



Operating Instructions

for the WABCO
Diagnostic Controller 446 300 320 0
with Program Card

ECAS 4x2-A 446 300 521 0

or

ECAS 6x2-A 446 300 527 0

or

ECAS BUS-A 446 300 529 0



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Abbreviations used

ECAS	Electronically Controlled Air Suspension
ECU	Electronic Control Unit
Counts	unit of measurement for movement or pressure sensor values
AA	drive axle
HA	rear axle
LA	lift axle
SA	trailing axle
VA	front axle
k(Ω)	kilo(ohm)
4x2	description code: 4 wheels, two of them driven
6x2	description code: 6 wheels, two of them driven
KW	calendar week
V1	version 1

1. BRIEF DESCRIPTION OF THE “ECAS” SYSTEM

The ECAS electronics 446 055 ... 0, combined with movement sensor 441 050 ... 0, solenoid valve 472 900 / 905 ... 0 and operating unit 446 056 ... 0, operates the automatic level regulation of commercial vehicles with air suspension. Distinctions are drawn between 4x2, 6x2 and bus systems with an appropriate range of equipment (eg., partial air, full air, trailing axle, lift axle).

The ECAS system regulates the specified level by continuous comparison between the actual heights measured (on an inductive basis) by the movement sensors, and the specified heights stored in the electronics. In the event of deviations between these values, solenoid valves are activated and the airbags pressurized or depressurized until the specified level is again achieved. The specified level can be the standard level (running level), but it can also be any other stored level.

All height adjustments take place within pre-selectable tolerance limits.

Adjustments to the level are introduced in a matter of seconds when the vehicle is at a standstill. In motion (recognized by a tachometer signal), they only take place after a delay of approximately 60 seconds.

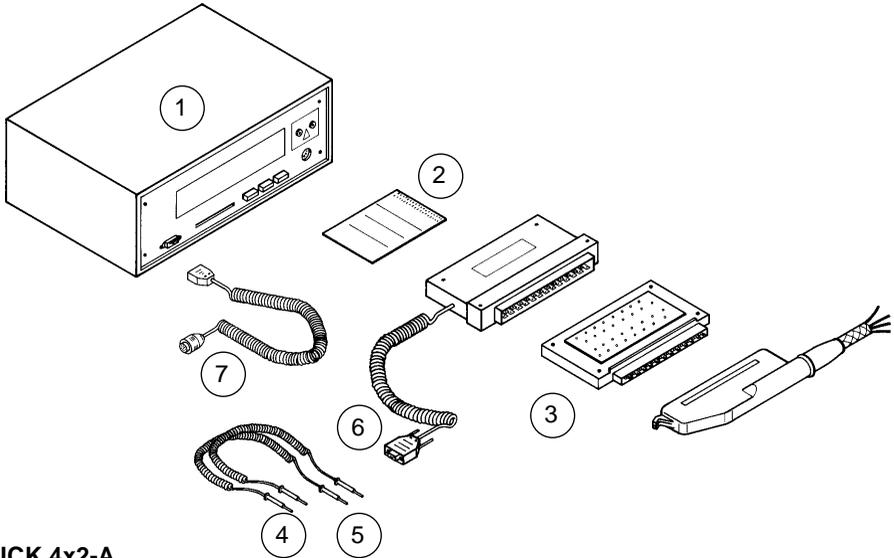
The level can be deliberately altered using the ECAS operating unit (truck) or the operating switch (bus). After the change has been completed, it is then stored as the new specified level. Re-adjustment takes place automatically if there is a change in load.

The ECAS can fulfil other functions:

- automatic upper and lower height limitation
- correction of transverse stability
- level and pressure checks
- fault recognition and display
- raise/lower lift-axle
- load/unload trailing axle
- start-up assistance
- zero-point adjustment with raised lift-axle
- LSV control
- maintenance of residual pressure to avoid crushing the airbags
- kneeling (for buses), lowering over one wheel, or the whole side, to assist boarding at bus stops
- start-up lock (for buses)
- door release (for buses)
- storage and retrieval of freely selectable levels by means of the operating unit

When faults are recognized, the indicator lamp lights up, and the faults are permanently stored for diagnostic purposes in the control electronics.

2. DIAGNOSTIC COMPONENTS



TRUCK 4x2-A

1	Diagnostic controller	446 300 320 0
	Program card	446 300 521 0
3	25-pin measuring adaptor	446 300 311 0
4	Multimeter cable, black	894 604 301 2
5	Multimeter cable, red	894 604 302 2
6	25-pin connecting adaptor	446 300 317 0
	or	
7	Connecting cable (ISO 9141)	894 604 303 2

ECAS 6x2-A or ECAS Bus-A

1	Diagnostic controller	446 300 320 0
2	Program card 6x2-A or	446 300 527 0
	Program card Bus-A	446 300 529 0
3	35-pin measuring adaptor	446 300 314 0
4	Multimeter cable, black	894 604 354 2
5	Multimeter cable, red	894 604 355 2
6	35-pin connecting adaptor	446 300 316 0
	or	
	universal 35-pin connector adaptor	446 300 327 0
	or	
7	Connecting cable (ISO 9141)	894 604 303 2

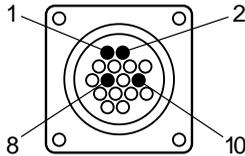
	The Diagnostic Controller Set	446 300 331 0
	consists of Diagnostic Controller	446 300 320 0
	and carrying case	446 300 022 2

3. CONNECTIONS

3.1 Vehicle with an ISO 9141 Central Diagnostic Socket

The diagnostic socket in the vehicle must correspond to the pin allocation in ISO 9141 as given below. To record the diagnosis, plug the connecting cable to the vehicle's ISO socket.

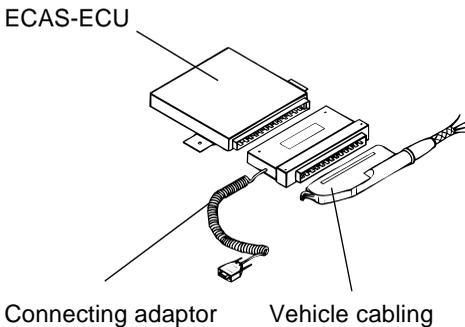
Pin allocation in the diagnostic socket:



- 1 Battery positive - (terminal 30)
- 2 Battery negative - (terminal 31)
- 8 Diagnostic K-cable
- 10 Diagnostic L-cable

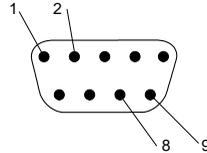
3.2 Vehicles without ISO 9141 Central Diagnostic Socket

If the vehicle does not have an ISO 9141 diagnostic socket, connect the diagnostic controller using a connecting adaptor (accessory). With the ignition switched off, the connecting adaptor is plugged in between the vehicle cabling and the electronics.



When the diagnosis has been completed, the connecting adaptor must be removed!

Using the connecting adaptor, the pin allocation of the DB-9 „Diagnostic Input“ plug on the front of the diagnostic controller is as follows:



- 1 Battery positive (terminal 30)
- 2 Battery negative (terminal 31)
- 8 Diagnostic K-cable
- 10 Diagnostic L-cable

Connect the 9-pin plug of the connecting cable or connecting adaptor to the diagnostic controller. This provides both the diagnostic connection and the power supply. Black bars appear on the display screen.

The connecting adaptor's red rocker switch must be in the "1" position; this ensures the power supply to the ECU.

Push the program card into the special slot. Ensure that the side of the card with the contacts is uppermost.

The following display or a similar one appears, depending on the program card. If not, refer to Section 7, Fault Causes.

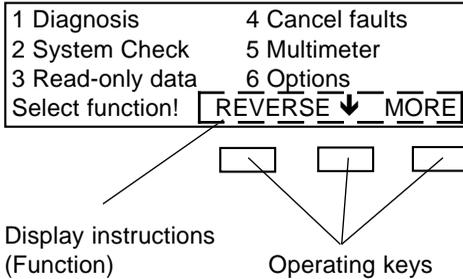
ECAS 6x2
Version 1.00 (English) **START**



The first screen displays the System and version (1.00 in the example). Press the right-hand key.

4. OPERATING THE DIAGNOSTIC CONTROLLER

The diagnostic controller is operated by means of 3 operating keys on the front, or via the external keypad. The assignment of keys depends on the instructions which appear on the display directly above the keys.



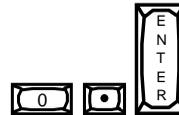
Key	Function
START	start program
EXIT	display reverts to previous menu or program step.
(ARROW)	selection of an item in the main menu.
↓	The next menu item is selected each time the key is depressed. The selected menu item flashes.
CONTINUE:	the menu item selected before is activated/cancelled.
ESCAPE	in the event of malfunction you can escape from the current function.

Operating the External Keypad 446 300 328 0



The external keypad facilitates entry of numerical values. The keypad is not absolutely essential for the program cards described in these instructions.

Functions are only assigned to the marked keys.



The keys can be used instead of the three operating keys on the diagnostic controller.

Exception: if it is necessary to enter figures during the program, this function does not apply.

Using the ten-key block ... it is possible either to enter numerical data (for example ISO addresses) or to select numbered items from the main menu.



Using the  key, the menu item indicated is executed. The key has the same function as the controller key CONT.



Using , you can revert to the previous main menu displayed.



Using , when there is a series of data displayed (eg., parameter, function test, calibration data), you can revert to the previous display.

5. PROGRAM STRUCTURE

Menu Selection ECAS 4x2-A 446 300 521 0

- 1 Diagnosis
 - 1 Fault finding
 - 2 Control
 - 1 Lift/lower
 - 2 Pressurize-valve
 - 3 Lamp test
 - 4 LSV (optional)
 - 3 Test and Measurement Values
 - 1 Movement sensor values
 - 2 Tachometer signal
 - 3 Switch settings
 - 4 Remote operation
 - 5 Test of the L-cable
 - 4 Control Equipment Data
 - 1 Parameters
 - 2 WABCO data
 - 3 Memory data
 - 5 Functional Test
 - 6 Calibration
 - 1 Calibrate
 - 2 Display calibration data
- 2 System Check
- 3 Read-Only Data
- 4 Cancel faults
- 5 Multimeter
 - 1 Direct current
 - 2 Alternating current
 - 3 Resistance
- 6 Options
 - 1 ISO addresses
 - 1 Help messages
 - 3 Version
 - 4 Testable ECUs

Menu Selection ECAS 6x2-A 446 300 527 0

- 1 Diagnosis
 - 1 Fault finding
 - 2 Control
 - 1 Lift/lower
 - 2 Pressurize-valve
 - 3 Lamp test
 - 4 Lift-axle/bag
 - 5 LSV (optional)
 - 3 Test and Measurement Values
 - 1 Movement sensor values
 - 2 Tachometer signal
 - 3 Switch settings
 - 4 Remote operation
 - 5 Test of the L-cable
 - 6 Voltage
 - 4 Control Equipment Data
 - 1 Parameters
 - 2 WABCO data
 - 3 Memory data
 - 5 Functional Test
 - 6 Calibration
 - 1 Calibrate
 - 2 Display calibration data
- 2 System Check
- 3 Read-Only Data
- 4 Cancel faults
- 5 Multimeter
 - 1 Direct current
 - 2 Alternating current
 - 3 Resistance
- 6 Options
 - 1 ISO addresses
 - 2 Help messages
 - 3 Version
 - 4 Testable ECUs

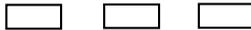
Menu Selection ECAS Bus-A 446 300 529 0

- 1 Diagnosis
 - 1 Fault finding
 - 2 Control
 - 1 Lift/lower
 - 2 Pressurize-valve
 - 3 Lamp test
 - 4 Control outputs
 - 5 Throttle test
 - 6 Kneeling function
 - 3 Test and Measurement Values
 - 1 Movement sensor values
 - 2 Tachometer signal
 - 3 Switch settings
 - 4 Voltages
 - 5 Pressure sensor value
 - 4 Control Equipment Data
 - 1 Parameters
 - 2 WABCO data
 - 5 Functional Test
 - 6 Calibration
 - 1 Calibrate movement sensor
 - 2 Display movement sensor data
 - 3 Calibrate pressure sensor
 - 4 Display pressure sensor data
- 2 System Check
- 3 Multimeter
 - 1 Direct current
 - 2 Alternating current
 - 3 Resistance
- 4 Options.
 - 1 ISO addresses
 - 2 Help messages
 - 3 Version
 - 4 Testable ECUs

5.1 Diagnosis

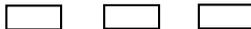
When the diagnostic function is called up from Menu Item 1, the connection is made to the ECAS control unit.

1 Diagnosis	4 Cancel faults
2 System Check	5 Multimeter
3 Read-only data	6 Options
Select function!	EXIT ↓ CONT.



Let the cursor flash on „1“, and press the "CONT." key (the example shown here is for the ECAS 6x2-A).

Equipment type : ECAS 6x2
WABCO Equipment No. : 446 055 040 0
Production date: KW 38.1991
Software No.: 1.0.0.0 CONT.



The ECAS ECU data are displayed.

1 Fault finding	4 Control equip't data
2 Control	5 Functional test
3 Test & measurem't values	6 Calibration
Select function!	EXIT ↓ CONT.



The following functions can be selected in diagnostic mode, and the indicator lamp flashes or lights up, depending on the system.

5.1.1 Fault finding

If the ECAS control unit has detected a fault in the system (indicator lamp lights up or flashes), this function will help to find the fault. Depending on the ECAS system and the type of fault, the following information is displayed:

- Cause and location of fault displayed in clear, eg., "fault in movement sensor rear right", "cable break or impedance too high".
- Indication of how frequently the fault has occurred.
- The display "fault currently present" means that the fault was still present when the diagnostic mode was selected. There then arises a more detailed fault finding path with concrete instructions for fault correction. An example is given on page 15. The display "fault is not currently present" means the fault was not present when diagnostic mode was selected, ie., the fault cannot be found through the fault finding process (electrical measurements). An example of this is an intermittent contact.

On selection, electrical measurements (resistance, for example) can be carried out using the integral multimeter with the aid of the measuring adaptor. To this end, the desired and actual values are displayed.

After confirmation that repair has been carried out, the fault is cancelled in the ECU. It is only possible to quit the fault search path when all faults have been cleared or when the ignition is switched off.

5.1.2 Control

Using the "Control" function, specific components in the ECAS system can be controlled and their function checked. For the ECAS 6x2-A and ECAS Bus-A programs the following applies: if a fault is detected during the control of the valves, a fault is reported and the control remains ineffective (for example, obstruction in valve, front axle).

Lift/Lower

Using this function it is possible – depending on the equipment – to control the solenoid valves on the front and rear axle and/or the individual airbags, and to read of the movement sensor values on the display. The relevant movement sensor value can be increased by operating the pressurize key.

This value can be decreased by operating the depressurize key.

If no movement sensor is connected, the value “255” appears at the relevant point. When there is a short circuit “0” is displayed.

Pressurize-valve

The “pressurize-valve” or “central 3/2-way valve” is in series with the 2/2-way valves, and determines whether “Lift” or “Lower” operates. It is switched exclusively by the ON key, independently of the 2/2-way valves. The movement sensor values must not change after the key has been operated; if they do, there is a leak in one of the 2/2-way valves.

Lamp Test

Depending on the system, using the lamp test, various lamps can be switched on by a keystroke. These can include the indicator lamp, warning lamp, display lamp(s) for raised lift-axle, and start-up assistance.

Lift-axle (display depends on system)

The lift-axle can be raised or lowered. By using the RAISE or LOWER key, the valves on the lift-axle and the airbag valve can either be operated for 5 seconds or for the length of time the key is depressed. The “5 sec.” control position should be selected for a complete lift or lower operation.

Control Outputs (only for Bus-A)

The start-up lock and door release can be controlled. By pressing the “A” or “B” keys, the display shows whether the start-up lock and/or door release are switched on or off.

Load Sensing Valve

(display depends on system)

By pressing the key marked “A” a solenoid valve is triggered which supplies the LSV regulator with supply pressure instead of airbag pressure.

Throttle Test (only for Bus-A)

With this function it is possible to trigger the transverse throttle or the main stream throttle.

Kneeling Function (only for Bus-A)

Depending on the options selected, the appropriate valves are triggered to test the kneeling function.

5.1.3 Test and measurement values

Movement Sensor Values

The current movement sensor values are displayed.

Tachometer Signal

With this function, the connection to the signal output of the tachometer can be checked. The vehicle must first be brought up to a speed, for instance on a rolling test rig, at which the tachometers gives a signal (faster than 1 km/h) .

Switch Settings

This function permits the status of various switches to be displayed. Operate switch in vehicle for this.

Remote Operation

The function of the ECAS operating unit and/or the operating switch/key can be checked. Connect operating unit and operate all keys one after another. The display indicates the key being operated.

Test of the L-cable

An automatic check is made to ascertain whether the "L-cable diagnosis" has a short circuit or a break.

Voltage (display depends on system)

The current value for the operating voltage and, if applicable, the voltages of the valve relays are indicated.

Note: the valve relay voltage is approximately 0.7 V lower than the operating voltage.

Pressure Sensor Value (display depends on system)

The current pressure sensor value is displayed.

5.1.4 Control Equipment Data

Parameters

The parameters are system-specific ECU settings which can be displayed by means of the diagnostic controller. With the accompanying program card 446 300 5.. 0 the parameters cannot be altered.

WABCO Data

The ECAS control equipment data are displayed. These are ECU model, equipment number, production date and ECU software number.

Memory Data (not for Bus-A)

The values for M1 and M2 stored in memory using the ECAS operating unit are displayed as count values for the movement sensors. These values have been stored by means of the ECAS operating unit by simultaneously pressing the "STOP" and "M1", or "STOP" and "M2" keys.

5.1.5 Functional test

This section combines items 5.1.2 "Control" and 5.1.3 "Test and Measurement Values". The test procedures, which are set out here in another sequence, enable all system components to be checked in turn. Selection of this segment is particularly recommended after comprehensive repairs. On the other hand, item 5.2 "System Check" is to be selected for the initial installation of the ECAS system.

5.1.6 Calibration

The system calibration is intended largely to counter the installation tolerances which arise when the ECAS is installed, together with equipment tolerances. Re-calibration is also necessary when sensor or electronics are changed.

How is the calibration made?

Using the "Control" key, the vehicle is brought to the desired normal level (running level). By operating the keys, the actual level is stored as the normal level. Depending on the system, further levels (upper and lower level) are calibrated in the same way.

Note: at least the normal level must be known, for instance as a distance between the frame and the axle, in accordance with the vehicle manufacturer's data. It should also be known whether the upper and lower level are the buffer stops, for instance, or whether other levels must be calibrated.

Fault recognition during system calibration

If the calibration is recognised as being incorrect, the calibration data can be read using the "display calibration data" menu item. The calibration level positions must have a clear and unambiguous allocation.

A calibration must fulfil the following requirements:

- a) the movement sensor values entered must be >4 counts and
- b) <255 counts
- c) the upper stop level must be greater than normal level (in counts) + $3 \times$ (tolerance of specified level) + 3 counts
- d) the lower stop level must be less than normal level - $2 \times$ (tolerance of specified level).

Note: the tolerances of the specified level front/rear are laid down in parameter 6/7 (ECAS 4x2-A) and parameter 7/8 (ECAS 6x2-A) and parameter 10/12 (ECAS Bus-A).

Display Calibration Data

The calibration data stored in the ECAS control unit are displayed.

Calibrate Pressure Sensor (optional)

The pressure sensor is calibrated at atmospheric pressure. The connected

airbag is completely depressurized using the operating keys on the Diagnostic Controller.

Display Pressure Sensor Value (optional)

The calibrated value of the pressure sensor is displayed.

5.2. System Check

After the installation of the ECAS system a complete test of the system can be carried out using the "system check" function. The appropriate wiring diagram for the system must be used:

- electrical measurements of the components using the integral multi-meter
- control of the components (see 5.1.2 for explanation)
- test and measurement values (see 5.1.3 for explanation)
- calibration of the system (see 5.1.6 for explanation)

5.3. Read-only Data (free-running protocol - not for Bus-A)

This function is only possible with some ECUs. After switching on the ignition, the ECAS control unit provides recurring data messages with the following content:

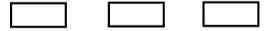
- customer-specific data
- current and stored fault, numbers
- system-specific values

The data messages can be displayed under this menu item.

5.4. Cancel Faults (not for Bus-A)

This function is to cancel all faults stored at one time. If the fault is still present, it is immediately re-entered in the ECU. The "Cancel Faults" function is only possible with certain ECUs.

1 DC Voltage	3 Resistance
2 AC Voltage	
Select function!	EXIT ↓ CONT.



5.5. Multimeter

Application:

Direct voltages: vehicle supply system voltage

Resistances: valves, relays, sensors, line dip

Electrical measurements can be carried out within the range appropriate to the vehicle (low voltage) by using the integral multimeter function. To do this, only the desired measurement function (direct current, alternating current or resistance) need be selected. The range of measurement is set automatically by the equipment.

Warning:

The measuring equipment may only be used within the following ranges:

Range	Display definition	Accuracy of extreme value in range at 20 °C	
DC			
2.0 Volt	0.1 Volt	± 0.2 %	± 0.0 Volt
20.0 Volt	0.1 Volt	± 0.2 %	± 0.1 Volt
50.0 Volt	0.1 Volt	± 0.2 %	± 0.1 Volt
AC			
2.0 Volt	0.01 Volt	± 0.6 %	± 0.02 Volt
35.0 Volt	0.1 Volt	± 0.6 %	± 0.4 Volt
Resistance			
20.0 Ω	0.1 Ω	± 0.3 %	± 0.1 Ω
200.0 Ω	0.1 Ω	± 0.2 %	± 0.1 Ω
2.0 kΩ	1.0 Ω	± 0.2 %	± 1.0 Ω
20.0 kΩ	10.0 Ω	± 0.1 %	± 10.0 Ω
95.0 kΩ	100.0 Ω	± 0.2 %	± 100.0 Ω

5.6. Options

Options include the following sub-sections:

ISO Addresses

The DIAGNOSTIC CONTROLLER uses the ISO address to communicate with the appropriate vehicle electronics when the system starts up. Using the ISO address, the ECU recognises that it has to commence data traffic with the CONTROLLER. Each type of electronics therefore has its own amendable address (for example ECAS articulated bus = 16, trailer = 17).

Help messages

This function gives the operator the possibility of obtaining additional assistance in operating. If the function is switched on at suitable points between the program steps, more detailed explanations of the program appear.

Versions

Hardware:	V1 multimeter: V1
Operating system:	V3.1 (7.3.91)
Program:	V1.00 (3.3.93)
Checksum:	BC 99 (hex) CONT.



This function shows the as-delivered status of the Controller used and of the program card:

- controller hardware
- controller operating system with version and production date
- multimeter version
- program card with version, production date and checksum

Testable ECUs

The display indicates which ECAS electronics can be tested with this program card.

Basically, however, other (future) ECAS ECUs of the same type series will also be testable, so that the program card – within certain limits – is upwardly compatible.

Cards 446 300 5.. 0 basically recognise whether the ECU is testable. If not, they automatically prevent diagnostic operation (see “Malfunctions”).

Program card	Testable ECUs *
ECAS 4x2-A	446 055 020 0
446 300 521 0	↓
	446 055 026 0
ECAS 6x2-A	446 055 040 0
446 300 527 0	446 055 041 0
	446 055 042 0
	446 055 044 0
	446 055 046 0
	446 055 047 0
ECAS Bus-A	448 055 050 0
446 300 529 0	446 055 051 0
	446 055 052 0
	446 055 054 0

* as at 09/1995



6. EXAMPLE OF FAULT FINDING "MOVEMENT SENSOR CABLE BREAK" (6x2)

The fault finding is explained in this section, using an example.

Two faults are stored in the ECAS-ECU

CONT.

This display only appears if more than one fault has been stored.

Fault in rear left movement sensor (Cable break or impedance too high)
The fault is currently present!
(1x occurred) CONT. REPAIR

Fault location (movement sensor rear left) and type (cable break or impedance) are displayed.

In addition, there is an indication of whether the fault was actually present when the diagnosis started.

If the fault occurs several times (eg., an intermittent contact) the frequency is indicated

The fault search is started with the REPAIR key.

Any further faults present are then revealed by using "CONTINUE" key. Press "REPAIR" to initiate the fault finding path.

Check rear left movement sensor line and plug connection for damage.
Fault found?

NO YES

Check components visually for damage. If fault has been found, confirm with "YES". If not, answer "NO" to go on to the next step.

Switch off ignition!
THEN disconnect ECAS ECU
connect measuring adaptor
and switch on ignition! CONT.

Always switch off the ignition when disconnecting the ECU! The measuring adaptor must be firmly plugged into the cabling plug.

ECAS 4x2: measuring adaptor 25-pin

ECAS 6x2: measuring adaptor 35-pin.

Note: If the 25-/35-pin connecting adaptor is used, the power supply can be switched off at the adaptor's rocker switch (corresponds to "Ignition Off"). This way the Diagnostic Controller remains in operation.

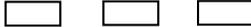
Measure resistance: PIN 25/27
Should be: 100 - 140 Ω is: 95 kΩ
Check actual value!

LOW OK HIGH

Connect multimeter cables (red and black) to the multimeter sockets on the Diagnostic Controller. In this example, the test probes must be plugged into sockets 25 and 27 of the measuring adaptor. Compare the actual value (the measured value) with the specified value. Using the appropriate key, enter whether the actual value is LOWER, within

the tolerance range OK or GREATER than the specified value (on the display illustrated, the actual value is greater than the specified value).

Sensor, line or plugged connection faulty.
Change defective part.
CONT.



Test the relevant parts and, if necessary, change them.

Note: because there is a cable break the location of the fault cannot be more precisely determined. The parts must be tested individually.

In the event of more than one fault, the display would now show the other faults. If all faults have been indicated according to the same or similar repair instructions, the following screen appears:

The ECAS control equipment has no FURTHER faults stored
CONT.



No further faults are stored.

Switch off ignition!
THEN disconnect measuring adaptor, connect ECAS ECU and switch on ignition!
CONT.



Always switch off the ignition when disconnecting the ECU, or operate the rocker switch on the adaptor!

All REPAIRED faults have been cancelled in the ECAS ECU!
CONT.



Note: only faults which have been repaired have been cancelled.

The ECAS control equipment has NO faults stored
CONT.

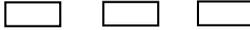


The fault memory is read again for checking purposes. The display indicates that no fault is stored in the ECU. Otherwise the fault search would recommence.

To quit the fault search path press CONT.

7. MALFUNCTIONS “DIAGNOSIS”

No display



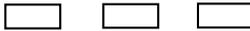
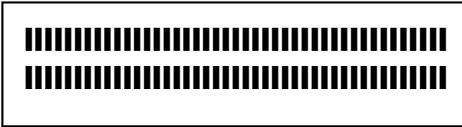
Cause

- no power supply
- low voltage (less than approx 7 V)

Remedy

- check all plugged connections
- check supply voltage

Black “bars”

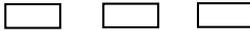
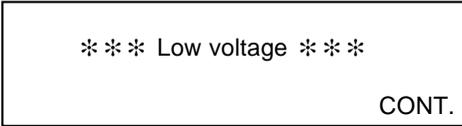


Cause

- program card not pushed in

Remedy

- push program card in as far as the stop



Cause

- Supply voltage too low (only during diagnostic operation)

Remedy

- check battery load capacity, and ensure adequate supply.

*** Initialization error ***
 Switch on ignition!
 Check diagnostic connection
 and ISO address! CONT.

Cause

- Supply voltage too low (less than 18 V)
- No supply voltage (ignition off)
- ISO address incorrect
- Incorrect ECU, or no ECU connected
- Diagnostic line broken or transposed

Remedy

- ensure adequate supply
- switch on ignition, or operate rocker switch on adptor
- re-enter ISO address.
 Pre-set ECAS: address 16
 (see 5.6 "ISO Address")
- check ECU and connection
- check function and correct allocation of lines and connections

*** Incorrect passwords ***
 no diagnosis possible!
 CONT.

Cause

- Incorrect ECU connected
- Incorrect "WABCO data" in ECU, or ECU defective

Remedy

- check ECU part number
- if correct ECU is installed, exchange it.

*** Defective program card ***

Cause

- Defective program card
- Incorrect program card
- Program card not fully inserted

Remedy

- change program card
- push program card in as far as the stop

*** Communications break ***
Re-start diagnosis!

CONT.



Cause

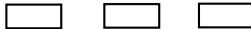
- data transfer interrupted during diagnosis
- line or voltage interruption during diagnosis

Remedy

- check all connections
- a) ISO plug in vehicle: - switch on ignition
- b) Connection adaptor:
 - set red rocker switch in "1" position

*** Unrecognized control unit ***
No diagnosis possible with this
program card!

CONT.



Cause

- ECU cannot be tested with this program card
- EEPROM (non volatile memory of diagnostic controller) defective

Remedy

- use correct program card
- repair diagnostic controller

Notes:
