CIRCUIT OPERATION

Selector Interlock

When the gear selector is in the park position, the Transmission Range Selector Switch (Z110) is de-energized and prevents the selector from being moved into another gear. To free the selector, the Ignition Switch (X134) must be in position II and the brake pedal must be depressed. When this occurs, voltage from Fuse F B1 is applied to the Transmission Range Selector Switch through the closed Stop Lamp Switch (X168). The Transmission Range Selector Switch is grounded at E200 through the selector switch, the KS wire and the B wire. The solenoid now energizes, freeing the selector.

Ignition Key Interlock

On vehicles equipped with the interlock safety feature the vehicle must be in park and the transfer case in high or low gear before the key can be removed from the ignition. If the gear selector or transfer were out of gear, the key must be cycled before removal.

If the vehicle is not in park, voltage from Fuse B2 is applied to the Ignition Key Switch and Solenoid (X177) through the closed contacts of the Transmission Range Selector Switch (Z110). When the ignition switch is placed in the 0 position, the switch in the Ignition Key Switch and Solenoid closes to energize the solenoid and prevent key removal.

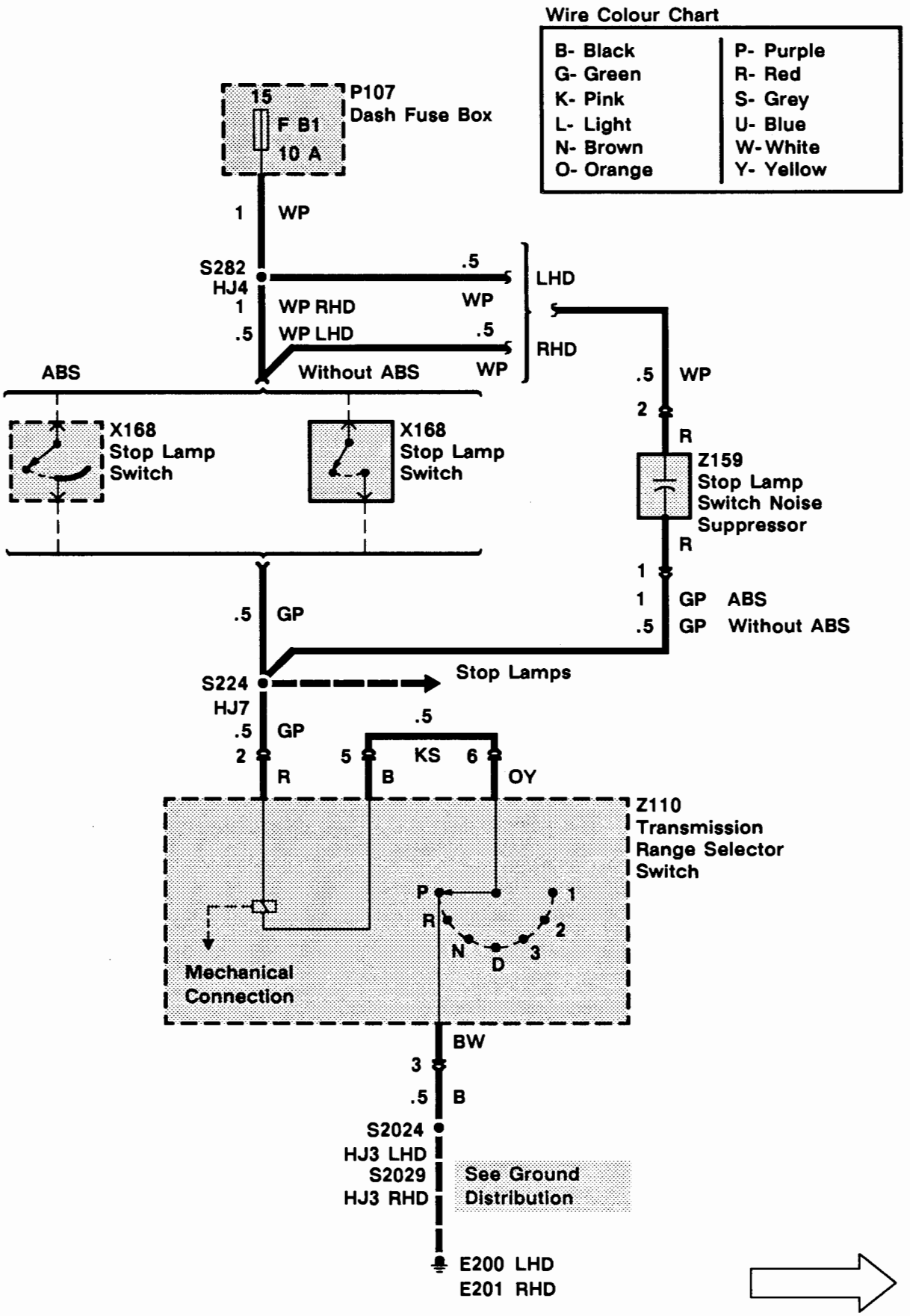
If the transfer box is in the neutral position, Interlock Relay 1 (K153) is de-energized, since the relay coil is not grounded by the Transfer Box Position Switch. When the relay is de-energized, voltage is applied to the Ignition Key Switch and Solenoid (X177) through the relay's switch contacts causing the solenoid to energize and prevent key removal.

Transfer Box Interlock

The Transfer Box Interlock safety feature is designed to prevent the transfer case shifter from being shifted out of "H" or "L" unless the vehicle's gear selector is in the neutral position.

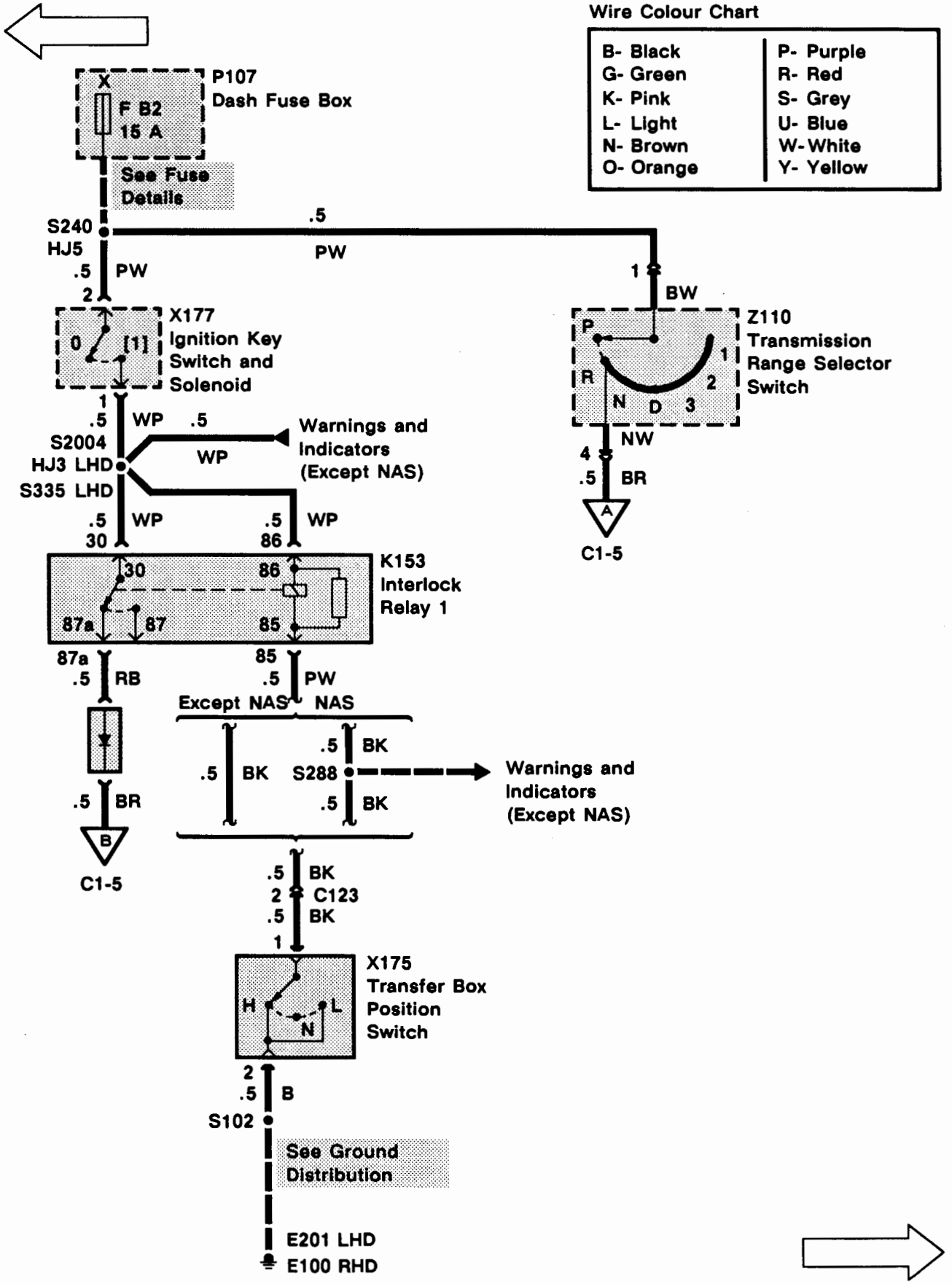
When the gear selector is placed in the neutral position, voltage is applied to the Interlock Relay 2's coil through the Transmission Range Selector Switch (Z110). The relay's coil is grounded through the Park/ Neutral Position Switch (X167).

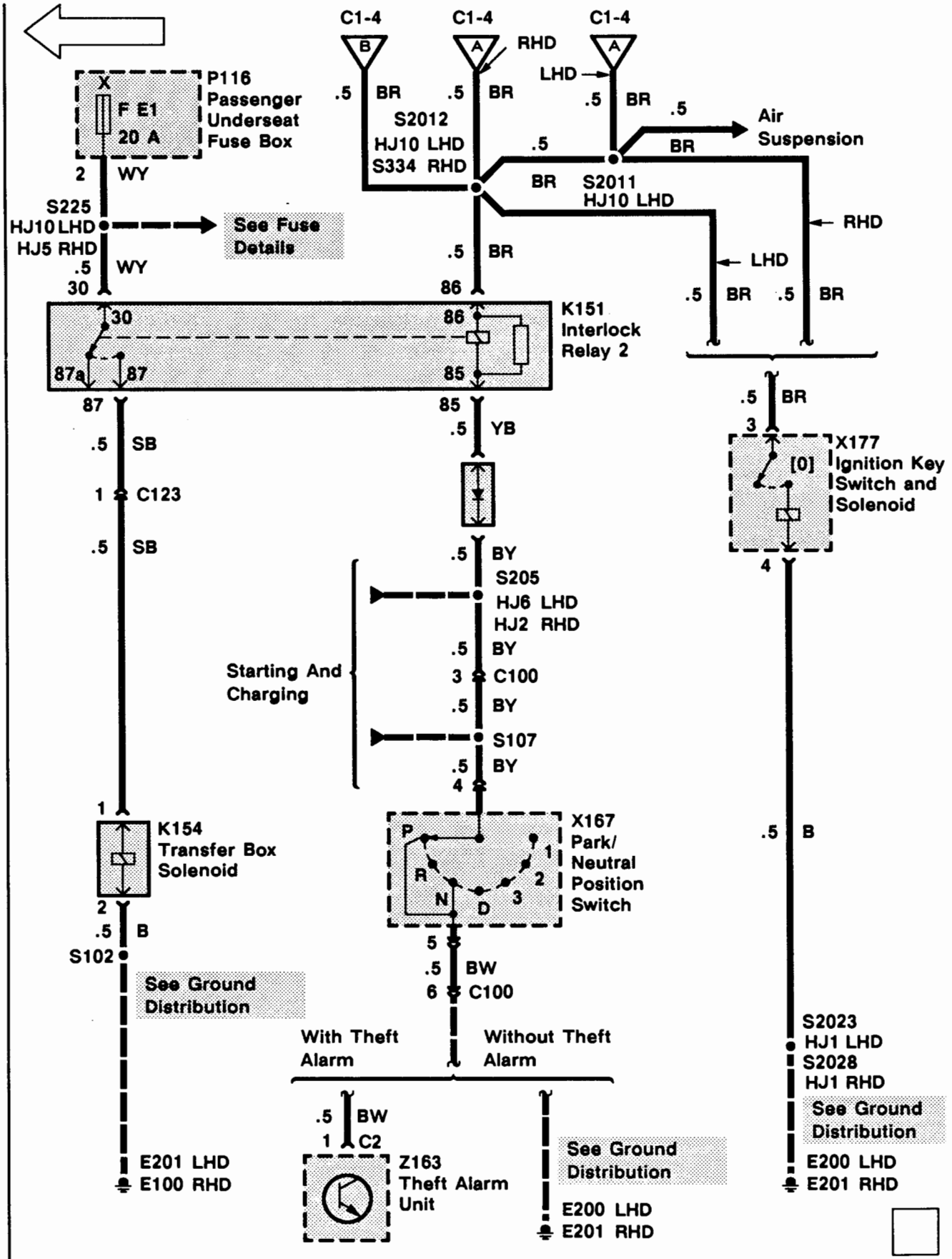
Interlock Relay 2 now energizes and applies voltage from Fuse E1 to the Transfer Box Solenoid. When the Transfer Box Solenoid is energized the transfer box shifter can be operated.


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
15
F B1
10 A
P107
Dash Fuse Box
1
WP
S282
HJ4
1
WP RHD
.5
WP LHD
.5
WP
LHD
WP
.5
RHD
WP
ABS
Without ABS
X168
Stop Lamp
Switch
X168
Stop Lamp
Switch
.5
WP
2
R
Z159
Stop Lamp
Switch Noise
Suppressor
R
1
1
GP ABS
.5
GP Without ABS
.5
GP
S224
HJ7
Stop Lamps
.5
GP
2
R
.5
5
B
KS
6
OY
Z110
Transmission
Range Selector
Switch
P
R
N
D
1
2
3
Mechanical
Connection
BW
3
.5
B
S2024
HJ3 LHD
S2029
HJ3 RHD
See Ground
Distribution
E200 LHD
E201 RHD

C1 ETM

1993 RANGE ROVER




C1-4
C1-4
C1-4
B
A
A
RHD
LHD
.5 BR
.5 BR
.5 BR
.5
Air Suspension
S2012
HJ10 LHD
S334 RHD
BR
S2011
HJ10 LHD
RHD
LHD
.5 BR
.5 BR
X
F E1
20 A
P116
Passenger Underseat Fuse Box
2 WY
S225
HJ10 LHD
HJ5 RHD
.5 WY
30
See Fuse Details
.5 BR
86
K151
Interlock Relay 2
30
87a
87
86
85
87
.5 SB
1 C123
.5 SB
85
.5 YB
.5 BR
3
X177
[0]
Ignition Key Switch and Solenoid
4
.5 BY
S205
HJ6 LHD
HJ2 RHD
.5 BY
3 C100
.5 BY
S107
.5 BY
4
Starting And Charging
1
K154
Transfer Box Solenoid
2
.5 B
S102
See Ground Distribution
E201 LHD
E100 RHD
P
R
N
D
1
2
3
X167
Park/ Neutral Position Switch
5
.5 BW
6 C100
.5 B
S2023
HJ1 LHD
S2028
HJ1 RHD
See Ground Distribution
E200 LHD
E201 RHD
With Theft Alarm
Without Theft Alarm
.5 BW
1 C2
Z163
Theft Alarm Unit
See Ground Distribution
E200 LHD
E201 RHD

C1 ETM

SYSTEM DIAGNOSIS

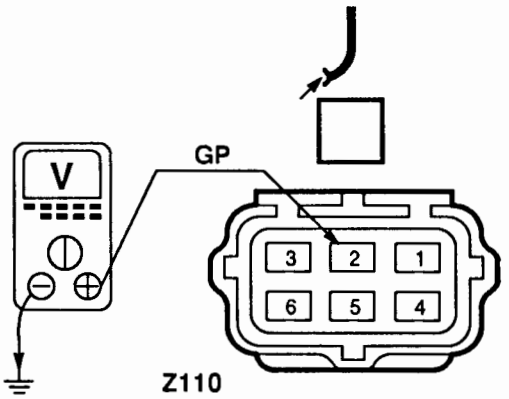
1. If the transmission range selector cannot be shifted out of park, do Test A.
2. If the ignition key cannot be removed with the transmission range selector in park and the transfer box is in "H" or "L", do test B.
3. If the transfer box can be shifted out of "H" or "L" while in any gear except neutral, do test C.
4. If the ignition key can be removed with the transmission range selector in any gear except park or with the transfer box in the neutral position, do test D.
5. If the transfer box cannot be shifted into "N", "H", or "L", with the ignition key inserted and gear selector in "N", do test F.

Test A

1A

CONDITIONS
- **Ignition Switch**
  Position: II

RESULTS
- **Brake Pedal - Depressed**
  BAT VOLT
- **Brake Pedal - Released**
  0V



Z110
Transmission
Range Selector
Switch

OK

PROBLEM CAUSE
- **GP Wire**
- **WP Wire**
- **F B1 Fuse**
- **Stop Lamp Switch**

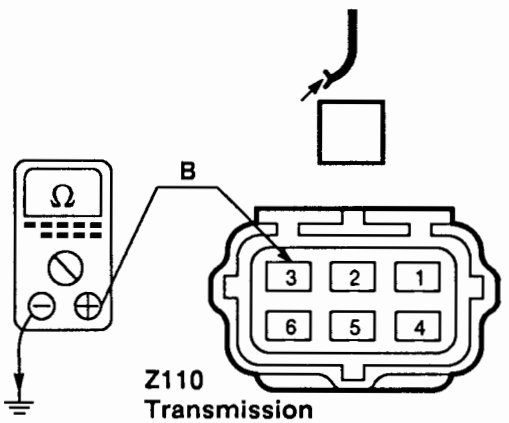
OK

2A

2A

CONDITIONS
- **Ignition Switch**
  Position: 0

RESULTS
Less than 1 ohm



Z110
Transmission
Range Selector
Switch

OK

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

OK

3A

C1 ETM

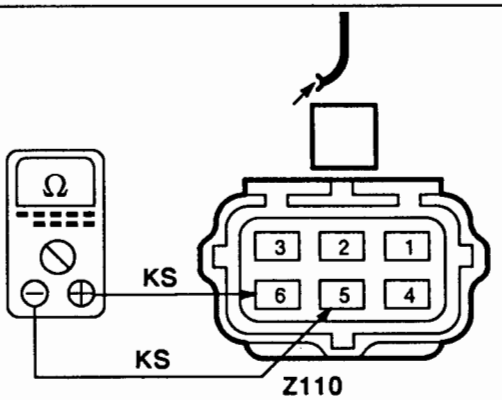
1993 RANGE ROVER

2A

3A

CONDITIONS
- **Ignition Switch**
  Position: II

RESULTS
Less than 1 ohm



Z110
Transmission
Range Selector
Switch

OK **PROBLEM CAUSE**
- KS Wire

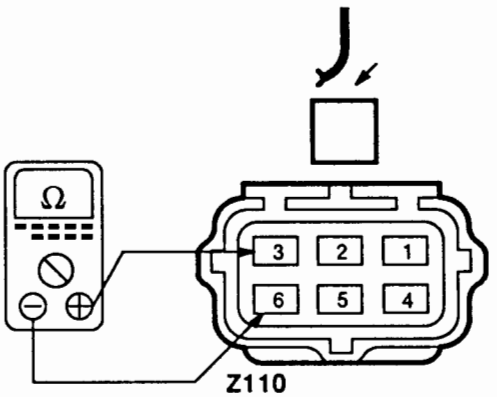
OK

4A

4A

CONDITIONS
- **Ignition Switch**
  Position: 0

RESULTS
- **Gear Selector**
  P = Less than 1 ohm
  D = More than 1000 ohms



Z110
Transmission
Range Selector
Switch

OK **PROBLEM CAUSE**
- Microswitch (Gear Selector)

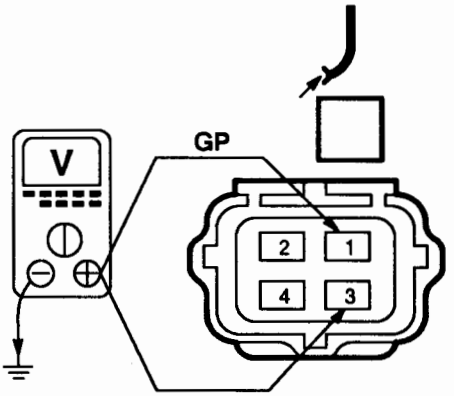
OK **PROBLEM CAUSE**
- Interlock Solenoid

Test B

1B

CONDITIONS
- **Ignition Switch**
  Position: II
- **Gear Selector**
  P
- **Transfer Box Position Switch**
  H or
  L

RESULTS
0V



X177
Ignition Key Switch and Solenoid

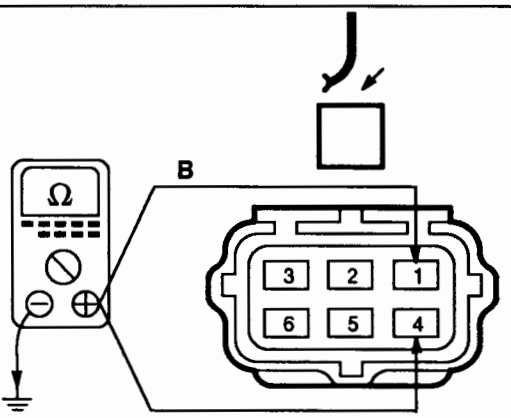
OK → 2B

OK → **PROBLEM CAUSE**
- **Ignition Key Switch and Solenoid**

2B

CONDITIONS
- **Ignition Switch**
  Position: 0

RESULTS
- **Gear Selector**
  P = more than 1 ohm



Z110
Transmission Range Selector Switch

OK → **PROBLEM CAUSE**
- **Transmission Range Selector Switch**

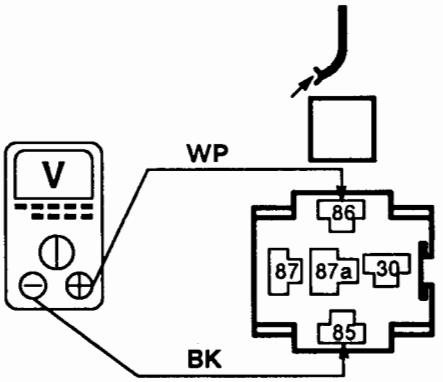
OK → 3B

2B

3B

CONDITIONS
- **Ignition Switch**
  Position: II
- **Inertia Fuel Shutoff Switch**
  H or
  L

RESULTS
BAT VOLT



K153
Interlock
Relay 1

OK **PROBLEM CAUSE**
- **BK Wire**
- **Transfer Box Position Switch**

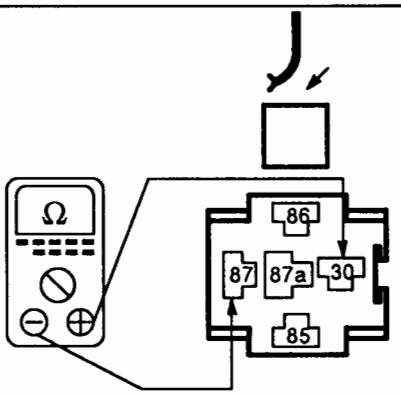
OK **PROBLEM CAUSE**
- **Interlock Relay 1**
- **RB Wire**
- **BR Wire**

Test C

1C

CONDITIONS
- **Ignition Switch**
  Position: 0

RESULTS
more than 1 ohm



K151
Interlock
Relay 2

OK **PROBLEM CAUSE**
- **Interlock Relay 2**

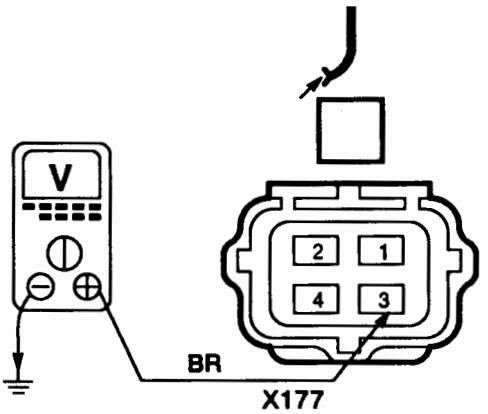
OK **PROBLEM CAUSE**
- **SB Wire**
- **Transfer Box Solenoid**

Test D

1D

CONDITIONS
- **Ignition Switch**
  Position: II
- **Gear Selector**
  P

RESULTS
- **Transfer Box Position Switch**
  N = BAT VOLT



OK **GO TO TEST E**

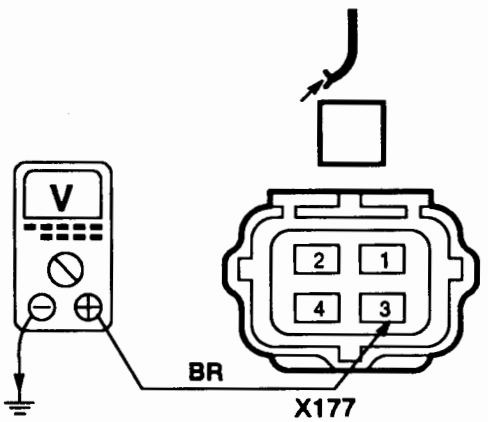
OK

2D

2D

CONDITIONS
- **Ignition Switch**
  Position: II
- **Transfer Box Position Switch**
  H or
  L

RESULTS
- **Gear Selector**
  P = 0 VOLTS
  R, N, D, 3, 2, 1 = BAT VOLTS



OK **PROBLEM CAUSE**
- **BR Wire**
- **Transmission Range Selector Switch**

OK **PROBLEM CAUSE**
- **Ignition Key Switch and Solenoid**

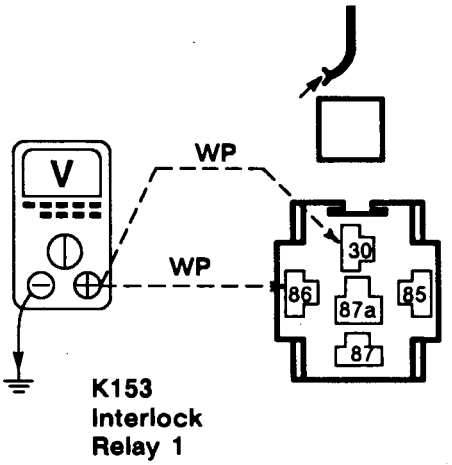
C1 ETM

Test E

1E

CONDITIONS
- **Ignition Switch**
  Position: II

RESULTS
BAT VOLT



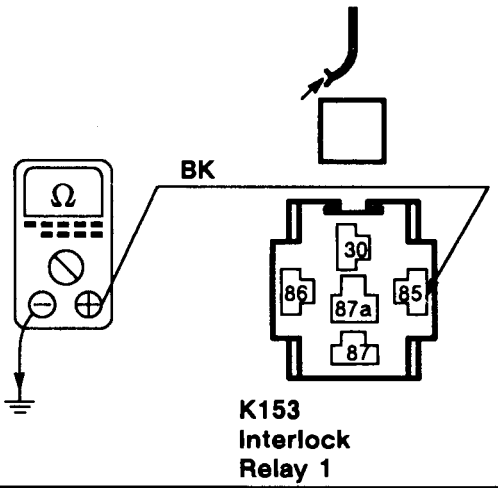
OK **PROBLEM CAUSE**
- **WP Wire**
- **Ignition Key Switch and Solenoid**

OK → 2E

2E

CONDITIONS
- **Ignition Switch**
  Position: 0
- **Transfer Box Position Switch**
  N

RESULTS
more than 1 ohm



OK **PROBLEM CAUSE**
- **BK Wire**
- **Transfer Box Position Switch**

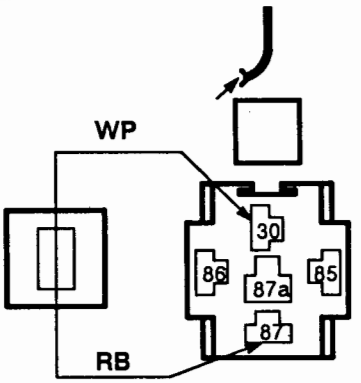
OK → 3E

2E

3E

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

RESULTS
Ignition key cannot be removed



K153
Interlock
Relay 1

OK **PROBLEM CAUSE**
- **RB Wire**
- **Diode**
- **BR Wire**

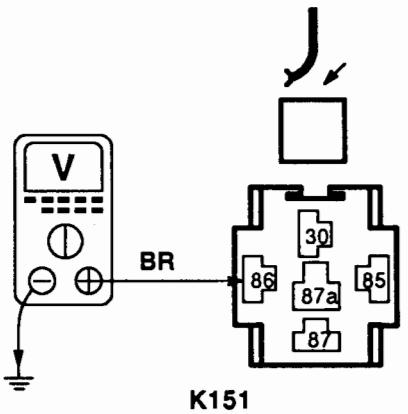
OK **PROBLEM CAUSE**
- **Interlock Relay 1**

Test F

1F

CONDITIONS
- **Ignition Switch**
  Position: II

RESULTS
- **Gear Selector**
  N = BAT VOLT



K151
Interlock
Relay 2

OK **PROBLEM CAUSE**
- **BR Wire**
- **Transmission Range Selector Switch**

OK

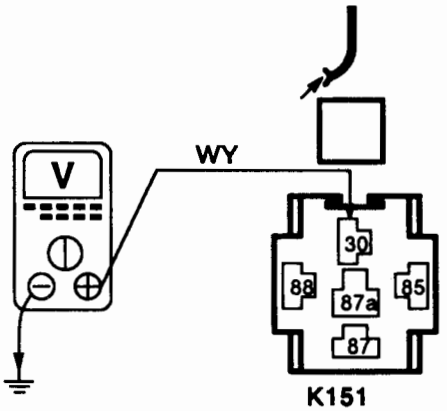
2F

1F

2F

CONDITIONS
- **Ignition Switch**
  Position: II

RESULTS
BAT VOLT



OK **PROBLEM CAUSE**
- **E1 Fuse**
- **WY Wire**

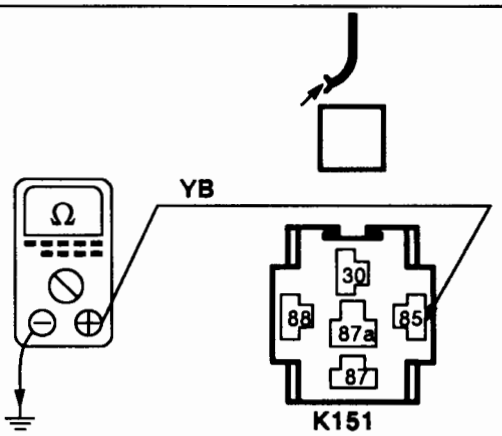
OK

3F

3F

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

RESULTS
Less than 1 ohm



OK **PROBLEM CAUSE**
- **YB Wire**
- **Diode**
- **BY Wire**

OK

4F

3F

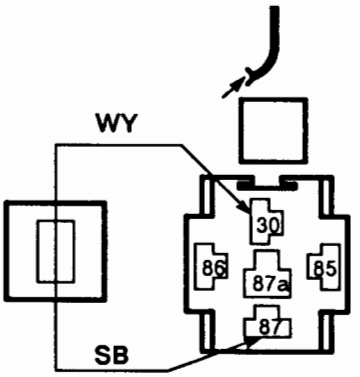
4F

CONDITIONS

- **Ignition Switch**
  Position: II

RESULTS

Transfer box gear selector shifts



K151
Interlock
Relay 2

OK **PROBLEM CAUSE**

- SB Wire
- Transfer Box Solenoid
- B Wire

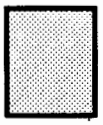
OK **PROBLEM CAUSE**

- Interlock Relay 2

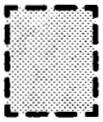
KEY INFORMATION

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