

# DEFOGGERS - REAR WINDOW & MIRROR

## 1998 Toyota Supra

### 1998 ACCESSORIES & EQUIPMENT

Toyota - Rear Window & Mirror Defoggers

Lexus; LX470

Toyota; Avalon, Camry, Celica, Corolla, Land Cruiser, RAV4, Sienna, Supra, Tercel, 4Runner

## DESCRIPTION & OPERATION

**NOTE:** Some systems use an integrated or multipurpose relay as defogger relay. Some systems use a timer between switch and heating grid, and some use only a switch and heating grid.

Rear window defogger systems use a heating wire grid bonded to the inside of window. Heat is regulated by a control switch and a relay/timer. Most systems have an indicator light to show system is operating.

Power to the control switch is through a fuse in the fuse block. Timer relay will supply power to the grid for 12-18 minutes or until the ignition is turned off. On 4Runner, relay ground is through rear power window limit switch. Some models are also available with an outside rearview mirror heater/defogger.

## TROUBLE SHOOTING

### DEFOGGER DOES NOT WORK

Blown fuse or poor contact. Defogger switch defective. Poor connections. Broken wire. Relay defective.

### INDICATOR LIGHT DOES NOT WORK

Bulb burned out. Open wire or poor connection.

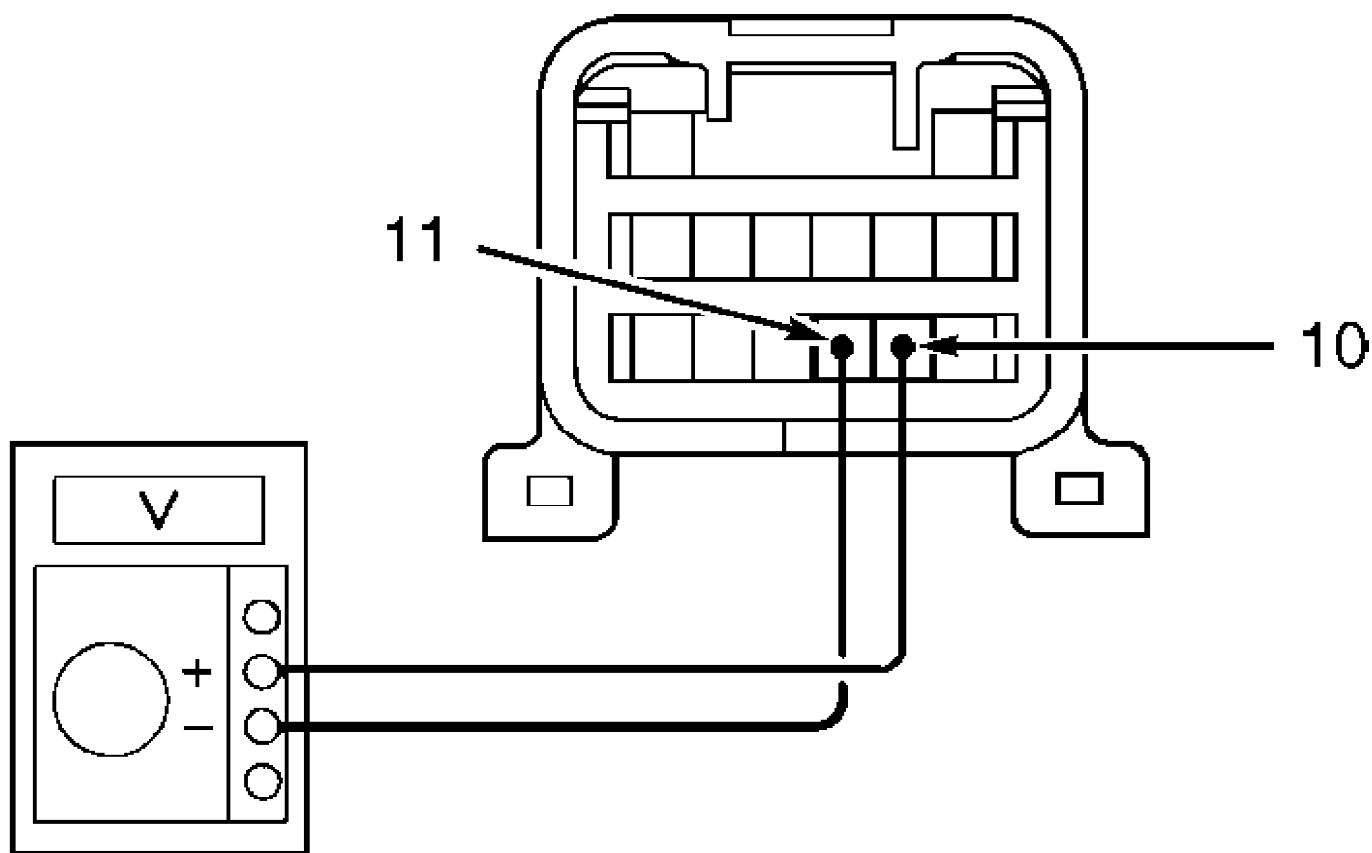
## COMPONENT TESTS

### DEFOGGER SWITCH TEST

Avalon

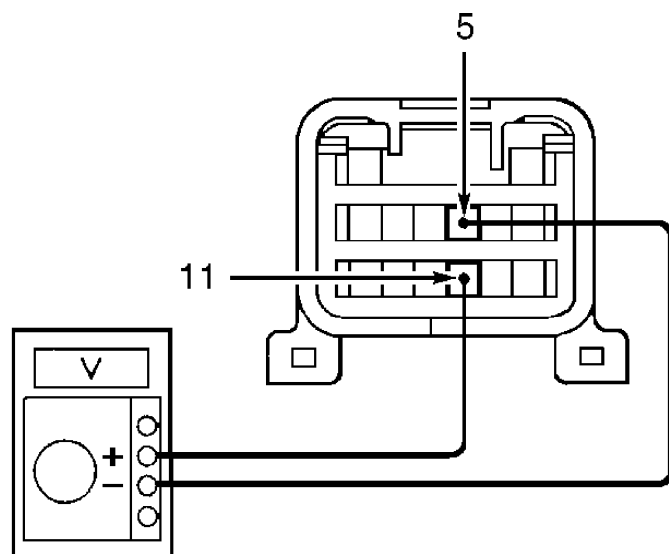
1) If equipped with automatic A/C, backprobe with positive voltmeter lead to defogger switch terminal No. 10 and negative lead to terminal No. 11. See Fig. 1 or 2. If equipped with manual A/C, backprobe with positive voltmeter lead to defogger switch terminal No. 11 and negative lead to terminal No. 5. See Fig. 1 or 2.

2) On all models, ensure battery voltage exists with defogger switch in OFF position. Turn defogger switch to ON position. Ensure indicator light is on and less than one volt exists. After 15 minutes, defogger switch should turn off and battery voltage should exist again. If defogger switch does not operate as specified, replace switch.



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Fig. 1: Defogger Switch Terminals (Avalon - With Automatic A/C)



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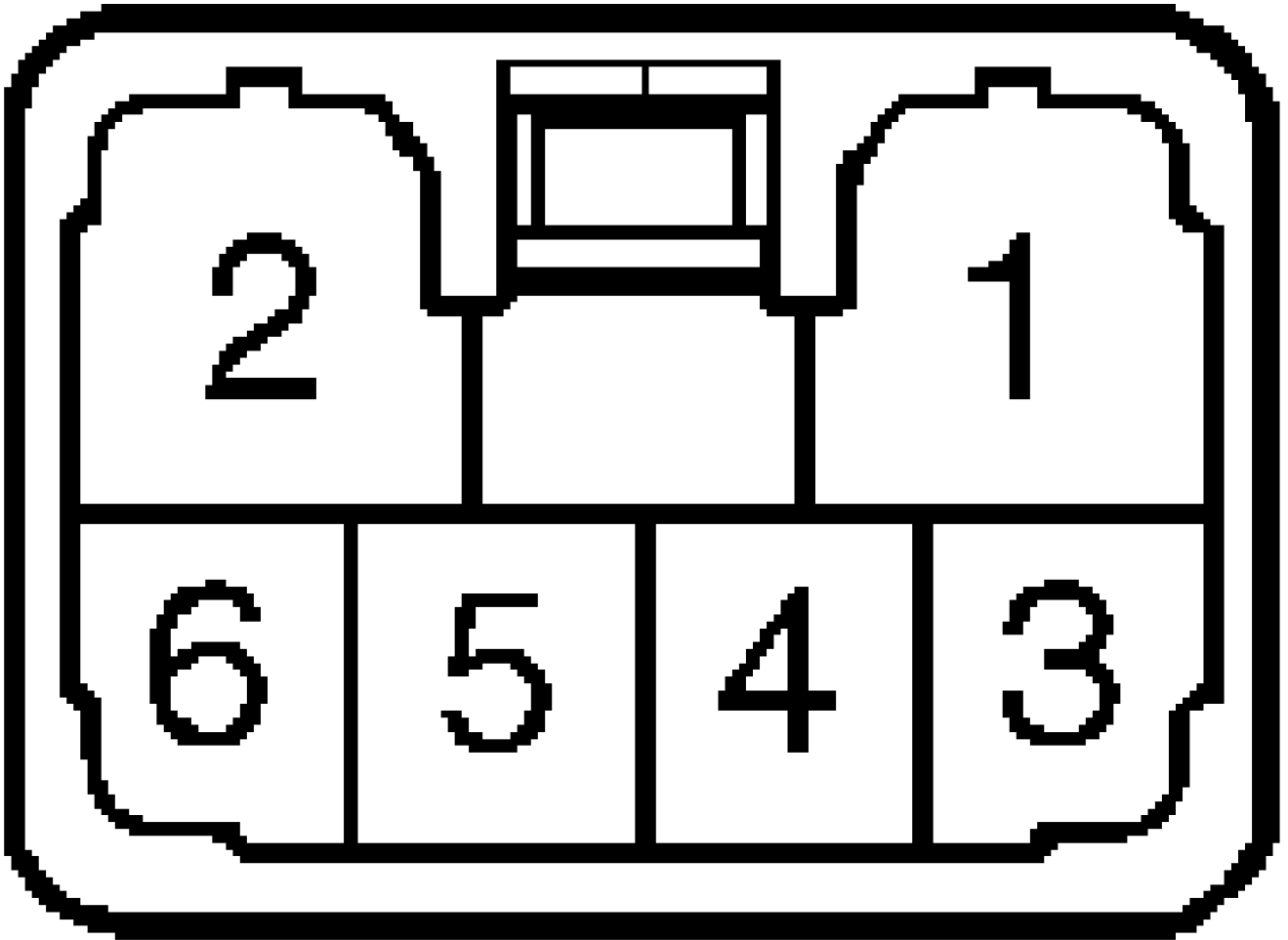
Fig. 2: Defogger Switch Terminals (Avalon - With Manual A/C)

Camry

1) Remove rear defogger switch. Terminals No. 2 and 6 are for bulb illumination. Using an ohmmeter, check for continuity between

terminals No. 2 and 6 of switch. See Fig. 3. Continuity should exist at all times. If continuity does not exist, check illumination bulb.

2) Connect battery positive lead to terminal No. 4, and battery negative lead to terminal No. 3. See Fig. 3. Connect a 3.4-watt test light between battery voltage and terminal No. 5. Turn defogger on. Ensure test light comes on for 12-18 minutes and then goes out. If switch does not operate as specified, replace switch.



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Fig. 3: Identifying Defogger Switch Terminals (Camry, Celica, Corolla, Sienna, Tercel & 4Runner)  
Courtesy of Toyota Motor Sales, U.S.A., Inc.

#### Celica

1) Backprobe with positive voltmeter lead to defogger switch terminal No. 5 and negative lead to terminal No. 4. See Fig. 3. Ensure battery voltage exists with defogger switch in OFF position. Turn defogger switch to ON position. Ensure indicator light is on and less than one volt exists. If voltage is not as specified, replace switch.

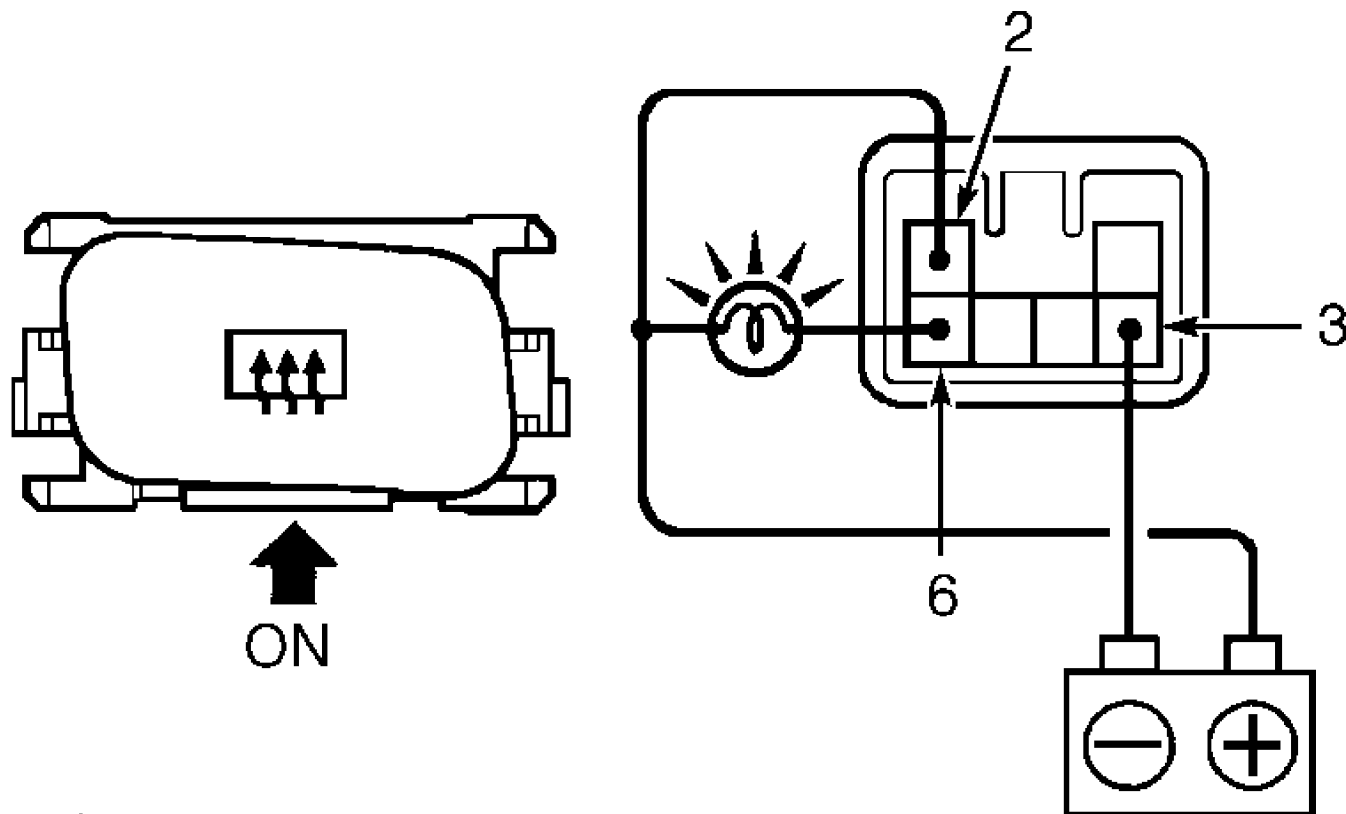
2) Terminals No. 2 and 6 are for bulb illumination. Using an ohmmeter, check for continuity between terminals No. 2 and 6 of switch. See Fig. 3. Continuity should exist at all times.

3) If defogger switch is equipped with timer, ensure defogger switch turns off and battery voltage is again present after 12-18 minutes. If defogger switch does not operate as specified, replace switch.

#### Corolla

1) With defogger switch on, ensure continuity exists between terminals No. 3 and 6. See Fig. 3. With switch off, continuity should not exist between any terminals. Check for continuity between terminals No. 1 and 4 (light bulb). Continuity should exist at all times. If continuity is not as specified, replace switch.

2) Disconnect defogger switch. Connect fused jumper between battery positive lead and terminal No. 2 and battery negative lead to terminal No. 3 (switch side). Connect a 3.4-watt test light between terminal No. 6 and battery voltage. See Fig. 4. Push defogger switch to ON position. Ensure test light and indicator light come on for 12-18 minutes and then goes out. If switch does not operate as specified, replace switch.



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Fig. 4: Testing Defogger Switch With Timer (Corolla & Tercel)  
Courtesy of Toyota Motor Sales, U.S.A., Inc.

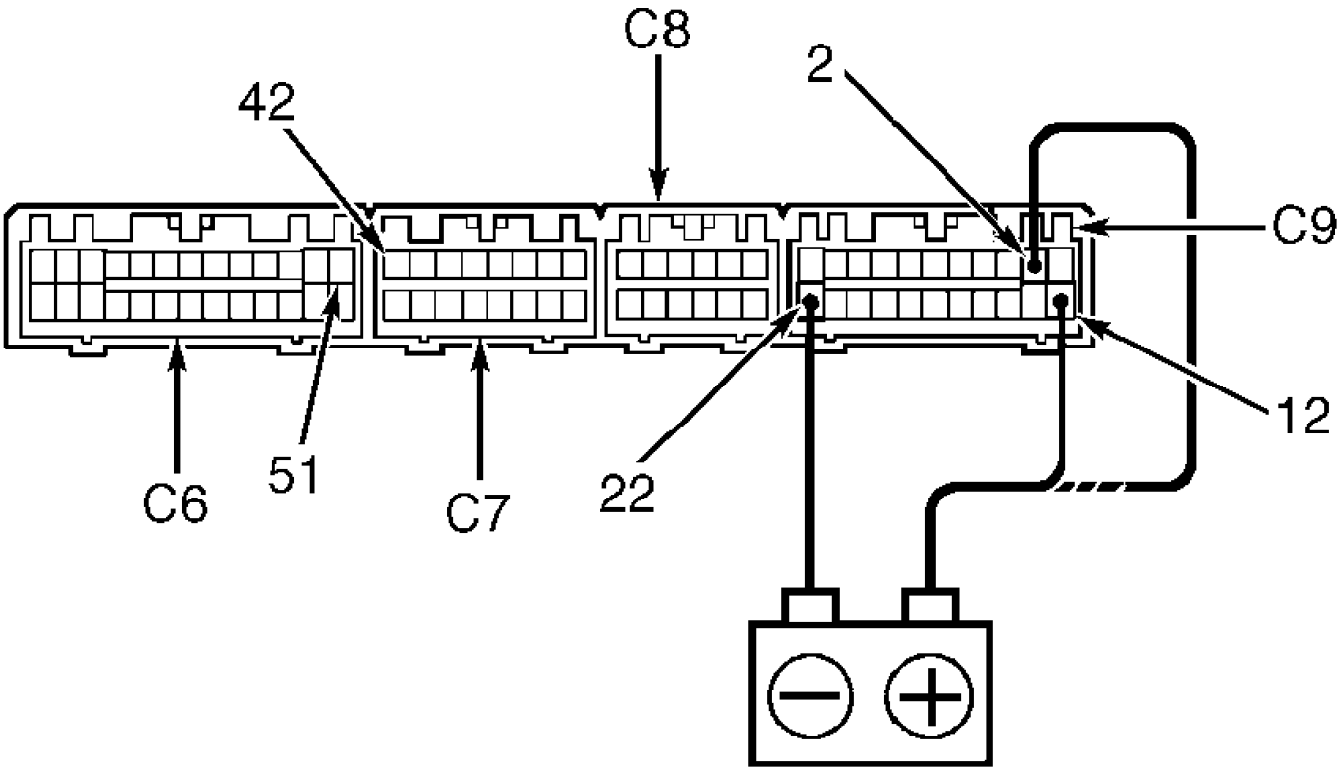
#### Land Cruiser & Lexus LX470

1) Remove climate control panel and disconnect 4 connectors. Connect fused jumper between battery voltage and connector C9 terminals No. 2 and 12. Connect ground to terminal No. 22 (switch side). See Fig. 5.

2) Connect DVOM positive lead to connector C7 terminal No. 42 and negative lead to ground. With rear defogger switch in OFF

position, battery voltage should be indicated. Go to next step.

3) Turn rear defogger switch to ON position and monitor DVOM. Reading should be less than one volt. After approximately 15 minutes, the timer should turn the rear defogger off and the reading should be 12 volts. If readings are not as specified, replace A/C amplifier. See A/C AMPLIFIER under REMOVAL & INSTALLATION.



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Fig. 5: Testing Defogger Switch Timer Function (Land Cruiser & Lexus LX470)  
 Courtesy of Toyota Motor Sales, U.S.A., Inc.

RAV4

1) Remove rear defogger switch. Check continuity of switch. See DEFOGGER SWITCH CONTINUITY TEST TABLE (RAV4). See Fig. 6. If continuity is not as specified, replace switch.

DEFOGGER SWITCH CONTINUITY TEST TABLE (RAV4)

Switch Position	(1) Terminals No.	Continuity
OFF	None	No
ON	3, 5 & 8	Yes
ON (Illumination)	3 & 5	Yes
Illumination	2 & 6	Yes

(1) - See Fig. 6.

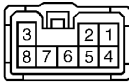


Fig. 6: Identifying Defogger Switch Terminals (RAV4)  
 Courtesy of Toyota Motor Sales, U.S.A., Inc.

#### Sienna

1) Remove rear defogger switch. Terminals No. 1 and 4 are for bulb illumination. Using an ohmmeter, check for continuity between terminals No. 1 and 3 of switch. See Fig. 3. Continuity should exist at all times. If continuity does not exist, check illumination bulb.

2) Connect battery positive lead to terminal No. 2, and battery negative lead to terminal No. 4 (switch side). Connect a 3.4-watt test light between battery voltage and terminal No. 6. Turn defogger on. Ensure test light comes on for 12-18 minutes and then goes out. If switch does not operate as specified, replace switch.

#### Supra

1) Defogger switch is part of heater control switch. Locate A/C-heater control switch Orange 14-pin "B" connector and ensure it is connected. See Fig. 7. Using voltmeter positive lead, backprobe connector terminal No. 7. Using voltmeter negative lead, backprobe "B" connector terminal No. 10. Ensure battery voltage exists with defogger switch in OFF position. Turn defogger switch to ON position. Ensure indicator light is on and less than one volt exists between connector terminals No. 7 and 10. After 15 minutes, ensure defogger switch is off and battery voltage is again present. If voltage is not as specified, go to next step.

2) Disconnect A/C-heater control switch Orange 14-pin "B" connector. Turn defogger switch to ON position. Ensure continuity exists between switch terminals No. 7 and 10. If continuity does not exist, repair or replace A/C-heater control switch.

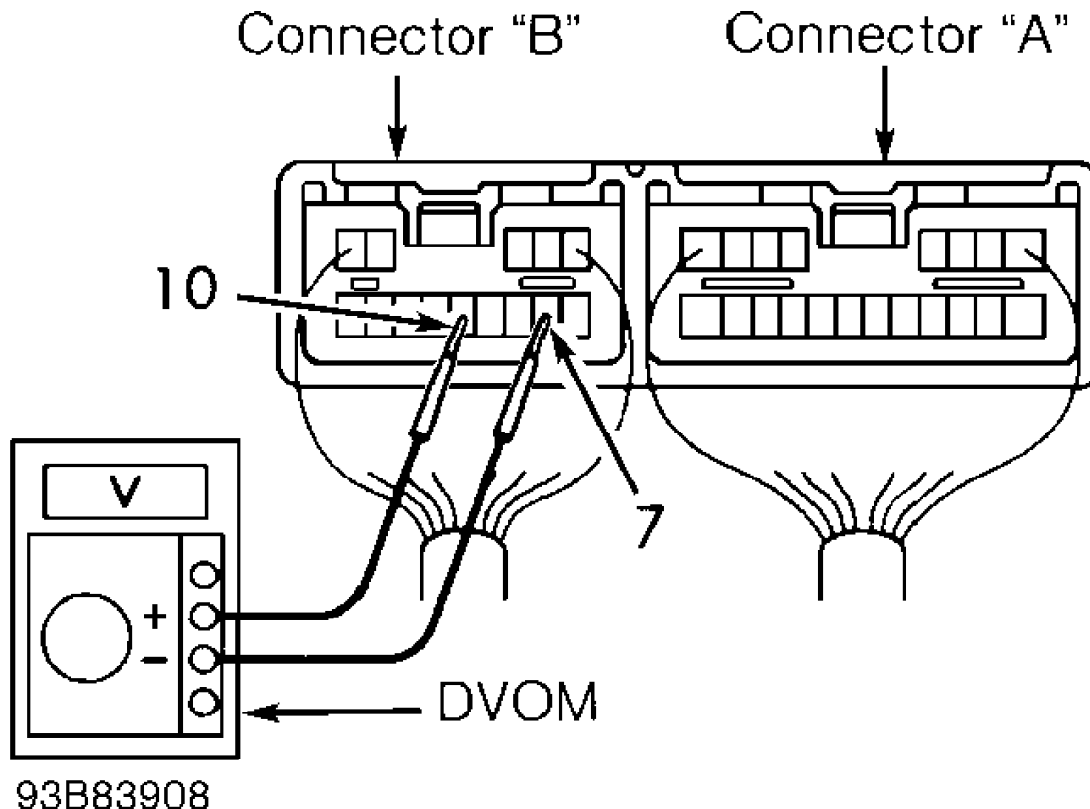


Fig. 7: Testing Defogger Switch (Supra)  
Courtesy of Toyota Motor Sales, U.S.A., Inc.

#### Tercel

1) Remove rear defogger switch. Terminals No. 1 and 3 are for

bulb illumination. Using an ohmmeter, check for continuity between terminals No. 1 and 4 of switch. See Fig. 3. Continuity should exist at all times. If continuity is not as specified, replace defogger switch and retest system.

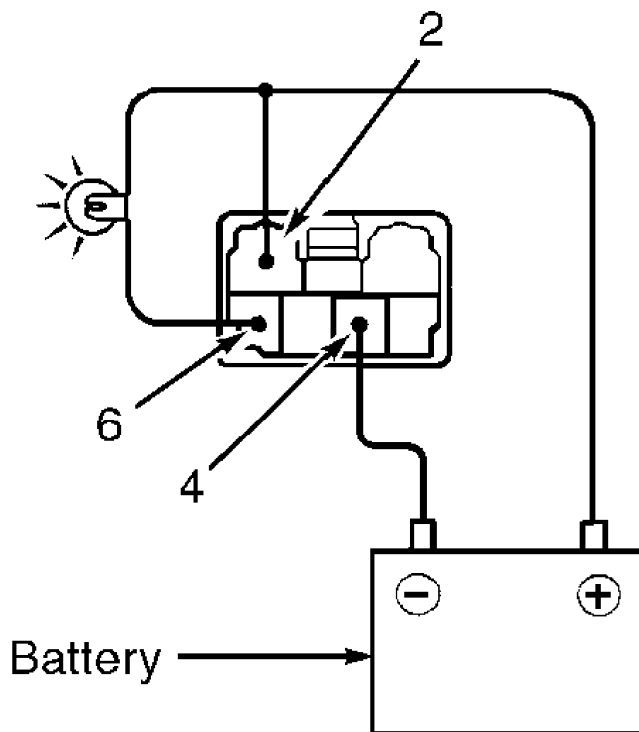
2) On models without timer, remove defogger switch. Ensure continuity exists between switch terminals No. 2, 3 and 6 with switch on. See Fig. 3. With defogger switch off, continuity should not exist between any terminals. If continuity is not as specified, replace defogger switch and retest system.

3) On models with timer, connect fused jumper battery positive lead to terminal No. 2 and battery negative lead to terminal No. 3 (switch side). Connect a 3.4-watt test light between battery voltage and terminal No. 6. See Fig. 4. Turn defogger on. Ensure indicator light and test light come on for 12-18 minutes and then go out. If defogger switch with timer does not operate as specified, replace switch.

#### 4Runner

1) Remove rear defogger switch. Terminals No. 1 and 3 are for bulb illumination. Using an ohmmeter, check for continuity between terminals No. 1 and 3 of switch. See Fig. 3. Continuity should exist at all times. If continuity does not exist, check illumination bulb.

2) Connect battery positive lead to terminal No. 2, and battery negative lead to terminal No. 4 (switch side). See Fig. 8. Connect a 3.4-watt test light between battery voltage and terminal No. 6. Turn defogger on. Ensure test light comes on for 12-18 minutes and then goes out. If switch does not operate as specified, replace switch.



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Fig. 8: Testing Defogger Switch (4Runner)  
Courtesy of Toyota Motor Sales, U.S.A., Inc.

#### RELAY TEST

NOTE: Testing for Land Cruiser/Lexus LX470 mirror heater relay is the same as testing for defogger relay.

Tercel

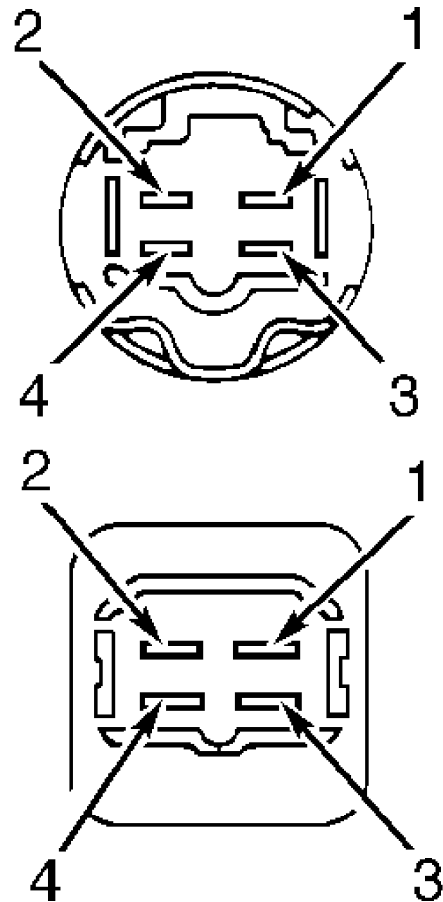
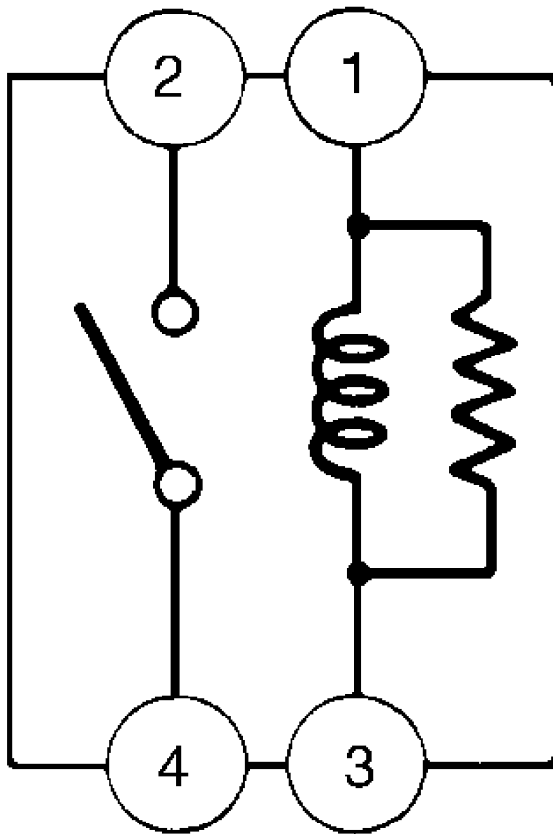
1) Using an ohmmeter, ensure continuity exists between terminals No. 1 and 3. See Fig. 9. Continuity should not exist between terminals No. 2 and 4. If continuity is not as specified, replace relay.

2) Connect battery positive lead to terminal No. 1 and battery negative lead to terminal No. 3. Continuity should exist between terminals No. 2 and 4. If operation is not as specified, replace relay.

Except Tercel

1) Using an ohmmeter, ensure continuity exists between terminals No. 1 and 2. See Fig. 10 or 11. Continuity should not exist between terminals No. 3 and 5. If continuity is not as specified, replace relay.

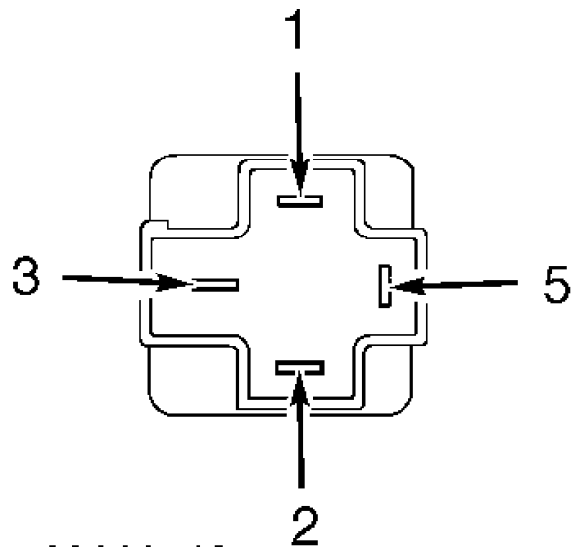
2) Connect battery positive lead to terminal No. 1 and battery negative lead to terminal No. 2. Continuity should exist between terminals No. 3 and 5. If operation is not as specified, replace relay.



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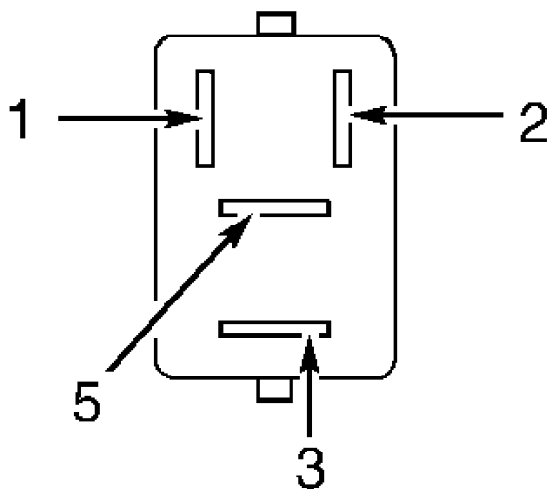
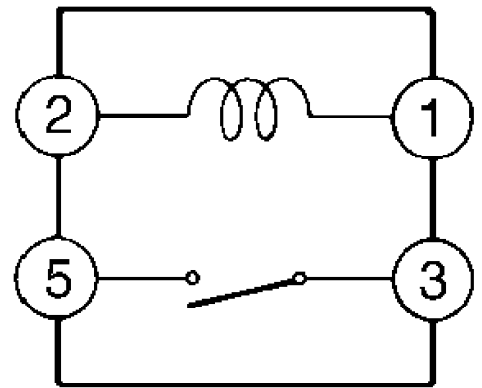
Fig. 9: Testing Defogger Relay (Tercel)  
Courtesy of Toyota Motor Sales, U.S.A., Inc.





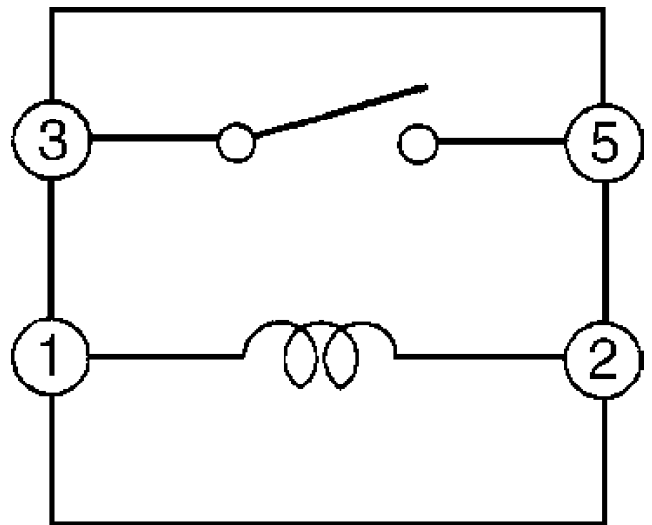
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Fig. 10: Testing Defogger Relay (Avalon, Celica & Supra)  
Courtesy of Toyota Motor Sales, U.S.A., Inc.



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Fig. 11: Testing Defogger Relay (Camry, Corolla, Land Cruiser, Lexus LX470, Sienna & 4Runner)  
Courtesy of Toyota Motor Sales, U.S.A., Inc.

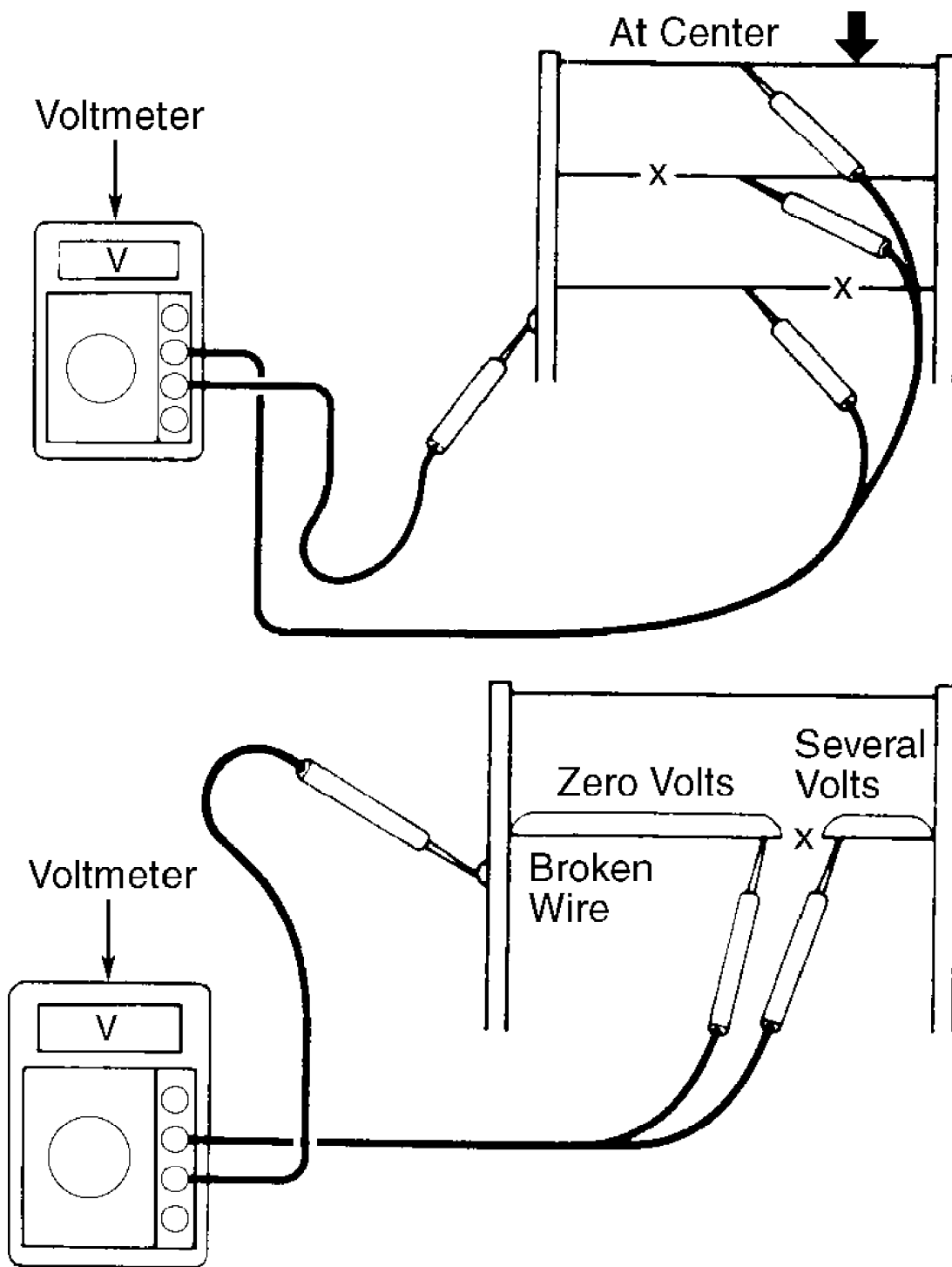


## GRID FILAMENT TEST

**NOTE:** When testing grid wires with voltmeter, wrap aluminum foil around end of test probe, then press foil to grid wire. This will prevent probe from damaging grid wire.

1) To locate breaks in grid wire filaments, attach a voltmeter to middle portion of each filament. Attach other meter probe to vertical section of window grid. See Fig. 12.

2) If a grid is broken, meter will register zero volts or about 10 volts, depending on if grid is broken between or outside test leads. If wire is unbroken, meter will register about 5 volts. To locate break, move probe along wire until voltage changes abruptly.



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Fig. 12: Testing Grid Filament  
Courtesy of Toyota Motor Sales, U.S.A., Inc.

POWER WINDOW LIMIT SWITCH

#### 4Runner

Power window limit switch is located behind trim panel and bottom of rear door. Using an ohmmeter, ensure continuity exists between terminals No. 1 and 2 when switch is turned to ON position (window up). Continuity should not exist between any terminals when switch is pushed to OFF position. If continuity is not as specified, replace power window limit switch.

## SYSTEM TESTS

### REAR WINDOW DEFOGGER SYSTEM CHECK

1) Ensure all in-line fuses or circuit breakers are okay. Turn ignition and control switches to ON position. Glass should feel warm after a few minutes.

2) If glass is not warm, use a test light or voltmeter to check for battery voltage at grid feed wire. If voltage is not correct, check wiring harness, control switch and timer/relay.

### DEFOGGER SWITCH TIMER CIRCUIT

#### Camry

Disconnect defogger switch 6-pin connector. Use DVOM to check circuits as specified. See DEFOGGER TIMER CIRCUIT TEST TABLE (CAMRY). If readings are not as specified, repair circuit as necessary. If readings are as specified, replace defogger switch and retest system.

DEFOGGER TIMER CIRCUIT TEST TABLE (CAMRY)

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Between Terminal No. & Ground (1)	Condition	Specification
3 .....	All .....	Continuity
4 .....	IGN In LOCK/ACC .....	Zero Volts
4 .....	IGN In ON .....	Battery Voltage
5 .....	IGN In LOCK/ACC .....	Zero Volts
5 .....	IGN In ON .....	Battery Voltage

(1) - See Fig. 3.

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#### Corolla & Tercel

Disconnect defogger switch 6-pin connector. Use DVOM to check circuits as specified. See DEFOGGER TIMER CIRCUIT TEST TABLE (COROLLA & TERCEL). If readings are not as specified, repair circuit as necessary. If readings are as specified, replace defogger switch and retest system.

DEFOGGER TIMER CIRCUIT TEST TABLE (COROLLA & TERCEL)

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Between Terminal No. & Ground (1)	Condition	Specification
3 .....	All .....	Continuity
2 .....	IGN In LOCK/ACC .....	Zero Volts
2 .....	IGN In ON .....	Battery Voltage
6 .....	IGN In LOCK/ACC .....	Zero Volts
6 .....	IGN In ON .....	Battery Voltage

(1) - See Fig. 3.

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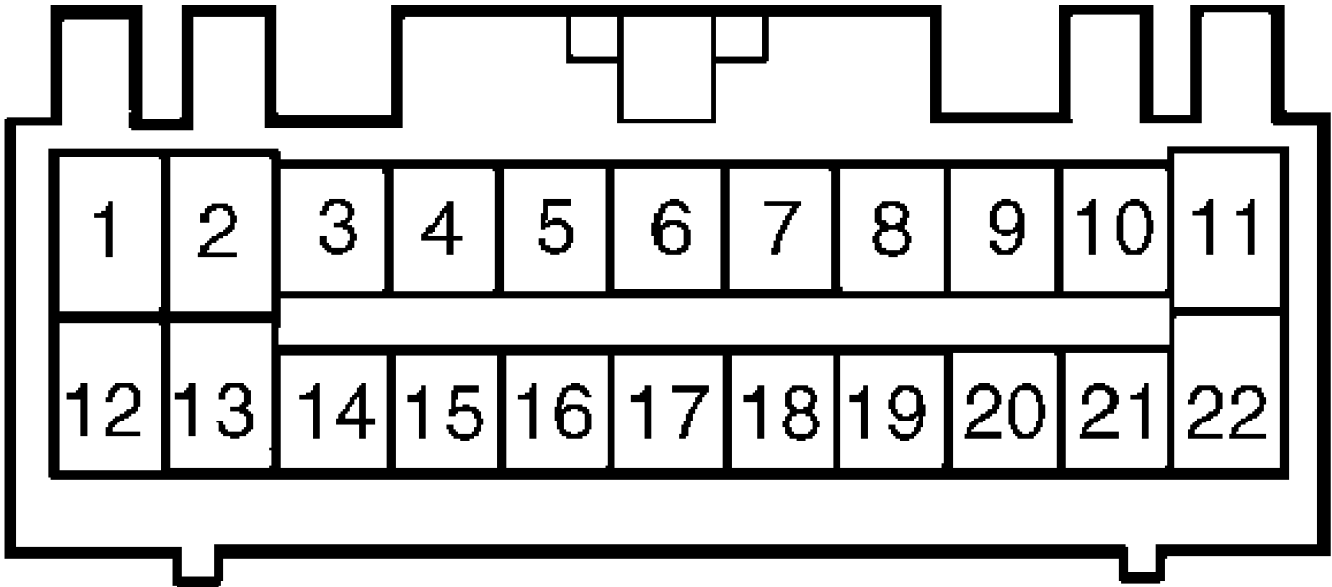
Land Cruiser & Lexus LX470

Disconnect control panel 22-pin connector C9. See Figs. 5 and 13. Use DVOM to check circuits as specified. See CONTROL PANEL SWITCH CIRCUIT TEST TABLE (LAND CRUISER/LEXUS LX470). If readings are as specified, replace switch and retest system. If readings are not as specified, repair circuit as necessary. If readings are as specified, replace defogger switch and retest system.

CONTROL PANEL SWITCH CIRCUIT TEST TABLE (LAND CRUISER/LEXUS LX470)

Between Terminal No. & Ground (1)		Condition	Specification
22	.....	All	..... Continuity
12	.....	All	..... Battery Voltage
1	.....	IGN In LOCK/ACC	..... Zero Volts
1	.....	IGN In ON	..... Battery Voltage
2	.....	IGN In LOCK/ACC	..... Zero Volts
2	.....	IGN In ON	..... Battery Voltage

(1) - See Fig. 13.



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Fig. 13: Control Panel Connector C9 Terminals (Land Cruiser & Lexus LX470)  
Courtesy of Toyota Motor Sales, U.S.A., Inc.

Sienna

Disconnect defogger switch 6-pin connector. See WIRING DIAGRAMS. Use DVOM to check circuits as specified. See DEFOGGER TIMER CIRCUIT TEST TABLE (SIENNA). If readings are not as specified, repair circuit as necessary. If readings are as specified, replace defogger switch and retest system.

DEFOGGER TIMER CIRCUIT TEST TABLE (SIENNA)

Between Terminal No.

& Ground		Condition	Specification
3	.....	All	Continuity
1	.....	IGN In LOCK/ACC	Zero Volts
1	.....	IGN In ON	Battery Voltage
2	.....	IGN In LOCK/ACC	Zero Volts
2	.....	IGN In ON	Battery Voltage

#### 4Runner

Disconnect defogger switch 6-pin connector. See WIRING DIAGRAMS. Use DVOM to check circuits as specified. See DEFOGGER TIMER CIRCUIT TEST TABLE (4RUNNER). If readings are not as specified, repair circuit as necessary. If readings are as specified, replace defogger switch and retest system.

DEFOGGER TIMER CIRCUIT TEST TABLE (4RUNNER)

Between Terminal No. & Ground		Condition	Specification
4	.....	All	Continuity
2	.....	IGN In LOCK/ACC	Zero Volts
2	.....	IGN In ON	Battery Voltage
6	.....	IGN In LOCK/ACC	Zero Volts
6	.....	IGN In ON	Battery Voltage

## INSTRUMENT PANEL JUNCTION BLOCK TESTS (REAR DEFOGGER)

#### RAV4 (Circuit Test)

Remove instrument panel junction block located under driver's side of instrument panel. Inspect 23-pin connector "A" terminals with DVOM by backprobing specified terminals. Disconnect junction block 15-pin connector "B". Test specified terminal. See JUNCTION BLOCK CONNECTOR CIRCUIT TEST table.

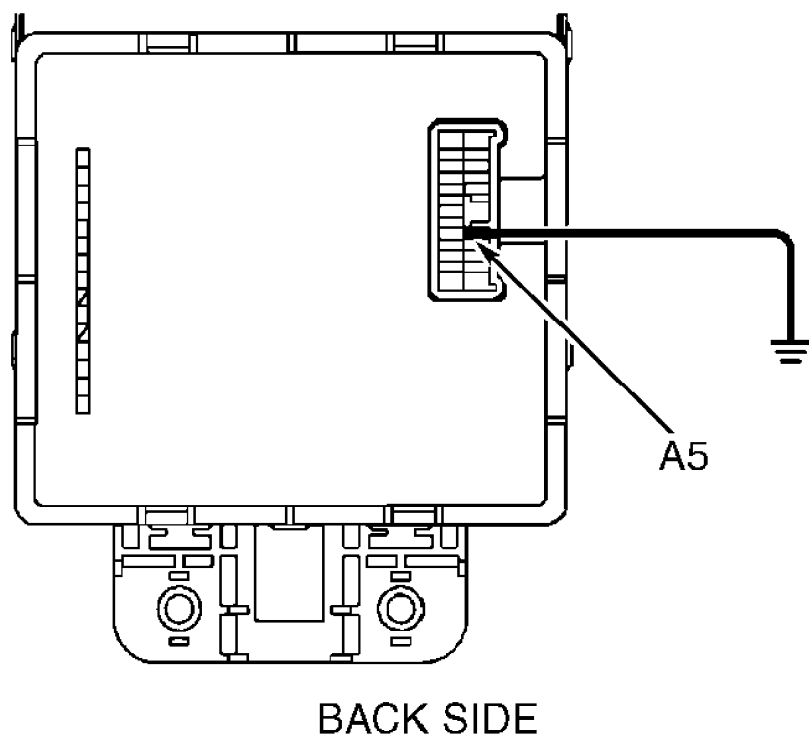
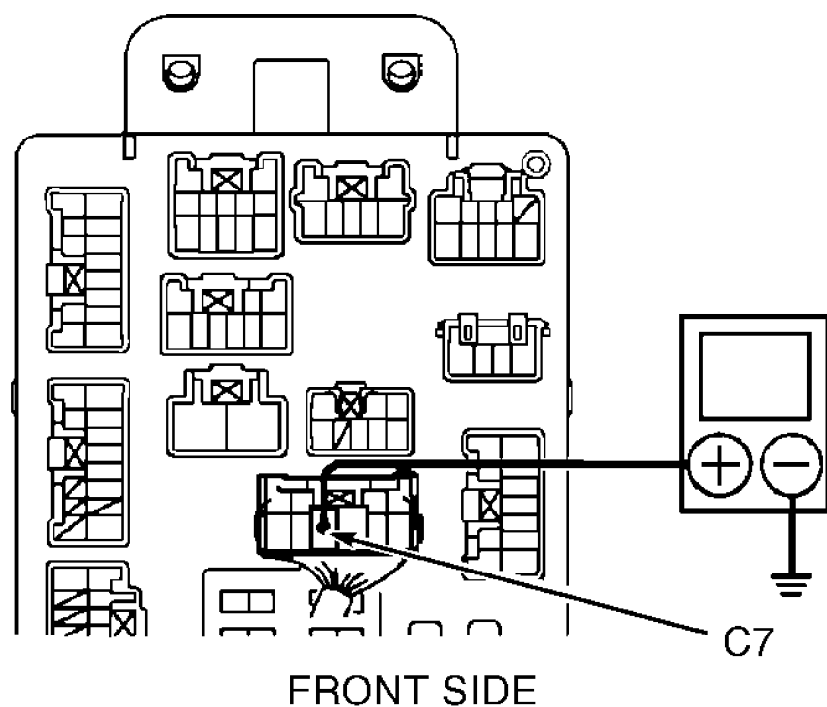
See WIRING DIAGRAMS. If circuit is okay, replace relay. If circuit is not okay, repair as necessary. See WIRING DIAGRAMS.

#### RAV4 (Operation Check)

Disconnect 23-pin connector "A" from junction block. Connect positive lead of DVOM to junction block terminal C7 and negative lead to ground. Connect jumper wire between 23-pin connector "A" cavity terminal A5 and ground. See Fig. 14. If continuity is not indicated, replace junction block.

JUNCTION BLOCK CONNECTOR CIRCUIT TEST TABLE

Connect Between		Switch Position	Specification
A5 & Ground	.....	ON	Continuity
A11 & Ground	.....	All Positions	Continuity
B4 & Ground	.....	All Positions	Continuity
B3 & Ground	.....	All Positions	Battery Voltage



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Fig. 14: Identifying Junction Block Connector Terminals (RAV4)  
 Courtesy of Toyota Motor Sales, U.S.A., Inc.

#### REARVIEW MIRROR DEFOGGER OPERATION

#### Avalon

Locate and disconnect outside rearview mirror 6-pin connector. Connect battery positive lead to terminal No. 6 (Black/Red wire), and battery negative lead to terminal No. 4 (White/Black wire). After a short time, ensure mirror becomes warm. If mirror does not become warm, replace mirror assembly.

#### Camry

Locate and disconnect outside rearview mirror 6-pin connector. Connect battery positive lead to terminal No. 4 and battery negative lead to terminal No. 6. See WIRING DIAGRAMS. After a short time, ensure mirror becomes warm. If mirror does not become warm, replace mirror assembly.

#### Land Cruiser & Lexus LX470

Locate and disconnect outside rearview mirror 16-pin connector. Connect battery positive lead to terminal No. 5, and battery negative lead to terminal No. 12. See WIRING DIAGRAMS. After a short time, ensure mirror becomes warm. If mirror does not become warm, replace mirror assembly.

#### Sienna

Locate and disconnect outside rearview mirror 6-pin connector. Connect battery positive lead to terminal No. 4, and battery negative lead to terminal No. 6. See WIRING DIAGRAMS. After a short time, ensure mirror becomes warm. If mirror does not become warm, replace mirror assembly.

#### Supra

Locate and disconnect outside rearview mirror 5-pin connector. Connect battery positive lead to terminal No. 2, and battery negative lead to terminal No. 1. See WIRING DIAGRAMS. After a short time, ensure mirror becomes warm. If mirror does not become warm, replace mirror assembly.

### REARVIEW MIRROR DEFOGGER TIMER OPERATION

#### Land Cruiser & Lexus LX470

1) Remove climate control panel and disconnect 4 connectors. Connect fused jumper between battery voltage and connector C9 terminals No. 2 and 12. Connect ground to terminal No. 22 (switch side). See Fig. 5.

2) Connect DVOM positive lead to connector C6 terminal No. 51 and negative lead to ground. With rearview mirror defogger switch in OFF position, battery voltage should be indicated. Go to next step.

3) Turn rearview mirror defogger switch to ON position and monitor DVOM. Reading should be less than one volt. After approximately 15 minutes, the timer should turn the defogger off and the reading should be 12 volts. If readings are not as specified, replace A/C amplifier. See A/C AMPLIFIER under REMOVAL & INSTALLATION.

### REARVIEW MIRROR DEFOGGER CIRCUIT

#### Supra

1) Locate and disconnect outside rearview mirror 5-pin connector. Ensure continuity exists between ground and 5-pin harness-side connector terminal No. 1. See WIRING DIAGRAMS. If continuity exists, go to next step.

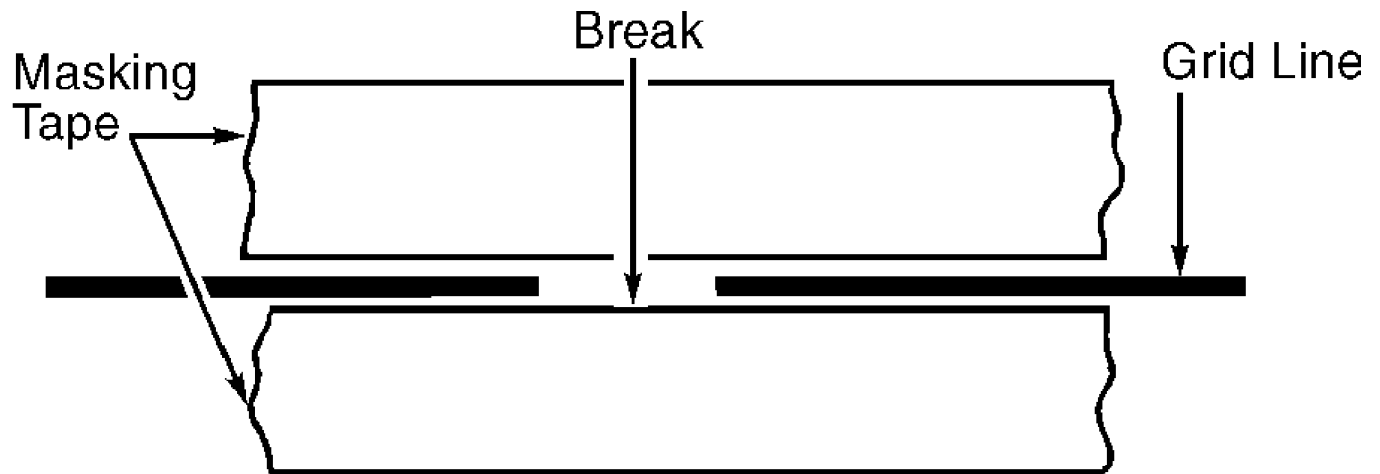
2) Turn ignition on and defogger switch off. Ensure no voltage exists between ground and 5-pin harness-side connector terminal No. 2. Turn ignition and defogger switch on. Ensure battery voltage exists between ground and 5-pin harness-side connector terminal No. 2. If harness side circuit is not as specified, inspect

other related components and/or harnesses.

## ON-VEHICLE SERVICE

### GRID FILAMENT REPAIR

Clean broken wire tips thoroughly. Place masking tape along both sides of broken wire. See Fig. 15. Apply Repair Paste (DuPont 4817) to broken section of grid. Remove masking tape after paste has dried. Wait 24 hours before using defogger.



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Fig. 15: Repairing Rear Defogger Grid Filament  
Courtesy of Toyota Motor Sales, U.S.A., Inc.

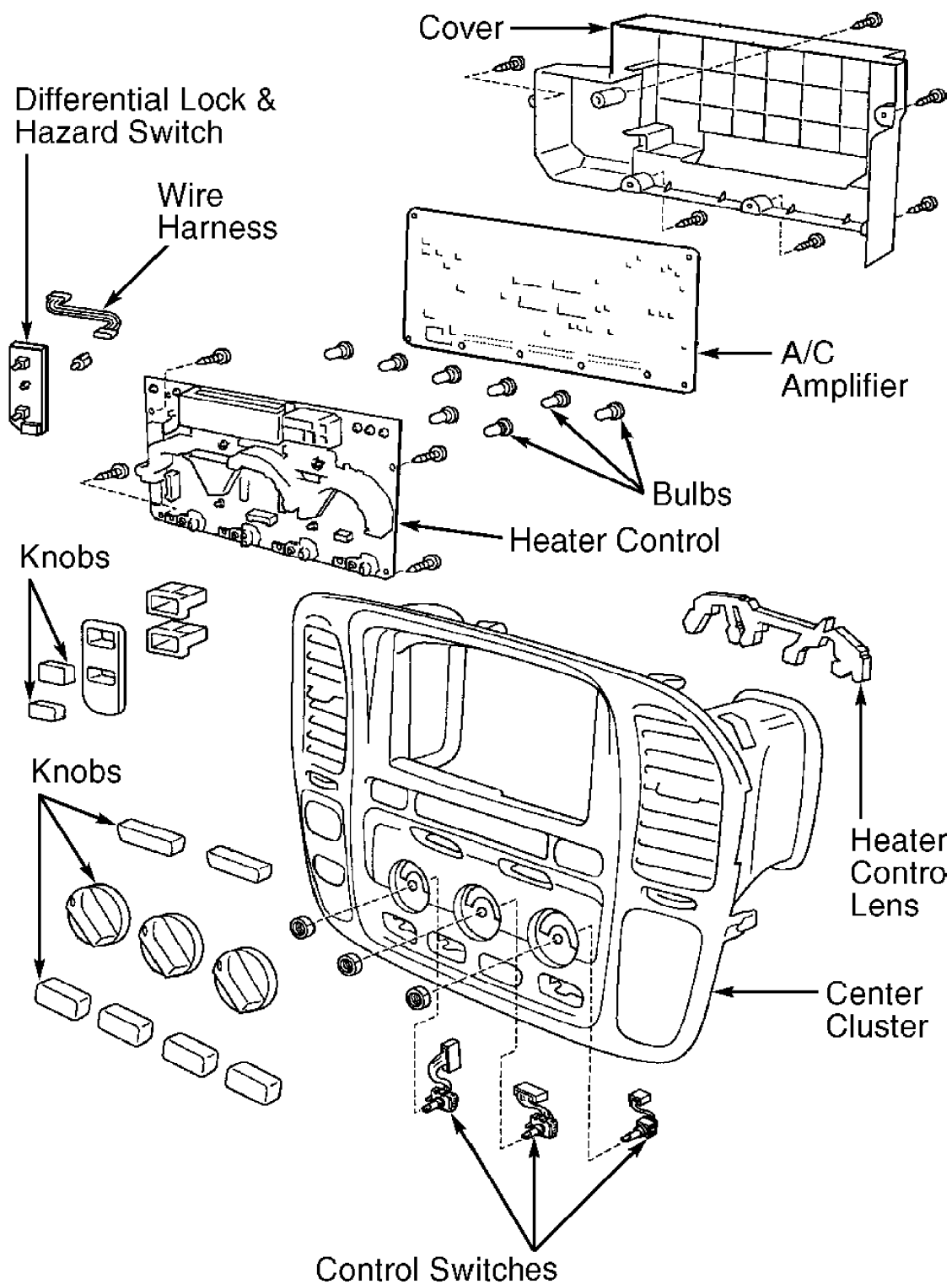
## REMOVAL & INSTALLATION

### A/C AMPLIFIER

Removal & Installation (Land Cruiser & Lexus LX470)

Disconnect negative battery cable. Using a trim stick, gently pry left side, right side and top of center cluster containing A/C-heater control assembly. Pull panel out far enough to disconnect electrical connectors and cables. To replace A/C amplifier, refer to illustration. See Fig. 16. To install, reverse removal procedure.





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Fig. 16: Exploded View Of Front A/C-Heater Control Assembly (Land Cruiser & Lexus LX470)

Courtesy of Toyota Motor Sales, U.S.A., Inc.

## WIRING DIAGRAMS

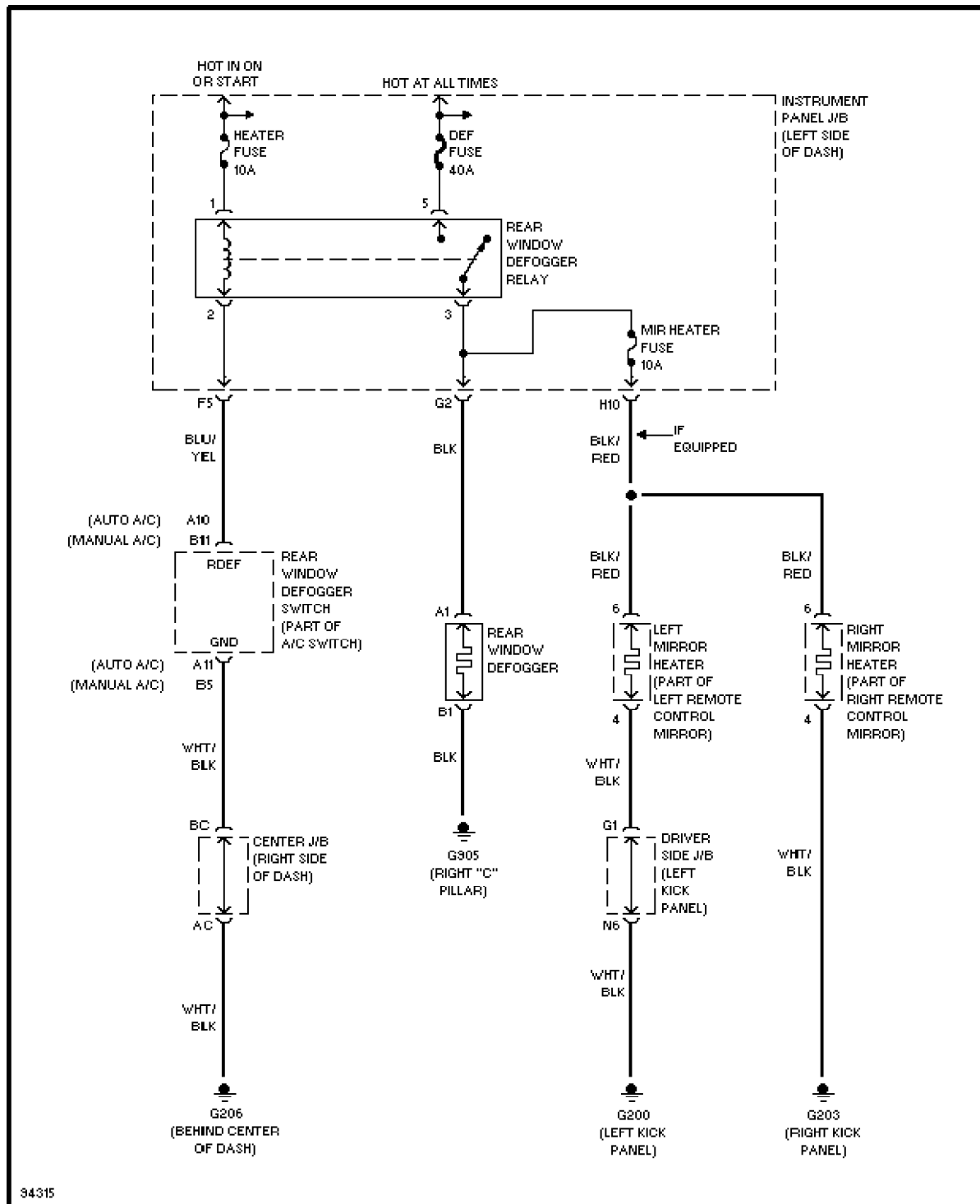


Fig. 17: Rear Window & Mirror Defogger System Wiring Diagram (Avalon)

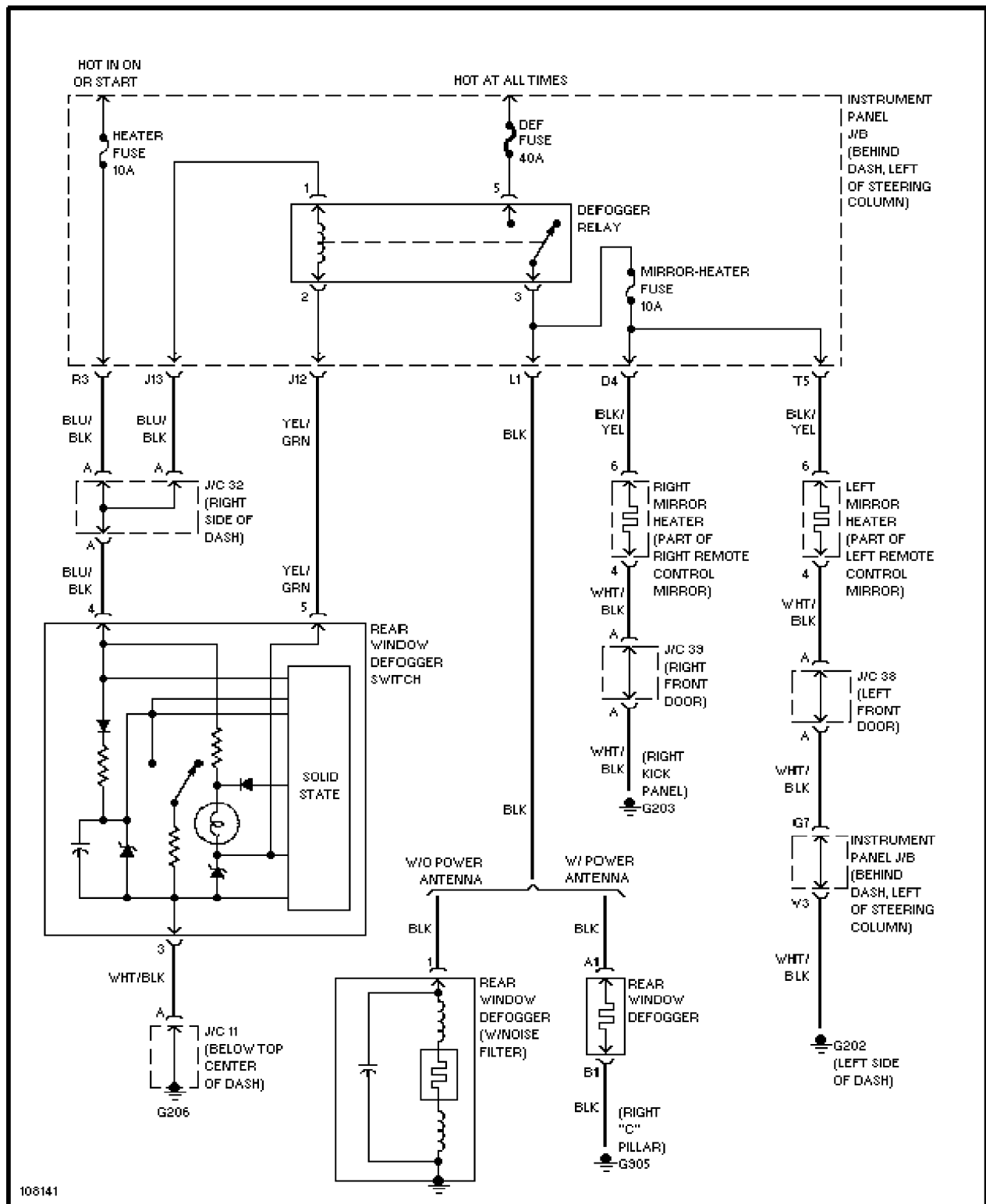
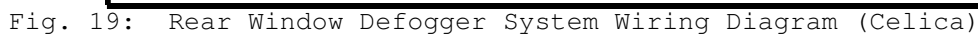


Fig. 18: Rear Window & Mirror Defogger System Wiring Diagram (Camry)



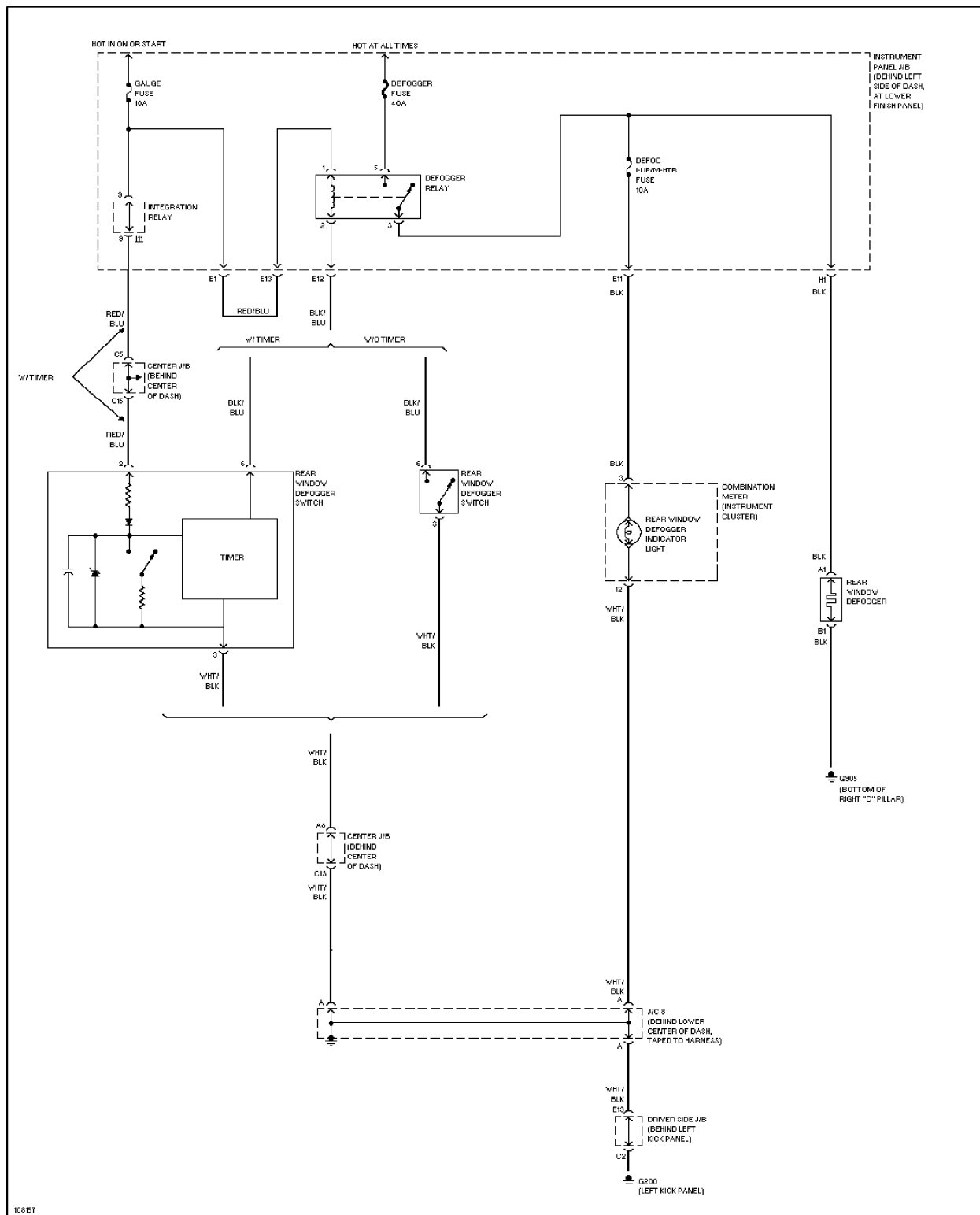
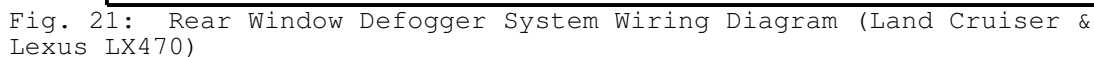


Fig. 20: Rear Window Defogger System Wiring Diagram (Corolla)



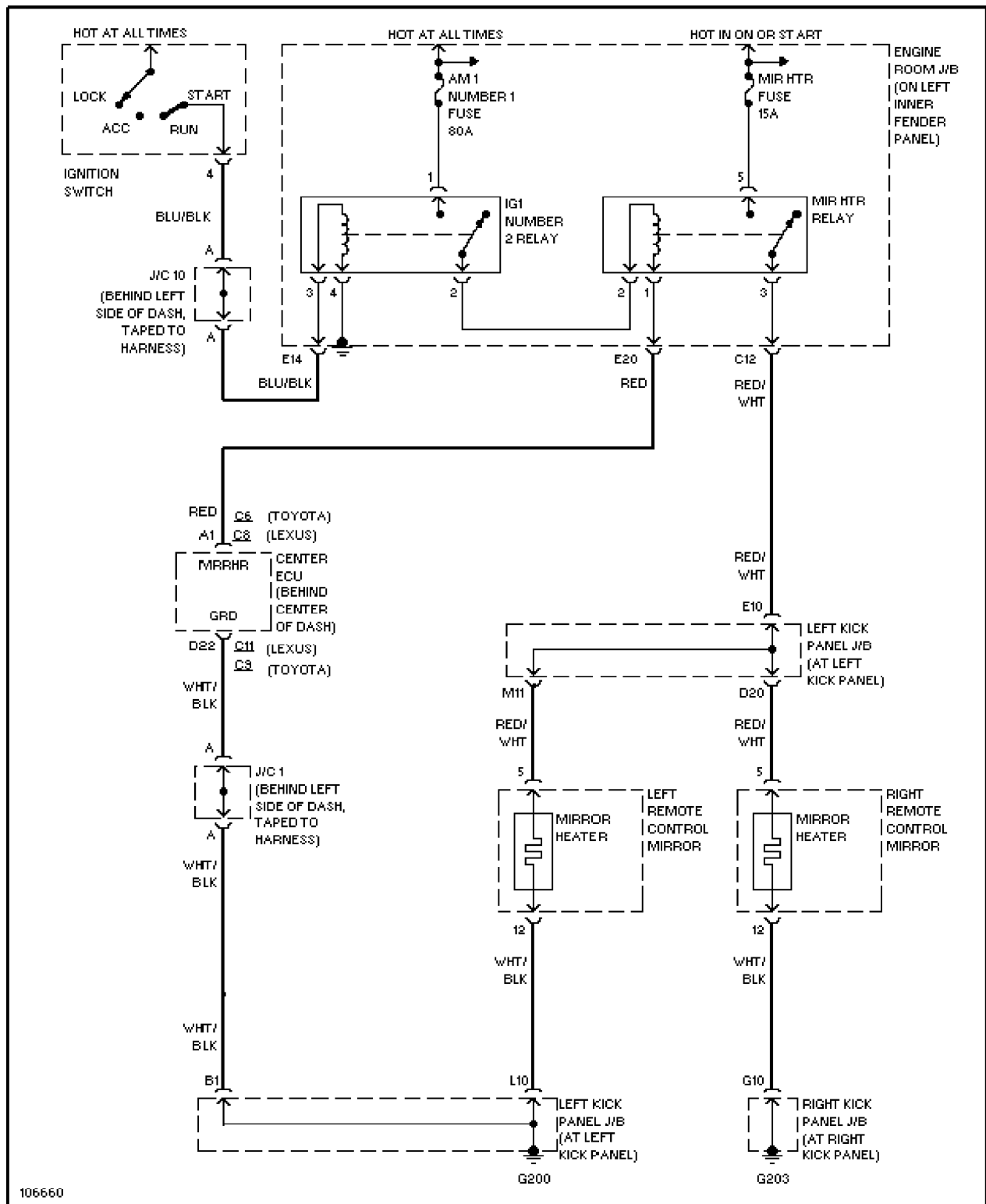


Fig. 22: Mirror Defogger System Wiring Diagram (Land Cruiser & Lexus LX470)

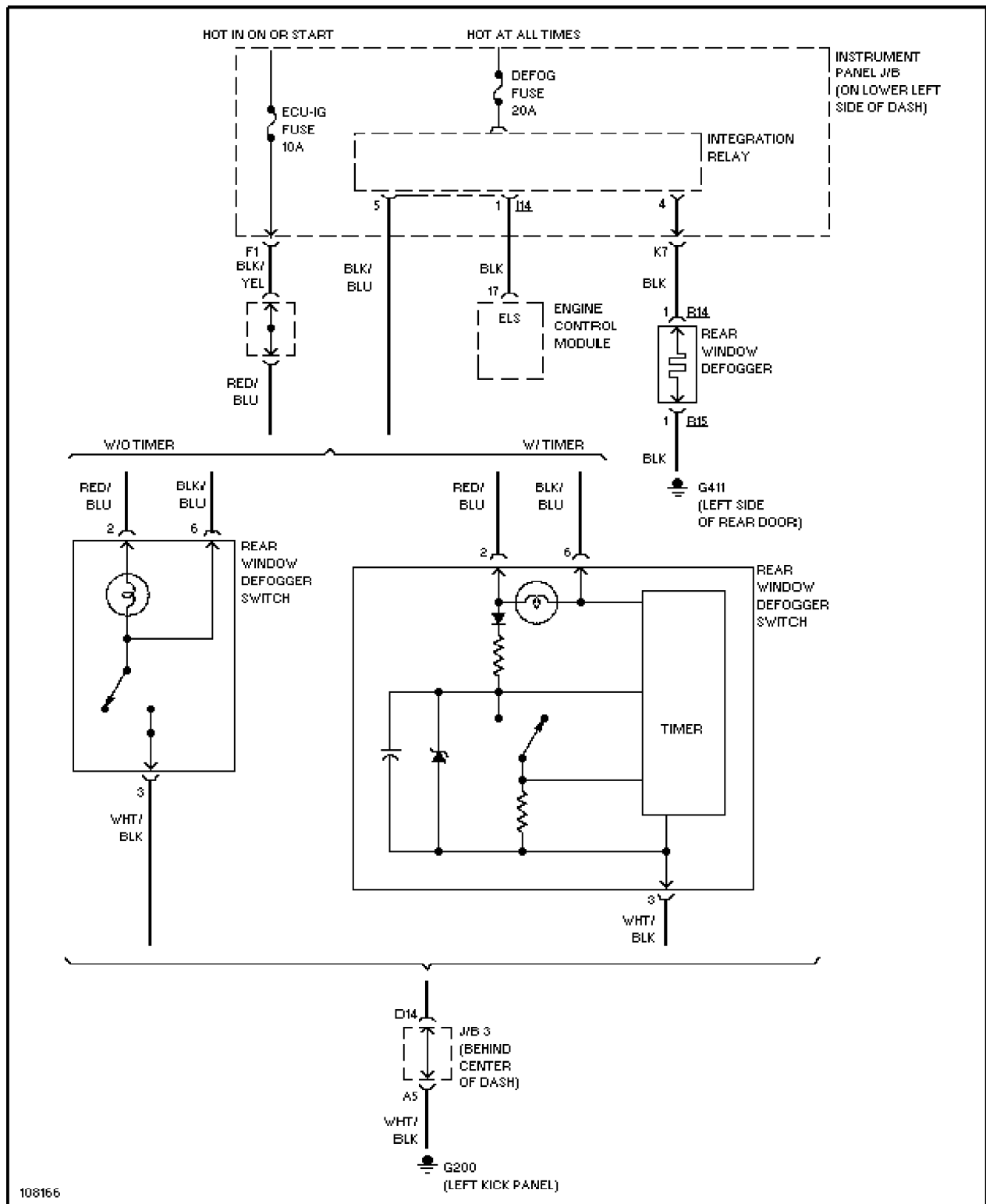


Fig. 23: Rear Window Defogger System Wiring Diagram (RAV4)



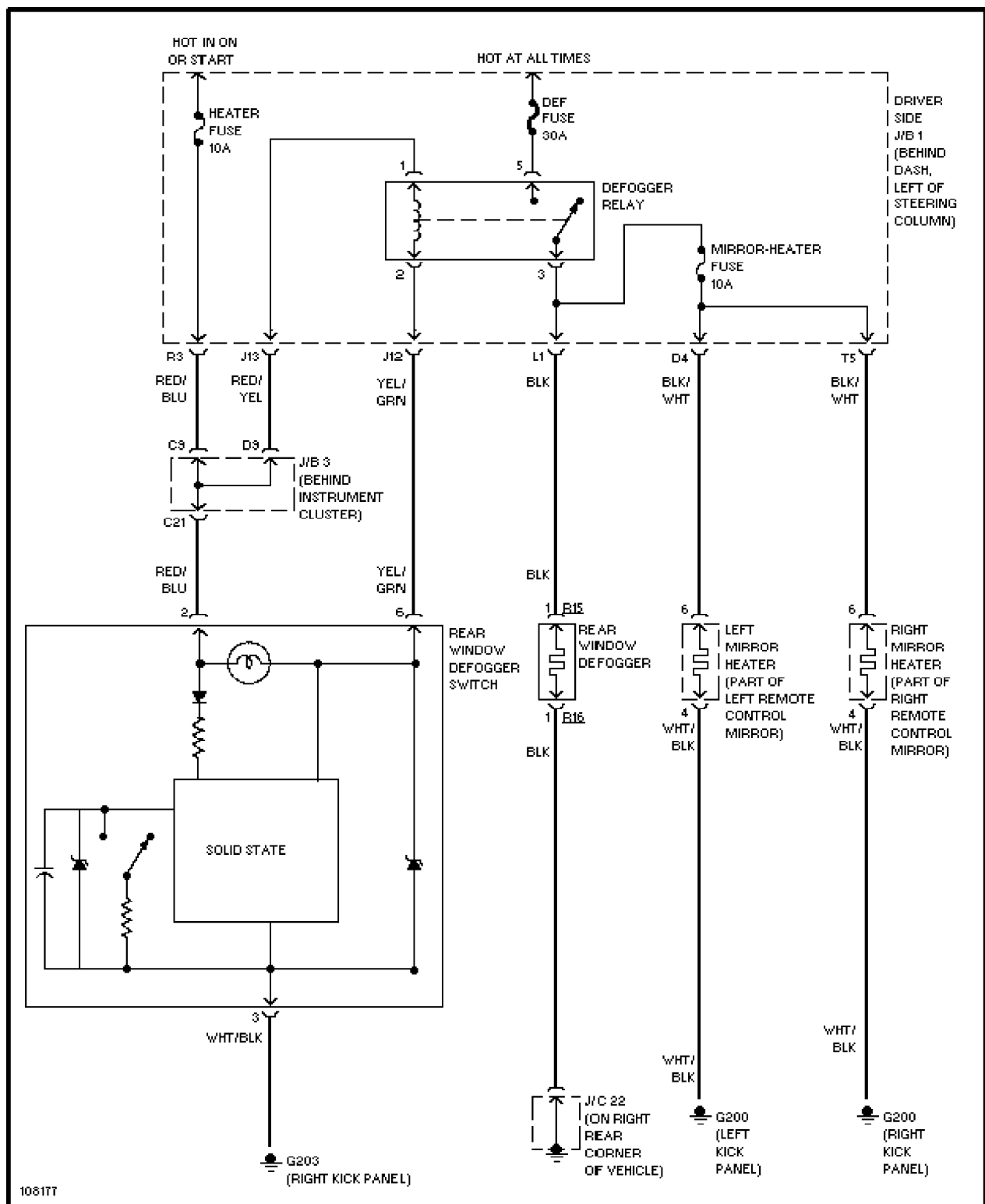


Fig. 24: Rear Window & Mirror Defogger System Wiring Diagram (Sienna)

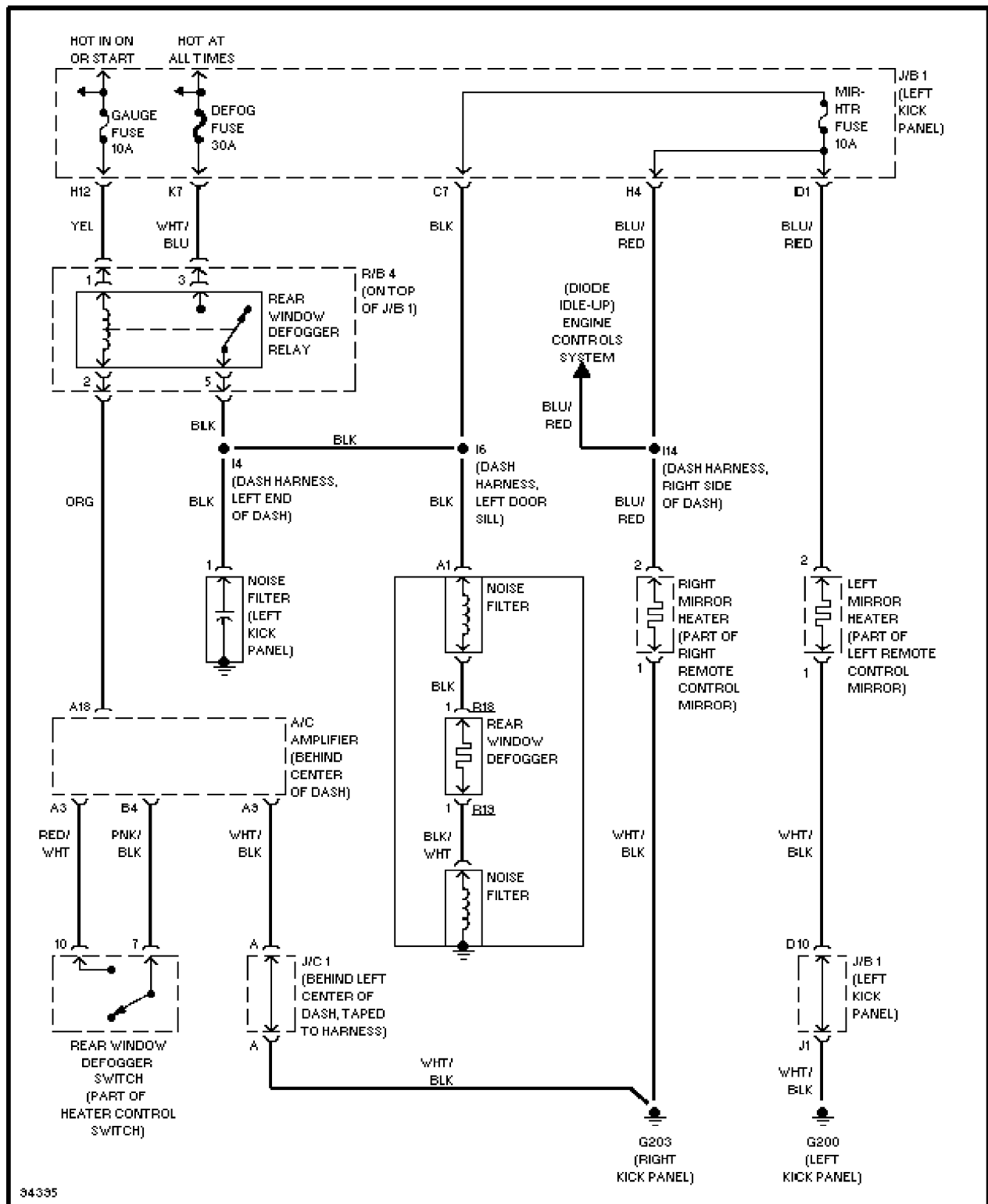


Fig. 25: Rear Window & Mirror Defogger System Wiring Diagram (Supra)

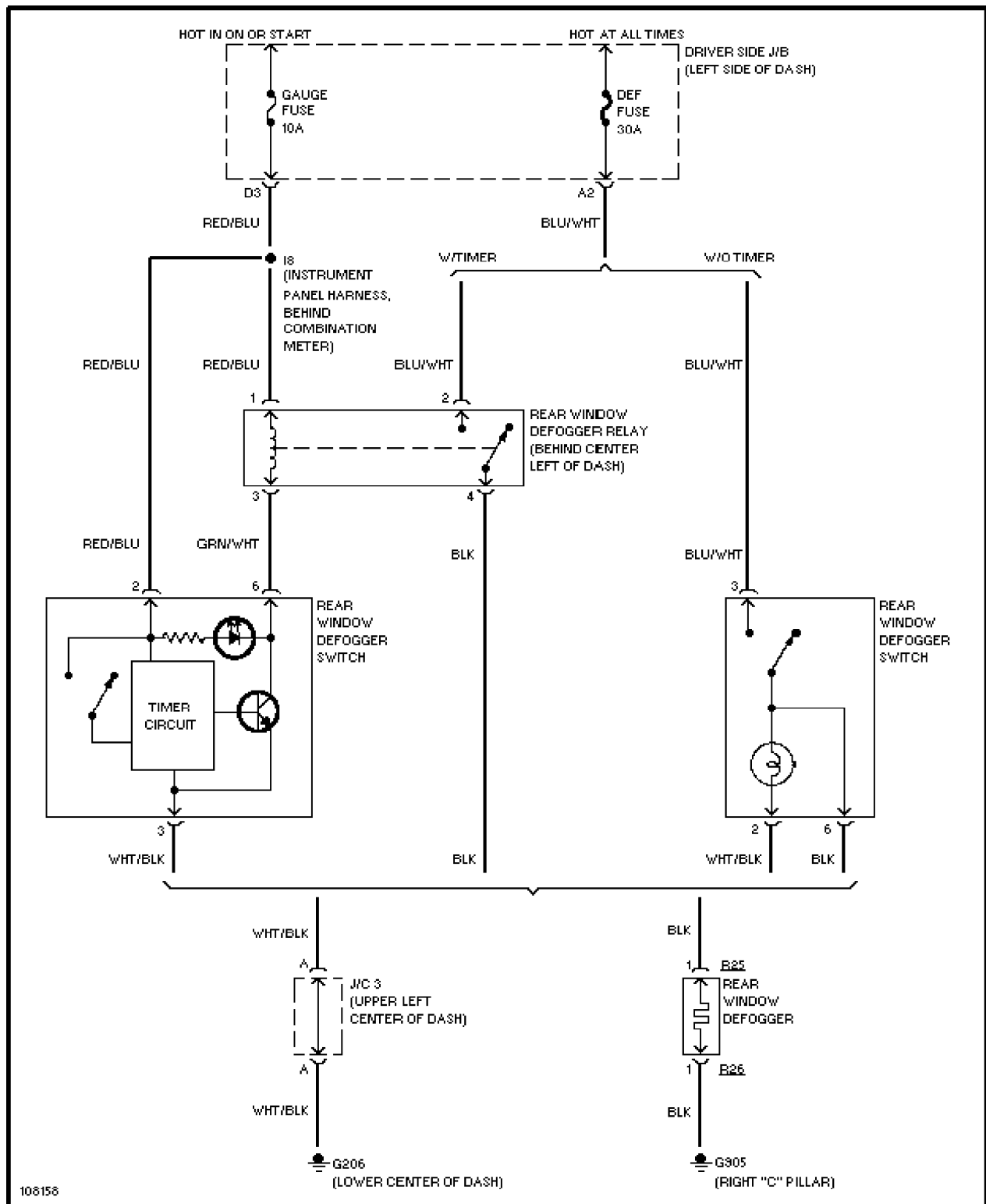


Fig. 26: Rear Window Defogger System Wiring Diagram (Tercel)

