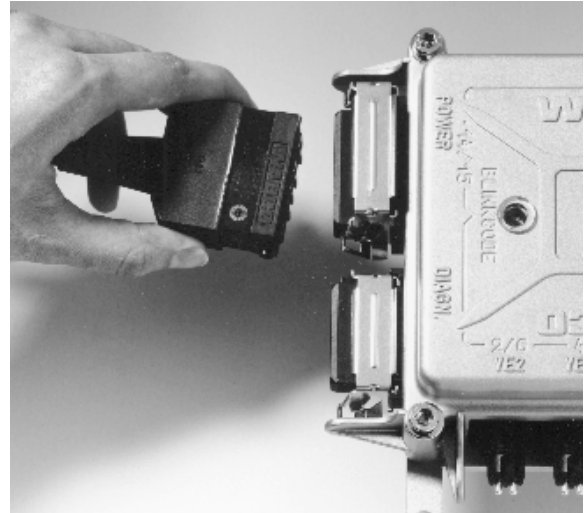


WABCO



**Blinkcode of
VARIO COMPACT
Trailer ABS**

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Blinkcode Vario Compact

With the development of the Vario Compact ABS (VCS) WABCO have considerably improved the well-known flash code of the Vario C.

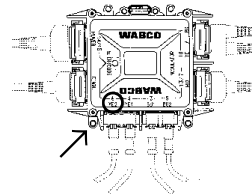
The essential improvements are:

- Flash code split into normal and expert modes
- For the first time it is possible to start-up correctly with the flash code plug.

1. Explanatory notes on the flash code

1.1. Normal mode - automatic display without auxiliary equipment with integral LED

The normal mode gives a quick and simple display of the current faults without any auxiliary equipment such as flash code plug or tester. The flash code LED in the electronics box starts up immediately a fault occurs. Only the faulty components will be displayed and they can be clearly matched to the figures marked on the ECU casing.



Example:

The LED flashes 6x. The faulty components is YE 2 (sensor YE 2).

Result: The sensor or the cable from socket YE 2 is faulty.

The LED display flashes
double identification
on ECU top:

7x modulator fault
13x retarder fault
14x fault on supply cable or
system difference
15x ECU fault

When the fault has been cleared the flash code LED automatically goes out after the ignition has been switched OFF and ON again.

Trigger (activation) normal mode by trigger plug: Press key on flash code plug once for 1 second. This can be important if the vehicle has an external diagnostic cable and the LED display is obscured.

1.2. Expert mode (only possible with flash code plug)

The expert mode enables skilled workshop personnel to accurately diagnose faults. Then the system configuration and all stored faults are shown. The activation of expert mode is only possible with the flash code plug WABCO no. 446 300 334 0.

Special features of the flash code plug: When the key is pressed it is confirmed by a lamp reaction. Key released = lamp off, key pressed = lamp on. As soon as the lamp goes out, it can be activated again.

Expert mode trigger: The key is pressed twice for 1 sec. After activation first of all, the system recognised will be indicated. If there are stored faults, these will be indicated once. Then expert mode ends and the LED goes back to normal status. If the fault store has to be shown again it will need to be activated again.

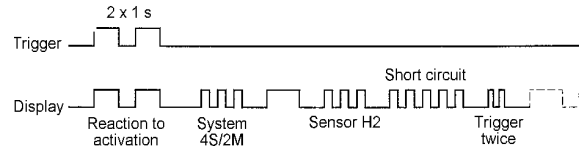
System display:

Display	System
2	4S/3M
3	4S/2M
4	2S/2M
5	2S/1M
7	4S/3M + Retarder
8	4S/2M + Retarder
11	4S/3M + ISS
12	4S/2M + ISS
13	2S/2M + ISS
14	2S/1M + ISS

Fault display: The faults are shown in 3 parts:

Faulty component	Fault type	Fault frequency
1st place	2nd place	3rd place
3	5	2

Beispiel:



According to the fault list sensor H2 (c) is the “**faulty components**” a cable break or short circuit the “**fault type**”. The fault has occurred twice, the “**fault frequency**”.

In expert mode the fault can therefore be accurately identified!

The output of two faults is separated by a flash that lasts 2.5 seconds. The first fault shown is also generally the one that occurred last.

The frequency of a fault always refers to the component and not the type of fault.

Fault numbering

Component	Fault-type	Explanation	
3	5	Cable break, short circuit	
3	7	Air gap	Sensor fault H2 (c)
3	10	Speed jump	
3	11	Tyre pressure	
4	5	Cable break, short circuit	
4	7	Air gap	Sensor fault H1 (d)
4	10	Speed jump	
4	11	Tyre pressure	
5	5	Cable break, short circuit	
5	7	Air gap	Sensor fault Z2/L2 (e)
5	10	Speed jump	
5	11	Tyre pressure	
6	5	Cable break, short circuit	
6	7	Air gap	Sensor fault Z1/L1 (f)
6	10	Speed jump	
6	11	Tyre pressure	
7	3	External power supply	
7	5	Cable break	Modulator fault L (A)
7	6	Short circuit to ground	
7	12	ECU internal failure	
9	3	External power supply	
9	5	Cable break	Modulator fault H2 (C)
9	6	Short circuit to ground	
9	12	ECU internal failure	
10	3	External power supply	
10	5	Cable break	Modulator fault H1 (B)
10	6	Short circuit to ground	
10	12	ECU internal failure	

Component	Fault-type	Explanation	
13	3	External power supply	
13	5	Cable break	Retarder activation
13	6	Short circuit to ground	
13	12	ECU internal failure	
14	2	System not identical	
14	3	Overvoltage	
14	4	Undervoltage	
14	5	Warning lamp earth faulty	System fault
14	12	Shut-off paths faulty	
15	9	EMI failure	
15	12	ECU internal fault	

2. Clearing one or more current faults

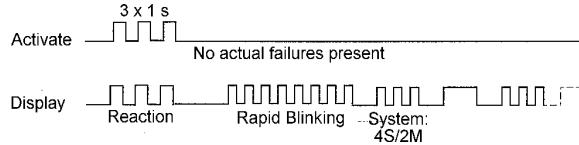
Irrespective of the mode (expert or normal) after a fault has been cleared the ignition must always be switched OFF and ON, so that that the ECU will know the fault has been eliminated.

2.1. Clearing the fault memory (clear all)

If there is no current fault, in expert mode the fault memory can be completely cleared. To do this it is necessary to activate 3 times for 1 second. Success will be indicated by rapid flashing of the LED. Then the system will permanently flash out.

The system is then in start up mode

Example : CLEAR ALL



3. Specifying the system (System set)

If the system installed in the vehicle is not identical to the one pre-set in the ECU, it needs to be reset. To do this in expert mode, activate the plug 3 times for 1 second.

Then the re-identified system is flashed out. In order to execute the set-up, this system must be confirmed. After the system has been flashed out 3 times it needs to be activated for 3 seconds.

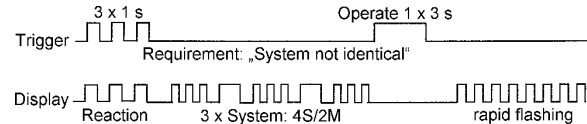
The completed system set is also confirmed by rapid flashing. The fault memory is now automatically cleared. Then the new system is permanently flashed out.

The system is then in start-up mode.

Requirements for system set:

- Fault, "System not identical" (Fault 14-2) must be present.
- There is no other component fault currently present.

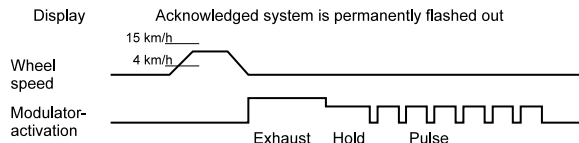
Example: system set



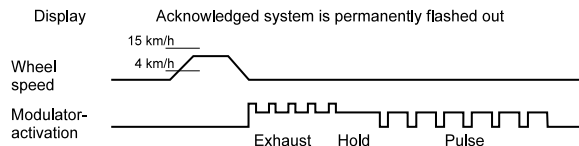
4. System Test

After the initial installation or alterations (repairs) to the ABS system, the correct pneumatic and electrical allocation need to be checked.

4.1. System Test - without brake pressure



Start up cycle for wheels Z1, Z2 and L2 (f, e) without brake pressure



Start up cycle for wheels H1, H2 and L1 (d, c) without brake pressure

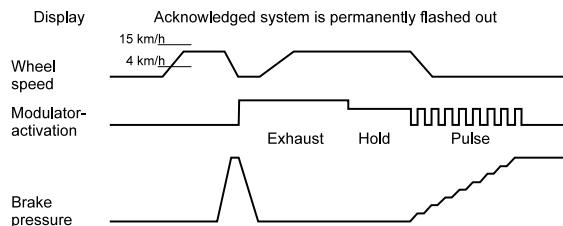
- Requirements:
- Fault-free system
 - Permanent flashing of system (after clear all or system set)
 - Rotate wheel by rolling road or manually (V=4-15 km/h)

- Testing:
- Turn one wheel then stop
 - ECU activates appropriate modulator as soon as the wheel stops.

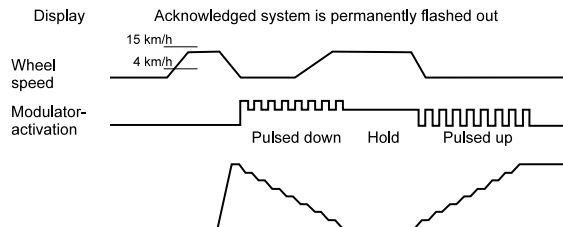
- Begin System Test
- After short wait the appropriate modulator is activated, exhaust 2 secs and hold 1 sec. Then pulsed up 8 times.

If you only wish to test the electrical sensor/modulator match, while the modulator is in operation the correct modulator can be determined by listening or contact.

4.2. System Test - with brake pressure



Start up cycle for wheels Z1, Z2 and L2 (f, e) with brake pressure



Start up cycle for wheels H1, H2 and L1 (d, c) with brake pressure

In order to fully check all the electrical/pneumatic sensor/brake chamber allocation, a compressed air supply is needed.

Requirements:

- Brake chamber pressure off
- Otherwise like starting up without brake pressure, see no. 4.

Testing:

- Turn wheel ($4 < V < 15$ km/h)
- Apply Brake
- Solenoid valve starts to activate, the rotated wheel brake chamber is exhausted and the wheel can now be rotated for 3 secs.
- If after pressure is exhausted wheel cannot be turned, sensor/chamber match is incorrect (for Z1, Z2 and L1, (f,e)).
- General starting up instructions: To achieve better differentiation wheels H1, H2 and L2 (d,c) are not immediately exhausted, but pulsed down.

Usually one modulator controls several wheels. However to be able to differentiate between H (c or d) wheels and Z (e or f) wheels with sensing of the wheels of one modulator, the exhaust cycles differ. The H axle is pulsed out 8x, the Z axle is fully exhausted. For the L axle L1 (f) and L2 (e) are different. Wheel L1 is pulsed down and L2 is fully exhausted.

5. Service Signal

The latest generation of VCS electronic units is equipped with an electronic notebook. In this notebook you can set various service signal for instance "grease slack adjuster" (the factory prescribed all 30,000 km).

After activating the function "Service Signal" and when 30,000 km have been reached, the warning lamp will blink fast 8 times after ignition.

You will need the compact tester for the modification or the activation of the service signal.

6. Summary

Activation:

- Normal mode: 1 x 1 second
- Expert mode: 2 x 1 second, pause 1 sec.

Normal mode:

- Current fault displayed once

Expert mode:

- Acknowledged system displayed once and all stored faults and fault frequency

Clear fault memory:

- Activate 1 sec 3 x, with 1 sec pause for each
- When cleared it will be confirmed by rapid flashing of LED.
- Only possible if no fault present

Set system parameters (system set)

- Activate 3 x 1 sec, with 1 sec pause for each
- Only possible if "System not identical" fault (14-2) present.
- No other fault may be currently present.

System test:

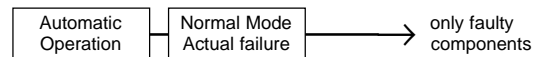
- Clear fault memory (CLEAR ALL) or system set (3 x 1 seconds)
- The system is permanently flashed out.
- Then a sensed wheel is turned and halted.
- The pertinent modulator is triggered by the electronic system.

Service Signal:

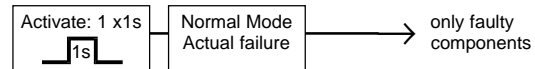
- As soon as the selected kilometer reading has been reached the warning lamp will quickly blink 8 times after ignition.

Normal mode

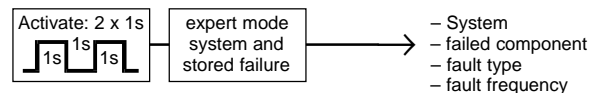
Integrated LED:



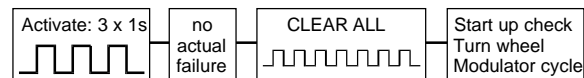
Blinkcode-Display:



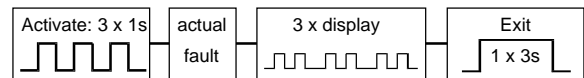
Expert Mode



Clear fault memory



Set system parameters



7. Other diagnostic possibilities

If the above diagnostic system seems to be too time consuming, WABCO offers you a more user-friendly troubleshooting device:

Compact Tester:

With this tester, for the first time it is possible to test trailer electronic systems type Vario C and VCS without documentation and carry out a proper system check procedure. The faults are logically matched to icons and easy to understand.

Wabco Compact Tester No. 446 300 400 0
Diagnostic cable 446 300 401 0

Diagnostic Controller:

This enables a full and comprehensive diagnosis to be carried out. This controller also incorporates a Multimeter. The ABS system test can also be printed out as a report.

Wabco Diagnostic Controller Set No. 446 300 331 0
VCS programme chart, German 446 300 624 0
English 446 300 651 0
Diagnostic cable for external connection 446 300 329 2

Notes:

Notes:

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