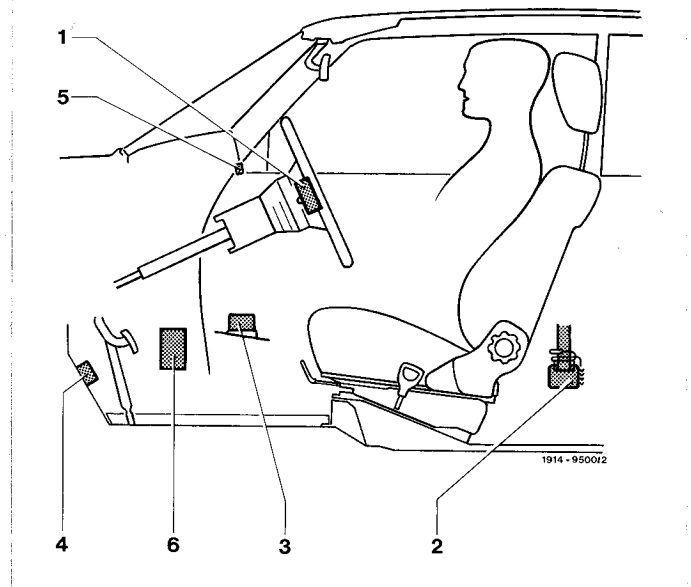


## A. General

The driver airbag unit in the steering wheel and the passenger airbag unit installed in place of the glove box, in conjunction with the belt tensioners for the seat belts and the energy-absorbing panels on the driver's and/or passenger's side, serve to increase the level of protection provided by the three-point seat belts installed as standard equipment, when these are worn.

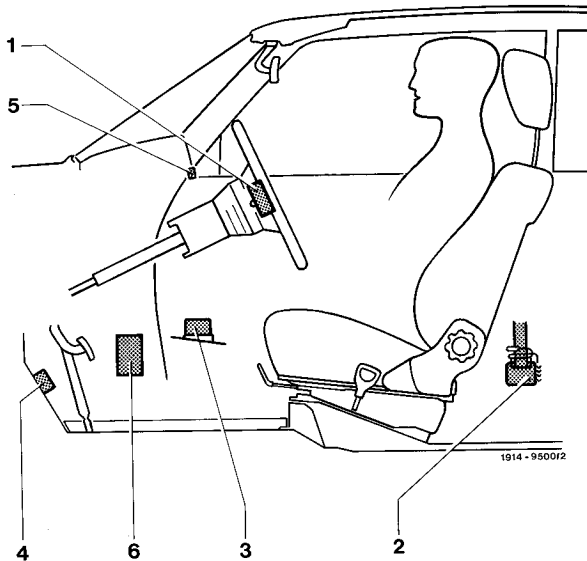
Both systems are electrically activated by a single control unit in the event of moderately severe to severe frontal collisions. Current knowledge indicates that the entire (intact) driver/passenger airbag unit maintains its full functional reliability for at least 10 years. In contrast to the three-point seat belt which only affords protection when it is applied, the occupants of the vehicle have no influence over the protective effect of the airbag and belt tensioner restraint system. For increased protection it is essential that the three-point seat belt is applied and the restraint system consisting of driver's airbag and belt tensioner is installed. The restraint system of driver's and passenger's airbag and belt tensioner, only provides increased protection in the event of a frontal collision. An occupant **not** wearing the three-point seat belt remains **unprotected** in side and rear end collisions, or if the vehicle overturns.



**Driver's airbag**

Illustrated for model 126

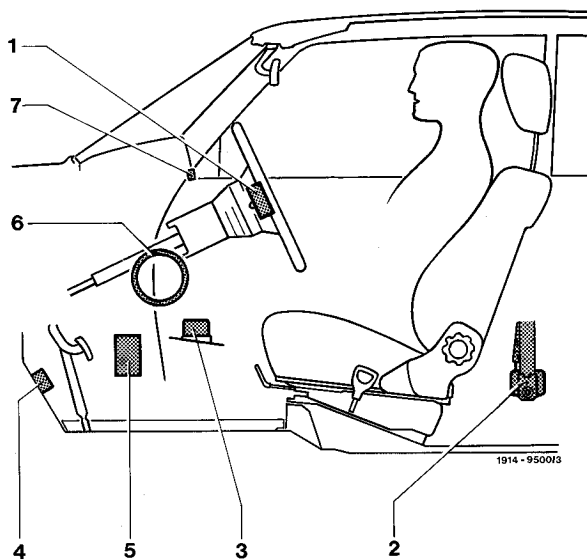
- 1 Airbag unit
- 2 Belt tensioner
- 3 Control unit (sensor)
- 4 Reserve power source
- 5 Warning lamp
- 6 Voltage transformer



**Driver's airbag** (USA)

Illustrated for model 126, (USA) version

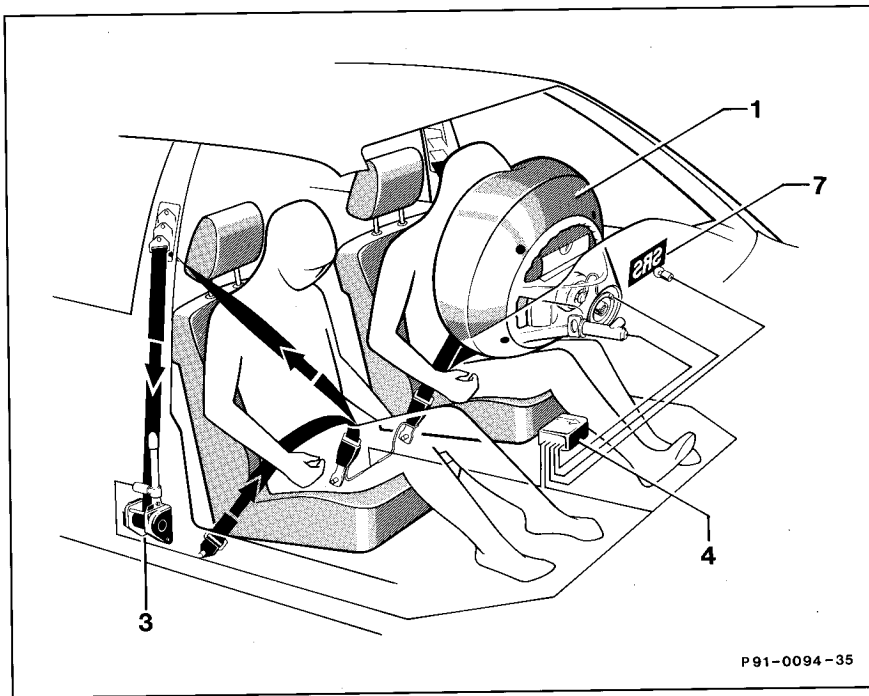
- 1 Airbag unit
- 2 Belt tensioner
- 3 Control unit (sensor)
- 4 Reserve power source
- 5 Voltage transformer
- 6 Energy-absorbing panel under dashboard (driver's side)
- 7 Warning lamp




**Driver's airbag**

Illustrated for model 124 as of 09/87

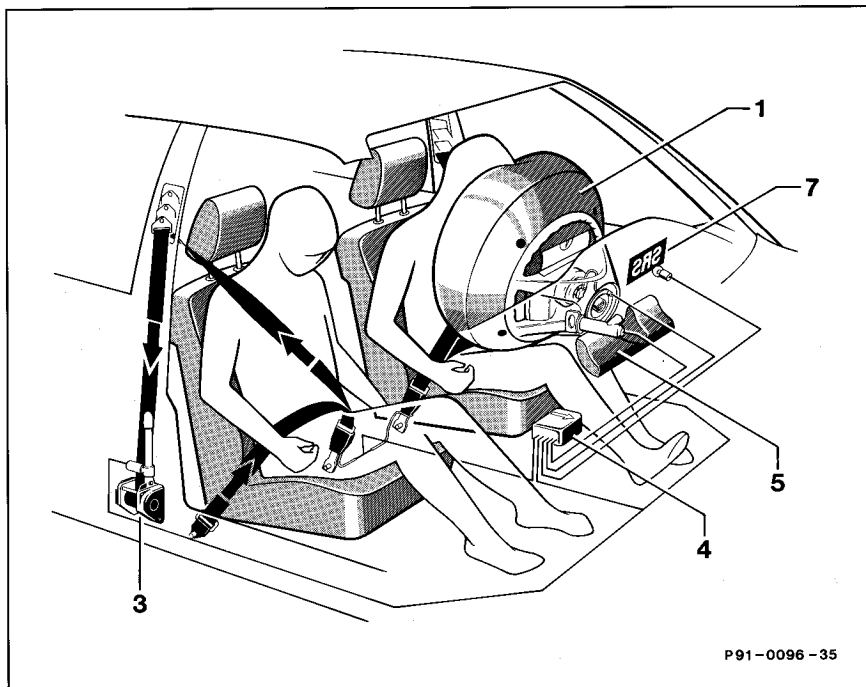
- 1 Driver airbag unit
- 3 Belt tensioner (left and right)
- 4 Control unit
- 7 RS/SRS warning lamp



## Driver's airbag

Illustrated for model 124  
as of 09/87,  version

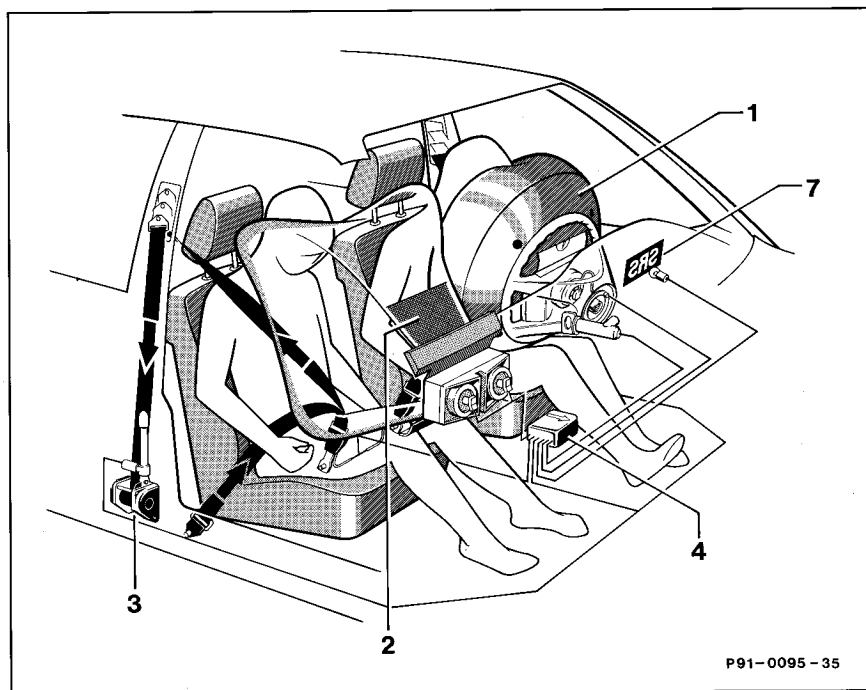
- 1 Driver airbag unit
- 3 Belt tensioner (left and right)
- 4 Control unit
- 5 Energy-absorbing panel under dashboard (driver's side)
- 7 RS/SRS warning lamp



## Driver's and passenger's airbags

Illustrated for model 124  
as of 09/87

- 1 Driver airbag unit
- 2 Passenger airbag unit
- 3 Belt tensioner (left and right)
- 4 Control unit
- 7 SRS warning lamp

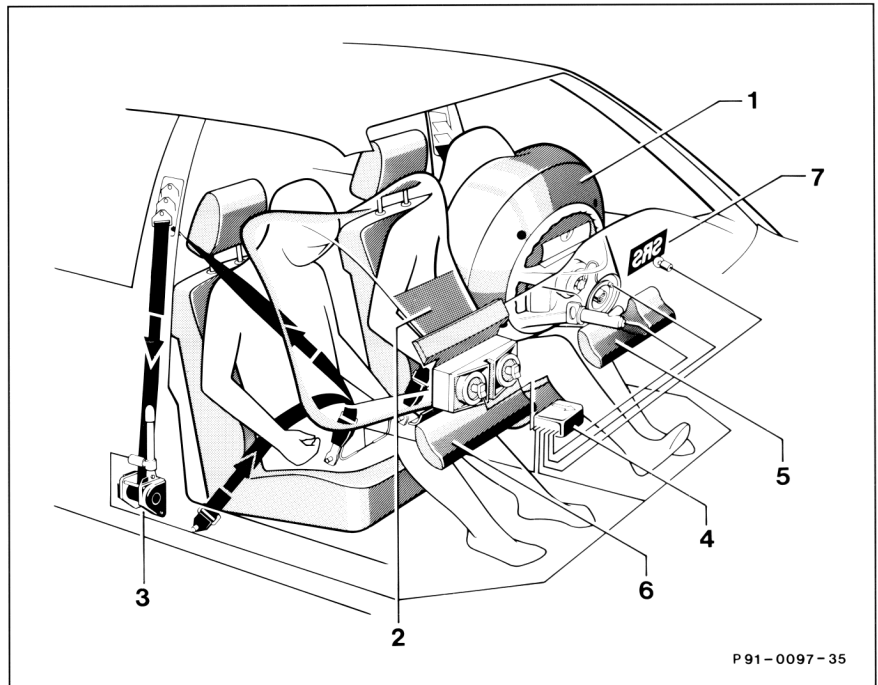


**Driver's and passenger's airbags**

(USA)

Illustrated for model 124 as of 09/88, (USA) version

- 1 Driver airbag unit
- 2 Passenger airbag unit
- 3 Belt tensioner (left and right)
- 4 Control unit
- 5 Energy-absorbing panel under dashboard (driver's side)
- 6 Energy-absorbing panel under dashboard (passenger's side)
- 7 SRS warning lamp

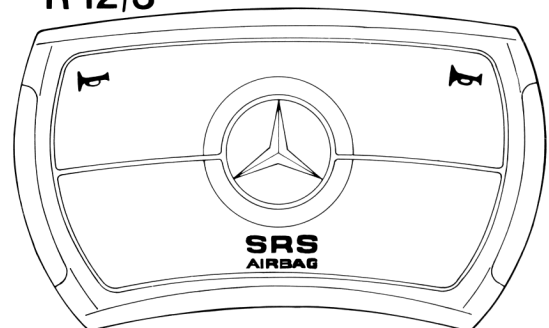


**Arrangement of components in vehicles up to 09/87**

**1 Driver airbag unit**  
in the steering wheel for all models

**2 Belt tensioner**  
in the left and right center pillars

R 12/3

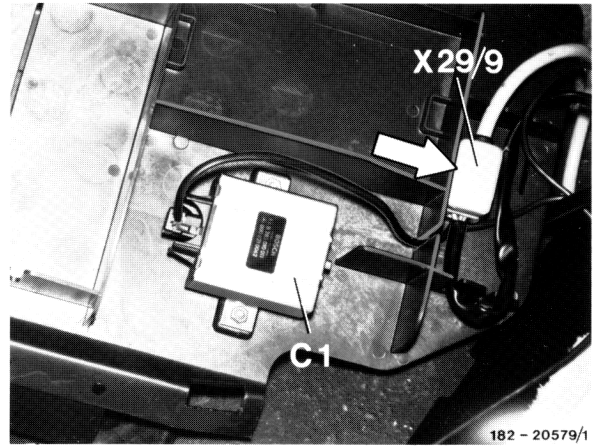


**3 Control unit**  
on the tunnel in front of the gear shift lever



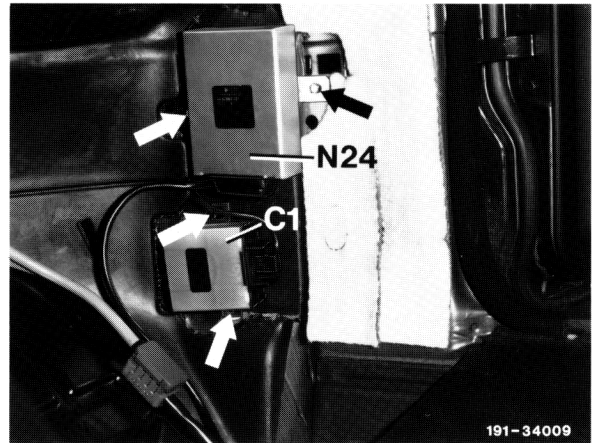
#### 4 Reserve power source

Model 124 1st version, under passenger's foot rest



C1 Reserve power source

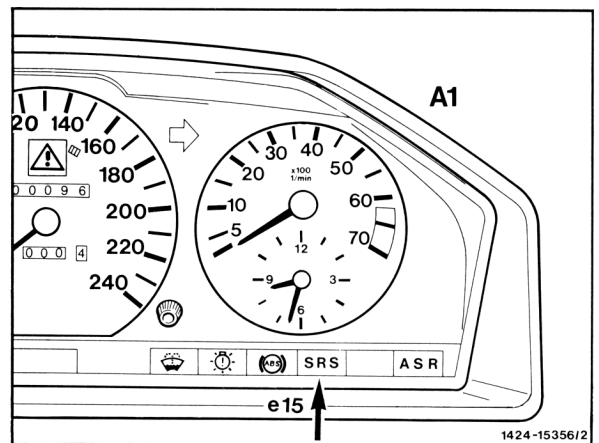
Model 124 2nd version, under side panelling in passenger's footwell



C1 Reserve power source

#### 5 RS warning lamp

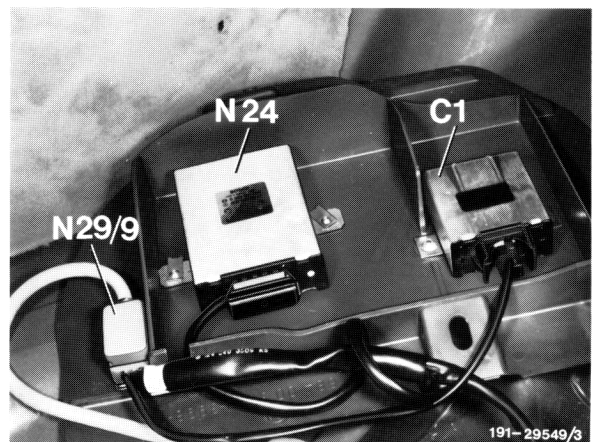
in right-hand half of instrument cluster for all models



A1e15 RS warning lamp

#### 6 Voltage transformer

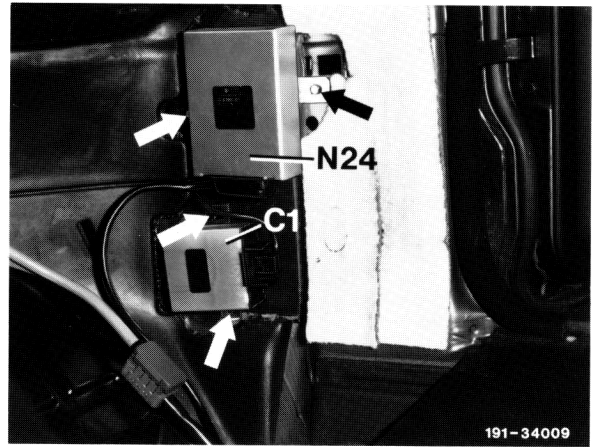
Model 124 1st version, under passenger's foot rest



N24 Voltage transformer

**Model 124** 2nd version, under side panelling in passenger's footwell

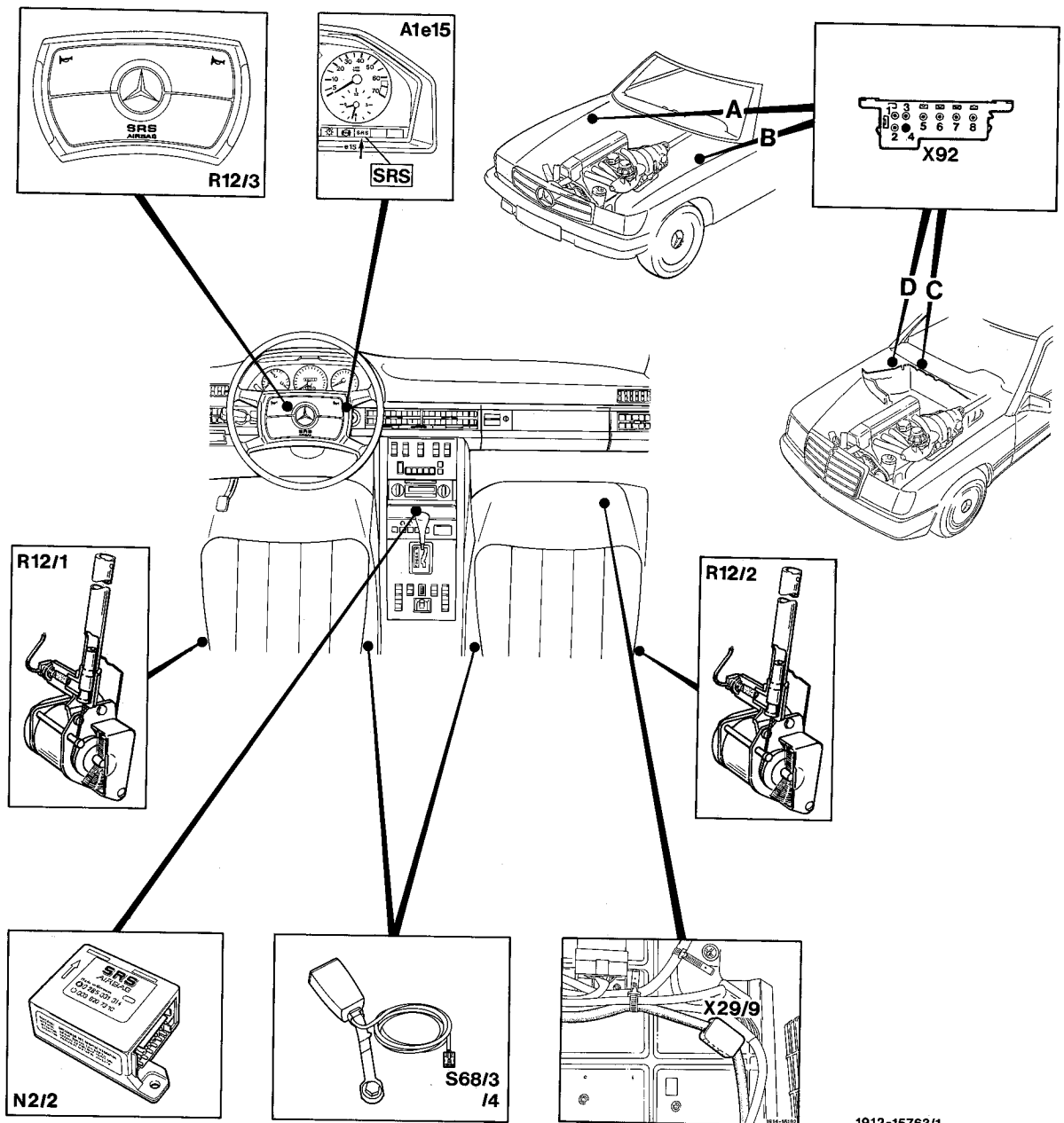
N24 Voltage transformer



**Note**

The components listed above are located at the same points in (USA) version vehicles. In addition, an energy-absorbing panel is installed under the dashboard.

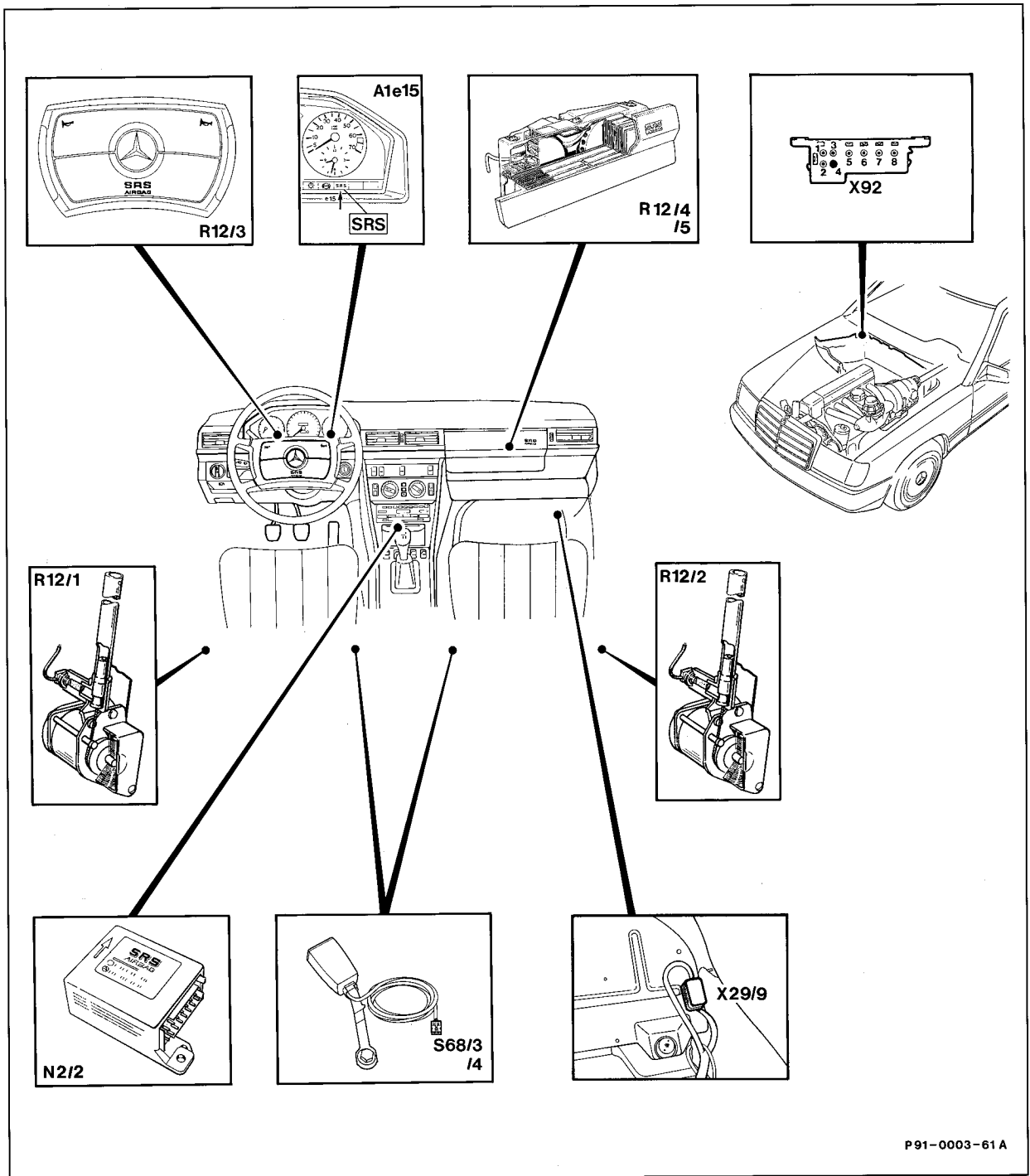
Arrangement of components for driver's airbag as of 09/87



1912-15763/1

A1e15	Airbag warning lamp (RS/SRS)	S68/3	Switch for belt buckle/airbag, belt tensioner, driver
N2/2	Control unit, belt tensioner with airbag	S68/4	Switch for belt buckle/airbag, belt tensioner, passenger
R12/1	Detonator, belt tensioner, driver's side	X29/9	Test coupling/plug connection, airbag, 10-pin
R12/2	Detonator, belt tensioner, passenger's side	X92	Test coupling for diagnosis, 8-pin (flashing code) D, model 124
R12/3	Detonator, driver's airbag		

Arrangement of components for driver's and passenger's airbags as of 09/88



P91-0003-61 A

- |       |  |       |   |
|-------|--|-------|---|
| A1e15 | Airbag warning lamp (RS/SRS)             | R12/5 | Detonator 2, airbag (passenger)                       |
| N2/2  | Control unit, belt tensioner with airbag | S68/3 | Switch for belt buckle/airbag, belt tensioner, driver |
| R12/1 | Detonator, belt tensioner, left seat     | S68/4 | Switch for belt buckle, passenger, belt tensioner,    |
| R12/2 | Detonator, belt tensioner, right seat    | X92   | Test coupling for diagnosis, 8-pin (flashing code)    |
| R12/3 | Detonator, airbag (driver)               |       |   |
| R12/4 | Detonator 1, airbag (passenger)          |       |   |

*91.0201-600/8*



## Adhesive labels for replacement date of airbag units

### Adhesive label for replacement date of driver airbag unit up to 09/87

An adhesive label with the replacement date of the airbag unit is located on the inside of the glove box lid on the left-hand side.



### Adhesive label for replacement date of driver airbag unit as of 09/87

An adhesive label with the replacement date of the airbag unit is located on the left-hand center pillar below the latch striker.



Illustrated for model 126

### Adhesive label for replacement date of driver and passenger airbag units as of 09/88

An adhesive label with the replacement date of driver and passenger airbag units is located on the left-hand center pillar below the latch striker. The replacement date always applies to the entire driver/passenger airbag unit. The replacement period is at least 10 years.

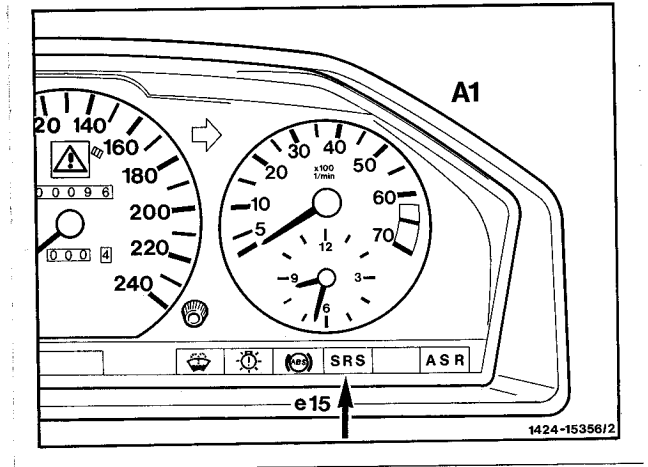


1914-15701/1

## Driving with the airbag and belt tensioner restraint system

When the ignition key is moved from position "1", the red warning lamp marked "RS" or "SRS" in the instrument cluster lights up.

The warning lamp indicates the readiness of the airbag and belt tensioner restraint system. It must light up from key position "1" and go out again after approx. 10 s in vehicles up to 09/87, or after approx. 4 s in vehicles as of 09/87. If it does not light up, or fails to go out after the specified period, or if it lights up when driving, there is a fault in the system. The time of the fault is registered by the control unit and can be called up at a later date.



If this fault display appears, the entire system must be examined as soon as possible by specialist personnel using the airbag tester (in vehicles up to 09/87) or by means of pulse output (in vehicles as of 09/87).

This does not impair the operation of the driver's and passenger's seat belts installed as standard equipment.

The full airbag and belt tensioner restraint system consists of the following components:

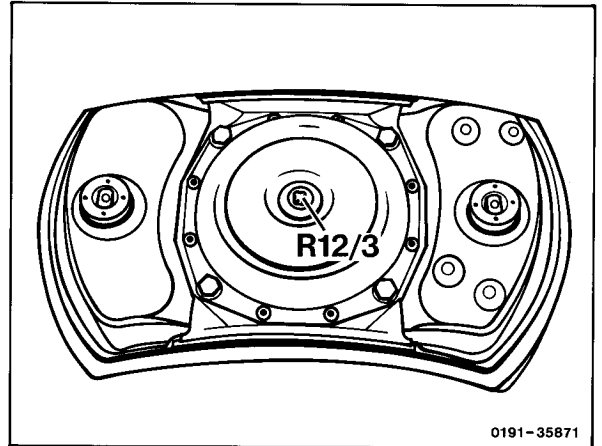
- B. Driver airbag unit
- C. Passenger airbag unit
- D. Belt tensioner unit
- E. Control unit
- F. Reserve power source (up to 09/87)
- G. Warning lamp
- H. Voltage transformer (up to 09/87)
- I. Energy-absorbing panels under the dashboard (USA only)

## B. Driver airbag unit

### Design

The driver airbag unit consists of:

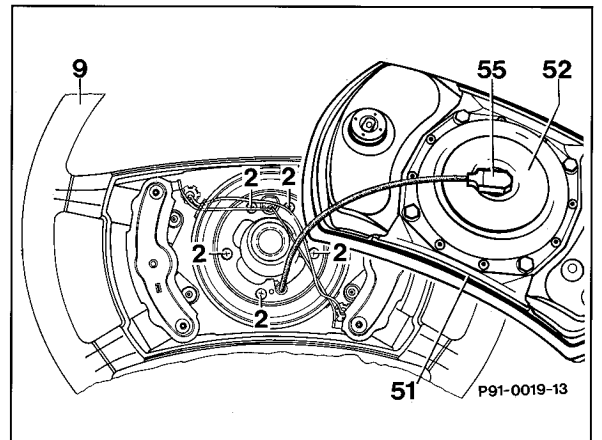
signal carrier,  
cushion with integral airbag,  
retaining plate and  
gas generator.



0191-35871

The safety element proper is the airbag which is inflated within 25 ms to fill the space between the driver and the steering wheel.

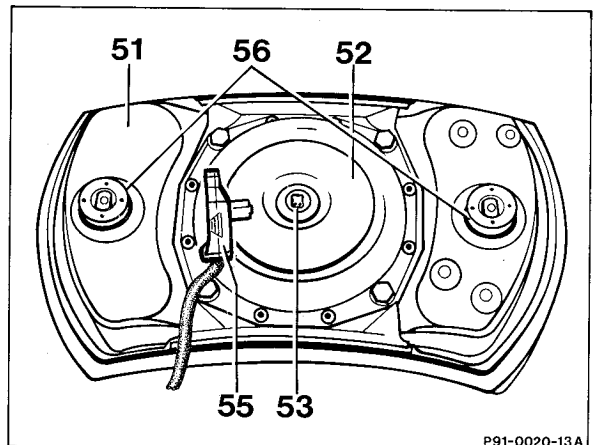
The complete driver airbag unit is bolted to the steering wheel installed in the vehicle after connecting the special plug connection (55).



- 9 Steering wheel
- 51 Driver airbag unit
- 52 Gas generator
- 55 Plug connection

Before the driver airbag unit is fitted in the vehicle, it is electrically shorted automatically by means of a short-circuiting link. The short-circuiting link is automatically opened when the plug connection (55) is plugged in.

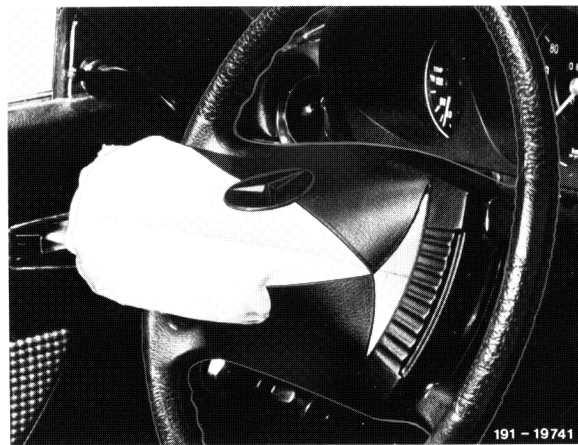
- 51 Driver airbag unit
- 52 Gas generator
- 53 Gas generator plug connection
- 55 Plug connection
- 56 Generator carrier with special nuts.



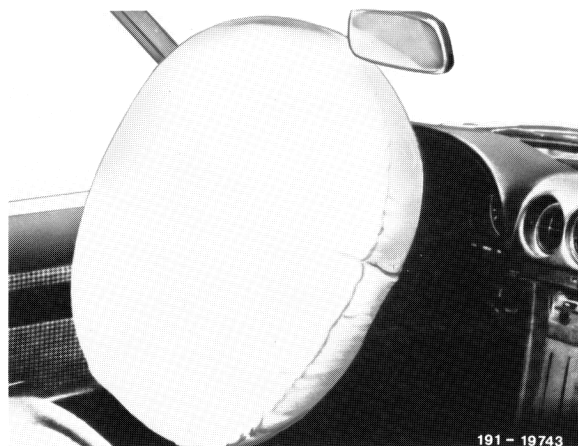
P91-0020-13A

### Method of operation

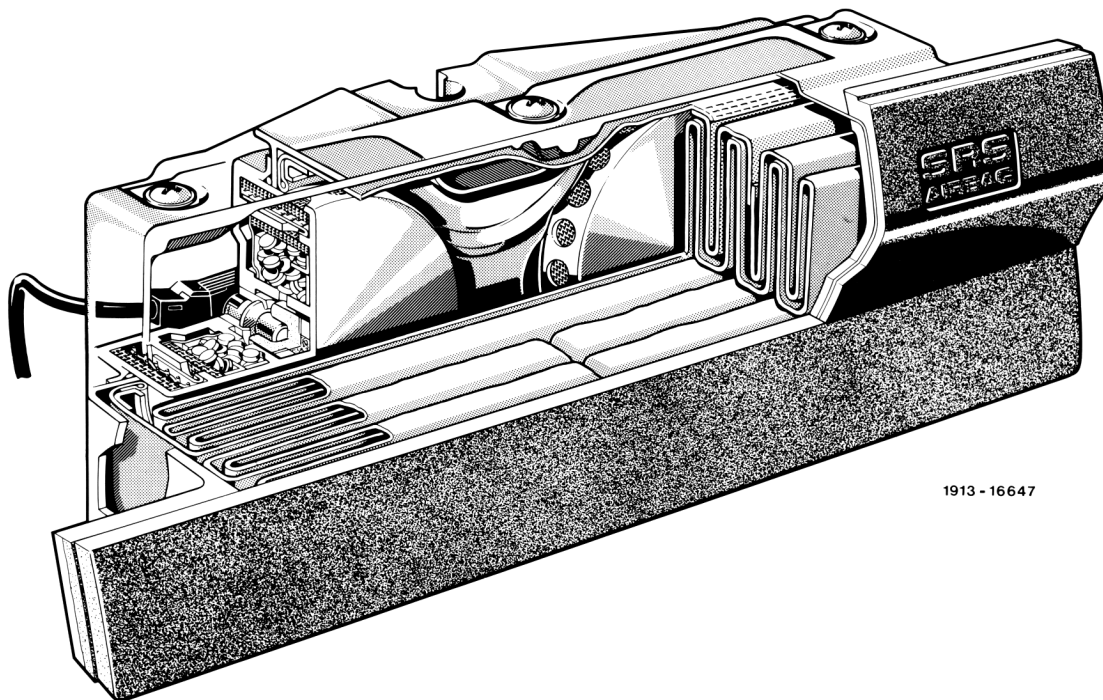
When the control unit sends the appropriate electrical pulse (ignition pulse) to the detonator located inside the gas generator, the solid fuel in the gas generator is ignited. The fuel burns within an extremely short time releasing a certain quantity of gas at a certain pressure. The gas is guided into the airbag via filters.



The nylon fabric airbag folded on top of the gas generator tears open the cushion at a predetermined breaking point. The gas rigidly inflates the airbag, thus preventing the driver's head from colliding with the steering wheel. After approx. 60 ms the gas has escaped through 4 vents or through a filter section in the airbag, and the airbag collapses.



## C. Passenger airbag unit



1913 - 16647

Passenger airbag unit

In the event of a severe frontal collision, the risk of injury to the chest and head area is further reduced by the combined system of seat belts with belt tensioners and driver's and/or passenger's airbag, in comparison to the seat belts with belt tensioners installed as standard equipment.

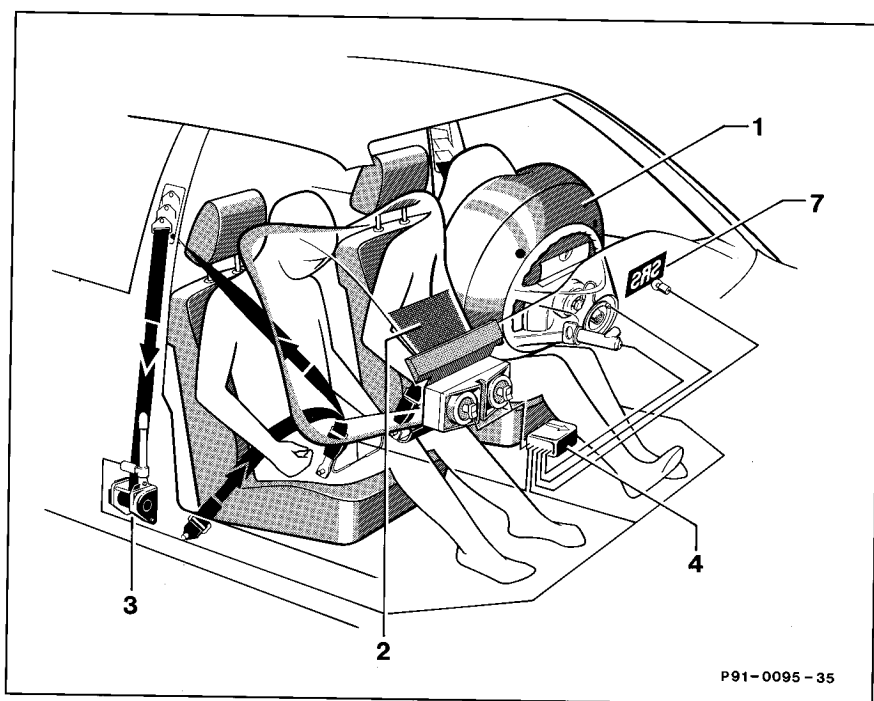
The driver and passenger airbag units bear the inscription "SRS Airbag". The warning lamp is marked "SRS" (Supplemental Restraint System).

The passenger airbag unit is installed in place of the glove box.

The complete passenger airbag unit consists of a die-cast light alloy frame bearing on one side **two** gas generators (of the same type used in the driver airbag unit) and on the other side, the folded airbag with its cover.

The passenger's airbag is made of a similar material to the driver's airbag (Neoprene-coated polyamide fabric) in 4 sections sown together, and has a volume of approx. 170 litres when inflated (driver's airbag approx. 60 litres).

The gas released during combustion of the solid fuel is approx. 95 % nitrogen. It is non-toxic and non-irritant. The shape of the passenger's airbag is completely different to that of the driver's airbag.



Driver's and passenger's airbags

P91-0095-35

The passenger's airbag is fitted with an insert of gas-permeable filter material on the side nearest the windshield to release the gas after inflation. The two gas generators of the passenger airbag unit are not ignited simultaneously but with a delay of 15 ms between the first and the second. In this way, inflation of the airbag is slightly prolonged, reducing the rate of pressure increase in the passenger compartment. The passenger's airbag inflates in around 35 ms (driver's airbag around 25 ms). The method of operation is identical to that of the driver airbag unit.

The complete passenger airbag unit must be introduced from the passenger-compartment side into the appropriately modified and reinforced dashboard after connecting the two special plug connections.

The passenger airbag unit is secured by a single bolt (2).

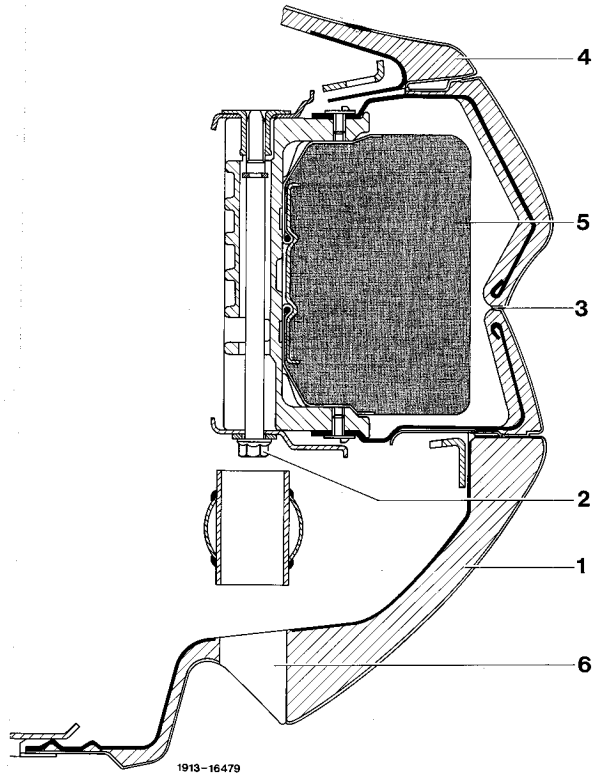
The passenger airbag unit is automatically shorted by means of two short-circuiting links before assembly in the vehicle. The short-circuiting links are automatically opened when the plug connections are plugged in.

The panelling below the dashboard as far as the passenger's footwell has been adapted to the modified shape in this region.

The airbag cover facing the front passenger is shaped so as to continue the line of the dashboard. The cover consists of grained PVC sheet, backed with polyurethane foam and reinforced with light alloy plates.

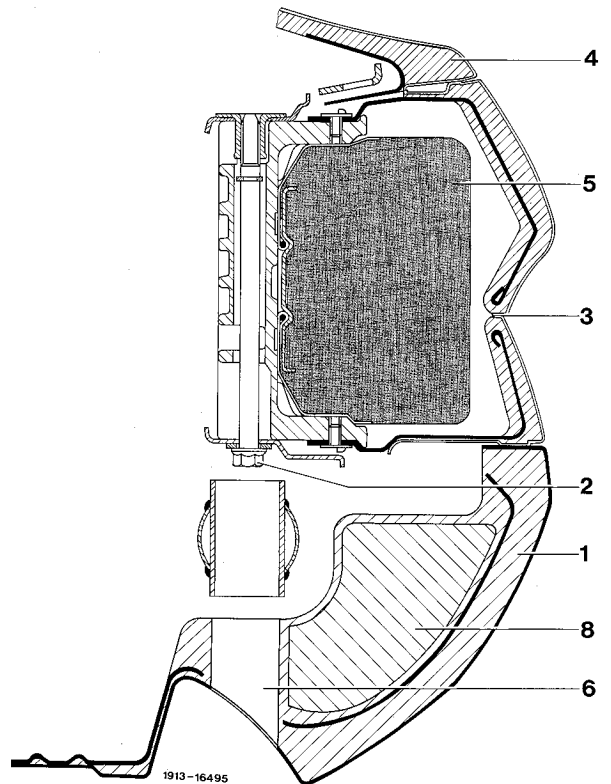
Passenger airbag unit (cross section)

- 1 Panel under dashboard
- 2 Central retaining bolt for passenger airbag unit
- 3 Predetermined breaking point
- 4 Dashboard
- 5 Folded airbag
- 6 Bore



Passenger airbag unit (cross section),  
 (USA) version

- 1 Panel under dashboard
- 2 Central retaining bolt for passenger airbag unit
- 3 Predetermined breaking point
- 4 Dashboard
- 5 Folded airbag
- 6 Bore
- 8 Energy-absorbing panel under dashboard (passenger's side)





## D. Belt tensioner unit

### Design of cable tensioner (2nd version as of 09/84)

#### Method of operation

The complete unit is installed in the left-hand and right-hand center pillars and connected electrically by means of an 2-pin plug. The belt tensioner unit is automatically shorted by means of a short-circuiting link before assembly in the vehicle. The short-circuiting link is automatically opened when the plug connection is plugged in. If the control unit sends an electrical pulse to the propellant capsule, high-pressure combustion gas is released. This propellant gas passes by way of a T-piece to the plunger which is accelerated upwards. The wire cable pulls on the cable pulley and rotates it, and thus the belt retractor, to tension the seat belt. This reduces any slack in the belt and prevents the so-called film-reel effect in the wound belt.

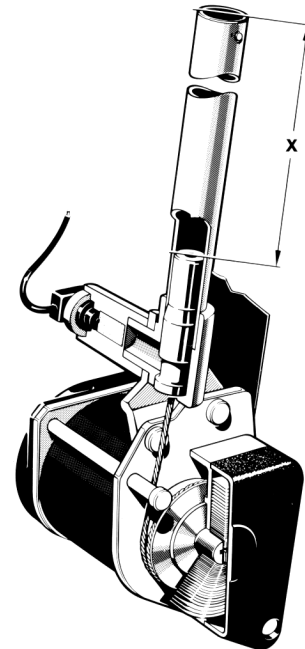
**Test for triggering:** A colored mark (green or yellow) is present on the cable to check whether the belt tensioner has been triggered. If no colored mark is visible, the belt tensioner has been triggered and must be renewed. During the launch of this series, several vehicles were manufactured without this colored mark on the cable of the belt tensioner.



These belts must be tested as follows:  
Remove the protective rubber cap on the end of the tube and measure distance "X".

Distance X:  $170 \pm 5$  mm

If distance "X" is less than the specified length, the belt tensioner has been triggered and must be renewed.

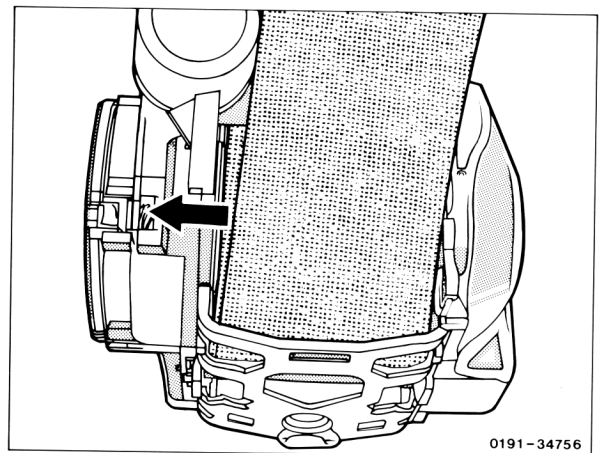


1914-12202/1

As of 01/86, there is an observation window in the housing of the belt tensioner, through which the cable is visible.

Belt tensioners where **no** cable is visible have been triggered and must be renewed.

As of 08/87, belt tensioners are supplied by two manufacturers.



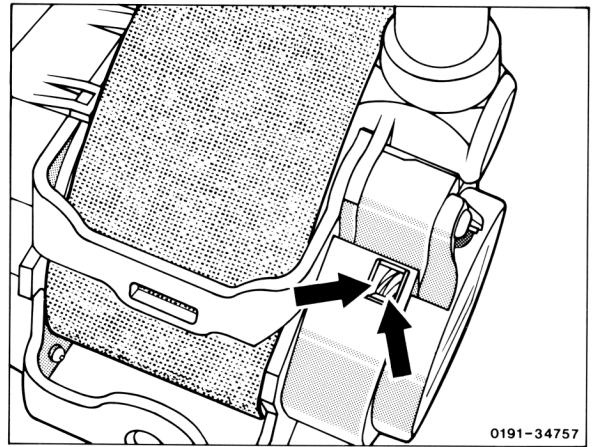
0191-34756

The housing of the Autoflug belt tensioner is also fitted with an observation window through which 2 cables are visible.

Autoflug belt tensioners where only 1 cable or no cable is visible, have been triggered and must be renewed.

The Autoflug belt tensioners are factory-fitted with a tube which is approx. 80 mm shorter than that of the Repa belt tensioners.

Repa belt tensioners also feature these shorter tubes as of 01/88.



## E. Control unit

The control unit, also referred to as the triggering unit or crash sensor, is responsible for determining the severity of a collision and, if necessary, triggering the restraint system at the correct time.

### General

---

#### (Vehicles up to 09/87)

Two integrated circuits are accommodated together with an acceleration sensor in a common housing.

The housing and the electrical connections have been designed in such a way as to virtually exclude any malfunctions due to electrical interference in the vehicle electrical system caused by the switching of various electrical consumer components on and off, and by electromagnetic interference on public highways.



## Function

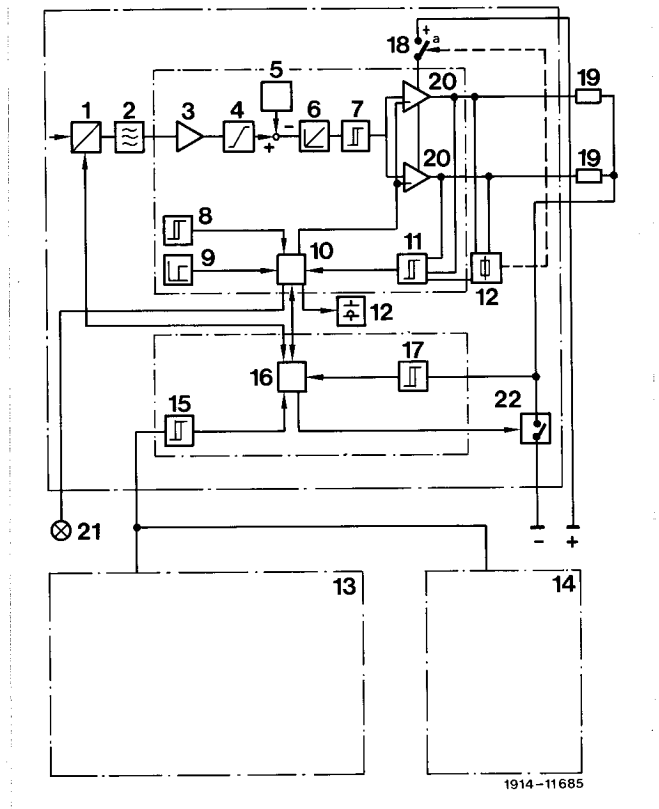
The electronic control unit processes the deceleration of the vehicle during a frontal collision and must therefore be rigidly coupled with the vehicle.

Incorrect triggerings are avoided by means of an integral mercury switch which interrupts the ignition circuits of the airbag and belt tensioner restraint system during normal driving, and by a predetermined deceleration threshold  $a_s$ .



The acceleration sensor (1) in the control unit records the deceleration or acceleration acting on the vehicle on the longitudinal direction, and generates a signal. This signal is sent via the high-pass filter (2) to the amplifier (3) which adapts the signal strength to the following processing stages. The acceleration signal is restricted in the limiter (4) and is reduced by a constant acceleration threshold  $a_s$  in a subtractor circuit (5). The integrator (6) then integrates the signal produced and passes it on to the trigger switch (7) for evaluation. If the fixed triggering speed  $V$  is exceeded, the output stages (20) are activated. This effects triggering of the driver's airbag and the belt tensioners by means of the detonators (19) when the test cycle is complete. An additional precaution against incorrect triggering is a mercury switch (18) installed in the control unit. The control unit also contains a further circuit to monitor the ignition circuits and to perform its own function check. Malfunctions are indicated by the warning lamp (21).

- 1 Acceleration sensor
- 2 High-pass filter
- 3 Amplifier
- 4 Limiter
- 5 Subtractor circuit
- 6 Integrator
- 7 Trigger switch
- 8 Voltage monitoring
- 9 Switch-on delay
- 10 Logic circuit
- 11 Ignition circuit monitoring
- 12 Fault memory
- 13 Voltage transformer
- 14 Reserve power source
- 15 Reserve power source monitoring
- 16 Sequence control system
- 17 Output stage monitoring
- 18 Mercury switch
- 19 Detonators for airbag and belt tensioner generators
- 20 Output stages
- 21 Warning lamp
- 22 Test switch

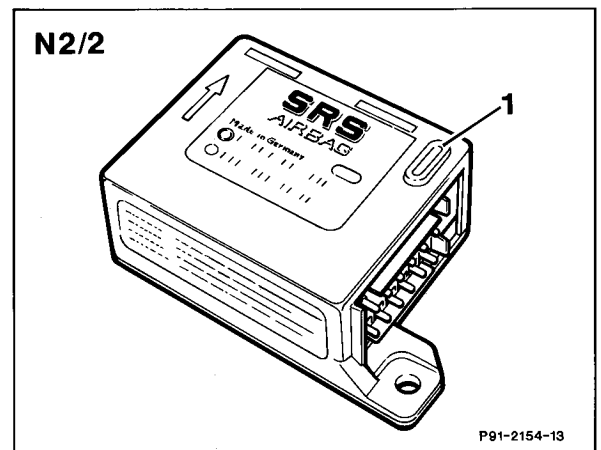


### Airbag control unit (1st generation up to 09/87 revised for service)

Due to further technical developments (derived from the 3rd generation airbag with integral reserve power source and voltage transformer), and improved environmental compatibility (free from mercury), the airbag control unit (1/3) has been launched and adapted to the present level of technology.

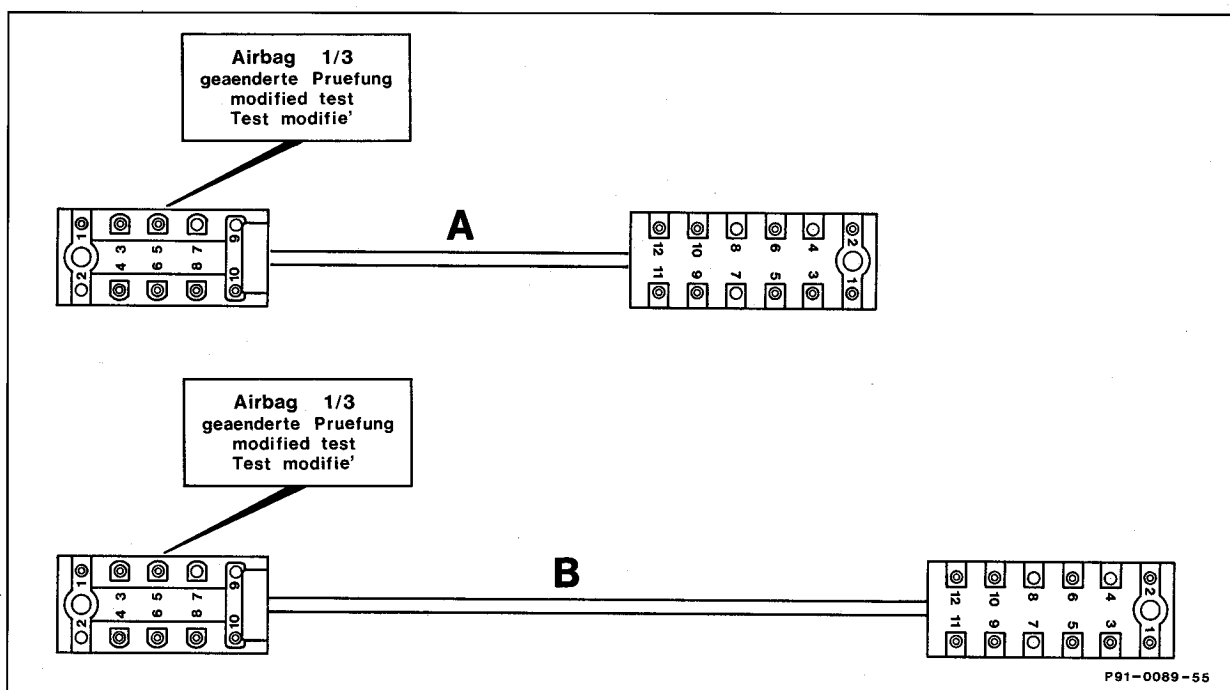


The RS or SRS warning lamp (A1e15) must go out after approx. 4 s. Test steps 2, 6 and 7 of the test using the airbag tester, part no. 126 589 10 21 00, are no longer required.



N2/2 Airbag control unit  
Part number 004 820 11 10  
1 Web

When installing a modified airbag control unit, the voltage transformer (N24) and the reserve power source (C1) must be removed and the cable ends must be insulated with black insulating tape and fastened to the existing cable harness. The airbag control unit (1/3) has the part number 004 820 11 10 and, in conjunction with the cable (A), part number 124 540 57 35, replaces the previous control unit, part number 124 820 51 10; and, in conjunction with the cable (B), part number 124 540 58 35, replaces the control unit, part number 002 820 97 10. A notice on airbag 1/3 and on the modified test procedure is stamped on the top section of the test coupling for the airbag 10-pin plug connection (X29/9).



P91-0089-55

- A Cable, part number 124 540 57 35
- B Cable, part number 124 540 58 35

## Note

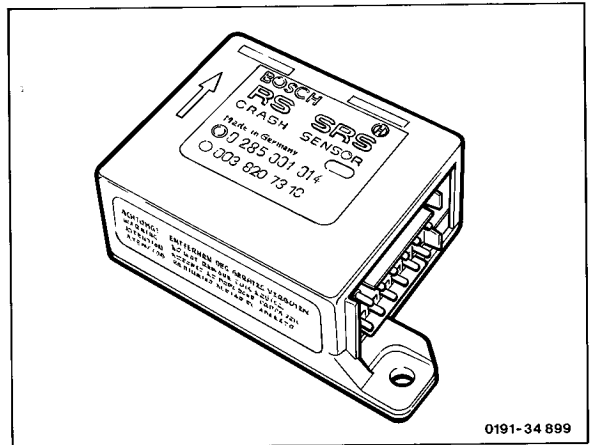
The control units, part number 124 820 51 10 and part number 002 820 97 10, are no longer supplied as spare parts. The voltage transformer and reserve power source are still available.

## General

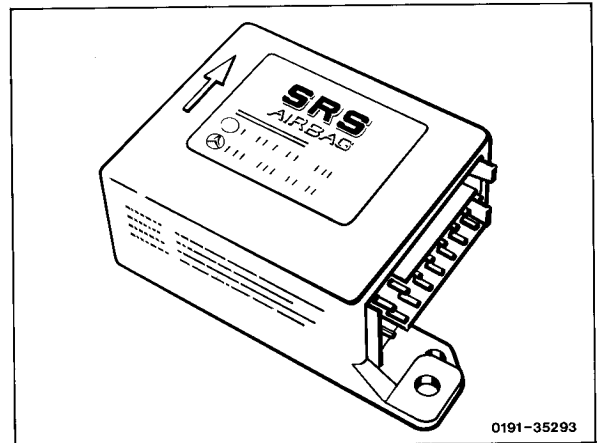
### (Vehicles as of 09/87 or as of 01/88)

As of 09/87, the airbag restraint system has a new control unit with integral reserve power source and voltage transformer. This means that the reserve power source and voltage transformer previously accommodated in separate housings are no longer required.

Control unit, driver's airbag, 12-pin



Control unit, driver's and passenger's airbags, 16-pin



## Function

The control unit processes the vehicle deceleration during a frontal collision and is rigidly coupled on a support bracket with the transmission tunnel of the vehicle (as before). By means of an integral safety switch which interrupts the ignition circuits for the driver's airbag and belt tensioner restraint system during

normal driving, the airbag and belt tensioners can only be triggered by an actual acceleration. This prevents any malfunctions.

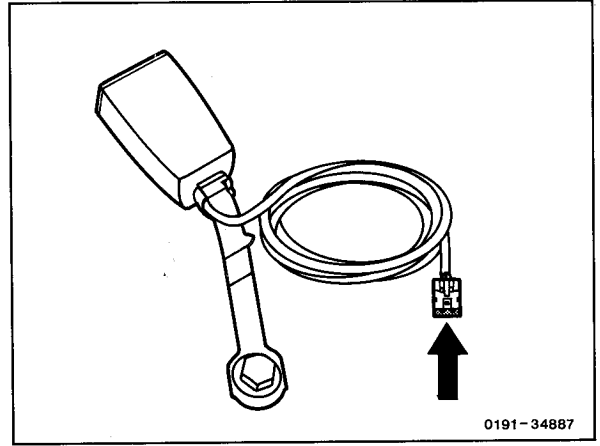
An acceleration sensor installed in the control unit detects the deceleration acting on the vehicle in the longitudinal direction and sends an appropriately conditioned signal to the trigger switches for evaluation. If the fixed triggering thresholds of both trigger switches are exceeded, the output stages are activated as is appropriate for the circumstances detected via the belt buckle switch (buckle latch in/not in belt buckle). This results in triggering of the system (see table). If the power supply is interrupted during a collision, the driver's airbag and/or passenger's airbag can still be triggered within 100 ms, but not the two belt tensioners. The warning lamp lights up if the vehicle voltage is  $< 9.5 \text{ V}$  for longer than 10 s. The lamp goes out at a voltage  $> 10 \text{ V}$ .

The housing and the electrical connections have been designed in such a way as to virtually exclude malfunctions due to electrical interference in the vehicle electrical system caused by the switching of electric consumer units on and off, and by electromagnetic radiation on public highways.

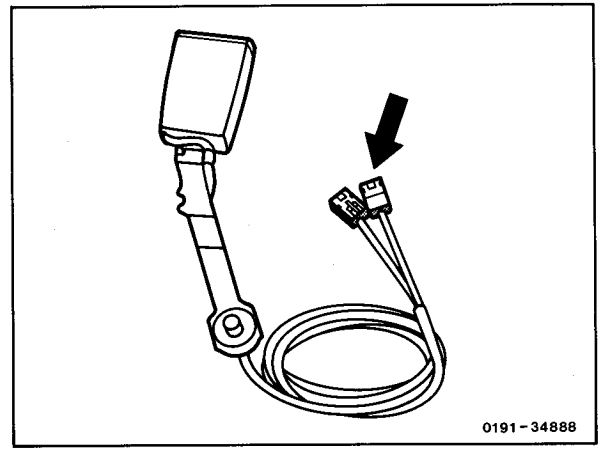
In order to detect whether the buckle latches are inserted in the belt buckles or not, new belt buckles with separate switches and resistors were necessary. This results in the triggering logic listed below.



Belt buckle, all models except coupé



Belt buckle, coupé



**Triggering logic of driver's airbag and belt tensioners**

Control unit		Driver's seat		Passenger's seat	
		Buckle latch		Buckle latch	
		Not inserted	Inserted	Not inserted	Inserted
1st triggering threshold exceeded	Belt tensioner	Not triggered	Triggered	Not triggered	Triggered
	Driver's airbag	Triggered	Not triggered		
2nd triggering threshold exceeded	Driver's airbag	Already triggered	Triggered		

**Explanation**

In the event of a minor collision where the protection offered by the safety belt is sufficient, the belt tensioner only is triggered when the 1st triggering threshold is exceeded, as long as the buckle latch is inserted in the belt buckle.

In the event of a severe collision exceeding the 2nd triggering threshold, the airbag is triggered as well.

**Triggering logic of driver's and passenger's airbags and belt tensioners**

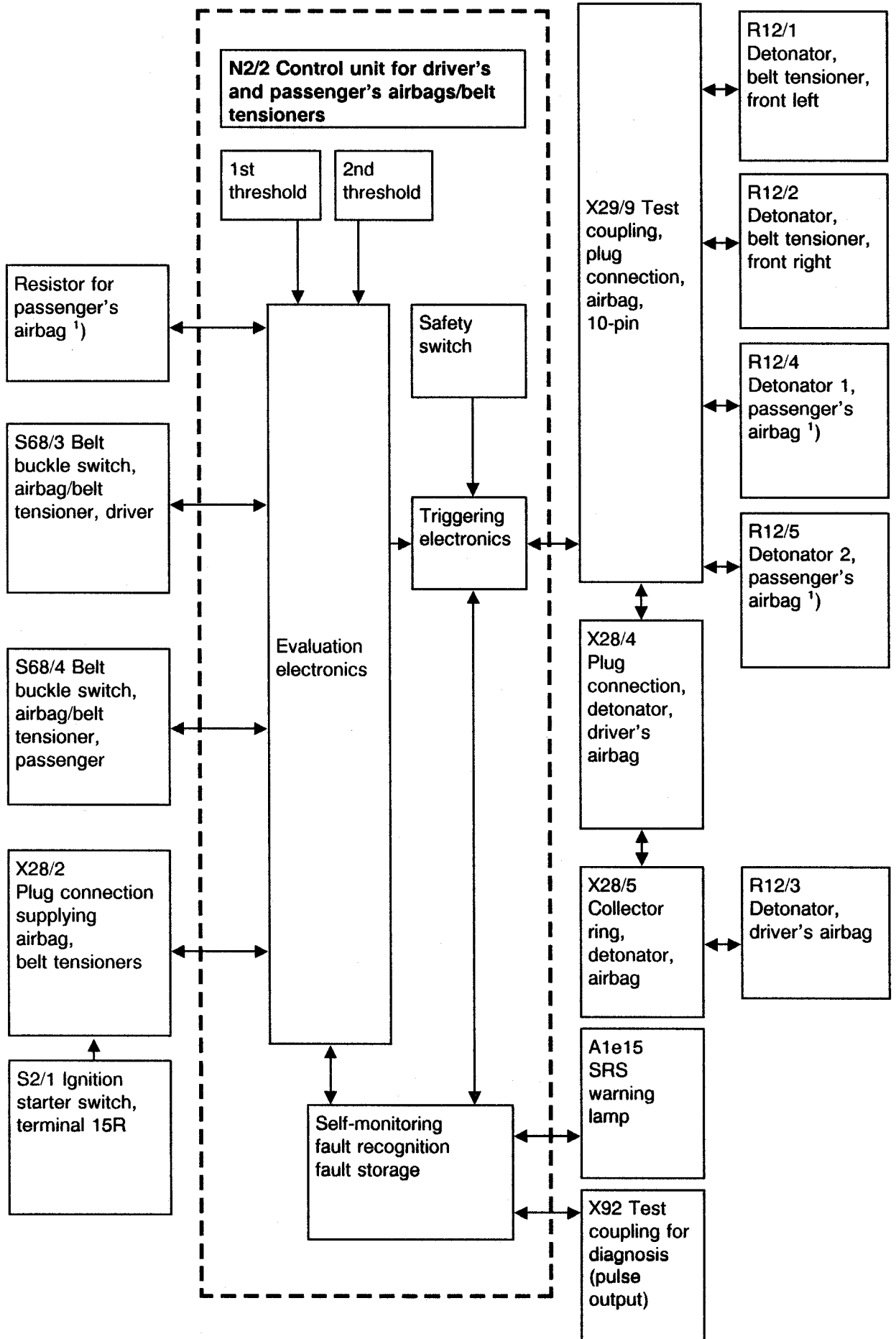
Control unit		Driver's seat		Resistor for passenger's airbag	Passenger's seat	
		Buckle latch			Buckle latch	
		Not inserted	Inserted		Not inserted	Inserted
1st triggering threshold exceeded	Belt tensioners	Not triggered	Triggered	Simulates a constantly occupied passenger's seat	Not triggered	Triggered
	Driver's/ passenger's airbag	Triggered	Not triggered		Triggered	Not triggered
2nd triggering threshold exceeded	Driver's/ passenger's airbag	Already triggered	Triggered		Already triggered	Triggered

**Explanation**

In the event of a minor collision where the protection offered by the safety belts is sufficient, only the belt tensioners are activated when the 1st triggering threshold is exceeded, as long as the buckle latch is inserted in the belt buckle.

If the buckle latches are not inserted in the belt buckles, or if the 2nd triggering threshold is exceeded, the driver's airbag and/or passenger's airbag is activated in place of or in addition to the belt tensioners.

**Block diagram of the entire function of the driver's and passenger's airbags/belt tensioners**



1) Only when passenger's airbag is installed

## F. Reserve power source (up to 09/87)

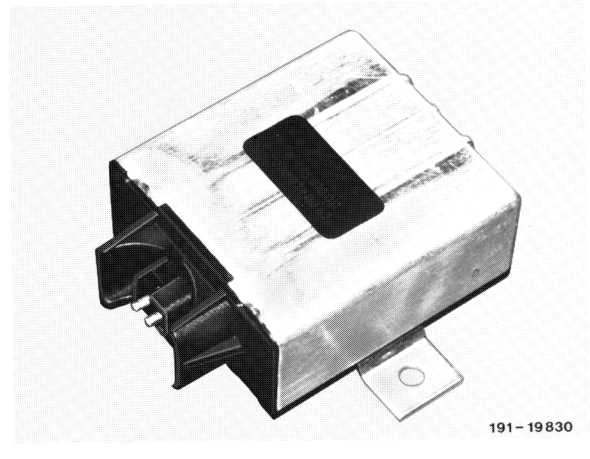
### Design

The reserve power source is located in a separate housing connected with the control unit by means of a cable harness.

### Method of operation

Should the vehicle battery fail immediately in the event of a collision, the control unit and the ignition circuits are supplied from a reserve power source.

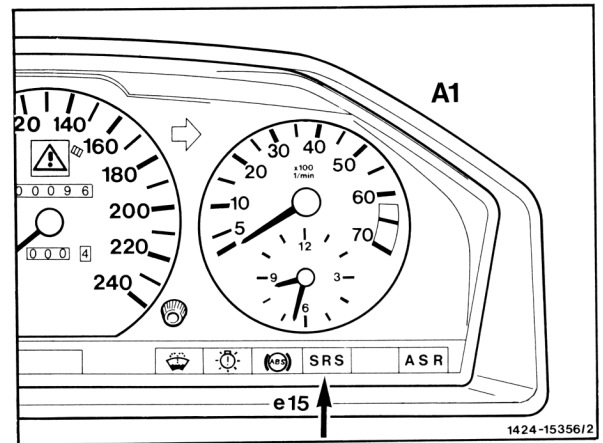
Failures of the reserve power source are indicated by the warning lamp in the instrument cluster.



## G. Warning lamp

The warning lamp is located in the instrument cluster and is marked "RS" for Restraint System (or "SRS" for Supplemental Restraint System).

The warning lamp indicates the readiness of the airbag and belt tensioner restraint system. It must light up when the key is moved from position "1" and go out again after approx. 10 s in vehicles up to 09/87, or after approx. 4 s in vehicles as of 09/87.



If it fails to light, or if it fails to go out after the period specified, there is a fault in the system. The time of the fault is registered by the control unit and can be called up at a later date.



Should the above fault display appear, the entire system must be examined as soon as possible by specialist personnel using a tester or, in vehicles as of 09/87, by means of pulse output. This does not impair the function of the driver's and passenger's seat belts installed as standard equipment.

## H. Voltage transformer (up to 09/87)

### Design

The voltage transformer is located in a separate housing and is connected with the airbag cable harness by means of a plug connection.

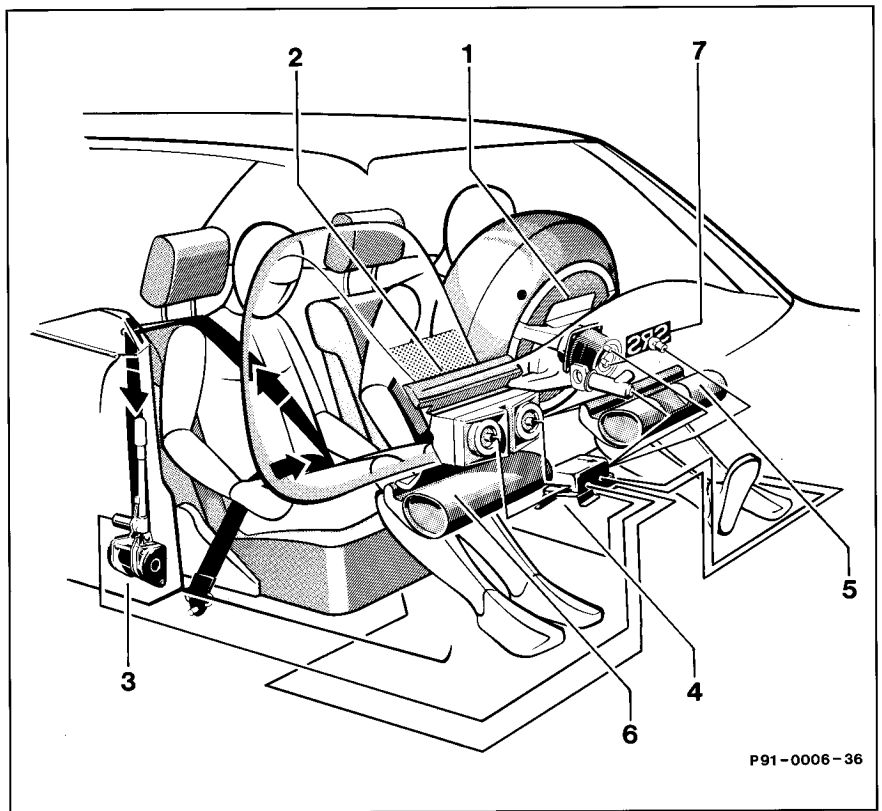
N24 Voltage transformer



### Method of operation

The function of the voltage transformer is to supply the control unit and reserve power source with a constant voltage of  $12 \pm 1$  volts even in the event of low battery voltage ( $\geq 4.0$  volts).

## I. Energy-absorbing panels under dashboard (USA only)



The energy-absorbing panels (5 and 6) are located on the driver's side (and on the passenger's side if a passenger's airbag is fitted) under the dashboard. They consist of energy-absorbing foam with an integral corrugated steel tube as an additional deformation element.

In conjunction with the driver's and passenger's airbags and the belt tensioners, these panels serve to further increase safety in the event of moderately severe to severe collisions.