A. General

There is a diagnosis program integrated into the control unit (N2/2), which checks the control unit and the airbag system components.

When a fault is detected:

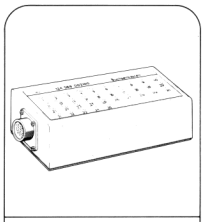
- warning lamp (A1e15) does not light up in steering lock key position "1"
- does not go out after 4 s
- lights up when the vehicle is driven

The warning lamp goes out again when no more faults are present; however, the fault remains stored. The stored fault can be called up in the form of a flashing pulse via warning lamp (A1e15) or digitally via a pulse meter. The number of flashing pulses indicates the fault detected (refer to table of pulse displays).

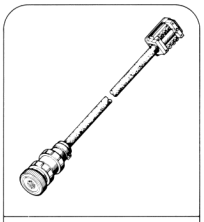
Test conditions

- During pulse output, the test coupling/plug connection for airbag (X29/9) remains contacted.
- Battery voltage (11 – 14 V).

Special tools

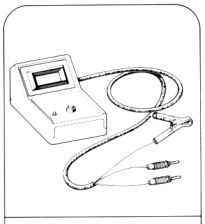


124 589 00 21 00



124 589 35 63 00

201 589 00 99 00



124 589 19 21 00

Conventional tool

Multimeter	e.g. Sun, DMM-5 or Hermann, Avometer 2003 Fluke, 23

B. Trouble diagnosis using the pulse meter

Notes on the pulse display

If no fault is indicated via the pulse display in the event of a complaint, the function test, section "C/d" must be performed.

The number 1 signifies that no fault is recorded in the electronic sytem. All other numbers are assigned to a certain fault circuit.

The numbers 1 through 10 appear on the display of the pulse meter.

- If the light-emitting diode "U Batt:" lights up after connection, both the pulse meter and the power supply for the pulse meter are in order.

Testing

- Connect pulse meter in acccordance with connection diagram.

Note
Light-emitting diode "U Batt:" in the display must light up.
If it fails to do so switch multimeter to "volts" position and

a) Test socket 1 of test coupling X92 to battery positive (11 – 14 V).

b) Test socket 6 of test coupling X92 to socket 1 (6 – 12 V).

- Press start button for between 2 and 4 seconds.
- Read off displayed pulse output and note down.
- Press start button again for between 2 and 4 seconds. The previous number appears again if there are no more faults in the system.
- Eliminate noted fault (pulse output) in accordance with the fault-finding diagram.
- Test individual components.

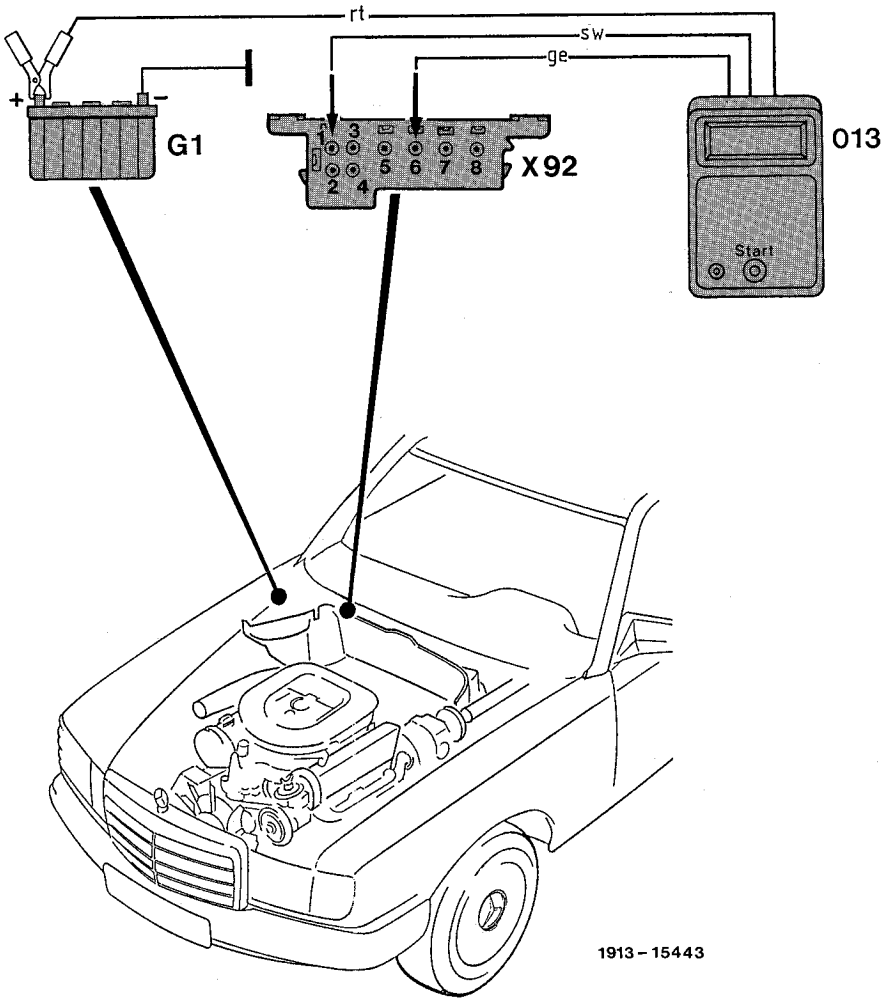
Clearing the fault memory
The displayed pulse must be cleared as follows after a fault has been rectified:

- Press start button and call up the eliminated fault, then press start button for at least 6 – 8 seconds.

Note
Each pulse displayed must be cleared individually.

- No display: Stored fault has been cleared.
- Number displayed (> 1): further faults in system.

a) Connection diagram for pulse meter



013 Pulse meter
G1 Battery
X92 Test coupling for diagnosis, 8-pin, flashing code

The number of pulses indicates whether there is a fault and which fault is present, or which component is faulty.

Pulse display 10 signifies that the control unit has activated the output stages of the airbag. This pulse display cannot be cleared.
The control unit must be renewed.

Pulse display	Fault
1	No fault stored
2	Control unit
3	Triggering circuit, driver's airbag
4	Triggering circuit, passenger's airbag
5	Driver's belt buckle
6	Passenger's belt buckle
7	Resistance, passenger's seat, airbag
8	Low voltage
9	Warning lamp
10	Control unit

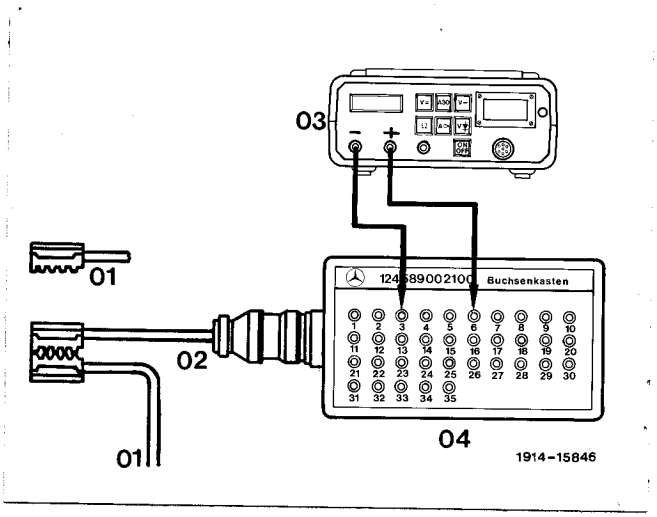
b) Connection diagram for socket box

Note

The negative terminal of the battery must be disconnected and covered before disconnecting the test coupling/plug connection for airbag, 10-pin.

Connection diagram for socket box

01 Test coupling/plug connection, airbag, 10-pin
02 Test cable
03 Multimeter
04 Socket box



C. Test program with socket box and multimeter

Symbols for testers:

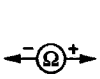
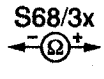
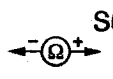
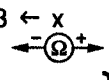
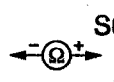
 Socket box

 Battery

 Multimeter

Display	Test step/ scope of test	Tester/ test connection	Operation/ requirement	Reference value	Possible cause/remedy
1	1	–	–	–	No fault stored
2	Control unit		Ignition: ON Clear pulse display 2.	Pulse display 2 cleared	–
			Pulse display 2 cannot be cleared Ignition: OFF Disconnect battery -ve terminal, cover; disconnect test coupling (X29/9).		Renew control unit
3 [1])	Driver's airbag Collector ring Cables as far as (X29/9)	 3 5	Ignition: OFF Disconnect battery -ve terminal and cover.	2 – 5 Ω	Airbag unit, 4 carbon contacts, collector ring, cables (open circuit, short circuit)
		 ⊥ 5	Disconnect test coupling (X29/9) and connect test cable, turn steering wheel to full lock left and right.	∞ Ω	Short to ground

[1]) If test with pulse display 3 is in order but pulse display cannot be cleared, continue by testing cables in accordance with section "C/a".

Display	Test step/ scope of test	Tester/ test connection	Operation/ requirement	Reference value	Possible cause/remedy
4 [1])	Passenger's airbag	 6 — 7	Ignition: OFF Disconnect battery -ve terminal and cover.	2 – 5 Ω	Passenger's airbag Cables
		 ⊥ — 6	Disconnect test coupling (X29/9) and connect test cable	∞ Ω	Cables
		 6 — 8		2 – 5 Ω	Passenger's airbag Cables
5	Driver's belt buckle	 S68/3x 1 — 2	Disconnect plug connection (S68/3x). Belt buckle **not** inserted. Inserted	400 ± 10 Ω 100 ± 10 Ω	Belt buckle
	Cables	 ⊥ — S68/3x ⊥ — 2	Disconnect plug connection (S68/3x).	< 1 Ω	Open circuit in cable
	Cables	 S68/3 ← x — N2/2 1 — 10	Ignition: OFF Disconnect battery -ve terminal and cover. Disconnect test coupling (X29/9). Disconnect plug connection from control unit.	< 1 Ω	Open circuit in cable
	Cables	 ⊥ — S68/3x ⊥ — 1		∞ Ω	Short to ground

[1]) If test for pulse display 4 is in order but pulse display cannot be cleared, continue by testing cables in accordance with section "C/b".

Dis-play	Test step/ scope of test	Tester/ test connection	Operation/ requirement	Reference value	Possible cause/remedy
6	Passenger's belt buckle	S68/4x 1 — Ω — 2	Disconenct plug connection (S68/4x).		Belt buckle
			Belt buckle **not** inserted.	400 ± 10 Ω	
			Belt buckle inserted.	100 ± 10 Ω	
	Cables	⊥ S68/4x ⊥ Ω — 2	Disconnect plug connection (S68/4x).	< 1 Ω	Open circuit in cable
	Cables	S68/4x N2/2 1 — Ω — 11	Ignition: OFF Disconnect battery -ve terminal and cover. Disconnect test coupling (X29/9). Disconnect plug connection from control unit.	< 1 Ω	Open circuit in cable
	Cables	⊥ S68/4x ⊥ Ω — 1		∞ Ω	Short to ground

Dis-play	Test step/ scope of test	Tester/ test connection	Operation/ requirement	Reference value	Possible cause/remedy
7	Resistance, passenger's seat, airbag	N2/2 12 —(-Ω+)— 15	Ignition: OFF Disconnect battery -ve terminal and cover. Disconnect test coupling (X29/9). Disconnect plug connection from control unit.	100 Ω ± 10	Open circuit
8	Supply voltage	⊥ (X29/9) (-V+) ⊥ — 2	Ignition: OFF Disconnect battery -ve terminal and cover. Disconnect test coupling (X29/9). Ignition: ON	11 – 14 V	Check battery, alternator, ignition starter switch X28/2, and cable from X28/2 to N2/2 as per wiring diagram. **Note** To test the cable: Ignition: OFF Disconnect battery -ve terminal and cover. Disconnect test coupling (X29/9). Disconnect plug connection from control unit.

Dis-play	Test step/ scope of test	Tester/ test connetion	Operation/ requirement	Reference value	Possible cause/remedy
9	Warning lamp		Ignition: ON	Warning lamp lights up	Warning lamp
	Supply voltage	A1e15 pink pink/yellow black/red	Ignition: ON	11 – 14 V	Warning lamp Check cables from A1e15 to N2/2 and X28/2 or to fuse box as per wiring diagram, for open circuit, short circuit and short to positive. **Note** To test the cable: Ignition: OFF Disconnect battery -ve terminal and cover. Disconnect test coupling (X29/9). Disconnect plug connection from control unit.
10	Control unit	–	Ignition: OFF Disconnect battery -ve terminal and cover. Diconnect test coupling (X29/9).	–	Renew control unit.

a) Testing cables if pulse display 3 appears

Display	Test step/ scope of test	Tester/ test connection	Operation/ requirement	Reference value	Possible cause/remedy
3	Check cables between X29/9 and N2/2 for open circuit	X29/9 N2/2 5 — 2	Ignition: OFF Disconnect battery -ve terminal and cover.	< 1 Ω	Open circuit
		X29/9 N2/2 3 — 6	Disconnect test coupling (X29/9). Disconnect plug connection from control unit.	< 1 Ω	Open circuit
	Check cables between X29/9 and N2/2 for short circuit	X29/9 5 — 3		∞ Ω	Short circuit
	Check cables between X29/9 and N2/2 for short to ground	⊥ X29/9 ⊥ — 5		∞ Ω	Short to ground
		⊥ X29/9 ⊥ — 3		∞ Ω	Short to ground
	Check cables of X29/9 for short to positive	X29/9 5 — +		∞ Ω	Short to positive
		X29/9 3 — +		∞ Ω	Short to positive

b) Testing cables if pulse display 4 appears

Display	Test step/ scope of test	Tester/ test connection	Operation/ requirement	Reference value	Possible cause/remedy
4	Cables between X29/9 and X29/9	X29/9 5 — 6	Ignition: OFF Disconnect battery -ve terminal and cover. Disconnect test coupling (X29/9). Disconnect plug connection from control unit.	< 1 Ω	Open circuit
	Check cables between X29/9 and N2/2 for open circuit	X29/9 N2/2 5 — 2 8 — 13 7 — 14		< 1 Ω	Open circuit
	Check cables between X29/9 and N2/2 for short circuit	X29/9 5 — 7 5 — 8 7 — 8		∞ Ω	Short circuit
	Check cables between ⊥ and X29/9 for short to ground	⊥ X29/9 ⊥ — 5 ⊥ — 7 ⊥ — 8		∞ Ω	Short to ground
	Check cables from X29/9 for short to positive	X29/9 + 5 — + 7 — + 8 — +		∞ Ω	Short to positive

c) Testing electrical function of belt tensioners

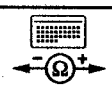
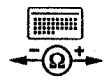
The belt tensioners are not tested by the airbag control unit. For this reason, the belt tensioners must be tested as follows when working on the airbag restraint system:

Symbols for testers:

 Socket box

 Multimeter

Test program with socket box

Display	Test step/ scope of test	Tester/ test connection	Operation/ requirement	Reference value	Possible cause/remedy
Is not recorded by pulse display	Driver's belt tensioner	 4 9	Ignition: OFF Disconnect battery -ve terminal and cover.	2 – 5 Ω	Belt tensioner, cables
		 ⊥ 4	Disconnect test coupling (X29/9) and connect test cable	∞ Ω	Short to ground
	Passenger's belt tensioner	 4 10		2 – 5 Ω	Belt tensioner, cables

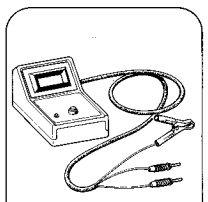
d) Testing if no pulse display appears

Test condition

- Test coupling/plug connection for airbag (X29/9) contacted.
- Battery voltage 11 – 14 V
- Pulse meter connected in accordance with connection diagram
  (—ᐸ 1 black cable, —ᐸ 6 yellow cable).
- Ignition switched on
- Start button on pulse meter pressed for 2 – 4 s.

Special tools

201 589 00 99 00



124 589 19 21 00

Conventional tester

Multimeter	e.g. Sun, DMM-5 or Avometer 2003

Testing

1 Check that socket 6 is correctly clamped in the 8-pin test coupling for diagnosis (X92).

2 Check cables in accordance with test program using multimeter and electrical connection set.

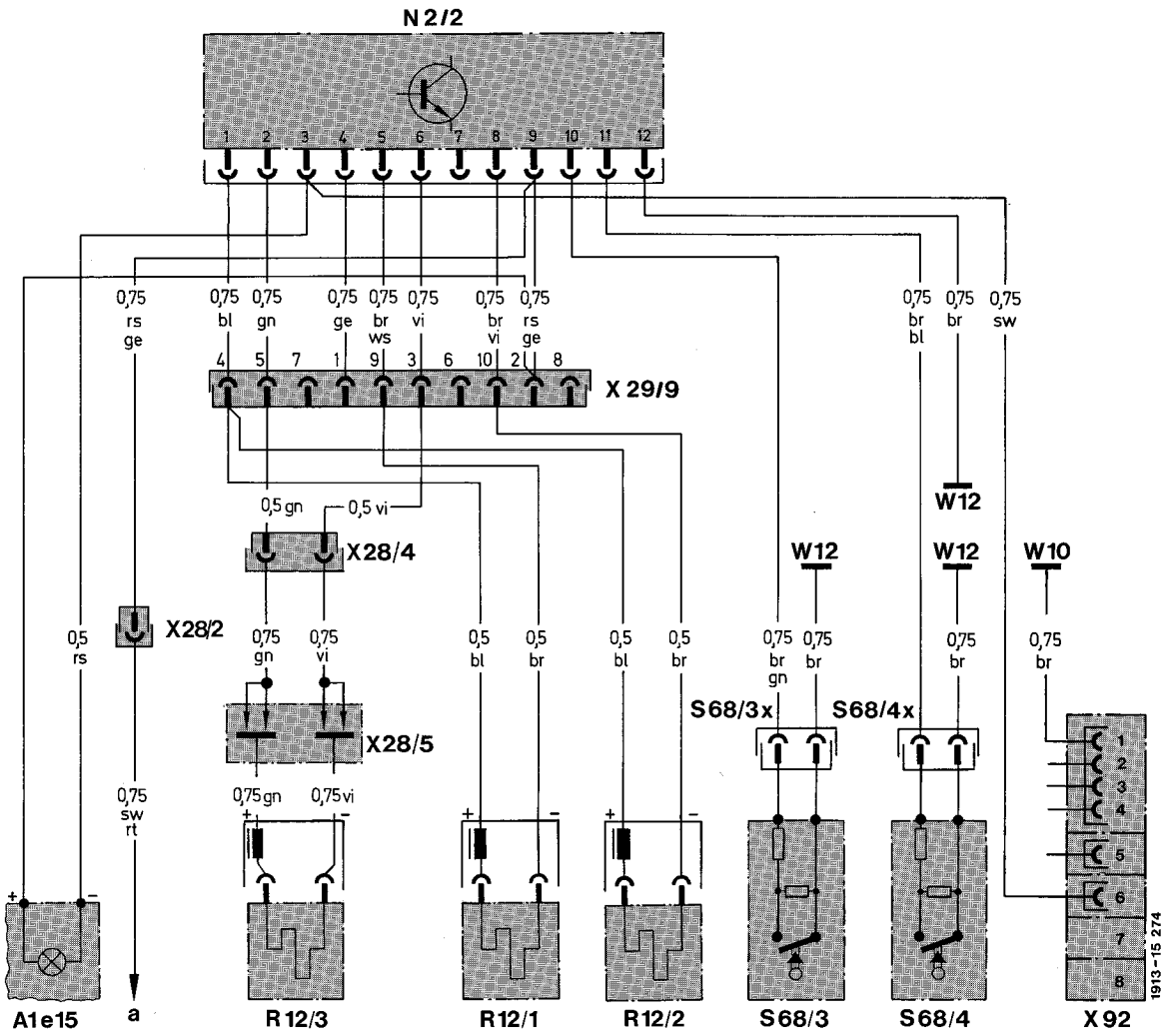
Test program

Symbol for tester:
 Multimeter

Dis-play	Test step/ scope of test	Tester/ test connection	Operation/ requirement	Reference value	Possible cause/remedy
	Cable between ⊥ and X92 for open circuit	⊥ — X92 ⊥ — 1	Ignition: OFF	< 1 Ω	Open circuit in cable
	Cable between X92 and N2/2 for open circuit	X92 — N2/2 6 — 3	Ignition: OFF Disconnect battery -ve terminal and cover. Disconnect test coupling X29/9. Disconnect plug connection from control unit (N2/2)	< 1 Ω	Open circuit in cable
	Check cable between ⊥ and X92 for short to ground	⊥ — X92 ⊥ — 6		∞ Ω	Short to ground

Remedy:
If all values in the table are in order, the control unit must be renewed.

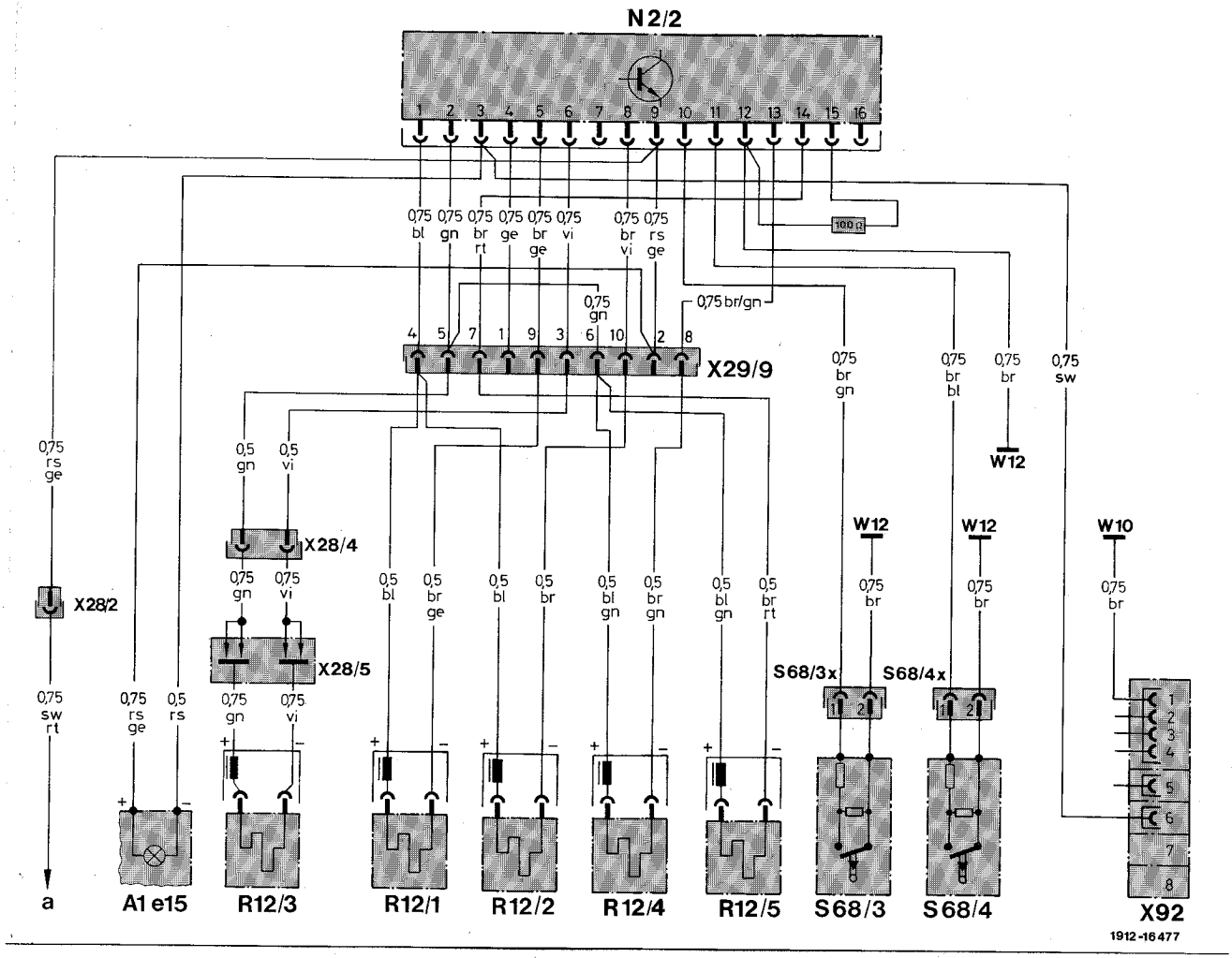
D. Wiring diagrams



Electrical wiring diagram for driver's airbag with belt tensioners (as of 09/87)

A1e15	RS warning lamp (airbag)
N2/2	Control unit, belt tensioner with airbag
R12/1	Detonator, belt tensioner, front left
R12/2	Detonator, belt tensioner, front right
R12/3	Detonator, airbag
S68/3	Belt buckle switch, airbag/belt tensioner, driver
S68/3x	Plug connection, belt buckle switch, airbag/belt tensioner, driver
S68/4	Belt buckle switch, airbag/belt tensioner, passenger
S68/4x	Plug connection, belt buckle switch, airbag/belt tensioner, passenger
W10	Ground, battery
W12	Ground, center console
X28/2	Plug connection, power supply for airbag with belt tensioner
X28/4	Plug connection, airbag/detonator
X28/5	Collector ring, detonator, airbag, 2-pin
X29/9	Test coupling/plug connection, airbag, 10-pin
X92/1	Test coupling for diagnosis, 8-pin (flashing code), ground (socket 1, 4-pin)
X92/6	Flashing code, airbag (socket 6, 1-pin)
a	Fuse box, terminal 15 R, unfused side

All pins in the plug are short-circuited when the 10-pin test coupling/plug connection for airbag is disconnected. When the connection for the belt tensioner detonators (R12/1, R12/2) and the airbag detonator (R12/3) is disconnected, the detonators are short-circuited.



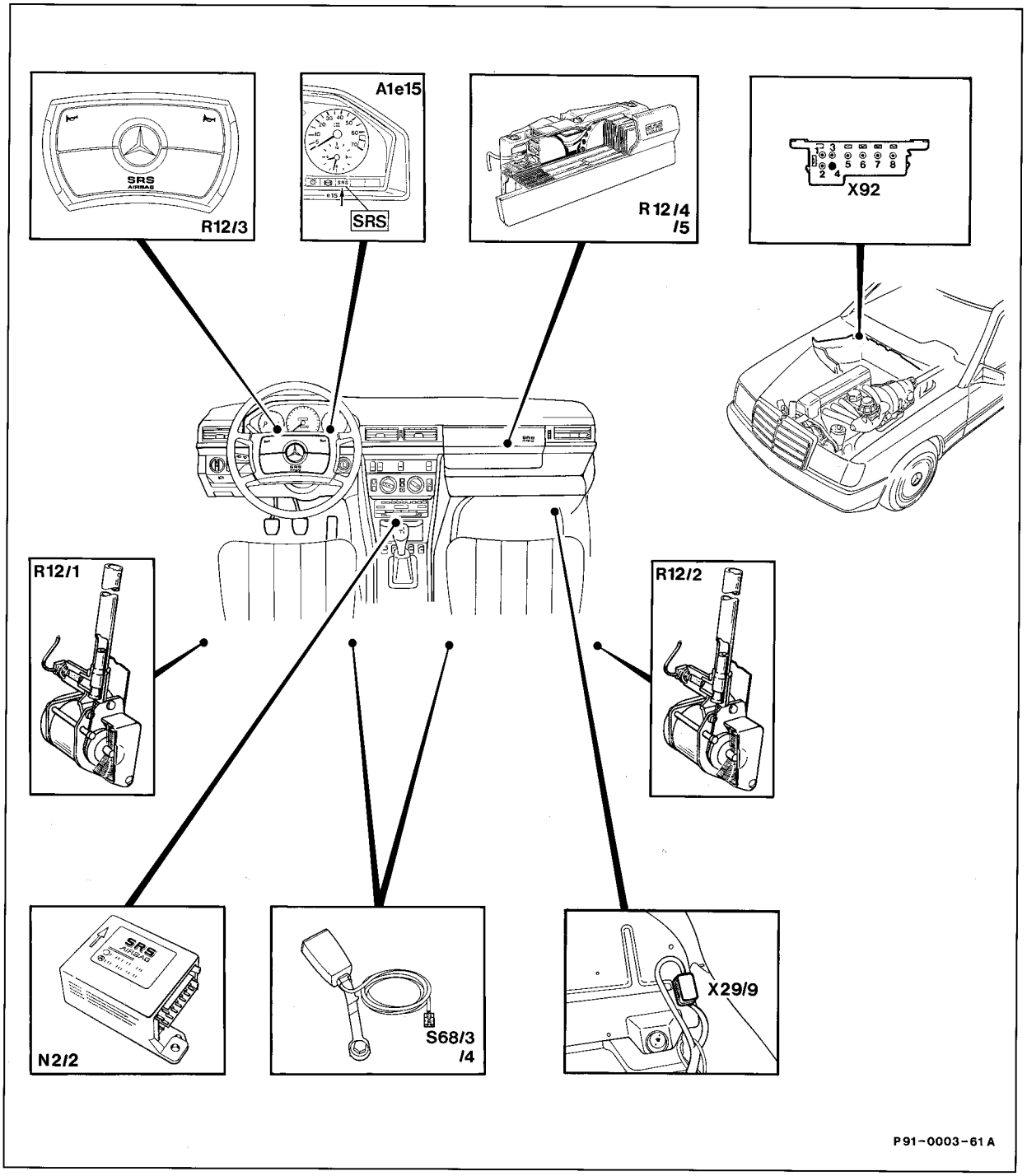
Electrical wiring diagram for driver's and passenger's airbag with belt tensioners (as of 09/88)

A1e15	SRS warning lamp (airbag)
N2/2	Control unit, belt tensioner with airbag
R12/1	Detonator, belt tensioner, front left
R12/2	Detonator, belt tensioner, front right
R12/3	Detonator, driver's airbag
R12/4	Detonator 1, passenger's airbag
R12/5	Detonator 2, passenger's airbag
S68/3	Belt buckle switch, airbag/belt tensioner, driver
S68/3x	Plug connection, belt buckle switch, airbag/belt tensioner, driver
S68/4	Belt buckle switch, airbag/belt tensioner, passenger
S68/4x	Plug connection, belt buckle switch, airbag/belt tensioner, passenger
W10	Ground, battery
W12	Ground center console
X28/2	Plug connection, power supply, airbag with belt tensioner
X28/4	Plug connection, airbag/detonator
X28/5	Collector ring, detonator, airbag, 2-pin
X29/9	Test coupling/plug connection, airbag, 10-pin
X92	Test coupling for diagnosis, 8-pin (flashing code)
a	Fuse box, terminal 15 R, unfused side

Note

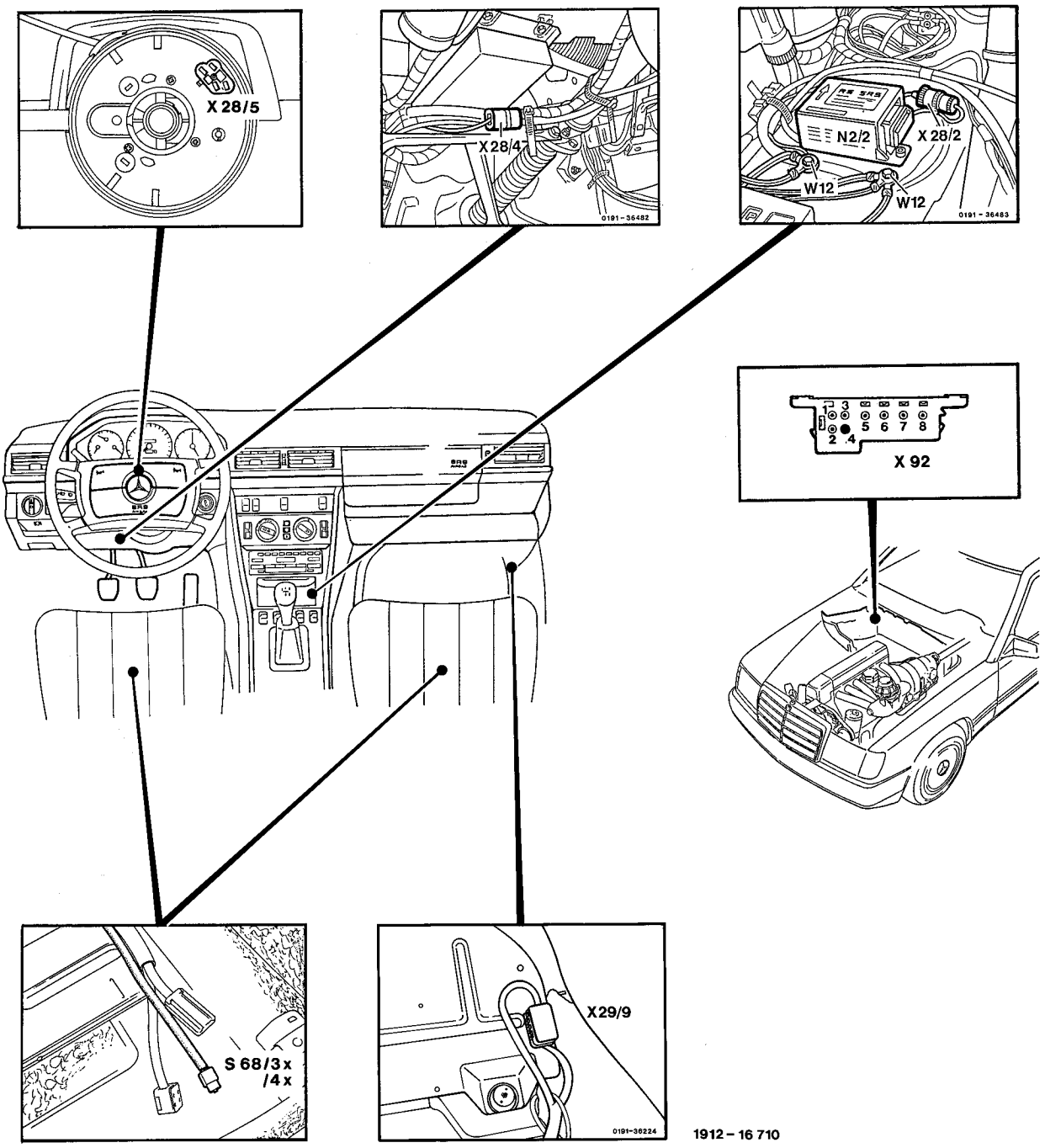
Eight plug pins are short-circuited when the test coupling/plug connection (X29/9) for airbag, 10-pin, is disconnected. When the connection for the belt tensioner detonators (R12/1, R12/2) and the airbag detonators (R12/3, R12/4, R12/5) is disconnected, the detonators are short-circuited.

E. Arrangement of components



A1e15	RS/SRS warning lamp, airbag
N2/2	Control unit, belt tensioner with airbag
R12/1	Detonator, belt tensioner, front left
R12/2	Detonator, belt tensioner, front right
R12/3	Detonator, airbag
R12/4	Detonator 1, airbag (passenger)
R12/5	Detonator 2, airbag (passenger)
S68/3	Switch, belt buckle/airbag, belt tensioner, driver
S68/4	Switch, belt buckle/airbag, belt tensioner, passenger
X29/9	Test coupling/plug connection, airbag, 10-pin
X92	Test coupling for diagnosis, 8-pin (flashing code)

F. Arrangement of plug connections



1912 – 16 710

S68/3x	Plug connection, belt buckle switch, airbag/belt tensioner, driver
S68/4x	Plug connection, belt buckle switch, airbag/belt tensioner, passenger
X28/2	Plug connection, power supply, airbag with belt tensioner
X28/4	Plug connection, airbag/detonator
X28/5	Collector ring, detonator, airbag, 2-pin
X29/9	Test coupling/plug connection, airbag, 10-pin
X92	Test coupling for diagnosis, 8-pin (flashing code)