

## BRERA/SPIDER 2.2 JTS AUTOMATICALLY OPERATED HOOD 7030H

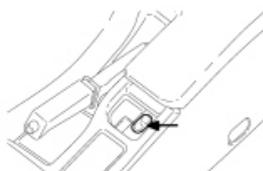
### INTRODUCTION

The new Spider is equipped with an electrohydraulic system for the automated movement of the hood which ensures that the driver can open and close the hood quickly and safely without leaving their seat.

### OPERATION

The automatic activation of the hood takes place by pressing the dedicated button in the centre console.

 The button is pressed for the entire duration of the operation.



The manoeuvre is reproduced in the control panel display which illustrates the movement of the hood diagrammatically. The completion of the manoeuvre is confirmed by a "beep" and by the "HOOD OPENING (OR CLOSING) CYCLE COMPLETED" message which appears in the display.



Any error messages notifying the presence of any system malfunctions also appear in the display.

These errors may be temporary, involving a break in the operating cycle which can then be restored, or they may be permanent.

In this case, the hood system must be repaired at a Service Centre.

There is a manual emergency procedure which allows the hood to be closed.

Only move the hood with the vehicle stationary because the hood should not be opened/closed whilst the vehicle is moving: if there has been an accidental attempt to activate the hood whilst the vehicle is moving, this manoeuvre will be automatically prevented.

If the activation of the hood was started with the vehicle stationary and then the vehicle was driven, the process, once started, can only be completed by stopping the vehicle once again.

At the start of the hood opening or closing operation, always check that the windows in the doors are slightly lowered (middle drop) in automatic mode. If this is not the case, release the hood activating button and lower the windows in both doors using the buttons or open the doors slightly.

 In order not to run the battery down, it is advisable to carry out the hood opening or closing operations with the engine running.

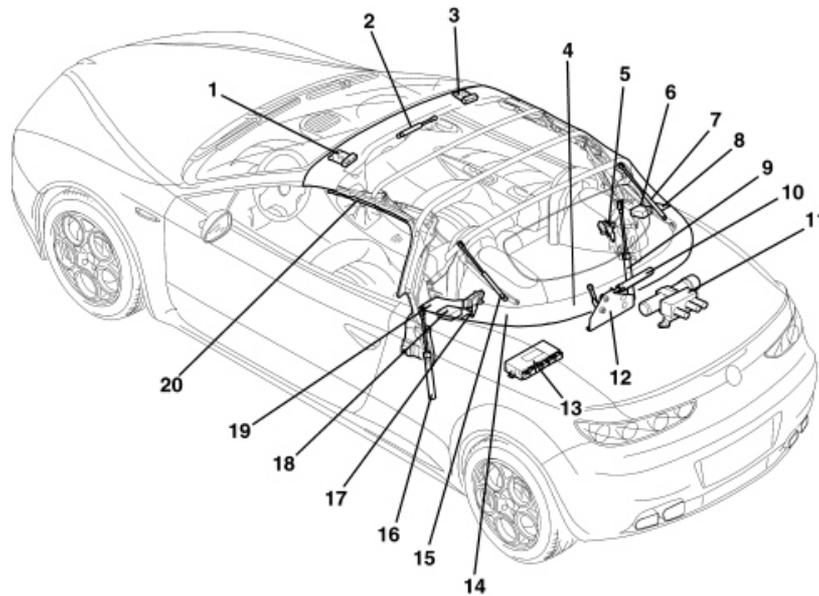
### SYSTEM COMPONENTS

An electronic control unit controls the entire electrohydraulic system which carries out the hood automatic opening/closing cycle.

The activation of the hood takes place by pressing the dedicated button located on the centre tunnel.

Numerous sensors are located in the hood and hood cover locks and in the hood activating cylinders.

Thanks to the information received from the sensors, the control unit controls the locking and unlocking of the hood and hood cover locks by means of dedicated electric motors and it controls the hydraulic system for the cylinders for the hood, the arch and the hood cover.

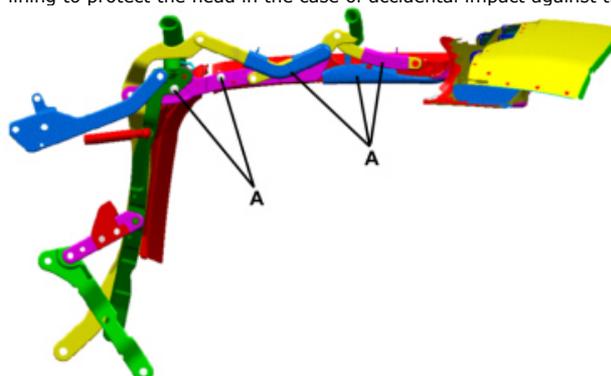


1. Left front lock
2. Front locks hydraulic cylinder
3. Right front lock
4. Arch
5. Right hood cover lock
6. Right flap motor
7. Right arch movement hydraulic cylinder
8. Right flap
9. Right hood activation hydraulic cylinder
10. Hood cover movement hydraulic cylinder
11. Hood control electrohydraulic assembly
12. Hood cover movement device
13. Hood electronic control unit
14. Hood cover
15. Left arch movement hydraulic cylinder
16. Left hood activation hydraulic cylinder
17. Left hood cover lock
18. Left flap motor
19. Left flap
20. Hood frame

## HOOD

The hood comprises a double layer fabric with rubber in between and a (7mm) layer of polyurethane applied to the inside of the cloth which has a sound insulation function.

There is padding (A) under the inner lining to protect the head in the case of accidental impact against the frame linkage.

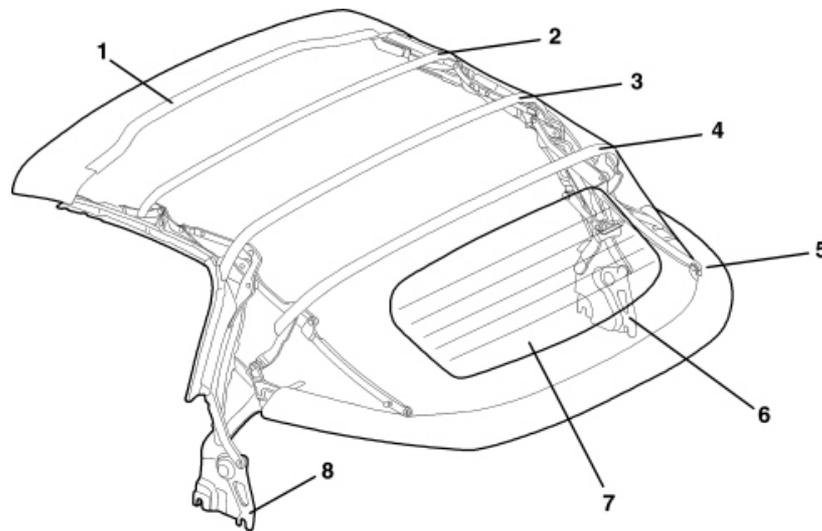


The hood is equipped with a (3.15 mm thick) glass heated rear windscreen fastened by the pressing of the polyurethane perimeter seal to produce an optimum seal and finish.

The rearscreen cannot be replaced separately from the cloth.

The steel frame is made up of linkage securing it to the bodyshell, a front crossmember, a rear arch and three intermediate ribs.

The front closure takes place by means of two locks (by the hood) and two strikers (on the windscreen crossmember) activated by an electrohydraulic device capable of detecting the approach of the lock levers to the correct position and activating the closure of the actual levers.



1. Front crossmember
2. Rib 1
3. Rib 2
4. Rib 3
5. Arch
6. Right mounting bracket
7. Heated rear windscreen
8. Left mounting bracket

The front, side and rear seals are secured to the frame guaranteeing the correct seal with the windscreen crossmember, the side windows and the hood cover.

All the seals have been treated with silicon paint.

#### HOOD COVER

The hood cover features a steel structure with a black PVC finish trim and aluminium mouldings.

The hood cover is connected to the vehicle by two gooseneck hinges positioned at the side.

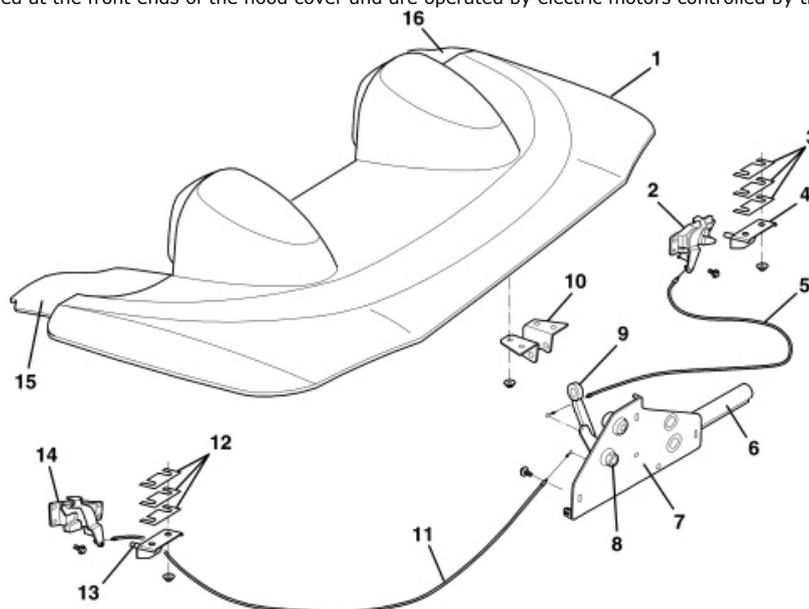
Two rubber buffers are fitted at the bottom of the hood cover frame and are compressed on the hood linkage because when it is in the rest position folded in its housing with the hood cover closed in order to limit shaking whilst driving.

The opening/closing of the hood cover is controlled by a hydraulic cylinder which acts on the device that operates the lifting lever.

The hood cover closing locks which engage the mounting pins are also controlled by the device.

To ensure the alignment of the hood cover in the closed position, there is a series of shims positioned between the pins and the hood cover.

The moving flaps are hinged at the front ends of the hood cover and are operated by electric motors controlled by the control unit.

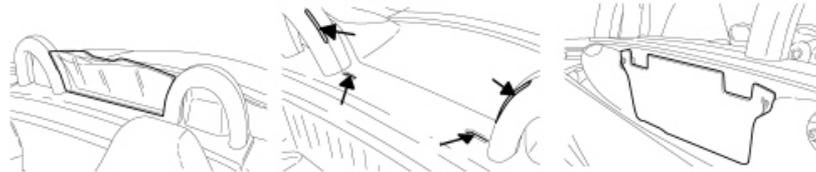


1. Hood cover
2. Right lock
3. Shims
4. Right pin on hood cover
5. Right lock bowden control cable
6. Hydraulic cylinder
7. Hood cover activating device
8. Lock control system fastening nut
9. Lifting lever

10. Lever attachment
11. Left lock bowden control cable
12. Shims
13. Left pin on hood cover
14. Left lock
15. Left flap
16. Right flap

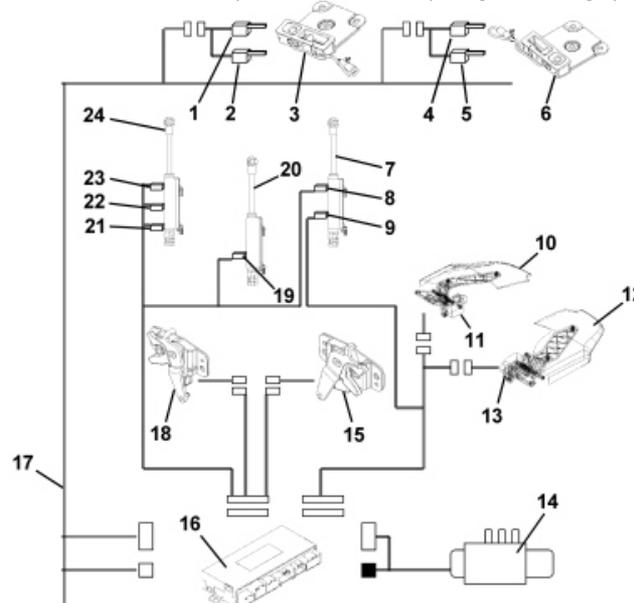
### WIND STOPPER (WHERE FITTED)

This is a transparent shield that is positioned behind the seats, secured to the anti-roll bars and to the partition. It improves comfort when driving at all speeds by limiting the air turbulence that is created inside the passenger compartment when driving with the hood open. The fitting position, the mounting zones and the correct storage, when not fitted are illustrated in the diagram.



### SENSORS AND ACTUATORS

The hood system is governed by an electronic control unit which converses with the vehicle CAN which receives signals from a series of sensors and controls the various actuators for the correct implementation of the opening and closing cycles.

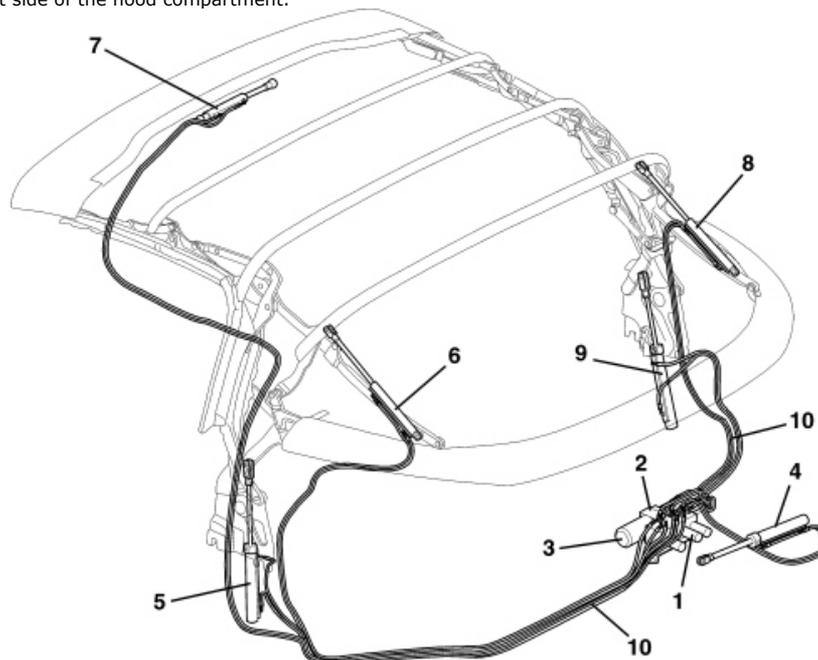


1. Left hood sensor on windscreen crossmember
2. Hood left front lock sensor
3. Left front lock
4. Right hood sensor on windscreen crossmember
5. Hood right front lock sensor
6. Right front lock
7. Hood cover hydraulic cylinder
8. Hood cover raised sensor
9. Hood cover lowered sensor
10. Right flap
11. Right flap motor
12. Left flap
13. Left flap motor
14. Hood control electrohydraulic assembly
15. Right hood cover lock
16. Hood electronic control unit
17. Vehicle wiring
18. Left hood cover lock
19. Hood folded sensor
20. Left hood activation hydraulic cylinder
21. Arch raised sensor
22. Arch in intermediate position sensor
23. Arch lowered sensor
24. Left arch movement hydraulic cylinder

The sensors located in the cylinders and the locks are Hall effect sensors which send the control unit a signal which varies from 12 V to around 9.5 V when passing a certain mechanism position.

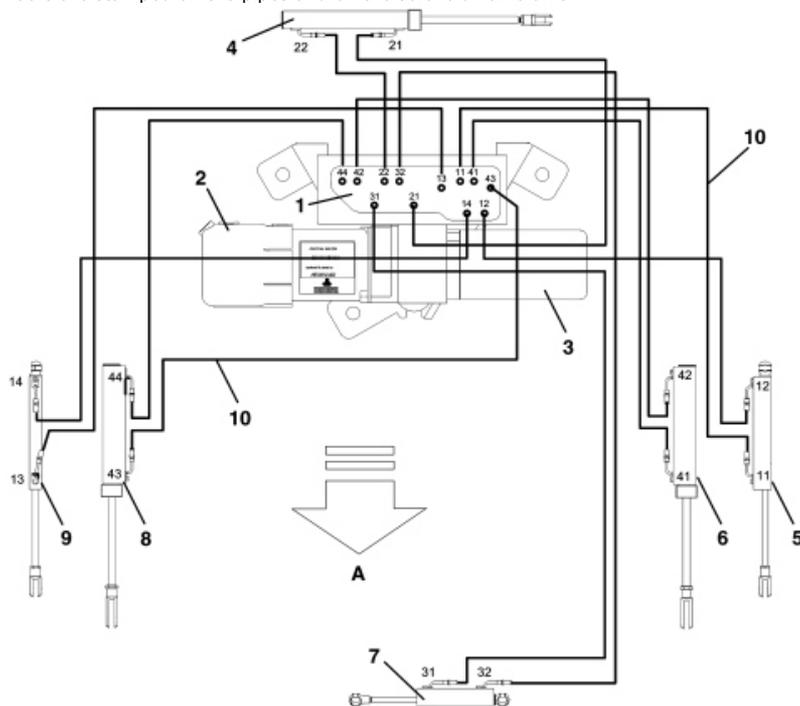
### HYDRAULIC SYSTEM

The electrohydraulic system is composed of an electric pump integrated with a solenoid valve assembly which controls the raising/lowering of the hood cover, the arch and the hood itself by means of six hydraulic cylinders. It involves a closed circuit system which works at high pressure with suitable pipes and connectors and safety systems. The pump and solenoid valve hydraulic components are located inside the reservoir-accumulator in a single assembly located in the passenger compartment on the right side of the hood compartment.



- 1. Solenoid unit
- 2. Pump with electric motor
- 3. Reservoir - accumulator
- 4. Hood cover cylinder
- 5. Left hood cylinder
- 6. Left arch cylinder
- 7. Front locks cylinder
- 8. Right arch cylinder
- 9. Right hood cylinder
- 10. Hydraulic pipes

The pipes branch out from the solenoid valve unit towards the various hydraulic actuators. The individual pipes are numbered as illustrated in the diagram below. The numbers are stamped on the pipes and on the solenoid valve unit.



- A. Direction of travel
- 1. Solenoid unit
- 2. Pump with electric motor
- 3. Reservoir - accumulator
- 4. Hood cover cylinder

5. Left hood cylinder
6. Left arch cylinder
7. Front locks cylinder
8. Right arch cylinder
9. Right hood cylinder
10. Hydraulic pipes

## OPERATING SEQUENCES



The "HOOD OPENING" refers to the operation of opening the vehicle "roof" by folding the hood in the dedicated rear compartment. The reverse "HOOD CLOSING" operation refers to the closing of the vehicle "roof" by extending the hood until it attaches to the windscreen.

The OPENING sequence and the reverse CLOSING sequence take place via numerous "steps" described below:

### Opening cycle:

1. Middle drop window lowering (about 50 mm).
2. Arch raising.
3. Hood cover opening
4. Unlocking of front locks on windscreen crossmember
5. Flaps in intermediate position
6. Arch lowering in intermediate position
7. Flaps in outer position
8. Hood opening and folding in hood compartment
9. Hood cover closing
10. Window raising

### Closing cycle

1. Middle drop window lowering (about 50 mm)
2. Hood cover opening
3. Hood closing
4. Arch raising
5. Flaps in intermediate position
6. Flaps in inner position
7. Hood cover closing
8. Locking of front locks on windscreen crossmember
9. Complete arch lowering
10. Window raising

## INTERRUPTING THE MANOEUVRE

If the hood operating button is released, the movement automatically stops straight away. The movement operation can be continued by pressing the button again in the desired direction, opening or closing.

The closing of the door side windows takes place automatically, from the middle drop position, at the end of the completed hood opening or closing manoeuvre. Therefore do not close the side windows using the electric window buttons before it is completely closed otherwise the perfect seal between the side windows and the hood rubber seals is not ensured.

## MANUAL HOOD CLOSING IN THE CASE OF AN ELECTRICAL PROBLEM

### Op. 7030H02 HOOD EMERGENCY CLOSING - CARRY OUT PROCEDURE

## ELECTRONIC MANAGEMENT OF THE HOOD SYSTEM

### ELECTRONIC CONTROL SYSTEM

The "Boot Hood Compartment Node (NVB-C)" manages the operations of opening and closing the hood. It is located in the passenger compartment on the left side under the hood compartment mat.

All the hood operations are made safe and reliable taking into consideration all the important factors such as vehicle speed, battery voltage, etc.

Operation

The "Boot Hood Node (NVB-C)" supervises the following functions:

1. Receiving and transmitting information on the B-CAN.
2. It possesses auto diagnostic functions for error recovery and for checks on the input and output signals.
3. It supervises the control of the hood system:
  - hydraulic movement control (Hall effect sensors);
  - flap movement control;
  - Bose audio system operation;
  - limp-home;
  - logistic-mode;
  - input from hood activating button in the centre console;
  - check on alarm conditions, e.g. vehicle speed, internal system errors, etc. warning the driver via the NQS display.
4. It interacts with other control units for the optimum management of the system:
  - NPG and NPP: (middle drop);
  - NCL: MANAGEMENT of heated rear windscreen and Auto/Manual operation;
  - NBC (logistic mode)

Power supply voltage behaviour

The "Boot Hood Compartment Node (NVB-C)" requires the key in the ignition and turned on to move the hood.

Movement is inhibited during starting.



The hood can only be closed if the supply voltage for the "Boot Hood Node (NVB-C)" is more than 9V and less than 16V. Any opening/closing cycle is interrupted if the voltage goes below 8.6 V.

Logistic-mode

If the vehicle is in the Logistic mode configuration (NBC software configuration) the "Boot Hood Node (NVB-C)" only allows the hood closing cycle.

**Sensors**

It should be possible to complete a hood opening/closing cycle even if a sensor becomes defective but is not required to complete the actual cycle or to guarantee a certain hood position.

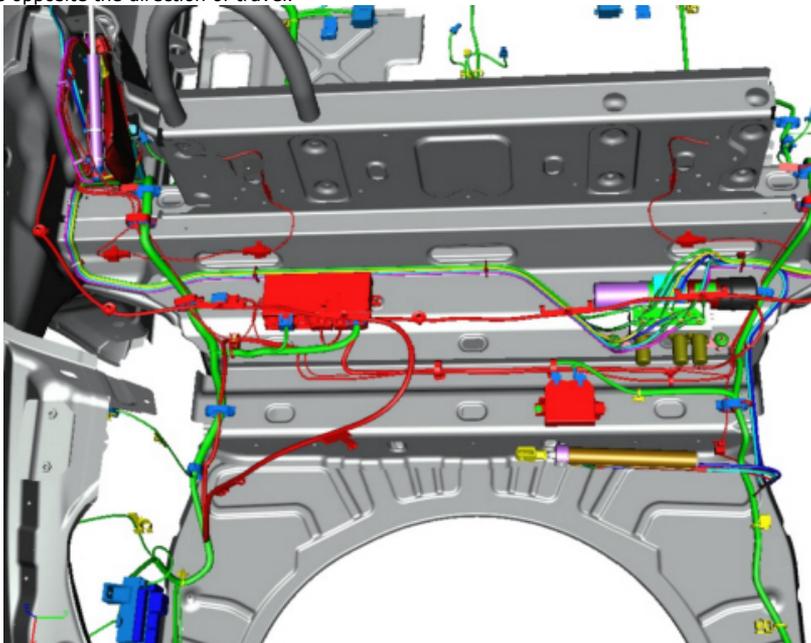
If one or two sensors providing redundant information becomes faulty, the status of the non defective sensor is taken from the "Boot Hood Node (NVB-C)"; this means that even if a redundant sensor becomes faulty the system should be capable of completing the action in progress. If only one sensor is defective and the hood is completely closed, it does not move at all.

The redundant sensors are:

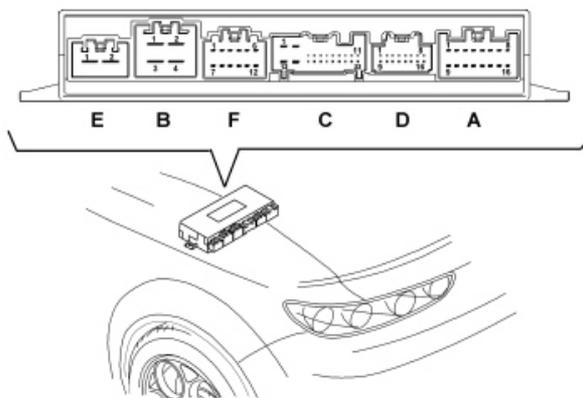
- the sensors in the hood cover locks
- the hood sensors on the windscreen crossmember
- the front striker sensors on the windscreen crossmember

**COMPONENT LOCATION**

The Boot Hood Node (NVB-C)" and the hood control electrohydraulic unit are located under the carpet in the housing for the hood and the connectors are on the side opposite the direction of travel.



**PIN OUT AND CONNECTORS**



- conn. A and B = rear wiring
- conn. C and D = hood bridge
- conn. E and F = hood hydraulic unit bridge

Connector A

PIN	DESCRIPTION
1	CAN H line
2	N.C.
3	Hood closing control switch

4	Hood closed right sensor
5	N.C.
6	Hood closed left sensor
7	
8	N.C.
9	CAN L line
10	N.C.
11	Hood opening control switch
12	Right hood sensor on windscreen crossmember
13	Front sensor power supply
14	Left hood sensor on windscreen crossmember
15	N.C.
16	Bose amplifier output

## Connector B

PIN	DESCRIPTION
1	Earth
2	Power supply from fuse F62
3	Earth
4	Power supply from fuse F63

## Connector C

PIN	DESCRIPTION
1	Right flap motor (-)
2	Left flap motor (-)
3	N.C.
4	N.C.
5	Left flap sensor (-)
6	Right flap signal
7	Right flap sensor (+)
8	N.C.
9	N.C.
10	N.C.
11	Hood cover resting signal
12	Right flap motor (+)
13	Left flap motor (+)
14	N.C.

15	N.C.
16	Right flap sensor (-)
17	Left flap sensor signal
18	Left flap sensor (+)
19	N.C.
20	N.C.
21	N.C.
22	N.C.

## Connector D

PIN	DESCRIPTION
1	Arch intermediate position switch
2	Right hood cover lock switch
3	Arch lowered switch
4	Left hood cover lock switch
5	N.C.
6	N.C.
7	Arch raised switch
8	Hood cover open sensor
9	Hood folded sensor
10	N.C.
11	N.C.
12	N.C.
13	N.C.
14	Hood cover lock switches power supply
15	Arch and hood folded switches power supply
16	Hood cover sensors power supply

## Connector E

PIN	DESCRIPTION
1	Pump (+)
2	Pump (-)

## Connector F

PIN	DESCRIPTION
1	NTC sensor (-)
2	Valve 1
3	Valve 2

4	Valve 3
5	N.C.
6	N.C.
7	NTC sensor (+)
8	Valve 1 earth
9	Valve 2 earth
10	Valve 3 earth
11	N.C.
12	N.C.