



Mercedes-Benz

# Group 91



# Objectives

Students will be able to:

- identify seat components and special tools
- answer questions pertaining to the AIRSCARF
- identify new SRS components
- explain function of the 2 stage belt force limiter

# Contents

Seats	4
Seat service tips	6
Head Rest Ventilation (AIRSCARF)	8
AIRSCARF control	10
AIRSCARF heating element	12
AIRSCARF blower	13
AIRSCARF networking	17
Supplemental Restraint System (SRS)	22
SRS sensors	25
Emergency Tensioning Device/Belt Force Limiter	26
Head Thorax bag	28
Kneebag	29

# R171 – Seats



# R171 – Seats

What has changed on the R171 seats ?

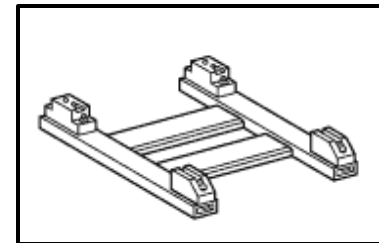
- Leather covering designed to wrinkle with time
- All seats over time will wrinkle differently
- Seat backrest painted magnesium
- If magnesium becomes damaged (scratches) must be replaced due to corrosion (creates fatigue)
- Seat adjuster/memory buttons outboard side of seat



# R171 – Seats Service Tip

Service tip on the manual seats

- Manual operated seats must be placed on special tool W171 589 00 31 00 when removing backrest frame or dismantling the seat frame
- Aids in pretension of seat height adjustment
- Seat frame twists without magnesium backrest frame installed

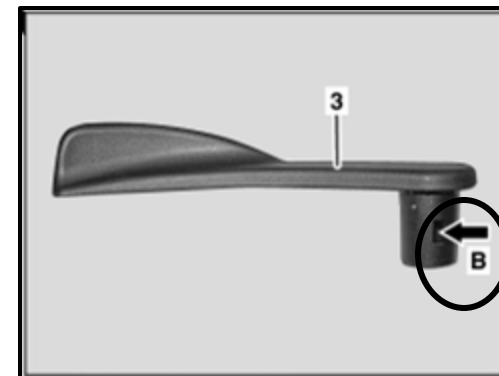
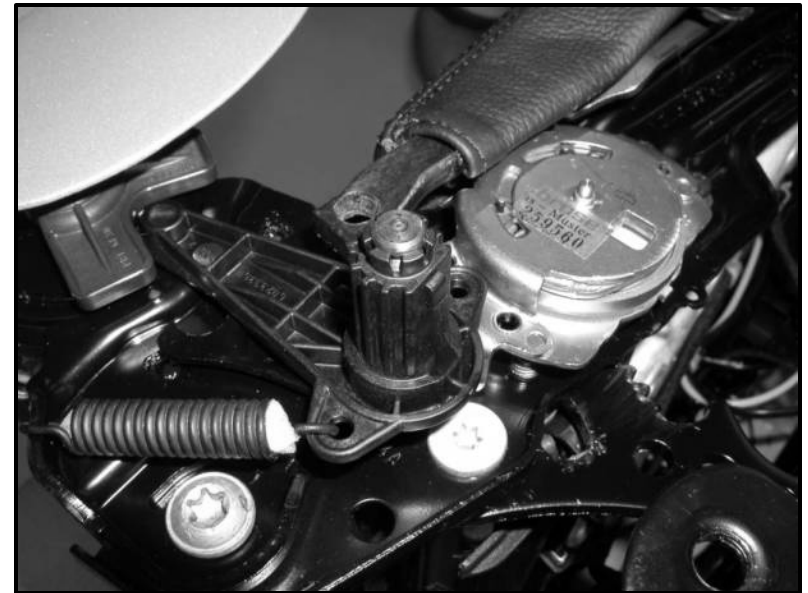


W171 589 00 31 00

# R171 – Seats Service Tip

Service tip for manual backrest

- Engaging pin of manual seat backrest adjustment may brake if lever is removed incorrectly
- Adjuster not available separately !
- Insert screwdriver in slot B to release



# Head Rest Ventilation (AIRSCARF) (Optional)

This innovation extends your convertible car season

Front headroom heating enables open driving even when outside temperatures are lower





# Head Rest Ventilation (AIRSCARF) (Optional)

- Provides additional heating in driver and passenger head area
- Integrated into the backrest of the driver and passenger seat
- Seat heater and seat ventilation control module (N25/7) regulates heating element and blower
- Heating element and blower depend on selected setting (1, 2, and 3), Blower speed varies by vehicle speed and vario roof position



# AIRSCARF Control

The front HS, head area ventilation and steering wheel heater control unit (N25/7) controls the following functions:

- Heated seats
- AIRSCARF system



N25/7 - Front HS [SIH], head area ventilation control unit

# AIRSCARF Prerequisites



## Prerequisites:

Ignition 15 "On"

Interior temperature < 104°F

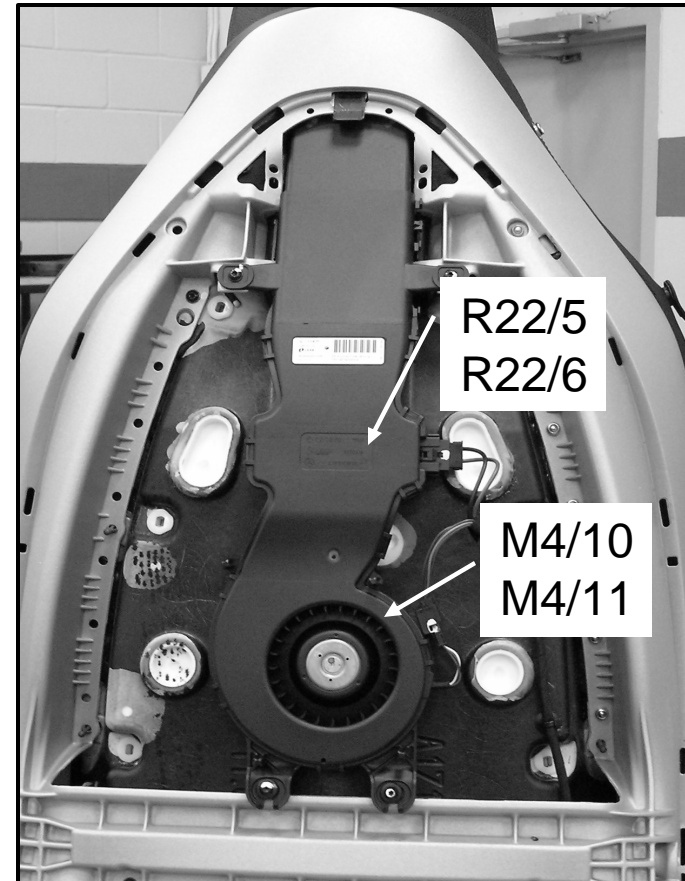
Switch activation

- 3 stage switch, High, Medium, Low and off (no time out)
- Information received by Upper Control Panel (UCP)
- Function displayed via 3 LED's

# AIRSCARF Heating Element

Heating element:

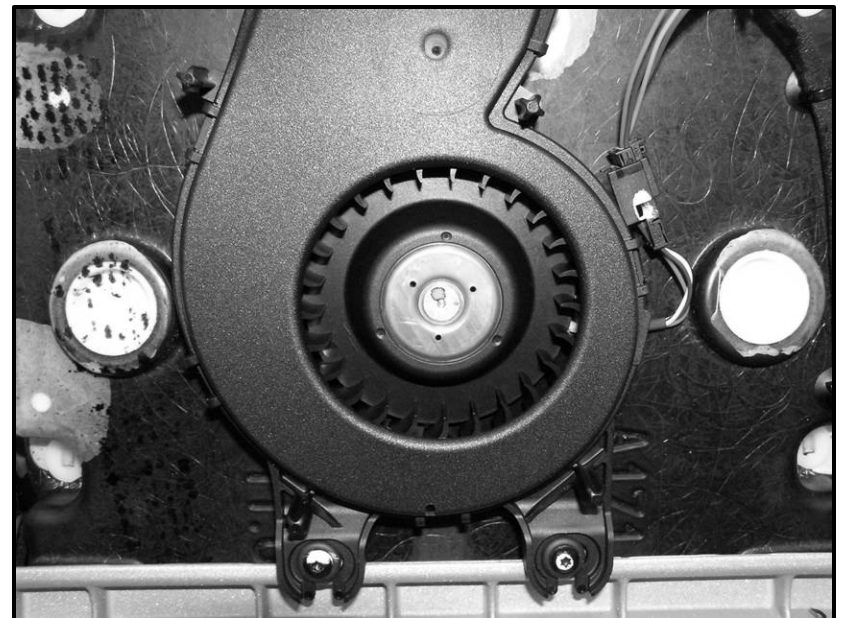
- Controlled via PWM signal from front heating and AIRSCARF module
- If AIRSCARF blower is inoperative heater will not activate
- Only available as assembly  
blower motor, heating element, air ducting



R22/5,R22/6 – Heater element  
M4/10,M4/11 – Blower motor

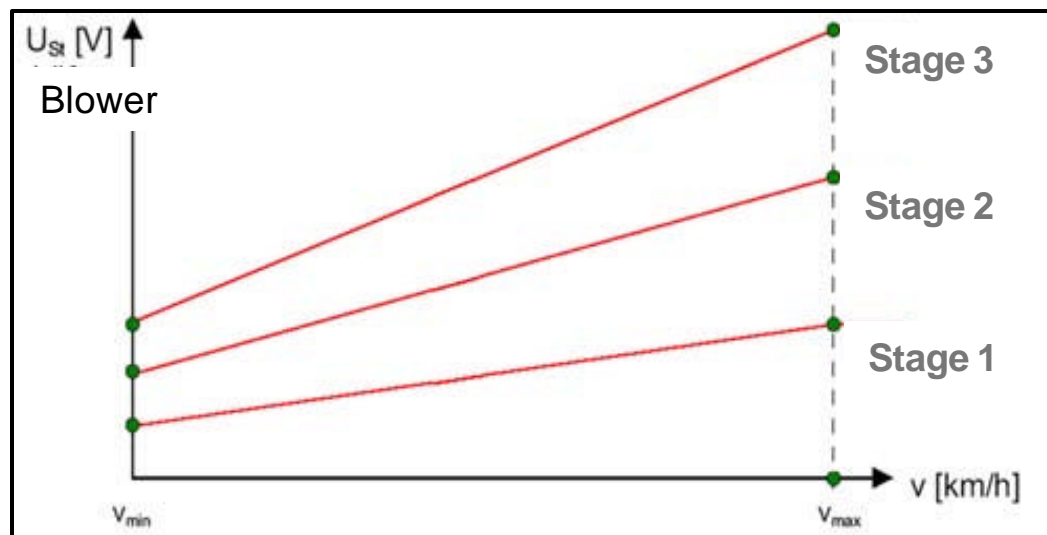
# AIRSCARF Blower Motor

- Air for blower drawn in from bottom of seat (no additional vents)
- Voltage regulated between 2 to 8 volts via N25/7
- Active 10 seconds after heating element activated (prevents cold air)
- Active at lowest speed ~ 5 seconds when system is shut off (reduces heating element temperature)
- Sends feedback signal (square wave) to N25/7



# AIRSCARF Blower Speed

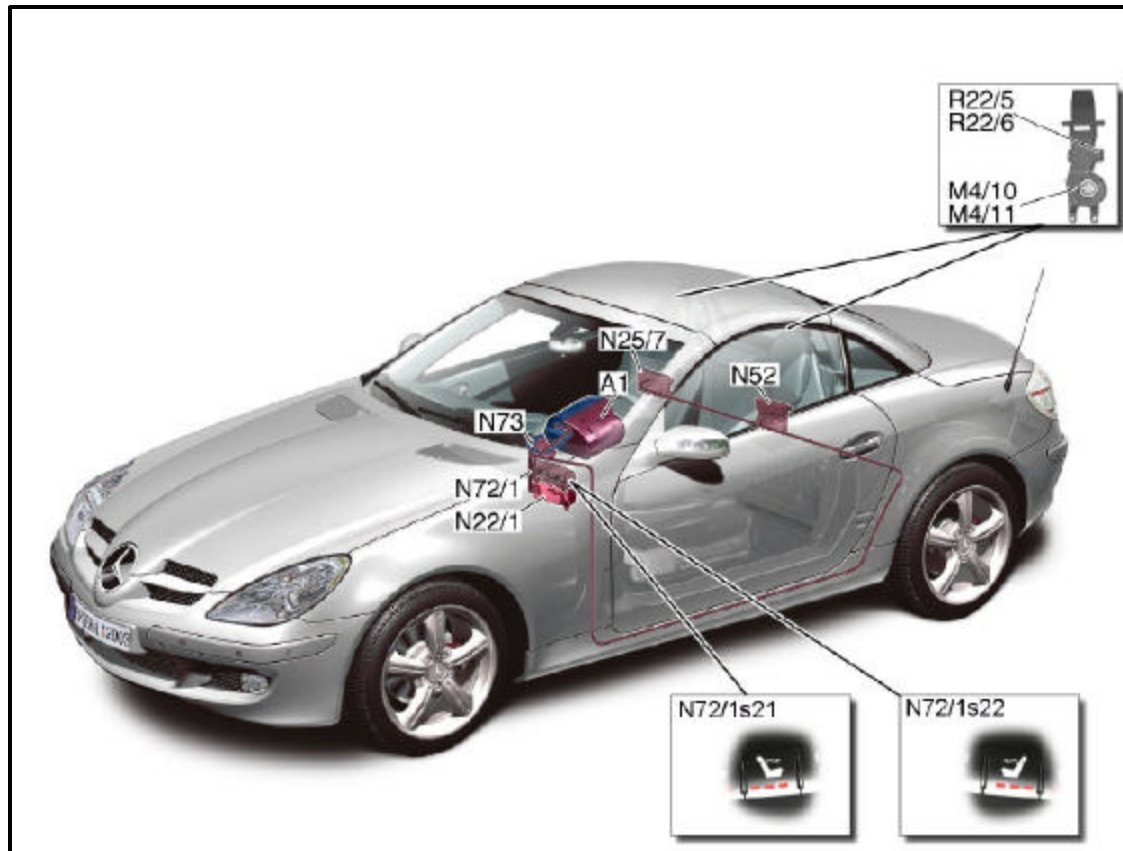
- Blower motor
  - Blower speed determined by vehicle speed and Vario Roof position
  - Vario Roof closed  $\rightarrow$  each stage fixed
  - Vario Roof open  $\rightarrow$  Speed increased based on vehicle speed
    - Blower speed in each stage is increased in 8 steps up to maximum at 50mph



# AIRSCARF

Heating Stage	Heat level	Modulation Heater	Voltage blower	Status Indicator
1	low	~ 30 %	2.5 – 3.5V	1 LED
2	medium	~ 60%	3.0 – 5.5V	2 LED's
3	high	~ 90 %	3.5 – 7.5V	3 LED's

# AIRSCARF Components



R22/5 R22/6 – Left, Right AIRSCARF heating element

M4/10 M4/11 – Left, Right AIRSCARF blower

N25/7 – Seat heater and ventilation control module

N22/1 – Control and operator module comfort (AAC)

N72/1 – Upper control panel

N72/1s21 N72/1s22 – Driver, passenger AIRSCARF switch

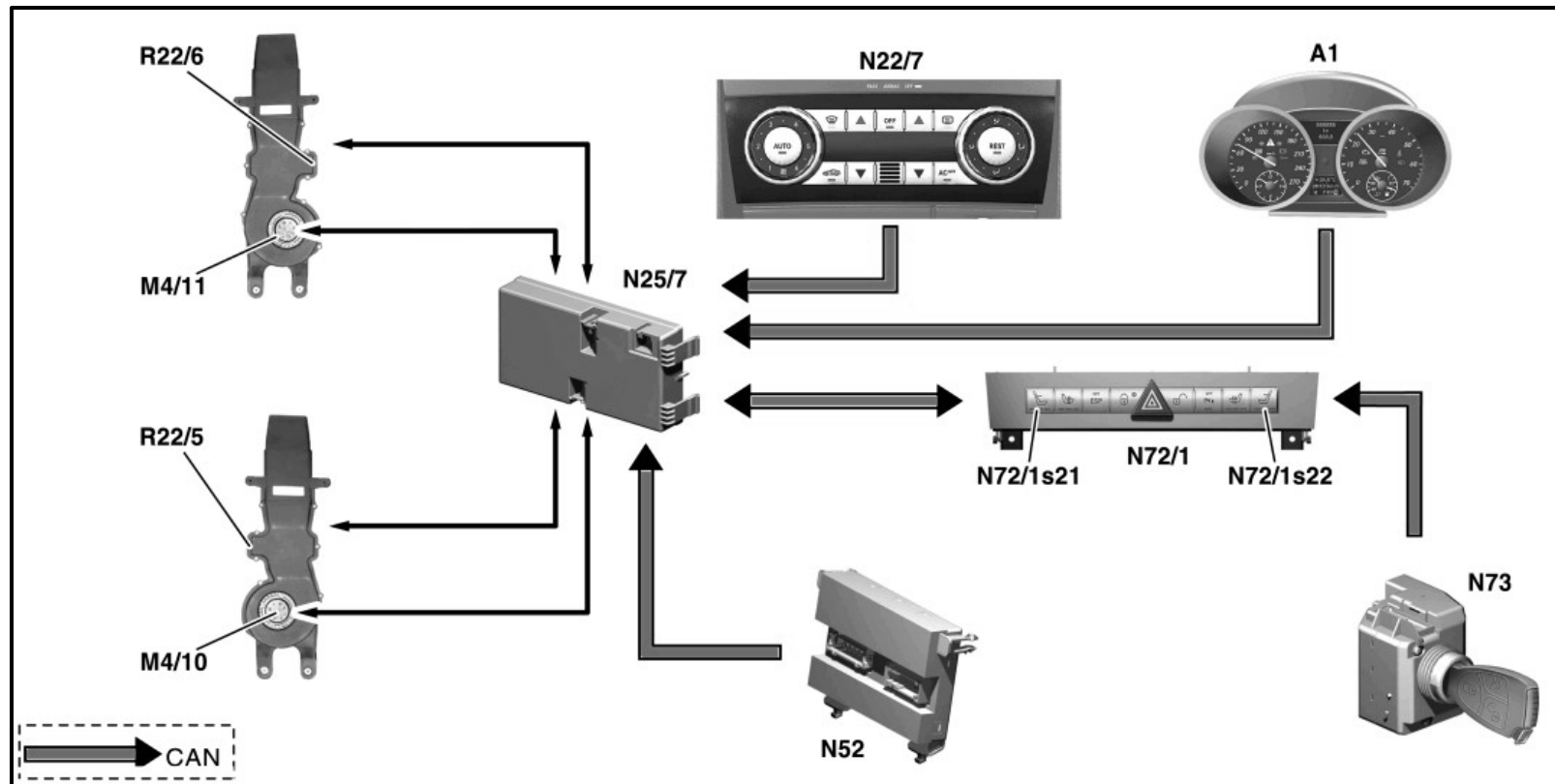
A1 – Instrument cluster

N73 – EIS

N52 – Vario roof control module



# AIRSCARF Networking

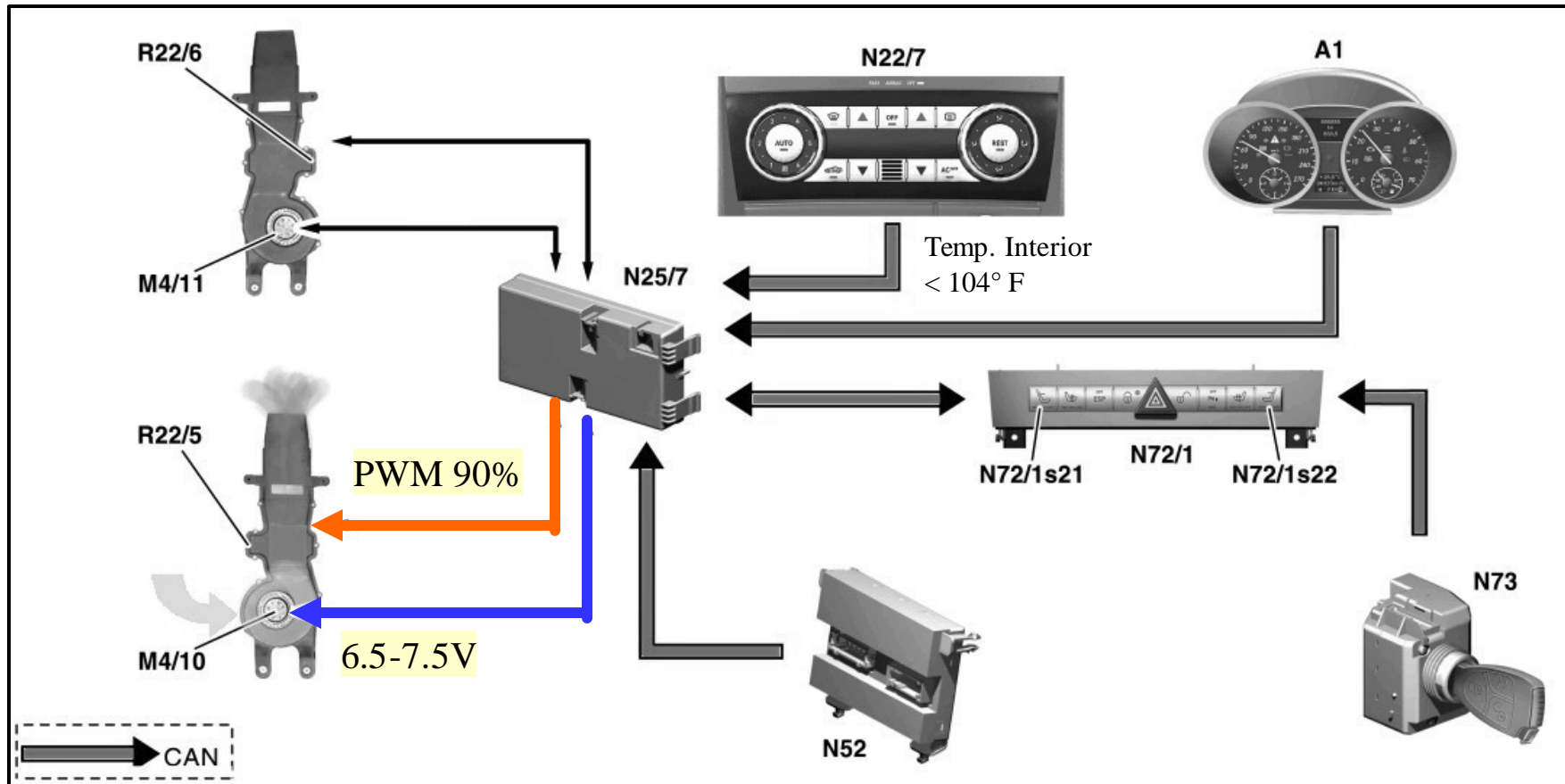


System off



- R22/5,6 – Left, Right AIRSCARF heating element
- M4/10,11 – Left, Right AIRSCARF blower
- N25/7 – Seat heater and ventilation control module
- N22/7 – Control and operator module comfort AAC (CAAC)
- N72/1 – Upper control panel
- N72/1s21,s22 – Driver, passenger AIRSCARF switch
- A1 – Instrument cluster
- N73 – EIS
- N52 – Vario roof control module

# AIRSCARF Networking (High)

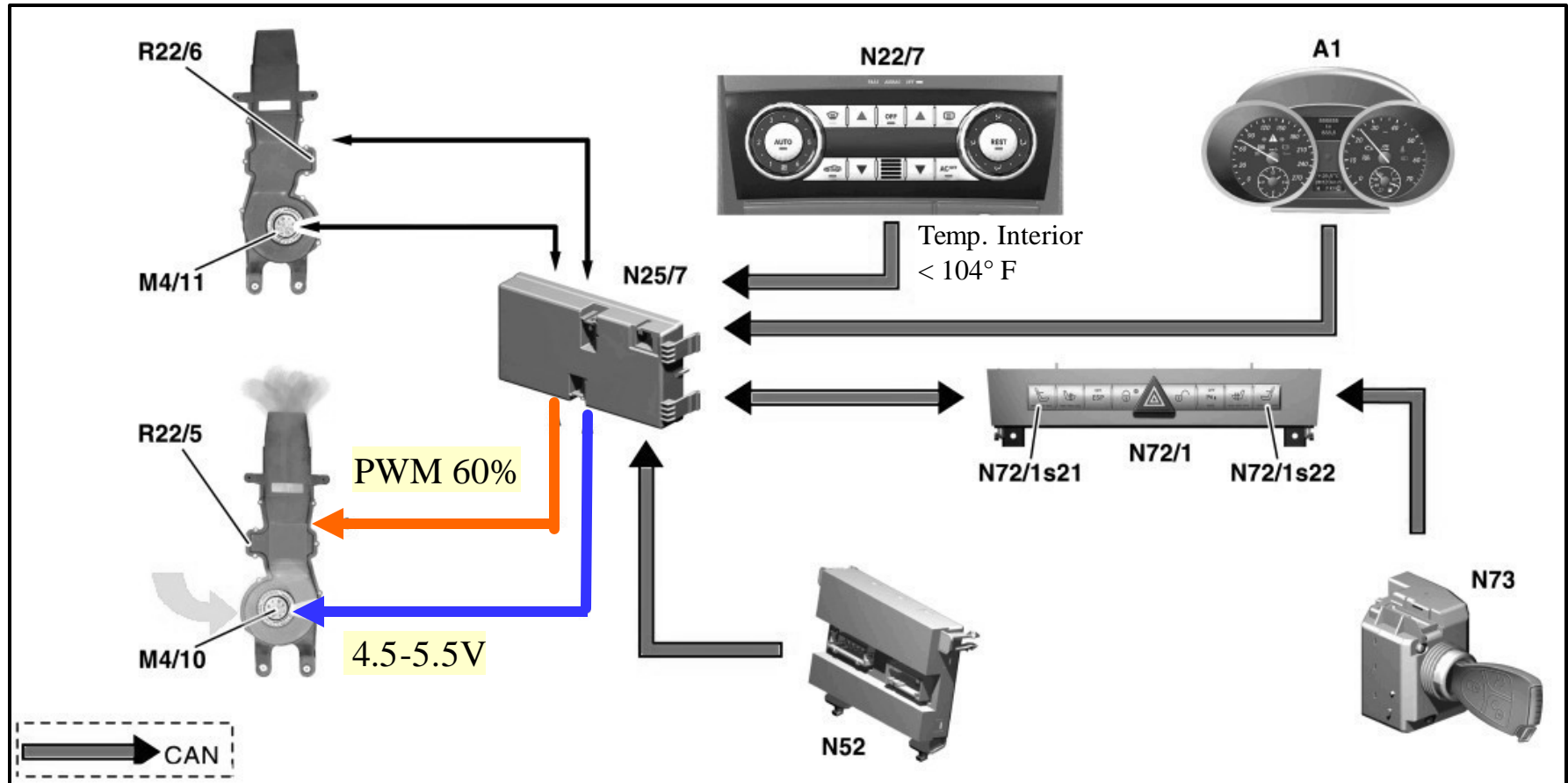


Level 3 - High



Stays on this level until button is pressed, no time out

# AIRSCARF Networking (Medium)

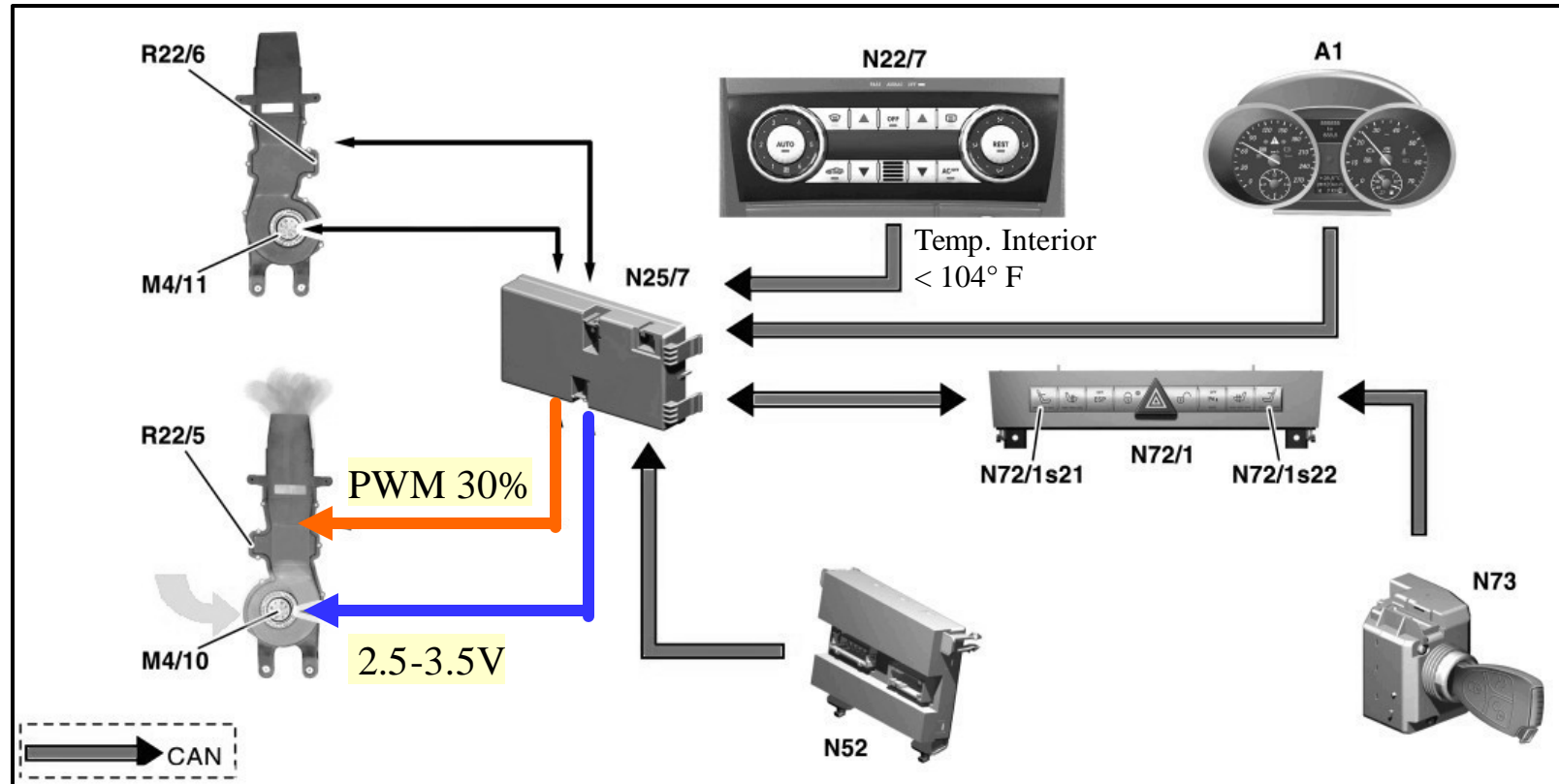


Level 2 - Medium



Stays on this level until button is pressed, no time out

# AIRSCARF Networking (Low)

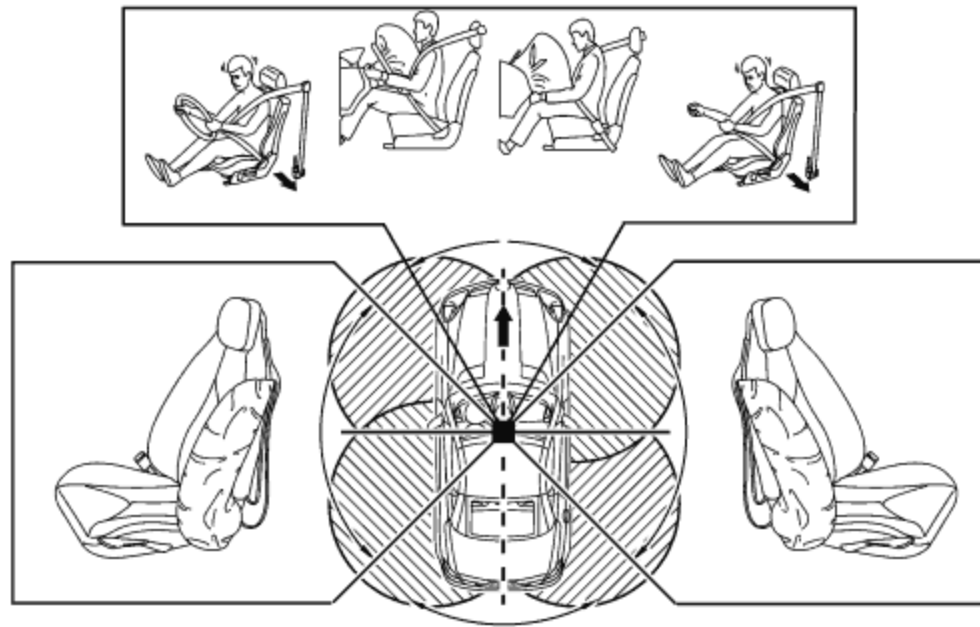


Level 1 - Low



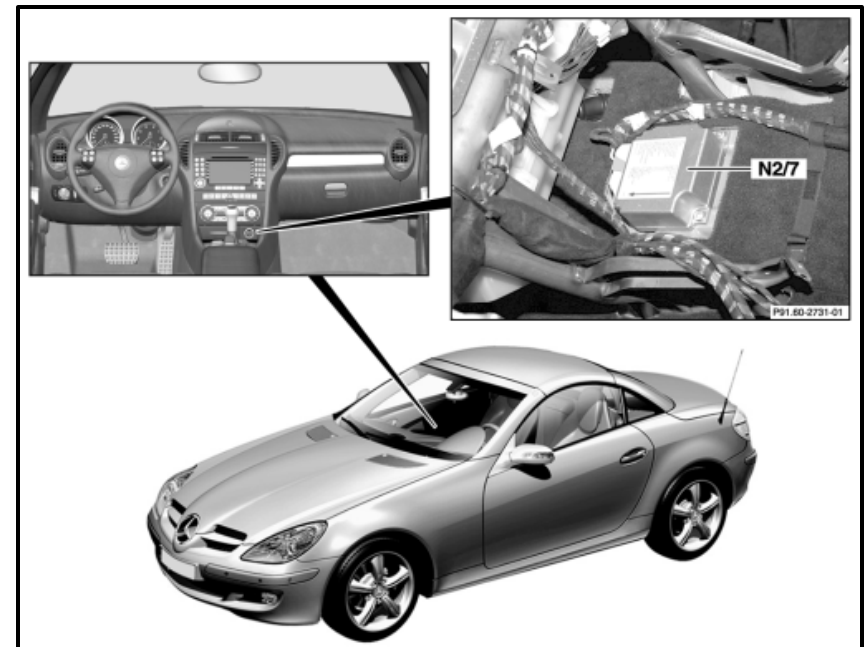
Stays on this level until button is pressed, no time out

# Supplemental Restraint System (SRS)



# Supplemental Restraint System (SRS)

- SRS control unit (N2/7) located on transmission tunnel, in front of the electronic selector lever module control unit (N15/5)
- Via input from crash sensors SRS control unit determines whether the crash criteria for actuation have been reached
- Which restraint devices are enabled for the driver and passenger is dependent on the seat belt buckle switches and child seat recognition



N2/7 SRS control unit

# Supplemental Restraint System (SRS)

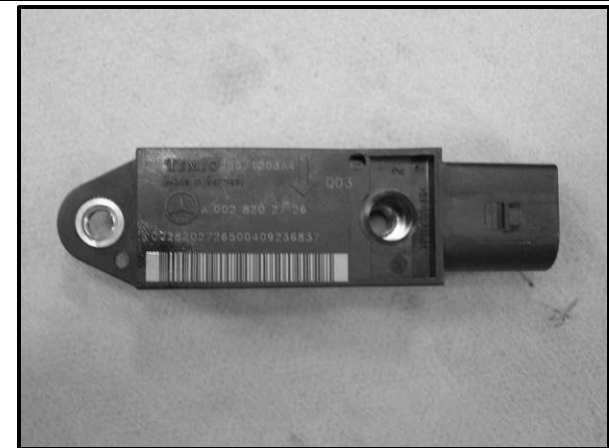
- SRS control module with maximum 12 squibs
  - Two-stage driver airbag
  - Two-stage passenger airbag
  - Head-Thorax bag (HTB) driver and passenger
  - Emergency tensioning device driver and passenger
  - Two-stage belt force limiter driver and passenger
  - Kneebag driver and passenger



# SRS Sensors

## SRS sensors

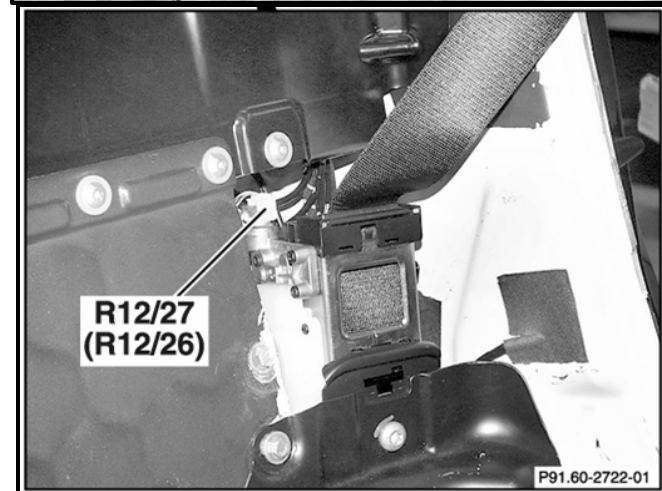
- Acceleration sensor in SRS control unit
- Roll sensor in SRS control unit (N2/7)
- Passenger seat occupancy recognition and automatic child seat recognition sensor B48 as known from 170 in seat cushion
- Head-Thorax bag side impact sensors at seat cross member
- Upfront sensors under radiator cross member





# Emergency Tensioning Device/Belt Force Limiter

- Emergency tensioning device (R46, R46/1)
  - Fitted to seat frame to reduce slack in seat belt
- Belt force limiter (R12/26, R12/27)
  - 1st stage belt force limiter - Ignition squib not deployed
  - 2nd stage belt force limiter - Ignition squib deployed
  - 2nd stage belt force limiter activated in certain severe frontal crashes
  - Can reduce high seat belt forces acting on occupants
  - Only employed if seat belt is latched

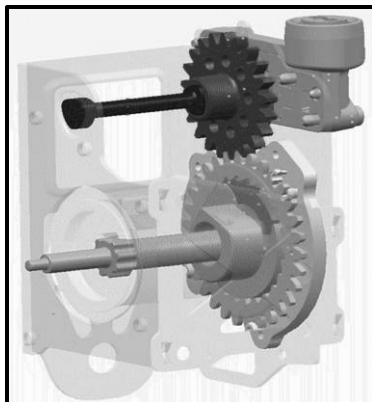


## 2 – Stage Belt Force Limiter

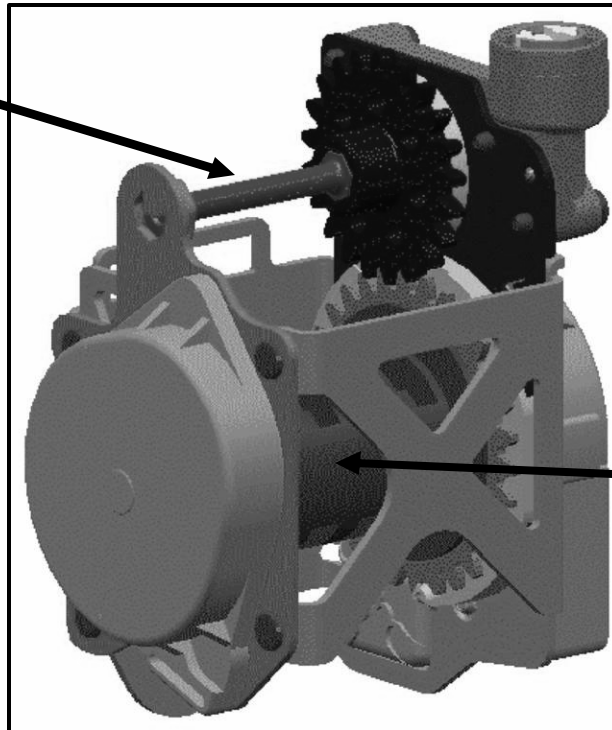
Secondary Torsion Bar

Ignition Squib

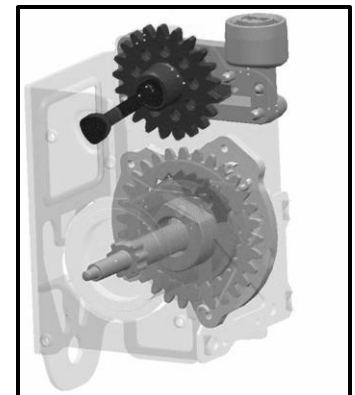
Primary Torsion Bar (in reel)



1<sup>st</sup> Stage

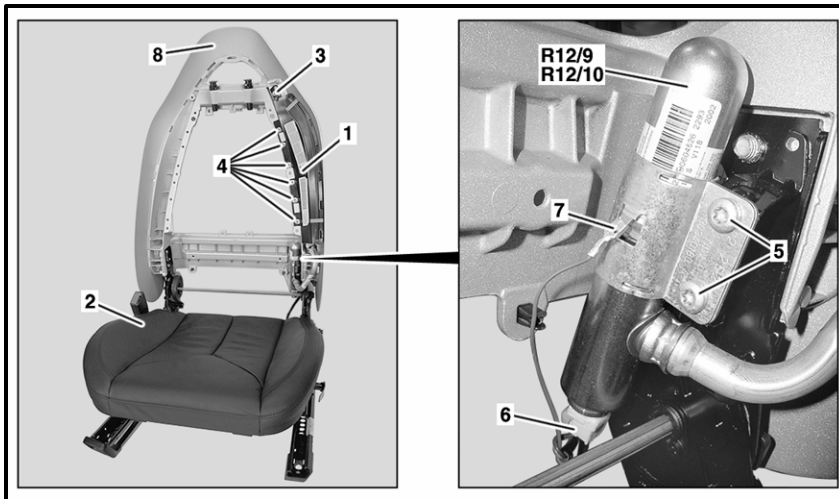


2<sup>nd</sup> Stage (deployed)



# Head Thorax Bag

- Head Thorax Bag
  - Takes over function of sidebag and windowbag
  - Deploys between backrest cushion and magnesium frame
  - Plastic pins hold cushion to frame prior to deployment



R12/9 – Driver sidebag squib

R12/10 – Passenger sidebag squib



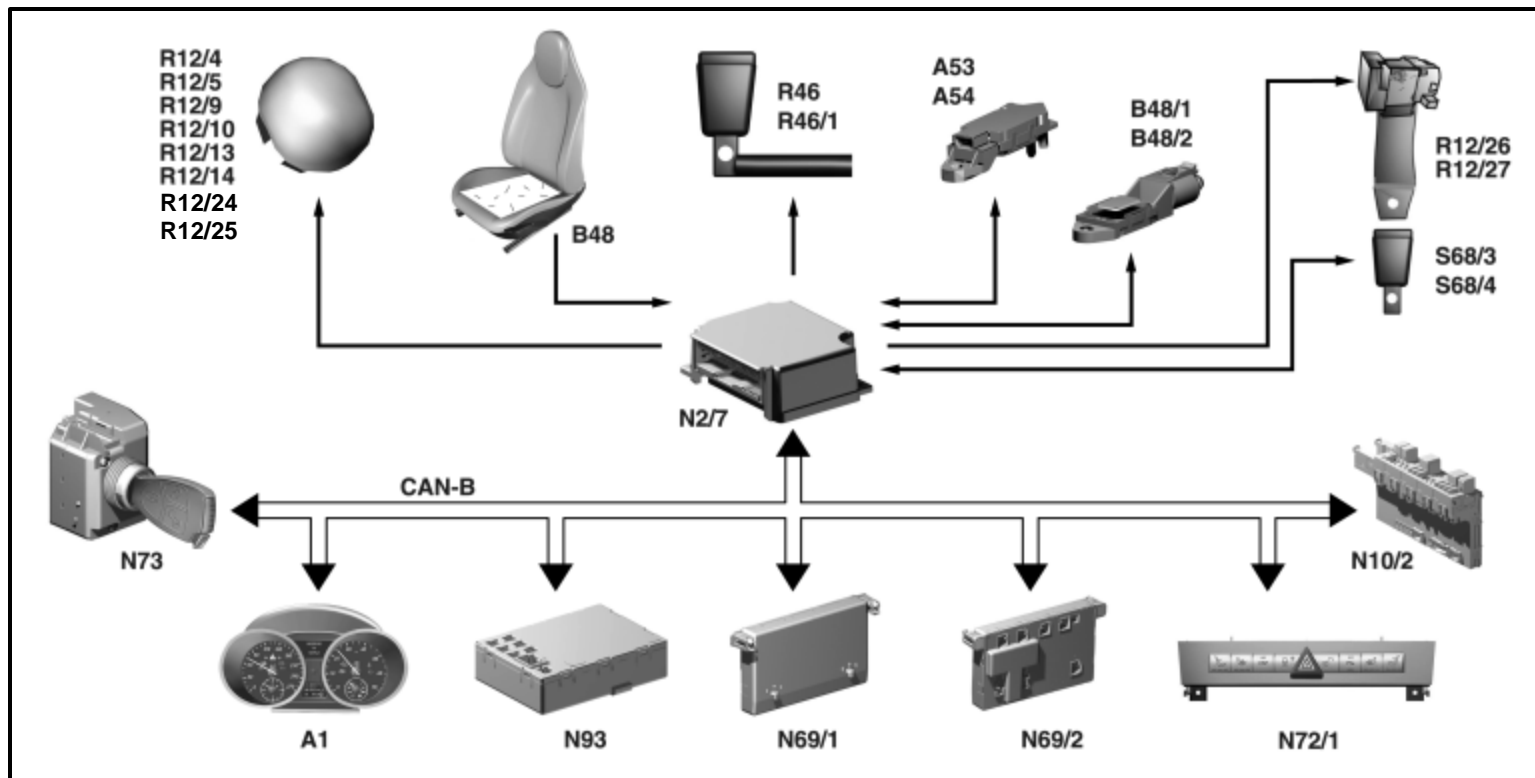
# Kneebag

- Kneebag (R12/24, R12/25)
  - Standard equipment for both driver and passenger side
  - Provide additional protection in a frontal crash
  - Triggered in conjunction with front airbags



Location: Attached to inside of lower instrument panel driver and passenger side

# SRS Networking



A1 Instrument cluster  
A53 Left side airbag sensor  
A54 Right side airbag sensor  
B48 Front passenger seat occupied and child seat recognition sensor  
B48/1 Driver-side frontal acceleration sensor  
B48/2 Passenger-side frontal acceleration sensor  
N2/7 Restraint systems control unit  
N10/2 Rear SAM control unit with fuse and relay module N69/1 Left door control unit  
N69/2 Right door control unit  
N72/1 Upper control panel control unit  
N73 DI control unit  
N93 Central gateway control unit  
R12/4 Passenger airbag squib 1  
R12/5 Passenger airbag squib 2  
R12/9 Driver sidebag squib  
R12/10 Front passenger sidebag squib  
R12/13 Driver airbag squib 1  
R12/14 Driver airbag squib 2 R12/26 Front passenger belt force limiter  
R12/24 Front passenger kneebag squib  
R12/25 Driver kneebag squib  
R12/27 Driver belt force limiter  
R46 Driver buckle ETR squib  
R46/1 Front passenger buckle ETR squib  
S68/3 Driver seat belt buckle restraint systems switch  
S68/4 Front passenger seat belt buckle restraint systems switch

# Questions?