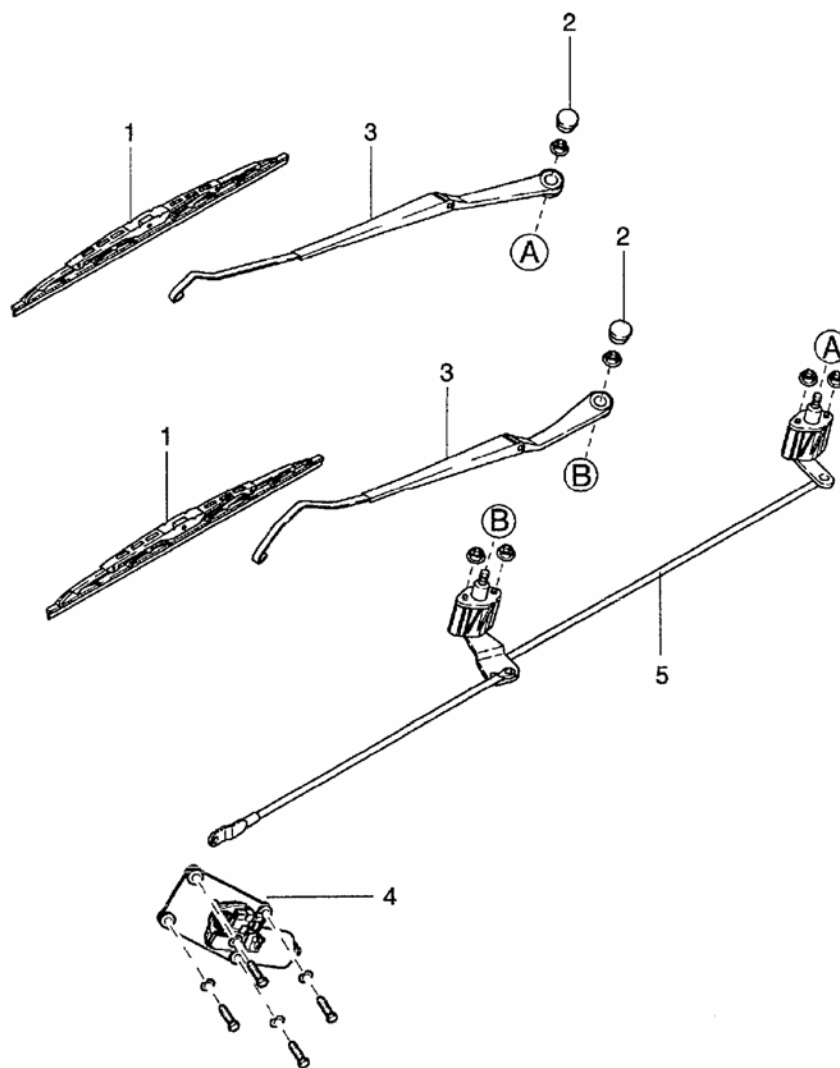


2002 ACCESSORIES & EQUIPMENT

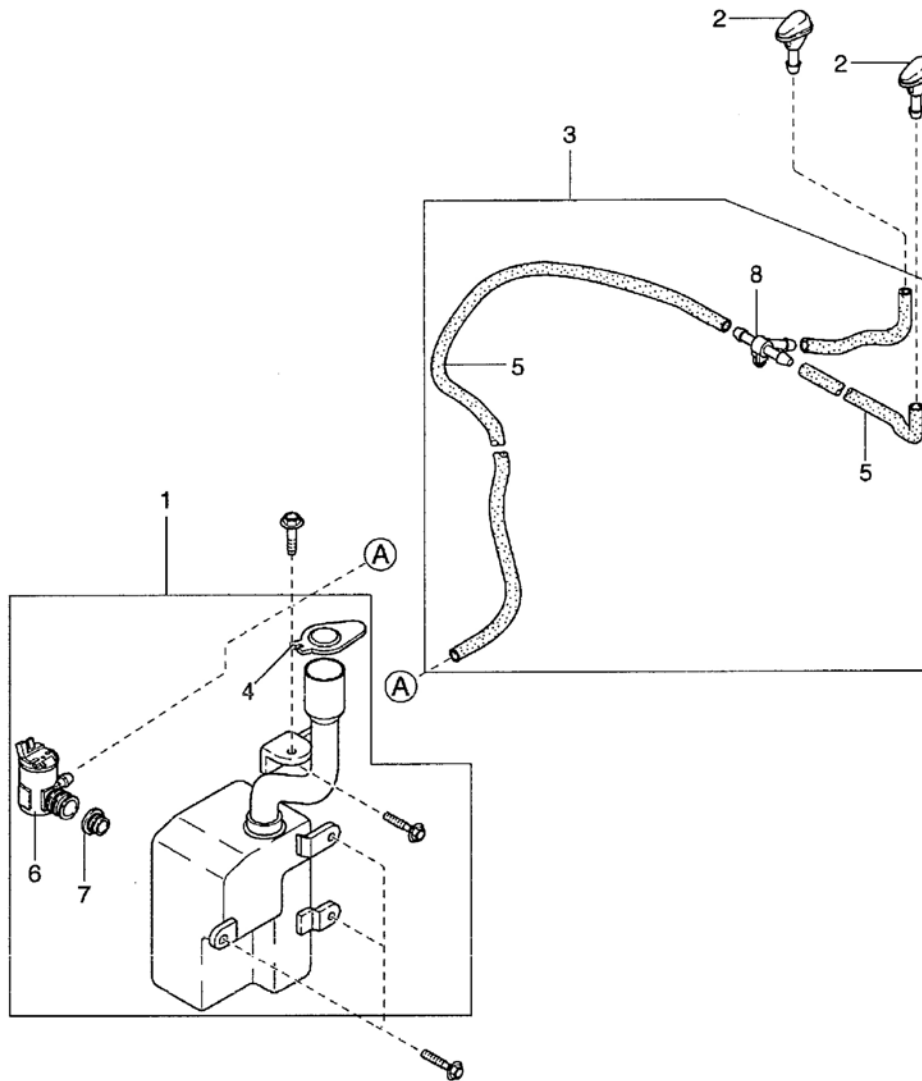
Wiper/Washer Systems - Sedona

FRONT WIPER/WASHER SYSTEM



- 1. Wiper blade
- 2. Wiper arm cover
- 3. Wiper arm
- 4. Motor assembly
- 5. Link assembly

Fig. 1: Illustrating Front Wiper/Washer Components (1 Of 2)
 Courtesy of KIA MOTORS AMERICA, INC.



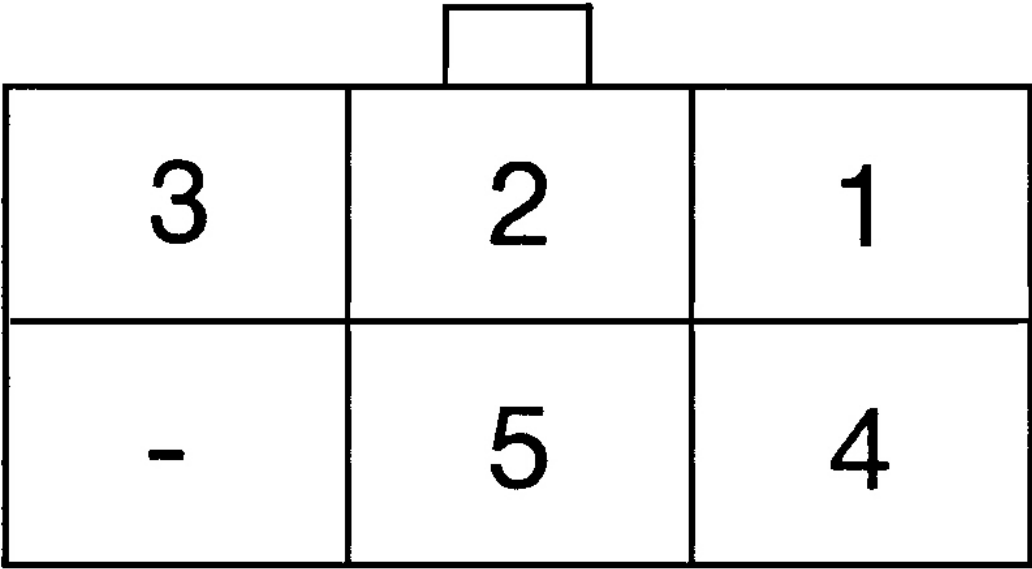
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|-------------------------|-------------------|
| 1. Washer tank assembly | 5. Hose |
| 2. Washer nozzle | 6. Motor assembly |
| 3. Pipe assembly | 7. Grommet |
| 4. Tank cap | 8. Pipe clip |

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Fig. 2: Illustrating Front Wiper/Washer Components (2 Of 2)
 Courtesy of KIA MOTORS AMERICA, INC.

SPEED OPERATION CHECK

- 1. Remove the connector from the wiper motor.
- 2. Attach the positive (+) lead from the battery to terminal 4 and the negative (-) lead to terminal 1.
- 3. Check that the motor operates at low speed.
- 4. Connect the positive (+) lead from the battery to terminal 4 and the negative (-) lead to terminal 2.
- 5. Check that the motor operates at high speed.



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Fig. 3: Illustrating Front Wiper Motor Connector Pinout
Courtesy of KIA MOTORS AMERICA, INC.

AUTOMATIC STOP OPERATION CHECK

- 1. Operate the motor at low speed.
- 2. Stop the motor operation anywhere except at the off position by disconnecting terminal 4.
- 3. Connect the positive (+) lead from the battery to terminal 5 and the negative (-) lead to terminal 1.
- 4. Check that the motor stops running at the off position.

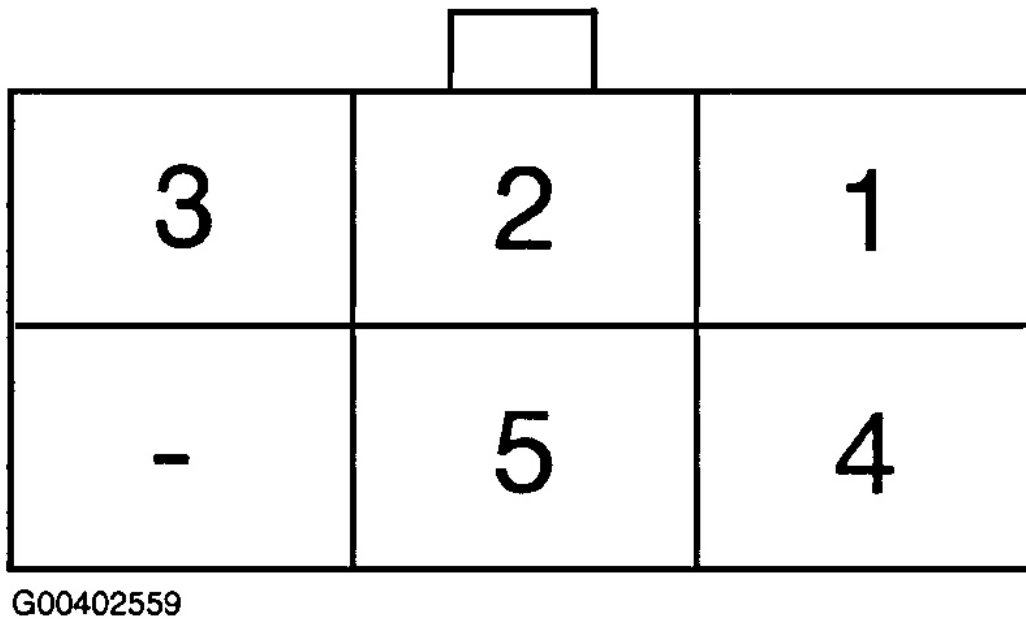


Fig. 4: Illustrating Front Wiper Motor Connector Pinout
Courtesy of KIA MOTORS AMERICA, INC.

WASHER MOTOR OPERATION CHECK

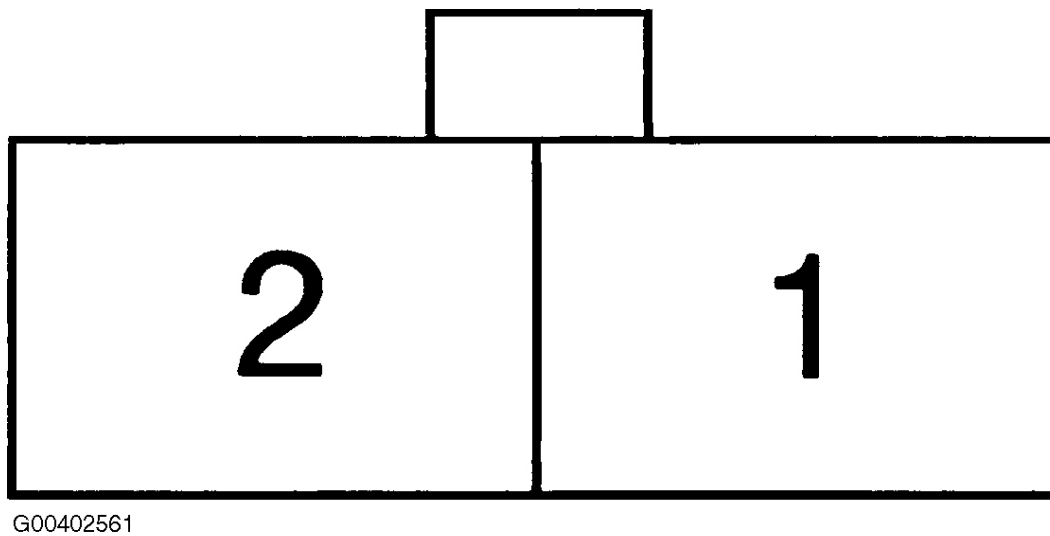


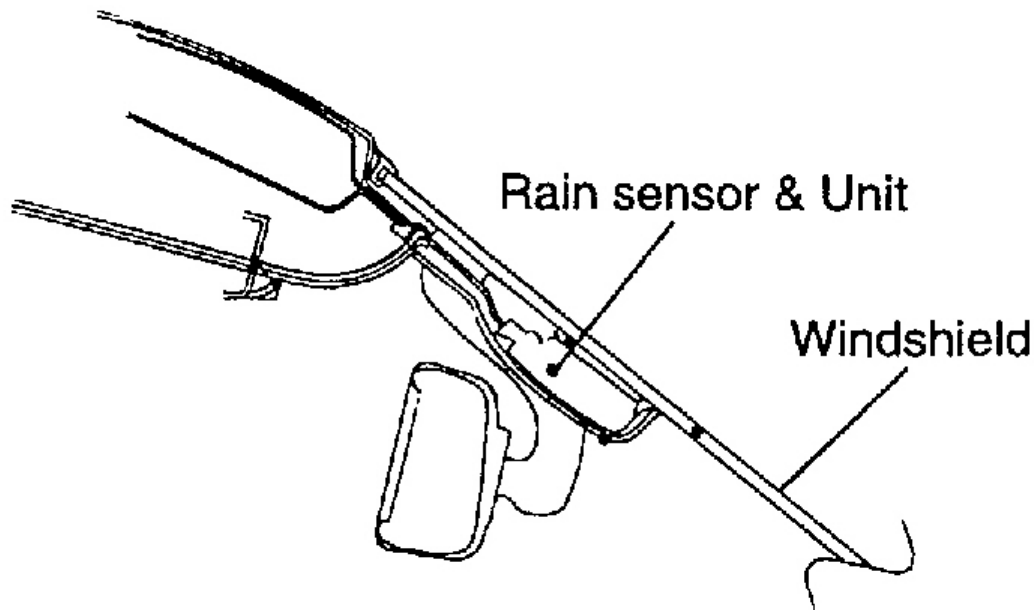
Fig. 5: Illustrating Front Washer Motor Connector

Courtesy of KIA MOTORS AMERICA, INC.

RAIN SENSOR

DESCRIPTION

The rain sensing windshield wiper system is a wiper system that, in addition to providing normal wiper functions off, mist, manual low speed, manual high speed, and washer, provides automatic control of automatic int, automatic low, and automatic high speeds.



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Fig. 6: Locating Rain Sensor Unit

Courtesy of KIA MOTORS AMERICA, INC.

MULTI FUNCTION SWITCH POSITION	RAINSENSOR OPERATING MODE	SENSOR ACTION
MIST	MIST	Mist is controlled by the column switch. The sensor has no affect on this function.
OFF	OFF	If not already parked, wiper motor moves with low speed until blades are inthe depressed park position.
AUTOMATIC Automatic mode has 9 sensitivity ettings.	AUTOMATIC	Automatic INT/speed control The sensitivity to raindrop accumulation on the windshield is set by the multifunction switch sensitivity adjustment.
LOW SPEED	MANUAL	Wiper motor runs continuously in low speed for example 45 wipes/minute. The sensor has no affect on this function.
HI SPEED	MANUAL	Wiper motor runs continuously with high speed for example 60 wipes/minute. The sensor has no affect on this function.
WASHER When washer switch is turned on during 0.6 sec or more	WASHER	If washer switch is turned on during 0.6 sec or more, the wiper operate during 2.5~3.8 sec.
WASHER When washer switch is turned on during 0.6 sec or less	WASHER	If washer switch is turned on during 0.6 sec or less, the wiper operate only one time.

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Fig. 7: Rain Sensor Functional Chart
Courtesy of KIA MOTORS AMERICA, INC.

OFF MODE

With the wiper switch "OFF" the ignition switch "ON" the rain sensor is considered to be in the "OFF" mode.

In this mode, the sensor commands the wiper motor to be "OFF".

AUTOMATIC MODE

When the multifunction switch is moved to auto position and the ignition switch is in the run or accessory positions, the rain sensor is considered to be in "automatic" mode.

Once a single "instant wipe" has occurred, the wipers remain at "inner wipe/park" until the rain sensor determines that the dwell time at that position is appropriate for the amount of precipitation an the windshield, rain sensor provides input to the wiper motor to activate the wipers to clear the precipitation from the windshield.

AUTOMATIC INT

For all automatic int, operations the rain sensor commands the wipers to operate in low speed for one wipe, followed by a variable dwell period in the inner wipe position.

AUTOMATIC LOW

Automatic low speed operation is utilized when the amount of precipitation impinging on the windshield

exceeds the automatic int to automatic low threshold.

This threshold includes sufficient hysteresis to prevent cycling between automatic int and automatic low speed operation with a steady amount of precipitation accumulation on the windshield.

AUTOMATIC HIGH

Automatic high speed operation utilized when the amount of precipitation impinging on the windshield exceeds the automatic low to automatic high threshold.

This threshold includes sufficient hysteresis to prevent cycling between automatic low and automatic high speed operation with a steady amount of precipitation accumulation on the windshield.

WASHER MODE

The rain sensor monitors the multifunction switch to determine if the washer function is selected.

Rain sensor enables the wiper motor to run in low speed during the washer mode and performs wipes from 2.5 to 3.8 sec.

MANUAL MODE

The rain sensor determines when a manual mode such as manual low, mist, off or manual high is selected.

The column performs these modes and the rain sensor has no affect.

REPLACEMENT

The rain sensor module is mounted to the opto coupler using two snap fit stainless steel clips.

This allows the rain sensor module to be easily removed and replaced in the event of a rain sensor module failure.

If the windshield requires replacement, the existing rain sensor module may be unsnapped from the original windshield and reinstalled onto the new windshield.

It is snap-fit to the new opto coupler, an integral portion of the replacement windshield as delivered by the replacement windshield manufacturer.

TROUBLESHOOTING

The rain sensor has two levels of fault detection as described below.

FAULT A

Fault A is indicated when the sensor has detected that the sensor servo operating point is above the expected limits. This is an indication of damage to the windscreen in the area of the coupler of the sensor has been

removed from the coupler.

FAULT B

Fault B is indicated when the sensor has detected that it no longer is responding to rain signals.

This is an indication of damage to the windscreen in the area of the coupler or, more likely, that the sensor has detected an electrical failure within the sensor.

ATTACHMENT GRADE VALUE

Attachment grade is used to determine when fault in A is detected. The attachment grade value is set at 140. This allows the product to operate in all conditions other than the most severe damage to the windscreen.

USE SENSITIVITY ADJUSTMENT TO INDICATE FAULT

A method to indicate detected faults is available to a service garage technician by using the sensitivity input and the wipers as an indicator. The service method is described as follows.

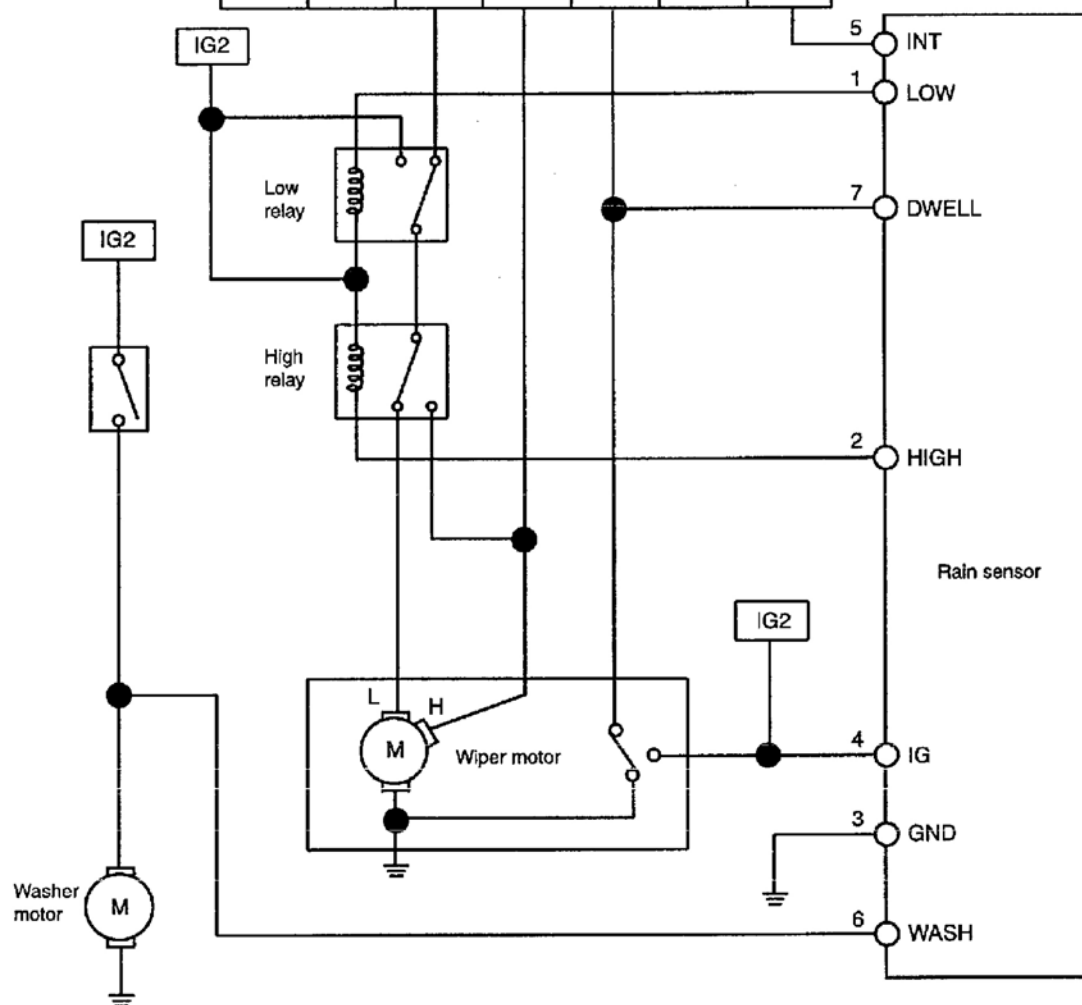
1. With ignition "ON", move the sensitivity adjustment to the high sensitivity setting.
2. Decrease the sensitivity by one setting.
3. If a wipe occurs, then Fault A has been detected and the service technician should assure that the coupler area on the windscreen is not damaged and the sensor is secured to the coupler.
4. Decrease the sensitivity one more setting.
5. If a wipe occurs, then fault B has been detected and the sensor should be removed and replaced with a known good sensor.

CAUTION: When the ignition key is "ON" and the multi function switch is in the auto position the wiper could operate in the following conditions.

- **Be careful not to touch the upper sensor front window glass.**
- **Be careful not to touch the upper sensor front window glass with a cloth.**
- **Be careful not to vibrate the front window glass.**

CIRCUIT

	ONE-TOUCH	LOW	HIGH	AS	IG	INT
OFF	OFF					
	ON					
INT						
LOW						
HIGH						

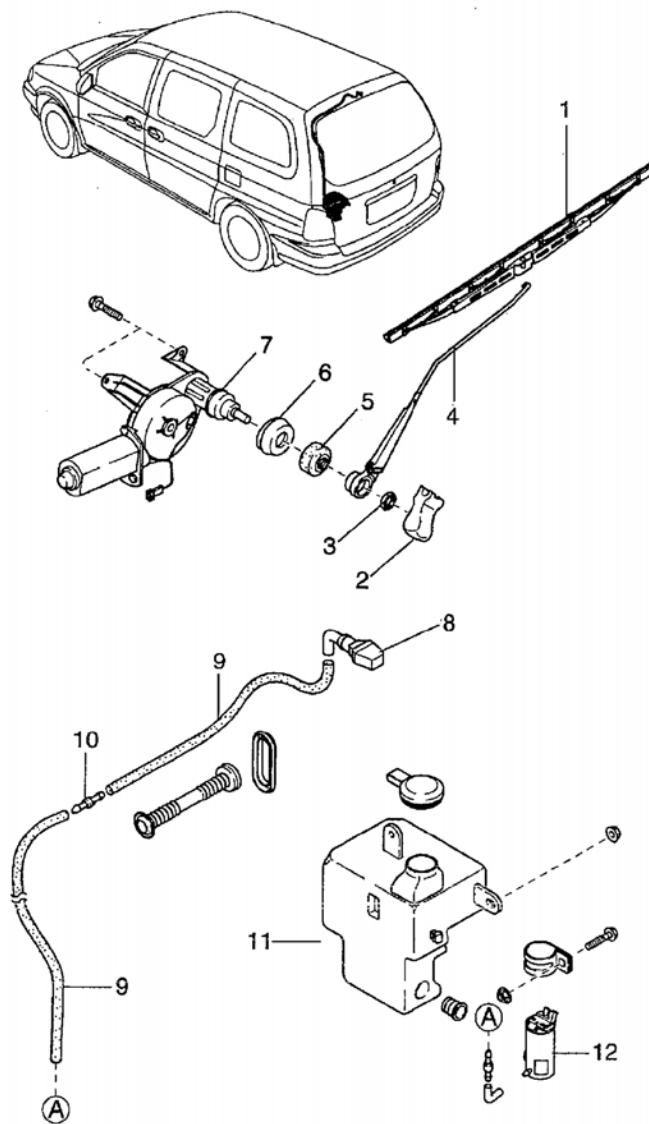


8	7	6	5	4	3	2	1
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Fig. 8: Rain Sensor Circuit Diagram
Courtesy of KIA MOTORS AMERICA, INC.

REAR WIPER/WASHER SYSTEM

COMPONENT



- 1. Wiper blade
- 2. Wiper arm cover
- 3. Nut
- 4. Wiper arm

- 5. Cap seal
- 6. Outer bush
- 7. Motor assembly
- 8. Washer nozzle

- 9. Hose
- 10. Check valve
- 11. Washer tank assembly
- 12. Washer motor

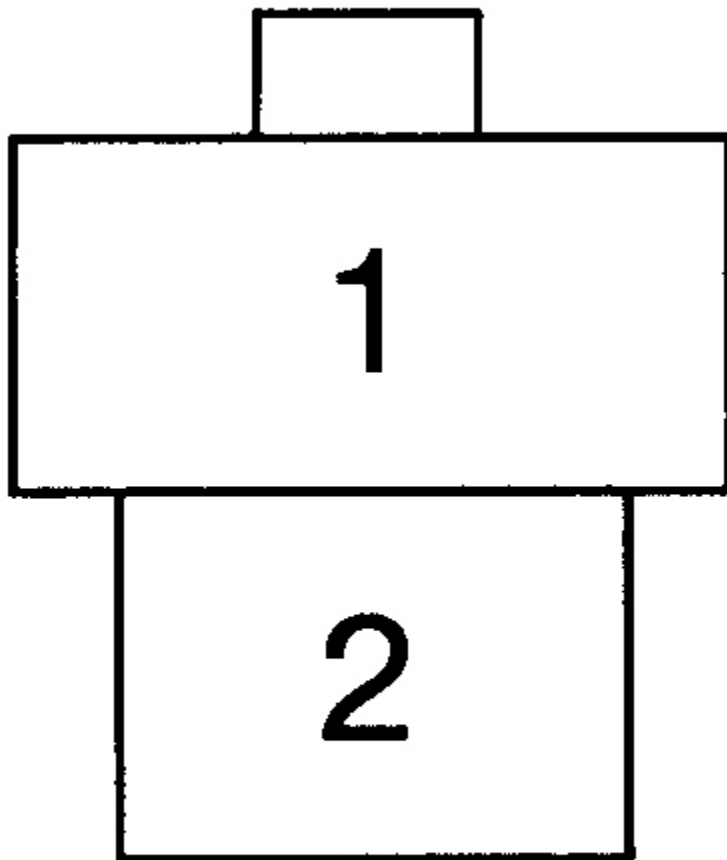
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Fig. 9: Illustrating Rear Wiper/Washer Components
 Courtesy of KIA MOTORS AMERICA, INC.

REAR WIPER/WASHER MOTORS

SPEED OPERATION CHECK

1. Remove the connector from the wiper motor.
2. Attach the positive (+) lead from the battery to terminal 2 and the negative (-) lead terminal 1.
3. Check that the motor operates at low speed.



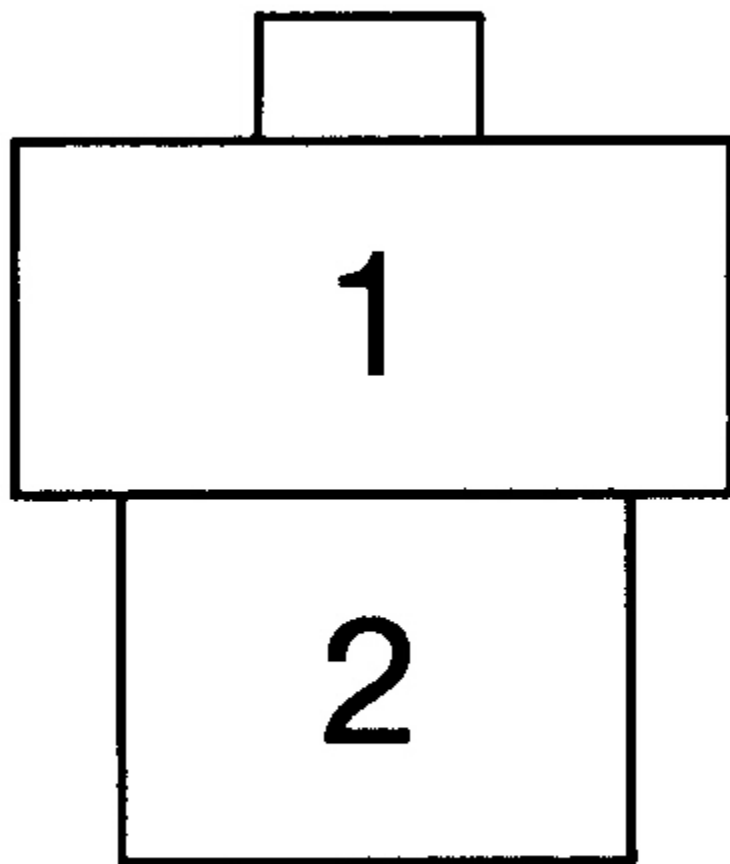
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Fig. 10: Illustrating Rear Wiper Motor Connector
Courtesy of KIA MOTORS AMERICA, INC.

REAR WASHER MOTOR

1. With the washer motor connected to the washer tank, fill the washer tank with water.

2. Connect battery positive (+) and negative (-) cables to terminals 2 and 1 respectively to see that the washer motor runs and water is pumped.

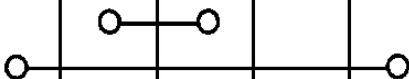

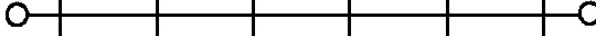






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Fig. 11: Illustrating Rear Washer Motor Connector
Courtesy of KIA MOTORS AMERICA, INC.

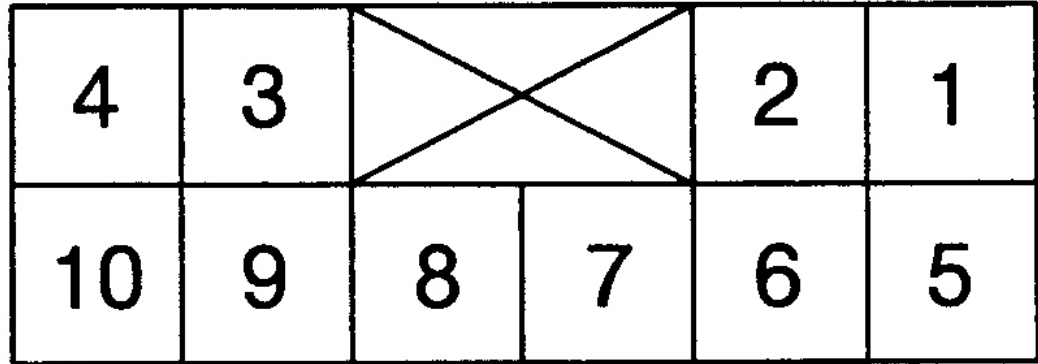
REAR WIPER WASHER SWITCH

Check the continuity between the terminal as shown in table.

Terminal Condition		1	3	4	5	6	8	9
Wiper	ON							
	OFF							
	INT							
Washer (push type)	ON							
	OFF							

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Fig. 12: Testing Rear Wiper/Washer Switch Continuity
Courtesy of KIA MOTORS AMERICA, INC.



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Fig. 13: Illustrating Rear Wiper/Washer Switch Connector Pinout

Courtesy of KIA MOTORS AMERICA, INC.