



**Blinkcode**  
for Goods Vehicles  
and Buses  
ABS/ASR "C"-Generation



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The WABCO ABS/ASR “C ”-generation offers the possibility for system faults to be recorded, interpreted and then erased via an easy-to-use “blinkcode ”.

The blinkcode covers an extensive range of system faults allowing the operator to quickly diagnose their location and cause.

This document covers:

- the general operation
- the blinkcode structure
- activation procedure of the blinkcode
- description of blinkcode confirmation.

Faults in the system are detected and stored by an integrated safety circuit. The faults remain stored even if the electrical supply is switched off.

The blinkcode does not replace a vehicle test such as the step-by-step test with WABCO test-box 446 007 018 0 or Diagnostic Controller 446 300 320 0.

Such test equipment is necessary for deeper fault analysis and mismatching tests.

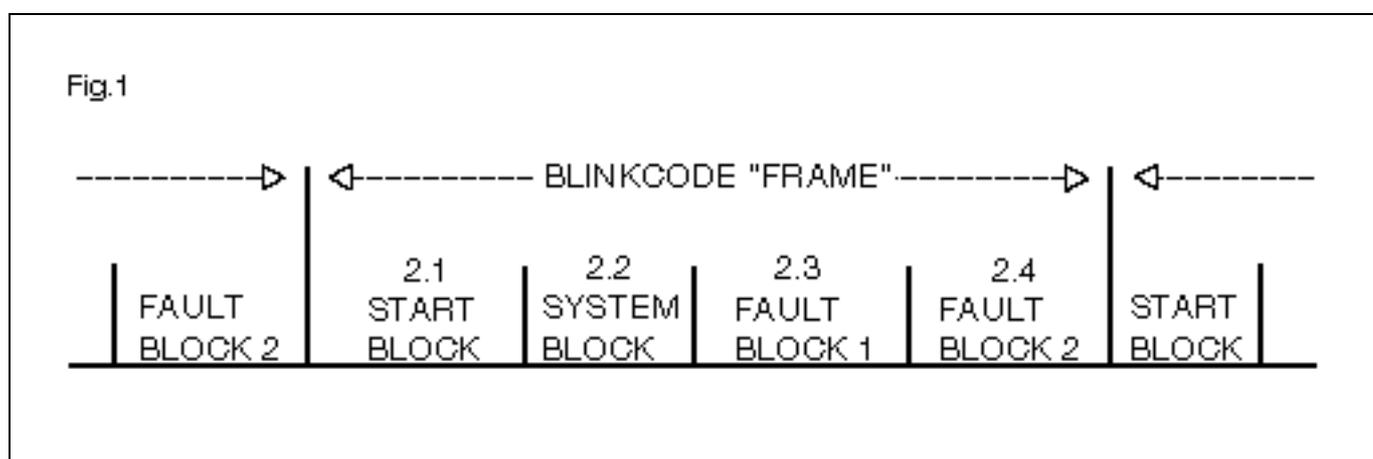
After each service on the ABS/ASR system, the memory has to be cleared and a fault-free operation of the system should be verified by a test-drive with the warning lamp extinguishing once the vehicle has reached 7 km/h.

## 1. General advice:

- 1.1. Blinkcodes are stored in their numerical – not chronological – order, beginning with the highest. They are transmitted via the vehicle’s ASR lamp, even if no failure is acutally present.
- 1.2. The blinkcode can only be activated with the vehicle stationary.
- 1.3. On first using the blinkcode the user should become familiar with the blinkcode “pattern ” (typically a group of flashes separated by a pause of 2.5 s).
- 1.4. The blinkcode continues until such time as the user terminates it. This should be done only when the user has no doubt as to which error-code is being “blinked” .
- 1.5. When the blinkcode is terminated during transmission the displayed fault is then erased.
- 1.6. Erasure of the fault is inhibited if the ignition is switched of while pin 14 of the ECU is connected to earth (blinkcode active).
- 1.7. If erasure of a fault is not possible, it means the fault is actually present and must first be repaired.
- 1.8. E.C.U. variants having a particular WABCO-no. have a corresponding blinkcode ensuring correct interpretation of the fault code. (E.C.U. variants can be based on which ASR interface is fitted for example, see Fig. 10).
- 1.9. When the blinkcode is activated the appropriate ASR switch is set to “off ”.
- 1.10. If blinkcode is not activated once pin 14 has been grounded, the wiring of pins 3, 9, 14 and 27 should be checked.

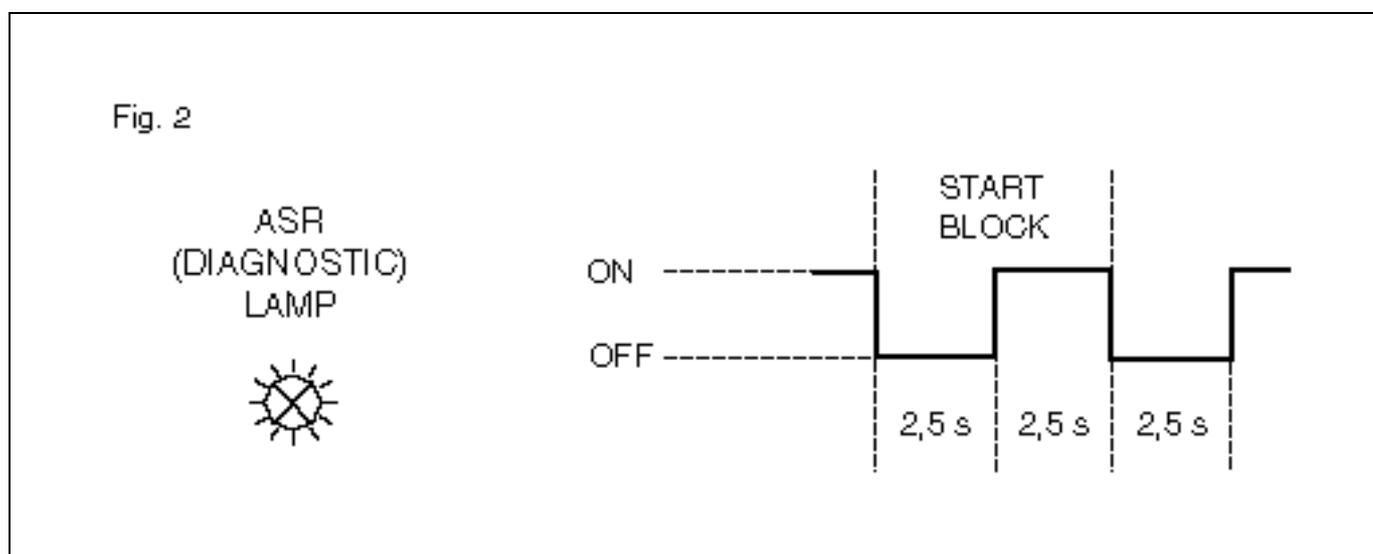
Each blinkcode is transmitted within a specific frame work. The frame itself comprises four distinct parts or “blocks ”

- 2.1. Start block: indicates blinkcode commence
- 2.2. System block: indicates which system is installed
- 2.3. Fault block 1: } these two blocks make up the  
Fault block 2: } fault code

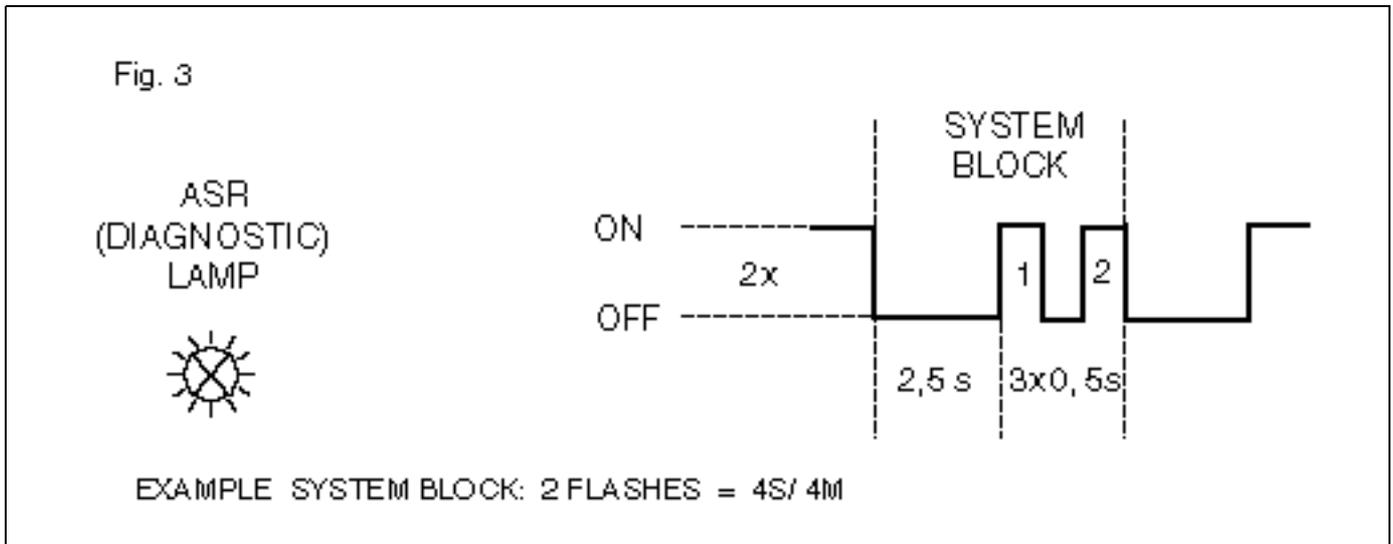


### 2.1. Start block (see Fig. 2)

Once pin 14 of the E.C.U. has been connected to vehicle ground for longer than 5 seconds. The blinkcode commences with the “start block ”.

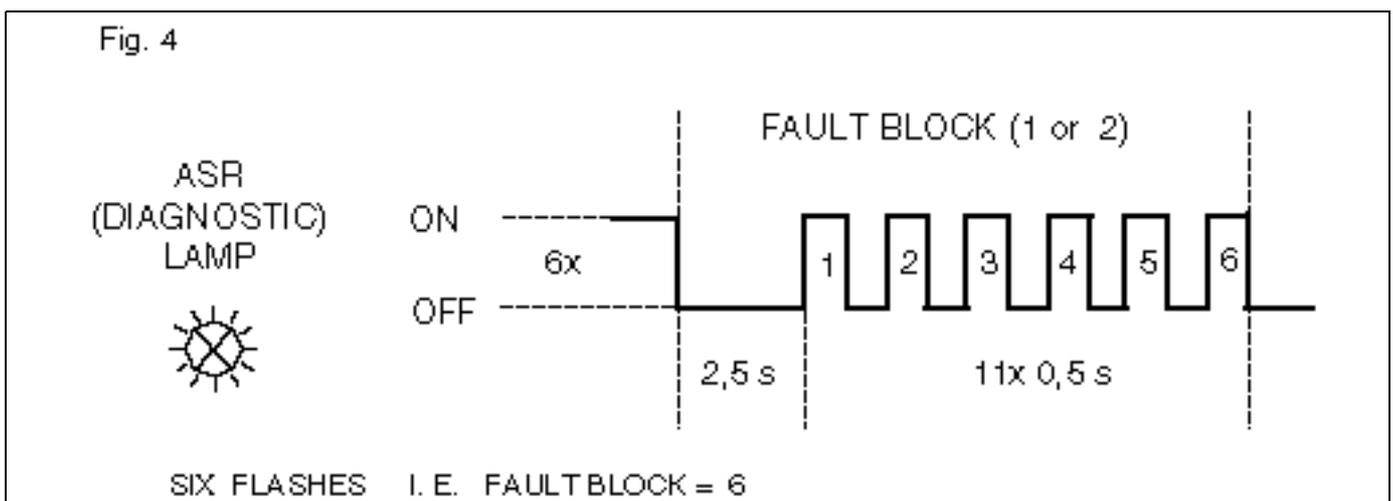


## 2.2. System block (see Fig. 3)



System block		ABS-System
1 x	=	6S/6M
2 x	=	4S/4M
3 x	=	4S/3M
4 x	=	6S/4M
5 x	=	6S/3M

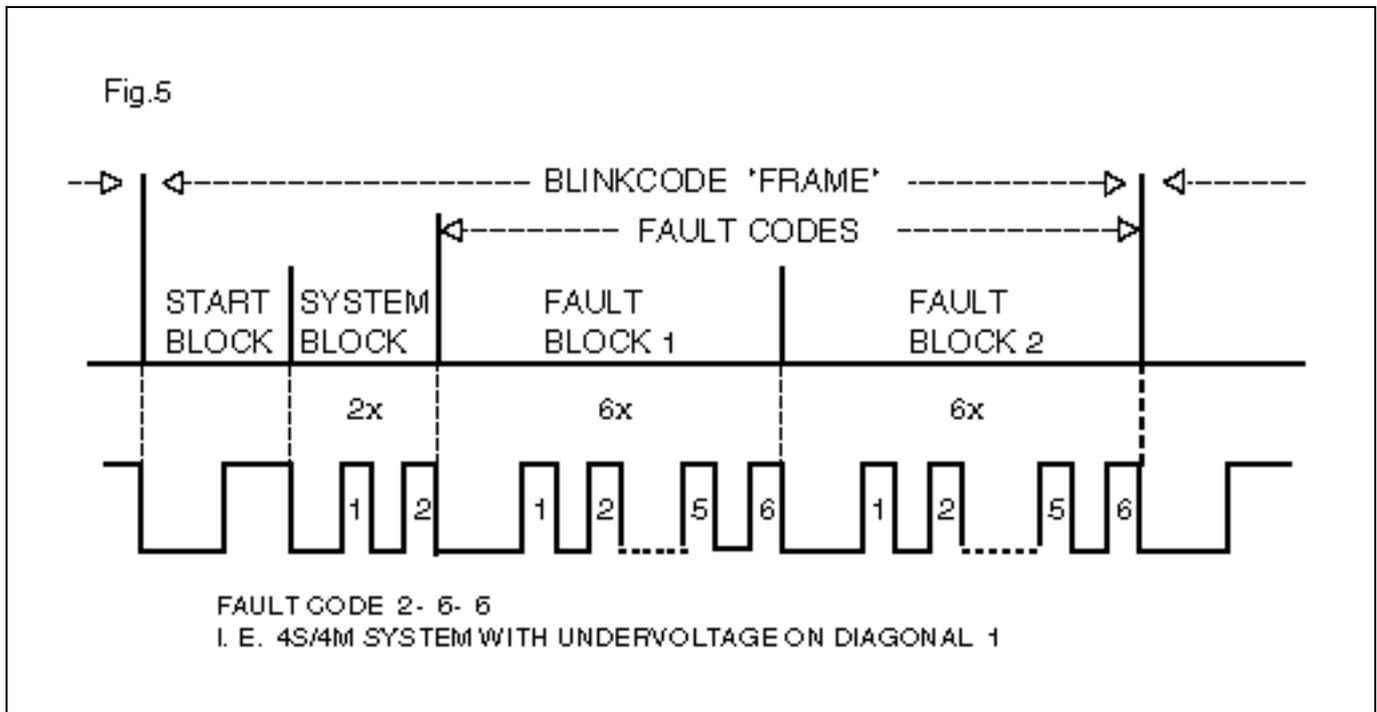
## 2.3. Fault blocks 1 or 2 (see Fig. 4)



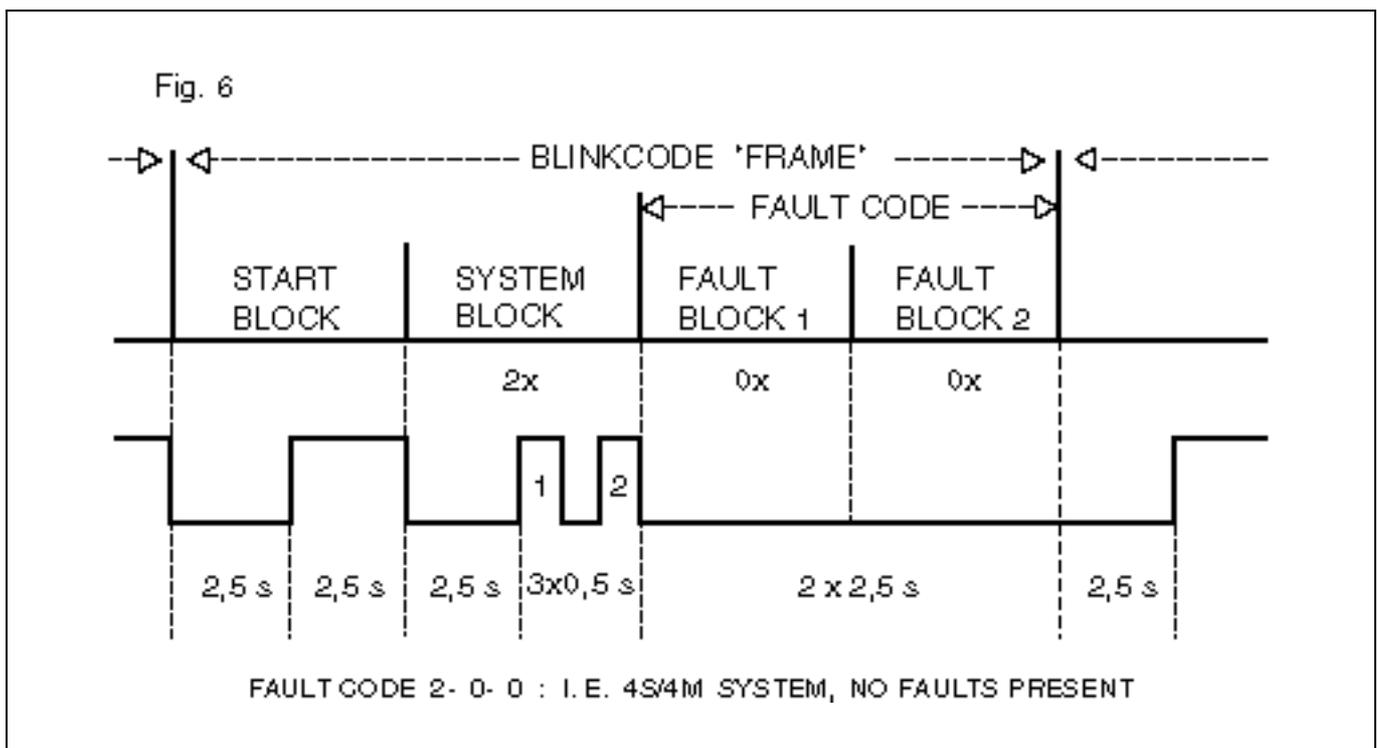
- e. g. Fault block 1 = six flashes  
 Fault block 2 = six flashes

Fault code is therefore 6-6  
 which translates as "under voltage, diagonal 1" when the  
 blinkcode list is referred to (page 9).

### Exampel 1: Fault code 2-6-6



### Example 2: No fault present 2-0-0 (system o.k.)



The blinkcode can be activated using one of the following methods:

- 4.1. In the case of a vehicle not having an ASR lamp installed:

Connect a filament bulb (2 W . . 5 W) to pin 3 of the E.C.U. (see circuit diagrams Figs. 7 and 8). This can be achieved using WABCO Inter-adaptor (part no. 446 300 3 . . 0) installed between E.C.U. and E.C.U.-connector ( **Ignition: OFF!**).

- 4.2. By connecting pin 14 to vehicle ground for longer than 5 seconds this can be achieved via the switch on the Inter-adaptor ( **Ignition: ON!**).

## IF ANY WORK ON THE VEHICLE'S WIRING IS TO BE CARRIED OUT, THE IGNITION MUST ALWAYS BE SWITCHED OFF!

- 4.3. The blinkcode can be read and noted as described in section 2 until the user is in no doubt as to the transmitted fault-code! The fault can be erased by disconnecting pin 14 from vehicle ground during the blinkcode transmission.

If erasure of a stored fault is to be avoided, the ignition should be switched off during blinkcode transmission.

If erasure of a fault-code is not possible, this means the fault is present at this time. This fault is recognised by the E.C.U. safety circuit each time the ignition is switched on.

Faults actually present must first be repaired before further fault-codes can be read.

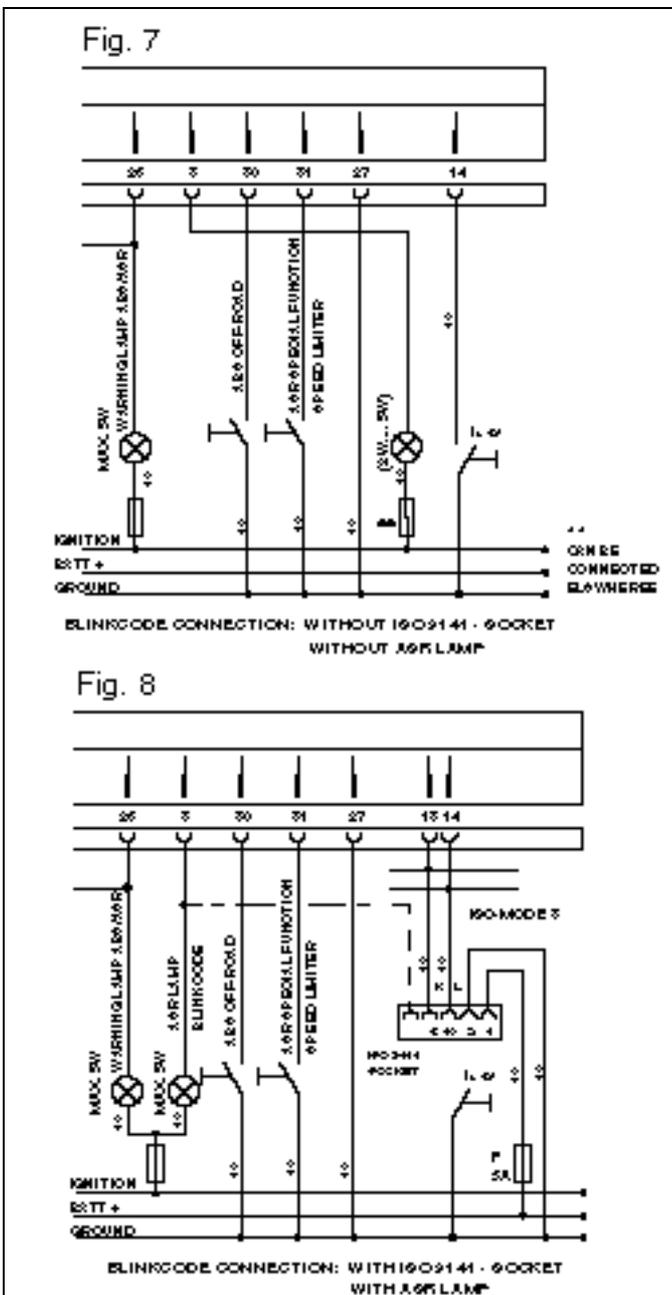
The noted faults should now be repaired; for this repair advice notes in the blinkcode list should be used (section 6).

Care should be taken regarding ECU part numbers, as a 4S/3M E.C.U. connected to a 4S/3M system will result in the warning-lamp being permanently lit although no failure will be stored.

Following each repair the blinkcode should be re-activated by the user to ensure that no further faults exist and the fault memory of the connected E.C.U. is cleared.

When all faults have been read and erased, the code for "System O.K." is transmitted (i.e. X-0-0).

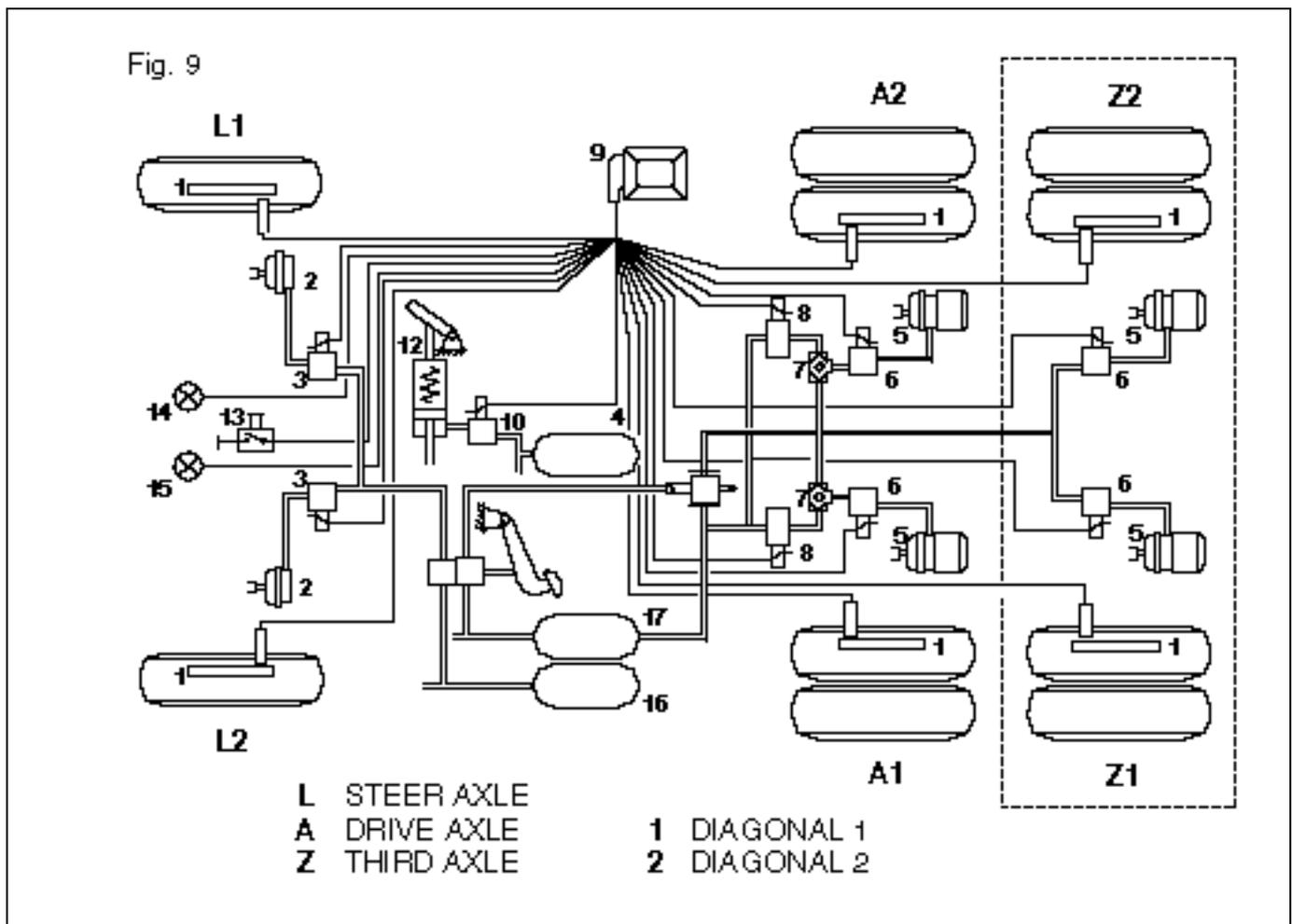
**AFTER EACH REPAIR THE SYSTEM OPERATION SHOULD BE FURTHER VERIFIED BY A TEST DRIVE DURING WHICH THE ABS- AND ASR LAMPS SHOULD EXTINGUISH ONCE THE VEHICLE HAS REACHED ca. 7 KM/H.**



The following pages list the fault codes in their numerical order along with an interpretation of the fault code and its effect on the specific system:

- the affected component
- the affected diagonal
- the affected wheel

(see system scheme for a 6S/6M - ABS/ASR (Abb. 9)).



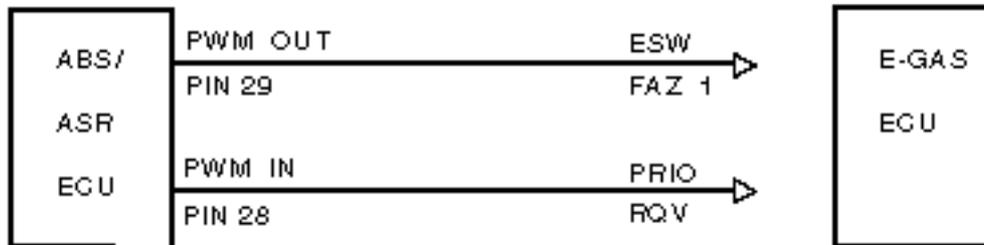
Under the columns "Repair Instruction" can be found a series of capital letters A, B, C etc. These refer to a series of repair instructions referred to in section 6. This should make the process of fault-finding and repair that much easier.

Fault Block 1	Fault Block 2	Components	Diagonal	Wheel	Fault	Repair advice note	Remark
- 6	- 6	Relay (VR1)	1	-	Low-voltage / relay cannot switch	A	voltage too low on pin 1, 9 or 19
- 6	- 7	Relay (VR2)	2	-			
- 6	- 8	Sensor (steer-axle)	1	F/R	Loss of wheel-speed signal	B	
- 6	- 9	Sensor (steer-axle)	2	F/L			
- 6	- 10	Sensor (steer-axle)	1	F/R	Impedance too high (wiring damage or short circuit)	C	
- 6	- 11	Sensor (steer-axle)	2	F/L			
- 6	- 12	Sensor (steer-axle)	1	F/R	Wheel-speed signal not plausible	D	wheel-slip value not plausible
- 6	- 13	Sensor (steer-axle)	2	F/L			
- 7	- 0	Sensor (drive-axle)	1	R/L	Loss of wheel-speed signal	B	
- 7	- 1	Sensor (drive-axle)	2	R/R			
- 7	- 2	Sensor (drive-axle)	1	R/L	Impedance too high (wiring damage or short circuit)	C	
- 7	- 3	Sensor (drive-axle)	2	R/R			
- 7	- 4	Sensor (drive-axle)	1	R/L	Wheel-speed signal not plausible	D	
- 7	- 5	Sensor (drive-axle)	2	R/R			
- 7	- 8	Sensor (third-axle 6 Ch.)	1	R/L	Loss of wheel-speed signal	B	
- 7	- 9	Sensor (third-axle 6 Ch.)	2	R/R			
- 7	- 10	Sensor (third-axle 6 Ch.)	1	R/L	Impedance too high (wiring damage or short circuit)	C	
- 7	- 11	Sensor (third-axle 6 Ch.)	2	R/R			
- 7	- 12	Sensor (third-axle 6 Ch.)	1	R/L	Wheel-speed signal not plausible	D	
- 7	- 13	Sensor (third-axle 6 Ch.)	2	R/R			

Fig. 10

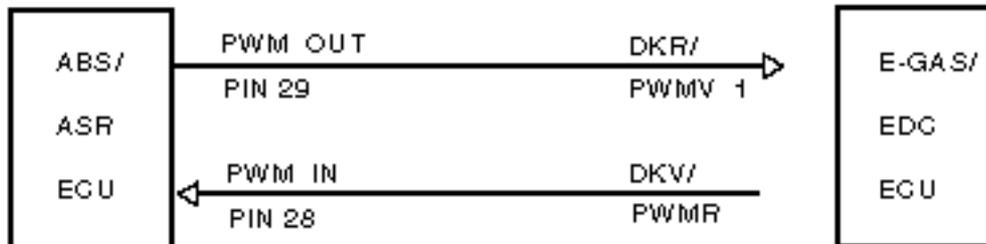
**E-GAS-INTERFACE**

E-GAS-INTERFACE **WITHOUT** FEEDBACK (UNI-DIRECTIONAL)



E.G. WABCO PART-NO. : 446 00x 031 0  
 ..... 037 0  
 446 00x 041 0  
 ..... 043 0  
 ..... 044 0  
 .....

E-GAS-INTERFACE **WITH** FEEDBACK (BI-DIRECTIONAL)



Z.B. WABCO PART-NO. : 446 00x 035 0  
 ..... 051 0  
 446 00x 053 0  
 ..... 054 0  
 .....  
 ..... 058 0  
 ..... 064 0  
 ..... 066 0  
 ..... 068 0  
 ..... 075 0  
 .....  
 ..... 085 0

Fault Block 1	Fault Block 2	Components	Diagonal	Wheel	Fault	Repair advice note	Remark
- 8	- 0	ECU	1	-	ECU-internal fault	H	
- 8	- 1	ECU	2	-			
- 8	- 2	ASR-Prop. -Valve	1	-	Damaged wiring	E	
- 8	- 3	E-Gas / EDC interface PWM-OUT (PIN 29)	2	-	Short to ground*	F	* Fault code for uni-directional (see Fig. 10, e.g. VDO E-Gas)
					Short to ground** or battery plus	F/G	** Fault code for bi-directional (see Fig. 10, e.g. BOSCH EDC/EMS, VDO-EMR)
- 8	- 4	ASR-Prop. -Valve	1	-	Short to ground	F	
- 8	- 5	E-Gas / EDC interface PWM-IN (PIN 28)	2	-	Short to battery plus*	G	* Fault code for uni-directional (see Fig. 10, e.g. VDO E-Gas)
					Error Message from** E-Gas / EDC-ECU	I	
- 8	- 6	Speed-limiter interface (PIN 10)	1	-	Faulty C3 signal from tachograph	I/E	
- 8	- 7	E-Gas / EDC interface PWM-IN (PIN 28)	2	-	Short to ground *	F	** Fault code for bi-directional (see Fig. 10, e.g. BOSCH EDC/EMS, VDO-EMR)
					Short to battery ** plus or damaged wiring	F/G	
- 8	- 9	E-Gas / EDC interface PWM-IN (PIN 28)	2	-	Short to battery plus*	G	
					Loss of data transfer	I	
- 8	- 10	ABS-Solenoid valve (inlet, steer axle)	1	F/R	Short to ground	F	
- 8	- 11	ABS-Solenoid valve (inlet, steer axle)	2	F/L			
- 8	- 12	ABS-Solenoid valve (inlet, steer axle)	1	F/R	Damaged wiring	E	
- 8	- 13	ABS-Solenoid valve (inlet, steer axle)	2	F/L			
- 8	- 14	ABS-Solenoid valve (outlet, steer axle)	1	F/R	Short to ground	F	
- 8	- 15	ABS-Solenoid valve (outlet, steer axle)	2	F/L			

Fault Block 1	Fault Block 2	Components	Diagonal	Wheel	Fault	Repair advice note	Remark
- 9	- 0	ABS-Solenoid valve (outlet, steer axle)	1	F/R	Damaged wiring	E	
- 9	- 1	ABS-Solenoid valve (outlet, steer axle)	2	F/L			
- 9	- 2	ABS-Solenoid valve (inlet, drive axle)	1	R/L	Short to ground	F	
- 9	- 3	ABS-Solenoid valve (inlet, drive axle)	2	R/R			
- 9	- 4	ABS-Solenoid valve (inlet, drive axle)	1	R/L	Damaged wiring	E	
- 9	- 5	ABS-Solenoid valve (inlet, drive axle)	2	R/R			
- 9	- 6	ABS-Solenoid valve (outlet, drive axle)	1	R/L	Short to ground	F	
- 9	- 7	ABS-Solenoid valve (outlet, drive axle)	2	R/R			
- 9	- 8	ABS-Solenoid valve (outlet, drive axle)	1	R/L	Damaged wiring	E	
- 9	- 9	ABS-Solenoid valve (outlet, drive axle)	2	R/R			
- 9	- 10	ABS-Solenoid valve (inlet, third axle)	1	R/L	Short to ground	F	
- 9	- 11	ABS-Solenoid valve (inlet, third axle)	2	R/R			
- 9	- 12	ABS-Solenoid valve (inlet, third axle)	1	R/L	Damaged wiring	E	
- 9	- 13	ABS-Solenoid valve (inlet, third axle)	2	R/R			
- 9	- 14	ABS-Solenoid valve (outlet, third axle)	1	R/L	Short to ground	F	
- 9	- 15	ABS-Solenoid valve (outlet, third axle)	2	R/R			

Fault Block 1	Fault Block 2	Components	Diagonal	Wheel	Fault	Repair advice note	Remark
- 10	- 0	ABS-Solenoid valve (outlet, third axle)	1	R/L	Damaged wiring	E	
- 10	- 1	ABS-Solenoid valve (outlet, third axle)	2	R/R			
- 10	- 2	ASR-Diff. -Valve	1	R/L	Short to ground	F	
- 10	- 3	ASR-Diff. -Valve	2	R/R			
- 10	- 4	ASR-Diff. -Valve	1	R/L	Damaged wiring	E	
- 10	- 5	ASR-Diff. -Valve	2	R/R			
- 10	- 7	3rd Brake Relay (PIN 11)	2	-	Short to battery plus	G	
- 10	- 8	ASR engine prop.-v. control (pin 12) or ASR-E-Gas interface	1	-	Permitted activation time (continuous) has been exceeded, i.e. excessive drive slip	K	
- 10	- 9		2	-			
- 11	- 12	ABS-Solenoid valve (steer axle)	1	F/R	Short to battery plus	L	
- 11	- 13	ABS-Solenoid valve (steer axle)	2	F/L			
- 11	- 14	ABS-Solenoid valve (drive axle)	1	R/L	Short to battery plus	L	
- 11	- 15	ABS-Solenoid valve (drive axle)	2	R/R			
- 12	- 0	ABS-Solenoid valve (third axle)	1	R/L	Short to battery plus	L	
- 12	- 1	ABS-Solenoid valve (third axle)	2	R/R			
- 12	- 2	ASR-Diff. -Valve	1	R/L	Short to battery plus	L	
- 12	- 3	ASR-Diff. -Valve	2	H/R			
- 12	- 4	ASR-Prop. -Valve	1	-	Short to battery plus	L	
- 12	- 7	3rd Brake Relay (PIN 11)	2	-	Short to ground	F	
- 12	- 8	ABS-Solenoid valve (steer axle)	1	F/R	Short to battery plus	G	
- 12	- 9		2	F/L			
- 12	- 10	ABS-Solenoid valve (drive axle)	1	R/L	Short to battery plus	G	
- 12	- 11		2	R/R			
- 12	- 12	ABS-Solenoid valve (third axle)	1	R/L	Short to battery plus	G	
- 12	- 13		2	R/R			
- 12	- 14	ASR-Diff. -Valve (drive axle)	1	R/L	Short to battery plus	G	
- 12	- 15		2	R/R			

Fault Block 1	Fault Block 2	Components	Dia-gonal	Wheel	Fault	Repair advice note	Remark
- 13	- 0	ASR-Prop. -Valve (PIN 12)	1	-	Short to battery plus	G	
- 13	- 4	Relay (VR1)	1	-	Relay does not switch	M	
- 13	- 5	Relay (VR2)	2	-			
- 13	- 6	ECU	1	-	ECU-internal fault	H	
- 13	- 7	ECU	2	-			
- 13	- 8	ECU	1	-	Overvoltage	N	
- 13	- 9	ECU	2	-			
- 13	- 10	ECU	1	-	ECU-internal fault	H	
- 13	- 11	ECU	2	-			
- 13	- 12	ECU	1	-	ECU-internal fault	H	
- 13	- 13	ECU	2	-			
- 13	- 14	ECU	1	-	ECU-internal fault	H	
- 13	- 15	ECU	2	-			
- 14	- 0	ECU	1	-	ECU-internal fault	H	
- 14	- 1	ECU	2	-			
- 14	- 2	ECU	1	-	ECU-internal fault	H	
- 14	- 3	ECU	2	-			
- 14	- 4	ECU	1	-	ECU-internal fault	H	
- 14	- 5	ECU	2	-			
- 14	- 6	ABS-Solenoid valve	1	-	Permitted activat. time (continuous) has been exceeded	K	
- 14	- 7	ABS-Solenoid valve	2	-			
- 14	- 8	ASR Diff. -Valve	1	R/L			
- 14	- 9	ASR Diff. -Valve	2	R/R			
- 14	- 10	ECU	1	-	ECU-internal fault	H	
- 14	- 11	ECU	2	-			
- 14	- 12	ECU	1	-	ECU-internal fault	H	
- 14	- 13	ECU	2	-			
- 14	- 14	ECU	1	-	ECU-internal fault	H	
- 14	- 15	ECU	2	-			
- 15	- 0	ECU	1	-	ECU-internal fault	H	
- 15	- 1	ECU	2	-			
↓	↓	↓			↓	H	
- 15	- 8	ECU	1	-	ECU-internal fault	H	
- 15	- 9	ECU	2	-			

The following repair instructions should make fault-finding and repair somewhat easier.

step test or Diagnostic Controller should be used. The vehicle wiring here tested is in accordance with WABCO wiring diagram (see Fig. 11).

To trace the reason for the fault, the WABCO step-by-

Repair Instr.	Fault	Explanation
A	Undervoltage: voltage measured at pin 1, 9 or 19 is too low (valve relay does not switch)	Check wiring and supply voltage. Possible blown fuse. Possible faulty relay(s).
B	Loss of wheel-speed signal (interruption)	Check sensor wiring and connectors for intermittent contact or for short-circuit.  Measure sensor voltage and compare with required value in Step-by-step list.  Toothed-wheel/sensor installation: check toothed-wheel for damage, check air-gap, bearing-play and sensor location.
C	Incorrect impedance (interruption or short circuit)	Check wiring e.g. sensor (note temperature) for intermittent-contact.
D	Implausible wheel-speed signal	Measure sensor voltage and compare with required value in Step-by-step list.  – air gap between sensor and toothed wheel too large (check play in wheel bearing)  – difference in toothed-wheel teeth number or in tyre-size
E	Broken cable	The connection between ECU and the component is temporarily or permanently interrupted.  Impedance value: check wiring e.g. intermittent contact
F	Short to ground	The ECU output is temporarily or permanently shorted to ground.  Impedance value: check vehicle wiring.
G	Short-circuit to battery supply (reversed supply)	The ECU output, or the connected component is short-circuited to battery supply.
H	ECU-internal fault	Replace the Electronic Control Unit.
I	Faulty data from E-Gas / EDC-ECU	– Use the specific diagnosis recommended by the E-Gas manufacturer  – Test the interface for interruption  – Loss of data transmission  – Signal not manufacturer-specific

Repair Instr.	Fault	Explanation
K	Duty cycle exceeded excess time, e.g. excessive drive slip Double air gap at front axle  N.B. MAY RESULT FROM ROLLING-ROAD WORK!	Permanent, inadmissible drive-slip on the drive-axle (i.e. longer than 60 seconds).  Check function of the engine-control actuator (e.g. prop.-valve, servo motor) check also air gaps at front axle, tyre-sizes and toothed wheel teeth number.
L	Short to battery supply	The overvoltage on the component in question prevents the valve-relay to which it is connected from switching.  Amplifier and pin 1/19 or amplifier inlet/outlet valves are short-circuited together or break-down of the amplifier.  The amplifier could be switched via the Diagnostic Controller. Check wiring!
M	Relay does not open	Voltage should be measured on pin 1 or 19, since relay cannot switch.  The closed relay does not open (e.g. sticking contacts) due to outside influence on pins 1, 19 or short-circuit to ground on pins 25/8 or pins 8 and 25 are swapped.  Check relay operation!
N	Overvoltage	<ul style="list-style-type: none"> <li>– Supply voltage is greater than 32 volts for more than 5 seconds.</li> <li>– Check alternator and battery.</li> </ul>

**N.B.**

If after an intensive search no fault can be found in the system, the ECU could be defective.

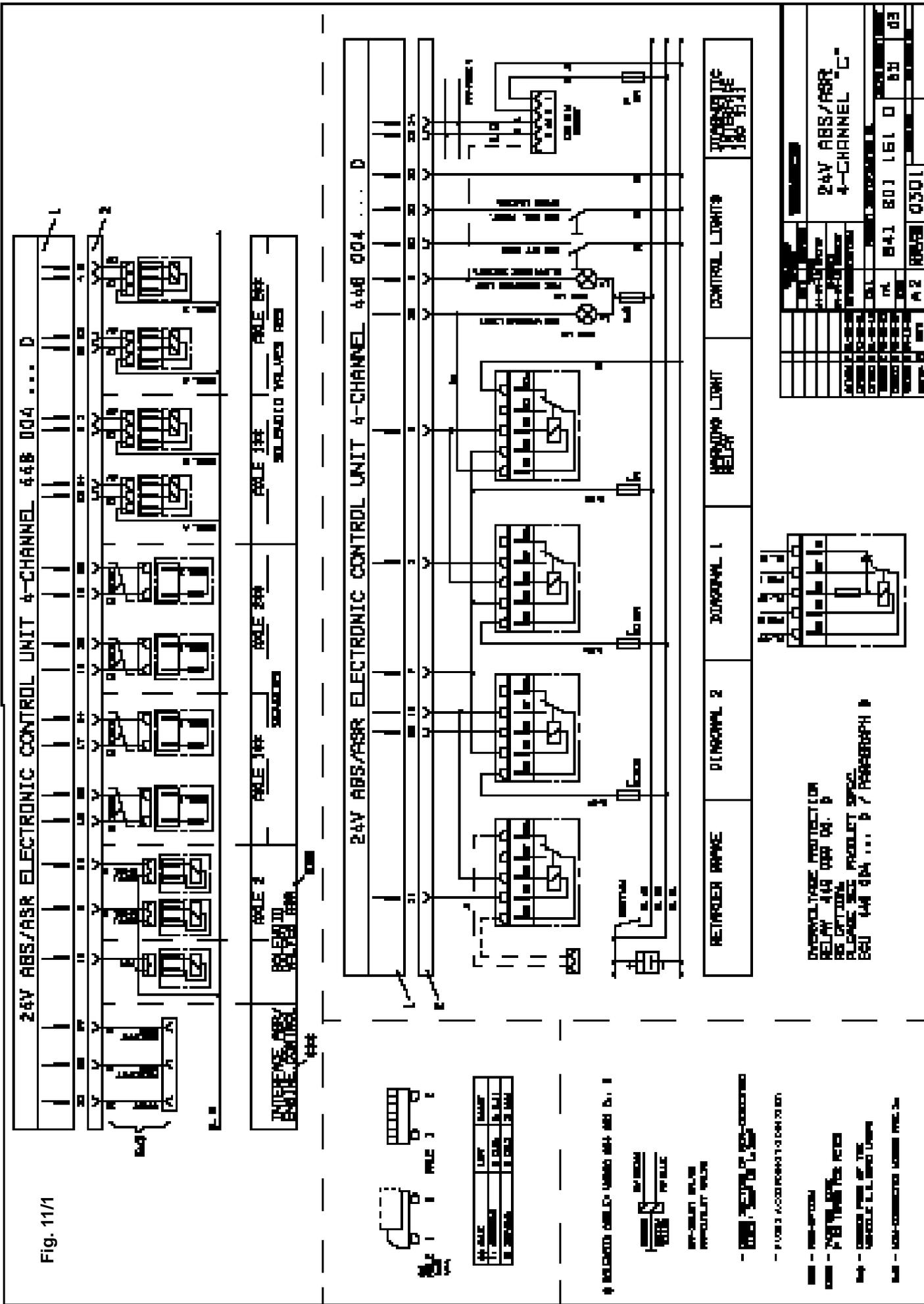


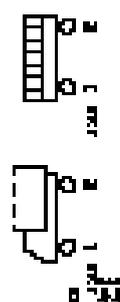
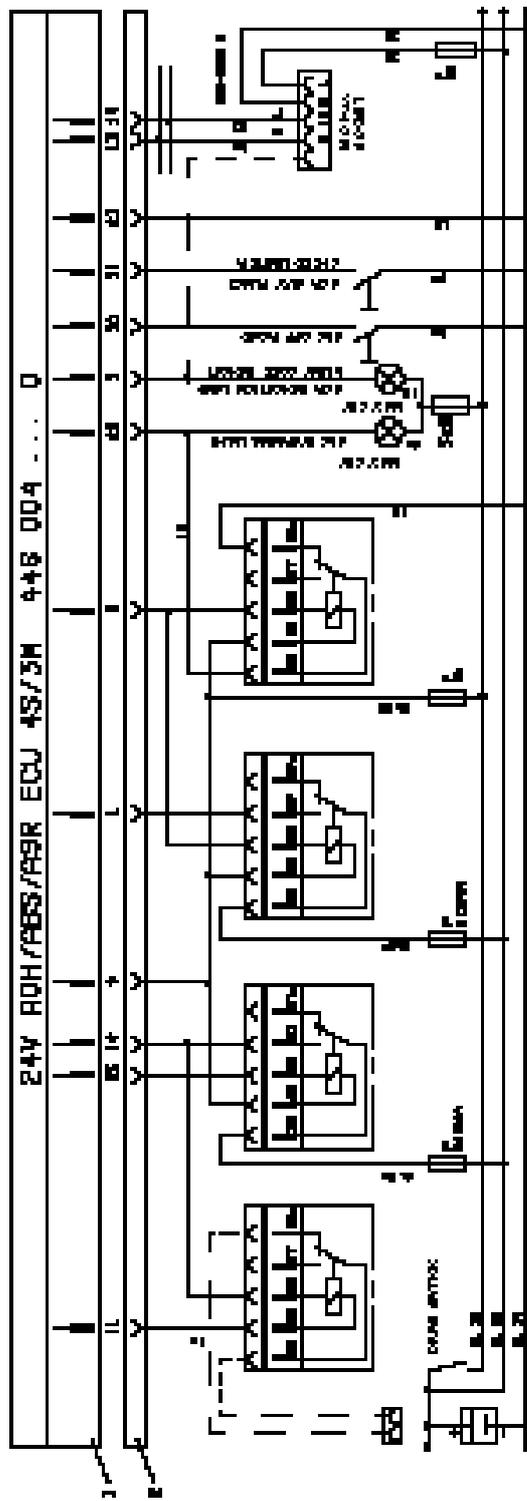
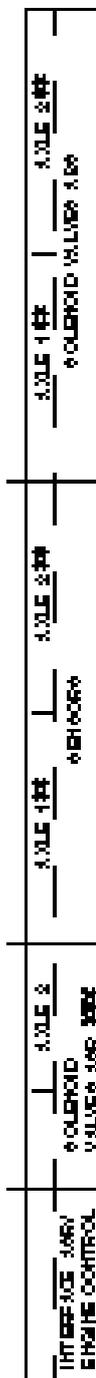
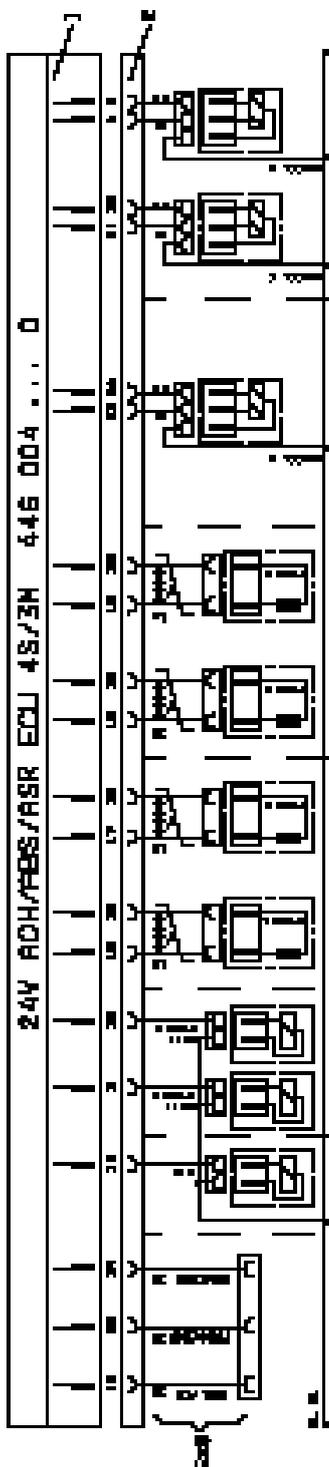
Fig. 11/1

SOLENOID VALVE	RELAY	WIRING
1	1	1
2	2	2
3	3	3
4	4	4
5	5	5
6	6	6
7	7	7
8	8	8
9	9	9
10	10	10
11	11	11
12	12	12
13	13	13
14	14	14
15	15	15
16	16	16
17	17	17
18	18	18
19	19	19
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88	88	88
89	89	89
90	90	90
91	91	91
92	92	92
93	93	93
94	94	94
95	95	95
96	96	96
97	97	97
98	98	98
99	99	99
100	100	100

DISCONNECT PROTECTION RELAY 448 004 04. B  
 AS OPTIONAL  
 PLEASE SEE PRODUCT SPEC.  
 448 004 004 ... B / PARAGRAPH 8

WIRING	DIAGRAM	WIRING	DIAGRAM	WIRING	DIAGRAM
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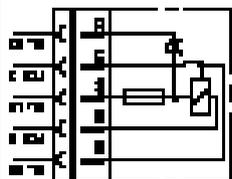
Fig. 11/2



RELAY	WIRING	FUNCTION
1	24V	START
2	24V	STOP
3	24V	STOP
4	24V	STOP
5	24V	STOP
6	24V	STOP
7	24V	STOP
8	24V	STOP
9	24V	STOP
10	24V	STOP
11	24V	STOP
12	24V	STOP
13	24V	STOP
14	24V	STOP
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40	24V	STOP
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43	24V	STOP
44	24V	STOP
45	24V	STOP
46	24V	STOP
47	24V	STOP
48	24V	STOP
49	24V	STOP
50	24V	STOP

- 1 - 24V SUPPLY
- 2 - 24V SUPPLY
- 3 - 24V SUPPLY
- 4 - 24V SUPPLY
- 5 - 24V SUPPLY
- 6 - 24V SUPPLY
- 7 - 24V SUPPLY
- 8 - 24V SUPPLY
- 9 - 24V SUPPLY
- 10 - 24V SUPPLY
- 11 - 24V SUPPLY
- 12 - 24V SUPPLY
- 13 - 24V SUPPLY
- 14 - 24V SUPPLY
- 15 - 24V SUPPLY
- 16 - 24V SUPPLY
- 17 - 24V SUPPLY
- 18 - 24V SUPPLY
- 19 - 24V SUPPLY
- 20 - 24V SUPPLY
- 21 - 24V SUPPLY
- 22 - 24V SUPPLY
- 23 - 24V SUPPLY
- 24 - 24V SUPPLY
- 25 - 24V SUPPLY
- 26 - 24V SUPPLY
- 27 - 24V SUPPLY
- 28 - 24V SUPPLY
- 29 - 24V SUPPLY
- 30 - 24V SUPPLY
- 31 - 24V SUPPLY
- 32 - 24V SUPPLY
- 33 - 24V SUPPLY
- 34 - 24V SUPPLY
- 35 - 24V SUPPLY
- 36 - 24V SUPPLY
- 37 - 24V SUPPLY
- 38 - 24V SUPPLY
- 39 - 24V SUPPLY
- 40 - 24V SUPPLY
- 41 - 24V SUPPLY
- 42 - 24V SUPPLY
- 43 - 24V SUPPLY
- 44 - 24V SUPPLY
- 45 - 24V SUPPLY
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- 47 - 24V SUPPLY
- 48 - 24V SUPPLY
- 49 - 24V SUPPLY
- 50 - 24V SUPPLY

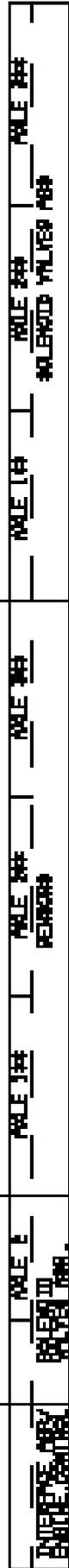
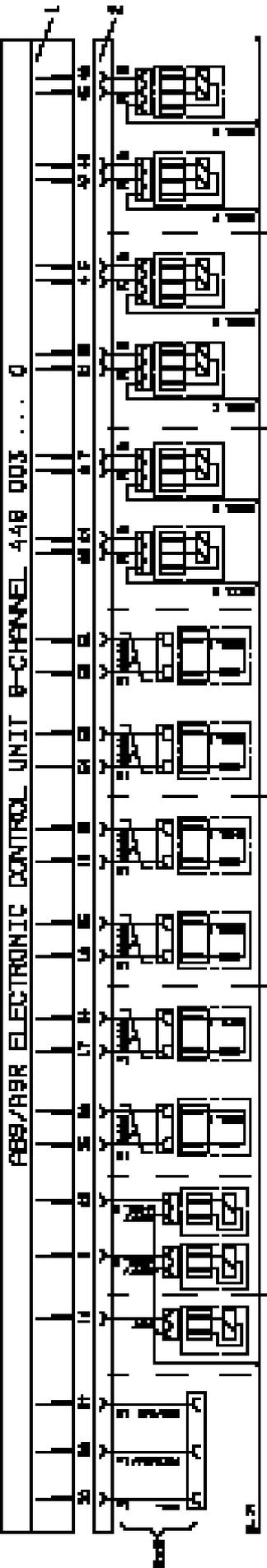
RELAY	WIRING	FUNCTION
1	24V	START
2	24V	STOP
3	24V	STOP
4	24V	STOP
5	24V	STOP
6	24V	STOP
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8	24V	STOP
9	24V	STOP
10	24V	STOP
11	24V	STOP
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20	24V	STOP
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38	24V	STOP
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43	24V	STOP
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47	24V	STOP
48	24V	STOP
49	24V	STOP
50	24V	STOP



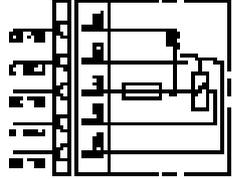
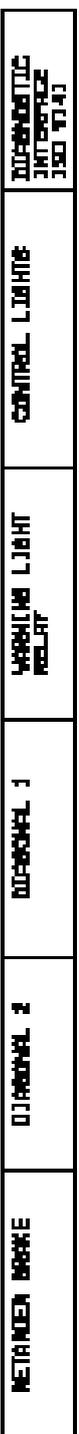
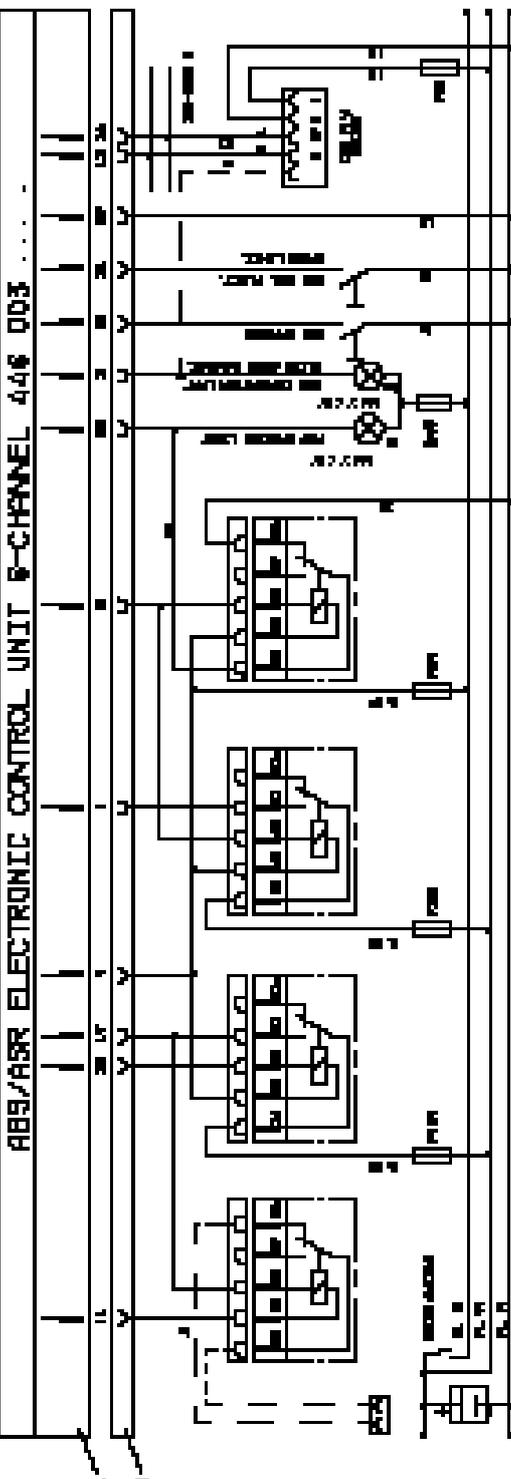
OVERVOLTAGE PROTECTION  
 RELAY #12 (24V) ... 0  
 3.0 OPTION  
 PLEASE SEE PRODUCT #450.  
 ECU 446 004 ... 0 / PARTSBOOK 2

RELAY	WIRING	FUNCTION
1	24V	START
2	24V	STOP
3	24V	STOP
4	24V	STOP
5	24V	STOP
6	24V	STOP
7	24V	STOP
8	24V	STOP
9	24V	STOP
10	24V	STOP
11	24V	STOP
12	24V	STOP
13	24V	STOP
14	24V	STOP
15	24V	STOP
16	24V	STOP
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18	24V	STOP
19	24V	STOP
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37	24V	STOP
38	24V	STOP
39	24V	STOP
40	24V	STOP
41	24V	STOP
42	24V	STOP
43	24V	STOP
44	24V	STOP
45	24V	STOP
46	24V	STOP
47	24V	STOP
48	24V	STOP
49	24V	STOP
50	24V	STOP

ABS/ASR ELECTRONIC CONTROL UNIT 8-CHANNEL 448 003 ... 0



ABS/ASR ELECTRONIC CONTROL UNIT 8-CHANNEL 448 003 ... 0



OVERVOLTAGE PROTECTION  
RELAY 448 008 004 0  
AS OPTION  
PLEASE SEE PRODUCT SPEC.  
ECU 448 004 ... 0 / PARTS LIST II

- ###- ABS-ASR
- ####- WHEEL SPEED SENSORS
- ###- WHEEL VALVES
- ###- WHEEL SPEED SENSORS
- ###- WHEEL VALVES

Fig. 11/3

ABS/ASR  
8-CHANNEL

WABCO	448 003 000 0	041 80J 160 0	80	03
WABCO	448 003 000 0	041 80J 160 0	80	03
WABCO	448 003 000 0	041 80J 160 0	80	03
WABCO	448 003 000 0	041 80J 160 0	80	03
WABCO	448 003 000 0	041 80J 160 0	80	03
WABCO	448 003 000 0	041 80J 160 0	80	03
WABCO	448 003 000 0	041 80J 160 0	80	03
WABCO	448 003 000 0	041 80J 160 0	80	03
WABCO	448 003 000 0	041 80J 160 0	80	03
WABCO	448 003 000 0	041 80J 160 0	80	03

**NOTES**