



**TABLE
OF
FLASHCODES
FOR FAULT MEMORIES**

Note:

For notes on setting and repair of individual systems please consult the Repair Manuals or the relevant Service Information sheets.

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BOSCH ABS/ASR 2E

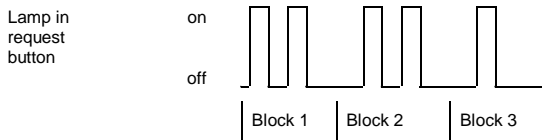
Reading out the fault memory

- Switch off ignition and connect up request button
- Switch on ignition and press button for more than 1 second

The fault codes are emitted in three blocks. The first block indicates which control unit status (configuration) is set. In the second and third blocks the faults in the diagonals FL/RR (second block) and FR/RL (third block) can be read out.

Pause between flashes approx. 0.5 s
Duration of flashes approx. 0.5 s
Pause between individual blocks approx. 1.5 s

Example of flashcode: Flashcode 2 in Block 1 for an ABS unit,
flashcode 2 in Block 2 and flashcode 1 in
Block 3.



Erasing the fault memory

- Switch off ignition and connect up request button
- Press button and keep it pressed
- Switch on ignition and release button after > 3 seconds

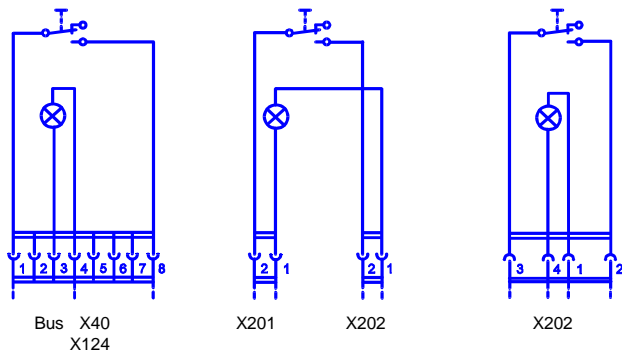
Block 1:	Flashcode
ABS unit	2
ABS unit with ASR engine control (not an MAN application))	3
ABS unit with ASR brake control (not an MAN application)	4
ABS unit with ASR brake and engine control	5

Flashcodes 3 and 4 may be emitted if components are not connected up or are defective.

Block 2 (FL/RR) and Block 3 (FR/RL):

Fault type	Flashcode
No fault.....	1
Control unit defective	2
Speed sensor signal path:	
⇒ front: inadmissible gap	3
⇒ rear: inadmissible gap	4
⇒ front: crack or short-circuit	6
⇒ rear: crack or short-circuit.....	7
Undervoltage, or relay for pressure control valve cannot be triggered	9
Pressure control valve signal path:	
⇒ front	10
⇒ rear	11
Relay for pressure control valve cannot switch (sticking))	13
Signal path for ASR solenoid valve.....	14

Connection diagram for request button



BOSCH ABS/ASR 3E

Reading out the fault memory

- Switch off ignition and connect up request button
- Switch on ignition
- Press button for > 2 seconds

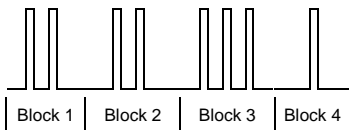
Blocks 1 and 2 indicate the configuration of the control unit. In Blocks 3 and 4 the faults in the diagonals FL/CR/RL (Block 3) and FR/CL/RR (Block 4) can be read out.

Example of flashcode: Flashcode 2 in Block 1, Flashcode 2 in Block 2, Flashcode 3 in Block 3 and Flashcode 1 in Block 4.

Lamp in
request
button

on

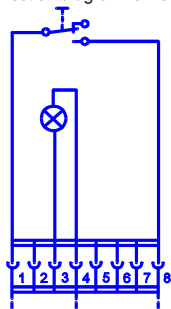
off



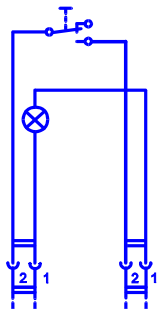
Erasing the fault memory

- Switch off ignition and connect up request button
- Press button and keep it pressed
- Switch on ignition and release button after > 3 seconds

Connection diagram for request button

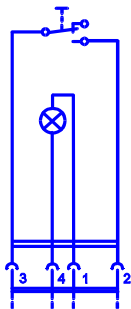


Bus X40
X124



X201

X202



X202

Block 1:	Flashcode
ABS unit	2
ABS unit with ASR engine control (not an MAN application)	3
ABS unit with ASR brake control at rear (not an MAN application)	4
ABS unit with ASR brake control at rear and engine control	5
ABS unit with ASR brake control in centre (not an MAN application)	6
ABS unit with ASR brake control in centre and engine control (not an MAN application)	7
ABS unit with ASR brake control at rear and in centre (not an MAN application)	8
ABS unit with ASR brake control at rear and in centre and engine control (not an MAN application)	9
Flashcodes 3, 4, 6, 7, 8 and 9 may occur if components are defective or not connected up.	
Block 2:	Flashcode
24 V operation, modified individual control on front axle	2
Block 3 (FL/CR/RL) and Block 4 (FR/CL/RR):	
Type of fault	Flashcode
No fault	1
Control unit defective	2
Speed sensor signal path:	
⇒ front: inadmissible gap	3
⇒ centre: inadmissible gap	4
⇒ rear: inadmissible gap	5
⇒ front: crack or short-circuit	6
⇒ centre: crack or short-circuit	7
⇒ rear: crack or short-circuit	8
Undervoltage, or relay for pressure control valves cannot be triggered	9
Signal path for pressure control valve:	
⇒ front	10
⇒ centre	11
⇒ rear	12
Relay for pressure control valve cannot switch (sticking)	13
Signal path for ASR solenoid valve	14
Inadmissible configuration (incorrect solenoid valve may be fitted)	15

BOSCH ABS/ASR 2M

Reading out the fault memory

- Switch off ignition and connect up request button
- Switch on ignition
- Press button for > 1 second

Blocks 1 and 2 indicate the configuration to which the control unit is set. In Blocks 3 and 4 the faults in the diagonals FL/RR (Block 3) and FR/RL (Block 4) can be read out.

Duration of a flash approx. 0,2 s

Pause between flashes approx. 0,4 s

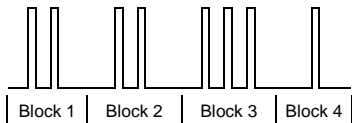
Pause between blocks approx. 1,5 s

Example of flashcode: Flashcode 2 in Block 1, Flashcode 2 in Block 2,
Flashcode 3 in Block 3 and Flashcode 1 in Block 4.

Lamp in
request
button

on

off



Erasing the fault memory

- Switch off ignition and connect up request button
- Press button and keep it pressed
- Switch on ignition and release button after > 2 seconds

ASR check lamp: Continually on: fault in servomotor path
Dimmed permanent light: fault in signal at terminal W

Gap recognition from control unit 81.25935-6410 onwards

- Drive vehicle at speed > 20 km/h
 - Stop vehicle and switch off ignition
 - Switch on ignition
- ⇒ Gap in order: ABS lamp continually on.
- ⇒ Gap enlarged: ABS lamp flashes 3 x and then remains continually on.
- Adjust speed sensors and accelerate vehicle several times from standstill to > 20 km/h so that the control unit can adjust to the change in the gaps.

Block 1:	Flashcode
ABS unit with HGB (from control unit 81.25935-6410).....	2
ABS unit with ASR engine control and HGB (not an MAN application).....	3
ABS unit with ASR brake control (not an MAN application)	4
ABS unit with ASR brake and engine control and HGB	5

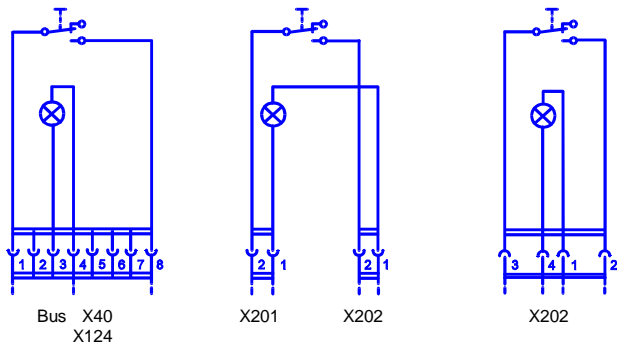
Flashcodes 3 and 4 may occur if components are defected or not connected up.

Block 2:	Flashcode
24 V operation: individual control modified on front axle	2

Block 3 (FL/RR) and Block 4 (FR/RL):

Type of fault	Flashcode
No fault.....	1
Control unit defective	2
Speed sensor signal path:	
⇒ front: inadmissible gap or short-circuit.....	3
⇒ rear: inadmissible gap or short-circuit	4
⇒ front: crack or short-circuit.....	5
⇒ rear: crack or short-circuit.....	6
Undervoltage or relay for pressure control valve cannot be triggered	7
Pressure control valve signal path:	
⇒ front	9
⇒ rear	10
Relay for pressure control valve cannot switch (sticking)	13
Signal path for ASR solenoid valve.....	14

Connection diagram for request button



BOSCH ABS/ASR 2M Stage 1

Reading out the fault memory

- Switch off ignition and connect up request button
- Switch on ignition
- Press button for > 1 second

Blocks 1 and 2 indicate the configuration to which the control unit is set. In Blocks 3 and 4 the faults in the diagonals FL/RR (Block 3) and FR/RL (Block 4) can be read out.

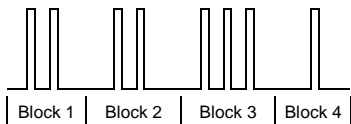
Duration of a flash approx. 0.2 s
Pause between flashes approx. 0.4 s
Pause between blocks approx. 1.5 s

Example of flashcode: Flashcode 2 in Block 1, Flashcode 2 in Block 2,
Flashcode 3 in Block 3 and Flashcode 1 in Block 4.

Lamp in
request
button

on

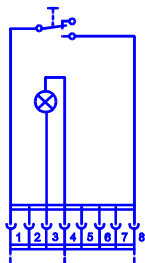
off



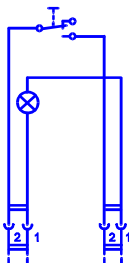
Erasing the fault memory

- Switch off ignition and connect up request button
- Press button and keep it pressed
- Switch on ignition and release button after > 3 seconds

Connection diagram for request button

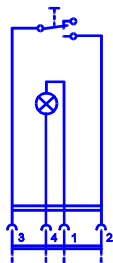


Bus X40



X201

X202



X202

Block 1:	Flashcode
ABS unit with HGB	2
ABS unit with ASR engine control and HGB (not an MAN application)	3
ABS unit with ASR brake control and HGB (not an MAN application)	4
ABS unit with ASR brake and engine control and HGB	5

Flashcodes 3 and 4 may occur if components are defective or not connected up.

Block 2:	Flashcode
24 V operation: individual control modified on front axle	2

Block 3 (FL/RR) and Block 4 (FR/RL):

Type of fault	Flashcode
No fault	1
Control unit defective	2
Speed sensor signal path:	
⇒ front: inadmissible gap or short-circuit	3
⇒ rear: inadmissible gap or short-circuit	4
⇒ front: crack or short-circuit	6
⇒ rear: crack or short-circuit	7
Undervoltage or relay for pressure control valves cannot be triggered	9
Pressure control valve signal path:	
⇒ front	10
⇒ rear	11
Relay for pressure control valve cannot switch (sticking)	13
Signal path for ASR control valve	14
Fault in servomotor	15
Fault in C3/B7-Signal	16
Fault in signal at terminal W	17
Wheel equalisation difference too large	18
Fault in signal path for relay for engine brake/retarder switch-off (emission possible only in Block 4)	19
Fault in signal path for clutch switch	20

Gap recognition

- Drive vehicle at > 20 km/h
 - Stop vehicle and switch off ignition
 - Switch on ignition
 - ⇒ Gap in order: ABS lamp is continually on.
 - ⇒ Gap enlarged: ABS lamp flashes 3x and then remains continually on.
- Adjust speed sensors and accelerate vehicle several times from standstill to > 20 km/h so that the control unit can adjust to the changed gaps.

BOSCH ABS/ASR CI 12

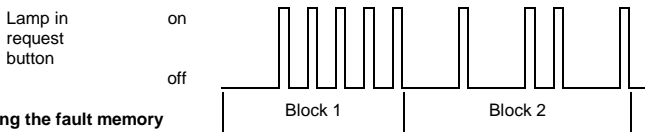
Reading out the fault memory

- Switch off ignition and connect up request button
- Switch on ignition
- Wait for 2 seconds and then press button for at least 2 seconds.

The flashcodes are emitted in two blocks. Block 1 indicates the configuration to which the control unit is set. Block 2 indicates the actual fault code. Each fault code must be requested individually.

Pause before first flash	approx. 3 s
Duration of a flash	approx. 0.5 s
Pause between hundreds and tens or tens and units	approx. 3 s
Pause between hundreds and hundreds	approx. 1 s
Pause between tens and tens	approx. 1 s
Pause between units and units	approx. 1 s

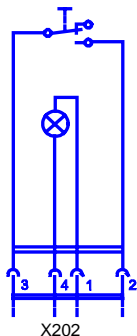
Example of flashcode: Flashcode 5 in Block 1, Flashcode 121 in Block 2.



Erasing the fault memory

- Switch off ignition and connect up request button
- Press the button
- Switch on ignition and keep button pressed for > 2 seconds
- Do not switch off ignition until at least 5 seconds have passed.

Connection diagram for request button



Block 1:	Flashcode
Pure ABS unit, modified individual control on front axle.....	2
ABS unit with ASR engine control (not an MAN application)	3
ABS unit with ASR brake control (not an MAN application)	4
ABS unit with ASR brake and engine control.....	5
Pure ABS unit with Select-Low control on front axle (not an MAN application).....	6
ABS unit with Select-Low control on front axle and ASR engine control (not an MAN application).....	7
ABS unit with Select-Low control on front axle and ASR brake control (not an MAN application)	8
ABS unit with Select-Low control on front axle and ASR brake and engine control (not an MAN application).....	9
Flashcodes 3, 4, 6, 7, 8 and 9 may occur if components are defective or not connected up.	

Block 2:	Flashcode
Type of fault	121
No fault	121
CAN data bus:	
⇒ BusOff, repair CAN bus	211
⇒ Tachograph signal, plausibility	212
⇒ Communication interrupted, repair CAN bus	213
⇒ Time-out, gearbox messages, repair CAN bus	214
⇒ Time-out, engine messages, repair CAN bus.....	215
⇒ Time-out, retarder messages, repair CAN bus.....	216
Brake light switch not yet actuated, check cabling.....	217
Control unit defective	221
Control unit defective	222
Control unit defective	223
Control unit defective	224
Control unit defective	225
Control unit defective	226
Control unit defective	227
Configuration EEPROM parameters defective.....	228
Axle tyres or pulse ring incorrect.....	232
Voltage supply to pressure control valve, undervoltage.....	242
Voltage supply to pressure control valve, interruption	243
Control unit defective	244
Pressure control valve:	
⇒ Earth, FR or RL, control unit output, short-circuit to earth	251
⇒ Earth, FR or RL, control unit output, short-circuit to +UBatt	252
⇒ Earth, diagonal FR/RL, interruption (PIN X1, 12)	253
⇒ Voltage supply, diagonal FR/RL, incorrect polarity of +/-	254
⇒ Earth, FL or RR, control unit output, short-circuit to earth	255
⇒ Earth, FL or RR, control unit output, short-circuit to +UBatt	256

Pressure control valve:	
⇒ Earth, diagonal FL/RR, interruption (PIN X1, 11)	257
⇒ Voltage supply, diagonal FL/RR, incorrect polarity of +/-	258
Speed sensors:	
⇒ RL, interruption/short-circuit	312
⇒ RL, pulse ring defective, gap too large	316
⇒ FL, interruption/short-circuit	322
⇒ FL, pulse ring defective, gap too large	326
⇒ RR, interruption/short-circuit	342
⇒ RR, pulse ring defective, gap too large	346
⇒ FR, interruption/short-circuit	362
⇒ FR, pulse ring defective, gap too large	366
⇒ RL, interturn fault, gap, pole wheel, signal	411
⇒ RL, tyres or pulse ring incorrect	415
⇒ FL, interturn fault, gap, pole wheel, signal	421
⇒ FL, tyres or pulse ring incorrect	425
Speed sensors:	
⇒ RR, interturn fault, gap, pole wheel, signal	441
⇒ RR, tyres or pulse ring incorrect	445
⇒ FR, interturn fault, gap, pole wheel, signal	461
⇒ FR, tyres or pulse ring incorrect	465
Pressure control valve:	
⇒ FL, inlet valve, interruption	512
⇒ FL, inlet valve, short-circuit to earth	513
⇒ FL, inlet valve, short-circuit to +UBatt	514
⇒ FL, earth connection, interruption	515
⇒ FL, outlet valve, interruption	516
⇒ FL, outlet valve, short-circuit to earth	517
⇒ FL, outlet valve, short-circuit to +UBatt	518
⇒ RL, inlet valve, interruption	522
⇒ RL, inlet valve, short-circuit to earth	523
⇒ RL, inlet valve, short-circuit to +UBatt	524
⇒ RL, earth connection, interruption	525
⇒ RL, outlet valve, interruption	526
⇒ RL, outlet valve, short-circuit to earth	527
⇒ RL, outlet valve, short-circuit to +UBatt	528
⇒ RR, inlet valve, interruption	532
⇒ RR, inlet valve, short-circuit to earth	533
⇒ RR, inlet valve, short-circuit to +UBatt	534
⇒ RR, earth connection, interruption	535
⇒ RR, outlet valve, interruption	536
⇒ RR, outlet valve, short-circuit to earth	537
⇒ RR, outlet valve, short-circuit to +UBatt	538
⇒ FR, inlet valve, interruption	552

Block 2:

Type of fault	Flashcode
Pressure control valve:	
⇒ FR, inlet valve, short-circuit to earth.....	553
⇒ FR, inlet valve, short-circuit to +UBatt.....	554
⇒ FR, earth connection, interruption	555
⇒ FR, outlet valve, interruption	556
⇒ FR, outlet valve, short-circuit to earth.....	557
⇒ FR, outlet valve, short-circuit to +UBatt.....	558
⇒ FL, short-circuit to another valve	611
⇒ FL, incorrectly configured	616
⇒ RL, short-circuit to another valve.....	621
⇒ RR, short-circuit to another valve	631
⇒ FR, short-circuit to another valve.....	651
⇒ FR, incorrectly configured	656
ASR solenoid valve:	
⇒ Interruption	712
⇒ Short-circuit to earth	713
⇒ Short-circuit to +UBatt	714
⇒ Short-circuit to another valve.....	721
⇒ Recognised but not configured.....	726
Interaxle lock/shut-off valve, short-circuit to earth	811
Interaxle lock/shut-off valve, short-circuit to +UBatt.....	812
Engine interface:	
⇒ DKR, short-circuit to earth or +UBatt.....	813
⇒ DKV, actuator reports fault	814
⇒ DKV, interruption/short-circuit.....	815
⇒ DKV, time-out	816
Triggering of relay for engine brake/retarder:	
⇒ Short-circuit to +UBatt	817
⇒ Interruption or short-circuit to earth	818

KNORR ABS

Reading out the fault memory

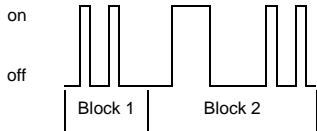
- Switch off ignition and connect up request button
- Switch on ignition and wait for 2 seconds
- Press button for 2 seconds

The first block indicates the configuration to which the control unit is set. The second block indicates the fault codes. Each fault code must be requested individually.

Duration of a ten.....	approx. 2 s
Duration of a unit.....	approx. 0.5 s
Pause between tens and units	approx. 3 s
Pause between units and units.....	approx. 1 s
Pause between tens and tens	approx. 1 s

Example of flashcode: Flashcode 2 in Block 1 and Flashcode 12 in Block 2.

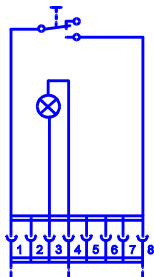
Lamp in
request
button



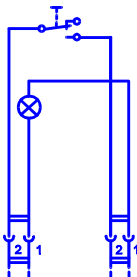
Erasing the fault memory

- Switch of ignition and connect up request button
- Press button and keep it pressed
- Switch on ignition and release it after > 2 seconds

Connection diagram for request button

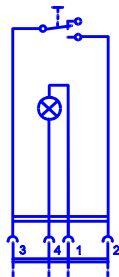


X124



X201

X202



X202

Block 1:	Flashcode
ABS unit without ASR	2
ABS unit with ASR engine control (not an MAN application)	3
ABS unit with ASR brake control (not an MAN application)	4
ABS unit with ASR brake and engine control (not an MAN application)	5
Flashcodes 3, 4 and 5 may occur if components are defective or not connected up.	
Block 2 (Diagonal 1 FR/RL, Diagonal 2 FL/RR):	
Type of fault	Flashcode
No fault	1
Speed sensors:	
⇒ FL, interruption or short-circuit	10
⇒ FL, gap too large, interturn fault, pole wheel fault	11
⇒ FR, interruption or short-circuit	12
⇒ FR, gap too large, interturn fault, pole wheel fault	13
⇒ RL, interruption or short-circuit	14
⇒ RL, gap too large, interturn fault, pole wheel fault	15
⇒ RR, interruption or short-circuit	16
⇒ RR, gap too large, interturn fault, pole wheel fault	17
Pressure control valve:	
⇒ FL, interruption or short-circuit	22
⇒ FR, interruption or short-circuit	23
⇒ RL, interruption or short-circuit	24
⇒ RR, interruption or short-circuit	25
ASR brake valve, RL, interruption or short-circuit	28
ASR brake valve, RR, interruption or short-circuit	29
ASR engine control, E-Gas/EDC interface fault	31
Relay voltage supply for pressure control valve:	
⇒ Diagonal 1 cannot be switched off (contact sticking)	32
⇒ Diagonal 1 cannot be switched off	33
⇒ Diagonal 2 cannot be switched off (contact sticking)	34
⇒ Diagonal 2 cannot be switched off	35
ABS engine brake/retarder switch-off, interruption or short-circuit	36
ABS warning lamp, tractor, interruption or short-circuit	38
Switch-on time monitoring of valves (implausible triggering)	52
ASR recognised but not configured	53
Differences in wheel diameter too large	54
Voltage supply for pressure-control valves, diagonal 1, overvoltage	56
Voltage supply for pressure-control valves, diagonal 2, overvoltage	57
Speed recording, signals with frequency > 1500 Hz, unwanted signals	91
Pressure control valves, bleeding and holding times too long	92
Configuration error (defective EEPROM parameters)	98
Control unit defective	99

WABCO „C“ ABS/ASR

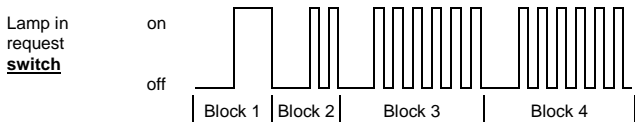
Reading out the fault memory

- Switch-off ignition and connect up request switch
- Switch on ignition and wait for 2 seconds
- Close the switch

If the switch is opened the fault entry in the fault memory will be erased. Switching off the ignition before the switch is opened ends the flashcode emission without erasing the fault in the fault memory. The first block is a "starting block"; this begins the fault code emission. The second block indicates the configuration to which the control unit is set. Blocks 3 and 4 indicate the actual fault codes. The flashcode emission may be deactivated (ended) only in the pauses between the constantly repeated flashcodes.

Duration of starting block	approx. 2.5 s
Pause between blocks	approx. 2.5 s
Duration of a flash	approx. 0.5 s
Pause between flashes	approx. 0,5 s

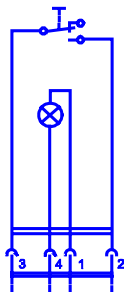
Example of flashcode: Starting block (Block1), Flashcode 2 in Block 2,
Flashcode 6 in Block 3 and Flashcode 6 in Block 4.



Erasing the fault memory

- Switch off ignition and connect up request switch
- Switch on ignition and wait for 2 seconds
- Close the switch
- Open the switch during flashcode emission.

Connection diagram for request switch



X202

Block 2:

	Flashcode
ABS system 6S/6K.....	1
ABS system 4S/4K.....	2
ABS system 4S/3K.....	3
ABS system 6S/4K.....	4
ABS system 6S/3K.....	5

Flashcodes 3, 4 and 5 may occur if parts are defective or not connected up.

Block 3 and Block 4:

Type of fault	Flashcode	
	Block 3	Block 4
Valve relay FR/RL, undervoltage	6	6
Valve relay FL/RR, undervoltage	6	7
Speed sensor:		
⇒ FR, wheel speed signal fault (failure).....	6	8
⇒ FL, wheel speed signal fault (failure).....	6	9
⇒ FR, interruption or short-circuit in cable	6	10
⇒ FL, interruption or short-circuit in cable	6	11
⇒ FR, wheel speed signal implausible.....	6	12
⇒ FL, wheel speed signal implausible	6	13
⇒ RL, wheel speed signal fault (failure).....	7	0
⇒ RR, wheel speed signal fault (failure).....	7	1
⇒ RL, interruption of short-circuit in cable.....	7	2
⇒ RR, interruption or short-circuit in cable	7	3
⇒ RL, wheel speed signal implausible	7	4
⇒ RR, wheel speed signal implausible	7	5
⇒ ML, wheel speed signal fault (failure).....	7	8
⇒ MR, wheel speed signal fault (failure)	7	9
⇒ ML, inadmissible impedance, interruption/short-circuit	7	10
⇒ MR, interruption or short-circuit in cable.....	7	11
⇒ ML, wheel speed signal implausible.....	7	12
⇒ MR, wheel speed signal implausible	7	13
Control unit defective	8	0
Control unit defective	8	1
ASR proportional valve (not an MAN application).....	8	2
ASR interface, DKR signal, interruption in cable (PIN 29)	8	3
ASR proportional valve (not an MAN application).....	8	4
ASR interface, DKV signal, faulty data transfer (PIN 28)	8	5
Interface for V signal (not an MAN application).....	8	6
ASR interface, DKV signal, interruption in cable (PIN 28)	8	7
ASR interface, DKV signal, faulty data transfer (PIN 28)	8	9

Pressure control valve:

⇒ FR, inlet, short-circuit to earth	8	10
⇒ FL, inlet, short-circuit to earth	8	11
⇒ FR, inlet, interruption in cable	8	12
⇒ FL, inlet, interruption in cable	8	13
⇒ FR, outlet, short-circuit to earth	8	14
⇒ FL, outlet, short-circuit to earth	8	15
⇒ FR, outlet, interruption in cable	9	0
⇒ FL, outlet, interruption in cable	9	1
⇒ RL, inlet, short-circuit to earth	9	2
⇒ RR, inlet, short-circuit to earth	9	3
⇒ RL, inlet, interruption in cable	9	4
⇒ RR, inlet, interruption in cable	9	5
⇒ RL, outlet, short-circuit to earth	9	6
⇒ RR, outlet, short-circuit to earth	9	7
⇒ RL, outlet, interruption in cable	9	8
⇒ RR, outlet, interruption in cable	9	9
⇒ ML, inlet, short-circuit to earth	9	10
⇒ MR, inlet, short-circuit to earth	9	11
⇒ ML, inlet, interruption in cable	9	12
⇒ MR, inlet, interruption in cable	9	13
⇒ ML, outlet, short-circuit to earth	9	14
⇒ MR, outlet, short-circuit to earth	9	15
⇒ ML, outlet, interruption in cable	10	0
⇒ MR, outlet, interruption in cable	10	1
ASR valve RL, short-circuit to earth	10	2
ASR valve RR, short-circuit to earth	10	3
ASR valve RL, interruption in cable	10	4
ASR valve RR, interruption in cable	10	5
Retarder shut-off relay (PIN 11), short-circuit to +UBatt	10	7
ASR engine control: inadmissible drive slip (EMS/EDC)	10	8
ASR engine control: inadmissible drive slip (EMS/EDC)	10	9
Pressure control valve:		
⇒ FR, short-circuit to +UBatt or output stage defective	11	12
⇒ FL, short-circuit to +UBatt or output stage defective	11	13
⇒ RL, short-circuit to +UBatt or output stage defective	11	14
⇒ RR, short-circuit to +UBatt or output stage defective	11	15
⇒ ML, short-circuit to +UBatt or output stage defective	12	0
⇒ MR, short-circuit to +UBatt or output stage defective	12	1
ASR valve RL, short-circuit to +UBatt or output stage defective	12	2
ASR valve RR, short-circuit to +UBatt or output stage defective	12	3
ASR proportional valve (not an MAN application)	12	4
Retarder shut-off relay (PIN 11), short-circuit to earth	12	7

Pressure control valve:

⇒ FR, short-circuit to +UBatt	12	8
⇒ FL, short-circuit to +UBatt	12	9
⇒ RL, short-circuit to +UBatt	12	10
⇒ RR, short-circuit to +UBatt	12	11
⇒ ML, short-circuit to +UBatt	12	12
⇒ MR, short-circuit to +UBatt	12	13
ASR valve RL, short-circuit to +UBatt	12	14
ASR valve RR, short-circuit to +UBatt	12	15
ASR proportional valve (not an MAN application)	13	0
Valve relay RL/FR, relay contact sticking	13	4
Valve relay RR/FL, relay contact sticking	13	5
Control unit defective	13	6
Control unit overvoltage, check alternator charge voltage	13	7
Control unit defective	13	8
Control unit defective	13	9
Control unit defective	13	10
Control unit defective	13	11
Control unit defective	13	12
Control unit defective	13	13
Control unit defective	13	14
Control unit defective	13	15
Control unit defective	14	0
Control unit defective	14	1
Control unit defective	14	2
Control unit defective	14	3
Control unit defective	14	4
Control unit defective	14	5
Pressure control valve modulation RL/FR, switch-on time too long	14	6
Pressure control valve modulation RR/FL, switch-on time too long	14	7
ASR valve RL, switch-on time too long	14	8
ASR-valve RR, switch-on time too long	14	9
Control unit defective	14	10
Control unit defective	14	11
Control unit defective	14	12
Control unit defective	14	13
Control unit defective	14	14
Control unit defective	14	15

ECAS air suspension for buses

Reading out the fault memory

- Switch off ignition and connect up request button
- Switch on ignition
- Wait for > 2 seconds and press button

Emission of the flashcode begins after 3 seconds. When the first flashcode has been emitted further emission is automatically interrupted. For the next fault the button be pressed again for at least 2 seconds.

Duration of a unit.....	approx. 0.5 s
Duration of a ten.....	approx. 2 s
Pause between a ten and a unit.....	approx. 3 s
Pause between a unit and a unit.....	approx. 1 s
Pause between a ten and a ten.....	approx. 1 s

Example of flashcode: fault code 12

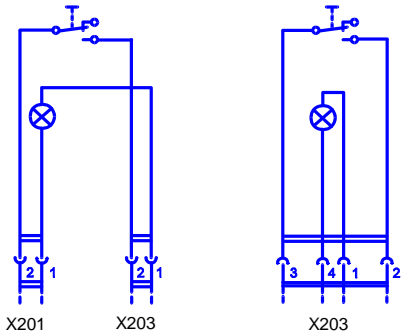


Erasing the fault memory

- Switch off ignition and connect up request button
- Press button and keep it pressed
- Switch on ignition and release button after > 2 seconds

In vehicles with 2 ECAS control units (articulated buses) each control unit must be read and/or erased separately. For this the 35-pole plug on the control unit not affected must be pulled out when the ignition is switched off.

Connection diagram for request button



Type of fault	Flashcode
Internal fault in control unit:	
⇒ Control unit defective.....	1
⇒ Cumulative test fault in calibration data, recalibrate displacement sensors.....	2
⇒ Control unit defective.....	3
⇒ Control unit defective.....	4
⇒ Control unit defective.....	5
⇒ Control unit defective.....	6
⇒ Cumulative test fault in calibration data, recalibrate pressure sensor.....	(8)
⇒ Control unit or ECAS fuse, terminal 30, defective.....	9
Sensor fault, interruption or short-circuit to +UB:	
⇒ Displacement sensor rear [front] right	10
⇒ Displacement sensor rear [front] left	11
⇒ Displacement sensor front [centre].....	12
Pressure sensor, short-circuit to +UB	(15)
Anti-trap device contact strip, interruption or short-circuit to +UB.....	(17)
Sensor fault, interruption or short-circuit to earth:	
⇒ Displacement sensor rear [front] right	20
⇒ Displacement sensor rear [front] left	21
⇒ Displacement sensor front [centre].....	22
Pressure sensor, short-circuit or interruption to earth	(25)
Anti-trap device contact strip, short-circuit to earth.....	(27)
Fault in solenoid valve, interruption or short-circuit to +UB:	
⇒ Central solenoid valve, reservoir A *	30
⇒ Valve RA [FA] left C *	31
⇒ Valve RA [FA] right B *	32
⇒ Valve FA [CA] left F *	33
⇒ Valve FA [CA] right E *	34
⇒ Bus-stop brake valve.....	(35)
⇒ Valve for primary current throttle	(39)
⇒ Valve, transverse throttle D *	(70)
Solenoid valve fault, interruption or short-circuit to earth:	
⇒ Central solenoid valve, reservoir A *	40
⇒ Valve RA [FA] left C *	41
⇒ Valve RA [FA] right B *	42
⇒ Valve FA [CA] left F *	43
⇒ Valve FA [CA] right E *	44
⇒ Bus-stop brake valve.....	(45)
⇒ Valve, primary current throttle	(49)
⇒ Valve, transverse throttle D *	(71)
[]	For the forebody of articulated buses the data in the square brackets apply.
()	For vehicles with this equipment.
*	The letter is on the corrugated tube of the relevant valve.

Type of fault	Flashcode
Relay, door release:	
⇒ Interruption or short-circuit to +UB	(36)
⇒ Short-circuit to earth	(46)
Plausibility fault (mechanical fault) during raising:	
⇒ Displacement sensor rear [front] right	50
⇒ Displacement sensor rear [front] left	51
⇒ Displacement sensor front [centre]	52
Plausibility fault (mechanical fault) during lowering:	
⇒ Displacement sensor rear [front] right	60
⇒ Displacement sensor rear [front] left	61
⇒ Displacement sensor front [centre]	62
Control unit defective	80
Speed signal interruption or short-circuit to +UB	81

[] For the forebodies of articulated buses the data in square brackets apply.

() For vehicles with this equipment.

* The letter is on the corrugated tube of the relevant valve.

Door control system IFE

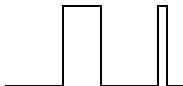
Reading out the fault memory

- Switch off ignition and connect up request button
- Switch on ignition
- Press button for > 2 seconds

Duration of a ten.....	approx. 2 s
Duration of a unit.....	approx. 0.5 s
Pause between a ten and a unit.....	approx. 3 s
Pause between a unit and a unit.....	approx. 1 s

Example of flashcode: Fault code 11

Lamp in
request
button on
 off



Erasing the fault memory

- Switch off ignition and connect up request button
- Press button and keep it pressed
- Switch on ignition and release button after > 2 seconds

Type of fault	Flashcode
Break in connecting cable from door motor	1
Inward-swinging door: more than 10 seconds to reach fully open position.....	*2
Slide-glide door: limit switch reports door closed, door displacement sensor report displacement pulses	*2
Door does not unlock within 3 seconds.....	3
Inward-swinging door: more than 10 seconds to reach fully closed position	*4
Slide-glide door: fault in door displacement sensor	*4
Door monitoring in opening direction responded 3x during opening	5
Motor current monitor responded at 5 closing procedures in succession	6
Short-circuit at one output of door control system.....	7
Fault in pressure wave switch (responded continuously for more than 1 minute).....	8
Fault in electronic eye (responded continuously for more than 1 minute).....	9
Fault in door opening button (actuated continuously for more than 1 minute).....	10
Fault in driver's button (actuated continuously for more than 1 minute).....	11

* Slide-glide door and inward-swinging door have the same fault code number
Flashcodes 1, 2, 3 and 4 lead to switch-off of door motor.

ECAS air suspension for trucks

Reading out the fault memory

- Switch off ignition and connect up request button
- Switch on ignition
- Press button for > 2 seconds

Emission of the flashcode begins after 3 seconds. After emission of the first fault further emission is automatically interrupted. For the next fault the button must be pressed again for at least 2 seconds.

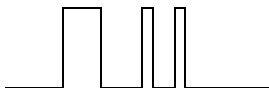
Duration of a unit.....	approx. 0.5 s
Duration of a ten.....	approx. 2 s
Pause between a ten and a unit.....	approx. 3 s
Pause between a unit and a unit.....	approx. 1 s
Pause between a ten and a ten.....	approx. 1 s

Example of flashcode: Fault code 12

Lamp in
request
button

on

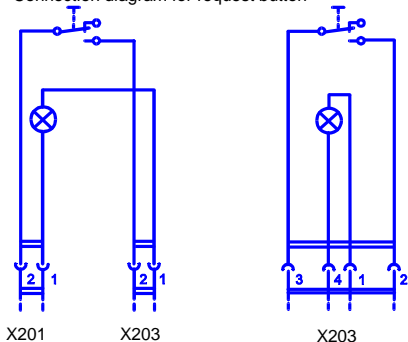
off



Erasing the fault memory

- Switch off ignition and connect up request button
- Press button and keep it pressed
- Switch on ignition and release button after at least 2 and at most 4 seconds

Connection diagram for request button



Type of fault	4x2	6x2
Flashcode		
Control unit defective	1	1
Cumulative test fault in calibration data (recalibrate displacement sensors).....	2	2
Control unit defective.....	3	3
Control unit defective.....	4	4
Control unit defective.....	5	5
Control unit defective.....	6	6
Control unit defective.....	-	*7
Pressure switch, moving-off aid/empty run	-	8
Control unit or ECAS fuse, terminal 30 defective	-	9
Sensor fault, interruption or short-circuit to +UB:		
⇒ Displacement sensor RR	10	10
⇒ Displacement sensor RL.....	11	11
⇒ Displacement sensor, front.....	12	12
Sensor fault, short-circuit to earth:		
⇒ Displacement sensor RR	14	20
⇒ Displacement sensor RL.....	15	21
⇒ Displacement sensor, front.....	16	22
Valve fault, interruption or short-circuit to +UB:		
⇒ Central solenoid valve, reservoir.....	20	30
⇒ Solenoid valve, RA or drive axle left.....	21	31
⇒ Solenoid valve, RA or drive axle right	22	32
⇒ Solenoid valve, lowering/burdening lifting/trailing axle.....	--	33
⇒ Solenoid valve, raising/relieving lifting/trailing axle	--	34
⇒ Solenoid valve, front axle	23	36
⇒ ALB control	24	35
⇒ Solenoid valve, lifting bellows.....	--	37
Valve fault, interruption or short-circuit to earth:		
⇒ Central solenoid valve, reservoir.....	30	40
⇒ Solenoid valve, RA or drive axle left.....	31	41
⇒ Solenoid valve, RA or drive axle right	32	42
⇒ Solenoid valve, lowering/burdening lifting/trailing axle.....	--	43
⇒ Solenoid valve, raising/relieving lifting/trailing axle.....	--	44
⇒ Solenoid valve, front axle	33	46
⇒ Solenoid valve, lifting bellows.....	--	47
Plausibility fault (mechanical fault) during raising:		
⇒ Displacement sensor, RR	40	50
⇒ Displacement sensor, RL.....	41	51
⇒ Displacement sensor, front.....	42	52
Plausibility fault (mechanical fault) during lowering:		
⇒ Displacement sensor, RR	44	60
⇒ Displacement sensor, RL.....	45	61
⇒ Displacement sensor, front.....	46	62
Control unit defective.....	--	**80
Speed signals interrupted or short-circuit to +UB.....	--	**81

* = up to control unit: 81.25935-6416; 466 055 041 0

** = from control unit 81.25935-6547; 466 055 047 0

Type of fault	Flashcode
Control unit defective	1
Cumulative test error in calibration data, recalibrate displacement sensors.....	2
Control unit defective	3
Control unit defective	4
Control unit defective	5
Control unit defective	6
Cumulative test error in calibration data, recalibrate pressure sensors	8
Valve relay or ECAS fuse, terminal 30, defective	9
Sensor fault, interruption or short-circuit to +UB:	
⇒ Displacement sensor RR.....	10
⇒ Displacement sensor RL	11
⇒ Displacement sensor, front.....	12
Sensor fault, short-circuit to +UB:	
⇒ Pressure sensor, drive axle right.....	13
⇒ Pressure sensor RA or drive axle left.....	14
⇒ Pressure sensor, brake	15
Sensor fault, short-circuit to earth:	
⇒ Displacement sensor RR.....	20
⇒ Displacement sensor RL	21
⇒ Displacement sensor, front.....	22
Sensor fault, interruption or short-circuit to earth:	
⇒ Pressure sensor, RA or drive axle right.....	23
⇒ Pressure sensor, RA or drive axle left.....	24
⇒ Pressure sensor, brake	25
Valve fault, interruption or short-circuit to +UB:	
⇒ Central solenoid valve, reservoir	30
⇒ Solenoid valve, RA or drive axle left	31
⇒ Solenoid valve, RA or drive axle right	32
⇒ Solenoid valve, lowering/burdening lifting/trailing axle.....	33
⇒ Solenoid valve, raising/relieving lifting/trailing axle.....	34
⇒ ALB control	35
⇒ Solenoid valve, front axle	36
⇒ Solenoid valve, dampers soft	37
⇒ Solenoid valve, dampers medium	38

Type of fault	Flashcode
Valve fault, interruption or short-circuit to earth:	
⇒ Central solenoid valve, reservoir	40
⇒ Solenoid valve, RA or drive axle left	41
⇒ Solenoid valve, RA or drive axle right	42
⇒ Solenoid valve, lowering/burdening lifting/trailing axle.....	43
⇒ Solenoid valve, raising/relieving lifting/trailing axle.....	44
⇒ ALB control	45
⇒ Solenoid valve, front axle	46
⇒ Solenoid valve, dampers soft	47
⇒ Solenoid valve, dampers medium	48
Plausibility fault (mechanical fault) during raising:	
⇒ Displacement sensor RR.....	50
⇒ Displacement sensor RL	51
⇒ Displacement sensor, front.....	52
Plausibility fault (mechanical fault) during lowering:	
⇒ Displacement sensor RR.....	60
⇒ Displacement sensor RL	61
⇒ Displacement sensor, front.....	62
Control unit defective	80
Speed signals, interruption or short-circuit to +UB.....	81

WEBASTO auxiliary heater Airtop 2000

Reading out the fault memory

- The fault is shown automatically in the display when it occurs.

The faults are shown in the display of the control box. Only one fault can be displayed. If more than one fault is present, the next fault will not be shown in the display until after the first fault has been rectified.




Erasing the fault memory

- After repairs switch off the heater, wait for after-running and switch heater on again. The fault will be erased automatically.



Type of fault	Flashcode
No start, after 2 attempts to start.....	F 01
Flame interrupted, more than 5x within one heating cycle	F 02
Under/overvoltage.....	F 03
Premature flame recognition.....	F 04
Flame monitor, interruption or short-circuit	F 05
Temperature sensor for heater, interruption or short-circuit.....	F 06
Metering pump, short-circuit.....	F 07
Blower motor, interruption/short-circuit or defective speed.....	F 08
Glow plug, interruption or short-circuit	F 09
Overheating.....	F 10

Eberspächer auxiliary heater D1LCC/D3LCC






Reading out the fault memory

- Switch off the auxiliary heater
- Switch on auxiliary heater with button .
- Press button  and with 2 seconds also press button .

The last fault to occur will be shown in the display, e.g.: AF:64

With buttons  and  a further four faults, if present, can be read out. E.g.: F:10, F:13.

Erasing the fault memory

- Switch off the auxiliary heater-
- Switch on auxiliary heater with button .
- Press button  and within 2 seconds also press button .
- Open the 1-pole plug connection X 683, which is at the plug connection between wiring harness and control box.
- Press buttons  and  simultaneously and close plug connection X 683.

Type of fault	Fault code
No fault present.....	(0)00
Control unit, chamber 1, to relay for fresh-air blower, short-circuit to earth or control unit defective.....	(0)04
Control unit, chamber 2, to relay for electrical isolator switch or input for anti-theft system, short-circuit to earth or control unit defective.....	(0)05
TRS switch-off due to signal change from plus to minus at control unit, chamber 10, or plus at control unit, chamber 12.....	(0)09
Voltage between control unit chamber 5 and chamber 11: ⇒ Overvoltage > 31.8 V (30.4 V if glow plug switched on).....	(0)10
⇒ Undervoltage < 21 V (19 V if glow plug switched on).....	(0)11
Connection between control unit and overheating sensor: no continuity.....	(0)12
Overtemperature in flame sensor > 340° C or > 2270 Ω	(0)13
To many overheatings, control unit locked.....	(0)15
Check glow plug (approx. 1 Ω to 2 Ω), control units chambers 6 and 9 to glow plug, interruption or control unit defective.....	(0)20
Glow plug or control unit, chamber 6, to glow plug: short-circuit or control unit defective.....	(0)21

If the fault code is read out with an Eberspächer diagnosis unit, it has 3 digits (e.g. 021). If it is read out with the module clock, it has only 2 digits (e.g. 21).

Type of fault	Fault code
Control unit, chamber 4, to connection plug for module clock:	
short-circuit to plus	(0)25
Burner motor or speed control defective: speed discrepancy	(0)33
Metering pump or control unit, chamber 3, to metering pump:	
⇒ Short-circuit	(0)47
⇒ No continuity, check minus supply for metering pump	(0)48
Too many attempts to start, control unit locked	(0)50
Flame already present at switch-on (flame sensor > 62° or >1240 Ω).....	(0)51
No start, safety time exceeded.....	(0)52
Flame interrupted:	
⇒ During starting	(0)53
⇒ At high speed.....	(0)54
⇒ At medium speed	(0)55
⇒ At low speed.....	(0)56
External temperature control sensor:	
⇒ Interruption > 2800 Ω.....	(0)60
⇒ Short-circuit < 280 Ω	(0)61
Control box potentiometer:	
⇒ Interruption >2800 Ω (normal value 1750 Ω to 2080 Ω ±80 Ω)	(0)62
⇒ Short-circuit < 280 Ω (normal value 1750 Ω to 2080 Ω ±80 Ω)	(0)63
Flame sensor or flame sensor lead:	
⇒ Interruption > 3200 Ω.....	(0)64
⇒ Short-circuit < 200 Ω	(0)65
Overheating sensor, interruption > 3200 Ω or short-circuit <200 Ω	(0)71
Control unit defective	(0)90
External interference voltage	(0)91
Control unit defective:	
⇒ ROM error	(0)92
⇒ RAM error.....	(0)93
⇒ EEPROM fault	(0)94
⇒ Internal temperature sensor defective	(0)96
⇒ Oscillator or undervoltage fault.....	(0)97

If the fault code is read out with an Eberspächer diagnosis unit, it has 3 digits (e.g. 021). If it is read out with the module clock, it has only 2 digits (e.g. 21).

Type of fault	Flashcode
Valve: (check cabling to heater or drive in heater)	
⇒ Short-circuit	11
⇒ Interruption	12
⇒ Stepping error.....	13
Button defective (change control box)	21
Short-circuit in blower.....	26
Interruption in blower.....	27
Passenger compartment flap drive: short-circuit.....	31
Passenger compartment flap drive: interruption	32
Footwell flap drive: short-circuit	33
Footwell flap drive: interruption	34
Window flap drive: short-circuit.....	35
Window flap drive: interruption.....	36
Fresh-air flap: short-circuit	37
Fresh-air flap: interruption	38
Air-conditioning flap: short-circuit.....	39
Air-conditioning flap: interruption.....	41
Output:	
⇒ V short-circuit	43
⇒ V interruption	44
⇒ W short-circuit	45
⇒ W interruption.....	46
⇒ X short-circuit.....	47
⇒ X interruption	48
⇒ Y short-circuit.....	49
⇒ Y interruption	51
⇒ Z short-circuit.....	52
⇒ Z interruption	53
Fault in memory (change control box).....	54

BEHR air-conditioner

Reading out the fault memory

- Switch off ignition and connect up request button
- Switch on ignition
- Press button for at least 2 seconds

When the first fault code has been emitted display of further codes will be automatically interrupted. for the next fault code the button must be pressed again for at least 2 seconds.

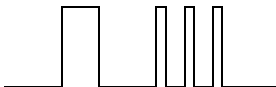
Duration of a ten.....	approx. 2 s
Duration of a unit.....	approx. 0.5 s
Pause between a ten and a unit.....	approx. 3 s
Pause between a unit and a unit.....	approx. 1 s
Pause between a ten and a ten.....	approx. 1 s
Pause before emission of flashcode	approx. 3 s

Example of flashcode: Fault code 13

Lamp in
request
button

on

off



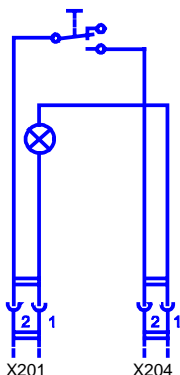
Erasing the fault memory

- Switch off ignition and connect up request button
- Press button and keep it pressed
- Switch on ignition and release button after > 2 seconds

Type of fault	Flashcode
Temperature sensor:	
⇒ Interior (IF): short-circuit to earth.....	1
⇒ Interior (IF): short-circuit to +UB or interruption.....	2
⇒ Exterior (AF): short-circuit to earth	3
⇒ Exterior (AF): short-circuit to +UB or interruption.....	4
⇒ Heat exchanger (TF): short-circuit to earth.....	5
⇒ Heat exchanger (TF):short-circuit to +UB or interruption.....	6
⇒ Evaporator (VF): short-circuit to earth	7
⇒ Evaporator (VF): short-circuit to +UB or interruption.....	8
Compressor coupling: short-circuit to earth, +UB or interruption	9
Water clock valve: short-circuit to earth or interruption.....	11
Water clock valve: short-circuit to +UB	12
Blower relay: short-circuit to earth or interruption	*13
Blower relay: short-circuit to +UB.....	*14
Coding not stored in control unit.....	15
Coding stored does not correspond to the components dependent on the control unit.....	16

* For air-conditioner only

Connection diagram for request button



WABCO ATC (Automatic Temperature Control) heater/air-conditioner control

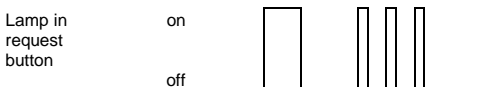
Reading out the fault memory

- Switch off ignition and connect up request button
- Switch on ignition
- Press button for at least 2 seconds

When the first fault code has been emitted, display of further fault codes will be automatically interrupted. For further codes the button must be pressed again for at least 2 seconds.

Duration of a ten.....	approx. 2 s
Duration of a unit.....	approx. 0.5 s
Pause between a ten and a ten.....	approx. 1 s
Pause between a ten and a unit.....	approx. 3 s
Pause between a unit and a unit.....	approx. 1 s
Pause before flashcode emission.....	approx. 3 s

Example of flashcode: Fault code 13

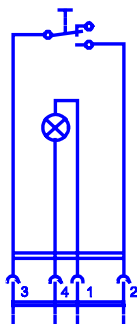


Erasing the fault memory

- Switch off ignition and connect up request button
- Press button and keep it pressed
- Switch on ignition
- Release button after > 2 seconds and < 4 seconds

Type of fault	Flashcode
Control unit defective (cumulative test fault, fan curves).....	1
Control unit defective (cumulative test fault, setting data).....	2
Spec. temperature transmitter, short-circuit to +UBatt.....	3
Spec. temperature transmitter, short-circuit to earth/interruption in cable.....	4
Temperature sensor:	
⇒ Evaporator, short-circuit to +UBatt	6
⇒ Evaporator, short-circuit to earth	7
⇒ evaporator, interruption in cable.....	8
⇒ Inside air, short-circuit to +UBatt	9
⇒ Inside air, short-circuit to earth	10
⇒ Inside air, interruption in cable	11
⇒ Air outlet, short-circuit to +UBatt	12
⇒ Air outlet, short-circuit to earth	13
⇒ Air outlet, interruption in cable	14
⇒ External air, short-circuit to +UBatt.....	15
⇒ External air, short-circuit to earth.....	16
⇒ External air, interruption in cable.....	17
Mode switch defective.....	18
Control unit defective (cumulative test fault, calibration data).....	21

Connection diagram for request button



X204

Automated pre-selector shift (AVS)

Reading out the fault memory

- Turn rotary switch to neutral position
- Hold stalk switch in "Plus" position

The fault codes are emitted on the gear display as long as the stalk switch is held in the "Plus" position.

Erasing the fault memory

- Possible only with MAN-cats

Type of fault	Display
Short-circuit to earth:	
⇒ Solenoid valve Y6 (Y135).....	21
⇒ Solenoid valve Y1 (Y135).....	23
⇒ Solenoid valve Y2 (Y135).....	24
⇒ Solenoid valve Y3 (Y135).....	25
⇒ Solenoid valve Y4 (Y135).....	26
⇒ Solenoid valve Y5 (Y135).....	27
⇒ Solenoid valve Y8 (Y135).....	28
⇒ Lamp for substitute driving program switch (S167).....	34
⇒ Solenoid valve, confirm (Y137)	35
⇒ Clutch retention valve (136).....	36
Interruption or short-circuit to +UB:	
⇒ Solenoid valve Y6 (Y135).....	41
⇒ Solenoid valve Y1 (Y135).....	43
⇒ Solenoid valve Y2 (Y135).....	44
⇒ Solenoid valve Y3 (Y135).....	45
⇒ Solenoid valve Y4 (Y135).....	46
⇒ Solenoid valve Y5 (Y135).....	47
⇒ Solenoid valve Y8 (Y135).....	48
⇒ Lamp for substitute driving program switch (S167).....	54
⇒ Solenoid valve, confirm (Y137)	55
⇒ Clutch retention valve (136).....	56
Gearbox in neutral signal missing / Gear engaged signal does not drop out.....	61
Gear engaged signal:	
⇒ Missing during shifting.....	62
⇒ Missing without shifting	63
Group engaged signal does not drop out if group is engaged, or drops out and is no longer present.....	
Group engaged signal drops out without shifting and is no longer present.....	64
Overrevving during gearshift.....	65
Overrevving during gearshift.....	66
Gear engaged signal and gearbox in neutral signals present simultaneously	67
Voltage from actual value transmitter (B138) or duty factor of PWM interface:	
⇒ too low (cable 74502).....	71
⇒ too high (cable 74502).....	72

Type of fault	Display
Supply voltage from actual value transmitter (B138):	
⇒ too low	73
⇒ too high	74
Battery voltage:	
⇒ too low	75
⇒ too high	76
Signal from speed pickup (B135) faulty	77
Signal from tachograph missing	78
Fault in stalk switch (S157) / pre-selector switch (S171)	81
Cable 40502 to display (A145) disturbed	82
Short-circuit to earth (more detailed analysis not possible)	83
Mechanical defect in gearbox/wrong control unit	84
Substitute driving program has been activated	88
Control unit defective	91
Control unit defective	92
Control unit defective	93

RENK DOROMAT

Reading out the fault memory

- Switch off ignition and set gearbox to neutral
- Connect up request button
- Switch on ignition and press button for > 2.5 seconds

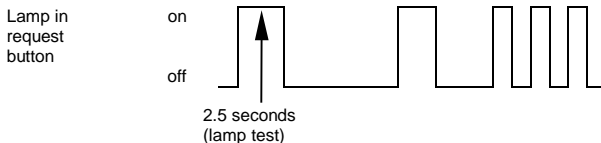
The fault codes are emitted only via the gearbox oil temperature check lamp.

If no fault has been stored, the gearbox oil temperature check lamp goes out after the lamp test and remains out.

If a fault has been stored, the fault code will be emitted 6 seconds after the lamp test. The display is interrupted automatically after the first fault code. For further fault codes the button must be pressed again for > 2.5 seconds.

Duration of a ten.....	approx. 2 s
Duration of a unit.....	approx. 0.5 s
Dark period between a ten and a unit	approx. 3 s
Dark period between a unit and a unit.....	approx. 1 s
Dark period between a ten and a ten.....	approx. 1 s

Example of flashcode: Fault code 13

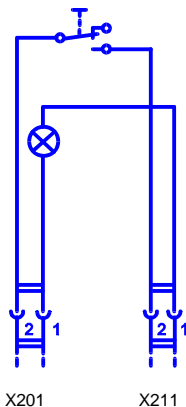


Erasing the fault memory

- Switch off ignition and connect up request button
- Press button and keep it pressed
- Switch on ignition and release button after > 2 seconds

Type of fault	Flashcode
1st gear solenoid defective, cable or output stage.....	1
2nd gear solenoid defective, cable or output stage.....	2
3rd gear solenoid defective, cable or output stage	3
4th gear solenoid defective, cable or output stage.....	4
Reverse gear solenoid defective, cable or output stage	5
Converter solenoid defective, cable or output stage.....	6
Gearbox PTO defective, cable or output stage	7
Modulation solenoid 1 defective cable or output stage	9
Neutral solenoid defective, cable or output stage	11
Drive pickup (engine speed) defective, cable, output stage or earth fault in pickup	12
Output pickup (road speed) defective, cable, output stage or earth fault in pickup.....	13
Engine brake defective, cable or output stage	14
Temperature lamp defective cable or output stage.....	15
Starter interlock defective, cable or output stage.....	16
Locking solenoid defective, cable or output stage	17
Modulation solenoid 2 defective, cable or output stage	18

Connection diagram for request button



SAMT B

Reading out the fault memory

- Switch off ignition, set gearbox to neutral, do not depress the clutch
- Switch on ignition
- Move gearshift lever to downshift position and hold it there
- Briefly switch ignition off and on again (once only)
- Read off fault codes at gear display, thereby keeping the gearshift lever in the downshift position. A buzzer sounds after the last fault code and the display switches back to neutral
- Release gearshift lever

Erasing the fault memory

- Switch off ignition and set gearbox to neutral. Do not depress the clutch
- Switch on ignition
- Move gearshift lever to downshift position and hold it there
- Briefly switch ignition off and on again twice
- When the fault memory has been erased a buzzer briefly sounds and "00" appears briefly in the display. After this the display returns to neutral
- Release gearshift lever

Type of fault	Flashcode
Relay for power supply K314:	
⇒ Short-circuit in coil to earth.....	A0
⇒ Interruption in coil or short-circuit to +UBatt	A1
Battery voltage too high	A2
Battery voltage too low.....	A3
"Ignition on" signal missing	A4
Voltage at XY switch unit too high.....	A5
Voltage at XY switch unit too low	A6
Voltage supply for gearshift lever: short-circuit	A7
Voltage supply for gear display, short-circuit	A8
Solenoid valve for low splitter range:	
⇒ Short-circuit	B0
⇒ Interruption or short-circuit to +UBatt	B1
Solenoid valve for high splitter range:	
⇒ Short-circuit	B2
⇒ Interruption or short-circuit to +UBatt	B3
Mechanical fault in slow splitter range	B4
Mechanical fault in high splitter range.....	B5
"Splitter" switch defective.....	B6
Solenoid valve for high range-change group:	
⇒ Short-circuit	C0
⇒ Interruption or short-circuit to +UBatt	C1
Solenoid valve for low range-change group:	
⇒ Short-circuit	C2
⇒ Interruption or short-circuit to +UBatt	C3

Type of fault	Flashcode
Mechanical fault in high range-change group.....	C4
Mechanical fault in low range-change group.....	C5
"Range-change" switch defective.....	C6
Short-circuit in solenoid valve for clutch or external short-circuit.....	D0
Interruption or short-circuit to +UBatt in solenoid valve for clutch.....	D1
Fault in data cable between SAMT control unit in cab and SAMT control unit on gearbox.....	E0
Fault in CAN data bus:	
⇒ between SAMT control unit and EDC control unit.....	E1
⇒ between SAMT control unit and retarder control unit.....	E2
⇒ between SAMT control unit and ABS/ASR control unit.....	E3
⇒ general communication fault, SAMT control unit switched off.....	E4
Fault in data cable between SAMT control unit and gear display, or faulty data transfer.....	EE
Fault in SAMT control unit (cab).....	F0
Fault in SAMT control unit (gearbox).....	F1
Current at X motor of XY switch unit.....	H0
Interruption or short-circuit to earth at X motor of XY switch unit.....	H1
X potentiometer outside normal operating range.....	H2
"Gate selector rail" cannot be triggered.....	H3
Current at Y motor of XY switch unit.....	J0
Interruption or short-circuit to earth at Y motor of XY switch unit.....	J1
Y potentiometer outside normal operating range.....	J2
One forward gear cannot be triggered.....	J3
One reverse gear cannot be triggered.....	J4
Neutral position cannot be triggered.....	J5
Signal from countershaft speed sensor missing.....	L0
Signal from mainshaft speed sensor missing.....	L1
Signal from output shaft speed sensor missing.....	L2
Solenoid valve for gearbox brake:	
⇒ Short-circuit.....	U0
⇒ Interruption or short-circuit to +UBatt.....	U1
Reservoir air pressure to gearbox too low.....	U2
Position of gearshift lever illogical; up- and downshift requested simultaneously at SAMT control unit in cab or short-circuit to +UBatt.....	U3

VOITH DIWA.3

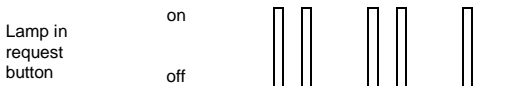
Reading out the fault memory

- Switch off ignition and connect up request button
- Switch on ignition
- Press button for > 2 seconds

Emission of the flashcode begins after 3 seconds. When the first fault code has been emitted emission of further codes is automatically interrupted. For the next fault the button must be pressed again for at least 2 seconds.

Duration of a flash	approx. 0.5 s
Pause between a hundred and a hundred	approx. 1 s
Pause between a hundred and a ten	approx. 3 s
Pause between a ten and a ten	approx. 1 s
Pause between a ten and a unit	approx. 3 s
Pause between a unit and a unit	approx. 1 s

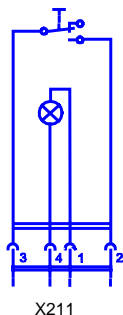
Example of flashcode: Fault code 221



Erasing the fault memory

- Switch off ignition and connect up request button
- Press button and keep it pressed
- Switch on ignition and release button after > 2 seconds

Connection diagram for request button



Type of fault	Flashcode
Sensor:	
⇒ Input speed.....	221
⇒ Output speed.....	222
⇒ Turbine speed.....	223
⇒ Oil temperature.....	224
Input clutch.....	331
Through clutch.....	332
Clutch for 4th gear.....	333
Pump brake.....	334
Converter brake, small piston	335
Turbine brake	336
Pressure, converter outlet valve WP.....	337
Pressure, converter outlet valve WR	338
Converter brake, large piston.....	339
Control element REA1	341
Relays:	
⇒ Control.....	342
⇒ Converter brake.....	343
⇒ Speed switch	344
⇒ Reversing lights.....	345
Button lighting	346
Bus-stop brake relay	347
Relay, adhesion display	348
Central warning lamp	358
Gearbox oil warning lamp	359
Service brake	361
Parking brake.....	362
Load pickup.....	363
Button.....	364
Control reset.....	391
Software.....	392
REA0 control element	399
Monitoring controller.....	451
Supply voltage.....	481
Control pressure.....	499

Voith-Retarder

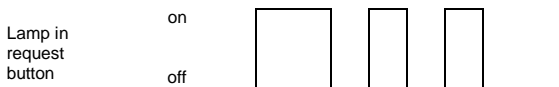
Reading out the fault memory

- Retarder step switch in zero position. Switch off ignition and connect up request button
- Switch on ignition
- Press button for > 2 seconds

When the first fault code has been emitted, emission of further codes will be automatically interrupted. For the next fault the button must be pressed again for at least 2 seconds.

Duration of a ten..... approx. 2 s
Duration of a unit..... approx. 1 s
Dark phase..... approx. 1 s

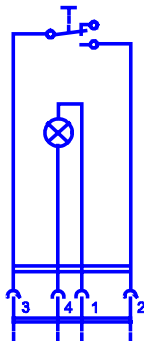
Example of flashcode: Fault code 12



Erasing the fault memory

- Retarder step switch in zero position. 0, Switch off ignition and connect up request button.
- Press button and keep it pressed
- Switch on ignition and release button after >2 seconds.

Connection diagram for request button



X207

Type of fault	Flashcode
Relay, retarder operation in stages, short-circuit to earth	1
Output, relay for speed reduction, short-circuit to +UBatt	2
Engine brake relay, short-circuit to earth	3
LED output in stage switch, short-circuit to earth	4
PIN X1/7, undervoltage (< 17,5 Volt)	5
PIN X1/7, overvoltage (> 32,5 Volt)	6
Water temperature sensor:	
⇒ Interruption or short-circuit to UBatt (> 2000 Ohm)	8
⇒ Short-circuit to earth (< 600 Ohm)	9
Oil temperature sensor:	
⇒ Interruption or short-circuit to UBatt (> 2000 Ohm)	11
⇒ Short-circuit to earth (< 600 Ohm)	12
Stage switch:	
⇒ Undefined switching status	13
⇒ Short-circuit to UBatt	14
⇒ Short-circuit to earth	15
Speedo signal, interruption	16
Speedo signal, short-circuit to UBatt or undefined signal	18
ABS signal, short-circuit to earth	19
ABS signal, signal level undefined	21
ABS signal, internal fault in Digiprop control unit	22
Fault in prop. valve:	
⇒ Short-circuit to UBatt at prop. valve, or control unit defective	23
⇒ Short-circuit in prop. valve solenoid, short-circuit in prop. valve cable, interruption in prop. valve solenoid, interruption in prop. valve cable, short-circuit to earth at prop. valve	24
⇒ Control unit defective	25
⇒ Control unit defective	26
⇒ Control unit defective	27
PIN X1/13, undervoltage (< 17.5 Volt)	28
Internal fault relating to safety module	29
Data record / parameters, faulty coding	31
Retarder operation lamp:	
⇒ Interruption or short-circuit to earth	32
⇒ Short-circuit to UBatt	33
Engine speed signal missing	34
Internal fault relating to ROM / EEPROM	35

ZF-Retarder (Intarder)

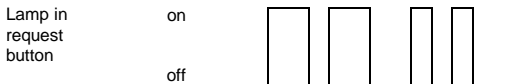
Reading out the fault memory

- Switch off ignition and connect up request button
- Switch on ignition
- Press request button for > 2 seconds

The flashcode is emitted after 3 seconds. After the first fault code emission of further codes is automatically interrupted. For the next fault code the button must be pressed again for at least 2 seconds.

Duration of a ten.....	approx. 2 s
Duration of a unit.....	approx. 1 s
Dark phase between a ten and a unit.....	approx. 2 s
Dark phase between a unit and a unit.....	approx. 1 s
Dark phase between a ten and a ten.....	approx. 1 s

Example of flashcode: Fault code 22

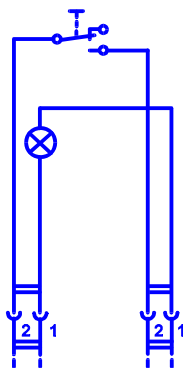


Erasing the fault memory

- Switch off ignition and connect up request button
- Press button and keep it pressed
- Switch on ignition and release button after > 2 seconds

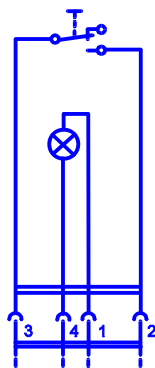
Type of fault	Flashcode
Charge valve, interruption	21
Intarder check lamp, interruption	22
Charge valve, short-circuit	41
Intarder check lamp, short-circuit	42
Brake light, short-circuit.....	44
Coolant temperature sensor:	
⇒ Short-circuit or < 1000 Ohm	51
⇒ Interruption or > 400 kOhm.....	55
Brake stage switch, signal combination implausible	66
Output speed sensor, interruption or short-circuit	77
Proportional solenoid, interruption	88
Overvoltage in vehicle electrics > +38Volt.....	99

Connection diagram for request button



X201

X207



X207

ZF HP500

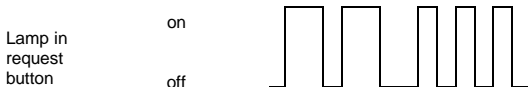
Reading out the fault memory

- Switch off ignition and connect up request button
- Switch on ignition
- Press request button for > seconds

If no fault has been stored, the lamp goes out when the button is pressed. If a fault is present, emission of the flashcode begins after 3 seconds. After emission of the first fault code emission is automatically interrupted. For the next fault code the button must be pressed again for at least 2 seconds.

Duration of a ten.....	approx. 2 s
Duration of a unit.....	approx. 1 s
Dark phase between a ten and a unit.....	approx. 2 s
Dark phase between a unit and a unit.....	approx. 1 s
Dark phase between a ten and a ten.....	approx. 1 s

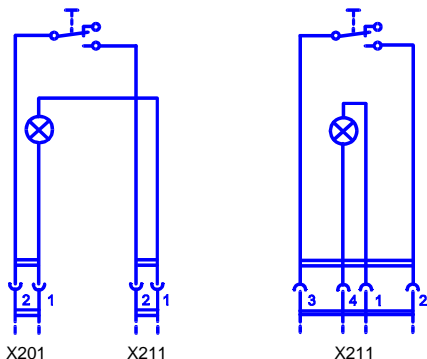
Example of flashcode: Fault code 23



Erasing the fault memory

- Switch off ignition and connect up request button
- Press button and keep it pressed
- Switch on ignition and release button after > 3 seconds

Connection diagram for request button



Type of fault	Flashcode
Slip fault	11
Slipping time too long (gear change 1->2)	12
Slipping time too long (gear change 2->3)	13
Slipping time too long (gear change 3->4)	14
Slipping time too long (gear change 4->5)	15
Slipping time too long (gear change 5->6)	16
Slipping time too long (gear change 6->7)	17
Slipping time too long (gear change 7->8)	18
Load pickup faulty, tap voltage too high/low	23
Output speed sensor faulty	25
Turbine speed sensor faulty	27
Speedo output SD3:	
⇒ Short-circuit to 24 Volt	28
⇒ Short-circuit to earth	29
Short-circuit to earth	
⇒ Brake G, cable 45 AD1	31
⇒ Brake F, cable 44 AD 2	32
⇒ Brake E, cable 42 AD 3	33
⇒ Brake D, cable 39 AD 4	34
⇒ Clutch C, cable 4 AD 5	35
⇒ Clutch B, cable 22 AD 6	36
⇒ Clutch A, cable 3 AD 7	37
⇒ Converter clutch WK, cable 1 AD 8	38
⇒ Retarder output, cable 49 AD 9	39
⇒ Engine brake output, cable 50 AD 10	40
⇒ Engine brake output, cable 53 AD 11	41
⇒ V signal, cable 55 AD 12	42
⇒ PTO output, cable 11 AD 13	43
⇒ Antigas signal, cable 30 AD 14	44
⇒ Load reduction/gear signal 1, cable 12 AD 15	45
⇒ Bar magnet/fault display (H1), cable 54 AD 16	46
Interruption or short-circuit to 24 Volt	
⇒ Brake G, cable G	51
⇒ Brake F, cable F	52
⇒ Brake E, cable E	53
⇒ Clutch D, cable D	54
⇒ Clutch C, cable C	55

Type of fault	Flashcode
Interruption or short-circuit to 24 Volt	
⇒ Clutch B, cable B.....	56
⇒ Clutch A, cable A.....	57
⇒ Converter clutch, cable WK.....	58
⇒ Retarder output, check lamp not working, cable 1 BN2	59
⇒ Engine brake output, engine brake not working, cable 12 BN2.....	60
⇒ Retarder reduction output, retarder not reduced, cable 632.....	61
⇒ V signal 1, cable 5 BN1	62
⇒ PTO output, cable 6 BN2.....	63
⇒ Antigas signal, cable 4 BN2	64
⇒ Load reduction/gear signal 2, cable 9 BN2	65
⇒ Bar magnet/fault display (driving switch lamp), cable 15 BN2	66
Load pickup, incorrect setting	71
Driving switch defective/interrupted	73
Vehicle electrics faulty	75
Constricted pressure valve, fault at current output AI1	77
Load pickup, supply voltage faulty	79

EMS 3.3

Reading out the fault memory

- Switch off ignition and connect up request button
- Switch on ignition and press button for > 1 second

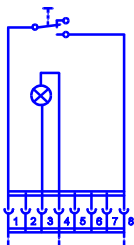
The flashcode is emitted only via the E-Gas lamp, not via the lamp in the request button.

Erasing the fault memory

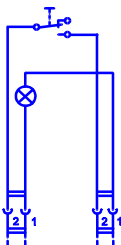
- Switch off ignition and connect up request button
- Press button and keep it pressed
- Switch on ignition and release button after > 1 second

Type of fault	Flashcode
No fault.....	1
Control unit defective	2
Actuator check-back.....	3
Pedal potentiometer 1, fault	4
Actuator fault	5
Pedal potentiometer, signal not identical with that from pedal potentiometer 2.....	6
Speed signal fault.....	7
ASR interface fault	8
Pedal potentiometer 2, fault	9
Road speed fault (cruise control)	10
Actuator current, fault.....	11
Actuator, learning fault	12
Speed signal (signal fault).....	13
Control unit trigger to solenoid valve, engine stop is interrupted	14

Connection diagram for request button

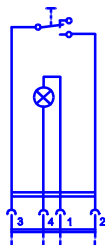


X70



X201

X210



X210

EDC M7

Reading out the fault memory

- Switch off ignition and connect up request button
 - Diagram A for control units up to end of 990 (290/300/330 hp)
 - Diagram B for control unit from 1991 onwards (320/420 hp)
- Remove feet from clutch and brake pedals (otherwise the fault code will be erased)
- Switch on ignition
- Press button for > 2 seconds

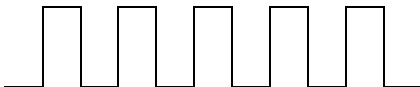
After emission of the first fault code further emission is automatically interrupted. For the further fault codes the button must be pressed again for at least 2 seconds.

Example of flashcode: Fault code 5

Lamp in
request
button

on

off



Erasing the fault memory (290/300/330 hp with control units up to end of 1990)

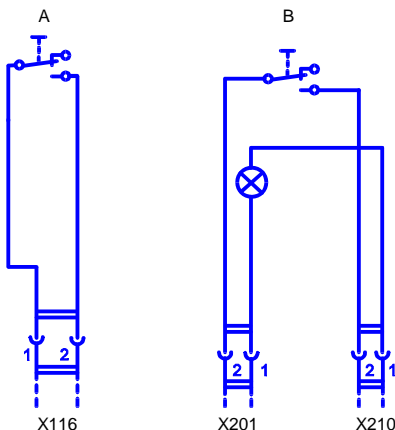
- Switch off ignition and connect up request button in accordance with diagram (A)
- Switch on ignition
- Press request button and at the same time actuate clutch or brake pedal

Erasing the fault memory (320/420 hp with control units from 1991 onwards)

- Switch off ignition and connect up request button in accordance with diagram (B)
- Press button and keep it pressed
- Switch on ignition
- Release button after > 3 seconds

Type of fault	Flashcode
Pedal value transmitter defective	1
Fuel temperature sensor (only for 290/300/330 hp)	2
Charge air temperature sensor	3
System speed pickup in mechanism	4
Boost pressure sensor	5
Control rod travel pickup in mechanism	6
Coolant temperature sensor	7
Road speed pickup: no signal or fault in signal	8
Idling switch in pedal value transmitter faulty (with 320/420 hp only)	9
Quantity mechanism, system deviation	10
Not occupied	11
Not occupied	12
Control unit defective	13
Auxiliary speed sensor: no signal (terminal W))	14
Control unit defective	15

Connection diagram for request button:



Type of fault	Please observe SI 97 04 22/2	Flashcode	
		long	short
Pedal value transmitter		-	1
Charge air temperature sensor		-	3
Primary speed sensor		-	4
Boost pressure sensor		-	5
Control rod recording in mechanism		-	6
Coolant temperature sensor		-	7
Road speed pickup		-	8
Idling switch in pedal value transmitter		-	9
Quantity mechanism (system deviation)		-	10
Auxiliary speed sensor		-	14
Fuel temperature sensor		1	1
Battery undervoltage		1	3
Brake proximity switch		1	4
Clutch proximity switch		1	5
Control unit (computer link)		1	6
Overrevving		1	7
Start of injection, system deviation		1	8
Boost pressure controller, system deviation		1	9
Needle movement sensor		1	10
Mechanical defect in needle movement sensor (needle sticks)		1	11
Multistage switch for torque limiter		1	12
Control element (stalk switch)		1	13
ASR interface		1	14
Control unit (CAN module)		1	15
CAN signal, ASR2		2	1
CAN signal, gearbox control		2	3
Idling switch in pedal value transmitter, plausibility with brake		2	4
Main relay		2	5
Multistage switch, top speed		2	7
Atmospheric pressure sensor (in control unit)		2	8
CAN signal from ASR to retarder		2	10
CAN signal from gearbox to retarder		2	11
CAN signal from vehicle management to engine brake		2	12
CAN signal from vehicle management		2	13
CAN signal from gearbox to EDC		2	14
Control unit (computer after-running not completed, EHAB)		3	1
Control unit defective (computer 1 defective)		3	2
Control unit defective (computer 2 defective)		3	3
External stop recording		3	4
Boost pressure control VTG		3	5
Intercooling bypass		3	6
After-running not complete		3	8
After-running watchdog fault		3	9

VDO speed limiter AGB-S

Reading out the fault memory

- Switch off ignition and connect up request button
- Switch on ignition and wait for 2 seconds
- Press button for > 2 seconds

Emission is automatically interrupted after emission of the first fault code. For further fault codes the button must be pressed again for at least 2 seconds.

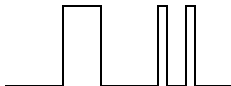
Dark phase before emission	approx. 3 s
Duration of long flash	approx. 2 s
Duration of short flash	approx. 0.5 s
Pause between a long and a short flash	approx. 3 s
Pause between two short flashes.....	approx. 1 s
Pause between two long flashes.....	approx. 1 s

Example of flashcode: Fault code 1x long and 2x short flashes

Lamp in
request
button

on

off



Erasing the fault memory

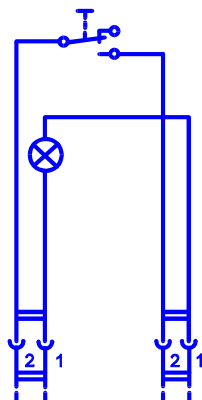
- Switch off ignition and connect up request button
- Press button and keep it pressed
- Switch on ignition and release button after > 2 seconds

Type of fault

Flashcode

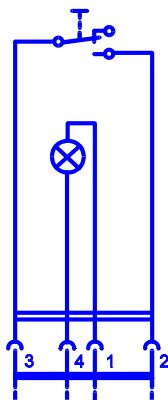
	long	short
Clutch switch, if present	1	2
Road speed signal, cable, short-circuit to earth or cable capacity too high	2	2
Road speed signal, cable open or short-circuit to +UB or signal fault	2	4
Servomotor, potentiometer cable(s)	3	1
Fault in signal path for terminal W	3	2
Program fault, (control unit defective)	3	3
Configuration error, data out of tolerance	3	5
Servomotor cable, short-circuit to +UB	4	1
Servomotor cable, short-circuit to earth	4	2
Servomotor, internal short-circuit	4	3
Servomotor or servomotor cable interrupted	4	4
Positioning fault, servomotor incorrectly adjusted	4	5

Connection diagram for request button



X201

X210



X210

WABCO air injection

Reading out the fault memory

- Switch off ignition and connect up request button
- Switch on ignition
- Press button for at least 2 seconds

Erasing the fault memory

- Switch off ignition and connect up request button
- Press button and keep it pressed
- Switch on ignition
- Release button after > 2 seconds

Type of fault

Flashcode

Control unit defective:

⇒ Cumulative test, ROM	1
⇒ Cumulative test, Wabco data	2
⇒ Cumulative test, parameters	3
⇒ RAM cells defective	4
Solenoid valve path:	
⇒ Short-circuit	5
⇒ Interruption	6

Connection diagram for request button

