KEYLESS ENTRY SYSTEM

1995 Volvo 850

1995 ACCESSORIES & EQUIPMENT
Volvo Keyless Entry Systems

850

DESCRIPTION & OPERATION

850 models with central locking and factory installed alarm system can be equipped with a remote-controlled keyless entry system. Transmitter has a range of about 5 meters. Remote control cannot be used to lock vehicle if ignition switch is in position I or II.

Upon receiving signals from transmitter, receiver unit transmits locking or unlocking signals to central locking relay. Central locking relay switches interior lighting on and off, and transmits signals to alarm relay to activate and deactivate alarm. Receiver includes a memory which can store coded radio signals from a maximum of 3 different transmitters. Information is retained in memory even if battery is disconnected.

RECEIVER PROGRAMMING

Transmitter Replacement

If transmitter is replaced, unit may need reprogramming. It is necessary that receiver be programmed with each key code. To reprogram receiver, turn ignition switch to position I or II 5 times within 10 seconds. Leave ignition on at fifth turn. Press either LOCK or UNLOCK button on transmitter once within 30 seconds. If transmitter is provided with different key codes, programming of each unique code must be accomplished within 30 seconds. Turn ignition off. Verify operation of each individual transmitter.

TESTING & DIAGNOSIS

FAULT TRACING

NOTE: Ensure ignition is turned off when connecting or disconnecting test instruments or connectors, or when making resistance measurements.

Ensure doors and trunk are open. Lock unit should be latched in lock position by pressing in central locking unit latch with a screwdriver. After fault tracing, release latch by opening door with inside or outside handle.

CENTRAL LOCKING INOPERABLE

NOTE: Use illustration for central locking relay base terminal identification. See Fig. 1.

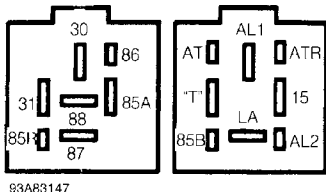

Fig. 1: Identifying Central Locking Relay Base Terminals
Courtesy of Volvo Cars of North America.

1) Turn ignition off. Remove and check fuses No. 3 and 6. Replace as necessary. If fuses are okay, go to next step.

2) Ensure ignition is off. Connect voltmeter between fuse No. 6 terminal and ground. If battery voltage is present, go to next step. If battery voltage is not present, an open or short circuit is present in wiring between fuse and battery.

3) Ensure ignition is off. Connect voltmeter between fuse No. 3 terminal and ground. Zero volts should be present. Turn ignition on and repeat measurement. Battery voltage should be present. If voltage readings are correct, go to next step. If voltage readings are not correct, check wiring between fuse terminal and ignition switch for an open or short circuit.

4) Ensure ignition is off. Reinstall fuses. Check if system can be operated from another front door or from trunk. If system can be operated from another front door or trunk, go to step 14). If system cannot be operated from another front door or trunk, go to next step.

5) Ensure ignition is off. Check if front doors and trunk can be locked and unlocked by key, and if rear doors can be unlocked by raising interior locking button and opening with inside handle. If any component cannot be operated, a mechanical fault is present in central locking unit. Replace unit as necessary. If all components can be operated, go to next step.

6) Ensure ignition is off. Remove central locking relay located in passenger compartment relay center. Connect ohmmeter between relay base terminal No. 31 and ground. If about zero ohms are present, go to next step. If about zero ohms are not present, repair ground circuit between relay base terminal No. 31 and ground. Reinstall relay.

7) Ensure ignition is off. Connect voltmeter between relay base terminals No. 30 and 31. If battery voltage is present, go to next step. If battery voltage is not present, check for an open or short circuit in wiring between relay base terminal No. 30 and fuse terminal No. 6. Reinstall central locking relay.

8) Ensure ignition is off. Connect voltmeter between relay base terminals No. 15 and 31. Zero volts should be present. Turn ignition on. Connect voltmeter between relay base terminals No. 15 and 31. Battery voltage should be present. If voltages are to specification, go to next step. If voltages are not to specification, check trigger supply wiring for an open or short circuit between relay base terminal No. 15 and fuse No. 3 terminal. Reinstall central locking relay.

9) Ensure ignition is off. Connect ohmmeter between relay base terminals No. 87 and 31. Ohmmeter should indicate infinite resistance. Connect voltmeter between relay base terminals No. 88 and 31. Zero volts should be present. If resistance and voltage measurements are to specification, go to next step. If resistance and voltage measurements are not to specification, check for short circuit in wiring between relay base terminal No. 88 and central locking motors. Reinstall central locking relay.

10) Ensure ignition is off. To test unlock function, connect jumper wire between relay base terminals No. 87 and 31. Apply battery voltage for 2 seconds by jumping relay base terminals No. 88 and 30. If central locking units do not unlock, go to next step. If central locking units unlock, go to step 15).

11) To test lock function, connect jumper wire between relay base terminals No. 88 and 31. Apply battery voltage for 2 seconds by jumping relay base terminals No. 87 and 30. If central locking units do not lock or unlock, go to next step. If central locking units lock or unlock, go to step 15).

12) Ensure ignition is off and all doors are unlocked. Connect ohmmeter between relay base terminals No. 87 and 88. If

ohmmeter reads 1-15 ohms, an individual motor winding may be faulty. Go to step 14).

13) If ohmmeter reads zero ohms, check for short circuit in wiring between central locking motors and relay base terminals No. 87 and 88. If ohmmeter reads infinite resistance, check central locking relay base for evidence that relay is burned out. If relay appears burned out, replace relay and all central locking motors. If relay does not appear burned out, go to next step.

14) Ensure ignition is off and all doors are unlocked. Remove door, trunk, or trunk lid panels as necessary. Disconnect appropriate central locking unit connector. See Fig. 2. Connect ohmmeter between following terminals:

* Front Door - Between terminals No. 10 and 12 in central locking unit 14-pin connector.
* Rear Door - Between terminals No. 3 and 4 in central locking unit 8-pin connector.
* Trunk Lid - Between terminals No. 6 and 7 in central locking unit 8-pin connector.
* Filler Cover - Between terminals No. 1 and 2 in central locking unit 2-pin connector.

If ohmmeter reads 1-15 ohms in all cases, go to next step. If ohmmeter does not read 1-15 ohms in all cases, an open or short circuit is present in central locking unit wiring harness or motor winding. Repair or replace motor as necessary.

15) Ensure ignition is off and all doors and trunk are locked. Connect ohmmeter between relay base terminals No. 31 and 86. Zero ohms should be present. Connect ohmmeter between relay base terminals No. 31 and 85A, 85B, and 85R. Ohmmeter should indicate infinite resistance in all cases.

16) Unlock all doors and trunk. Connect ohmmeter between relay base terminals No. 31 and 86. Ohmmeter should indicate infinite resistance. Connect ohmmeter between relay base terminals No. 31 and 85A, 85B, and 85R. Ohmmeter should indicate zero ohms in all cases.

17) If all readings are to specification, go to step 28). If readings for terminals No. 85A or 85B are not to specification, go to next step. If reading for terminal No. 85R is not to specification, go to step 22).

18) Ensure ignition is off. Remove left or right front door panel as necessary. Disconnect central locking unit 14-pin connector. See Fig. 2. Lock front door that has faulty central locking unit. Connect ohmmeter between central locking unit 14-pin connector terminals No. 11 and 14. Ohmmeter should indicate infinite resistance. Connect ohmmeter between central locking unit 14-pin connector terminals No. 13 and 14. Ohmmeter should indicate about zero ohms.

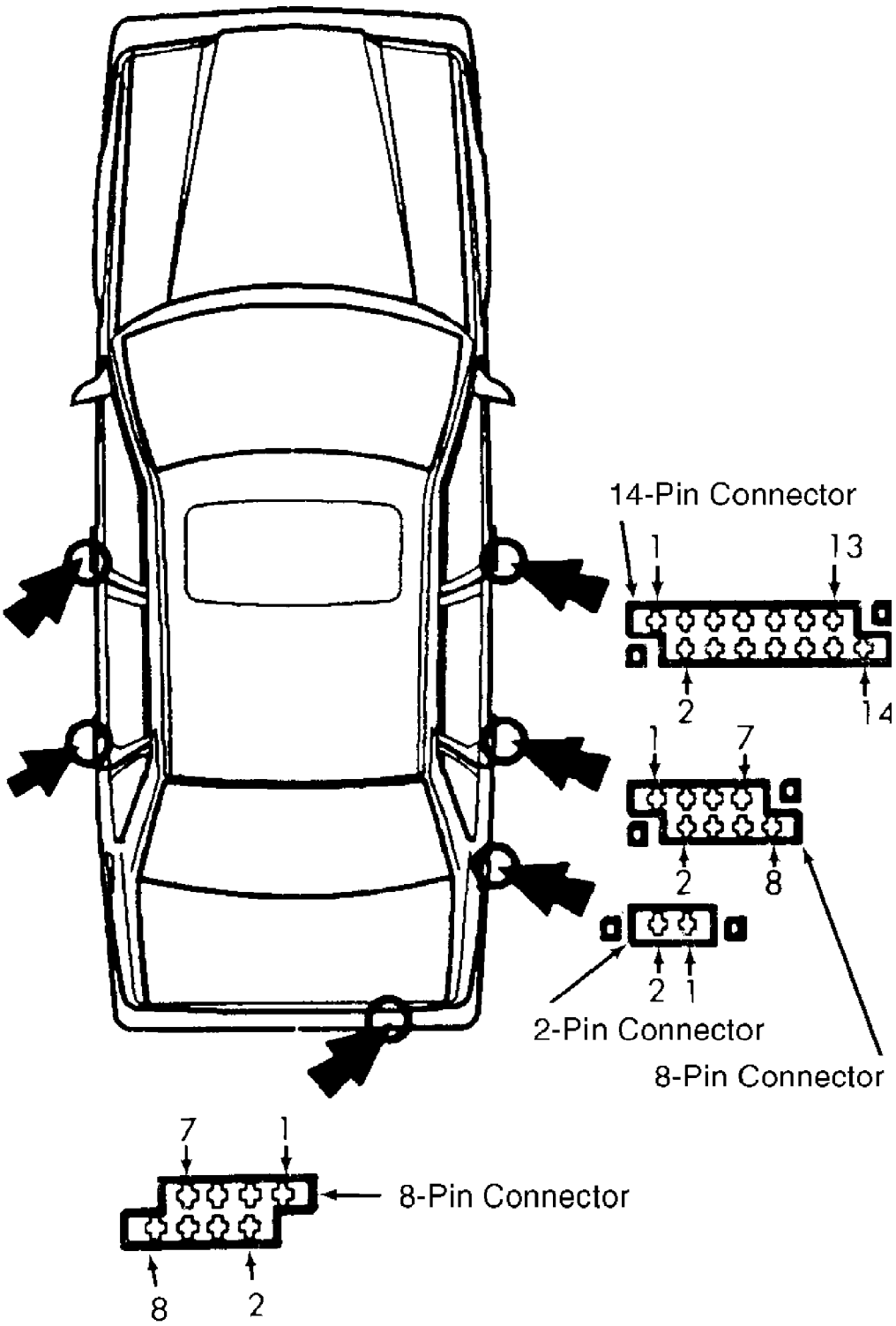

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Fig. 2: Locating Central Locking Connectors
Courtesy of Volvo Cars of North America.

19) Unlock front door with faulty central locking unit. Connect ohmmeter between central locking unit 14-pin connector

terminals No. 11 and 14. See Fig. 2. Ohmmeter should indicate about zero ohms. Connect ohmmeter between central locking unit 14-pin connector terminals No. 13 and 14. Ohmmeter should indicate infinite resistance.

20) If resistances are to specification, go to next step. If resistances are not to specification, a fault is present in central locking operating switch or wiring. If switch and wiring are okay, replace complete central locking unit. Reinstall central locking relay.

21) Ensure ignition is off. Ensure door panel from door with faulty locking unit is removed. Disconnect central locking unit 14-pin connector. See Fig. 2. Connect ohmmeter between 14-pin connector terminal No. 14 and ground. If ohmmeter indicates about zero ohms, go to step 25). If ohmmeter does not indicate about zero ohms, an open or short circuit is present in ground wire between 14-pin connector terminal No. 14 and ground point at left or right "A" pillar.

22) If resistance measurements for terminal No. 85R were incorrect in step 17), ensure ignition is off. Remove trunk lid panels as necessary. Disconnect central locking unit 8-pin connector located in trunk lid. Lock trunk. Connect ohmmeter between 8-pin connector terminals No. 4 and 2. See Fig. 2. Ohmmeter should indicate about zero ohms. Connect ohmmeter between 8-pin connector terminals No. 5 and 2. See Fig. 2. Ohmmeter should indicate infinite resistance.

23) Unlock trunk lid. Connect ohmmeter between 8-pin connector terminals No. 4 and 2. See Fig. 2. Ohmmeter should indicate infinite resistance. Connect ohmmeter between 8-pin connector terminals No. 5 and 2. Ohmmeter should indicate about zero ohms. If resistances are to specification, go to next step. If resistances are not to specification, switch or complete central locking unit may be defective. Repair or replace as necessary. Reinstall central locking relay.

24) Ensure ignition is off and trunk lid panels are removed as necessary. Disconnect central locking unit 8-pin connector located in trunk lid. See Fig. 2. Connect ohmmeter between 8-pin connector terminal No. 2 and ground. If zero ohms are present, go to next step. If zero ohms are not present, an open or short circuit to voltage is present in ground wire between 8-pin connector terminal No. 2 and ground point in left side of luggage compartment.

25) Turn ignition off. Lock all doors and trunk. Remove central locking relay. Connect ohmmeter between relay base terminals No. 31 and 86. About zero ohms should be present. Unlock all doors and trunk. Connect ohmmeter between relay base terminals No. 31 and 86. Ohmmeter should indicate infinite resistance.

26) If resistance readings are not to specification, go to next step. If resistance readings are to specification, an open or short circuit is present in unlocking signal wiring between front door or trunk along with a possible faulty central locking unit and relay. On left front door, check wiring between relay base terminal No. 85A and 14-pin connector terminal No. 11. On right front door, check wiring between relay base terminal No. 85B and 14-pin connector terminal No. 11. On trunk, check wiring between relay base terminal No. 85R and 14-pin connector terminal No. 5. See Figs. 1 and 2.

27) If resistance readings were not to specification in step 26), an open or short circuit is present in locking signal wiring between front door or trunk along with a possible faulty central locking unit and relay. On left or right front door, check wiring between relay base terminal No. 86 and 14-pin connector terminal No. 13. On trunk, check wiring between relay base terminal No. 85 and 8-pin connector terminal No. 4. See Figs. 1 and 2.

28) If resistance readings were correct in step 17), turn ignition on. Ensure all interior lighting is off. Remove central locking relay. Connect voltmeter between relay base terminals ATR and No. 31, then between terminals LA and No. 31. If voltmeter indicates

zero volts in all cases, replace central locking relay.

29) If first measurement was incorrect (between relay base terminals ATR and No. 31), wiring between relay base terminal ATR and alarm relay terminal ATR is shorted to voltage. If second measurement was incorrect (between relay base terminals LA and No. 31), wiring between relay base terminal LA and interior light wiring is shorted to voltage. Repair wiring and replace relay as necessary.

CENTRAL LOCKING INOPERABLE AT DOOR ONLY

1) Ensure ignition is off. Close door. Attempt to lock and unlock door mechanically using inside locking button and inside handle. If central locking unit can be operated mechanically, go to step 14) under CENTRAL LOCKING INOPERABLE to check motor windings. If central locking unit cannot be operated mechanically, determine whether vehicle is equipped with anti-theft locking function.

2) If vehicle is not equipped with anti-theft locking, mechanical fault is present in central locking unit or inside lock and door opener linkage. If vehicle is equipped with anti-theft locking, ensure central locking motor is not stuck in anti-theft locking position.

CENTRAL LOCKING INOPERABLE AT TRUNK ONLY

1) Ensure ignition is off. Check if trunk lid can be locked and unlocked with key.

NOTE: When trunk is locked, key should be removed in vertical position. If not, trunk will not be operable using central locking system.

2) If central locking unit can be operated mechanically, go to next step. If central locking unit cannot be operated mechanically, a mechanical fault is present in central locking unit. Replace central locking unit.

3) Turn ignition off. Unlock trunk with door key. Ensure doors and fuel filler cover are unlocked. Lock trunk with door key. Ensure door and fuel filler cover are locked. If central locking unit can be operated electrically, go to step 14) under CENTRAL LOCKING INOPERABLE to check trunk unit motor windings.

4) If central locking unit cannot be operated electrically, go to step 22) under CENTRAL LOCKING INOPERABLE to check trunk operating switch.

CENTRAL LOCKING INOPERABLE AT FUEL FILLER COVER ONLY

1) Turn ignition off and open fuel filler cover. Using door key, unlock central locking system on right front door. Check if locking lever from central locking unit on filler cover has moved to locked position. Using door key, lock central locking system on right front door. Check if locking lever from central locking unit on filler cover has moved to unlocked position.

2) If central locking unit cannot be operated electrically, mechanical fault is present in either filler cover or central locking unit. If locking lever does not operate without sticking, lubricate cover and lever as necessary. If central locking unit cannot be operated electrically, go to step 14) under CENTRAL LOCKING INOPERABLE to check fuel filler cover motor winding.

CENTRAL LOCKING INOPERABLE BY REMOTE CONTROL

1) Attempt to lock/unlock system using a known good

transmitter. If a different transmitter operates system, go to step 12). If a different transmitter does not operate system, go to next step.

2) Turn ignition off. Remove and check fuses No. 15 and 32. If fuses are defective, system may have exhibited a temporary overload or fault in central locking system. Replace fuses and go to step 5). If fuses are okay, go to next step.

3) Turn ignition on. Connect voltmeter between fuse No. 15 fuse holder terminal and ground. If battery voltage is present, go to next step. If battery voltage is not present, an open or short circuit is present in wiring between fuse holder terminal and battery.

4) Turn ignition off. Connect voltmeter between fuse No. 32 fuse holder terminal and ground. Zero voltage should be present. Turn ignition switch to position I. Battery voltage should be present. If voltages are to specification, go to next step. If voltages are not to specification, check for an open or short circuit in voltage supply wire between fuse holder terminal and ignition switch.

5) Ensure ignition is off, all fuses are installed, and all doors are closed. Check if central locking system can be operated manually by key from both front doors and trunk. If system can be operated, go to next step. If system cannot be operated, see CENTRAL LOCKING INOPERABLE.

6) Ensure ignition is off. Disconnect receiver 5-pin connector. Receiver is located under right side of instrument panel. Connect ohmmeter between 5-pin connector terminal No. 1 and ground. See Fig. 3. If ohmmeter indicates about zero ohms, go to next step. If ohmmeter does not indicate about zero ohms, an open or short circuit to voltage is present in receiver ground wire between 5-pin connector terminal No. 1 and electrical distribution unit power ground terminal.

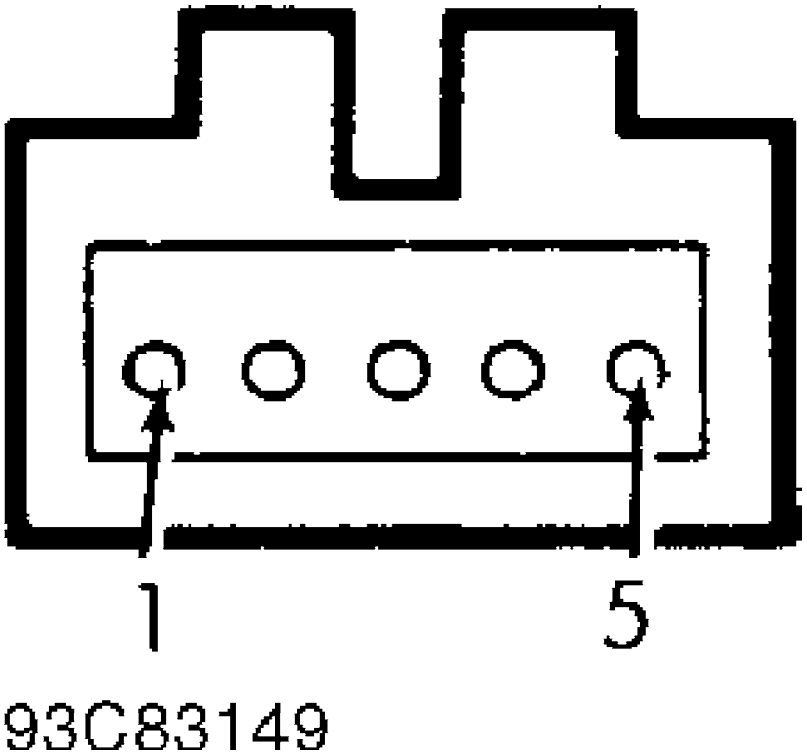

Fig. 3: Identifying Receiver 5-Pin Connector Terminals
Courtesy of Volvo Cars of North America.

7) Ensure ignition is off and receiver 5-pin connector is disconnected. See Fig. 3. Connect voltmeter between 5-pin connector

terminals No. 1 and 5. If battery voltage is present, go to next step. If battery voltage is not present, an open or short circuit to ground is present in receiver supply wiring between 5-pin connector terminal No. 5 and fuse No. 15 fuse holder terminal.

8) Ensure ignition is off and receiver 5-pin connector is disconnected. See Fig. 3. Ensure ignition is off. Connect voltmeter between 5-pin connector terminals No. 1 and 4. Voltmeter should indicate zero volts. Turn ignition switch to position I and repeat voltage measurement. Voltmeter should indicate battery voltage.

9) If voltage measurements are to specification, go to next step. If voltage measurements are not to specification, an open or short circuit is present in trigger supply wiring between fuse No. 32 fuse holder terminal and 5-pin connector terminal No. 4. See Fig. 3.

10) Ensure ignition is off and receiver 5-pin connector is disconnected. See Fig. 3. Remove central locking relay. Connect ohmmeter between 5-pin connector terminal No. 3 and relay base terminal ATR. See Figs. 1 and 3. Ohmmeter should indicate zero ohms. Connect ohmmeter between 5-pin connector terminals No. 1 and 3. Ohmmeter should indicate infinite resistance. Connect voltmeter between 5-pin connector terminals No. 1 and 3. Voltmeter should indicate zero volts.

11) If all resistance and voltage readings are to specification, go to next step. If resistance and voltage readings are not to specification, an open or short circuit is present in receiver signal wiring between wiring harness 5-pin connector terminal No. 3 and base relay terminal ATR.

12) Ensure ignition is off. Reconnect receiver 5-pin connector. See Fig. 3. Reinstall central locking relay. Remove transmitter battery cover and remove battery. Connect voltmeter to battery. If battery has minimum 2.8 volts, reinstall battery and go to next step. If battery voltage does not meet specification, replace battery. Test transmitter by operating LOCK and UNLOCK buttons. If system still does not activate, go to next step.

13) Ensure ignition is off. Reprogram receiver. See RECEIVER PROGRAMMING. Test transmitter by pressing LOCK and UNLOCK buttons. If central locking system does not activate, go to next step.

14) Ensure ignition is off. Remove central locking relay. Connect voltmeter between relay base terminals ATR and No. 31. See Fig. 1. Operate transmitter LOCK button and check voltage. If voltmeter indicates any voltage, replace central locking relay. If system still does not activate, go to step 16). If voltmeter does not indicate any voltage, go to next step.

15) Ensure ignition is off. Reinstall central locking relay. Replace transmitter. Reprogram receiver. See RECEIVER PROGRAMMING. Test transmitter by pressing LOCK and UNLOCK buttons. If central locking system does not activate, go to next step.

16) Ensure ignition is off. Replace and reprogram receiver unit. Test receiver by pressing transmitter LOCK and UNLOCK buttons. If central locking system still does not activate, go to step 28) under CENTRAL LOCKING INOPERABLE to check central locking unit.

REMOVAL & INSTALLATION

CENTRAL LOCKING ACTUATOR

Removal & Installation

Remove door panel. See appropriate POWER WINDOWS article. Remove lock unit. Remove actuator from lock unit. See Fig. 4. To install, reverse removal procedure.

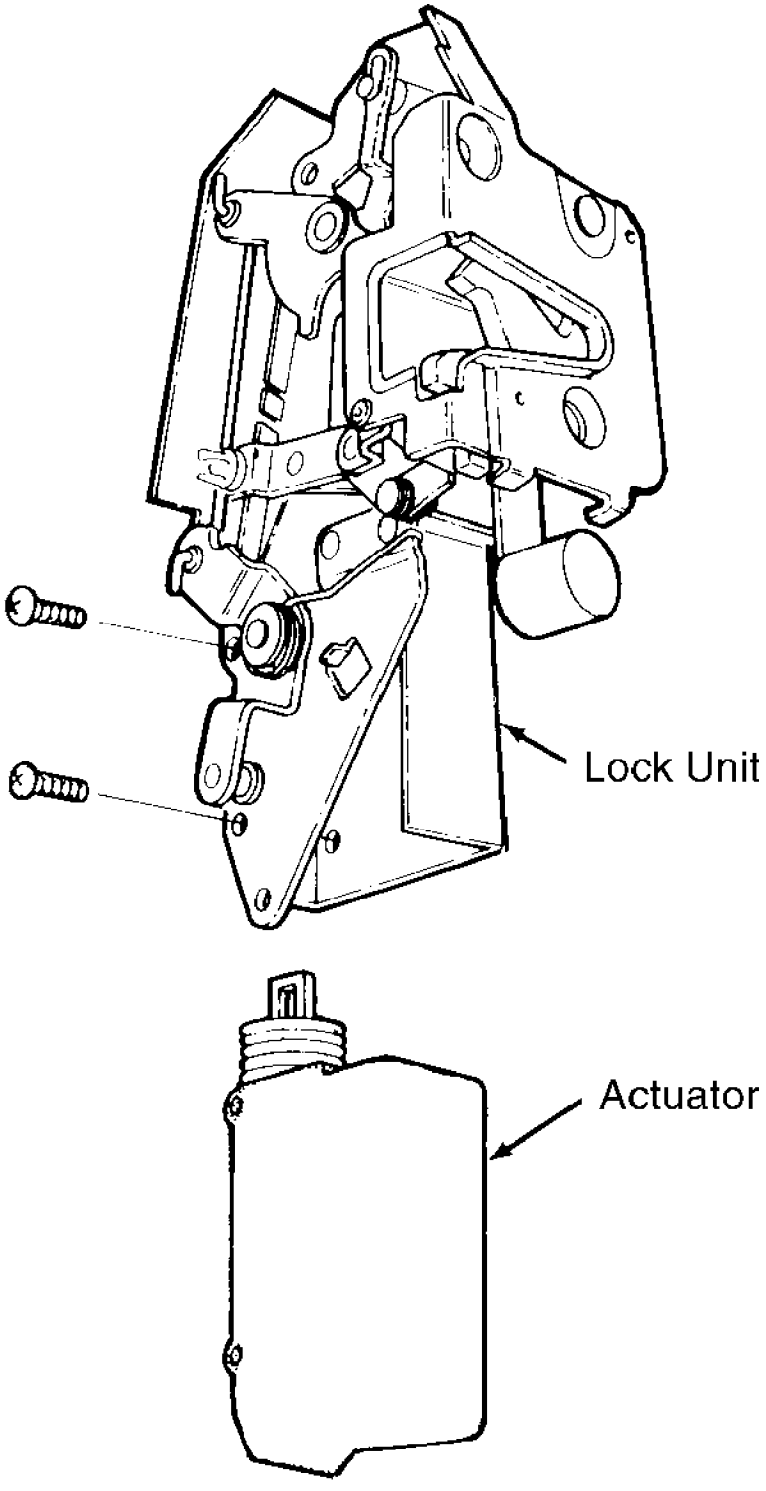

Fig. 4: Removing Central Locking Actuator
Courtesy of Volvo Cars of North America.

WIRING DIAGRAMS

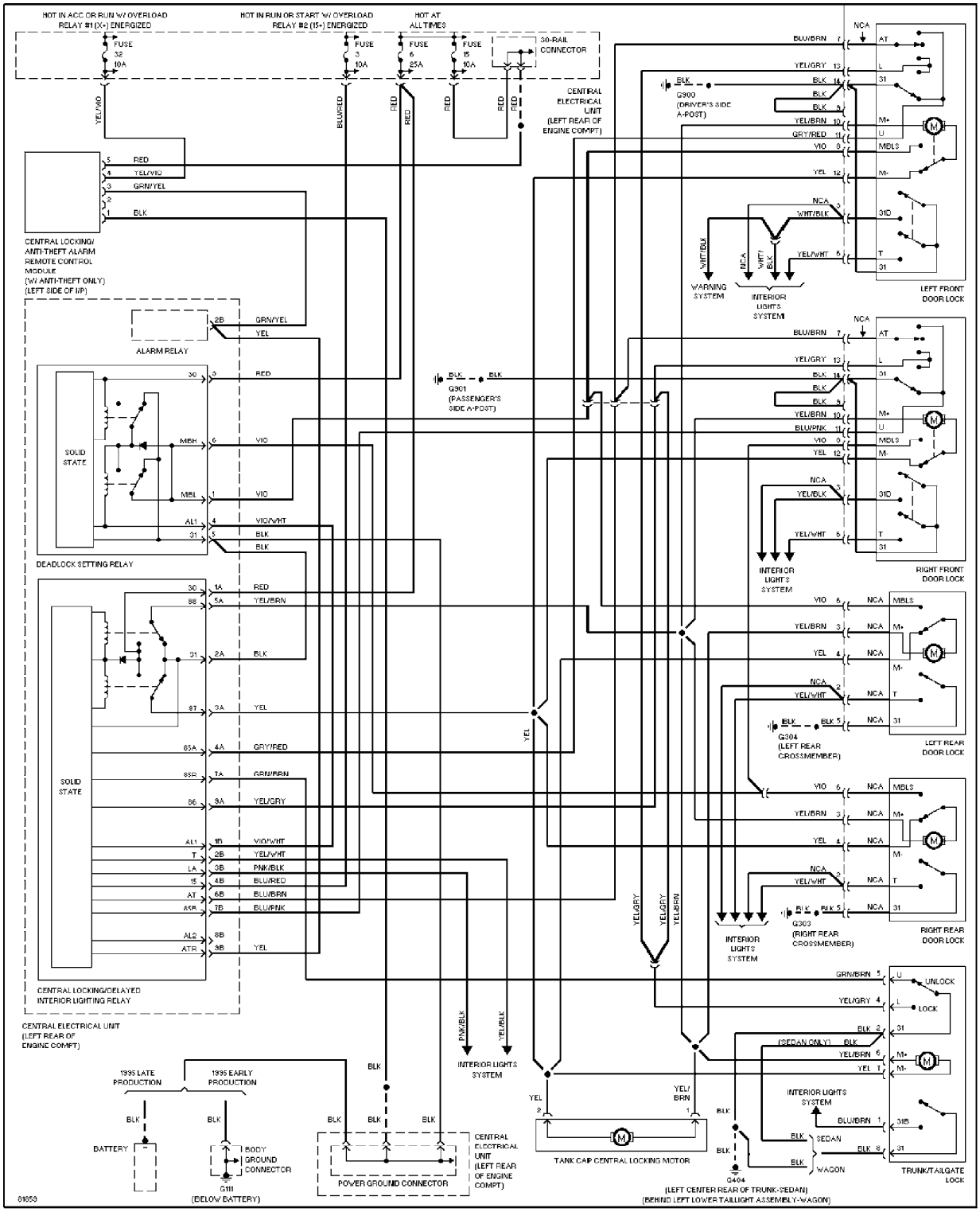

Fig. 5: Keyless Entry System Wiring Diagram (1995 - With Deadlock)

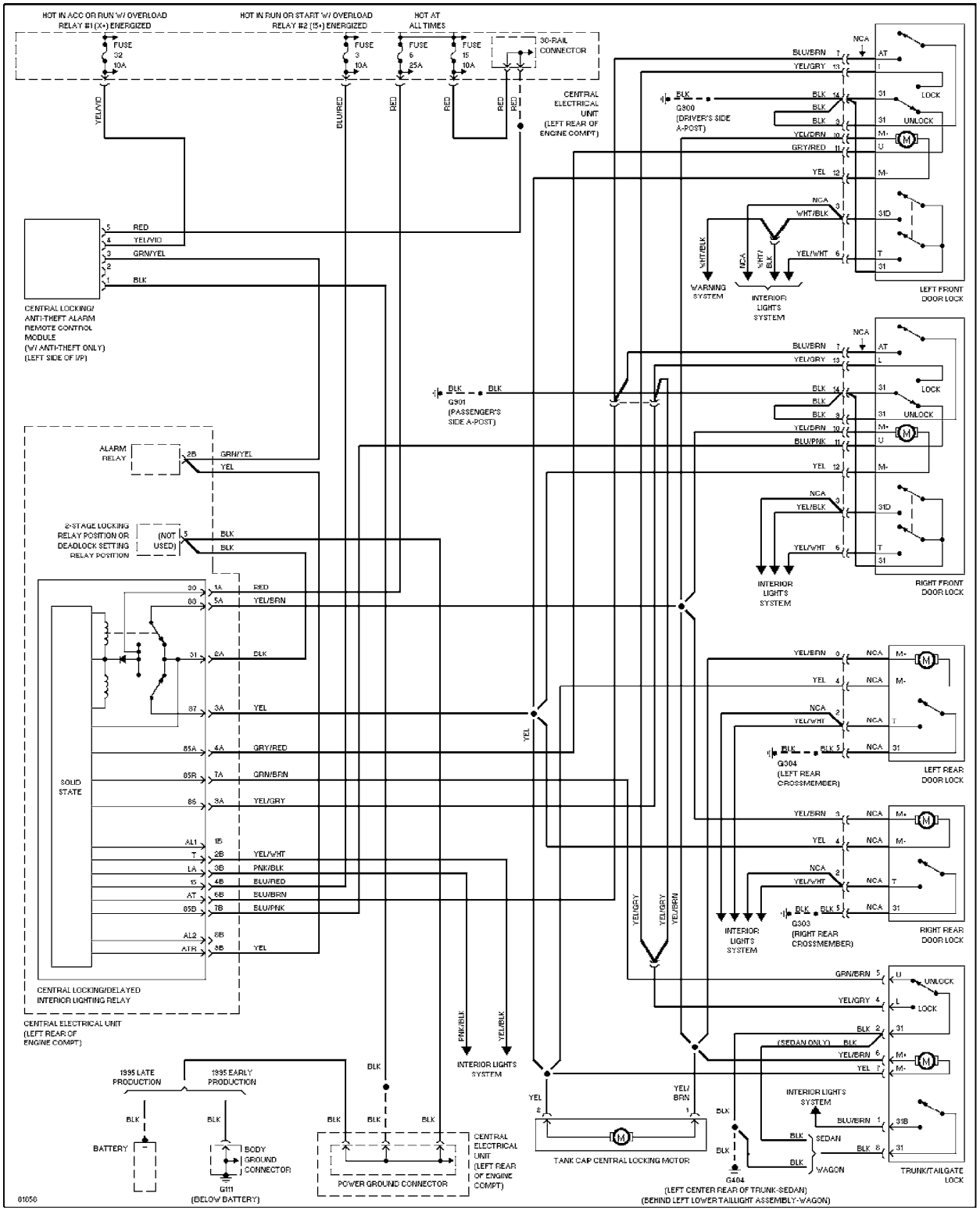

Fig. 6: Keyless Entry System Wiring Diagram (1995 - Without Deadlock)