CIRCUIT OPERATION

Driver Seat

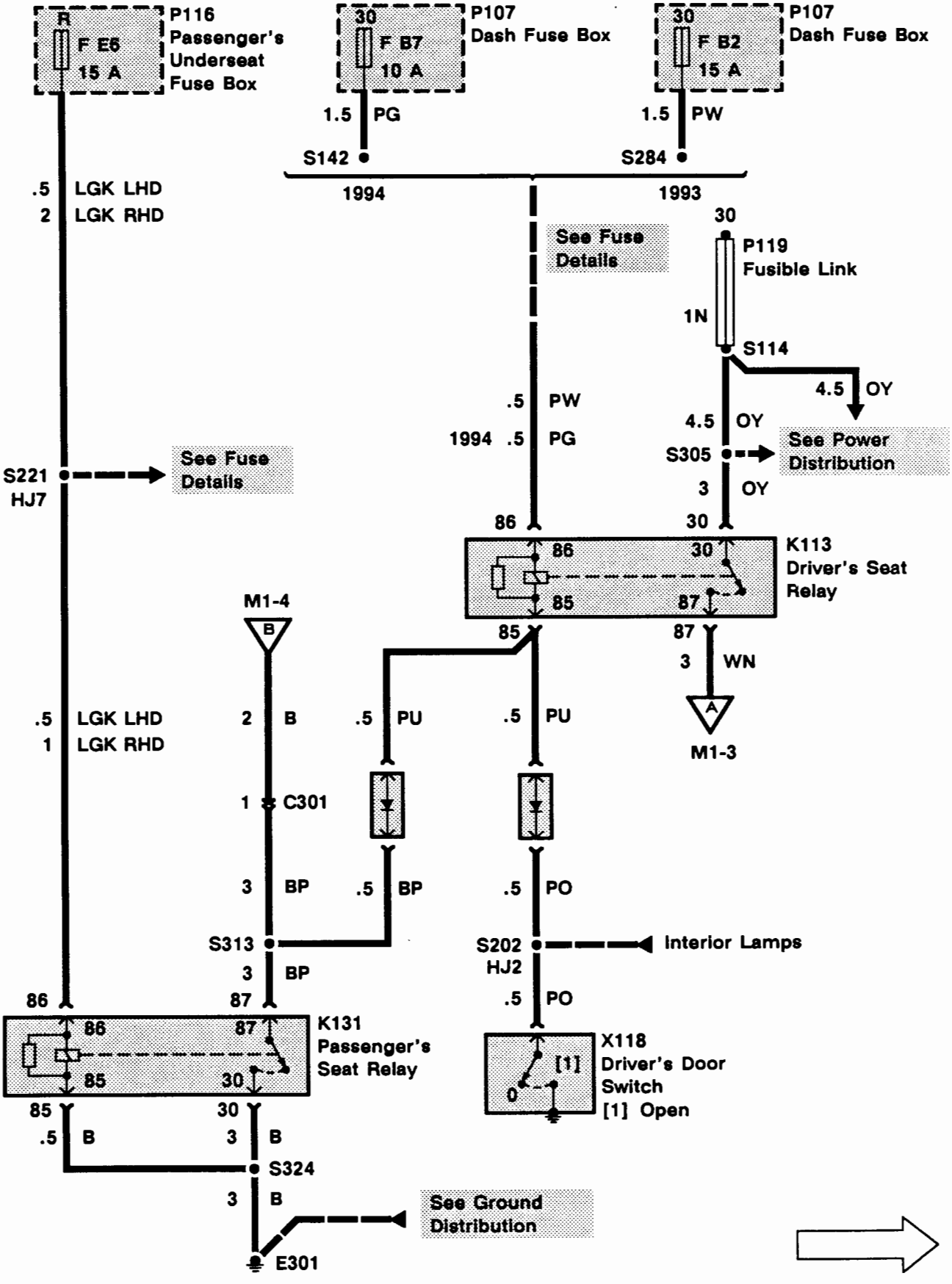
When the Ignition Switch (X134) is in position I or II, the Passenger Seat Relay (K131) applies ground to the Driver Seat Relay (K113). Ground is also applied to this relay when the driver's door is open. This allows the driver's seat to be adjusted with the door open. When the Driver Seat Relay (K113) is energized, battery voltage is applied to the Driver Seat Control Switch (X121). This switch is connected directly to ground. The Driver Seat Control Switch controls 4 seat control motors via 4 double-contact switches. When each switch is moved to operate its corresponding motor, 1 seat switch contact applies ground while the other applies battery voltage to the respective seat motor. The motor turns to adjust the seat in the requested direction.

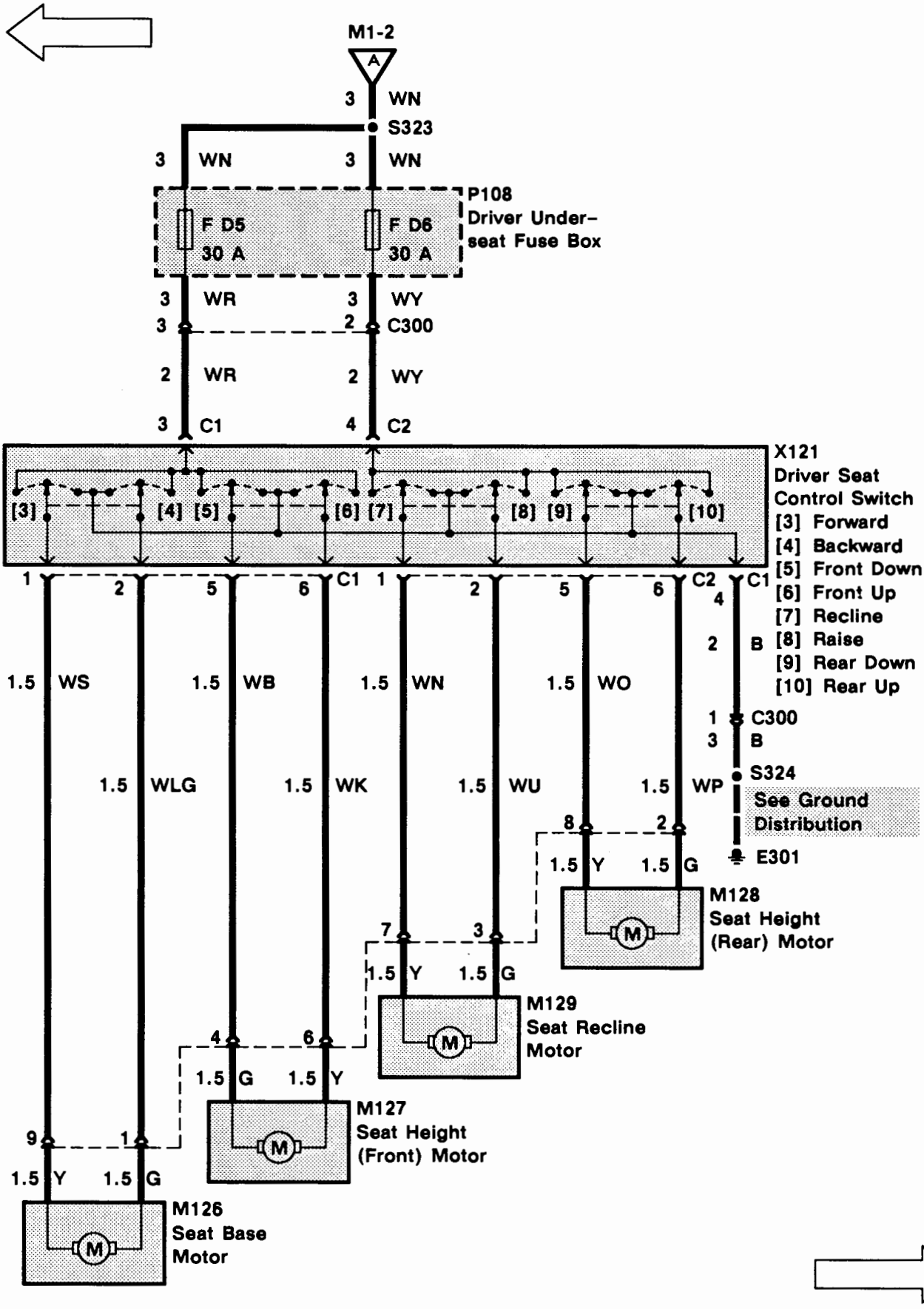
Passenger Seat

Battery voltage is applied to the Passenger Seat Control Switch (X152) at all times. When the Ignition Switch (X134) is in position I or II, the Passenger Seat Relay (K131) is energized, applying ground to the Passenger Seat Control Switch. The Passenger Seat Control Switch operates like the Driver Seat Control Switch (X121).

M1 ETM

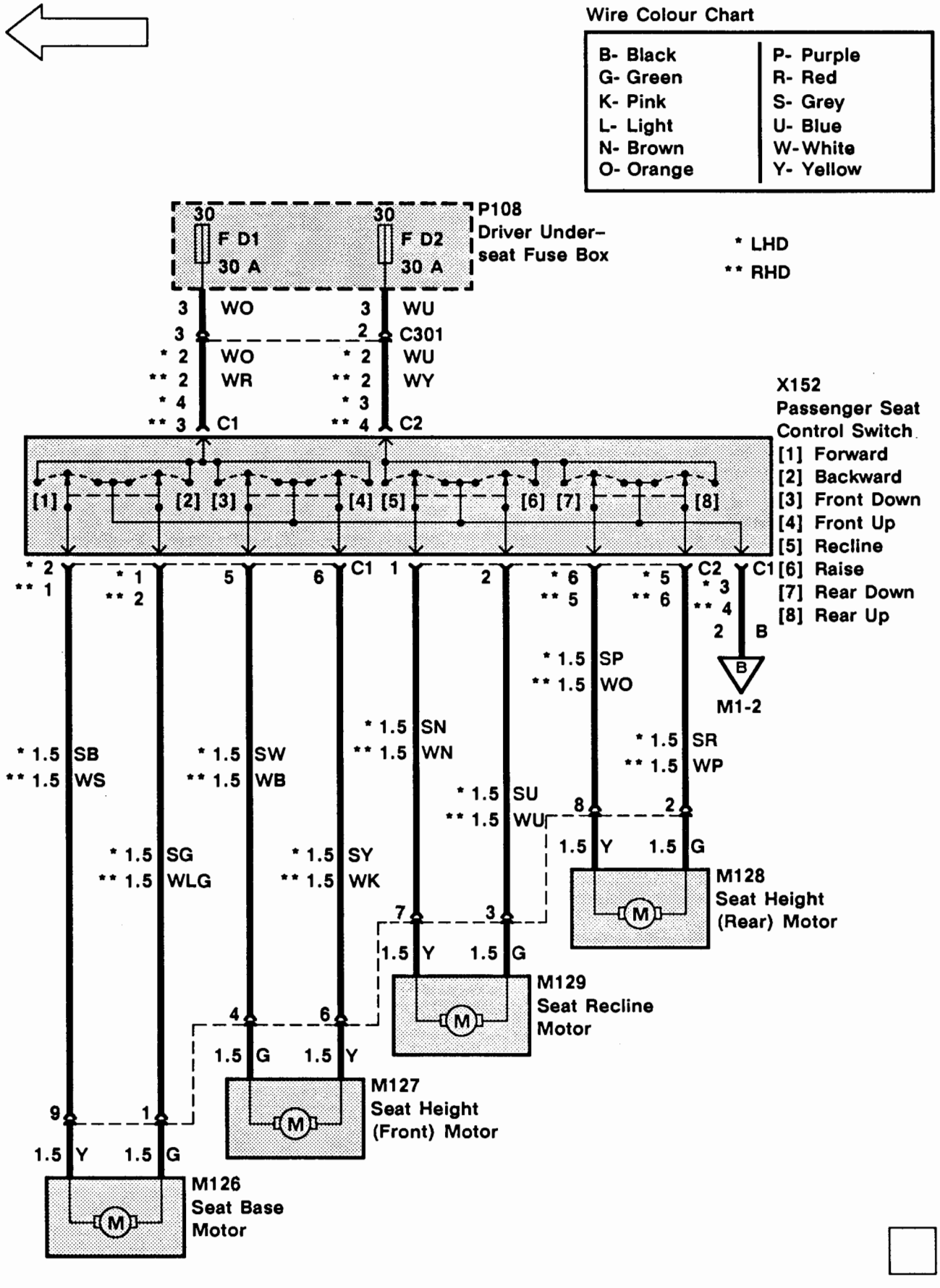
1993/1994 RANGE ROVER




M1-2
A
3 WN
S323
3 WN
3 WN
P108
Driver Under-seat Fuse Box
F D5
30 A
F D6
30 A
3 WR
3 WY
3
2
C300
2 WR
2 WY
3 C1
4 C2
X121
Driver Seat Control Switch
[3] Forward
[4] Backward
[5] Front Down
[6] Front Up
[7] Recline
[8] Raise
[9] Rear Down
[10] Rear Up
[3] [4] [5] [6] [7] [8] [9] [10]
1 2 5 6 C1
1 2 5 6 C2
C1
4
2 B
1.5 WS
1.5 WB
1.5 WN
1.5 WO
1 C300
3 B
S324
See Ground Distribution
1.5 WLG
1.5 WK
1.5 WU
1.5 WP
8 2
1.5 Y
1.5 G
E301
M128
Seat Height (Rear) Motor
7 3
1.5 Y
1.5 G
M129
Seat Recline Motor
4 6
1.5 G
1.5 Y
M127
Seat Height (Front) Motor
9 1
1.5 Y
1.5 G
M126
Seat Base Motor
M

M1 ETM

1993 RANGE ROVER



TROUBLESHOOTING HINTS

1. If the driver's seat does not operate only when the driver door is open, check the PU wire, PO wire, driver power seat diode and Driver Door Switch (X118).
2. If the passenger's seat is OK but the driver's seat operates only when the driver's door is open, check the PU wire, B wire and driver power seat diode.

SYSTEM DIAGNOSIS

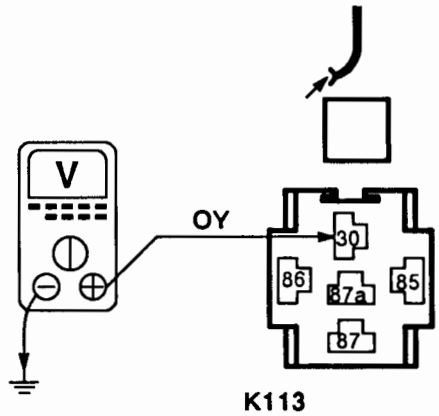
1. If the driver's power seat does not move in any direction, do Test A.
2. If the passenger's power seat does not move in any direction but the driver's seat is OK, do Test C (left side) or Test E (right side).
3. If some, but not all, of the driver's power seat functions operate, do Test G.
4. If some, but not all, of the passenger's power seat functions operate, do Test H.
5. If neither power seat operates when the driver's door is closed, do Test F.

Test A

1A

CONDITIONS
- **Ignition Switch**
  Position: 0

RESULTS
BAT VOLT



K113
Driver Seat
Relay

OK **PROBLEM CAUSE**
- **OY Wire**
- **Fusible Link**

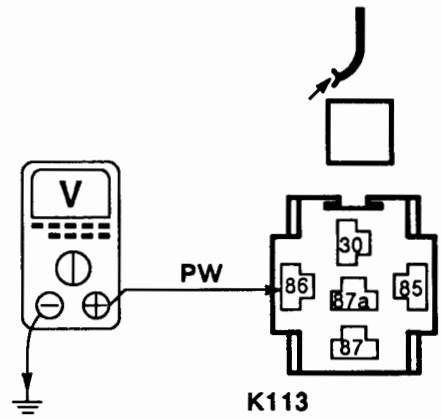
OK

2A

2A

CONDITIONS
- **Ignition Switch**
  Position: 0

RESULTS
BAT VOLT



K113
Driver Seat
Relay

OK **PROBLEM CAUSE**
- **PW Wire**
- **F B2 Fuse**

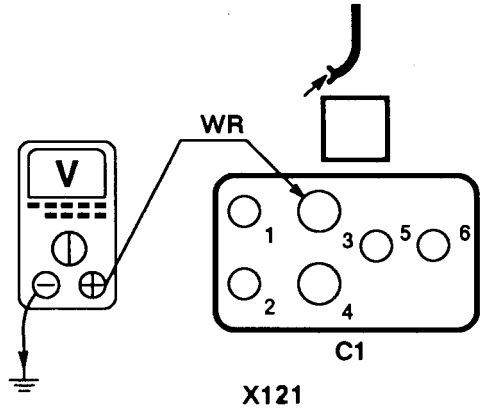
OK **PROBLEM CAUSE**
- **LHD**
  Go to Test B
- **RHD**
  Go to Test D

Test B

1B

CONDITIONS
- **Ignition Switch**
  Position: 0
- **Driver's door**
  Open

RESULTS
BAT VOLT



X121
Driver Seat
Control Switch

OK

PROBLEM CAUSE
- F E5 Fuse
- WR Wire
- WN Wire

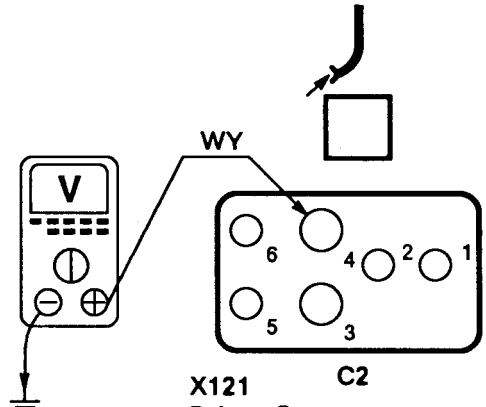
OK

2B

2B

CONDITIONS
- **Ignition Switch**
  Position: 0
- **Driver's door**
  Open

RESULTS
BAT VOLT



X121
Driver Seat
Control Switch

OK

PROBLEM CAUSE
- F E6 Fuse
- WY Wire
- WN Wire

OK

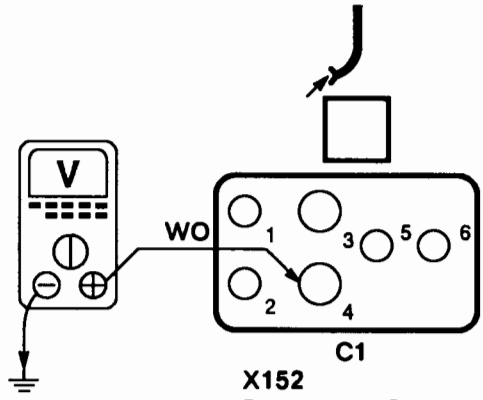
PROBLEM CAUSE
- B Wire
- Seat motors connector
- Driver Seat Control Switch

Test C

1C

CONDITIONS
- **Ignition Switch**
  Position: 0

RESULTS
BAT VOLT



X152
Passenger Seat Control Switch

OK **PROBLEM CAUSE**
- **F D1 Fuse**
- **WO Wire**

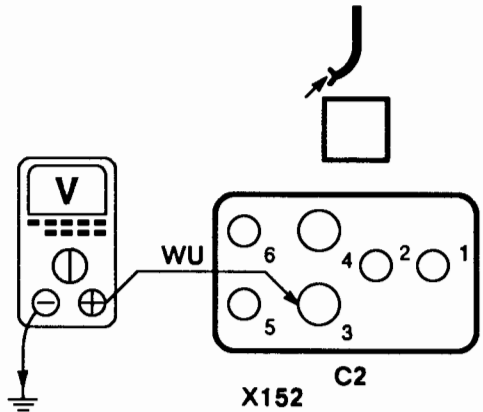
OK

2C

2C

CONDITIONS
- **Ignition Switch**
  Position: 0

RESULTS
BAT VOLT



X152
Passenger Seat Control Switch

OK **PROBLEM CAUSE**
- **F D2 Fuse**
- **WU Wire**

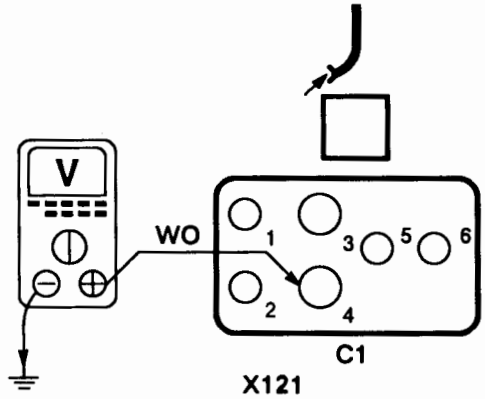
OK **PROBLEM CAUSE**
- **B Wire**
- **Seat motors connector**
- **Passenger Seat Control Switch**

Test D

1D

CONDITIONS
- **Ignition Switch**
  Position: 0
- **Driver's door**
  Open

RESULTS
BAT VOLT



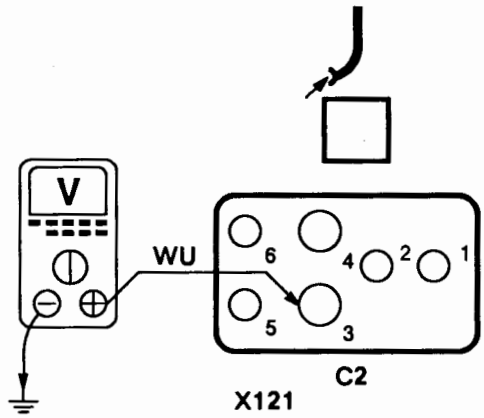
OK **PROBLEM CAUSE**
- F E5 Fuse
- WO Wire
- WR Wire
- WN Wire

OK → 2D

2D

CONDITIONS
- **Ignition Switch**
  Position: 0
- **Driver's door**
  Open

RESULTS
BAT VOLT



OK **PROBLEM CAUSE**
- F E6 Fuse
- WU Wire
- WY Wire
- WN Wire

OK **PROBLEM CAUSE**
- B Wire
- Seat motors connector
- Driver Seat Control Switch

M1 ETM

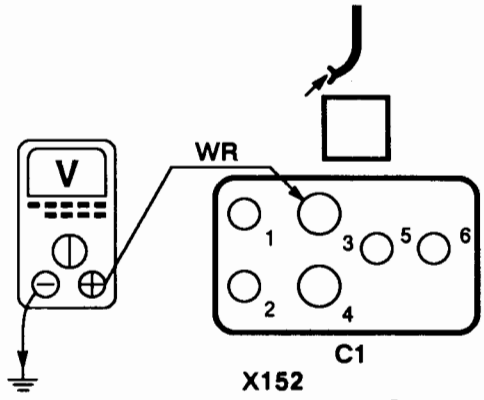
1993 RANGE ROVER

Test E

1E

CONDITIONS
- **Ignition Switch**
  Position: 0

RESULTS
BAT VOLT



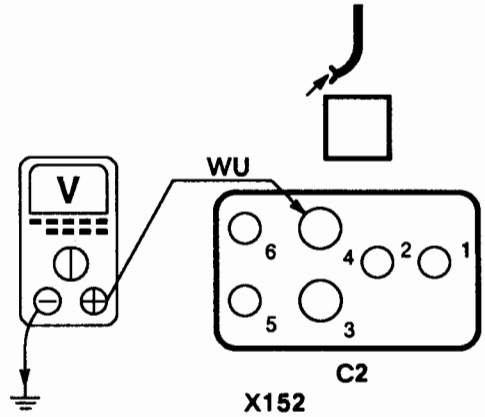
OK **PROBLEM CAUSE**
- F D1 Fuse
- WR Wire
- WO Wire

OK → 2E

2E

CONDITIONS
- **Ignition Switch**
  Position: 0

RESULTS
BAT VOLT



OK **PROBLEM CAUSE**
- F D2 Fuse
- WY Wire
- WU Wire

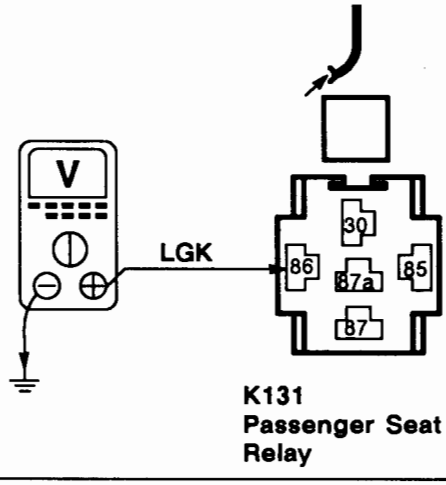
OK **PROBLEM CAUSE**
- B Wire
- BP Wire
- Seat motors connector
- Passenger Seat Control Switch

Test F

1F

CONDITIONS
- **Ignition Switch**
  Position: I

RESULTS
BAT VOLT



K131
Passenger Seat
Relay

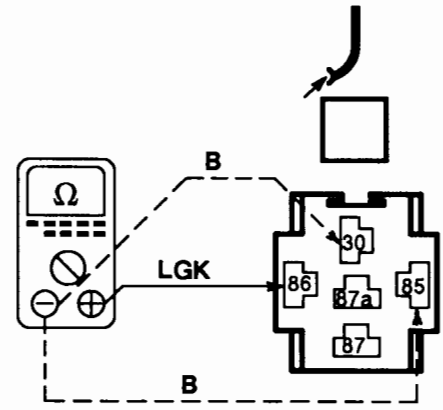
OK **PROBLEM CAUSE**
- **F E6 Fuse**
- **LGK Wire**

OK → 2F

2F

CONDITIONS
- **Ignition Switch**
  Position: 0

RESULTS
Less than 2 ohms



K131
Passenger Seat
Relay

OK **PROBLEM CAUSE**
- **B Wire**

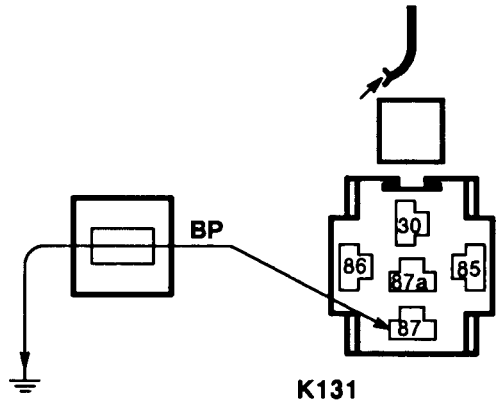
OK → 3F

2F

3F

CONDITIONS
- **Ignition Switch**
  Position: II

RESULTS
Seats
Operate



K131
Passenger Seat Relay

OK **PROBLEM CAUSE**
- **BP Wire**

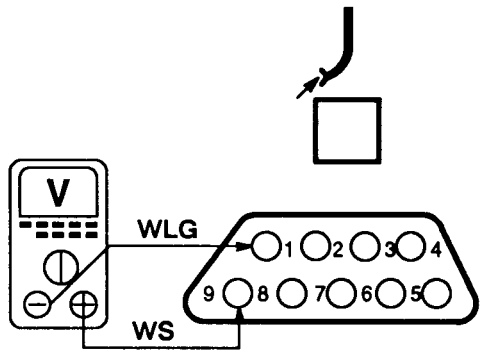
OK **PROBLEM CAUSE**
- **Passenger Seat Relay**

Test G

1G

CONDITIONS
- **Ignition Switch**
  Position: I

RESULTS
- **X121, X152 Seat Switches**
  Forward
  +BAT VOLT
  Backward
  -BAT VOLT



Seat motors connector

OK **PROBLEM CAUSE**
- **WLG Wire**
- **WS Wire**
- **X121, X152 Seat Switches**

OK

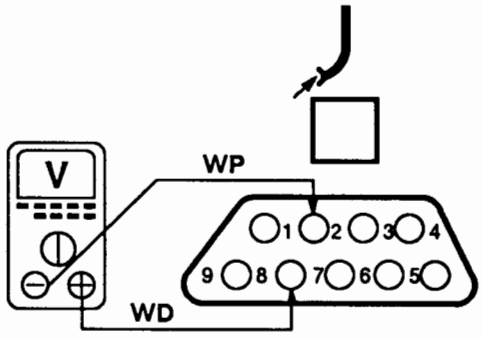
2G

1G

2G

CONDITIONS
- **Ignition Switch**
  Position: I

RESULTS
- **X121, X152 Seat Switches**
  Rear up
  -BAT VOLT
  Rear down
  +BAT VOLT



Seat motors connector

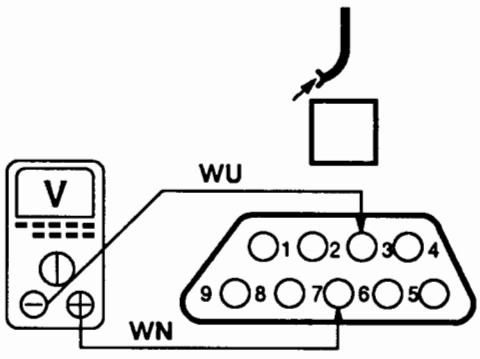
OK **PROBLEM CAUSE**
- **WP Wire**
- **WO Wire**
- **X121, X152 Seat Switches**

OK → 3G

3G

CONDITIONS
- **Ignition Switch**
  Position: I

RESULTS
- **X121, X152 Seat Switches**
  Recline
  +BAT VOLT
  Raise
  -BAT VOLT



Seat motors connector

OK **PROBLEM CAUSE**
- **WU Wire**
- **WN Wire**
- **X121, X152 Seat Switches**

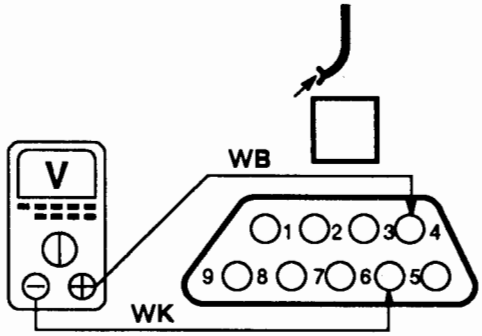
OK → 4G

3G

4G

CONDITIONS
- **Ignition Switch**
  Position: I

RESULTS
- **X121, X152 Seat Switches**
  Front down
  +BAT VOLT
  Front up
  -BAT VOLT



Seat motors connector

OK **PROBLEM CAUSE**
- **WB Wire**
- **WK Wire**
- **X121, X152 Seat Switches**

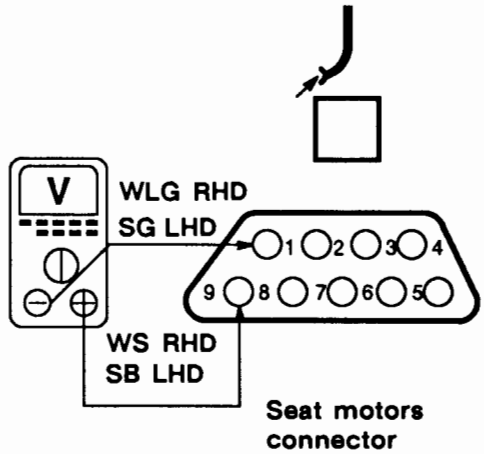
OK **PROBLEM CAUSE**
- **Seat motors**

Test H

1H

CONDITIONS
- **Ignition Switch**
  Position: I

RESULTS
- **X121, X152 Seat Switches**
  Forward
  +BAT VOLT
  Backward
  -BAT VOLT



Seat motors connector

OK **PROBLEM CAUSE**
- **SG Wire LHD**
- **SB Wire LHD**
- **WLG Wire RHD**
- **WS Wire RHD**
- **X121, X152 Seat Switches**

OK

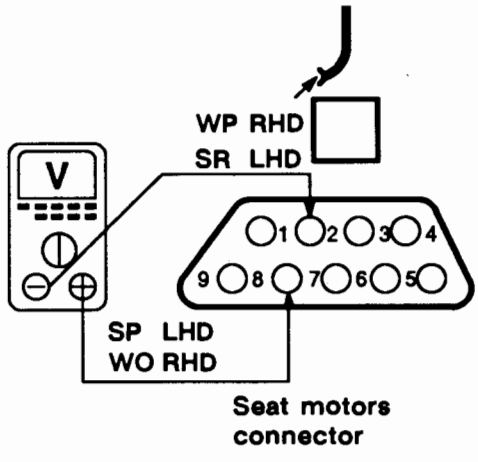
2H

1H

2H

CONDITIONS
- **Ignition Switch**
  Position: I

RESULTS
- **X121, X152 Seat Switches**
  Rear up
  -BAT VOLT
  Rear down
  +BAT VOLT



OK

PROBLEM CAUSE
- SR Wire LHD
- SP Wire LHD
- WP Wire RHD
- WO Wire RHD
- X121, X152 Seat Switches

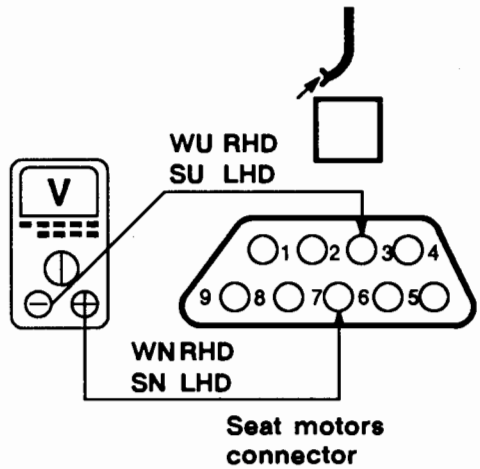
OK

3H

3H

CONDITIONS
- **Ignition Switch**
  Position: I

RESULTS
- **X121, X152 Seat Switches**
  Recline
  +BAT VOLT
  Raise
  -BAT VOLT



OK

PROBLEM CAUSE
- SU Wire LHD
- SN Wire LHD
- WU Wire RHD
- WN Wire RHD
- X121, X152 Seat Switches

OK

4H

M1 ETM

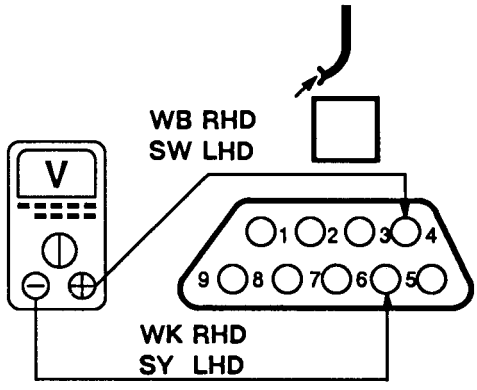
1993 RANGE ROVER

3H

4H

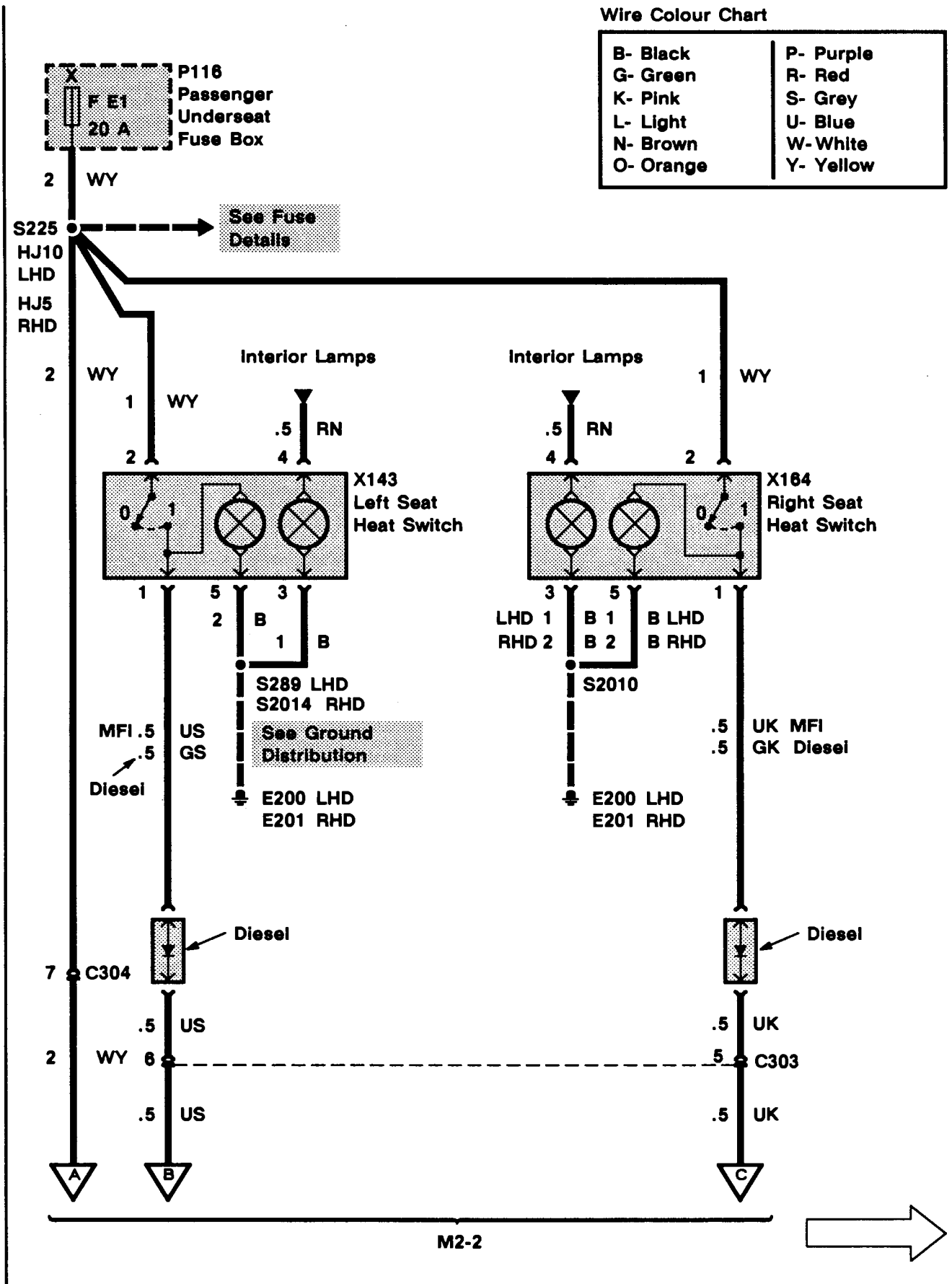
CONDITIONS
- **Ignition Switch**
  Position: I

RESULTS
- **Ignition Switch**
  Front down
  +BAT VOLT
  Front up
  -BAT VOLT



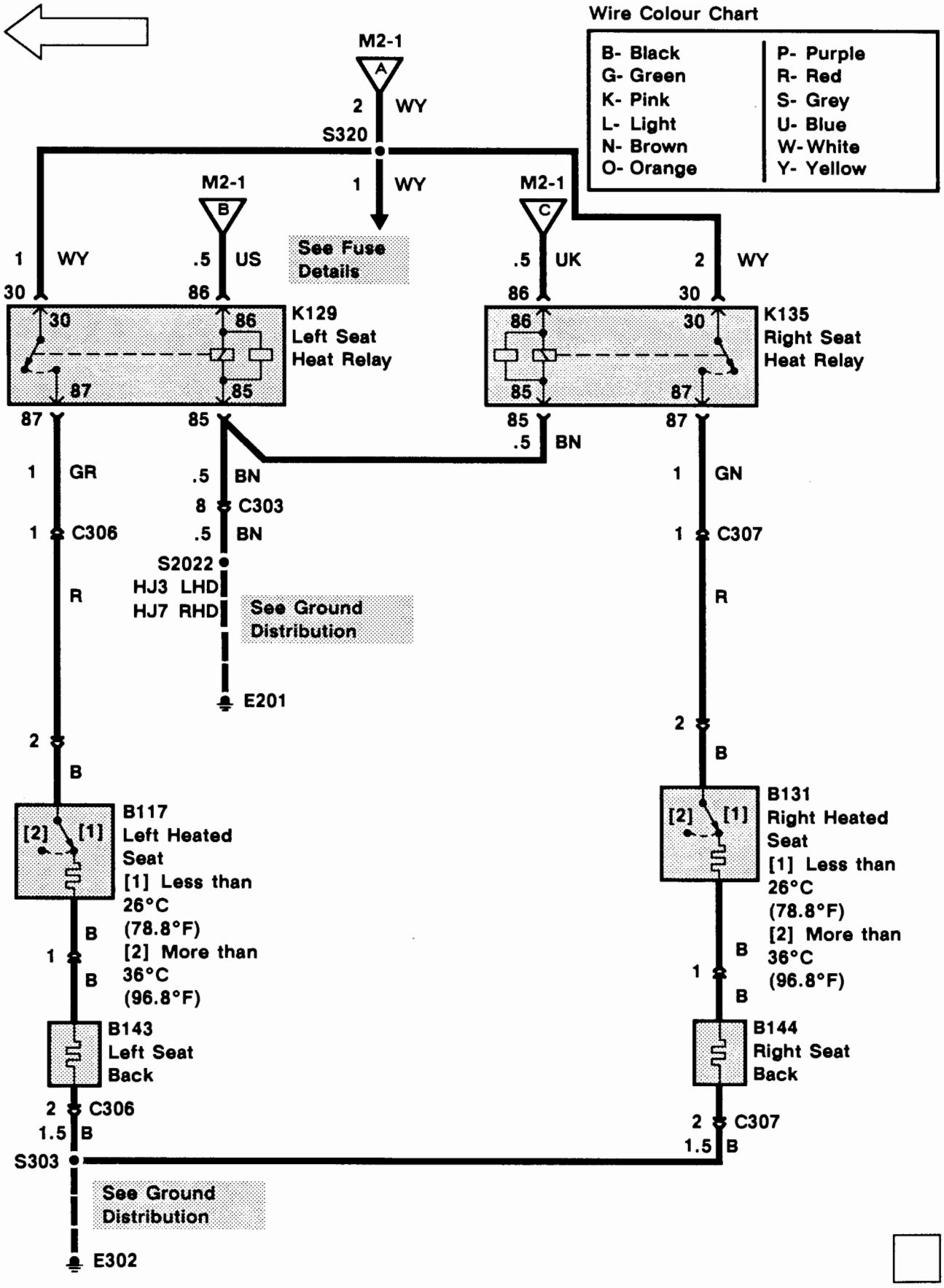
OK **PROBLEM CAUSE**
- WB Wire LHD
- WK Wire LHD
- WB Wire RHD
- WK Wire RHD
- X121, X152 Seat Switches

OK **PROBLEM CAUSE**
- Seat motors


Wire Colour Chart
B- Black
G- Green
K- Pink
L- Light
N- Brown
O- Orange
P- Purple
R- Red
S- Grey
U- Blue
W- White
Y- Yellow
X
F E1
20 A
P116
Passenger
Underseat
Fuse Box
2 WY
S225
HJ10
LHD
HJ5
RHD
See Fuse Details
Interior Lamps
Interior Lamps
2 WY
1 WY
.5 RN
4
2
X143
Left Seat
Heat Switch
0 1
1 WY
.5 RN
4
2
X164
Right Seat
Heat Switch
0 1
1
5
3
2 B
1 B
S289 LHD
S2014 RHD
See Ground Distribution
E200 LHD
E201 RHD
3
5
1
LHD 1
RHD 2
B 1
B 2
B LHD
B RHD
S2010
E200 LHD
E201 RHD
MFI .5 US
.5 GS
Diesel
.5 UK MFI
.5 GK Diesel
Diesel
Diesel
7 C304
.5 US
2 WY 6
.5 US
.5 UK
5 C303
.5 UK
A
B
C
M2-2

M2 ETM

1993 RANGE ROVER



CIRCUIT OPERATION

When the Ignition Switch (X134) is in position II, voltage is supplied to the power mirrors circuit by fuse F E2.

Right/Down Movement

When the Mirror Adjustment Switch (X146) is in the RIGHT or DOWN position, voltage is applied to the selected Mirror Actuator (M115, M123) at terminal 4 through the Mirror Adjustment Switch, the SW wire, and the Mirror Changeover Switch (X192). The selected Mirror Actuator is grounded at E200 through the PR wire, the SLG wire, the 'Left/Up' contacts of the Mirror Adjustment Switch and the B wire. The mirrors now move.

If the DOWN position is selected, the 'Up/Down' contacts in the Mirror Adjustment Switch close to apply voltage to a solenoid in the Mirror Actuator through the WP wire. The solenoid energizes because it is grounded at E200 or E201 through the B wire. The energized solenoid engages the motor in the actuator with the up/down gearbox.

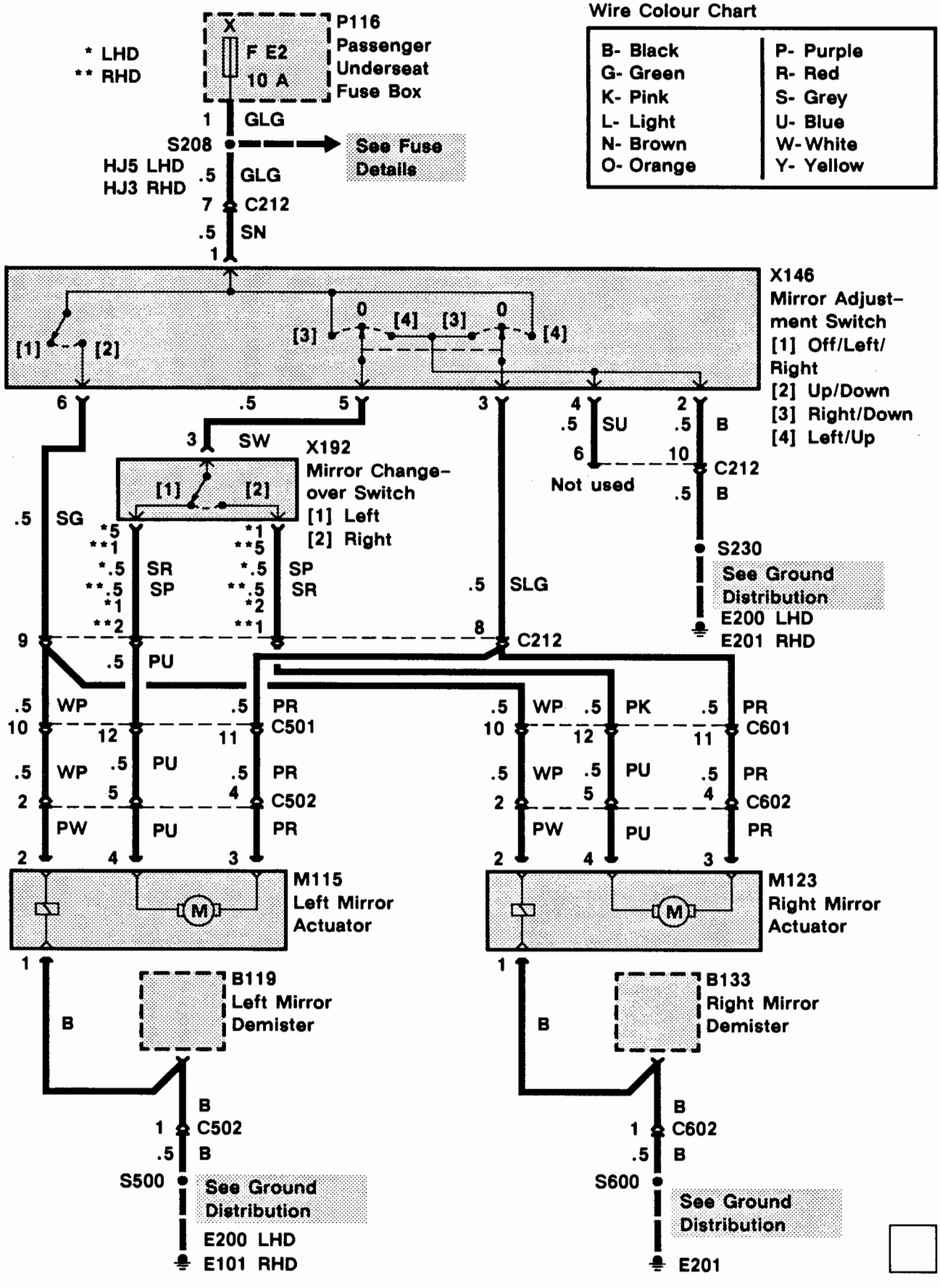
Left/Up Movement

When the Mirror Adjustment Switch (X146) is in the LEFT/UP position, voltage is applied to the selected mirror through the Mirror Adjustment Switch and the SLG wire. The selected Mirror Actuator (M115, M123) is grounded at E200 through the PW wire, the Mirror Changeover Switch (X192), the 'Right/Down' contacts of the Mirror Adjustment Switch and the B wire. The Mirror Actuator now runs.

When the UP position is selected, the 'up/down' contacts of the Mirror Adjustment Switch close to energize the Mirror Actuator solenoid. When the solenoid is energized, it engages the up/down gearbox.

M3 ETM

1993 RANGE ROVER



TROUBLESHOOTING HINTS

If both mirrors will not move left or right but the mirror operates up and down, replace the Mirror Adjustment Switch (X146).

SYMPTOM DIAGNOSIS

1. If the mirrors do not operate at all, do Test A.
2. If one or both mirrors will not move up or down but the mirror does move left and right, do Test B.
3. If only one mirror does not operate, do Test C, the Mirror Actuator (M115, M123) Test.

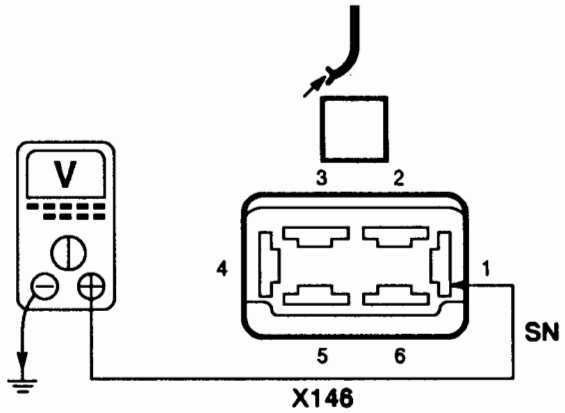
M3 ETM

Test A

1A

CONDITIONS
- **Ignition Switch**
  Position: II

RESULTS
BAT VOLT



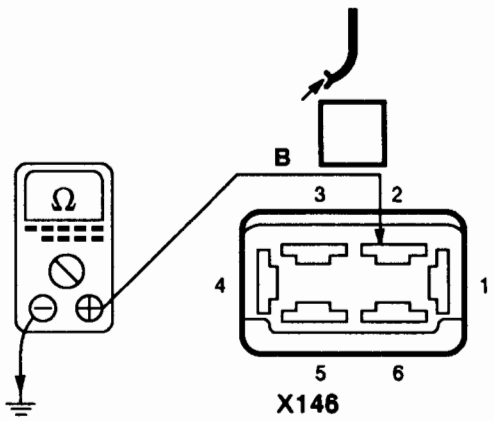
OK **PROBLEM CAUSE**
- F 2 Fuse
- GLG Wire
- SN Wire

OK → 2A

2A

CONDITIONS
- **Ignition Switch**
  Position: II

RESULTS
Less than 1 ohm



OK **PROBLEM CAUSE**
- B Wire

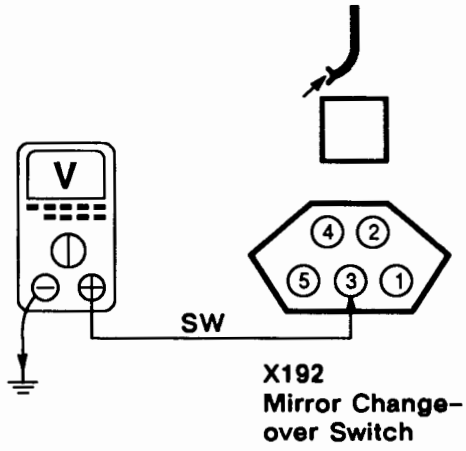
OK → 3A

2A

3A

CONDITIONS
- **Ignition Switch**
  Position: II

RESULTS
- **Mirror Adjustment Switch**
  Right/Down
  BAT VOLT
  Neutral
  0V



OK **PROBLEM CAUSE**
- **SW Wire**
- **Mirror Adjustment Switch**

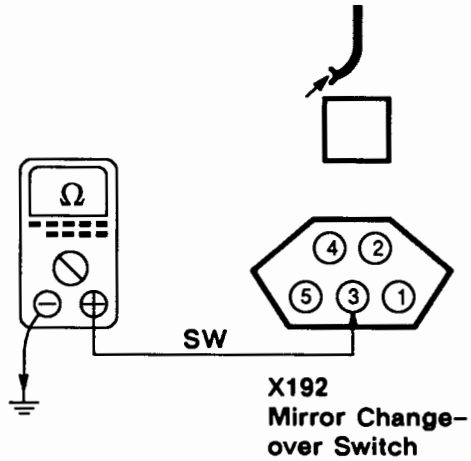
OK

4A

4A

CONDITIONS
- **Ignition Switch**
  Position: II

RESULTS
- **Mirror Adjustment Switch**
  Left/Up
  Less than 1 ohm
  Neutral
  More than 10K ohms



OK **PROBLEM CAUSE**
- **Mirror Adjustment Switch**

OK

5A

M3 ETM

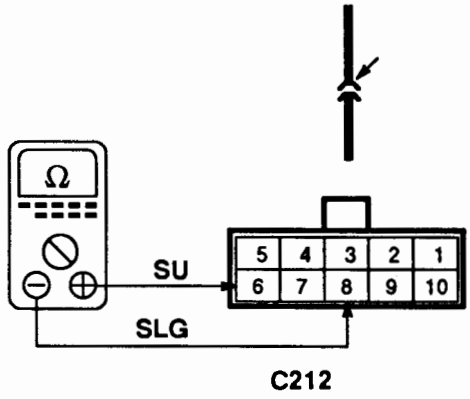
1993 RANGE ROVER

4A

5A

CONDITIONS
- **Ignition Switch**
  Position: 0

RESULTS
- **Mirror Adjustment Switch**
  Right/Down
  Less than 1 ohm
  Neutral
  More than 10K ohms



OK **PROBLEM CAUSE**
- **SLG Wire**
- **Mirror Adjustment Switch**

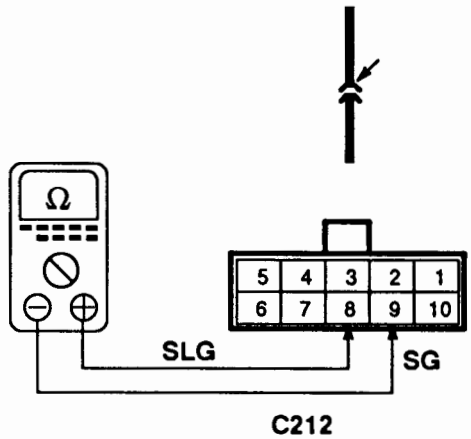
OK

6A

6A

CONDITIONS
- **Ignition Switch**
  Position: 0

RESULTS
- **Mirror Adjustment Switch**
  Left/Up
  Less than 1 ohm
  Neutral
  More than 10K ohms



OK **PROBLEM CAUSE**
- **Mirror Adjustment Switch**

OK

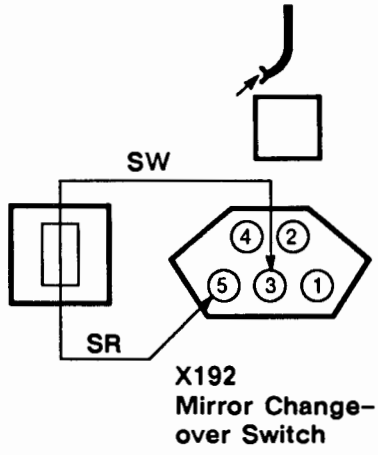
7A

6A

7A

CONDITIONS
- Ignition Switch
  Position: II
- Mirror Adjustment Switch
  Right/Down

RESULTS
- Mirror
  Moves



X192
Mirror Change-over Switch

OK PROBLEM CAUSE
- SLG Wire
- SG Wire
- WP Wire
- Mirror Adjustment Switch
- M115, M123 Mirror Actuator

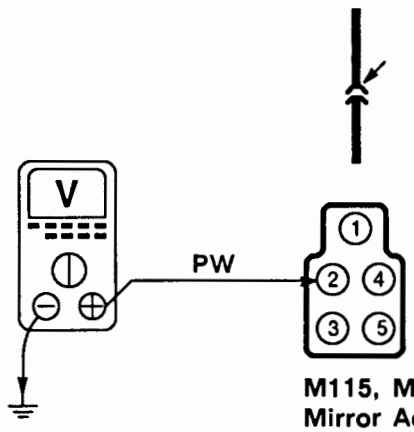
OK PROBLEM CAUSE
- Mirror Changeover Switch

Test B

1B

CONDITIONS
- Ignition Switch
  Position: II

RESULTS
- Mirror Adjustment Switch
  Up/Down
  BAT VOLT
  Left/Right
  0V



M115, M123
Mirror Actuator

OK PROBLEM CAUSE
- WP Wire
- Mirror Adjustment Switch

OK

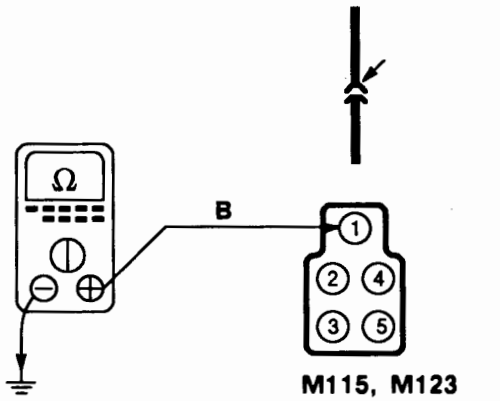
2B

1B

2B

CONDITIONS
- **Ignition Switch**
  Position: 0

RESULTS
Less than 1 ohm



M115, M123
Mirror Actuator

OK **PROBLEM CAUSE**
- **B Wire**
- **E200**

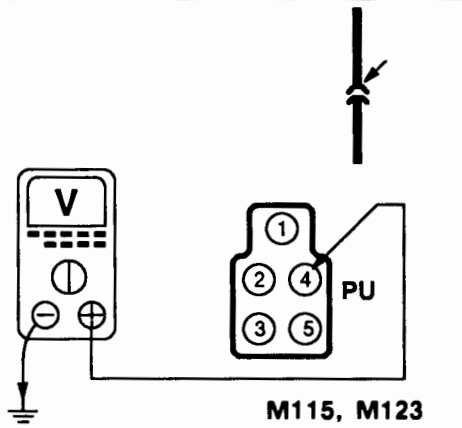
OK **PROBLEM CAUSE**
- **M115, M123 Mirror Actuator**

Test C

1C

CONDITIONS
- **Ignition Switch**
  Position: II
- **Mirror Changeover Switch**
  Select Suspect Mirror

RESULTS
- **Mirror Adjustment Switch**
  Right/Down
  BAT VOLT
  Left/Up
  0V



M115, M123
Mirror Actuator

OK **PROBLEM CAUSE**
- **PU/PK Wire**
- **Mirror Changeover Switch**

OK

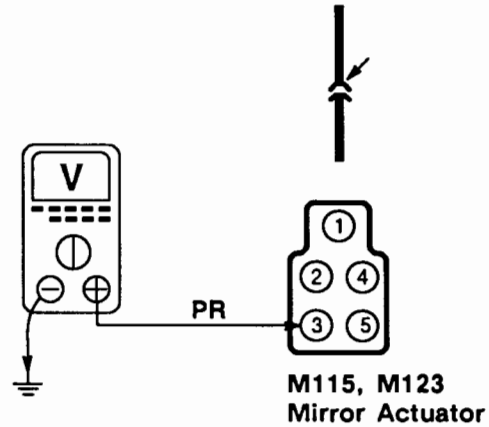
2C

1C

2C

CONDITIONS
- **Ignition Switch**
  Position: II
- **Mirror Changeover Switch**
  Select Suspect Mirror

RESULTS
- **Mirror Adjustment Switch**
  Left/Up
  BAT VOLT
  Right/Down
  0V



M115, M123
Mirror Actuator

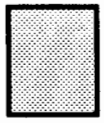
OK **PROBLEM CAUSE**
- **PR Wire**
- **Mirror Changeover Switch**

OK **PROBLEM CAUSE**
- **M115, M123 Mirror Actuator**

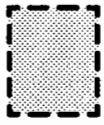
KEY INFORMATION

CIRCUIT DIAGRAMS

- Circuit diagrams are arranged so that current flow is from the top of the diagram (current source) to the bottom of the diagram (ground).
- Only those components that work together in the circuit are shown. If only part of a component is used in the circuit, then only that part of the component is shown.
- Remember:



Entire component



Part of a component

TERMINAL NUMBER	DESIGNATION
50	Battery voltage: Ignition Switch in position III
30	Battery voltage: supplied constantly
15	Battery voltage: Ignition Switch In position II or III
R	Battery voltage: Ignition Switch in positions I, II
31	Ground

See Introduction (i) for additional circuit diagram symbols.

DIAGNOSIS

- If the diagram is accompanied by text:

- Read the Circuit Operation before proceeding with the electrical diagnosis.
- Read the Troubleshooting Hints before performing the System Diagnosis.
- Tests follow the System Diagnosis.
- When performing the System Diagnosis, be certain that all components disconnected in previous steps are reconnected unless otherwise directed.

Component is disconnected. Backprobe harness connector

Component Is connected. Backprobe harness connector

Component is disconnected. Probe component

Component is disconnected. Probe harness connector

Probe in-line connector

CIRCUIT OPERATION

Power and Ground

The Memory Seat Fuse (P115) applies battery voltage to retain the memory circuit of the Memory Seat ECU (Z146) at all times. Voltage to operate the seat motors (M126, M127, M128, M129) and the mirror actuators (M115, M123) is supplied to the Memory Seat ECU from fuses F D5 and F D6. The Fusible Link (P119) supplies voltage to fuses F D5 and F D6 whenever the Driver Seat Relay (K113) is energized. The relay is energized when the driver's door is open, causing the Driver Door Switch (X118) to ground the relay's coil, or when the ignition is in position 2, causing the Passenger Seat Relay (K131) to ground the Driver Seat Relay. The Memory Seat ECU is grounded at ground E301 through the B wires.

Inhibit Inputs

The Memory Seat ECU (Z146) will not permit movement to the memorized position when the ignition is position 2 unless the handbrake is applied and vehicle speed is below 6 kmh. Vehicles equipped with an automatic transmission must also be in PARK or NEUTRAL for operation to occur.

The ECU monitors the Handbrake Switch (X191) position at terminal C1/13. When the handbrake is in position 1, the brake is applied and ground is applied to the ECU terminal.

Vehicle speed is monitored by the ECU at terminal C1/20 through the speed output signal supplied by the Vehicle Speed Sensor Buffer (Z160).

The ECU monitors gear position through the Starter Inhibit/Reverse Switch (X167). The switch grounds the ECU at terminal C1/24 when the transmission is in PARK or NEUTRAL.

Seat Motors

4 reversible motors control seat position, with each motor controlling 1 plane of movement. The Memory Seat ECU (Z146) applies both voltage and ground to the motors based on the position of the Driver Seat Control Switch (X121) or the execution of a memory position.

Memory Mirror Actuators (M115, M123)

Each Memory Mirror Actuator contains 2 motors which controls 1 plain of movement. The Memory Seat ECU (Z146) applies both voltage and ground to the motors based on the position of the Mirror Adjustment Switch (X146) or the execution of a memory position.

Setting Memory

When the round, green memory set button is depressed, terminal C3/10 of the Memory Seat ECU (Z146) is grounded through the switch contacts. This signals the ECU to record the seat position as reported through the seat position sensors (X194, X195, X196, X197) and the mirror positions through the potentiometers of the Memory Mirror Actuators (M115, M123).

When memory seat position switch 1 or 2 is depressed, ECU terminals C3/8 or C3/9 are grounded through the switch. This signals ECU to record the current position as position '1' or '2'. Subsequent depressions of memory seat position switch 1 or 2 will cause the ECU to move the seat and mirrors to the position retained in memory. The memory can be cleared by setting a new position or by removing the Memory Seat Fuse (P115).

SELF TEST MODE

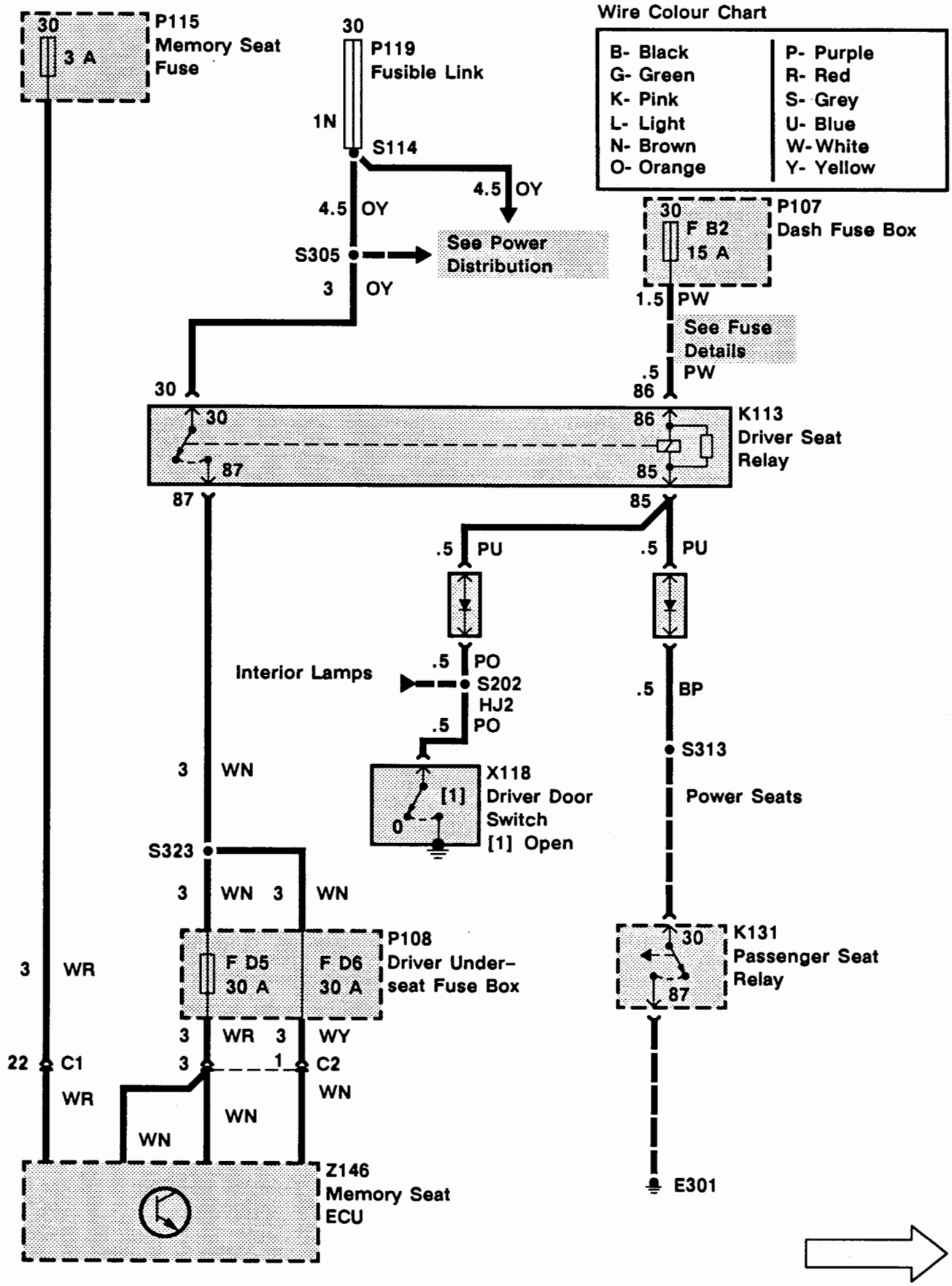
The Self Test Mode is a test routine the Memory Seat ECU (Z146) performs when initialized. When the ECU is commanded into the Self Test Mode, it operates the seats and the mirrors in all planes of travel. Perform the self test before attempting any diagnosis of the memory seat and mirror system. The cause of a system fault can be narrowed down through observation of the seats and mirrors during the Self Test Mode. Before starting the Self Test Mode, be sure to clear away everything from the pathway of the seats.

To initialize the Self Test Mode, do the following:

1. Park vehicle and open driver's door.
2. Press round, green memory button 5 times.
3. Press seat position buttons 1 and 2 in the following sequence:
   2-1-1-2

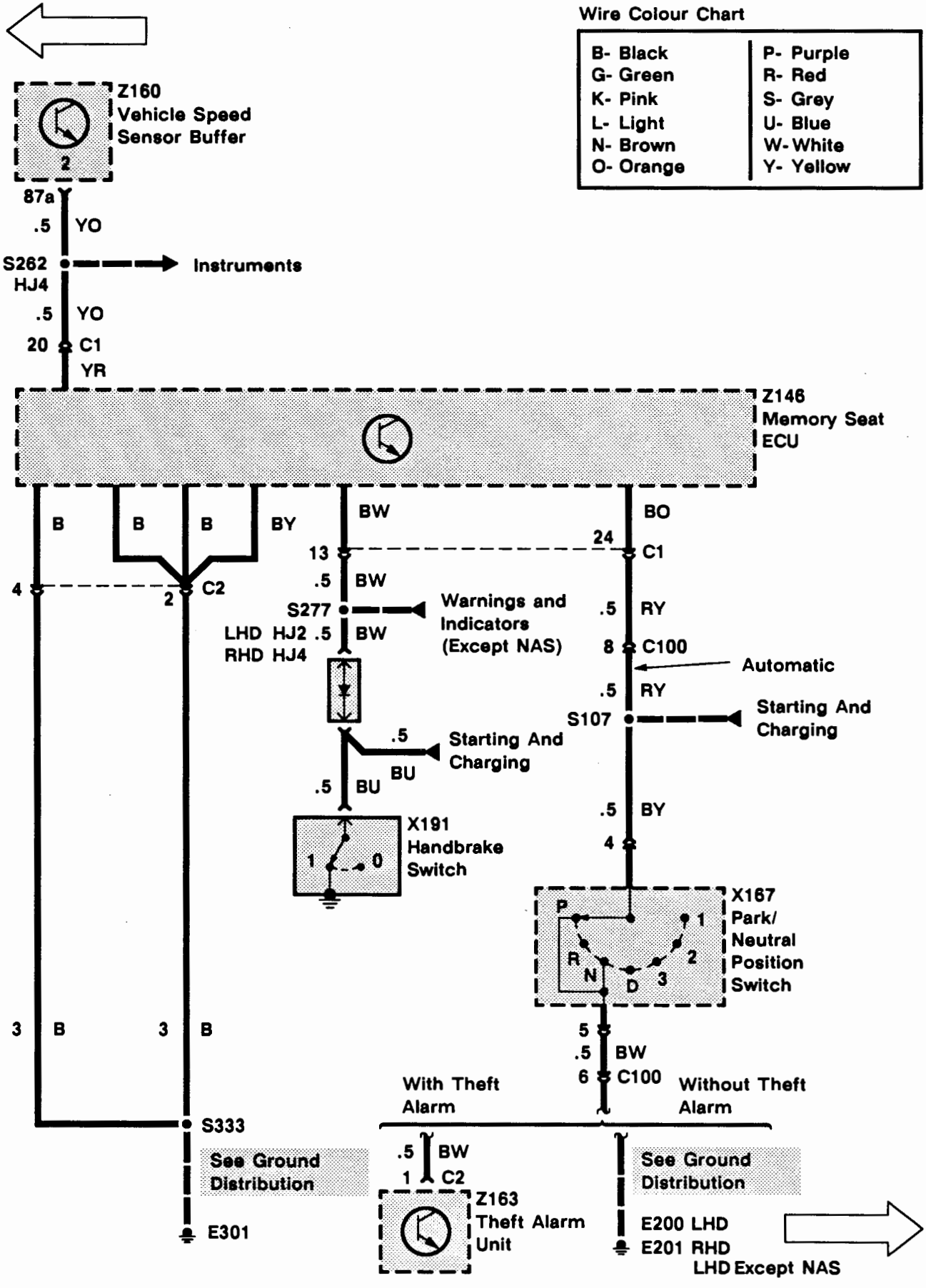
Seat and mirrors will now move. The test is completed when the seat and mirrors stop in the mid-travel position.

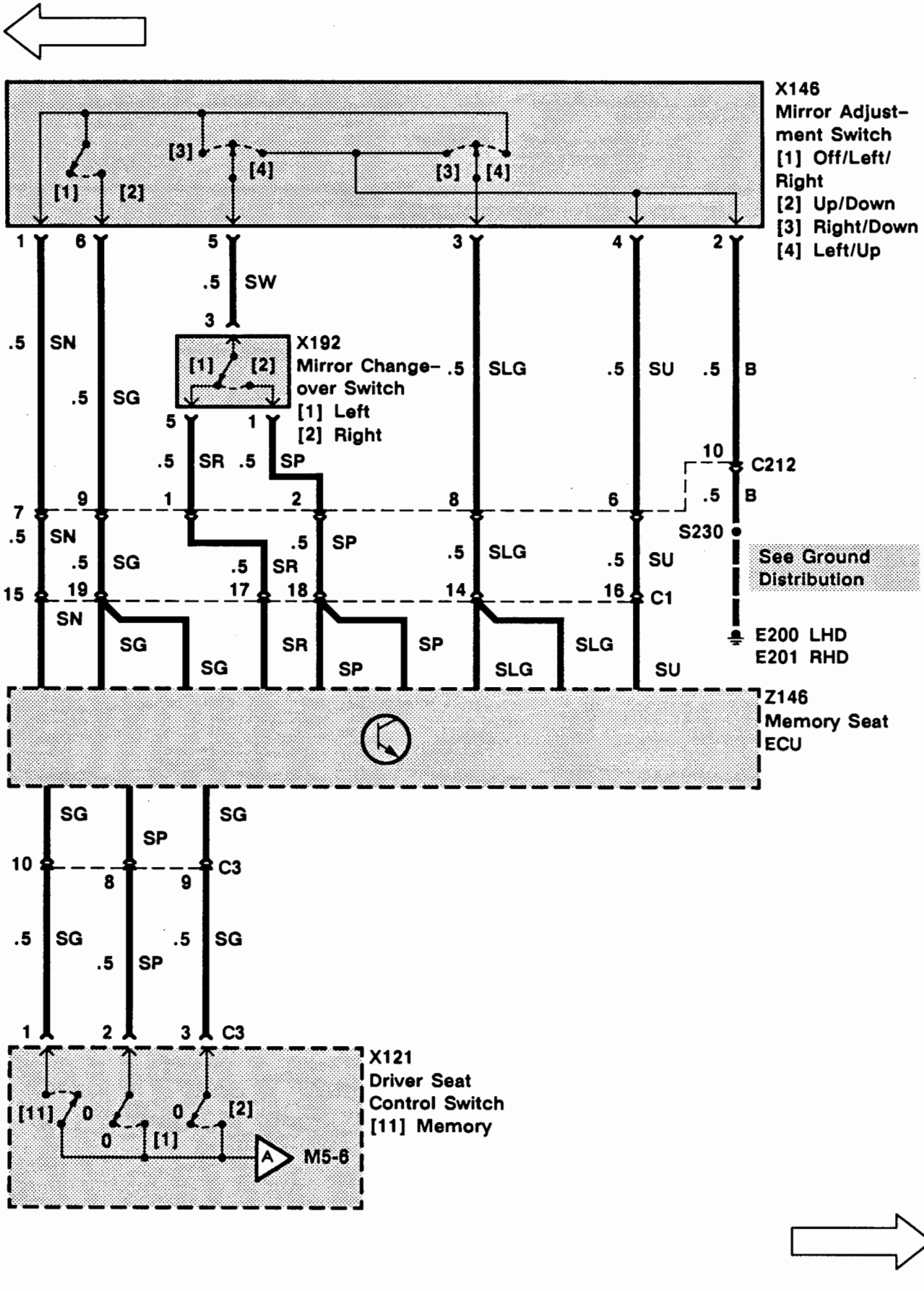
If a motor did not operate at all during the test sequence, that motor or its wiring is faulty. If a motor moves in a plane and then suddenly stops, a loss of the feedback position is indicated. Proceed to the System Diagnosis for further testing.


Wire Colour Chart
B- Black
G- Green
K- Pink
L- Light
N- Brown
O- Orange
P- Purple
R- Red
S- Grey
U- Blue
W- White
Y- Yellow
P115 Memory Seat Fuse
3 A
P119 Fusible Link
1N
S114
4.5 OY
S305
See Power Distribution
3 OY
P107 Dash Fuse Box
F B2
15 A
1.5 PW
See Fuse Details
.5 PW
K113 Driver Seat Relay
Interior Lamps
.5 PO
S202
HJ2
.5 PO
.5 PU
.5 BP
S313
Power Seats
X118 Driver Door Switch
[1] Open
3 WN
S323
P108 Driver Under-seat Fuse Box
F D5
30 A
F D6
30 A
3 WR
3 WY
22 C1
C2
K131 Passenger Seat Relay
E301
Z146 Memory Seat ECU

M5 ETM

1993 RANGE ROVER




X146
Mirror Adjustment Switch
[1] Off/Left/Right
[2] Up/Down
[3] Right/Down
[4] Left/Up
[1] [2] [3] [4] [3] [4]
1 6 5 3 4 2
.5 SW
3
.5 SN
.5 SG
X192
Mirror Change-over Switch
[1] Left
[2] Right
[1] [2]
5 1
.5 SR .5 SP
.5 SLG
.5 SU
.5 B
10
C212
.5 B
7 9 1 2 8 6
.5 SN
.5 SG
.5 SR
.5 SP
.5 SLG
.5 SU
S230
See Ground Distribution
15 19 17 18 14 16
C1
SN
SG
SG
SR
SP
SP
SLG
SLG
SU
E200 LHD
E201 RHD
Z146
Memory Seat ECU
SG
SP
SG
10 8 9
C3
.5 SG
.5 SP
.5 SG
1 2 3 C3
X121
Driver Seat Control Switch
[11] Memory
[11] 0 0 [2]
0 [1]
A
M5-6

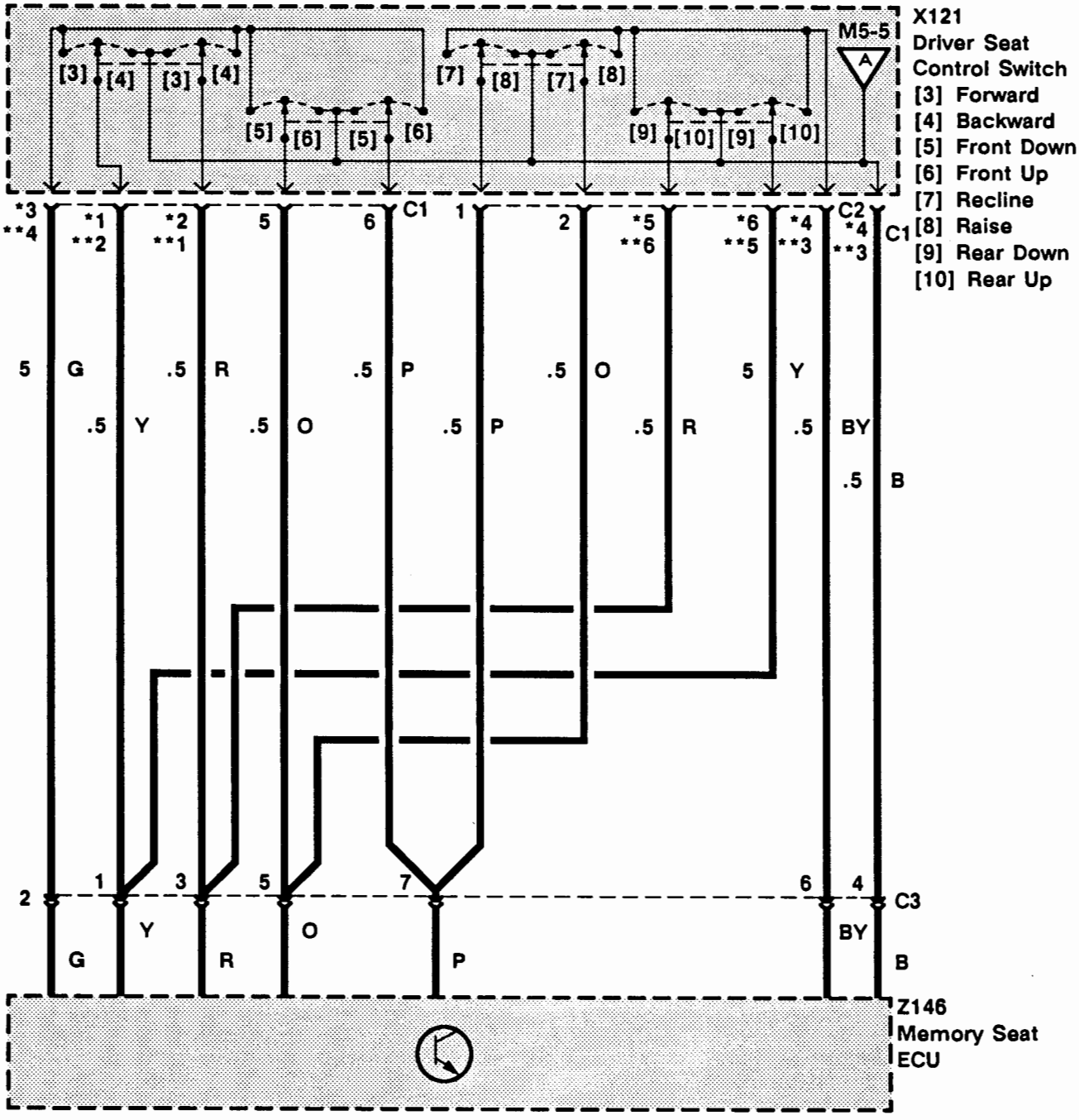
M5 ETM

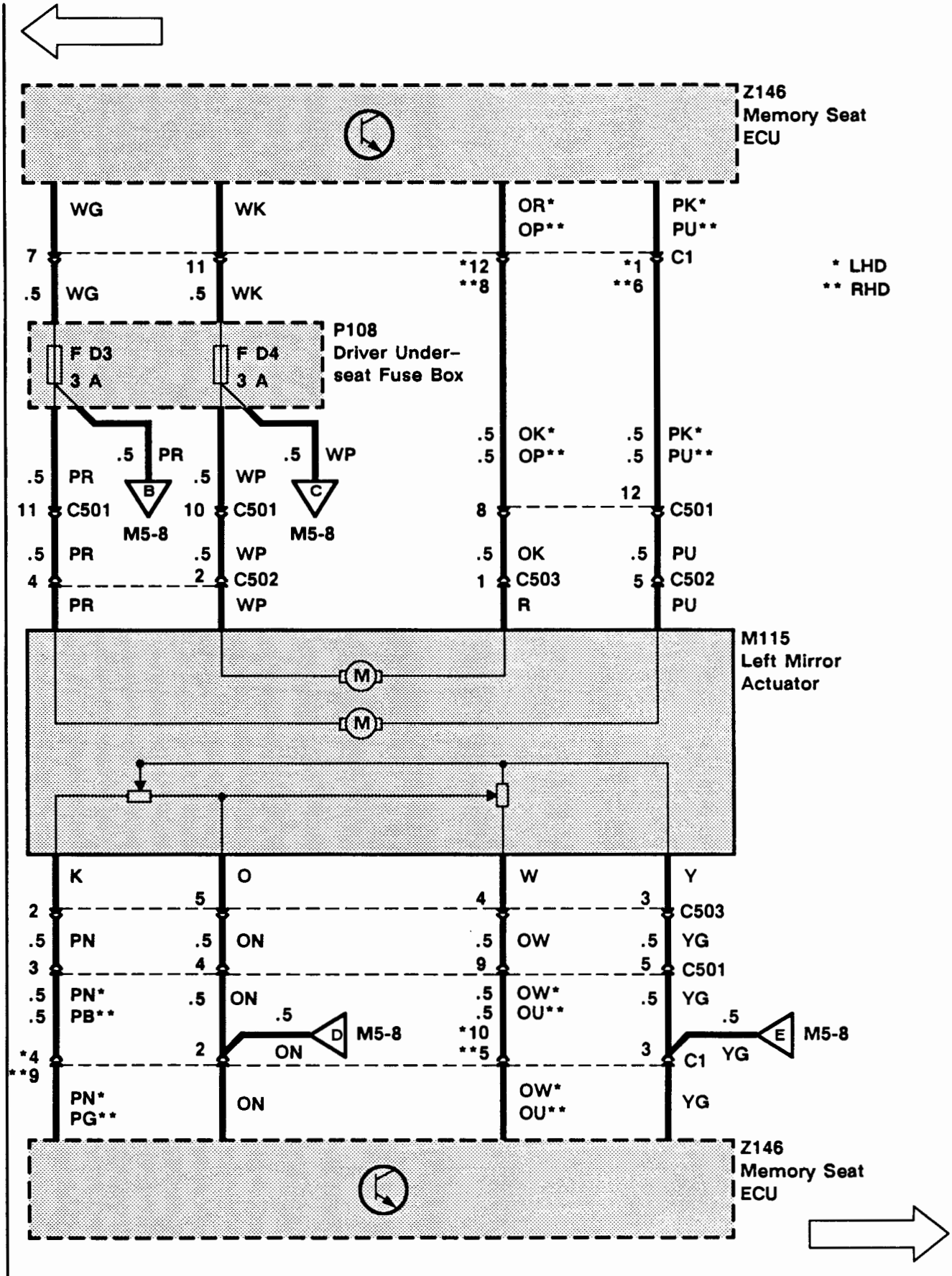
1993 RANGE ROVER

* LHD
** RHD

Wire Colour Chart

B- Black	P- Purple
G- Green	R- Red
K- Pink	S- Grey
L- Light	U- Blue
N- Brown	W- White
O- Orange	Y- Yellow



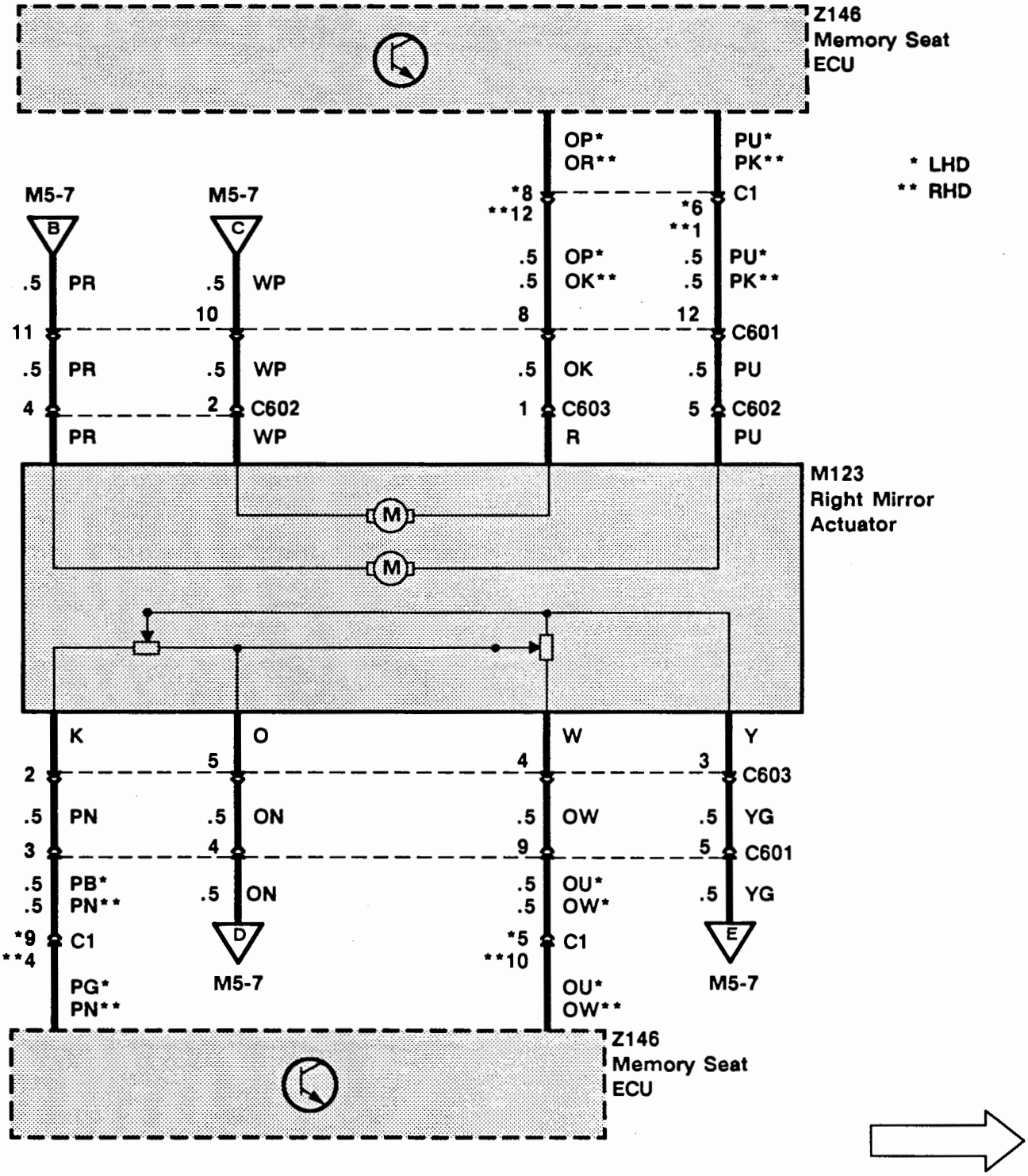

Z146
Memory Seat
ECU
WG
WK
OR*
OP**
PK*
PU**
7
11
*12
**8
*1
**6
C1
.5 WG
.5 WK
* LHD
** RHD
P108
Driver Under-
seat Fuse Box
F D3
3 A
F D4
3 A
.5 PR
.5 WP
.5 OK*
.5 OP**
.5 PK*
.5 PU**
B
C
M5-8
M5-8
12
11 C501
10 C501
8 C501
.5 PR
.5 WP
.5 OK
.5 PU
4
2 C502
1 C503
5 C502
PR
WP
R
PU
M115
Left Mirror
Actuator
M
M
K
O
W
Y
5
4
3
2 C503
.5 PN
.5 ON
.5 OW
.5 YG
3
4
9
5 C501
.5 PN*
.5 PB**
.5 ON
.5 OW*
.5 OU**
.5 YG
.5
D
M5-8
.5
E
M5-8
*4
**9
2
ON
*10
**5
3
C1
YG
PN*
PG**
ON
OW*
OU**
YG
Z146
Memory Seat
ECU

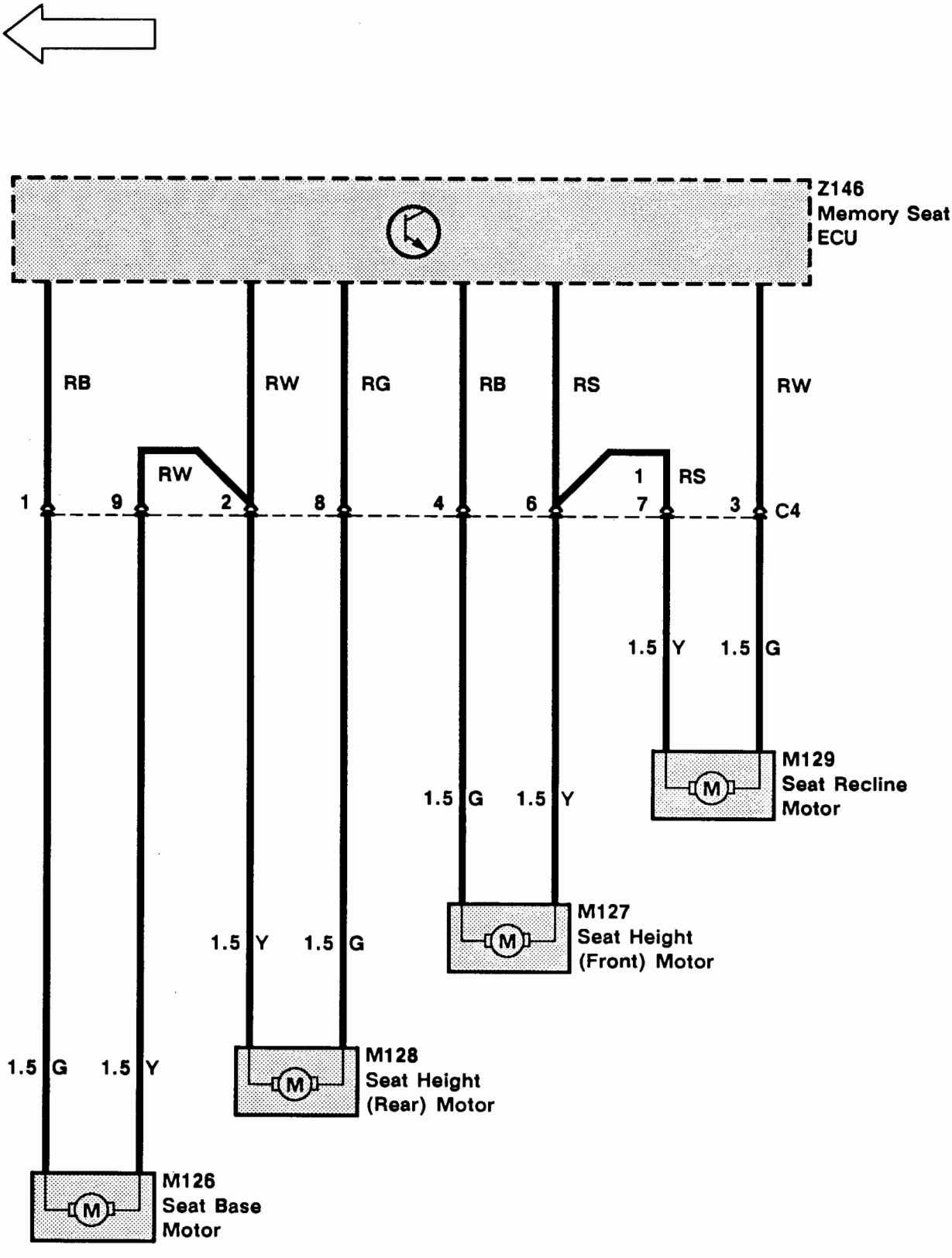
M5 ETM

1993 RANGE ROVER

Wire Colour Chart

B- Black	P- Purple
G- Green	R- Red
K- Pink	S- Grey
L- Light	U- Blue
N- Brown	W- White
O- Orange	Y- Yellow



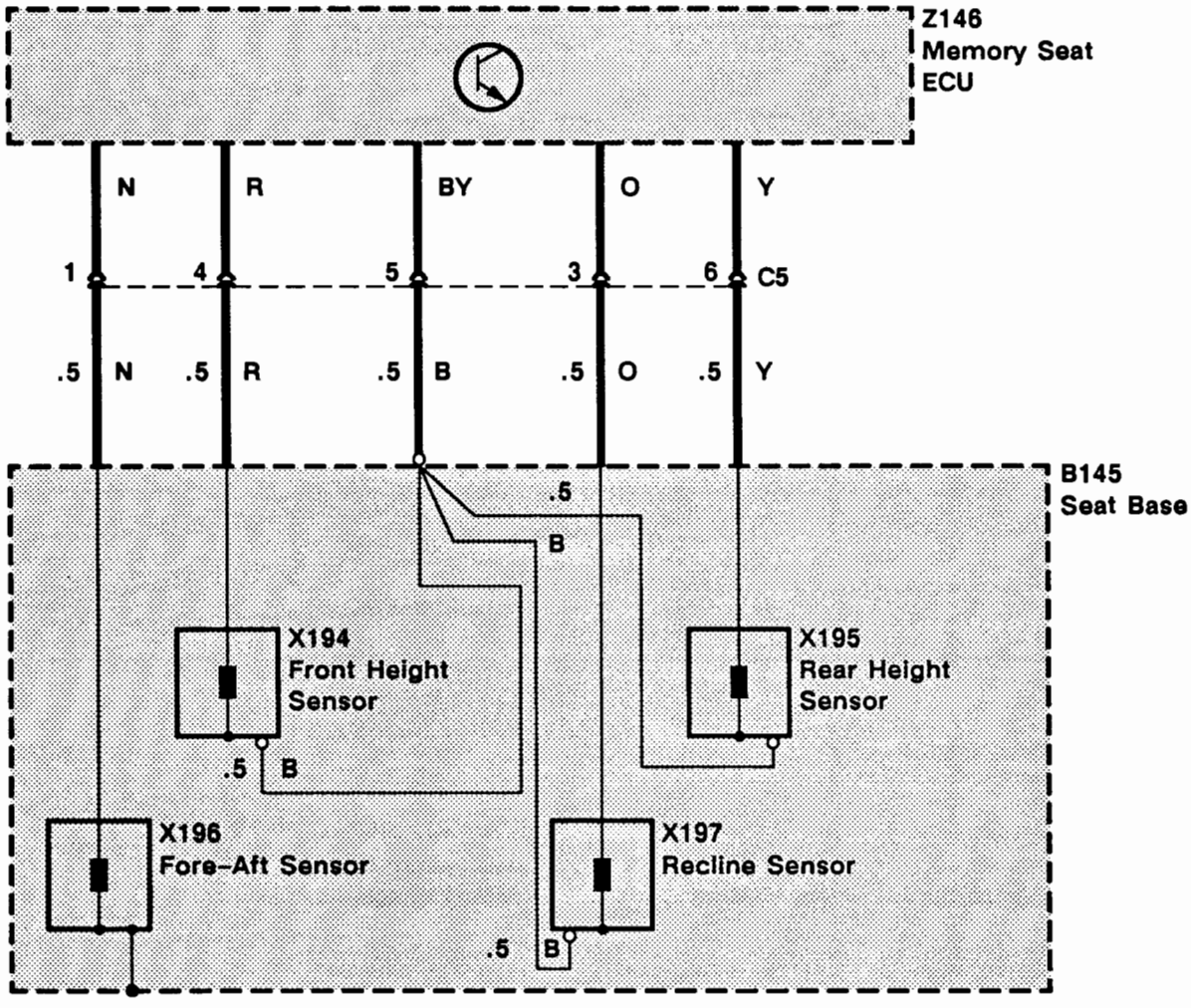

Z146
Memory Seat
ECU
RB
RW
RG
RB
RS
RW
RW
RS
1
9
2
8
4
6
1
7
3
C4
1.5 Y
1.5 G
M129
Seat Recline
Motor
1.5 G
1.5 Y
M127
Seat Height
(Front) Motor
1.5 Y
1.5 G
M128
Seat Height
(Rear) Motor
1.5 G
1.5 Y
M126
Seat Base
Motor

M5 ETM

1993 RANGE ROVER

Wire Colour Chart

B- Black	P- Purple
G- Green	R- Red
K- Pink	S- Grey
L- Light	U- Blue
N- Brown	W- White
O- Orange	Y- Yellow



SYSTEM DIAGNOSIS

NOTE: Perform the Self Test before performing any diagnosis on the memory seats and mirrors.

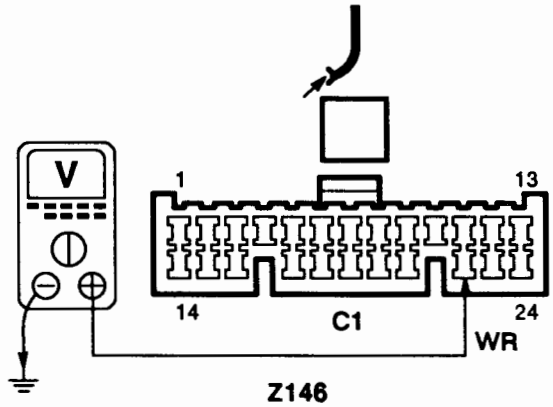
1. If the system will not perform the Self Test, do Test E, Driver Seat Control Switch (X121) test.
2. If manual and memory seat functions are totally inoperative, check the Memory Seat Fuse (P115) and fuses F D5 and F D6. Do Test A if the fuses are OK.
3. If the system does not retain memory seat or mirror positions, do Test A, Memory Seat ECU (Z146) power test.
4. If the memory seat system does not operate when the ignition is in position II and the handbrake is applied, do Test B (manual transmission) or Test C (automatic transmission).
5. If memory seat and mirror functions do not operate but the seat does operate in some modes manually, do Test E, Driver Seat Control Switch (X121) test.
6. If all seat motors operate during the Self Test but do not operate when the Driver Seat Control Switch (X121) is used, do Test F.
7. If all mirror motors operate during the Self Test but do not operate when the Mirror Adjustment Switch (X146) is used, do Test G.
8. If a seat motor moves during the Self Test and then stops, replace the defective seat sensor (X194, X195, X196, X197).
9. If a seat motor (M126, M127, M128, M129) does not move at all during the Self Test, do Test J.
10. If a mirror motor does not move at all during the Self Test, do Test K (Left Memory Mirror Actuator, M115) or Test L (Right Memory Mirror Actuator, M123).
11. If a mirror motor moves during the Self Test and then stops, do Test H [Left Memory Mirror Actuator, M115 (LHD), Right Memory Mirror Actuator, M123 (RHD)] or Test I [Right Memory Mirror Actuator, M123 (LHD), Left Memory Mirror Actuator, M115 (RHD)].

Test A

1A

CONDITIONS
- **Ignition Switch**
  Position: 0

RESULTS
BAT VOLT



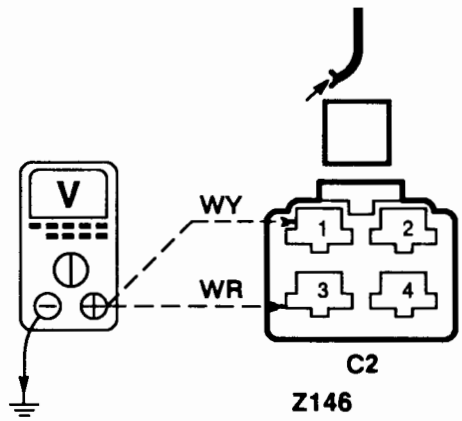
OK **PROBLEM CAUSE**
- WR Wire
- Memory Seat Fuse

OK → 2A

2A

CONDITIONS
- **Ignition Switch**
  Position: 0
- **Driver's door**
  Open

RESULTS
BAT VOLT



OK **GO TO TEST D**

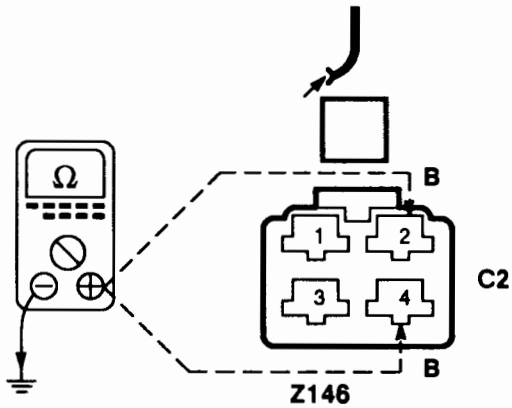
OK → 3A

2A

3A

CONDITIONS
- **Ignition Switch**
  Position: 0

RESULTS
Less than 1 ohm



OK **PROBLEM CAUSE**
- **B Wire**

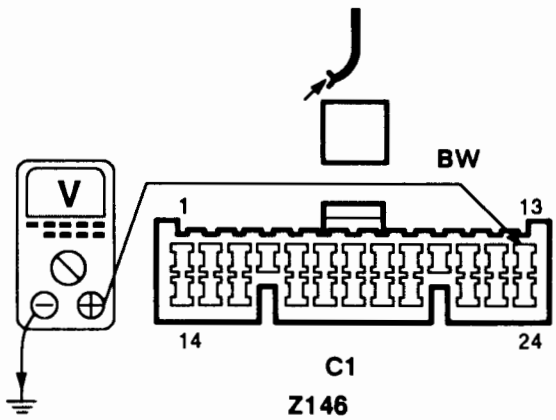
OK **PROBLEM CAUSE**
- **Memory Seat ECU**

Test B

1B

CONDITIONS
- **Ignition Switch**
  Position: II

RESULTS
- **Handbrake**
  Applied
  0 VOLT
  Released
  BAT VOLT



OK **PROBLEM CAUSE**
- **BW Wire**
- **Handbrake Switch**

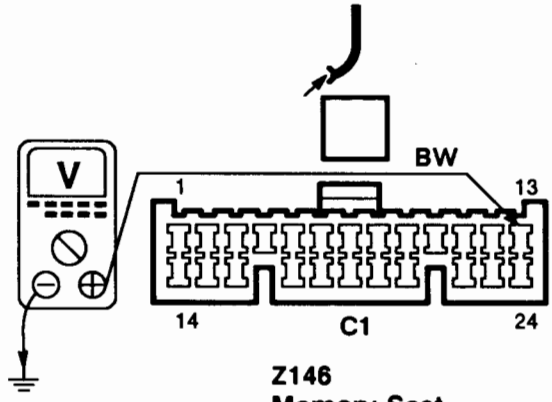
OK **PROBLEM CAUSE**
- **Memory Seat ECU**

Test C

1C

CONDITIONS
- **Ignition Switch**
  Position: II

RESULTS
- **Handbrake**
  Applied
  0 VOLT
  Released
  BAT VOLT



OK **PROBLEM CAUSE**
- BW Wire
- Handbrake Switch

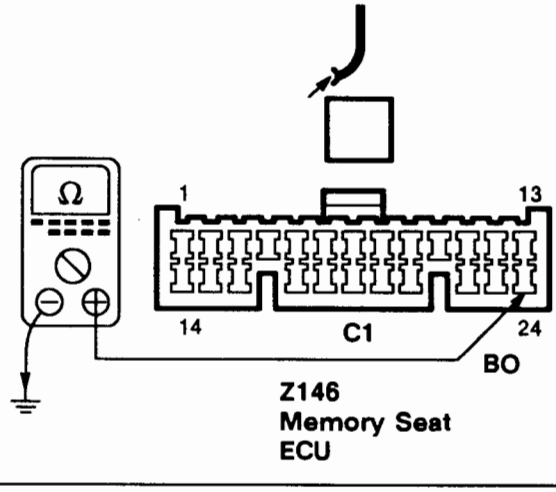
OK

2C

2C

CONDITIONS
- **Ignition Switch**
  Position: 0
- **Gear Selector**
  Park

RESULTS
Less than 1 ohm



OK **PROBLEM CAUSE**
- RY Wire

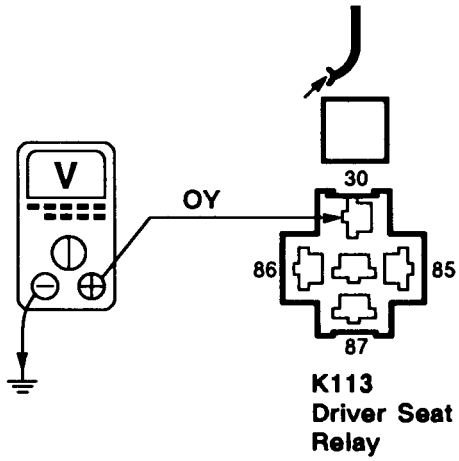
OK **PROBLEM CAUSE**
- Memory Seat ECU

Test D

1D

CONDITIONS
- **Ignition Switch**
  Position: 0

RESULTS
BAT VOLT



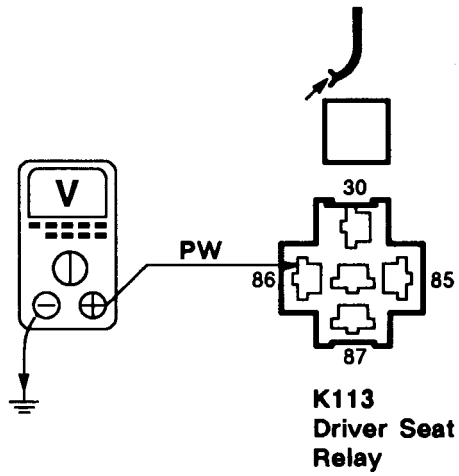
OK **PROBLEM CAUSE**
- OY Wire
- Fusible Link

OK → 2D

2D

CONDITIONS
- **Ignition Switch**
  Position: 0

RESULTS
BAT VOLT



OK **PROBLEM CAUSE**
- F B2 Fuse
- PW Wire

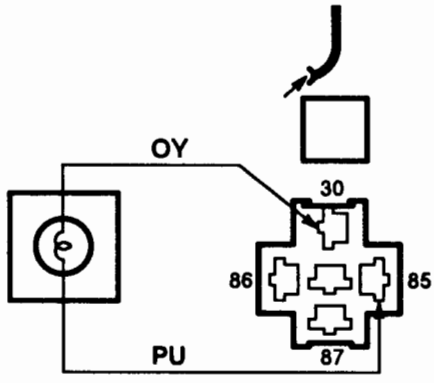
OK → 3D

2D

3D

CONDITIONS
- **Ignition Switch**
  Position: 0
- **Driver's door**
  Open

RESULTS
Test lamp illuminates



K113 Driver Seat Relay

OK **PROBLEM CAUSE**
- PU Wire
- Driver Door Switch

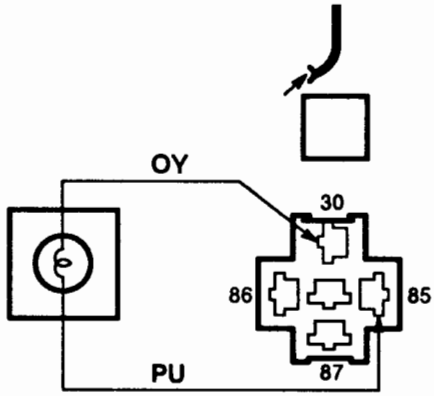
OK

4D

4D

CONDITIONS
- **Ignition Switch**
  Position: II
- **Driver's door**
  Closed

RESULTS
Test lamp illuminates



K113 Driver Seat Relay

OK **PROBLEM CAUSE**
- PU Wire
- BP Wire

OK

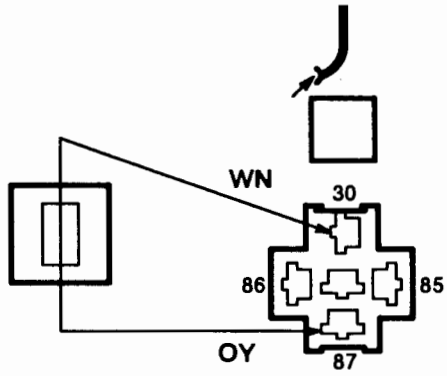
5D

4D

5D

CONDITIONS
- **Ignition Switch**
  Position: 0

RESULTS
- **Seat memory**
  Operates



K113
Driver Seat
Relay

OK **PROBLEM CAUSE**
- F D5 Fuse
- F D6 Fuse
- WN Wire

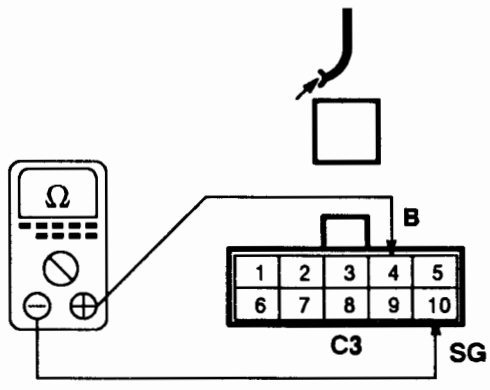
OK **PROBLEM CAUSE**
- Driver Seat Relay

Test E

1E

CONDITIONS
- **Ignition Switch**
  Position: 0

RESULTS
- **Green memory button**
  Depressed
  Less than 1 ohm
  Released
  More than 10K ohms



Z146
Memory Seat
ECU

OK **PROBLEM CAUSE**
- SG Wire
- B Wire
- Driver Seat Control Switch

OK

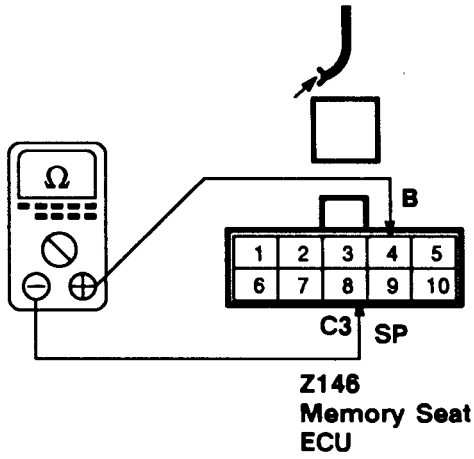
2E

1E

2E

CONDITIONS
- **Ignition Switch**
  Position: II

RESULTS
- **Position 1 button**
  Depressed
  Less than 1 ohm
  Released
  More than 10K ohms



OK **PROBLEM CAUSE**
- SP Wire
- Driver Seat Control Switch

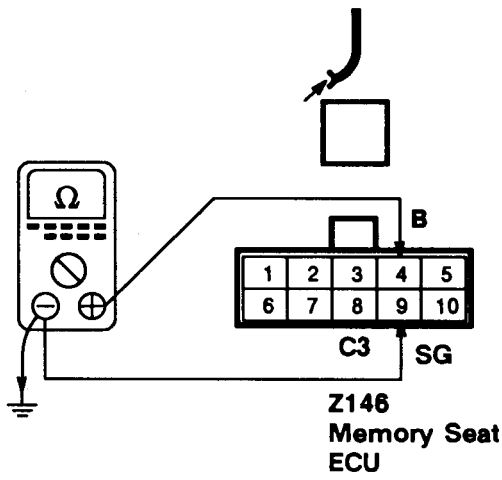
OK

3E

3E

CONDITIONS
- **Ignition Switch**
  Position: 0

RESULTS
- **Position 2 button**
  Depressed
  Less than 1 ohm
  Released
  More than 10K ohms



OK **PROBLEM CAUSE**
- SG Wire
- Driver Seat Control Switch

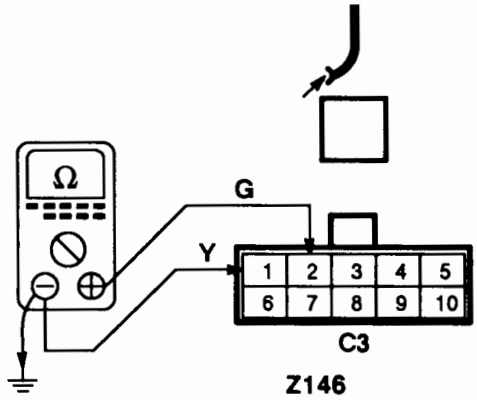
OK **PROBLEM CAUSE**
- Memory Seat ECU

2F

3F

CONDITIONS
- **Ignition Switch**
  Position: 0
- **Driver Seat Control Switch**
  Forward

RESULTS
Less than 1 ohm



OK **PROBLEM CAUSE**
- G Wire
- Y Wire
- Driver Seat Control Switch

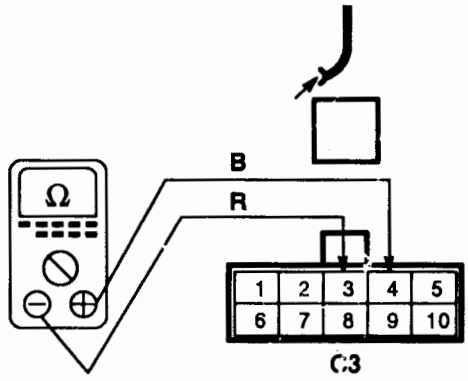
OK

4F

4F

CONDITIONS
- **Ignition Switch**
  Position: 0
- **Driver Seat Control Switch**
  Forward

RESULTS
Less than 1 ohm



OK **PROBLEM CAUSE**
- B Wire
- R Wire
- Driver Seat Control Switch

OK

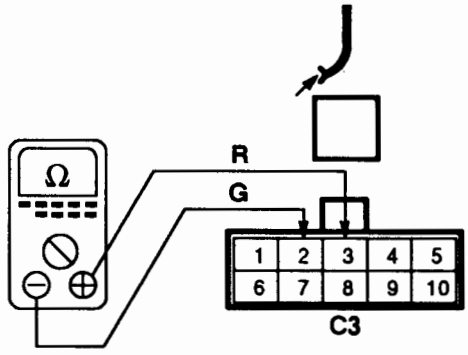
5F

4F

5F

CONDITIONS
- **Ignition Switch**
  Position: 0
- **Driver Seat Control Switch**
  Backward

RESULTS
Less than 1 ohm



Z146
Memory Seat
ECU

OK **PROBLEM CAUSE**
- **Driver Seat Control Switch**

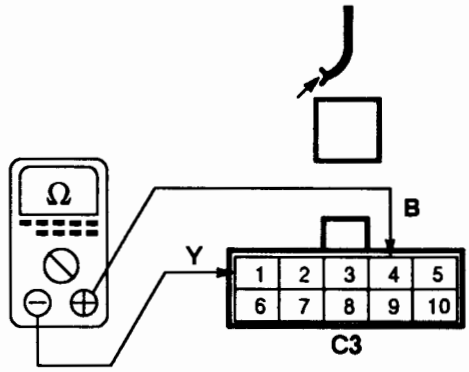
OK

6F

6F

CONDITIONS
- **Ignition Switch**
  Position: 0
- **Driver Seat Control Switch**
  Backward

RESULTS
Less than 1 ohm



Z146
Memory Seat
ECU

OK **PROBLEM CAUSE**
- **Driver Seat Control Switch**

OK

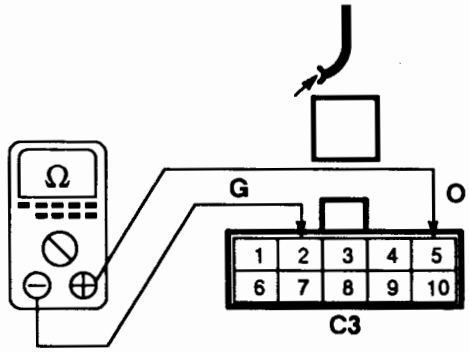
7F

6F

7F

CONDITIONS
- **Ignition Switch**
  Position: 0
- **Driver Seat Control Switch**
  Front down

RESULTS
Less than 1 ohm



Z146
Memory Seat
ECU

OK **PROBLEM CAUSE**
- **O Wire**
- **Driver Seat Control Switch**

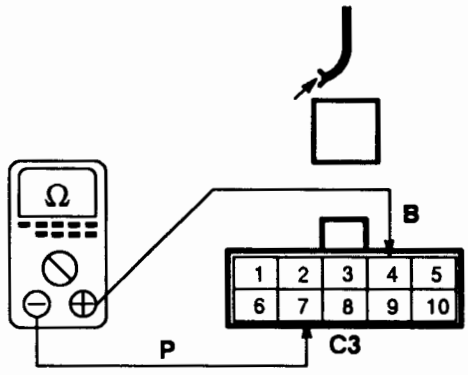
OK

8F

8F

CONDITIONS
- **Ignition Switch**
  Position: 0
- **Driver Seat Control Switch**
  Front down

RESULTS
Less than 1 ohm



Z146
Memory Seat
ECU

OK **PROBLEM CAUSE**
- **P Wire**
- **Driver Seat Control Switch**

OK

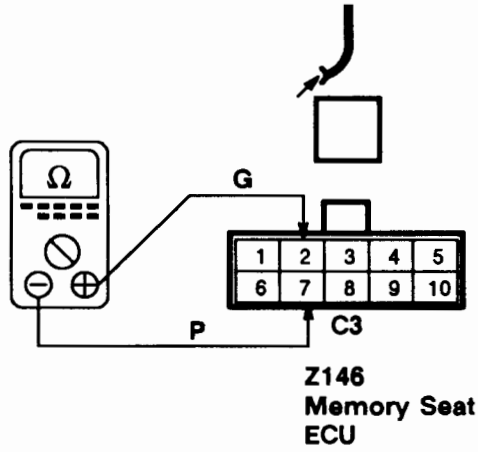
9F

8F

9F

CONDITIONS
- **Ignition Switch**
  Position: 0
- **Driver Seat Control Switch**
  Front up

RESULTS
Less than 1 ohm



OK **PROBLEM CAUSE**
- **Driver Seat Control Switch**

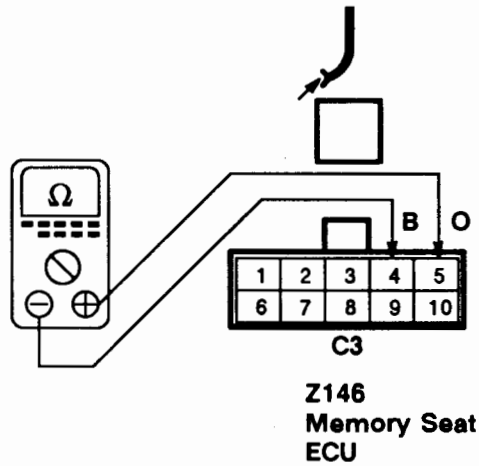
OK

10F

10F

CONDITIONS
- **Ignition Switch**
  Position: 0
- **Driver Seat Control Switch**
  Front up

RESULTS
Less than 1 ohm



OK **PROBLEM CAUSE**
- **Driver Seat Control Switch**

OK

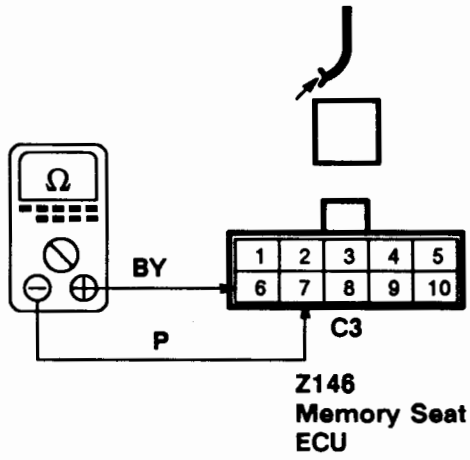
11F

10F

11F

CONDITIONS
- **Ignition Switch**
  Position: 0
- **Driver Seat Control Switch**
  Recline

RESULTS
Less than 1 ohm



OK

PROBLEM CAUSE
- BY Wire
- P Wire
- Driver Seat Control Switch

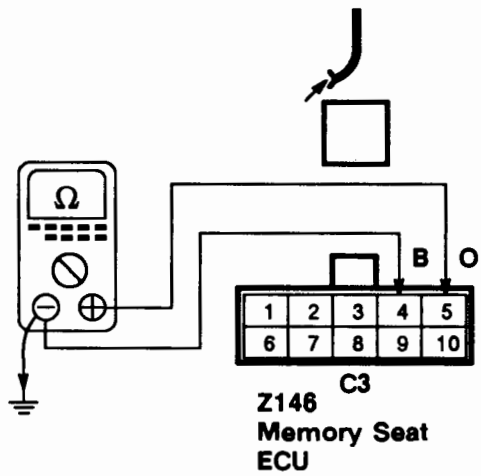
OK

12F

12F

CONDITIONS
- **Ignition Switch**
  Position: 0
- **Driver Seat Control Switch**
  Recline

RESULTS
Less than 1 ohm



OK

PROBLEM CAUSE
- O Wire
- Driver Seat Control Switch

OK

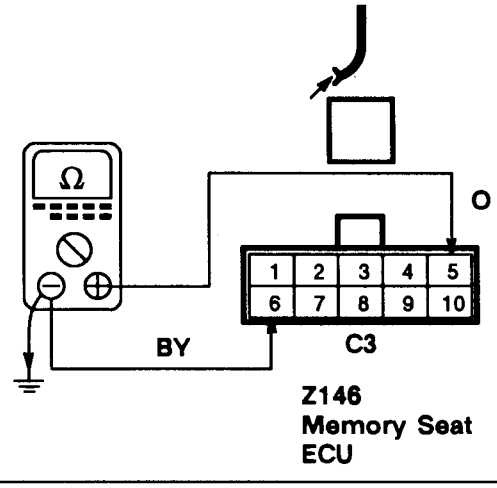
13F

12F

13F

CONDITIONS
- **Ignition Switch**
  Position: 0
- **Driver Seat Control Switch**
  Raise

RESULTS
Less than 1 ohm



OK **PROBLEM CAUSE**
- **Driver Seat Control Switch**

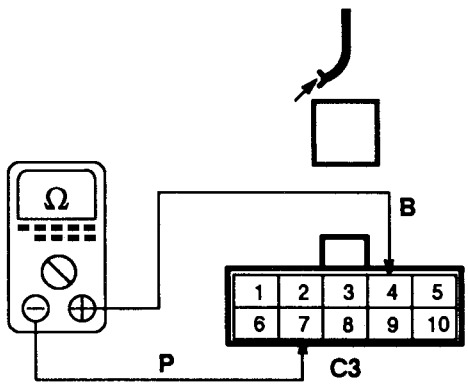
OK

14F

14F

CONDITIONS
- **Ignition Switch**
  Position: 0
- **Driver Seat Control Switch**
  Raise

RESULTS
Less than 1 ohm



OK **PROBLEM CAUSE**
- **Driver Seat Control Switch**

OK

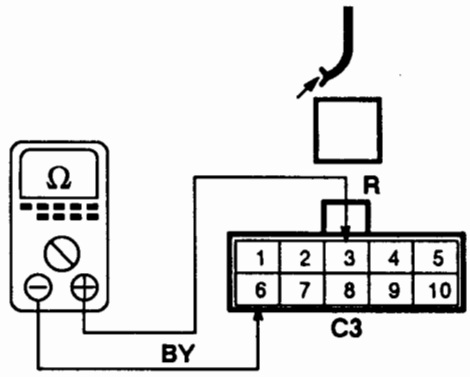
15F

14F

15F

CONDITIONS
- **Ignition Switch**
  Position: 0
- **Driver Seat Control Switch**
  Rear down

RESULTS
Less than 1 ohm



Z146
Memory Seat
ECU

OK

PROBLEM CAUSE
- **R Wire**
- **Driver Seat Control Switch**

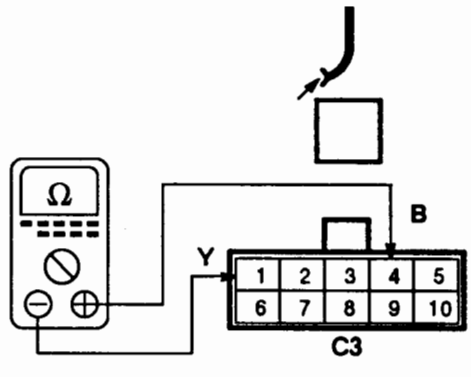
OK

16F

16F

CONDITIONS
- **Ignition Switch**
  Position: 0
- **Driver Seat Control Switch**
  Rear down

RESULTS
Less than 1 ohm



Z146
Memory Seat
ECU

OK

PROBLEM CAUSE
- **Driver Seat Control Switch**

OK

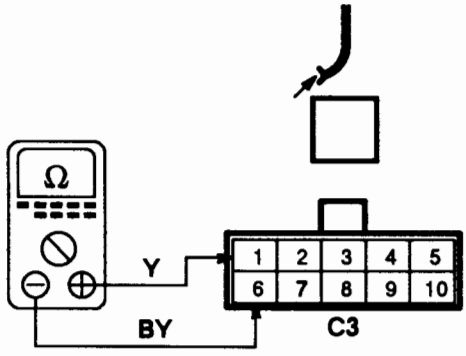
17F

16F

17F

CONDITIONS
- **Ignition Switch**
  Position: 0
- **Driver Seat Control Switch**
  Rear up

RESULTS
Less than 1 ohm



Z146
Memory Seat
ECU

OK **PROBLEM CAUSE**
- **Driver Seat Control Switch**

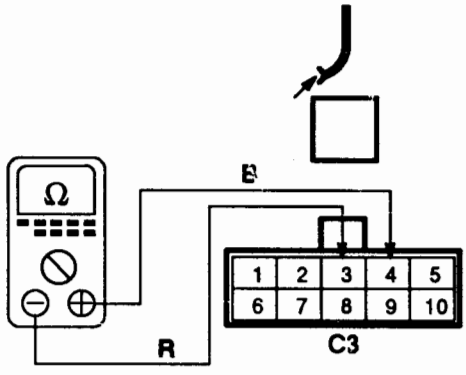
OK

18F

18F

CONDITIONS
- **Ignition Switch**
  Position: 0
- **Driver Seat Control Switch**
  Rear up

RESULTS
Less than 1 ohm



Z146
Memory Seat
ECU

OK **PROBLEM CAUSE**
- **Driver Seat Control Switch**

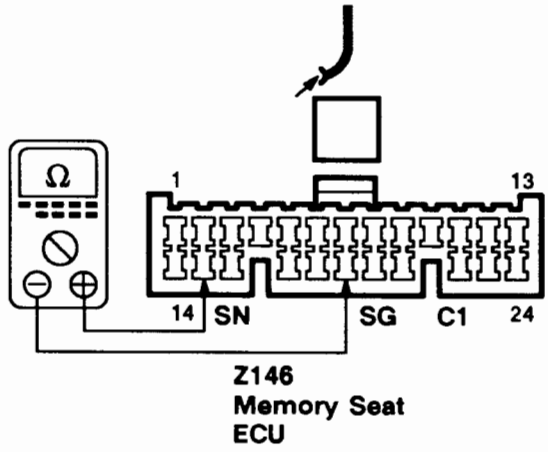
OK

Test G

1G

CONDITIONS
- **Ignition Switch**
  Position: 0
- **Mirror Adjustment Switch**
  Up

RESULTS
Less than 1 ohm



Z146
Memory Seat
ECU

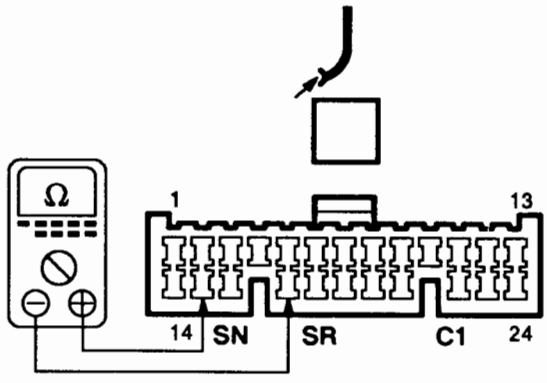
OK **PROBLEM CAUSE**
- **SN Wire**
- **SG Wire**
- **Mirror Adjustment Switch**

OK → 2G

2G

CONDITIONS
- **Ignition Switch**
  Position: 0
- **Mirror Adjustment Switch**
  Down
- **Mirror Changeover Switch**
  Left

RESULTS
Less than 1 ohm



Z146
Memory Seat
ECU

OK **PROBLEM CAUSE**
- **SR Wire**
- **SW Wire**
- **Mirror Changeover Switch**
- **Mirror Adjustment Switch**

OK → 3G

M5 ETM

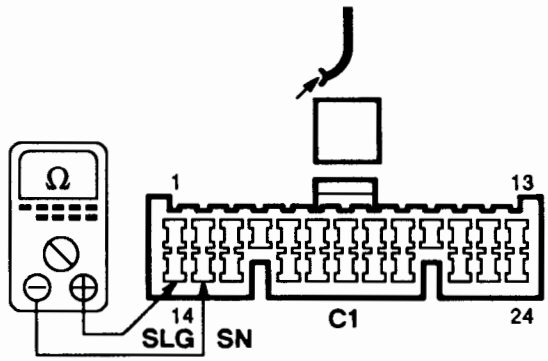
1993 RANGE ROVER

2G

3G

CONDITIONS
- **Ignition Switch**
  Position: 0
- **Mirror Adjustment Switch**
  Up

RESULTS
Less than 1 ohm



Z146
Memory Seat
ECU

OK

PROBLEM CAUSE
- **SLG Wire**
- **Mirror Adjustment Switch**

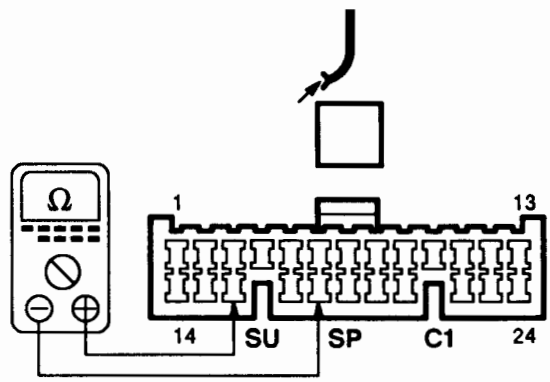
OK

4G

4G

CONDITIONS
- **Ignition Switch**
  Position: 0
- **Mirror Adjustment Switch**
  Up
- **Mirror Changeover Switch**
  Right

RESULTS
Less than 1 ohm



Z146
Memory Seat
ECU

OK

PROBLEM CAUSE
- **SP Wire**
- **SU Wire**
- **Mirror Changeover Switch**

OK

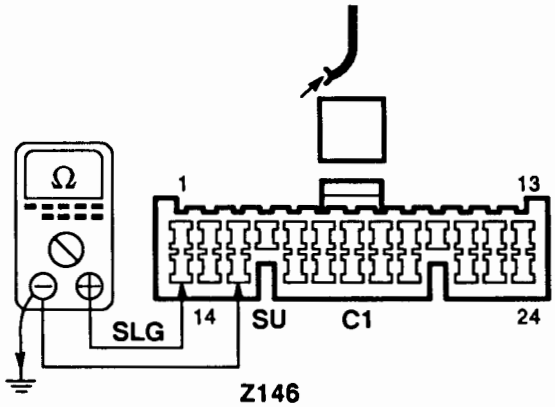
5G

4G

5G

CONDITIONS
- **Ignition Switch**
  Position: 0
- **Mirror Adjustment Switch**
  Down

RESULTS
Less than 1 ohm



OK **PROBLEM CAUSE**
- SLG Wire
- Mirror Adjustment Switch

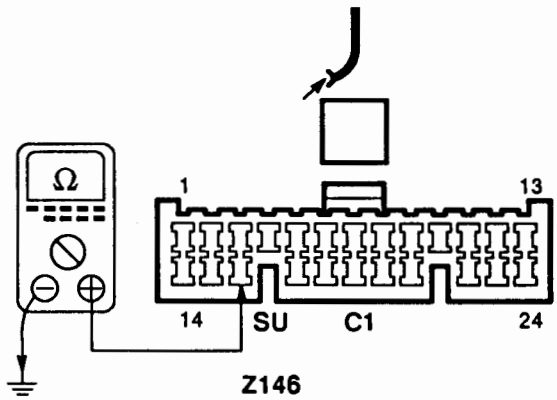
OK

6G

6G

CONDITIONS
- **Ignition Switch**
  Position: 0

RESULTS
Less than 1 ohm



OK **PROBLEM CAUSE**
- B Wire
- Mirror Adjustment Switch

OK **PROBLEM CAUSE**
- Memory Seat ECU

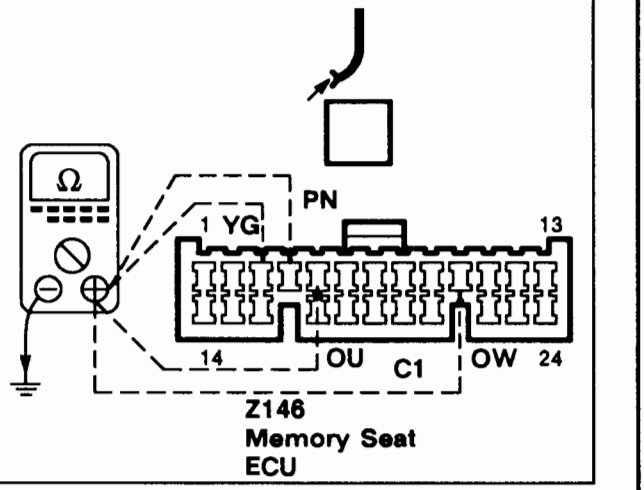
M5 ETM

Test H

1H

CONDITIONS
- **Ignition Switch**
  Position: 0

RESULTS
More than 1000 ohms



OK

PROBLEM CAUSE
- YG Wire
- PN Wire
- OU Wire
- OW Wire
- Left Mirror Actuator
- Right Mirror Actuator

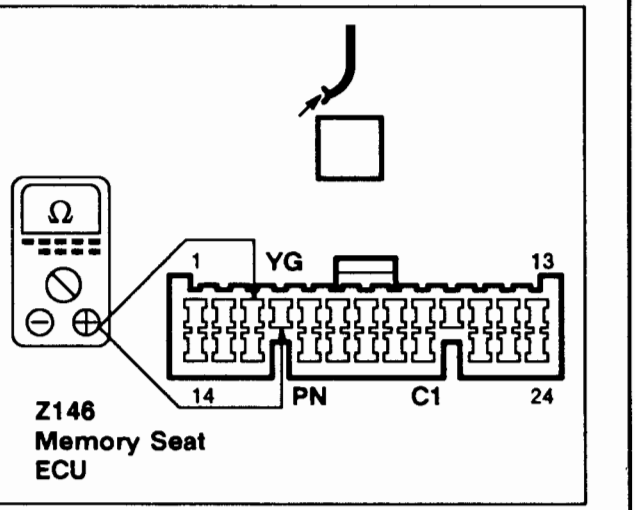
OK

2H

2H

CONDITIONS
- **Ignition Switch**
  Position: 0

RESULTS
Less than 50K ohms



OK

PROBLEM CAUSE
- PN Wire
- YG Wire
- Left Mirror Actuator
- Right Mirror Actuator

OK

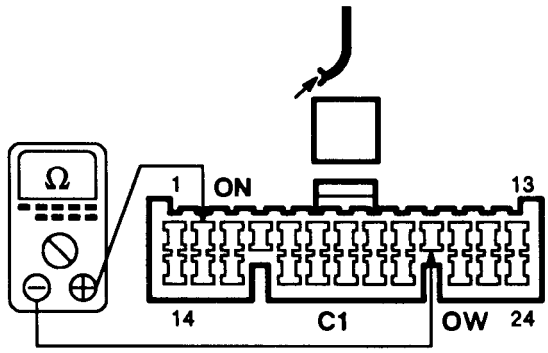
3H

2H

3H

CONDITIONS
- **Ignition Switch**
  Position: 0

RESULTS
Less than 50K ohms



Z146
Memory Seat
ECU

OK **PROBLEM CAUSE**
- ON Wire
- OW Wire
- Left Mirror Actuator
- Right Mirror Actuator

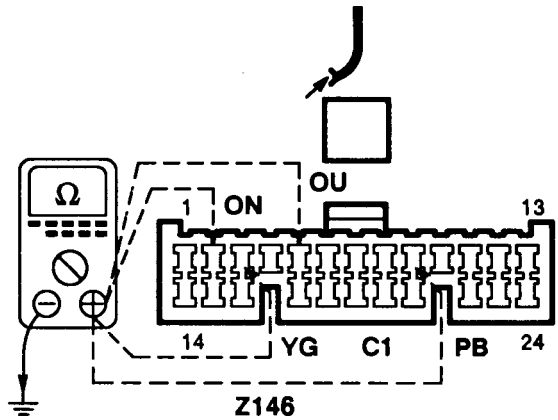
OK **PROBLEM CAUSE**
- Memory Seat ECU

Test I

1I

CONDITIONS
- **Ignition Switch**
  Position: 0

RESULTS
More than 1000 ohms



Z146
Memory Seat
ECU

OK **PROBLEM CAUSE**
- OU Wire
- ON Wire
- YG Wire
- PB Wire
- Right Mirror Actuator
- Left Mirror Actuator

OK

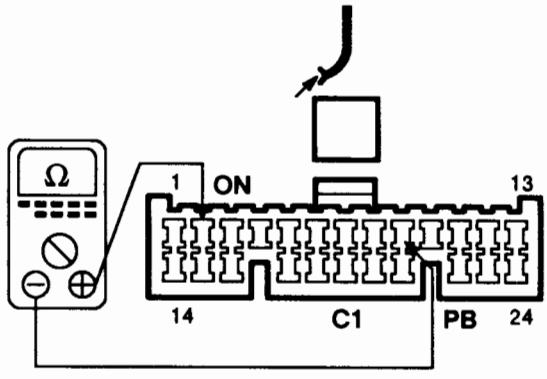
2I

1I

2I

CONDITIONS
- **Ignition Switch**
  Position: 0

RESULTS
Less than 50K ohms



Z146
Memory Seat
ECU

OK **PROBLEM CAUSE**
- **ON Wire**
- **PB Wire**
- **Right Mirror Actuator**
- **Left Mirror Actuator**

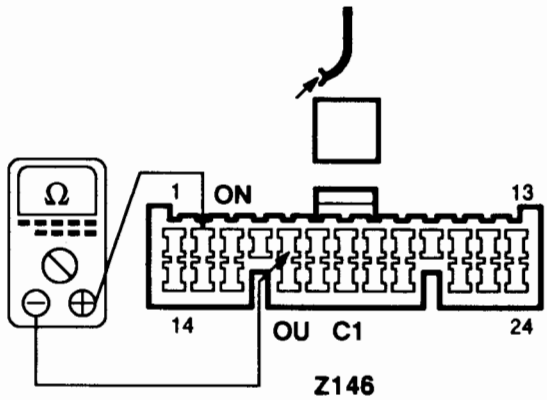
OK

3I

3I

CONDITIONS
- **Ignition Switch**
  Position: 0

RESULTS
Less than 50K ohms



Z146
Memory Seat
ECU

OK **PROBLEM CAUSE**
- **OU Wire**
- **ON Wire**
- **Right Mirror Actuator**
- **Left Mirror Actuator**

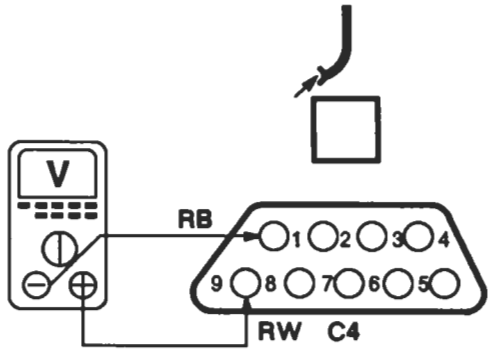
OK **PROBLEM CAUSE**
- **Memory Seat ECU**

Test J

1J

CONDITIONS
- **Ignition Switch**
  Position: I
- **Driver's door**
  Open

RESULTS
- **Driver Seat Control Switch**
  Forward
  +BAT VOLT
  Backward
  –BAT VOLT



OK **PROBLEM CAUSE**
- **Memory Seat ECU**

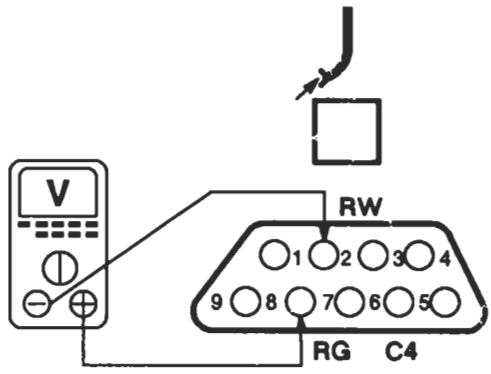
OK

2J

2J

CONDITIONS
- **Ignition Switch**
  Position: I
- **Driver's door**
  Open

RESULTS
- **Driver Seat Control Switch**
  Rear up
  –BAT VOLT
  Rear down
  +BAT VOLT



OK **PROBLEM CAUSE**
- **Memory Seat ECU**

OK

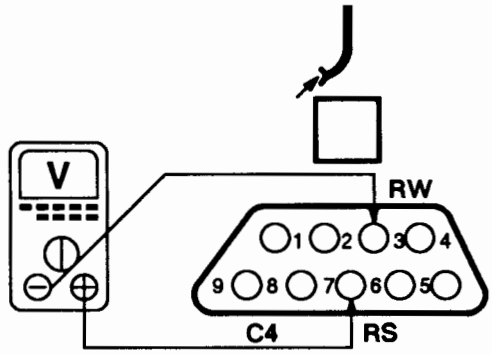
3J

2J

3J

CONDITIONS
- **Ignition Switch**
  Position: I
- **Driver's door**
  Open

RESULTS
- **Driver Seat Control Switch**
  Recline
  +BAT VOLT
  Raise
  -BAT VOLT



Z146
Memory Seat
ECU

OK **PROBLEM CAUSE**
- **Memory Seat ECU**

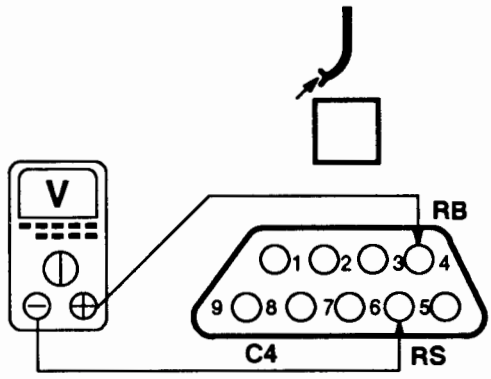
OK

4J

4J

CONDITIONS
- **Ignition Switch**
  Position: I
- **Driver's door**
  Open

RESULTS
- **Driver Seat Control Switch**
  Front up
  +BAT VOLT
  Front down
  -BAT VOLT



Z146
Memory Seat
ECU

OK **PROBLEM CAUSE**
- **Memory Seat ECU**

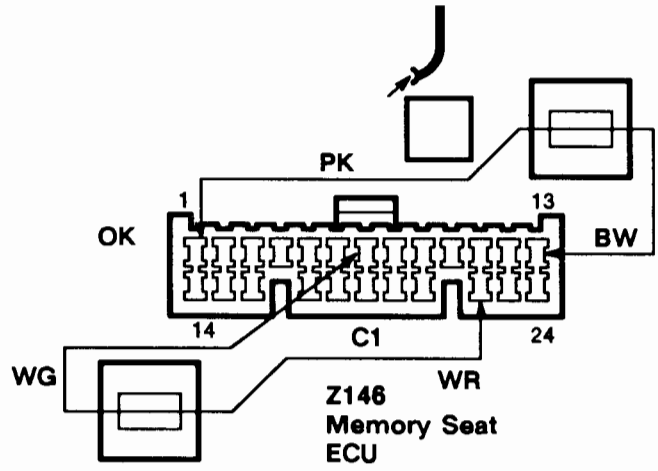
OK **PROBLEM CAUSE**
- **Seat motors**

Test K

1K

CONDITIONS
- Ignition Switch
  Position: 0
- Handbrake
  Applied

RESULTS
- Left Mirror Actuator
- Right Mirror Actuator
  Moves



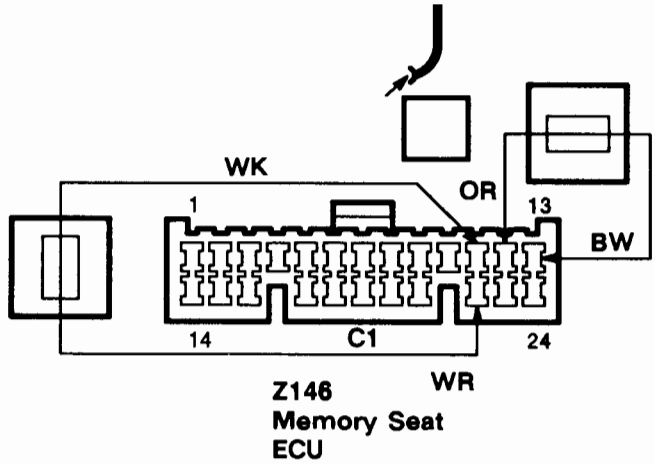
OK — PROBLEM CAUSE
- WG Wire
- PR Wire
- PK Wire
- Left Mirror Actuator
- Right Mirror Actuator

OK → 2K

2K

CONDITIONS
- Ignition Switch
  Position: 0
- Handbrake
  Applied

RESULTS
- Left Mirror Actuator
- Right Mirror Actuator
  Moves



OK — PROBLEM CAUSE
- WK Wire
- WP Wire
- OK Wire
- Left Mirror Actuator
- Right Mirror Actuator

OK — PROBLEM CAUSE
- Memory Seat ECU

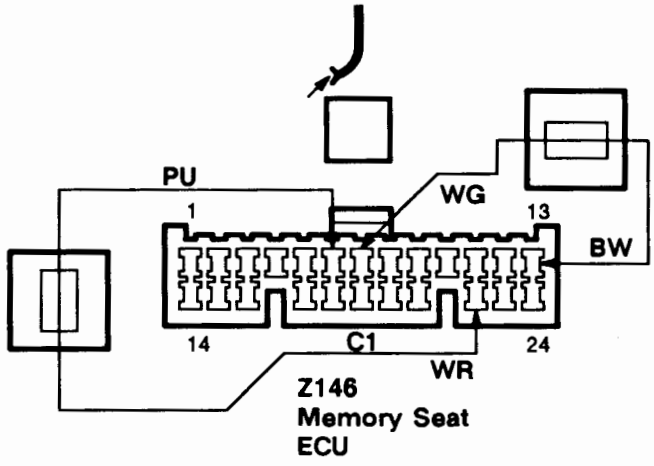
M5 ETM

Test L

1L

CONDITIONS
- **Ignition Switch**
  Position: 0
- **Handbrake**
  Applied

RESULTS
- **Right Mirror Actuator**
- **Left Mirror Actuator**
  Moves



OK

PROBLEM CAUSE
- WG Wire
- PU Wire
- PR Wire
- Right Mirror Actuator
- Left Mirror Actuator

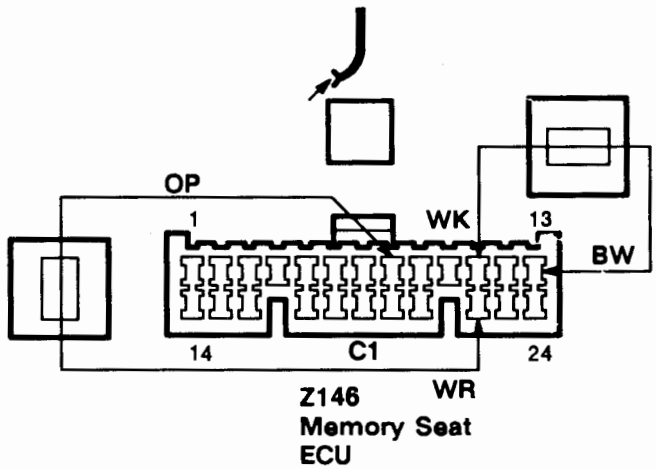
OK

2L

2L

CONDITIONS
- **Ignition Switch**
  Position: 0
- **Handbrake**
  Applied

RESULTS
- **Right Mirror Actuator**
  Moves



OK

PROBLEM CAUSE
- OP Wire
- WK Wire
- WP Wire
- Right Mirror Actuator
- Left Mirror Actuator

OK

PROBLEM CAUSE
- Memory Seat ECU