

WABCO



FLASH CODE
ABS VARIO-C SYSTEM

Description of the Flash Code

The flash code enables workshop personnel to locate problems in the ABS system quickly and accurately.

In general, with the VARIO-C system, faults are stored in the electronics and can be read off by means of the flash code.

This flash code is not a replacement for a final test after installation!

1. Operation

1.1 Provide adequate operating voltage for the electronics:

$U \geq 24V$ (or 12V in appropriate systems)

1.2 Undo the bolts in the cover of the housing, remove the cover and fold down.

Note:

- Protect the cover seal from damage.
- Pull the cable binder through the eyes on the side of the housing, and secure the cover against falling off.
- Keep the bolts in a safe place.

1.3 As shown in Fig. 1, change the position of the black test plug (the bridge between contacts "BK 6" and "BK 10") to start the flash code. After approximately 5 seconds the red warning lamp will start to flash.

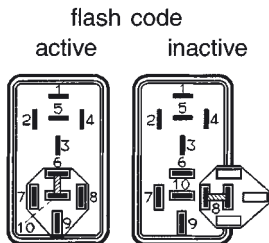


Fig. 1

1.4 Select the system / fault message given by the flash pulses of the red warning lamp, and read off the source of the failure from the fault list below.

1.5 Repair fault and/or eliminate source of failure.

1.6 Cancel the fault code in the electronics by removing the black test plug.

1.7 Wait until the current flash code is completed, and start the flash code again

(see 1.3) until finally, after the system code, the following fault code flashes out: -

0

 -

0

 .

- 1.8 Plug the black test plug into the parked position (see Fig. 1). Replace this list in the housing!
- 1.9 Place the cover on the housing and tighten the bolts evenly crosswise.

Note:

- Take care to ensure the seal surfaces are clean, and that the seal lies evenly all round.
- Do not trap any cable between the sealing edges.
- Protect the housing bolts against corrosion.

2. Explanation of the Flash Code

The VARIO-C electronic system has an internal non-volatile fault memory, i.e., faults recognized by the electronics are stored in a file even after the operating voltage has been switched off. If need be, they can be read off again by the workshop personnel.

This can be done by means of the integral flash

code, without the need of any expensive aids. A numerical code is given out by the flashing of the ABS warning lamp; either the one in the electronics or the external one in the truck. This numerical code is made up of three (3) positions, which have the following significance:

system code	fault code	
1st position	2nd position	3rd position

2.1 System Code (1st Position)

This indicates the system recognized by the electronics in accordance with Table 1.

2.2 Fault Code (2nd and 3rd Positions)

The detailed fault code indicates the faulty components or the cause of the failure in accordance with Table 2.

In doing so, the electronics distinguishes between current (i.e. existing now) and stored faults:

2.2.1 Current Faults

Current faults are those present when the ignition is switched on, and are indicated as a matter of

1st	2nd	3rd	System	Option
1	x	x	6S/3M	
2	x	x	4S/3M	
3	x	x	4S/2M	
4	x	x	2S/2M	
5	x	x	2S/1M	
6	x	x	6S/3M	*)
7	x	x	4S/3M	*)
8	x	x	4S/2M	*)
9	x	x	2S/2M	*)

*) with retarder control Table 1

priority. They must be repaired before further flash codes can be read off.

2.2.2 Stored Faults

Stored faults are not currently present in the electrical system. They are indicated in numerical order, i.e., with the higher numerical codes first.

It is not possible to draw conclusions about the chronological occurrence of the faults from this flash sequence.

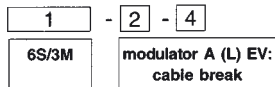
3. Chronological Sequence of the Flash Code

Approximately 5 seconds after the connection has been made between contact 6 and contact 10, the

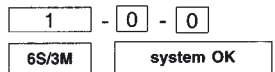
flash code commences with an initial message
 WL = 2.5 seconds OFF
 WL = 2.5 seconds ON
 WL = ABS-warning lamp (internal or external).
 Next the first, second and third positions of the flash code are indicated by an appropriate number of 0.5 second long flash pulses. In order to distinguish between the various positions, time intervals "WL = 2.5 seconds OFF" are interposed.

Example:

1.) Flash code with fault message (Fig. 2)



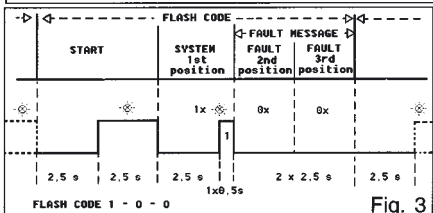
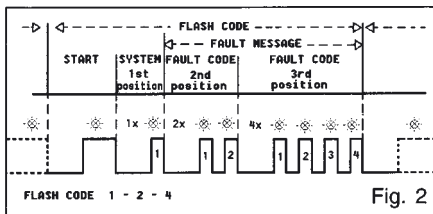
2.) Flash code without fault message — system code only (Fig. 3)



The active flash code is repeated a random number of times.

Note:

With the VARIO-C1 (approximate production date up to February 1992), the system is redefined each time



the ignition is switched on. This could lead to incorrect interpretations in the case of a few specific faults, if they occurred, for example, when the ignition was not switched on. With the VARIO-C2, the system configuration is stored in the electronics so that fault messages can always be displayed relative to the system. If the system stored in the electronics is not identical to that installed in the vehicle, the system gives the following flash code:

System - 1 - 1

- If this fault message appears, take the following action:
- remove the test plug
 - wait until the end of the current flash code
 - replace the test plug.

The flash code

System - 0 - 0

indicates the fault-free system which has been stored in the memory.

4. Cancelling the Fault Memory

After removal of the black test plug, the flash code is brought to an end, and at the same time the fault message is cancelled. If cancellation is to be prevented, the power supply to the electronics must be interrupted (put black test plug in "active" position). If a fault message will not cancel or if the flash code will not activate, change the electronics.

ABS VARIO-C FLASH CODE / Table 2

System Code Code 1.	Fault Code 2. 3.	Cause of Fault
	0 0	System OK
	1 1	Parameterize system (re-initialise flash code)
	1 2	Sensor B (L1): Sensor speed jump () = development designation
	1 3	Sensor B (L1): Air gap
	1 4	Sensor B (L1): Interruption of wire, short circuit
	1 5	Sensor D (H1): Sensor speed jump
	1 6	Sensor D (H1): Air gap
	1 7	Sensor D (H1): Interruption of wire, short circuit
	1 8	Sensor A (L2): Sensor speed jump
	1 9	Sensor A (L2): Air gap
	1 10	Sensor A (L2): Interruption of wire, short circuit
	1 11	Sensor C (H2): Sensor speed jump
	1 12	Sensor C (H2): Air gap
	1 13	Sensor C (H2): Interruption of wire, short circuit
	1 14	Sensor F (Z1): Sensor speed jump
	1 15	Sensor F (Z1): Air gap
	2 0	Sensor F (Z1): Interruption of wire, short circuit
	2 1	Sensor E (Z2): Sensor speed jump
	2 2	Sensor E (Z2): Air gap
	2 3	Sensor E (Z2): Interruption of wire, short circuit
	2 4	Modulator A (L) IV: Break in wiring
	2 5	Modulator A (L) OV: Break in wiring
	2 6	Modulator B (H1) IV: Break in wiring
	2 7	Modulator B (H1) OV: Break in wiring
	2 8	Modulator C (H2) IV: Break in wiring
	2 9	Modulator C (H2) OV: Break in wiring
	2 10	Modulator A (L) IV: Short to earth / ground
	2 11	Modulator A (L) OV: Short to earth / ground
	2 12	Modulator B (H1) IV: Short to earth / ground
	2 13	Modulator B (H1) OV: Short to earth / ground
	2 14	Modulator C (H2) IV: Short to earth / ground
	2 15	Modulator C (H2) OV: Short to earth / ground
	3 2	Contact 3 (supply plug) earth missing
	3 3	Undervoltage
	3 4	Break in wiring contact 7: retarder (ECU 446 105 051 0 only)
	3 5	Short circuit contact 7: retarder (ECU 446 105 051 0 only)
	3 6	} Earth break modulator A (L) [red] *) } or ECU *)
	3 7	
	3 8	} Earth break modulator B (H1) [yellow] *) } or ECU *)
	3 9	
	3 10	} Earth break modulator C (H2) [blue] *) } or ECU *)
	3 11	
	3 13	Permanent positive at contact 7: retarder (ECU 446 105 051 0 only)
	3 12	Overvoltage
	4 6	Modulator A (L) IV: Short circuit to positive
	4 7	Modulator A (L) OV: Short circuit to positive
	4 8	Modulator B (H1) IV: Short circuit to positive
	4 9	Modulator B (H1) OV: Short circuit to positive
	4 10	Modulator C (H2) IV: Short circuit to positive
	4 11	Modulator C (H2) OV: Short circuit to positive
	4 12	No operative modulator connected
	4 13	No operative sensor connected
	4 14	Short circuit to positive (contact 7) retarder (ECU 446 105 051 0 only)

SEE TABLE FOR SYSTEM CODE

*) With this fault, the system configuration flashed out is meaningless. Before changing the ECU, check the earth lead (yellow/green) of each valve against outlet and inlet valves again.

ABS VARIO-C SYSTEM

6S/3M



4S/3M



4S/2M



2S/2M



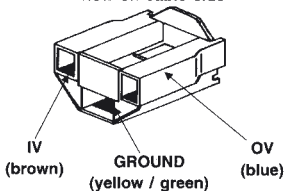
2S/1M



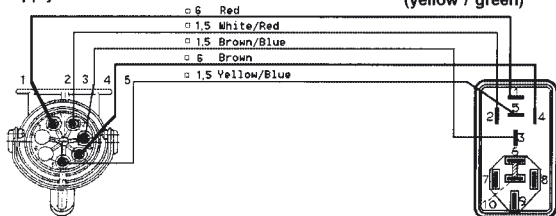
PLEASE IDENTIFY SYSTEM
INSTALLED AND ENTER DATA
IN THE ELECTRONICS.

Service	Date

Solenoid plug
- view on cable side -



Power supply



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