

B. Basic and national version Standard (CH) (S) (I)
(KE designation: KE II)

Engine 102.962 Standard (CH) (S) **with A/C compressor**

Engine 102.962 NV KAT (RÜF)

Engine 102.963 (I)

Engine 102.982 Standard (CH) (S)

Engine 102.983 Standard

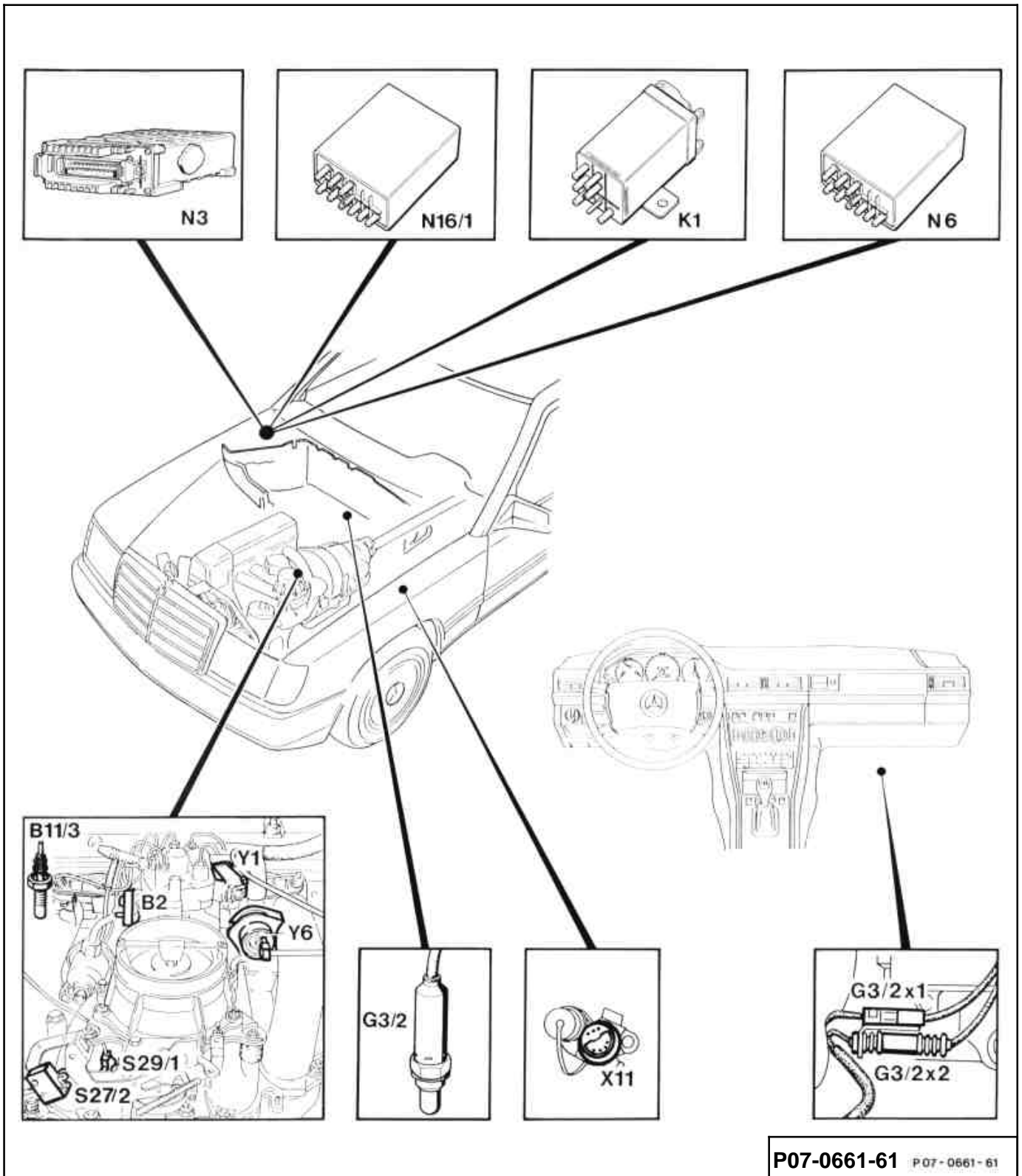
Engine 102.985 Standard

- a) Model survey
- b) Arrangement of components
- c) Electrical test data
- d) Wiring diagrams
- e) Pin assignment of KE control unit coupling (N3)
- f) Special tools, commercially available tools
- g) Connecting testers according to connection diagram
- h) Test programme with contact box
- i) Table of voltage values for coolant temperature sensor (B11/3)
- j) Testing decel fuel shutoff

a) Model survey

Model	Engine	Version	Production year/ model year
124.021	102.963	(I)	up to 09/88
124.023	102.982	Standard	12/84-09/86
		(CH)	1985, 1986
		(S)	1985-1987
201.024	102.962	Standard with A/C compressor	09/84-09/86
		NV (KAT/RÜF)	09/84-09/85
		(CH) with A/C compressor	1986
		(S) with A/C compressor	1986, 1987
201.028	102.985	Standard	09/85-09/86
201.034	102.983	Standard	09/83-09/85

b) Arrangement of components



B2 Air flow sensor potentiometer
 B11/3 Coolant temperature sensor
 (B11/2) on Engine 102.983:

N3 KE control unit
 N6 Compressor cutoff control unit
 N16/1 Fuel pump relay

	see section i)		
G3/2	only Engine 102.962 NV (KAT/RÜF): heated oxygen sensor	S27/2	Decel fuel shutoff microswitch
		S29/1	Full load detection throttle valve switch (S29/2 on Engine 102.983 with full load and idle speed detection and (CH) (S))
G3/2x1	only Engine 102.962 NV (KAT/RÜF): oxygen sensor heating coil plug connection		
G3/2x2	only Engine 102.962 NV (KAT/RÜF): oxygen sensor signal plug connection	X11	Diagnosis socket/terminal block, terminal TD
		Y1	Electrohydraulic actuator
K1	Overvoltage protection relay	Y6	Idle speed air valve (3-pin connection)

c) Electrical test data (current at actuator in mA)

Engine	Version	Current at actuator with ignition switched on (mA)	Coolant temperature sensor		Post-start enrichment Post-start at +20 °C	Acceleration enrichment Coolant temperature +20 °C and blipping throttle	Full load correction at approx. 2000/min	Part load mixture adaptation
			Coolant temperature +20 °C (warming-up base value) Resistance 2.3-2.8 kΩ	Coolant temperature +80 °C Resistance 290-370 Ω				
102.962	Std. (CH) (S)	-1)	11-15	0	20-28	>15	5-7	-
	NV (RÜF/KAT)		9-14	7-9		9-14	7-9	
102.963	Std. (I)		11-15	0	20-28	>15	5-7	-
102.982 102.985	Std. (CH) (S)		15-19					
102.983	Std.							25-32

Decel fuel shutoff: current at actuator approx. -60 mA

1) 75-85 mA with coolant temperature sensor coupling disconnected

d) Wiring diagrams

The wiring diagrams are assigned to the relevant wiring diagram volume according to the model.

Model 124 up to 08/89

Volume 3 Wiring diagrams -
vehicle wiring diagrams.

Volume 3.1 Wiring diagrams -
single wiring diagrams.

Model 124 as of 09/89 up to 09/92

Volume 4 Wiring diagrams -
vehicle wiring diagrams.

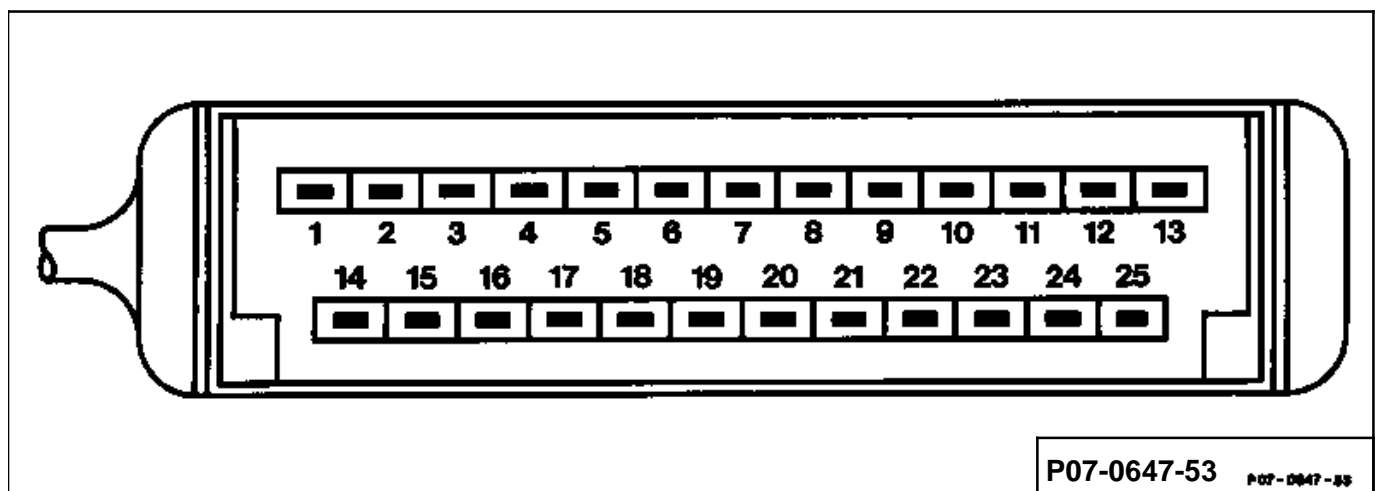
Volume 4.1 Wiring diagrams -
single wiring diagrams.

Model 201

Volume 5 Wiring diagrams -
vehicle wiring diagrams.

Volume 5.1 Wiring diagrams -
single wiring diagrams.

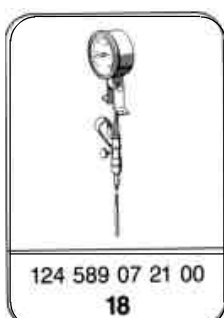
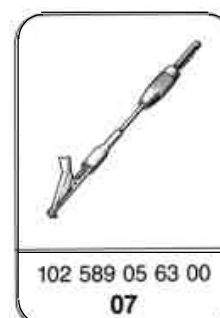
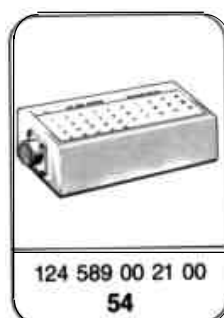
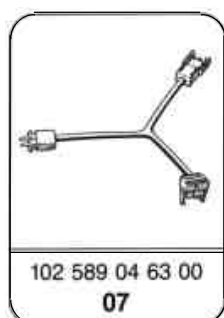
e) Pin assignment of KE control unit coupling (N3)



1	Overvoltage protection relay contact 2 (K1 or K1/1), terminal 87 or terminal 87E	16	Model 124 with manual transmission: Engine ground (W11) ⓐ main ground (W1) via interior/engine plug connection (X26), contact 10
2	Engine ground (W11)		Model 124 with automatic transmission: Interior/engine plug connection (X26), contact 10, gear detection
3	Idle speed air valve (Y6), contact 3		Model 201 with manual transmission: Battery ground (W10)
4	Idle speed air valve (Y6), contact 1		Engine 102.983: not assigned
5	Throttle valve switch (S29/1 or S29/2), full load detection		Model 201 with automatic transmission: taillamp wiring harness plug connection, 2-pin (X18)
6	Cruise control plug connection (X33)	17	Air flow sensor potentiometer (B2), contact 2
7	not assigned	18	Air flow sensor potentiometer (B2), contact 3
8	not assigned	19	Compressor shutoff control unit (N6), contact 4: 102.962 Std. ⓐ ⓑ 102.962/982 contact 7: 102.982, 102.962 ⓓ
9	Engine 102.962 NV KAT (RÜF): ground from connector 7 is linked internally to ground of connector 2	20	102.962 NV KAT (RÜF)
10	Fuel pump relay (N16/1, N16/2, N16/3, N16/4) contact 2, TF signal	21	Battery ground (W10)
11	Electrohydraulic actuator (Y1), contact 2	22	Coolant temperature sensor
12	not assigned	23	not assigned
13	Electrohydraulic actuator (Y1), contact 1		Engine 102.962 NV KAT (RÜF): diagnosis socket (X11), contact 3 via headlamp wiring harness plug connection
14	Decel fuel shutoff microswitch (S27/2), contact 1, idle speed detection	24	Fuel pump relay (N16/1, N16/2) contact 12, terminal 50 (start detection)
15	Air flow sensor potentiometer (B2), contact 1	25	Fuel pump relay (16/1, N16/2) contact 10, TD signal
	Ground (W10 or W11)		
	Engine 102.962 NV KAT (RÜF): not assigned		

f) Special tools, commercially available tools

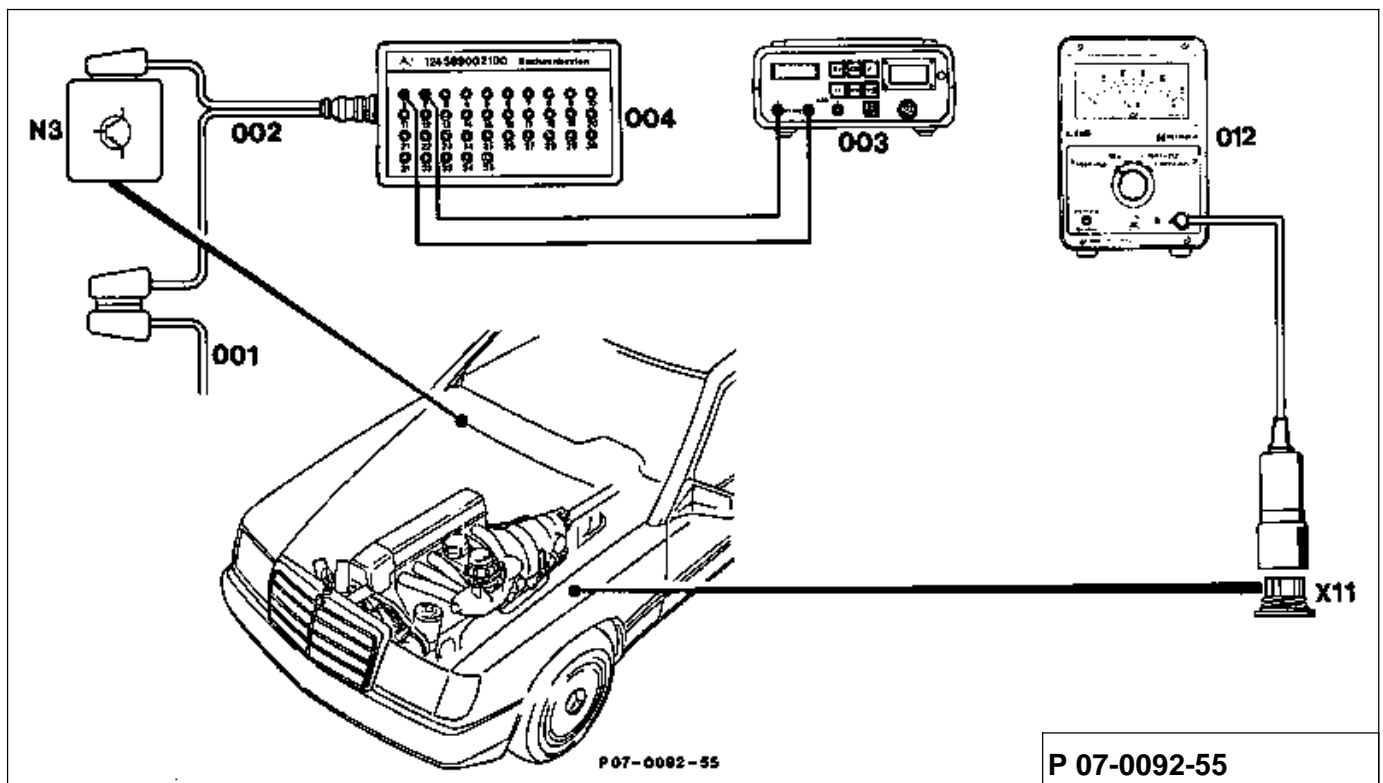
Special tools



Commercially available tools

Multimeter	e. g. Sun, DMM-5
Twin socket	e. g. Hermann, ECD 53
Lambda control tester	e. g. Hermann, L 115
Engine tester	e. g. Bosch, MOT 002.02

g) Connecting testers according to connection diagram



001	KE control unit coupling	033	Test cable 102 589 04 63 00
002	Test cable	N3	KE control unit
003	Multimeter	X11	Diagnosis socket
004	Contact box		
012	Lambda control tester (only for engine 102.962 NV KAT)		






Note

Engine 102.962 NV KAT

Set lambda control via control value (volts) by connecting lambda control tester or multimeter ("volts" position) to diagnosis socket.

h) Test programme with contact box

Key to symbols

	Contact box
	Battery
	Multimeter
	Contact
	Connector



Voltage measurement (volts, direct voltage)



Current measurement (amperes, direct voltage)









Resistance measurement (ohms)



Note

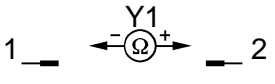
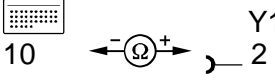
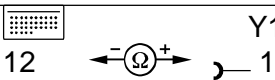
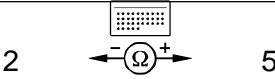
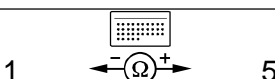
If the specified value of a test step, e. g. step 4.0, is in order, it is not necessary to perform test step 4.1.



Different component designations are possible depending on wiring diagram or in the case of vehicles fitted with optional equipment. These designations are given in parentheses.

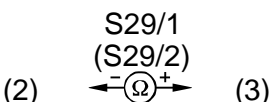
On/off ratio readout	Test step/ Test scope	Test connection	Operation/ Requirement	Specifi- cation	Possible cause/Remedy
-	1.0 Ground	 2  + 	Ignition: ON	11-14 V	Loose ground connection, cable has open circuit
-	2.0 Ground	 15  + 	Ignition: ON	11-14 V	Loose ground connection (W11), cable has open circuit
On/off ratio readout	Test step/ Test scope	Test connection	Operation/ Requirement	Specifi- cation	Possible cause/Remedy

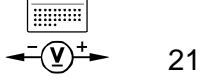
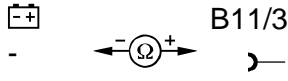
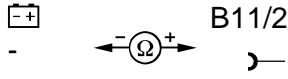
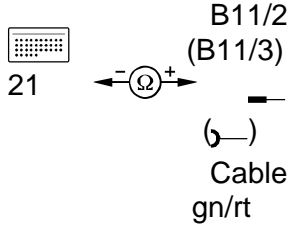
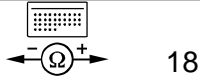
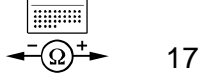
-	3.0 Supply voltage from (N3), terminal 15		Ignition: ON	11-14 V	Fuse in overvoltage protection, overvoltage protection faulty or not connected. Cable to contact 1 (terminal 30) has open circuit. Actuation of contact 3 (terminal 15) has open circuit. Cable from contact 2 (terminal 87 or 87E) to (N3) contact 1 has open circuit
	3.1 Cable terminal 30		Ignition: OFF Overvoltage protection disconnected	11-14 V	Cable has open circuit
	3.2 Cable terminal 15		Ignition: ON Overvoltage protection disconnected	11-14 V	Cable has open circuit
	3.3 Cable terminal 87 or 87E		Ignition: OFF Overvoltage protection disconnected	<1 Ω	Cable has open circuit
	3.4 Cable terminal 31 (ground)		Ignition: OFF Overvoltage protection disconnected	<1 Ω	Cable has open circuit
On/off ratio readout	Test step/ Test scope	Test connection	Operation/ Requirement	Specifi- cation	Possible cause/Remedy

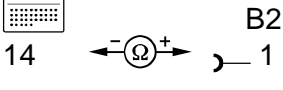
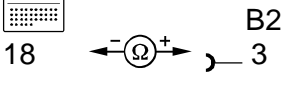
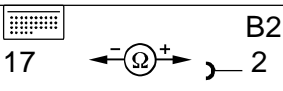
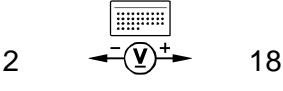
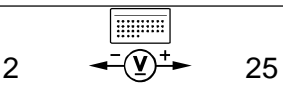
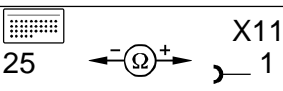
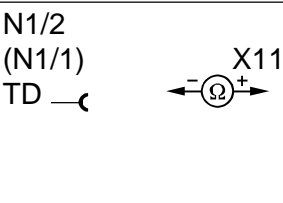
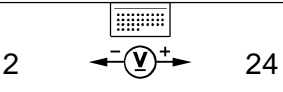
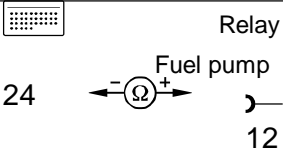
-	4.0 Current at actuator	 set to A	Connect test cable 102 545 04 63 00 to actuator. Ignition: ON Coupling at coolant temperature sensor disconnected 20 °C simulated with test resistance Additionally coupling of decel fuel shutoff microswitch (S27/2) disconnected. Start engine and blip throttle Coupling of throttle valve switch (full load contact) bridged. Coupling of decel fuel shutoff microswitch (S27/2) disconnected. Start engine	75-85 mA see table section c), warming-up base value see table, acceleration enrichment see table, full load correction at 2000/ min	Electrohydraulic actuator Wiring KE control unit Air flow sensor potentiometer, see test step 8.0
On/off ratio readout	Test step/ Test scope	Test connection	Operation/ Requirement	Specifi- cation	Possible cause/Remedy
-	5.0 Electrohydraulic actuator	10  12	Ignition: OFF Disconnect test cable. Coupling at KE control unit disconnected	19.5 ±1 Ω	Electrohydraulic actuator Wiring

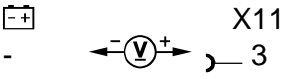
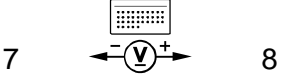
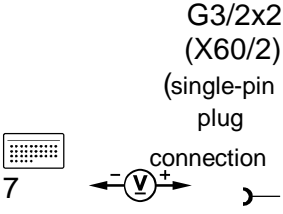
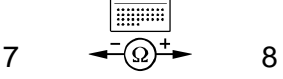
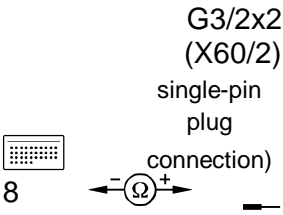
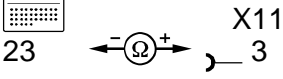
	5.1 Electrohydraulic actuator		Coupling at (Y1) disconnected	19.5 ±1 Ω	Replace electrohydraulic actuator
	5.2 Cable			<1 Ω	Cable has open circuit
	5.3 Cable			<1 Ω	Cable has open circuit
-	A 6.0 ¹⁾ Full load contact		Ignition: OFF Coupling at KE control unit disconnected	∞	Full load contact Wiring (to ground) Engine 102.983: incorrect polarity of coupling (S29/2x, X56)
			Accelerator in full load position	<1 Ω	
	B 6.0 ²⁾ Full load contact		Ignition: OFF Coupling at KE control unit disconnected	∞	Full load contact Wiring (to terminal 15)
			Accelerator in full load position	<1 Ω	

- 1) Only Standard versions (without 102.962 NV KAT (RÜF)) national versions   see wiring diagrams
2) Only engine 102.962 NV KAT (RÜF)

On/off ratio readout	Test step/ Test scope	Test connection	Operation/ Requirement	Specifi- cation	Possible cause/Remedy
-	6.1 Full load contact		Coupling of throttle valve switch plug connection disconnected	∞	Set or replace throttle valve switch
			Accelerator in full load position	<1 Ω	

-	7.0 Coolant temperature sensor	2  21	Engine idling (at operating temperature). KE control unit connected	At +80 °C 0.29-0.35 V other values see table section i)	Coolant temperature sensor Wiring
	A 7.1 Coolant temperature sensor 1-pin	 B11/3	Coupling at temperature sensor disconnected	Ω value see table section i)	Replace coolant temperature sensor
	B 7.1 Coolant temperature sensor 2-pin	 B11/2	Both couplings at temperature sensor disconnected (measure both contacts)	Ω value see table section i)	Replace coolant temperature sensor
	7.2 Cable	 B11/2 (B11/3) 21 Cable gn/rt		<1 Ω	Cable has open circuit
On/off ratio readout	Test step/ Test scope	Test connection	Operation/ Requirement	Specifi- cation	Possible cause/Remedy
-	8.0 Air flow sensor potentiometer	14  18	Ignition: OFF KE control unit disconnected		Replace or set air flow sensor potentiometer Wiring KE control unit
		14  17	Air flow sensor plate in zero position	3.2-4.8 kΩ	
			Air flow sensor plate in zero position	560-840 Ω	
			Air flow sensor plate deflected	3.8-5.6 kΩ	

	8.1 Cable		Ignition: OFF measure at coupling (B2)	<1 Ω	Cable has open circuit
	8.2 Cable			<1 Ω	Cable has open circuit
	8.3 Cable			<1 Ω	Cable has open circuit
	8.4 KE control unit		Ignition: ON KE control unit connected	7.4- 8.6 V	Replace KE control unit
On/off ratio readout	Test step/ Test scope	Test connection	Operation/ Requirement	Specifi- cation	Possible cause/Remedy
-	9.0 TD signal		Engine idling (operating temperature) KE control unit connected	6-12 V	Ignition control unit Wiring
	9.1 Cable		Ignition: OFF	<1 Ω	Cable has open circuit
	9.2 Cable		Coupling (TD signal) at ignition control unit disconnected 1	<1 Ω	Cable has open circuit
	10.0 Terminal 50 (start detection)		Starter: ON Selector lever of automatic transmission in position "P" or "N"	11-14 V	Cable
	10.1 Cable		Ignition: OFF	<1 Ω	Cable has open circuit

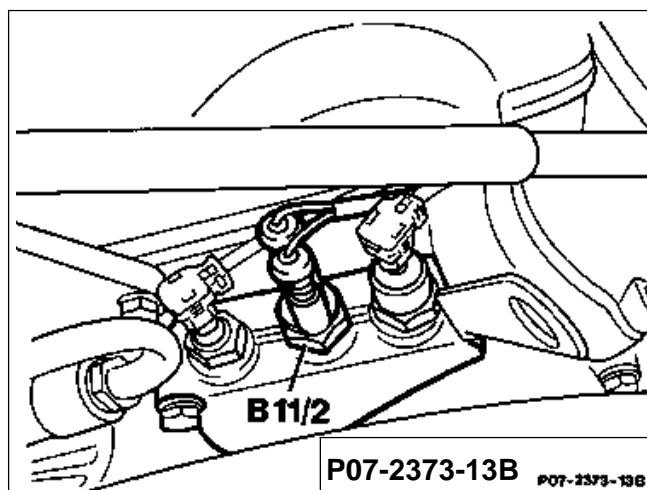
-	11.0 Lambda control (only engine 102.962 NV KAT)		Engine idling (at operating temperature) KE control unit connected	2.1-4.8 V Readout fluctuates	Set lambda control via control value, see Op. No. 07.3-110 Oxygen sensor Wiring
On/off ratio readout	Test step/ Test scope	Test connection	Operation/ Requirement	Specifi- cation	Possible cause/Remedy
-	11.1 Oxygen sensor		Engine idling (operating temperature) KE control unit connected	fluctuates between 0.1-0.9 V	Oxygen sensor Wiring
	11.2 Oxygen sensor		Engine idling (operating temperature) Separate plug connection (G3/2x2) and place connector to ground (lean simulation)	>450 mV	Replace oxygen sensor
	11.3 Cable		Ignition: OFF Coupling at KE control unit disconnected	∞	Cable faulty
	11.4 Cable			<1 Ω	Cable has open circuit
	11.5 Cable			<1 Ω	Cable has open circuit

i) Table of voltage values of coolant temperature sensor (B11/3)

Temperature in °C	Resistance	Voltage at contact 21 coolant (volts)
-20	15.7 kΩ	3.24-3.94
-10	9.2 kΩ	2.84-3.47
0	5.9 kΩ	2.39-2.93
10	3.7 kΩ	1.94-2.37
20	2.5 kΩ	1.51-1.84
30	1.7 kΩ	1.16-1.42
40	1.18 kΩ	0.88-1.08
50	840 Ω	0.66-0.80
60	600 Ω	0.50-0.61
70	435 Ω	0.38-0.46
80	325 Ω	0.29-0.35
90	247 Ω	0.22-0.26

Engine 102.983

Arrangement of coolant temperature sensor (B11/2).

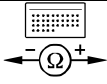
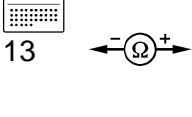
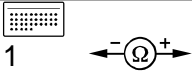

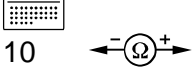
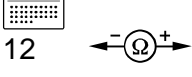
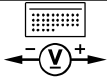
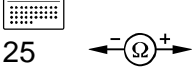


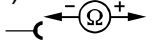
j) Testing decel fuel shutoff

Connection diagram of contact box, see section g)

On/off ratio readout	Test step/ Test scope	Test connection	Operation/ Requirement	Specifi- cation	Possible cause/Remedy

-	1.0 Decel fuel shutoff		Engine speed >3000 (engine at operating temperature) KE control unit connected Operate decel fuel shutoff microswitch (S27/2) by hand	Engine surges	Decel fuel shutoff microswitch Wiring KE control unit Check throttle control (Op. No. 30-300)
	1.1 Micro-switch		Coupling at microswitch disconnected Depress accelerator	<1 Ω ∞	Replace microswitch
	A 1.1.1 Decel fuel shutoff microswitch (S27/2) (without engine 102.962 NV KAT/RÜF)		Ignition: OFF Depress accelerator	<1 Ω ∞	Wiring
	A 1.1.2 Cable			<1 Ω	Cable has open circuit
	A 1.1.3 Cable			<1 Ω	Cable has open circuit to ground (W11)
On/off ratio readout	Test step/ Test scope	Test connection	Operation/ Requirement	Specifi- cation	Possible cause/Remedy

-	B 1.1.1 Decel fuel shutoff microswitch (S27/2) (only engine 102.962 NV KAT/RÜF)	1  13	Ignition: OFF Depress accelerator	<1 Ω ∞	Wiring
	B 1.1.2 Cable	 S27/2 13	gr/sw	<1 Ω	Cable has open circuit
	B 1.1.3 Cable	 S27/2 1	gr	<1 Ω	Cable has open circuit to terminal 15
	1.2 Current at actuator	 set to A	Connect test cable 102 545 04 63 00 to actuator. Engine speed >3000/ min. Operate decel fuel shutoff microswitch (S27/2) by hand	-60 mA	Wiring TD signal KE control unit
	1.2.1 Cable	 Y1 10	2	<1 Ω	Cable has open circuit
	1.2.2 Cable	 Y1 12	1	<1 Ω	Cable has open circuit
	1.2.3 TD signal	2  25	Engine idling (operating temperature). KE control unit connected	6-12 V	Wiring
On/off ratio readout	Test step/ Test scope	Test connection	Operation/ Requirement	Specifi- cation	Possible cause/Remedy
-	1.2.4 Cable	 X11 25	1	<1 Ω	Cable has open circuit

1.2.5 Cable	N1/2 (N1/1) TD 	X11 1 Coupling (TD signal) at ignition control unit disconnected	<1 Ω	Cable has open circuit
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