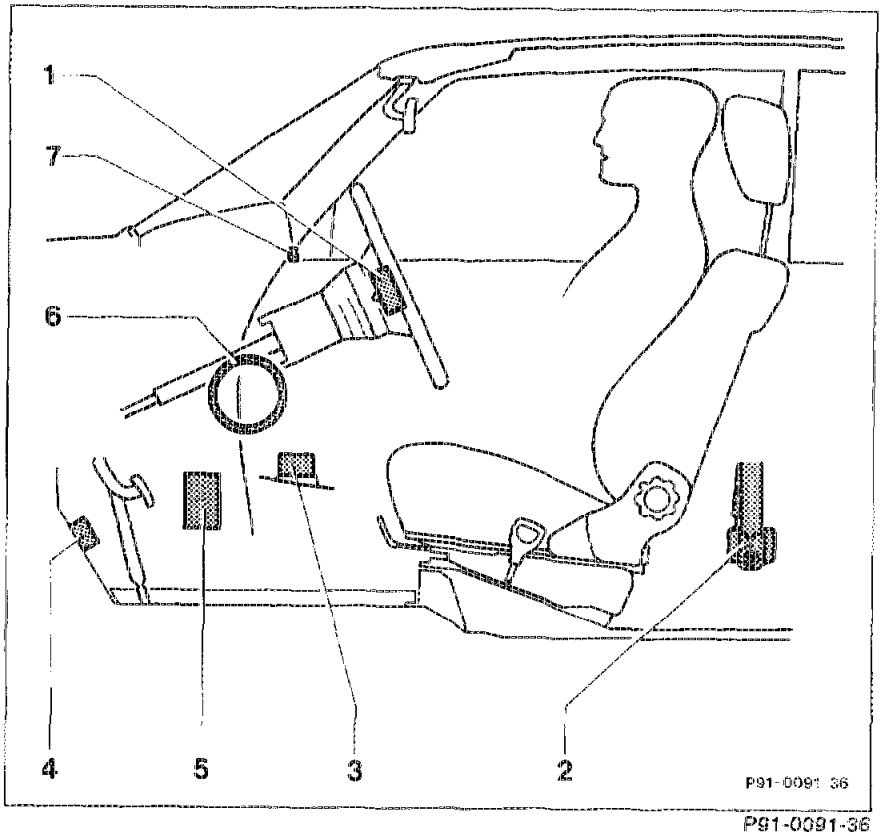
General

The protection afforded by standard three-point (fastened) safety belts is enhanced by the driver's airbag unit in the steering wheel and the front passenger's airbag unit (replacing the glove box) in combination with the emergency tensioning retractor (ETR) and knee bolsters on the driver's and passenger's side.

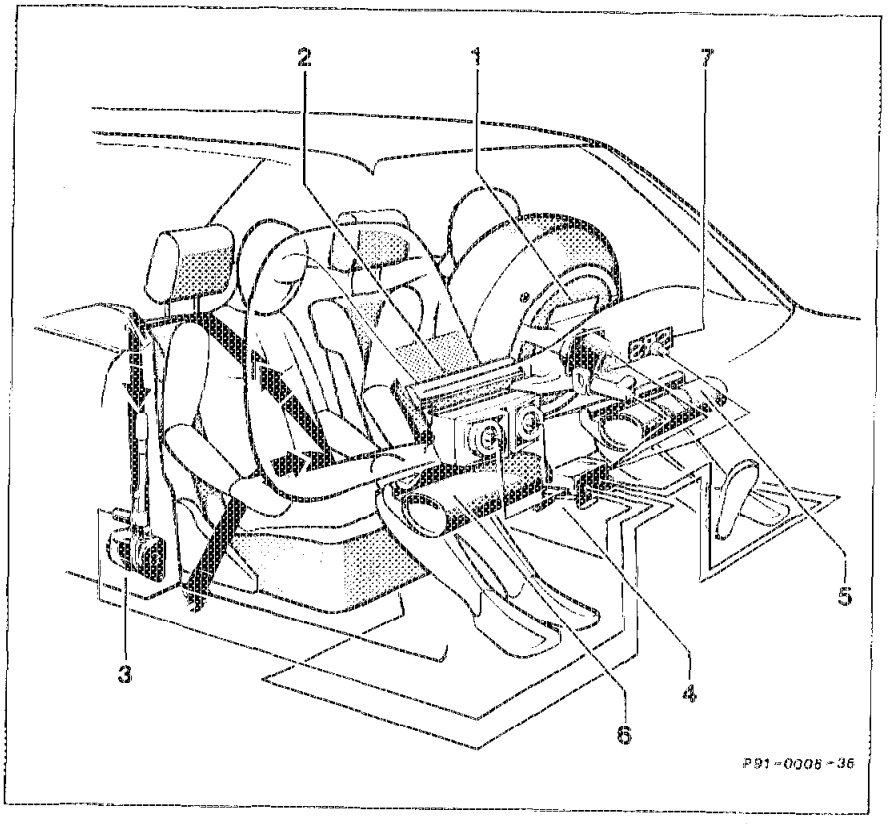
Both systems are activated electrically by a control module in the event of moderately severe and severe front-end accidents. Complying with the current state of the art, the (intact) airbag system remains fully functional for at least fifteen years. In contrast to the three-point safety belt, which affords protection only when fastened, the occupant of a vehicle fitted with the airbag/ETR restraint system cannot influence the protective effect in any way. Preconditions for the enhanced protective effect are the (fastened) three-point safety belt and the restraint system consisting of the driver's airbag and ETR. The airbag/ETR restraint system offers increased protection only in a front-end collision. In the case of side-on and rear-end collisions and roll-overs, the occupant remains unprotected if his or her three-point safety belt has not been fastened.



P91-0091-36

Depicted on 126 model, (USA) specification

1 Airbag unit
2 ETR
3 Control module
4 Energy accumulator
5 Voltage converter
6 Knee bolster
7 MIL



P91-0006-36

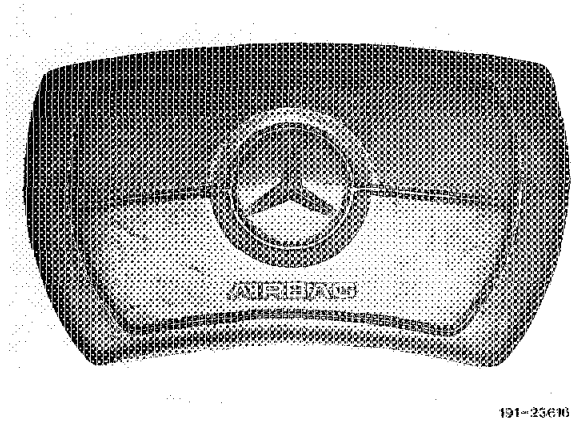
Depicted on 126 model, (USA) specification

1 Driver's airbag unit
2 Passenger's airbag unit
3 ETR
4 Control module
5 Knee bolster (driver's side)
6 Knee bolster (passenger's side)
7 SRS MIL

Component layout in vehicle (Types 1 and 2)

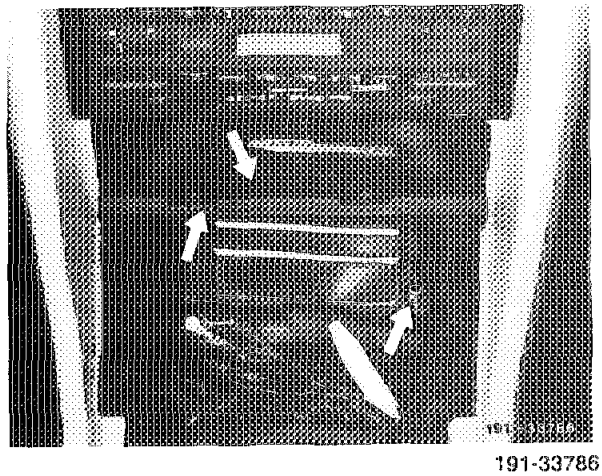
1 Airbag unit in steering wheel, all models.

2 ETR
126 Model: type 1 in central pillar, right side
126 Model: type 2 in central pillar, left and right sides



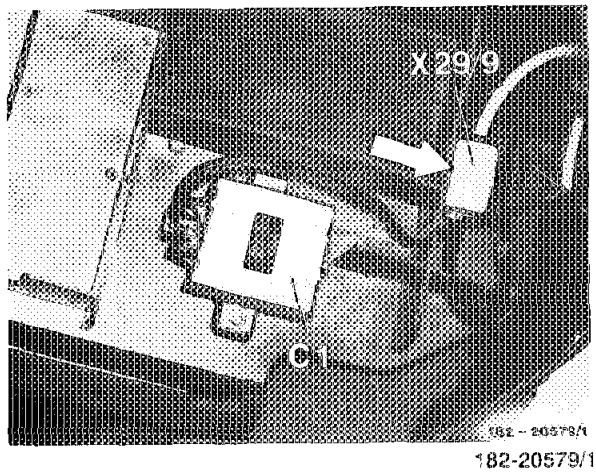
191-23616

3 Control module on center console in front of gear/auto selector lever.



191-33786

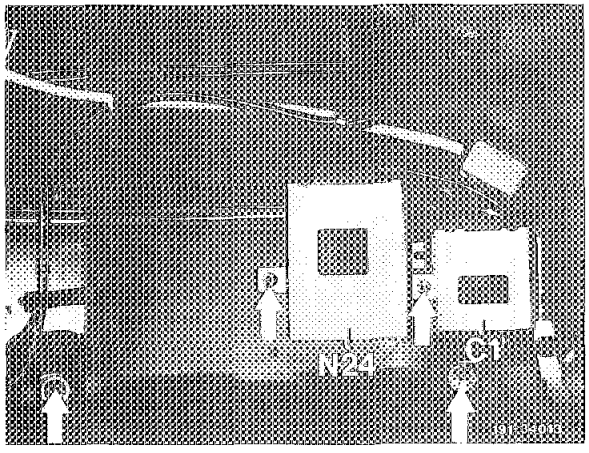
4 Battery
126 Model: type 1 under front passenger's footrest



182-20579/1

C1 SRS Energy accumulator

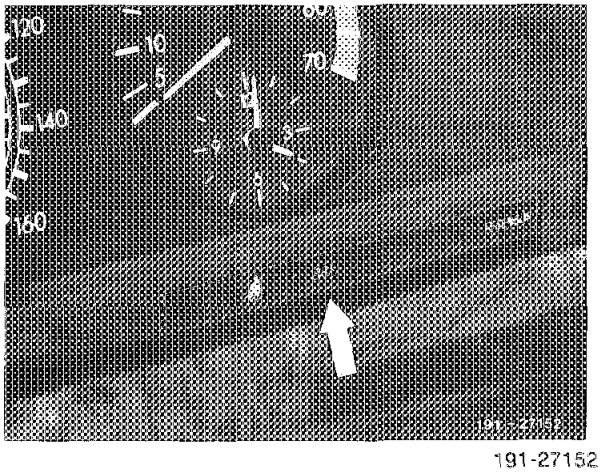
126 Model: type 2 on panel under front passenger's footrest.



C1 SRS energy accumulator

191-34013

5 SRS MIL in right half of instrument cluster on all models.

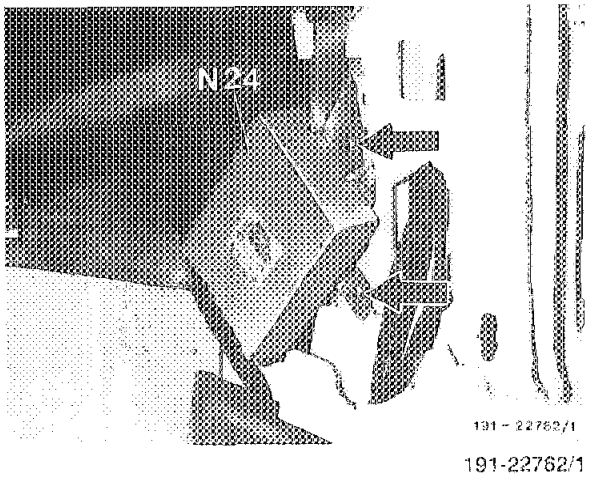


A1e15 SRS MIL

191-27152

6 SRS Voltage converter

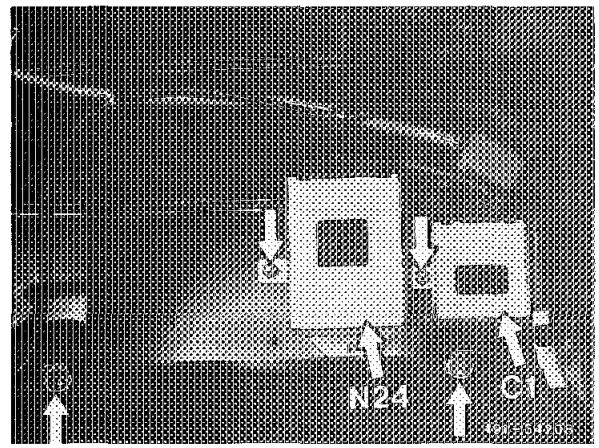
126 Model: type 1 on right, under instrument panel



N24 SRS Voltage converter

191-22762/1

126 Model: type 2 on panel under front passenger's footrest



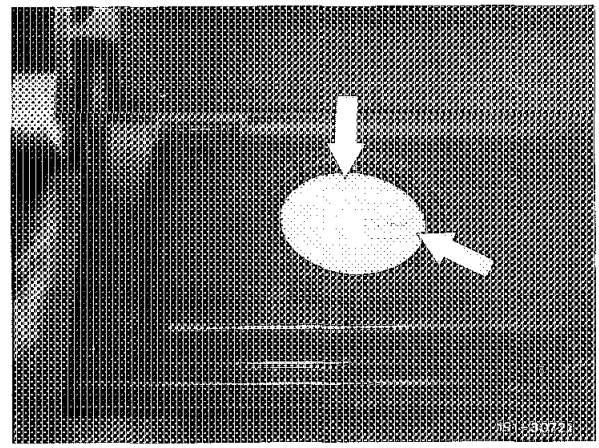
191-34208

N24 SRS Voltage converter

A knee bolster is installed under the instrument panel on the driver's and front passenger's side.

7 Sticker showing replacement date

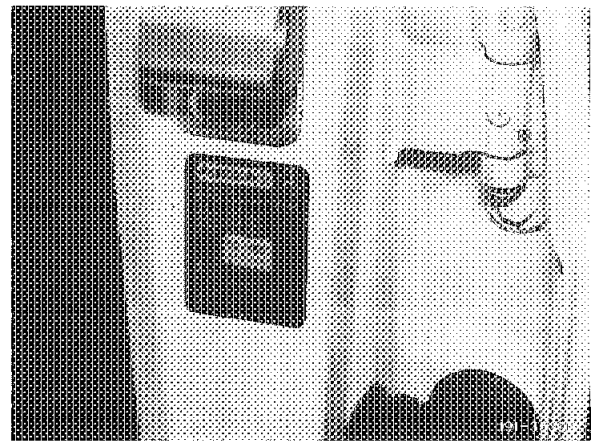
On vehicles up to 09/87, the sticker showing the airbag unit replacement date is affixed to the left side of the glove box lid.



191-30721

Sticker showing driver's airbag unit replacement date, from 09/87

Since 09/87, a modified sticker showing the airbag unit replacement date has been affixed to the left-side central pillar, below the door latch.



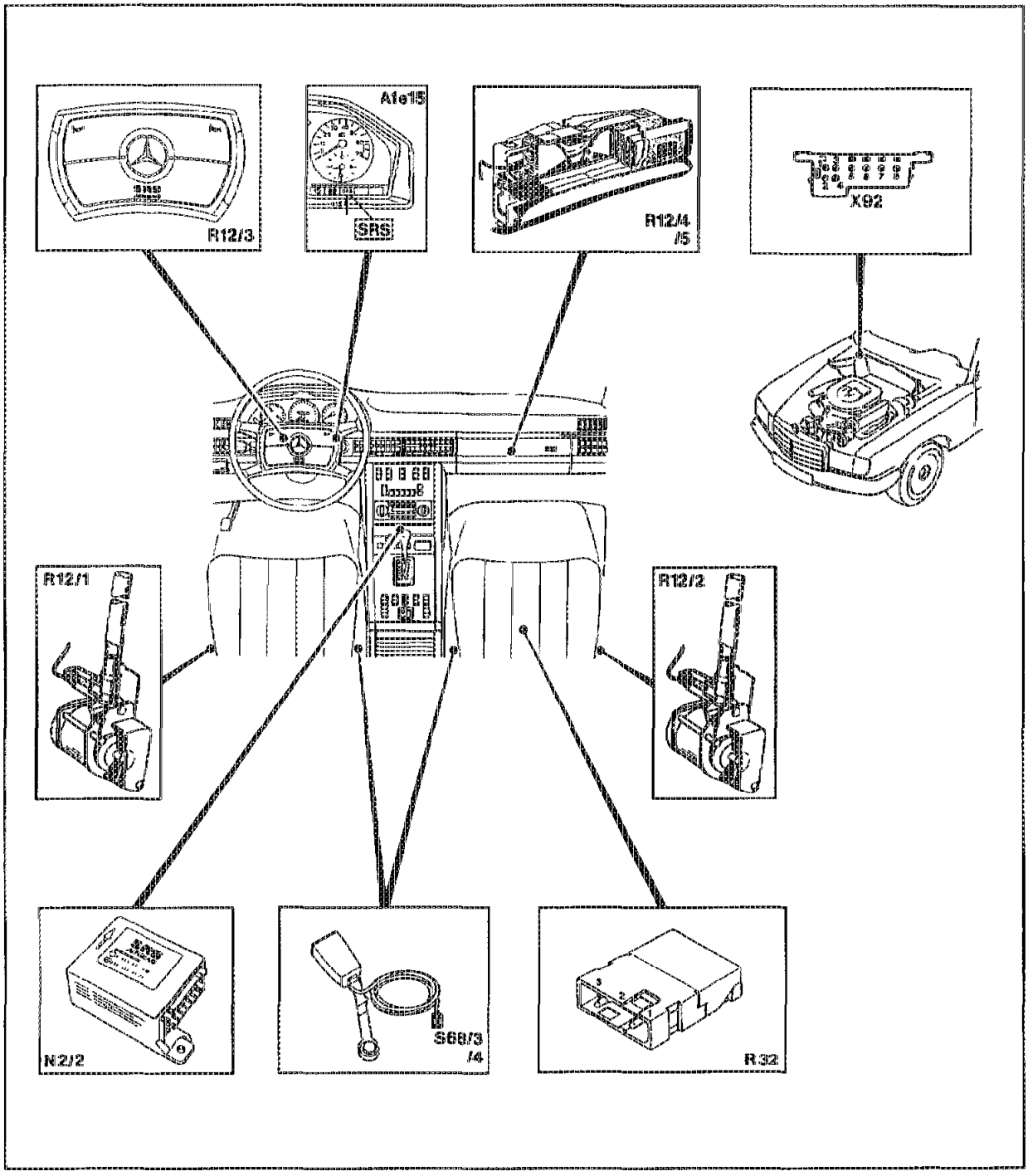
191-35300

Sticker showing driver's and front passenger's airbag unit replacement date, from 01/88

The sticker showing the replacement date for the driver's and front passenger's airbag units is affixed to the left-side central pillar, below the door striker. The replacement date relates in each case to the complete driver's and front passenger's airbag unit. The service life of these components is at least 15 years.

1914-15701

Component layout, Model 126 (type 3, from 09/87)



1912-16590

A1e15	MIL, SRS, airbag
N2/2	Control module, ETR with airbag
R12/1	Squib for ETR, driver's side
R12/2	Squib for ETR, front passenger's side
R12/3	Squib for driver's airbag
	Vehicles with front passenger's airbag only
R12/4	Squib 1 front passenger's airbag
R12/5	Squib 2 front passenger's airbag
R32	Resistor, front passenger's airbag (up to last vehicle ident. No. 126 1A 439 844).
S68/3	Switch, belt buckle, airbag/ETR, driver
S68/4	Switch, belt buckle, airbag/ETR, front passenger
X92	Test connections for 8-pole diagnostics (flasher code).

Note

In addition, a knee bolster is installed below the instrument panel on the driver's and passenger's side.

Driving with the airbag/ETR restraint system

From key position 1 onwards, the red MIL in the instrument cluster lights up, showing the letters SRS.

The MIL indicates the serviceability of the airbag/ETR restraint system. It must light up from key position 1 onwards and go out again after approx. 10 s (vehicles up to 09/87) or approx. 4 s (vehicles from 09/87). If it fails to light up, or does not go out again after the specified time, there is a fault in the system. The fault time is registered by the control module and can be read off later.

⚠ **WARNING!**

If a fault is indicated as above, the entire system must be checked as soon as possible by a qualified technician with a test instrument or (in the case of vehicles from 09/87) an impulse counter.

The functional efficiency of the driver's and front passenger's safety belts installed as standard is not affected by the above.

The complete airbag/ETR restraint system consists of the following components:

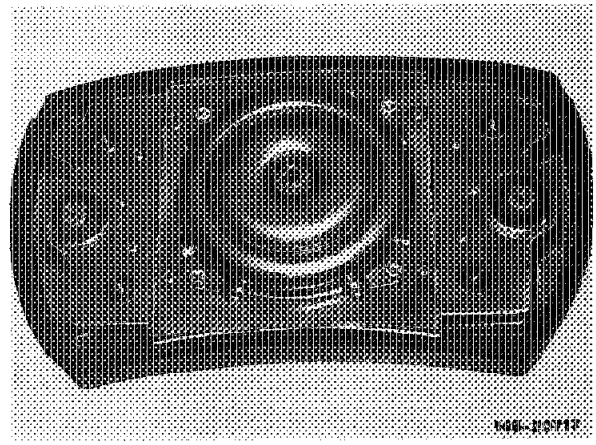
A. Driver's airbag unit
B. Front passenger's airbag unit
C. ETR unit
D. Control module
E. Energy accumulator (integral with control module on vehicles from 09/87)
F. MIL
G. Voltage converter (integral with control module on vehicles from 09/87)
H. Knee bolster

A. Driver's airbag unit

Configuration
The driver's airbag unit consists of:

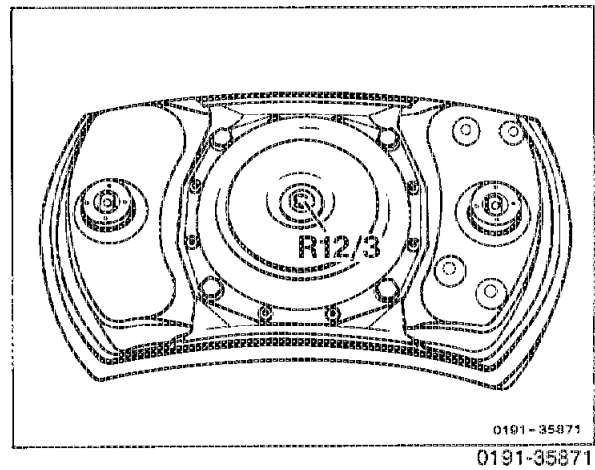
Signal carrier
Pad with integral airbag
Retaining plate, and
Gas generator

Type 1



146-20717

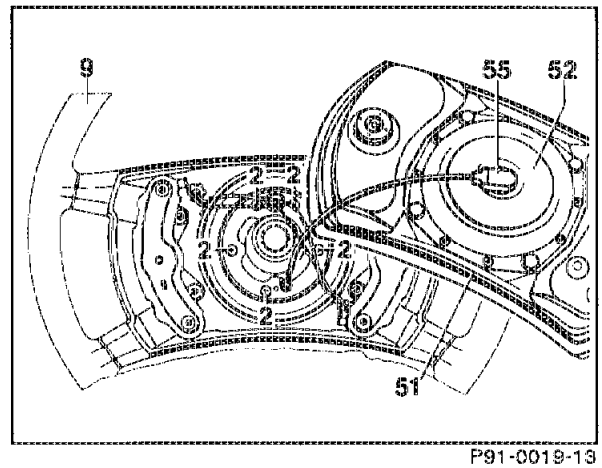
The only protective element is the airbag, which is inflated within 25 ms and thus instantly occupies the space between the driver and the steering wheel.



0191-35871

Type 2 (since 11/85)

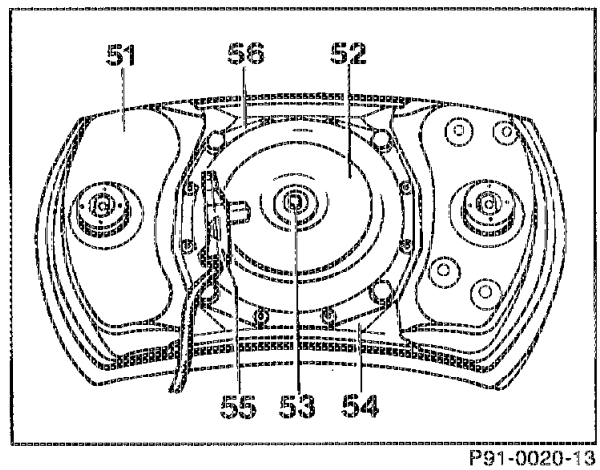
The complete driver's airbag unit is secured to the steering wheel (which is fully installed in the vehicle) after the special plug connector (55) has been plugged in.



P91-0019-13

9 Steering wheel
51 Driver's airbag unit
52 Gas generator
55 Plug connector

Before the driver's airbag unit is installed in the vehicle, it is automatically short-circuited electrically with a short-circuiting link. The latter opens automatically when plug connector (55) is inserted.

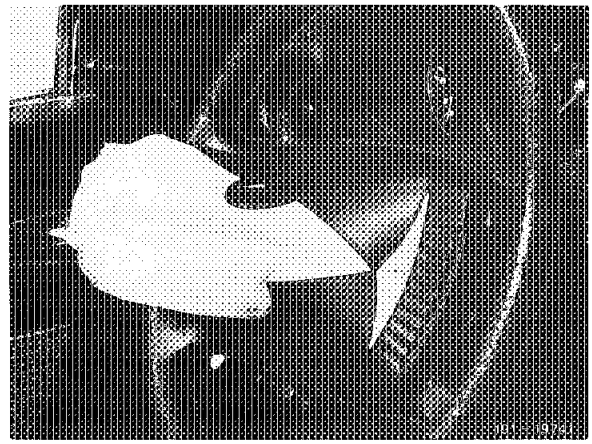


P91-0020-13

51 Driver's airbag unit
52 Gas generator
53 Gas generator plug connection
54 Retaining plate
55 Plug connector
56 Generator retainer

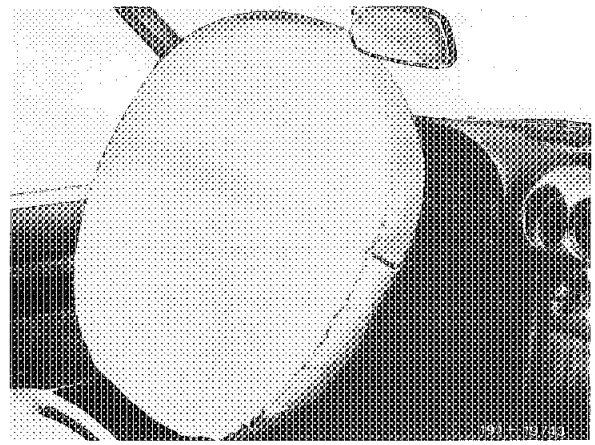
Mode of operation

If an appropriate electrical impulse (ignition impulse) is transmitted from the control module to the squib located in the gas generator, the solid propellant in the gas generator is ignited. It burns off rapidly, generating a certain volume of pressurized gas in the process. This gas is directed through filters into the airbag.



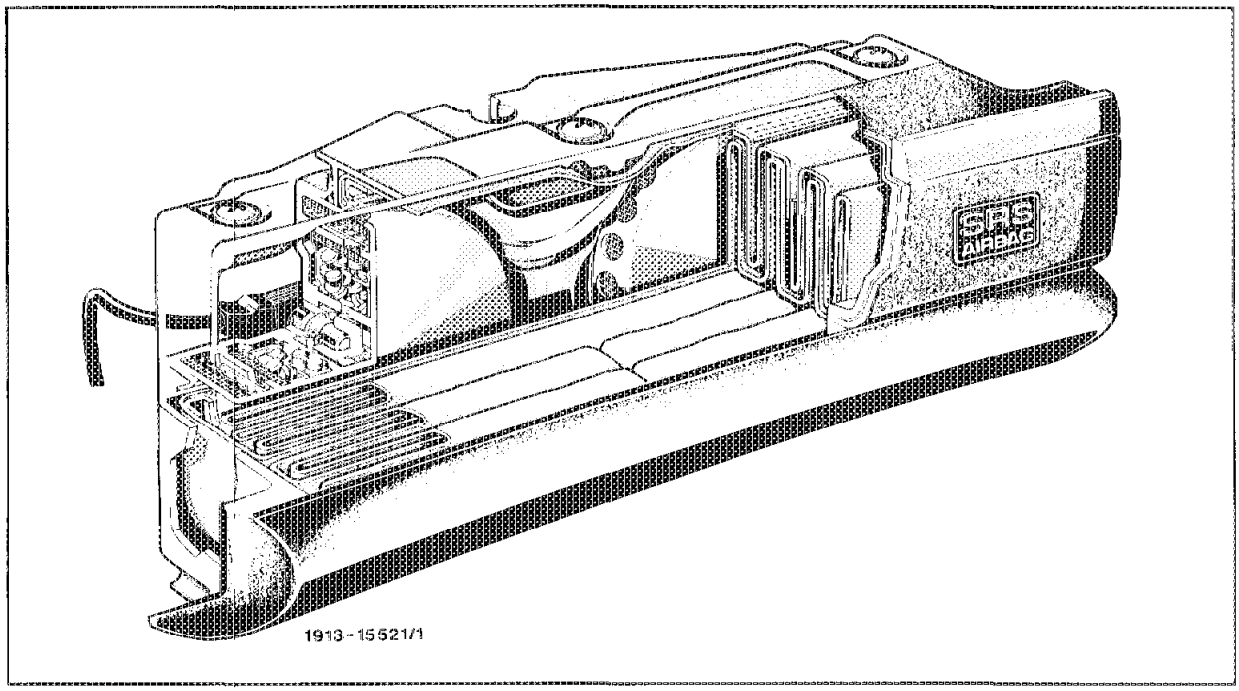
191-19741

The woven nylon airbag, folded on top of the gas generator, bursts the padding at a predetermined breaking point. The bag is fully inflated by the gas, thereby preventing the driver's head from hitting the steering wheel. Within approx. 6 ms, the gas is evacuated through 4 vent apertures in the bag, which then collapses.



191-19743

B. Front passenger's airbag unit



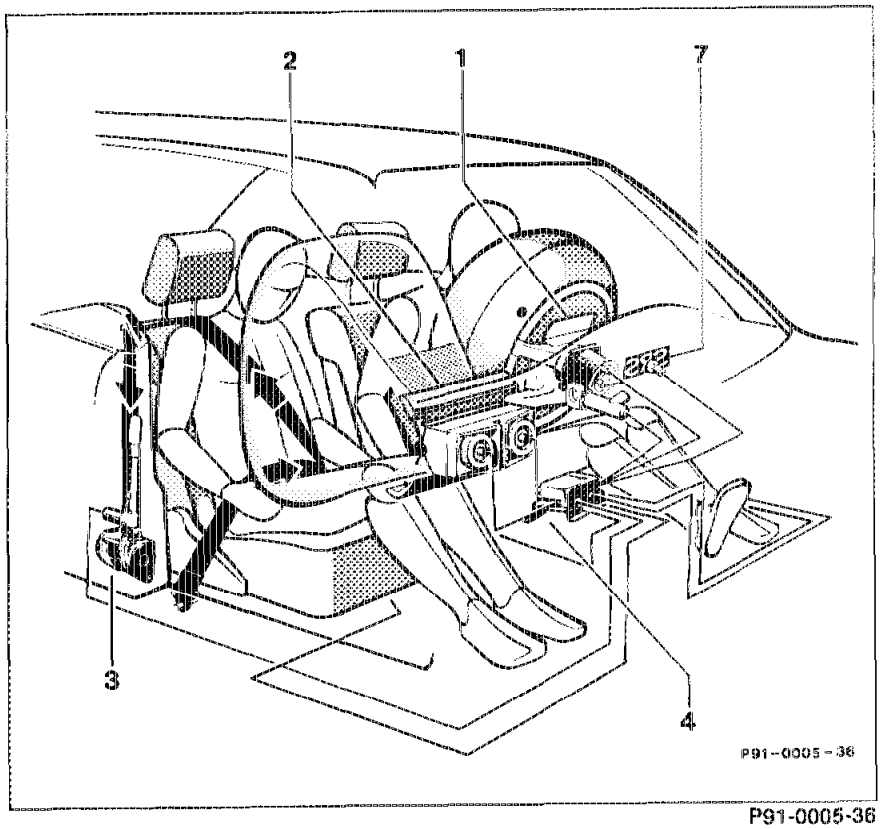
1913-15521/1

Front passenger's airbag unit

The risk of injuries in the area of the chest and head from serious front-end accidents is still further reduced by the combined system of safety belts with ETRs and driver's or front passenger's airbags, as compared with the safety belts with ETRs installed as standard equipment.
The driver's and front passenger's airbag units are both marked "SRS". The SRS MIL carries the letters SRS (Supplementary Restraint System).

The front passenger's airbag unit is installed instead of the glove box. On vehicles without a telephone, a lockable compartment is incorporated at the rear end of the center console, which can be closed by means of a roller shutter and which replaces the glove box.

The front passenger's airbag unit is supplied ready for installation and comprises a die cast, light alloy frame with two gas generators (as used on the existing driver's airbag unit) on one side and the folded airbag with its cover on the other.
The front passenger's airbag is made of similar material to the driver's airbag (neoprene-coated polyamide fabric), sewn together from 4 parts, and has a volume of approx. 170 liters (driver's airbag approx. 60 liters) when inflated.
The gas released by the ignition of the solid propellant contains approx. 95% nitrogen. It is non-toxic and non-caustic. The shape of the front passenger's airbag is completely different from that of the driver's airbag.



Driver's/front passenger's airbags

P91-0005-36

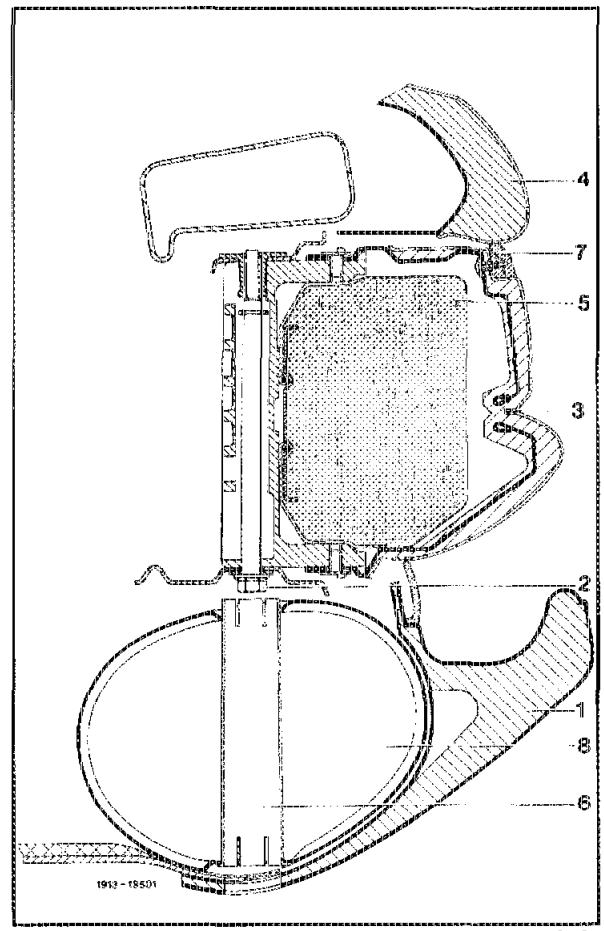
For evacuation after inflation, the front passenger's airbag incorporates an insert made of filter mesh (size 200 x 500 mm) which is permeable to gas and is located on the side facing the windshield.
The two gas generators in the front passenger's airbag are not ignited simultaneously, but at a 15 ms time lag. As a result, the time required for inflation is slightly extended and the pressure increase inside the vehicle is retarded. The inflation period for the front passenger's airbag is approx. 35 ms (driver's airbag approx. 25 ms). The method of operation is the same as for the driver's airbag unit.

The front passenger's airbag unit, supplied ready for installation, is introduced from inside the vehicle into the modified, reinforced instrument panel after the two special connections have been plugged in. The airbag is secured with a single screw (2).
Before the front passenger's airbag unit is installed in the vehicle, the unit is automatically short-circuited electrically with two short-circuiting links. These open automatically when the plug connectors are inserted.

The trim underneath the instrument panel, towards the front passenger's footwell, has been adapted to the modified shape.
The airbag trim facing the front passenger continues the line of the instrument panel. It consists of grained PVC sheet with polyurethane foam backing, reinforced by a light alloy panel.

Note

The trim under the instrument panel (1) has been modified, in that it incorporates an aperture (6) which provides access to the fastening screw (2).



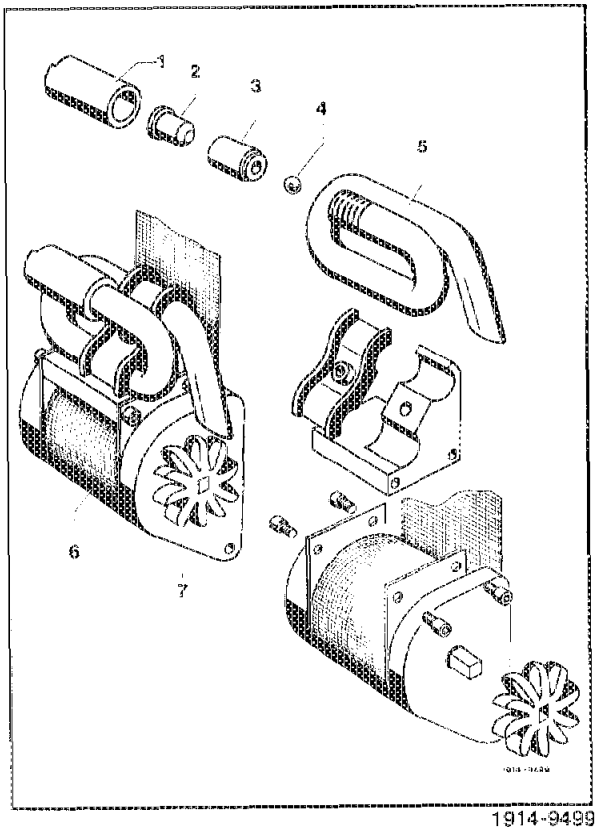
1913-16501

1 Trim under instrument panel
2 Central fastening screw for front passenger's airbag unit
3 Predetermined breaking point
4 Instrument panel
5 Airbag, folded
6 Aperture
7 Decorative wood fillet
8 Knee bolster

C. ETR unit

Type 1 - Turbine tensioner, assembly
The turbine tensioner unit comprises:

Propellant capsule
Floating plunger
Liquid-filled tube
Turbine and
Automatic belt reel



1914-9499

1 Union nut
2 Propellant capsule
3 Propellant capsule bearing
4 Floating plunger
5 Liquid-filled tube
6 Automatic belt reel
7 Turbine

Method of operation

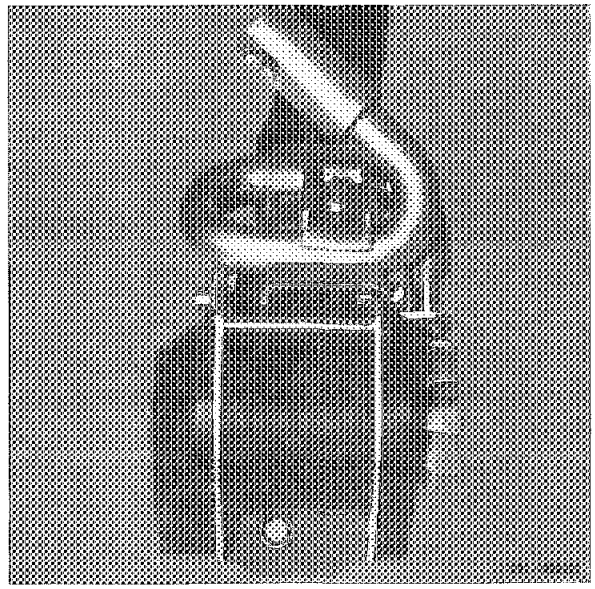
If an electrical impulse is transmitted by the control module to the propellant capsule, the resulting gas discharge generates an increase in pressure which forces the floating plunger through the liquid-filled tube. This in turn directs the liquid through a hitherto closed nozzle and on to the turbine blade, causing the turbine to rotate.

The belt reel is wound back, taking up any slack in the belt and eliminating any payout tendency. The belt holds the seat occupant securely, providing increased protection.

The forces generated by the ETR are calculated in such a way that it is not capable of forcing the passenger back into the seat by means of the safety belt.

The complete unit is installed in place of the normal inertia reel in the right-side central pillar (both central pillars in vehicles from 09/84 onwards) and connected to the electrical system by a two-pin plug.

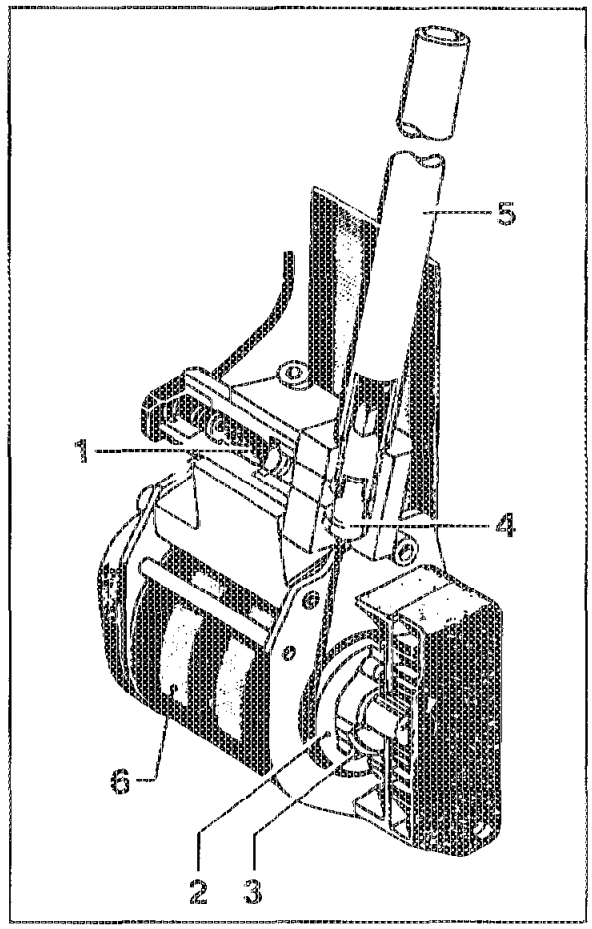
Before the ETR unit is installed in the vehicle, it is automatically short-circuited electrically with a short-circuiting link, which opens automatically when the plug connector is inserted.



191-19829

Type 2: Cable tensioner, assembly

The cable-type tensioner is an improved version of the turbine tensioner and has been installed from 09/84 onwards.



1914-11418/1

1 Gas generator
2 Cable pulley
3 Clutch
4 Plunger with cable
5 Tube

Method of operation

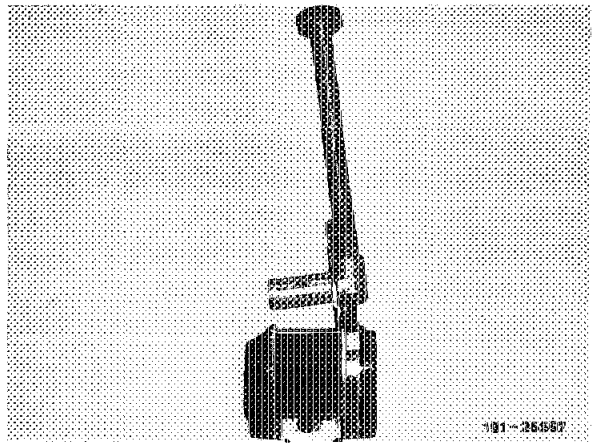
The complete unit is installed in the left and right central pillars in place of the normal inertia reels and connected to the electrical system by a two-pin plug.

Before the ETR unit is installed, it is automatically short circuited electrically with a short-circuiting link which opens automatically when the plug connector is inserted.

If an electrical impulse is transmitted by the control module to the propellant capsule, gas is discharged at high pressure and is directed via a T-joint to the plunger, which is driven upwards at high speed. The interlinking cable applies torque to the cable pulley, the shear pins snap and the cable pulley is frictionally connected to the belt reel by way of the clutch.

The belt reel is wound back, taking up any slack in the belt and eliminating any payout tendency. The belt holds the seat occupant securely, providing increased protection.

The forces generated by the ETR are calculated in such a way that it is not capable of forcing the passenger back into the seat by means of the safety belt.



191-25597

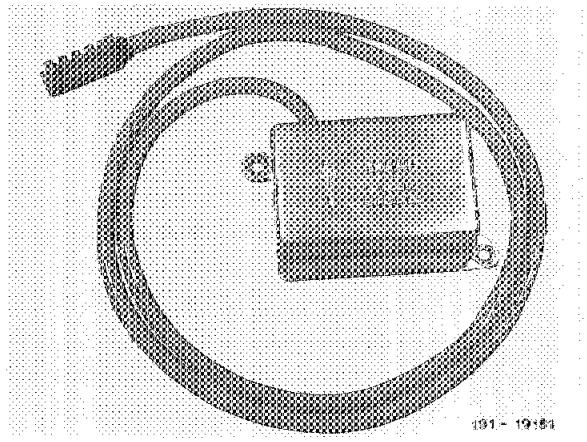
D. Control module

The control module, also described as the activating unit or crash sensor, fulfills the function, in the event of an accident, of determining its severity and, if necessary, of instantly activating the restraint system.

General

(Vehicles up to 08/87)
Two integrated circuits and an acceleration sensor are accommodated in a common housing.

The housing and electrical connections are designed in such a way that functional failures due to interference in the vehicle's electrical system from the switching-on of electrical equipment, and electromagnetic interference radiation on public roads, are dependably excluded.

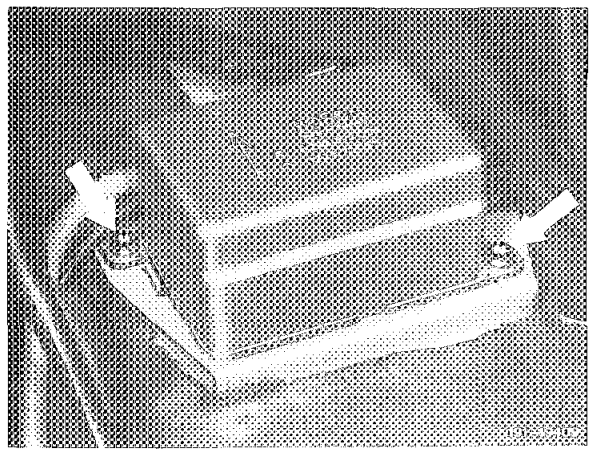


191-19181

Method of operation

The electronic control module responds to the vehicle deceleration resulting from a front-end collision and must therefore be rigidly connected to the vehicle.

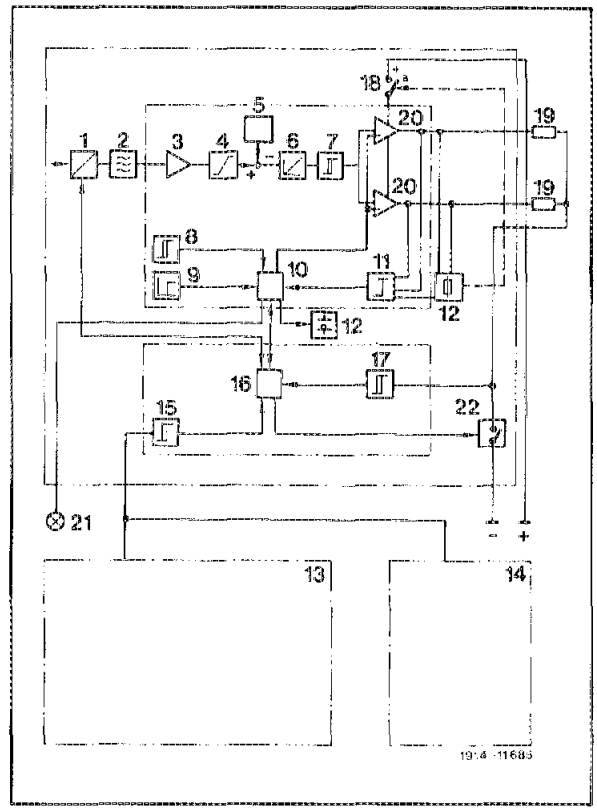
A built-in mercury switch interrupts the airbag/ETR restraint system ignition circuits during normal driving modes up to a predetermined retardation threshold a_s, thereby excluding the possibility of malfunctions.



191-19409

The acceleration sensor (1) in the control module detects the deceleration or acceleration acting on the vehicle in a longitudinal direction and generates a signal accordingly. This signal is transmitted through a high-pass filter (2) to the amplifier (3), which adjusts the signal strength to the following processing stages. The acceleration signal is limited within the limiter (4) and reduced in a subtraction circuit (5) by a constant acceleration threshold a_s.
The integrator (6) integrates the resulting signal and transmits it to the threshold value switch (7) for evaluation. If the preset triggering speed V is exceeded, the end-stages (20) are activated. This has the effect of activating the driver's airbag and ETR via the squibs (19) on completion of the test cycle. As an additional safeguard against malfunctions, the control module is equipped with a mercury switch (18). It also incorporates a further control circuit which monitors the ignition circuits and checks its own functional serviceability. Functional faults are indicated by the MIL (21).

1 Acceleration sensor
2 High-pass filter
3 Amplifier
4 Limiter
5 Subtraction circuit
6 Integrator
7 Threshold value switch
8 Voltage monitoring
9 Closing delay circuit
10 Logic
11 Ignition circuit monitoring
12 Fault memory
13 Voltage converter
14 Energy accumulator
15 Energy accumulator monitoring
16 Process controls
17 End-stage monitoring
18 Mercury switch
19 Airbag/ETR generator squibs
20 End-stages
21 MIL
22 Test switch

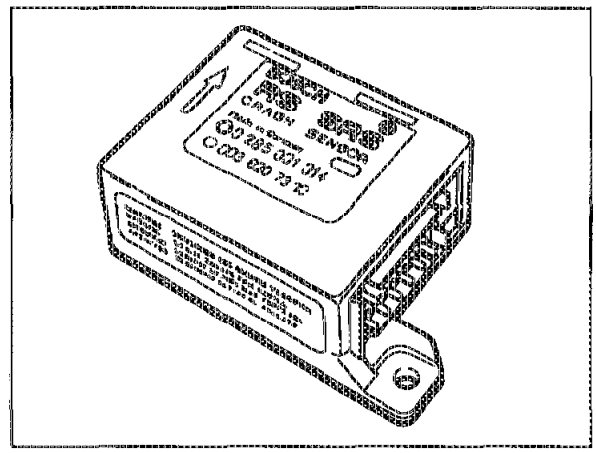


1914-11685

General

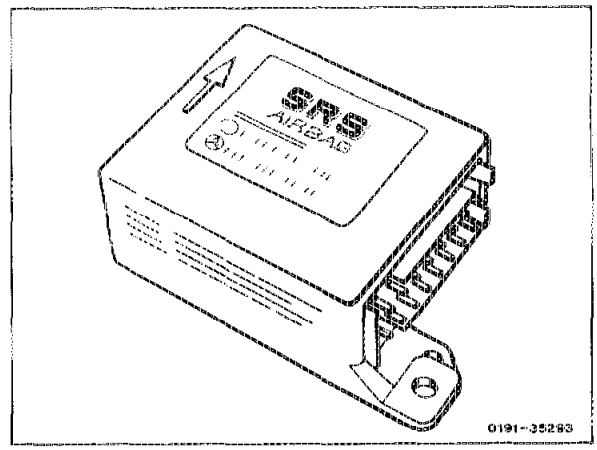
(Vehicles from 09/87 or 01/88)

From 09/87 onwards, the airbag restraint system has been fitted with a new control module with integral energy accumulator and voltage converter, thus eliminating the separate housings previously employed for these components.



Control module, driver's airbag, 12-pole

0191-34899



0191-35293

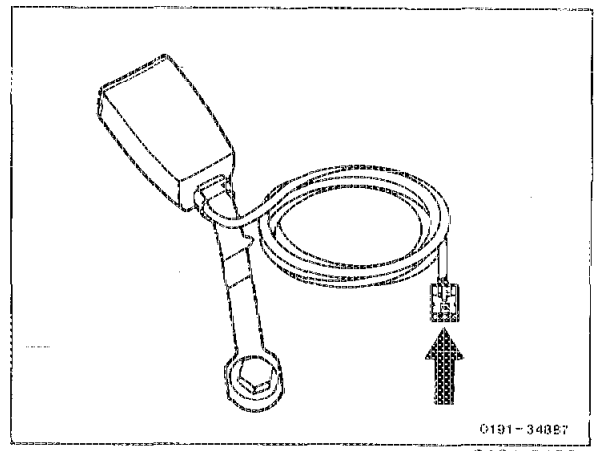
Control module, driver's and front passenger's airbag, 16-pole

Method of operation

The control module is located on a console and rigidly connected to the transmission tunnel of the vehicle (as before). Its function is to respond to vehicle deceleration in a front-end collision. Due to a built-in safety switch, which interrupts the ignition circuits to the driver's airbag/ETR restraint system, the airbag and ETR can only be triggered by an actual case of acceleration. Malfunctions are thereby prevented.

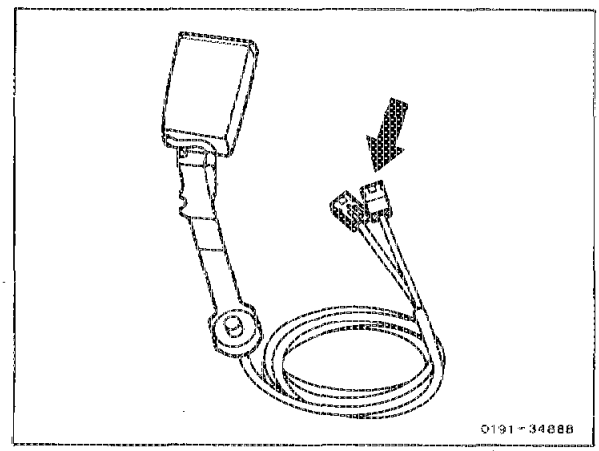
An acceleration sensor installed in the control module detects the deceleration acting on the vehicle in a longitudinal direction and transmits a signal, which has been appropriately processed, to the threshold value switches for evaluation. If the preset deployment thresholds of the two switches are exceeded, the end-stages are connected in accordance with the conditions signaled by the belt buckle switches (buckle fastened or not fastened). This activates the system (see table). If the power supply is interrupted in an accident, the driver's airbag can still be triggered within 100 ms, but not the two ETRs. If the vehicle's power supply falls below 9.5 V for a period exceeding 10 seconds, the MIL will light up. It will go out again at a voltage exceeding 10 V.

The housing and electrical connections are designed in such a way that functional failures due to interference in the vehicle's electrical system from the switching-on of electrical equipment, and electromagnetic interference radiation on public roads, are dependably excluded.
New-type belt buckles, with separate switches and resistors, are needed for the purpose of identifying whether the buckles are fastened or otherwise and to initiate the ensuing deployment logic.



Belt buckle, all models except coupe

0191-34887



Belt buckle, coupe

0191-34888

Deployment logic, driver's airbag and ETR

Control module (crash sensor)	1st threshold passed		2nd threshold passed
	Airbag	**ETR**	**Airbag**
Driver's seat/front passenger's seat: *Buckle not fastened*	Deployed	Not deployed	Already deployed
Buckle fastened	Not deployed	Deployed	Deployed

Explanation

In a minor accident, in which the safety belt provides adequate protection, only the ETR is activated when the first deployment threshold is passed, provided the belt buckle is fastened.
In a more serious accident, whereby the second threshold is passed, the airbag is also activated.

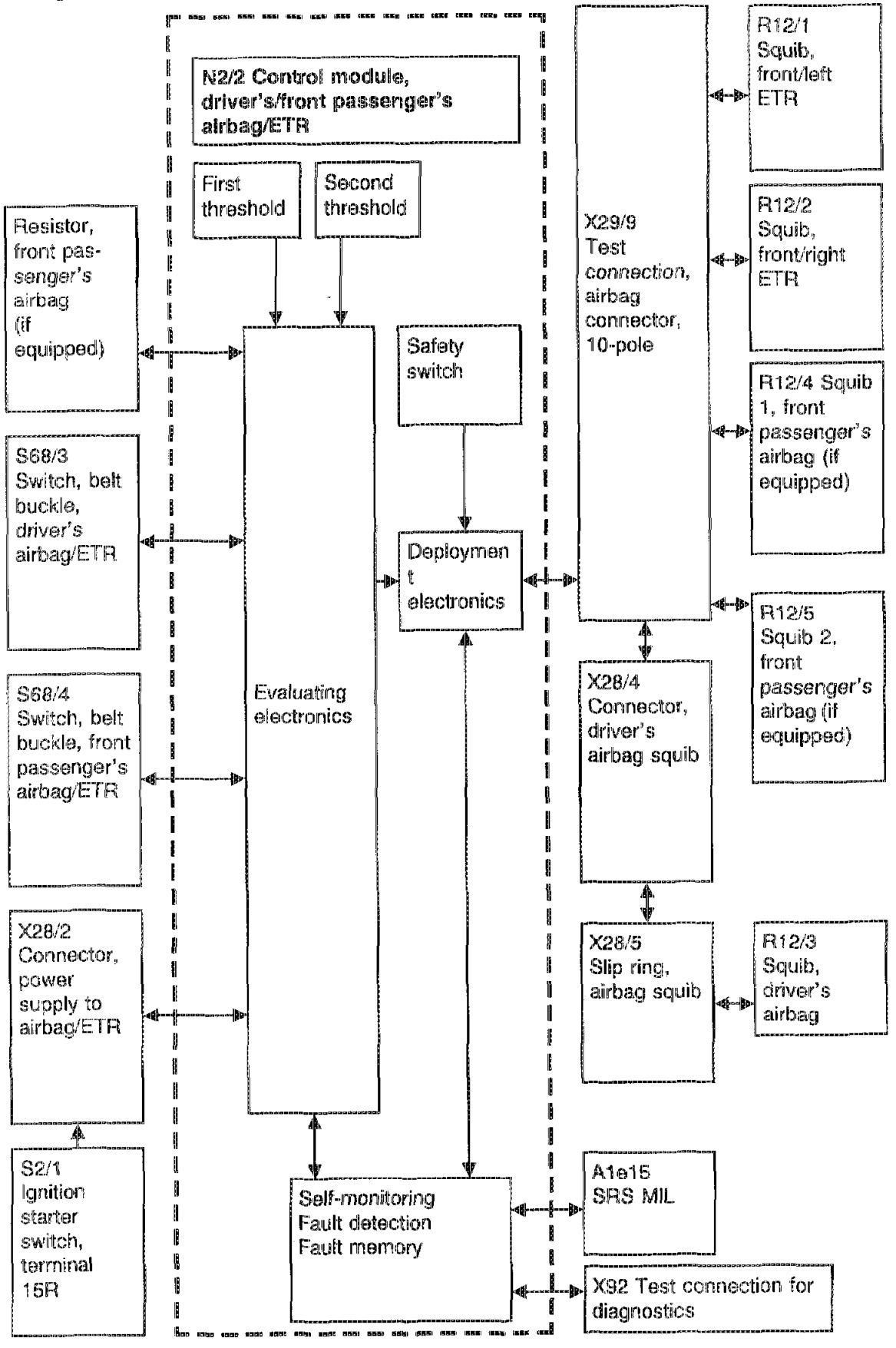
Deployment logic, driver's and front passenger's airbag and ETR

Control module		Driver's seat Belt buckle		Front passenger's seat		
				Resistor, front passenger's airbag	Belt buckle	
		Not fastened	Fastened		**Not** fastened	Fastened
1st deployment threshold passed	Belt tensioner	**Not** deployed	Deployed	Simulates a permanently occupied front passenger's seat	**Not** deployed	Deployed
	Driver's or front passenger's airbag	Deployed	**Not** deployed		Deployed	**Not** deployed
2nd deployment threshold passed	Driver's or front passenger's airbag	Already deployed	Deployed		Already deployed	Deployed

Explanation

In a minor accident, in which the safety belt provides adequate protection, only the ETR is activated when the first deployment threshold is passed, provided the belt buckle is fastened.
If the belt buckles are not fastened or the second deployment threshold is passed, the driver's and passenger's airbags will be activated instead of, or in addition to, the ETRs.

Block diagram, overall function driver's/front passenger's airbag/ETR

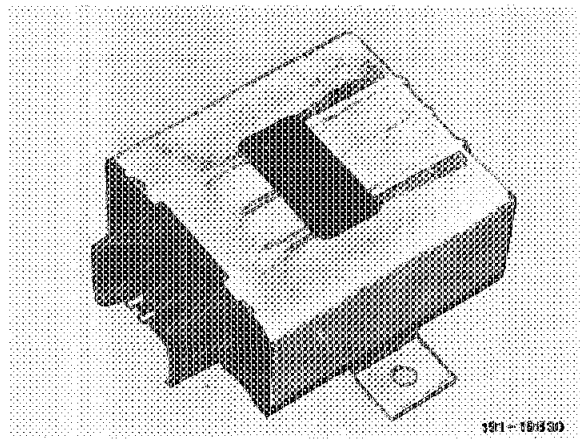


E. Energy accumulator (up to 08/87)

Design
The energy accumulator is accommodated in a separate housing, which is connected by a lead to the control module.

Method of operation
If the vehicle battery should fail at the very moment of a collision, the control module and ignition circuits are powered by the energy accumulator.

Any failure of the energy accumulator is indicated by the MIL in the instrument cluster.

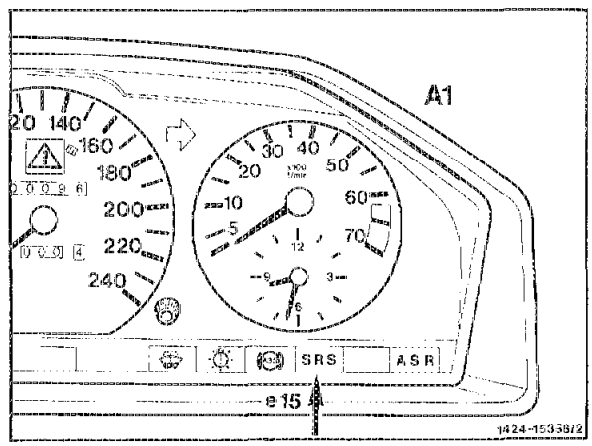


191-19830

F. Malfunction Indicator Lamp (MIL)

The MIL is located in the instrument cluster and is marked SRS (Supplementary Restraint System).

The MIL indicates the functional readiness of the airbag/ETR restraint system. It must light up from the key position 1 onwards and go out again after approx. 10 s (vehicles up to 09/87) or approx. 4 s (vehicles from 09/87 onwards).



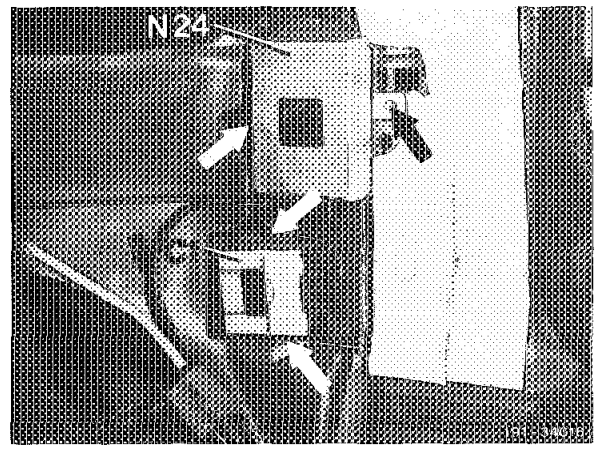
1424-15356/2

If it fails to light up, or does not go out again after the specified time, there is a fault in the system. The fault time is registered by the control module and can be read off later.

⚠ **CAUTION!**
If a fault is indicated as above, the entire system must be checked as soon as possible by a qualified technician with a test instrument or (in the case of vehicles from 09/87) an impulse counter. The functional efficiency of the driver's and front passenger's safety belts installed as standard is not affected by the above.

G. Voltage converter (up to 08/87)

Design
The voltage converter is accommodated in a separate housing and is connected to the airbag circuitry by a plug connector.



N24 Voltage converter depicted on Model 124

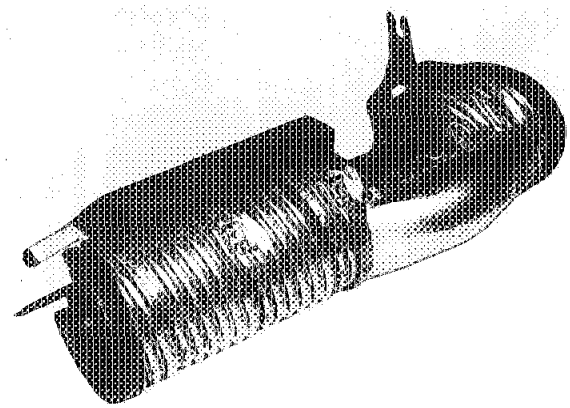
191-34016

Method of operation
The voltage converter fulfills the function of ensuring a constant power supply of 12 ± 1 Volt to the control module and energy accumulator, even when the vehicle battery is low (≥ 4.0 Volts).

H. Knee bolsters

The knee bolsters, which are located on the driver's and passenger's sides below the instrument panel, consist of a protective tube and cladding.

In combination with the driver's and passenger's airbags and ETRs, the knee bolsters offer increased protection in moderately serious and serious accidents.



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