Checking Procedure

General Information

This Checking Procedure contains the diagnosis of the following electronic system:

- ABS 430 Anti-Lock Brake System

Vehicle Diagnostic Concept:

The main purpose of a vehicle diagnostic concept is locating and eliminating faults in the shortest time possible. Therefore, the following diagnostic strategy has been developed as a guideline that leads technicians straight to the source fault:

Starting point is the vehicle that contains a certain number of electronic systems, e.g. engine management system, airbag, and ABS system.
Each of these electronic systems consists of so - called "functional groups" that are functionally related to each other. A Coolant Temperature Sensor Circuit for example represents such a functional group.
Each of the functional groups consists of several components, such as switches, sensors, wires etc. A Coolant Temperature Sensor Circuit for example is made up of a sensor, a wiring harness, a control unit, and the software of the control unit.
Based on this structure, the first diagnostic step should be the identification and localisation of the defective electronic system, next comes the diagnosis of the corresponding defective functional group, and finally, locate and repair of the defective component within that group.

The Diagnostic System Check (described in table A, Diagnostic System Check) of this checking procedure follows that diagnostic path. Diagnosis of an electronic system according to the above described concept always starts with this Main Check.

The instructions described in the Diagnostic System Check section must be followed closely. Every time a test or test step is passed without fault, the Diagnostic System Check continues with the next step. Some of the tests include references to related functional groups (tables B-x). When there is a fault, the corresponding functional group tests are performed in order to detect the defective functional group. When that group has been identified, the troubleshooting tables (C-x) are used to locate the faulty component. After repair of the fault, the affected functional group (tables B-x) must be rechecked to continue after this test at the appropriate position of the Diagnostic System Check (table A).
When all test steps of the Diagnostic System Check have been completed successfully, the system is fully operational.

Safety Measures

Please take notice of any relevant safety measures for each work operation / step.

The safety measures can be found in the following area of TIS 2000:

- Service Information
- Standard Information
- Select: Model
- Select: Model year
- Select: One or more assembly groups
- Application: Warnings, disclaimers, safety

Electronic System Specific Information

- **Trouble Code Features**
  In a few cases, the diagnostic tester may display a trouble code status or description that looks unfamiliar. Trouble code status and trouble code description are concerned:

  Trouble Code Status:
  Instead of the known PRESENT, NOT PRESENT and INTERMITTENT message, you may read UNKNOWN in the tester display. This tells you that the diagnostic software or control unit contains a piece of incorrect information that is unknown to the diagnostic tester and that it is unable to read or evaluate. Both the trouble code number and the trouble code text are not changed in this case.

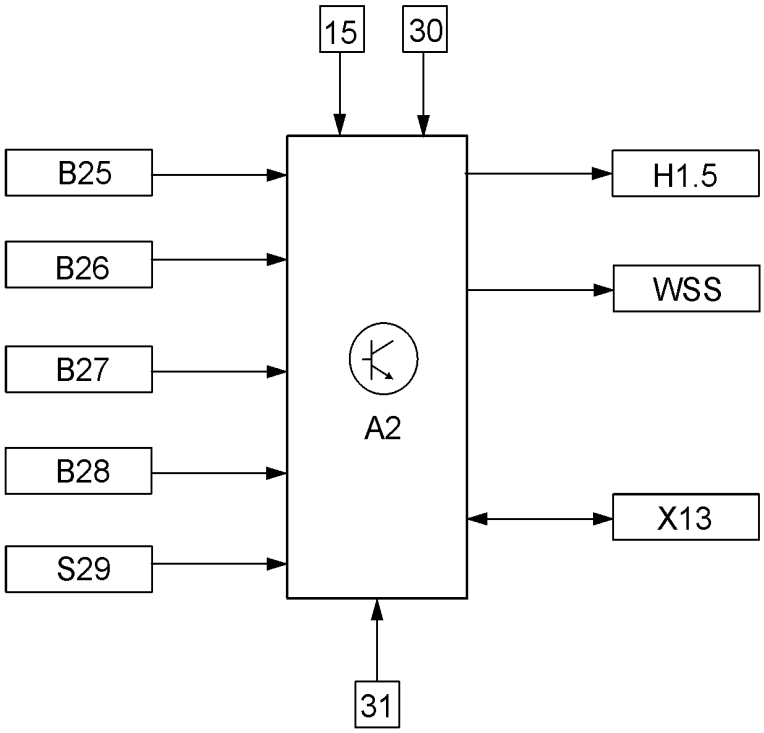
  Trouble Code Text:
  The diagnostic tester displays a trouble code number that is unknown to the diagnostic software, or the trouble code number and fault symptom do not lead to a plausible result when they are being diagnosed. In both cases, the diagnostic tester will display TROUBLE CODE NOT DEFINED.

  A combination of both above described messages is also possible. There are basically two reasons for this: the diagnostic program you are using is outdated, or there is a fault in the electronic control unit.

  All of the above mentioned special cases have one thing in common: The corresponding fault can not be removed by means of a diagnostic tester function.

Electronic System Picture Information

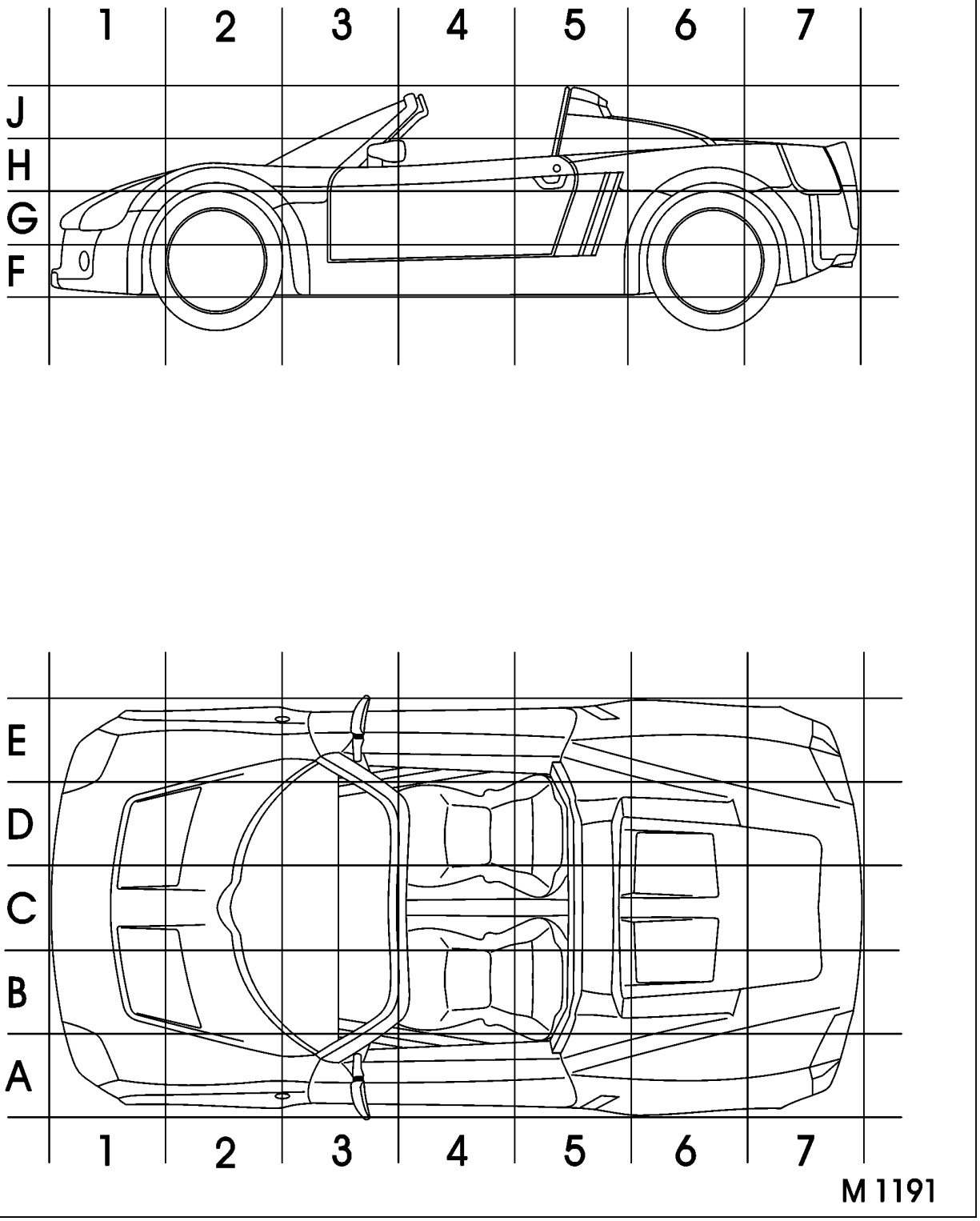
Block Diagram ('01-'02)



M 1001

Legend	Legend
30 System voltage (terminal 30)	B26 Sensor - Wheel Speed, Front Right
15 Ignition ON (terminal 15)	B27 Sensor - Wheel Speed, Rear Left
31 Ground (terminal 31)	B28 Sensor - Wheel Speed, Rear Right
X13 Diagnostic Link	H1.5 Telltale - Anti Lock Brake System
A2 Control Unit - Anti Lock Brake System	S29 Switch - Stop Lamp, Single
B25 Sensor - Wheel Speed, Front Left	WSS = Distance Signal

Parts Location



Component	LHD	RHD	Location
A1 Control Unit - Airbag	C3H	C3H	behind instrument panel
A2 Control Unit - Anti Lock Brake System	B2H	D2H	at ABS modulator
A4 Control Unit - Multec	D6H	D6H	at engine

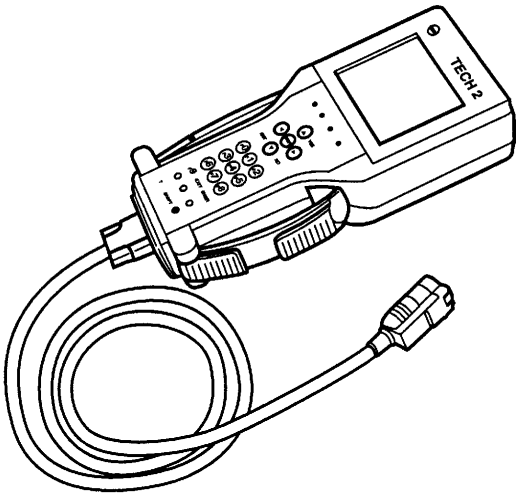
A5 Control Unit - Motronic	D6H	D6H	at engine
A13 Control Unit - Anti Theft Warning Unit	D3H	B3H	behind instrument panel above foot compartment, front passenger side
A17 Control Unit - Immobiliser	B3G	D3G	under steering-column covering
B25 Sensor - Wheel Speed, Front Left	A2F	A2F	wheel suspension, front left
B26 Sensor - Wheel Speed, Front Right	E2F	E2F	wheel suspension, front right
B27 Sensor - Wheel Speed, Rear Left	A6F	A6F	wheel suspension, rear left
B28 Sensor - Wheel Speed, Rear Right	E6F	E6F	wheel suspension, rear right
E3 Back Lamp Unit - Left	A7H	A7H	taillight, left
E4 Back Lamp Unit - Right	E7H	E7H	taillight, right
E24 Stop Lamp - Centre Position	C5J	C5J	car roof, rear
G1 Battery	D2G	B2G	Body, front
G2 Alternator	D6G	D6G	at engine
H1 Instrument	B3H	D3H	instrument panel
H1.1 Charging Indicator Lamp	B3H	D3H	in the instrument
H1.2 Telltale - Oil Pressure	B3H	D3H	in the instrument
H1.5 Telltale - Anti Lock Brake System	B3H	D3H	in the instrument
S1 Switch - Starter	B3H	D3H	steering-column covering
S29 Switch - Stop Lamp, Single	B2G	D2G	at clutch pedal
S43 Switch - Stop Lamp, Double	B2G	D2G	at clutch pedal
S31 Switch - Back up Lamp	B6G	B6G	at transmission
X13 Diagnostic Link	D3G	B3G	leg room, front passenger; near centre console

Rated Fuse Current of the Fused Jumper Wire

Wire gauge given in mm^2	Rated fuse current of the fused jumper wire given in A
0,5	5
0,75	7,5
1,0	10
1,5	15
2,5	25
4,0	30
6,0	30

Standard Diagnostic Checking Equipment

I



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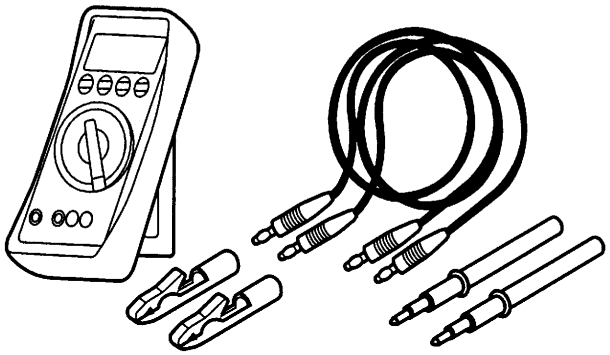

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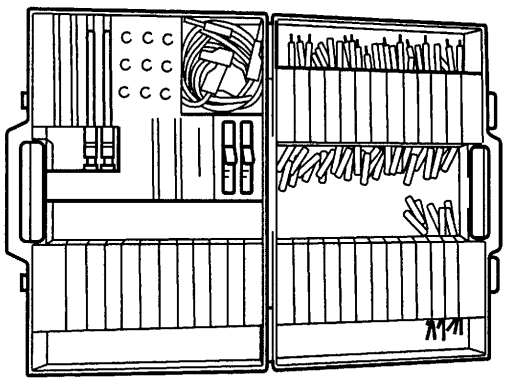
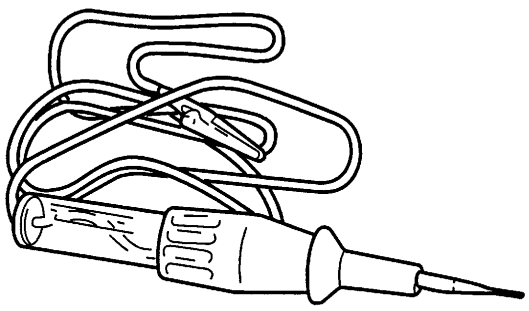


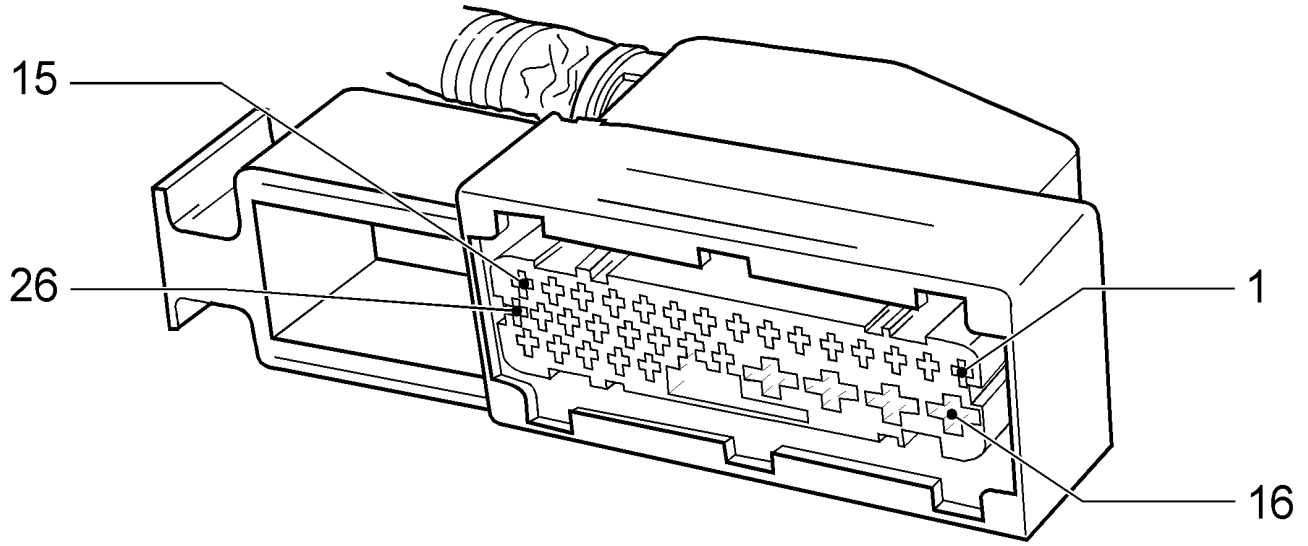
IV



G 2431

No.	Checking Equipment	No.	Checking Equipment
I	TECH 2 Basic Kit and Adapters	III	Electronic Kit I KM-609
II	Multimeter MKM-587-A or Multimeter MKM-874	IV	Test Lamp KM-J-34142-B or Test Lamp KM-601

Terminal Assignment Wiring Harness Plug A2

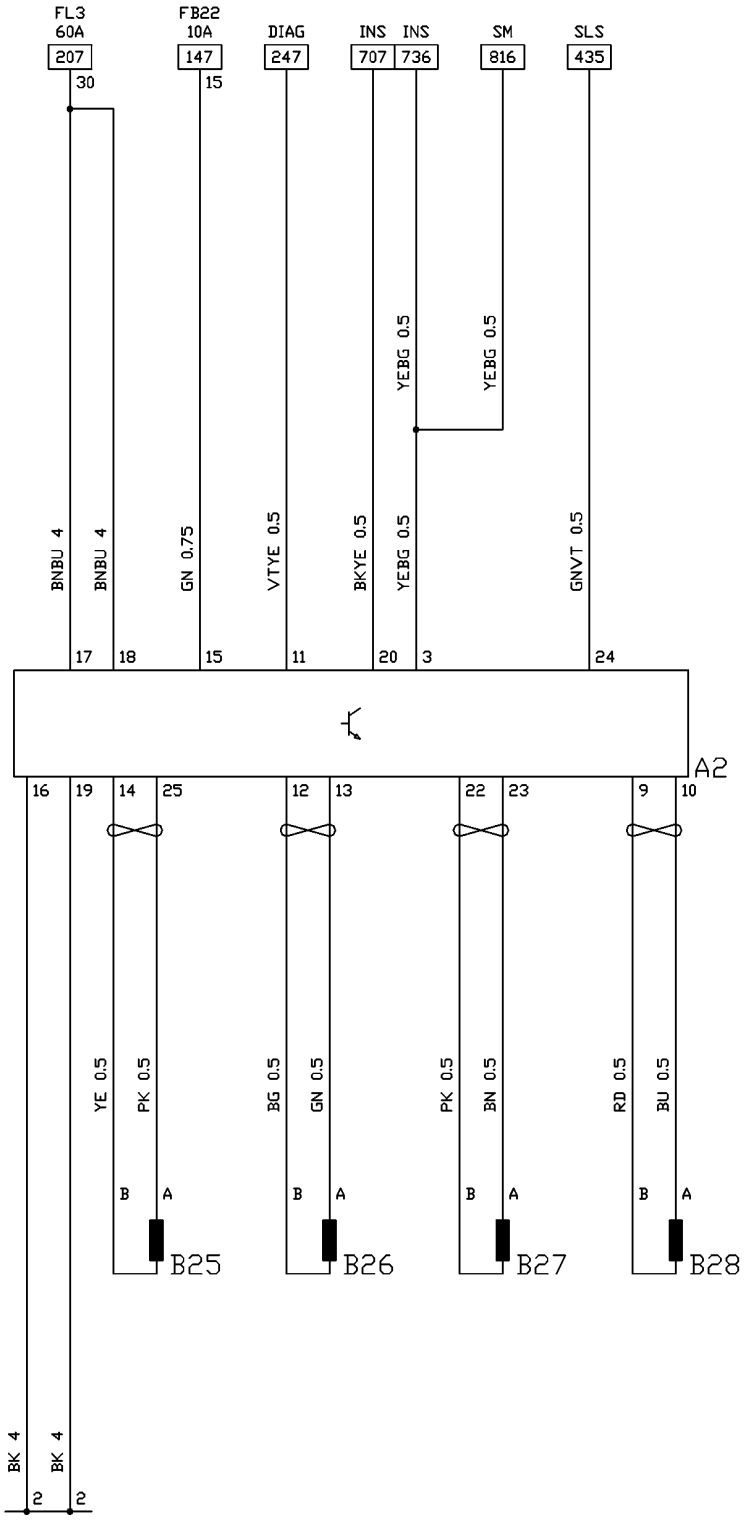


M 0765

No.	Legend	No.	Legend
3	Distance signal (Impulse from ABS)	17	30 System voltage (terminal 30)
9	B28 Sensor - Wheel Speed, Rear Right	18	30 System voltage (terminal 30)
10	B28 Sensor - Wheel Speed, Rear Right	19	Ground (terminal 31)
11	X13 Diagnostic Link	20	H1.5 Telltale - Anti Lock Brake System
12	B26 Sensor - Wheel Speed, Front Right	22	B27 Sensor - Wheel Speed, Rear Left

13	B26 Sensor - Wheel Speed, Front Right	23	B27 Sensor - Wheel Speed, Rear Left
14	B25 Sensor - Wheel Speed, Front Left	24	S29 Switch - Stop Lamp, Single
15	Switched system voltage Terminal 15	25	B25 Sensor - Wheel Speed, Front Left
16	Ground (terminal 31)		

Wiring Schematic Diagram 1 (Model Year ('01-'02))



M 1060

Legend	Legend
A2 Control Unit - Anti Lock Brake System	B28 Sensor - Wheel Speed, Rear Right
B25 Sensor - Wheel Speed, Front Left	FL3 Fuse
B26 Sensor - Wheel Speed, Front Right	FB22 Fuse
B27 Sensor - Wheel Speed, Rear Left	

Abbreviations:	
DIAG = Diagnostic Link	SLS Switch - Stop Lamp
INS = Instrument	SM = Control Unit Engine

A - Diagnostic System Check

T01 - Checking Procedure Validity

Work Order Description	Nominal Value
ABS 430 Anti-Lock Brake System This Checking Procedure is valid for the following vehicles: • Opel Speedster 2001, 2002, 2003 • Vauxhall VX220 2001, 2002, 2003 Production dependent vehicle modifications of other model years are not covered by this Checking Procedure. This might lead to improper diagnosis.	

Yes:T02

T02 - Customer Complaint Validation

Work Order Description	Nominal Value
• Record customer complaint for later use • Verify and validate the recorded customer complaint **Note:** Record the information by using the Protocol-Function of the TIS 2000 Checking Procedure Application.	Is the malfunction reproducible?

Yes:T03	No:T10

T03 - System Operation as Designed

Work Order Description	Nominal Value
• Check if the customer complaint is a normal system behaviour and if the customer operates the system properly.	System okay?

Note: Refer to the operating manual of the system / the vehicle	

Yes:T04	No:T05

T04 - Inform the Customer	
Work Order Description	**Nominal Value**
• Inform the customer, that the system behaviour is normal respectively how to operate the system correctly.	

Yes:	
T05 - Preliminary Diagnostic Check (Visual Inspection)	
Work Order Description	**Nominal Value**
Perform a visual check of all accessible components of the concerned system using the recorded customer complaint (this should take a maximum of 2 minutes) • All consumers turned off • Verify battery condition • Check the following fuses for proper operation: FL1, FL3, FB5, FB8, FB22 Fuse • Check if all ground connections are clean, tight and installed properly • Check if all connections and plugs of the concerned system are clean, tight / correctly installed and have no damages. • Check brake fluid tank for correct fluid level • Check the concerned system for leaks • Vehicle jacked-up so that the wheels can turn freely • Check the following component for proper operation: Wheel bearings • Check outer constant-velocity joints for function • Check tyre condition and size • Check brake system (except ABS-system) for function • After successful test/fault repair proceed to the next test step	

Note: The battery must not be disconnected at this point of the Diagnostic System Check, as the control units of the vehicle could otherwise lose stored diagnostic information. If the system operates correctly after replacing a defective fuse, the switched circuits, which are supplied by this fuse, should be checked for short circuit to ground.	
Yes:T06	
T06 - Connect Diagnostic Tester and Establish Communication	
Work Order Description	**Nominal Value**
Before connecting the diagnostic tester, observe the instructions of the diagnostic tester operators manual • Connect diagnostic tester, select concerned Electronic System, establish communication and verify, that the correct control unit is installed: Refer to Table B-03 Connect Diagnostic Tester and Establish Communication • After successful test/fault repair proceed to the next test step	
Yes:T07	
T07 - Diagnostic Trouble Codes	
Work Order Description	**Nominal Value**
Important: Trouble codes are only a reference on faults in a subgroup of the system. Trouble codes are not a direct reference on a defective component. • Read and record diagnostic trouble codes including status • Delete trouble codes • The trouble code status PRESENT only exists under certain conditions. • Operate the system in different operating conditions until the trouble code is PRESENT.	

• If a trouble code with status present is stored: Refer to Table B-01 DIAGNOSTIC TROUBLE CODE • After successful test/fault repair proceed to the next test step **Note:** If a trouble code is set, check for newest Technical Information TI regarding the trouble code before proceeding with the diagnostic procedure.	
Yes:T08	
T08 - System Quick Check	
Work Order Description	**Nominal Value**
• Perform the following quick checks: Refer to Table B-02 DATA LIST Refer to Table B-05 ACTUATOR TEST • After successful test/fault repair proceed to the next test step	
Yes:T09	
Yes:	
T09 - System / Function End Test	
Work Order Description	**Nominal Value**
• Check if the customer complaint is repaired and the concerned system is fully operational. • **Note:** Drive the vehicle in different driving conditions (engine speed and engine load conditions) over a considerable distance. Pay attention to unusual noise and other system irregularities. • Turn ignition OFF and ON • Delete trouble codes **Note:** Read the trouble codes again after the test drive and check for symptoms / customer complaints. If a complaint still exists, restart the diagnostic session for a second time. If the problem can not	

be solved in the second diagnostic session, contact the local support centre.	

T10 - Intermittent System Operation

Work Order Description	Nominal Value
Most intermittent problems are caused by faulty electrical connectors, faulty ground connections, broken wiring, temperature problems or radio interference. Intermittent faults can be traced either by using INTERMITTENT/NOT PRESENT trouble codes or the snapshot function of the diagnostic tester in combination with the following tests: • Perform the following evaluation: Refer to Table B-04 Check: Intermittent Faults • After successful test/fault repair proceed to the next test step	

Yes:T09

B-01 - DIAGNOSTIC TROUBLE CODE

C0035 - Front Left Wheel Speed Sensor Incorrect Signal

- Vehicle speed is greater than 6 km/h (4 mph)
- Incorrect signal from speed sensor
- Above condition must be fulfilled for at least 0.015 s .

Effect:

- The ABS function is locked.
- The system telltale is switched on.

Concerned Terminals:
14, 25

Refer to test step :C-04

C0035 - Front Left Wheel Speed Sensor No Signal

- Incorrect signal from speed sensor
- ABS control not active
- Above condition must be fulfilled for at least 3 s .

Effect:

- The ABS function is locked.
- The system telltale is switched on.

Concerned Terminals:
14, 25

Refer to test step :C-04

C0035 - Front Left Wheel Speed Sensor Short Circuit or Circuit Open

- Short circuit in wiring harness or short circuit to ground in circuit to the control unit.
- Above condition must be fulfilled for at least 0.7 s .

or

- Interruption in circuit to control unit terminal 14, 25
- Above condition must be fulfilled for at least 0.2 s .

Effect:

- The ABS function is locked.
- The system telltale is switched on.

Concerned Terminals:
14, 25

Refer to test step :C-04

C0040 - Front Right Wheel Speed Sensor Incorrect Signal

- Vehicle speed is greater than 6 km/h (4 mph)
- Incorrect signal from speed sensor
- Above condition must be fulfilled for at least 0.015 s .

Effect:

- The ABS function is locked.
- The system telltale is switched on.

Concerned Terminals:
12, 13

Refer to test step :C-05

C0040 - Front Right Wheel Speed Sensor No Signal

- Incorrect signal from speed sensor
- ABS control not active
- Above condition must be fulfilled for at least 3 s .

Effect:

- The ABS function is locked.
- The system telltale is switched on.

Concerned Terminals:
12, 13

Refer to test step :C-05

C0040 - Front Right Wheel Speed Sensor Short Circuit or Circuit Open

- Short circuit in wiring harness or short circuit to ground in circuit to the control unit.
- Above condition must be fulfilled for at least 0.7 s .

or

- Interruption in circuit to control unit terminal 12, 13
- Above condition must be fulfilled for at least 0.2 s .

Effect:

- The ABS function is locked.
- The system telltale is switched on.

Concerned Terminals:
12, 13

Refer to test step :C-05

C0045 - Rear Left Wheel Speed Sensor Incorrect Signal

- Vehicle speed is greater than 6 km/h (4 mph)
- Incorrect signal from speed sensor
- Above condition must be fulfilled for at least 0.015 s .

Effect:

- The ABS function is locked.
- The system telltale is switched on.

Concerned Terminals:
22, 23

Refer to test step :C-06

C0045 - Rear Left Wheel Speed Sensor No Signal

- Incorrect signal from speed sensor
- ABS control not active
- Above condition must be fulfilled for at least 3 s .

Effect:

- The ABS function is locked.
- The system telltale is switched on.

Concerned Terminals:
22, 23

Refer to test step :C-06

C0045 - Rear Left Wheel Speed Sensor Short Circuit or Circuit Open

- Short circuit in wiring harness or short circuit to ground in circuit to the control unit.
- Above condition must be fulfilled for at least 0.7 s .

or

- Interruption in circuit to control unit terminal 22, 23
- Above condition must be fulfilled for at least 0.2 s .

Effect:

- The ABS function is locked.
- The system telltale is switched on.

Concerned Terminals:
22, 23

Refer to test step :C-06

C0050 - Rear Right Wheel Speed Sensor Incorrect Signal

- Vehicle speed is greater than 6 km/h (4 mph)
- Incorrect signal from speed sensor
- Above condition must be fulfilled for at least 0.015 s .

Effect:

- The ABS function is locked.
- The system telltale is switched on.

Concerned Terminals:
9, 10

Refer to test step :C-07

C0050 - Rear Right Wheel Speed Sensor No Signal

- Incorrect signal from speed sensor
- ABS control not active
- Above condition must be fulfilled for at least 3 s .

Effect:

- The ABS function is locked.
- The system telltale is switched on.

Concerned Terminals:
9, 10

Refer to test step :C-07

C0050 - Rear Right Wheel Speed Sensor Short Circuit or Circuit Open

- Short circuit in wiring harness or short circuit to ground in circuit to the control unit.
- Above condition must be fulfilled for at least 0.7 s .

or

- Interruption in circuit to control unit terminal 9, 10
- Above condition must be fulfilled for at least 0.2 s .

Effect:

- The ABS function is locked.
- The system telltale is switched on.

Concerned Terminals:
9, 10

Refer to test step :C-07

C0060 - Front Left Outlet Solenoid Valve Circuit Malfunction

- Ignition ON for longer than 4 s
- ABS control not active
- Voltage valve feedback is evaluated and indicates an implausible value (Valve circuit or driver output malfunction)
- Above conditions must be fulfilled for at least 0.030 s .

Effect:

- The ABS function is locked.
- The system telltale is switched on.

Concerned Terminals:
-

Refer to test step :C-12

C0065 - Front Left Inlet Solenoid Valve Circuit Malfunction

- Ignition ON for longer than 4 s
- ABS control not active
- Voltage valve feedback is evaluated and indicates an implausible value (Valve circuit or driver output malfunction)
- Above conditions must be fulfilled for at least 0.030 s .

Effect:

- The ABS function is locked.
- The system telltale is switched on.

Concerned Terminals:
-

Refer to test step :C-12

C0070 - Front Right Outlet Solenoid Valve Circuit Malfunction

- Ignition ON for longer than 4 s
- ABS control not active

- Voltage valve feedback is evaluated and indicates an implausible value (Valve circuit or driver output malfunction)
- Above conditions must be fulfilled for at least 0.030 s .

Effect:

- The ABS function is locked.
- The system telltale is switched on.

Concerned Terminals:
-

Refer to test step :C-12

C0075 - Front Right Inlet Solenoid Valve Circuit Malfunction

- Ignition ON for longer than 4 s
- ABS control not active
- Voltage valve feedback is evaluated and indicates an implausible value (Valve circuit or driver output malfunction)
- Above conditions must be fulfilled for at least 0.030 s .

Effect:

- The ABS function is locked.
- The system telltale is switched on.

Concerned Terminals:
-

Refer to test step :C-12

C0080 - Rear Left Outlet Solenoid Valve Circuit Malfunction

- Ignition ON for longer than 4 s
- ABS control not active
- Voltage valve feedback is evaluated and indicates an implausible value (Valve circuit or driver output malfunction)
- Above conditions must be fulfilled for at least 0.030 s .

Effect:

- The ABS function is locked.
- The system telltale is switched on.

Concerned Terminals:
-

Refer to test step :C-12

C0085 - Rear Left Inlet Solenoid Valve Circuit Malfunction

- Ignition ON for longer than 4 s
- ABS control not active
- Voltage valve feedback is evaluated and indicates an implausible value (Valve circuit or driver output malfunction)

- Above conditions must be fulfilled for at least 0.030 s .

Effect:

- The ABS function is locked.
- The system telltale is switched on.

Concerned Terminals:
-

Refer to test step :C-12

C0090 - Rear Right Outlet Solenoid Valve Circuit Malfunction

- Ignition ON for longer than 4 s
- ABS control not active
- Voltage valve feedback is evaluated and indicates an implausible value (Valve circuit or driver output malfunction)
- Above conditions must be fulfilled for at least 0.030 s .

Effect:

- The ABS function is locked.
- The system telltale is switched on.

Concerned Terminals:
-

Refer to test step :C-12

C0095 - Rear Right Inlet Solenoid Valve Circuit Malfunction

- Ignition ON for longer than 4 s
- ABS control not active
- Voltage valve feedback is evaluated and indicates an implausible value (Valve circuit or driver output malfunction)
- Above conditions must be fulfilled for at least 0.030 s .

Effect:

- The ABS function is locked.
- The system telltale is switched on.

Concerned Terminals:
-

Refer to test step :C-12

C0110 - Return Pump Circuit Open Or Shorted

- Return pump voltage feedback is evaluated and indicates an implausible value

Effect:

- The ABS function is locked.

- The system telltale is switched on.

Concerned Terminals:
16,17

Refer to test step :C-10

Refer to test step :C-10

C0110 - Return Pump Locked Or Shorted

- Vehicle speed is greater than 5 km/h (3 mph)
- Return pump voltage feedback is evaluated and indicates an implausible value
  (Return pump motor locked)

Effect:

- The ABS function is locked.
- The system telltale is switched on.

Concerned Terminals:
16,17

C0121 - Valve Relay Circuit Malfunction

- Voltage valve feedback is evaluated and indicates an implausible value (Valve circuit or driver output malfunction)

Effect:

- The ABS function is locked.
- The system telltale is switched on.

Concerned Terminals:
18, 19

Refer to test step :C-09

C0161 - Brake Light Switch Fault

- Vehicle speed is greater than 24 km/h (15 mph)
- Brake switch (stop light) indicates continuously brake application since ignition ON

or

- ABS activation on all four wheels without brake switch indication
- Above condition must be fulfilled for at least 1 s .

Effect:

- The system function is not affected.

Concerned Terminals:
24

Refer to test step :C-11

C0232 - Brake System Telltale Voltage High Or Open Circuit

- Short to voltage or interruption in circuit to control unit terminal 20
- Above condition must be fulfilled for at least 0.175 s .

Effect:

- The ABS function is locked.

Concerned Terminals:
20

Refer to test step :C-13

C0232 - Brake System Telltale Voltage Low

- Short to ground in circuit to control unit terminal 20
- Above condition must be fulfilled for at least 0.175 s .

Effect:

- The ABS function is locked.

Concerned Terminals:
20

Refer to test step :C-13

C0245 - Wheel Speed Error

- The fault will be stored if the averaged speed of one wheel is at least 25 % above the speed of the other wheels for longer then 12 s .
- Vehicle speed is greater than 8 km/h (5 mph)
- ABS control not active

Effect:

- The ABS function is locked.
- The system telltale is switched on.

Note:

The trouble code may also be recognised if the brake is mechanically defective.

Concerned Terminals:
9, 10, 12, 13, 14, 22, 23, 25

Refer to test step :C-08

C0245 - Wheel Speed Sensor Erratic Signal

- Vehicle speed is greater than 6 km/h (4 mph)
- Wheel speed signal is monitored for implausible acceleration
- Above conditions must be fulfilled for at least 0.15 s .

Effect:

- The ABS function is locked.
- The system telltale is switched on.

Concerned Terminals:
9, 10, 12, 13, 14, 22, 23, 25

Refer to test step :C-08

C0252 - Replace Electronic Control Unit (ECU)

- Control unit hardware failure
- Vehicle speed is greater than 16 km/h (10 mph)
- Above conditions must be fulfilled for at least 0.2 s .

Effect:

- The ABS function is locked.
- The system telltale is switched on.

Concerned Terminals:
-

Refer to test step :C-02

C0550 - Brake System Or Electronic Control Unit (ECU) Malfunction

- Feedback signals of valves are evaluated and indicate implausible values.
- Above condition must be fulfilled for at least 60 s .

Effect:

- The ABS function is locked.
- The system telltale is switched on.

Note:

The trouble code may also be recognised if the brake is mechanically defective.

Concerned Terminals:
-

Refer to test step :C-12

C0550 - Replace Electronic Control Unit (ECU)

- Control unit hardware failure
- The fault is stored directly on recognition.

Effect:

- The ABS function is locked.
- The system telltale is switched on.

Concerned Terminals:

-

Refer to test step :C-02

C0556 - Replace Electronic Control Unit (ECU)

- Control unit hardware failure
- The fault is stored directly on recognition.

Effect:

- The ABS function is locked.
- The system telltale is switched on.

Concerned Terminals:

-

Refer to test step :C-02

C0561 - Replace Electronic Control Unit (ECU)

- Control unit hardware failure (checksum fault, RAM defective)
- The fault is stored directly on recognition.

Effect:

- The ABS function is locked.
- The system telltale is switched on.

Concerned Terminals:

-

Refer to test step :C-02

C0563 - Replace Electronic Control Unit (ECU)

- Control unit hardware failure (RAM defective)
- The fault is stored directly on recognition.

Effect:

- The ABS function is locked.
- The system telltale is switched on.

Concerned Terminals:

-

Refer to test step :C-02

C0564 - Replace Electronic Control Unit (ECU)

- Control unit hardware failure (RAM defective)
- The fault is stored directly on recognition.

Effect:

- The ABS function is locked.
- The system telltale is switched on.

Concerned Terminals:
-

Refer to test step :C-02

C0800 - Switched Battery Voltage High (Valve Relay)

- The voltage at the control unit input (terminal 15) is greater than 17 V .
- Above condition must be fulfilled for at least 0.5 s .
- Vehicle speed is greater than 6 km/h (4 mph)

Effect:

- The ABS function is locked.
- The system telltale is switched on.

Concerned Terminals:
15, 19

Refer to test step :C-03

Refer to test step :C-03

C0800 - Switched Battery Voltage Low (Valve Relay)

- The voltage at the control unit input (terminal 15) is less than 9.5 V .
- Above conditions must be fulfilled for at least 0.5 s .
- Vehicle speed is greater than 6 km/h (4 mph)

or

- The voltage at the control unit input (terminal 15) is less than 9.0 V .
- Above condition must be fulfilled for at least 0.5 s .

Effect:

- The ABS function is locked.
- The system telltale is switched on.

Concerned Terminals:
15, 19

B-02 - DATA LIST

T01 - Tester Display FL Wheel Speed (Front Left)

Work Order Description	Nominal Value
• Ignition ON • Engine OFF • Vehicle jacked-up and corresponding wheel slowly turned by hand	greater than 1 km/h greater than 1 mph
• Vehicle travelling (constant speed, approximately 30 km/h (19 mph))	30 km/h 19 mph

Concerned Terminals: 14, 25	
Yes:T02	**No:C-04**

T02 - Tester Display FR Wheel Speed (Front Right)

Work Order Description	**Nominal Value**
• Ignition ON • Engine OFF • Vehicle jacked-up and corresponding wheel slowly turned by hand	greater than 1 km/h greater than 1 mph
• Vehicle travelling (constant speed, approximately 30 km/h (19 mph))	30 km/h 19 mph
Concerned Terminals: 12, 13	
Yes:T03	**No:C-05**

T03 - Tester Display RL Wheel Speed (Rear Left)

Work Order Description	**Nominal Value**
• Ignition ON • Engine OFF • Vehicle jacked-up and corresponding wheel slowly turned by hand	greater than 1 km/h greater than 1 mph
• Vehicle travelling (constant speed, approximately 30 km/h (19 mph))	30 km/h 19 mph
Concerned Terminals: 22, 23	
Yes:T04	**No:C-06**

T04 - Tester Display RR Wheel Speed (Rear Right)

Work Order Description	**Nominal Value**
• Ignition ON • Engine OFF • Vehicle jacked-up and corresponding wheel slowly turned by hand	greater than 1 km/h greater than 1 mph
• Vehicle travelling (constant speed, approximately 30 km/h (19 mph))	30 km/h 19 mph
Concerned Terminals: 9, 10	
Yes:T05	**No:C-07**

T05 - Tester Display Valve Relay Command	
Work Order Description	**Nominal Value**
• Ignition ON • Engine OFF • All consumers turned off	Active
Concerned Terminals: 18, 19	
Yes:T06	**No:C-09**

T06 - Tester Display Valve Relay Feedback	
Work Order Description	**Nominal Value**
• Ignition ON • Engine OFF • All consumers turned off	Active
Concerned Terminals: 18, 19	
Yes:T07	**No:C-09**

T07 - Tester Display Switched Battery Voltage (Valve Relay)	
Work Order Description	**Nominal Value**
• Ignition ON • Engine OFF • All consumers turned off **Note:** The value of the "Switched Power Supply" (Terminal 30) is determined at an internal relay in the control unit.	11 ... 13 V
Concerned Terminals: 18, 19	
Yes:T08	**No:C-09**

T08 - Tester Display Return Pump Command	
Work Order Description	**Nominal Value**
• Ignition ON • Engine OFF • All consumers turned off	Inactive 12V
Concerned Terminals:	

16,17	
Yes:T09	**No:C-10**

T09 - Tester Display Return Pump Feedback

Work Order Description	**Nominal Value**
• Ignition ON • Engine OFF • All consumers turned off	Inactive 12V
Concerned Terminals: 16,17	
Yes:T10	**No:C-10**

T10 - Tester Display Brake Light Switch

Work Order Description	**Nominal Value**
• Ignition ON • Engine OFF • All consumers turned off	Inactive 0V
• Brake pedal actuated	Active 12V
Concerned Terminals: 24	
Yes:T11	**No:C-11**

T11 - Tester Display FL ABS Valves Command (Front Left)

Work Order Description	**Nominal Value**
• Ignition ON • Engine OFF • All consumers turned off	Normal Braking
Concerned Terminals: -	
Yes:T12	**No:C-12**

T12 - Tester Display FL ABS Valves Feedback (Front Left)

Work Order Description	**Nominal Value**
• Ignition ON • Engine OFF • All consumers turned off	Normal Braking
Concerned Terminals: -	
Yes:T13	**No:C-12**

T13 - Tester Display FR ABS Valves Command (Front Right)	
Work Order Description	**Nominal Value**
• Ignition ON • Engine OFF • All consumers turned off	Normal Braking
Concerned Terminals: -	
Yes:T14	**No:C-12**

T14 - Tester Display FR ABS Valves Feedback (Front Right)	
Work Order Description	**Nominal Value**
• Ignition ON • Engine OFF • All consumers turned off	Normal Braking
Concerned Terminals: -	
Yes:T15	**No:C-12**

T15 - Tester Display RL ABS Valves Command (Rear Left)	
Work Order Description	**Nominal Value**
• Ignition ON • Engine OFF • All consumers turned off	Normal Braking
Concerned Terminals: -	
Yes:T16	**No:C-12**

T16 - Tester Display RL ABS Valves Feedback (Rear Left)	
Work Order Description	**Nominal Value**
• Ignition ON • Engine OFF • All consumers turned off	Normal Braking
Concerned Terminals: -	
Yes:T17	**No:C-12**

T17 - Tester Display RR ABS Valves Command (Rear Right)	
Work Order Description	**Nominal Value**
• Ignition ON	Normal Braking

• Engine OFF • All consumers turned off	
Concerned Terminals: -	

Yes:T18	No:C-12

T18 - Tester Display RR ABS Valves Feedback (Rear Right)

Work Order Description	Nominal Value
• Ignition ON • Engine OFF • All consumers turned off	Normal Braking
Concerned Terminals: -	

Yes:T19	No:C-12

T19 - Tester Display Brake System Telltale

Work Order Description	Nominal Value
• Ignition ON • Engine OFF • All consumers turned off	On 0V
Concerned Terminals: 20	

No:C-13

B-03 - Connect Diagnostic Tester and Establish Communication

T01 - Connect Diagnostic Tester and Establish Communication

Work Order Description	Nominal Value
Before connecting the diagnostic tester, observe the instructions of the diagnostic tester operators manual Connect diagnostic tester: • Ignition OFF • Connect the diagnostic tester with the required adapter to the diagnostic link • Ignition ON Select concerned electronic system and establish communication:	Communication established and selected system recognised?

• Select diagnostics • Select model year: 2002 **(2002)**2001 **(2001)**2003 **(2003)** Select model: Speedster/VX220 • Select electronic system group: Electronic chassis system • Select electronic system or engine: ABS 430 Anti-Lock Brake System • Diagnostic tester now establishes communication with the selected Electronic System.	

Yes:	No:T02

T02 - Check: Fault Location

Work Order Description	Nominal Value
• Communication with control unit is interrupted • Does one of the following messages appear on the Diagnostic Tester display? Selected System Existing ECU Mismatch! or Mismatch between selected engine and existing engine ECU! or Unknown ECU!	

Yes:T03	No:T06

T03 - Check: Programming

Work Order Description	Nominal Value
• Is the used diagnostic tester software up to date? **Note:** Refer to information about the current software version in the menu point - TIS 2000 News	

Yes:T04	No:T05

T04 - Control Unit Information

Work Order Description	Nominal Value
• Replace the following component: A2 Control Unit - Anti Lock Brake System	

Yes:T01

T05 - Program Software

Work Order Description	Nominal Value
• Program Software: Download the latest version of diagnostic software into the diagnostic tester.	

Yes:T01

T06 - Communication Establishment

Work Order Description	Nominal Value
• Perform the following test step: Refer to Table C-01 No Communication between Diagnostic Tester and Control Unit • After successful test/fault repair proceed to the next test step	

Yes:T01

Yes:

B-04 - Check: Intermittent Faults

T01 - Intermittent System Operation

Work Order Description	Nominal Value
Check Additional Information • Check the newest Technical Information TI for tips regarding the appeared intermittent problems before proceeding with the diagnostic procedure. Preliminary diagnostic check (visual inspection) • Check all sensors, actuators and the wiring harness of the system for corrosion and damages. • Check all ground connections of the system for corrosion and damages • Check all connectors of the system for corrosion and for damaged terminals. • Check if the fault was recognised in an area of strong electromagnetic sources e.g. near radio stations Diagnostic Trouble Codes • Read and record trouble codes	

- Check for trouble codes with status INTERMITTENT or NOT PRESENT. If a trouble code is stored this may indicate the circuit which has the intermittent condition. INTERMITTENT and NOT PRESENT trouble codes are leading to an intermittent problem. This trouble codes refer to a related functional group. To find the defective component the following test steps may be helpful.
- Use the following table to obtain the concerned functional group and perform the following additional test steps, while performing the troubleshooting in the C-x tables.
  Refer to Table B-01 DIAGNOSTIC TROUBLE CODE
  Move the related connectors, wiring harness and components in order to find the failure. Switch on all electric consumers by turns, because this can cause an electromagnetic interference in a circuit. Use the TECH 31 or an oscilloscope to observe the wiring harness for disturbances. Operate the system under different conditions over a considerable time.

Snapshot function of the Diagnostic tester and TIS 2000

- Select the snapshot function of the Diagnostic Tester. Set the Diagnostic Tester to trigger on ANY CODE /CENTER and try to recreate the conditions that may cause the intermittent trouble code to be set (use the customer complaint information). Use the Diagnostic tester or TIS 2000 application to analyse the related datalist parameters.
  The disturbances in the signal can be observed at the trigger point where the trouble code is set.
  Use the following table to obtain the concerned functional group and perform the following additional test steps, while performing the troubleshooting in the C-x

tables. Refer to Table B-01 DIAGNOSTIC TROUBLE CODE Refer to Table B-02 DATA LIST Move the related connectors, wiring harness and components in order to find the failure. Switch on all electric consumers by turns, because this can cause an electromagnetic interference in a circuit. Use the TECH 31 or an oscilloscope to observe the wiring harness for disturbances. Operate the system under different conditions over a considerable time. After successful test/fault repair proceed to the next test step	

B-05 - ACTUATOR TEST

T01 - Tester Display Valve Relay Test

Work Order Description	Nominal Value
• Ignition ON • Engine OFF • Press corresponding key in the system main menu to call up Actuator-Test functions, select the desired test and confirm with ENTER . Follow the instructions in the diagnostic tester display.	Clicking noise from the relay
Concerned Terminals: 18, 19	

Yes:T02	No:C-09

T02 - Tester Display Return Pump Test

Work Order Description	Nominal Value
• Ignition ON • Engine OFF • Press corresponding key in the system main menu to call up Actuator-Test functions, select the desired test and confirm with ENTER . Follow the instructions in the diagnostic tester display. **Note:**	Return pump operating

After the relay is energised the return pump must operate for approximately 5 s .	
Concerned Terminals: 16,17	

Yes:T03	No:C-10

T03 - Tester Display Front Left Solenoid Valve Test

Work Order Description	Nominal Value
• Secure vehicle so that it cannot roll off. • Vehicle jacked-up so that the wheels can turn freely • Parking brake released • Selector lever in position N • Ignition ON • Press corresponding key in the system main menu to call up Actuator-Test functions, select the desired test and confirm with ENTER . Follow the instructions in the diagnostic tester display. **Note:** During the last check in this actuator test (PRESSURE RELEASE function) - after the check of the return pump - a display inquires whether the wheel being checked can be turned. Compared to previous requests in the actuator test, the wheel can only be turned at this point with more force than in previous checks. However, the wheel should in no case lock.	Test okay?
Concerned Terminals: -	

Yes:T04	No:C-12

T04 - Tester Display Front Right Solenoid Valve Test

Work Order Description	Nominal Value
• Secure vehicle so that it cannot roll off. • Vehicle jacked-up so that the wheels can turn freely • Parking brake released • Selector lever in position N • Ignition ON	Test okay?

• Press corresponding key in the system main menu to call up Actuator-Test functions, select the desired test and confirm with ENTER . Follow the instructions in the diagnostic tester display. **Note:** During the last check in this actuator test (PRESSURE RELEASE function) - after the check of the return pump - a display inquires whether the wheel being checked can be turned. Compared to previous requests in the actuator test, the wheel can only be turned at this point with more force than in previous checks. However, the wheel should in no case lock.	
Concerned Terminals: -	

Yes:T05	No:C-12

T05 - Tester Display Rear Left Solenoid Valve Test

Work Order Description	Nominal Value
• Secure vehicle so that it cannot roll off. • Vehicle jacked-up so that the wheels can turn freely • Parking brake released • Selector lever in position N • Ignition ON • Press corresponding key in the system main menu to call up Actuator-Test functions, select the desired test and confirm with ENTER . Follow the instructions in the diagnostic tester display. **Note:** During the last check in this actuator test (PRESSURE RELEASE function) - after the check of the return pump - a display inquires whether the wheel being checked can be turned. Compared to previous requests in the actuator test, the wheel can only be turned at this point with more force than in previous checks. However, the wheel should in no case lock.	Test okay?

Concerned Terminals: -	
Yes:T06	**No:C-12**

T06 - Tester Display Rear Right Solenoid Valve Test

Work Order Description	**Nominal Value**
• Secure vehicle so that it cannot roll off. • Vehicle jacked-up so that the wheels can turn freely • Parking brake released • Selector lever in position N • Ignition ON • Press corresponding key in the system main menu to call up Actuator-Test functions, select the desired test and confirm with ENTER . Follow the instructions in the diagnostic tester display. **Note:** During the last check in this actuator test (PRESSURE RELEASE function) - after the check of the return pump - a display inquires whether the wheel being checked can be turned. Compared to previous requests in the actuator test, the wheel can only be turned at this point with more force than in previous checks. However, the wheel should in no case lock.	Test okay?
Concerned Terminals: -	
Yes:T07	**No:C-12**

T07 - Tester Display Telltale Test

Work Order Description	**Nominal Value**
• Ignition ON • Engine OFF • Selector lever in position N • Press corresponding key in the system main menu to call up Actuator-Test functions, select the desired test and confirm with ENTER . Follow the instructions in the diagnostic tester display.	

• Press soft key ON	ABS telltale ON
• Press soft key OFF	ABS telltale OFF
Concerned Terminals: 20	

No:C-13

C-01 - No Communication between Diagnostic Tester and Control Unit

T01 - Check: Component

Work Order Description	Nominal Value
• Ignition OFF • All consumers turned off • Measure voltage between the following terminals: G1 Battery Terminal 30 & Ground	greater than 11 V

Yes:T02	No:E23

T02 - Check: Short to Ground/Interruption of Voltage Supply Circuit

Work Order Description	Nominal Value
• Disconnect wiring harness connector from: Diagnostic tester • Measure voltage between the following terminals: X13 Diagnostic Link Wiring harness connector (wiring harness side) terminal 16 & Ground	greater than 11 V

Yes:T03	No:T20

T03 - Check: Circuit Interruption of Ground Circuit

Work Order Description	Nominal Value
• Measure voltage between the following terminals: X13 Diagnostic Link Wiring harness connector (wiring harness side) terminal 16 & X13 Diagnostic Link	greater than 11 V

Wiring harness connector (wiring harness side) terminal 4,5	

Yes:T04	No:E18

T04 - Check: Component

Work Order Description	Nominal Value
• Check the following component for proper operation: Diagnostic tester	Test okay?

Yes:T05	No:E17

T05 - Check: Short to Voltage/Ground/Interruption of Voltage Supply

Work Order Description	Nominal Value
• Ignition OFF • Disconnect wiring harness connector from: A2 Control Unit - Anti Lock Brake System • Ignition ON • Measure voltage between the following terminals: A2 Control Unit - Anti Lock Brake System Wiring harness connector (wiring harness side) terminal 15 & Ground	greater than 11 V

Yes:T06	No:T11

T06 - Check: Circuit Interruption of Ground Circuit

Work Order Description	Nominal Value
• Measure voltage between the following terminals: A2 Control Unit - Anti Lock Brake System Wiring harness connector (wiring harness side) terminal 15 & A2 Control Unit - Anti Lock Brake System Wiring harness connector (wiring harness side) terminal 16, 19	greater than 11 V

Yes:T07	No:E06

T07 - Check: Short to Voltage/Ground/Interruption of Signal Circuit

Work Order Description	Nominal Value
Important:	Communication established?

• Before working on the pyrotechnical system: Ignition off Disconnect and mask battery negative terminal Wait 1 min until the capacitor in the control unit has discharged. • Disconnect wiring harness connector from: A1 Control Unit - Airbag • Connect wiring harness connector to: A2 Control Unit - Anti Lock Brake System • Connect battery negative terminal • Connect diagnostic tester to the diagnostic link • Ignition ON • Establish communication with following control unit: A2 Control Unit - Anti Lock Brake System **Note:** To avoid a Power Sounder activation, disconnect ground cable from battery within 15s after switching off ignition.	

Yes:E01	No:T08

T08 - Check: Short to Voltage of Signal Circuit

Work Order Description	Nominal Value
• Ignition OFF • Disconnect wiring harness connector from: A2 Control Unit - Anti Lock Brake System • Disconnect wiring harness connector from: Diagnostic tester • Measure voltage between the following terminals: X13 Diagnostic Link Wiring harness connector (wiring harness side) terminal 12 & Ground	less than 0.3 V

Yes:T09	No:E05

T09 - Check: Short to Ground of Signal Circuit

Work Order Description	Nominal Value
• Measure resistance between the following	greater than 500 kOhm

terminals: A2 Control Unit - Anti Lock Brake System Wiring harness connector (wiring harness side) terminal 11 & Ground	

Yes:T10	No:E04

T10 - Check: Interruption of Signal Circuit

Work Order Description	Nominal Value
• Measure resistance between the following terminals: X13 Diagnostic Link Wiring harness connector (wiring harness side) terminal 12 & A2 Control Unit - Anti Lock Brake System Wiring harness connector (wiring harness side) terminal 11	less than 0.3 Ohm

Yes:E02	No:E03

T11 - Check: Short to Voltage/Ground/Interruption of Voltage Supply

Work Order Description	Nominal Value
• Remove electrical component from socket: FB22 Fuse • Check the following component for proper operation: FB22 Fuse	Test okay?

Yes:T12	No:T19

T12 - Check: Short to Voltage/Ground/Interruption of Voltage Supply

Work Order Description	Nominal Value
• Measure voltage between the following terminals: FB22 Fuse Input contact & Ground	greater than 11 V

Yes:E07	No:T13

T13 - Check: Short to Voltage/Ground/Interruption of Voltage Supply

Work Order Description	Nominal Value
• Remove electrical component from socket:	Test okay?

FL1 Fuse • Check the following component for proper operation: FL1 Fuse	
Yes:T14	**No:T16**

T14 - Check: Interruption of Voltage Supply Circuit

Work Order Description	Nominal Value
• Measure voltage between the following terminals: FL1 Fuse Input contact & Ground	greater than 11 V
Yes:T15	**No:E10**

T15 - Check: Interruption of Voltage Supply Circuit

Work Order Description	Nominal Value
• Disconnect wiring harness connector from: S1 Switch - Starter • Insert electrical component in socket: FL1 Fuse • Measure voltage between the following terminals: S1 Switch - Starter Wiring harness connector (wiring harness side) terminal 30 & Ground	greater than 11 V
Yes:E08	**No:E09**

T16 - Check: Short to Ground of Signal Circuit

Work Order Description	Nominal Value
• Disconnect wiring harness connector from: S1 Switch - Starter • Insert new fuse FL1 and then check the fuse for proper operation.	Test okay?
Yes:T17	**No:E14**

T17 - Check: Short to Ground of Voltage Supply Circuit

Work Order Description	Nominal Value
• Connect fused jumper wire to: S1 Switch - Starter	Test okay?

Wiring harness connector (wiring harness side) terminal 15A & G1 Battery Battery Voltage (Positive Terminal) • Check the following component for proper operation: Fuse of the fused jumper wire	

Yes:T18	No:E13

T18 - Check: Short to Ground of Voltage Supply Circuit

Work Order Description	Nominal Value
• Remove fused jumper wire • Connect fused jumper wire to: S1 Switch - Starter Wiring harness connector (wiring harness side) terminal 15 & G1 Battery Battery Voltage (Positive Terminal) • Check the following component for proper operation: Fuse of the fused jumper wire	Test okay?

Yes:E11	No:E12

T19 - Check: Short to Ground of Voltage Supply Circuit

Work Order Description	Nominal Value
• Ignition OFF • Reconnect all disconnected components • Insert new fuse FB22 and then check the fuse for proper operation. • Ignition ON	Test okay?

Yes:E15	No:E16

T20 - Check: Short to Ground/Interruption of Voltage Supply Circuit

Work Order Description	Nominal Value
• Remove electrical component from socket: FB8 Fuse • Check the following component for proper operation: FB8 Fuse	Test okay?

Yes:T21	No:T22

T21 - Check: Short to Ground/Interruption of Voltage Supply Circuit

Work Order Description	Nominal Value
• Measure voltage between the following terminals: FB8 Fuse Input contact & Ground	greater than 11 V

Yes:E19	No:E20

T22 - Check: Short to Ground of Voltage Supply Circuit

Work Order Description	Nominal Value
• Insert new fuse FB8 and then check the fuse for proper operation.	Test okay?

Yes:E21	No:T23

T23 - Check: Short to Ground of Voltage Supply Circuit

Work Order Description	Nominal Value
• Disconnect wiring harness connector from: A5 **(Z 20 LET)**A4 **(Z 22 SE)** Control Unit - Engine (Wiring Harness Connector X31 **(Z 20 LET)** X21 **(Z 22 SE)**) • Insert new fuse FB8 and then check the fuse for proper operation. • Disconnect each of the following components/control units consecutively from the wiring harness and repeat the check each time: A17 Control Unit - Immobiliser H1 Instrument	Test okay?

Yes:E01	No:T24

T24 - Check: Vehicle Configuration

Is the following information correct for the actual vehicle?

Anti-Theft Warning System

Yes:T25	No:E22

T25 - Check: Vehicle Configuration

Is the following information correct for the actual vehicle?

Central Door Locking System

Yes:E22	No:T26

T26 - Check: Short to Ground of Voltage Supply Circuit

Work Order Description	Nominal Value
• Disconnect wiring harness connector from: A13 Control Unit - Anti Theft Warning Unit (Wiring Harness Connector X23) • Insert new fuse FB8 and then check the fuse for proper operation.	Test okay?

Yes:E01	No:E22

E01 - Result: Defective Component

If the nominal value is reached during one of the measurements, the component/control unit that has been disconnected immediately before that measurement is defective.

Important:

Reset concerned control unit (engine or immobiliser control unit) with diagnostic tester before replacing. Select immobiliser in the diagnostic tester and call up the corresponding test in the menu ADDITIONAL FUNCTIONS. Ensure that both control units are never reset and replaced at the same time.

Note:

If the defective component is a switching device (e.g. switch or relay) or a fuse, the cause for the fault may be located in the circuit behind that component.
In case of a switching device, the corresponding part of the circuit should be checked for short to ground/voltage before replacing the component.

E02 - Result: Defective Component

- Defective component:
  A2 Control Unit - Anti Lock Brake System

E03 - Result: Interruption

- Circuit interruption between:
  X13 Diagnostic Link
  Wiring harness connector (wiring harness side) terminal 12
  &
  A2 Control Unit - Anti Lock Brake System
  Wiring harness connector (wiring harness side) terminal 11

E04 - Result: Short to Ground

- Short circuit to ground between:
  X13 Diagnostic Link
  Wiring harness connector (wiring harness side) terminal 12
  &
  A2 Control Unit - Anti Lock Brake System
  Wiring harness connector (wiring harness side) terminal 11
  &
  A1 Control Unit - Airbag
  Wiring harness connector (wiring harness side) terminal 12

E05 - Result: Short to Voltage

- Short circuit to voltage between:
  X13 Diagnostic Link
  Wiring harness connector (wiring harness side) terminal 12
  &
  A2 Control Unit - Anti Lock Brake System
  Wiring harness connector (wiring harness side) terminal 11
  &
  A1 Control Unit - Airbag
  Wiring harness connector (wiring harness side) terminal 12

E06 - Result: Interruption

- Circuit interruption between:
  A2 Control Unit - Anti Lock Brake System
  Wiring harness connector (wiring harness side) terminal 16,19
  &
  Ground

E07 - Result: Interruption

- Circuit interruption between:
  FB22 Fuse
  Output contact
  &
  A2 Control Unit - Anti Lock Brake System
  Wiring harness connector (wiring harness side) terminal 15

E08 - Result: Interruption

- Circuit interruption between:
  S1 Switch - Starter
  Wiring harness connector (wiring harness side) terminal 15
  &
  FB22 Fuse
  Input contact

or

- Defective component:
  S1 Switch - Starter

E09 - Result: Interruption

- Circuit interruption between:
  FL1 Fuse
  Output contact
  &
  S1 Switch - Starter
  Wiring harness connector (wiring harness side) terminal 30

E10 - Result: Interruption

- Circuit interruption between:
  G1 Battery
  Battery Voltage (Positive Terminal)

&
FL1 Fuse
Input contact

E11 - Result: Defective Component

- Defective component:
  S1 Switch - Starter

E12 - Result: Short to Ground

- Short circuit to ground between:
  S1 Switch - Starter
  Wiring harness connector (wiring harness side) terminal 15
  &
  FB2, FB5, FB6, FB7, FB20, FB22 **(Z 20 LET)**FB2, FB5, FB6, FB7, FB22 **(Z 22 SE)** Fuse

or

- Defective component:
  A1 Control Unit - Airbag

E13 - Result: Short to Ground

- Short circuit to ground between:
  S1 Switch - Starter
  Wiring harness connector (wiring harness side) terminal 15A
  &
  FB3, FB4 Fuse
  Input contact

E14 - Result: Short to Ground

- Short circuit to ground between:
  FL1 Fuse
  Output contact
  &
  S1 Switch - Starter
  Wiring harness connector (wiring harness side) terminal 30

E15 - Result: System Overload

- A temporary current overload in the system behind fuse FB22 has occurred

E16 - Result: Short to Ground

- Short circuit to ground between:
  FB22 Fuse
  Output contact
  &
  A2 Control Unit - Anti Lock Brake System
  Wiring harness connector (wiring harness side) terminal 15

or

- Defective component:
  A2 Control Unit - Anti Lock Brake System

E17 - Result: Defective Component

- Defective component:
  Diagnostic tester

E18 - Result: Interruption

- Circuit interruption between:
  X13 Diagnostic Link
  Wiring harness connector (wiring harness side) terminal 4,5
  &
  Ground

E19 - Result: Interruption

- Circuit interruption between:
  FB8 Fuse
  Output contact
  &
  X13 Diagnostic Link
  Wiring harness connector (wiring harness side) terminal 16

E20 - Result: Interruption

- Circuit interruption between:
  G1 Battery
  Terminal 30
  &
  FB8 Fuse
  Input contact

E21 - Result: Defective Component

- Defective component:
  Diagnostic tester

E22 - Result: Short to Ground

- Short circuit to ground between:
  FB8 Fuse
  Output contact
  &
  X13 Diagnostic Link
  Wiring harness connector terminal 16
  &
  Concerned terminals of all wiring harness connectors, which are connected with the corresponding lead.

E23 - Result: Defective Component

- Defective component:
  G1 Battery

C-02 - Control Unit Hard- and Software

E01 - Result: Defective Component

- Defective component:
  A2 Control Unit - Anti Lock Brake System

C-03 - System Voltage Circuit

T01 - Check: Component

Work Order Description	Nominal Value
• Ignition OFF • Disconnect wiring harness connector from: Diagnostic tester • Engine running • All consumers turned off • Increase engine speed to 3000 rpm • Measure voltage between the following terminals: G1 Battery Terminal 30 & Ground	13 ... 15 V

Yes:T02	No:E04

T02 - Check: Transition Resistance of Voltage Supply Circuit

Work Order Description	Nominal Value
• Ignition OFF • Disconnect wiring harness connector from: A2 Control Unit - Anti Lock Brake System • Ignition ON • Connect test lamp (21 W) and multimeter in parallel and measure voltage between the following terminals: A2 Control Unit - Anti Lock Brake System Wiring harness connector (wiring harness side) terminal 15 & Ground	greater than 11 V

Yes:T03	No:E03

T03 - Check: Transition Resistance of Ground Circuit

Work Order Description	Nominal Value
• Connect test lamp (21 W) and multimeter in parallel and measure voltage between the following terminals: A2 Control Unit - Anti Lock Brake System Wiring harness connector (wiring harness side) terminal 16, 19 & Battery voltage	greater than 11 V

Yes:E01	No:E02

E01 - Result: Defective Component

- Defective component:
  A2 Control Unit - Anti Lock Brake System

E02 - Result: High Transition Resistance

- High transition resistance between:
  G1 Battery
  Terminal 31
  &
  A2 Control Unit - Anti Lock Brake System
  Wiring harness connector (wiring harness side) terminal 16, 19

E03 - Result: High Transition Resistance

- High transition resistance between:
  G1 Battery
  Terminal 30
  &
  A2 Control Unit - Anti Lock Brake System
  Wiring harness connector (wiring harness side) terminal 15

E04 - Result: Defective Component

- Defective component:
  G2 Alternator

or

- Circuit interruption between:
  G1 Battery
  Terminal 30
  &
  G2 Alternator
  Wiring harness connector (wiring harness side) terminal B+

or

- Bad ground connection

C-04 - Front Left Wheel Sensor Circuit

T01 - Check: Short to Voltage of Signal Circuit

Work Order Description	Nominal Value
• Ignition OFF • Disconnect wiring harness connector from: A2 Control Unit - Anti Lock Brake System • Ignition ON • Measure voltage between the following terminals: A2 Control Unit - Anti Lock Brake System Wiring harness connector (wiring harness	less than 0.3 V

side) terminal 25 & Ground	

Yes:T02	No:E06

T02 - Check: Short to Ground of Signal Circuit

Work Order Description	Nominal Value
• Ignition OFF • Measure resistance between the following terminals: A2 Control Unit - Anti Lock Brake System Wiring harness connector (wiring harness side) terminal 25 & Ground	greater than 500 kOhm

Yes:T03	No:E05

T03 - Check: Interruption of Signal Circuit

Work Order Description	Nominal Value
• Measure resistance between the following terminals: A2 Control Unit - Anti Lock Brake System Wiring harness connector (wiring harness side) terminal 25 & A2 Control Unit - Anti Lock Brake System Wiring harness connector (wiring harness side) terminal 14	1.4 ... 1.7 kOhm

Yes:T04	No:T05

T04 - Check: Component

Work Order Description	Nominal Value
• Switch multimeter to alternating-current voltage measurement. • Vehicle jacked-up and front left wheel slowly turned by hand • Measure voltage between the following terminals: A2 Control Unit - Anti Lock Brake System Wiring harness connector (wiring harness side) terminal 25 & A2 Control Unit - Anti Lock Brake System Wiring harness connector (wiring harness	greater than 0.01 V

side) terminal 14	

Yes:E01	No:E02

T05 - Check: Interruption of Signal Circuit

Work Order Description	Nominal Value
• Measure resistance between the following terminals: A2 Control Unit - Anti Lock Brake System Wiring harness connector (wiring harness side) terminal 25 & A2 Control Unit - Anti Lock Brake System Wiring harness connector (wiring harness side) terminal 14	greater than 1.7 kOhm

Yes:E03	No:E04

E01 - Result: Defective Component

- Defective component:
  A2 Control Unit - Anti Lock Brake System

E02 - Result: Defective Component

- Defective component:
  B25 Sensor - Wheel Speed, Front Left

E03 - Result: Interruption

- Circuit interruption between:
  A2 Control Unit - Anti Lock Brake System
  Wiring harness connector (wiring harness side) terminal 25
  &
  B25 Sensor - Wheel Speed, Front Left
  Wiring harness connector (wiring harness side) terminal B
  or
  A2 Control Unit - Anti Lock Brake System
  Wiring harness connector (wiring harness side) terminal 14
  &
  B25 Sensor - Wheel Speed, Front Left
  Wiring harness connector (wiring harness side) terminal A

or

- Defective component:
  B25 Sensor - Wheel Speed, Front Left

E04 - Result: Short Circuit in Wiring Harness

- Short circuit in wiring harness between:
  A2 Control Unit - Anti Lock Brake System
  Wiring harness connector (wiring harness side) terminal 25
  &

A2 Control Unit - Anti Lock Brake System
Wiring harness connector (wiring harness side) terminal 14

or

- Defective component:
  B25 Sensor - Wheel Speed, Front Left

E05 - Result: Short to Ground

- Short circuit to ground between:
  A2 Control Unit - Anti Lock Brake System
  Wiring harness connector (wiring harness side) terminal 25
  &
  B25 Sensor - Wheel Speed, Front Left
  Wiring harness connector (wiring harness side) terminal B
  or
  A2 Control Unit - Anti Lock Brake System
  Wiring harness connector (wiring harness side) terminal 14
  &
  B25 Sensor - Wheel Speed, Front Left
  Wiring harness connector (wiring harness side) terminal A

or

- Defective component:
  B25 Sensor - Wheel Speed, Front Left

E06 - Result: Short to Voltage

- Short circuit to voltage between:
  A2 Control Unit - Anti Lock Brake System
  Wiring harness connector (wiring harness side) terminal 25
  &
  B25 Sensor - Wheel Speed, Front Left
  Wiring harness connector (wiring harness side) terminal B
  or
  A2 Control Unit - Anti Lock Brake System
  Wiring harness connector (wiring harness side) terminal 14
  &
  B25 Sensor - Wheel Speed, Front Left
  Wiring harness connector (wiring harness side) terminal A

C-05 - Front Right Wheel Sensor Circuit

T01 - Check: Short to Voltage of Signal Circuit

Work Order Description	Nominal Value
• Ignition OFF • Disconnect wiring harness connector from: A2 Control Unit - Anti Lock Brake System	less than 0.3 V

• Ignition ON • Measure voltage between the following terminals: A2 Control Unit - Anti Lock Brake System Wiring harness connector (wiring harness side) terminal 13 & Ground	

Yes:T02	No:E06

T02 - Check: Short to Ground of Signal Circuit

Work Order Description	Nominal Value
• Ignition OFF • Measure resistance between the following terminals: A2 Control Unit - Anti Lock Brake System Wiring harness connector (wiring harness side) terminal 13 & Ground	greater than 500 kOhm

Yes:T03	No:E05

T03 - Check: Interruption of Signal Circuit

Work Order Description	Nominal Value
• Measure resistance between the following terminals: A2 Control Unit - Anti Lock Brake System Wiring harness connector (wiring harness side) terminal 13 & A2 Control Unit - Anti Lock Brake System Wiring harness connector (wiring harness side) terminal 12	1.4 ... 1.7 kOhm

Yes:T04	No:T05

T04 - Check: Component

Work Order Description	Nominal Value
• Switch multimeter to alternating-current voltage measurement. • Vehicle jacked-up and front right wheel slowly turned by hand • Measure voltage between the following terminals: A2 Control Unit - Anti Lock Brake System	greater than 0.01 V

Wiring harness connector (wiring harness side) terminal 13 & A2 Control Unit - Anti Lock Brake System Wiring harness connector (wiring harness side) terminal 12	

Yes:E01	No:E02

T05 - Check: Interruption of Signal Circuit

Work Order Description	Nominal Value
• Measure resistance between the following terminals: A2 Control Unit - Anti Lock Brake System Wiring harness connector (wiring harness side) terminal 13 & A2 Control Unit - Anti Lock Brake System Wiring harness connector (wiring harness side) terminal 12	greater than 1.7 kOhm

Yes:E03	No:E04

E01 - Result: Defective Component

- Defective component:
  A2 Control Unit - Anti Lock Brake System

E02 - Result: Defective Component

- Defective component:
  B26 Sensor - Wheel Speed, Front Right

E03 - Result: Interruption

- Circuit interruption between:
  A2 Control Unit - Anti Lock Brake System
  Wiring harness connector (wiring harness side) terminal 13
  &
  B26 Sensor - Wheel Speed, Front Right
  Wiring harness connector (wiring harness side) terminal B
  or
  A2 Control Unit - Anti Lock Brake System
  Wiring harness connector (wiring harness side) terminal 12
  &
  B26 Sensor - Wheel Speed, Front Right
  Wiring harness connector (wiring harness side) terminal A

or

- Defective component:
  B26 Sensor - Wheel Speed, Front Right

E04 - Result: Short Circuit in Wiring Harness

- Short circuit in wiring harness between:
  A2 Control Unit - Anti Lock Brake System
  Wiring harness connector (wiring harness side) terminal 13
  &
  A2 Control Unit - Anti Lock Brake System
  Wiring harness connector (wiring harness side) terminal 12

or

- Defective component:
  B26 Sensor - Wheel Speed, Front Right

E05 - Result: Short to Ground

- Short circuit to ground between:
  A2 Control Unit - Anti Lock Brake System
  Wiring harness connector (wiring harness side) terminal 13
  &
  B26 Sensor - Wheel Speed, Front Right
  Wiring harness connector (wiring harness side) terminal B
  or
  A2 Control Unit - Anti Lock Brake System
  Wiring harness connector (wiring harness side) terminal 12
  &
  B26 Sensor - Wheel Speed, Front Right
  Wiring harness connector (wiring harness side) terminal A

or

- Defective component:
  B26 Sensor - Wheel Speed, Front Right

E06 - Result: Short to Voltage

- Short circuit to voltage between:
  A2 Control Unit - Anti Lock Brake System
  Wiring harness connector (wiring harness side) terminal 13
  &
  B26 Sensor - Wheel Speed, Front Right
  Wiring harness connector (wiring harness side) terminal B
  or
  A2 Control Unit - Anti Lock Brake System
  Wiring harness connector (wiring harness side) terminal 12
  &
  B26 Sensor - Wheel Speed, Front Right
  Wiring harness connector (wiring harness side) terminal A

C-06 - Rear Left Wheel Sensor Circuit

T01 - Check: Short to Voltage of Signal Circuit

Work Order Description	Nominal Value

• Ignition OFF • Disconnect wiring harness connector from: A2 Control Unit - Anti Lock Brake System • Ignition ON • Measure voltage between the following terminals: A2 Control Unit - Anti Lock Brake System Wiring harness connector (wiring harness side) terminal 23 & Ground	less than 0.3 V

Yes:T02	No:E06

T02 - Check: Short to Ground of Signal Circuit

Work Order Description	Nominal Value
• Ignition OFF • Measure resistance between the following terminals: A2 Control Unit - Anti Lock Brake System Wiring harness connector (wiring harness side) terminal 23 & Ground	greater than 500 kOhm

Yes:T03	No:E05

T03 - Check: Interruption of Signal Circuit

Work Order Description	Nominal Value
• Measure resistance between the following terminals: A2 Control Unit - Anti Lock Brake System Wiring harness connector (wiring harness side) terminal 23 & A2 Control Unit - Anti Lock Brake System Wiring harness connector (wiring harness side) terminal 22	1.4 ... 1.7 kOhm

Yes:T04	No:T05

T04 - Check: Component

Work Order Description	Nominal Value
• Switch multimeter to alternating-current voltage measurement. • Vehicle jacked-up and rear left wheel slowly turned by hand	greater than 0.01 V

• Measure voltage between the following terminals: A2 Control Unit - Anti Lock Brake System Wiring harness connector (wiring harness side) terminal 23 & A2 Control Unit - Anti Lock Brake System Wiring harness connector (wiring harness side) terminal 22	

Yes:E01	No:E02

T05 - Check: Interruption of Signal Circuit

Work Order Description	Nominal Value
• Measure resistance between the following terminals: A2 Control Unit - Anti Lock Brake System Wiring harness connector (wiring harness side) terminal 23 & A2 Control Unit - Anti Lock Brake System Wiring harness connector (wiring harness side) terminal 22	greater than 1.7 kOhm

Yes:E03	No:E04

E01 - Result: Defective Component

- Defective component:
  A2 Control Unit - Anti Lock Brake System

E02 - Result: Defective Component

- Defective component:
  B27 Sensor - Wheel Speed, Rear Left

E03 - Result: Interruption

- Circuit interruption between:
  A2 Control Unit - Anti Lock Brake System
  Wiring harness connector (wiring harness side) terminal 23
  &
  B27 Sensor - Wheel Speed, Rear Left
  Wiring harness connector (wiring harness side) terminal B
  or
  A2 Control Unit - Anti Lock Brake System
  Wiring harness connector (wiring harness side) terminal 22
  &
  B27 Sensor - Wheel Speed, Rear Left
  Wiring harness connector (wiring harness side) terminal A

or

- Defective component:
  B27 Sensor - Wheel Speed, Rear Left

E04 - Result: Short Circuit in Wiring Harness

- Short circuit in wiring harness between:
  A2 Control Unit - Anti Lock Brake System
  Wiring harness connector (wiring harness side) terminal 23
  &
  A2 Control Unit - Anti Lock Brake System
  Wiring harness connector (wiring harness side) terminal 22

or

- Defective component:
  B27 Sensor - Wheel Speed, Rear Left

E05 - Result: Short to Ground

- Short circuit to ground between:
  A2 Control Unit - Anti Lock Brake System
  Wiring harness connector (wiring harness side) terminal 23
  &
  B27 Sensor - Wheel Speed, Rear Left
  Wiring harness connector (wiring harness side) terminal B
  or
  A2 Control Unit - Anti Lock Brake System
  Wiring harness connector (wiring harness side) terminal 22
  &
  B27 Sensor - Wheel Speed, Rear Left
  Wiring harness connector (wiring harness side) terminal A

or

- Defective component:
  B27 Sensor - Wheel Speed, Rear Left

E06 - Result: Short to Voltage

- Short circuit to voltage between:
  A2 Control Unit - Anti Lock Brake System
  Wiring harness connector (wiring harness side) terminal 23
  &
  B27 Sensor - Wheel Speed, Rear Left
  Wiring harness connector (wiring harness side) terminal B
  or
  A2 Control Unit - Anti Lock Brake System
  Wiring harness connector (wiring harness side) terminal 22
  &
  B27 Sensor - Wheel Speed, Rear Left
  Wiring harness connector (wiring harness side) terminal A

C-07 - Rear Right Wheel Sensor Circuit

T01 - Check: Short to Voltage of Signal Circuit

Work Order Description	Nominal Value
• Ignition OFF • Disconnect wiring harness connector from: A2 Control Unit - Anti Lock Brake System • Ignition ON • Measure voltage between the following terminals: A2 Control Unit - Anti Lock Brake System Wiring harness connector (wiring harness side) terminal 10 & Ground	less than 0.3 V

Yes:T02	No:E06

T02 - Check: Short to Ground of Signal Circuit

Work Order Description	Nominal Value
• Ignition OFF • Measure resistance between the following terminals: A2 Control Unit - Anti Lock Brake System Wiring harness connector (wiring harness side) terminal 10 & Ground	greater than 500 kOhm

Yes:T03	No:E05

T03 - Check: Interruption of Signal Circuit

Work Order Description	Nominal Value
• Measure resistance between the following terminals: A2 Control Unit - Anti Lock Brake System Wiring harness connector (wiring harness side) terminal 10 & A2 Control Unit - Anti Lock Brake System Wiring harness connector (wiring harness side) terminal 9	1.4 ... 1.7 kOhm

Yes:T04	No:T05

T04 - Check: Component

Work Order Description	Nominal Value
• Switch multimeter to alternating-current	greater than 0.01 V

voltage measurement. • Vehicle jacked-up and rear right wheel slowly turned by hand • Measure voltage between the following terminals: A2 Control Unit - Anti Lock Brake System Wiring harness connector (wiring harness side) terminal 10 & A2 Control Unit - Anti Lock Brake System Wiring harness connector (wiring harness side) terminal 9	

Yes:E01	No:E02

T05 - Check: Interruption of Signal Circuit

Work Order Description	Nominal Value
• Measure resistance between the following terminals: A2 Control Unit - Anti Lock Brake System Wiring harness connector (wiring harness side) terminal 10 & A2 Control Unit - Anti Lock Brake System Wiring harness connector (wiring harness side) terminal 9	greater than 1.7 kOhm

Yes:E03	No:E04

E01 - Result: Defective Component

- Defective component:
  A2 Control Unit - Anti Lock Brake System

E02 - Result: Defective Component

- Defective component:
  B28 Sensor - Wheel Speed, Rear Right

E03 - Result: Interruption

- Circuit interruption between:
  A2 Control Unit - Anti Lock Brake System
  Wiring harness connector (wiring harness side) terminal 10
  &
  B28 Sensor - Wheel Speed, Rear Right
  Wiring harness connector (wiring harness side) terminal B
  or
  A2 Control Unit - Anti Lock Brake System
  Wiring harness connector (wiring harness side) terminal 9
  &
  B28 Sensor - Wheel Speed, Rear Right
  Wiring harness connector (wiring harness side) terminal A

or

- Defective component:
  B28 Sensor - Wheel Speed, Rear Right

E04 - Result: Short Circuit in Wiring Harness

- Short circuit in wiring harness between:
  A2 Control Unit - Anti Lock Brake System
  Wiring harness connector (wiring harness side) terminal 10
  &
  A2 Control Unit - Anti Lock Brake System
  Wiring harness connector (wiring harness side) terminal 9

or

- Defective component:
  B28 Sensor - Wheel Speed, Rear Right

E05 - Result: Short to Ground

- Short circuit to ground between:
  A2 Control Unit - Anti Lock Brake System
  Wiring harness connector (wiring harness side) terminal 10
  &
  B28 Sensor - Wheel Speed, Rear Right
  Wiring harness connector (wiring harness side) terminal B
  or
  A2 Control Unit - Anti Lock Brake System
  Wiring harness connector (wiring harness side) terminal 9
  &
  B28 Sensor - Wheel Speed, Rear Right
  Wiring harness connector (wiring harness side) terminal A

or

- Defective component:
  B28 Sensor - Wheel Speed, Rear Right

E06 - Result: Short to Voltage

- Short circuit to voltage between:
  A2 Control Unit - Anti Lock Brake System
  Wiring harness connector (wiring harness side) terminal 10
  &
  B28 Sensor - Wheel Speed, Rear Right
  Wiring harness connector (wiring harness side) terminal B
  or
  A2 Control Unit - Anti Lock Brake System
  Wiring harness connector (wiring harness side) terminal 9
  &
  B28 Sensor - Wheel Speed, Rear Right

Wiring harness connector (wiring harness side) terminal A

C-08 - Wheel Sensor Circuits

T01 - Check: Mechanical Functionality

Work Order Description	Nominal Value
• Check the following component for damage and contamination: B25 Sensor - Wheel Speed, Front Left	Mechanical function check okay?

Yes:T02	No:E05

T02 - Check: Mechanical Functionality

Work Order Description	Nominal Value
• Check the following component for damage and contamination: B26 Sensor - Wheel Speed, Front Right	Mechanical function check okay?

Yes:T03	No:E04

T03 - Check: Mechanical Functionality

Work Order Description	Nominal Value
• Check the following component for damage and contamination: B27 Sensor - Wheel Speed, Rear Left	Mechanical function check okay?

Yes:T04	No:E03

T04 - Check: Mechanical Functionality

Work Order Description	Nominal Value
• Check the following component for damage and contamination: B28 Sensor - Wheel Speed, Rear Right	Mechanical function check okay?

Yes:E01	No:E02

E01 - Result: Defective Component

- Defective component:
  A2 Control Unit - Anti Lock Brake System

E02 - Result: Defective Component

- Defective component:
  B28 Sensor - Wheel Speed, Rear Right

E03 - Result: Defective Component

- Defective component:
  B27 Sensor - Wheel Speed, Rear Left

E04 - Result: Defective Component

- Defective component:

B26 Sensor - Wheel Speed, Front Right

E05 - Result: Defective Component

- Defective component:
  B25 Sensor - Wheel Speed, Front Left

C-09 - Valve Relay Circuit

T01 - Check: Short to Ground of Voltage Supply Circuit

Work Order Description	Nominal Value
• Ignition OFF • Remove electrical component from socket: FL3 Fuse • Check the following fuses for proper operation: FL3 Fuse	Test okay?

Yes:T02	No:T04

T02 - Check: Short to Voltage/Ground/Interruption of Voltage Supply

Work Order Description	Nominal Value
• Measure voltage between the following terminals: FL3 Fuse Input contact & Ground	greater than 11 V

Yes:T03	No:E03

T03 - Check: Interruption of Voltage Supply Circuit

Work Order Description	Nominal Value
• Disconnect wiring harness connector from: A2 Control Unit - Anti Lock Brake System • Insert electrical component in socket: FL3 Fuse • Connect test lamp (21 W) and multimeter in parallel and measure voltage between the following terminals: A2 Control Unit - Anti Lock Brake System Wiring harness connector (wiring harness side) terminal 18 & Ground	greater than 11 V

Yes:E01	No:E02

T04 - Check: Short to Ground of Voltage Supply Circuit

Work Order Description	Nominal Value
• Disconnect wiring harness connector from: A2 Control Unit - Anti Lock Brake System • Insert new fuse FL3 and then check the fuse for proper operation.	Test okay?
Yes:E04	**No:E05**

E01 - Result: Defective Component

- Defective component:
  A2 Control Unit - Anti Lock Brake System

E02 - Result: Interruption

- Circuit interruption between:
  A2 Control Unit - Anti Lock Brake System
  Wiring harness connector (wiring harness side) terminal 18
  &
  FL3 Fuse
  Output contact

or

- High transition resistance between:
  A2 Control Unit - Anti Lock Brake System
  Wiring harness connector (wiring harness side) terminal 18
  &
  FL3 Fuse
  Output contact

E03 - Result: Interruption

- Circuit interruption between:
  G1 Battery
  Terminal 30
  &
  FL3 Fuse
  Input contact

or

- High transition resistance between:
  G1 Battery
  Terminal 30
  &
  FL3 Fuse
  Input contact

E04 - Result: Defective Component

- Defective component:
  A2 Control Unit - Anti Lock Brake System
  or

ABS, Hydraulic Unit

E05 - Result: Short to Ground

- Short circuit to ground between:
  FL3 Fuse
  Output contact
  &
  A2 Control Unit - Anti Lock Brake System
  Wiring harness connector (wiring harness side) terminal 18
  &
  A2 Control Unit - Anti Lock Brake System
  Wiring harness connector (wiring harness side) terminal 17

C-10 - Return Pump Relay Circuit

T01 - Check: Short to Ground/Interruption of Voltage Supply Circuit

Work Order Description	Nominal Value
• Measure voltage between the following terminals: A2 Control Unit - Anti Lock Brake System Wiring harness connector (wiring harness side) terminal 17 & Ground	greater than 11 V

Yes:T02	No:E03

T02 - Check: Circuit Interruption of Ground Circuit

Work Order Description	Nominal Value
• Measure voltage between the following terminals: A2 Control Unit - Anti Lock Brake System Wiring harness connector (wiring harness side) terminal 17 & A2 Control Unit - Anti Lock Brake System Wiring harness connector (wiring harness side) terminal 16	greater than 11 V

Yes:E01	No:E02

E01 - Result: Defective Component

- Defective component:
  A2 Control Unit - Anti Lock Brake System

or

- Defective component:
  ABS, Hydraulic Unit

E02 - Result: Interruption

- Circuit interruption between:
  A2 Control Unit - Anti Lock Brake System
  Wiring harness connector (wiring harness side) terminal 16
  &
  Ground

E03 - Result: Interruption

- Circuit interruption between:
  A2 Control Unit - Anti Lock Brake System
  Wiring harness connector (wiring harness side) terminal 17
  &
  FL3 Fuse
  Output contact

C-11 - Brake-Light Switch Circuit

T01 - Check: Vehicle Configuration

Is the following information correct for the actual vehicle?

Z 20 LET

Yes:T02	No:T26

T02 - Check: Short to Ground/Interruption of Voltage Supply Circuit

Work Order Description	Nominal Value
• Ignition OFF • Disconnect wiring harness connector from: S43 Switch - Stop Lamp, Double • Measure voltage between the following terminals: S43 Switch - Stop Lamp, Double Wiring harness connector (wiring harness side) terminal 1, 4 & Ground	greater than 11 V

Yes:T03	No:T10

T03 - Check: Short to Voltage of Signal Circuit

Work Order Description	Nominal Value
• Ignition ON • Measure voltage between the following terminals: S43 Switch - Stop Lamp, Double Wiring harness connector (wiring harness side) terminal 2 & Ground	less than 0.3 V

Yes:T04	No:T09

T04 - Check: Short to Voltage of Signal Circuit

Work Order Description	Nominal Value
• Measure voltage between the following terminals: S43 Switch - Stop Lamp, Double Wiring harness connector (wiring harness side) terminal 3 & Ground	less than 0.3 V

Yes:T05	No:T08

T05 - Check: Interruption of Signal Circuit

Work Order Description	Nominal Value
• Ignition OFF • Disconnect wiring harness connector from: A5 Control Unit - Motronic (Wiring Harness Connector X31) • Connect fused jumper wire to: S43 Switch - Stop Lamp, Double Wiring harness connector (wiring harness side) terminal 1 & S43 Switch - Stop Lamp, Double Wiring harness connector (wiring harness side) terminal 2 • Ignition ON • Measure voltage between the following terminals: A5 Control Unit - Motronic Wiring harness connector (wiring harness side) terminal 57 (X31) & Ground	greater than 11 V

Yes:T06	No:E04

T06 - Check: Interruption of Signal Circuit

Work Order Description	Nominal Value
• Remove fused jumper wire • Connect fused jumper wire to: S43 Switch - Stop Lamp, Double Wiring harness connector (wiring harness side) terminal 4 &	greater than 11 V

S43 Switch - Stop Lamp, Double Wiring harness connector (wiring harness side) terminal 3 • Measure voltage between the following terminals: A5 Control Unit - Motronic Wiring harness connector (wiring harness side) terminal 25 (X31) & Ground	

Yes:T07	No:E03

T07 - Check: Component

Work Order Description	Nominal Value
• Remove fused jumper wire • Connect wiring harness connector to: S43 Switch - Stop Lamp, Double • Brake pedal actuated • Measure voltage between the following terminals: A5 Control Unit - Motronic Wiring harness connector (wiring harness side) terminal 25 (X31) & Ground	greater than 11 V

Yes:E01	No:E02

T08 - Check: Short to Voltage of Signal Circuit

Work Order Description	Nominal Value
• Ignition OFF • Disconnect wiring harness connector from: A5 Control Unit - Motronic (Wiring Harness Connector X31) • Ignition ON • Measure voltage between the following terminals: S43 Switch - Stop Lamp, Double Wiring harness connector (wiring harness side) terminal 3 & Ground • Disconnect each of the following components/control units consecutively from the wiring harness and repeat the measurement each time:	less than 0.3 V

E3 Back Lamp Unit - Left E4 Back Lamp Unit - Right E24 Stop Lamp - Centre Position A2 Control Unit - Anti Lock Brake System	
Yes:E05	**No:E06**

T09 - Check: Short to Voltage of Signal Circuit

Work Order Description	Nominal Value
• Ignition OFF • Disconnect wiring harness connector from: A5 Control Unit - Motronic (Wiring Harness Connector X31) • Ignition ON • Measure voltage between the following terminals: S43 Switch - Stop Lamp, Double Wiring harness connector (wiring harness side) terminal 2 & Ground	less than 0.3 V
Yes:E07	**No:E08**

T10 - Check: Short to Ground/Interruption of Voltage Supply Circuit

Work Order Description	Nominal Value
• Ignition OFF • Remove electrical component from socket: FB5 Fuse • Check the following component for proper operation: FB5 Fuse	Test okay?
Yes:T11	**No:T12**

T11 - Check: Interruption of Voltage Supply Circuit

Work Order Description	Nominal Value
• Ignition ON • Measure voltage between the following terminals: FB5 Fuse Input contact & Ground	greater than 11 V
Yes:E09	**No:E10**

T12 - Check: Short to Ground of Voltage Supply Circuit

Work Order Description	Nominal Value
• Reconnect all disconnected components • Brake pedal not actuated • Following gear is not engaged: Reverse gear • Ignition ON • Insert new fuse FB5 and then check the fuse for proper operation.	Test okay?
Yes:T13	**No:T24**

T13 - Check: Short to Ground of Signal Circuit

Work Order Description	Nominal Value
• Following gear is engaged: Reverse gear • Check the following fuses for proper operation: FB5 Fuse	Test okay?
Yes:T14	**No:T17**

T14 - Check: Short to Ground of Signal Circuit

Work Order Description	Nominal Value
• Brake pedal actuated Check the following fuses for proper operation: FB5 Fuse	Test okay?
Yes:E11	**No:T15**

T15 - Check: Short to Ground of Signal Circuit

Work Order Description	Nominal Value
• Disconnect wiring harness connector from: S43 Switch - Stop Lamp, Double • Connect fused jumper wire to: S43 Switch - Stop Lamp, Double Wiring harness connector (wiring harness side) terminal 3 & Battery Voltage (Positive Terminal) • Check the following system for proper operation: Fuse of the fused jumper wire	Test okay?
Yes:E12	**No:T16**

T16 - Check: Short to Ground of Signal Circuit

Work Order Description	Nominal Value
• Disconnect wiring harness connector from: E24 Stop Lamp - Centre Position • Insert new fuse into the socket of the fused jumper wire and then check this fuse for proper operation. • Disconnect each of the following components/control units consecutively from the wiring harness and repeat the check each time: E3 Back Lamp Unit - Left E4 Back Lamp Unit - Right A5 Control Unit - Motronic	Test okay?

Yes:E13	No:E14

T17 - Check: Vehicle Configuration

Is the following information correct for the actual vehicle?

Right Hand Driven

Yes:T18	No:T21

T18 - Check: Vehicle Configuration

Is the following information correct for the actual vehicle?

Radio

Yes:T19	No:T20

T19 - Result: Short to Ground

Work Order Description	Nominal Value
• Disconnect wiring harness connector from: E3 Back Lamp Unit - Left • Insert new fuse FB5 and then check the fuse for proper operation. • Disconnect each of the following components/control units consecutively from the wiring harness and repeat the check each time: A14 Radio	Test okay?

Yes:E13	No:E15

T20 - Check: Short to Ground of Signal Circuit

Work Order Description	Nominal Value
• Disconnect wiring harness connector from: E3 Back Lamp Unit - Left • Insert new fuse FB5 and then check the	Test okay?

fuse for proper operation.	

Yes:E13	No:E16

T21 - Check: Vehicle Configuration

Is the following information correct for the actual vehicle?

Radio

Yes:T22	No:T23

T22 - Check: Short to Ground of Signal Circuit

Work Order Description	Nominal Value
• Disconnect wiring harness connector from: E4 Back Lamp Unit - Right • Insert new fuse FB5 and then check the fuse for proper operation. • Disconnect each of the following components/control units consecutively from the wiring harness and repeat the check each time: A14 Radio	Test okay?

Yes:E13	No:E17

T23 - Check: Short to Ground of Signal Circuit

Work Order Description	Nominal Value
• Disconnect wiring harness connector from: E4 Back Lamp Unit - Right • Insert new fuse FB5 and then check the fuse for proper operation.	Test okay?

Yes:E13	No:E18

T24 - Check: Short to Ground of Voltage Supply Circuit

Work Order Description	Nominal Value
• Disconnect wiring harness connector from: S43 Switch - Stop Lamp, Double • Insert new fuse FB5 and then check the fuse for proper operation.	Test okay?

Yes:E19	No:T25

T25 - Check: Short to Ground of Voltage Supply Circuit

Work Order Description	Nominal Value
• Disconnect wiring harness connector from: S28 Switch - Clutch • Insert new fuse FB5 and then check the	Test okay?

fuse for proper operation.	

Yes:E13	No:E20

T26 - Check: Short to Voltage of Signal Circuit

Work Order Description	Nominal Value
• Ignition OFF • Disconnect wiring harness connector from: A2 Control Unit - Anti Lock Brake System • Ignition ON • Brake pedal not actuated • Measure voltage between the following terminals: A2 Control Unit - Anti Lock Brake System Wiring harness connector (wiring harness side) terminal 24 & Ground	less than 0.3 V

Yes:T27	No:T43

T27 - Check: Short to Ground/Interruption of Signal Circuit

Work Order Description	Nominal Value
• Brake pedal actuated • Measure voltage between the following terminals: A2 Control Unit - Anti Lock Brake System Wiring harness connector (wiring harness side) terminal 24 & Ground	greater than 11 V

Yes:E21	No:T28

T28 - Check: Short to Ground/Interruption of Voltage Supply Circuit

Work Order Description	Nominal Value
• Ignition OFF • Remove electrical component from socket: FB5 Fuse • Check the following component for proper operation: FB5 Fuse	Test okay?

Yes:T29	No:T30

T29 - Check: Interruption of Voltage Supply Circuit

Work Order Description	Nominal Value

• Ignition ON • Measure voltage between the following terminals: FB5 Fuse Input contact & Ground	greater than 11 V

Yes:E22	No:E23

T30 - Check: Short to Ground of Voltage Supply Circuit

Work Order Description	Nominal Value
• Brake pedal not actuated • Following gear is not engaged: Reverse gear • Ignition ON • Insert new fuse FB5 and then check the fuse for proper operation.	Test okay?

Yes:T31	No:T42

T31 - Check: Short to Ground of Signal Circuit

Work Order Description	Nominal Value
• Following gear is engaged: Reverse gear • Check the following fuses for proper operation: FB5 Fuse	Test okay?

Yes:T32	No:T35

T32 - Check: Short to Ground of Signal Circuit

Work Order Description	Nominal Value
• Brake pedal actuated • Check the following fuses for proper operation: FB5 Fuse	Test okay?

Yes:E21	No:T33

T33 - Check: Short to Ground of Signal Circuit

Work Order Description	Nominal Value
• Disconnect wiring harness connector from: S29 Switch - Stop Lamp, Single • Connect fused jumper wire to: S29 Switch - Stop Lamp, Single Wiring harness connector (wiring harness	Test okay?

side) terminal 2 & Battery Voltage (Positive Terminal) • Check the following fuses for proper operation: Fuse of the fused jumper wire	

Yes:E24	No:T34

T34 - Check: Short to Ground of Signal Circuit

Work Order Description	Nominal Value
• Disconnect wiring harness connector from: E24 Stop Lamp - Centre Position • Insert new fuse into the socket of the fused jumper wire and then check this fuse for proper operation. • Disconnect each of the following components/control units consecutively from the wiring harness and repeat the check each time: E3 Back Lamp Unit - Left E4 Back Lamp Unit - Right	Test okay?

Yes:E25	No:E26

T35 - Check: Vehicle Configuration

Is the following information correct for the actual vehicle?

Right Hand Driven

Yes:T36	No:T39

T36 - Check: Vehicle Configuration

Is the following information correct for the actual vehicle?

2003,Radio

Yes:T37	No:T38

T37 - Check: Short to Ground of Signal Circuit

Work Order Description	Nominal Value
• Disconnect wiring harness connector from: E3 Back Lamp Unit - Left • Insert new fuse FB5 and then check the fuse for proper operation. • Disconnect each of the following components/control units consecutively from the wiring harness and repeat the check each time: A14 Radio	Test okay?

Yes:E25	No:E27

T38 - Check: Short to Ground of Signal Circuit

Work Order Description	Nominal Value
• Disconnect wiring harness connector from: E3 Back Lamp Unit - Left • Insert new fuse FB5 and then check the fuse for proper operation.	Test okay?

Yes:E25	No:E28

T39 - Check: Vehicle Configuration

Is the following information correct for the actual vehicle?

2003,Radio

Yes:T40	No:T41

T40 - Check: Short to Ground of Signal Circuit

Work Order Description	Nominal Value
• Disconnect wiring harness connector from: E4 Back Lamp Unit - Right • Insert new fuse FB5 and then check the fuse for proper operation. • Disconnect each of the following components/control units consecutively from the wiring harness and repeat the check each time: A14 Radio	Test okay?

Yes:E25	No:E29

T41 - Check: Short to Ground of Signal Circuit

Work Order Description	Nominal Value
• Disconnect wiring harness connector from: E4 Back Lamp Unit - Right • Insert new fuse FB5 and then check the fuse for proper operation.	Test okay?

Yes:E25	No:E30

T42 - Check: Short to Ground of Voltage Supply Circuit

Work Order Description	Nominal Value
• Disconnect wiring harness connector from: S29 Switch - Stop Lamp, Single • Insert new fuse FB5 and then check the fuse for proper operation.	Test okay?

Yes:E25	No:E31

T43 - Check: Short to Voltage of Signal Circuit

Work Order Description	Nominal Value
• Ignition OFF • Disconnect wiring harness connector from: E3 Back Lamp Unit - Left • Ignition ON • Measure voltage between the following terminals: A2 Control Unit - Anti Lock Brake System Wiring harness connector (wiring harness side) terminal 24 & Ground	less than 0.3 V

Yes:E32	No:T44

T44 - Check: Short to Voltage of Signal Circuit

Work Order Description	Nominal Value
• Ignition OFF • Disconnect wiring harness connector from: E4 Back Lamp Unit - Right • Ignition ON • Measure voltage between the following terminals: A2 Control Unit - Anti Lock Brake System Wiring harness connector (wiring harness side) terminal 24 & Ground	less than 0.3 V

Yes:E32	No:E33

E01 - Result: Defective Component

- Defective component:
  S43 Switch - Stop Lamp, Double
  or
  A5 Control Unit - Motronic

Note:

Reset concerned control unit (engine or immobiliser control unit) with diagnostic tester before replacing. Select immobiliser in the diagnostic tester and call up the corresponding test in the menu ADDITIONAL FUNCTIONS. Ensure that both control units are never reset and replaced at the same time.

E02 - Result: Defective Component

- Defective component:
  S43 Switch - Stop Lamp, Double

Note:

Check adjustment of the following component (refer to Service Manual):

S43 Switch - Stop Lamp, Double

E03 - Result: Interruption

- Circuit interruption between:
  S43 Switch - Stop Lamp, Double
  Wiring harness connector (wiring harness side) terminal 3
  &
  A5 Control Unit - Motronic
  Wiring harness connector (wiring harness side) terminal 25 (X79)

E04 - Result: Interruption

- Circuit interruption between:
  S43 Switch - Stop Lamp, Double
  Wiring harness connector (wiring harness side) terminal 2
  &
  A5 Control Unit - Motronic
  Wiring harness connector (wiring harness side) terminal 57 (X31)

E05 - Result: Defective Component

- If the nominal value is reached during one of the measurements, the component/control unit that has been disconnected immediately before that measurement is defective.

Note:

Reset concerned control unit (engine or immobiliser control unit) with diagnostic tester before replacing. Select immobiliser in the diagnostic tester and call up the corresponding test in the menu ADDITIONAL FUNCTIONS. Ensure that both control units are never reset and replaced at the same time.

E06 - Result: Short to Voltage

- Short circuit to voltage between:
  S43 Switch - Stop Lamp, Double
  Wiring harness connector (wiring harness side) terminal 3
  &
  A5 Control Unit - Motronic
  Wiring harness connector (wiring harness side) terminal 25 (X31)
  &
  Wiring harness connector terminals of all components (wiring harness side), which were disconnected from the wiring harness during this trouble shooting session
  &
  Concerned terminals of all wiring harness connectors, which are connected with the corresponding lead.

E07 - Result: Defective Component

- Defective component:

A5 Control Unit - Motronic

Note:

Reset concerned control unit (engine or immobiliser control unit) with diagnostic tester before replacing. Select immobiliser in the diagnostic tester and call up the corresponding test in the menu ADDITIONAL FUNCTIONS. Ensure that both control units are never reset and replaced at the same time.

E08 - Result: Short to Ground

- Short circuit to voltage between:
  S43 Switch - Stop Lamp, Double
  Wiring harness connector (wiring harness side) terminal 2
  &
  A5 Control Unit - Motronic
  Wiring harness connector (wiring harness side) terminal 57 (X31)

E09 - Result: Interruption

- Circuit interruption between:
  FB5 Fuse
  Output contact
  &
  S43 Switch - Stop Lamp, Double
  Wiring harness connector (wiring harness side) terminal 1, 4

E10 - Result: Interruption

- Circuit interruption between:
  S1 Switch - Starter
  Wiring harness connector (wiring harness side) terminal 15
  &
  FB5 Fuse
  Input contact

E11 - Result: System Overload

- Defective component:
  A2 Control Unit - Anti Lock Brake System

E12 - Result: Defective Component

- Defective component:
  S43 Switch - Stop Lamp, Double

E13 - Result: Defective Component

- If the nominal value is reached during one of the measurements, the component/control unit that has been disconnected immediately before that measurement is defective.

Note:

If the defective component is a switching device (e.g. switch or relay) or a fuse, the cause for the fault may be located in the circuit behind that component.
In case of a switching device, the corresponding part of the circuit should be checked for short to ground/voltage before replacing the component.

E14 - Result: Short to Ground

- Short circuit to ground between:
  S43 Switch - Stop Lamp, Double
  Wiring harness connector (wiring harness side) terminal 3
  &
  A2 Control Unit - Anti Lock Brake System
  Wiring harness connector (wiring harness side) terminal 24
  &
  Wiring harness connector terminals of all components (wiring harness side), which were disconnected from the wiring harness during this trouble shooting session

or

- Defective component:
  A2 Control Unit - Anti Lock Brake System

E15 - Result: Short to Ground

- Short circuit to ground between:
  S31 Switch - Back up Lamp
  Wiring harness connector (wiring harness side) terminal B
  &
  E3 Back Lamp Unit - Left
  Wiring harness connector (wiring harness side) terminal 3
  &
  A14 Radio
  Wiring harness connector (wiring harness side) terminal 6

or

- Defective component:
  S31 Switch - Back up Lamp
  A14 Radio

E16 - Result: Short to Ground

- Short circuit to ground between:
  S31 Switch - Back up Lamp
  Wiring harness connector (wiring harness side) terminal B
  &
  E3 Back Lamp Unit - Left
  Wiring harness connector (wiring harness side) terminal 3

or

- Defective component:
  S31 Switch - Back up Lamp

E17 - Result: Short to Ground

- Short circuit to ground between:
  S31 Switch - Back up Lamp

Wiring harness connector (wiring harness side) terminal B
&
E4 Back Lamp Unit - Right
Wiring harness connector (wiring harness side) terminal 3
&
A14 Radio
Wiring harness connector (wiring harness side) terminal 6

or

- Defective component:
  S31 Switch - Back up Lamp
  A14 Radio

E18 - Result: Short to Ground

- Short circuit to ground between:
  S31 Switch - Back up Lamp
  Wiring harness connector (wiring harness side) terminal B
  &
  E4 Back Lamp Unit - Right
  Wiring harness connector (wiring harness side) terminal 3

E19 - Result: Short to Ground

- Short circuit to ground between:
  S43 Switch - Stop Lamp, Double
  Wiring harness connector (wiring harness side) terminal 2
  &
  A5 Control Unit - Motronic
  Wiring harness connector (wiring harness side) terminal 57 (X31)

or

- Defective component:
  A5 Control Unit - Motronic

Note:

Reset the concerned control unit with the diagnostic tester before replacing it. In order to do that, call up the "RESET" function from the PROGRAMMING menu of the current system on the diagnostic tester.

E20 - Result: Short to Voltage/Ground

- Short circuit to ground between:
  FB5 Fuse
  Output contact
  &
  Wiring harness connector terminals of all components (wiring harness side), which were disconnected from the wiring harness during this trouble shooting session
  &

S31 Switch - Back up Lamp
Wiring harness connector (wiring harness side) terminal A

or

- Defective component:
  S31 Switch - Back up Lamp

E21 - Result: Defective Component

- Defective component:
  A2 Control Unit - Anti Lock Brake System

E22 - Result: Interruption

- Circuit interruption between:
  FB5 Fuse
  Output contact
  &
  A2 Control Unit - Anti Lock Brake System
  Wiring harness connector (component side) terminal 24

E23 - Result: Interruption

- Circuit interruption between:
  FB5 Fuse
  Input contact
  &
  S1 Switch - Starter
  Wiring harness connector (component side) terminal 15

E24 - Result: Defective Component

- Defective component:
  S29 Switch - Stop Lamp, Single

E25 - Result: Defective Component

- If the nominal value is reached during one of the measurements, the component/control unit that has been disconnected immediately before that measurement is defective.

Note:

If the defective component is a switching device (e.g. switch or relay) or a fuse, the cause for the fault may be located in the circuit behind that component.
In case of a switching device, the corresponding part of the circuit should be checked for short to ground/voltage before replacing the component.

E26 - Result: Short to Ground

- Short circuit to ground between:
  S29 Switch - Stop Lamp, Single
  Wiring harness connector (component side) terminal 2
  &
  A2 Control Unit - Anti Lock Brake System
  Wiring harness connector (component side) terminal 24
  &

Wiring harness connector terminals of all components (wiring harness side), which were disconnected from the wiring harness during this trouble shooting session

or

- Defective component:
  A2 Control Unit - Anti Lock Brake System

E27 - Result: Short to Ground

- Short circuit to ground between:
  S31 Switch - Back up Lamp
  Wiring harness connector (wiring harness side) terminal B
  &
  E3 Back Lamp Unit - Left
  Wiring harness connector (wiring harness side) terminal 3
  &
  A14 Radio
  Wiring harness connector (wiring harness side) terminal 6

or

- Defective component:
  S31 Switch - Back up Lamp
  A14 Radio

E28 - Result: Short to Ground

- Short circuit to ground between:
  S31 Switch - Back up Lamp
  Wiring harness connector (wiring harness side) terminal B
  &
  E3 Back Lamp Unit - Left
  Wiring harness connector (wiring harness side) terminal 3

or

- Defective component:
  S31 Switch - Back up Lamp

E29 - Result: Short to Ground

- Short circuit to ground between:
  S31 Switch - Back up Lamp
  Wiring harness connector (wiring harness side) terminal B
  &
  E4 Back Lamp Unit - Right
  Wiring harness connector (wiring harness side) terminal 3
  &
  A14 Radio
  Wiring harness connector (wiring harness side) terminal 6

or

- Defective component:
  S31 Switch - Back up Lamp
  A14 Radio

E30 - Result: Short to Ground

- Short circuit to ground between:
  S31 Switch - Back up Lamp
  Wiring harness connector (wiring harness side) terminal B
  &
  E4 Back Lamp Unit - Right
  Wiring harness connector (wiring harness side) terminal 3

or

- Defective component:
  S31 Switch - Back up Lamp

E31 - Result: Short to Ground

- Short circuit to ground between:
  FB5 Fuse
  Output contact
  &
  S29 Switch - Stop Lamp, Single
  Wiring harness connector (wiring harness side) terminal 1
  &
  S31 Switch - Back up Lamp
  Wiring harness connector (wiring harness side) terminal A

or

- Defective component:
  S31 Switch - Back up Lamp

E32 - Result: Defective Component

- If the nominal value is reached during one of the measurements, the component/control unit that has been disconnected immediately before that measurement is defective.

Note:

If the defective component is a switching device (e.g. switch or relay) or a fuse, the cause for the fault may be located in the circuit behind that component.
In case of a switching device, the corresponding part of the circuit should be checked for short to ground/voltage before replacing the component.

E33 - Result: Short to Voltage

- Short circuit to voltage between:
  A2 Control Unit - Anti Lock Brake System
  Wiring harness connector (wiring harness side) terminal 24

&
E24 Stop Lamp - Centre Position
Wiring harness connector (wiring harness side) terminal 1
&
Wiring harness connector terminals of all components (wiring harness side), which were disconnected from the wiring harness during this trouble shooting session

or

- Defective component:
  S29 Switch - Stop Lamp, Single

C-12 - Solenoid Valve Circuit

T01 - Result: Mechanical Fault

Work Order Description	Nominal Value
Is the following Diagnostic Trouble Code stored? C0550 Brake System Or Electronic Control Unit (ECU) Malfunction	

Yes:E01	No:E02

E01 - Result: Mechanical Fault

- Defective component:
  ABS, Hydraulic Unit

or

- Check brake system (except ABS-system) for function

Note:

The trouble code may also be recognised if the brake is mechanically defective.

E02 - Result: Defective Component

- Defective component:
  A2 Control Unit - Anti Lock Brake System

C-13 - ABS Telltale Circuit

T01 - Check: Component

Work Order Description	Nominal Value
• Ignition ON	Is at least one of the following components

	switched on? H1.2 Telltale - Oil Pressure H1.1 Charging Indicator Lamp

Yes:T02	No:E04

T02 - Check: Short to Voltage/Interruption of Signal Circuit

Work Order Description	Nominal Value
• Ignition OFF • Disconnect wiring harness connector from: A2 Control Unit - Anti Lock Brake System • Ignition ON	Is the following telltale ON? H1.5 Telltale - Anti Lock Brake System

Yes:T03	No:E03

T03 - Check: Short to Ground of Signal Circuit

Work Order Description	Nominal Value
• Open short circuit contact in wiring harness connector terminal 20	Is the following telltale OFF? H1.5 Telltale - Anti Lock Brake System

Yes:E01	No:E02

E01 - Result: Defective Component

- Defective component:
  A2 Control Unit - Anti Lock Brake System

E02 - Result: Short to Ground

- Short circuit to ground between:
  Instrument
  Wiring harness connector (wiring harness side) terminal B12
  &
  A2 Control Unit - Anti Lock Brake System
  Wiring harness connector (wiring harness side) terminal 20

or

- Defective component:
  Instrument

E03 - Result: Short to Voltage/Interruption

- Short circuit to voltage/interruption of circuit between:
  Instrument
  Wiring harness connector (wiring harness side) terminal B12
  &
  A2 Control Unit - Anti Lock Brake System
  Wiring harness connector (wiring harness side) terminal 20

or

- Defective component:
  H1.5 Telltale - Anti Lock Brake System
  or
  Instrument

E04 - Result: Defective Component

- Following system/component is faulty:
  Instrument