

ANTI-THEFT SYSTEM

1995 Volvo 850

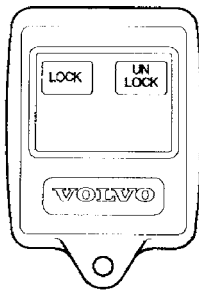
1995-96 ACCESSORIES & EQUIPMENT
Volvo Anti-Theft Systems

850

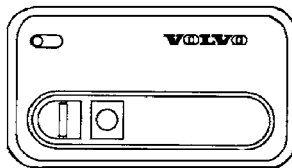
DESCRIPTION & OPERATION

WARNING: Deactivate air bag system before performing any service operation. For 1995 850, see AIR BAG RESTRAINT SYSTEM, for 1996 850, see AIR BAG RESTRAINT SYSTEM article. Do not apply electrical power to any component on steering column without first deactivating air bag system. Air bag may deploy.

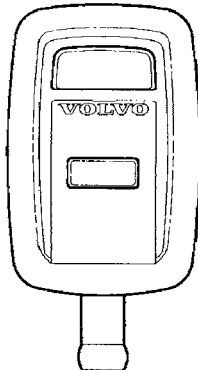
NOTE: Anti-theft alarm system comes in 3 different versions: basic alarm, Guard Alarm I, and Guard Alarm II. See Fig. 1.



BASIC ALARM



GUARD ALARM I



GUARD ALARM II

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Fig. 1: Identifying Alarm System Types
Courtesy of Volvo Cars of North America.

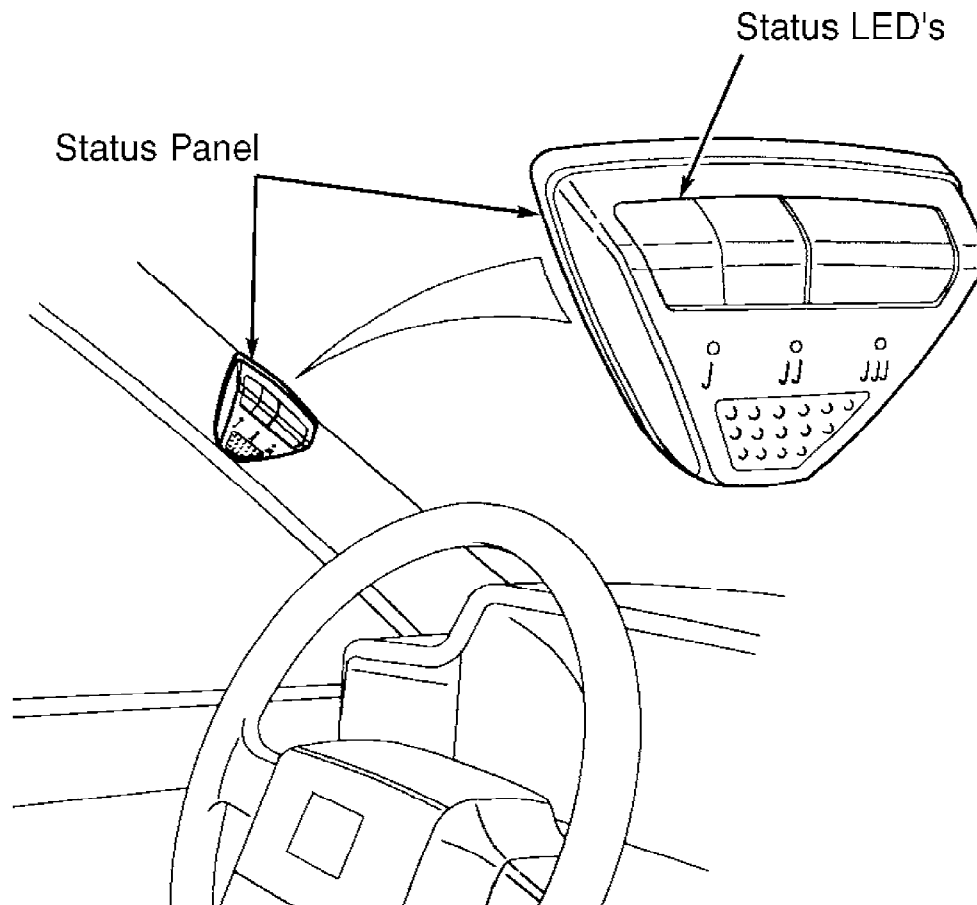
BASIC ALARM

Alarm is activated by LOCK button on remote control or by locking either front door or trunk using standard door keys. Central locking system's remote control, setting device and lock cylinder micro-switches send signals to central locking relay, which in turn sends a control signal to alarm control module.

After 5 seconds, indicator LED goes out and starts flashing. This indicates that alarm has been activated. If any hood, trunk or any door is open when system is activated, LED will not come on. When doors, hood and trunk are closed, LED will start flashing to indicate that all alarm loops have been activated. Alarm is protected by standard door contacts, contact on hood catch, contact on rear window, and starter inhibitor.

GUARD ALARM I

Alarm is activated by pressing remote control button. This sends a series of pulses which are received by a radio receiver. The signal is converted and sent to the control module. When activated, vehicle's turn signals flash for about 2 seconds to confirm that alarm has been set. Status LED will flash to show alarm is activated. See Fig. 2.



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Fig. 2: Locating Status Panel
Courtesy of Volvo Cars of North America.

GUARD ALARM II

Alarm is activated by pressing large button on remote control. Remote control sends a signal to receiver built into control module. Control module decodes the signal and decides whether string of pulses is correct. Alarm activation is indicated by single short flashes from indicator LED. If hood, trunk or any door is open, or if there is a fault, indicator LED will light for 5 seconds, then begin flashing.

RECEIVER PROGRAMMING

BASIC ALARM

NOTE: Programming procedures are not available from the manufacturer.

GUARD ALARM I

1) Ensure alarm is deactivated. Close all doors, hood, and trunk. Turn ignition on. Press function button on status panel until status LED and indicator LED are lit. Release function button. Using status panel function button, advance to unoccupied key code location I, II or III. An occupied location is indicated by a flashing LED. An unoccupied location is indicated by a steadily lit LED. If a code is programmed into an occupied location, the old code is erased.

2) Select one of 3 locations. Send a code signal within 10 seconds using remote control. Alarm will acknowledge an approved code with brief flashes of status and indicator LED's before reverting to standard mode.

GUARD ALARM II

1) Ensure all doors, hood, and trunk are closed. Turn ignition on and off at least 5 times in 10 seconds. Indicator LED should start to flash. Leave ignition on. Once indicator LED starts flashing, first remote control must be programmed within 15 seconds.

2) Press one button on one remote control. Programming is acknowledged by indicator LED lighting for about 2 seconds. Indicator LED will then start flashing for 10 seconds. Program other remote control within 10 seconds while indicator LED is flashing. Turn ignition off. Test remote controls.

SYSTEM TESTS

SELF TEST

NOTE: Following control module test requires use of Volvo Guard Alarm II Programming Box (1399141-9). See Fig. 3.

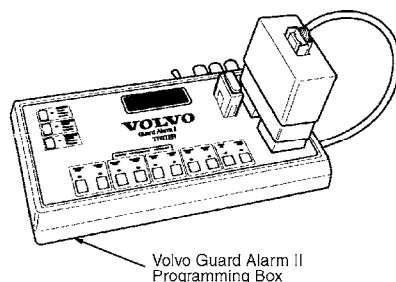


Fig. 3: Identifying Volvo Guard Alarm II Programming Box
Courtesy of Volvo Cars of North America.

Guard Alarm II Control Module

Press button "C" RUN SELF TEST on programming box. Lower display line should read TESTING. If control module is okay, lower line of display will read TEST OK. If control module is faulty, display will read ERRCODE XXX.

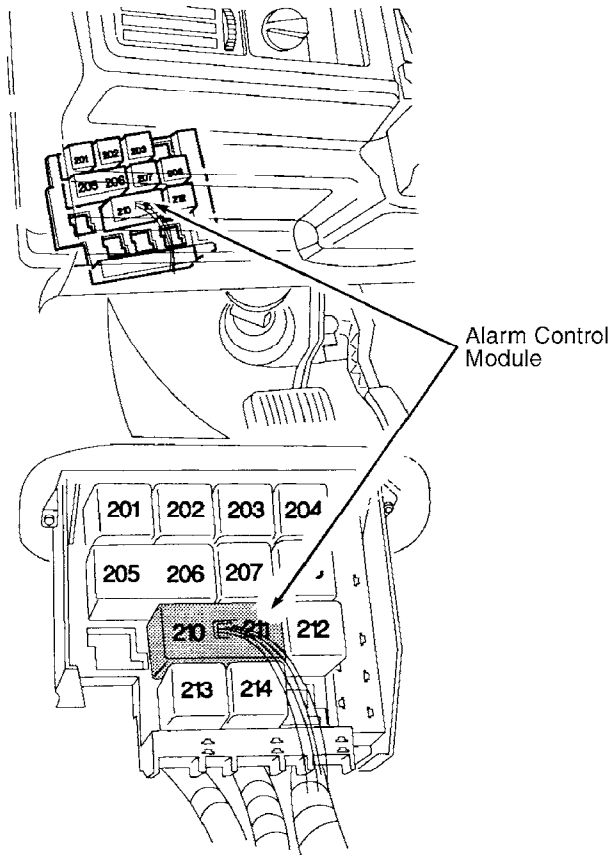
FUNCTIONAL TESTS

No Alarm When Door Is Opened

1) Turn ignition off. Remove alarm control module.

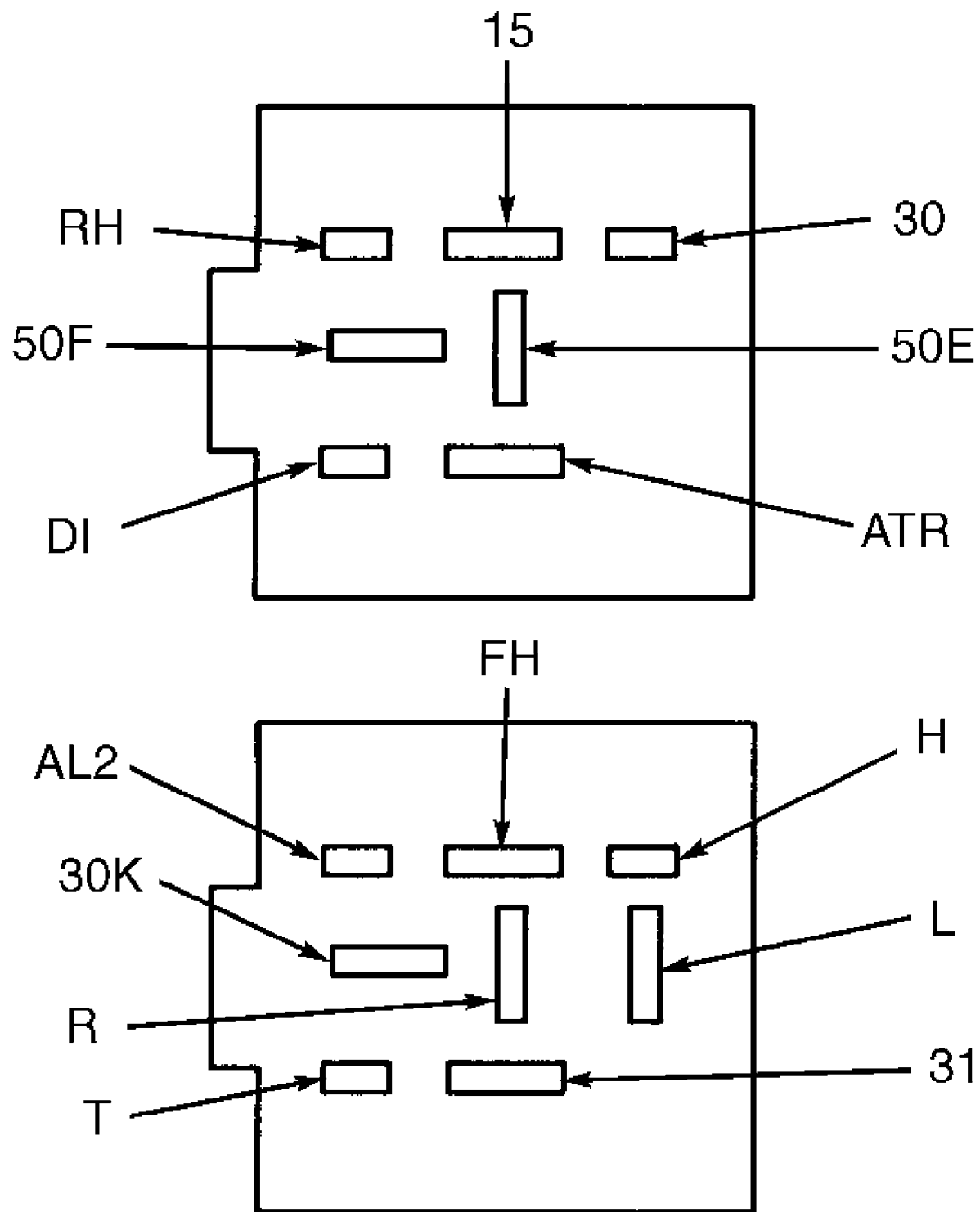
See Fig. 4. Open a door. Connect voltmeter between alarm control module connector terminals "T" and No. 31. See Fig. 5. If voltmeter reads less than one volt, go to next step. If voltmeter does not read less than one volt, check wiring between terminals "T" and No. 31 for a short to voltage.

2) Turn ignition off. Change locking unit in door to locked position by pushing catch in with a screwdriver. Connect voltmeter between alarm control module connector terminals "T" and No. 31. See Fig. 5. Close door. If battery voltage is present, replace alarm control module. If system is Guard Alarm II, perform control module self test before replacing control module. See SELF TEST. If battery voltage is not present, check for open circuit in wiring at alarm control module connector terminal "T".



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Fig. 4: Locating Alarm Control Module
Courtesy of Volvo Cars of North America.



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Fig. 5: Identifying Alarm Control Module Connector Terminals
Courtesy of Volvo Cars of North America.

No Hood Alarm

1) Disconnect hood alarm 2-pin connector. Connect ohmmeter

between connector terminal No. 2 and ground. See Fig. 6. If ohmmeter reads zero ohms, go to next step. If ohmmeter does not read zero ohms, check wiring between hood alarm connector terminal No. 2 and ground.

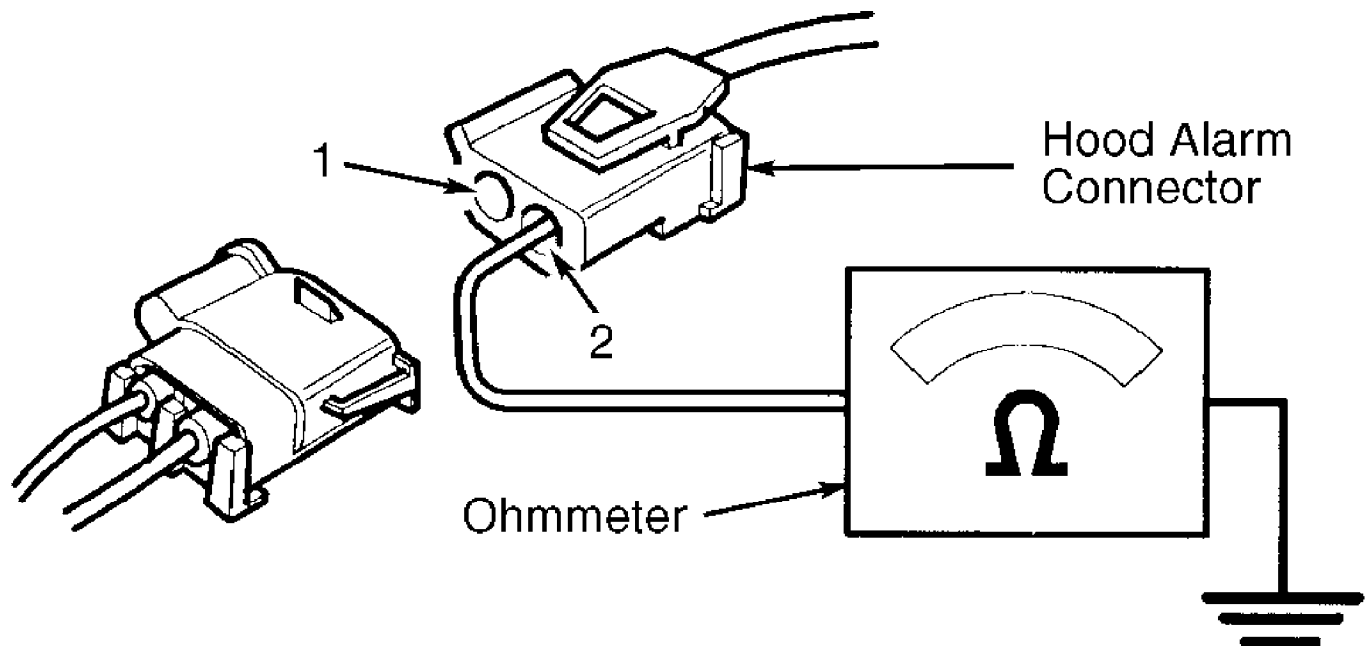
2) Turn ignition off. Remove alarm control module.

See Fig. 4. Connect voltmeter between alarm control module connector terminals FH and No. 31. See Fig. 5. If voltmeter reads zero volts, go to next step. If voltmeter does not read zero volts, check wiring at connector terminal FH for a short to voltage.

3) Turn ignition off. Connect jumper wire between hood alarm terminals No. 1 and 2. Connect ohmmeter between alarm control module connector terminals FH and No. 31. If ohmmeter reads zero ohms, go to next step. If ohmmeter does not read zero ohms, check for open circuit in wiring between hood alarm connector terminal No. 1 and alarm control module connector terminal FH.

4) Turn ignition off. Remove jumper wire. Reconnect hood alarm connector. Close hood. Connect ohmmeter between alarm control module connector terminals FH and No. 31. See Fig. 5. Ohmmeter should read infinite resistance with hood closed. Open hood. Ohmmeter should read zero ohms. If ohmmeter readings are not to specification, go to next step. If ohmmeter readings are to specification, replace alarm control module.

5) Turn ignition off. Open hood. Reconnect ohmmeter between alarm control module connector terminals FH and No. 31. See Fig. 5. Ohmmeter should read about zero ohms when hood is open. If all resistances are okay, replace alarm control module. On Guard Alarm II, run control module self test before replacing control module. See SELF TEST. If resistances are not okay, replace hood lock sensor.



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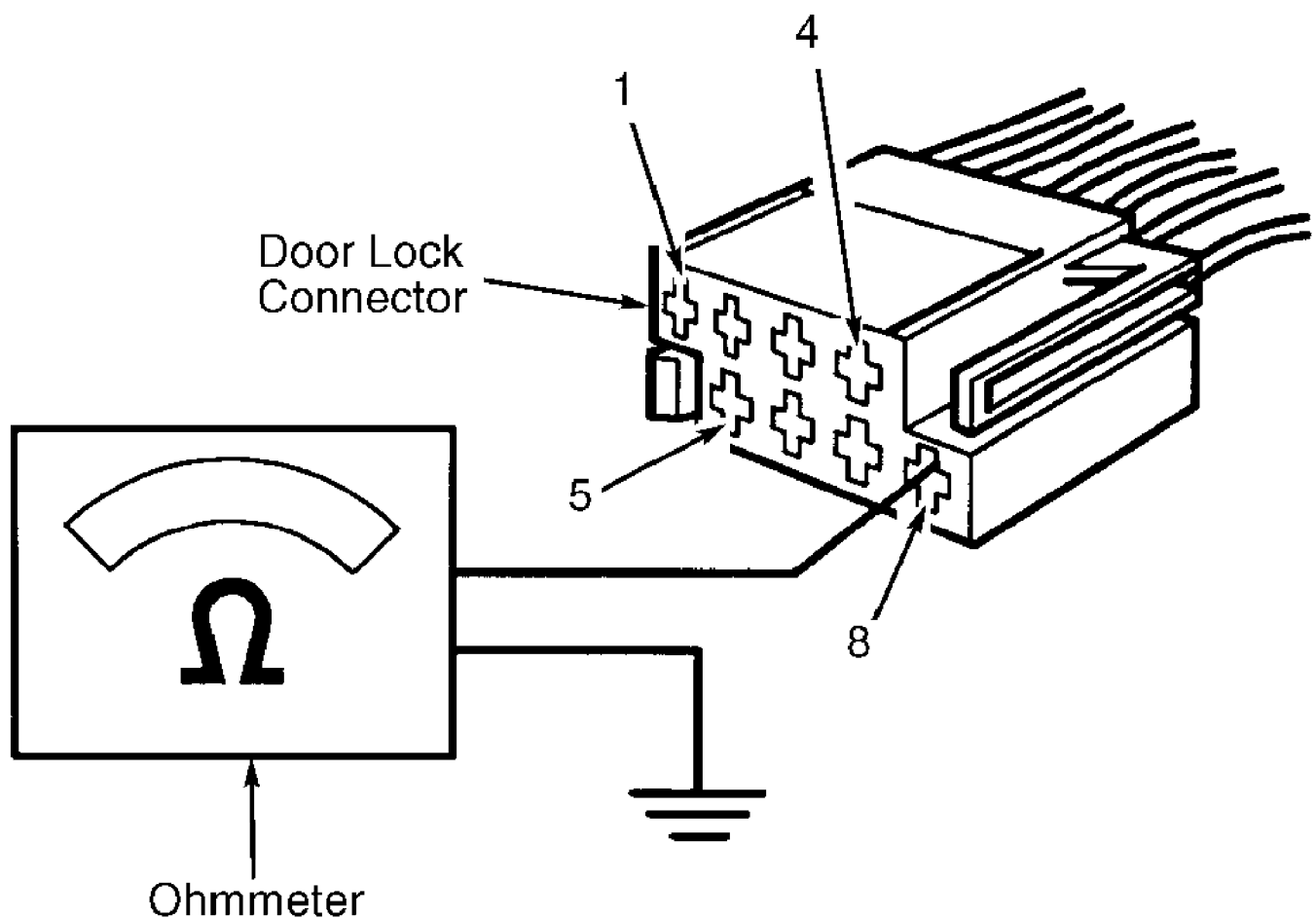
Fig. 6: Identifying Hood Alarm 2-Pin Connector
Courtesy of Volvo Cars of North America.

No Alarm On Trunk

1) Using hand-held transmitter, deactivate alarm. Turn ignition off. Open trunk or tailgate. Set trunk/tailgate light to TRUNK position. Trunk/tailgate light should come on. On 4-door models, change trunk locking unit to locked position by pushing catch in with

a screwdriver. Trunk light should go out. Reset catch to open position by pressing trunk lid opener. On station wagon models, close tailgate. Luggage compartment light should go out. If system operates to specification, go to next step. If system does not operate to specification, check courtesy light and/or install a new trunk/tailgate switch.

2) Turn ignition off. Open trunk/tailgate. Remove panel around door lock. Disconnect 8-pin trunk lock connector. See Fig. 7. Connect ohmmeter between trunk lock connector terminal No. 8 and ground. If ohmmeter reads about zero ohms, go to next step. If ohmmeter does not read about zero ohms, check wiring between connector terminal No. 8 and ground for an open circuit.



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Fig. 7: Identifying Door Lock 8-Pin Connector
Courtesy of Volvo Cars of North America.

3) Turn ignition off. Remove alarm control module. See Fig. 4. Open trunk/tailgate. Turn off luggage compartment light. Connect voltmeter between alarm control module connector terminals RH and No. 31. See Fig. 5. If voltmeter reads less than one volt, go to next step. If voltmeter does not read less than one volt, check wiring between trunk connector terminal No. 1 and alarm control module connector terminal RH for a short circuit to voltage.

4) Turn ignition off. Connect jumper wire between trunk connector terminals No. 1 and 8. Connect ohmmeter between alarm control module connector terminals RH and No. 31. See Fig. 5. If ohmmeter reads about zero ohms, go to next step. If ohmmeter does not

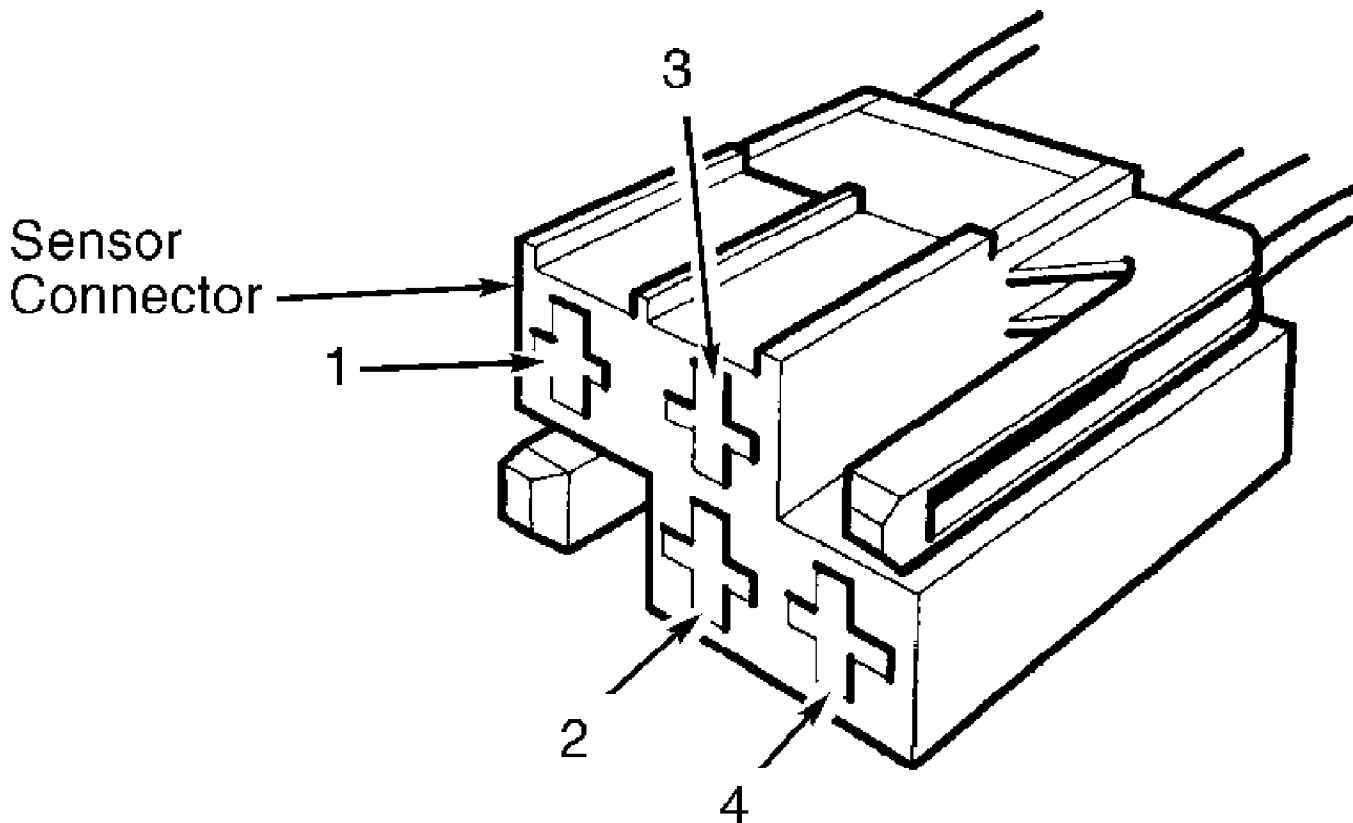
read about zero ohms, check wiring for an open circuit between trunk connector terminal No. 1 and alarm control module connector terminal RH.

5) Turn ignition off. Remove jumper wire. Reconnect trunk connector. Close trunk/liftgate. Connect ohmmeter between alarm control module connector terminals RH and No. 31. See Fig. 5. Ohmmeter should read infinite resistance when trunk is closed. Disconnect ohmmeter. Turn ignition off. Open trunk/liftgate. Turn off trunk light.

6) Reconnect ohmmeter between alarm control module connector terminals RH and No. 31. See Fig. 5. If ohmmeter reads about zero ohms when trunk/liftgate is open, replace alarm control module. If Guard Alarm II, run control module self test. See SELF TEST. If any reading is incorrect, replace trunk contact.

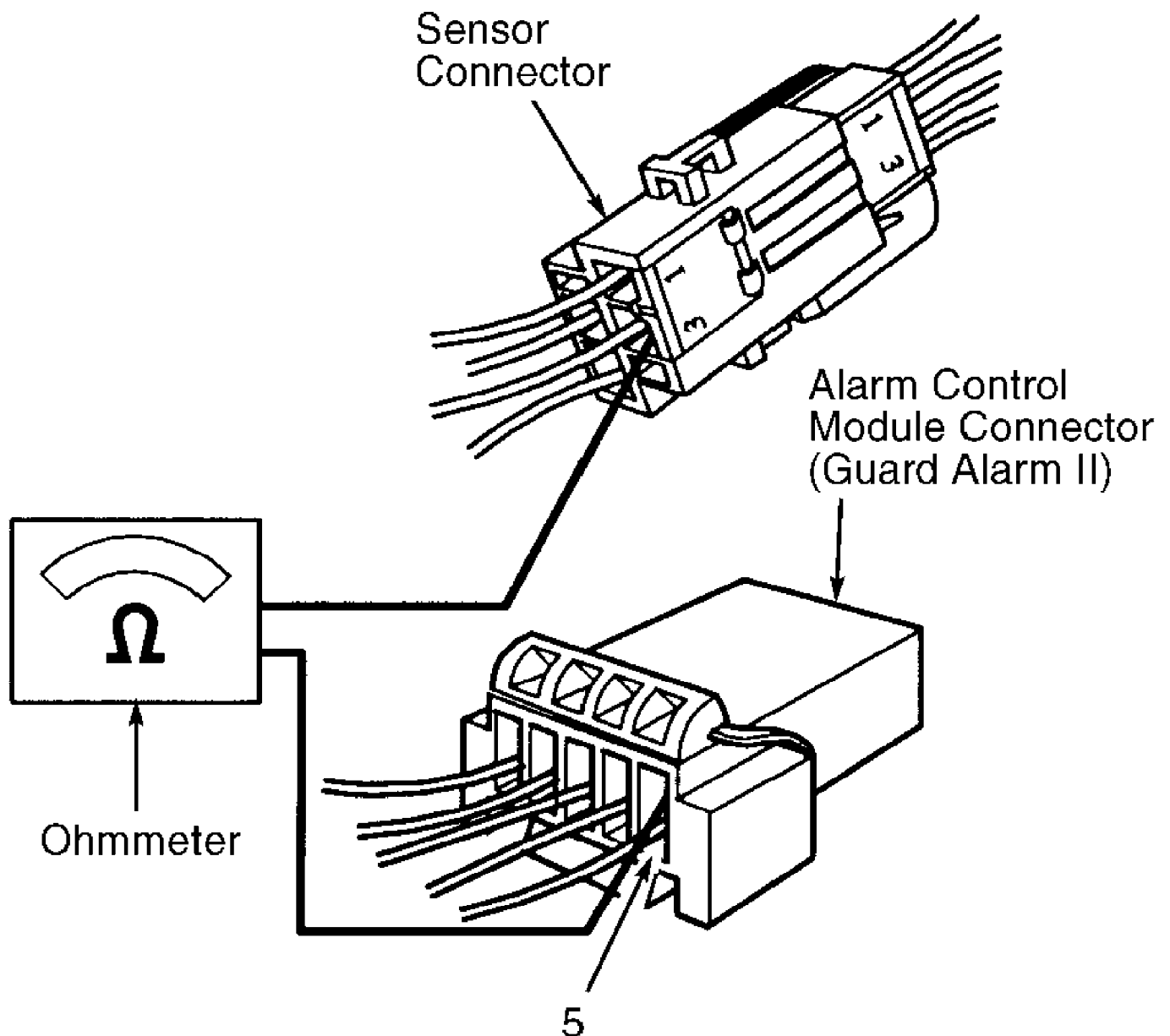
No Alarm On Sensor (Guard Alarm I & II)

1) Using hand-held transmitter, deactivate alarm. Turn ignition off. Disconnect 4-pin sensor connector. See Fig. 8. Connect an ohmmeter between connector terminal No. 1 and ground. If ohmmeter reads about zero ohms, go to next step. If ohmmeter does not read about zero ohms, check ground wire for an open circuit between sensor 4-pin connector terminal No. 1 and alarm control module 10-pin connector terminal No. 1 (Guard Alarm I) or 5-pin connector terminal No. 3 (Guard Alarm II). See Fig. 9. Repair as necessary.



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Fig. 8: Identifying Sensor 4-Pin Connector
Courtesy of Volvo Cars of North America.



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Fig. 9: Identifying Sensor & Alarm Control Module Connectors
(Guard Alarm II)

Courtesy of Volvo Cars of North America.

2) Turn ignition off. Connect voltmeter between 4-pin connector terminals No. 1 and 2. If battery voltage is present, go to next step. If battery voltage is not present, check voltage supply wire for an open circuit between sensor 4-pin connector terminal No. 2, and alarm control module connector 10-pin connector terminal No. 4 (Guard Alarm I) or 5-pin connector terminal No. 4 (Guard Alarm II).

3) Turn ignition off. Using hand-held transmitter, activate alarm. Wait 10 seconds. Connect jumper wire between 4-pin connector terminals No. 3 and 1. If alarm sounds, replace sensor. If alarm does not sound, turn ignition off. Disconnect alarm control module 10-pin connector (Guard Alarm I) or 5-pin connector (Guard Alarm II).

4) Connect ohmmeter between 4-pin connector terminal No. 3

and alarm control module connector terminal No. 5. See Fig. 9. If ohmmeter reads about zero ohms, replace alarm control module. If Guard Alarm II, run control module self test. See SELF TEST. If any reading is incorrect, check wiring for an open circuit between 4-pin connector terminal No. 3 and alarm control module connector terminal No. 5.

False Alarm

1) Using hand-held transmitter, deactivate alarm. Turn ignition off. Remove alarm control module. See Fig. 4. Disconnect all alarm loops (door, trunk, hood, etc.) except ignition. Disconnect following wiring from relay center and insulate with tape or insulators:

- * Door contacts (Yellow/White wire at terminal "T").
- * Hood alarm loop (Yellow/Black wire at terminal FH).
- * Trunk alarm loop (Blue/Brown wire at terminal RH).

2) Disconnect sensor 4-pin connector (Guard Alarm I and II). Turn ignition off. Reinstall alarm control module. Close all doors, hood, and trunk lid. Activate alarm. If alarm continues, check false alarm at ignition voltage supply circuit.

No Audible Signal When Alarm Is Triggered

1) Using hand-held transmitter, deactivate horn. Turn ignition off. Remove alarm control module. See Fig. 4. Connect jumper wire between alarm control module connector terminals "H" and No. 30. See Fig. 5. If horn does not sound, go to next step. If horn sounds, replace alarm control module. If Guard Alarm II, run control module self test. See SELF TEST.

2) Turn ignition off. Leave jumper wire connected. Disconnect horn 2-pin connector. Connect voltmeter between horn connector terminal No. 1 (Yellow/Red wire) and ground. If battery voltage is present, go to next step. If voltage is not present, check wiring between alarm control module connector terminal "H" and horn connector terminal No. 1 for an open circuit.

3) Turn ignition off. Remove jumper wire. Connect ohmmeter between horn connector terminal No. 2 (Black wire) and ground. If ohmmeter reads about zero ohms, replace horn. If ohmmeter does not read about zero ohms, check wiring between horn connector terminal No. 2 and ground.

Turn Signal Lights Do Not Flash When Alarm Is Triggered

1) Using hand-held transmitter, deactivate alarm. Turn ignition on. Turn left and right turn signal indicators on. If both indicators flash, go to next step. If both indicators do not flash, check turn signal switch.

2) Turn ignition off. Remove fuse No. 13 from engine compartment fuse panel. If fuse is okay, go to next step. If fuse is not okay, check wiring between battery and alarm control module connector terminal No. 30K for a short to ground.

3) Ensure ignition is off. Connect voltmeter between ground and fuse No. 13 terminal. If battery voltage is present, go to next step. If battery voltage is not present, check wiring between battery and fuse No. 13 terminal.

4) Ensure ignition is off. Replace fuse. Remove alarm control module. Connect voltmeter between alarm control module connector terminals No. 30K and No. 31. See Fig. 5. If battery voltage is present, go to next step. If battery voltage is not present, check for an open circuit in wiring between fuse No. 13 terminal and alarm control module terminal No. 30K.

5) Ensure ignition is off. Connect jumper wire between alarm control module terminals No. 30K and "L". Left turn signal should come on. Connect jumper wire between alarm control module terminals No. 30K

and "R". Right turn signal should come on.

6) If both turn signals operate, replace alarm control module. If Guard Alarm II, run control module self test. See SELF TEST. If neither turn signal operates, check wiring between alarm control module terminal "L" and left turn signal splice, or wiring between alarm control module terminal "R" and right turn signal splice for an open circuit.

Start Inhibitor Malfunction

1) Using hand-held transmitter, deactivate alarm. Turn ignition off. Remove alarm control module. Attempt to start engine by turning ignition switch to position III. If starter does not crank, go to next step. If starter cranks, check for short circuit in wiring to alarm control module connector terminals No. 50E and 50F. See Fig. 5.

2) Turn ignition off. Remove fuse No. 2 from engine compartment fuse panel. If fuse is okay, go to next step. If fuse is not okay, check for short circuit in wiring between battery and alarm control module terminal No. 15.

3) Replace fuse. Turn ignition off. Connect voltmeter between alarm control module terminals No. 15 and 31. Voltmeter should read zero volts. Turn ignition on. Voltmeter should now read battery voltage.

4) If both voltage readings are okay, replace alarm control module. If Guard Alarm II, run control module self test. See SELF TEST. If any voltage reading is not okay, check for open circuit in wiring between ignition and alarm control module terminal No. 15.

Starter Inhibitor Will Not Disengage

1) Using hand-held transmitter, deactivate alarm. Turn ignition off. Remove alarm control module. See Fig. 4. Connect jumper wire between alarm control module connector terminals No. 50E and 50F. See Fig. 5. Attempt to start engine by turning ignition switch to position III. If starter does not crank, go to next step. If starter cranks, replace alarm control module. If Guard Alarm II, run control module self test. See SELF TEST.

2) Turn ignition off. Remove jumper wire. Connect voltmeter between alarm relay terminals No. 50E and 31. Turn ignition switch to position III. If battery voltage is present, problem is in starting system. If battery voltage is not present, check wiring for an open circuit or short to ground between ignition switch and alarm control module terminal No. 50E.

Indicator LED/Status Panel Faulty (Basic & Guard Alarm II)

1) Check for open circuit in LED/status panel ground wire. Also check for open circuit in LED/status panel signal wires. Check for short circuit to ground or voltage in LED/status panel signal wires. Also check for possible fault in LED/status panel and/or fault in alarm control module.

2) Using hand-held transmitter, deactivate alarm. Turn ignition off. Insert a screwdriver by side of indicator LED and carefully pry upward. Disconnect LED indicator connector. See Fig. 10.

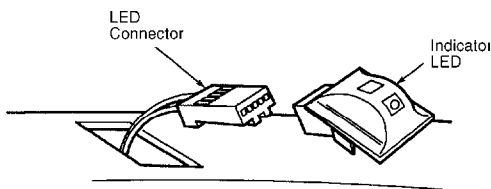


Fig. 10: Identifying LED Connector
Courtesy of Volvo Cars of North America.

NOTE: On vehicles without Electronic Climate Control (ECC), 2-pin

connector is used. On vehicles with ECC, 5-pin connector is used, as A/C sun sensor is integrated in indicator LED.

3) Connect ohmmeter between ground and LED connector terminal No. 2 (without Electronic Climate Control - ECC) or No. 5 (with ECC). If ohmmeter reads zero ohms, go to next step. If ohmmeter does not read zero ohms, check LED ground wire for an open circuit.

4) Turn ignition off. Connect an ohmmeter between LED connector terminals No. 1 and 2 (without ECC) or between terminals No. 1 and 5 (with ECC). If ohmmeter reads high resistance, go to next step. If ohmmeter does not read high resistance, check LED signal wire for a short circuit to ground.

5) Turn ignition on, then off. Connect voltmeter between LED connector terminals No. 1 and 2 (without ECC) or between terminals No. 1 and 5 (with ECC). If voltmeter reads zero volts, go to next step. If voltmeter does not read zero volts, check LED signal wire for a short circuit to voltage.

6) Turn ignition off. To check system with LED indicator mounted on speaker grille, go to next step. To check system with LED indicator mounted on instrument panel, remove alarm control module. See Fig. 4. Connect jumper wire between alarm control module connector terminals DI and No. 31. See Fig. 5. Connect an ohmmeter between LED indicator connector terminals No. 1 and 2 (without ECC) or between terminals No. 1 and 5 (with ECC). Ohmmeter should read about zero ohms. Go to next step.

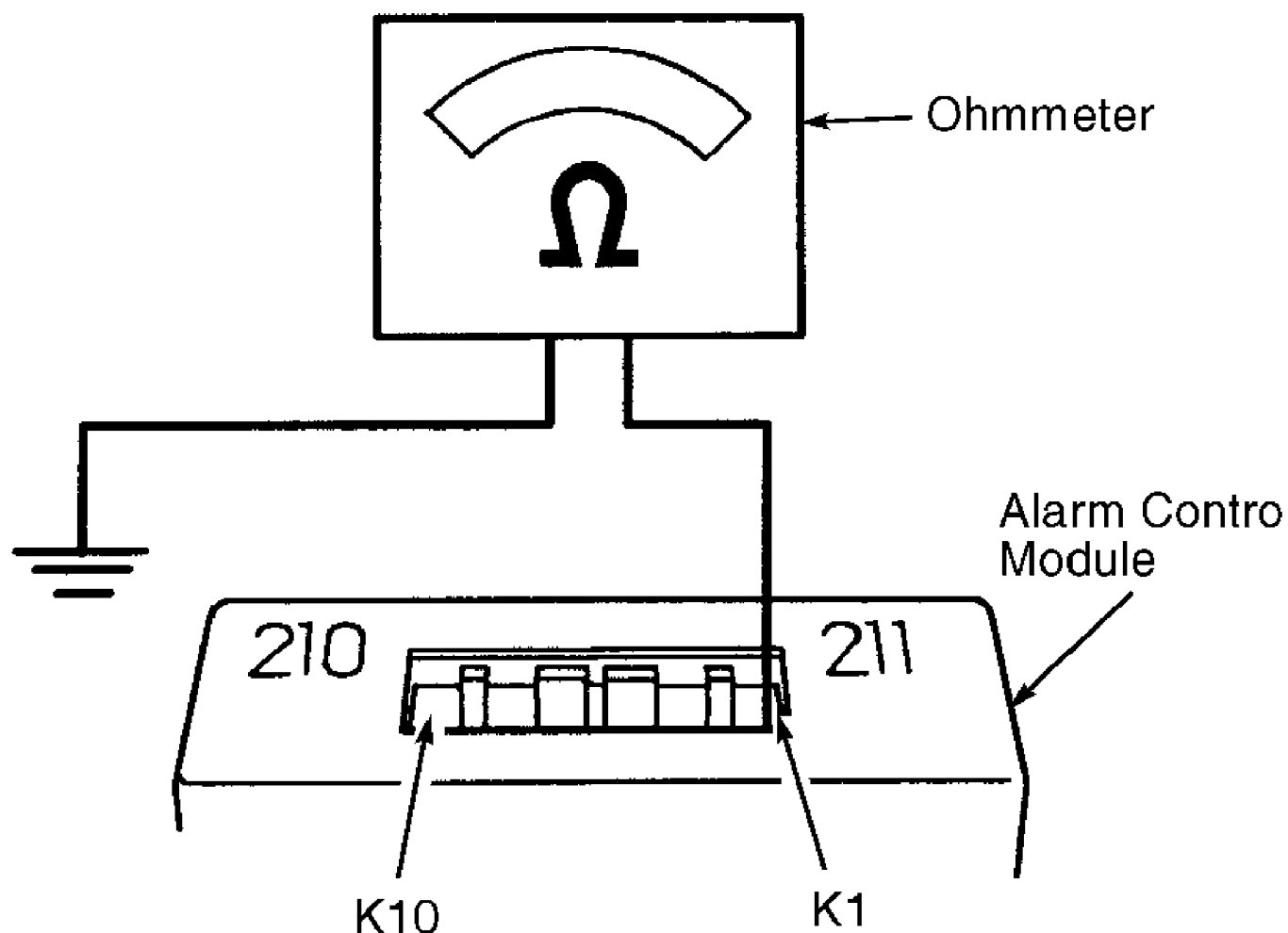
7) Turn ignition off. Disconnect alarm control module connector. See Fig. 4. Connect ohmmeter between 2-pin connector terminal No. 1 (Blue/White or Red wire) and 5-pin connector terminal No. 1 (Black wire). If ohmmeter reads zero ohms, go to next step. If ohmmeter does not read zero ohms, check LED signal lead for an open circuit.

8) Turn ignition off. Remove jumper wire from alarm control module connector terminals DI and No. 31. See Fig. 5. Reinstall alarm control module. Activate alarm using hand-held transmitter. Wait 10 seconds. Trigger alarm by opening hood. Deactivate alarm using hand-held transmitter.

9) On vehicles without ECC, connect voltmeter between LED connector terminals No. 1 and 2. On vehicles with ECC, connect voltmeter between LED connector terminals No. 1 and 5. If voltmeter reads at least 4 volts, install new LED. If voltmeter does not read at least 4 volts, replace alarm control module. If Guard Alarm II, run control module self test. See SELF TEST.

Indicator LED/Status Panel Faulty (Guard Alarm I)

1) Deactivate alarm using hand-held transmitter. Turn ignition off. Disconnect alarm control module 10-pin connector. Connect ohmmeter between alarm control module terminal K1 and ground. See Fig. 11. Ohmmeter should read about zero ohms. Connect voltmeter between alarm control module terminals K1 and K4. Voltmeter should read battery voltage.



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Fig. 11: Identifying Alarm Control Module Connector Terminals
Courtesy of Volvo Cars of North America.

2) Connect voltmeter between alarm control module terminals K1 and K2. Voltmeter should read 0-5 volts. Connect voltmeter between alarm control module terminals K1 and K3. Voltmeter should read 5 volts. If all measurements are okay, go to next step. If any measurements are not okay, replace alarm control module.

3) Using ohmmeter, ensure continuity is present in wiring between 10-pin and Yellow 4-pin connectors. See Fig. 12. Repair as necessary. If wiring is okay, go to next step.

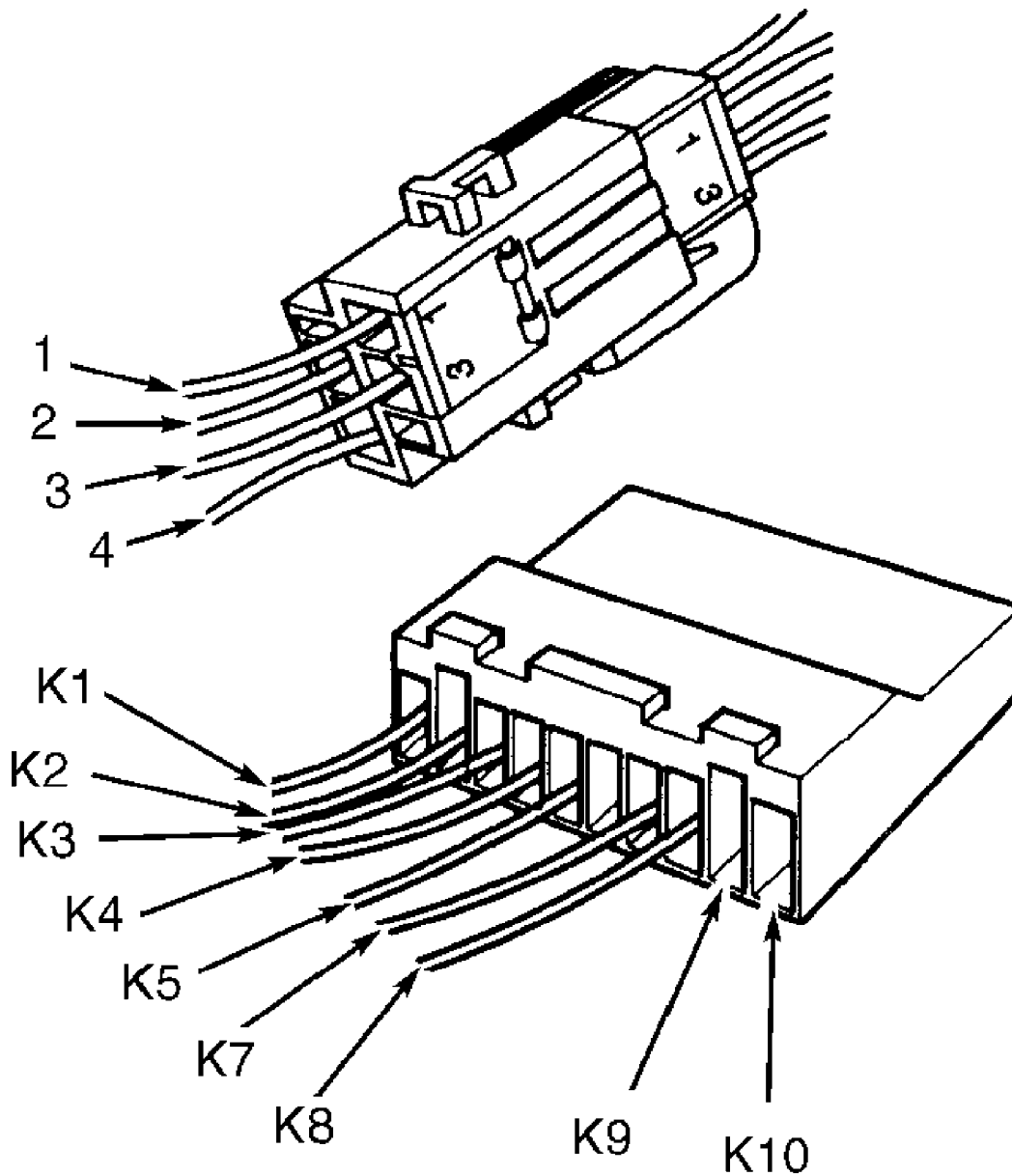
4) Turn ignition off. Reconnect 10-pin connector in alarm control module. Backprobe ohmmeter between Yellow 4-pin connector terminal No. 4 and ground. If ohmmeter reads about zero ohms, go to next step. If ohmmeter does not read about zero ohms, check wiring between Yellow 4-pin connector terminal No. 4 and alarm control module 10-pin connector terminal K1 for an open circuit.

5) Turn ignition off. Backprobe voltmeter between Yellow 4-pin connector terminals No. 3 and 4. If battery voltage is present, go to next step. If battery voltage is not present, check for short to ground in wiring between Yellow 4-pin connector terminal No. 3 and alarm control module 10-pin connector.

6) Ensure ignition is off. Backprobe voltmeter between Yellow 4-pin connector terminals No. 1 and 4. If voltmeter reads about 5 volts, go to next step. If voltmeter does not read about 5 volts,

check wiring for short to ground or voltage between Yellow 4-pin connector terminal No. 1 and alarm control module 10-pin connector terminal K3.

7) Ensure ignition is off. Backprobe voltmeter between Yellow 4-pin connector terminals No. 2 and 4. If voltmeter reads 0-5 volts, replace status panel. If voltmeter does not read 0-5 volts, check wiring for short to ground or voltage between status panel Yellow 4-pin connector, terminal No. 2, and alarm control module 10-pin connector, terminal K2.



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Fig. 12: Identifying 10-Pin & 4-Pin Connectors
Courtesy of Volvo Cars of North America.

Remote Control Inoperative

An inoperative remote control can be caused by interference

from surroundings (buildings, vehicles, etc.), defective batteries, incorrectly programmed remote, or defective remote control unit.

Alarm Cannot Be Activated Or Deactivated

1) Check for open or short circuit in ground wire to alarm relay connector. Check for open or short circuit in voltage supply wire to alarm relay connector.

2) Check for open or short circuit in ignition supply wire to alarm control module connector. Check if remote control is programmed incorrectly. Check for faulty fuse No. 2 or 6. Check for defective remote control, central locking relay, relief relay, or alarm control module.

3) On basic alarm system, check for defective ignition switch, open or short circuit in signal wire between central locking relay and alarm control module, or short circuit to voltage in signal wire between central locking relay and alarm control module.

4) On Guard Alarm I system, check for open circuit in accessory cable ground wire. Check for short circuit to ground in accessory cable supply. Check for open circuit in accessory cable supply.

Central Locking System Does Not Lock Or Open When Activated Or Deactivated (Guard Alarm I & II)

Check for open or short circuit in signal wire between central locking relay and alarm control module. Check for short circuit to voltage in signal wire between central locking relay and alarm control module. Check for defective central locking relay or alarm control module.

Panic Function Does Not Work (Guard Alarm I & II)

Check for failing remote control range. Check for defective remote control. Check batteries. Check for defective remote control module.

Alarm Will Not Reactivate (Guard Alarm I & II)

Check for defective alarm control module.

REMOVAL & INSTALLATION

WARNING: Deactivate air bag system before performing any service operation. For 1995 850, see AIR BAG RESTRAINT SYSTEM, for 1996 850, see AIR BAG RESTRAINT SYSTEM article. Do not apply electrical power to any component on steering column without first deactivating air bag system. Air bag may deploy.

ALARM CONTROL MODULE

Removal & Installation

Alarm control module is located under left side of instrument panel. See Fig. 4.

WIRING DIAGRAMS

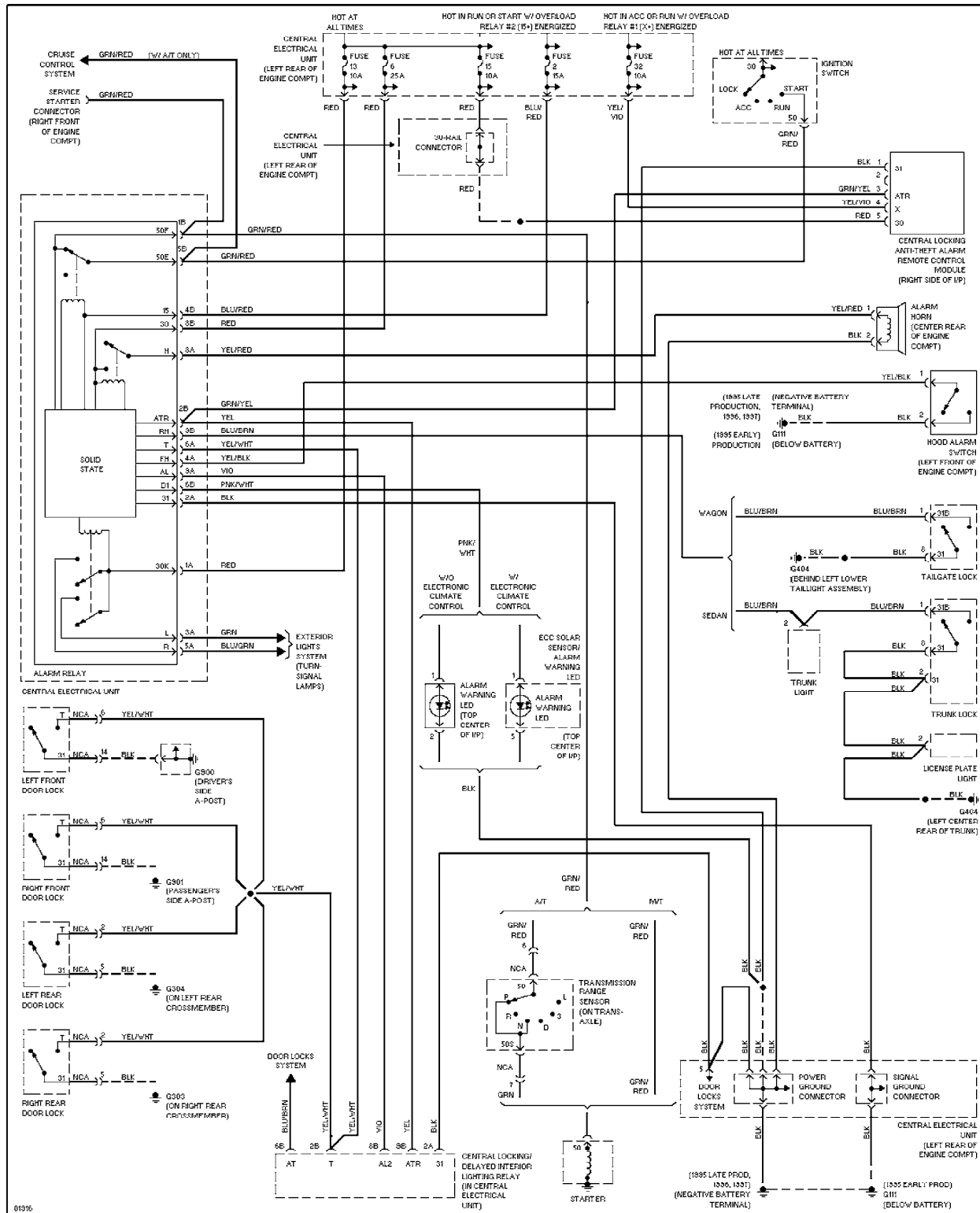


Fig. 13: Anti-Theft System Wiring Diagram (1995-96 - Base Model)

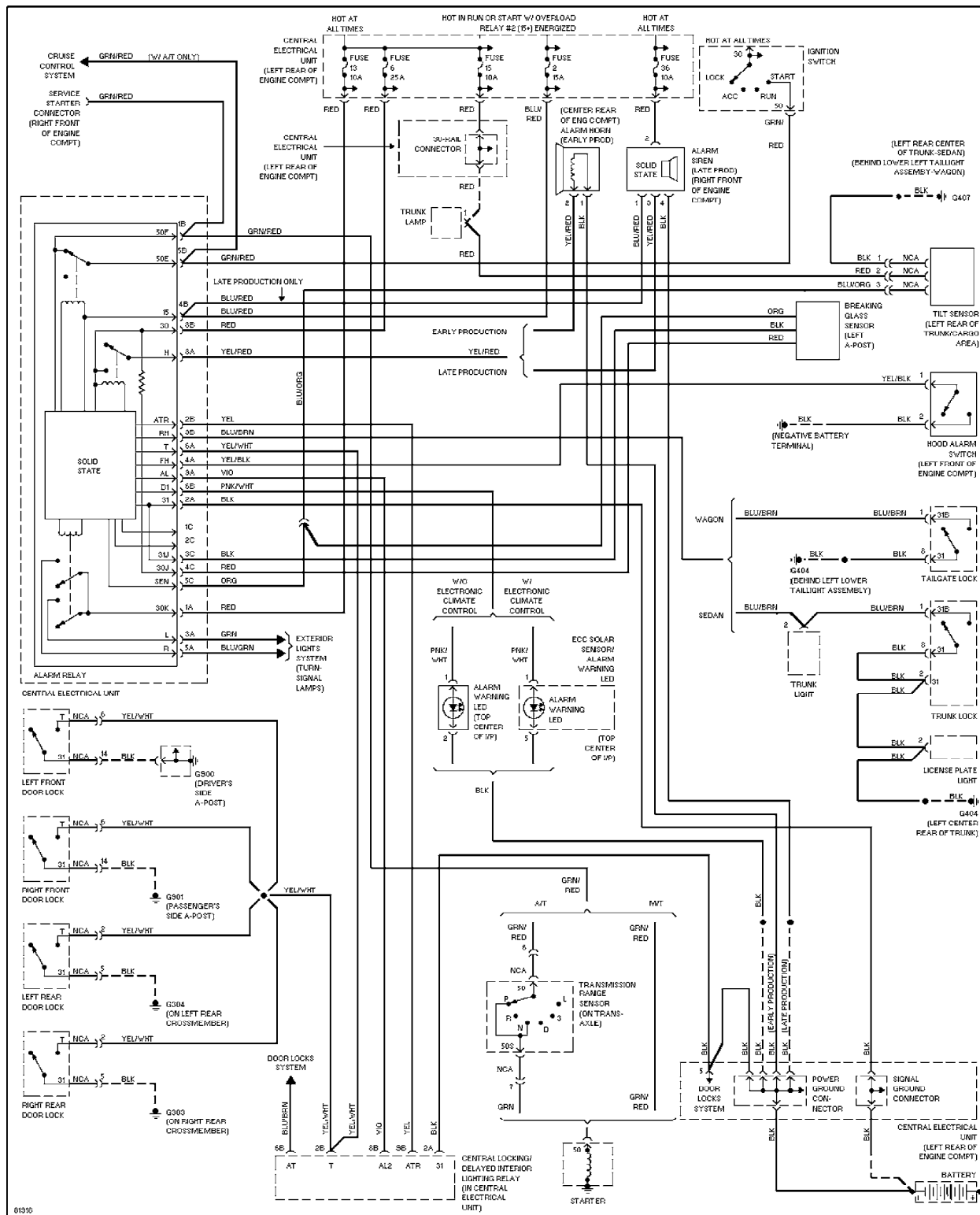


Fig. 15: Anti-Theft System Wiring Diagram (1996 - Grand Alarm II - Late Production)