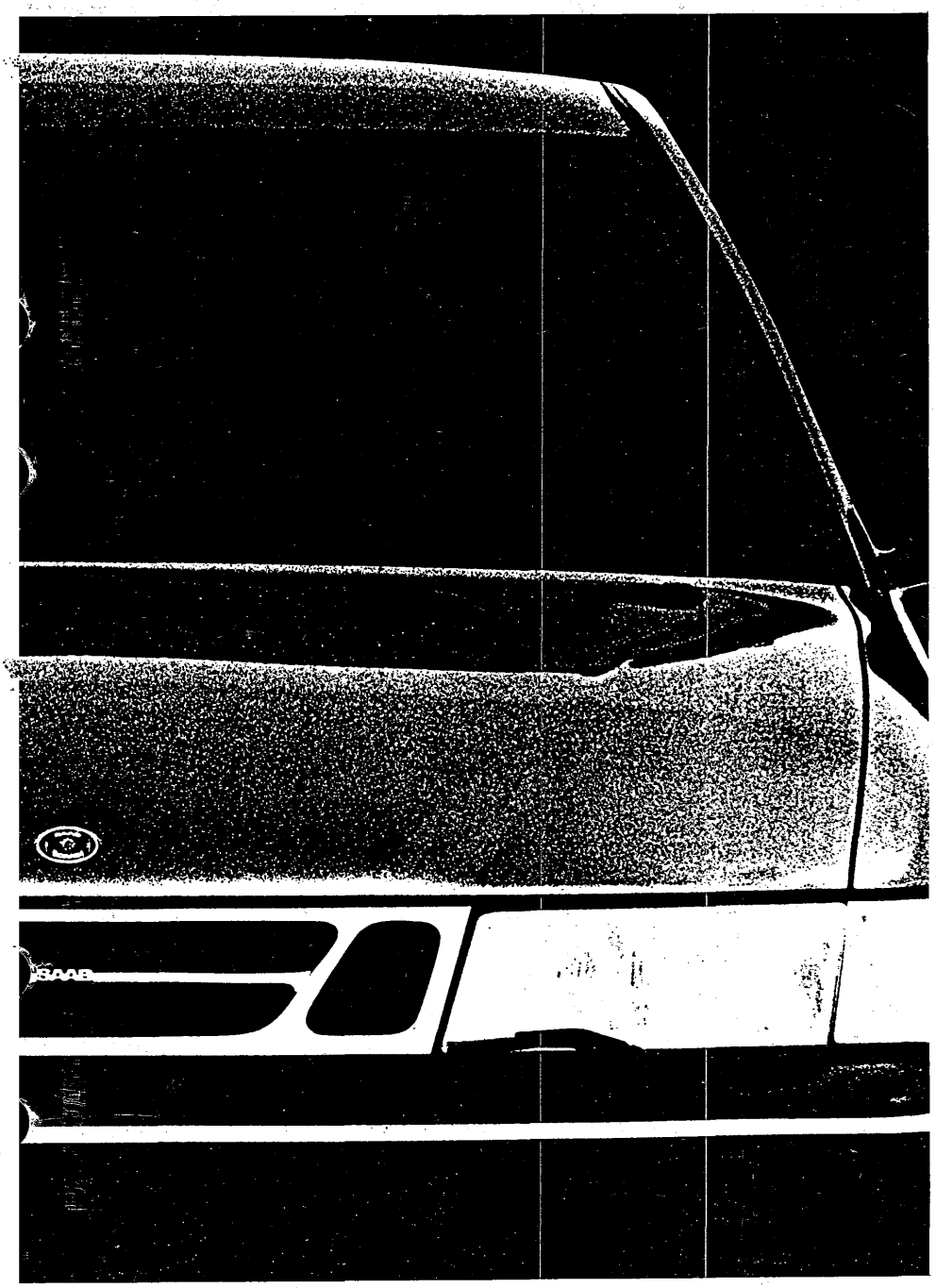
Saab 9000

Service Manual



M 1995–

ENG

8:6 SRS (Airbag)

Saab 9000

SERVICE MANUAL

8:6 SRS (Airbag)

M 1995–

Preface

All information and illustrations in this Service Manual are based on the design of the cars at the time of the final editing of the manuals. Choice of models, technical data and equipment vary from one market to another and may be changed without prior notice.

Saab Automobile AB

Warning, Important and Note

The headings "Warning", "Important" and "Note" occur from time to time in the Service Manual. They are used to draw the attention of the reader to information of special interest and seriousness. The importance of the information is indicated by the three different headings and the difference between them is explained below.

⚠ WARNING

Warns of the risk of material damage and grave injury to mechanics and the driver, as well as serious damage to the car.

Important

Points out the risk of minor damage to the car and also warns the mechanic of difficulties and time-wasting mistakes.

Note

Hints and tips on how the work can be done in a way that saves time and labour. This information is not supplied for reasons of safety.

Market codes

The codes refer to market specifications

AT	Austria	GB	Great Britain
AU	Australia	GR	Greece
BE	Belgium	IS	Iceland
CA	Canada	IT	Italy
CH	Switzerland	JP	Japan
DE	Germany	ME	Middle East
DK	Denmark	NL	Netherlands
ES	Spain	NO	Norway
EU	Europe	SE	Sweden
FE	Far East	US	USA
FI	Finland	UC	US California
FR	France		

Production: Service Support, Saab Automobile AB, Trollhättan, Sweden

Safety and handling instructions

Working on the SRS

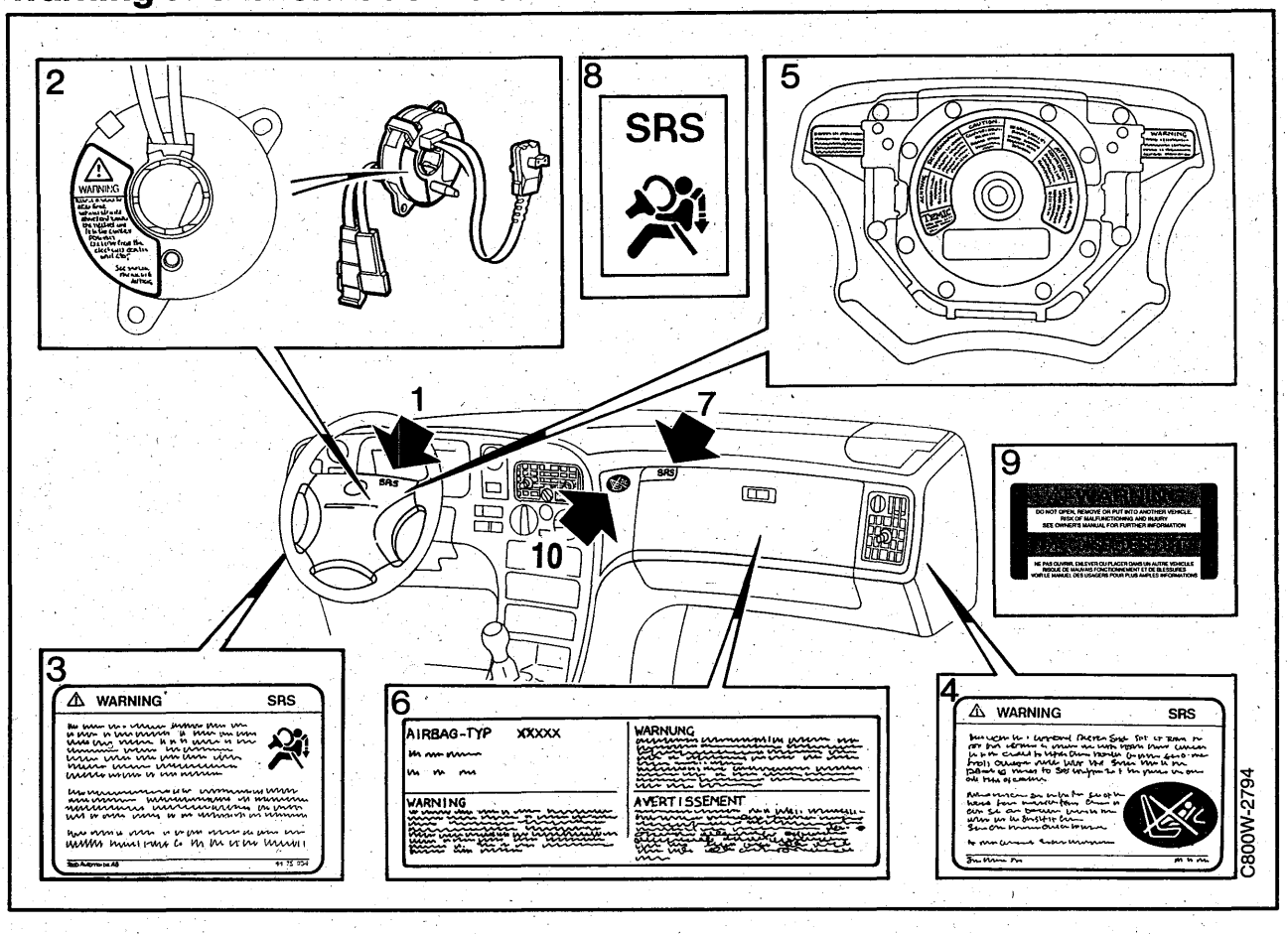
⚠ WARNING

When working on the SRS, the following points must be followed:

- All work must be carefully carried out as described in the Service Manual. There is a risk of personal injury if things are not done in the correct way.
- Always disconnect the negative lead from the battery before working on the SRS.
- Components which form part of the system may not be dismantled or repaired. They must be handled with care and stored in a dry place at room temperature.
- Belt tensioners must not be treated with lubricant, cleaner etc.
- Airbags must be stored at room temperature.At higher temperatures they will age. At temperatures over +135°C there is a danger that they could self–activate.

  The belt tensioners must never be exposed to temperatures over +100°C.
- Airbags must be stored in a special place, away from storage areas containing petroleum products or other flammable materials.
- The airbags and the belt tensioners are classed as pyrotechnical devices and must be stored and handled in accordance with the laws and regulations of the country concerned.
- Airbags and belt tensioners must be fitted immediately after they have been fetched from the stores. If work is interrupted, the airbag and the belt tensioner must be returned to the stores and locked away. Under no circumstances may an airbag or belt tensioner be left unattended.
- Airbags must be stored and carried with the metal cover facing downwards to avoid injury in the event of accidental detonation.
- Belt tensioners which have been dropped more than 0.5 meters onto a hard surface must not be used.
- Wear goggles and gloves when dismantling a detonated airbag. Place the airbag in a tightly sealed plastic bag. Wash hands in a mild soap solution and warm water after handling a detonated airbag.

Warning and information labels



A number of warning and information labels are affixed to the car which state that it is equipped with an airbag system. For your own safety, follow the instructions.

1 The letters "SRS" (Supplementary Restraint System) are embossed on the steering wheel.

2 There is a warning label on the contact roller.

3 A warning label is located on the side of the facia on the driver's side.

4 A warning label is located on the side of the facia on the passenger side (cars with passenger airbag).

5 A warning label is located on the rear of the steering wheel airbag .

6 There is a warning label on the rear of the passenger side airbag.

7 On cars with a passenger side airbag, the letters "SRS" are embossed on the airbag cover.

8 There is an "SRS" symbol on the bottom left–hand corner of the windshield. In the case of an accident, the symbols are intended to inform rescue personnel that the car is equipped with an airbag.

9 There is a warning label on the aluminum tube of the belt tensioner.

10 There is a warning label on the facia between the upper air vent and the glove compartment.

Welding

Before welding, remove and cover the negative lead from the battery.

Painting

When painting, mask the weld screws in the SRS control module mounting bracket and the ground connection to ensure that the control module remains grounded.

Electrical work

Electric leads in the airbag system must not be spliced. Splicing can cause malfunction in the system which can result in injury or leave the system unserviceable.
Damaged insulation on SRS leads may be covered with new insulation if the copper conductor is undamaged.
SRS connectors must not be greased.

Fault diagnosis

When carrying out fault diagnosis you must not use an instrument with its own power source like an ohmmeter, diode tester or buzzer **directly** on the driver airbag, the passenger airbag, the belt tensioners or the control module. Instead, dis–con–nect the electrical connectors from the airbags and the belt tensioners and connect each one to its reference resistor. Fault diagnosis is described in greater detail under "Diagnostics and fault diagnosis".

Work on the car body

When conducting body work that involves impacts and vibration on the body, the control module connector must be disconnected.

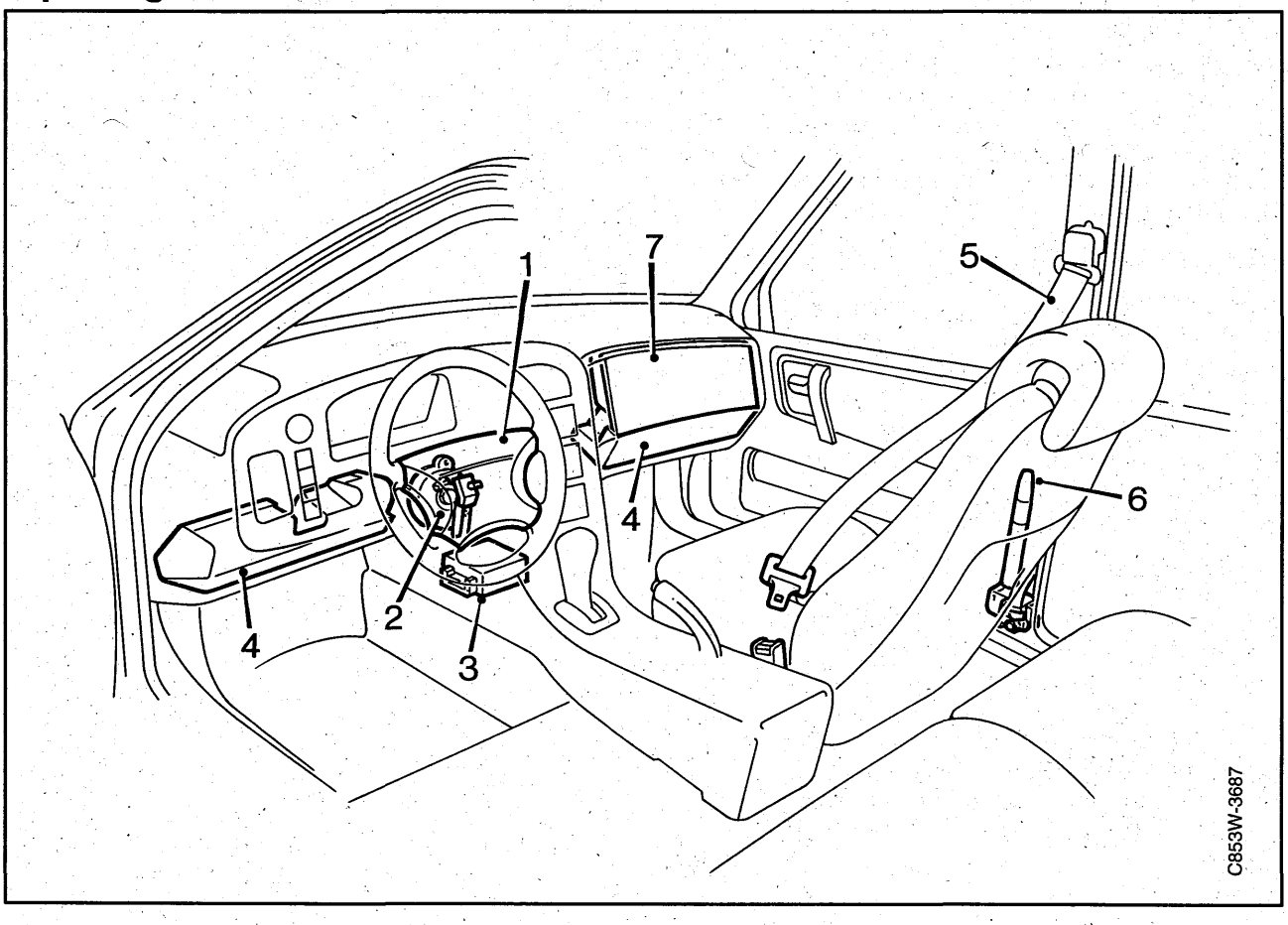
Work on the steering gear

During all work when the contact roller is in place and the steering column is not connected to the steering gear, the steering wheel must be locked to avoid altering the basic setting of the contact roller.

⚠ WARNING

If the basic setting of the contact roller is altered, the spiral shaped conductor in the contact roller is destroyed when the steering wheel is turned to full lock, and the airbag is rendered unserviceable leading to the risk of serious injury in a collision.

Replacing safety components when repairing crashed cars.



When repairing cars that have been damaged in a collision, it is important to replace the correct components in order to avoid any doubt about the reliability of the car when it has been repaired. These components are listed below.

For additional information about repairing crash–damaged cars, refer to the appropriate section in the Service Manual.

When repairing a car with detonated airbag, the following components must **always** be replaced:

1 Steering wheel and airbag as well as the steering column and assembly

2 Contact roller

3 Control module

4 Knee shield (USA and Canada only)

5 All seat belts in use when the collision occurred

6 Belt tensioners

7 Passenger airbag (where fitted)

⚠ WARNING

Change all the seat belts if it cannot be determined with certainty which belts were in use when the collision occurred.

The seat belt on the passenger side must always be changed, even if it has not been used as the belt tensioner has been activated.

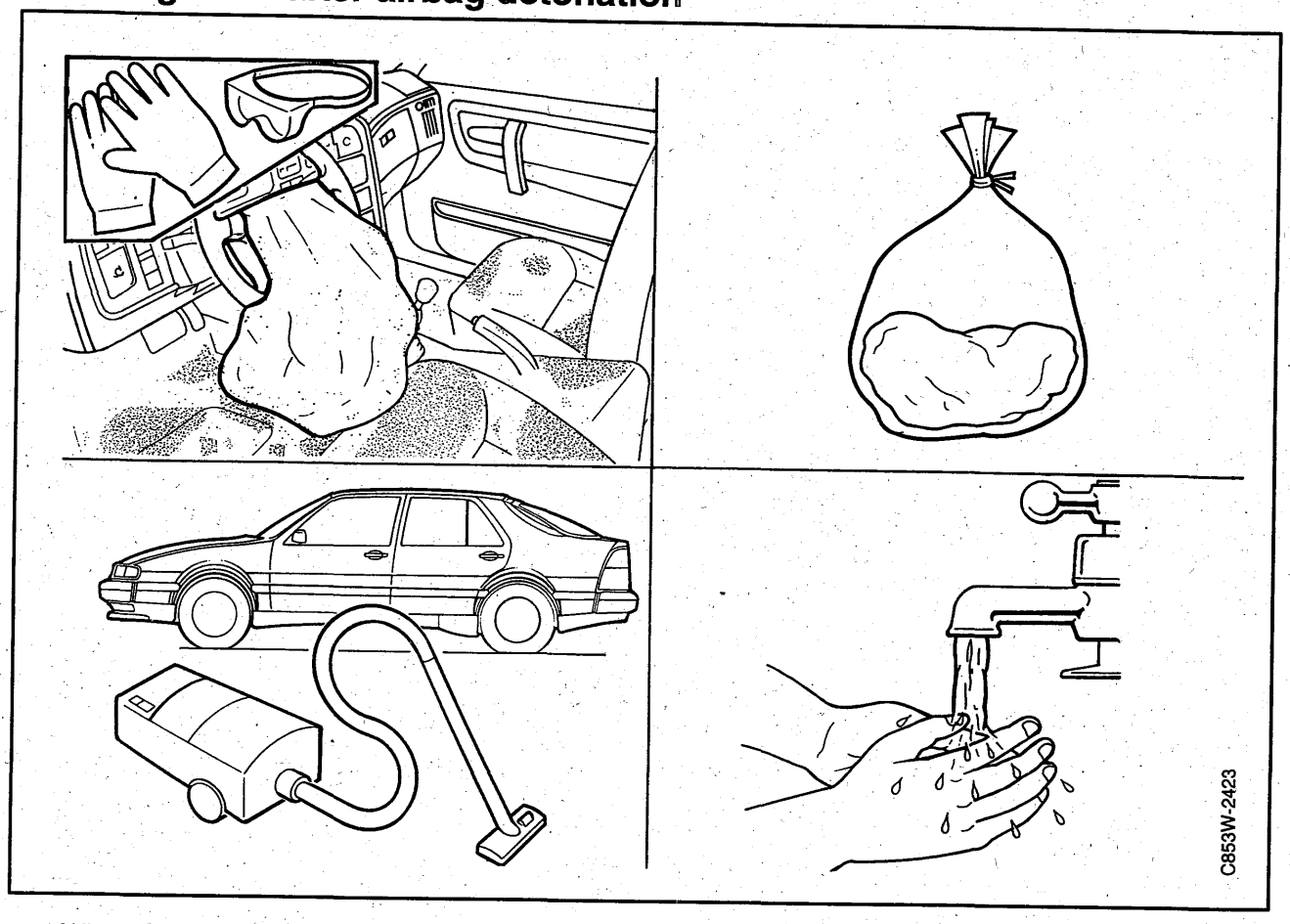
The following components must be checked for burn damage and deformation:

- System wiring
- Windscreen
- Bracket for steering column assembly with wires (not fitted on RHD)

To guarantee operation of the system after damage to the bodywork, brackets and other damaged parts must be restored to their original condition.

Change damaged components.

Cleaning a car after airbag detonation

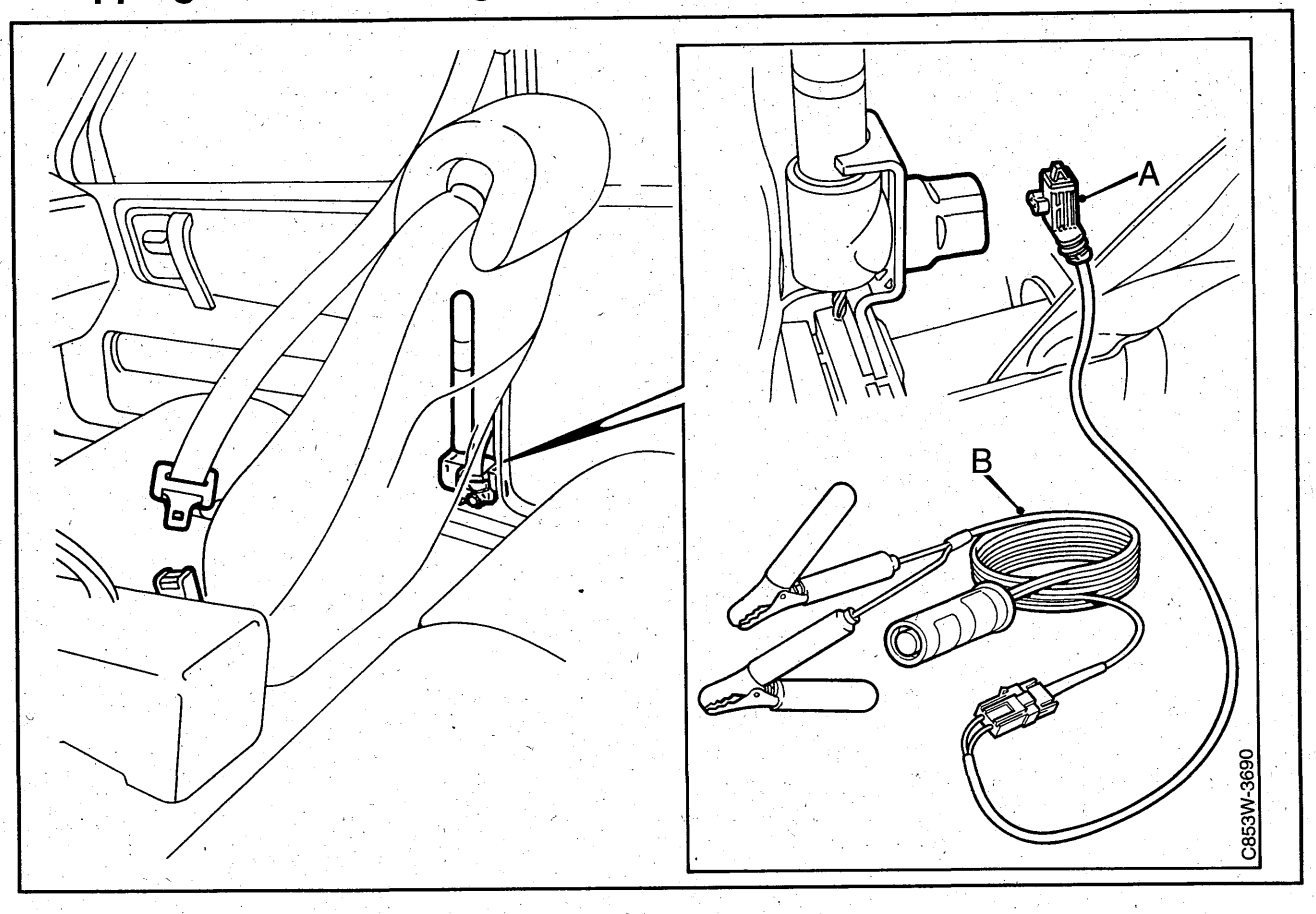


- When the airbag detonates, talc and combustion residues in the form of dust particles are released. These may contain traces of caustic soda.

> **⚠ WARNING**
>
> Wear goggles and gloves to avoid the risk of skin and eye irritation when cleaning a car in which the airbag has detonated.

- Place the airbag in a tightly sealed plastic bag when it has been removed. Remember that the airbag gas generator is extremely hot immediately after the airbag has detonated.
- Thoroughly clean all interior surfaces of the car with a vacuum cleaner.
- Wash hands with soap and water after handling a detonated airbag.

Scrapping cars with airbags.



To avoid injury when scrapping cars with airbag and belt tensioners, undetonated airbags and belt tensioners must be rendered unserviceable by electrical detonation as described below before the car is scrapped. These safety measures are essential as the pyrotechnical units can cause injury if handled incorrectly.

⚠ WARNING

The airbags and belt tensioners to be detonated must be correctly fitted in the car. Check that there are no loose objects in the vicinity of the airbag.

Detonation of an airbag module that is loose or not fitted in place could cause serious injury.

There is a danger of accident if undetonated airbag modules or belt tensioners are exposed to high temperatures, for example when scrapping or if the parts loaded with explosive begin to burn or smoulder.

Scrapping belt tensioners

The belt tensioners must be detonated using triggering device 84 71 104 (B) and cable assembly 86 11 469 (A).

1 Detonation in the off position. Remove the negative lead from the battery. Cover the negative terminal.

2 Push the seat forward and fold down the backrest.

3 Remove the covers from the front and rear scuff plates.

4 Unscrew and remove the scuff plates.

5 Remove the screws holding the trim on the B–pillar.

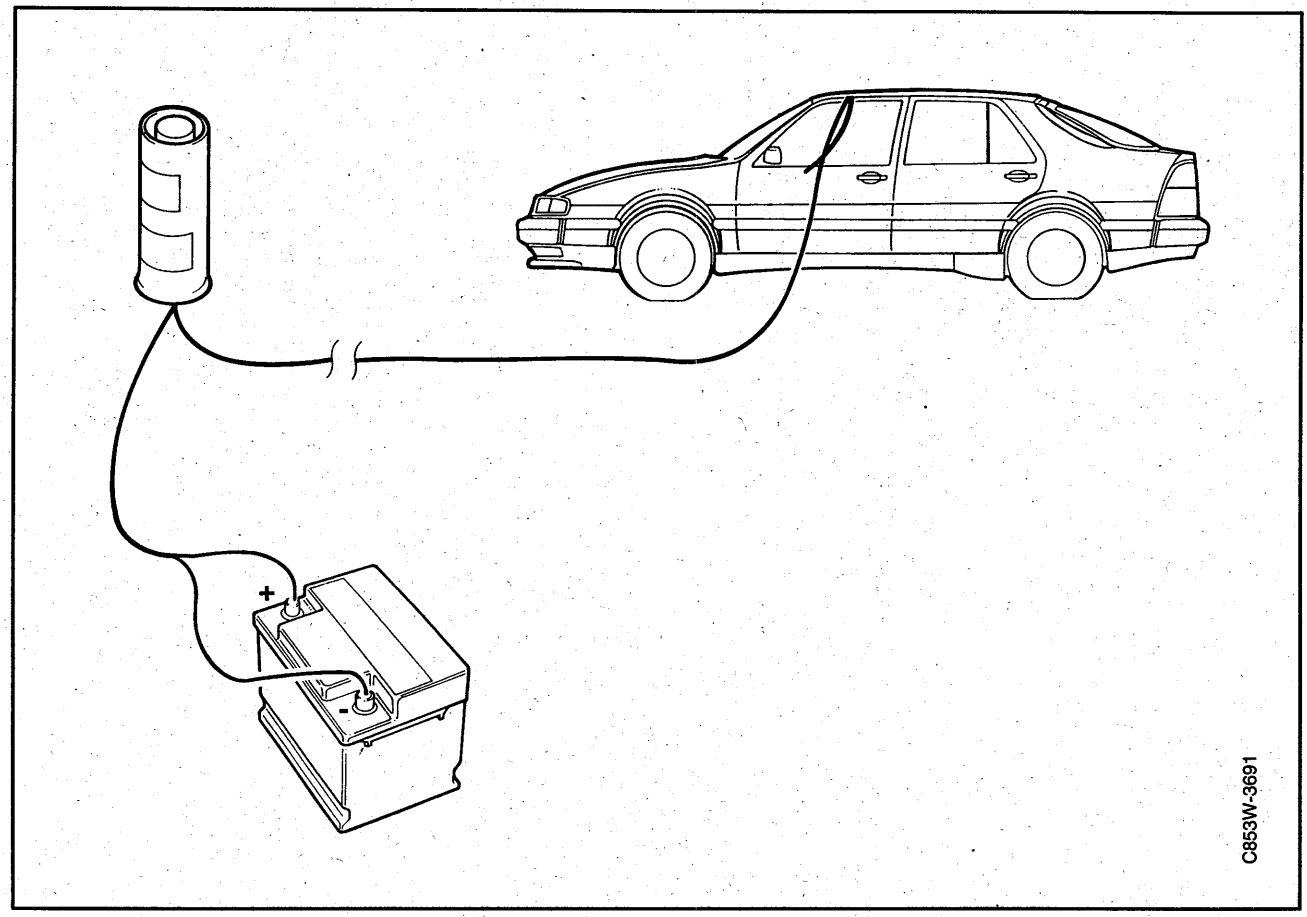
6 Remove the cover, detach the seat belt guide from the B–pillar and remove the B–pillar trim.

7 Remove the plastic protector from over the belt tensioner.

8 Remove the connector from the belt tensioner and plug in triggering device connector 86 11 469 to the belt tensioner.

9 Refit the seat belt guide in its fastening (this is to protect the B–pillar trim when detonating).

Scrapping cars with airbags (contd.)



10 Check that the belt is running freely and can be pulled back approximately 180 mm without damaging anything.

11 Run the triggering device to the engine compartment. Close all doors and windows, checking that there is nobody in the car.

12 Connect the triggering device clamps to the battery terminals.

13 Stand in front of the car and press the triggering button.

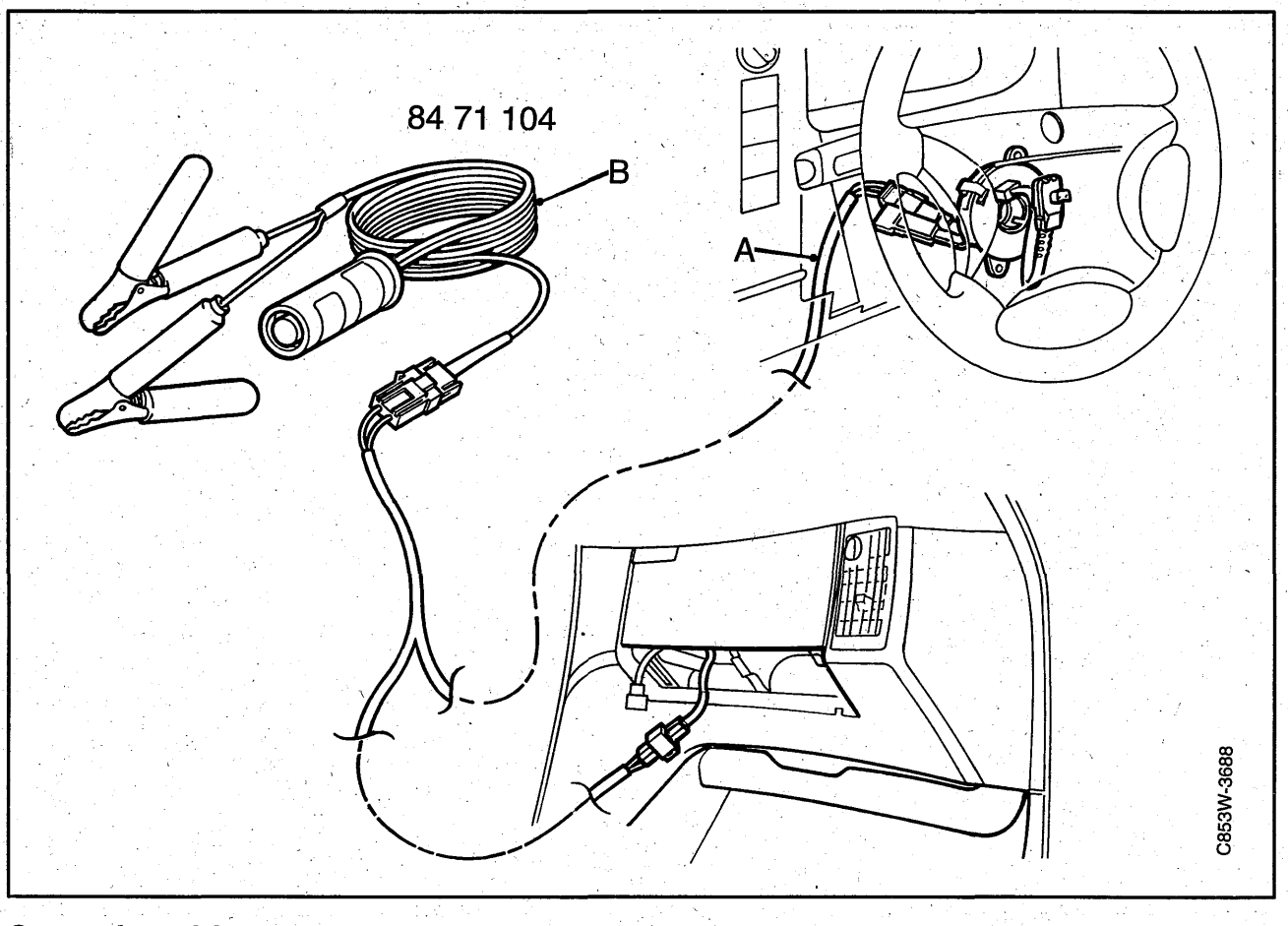
⚠ WARNING

If the belt tensioner does not detonate at the first attempt, disconnect the triggering device from the battery and carefully check the leads and the battery.

⚠ WARNING

Parts that make up the SRS must under no circumstances be removed from one car to be used in another.

Scrapping cars with airbags (contd.)



Scrapping airbags

Airbags must be detonated using triggering device 84 71 104 (B) and cable assembly 86 11 477 (A).

The triggering device consists of an approximately 15 meter long two–conductor cable with a push–button and battery terminal clamps plus a connector for plugging into the car's wiring.

The battery to which the triggering device is connected must be in good condition.

1 Park the car outdoors. The safety distance from the car is 10 meters. No persons or objects may be within the safety distance.

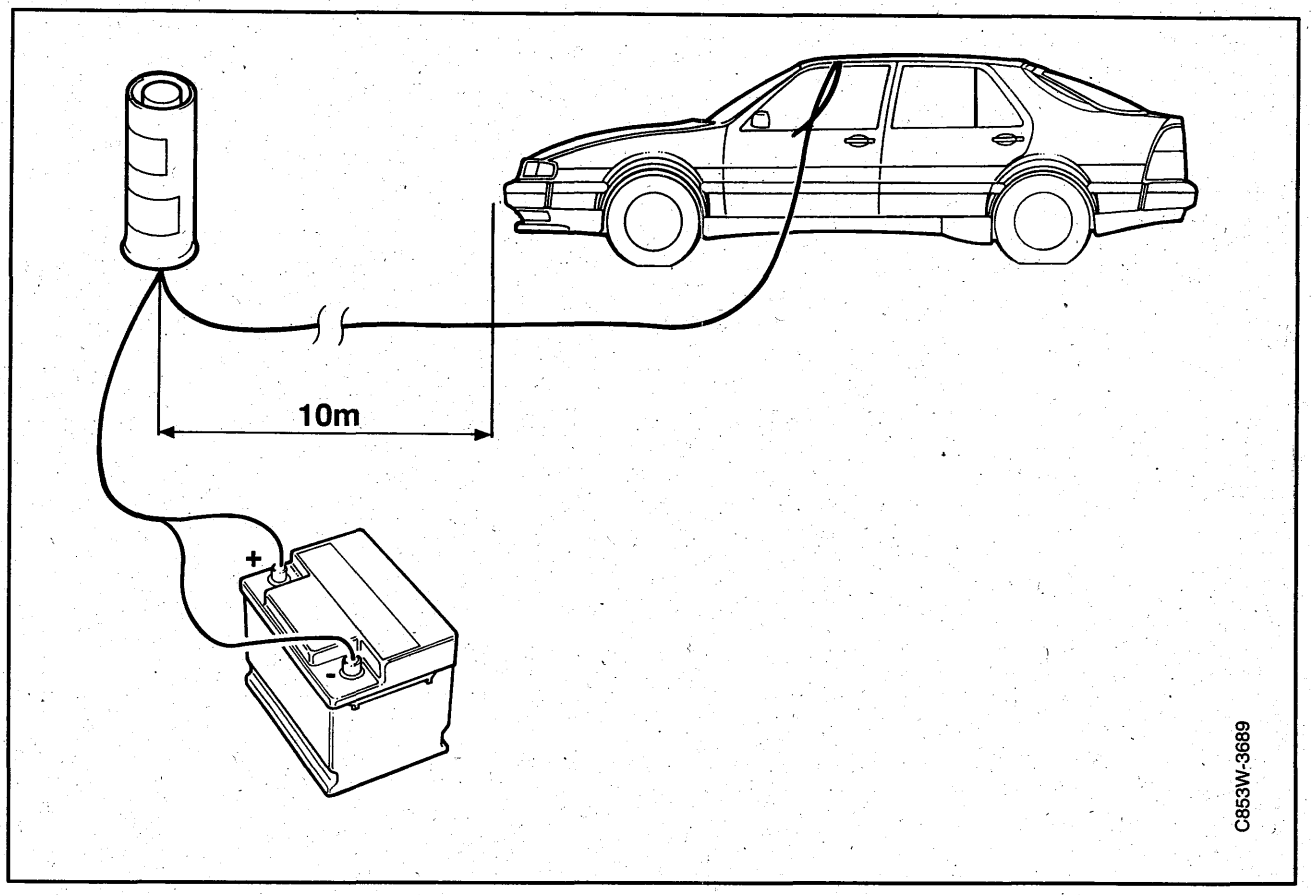
2 Make sure that nobody is in the car and that there are no loose objects in the front seat or on the facia.

3 Disconnect the negative lead from the battery.

4 Steering wheel airbag:
   a. Remove the lower steering column cover.
   b. Unplug the orange 2–pin connector. Connect the triggering device connector to cable assembly 86 11 477. Connect the cable assembly to the orange connector.

5 Passenger side airbag:
   a. Remove the plastic covers from over the two screws securing the lower cover panel. Remove the screws. Withdraw the lower cover panel which is secured with clips. Use tool 82 92 997 and work from right to left. Do not use force.
   b. Unplug the airbag's 2–pin connector. Connect the triggering device connector to cable assembly 86 11 477. Connect the cable assembly to the airbag's 2–pin connector.

Scrapping cars with airbags (contd.)



6 Run the lead through the door opening and close the door. Check that all doors and windows are closed.

7 Position a battery 10 meters from the car. Connect the triggering device to the battery. Make sure that nobody is within the 10 meter safety distance from the car.

8 Detonate the airbag by pressing the triggering button. When the airbag detonates, the sound of an explosion will be heard and white smoke will be visible inside the car.

9 Disconnect the triggering device leads from the battery immediately after the airbag has detonated. Wait 30 minutes before continuing work to allow the airbag's gas generator to cool down.

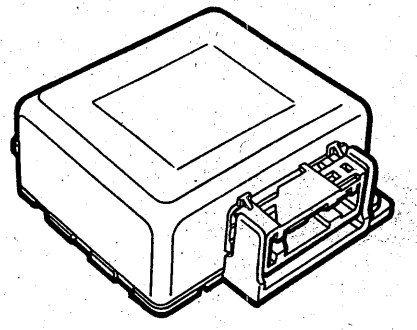
⚠ WARNING

If the airbag does not detonate at the first attempt, disconnect the triggering device from the battery and carefully examine the leads.

⚠ WARNING

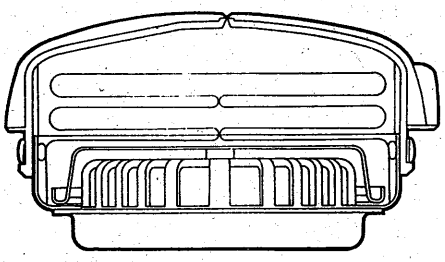
Parts that make up the SRS must under no circumstances be removed from one car to be used in another.

Technical data



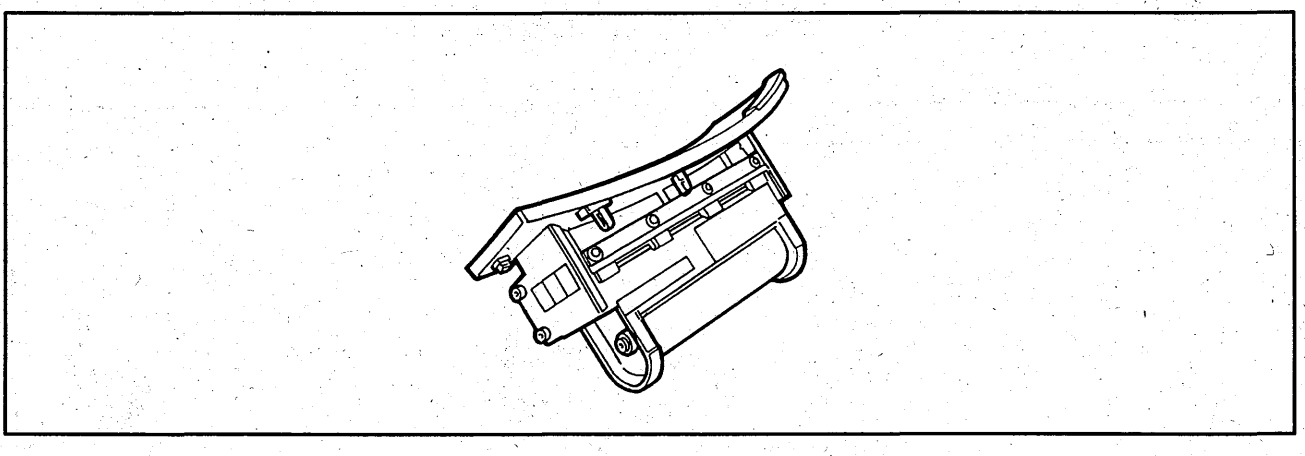
SRS control module

Voltage measurement +15	pin No.	5
Ground	pin No.	6
Diagnostics	pin No.	9
Airbag, driver side	pin No.	10–11
Airbag, passenger side	pin No.	13–14
Belt tensioner, driver side	pin No.	1–2
Belt tensioner, passenger side	pin No.	3–4
Working area	voltage	7–16 V
Time for self–test		6 sec.
Time to disconnect energy reserve		max 5 sec
Number of trouble codes stored		5 + 1 for crash



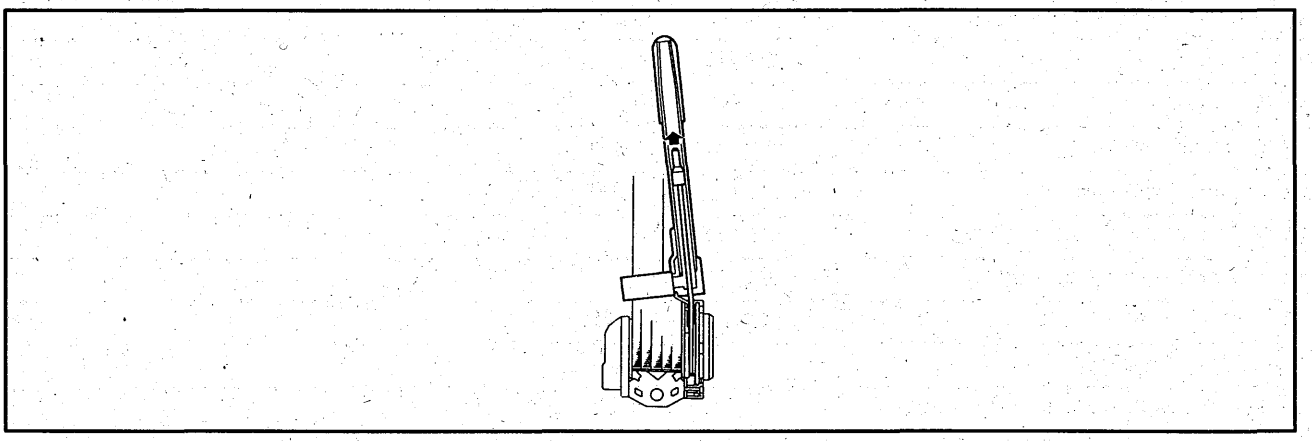
Airbag, driver side

Volume	approx. 70 liters



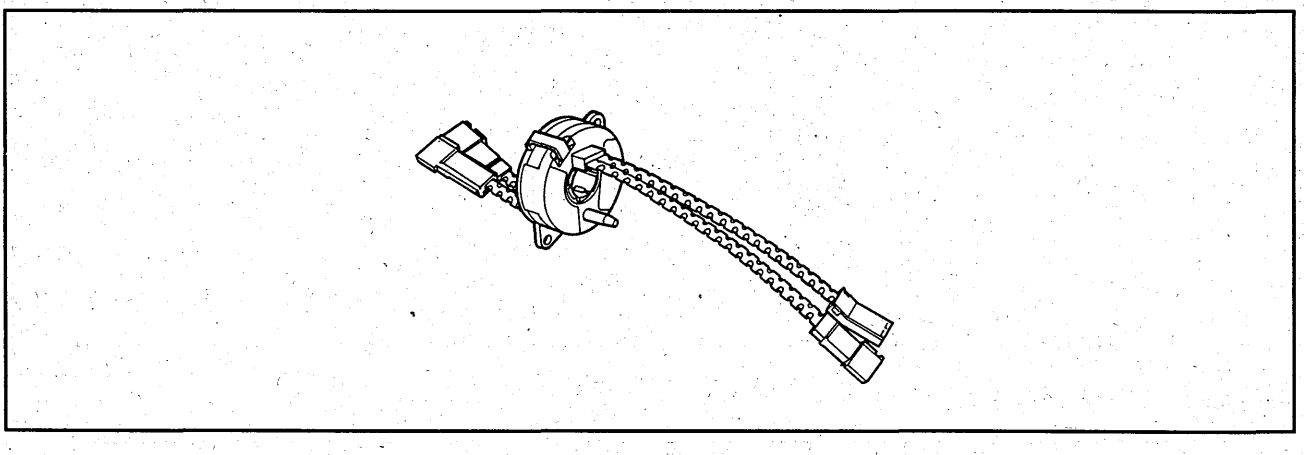
Airbag, passenger side

Volume	approx 150 liters



Seatbelt tensioner

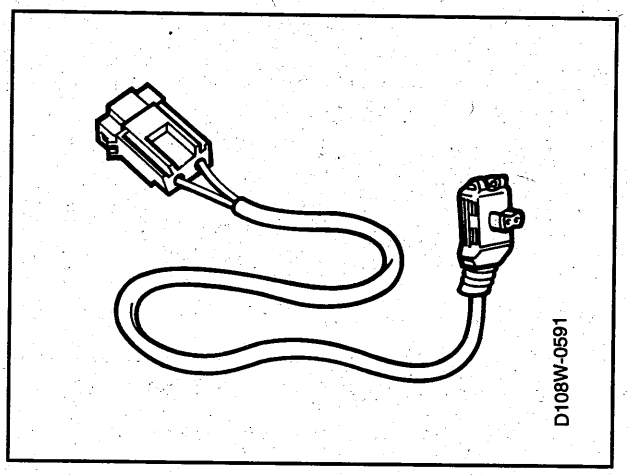
Stroke length	180 mm



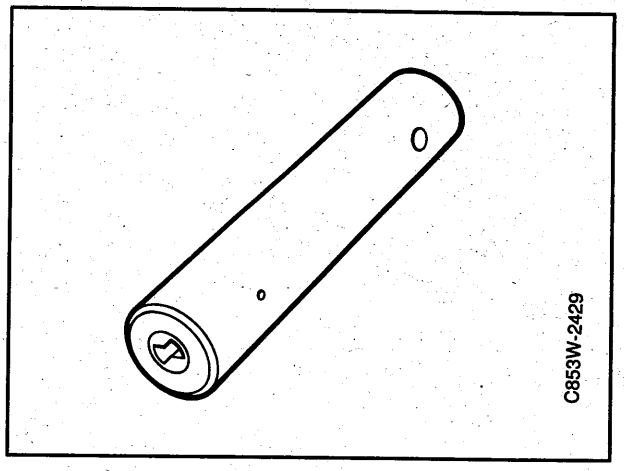
Contact roller

Permitted rotation of moving part	max 2.5 rotations either way from the center position

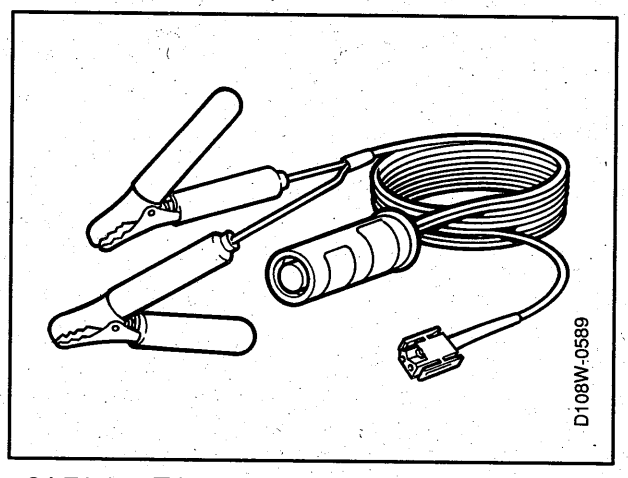
Special tools



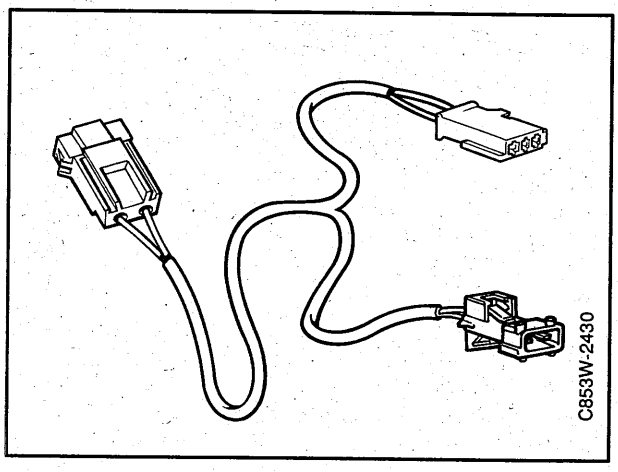
86 11 469 Cable assembly for the triggering device for scrapping belt tensioners



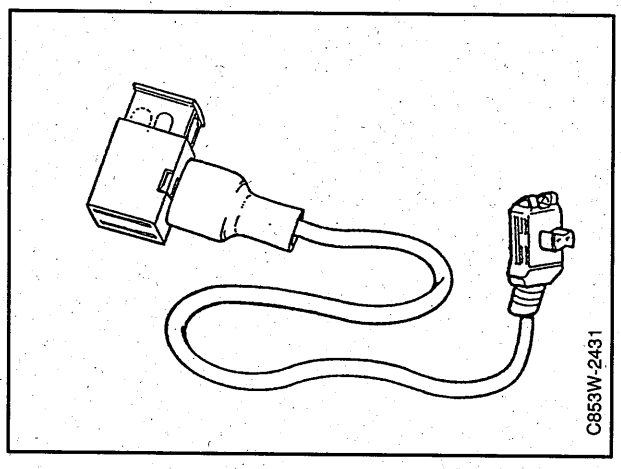
84 71 153 Reference resistor



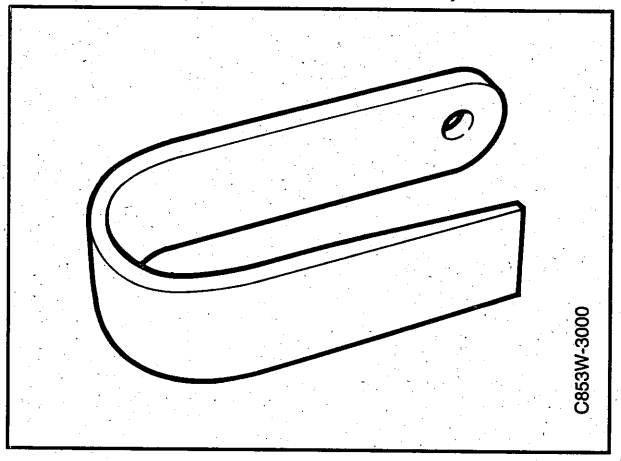
84 71 104 Triggering device for scrapping airbags and belt tensioners



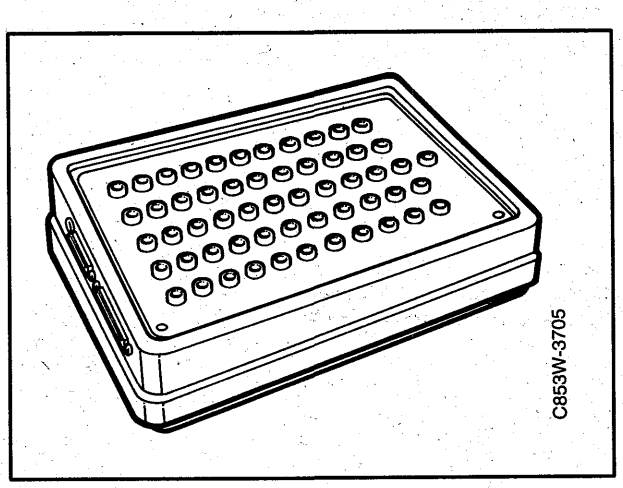
86 11 477 Cable assembly for trigger device for scrapping airbags in the steering wheel and on the passenger side



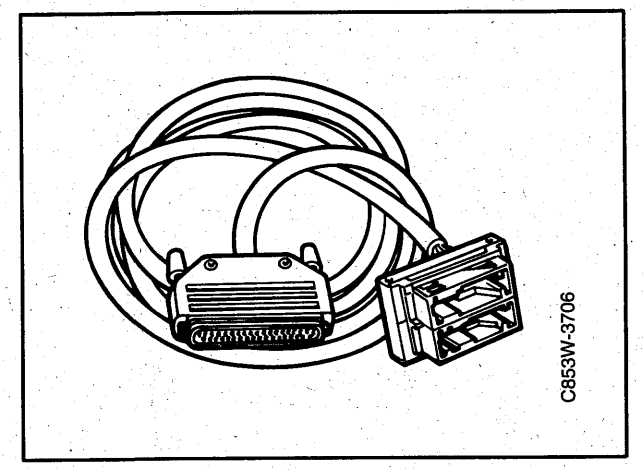
86 11 378 Cable assembly for connecting reference resistor on the passenger side.



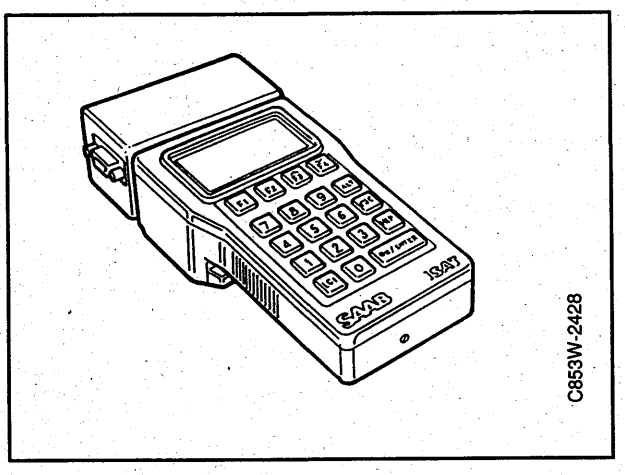
82 92 997 Dismantling tool for the cover panel under the passenger side airbag



86 11 006 Breakout Box (BOB)



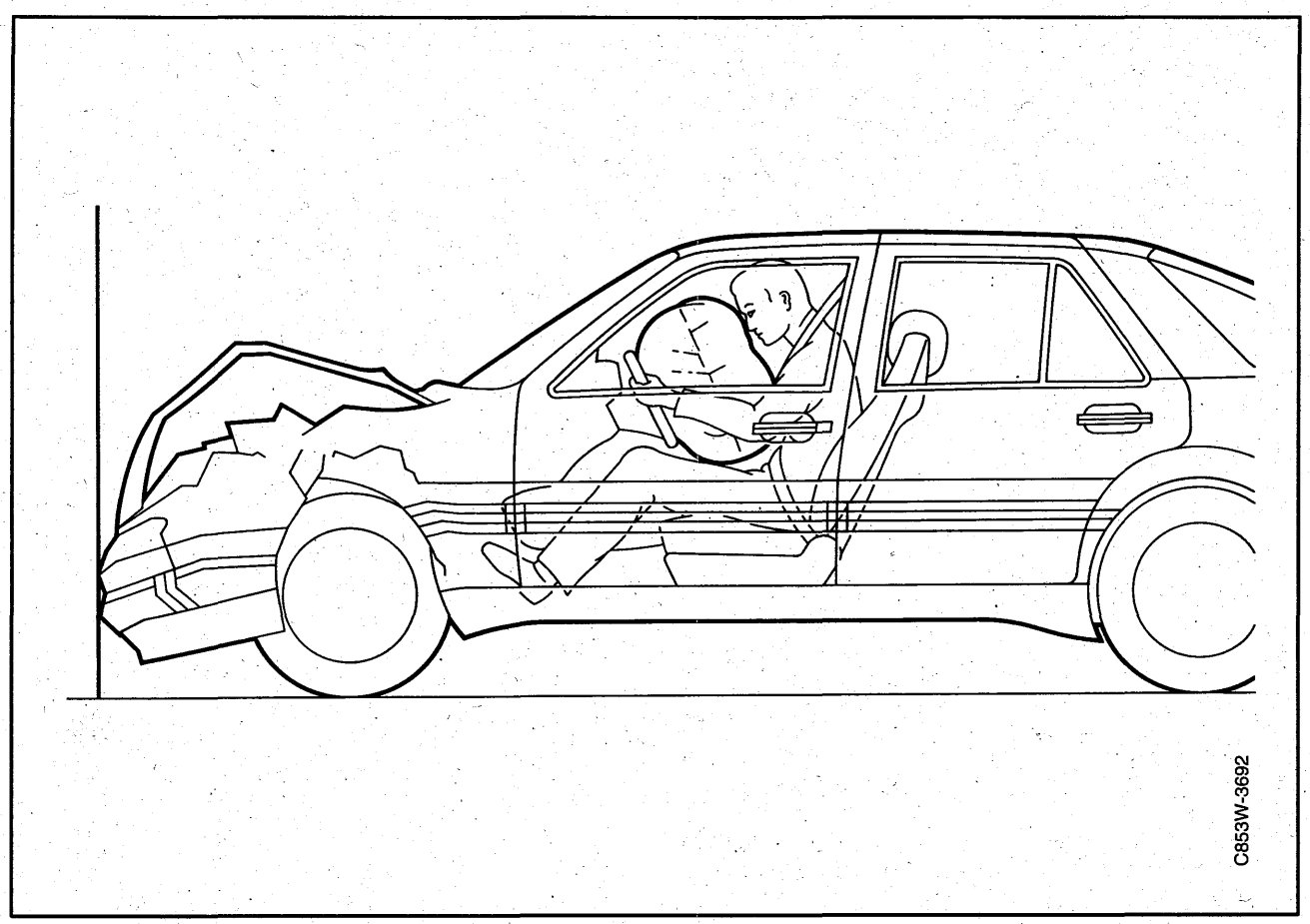
86 11 865 15–pin test lead to the breakout box, SRS (Airbag) M95–



86 10 834 ISAT
86 11 436 SDAII
86 11 915 Mass storage module

Technical description

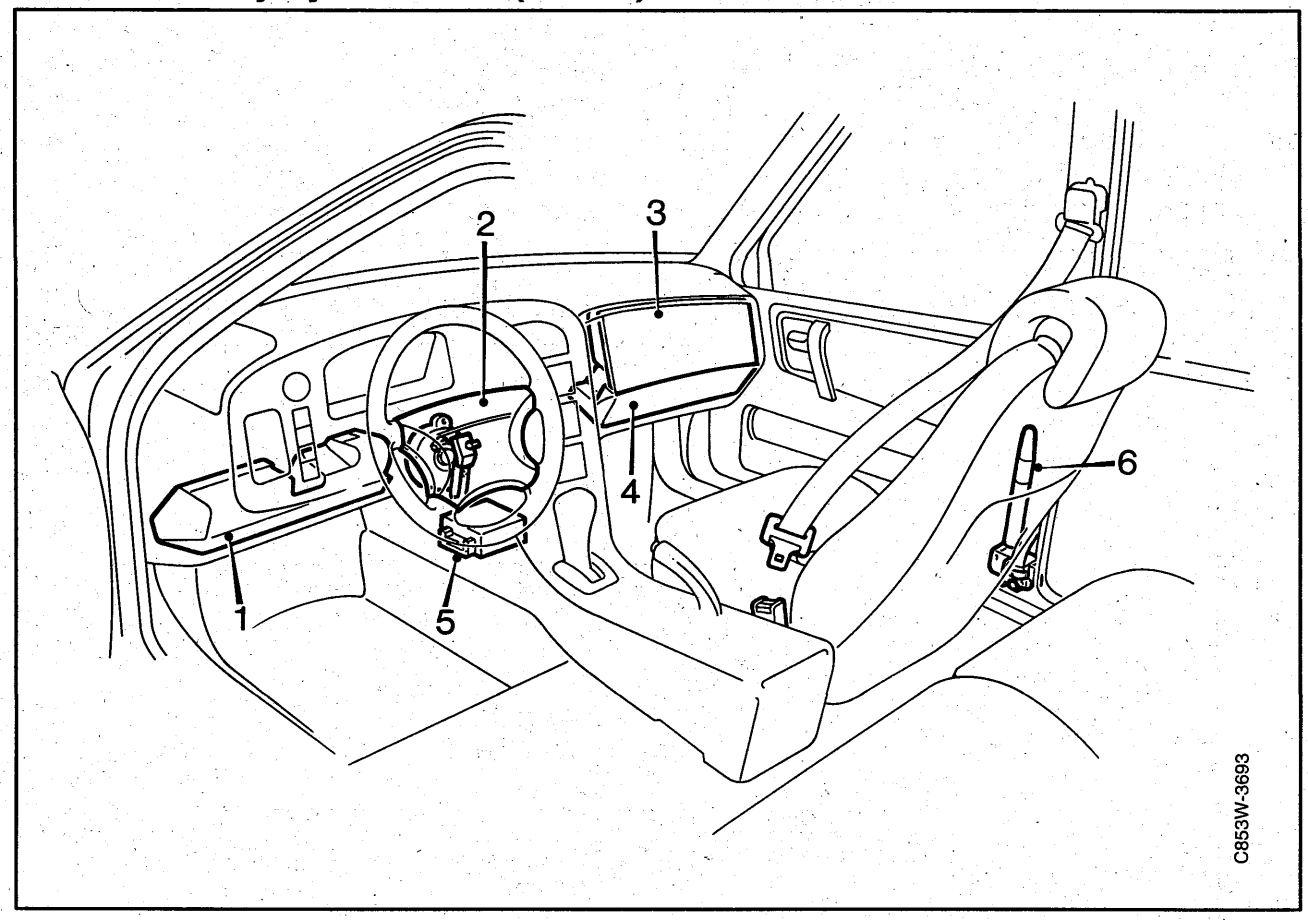
Passive safety system SRS (Supplementary Restraint System)



As of year model 1995 a new SRS system is being introduced on the Saab 9000. The system has pyrotechnical belt tensioners which are controlled together with the airbags by the SRS control module. The front sensors are replaced with sensors in the SRS control module.

All cars are equipped with an airbag on the driver side. Cars to US or CA specification are all also equipped with an airbag on the passenger side. In certain other markets an airbag on the passenger side is offered as a factory–fitted option.

Passive safety system SRS (contd.)



1. Knee shields, driver side
2. Airbag, steering wheel
3. Airbag, passenger side
4. Knee shield, passenger side
5. SRS control module
6. Pyrotechnical belt tensioner

The SRS system is a compliment to the car seat belts and considerably improves safety during serious frontal collisions. In a collision comparable to a speed of 25 km/h into a barrier, the airbags are activated together with the belt tensioners and prevent the driver and passenger in the front seat from striking the steering wheel, facia and windshield.

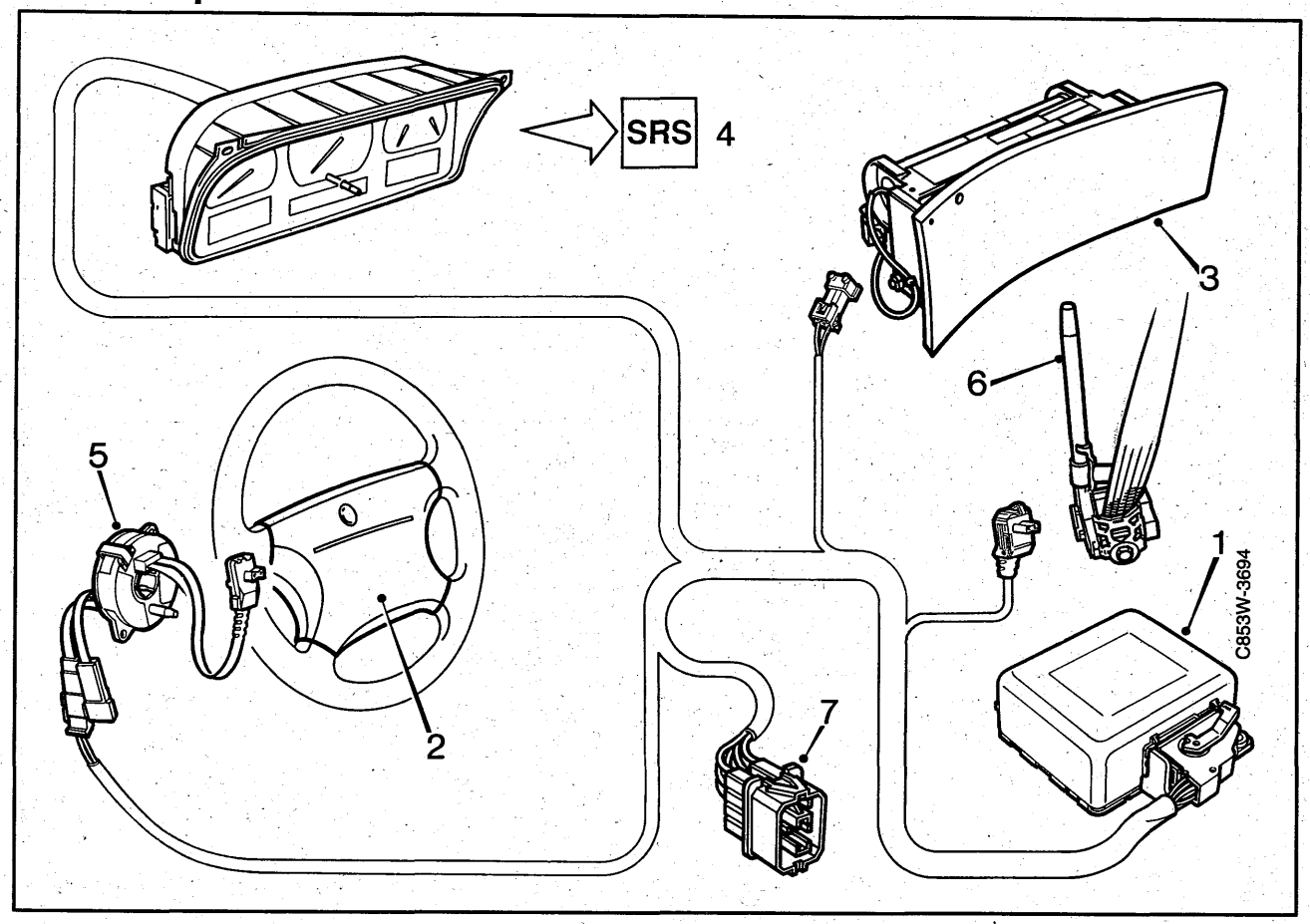
The airbag on the driver side is in the center of the steering wheel while the airbag on the passenger side is located in the panel in front of the passenger.

The entire system is controlled by a control module located on the tunnel in front of the central console. The control module senses a collision and sends an impulse to the electric detonators. The electric detonators activate the gas generators and the airbags are activated.

The control module continually tests the SRS and stores any trouble codes.

To prevent the driver sliding in under the facia during a collision, there are knee shields under the facia on cars with USA and Canada specification.

Main components of the SRS



1 Control module

2 Airbag mounted in steering wheel with gas generator

3 Airbag on passenger side with gas generator (factory–fitted option in certain markets)

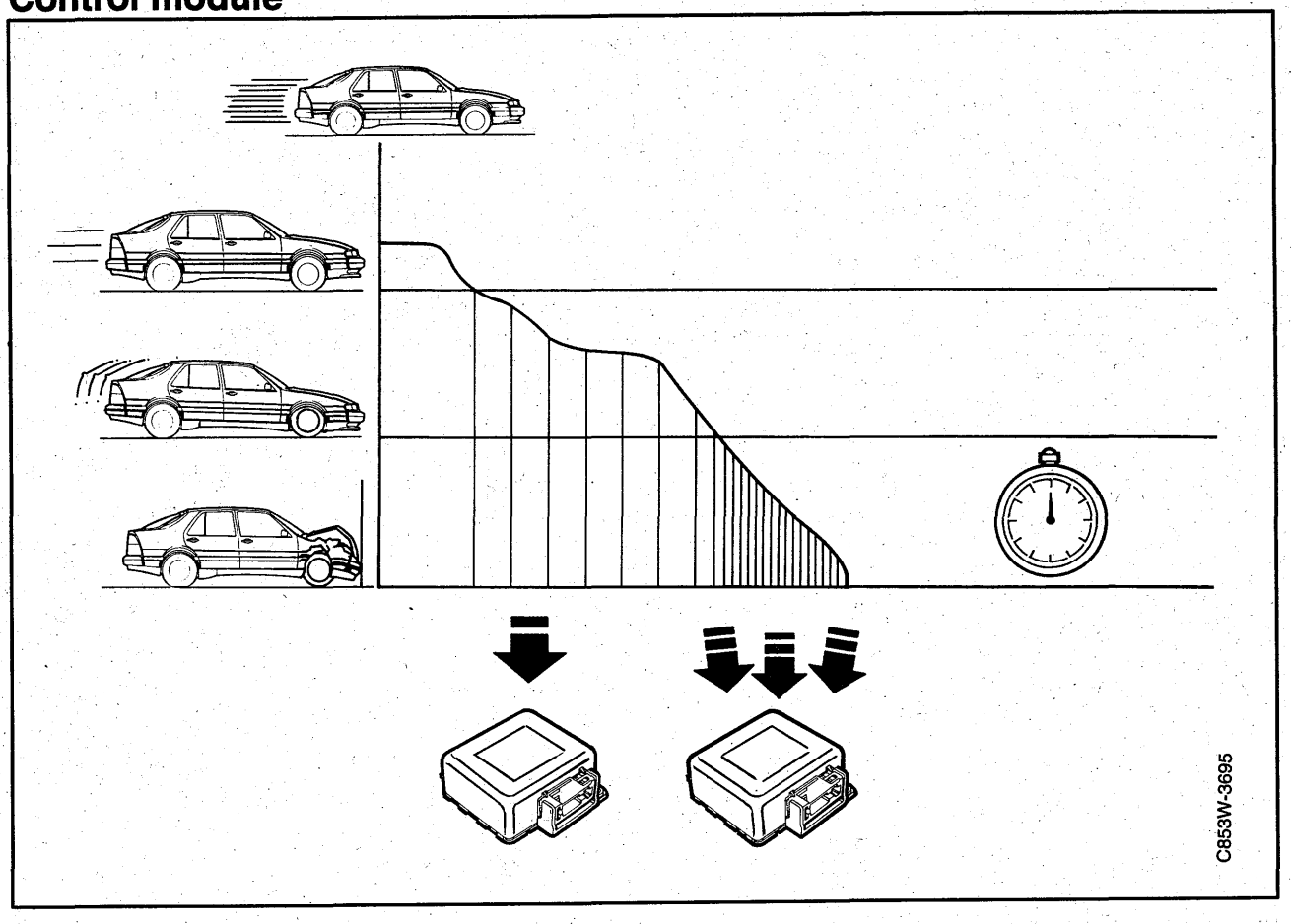
4 SRS warning lamp

5 Contact roller

6 Seatbelt tensioner

7 Data link connector

Control module



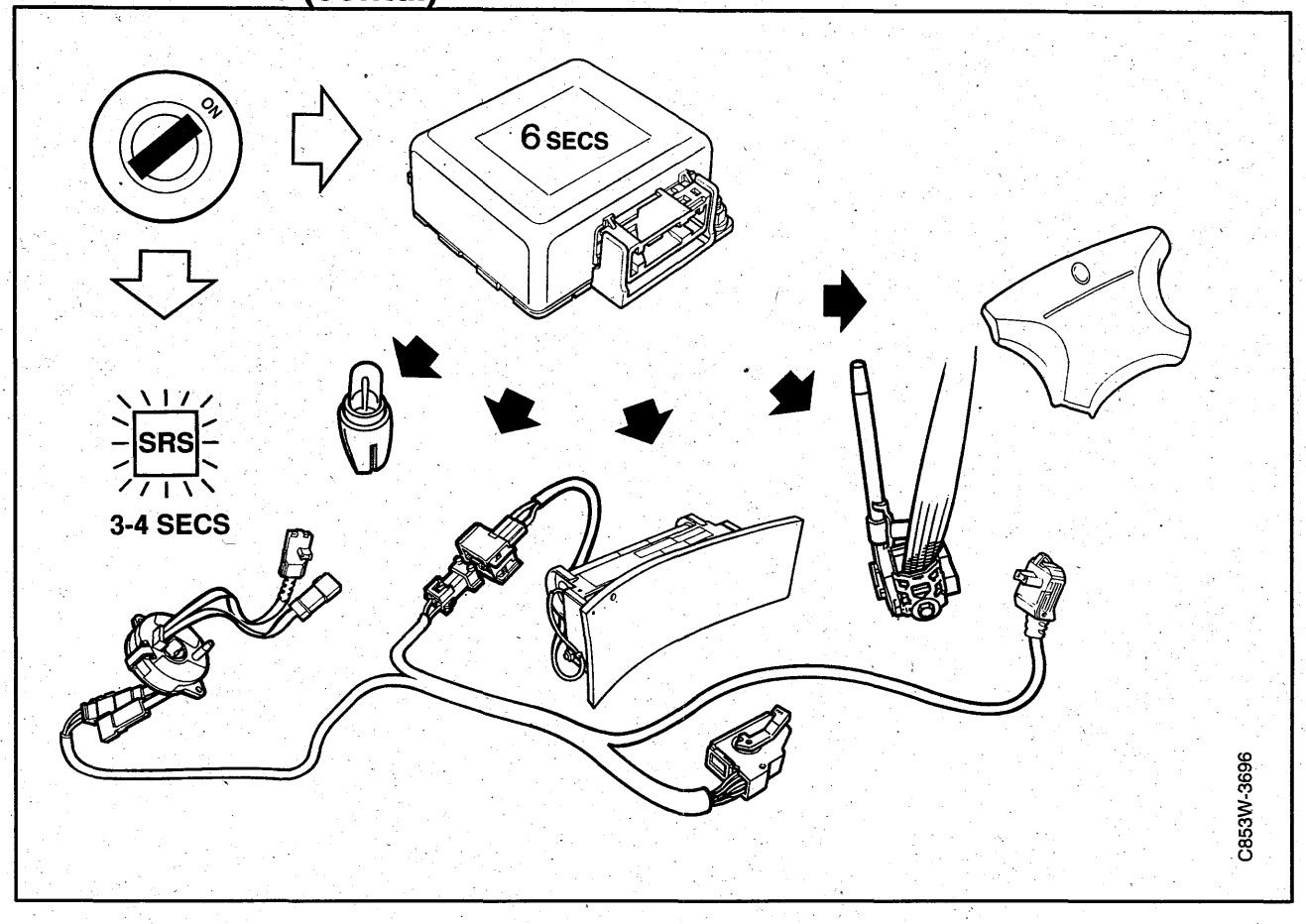
In the control module are a piezo–electric acceleration sensor, a processor, an energy reserve, a voltage transducer and an electromagnetic safety sensor.

The mounting of the control module is direction–dependent because of the **acceleration sensor** which senses the acceleration and retardation in the car's direction of travel. When retardation increases over a certain level, the **processor** begins to process the signal from the acceleration sensor more carefully. If the retardation continues to increase and exceeds the levels defined for a collision, the processor will send an impulse to the electric detonators, inflating the airbags and activating the belt tensioners.

The energy reserve is supplied with energy from the **voltage transducer** which increases the voltage to just over twice that of the battery. There is one energy reserve for the detonators and another which keeps the processor going for a short period in the case of a voltage drop.

The control module can be programmed for the correct configuration, (airbag driver side or airbag driver side and passenger side) using ISAT.

Control module (contd.)



Self–diagnostics

When the ignition is switched on and the system is charged, the control module begins an initial self–test for a maximum of 6 seconds. The airbags cannot be activated during this time.
During the self–test, the electric detonators, cable assembly, SRS lamp and processor are checked.

The SRS lamp is lit for 3–4 seconds during the first test with operating charge to test the lamp.
The self–test then continues for as long as the voltage is switched on. The system is then functioning normally and can detect a collision.

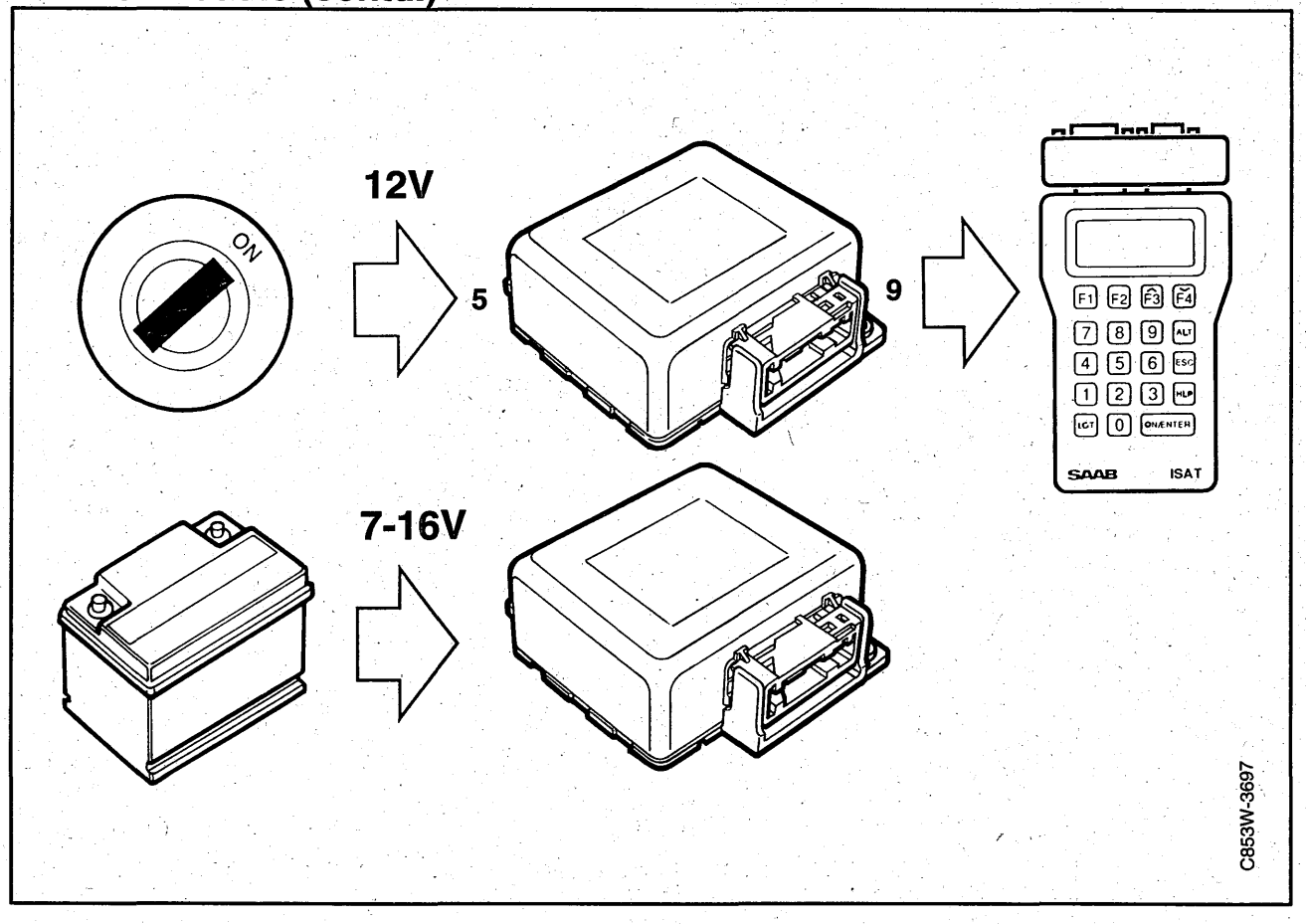
In case of fault, the SRS lamp stays lit.

Important

When switching on the ignition:
The SRS is not functional for the first 6 seconds.

When a fault is detected for the first time a trouble code is registered. A "P" in front of the trouble code means that the fault is permanent and an "I" means that the fault is intermittent. When the trouble code is registered a fault counter and a fault time counter are started.
The fault counter counts how many times a particular fault has been registered, up to 255 times.
The fault time counter shows how long a permanent fault has been registered (max. 40 hours), or alternatively how much time has elapsed since an intermittent fault was registered for the first time. The fault time counter counts in five minute intervals of charged time. The first interval is however two and a half minutes long so that even faults registered after a short time driving can be included.

Control module (contd.)



The control module stores up to five different trouble codes plus trouble code B1615 (detonator circuit activated). Further trouble codes are not registered.

When the feed voltage is cut it takes a maximum of 5 seconds for the processor to disconnect the energy reserve from the detonator circuits.

The control module is disposable, and if it has activated the airbags once it cannot be reused. If this has happened the SRS lamp is lit.
Trouble codes can be read after the airbags have been activated but cannot be erased.

Control module voltage feed

With the ignition key in the drive position the control module is supplied with +15 volts via fuse 4 to pin 5. The control module is specified to work with a voltage feed between 7 and 16 volts.

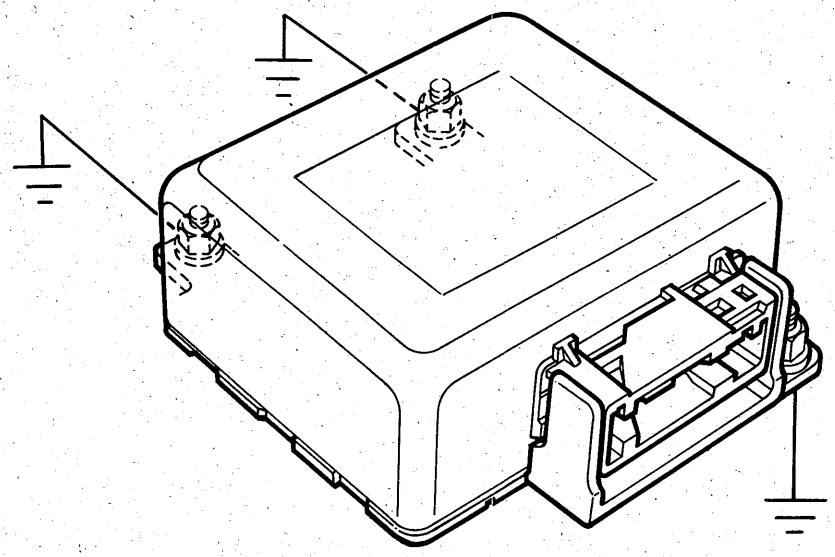
Connector

The control module connector is equipped with 5 short–circuiting straps which, in pairs, short–circuit the leads to the four detonators and between the warning lamp lead and ground.

Diagnostics with ISAT

Communication with ISAT is via pin 9. The data link connector is located under the passenger seat.

Control module (contd.)



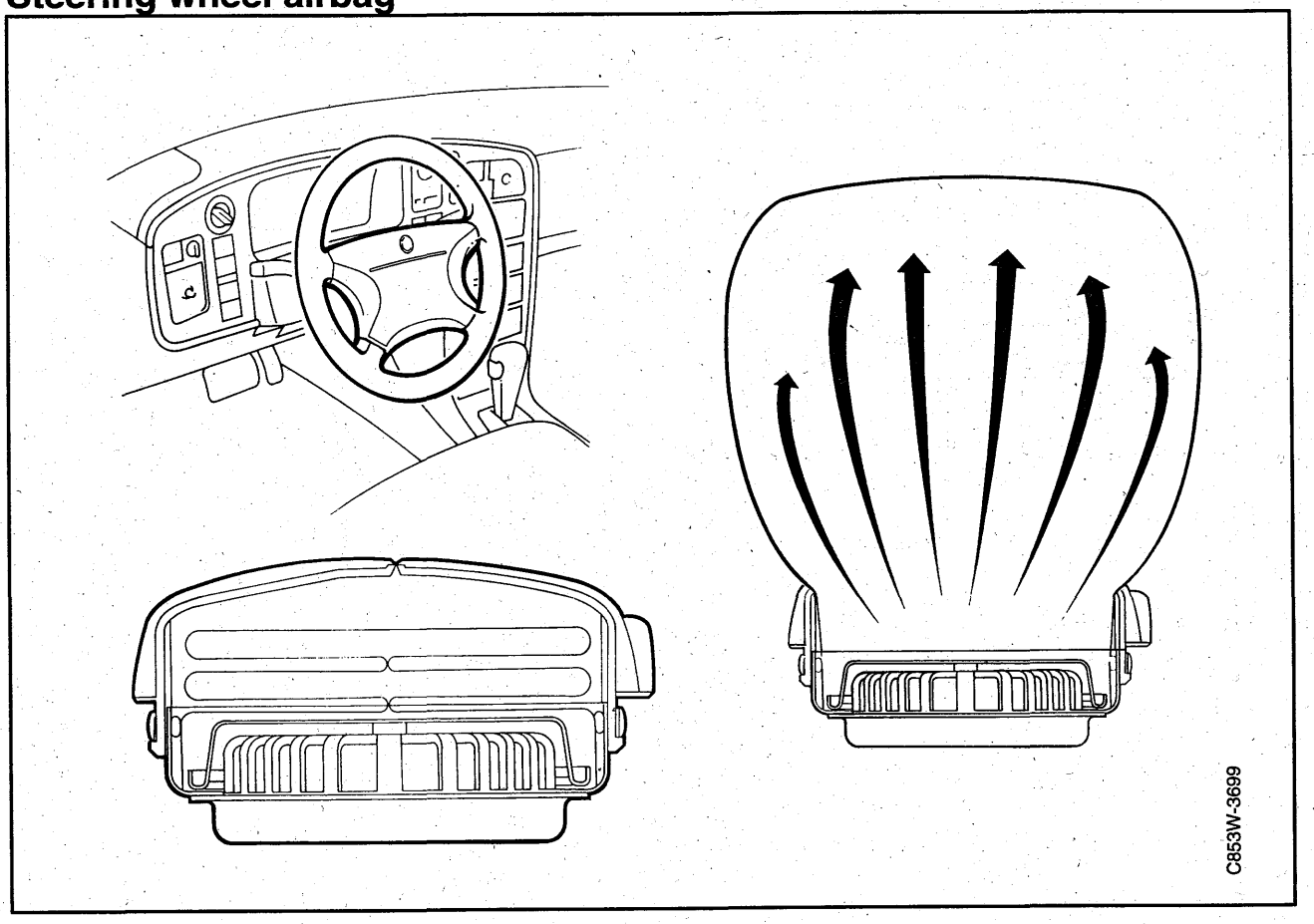
C853W-3698

Control module grounding

The control module is grounded onto the three attaching bolts. No other earth leads from other systems may be connected to the control module fastening bolts as the function of the SRS may be disturbed and a fault signal may be received from the control module.

Insufficient grounding will not produce a trouble code. When the ground contact is re–established after having been cut, this is equivalent to turning on the voltage and the control module restarts its self–test and the SRS lamp lights for 3–4 seconds. If the grounding contact should again be broken during these 3–4 seconds, this is equivalent to turning off the voltage and the lamp goes out. If the grounding contact is both broken and reconnected during the 3–4 seconds, this is equivalent to switching the voltage on and off which makes the SRS lamp flash.

Steering wheel airbag



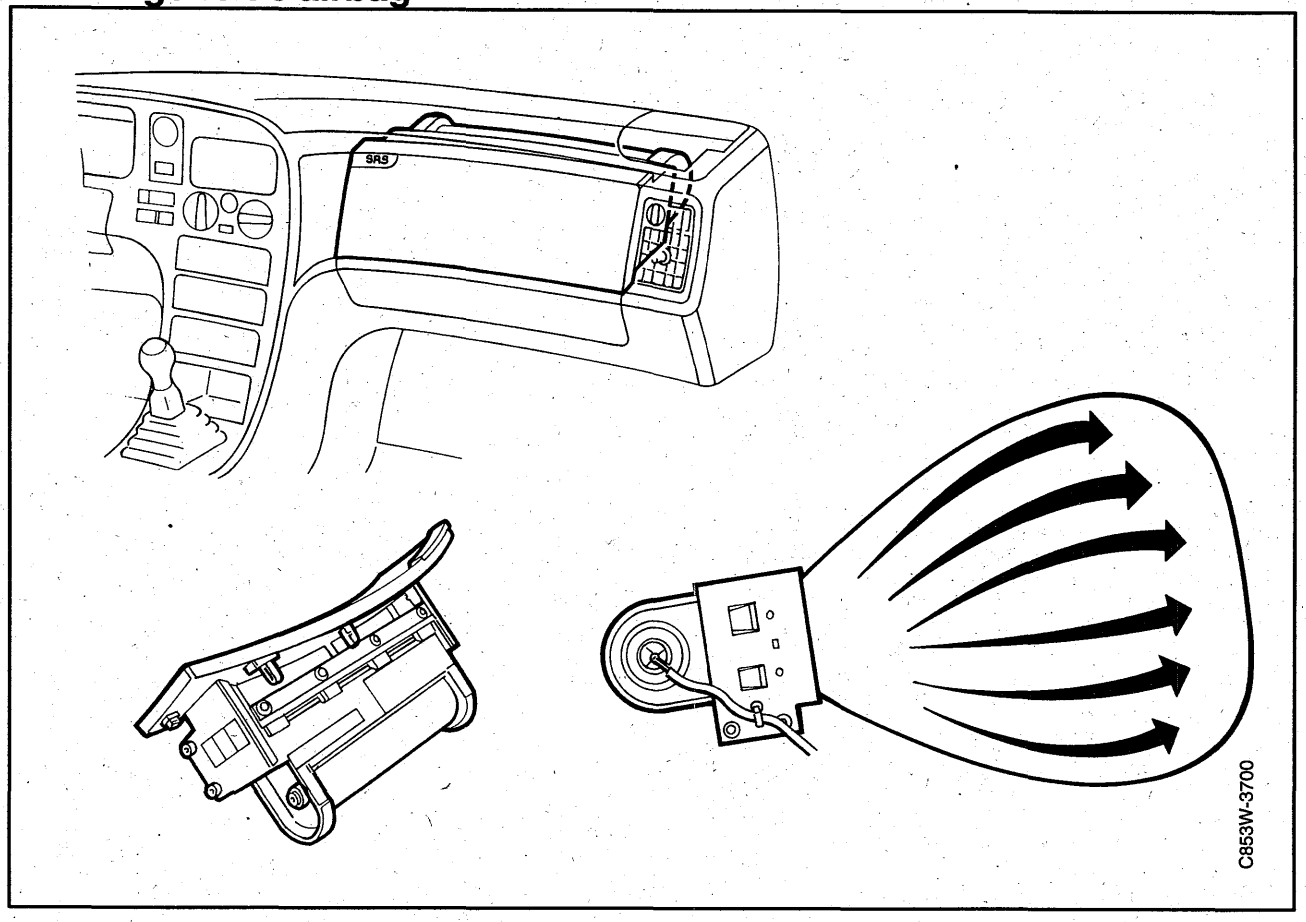
In the steering wheel airbag is a gas generator and an air bag.
The gas generator is riveted and bolted to a plate bracket. The air bag is protected by a plastic casing with a fractural impression mounted on the plate bracket. The airbag has a volume of approximately 70 liters.
The airbag is connected between pins 10 and 11 on the control module.
A special contact roller distributes test and detonation current to the steering wheel airbag.

Steering wheel airbag gas generator

The gas generator consists of an aluminum casing divided into a central chamber and two annular chambers.

The center chamber contains an electric detonator and an explosive charge which is connected via passages to the inner annular chamber.
The inner annular chamber contains a fuel that generates a gas when it is burned and which, via passages reaches a filter in the outer annular chamber. The filter removes particles from the gas before it passes out to the airbag.

Passenger side airbag



In the passenger airbag is a gas generator and an air bag. The airbag has a volume of approximately 150 liters. The gas generator is bolted to the airbag housing which is in turn bolted to the facia. The airbag is held in place with a plastic casing with fracture lines. There are corresponding fracture lines in the facia.

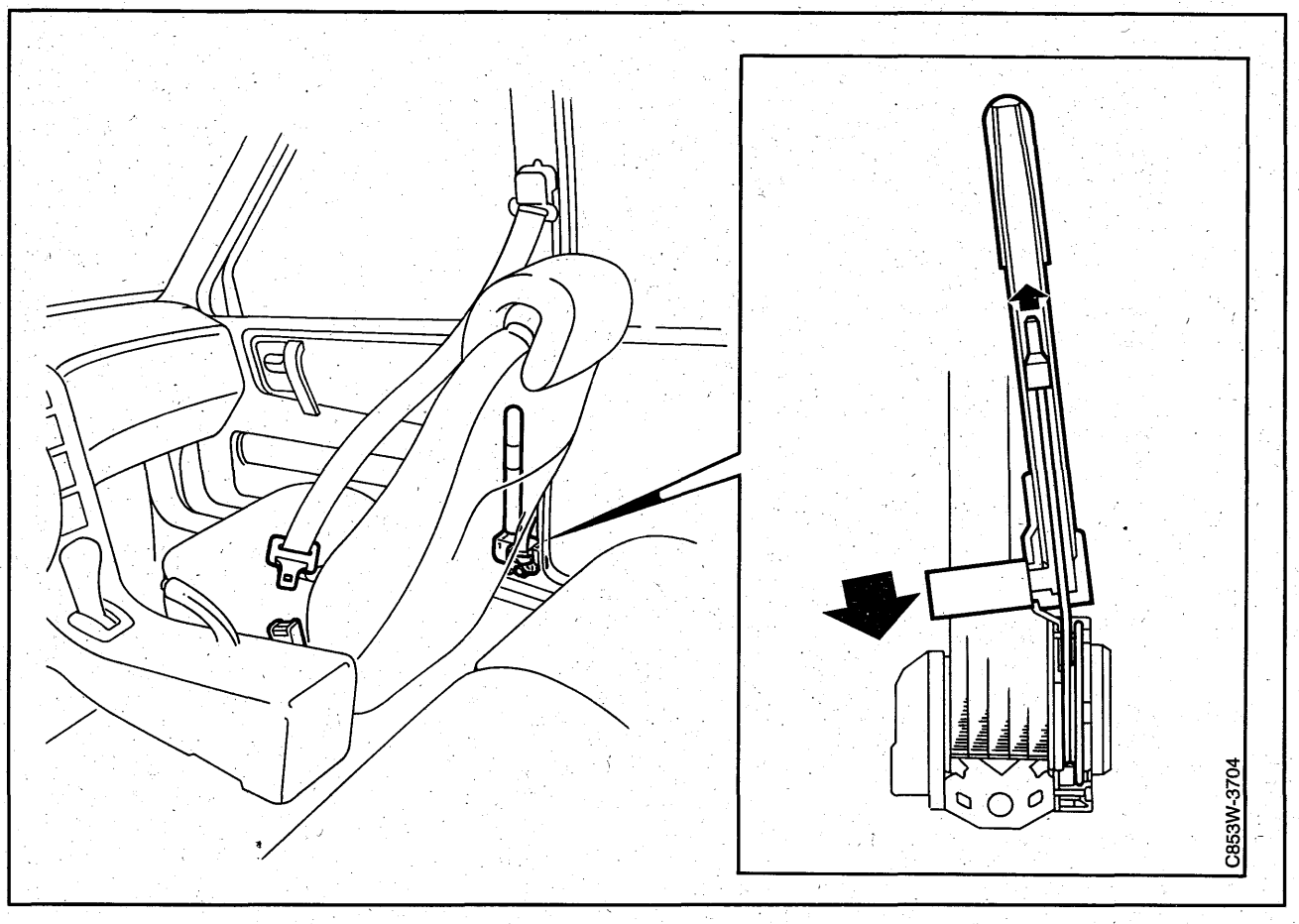
The passenger airbag is connected between pins 13 and 14 on the control module.

Gas generator in the passenger side airbag

The gas generator consists of an aluminum casing divided into an inner chamber, a center chamber and two annular chambers.

In the inner chamber is an electric detonator and an explosive charge which is connected to the center chamber via passages.
The center chamber contains a fuel in tablet form which develops a gas when it burns. The center chamber is connected to both outer chambers via passages equipped with a filter. The filter separates particles from the gas.
In the outer chamber, the gas passes through a further filter before it reaches the airbag.

Seatbelt tensioner

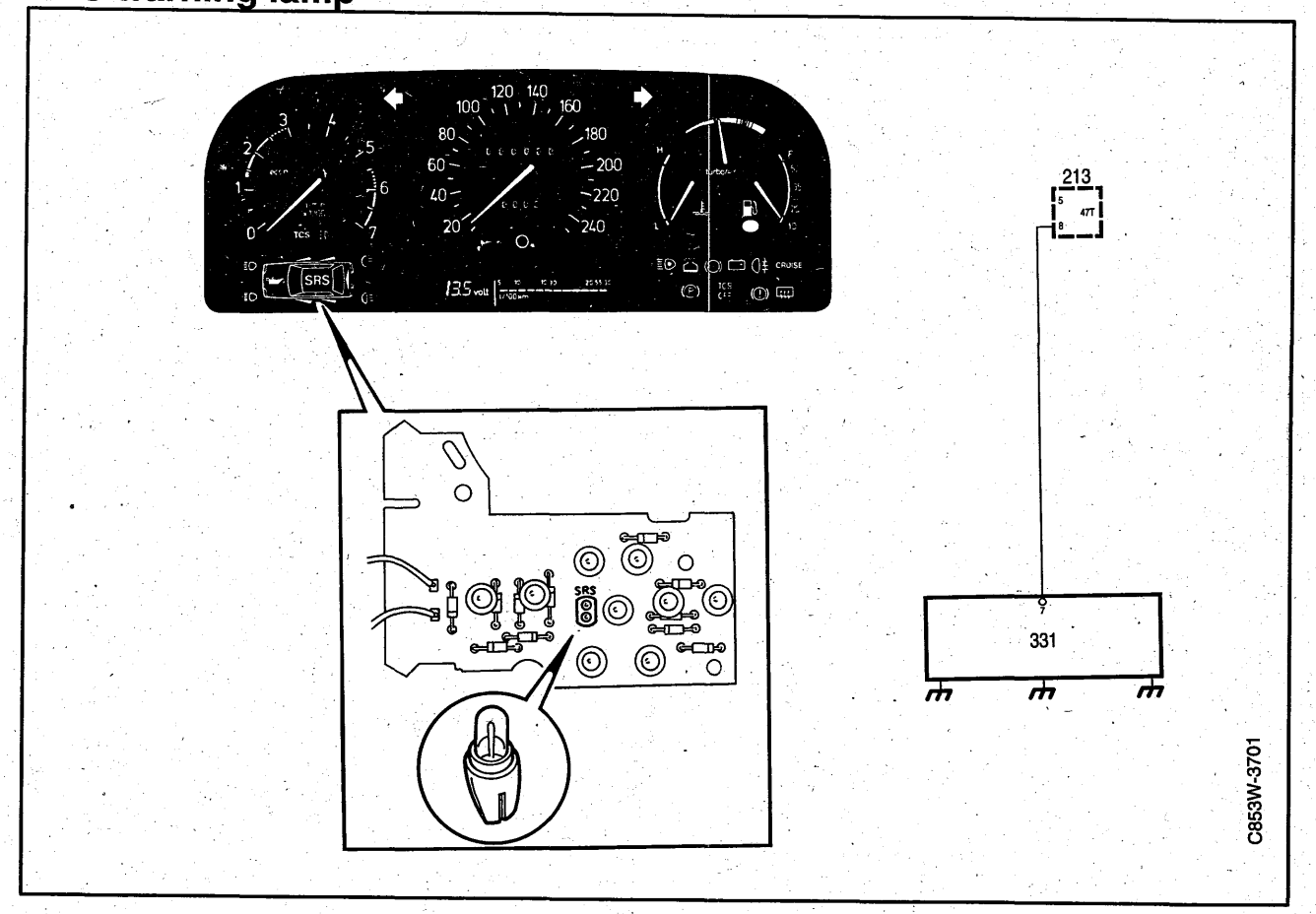


The belt tensioner tensions the seat belt during a collision which reduces the body's forward movement. The car is equipped with belt tensioners on the driver and front passenger seats.

The belt tensioner consists of a pyrotechnical charge which is detonated by the SRS control module together with the airbag(s). When the charge is detonated, a high gas pressure is generated which drives a piston in an aluminum tube. The piston is connected to the belt roller via a steel wire. The stroke length of the piston is approximately 180 mm which is the maximum length the belt can be rolled up.

The belt tensioner on the driver side is connected to pin 1 and pin 2 on the SRS control module.
The belt tensioner on the passenger side is connected to pins 3 and 4 on the SRS control module.

SRS warning lamp



Faults in the system are indicated by the SRS symbol on the combination instrument pictogram lighting and staying lit.

When the ignition key is turned to the start or drive position, the SRS lamp lights for 3–4 seconds and then goes out, providing no trouble codes are stored.

If there are trouble codes stored, the lamp will light for 3–4 seconds, go out for a half a second and them shine constantly until the ignition is switched off or the trouble codes are erased.

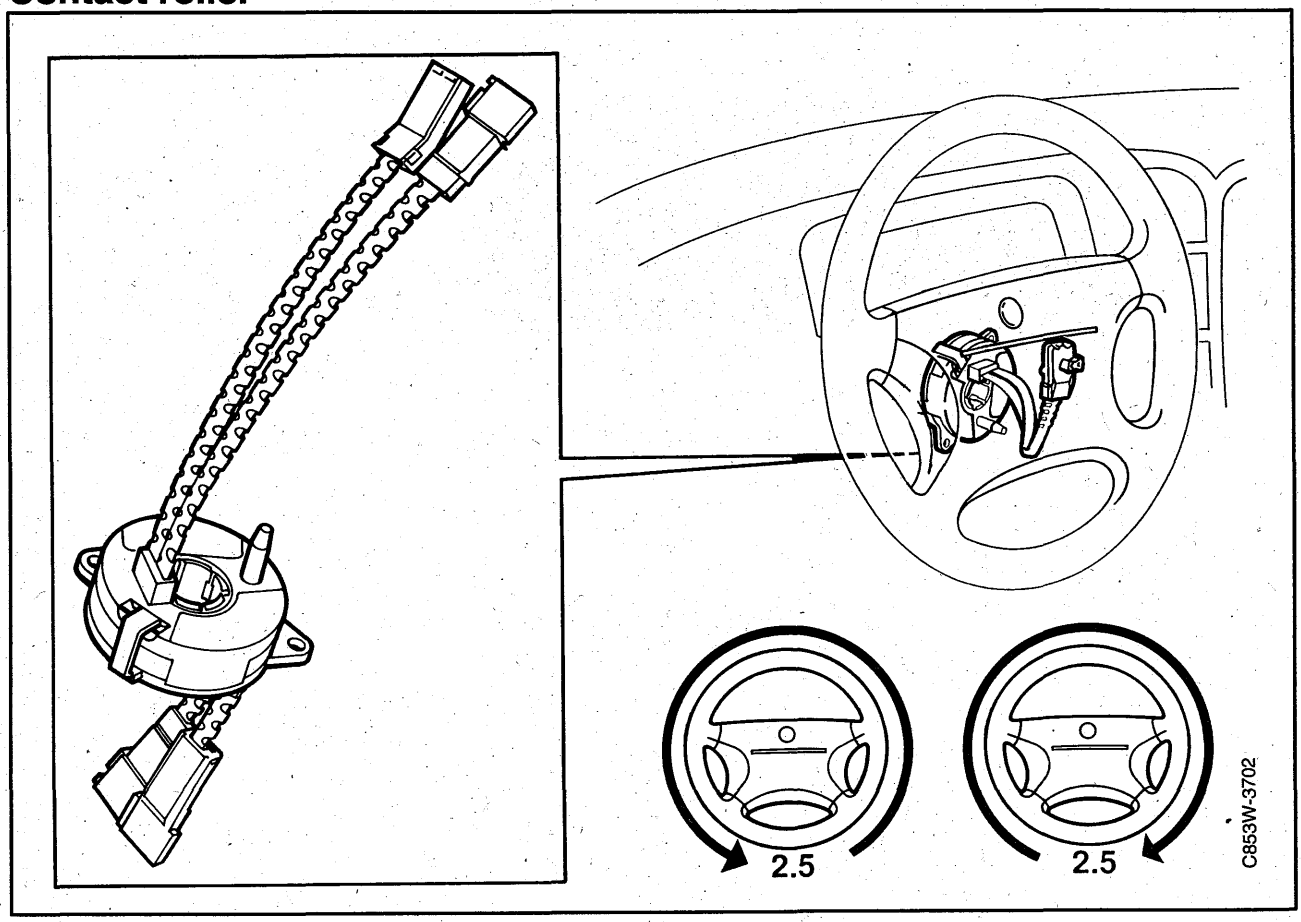
If the airbags have been activated, the SRS lamp stays lit.

SRS lamp voltage feed

The SRS lamp voltage feed is via fuse 13 and is grounded by the control module via pin 7.

If the control module connector is disconnected, when the ignition is switched on, the lamp is grounded via a short–circuiting strap to pin 6 in the connector and stays lit.

Contact roller

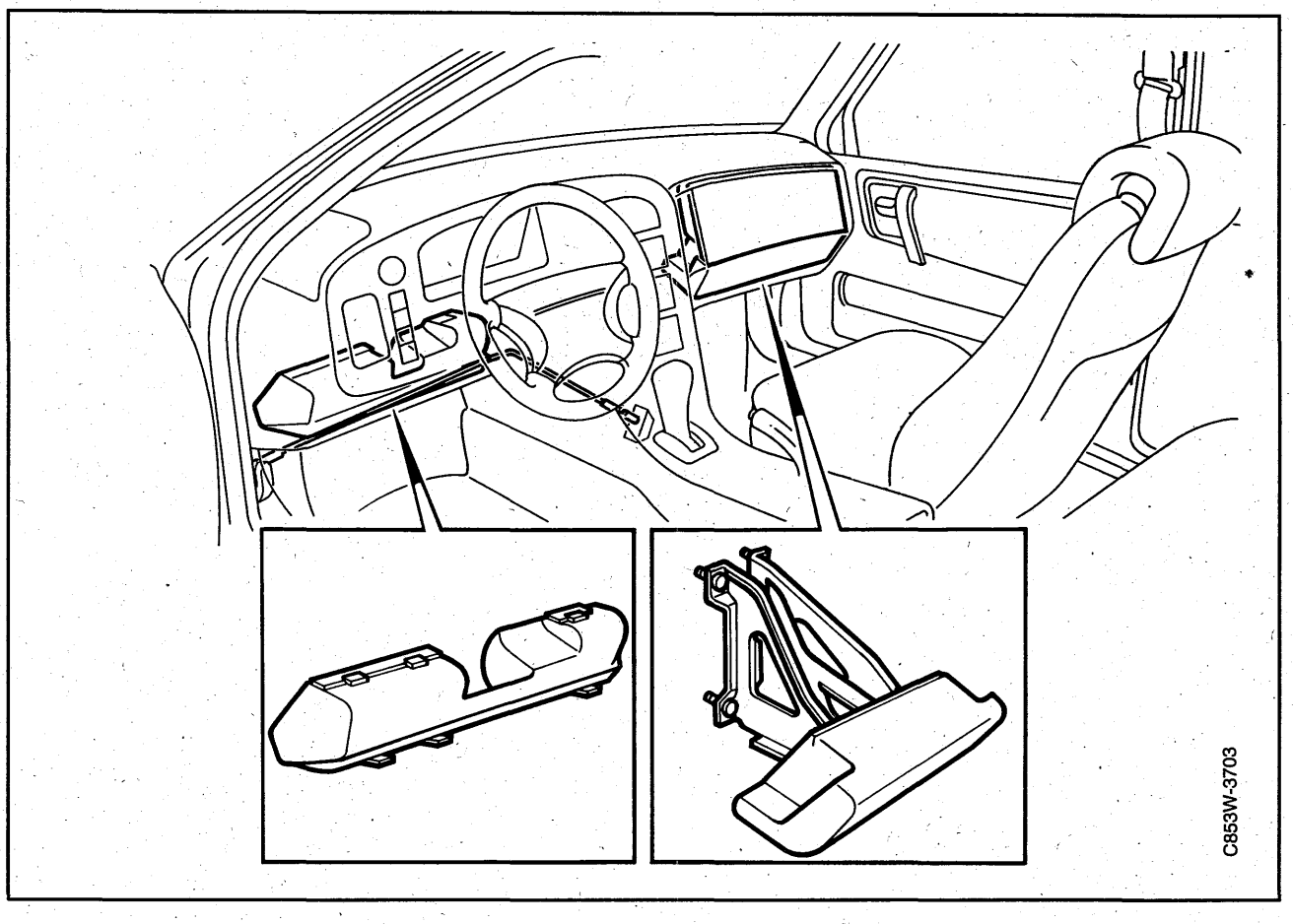


To distribute test and detonation current to the steering wheel airbag, there is a contact roller between the steering wheel and the steering wheel bracket. The contact roller also distributes current to the horn via two separate leads.

The contact roller consists of a fixed and a moving part. Between the fixed and the moving parts is a coiled plastic strip with four conductors molded into it.

The moving part of the contact roller can be rotated approximately 5 times, that is to say approximately two and a half turns each way from the middle position. If this is exceeded, the coiled strip will break and the SRS will be rendered unserviceable. This is detected in the control module and the SRS lamp lights.

Steering wheel, steering column assembly and knee shield



The steering wheel and the steering column assembly are specially designed. In order to stabilize the steering column assembly during a collision, a wire is stretched from the lower portion of the A–pillar over the steering column assembly to the floor strengthening tunnel. Right–hand–drive cars do not have this wire.

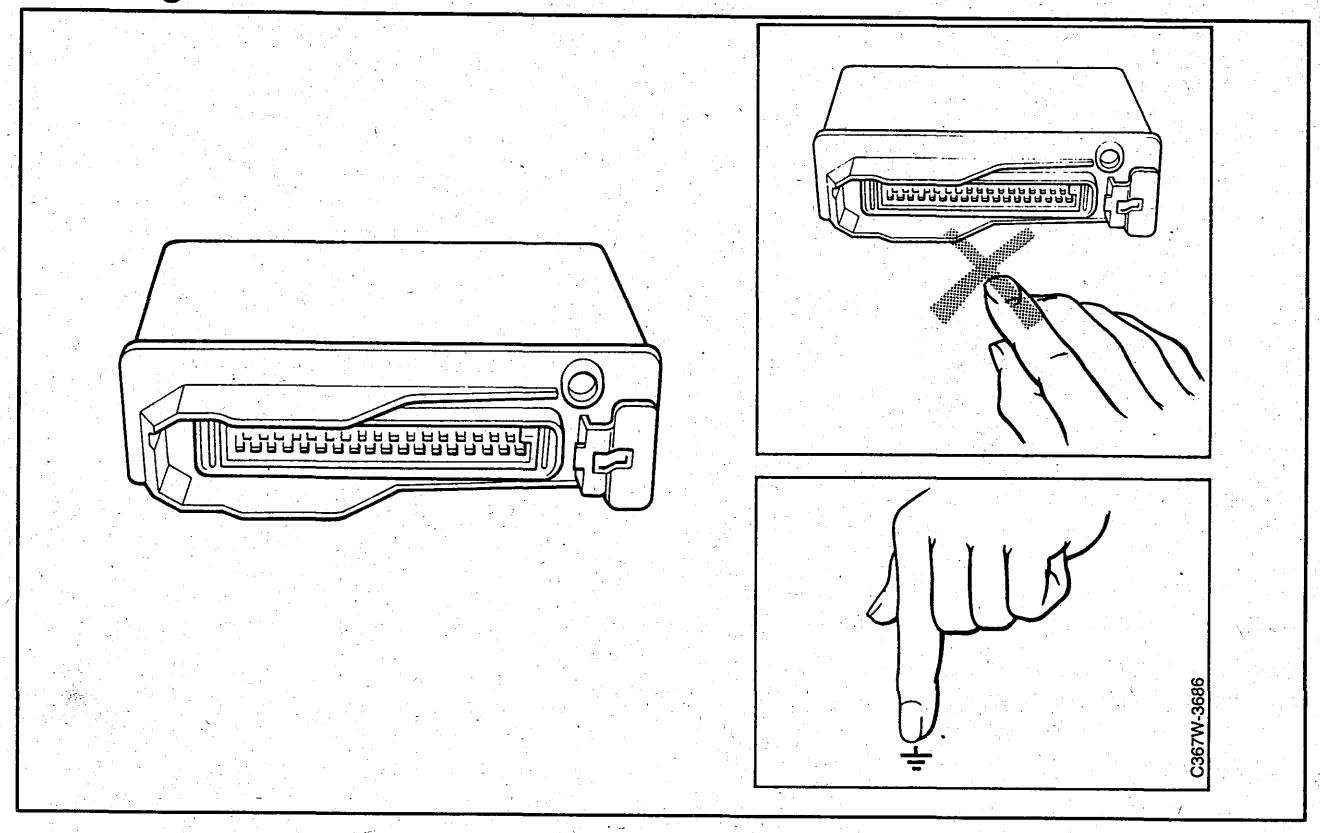
The steering wheel is adjustable in four directions; in and out as well as up and down. In the center of the steering wheel is space for the airbag.

On the steering column assembly is a knee shield plate to which a knee shield of impact–absorbing material is screwed.

On cars with USA and Canada specification, there is a knee protection plate on the steering column to which shock–absorbing material is bolted. There is a corresponding knee shield on the passenger side.

Diagnostics and fault diagnosis

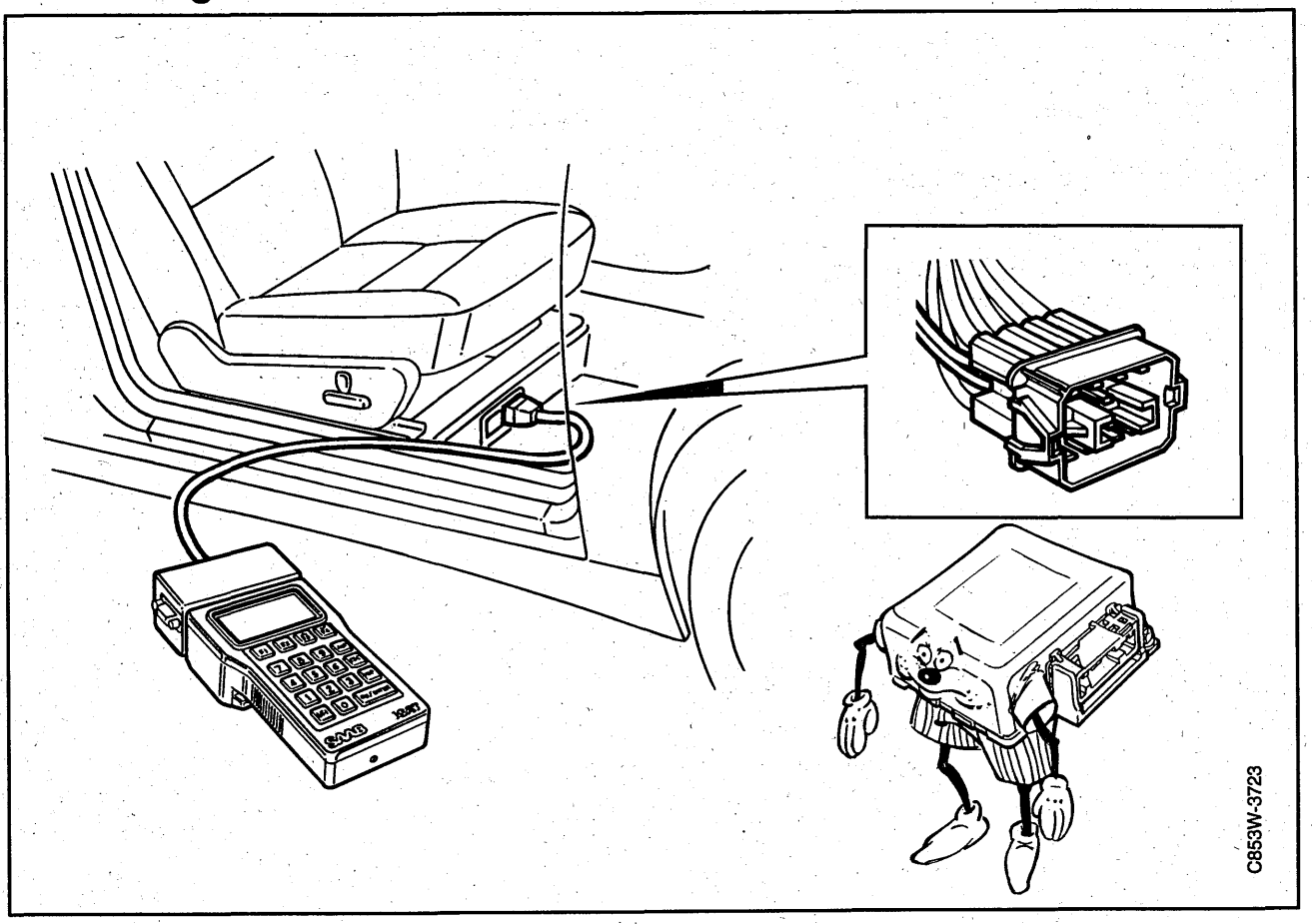
Handling control modules



All control modules are sensitive to static electricity and can, if they are handled incorrectly, be so seriously damaged that they cease to function properly. It is therefore important to ensure that the following rules are observed at all times when the control module has to be removed or replaced for any reason.

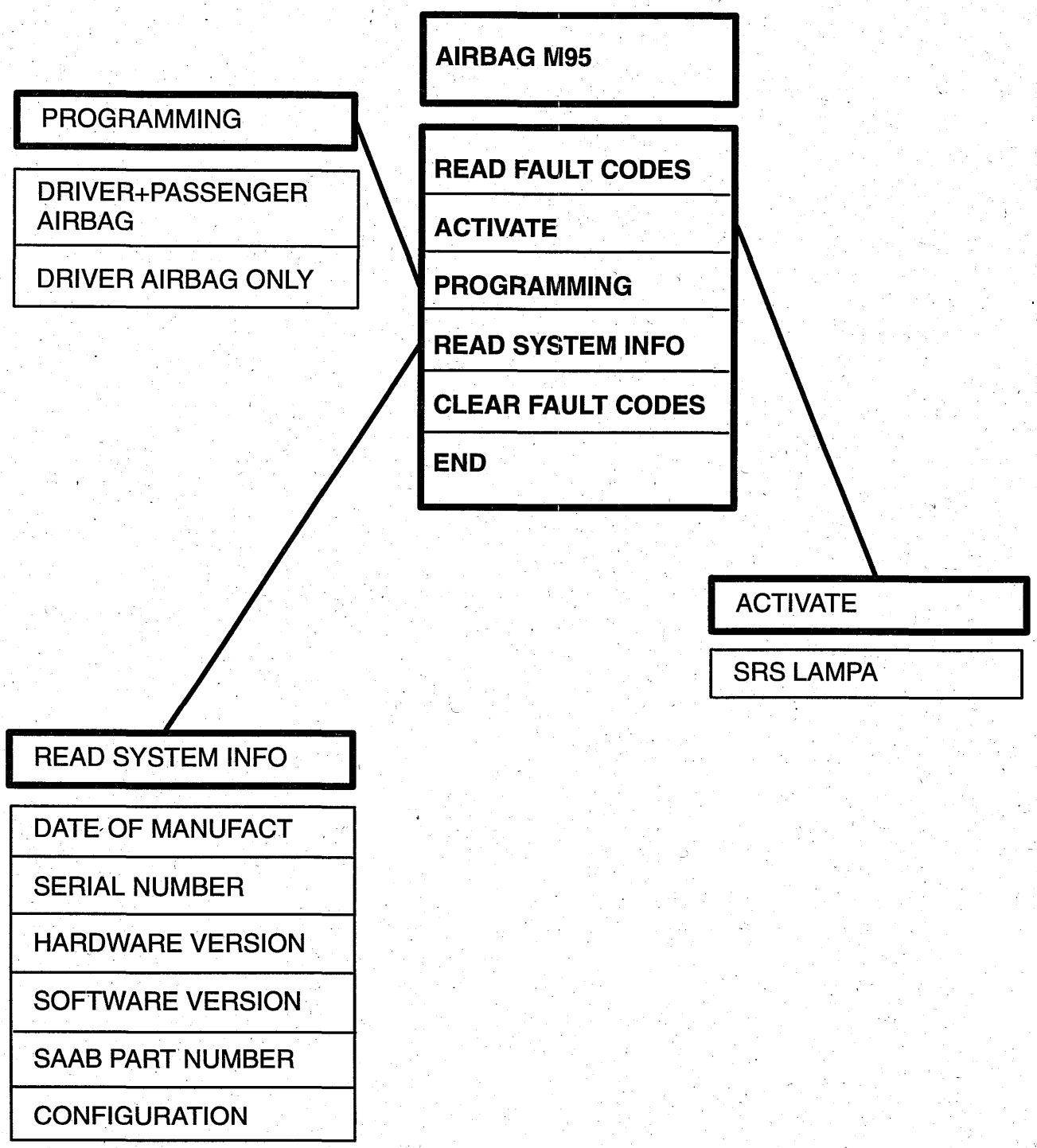
- Avoid unplugging or removing the control module unless absolutely necessary.
- Never touch the contact pins and never place the control module in such a way that the pins may come into contact with any objects.
- Before unpackaging a new control module, ground the packaging to the car body. Open the packaging as short a time as possible before fitting.
- Avoid working in clothes of synthetic materials and wool.
- When working with control modules, it is important that you regularly ground yourself to the car. This is especially important when you have been sitting in the car, when you have changed position or moved around the car and when you are working in climate conditions with very dry air (for example during the winter in cold markets).
- Always handle control modules that are suspected of being defective with the same care as a non–defective control module. This will appreciably improve your chances of deter–mining the cause of the fault.

Connecting ISAT



ISAT is connected to the data link connector located under the passenger seat.

Command menus



Quick test

Pin	Color	Component Function	Measuring conditions	Measured value	Between X–Y	Function/ fault diagnosis
1	BN	Belt tensioner, driver	Connect reference resistor. Connect BOB. Ignition off.	approx. 2.5 Ohms	1–2	24/on DTC table
2	BU	Belt tensioner, driver	Connect reference resistor. Connect BOB. Ignition off.	approx. 2.5 Ohms	1–2	24/on DTC table
3	BU/ WH	Belt tensioner, passenger	Connect reference resistor. Connect BOB. Ignition off.	approx. 2.5 Ohms	3–4	24/on DTC table
4	YE/WH	Belt tensioner, passenger	Connect reference resistor. Connect BOB. Ignition off.	approx. 2.5 Ohms	3–4	24/on DTC table
5	GN/WH	Battery voltage +15	Connect BOB. Ignition on.	approx. 12 V	5–6	20/on DTC table
6	BK	Ground	Connect BOB. Ignition off.	0 Ohms	6 – ground	21/on DTC table
7	BU	SRS lamp	Connect ISAT. Ignition on. Activate SRS lamp.	SRS lamp should light.	–	25/as DTC table
9	GN	Data link connector	Connect BOB. Ignition off.	approx. 0.5 Ohms	9–1 (in data link connector)	20/on DTC table
10	OG	Airbag, driver	Connect reference resistor. Connect BOB. Ignition off.	3–4 Ohms	10–11	22/on DTC table
11	RD	Airbag, driver	Connect reference resistor. Connect BOB. Ignition off.	3–4 Ohms	10–11	22/as DTC table
13	VT	Airbag, passenger side	Connect reference resistor. Connect BOB. Ignition off.	approx. 2.5 Ohms	13–14	23/on DTC table
14	GY	Airbag, passenger side	Connect reference resistor. Connect BOB. Ignition off.	approx. 2.5 Ohms	13–14	23/as DTC table

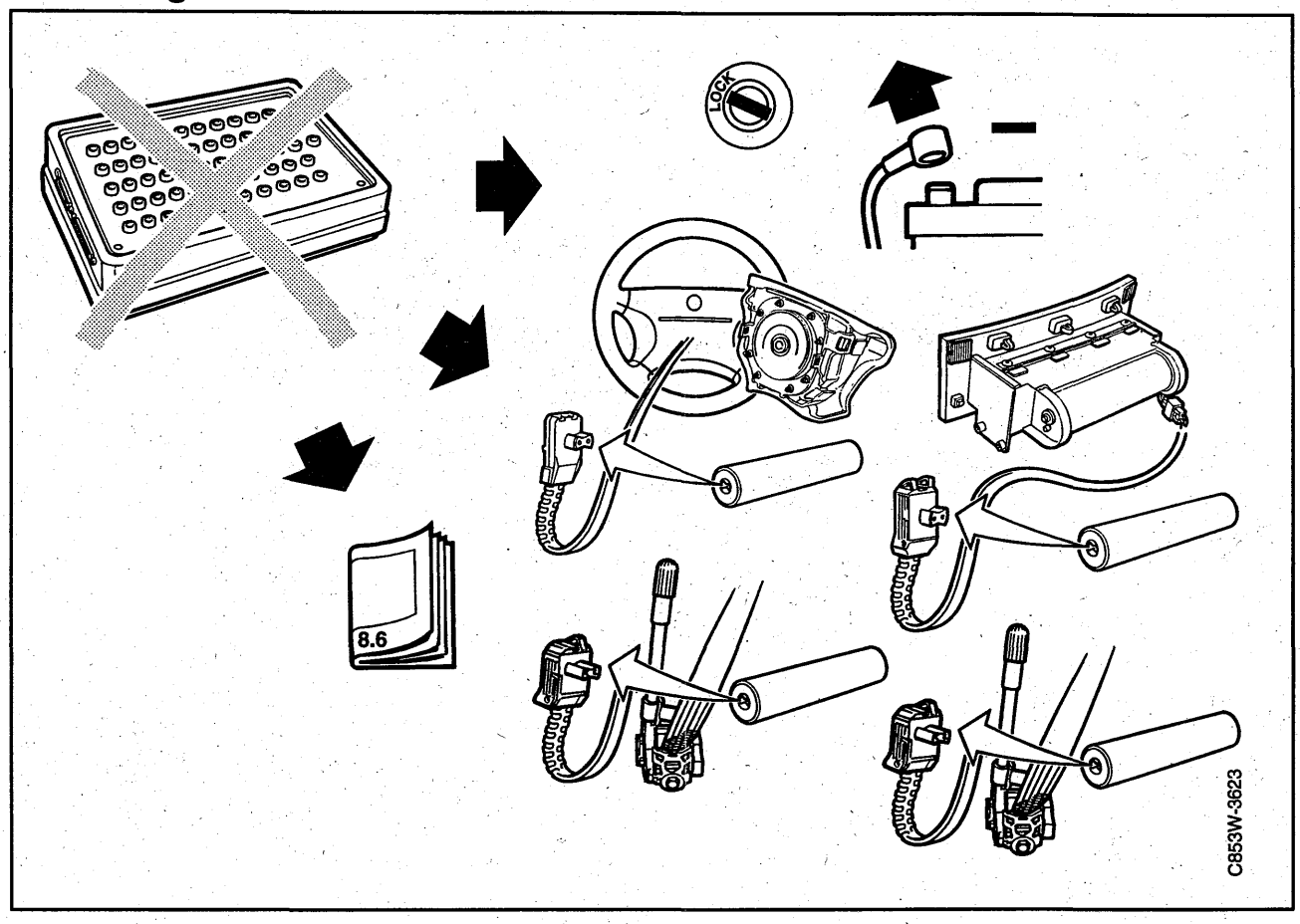
Diagnostic trouble code table

DTC	Faulty function/component	FAULT	Text in ISAT window	Page
B1227	SRS warning lamp	Short circuit to positive battery terminal	FAULT X Y B1227 SRS LAMP SHORTED TO B+ xxxC xxH xxM	36
B1228	SRS warning lamp	Short circuit to ground, break or faulty lamp	FAULT X Y B1228 SRS LAMP OPEN CIRCUIT, GROUND xxxC xxH xxM	38
B1332	Airbag, driver	Break	FAULT X Y B1332 DRIVER AIRBAG OPEN CIRCUIT xxxC xxH xxM	42
B1333	Airbag, driver	Shorting between leads to airbag	FAULT X Y B1333 DRIVER AIRBAG RESISTANCE TOO LOW xxxC xxH xxM	47
B1337	Airbag, passenger	Break	FAULT X Y B1337 PASSENGER AIRBAG OPEN CIRCUIT xxxC xxH xxM	50
B1338	Airbag, passenger	Shorting between leads to airbag	FAULT X Y B1338 PASSENGER AIRBAG RESISTANCE TOO LOW xxxC xxH xxM	54
B1605	Control module	Internal fault	FAULTX Y B1605 CONTROL UNIT FAULT xxxC xxH xxM	57
B1610	Control module	Control unit program–med with wrong confi–guration	FAULT X Y B1610 CON.M.WRNGLY PROG'D xxxC xxH xxM	57
B1615	Control module	Control module used	FAULT X Y B1337 IGNITION CIRCUIT ACTIVATED CRASH xxxC xxH xxM	57
B2332	Airbag, driver	Shorting to ground	FAULT X Y B2332 PASSENGER AIRBAG SHORTED TO GROUND xxxC xxH xxM	58
B2333	Airbag, driver	Short circuit to + battery terminal	FAULT X Y B2333 DRIVER AIRBAG SHORTED TO B+	63
B2337	Airbag, passenger	Shorting to ground	FAULT X Y B2337 PASSENGER AIRBAG SHORTED TO GROUND xxxC xxH xxM	58
B2338	Airbag, passenger	Short circuit to + battery terminal	FAULT X Y B2338 PASSENGER AIRBAG SHORTED TO B+	63
B2441	Belt tensioner, driver	Break	FAULT X Y B2441 DRIVER BELT TENS. OPEN CIRCUIT xxxC xxH xxM	68

B2442	Belt tensioner, driver	Shorting to ground	FAULT X Y B2442 DRIVER BELT TENES. SHORTED TO GROUND xxxC xxH xxM	72
B2443	Belt tensioner, driver	Short circuit to positive battery terminal	FAULT X Y B2443 DRIVER BELT TENS. SHORTED TO B+ xxxC xxH xxM	76
B2444	Belt tensioner, driver	Shorting between leads to belt tensioner	FAULT X Y B2444 DRIVER BELT TENS. RESISTANCE TOO LOW xxxC xxH xxM	80
B2446	Belt tensioner, passenger	Break	FAULT X Y B2446 PASS. BELT TENS. OPEN CIRCUIT xxxC xxH xxM	83
B2447	Belt tensioner, passenger	Shorting to ground	FAULT X Y B2447 PASS. BELT TENS. SHORTED TO GROUND xxxC xxH xxM	72
B2448	Belt tensioner, passenger	Short circuit to positive battery terminal	FAULT X Y B2448 PASS. BELT TENS. SHORTED TO B+ xxxC xxH xxM	76
B2449	Belt tensioner, passenger	Shorting between leads to belt tensioner	FAULT X Y B2449 PASS. BELT TENS. RESISTANCE TOO LOW xxxC xxH xxM	87
No DTC displayed	Control module	No voltage		90

FAULT X = Order number of diagnostic trouble code
Y = Type of fault: P=permanent fault. I=intermittent fault.
xxxC = number of times each fault has been registered (0–255)
xxH = number of hours since DTC first registered (max. 40 hours)
xxM = number of minutes since DTC first registered
BATT+ = battery positive
SHORT CIR = shorted

Fault diagnosis



Before starting fault diagnosis, observe the following points:

⚠ WARNING

No measurements or connections are to be made to the SRS before the airbags have been disconnected.

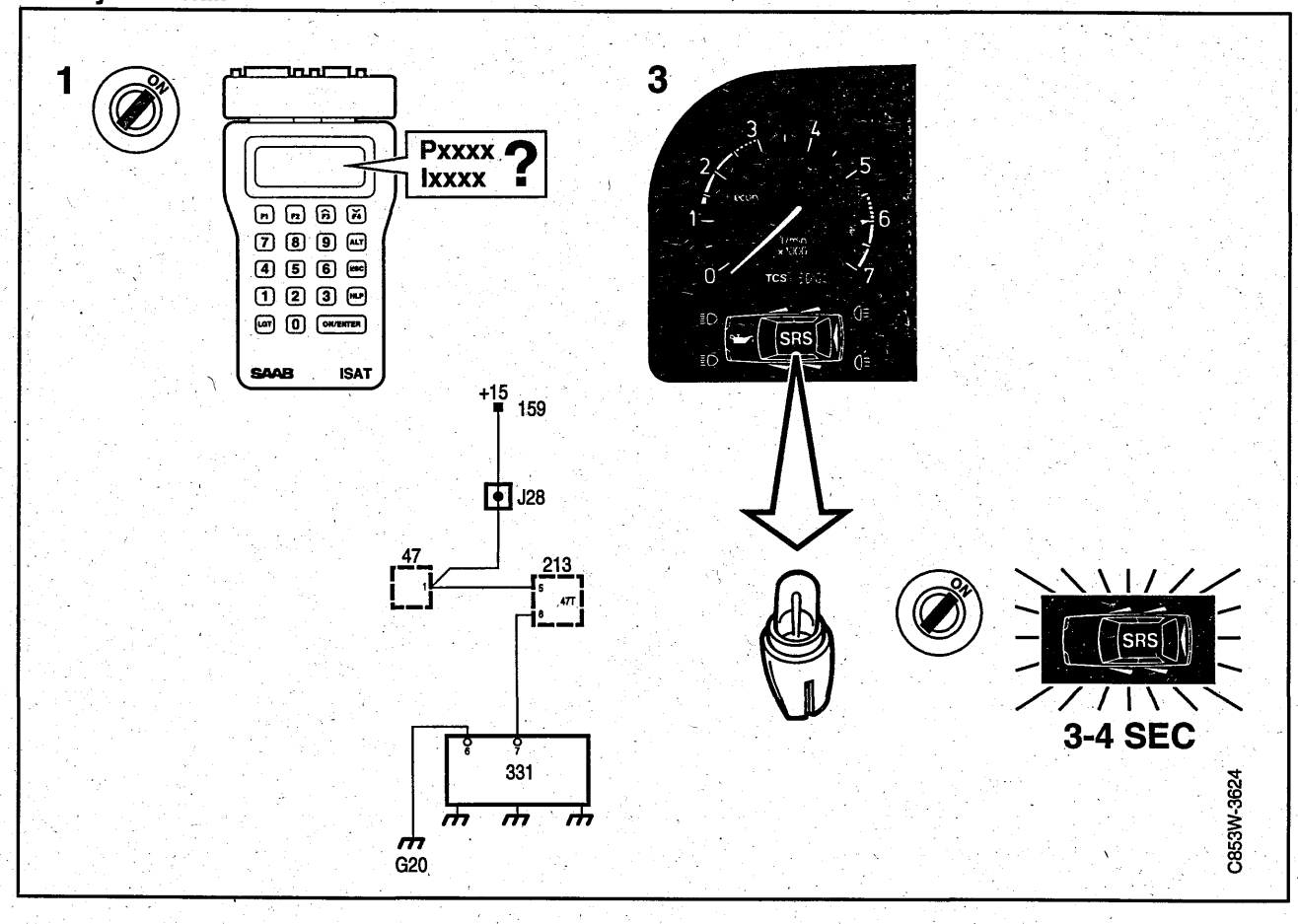
- Read through the "Safety and handling instructions" in this book.
- Turn off the ignition and remove the negative cable from the battery.
- Unplug the connector from the back of the steering wheel airbag and disconnect connector, H2–77, to the passenger airbag.
- Connect reference resistor 84 71 153 to the airbag connector in the steering wheel.Connect reference resistor 84 71 153 via cable assembly 86 11 378 to the connector for the passenger airbag.
- When diagnosing faults in the belt tensioners, connect reference resistor 84 71 153 to each connector on the belt tensioners.

Also note the following:

- Do not splice the SRS cables.
  Splicing can cause functional defects and render the system unserviceable and even lead to injury.
- If a connector is unplugged when the ignition is on, this is registered as a fault by the control module. The fault does not disappear until the connector is reconnected and the trouble code has been erased.

Trouble code B1227

Lamp in SRS symbol shorting to positive battery terminal.



SRS lamp does not light for 3–4 seconds after the ignition is turned on. The lamp is connected to pin 7 on the control module.

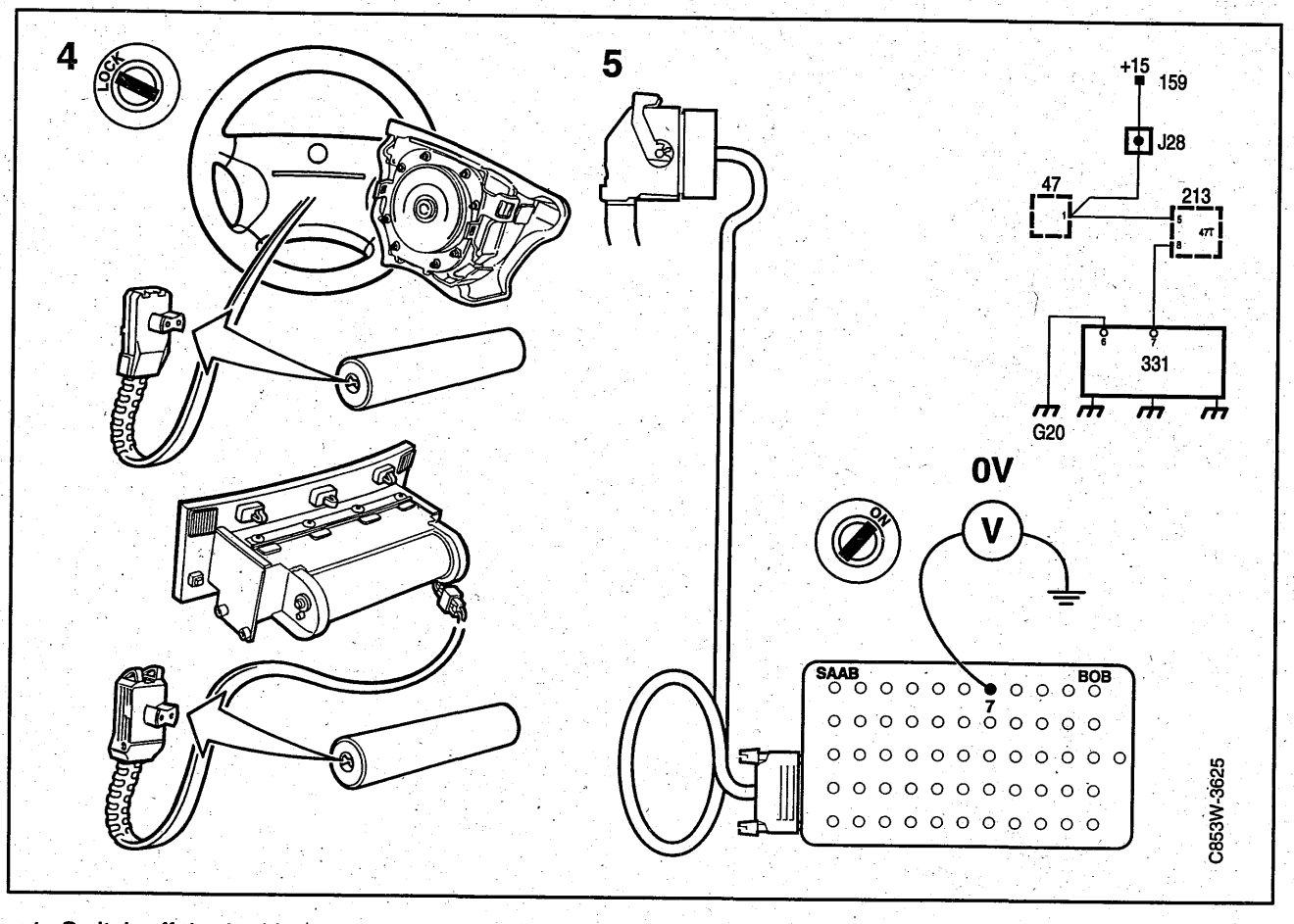
1 Connect ISAT. Note the diagnostic trouble code and type of fault. P=permanent fault; I=intermittent fault.
If the fault is permanent:
Proceed to point 3.
If the fault is intermittent:
Proceed to point 2.

2 The fault is intermittent: Try to expose the fault when taking each reading during fault tracing. Manipulate the connectors and cables and turn the steering wheel when taking measurements.

Proceed to point 3.

3 Take out the combined instrument and change the SRS lamp. Switch on the ignition.
The lamp should light for 3–4 seconds after the ignition has been switched on.
If the lamp lights:
The fault was in the lamp. Proceed to point 6.
If the lamp does not light:
Proceed to point 4.

Diagnostic trouble code B1227 (contd.)



4 Switch off the ignition and disconnect the negative lead from the battery. Unbolt the airbag from the steering wheel and unplug the connector from the back. Plug in reference resistor 84 71 153 to the connector.

On cars with a passenger airbag:

a. Remove the lower cover plate and unplug connector H2–77 to the passenger airbag.

b. Connect reference resistor 84 71 153 to the pin connector using cable assembly 86 11 378.

Proceed to point 5.

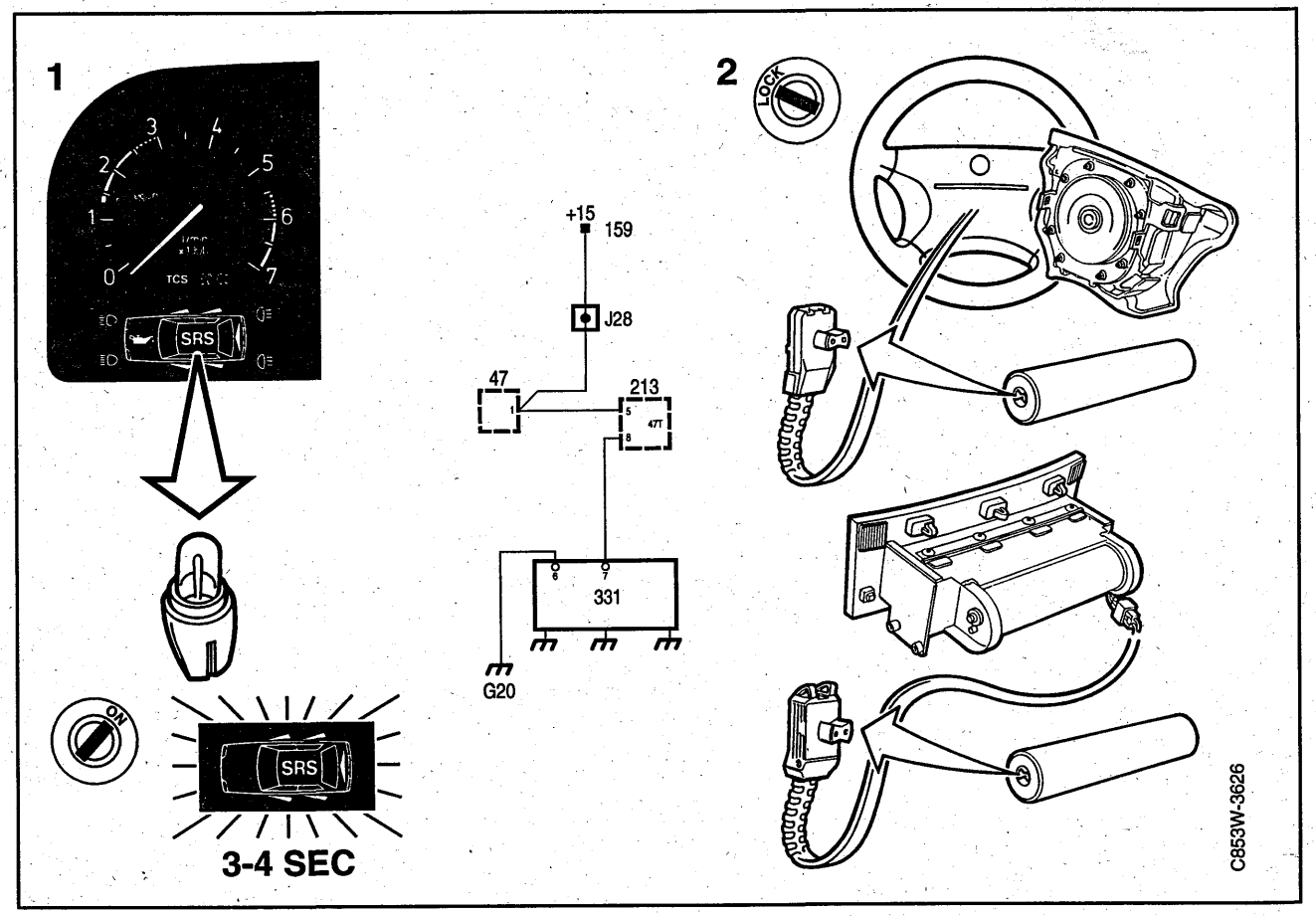
5 Unplug the SRS control module connector and connect a BOB. Unplug the pictogram 14–pin connector from the combined instrument. Reconnect the negative battery lead and switch on the ignition. Connect a voltmeter between connector 7 on the BOB and a safe grounding point.
Voltmeter should read 0 V.
If the reading is OK:
Proceed to point 6.
If the reading is incorrect:
If the reading shows battery voltage, the fault is in the cable assembly between the pictogram connector and the SRS control module connector.
Switch off the ignition and investigate the cause of the fault. Correct the fault.
Proceed to point 6.

6 Switch off the ignition and disconnect the negative lead from the battery.
Remove reference resistors and plug in all connectors to their original components.
Reconnect the battery negative lead and switch on the ignition.

Erase diagnostic trouble code. Switch off the ignition and switch it back on again, wait for at least 10 seconds with the ignition on. Check to see if the diagnostic trouble code reappears.
If the diagnostic trouble code reappears:
Proceed to page 92.
If the diagnostic trouble code does not reappear:
Return the car to good order.

Diagnostic trouble code B1228

Lamp in SRS symbol faulty, open circuit in cable assembly or short circuit to ground.



The lamp is connected to pin 7 in the connector. Voltage feed to the SRS lamp and all pilot and warning lamps is via fuse 13.

Switch on the ignition and check the SRS lamp.
All warning lamps except the SRS lamp light:
Proceed to point 1.
The SRS lamp is lit constantly:
Proceed to point 4.

1 Take out the combined instrument and change the SRS lamp. Switch on the ignition.
The lamp should light for 3–4 seconds after the ignition has been switched on.
If the SRS lamp lights:
The SRS lamp was faulty. Return the car to good order.
If the lamp still does not light:
Proceed to point 2.

2 Switch off the ignition and disconnect the negative lead from the battery. Undo the bolts securing the steering wheel airbag. Unplug the connector on the back of the airbag and plug reference resistance 84 71 153 into the connector.

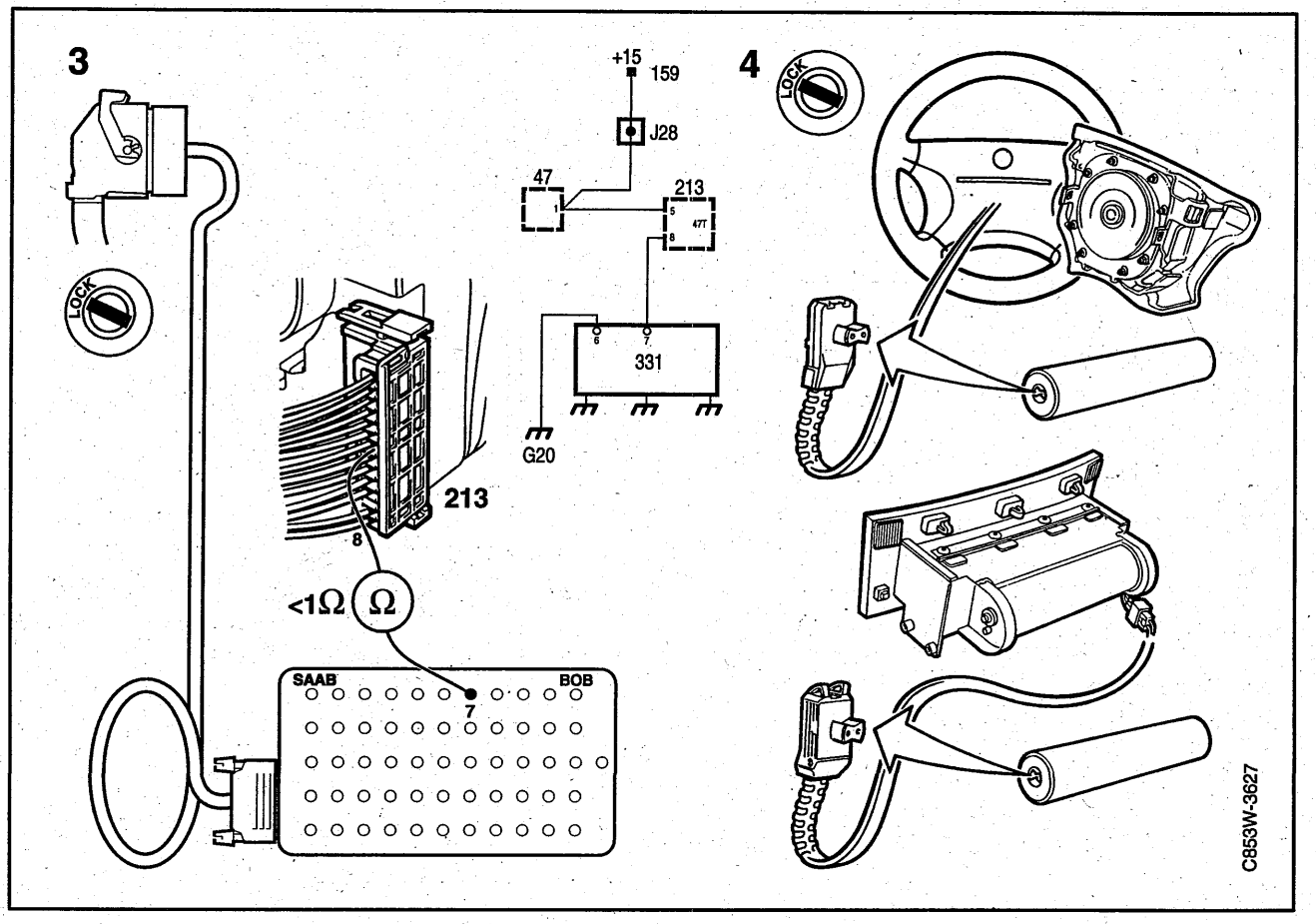
On cars with a passenger airbag:

a. Remove the lower cover plate and unplug connector H2–77 to the passenger airbag.

b. Connect reference resistor 84 71 153 to the pin connector using cable assembly 86 11 378.

Proceed to point 3.

Diagnostic trouble code B1228 (contd.)



3 Free the SRS control module. Disconnect the SRS control module connector and plug in a BOB.
Detach the combined instrument. Unplug the pictogram connector in the combined instrument.

Connect an ohmmeter between sleeve 8 in the pictogram connector on the cable assembly and contact 7 on the BOB.
The ohmmeter should read less than 1 Ohm.
If the reading is OK:
Proceed to point 8.
If the reading is incorrect:
Check the lead between sleeve 8 in the pictogram connector and sleeve 7 in the control module connector for breaks and loose connections.
Correct the fault and proceed to point 8.

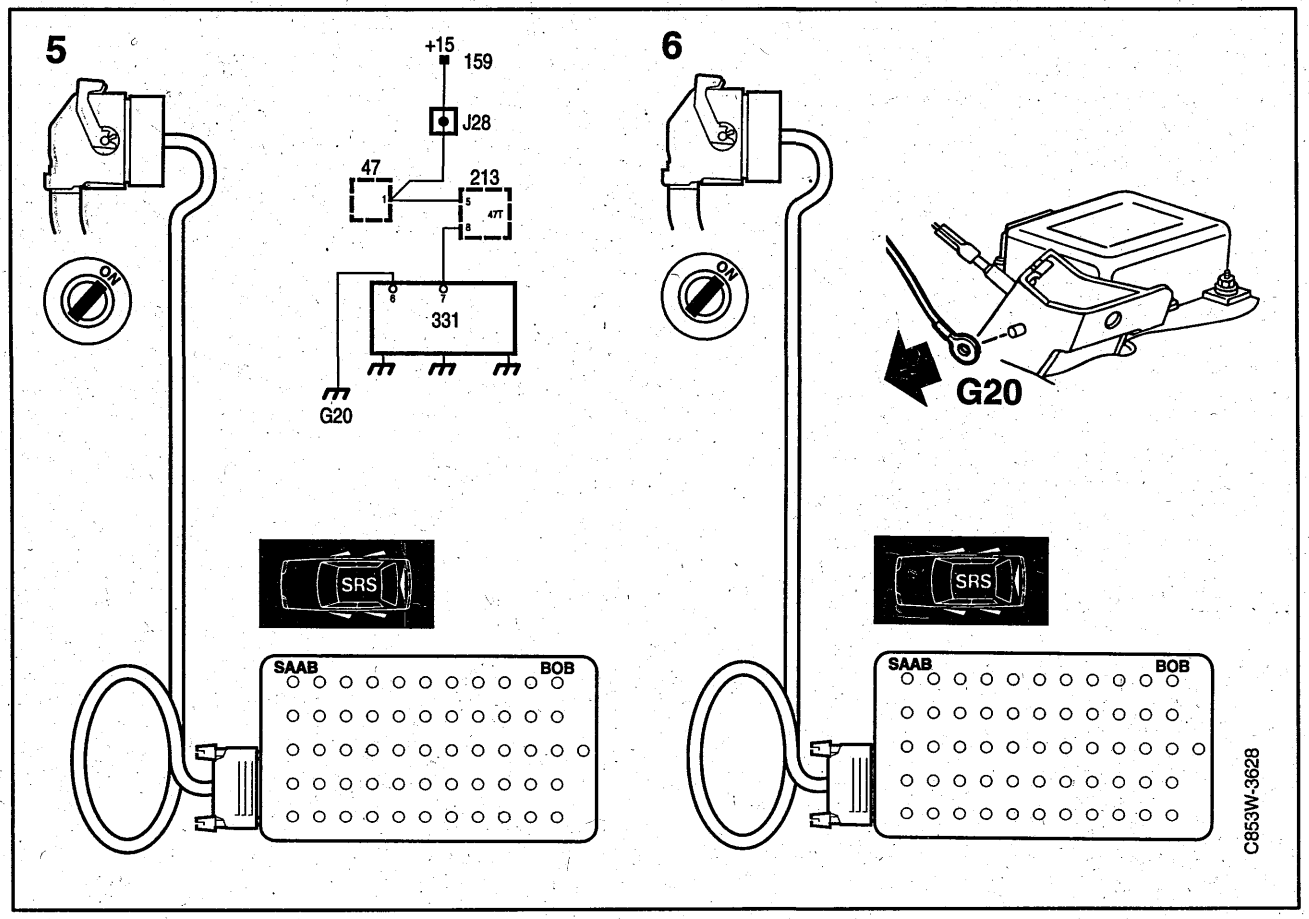
4 Switch off the ignition and disconnect the negative lead from the battery. Undo the bolts securing the steering wheel airbag. Unplug the connector on the back of the airbag and plug reference resistance 84 71 153 into the connector.

On cars with a passenger airbag.

a. Remove the lower cover plate and unplug connector H2–77 to the passenger airbag.
b. Connect reference resistor 84 71 153 to the male part of the connector using cable assembly 86 11 378.

Proceed to point 5.

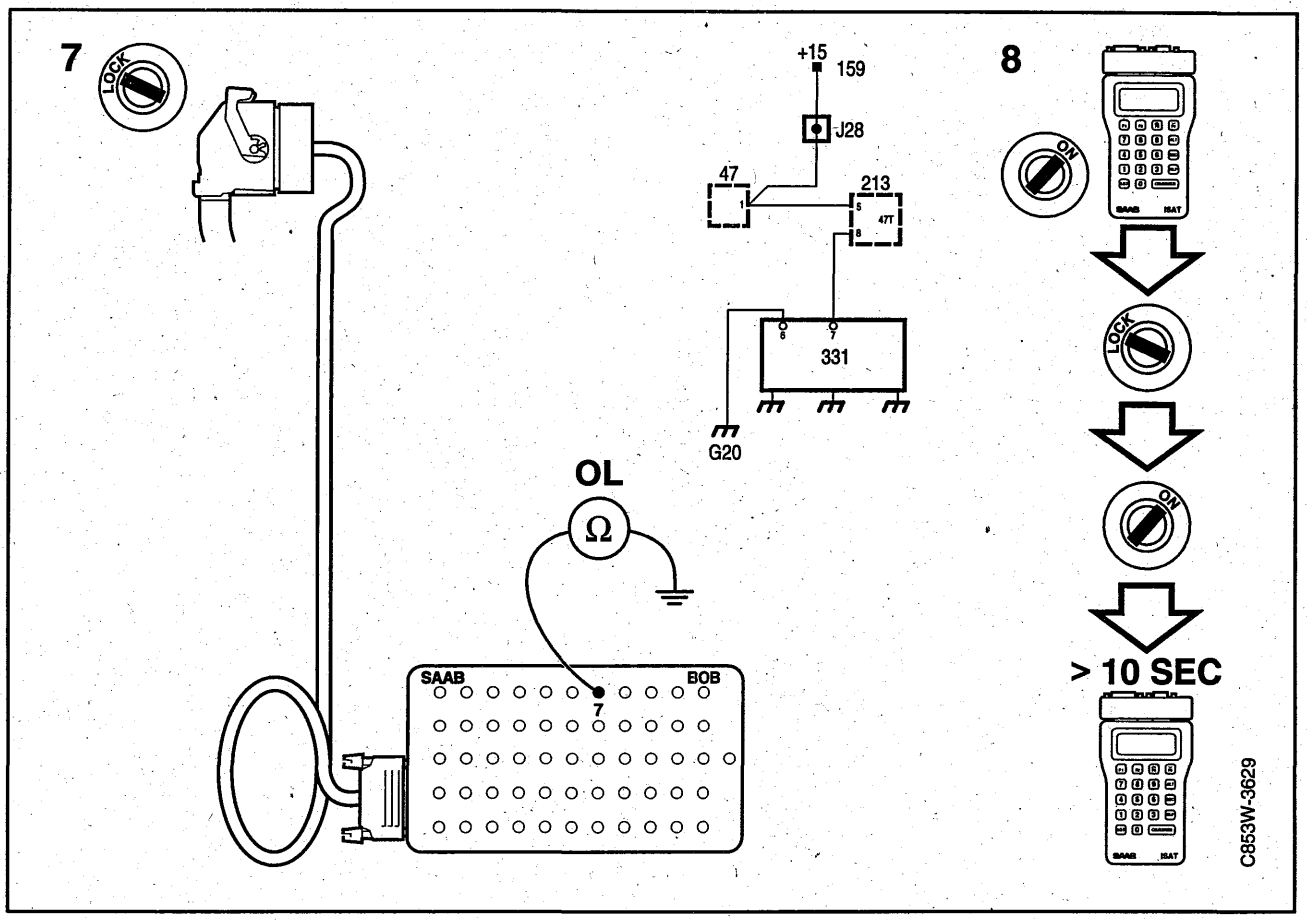
Diagnostic trouble code B1228 (contd.)



5 Free the SRS control module. Unplug the connector from the SRS control module and plug a BOB into the connector. Refit the battery negative lead and switch on the ignition.
The SRS lamp should not light.
If the lamp does not light:
Proceed to point 8.
If the lamp lights:
Proceed to point 6.

6 Disconnect grounding connection G20 from the SRS control module.
The SRS lamp should go out.
If the lamp goes out:
The fault is in the SRS connector. Replace the connector and associated cable assembly.
Proceed to point 8.
If the lamp does not go out:
Reconnect the grounding connector and proceed to point 7.

Diagnostic trouble code B1228 (contd.)



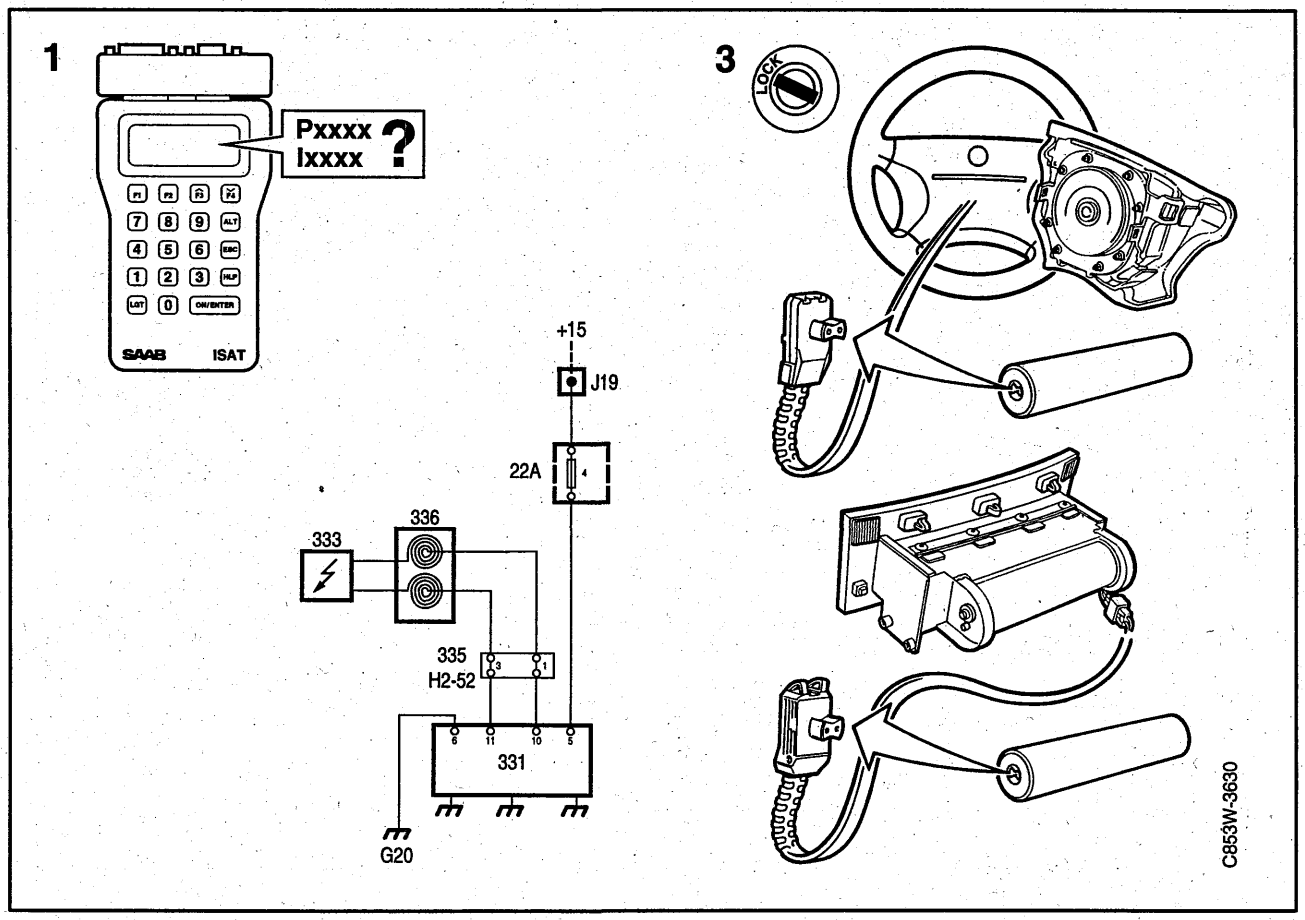
7 Take out the combined instrument.
Unplug the pictogram connector in the combined instrument. Connect an ohmmeter between contact 7 on the BOB and a safe grounding point.
The ohmmeter should show infinite resistance.
If the reading is OK:
Proceed to point 8.
If the reading is incorrect:
The cable is shorting to ground between sleeve 7 in the SRS control module connector and the pictogram connector. Investigate the cause and correct the fault.
Proceed to point 8.

8 Switch off the ignition and disconnect the negative lead from the battery.
Remove reference resistors and plug in all connectors to their original components.
Reconnect the battery negative lead and switch on the ignition.

Erase diagnostic trouble code. Switch off the ignition and switch it back on again, wait for at least 10 seconds.
Check to see if the diagnostic trouble code reappears.
If the diagnostic trouble code reappears:
Proceed to page 92.
If the diagnostic trouble code does not reappear:
Return the car to good order.

Diagnostic trouble code B1332

Driver airbag, interruption



1 Connect the ISAT. Note the diagnostic trouble code. P=permanent fault. I=intermittent fault.
If the fault is permanent:
Proceed to point 3.
If the fault is intermittent:
Proceed to point 2.

2 The fault is intermittent. Try to provoke the fault when taking measurements during fault diagnosis.
Manipulate connectors and leads as well as turning the steering wheel while taking measurements.

Important
If no fault can be demonstrated while taking measurements, change the contact roller. The contact roller is the most common cause of intermittent faults.

Proceed to point 3.

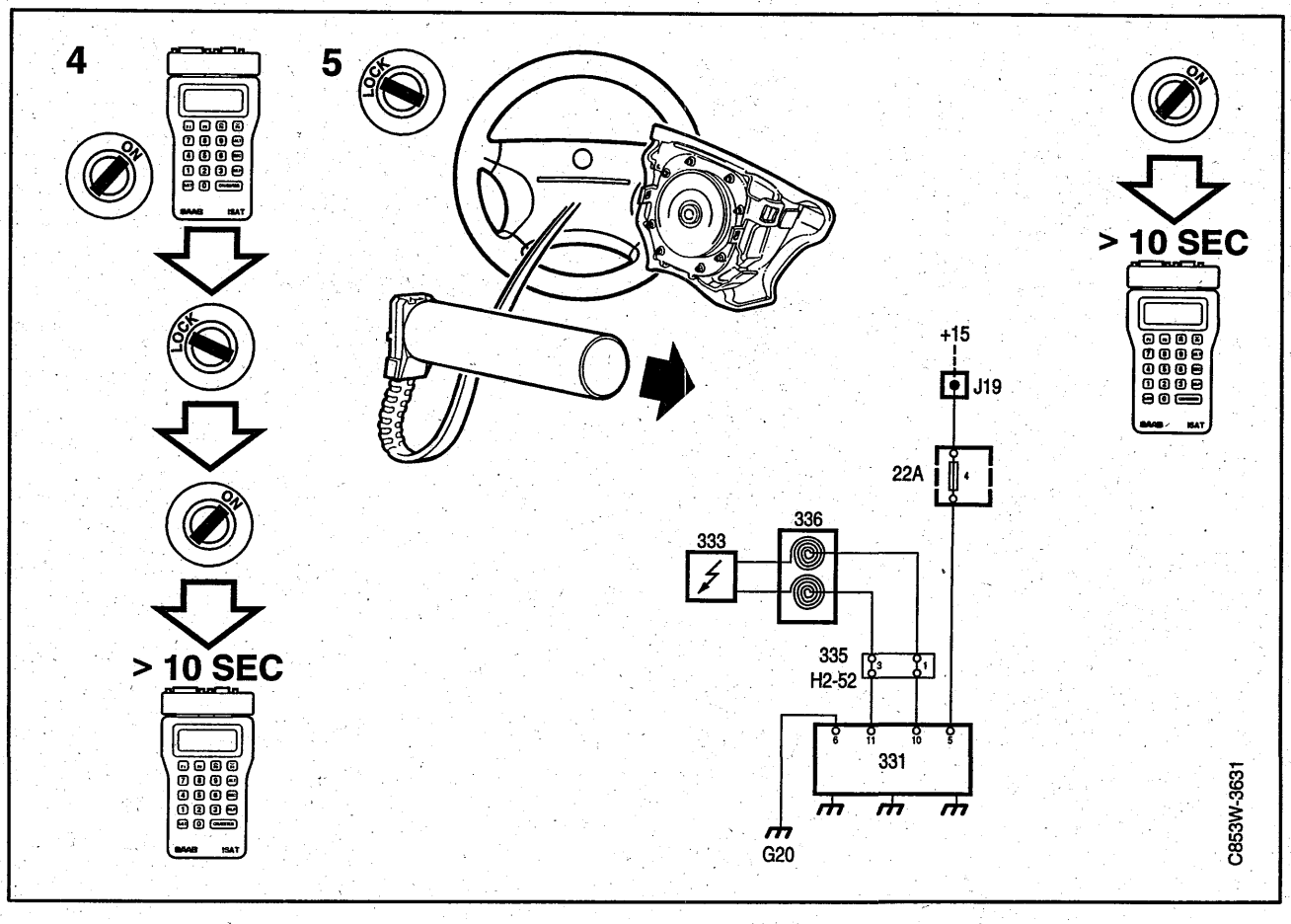
3 Switch off the ignition and disconnect the battery negative cable. Unscrew the steering wheel airbag and unplug the connector on the back of the airbag. Plug in reference resistor 84 71 153 to the connector.

On cars with a passenger airbag.

a. Remove the lower cover plate and unplug connector H2–77 to the passenger airbag.
b. Connect reference resistor 84 71 153 to pin connector H2–77 using cable assembly 86 11 378.

Proceed to point 4.

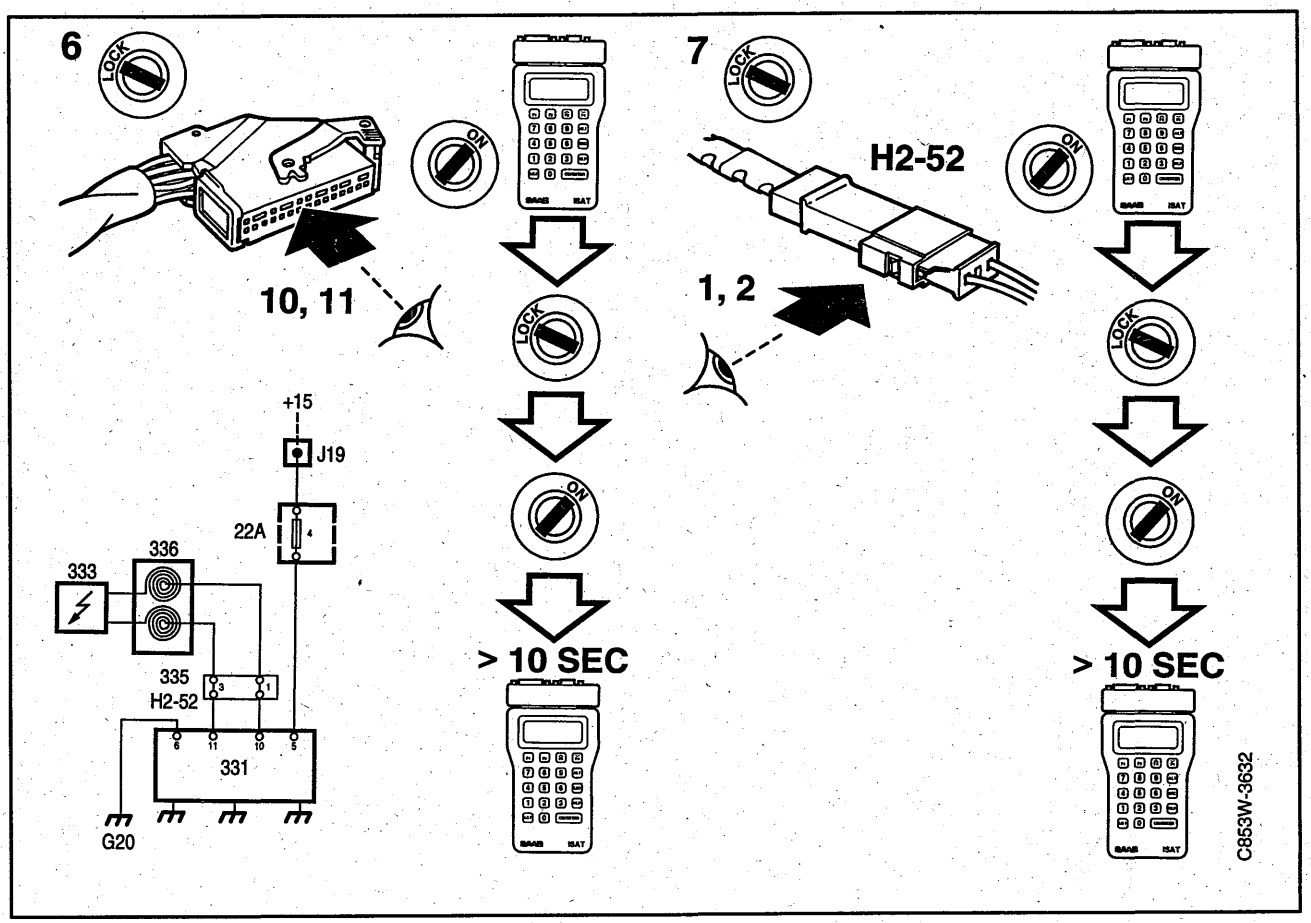
Diagnostic trouble code B1332 (contd.)



4 Reconnect the negative battery lead and switch on the ignition. Erase diagnostic trouble code. Switch off the ignition and switch it on again, wait for at least 10 seconds with the ignition on.
Check to see if the diagnostic trouble code returns.
If the diagnostic trouble code returns:
Proceed to point 6.
If the diagnostic trouble code does not return:
The fault is in the steering wheel airbag.
Conduct extra tests as described in point 5.

5 Switch off the ignition and disconnect the negative lead from the battery. Remove the reference resistor from the steering wheel airbag connector and reconnect the airbag.
Reconnect the negative battery lead and switch on the ignition. Wait for at least 10 seconds with the ignition on.
Check to see if the diagnostic trouble code returns. (the airbag may have been badly connected).
If the diagnostic trouble code returns:
Change the steering wheel airbag. Then proceed to point 10.
If the diagnostic trouble code does not return:
The fault is intermittent. Return to point 2.

Diagnostic trouble code B1332 (contd.)



6 Switch off the ignition and unplug the connector from the SRS control module. Check pins 10 and 11 for breaks and bad contacts.

Refit the connector and switch on the ignition. Erase diagnostic trouble code. Switch off the ignition and switch it back on, wait for at least 10 seconds with the ignition on.
Check to see if the diagnostic trouble code returns.
If the diagnostic trouble code returns:
Proceed to point7.
If the diagnostic trouble code does not return:
The fault was in the connector. Proceed to point 10.

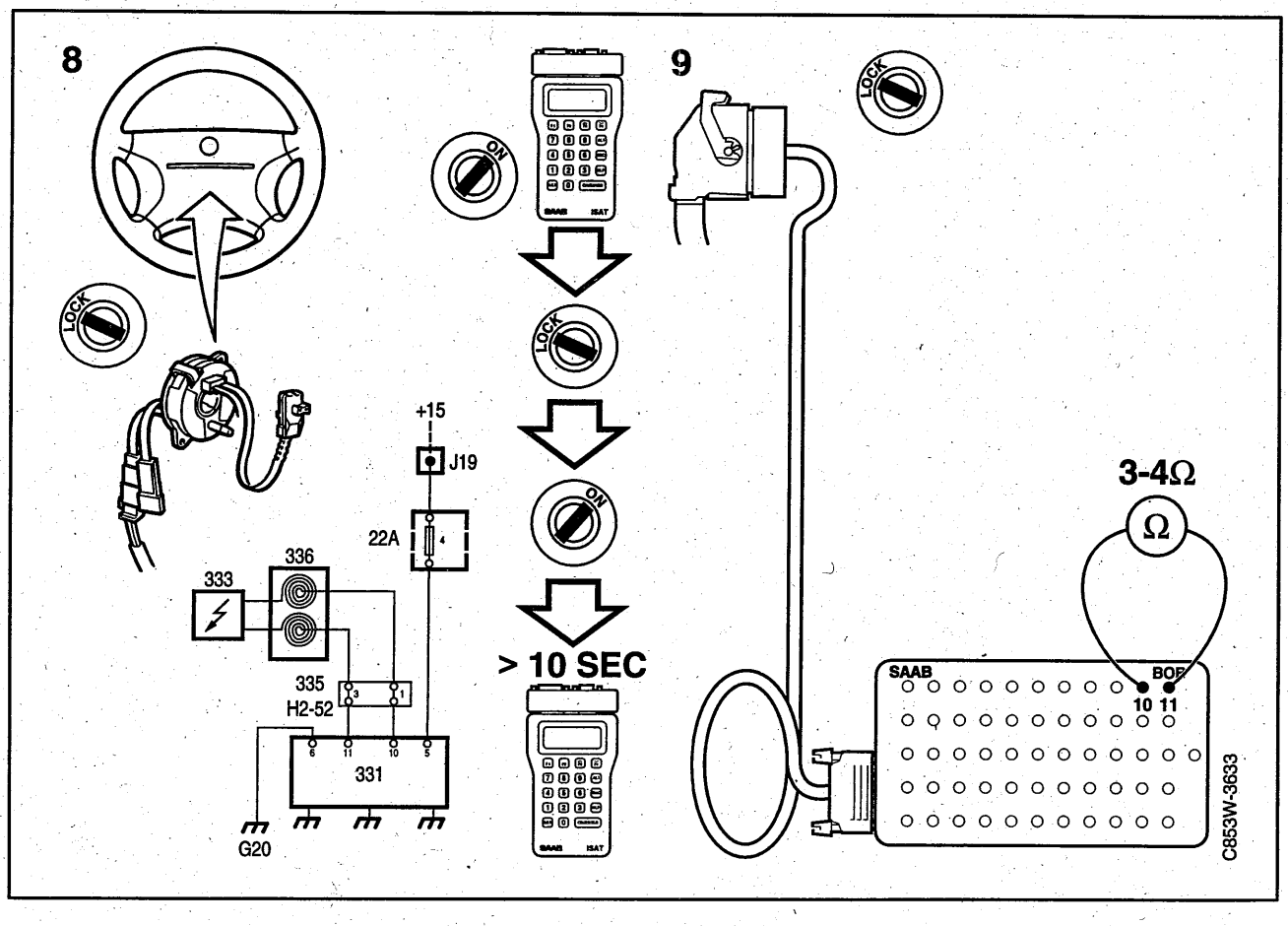
Important
If no fault was found in the connector, the fault may be intermittent. Try to provoke any inter–mittent fault and see if the SRS lamp lights.

7 Switch off the ignition. Unplug connector H2–52 and check pins and sleeves for breaks and bad contacts.

Join the connector. Switch on the ignition and erase the diagnostic trouble code. Switch off the ignition and switch it back on, wait at least 10 seconds with the ignition on.
Check to see if the diagnostic trouble code returns.
If the diagnostic trouble code returns:
Proceed to point8.
If the diagnostic trouble code does not return:
The fault was in the connector. Proceed to point 10.

Important
If no fault was detected in the connector, the fault may be intermittent. Try to provoke any intermittent fault and see if the SRS lamp lights.

Diagnostic trouble code B1332 (contd.)

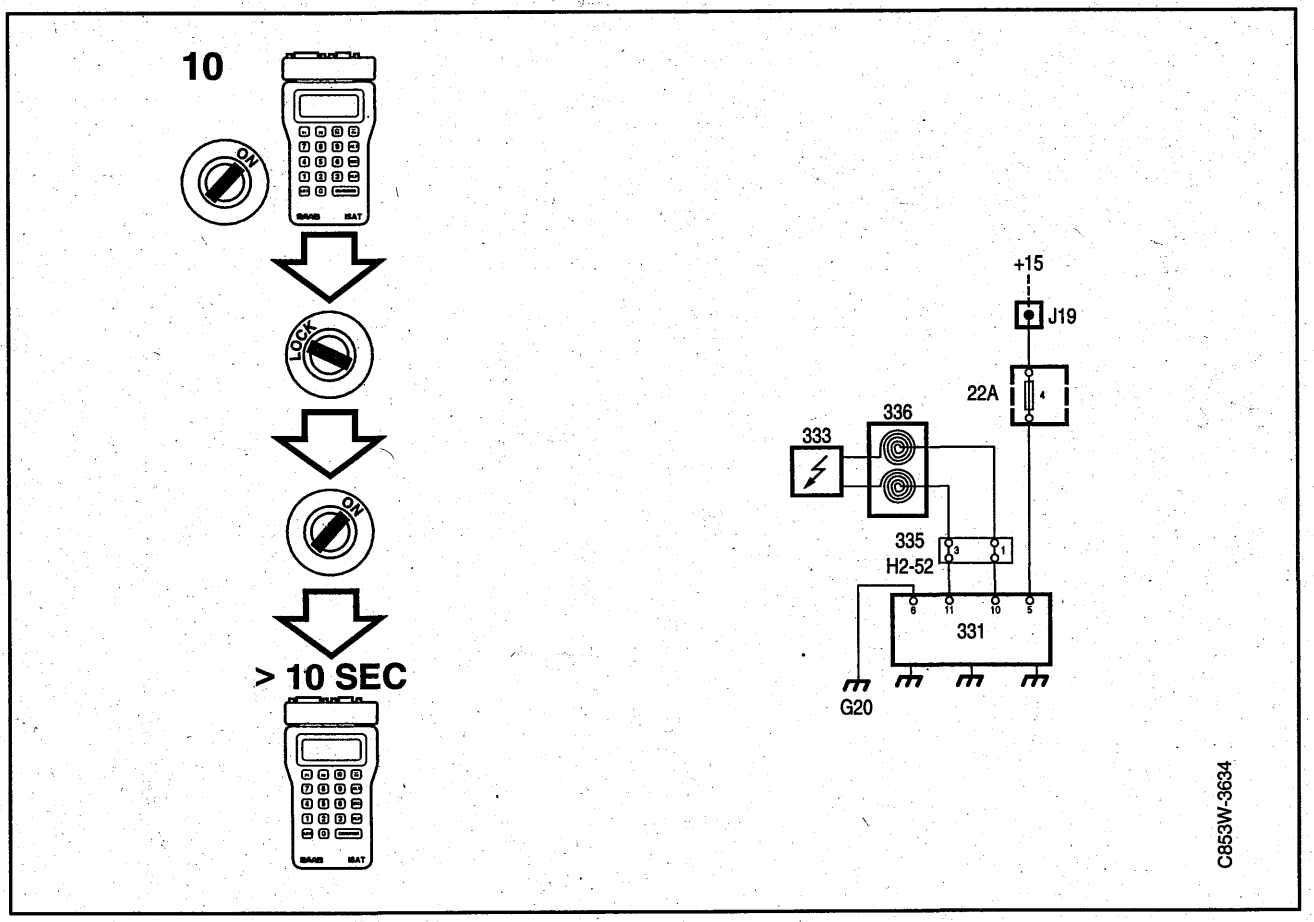


8 Switch off the ignition. Unplug connector H2–52 and remove the reference resistor from the steering wheel airbag connector. Change the contact roller. Join the connector and reconnect the reference resistor.

Switch on the ignition and erase the diagnostic trouble code. Switch off the ignition and switch it back on, wait for at least 10 seconds with the ignition on.
Check to see if the diagnostic trouble code returns.
If the diagnostic trouble code returns:
Proceed to point 9.
If the diagnostic trouble code does not return:
The fault was in the contact roller. Proceed to point 10.

9 Switch off the ignition and check the cable assembly by connecting a BOB to the SRS control module connector on the cable assembly. Connect an ohmmeter between contacts 10 and 11.
The ohmmeter should read 3–4 Ω.
If the reading is OK:
Proceed to point 10.
If the reading is off:
Investigate the cause and change the cable assembly.
Proceed to point 10.

Diagnostic trouble code B1332 (contd.)

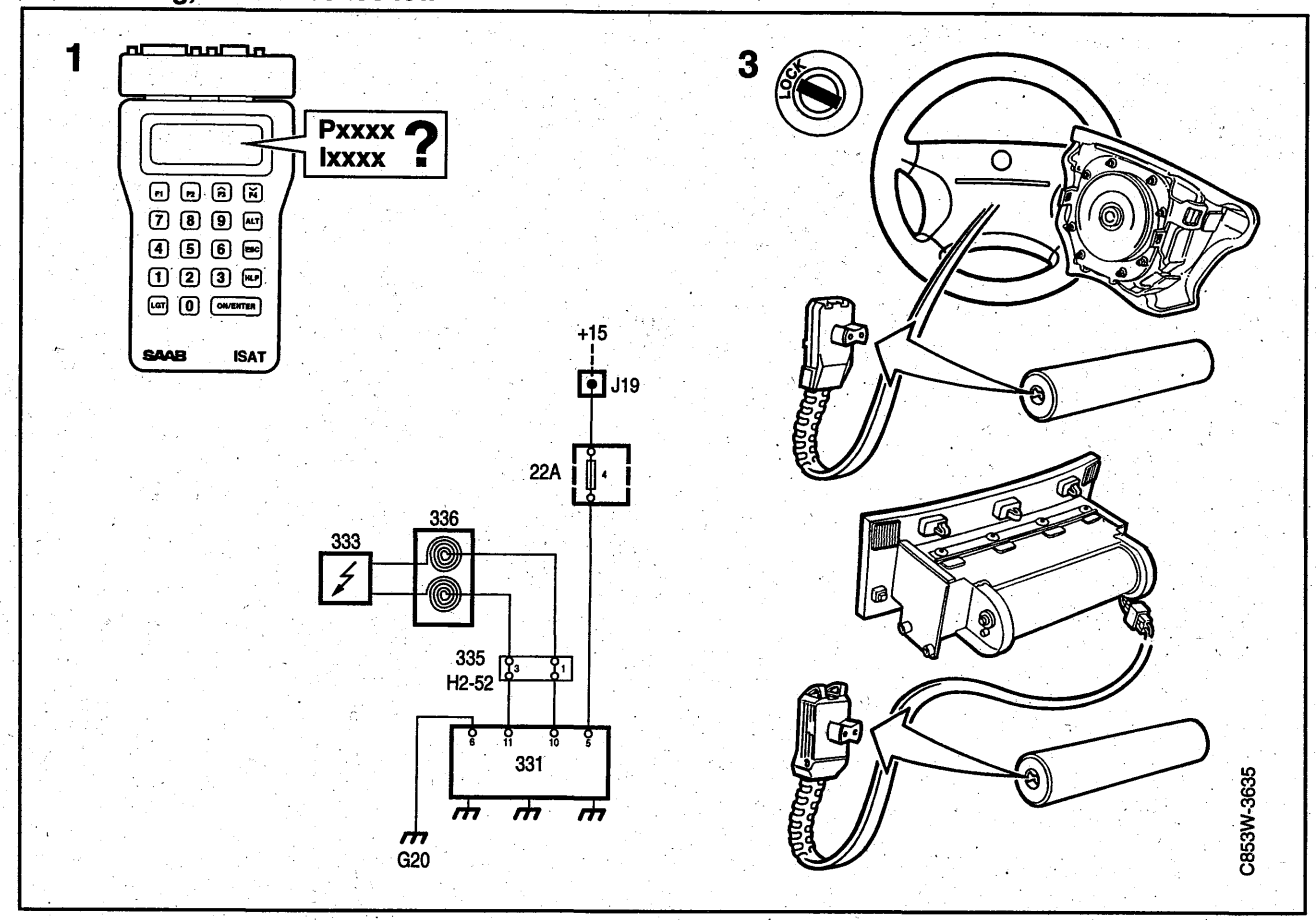


10 Switch off the ignition and disconnect the negative lead from the battery.
Remove reference resistors and plug in all connectors to their original components.
Reconnect the battery negative lead and switch on the ignition.

Erase diagnostic trouble code. Switch off the ignition and switch it back on again. Wait for at least 10 seconds with the ignition on.
Check to see if the diagnostic trouble code returns.
If the diagnostic trouble code returns:
Proceed to page 92.
If the diagnostic trouble code does not reappear:
Return the car to good order.

Diagnostic trouble code B1333

Driver airbag, resistance too low



1 Connect ISAT. Note the diagnostic trouble code and the type of fault. P=permanent fault, I= intermittent fault.
If the fault is permanent:
Proceed to point 3.
If the fault is intermittent:
Proceed to point 2.

2 The fault is intermittent. Try to provoke the fault when taking measurements during fault diagnosis.
Manipulate connectors and leads as well as turning the steering wheel while taking measurements.

Important
If no fault can be demonstrated while taking measurements, change the contact roller. The contact roller is the most common cause of intermittent faults.

Proceed to point 3.

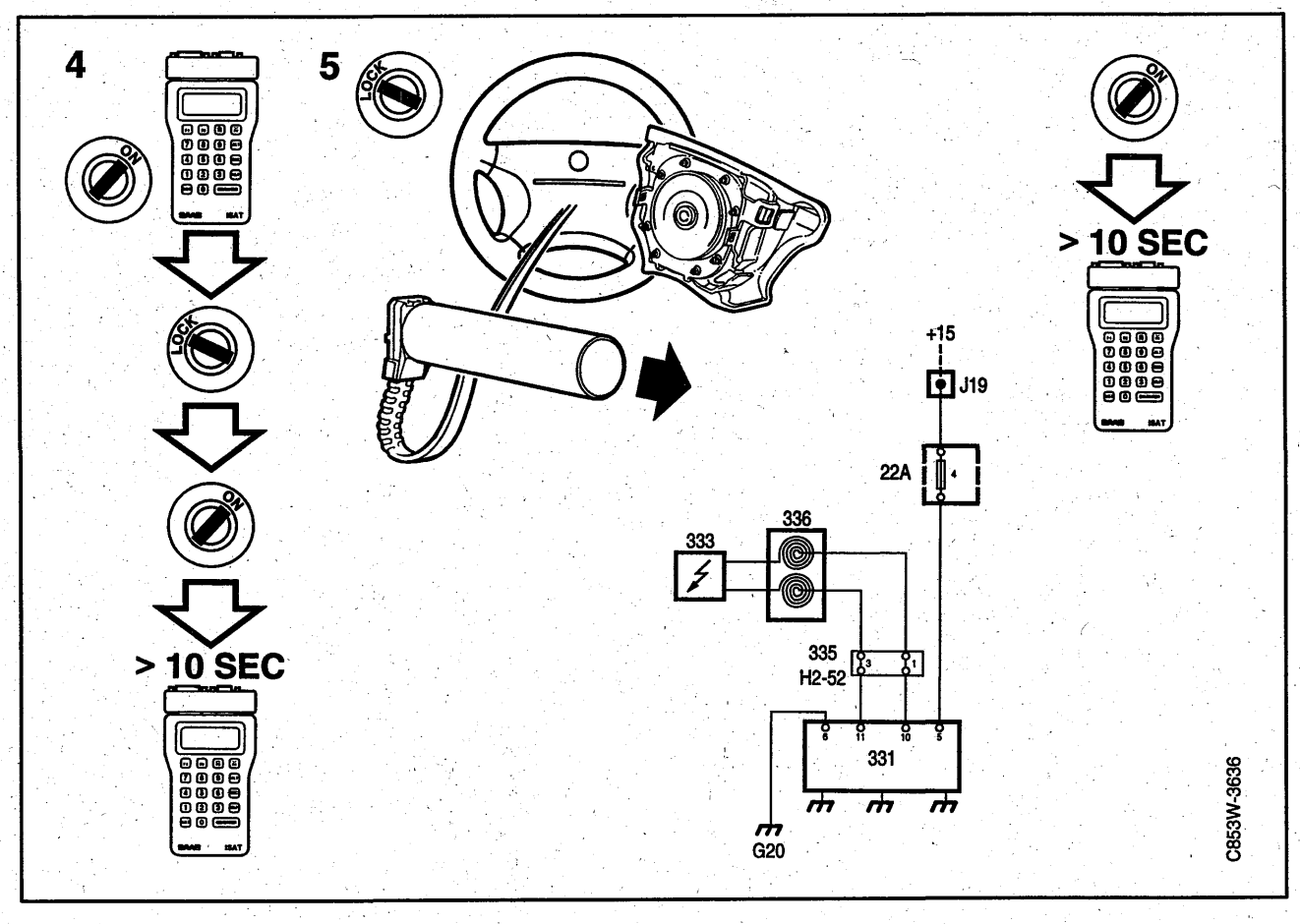
3 Switch off the ignition and remove the negative lead from the battery. Unscrew the steering wheel airbag and unplug the connector on the back of the airbag. Plug in reference resistor 84 71 153 to the connector.

On cars with a passenger airbag.

a. Remove the lower cover plate and unplug connector H2–77 to the passenger airbag.
b. Connect reference resistor 84 71 153 to pin connector H2–77 using cable assembly 86 11 378.

Proceed to point 4.

Diagnostic trouble code B1333 (contd.)

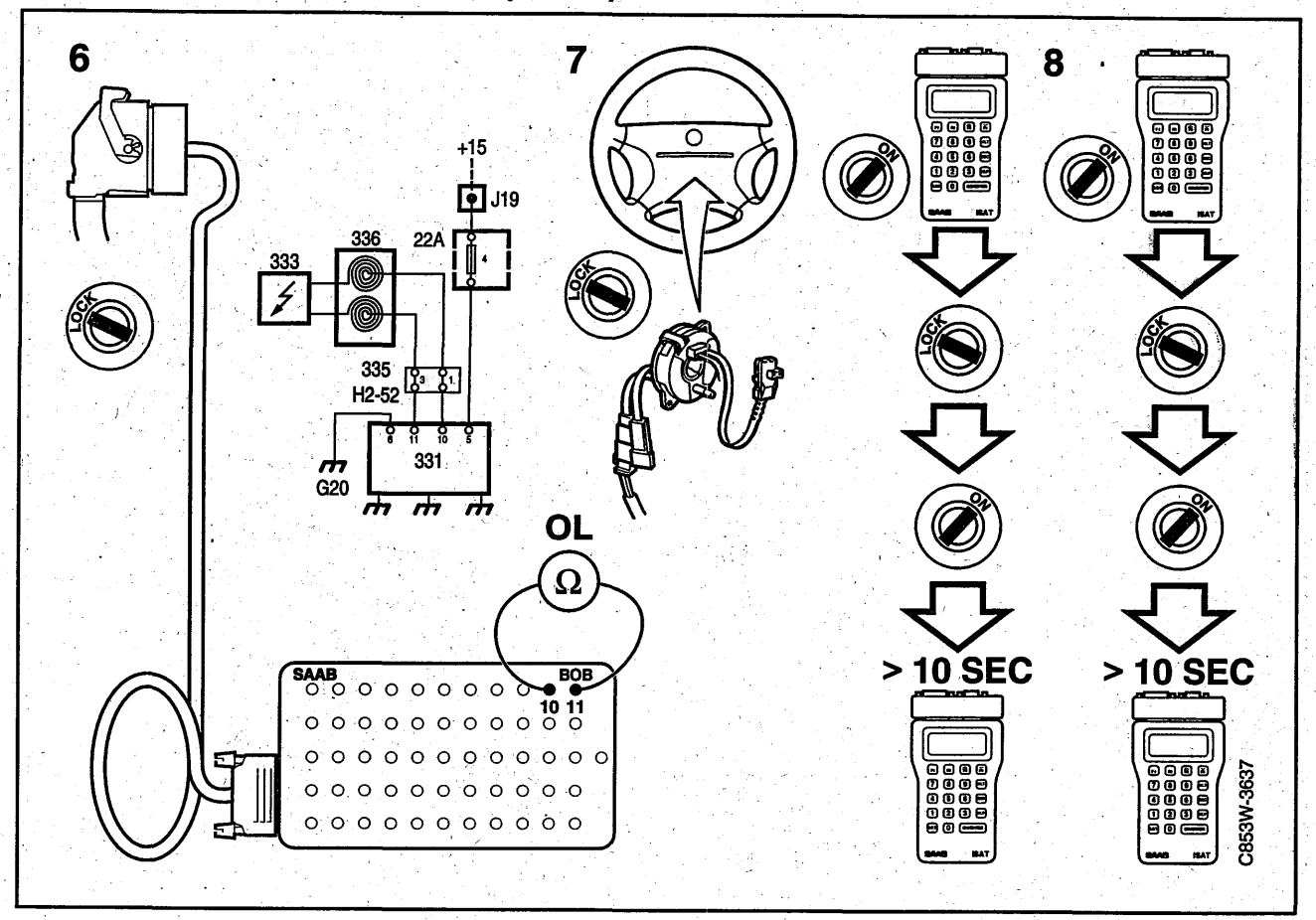


4 Reconnect the negative battery lead and switch on the ignition. Erase diagnostic trouble code. Switch off the ignition and switch it back on, wait for at least 10 seconds with the ignition on.
Check to see if the diagnostic trouble code returns.
If the diagnostic trouble code returns:
Proceed to point 6.
If the diagnostic trouble code does not return:
The fault is in the airbag. Conduct extra tests as described in point 5.

5 Switch off the ignition and disconnect the negative lead from the battery. Remove the reference resistor from the airbag connector and plug in the airbag.

Refit the negative lead to the battery and switch on the ignition. Wait for at least 10 seconds with the ignition on.
Check to see if the diagnostic trouble code returns.
If the diagnostic trouble code returns:
Change the steering wheel airbag. Then proceed to point 8.
If the diagnostic trouble code does not return:
The fault is intermittent. Return to point 2.

Diagnostic trouble code B1333 (contd.)



6 Switch off the ignition. Unplug the connector from the SRS control module and connect a BOB. Unplug connector H2–52. Connect an ohmmeter between contacts 10 and 11 on the BOB.
The ohmmeter should show infinite resistance.
If the reading is OK: Proceed to point 7.
If the reading is incorrect:
There is a short circuit in the cable assembly between connector H2–52 and the connector to the SRS control module.
Investigate the cause and change the cable assembly. Then proceed to point 8.

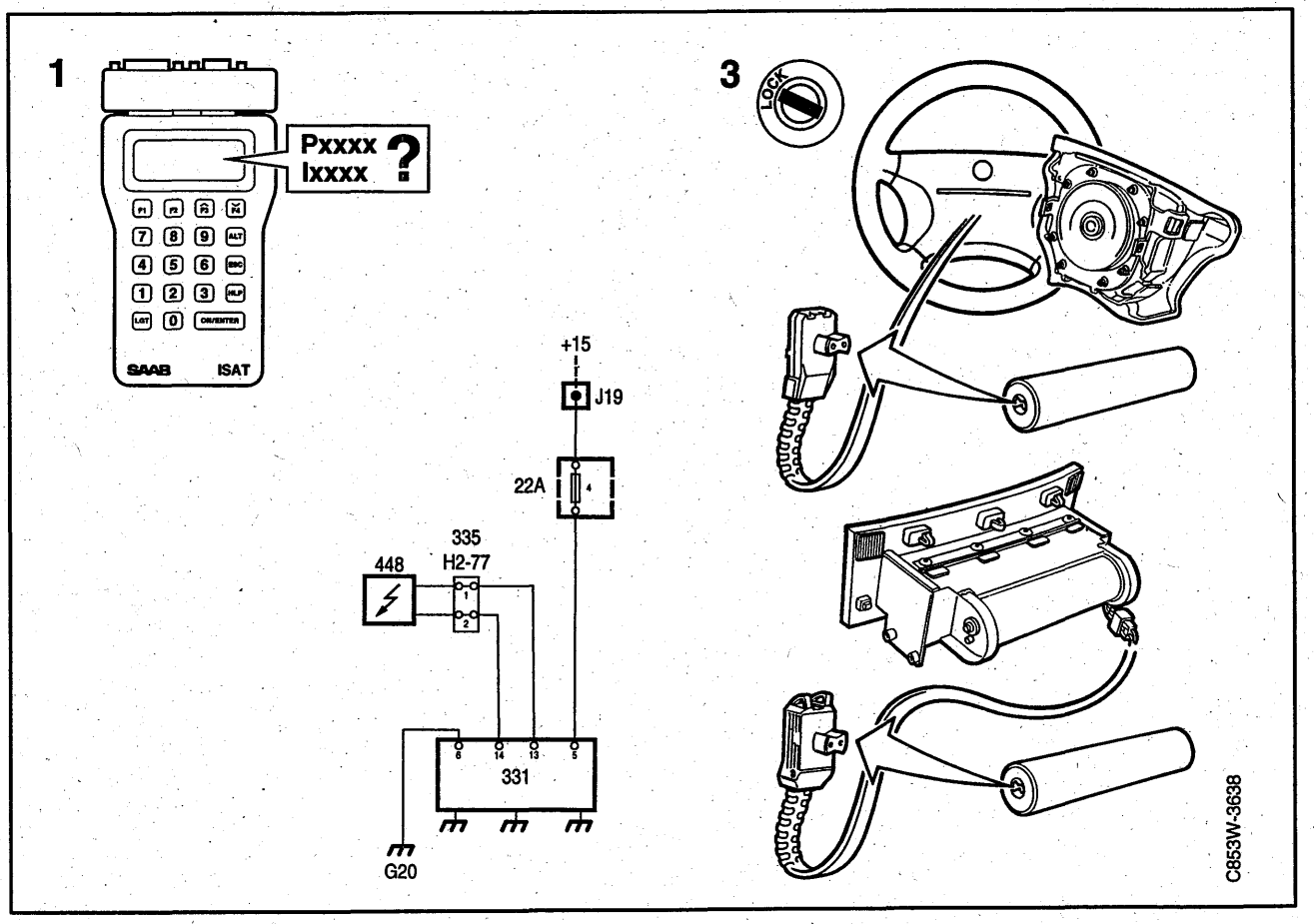
7 Change the contact roller. Fit a reference resistor to the connector for the steering wheel airbag. Plug in connector H2–52 and reconnect the connector to the SRS control module.
Switch on the ignition and erase the diagnostic trouble code. Switch off the ignition and switch it back on, wait for at least 10 seconds with the ignition on.
Check to see if the diagnostic trouble code returns.
If the diagnostic trouble code returns:
Proceed to page 92.
If the diagnostic trouble code does not return:
The fault was in the contact roller. Proceed to point 8.

8 Switch off the ignition and disconnect the negative lead from the battery.
Remove the reference resistor and plug in all connectors to their original components. Refit the negative battery lead and switch on the ignition.

Erase diagnostic trouble code. Switch off the ignition and switch it back on again. Wait for at least 10 seconds with the ignition on.
Check to see if the diagnostic trouble code returns.
If the diagnostic trouble code returns:
Proceed to page 92.
If the diagnostic trouble code does not return:
Return the car to good order.

Diagnostic trouble code B1337

Passenger airbag, interruption



1 Connect ISAT. Note the diagnostic trouble code and the type of fault. P=permanent fault, I= intermittent fault.
If the fault is permanent:
Proceed to point 3.
If the fault is intermittent:
Proceed to point 2.

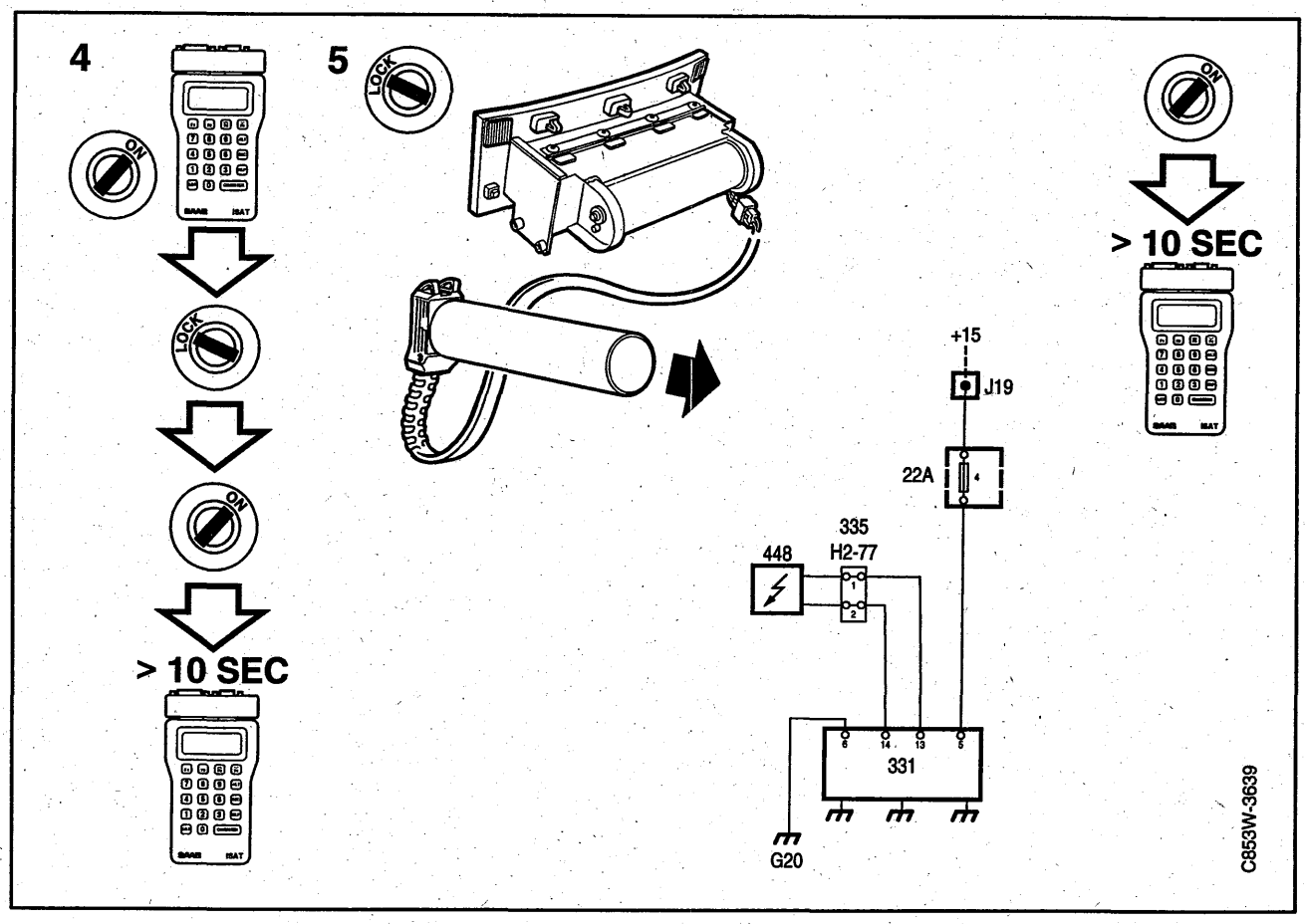
2 The fault is intermittent: Try to expose the fault when taking each reading during fault tracing. Manipulate the connectors and cables and turn the steering wheel when taking measurements.

Proceed to point 3.

3 Switch off the ignition and disconnect the negative lead from the battery. Undo the bolts securing the steering wheel airbag. Unplug the connector on the back of the airbag and plug in reference resistor 84 71 153.

Remove the lower cover plate and unplug connector H2–77 for the passenger airbag. Connect reference resistor 84 71 153 to connector H2–77 using cable assembly 86 11 378.
Proceed to point 4.

Diagnostic trouble code B1337 (contd.)

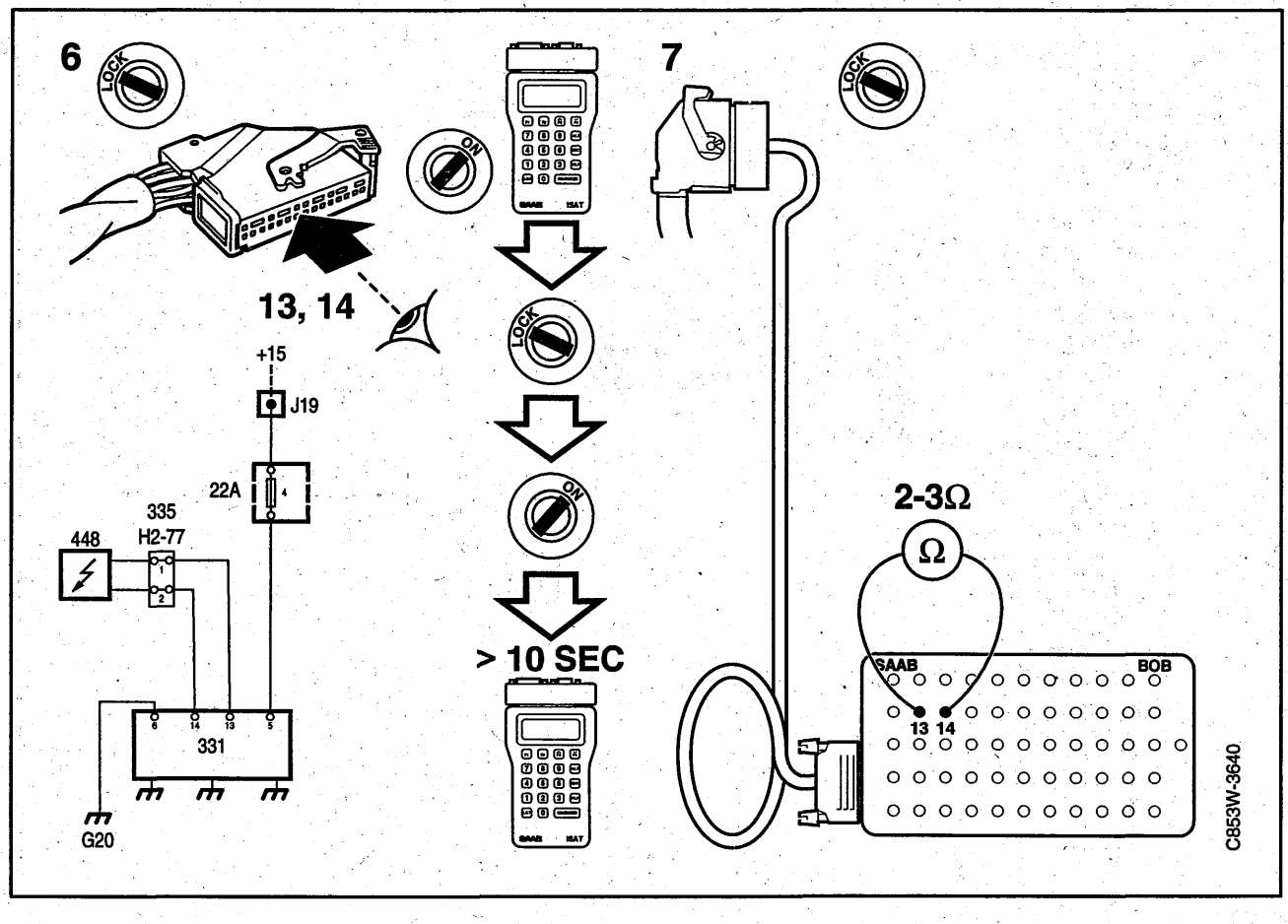


4 Reconnect the negative battery lead and switch on the ignition. Erase diagnostic trouble code. Switch off the ignition and switch it back on again. Wait for at least 10 seconds with the ignition on.
Check to see if the diagnostic trouble code returns.
If the diagnostic trouble code returns:
Proceed to point6.
If the diagnostic trouble code does not return:
The fault was in the passenger airbag.
Conduct extra tests as described in point 5.

5 Switch off the ignition and disconnect the negative lead from the battery. Remove cable assembly 86 11 378 complete with reference resistor from the airbag connector and plug in the passenger airbag.

Refit the negative lead to the battery and switch on the ignition. Wait for at least 10 seconds with the ignition on.
Check to see if the diagnostic trouble code returns.
If the diagnostic trouble code returns:
Change the passenger airbag. Then proceed to point 8.
If the diagnostic trouble code does not return:
The fault is intermittent. Return to point 2.

Diagnostic trouble code B1337 (contd.)



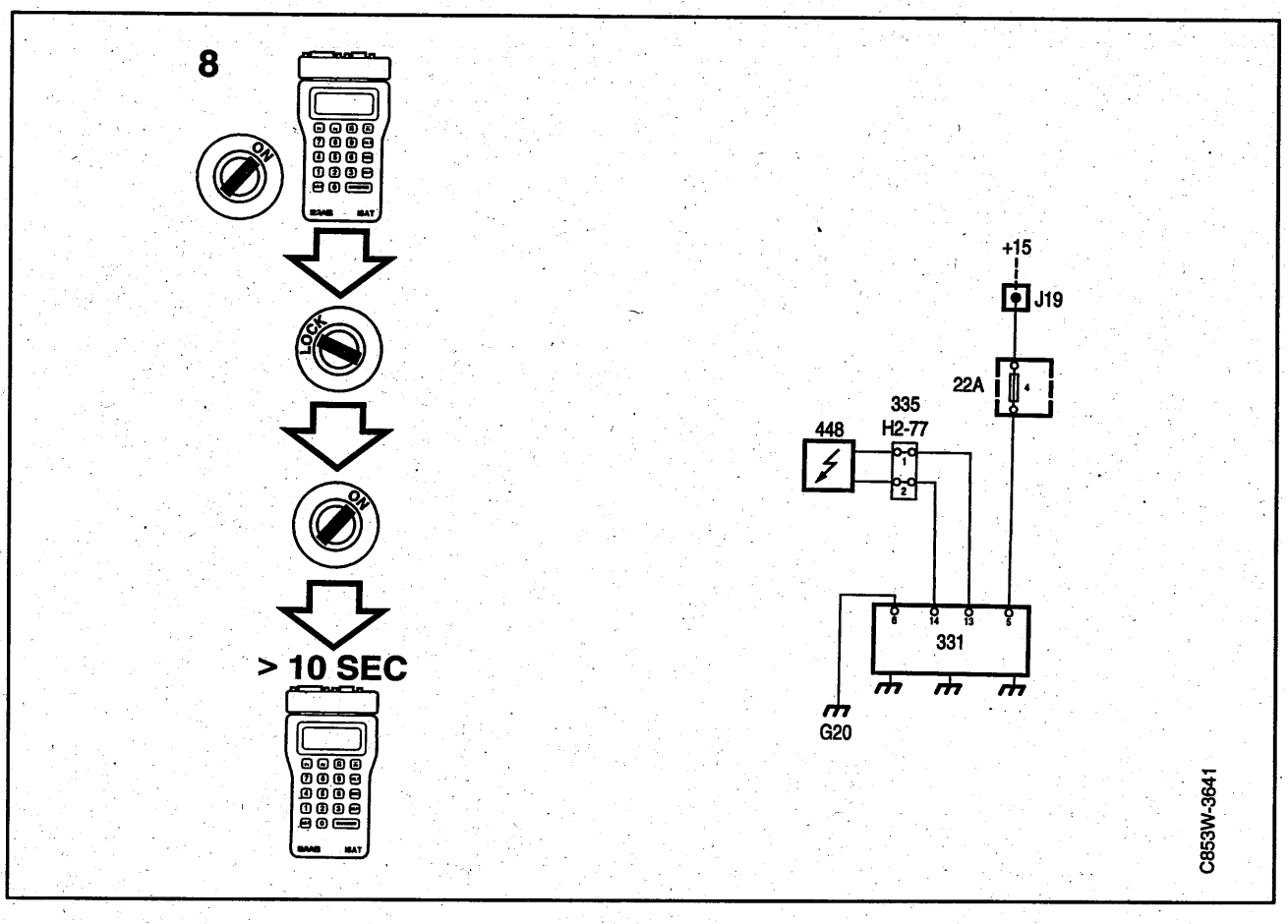
6 Switch off the ignition. Detach the SRS control module.Remove the connector from the SRS control.module and check sleeves 13 and 14 for breaks and bad contact. Plug in the con– nector to the SRS control module and switch on the ignition.

Erase diagnostic trouble code. Switch off the ignition and switch it back on again. Wait for at least 10 seconds with the ignition on.
Check to see if the diagnostic trouble code returns.
If the diagnostic trouble code returns:
Proceed to point7.
If the diagnostic trouble code does not return:
The fault was in the SRS connector. Proceed to point 8.

Important
If no fault was found in the connector, the fault may be intermittent. Try to provoke any intermit– tent fault and see if the SRS lamp lights.

7 Switch off the ignition. Remove the connector from the SRS control module and plug a BOB into the connector. Connect an ohmmeter between contacts 13 and 14 on the BOB. The ohmmeter should read 2–3 ohms.
If the reading is OK:
Proceed to point8.
If the reading is incorrect:
If the ohmmeter shows high resistance, there is a break in the cable assembly between the SRS control module and the passenger airbag. Investigate the cause and change the cable assembly. Then proceed to point 8.

Diagnostic trouble code B1337 (contd.)

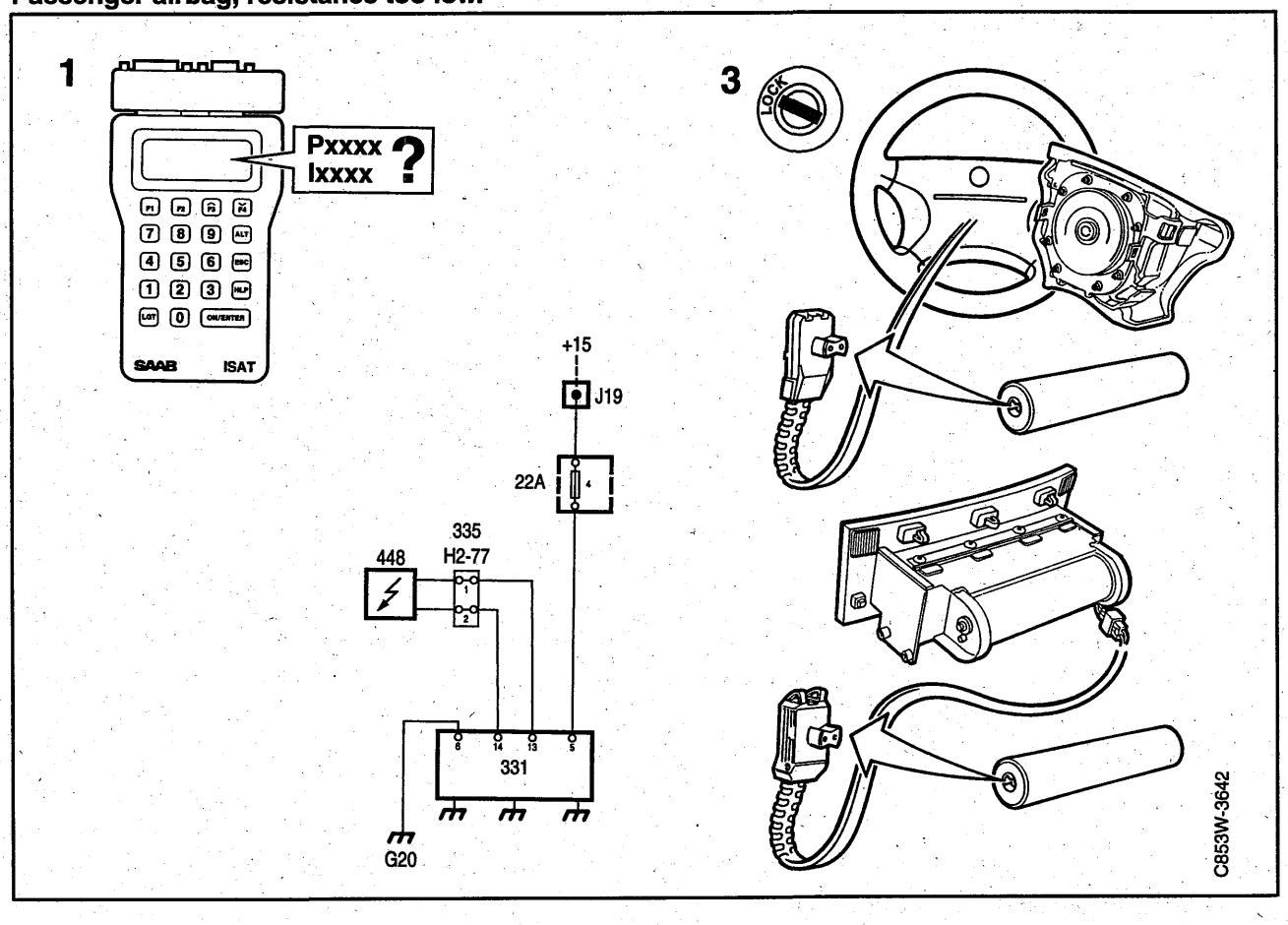


8 Switch off the ignition and disconnect the negative lead from the battery.
Remove reference resistors and plug in all connectors to their original components.
Reconnect the battery negative lead and switch on the ignition.

Erase diagnostic trouble code. Switch off the ignition and switch it back on again. Wait for at least 10 seconds.
Check to see if the diagnostic trouble code returns.
If the diagnostic trouble code does not return:
Proceed to page 92.
If the diagnostic trouble code does not return:
Return the car to good order.

Diagnostic trouble code B1338

Passenger airbag, resistance too low.



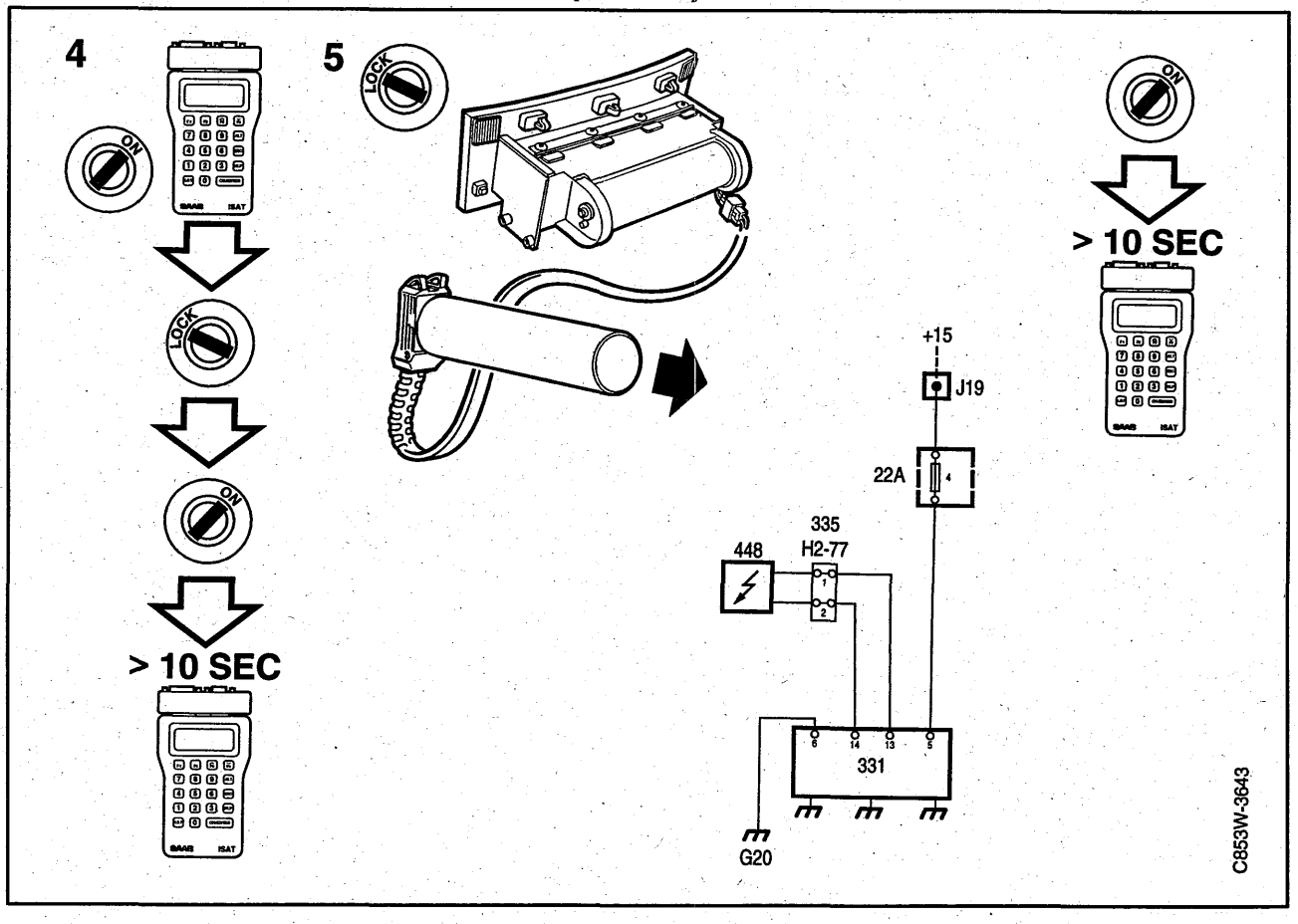
1 Connect ISAT. Note the diagnostic trouble code and the type of fault.
P=permanent fault, I= intermittent fault.
If the fault is permanent:
Proceed to point 3.
If the fault is intermittent:
Proceed to point 2.

2 The fault is intermittent: Try to expose the fault when taking each reading during fault tracing. Manipulate the connectors and cables and turn the steering wheel when taking measurements.

Proceed to point 3.

3 Switch off the ignition and remove the negative lead from the battery. Unscrew the steering wheel airbag and unplug the connector on the back of the airbag. Connect reference resistor 84 71 153 to the connector. Remove the lower cover plate and unplug connector H2–77 to the passenger airbag. Connect reference resistor 84 71 153 to connector H2–77 using cable assembly 86 11 378.
Proceed to point 4.

Diagnostic trouble code B1338 (contd.)

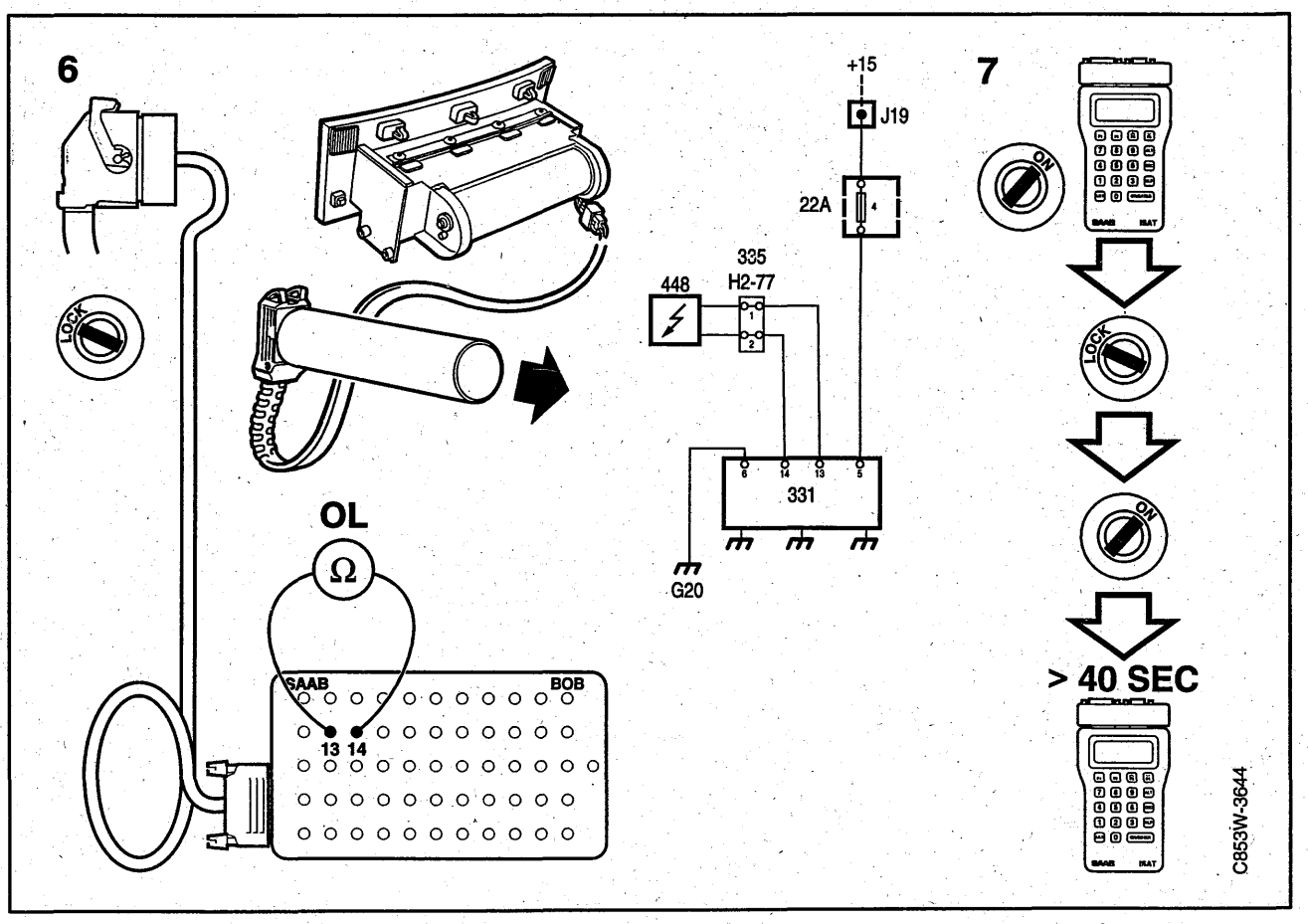


4 Reconnect the negative battery lead and switch on the ignition. Erase the diagnostic trouble code.
Switch off the ignition and switch it back on, wait for at least 10 seconds with the ignition on.
Check to see if the diagnostic trouble code returns.
If the diagnostic trouble code returns:
Proceed to point 6.
If the diagnostic trouble code does not return:
The fault was in the passenger airbag.
Conduct extra tests as described in point 5.

5 Switch off the ignition and disconnect the negative lead from the battery. Remove cable assembly 86 11 378 complete with reference resistor from the airbag connector and plug in the passenger airbag.

Refit the negative lead to the battery and switch on the ignition. Wait for at least 10 seconds with the ignition on.
Check to see if the diagnostic trouble code returns.
If the diagnostic trouble code returns:
Change the passenger airbag. Then proceed to point 7.
If the diagnostic trouble code does not return:
The fault is intermittent. Return to point 2.

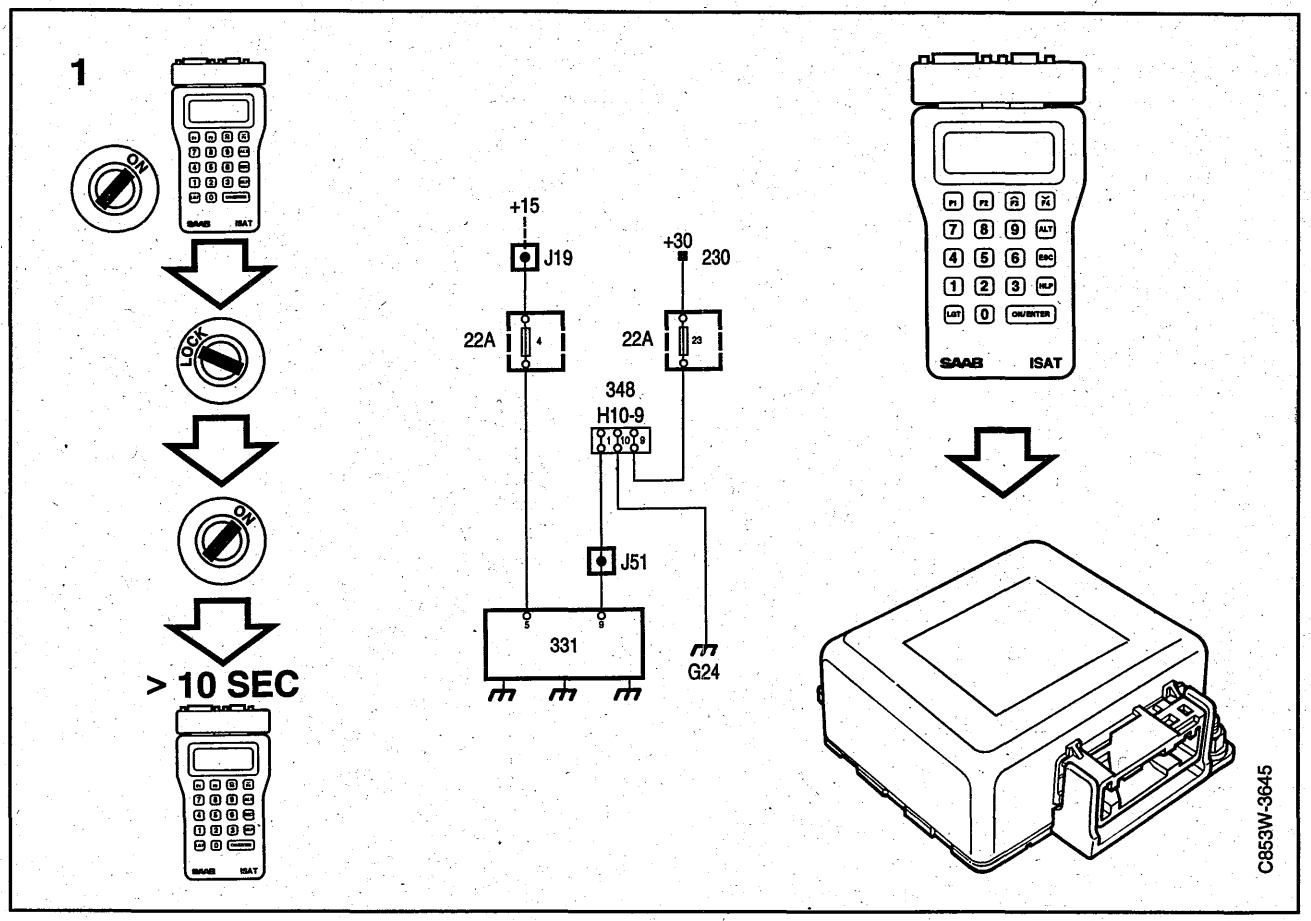
Diagnostic trouble code B1338 (contd.)



6 Switch off the ignition and remove cable assembly 86 11 378 complete with the reference resistor.
Check the cable assembly by connecting a BOB to the SRS control module connector on the cable assembly. Connect an ohmmeter between contacts 13 and 14 on the BOB.
The ohmmeter should show infinite resistance.
If the reading is OK:
Proceed to point 7.
If the reading is incorrect:
There is a short circuit in the cable assembly between the SRS control module and the passenger airbag. Investigate the cause and change the cable assembly. Then proceed to point 7.

7 Switch off the ignition and disconnect the negative lead from the battery.
Remove reference resistors and plug in all connectors to their original components.
Reconnect the battery negative lead and switch on the ignition.

Erase diagnostic trouble code. Switch off the ignition and switch it back on again. Wait for at least 10 seconds with the ignition on.
Check to see if the diagnostic trouble code returns.
If the diagnostic trouble code returns:
Proceed to page 92.
If the diagnostic trouble code does not return:
Return the car to good order.



Diagnostic trouble code B1605

Control module defective

1 Switch on the ignition and erase the diagnostic trouble code.Switch off the ignition and switch it back on again. Wait for at least 10 seconds with the ignition on. Check to see if the diagnostic trouble code returns.
If the diagnostic trouble code returns:
Try using a new control module that is known to function correctly.
If the diagnostic trouble code does not return: No action.

The diagnostic trouble code can have been activated if the voltage feed has been lower than 7 V.

Diagnostic trouble code B1610

Control module incorrectly programmed

1 Switch on the ignition and erase the diagnostic trouble code.Switch off the ignition and switch it back on again. Wait for at least 10 seconds with the ignition on. Check to see if the diagnostic trouble code returns.
If the diagnostic trouble code returns:
Proceed to point 2.
If the diagnostic trouble code does not return:
No action.

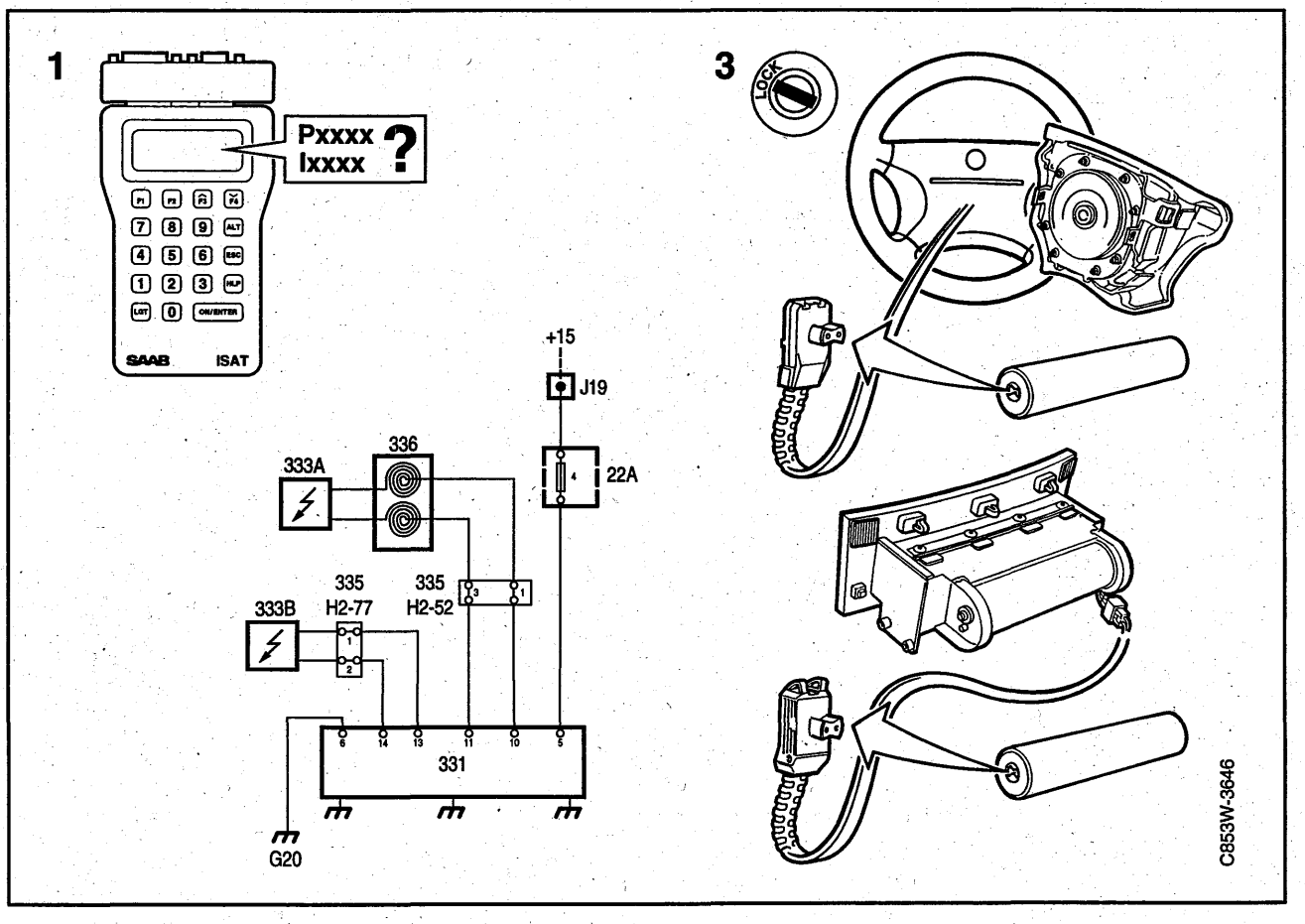
2 Connect ISAT. Using the ISAT, check if the SRS control module is programmed for one or two airbags and compare this with the actual number of airbags in the car.
If the number is OK:
If there are other diagnostic trouble codes stored, take action on these first.
If there are no other diagnostic trouble codes stored, proceed to page 92.
If the number is not OK:
Program the correct number of airbags using the ISAT. Programming is executed under the "PROGRAMMING" menu on the ISAT, see page 31.

Diagnostic trouble code B1615

Detonator circuit activated
SRS control module is used. Change the SRS control module.
Proceed to section "Changing safety components when repairing crashed cars", see page 4.

Diagnostic trouble code B2332 / Diagnostic trouble code B2337

Driver airbag, short to ground / Passenger airbag, short to ground.



1 Connect ISAT. Note diagnostic trouble code and type of fault.
P=permanent fault, I=intermittent fault.
If the fault is permanent:
Proceed to point 3.
If the fault is intermittent:
Proceed to point 2.

2 The fault is intermittent: Try to expose the fault when taking each reading during fault tracing. Manipulate connectors and leads as well as turning the steering wheel while taking measurements.

Important
If no fault can be demonstrated while taking measurements, change the contact roller. The contact roller is the most common cause of intermittent faults.

Proceed to point 3.

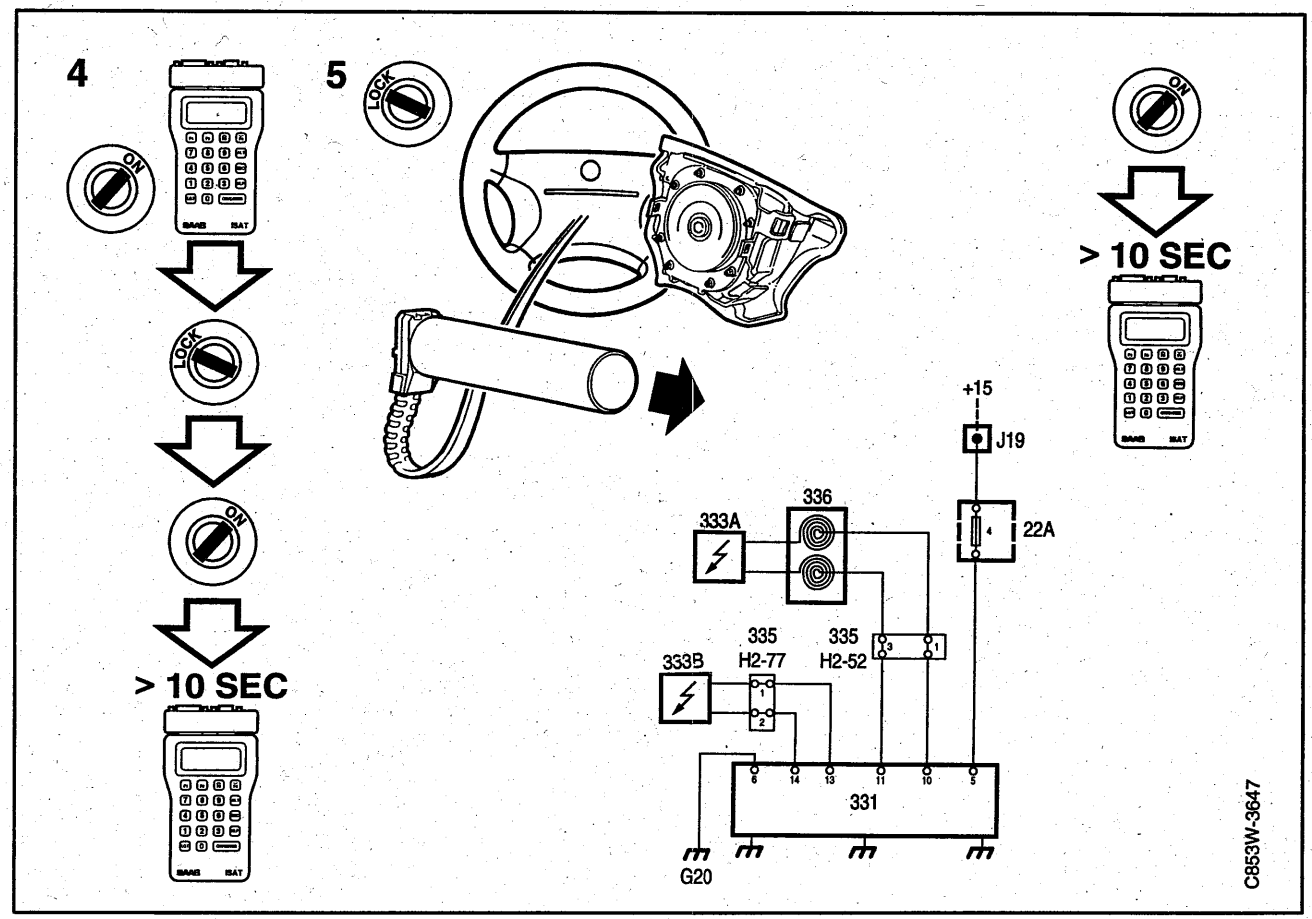
3 Switch off the ignition and disconnect the battery negative cable. Unscrew the steering wheel airbag and unplug the connector on the back of the airbag. Plug in reference resistor 84 71 153 to the connector.

On cars with a passenger airbag.

a. Remove the lower cover plate and unplug connector H2–77 to the passenger airbag.
b. Connect reference resistor 84 71 153 to pin connector H2–77 using cable assembly 86 11 378.

Proceed to point 4.

Diagnostic trouble code B2332 / Diagnostic trouble code B2337 (contd.)

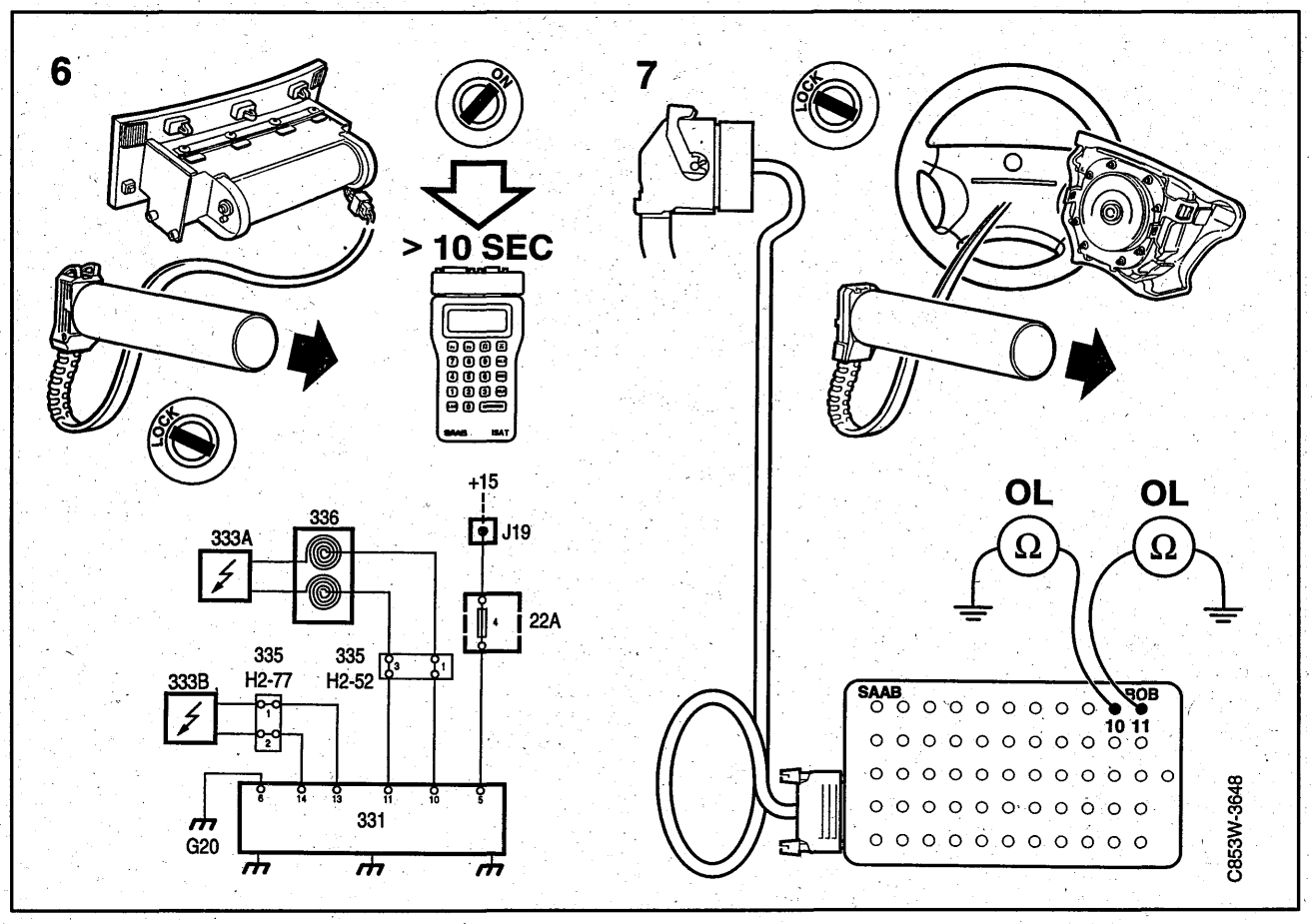


4 Reconnect the negative battery lead and switch on the ignition. Erase diagnostic trouble code. Switch off the ignition and switch it on again, wait for at least 10 seconds with the ignition on.
Check to see if the diagnostic trouble code returns.
If the diagnostic trouble code returns:
Proceed to point 7.
If the diagnostic trouble code does not return:
The fault is in the steering wheel airbag or the passenger airbag (if fitted). Conduct extra tests as described in point 5.

5 Switch off the ignition and disconnect the negative lead from the battery. Remove the reference resistor from **the steering wheel airbag** connector and connect the steering wheel airbag.

Refit the negative lead to the battery and switch on the ignition. Wait for at least 10 seconds with the ignition on.
Check to see if the diagnostic trouble code returns.
If the diagnostic trouble code returns:
Switch off the ignition, remove the negative lead from the battery and change the steering wheel airbag.
Then proceed to point 11.
If the diagnostic trouble code does not return:
If the car is fitted with an airbag on the passenger side, do an extra test as described in point 6.
If the car has no passenger airbag, the fault is intermittent. Return to point 2.

Diagnostic trouble code B2332 / Diagnostic trouble code B2337 (contd.)



6 Switch off the ignition and disconnect the negative lead from the battery. Reconnect the reference resistor to the steering wheel airbag connector.

Remove cable assembly 86 11 378 complete with reference resistor from the **passenger airbag** connector and plug in the passenger airbag.

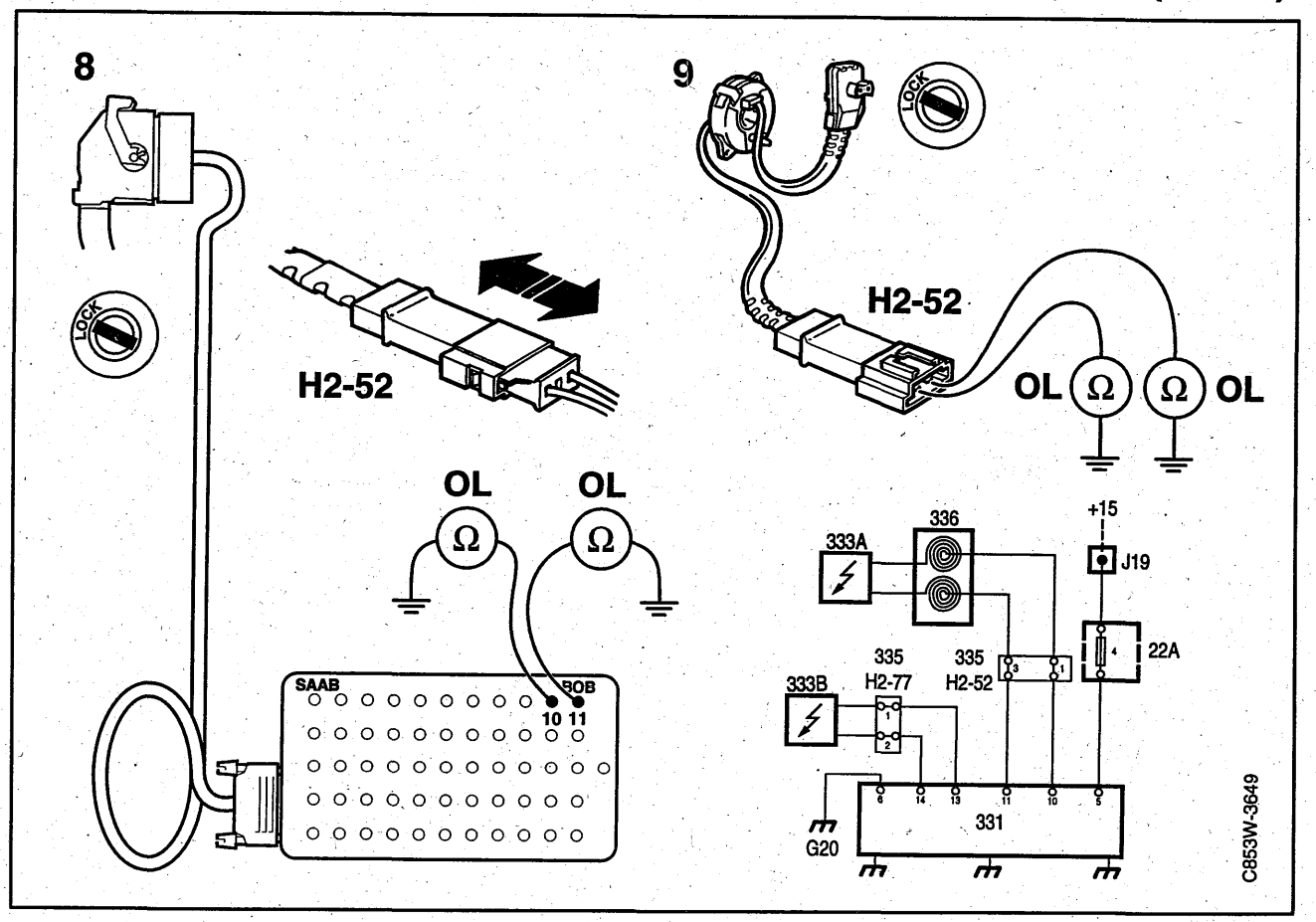
Refit the negative lead to the battery and switch on the ignition. Wait for at least 10 seconds with the ignition on.
Check to see if the diagnostic trouble code returns.
If the diagnostic trouble code returns:
Switch off the ignition, remove the negative lead from the battery and change the passenger airbag.
Then proceed to point 11.
If the diagnostic trouble code does not return:
The fault is intermittent. Return to point 2.

7 Switch off the ignition and remove the reference resistor from the steering wheel airbag connector.

Unplug the connector from the SRS control module and connect a BOB to the cable assembly.

Connect an ohmmeter between contact 10 on the BOB and a safe grounding point. Then connect the ohmmeter between contact 11 on the BOB and a safe grounding point.
In both measurements, the ohmmeter should show infinite resistance.
If the measurement is OK:
If the car is equipped with a passenger airbag, proceed to point10 .
If the car has no passenger airbag, proceed to point 11.
If the measurement is incorrect:
Proceed to point 8.

Diagnostic trouble code B2332 / Diagnostic trouble code B2337 (contd.)

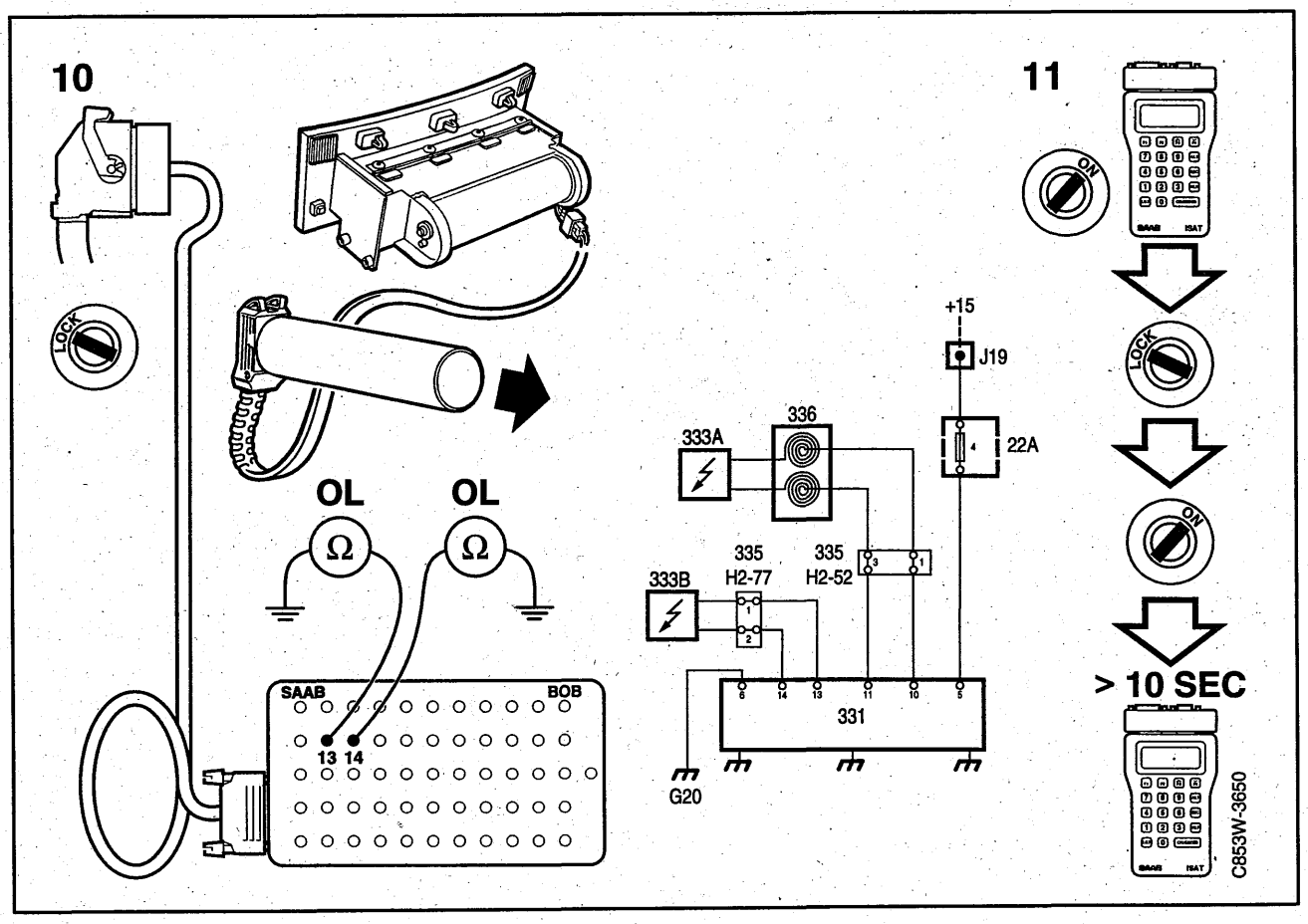


8 Switch off the ignition and unplug connector H2–52.
Connect an ohmmeter between contact 10 on the BOB and a safe grounding point. Then connect the ohmmeter between contact 11 on the BOB and a safe grounding point.
The ohmmeter should show infinite resistance.
If the measurement is OK:
Proceed to point 9.
If the measurement is incorrect:
If any of the measurements shows low resistance, there is a short to ground on the lead in question between the SRS connector and connector H2–52. Investigate the cause and change the cable assembly. Then proceed to point 11.

9 Connect an ohmmeter between pin 1 in connector H2–52 from the contact roller and a safe grounding point. Then connect the ohmmeter between pin 2 in the connector and a safe grounding point.
The ohmmeter should show infinite resistance.
If the measurement is OK:
If the car is fitted with a passenger airbag, proceed to point 10.

If the car has no passenger airbag, proceed to point 11.
If the measurement is incorrect:
If any of the measurements shows low resistance, the fault is in the contact roller. Change the contact roller and then proceed to point 11.

Diagnostic trouble code B2332 / Diagnostic trouble code B2337 (contd.)



10 Switch off the ignition and remove cable assembly 86 11 378 complete with reference resistor from passenger airbag connector H2–77.

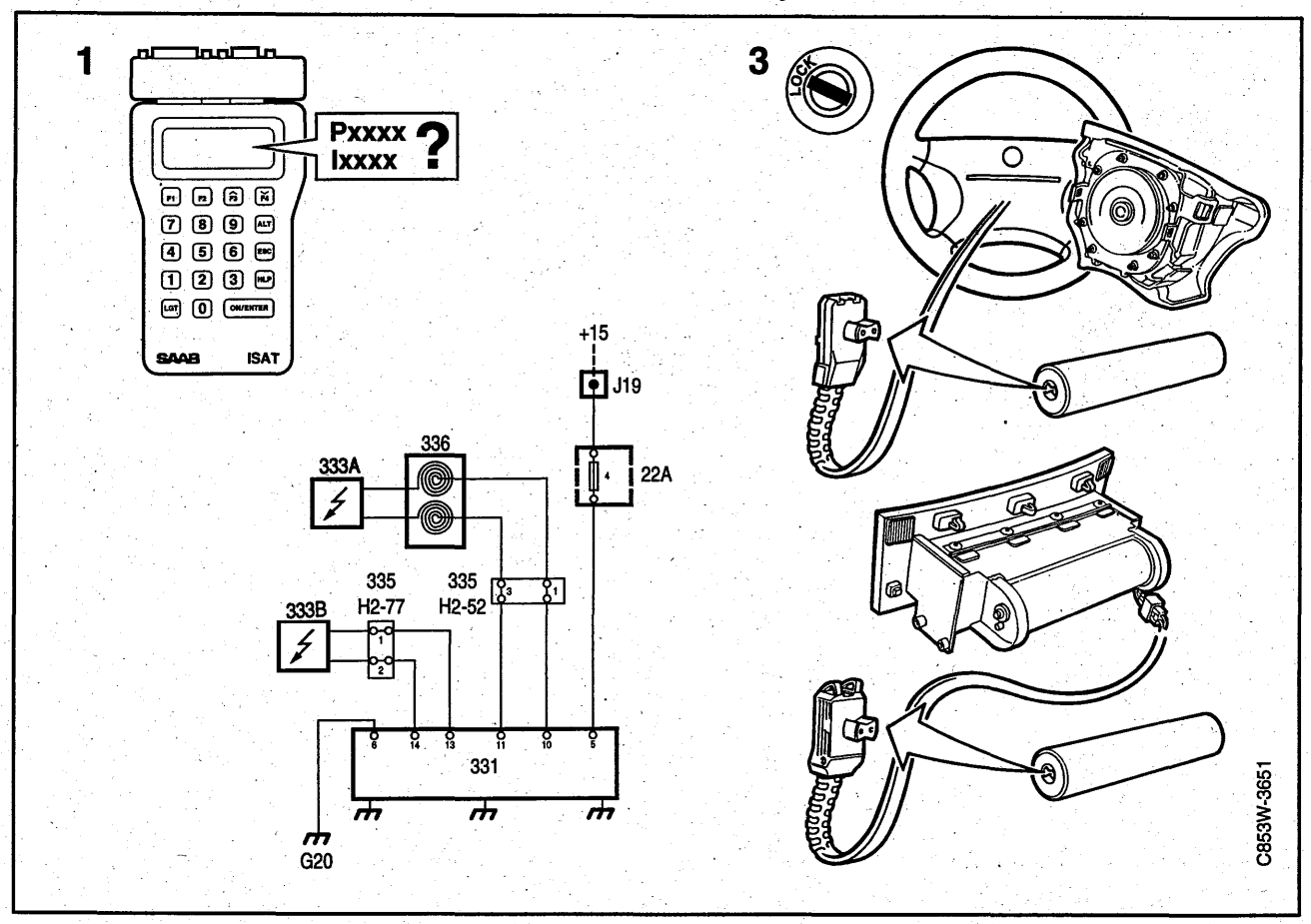
Connect an ohmmeter between contact 13 on the BOB and a safe grounding point. Then connect the ohmmeter between contact 14 on the BOB and a safe grounding point.
In both measurements, the ohmmeter should show infinite resistance.
If the measurement is OK:
Proceed to point 11.
If the measurement is incorrect:
If any of the measurements shows low resistance, there is a short to ground on the lead in question. Investigate the cause and change the cable assembly. Then proceed to point 11.

11 Switch off the ignition and disconnect the negative lead from the battery.
Remove reference resistors and plug in all connectors to their original components.
Reconnect the battery negative lead and switch on the ignition.

Erase diagnostic trouble code. Switch off the ignition and switch it back on again. Wait for at least 10 seconds with the ignition on.
Check to see if the diagnostic trouble code returns.
If the diagnostic trouble code returns:
Proceed to page 92.
If the diagnostic trouble code does not return:
Return the car to good order.

Diagnostic trouble code B2333 / Diagnostic trouble code B2338

Driver airbag / Passenger airbag, short to the positive battery terminal.



1 Connect ISAT. Note the diagnostic trouble code and the type of fault.
P=permanent fault, I= intermittent fault.
If the fault is permanent:
Proceed to point 3.
If the fault is intermittent:
Proceed to point 2.

2 The fault is intermittent: Try to expose the fault when taking each reading during fault tracing. Manipulate connectors and leads as well as turning the steering wheel while taking measurements.

Important
If no fault can be demonstrated while taking measurements, change the contact roller. The contact roller is the most common cause of intermittent faults.

Proceed to point 3.

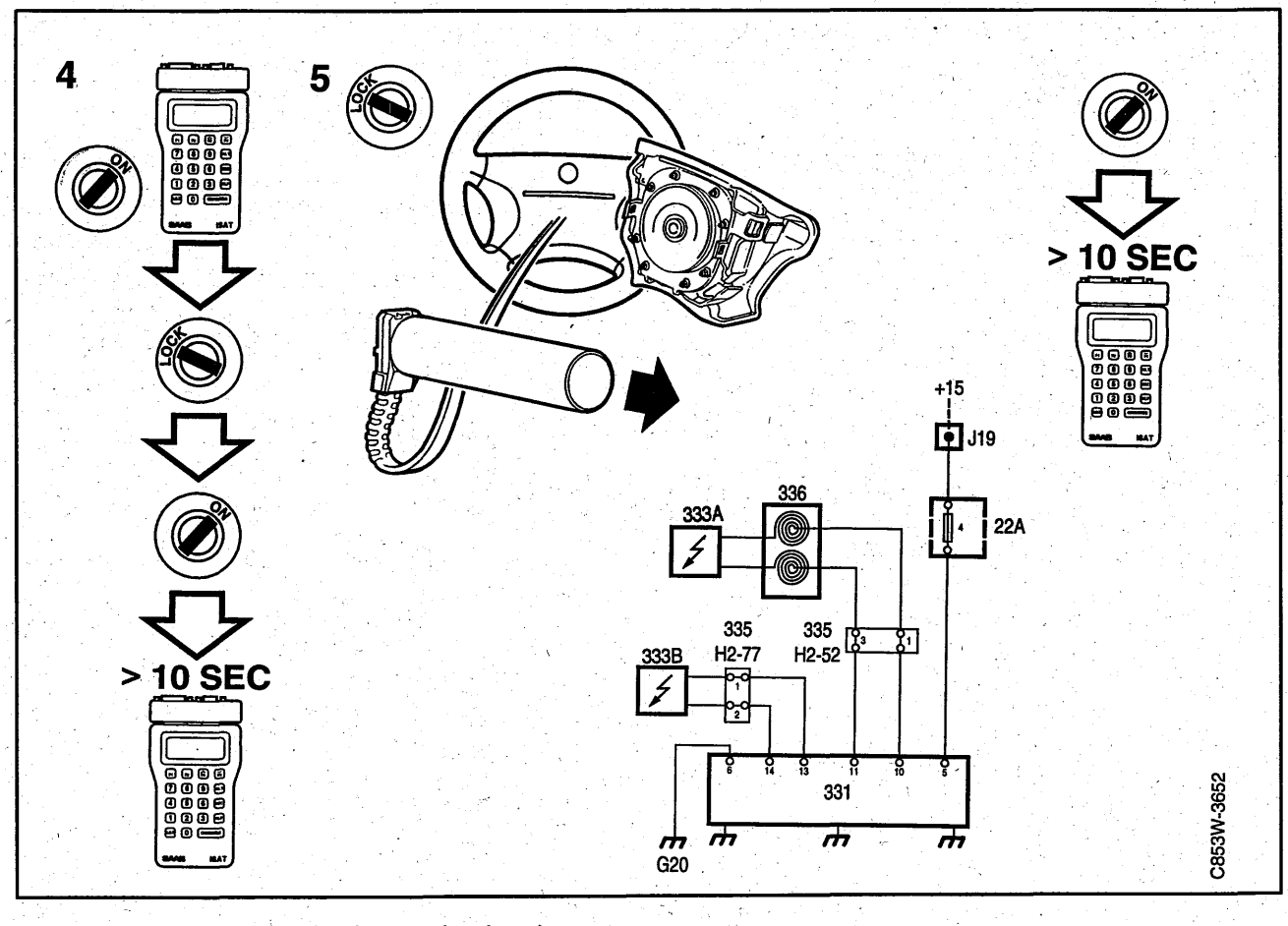
3 Switch off the ignition and disconnect the battery negative cable. Unscrew the steering wheel airbag and unplug the connector on the back of the airbag. Plug reference resistor 84 71 153 into the connector.

On cars with a passenger airbag.

a. Remove the lower cover plate and unplug connector H2–77 to the passenger airbag.
b. Connect reference resistor 84 71 153 to pin connector H2–77 using cable assembly 86 11 378.

Proceed to point 4.

Diagnostic trouble code B2333 / Diagnostic trouble code B2338 (contd.)

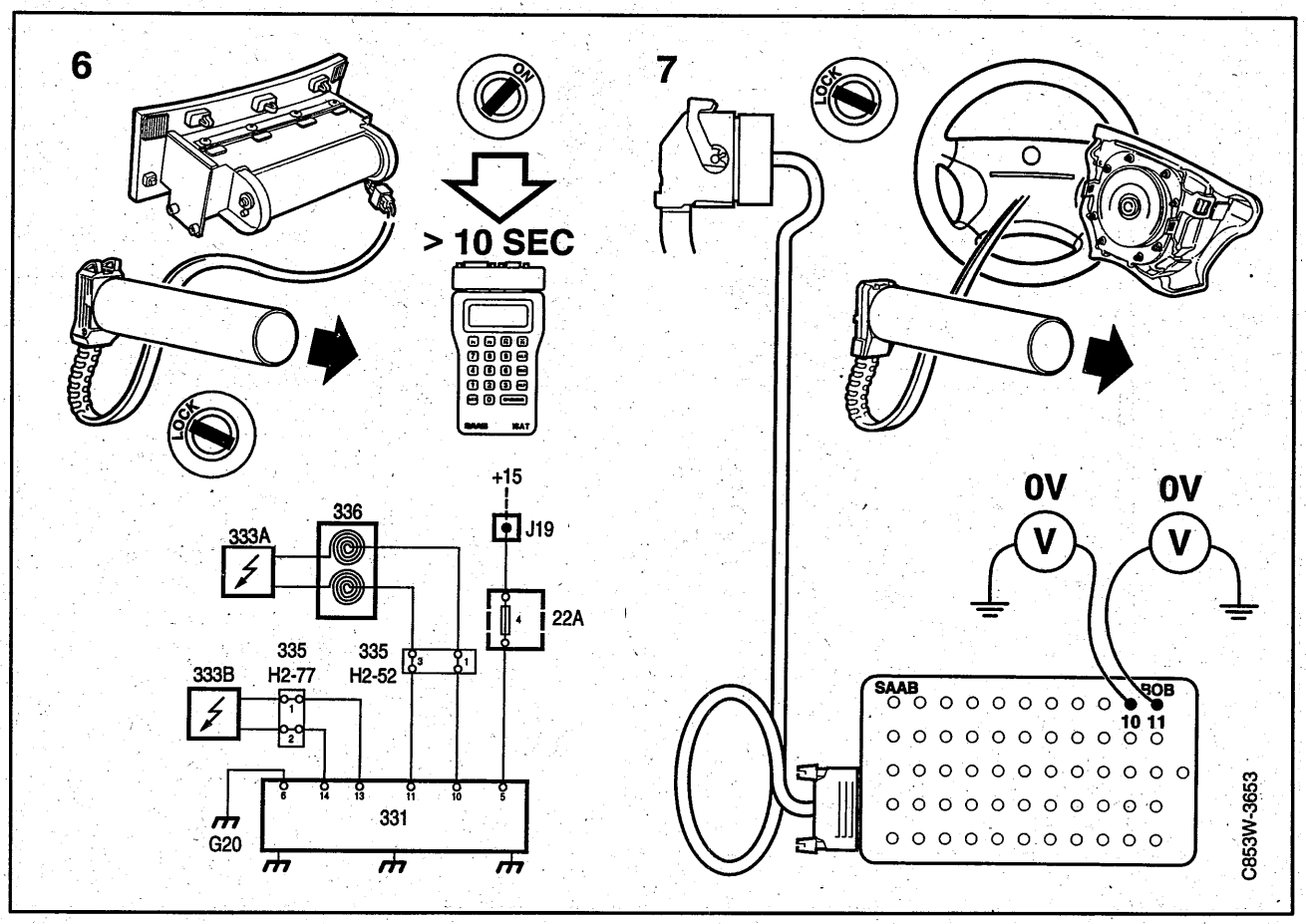


4 Reconnect the negative battery lead and switch on the ignition. Erase diagnostic trouble code. Switch off the ignition and switch it on again, wait for at least 10 seconds with the ignition on.
Check to see if the diagnostic trouble code returns.
If the diagnostic trouble code returns:
Proceed to point 7.
If the diagnostic trouble code does not return:
The fault is in the steering wheel airbag or in the passenger airbag (if fitted). Conduct extra tests as described in point 5.

5 Switch off the ignition and disconnect the negative lead from the battery. Remove the reference resistor from**the steering wheel airbag** connector and connect the steering wheel airbag.

Refit the negative lead to the battery and switch on the ignition. Wait for at least 10 seconds with the ignition on.
Check to see if the diagnostic trouble code returns.
If the diagnostic trouble code returns:
Switch off the ignition, remove the negative lead from the battery and change the steering wheel airbag.
Then proceed to point 11.
If the diagnostic trouble code does not return:
If the car is fitted with an airbag on the passenger side, do an extra test as described in point 6.
If the car has no passenger airbag, the fault is intermittent. Return to point 2.

Diagnostic trouble code B2333 / Diagnostic trouble code B2338 (contd.)



6 Switch off the ignition and disconnect the negative lead from the battery. Reconnect the reference resistor to the steering wheel airbag connector.

Remove cable assembly 86 11 378 complete with reference resistor from the **passenger airbag** connector and plug in the passenger airbag.

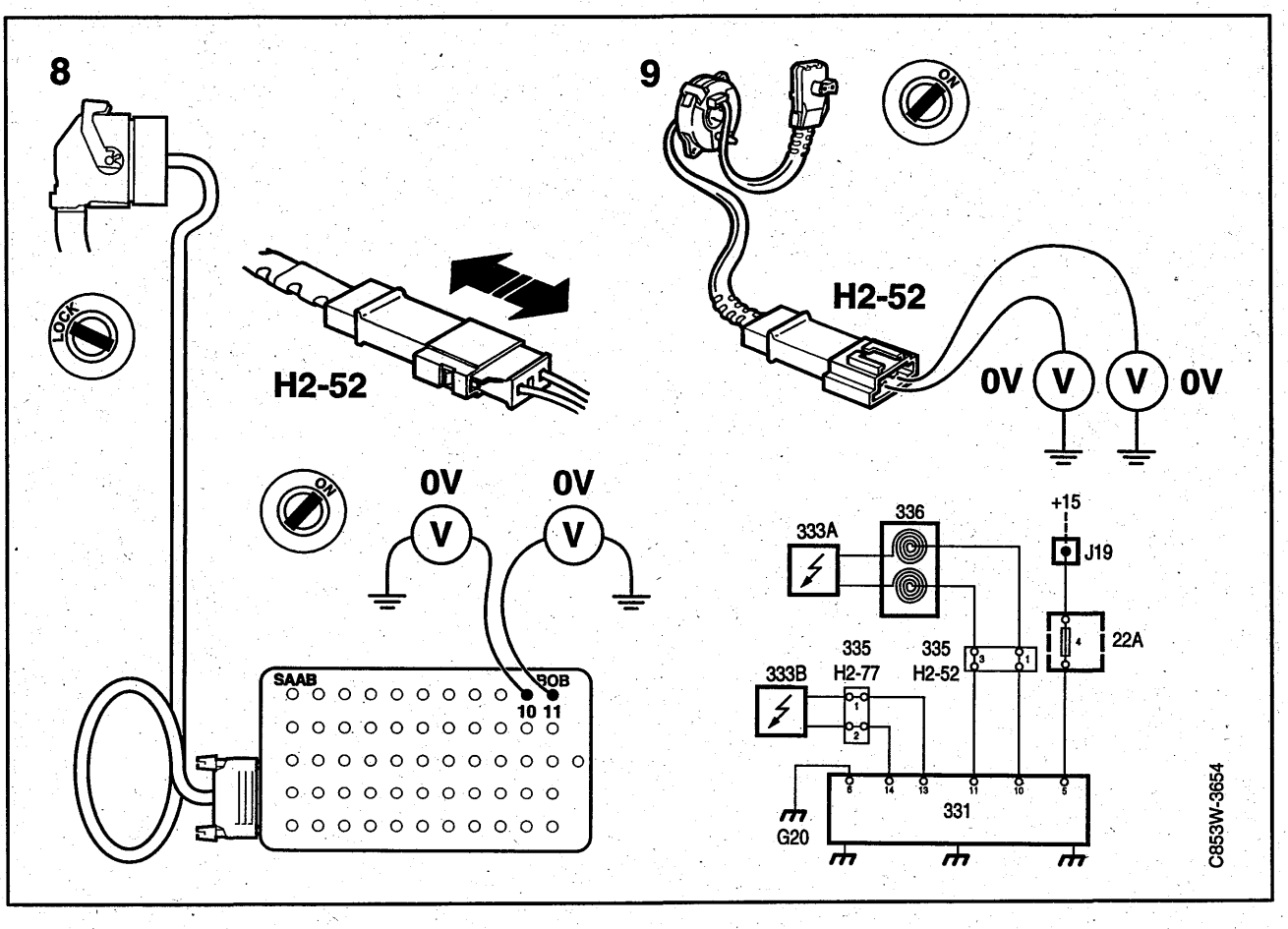
Refit the negative lead to the battery and switch on the ignition. Wait for at least 10 seconds with the ignition on.
Check to see if the diagnostic trouble code returns.
If the diagnostic trouble code returns:
Switch off the ignition, remove the negative lead from the battery and change the passenger airbag. Then proceed to point 11.
If the diagnostic trouble code does not return:
The fault is intermittent. Return to point 2.

7 Switch off the ignition and remove the reference resistor from the steering wheel airbag connector.

Unplug the connector from the SRS control module and connect a BOB to the cable assembly.

Switch on the ignition and connect a voltmeter between contact 10 on the BOB and a safe grounding point. Then connect the voltmeter between contact 11 and a safe grounding point.
In both measurements, the voltmeter should show 0 V.
If the measurement is OK:
If the car is fitted with a passenger airbag, proceed to point 10.
If the car has no passenger airbag. Proceed to point11.
If the measurement is incorrect:
Proceed to point 8.

Diagnostic trouble code B2333 / Diagnostic trouble code B2338 (contd.)

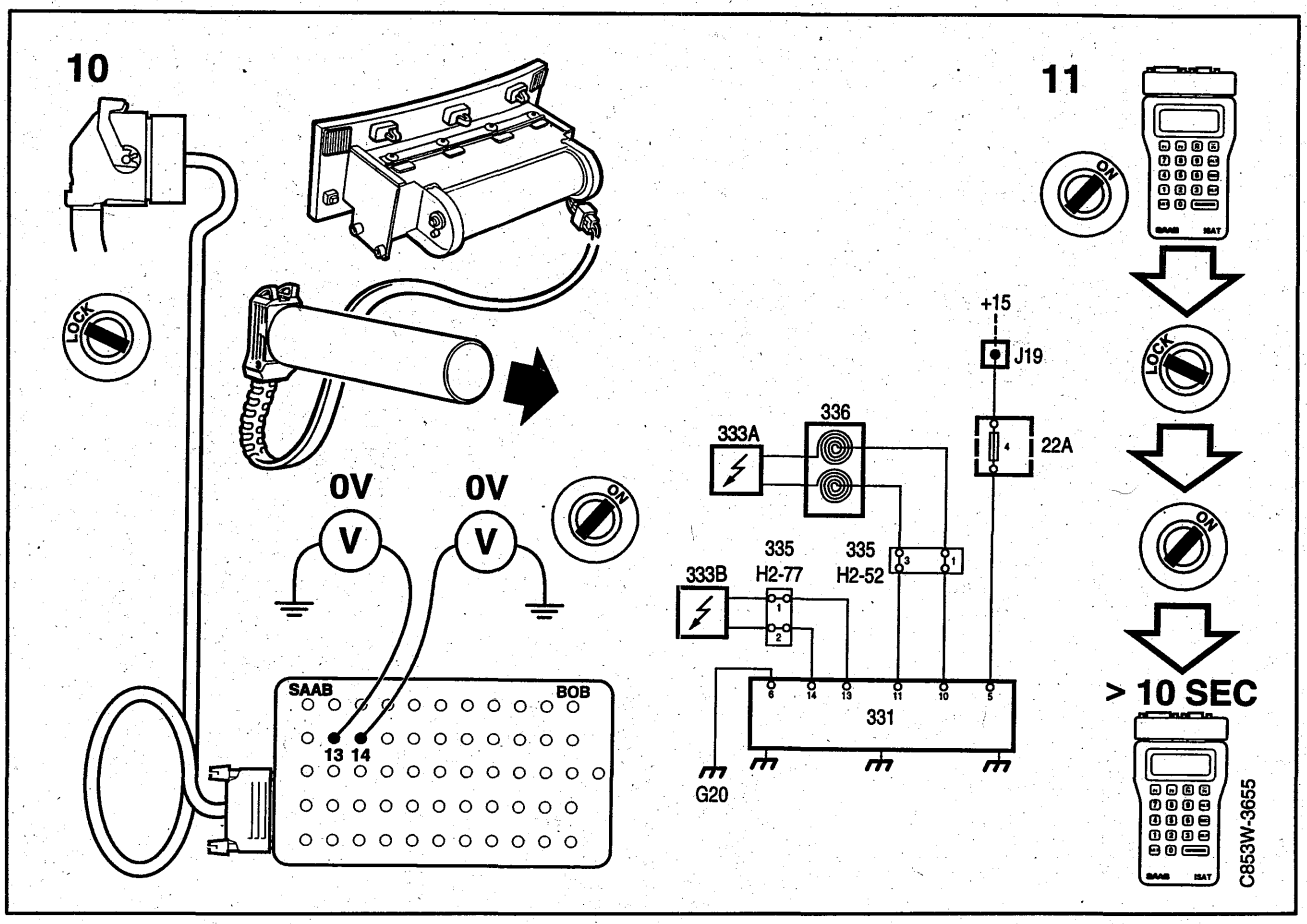


8 Switch off the ignition and unplug connector H2–52. Switch on the ignition.

Connect a voltmeter between contact 10 on the BOB and a safe grounding point. Then connect a voltmeter between contact 11 on the BOB and a safe grounding point.
The voltmeter should show 0 V.
If the measurement is OK:
Proceed to point 9.
If the measurement is incorrect:
If any of the measurements shows voltage, there is a short to the battery voltage on the lead in question between the SRS connector and connector H2–52. Investigate the cause and change the cable assembly. Then proceed to point 11.

9 Connect a voltmeter between pin 1 in connector H2–52 from the contact roller and a safe grounding point. Then connect a voltmeter between pin 2 in the connector and a safe grounding point.
The voltmeter should show 0 V.
If the measurement is OK:
If the car is fitted with a passenger airbag, proceed to point 10.
If the car has no passenger airbag. Proceed to point 11.
If the measurement is incorrect:
If any of the measurements shows voltage, the fault is in the contact roller. Change the contact roller and then proceed to point 11.

Diagnostic trouble code B2333 / Diagnostic trouble code B2338 (contd.)



10 Switch off the ignition and remove cable assembly 86 11 378 complete with reference resistor from passenger airbag connector H2–77. Switch on the ignition.

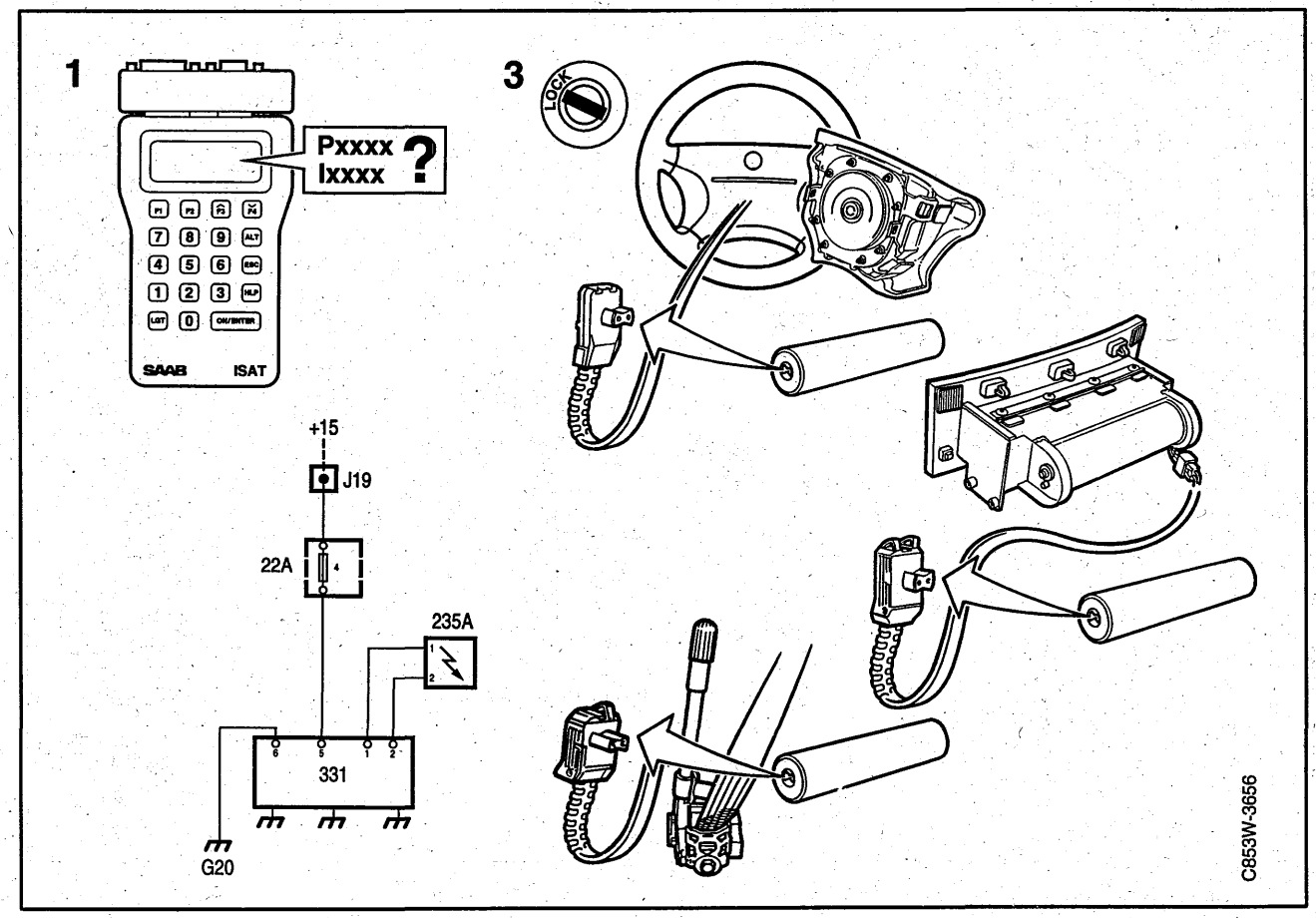
Connect a voltmeter between contact 13 on the BOB and a safe grounding point. Then connect a voltmeter between contact 14 on the BOB and a safe grounding point.
In both measurements, the voltmeter should show 0 V.
If the reading is OK:
Proceed to point 11.
If the measurement is incorrect:
If any of the measurements shows voltage, there is a short to the battery voltage on the lead in question. Investigate the cause and change the cable assembly. Then proceed to point 11.

11 Switch off the ignition and disconnect the negative lead from the battery.
Remove reference resistors and plug in all connectors to their original components.
Reconnect the negative lead to the battery and switch on the ignition.

Erase diagnostic trouble code. Switch off the ignition and switch it back on again. Wait for at least 10 seconds with the ignition on.
Check to see if the diagnostic trouble code returns.
If the diagnostic trouble code returns:
Proceed to page 92.
If the diagnostic trouble code does not return:
Return the car to good order.

Diagnostic trouble code B2441

Driver's belt tensioner, interruption.



1 Connect ISAT. Note the diagnostic trouble code and the type of fault.
P=permanent fault, I= intermittent fault.
If the fault is permanent:
Proceed to point 3.
If the fault is intermittent:
Proceed to point 2.

2 The fault is intermittent: Try to expose the fault when taking each reading during fault tracing. Manipulate the connectors and leads while taking the measurements.

Proceed to point 3.

3 Switch off the ignition and disconnect the negative lead from the battery. Undo the bolts securing the steering wheel airbag. Unplug the connector on the back of the airbag. Plug reference resistor 84 71 153 into the connector.

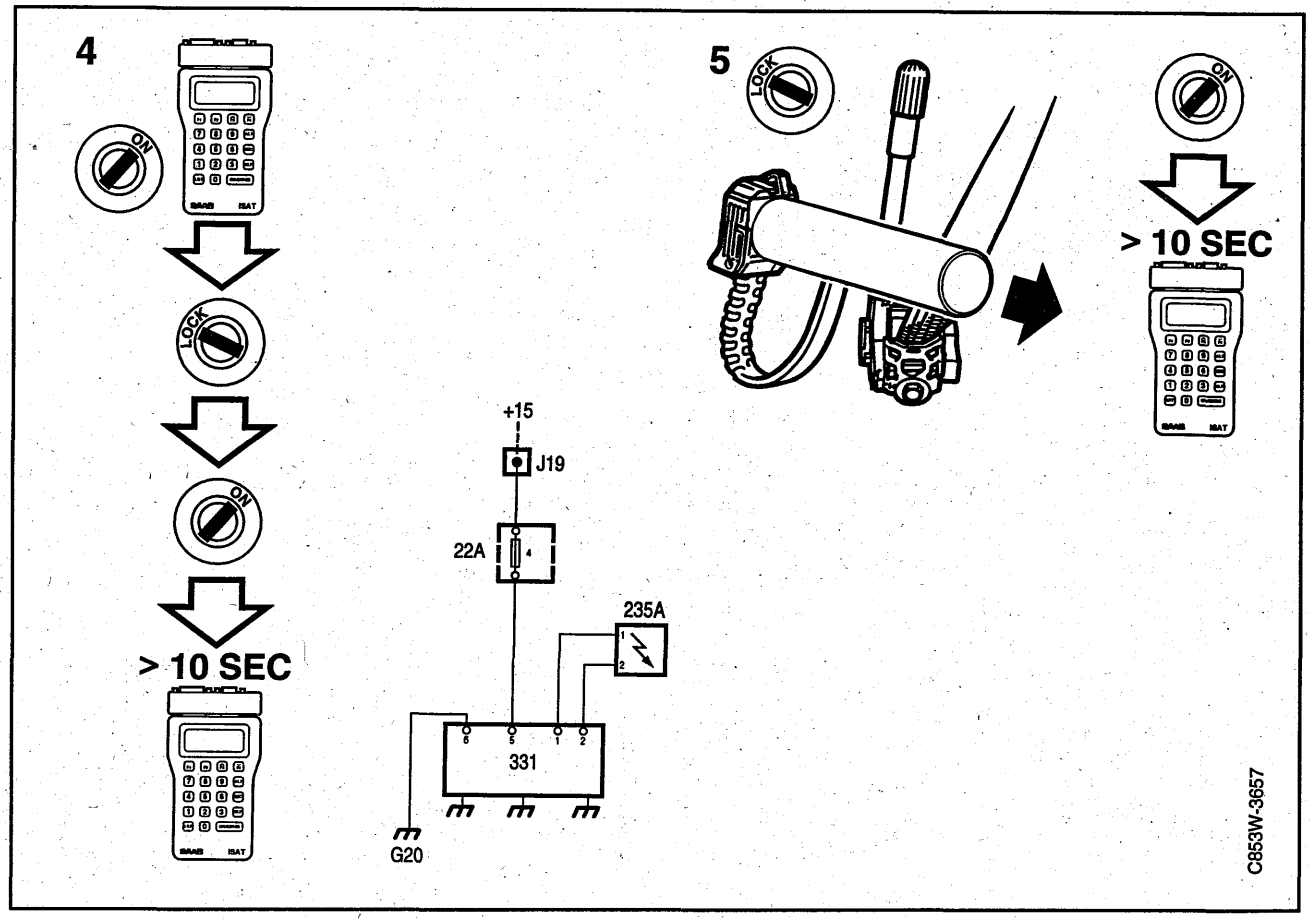
On cars with a passenger airbag.

a. Remove the lower cover plate and unplug connector H2–77 to the passenger airbag.

b. Connect reference resistor 84 71 153 to pin connector H2–77 using cable assembly 86 11 378.

Remove the trim from the B–pillar on the driver's side. Unplug the connector from the driver's belt tensioner. Connect reference resistor 84 71 153 to the connector.
Proceed to 4.

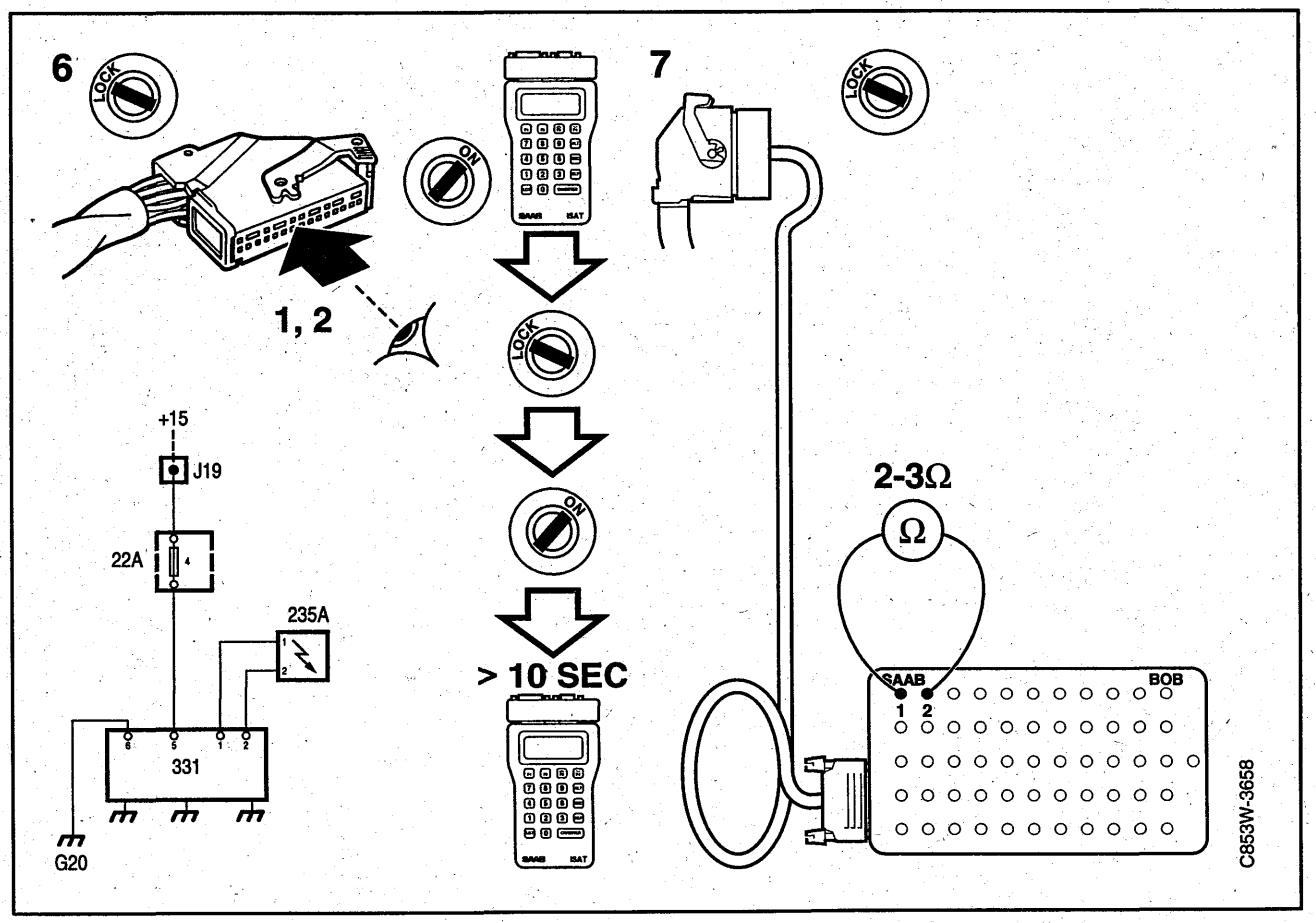
Diagnostic trouble code B2441 (contd.)



4 Reconnect the negative battery lead and switch on the ignition. Erase diagnostic trouble code. Switch off the ignition and switch it back on again. wait for at least 10 seconds with the ignition on.
Check to see if the diagnostic trouble code returns.
If the diagnostic trouble code returns:
Proceed to point 6.
If the diagnostic trouble code does not return:
The fault is in the belt tensioner. Do extra tests as described in point 5.

5 Switch off the ignition and disconnect the negative lead from the battery. Remove the reference resistor from the belt tensioner connector and connect the belt tensioners. Reconnect the negative battery lead and switch on the ignition. Wait for at least 10 seconds with the ignition on.
Check to see if the diagnostic trouble code returns.
If the diagnostic trouble code returns:
Switch off the ignition, remove the negative lead from the battery and change the belt tensioner. Then proceed to point 8.
If the diagnostic trouble code is gone:
The fault is intermittent. Return to point 2.

Diagnostic trouble code B2441 (contd.)



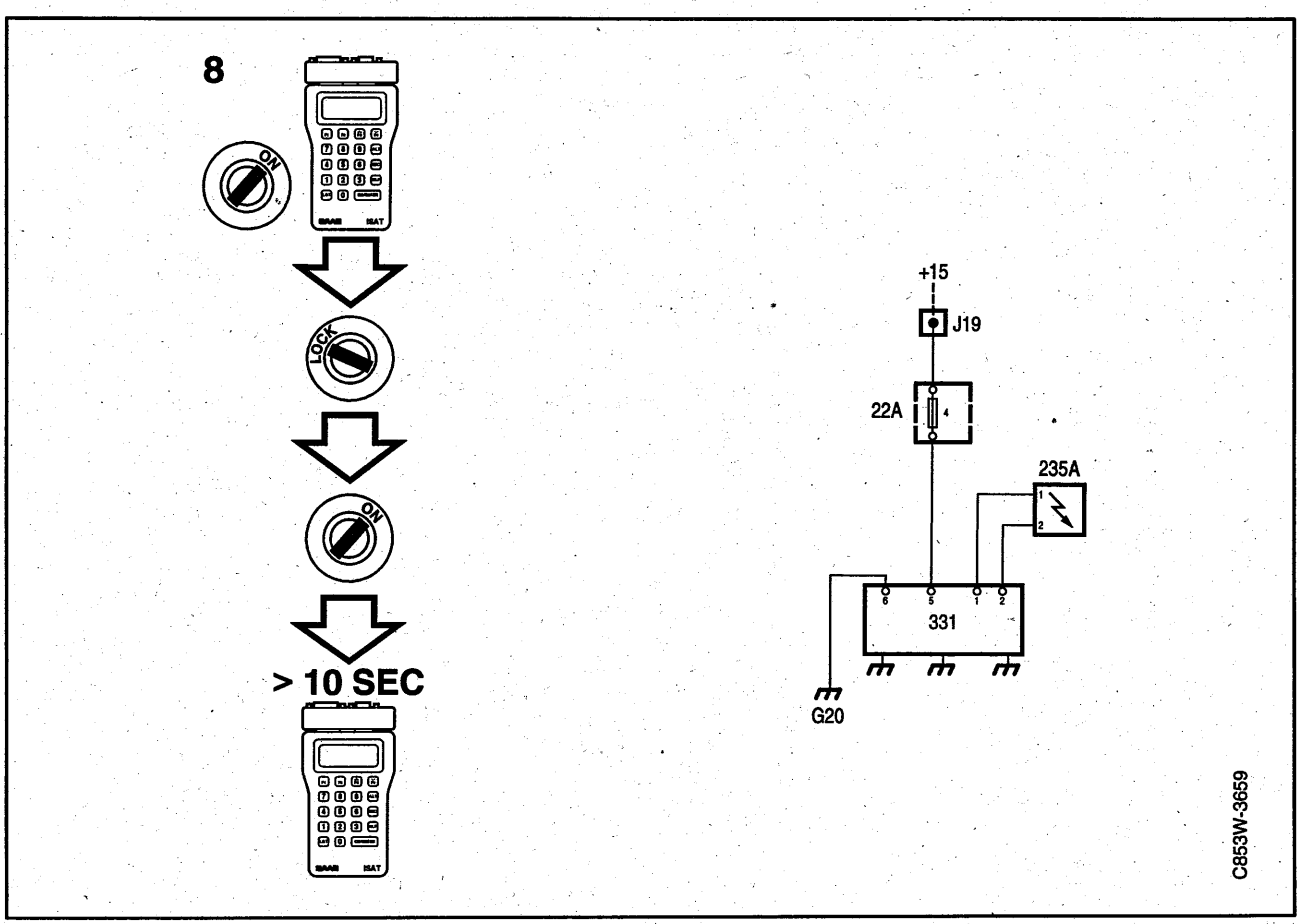
6 Switch off the ignition and remove the connector from the SRS control module. Check pins 1 and 2 for breaks and bad connections. Plug the connector into the SRS control module.

Switch on the ignition and erase the diagnostic trouble code. Switch off the ignition and switch it back on again. Wait for at least 10 seconds with the ignition on.
Check to see if the diagnostic trouble code returns.
If the diagnostic trouble code returns:
Proceed to point 7.
If the diagnostic trouble code does not return:
The fault was in the SRS connector. Proceed to point 8.

Important
If no fault is detected in the connector, the fault can be intermittent. Try to provoke any intermittent fault and see if the SRS lamp lights.

7 Switch off the ignition. Unplug the connector on the SRS control module and connect a BOB to the cable assembly. Connect an ohmmeter between contacts 1 and 2 on the BOB.
The ohmmeter should read 2–3 ohms.
If the reading is OK:
Proceed to point 8.
If the measurement is incorrect:
If the measurement shows high resistance, there is a break in the cable assembly between the SRS connector and the belt tensioner. Investigate the cause and change the cable assembly. Then proceed to point 8.

Diagnostic trouble code B2441 (contd.)

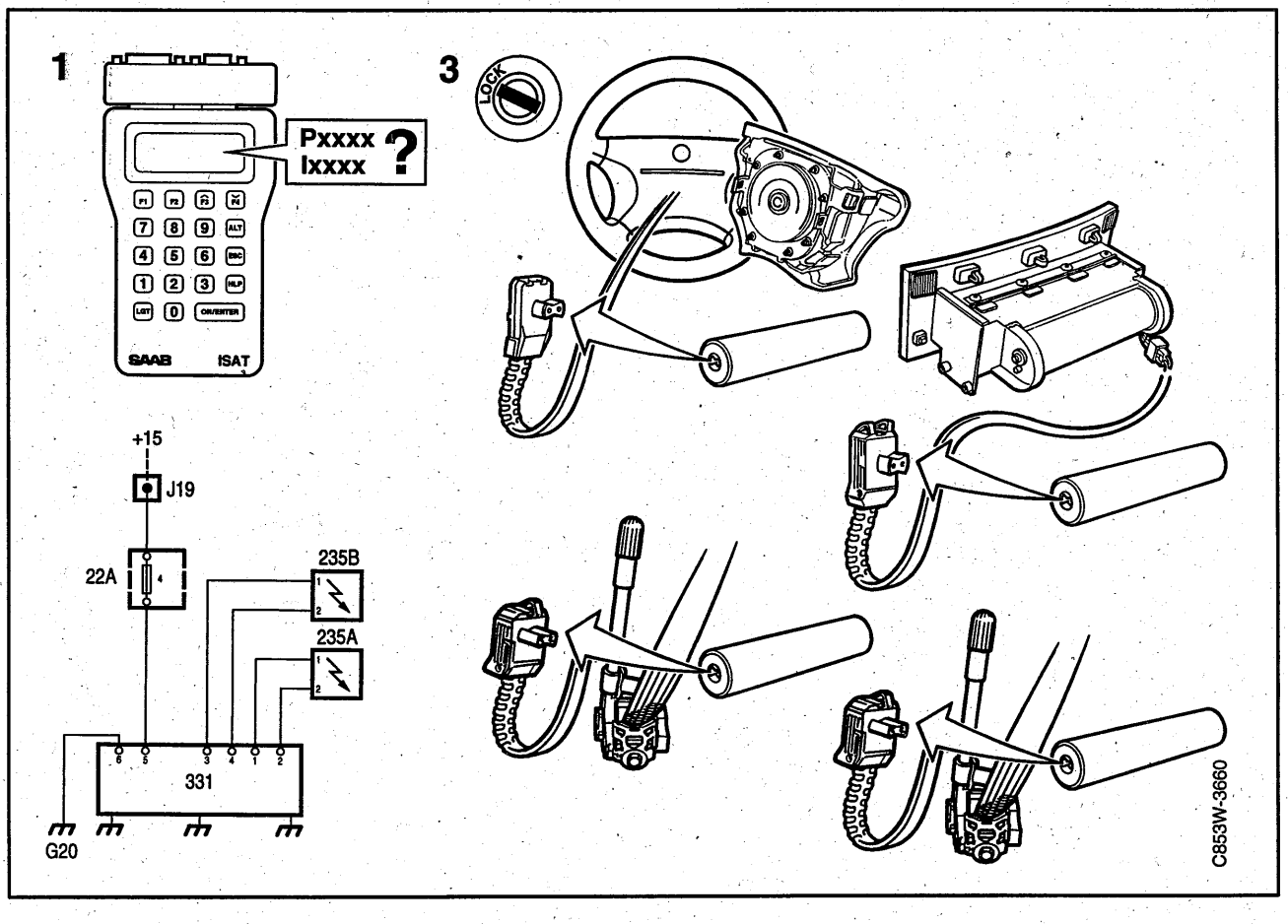


8 Switch off the ignition and disconnect the negative lead from the battery.
Remove reference resistors and plug in all connectors to their original components.
Reconnect the battery negative lead and switch on the ignition.

Erase diagnostic trouble code. Switch off the ignition and switch it back on again. Wait for at least 10 seconds with the ignition on.
Check to see if the diagnostic trouble code returns.
If the diagnostic trouble code returns:
Proceed to page 92.
If the diagnostic trouble code does not return:
Return the car to good order.

Diagnostic trouble code B2442 / Diagnostic trouble code B2447

Driver belt tensioner / passenger belt tensioner, short to ground



1 Connect ISAT. Note the diagnostic trouble code and the type of fault.
P=permanent fault, I= intermittent fault.
If the fault is permanent:
Proceed to point 3.
If the fault is intermittent:
Proceed to point 2.

2 The fault is intermittent: Try to expose the fault when taking each reading during fault tracing. Manipulate the connectors and leads while taking the measurements.

Proceed to point 3.

3 Switch off the ignition and disconnect the negative lead from the battery. Undo the screws securing the steering wheel airbag. Unplug the connector on the back of the airbag. Plug reference resistor 84 71 153 into the connector.

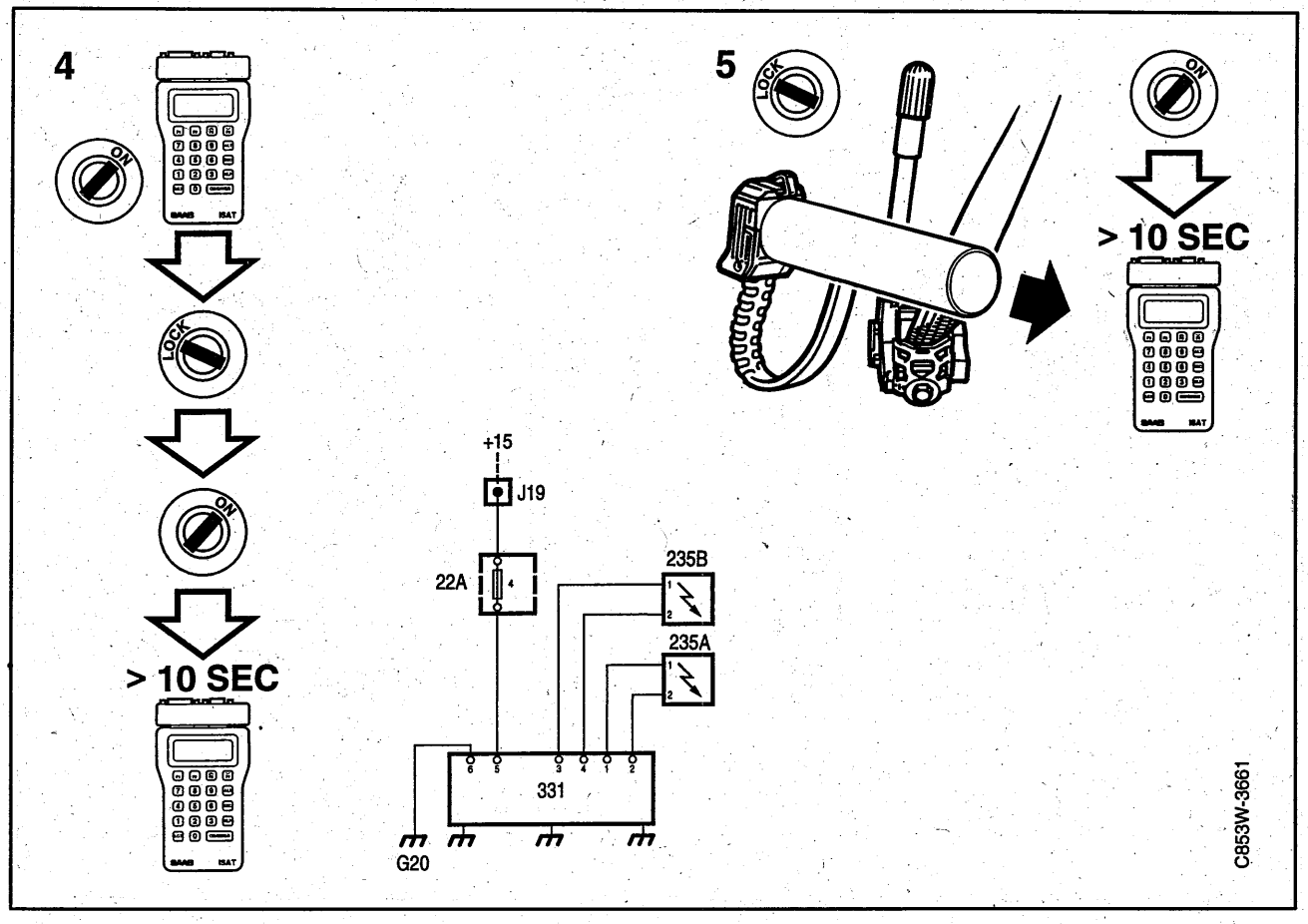
On cars with a passenger airbag.

a. Remove the lower cover plate and unplug connector H2–77 to the passenger airbag.

b. Connect reference resistor 84 71 153 to pin connector H2–77 using cable assembly 86 11 378.

Remove the trim from the B–pillars. Unplug the connectors on the belt tensioners. Connect reference resistor 84 71 153 to the connector.
Proceed to point 4.

Diagnostic trouble code B2442 / Diagnostic trouble code B2447 (contd.)

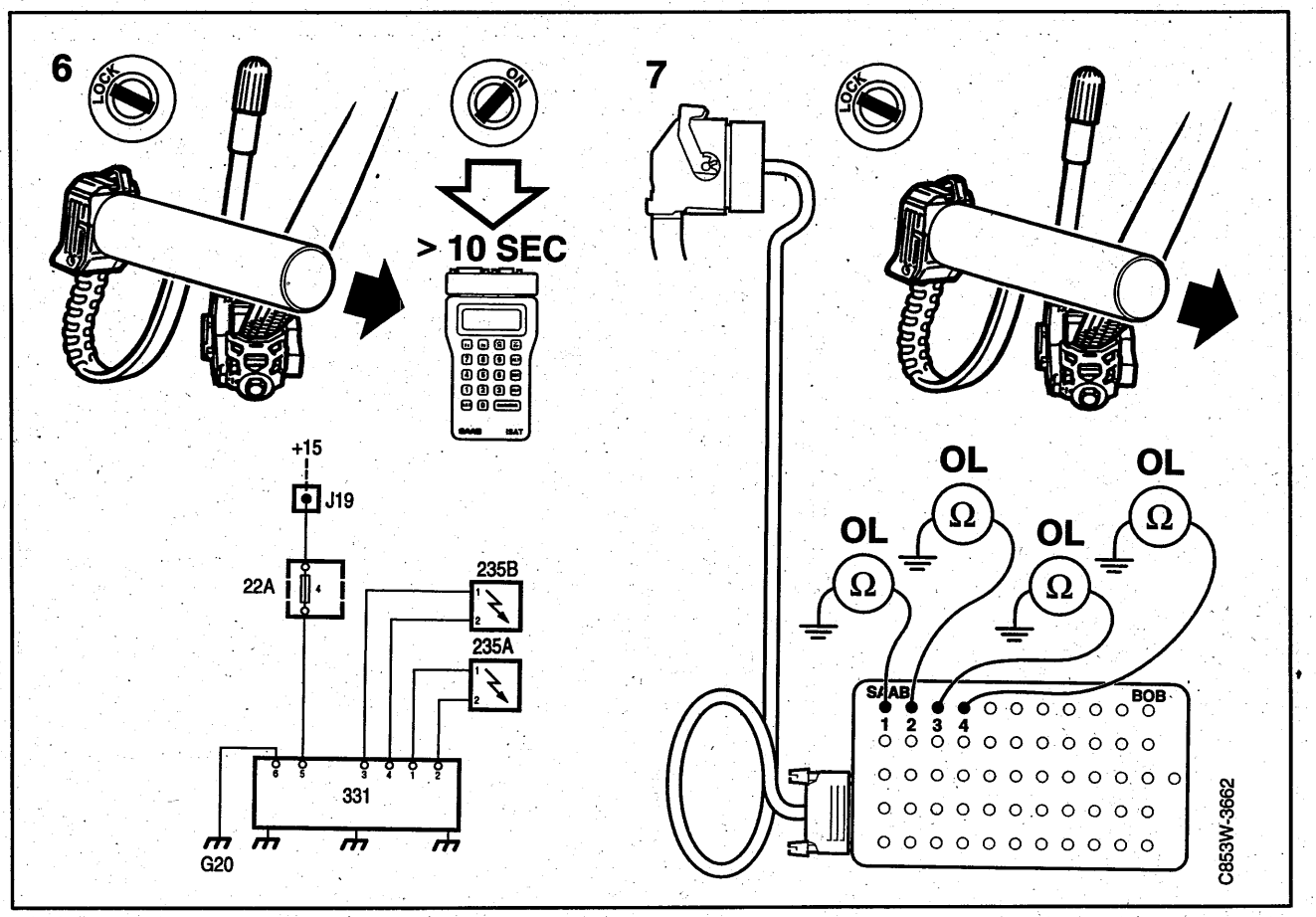


4 Reconnect the negative battery lead and switch on the ignition. Erase diagnostic trouble code. Switch off the ignition and switch it back on again. wait for at least 10 seconds with the ignition on.
Check to see if the diagnostic trouble code returns.
If the diagnostic trouble code returns:
Proceed to point 7.
If the diagnostic trouble code does not return:
The fault is in the driver or passenger belt tensioner. Conduct extra tests as described in point 5.

5 Switch off the ignition and disconnect the negative lead from the battery. Remove the reference resistor from the belt tensioner connector on the **driver side** and connect the belt tensioner.

Refit the negative lead to the battery and switch on the ignition. Wait for at least 10 seconds with the ignition on.
Check to see if the diagnostic trouble code returns.
If the diagnostic trouble code returns:
Switch off the ignition, remove the negative battery lead and change the driver belt tensioner. Then proceed to point 8.
If the diagnostic trouble code does not return:
The fault is in the belt tensioner on the passenger side. Conduct extra tests as described in point 6.

Diagnostic trouble code B2442 / Diagnostic trouble code B2447 (contd.)



6 Switch off the ignition and disconnect the negative lead from the battery. Refit the reference resistor on the driver belt tensioner connector.

Remove the reference resistor from the belt tensioner connector on the **passenger side** and reconnect the belt tensioner.

Refit the negative lead to the battery and switch on the ignition. Wait for at least 10 seconds with the ignition on.
Check to see if the diagnostic trouble code returns.
If the diagnostic trouble code returns:
Switch off the ignition, remove the negative lead from the battery and change the passenger belt tensioner. Then proceed to point 8.
If the diagnostic trouble code does not return:
The fault is intermittent. Return to point 2.

7 Switch off the ignition and remove the refe–rence resistors from the two belt tensioner connectors. Free the SRS control module. Unplug the SRS control module connector and plug a BOB into the cable assembly.

First test the driver belt tensioner:

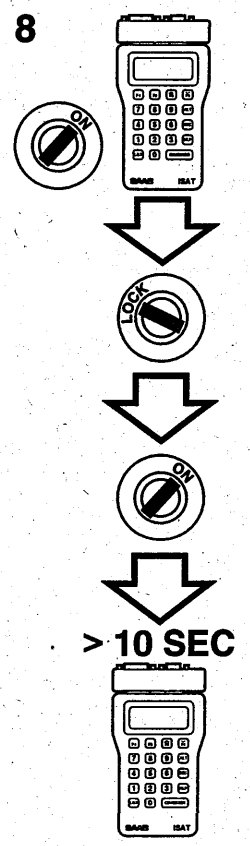
a. Connect an ohmmeter between contact 1 on the BOB and a safe grounding point. Then connect the ohmmeter between contact 2 on the BOB and a safe grounding point.

Then measure the passenger belt tensioner.

b. Connect the ohmmeter between contact 3 on the BOB and a safe grounding point. Then connect the ohmmeter between contact 4 on the BOB and a safe grounding point.

In all four measurements, the ohmmeter should show infinite resistance.
If the reading is OK:
Proceed to point 8.
If the measurement is incorrect:
If any of the measurements shows a low resistance, there is a short to ground on the lead in question. Investigate the cause and change the cable assembly. Then proceed to point 8.

Diagnostic trouble code B2442 / Diagnostic trouble code B2447 (contd.)



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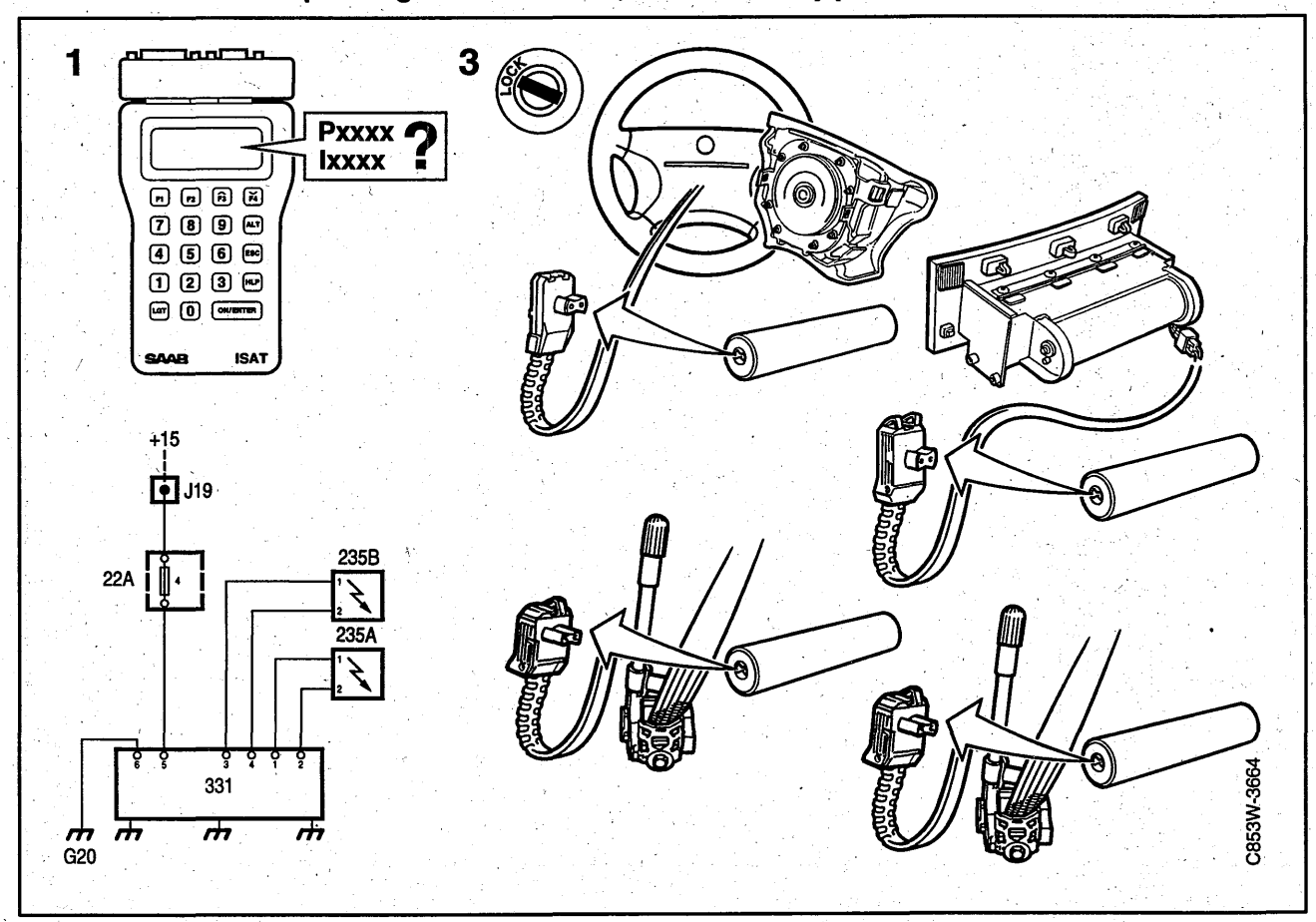
8 Switch off the ignition and disconnect the negative lead from the battery.
Remove reference resistors and plug in all connectors to their original components.
Reconnect the battery negative lead and switch on the ignition.

Erase diagnostic trouble code. Switch off the ignition and switch it back on again. Wait for at least 10 seconds with the ignition on.
Check to see if the diagnostic trouble code returns.
If the diagnostic trouble code returns:
Proceed to page 92.
If the diagnostic trouble code does not return:
Return the car to good order.

Diagnostic trouble code B2443 / Diagnostic trouble code B2448

Driver belt tensioner / passenger belt tensioner, short to battery positive terminal.



1 Connect ISAT. Note the diagnostic trouble code and the type of fault. P=permanent fault, I= intermittent fault.
If the fault is permanent:
Proceed to point 3.
If the fault is intermittent:
Proceed to point 2.

2 The fault is intermittent: Try to expose the fault when taking each reading during fault tracing. Manipulate the connectors and leads while taking the measurements.

Proceed to point 3.

3 Switch off the ignition and remove the negative lead from the battery. Undo the screws securing the steering wheel airbag. Unplug the connector on the back of the airbag. Plug reference resistor 84 71 153 into the connector.

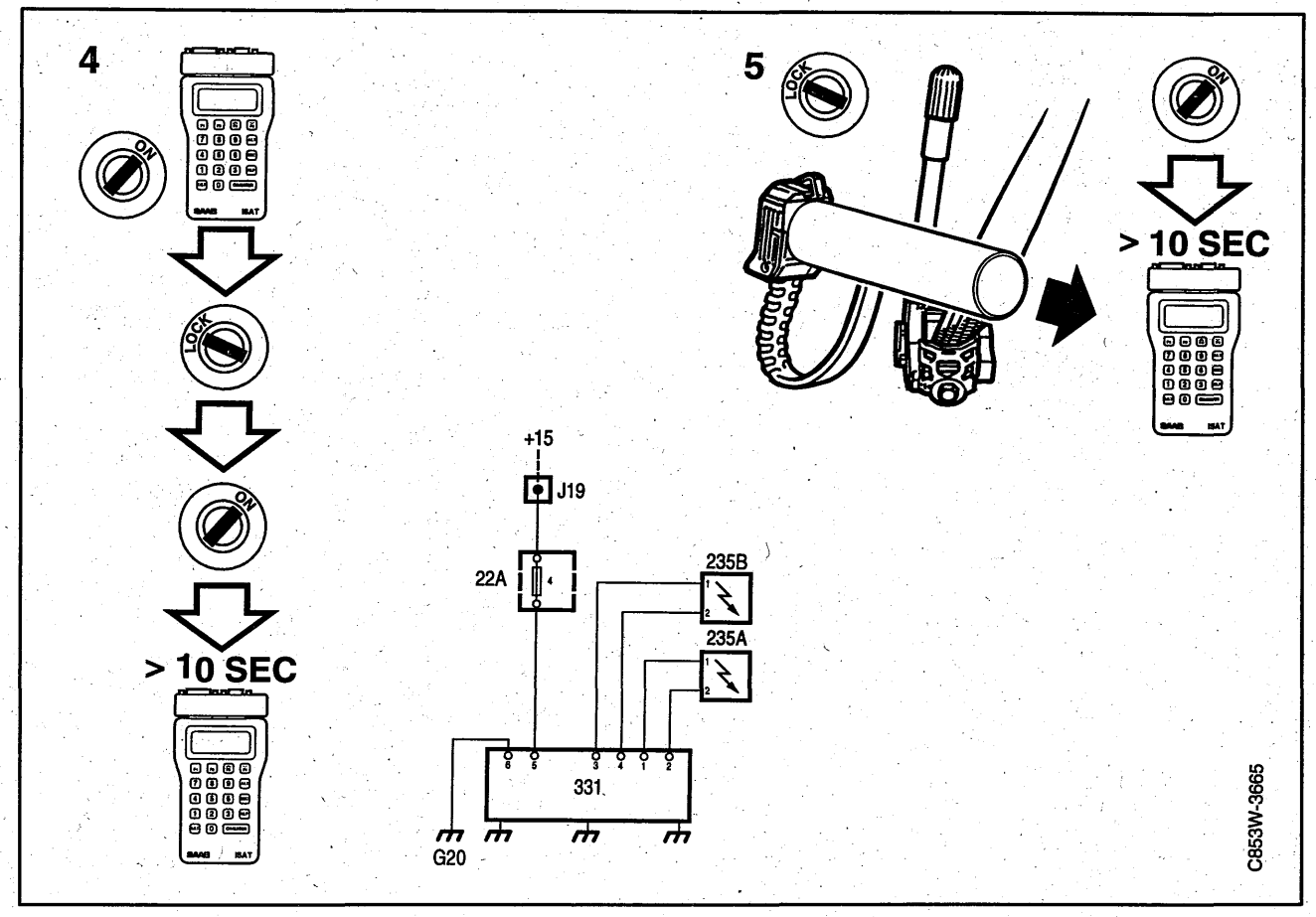
On cars with a passenger airbag.

a. Remove the lower cover plate and unplug connector H2–77 to the passenger airbag.

b. Connect reference resistor 84 71 153 to pin connector H2–77 using cable assembly 86 11 378.

Remove the trim from the B–pillars. Unplug the connectors on the belt tensioners. Connect reference resistor 84 71 153 to the connector. Proceed to point 4.

Diagnostic trouble code B2443 / Diagnostic trouble code B2448 (contd.)

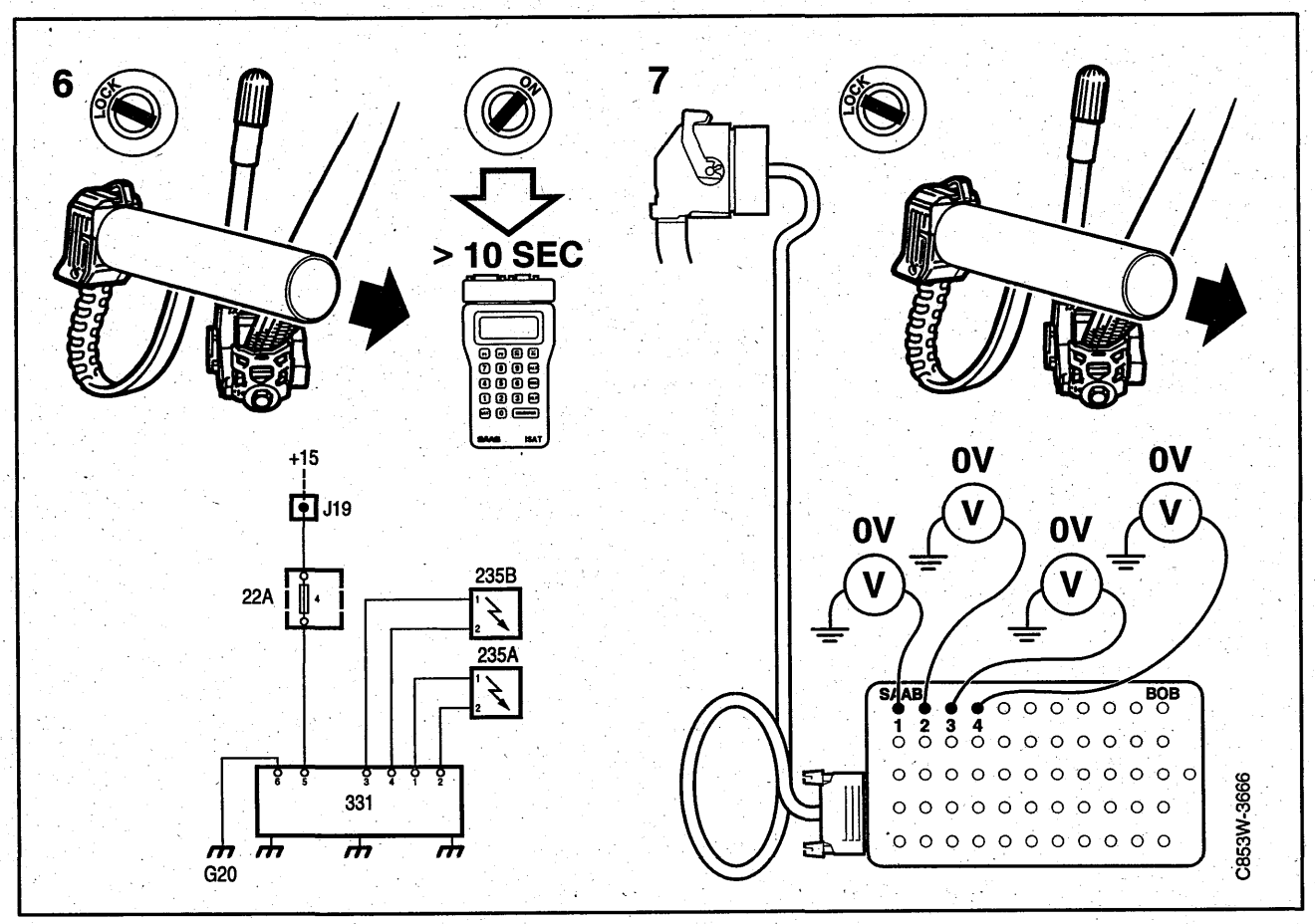


4 Reconnect the negative battery lead and switch on the ignition. Erase diagnostic trouble code. Switch off the ignition and switch it back on again. Wait for at least 10 seconds with the ignition on.
Check to see if the diagnostic trouble code returns.
If the diagnostic trouble code returns:
Proceed to point 7.
If the diagnostic trouble code does not return:
The fault is in the driver or passenger belt tensioner. Conduct extra tests as described in point 5.

5 Switch off the ignition and disconnect the negative lead from the battery. Remove the reference resistor from the belt tensioner connector on the **driver side** and reconnect the belt tensioner.

Refit the negative lead to the battery and switch on the ignition. Wait for at least 10 seconds with the ignition on.
Check to see if the diagnostic trouble code returns.
If the diagnostic trouble code returns:
Switch off the ignition, disconnect the negative lead from the battery and change the belt tensioner on the driver side.
Then proceed to point 8.
If the diagnostic trouble code does not return:
The fault is in the belt tensioner on the passenger side. Conduct extra tests as described in point 6.

Diagnostic trouble code B2443 / Diagnostic trouble code B2448 (contd.)



6 Switch off the ignition and disconnect the negative lead from the battery. Refit the reference resistor to the belt tensioner connector on the driver side.

Remove the reference resistor from the belt tensioner connector on the **passenger side** and reconnect the belt tensioner.
Reconnect the negative battery lead and switch on the ignition. Wait for at least 10 seconds with the ignition on.
Check to see if the diagnostic trouble code returns.
If the diagnostic trouble code returns:
Switch off the ignition, disconnect the negative lead from the battery and change the belt tensioner on the passenger side.
Then proceed to point 8.
If the diagnostic trouble code does not return:
The fault is intermittent. Return to point 2.

7 Switch off the ignition and remove the reference resistors from the two belt tensioner connectors. Free the SRS control module. Remove the connector from the SRS control module and connect a BOB to the cable assembly. Switch on the ignition.

First test the driver belt tensioner:

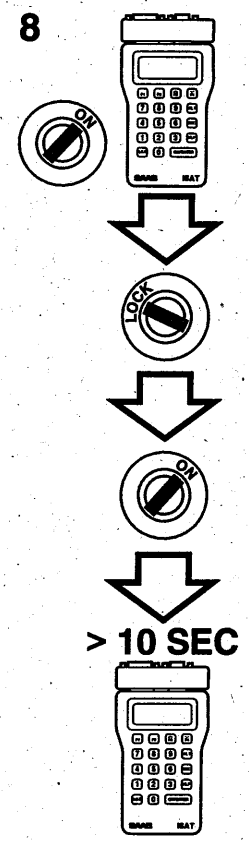
a. Connect a voltmeter between contact 1 on the BOB and a safe grounding point. Then connect the voltmeter between connector 2 on the BOB and a safe grounding point.

Then measure the passenger belt tensioner.

b. Connect the voltmeter between contact 3 on the BOB and a safe grounding point. Then connect the voltmeter between contact 4 on the BOB and a safe grounding point.

The voltmeter should show 0 V at all measurements.
If the reading is OK:
Proceed to point 8.
If the measurement is incorrect:
If any of the measurements shows voltage, there is a short to the battery voltage on the lead in question. Investigate the cause and change the cable assembly. Then proceed to point 8.

Diagnostic trouble code B2443 / Diagnostic trouble code B2448 (contd.)



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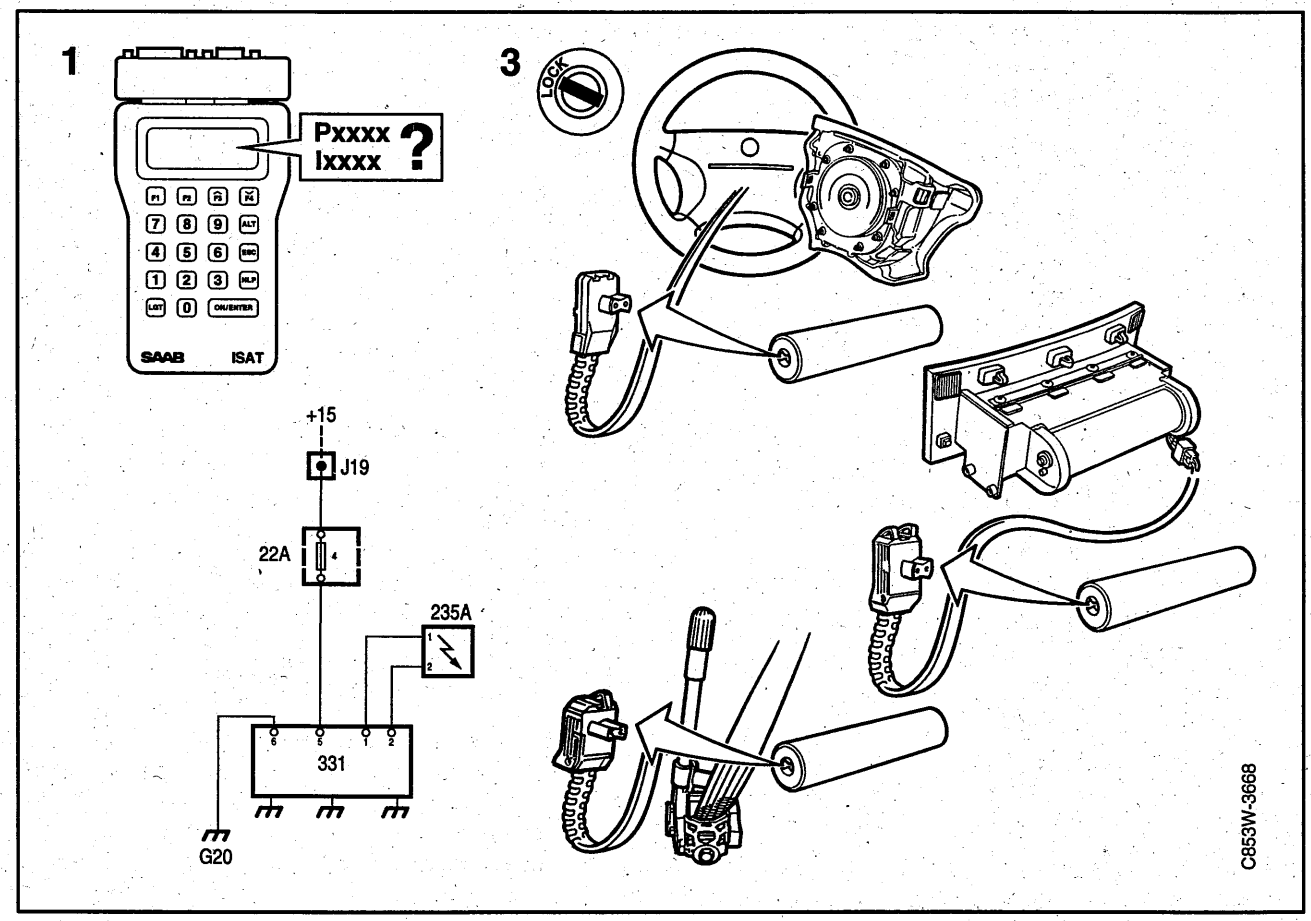
8 Switch off the ignition and disconnect the negative lead from the battery.
Remove reference resistors and plug in all connectors to their original components.
Reconnect the battery negative lead and switch on the ignition.

Erase diagnostic trouble code. Switch off the ignition and switch it back on again. Wait for at least 10 seconds with the ignition on.
Check to see if the diagnostic trouble code returns.
If the diagnostic trouble code returns:
Proceed to page 92.
If the diagnostic trouble code does not return:
Return the car to good order.

Diagnostic trouble code B2444

Driver belt tensioner, resistance too low.



1 Connect ISAT. Note the diagnostic trouble code and the type of fault. P=permanent fault, I= intermittent fault.
If the fault is permanent:
Proceed to point 3.
If the fault is intermittent:
Proceed to point 2.

2 The fault is intermittent: Try to expose the fault when taking each reading during fault tracing. Manipulate the connectors and cables and turn the steering wheel when taking measurements.

Proceed to point 3.

3 Switch off the ignition and disconnect the negative lead from the battery. Undo the screws securing the steering wheel airbag. Unplug the connector on the back of the airbag. Plug reference resistor 84 71 153 into the connector.

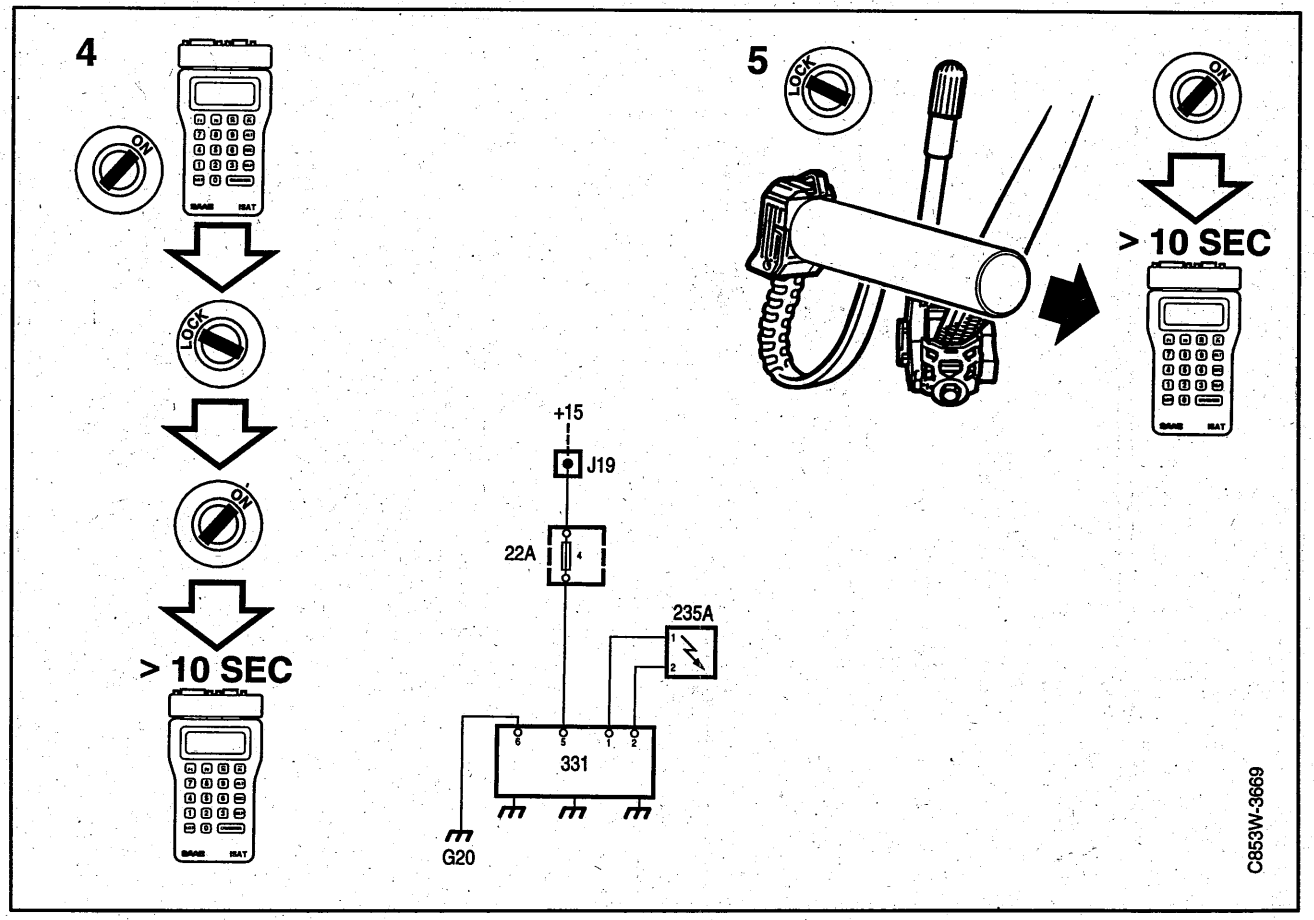
On cars with a passenger airbag.

a. Remove the lower cover plate and unplug connector H2–77 to the passenger airbag.

b. Connect reference resistor 84 71 153 to pin connector H2–77 using cable assembly 86 11 378.

Remove the trim from the B–pillar on the driver's side. Unplug the connector from the driver's belt tensioner. Connect reference resistor 84 71 153 to the connector.
Proceed to point 4.

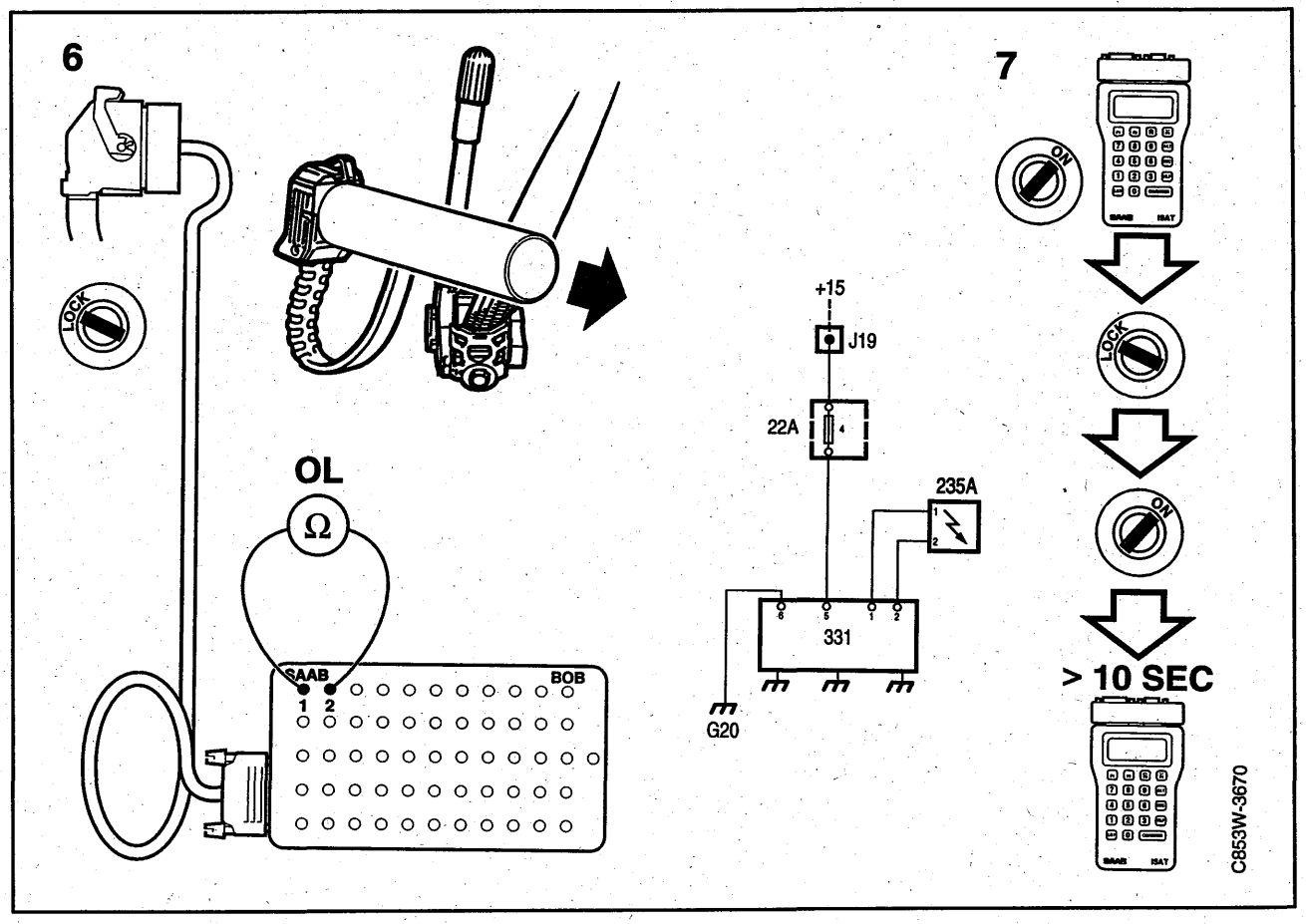
Diagnostic trouble code B2444 (contd.)



4 Reconnect the negative battery lead and switch on the ignition. Erase diagnostic trouble code. Switch off the ignition and switch it back on again. Wait for at least 10 seconds with the ignition on.
Check to see if the diagnostic trouble code returns.
If the diagnostic trouble code returns:
Proceed to point 6.
If the diagnostic trouble code does not return:
The fault is in the belt tensioner. Do extra tests as described in point 5.

5 Switch off the ignition and disconnect the negative lead from the battery. Remove the reference resistor from the belt tensioner connector and connect the belt tensioners. Reconnect the negative battery lead and switch on the ignition. Wait for at least 10 seconds with the ignition on.
Check to see if the diagnostic trouble code returns.
If the diagnostic trouble code returns:
Switch off the ignition, remove the negative lead from the battery and change the belt tensioner. Then proceed to point 7.
If the diagnostic trouble code is gone:
The fault is intermittent. Return to point 2.

Diagnostic trouble code B2444 (contd.)



6 Switch off the ignition and disconnect the reference resistor from the belt tensioner connector.

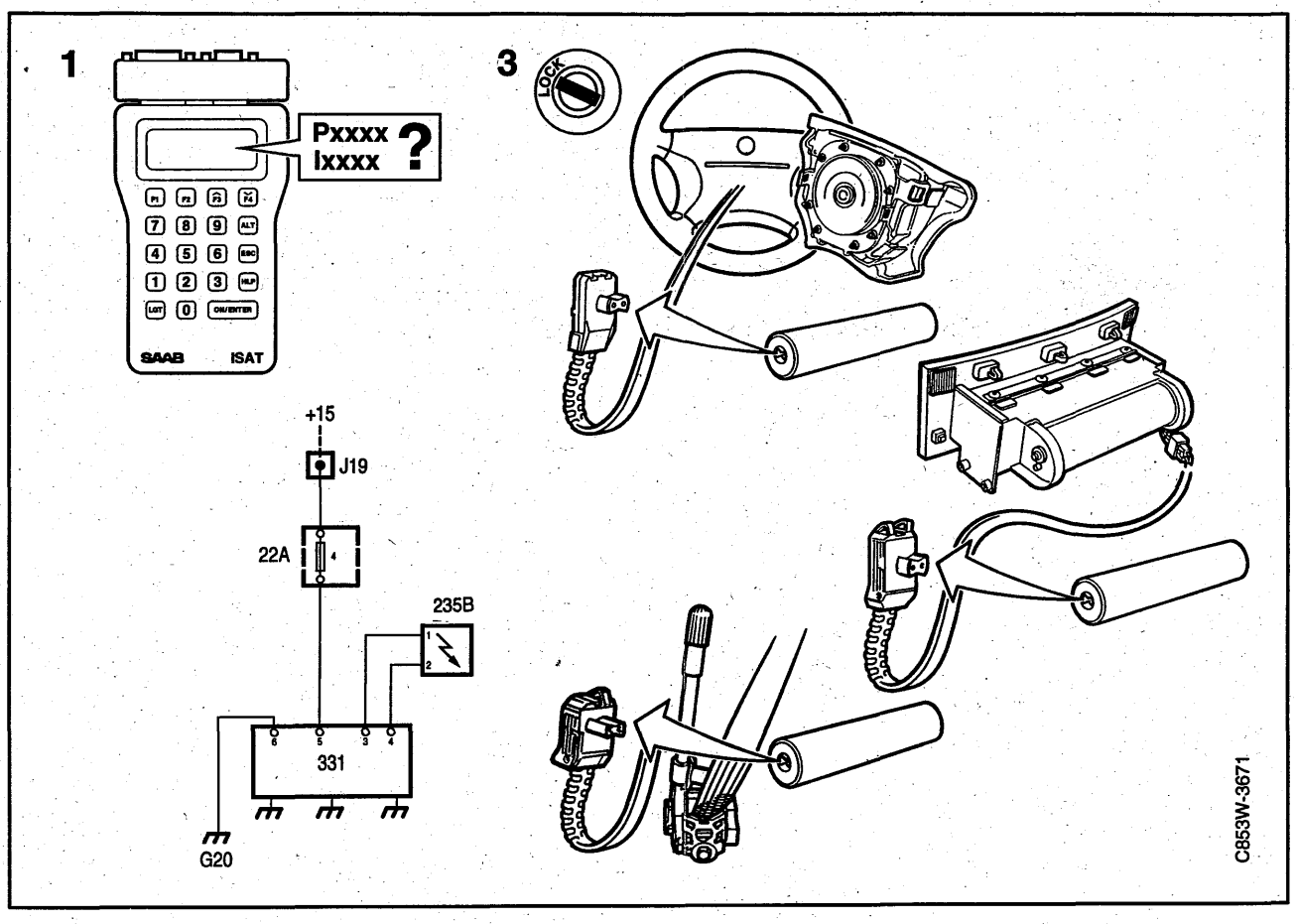
Free the SRS control module. Unplug the SRS control module connector and connect a BOB to the cable assembly. Connect an ohmmeter between contacts 1 and 2 on the BOB.
The ohmmeter should show infinite resistance.
If the reading is OK:
Proceed to point 7.
If the value is incorrect:
If the measurement shows low resistance, there is a short between the two conductors to the belt tensioner. Investigate the cause and change the cable assembly. Then proceed to point 7.

7 Switch off the ignition and disconnect the negative lead from the battery.
Remove reference resistors and plug in all connectors to their original components.
Reconnect the battery negative lead and switch on the ignition.

Erase diagnostic trouble code. Switch off the ignition and switch it back on again. Wait for at least 10 seconds with the ignition on.
Check to see if the diagnostic trouble code returns.
If the diagnostic trouble code returns:
Proceed to page 92.
If the diagnostic trouble code does not return:
Return the car to good order.

Diagnostic trouble code B2446

Passenger belt tensioner, interruption.



1 Connect ISAT. Note the diagnostic trouble code and the type of fault.
P=permanent fault, I= intermittent fault.
If the fault is permanent:
Proceed to point 3.
If the fault is intermittent:
Proceed to point 2.

2 The fault is intermittent: Try to expose the fault when taking each reading during fault tracing. Manipulate the connectors and leads while taking the measurements.

Proceed to point 3.

3 Switch off the ignition and disconnect the negative lead from the battery. Undo the bolts securing the steering wheel airbag. Unplug the connector on the back of the airbag. Plug reference resistor 84 71 153 into the connector.

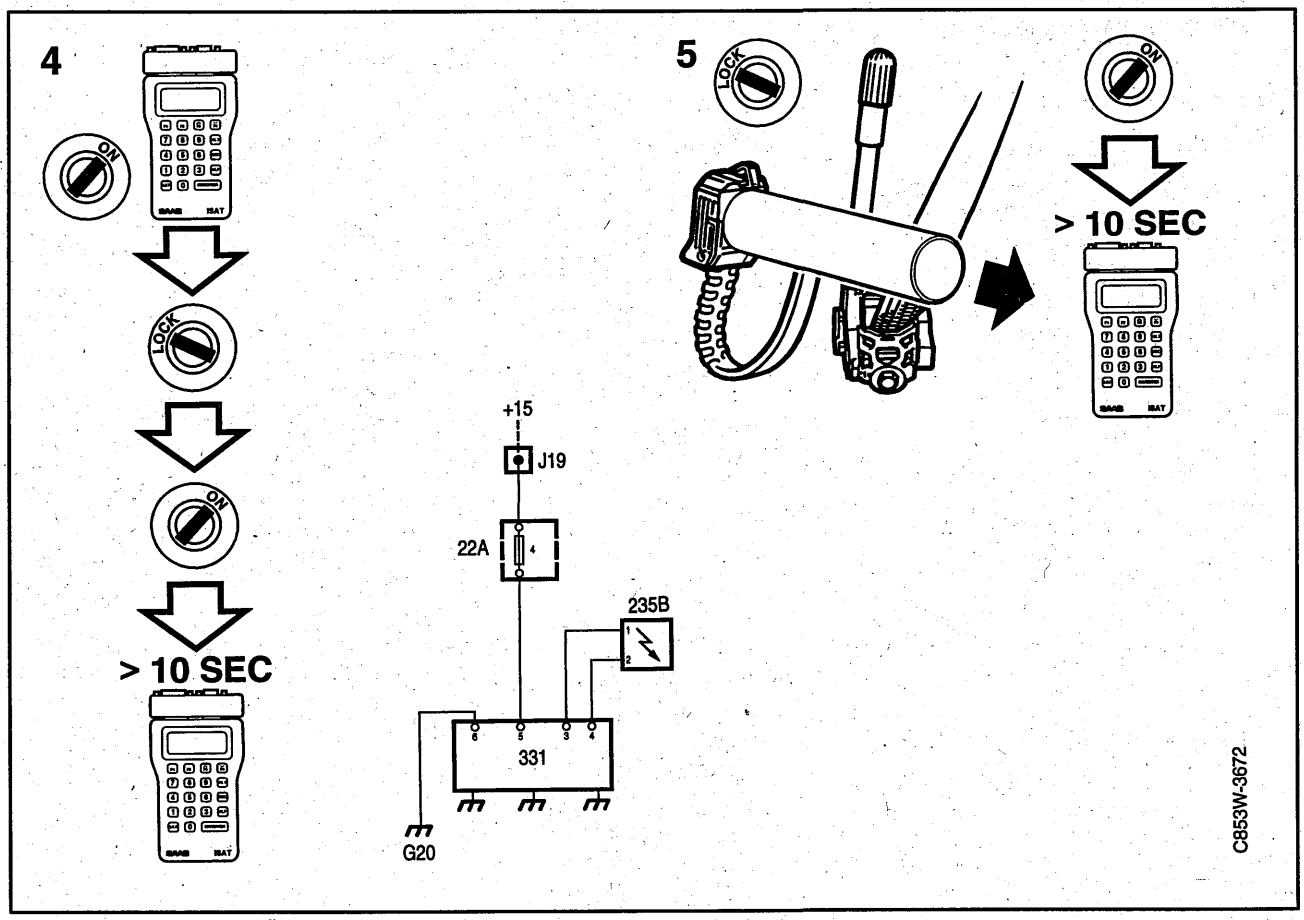
On cars with a passenger airbag.

a. Remove the lower cover plate and unplug connector H2–77 to the passenger airbag.

b. Connect reference resistor 84 71 153 to pin connector H2–77 using cable assembly 86 11 378.

Remove the trim from the B–pillar on the passenger side. Unplug the connector on the passenger belt tensioner. Plug reference resistor 84 71 153 into the connector.
Proceed to point 4.

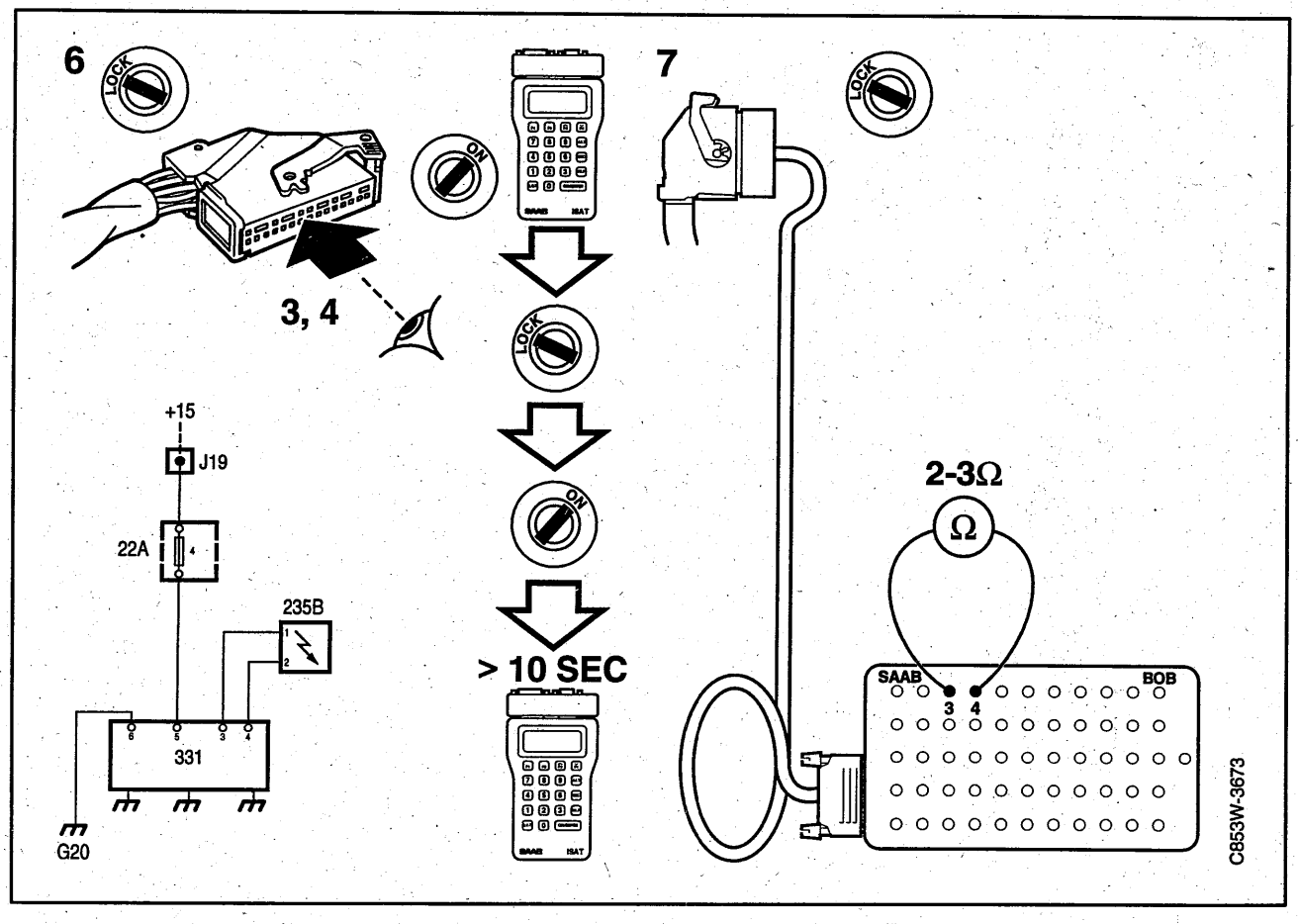
Diagnostic trouble code B2446 (contd.)



4 Reconnect the negative battery lead and switch on the ignition. Erase diagnostic trouble code. Switch off the ignition and switch it back on again. wait for at least 10 seconds with the ignition on.
Check to see if the diagnostic trouble code returns.
If the diagnostic trouble code returns:
Proceed to point 6.
If the diagnostic trouble code does not return:
The fault is in the belt tensioner. Do extra tests as described in point 5.

5 Switch off the ignition and disconnect the negative lead from the battery. Remove the reference resistor from the belt tensioner connector and connect the belt tensioners. Reconnect the negative battery lead and switch on the ignition. Wait for at least 10 seconds with the ignition on.
Check to see if the diagnostic trouble code returns.
If the diagnostic trouble code returns:
Switch off the ignition, disconnect the negative lead from the battery and change the belt tensioner. Then proceed to point 8.
If the diagnostic trouble code is gone:
The fault is intermittent. Return to point 2.

Diagnostic trouble code B2446 (contd.)



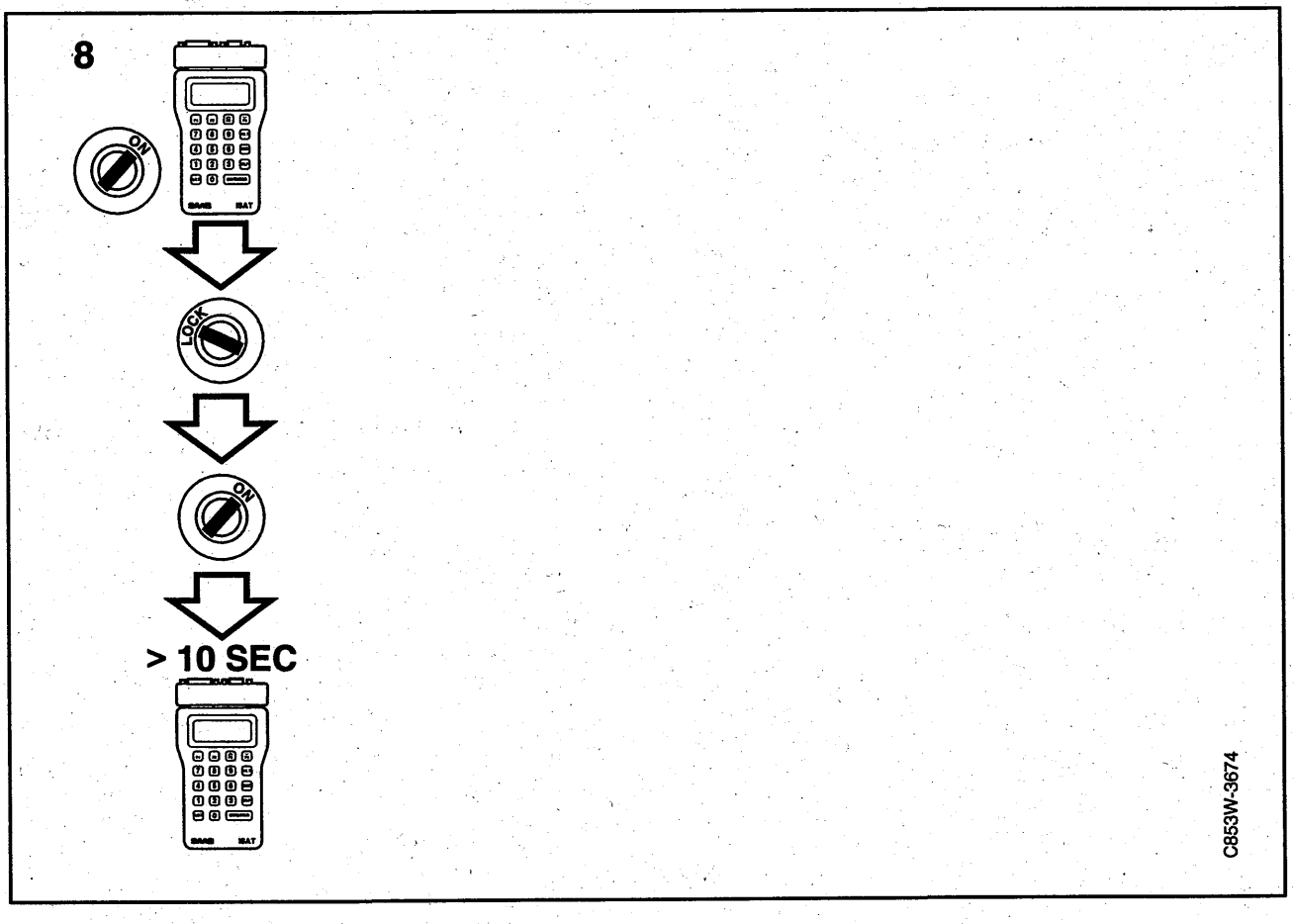
6 Switch off the ignition and unplug the SRS control module connector. Check pins 3 and 4 for breaks and bad connections. Plug the connector into the SRS control module and switch on the ignition.

Erase diagnostic trouble code. Switch off the ignition and switch it back on again. Wait for at least 10 seconds.
Check to see if the diagnostic trouble code returns.
If the diagnostic trouble code returns:
Proceed to point 7.
If the diagnostic trouble code does not return:
The fault was in the SRS connector.
Proceed to point 8.

Important
If no fault was found in the connector, the fault may be intermittent. Try to provoke any intermittent fault and see if the SRS lamp lights.

7 Switch off the ignition. Unplug the SRS control module connector and connect a BOB to the cable assembly. Connect an ohmmeter between contacts 3 and 4 on the BOB.
The ohmmeter should read 2–3 ohms.
If the reading is OK:
Proceed to point 8.
If the measurement is incorrect:
If the measurement shows high resistance, there is a break in the cable assembly between the SRS connector and the belt tensioner. Investigate the cause and change the cable assembly. Then proceed to point 8.

Diagnostic trouble code B2446 (contd.)

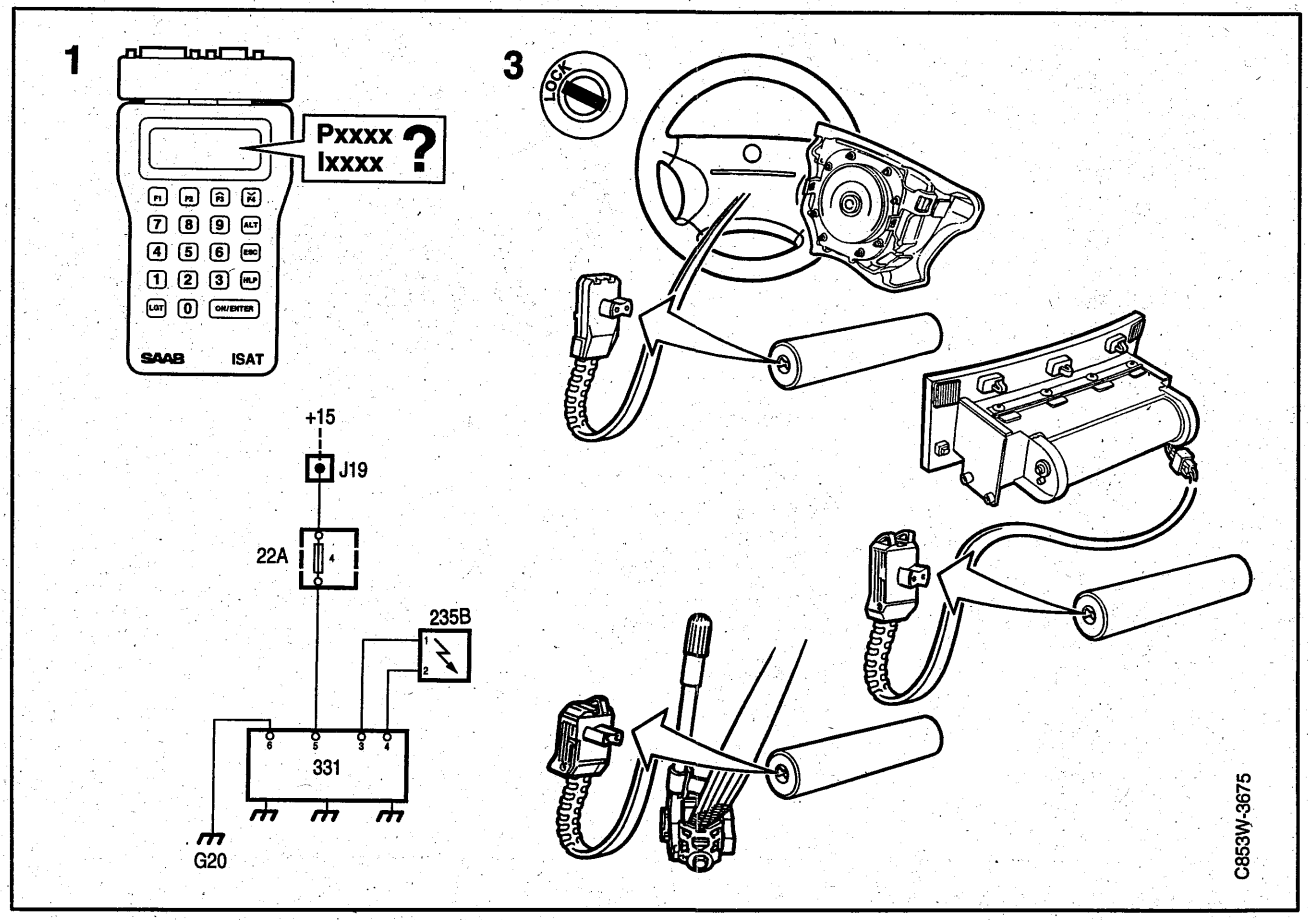


8 Switch off the ignition and disconnect the negative lead from the battery.
Remove reference resistors and plug in all connectors to their original components.
Reconnect the battery negative lead and switch on the ignition.

Erase diagnostic trouble code. Switch off the ignition and switch it back on again. Wait for at least 10 seconds with the ignition on.
Check to see if the diagnostic trouble code returns.
If the diagnostic trouble code returns:
Proceed to page 92.
If the diagnostic trouble code does not return:
Return the car to good order.

Diagnostic trouble code B2449

Passenger belt tensioner, resistance too low.



1 Connect ISAT. Note the diagnostic trouble code and the type of fault.
P=permanent fault, I= intermittent fault.
If the fault is permanent:
Proceed to point 3.
If the fault is intermittent:
Proceed to point 2.

2 The fault is intermittent: Try to expose the fault when taking each reading during fault tracing. Manipulate the connectors and leads while taking the measurements.

Proceed to point 3.

3 Switch off the ignition and disconnect the negative lead from the battery. Undo the bolts securing the steering wheel airbag. Unplug the connector on the back of the airbag. Plug reference resistor 84 71 153 into the connector.

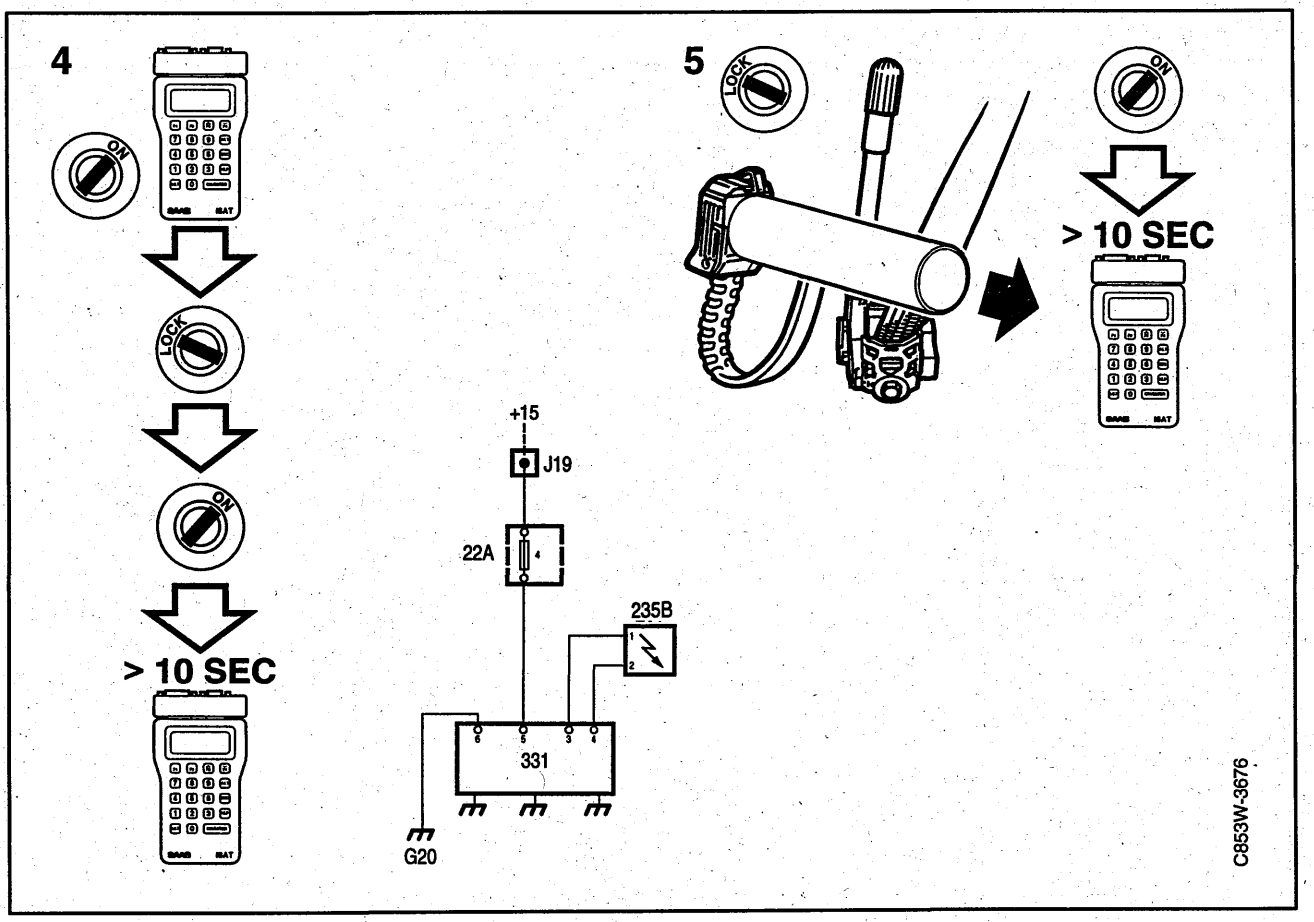
On cars with a passenger airbag.

a. Remove the lower cover plate and unplug connector H2–77 to the passenger airbag.

b. Connect reference resistor 84 71 153 to pin connector H2–77 using cable assembly 86 11 378.

Remove the trim from the B–pillar on the passenger side. Unplug the connector on the passenger belt tensioner. Plug reference resistor 84 71 153 into the connector.
Proceed to point 4.

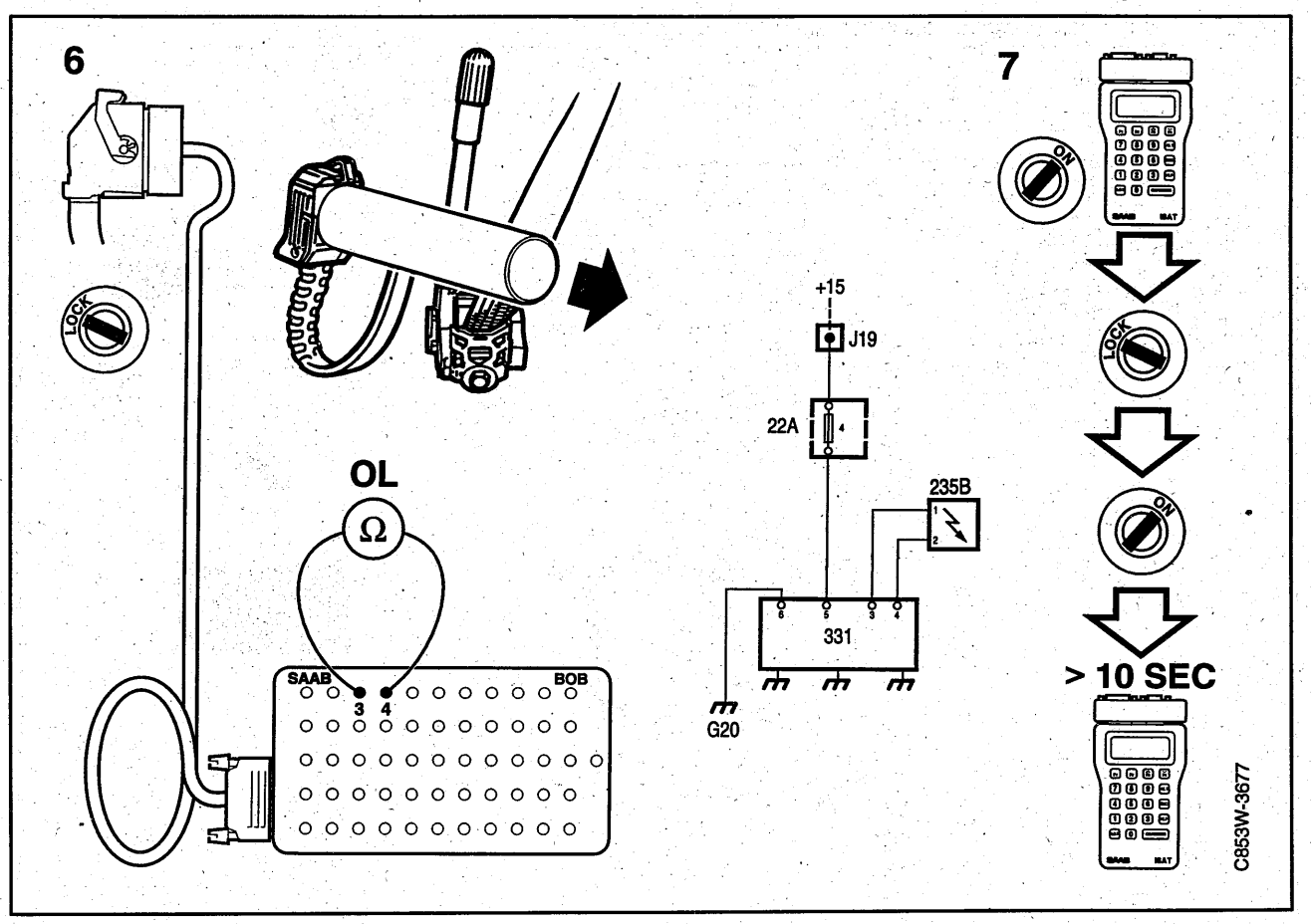
Diagnostic trouble code B2449 (contd.)



4 Reconnect the negative battery lead and switch on the ignition. Erase diagnostic trouble code. Switch off the ignition and switch it back on again. Wait for at least 10 seconds with the ignition on.
Check to see if the diagnostic trouble code returns.
If the diagnostic trouble code returns:
Proceed to point 6.
If the diagnostic trouble code does not return:
The fault is in the belt tensioner. Do extra tests as described in point 5.

5 Switch off the ignition and disconnect the negative lead from the battery. Remove the reference resistor from the belt tensioner connector and connect the belt tensioners. Reconnect the negative battery lead and switch on the ignition. Wait for at least 10 seconds with the ignition on.
Check to see if the diagnostic trouble code returns.
If the diagnostic trouble code returns:
Switch off the ignition, remove the negative lead from the battery and change the belt tensioner. Then proceed to point 7.
If the diagnostic trouble code is gone:
The fault is intermittent. Return to point 2.

Diagnostic trouble code B2449 (contd.)



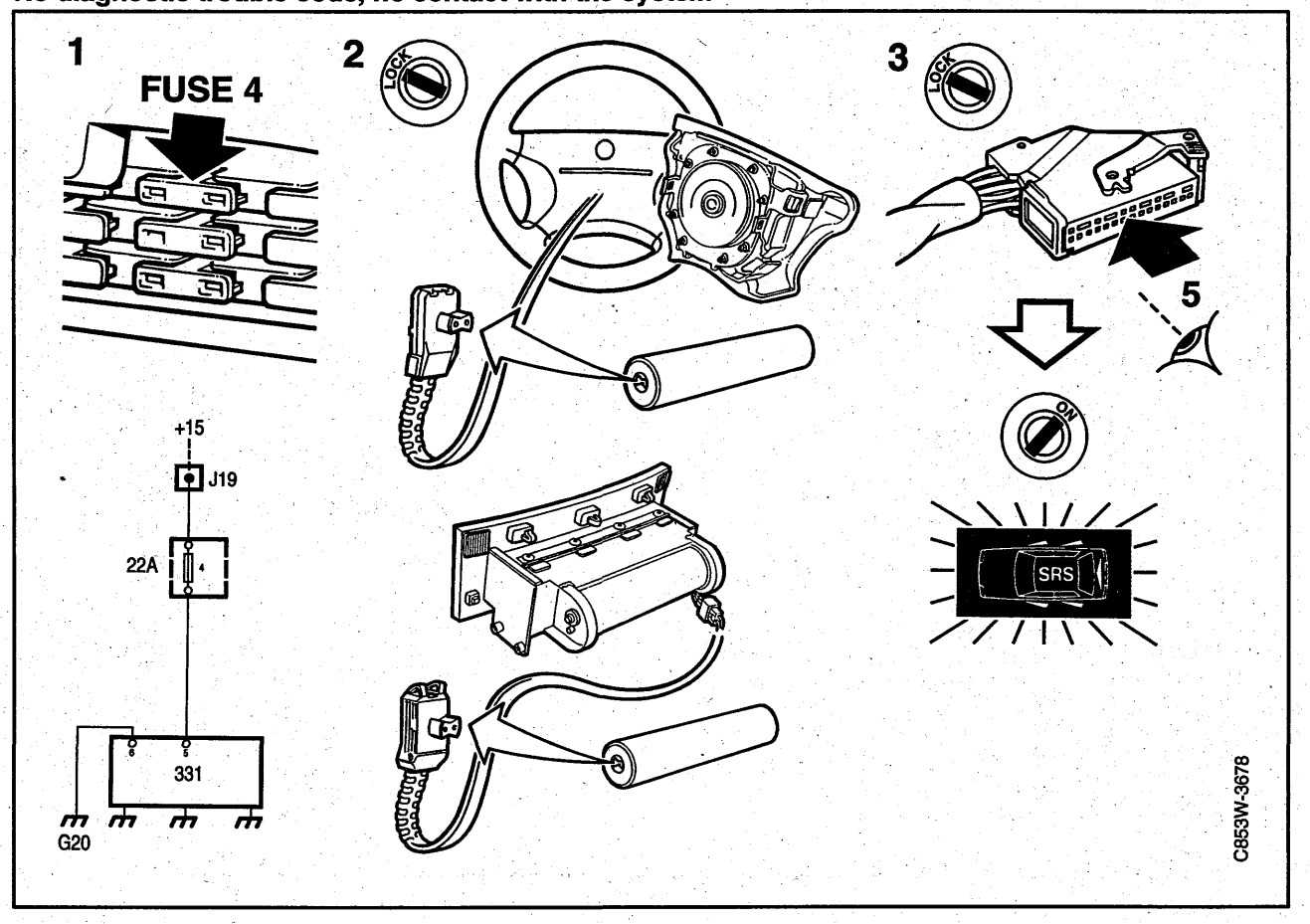
6 Switch off the ignition and remove the reference resistor from the belt tensioner connector. Free the SRS control module. Unplug the connector from the SRS control module and plug a BOB into the cable assembly. Connect an ohmmeter between contacts 3 and 4 on the BOB.
The ohmmeter should show infinite resistance.
If the reading is OK:
Proceed to point 7.
If the value is incorrect:
If the measurement shows low resistance, there is a short between the two conductors to the belt tensioner. Investigate the cause and change the cable assembly. Then proceed to point 7.

7 Switch off the ignition and disconnect the negative lead from the battery.
Remove reference resistors and plug in all connectors to their original components.
Reconnect the battery negative lead and switch on the ignition.

Erase diagnostic trouble code. Switch off the ignition and switch it back on again. Wait for at least 10 seconds with the ignition on.
Check to see if the diagnostic trouble code returns.
If the diagnostic trouble code returns:
Proceed to page 92.
If the diagnostic trouble code does not return:
Return the car to good order.

SRS lamp lights dimly and no diagnostic trouble code is displayed

No diagnostic trouble code, no contact with the system



1 Check fuse 4.

2 Switch off the ignition and disconnect the negative lead from the battery. Undo the bolts securing the steering wheel airbag. Unplug the connector on the back of the airbag. Plug reference resistor 84 71 153 into the connector.

On cars with a passenger airbag.

a. Remove the lower cover plate and unplug connector H2–77 to the passenger airbag.

b. Connect reference resistor 84 71 153 to pin connector H2–77 using cable assembly 86 11 378.

Proceed to point 3.

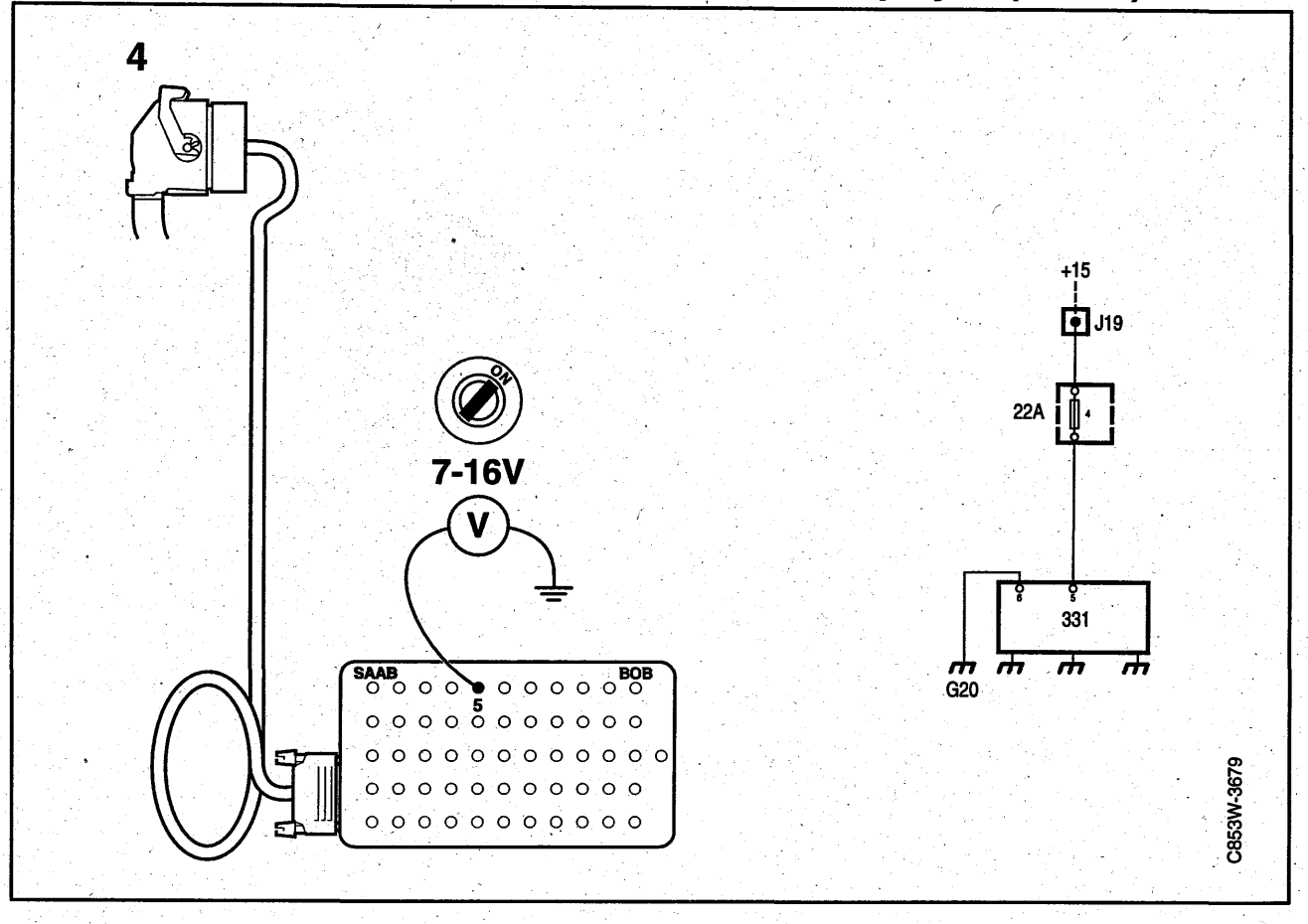
3 Unplug the SRS control module connector and check pin 5 for breaks and bad connections.

Refit the connector to the SRS control module. Refit the battery negative lead and switch on the ignition.
The SRS lamp should light for 3–4 seconds and then go out.
If the lamp goes out:
The fault was in the connector. Return the car to good order.

Important
If no fault was found in the connector, the fault may be intermittent. Try to provoke any intermittent fault and see if the SRS lamp lights.

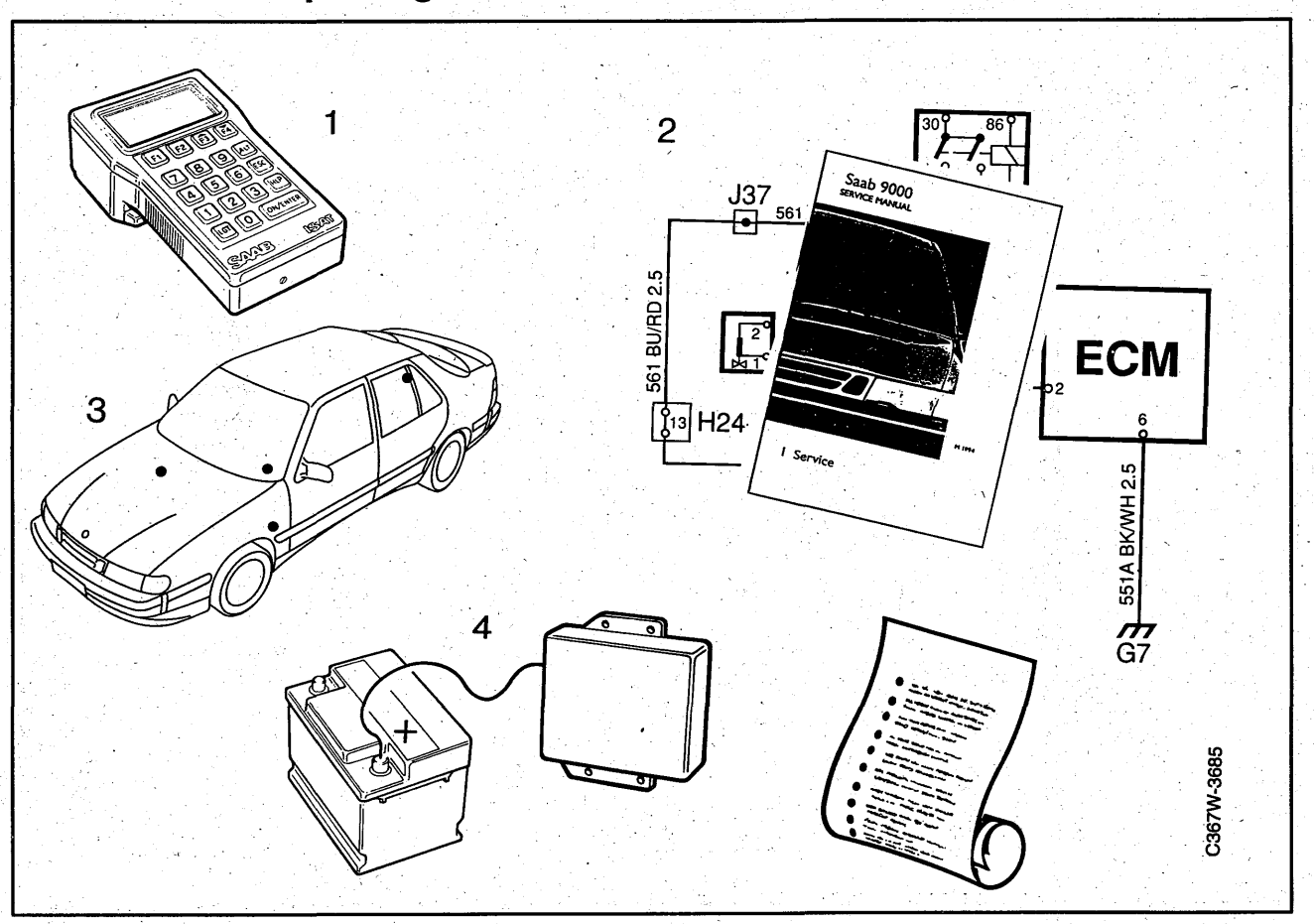
If the lamp does not go out:
Proceed to point 4.

SRS lamp lights dimly and no trouble code is displayed (contd.)



4 Switch off the ignition. Unplug the connector from the SRS control module and connect a BOB to the cable assembly. Switch on the ignition and connect a voltmeter between contact 5 on the BOB and a safe grounding point.
The voltmeter should show 7–16 V.
If the value is OK:
Proceed to page 92.
If the value is incorrect:
If there is no battery voltage, inspect the cable assembly between fuse 4 and the SRS control module for breaks. If there is a fault, change the cable assembly.

Procedure for replacing the control module



When all tests have been conducted as described in the action program for the particular diagnostic trouble code and no fault has been found, it is natural to assume that the control module is faulty.

Considering that the control module is both a very high quality and a very expensive component, it is important to be as sure as possible of the diagnosis.

Go through the following points very carefully before definitely deciding that the control module is the cause of the fault.

1 Check one more time that the points in the fault diagnosis procedure for the relevant diagnostic trouble code have been followed. If fault diagnosis has not been conducted according to the procedure for intermittent faults, repeat the fault diagnosis and try to provoke intermittent faults.

2 Study the wiring diagram for the relevant circuit and make sure that you understand it. If necessary, use the appropriate parts of the technical description and the electrical function description in Service Manual "3:2 Electrical system, wiring diagrams.

3 Check all grounding points. If you have done this before, do it again.

4 Check the voltage feed and fuses to the control module.

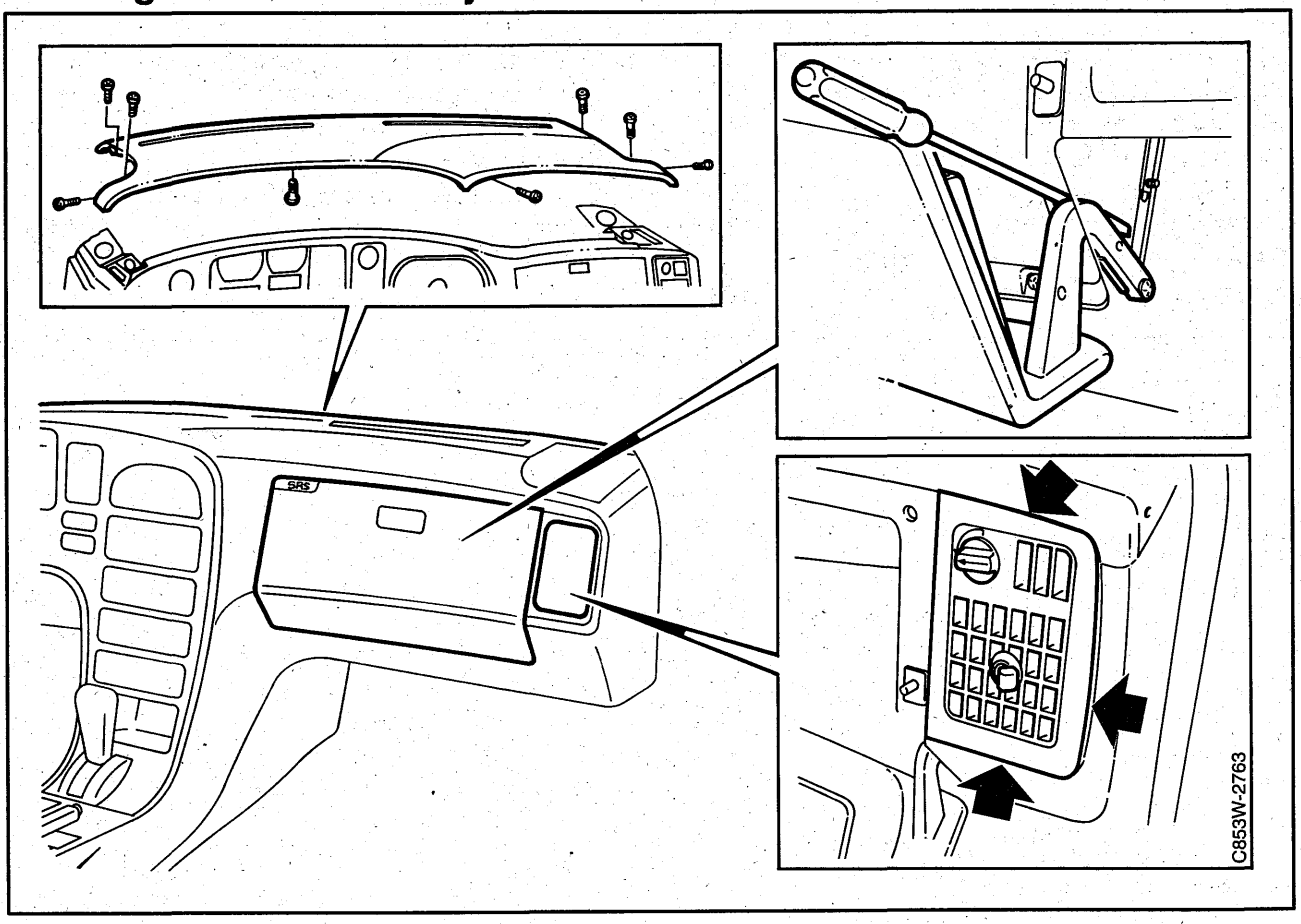
5 Check that there are no bad connections in the SRS control module connector.

6 If the original fault still persists, the control module will have to be changed.

Important
If the original fault is of the intermittent type, the fault is almost always in the cable assembly. If the fault is intermittent, the cable assembly must therefore be changed before the SRS control module is changed.

Removal and fitting

Steering column assembly



⚠ WARNING

Before starting work, read the "Safety and handling instructions" section.

To remove

Important

When removing a steering column assembly from a right–hand drive car, A/C components have to be removed. In these cases see Service Manual 8:3 Climate control system, ACC.

1 Remove the front sill scuff plate on the driver's side.

2 Set the windscreen wipers straight up by switching off the ignition at the right moment.

3 Disconnect the negative lead from the battery.

Important

The engine must not be running when the negative cable is removed. The alternator may be seriously damaged.

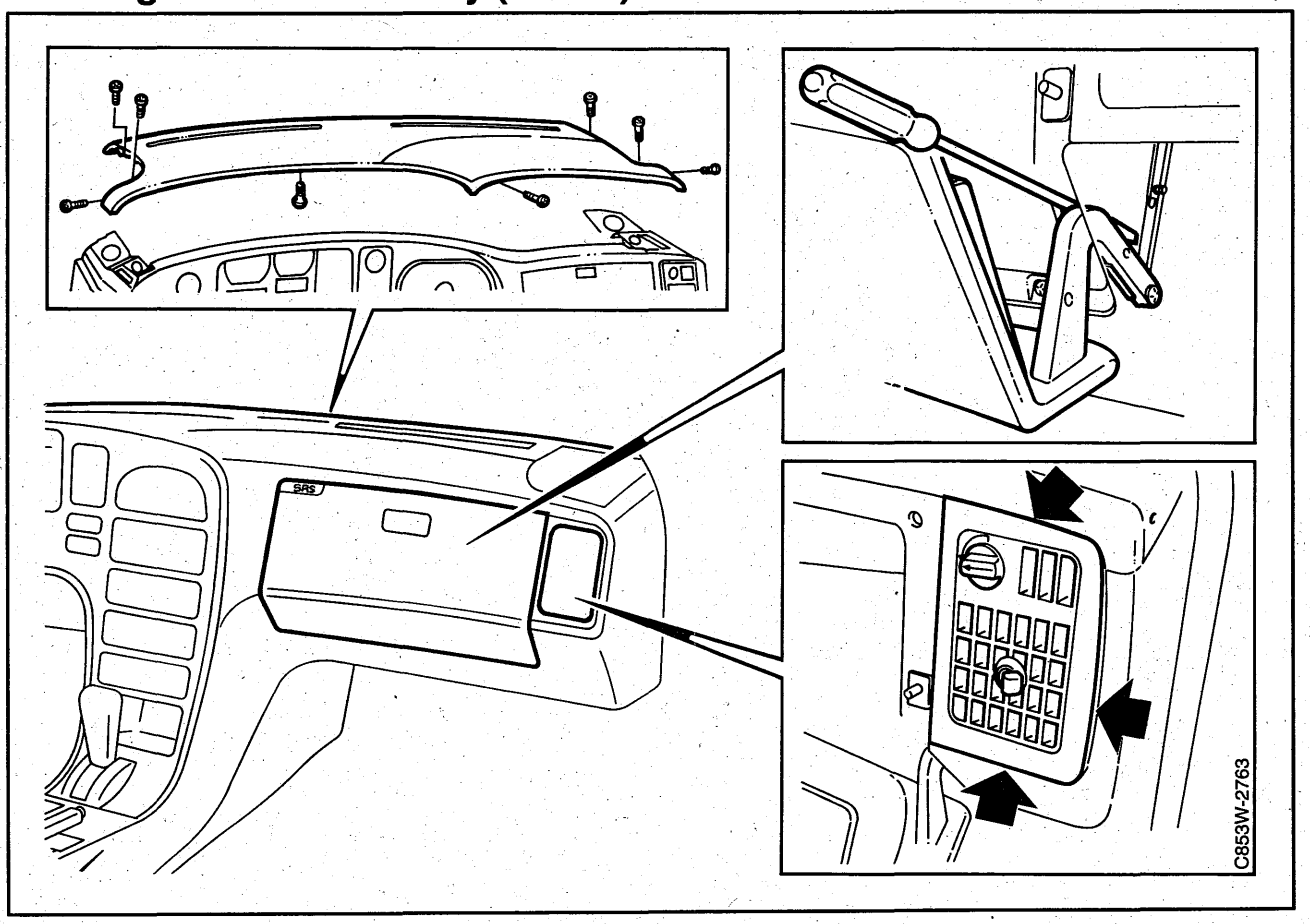
4 Remove the trim from the A pillar.

5 Remove the speaker grilles.

Cars with anti–theft alarm: Unplug the connector for the anti–theft alarm light–emitting diode.

Remove the spacers.

Steering column assembly (contd.)



6 Remove the upper section of the facia (8 screws). One of the retaining screws is located behind the rubber plug inside the glove compartment.

On cars with a passenger airbag, one screw is located under the SRS emblem in the upper left–hand corner of the airbag module.

Remove the safety wire between the A–pillars.

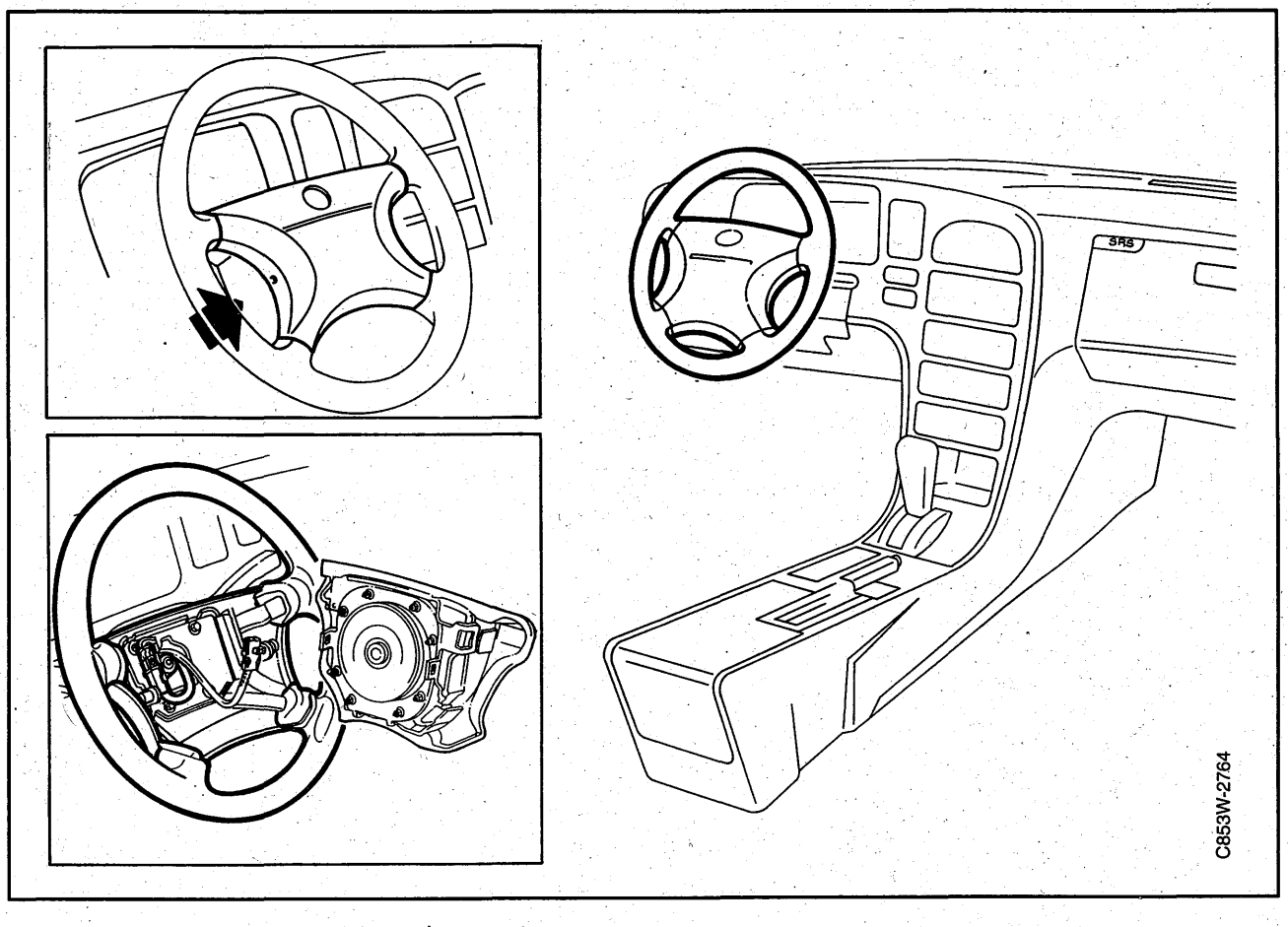
7 Remove the glove compartment as follows:

Open the glove compartment door to its lowest position by bending out the link arms so that the stops disengage.

Remove the screws securing the glove compartment.

Pull out the glove compartment together with the facia vent. Using a screwdriver, carefully prize around the facia vent. Note the positions of the clips. Disconnect the leads to the glove compartment lighting and lighting switch.

Steering column assembly (contd.)



8 Remove the screws securing the main fuse box and lower it.

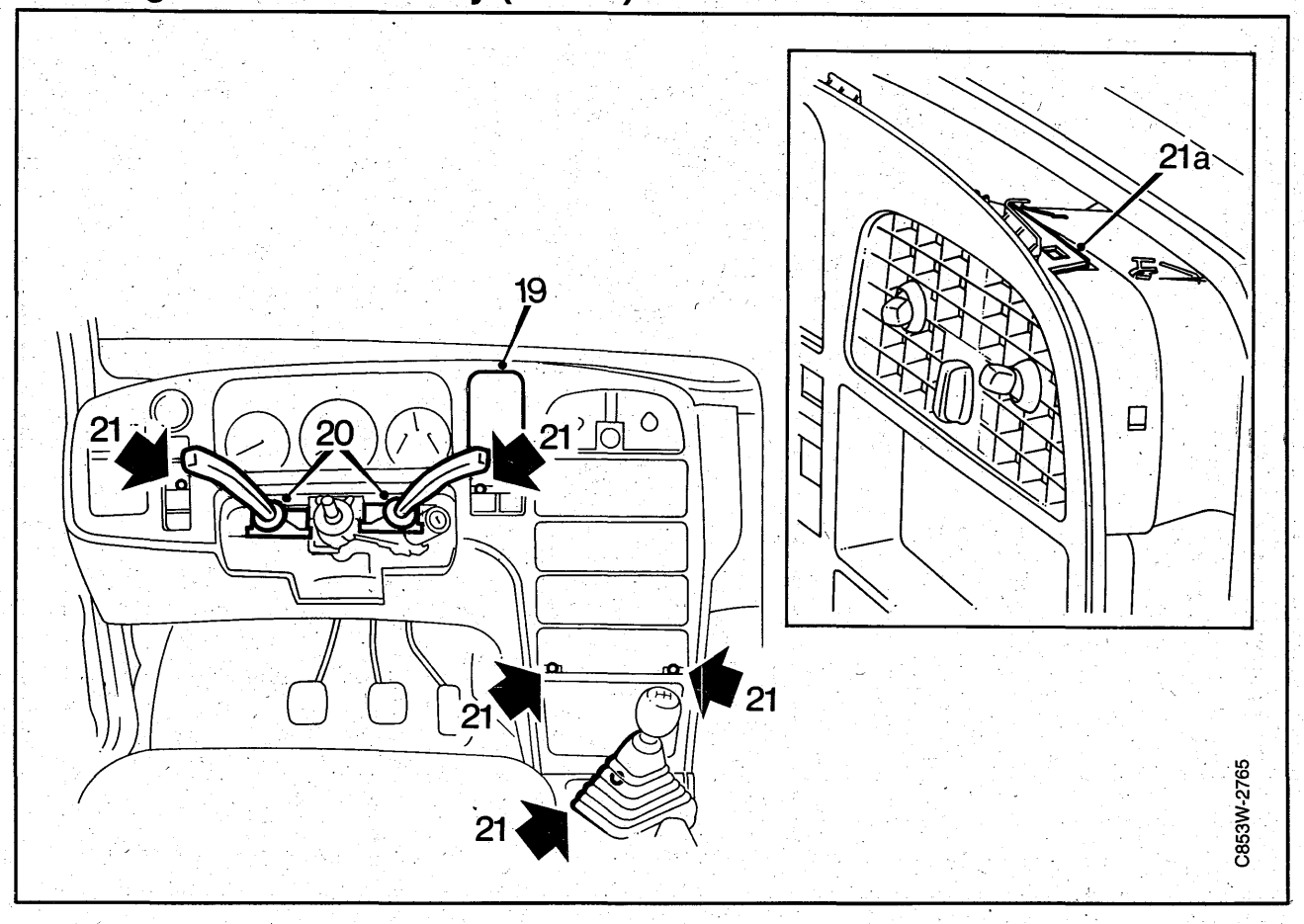
9 Remove the ashtray.
Bend down the two retaining clips on the top of the ashtray holder. Pull out the holder and unplug the electrical connectors.

10 Cars for the US market:
Remove the lower radio compartment and disconnect the two electrical connectors.
Remove the upper radio compartment and disconnect the antenna lead and the electrical connectors.

11 Press out the ACC control module and unplug the connector.
For cars with manual A/C, see Service Manual 8:3.

12 Remove the two securing screws holding the steering wheel airbag and the electrical connector.
Remove the airbag.

Steering column assembly (contd.)



13 Position the wheels straight forward.

14 Unplug the horn connector in the steering wheel. Remove the steering wheel (M22).

15 Remove the upper and lower steering column covers.

16 Remove the covers over the cabin tempe–rature sensor and unused places.

17 Carefully ease the edges of the interior temperature transmitter and push it in.

18 Push out all switches and unplug the con–nectors.

Important

Mark the connectors to avoid wrong connections when assembling.

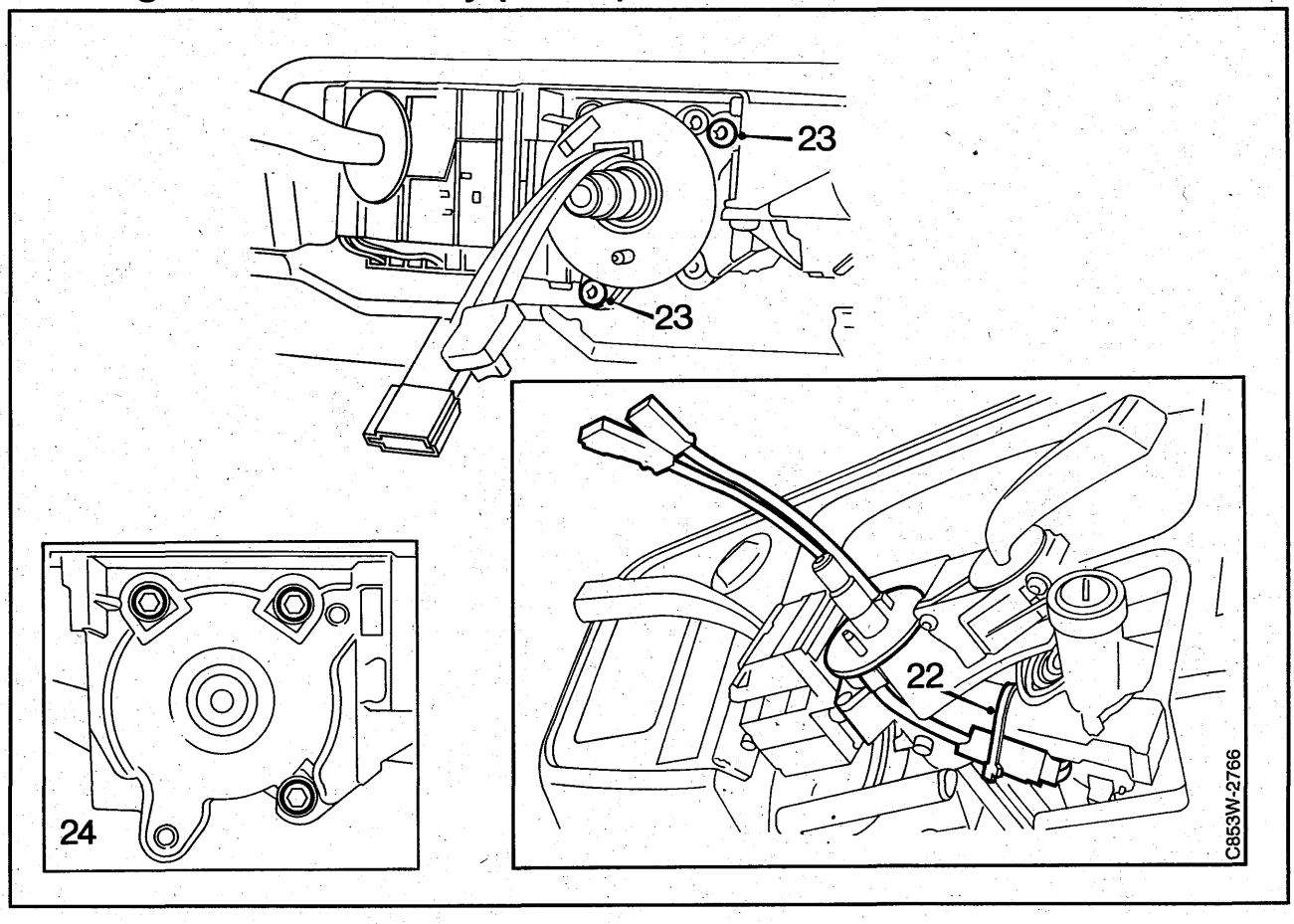
19 Remove the clock/SCC (DCC) module. Unplug the two connectors.

20 Remove the upper connector from the direction indicator and lighting stalk switch. Unplug the connector from the wiper and washer stalk switch. Remove the stalk switch. Remove the two remaining connectors from the direction indicator and lighting stalk switch.

21 Remove the five screws securing the instrument panel
(1 screw under the rubber bellows on the gear lever). Remove the cover plate round the gear lever.

21a Pull the instrument panel forward slightly and carefully ease the plastic fasteners attaching the panel to the center vent. Move the panel forwards in the center and withdraw it from the mounting on the outer side.

Steering column assembly (contd.)



22 Cut the cable tie and unplug the horn and contact roller connectors.

23 Remove the two screws securing the contact roller and lift it out.

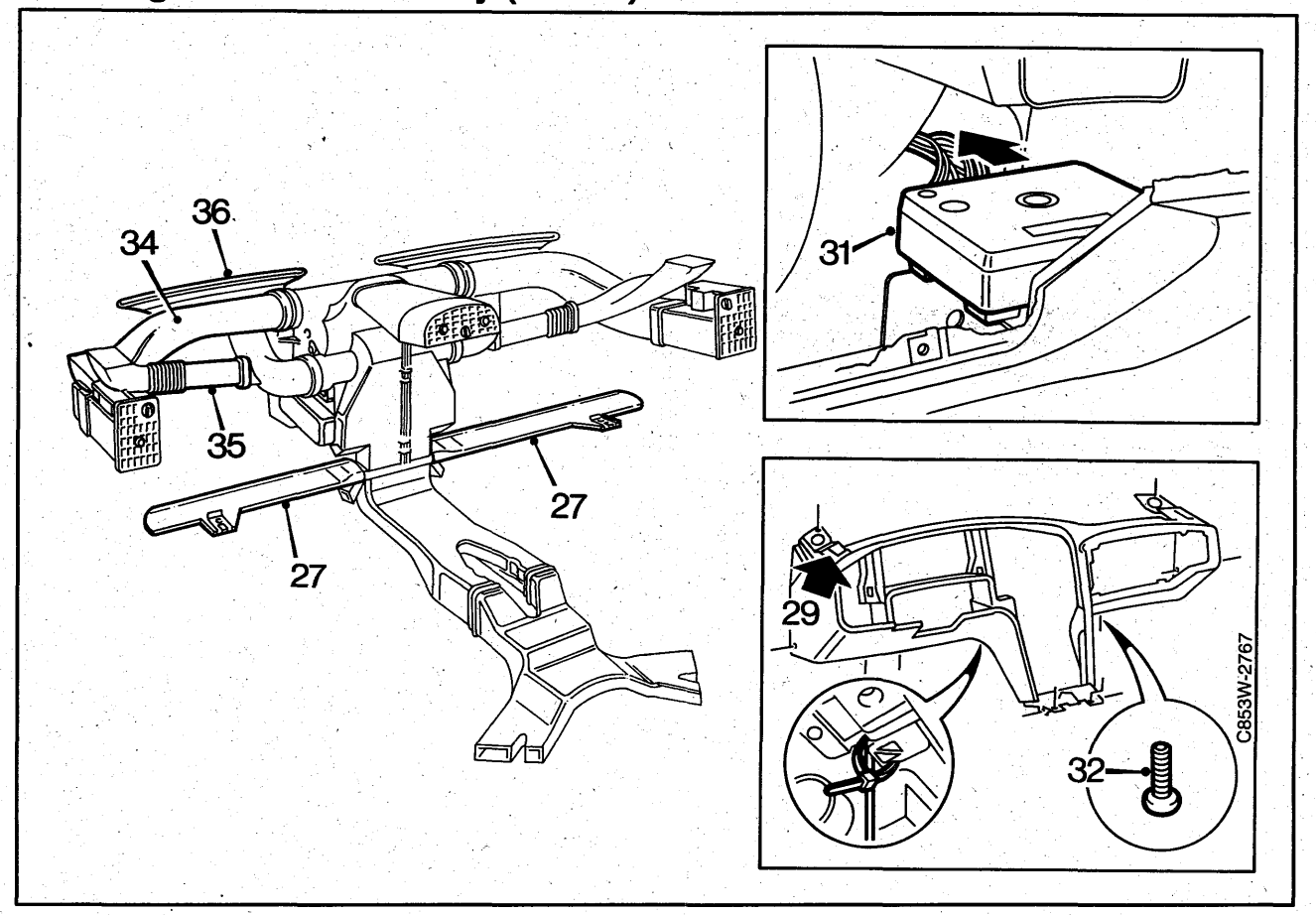
Important

The contact roller is fragile. Handle with care.

24 Remove the stalk switch holder.

25 Remove the combined instrument as follows:
Remove the two screws securing the combined instrument.
Remove the turbo pressure gauge hose and turn the instrument with the glass against the windshield.
Unplug the connectors and remove the rubber supports from the main instrument display panel and lift it out.

Steering column assembly (contd.)



26 Remove the left–hand and right–hand sound baffles.

27 Remove the right–hand and left–hand floor air ducts.

28 Remove the panels (carpet) from the left–hand and right–hand sides of the center console.

29 Remove the screws securing the demister side vent to the facia. The screws are in the air duct.

30 Unplug the speaker connectors.

31 Remove the anti–theft alarm control module from the facia and let it hang on its cables. The control unit is located on the right–hand side under the electrical distribution box. On cars with a passenger airbag, the control module is located on the airbag bracket.

32 Undo the 12 fastening screws from the facia. Two screws are located under plastic covers on the center console. Cut the cable tie that holds the safety wire to the panel.

33 Tape the facia to protect the gear lever.

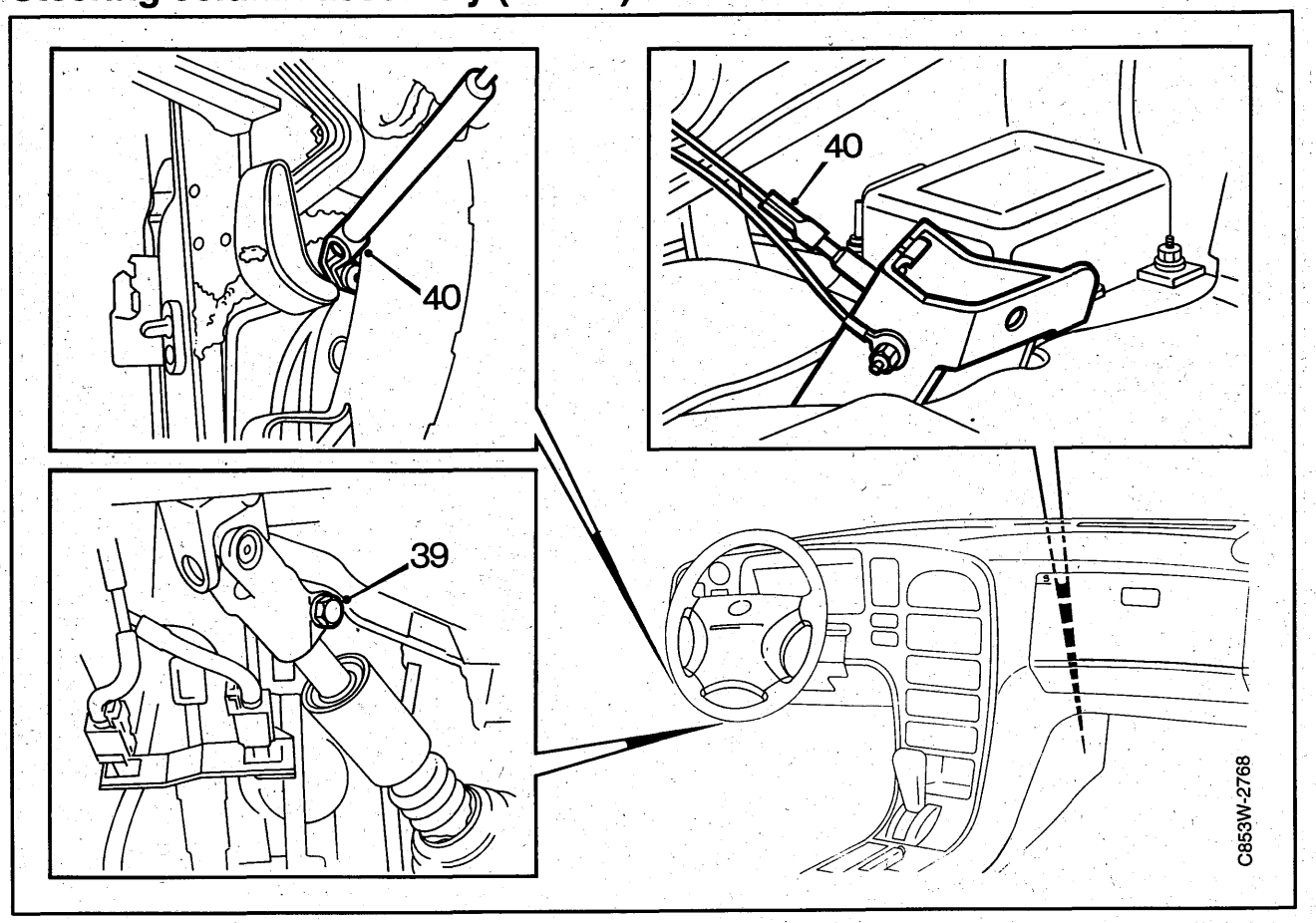
Place the gear lever in reverse and carefully press over the lower part of the facia. Push the gear lever forward and lift the facia out of the car.

34 Cut the cable tie and remove the air duct from the driver side.
Remove the side vent.

35 Remove the inner part of the side vent. Note the clip.

36 Remove the demister vent for the driver side of the windshield.

Steering column assembly (contd.)



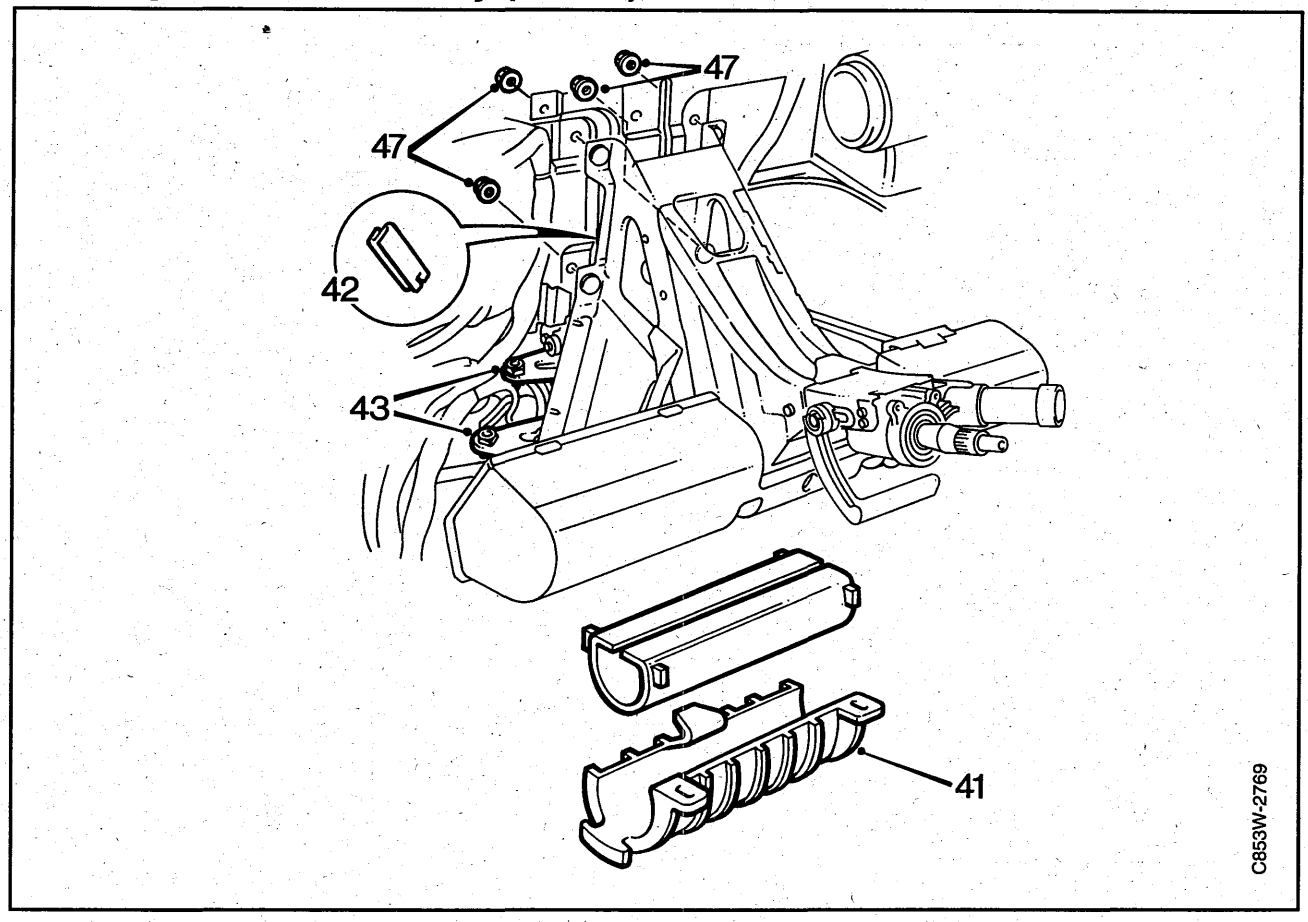
37 Bend aside the wiring harness on the left–hand side of the steering column assembly. Note how the wiring harness is installed.

38 Unplug the connector from the ignition lock and remove the cable tie securing the lead. Remove the cable tie securing the wiring harness onto the right–hand side of the steering column assembly.

39 Slacken the clamped joint and remove the bolt between the steering column universal joint and the intermediate shaft.

40 Remove the safety wire from the bracket on the tunnel. Release the wire from the attachment on the other side.

Steering column assembly (contd.)



41 Remove the wiring harness holder.

42 Remove the plastic clips between the steering column assembly and the facia crossmember. (The clips do not need to be refitted on assembly).

43 Remove the two screws securing the electronics bracket to the steering column assembly.

44 From the engine compartment:
Remove the cover from the bulkhead partition space.

45 Free the ABS control module.
Lift the LH control module to the side.

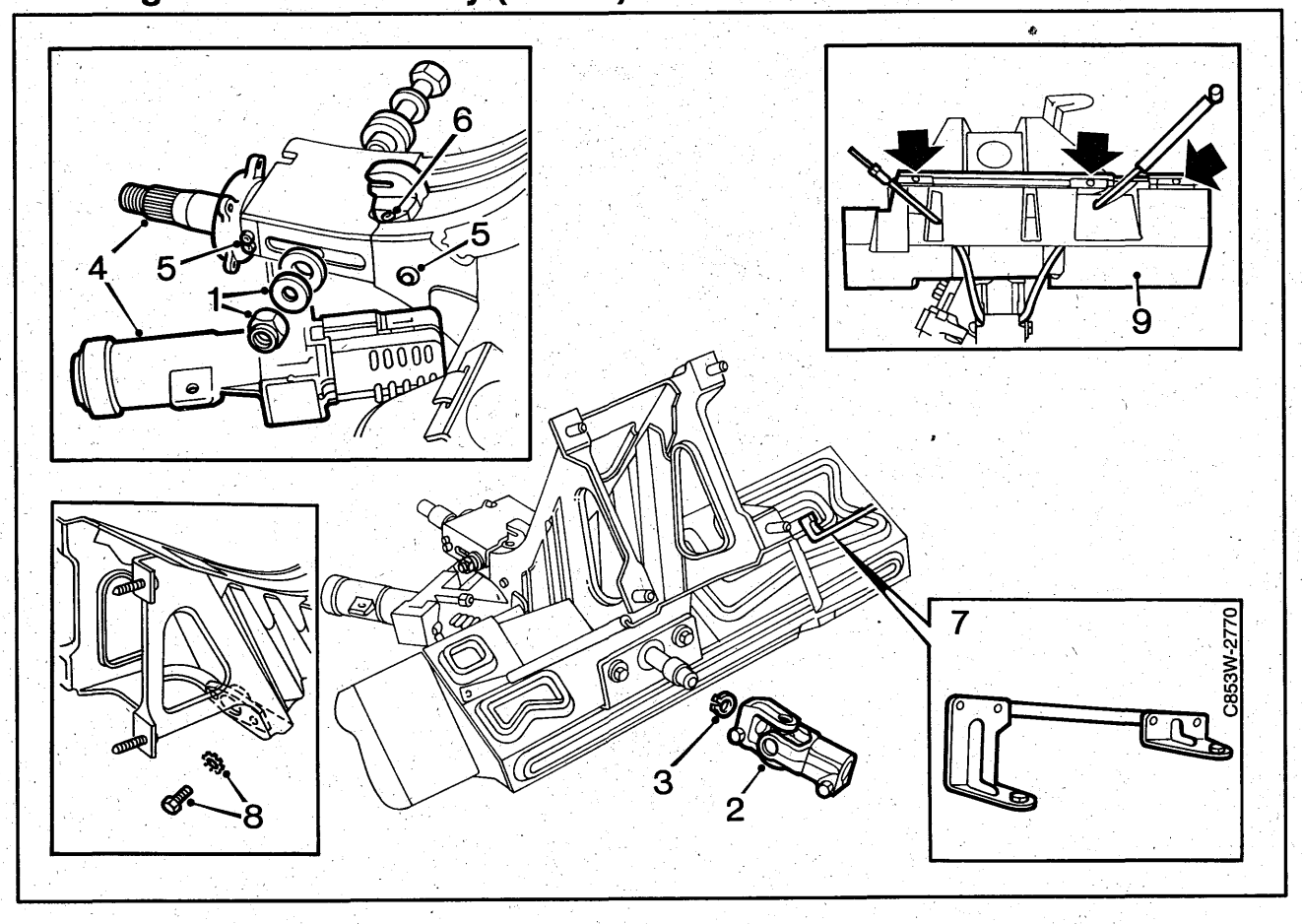
46 Remove the locking washer from the left–hand wiper spindle and take off the link arm.

The link arm may be secured with a plastic bush which must be prized loose.

47 Remove the four securing nuts from the steering column assembly. These are undone from the bulkhead partition space.

48 Release the vacuum hose from the steering column assembly and lift it out of the car. Note the position of the washers.

Steering column assembly (contd.)



Steering column assembly, to dismantle

Important

The two parts of the steering column assembly are matched and may under no circumstances be separated.

1 Remove the transverse bolt together with the spacer and washers.

2 Remove the universal joint from the steering column.

3 Remove the circlip on the lower end of the steering column assembly.

4 Compress the steering column assembly so that it comes out of the lower bearing and remove the steering column assembly complete with the ignition lock bracket.

5 Remove the slide rails.

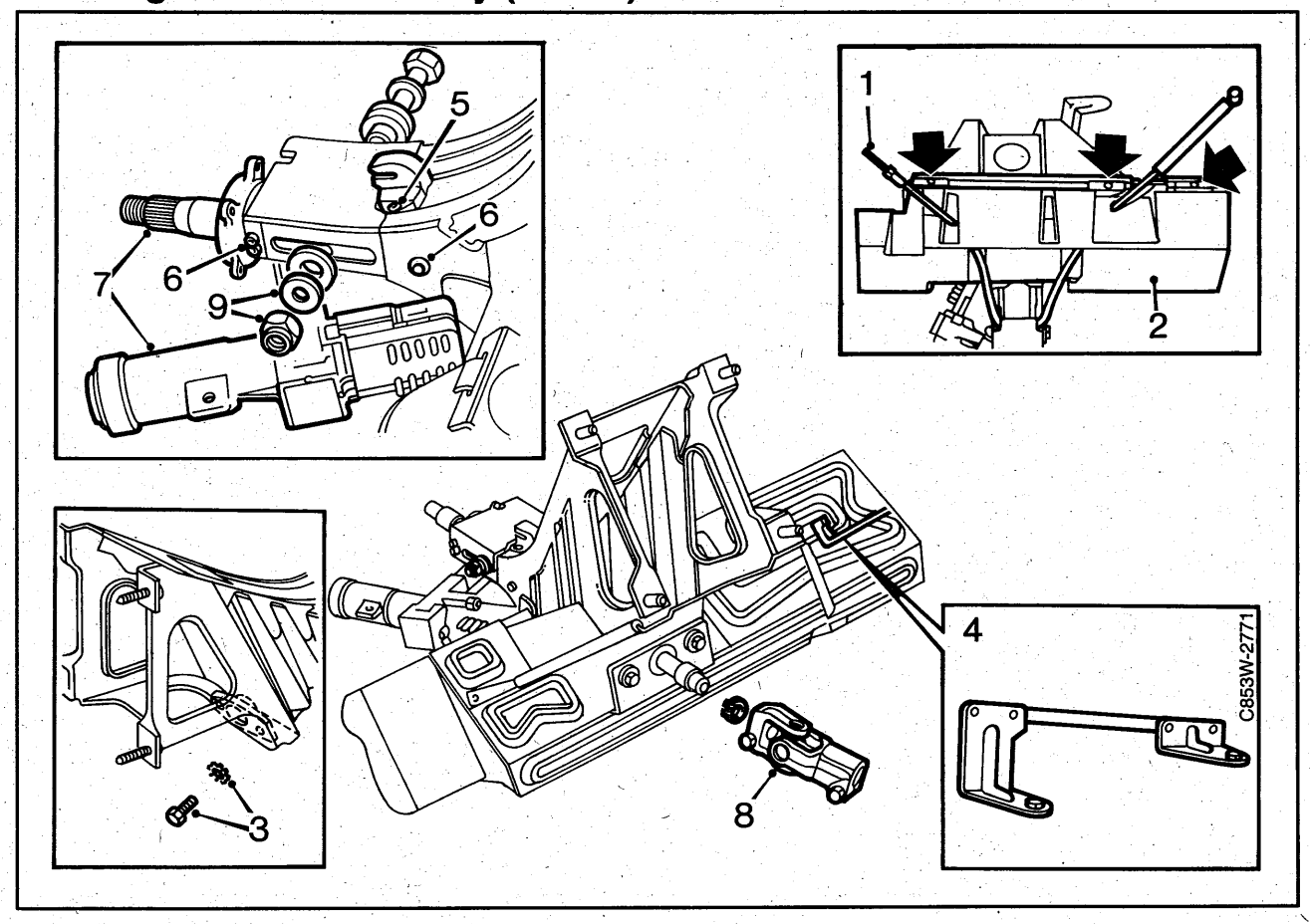
6 Drill out the pop rivets and remove the facia holder.

7 Remove the mounting brackets for the electronics holder.

8 Remove the steering column bearing housing and the vacuum hose clip.

9 Drill out the pop rivets securing the knee shield and remove it together with the safety wire.

Steering column assembly (contd.)



Steering column assembly, to assemble

1 Install the wire so that the threaded end comes up against the center console when installed in the car.

2 Fit the knee shield.

3 Fit the steering column bearing housing and the clip for the vacuum hose.

4 Fit the mounting brackets for the electronics holder.

5 Fit the facia holder.

6 Fit the slide rails.

7 Insert the steering column with the ignition lock bracket in the correct position and fit the circlip on the lower end of the steering column.

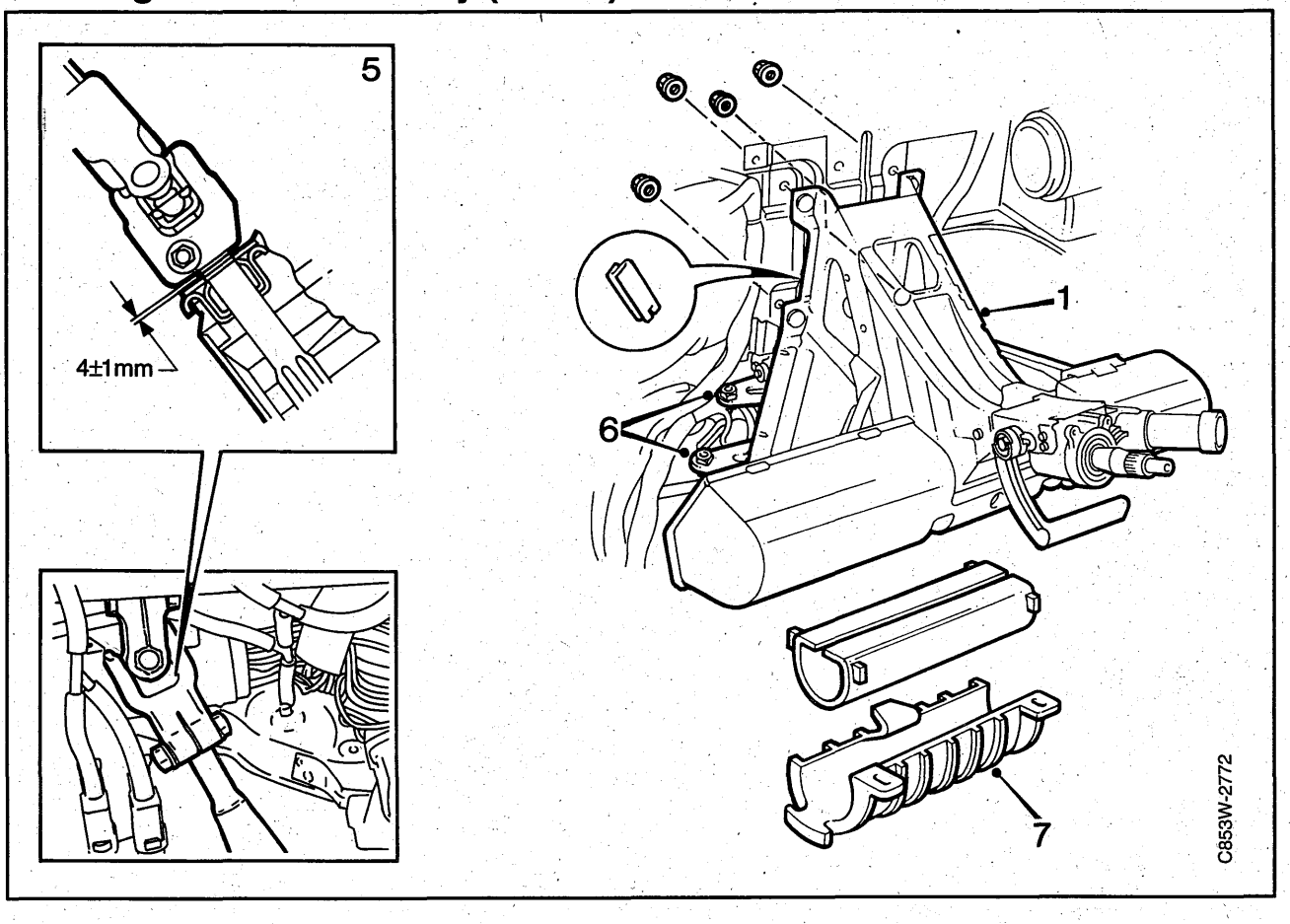
8 Fit the universal joint to the steering column assembly.

Tightening torque:
27 NM (20.0 lbf ft)

9 Fit the transverse bolt complete with spacer and washers.

Tighten the nut until a resistance can be felt when the steering wheel adjustment device is pushed in and pulled out while the friction brake is disengaged.

Steering column assembly (contd.)



Fitting

Important

Secure parts that have been previously removed, for example electrical leads and air ducts so that they will not rattle.

1 Make sure that any washers are placed in their original positions on the steering column securing bolts and position the steering column in place on the bulkhead partition.
Fit the vacuum hose on the steering column.
Install the wiring harness on the right–hand side of the steering column assembly and fit the cable tie to the steering column.

Fit the upper nuts that secure the steering column assembly.Fit the universal joint loosely on the intermediate shaft.
Fit the lower steering column nuts and tighten all four nuts.
Tightening torques:
23 Nm (17.0 lbf ft)
Waxed nuts (green chromed)
18 Nm (13,3 lbf ft)

2 Press the link arm onto the wiper spindle and fit the locking washer if any.

3 Position the electrical leads.

Refit the LH control module.

Fit the bracket for the ABS control module.

Fit the ABS control module in place.

Fit the clip that secures the ABS control module.

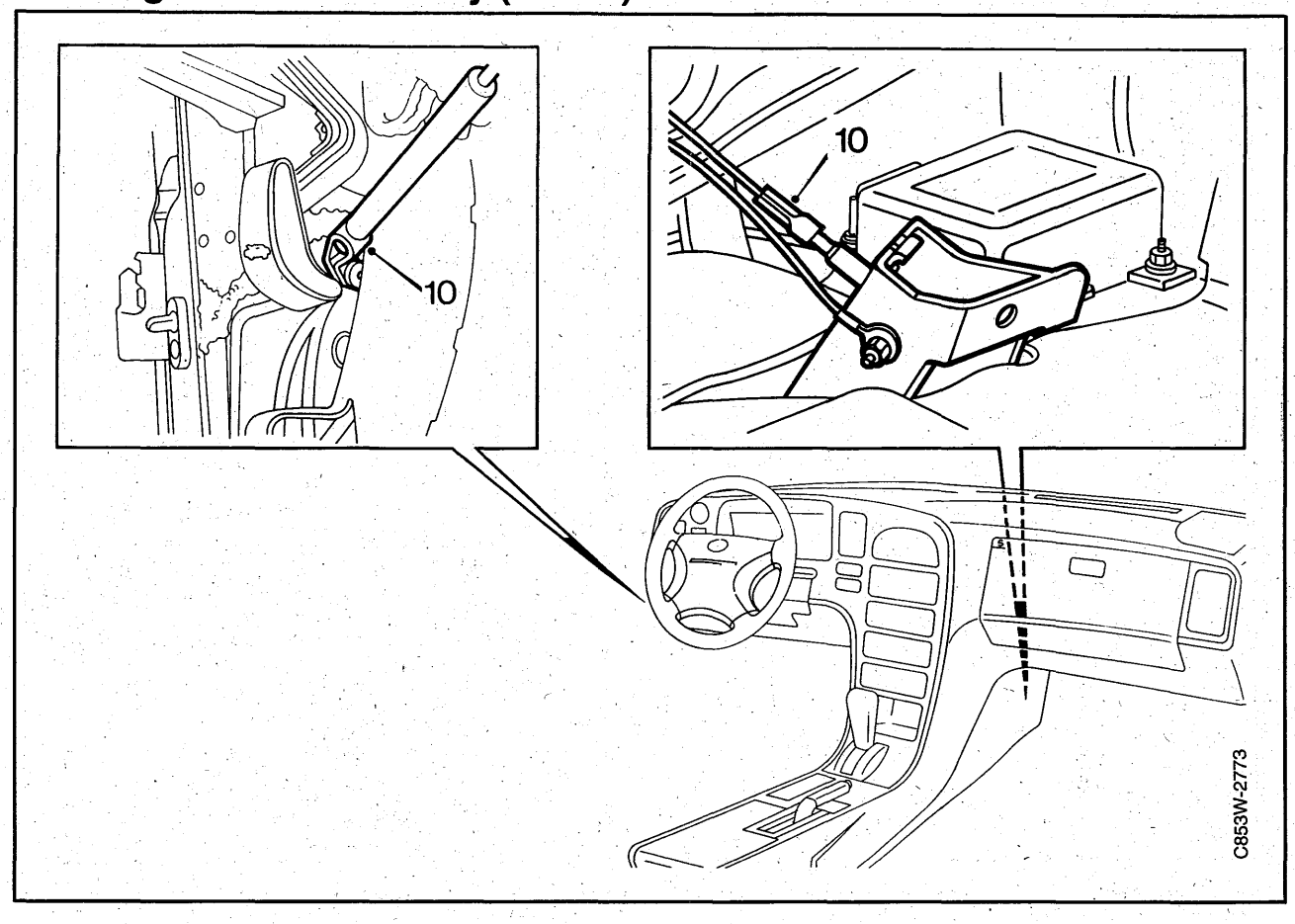
4 Refit the cover over the bulkhead partition space.

5 Adjust the clearance between the upper universal joint on the intermediate shaft and the steering column assembly. Pull out the steering column universal joint.
Tightening torque:
28 Nm (20,7 lbf ft)

6 Fit the electronics holder to the steering column.

7 Fit the wiring harness holder. Make sure that the plastic cover is in the correct position so that it covers the whole of the metal holder.

Steering column assembly (contd.)



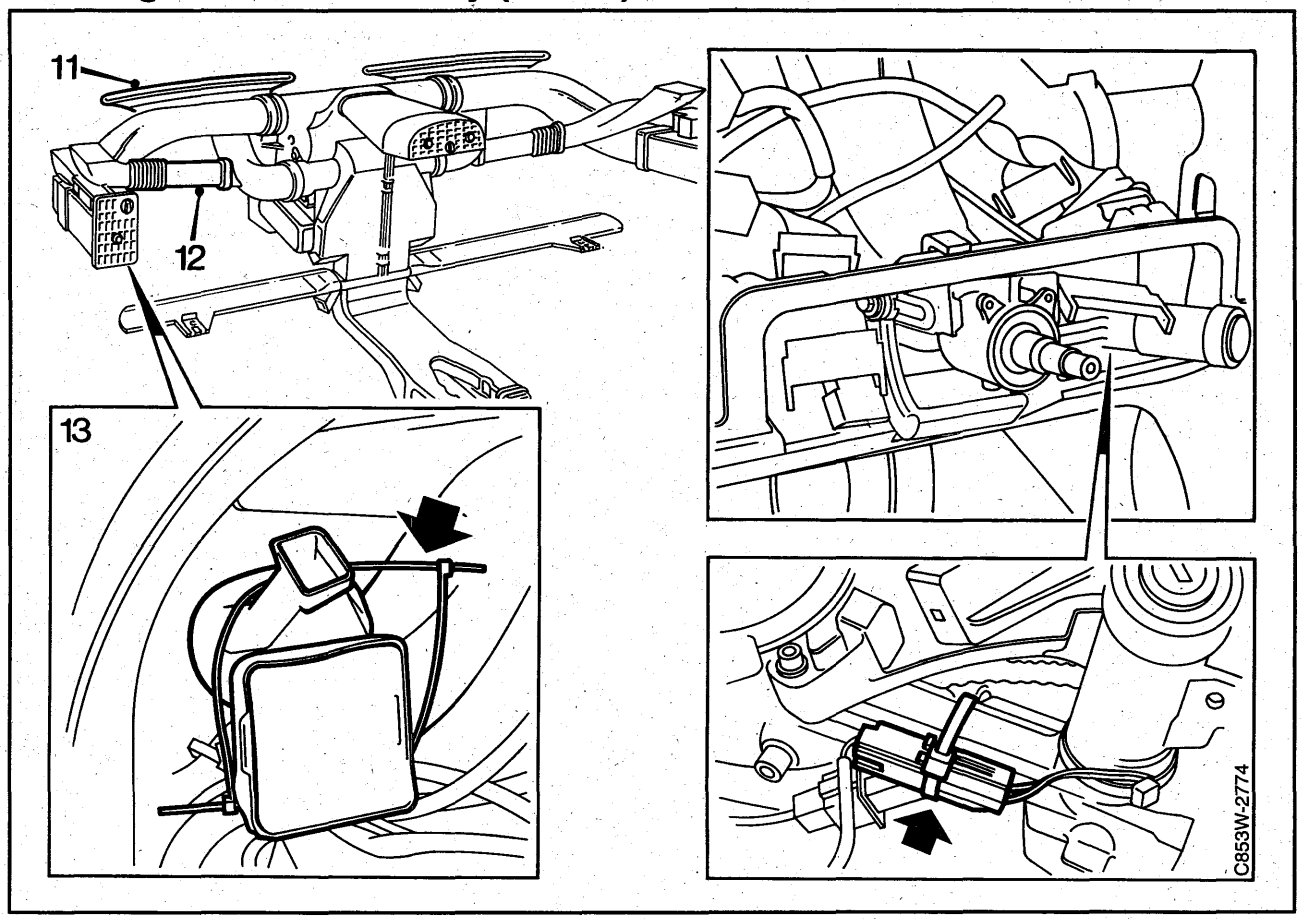
8 Place cabling in the correct position.

9 Plug in the ignition lock connector.

10 Fit the safety wire.

Tightening torque:
1,2 Nm (0,9 lbf ft)

Steering column assembly (contd.)



11 Fit the demister nozzle for the windshield on the driver side.

12 Fit the inner part of the side nozzle on the driver side.Note the clip.

13 Fit the side nozzle on the driver side.
Fit the air duct. Fasten them together with cable ties.

14 Place cabling in the correct position, run the turbo pressure gauge hose along the left–hand side of the steering column assembly and fasten it with tape.
Lift the facia into position. This will be made easier if an assistant can help.
Ensure that the facia goes in to the groove in the locating pad.

Fit and tighten the retaining screws. Refit the plastic covers over the screws.

Secure the safety wire to the facia using a cable tie.

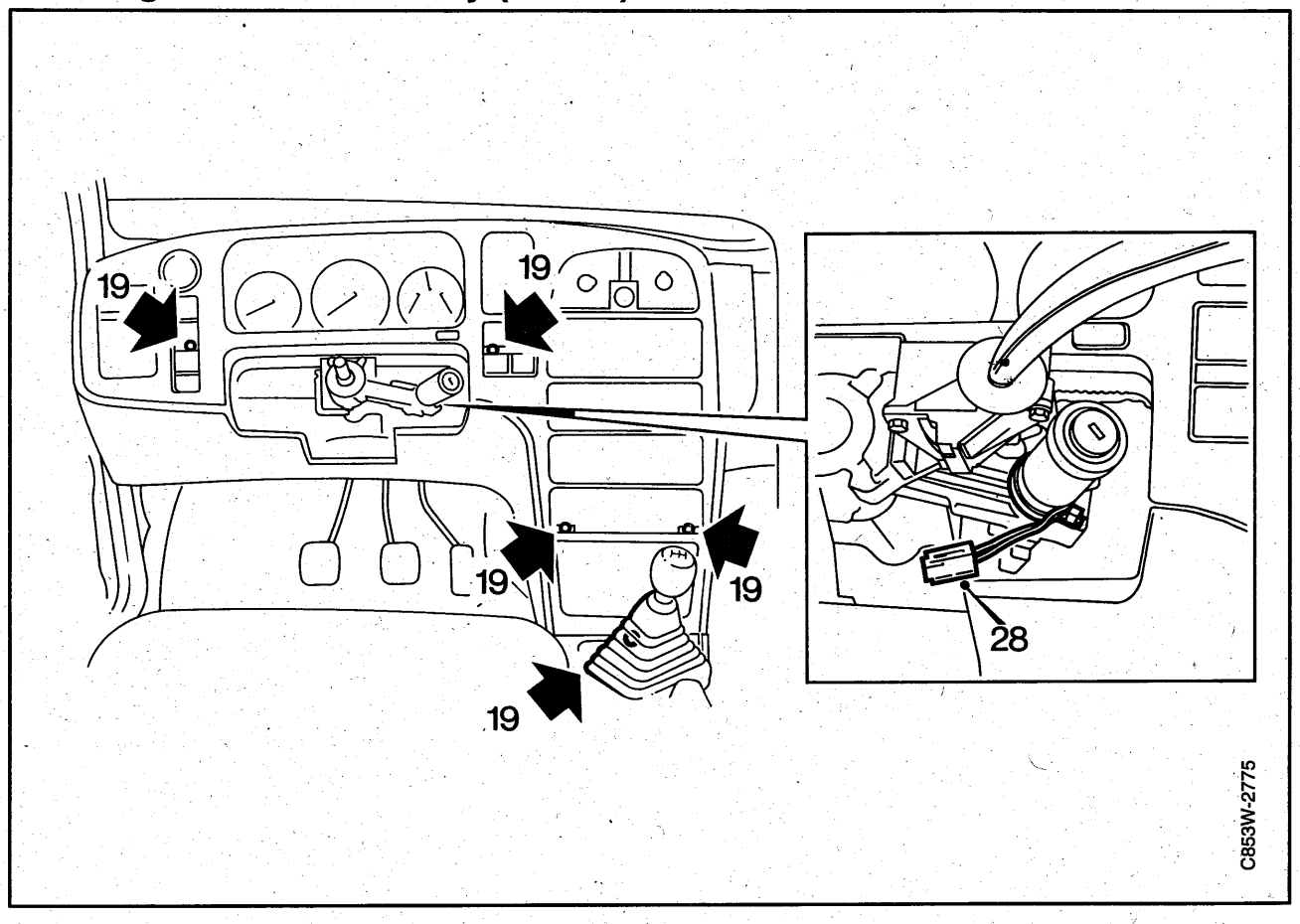
15 Plug in the speaker connectors.

16 Place the combined instrument upside down with the glass against the windshield and plug in all connectors.

Turn the instrument down and fit the rubber supports.

17 Position the instrument in the panel. Fit the hose to the turbo pressure gauge.
Fit the two securing screws.

Steering column assembly (contd.)



18 Secure the side demister nozzles in the facia.

19 Remove the outer cabin air damper from the facia and fit it to the air duct.
Fit the center cabin air damper.
Place the facia in position. Pull forward the switch connectors. Fit the air damper on the facia using a bent steel wire.
Screw the instrument plate and the cover panel in place over the gear lever housing.
Fit the gear lever gaiter.

20 Plug in the switch connectors. Press the switches into position and fit the cover plate.

21 Cars with A/C:
Press the interior temperature sensor into position and fit the cover.

22 Plug in connectors to the clock/SCC (DCC) module. Fit the clock/SCC (DCC) module.

23 Connect and fit the ACC control module.Clamp the lead.
Cars with manual A/C, see Service Manual 8:3.

24 Cars for the USA market:
Position the lower radio compartment.
Connect the antenna lead and the electrical connections to the upper radio compartment and fit the compartments.

25 Connect the ashtray lighting and the cigarette lighter connector and fit the ashtray holder.
Insert the ashtray.

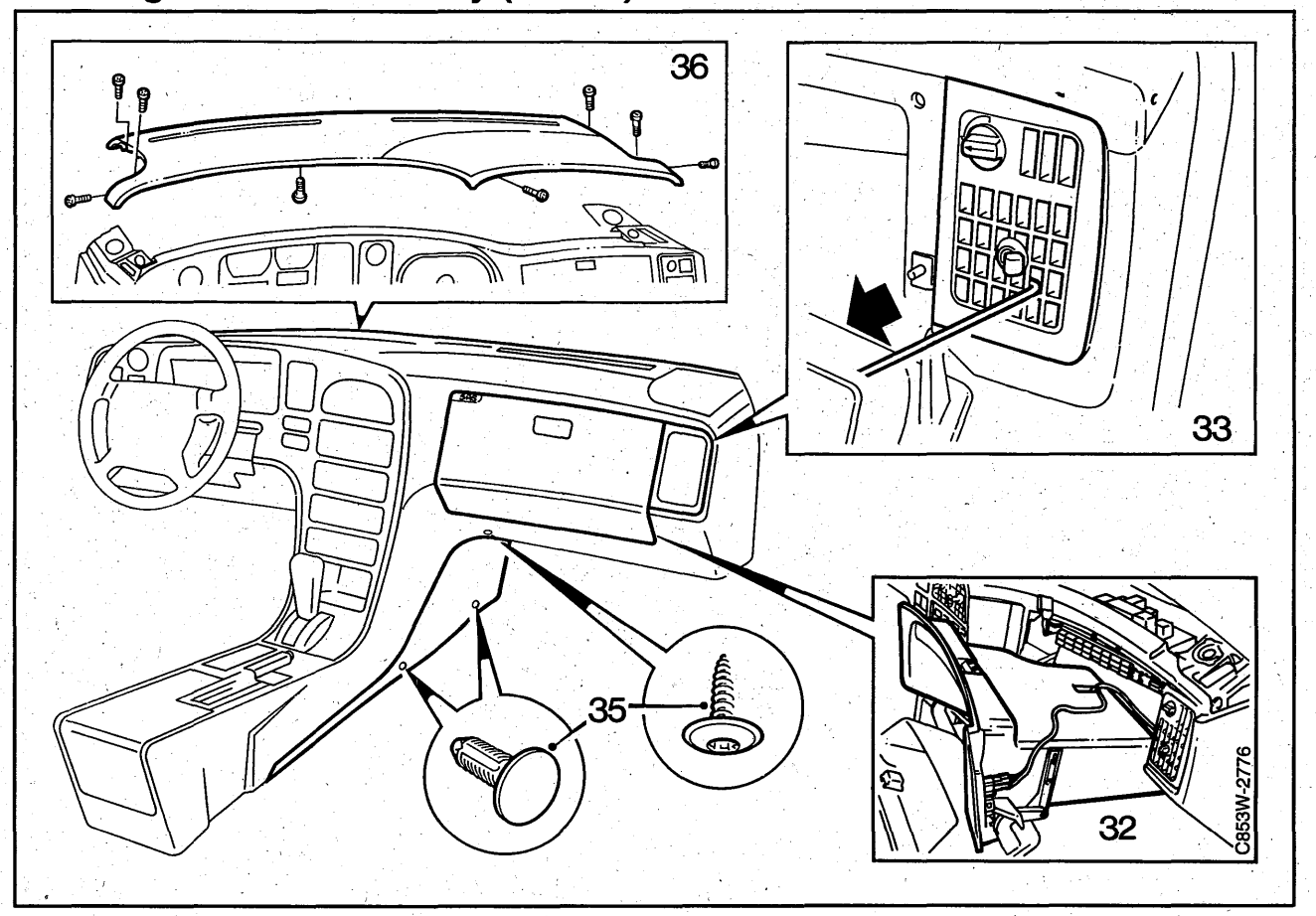
26 Fit the switch holder. Be careful to adjust the horizontal position of the holder.

27 Fit the wiper/washer stalk switch to the switch holder and plug in the connector.

Fit the direction indicator and light stalk switch to the switch holder and plug in the connector.

28 Fasten the airbag lead and the wiper and washer leads to the ignition lock housing using a cable tie.

Steering column assembly (contd.)



29 Fit the electrical distribution box.

30 Fit the anti–theft alarm control module to the facia. The control module is located to the right under the electrical distribution box.

In cars with a passenger airbag, the control module is located on the airbag bracket.

31 Remove the cabin air damper from the glove compartment and fit the damper to the air duct.

32 Connect the leads to the glove compartment lighting and switch. Fit the glove compartment.

33 Pull the cabin air damper into position using a bent metal wire.

34 Fit the floor ducts under the facia on the left and right sides.

35 Fit the panels (carpets) on the center console. Guide the top edge into the groove on the center console and then fit the clips.

36 Fit the safety wire on the top part of the facia.

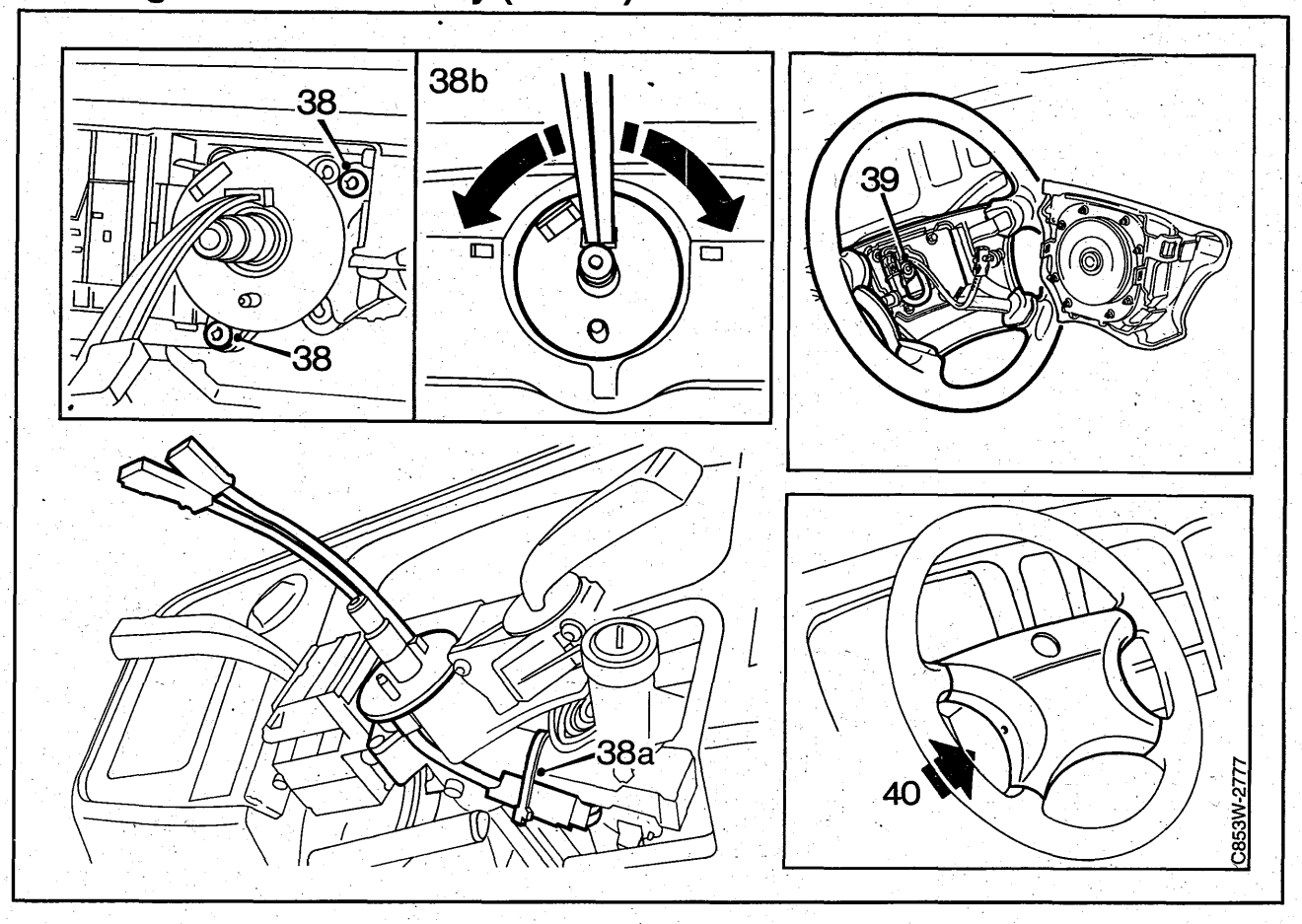
Tightening torque, safety wire:
28 Nm (20,7 lbf ft)

Left–hand side:
Where fitted, plug in the connector for the anti–theft alarm LED, fit the spacer and the speaker grilles.

Right–hand side:
Where fitted, connect the solar sensor. Fit the spacer and speaker grilles.
Note the position of the solar sensor, on top of the facia in the middle

37 Fit the trim on the A pillars.

Steering column assembly (contd.)



38 Fit the contact roller as follows:

Important

The contact roller is fragile. Handle with care.

Remove the transport protection ,if any.
Fit the contact roller in the holder.
Plug in the connectors for the horn and the connectors (orange) for the airbag.

38a Fasten the connectors and the wiring to the steering column assembly using a cable tie.

Fit the upper steering column cover and then the lower one (4 screws). Make sure that the leads to the contact roller are not pinched by the cover's center retaining screw.

38b Set the contact roller to its center position as follows:
Check that the wheels are pointed straight forward
Rotate the contact roller counter clockwise to its end position. Then rotate it clockwise half–way back, that is to say 2.5 turns.

39 Fit the steering wheel as follows:
Push the leads through the hole.
Adjust the steering wheel position at the same time as the contact roller is adjusted to the steering wheel.
Fit the steering wheel nut.
Turning torque:30 Nm (22.2 lbf ft)
Plug in the horn connector.

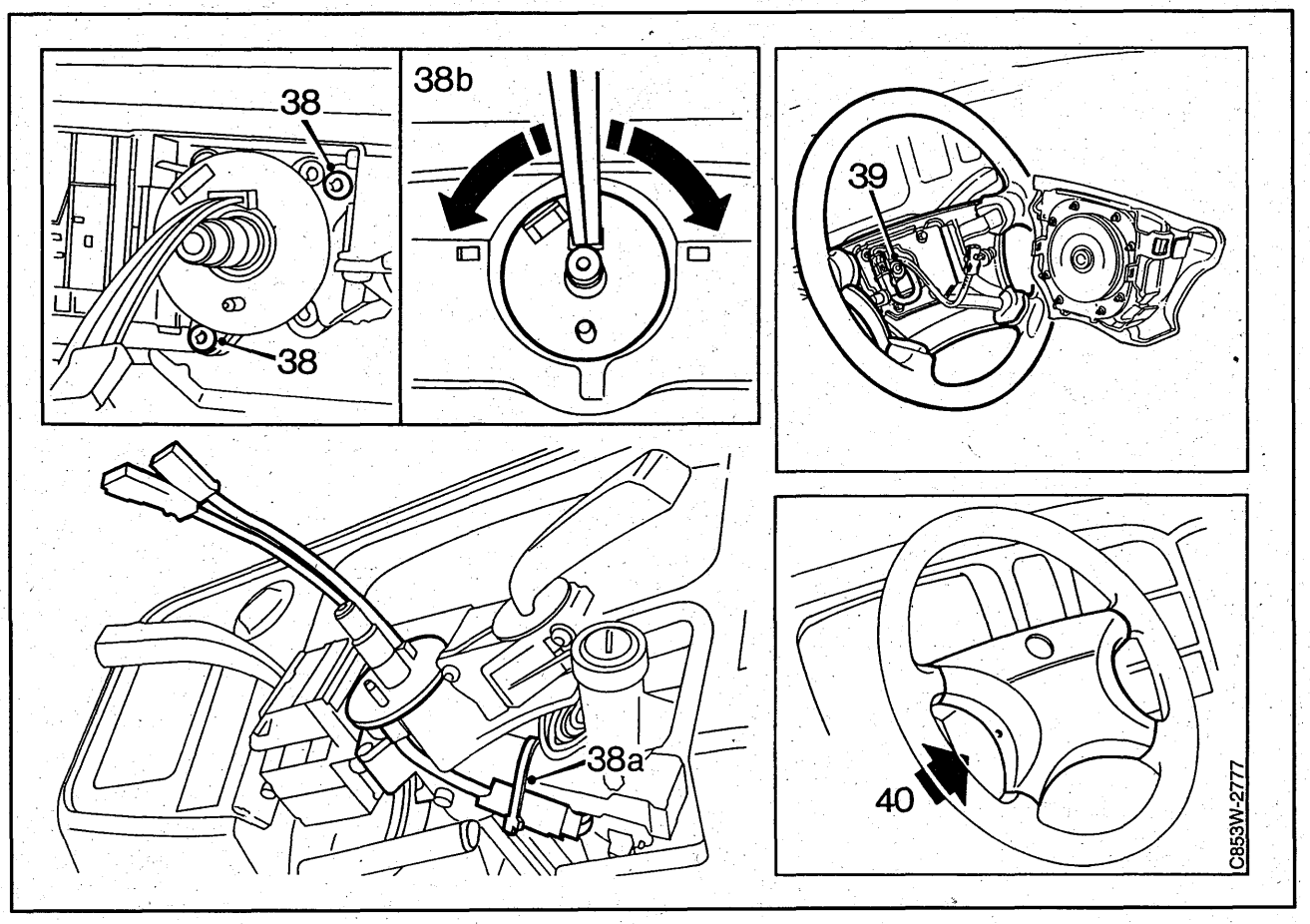
40 Plug in the steering wheel airbag connector and fit the airbag.

Turning torque:
7,0 Nm (5,2 lbf ft)

41 Connect the battery lead.

42 Fit the sill scuff plates. Fit the left–hand and right–hand sound baffles.

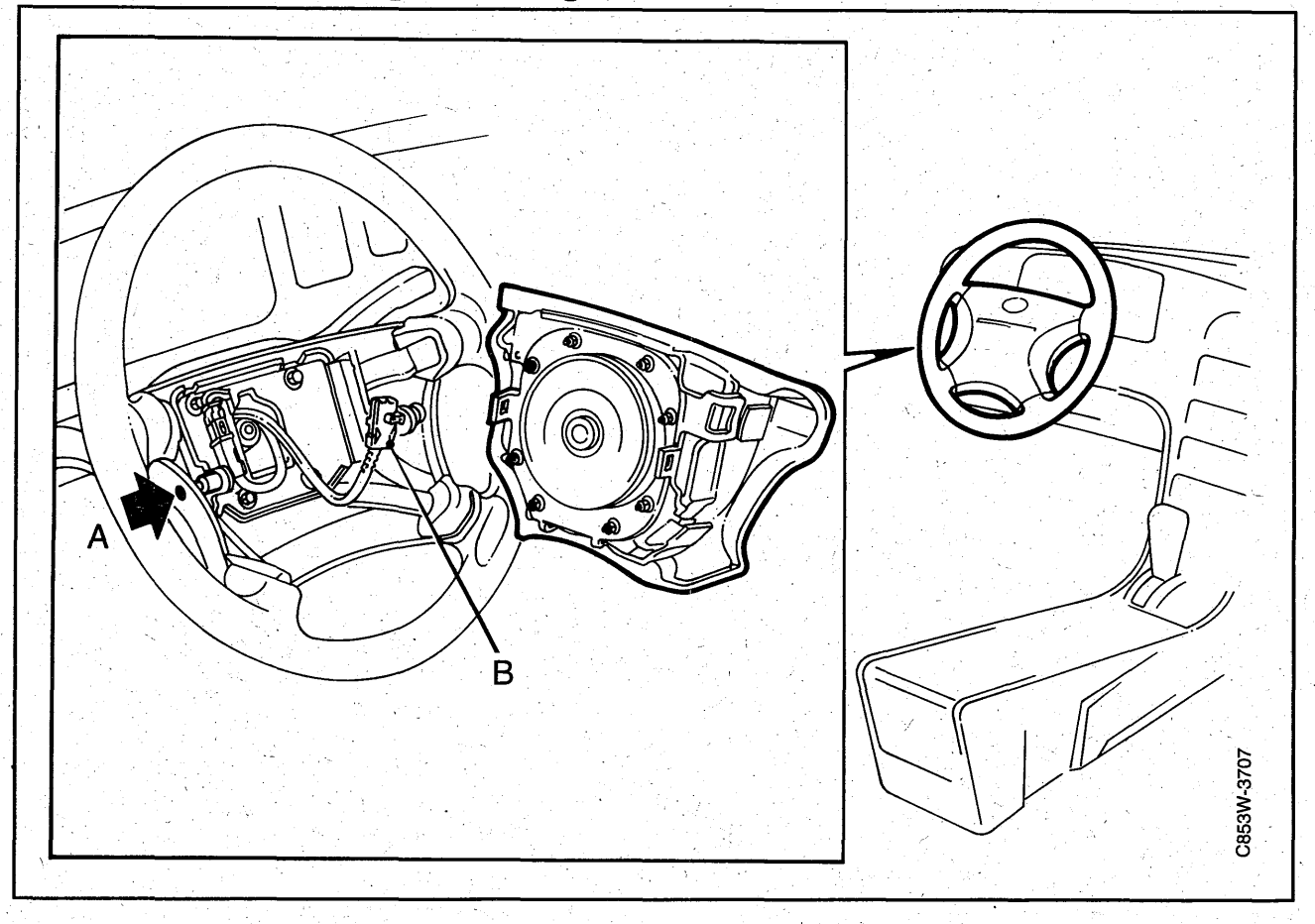
Steering column assembly (contd.)



43 Connect an ISAT to the data link connector and erase any diagnostic trouble codes.

Switch on the ignition and wait for at least 10 seconds with the ignition on. Check that the SRS lamp lights for 3–4 seconds and then goes out. Check that the SRS lamp does not show a fault (stays lit).
Disconnect the ISAT.

Steering wheel airbag, to change



> **⚠ WARNING**
>
> Before starting work, read the Safety and handling instructions section.

To remove

1 Disconnect the negative lead from the battery.

Important

The engine must not be running when the battery lead is disconnected. The alternator may be seriously damaged.

2 Remove the rubber plugs over the airbag retaining screws (A).

3 Remove the two airbag retaining screws (A).

4 Lift out the airbag and unplug the connector (B).

Fitting

1 Fit the connector to the airbag (B).

2 Fit the airbag (A).
Tightening torque: Airbag screws 7,0 Nm (5,2 lbf ft).

3 Fit the rubber plugs over the screws (A).

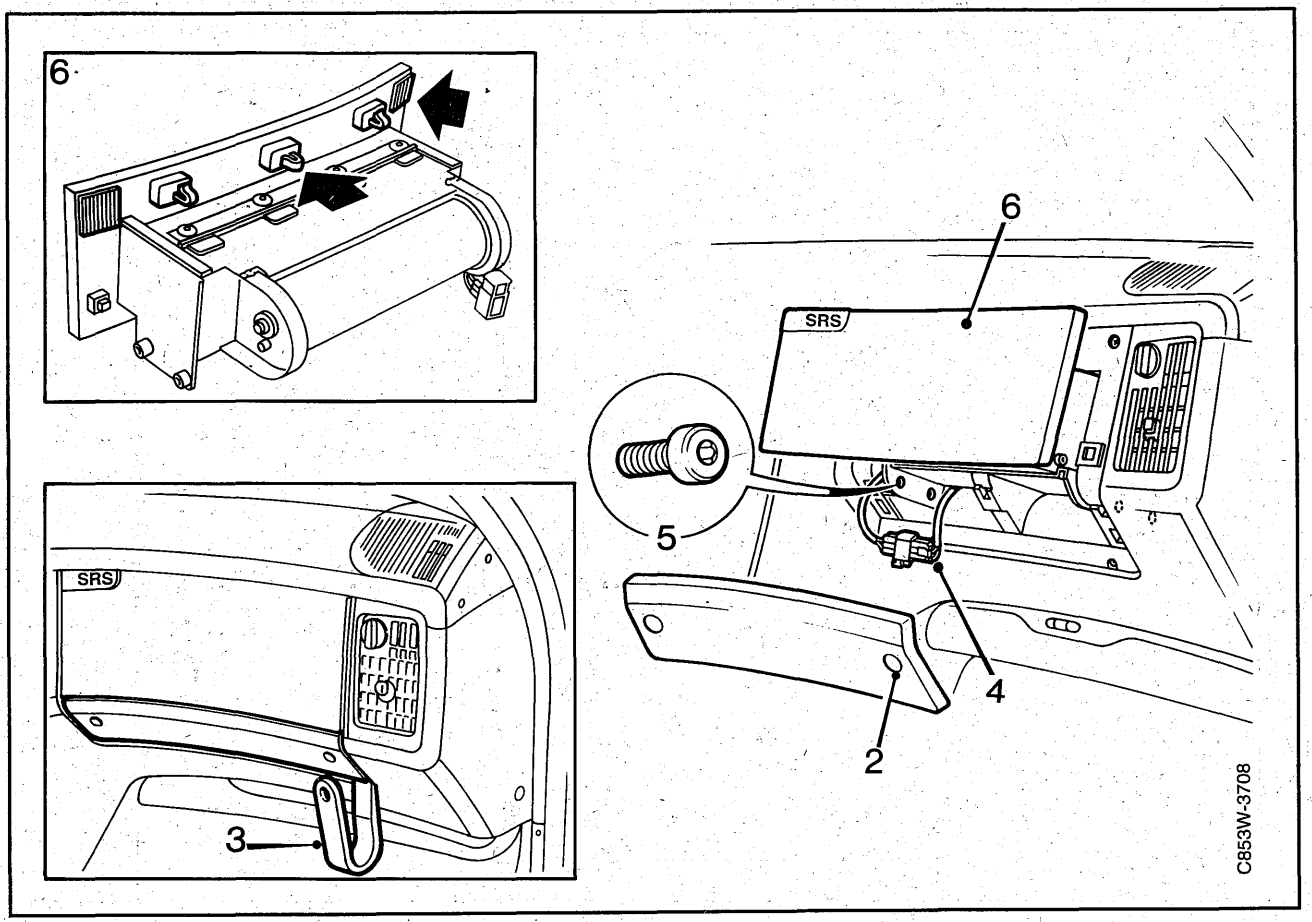
4 Connect the negative battery lead.

5 Connect an ISAT to the data link connector and erase any diagnostic trouble codes.

Switch on the ignition and wait for at least 10 seconds with the ignition on. Check that the SRS lamp lights for 3–4 seconds and then goes out. Check that the SRS lamp does not show a fault (stays lit).

Disconnect the ISAT.

Passenger airbag, to change



⚠ WARNING

Before starting work, read the Safety and handling instructions section.

To remove

1 Disconnect the negative lead from the battery.

2 Remove the plastic covers from over the two screws securing the lower cover panel. Remove the screws.

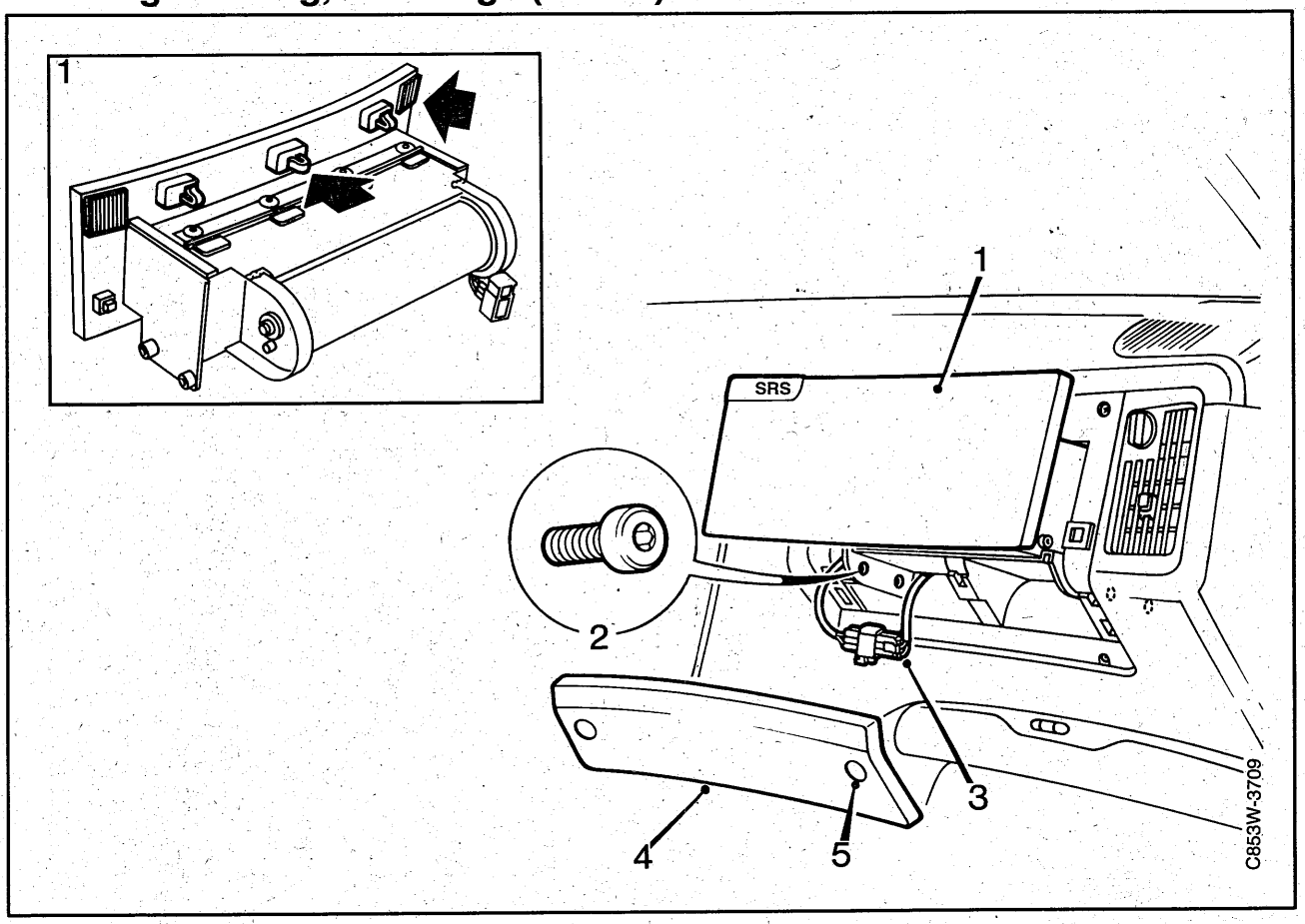
3 Pull the lower cover away (this is also held in place with clips). Use tool 82 92 997 and work from right to left. Do not use force.

4 Unplug the airbag connector.

5 Remove the four airbag securing screws (two on each side) in the space below the removed cover.

6 Grip both hands behind the airbag and pull it out. (The airbag is also secured with clips.)

Passenger airbag, to change (contd.)



⚠ WARNING

Before starting work, read the Safety and handling instructions section.

Fitting

1 Fit the airbag. Make sure the clips fasten.

2 Fit the four screws, two on each side in the space under the airbag.
Tightening torque: 4 Nm (3 lbf ft)

3 Plug in the airbag connector.

4 Fit the lower cover.

5 Fit the screws that secure the lower cover panels and then fit the plastic covers over the screws.

Tightening torque: 4 Nm (3 lbf ft)

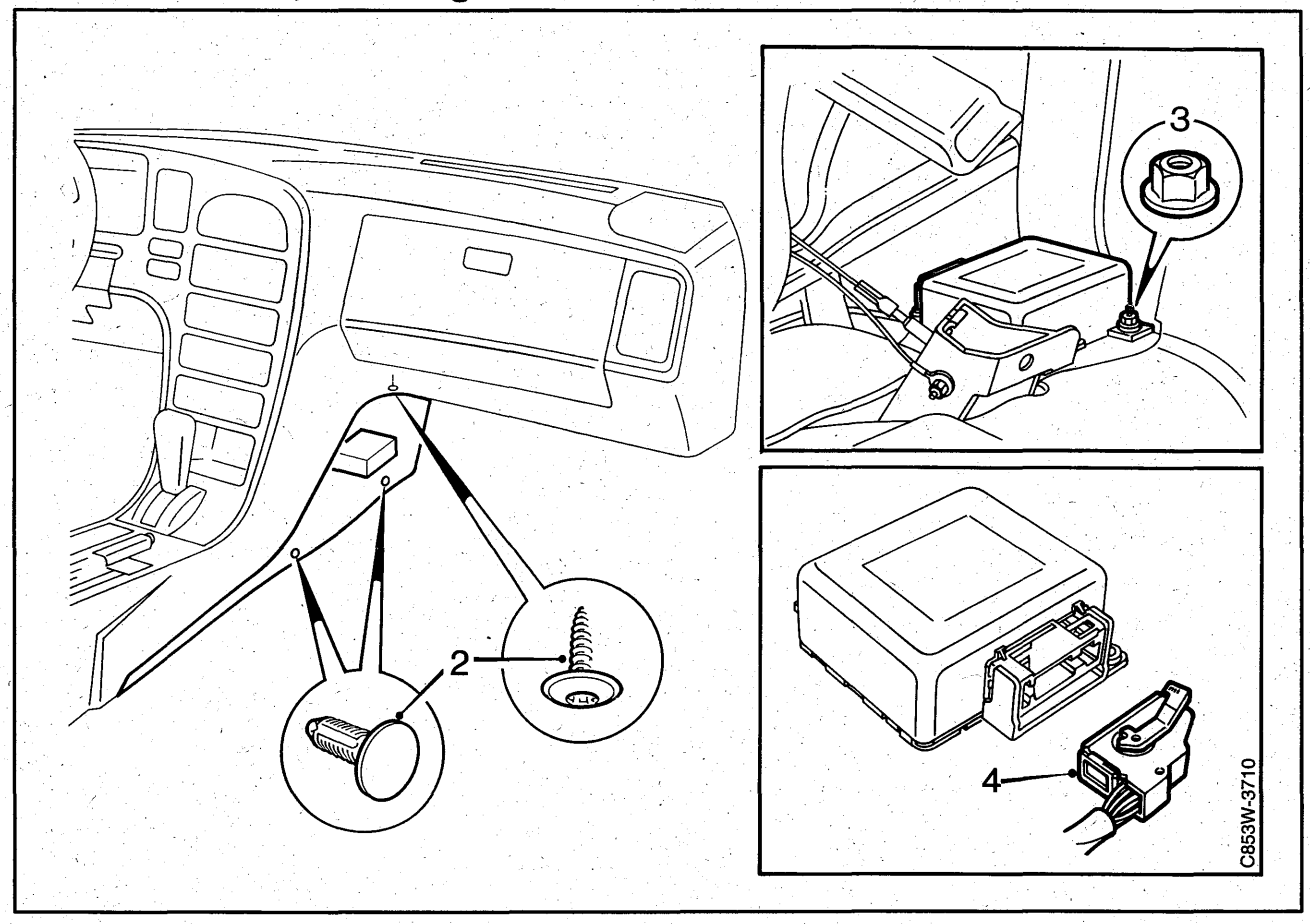
6 Connect the negative battery lead.

7 Connect the ISAT to the data link connector and erase any diagnostic trouble codes.

8 Switch on the ignition and wait for at least 10 seconds with the ignition on. Check that the SRS symbol lights for 3–4 seconds and then goes out. Check that the SRS lamp does not show a fault (stays lit).

9 Disconnect the ISAT.

Control module, to change



⚠ WARNING

Before starting work, read the Safety and handling instructions section.

1 Disconnect the negative battery lead

2 Remove the carpet on the center console on the passenger side.

3 Remove the three control module securing screws.

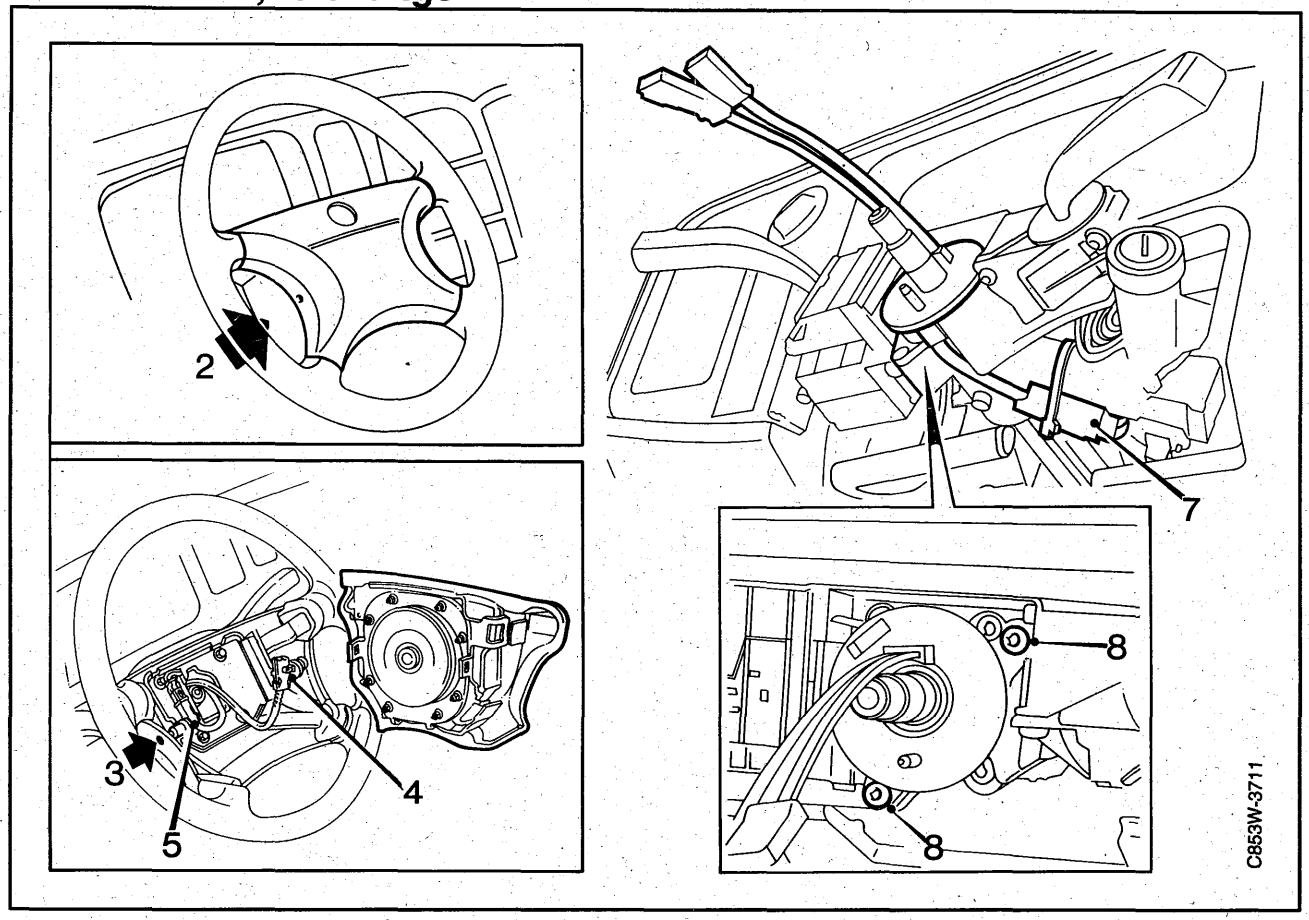
4 Unplug the connector from the control module.

Fitting is in reverse order.

Tightening torque, control module: 9 Nm (6.6 lbf ft).

Connect ISAT to the data link connector and program in the number of airbags that the car is equipped with. Erase any diagnostic trouble codes.
Switch on the ignition and wait for at least 10 seconds with the ignition on. Check that the SRS lamp lights for 3–4 seconds and then goes out. Check that the SRS lamp does not show any fault (stays lit).
Disconnect the ISAT.

Contact roller, to change



> **⚠ WARNING**
>
> Before starting work, read the Safety and handling instructions section.

To remove

1 Disconnect the negative lead from the battery.

Important

The engine must not be running when the battery lead is disconnected.
The alternator may be seriously damaged.

2 Remove the rubber plugs from the airbag securing screws.

3 Remove the two securing screws holding the steering wheel airbag.

4 Lift out the airbag and unplug the connector.

5 Position the wheels directly forward. Release the horn connector in the steering wheel. Remove the steering wheel (M22).

6 Remove the steering column covers.

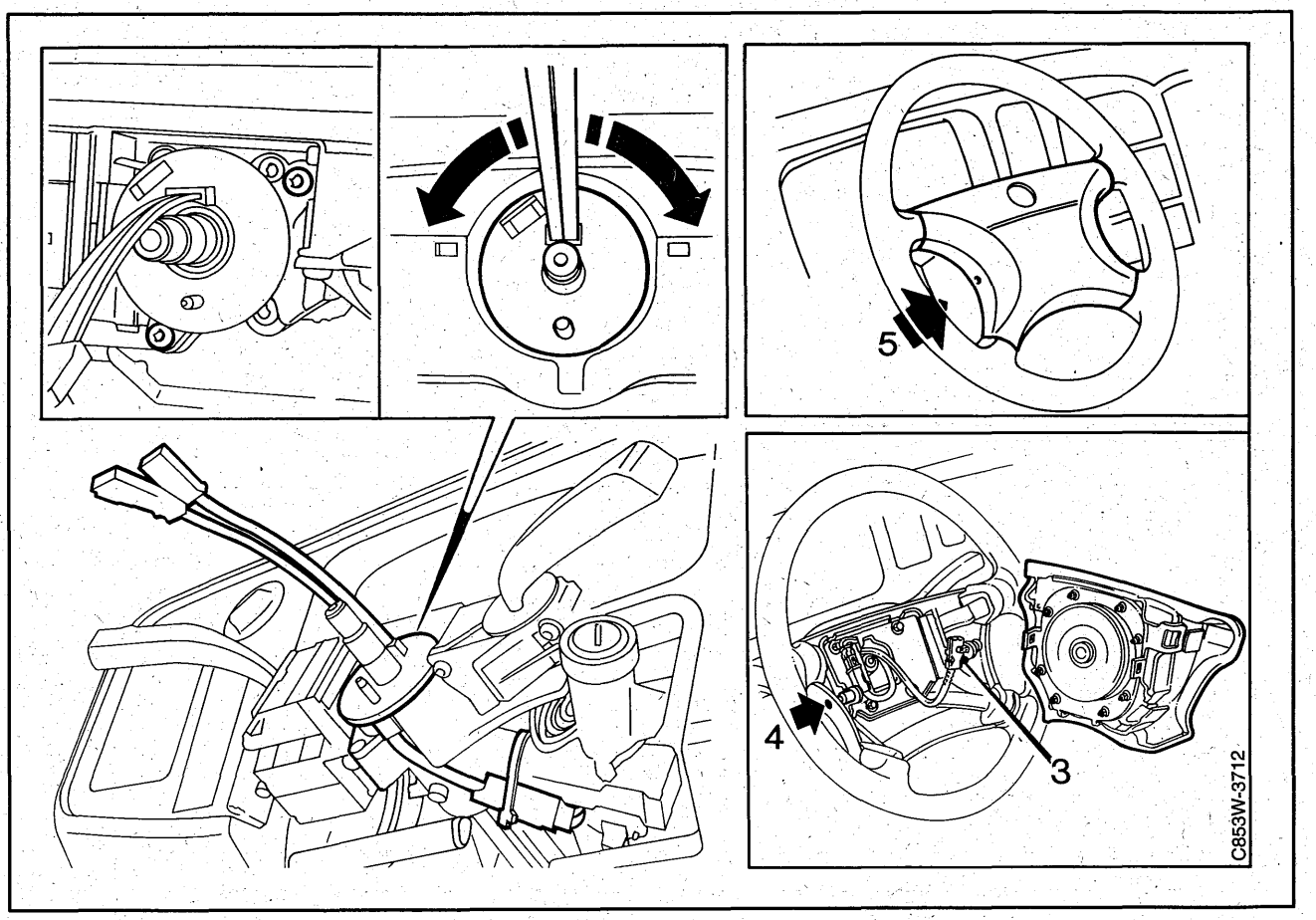
7 Unplug the horn connector.
Cut the cable tie and unplug the contact roller connector.

8 Remove the two screws securing the contact roller and lift it out.

Important

The contact roller is fragile. Handle with care.

Contact roller, to change (contd.)



Fitting

1 Fit the contact roller as follows:

Important
The contact roller is fragile. Handle with care.

Remove the transport protection ,if any.

Fit the contact roller in the holder.

Plug in the airbag connector (orange) and the horn connector.

Fasten the connectors and leads to the steering column using a cable tie.

Fit the upper steering column cover and then the lower one (4 screws). Make sure that the leads to the contact roller are not pinched by the cover's center retaining screw.

1a Set the contact roller center position as follows:

Check that the wheels are positioned straight forward.

Rotate the contact roller counter clockwise to the end position. Then rotate it half–way back, that is to say 2.5 turns.

2 Fit the steering wheel as follows:

Push the leads through the hole.

Set the steering wheel position at the same time as the contact roller is set to the steering wheel.

Fit the steering wheel nut.

Tightening torque: 30 Nm (22.1 lbf ft)
Plug in the horn connector.

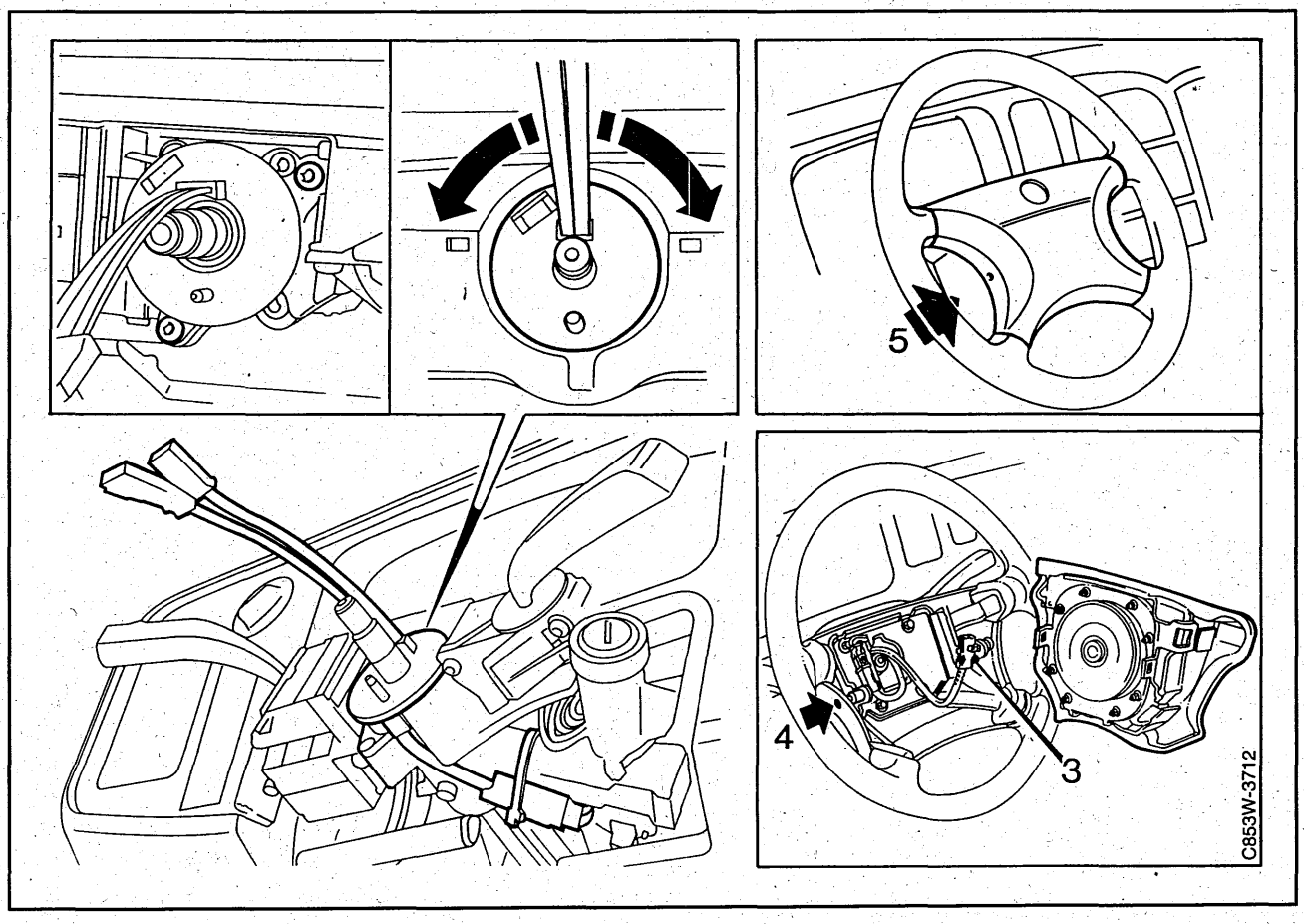
3 Fit the airbag connector.

4 Fit the airbag.
Tightening torque: Airbag screws 7,0 Nm (5.2 lbf ft).

5 Fit the rubber plugs over the screws.

6 Connect the negative battery lead.

Contact roller, to change (contd.)

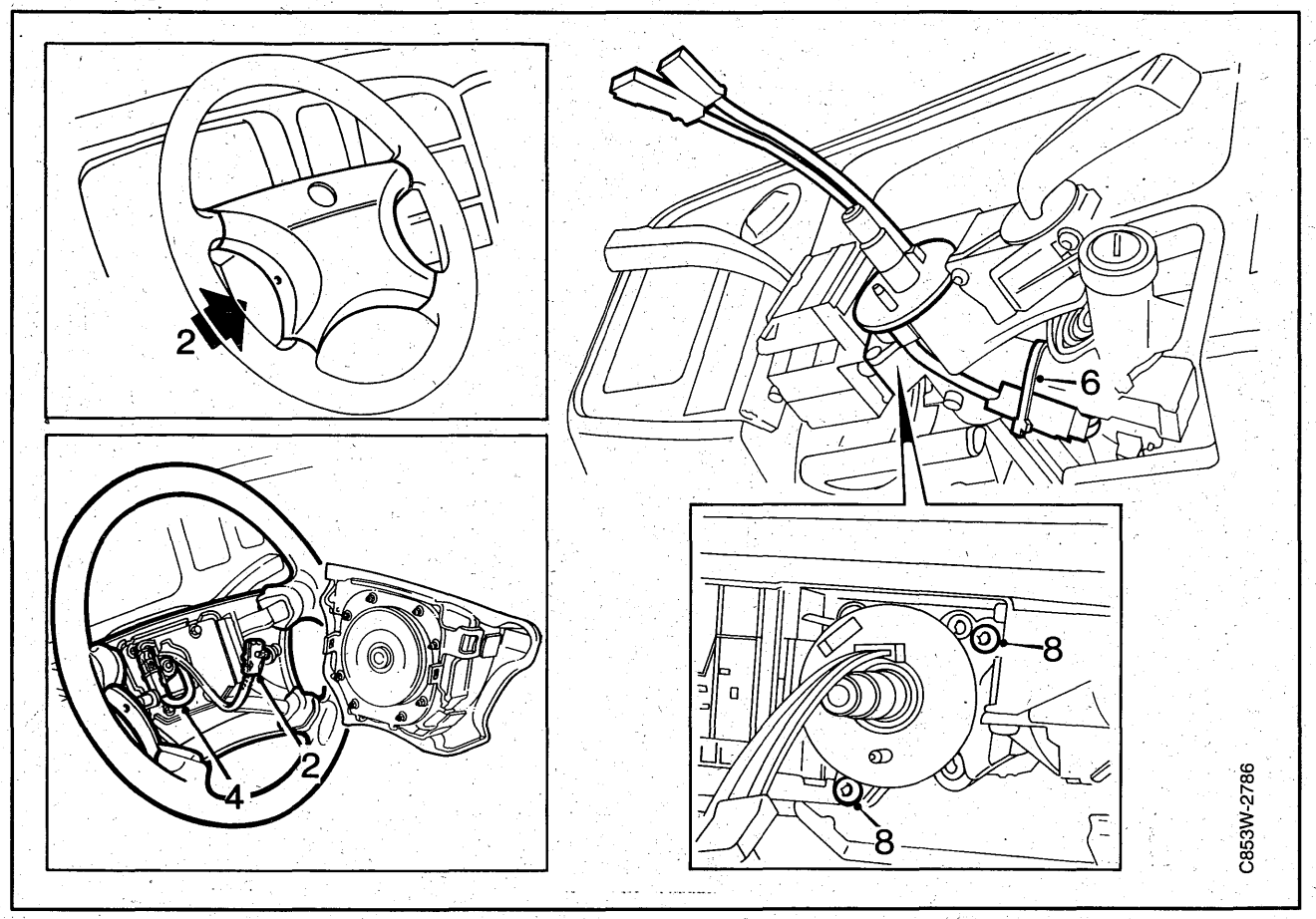


7 Plug in ISAT to the data link connector and erase any diagnostic trouble codes.

Switch on the ignition and wait for at least 10 seconds with the ignition on. Check that the SRS lamp lights for 3–4 seconds and then goes out. Check that the SRS lamp does not show a fault (stays lit).

8 Disconnect the ISAT.

Steering column lock



⚠ WARNING

Before starting work, read the Safety and handling instructions section.

To remove from car

1 Disconnect the negative lead from the battery.

Important

The engine must not be running when the battery lead is disconnected. The alternator may be seriously damaged.

2 Undo the two securing screws holding the steering wheel airbag and unplug the connector.

Remove the airbag.

3 Position the wheels straight forward.

4 Unplug the horn connector. Remove the steering wheel (M22).

5 Remove the upper and lower steering column covers (four screws).

6 Cut the cable ties securing the electric leads to the steering column assembly.

7 Unplug the connectors from the wiper/washer and direction indicator stalk switches.

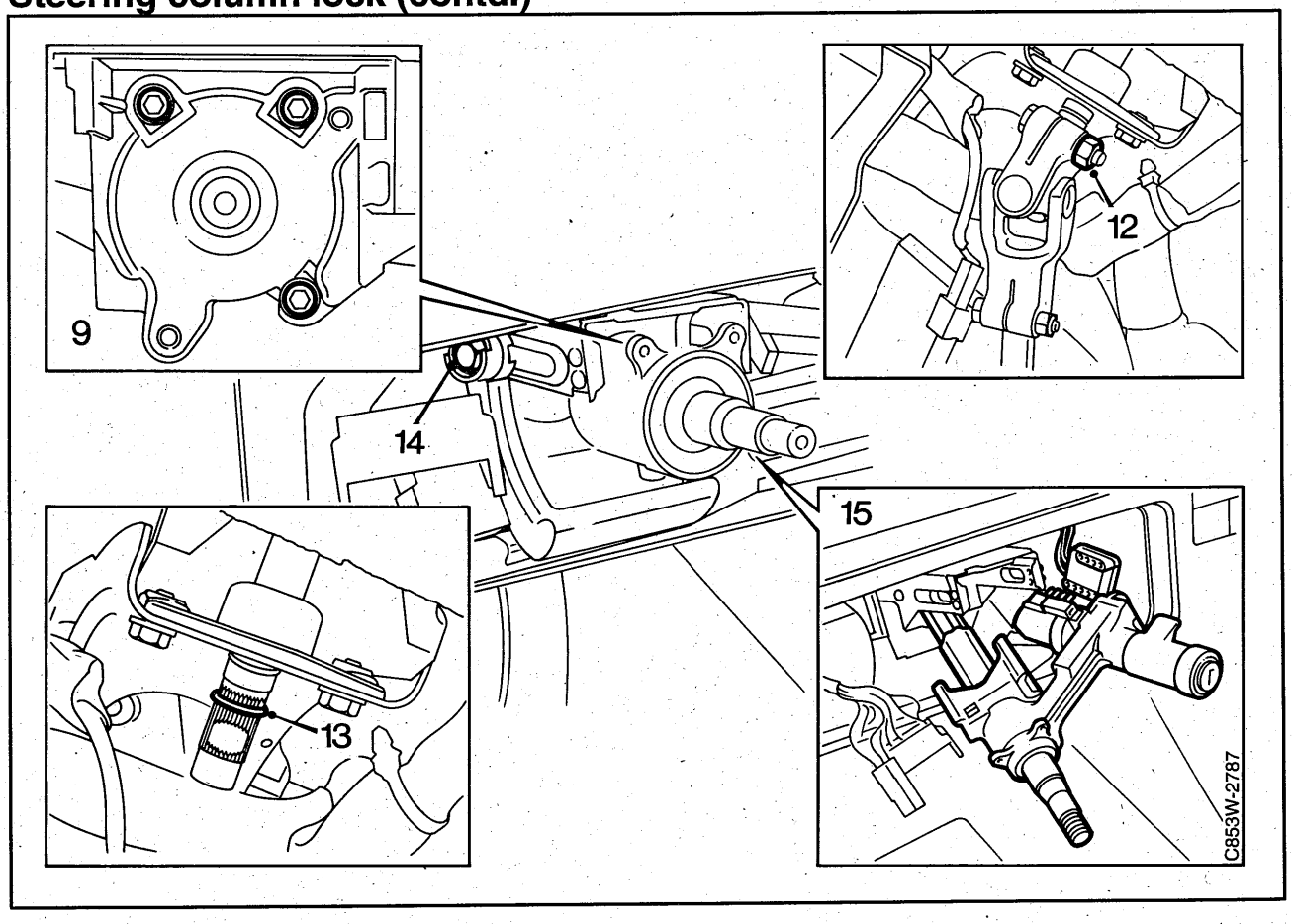
Unplug the airbag and horn connectors. Mark the connectors.

8 Remove the two screws securing the contact roller and lift it out.

Important

The contact roller is fragile. Handle with care.

Steering column lock (contd.)



9 Remove the stalk switch holder.

10 Remove the sound baffle under the facia.

11 Remove the floor air duct.

12 Remove the two bolts on the universal joint between the steering column assembly and the intermediate shaft and pull the universal joint off the steering column splines.

13 Remove the retaining ring at the lower end of the steering column.

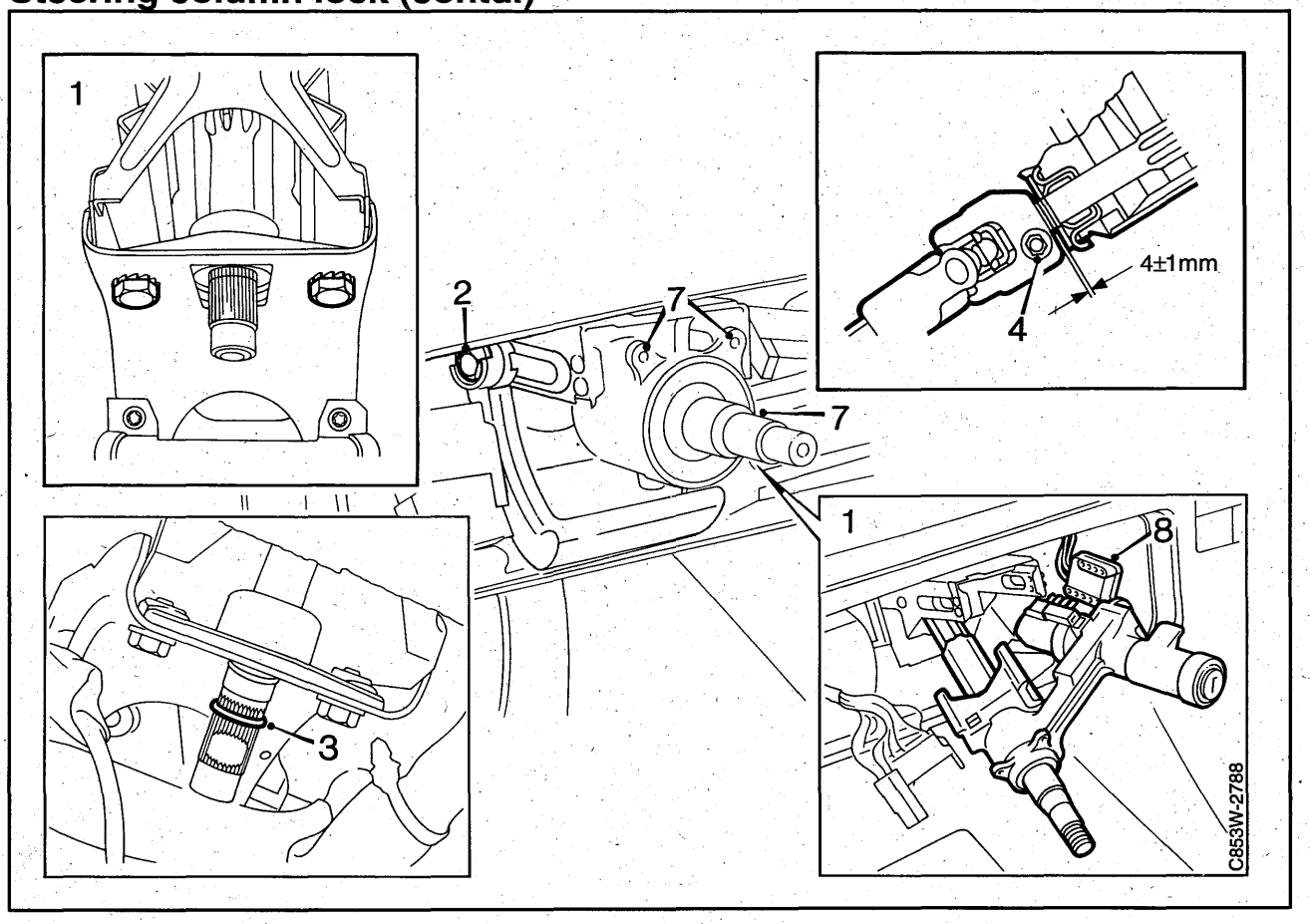
14 Remove the transverse bolt together with the spacer and washers.

15 Push the steering column up through the lower bearing and withdraw it together with the steering column lock from the steering column assembly. unplug the connector from the ignition lock.

Important

The two parts of the steering column assembly are matched and may under no circumstances be separated.

Steering column lock (contd.)



To fit in car

1 Position the steering column complete with steering column lock in place.Plug in the ignition lock connector. Make sure that the steering column enters the lower bearing in the steering column assembly and protrudes about 30 mm so that the universal joint can be fitted.

2 Fit the transverse bolt complete with spacer and washers.

Tightening torque: 20 Nm (14.8 lbf ft)

3 Fit the retaining ring on the lower end of the steering column.

4 Fit the universal joint between steering column and the intermediate shaft. Make sure that the bolt in the lower clamped joint is tightened below the stop at the end of the intermediate shaft. Adjust the clearance between the universal joint and the steering column assembly.

Tightening torque
27 Nm (20,0 lbf ft)

Clearance should be 4 ± 1 mm (0.16 mm ± 0.04 in)

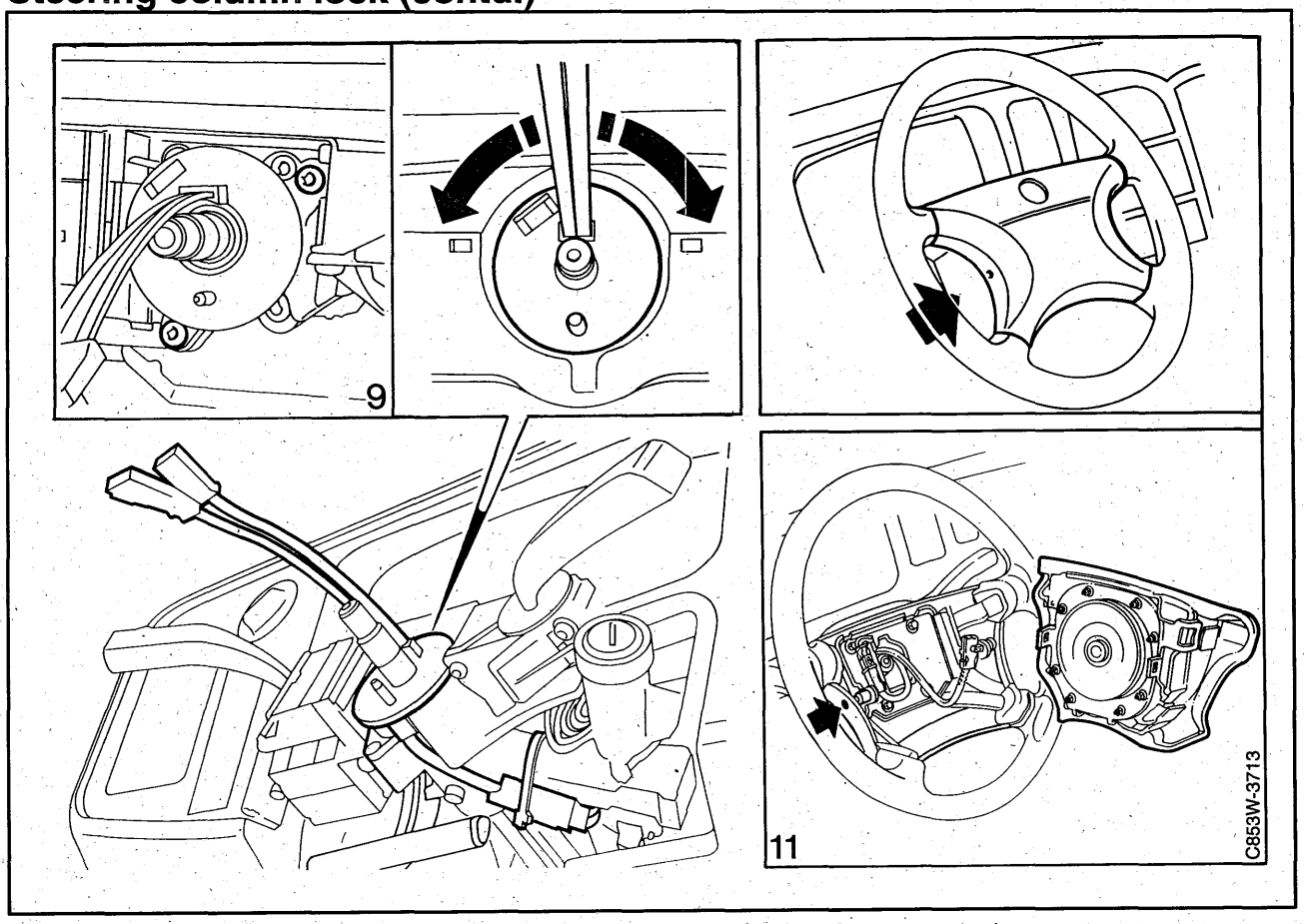
5 Fit the floor air duct.

6 Fit the sound baffle under the facia.

7 Fit the holder with stalk switches. carefully adjust the horizontal position of the holder.

8 Plug in the connector for the stalk switches.

Steering column lock (contd.)



9 Fit the contact roller as follows:

Important
The contact roller is fragile. Handle with care.

Fit the contact roller in the holder.

Plug in the airbag connector (orange) and the horn connector.

Fasten the connectors and wiring to the steering column assembly with a cable tie.

Fit the upper steering column cover and then the lower one (4 screws). Make sure that the leads to the contact roller are not pinched by the cover's center retaining screw.

Set the contact roller center position as follows:
Check that the wheels are positioned straight forward.
Rotate the contact roller counter clockwise to the end position. Then rotate it half–way back, about 2.5 turns.

10 Fit the steering wheel as follows:

Push the leads through the hole.

Set the steering wheel position at the same time as the contact roller is set to the steering wheel.

Fit the steering wheel nut.

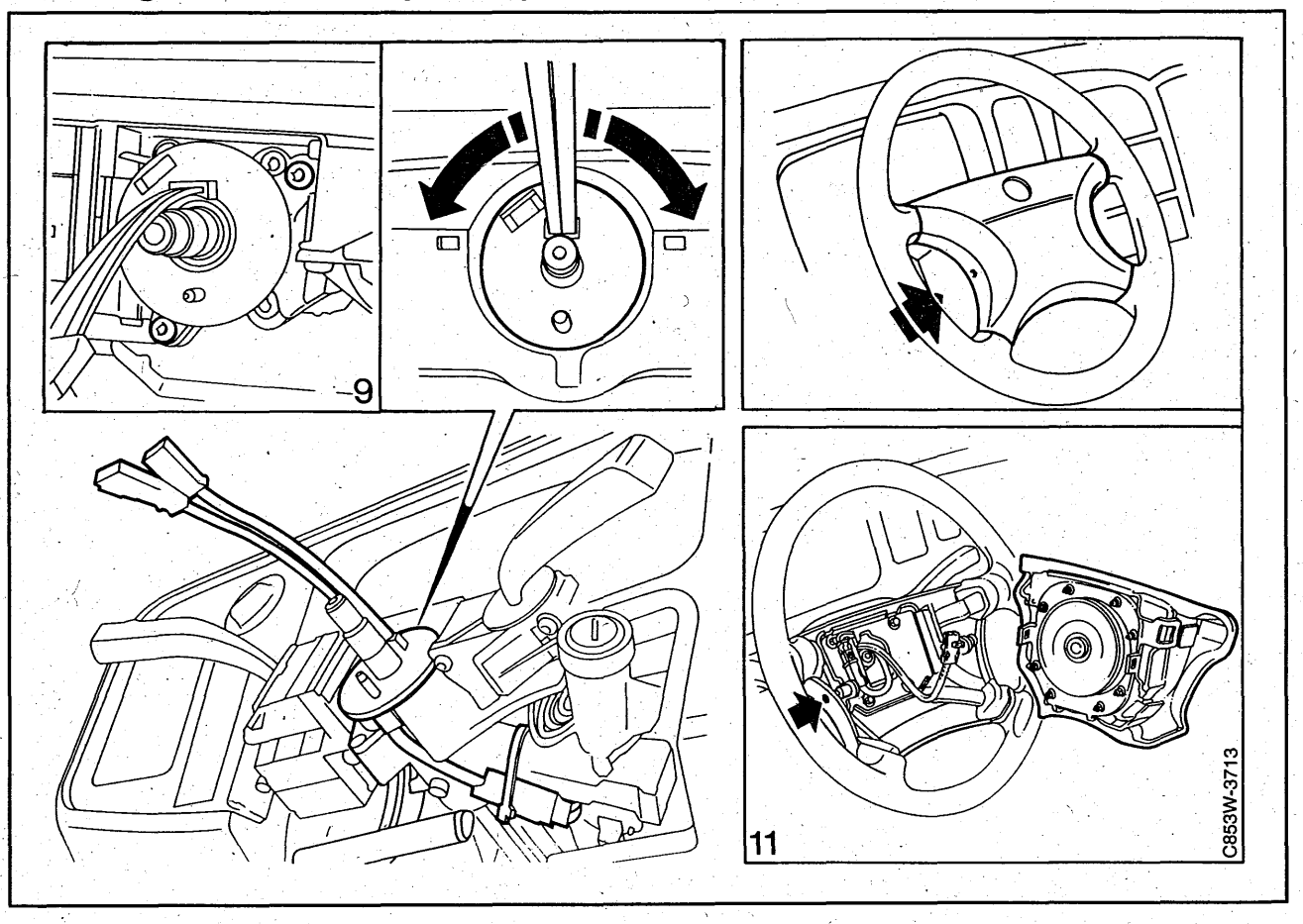
Tightening torque: 30 Nm (22.1 lbf ft)

Plug in the horn connector.

11 Plug in the steering wheel airbag connector and fit the airbag.

Turning torque:
7,0 Nm (5,2 lbf ft)

Steering column lock (contd.)

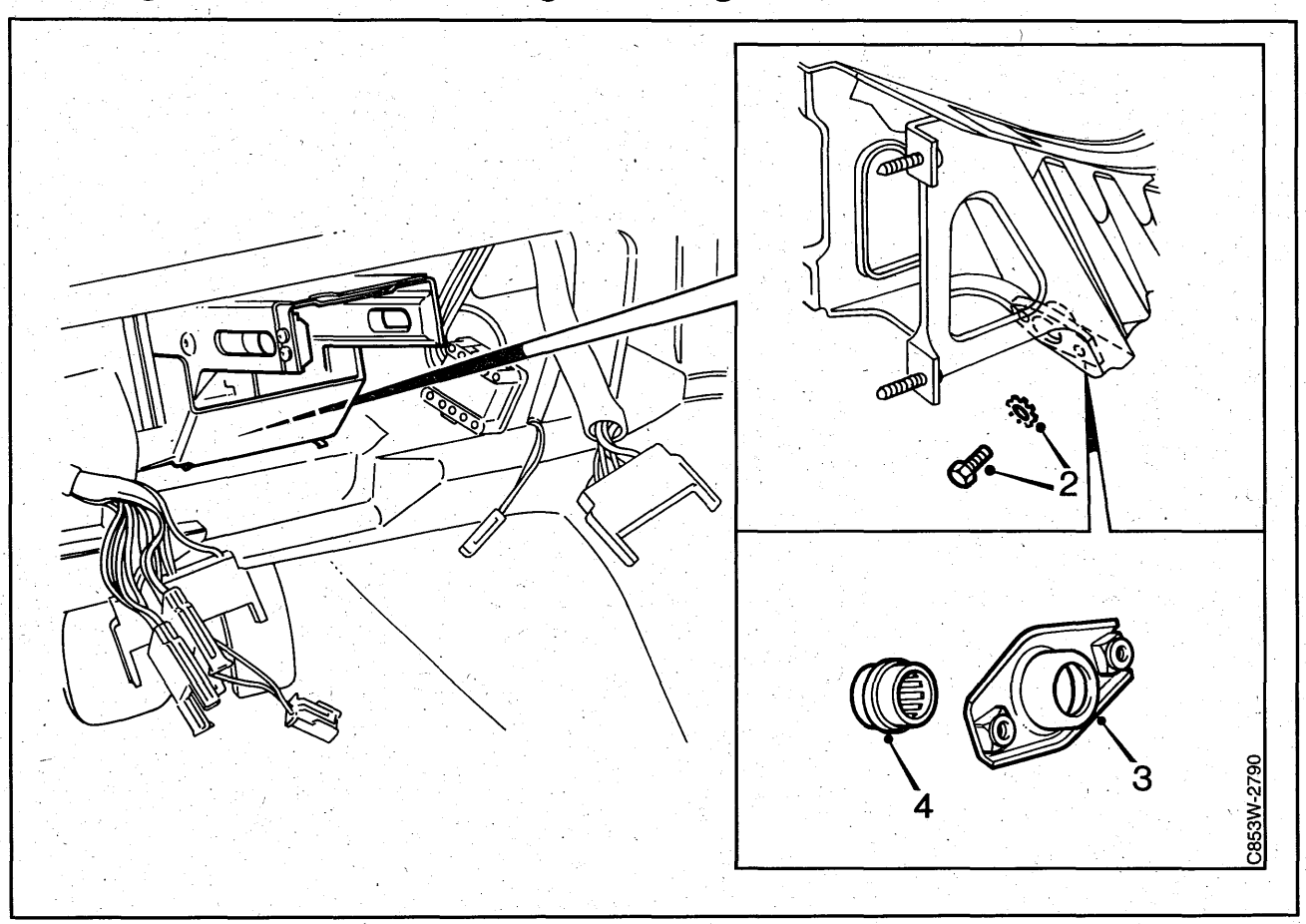


12 Connect the battery lead. Connect ISAT to the data link connector and erase any diagnostic trouble codes.

Switch on the ignition and wait for at least 10 seconds with the ignition on. Check that the SRS lamp lights for 3–4 seconds and then goes out. Check that the SRS lamp does not show a fault (stays lit).

13 Disconnect the ISAT.

Steering column lower bearing, to change



⚠ WARNING

Before starting work, read the Safety and handling instructions section.

Important

When changing the steering column lower bearing on RHD cars, certain A/C components have to be removed. In these cases, see Service Manual 8:3 Heating, ventilation and air conditioning systems.

1 Removing the steering column lock, see page 118.

2 Remove the bearing housing retaining bolts.

3 Lift the bearing housing away from the steering column assembly.

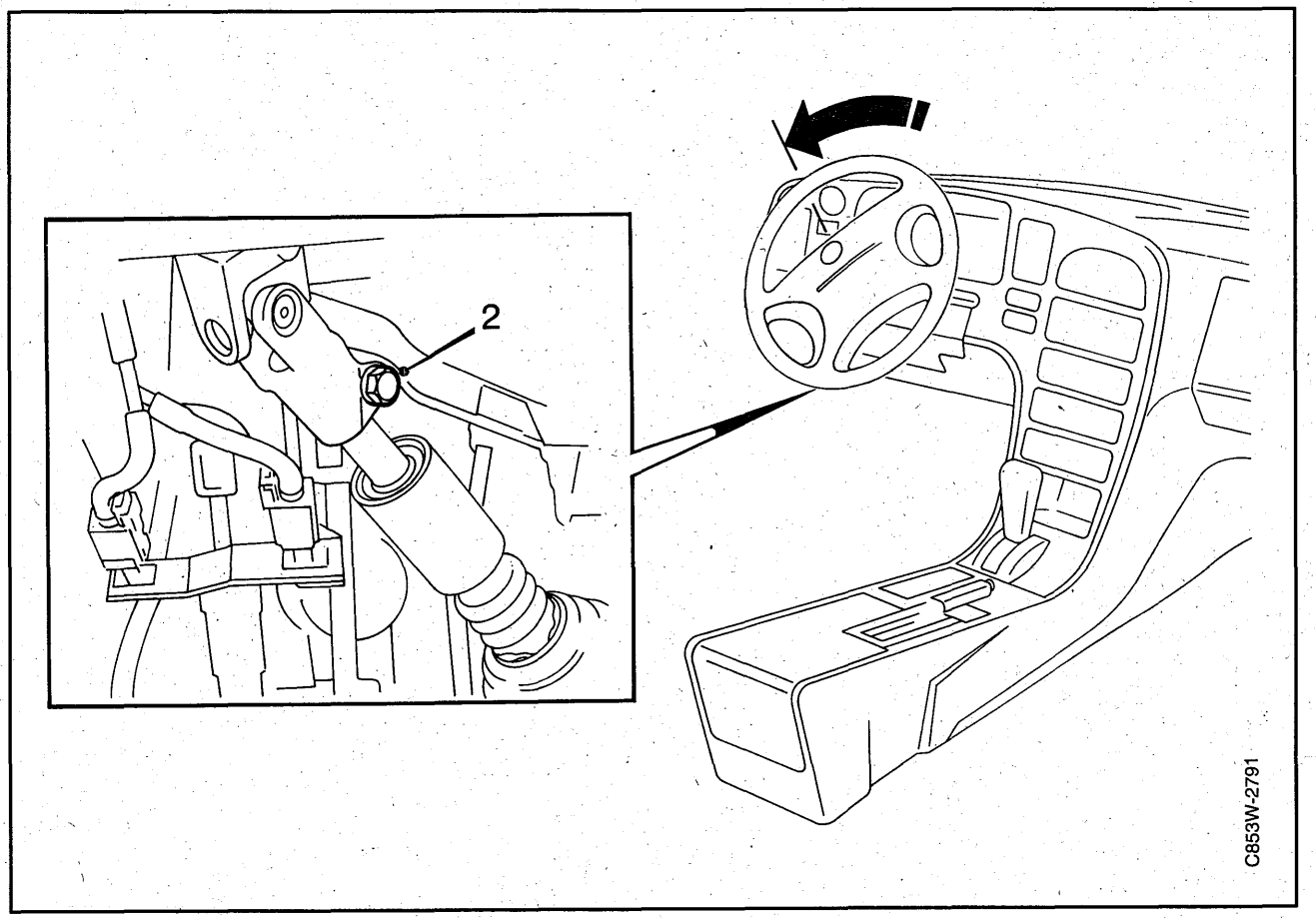
4 Press the bearing out of the housing.

5 Smear a little vaseline on the bearing's rubber brush and press the bearing into the housing.

6 Fit the bearing housing in the steering column assembly.

7 Fit the steering wheel housing, see page 120.

To lock the steering wheel using the steering column lock



⚠ WARNING

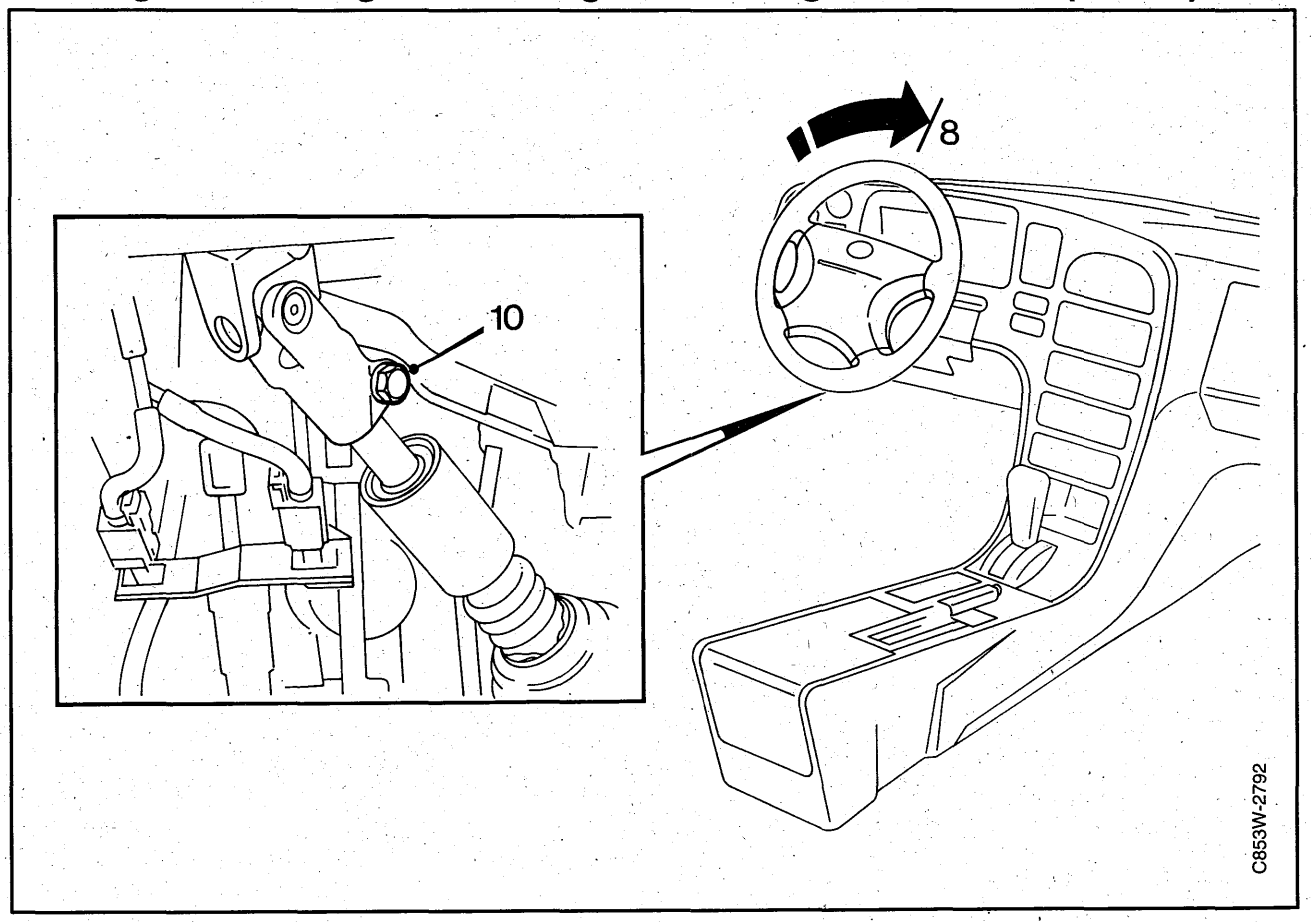
Before starting work, read the Safety and handling instructions section.

Important

If carrying out work with the contact roller fitted and the when the steering column is not connected to the steering gear, the steering wheel must be locked using the steering column lock so that the basic setting of the contact roller will not be altered.
If the basic setting of the contact roller **is changed,** the coiled conductor in the contact roller may break when the steering wheel is turned to full lock.

1 Remove the driver side sound baffle.
2 Remove the nut and bolt from the steering column clamped joint. Do not separate the joint.
3 Position the wheels straight forward.
4 Remove the key from the ignition lock.
5 Turn the steering wheel **counter clockwise until it locks.**

Locking the steering wheel using the steering column lock (contd.)



To reset

6 Position the wheels straight forward.

7 Insert the key in the ignition lock.

8 Turn the steering wheel **clockwise** to the horizontal position (straight ahead position).

Important

Do **not** turn the steering wheel counter clockwise, as the basic setting of the contact roller will be altered.

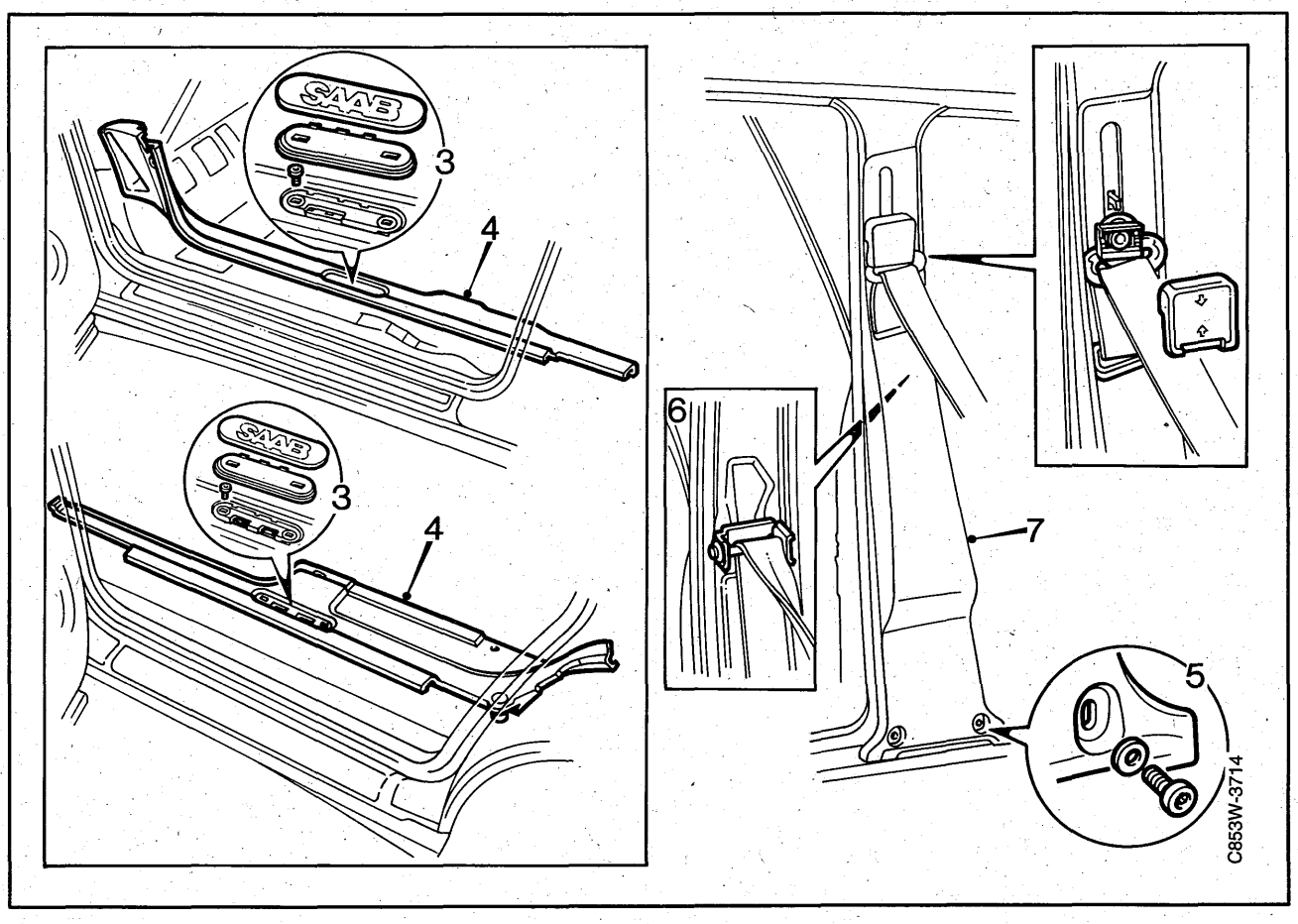
If the basic setting has been altered, see page 115, "Contact roller, to change".

9 Connect the steering column intermediate shaft. Check that the steering wheel is in the straight ahead position.

10 Fit the nut and bolt for the steering column clamped joint.

11 Fit the sound baffle.

Belt roller and belt tensioner, to change



Important
If the belt tensioners have not been activated, they should be scrapped before removal. Scrapping belt tensioners, see page6 in the Safety and handling instructions chapter.

1 Detonation in the off position. Disconnect the negative battery lead. Cover the negative pole.

2 Push the seat to its most forward position.

3 Remove the covers from the front and rear scuff plates.

4 Unscrew and remove the scuff plates.

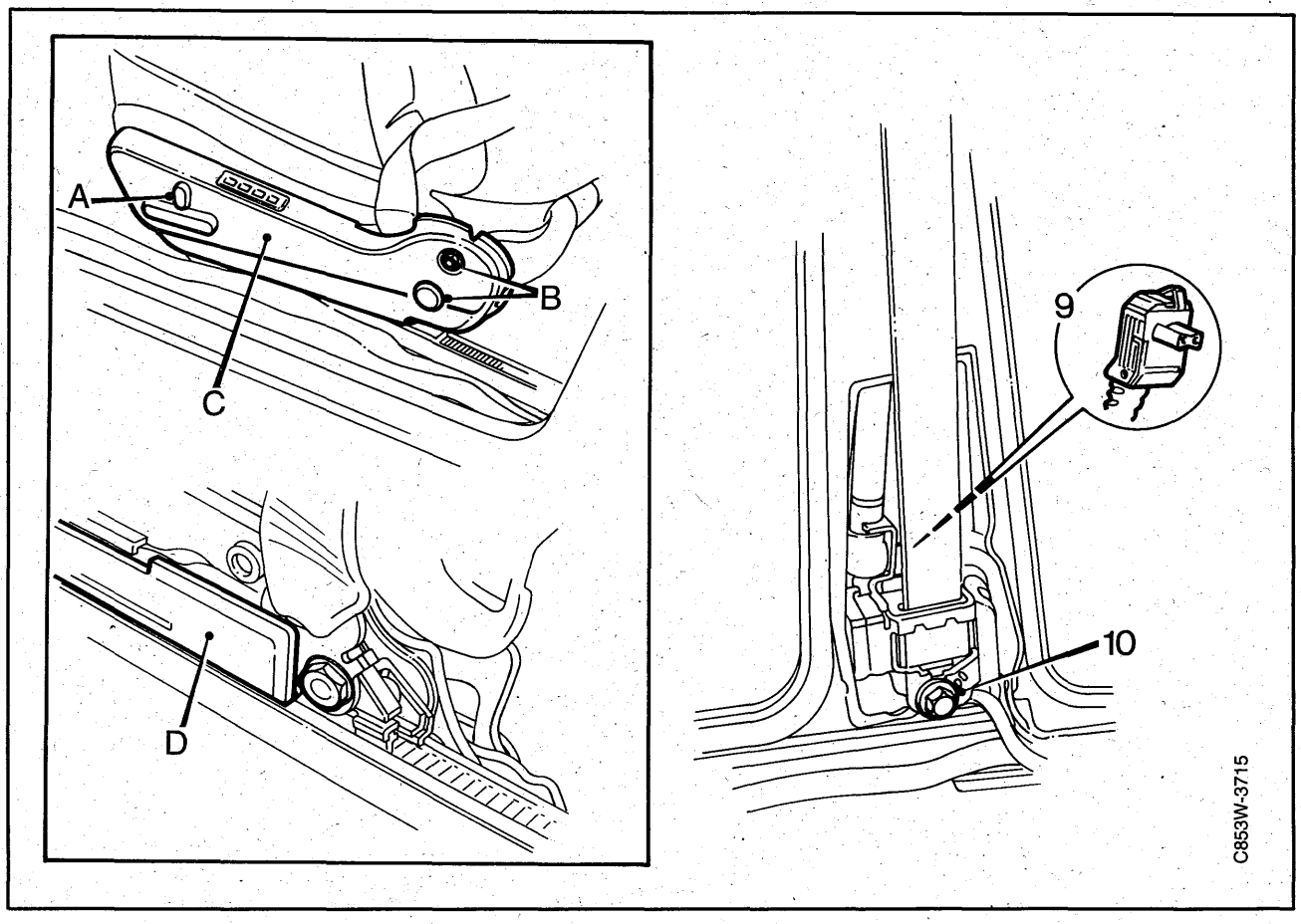
5 Remove the screws holding the trim on the B–pillar.

6 Remove the cover and release the seat belt anchorage from the B pillar.

7 Remove the trim from the B pillar.

8 Remove the belt guide from the B pillar.

Belt roller and belt tensioner, to change (contd.)



9 Remove the connector from the belt tensioner.

10 Undo the bolt securing the belt roller and belt tensioner.

If the car is fitted with electric seat.

a. Remove the switch from the electric seat.

b. Remove the screws securing the electric seat outer cover. Note the screw in the back edge.

c. Remove the cover.

d. Push the rail forward to expose the belt nut.

---

11 Free the belt from the seat. Pull the trim forward and press the anchorage and the locking tongue through the hole in the B pillar trim.

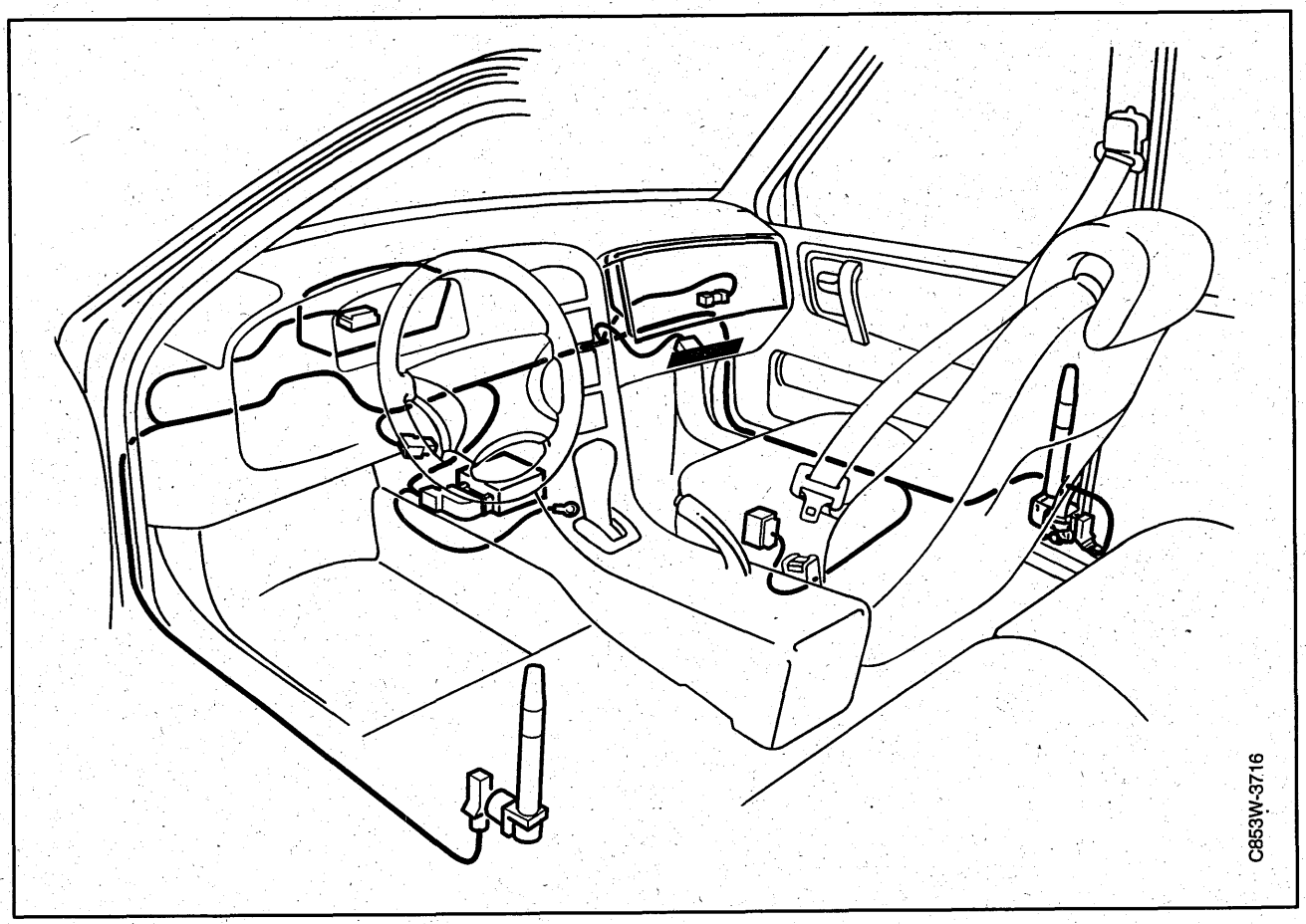
12 Fit a new belt roller with belt tensioner. Refit parts that have been removed.

13 Connect the battery lead. Connect ISAT to the data link connector and erase any diagnostic trouble codes.

Switch on the ignition and wait for at least 10 seconds with the ignition on. Check that the SRS lamp lights for 3–4 seconds and then goes out. Check that the SRS lamp does not show a fault (stays lit).

14 Disconnect the ISAT.

Complete SRS spare cable assembly, to fit



In the case of limited faults it is not necessary to change the entire assembly. Disconnect faulty leads/parts and replace them with the equivalent new from the spare cable assembly.

Existing SRS cable assembly, removal

1 Detonation in the off position. Remove the negative lead from the battery. Cover the negative terminal.

2 Remove the upper part of the facia, 8 screws. One of the retaining screws is located behind the rubber plug inside the glove compartment. In cars with a passenger airbag, a securing screw is located under ths SRS embelem in the upper left–hand corner of the airbag mo–dule.

3 Remove the lower part of the facia.

4 Remove the fuse holder.

5 Remove the carpet on the driver and pas–senger side of the center console.

6 Unplug the connector from the SRS control module and remove the grounding lead by the SRS control module.

7 Remove the lower steering column cover. Unplug the orange connector from the contact roller.

8 Remove the covers from the front and rear scuff plates.

9 Unscrew and remove the scuff plates.

10 Undo the screws securing the B pillar trim.

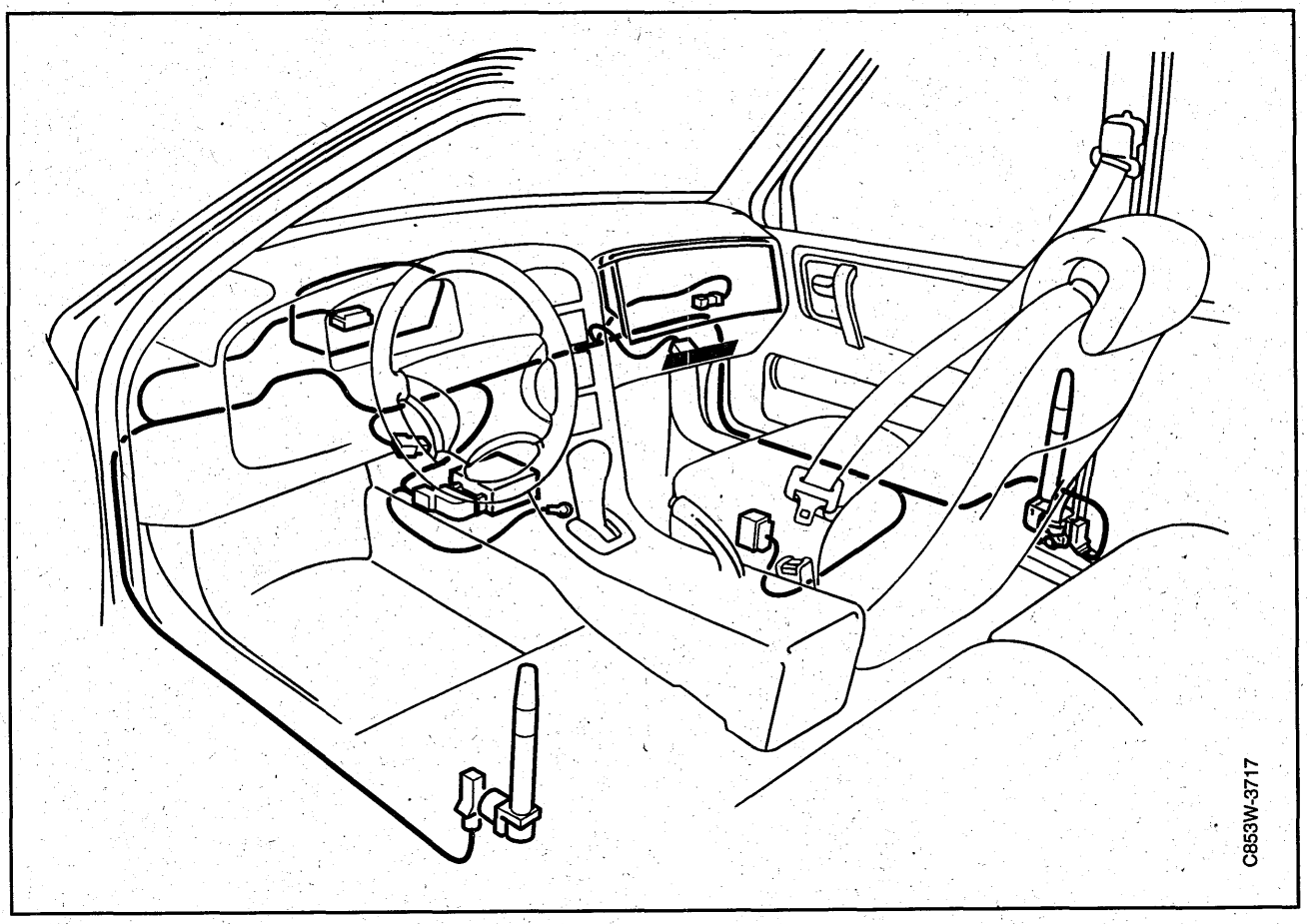
11 Remove the cover and free the seat belt anchorage from the B pillar.

12 Remove the B pillar trim.

13 Remove the plastic cover over the belt tensioners.

14 Unplug the electrical connectors from the belt tensioners. Tape the electrical connectors to the existing assembly so that they cannot come into contact with moving parts such as belt tensioner and belt.

Complete SRS spare cable assembly, to fit (contd.)



15 Remove the screws securing the combined instrument and lift up the instrument.

16 Unplug the pictogram connector on the left–hand side of the combined instrument.

17 Remove sleeve 8 from the connector. The sleeve has a blue lead. Clip the sleeve off the lead and insulate the lead.

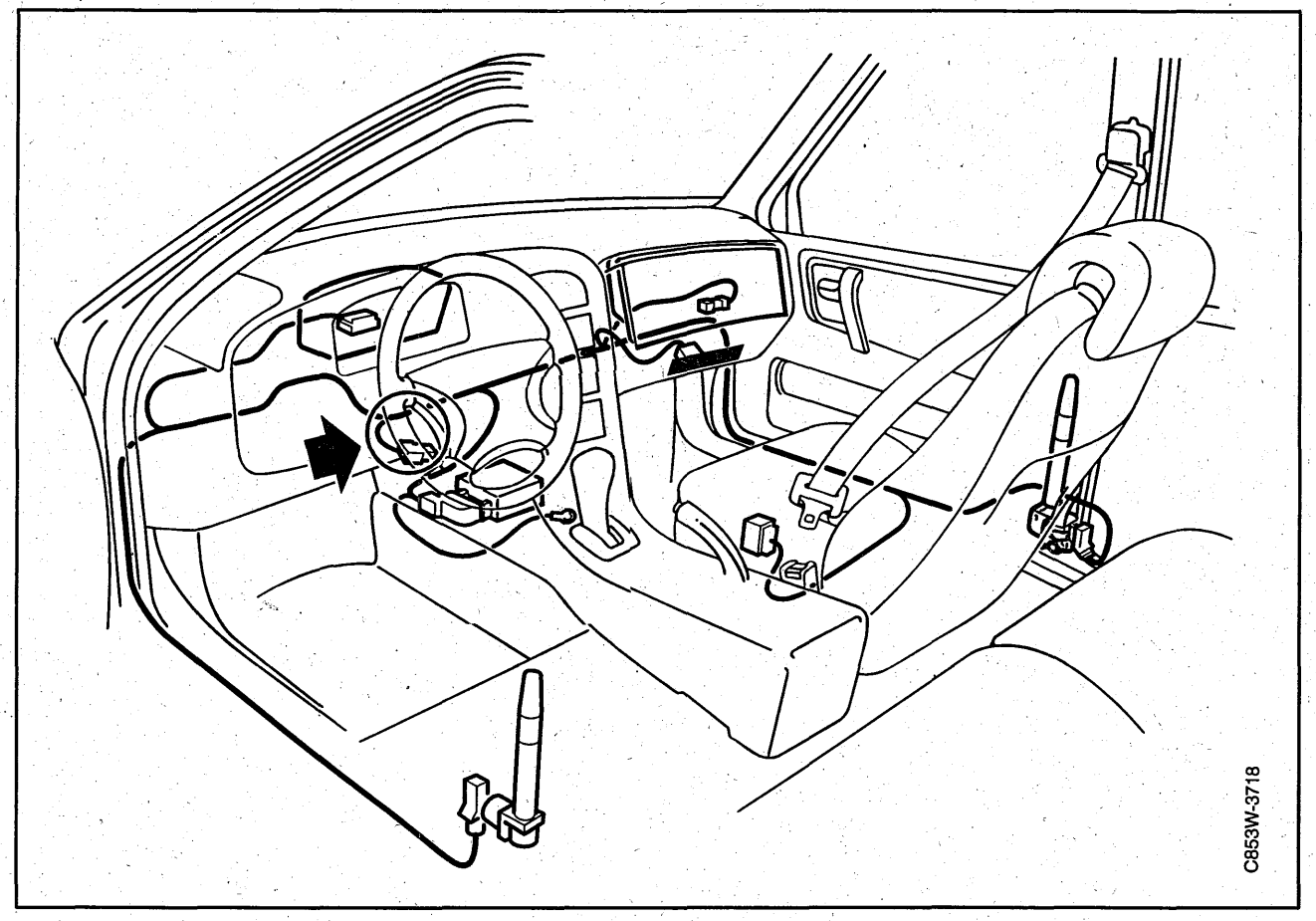
If the car is fitted with a passenger airbag.

a. Remove the plastic covers from over the two screws securing the lower cover panel. Remove the screws.

b. Pull the lower cover away (this is also held in place with clips). Use tool 82 92 997 and work from right to left. Do not use force.

c. Unplug connector H2–77 to the passenger airbag.
Tape up the connector on the rejected cable assembly so that it cannot rattle.

Complete SRS spare cable assembly, to fit (contd.)



SRS spare cable assembly, to fit

1 Position the cable assembly in the car, starting with the SRS control module.

2 Tape the cable assembly in the air duct above the SRS control module.

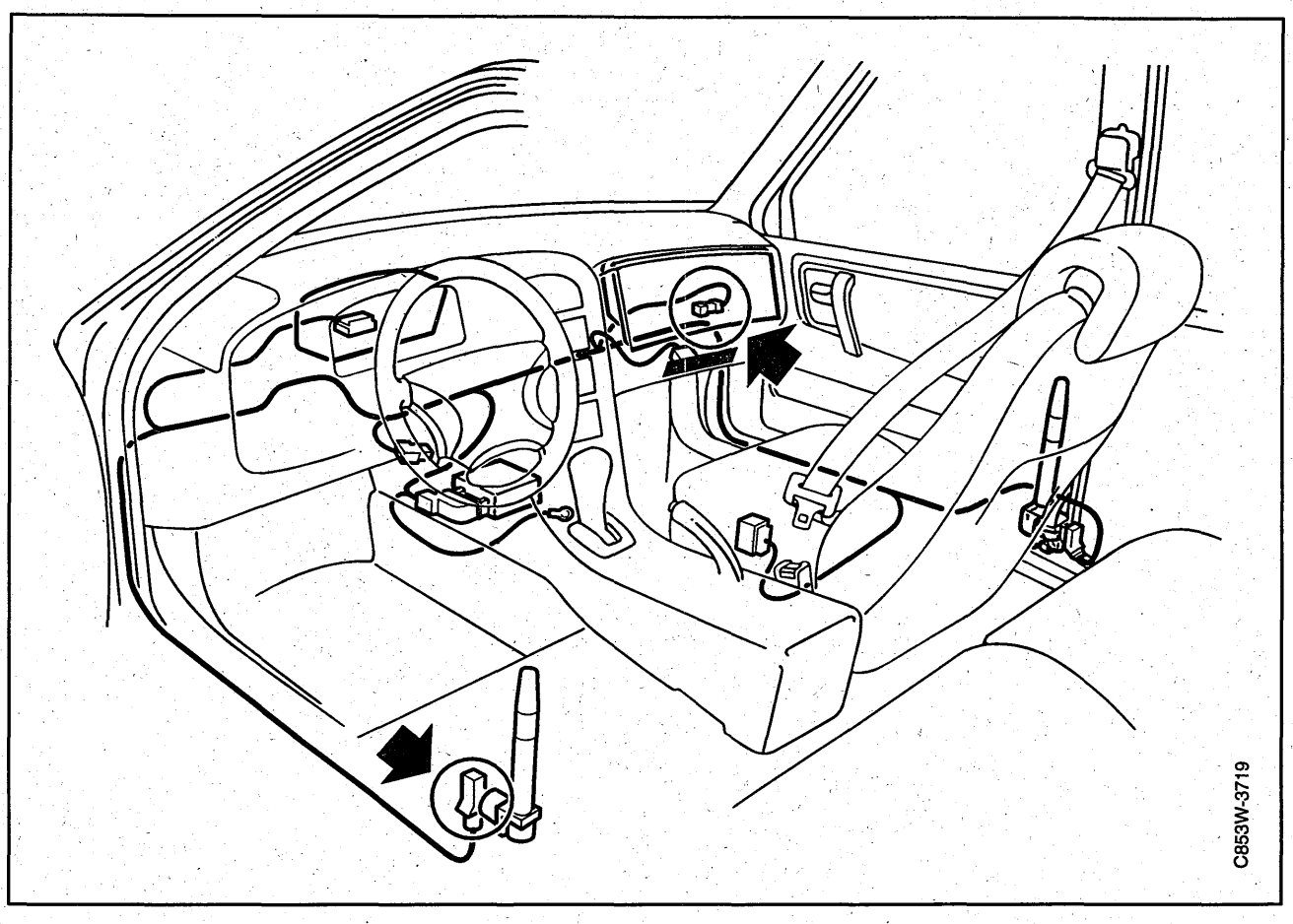
Steering wheel airbag

3 Run the steering wheel airbag wiring (one red and one orange lead) to the orange connector by the steering shaft. Plug in the connector.

4 Tie the wiring with cable ties. Where possible, tie to existing wiring.

> **⚠ WARNING**
>
> The leads must not come into contact with moving parts like the steering column.

Complete SRS spare cable assembly, to fit (contd.)



Belt tensioner, driver side

5 Run the belt tensioner wiring against the door on the driver side (one brown and one blue lead).

6 Tie the wiring to the air duct over the pedal bracket using cable ties.

7 Run the wiring from the outer part of the air duct to the existing wiring harness by the wheel housing.
Run the new wiring in the cable channel together with existing wiring.

8 Undo the bolt securing the belt roller and belt tensioner.

9 Run the wiring behind the belt tensioner together with existing wiring.

10 Plug in the connector to the belt tensioner.

11 Tie the wiring to existing wiring using cable ties.

> **⚠ WARNING**
>
> The wiring must not come into contact with moving parts like the belt tensioner and belt.

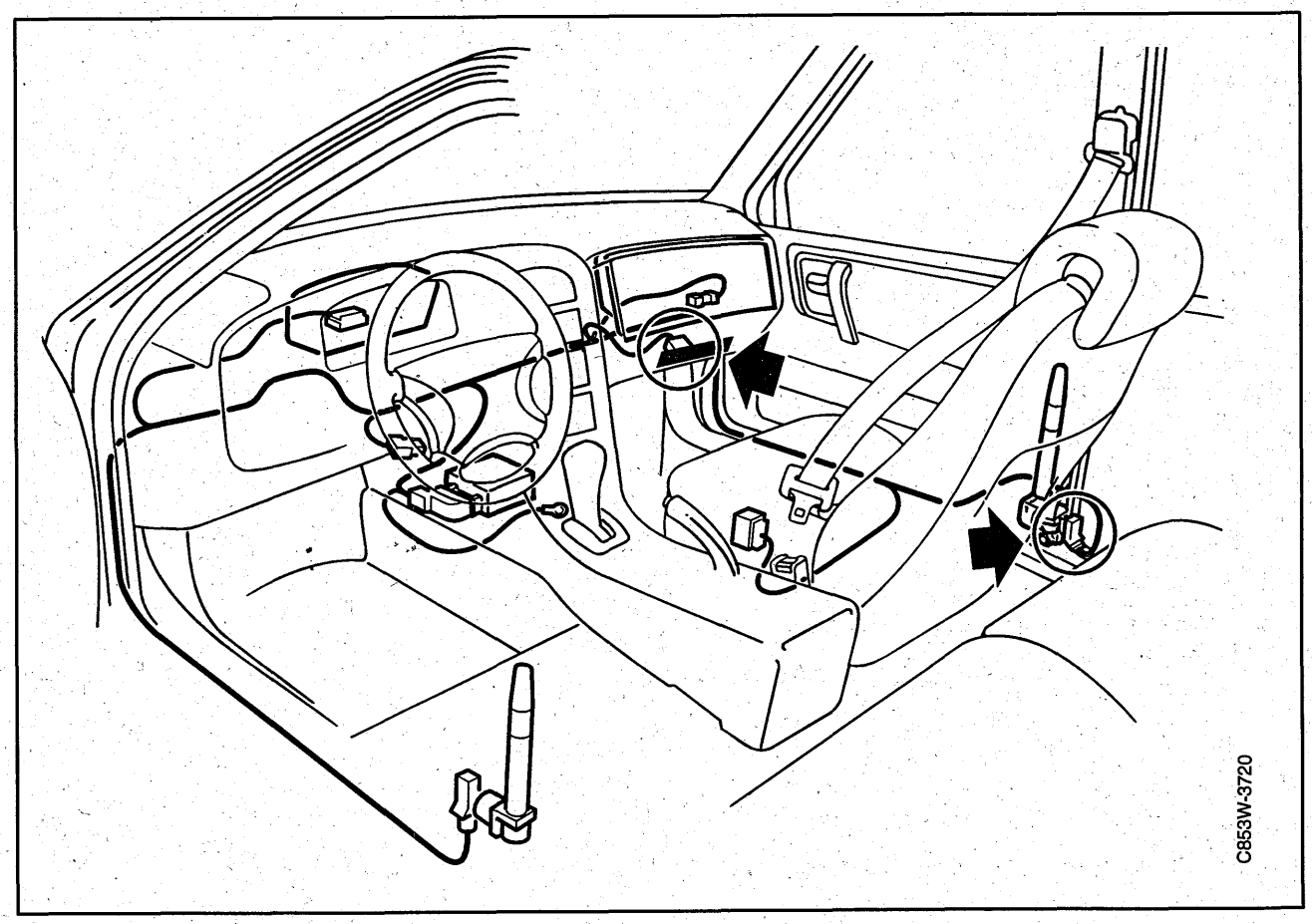
Airbag, passenger side

Only if the car is fitted with passenger airbag.

12 Run the passenger airbag wiring (one gray and one violet lead) to the connector from the existing passenger airbag. Plug in the connector.

13 Tie the leads with cable ties so that they cannot rattle.

Complete SRS spare cable assembly, to fit (contd.)



Belt tensioner, passenger side

14 Fold the carpet away from the bulkhead partition on the passenger side.

15 Run the wiring (one blue/white and one yellow/white lead), along the bulkhead partition, up to the cable channel by the wheel housing. Tape the wiring to the bulkhead partition.

16 Fit the new wiring in the cable channel together with existing wiring.

17 Undo the bolt securing the belt roller and belt tensioner.

18 Run the wiring behind the belt tensioner together with existing wiring.

19 Plug in the connector to the belt tensioner.

20 Tie the wiring to existing wiring using cable ties.

> **⚠ WARNING**
>
> The wiring must not come into contact with moving parts like the belt tensioner and belt.

Fuse

21 Run the fuse lead (green/white) along existing wiring as far as the fuse holder. Tie the lead to existing wiring and the air vent above the SRS control module using cable ties.

22 Remove fuse 4 from the fuse holder.

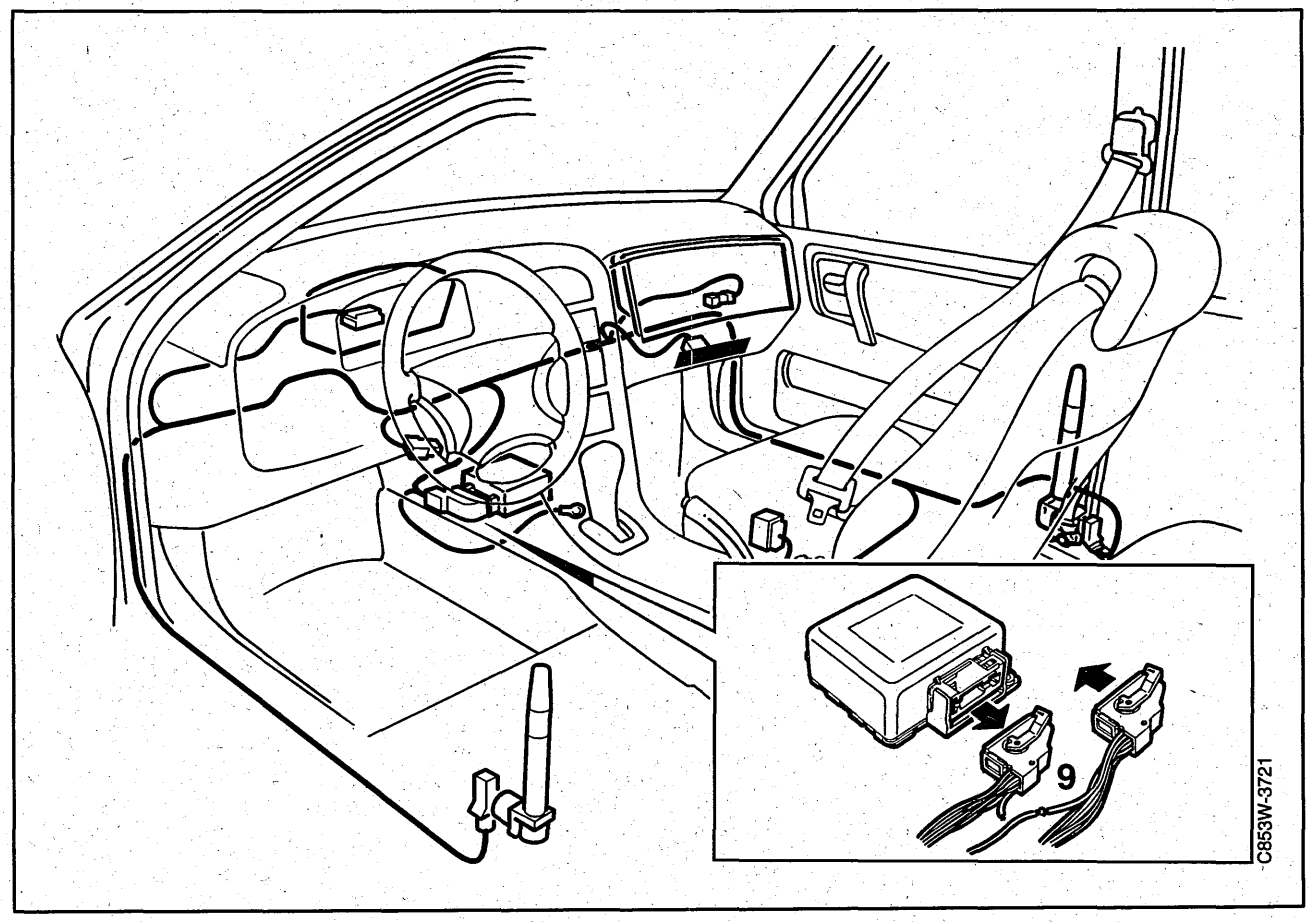
Connect a buzzer between sleeve 5 in the SRS connector and the sleeves in fuse 4. The buzzer sounds when it is connected to one of the sleeves in the fuse holder. Remove the sleeve that "buzzes".

23 Cut the sleeve from the lead and insulate the lead.

24 Connect the new sleeve on the spare cable assembly to the fuse.

25 Refit fuse 4.

Complete SRS spare cable assembly, to fit (contd.)



Data link connector

26 Pull out sleeve 9 in the rejected SRS connector and cut the lead at the sleeve. Cut as near the sleeve as possible.

27 Thread shrink tubing over the lead from sleeve 9 in the new SRS connector.

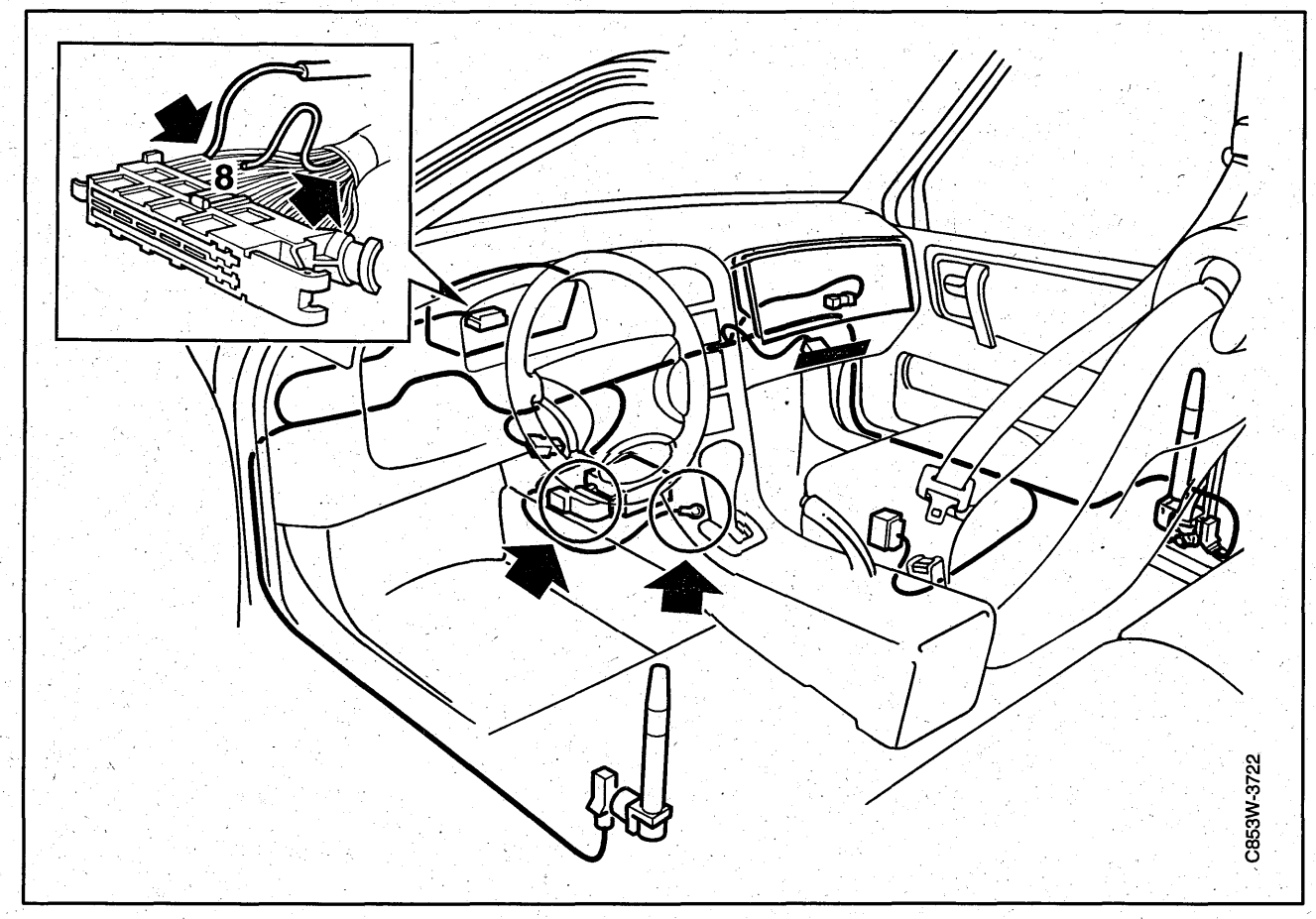
28 Solder together the lead from sleeve 9 in the new SRS connector and the cut lead in the rejected SRS cable assembly.
First cut the lead to appropriate length.

29 Slide on the shrink tube and heat. Attach the shrink tube to the cable assembly on both sides of the shrink tube so that it cannot bend. Use tape or cable ties.

30 Tape up the rejected connector.

31 Plug the SRS connector into the SRS control module.

Complete SRS spare cable assembly, to fit (contd.)



Instrument

32 Run the blue lead along the air duct over the pedal bracket. Secure using cable ties.

33 The wiring runs from the outer part of the air duct directly up to the instrument.

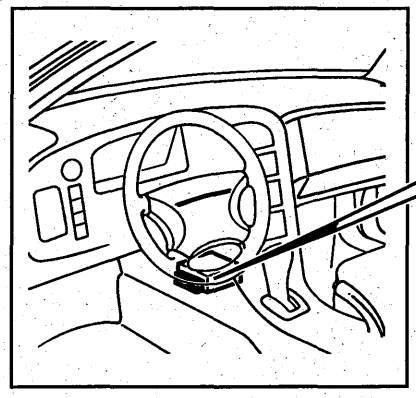
34 Connect the lead to position 8 in the pictogram connector. Secure to existing wiring using cable ties.

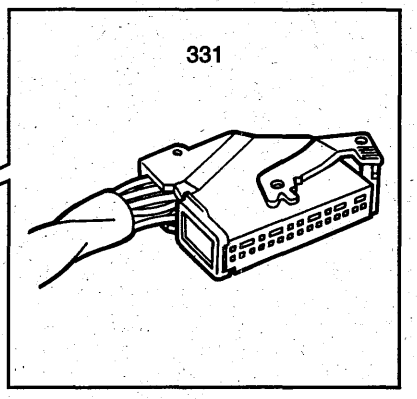
35 Plug the spare cable assembly connector into the SRS control module.

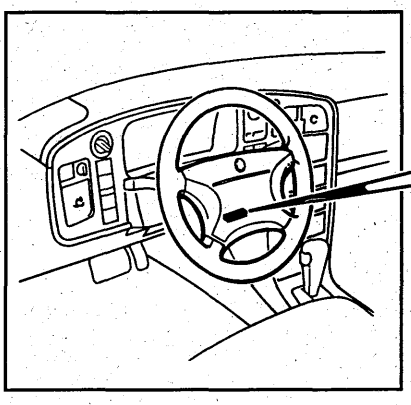
36 Connect the spare cable assembly grounding lead to the grounding point by the SRS control module.

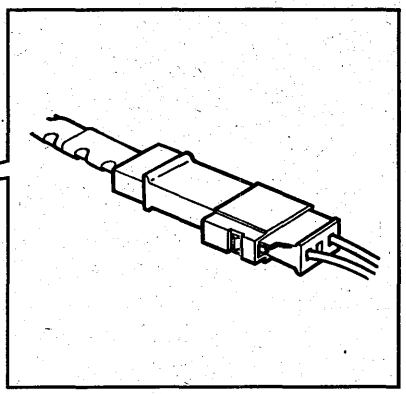
37 Reconnect the negative battery lead and switch on the ignition. Erase diagnostic trouble codes. Switch off the ignition and switch it back on again. Wait for at least 10 seconds. Check to see if a diagnostic trouble code is displayed.
If a diagnostic trouble code is displayed:
Conduct appropriate fault diagnosis as described in the chapter "Diagnostics and fault finding".
If no diagnostic trouble code displayed:
Refit parts that have been removed.

Connectors and grounding points



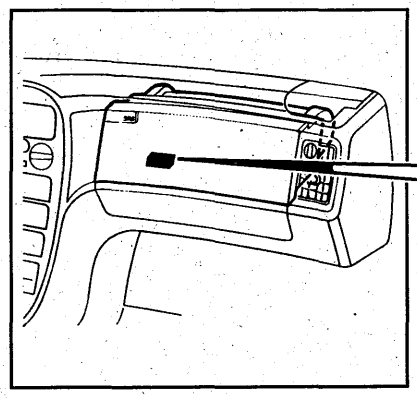


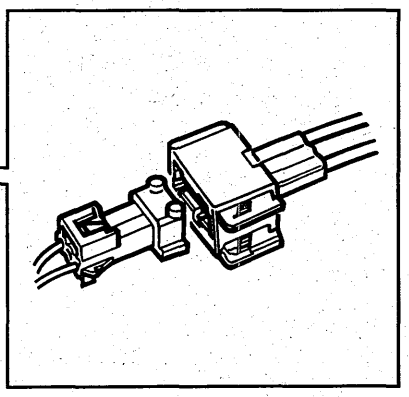




H2-52

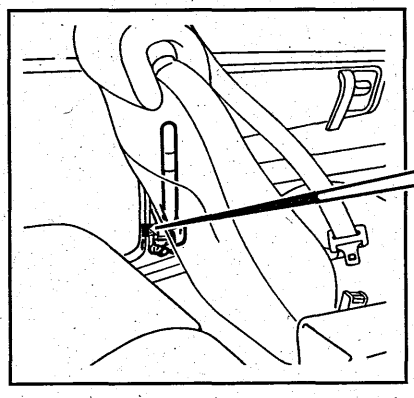
1	3
OG	RD

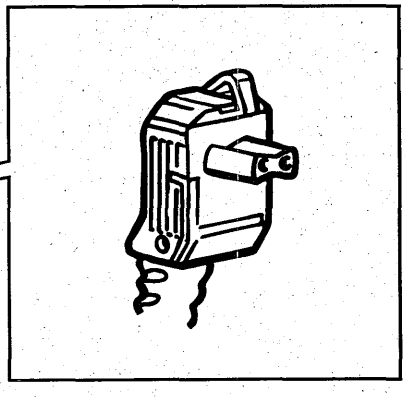




H2-77

1	2
VT	GY





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1	2
BN	BU

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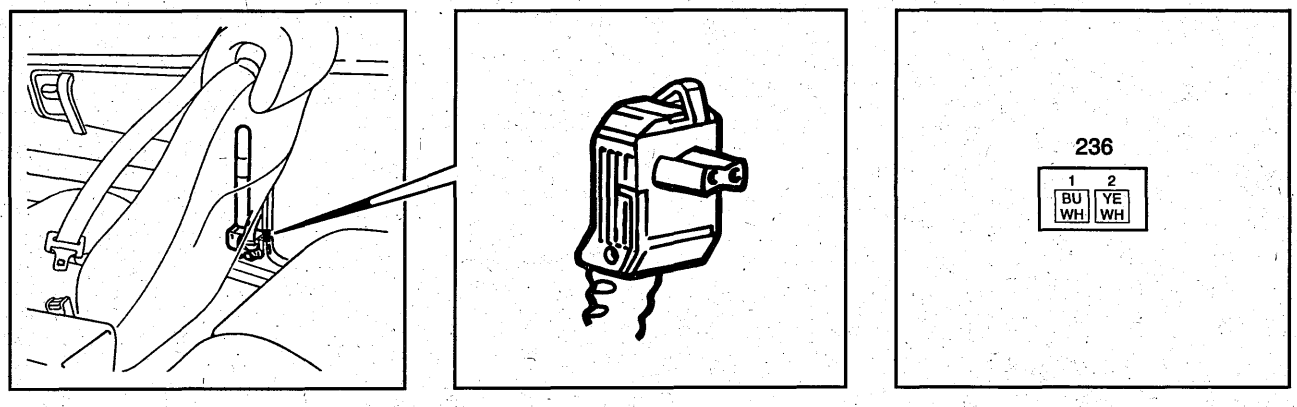

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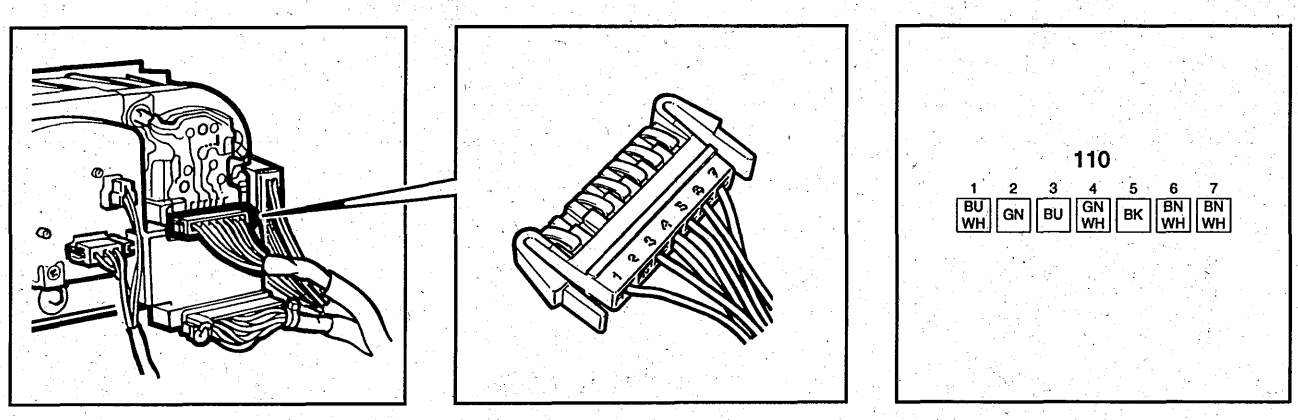
1	2
BU WH	YE WH



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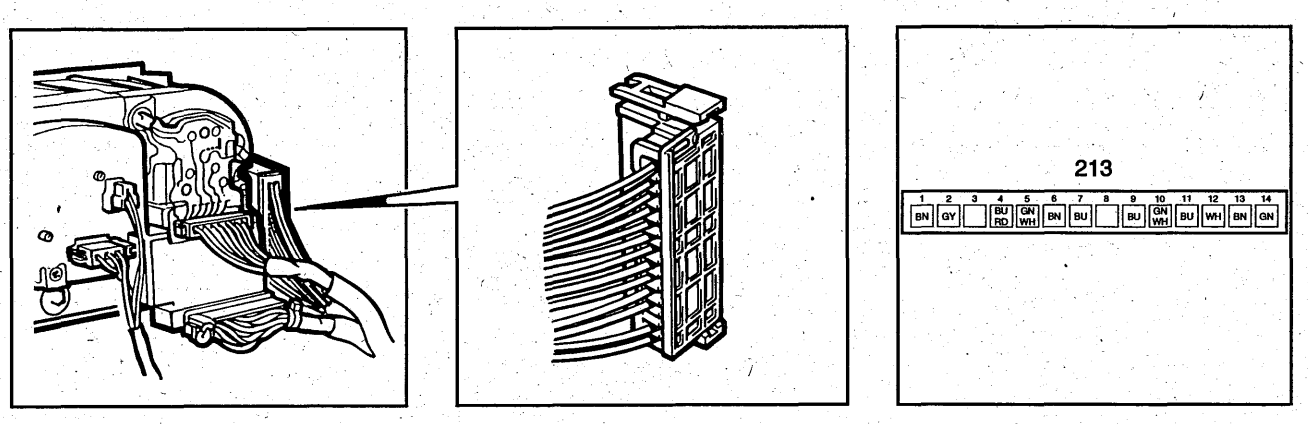
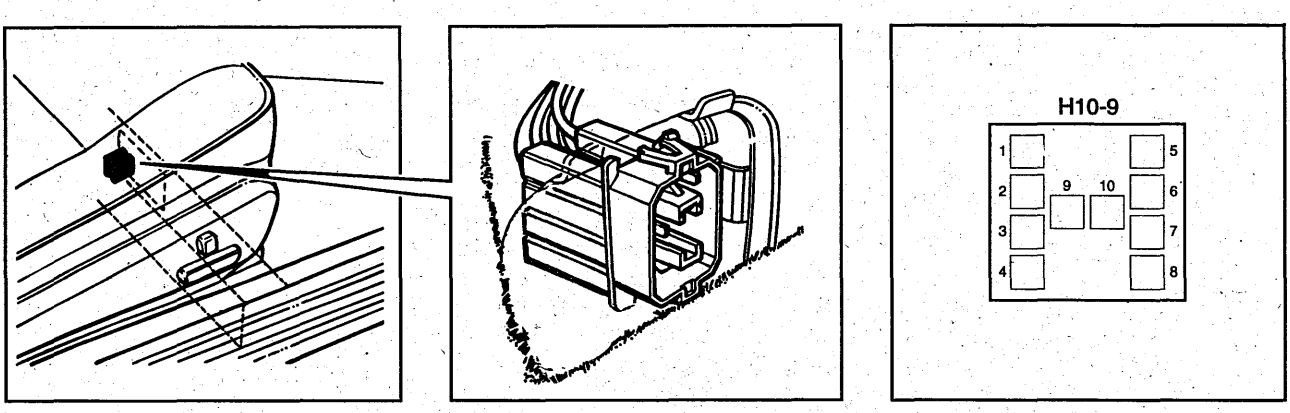
1	2	3	4	5	6	7
BU WH	GN	BU	GN WH	BK	BN WH	BN WH



213

1	2	3	4	5	6	7	8	9	10	11	12	13	14
BN	GY		BU RD	GN WH	BN	BU		BU	GN WH	BU	WH	BN	GN



H10-9

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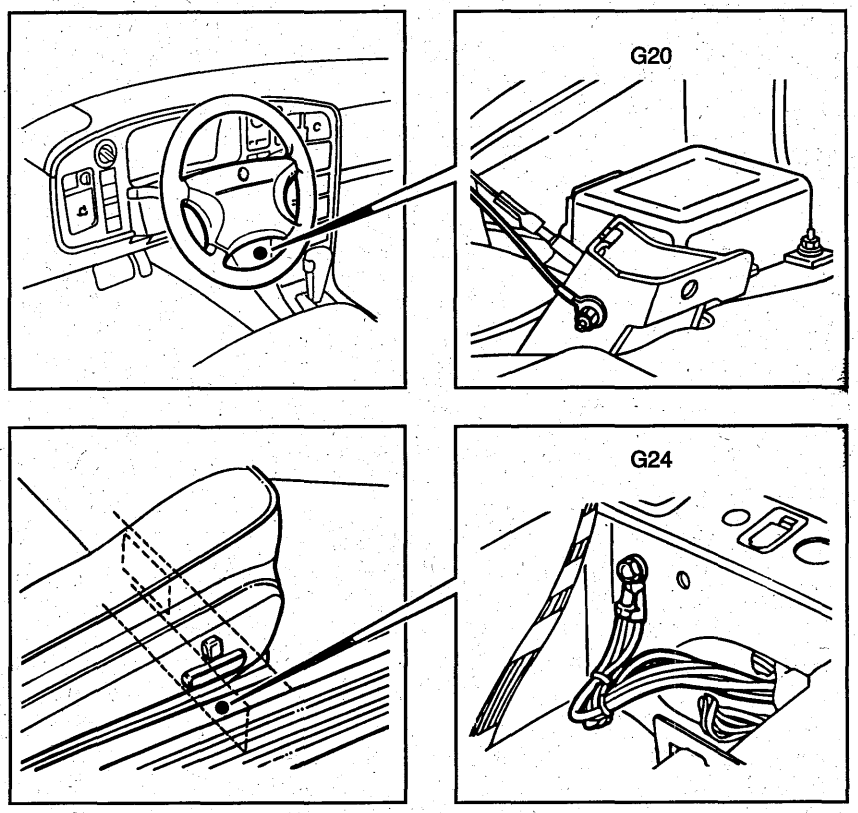

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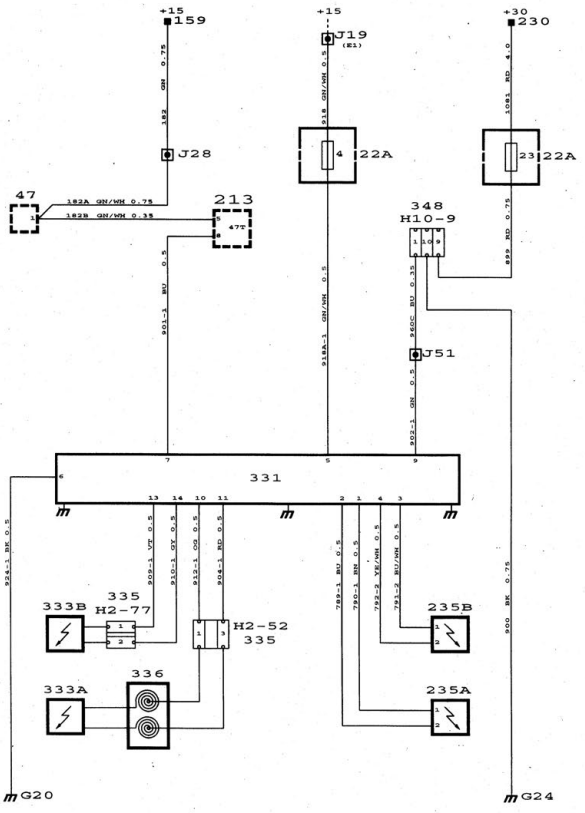
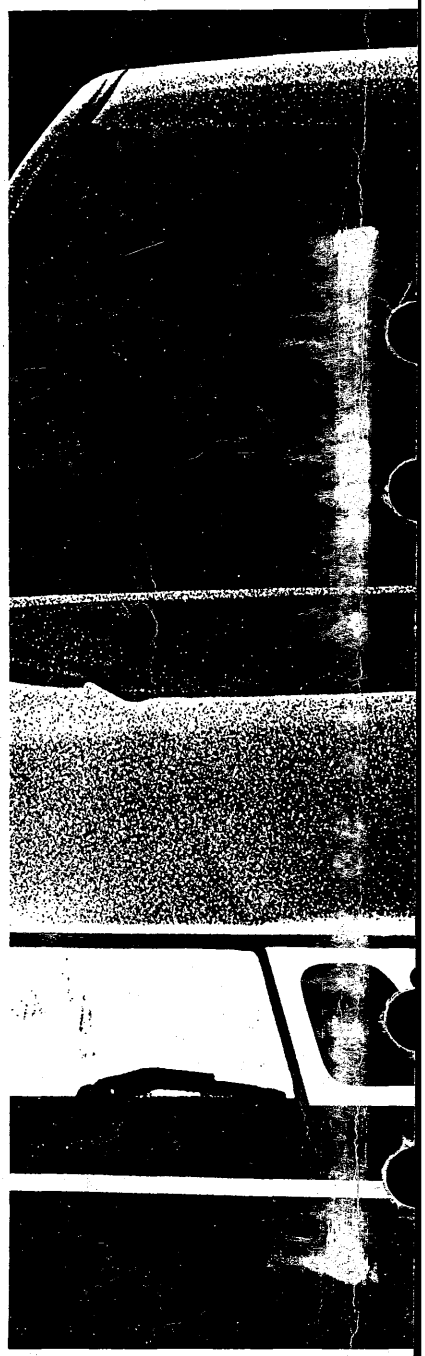
Wiring Diagrams

Component location

22A	Fuse holder, glove compartment
47	Combined instrument
159	Distribution terminal, +15
213	Pictogram, in combined instrument
230	Distribution terminal, +30
235 A	Belt tensioner on driver side
235 B	Belt tensioner on passenger side
331	SRS control module, under front center console
333A	Airbag in steering wheel
333B	Airbag, passenger side
335	2–pin connector for airbag
336	Contact roller, inside steering wheel
348	Data link connector, under passenger seat
G20	Grounding point, SRS control module, next to SRS control module
G24	Grounding point, right–hand front seat member
H2–52	Orange short–circuiting connector next to steering wheel
H2–77	2–pin connector for passenger airbag, located under the airbag
H10–9	Data link connector, under passenger seat
J19	Crimp LHD; Approx 180mm from the ignition lock and approx 260mm from windshield and rear windshield wiper switches (main cable assembly). RHD; Approx 260mm from ignition lock (main cable assembly)
J28	Crimp LHD; Approx 310mm from the EDU(main cable assembly) RHD; Approx 230mm from the EDU(main cable assembly)
J51	Crimp, approx 275mm from the data link connector under the passenger seat. (main cable assembly)

Wiring Diagrams





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