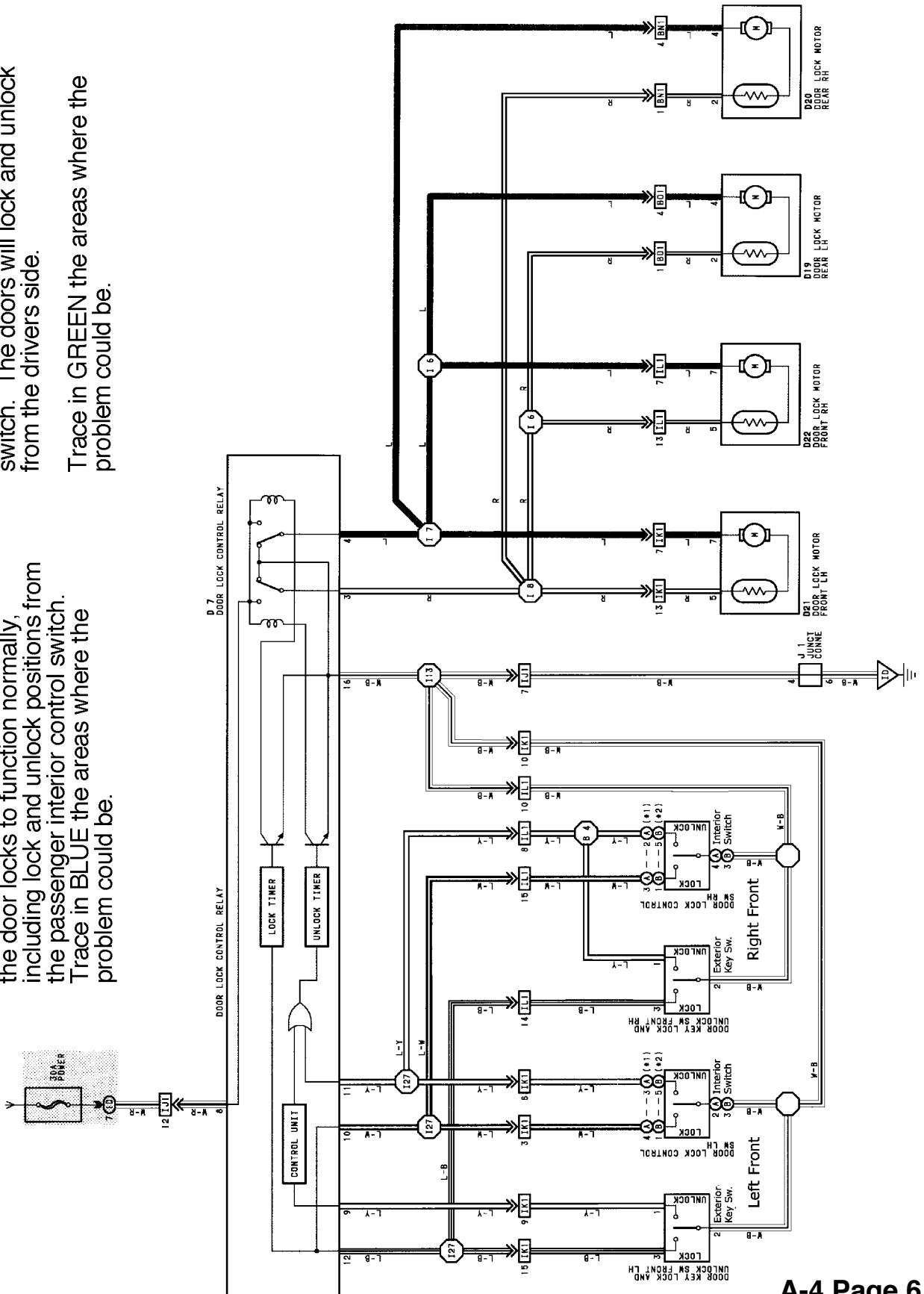


PROBLEM #1

The Doors will UNLOCK but not LOCK from the the passenger front (Outside) Door Key Switch. All other switches allow the door locks to function normally, including lock and unlock positions from the passenger interior control switch. Trace in BLUE the areas where the problem could be.

PROBLEM #2

The None of the Doors will lock or unlock from either the passenger front Door Key Switch or the inside passenger control switch. The doors will lock and unlock from the drivers side. Trace in GREEN the areas where the problem could be.



PROBLEM #3

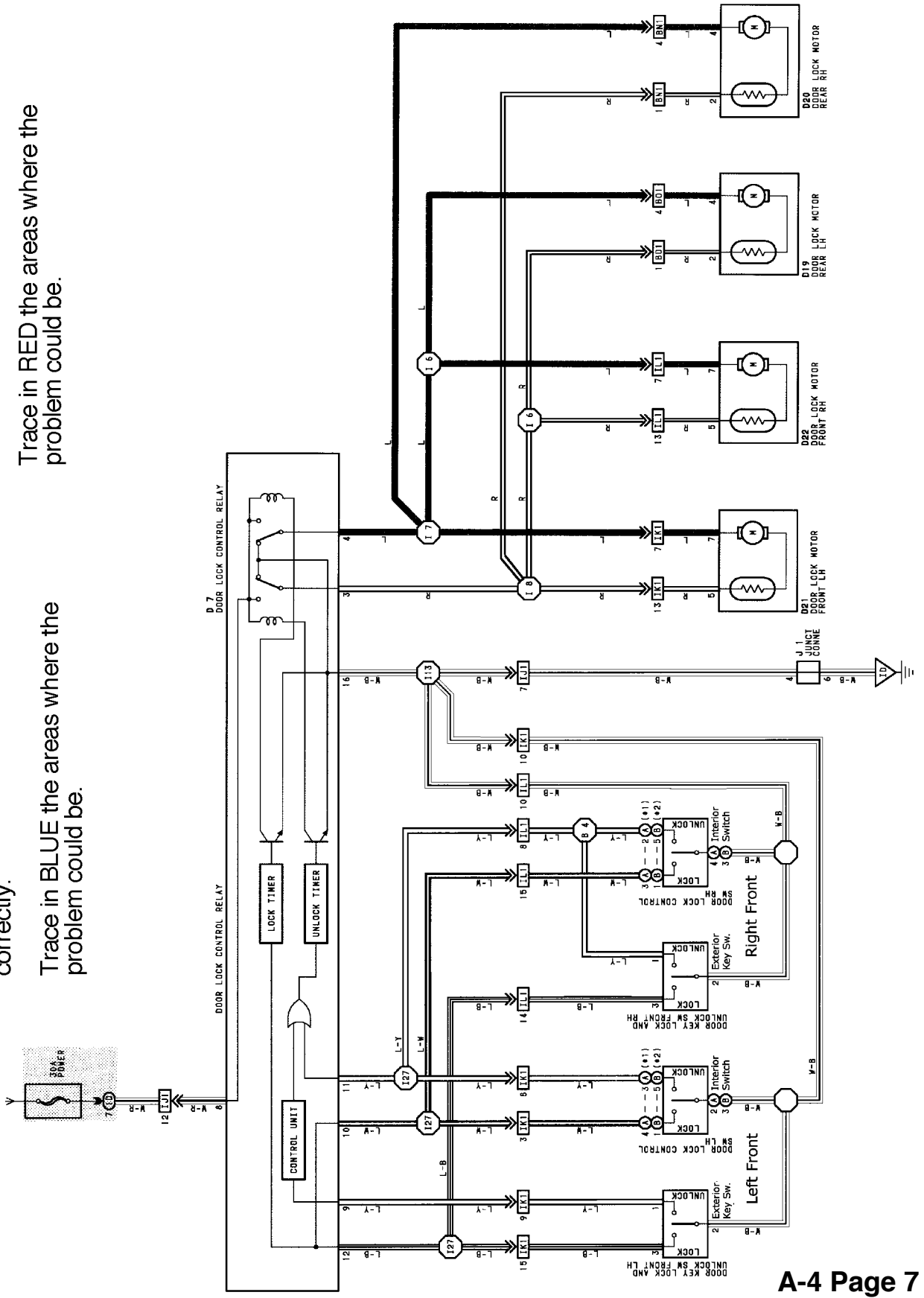
The Right Rear Door **will not lock or unlock**. The other doors function correctly.

Trace in **BLUE** the areas where the problem could be.

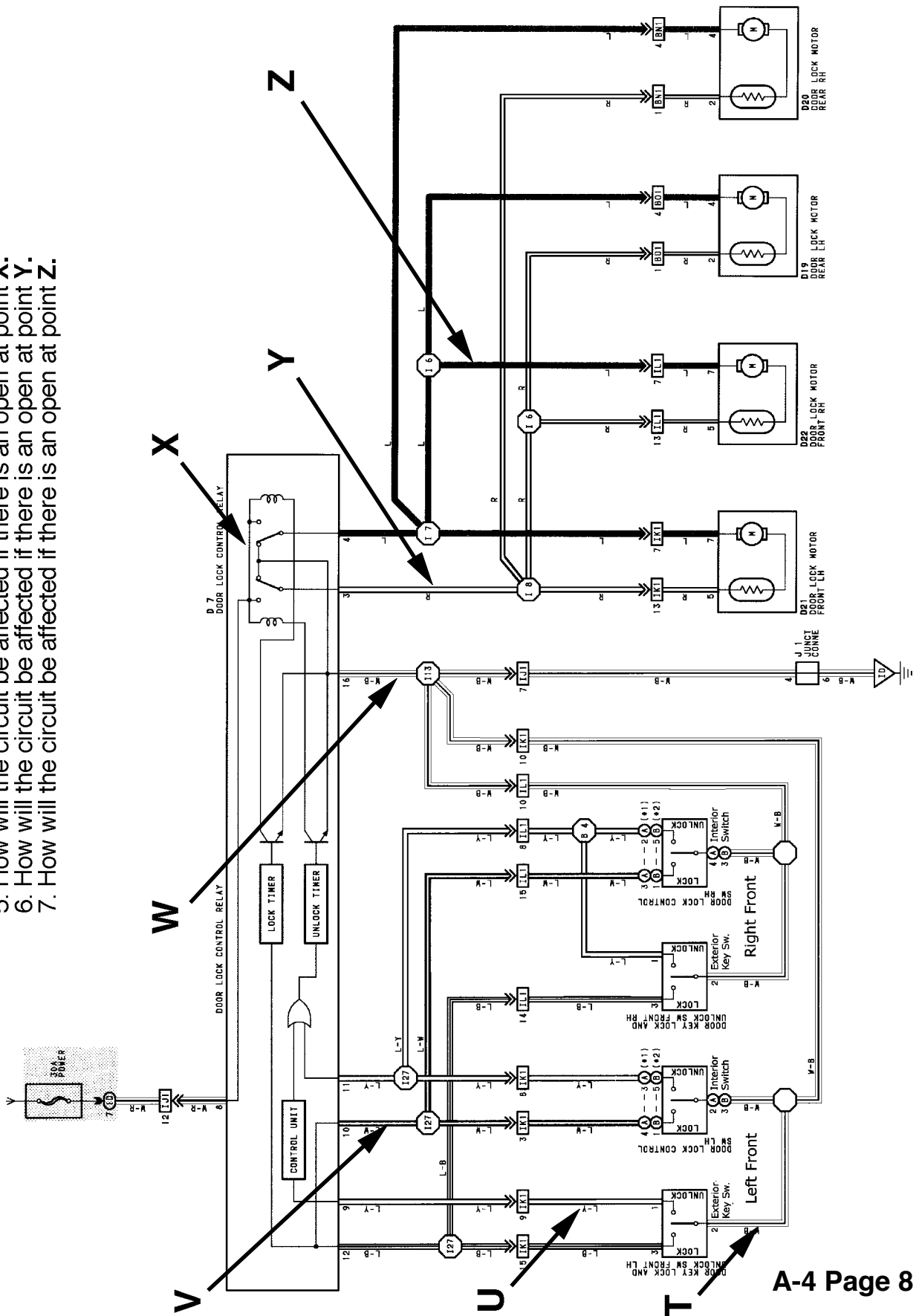
PROBLEM #4

The None of the Doors will lock or unlock from any of the switches.

Trace in **RED** the areas where the problem could be.



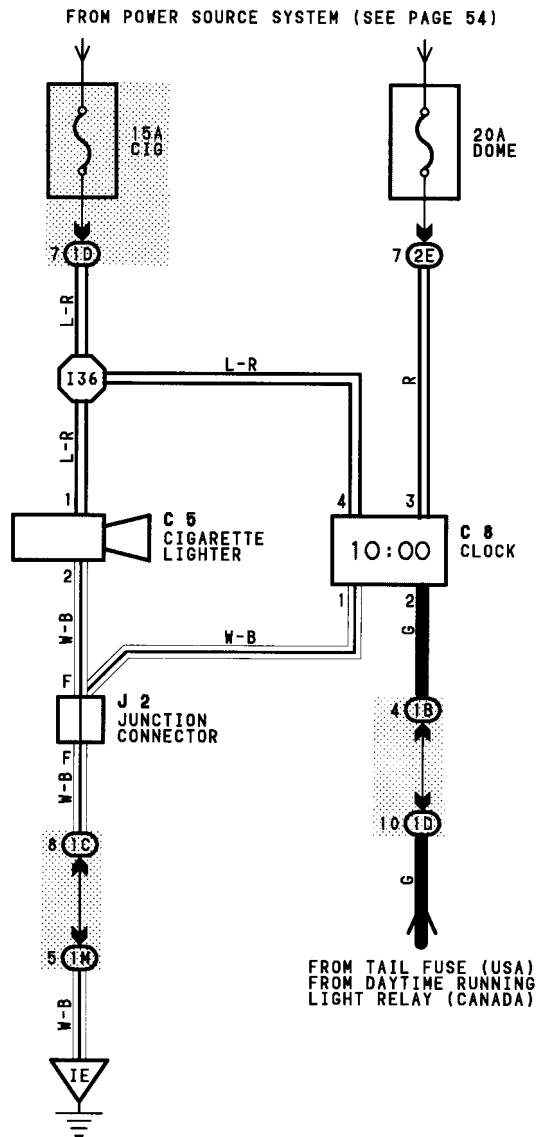
- Determine what the affect will be on the following circuit.**
1. How will the circuit be affected if there is an open at point **T**.
 2. How will the circuit be affected if there is an open at point **U**.
 3. How will the circuit be affected if there is an open at point **V**.
 4. How will the circuit be affected if there is an open at point **W**.
 5. How will the circuit be affected if there is an open at point **X**.
 6. How will the circuit be affected if there is an open at point **Y**.
 7. How will the circuit be affected if there is an open at point **Z**.

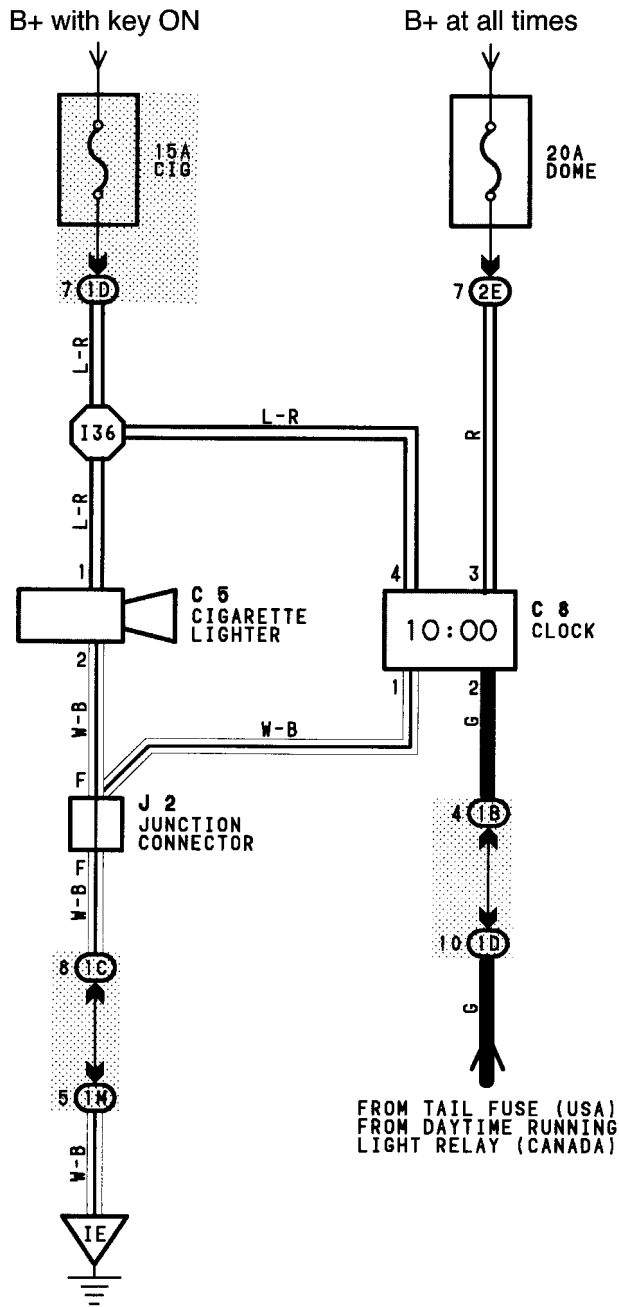


TOYOTA

Clock/Cig Circuit

Worksheets





SERVICE HINTS

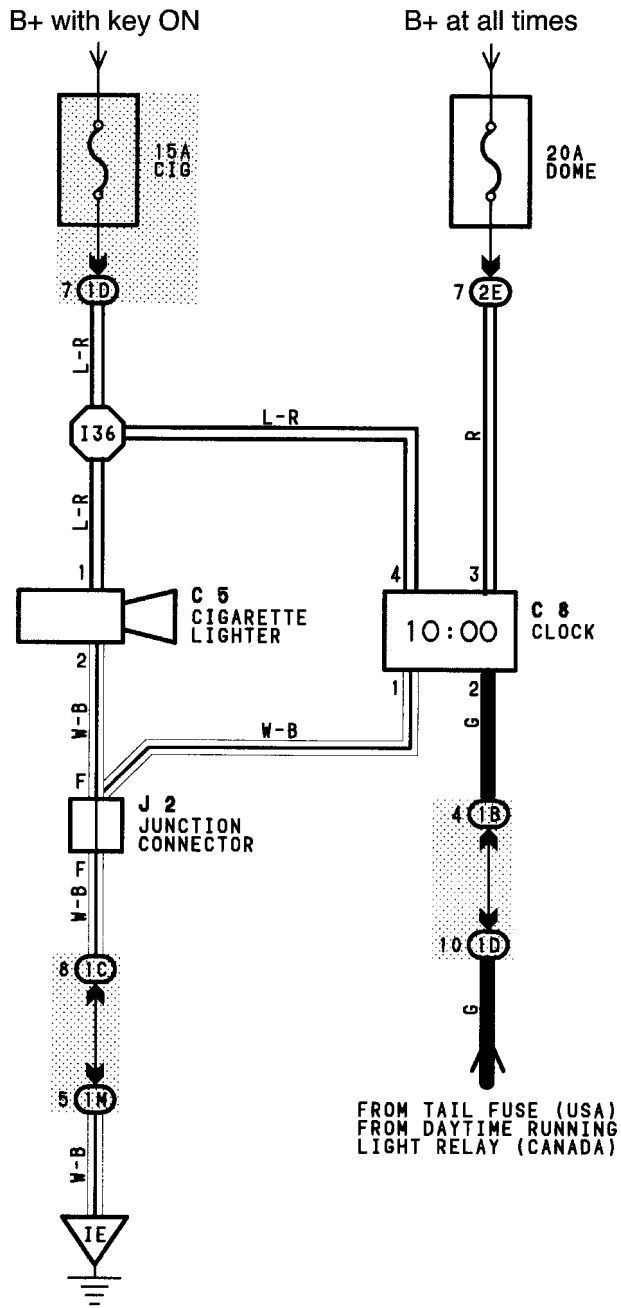
C 5 CIGARETTE LIGHTER

- 1-GROUND: APPROX. 12VOLTS WITH IGNITION SW AT ACC OR ON POSITION
- 2-GROUND: ALWAYS CONTINUITY

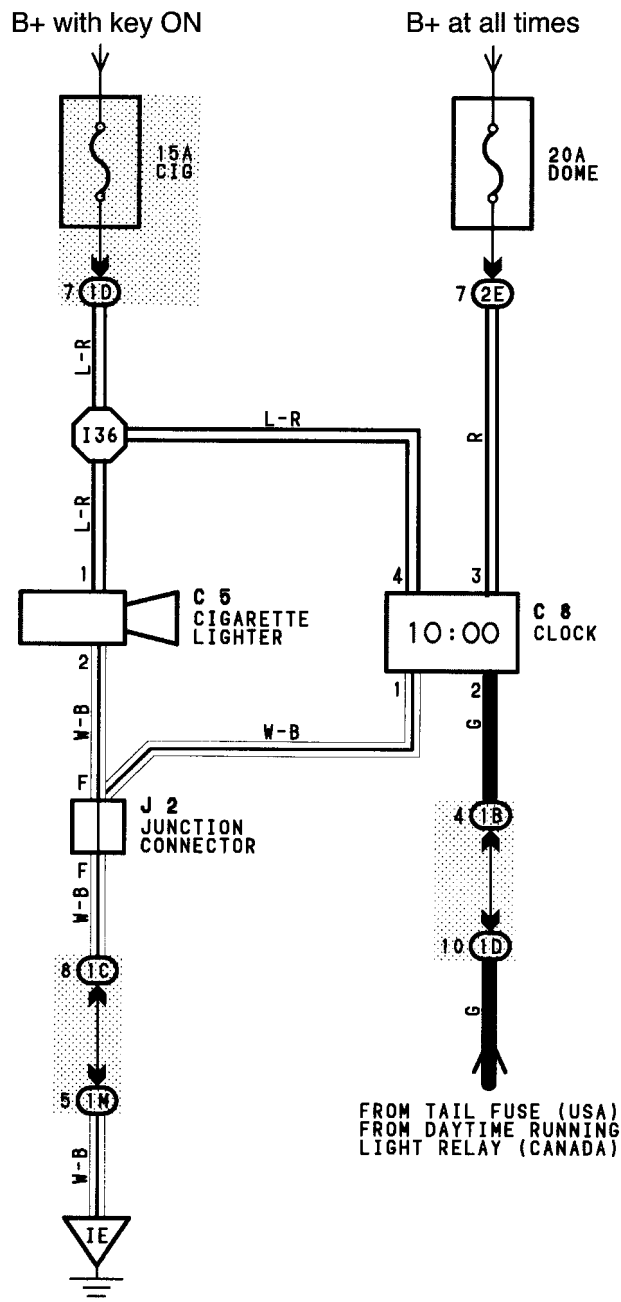
C11 CLOCK

- 3-GROUND: ALWAYS 12VOLTS (POWER FOR CLOCK)
- 4-GROUND: APPROX. 12VOLTS WITH IGNITION SW AT ACC OR ON POSITION (POWER FOR INDICATION)
- 2-GROUND: APPROX. 12VOLTS WITH LIGHT CONTROL SW AT TAIL OR HEAD POSITION APPROX. 12VOLTS WITH ENGINE RUNNING AND PARKING BRAKE RELEASED (CANADA)
- 1-GROUND: ALWAYS CONTINUITY

FROM TAIL FUSE (USA)
FROM DAYTIME RUNNING
LIGHT RELAY (CANADA)



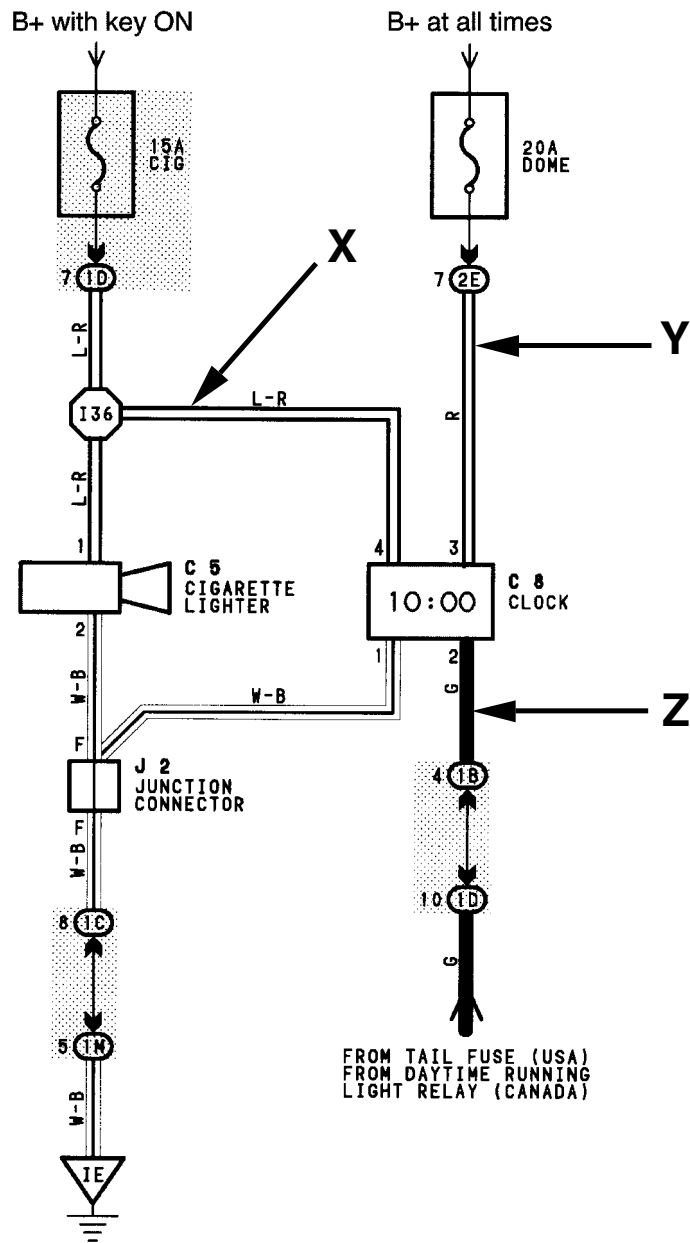
1. Trace in RED the part of the clock's circuit that allows the clock's display to light.
2. Trace in BLUE the part of the clock's circuit that allows the Clock to keep the correct time when the engine is not running (Memory).
3. Trace in GREEN the part of the clock's circuit that allows the Clock's display to dim when the headlights are turned on.



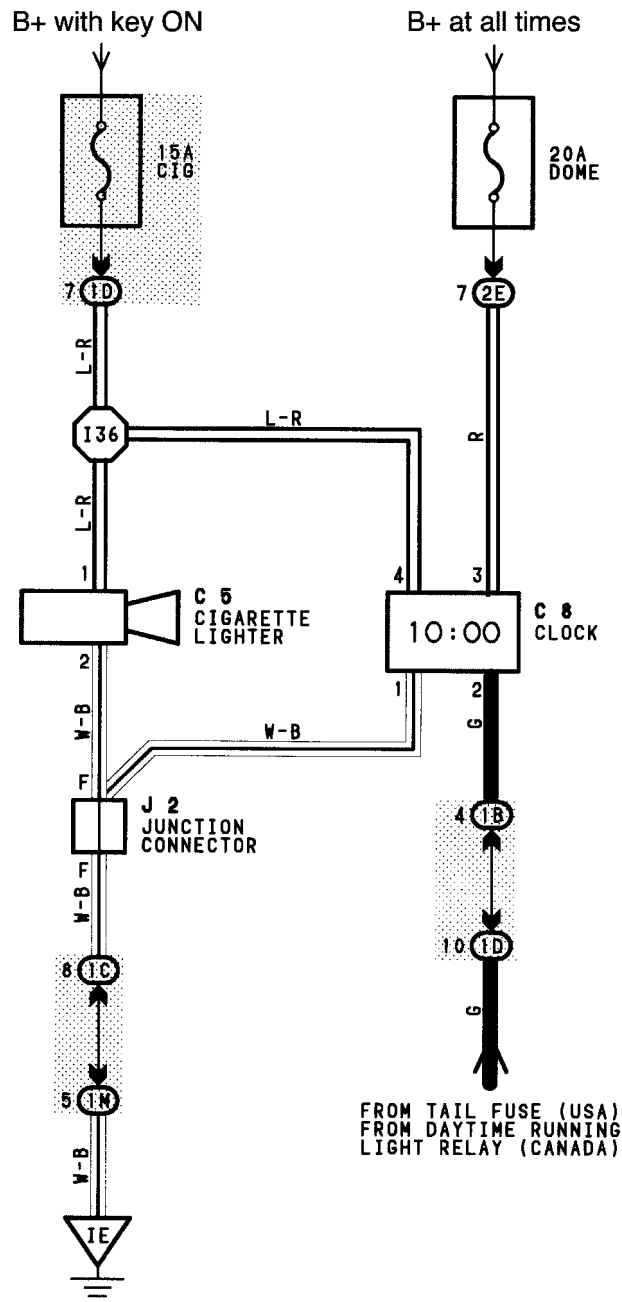
1. How will the circuit be affected if there is an open at point X.

2. How will the circuit be affected if there is an open at point Y.

3. How will the circuit be affected if there is an open at point Z.



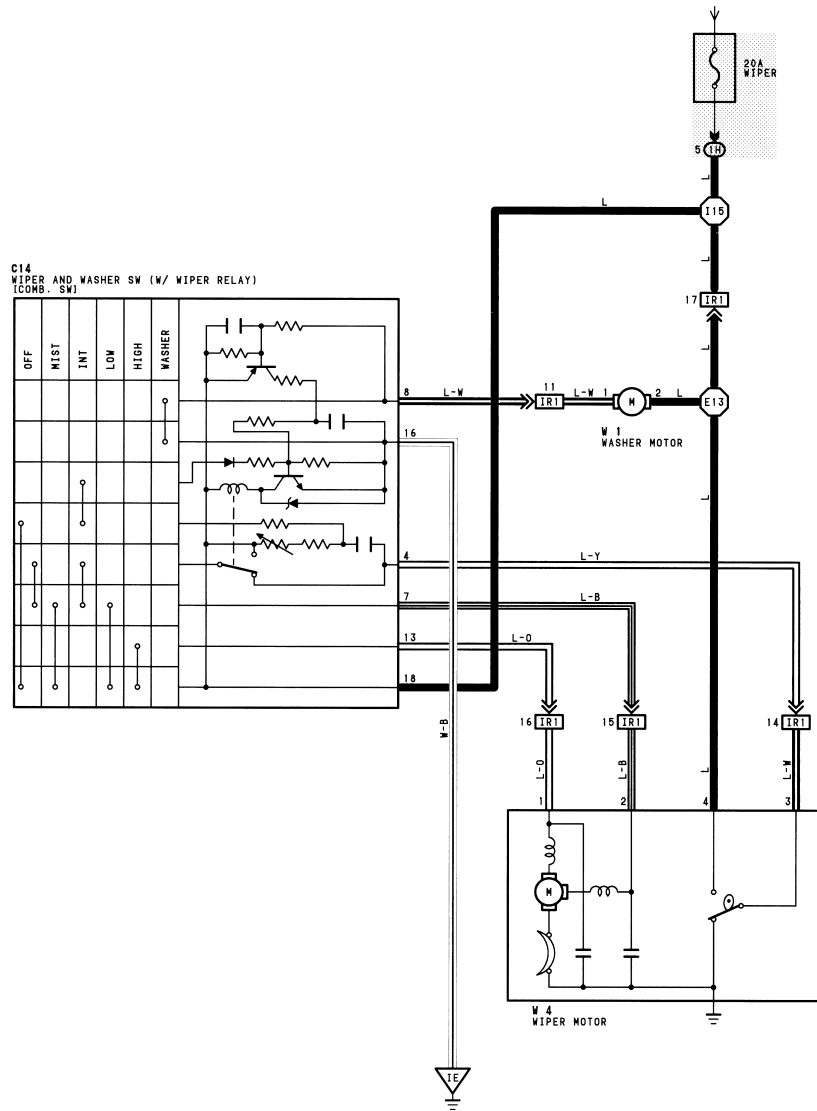
1. The clock display will not dim when the headlamps are turned on. Trace in RED the area(s) that could be at fault.
2. The clock loses its time (memory) each time the ignition switch is turned off and has to be reset with the correct time. Trace in BLUE the area(s) that could be at fault.
3. The clock display never light up. The cigarette lighter works. Trace in GREEN the area(s) that could be at fault.



TOYOTA

Wiper/Washer Circuit

Worksheets



SYSTEM OUTLINE

WITH THE IGNITION SW TURNED ON, THE CURRENT FLOWS TO **TERMINAL 18** OF THE WIPER AND WASHER SW. **TERMINAL 2** OF THE WASHER MOTOR AND **TERMINAL 4** OF THE WIPER MOTOR THROUGH THE WIPER FUSE.

1. LOW SPEED POSITION

WITH WIPER SW TURNED TO **LOW** POSITION, THE CURRENT FLOWS FROM **TERMINAL 18** OF THE WIPER AND WASHER SW → **TERMINAL 7** → **TERMINAL 2** OF THE WIPER MOTOR → WIPER MOTOR → TO **GROUND** AND CAUSES TO THE WIPER MOTOR TO RUN AT **LOW** SPEED.

2. HIGH SPEED POSITION

WITH WIPER SW TURNED TO **HIGH** POSITION, THE CURRENT FLOWS FROM **TERMINAL 18** OF THE WIPER AND WASHER SW → **TERMINAL 13** → **TERMINAL 1** OF THE WIPER MOTOR → WIPER MOTOR → TO **GROUND** AND CAUSES TO THE WIPER MOTOR TO RUN AT **HIGH** SPEED.

3. INT POSITION (W/ INT SW)

WITH WIPER SW TURNED TO **INT** POSITION, THE RELAY OPERATES AND THE CURRENT WHICH IS CONNECTED BY RELAY FUNCTION FLOWS FROM **TERMINAL 18** OF THE WIPER AND WASHER SW → **TERMINAL 16** → TO **GROUND**. THIS FLOW OF CURRENT OPERATES THE INTERMITTENT CIRCUIT AND THE CURRENT FLOWS FROM **TERMINAL 18** OF THE WIPER AND WASHER SW → **TERMINAL 7** → **TERMINAL 2** OF THE WIPER MOTOR → TO **GROUND** AND THE WIPER FUNCTIONS.

THE INTERMITTENT OPERATION IS CONTROLLED BY A CONDENSER'S CHARGED AND DISCHARGED FUNCTION INSTALLED IN RELAY AND THE INTERMITTENT TIME IS CONTROLLED BY A TIME CONTROL SW TO CHANGE THE CHARGING TIME OF THE CONDENSER.

4. WASHER CONTINUOUS OPERATION (W/ INT CONTROL)

WITH WASHER SW TURNED TO **ON**, THE CURRENT FLOWS FROM **TERMINAL 2** OF THE WASHER MOTOR → **TERMINAL 1** → **TERMINAL 8** OF THE WIPER AND WASHER SW → **TERMINAL 16** → TO **GROUND** AND CAUSES TO THE WASHER MOTOR TO RUN AND WINDOW WASHER TO JET. THIS CAUSES THE CURRENT TO FLOW TO WASHER CONTINUOUS OPERATION CIRCUIT IN **TERMINAL 18** OF THE WIPER AND WASHER SW → **TERMINAL 7** → **TERMINAL 2** OF THE WIPER MOTOR → TO **GROUND** AND THE WIPER FUNCTION.

SERVICE HINTS

C14 WIPER AND WASHER SW

- 16-GROUND: ALWAYS CONTINUITY
- 18-GROUND: APPROX. 12VOLTS WITH IGNITION SW AT **ON** POSITION
- 7-GROUND: APPROX. 12VOLTS WITH WIPER AND WASHER SW AT **LOW** OR **HIST** POSITION
APPROX. 12VOLTS 2 TO 12SECONDS INTERMITTENTLY WITH WIPER SW AT **INT** POSITION
- 4-GROUND: APPROX. 12VOLTS WITH IGNITION SW ON UNLESS WIPER MOTOR AT **STOP** POSITION
- 13-GROUND: APPROX. 12VOLTS WITH WIPER AND WASHER SW AT **HIGH** POSITION

W 4 WIPER MOTOR

- 3-4: CLOSED UNLESS WIPER MOTOR AT **STOP** POSITION

○ : PARTS LOCATION

CODE	SEE PAGE	CODE	SEE PAGE	CODE	SEE PAGE
C14	30	W 1	28(3VZ-FE), 29(5S-FE)	W 4	28(3VZ-FE), 29(5S-FE)

○ : JUNCTION BLOCK AND WIRE HARNESS CONNECTOR

CODE	SEE PAGE	JUNCTION BLOCK AND WIRE HARNESS (CONNECTOR LOCATION)
1H	20	FLOOR NO.1 WIRE AND J/B NO.1 (INSTRUMENT PANEL LEFT)

□ : CONNECTOR JOINING WIRE HARNESS AND WIRE HARNESS

CODE	SEE PAGE	JOINING WIRE HARNESS AND WIRE HARNESS (CONNECTOR LOCATION)
IR1	38	ENGINE ROOM MAIN WIRE AND COWL WIRE (RIGHT KICK PANEL)

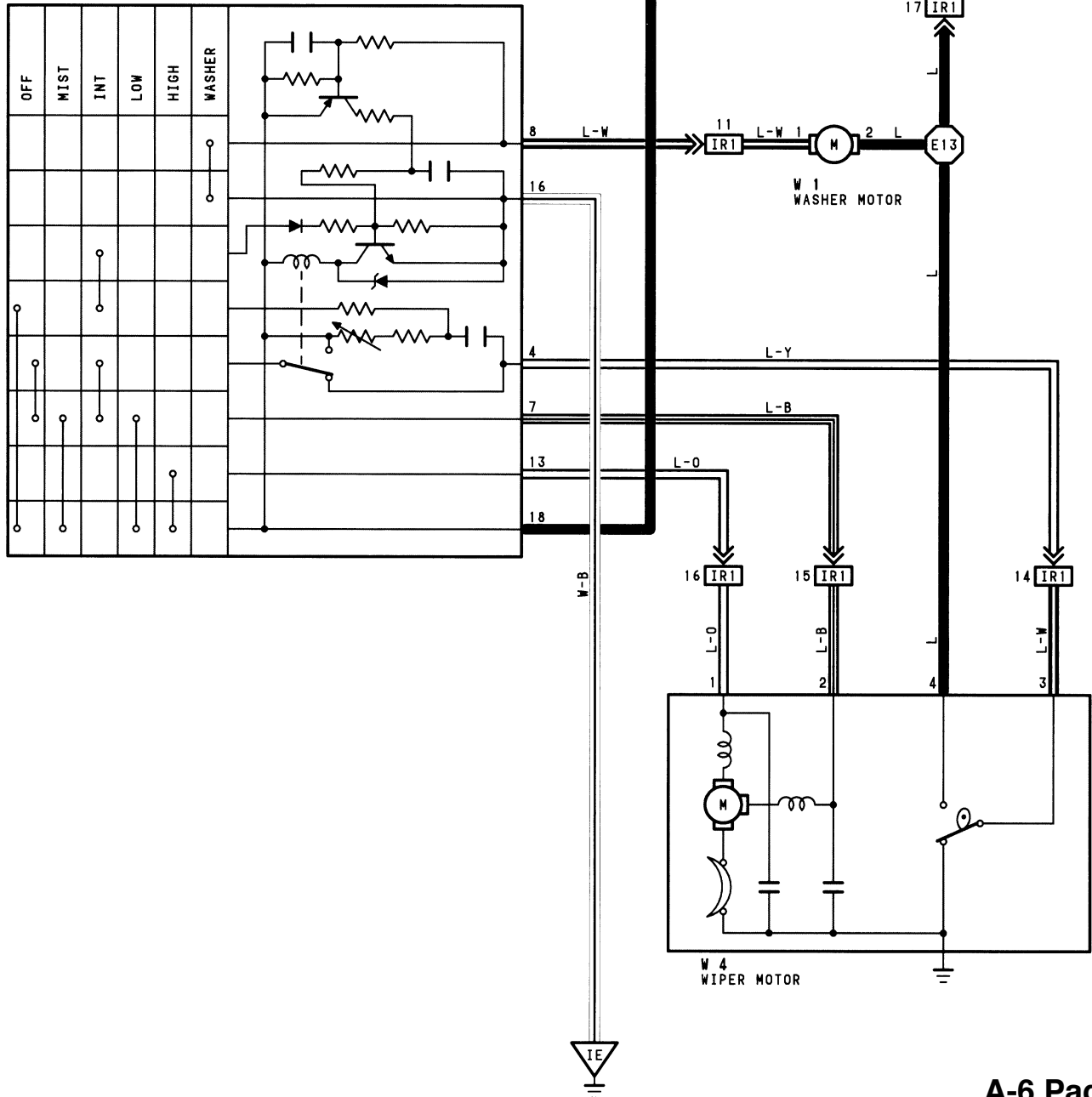
▽ : GROUND POINTS

CODE	SEE PAGE	GROUND POINTS LOCATION
IE	36	LEFT KICK PANEL

○ : SPLICE POINTS

CODE	SEE PAGE	WIRE HARNESS WITH SPLICE POINTS	CODE	SEE PAGE	WIRE HARNESS WITH SPLICE POINTS
E13	32(3VZ-FE)	ENGINE ROOM MAIN WIRE	I15	38	COWL WIRE
	34(5S-FE)				

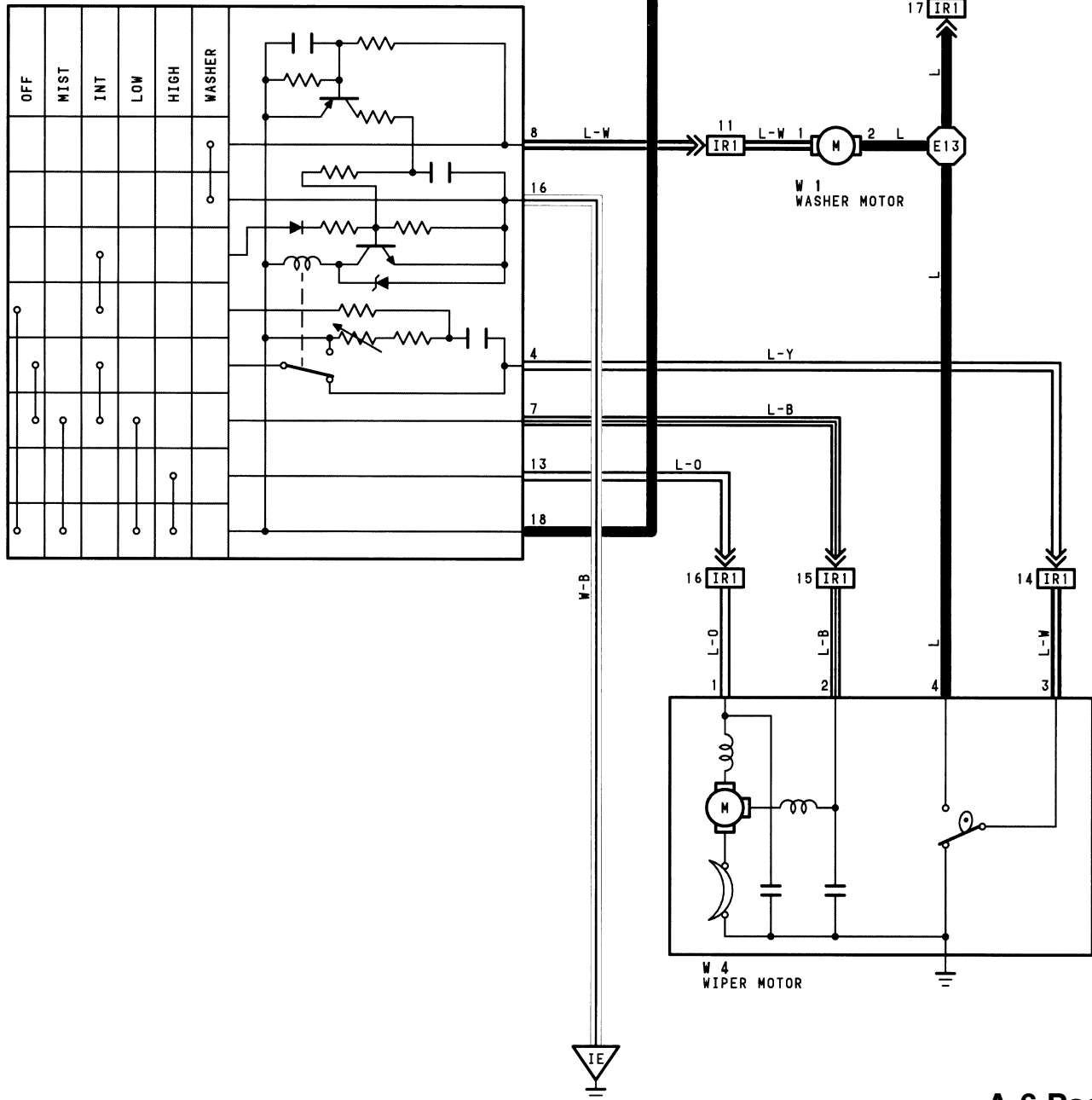
C14
WIPER AND WASHER SW (W/ WIPER RELAY)
[COMB. SW]



The WIPER SWITCH is in the LOW SPEED position.

1. Trace in RED the POSITIVE power flow from the fuse to the motor.
2. Trace in BLUE the NEGATIVE power flow from the motor to ground.

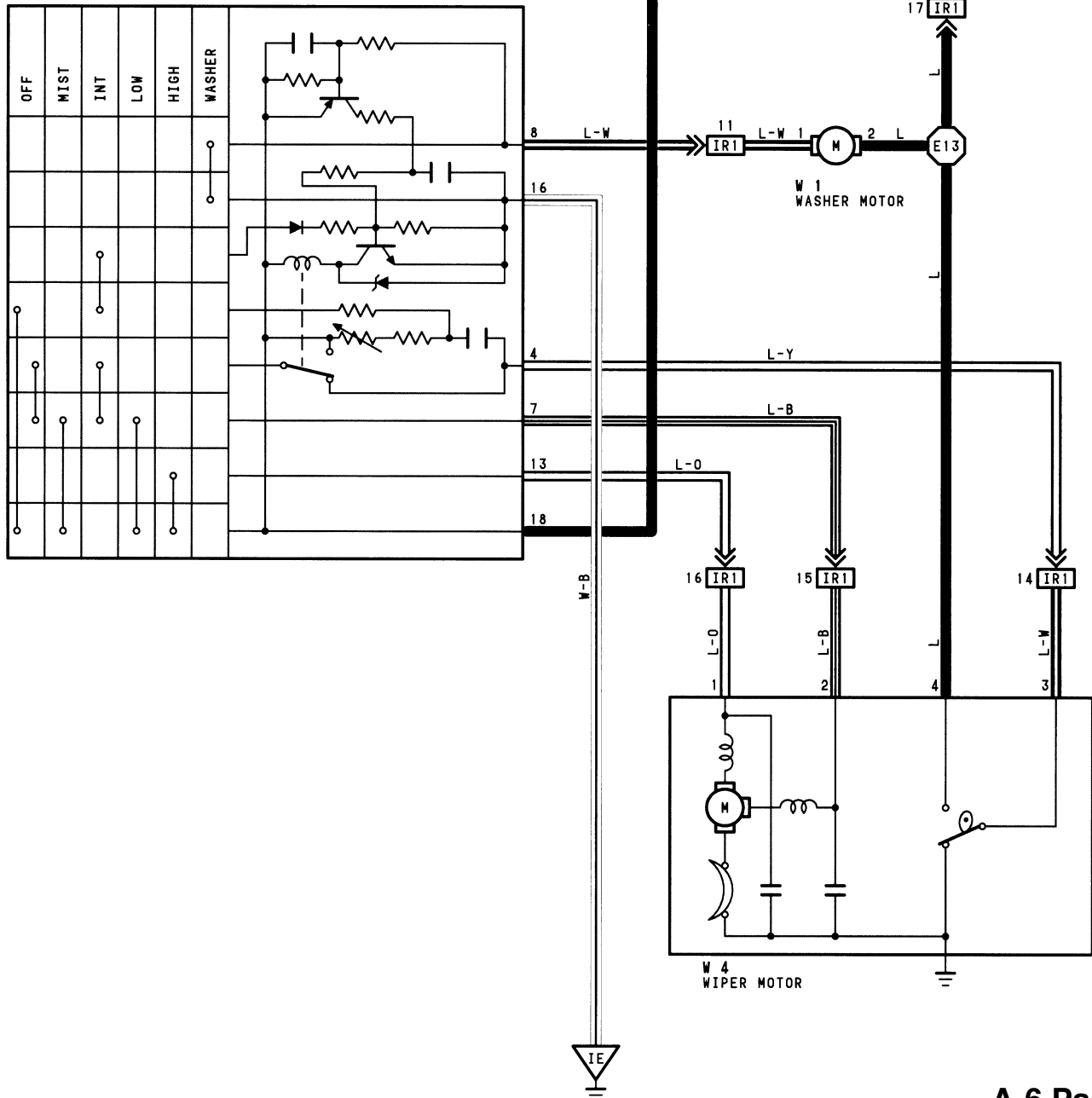
C14
WIPER AND WASHER SW (W/ WIPER RELAY)
[COMB. SW]



With the WIPER SWITCH is in the HIGH SPEED position.

1. Trace in RED the POSITIVE power flow from the fuse to the motor.
2. Trace in BLUE the NEGATIVE power flow from the motor to ground.

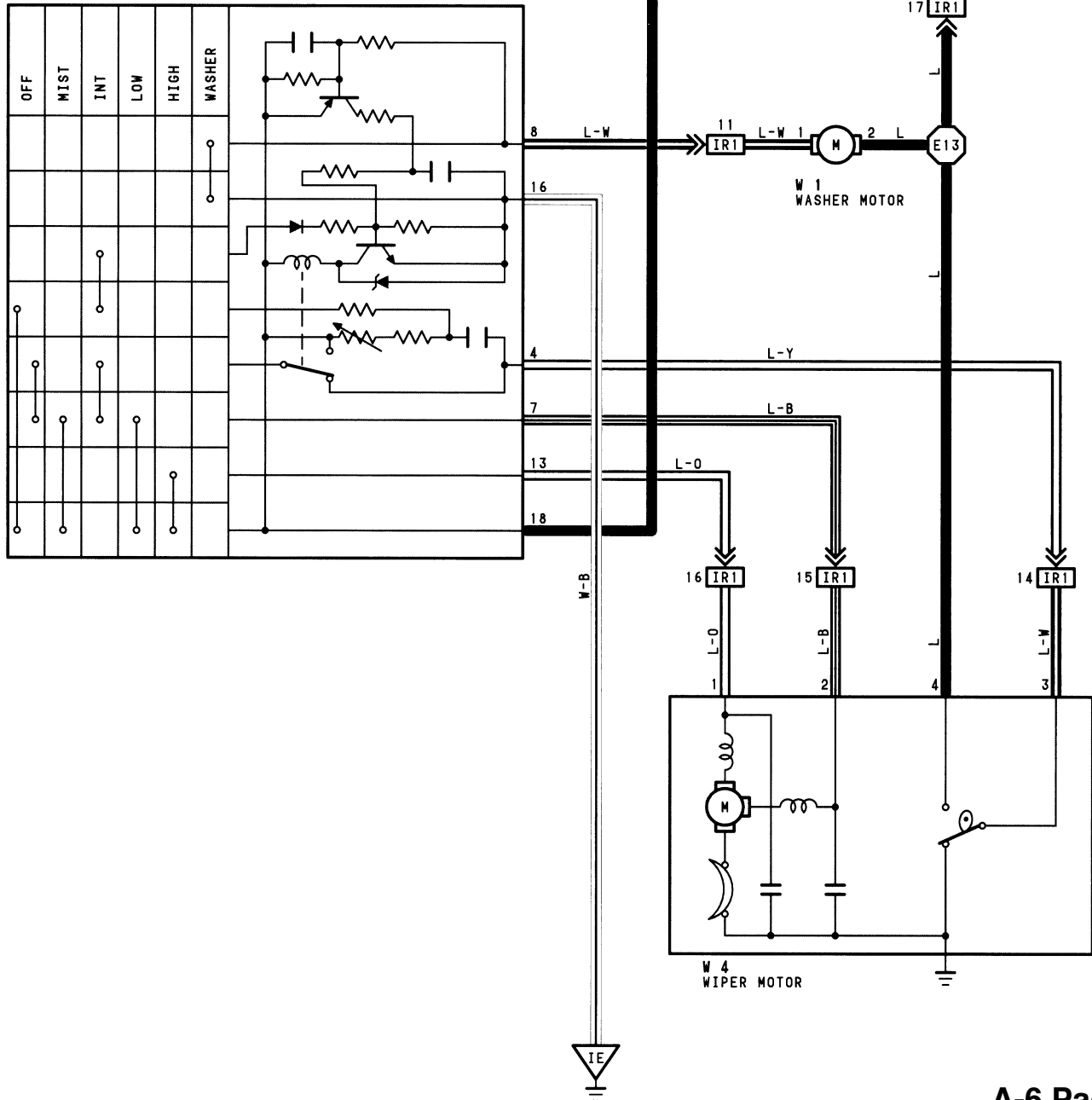
C14
WIPER AND WASHER SW (W/ WIPER RELAY)
[COMB. SW]



The WIPER SWITCH is turned to the OFF position while the wipers are in the up position on the windshield. The wipers continue to move until they reach the park position at the bottom of the windshield. Identify and draw this circuit .

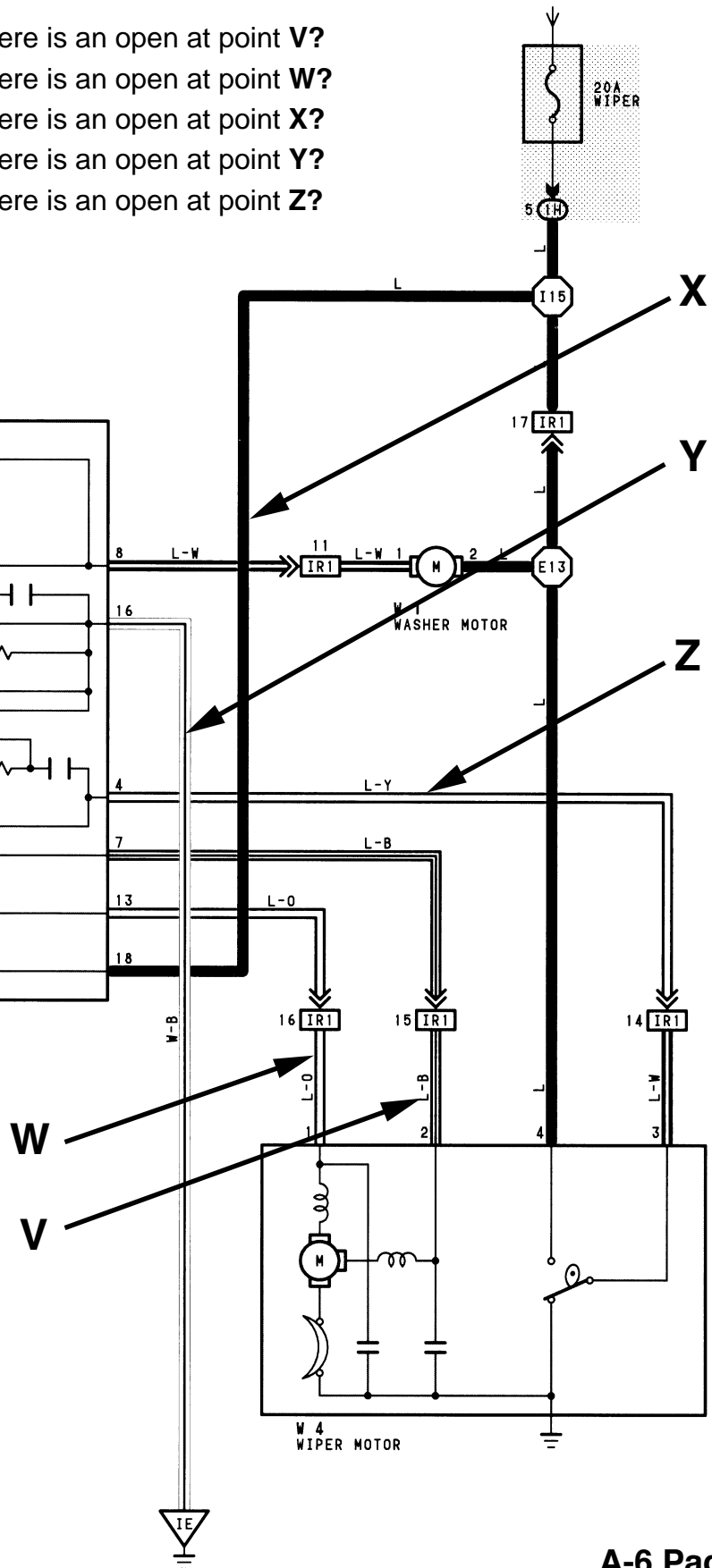
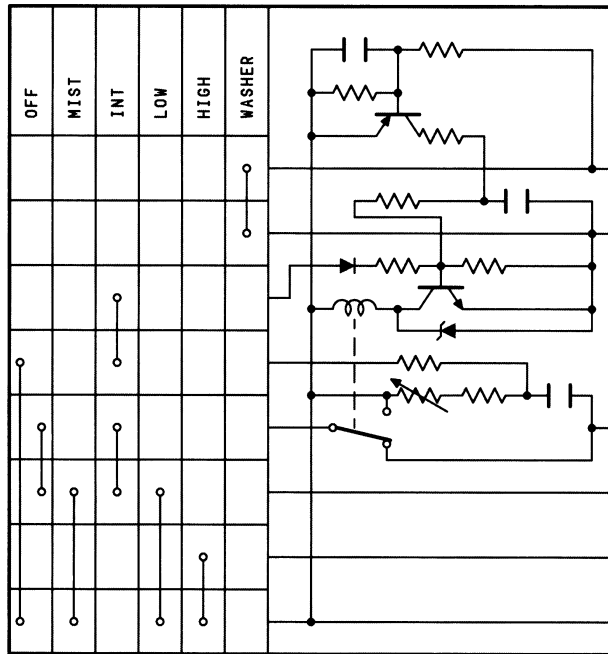
1. Trace in RED the POSITIVE power flow from the fuse to the motor.
2. Trace in BLUE the NEGATIVE power flow from the motor to ground.

C14
WIPER AND WASHER SW (W/ WIPER RELAY)
(COMB. SW)



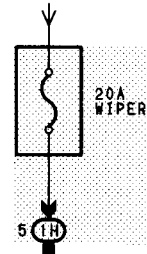
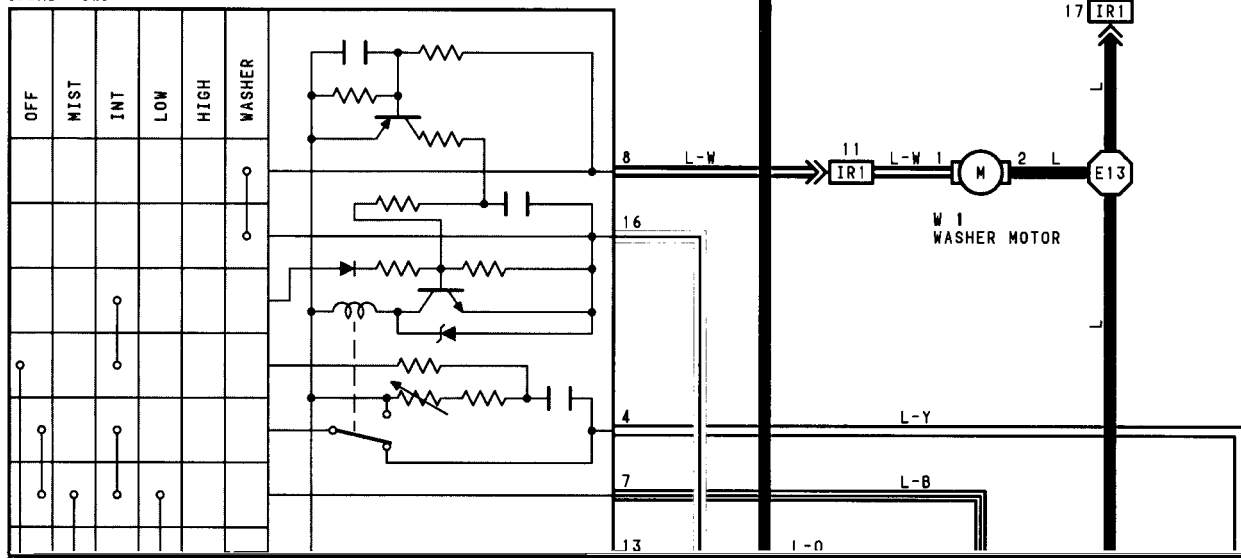
1. How will the circuit be affected if there is an open at point **V**?
2. How will the circuit be affected if there is an open at point **W**?
3. How will the circuit be affected if there is an open at point **X**?
4. How will the circuit be affected if there is an open at point **Y**?
5. How will the circuit be affected if there is an open at point **Z**?

C14
WIPER AND WASHER SW (W/ WIPER RELAY)
[COMB. SW]



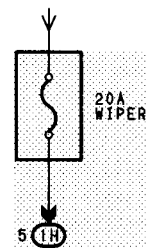
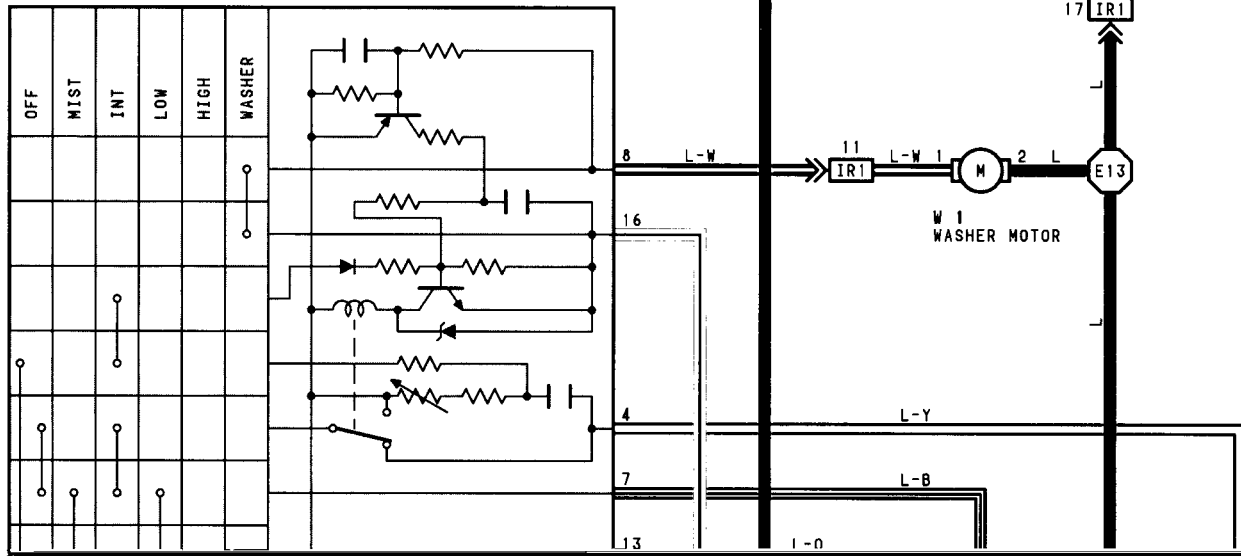
1. The Wipers will not work in the low speed position. All other positions function correctly (high speed, intermittent, park, and mist). Trace in RED the area(s) that could be at fault.
2. The Wipers will not work in any position, however the washer motor works but with no wipers. Trace in BLUE the area(s) that could be at fault.

C14
WIPER AND WASHER SW (W/ WIPER RELAY)
(COMB. SW)



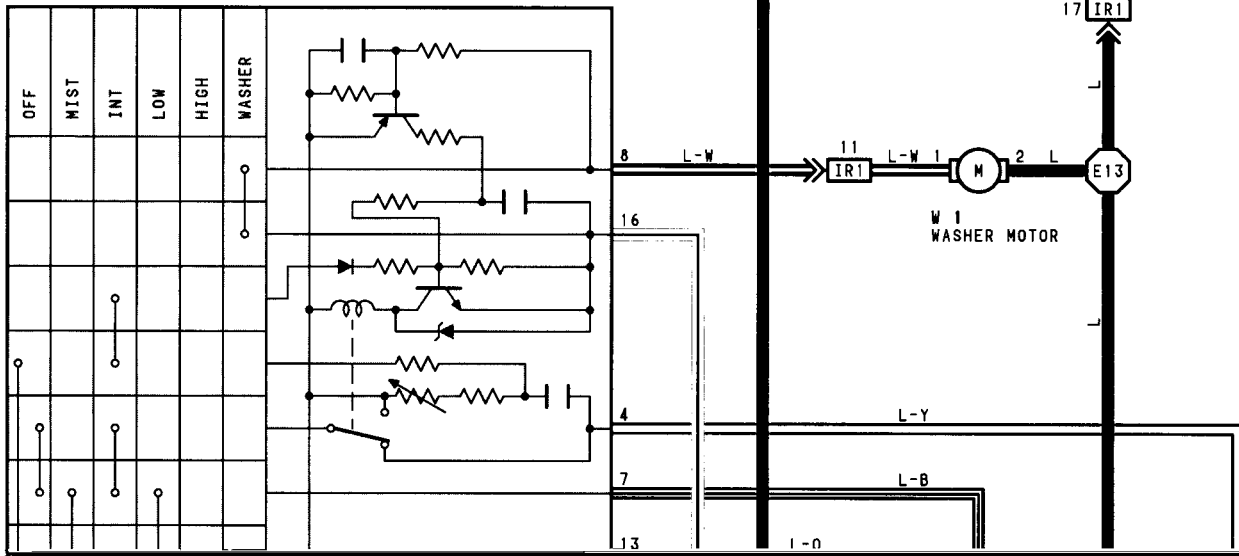
1. The Wipers will not work in the High Speed position. All other positions function correctly. Trace in RED the area(s) that could be at fault.
2. The Wipers stay up on the windshield when the wiper switch is turned off. All other wiper functions work correctly (high, low, mist, etc.) Trace in BLUE the area(s) that could be at fault.

C14
WIPER AND WASHER SW (W/ WIPER RELAY)
(COMB. SW)



1. Only the High Speed position works. All other positions (Low, Intermittent, Mist, Park, etc.) will not function.
Trace in RED the area(s) that could be at fault.
2. The Intermittent Wipers do not work. All other wiper functions work correctly (high, low, mist, etc.)
Trace in BLUE the area(s) that could be at fault.

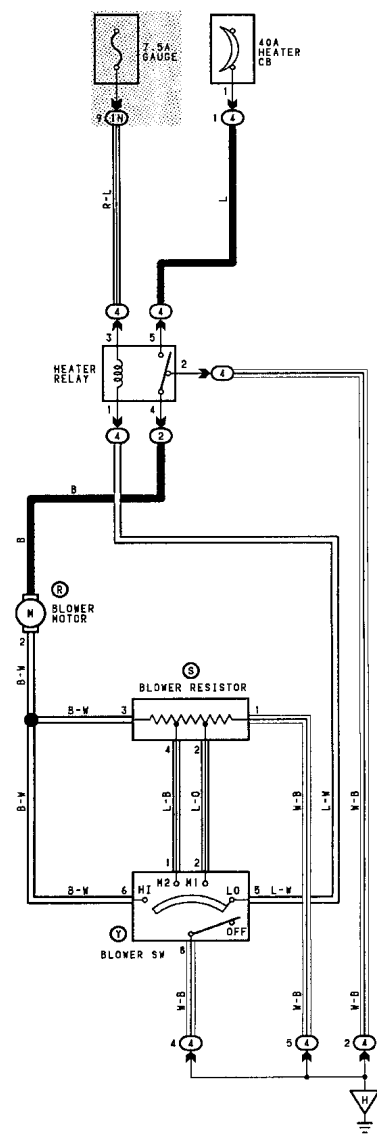
C14
WIPER AND WASHER SW (W/ WIPER RELAY)
(COMB. SW)



TOYOTA

Fan & Blower Circuits

Worksheets



SYSTEM OUTLINE**1. RECIRC/FRESH CONTROL SERVO MOTOR OPERATION (FOR PUSH SWITCH TYPE)**

(SWITCHING FROM FRESH TO RECIRC)

WITH THE IGNITION SW ON, CURRENT FROM THE GAUGE FUSE FLOWS TO TERMINAL 1 OF THE SERVO MOTOR. WHEN THE RECIRC SW IS TURNED ON, THE CURRENT FLOWS FROM SERVO MOTOR → TERMINAL 2 → TERMINAL 12 OF THE HEATER CONTROL ASSEMBLY → TERMINAL I17 → GROUND, THE MOTOR ROTATES AND THE DAMPER MOVES TO THE RECIRC SIDE. WHEN IT IS IN THE RECIRC POSITION, THE CIRCUIT IS CUT INSIDE THE SERVO MOTOR AND THE DAMPER STOPS IN THAT POSITION.

WITH THE CIRCUIT FOR THE INDICATOR LIGHT, CURRENT FLOWS FROM THE GAUGE FUSE → TERMINAL 17 OF THE HEATER CONTROL ASSEMBLY → INDICATOR LIGHT → TERMINAL I17 → GROUND AND THE INDICATOR LIGHT CONTINUES TO LIGHT UP WHILE THE RECIRC SW IS ON.

(SWITCHING FROM RECIRC TO FRESH)

WHEN THE IGNITION IS ON AND THE FRESH SW IS TURNED ON, CURRENT FLOWS FROM TERMINAL 3 OF THE SERVO MOTOR → TERMINAL I10 OF THE HEATER CONTROL ASSEMBLY → TERMINAL I17 → GROUND, THE MOTOR ROTATES AND THE DAMPER MOVES TO THE FRESH SIDE. WHEN THE DAMPER IS IN THE FRESH POSITION, THE CIRCUIT IS CUT INSIDE THE SERVO MOTOR AND THE DAMPER STOPS IN THAT POSITION.

2. OPERATION OF THE AIR VENT MODE CONTROL SERVO MOTOR (FOR PUSH SWITCH TYPE)

(SWITCHING FROM FACE TO BI-LEVEL)

WHEN THE BI-LEVEL SW IS TURNED ON WITH THE DAMPER IN THE FACE POSITION, A SIGNAL THAT THE CIRCUIT IS GROUNDED IS OUTPUT FROM TERMINAL I12 OF THE HEATER CONTROL ASSEMBLY → TERMINAL 6 OF THE SERVO MOTOR → TERMINAL D11 OF THE SYSTEM AMPLIFIER. (AT THIS TIME, THE CURRENT FLOWING THROUGH TERMINAL I 7 OF THE HEATER CONTROL ASSEMBLY FLOWS THROUGH TERMINAL I17 → GROUND, CAUSING THE INDICATOR LIGHT TO LIGHT UP). AT THE SAME TIME, THE SIGNAL FOR WHEN THE CIRCUIT IS NOT GROUNDED IS INPUT TO TERMINAL D10 OF THE AMPLIFIER. THESE 2 SIGNALS CAUSE THE AMPLIFIER TO OPERATE AND CURRENT FLOWS FROM TERMINAL D5 OF THE AMPLIFIER → SERVO MOTOR → TERMINAL D4 → GROUND, WHICH ROTATES THE SERVO MOTOR, CAUSING THE DAMPER TO MOVE TO THE BI-LEVEL POSITION.

WHEN THE DAMPER COMES TO THE BI-LEVEL POSITION, A SIGNAL THAT THE GROUND CIRCUIT IS CUT IS INPUT TO TERMINAL D11 OF THE AMPLIFIER, AND AMPLIFIER OPERATION CAUSES THE SERVO MOTOR TO STOP ROTATING AND THE DAMPER TO STAY IN POSITION.

(SWITCHING TO OTHER MODE POSITIONS)

WHEN SWITCHING THE DAMPER FROM FACE TOWARDS DEF, AS EXPLAINED BEFORE, A GROUND SIGNAL IS INPUT TO TERMINAL D11 OF THE AMPLIFIER AND A NON-GROUND SIGNAL IS INPUT TO TERMINAL D10 SO THAT CURRENT FLOWS FROM TERMINAL D5 → SERVO MOTOR → TERMINAL D4, MOVING THE DAMPER TO THE DESIRED POSITION.

WHEN SWITCHING THE DAMPER IN THE OPPOSITE DIRECTION FROM DEF TOWARDS FACE, A GROUND SIGNAL IS INPUT TO TERMINAL D10 OF THE AMPLIFIER AND A NON-GROUND SIGNAL IS INPUT TO TERMINAL D11 SO THAT THE CURRENT FLOWS FROM TERMINAL D4 → SERVO MOTOR → TERMINAL D5, CAUSING THE SERVO MOTOR TO ROTATE IN REVERSE AND MOVING THE DAMPER TO THE DESIRED POSITION.

3. OPERATION OF THE AIR MIX CONTROL SERVO MOTOR (FOR PUSH SWITCH TYPE)

(SWITCHING FROM WARM TO COOL)

WHEN THE TEMPERATURE CONTROL KNOB IS SWITCHED FROM WARM POSITION TO COOL POSITION, THE RESISTANCE INSIDE THE HEATER CONTROL ASSEMBLY BECOMES GREATER THAN THE RESISTANCE INSIDE THE SERVO MOTOR. THE SIGNAL AT THIS TIME IS INPUT TO THE SYSTEM AMPLIFIER, CAUSING THE AMPLIFIER TO OPERATE. CURRENT FLOWS FROM TERMINAL D8 OF THE AMPLIFIER → SERVO MOTOR → TERMINAL D9 → GROUND, CHANGING THE DAMPER FROM WARM TO COOL POSITION. WHEN THE RESPECTIVE RESISTANCES ARE THE SAME VALVE, THE SERVO MOTOR STOP.

(SWITCHING FROM COOL TO WARM)

WHEN THE TEMPERATURE CONTROL KNOB IS SWITCHED FROM COOL POSITION TO WARM POSITION, THE RESISTANCE INSIDE THE HEATER CONTROL ASSEMBLY BECOMES LESS THAN THE RESISTANCE INSIDE THE SERVO MOTOR. THE SIGNAL AT THIS TIME IS INPUT TO THE SYSTEM AMPLIFIER, CAUSING THE AMPLIFIER TO OPERATE. CURRENT FLOWS FROM TERMINAL D9 OF THE AMPLIFIER → SERVO MOTOR → TERMINAL D8 → GROUND, CHANGING THE DAMPER FROM COOL TO WARM POSITION. WHEN THE RESPECTIVE RESISTANCE ARE THE SAME VALVE, THE SERVO MOTOR STOPS.

4. RADIATOR FAN AND CONDENSER FAN OPERATION

WHEN THE IGNITION SW IS TURNED ON, CURRENT FROM THE IGN FUSE FLOWS THROUGH TERMINAL 1 OF THE RADIATOR FAN RELAY NO. 1 → TERMINAL 2 → TERMINAL 1 OF THE A/C HIGH PRESSURE SW → TERMINAL 2 → TERMINAL 1 OF THE A/C WATER TEMP. SW → GROUND, ACTIVATING THE RELAY. AT THIS TIME, CURRENT IS SUPPLIED FROM THE FL 30A RDI FAN TO TERMINAL 4 OF THE RELAY. AT THE SAME TIME, CURRENT FROM THE IGN FUSE FLOWS THROUGH TERMINAL 6 OF THE CONDENSER FAN RELAY NO. 2 → COIL → TERMINAL 2 → A/C HIGH PRESSURE SW → A/C WATER TEMP. SW → GROUND, THEN THROUGH THE FL 30A CDS → TERMINAL 1 OF THE A/C CONDENSER FAN MOTOR → TERMINAL 2 → TERMINAL 1 OF THE RELAY NO. 2 → TERMINAL 4 → TERMINAL 2 OF THE RELAY NO. 3.

* LOW SPEED OPERATION

WHEN THE A/C MAGNET CLUTCH IS TURNED ON DURING A/C OPERATION, CURRENT FROM THE A/C FUSE FLOWS THROUGH TERMINAL 1 OF THE A/C MAGNET CLUTCH RELAY → TERMINAL 2 → TERMINAL 1 OF THE CONDENSER FAN RELAY NO. 3 → TERMINAL 3 → GROUND, ACTIVATING RELAY NO. 3. THEN THE CURRENT APPLIED TO TERMINAL 2 OF RELAY NO. 3 FLOWS THROUGH TERMINAL 4 → TERMINAL 1 OF THE RADIATOR FAN MOTOR → TERMINAL 2 → GROUND. SINCE THE CONDENSER AND RADIATOR FAN MOTORS ARE CONNECTED IN SERIES, BOTH FANS ROTATE AT LOW SPEED.

SERVICE HINTS

RADIATOR FAN RELAY NO.1

4-3: OPEN WITH IGNITION SW ON, A/C HIGH PRESSURE SW ON AND WATER TEMP. SW ON

A/C FAN RELAY NO.2

② 1- ② 3: CLOSED WITH IGNITION SW OFF OR A/C HIGH PRESSURE SW OFF OR WATER TEMP. SW OFF

② 1- ② 4: CLOSED WITH IGNITION SW ON, A/C HIGH PRESSURE SW ON AND WATER TEMP. SW ON

A/C FAN RELAY NO.3

② 2- ② 4: CLOSED WITH IGNITION SW ON AND MAGNET CLUTCH ON

HEATER RELAY

④ 4- ④ 5: CLOSED WITH IGNITION SW ON AND BLOWER SW ON

ⓐ A/C HIGH PRESSURE SW(FOR RADIATOR FAN)

1-2: OPEN ABOVE 18KG/CM² (256PSI, 1765KPA)
CLOSED BELOW 14KG/CM² (199PSI, 1373KPA)

ⓑ A/C WATER TEMP. SW(FOR RADIATOR FAN)

1-GROUND: OPEN ABOVE 90°C (194°F)
CLOSED BELOW 83°C (181°F)

ⓒ A/C DUAL PRESSURE SW

1-2: OPEN WITH PRESSURE LESS THAN 2.1KG/CM² (30PSI, 206KPA) OR ABOVE 27KG/CM² (384PSI, 2648KPA)

ⓓ A/C IDLE-UP VSV

1-2: APPROX. 40Ω

ⓔ A/C ACCELERATION CUT AMPLIFIER

3-GROUND: APPROX. 12VOLTS FOR 3 SECONDS WITH THROTTLE VALVE OPENING ABOVE 80% AND VEHICLE SPEED BELOW 25KM/H (15.5MPH)

ⓕ A/C THERMISTOR

APPROX. 1.5KΩ AT 25°C (77°F)

ⓖ BLOWER RESISTOR

1-2: APPROX. 1.5Ω
2-4: APPROX. 0.8Ω
3-4: APPROX. 0.4Ω

○ : PARTS LOCATION

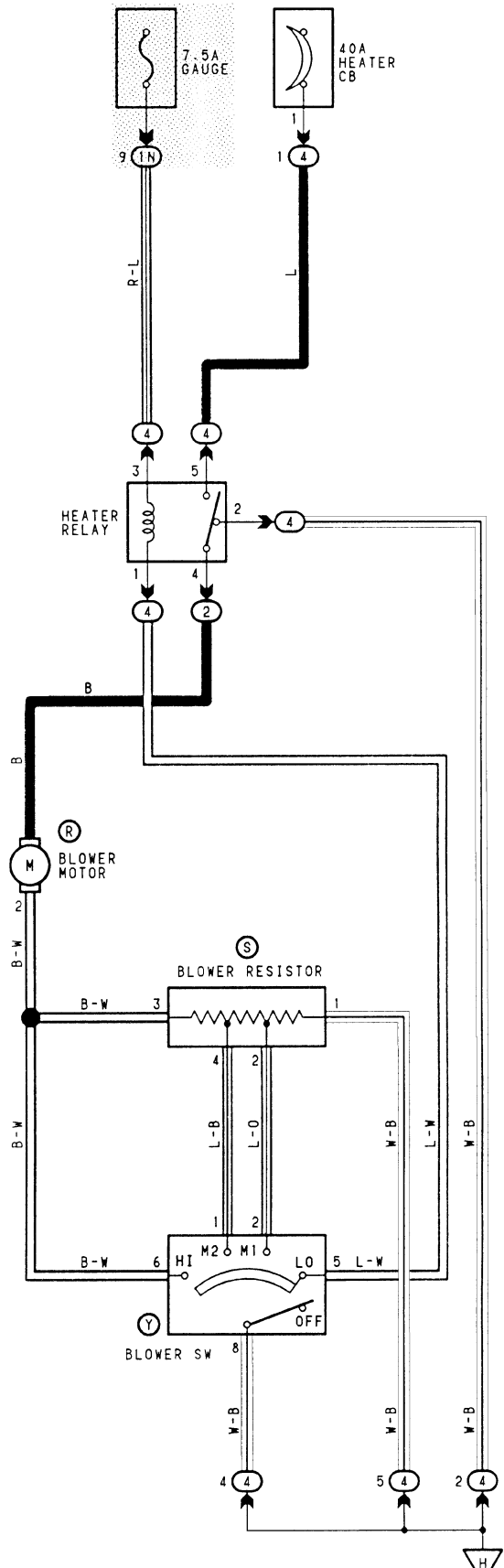
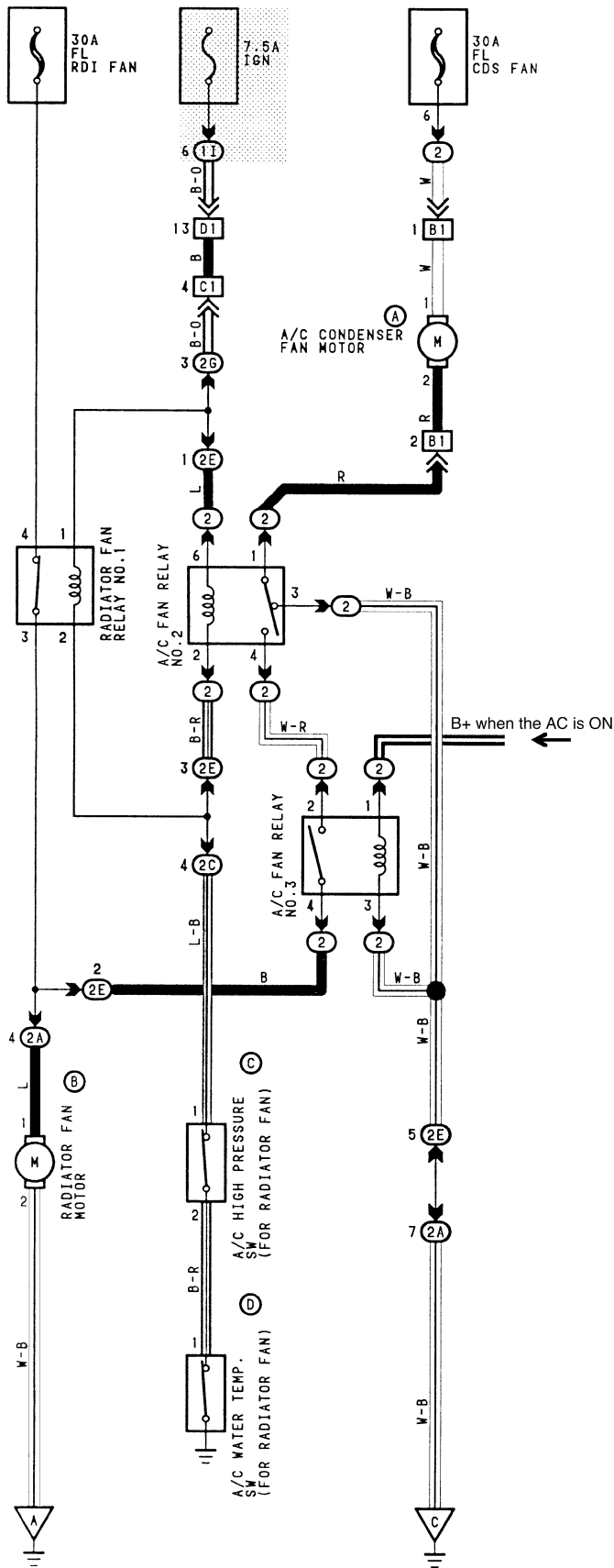
CODE	SEE PAGE	CODE	SEE PAGE	CODE	SEE PAGE
A	A8 25	H	A11 25	N	H6 28
B	R1 25	I	A19 25(FWD)	O	A24 28
C	A10 25	I	A20 28(ALL-TRAC/4WD)	P	A7 25
D	A13 25	J	A18 28	Q	I2 25
E	A12 25	K	T3 28	R	B5 28
F	A43 25(CANADA)	L	A21 28	S	B6 28
G	A9 25	M	A14 25(ALL-TRAC/4WD)	T	H7 28

○ : RELAY BLOCKS

CODE	SEE PAGE	RELAY BLOCKS (RELAY BLOCK LOCATION)
2	20	R/B NO.2 (ENGINE COMPARTMENT LEFT)
4	23	R/B NO.4 (RIGHT KICK PANEL)

○ : JUNCTION BLOCK AND WIRE HARNESS CONNECTOR

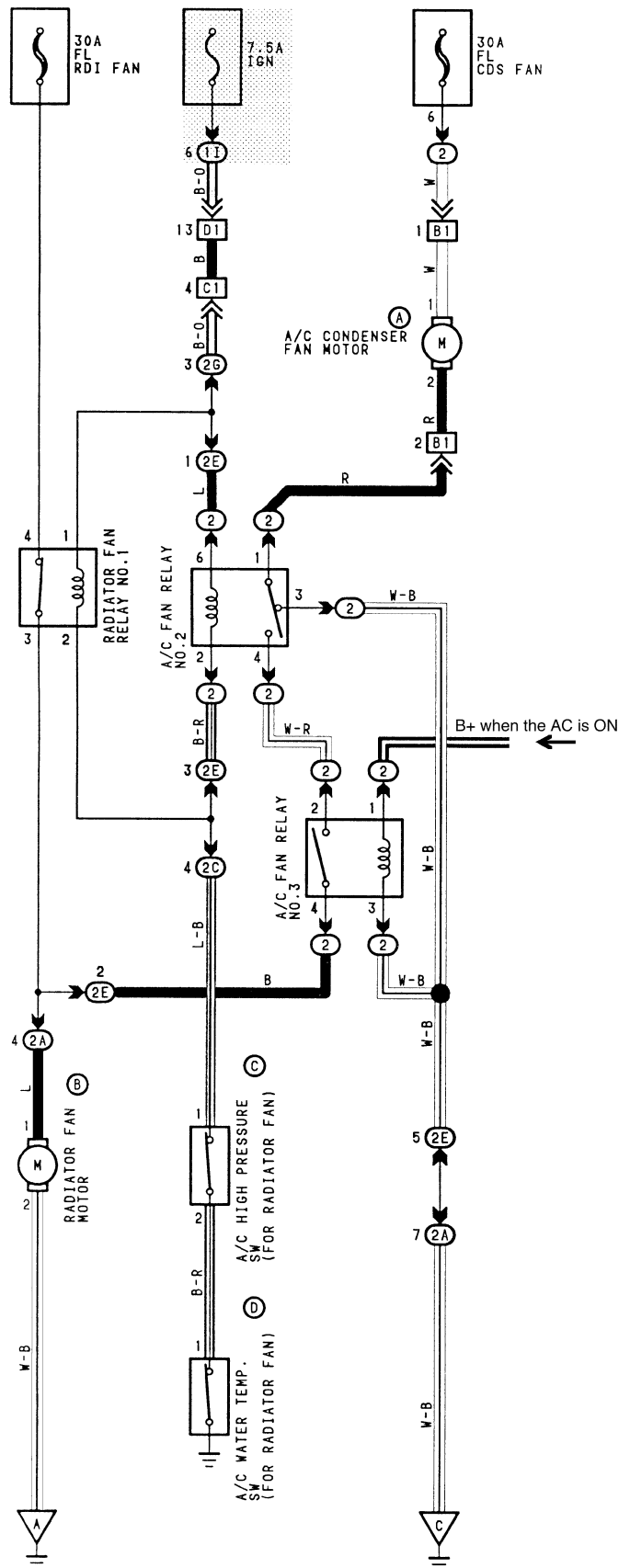
CODE	SEE PAGE	JUNCTION BLOCK AND WIRE HARNESS (CONNECTOR LOCATION)
1I	18	COWL WIRE AND J/B NO.1 (LEFT KICK PANEL)
1N		
2A	20	ENGINE ROOM MAIN WIRE AND J/B NO.2 (ENGINE COMPARTMENT LEFT)
2C	20	ENGINE WIRE AND J/B NO.2 (ENGINE COMPARTMENT LEFT)
2E	20	ENGINE ROOM NO.4 WIRE AND J/B NO.2 (ENGINE COMPARTMENT LEFT)
2G	20	ENGINE WIRE AND J/B NO.2 (ENGINE COMPARTMENT LEFT)



1. Draw in RED the fan circuit with the FANS in HIGH SPEED operation.
2. Draw in Blue the fan circuit with the FANS in LOW SPEED operation.
3. In HIGH SPEED FAN MODE what is the state of each of the three relays.
The air conditioning is off.
Relay #1: ON / OFF
Relay #2: ON / OFF
Relay #3: ON / OFF
4. In LOW SPEED FAN MODE what is the state of each of the three relays.
Relay #1: ON / OFF
Relay #2: ON / OFF
Relay #3: ON / OFF
5. How or when is relay #3 energized?

6. How or when is relay #2 energized?

7. What will happen to the Radiator Fan and the Radiator Fan Relay #1 when the Water Temp Sensor senses 199°F.



8. With the A/C ON , the HIGH PRESSURE SWITCH senses a pressure of 300 psi.
 What is the status of:
 Relay #1: ON / OFF
 Relay #2: ON / OFF
 Relay #3: ON / OFF

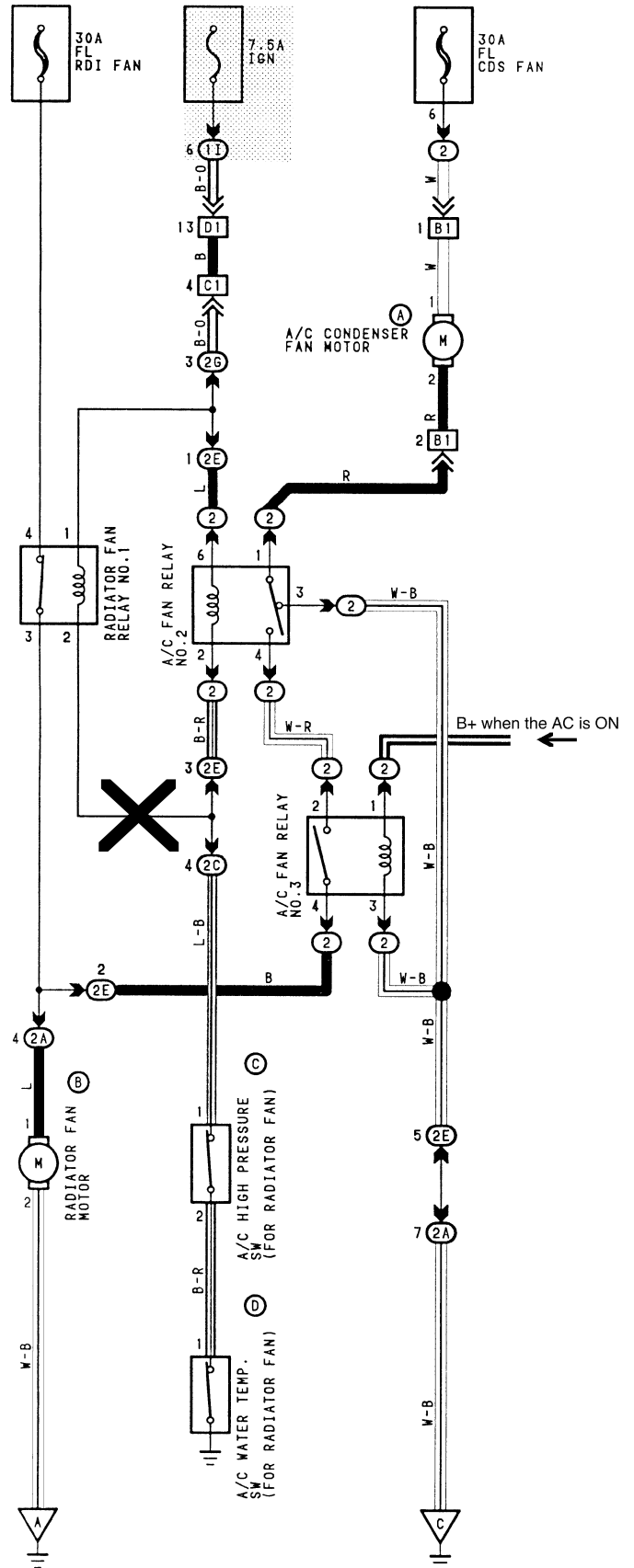
9. With the WATER TEMP SWITCH sensing a temperature of 200°F. The A/C is off. What is the status of:
 Relay #1: ON / OFF
 Relay #2: ON / OFF
 Relay #3: ON / OFF

10. With the A/C is on, Water Temp below 180°F, and A/C High pressure sensing 225 PSI. Which fan(s) is on and in what speed?

11. If a break occurred at point 'X' in the circuit, what would the result be.

12. What controls or inputs will cause the fans to run in HIGH SPEED MODE.

13. Explain the conditions that cause the fans to run in LOW SPEED MODE.

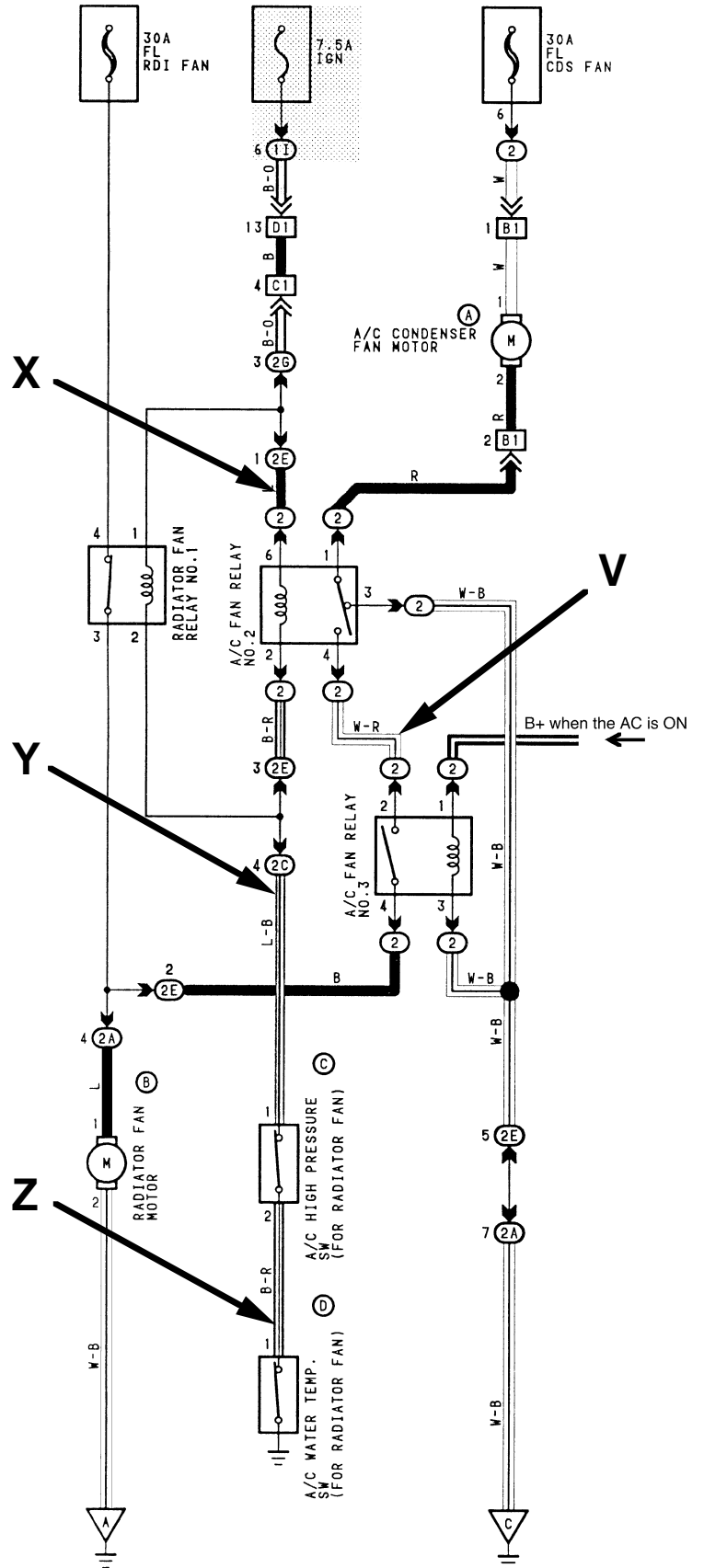


14. If a break occurred at point 'V' in the circuit , what would the result be.

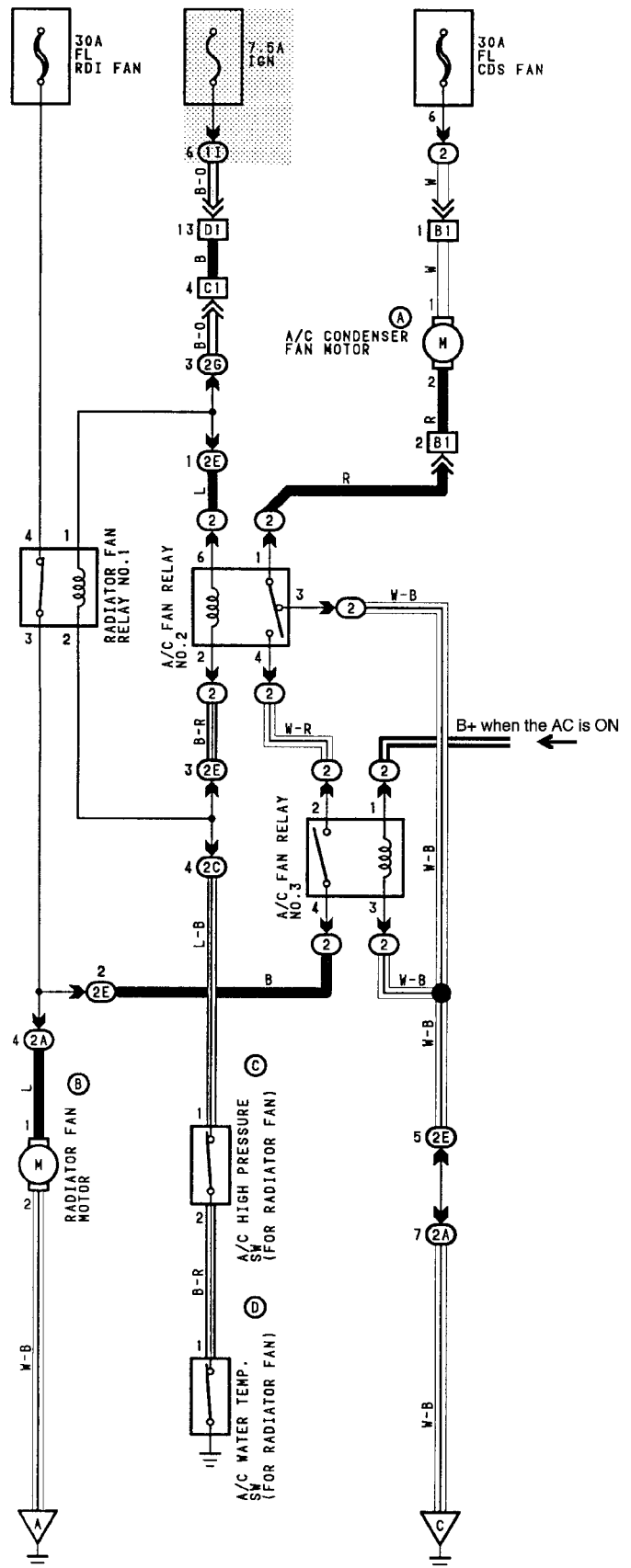
15. If a break occurred at point 'X' in the circuit , what would the result be.

16. If a break occurred at point 'Y' in the circuit , what would the result be.

17. If a break occurred at point 'Z' in the circuit , what would the result be.

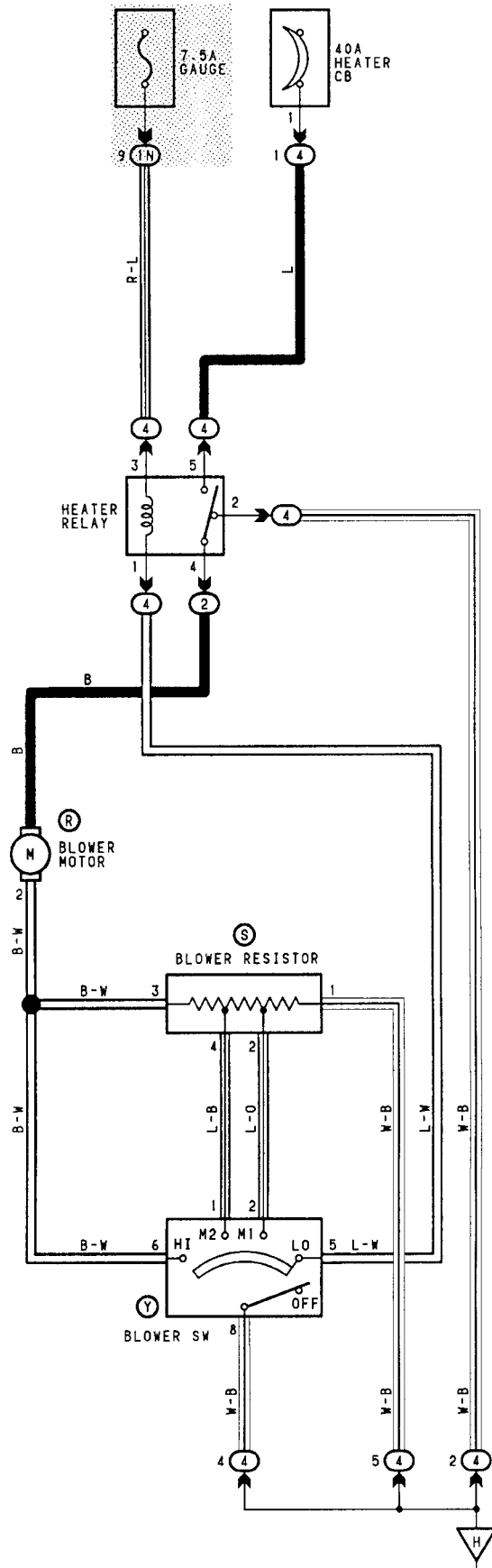


1. Both FANS will not work in LOW SPEED. The Fans only work in HIGH SPEED. Trace in RED the area(s) that could be at fault.
2. The RADIATOR FAN will not work in HIGH SPEED, however it will work in LOW SPEED when the AC switch is turned on. Trace in BLUE the area(s) that could be at fault.
3. The CONDENSER FAN works all the time and will not shut off. The RADIATOR FAN works only in HIGH SPEED but not in low speed. Trace in GREEN the area(s) that could be at fault.
4. The FANS will not turn on when the engine overheats. The fans work correctly in the other positions. Trace in Orange the area(s) that could be at fault.



1. Draw in RED the Blower CONTROL CIRCUIT with the blower motor in operation.
2. Draw in BLUE the BLOWER CIRCUIT with the BLOWER in the LOW SPEED position.
3. Draw in GREEN the BLOWER CIRCUIT with the BLOWER in M1 SPEED position.
4. Draw in ORANGE the BLOWER CIRCUIT with the BLOWER in HIGH SPEED position.
5. Explain the difference between the HI SPEED circuit and ALL OTHER SPEEDS.

7. How does the Heater Relay remain energized while different blower positions are selected.

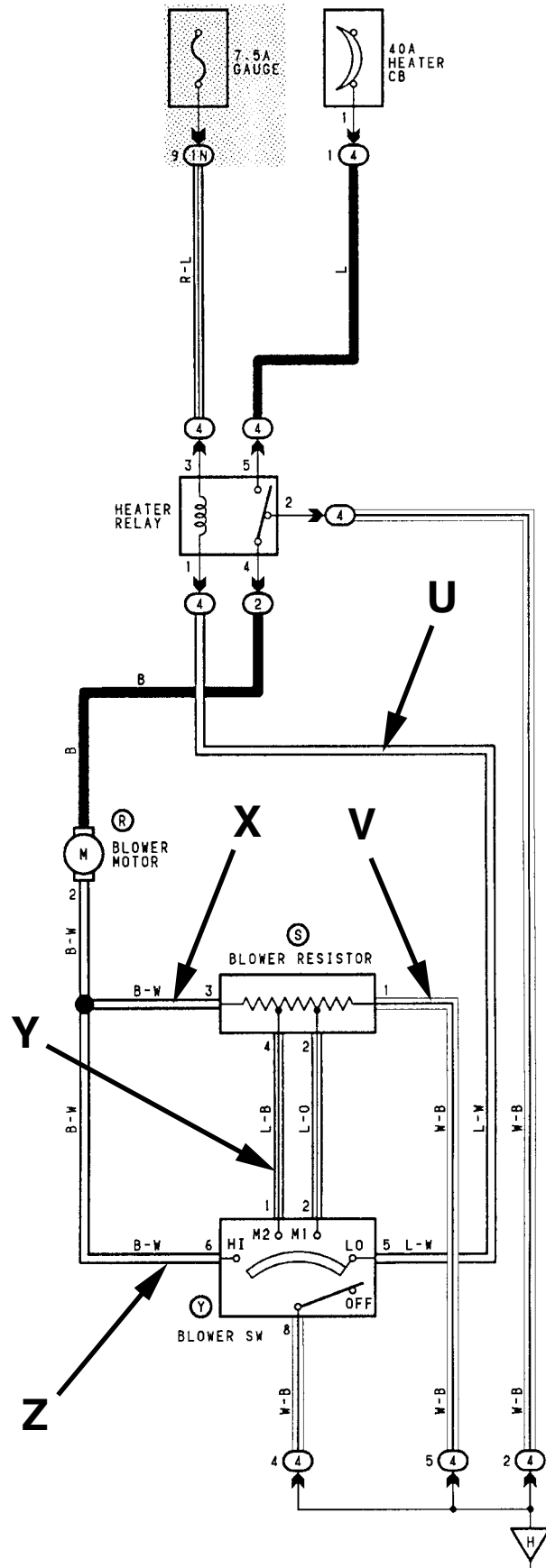


8. If a break occurred at point 'V' in the circuit , what would the result be.

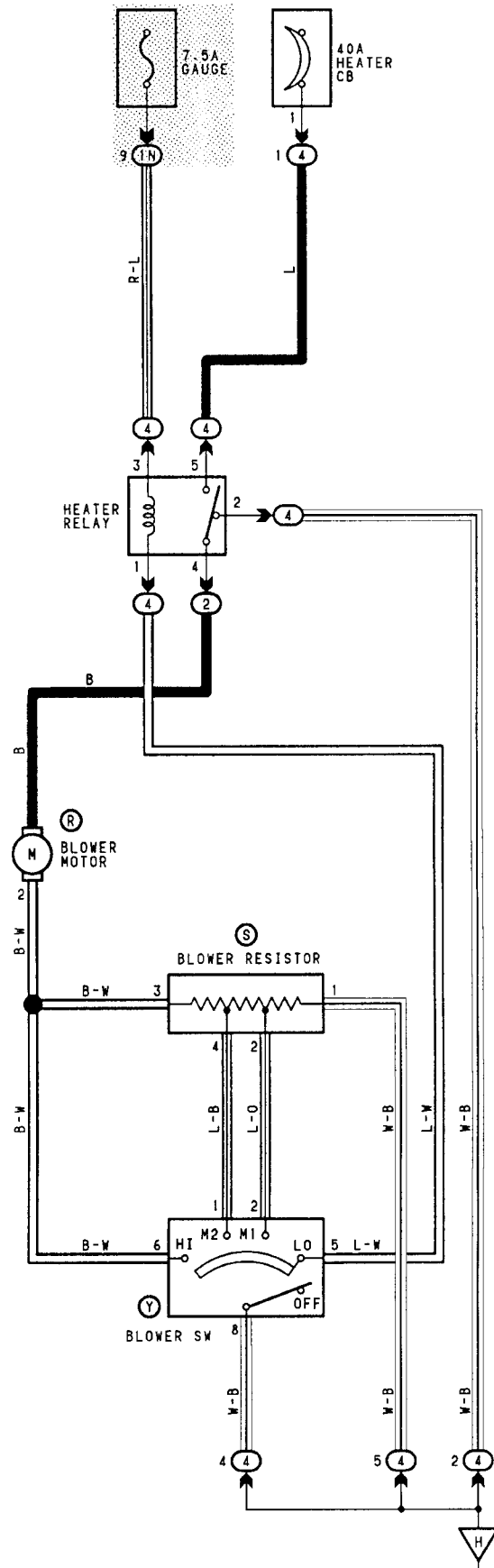
9. If a break occurred at point 'X' in the circuit , what would the result be.

10. If a break occurred at point 'Y' in the circuit , what would the result be.

11. If a break occurred at point 'Z' in the circuit , what would the result be.



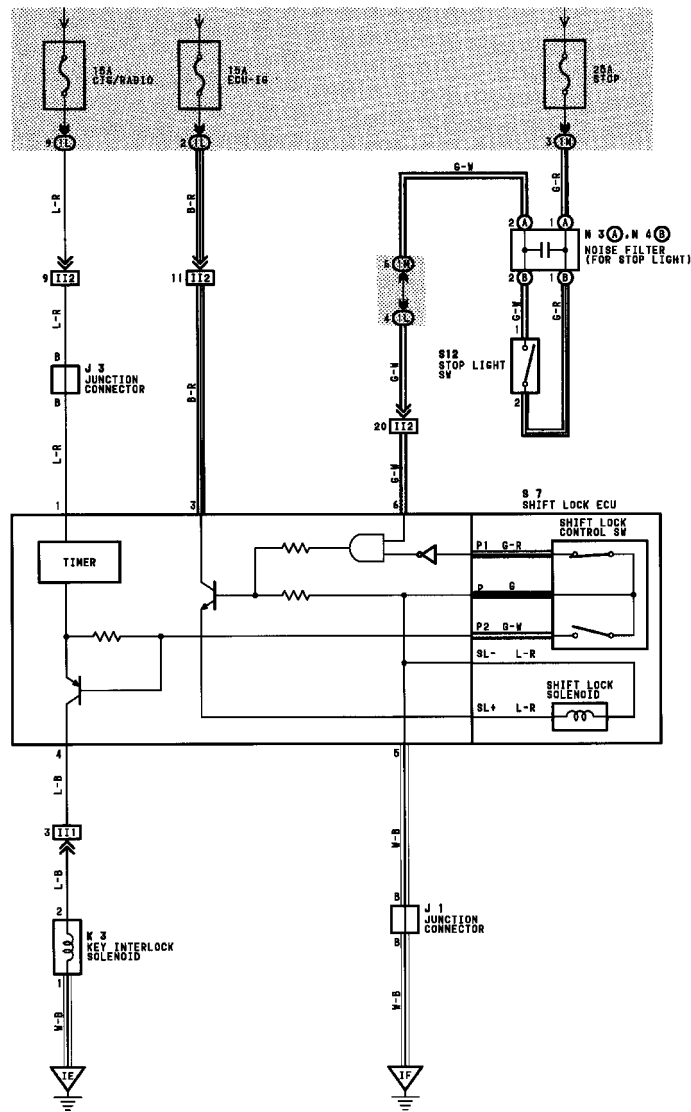
1. Only the HIGH SPEED blower works. None of the other blower speeds work. Trace in RED the area(s) that could be at fault.
2. The LOW SPEED blower does not work. All other speeds work correctly. Trace in BLUE the area(s) that could be at fault.
3. The blower does not work. A "click" from the relay is heard when the blower switch is placed any one of the blower speed positions. Trace in GREEN the area(s) that could be at fault.
4. When the blower switch is placed into the M2 (medium 2). The fan operates in low speed rather than M2. All other blower speed positions operate correctly. Trace in ORANGE the area(s) that could be at fault.



TOYOTA

Shift Lock Circuit

Worksheets



SYSTEM OUTLINE

WHEN THE IGNITION SW IS TURNED TO ACC POSITION THE CURRENT FROM THE CIG/RADIO FUSE FLOWS TO **TERMINAL 1** OF THE SHIFT LOCK ECU. WHEN THE IGNITION SW IS TURNED TO ON POSITION THE CURRENT FROM THE ECU-IG FUSE FLOWS TO **TERMINAL 3** OF THE ECU.

1. SHIFT LOCK MECHANISM

WITH THE IGNITION SW ON, WHEN A SIGNAL THAT THE BRAKE PEDAL IS DEPRESSED (STOP LIGHT SW ON) AND A SIGNAL THAT THE SHIFT LEVER IS PUT IN "P" RANGE (CONTINUITY BETWEEN P1 AND P OF THE SHIFT LOCK CONTROL SW) IS INPUT TO THE ECU, THE ECU OPERATES AND CURRENT FLOWS FROM **TERMINAL 3** OF THE ECU → **TERMINAL SL+** OF THE SHIFT LOCK SOLENOID → SOLENOID → **TERMINAL SL-** → **TERMINAL 5** OF THE ECU → **GROUND**. THIS CAUSES THE SHIFT LOCK SOLENOID TO TURN ON (PLATE STOPPER DISENGAGES) AND THE SHIFT LEVER CAN SHIFT INTO OTHER RANGE THAN THE "P" RANGE.

2. KEY INTERLOCK MECHANISM

WITH THE IGNITION SW IN ON OR ACC POSITION, WHEN THE SHIFT LEVER IS PUT IN "P" RANGE (NO CONTINUITY BETWEEN P2 AND P OF SHIFT LOCK CONTROL SW), THE CURRENT FLOWING FROM **TERMINAL 4** OF THE ECU → KEY INTERLOCK SOLENOID IS CUT OFF. THIS CAUSES THE KEY INTERLOCK SOLENOID TO TURN OFF (LOCK LEVER DISENGAGES FROM LOCK POSITION) AND THE IGNITION KEY CAN BE TURNED FROM ACC TO LOCK POSITION. IF THE IGNITION IS LEFT IN ACC OR ON POSITION WITH THE SHIFT LEVER IN OTHER THAN "P" RANGE, THEN AFTER APPROX. ONE HOUR THE ECU OPERATES TO RELEASE THE LOCK.

SERVICE HINTS

S 7 SHIFT LOCK ECU

- 1-GROUND: APPROX. 12VOLTS WITH IGNITION SW AT ACC OR ON POSITION
- 3-GROUND: APPROX. 12VOLTS WITH IGNITION SW AT ON POSITION
- 5-GROUND: ALWAYS CONTINUITY
- 6-GROUND: APPROX. 12VOLTS WITH BRAKE PEDAL DEPRESSED
- 4-GROUND: 0VOLTS WITH IGNITION SW AT ACC POSITION AND SHIFT LEVER POSITION IN P RANGE
- 6-12VOLTS WITH SHIFT LEVER POSITION IN EXCEPT P RANGE

○ : PARTS LOCATION

CODE	SEE PAGE	CODE	SEE PAGE	CODE	SEE PAGE
J 1	30	N 3	A 30	S12	30
J 3	30	N 4	B 30		
K 3	30	S 7	30		

○ : JUNCTION BLOCK AND WIRE HARNESS CONNECTOR

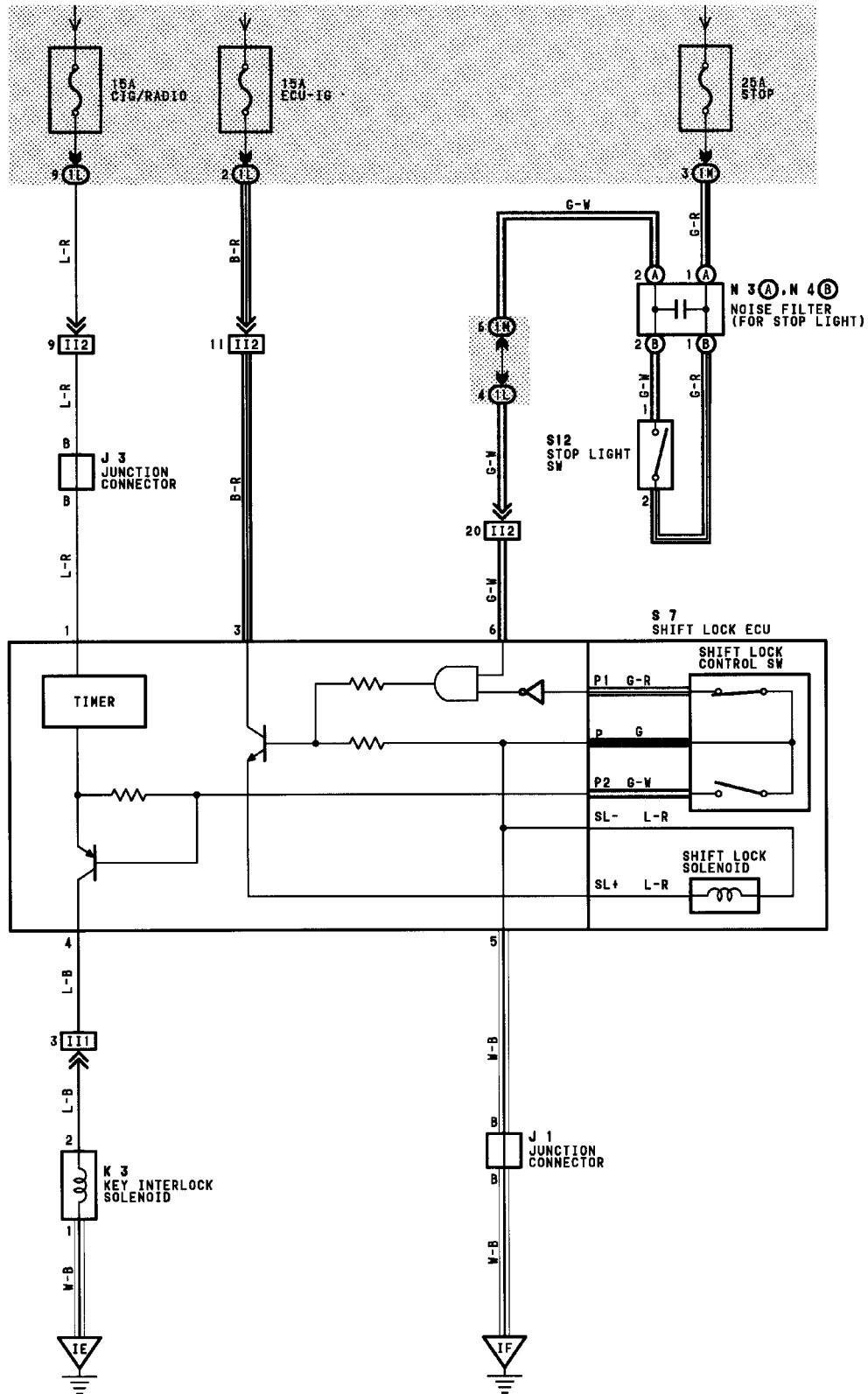
CODE	SEE PAGE	JUNCTION BLOCK AND WIRE HARNESS (CONNECTOR LOCATION)
1L	20	COWL WIRE AND J/B NO.1 (INSTRUMENT PANEL LEFT)
1M		

□ : CONNECTOR JOINING WIRE HARNESS AND WIRE HARNESS

CODE	SEE PAGE	JOINING WIRE HARNESS AND WIRE HARNESS (CONNECTOR LOCATION)
II1	36	COWL WIRE AND INSTRUMENT PANEL WIRE (LEFT KICK PANEL)
II2	36	INSTRUMENT PANEL WIRE AND COWL WIRE (BEHIND COMBINATION METER)

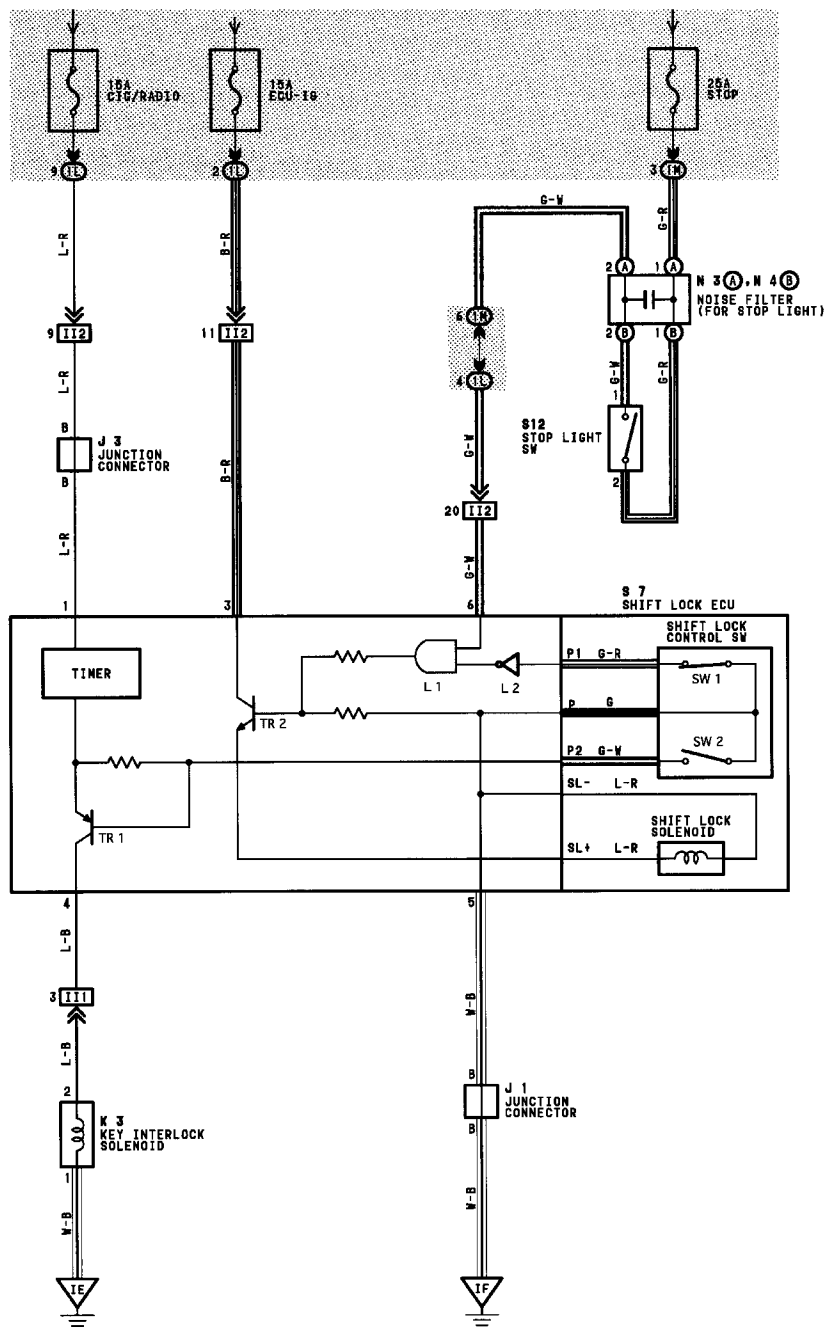
▽ : GROUND POINTS

CODE	SEE PAGE	GROUND POINTS LOCATION
IE	36	LEFT KICK PANEL
IF		

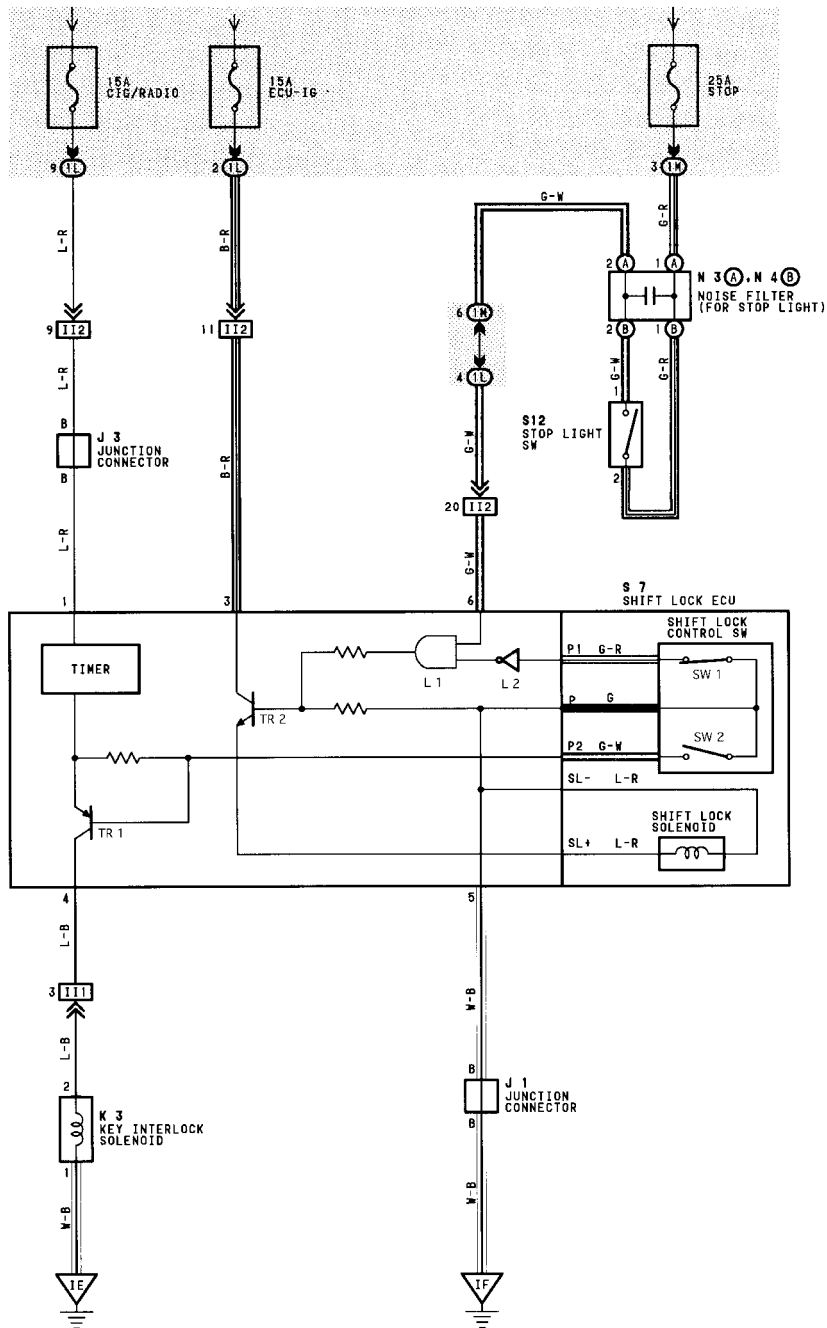


1. When is Switch SW1 closed and when is it open?
2. When is Switch SW2 closed and when is it open?
3. What is the function of the Key Interlock Solinoid?
4. What is the function of the Shift Lock Solinoid?
5. What is the function of Logic Gate L1?
6. What circuit or component does Transistor TR1 control?
7. What circuit or component does Transistor TR2 control?
8. What circuit or component does Logic Gate L1 control?

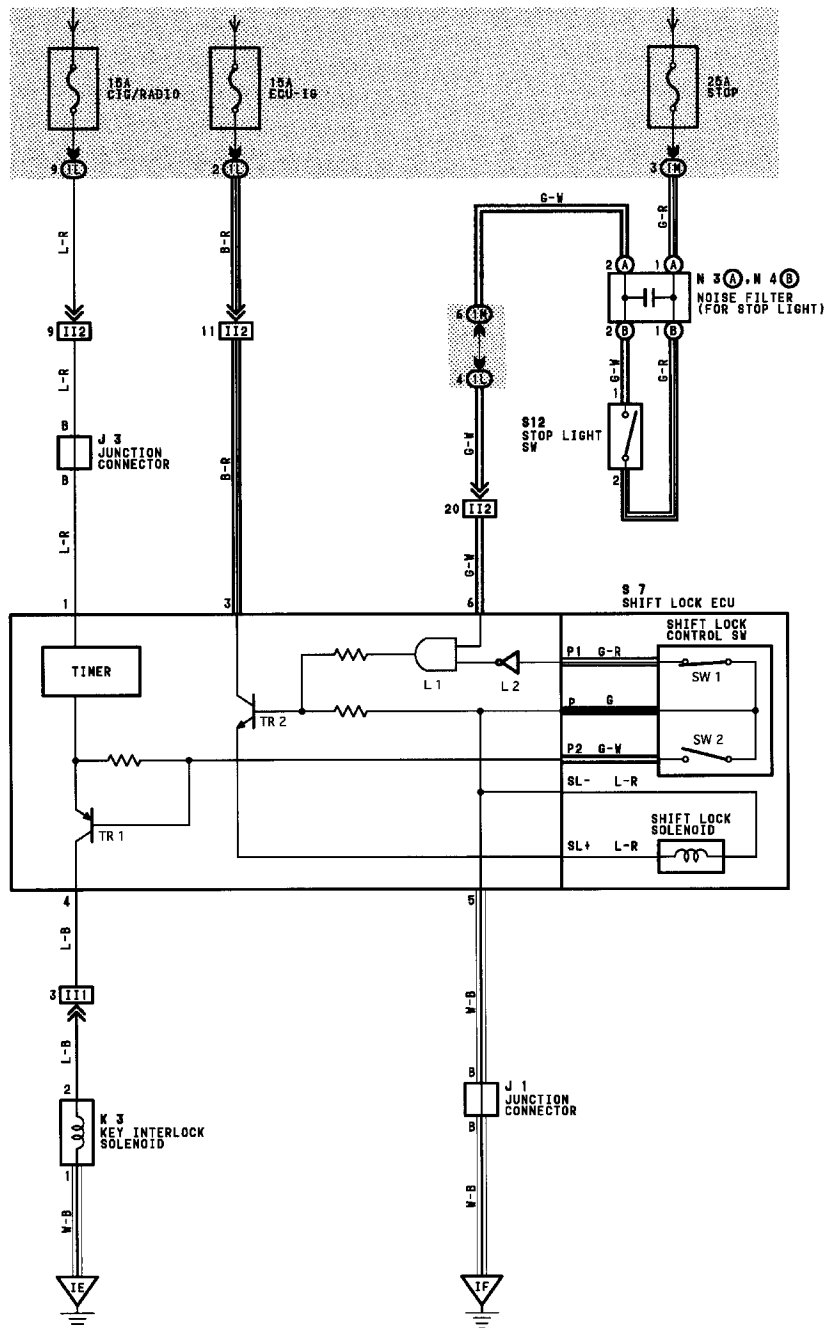
Hint: Use the Reference Page A-9 Page 2



1. Trace in RED the B+ input to Logic Gate L1 inside the Shift Lock ECU, when the Stop Light is closed.
2. Trace in BLUE the Ground input to Logic Gate L2 (NOT Gate) inside the Shift Lock ECU.
3. Trace in GREEN the positive output from Logic Gate L2 to base of Transistor TR2.
4. Trace in ORANGE the Shift Lock Solenoid Circuit (from the fuse to ground) that is controlled by Transistor TR2 (emitter-collector circuit of TR2).

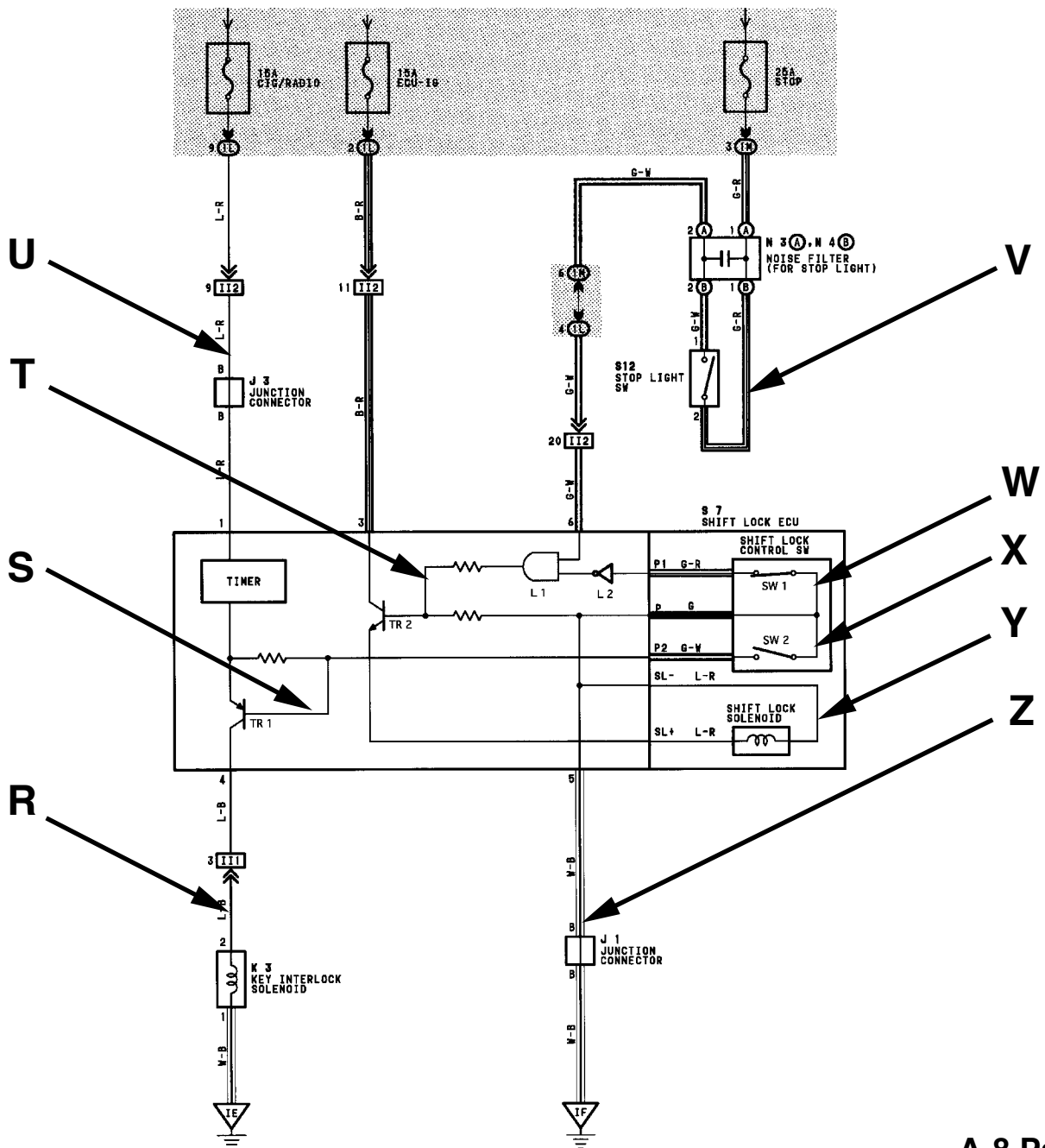


1. Trace in BLUE the Ground input to Transistor TR1 when Switch SW2 is closed.
2. Trace in ORANGE the Key Interlock Solenoid Circuit (from the fuse to ground) that is controlled by Transistor TR1 (emitter-collector circuit of TR1).
3. What is the function of the Timer Module in the Key Interlock Solenoid Circuit?



Determine what the affect will be on the following circuit.

1. How will the circuit be affected if there is an open at point **S**.
2. How will the circuit be affected if there is an open at point **T**.
3. How will the circuit be affected if there is an open at point **U**.
4. How will the circuit be affected if there is an open at point **V**.
5. How will the circuit be affected if there is an open at point **W**.
6. How will the circuit be affected if there is an open at point **X**.
7. How will the circuit be affected if there is an open at point **Y**.
8. How will the circuit be affected if there is an open at point **Z**.



1. The SHIFT LEVER will not move out of Park. Trace in RED the area(s) that could be at fault.
2. The IGNITION KEY will not turn to the LOCK position. Trace in BLUE the area(s) that could be at fault.

